

TEST REPORT
On behalf of

Signify North America Corporation

Product Name	Model Number
UNIT EQUIPMENT 4W WITH FIRSTLINK	BUB4WFL1
UNIT EQUIPMENT 2W WITH FIRSTLINK	BUB2WFL1

FCC ID: 2AF2NBUB4WFL1

Prepared For: Signify North America Corporation
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Report No. : ACI-F25105
Date of Test : 2025.02.25-06.30
Date of Report : 2025.08.20

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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TEST REPORT

Applicant : Signify North America Corporation
EUT Description : Refer to Sec.2.1
(A) Model No. : Refer to Sec.2.1
(B) Power Supply : 120 to 277V AC 60Hz
(C) Test Voltage : AC 120V/60Hz

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART C
AND ANSI C63.10:2020*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: Refer to Sec2.1), which was tested is technically compliance with the FCC limits.

This report applies to above tested Sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

The test results for EUT's ZigBee function are contained in No.ACI-F25106 report.

Date of Test : 2025.02.25-06.30 Date of Report : 2025.08.20

Producer :

Mindy Wang

MINDY WANG / Assistant

Review :

Jarey Lu

JAREY LU / Supervisor

AUDIX®
For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory :

Kamp Chen

Authorized Signature(s) KAMP CHEN / Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The result is determined according to the decision rules of customer selection in the ASC-403 application service form.

1. According to IEC GUIDE 115 Procedure 2 and ILAC-G8, the uncertainties value is not used in determining the PASS/FAIL results.

2. If the required specification or standard already contains the decision rules, it will be carried out in accordance with the regulations or standard documents or the requirements of the competent units. If the required specification or standard does not contain a decision rule, the same paragraph 1.

3. If your company has a required decision rule, it will be implemented in accordance with the requirements and ISO/IEC Guide 98-4 specifications.

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Results	Meets Limit
EMISSION			
Conducted Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2020	Pass*	15.207 15.107(b)
Radiated Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2020	Pass*	15.209(a) 15.109(b) 15.205(a)(c)
6 dB Bandwidth Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2020	Pass	15.247(a)(2)
Maximum Peak Output Power Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2020	Pass	15.247(b)(3)
Emission Limitations Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2020	Pass	15.247(d)
Band Edge Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2020	Pass	15.247(d)
Power Spectral Density Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2020	Pass	15.247(e)
Antenna Requirement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2020	Pass	15.203
N/A is an abbreviation for Not Applicable. * The EUT was a Class A product, the Class A limit applied for the Spurious Emission which not within the special band (like restricted band in FCC section 15.205(a)(c)).			

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description	Model Number
UNIT EQUIPMENT 4W WITH FIRSTLINK	BUB4WFL1
UNIT EQUIPMENT 2W WITH FIRSTLINK	BUB2WFL1

Type of EUT : ☒ Production ☐ Pre-product ☐ Pro-type

Note#1 : same main board but different lighting output power.

Note#2 : According to the difference, we test performed on the model “BUB4WFL1” for main test and model “BUB2WFL1” for differential test in current report.

Test Model : BUB4WFL1, BUB2WFL1

Radio Tech : BLE 5.0;
Zigbee.

Channel Freq. : BLE: 2402MHz-2480MHz; total 40 channels;
Zigbee: 2405MHz, 2450MHz, 2475MHz; total 3 channels.

Modulation : BLE: GFSK;
Zigbee: QPSK;

Antenna Info. : Antenna Type: PCB Antenna
Antenna Gain: 2.85 dBi

Note : The Antenna information was provided by the customer.

Applicant : Signify North America Corporation
10275 W. Higgins Rd. Rosemont IL 60018, USA.

2.2 EUT Specifications Assessed in Current Report

Mode	Modulation	Data Rate(Mbps)
BLE	GFSK	Up to 2

Channel List			
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
...	...	...	...
...	...	...	...
...	...	...	...
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

2.3 Test Information

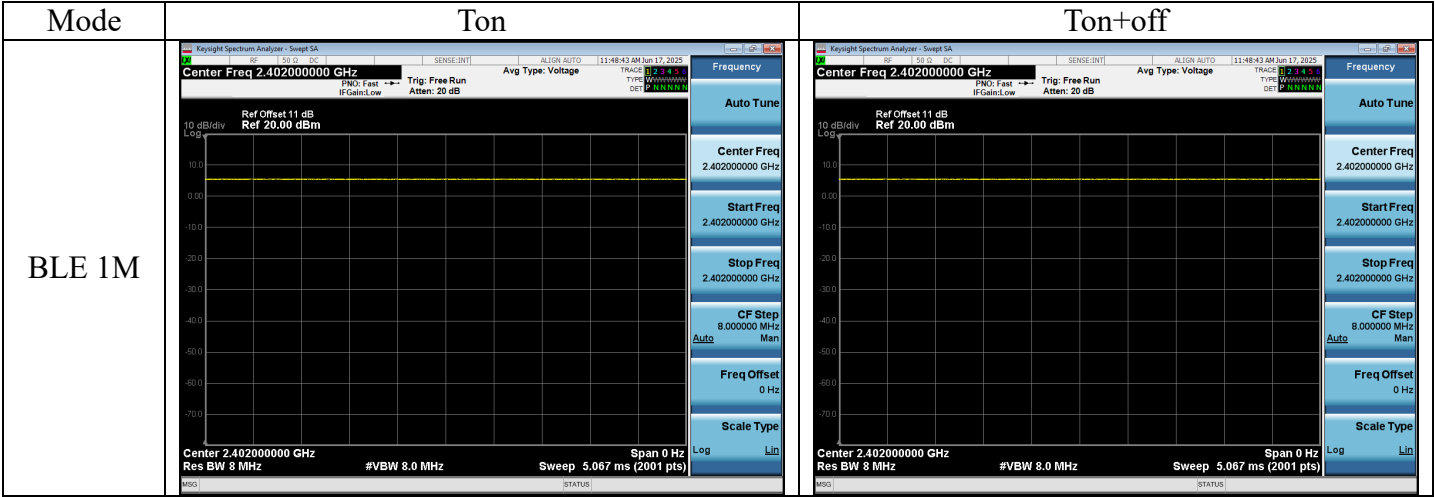
The test software “BLEtest_FCCRED.exe” was used to control EUT work in TX mode, Power Setting and select test channel.

Mode	data rate (Mbps)	Power Setting	Test Channel		Frequency (MHz)
BLE 1M	1	Default	Low:	00	2402
		Default	Middle:	20	2442
		Default	High:	39	2480
BLE 2M	2	Default	Low:	00	2402
		Default	Middle:	20	2442
		Default	High:	39	2480

Note: The setting information was provided by the customer.

2.4 Duty Cycle Check

Mode	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)
BLE 1M	5	5	100



2.5 Sample Description

Test Item	Model Number	Sample Number	Date of receipted
Conducted Emission	BUB4WFL1	E20250211046-01/01	2025.02.11
	BUB2WFL1	E20250211049-01/01	2025.02.11
Radiated Emission	BUB4WFL1	E20250211046-01/01	2025.02.11
	BUB2WFL1	E20250211049-01/01	2025.02.11
Conducted RF Test	BUB4WFL1	E20250211046a-01/01	2025.02.11

2.6 Supported equipment

Brand : Acer
Product Name: : Notebook PC
Model Name : TravelMate P238 series
Model Number : N15W8

Product Name : Test Dongle
Mode Number : BLEUIO

2.7 Description of Test Facility

Name of Firm : Audix Technology (Shanghai) Co., Ltd.

Site Location : 3F, Building 34, No. 680 Guiping Rd.,
Caohejing, Hi-Tech Park,
Shanghai 200233, China

Accredited by NVLAP, Lab Code : 200371-0

FCC Designation Number : CN5027

Test Firm Registration Number : 954668

3 CONDUCTED EMISSION TEST

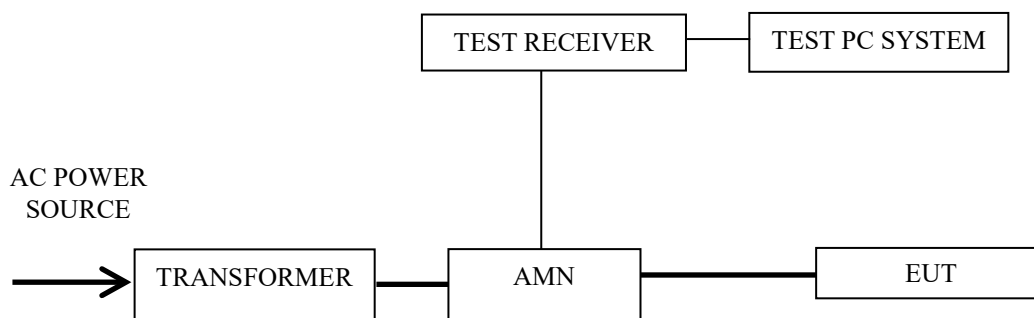
3.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESCI	101302	2025.02.22	1 Year
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	2025.02.22	1 Year
3.	Fixed Attenuator	SHYL	TTS-1	001	2025.02.22	1 Year
4.	CE Cable+Coaxial Switch (0.09-300MHz)	Audix+ANRITSU	CE Cable+MP59B	CE-SH1-001+6200655085	2025.02.22	1 Year
5.	Software	Audix	e3	e3.v9.210616	--	--

3.2 Block Diagram of Test Setup

3.2.1 Conducted Disturbance Test Setup



— : Signal Line

— : Power Line

3.3 Conducted Emission Limits

§15.107(b)(Class A)

Frequency Range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
NOTE 1 – The lower limit shall apply at the transition frequencies.		

3.4 Test Configuration

The EUT (listed in Sec.2.1) was installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner which tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

3.5.1 Setup the EUT as shown in Sec. 3.2.

3.5.2 Turn on the power of all equipment.

3.5.3 Turn the EUT on the test mode, and then test.

3.6 Test Procedures

The EUT was placed upon a non-metallic table, which is 0.8 m above the horizontal conducting ground plane and 0.4 m from a vertical reference plane. The EUT was connected to the power mains through an Artificial Mains Network (AMN) to provide a 50 Ω coupling impedance for the measuring equipment. Both sides of AC line (Line & Neutral) were checked to find out the maximum conducted emission according to FCC Part 15 Subpart C and ANSI C63.10:2020 requirements during conducted disturbance test.

The I.F. bandwidth of Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

Test with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. (According to KDB 174176 D01 Line Conducted FAQ)

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7

3.7 Test Results

< **PASS** >

The frequency and amplitude of the highest conducted emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Worst case emission:

(Model: BUB4WFL1)

No.	Operation	Mode	Channel	Frequency (MHz)	Data Page
1.	Transmitting	BLE1M	00	2402	P13-14

(Model: BUB2WFL1)

No.	Operation	Mode	Channel	Frequency (MHz)	Data Page
1.	Transmitting	BLE1M	00	2402	P15-16

NOTE 1 –Emission Level (dBμV/m) = Read Level (dBμV) + AMN Factor (dB) +
Aux Factor (dB) + Cable Loss (dB)

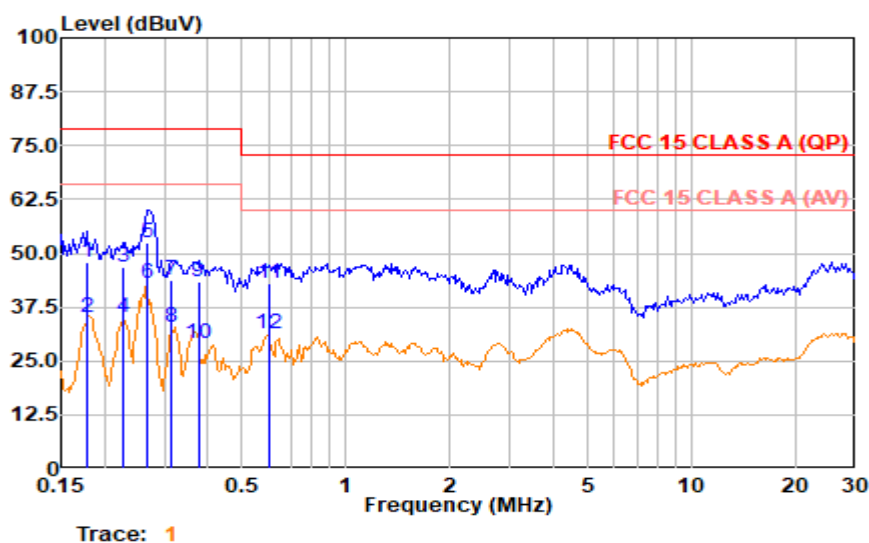
Margin (dB) = Limits (dBμV) - Emission Level (dBμV)

NOTE 2 – “QP” means “Quasi-Peak” values

NOTE 3 – The emission levels which not reported are too low against the official limit.

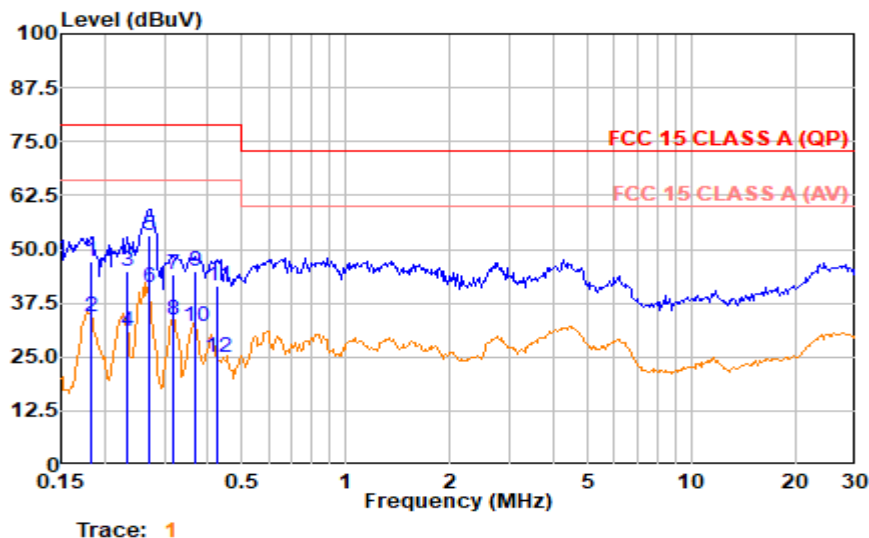
Worst case emission

Test Date:	2025.02.25	Temp./Hum.:	22°C/51%RH	Test By:	JareyLu
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Mode: BLE1M CH2402MHZ**Model: BUB4WFL1**

Polarization at Line

Frequency (MHz)	Meter Reading dB (μV)	AMN Factor (dB)	Aux Factor (dB)	Cable Loss (dB)	Emission Level dB (μV)	Limits dB (μV)	Margin (dB)	Remark
0.178	38.19	0.10	9.49	0.10	47.88	79.00	31.12	QP
0.178	25.44	0.10	9.49	0.10	35.13	66.00	30.87	Average
0.228	36.95	0.10	9.49	0.10	46.64	79.00	32.36	QP
0.228	25.38	0.10	9.49	0.10	35.07	66.00	30.93	Average
0.267	42.86	0.10	9.49	0.10	52.55	79.00	26.45	QP
0.267	33.45	0.10	9.49	0.10	43.14	66.00	22.86	Average
0.313	34.10	0.10	9.49	0.10	43.79	79.00	35.21	QP
0.313	23.21	0.10	9.49	0.10	32.90	66.00	33.10	Average
0.374	33.84	0.10	9.49	0.10	43.54	79.00	35.46	QP
0.374	19.46	0.10	9.49	0.10	29.16	66.00	36.84	Average
0.597	33.09	0.20	9.49	0.12	42.90	73.00	30.10	QP
0.597	21.61	0.20	9.49	0.12	31.41	60.00	28.59	Average

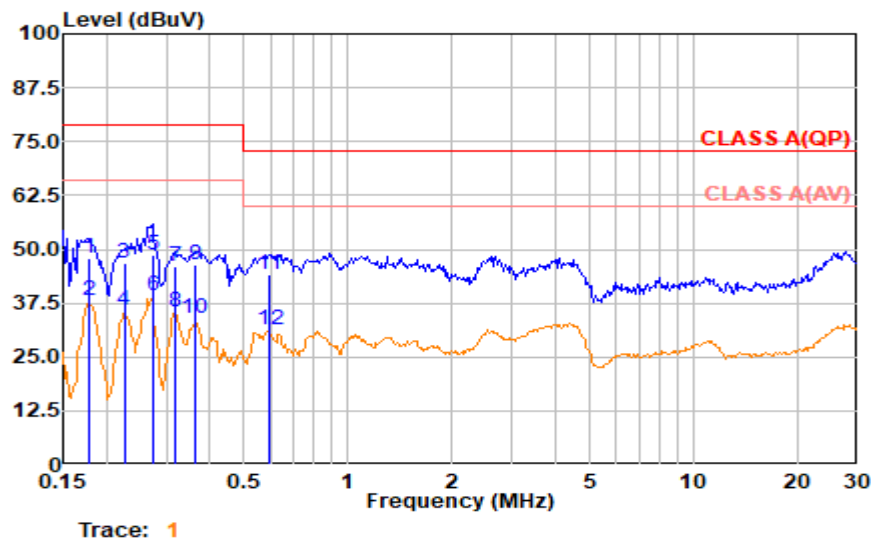
Mode: BLE1M CH2402MHZ**Model: BUB4WFL1**

Polarization at Neutral

Frequency (MHz)	Meter Reading dB (μV)	AMN Factor (dB)	Aux Factor (dB)	Cable Loss (dB)	Emission Level dB (μV)	Limits dB (μV)	Margin (dB)	Remark
0.183	37.49	0.10	9.49	0.10	47.18	79.00	31.82	QP
0.183	24.72	0.10	9.49	0.10	34.41	66.00	31.59	Average
0.232	35.31	0.10	9.49	0.10	45.00	79.00	34.00	QP
0.232	21.22	0.10	9.49	0.10	30.91	66.00	35.09	Average
0.270	43.69	0.10	9.49	0.10	53.38	79.00	25.62	QP
0.270	31.35	0.10	9.49	0.10	41.04	66.00	24.96	Average
0.316	34.56	0.10	9.49	0.10	44.25	79.00	34.75	QP
0.316	23.85	0.10	9.49	0.10	33.54	66.00	32.46	Average
0.367	35.22	0.10	9.49	0.10	44.91	79.00	34.09	QP
0.367	22.28	0.10	9.49	0.10	31.97	66.00	34.03	Average
0.426	31.64	0.10	9.49	0.11	41.33	79.00	37.67	QP
0.426	15.02	0.10	9.49	0.11	24.72	66.00	41.28	Average

