

TEST REPORT

On behalf of

Signify North America Corporation

Product Name	Model Number
EXIT SIGN WITH FIRSTLINK	BXBWFL1
COMBO EXIT SIGN WITH FIRSTLINK	BCB4WFL1

FCC ID: 2AF2NBCB4WFL1

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

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File No. : C1D2507054
Report No. : ACI-F25104
Date of Test : 2025.02.25-06.30
Date of Report : 2025.08.19

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 60Hz AC
(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 BLE function are contained in No.ACI-F25103 report.

Date of Test : 2025.02.25-06.30 Date of Report : 2025.08.19

Producer :

Huimin Yan
HUIMIN YAN / Assistant

Review :

LVY LV
LVY LV / Deputy Assistant Manager

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

Signatory :

Authorized Signature(s)

Kamp Chen
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

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

Product Name	Model Number
EXIT SIGN WITH FIRSTLINK	BXBWFL1
COMBO EXIT SIGN WITH FIRSTLINK	BCB4WFL1

Note#1 : main board PCB layout and RF module is the same, but the BCB4WFL1 with circuit of drive additional Bug-eye (2LED) on main board and the BXBWFL1 without this circuit.

Note#2 : According to the difference, the test performed on the model “BCB4WFL1” for main test and model “BXBWFL1” for differential test in current report.

Test Model : BCB4WFL1, BXBWFL1

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;

Test Tech. in current report : Zigbee.

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(kbps)
ZigBee	QOPSK	250

Channel List			
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
11	2405	25	2475
20	2450		

2.3 Test Information

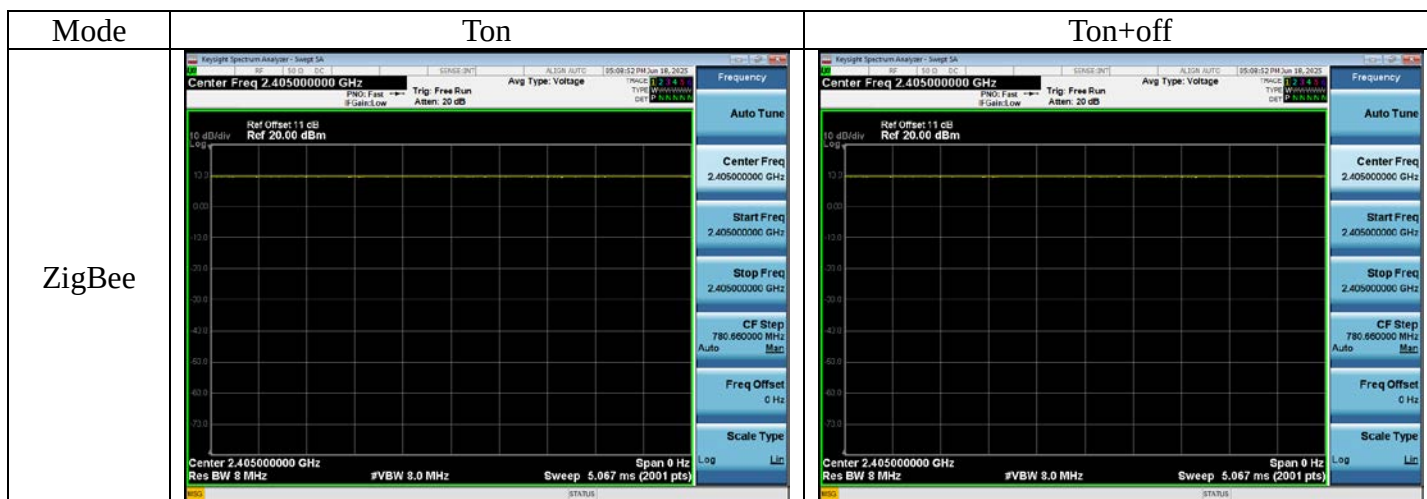
The test software “BLEtest_FCCRED.exe” was used to control EUT work in TX mode, Power Setting and select test channel.

Mode	data rate (kbps)	Power Setting	Test Channel		Frequency (MHz)
ZigBee	250	Default	Low:	11	2405
		Default	Middle:	20	2450
		Default	High:	25	2475

Note: The setting information was provided by the customer.

2.4 Duty Cycle Check

Mode	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)
ZigBee	5	5	100



2.5 Sample Description

Test Item	Model Number	Sample Number	Date of receipted
Conducted Emission	BXBWFL1	E20250211047-01/01	2025.02.11
	BCB4WFL1	E20250211048-01/01	2025.02.11
Radiated Emission	BXBWFL1	E20250211047-01/01	2025.02.11
	BCB4WFL1	E20250211048-01/01	2025.02.11
Conducted RF Test	BCB4WFL1	E20250211048-01/01	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

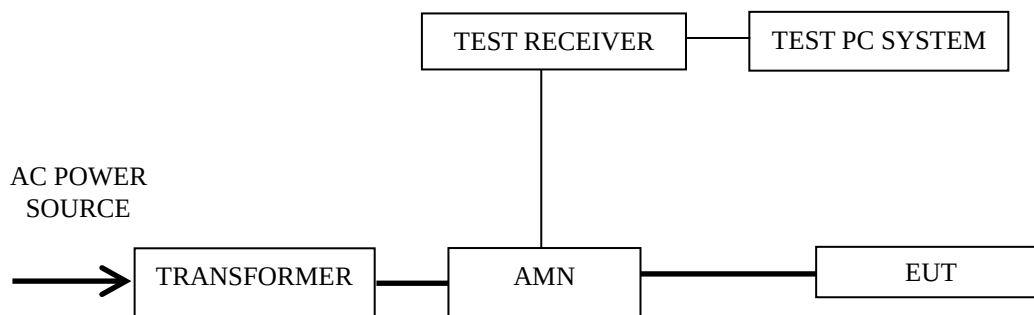
3.1 Test Equipment

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.	AMN	R&S	ESH2-Z5	843890/011	2025/7/3	1 Year
2.	Fixed Attenuator	SHYL	TTS-1	001	2025/2/22	1 Year
3.	Test Receiver	R&S	ESCI	101302	2025/2/22	1 Year
4.	CE Cable+Coaxial Switch (0.09-300MHz)	Audix+ ANRITSU	CE Cable+ MP59B	CE-SH1-001+ 6200655085	2025/2/22	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(μV)	
	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: BCB4WFL1)

No.	Operation	Mode	Channel	Frequency (MHz)	Data Page
1.	Transmitting	ZigBee	11	2405	P12-13

(Model: BXBWFL1)

No.	Operation	Mode	Channel	Frequency (MHz)	Data Page
1.	Transmitting	ZigBee	11	2405	P14-15

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

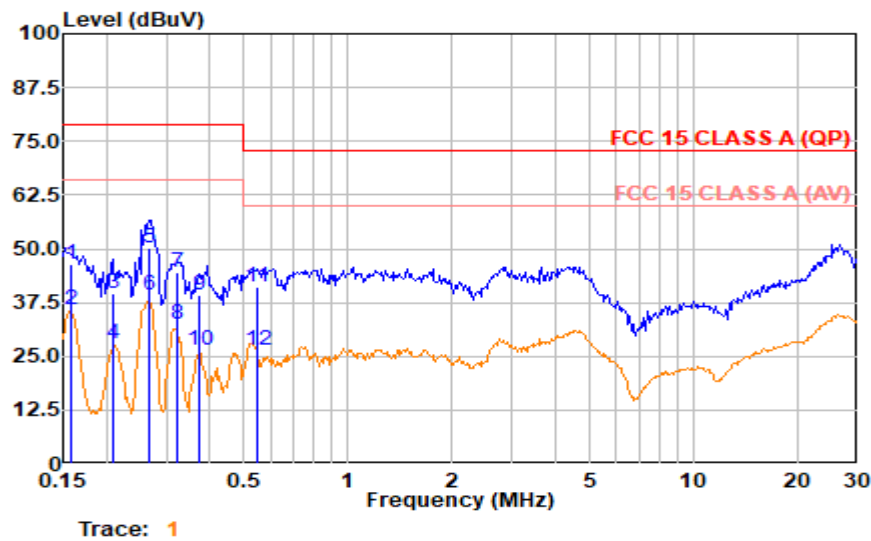
Margin (dB) = Limits (dB μ V) - Emission Level (dB μ V)

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

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

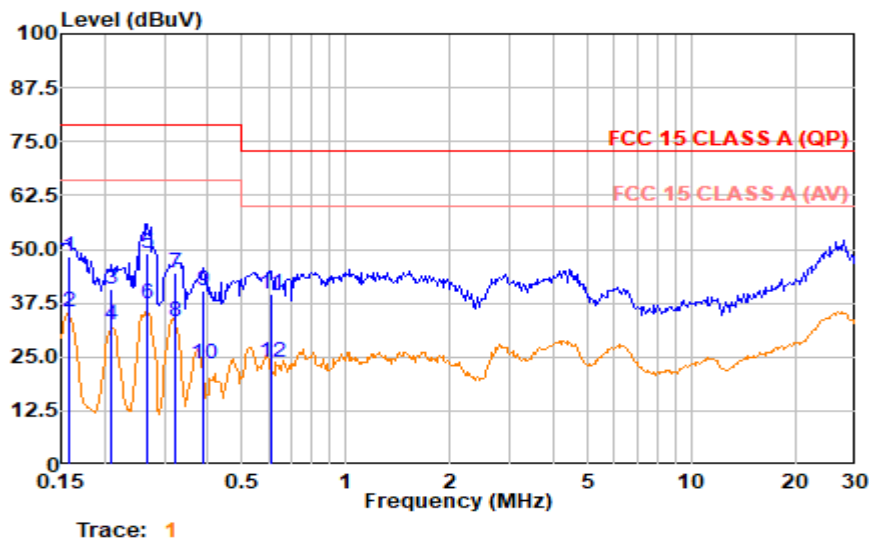
Worst case emission

Test Date:	2025.02.25	Temp./Hum.:	22°C/51%RH	Test By:	Jarey
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Mode: Zigbee CH2405MHZ**Model: BCB4WFL1**

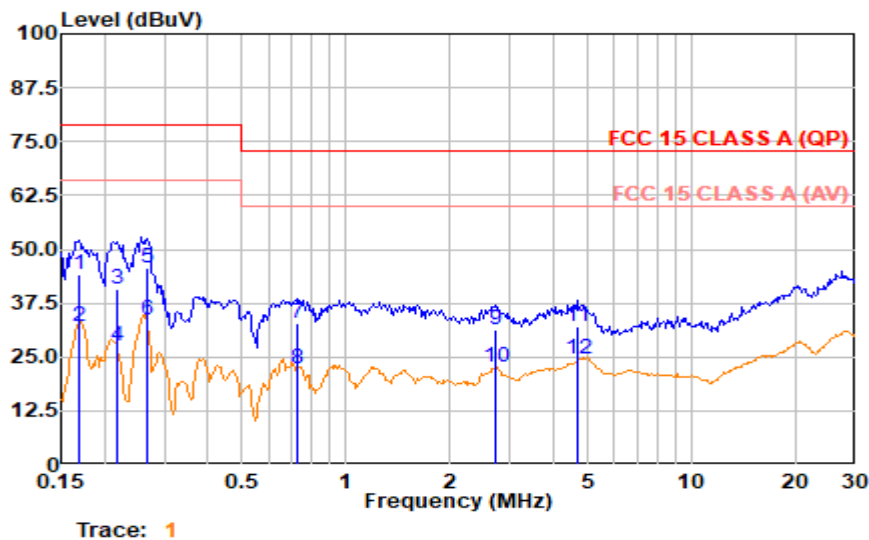
Polarization at Line

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
0.158	36.59	0.10	9.49	0.10	46.28	79.00	32.72	QP
0.158	25.99	0.10	9.49	0.10	35.68	66.00	30.32	Average
0.208	30.06	0.10	9.49	0.10	39.75	79.00	39.25	QP
0.208	18.12	0.10	9.49	0.10	27.81	66.00	38.19	Average
0.267	40.32	0.10	9.49	0.10	50.01	79.00	28.99	QP
0.267	29.43	0.10	9.49	0.10	39.12	66.00	26.88	Average
0.319	34.67	0.10	9.49	0.10	44.36	79.00	34.64	QP
0.319	22.93	0.10	9.49	0.10	32.62	66.00	33.38	Average
0.371	29.59	0.10	9.49	0.10	39.28	79.00	39.72	QP
0.371	16.64	0.10	9.49	0.10	26.34	66.00	39.66	Average
0.546	31.35	0.20	9.49	0.11	41.15	73.00	31.85	QP
0.546	16.77	0.20	9.49	0.11	26.57	60.00	33.43	Average

