

March 29, 2024

CalAmp Wireless Networks, Inc

2200 Faraday Ave, #200
Carlsbad, CA 92008

Dear Imad Rizk,

Enclosed is the Wireless test report for compliance testing of the CalAmp Wireless Networks, Inc., LTE CAT1 Telematics Gateway 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.



Documentation Department
Eurofins Electrical and Electronic Testing NA, Inc.

Reference: WIR130984_130989-CalAmp_FCC_ISED-BLE_Rev 1.1



FCC Test Site(s) Reg #:US1123
IC Test Site(s) Reg. #: 2043C

Certificates and reports shall not be reproduced except in full, without the written permission of Eurofins Electrical and Electronic Testing NA, Inc. While use of the A2LA logo in this report reflects Eurofins Electrical and Electronic Testing NA, Inc. accreditation under these programs, the report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government. This letter of transmittal is not a part of the attached report.

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: CalAmp Wireless Networks, Inc

Product: LTE CAT1 Telematics Gateway

Report: WIR130984_130989-CalAmp_FCC_ISED-BLE_Rev 1.1

Applicant Address:

**2200 Faraday Ave, #200
Carlsbad, CA 92008**

Manufacturer Address:

**2200 Faraday Ave, #200
Carlsbad, CA 92008**

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

FCC/ ISED Test Report

Applicant name: CalAmp Wireless Networks, Inc

Product: CalAmp Wireless Networks, Inc

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

Richard Dollente

Richard Dollente 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
Ø	March 29, 2024	Initial Issue.
1.0	April 22, 2024	Update Output Power Procedure
1.1	May 01, 2024	Add Test Data for Data Rate 2 MHz/ Updated Output Power for 1MHz Data Rate

Table of Contents

I.	Executive Summary	6
A.	Executive Summary	6
II.	Equipment Information.....	7
A.	Overview.....	7
B.	References.....	9
C.	Test Site	9
D.	Measurement Uncertainty	10
E.	Modifications	10
	Modifications to EUT	10
	Modifications to Test Standard.....	10
F.	Disposition of EUT	10
III.	Electromagnetic Compatibility Criteria for Intentional Radiators.....	11
A.	Radiated Emission and Bandage Measurement	11
B.	Conducted Emission Measurement.....	48
C.	6dB Bandwidth Measurement & 99% Bandwidth Measurement	51
D.	Conducted Output Power Measurement	60
E.	Power Spectral Density Measurement	62
F.	Conducted Out of Band Emission Measurement	67

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	N/A	Powered by DC so test is not required.
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	Meet the requirement of limit.
15.247(b)	RSS 247 5.2.1 RSS Gen 6.7	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	RSS 247 5.4.4	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	RSS 247 5.2.2	Antenna Requirement	PASS	Chip antenna (without connector) meet the requirement.

Note:

1. 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:	LTE CAT1 Telematics Gateway	
Brand:	CalAmp	
Model(s) Tested:	LMU4350LB/ LMU4351LB	
Series Model:	N/A	
Sample Status:	Product Sample	
EUT Specifications:	Primary Power:	12 Vdc/ 24 Vdc
	Voltage Frequency:	N/A
	Technology / Type of Modulations:	BLUETOOTH LE: GFSK
	Operating Frequency :	2.402 ~ 2.480GHz
	FCC ID:	APV-4350LB
	ISED ID:	5843C-4350LB
	Antenna Type/ Manufacturer/ Model:	Dielectric Chip Antenna/ CIROCOMM TECHNOLOGY/ DCAK0012
	Antenna connector:	N/A
	Antenna Gain	Antenna Gain: 2 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:	Richard Dollente	
Issue Date(s):	May 01, 2024	

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
LMU4350LB/ LMU4351LB	REV A	3.21.21	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 CalAmp Wireless Networks, Inc 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:

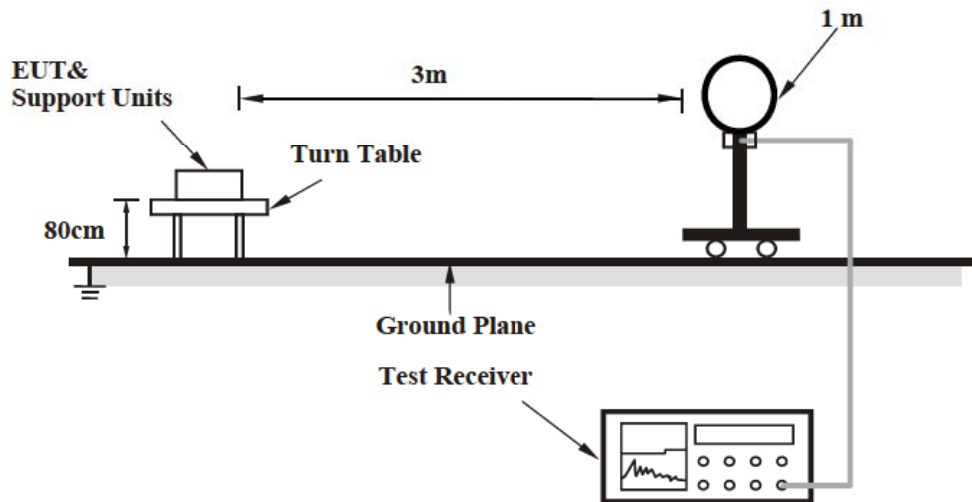
Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Test Procedures:

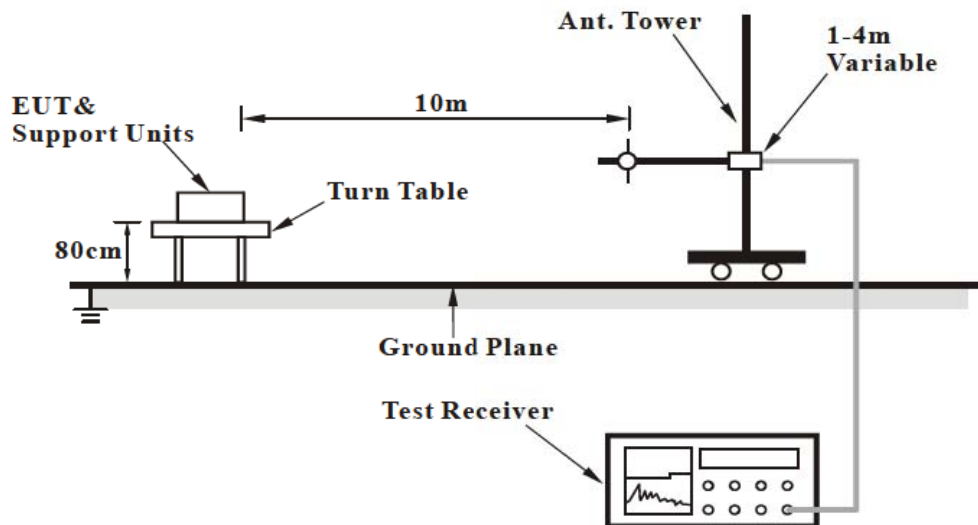
The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line. Only noise floor was measured above 18 GHz.

Test Setup

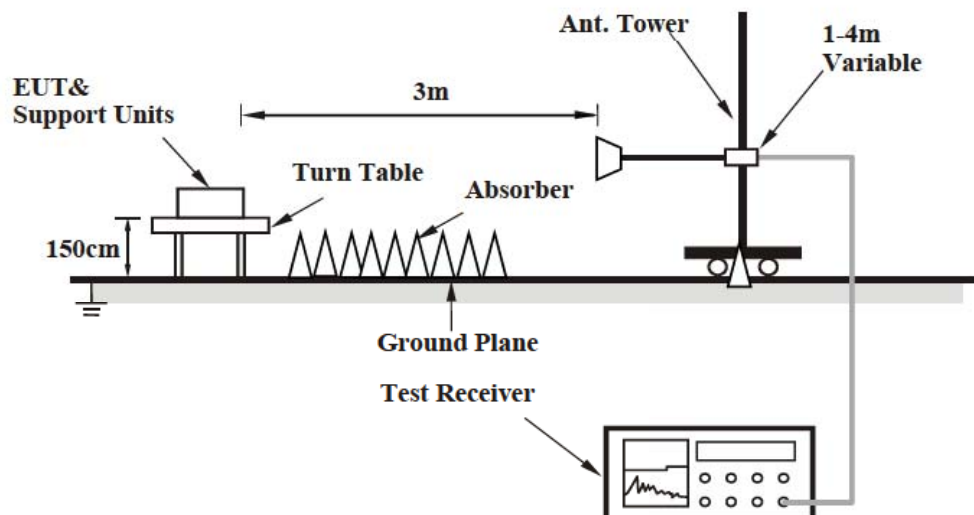
For Radiated Emission Below 30MHz



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

Note 1: Verified by calibrated instrumentation at the time of testing

Test Engineer: Richard Dollente

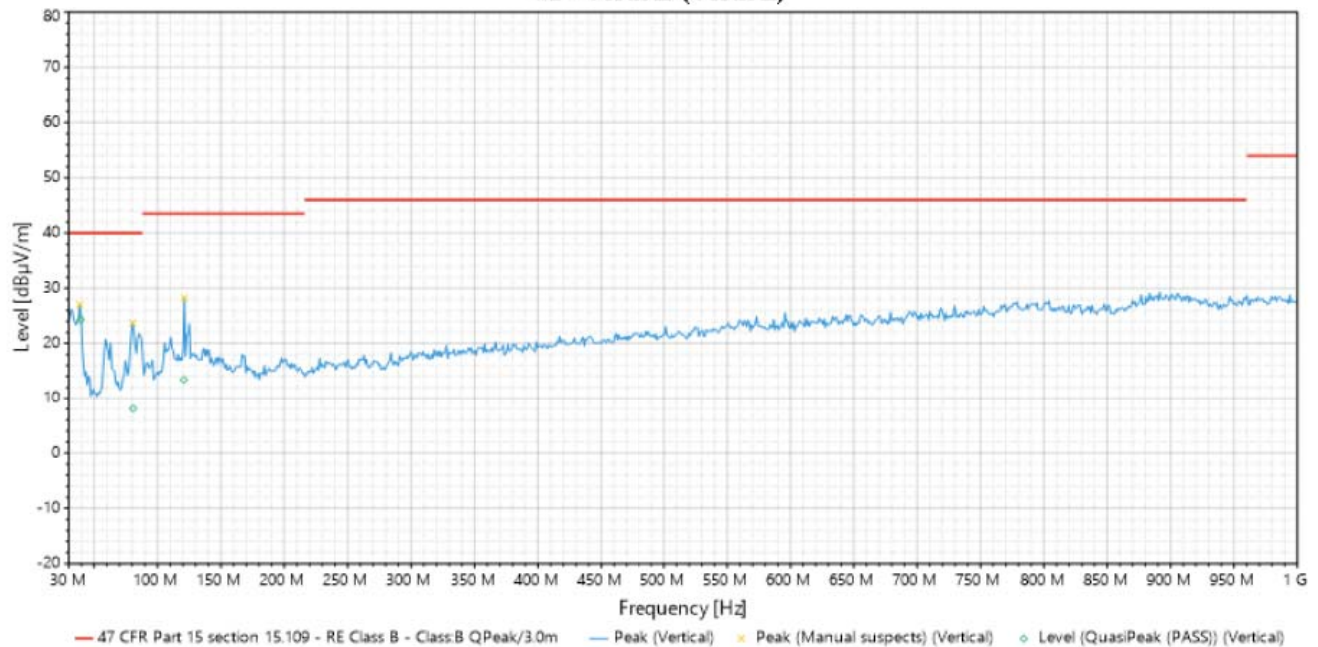
Test Date(s): 03/29/2024

Test Data

Radiated Emissions (30 MHz~1000 MHz)