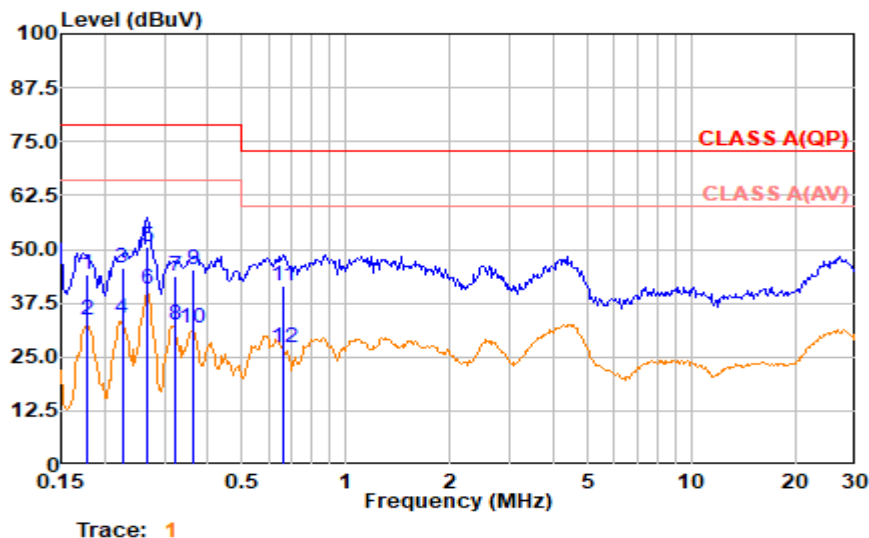
Mode: BLE1M CH2402MHZ

Model: BUB2WFL1



Polarization at Line

Frequency (MHz)	Meter Reading dB (μV)	AMN Factor (dB)	Aux Factor (dB)	Cable Loss (dB)	Emission Level dB (μV)	Limits dB (μV)	Margin (dB)	Remark
0.179	38.08	0.20	9.50	0.11	47.89	79.00	31.11	QP
0.179	28.29	0.20	9.50	0.11	38.10	66.00	27.90	Average
0.225	37.12	0.20	9.50	0.11	46.93	79.00	32.07	QP
0.225	26.08	0.20	9.50	0.11	35.89	66.00	30.11	Average
0.272	38.83	0.20	9.50	0.11	48.64	79.00	30.36	QP
0.272	29.45	0.20	9.50	0.11	39.26	66.00	26.74	Average
0.316	36.15	0.20	9.50	0.11	45.96	79.00	33.04	QP
0.316	25.64	0.20	9.50	0.11	35.45	66.00	30.55	Average
0.360	36.44	0.20	9.50	0.11	46.25	79.00	32.75	QP
0.360	24.06	0.20	9.50	0.11	33.88	66.00	32.12	Average
0.591	34.47	0.20	9.50	0.12	44.29	73.00	28.71	QP
0.591	21.60	0.20	9.50	0.12	31.42	60.00	28.58	Average

Mode: BLE1M CH2402MHZ**Model: BUB2WFL1**

Polarization at Neutral

Frequency (MHz)	Meter Reading dB (μV)	AMN Factor (dB)	Aux Factor (dB)	Cable Loss (dB)	Emission Level dB (μV)	Limits dB (μV)	Margin (dB)	Remark
0.179	34.53	0.20	9.50	0.11	44.34	79.00	34.66	QP
0.179	23.83	0.20	9.50	0.11	33.64	66.00	32.36	Average
0.225	35.99	0.20	9.50	0.11	45.80	79.00	33.20	QP
0.225	24.31	0.20	9.50	0.11	34.12	66.00	31.88	Average
0.267	40.71	0.20	9.50	0.11	50.52	79.00	28.48	QP
0.267	30.80	0.20	9.50	0.11	40.61	66.00	25.39	Average
0.319	34.13	0.20	9.50	0.11	43.95	79.00	35.05	QP
0.319	22.77	0.20	9.50	0.11	32.58	66.00	33.42	Average
0.360	35.29	0.20	9.50	0.11	45.11	79.00	33.89	QP
0.360	22.01	0.20	9.50	0.11	31.82	66.00	34.18	Average
0.660	31.84	0.20	9.50	0.13	41.67	73.00	31.33	QP
0.660	17.29	0.20	9.50	0.13	27.12	60.00	32.88	Average

4 RADIATED EMISSION TEST

4.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

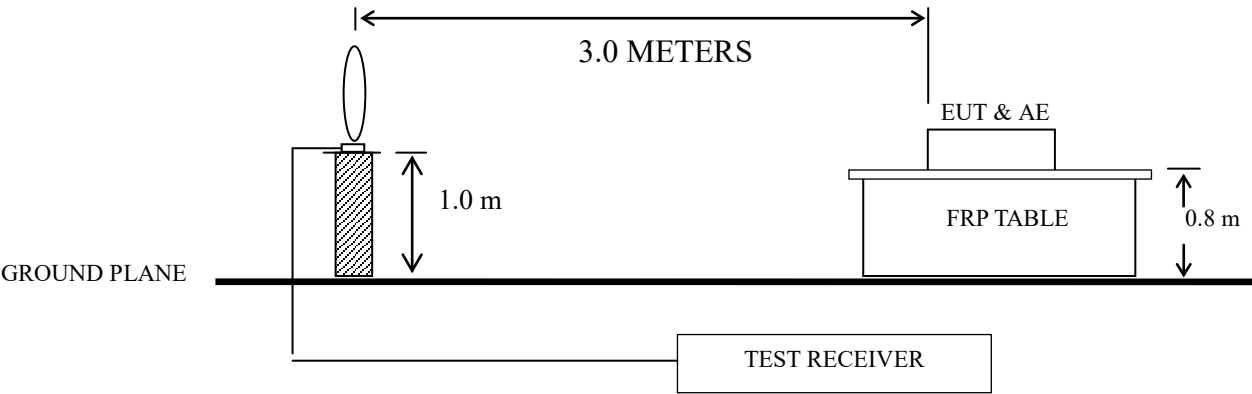
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Preamplifier	Agilent	8447D	2944A10548	2025.02.22	1 Year
2.	Preamplifier	HP	8449B	3008A00864	2025.02.22	1 Year
3.	EXA Signal Analyzer	Agilent	N9010A	MY52221182	2024.08.09	1 Year
4.	Test Receiver	R&S	ESCI	101303	2025.02.22	1 Year
5.	Loop Antenna	Schaffner	HLA6120	1193	2024.07.10	1 Year
6.	Bilog Antenna+6dB Attenuator	Schwarzbeck	VULB 9168+EMCI-N-6-06	708+AT-N0638	2025.01.15	1 Year
7.	Horn Antenna	EMCO	3115	96074878	2024.07.25	1 Year
8.	Horn Antenna	EMCO	3116	00062643	2025.01.21	2 Year
9.	Coaxial Cable(CH.3)	Mini-Circuits	FLC-2FT-SMSM+	21112086	2025.02.22	1 Year
10.	RE Cable-1m+Coaxial Switch	HARBOUR+ANRITSU	RE Cable-1m+MP59B	RE-1m-00x+6200655086	2025.02.22	1 Year
11.	RE Cable-5m	TIMES	SFT205-SMNM-5.0M	20250211-0001	2025.02.22	1 Year
12.	RE Cable-3m+RE Cable-10m	TIMES+SCHAFFNER	LMR400-NMNM-3.0M+RG 212U-MIL C 17	20250211-0001+RE-10m-001	2025.02.22	1 Year
13.	Software	Audix	e3	e3.v9.210616	--	--

4.2 Block Diagram of Test Setup

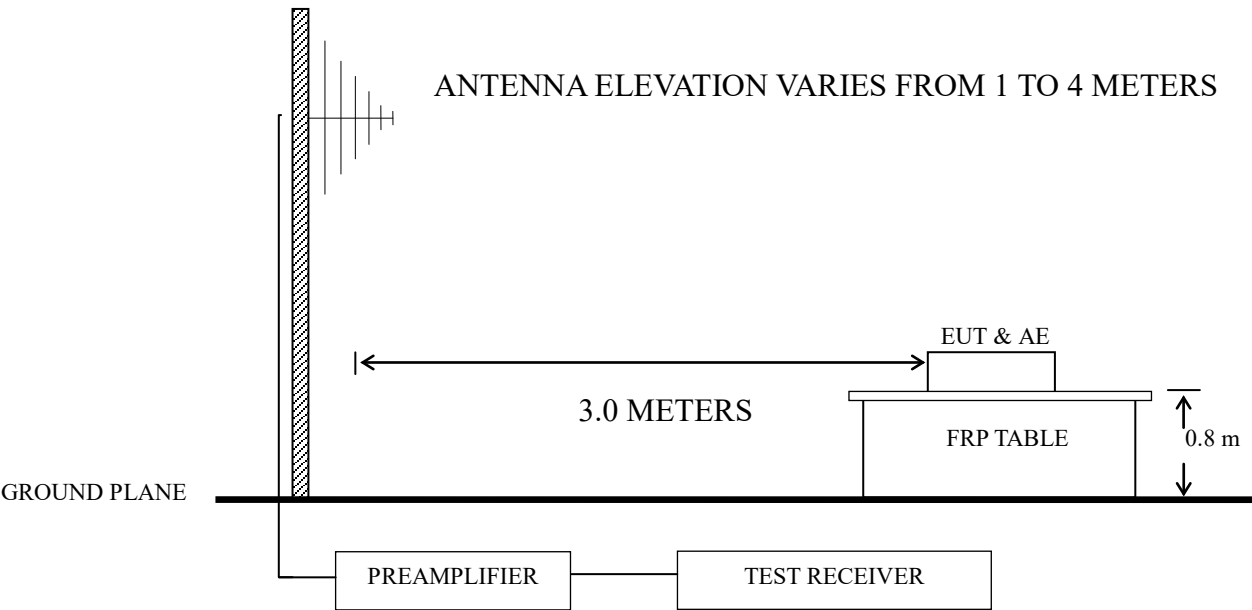
4.2.1 EUT & Peripherals



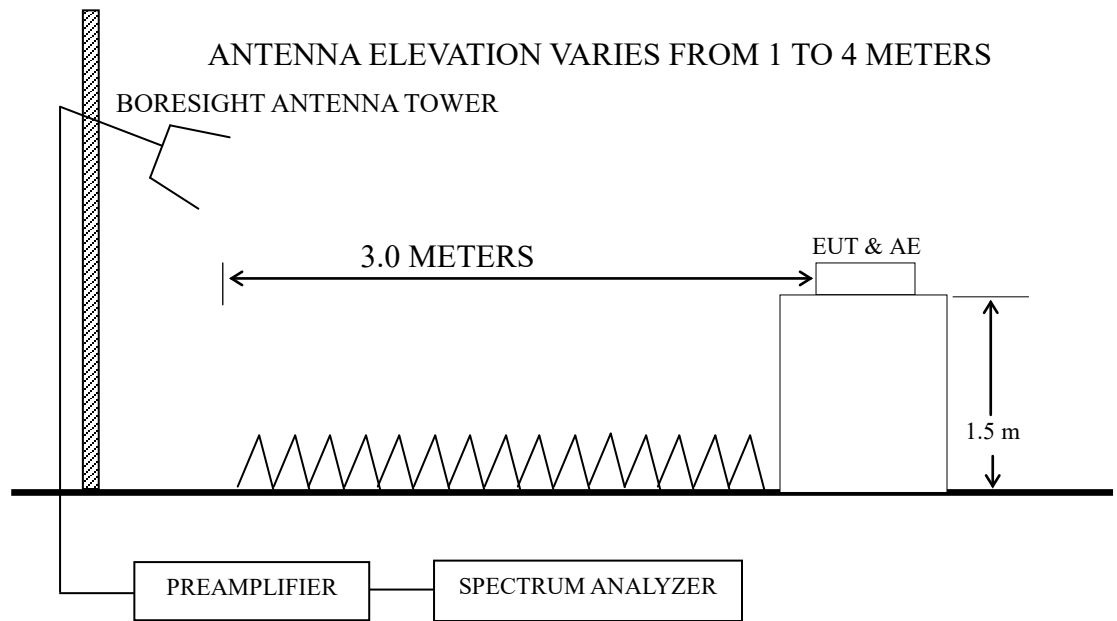
4.2.2 9kHz to 30MHz



4.2.3 Below 1GHz



4.2.4 Above 1GHz



4.3 Radiated Emission Limit

§15.109(b)(Class A)

Frequency (MHz)	Distance (m)	Field strength limits		Converted Field Strength Limits By 3 Meters Measuring Distance
		($\mu\text{V/m}$)	dB ($\mu\text{V/m}$)	dB ($\mu\text{V/m}$)
30 ~ 88	10	90	39.00	49.50
88 ~ 216	10	150	43.50	54.00
216 ~ 960	10	210	46.50	57.00
Above 960	10	300	49.50	60.00
NOTE 1 – The lower limit shall apply at the transition frequency. NOTE 2 – Measuring distance of 10 m is a primary requirement. In this case, the limits with measuring distance of 3 m shall be the above limit value increased $20\lg(10/3)=10.5$. NOTE 3 – 1 $\mu\text{V/m}$ is regarded as 0 dB ($\mu\text{V/m}$).				

§15.209:

Frequency (MHz)	Distance (m)	Field strength limits ($\mu\text{V/m}$)	
		($\mu\text{V/m}$)	dB($\mu\text{V/m}$)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
NOTE 1 - Emission Level dB ($\mu\text{V/m}$) = $20 \log$ Emission Level ($\mu\text{V/m}$) NOTE 2 - The tighter limit applies at the band edges. NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system. NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz. NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT			

4.4 Test Configuration

The EUT (listed in Sec.2.1) and the simulators (listed in Sec.2.2) were installed as shown on Sec.4.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

4.5 Operating Condition of EUT

4.5.1 Setup the EUT as shown in Sec. 3.2.

4.5.2 Turn EUT on.

4.5.3 Plug Test Dongle to Notebook PC.

4.5.4 Use the software as section 2.3 to select the test mode, remove the Test Dongle and Notebook PC, then test.

4.5.5 Repeat step 3.5.2 and 3.5.4, until the test of all modes finished.

4.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable. Below 1 GHz, the table height is 80 cm above the reference ground plane. Above 1 GHz, the table height is 1.5 m. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.10:2020 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of Agilent N9010A was set at 1MHz for above 1GHz.

The frequency range from 30 MHz to 25 GHz (Up to 10th harmonics from fundamental frequency) was checked.

All the test results are listed in Sec.3.7.

4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Frequency range: below 1GHz (Worst case emission)

(Model: BCB4WFL1)

No.	Operation	Mode	Channel	Frequency	Data Page
1.	Transmitting	BLE 1M	00	2402MHz	P24-25

(Model: BCB2WFL1)

No.	Operation	Mode	Channel	Frequency	Data Page
1.	Transmitting	BLE 1M	00	2402MHz	P26-27

Frequency range: above 1GHz

(Model: BCB4WFL1)

No.	Operation	Mode	Channel	Frequency	Data Page
1.	Transmitting	BLE 1M	00	2402 MHz	P28-31
2.			20	2442 MHz	P32-35
3.			39	2480 MHz	P36-39
4.	Transmitting	BLE 2M	00	2402 MHz	P40-43

Band-Edge and Restricted bands:

(Model: BCB4WFL1)

No.	Operation	Mode	Channel	Frequency	Data Page
1.	Transmitting	BLE 1M	00	2402 MHz	P44-45
2.			39	2480 MHz	P46-47
3.		BLE 2M	00	2402 MHz	P48-49
4.			39	2480 MHz	P50-51

NOTE 1 – Emission Level (dBμV/m) = Read Level (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB)

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m).

NOTE 2 – “QP” means “Quasi-Peak” values.

NOTE 3 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 4 – The emission levels which not reported are too low against the official limit.

NOTE 5 – The emission levels recorded below is data of EUT configured in Lying direction, for this direction was the maximum emission direction during the test. The data of Side & Standing direction are too low against the official limit to be reported.

NOTE 6 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.

For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

NOTE 7 – The frequency range 2310-2390MHz & 2483.5-2500MHz were tested for Restricted bands.

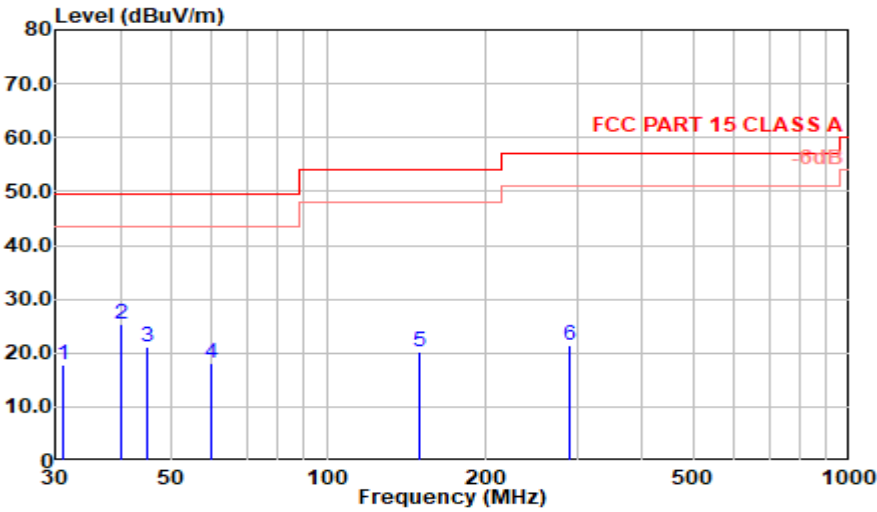
NOTE 8 – For the Emission 9kHz to 30MHz, the emissions were too low against to the limit.

