FCC REPORT
(BLE)

Applicant:	Dynamox SA
Address of Applicant:	Rodovia Jose Carlos Daux, n 600 KM 01 Modulo 05, Parque Tec. Alfa CEP 88030-090, Florianopolis, SC Brazil
Equipment Under Test (EUT)	
Product Name:	DynaLogger
Model No.:	DynaLogger HF, DynaLogger TcA+
FCC ID:	2AT3M010232
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	05 Jan., 2021
Date of Test:	06 Jan., to 16 Mar., 2021
Date of report issued:	13 May, 2021
Test Result:	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*16 Mar., 2021*	*Original*
01	*07 May, 2021*	*Update page 19, 21, 22*
02	*13 May, 2021*	*Update Section 5.3, 6.6.2, 6.7.2*

Tested by: Mike.ou ***Date:*** *13 May, 2021*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *13 May, 2021*

Project Engineer

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4 Test Summary

Test Items	Section in CFR 47	Test Data	Result
Antenna requirement	15.203 & 15.247 (b)	See Section 6.1	Pass
AC Power Line Conducted Emission	15.207	See Section 6.2	N/A
Conducted Peak Output Power	15.247 (b)(3)	Appendix A - BLE	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Appendix A - BLE	Pass
Power Spectral Density	15.247 (e)	Appendix A - BLE	Pass
Conducted Band Edge	15.247 (d)	Appendix A - BLE	Pass
Radiated Band Edge		See Section 6.6.2	Pass
Conducted Spurious Emission	15.205 & 15.209	Appendix A - BLE	Pass
Radiated Spurious Emission		See Section 6.7.2	Pass

Remark:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not Applicable.*
3. *The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*

Test Method:	*ANSI C63.10-2013* *KDB 558074 D01 15.247 Meas Guidance v05r02*

5 General Information

5.1 Client Information

Applicant:	Dynamox SA
Address:	Rodovia Jose Carlos Daux, n 600 KM 01 Modulo 05, Parque Tec. Alfa CEP 88030-090, Florianopolis, SC Brazil
Manufacturer/Factory:	Dynamox SA
Address:	Rodovia Jose Carlos Daux, n 600 KM 01 Modulo 05, Parque Tec. Alfa CEP 88030-090, Florianopolis, SC Brazil

5.2 General Description of E.U.T.

Product Name:	DynaLogger
Model No.:	DynaLogger HF, DynaLogger TcA+
Operation Frequency:	2402-2480 MHz
Channel numbers:	40
Channel separation:	2 MHz
Modulation technology:	GFSK
Data speed :	2Mbps
Antenna Type:	Internal Antenna
Antenna gain:	5.0 dBi
Power supply:	Non-rechargeable coin lithium battery DC3 V, 1000mAh
Remark:	Model: DynaLogger HF, DynaLogger TcA + BT circuit design, layout, IC, crystal, antenna, components and internal wiring, the only difference is the model name, appearance and peripheral circuit.
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test. Channel No. 0, 20 & 39 were selected as Lowest, Middle and Highest channel.

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode	Keep the EUT in continuous transmitting with modulation
Remark:	Conducted Output Powerand radiated spurious tested models DynaLogger HF, DynaLogger TcA+, It was found that the power of DynaLogger TcA+ was greater than that of DynaLogger HF, so other test Items tested model DynaLogger TcA+.
Radiated Emission: The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.	

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.16 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.20 dB (k=2)

5.6 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.7 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.8 Test Instruments list

Radiated Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	SAEMC	9m*6m*6m	966	07-21-2020	07-20-2021
Loop Antenna	SCHWARZBECK	FMZB1519B	044	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-20-2020	06-19-2021
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2020	11-17-2021
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Pre-amplifier	CD	PAP-1G18	11804	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-05-2020	03-04-2021
				03-05-2021	03-04-2022
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2020	11-17-2021
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-05-2020	03-04-2021
				03-05-2021	03-04-2022
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Cable	MICRO-COAX	MFR64639	K10742-5	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
RF Switch Unit	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	MTS8200	Version: 2.0.0.0		

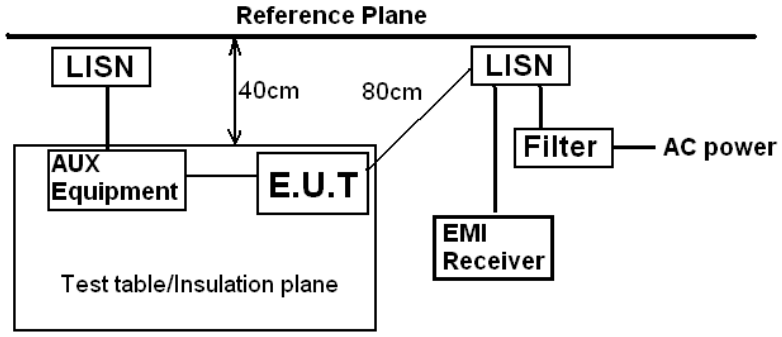
Conducted method:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Spectrum Analyzer	Keysight	N9010B	MY60240202	11-27-2020	11-26-2021
Vector Signal Generator	Keysight	N5182B	MY59101009	11-27-2020	11-26-2021
Analog Signal Generator	Keysight	N5173B	MY59100765	11-27-2020	11-26-2021
Power Detector Box	MWRF-test	MW100-PSB	MW201020JYT	11-27-2020	11-26-2021
Simulated Station	Rohde & Schwarz	CMW270	102335	11-27-2020	11-26-2021
RF Control Box	MWRF-test	MW100-RFCB	MW200927JYT	N/A	N/A
PDU	MWRF-test	XY-G10	N/A	N/A	N/A
Test Software	MWRF-tes	MTS 8310	Version: 2.0.0.0		
DC Power Supply	Keysight	E3642A	MY60296194	11-27-2020	11-26-2021

6 Test results and Measurement Data

6.1 Antenna requirement:

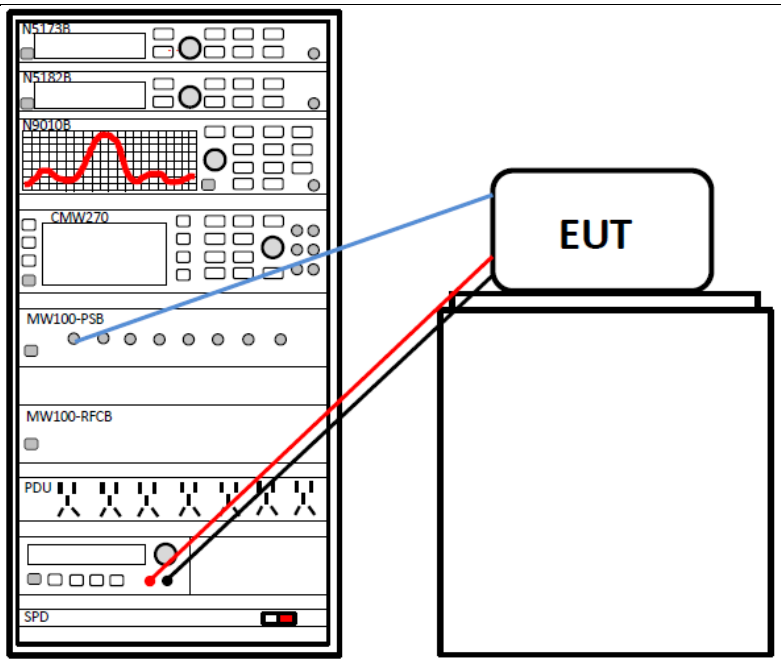
Standard requirement:	FCC Part 15 C Section 15.203 /247(b)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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. 15.247(b) (4) requirement: (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
E.U.T Antenna:	
The BLE antenna is an Internal antenna which cannot replace by end-user, the best-case gain of the antenna is 5.0 dBi.	

