

July 15, 2023

Actineon, Inc.
2530 Zanker Road
San Jose, California 95131

Dear Michael Kelsey,

Enclosed is the Wireless test report for compliance testing of the Actineon, Inc., IOT EDGE HUB / Splunk SPLKEH201GL 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: WIR125986-ACT_FCC_ISED-BLE_Rev 1.0



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

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FCC/ ISED Test Report

Applicant name: Actineon, Inc

Product: IOT EDGE HUB

Report: WIR125986-ACT_FCC_ISED-BT_Rev 1.0

Applicant Address:

**12530 Zanker Road
San Jose, California 95131**

Manufacturer Address:

**2530 Zanker Road
San Jose, California 95131**

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

FCC/ ISED Test Report

Applicant name: Actineon, Inc.

Product: IOT EDGE HUB

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	July 15, 2023	Initial Issue.
1	August 15, 2023	Update EUT/ Test software information

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I. Executive Summary

A. Executive Summary

47 CFR FCC Part 15, Subpart C (SECTION 15.247) / ISSED RSS-247 RSS 247 Issue2, RSS Gen Issue5				
FCC Clause	RSS Section(s)	Test Item	Result	Remarks
15.207	RSS-Gen [8.8]	AC Power Conducted Emission	PASS	Meet the Requirements
15.247(a)(1)(iii)	RSS-247 [5.1](d)	Number of Hopping Frequency Used	PASS	Note 1
15.247(a)(1)(iii)	RSS-247 [5.1](d)	Dwell Time on Each Channel	PASS	Note 1
15.247(a)(1)	RSS-247 [5.1](b)	1. Hopping Channel Separation 2. 20dB Bandwidth	PASS	Note 1
15.247(b)	RSS-247 [5.4](b)	Maximum Peak Output Power	PASS	Note 1
15.205 & 15.209 & 15.247(d)	RSS-247 [8.9] & RSS-Gen [8.10]	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing QP margin.
15.247(d)	RSS-247 [5.5]	Antenna Port Emission	PASS	Note 1
15.203	RSS-Gen [6.8]	Antenna Requirement	PASS	Meet the Requirements

Note:

1. Other test item please refer to FCC Module Report: TLZ-CM276NF, ISSED Module Report: 6100A-CM276NF
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:	IOT EDGE HUB	
Brand:	Actineon	
Model(s) Tested:	Splunk SPLKEH201GL	
Series Model:	N/A	
Sample Status:	Engineering sample	
Sample Serial Number:	ACT-076-4422-0135	
EUT Specifications:	Primary Power:	POE 48 Vdc/ 0.625A, Power adaptor: 15Vdc/ 2A
	Voltage Frequency:	N/A
	Technology / Type of Modulations:	BLUETOOTH Classic: GFSK, $\pi/4$ -DQPSK, 8DPSK
	Operating Frequency :	2.402 ~ 2.480GHz
	FCC ID:	2BBHWSPLKEH201GL
	ISED ID:	30709SPLKEH201GL
	Antenna Type:	PCB Antenna
	Antenna connector	IPEX MHF I
	Antenna Model	YF0026AA
	Antenna Gain	3.2 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):	August 15, 2023	

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

	Model No.	FCC ID	Note
-	-	-	-

-	-	-	-
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FCC/IC RF Testing Units Setting

Model	Hardware (FW) Rev.	Firmware (FW) Rev.	FW operation verification and Instruction
Splunk SPLKEH201GL	SPLKEH201GL	TEZI 5.7.0 v1.3.2	Verify by Spectrum Analyzer & Laptop

DESCRIPTION OF TEST MODES

Control software: Putty V0.78

Power Setting :

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

79 channels are provided for Bluetooth LE:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

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.

FCC Test Site(s) Reg #:US1123

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

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%
Conducted Emission Voltage	±2.44	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 Actineon, 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:

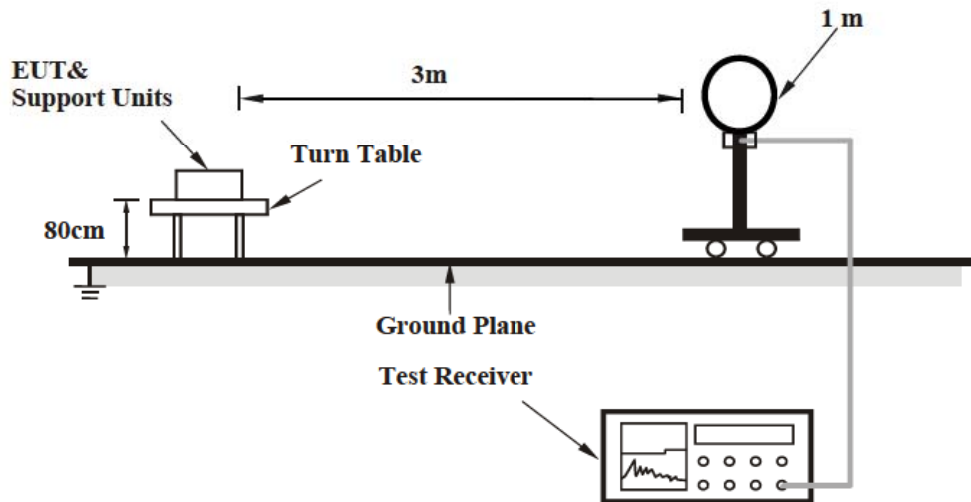
Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Test Procedures:

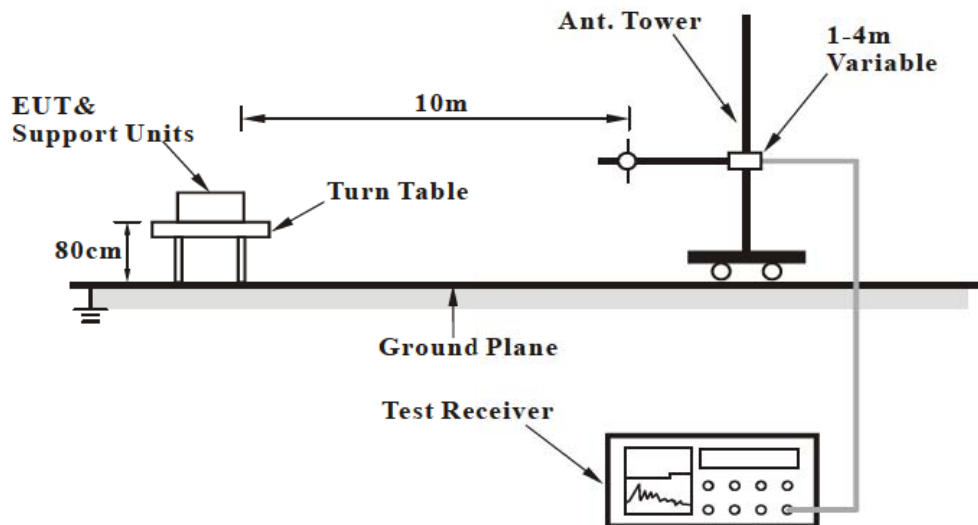
The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line. Only noise floor was measured above 18 GHz.

Test Setup

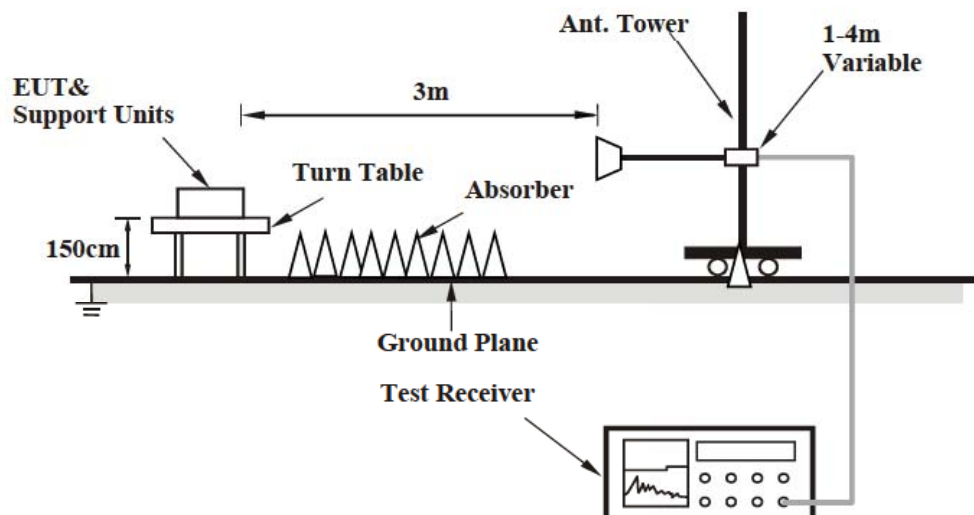
For Radiated Emission Below 30MHz



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	11/01/2022	11/01/2023
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
1S3983	Loop Antenna	ETS-LINDGREN	6512	10/ 14 /2021	10/ 14 /2023
Note 1: Verified by calibrated instrumentation at the time of testing					

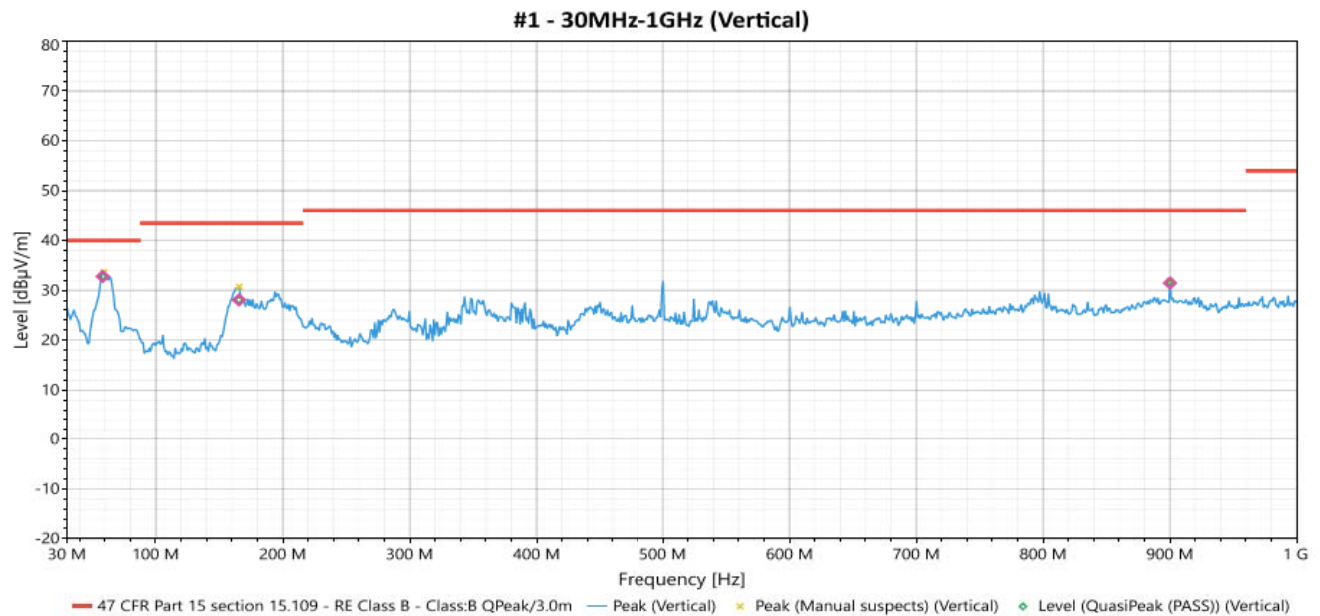
Test Engineer: Richard Dollente

Test Date(s): 04/22/2023

Test Data

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	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz		



