December 8, 2023

Trackonomy Systems

214 Devcon Drive
San Jose, CA 95112

Dear Saurabh Sanghai,

Enclosed is the Wireless test report for compliance testing of the Trackonomy Systems, Multifunctional IoT Platform Sensor as tested to the requirements of Title 47 of the CFR, Part 15 Subpart C, RSS 247 for Intentional Radiators.

Thank you for using the services of Eurofins Electrical and Electronic Testing NA, Inc. If you have any questions regarding these results or if Eurofins Electrical and Electronic Testing NA, Inc. can be of further service to you, please feel free to contact me.

Gary Chou

Documentation Department
Eurofins Electrical and Electronic Testing NA, Inc.

Reference: WIR129874-Track_FCC_ISED-BLE

ilac-MRA A2LA ACCREDITED CERT #591.02

Eurofins Electrical and Electronic Testing NA, Inc. is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

FCC/ ISED Test Report

Applicant name: Trackonomy Systems

Product: Multifunctional IoT Platform Sensor

Report: WIR129874-Track_FCC_ISED-BLE

Applicant Address:

214 Devcon Drive
San Jose, CA 95112

Manufacturer Address:

214 Devcon Drive
San Jose, CA 95112

Prepared By:
Eurofins Electrical and Electronic Testing NA, Inc.
3162 Belick St.
Santa Clara CA, 95054

FCC/ ISED Test Report

Applicant name: Trackonomy Systems

Product: Multifunctional IoT Platform Sensor

Standard
47 CFR FCC Part 15, Subpart C (Section 15.247)
558074 D01 15.247 Meas Guidance v05r02
RSS 247 Issue2, February 2017
RSS Gen Issue5, March 2019
ANSI C63.10: 2013

Christopher Martin
Christopher Martin Test Engineer, Wireless Laboratory

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements FCC Rules under normal use and maintenance.

Gary Chou
Gary Chou
Wireless Engineering Manager, Wireless Laboratory

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	December 8 , 2023	Initial Issue.

Table of Contents

I. Executive Summary

A. Executive Summary

47 CFR FCC Part 15, Subpart C (SECTION 15.247) RSS 247 Issue2, RSS Gen Issue5				
FCC/ IC Cluse	ISED	Test Item	Result	Remarks
15.207	RSS Gen 8.8	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.205 &15.209 & 15.247(d)	RSS Gen 8.8	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	RSS 247 5.5C	6dB bandwidth & 99% bandwidth	PASS	Note 1
15.247(b)	RSS 247 5.2.1 RSS Gen 6.7	Conducted power	PASS	Note 1
15.247(e)	RSS 247 5.4.4	Power Spectral Density	PASS	Note 1
15.203	RSS 247 5.2.2	Antenna Requirement	PASS	Meet the requirement.

Note:

1. Refer to RF module Report FCC ID : 2AXA8-FWB-2001, RF module report ISED ID : 27299-FWB2001
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

II. Equipment Information

A. Overview

EUT Summary Table

Product:	Multifunctional IoT Platform Sensor	
Brand:	Trackonomy Systems	
Model(s) Tested:	FWB-2001-L	
Series Model:	N/A	
Sample Status:	Original	
EUT Specifications:	Primary Power:	3.6 Vdc
	Voltage Frequency:	N/A
	Technology / Type of Modulations:	BLUETOOTH LE: GFSK
	Operating Frequency :	2.402 ~ 2.480GHz
	FCC ID:	2AXA8-FWB-2001
	ISED ID:	27299-FWB2001
	Antenna Type: PCB Antenna	
	Antenna Manufacturer/ Modle:	N/A
	Antenna connector:	N/A
	Antenna Gain	0 dBi
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 20.3° C	
	Relative Humidity: 47.5%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Christopher Martin	
Issue Date(s):	December 10, 2023	

NOTE: The following modules can be chosen to be configured in the EUT.

	Model No.	FCC ID	Note
-	-	-	-

-	-	-	-

FCC/IC RF Testing Units Setting

Model	Hardware (FW) Rev.	Firmware (FW) Rev.	FW operation verification and Instruction
FWB-2001-L	Nominal HW V2	Nominal FW V2	Verify by Spectrum Analyzer & Laptop

DESCRIPTION OF TEST MODES

Power Setting :

Channel	Frequency(MHz)	Power Setting
0	2402	default
19	2440	default
39	2480	default

40 channels are provided for Bluetooth LE:

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

B. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
B	wideband radio communication tester	ROHDE& SCHARZ	CMW500	1201.0002K50	-	Bluetooth Tester

Note: (Describe the outline of a simulator, if used for the tests, as a note under the table.)

Insert Cable Connections to/from EUT provided by test team.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
	-	-	-	-	0	-

Note: The core(s) is(are) originally attached to the cable(s).

General Description of Applied Standards

C. References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

- **47 CFR FCC Part 15, Subpart C (Section 15.247)**
- **558074 D01 15.247 Meas Guidance v05r02**
- **ANSI C63.10:2013**
- **RSS 247 Issue2**
- **RSS Gen Issue5**

D. Test Site

All testing was performed at Eurofins Electrical and Electronic Testing NA, Inc., 3162 Belick St. Santa Clara, CA 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Eurofins Electrical and Electronic Testing NA, Inc. has been accredited by the American Association for Laboratory Accreditation (A2LA) (Certificate #: 0591.02) in accordance with ISO/IEC 17025:2017.

Eurofins Electrical and Electronic Testing NA, Inc. is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

E. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
RF Frequencies	±4.52 Hz	2	95%
RF Power Conducted Emissions	±2.32 dB	2	95%
RF Power Conducted Spurious Emissions	±2.25 dB	2	95%
RF Power Radiated Emissions	±3.01 dB	2	95%

Uncertainty Calculations Summary

F. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

G. Disposition of EUT

The test sample including all support equipment (if any), submitted to the Electromagnetic Compatibility Lab for testing was returned to Trackonomy Systems upon completion of testing.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

Radiated Emission and Bandage Measurement

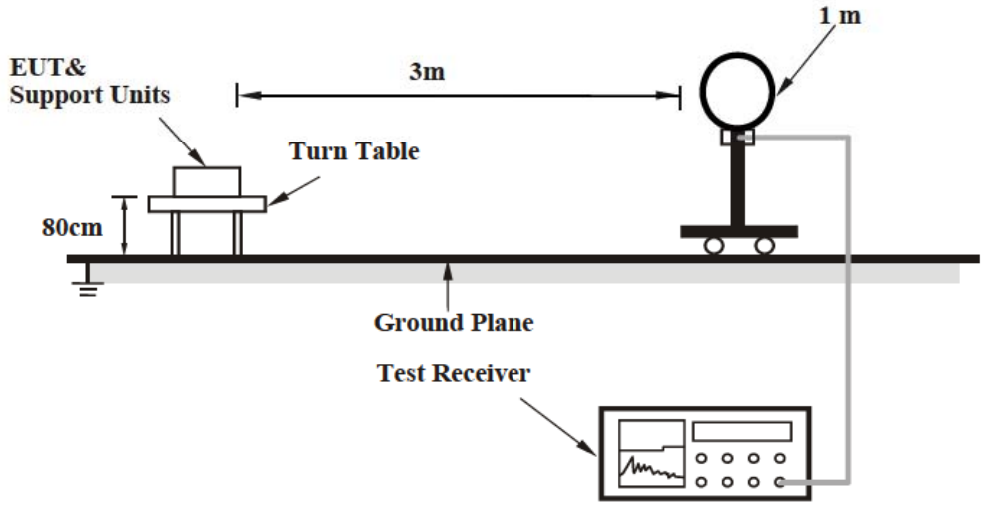
Limits of Radiated Emission and Bandage Measurement:
Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

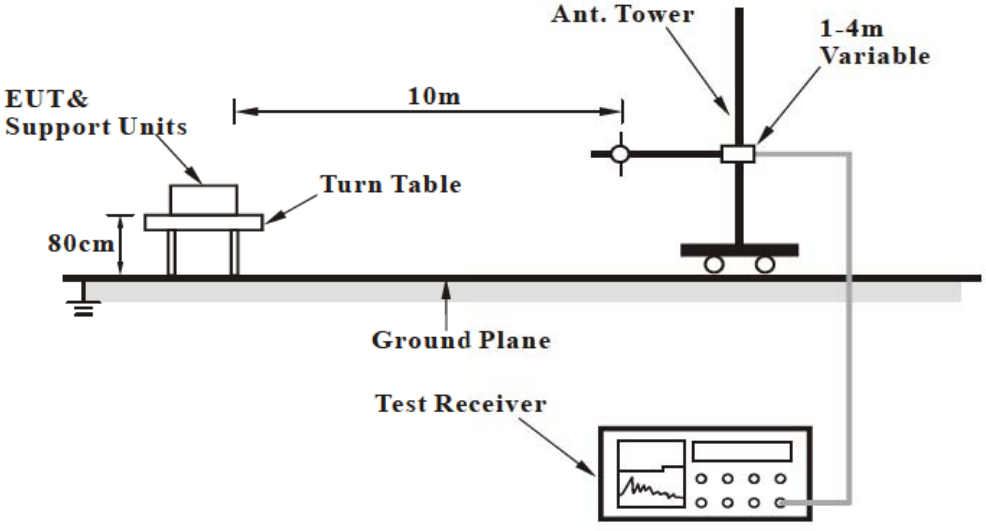
Test Procedures: The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line. Only noise floor was measured above 18 GHz.

Test Setup

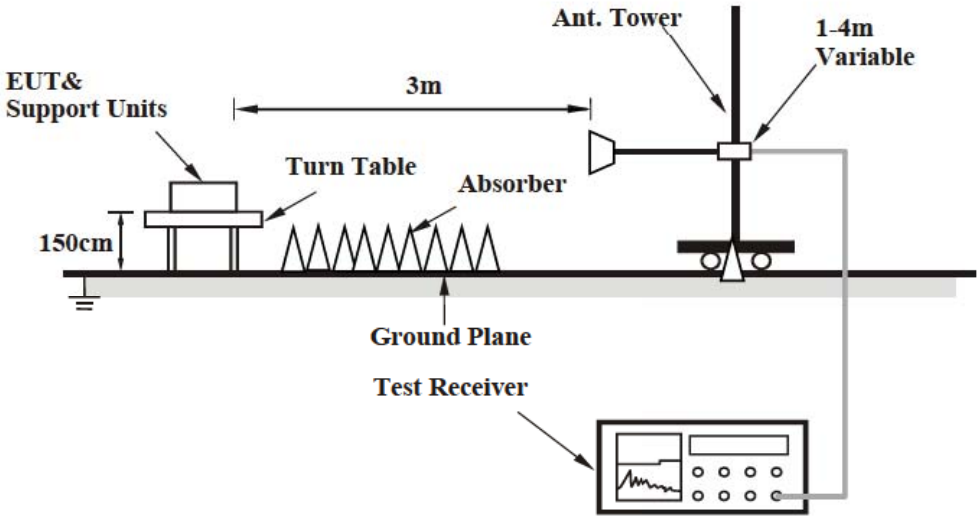
For Radiated Emission Below 30MHz



For Radiated emission 30 MHz to 1GHz



For Radiated emission 1GHz to 40GHz



Test Results: The EUT was tested is **compliant** with Radiated Spurious Emissions Requirements.