Radiated emission < 1GHz

Test Date:	2025.06.30	Temp./Hum.:	22°C/51%RH	Test By:	JareyLu
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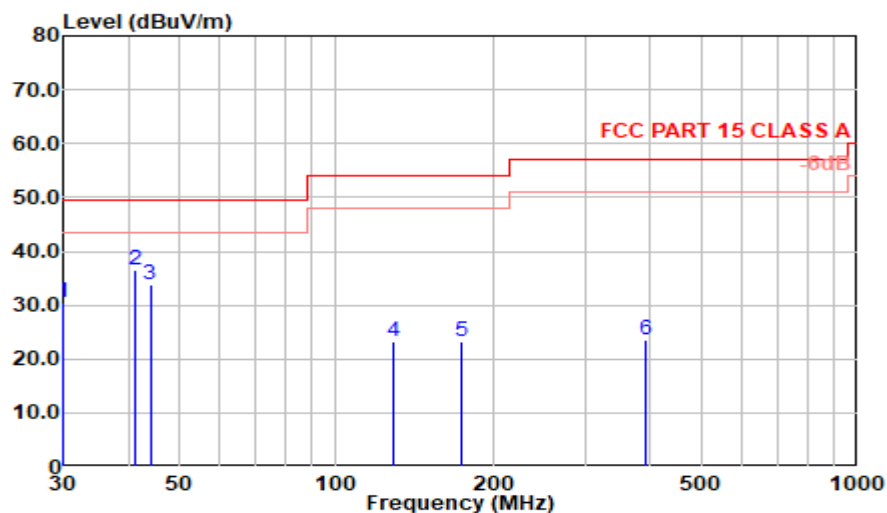
Mode: BLE1M CH2402MHz

Model: BUB4WFL1



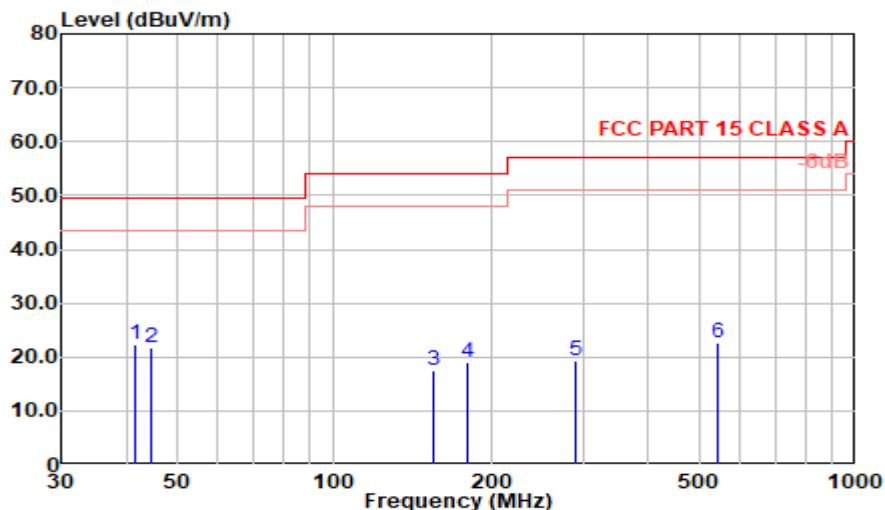
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
30.970	28.48	18.10	0.69	29.59	17.68	49.50	31.82	QP
40.185	35.15	18.94	0.77	29.54	25.31	49.50	24.19	QP
45.035	30.34	19.40	0.81	29.52	21.03	49.50	28.47	QP
59.585	27.67	19.14	0.91	29.46	18.26	49.50	31.24	QP
149.795	28.56	19.20	1.36	29.00	20.12	54.00	33.88	QP
290.930	28.64	19.02	2.02	28.33	21.35	57.00	35.65	QP

Mode: BLE1M CH2402MHz**Model: BUB4WFL1**

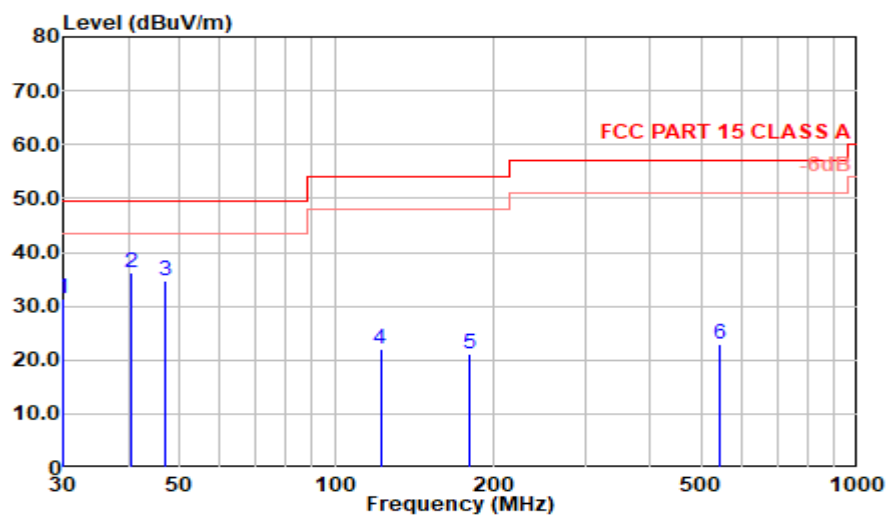
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
30.000	41.41	18.10	0.68	29.60	30.59	49.50	18.91	QP
41.155	46.09	19.13	0.77	29.54	36.46	49.50	13.04	QP
44.065	43.23	19.40	0.80	29.52	33.90	49.50	15.60	QP
128.455	34.10	17.25	1.29	29.28	23.35	54.00	30.65	QP
174.045	32.44	18.30	1.50	29.00	23.23	54.00	30.77	QP
393.265	28.82	21.27	2.31	28.79	23.61	57.00	33.39	QP

Mode: BLE1M CH2402MHz**Model: BUB2WFL1**

Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
41.640	31.94	19.23	0.78	29.54	22.41	49.50	27.09	QP
44.550	31.09	19.40	0.80	29.52	21.77	49.50	27.73	QP
155.130	25.84	19.19	1.39	29.00	17.41	54.00	36.59	QP
179.865	28.82	17.61	1.53	29.00	18.96	54.00	35.04	QP
290.930	26.48	19.02	2.02	28.33	19.18	57.00	37.82	QP
545.555	24.29	24.21	2.73	28.68	22.56	57.00	34.44	QP

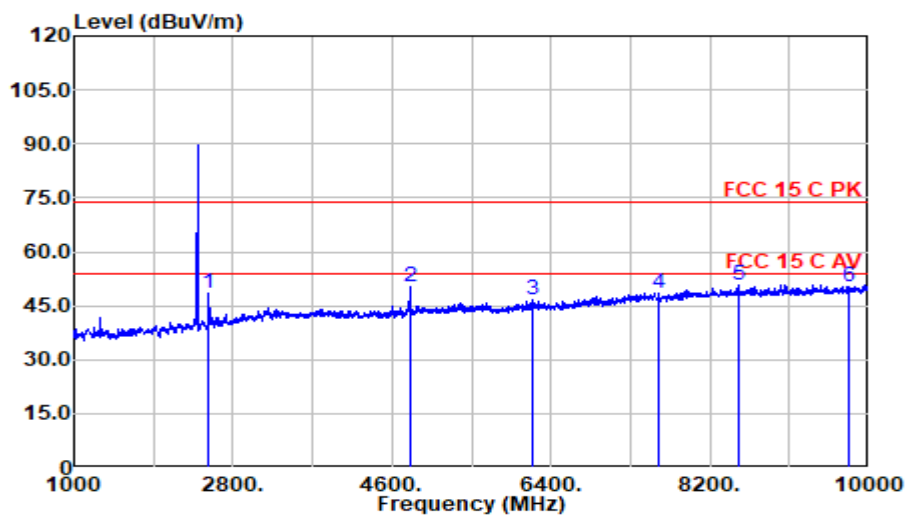
Mode: BLE1M CH2402MHz**Model: BUB2WFL1**

Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
30.000	42.36	18.10	0.68	29.60	31.54	49.50	17.96	QP
40.670	45.82	19.03	0.77	29.54	36.09	49.50	13.41	QP
46.975	44.00	19.50	0.82	29.51	34.81	49.50	14.69	QP
121.665	33.58	16.57	1.27	29.38	22.04	54.00	31.96	QP
180.835	31.09	17.52	1.53	28.99	21.15	54.00	32.85	QP
544.585	24.62	24.19	2.73	28.69	22.84	57.00	34.16	QP

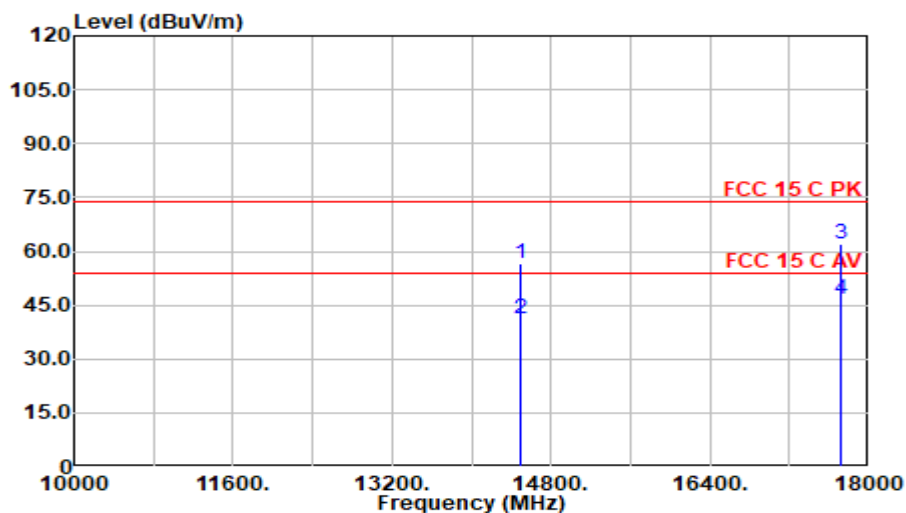
Radiated Emission > 1GHz

Test Date:	2025.06.29	Temp./Hum.:	22°C/51%RH	Test By:	JareyLu
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Mode: BLE1M CH2402MHz**Model: BUB4WFL1**

Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2530.000	52.90	28.68	2.99	35.95	48.62	74.00	25.38	Peak
4803.750	49.00	33.29	4.49	36.43	50.35	74.00	23.65	Peak
6202.000	43.68	34.60	5.24	36.82	46.70	74.00	27.30	Peak
7617.250	42.80	37.00	5.64	37.15	48.29	74.00	25.71	Peak
8518.250	43.68	38.40	5.81	37.30	50.59	74.00	23.41	Peak
9776.250	43.07	38.21	6.11	37.06	50.33	74.00	23.67	Peak

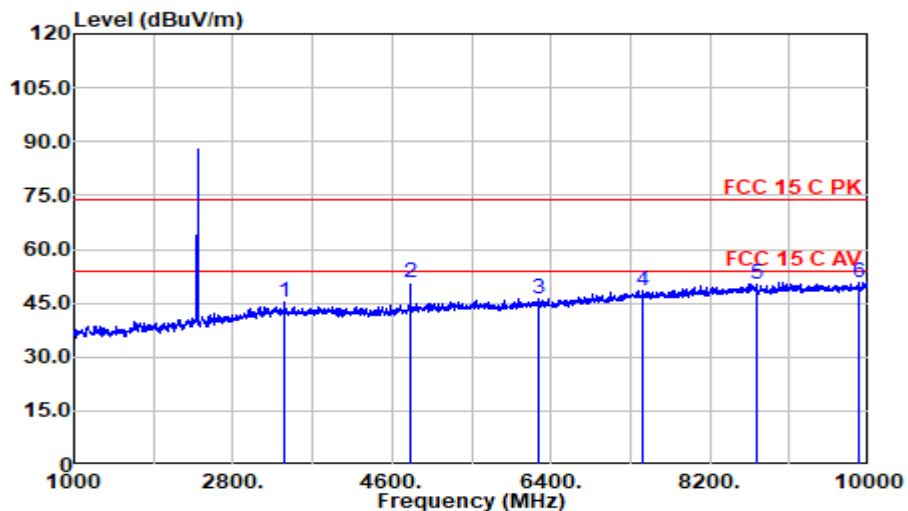
Mode: BLE1M CH2402MHz**Model: BUB4WFL1**

Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
14493.750	41.95	42.48	7.73	35.45	56.71	74.00	17.29	Peak
14493.750	26.49	42.48	7.73	35.45	41.26	54.00	12.74	Average
17723.750	42.80	45.27	8.60	34.51	62.16	74.00	11.84	Peak
17723.750	27.28	45.27	8.60	34.51	46.64	54.00	7.36	Average

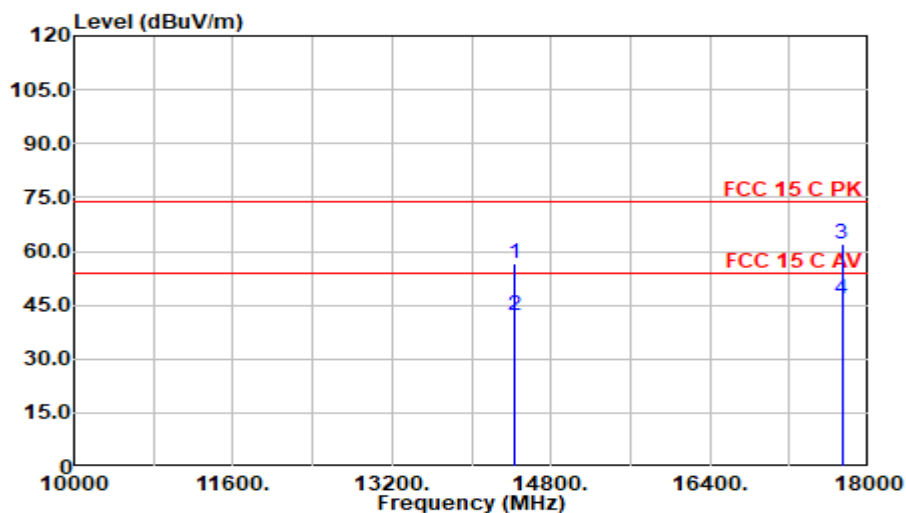
Mode: BLE1M CH2402MHz

Model: BUB4WFL1



Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
3375.750	45.99	31.35	3.52	35.69	45.17	74.00	28.83	Peak
4803.750	49.17	33.29	4.49	36.43	50.52	74.00	23.48	Peak
6261.500	43.41	34.52	5.26	36.83	46.37	74.00	27.63	Peak
7443.000	43.15	37.00	5.59	37.08	48.66	74.00	25.34	Peak
8726.500	43.37	38.33	5.84	37.30	50.24	74.00	23.76	Peak
9882.500	43.30	38.24	6.14	37.03	50.65	74.00	23.35	Peak

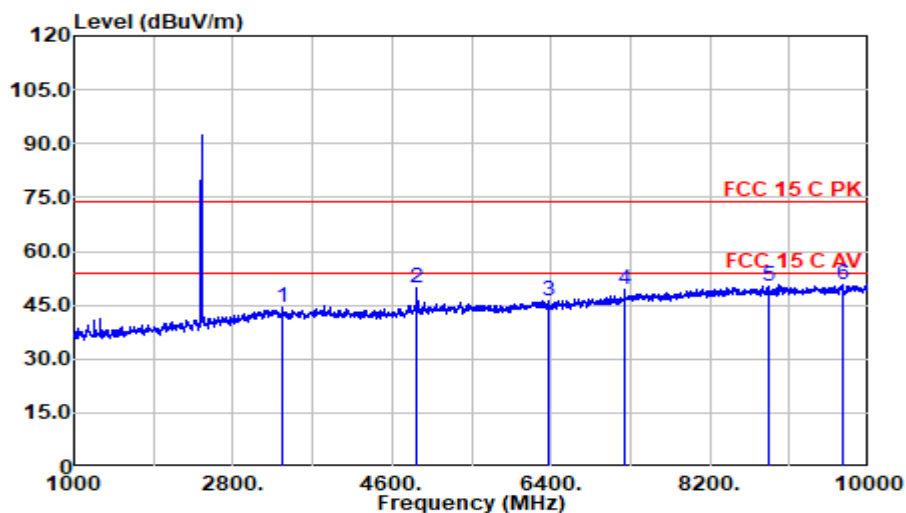
Mode: BLE1M CH2402MHz**Model: BUB4WFL1**

Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
14442.750	42.13	42.33	7.73	35.48	56.70	74.00	17.30	Peak
14442.750	27.51	42.33	7.73	35.48	42.08	54.00	11.92	Average
17728.000	42.61	45.28	8.60	34.51	61.99	74.00	12.01	Peak
17728.000	27.36	45.28	8.60	34.51	46.74	54.00	7.26	Average

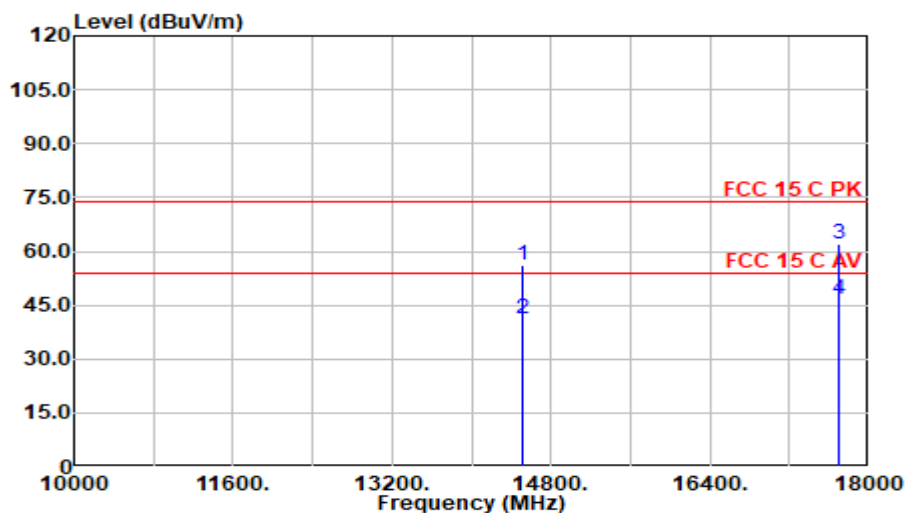
Mode: BLE1M CH2442MHz

Model: BUB4WFL1



Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
3363.000	45.14	31.37	3.52	35.68	44.35	74.00	29.65	Peak
4884.500	48.59	33.27	4.54	36.46	49.94	74.00	24.06	Peak
6372.000	42.94	34.60	5.30	36.84	46.00	74.00	28.00	Peak
7230.500	44.16	36.44	5.54	37.00	49.14	74.00	24.86	Peak
8875.250	43.60	38.30	5.86	37.30	50.46	74.00	23.54	Peak
9704.000	43.54	38.18	6.09	37.09	50.73	74.00	23.27	Peak