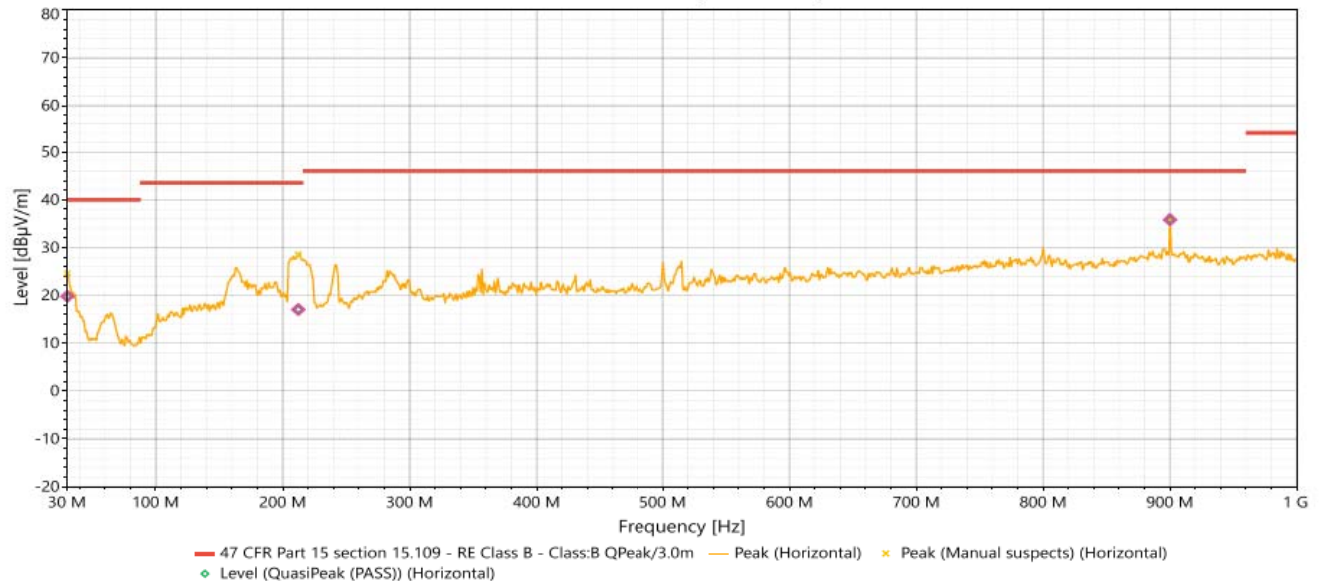
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/Fail
1	58.3	Vertical	32.787	40	-7.213	1.02	352	-13.45	Pass
2	165.64	Vertical	28.078	43.5	-15.422	1.65	9	-9.27	Pass
3	900.04	Vertical	31.482	46	-14.518	1.18	357	4.51	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	Richard Dollente
Test Mode	TX MODE BLE 2440 MHz		

#2 - 30MHz-1GHz (Horizontal)



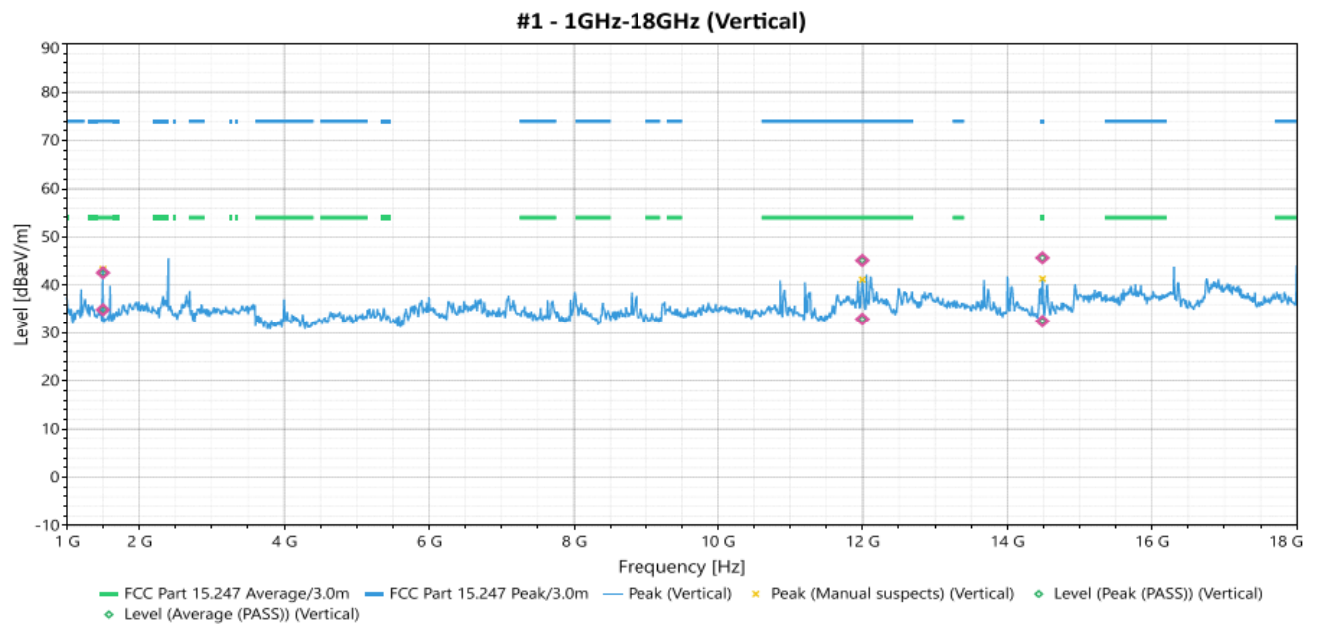
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Pass/Fail
1	30.43	Horizontal	19.797	40	-20.203	1.94	14	-0.97	Pass
2	212.29	Horizontal	17.042	43.5	-26.458	1.61	120	-9.68	Pass
3	900.03	Horizontal	35.806	46	-10.194	1.01	8	4.91	Pass

REMARKS:

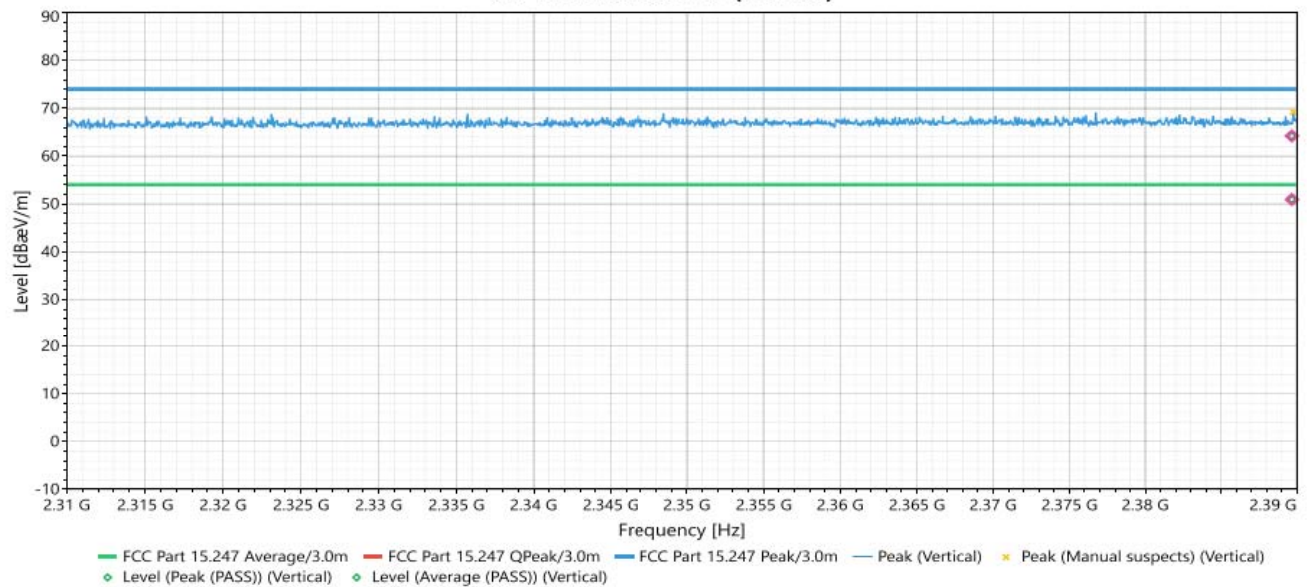
1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) +Preamplifier
3. Margin value = Emission level – Limit value.
4. The emission levels of other frequencies were less than 20dB margin against the limit.