Mode: Zigbee CH2405MHZ**Model: BCB4WFL1**

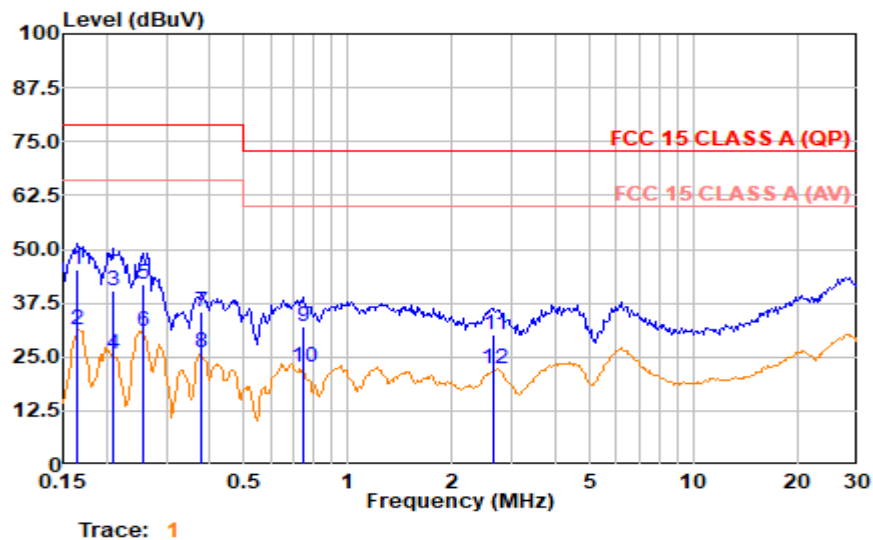
Polarization at Neutral

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
0.158	38.67	0.10	9.49	0.10	48.36	79.00	30.64	QP
0.158	25.91	0.10	9.49	0.10	35.60	66.00	30.40	Average
0.210	30.92	0.10	9.49	0.10	40.61	79.00	38.39	QP
0.210	22.62	0.10	9.49	0.10	32.31	66.00	33.69	Average
0.267	39.27	0.10	9.49	0.10	48.96	79.00	30.04	QP
0.267	27.76	0.10	9.49	0.10	37.45	66.00	28.55	Average
0.322	34.72	0.10	9.49	0.10	44.42	79.00	34.58	QP
0.322	23.66	0.10	9.49	0.10	33.35	66.00	32.65	Average
0.386	30.84	0.10	9.49	0.10	40.54	79.00	38.46	QP
0.386	13.64	0.10	9.49	0.10	23.33	66.00	42.67	Average
0.609	29.76	0.10	9.49	0.12	39.47	73.00	33.53	QP
0.609	14.14	0.10	9.49	0.12	23.85	60.00	36.15	Average

Mode: Zigbee CH2405MHZ**Model: BXBWFL1**

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
0.169	34.65	0.10	9.49	0.10	44.34	79.00	34.66	QP
0.169	22.49	0.10	9.49	0.10	32.18	66.00	33.82	Average
0.217	31.21	0.10	9.49	0.10	40.90	79.00	38.10	QP
0.217	17.86	0.10	9.49	0.10	27.55	66.00	38.45	Average
0.267	36.02	0.10	9.49	0.10	45.71	79.00	33.29	QP
0.267	23.87	0.10	9.49	0.10	33.56	66.00	32.44	Average
0.721	23.19	0.20	9.49	0.13	33.01	73.00	39.99	QP
0.721	12.29	0.20	9.49	0.13	22.11	60.00	37.89	Average
2.706	21.40	0.30	9.49	0.14	31.33	73.00	41.67	QP
2.706	12.90	0.30	9.49	0.14	22.83	60.00	37.17	Average
4.675	21.97	0.30	9.49	0.16	31.92	73.00	41.08	QP
4.675	14.53	0.30	9.49	0.16	24.48	60.00	35.52	Average

Mode: Zigbee CH2405MHZ**Model: BXBWFL1**

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
0.166	35.63	0.10	9.49	0.10	45.32	79.00	33.68	QP
0.166	21.63	0.10	9.49	0.10	31.32	66.00	34.68	Average
0.208	30.70	0.10	9.49	0.10	40.39	79.00	38.61	QP
0.208	15.92	0.10	9.49	0.10	25.61	66.00	40.39	Average
0.257	32.22	0.10	9.49	0.10	41.91	79.00	37.09	QP
0.257	21.20	0.10	9.49	0.10	30.89	66.00	35.11	Average
0.378	25.62	0.10	9.49	0.10	35.31	79.00	43.69	QP
0.378	16.31	0.10	9.49	0.10	26.01	66.00	39.99	Average
0.743	22.33	0.10	9.49	0.13	32.05	73.00	40.95	QP
0.743	13.08	0.10	9.49	0.13	22.80	60.00	37.20	Average
2.653	20.38	0.20	9.49	0.14	30.21	73.00	42.79	QP
2.653	12.25	0.20	9.49	0.14	22.08	60.00	37.92	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:

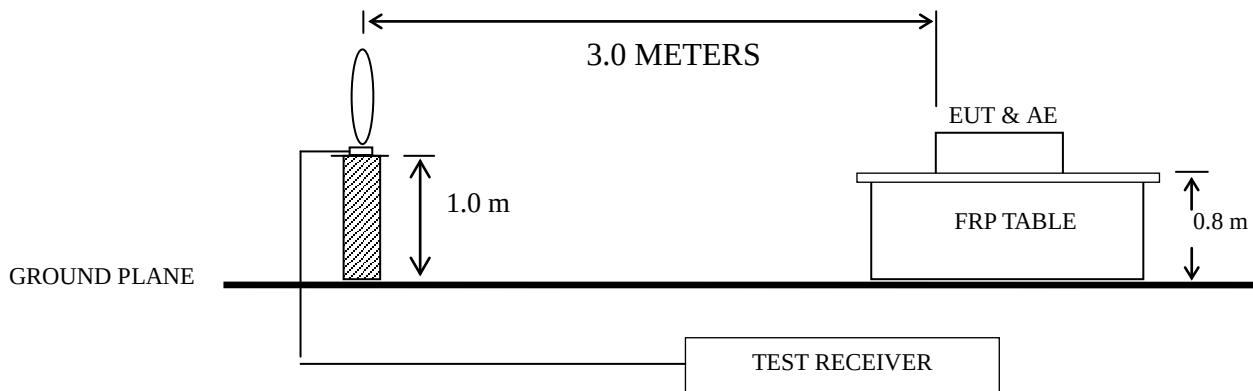
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Preamplifier	Agilent	8447D	2944A10548	2025.02.22	1 Year
2.	Preamplifier	HP	8449B	3008A00864	2025.02.22	1 Year
3.	EXA Signal Analyzer	Agilent	N9010A	MY52221182	2024.08.09	1 Year
4.	Test Receiver	R&S	ESCI	101303	2025.02.22	1 Year
5.	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

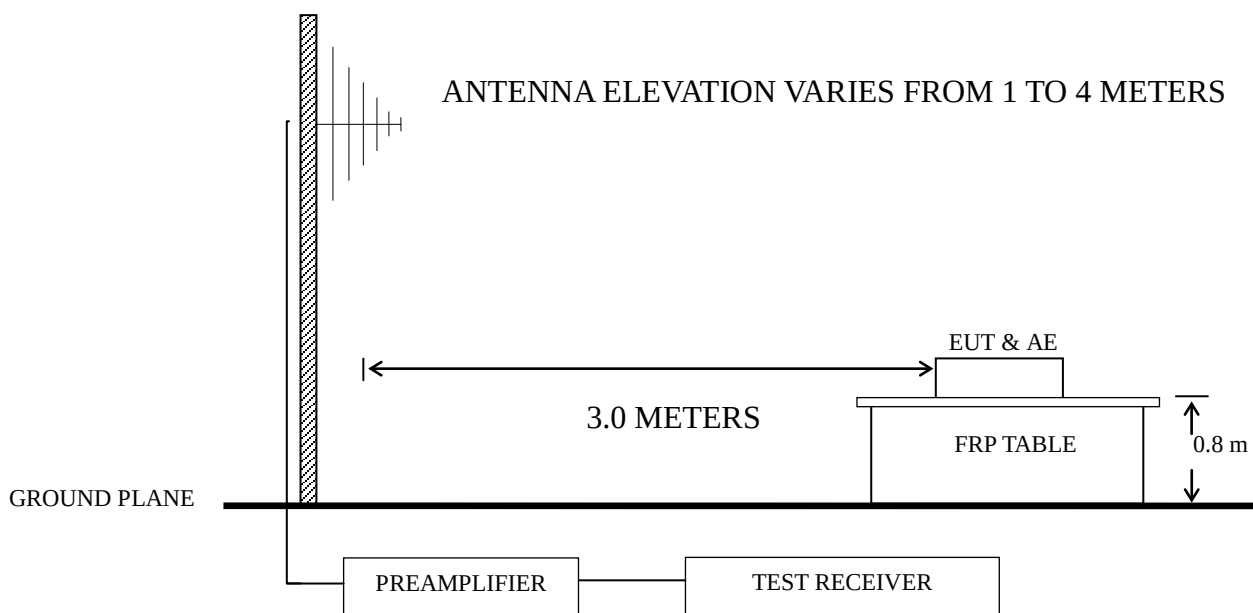
4.2.1 EUT & Peripherals



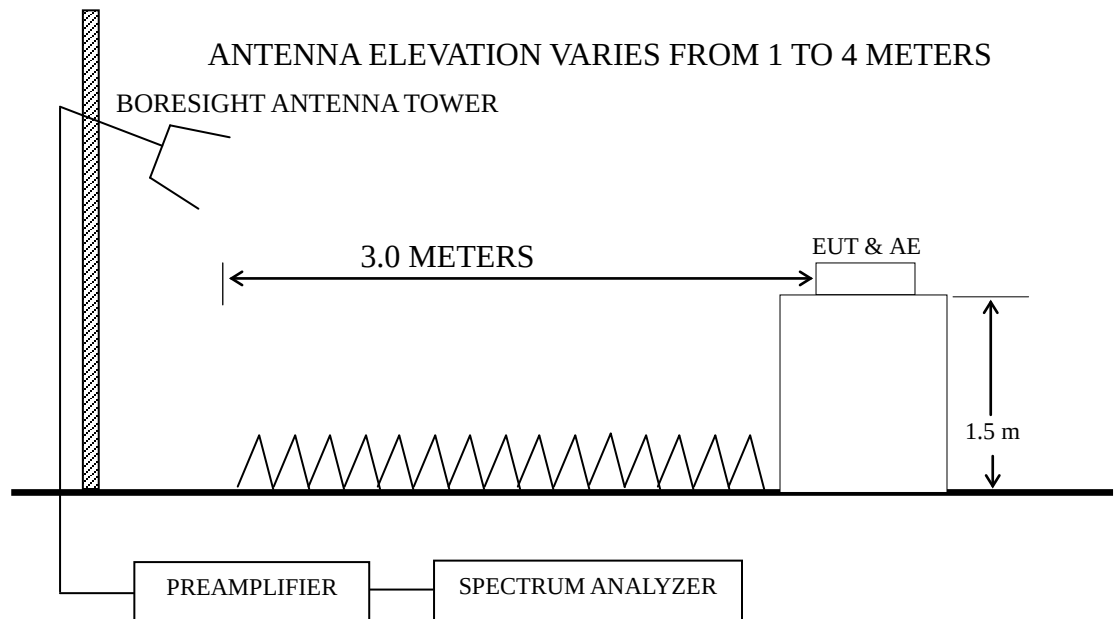
4.2.2 9kHz to 30MHz



4.2.3 Below 1GHz



4.2.4 Above 1GHz



4.3 Radiated Emission Limit (§15.209)

Frequency (MHz)	Distance (m)	Field strength limits (μV/m)	
		(μV/m)	dB(μV/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 (μV/m) = 20 log Emission Level (μV/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. 4.2.

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 4.5.3 and 4.5.4, 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.4.7.