Test Equipment List

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2003	EMI Test Receiver	Keysight	N9030B	11/06/2023	11/06/2024
1S2399	Turntable Controller	SUNOL SCIENCE	SC99V	Not Required	Not Required
1S2486	5 Meter Chamber Control Room	Panashield	5 Meter Control Room	Not Required	Not Required
1S3826	Horn Antenna	ETS-LINDGREN	3117	04/06/2023	04/06/2025
1S4802	Preamplifier	EMC Instrument	EMC118A45SE	Note 1	Note 1
1S2668	Preamplifier	Sonoma Instrument	310N	Note 1	Note 1
1S2600	Antenna	Sunol Sciences Corp	JB3	04/ 11/ 2023	04/ 11/ 2025
1S2404	Loop Antenna	ETS-LINDGREN	6512	08/ 29 /2022	08/ 29 /2024
Note 1: Verified by calibrated instrumentation at the time of testing					

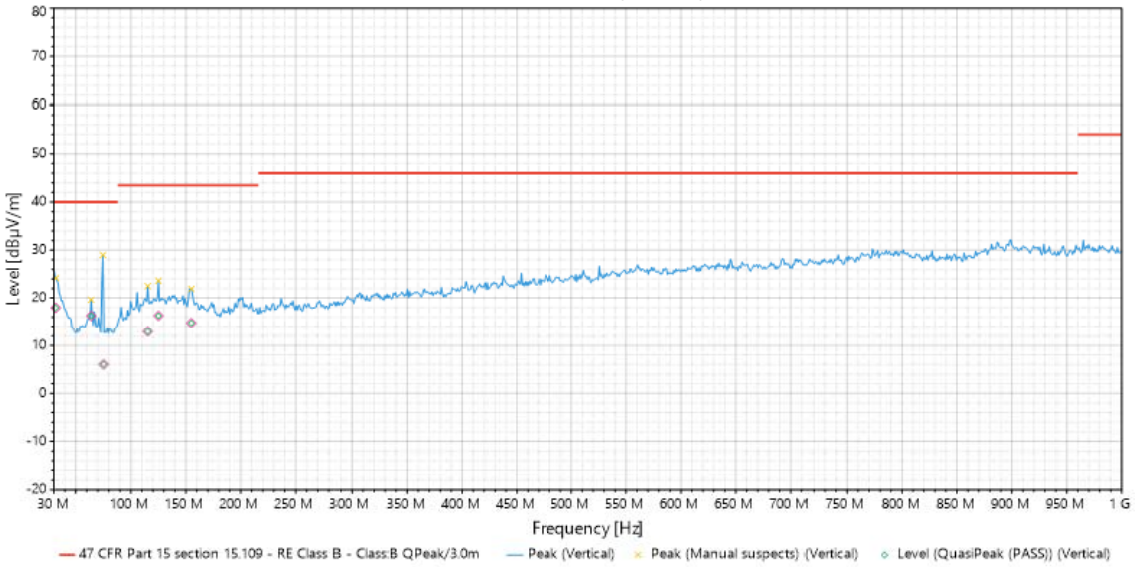
Test Engineer: Christopher Martin

Test Date(s): 11/30/2023

Test Data
Model:FBW-2001-C
Radiated Emissions (30 MHz~1000 MHz)

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	30MHz-1GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2440 MHz		

#1 - 30MHz-1GHz (Vertical)



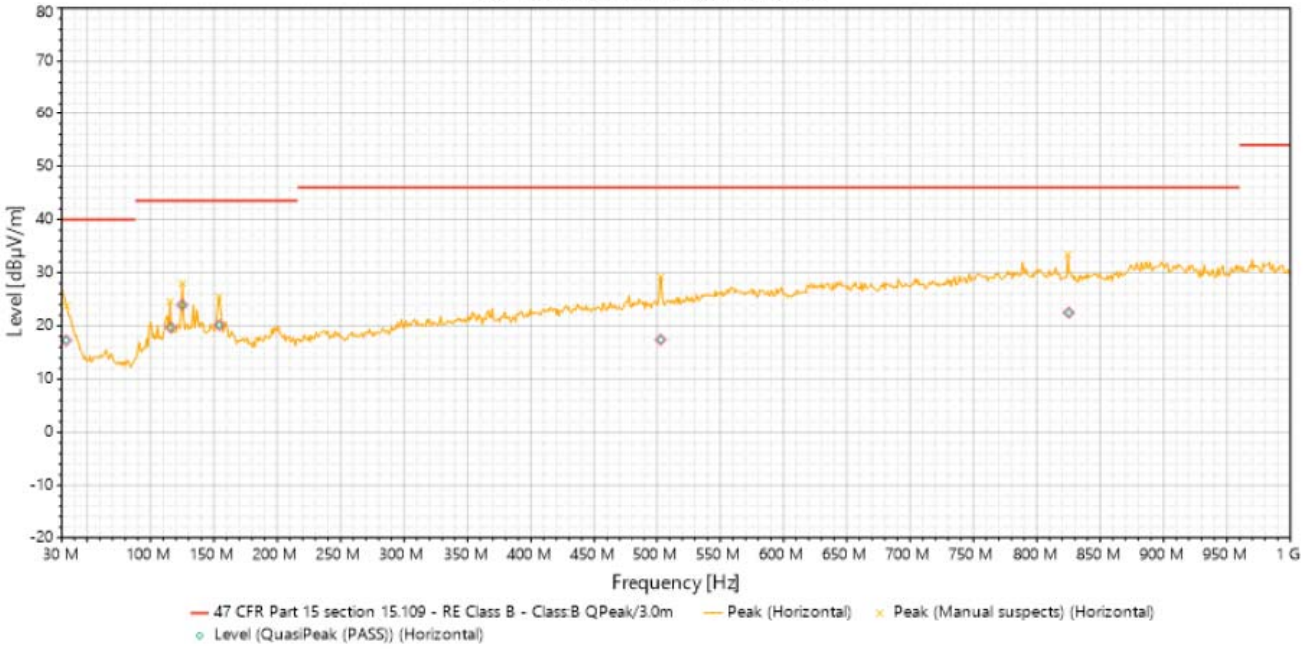
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/ Fail
1	31.76	Vertical	17.956	40	-22.044	3.479	234	-3.703	Pass
2	64.07	Vertical	16.283	40	-23.717	1.544	227	-13	Pass
3	75.27	Vertical	6.059	40	-33.941	3.062	193	-14.968	Pass
4	115.27	Vertical	12.957	43.5	-30.543	1.536	40	-7.959	Pass
5	125.08	Vertical	16.29	43.5	-27.21	3.465	49	-7.509	Pass
6	154.98	Vertical	14.745	43.5	-28.755	2.423	148	-8.383	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	30MHz-1GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2440 MHz		

#2 - 30MHz-1GHz (Horizontal)



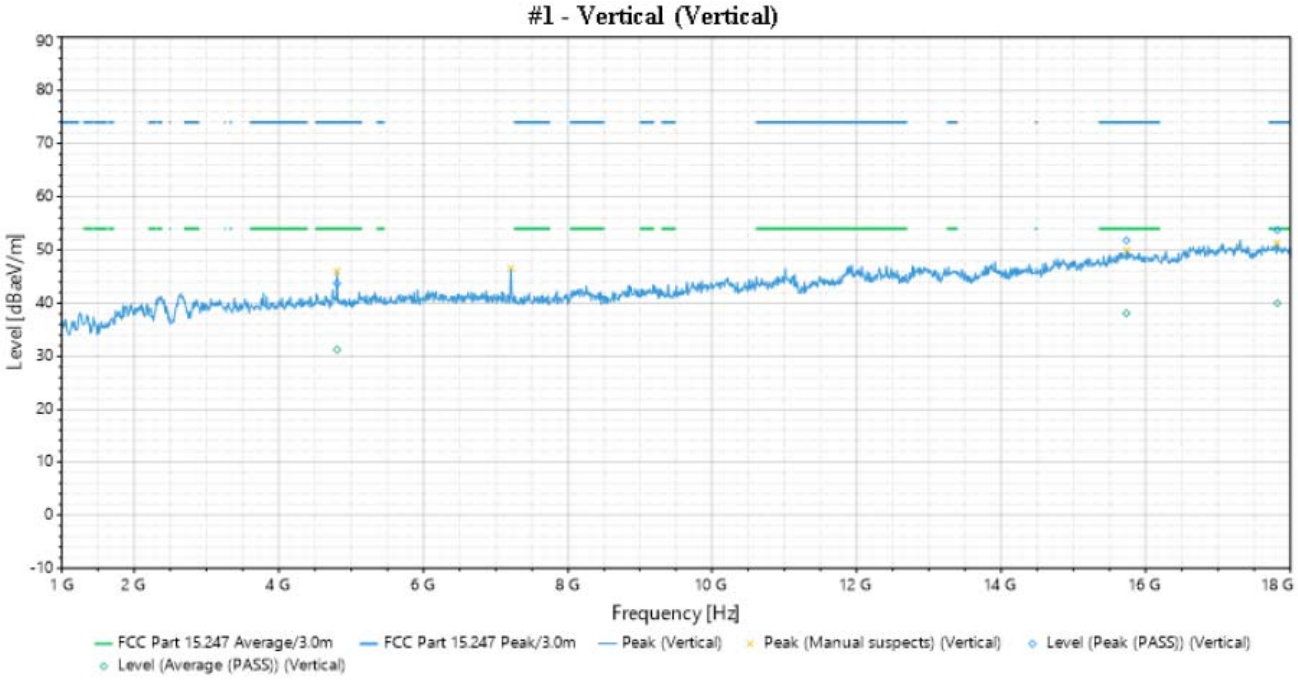
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/ Fail
1	33.55	Horizontal	17.281	40	-22.719	1.251	175	-3.59	Pass
2	115.96	Horizontal	19.703	43.5	-23.797	2.075	248	-8.331	Pass
3	125.04	Horizontal	23.933	43.5	-19.567	2.86	116	-7.781	Pass
4	154.25	Horizontal	20.13	43.5	-23.37	1.841	265	-8.787	Pass
5	503.05	Horizontal	17.402	46	-28.598	1.251	2	-2.22	Pass
6	825.17	Horizontal	22.485	46	-23.515	1.609	334	2.986	Pass

REMARKS:

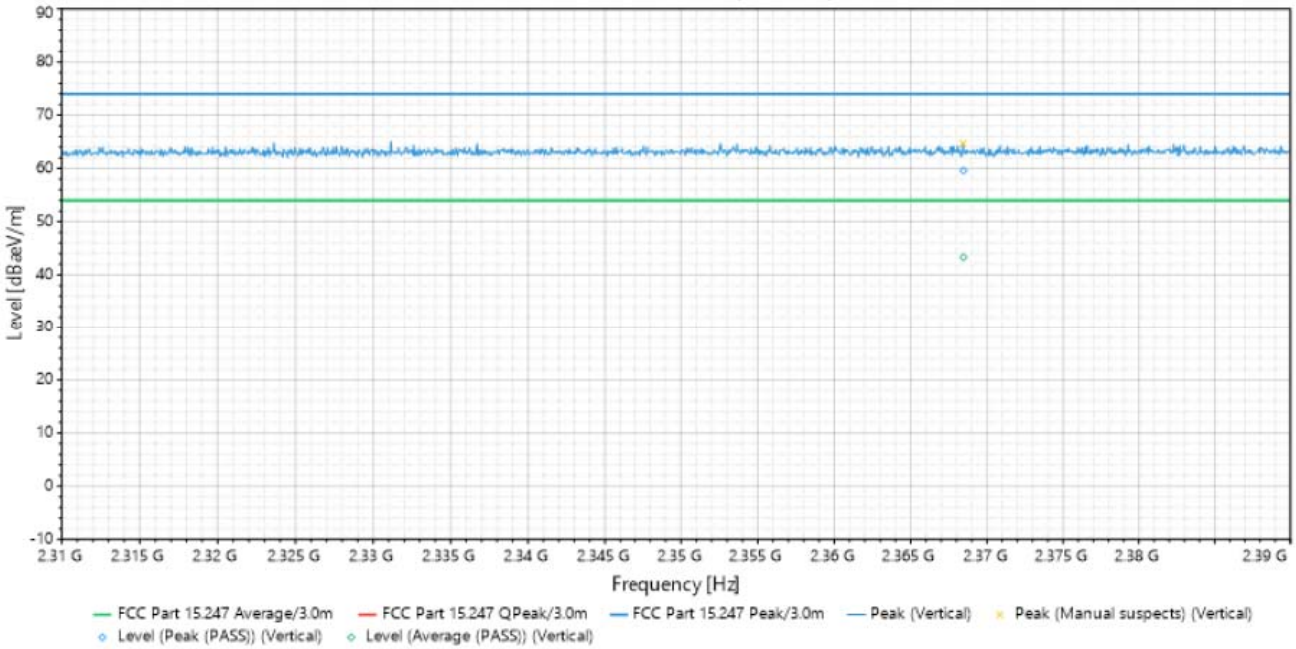
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