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	Richard Dollente
Test Mode	TX MODE BDR 2402 MHz		



#1 - 2.31GHz-2.39GHz (Vertical)

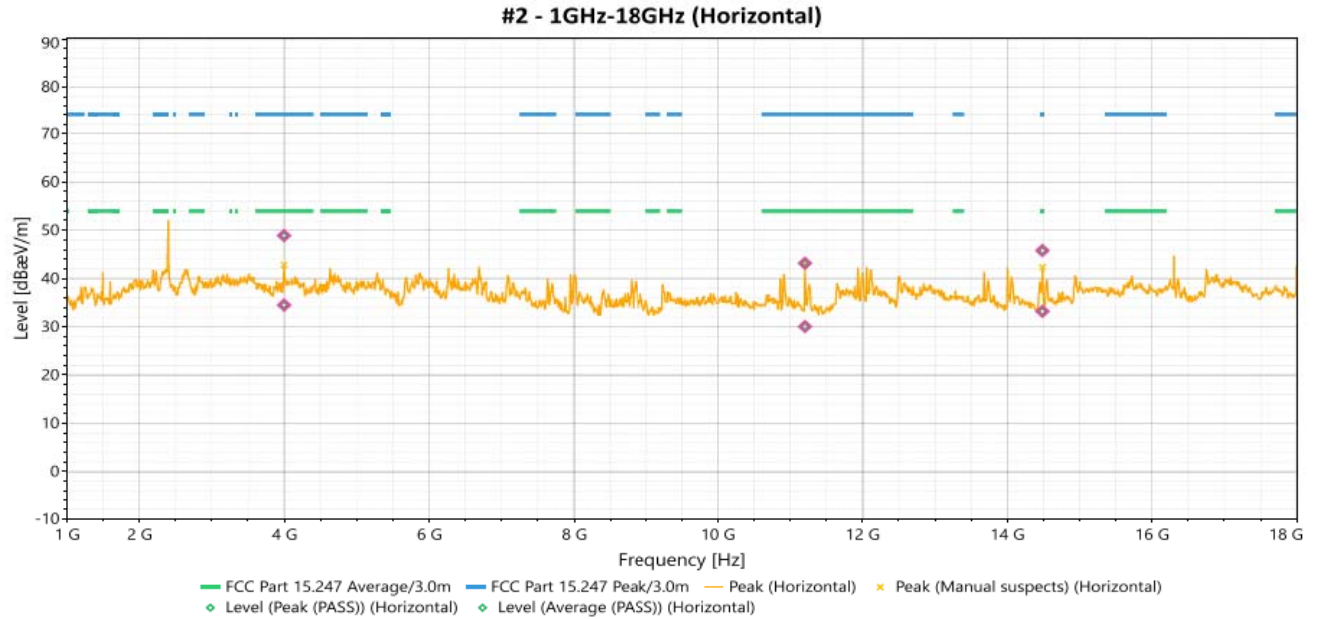


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	1499.7	Vertical	42.592	74	-31.408	1	340	-2.5	Peak (PASS)
2	1499.7	Vertical	34.91	54	-19.09	1	340	-2.5	Average (PASS)
3	11997.2	Vertical	45.135	74	-28.865	3.4	321	7.5	Peak (PASS)
4	11997.2	Vertical	32.906	54	-21.094	3.4	321	7.5	Average (PASS)
5	14486	Vertical	45.683	74	-28.317	3.14	6	6.7	Peak (PASS)
6	14486	Vertical	32.465	54	-21.535	3.14	6	6.7	Average (PASS)
7	2389.676	Vertical	64.219	74	-9.781	1.64	180	38.73	Peak (PASS)
8	2389.676	Vertical	50.934	54	-3.066	1.64	180	38.73	Average (PASS)

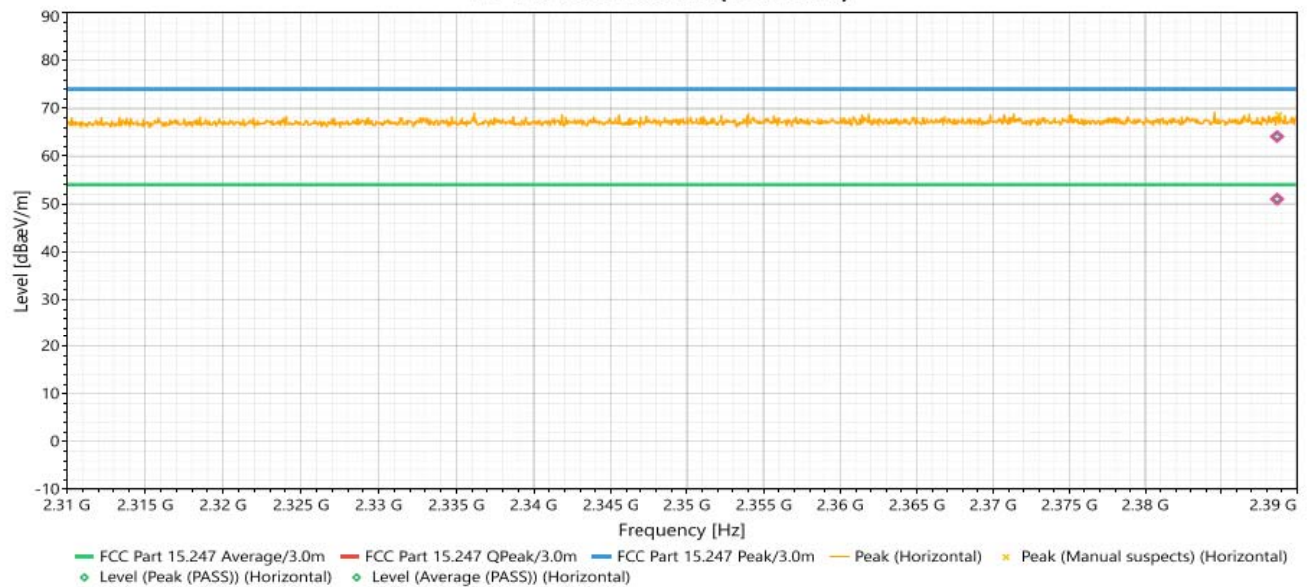
REMARKS:

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	Richard Dollente
Test Mode	TX MODE BDR 2402 MHz		



#2 - 2.31GHz-2.39GHz (Horizontal)



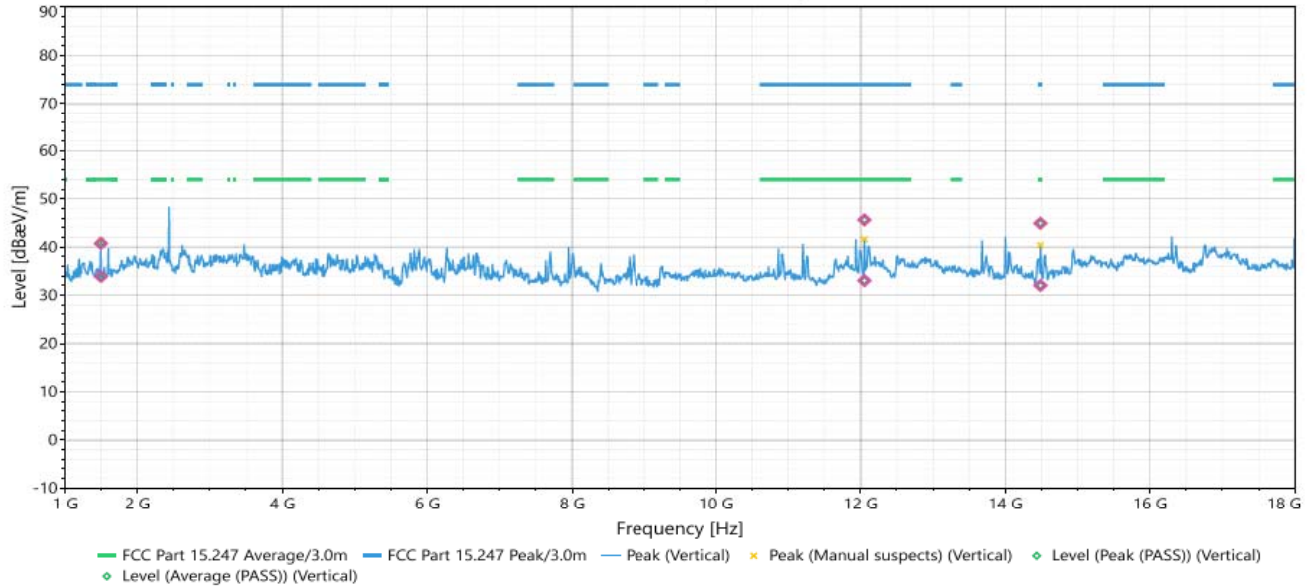
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	3998.7	Horizontal	48.901	74	-25.099	3.42	323	3.27	Peak (PASS)
2	3998.7	Horizontal	34.492	54	-19.508	3.42	323	3.27	Average (PASS)
3	11203.3	Horizontal	43.165	74	-30.835	1.8	113	6.49	Peak (PASS)
4	11203.3	Horizontal	30.064	54	-23.936	1.8	113	6.49	Average (PASS)
5	14486	Horizontal	45.803	74	-28.197	3.06	317	6.83	Peak (PASS)
6	14486	Horizontal	33.189	54	-20.811	3.06	317	6.83	Average (PASS)
7	2388.7	Horizontal	64.096	74	-9.904	2.82	142	38.84	Peak (PASS)
8	2388.7	Horizontal	51.014	54	-2.986	2.82	142	38.84	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	Richard Dollente
Test Mode	TX MODE BDR 2441 MHz		

#1 - 1GHz-18GHz (Vertical)

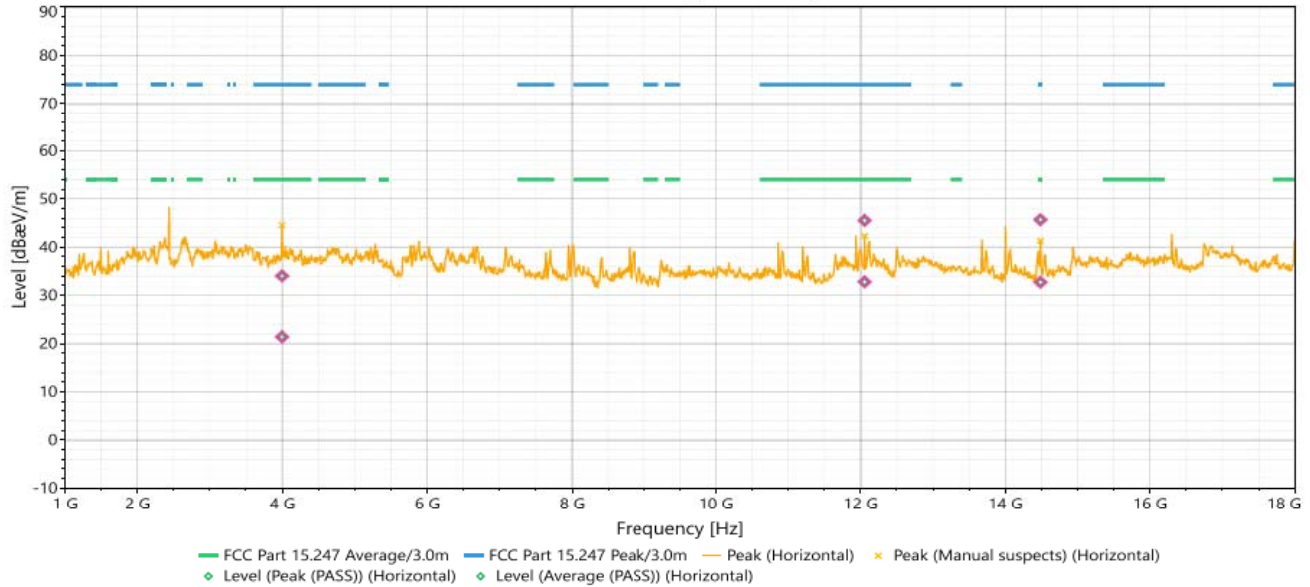


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	1499.7	Vertical	40.766	74	-33.234	1	360	-2.5	Peak (PASS)
2	1499.7	Vertical	33.9	54	-20.1	1	360	-2.5	Average (PASS)
3	12053.3	Vertical	45.641	74	-28.359	3.38	134	7.48	Peak (PASS)
4	12053.3	Vertical	33.062	54	-20.938	3.38	134	7.48	Average (PASS)
5	14486	Vertical	44.937	74	-29.063	2.57	176	6.7	Peak (PASS)
6	14486	Vertical	32.046	54	-21.954	2.57	176	6.7	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	Richard Dollente
Test Mode	TX MODE BDR 2441 MHz		