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	Zigbee	11	2405 MHz	P23-24

(Model: BXBWFL1)

No.	Operation	Mode	Channel	Frequency	Data Page
1.	Transmitting	Zigbee	11	2405 MHz	P25-26

Frequency range: above 1GHz (Worst case emission)

(Model: BCB4WFL1)

No.	Operation	Mode	Channel	Frequency	Data Page
1.	Transmitting	Zigbee	11	2405 MHz	P27-30
2.			20	2450 MHz	P31-34
3.			25	2475 MHz	P35-38

(Model: BXBWFL1)

No.	Operation	Mode	Channel	Frequency	Data Page
1.	Transmitting	Zigbee	11	2405 MHz	P39-42

Band-Edge and Restricted bands:

(Model: BCB4WFL1)

No.	Operation	Mode	Channel	Frequency	Data Page
1.	Transmitting	Zigbee	11	2405 MHz	P43-44
2.			25	2475 MHz	P45-46

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 Side direction, for this direction was the maximum emission direction during the test. The data of Standing & Lying 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.

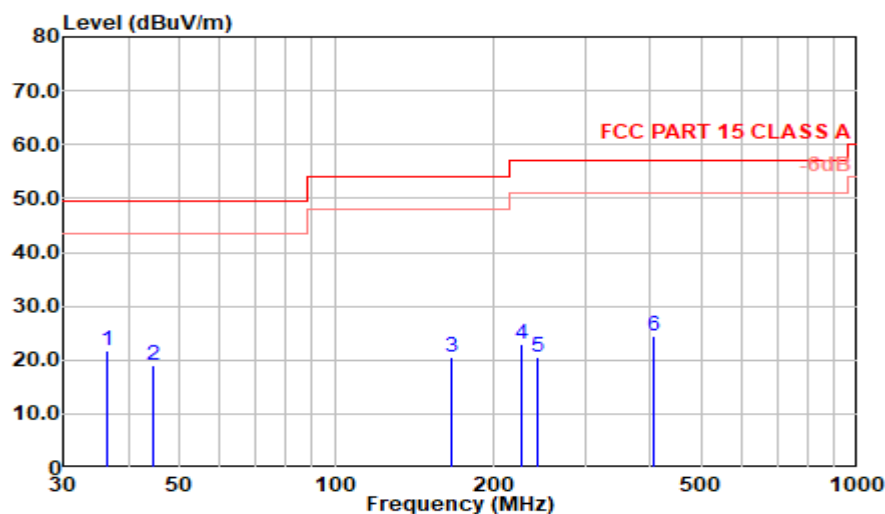
NOTE 7 – The frequency range 2310-2390MHz & 2483.5-2500MHz were

tested for Restricted bands.

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

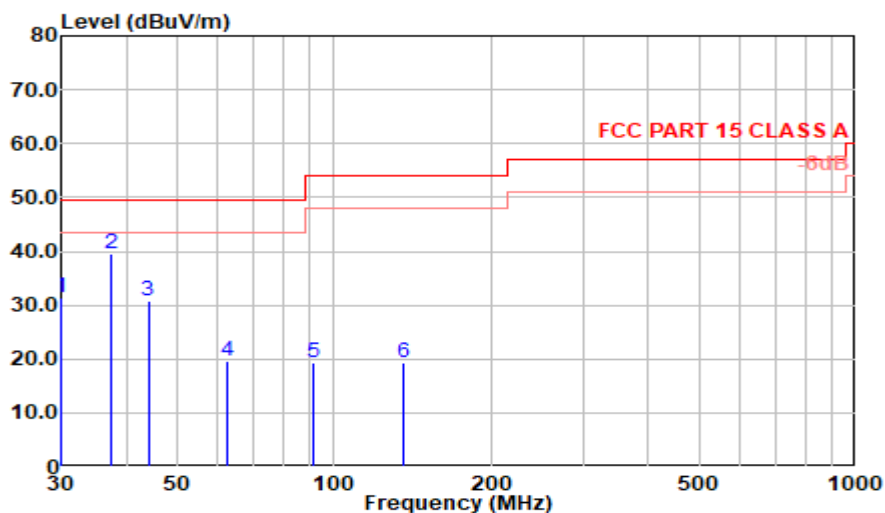
Radiated emission < 1GHz

Test Date:	2025.06.30	Temp./Hum.:	22°C/51%RH	Test By:	Jarey
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Mode: zigbee CH2405MHz**Model: BCB4WFL1**

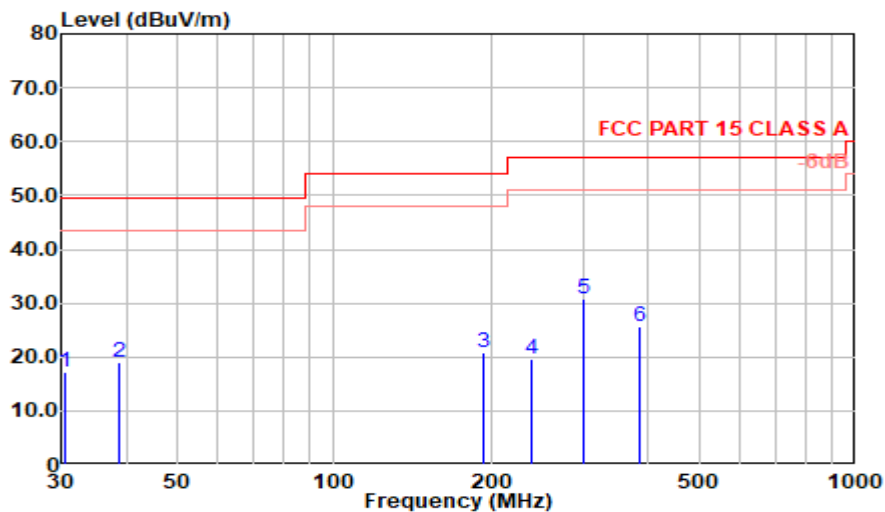
Polarization at Horizontal

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
36.305	32.04	18.63	0.73	29.56	21.85	49.50	27.65	QP
44.550	28.26	19.40	0.80	29.52	18.94	49.50	30.56	QP
165.800	29.14	18.90	1.45	29.00	20.49	54.00	33.51	QP
225.940	34.42	15.68	1.71	28.97	22.83	57.00	34.17	QP
244.370	29.90	17.66	1.79	28.88	20.48	57.00	36.52	QP
407.330	29.39	21.49	2.36	28.85	24.40	57.00	32.60	QP

Mode: zigbee CH2405MHz**Model: BCB4WFL1**

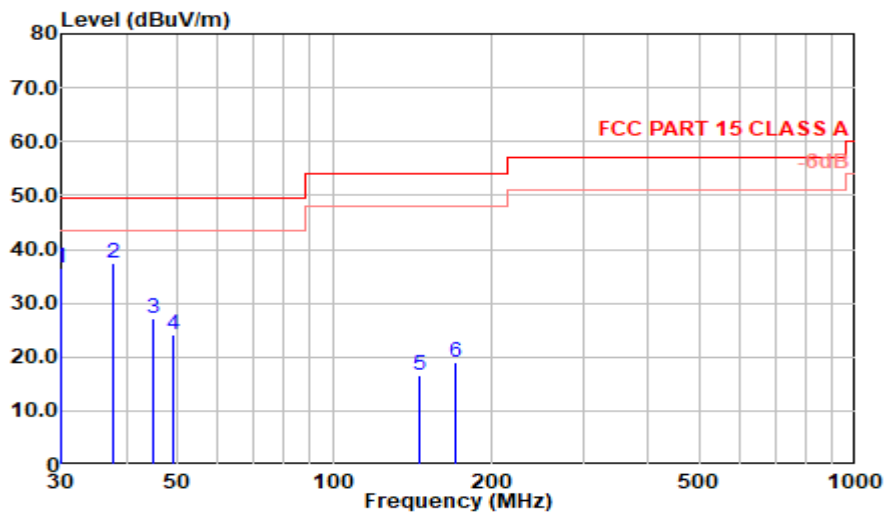
Polarization at Vertical

Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
30.000	42.28	18.10	0.68	29.60	31.46	49.50	18.04	QP
37.275	49.63	18.76	0.74	29.56	39.57	49.50	9.93	QP
44.065	40.14	19.40	0.80	29.52	30.82	49.50	18.68	QP
62.495	29.34	18.75	0.92	29.45	19.56	49.50	29.94	QP
91.110	34.09	13.61	1.12	29.46	19.37	54.00	34.63	QP
136.215	28.96	18.22	1.31	29.17	19.32	54.00	34.68	QP

Mode: zigbee CH2405MHz**Model: BXBWFL1**

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
30.485	27.89	18.10	0.68	29.60	17.07	49.50	32.43	QP
38.730	28.79	18.90	0.75	29.55	18.90	49.50	30.60	QP
192.960	31.74	16.30	1.59	28.87	20.77	54.00	33.23	QP
239.035	29.44	17.29	1.77	28.90	19.58	57.00	37.42	QP
300.630	37.71	19.21	2.05	28.21	30.76	57.00	26.24	QP
386.475	30.92	21.13	2.29	28.77	25.57	57.00	31.43	QP

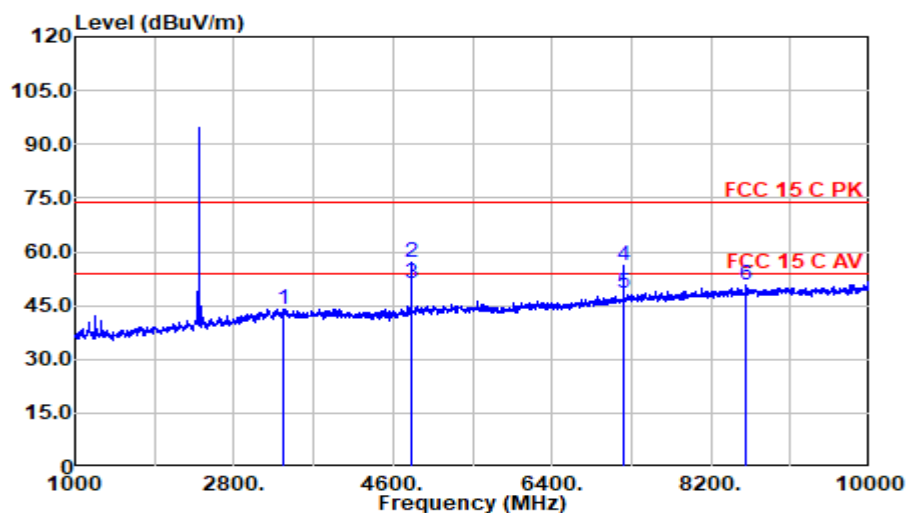
Mode: zigbee CH2405MHz**Model: BXBWFL1**

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	47.31	18.10	0.68	29.60	36.49	49.50	13.01	QP
37.760	47.52	18.85	0.75	29.55	37.57	49.50	11.93	QP
45.035	36.47	19.40	0.81	29.52	27.16	49.50	22.34	QP
49.400	33.14	19.54	0.84	29.50	24.03	49.50	25.47	QP
145.430	25.24	18.94	1.34	29.06	16.48	54.00	37.52	QP
171.620	27.92	18.54	1.48	29.00	18.94	54.00	35.06	QP

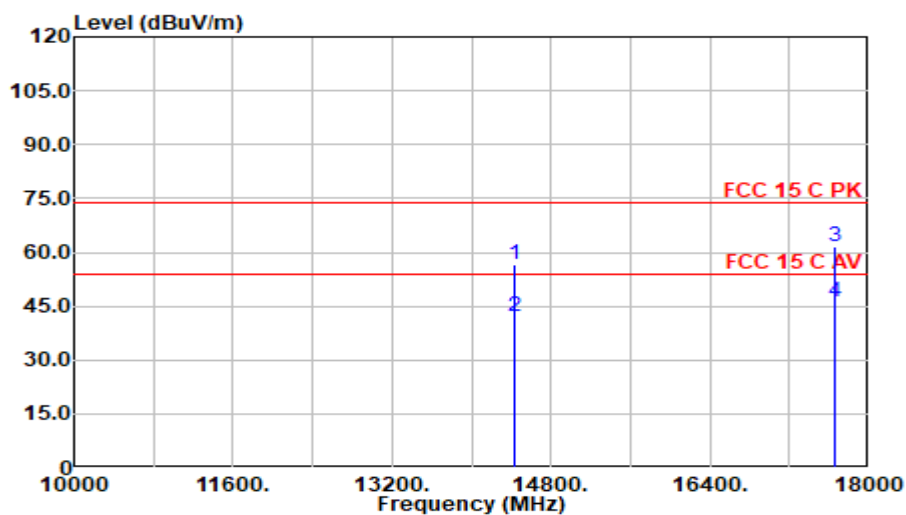
Radiated Emission > 1GHz

Test Date:	2025.06.29	Temp./Hum.:	22°C/51%RH	Test By:	Jarey
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Mode: zigbee CH2405MHz**Model: BCB4WFL1**