Radiated Emissions (Above 1GHz)

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2402 MHz		



#1 - 2.31GHz-2.39GHz (Vertical)



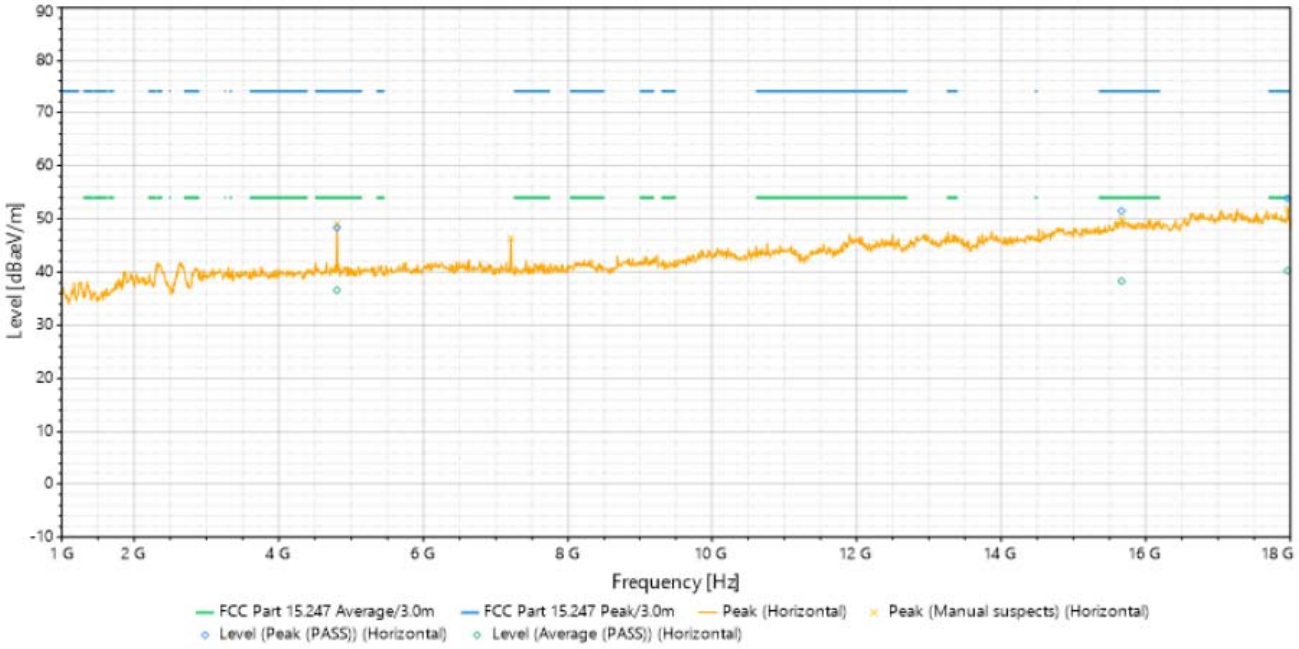
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	7207.55	Vertical	46.517	NaN	NaN	3.5	0	6.567	Peak (PASS)
2	4805.18	Vertical	43.706	74	-30.294	3.1	297	4.108	Peak (PASS)
3	4805.18	Vertical	31.273	54	-22.727	3.1	297	4.108	Average (PASS)
4	15734.43	Vertical	51.805	74	-22.195	3.1	166	10.018	Peak (PASS)
5	15734.43	Vertical	38.112	54	-15.888	3.1	166	10.018	Average (PASS)
6	17821.68	Vertical	53.748	74	-20.252	3.1	256	8.857	Peak (PASS)
7	17821.68	Vertical	39.998	54	-14.002	3.1	256	8.857	Average (PASS)
8	2368.461	Vertical	59.609	74	-14.391	2.836	153	38.172	Peak (PASS)
9	2368.461	Vertical	43.344	54	-10.656	2.836	153	38.172	Average (PASS)

REMARKS:

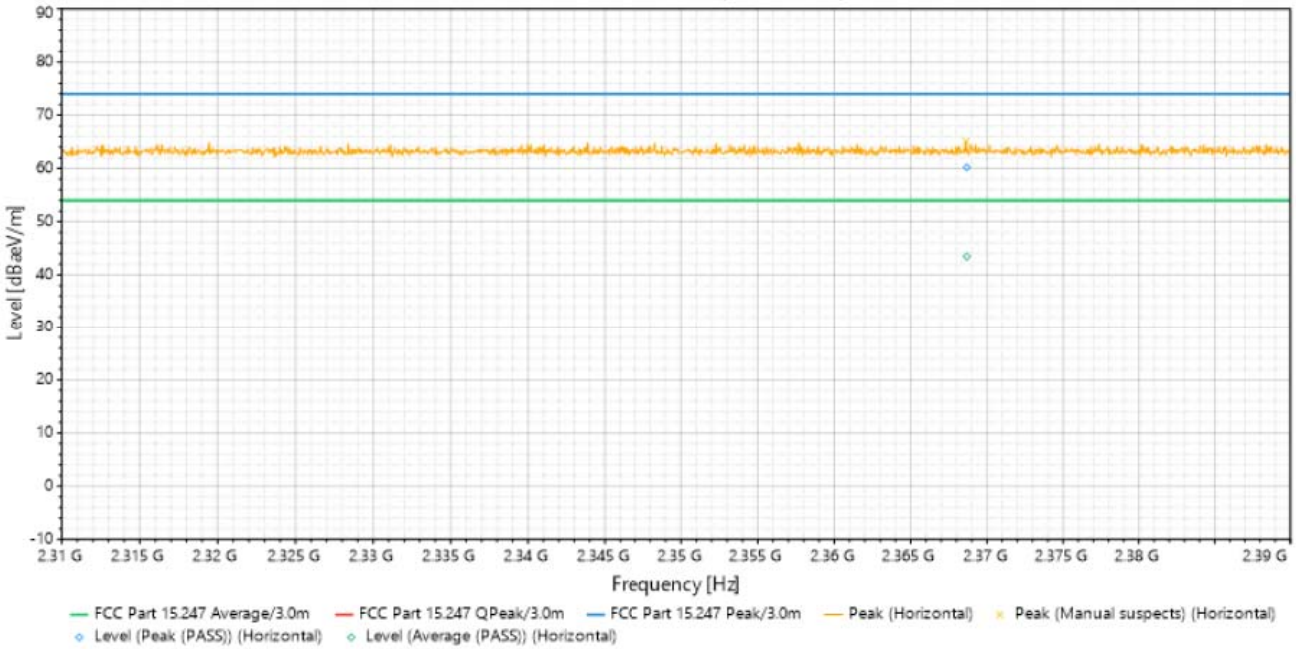
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2402 MHz		

#2 - Horizontal (Horizontal)



#2 - 2.31GHz-2.39GHz (Horizontal)



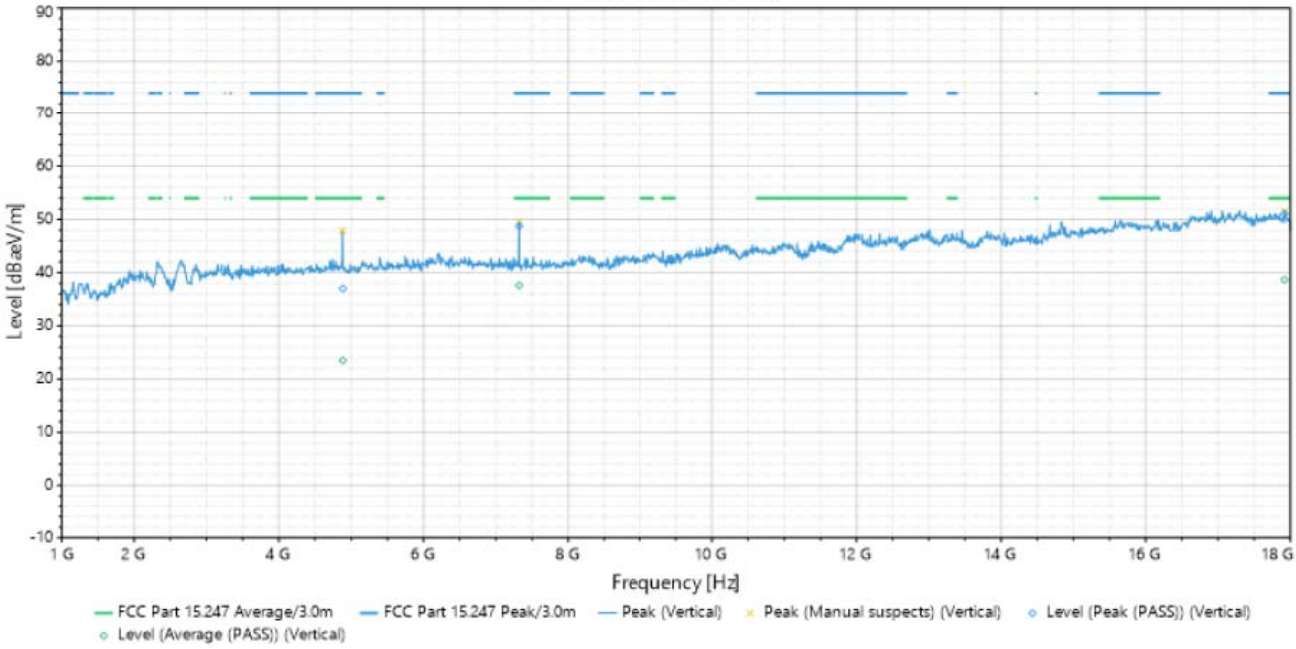
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	7204.66	Horizontal	46.339	NaN	NaN	3	8	6.607	Peak (PASS)
2	4803.34	Horizontal	48.337	74	-25.663	3.1	91	4.086	Peak (PASS)
3	4803.34	Horizontal	36.611	54	-17.389	3.1	91	4.086	Average (PASS)
4	15665.86	Horizontal	51.497	74	-22.503	3.1	360	9.949	Peak (PASS)
5	15665.86	Horizontal	38.316	54	-15.684	3.1	360	9.949	Average (PASS)
6	17958.57	Horizontal	53.853	74	-20.147	3.1	297	8.584	Peak (PASS)
7	17958.57	Horizontal	40.258	54	-13.742	3.1	297	8.584	Average (PASS)
8	2368.681	Horizontal	60.221	74	-13.779	1.717	353	38.273	Peak (PASS)
9	2368.681	Horizontal	43.448	54	-10.552	1.717	353	38.273	Average (PASS)

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2440 MHz		

#1 - Vertical (Vertical)