6.2 Conducted Emission

<table>
<tr><td>Test Requirement:</td><td colspan="3">FCC Part 15 C Section 15.207</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="3">150 kHz to 30 MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="3">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="3">RBW=9kHz, VBW=30kHz</td></tr>
<tr><td rowspan="6">Limit:</td><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
<tr><td colspan="3">* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test procedure:</td><td colspan="3">1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10(latest version) on conducted measurement.</td></tr>
<tr><td>Test setup:</td><td colspan="3"> 

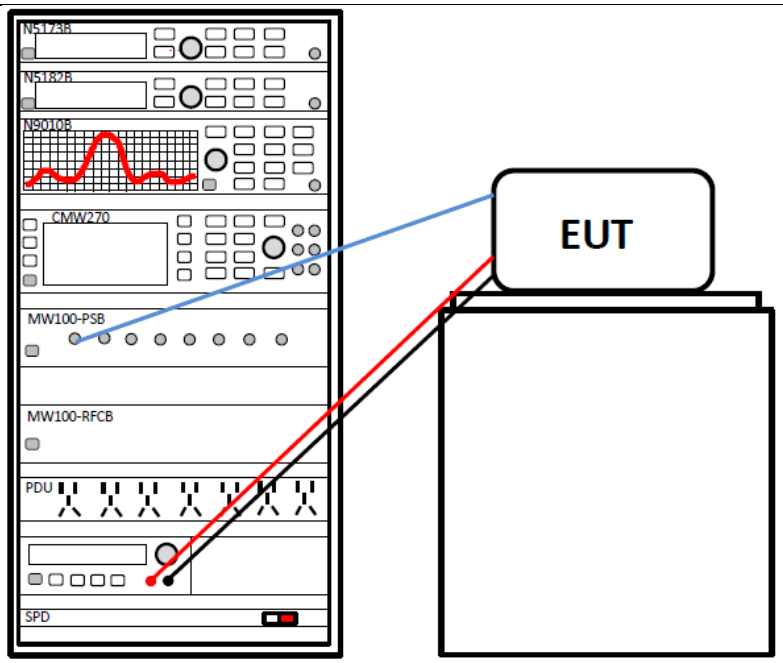
Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Instruments:</td><td colspan="3">Refer to section 5.9 for details</td></tr>
<tr><td>Test mode:</td><td colspan="3">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="3">N/A(EUT is powered by DC 3V)</td></tr>
</table>

6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

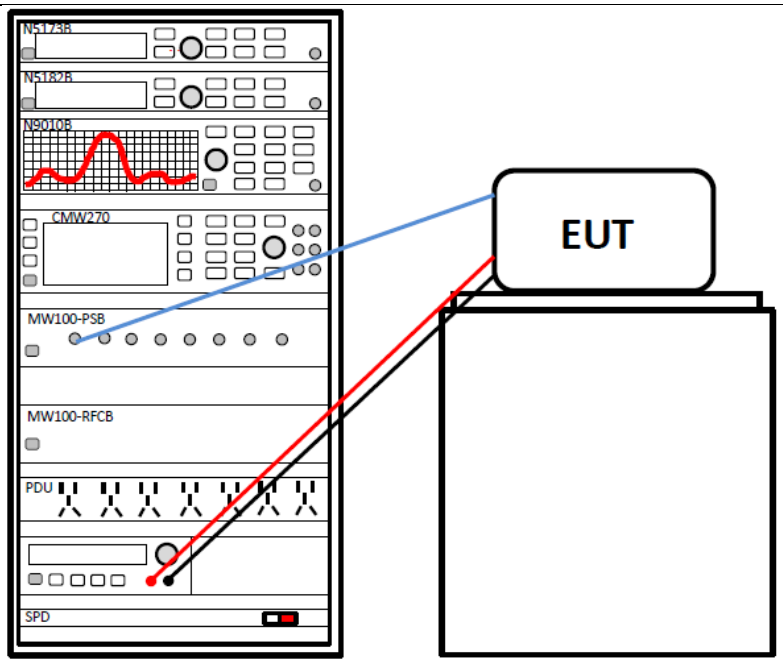
Measurement Data: Refer to Appendix A - BLE

6.4 Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)
Limit:	>500kHz
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data: Refer to Appendix A - BLE

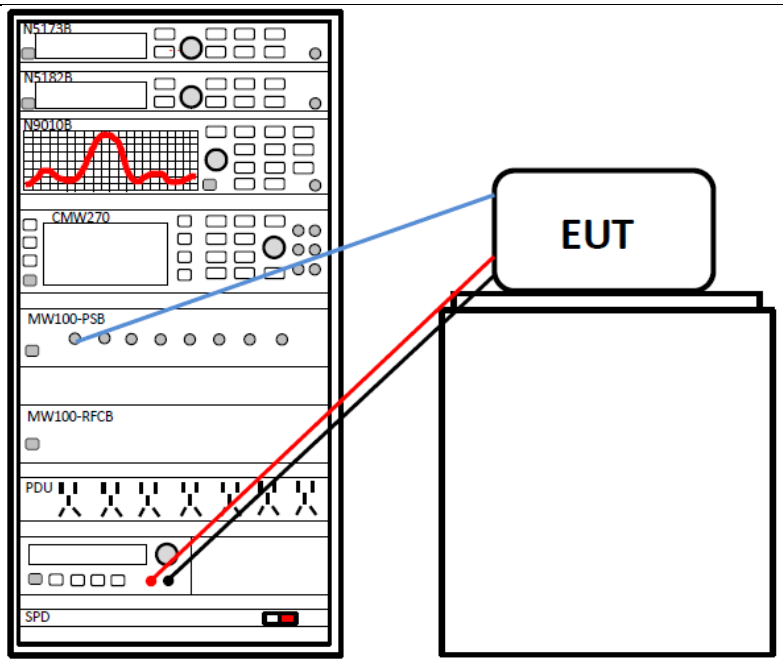
6.5 Power Spectral Density

Test Requirement:	FCC Part 15 C Section 15.247 (e)
Limit:	8 dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data: Refer to Appendix A - BLE