EUT Test Condition		Measurement Detail	
Input Power	3Vdcdc	Frequency Range	30MHz-1GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz, 1Mbps Data Rate		

#1 - Vertical (Vertical)



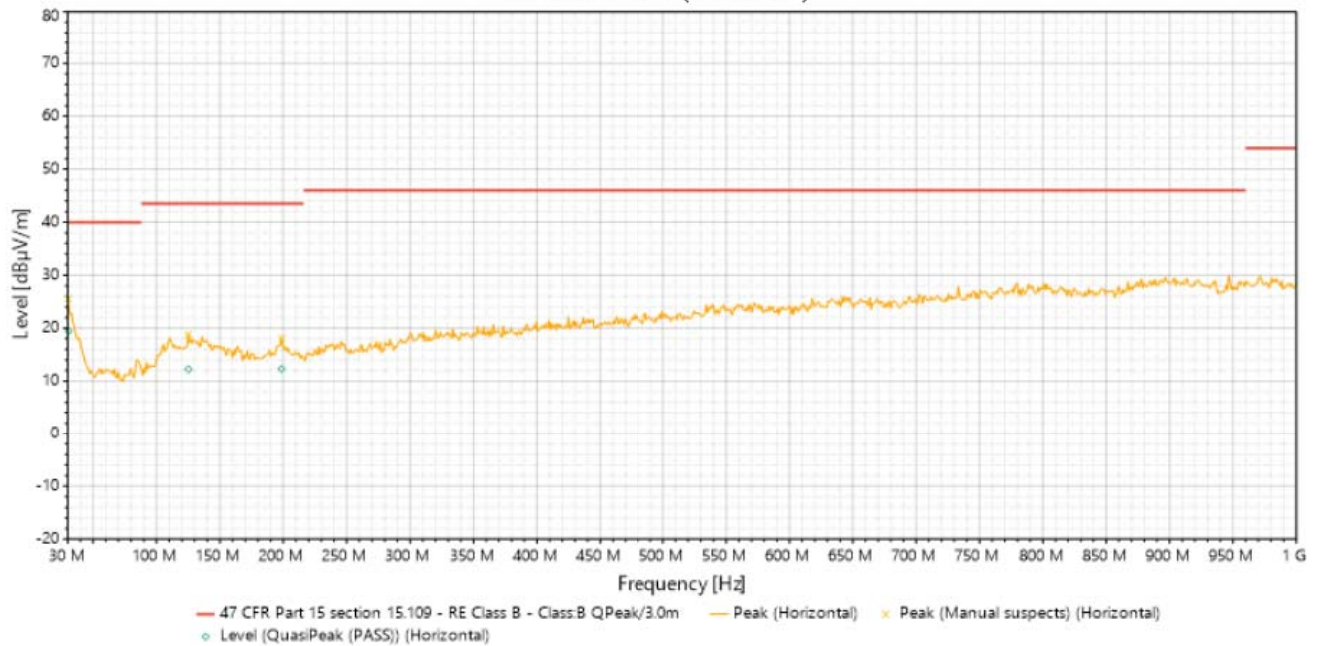
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/Fail
1	39.48	Vertical	24.321	40	-15.679	1.2	0	-9.541	Pass
2	80.81	Vertical	8.091	40	-31.909	1.972	197	-15.144	Pass
3	120.82	Vertical	13.422	43.5	-30.078	1.497	328	-7.68	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	3Vdcdc	Frequency Range	30MHz-1GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz, 1Mbps Data Rate		

#2 - Horizontal (Horizontal)



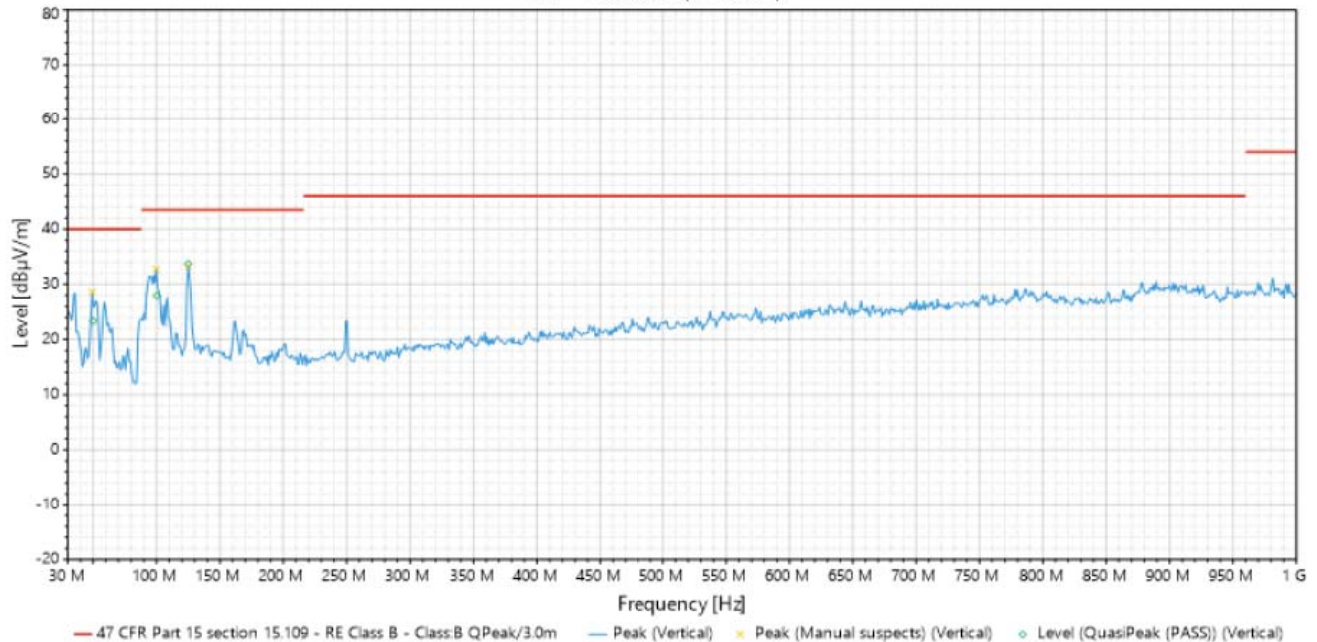
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/Fail
1	30.67	Horizontal	19.477	40	-20.523	2.919	24	-1.161	Pass
2	125.2	Horizontal	12.226	43.5	-31.274	2.088	215	-7.771	Pass
3	198.66	Horizontal	12.286	43.5	-31.214	3.273	201	-7.717	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	3Vdc	Frequency Range	30MHz-1GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz, 2Mbps Data Rate		

#1 - Vertical (Vertical)

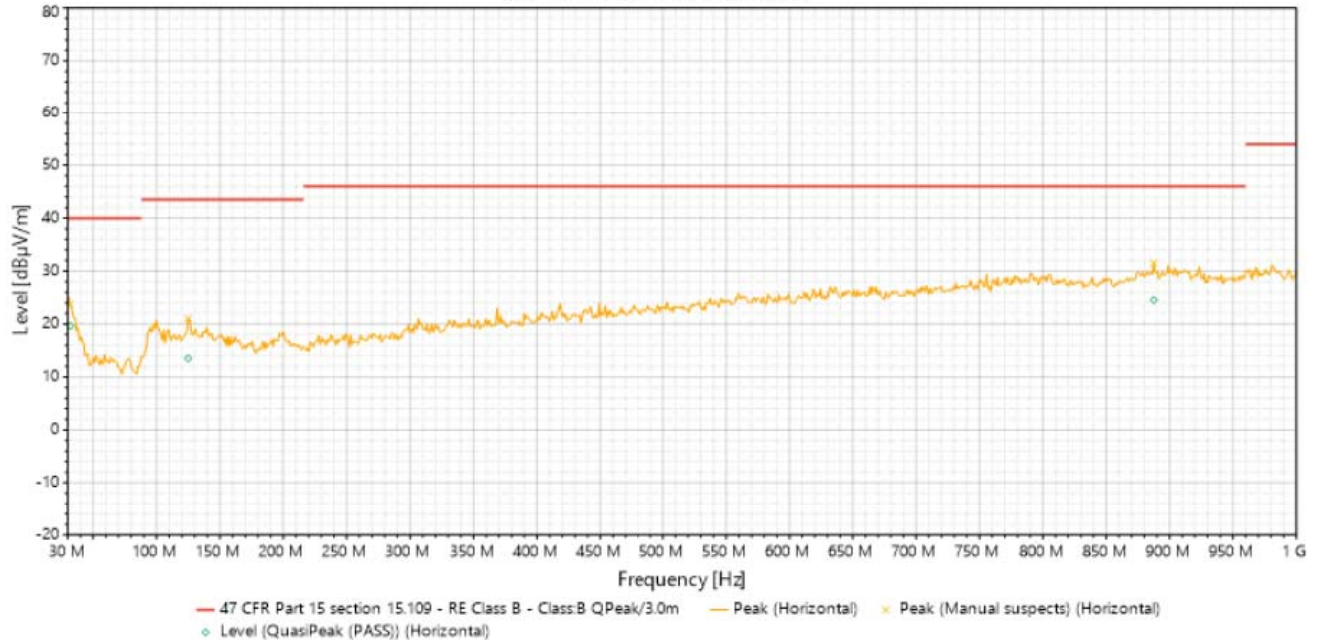


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/Fail
1	50.14	Vertical	23.392	40	-16.608	1.168	266	-14.42	Pass
2	100.27	Vertical	27.926	43.5	-15.574	1.866	32	-10.353	Pass
3	125	Vertical	33.681	43.5	-9.819	1.027	121	-7.513	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	3Vdc	Frequency Range	30MHz-1GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz, 2Mbps Data Rate		

#2 - Horizontal (Horizontal)


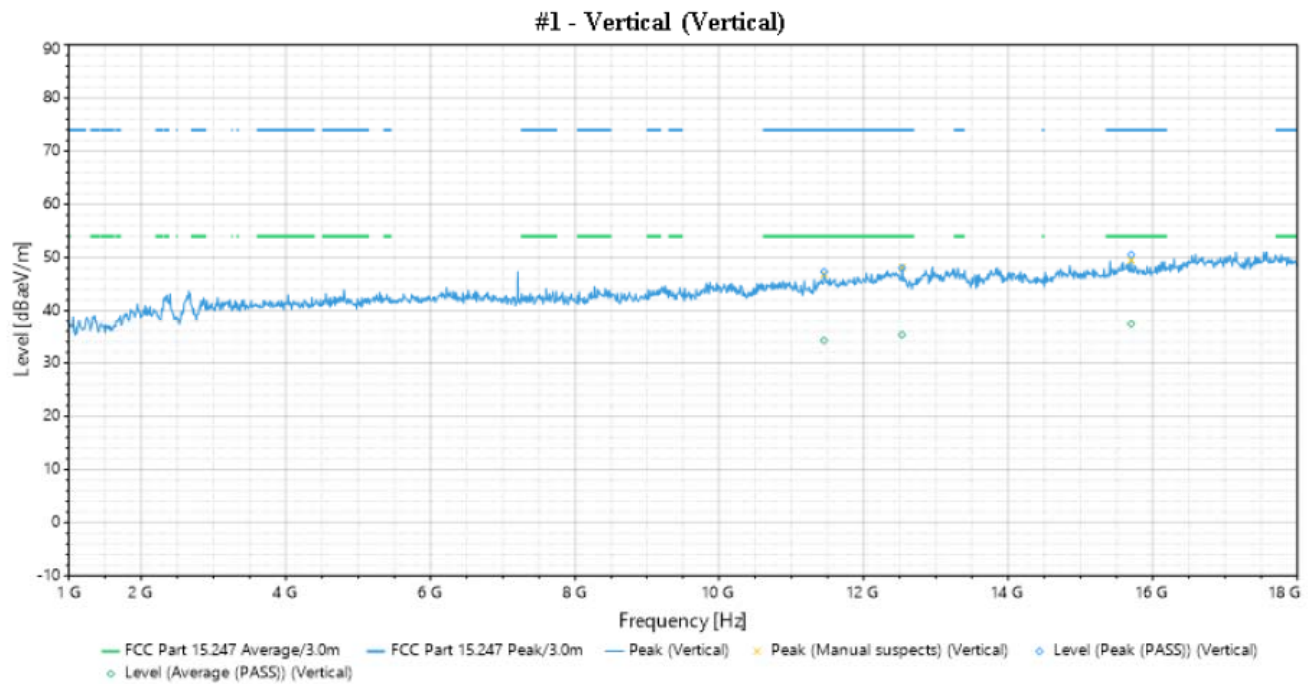
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/Fail
1	32.12	Horizontal	19.667	40	-20.333	1.801	17	-2.393	Pass
2	125.02	Horizontal	13.528	43.5	-29.972	1.328	333	-7.782	Pass
3	887.59	Horizontal	24.546	46	-21.454	2.644	243	4.78	Pass

