FCC Part 15.247

TEST REPORT

For

DozzyCozy Technology Co., Ltd.

15F-2, No.11, Section 2, Huannan Road, Pingzhen District, Taoyuan City, Taiwan 324

FCC ID: 2A6PCP10AA

Report Type:	**Product Name:**
Original Report	AirCozy Interactive Smart Pillow

Report Number : RXZ211115009RF03

Report Date : 2022-06-08

Reviewed By: Andy Shih

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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RXZ211115009	RXZ211115009RF03	2022-06-08	Original Report	JoJo Lu

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1. General Information

1.1. Product Description for Equipment under Test (EUT)

Applicant	DozzyCozy Technology Co., Ltd. 15F-2, No.11, Section 2, Huannan Road, Pingzhen District, Taoyuan City, Taiwan 324
Manufacturer	DozzyCozy Technology Co., Ltd. 15F-2, No.11, Section 2, Huannan Road, Pingzhen District, Taoyuan City, Taiwan 324
Brand(Trade) Name	DozzyCozy , AirCozy
Product (Equipment)	AirCozy Interactive Smart Pillow
Main Model Name	AirCozy Premium_N_VA
Series Model Name	AirCozy Premium_N_VA2
Model Discrepancy	AirCozy Premium_N_VA: single pump; AirCozy Premium_N_VA2: double pump
Frequency Range	2402 ~ 2480 MHz
Peak Conducted Output Power	BR(GFSK) Mode: -2.81 dBm EDR(π/4-DQPSK) Mode: -2.10 dBm
Modulation Technique	BR Mode: GFSK EDR Mode: π/4-DQPSK
Transmit Data Rate	BR(GFSK) Mode: 1 Mbps EDR(π/4-DQPSK) Mode: 2 Mbps
Power Operation (Voltage Range)	☒ AC ☒ Adapter I/P: 100-240V ~ 50/60Hz 0.8A O/P: +12.0V ⎓ 2.0A, 24.0W ☐ By AC Power Cord ☐ PoE
	☐ DC Type ☐ Battery ☐ DC Power Supply ☐ External from USB Cable ☐ External DC Adapter
	☐ Host System
Received Date	Dec 10, 2021
Date of Test	Mar 12, 2022 ~ Jun 02, 2022

*All measurement and test data in this report was gathered from production sample serial number: RXZ211115009-01 , RXZ211115009-02 (Assigned by BACL, New Taipei Laboratory).

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1.2. Objective

This report is prepared on behalf of *DozzyCozy Technology Co., Ltd.* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules.

1.3. Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
KDB 558074 D01 15.247 Meas Guidance v05r02.

1.4. Statement

Decision Rule: No, (The test results do not include MU judgment)

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Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
The determination of the test results does not require consideration of the uncertainty of the measurement, unless the assessment is required by customer agreement, regulation or standard document specification.
Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is not responsible for the authenticity of the information provided by the applicant that affects the test results.

1.5. Measurement Uncertainty

Parameter		Uncertainty
AC Mains		+/- 2.36 dB
RF output power, conducted		+/- 0.98 dB
Occupied Bandwidth		+/- 0.35 MHz
Unwanted Emissions, conducted		+/- 2.16 dBm
Emissions, radiated	30 MHz~1GHz	+/- 5.22 dB
	1 GHz~18 GHz	+/- 6.12 dB
	18 GHz~40 GHz	+/- 4.99 dB
Temperature		+/- 1.27 °C
Humidity		+/- 3.00 %

1.6. Environmental Conditions

Test Site	Test Date	Temperature (℃)	Relative Humidity (%)	ATM Pressure (hPa)	Test Engineer
AC Line Conducted Emissions	2022-04-27~2022-06-02	25.5~26.2	49~51	1010	Boris Kao
Radiation Spurious Emissions	2022-03-12~2022-06-02	21.1~26.1	54~72	1010	Aaron Pan
Conducted Spurious Emissions	2022-04-08	25	55	1010	Aaron Pan
20 dB Emission Bandwidth	2022-04-08	25	55	1010	Aaron Pan
Channel Separation Test	2022-04-08	25	55	1010	Aaron Pan
Time of Occupancy	2022-04-08	25	55	1010	Aaron Pan
Quantity of hopping channel	2022-04-09	25.5	57	1010	Aaron Pan
Maximum Output Power	2022-04-08	25	55	1010	Aaron Pan
100 kHz Bandwidth of Frequency Band Edge	2022-04-08~2022-04-09	25~25.5	55~57	1010	Aaron Pan

1.7. Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) to collect test data is located on

☒70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3732) and the FCC designation No.TW3732 under the Mutual Recognition Agreement (MRA) in FCC Test.

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2. System Test Configuration

2.1. Description of Test Configuration

For BT mode, 79 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	40	2442
1	2403	--	--
2	2404	76	2478
3	2405	77	2479
--	--	78	2480
39	2441	/	/

For BT Modes were tested with channel 0, 39 and 78.

The system was configured for testing in engineering mode, which was provided by manufacturer.

2.2. Equipment Modifications

No modification was made to the EUT.

2.3. EUT Exercise Software

The test software was used "FCC Assist 1.0.0.2"

Test Frequency		2402MHz	2441MHz	2480MHz
Power Level Setting	GFSK	10	10	5
	π/4-DQPSK	10	10	10

2.4. Test Mode

Pre-scan

AC Line Conducted Emissions and Radiated Spurious Emissions

Mode 1: AirCozy Premium_N_VA (Sample serial number: RXZ211115009-01)

Mode 2: AirCozy Premium_N_VA2 (Sample serial number: RXZ211115009-02)

Worst case is the Mode 1: AirCozy Premium_N_VA

Model 1: AirCozy Premium_N_VA for all test item.

Model 2: AirCozy Premium_N_VA2 test Below 1GHz Radiated Spurious Emissions and AC Line Conducted Emissions.

Transmitting simultaneously test

BT Mode and BLE Mode (FCC ID: SH6MDBT42Q, Model: MDBT42Q-U)

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2.5. Support Equipment List and Details

Description	Manufacturer	Model Number	S/N
Adapter	DozzyCozy	DSA-24PFS-12 FUS 120200	0521HB
SD Card	RAMBULL	128MB	N/A
NB	DELL	E6410	8N7PXN1
Fixture	Waveshare	FT232	N/A

2.6. External Cable List and Details

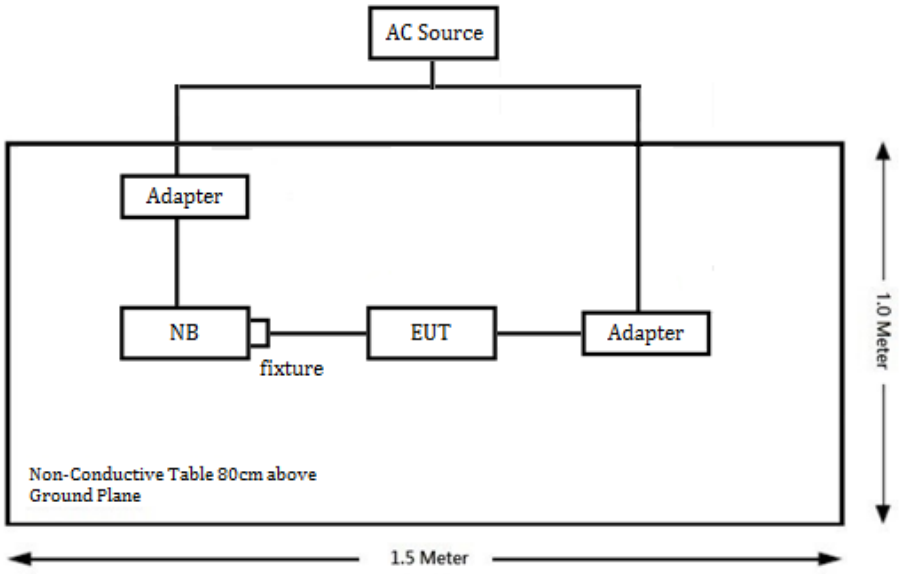
N/A

2.7. Block Diagram of Test Setup

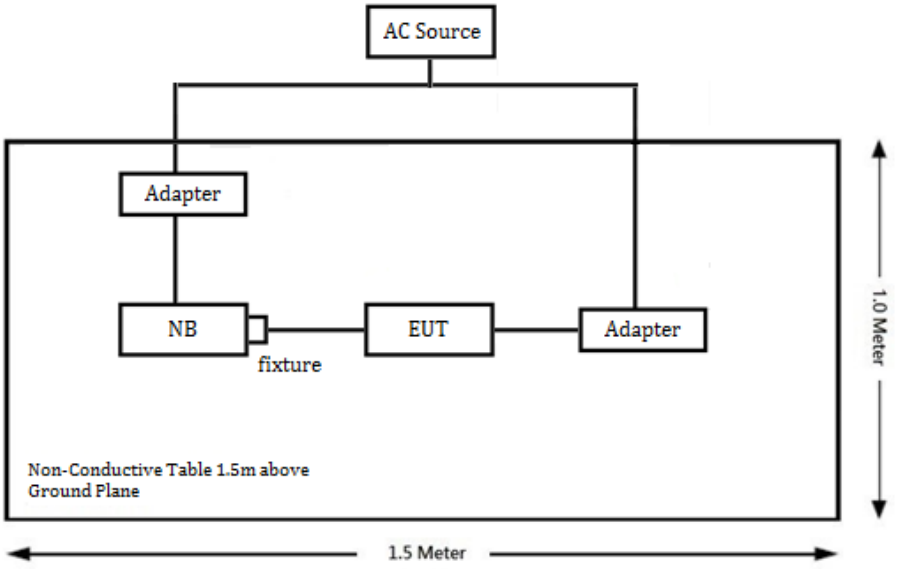
See test photographs attached in annex setup photos for the actual connections between EUT and support equipment.

Radiation:

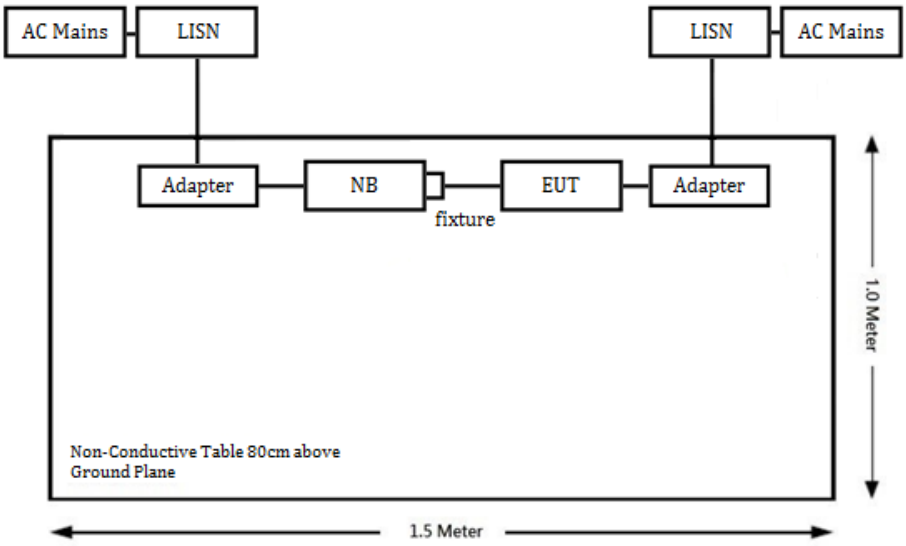
Below 1GHz:



Above 1GHz:



Conduction:



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3. Summary of Test Results

FCC Rules	Description of Test	Results
§15.247(i), §1.1307(b)(3)(i)	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(a)(1)	20 dB Emission Bandwidth	Compliance
§15.247 (a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance

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4. Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conduction Room (CON-A)					
LISN	Rohde & Schwarz	ENV216	101612	2022/1/14	2023/1/13
LISN	Rohde & Schwarz	ENV216	101248	2021/6/8	2022/6/7
EMI Test Receiver	Rohde & Schwarz	ESW8	100947	2021/7/23	2022/7/22
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM104	2021/7/29	2022/7/28
RF Cable	EMEC	EM-CB5D	1	2021/6/11	2022/6/10
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R
Radiation 3M Room (966-A)					
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/15542_01	2022/2/14	2023/2/13
Horn Antenna	EMCO	3115	9809-5583	2021/9/1	2022/8/31
Horn Antenna	ETS-Lindgren	3116	62638	2021/8/11	2022/8/10
Preamplifier	Sonoma	310N	130602	2021/6/8	2022/6/7
Preamplifier	A.H. system Inc.	PAM-0118P	466	2021/11/4	2022/11/3
Microware Preamplifier	EM Electronics Corporation	EM18G40G	60656	2021/12/27	2022/12/26
Spectrum Analyzer	Rohde & Schwarz	FSV40	101435	2022/1/13	2023/1/12
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2021/11/9	2022/11/8
Micro flex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2022/1/24	2023/1/23
Coaxial Cable	COMMATE	PEWC	8Dr	2021/12/24	2022/12/23
Coaxial Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2022/1/24	2023/1/23
Coaxial Cable	JUNFLON	J12J102248-00-B-5	AUG-07-15-044	2021/12/24	2022/12/23
Cable	EMC	EMC105-SM-SM-10000	201003	2022/1/24	2023/1/23
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-450CM	160309-1	2022/1/24	2023/1/23
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-50CM	15120-1	2022/1/18	2023/1/17
Software	Farad	EZ_EMC	BACL-03A1	N.C.R	N.C.R
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2022/2/18	2023/2/17
Cable	UTIFLEX	UFA210A	9435	2021/10/5	2022/10/4
Power Sensor	KEYSIGHT	U2021XA	MY54080018	2022/1/24	2023/1/23
Attenuator	MINI-CIRCUITS	BW-S10W5+	1419	2022/2/11	2023/2/10

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements

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5. FCC §15.247(i), §1.1307(b)(3)(i) – RF Exposure

5.1. Applicable Standard

According to subpart 15.247(i) and subpart §1.1307(b)(3)(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

For single RF sources (*i.e.*, any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold *Pth* (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). *Pth* is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^x & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

For multiple RF sources: Multiple RF sources are exempt if:

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a}\frac{P_i}{P_{th,i}} + \sum_{j=1}^{b}\frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k} \le 1$$

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5.2. RF Exposure Evaluation Result

Project info

Band	Freq (MHz)	Tune-up Power (dBm)	Ant Gain (dBi)	Distances (mm)	Duty (%)	Tune-up Power (mW)	ERP (dBm)	ERP (mW)
BT	2480	-2	-0.76	8	100%	0.63	-4.91	0.32
BLE	2480	-2.5	-0.76	8	100%	0.56	-5.41	0.29
BLE FCC ID: SH6MDBT42Q	2480	4	3.3	8	100%	2.51	5.15	3.27

Option A

The available maximum time-averaged power is no more than 1 mW

Band	Freq (MHz)	Result Option A
BT	2480	exempt
BLE	2480	exempt
BLE FCC ID: SH6MDBT42Q	2480	not exempt

Option B

The available maximum time-averaged power or effective radiated power (ERP), whichever is greater. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive).

Band	Freq (MHz)	Pth (mW)	X	ERP 20cm (mW)	Ratio	Result Option B
BT	2480	6.65	1.905	3060	0.095	exempt
BLE	2480	6.65	1.905	3060	0.085	exempt
BLE FCC ID: SH6MDBT42Q	2480	6.65	1.905	3060	0.492	exempt

Simultaneous Analysis :

BLE/BT and BLE (FCC ID: SH6MDBT42Q) can transmit simultaneously; the worst condition as below:

0.095 + 0.492 = 0.587 < 1

Result: The EUT meets exemption requirement.

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6. FCC §15.203 – Antenna Requirements

6.1. Applicable Standard

According to § 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna does not exceed 6dBi.

6.2. Antenna Information

Manufacturer	Model	Type	Antenna Gain
ZHUHAI JIELI TECHNOLOGY CO.,LTD	N/A	PCB Antenna	-0.76 dBi

Result: Compliance

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7. FCC §15.207(a) – AC Line Conducted Emissions

7.1. Applicable Standard

According to §15.207

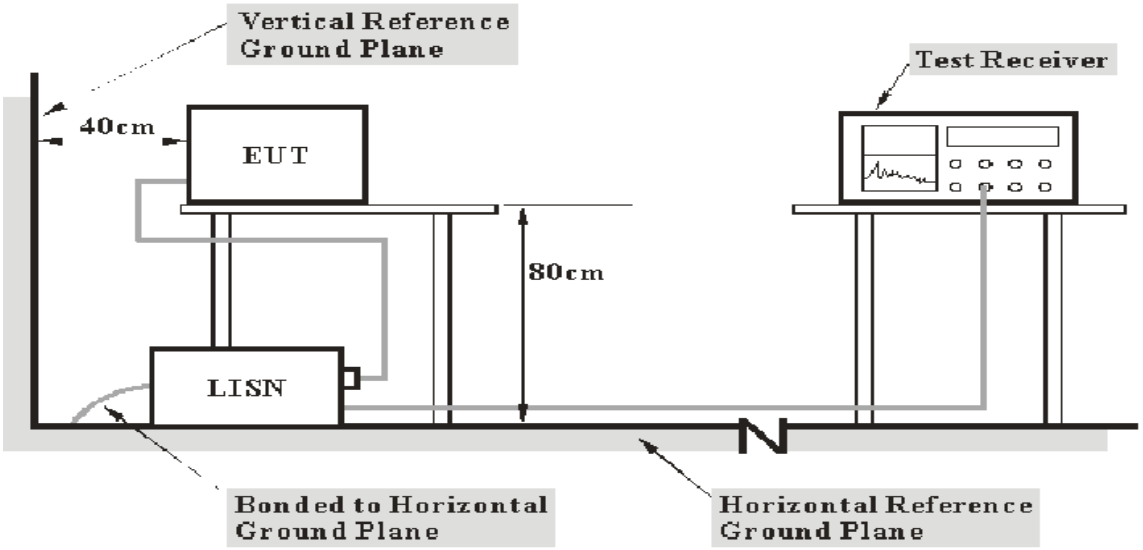
For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note 1	56 to 46 Note 2
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency.