#2 - 1GHz-18GHz (Horizontal)

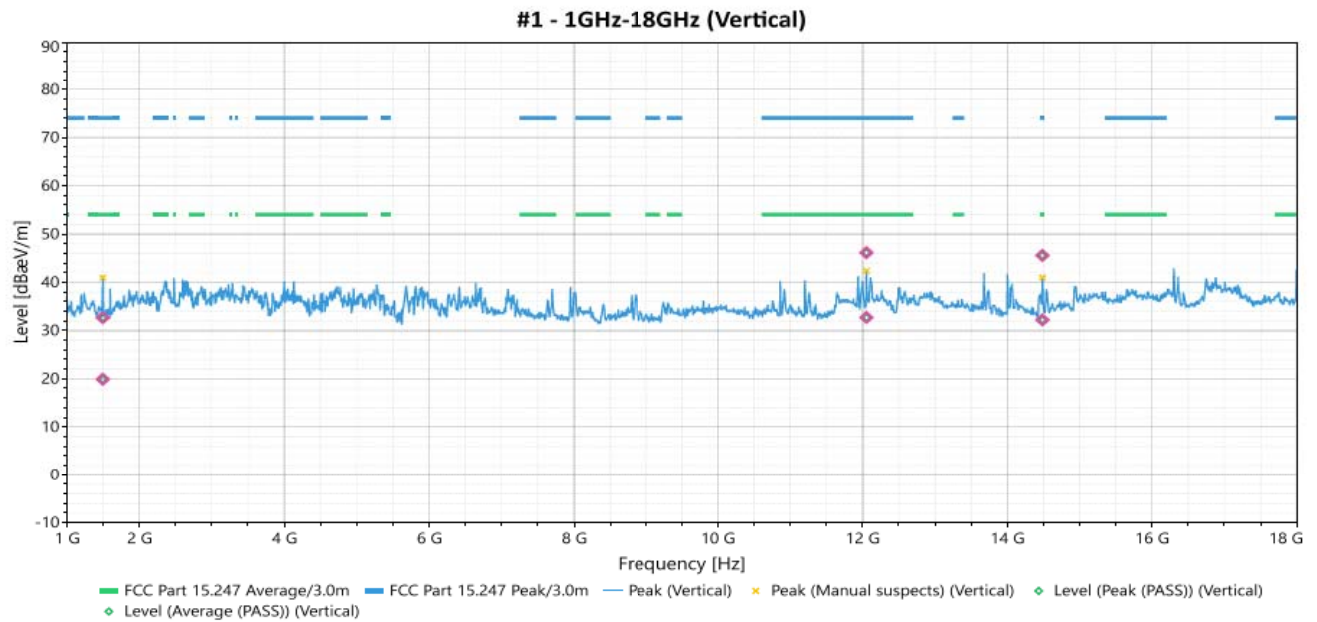


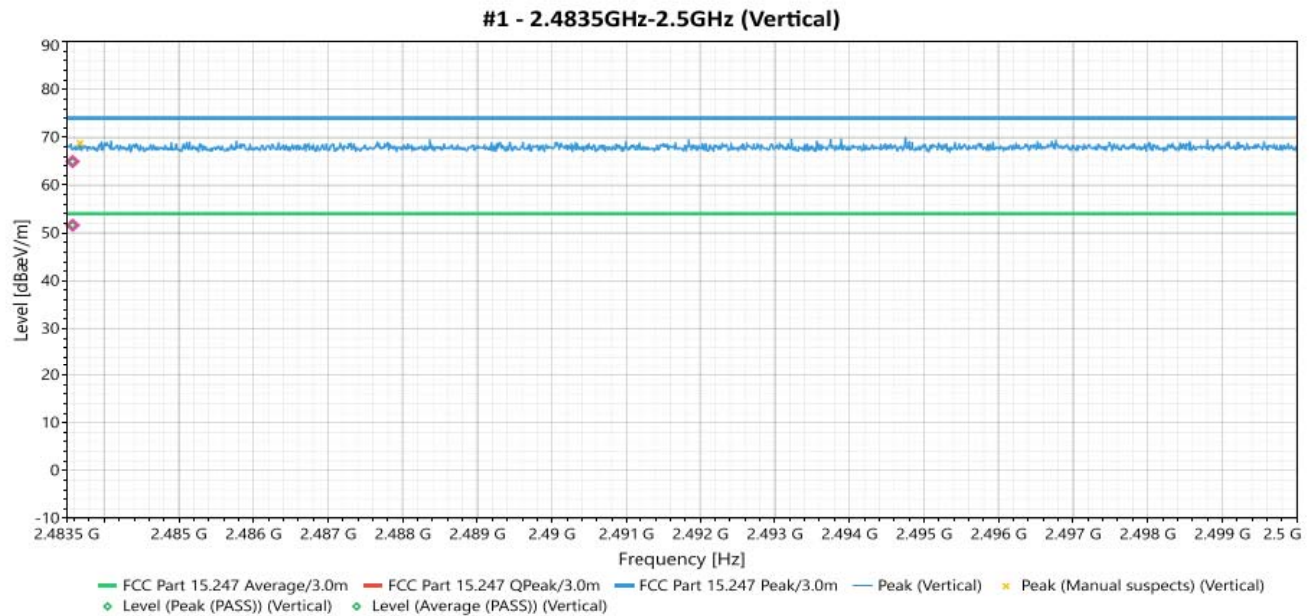
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	3998.7	Horizontal	34.029	74	-39.971	1	221	3.27	Peak (PASS)
2	3998.7	Horizontal	21.392	54	-32.608	1	221	3.27	Average (PASS)
3	12055	Horizontal	45.523	74	-28.477	3.04	5	7.51	Peak (PASS)
4	12055	Horizontal	32.799	54	-21.201	3.04	5	7.51	Average (PASS)
5	14486	Horizontal	45.669	74	-28.331	2.76	315	6.83	Peak (PASS)
6	14486	Horizontal	32.72	54	-21.28	2.76	315	6.83	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	Richard Dollente
Test Mode	TX MODE BDR 2480 MHz		