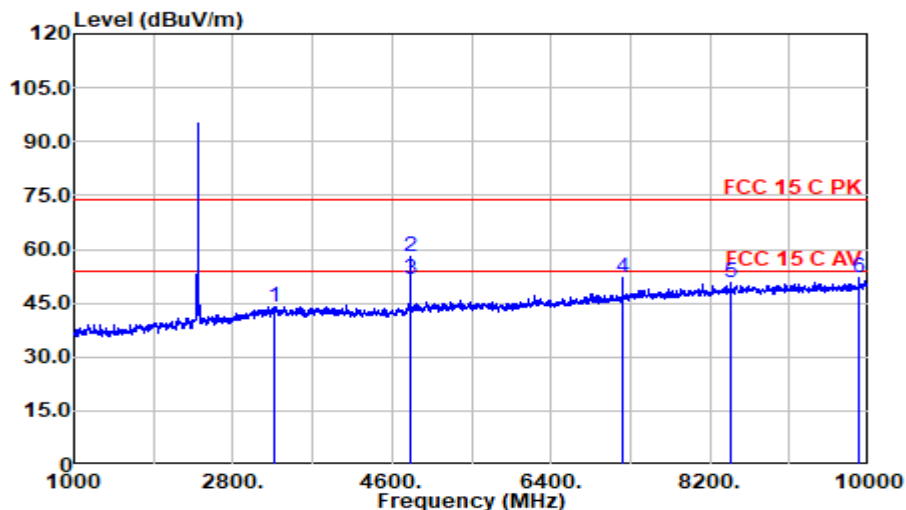
Polarization at Horizontal

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
3367.250	44.95	31.37	3.52	35.68	44.15	74.00	29.85	Peak
4808.000	55.53	33.28	4.49	36.43	56.87	74.00	17.13	Peak
4808.000	49.75	33.28	4.49	36.43	51.10	54.00	2.90	Average
7213.500	51.35	36.31	5.54	36.99	56.20	74.00	17.80	Peak
7213.500	43.53	36.31	5.54	36.99	48.39	54.00	5.61	Average
8599.000	43.82	38.40	5.82	37.30	50.74	74.00	23.26	Peak

Mode: zigbee CH2405MHz**Model: BCB4WFL1**

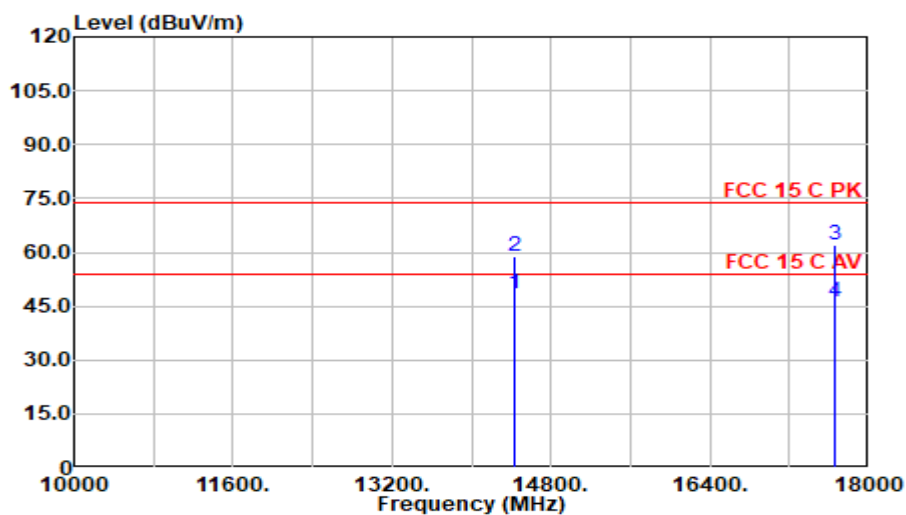
Polarization at Horizontal

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
14434.250	42.19	42.30	7.73	35.49	56.73	74.00	17.27	Peak
14434.250	27.52	42.30	7.73	35.49	42.06	54.00	11.94	Average
17660.000	42.74	44.96	8.59	34.53	61.75	74.00	12.25	Peak
17660.000	27.37	44.96	8.59	34.53	46.39	54.00	7.61	Average

Mode: zigbee CH2405MHz**Model: BCB4WFL1**

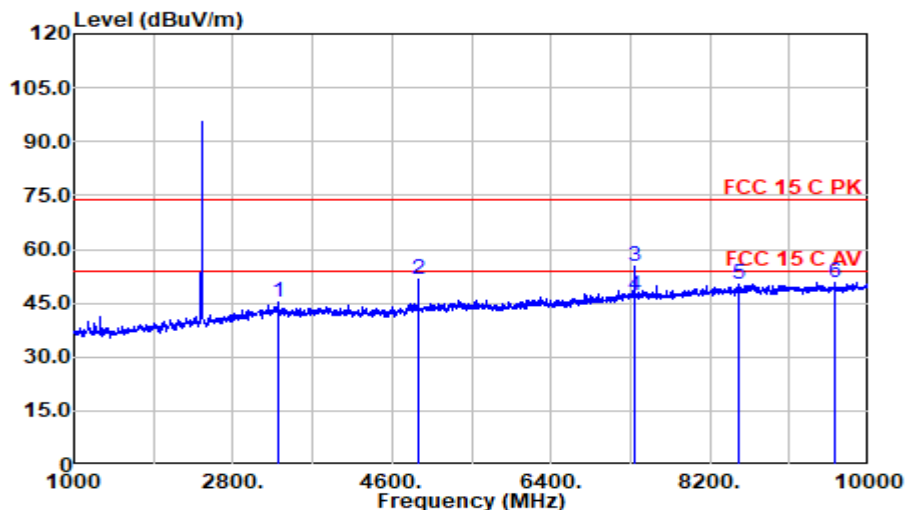
Polarization at Vertical

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
3269.500	44.76	31.30	3.45	35.61	43.90	74.00	30.10	Peak
4812.250	56.63	33.28	4.49	36.43	57.97	74.00	16.03	Peak
4812.250	50.36	33.28	4.49	36.43	51.70	54.00	2.30	Average
7217.750	47.38	36.34	5.54	36.99	52.27	74.00	21.73	Peak
8429.000	43.81	38.24	5.80	37.30	50.55	74.00	23.45	Peak
9882.500	44.64	38.24	6.14	37.03	51.98	74.00	22.02	Peak

Mode: zigbee CH2405MHz**Model: BCB4WFL1**

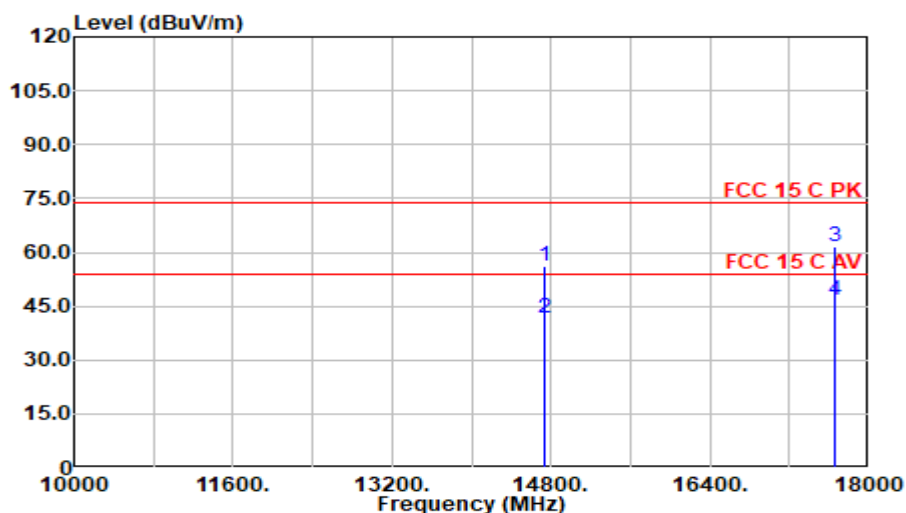
Polarization at Vertical

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
14426.800	33.99	42.28	7.73	35.50	48.51	54.00	5.49	Average
14430.000	44.18	42.29	7.73	35.49	58.70	74.00	15.30	Peak
17655.750	42.97	44.93	8.59	34.54	61.96	74.00	12.04	Peak
17655.750	27.40	44.93	8.59	34.54	46.38	54.00	7.62	Average

Mode: zigbee CH2450MHz**Model: BCB4WFL1**

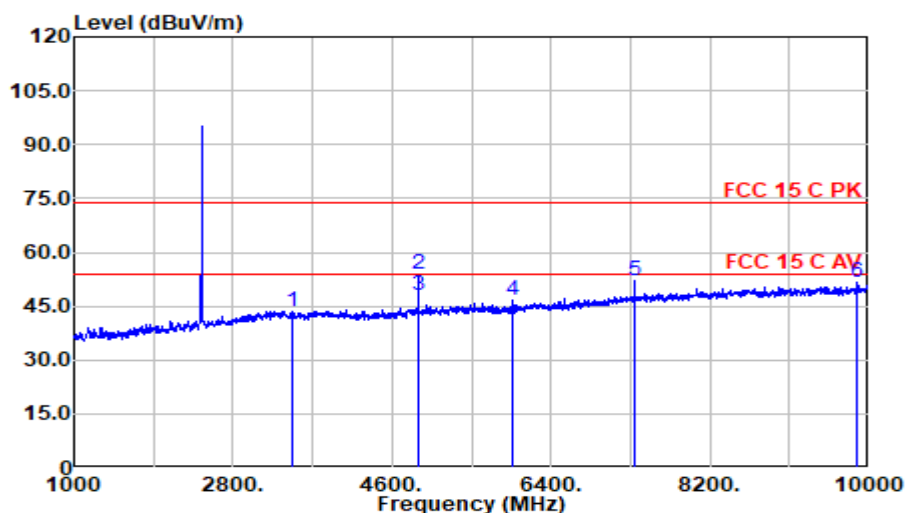
Polarization at Horizontal

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
3312.000	45.98	31.32	3.48	35.64	45.14	74.00	28.86	Peak
4897.250	50.40	33.29	4.55	36.46	51.78	74.00	22.22	Peak
7349.500	49.72	36.90	5.57	37.05	55.14	74.00	18.86	Peak
7349.500	41.47	36.90	5.57	37.05	46.90	54.00	7.10	Average
8526.750	43.54	38.40	5.81	37.30	50.45	74.00	23.55	Peak
9619.000	43.84	38.14	6.06	37.11	50.93	74.00	23.07	Peak

Mode: zigbee CH2450MHz**Model: BCB4WFL1**

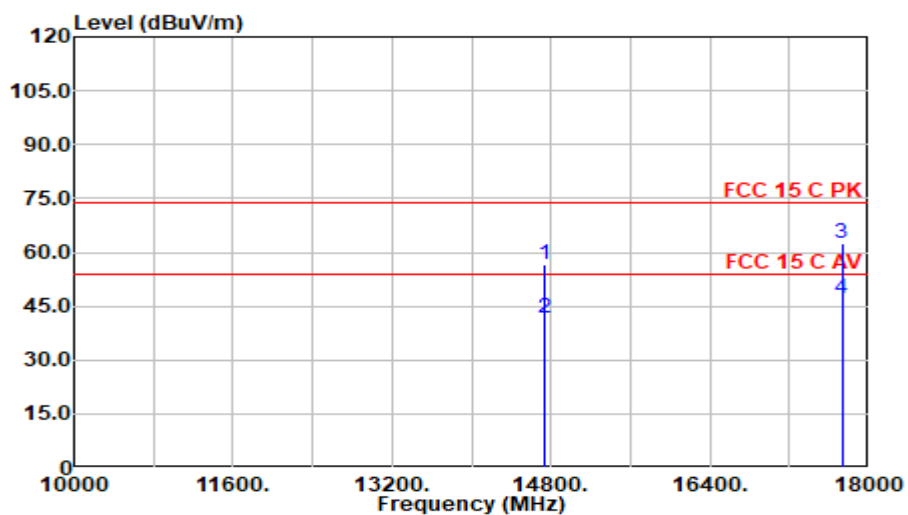
Polarization at Horizontal

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
14744.500	41.92	41.82	7.75	35.27	56.21	74.00	17.79	Peak
14744.500	27.59	41.82	7.75	35.27	41.88	54.00	12.12	Average
17655.750	42.42	44.93	8.59	34.54	61.41	74.00	12.59	Peak
17655.750	27.54	44.93	8.59	34.54	46.53	54.00	7.47	Average