Note 2: A linear average detector is required

7.2. EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

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7.3. EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations

Frequency Range	IF B/W
150kHz – 30MHz	9kHz

7.4. Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

7.5. Corrected Factor & Margin Calculation

The factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The “Over Limit” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for Over Limit calculation is as follows:

Over Limit = Level – Limit Line

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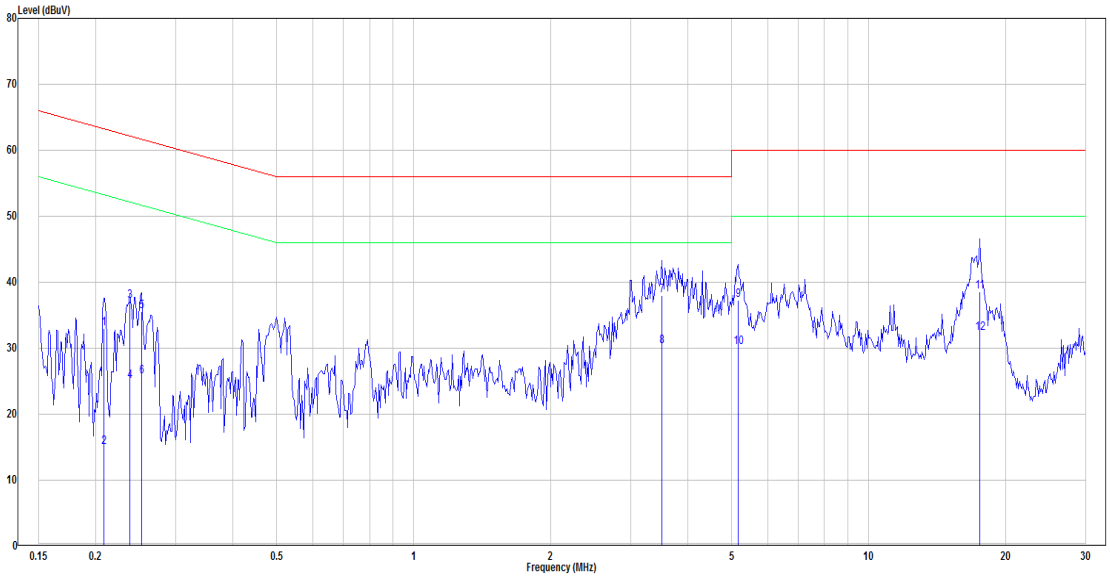
7.6. Test Results

Test Mode: Transmitting

Model: AirCozy Premium_N_VA

AC120 V, 60 Hz, Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.208	13.47	19.50	32.97	63.27	-30.30	QP
2	0.208	-4.56	19.50	14.94	53.27	-38.33	Average
3	0.238	17.66	19.50	37.16	62.17	-25.01	QP
4	0.238	5.44	19.50	24.94	52.17	-27.23	Average
5	0.252	16.13	19.50	35.63	61.69	-26.06	QP
6	0.252	6.25	19.50	25.75	51.69	-25.94	Average
7	3.509	18.45	19.62	38.07	56.00	-17.93	QP
8	3.509	10.61	19.62	30.23	46.00	-15.77	Average
9	5.166	17.57	19.66	37.23	60.00	-22.77	QP
10	5.166	10.45	19.66	30.11	50.00	-19.89	Average
11	17.568	18.81	19.81	38.62	60.00	-21.38	QP
12	17.568	12.54	19.81	32.35	50.00	-17.65	Average

Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

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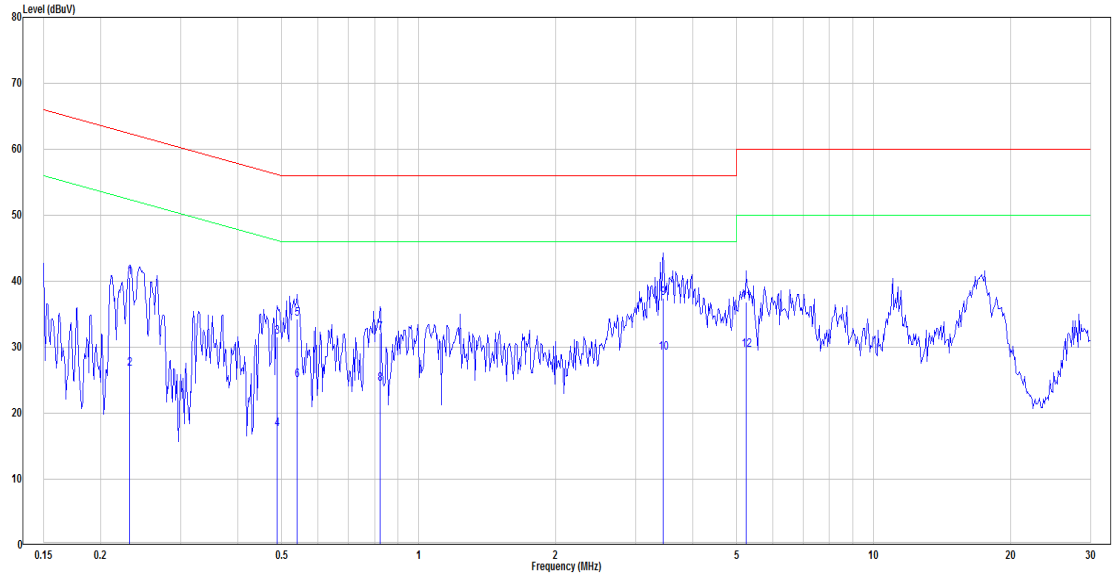
AC120 V, 60 Hz, Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.232	21.02	19.49	40.51	62.39	-21.88	QP
2	0.232	7.25	19.49	26.74	52.39	-25.65	Average
3	0.489	12.05	19.52	31.57	56.19	-24.62	QP
4	0.489	-1.90	19.52	17.62	46.19	-28.57	Average
5	0.541	14.73	19.52	34.25	56.00	-21.75	QP
6	0.541	5.43	19.52	24.95	46.00	-21.05	Average
7	0.822	12.64	19.53	32.17	56.00	-23.83	QP
8	0.822	4.90	19.53	24.43	46.00	-21.57	Average
9	3.454	17.79	19.61	37.40	56.00	-18.60	QP
10	3.454	9.55	19.61	29.16	46.00	-16.84	Average
11	5.249	17.20	19.67	36.87	60.00	-23.13	QP
12	5.249	9.84	19.67	29.51	50.00	-20.49	Average

Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

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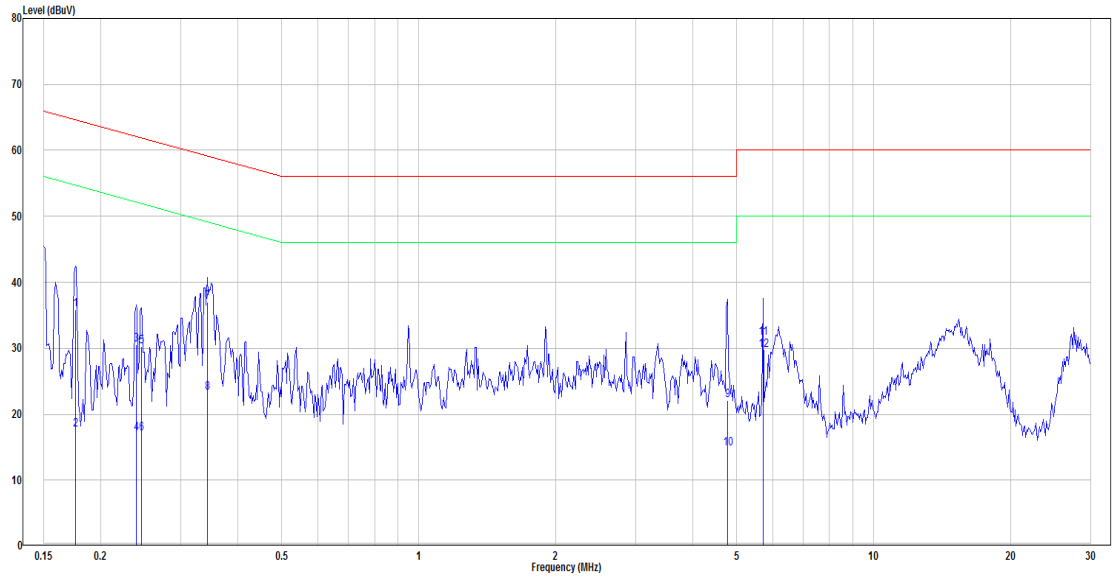
Model: AirCozy Premium_N_VA2

AC120 V, 60 Hz, Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.176	16.32	19.50	35.82	64.68	-28.86	QP
2	0.176	-1.83	19.50	17.67	54.68	-37.01	Average
3	0.239	11.06	19.50	30.56	62.13	-31.57	QP
4	0.239	-2.43	19.50	17.07	52.13	-35.06	Average
5	0.246	10.74	19.50	30.24	61.91	-31.67	QP
6	0.246	-2.40	19.50	17.10	51.91	-34.81	Average
7	0.343	17.42	19.51	36.93	59.13	-22.20	QP
8	0.343	3.77	19.51	23.28	49.13	-25.85	Average
9	4.772	2.41	19.65	22.06	56.00	-33.94	QP
10	4.772	-4.93	19.65	14.72	46.00	-31.28	Average
11	5.713	11.92	19.67	31.59	60.00	-28.41	QP
12	5.713	9.96	19.67	29.63	50.00	-20.37	Average

Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

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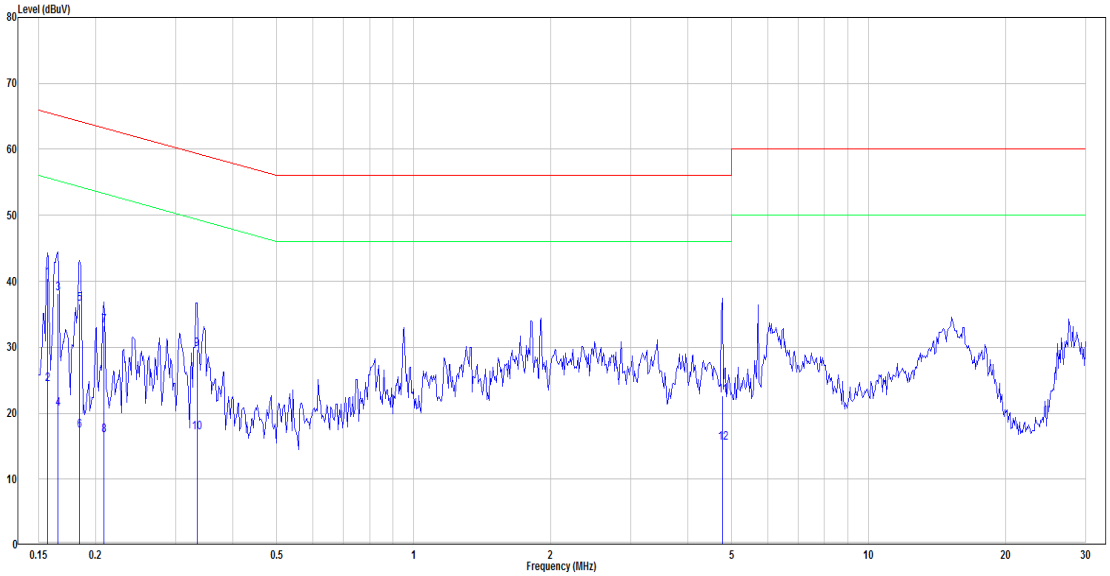
AC120 V, 60 Hz, Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.156	20.99	19.50	40.49	65.65	-25.16	QP
2	0.156	4.86	19.50	24.36	55.65	-31.29	Average
3	0.165	18.69	19.50	38.19	65.21	-27.02	QP
4	0.165	1.16	19.50	20.66	55.21	-34.55	Average
5	0.184	17.00	19.49	36.49	64.28	-27.79	QP
6	0.184	-2.20	19.49	17.29	54.28	-36.99	Average
7	0.208	13.79	19.49	33.28	63.27	-29.99	QP
8	0.208	-2.88	19.49	16.61	53.27	-36.66	Average
9	0.334	10.23	19.51	29.74	59.35	-29.61	QP
10	0.334	-2.40	19.51	17.11	49.35	-32.24	Average
11	4.772	2.95	19.66	22.61	56.00	-33.39	QP
12	4.772	-4.15	19.66	15.51	46.00	-30.49	Average

Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

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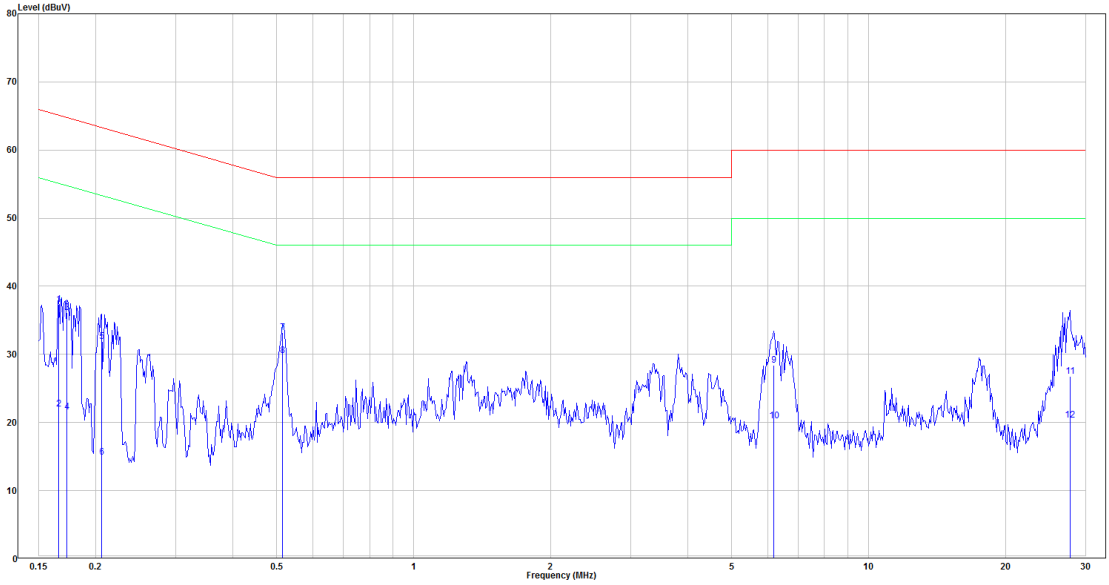
Transmitting simultaneously test:

BT and BLE mode transmitting simultaneously

AC120 V, 60 Hz, Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBµV)	Factor(dB)	(dBµV)	(dBµV)	(dB)	
1	0.166	17.81	19.50	37.31	65.16	-27.85	QP
2	0.166	2.48	19.50	21.98	55.16	-33.18	Average
3	0.173	16.61	19.50	36.11	64.81	-28.70	QP
4	0.173	2.02	19.50	21.52	54.81	-33.29	Average
5	0.206	12.38	19.50	31.88	63.36	-31.48	QP
6	0.206	-4.58	19.50	14.92	53.36	-38.44	Average
7	0.516	13.70	19.52	33.22	56.00	-22.78	QP
8	0.516	10.32	19.52	29.84	46.00	-16.16	Average
9	6.186	8.75	19.68	28.43	60.00	-31.57	QP
10	6.186	0.54	19.68	20.22	50.00	-29.78	Average
11	27.708	6.86	19.94	26.80	60.00	-33.20	QP
12	27.708	0.42	19.94	20.36	50.00	-29.64	Average

Note:

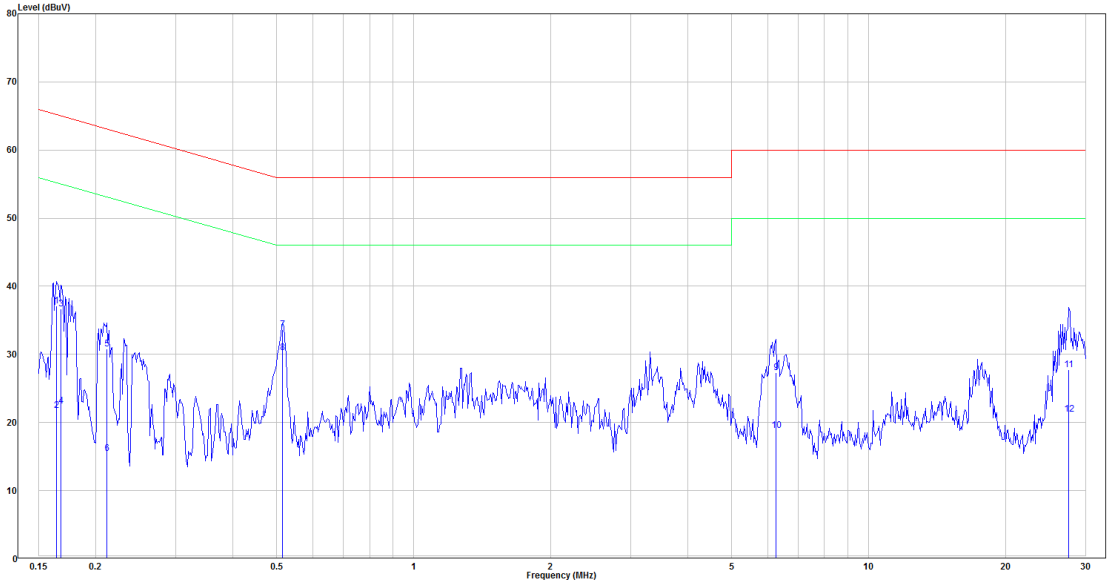
Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

AC120 V, 60 Hz, Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBµV)	Factor(dB)	(dBµV)	(dBµV)	(dB)	
1	0.164	17.58	19.50	37.08	65.25	-28.17	QP
2	0.164	2.24	19.50	21.74	55.25	-33.51	Average
3	0.168	17.23	19.50	36.73	65.08	-28.35	QP
4	0.168	2.96	19.50	22.46	55.08	-32.62	Average
5	0.212	11.32	19.49	30.81	63.14	-32.33	QP
6	0.212	-4.04	19.49	15.45	53.14	-37.69	Average
7	0.516	14.07	19.52	33.59	56.00	-22.41	QP
8	0.516	10.77	19.52	30.29	46.00	-15.71	Average
9	6.252	7.61	19.69	27.30	60.00	-32.70	QP
10	6.252	-0.83	19.69	18.86	50.00	-31.14	Average
11	27.562	7.72	20.00	27.72	60.00	-32.28	QP
12	27.562	1.26	20.00	21.26	50.00	-28.74	Average

Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

8. FCC §15.209, §15.205 , §15.247(d) – Spurious Emissions

8.1. Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	608 – 614	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	960 – 1240	5. 35 – 5. 46
2.1735 – 2.1905	16.80425 – 16.80475	1300 – 1427	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1435 – 1626.5	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1645.5 – 1646.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1660 – 1710	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1718.8 – 1722.2	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	2200 – 2300	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2310 – 2390	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2483.5 – 2500	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2690 – 2900	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	3260 – 3267	22.01 – 23.12
8.41425 – 8.41475	162.0125 –167.17	3.332 – 3.339	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3 3458 – 3 358	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3.600 – 4.400	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4		Above 38.6
13.36 – 13.41	399.9 – 410		

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains

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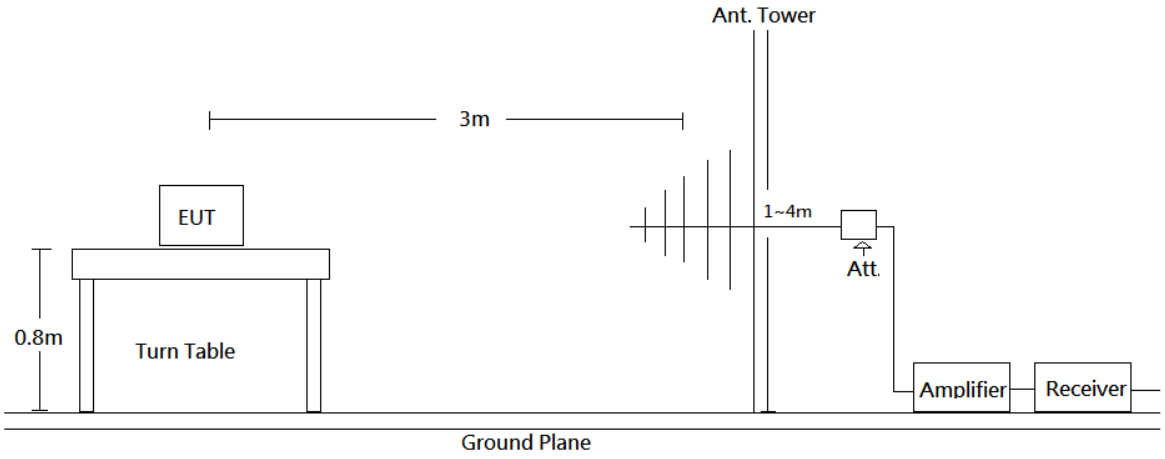
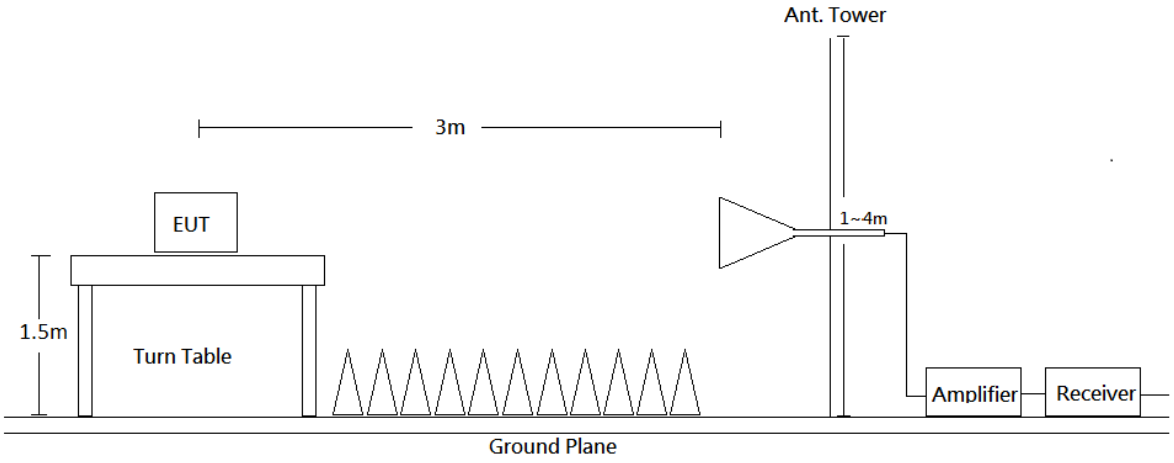
the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, 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).