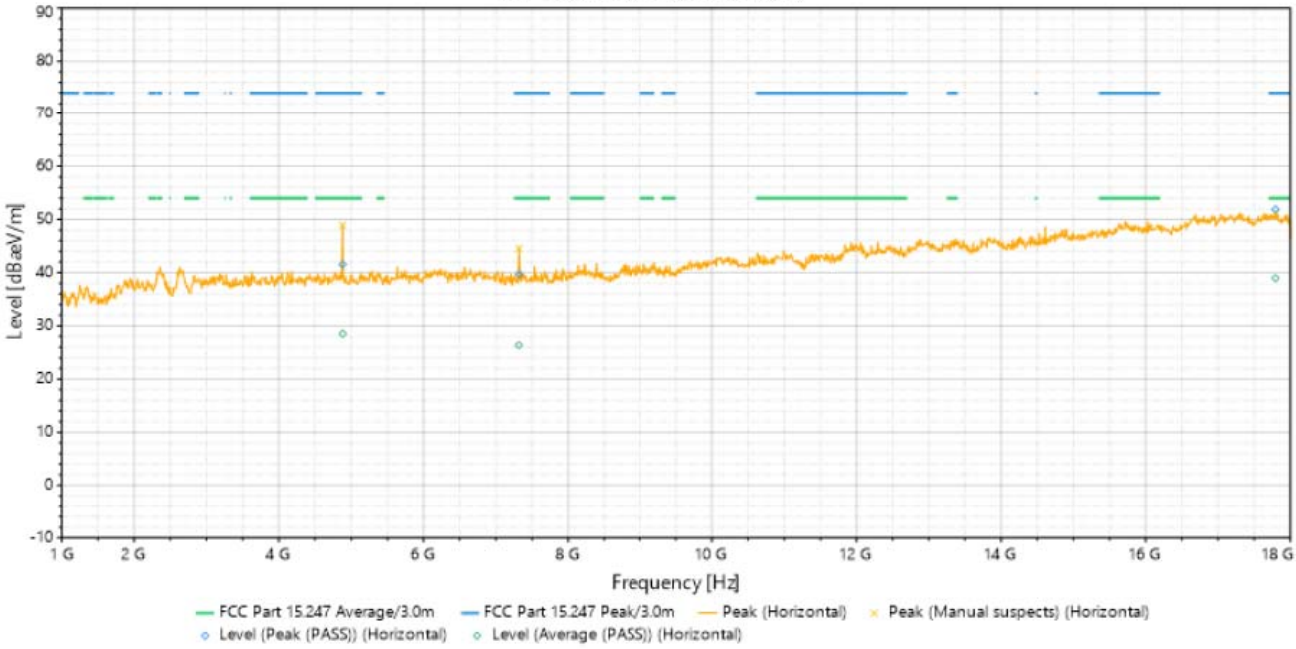


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	4884.89	Vertical	37.004	74	-36.996	2.6	360	4.178	Peak (PASS)
2	4884.89	Vertical	23.479	54	-30.521	2.6	360	4.178	Average (PASS)
3	7321.72	Vertical	48.762	74	-25.238	3.1	87	6.55	Peak (PASS)
4	7321.72	Vertical	37.61	54	-16.39	3.1	87	6.55	Average (PASS)
5	17918.43	Vertical	51.109	74	-22.891	3.4	295	8.84	Peak (PASS)
6	17918.43	Vertical	38.667	54	-15.333	3.4	295	8.84	Average (PASS)

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2440 MHz		

#2 - Horizontal (Horizontal)

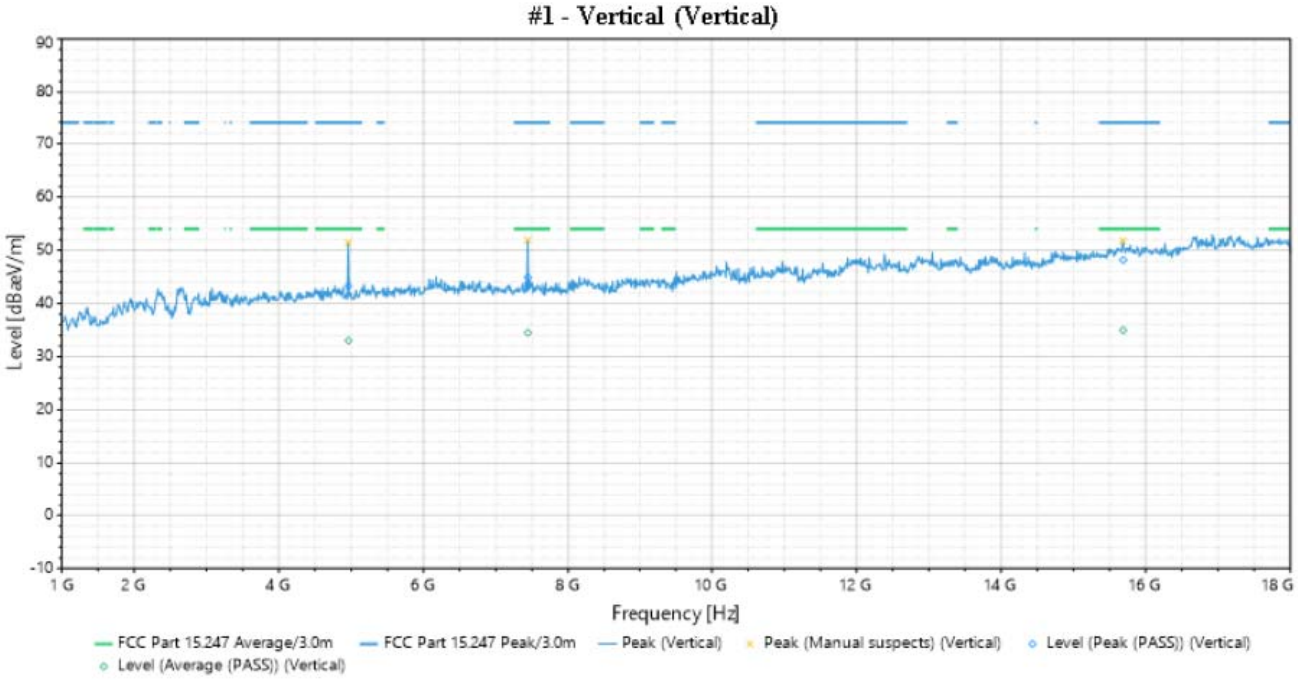


Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	4882.77	Horizontal	41.554	74	-32.446	3.1	52	4.126	Peak (PASS)
2	4882.77	Horizontal	28.506	54	-25.494	3.1	52	4.126	Average (PASS)
3	7317.93	Horizontal	39.686	74	-34.314	2.6	357	6.572	Peak (PASS)
4	7317.93	Horizontal	26.368	54	-27.632	2.6	357	6.572	Average (PASS)
5	17795.05	Horizontal	51.898	74	-22.102	2.6	360	8.691	Peak (PASS)
6	17795.05	Horizontal	38.981	54	-15.019	2.6	360	8.691	Average (PASS)

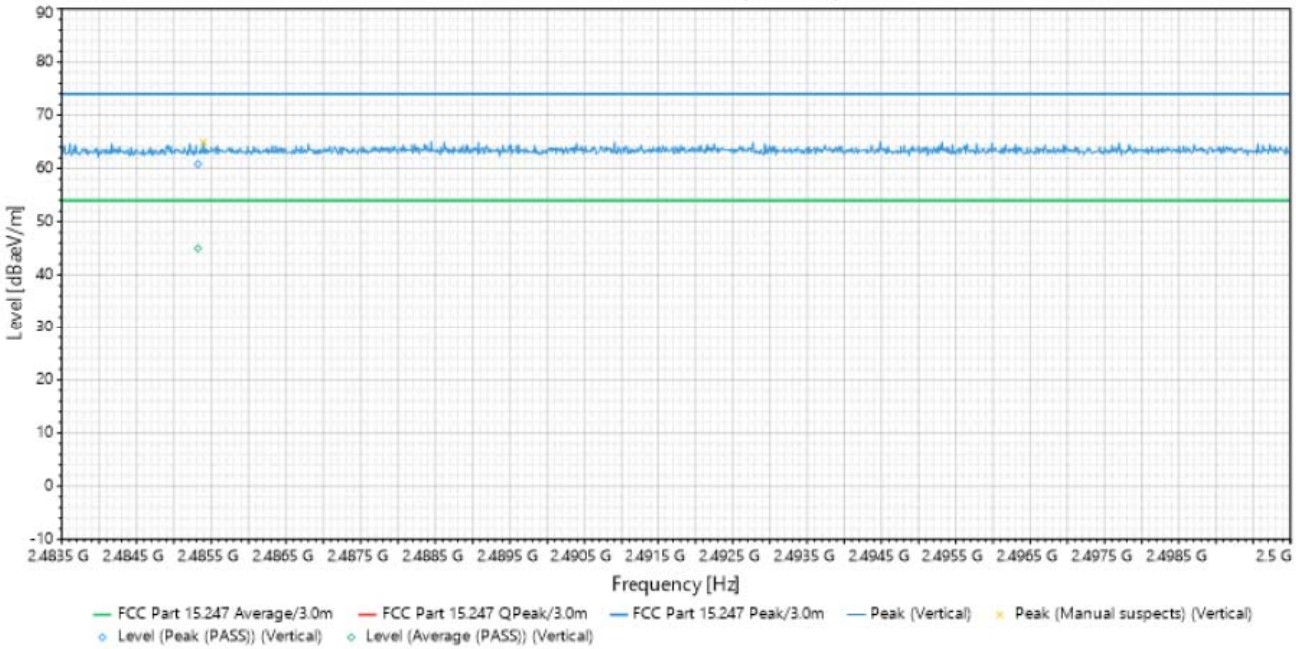
REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2480 MHz		



#1 - 2.4835GHz-2.5GHz (Vertical)

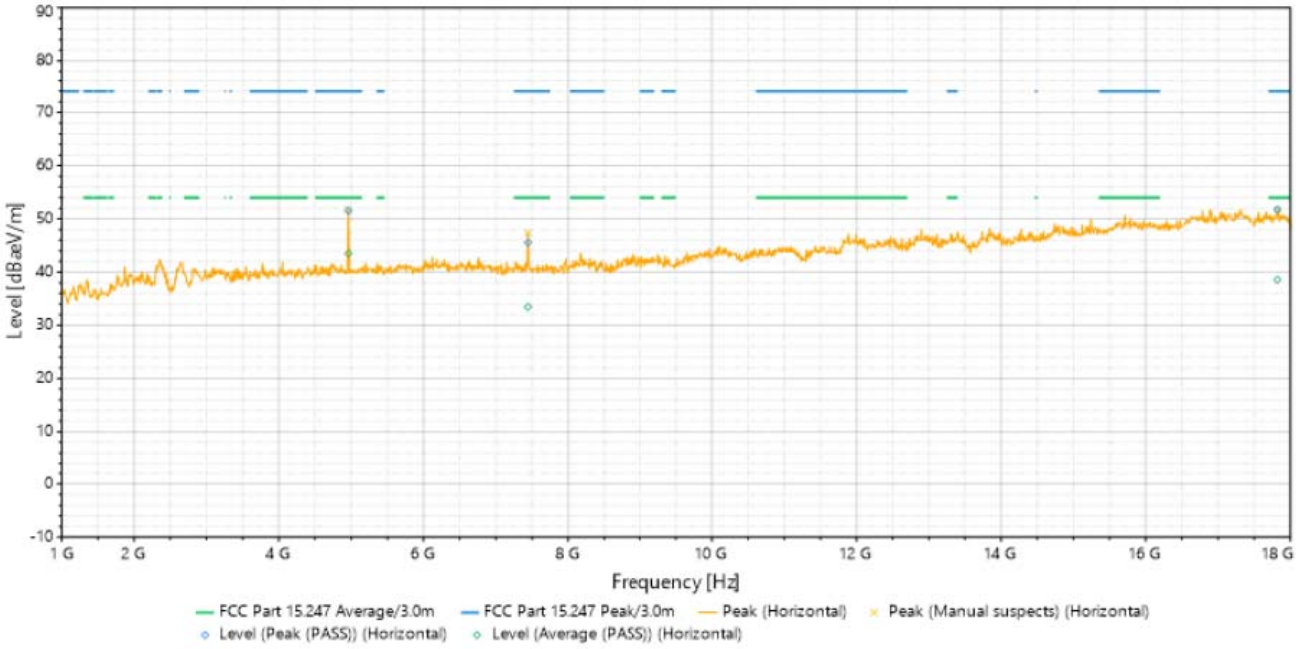


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	4961.06	Vertical	43.285	74	-30.715	1	151	4.184	Peak (PASS)
2	4961.06	Vertical	33.018	54	-20.982	1	151	4.184	Average (PASS)
3	7441.81	Vertical	44.904	74	-29.096	2.1	83	6.578	Peak (PASS)
4	7441.81	Vertical	34.498	54	-19.502	2.1	83	6.578	Average (PASS)
5	15687.56	Vertical	48.175	74	-25.825	2.4	0	10.019	Peak (PASS)
6	15687.56	Vertical	34.975	54	-19.025	2.4	0	10.019	Average (PASS)
7	2485.322	Vertical	60.817	74	-13.183	1.65	48	38.637	Peak (PASS)
8	2485.322	Vertical	44.992	54	-9.008	1.65	48	38.637	Average (PASS)