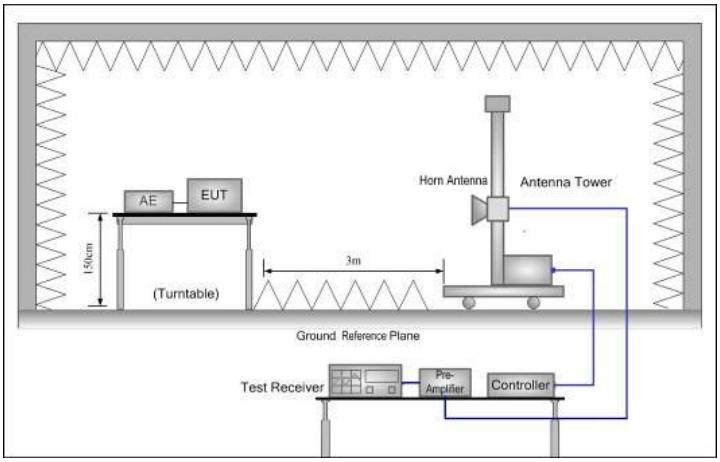
6.6 Band Edge

6.6.1 Conducted Emission Method

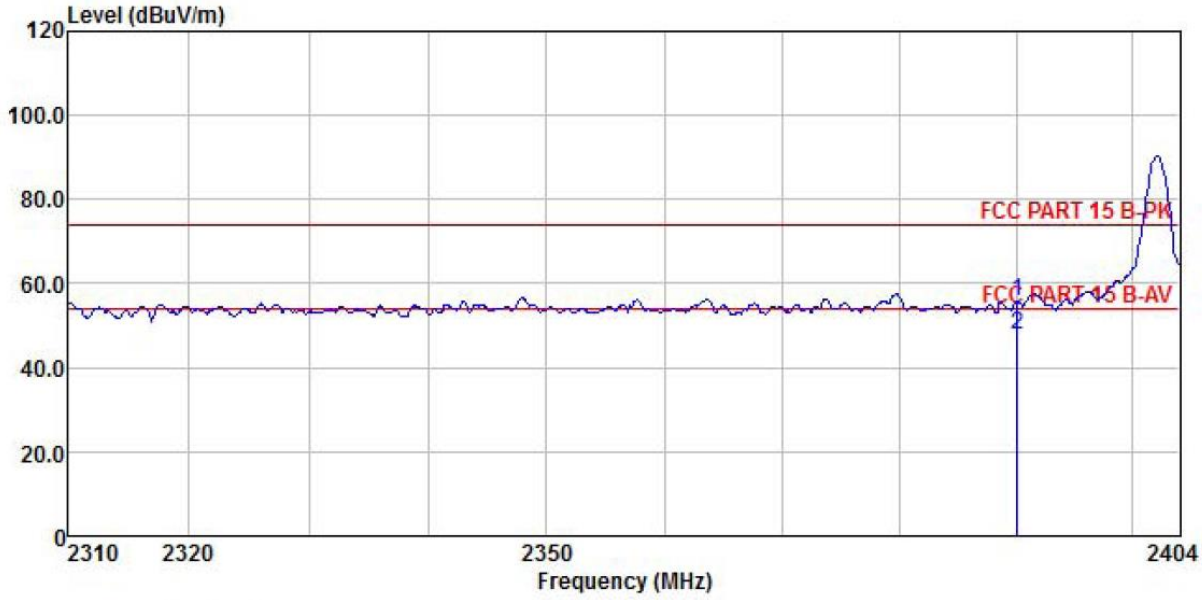
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data: Refer to Appendix A - BLE

6.6.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part 15 C Section 15.205 and 15.209</td></tr>
<tr><td>Test Frequency Range:</td><td>2310 MHz to 2390 MHz and 2483.5MHz to 2500 MHz</td></tr>
<tr><td>Test Distance:</td><td>3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr>
<tr><td>74.00</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td> 
</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 5.9 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td>Passed</td></tr>
</table>

Product Name:	DynaLogger	Product Model:	DynaLogger TcA+
Test By:	Mike	Test mode:	BLE Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

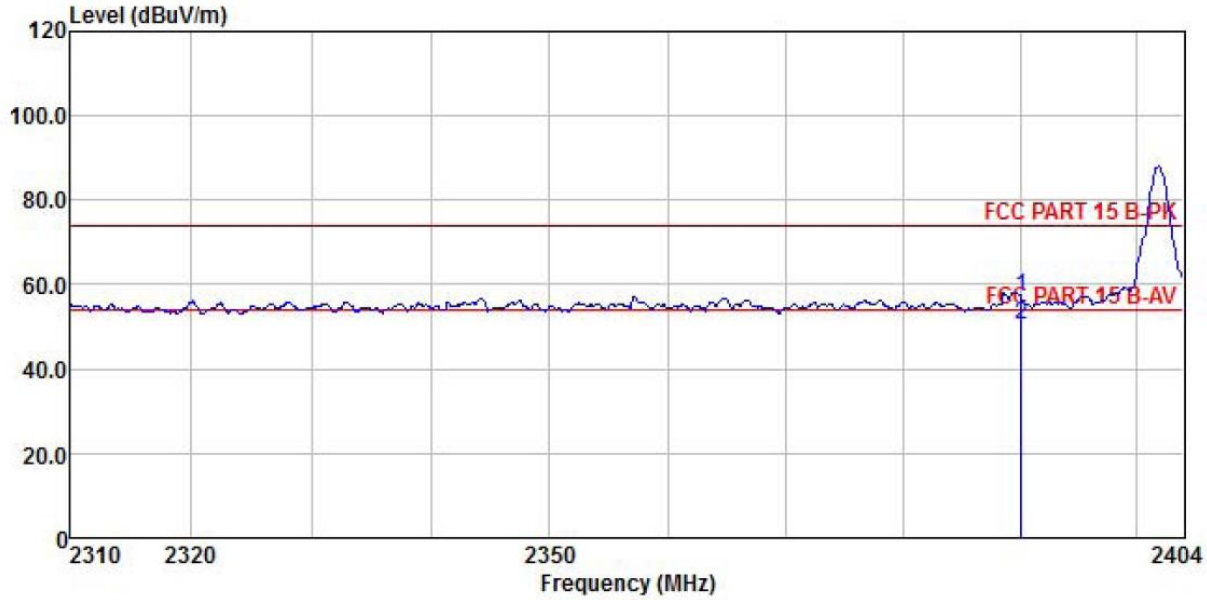


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	21.08	27.03	7.72	0.00	0.00	55.83	74.00	-18.17	Peak
2	2390.000	12.97	27.03	7.72	0.00	0.00	47.72	54.00	-6.28	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	DynaLogger	Product Model:	DynaLogger TcA+
Test By:	Mike	Test mode:	BLE Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