8.2. EUT Setup

Below 1 GHz:



Above 1 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

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8.3. EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Measurement method
30-1000 MHz	120 kHz	/	QP
Above 1 GHz	1 MHz	3 MHz	PK
	1 MHz	10 Hz	Ave

8.4. Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

8.5. Corrected Factor & Margin Calculation

The Correct Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Result – Limit

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8.6. Test Results

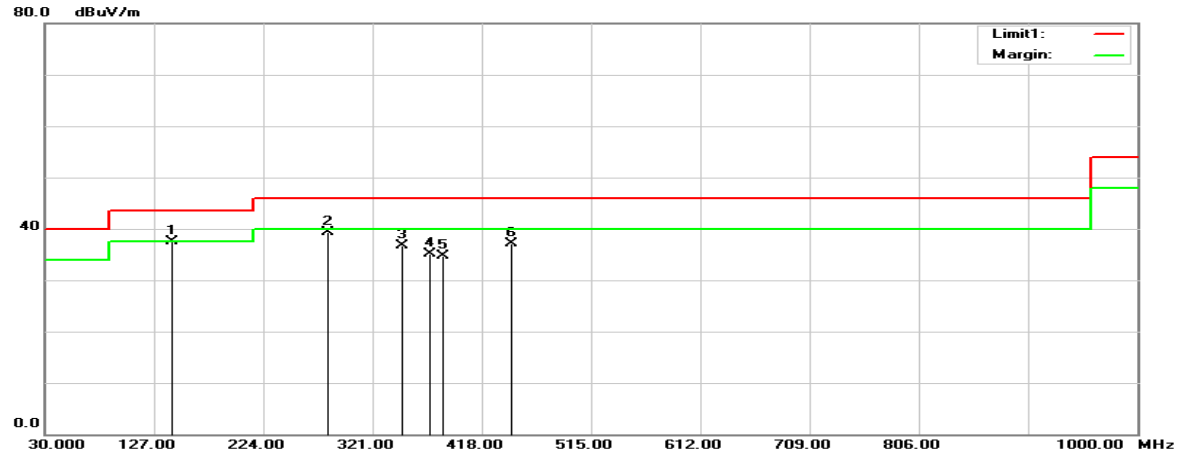
Test Mode: Transmitting (Pre-scan with three orthogonal axis, and worse case as Z axis.)

(Worst case is BR (GFSK) mode Middle channel)

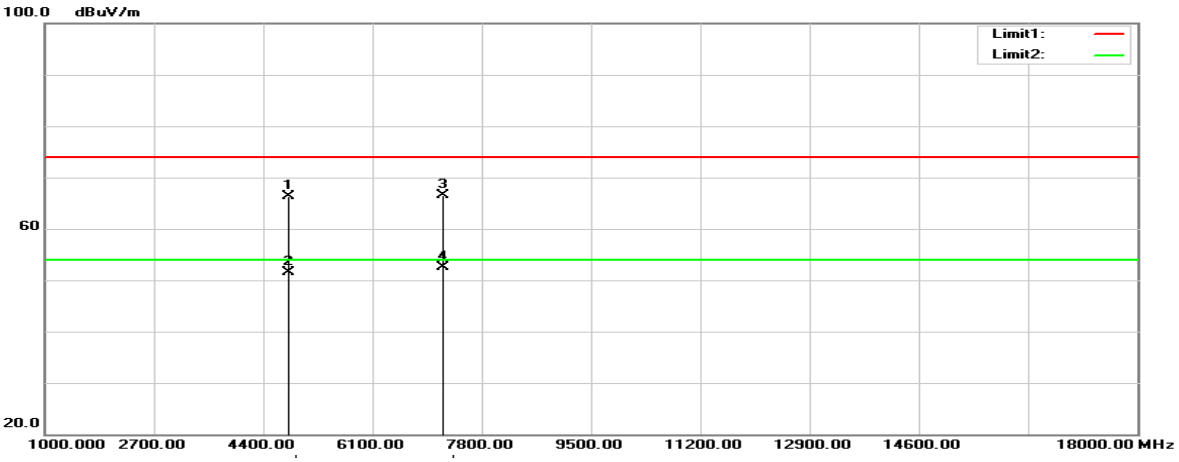
Model: AirCozy Premium_N_VA

Horizontal

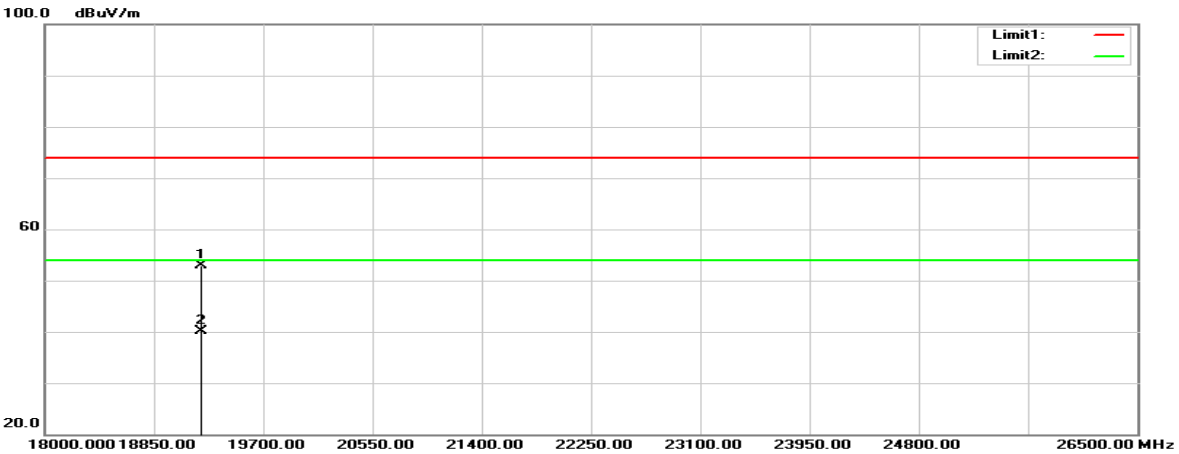
30MHz-1GHz:



1GHz-18GHz:



18GHz-26.5GHz:



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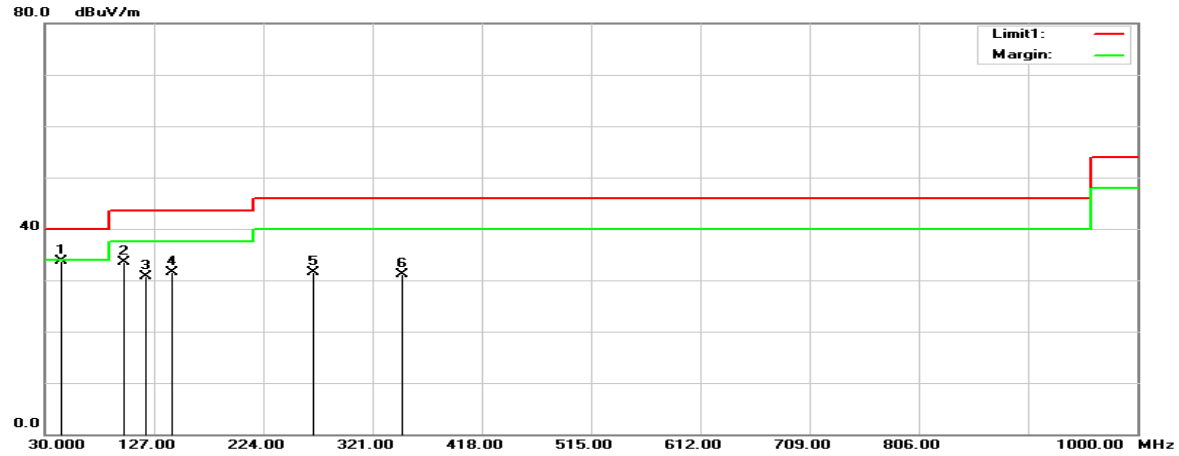
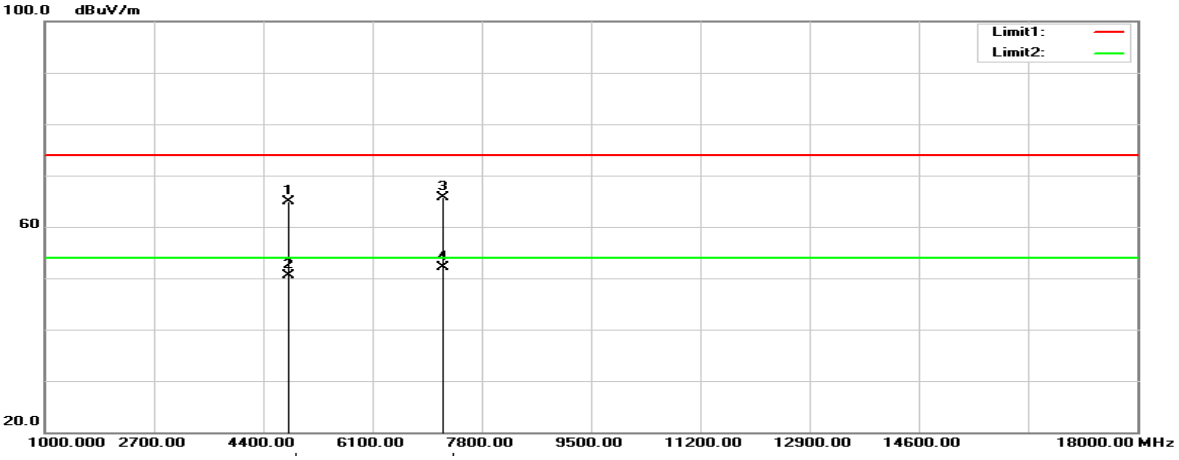
Vertical worst case is BR (GFSK) mode Middle channel)

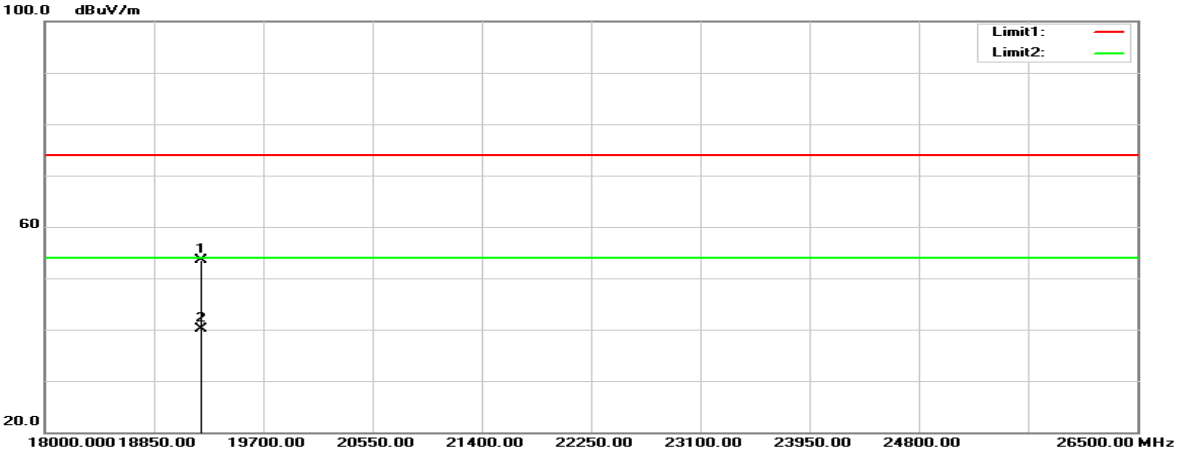
30MHz-1GHz:



1GHz-18GHz:



18GHz-26.5GHz:



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Below 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
143.4900	50.21	-12.80	37.41	43.50	-6.09	100	1	peak
281.2300	51.56	-12.33	39.23	46.00	-6.77	100	269	peak
347.1900	48.06	-11.43	36.63	46.00	-9.37	100	124	peak
371.4400	45.84	-10.83	35.01	46.00	-10.99	100	1	peak
384.0500	45.36	-10.70	34.66	46.00	-11.34	100	350	peak
444.1900	46.20	-9.10	37.10	46.00	-8.90	100	336	peak

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
44.5500	48.73	-14.97	33.76	40.00	-6.24	100	357	peak
99.8400	48.86	-15.29	33.57	43.50	-9.93	100	301	peak
119.2400	42.62	-11.83	30.79	43.50	-12.71	100	275	peak
143.4900	44.23	-12.80	31.43	43.50	-12.07	100	242	peak
268.6200	44.09	-12.63	31.46	46.00	-14.54	100	275	peak
347.1900	42.55	-11.43	31.12	46.00	-14.88	100	226	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Above 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
BR (GFSK), Low channel								
2385.500	57.73	-9.78	47.95	74.00	-26.05	165	155	peak
2385.500	44.20	-9.78	34.42	54.00	-19.58	165	155	AVG
4804.000	69.03	-2.70	66.33	74.00	-7.67	102	17	peak
4804.000	54.25	-2.70	51.55	54.00	-2.45	102	17	AVG
7206.000	63.84	2.76	66.60	74.00	-7.40	110	308	peak
7206.000	49.72	2.76	52.48	54.00	-1.52	110	308	AVG
BR (GFSK), Middle channel								
4882.000	68.55	-2.67	65.88	74.00	-8.12	105	15	peak
4882.000	53.93	-2.67	51.26	54.00	-2.74	105	15	AVG
7323.000	65.13	3.19	68.32	74.00	-5.68	114	302	peak
7323.000	49.80	3.19	52.99	54.00	-1.01	114	302	AVG
BR (GFSK), High channel								
2487.250	60.90	-8.83	52.07	74.00	-21.93	141	153	peak
2487.250	52.62	-8.83	43.79	54.00	-10.21	141	153	AVG
4960.000	64.74	-2.44	62.30	74.00	-11.70	114	12	peak
4960.000	51.49	-2.44	49.05	54.00	-4.95	114	12	AVG
7440.000	62.45	3.56	66.01	74.00	-7.99	150	311	peak
7440.000	48.90	3.56	52.46	54.00	-1.54	150	311	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
BR (GFSK), Low channel								
2381.100	56.62	-9.82	46.80	74.00	-27.20	196	93	peak
2381.100	44.01	-9.82	34.19	54.00	-19.81	196	93	AVG
4804.000	67.51	-2.70	64.81	74.00	-9.19	137	282	peak
4804.000	53.25	-2.70	50.55	54.00	-3.45	137	282	AVG
7206.000	62.98	2.76	65.74	74.00	-8.26	117	72	peak
7206.000	49.37	2.76	52.13	54.00	-1.87	117	72	AVG
BR (GFSK), Middle channel								
4882.000	66.27	-2.67	63.60	74.00	-10.40	127	267	peak
4882.000	52.55	-2.67	49.88	54.00	-4.12	127	267	AVG
7323.000	63.54	3.19	66.73	74.00	-7.27	113	295	peak
7323.000	49.76	3.19	52.95	54.00	-1.05	113	295	AVG
BR (GFSK), High channel								
2487.460	59.38	-8.83	50.55	74.00	-23.45	207	93	peak
2487.460	52.01	-8.83	43.18	54.00	-10.82	207	93	AVG
4960.000	63.83	-2.44	61.39	74.00	-12.61	103	264	peak
4960.000	50.47	-2.44	48.03	54.00	-5.97	103	264	AVG
7440.000	62.65	3.56	66.21	74.00	-7.79	106	2	peak
7440.000	48.77	3.56	52.33	54.00	-1.67	106	2	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
EDR (π/4-DQPSK), Low channel								
2356.300	57.01	-10.03	46.98	74.00	-27.02	153	153	peak
2356.300	43.51	-10.03	33.48	54.00	-20.52	153	153	AVG
4804.000	69.37	-2.70	66.67	74.00	-7.33	102	23	peak
4804.000	52.58	-2.70	49.88	54.00	-4.12	102	23	AVG
7206.000	63.47	2.76	66.23	74.00	-7.77	104	56	peak
7206.000	47.40	2.76	50.16	54.00	-3.84	104	56	AVG
EDR (π/4-DQPSK), Middle channel								
4882.000	68.53	-2.67	65.86	74.00	-8.14	105	16	peak
4882.000	52.10	-2.67	49.43	54.00	-4.57	105	16	AVG
7323.000	66.79	3.19	69.98	74.00	-4.02	110	312	peak
7323.000	49.29	3.19	52.48	54.00	-1.52	110	312	AVG
EDR (π/4-DQPSK), High channel								
2483.560	68.25	-8.89	59.36	74.00	-14.64	144	227	peak
2483.560	50.51	-8.89	41.62	54.00	-12.38	144	227	AVG
4960.000	66.91	-2.44	64.47	74.00	-9.53	151	13	peak
4960.000	51.17	-2.44	48.73	54.00	-5.27	151	13	AVG
7440.000	68.59	3.56	72.15	74.00	-1.85	121	306	peak
7440.000	49.40	3.56	52.96	54.00	-1.04	121	306	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
EDR (π/4-DQPSK), Low channel								
2383.900	57.30	-9.80	47.50	74.00	-26.50	190	93	peak
2383.900	43.40	-9.80	33.60	54.00	-20.40	190	93	AVG
4804.000	67.43	-2.70	64.73	74.00	-9.27	123	268	peak
4804.000	51.43	-2.70	48.73	54.00	-5.27	123	268	AVG
7206.000	62.42	2.76	65.18	74.00	-8.82	119	297	peak
7206.000	46.56	2.76	49.32	54.00	-4.68	119	297	AVG
EDR (π/4-DQPSK), Middle channel								
4882.000	66.09	-2.67	63.42	74.00	-10.58	111	291	peak
4882.000	50.56	-2.67	47.89	54.00	-6.11	111	291	AVG
7323.000	65.01	3.19	68.20	74.00	-5.80	101	7	peak
7323.000	48.40	3.19	51.59	54.00	-2.41	101	7	AVG
EDR (π/4-DQPSK), High channel								
2483.770	66.72	-8.88	57.84	74.00	-16.16	107	287	peak
2483.770	49.79	-8.88	40.91	54.00	-13.09	107	287	AVG
4960.000	65.04	-2.44	62.60	74.00	-11.40	110	281	peak
4960.000	50.06	-2.44	47.62	54.00	-6.38	110	281	AVG
7440.000	68.02	3.56	71.58	74.00	-2.42	108	1	peak
7440.000	49.38	3.56	52.94	54.00	-1.06	108	1	AVG

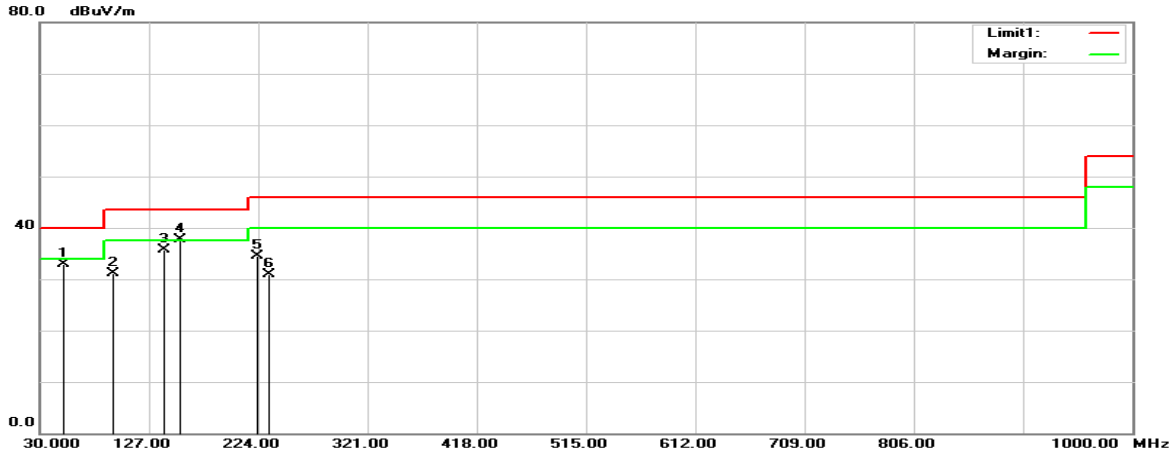
Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Model: AirCozy Premium_N_VA2