REMARKS:

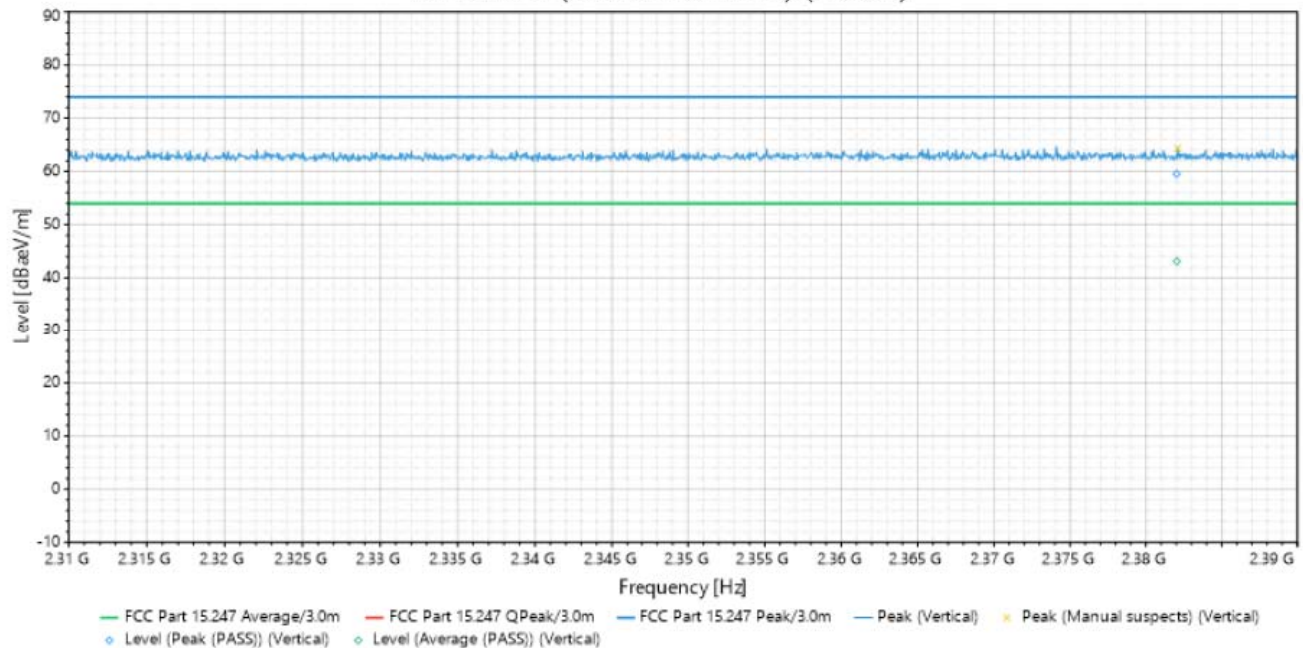
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

Radiated Emissions (Above 1GHz)

EUT Test Condition		Measurement Detail	
Input Power	3Vdcdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2402 MHz, 1Mbps Data Rate		



#1 - Vertical (2.31GHz - 2.39GHz) (Vertical)



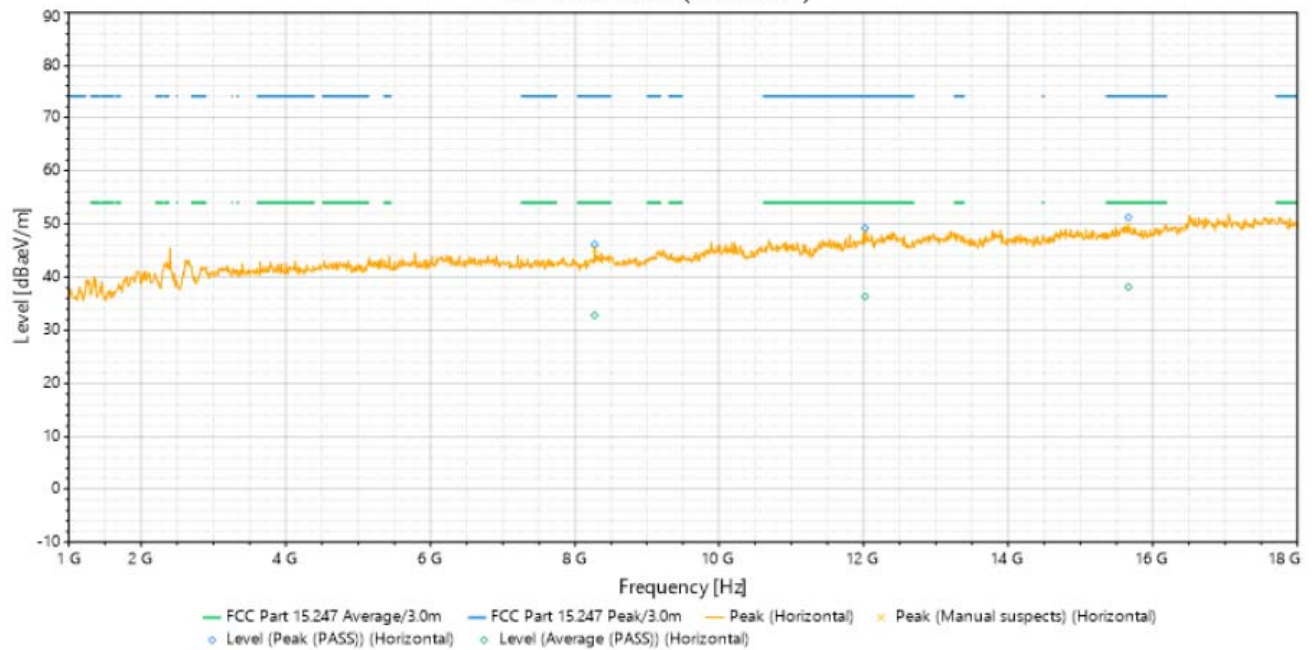
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	11454.1	Vertical	47.35	74	-26.65	3.1	263	8.006	Peak (PASS)
2	11454.1	Vertical	34.257	54	-19.743	3.1	263	8.006	Average (PASS)
3	12532.1	Vertical	48.06	74	-25.94	3.1	290	9.001	Peak (PASS)
4	12532.1	Vertical	35.307	54	-18.693	3.1	290	9.001	Average (PASS)
5	15702	Vertical	50.549	74	-23.451	3.1	265	10.027	Peak (PASS)
6	15702	Vertical	37.377	54	-16.623	3.1	265	10.027	Average (PASS)
7	2382.038	Vertical	59.551	74	-14.449	2.638	106	38.188	Peak (PASS)
8	2382.038	Vertical	43.149	54	-10.851	2.638	106	38.188	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	3Vdcdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2402 MHz, 1Mbps Data Rate		

#2 - Horizontal (Horizontal)



#2 - Horizontal (2.31GHz - 2.39GHz) (Horizontal)



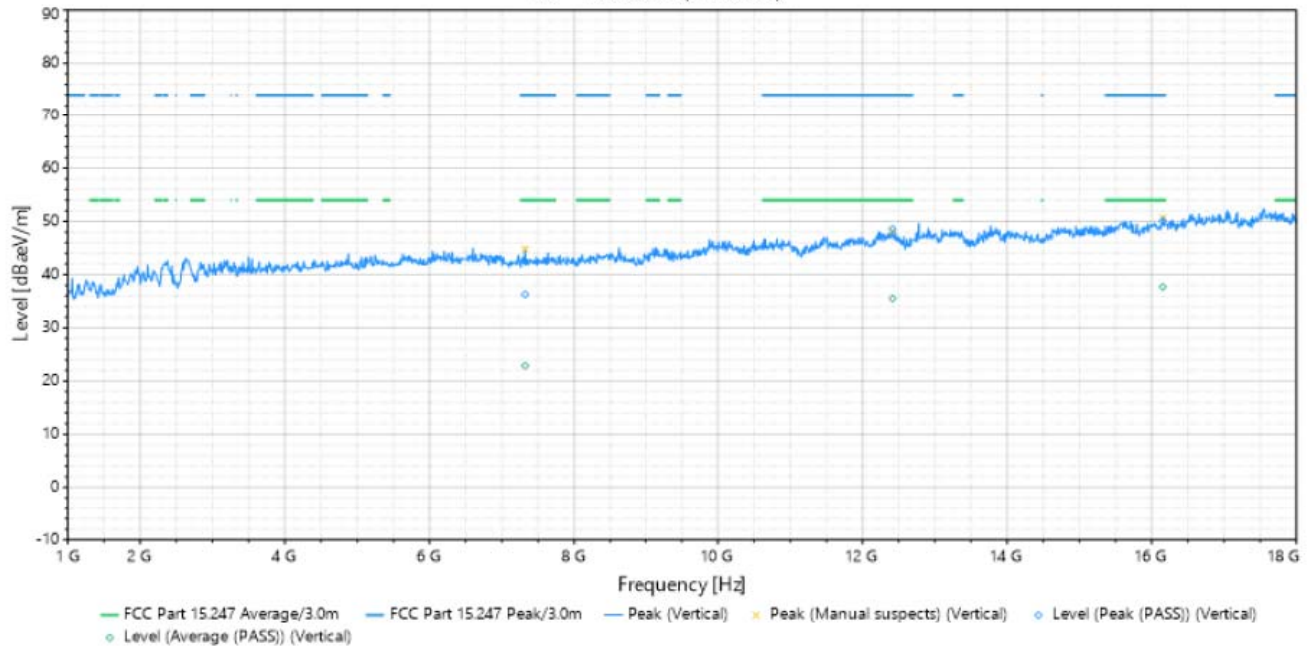
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	8265.4	Horizontal	46.186	74	-27.814	3.5	191	6.674	Peak (PASS)
2	8265.4	Horizontal	32.869	54	-21.131	3.5	191	6.674	Average (PASS)
3	12022.3	Horizontal	49.182	74	-24.818	3.5	145	8.882	Peak (PASS)
4	12022.3	Horizontal	36.346	54	-17.654	3.5	145	8.882	Average (PASS)
5	15664.2	Horizontal	51.238	74	-22.762	3.5	360	9.947	Peak (PASS)
6	15664.2	Horizontal	38.151	54	-15.849	3.5	360	9.947	Average (PASS)
7	2386.467	Horizontal	59.262	74	-14.738	2.435	15	38.311	Peak (PASS)
8	2386.467	Horizontal	43.289	54	-10.711	2.435	15	38.311	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	3Vdcdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz, 1Mbps Data Rate		