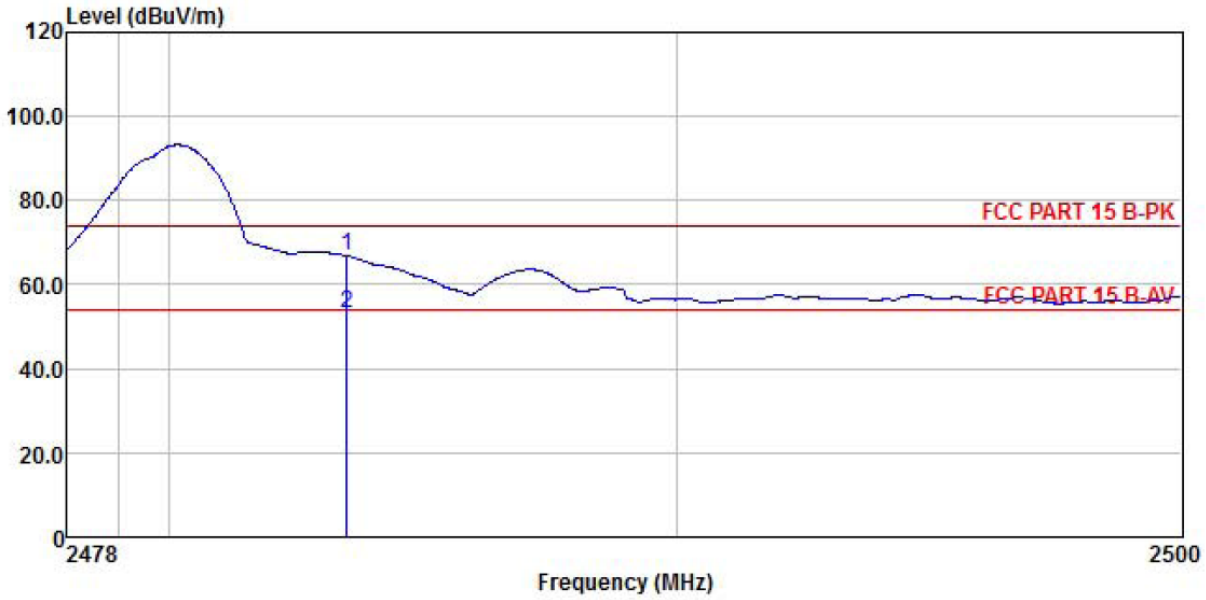


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	22.28	27.03	7.72	0.00	0.00	57.03	74.00	-16.97	Peak
2	2390.000	15.55	27.03	7.72	0.00	0.00	50.30	54.00	-3.70	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	DynaLogger	Product Model:	DynaLogger TcA+
Test By:	Mike	Test mode:	BLE Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

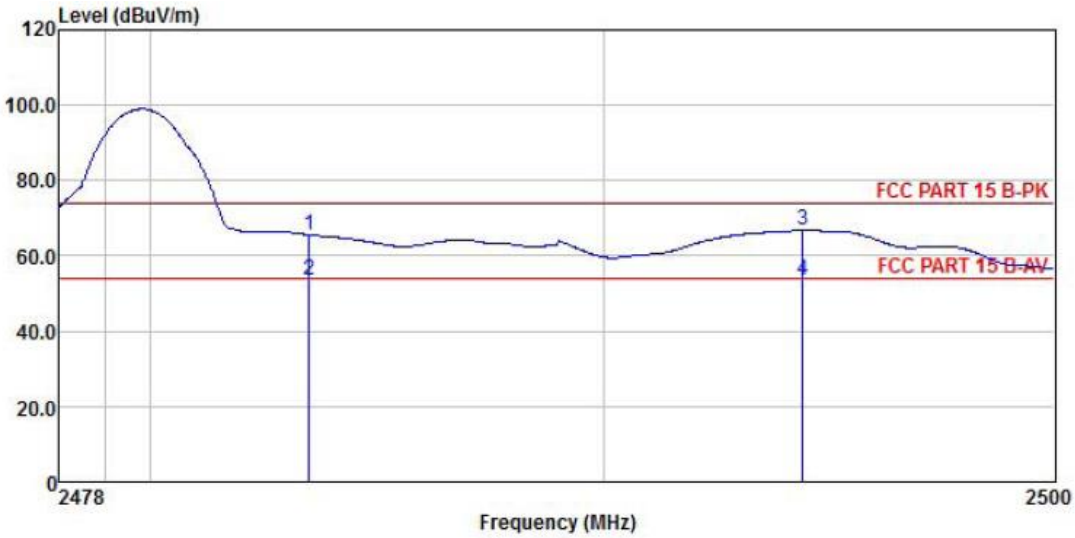


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	31.71	27.27	7.87	0.00	0.00	66.85	74.00	-7.15	Peak
2	2483.500	18.20	27.27	7.87	0.00	0.00	53.34	54.00	-0.66	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	DynaLogger	Product Model:	DynaLogger TcA+
Test By:	Mike	Test mode:	BLE Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

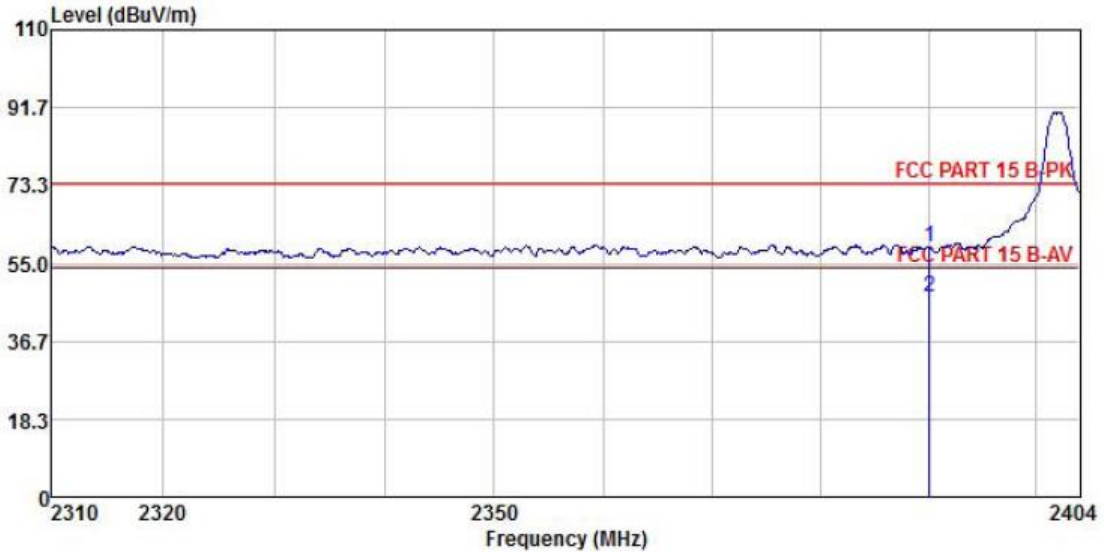


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	30.42	27.27	7.87	0.00	65.56	74.00	-8.44	Peak
2	2483.500	18.27	27.27	7.87	0.00	53.41	54.00	-0.59	Average
3	2494.416	31.50	27.28	7.90	0.00	66.68	74.00	-7.32	Peak
4	2494.416	18.33	27.28	7.90	0.00	53.51	54.00	-0.49	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	DynaLogger	Product Model:	DynaLogger HF
Test By:	Mike	Test mode:	BLE Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

