

FCC RF Test Report

For

Transceiver

Trade Name : VOXX
Model Number : PREBT
FCC ID : ELVATRYA
Date of Receipt : July 1, 2024
Date of Report : July 18, 2024

Prepared for

Nutek Corporation

No.167, Lane 235, Bauchiau Rd., Xindian District, New Taipei City, Taiwan

Prepared by



Central Research Technology Co.

11, Lane 41, Fushuen St., Jungshan Chiu, Taipei 104, Taiwan



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Verification of Compliance

Equipment under Test : Transceiver
Model No. : PREBT
FCC ID : ELVATRYA
Applicant : Nutek Corporation
Address : No.167, Lane 235, Bauchiau Rd., Xindian District, New Taipei City, Taiwan
Applicable Standards : 47 CFR part 15, Subpart C
ANSI C63.10:2020
Date of Testing : July 9 ~ 11, 2024
Deviation : The method, configuration and arrangement of the tests are following the requirement of customer and the applicable standards cited above.
Condition of Test Sample : Mass Production



We, **Central Research Technology Co.**, hereby certify that one sample of the designated product was tested in our facility during the period mentioned above. The test records, data evaluation and Equipment Under Test (EUT) configurations shown in the present report are true and accurate representation of the measurements of the sample's RF characteristics under the conditions herein specified.

The test results show that the EUT as described in the present report is in compliance with the requirements set forth in the standards mentioned above and apply to the tested sample identified in the present report only. The test report shall not be reproduced, except in its entirety, without the written approval of Central Research Technology Co.

PREPARED BY

:

A handwritten signature in blue ink, appearing to read 'Cathy Chen'.

(Cathy Chen/ Technical Manager)

, DATE :

July 18, 2024

APPROVED BY

:

A handwritten signature in blue ink, appearing to read 'Sam Chien'.

(Sam Chien /Authorized Signatory)

, DATE :

July 18, 2024

Contents

1	General Description	5
1.1	General Description of EUT	5
1.2	Applied standards	7
1.3	Test result	10
1.4	The Support Units	11
1.5	Layout of Setup	11
1.6	Test Instruments	12
1.7	Test Capability	15
1.8	Measurement Uncertainty	17
2	6dB Bandwidth	18
2.1	Applied standard	18
2.2	Measurement Procedure	18
2.3	Test configuration	18
2.4	Test Data	19
3	Maximum Peak Output Power	21
3.1	Applied standard	21
3.2	Measurement Procedure	21
3.3	Test configuration	21
3.4	Test Data	22
4	Power Spectral Density	23
4.1	Applied standard	23
4.2	Measurement Procedure	23
4.3	Test configuration	23
4.4	Test Data	24
5	Conducted Spurious emission	26
5.1	Applied standard	26
5.2	Measurement Procedure	26
5.3	Test configuration	26
5.4	Test Data	27
6	Radiated Spurious Emission.....	31
6.1	Applied standard	31
6.2	Measurement Procedure	32
6.3	Test configuration	33

6.4	Test Data	35
Attachment 1 – Photographs of the Test Configurations		
Attachment 2 – External Photographs of EUT		
Attachment 3 – Internal Photographs of EUT		

1 General Description

1.1 General Description of EUT

Equipment under Test : Transceiver

Model No. : PREBT

Power in : 5Vdc by vehicles

Frequency Range : 2402 MHz – 2480 MHz

Modular Function : GFSK

Channel No. : 40

Antenna Spec : Type: Antenna.: PCB

Brand/Mode No.: Nutek/ 2.4GHz MIFA PCB Antenna

Antenna Gain : -4.09 dBi

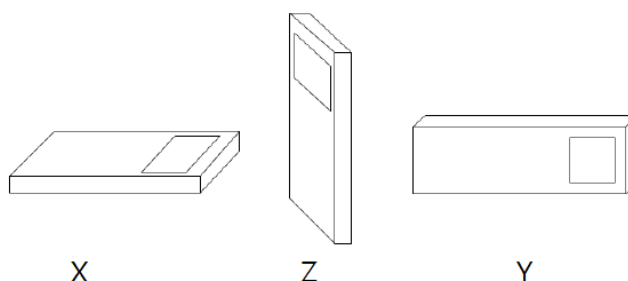
Channel List:

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

Test Mode

Test item	Mode	Operation Frequency
Conducted power test	BLE 1M	CH 0, CH 19, CH 39
Radiated emission above 1 GHz	BLE 1M	CH 0, CH 19, CH 39
Radiated emission below 1 GHz	BLE 1M	CH 19

According to the preliminary test for X,Y and Z axis, it was found X axis is worse. It was taken as the representative condition for test and its data are recorded in the present document.

**EUT Test step:**

1. EUT connect with NB.
2. Software Docklight v1.9
3. Adjust test mode, channel, setting power via software.
4. Press start testing.
5. EUT run test program and transmit signal.

1.2 Applied standards

(1) 6 dB Bandwidth

According to FCC 15.247(a)(2), the minimum 6 dB bandwidth shall be at least 500 kHz.

(2) Maximun Peak Output Power

According to FCC 15.247(b)(3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

According to FCC 15.247(b) (4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) Conducted emission measurements

According to FCC 15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph FCC 15.247(b)(3), the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in FCC 15.209(a) is not required. Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must also comply with the radiated emission limits specified in FCC 15.209(a).

(4) Power Spectral Density

According to FCC 15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

(5) Radiated emission measurements

For intentional device, according to FCC 15.209, the general requirement of field strength of radiated emissions from intentional radiator at a distance of 3 meters shall not exceed the below table.

Frequency (MHz)	Measurement Distance (m)	Field Strength (uV/m)	Field Strength (dBuV/m)
0.009-0.490	300	2400/F(kHz)	
0.490-1.705	30	24000/F(kHz)	
1.705-30.0	3	30	29.5
30 – 88	3	100	40.0
88 – 216	3	150	43.5
216 – 960	3	200	46.0
above 1610	3	500	54.0

Note1 : At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

Note 2: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade)

(6) Conduction Emission Requirement

For intentional device, according to FCC 15.207(a), line conduction emission limit is as below table.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency.

(7) Restricted Band

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

1.3 Test result

Test Item	FCC standard section	Report section	Test result
6 dB bandwidth	FCC 15.247(a)(2)	2	PASS
Maximun Peak Output Power	FCC 15.247(b)(3)	3	PASS
Power Spectral Density	FCC 15.247(e)	4	PASS
Conducted spurious emission	FCC 15.247(d)	5	PASS
Radiated emission measurements	FCC 15.209	6	PASS
Conducted AC power line measurement	FCC 15.207	N/A	N/A (Use DC power)

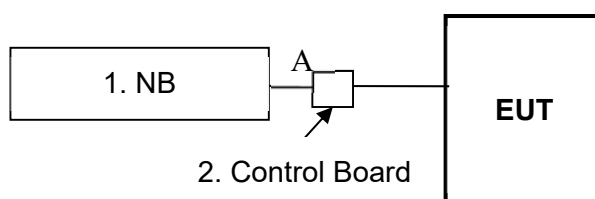
According to ANSI C63.10, determining compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

1.4 The Support Units

No.	Unit	Trade Name	Model No.	Power Code	Supported by lab.
1.	Notebook	hp	ProBook 6470b	1.8m	√
2.	Control Board	FDTI	FT232	1.2m	-

No.	Cable	Length	Core	Supported by lab.	Note
A	USB cable	1.0m	-	-	-

1.5 Layout of Setup



1.6 Test Instruments

Conducted Emission Test

Test Site and Equipment	Manufacturer	Model No. /Serial No.	Last Calibration Date	Calibration Due Date
Spectrum Alayzer	R&S	FSV40/ 101609	2023/10/18	2024/10/17
8-Port Modules for Switch Units	R&S	OSP-B157W8/ 100926	2022/10/18	2024/10/17
RFcable	JMCA	MWX/ C0150~C0153, C0161~C0163	2024/6/11	2025/6/10
Test software	R&S	EMC32/ V11.10.00	NCR	NCR
Test room	N/A	TR13	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR:No Calibration Required.

Radiated Emission Test (Below 1GHz)

Test Site and Equipment	Manufacturer	Model No. /Serial No.	Last Calibration Date	Calibration Due Date
EMI Receiver	R&S	ESCS30/ 836858/020	2023/11/6	2024/11/5
Spectrum Alayzer	Agilent	E4407B/ MY45106795	2024/6/28	2025/6/27
Antenna	EMCO	6502/ 00020558	2023/9/12	2024/9/11
Antenna	SCHWARZBECK & Mini-Circuits	VULB 9168 & BW-N5W5+/ VULB 9168-668 & 003	2023/9/12	2024/9/11
Pre-amplifer	Mini-circuit	ZKL-1R5+/ 004	2024/6/3	2024/12/2
RF cable	JYEBAO	0214/ C0080-4 + C0080-1 + C0080- 2+RSU(CRC- 011/11)+C0080-3	2024/6/3	2025/6/2
Test software	Audix	e3/ V6.20110303a2	NCR	NCR
Semi-anechoic chamber	ETS. LINDGREN	TR11/ 906-A	2024/5/27	2025/5/26

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the semi-anechoic chamber listed above is the date of NSA measurement.

Radiated Emission Test (Above 1 GHz)

Test Site and Equipment	Manufacturer	Model No. /Serial No.	Last Calibration Date	Calibration Due Date
Antenna	EMCO	3117/ 0082847	2023/11/27	2024/11/26
Antenna	Com-Power	AH-840/ 101098	2023/12/13	2024/12/12
Pre-amplifier	MITEQ	TTA1800-30-HG- N-M/ 1904295	2024/5/3	2025/5/2
Pre-amplifier	MITEQ	TTA1840-35-HG/ 2034375	2023/9/12	2024/9/11
RFcable	Suhner	Sucoflex 106P / C0091	2023/10/5	2024/10/4
RFcable	JMCA	MWX241/B/ C0103~C0104	2024/4/15	2025/4/14
MXA signal analyzer	KeySight	N9020A/ MY54420147	2024/7/9	2025/7/8
Test software	Audix	e3/ V9 20150907c	NCR	NCR
Semi-anechoic chamber	ETS. LINDGREN	TR1/ 17627-B	2023/12/9	2024/12/8

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the chamber TR1 listed above is the date of site VSWR measurement.

1.7 Test Capability

Test Facility

The test facility used for evaluating the conformance of the EUT with each standard in the present report meets what required in CISPR16 series and ANSI C63.4:2014 amended as per ANSI C63.4a:2017.

Test Room	Type of Test Room	Descriptions
TR1	3m fully-anechoic chamber	For the radiated emission measurement (above 1GHz)
TR11	3m semi-anechoic chamber	For the radiated emission measurement (below 1GHz)
TR13	Test Site	For the RF conducted emission measurement.
TR5	Shielding Room	For the conducted emission measurement.
TR20	Shielding Room	

Test Laboratory Competence Information

Central Research Technology Co. has been accredited / filed / authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation Certificate	USA	NVLAP	200575-0	ISO/IEC 17025
	USA	FCC	TW1104, TW0019	ISO/IEC 17025
	R.O.C. (Taiwan)	TAF	0905	ISO/IEC 17025
	R.O.C. (Taiwan)	BSMI	SL2-IN-E-0033, SL2-IS-E-0033, SL2-R1/R2-E-0033, SL2-A1-E-0033, SL2-L1-E-0033	ISO/IEC 17025
	Canada	ISED	TW0905	ISO/IEC 17025
Site Filing Document	Japan	VCCI	R-11527,C-11609,T-11441, G-10010,C-20010, G-10614, T-20009	Test facility list & NSA Data
Authorization Certificate	Germany	TUV	UA 50235497	ISO/IEC 17025

The copy of each certificate can be downloaded from our web site: www.crc-lab.com

1.8 Measurement Uncertainty

The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{CISPR} in table 1 of CISPR 16-4-2.

Test Item	Measurement Uncertainty	
Occupied bandwidth	0.6%	
Conducted emission	0.8 dB	
Radiated Emission: (9kHz~30MHz)	Horizontal 3.12dB ; Vertical 3.14dB	
Radiated Emission: (30MHz~1000MHz)	Horizontal 4.60dB ; Vertical 6.12dB	
Radiated Emission: (1GHz~6GHz)	Horizontal 4.70dB ; Vertical 4.56dB	
Radiated Emission: (6GHz~18GHz)	Horizontal 4.76dB ; Vertical 4.64dB	
Radiated Emission: (18GHz~40GHz)	Horizontal 4.94dB ; Vertical 4.96dB	
Line Conducted Emission	NSLK-8128-RC	2.92 dB
	ENV 4200	2.92 dB
	ESH2-Z5	2.94 dB

2 6dB Bandwidth

Result: Pass

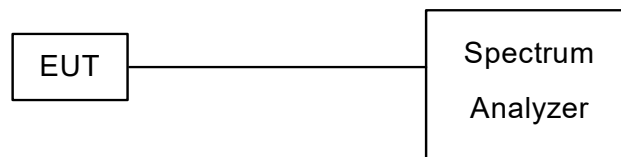
2.1 Applied standard

According to FCC 15.247(a)(2), the minimum 6 dB bandwidth shall be at least 500 kHz.