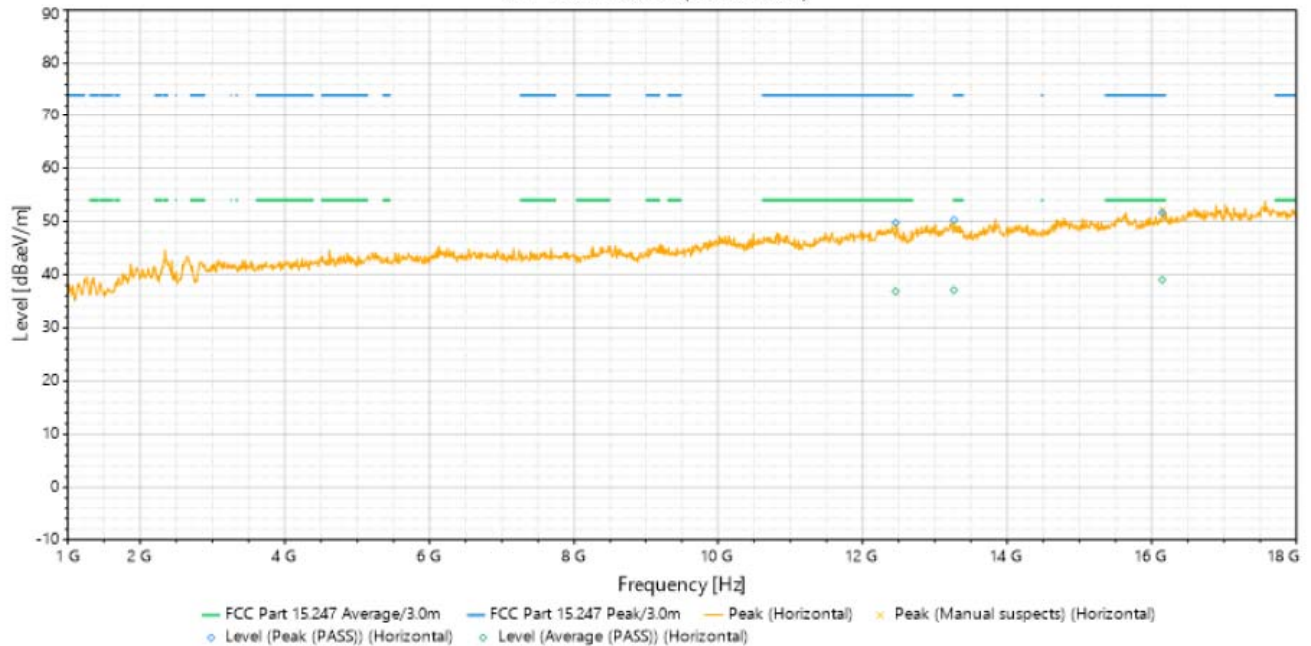
#1 - Vertical (Vertical)



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	7320.9	Vertical	36.286	74	-37.714	2.1	232	6.55	Peak (PASS)
2	7320.9	Vertical	22.891	54	-31.109	2.1	232	6.55	Average (PASS)
3	12415.2	Vertical	48.574	74	-25.426	3.1	219	8.86	Peak (PASS)
4	12415.2	Vertical	35.525	54	-18.475	3.1	219	8.86	Average (PASS)
5	16154.2	Vertical	50.13	74	-23.87	3.1	298	10.316	Peak (PASS)
6	16154.2	Vertical	37.696	54	-16.304	3.1	298	10.316	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	3Vdcdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz, 1Mbps Data Rate		

#2 - Horizontal (Horizontal)


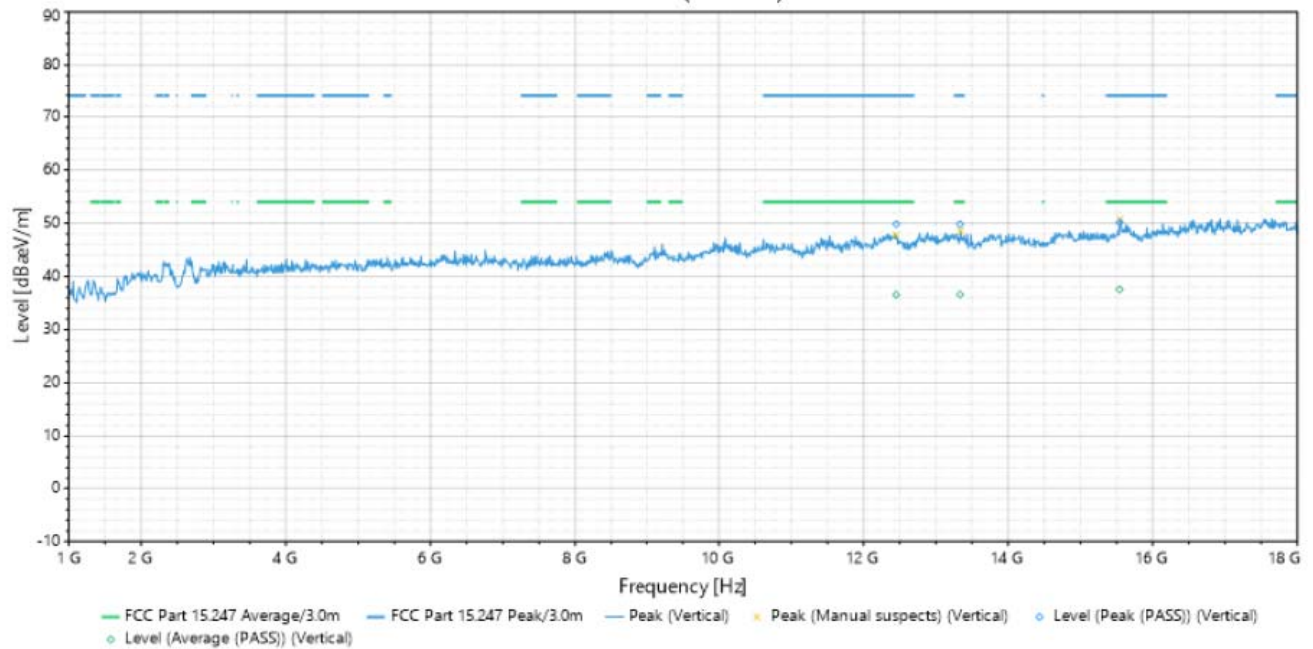
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	12458.1	Horizontal	49.748	74	-24.252	3.5	334	8.942	Peak (PASS)
2	12458.1	Horizontal	36.868	54	-17.132	3.5	334	8.942	Average (PASS)
3	13264.7	Horizontal	50.318	74	-23.682	3.5	228	8.719	Peak (PASS)
4	13264.7	Horizontal	37.076	54	-16.924	3.5	228	8.719	Average (PASS)
5	16145.8	Horizontal	51.654	74	-22.346	3.5	79	10.327	Peak (PASS)
6	16145.8	Horizontal	39.037	54	-14.963	3.5	79	10.327	Average (PASS)

REMARKS:

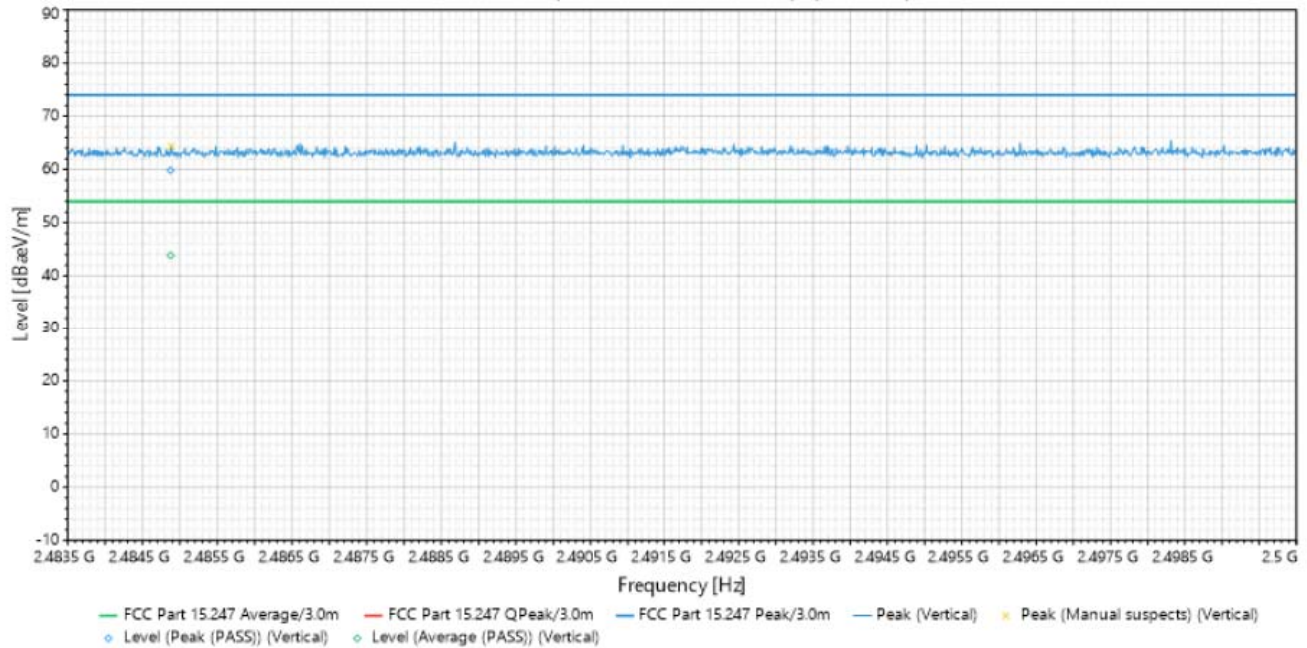
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	3Vdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2480 MHz, 1Mbps Data Rate		

#1 - Vertical (Vertical)



#1 - Vertical (2.4835GHz - 2.5GHz) (Vertical)