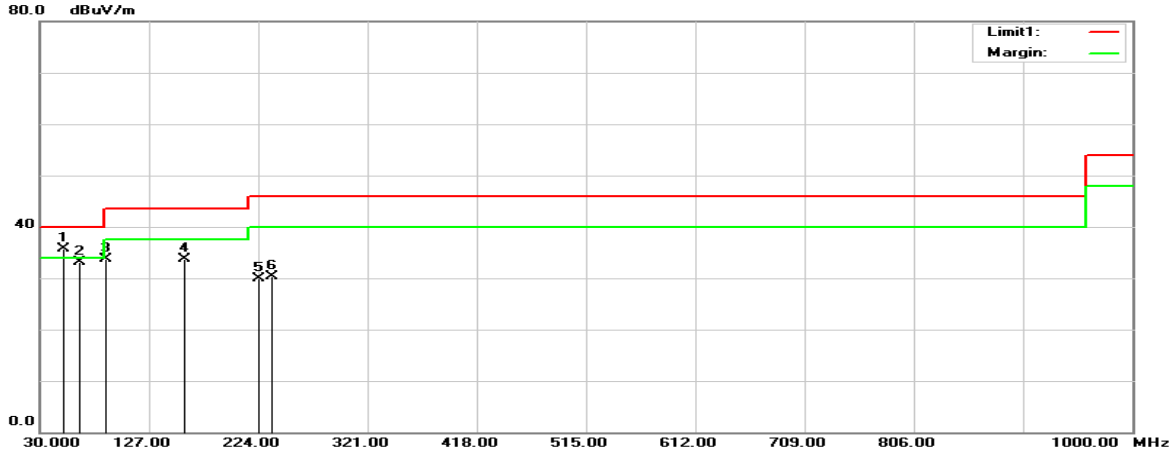
Horizontal

30MHz-1GHz:



Vertical

30MHz-1GHz:



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Below 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
51.3400	48.18	-15.20	32.98	40.00	-7.02	100	138	peak
94.9900	44.67	-13.56	31.11	43.50	-12.39	100	43	peak
140.5800	44.94	-9.14	35.80	43.50	-7.70	100	35	peak
155.1300	47.19	-9.46	37.73	43.50	-5.77	100	38	QP
223.0300	45.27	-10.68	34.59	46.00	-11.41	100	65	peak
233.7000	41.09	-10.10	30.99	46.00	-15.01	100	65	peak

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
51.3400	50.88	-15.20	35.68	40.00	-4.32	100	80	QP
65.8900	48.19	-15.04	33.15	40.00	-6.85	100	310	QP
88.2000	48.64	-14.99	33.65	43.50	-9.85	100	0	peak
159.0100	43.13	-9.50	33.63	43.50	-9.87	100	55	peak
224.9700	40.45	-10.64	29.81	46.00	-16.19	100	0	peak
235.6400	40.21	-9.98	30.23	46.00	-15.77	100	0	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

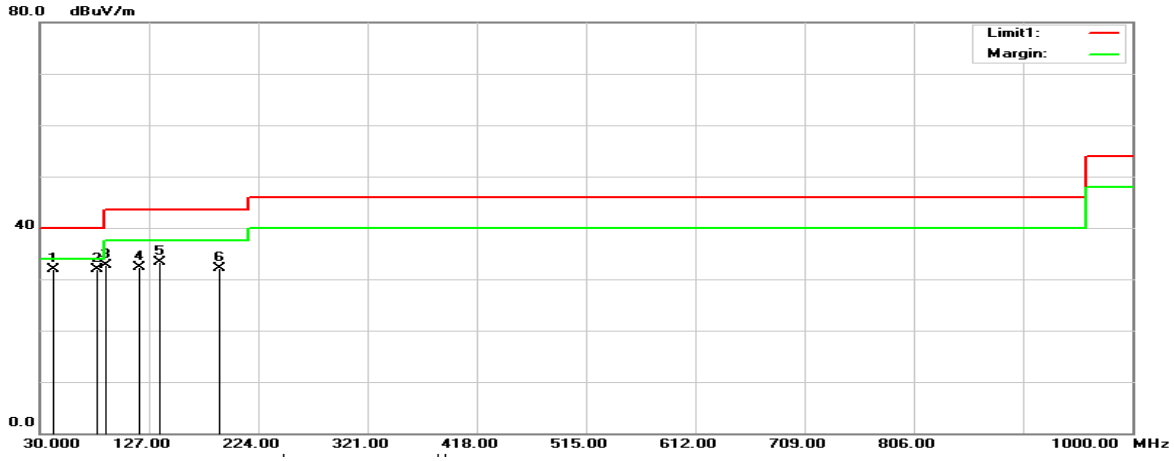
Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Transmitting simultaneously test:

BT and BLE mode transmitting simultaneously

30MHz-1GHz

Horizontal



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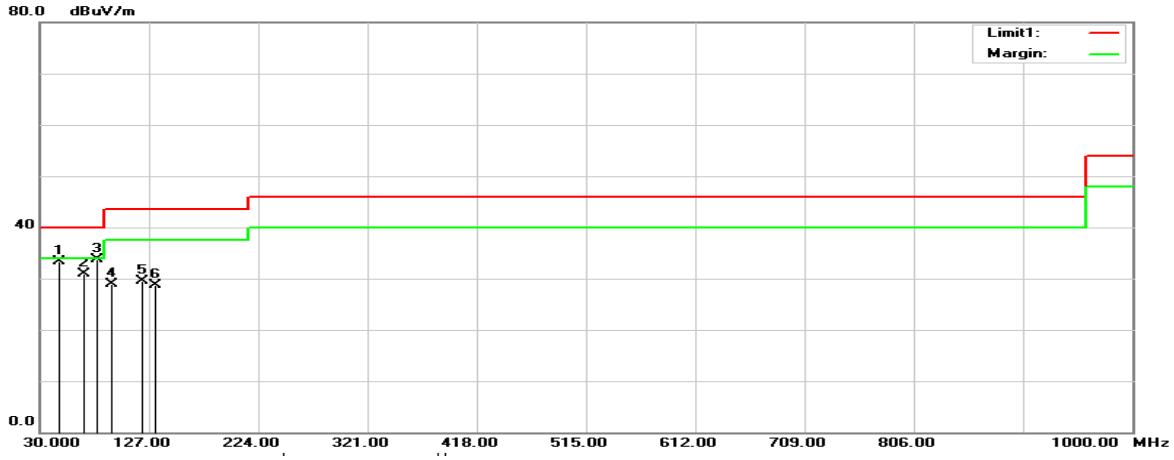

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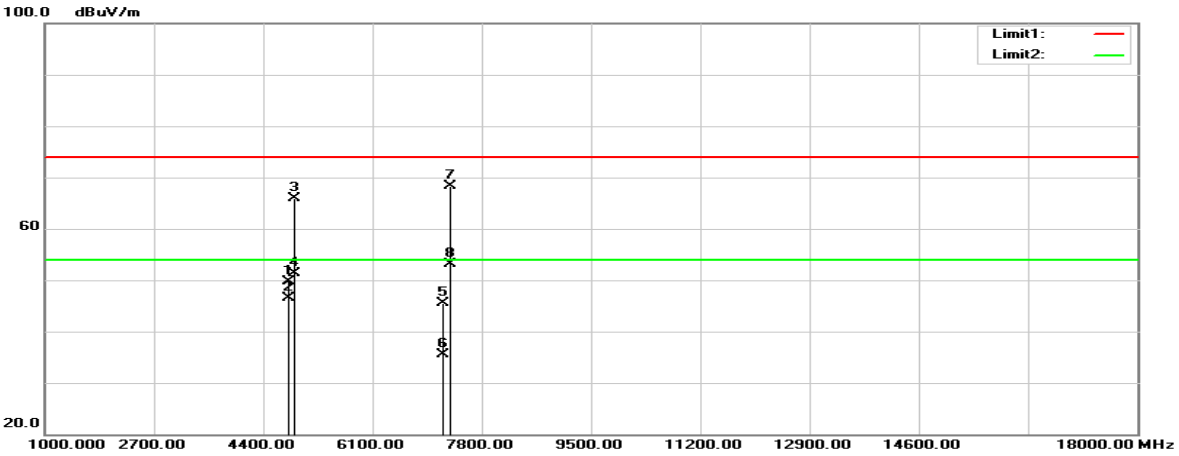
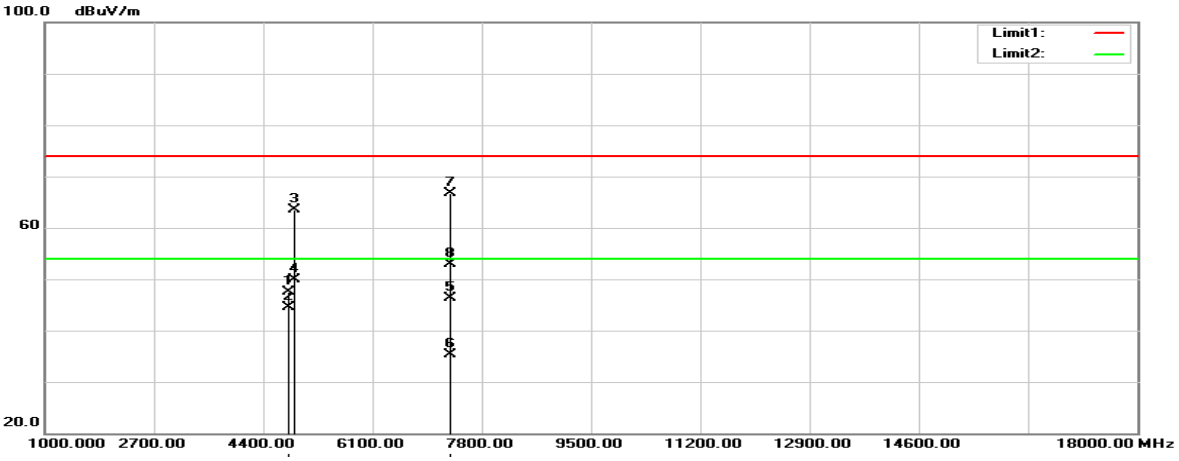
1GHz-18GHz:

Horizontal



Vertical



Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Below 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
41.6400	42.60	-10.69	31.91	40.00	-8.09	100	150	peak
81.4100	47.15	-15.29	31.86	40.00	-8.14	100	322	peak
88.2000	47.65	-14.99	32.66	43.50	-10.84	100	74	peak
118.2700	40.83	-8.62	32.21	43.50	-11.29	100	143	peak
136.7000	42.12	-8.77	33.35	43.50	-10.15	100	66	peak
190.0500	42.59	-10.55	32.04	43.50	-11.46	100	81	peak

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
47.4600	47.19	-13.97	33.22	40.00	-6.78	100	206	peak
69.7700	45.50	-14.68	30.82	40.00	-9.18	100	93	peak
81.4100	48.98	-15.29	33.69	40.00	-6.31	100	61	peak
94.0200	42.70	-13.77	28.93	43.50	-14.57	100	123	peak
121.1800	37.85	-8.30	29.55	43.50	-13.95	100	334	peak
132.8200	37.20	-8.40	28.80	43.50	-14.70	100	312	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Above 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
4804.000	52.36	-2.70	49.66	74.00	-24.34	122	57	peak
4804.000	49.21	-2.70	46.51	54.00	-7.49	122	57	AVG
4882.000	68.57	-2.67	65.90	74.00	-8.10	106	13	peak
4882.000	53.94	-2.67	51.27	54.00	-2.73	106	13	AVG
7206.000	42.81	2.76	45.57	74.00	-28.43	150	167	peak
7206.000	32.68	2.76	35.44	54.00	-18.56	150	167	AVG
7323.000	65.17	3.19	68.36	74.00	-5.64	112	305	peak
7323.000	49.82	3.19	53.01	54.00	-0.99	112	305	AVG

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
4804.000	50.13	-2.70	47.43	74.00	-26.57	151	289	peak
4804.000	47.22	-2.70	44.52	54.00	-9.48	151	289	AVG
4882.000	66.23	-2.67	63.56	74.00	-10.44	127	267	peak
4882.000	52.56	-2.67	49.89	54.00	-4.11	127	267	AVG
7306.000	43.18	3.14	46.32	74.00	-27.68	150	192	peak
7306.000	32.26	3.14	35.40	54.00	-18.60	150	192	AVG
7323.000	63.52	3.19	66.71	74.00	-7.29	113	295	peak
7323.000	49.76	3.19	52.95	54.00	-1.05	113	295	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

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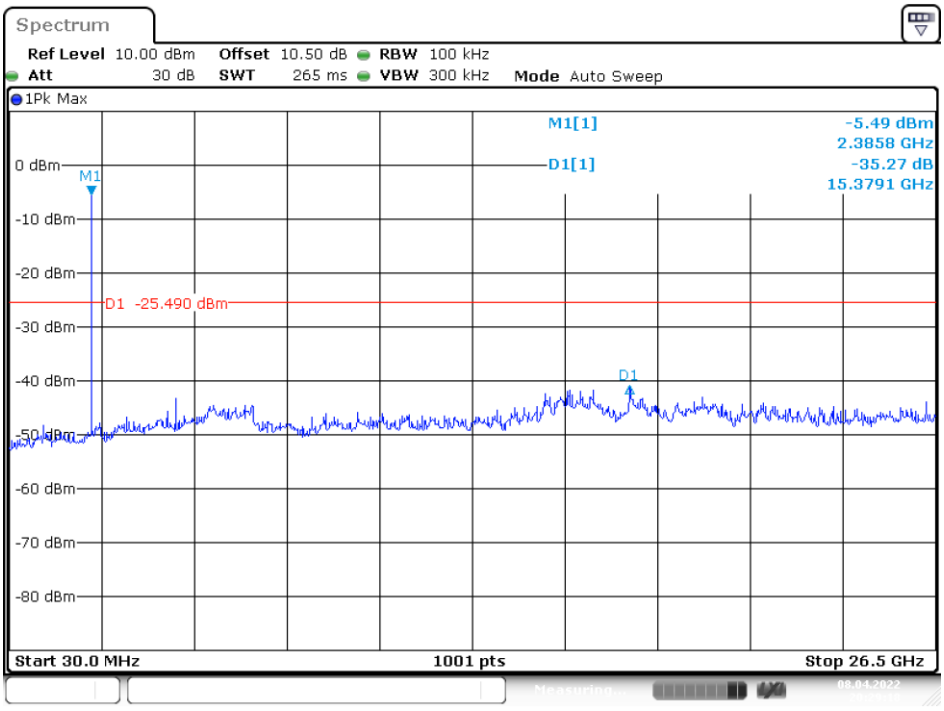
Conducted Spurious Emissions:

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
BR Mode (GFSK)				
Low	2402	35.27	≥ 20	PASS
Mid	2441	36.97	≥ 20	PASS
High	2480	30.94	≥ 20	PASS
EDR Mode (π/4-DQPSK):				
Low	2402	34.57	≥ 20	PASS
Mid	2441	31.15	≥ 20	PASS
High	2480	34.61	≥ 20	PASS

BR Mode (GFSK)

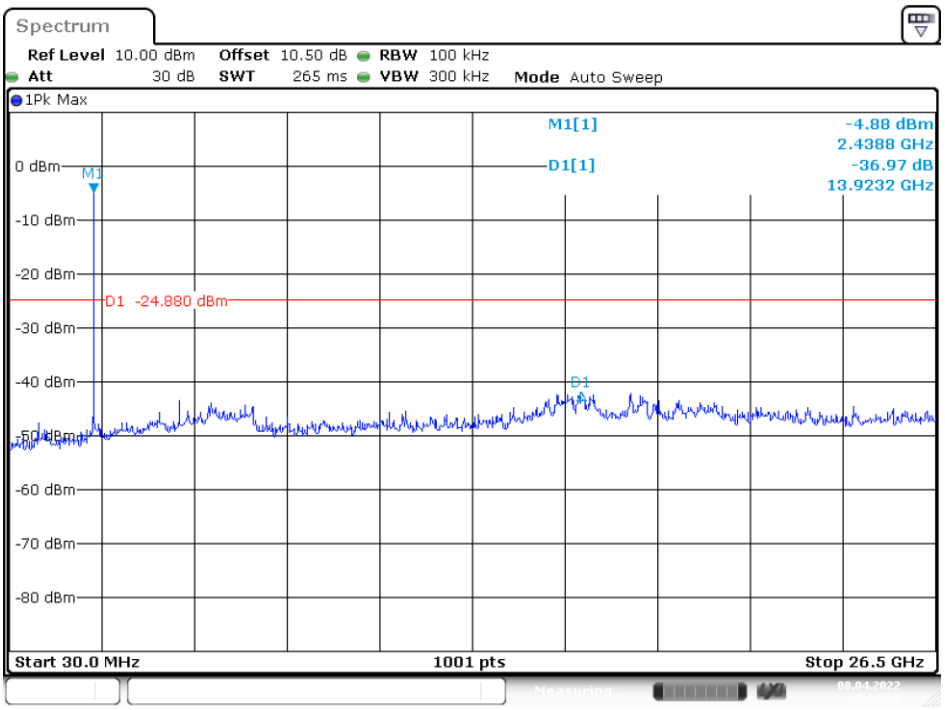
Low Channel



Date: 8.APR.2022 20:29:18

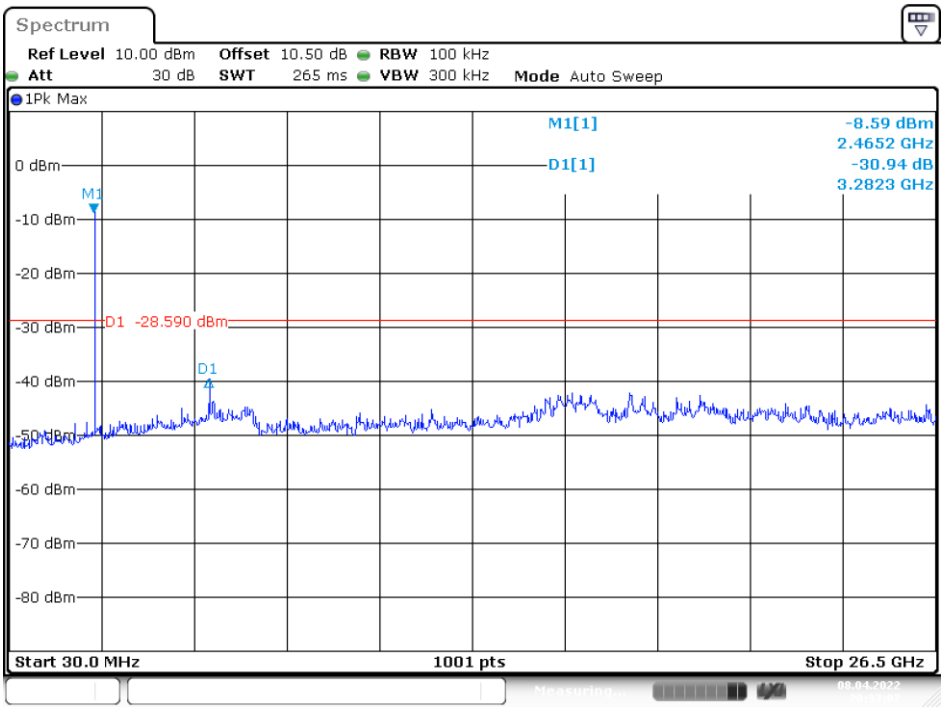
Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Middle Channel