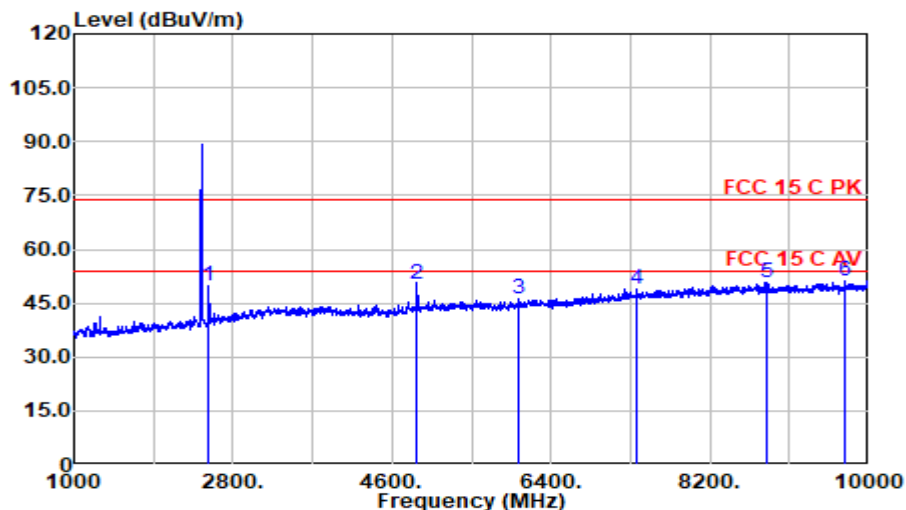
Mode: BLE1M CH2442MHz**Model: BUB4WFL1**

Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
14506.500	41.57	42.48	7.73	35.44	56.34	74.00	17.66	Peak
14506.500	26.46	42.48	7.73	35.44	41.23	54.00	12.77	Average
17702.500	42.55	45.21	8.59	34.52	61.83	74.00	12.17	Peak
17702.500	27.25	45.21	8.59	34.52	46.54	54.00	7.46	Average

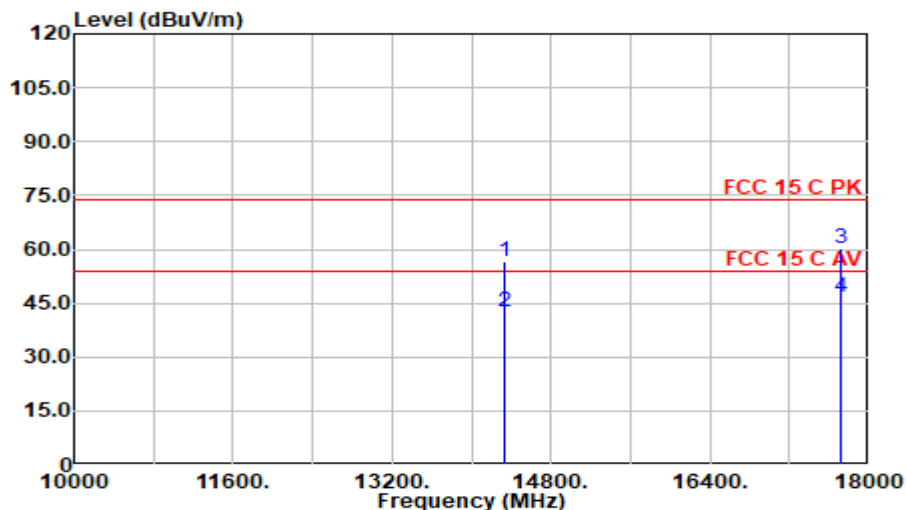
Mode: BLE1M CH2442MHz

Model: BUB4WFL1



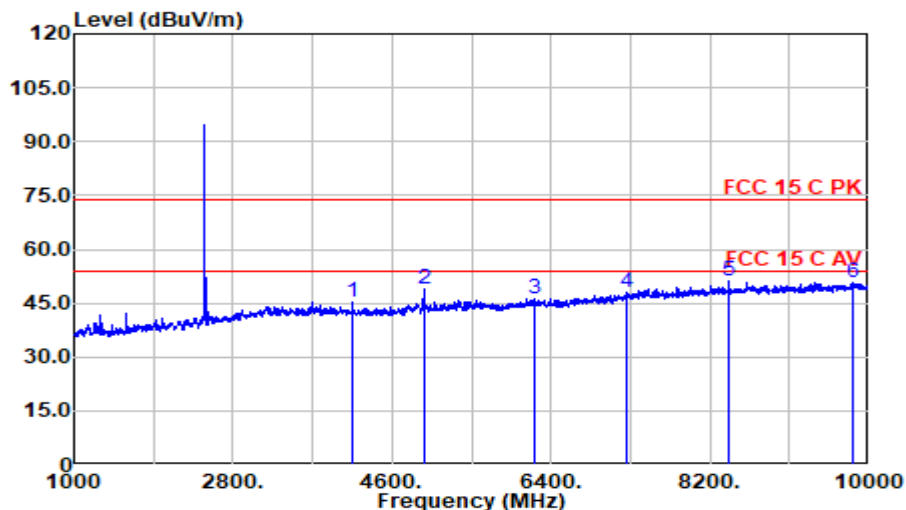
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2530.000	53.97	28.68	2.99	35.95	49.69	74.00	24.31	Peak
4884.500	48.78	33.27	4.54	36.46	50.13	74.00	23.87	Peak
6032.000	43.65	34.33	5.19	36.80	46.36	74.00	27.64	Peak
7370.750	43.47	36.94	5.58	37.05	48.94	74.00	25.06	Peak
8837.000	44.00	38.37	5.86	37.30	50.93	74.00	23.07	Peak
9721.000	43.89	38.12	6.09	37.08	51.01	74.00	22.99	Peak

Mode: BLE1M CH2442MHz**Model: BUB4WFL1**

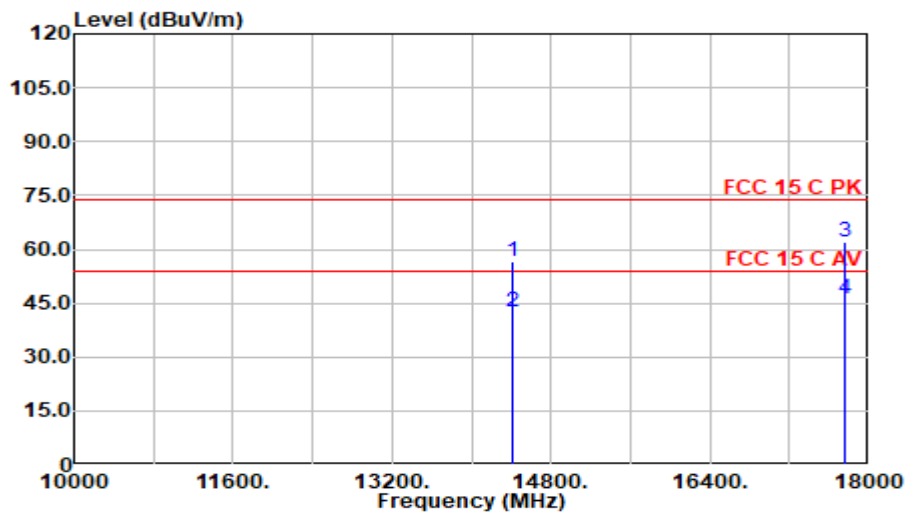
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
14328.000	42.54	42.13	7.72	35.57	56.82	74.00	17.18	Peak
14328.000	28.25	42.13	7.72	35.57	42.54	54.00	11.46	Average
17719.500	41.07	45.26	8.60	34.51	60.42	74.00	13.58	Peak
17719.500	27.41	45.26	8.60	34.51	46.75	54.00	7.25	Average

Mode: BLE1M CH2480MHz**Model: BUB4WFL1**

Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
4157.750	44.86	32.48	4.04	36.17	45.22	74.00	28.78	Peak
4961.000	47.25	33.48	4.59	36.49	48.83	74.00	25.17	Peak
6223.250	43.26	34.55	5.25	36.82	46.24	74.00	27.76	Peak
7251.750	42.85	36.61	5.55	37.01	48.00	74.00	26.00	Peak
8412.000	44.22	38.28	5.79	37.30	50.99	74.00	23.01	Peak
9810.250	43.19	38.42	6.12	37.05	50.68	74.00	23.32	Peak

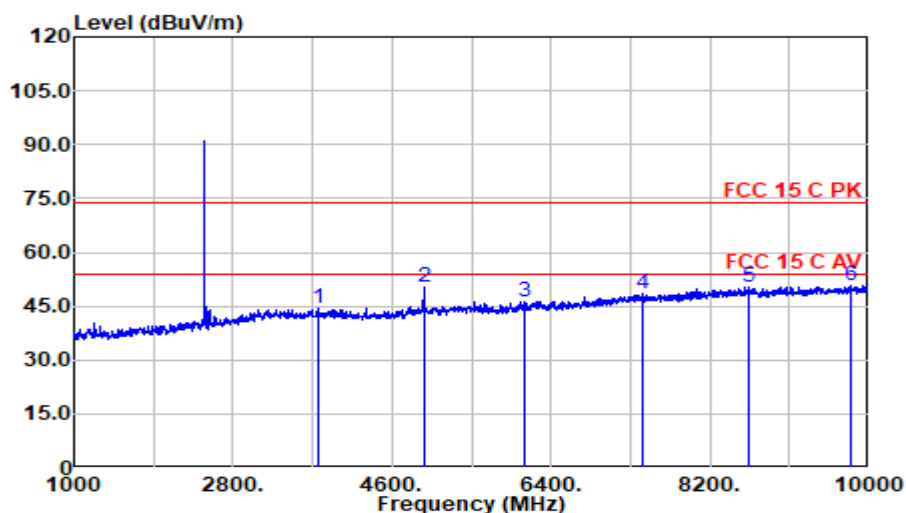
Mode: BLE1M CH2480MHz**Model: BUB4WFL1**

Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
14413.000	42.15	42.24	7.73	35.51	56.61	74.00	17.39	Peak
14413.000	28.32	42.24	7.73	35.51	42.77	54.00	11.23	Average
17766.250	42.30	45.40	8.61	34.49	61.82	74.00	12.18	Peak
17766.250	26.73	45.40	8.61	34.49	46.24	54.00	7.76	Average

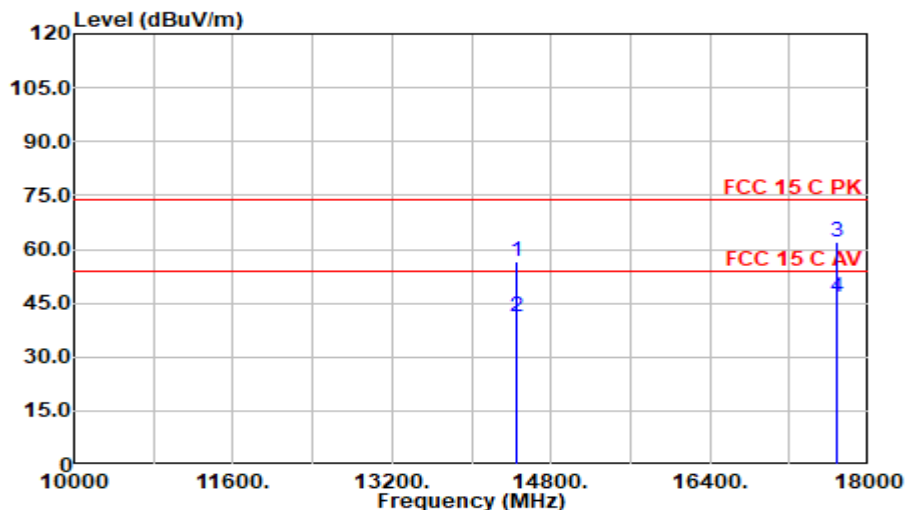
Mode: BLE1M CH2480MHz

Model: BUB4WFL1



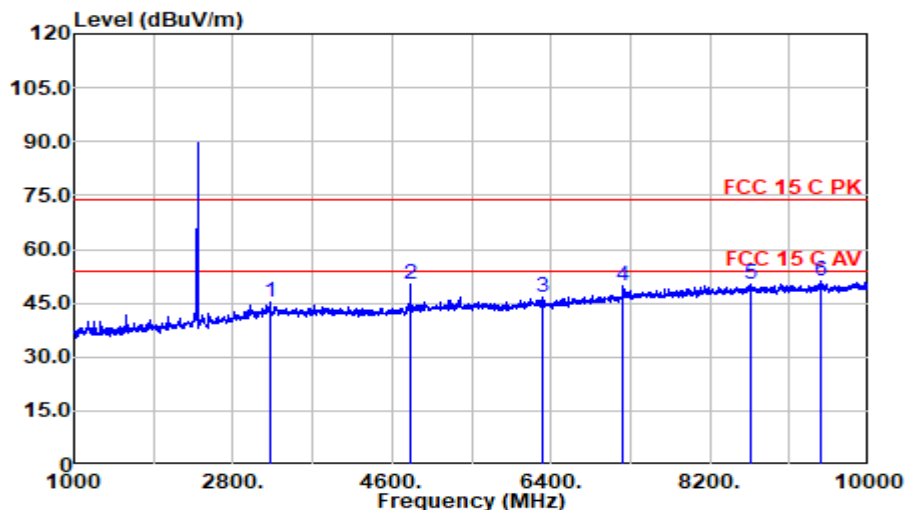
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
3771.000	44.32	32.44	3.78	35.96	44.59	74.00	29.41	Peak
4961.000	48.75	33.48	4.59	36.49	50.33	74.00	23.67	Peak
6100.000	43.48	34.20	5.21	36.81	46.09	74.00	27.91	Peak
7438.750	43.00	37.00	5.59	37.08	48.51	74.00	25.49	Peak
8633.000	43.16	38.40	5.83	37.30	50.09	74.00	23.91	Peak
9806.000	43.07	38.41	6.12	37.06	50.55	74.00	23.45	Peak

Mode: BLE1M CH2480MHz**Model: BUB4WFL1**

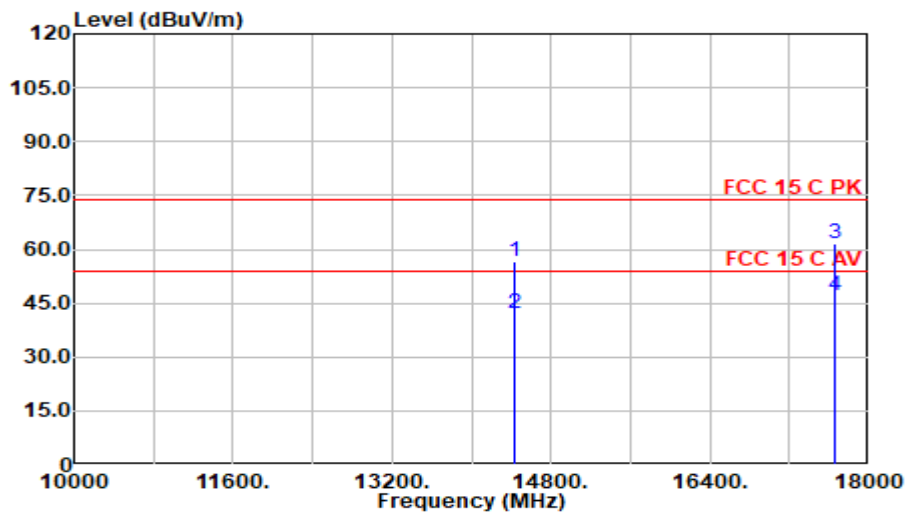
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
14459.750	41.91	42.38	7.73	35.47	56.54	74.00	17.46	Peak
14459.750	26.35	42.38	7.73	35.47	40.98	54.00	13.02	Average
17685.500	42.94	45.11	8.59	34.52	62.12	74.00	11.88	Peak
17685.500	27.59	45.11	8.59	34.52	46.77	54.00	7.23	Average

Mode: BLE2M CH2402MHz**Model: BUB4WFL1**

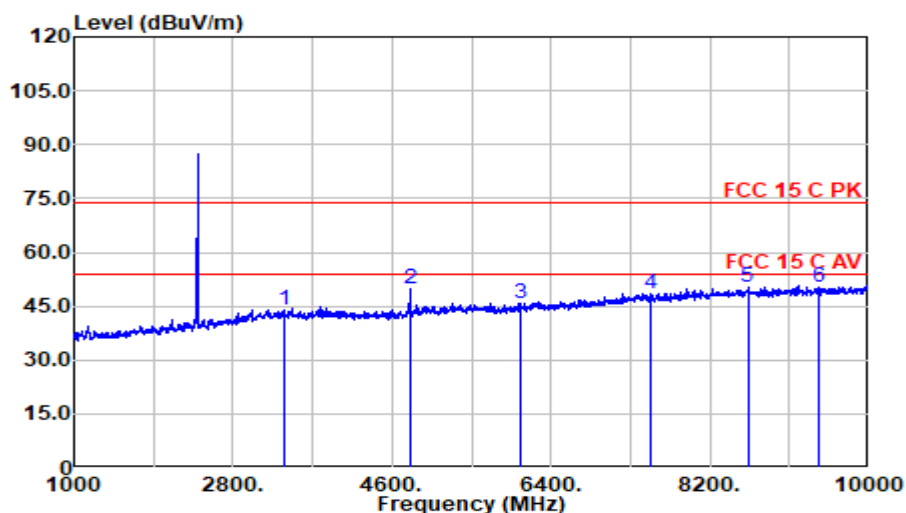
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
3214.250	46.33	31.16	3.41	35.57	45.33	74.00	28.67	Peak
4803.750	48.94	33.29	4.49	36.43	50.29	74.00	23.71	Peak
6304.000	43.49	34.60	5.28	36.83	46.53	74.00	27.47	Peak
7209.250	45.19	36.27	5.54	36.99	50.01	74.00	23.99	Peak
8654.250	43.18	38.42	5.83	37.30	50.12	74.00	23.88	Peak
9466.000	43.80	38.30	6.02	37.16	50.96	74.00	23.04	Peak

Mode: BLE2M CH2402MHz**Model: BUB4WFL1**

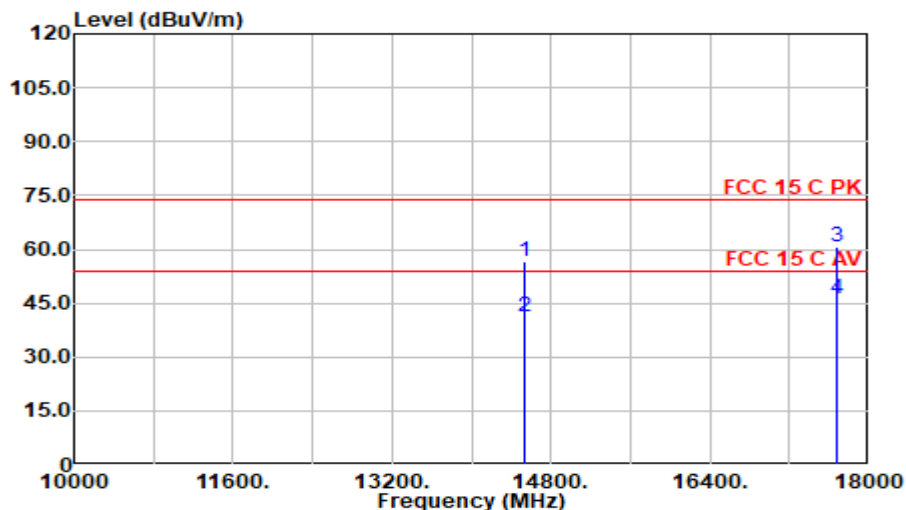
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
14430.000	42.28	42.29	7.73	35.49	56.81	74.00	17.19	Peak
14430.000	27.43	42.29	7.73	35.49	41.95	54.00	12.05	Average
17664.250	42.59	44.99	8.59	34.53	61.63	74.00	12.37	Peak
17664.250	28.26	44.99	8.59	34.53	47.30	54.00	6.70	Average