Mode: zigbee CH2450MHz**Model: BCB4WFL1**

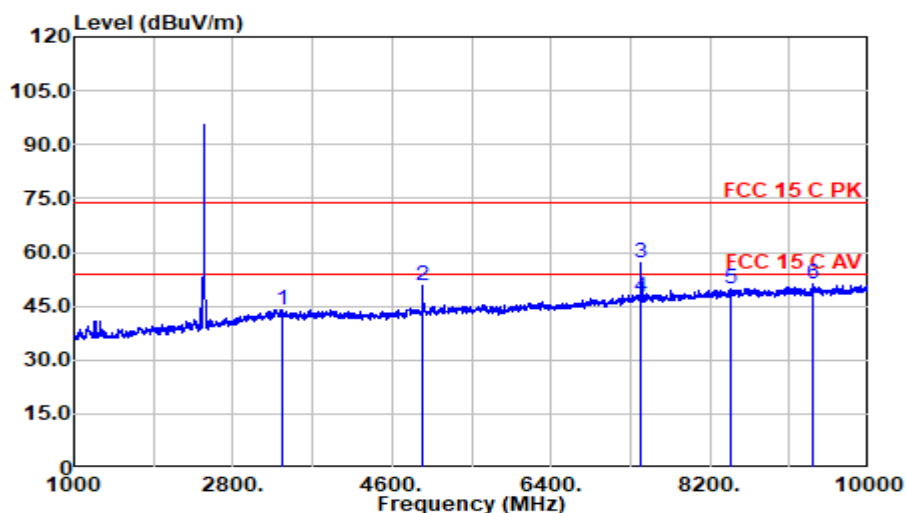
Polarization at Vertical

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
3473.500	44.48	31.30	3.59	35.76	43.62	74.00	30.38	Peak
4901.500	52.68	33.31	4.55	36.46	54.07	74.00	19.93	Peak
4901.500	46.39	33.31	4.55	36.46	47.78	54.00	6.22	Average
5972.500	44.16	34.09	5.17	36.79	46.62	74.00	27.38	Peak
7349.500	46.72	36.90	5.57	37.05	52.15	74.00	21.85	Peak
9857.000	43.93	38.44	6.13	37.04	51.46	74.00	22.54	Peak

Mode: zigbee CH2450MHz**Model: BCB4WFL1**

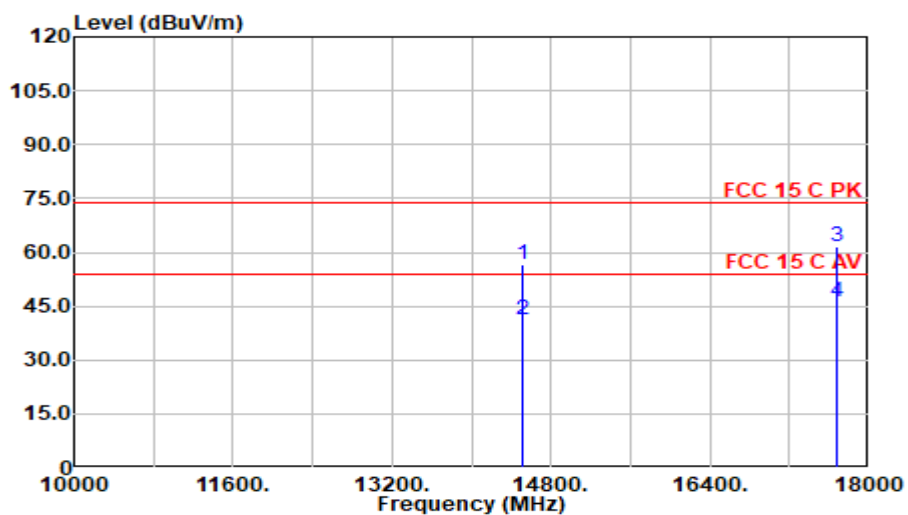
Polarization at Vertical

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
14740.250	42.22	41.84	7.74	35.28	56.52	74.00	17.48	Peak
14740.250	27.52	41.84	7.74	35.28	41.83	54.00	12.17	Average
17728.000	43.16	45.28	8.60	34.51	62.54	74.00	11.46	Peak
17728.000	27.72	45.28	8.60	34.51	47.09	54.00	6.91	Average

Mode: zigbee CH2475MHz**Model: BCB4WFL1**

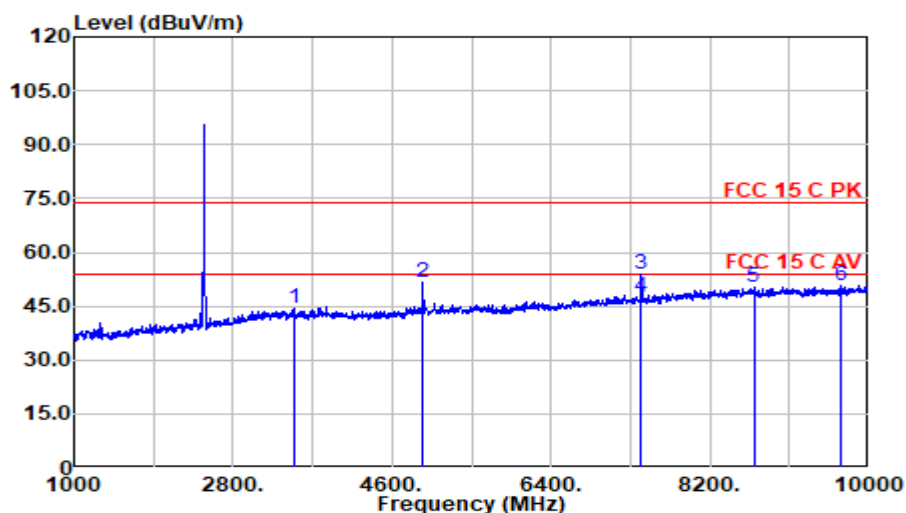
Polarization at Horizontal

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
3354.500	44.73	31.39	3.51	35.67	43.96	74.00	30.04	Peak
4948.250	49.01	33.49	4.58	36.48	50.60	74.00	23.40	Peak
7426.000	51.40	37.00	5.59	37.08	56.92	74.00	17.08	Peak
7426.000	42.14	37.00	5.59	37.08	47.65	54.00	6.35	Average
8446.000	43.32	38.21	5.80	37.30	50.03	74.00	23.97	Peak
9372.500	43.96	38.24	5.99	37.18	51.00	74.00	23.00	Peak

Mode: zigbee CH2475MHz**Model: BCB4WFL1**

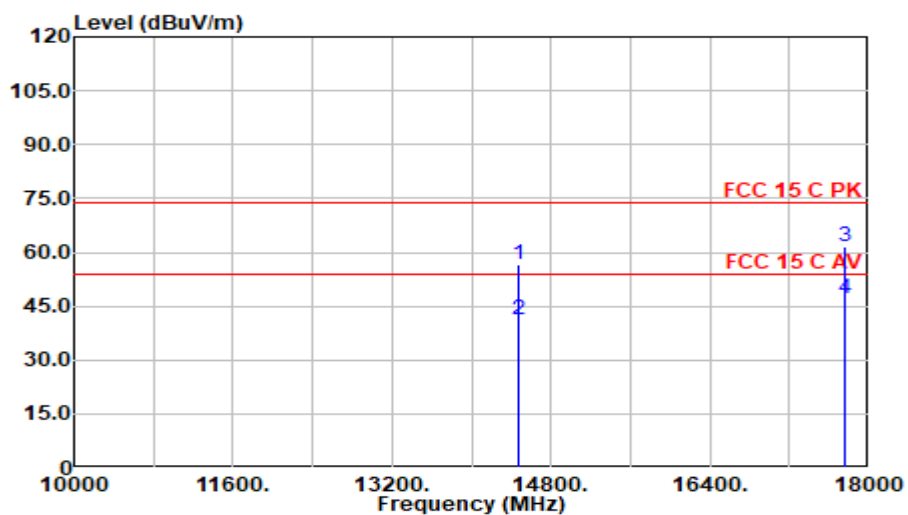
Polarization at Horizontal

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
14510.750	41.63	42.47	7.73	35.44	56.39	74.00	17.61	Peak
14510.750	26.46	42.47	7.73	35.44	41.23	54.00	12.77	Average
17672.750	42.40	45.04	8.59	34.53	61.49	74.00	12.51	Peak
17672.750	27.24	45.04	8.59	34.53	46.34	54.00	7.66	Average

Mode: zigbee CH2475MHz**Model: BCB4WFL1**

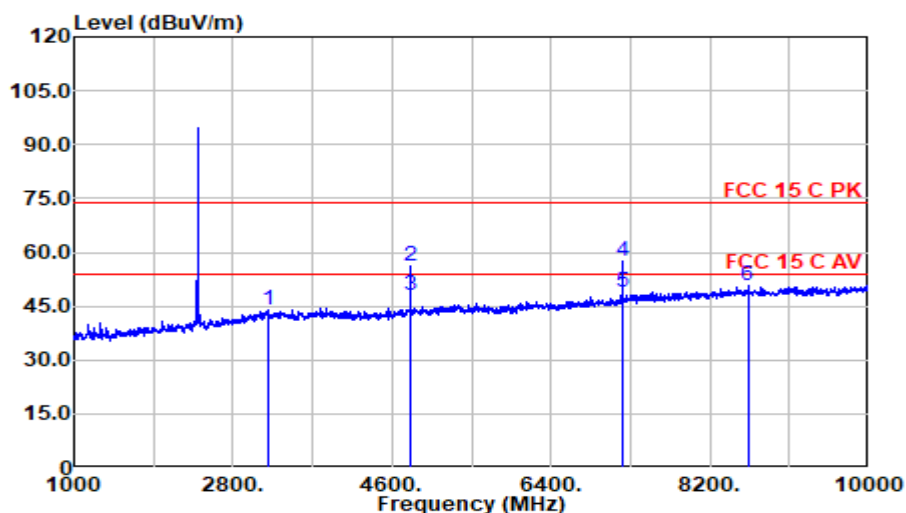
Polarization at Vertical

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
3494.750	45.29	31.30	3.61	35.77	44.42	74.00	29.58	Peak
4948.250	50.02	33.49	4.58	36.48	51.61	74.00	22.39	Peak
7421.750	48.33	37.00	5.59	37.08	53.85	74.00	20.15	Peak
7421.750	42.13	37.00	5.59	37.08	47.65	54.00	6.35	Average
8696.750	43.04	38.59	5.84	37.30	50.16	74.00	23.84	Peak
9678.500	43.31	38.20	6.08	37.09	50.49	74.00	23.51	Peak

Mode: zigbee CH2475MHz**Model: BCB4WFL1**

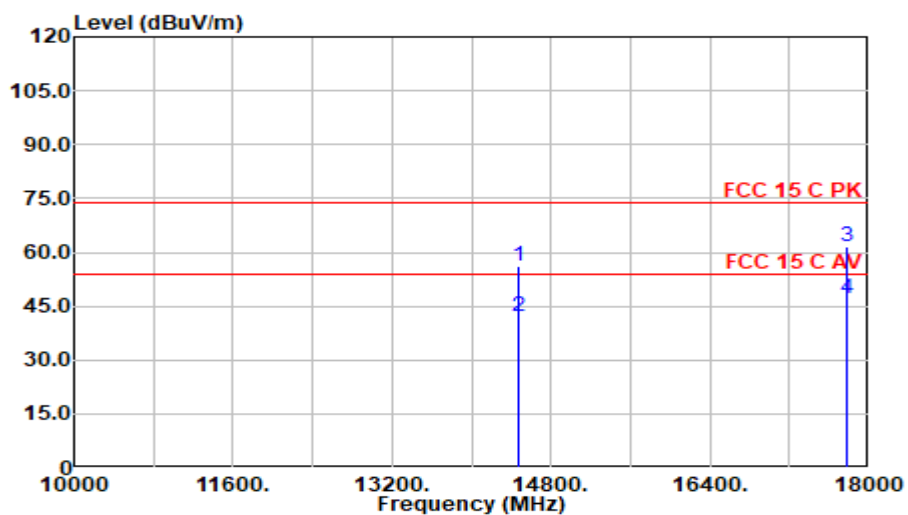
Polarization at Vertical

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
14468.250	41.89	42.40	7.73	35.47	56.56	74.00	17.44	Peak
14468.250	26.39	42.40	7.73	35.47	41.06	54.00	12.94	Average
17766.250	42.21	45.40	8.61	34.49	61.72	74.00	12.28	Peak
17766.250	27.52	45.40	8.61	34.49	47.03	54.00	6.97	Average