Date: 8.APR.2022 20:30:36

High Channel



Date: 8.APR.2022 20:33:07

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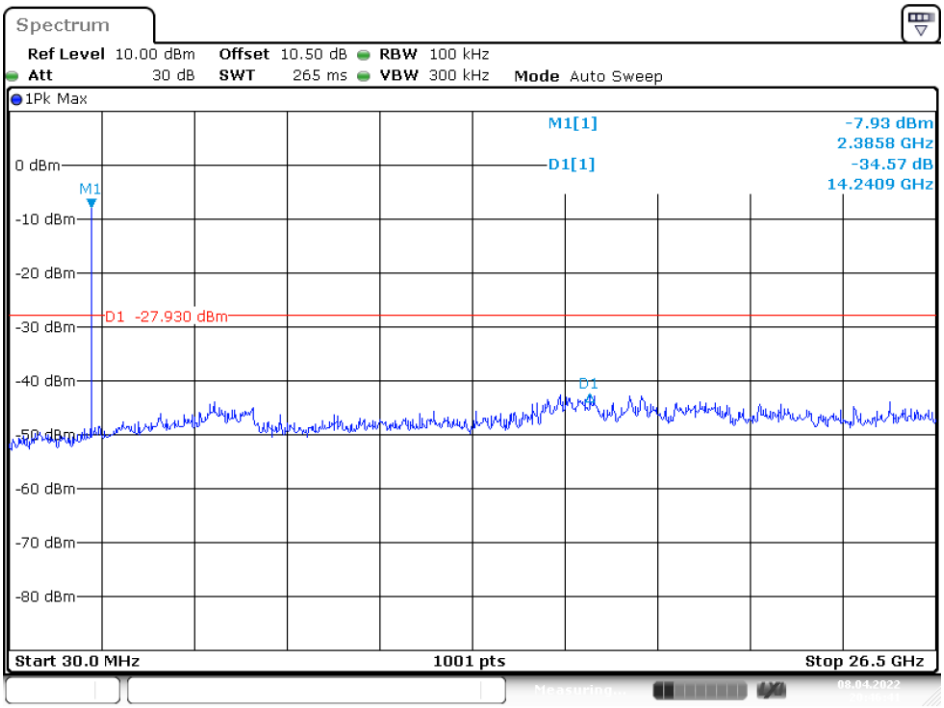
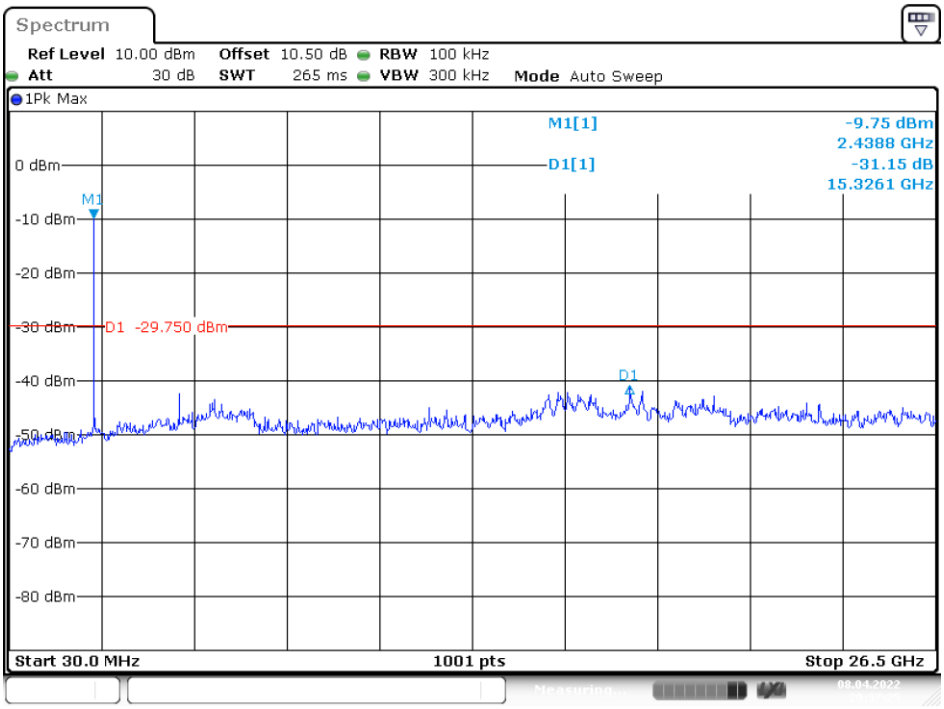
EDR Mode (π/4-DQPSK)

Low Channel



Date: 8.APR.2022 20:46:41

Middle Channel



Date: 8.APR.2022 20:37:25

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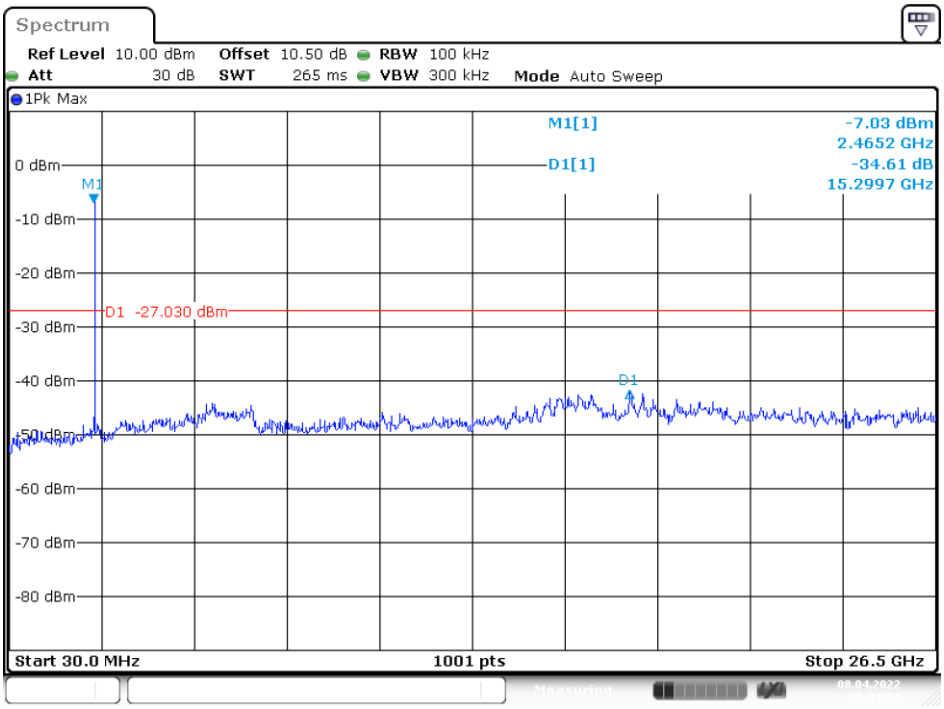
High Channel



Date: 8.APR.2022 20:34:54

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9. FCC §15.247(a)(1) – 20 dB Emission Bandwidth

9.1. Applicable Standard

According to FCC §15.247(a) (1) the maximum 20 dB bandwidth of the hopping channel shall be presented.

9.2. Test Procedure

(1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
(2) Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
(3) Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
(4) Repeat above procedures until all frequencies measured were complete.

9.3. Test Results

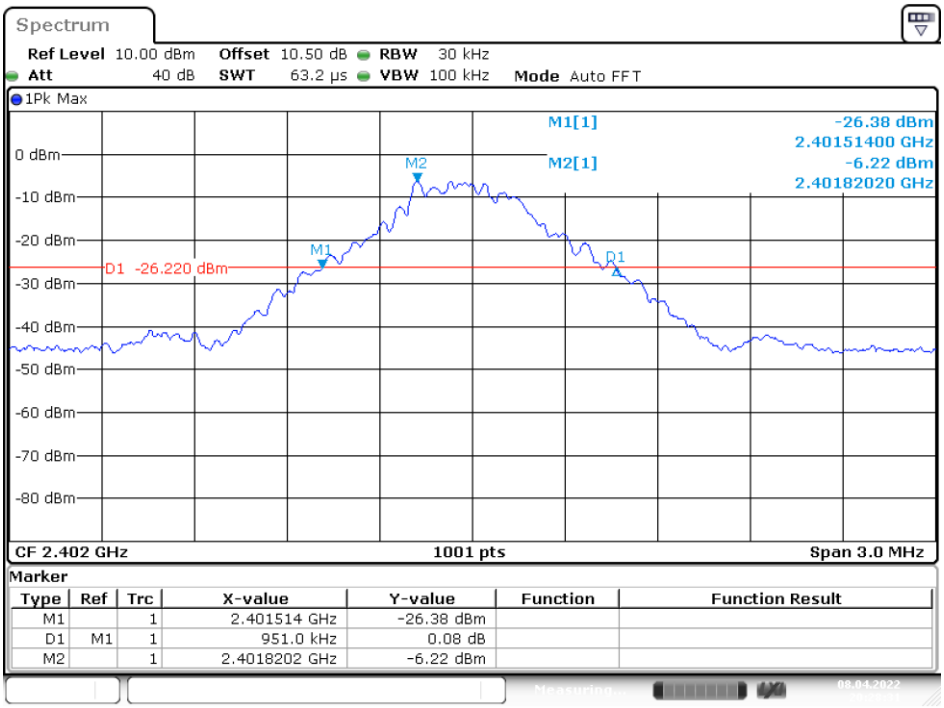
Channel	Frequency (MHz)	20 dBc BW (MHz)
BR Mode (GFSK)		
Low	2402	0.95
Middle	2441	0.95
High	2480	0.95
EDR Mode (π/4-DQPSK)		
Low	2402	1.31
Middle	2441	1.32
High	2480	1.32

Please refer to the following plots

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

BR Mode (GFSK)

Low Channel



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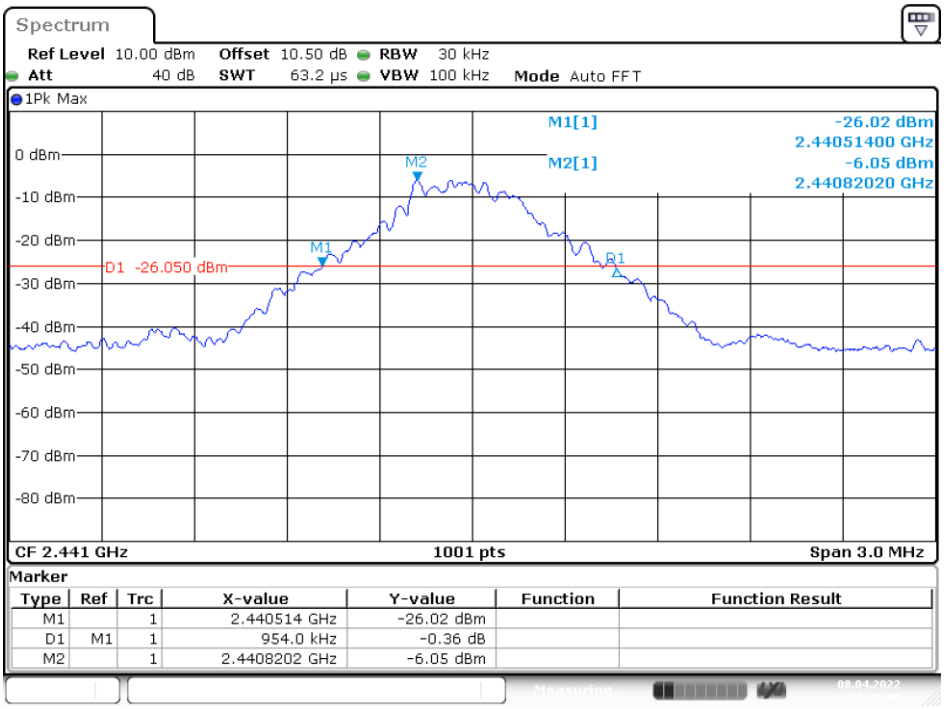
Middle Channel



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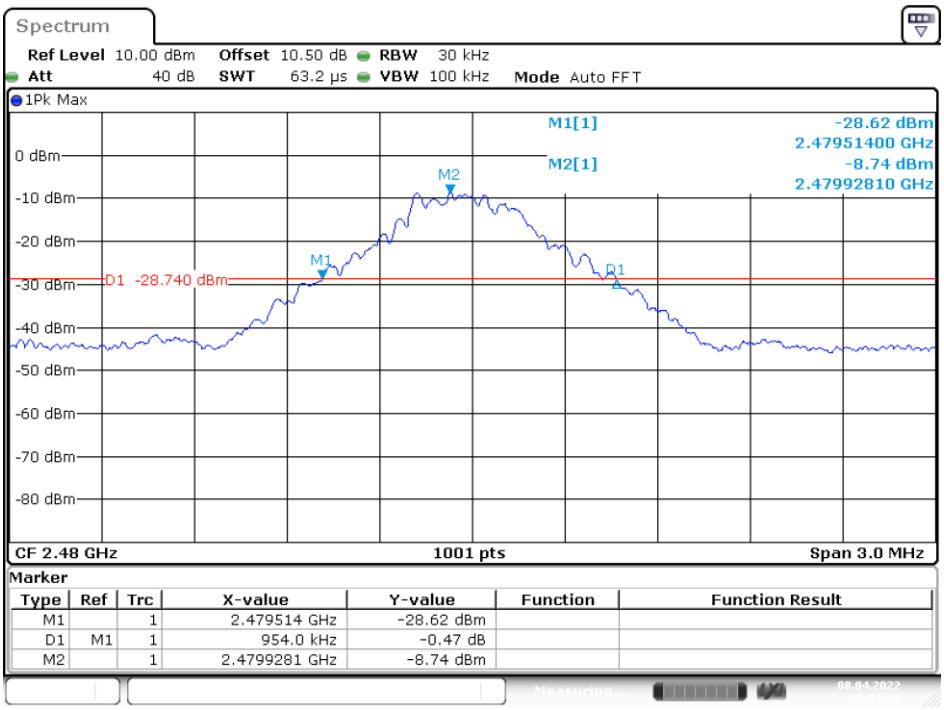
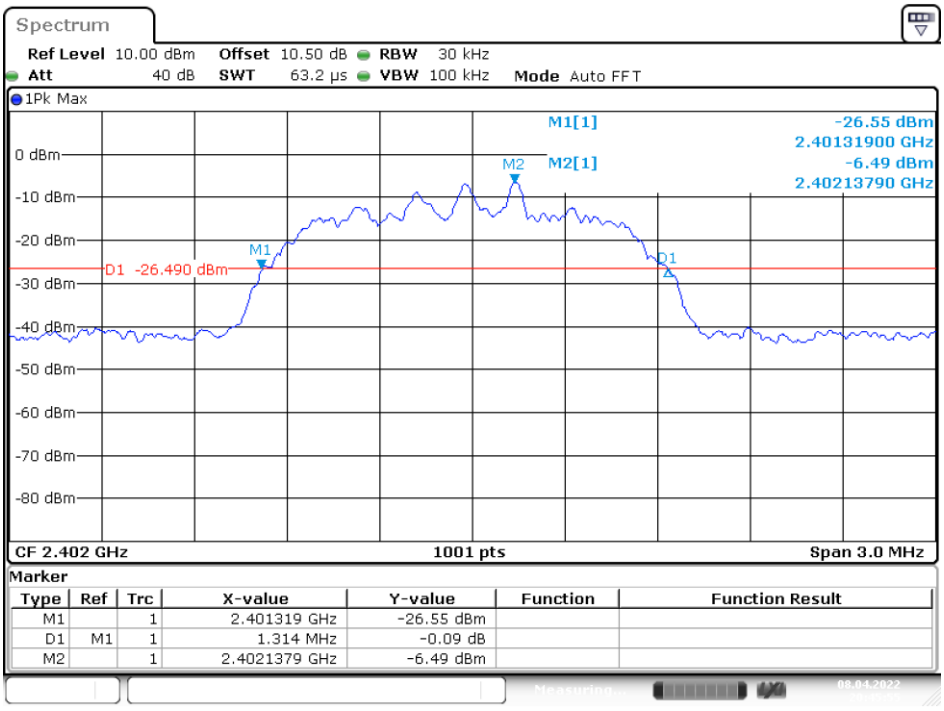
High Channel



Date: 8.APR.2022 20:31:37

EDR Mode (π/4-DQPSK)

Low Channel



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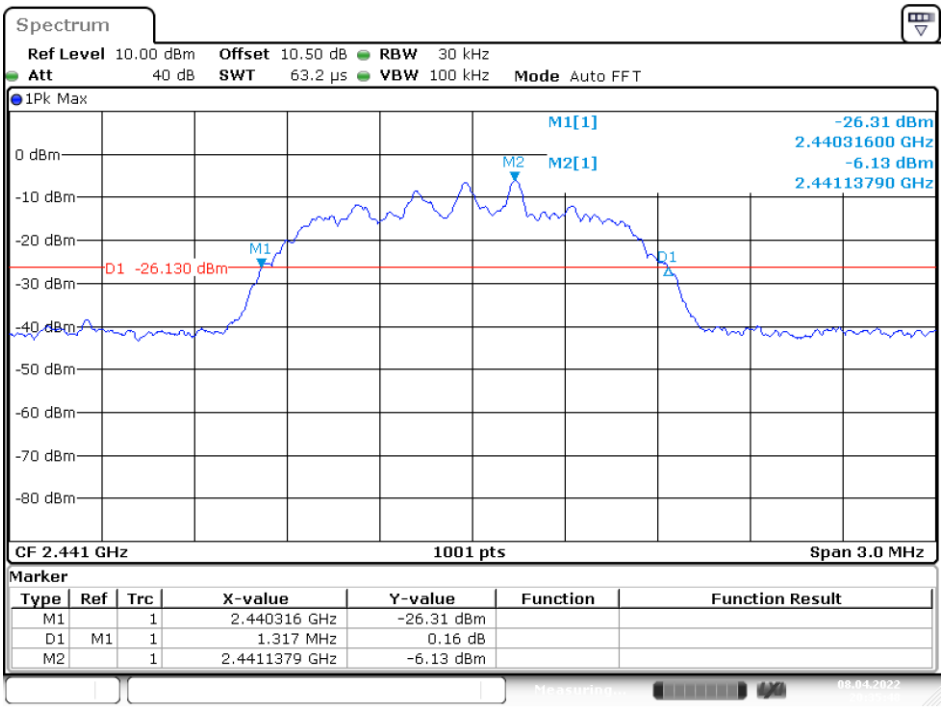
Middle Channel



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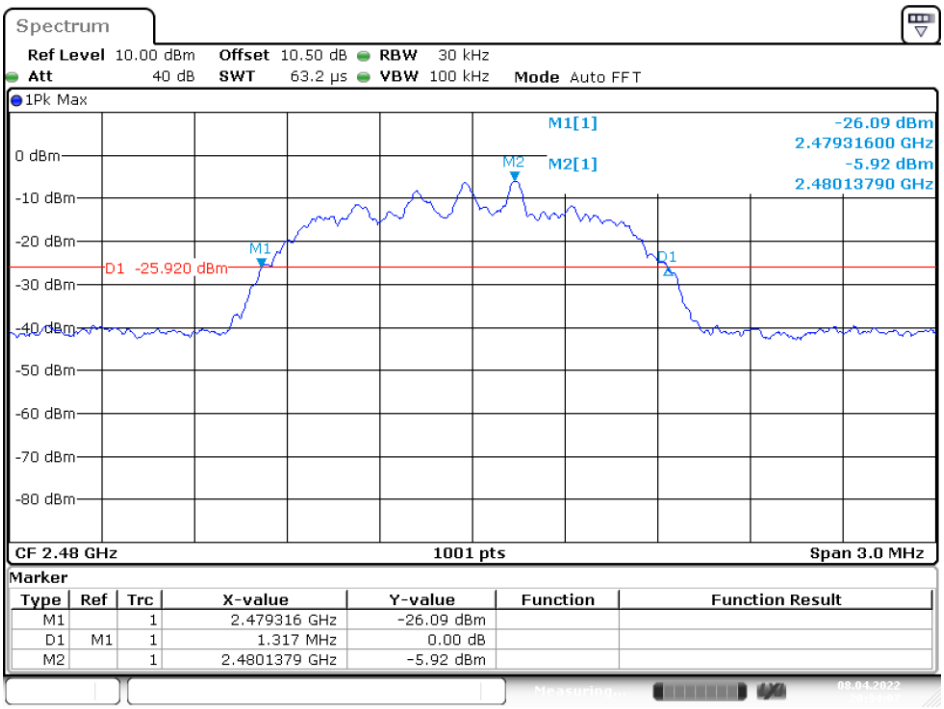
High Channel



Date: 8.APR.2022 20:34:07

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10. FCC §15.247(a)(1) – Channel Separation Test

10.1. Applicable Standard

According to FCC §15.247(a) (1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

10.2. Test Procedure

1. Set the EUT in transmitting mode, max hold the channel.
2. Set the adjacent channel of the EUT and max hold another trace.
3. Measure the channel separation.