Mode: BLE2M CH2402MHz**Model: BUB4WFL1**

Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
3388.500	44.95	31.32	3.53	35.70	44.11	74.00	29.89	Peak
4803.750	48.64	33.29	4.49	36.43	49.99	74.00	24.01	Peak
6057.500	42.98	34.37	5.20	36.81	45.74	74.00	28.26	Peak
7523.750	42.94	37.05	5.62	37.12	48.49	74.00	25.51	Peak
8628.750	43.44	38.40	5.83	37.30	50.37	74.00	23.63	Peak
9427.750	43.16	38.34	6.01	37.17	50.34	74.00	23.66	Peak

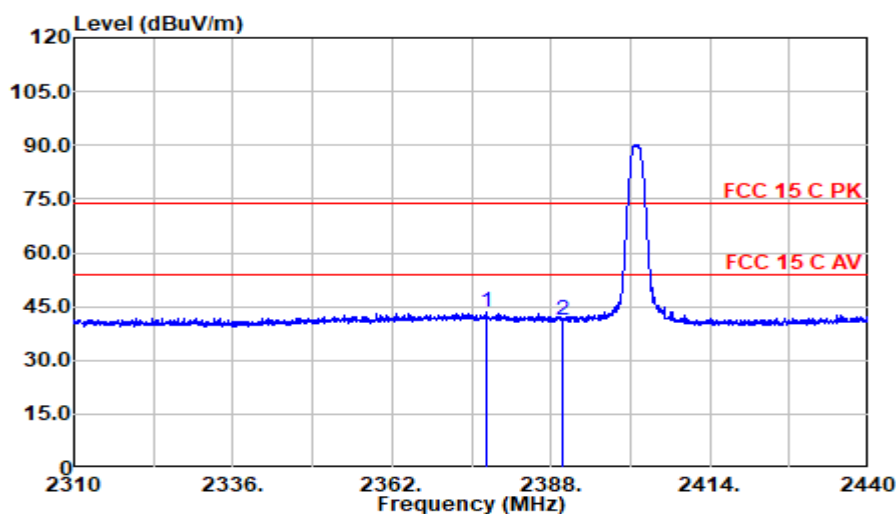
Mode: BLE2M CH2402MHz**Model: BUB4WFL1**

Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
14527.750	41.83	42.42	7.73	35.42	56.56	74.00	17.44	Peak
14527.750	26.38	42.42	7.73	35.42	41.11	54.00	12.89	Average
17668.500	41.42	45.01	8.59	34.53	60.49	74.00	13.51	Peak
17668.500	27.34	45.01	8.59	34.53	46.41	54.00	7.59	Average

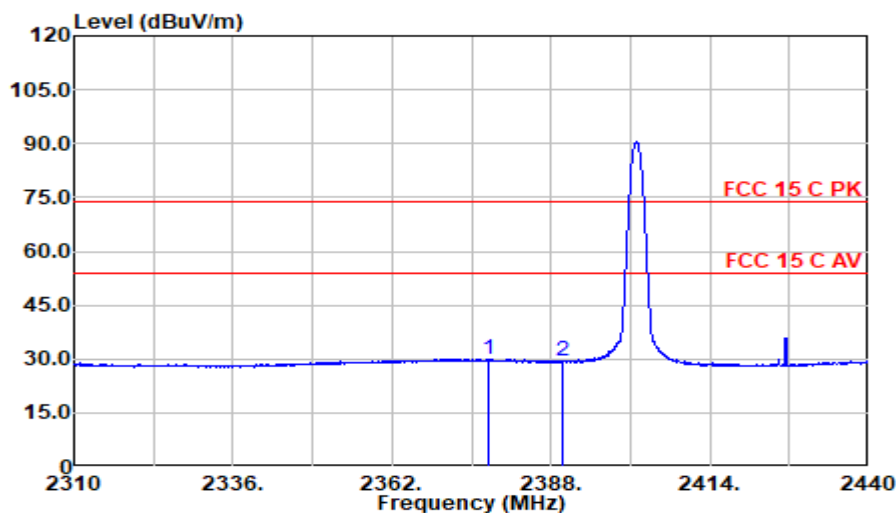
Band-Edge and Restricted bands:

Test Date:	2025.06.29	Temp./Hum.:	22°C/51%RH	Test By:	JareyLu
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Mode: BLE1M CH2402MHz

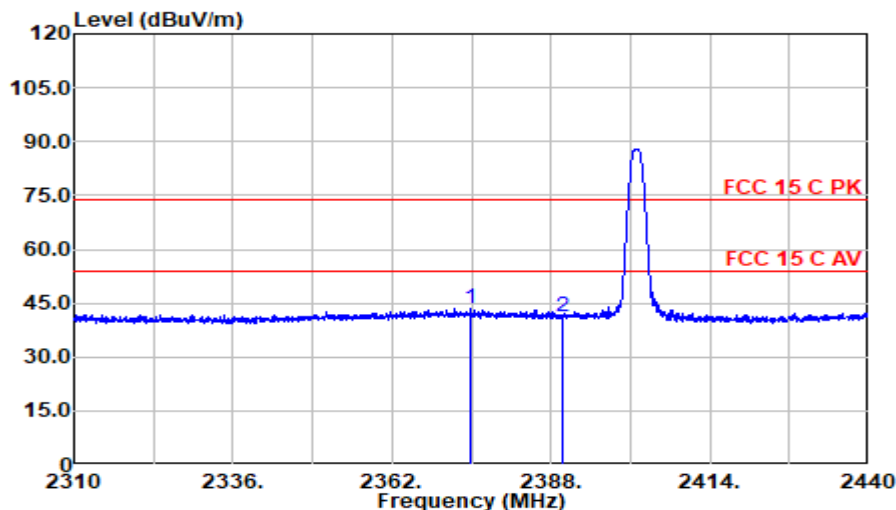
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2377.340	47.98	28.55	2.89	36.15	43.28	74.00	30.72	Peak
2390.000	45.71	28.58	2.90	36.13	41.06	74.00	32.94	Peak

Mode: BLE1M CH2402MHz

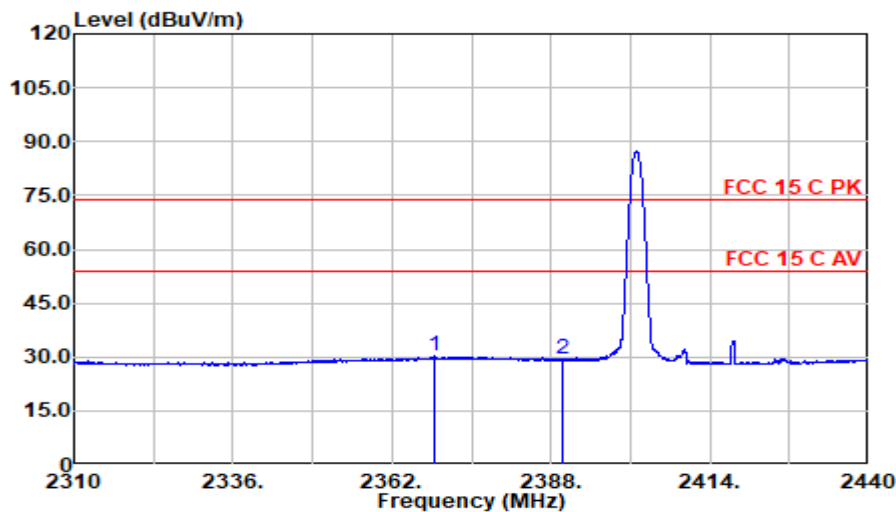
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2377.665	34.80	28.56	2.89	36.15	30.10	54.00	23.90	Average
2390.000	33.97	28.58	2.90	36.13	29.32	54.00	24.68	Average

Mode: BLE1M CH2402MHz

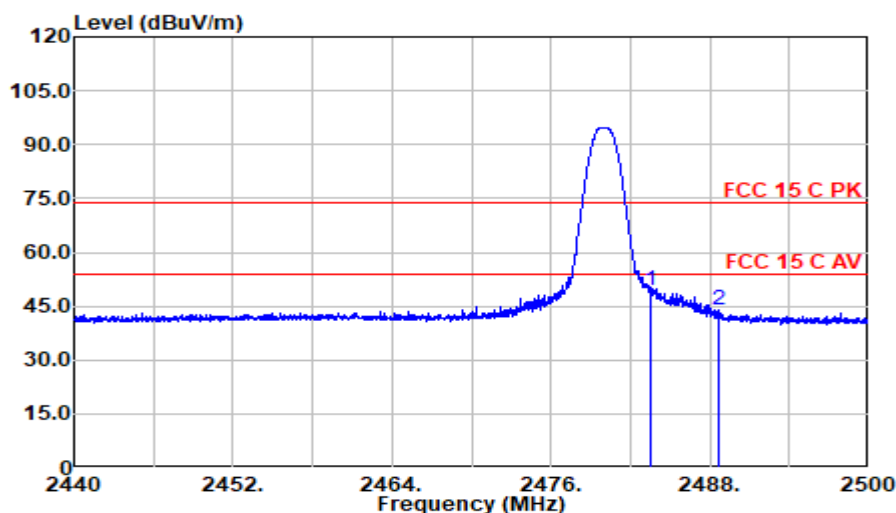
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
2374.870	47.97	28.55	2.89	36.15	43.26	74.00	30.74	Peak
2390.000	45.96	28.58	2.90	36.13	41.31	74.00	32.69	Peak

Mode: BLE1M CH2402MHz

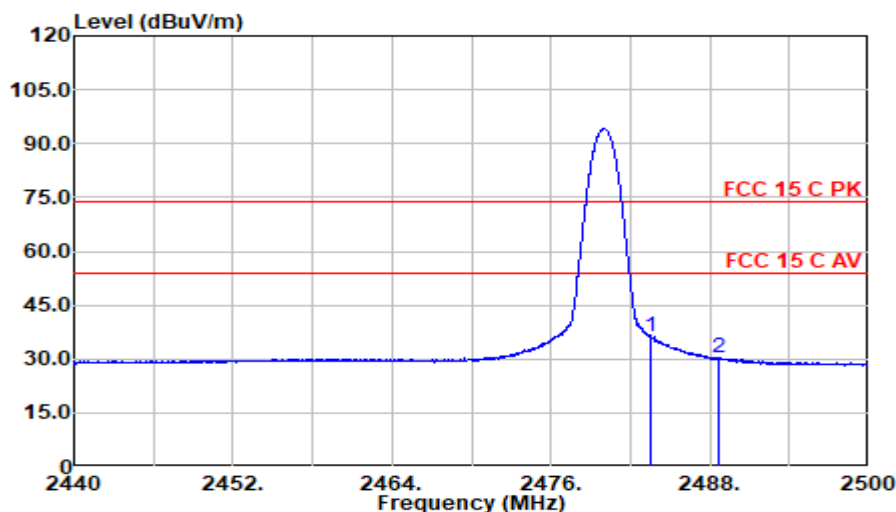
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
2368.825	34.88	28.54	2.88	36.16	30.14	54.00	23.86	Average
2390.000	33.94	28.58	2.90	36.13	29.28	54.00	24.72	Average

Mode: BLE1M CH2480MHz

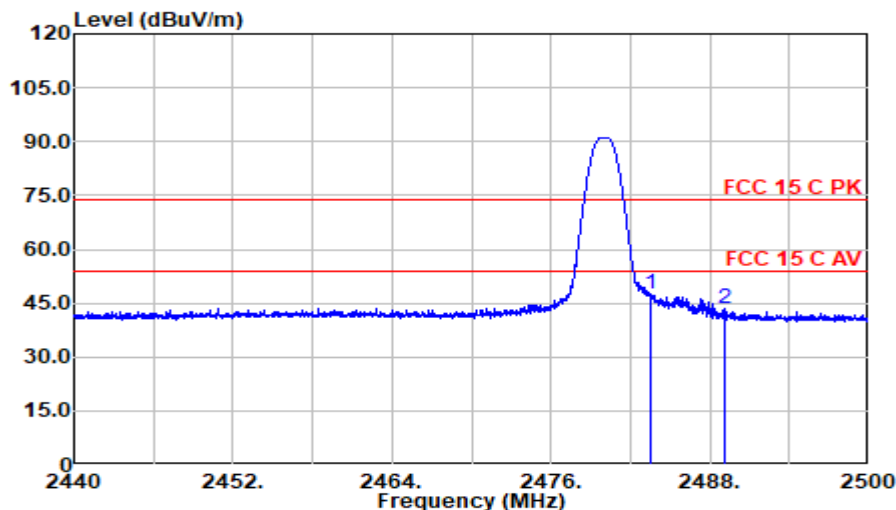
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2483.500	53.81	28.50	2.96	36.01	49.26	74.00	24.74	Peak
2488.600	48.52	28.50	2.96	36.00	43.98	74.00	30.02	Peak

Mode: BLE1M CH2480MHz

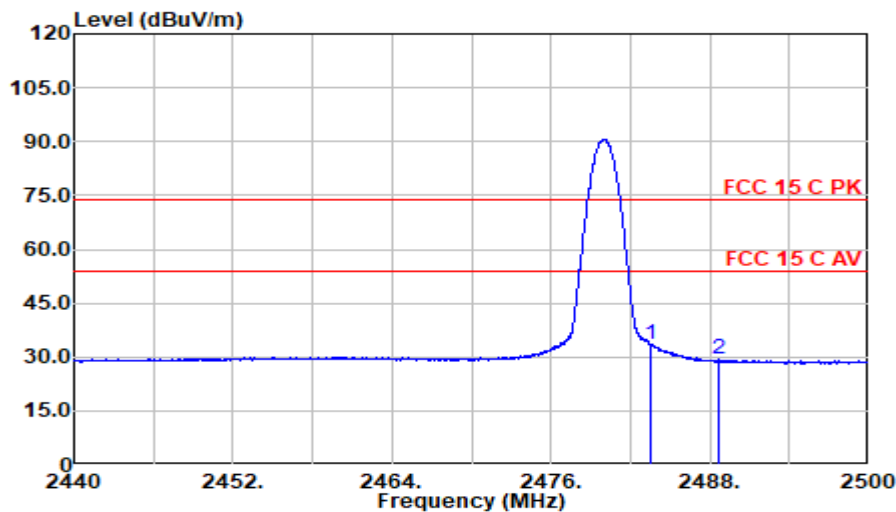
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2483.500	40.66	28.50	2.96	36.01	36.11	54.00	17.89	Average
2488.630	34.98	28.50	2.96	36.00	30.44	54.00	23.56	Average

Mode: BLE1M CH2480MHz

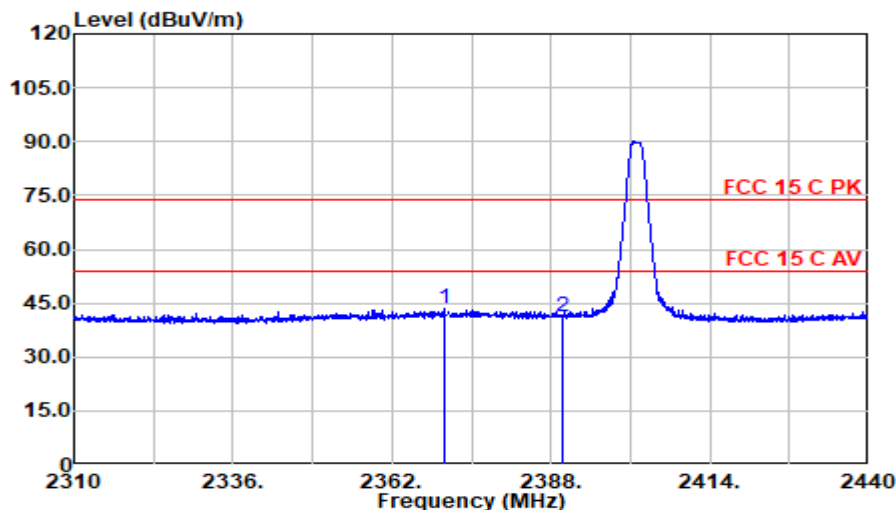
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2483.500	52.07	28.50	2.96	36.01	47.52	74.00	26.48	Peak
2489.080	48.00	28.50	2.96	36.00	43.46	74.00	30.54	Peak

Mode: BLE1M CH2480MHz

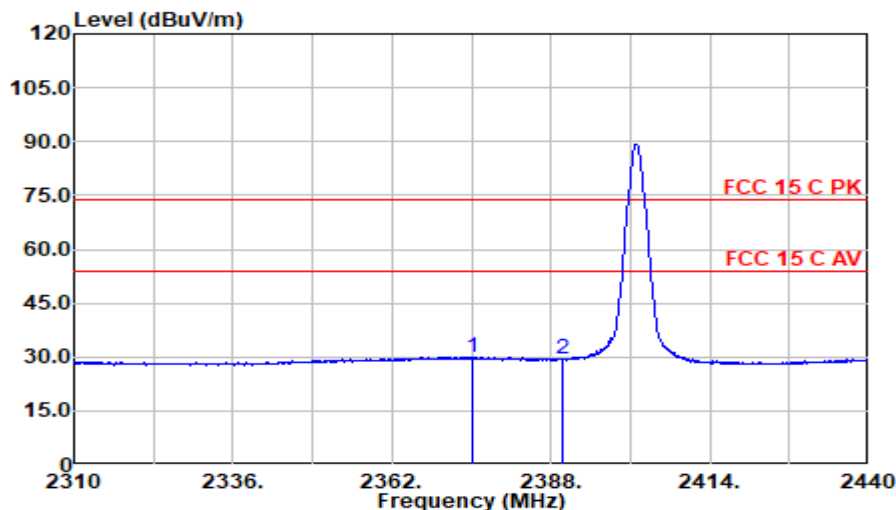
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2483.500	38.18	28.50	2.96	36.01	33.63	54.00	20.37	Average
2488.720	33.77	28.50	2.96	36.00	29.23	54.00	24.77	Average