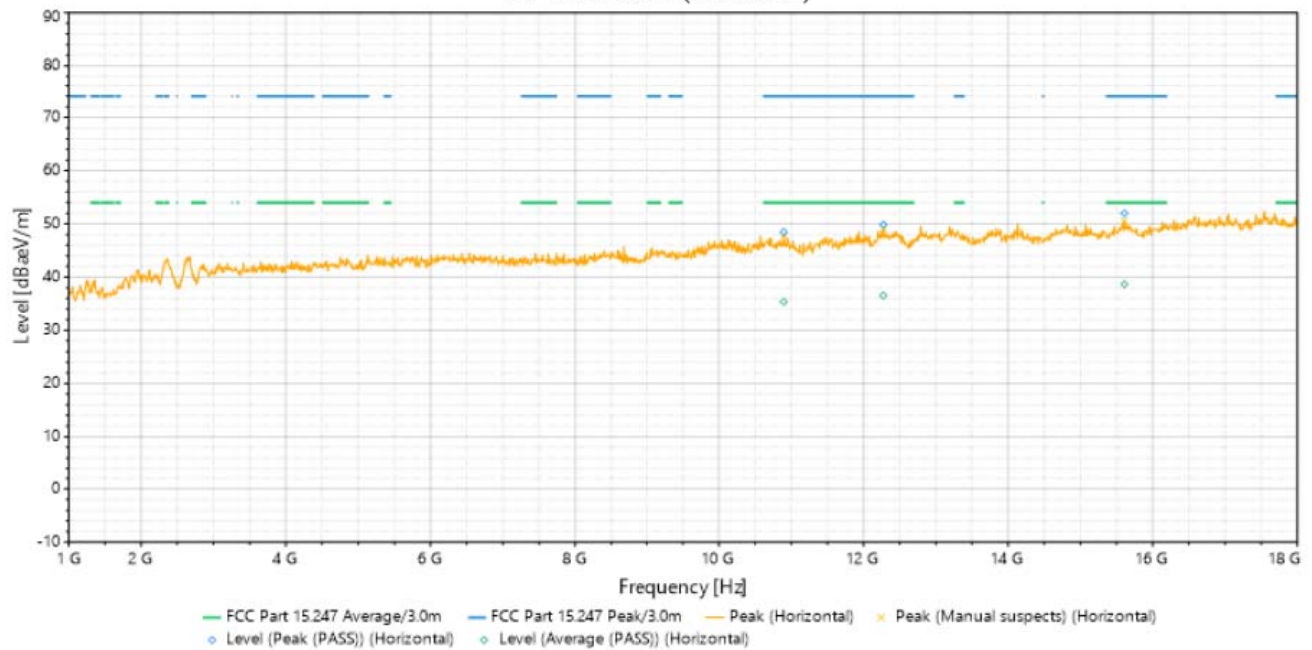


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	12452.6	Vertical	49.82	74	-24.18	3.1	298	8.92	Peak (PASS)
2	12452.6	Vertical	36.573	54	-17.427	3.1	298	8.92	Average (PASS)
3	13335.3	Vertical	49.818	74	-24.182	3.1	61	8.779	Peak (PASS)
4	13335.3	Vertical	36.601	54	-17.399	3.1	61	8.779	Average (PASS)
5	15543.3	Vertical	50.15	74	-23.85	3.1	360	9.825	Peak (PASS)
6	15543.3	Vertical	37.558	54	-16.442	3.1	360	9.825	Average (PASS)
7	2484.876	Vertical	59.849	74	-14.151	3.185	59.849	38.635	Peak (PASS)
8	2484.876	Vertical	43.838	54	-10.162	3.185	43.838	38.635	Average (PASS)

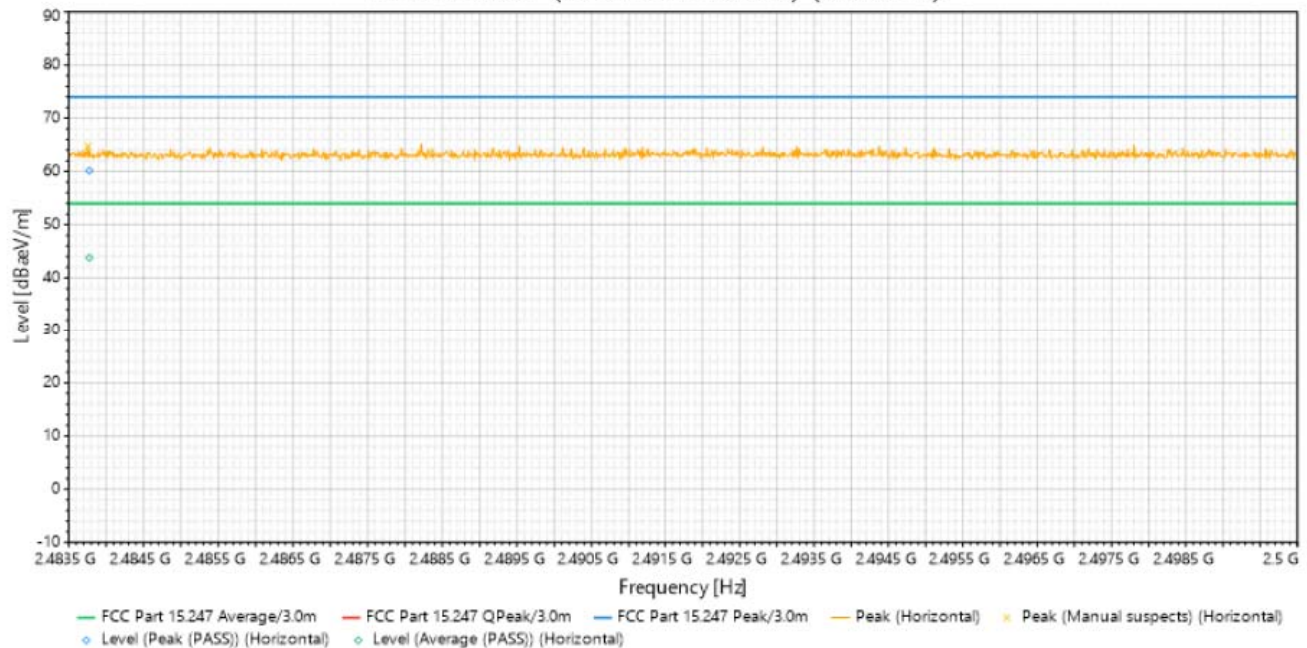
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) + Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	3Vdcdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2480 MHz, 1Mbps Data Rate		

#2 - Horizontal (Horizontal)



#2 - Horizontal (2.4835GHz - 2.5GHz) (Horizontal)

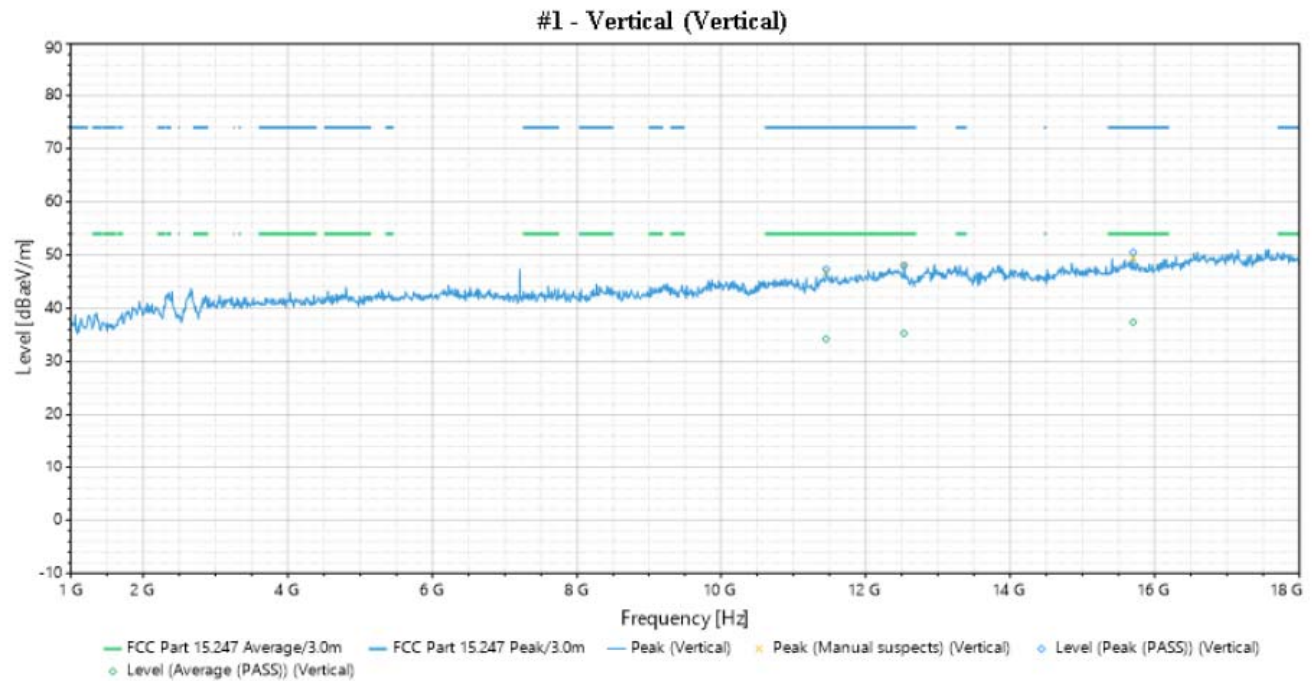


Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	10896.3	Horizontal	48.459	74	-25.541	3.5	272	7.822	Peak (PASS)
2	10896.3	Horizontal	35.369	54	-18.631	3.5	272	7.822	Average (PASS)
3	12273.9	Horizontal	49.876	74	-24.124	3.5	140	8.874	Peak (PASS)
4	12273.9	Horizontal	36.541	54	-17.459	3.5	140	8.874	Average (PASS)
5	15609.7	Horizontal	51.986	74	-22.014	3.5	155	9.893	Peak (PASS)
6	15609.7	Horizontal	38.664	54	-15.336	3.5	155	9.893	Average (PASS)
7	2483.775	Horizontal	60.161	74	-13.839	3.112	228	38.633	Peak (PASS)
8	2483.775	Horizontal	43.793	54	-10.207	3.112	228	38.633	Average (PASS)

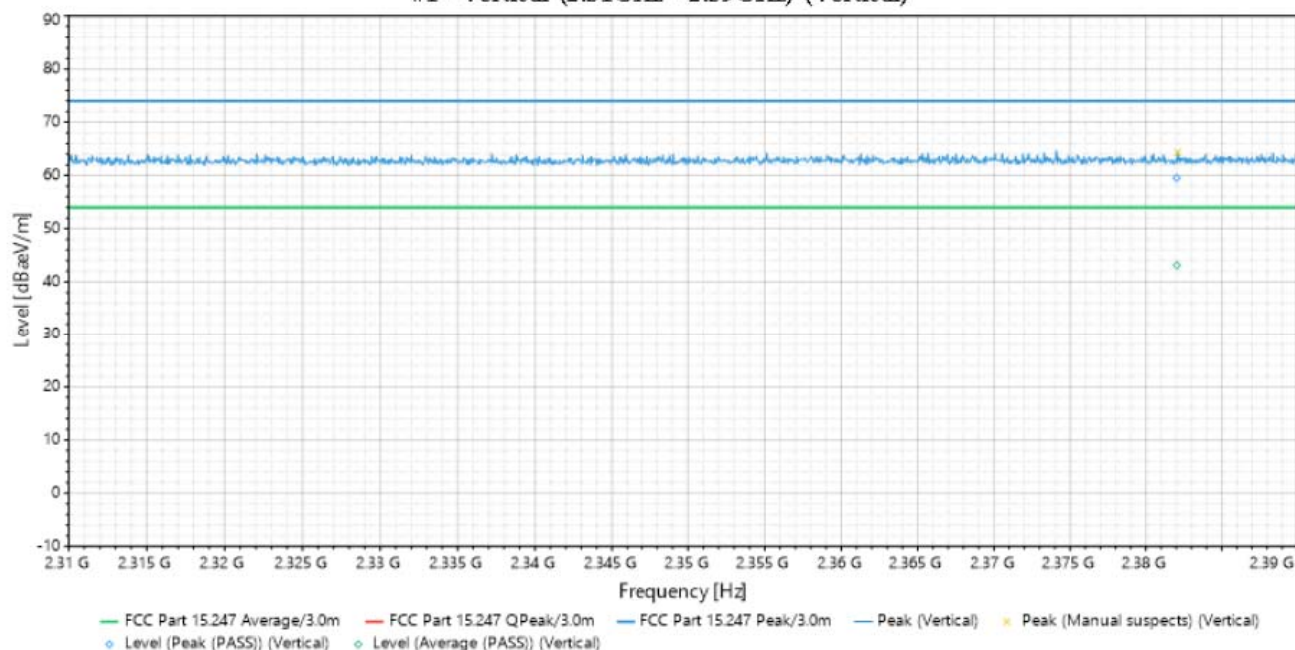
REMARKS:

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	3Vdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2402 MHz, 1Mbps Data Rate		



#1 - Vertical (2.31GHz - 2.39GHz) (Vertical)



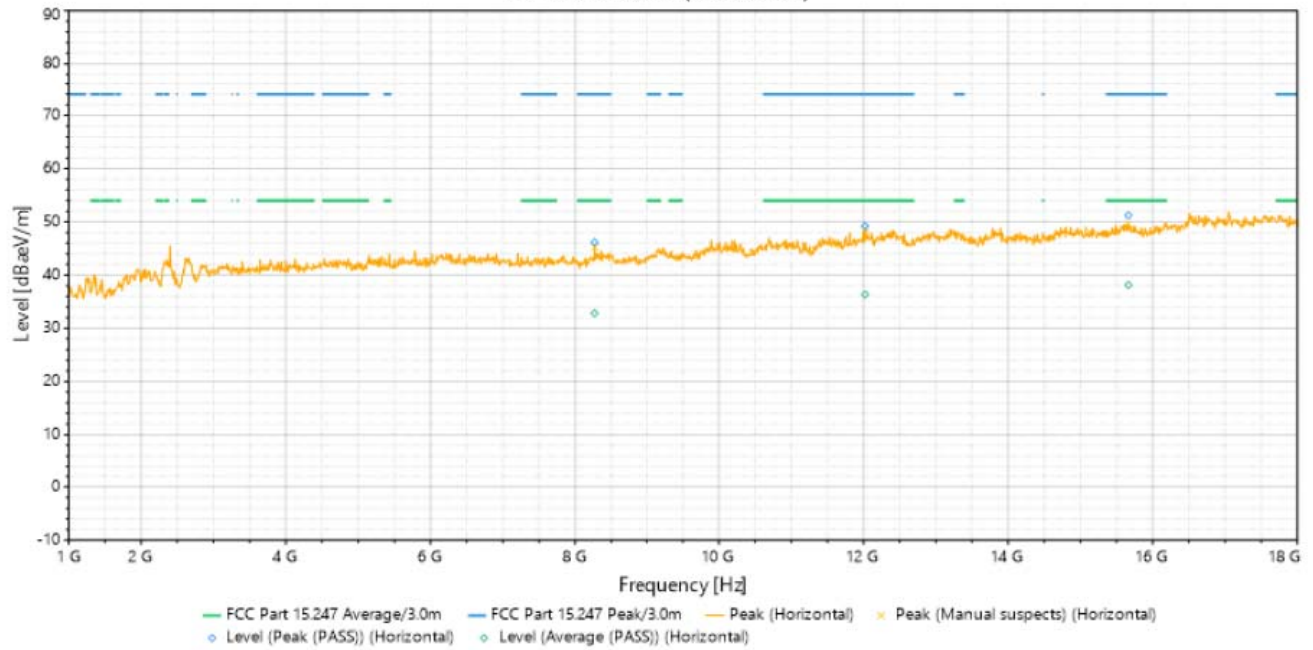
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	11454.1	Vertical	47.35	74	-26.65	3.1	263	8.006	Peak (PASS)
2	11454.1	Vertical	34.257	54	-19.743	3.1	263	8.006	Average (PASS)
3	12532.1	Vertical	48.06	74	-25.94	3.1	290	9.001	Peak (PASS)
4	12532.1	Vertical	35.307	54	-18.693	3.1	290	9.001	Average (PASS)
5	15702	Vertical	50.549	74	-23.451	3.1	265	10.027	Peak (PASS)
6	15702	Vertical	37.377	54	-16.623	3.1	265	10.027	Average (PASS)
7	2382.038	Vertical	59.551	74	-14.449	2.638	106	38.188	Peak (PASS)
8	2382.038	Vertical	43.149	54	-10.851	2.638	106	38.188	Average (PASS)

REMARKS:

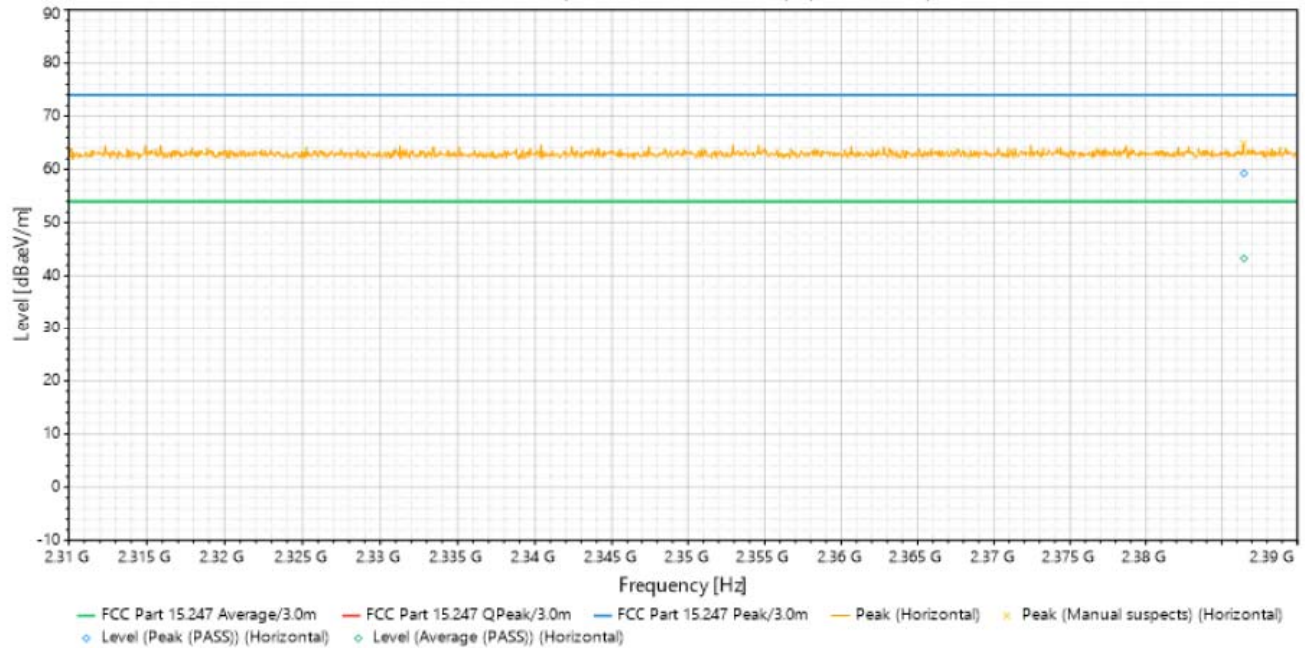
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	3Vdcdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2402 MHz, 1Mbps Data Rate		

#2 - Horizontal (Horizontal)



#2 - Horizontal (2.31GHz - 2.39GHz) (Horizontal)

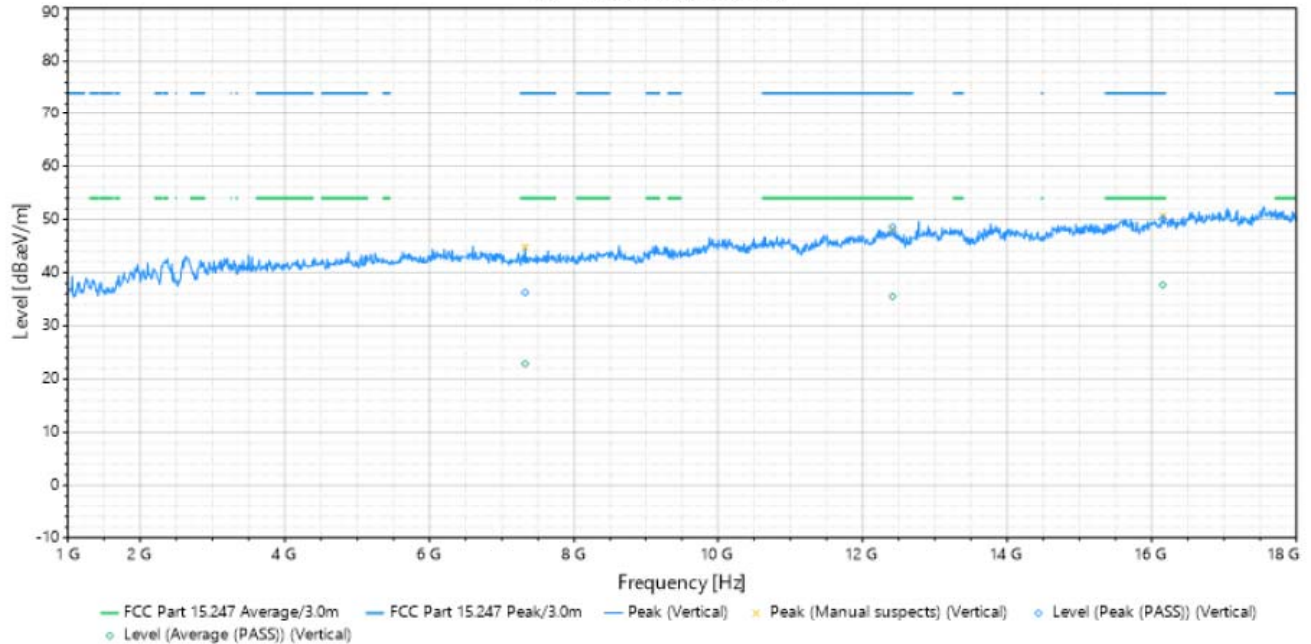


Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	8265.4	Horizontal	46.186	74	-27.814	3.5	191	6.674	Peak (PASS)
2	8265.4	Horizontal	32.869	54	-21.131	3.5	191	6.674	Average (PASS)
3	12022.3	Horizontal	49.182	74	-24.818	3.5	145	8.882	Peak (PASS)
4	12022.3	Horizontal	36.346	54	-17.654	3.5	145	8.882	Average (PASS)
5	15664.2	Horizontal	51.238	74	-22.762	3.5	360	9.947	Peak (PASS)
6	15664.2	Horizontal	38.151	54	-15.849	3.5	360	9.947	Average (PASS)
7	2386.467	Horizontal	59.262	74	-14.738	2.435	15	38.311	Peak (PASS)
8	2386.467	Horizontal	43.289	54	-10.711	2.435	15	38.311	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	3Vdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz, 1Mbps Data Rate		