10.3. Test Results

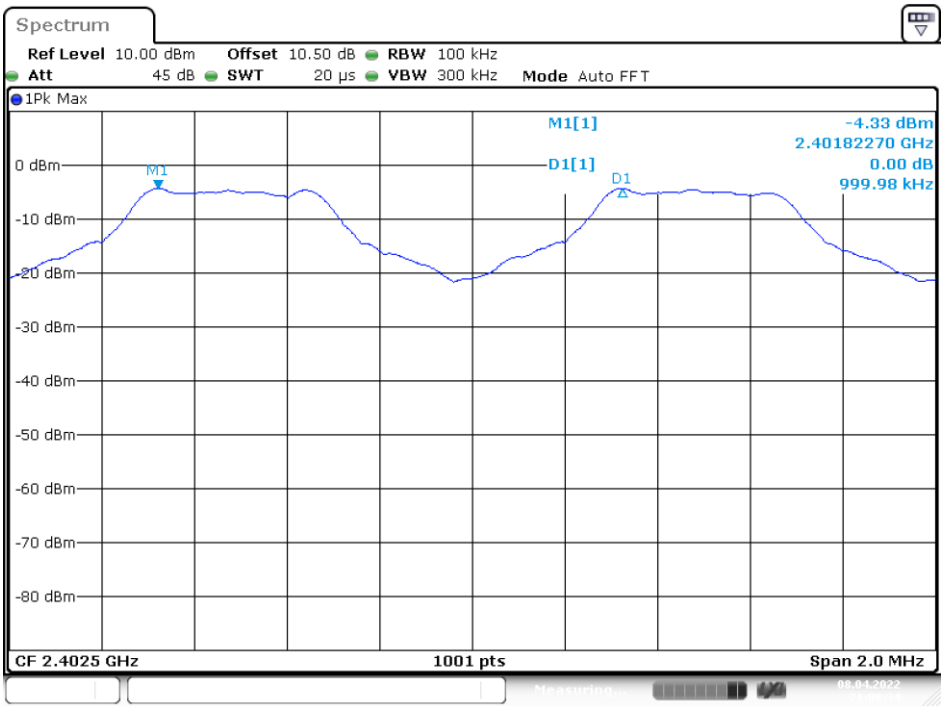
Channel	Channel Separation (MHz)	20 dBc BW (MHz)	Two-thirds of the 20 dB bandwidth (MHz)	Channel Separation Limit	Result
BR Mode (GFSK)					
Low	1	0.95	0.634	>two-thirds of the 20 dB bandwidth	Compliance
Middle	1	0.95	0.634	>two-thirds of the 20 dB bandwidth	Compliance
High	1	0.95	0.634	>two-thirds of the 20 dB bandwidth	Compliance
EDR Mode (π/4-DQPSK)					
Low	1	1.31	0.876	>two-thirds of the 20 dB bandwidth	Compliance
Middle	1	1.32	0.878	>two-thirds of the 20 dB bandwidth	Compliance
High	1	1.32	0.878	>two-thirds of the 20 dB bandwidth	Compliance

Please refer to the following plots.

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

BR Mode (GFSK)

Low Channel



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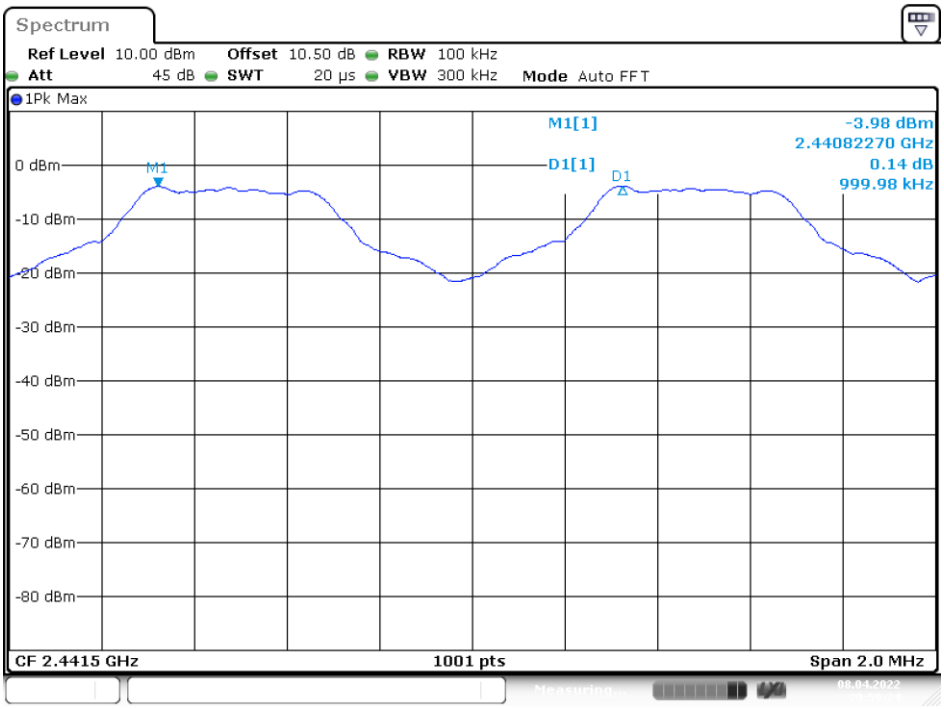
Middle Channel



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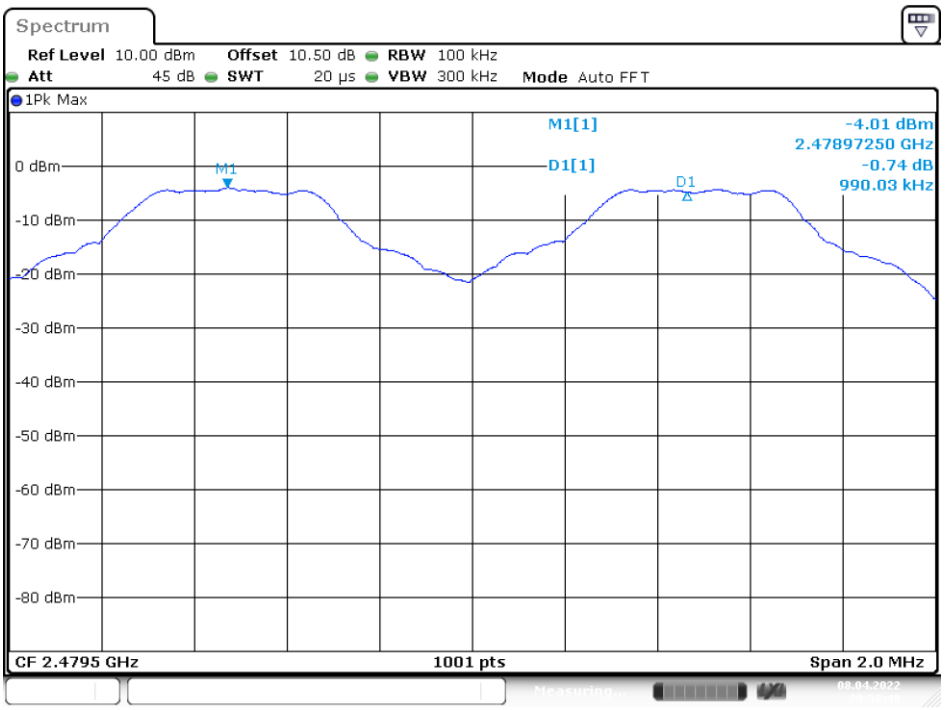
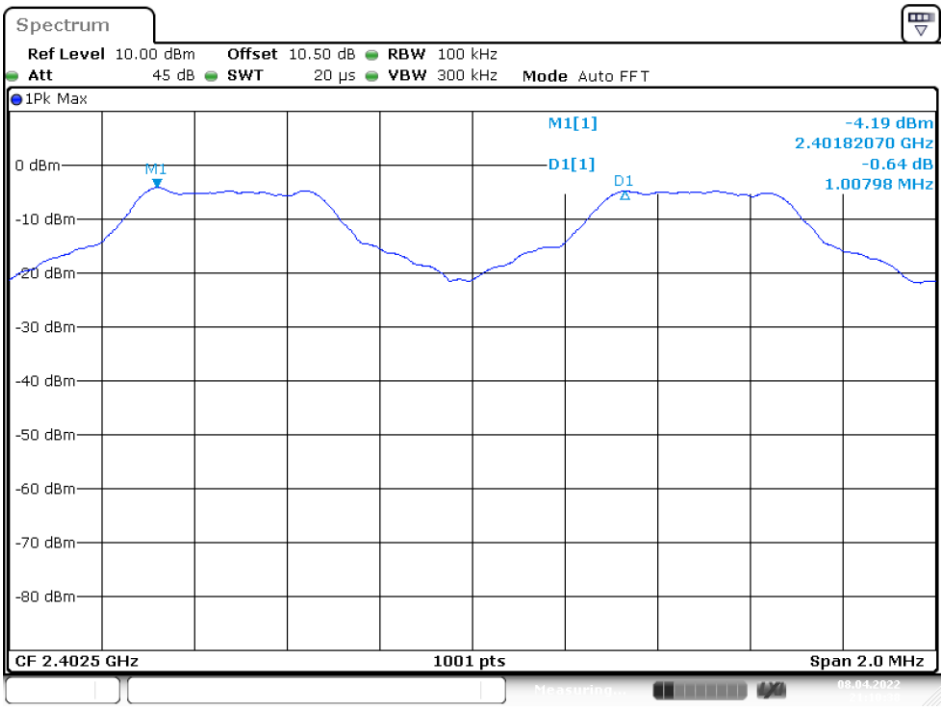
High Channel



Date: 8.APR.2022 20:58:49

EDR Mode (π/4-DQPSK)

Low Channel



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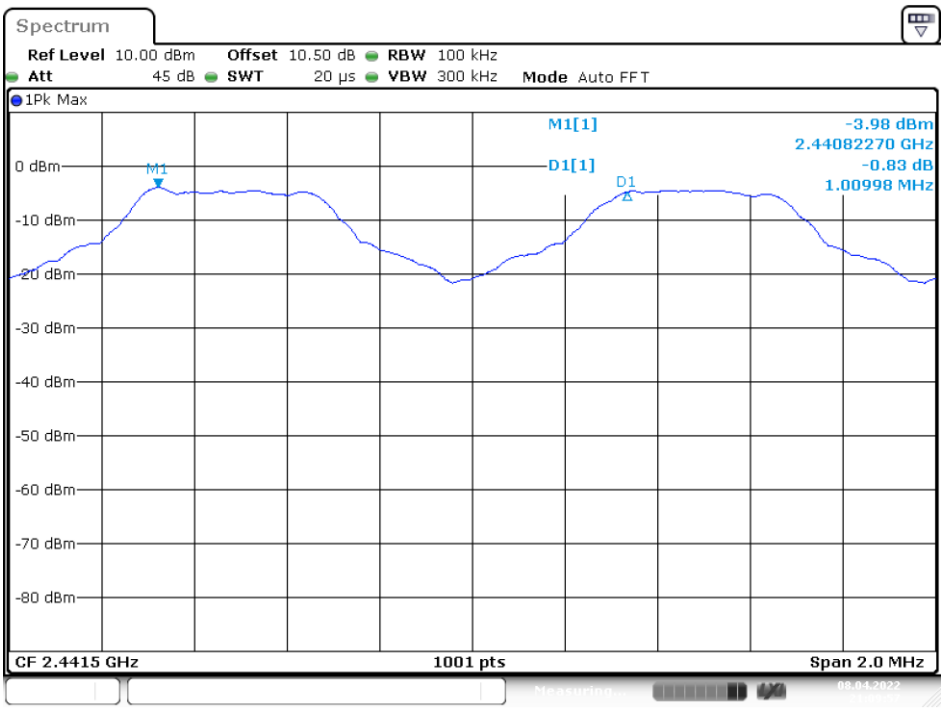
Middle Channel



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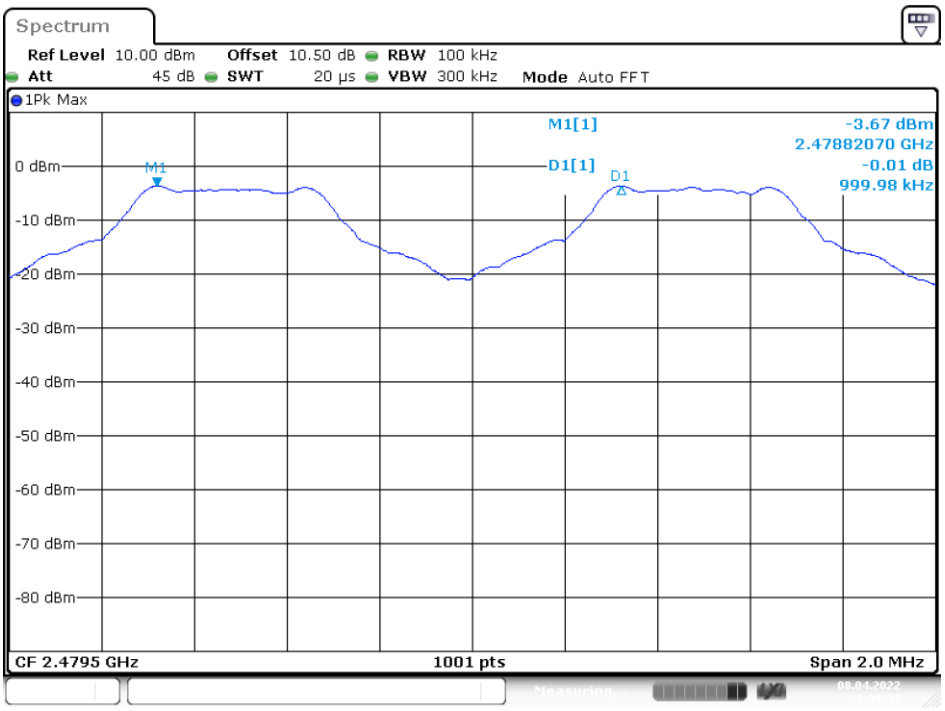
High Channel



Date: 8.APR.2022 21:09:34

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11. FCC§15.247(a)(1)(iii) –Time of Occupancy (Dwell Time)

11.1. Applicable Standard

According to FCC §15.247(a) (1) (iii).

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

11.2. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel RBW ≤ channel spacing and where possible RBW should be set >> 1/T, where T is the expected dwell time per channel Sweep = as necessary to capture the entire dwell time per hopping channel Detector function = peak Trace = max hold

Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements.

Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) x (period specified in the requirements / analyzer sweep time)

The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation.

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11.3. Test Results

Test mode: BR mode / 2402 ~ 2480MHz (GFSK)						
Mode	**Pulse Time (ms)**	**Hopping Number**	**Period Time (s)**	**Total of Dwell (ms)**	**Limit (ms)**	**Result**
DH1	0.370	320	31.6	118.40	<400	PASS
DH3	1.627	110	31.6	178.97	<400	PASS
DH5	2.877	70	31.6	201.39	<400	PASS
Test mode: EDR mode / 2402 ~ 2480MHz (π/4-DQPSK)						
Mode	**Pulse Time (ms)**	**Hopping Number**	**Period Time (s)**	**Total of Dwell (ms)**	**Limit (ms)**	**Result**
2DH1	0.383	320	31.6	122.56	<400	PASS
2DH3	1.639	150	31.6	245.85	<400	PASS
2DH5	2.885	60	31.6	173.10	<400	PASS

Note 1: A period time = 0.4*79 = 31.6 (s), Total of Dwell=Pulse Time * Hopping Number

Note 2: Hopping Number = Hopping Number/10 * 10

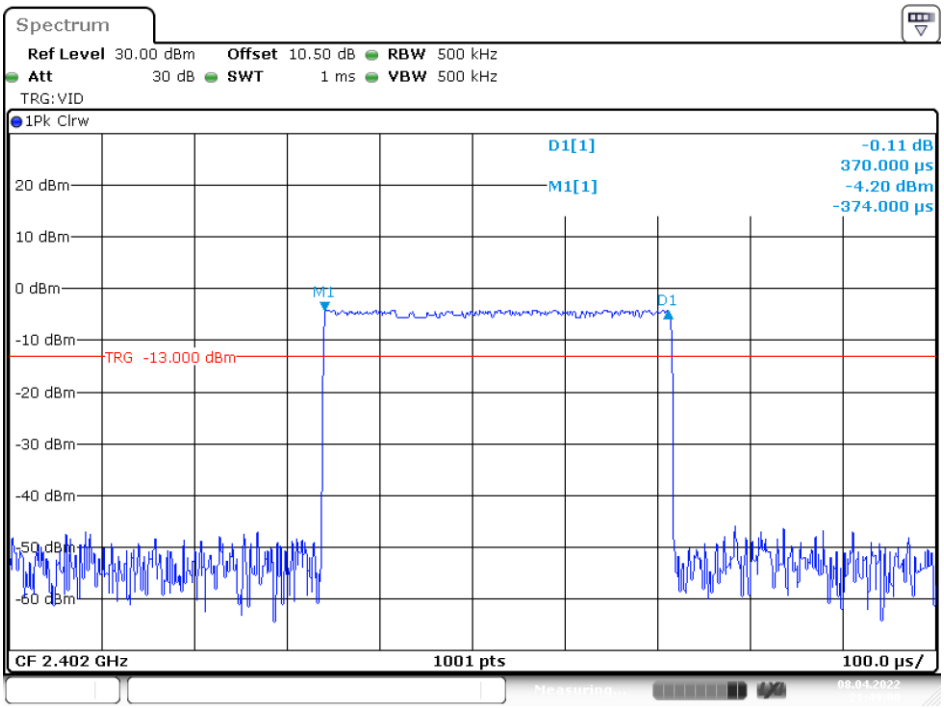
Note 3: Hopping Number/10 = Total of highest signals in 3.16s. (Second high signals were other channel)

Please refer to the following plots

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

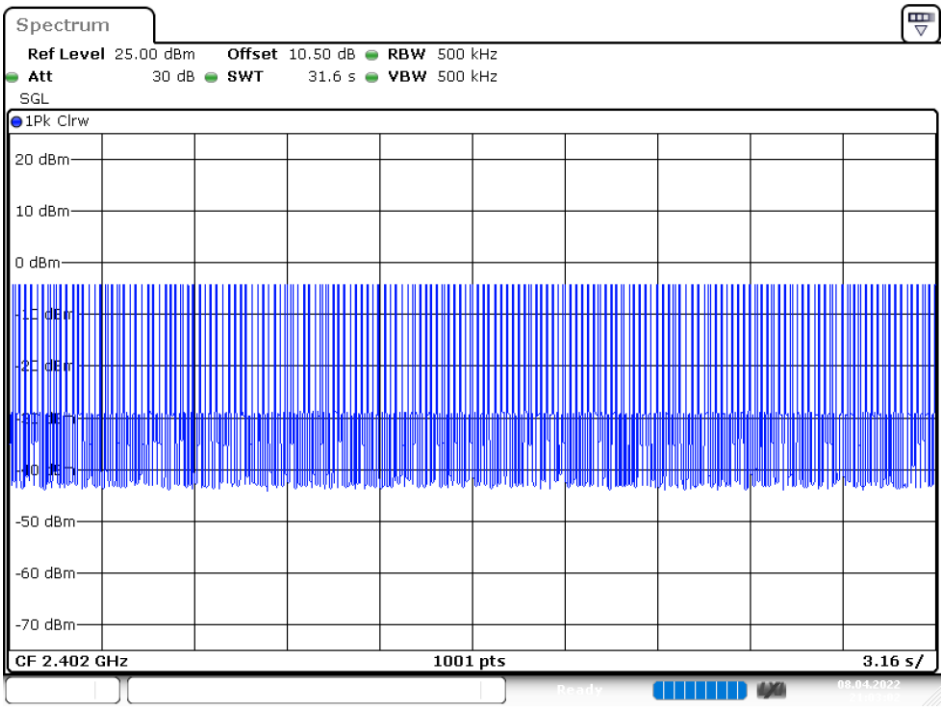
BR Mode (GFSK)