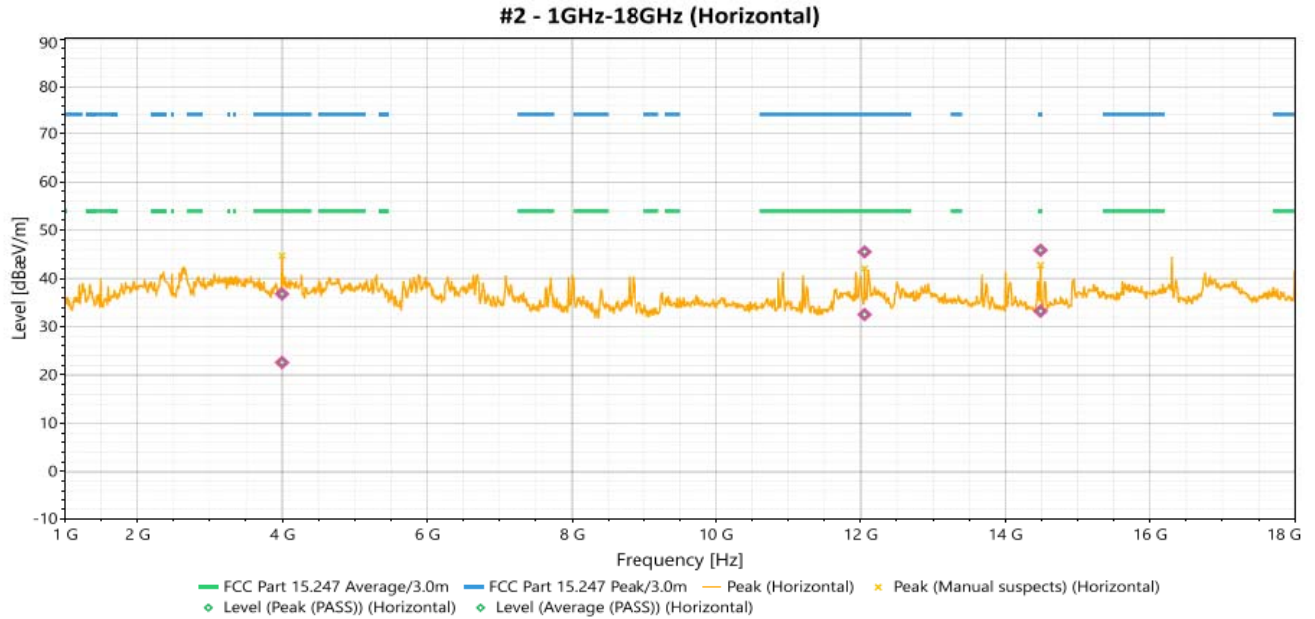




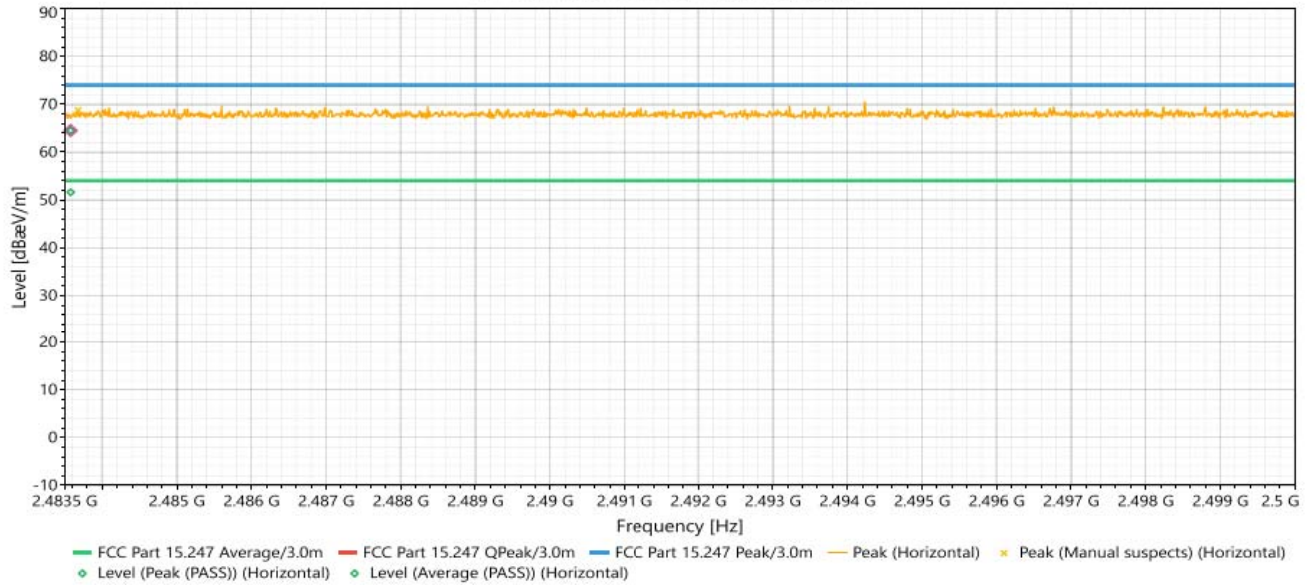
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	1498	Vertical	32.645	74	-41.355	1	196	-2.49	Peak (PASS)
2	1498	Vertical	19.898	54	-34.102	1	196	-2.49	Average (PASS)
3	12053.3	Vertical	46.126	74	-27.874	3.22	358	7.48	Peak (PASS)
4	12053.3	Vertical	32.698	54	-21.302	3.22	358	7.48	Average (PASS)
5	14486	Vertical	45.554	74	-28.446	2.35	114	6.7	Peak (PASS)
6	14486	Vertical	32.203	54	-21.797	2.35	114	6.7	Average (PASS)
7	2483.578	Vertical	64.93	74	-9.07	1.51	300	39.14	Peak (PASS)
8	2483.578	Vertical	51.606	54	-2.394	1.51	300	39.14	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	Richard Dollente
Test Mode	TX MODE BDR 2480 MHz		



#2 - 2.4835GHz-2.5GHz (Horizontal)

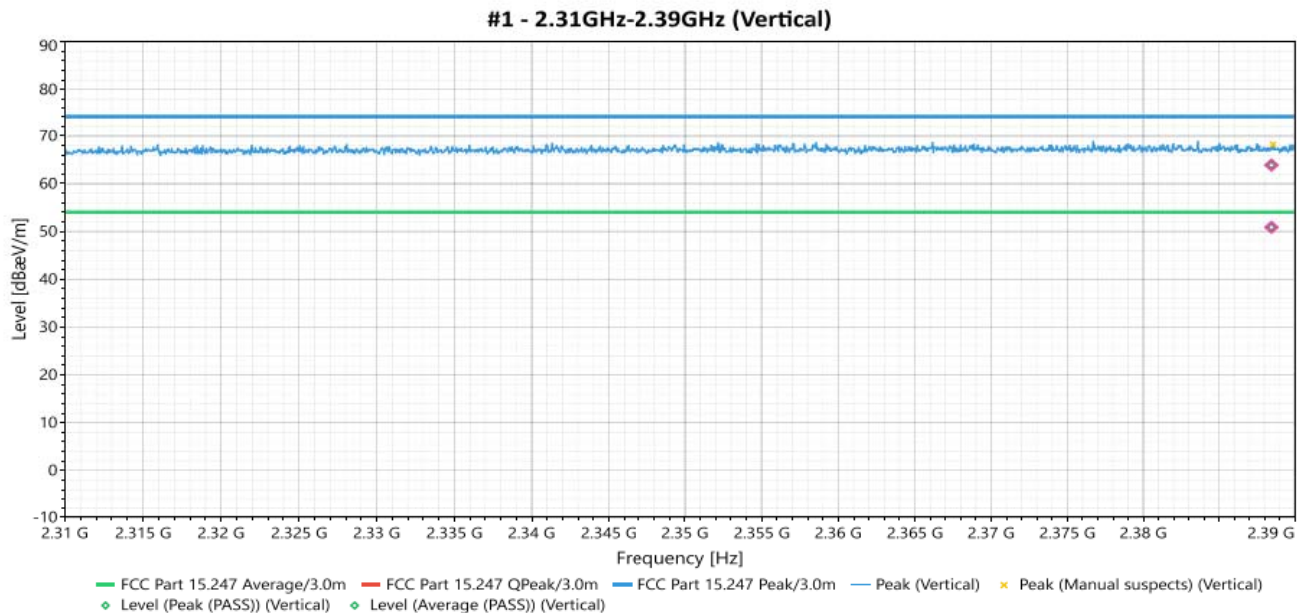


Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level [dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	3998.7	Horizontal	36.792	74	-37.208	2.41	334	3.27	Peak (PASS)
2	3998.7	Horizontal	22.602	54	-31.398	2.41	334	3.27	Average (PASS)
3	12055	Horizontal	45.515	74	-28.485	2.72	0	7.51	Peak (PASS)
4	12055	Horizontal	32.53	54	-21.47	2.72	0	7.51	Average (PASS)
5	14487.7	Horizontal	45.864	74	-28.136	3.16	22	6.83	Peak (PASS)
6	14487.7	Horizontal	33.237	54	-20.763	3.16	22	6.83	Average (PASS)
7	2483.578	Horizontal	64.508	74	-9.492	2.62	286	39.15	Peak (PASS)
8	2483.578	Horizontal	51.614	54	-2.386	2.62	286	39.15	Average (PASS)

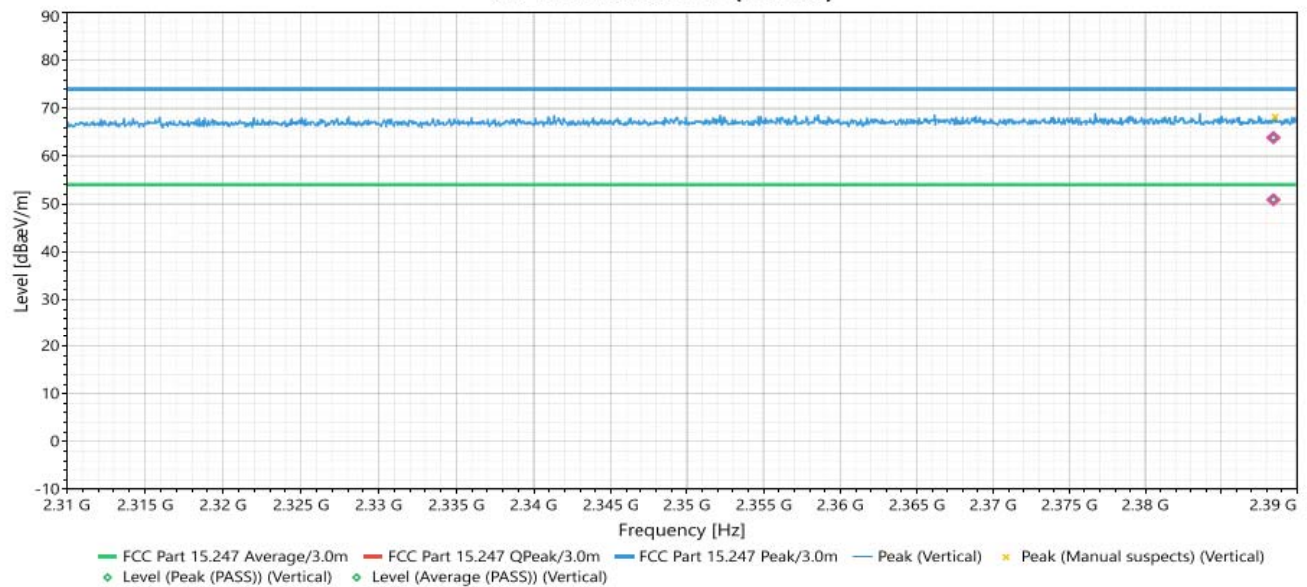
REMARKS:

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	Richard Dollente
Test Mode	TX MODE RDR 2402 MHz		



#1 - 2.31GHz-2.39GHz (Vertical)

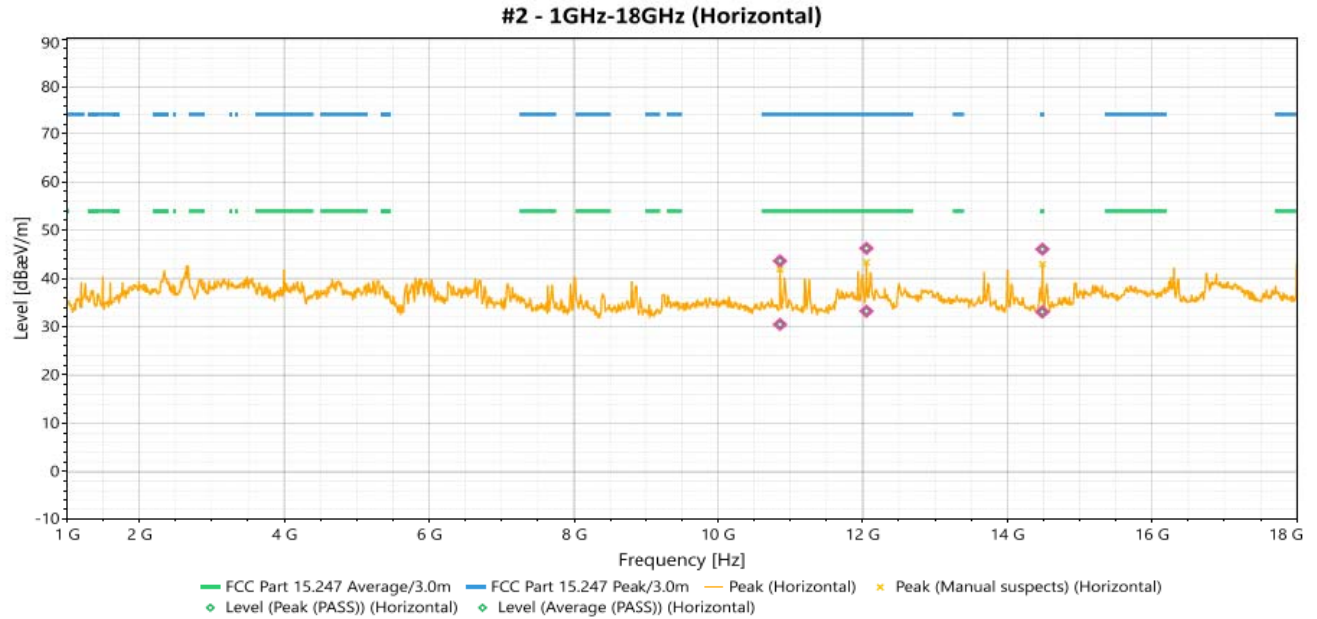


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	1499.7	Vertical	40.687	74	-33.313	1	358	-2.5	Peak (PASS)
2	1499.7	Vertical	33.657	54	-20.343	1	358	-2.5	Average (PASS)
3	12055	Vertical	46.035	74	-27.965	3.4	357	7.48	Peak (PASS)
4	12055	Vertical	33.042	54	-20.958	3.4	357	7.48	Average (PASS)
5	14486	Vertical	45.34	74	-28.66	3.34	265	6.7	Peak (PASS)
6	14486	Vertical	32.755	54	-21.245	3.34	265	6.7	Average (PASS)
7	2388.46	Vertical	63.88	74	-10.12	1.79	40	38.73	Peak (PASS)
8	2388.46	Vertical	50.895	54	-3.105	1.79	40	38.73	Average (PASS)