2.2 Measurement Procedure

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. A software provided by client enabled the EUT to transmit data at middle channel frequencies individually.
- c. Test procedures follow ANSI C63.10 Section 11.8.1.
- d. Spectrum Alayzer Setting: RBW=100 kHz, VBW=300 kHz, Max peak.
- e. Measure the 6dB bandwidth and compare with the required limit.

2.3 Test configuration



2.4 Test Data

Test Mode : Continuous transmitter

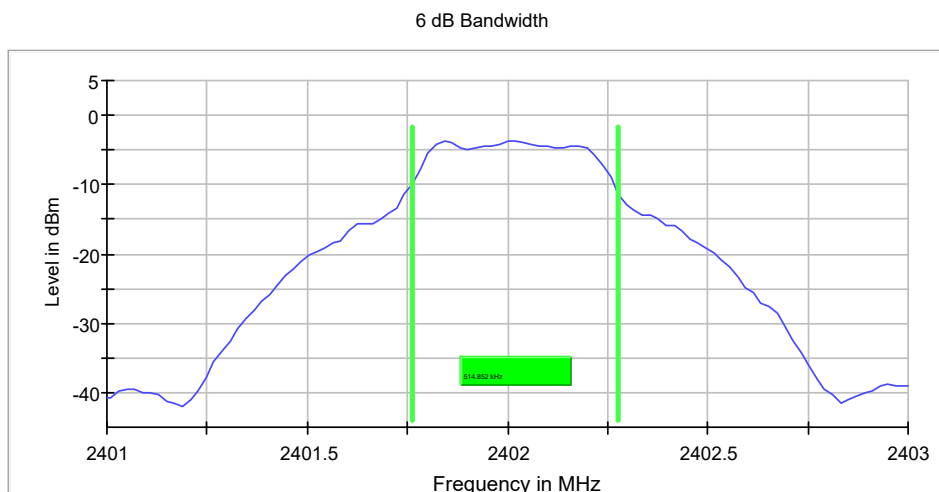
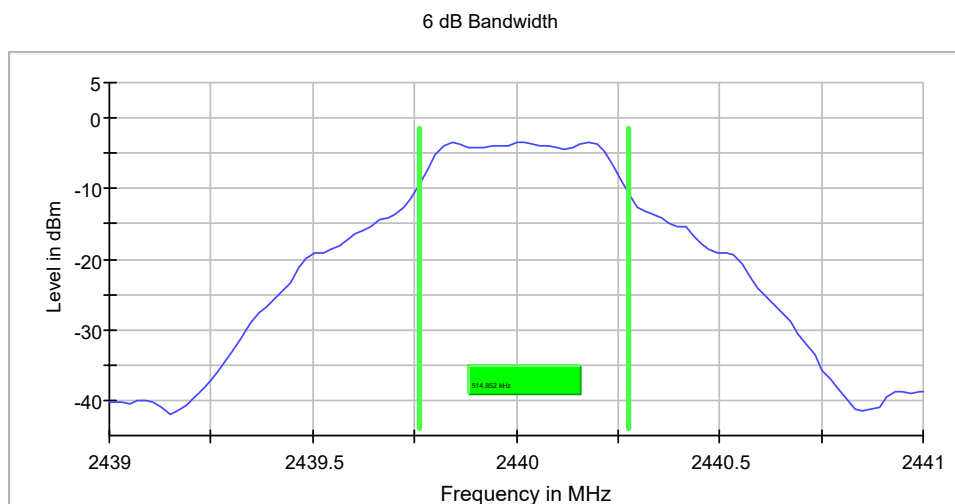
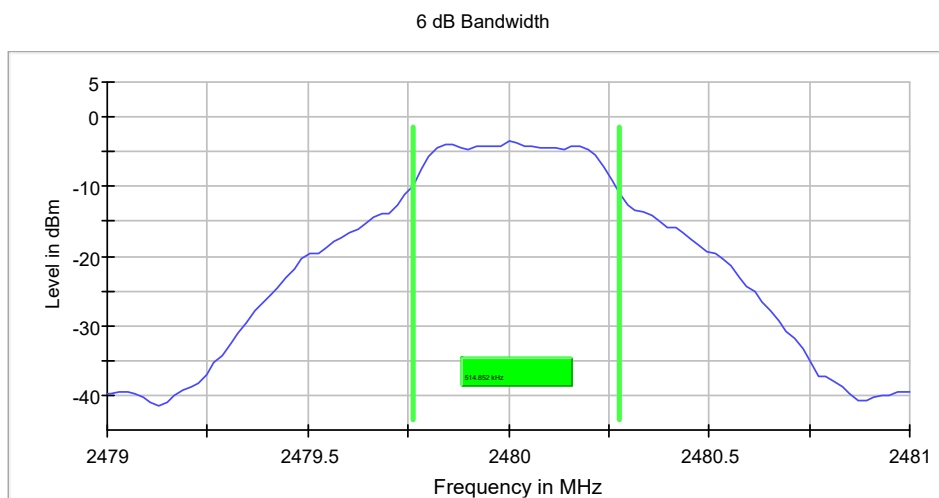
Tester : Eric

Ambient Temperature : 31°C

Relative Humidity : 53%

Test Date : 2024/7/11

Operating Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (kHz)
2402	0.51	> 500
2440	0.51	> 500
2480	0.51	> 500

Channel 0 (2402MHz)**Channel 19 (2440MHz)****Channel 39 (2480MHz)**

3 Maximum Peak Output Power

Result: Pass

3.1 Applied standard

According to FCC 15.247(b)(3), for systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

3.2 Measurement Procedure

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. Test procedures follow ANSI C63.10 section 11.9.1.1
- c. Measurement the Maximum Peak Output Power and compare with the required limit.

3.3 Test configuration



3.4 Test Data

Test Mode : Continuous transmitter

Tester : Eric

Ambient Temperature : 31°C

Relative Humidity : 53%

Test Date : 2024/7/11

Operating Frequency (MHz)	Peak Output power (dBm)	Limit (dBm)	Margin (dB)
2402	-3.6	30	33.6
2440	-3.1	30	33.1
2480	-3.3	30	33.1

Note:

1. $\text{Margin(dB)} = \text{Limit} - \text{output power}$

4 Power Spectral Density

Result: Pass

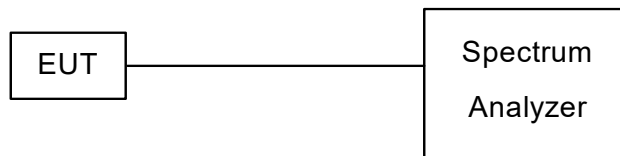
4.1 Applied standard

According to FCC 15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.2 Measurement Procedure

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. Test procedures follow ANSI C63.10 section 11.10.2.
- c. Spectrum Alayzer Setting: RBW=3 kHz, VBW=10 kHz, Max peak.
- d. Measure the power spectrtal density and compare with the required limit.

4.3 Test configuration



4.4 Test Data

Test Mode : Continuous transmitter

Tester : Eric

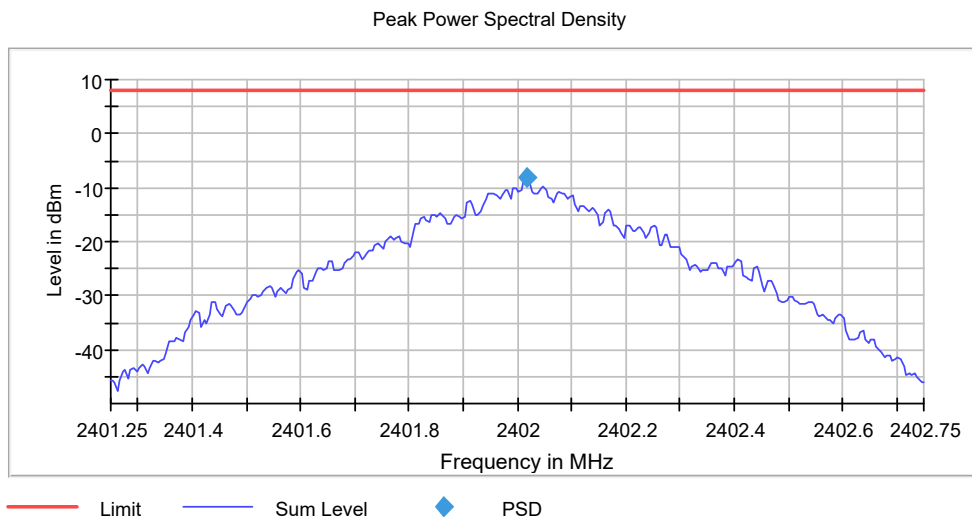
Ambient Temperature : 31°C

Relative Humidity : 53%

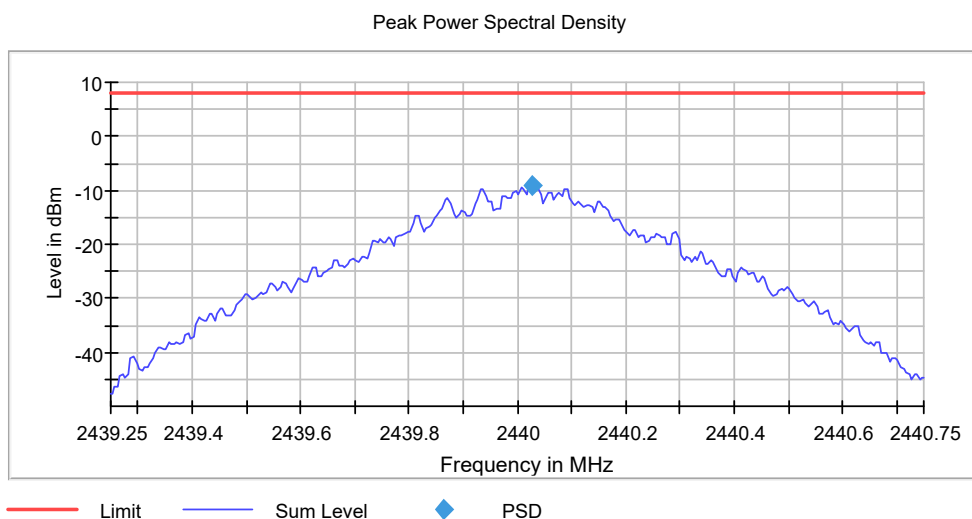
Test Date : 2024/7/11

Operating Frequency (MHz)	Power spectral Density (dBm/10kHz)	Limit (dBm/3kHz)	Margin (dB)
2402	-8.2	8	16.2
2440	-9.0	8	17.0
2480	-9.1	8	17.1

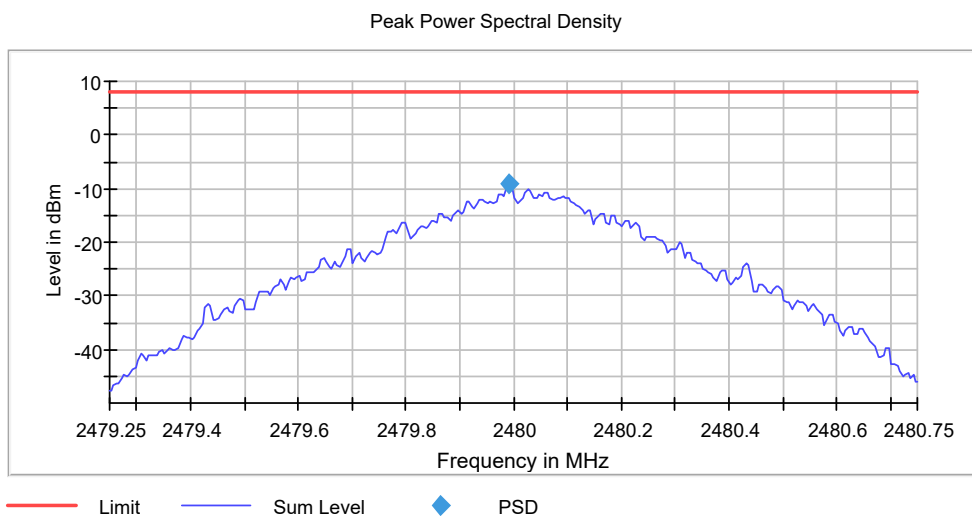
Channel 0 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



5 Conducted Spurious emission

Result: Pass

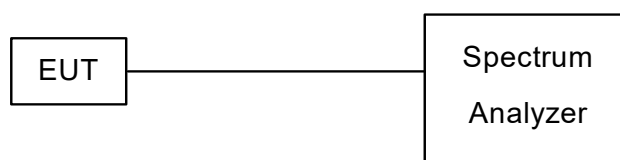
5.1 Applied standard

According to FCC 15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph FCC 15.247(b)(3), the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in FCC 15.209(a) are not required.