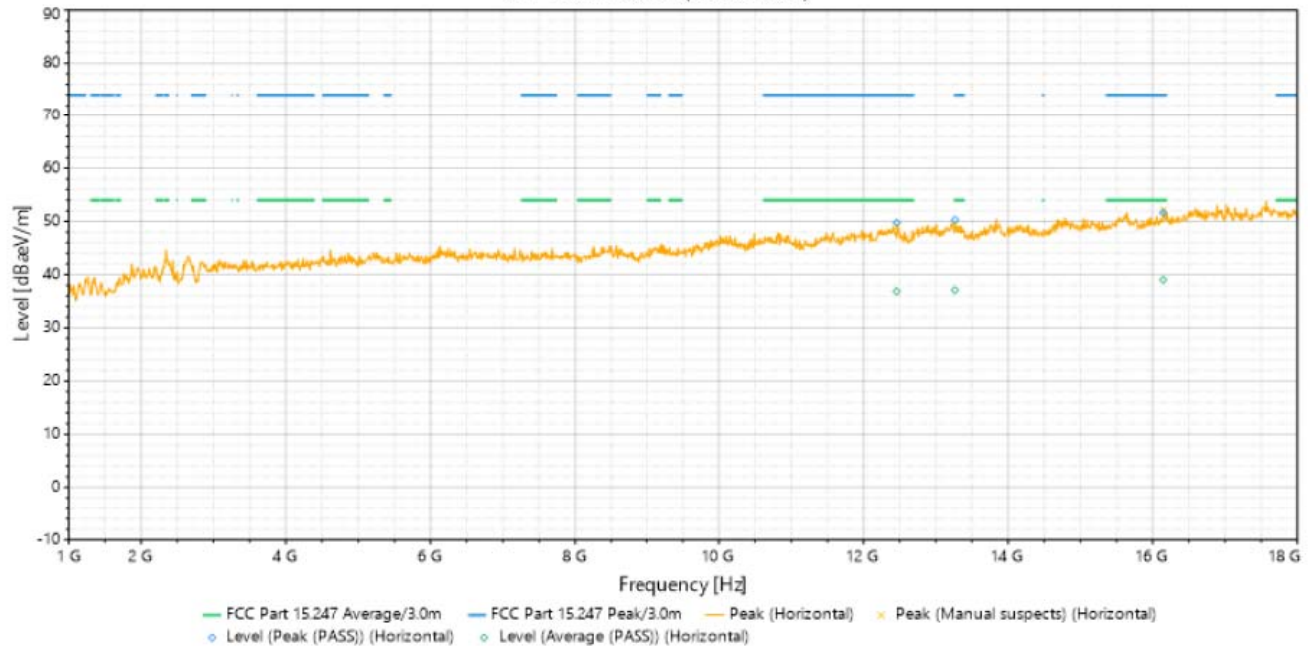
#1 - Vertical (Vertical)


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	7320.9	Vertical	36.286	74	-37.714	2.1	232	6.55	Peak (PASS)
2	7320.9	Vertical	22.891	54	-31.109	2.1	232	6.55	Average (PASS)
3	12415.2	Vertical	48.574	74	-25.426	3.1	219	8.86	Peak (PASS)
4	12415.2	Vertical	35.525	54	-18.475	3.1	219	8.86	Average (PASS)
5	16154.2	Vertical	50.13	74	-23.87	3.1	298	10.316	Peak (PASS)
6	16154.2	Vertical	37.696	54	-16.304	3.1	298	10.316	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	3Vdcdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz, 1Mbps Data Rate		

#2 - Horizontal (Horizontal)



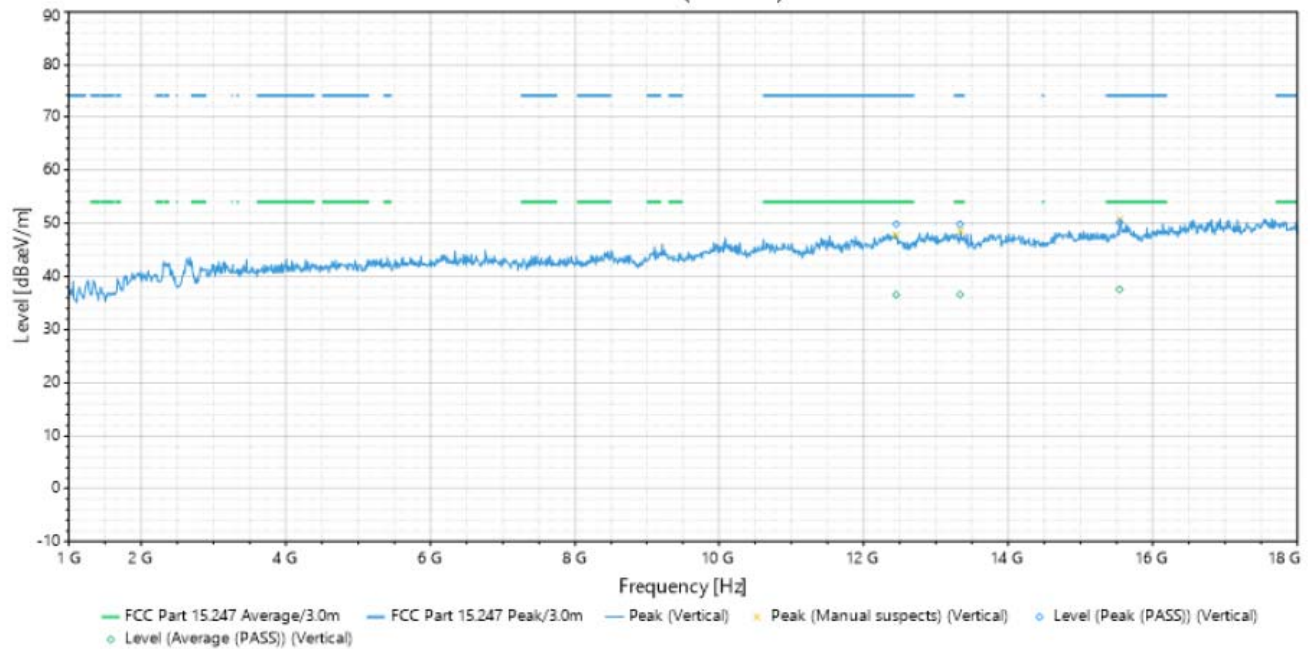
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	12458.1	Horizontal	49.748	74	-24.252	3.5	334	8.942	Peak (PASS)
2	12458.1	Horizontal	36.868	54	-17.132	3.5	334	8.942	Average (PASS)
3	13264.7	Horizontal	50.318	74	-23.682	3.5	228	8.719	Peak (PASS)
4	13264.7	Horizontal	37.076	54	-16.924	3.5	228	8.719	Average (PASS)
5	16145.8	Horizontal	51.654	74	-22.346	3.5	79	10.327	Peak (PASS)
6	16145.8	Horizontal	39.037	54	-14.963	3.5	79	10.327	Average (PASS)

REMARKS:

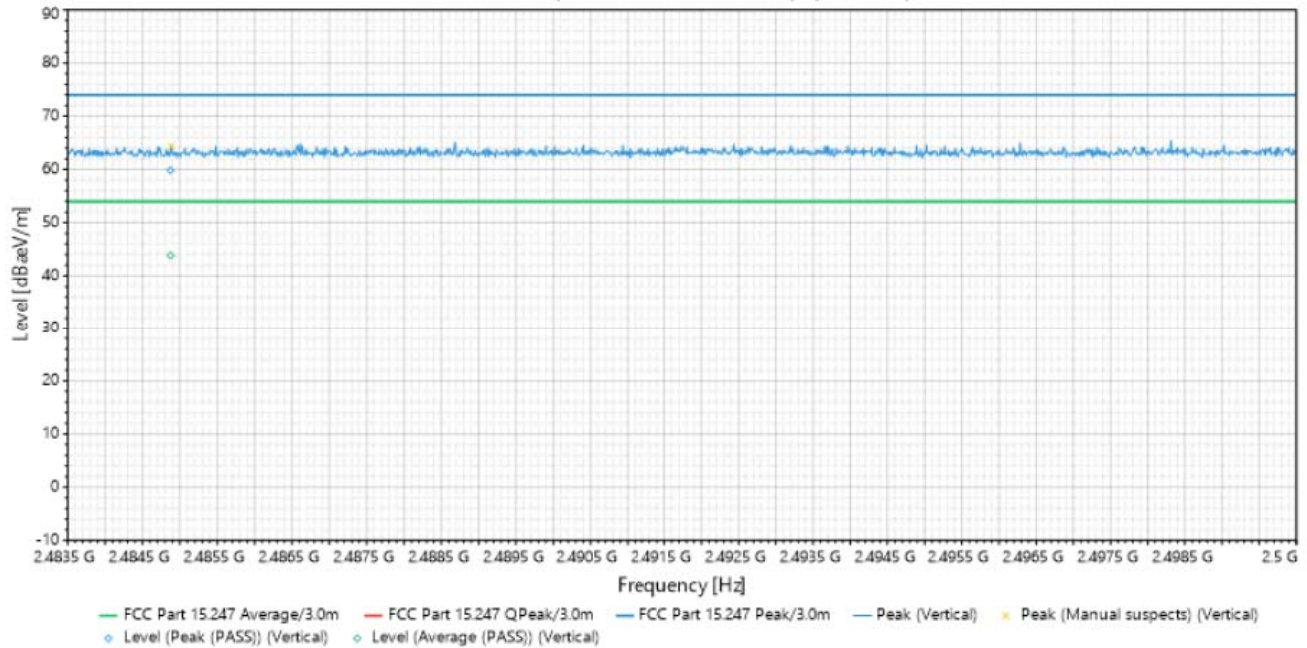
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	3Vdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2480 MHz, 1Mbps Data Rate		

#1 - Vertical (Vertical)



#1 - Vertical (2.4835GHz - 2.5GHz) (Vertical)

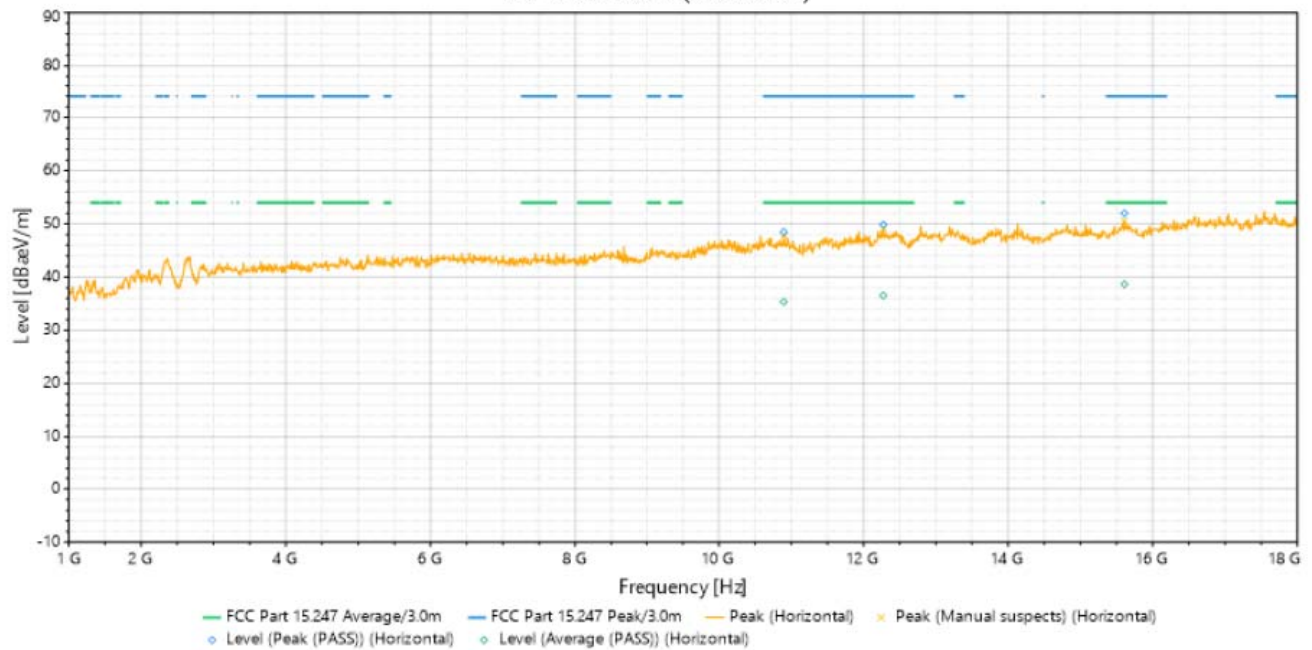


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	12452.6	Vertical	49.82	74	-24.18	3.1	298	8.92	Peak (PASS)
2	12452.6	Vertical	36.573	54	-17.427	3.1	298	8.92	Average (PASS)
3	13335.3	Vertical	49.818	74	-24.182	3.1	61	8.779	Peak (PASS)
4	13335.3	Vertical	36.601	54	-17.399	3.1	61	8.779	Average (PASS)
5	15543.3	Vertical	50.15	74	-23.85	3.1	360	9.825	Peak (PASS)
6	15543.3	Vertical	37.558	54	-16.442	3.1	360	9.825	Average (PASS)
7	2484.876	Vertical	59.849	74	-14.151	3.185	59.849	38.635	Peak (PASS)
8	2484.876	Vertical	43.838	54	-10.162	3.185	43.838	38.635	Average (PASS)