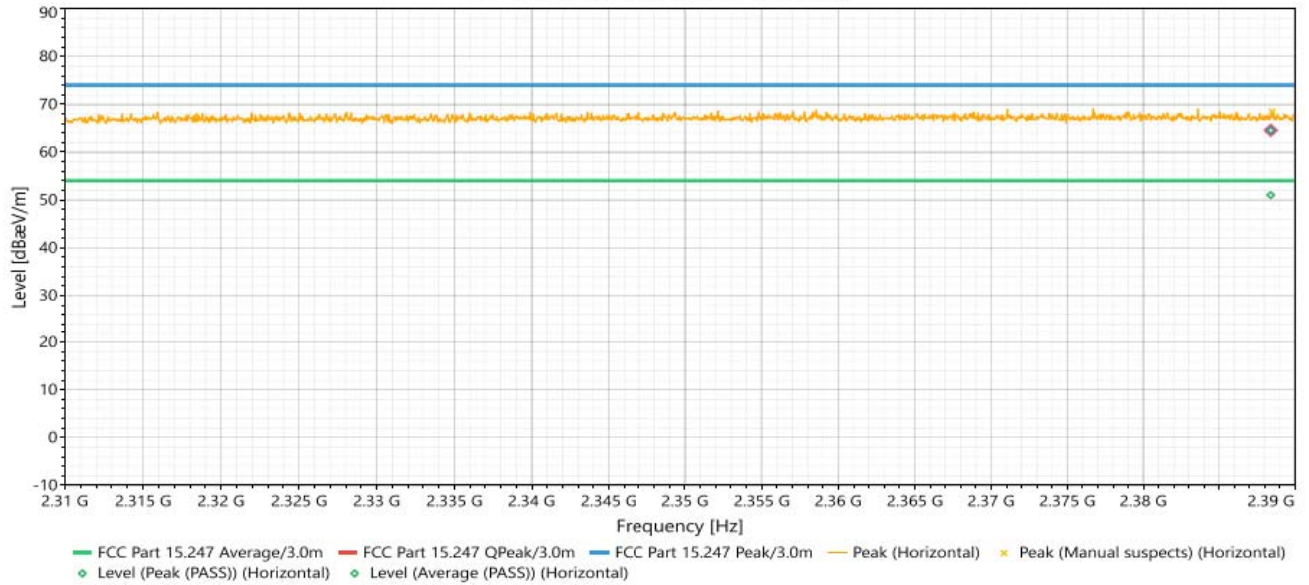
REMARKS:

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	Richard Dollente
Test Mode	TX MODE BDR 2402 MHz		



#2 - 2.31GHz-2.39GHz (Horizontal)



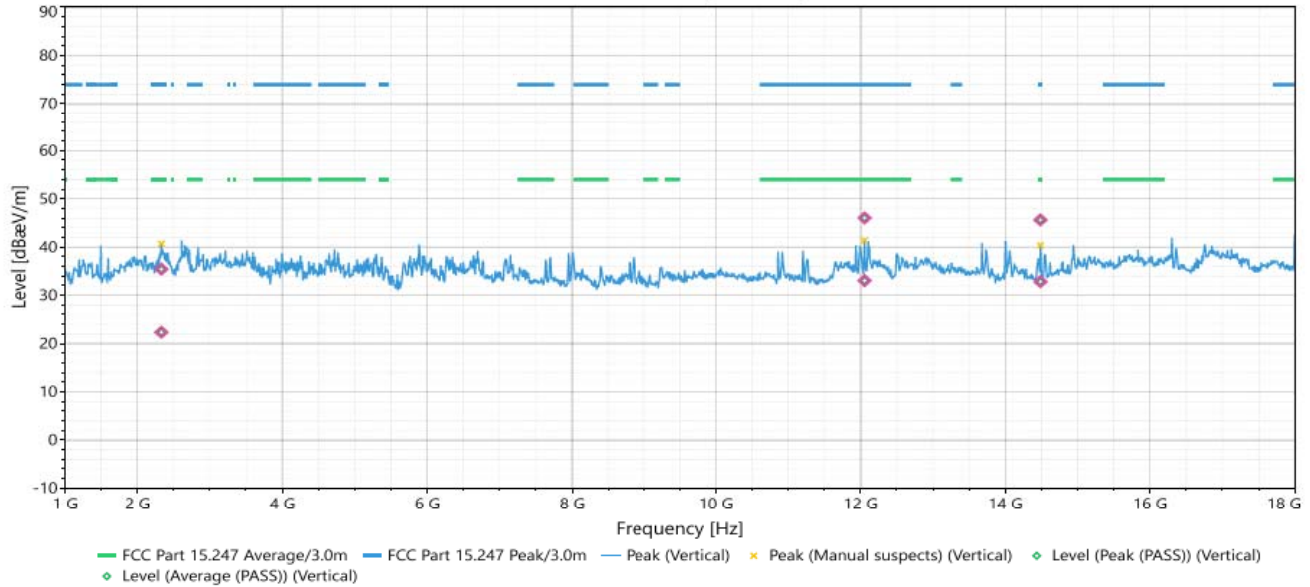
Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	10859.9	Horizontal	43.627	74	-30.373	3.11	64	6.59	Peak (PASS)
2	10859.9	Horizontal	30.489	54	-23.511	3.11	64	6.59	Average (PASS)
3	12053.3	Horizontal	46.25	74	-27.75	3.13	125	7.51	Peak (PASS)
4	12053.3	Horizontal	33.221	54	-20.779	3.13	125	7.51	Average (PASS)
5	14486	Horizontal	46.072	74	-27.928	3.15	194	6.83	Peak (PASS)
6	14486	Horizontal	33.066	54	-20.934	3.15	194	6.83	Average (PASS)
7	2388.412	Horizontal	51.008	54	-2.992	1	9	38.84	Peak (PASS)
8	2388.412	Horizontal	64.565	74	-9.435	1	9	38.84	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	Richard Dollente
Test Mode	TX MODE EDR 2441 MHz		

#1 - 1GHz-18GHz (Vertical)

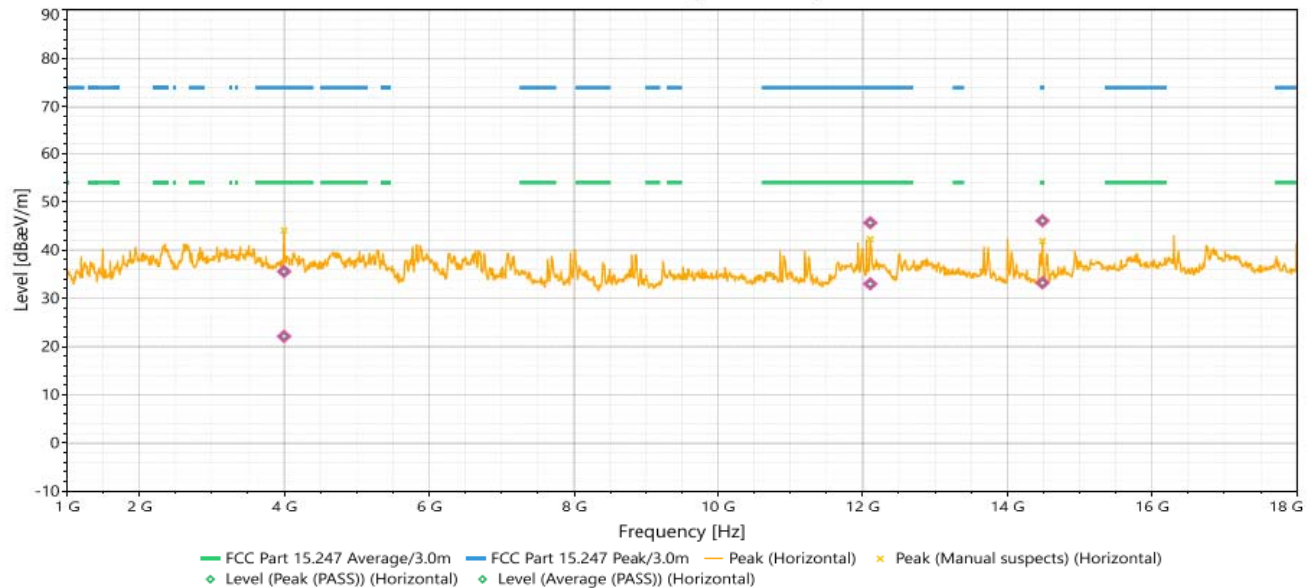


Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	2332.7	Vertical	35.426	74	-38.574	1.03	218	1.82	Peak (PASS)
2	2332.7	Vertical	22.365	54	-31.635	1.03	218	1.82	Average (PASS)
3	12055	Vertical	46.039	74	-27.961	3.37	182	7.48	Peak (PASS)
4	12055	Vertical	33.055	54	-20.945	3.37	182	7.48	Average (PASS)
5	14486	Vertical	45.625	74	-28.375	3.41	186	6.7	Peak (PASS)
6	14486	Vertical	32.84	54	-21.16	3.41	186	6.7	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	Richard Dollente
Test Mode	TX MODE BDR 2441 MHz		

#2 - 1GHz-18GHz (Horizontal)