5.2 Measurement Procedure

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. The software provided by client enabled the EUT to transmit data at low and high channel frequencies individually.
- c. Test procedures follow ANSI C63.10 section 11.11.
- d. Spectrum Alayzer Setting: RBW=100 kHz, VBW=300 kHz, Max peak
- e. Measurement the conducted spurious emission and compare with the required limit.

5.3 Test configuration



5.4 Test Data

Bandedge

Test Mode : Continuous transmitter

Tester : Eric

Ambient Temperature : 31°C

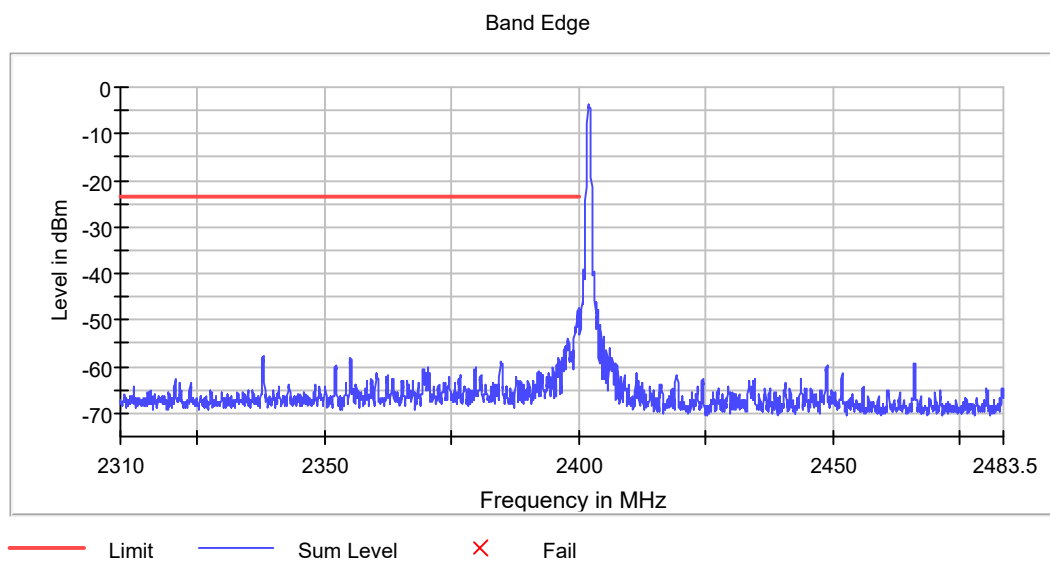
Relative Humidity : 53%

Test Date : 2024/7/11

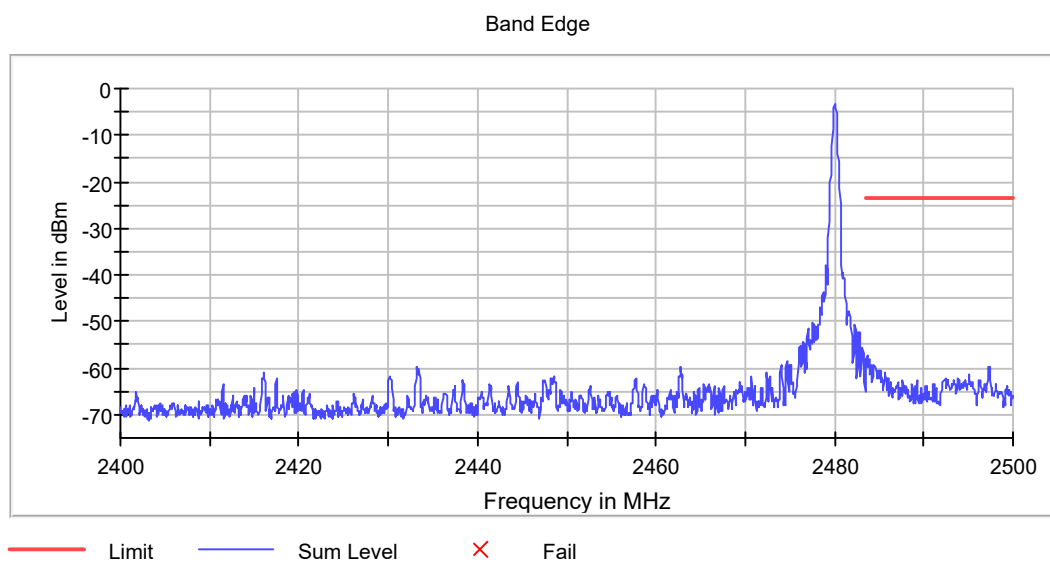
Operating Frequency (MHz)	Max emission of in band (dBm)	Frequency of out band max emission (MHz)	Max emission of out band (dBm)	Limit (dBm)	Margin (dB)
2402	-3.7	2399.98	-47.6	-23.7	23.9
2480	-3.4	2480.03	-57.1	-23.4	33.7

Note: Limit(dBm) = Max emission of in band - 20

Channel 0 (2402MHz)



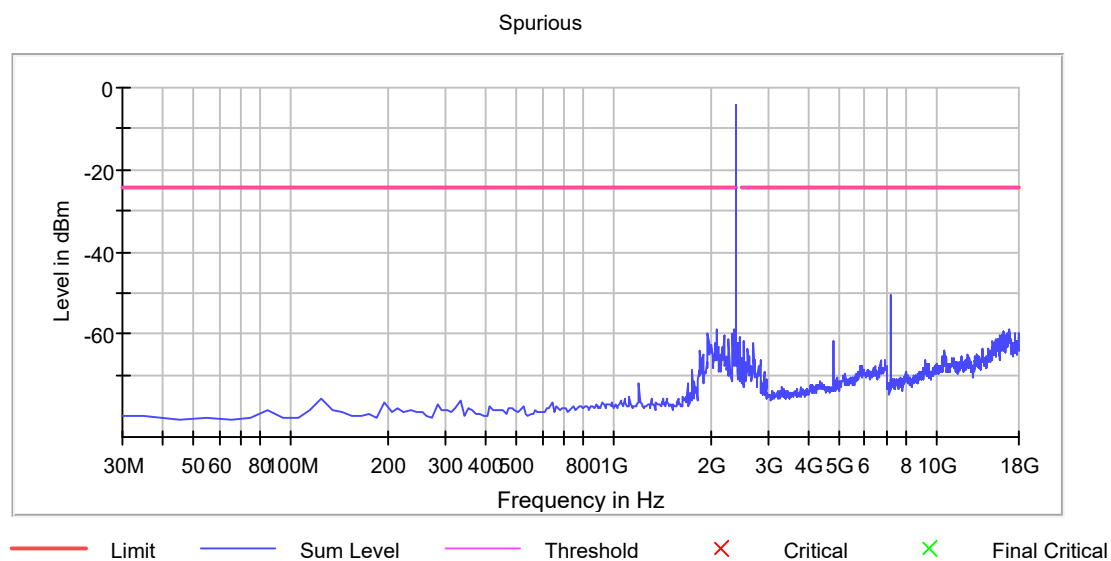
Channel 39 (2480MHz)



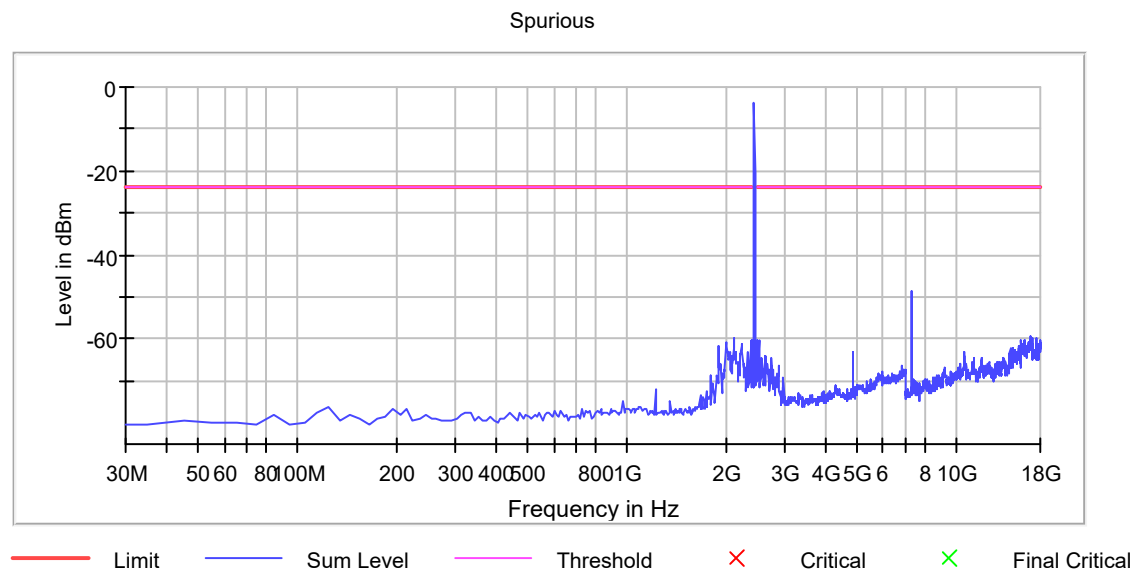
Out of band emission**Test Mode : Continuous transmitter****Tester : Eric****Ambient Temperature : 31°C****Relative Humidity : 53%****Test Date : 2024/7/11**

No signal can be detected from 18GHz to 25GHz, so the graphs are omitted above 18GHz

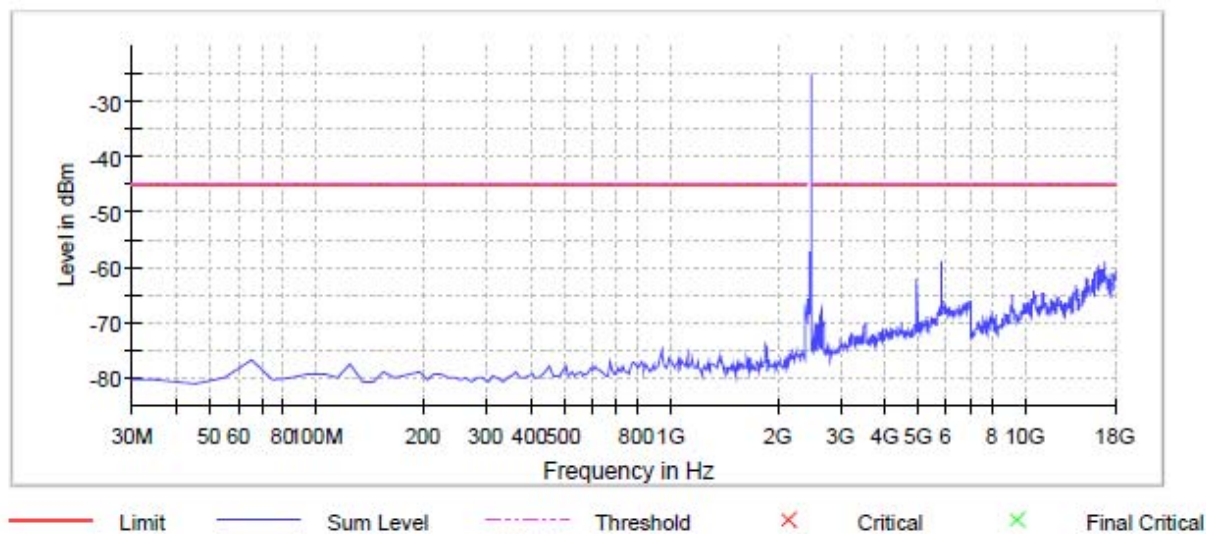
Channel 0 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



6 Radiated Spurious Emission

Result: Pass

6.1 Applied standard

According to FCC 15.247(d), fall in the restricted bands, as defined in FCC 15.205(a), must also comply with the radiated emission limits specified in FCC 15.209(a).