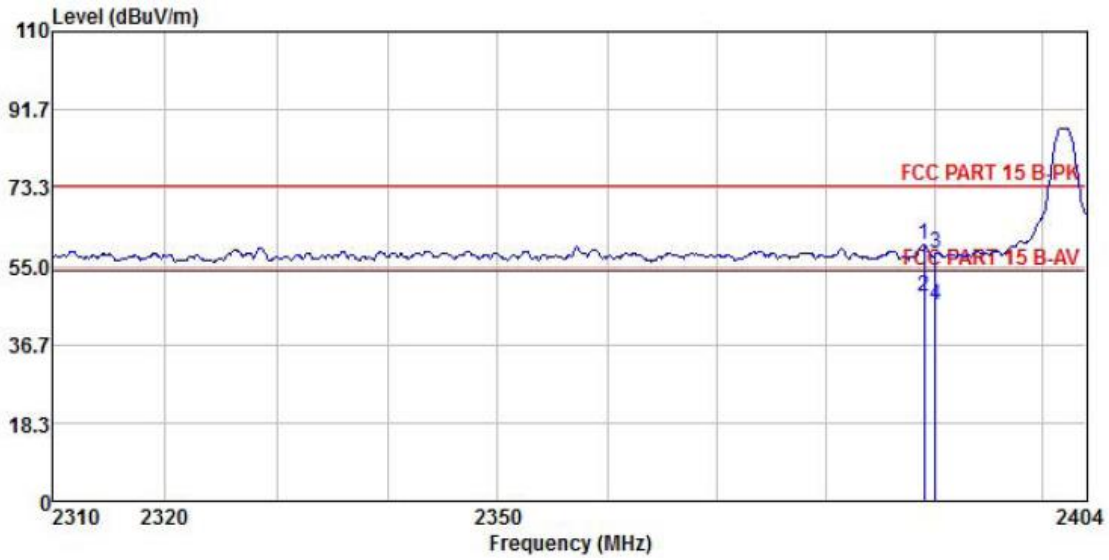


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	30.15	27.03	0.00	0.00	58.86	74.00	-15.14	Peak
2	2390.000	18.51	27.03	0.00	0.00	47.22	54.00	-6.78	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	DynaLogger	Product Model:	DynaLogger HF
Test By:	Mike	Test mode:	BLE Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

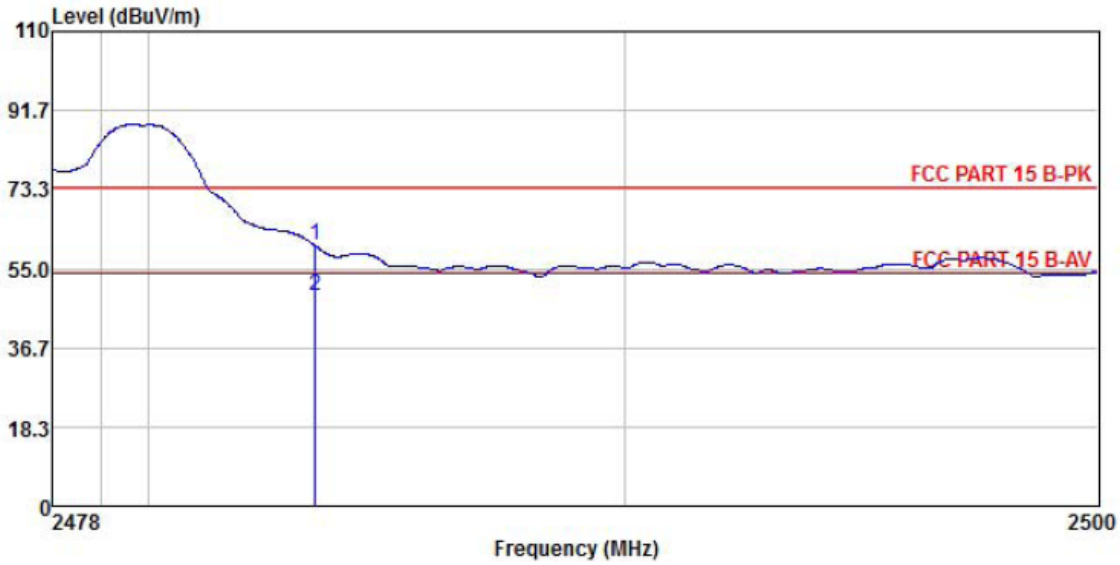


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2388.993	31.35	27.03	0.00	0.00	60.06	74.00	-13.94	Peak
2	2388.993	19.28	27.03	0.00	0.00	47.99	54.00	-6.01	Average
3	2390.000	29.25	27.03	0.00	0.00	57.96	74.00	-16.04	Peak
4	2390.000	17.08	27.03	0.00	0.00	45.79	54.00	-8.21	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	DynaLogger	Product Model:	DynaLogger HF
Test By:	Mike	Test mode:	BLE Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

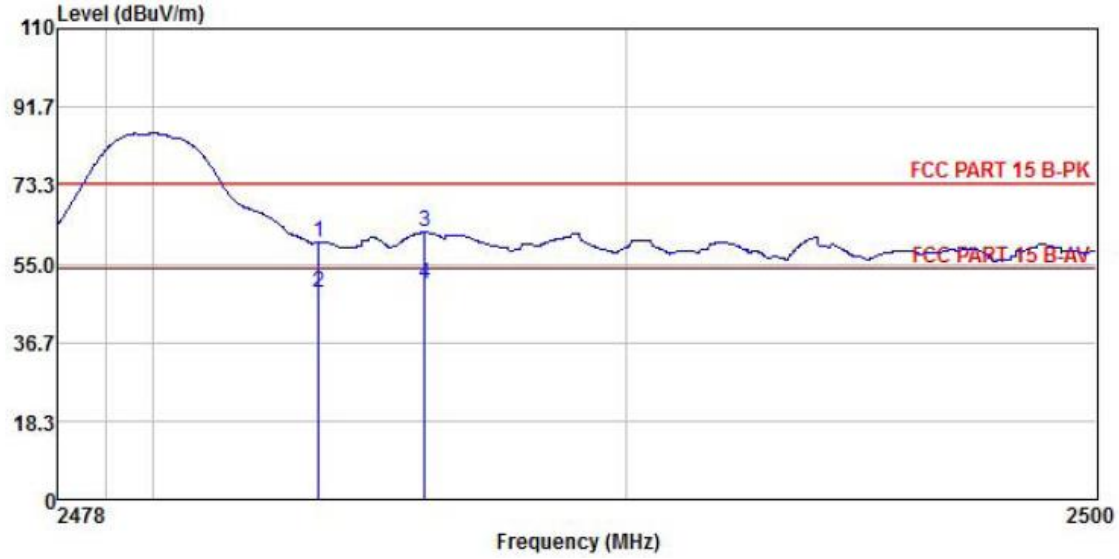


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	31.33	27.27	0.00	0.00	60.30	74.00	-13.70	Peak
2	2483.500	19.71	27.27	0.00	0.00	48.68	54.00	-5.32	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	DynaLogger	Product Model:	DynaLogger HF
Test By:	Mike	Test mode:	BLE Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%