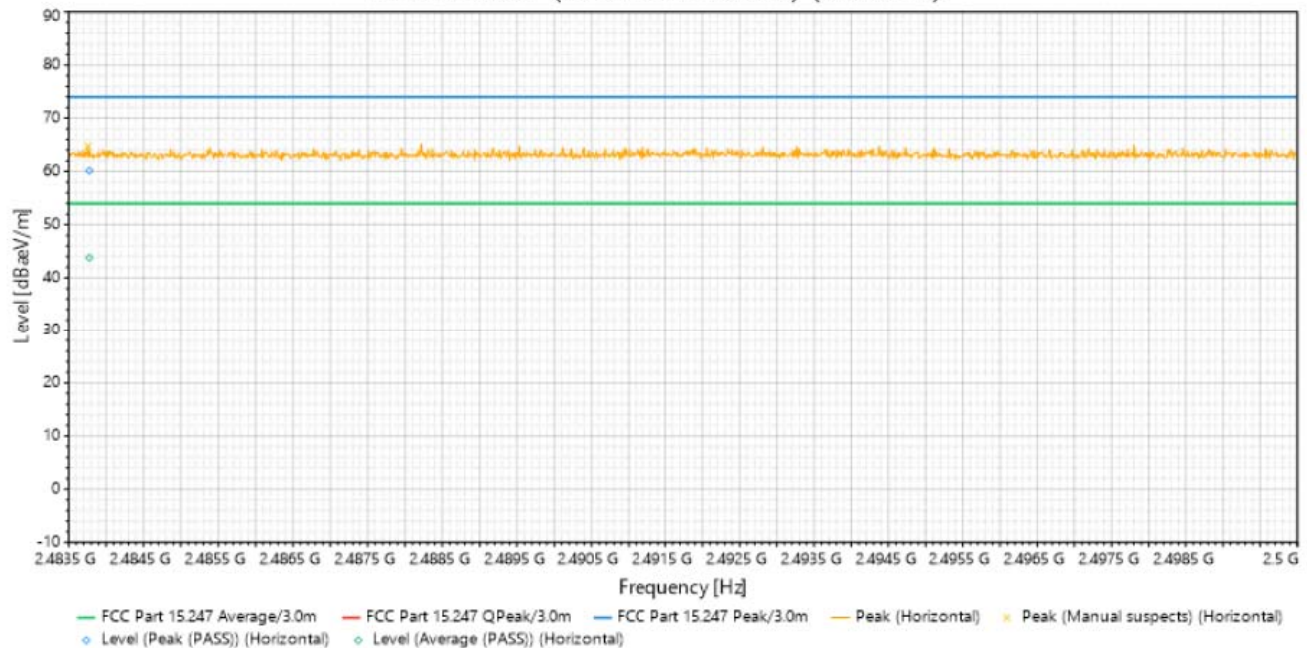
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

EUT Test Condition		Measurement Detail	
Input Power	3Vdcdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2480 MHz, 1Mbps Data Rate		

#2 - Horizontal (Horizontal)



#2 - Horizontal (2.4835GHz - 2.5GHz) (Horizontal)

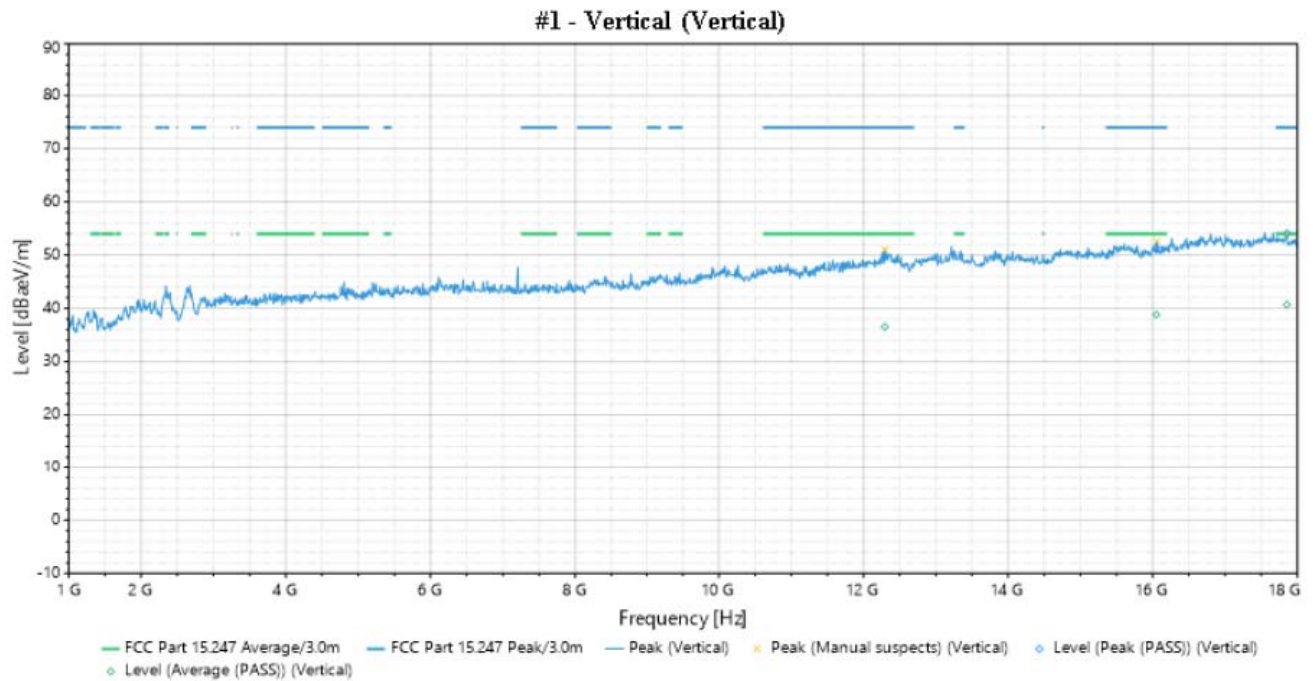


Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	10896.3	Horizontal	48.459	74	-25.541	3.5	272	7.822	Peak (PASS)
2	10896.3	Horizontal	35.369	54	-18.631	3.5	272	7.822	Average (PASS)
3	12273.9	Horizontal	49.876	74	-24.124	3.5	140	8.874	Peak (PASS)
4	12273.9	Horizontal	36.541	54	-17.459	3.5	140	8.874	Average (PASS)
5	15609.7	Horizontal	51.986	74	-22.014	3.5	155	9.893	Peak (PASS)
6	15609.7	Horizontal	38.664	54	-15.336	3.5	155	9.893	Average (PASS)
7	2483.775	Horizontal	60.161	74	-13.839	3.112	228	38.633	Peak (PASS)
8	2483.775	Horizontal	43.793	54	-10.207	3.112	228	38.633	Average (PASS)

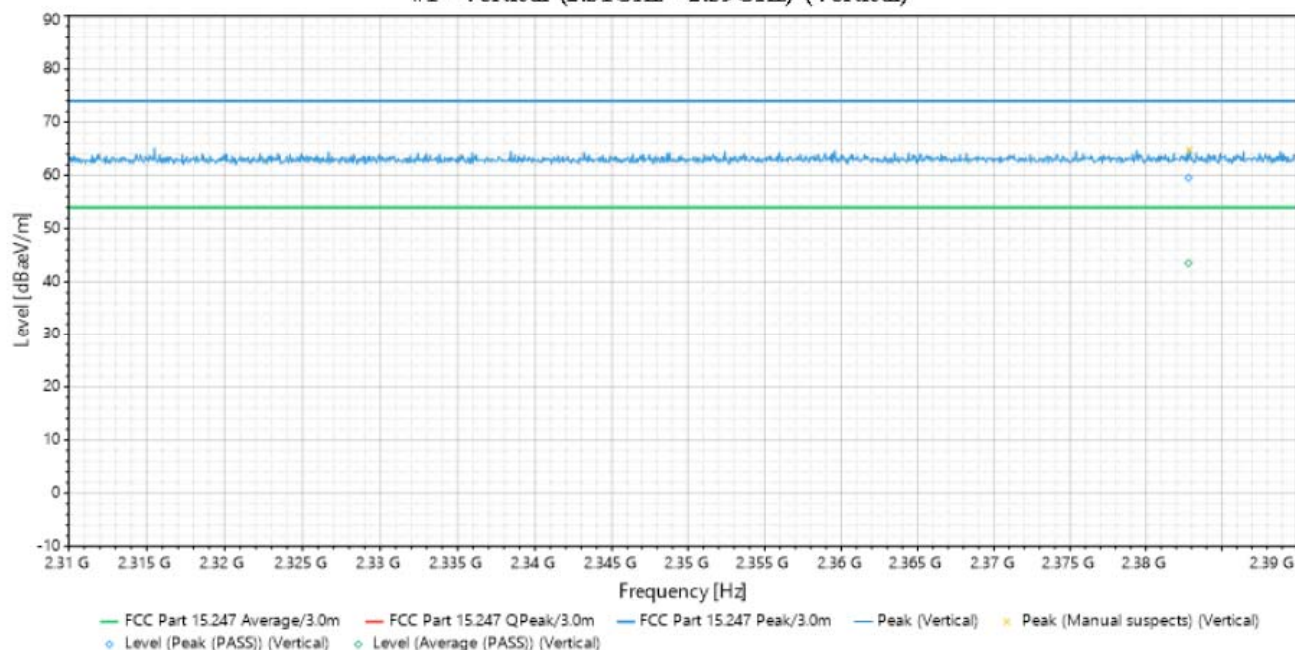
REMARKS:

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	3Vdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2402 MHz, 2Mbps Data Rate		



#1 - Vertical (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	12297	Vertical	49.689	74	-24.311	3.1	342	8.897	Peak (PASS)
2	12297	Vertical	36.537	54	-17.463	3.1	342	8.897	Average (PASS)
3	16051	Vertical	51.408	74	-22.592	3.1	198	10.334	Peak (PASS)
4	16051	Vertical	38.788	54	-15.212	3.1	198	10.334	Average (PASS)
5	17856.4	Vertical	54.093	74	-19.907	3.4	378	8.872	Peak (PASS)
6	17856.4	Vertical	40.702	54	-13.298	3.4	378	8.872	Average (PASS)
7	2382.809	Vertical	59.561	74	-14.439	2.457	234	38.19	Peak (PASS)
8	2382.809	Vertical	43.534	54	-10.466	2.457	234	38.19	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	3Vdcdc	Frequency Range	1GHz-26GHz
Environmental Conditions	25 deg. C, 70% RH	Tested By	Richard Dollente
Test Mode	TX MODE BLE 2402 MHz, 2Mbps Data Rate		

#2 - Horizontal (Horizontal)