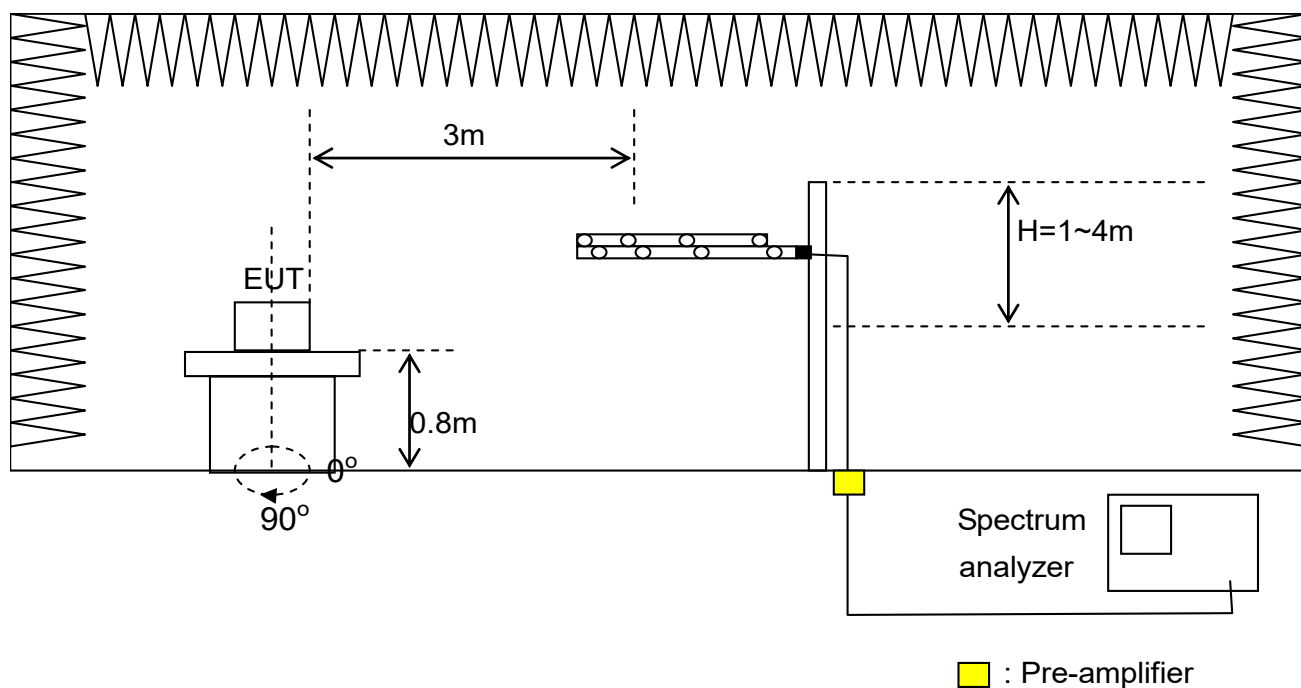
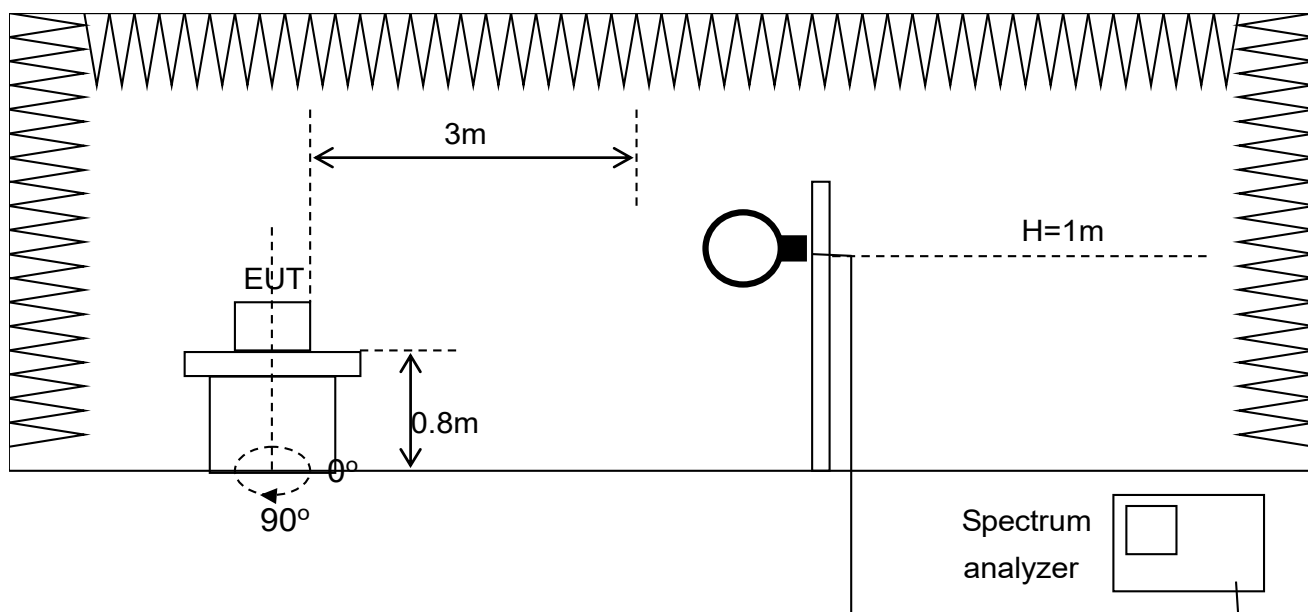
The amplitude of spurious emission are attenuated by more than 20 dB below the permissible value has no need to be reported.

6.2 Measurement Procedure

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. A software provided by client enabled the EUT to transmit and receive data at operating frequency.(if necessary)
- c. If the EUT is tabletop equipment, it should be placed on a wooden table with a height of 0.8 meters above the reference ground plane in the semi-anechoic chamber. If the EUT is floor-standing equipment, it should be placed on a non-conducted support with a height of 12 millimeters above the reference ground plane in the semi-anechoic chamber.
- d. The EUT is set 3m away from the interference receiving antenna.
- e. Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.
- f. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine at least six frequencies associated with higher emission levels and record them.
- g. Then measure each frequency found from step f. by using the spectrum with rotating the EUT and positioning the receiving antenna height to determine the maximum level.
- h. For measurement of frequency below 1000MHz, set the receiver detector to be Quasi-Peak per CISPR 16-1 to find out the maximum level occurred. Receiver Setting is 9 kHz – 150kHz: RBW=200 Hz. 150kHz – 30 MHz: RBW=9 kHz. 30 MHz- 1 GHz: RBW=120 kHz.
- i. For measurement of frequency above 1000MHz, set the spectrum detector to be Peak or Average to find out the maximum level occurred, if any. Spectrum Analyzer Setting is Peak:RBW=1 MHz, VBW=3 MHz. Average: RBW=1 MHz, VBW=3 kHz.
- j. Record frequency, azimuth angle of the turntable, height, and polarization of the receiving antenna and compare the maximum level with the required limit.
- k. Change the receiving antenna to another polarization to measure radiated emission by following step e. to j. again.
- l. If the peak emission level below 1000MHz measured from step f. is 4dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. value will be measured and presented.
- m. If the peak emission level above 1000MHz measured from step f. is 20dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate A.V. value will be measured and presented.

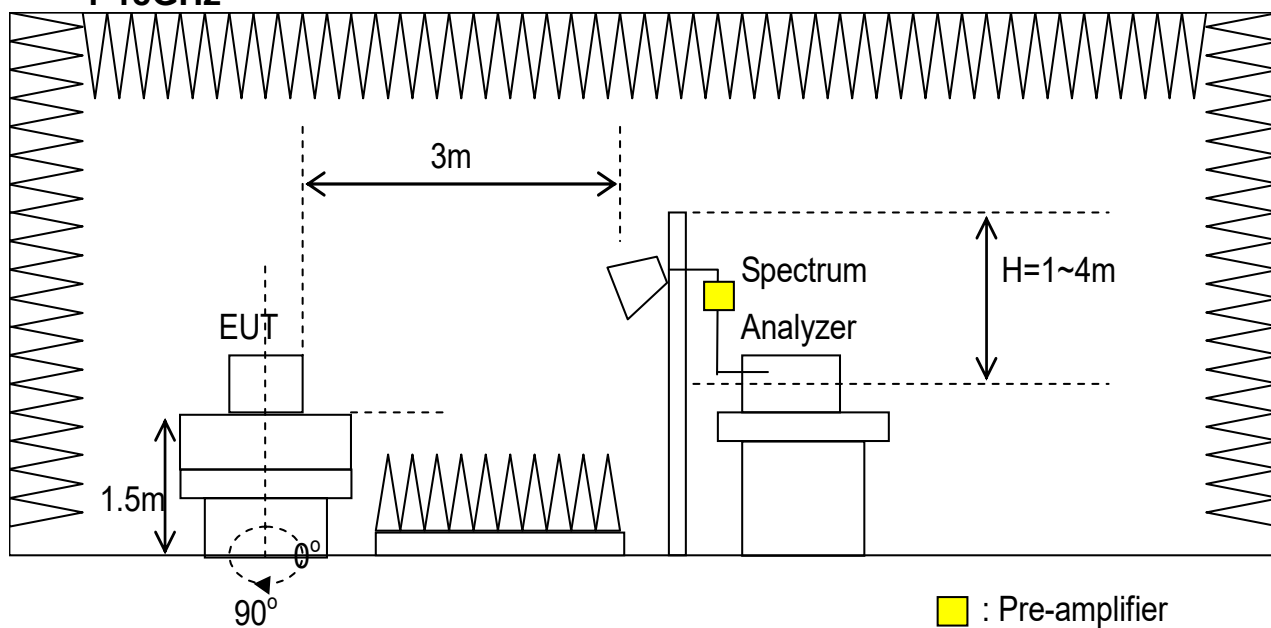
6.3 Test configuration

Below 1GHz

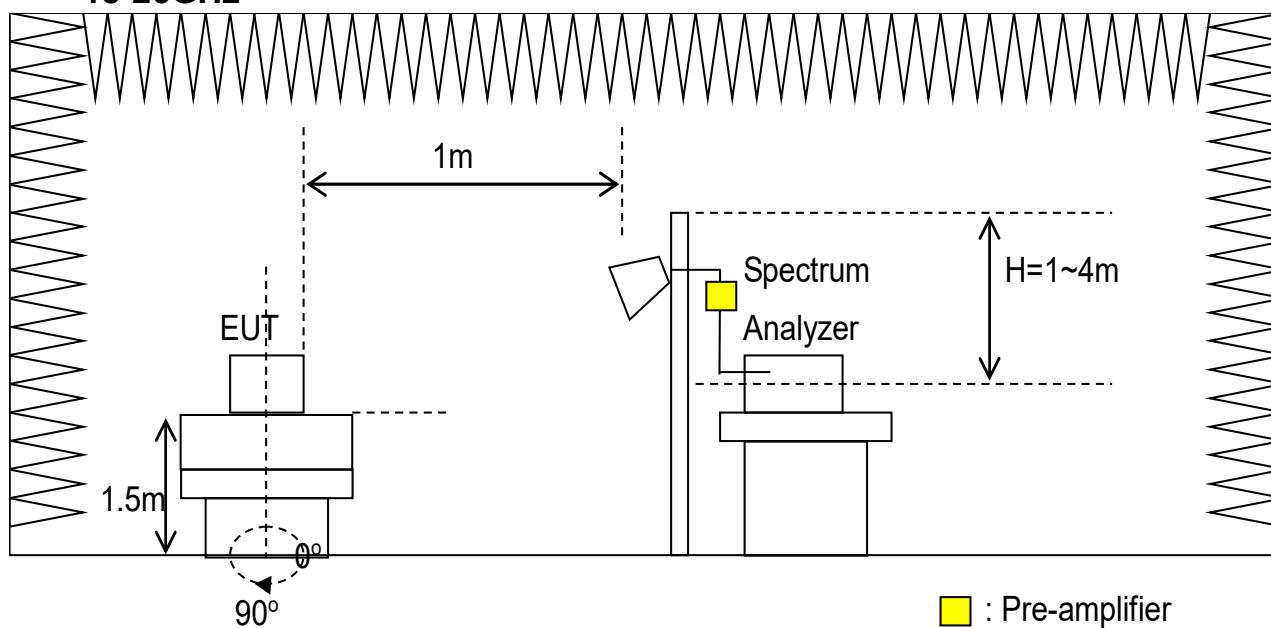


Above 1GHz

1-18GHz



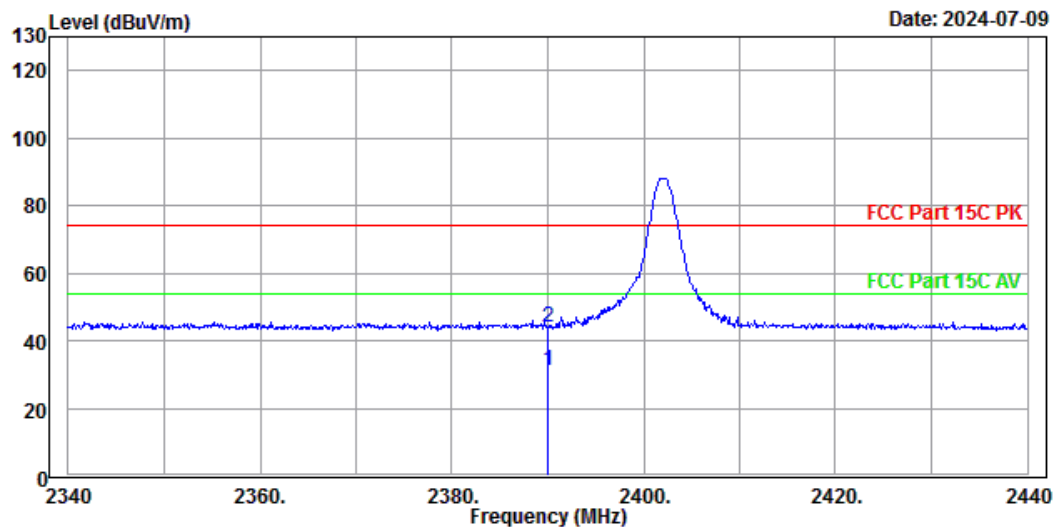
18-26GHz



6.4 Test Data

Bandedge

Test Mode : Continuous Transmitting, 2402 MHz
Polarization : Horizontal Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%