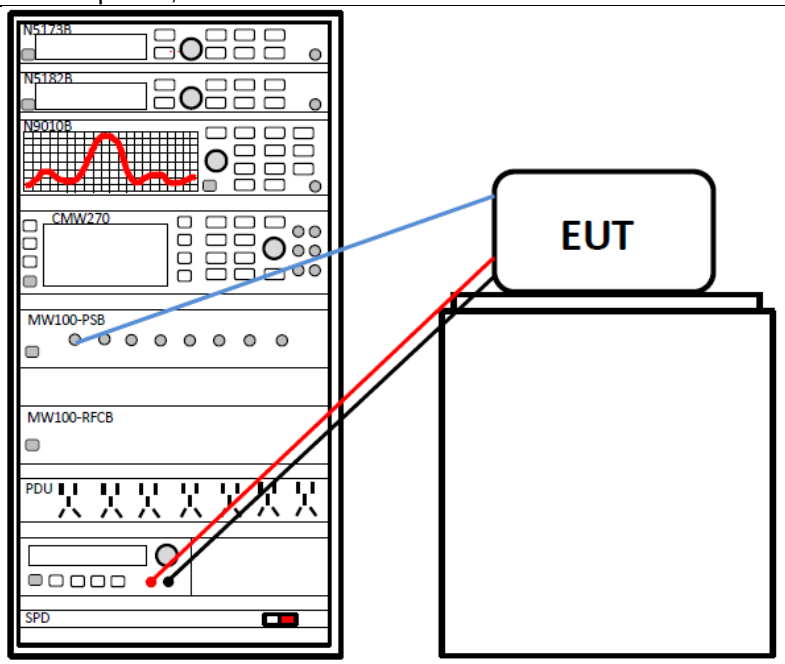
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	31.04	27.27	0.00	0.00	60.01	74.00	-13.99	Peak
2	2483.500	19.46	27.27	0.00	0.00	48.43	54.00	-5.57	Average
3	2485.744	33.39	27.27	0.00	0.00	62.36	74.00	-11.64	Peak
4	2485.744	21.41	27.27	0.00	0.00	50.38	54.00	-3.62	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

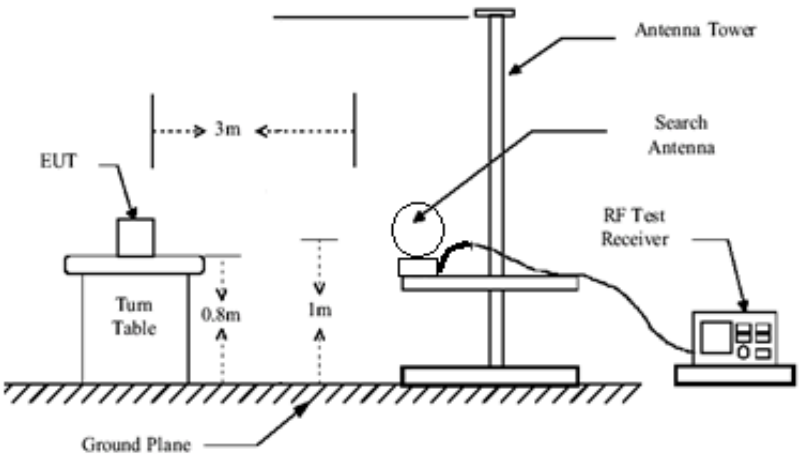
6.7 Spurious Emission

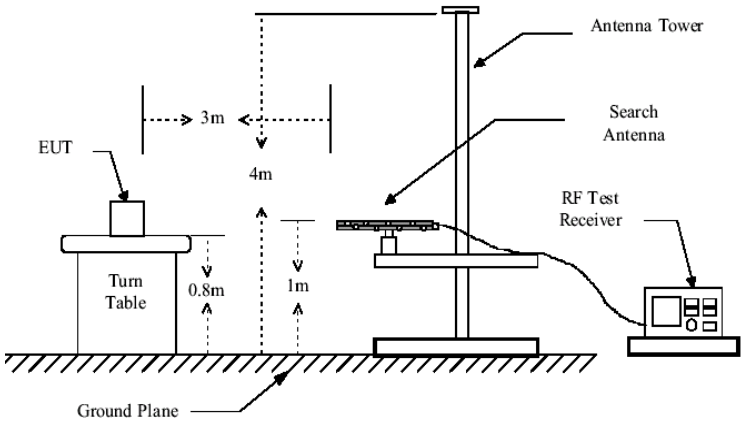
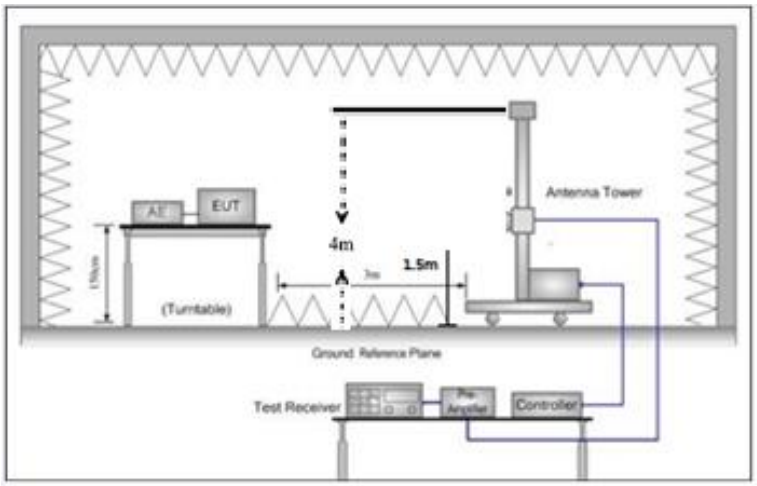
6.7.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data: Refer to Appendix A - BLE