DH1: Pulse Width



Date: 8.APR.2022 21:49:00

DH1: Hopping Number

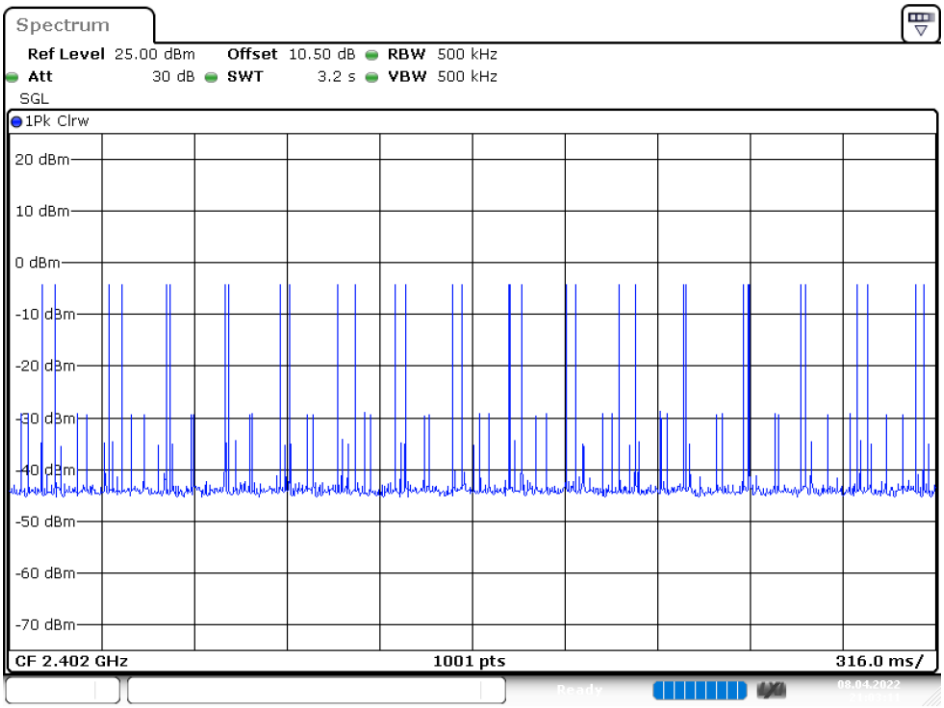


Date: 8.APR.2022 21:03:02

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

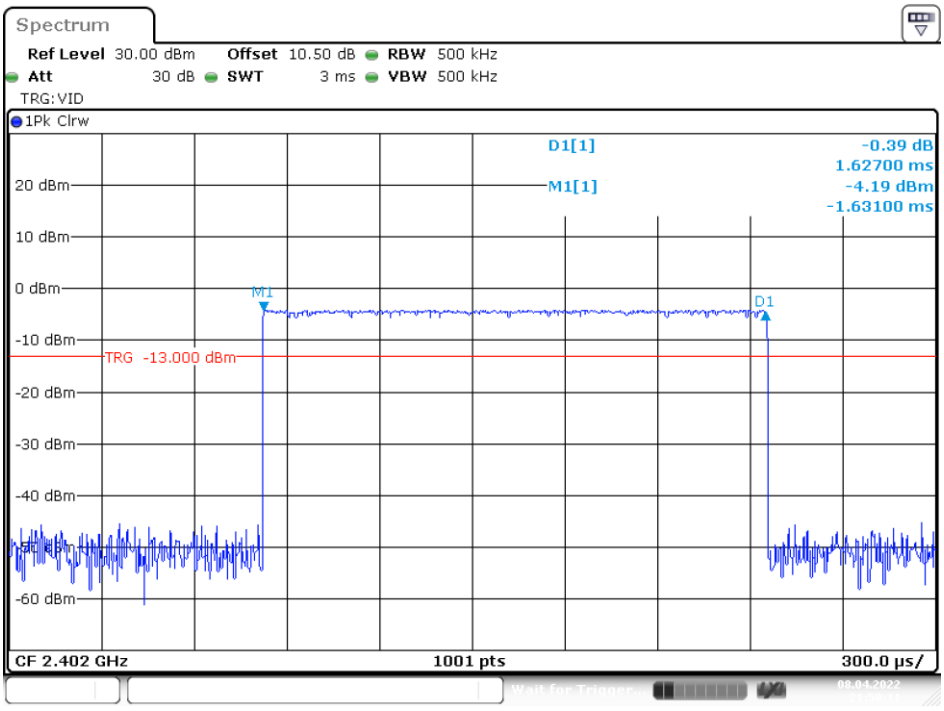
DH1: Hopping Number /10

(Hopping Number = 32 in 1/10 period of highest signals, Second High signals were other channel)



Date: 8.APR.2022 21:03:11

DH3: Pulse Width



Date: 8.APR.2022 21:50:12

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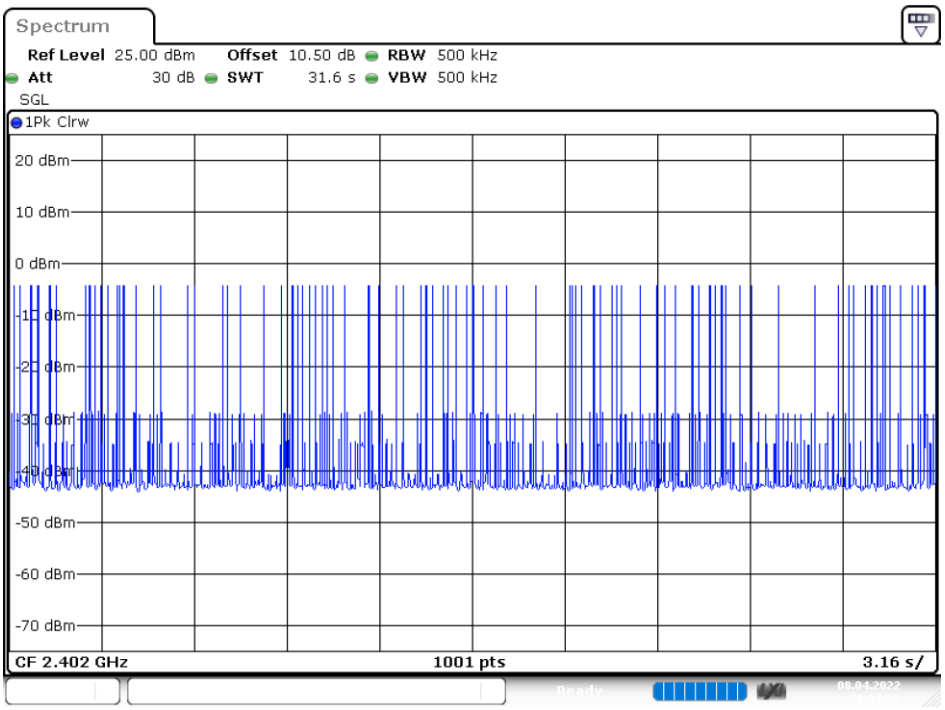
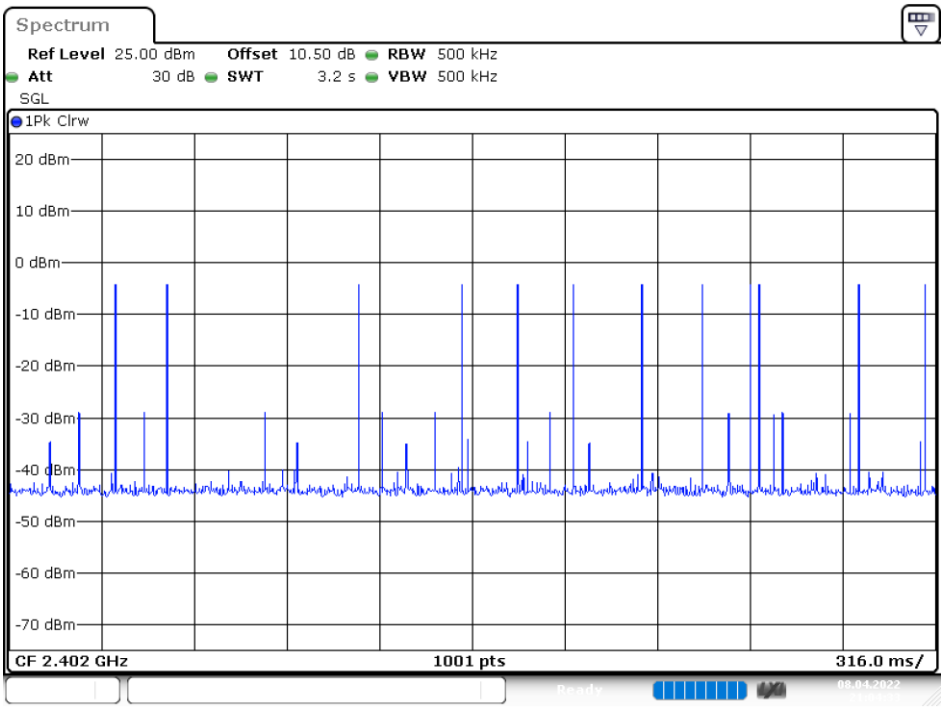
DH3: Hopping Number



Date: 8.APR.2022 21:04:26

DH3: Hopping Number /10

(Hopping Number = 11 in 1/10 period of highest signals, Second High signals were other channel)



Date: 8.APR.2022 21:04:33

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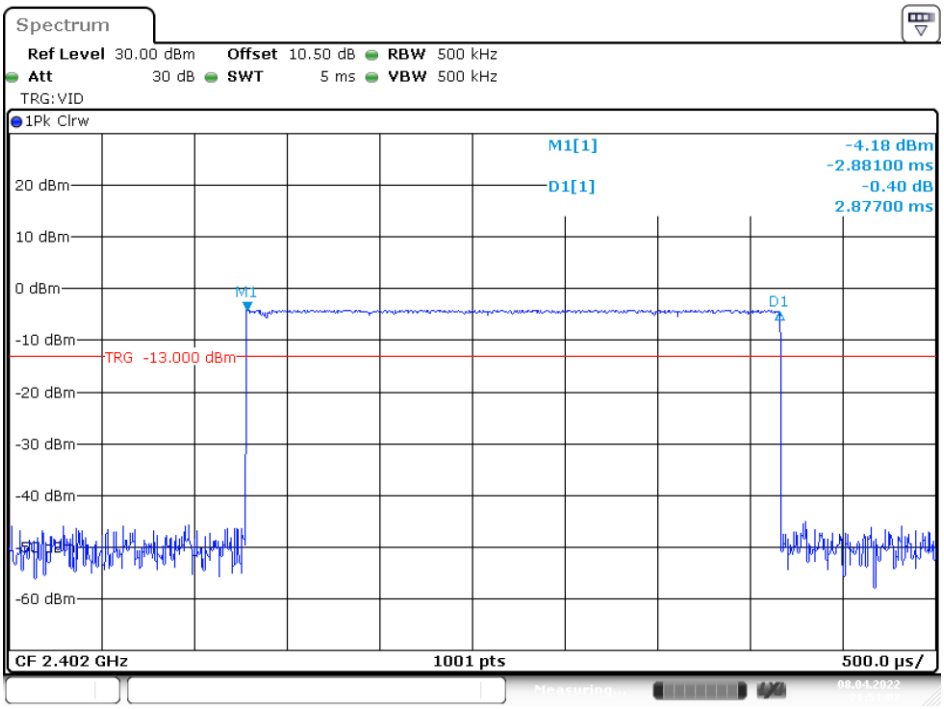
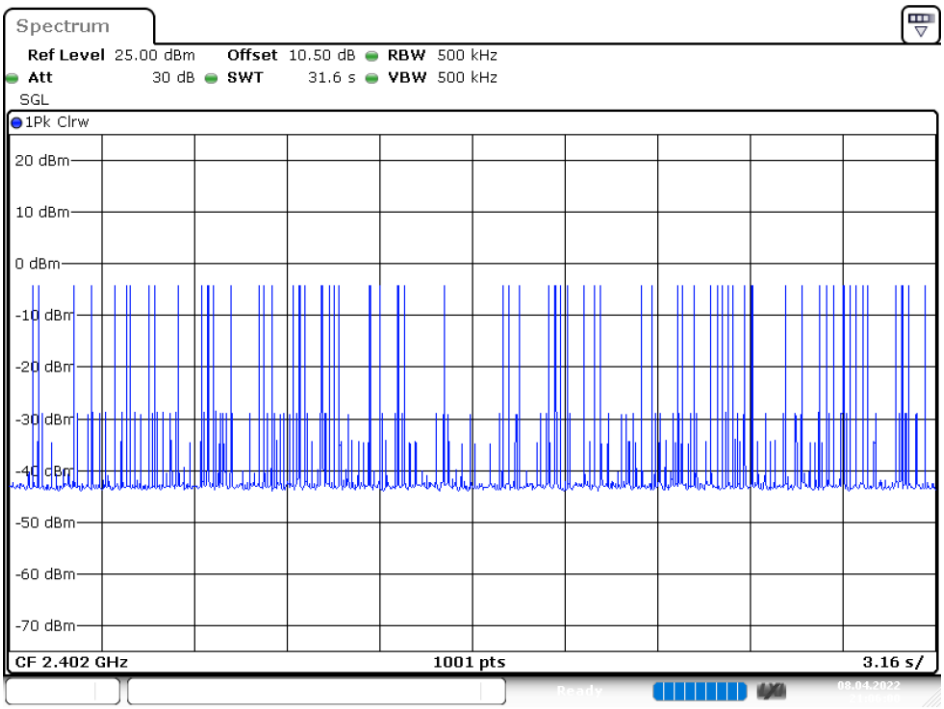
DH5: Pulse Width



Date: 8.APR.2022 21:51:02

DH5: Hopping Number

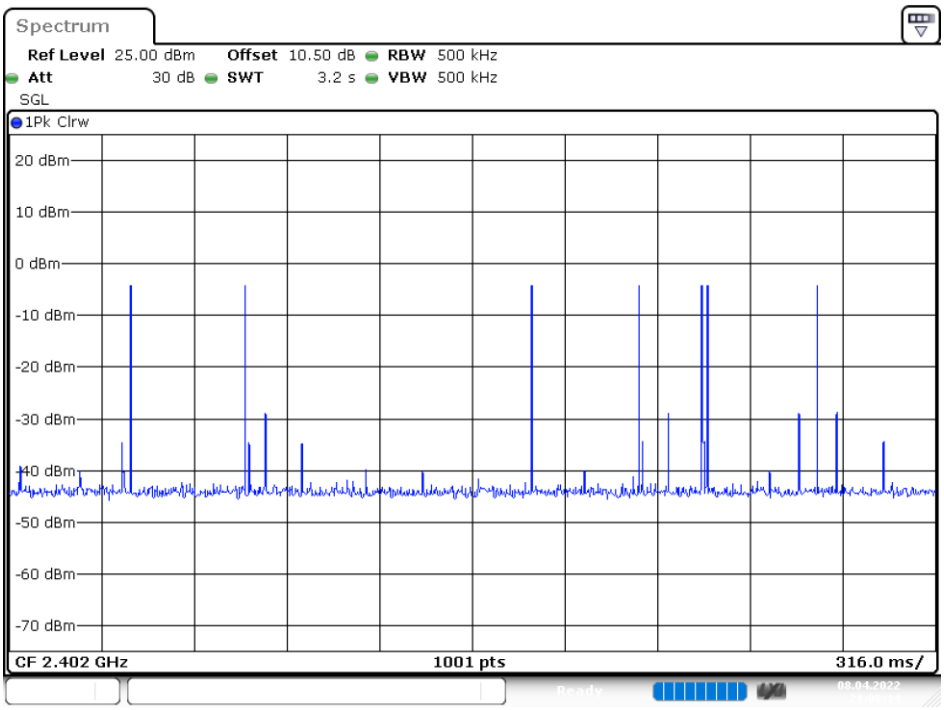


Date: 8.APR.2022 21:06:00

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

DH5: Hopping Number /10

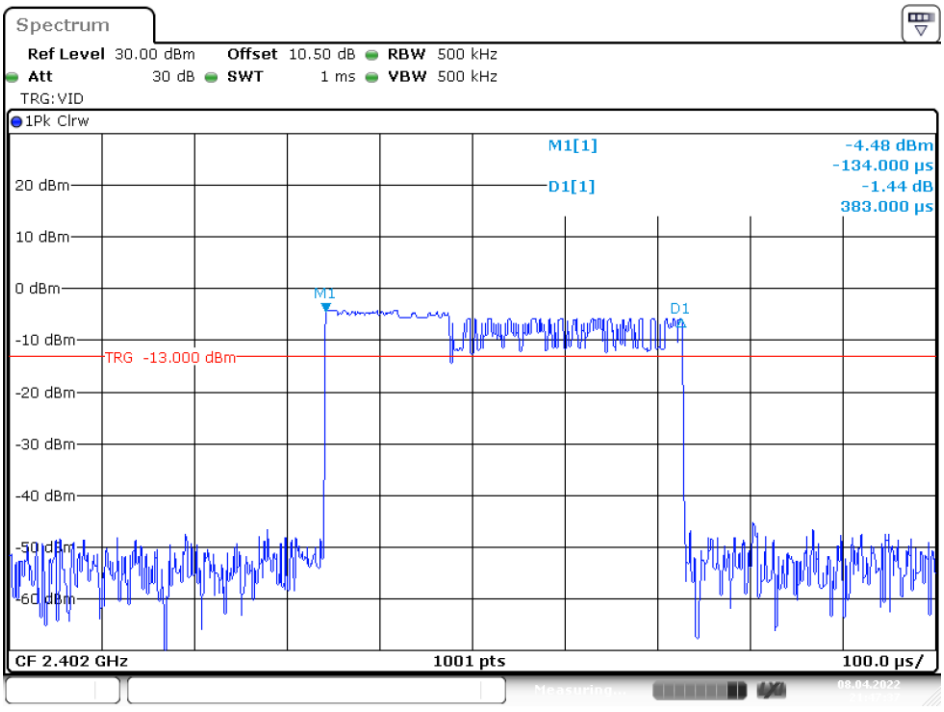
(Hopping Number = 7 in 1/10 period of highest signals, Second High signals were other channel)



Date: 8.APR.2022 21:06:15

EDR Mode (π/4-DQPSK)

2DH1: Pulse Width



Date: 8.APR.2022 21:47:38

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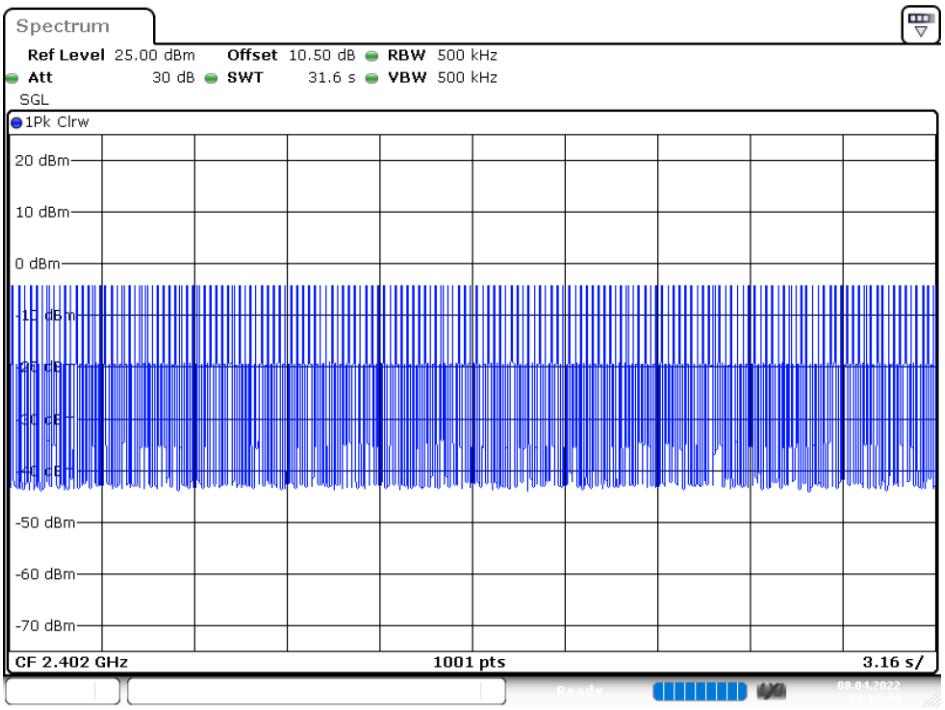
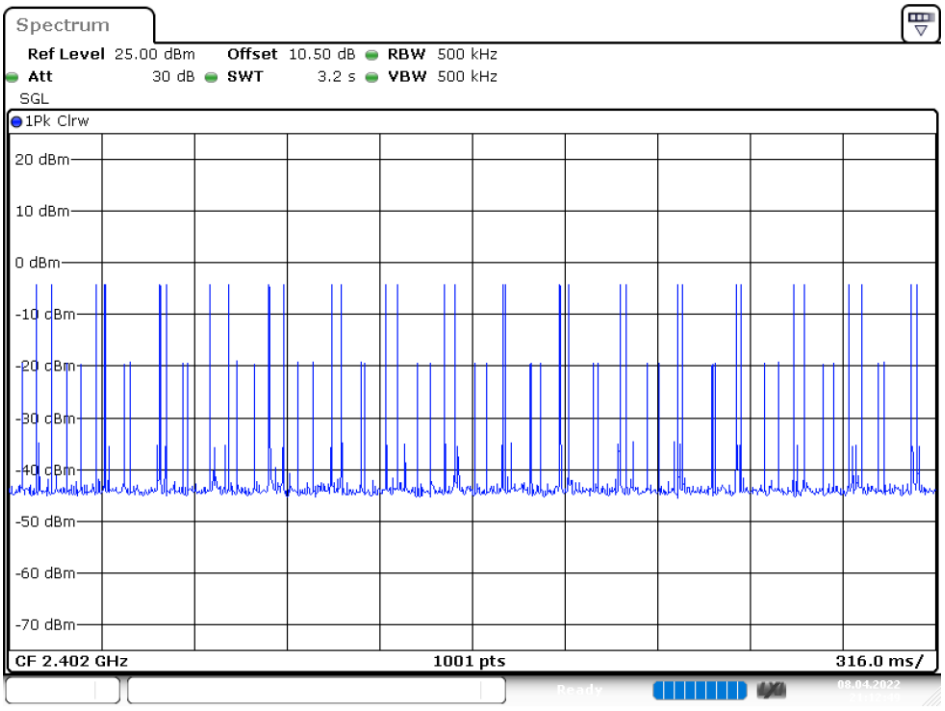
2DH1: Hopping Number