Mode: zigbee CH2405MHz**Model: BXBWFL1**

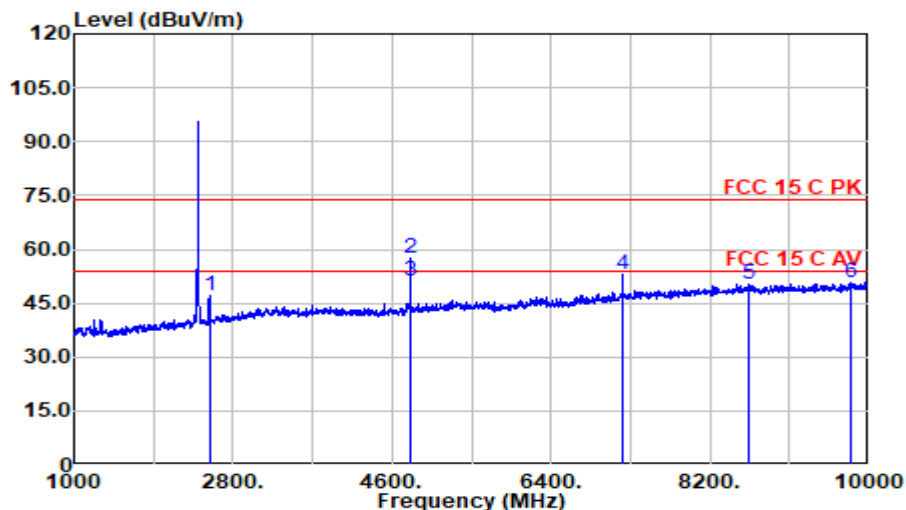
Polarization at Horizontal

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
3193.000	44.93	31.10	3.40	35.55	43.88	74.00	30.12	Peak
4808.000	54.84	33.28	4.49	36.43	56.18	74.00	17.82	Peak
4811.000	46.79	33.28	4.49	36.43	48.13	54.00	5.87	Average
7213.500	52.58	36.31	5.54	36.99	57.43	74.00	16.57	Peak
7214.000	44.02	36.31	5.54	36.99	48.88	54.00	5.12	Average
8628.750	43.66	38.40	5.83	37.30	50.59	74.00	23.41	Peak

Mode: zigbee CH2405MHz**Model: BXBWFL1**

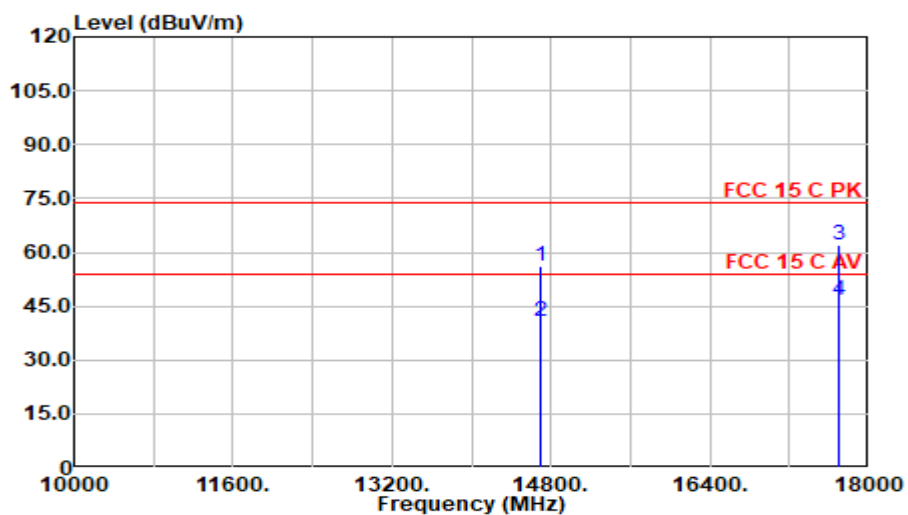
Polarization at Horizontal

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
14481.000	41.66	42.44	7.73	35.46	56.38	74.00	17.62	Peak
14481.000	27.37	42.44	7.73	35.46	42.08	54.00	11.92	Average
17783.250	42.09	45.45	8.61	34.48	61.66	74.00	12.34	Peak
17783.250	27.41	45.45	8.61	34.48	46.98	54.00	7.02	Average

Mode: zigbee CH2405MHz**Model: BXBWFL1**

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
2534.250	51.12	28.71	2.99	35.94	46.87	74.00	27.13	Peak
4808.000	56.09	33.28	4.49	36.43	57.43	74.00	16.57	Peak
4811.000	49.86	33.28	4.49	36.43	51.20	54.00	2.80	Average
7213.500	48.13	36.31	5.54	36.99	52.99	74.00	21.01	Peak
8637.250	43.39	38.40	5.83	37.30	50.32	74.00	23.68	Peak
9797.500	43.34	38.38	6.11	37.06	50.78	74.00	23.22	Peak

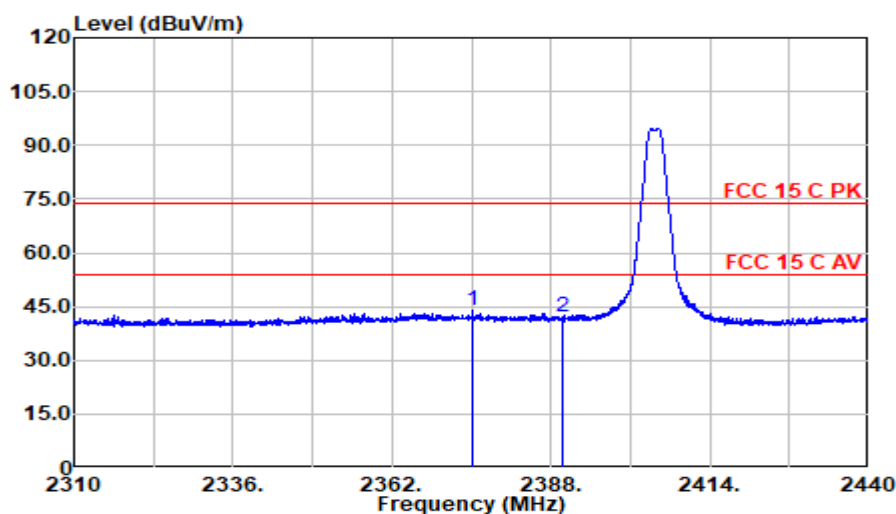
Mode: zigbee CH2405MHz**Model: BXBWFL1**

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
14702.000	41.68	41.99	7.74	35.30	56.11	74.00	17.89	Peak
14702.000	26.27	41.99	7.74	35.30	40.70	54.00	13.30	Average
17689.750	42.74	45.14	8.59	34.52	61.95	74.00	12.05	Peak
17689.750	27.37	45.14	8.59	34.52	46.58	54.00	7.42	Average

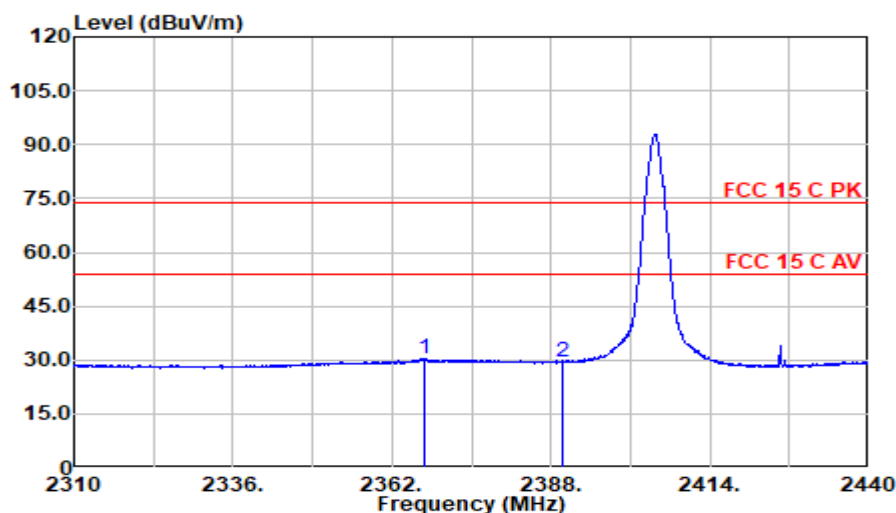
Band-Edge and Restricted bands:

Test Date:	2025.06.29	Temp./Hum.:	22°C/51%RH	Test By:	Jarey
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Mode: zigbee CH2405MHz

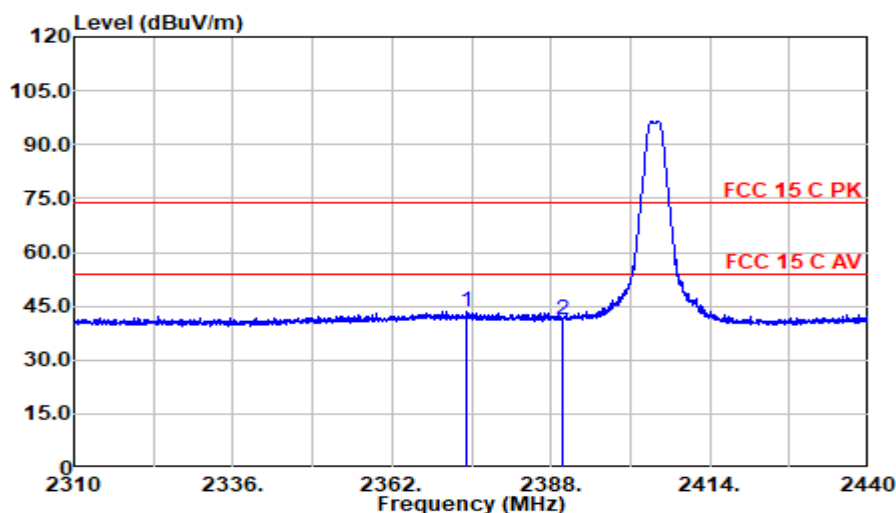
Polarization at Horizontal

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	48.41	28.55	2.89	36.15	43.70	74.00	30.30	Peak
2390.000	46.86	28.58	2.90	36.13	42.21	74.00	31.79	Peak

Mode: zigbee CH2405MHz

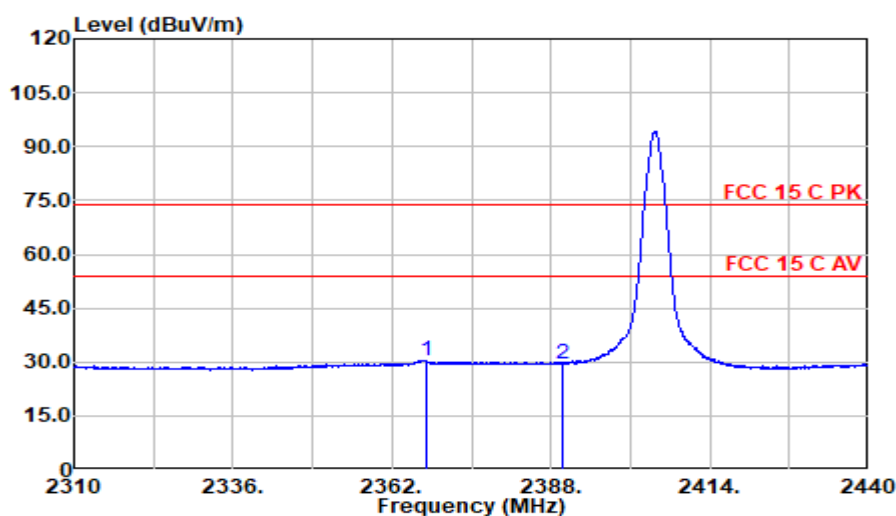
Polarization at Horizontal

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
2367.395	35.24	28.54	2.88	36.16	30.50	54.00	23.50	Average
2390.000	34.14	28.58	2.90	36.13	29.49	54.00	24.51	Average