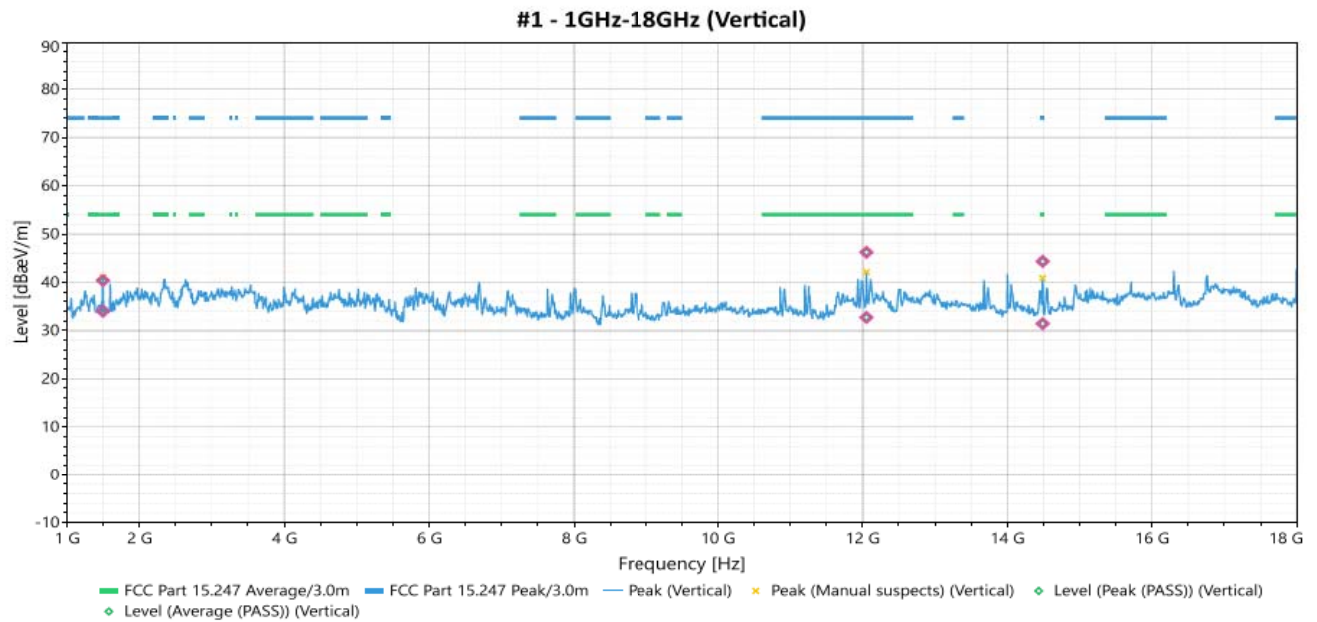


Antenna Polarity & Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (cm)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	3998.7	Horizontal	35.561	74	-38.439	2.21	217	35.561	Peak (PASS)
2	3998.7	Horizontal	22.117	54	-31.883	2.21	217	22.117	Average (PASS)
3	12106	Horizontal	45.662	74	-28.338	2.84	172	45.662	Peak (PASS)
4	12106	Horizontal	33.004	54	-20.996	2.84	172	33.004	Average (PASS)
5	14487.7	Horizontal	46.088	74	-27.912	3.09	76	46.088	Peak (PASS)
6	14487.7	Horizontal	33.231	54	-20.769	3.09	76	33.231	Average (PASS)

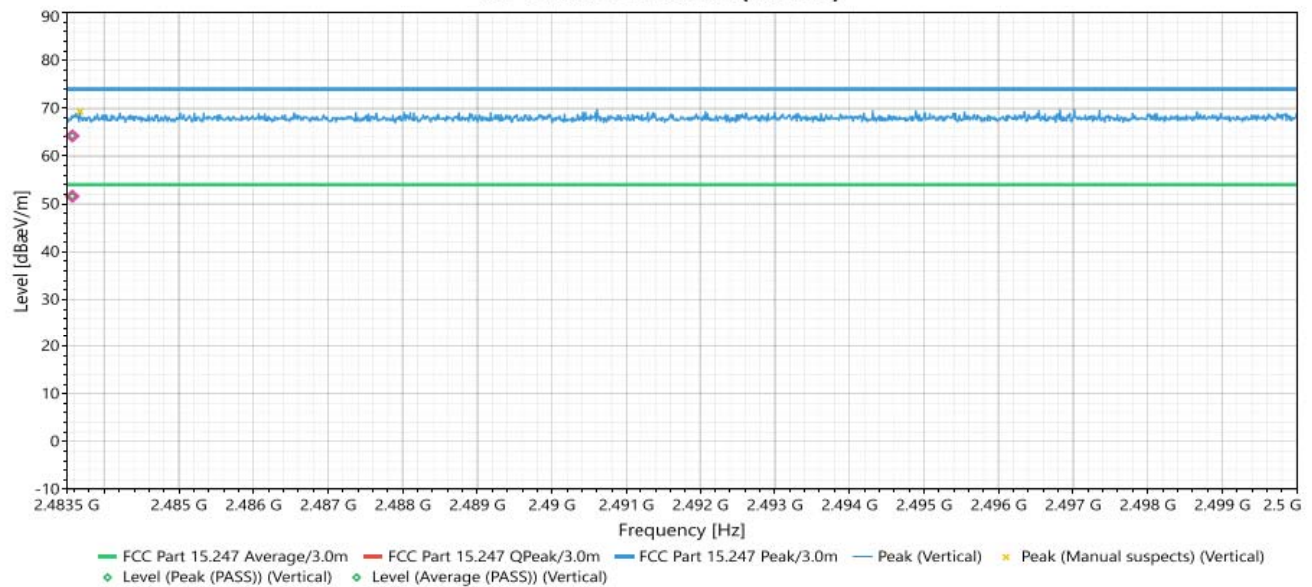
REMARKS:

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	Richard Dollente
Test Mode	TX MODE BDR 2480 MHz		



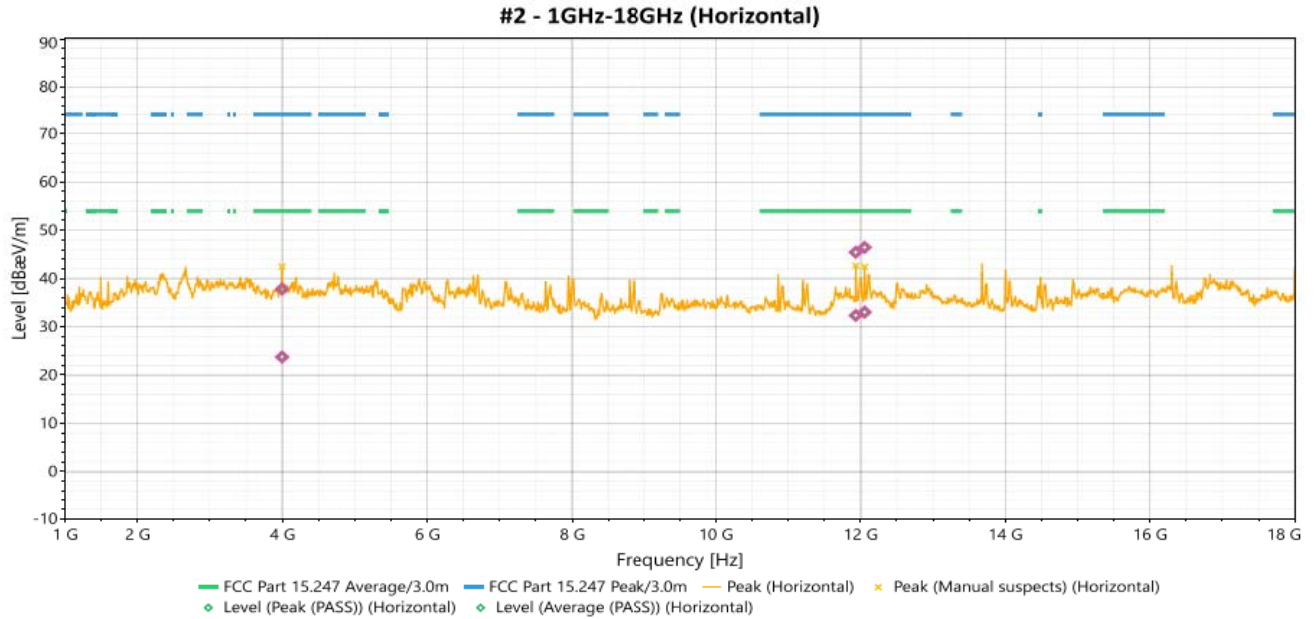
#1 - 2.4835GHz-2.5GHz (Vertical)



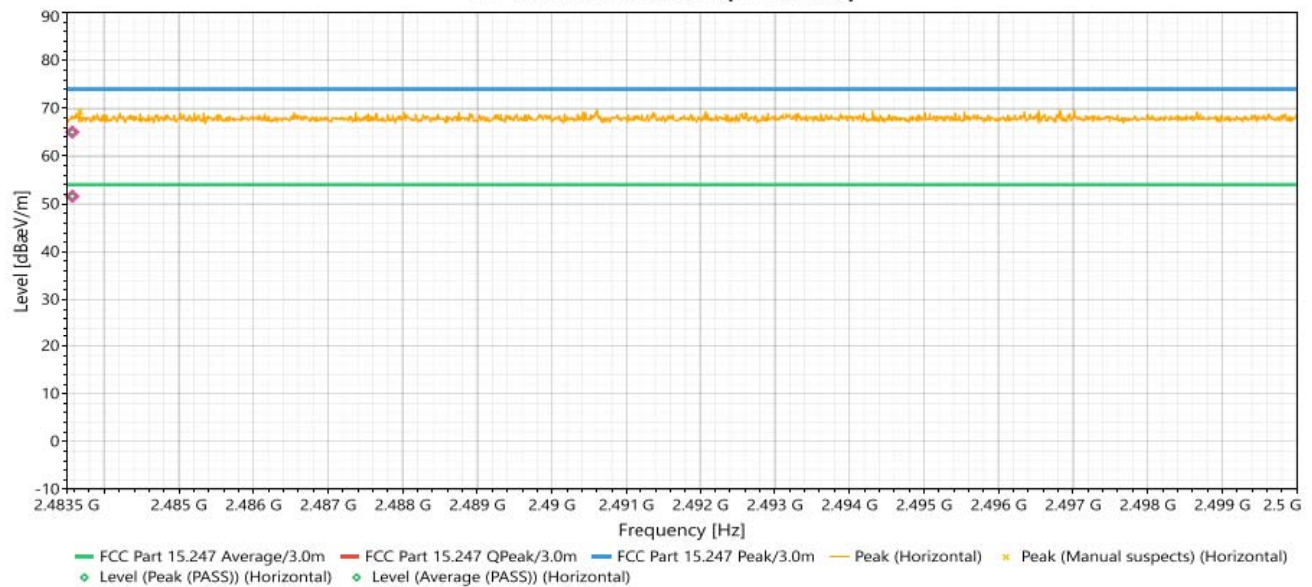
Antenna Polarity & Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Polarization	Level Peak[dB(uV/m)]	Limit Peak dB(uV/m)	Margin Peak [dB]	Height (m)	Angle (Deg)	Factor [dB(1/m)]	Measure Type/ Result
1	1499.7	Vertical	40.362	74	-33.638	1	180	-2.5	Peak (PASS)
2	1499.7	Vertical	33.986	54	-20.014	1	180	-2.5	Average (PASS)
3	12053.3	Vertical	46.201	74	-27.799	3.25	48	7.48	Peak (PASS)
4	12053.3	Vertical	32.71	54	-21.29	3.25	48	7.48	Average (PASS)
5	14489.4	Vertical	44.325	74	-29.675	1.4	22	6.71	Peak (PASS)
6	14489.4	Vertical	31.421	54	-22.579	1.4	22	6.71	Average (PASS)
7	2483.575	Vertical	64.231	74	-9.769	2.24	113	39.14	Peak (PASS)
8	2483.575	Vertical	51.605	54	-2.395	2.24	113	39.14	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	Richard Dollente
Test Mode	TX MODE EDR 2480 MHz		