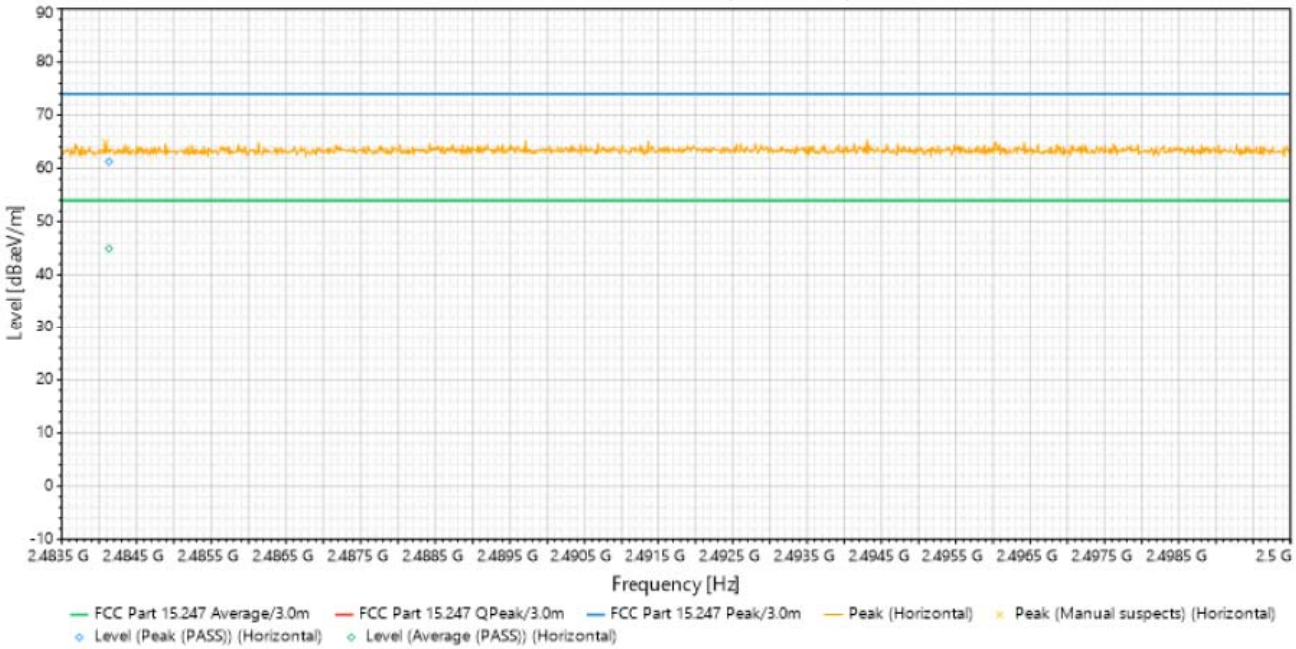
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2480 MHz		

#2 - Horizontal (Horizontal)



#2 - 2.4835GHz-2.5GHz (Horizontal)



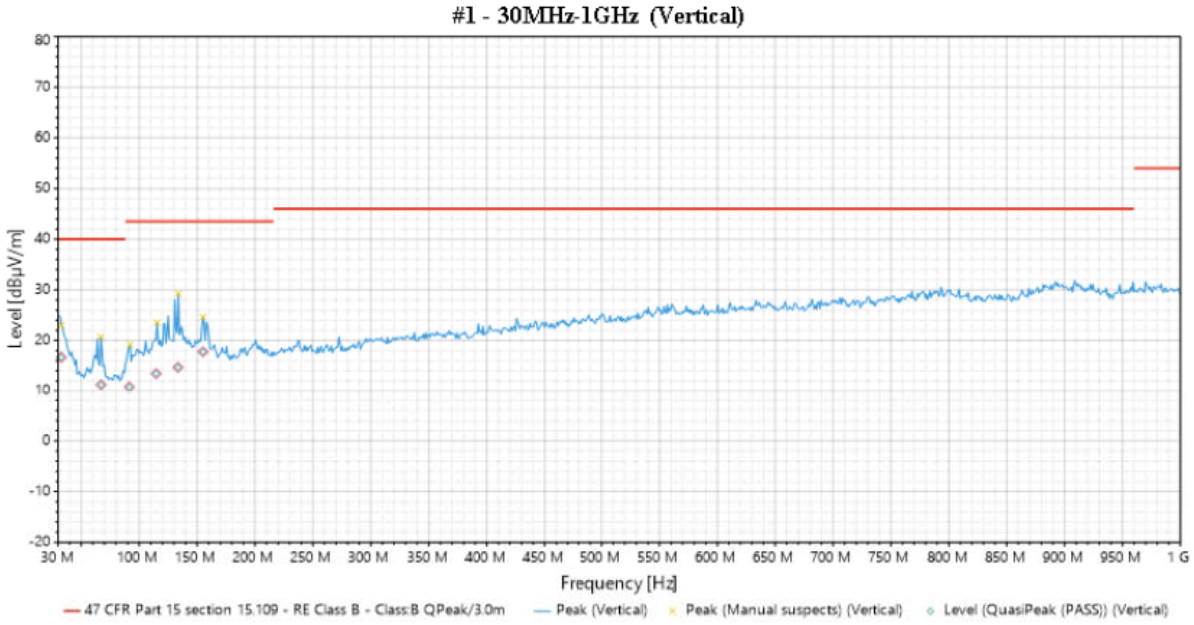
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	4961.3	Horizontal	51.562	74	-22.438	2.1	94	4.195	Peak (PASS)
2	4961.3	Horizontal	43.48	54	-10.52	2.1	94	4.195	Average (PASS)
3	7441.74	Horizontal	45.564	74	-28.436	3.1	297	6.586	Peak (PASS)
4	7441.74	Horizontal	33.469	54	-20.531	3.1	297	6.586	Average (PASS)
5	17821.93	Horizontal	51.745	74	-22.255	3.4	360	8.688	Peak (PASS)
6	17821.93	Horizontal	38.574	54	-15.426	3.4	360	8.688	Average (PASS)
7	2484.132	Horizontal	61.28	74	-12.72	1.78	203	38.635	Peak (PASS)
8	2484.132	Horizontal	44.973	54	-9.027	1.78	203	38.635	Average (PASS)

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

Model: FBW-2001-L
Radiated Emissions (30 MHz~1000 MHz)

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	30MHz-1GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2440 MHz		



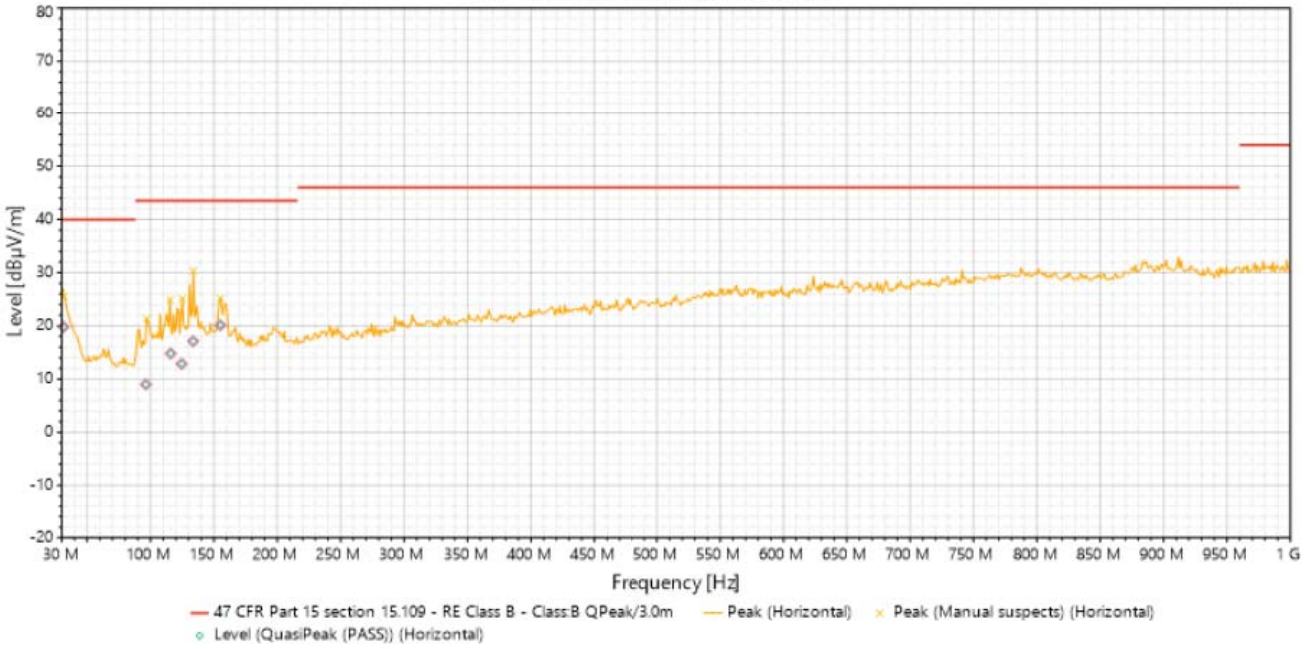
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/ Fail
1	32.83	Vertical	16.678	40	-23.322	3.303	0	-4.544	Pass
2	67.15	Vertical	11.26	40	-28.74	2.431	234	-13.667	Pass
3	91.49	Vertical	10.814	43.5	-32.686	2.768	0	-12.689	Pass
4	114.59	Vertical	13.479	43.5	-30.021	3.311	320	-8.056	Pass
5	133.43	Vertical	14.717	43.5	-28.783	2.76	348	-7.29	Pass
6	155.21	Vertical	17.795	43.5	-25.705	2.321	289	-8.402	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	30MHz-1GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2440 MHz		

#2 - 30MHz-1GHz (Horizontal)