Mode: zigbee CH2405MHz

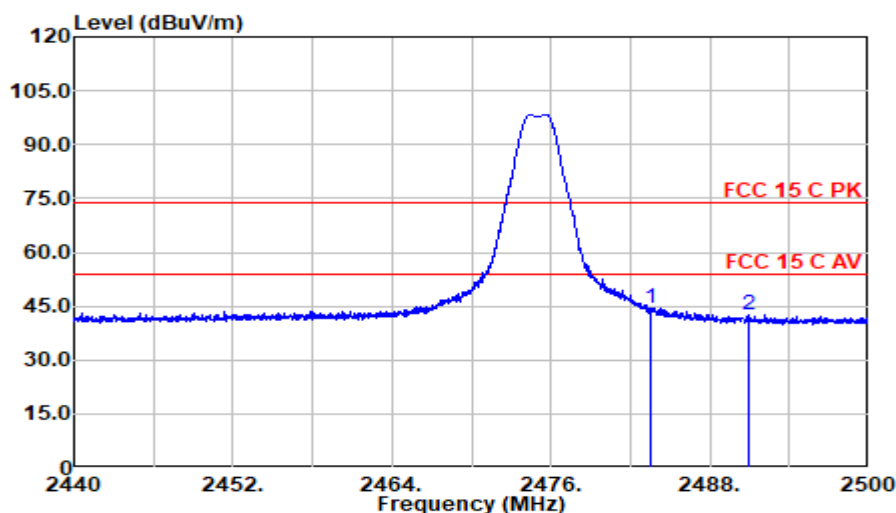
Polarization at Vertical

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
2374.220	48.36	28.55	2.89	36.15	43.65	74.00	30.35	Peak
2390.000	45.86	28.58	2.90	36.13	41.20	74.00	32.80	Peak

Mode: zigbee CH2405MHz

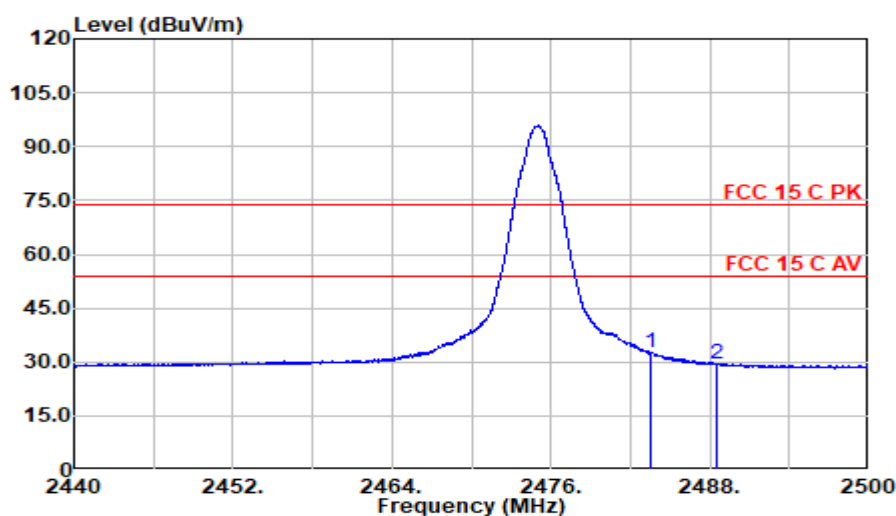
Polarization at Vertical

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
2367.525	35.28	28.54	2.88	36.16	30.53	54.00	23.47	Average
2390.000	34.27	28.58	2.90	36.13	29.62	54.00	24.38	Average

Mode: zigbee CH2475MHz

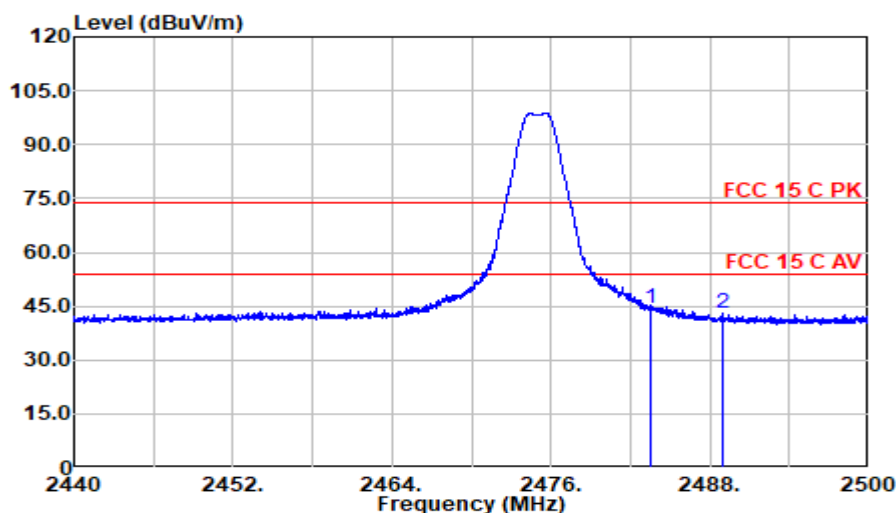
Polarization at Horizontal

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	48.73	28.50	2.96	36.01	44.18	74.00	29.82	Peak
2490.940	47.28	28.50	2.96	36.00	42.74	74.00	31.26	Peak

Mode: zigbee CH2475MHz

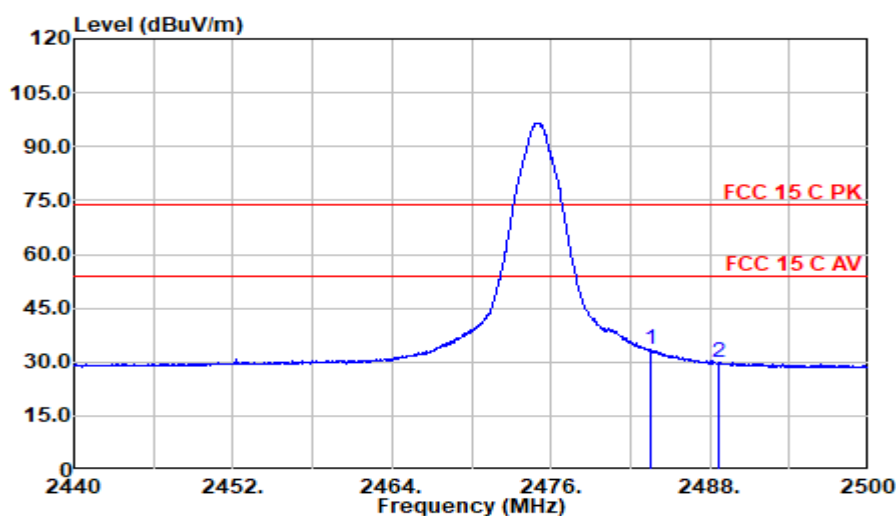
Polarization at Horizontal

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	37.07	28.50	2.96	36.01	32.52	54.00	21.48	Average
2488.540	34.17	28.50	2.96	36.00	29.64	54.00	24.36	Average

Mode: zigbee CH2475MHz

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	49.06	28.50	2.96	36.01	44.51	74.00	29.49	Peak
2488.900	47.51	28.50	2.96	36.00	42.97	74.00	31.03	Peak

Mode: zigbee CH2475MHz

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	38.05	28.50	2.96	36.01	33.50	54.00	20.50	Average
2488.690	34.43	28.50	2.96	36.00	29.89	54.00	24.11	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).

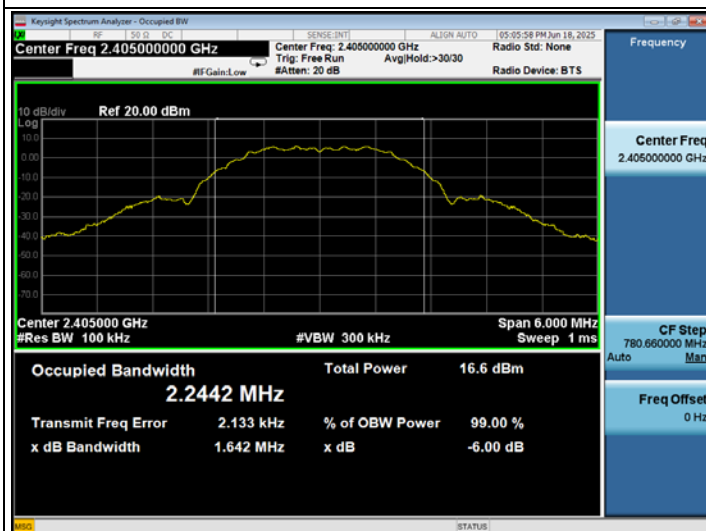
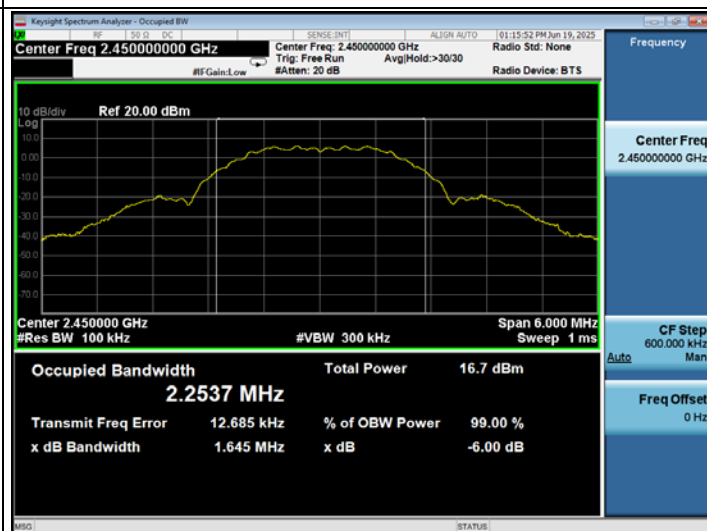
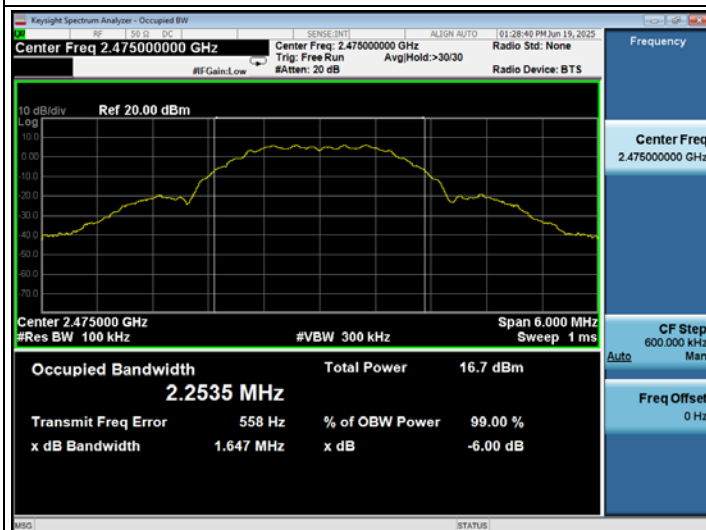
5.6 Test Results

PASSED.

All the test results are attached in next pages.