#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	3998.7	Horizontal	37.821	74	-36.179	2.47	332	3.27	Peak (PASS)
2	3998.7	Horizontal	23.725	54	-30.275	2.47	332	3.27	Average (PASS)
3	11934.3	Horizontal	45.439	74	-28.561	3.03	18	7.46	Peak (PASS)
4	11934.3	Horizontal	32.355	54	-21.645	3.03	18	7.46	Average (PASS)
5	12055	Horizontal	46.453	74	-27.547	3.15	275	7.51	Peak (PASS)
6	12055	Horizontal	33.042	54	-20.958	3.15	275	7.51	Average (PASS)
7	2483.575	Horizontal	65.035	74	-8.965	2.08	325	39.15	Peak (PASS)
8	2483.575	Horizontal	51.599	54	-2.401	2.08	325	39.15	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

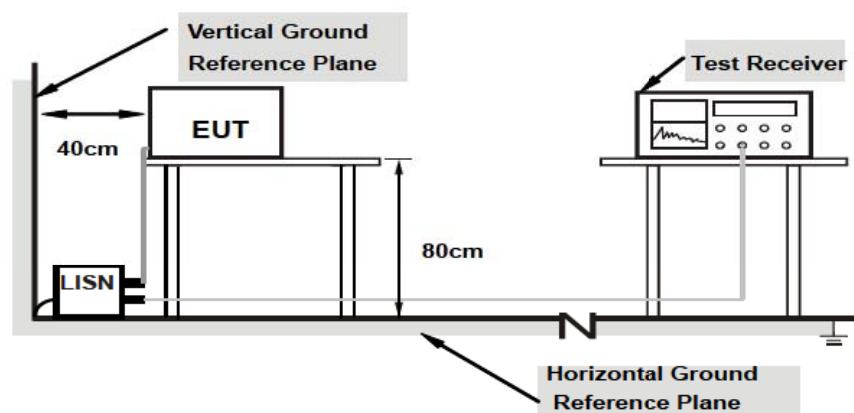
Note: 1. The lower limit shall apply at the transition frequencies.

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 Equipment List

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

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2488	Screen Room	Universal	Custom Made	Not Required	Not Required
1S4818	Digital Barometer	Control Company	6530. 68000-49	05/04/2022	05/04/2024
4U1668	True RMS Multimeter with Remote Display	Fluke	233	04/03/2023	04/03/2025
1S3898	Voltage Regulator	Volteq	TDGC2-5kVA	See Note	See Note
1S3809	EMI Receiver	Narda Safety Test Solutions	PMM 9010F	10/12/2022	10/12/2023
1S4781	Transient Limiter	Fischer Custom Communications, Inc.	450B-2.4-BNC	See Note	See Note
1U0337	LISN	Com-Power	LI-215A	10/12/2022	10/12/2023
1S2659	Impedance Stabilization Network (ISN)	Fischer Custom Communications, Inc.	F-071115-1057-1-09	04/06/2023	04/06/2024
1S54005	Micro-Ohmmeter	NDB Technologies, Inc.	DRM-1A	11/21/2022	11/21/2023
1S4852	Radio Communicator Analyzer	Anritsu	MT8821C	04/10/2023	04/10/2024

Test Engineer: Richard Dollente

Test Date(s): 04/22/2023

Test Results:

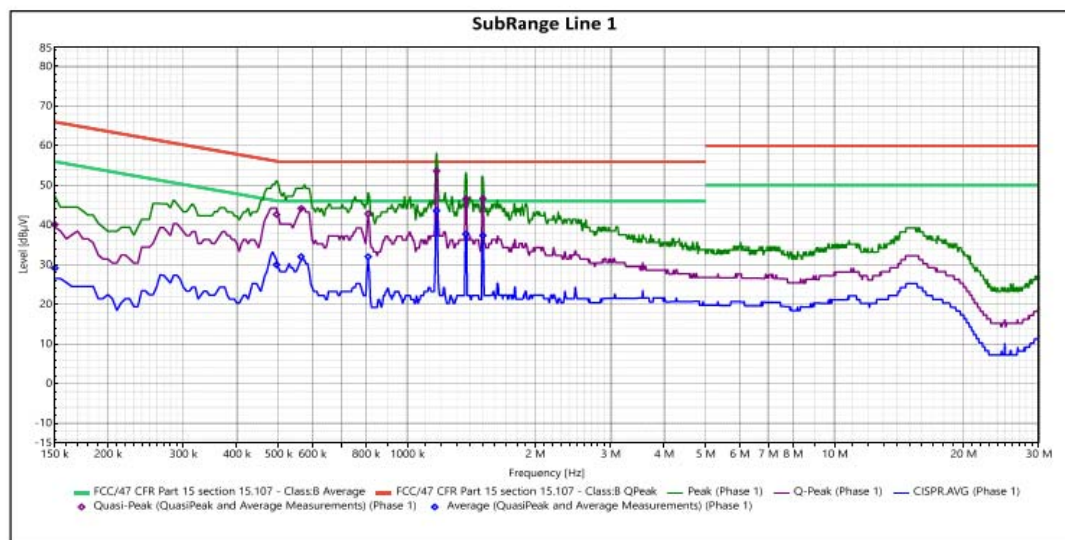
Test Results

Frequency Range	0.15-30 MHz	Phase	Line
Input Power	230 Vac	Environmental Conditions	24 °C, 48% RH
Tested by	Richard Dollente	Test Date	04/22/2023
Test Mode	Mode 1		

Line	Frequency	QP Amplitude (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Pass/Fail	Average Amplitude (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Pass/Fail
Phase 1	150 kHz	40.12	66	-25.88	Pass	29.15	56	-26.85	Pass
Phase 1	495 kHz	42.683	56.083	-13.4	Pass	29.993	46.083	-16.09	Pass
Phase 1	565 kHz	44.187	56	-11.813	Pass	31.987	46	-14.013	Pass
Phase 1	810 kHz	42.857	56	-13.143	Pass	31.987	46	-14.013	Pass
Phase 1	1.17 MHz	53.603	56	-2.397	Pass	43.623	46	-2.377	Pass
Phase 1	1.37 MHz	46.581	56	-9.419	Pass	37.721	46	-8.279	Pass

Remarks:

1. The emission levels of other frequencies were very low against the limit.
2. Margin value = Emission level – Limit value
3. Emission Level = Correction Factor + Reading Value

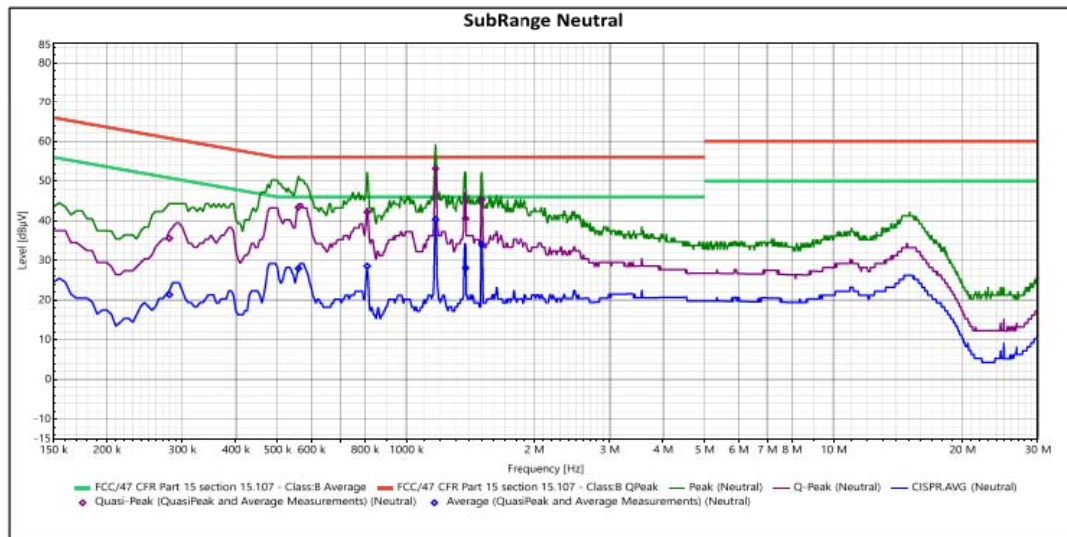


Frequency Range	0.15-30 MHz	Phase	Neutral
Input Power	230 Vac	Environmental Conditions	24 °C, 48% RH
Tested by	Richard Dollente	Test Date	04/20/2023
Test Mode	Mode 1		

Line	Frequency	QP Amplitude (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Pass/Fail	Average Amplitude (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Pass/Fail
Neutral	280 kHz	35.566	60.816	-25.25	Pass	21.356	50.816	-29.46	Pass
Neutral	560 kHz	43.378	56	-12.622	Pass	27.958	46	-18.042	Pass
Neutral	810 kHz	42.197	56	-13.803	Pass	28.577	46	-17.423	Pass
Neutral	1.17 MHz	53.163	56	-2.837	Pass	40.363	46	-5.637	Pass
Neutral	1.375 MHz	40.602	56	-15.398	Pass	28.092	46	-17.908	Pass
Neutral	1.5 MHz	45.279	56	-10.721	Pass	33.979	46	-12.021	Pass

Remarks:

1. The emission levels of other frequencies were very low against the limit.
2. Margin value = Emission level – Limit value
3. Emission Level = Correction Factor + Reading Value



IV. Pictures of test Arrangements

Please see setup photo file

END OF REPORT