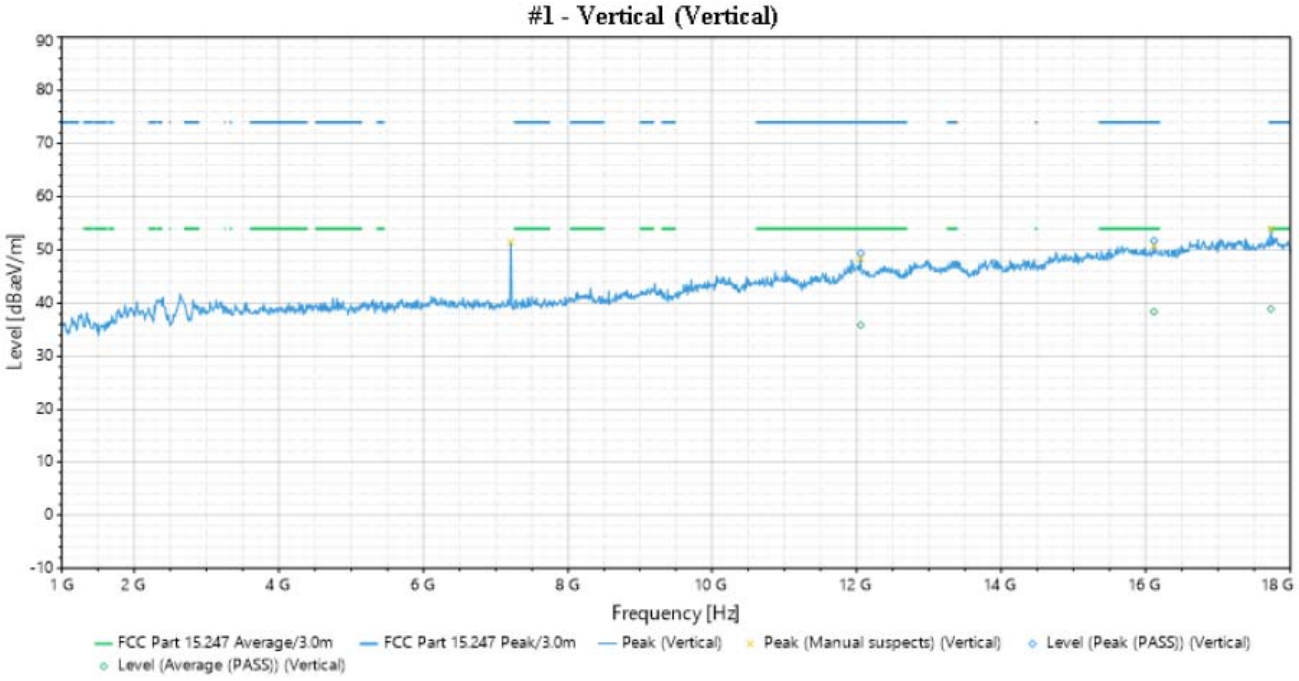
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/ Fail
1	31.51	Horizontal	19.797	40	-20.203	1.774	48	-1.862	Pass
2	96.38	Horizontal	9.005	43.5	-34.495	2.424	152	-12.049	Pass
3	115.91	Horizontal	14.793	43.5	-28.707	2.216	2	-8.333	Pass
4	124.63	Horizontal	12.861	43.5	-30.639	2.546	162	-7.811	Pass
5	133.72	Horizontal	17.107	43.5	-26.393	2.98	243	-7.357	Pass
6	155.18	Horizontal	20.115	43.5	-23.385	1.231	93	-8.854	Pass

REMARKS:

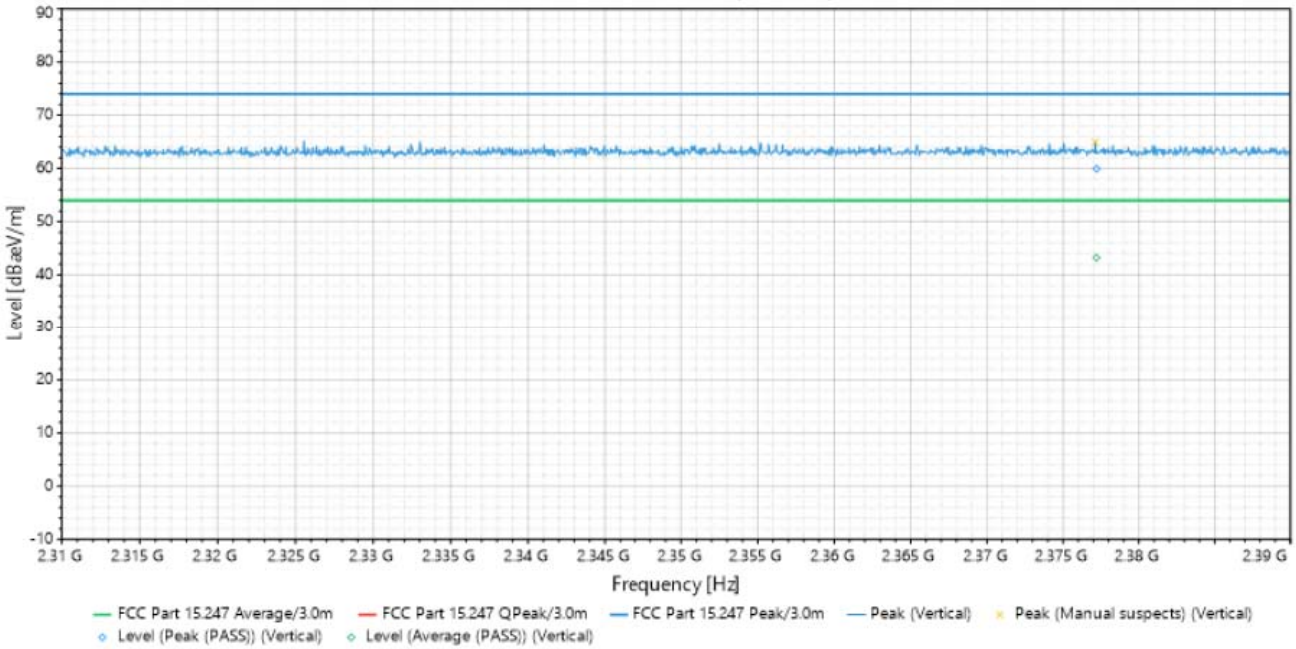
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

Radiated Emissions (Above 1GHz)

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2402 MHz		



#1 - 2.31GHz-2.39GHz (Vertical)



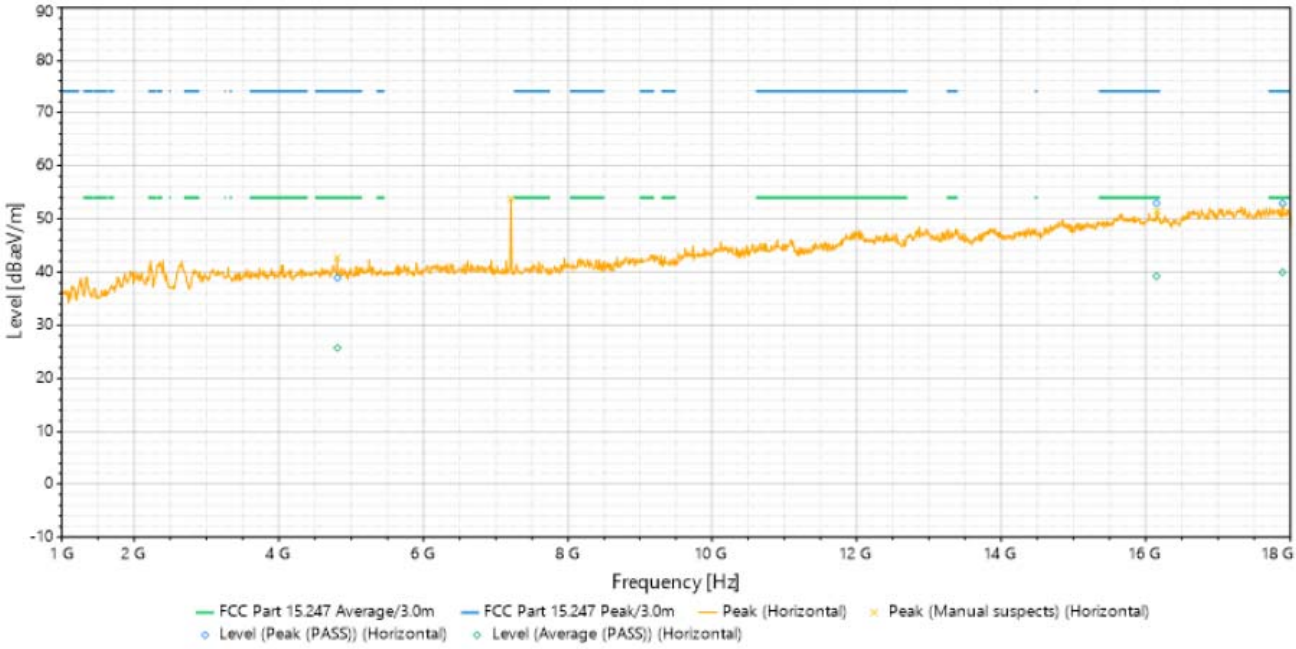
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	7204.49	Vertical	51.458	NaN	NaN	3	0	6.568	Peak (PASS)
2	12058.63	Vertical	49.424	74	-24.576	3.1	297	8.865	Peak (PASS)
3	12058.63	Vertical	35.866	54	-18.134	3.1	297	8.865	Average (PASS)
4	16115.01	Vertical	51.785	74	-22.215	3.4	166	10.362	Peak (PASS)
5	16115.01	Vertical	38.425	54	-15.575	3.4	166	10.362	Average (PASS)
6	17731.8	Vertical	51.974	74	-22.026	2.6	256	8.859	Peak (PASS)
7	17731.8	Vertical	38.935	54	-15.065	2.6	256	8.859	Average (PASS)
8	12058.63	Vertical	49.424	74	-24.576	3.1	297	8.865	Peak (PASS)
9	12058.63	Vertical	35.866	54	-18.134	3.1	297	8.865	Average (PASS)
10	2377.205	Vertical	59.981	74	-14.019	1.721	172	38.182	Peak (PASS)
11	2377.205	Vertical	43.223	54	-10.777	1.721	172	38.182	Average (PASS)

REMARKS:

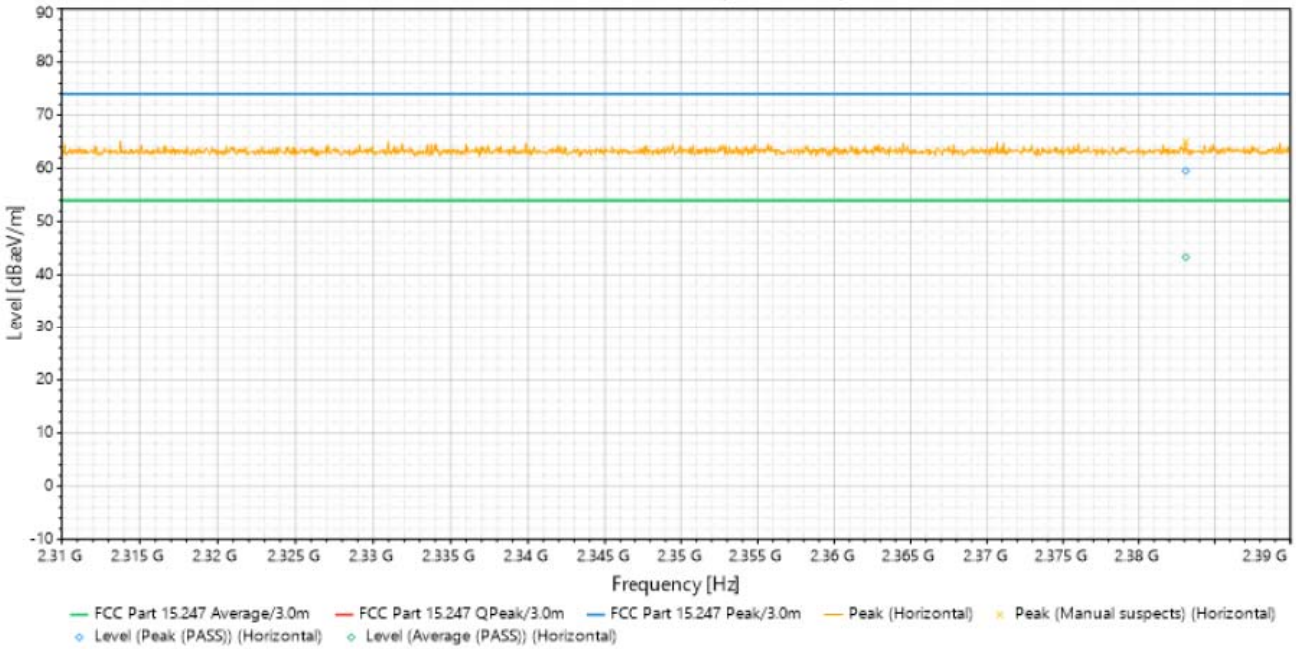
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2402 MHz		