Mode: BLE2M CH2402MHz

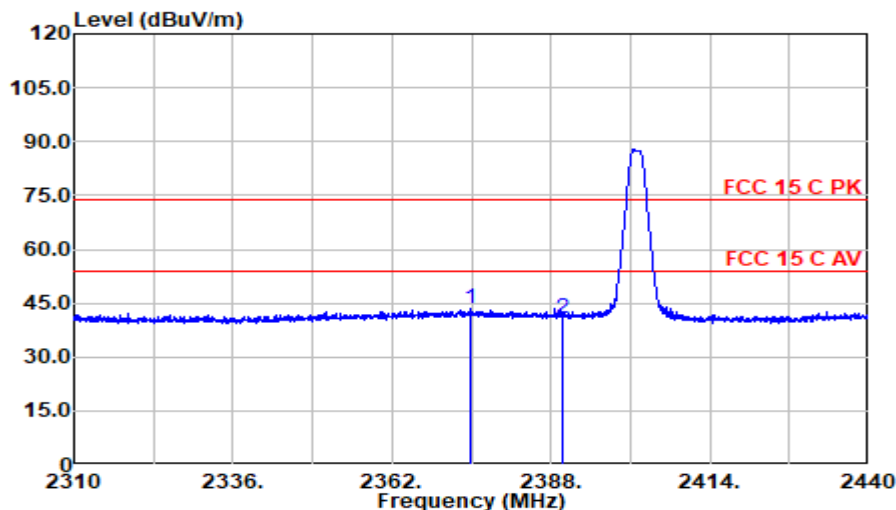
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2370.515	48.10	28.54	2.88	36.16	43.37	74.00	30.63	Peak
2390.000	45.83	28.58	2.90	36.13	41.17	74.00	32.83	Peak

Mode: BLE2M CH2402MHz

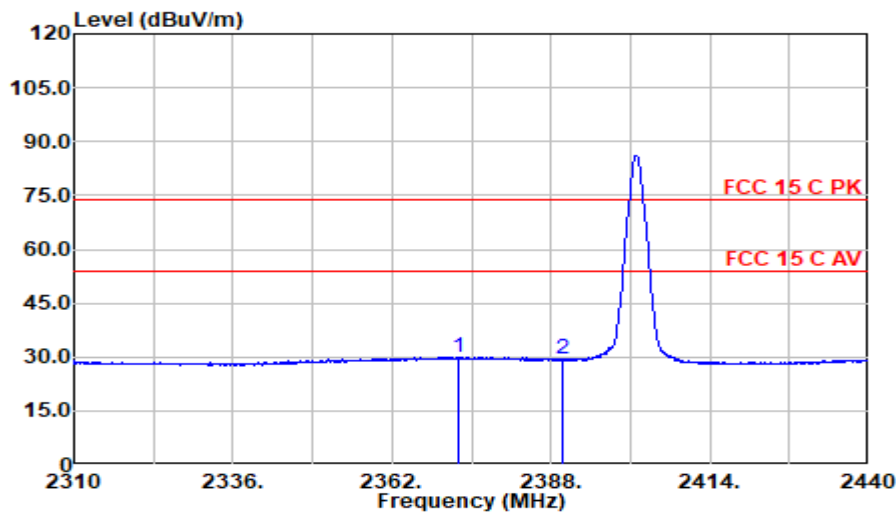
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2375.065	34.56	28.55	2.89	36.15	29.85	54.00	24.15	Average
2390.000	34.17	28.58	2.90	36.13	29.52	54.00	24.48	Average

Mode: BLE2M CH2402MHz

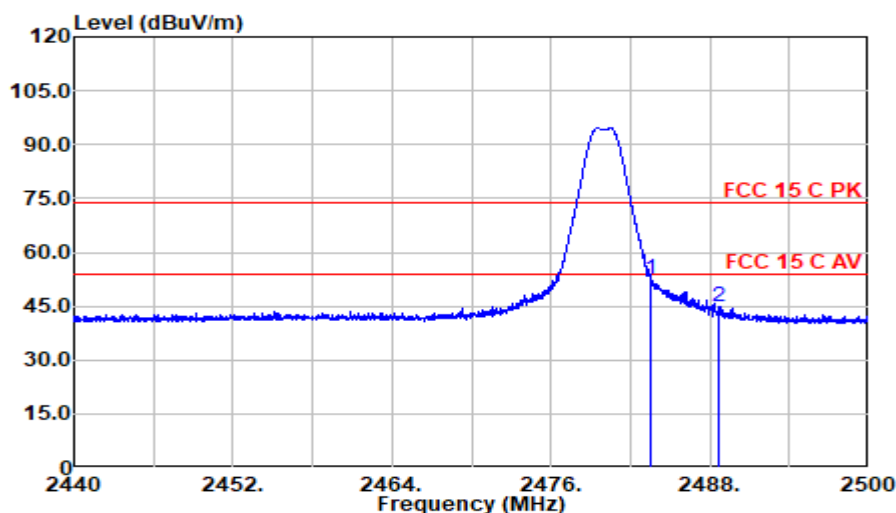
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2374.805	48.22	28.55	2.89	36.15	43.51	74.00	30.49	Peak
2390.000	45.60	28.58	2.90	36.13	40.94	74.00	33.06	Peak

Mode: BLE2M CH2402MHz

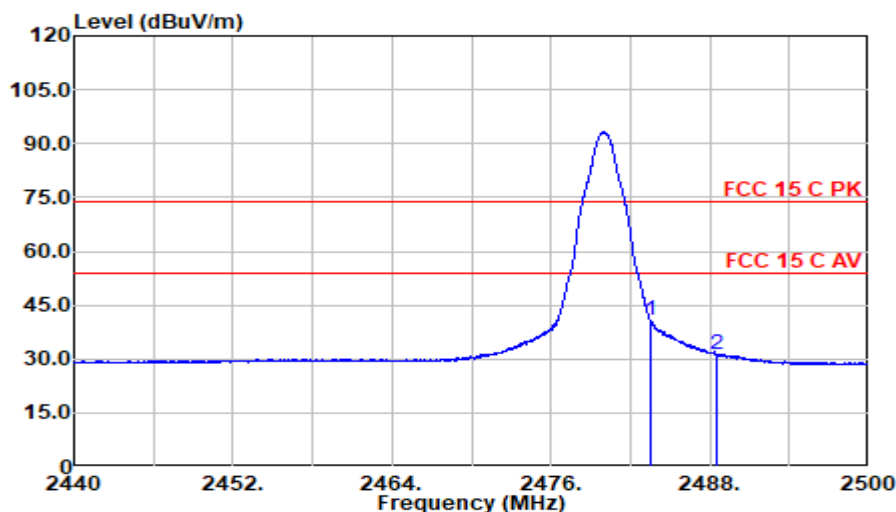
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2372.855	34.74	28.55	2.89	36.15	30.02	54.00	23.98	Average
2390.000	34.03	28.58	2.90	36.13	29.38	54.00	24.62	Average

Mode: BLE2M CH2480MHz

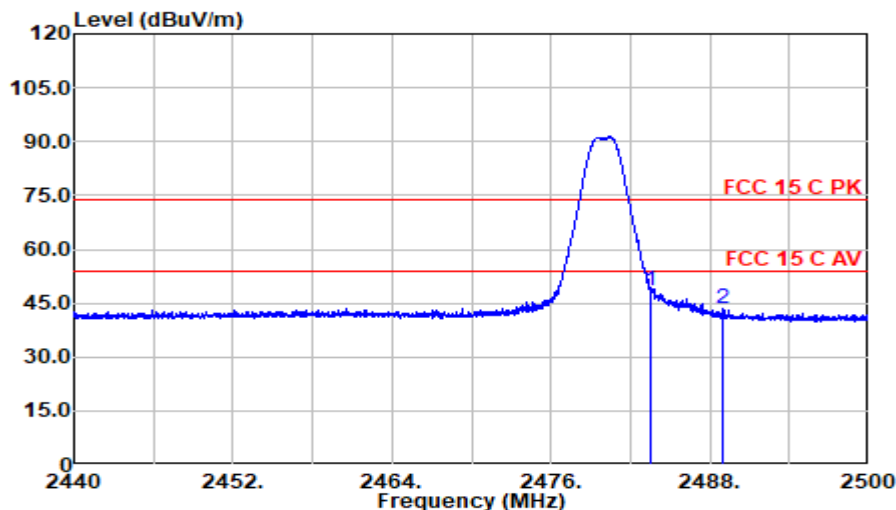
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2483.500	57.11	28.50	2.96	36.01	52.56	74.00	21.44	Peak
2488.630	49.52	28.50	2.96	36.00	44.98	74.00	29.02	Peak

Mode: BLE2M CH2480MHz

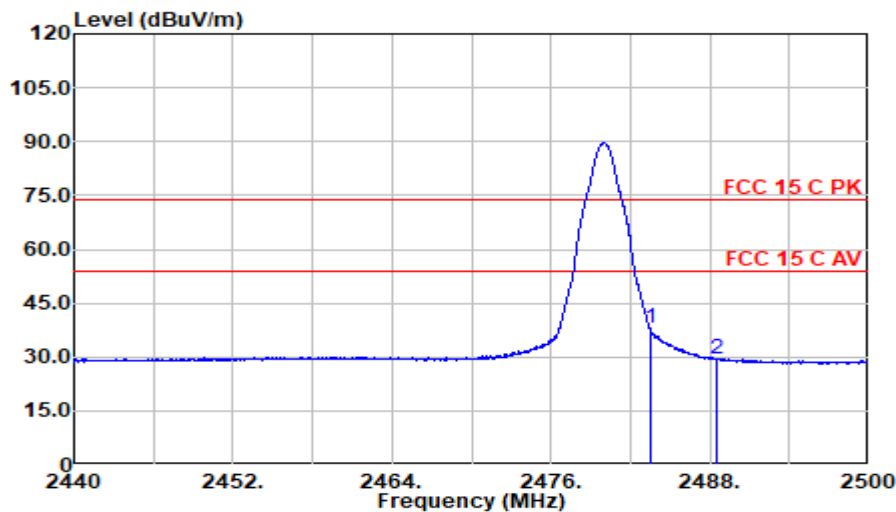
Polarization at Horizontal

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2483.500	45.50	28.50	2.96	36.01	40.95	54.00	13.05	Average
2488.480	35.92	28.50	2.96	36.00	31.38	54.00	22.62	Average

Mode: BLE2M CH2480MHz

Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2483.500	53.21	28.50	2.96	36.01	48.66	74.00	25.34	Peak
2489.020	47.83	28.50	2.96	36.00	43.30	74.00	30.70	Peak

Mode: BLE2M CH2480MHz

Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
2483.500	42.55	28.50	2.96	36.01	38.00	54.00	16.00	Average
2488.540	34.15	28.50	2.96	36.00	29.62	54.00	24.38	Average

5 6 dB BANDWIDTH MEASUREMENT

5.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2024.08.09	1 Year
2.	RF Cable	Mini-Circuits	FLC-3FT-SM SM+	22022838	2024.08.09	1 Year
3.	10 dB Attenuator	Mini-Circuits	BW-S10W2+	001	2024.09.21	1 Year

5.2 Block Diagram of Test Setup



5.3 Specification Limits (§15.247(a)(2))

The minimum 6 dB bandwidth shall be at least 500 kHz.

5.4 Operating Condition of EUT

The software as section 2.3 was used to enable the EUT to change the test mode one by one.

5.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with settings: RBW = 100kHz, VBW $\geq 3 \times$ RBW.

The 6 dB bandwidth is defined as the total spectrum the power of which is lower than peak power minus 6 dB .

The test procedure is defined in ANSI C63.10:2020 (the 11.8.2 Measurement Procedure “Option 2” was used).

5.6 Test Results

PASSED.

All the test results are attached in next pages.

Test Date:	2025.06.17	Temp./Hum.:	23°C/51%RH	Test By:	DoraMa
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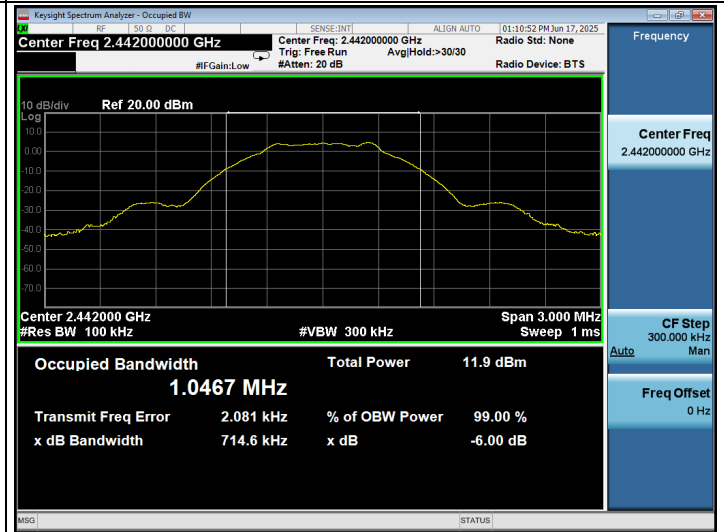
Mode	Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit
BLE 1M	00	2402	715.3	500 kHz
	20	2442	714.6	500 kHz
	39	2480	711.2	500 kHz
BLE 2M	00	2402	1352	500 kHz
	20	2442	1354	500 kHz
	39	2480	1351	500 kHz

BLE 1M

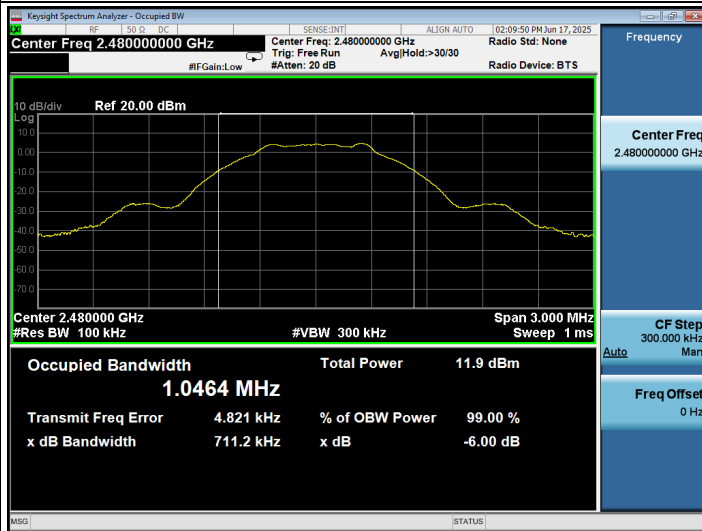
CH2402



CH2442



CH2480



BLE 2M

CH2402



CH2442



CH2480



6 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

6.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2024.08.09	1 Year
2.	RF Cable	Mini-Circuits	FLC-3FT-SM SM+	22022838	2024.08.09	1 Year
3.	10 dB Attenuator	Mini-Circuits	BW-S10W2+	001	2024.08.09	1 Year

6.2 Block Diagram of Test Setup

The Same as Section. 5.2.

6.3 Specification Limits ((§15.247(b)(3))

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5 MHz is: 1 Watt. (30 dBm)

6.4 Operating Condition of EUT

The software as section 2.3 was used to enable the EUT to change the test mode one by one.

6.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- a) $RBW \geq DTS \text{ Bandwidth}$.
- b) $VBW \geq [3 \times RBW]$.
- c) $\text{Span} \geq [3 \times RBW]$.
- d) Sweep time = auto.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

The test procedure is defined in ANSI C63.10:2020 (11.9.1.1 Measurement Procedure “ $RBW \geq DTS \text{ bandwidth}$ ” was used).

6.6 Test Results

PASSED.

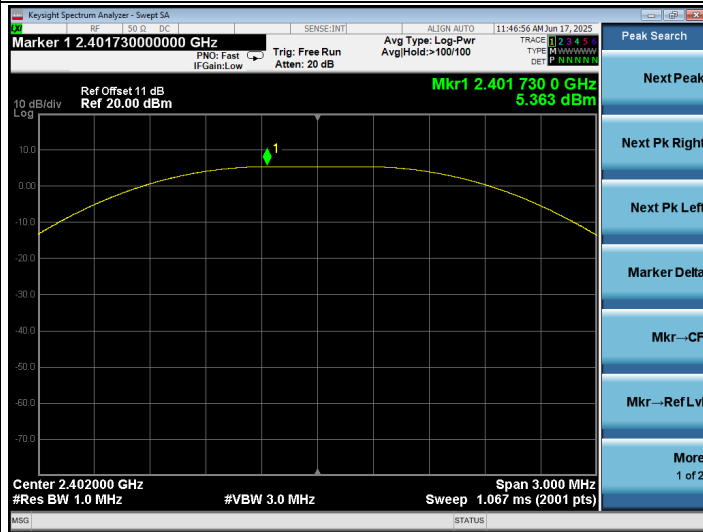
All the test results are listed below.