Test Date:	2025.06.18	Temp./Hum.:	23°C/51%RH	Test By:	DoraMa
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Mode	Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit
ZigBee	11	2405	1642	500 kHz
	20	2450	1645	500 kHz
	25	2475	1647	500 kHz

ZigBee**CH2405****CH2450****CH2475**

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	2024.09.21	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:	2025.06.18	Temp./Hum.:	23°C/51%RH	Test By:	DoraMa
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Mode	Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit
ZigBee	11	2405	9.513	30 dBm
	20	2450	9.573	30 dBm
	25	2475	9.648	30 dBm

ZigBee

CH2405



CH2450



CH2475



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	2024.09.21	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:	2025.06.18	Temp./Hum.:	23°C/51%RH	Test By:	DoraMa
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Mode	Channel	Frequency (MHz)	Data Page
ZigBee	11	2405	P56
	20	2450	P57
	25	2475	P58

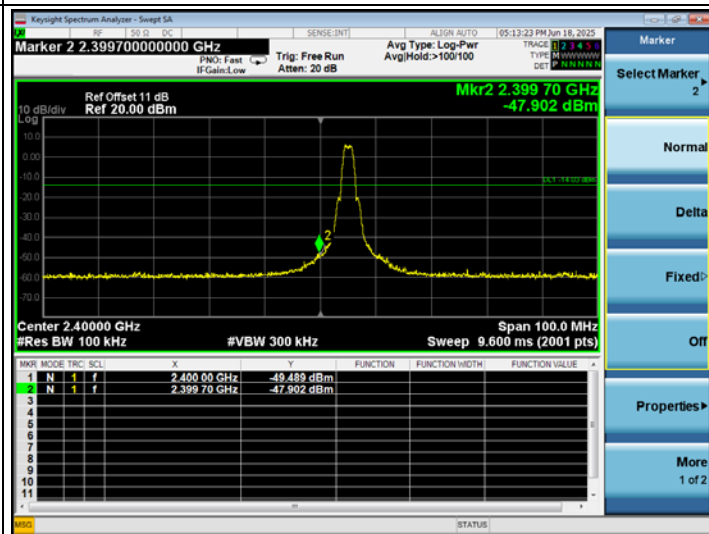
ZigBee

CH2405

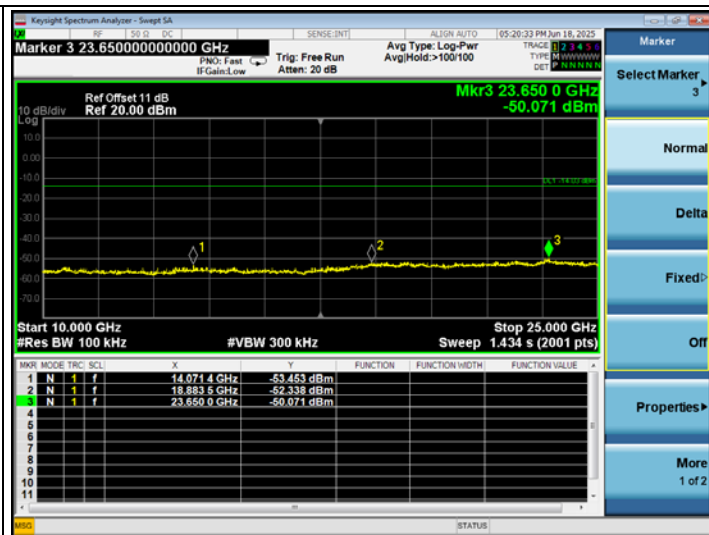
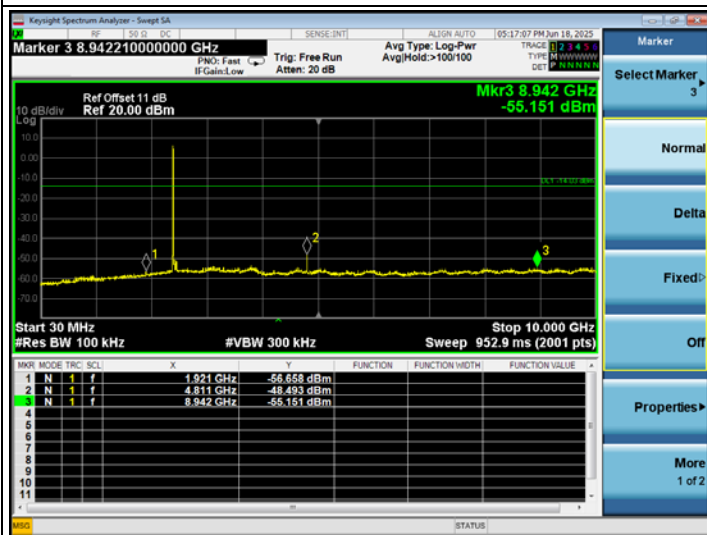
Reference Level

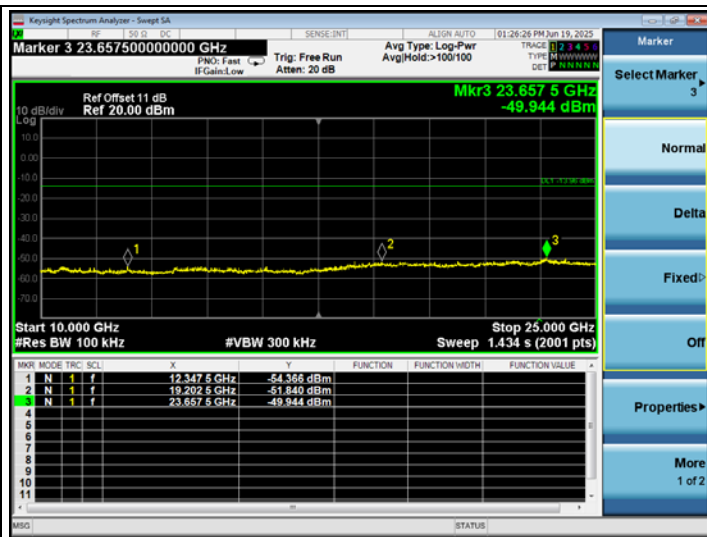
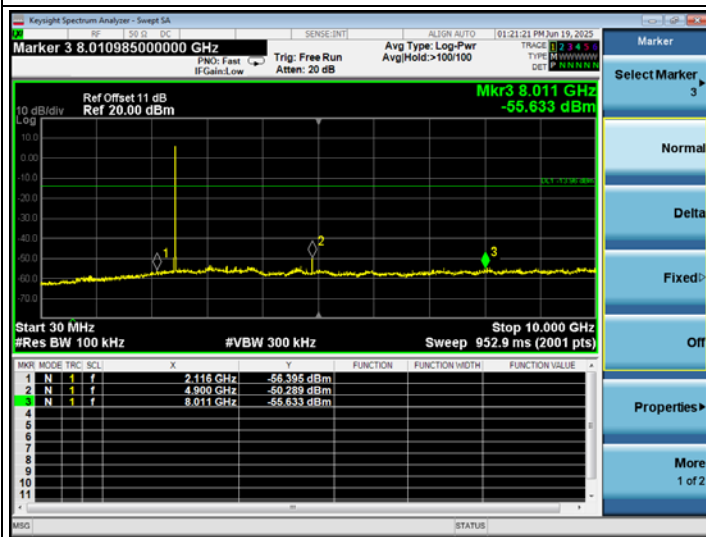


Lower Edge



Emission Level



ZigBee**CH2450****Reference Level****Emission Level**

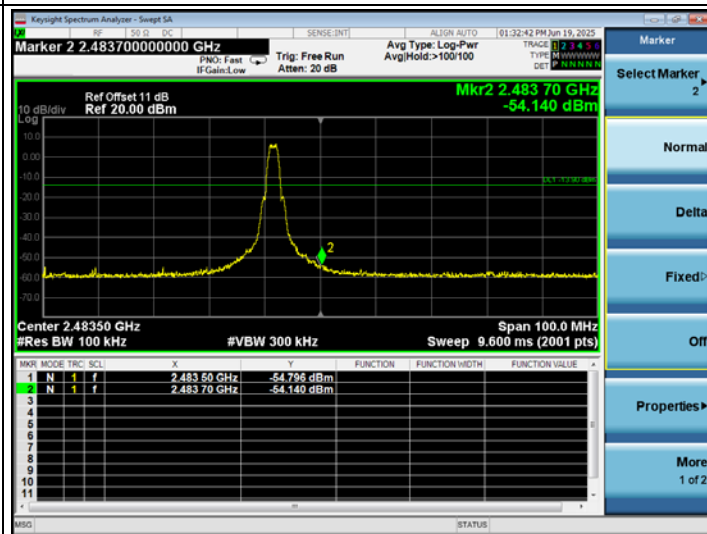
ZigBee

CH2475

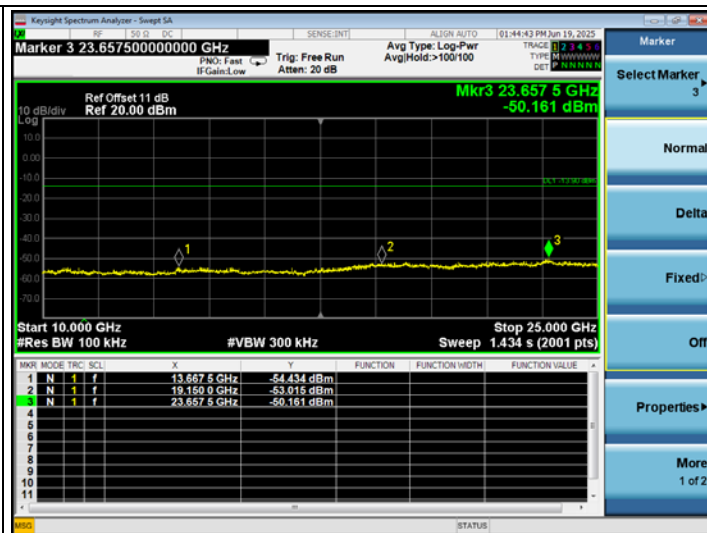
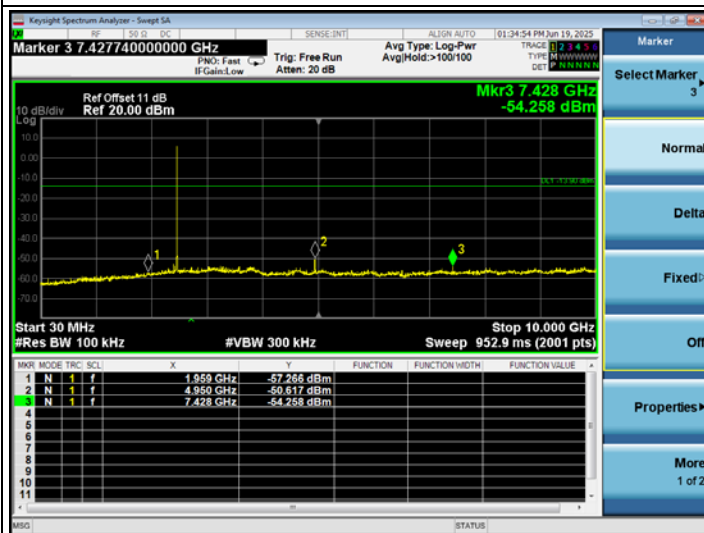
Reference Level



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	2024.09.21	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:	2025.06.18	Temp./Hum.:	23°C/51%RH	Test By:	DoraMa
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Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit
ZigBee	11	2405	-5.369	8 dBm
	20	2450	-5.483	8 dBm
	25	2475	-5.271	8 dBm

ZigBee

CH2405



CH2450



CH2475



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
Estimation of Uncertainty for Conduction Emission (Shielded Room-1)	9kHz~150kHz(50Ω/50μH -AMN)	3.74 dB
	150kHz~30MHz(50Ω/50μH -AMN)	3.34 dB
	150kHz~30MHz(50Ω/50μH –AMN-CAT 3)	3.46 dB
	150kHz~30MHz(50Ω/50μH –AMN-CAT 5)	3.48 dB
	150kHz~30MHz(50Ω/50μH –AMN-CAT 6)	3.60 dB
	9kHz~30MHz(VP, considering the effect of mains impedance when compared with AMN)	24.64 dB
	9kHz~30MHz(VP)	2.76 dB
	9kHz~30MHz(CP, considering the effect of AE impedance when compared with AMN)	24.64 dB
	9kHz~30MHz(CP)	2.82 dB
Estimation of Uncertainty for Conduction Emission (Shielded Room-3)	9kHz~150kHz(50Ω/50μH -AMN)	3.74 dB
	150kHz~30MHz(50Ω/50μH -AMN)	3.34 dB
Estimation of Uncertainty for Power Clamp	30MHz~300MHz (Absorbing Clamp)	3.68 dB
Estimation of Uncertainty for CDNE	30MHz~300MHz (CDNE-M210)	3.68 dB
	30MHz~300MHz (CDNE-M310)	3.68 dB
Estimation of Uncertainty for EMF	20kHz~10MHz	1.54 dB
Estimation of Uncertainty for Radiated Emission	30M~200MHz (Vertical)	4.56dB
	30M~200MHz (Horizontal)	4.44dB
	200M~1000MHz (Vertical)	5.28dB
	200M~1000MHz (Horizontal)	3.88dB
	1G~6GHz	4.34dB
	6G~18G Hz	4.40dB
	18G~40G Hz	4.04dB