Condition : FCC Part 15C PK 3m EMCO_3117_82847 HORIZONTAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read	Limit	Over	APos	TPos	Pol/Phase	Remark
	MHz	dBUV/m	Level	Factor	Line	Limit			
			dBuV	dB/m	dBUV/m	dB	cm	deg	
1	2390.000	31.30	46.88	-15.58	54.00	-22.70	299	256	HORIZONTAL Average
2	2390.000	43.81	59.39	-15.58	74.00	-30.19	299	256	HORIZONTAL Peak

Note:

1. Level (dBUV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

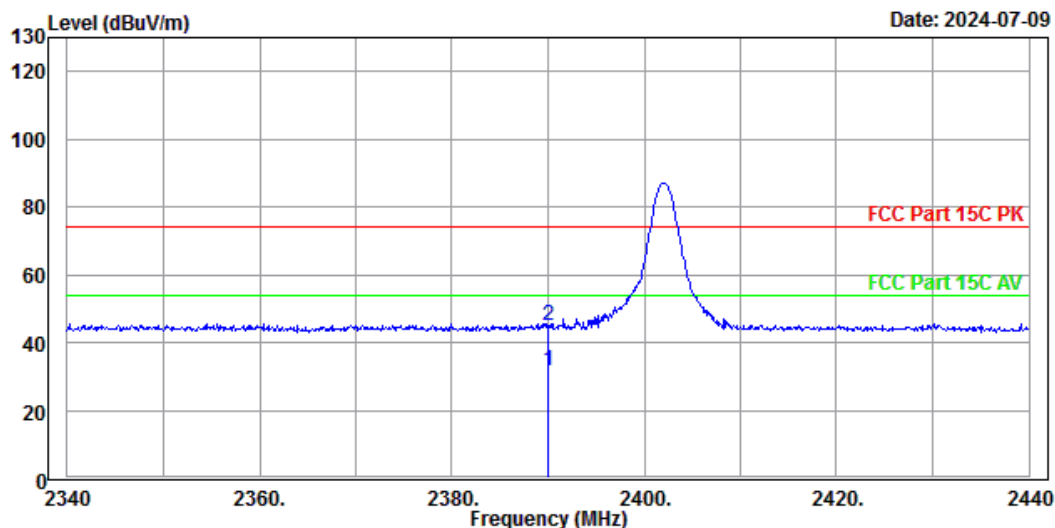
Test Mode : Continuous Transmitting, 2402 MHz

Polarization : Vertical

Tester : Jeffry

Ambient Temperature : 21°C

Relative Humidity : 61%



Condition : FCC Part 15C PK 3m EMCO_3117_82847 VERTICAL

POWER :

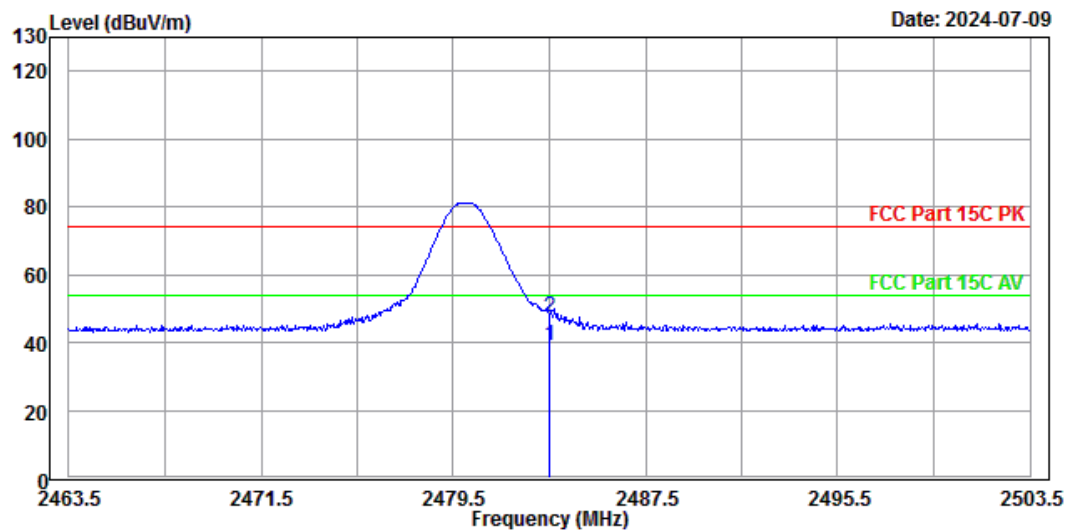
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2390.000	31.41	46.99	-15.58	54.00	-22.59	281	192	VERTICAL	Average
2	2390.000	44.81	60.39	-15.58	74.00	-29.19	281	192	VERTICAL	Peak

Note:

1. Level (dBuV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2480 MHz
Polarization : Horizontal Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%



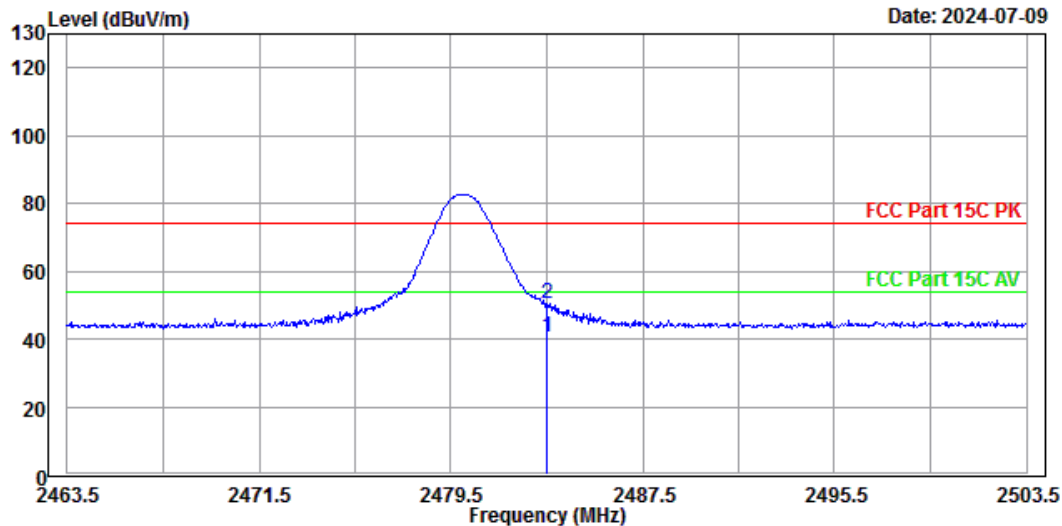
Condition : FCC Part 15C PK 3m EMCO_3117_82847 HORIZONTAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read	Limit	Over	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	Level	Factor	Line	Limit			
			dBuV	dB/m	dBuV/m	dB	cm	deg	
1	2483.500	39.16	54.75	-15.59	54.00	-14.84	330	157	HORIZONTAL Average
2	2483.500	47.59	63.18	-15.59	74.00	-26.41	330	157	HORIZONTAL Peak

Note:

1. Level (dBuV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2480 MHz
Polarization : Vertical Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%



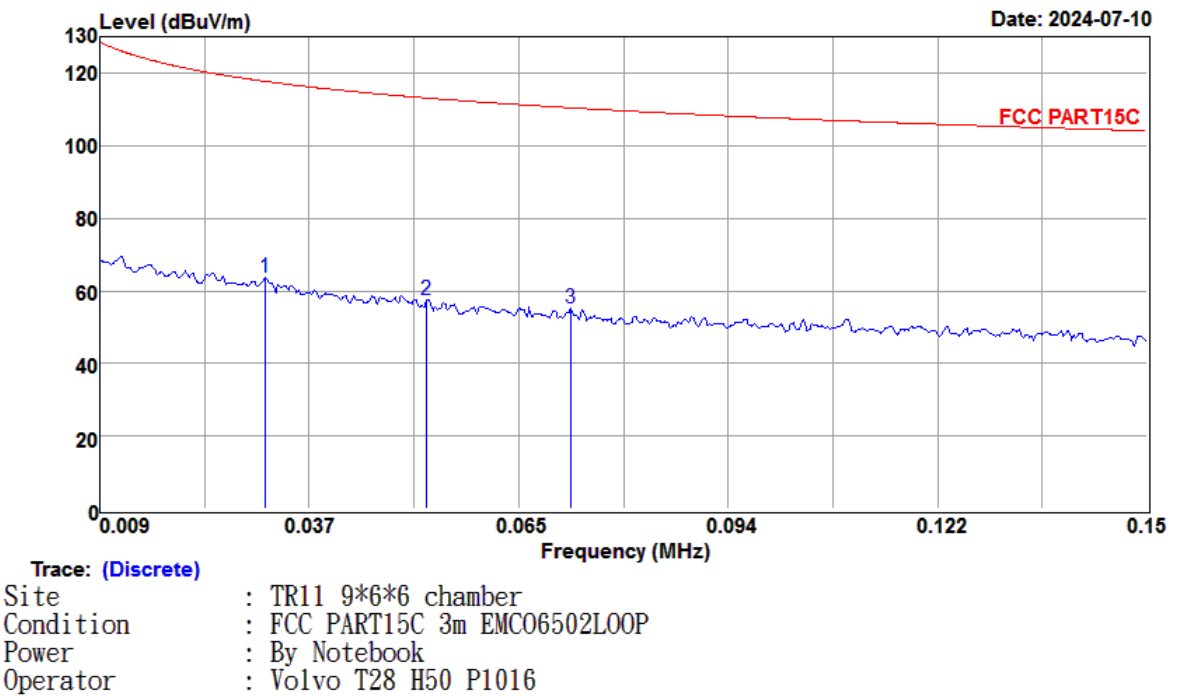
Condition : FCC Part 15C PK 3m EMCO_3117_82847 VERTICAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read Level	Limit Factor	Limit Line	Over Limit	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2483.500	40.48	56.07	-15.59	54.00	-13.52	331	192	VERTICAL	Average
2	2483.500	50.42	66.01	-15.59	74.00	-23.58	331	192	VERTICAL	Peak

- Note:
- 1. Level (dBuV/m) = Read level + Factor.
 - 2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
 - 3. Over Limit (dB) = Level – Limit line

Radiated Emission Measurement below 1000MHz

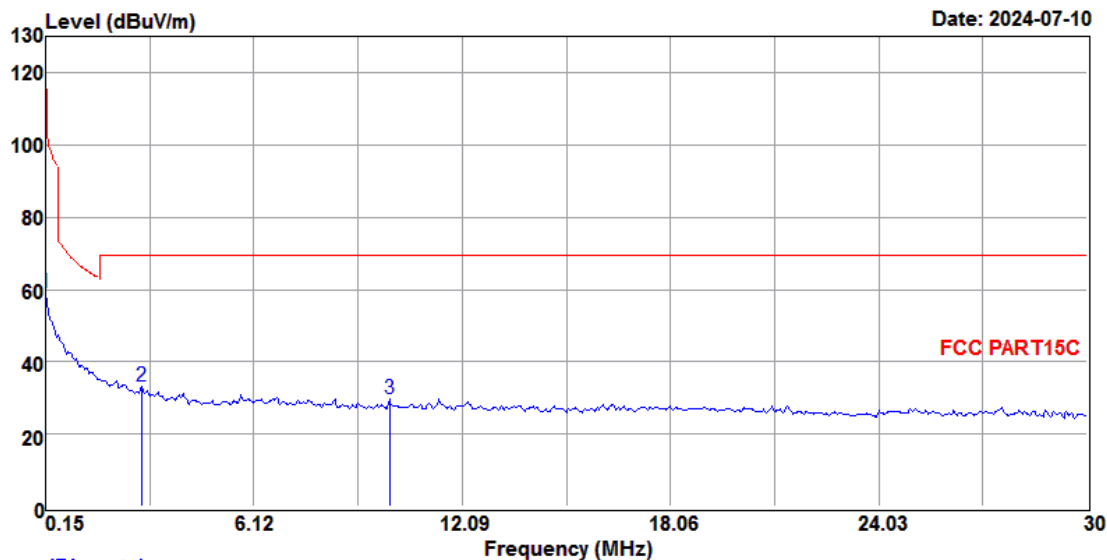
Test Mode : Continuous Transmitting, 2440MHz
Test Range : 9 kHz ~ 150 kHz
Polarization : Perpendicular
Ambient Temperature : 28°C
Tester : Volvo
Relative Humidity : 50%



	Freq	Level	Read	Limit	Over	A/Pos	T/Pos		
	MHz	dBuV/m	Level	Factor	Line	Limit		Pol/Phase	Remark
			dBuV	dB/m	dBuV/m	dB	cm	deg	
1	0.031	63.84	50.06	13.78	117.70	-53.86	---	---	Peak
2	0.053	57.46	45.05	12.41	113.12	-55.66	---	---	Peak
3	0.072	55.17	43.63	11.54	110.40	-55.23	---	---	Peak

- Note:
- 1. Level (dBuV/m) = Read level + Factor.
 - 2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
 - 3. Over Limit (dB) = Level – Limit line
 - 4. QK. is abbreviation of Quasi-Peak
 - 5. The receive antenna is setup at parallel, ground-parallel and perpendicular. The report just record the worst data of antenna orientation.