Test Date:	2025.06.17	Temp./Hum.:	23°C/51%RH	Test By:	DoraMa
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Mode	Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit
BLE 1M	00	2402	5.363	30 dBm
	20	2442	5.407	30 dBm
	39	2480	5.432	30 dBm
BLE 2M	00	2402	5.386	30 dBm
	20	2442	5.432	30 dBm
	39	2480	5.376	30 dBm

BLE 1M

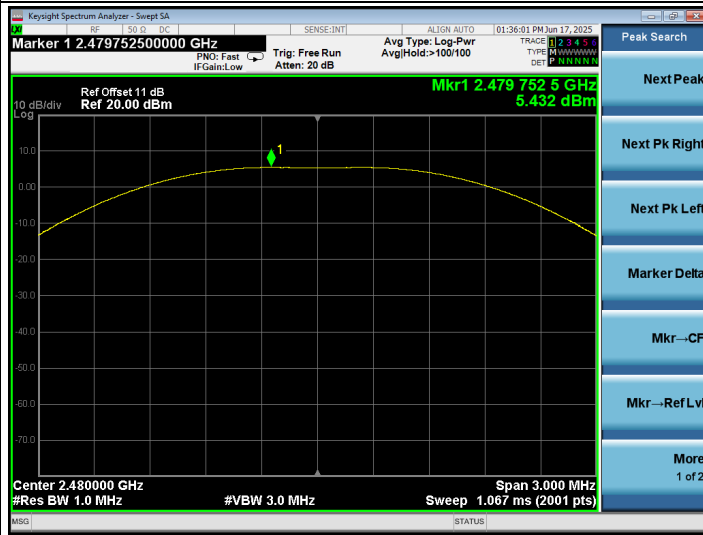
CH2402



CH2442

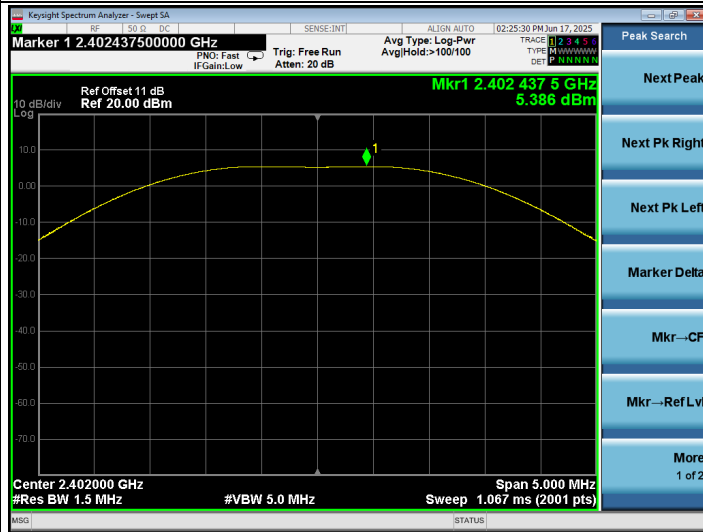


CH2480



BLE 2M

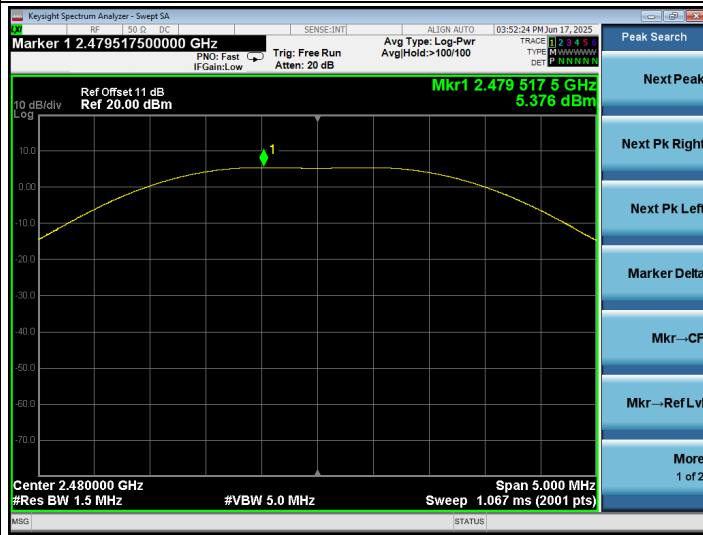
CH2402



CH2442



CH2480



7 EMISSION LIMITATIONS MEASUREMENT

7.1 Test Equipment

The following test equipment was used during the emission limitations test:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2024.08.09	1 Year
2.	RF Cable	Mini-Circuits	FLC-3FT-SM SM+	22022838	2024.08.09	1 Year
3.	10 dB Attenuator	Mini-Circuits	BW-S10W2+	001	2024.08.09	1 Year

7.2 Block Diagram of Test Setup

The Same as Section. 5.2.

7.3 Specification Limits (§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 (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). (※ This test result attaching to Section. 3.7)

7.4 Operating Condition of EUT

The software as section 2.3 was used to enable the EUT to change the test mode one by one.

7.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

Establish a reference level by using the following procedure:

- Set instrument center frequency to DTS channel center frequency.
- Set the span to ≥ 1.5 times the DTS bandwidth.
- Set the RBW = 100 kHz.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Establish an emission level by using the following procedure:

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW $\geq [3 \times \text{RBW}]$.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Scan up through 10th harmonic.

The test procedure is defined in ANSI C63.10:2020 (11.11.2 Reference level measurement and 11.11.3 Emission level measurement was used).

7.6 Test Results

PASSED.

The test data was attached in the next pages.

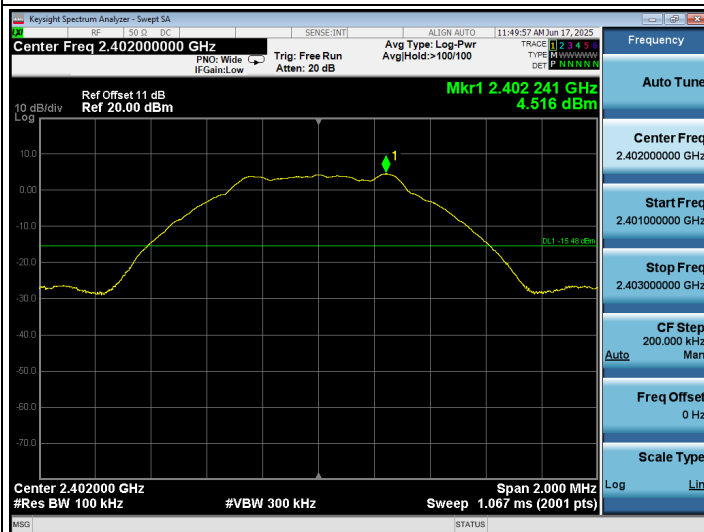
Test Date:	2025.06.17	Temp./Hum.:	23°C/51%RH	Test By:	DoraMa
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Mode	Channel	Frequency (MHz)	Data Page
BLE 1M	00	2402	P63
	20	2442	P64
	39	2480	P65
BLE 2M	00	2402	P66
	20	2442	P67
	39	2480	P68

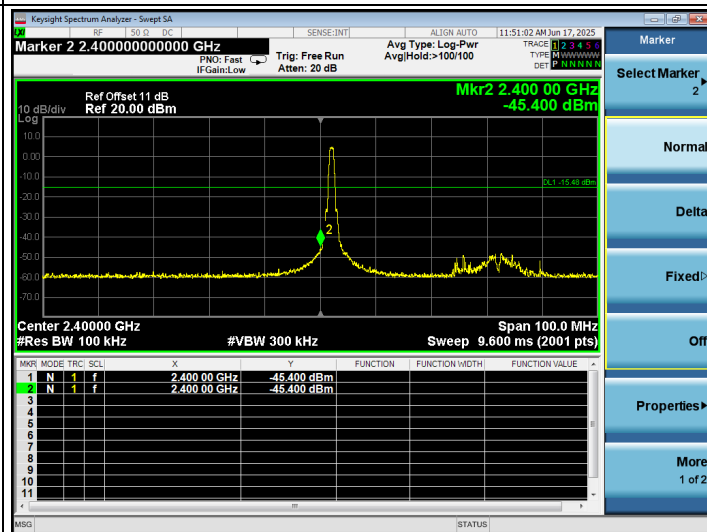
BLE 1M

CH2402

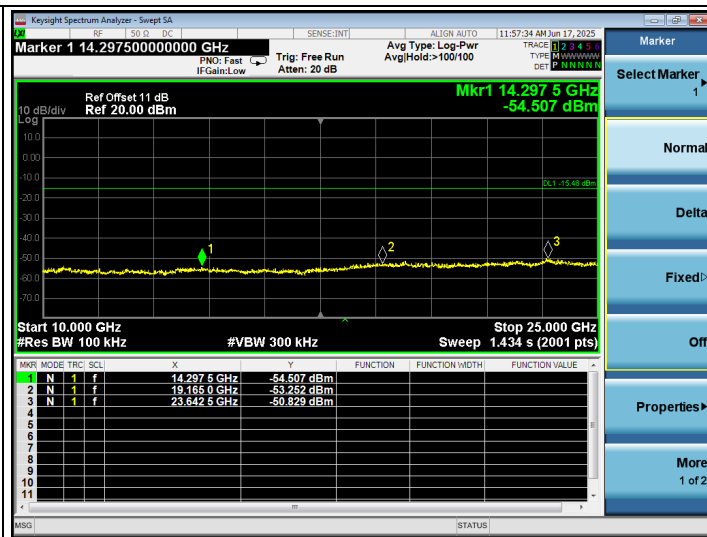
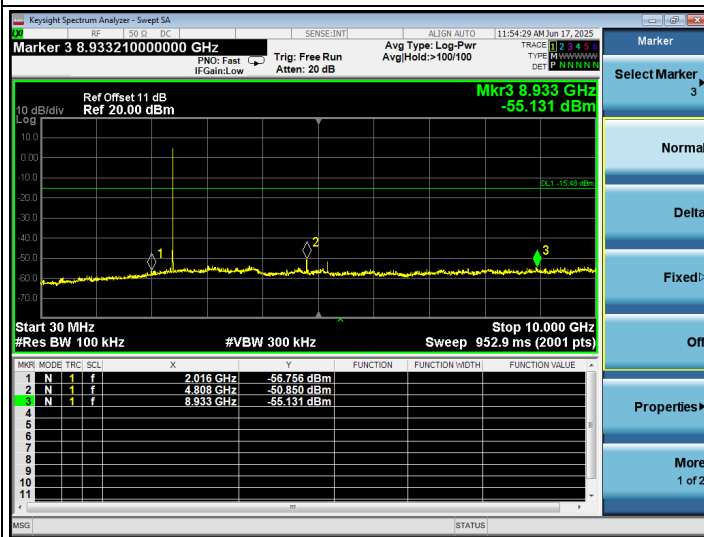
Reference Level



Lower Edge



Emission Level



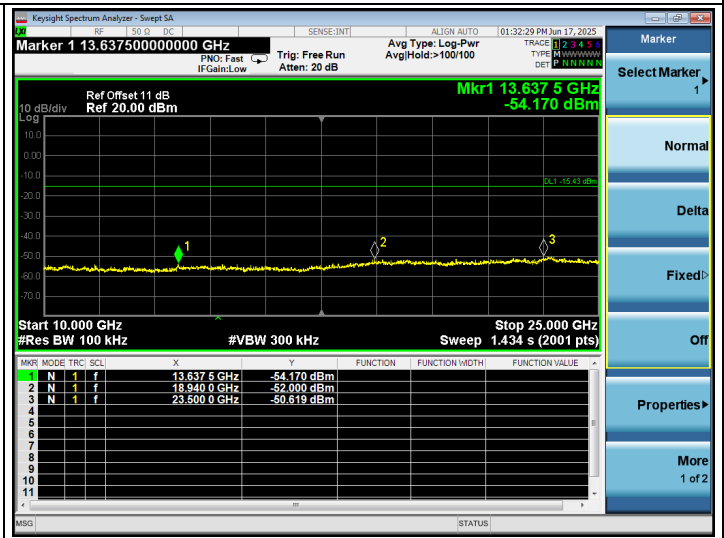
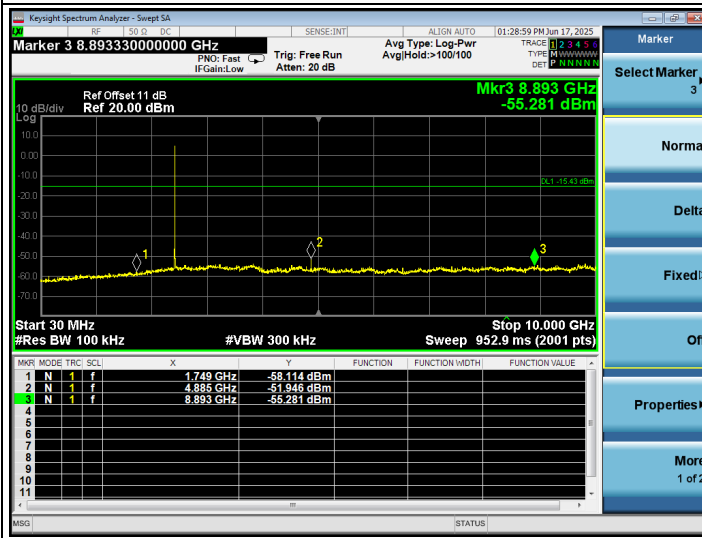
BLE 1M

CH2442

Reference Level



Emission Level



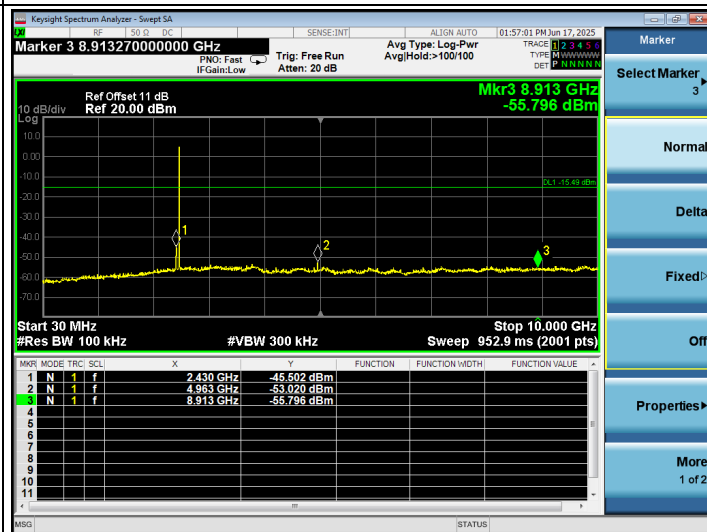
BLE 1M

CH2480

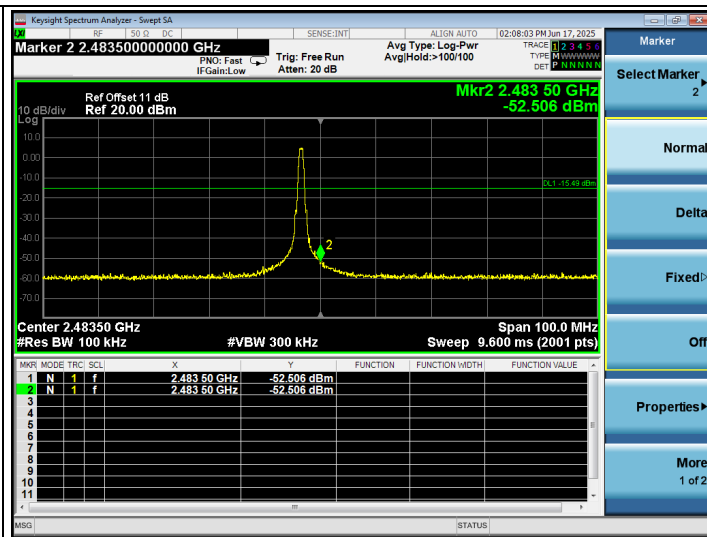
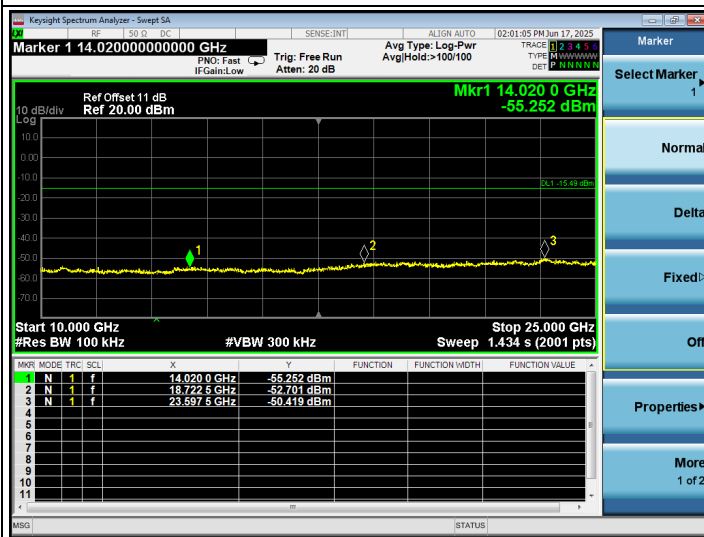
Reference Level



Higher Edge



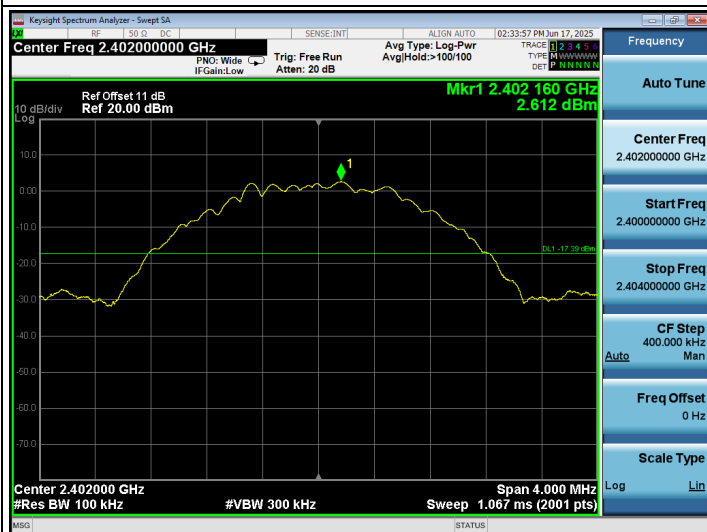
Emission Level



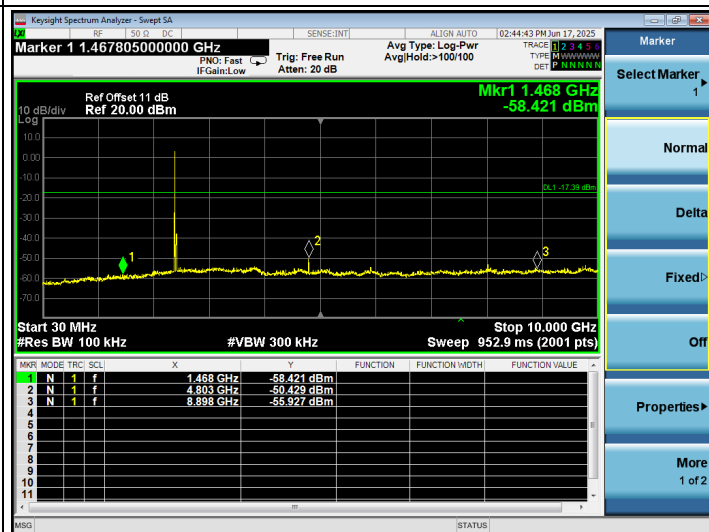
BLE 2M

CH2402

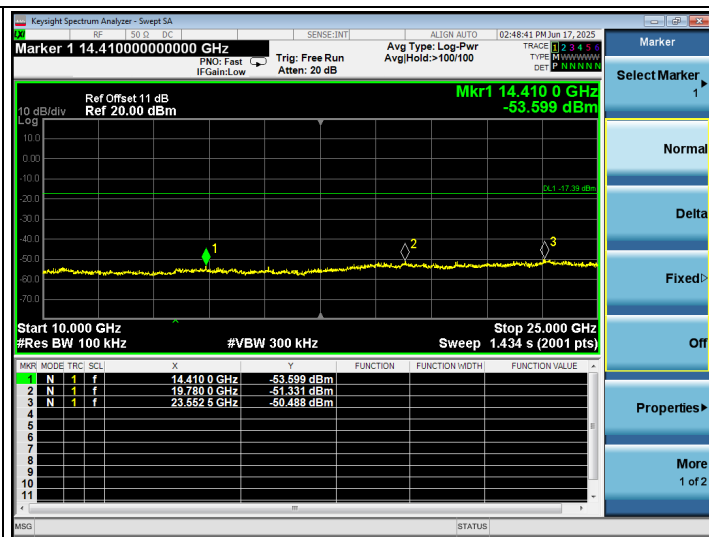
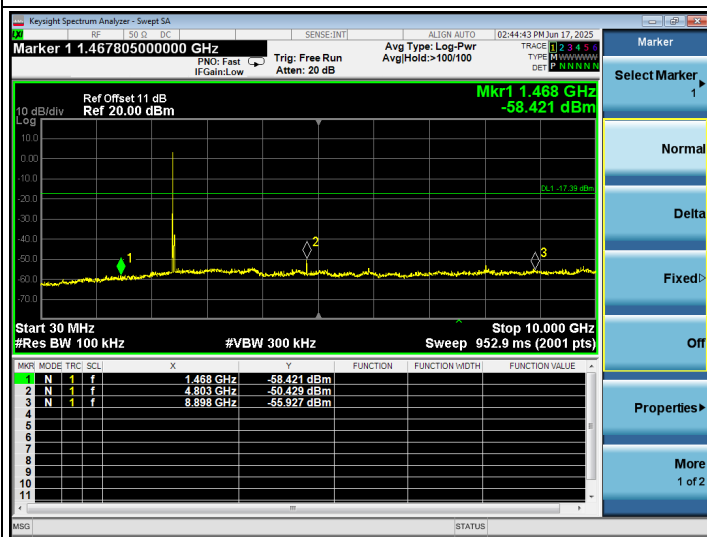
Reference Level