6.7.2 Radiated Emission Method

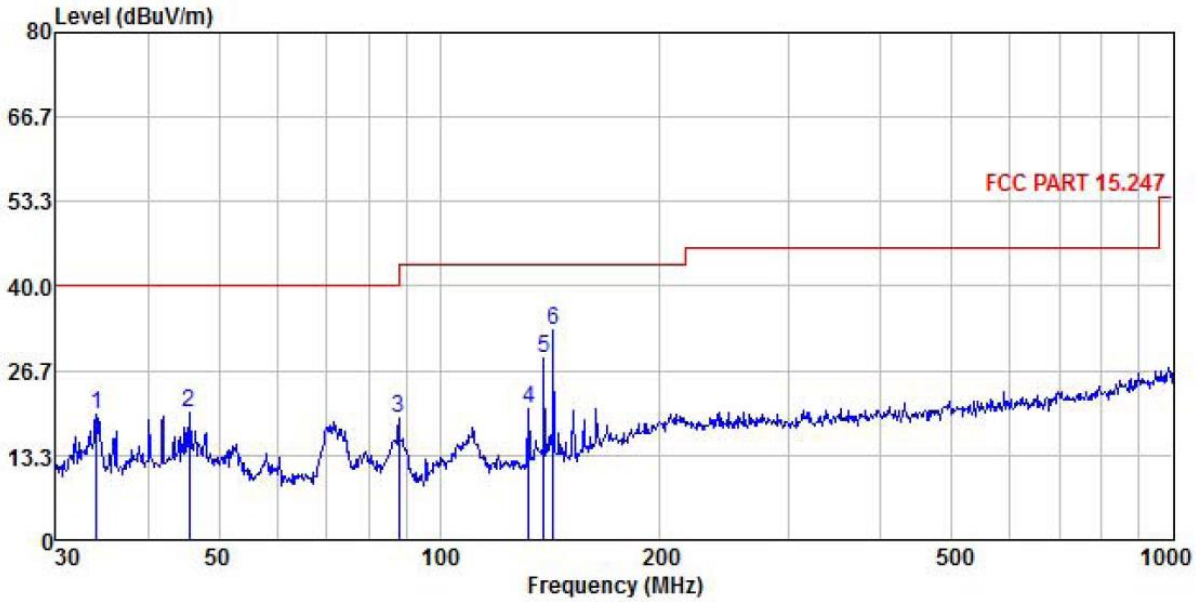
<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part 15 C Section 15.205 and 15.209</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">9kHz to 25GHz</td></tr>
<tr><td>Test Distance:</td><td colspan="5">3m</td></tr>
<tr><td>Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td></td><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td></td><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
<tr><td>Limit:</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td></td><td colspan="2">30MHz-88MHz</td><td colspan="2">40.0</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">88MHz-216MHz</td><td colspan="2">43.5</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">216MHz-960MHz</td><td colspan="2">46.0</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">960MHz-1GHz</td><td colspan="2">54.0</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">54.0</td><td>Average Value</td></tr>
<tr><td></td><td colspan="2">74.0</td><td>Peak Value</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td colspan="5">9kHz-30MHz
 
</td></tr>
</table>

	30MHz-1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 2. 9 kHz to 30MHz is lower than the limit 20dB, so only shows the data of above 30MHz in this report.

Measurement Data (worst case):

Below 1GHz:

Product Name:	DynaLogger	**Product Model:**	DynaLogger TcA+
Test By:	Mike	**Test mode:**	BLE Tx mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	DC 3V	**Environment:**	Temp: 24℃ Huni: 57%

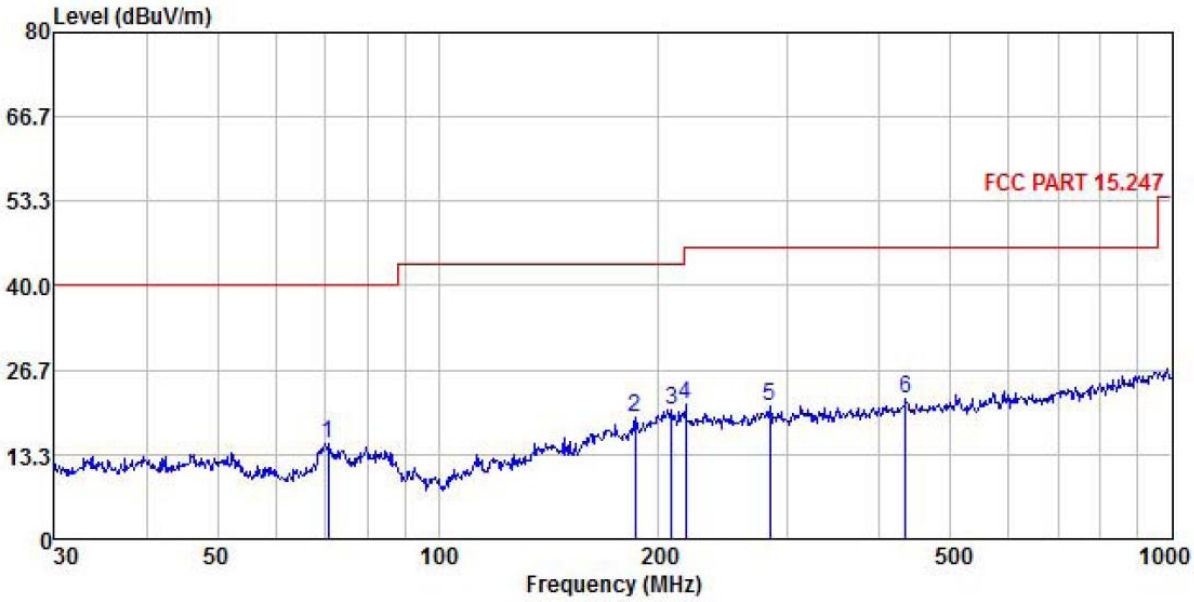


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	34.037	36.77	12.45	0.38	0.00	29.96	19.64	40.00	-20.36	QP
2	45.535	36.60	12.93	0.48	0.00	29.86	20.15	40.00	-19.85	QP
3	88.033	37.90	10.29	0.72	0.00	29.58	19.33	43.50	-24.17	QP
4	132.221	36.35	12.57	0.96	0.00	29.32	20.56	43.50	-22.94	QP
5	138.874	43.27	13.74	0.98	0.00	29.28	28.71	43.50	-14.79	QP
6	142.824	47.48	13.86	1.00	0.00	29.26	33.08	43.50	-10.42	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*
3. *The Aux Factor is a notch filter switch box loss, this item is not used.*

Product Name:	DynaLogger	Product Model:	DynaLogger TcA+
Test By:	Mike	Test mode:	BLE Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

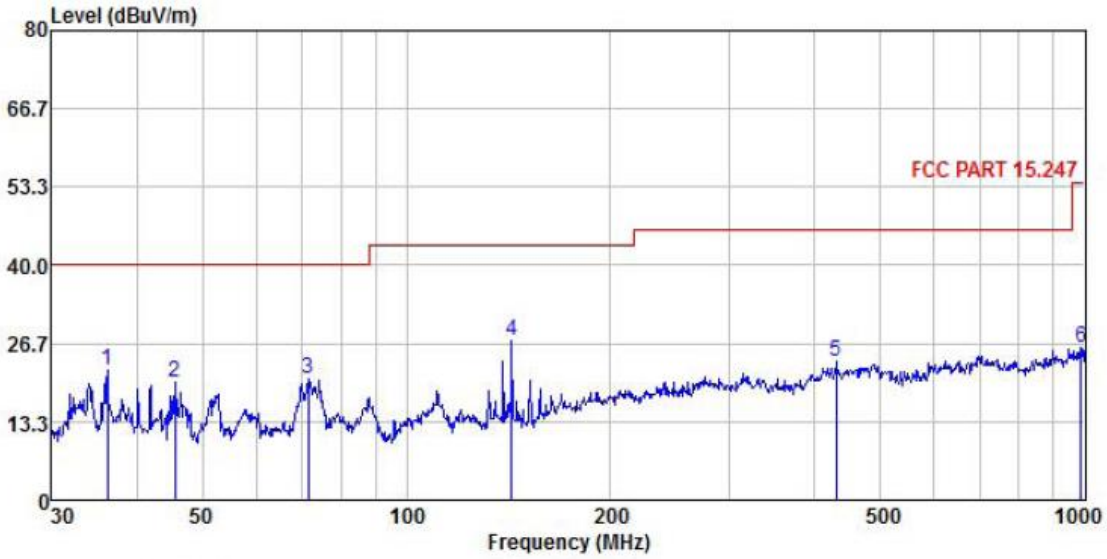


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	70.832	33.68	10.32	0.66	0.00	29.71	14.95	40.00	-25.05	QP
2	185.788	29.47	17.23	1.33	0.00	28.93	19.10	43.50	-24.40	QP
3	207.850	29.30	18.33	1.45	0.00	28.78	20.30	43.50	-23.20	QP
4	217.544	30.23	18.38	1.47	0.00	28.72	21.36	46.00	-24.64	QP
5	282.985	29.20	18.63	1.69	0.00	28.48	21.04	46.00	-24.96	QP
6	434.065	29.63	19.17	2.13	0.00	28.84	22.09	46.00	-23.91	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*
3. *The Aux Factor is a notch filter switch box loss, this item is not used.*