#2 - Horizontal (Horizontal)



#2 - 2.31GHz-2.39GHz (Horizontal)



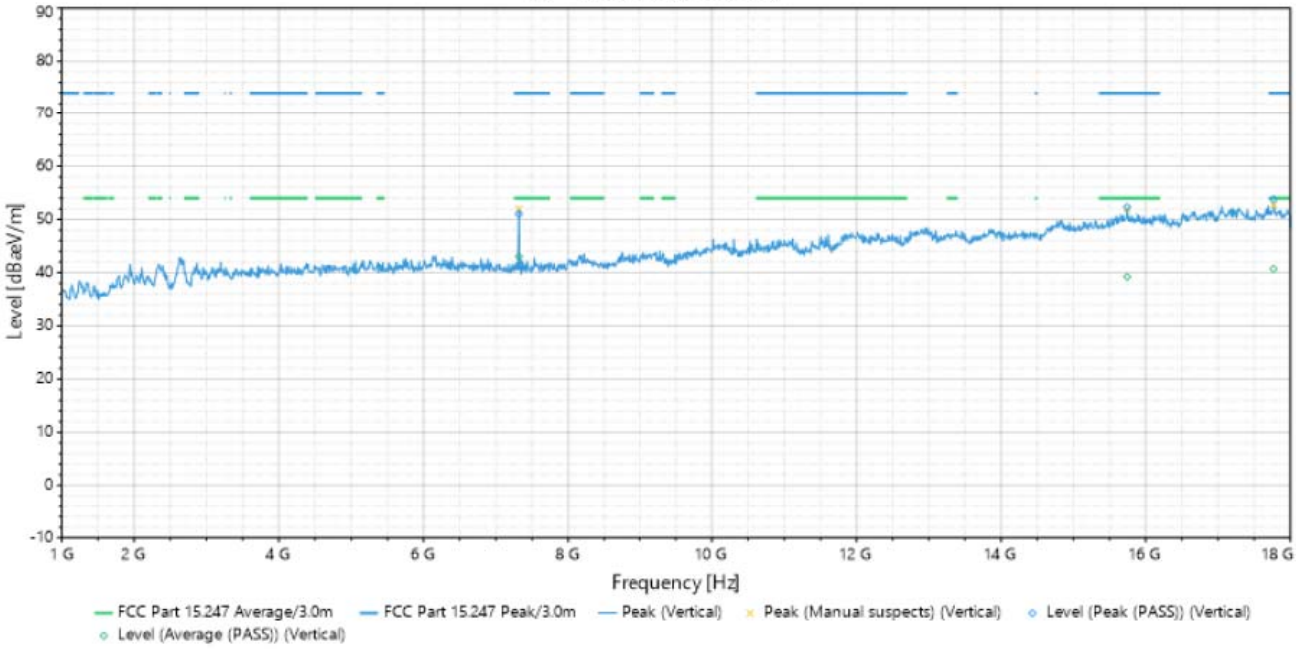
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	7204.66	Horizontal	53.781	NaN	NaN	1	39	6.607	Peak (PASS)
2	4811.04	Horizontal	38.916	74	-35.084	2.1	360	4.09	Peak (PASS)
3	4811.04	Horizontal	25.755	54	-28.245	2.1	360	4.09	Average (PASS)
4	16150.77	Horizontal	52.959	74	-21.041	3.1	233	10.324	Peak (PASS)
5	16150.77	Horizontal	39.23	54	-14.77	3.1	233	10.324	Average (PASS)
6	17893.32	Horizontal	52.919	74	-21.081	3.4	88	8.661	Peak (PASS)
7	17893.32	Horizontal	39.967	54	-14.033	3.4	88	8.661	Average (PASS)
8	2383.094	Horizontal	59.549	74	-14.451	2.43	247	38.307	Peak (PASS)
9	2383.094	Horizontal	43.333	54	-10.667	2.43	247	38.307	Average (PASS)

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2440 MHz		

#1 - Vertical (Vertical)

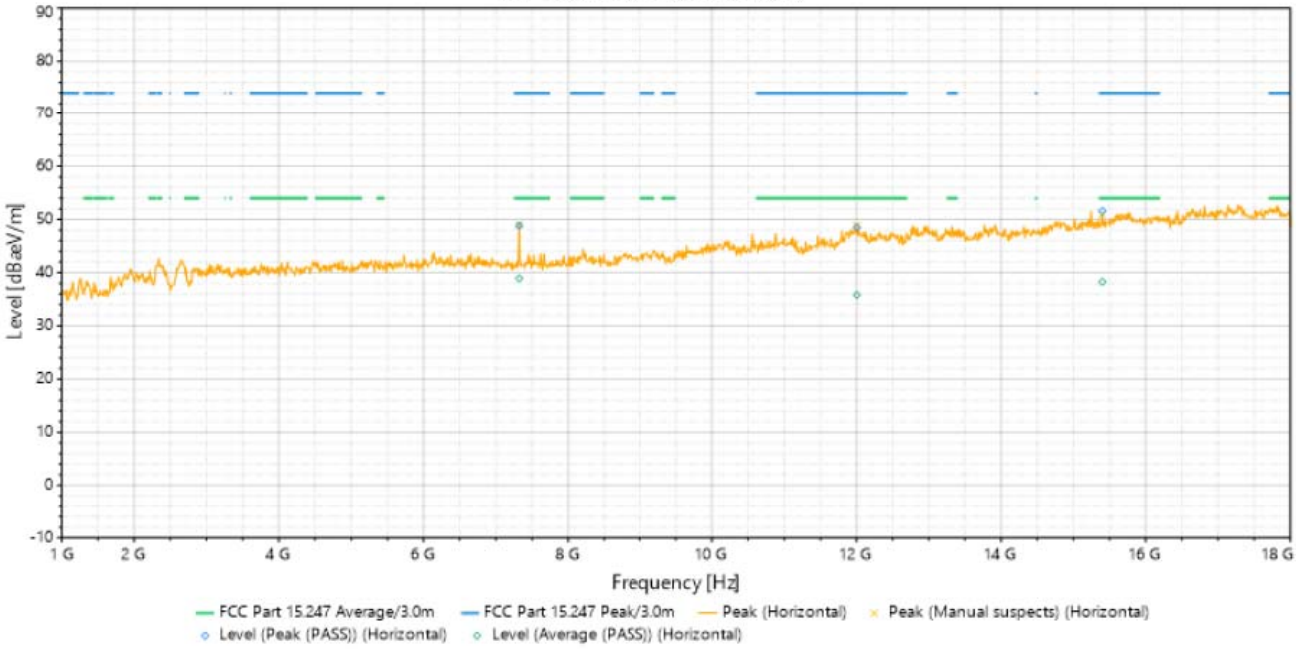


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	7318.79	Vertical	50.996	74	-23.004	3.1	360	6.549	Peak (PASS)
2	7318.79	Vertical	42.996	54	-11.004	3.1	360	6.549	Average (PASS)
3	15744.54	Vertical	52.309	74	-21.691	3.1	125	10.015	Peak (PASS)
4	15744.54	Vertical	39.22	54	-14.78	3.1	125	10.015	Average (PASS)
5	17769.52	Vertical	53.78	74	-20.22	3.1	199	8.847	Peak (PASS)
6	17769.52	Vertical	40.693	54	-13.307	3.1	199	8.847	Average (PASS)

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2440 MHz		

#2 - Horizontal (Horizontal)

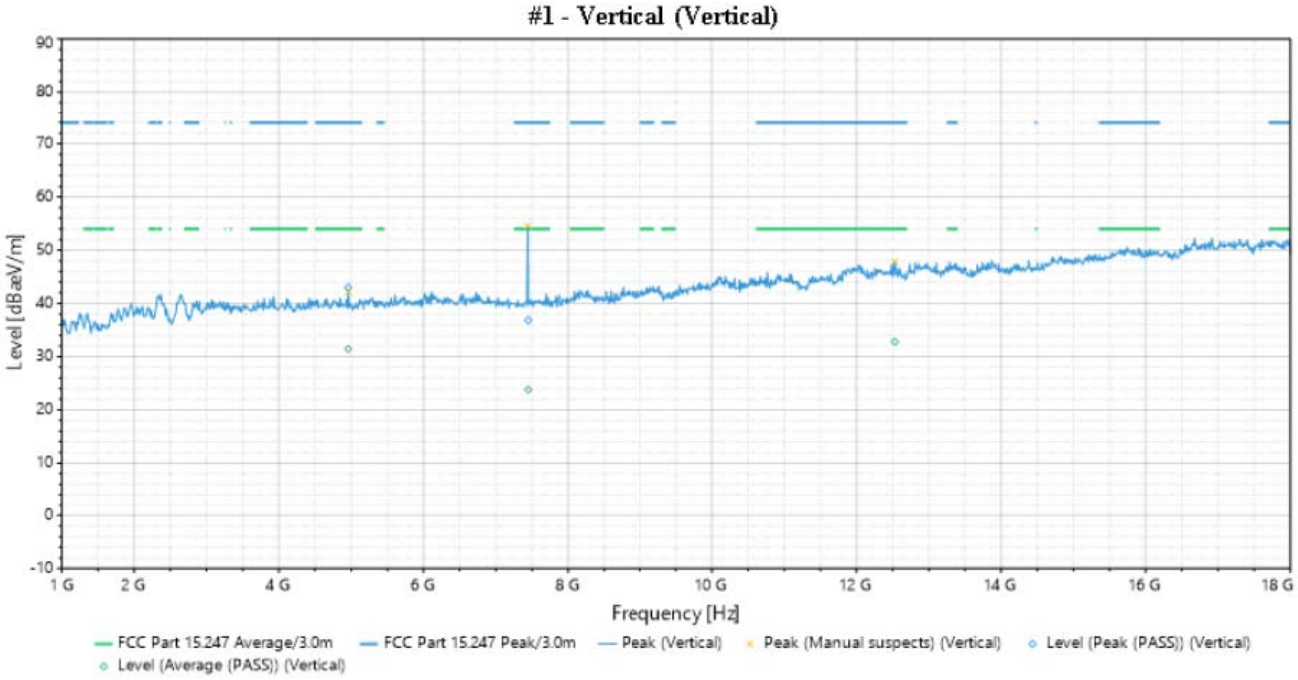


Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	7321.82	Horizontal	48.855	74	-25.145	2.1	84	6.574	Peak (PASS)
2	7321.82	Horizontal	38.918	54	-15.082	2.1	84	6.574	Average (PASS)
3	12004.24	Horizontal	48.489	74	-25.511	3.1	0	8.883	Peak (PASS)
4	12004.24	Horizontal	35.823	54	-18.177	3.1	0	8.883	Average (PASS)
5	15401.77	Horizontal	51.603	74	-22.397	3.1	254	9.444	Peak (PASS)
6	15401.77	Horizontal	38.269	54	-15.731	3.1	254	9.444	Average (PASS)