Lower Edge



Emission Level



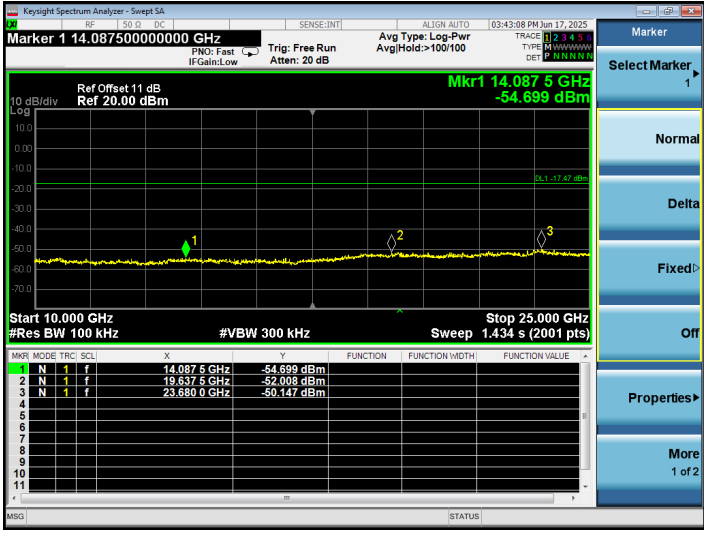
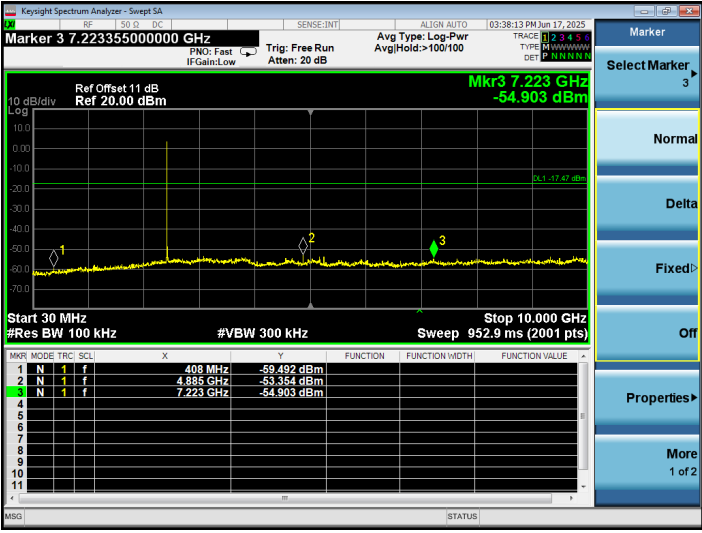
BLE 2M

CH2442

Reference Level



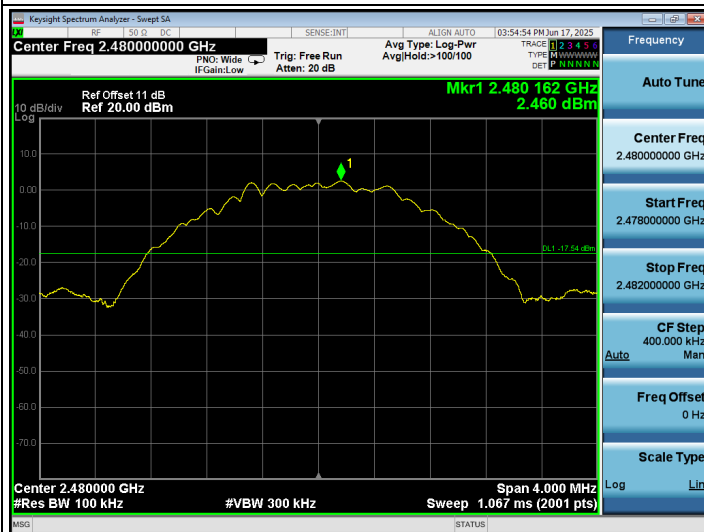
Emission Level



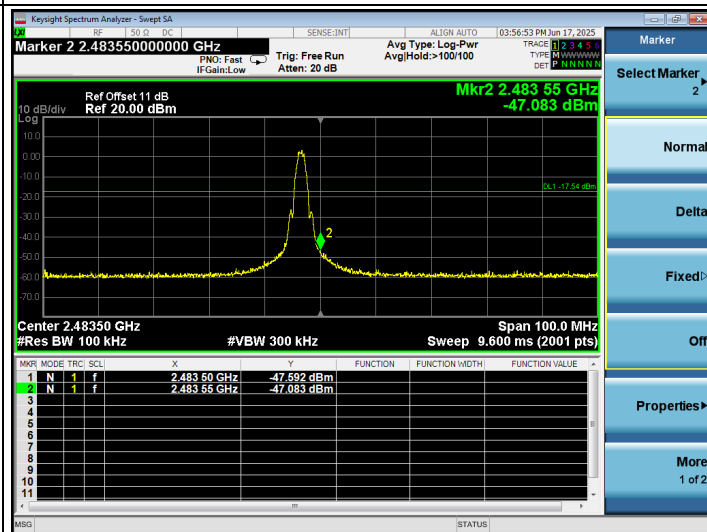
BLE 2M

CH2480

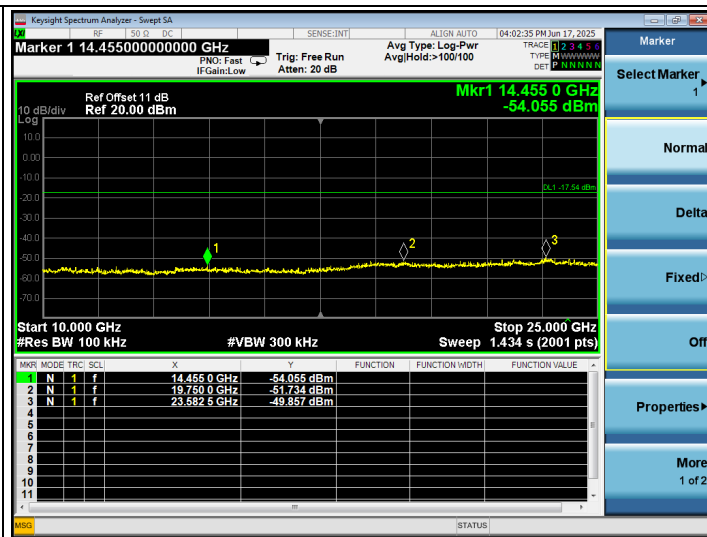
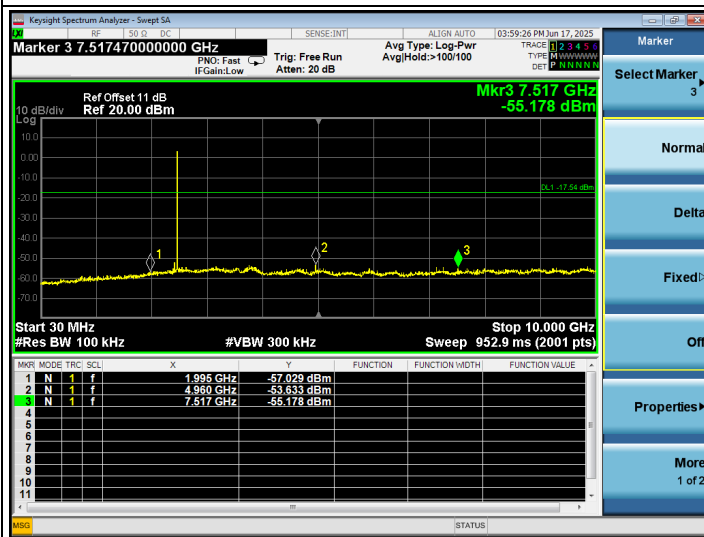
Reference Level



Higher Edge



Emission Level



8 POWER SPECTRAL DENSITY MEASUREMENT

8.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2024.08.09	1 Year
2.	RF Cable	Mini-Circuits	FLC-3FT-SM SM+	22022838	2024.08.09	1 Year
3.	10 dB Attenuator	Mini-Circuits	BW-S10W2+	001	2024.08.09	1 Year

8.2 Block Diagram of Test Setup

The Same as section 5.2.

8.3 Specification Limits (§15.247(e))

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band.

8.4 Operating Condition of EUT

The software as section 2.3 was used to enable the EUT to change the test mode one by one.

8.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

The test procedure is defined in ANSI C63.10:2020 (11.10.2 Measurement Procedure “Method PKPSD (peak PSD)” was used).

8.6 Test Results

PASSED.

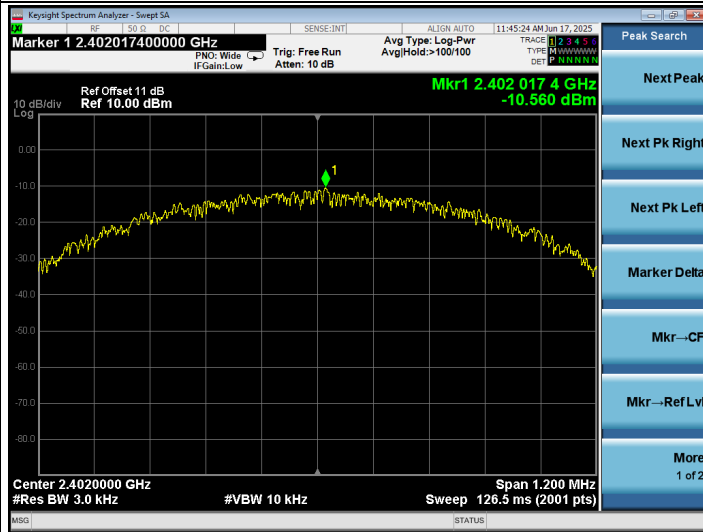
All the test results are attached in next pages.

Test Date:	2025.06.17	Temp./Hum.:	23°C/51%RH	Test By:	DoraMa
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Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit
BLE 1M	00	2402	-10.56	8 dBm
	20	2442	-10.453	8 dBm
	39	2480	-10.465	8 dBm
BLE 2M	00	2402	-12.322	8 dBm
	20	2442	-12.249	8 dBm
	39	2480	-12.306	8 dBm

BLE 1M

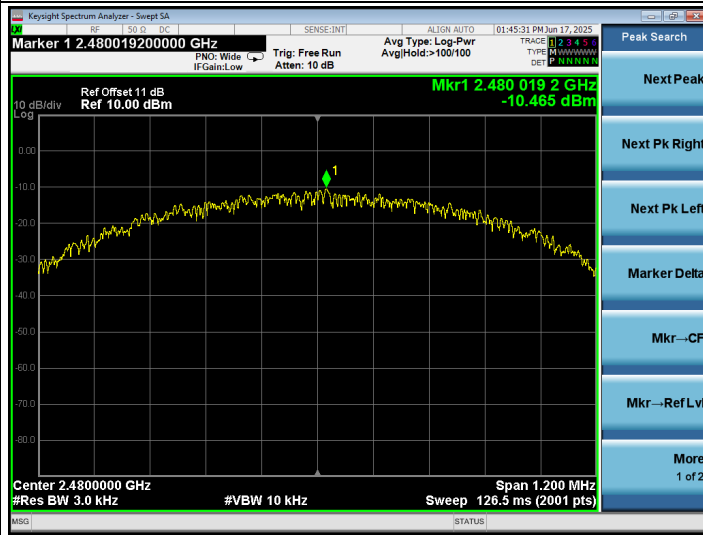
CH2402



CH2442

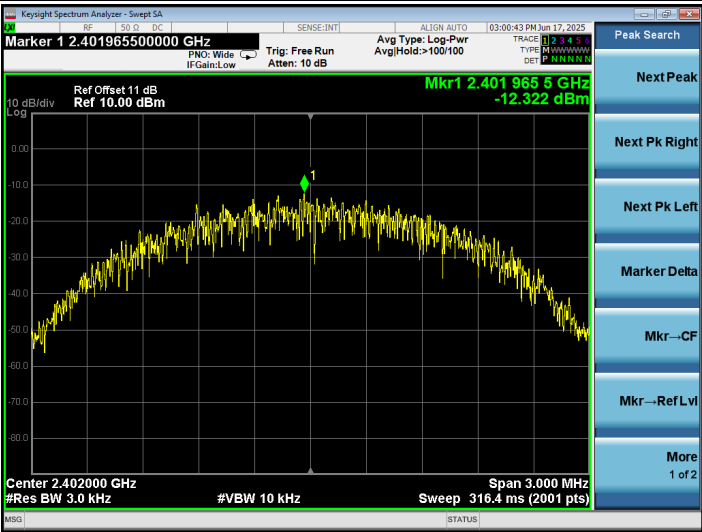


CH2480

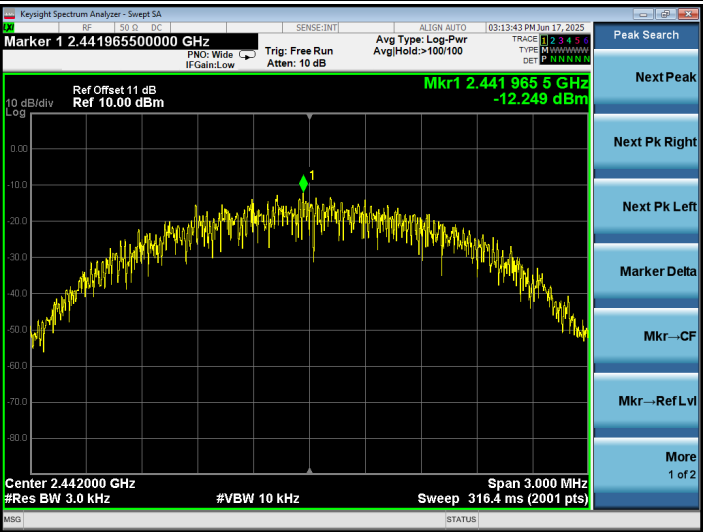


BLE 2M

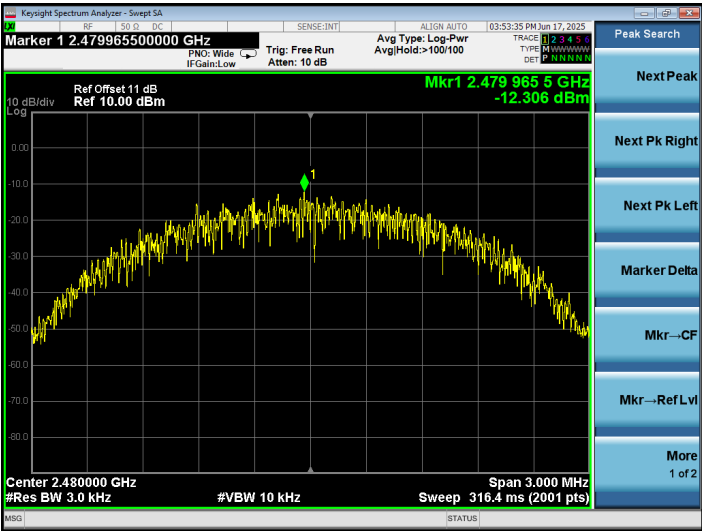
CH2402



CH2442



CH2480



9 ANTENNA REQUIREMENT

9.1 Specification Limits (§15.203)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

9.2 Result

According to KDB 353028 D1, the following describes the three ways that can be used to demonstrate compliance to Section 15.203:

- a) Antenna permanently attached.
- b) Unique (non-standard) antenna connector.
- c) Professional installation.

For this product, the antenna is:

- ☒ Antenna permanently attached
- ☐ Unique (non-standard) antenna connector
- ☐ Professional installation
- ☐ not meet any of ways list above

that

- ☒ compliant
- ☐ not compliant

with the requirement of Section 15.203.

10 DEVIATION TO TEST SPECIFICATIONS

None.

11 MEASUREMENT UNCERTAINTY LIST

The measurement uncertainty was estimated for test on the EUT according to CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage of K=2.

The uncertainties value is not used in determining the PASS/FAIL results.

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Conducted Emission No.1 Shielded Room	9kHz~150kHz	±3.1 dB
	150kHz~30MHz	±2.6 dB
Conducted Emission No.3 Shielded Room	9kHz~150kHz	±3.1 dB
	150kHz~30MHz	±2.6 dB
Radiated Emission	30MHz~200MHz, Horizontal	±3.8 dB
	30MHz~200MHz, Vertical	±4.1 dB
	200MHz~1000MHz, Horizontal	±3.6 dB
	200MHz~1000MHz, Vertical	±5.1 dB
	1GHz~6GHz	±5.3 dB
	6GHz~18GHz	±5.3 dB
	18GHz~40GHz	±3.5 dB
Output Power Test	50MHz~18GHz	0.77 dB
Power Density Test	9kHz~6GHz	1.08 dB
RF Frequency Test	9kHz~40GHz	6×10^{-4}
Bandwidth Test	9kHz~6GHz	1.5×10^{-3}
RF Radiated Power Test	30MHz~1000MHz	3.06 dB
Conducted Output Power Test	50MHz~18GHz	0.83 dB
AC Voltage(<10kHz) Test	120V~230V	0.04 %
DC Power Test	0V~30V	0.4 %
Temperature	-40°C~+100°C	0.52 °C
Humidity	30%~95%	2.6 %