Product Name:	DynaLogger	Product Model:	DynaLogger HF
Test By:	Mike	Test mode:	BLE Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

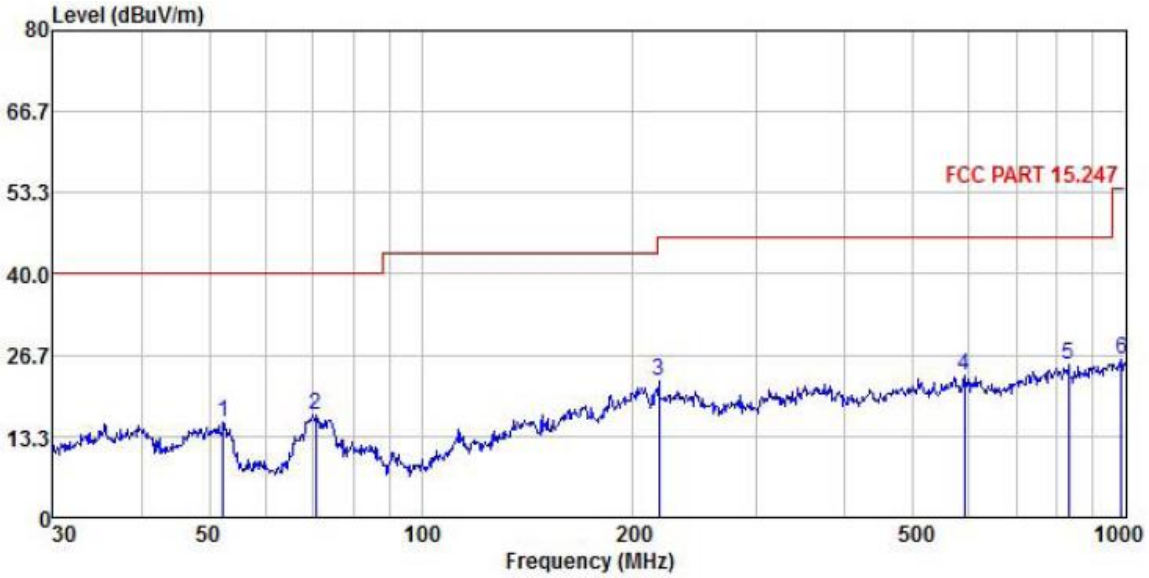


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	36.254	39.03	12.65	0.39	29.94	22.13	40.00	-17.87	QP
2	45.535	36.60	12.93	0.48	29.86	20.15	40.00	-19.85	QP
3	71.581	39.04	10.54	0.66	29.71	20.53	40.00	-19.47	QP
4	142.824	41.48	13.86	1.00	29.26	27.08	43.50	-16.42	QP
5	429.523	31.25	19.16	2.11	28.83	23.69	46.00	-22.31	QP
6	986.072	26.91	23.02	3.62	27.51	26.04	54.00	-27.96	QP

Remark:

4. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
5. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*
6. *The Aux Factor is a notch filter switch box loss, this item is not used.*

Product Name:	DynaLogger	Product Model:	DynaLogger HF
Test By:	Mike	Test mode:	BLE Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	52.391	32.62	12.29	0.49	29.81	15.59	40.00	-24.41	QP
2	70.832	35.68	10.32	0.66	29.71	16.95	40.00	-23.05	QP
3	217.544	31.23	18.38	1.47	28.72	22.36	46.00	-23.64	QP
4	590.974	29.85	19.85	2.59	28.97	23.32	46.00	-22.68	QP
5	830.400	28.66	21.21	3.17	28.08	24.96	46.00	-21.04	QP
6	986.072	26.78	23.02	3.62	27.51	25.91	54.00	-28.09	QP

Remark:

4. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
5. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*
6. *The Aux Factor is a notch filter switch box loss, this item is not used.*

Above 1GHz

DynaLogger TcA+ :

Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	68.26	30.78	12.39	54.31	57.12	74.00	-16.88	Vertical
4804.00	66.69	30.78	12.39	54.31	55.55	74.00	-18.45	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	58.92	30.78	12.39	54.31	47.78	54.00	-6.22	Vertical
4804.00	56.57	30.78	12.39	54.31	45.43	54.00	-8.57	Horizontal
Test channel: Middle channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	68.14	30.96	12.39	54.31	57.18	74.00	-16.82	Vertical
4884.00	66.39	30.96	12.39	54.31	55.43	74.00	-18.57	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	58.45	30.96	12.39	54.31	47.49	54.00	-6.51	Vertical
4884.00	56.30	30.96	12.39	54.31	45.34	54.00	-8.66	Horizontal
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	68.25	31.11	12.39	54.31	57.44	74.00	-16.56	Vertical
4960.00	66.49	31.11	12.39	54.31	55.68	74.00	-18.32	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	58.32	31.11	12.39	54.31	47.51	54.00	-6.49	Vertical
4960.00	55.90	31.11	12.39	54.31	45.09	54.00	-8.91	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

DynaLogger HF:

Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	68.14	30.78	12.39	54.31	57.00	74.00	-17.00	Vertical
4804.00	66.38	30.78	12.39	54.31	55.24	74.00	-18.76	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	58.73	30.78	12.39	54.31	47.59	54.00	-6.41	Vertical
4804.00	56.06	30.78	12.39	54.31	44.92	54.00	-9.08	Horizontal
Test channel: Middle channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	67.59	30.96	12.39	54.31	56.63	74.00	-17.37	Vertical
4884.00	65.37	30.96	12.39	54.31	54.41	74.00	-19.59	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	58.34	30.96	12.39	54.31	47.38	54.00	-6.62	Vertical
4884.00	55.47	30.96	12.39	54.31	44.51	54.00	-9.49	Horizontal
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	67.32	31.11	12.39	54.31	56.51	74.00	-17.49	Vertical
4960.00	65.87	31.11	12.39	54.31	55.06	74.00	-18.94	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	57.83	31.11	12.39	54.31	47.02	54.00	-6.98	Vertical
4960.00	54.58	31.11	12.39	54.31	43.77	54.00	-10.23	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*