Test Mode : Continuous Transmitting, 2440MHz
Test Range : 150 kHz ~30 MHz
Polarization : Perpendicular Tester : Volvo
Ambient Temperature : 28°C Relative Humidity : 50%



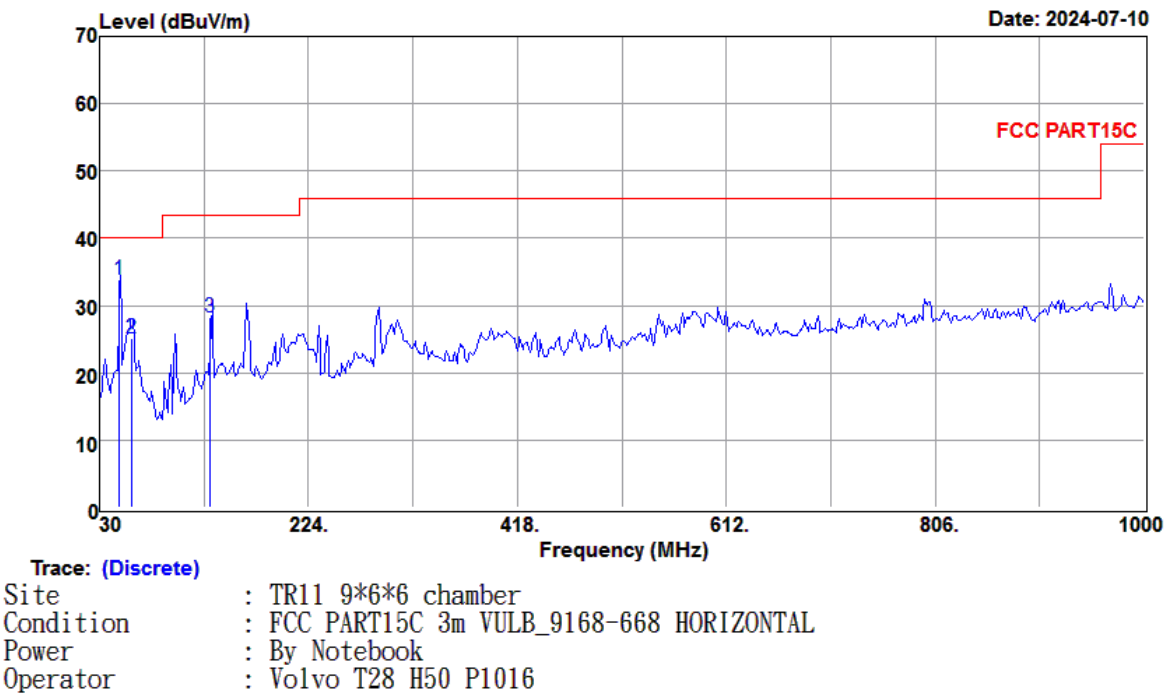
Trace: (Discrete)
Site : TR11 9*6*6 chamber
Condition : FCC PART15C 3m EMC06502LOOP
Power : By Notebook
Operator : Volvo T28 H50 P1016

	Freq	Level	Read	Limit	Over	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	Level	Factor	Line	Limit			
			dBuV	dB/m	dBuV/m	dB	cm	deg	
1	0.150	59.05	47.59	11.46	104.08	-45.03	---	---	Peak
2	2.896	33.18	22.57	10.61	69.50	-36.32	---	---	Peak
3	10.001	29.85	17.98	11.87	69.50	-39.65	---	---	Peak

Note:

1. Level (dBuV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line
4. QK. is abbreviation of Quasi-Peak
5. The receive antenna is setup at parallel, ground-parallel and perpendicular. The report just record the worst data of antenna orientation.

Test Mode : Continuous Transmitting, 2440MHz
Test Range : 30 MHz ~1 GHz
Polarization : Horizontal Tester : Volvo
Ambient Temperature : 28°C Relative Humidity : 50%

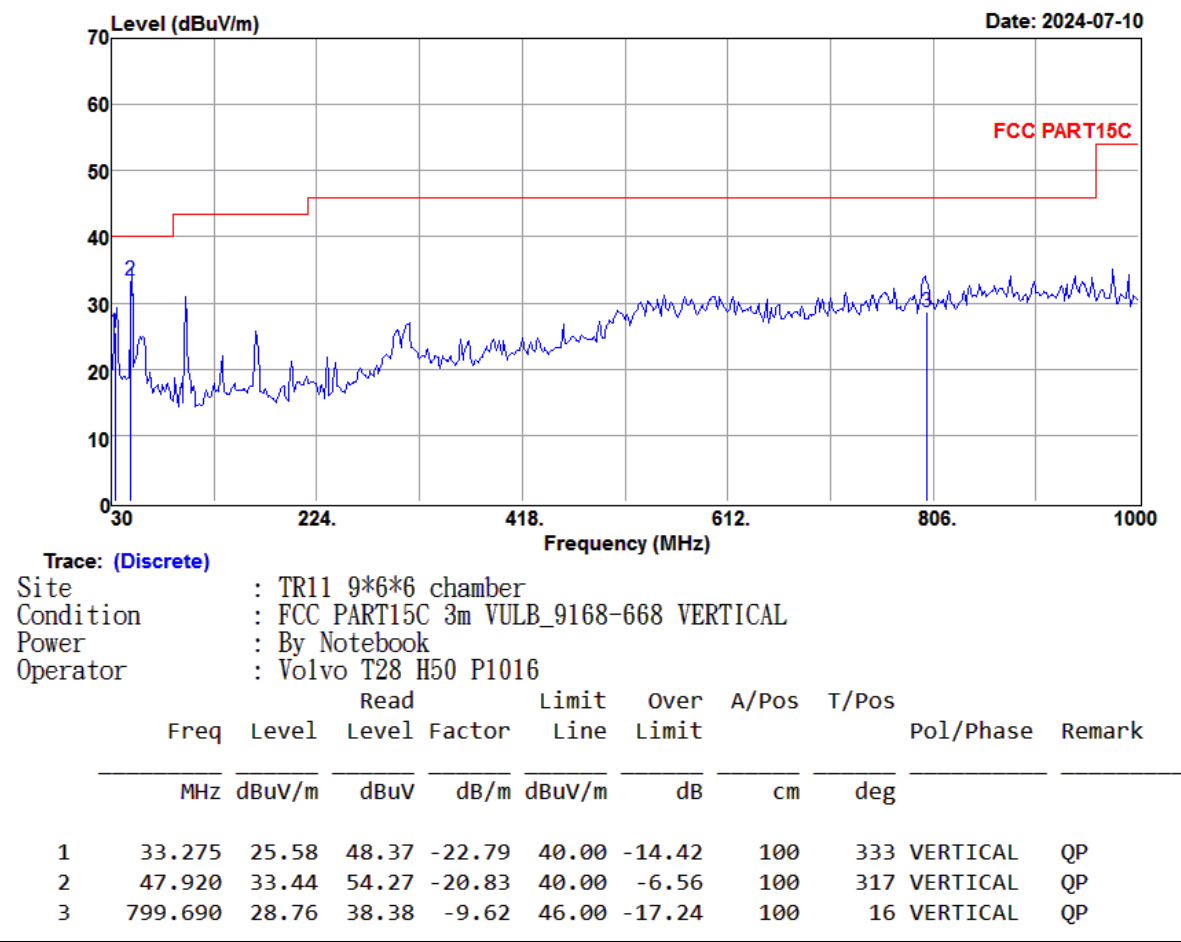


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	47.975	33.79	54.60	-20.81	40.00	-6.21	389	217	HORIZONTAL	QP
2	59.970	25.06	46.38	-21.32	40.00	-14.94	380	0	HORIZONTAL	QP
3	132.785	28.30	50.35	-22.05	43.50	-15.20	243	239	HORIZONTAL	QP

Note:

- Level (dBuV/m) = Read level + Factor.
- Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
- Over Limit (dB) = Level – Limit line
- QK. is abbreviation of Quasi-Peak
- The emission levels were too lower against the limit of frequency 9 kHz~ 30 MHz.

Test Mode : Continuous Transmitting, 2440MHz
Test Range : 30 MHz ~1 GHz
Polarization : Vertical Tester : Volvo
Ambient Temperature : 28°C Relative Humidity : 50%

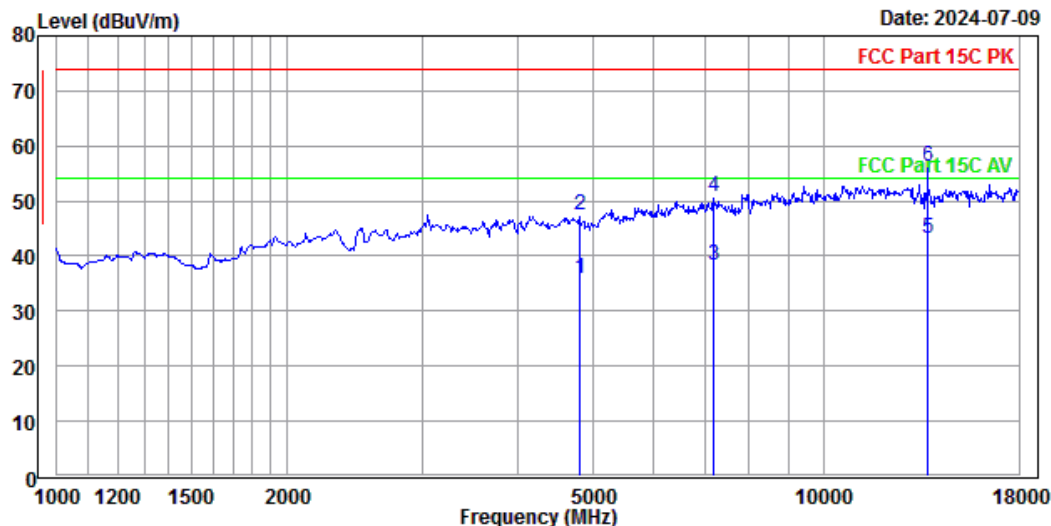


Note:

- 1. Level (dBuV/m) = Read level + Factor.
- 2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
- 3. Over Limit (dB) = Level – Limit line
- 4. QK. is abbreviation of Quasi-Peak
- 5. The emission levels were too lower against the limit of frequency 9 kHz~ 30 MHz.

Radiated Emission Measurement above 1000MHz

Test Mode : Continuous Transmitting, 2402 MHz
Test Range : 1 GHz ~ 18 GHz
Polarization : Horizontal Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%



Condition : FCC Part 15C PK 3m EMCO_3117_82847 HORIZONTAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read	Limit	Over	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	Level	Factor	Line	Limit			
			dBuV	dB/m	dBuV/m	dB	cm	deg	
1	4809.104	35.93	49.83	-13.90	54.00	-18.07	258	262	HORIZONTAL Average
2	4809.685	47.48	61.38	-13.90	74.00	-26.52	254	266	HORIZONTAL Peak
3	7206.210	38.42	49.08	-10.66	54.00	-15.58	342	99	HORIZONTAL Average
4	7206.750	50.81	61.47	-10.66	74.00	-23.19	344	91	HORIZONTAL Peak
5	13701.130	43.10	50.85	-7.75	54.00	-10.90	183	318	HORIZONTAL Average
6	13701.350	56.27	64.02	-7.75	74.00	-17.73	187	310	HORIZONTAL Peak

Note:

- Level (dBuV/m) = Read level + Factor.
- Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
- Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2402 MHz