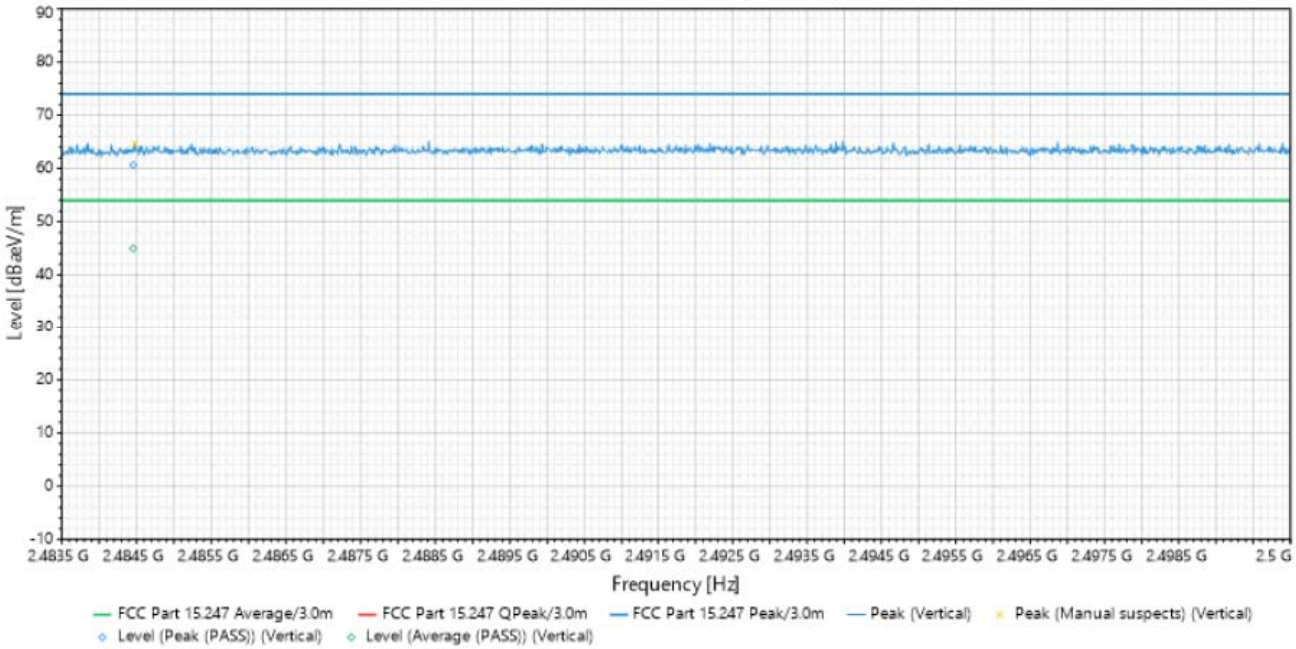
REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2480 MHz		



#1 - 2.4835GHz-2.5GHz (Vertical)

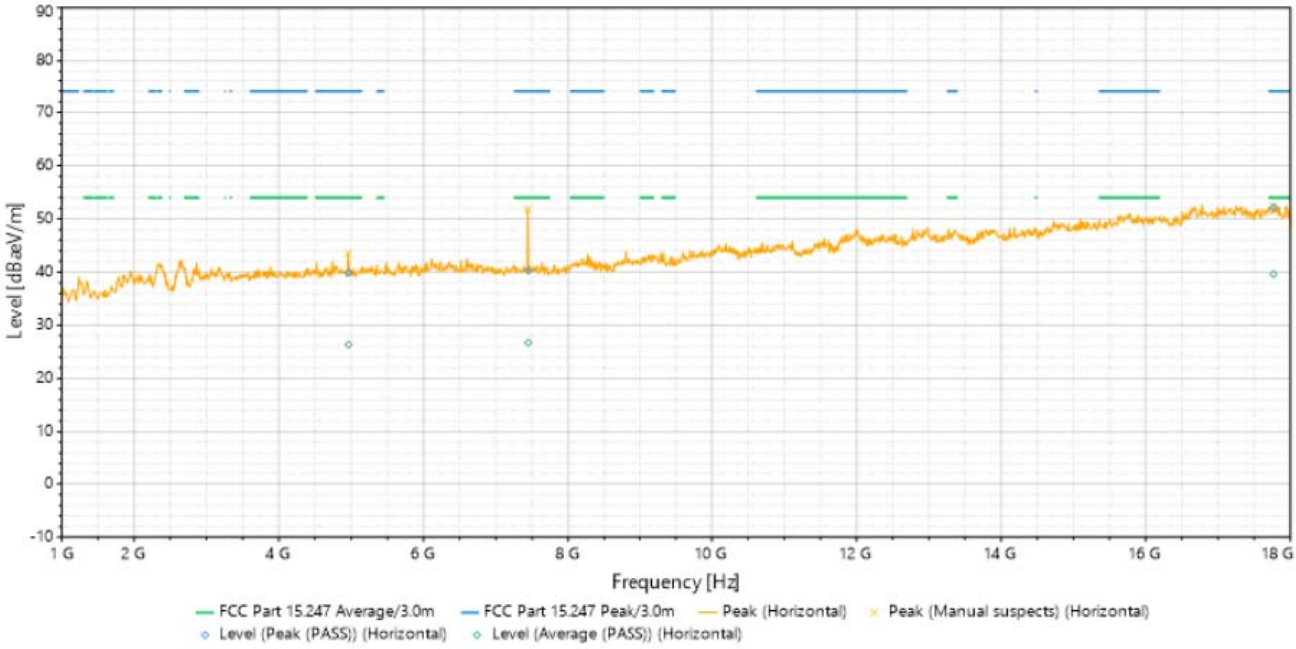


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	4959.3	Vertical	43.025	74	-30.975	2.6	356	4.181	Peak (PASS)
2	4959.3	Vertical	31.443	54	-22.557	2.6	356	4.181	Average (PASS)
3	7445.37	Vertical	36.863	74	-37.137	1.1	55	6.576	Peak (PASS)
4	7445.37	Vertical	23.794	54	-30.206	1.1	55	6.576	Average (PASS)
5	12529.57	Vertical	46.093	74	-27.907	2.6	256	9.001	Peak (PASS)
6	12529.57	Vertical	32.79	54	-21.21	2.6	256	9.001	Average (PASS)
7	2484.457	Vertical	60.648	74	-13.352	2.48	325	38.633	Peak (PASS)
8	2484.457	Vertical	45.001	54	-8.999	2.48	325	38.633	Average (PASS)

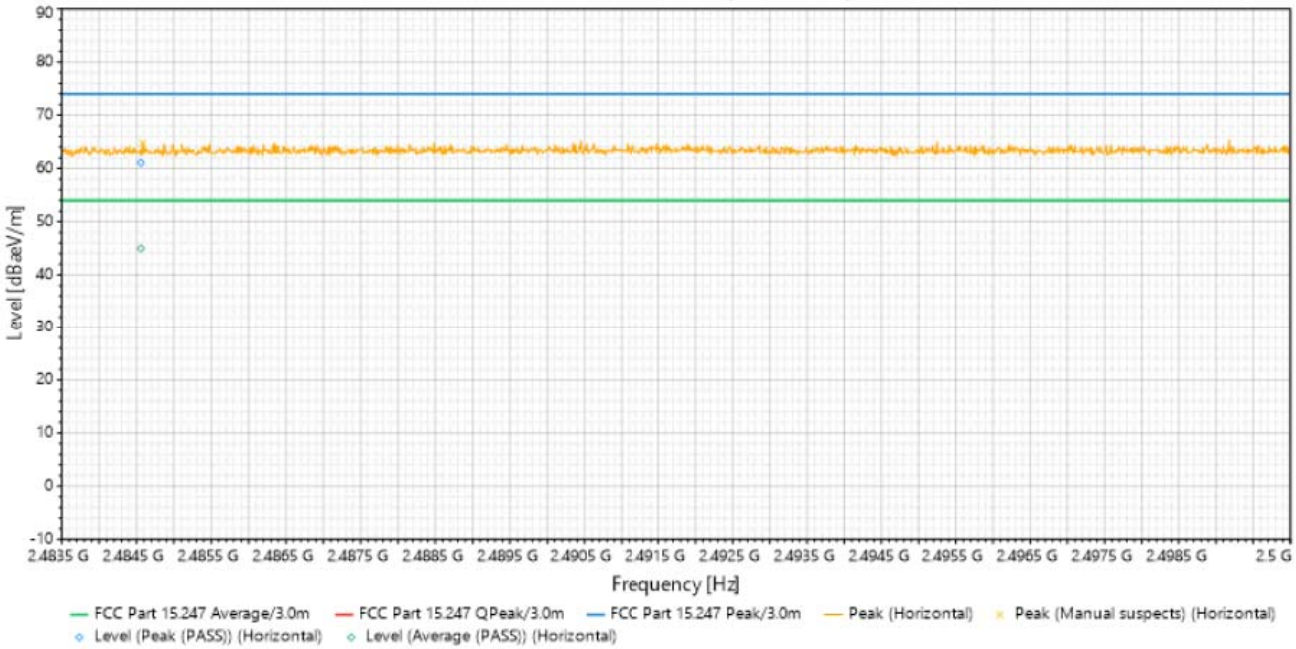
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	120 Vac	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Christopher Martin
Test Mode	TX MODE BLE 2480 MHz		

#2 - Horizontal (Horizontal)



#2 - 2.4835GHz-2.5GHz (Horizontal)



Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	4964.76	Horizontal	39.89	74	-34.11	2.6	360	4.197	Peak (PASS)
2	4964.76	Horizontal	26.372	54	-27.628	2.6	360	4.197	Average (PASS)
3	7445.41	Horizontal	40.281	74	-33.719	2.1	60	6.586	Peak (PASS)
4	7445.41	Horizontal	26.764	54	-27.236	2.1	60	6.586	Average (PASS)
5	17768.74	Horizontal	52.16	74	-21.84	3.4	0	8.699	Peak (PASS)
6	17768.74	Horizontal	39.624	54	-14.376	3.4	0	8.699	Average (PASS)
7	2484.559	Horizontal	61.077	74	-12.923	2.005	21	38.638	Peak (PASS)
8	2484.559	Horizontal	44.991	54	-9.009	2.005	21	38.638	Average (PASS)

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

Conducted Emission Measurement

Limits of Conducted Emission Measurement :

The following standards specified below are covered in the scope of this section of the test report:

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

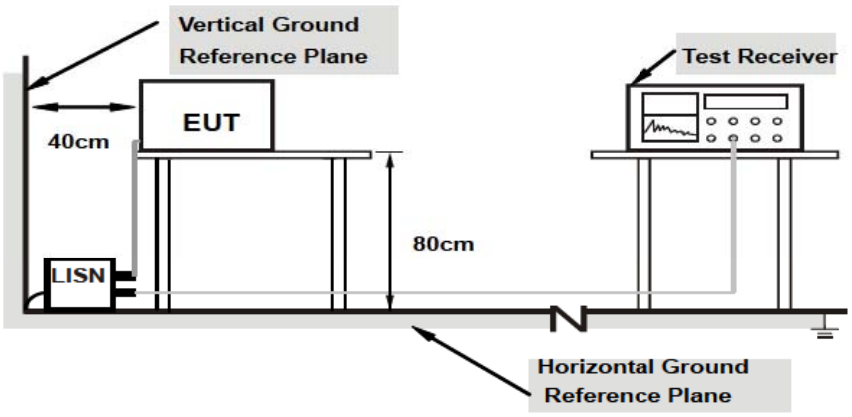
Conducted Emissions - Test Procedure

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency ranges from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Conducted Emissions - Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo)

Test Results:

N/A

IV. Pictures of test Arrangements

Please see setup photo file

END OF REPORT