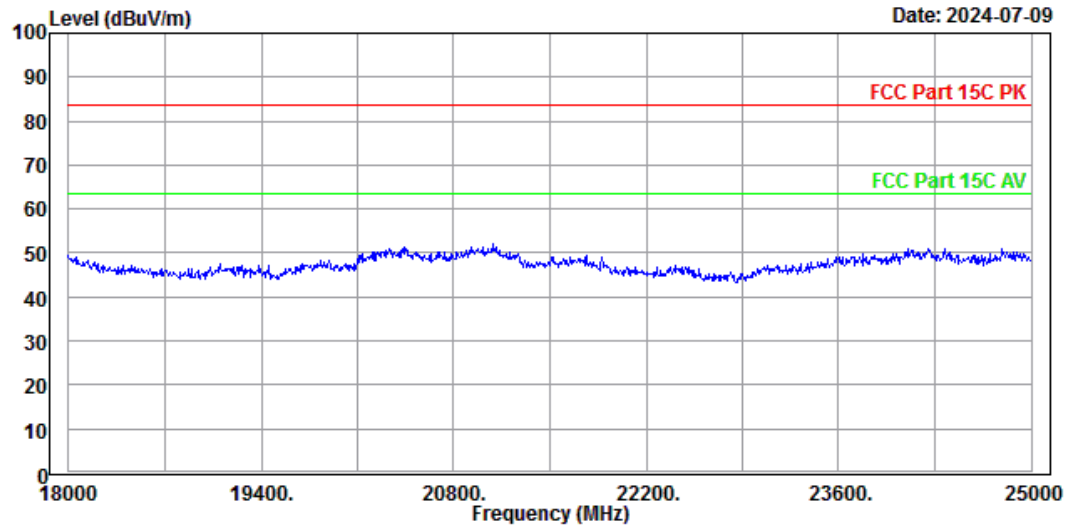
Test Range : 18 GHz ~ 25 GHz

Polarization : Horizontal

Tester : Jeffry

Ambient Temperature : 21°C

Relative Humidity : 61%



Condition : FCC Part 15C PK 1m COM-POWER_AH-840 HORIZONTAL

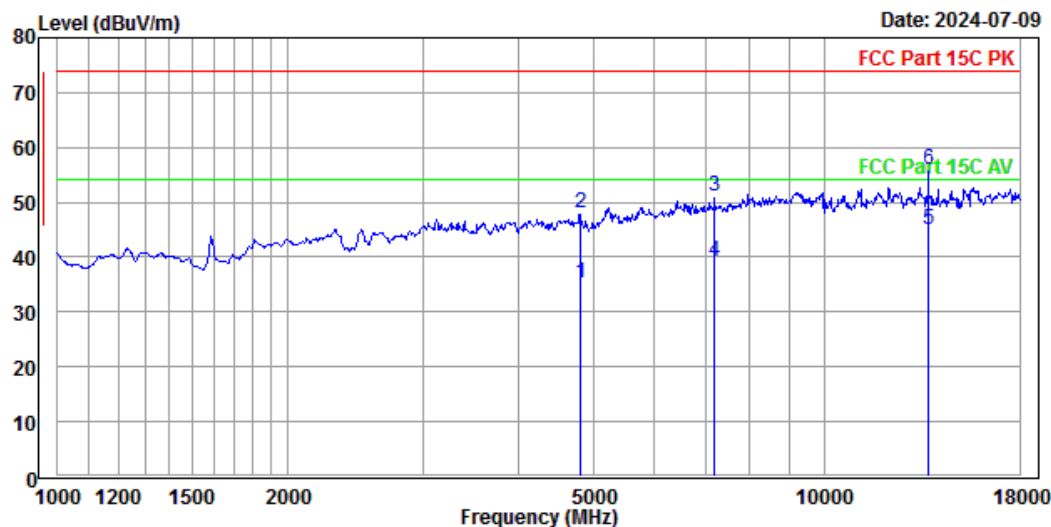
POWER :

OPERATOR : JEFFRT T:21 H:61 P:1009

Note:

1. Level (dBuV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2402 MHz
Test Range : 1 GHz ~ 18 GHz
Polarization : Vertical Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%



Condition : FCC Part 15C PK 3m EMCO_3117_82847 VERTICAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read	Limit	Over	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	Level	Factor	Line	Limit			
			dBuV	dB/m	dBuV/m	dB	cm	deg	
1	4809.730	35.23	49.13	-13.90	54.00	-18.77	262	248	VERTICAL Average
2	4809.790	48.17	62.07	-13.90	74.00	-25.83	267	245	VERTICAL Peak
3	7204.415	50.99	61.65	-10.66	74.00	-23.01	321	323	VERTICAL Peak
4	7204.545	39.24	49.90	-10.66	54.00	-14.76	326	328	VERTICAL Average
5	13717.250	45.12	52.88	-7.76	54.00	-8.88	262	278	VERTICAL Average
6	13717.820	56.10	63.85	-7.75	74.00	-17.90	268	271	VERTICAL Peak

Note:

- Level (dBuV/m) = Read level + Factor.
- Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
- Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2402 MHz

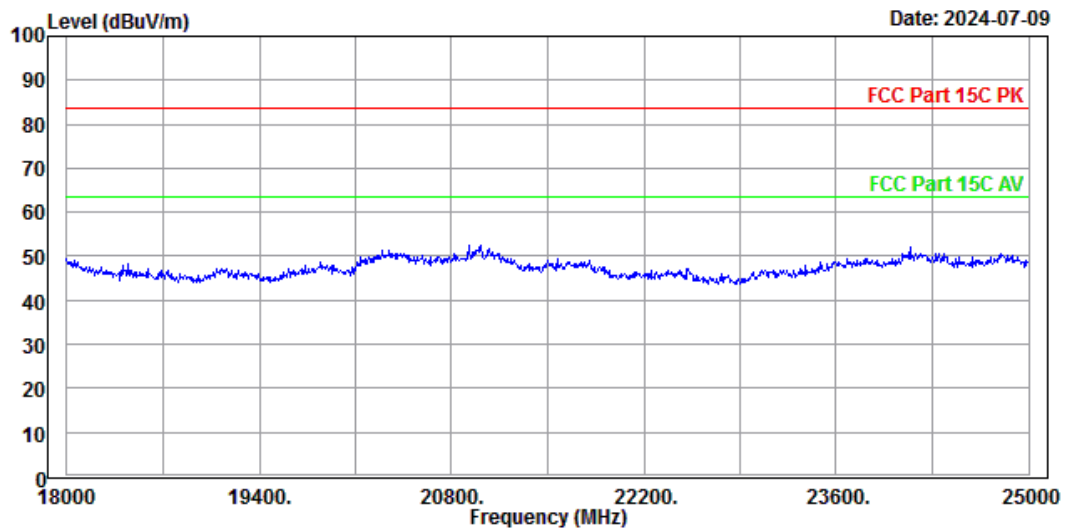
Test Range : 18 GHz ~ 25 GHz

Polarization : Vertical

Tester : Jeffry

Ambient Temperature : 21°C

Relative Humidity : 61%



Condition : FCC Part 15C PK 1m COM-POWER_AH-840 VERTICAL

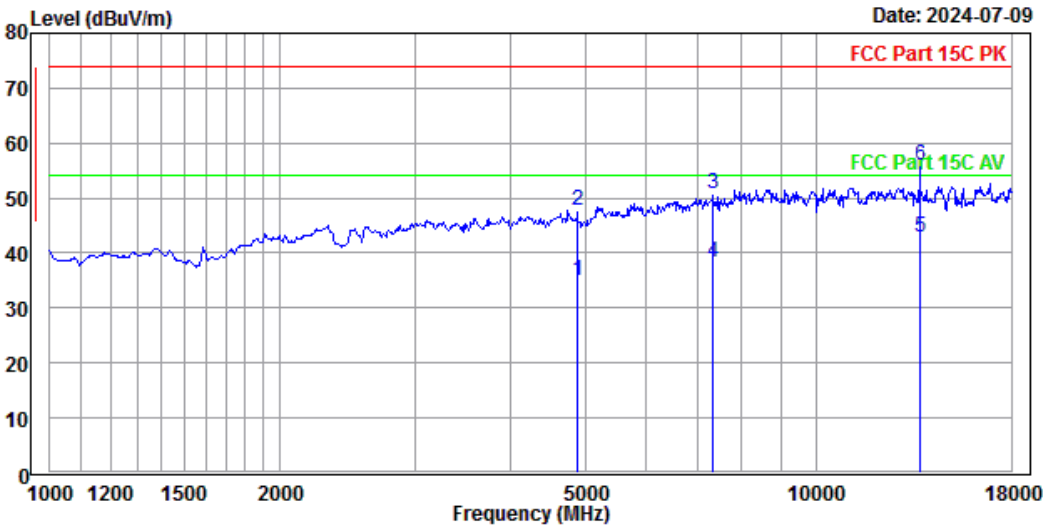
POWER :

OPERATOR : JEFFRT T:21 H:61 P:1009

Note:

1. Level (dBuV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2440 MHz
Test Range : 1 GHz ~ 18 GHz
Polarization : Horizontal Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%



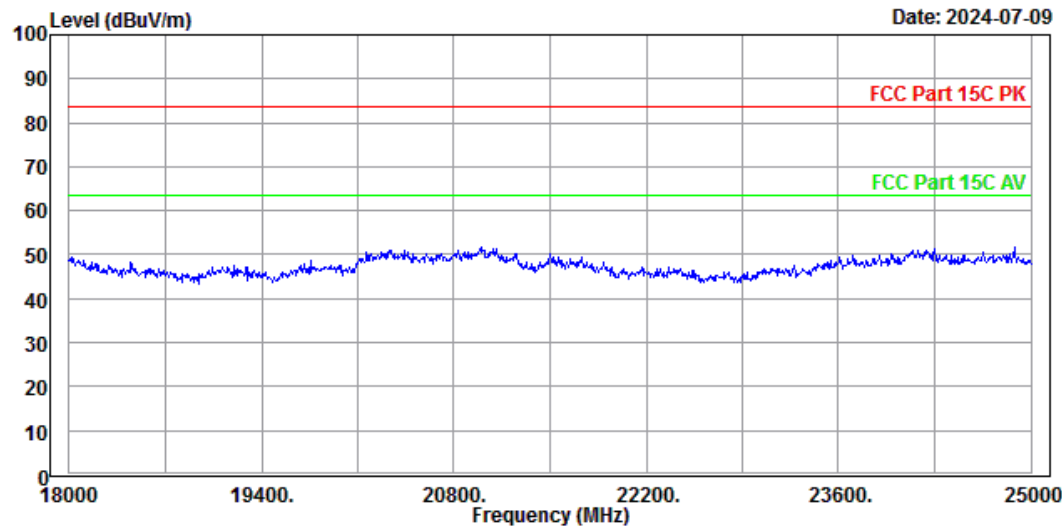
Condition : FCC Part 15C PK 3m EMCO_3117_82847 HORIZONTAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read	Limit	Over	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	Level	Factor	Line	Limit			
			dBuV	dB/m	dBuV/m	dB	cm	deg	
1	4874.581	35.06	49.04	-13.98	54.00	-18.94	303	138	HORIZONTAL Average
2	4874.765	47.65	61.63	-13.98	74.00	-26.35	299	130	HORIZONTAL Peak
3	7322.325	50.86	61.38	-10.52	74.00	-23.14	370	233	HORIZONTAL Peak
4	7322.568	38.37	48.90	-10.53	54.00	-15.63	375	237	HORIZONTAL Average
5	13680.850	42.83	50.63	-7.80	54.00	-11.17	308	150	HORIZONTAL Average
6	13680.920	56.11	63.91	-7.80	74.00	-17.89	303	157	HORIZONTAL Peak

Note:

- Level (dBuV/m) = Read level + Factor.
- Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
- Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2440 MHz
Test Range : 18 GHz ~ 25 GHz
Polarization : Horizontal Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%

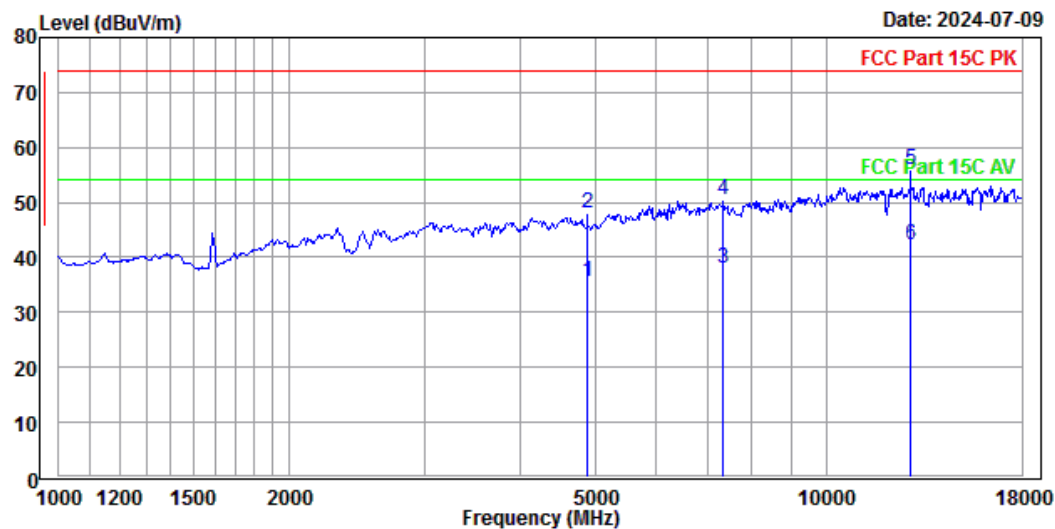


Condition : FCC Part 15C PK 1m COM-POWER_AH-840 HORIZONTAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

Note:

1. Level (dBuV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting,2440 MHz
Test Range : 1 GHz ~ 18 GHz
Polarization : Vertical Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%

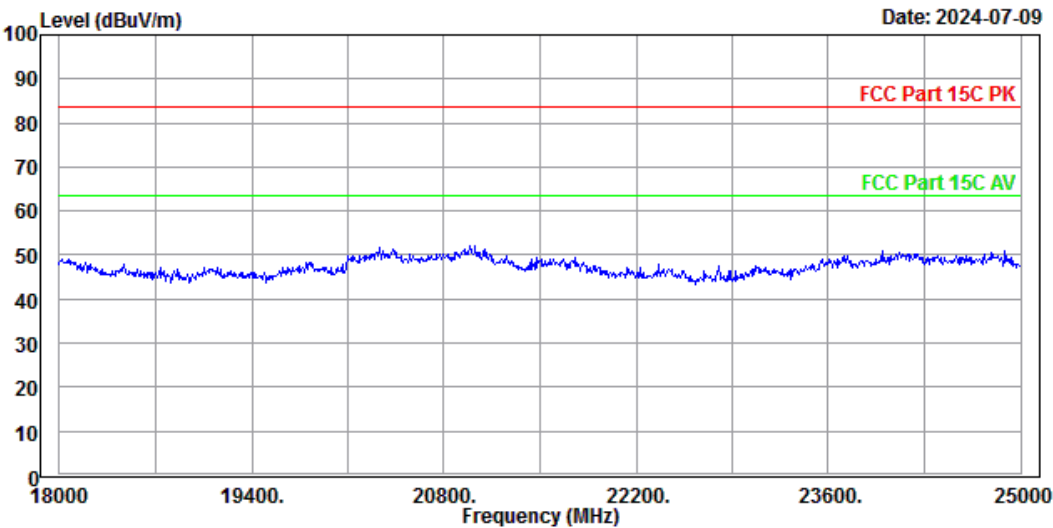


Condition : FCC Part 15C PK 3m EMCO_3117_82847 VERTICAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read Level	Limit Factor	Over Line	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg	
1	4873.627	35.72	49.70	-13.98	54.00	-18.28	301	339	VERTICAL Average
2	4873.995	47.98	61.96	-13.98	74.00	-26.02	305	332	VERTICAL Peak
3	7325.480	38.13	48.65	-10.52	54.00	-15.87	297	181	VERTICAL Average
4	7325.630	50.56	61.08	-10.52	74.00	-23.44	291	188	VERTICAL Peak
5	12899.210	55.94	61.82	-5.88	74.00	-18.06	331	90	VERTICAL Peak
6	12899.840	42.19	48.07	-5.88	54.00	-11.81	333	96	VERTICAL Average

- Note:
- 1. Level (dBuV/m) = Read level + Factor.
 - 2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
 - 3. Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting,2440 MHz
Test Range : 18 GHz ~ 25 GHz
Polarization : Vertical Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%

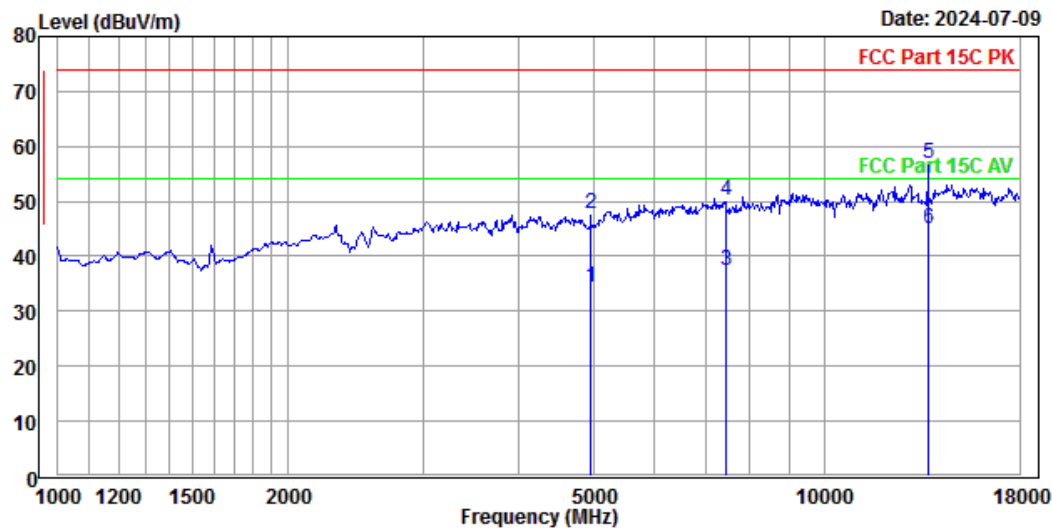


Condition : FCC Part 15C PK 1m COM-POWER_AH-840 VERTICAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

Note:

1. Level (dBuV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2480 MHz
Test Range : 1 GHz ~ 18 GHz
Polarization : Horizontal Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%



Condition : FCC Part 15C PK 3m EMCO_3117_82847 HORIZONTAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read	Limit	Over	APos	TPos	Pol/Phase	Remark
	MHz	dBUV/m	Level	Factor	Line	Limit			
			dBuV	dB/m	dBUV/m	dB	cm	deg	
1	4959.645	34.49	48.35	-13.86	54.00	-19.51	306	235	HORIZONTAL Average
2	4959.985	47.76	61.63	-13.87	74.00	-26.24	301	230	HORIZONTAL Peak
3	7443.410	37.56	48.23	-10.67	54.00	-16.44	227	123	HORIZONTAL Average
4	7443.490	50.05	60.72	-10.67	74.00	-23.95	222	118	HORIZONTAL Peak
5	13717.090	56.73	64.49	-7.76	74.00	-17.27	258	212	HORIZONTAL Peak
6	13717.800	45.01	52.76	-7.75	54.00	-8.99	253	217	HORIZONTAL Average

Note:

1. Level (dBUV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2480 MHz

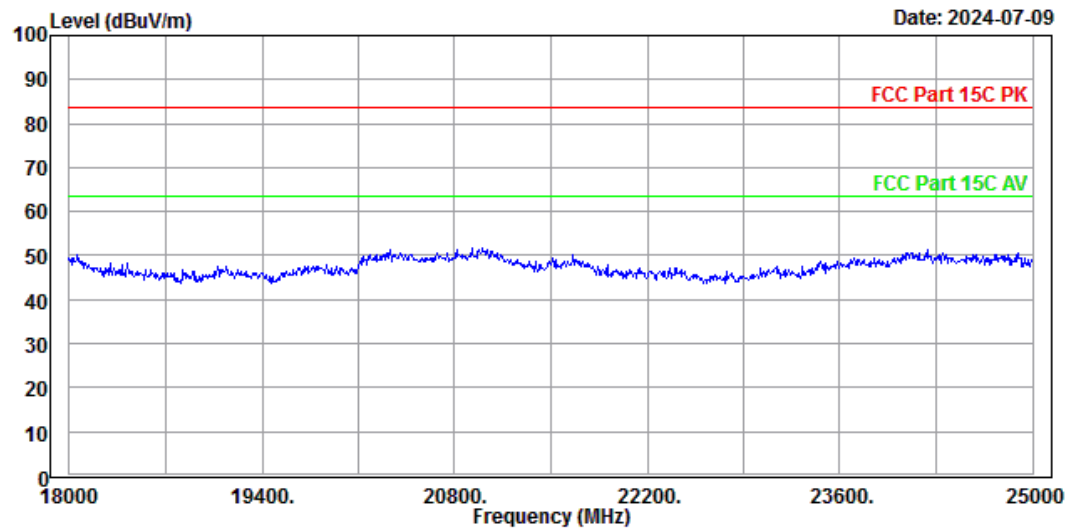
Test Range : 18 GHz ~ 25 GHz

Polarization : Horizontal

Tester : Jeffry

Ambient Temperature : 21°C

Relative Humidity : 61%



Condition : FCC Part 15C PK 1m COM-POWER_AH-840 HORIZONTAL

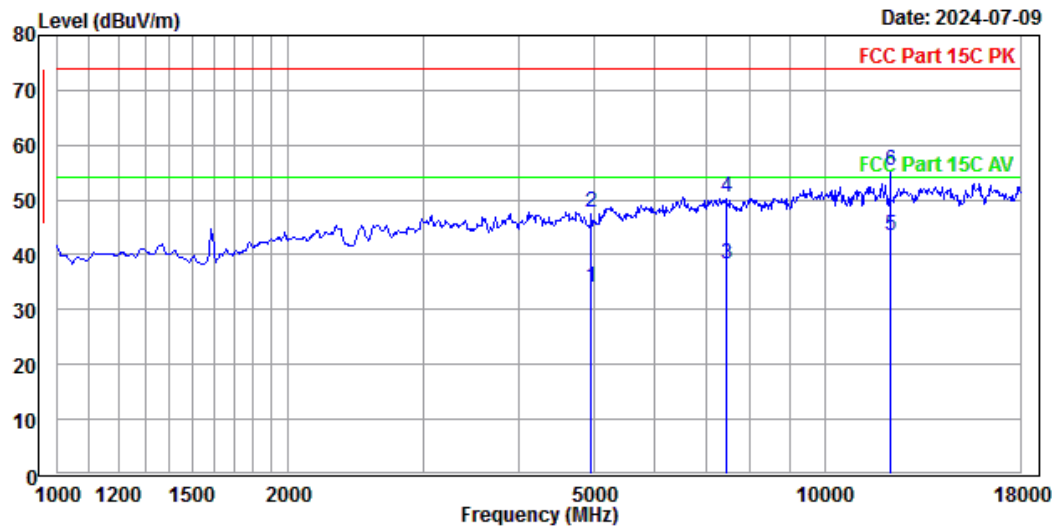
POWER :

OPERATOR : JEFFRT T:21 H:61 P:1009

Note:

1. Level (dBuV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2480 MHz
Test Range : 1 GHz ~ 18 GHz
Polarization : Vertical Tester : Jeffry
Ambient Temperature : 21°C Relative Humidity : 61%



Condition : FCC Part 15C PK 3m EMCO_3117_82847 VERTICAL
POWER :
OPERATOR : JEFFRT T:21 H:61 P:1009

	Freq	Level	Read	Limit	Over	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	Level	Factor	Line	Limit			
			dBuV	dB/m	dBuV/m	dB	cm	deg	
1	4960.650	34.21	48.08	-13.87	54.00	-19.79	183	60	VERTICAL Average
2	4960.680	47.67	61.54	-13.87	74.00	-26.33	189	57	VERTICAL Peak
3	7442.052	38.19	48.85	-10.66	54.00	-15.81	274	188	VERTICAL Average
4	7442.415	50.40	61.06	-10.66	74.00	-23.60	271	183	VERTICAL Peak
5	12166.150	43.37	48.95	-5.58	54.00	-10.63	318	333	VERTICAL Average
6	12166.750	55.43	61.01	-5.58	74.00	-18.57	316	338	VERTICAL Peak

Note:

- Level (dBuV/m) = Read level + Factor.
- Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
- Over Limit (dB) = Level – Limit line

Test Mode : Continuous Transmitting, 2480 MHz

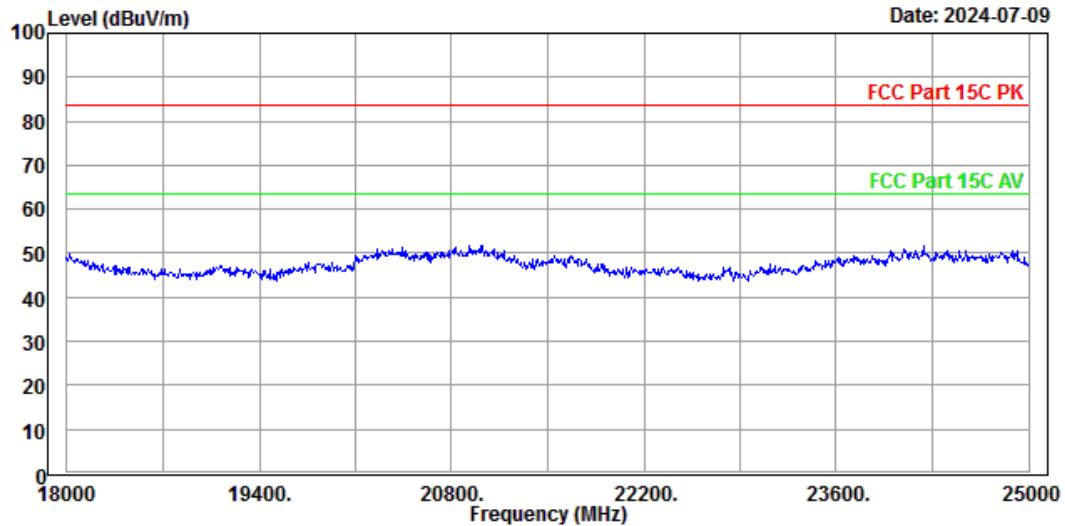
Test Range : 18 GHz ~ 25 GHz

Polarization : Vertical

Tester : Jeffry

Ambient Temperature : 21°C

Relative Humidity : 61%



Condition : FCC Part 15C PK 1m COM-POWER_AH-840 VERTICAL

POWER :

OPERATOR : JEFFRT T:21 H:61 P:1009

Note:

1. Level (dBuV/m) = Read level + Factor.
2. Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. Over Limit (dB) = Level – Limit line

-- End of report --