Date: 8.APR.2022 21:12:44

2DH1: Hopping Number /10

(Hopping Number = 32 in 1/10 period of highest signals, Second High signals were other channel)



Date: 8.APR.2022 21:12:50

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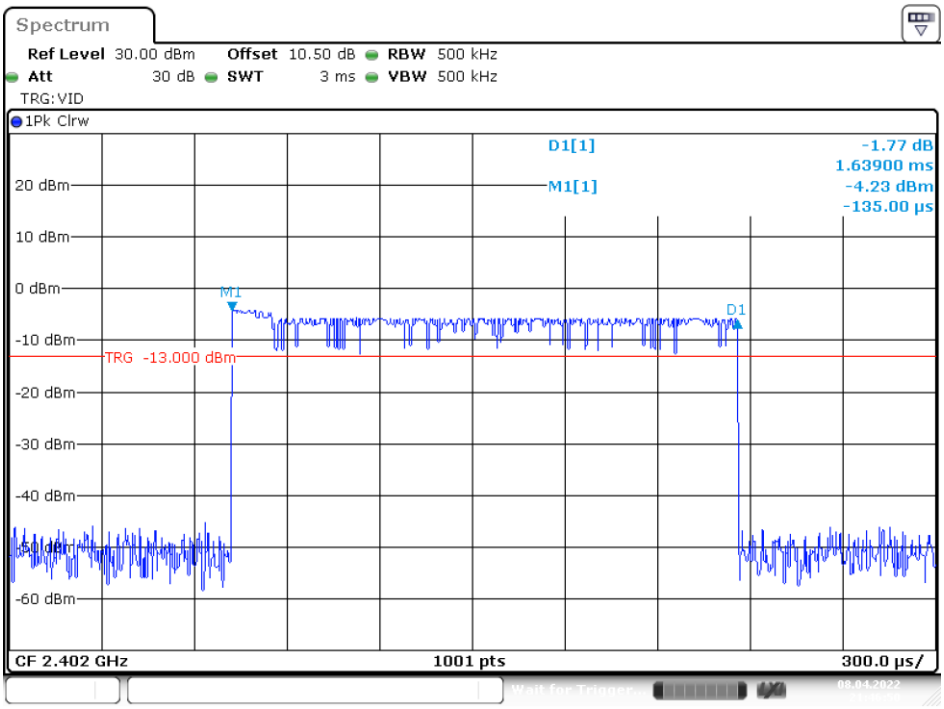
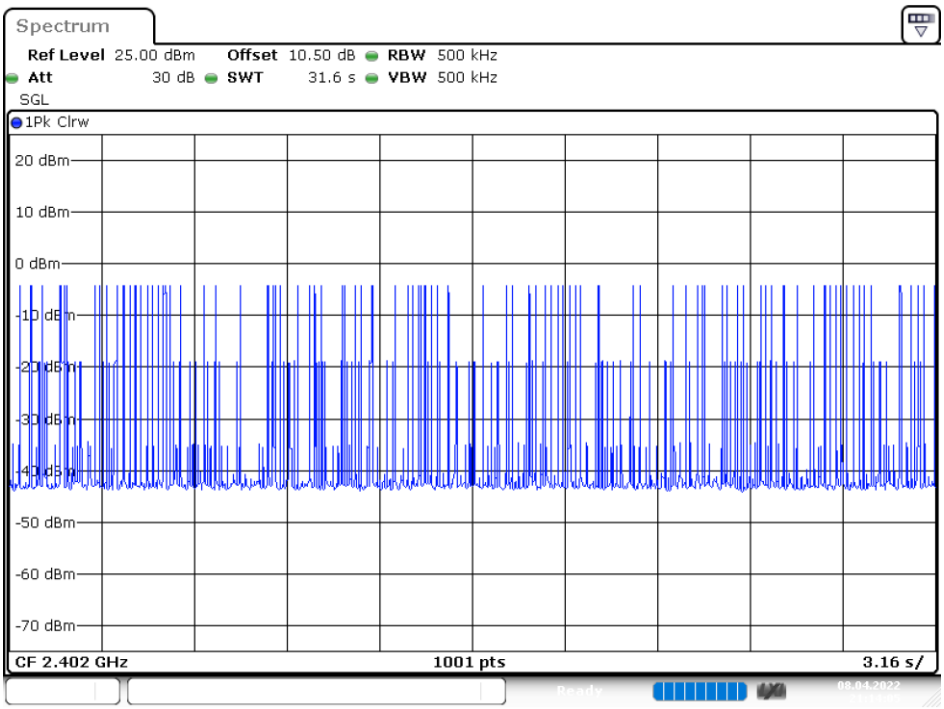
2DH3: Pulse Width



Date: 8.APR.2022 21:46:51

2DH3: Hopping Number



Date: 8.APR.2022 21:14:06

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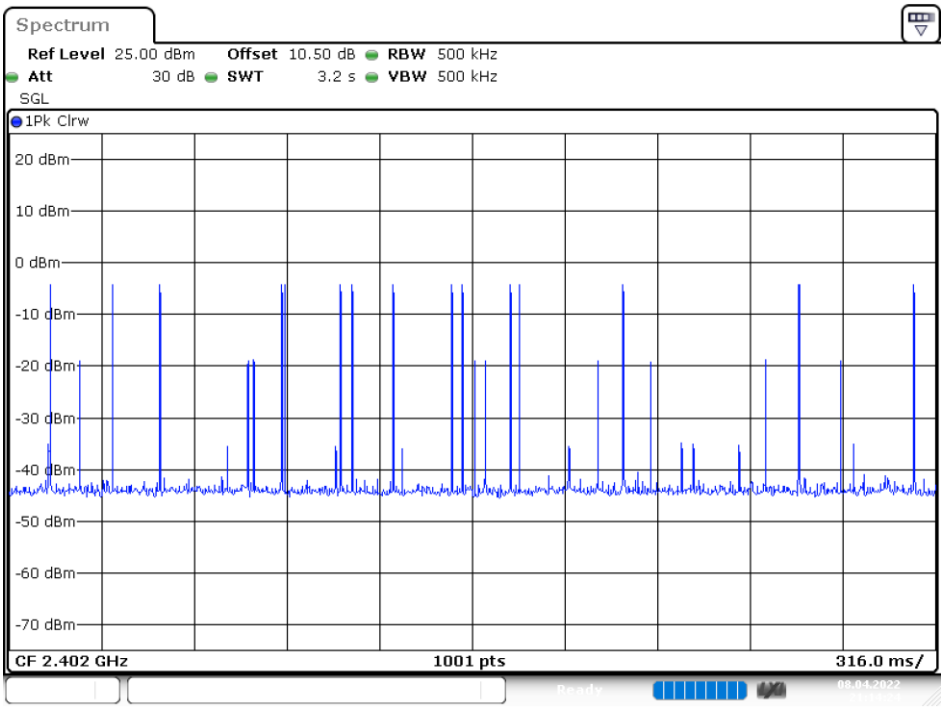
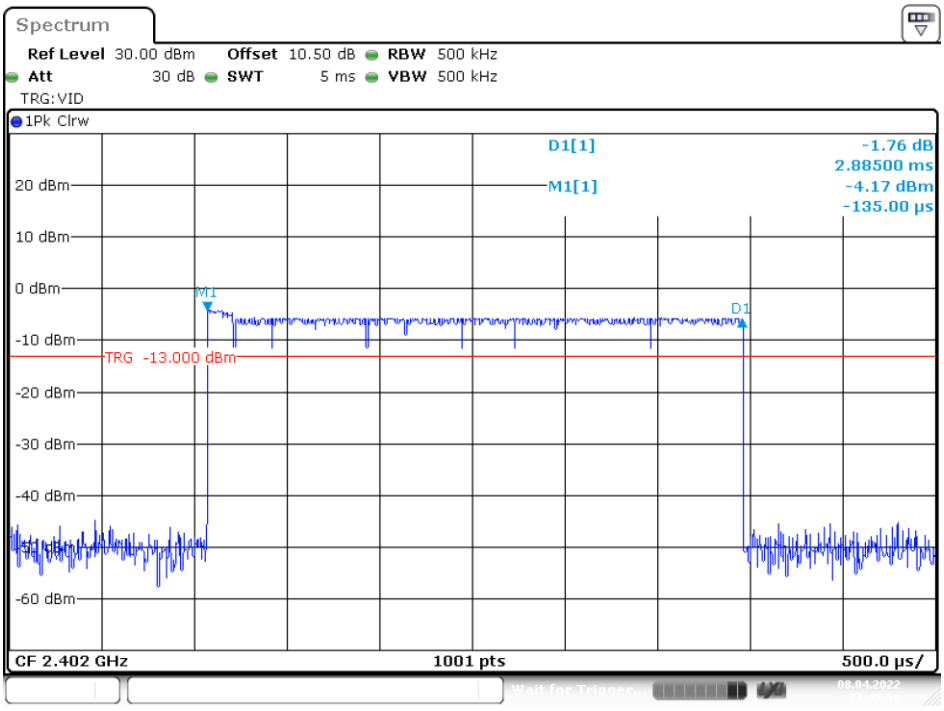
2DH3: Hopping Number /10

(Hopping Number = 15 in 1/10 period of highest signals, Second High signals were other channel)



Date: 8.APR.2022 21:14:25

2DH5: Pulse Width



Date: 8.APR.2022 21:45:59

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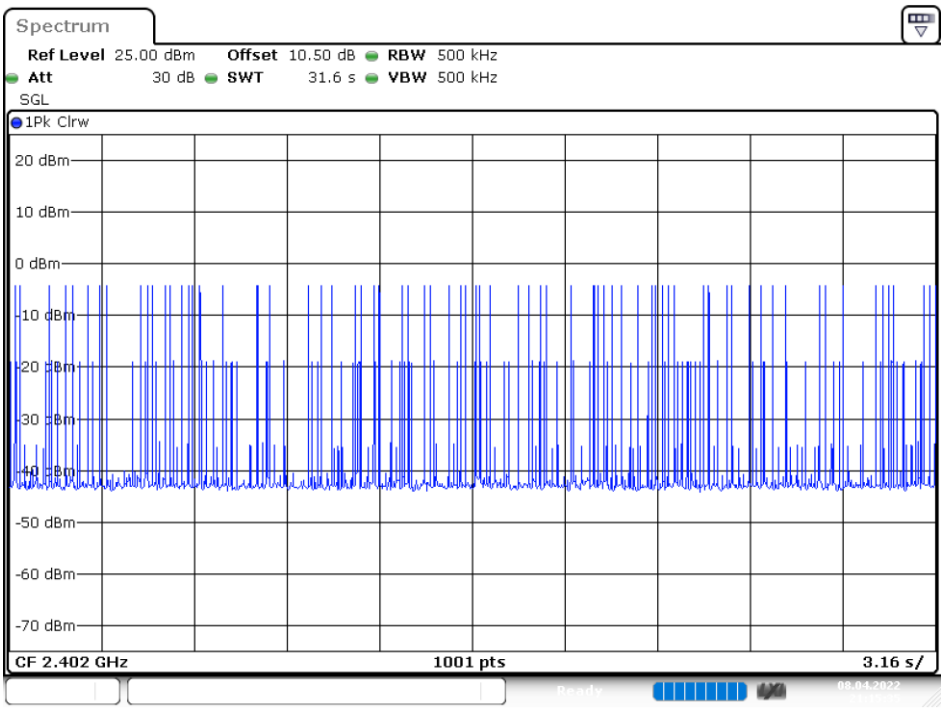
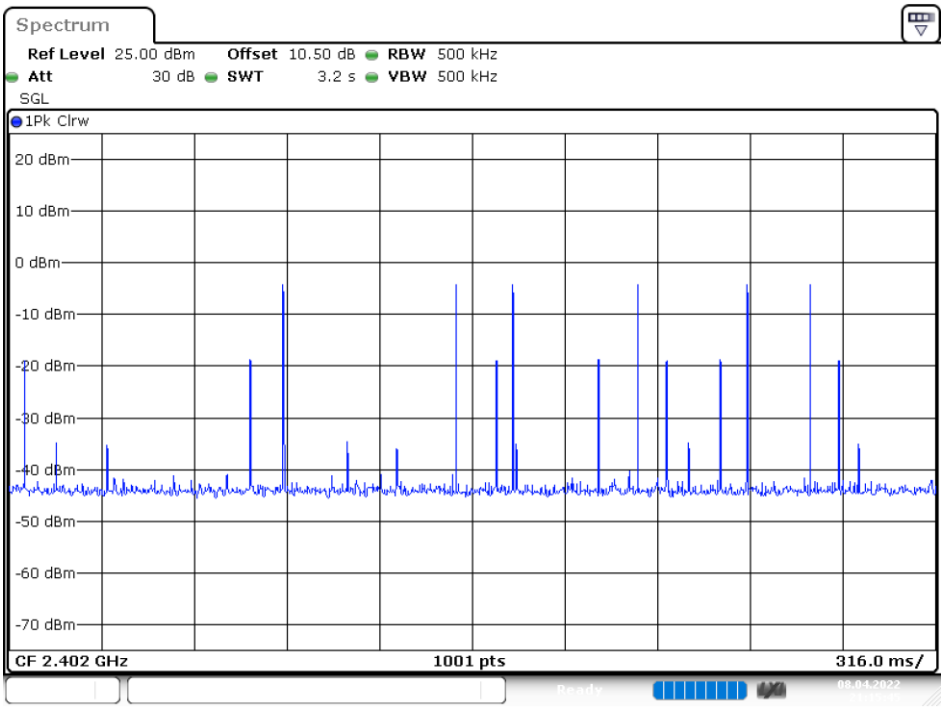
2DH5: Hopping Number



Date: 8.APR.2022 21:15:35

2DH5: Hopping Number /10

(Hopping Number = 6 in 1/10 period of highest signals, Second High signals were other channel)



Date: 8.APR.2022 21:15:46

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12. FCC §15.247(a)(1)(iii) –Quantity of hopping channel Test

12.1. Applicable Standard

According to FCC §15.247(a) (1) (iii).

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

12.2. Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

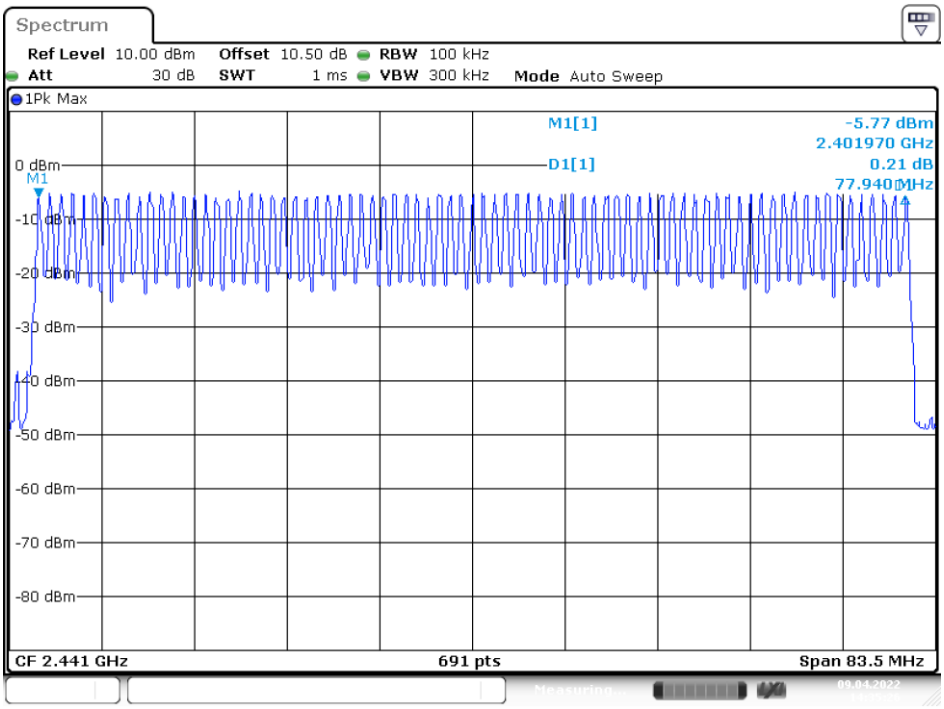
12.3. Test Results

Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)	Result
GFSK	2402-2480	79	>15	Compliance
π/4-DQPSK	2402-2480	79	>15	Compliance

Please refer to the following plots

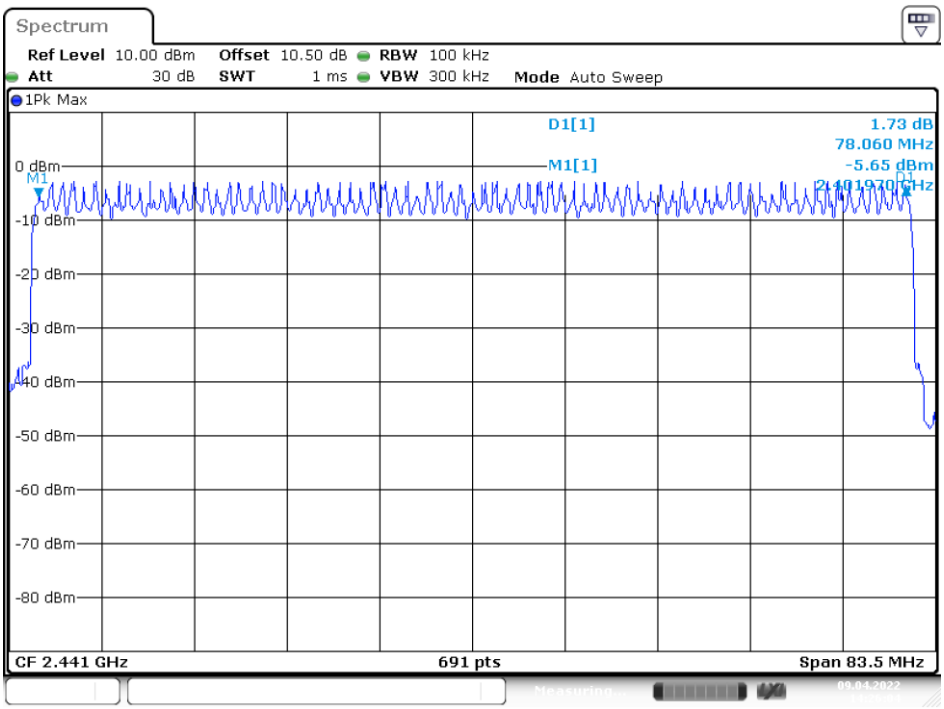
Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

BR Mode (GFSK)



Date: 9.APR.2022 14:35:26

EDR Mode (π/4-DQPSK)



Date: 9.APR.2022 14:26:05

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13. FCC §15.247(b)(1) – Maximum Output Power

13.1. Applicable Standard

According to FCC §15.247(b) (1).

Frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725- 5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

13.2. Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.

2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to measuring equipment.

13.3. Test Results

Peak Conducted Output Power

Channel	Frequency (MHz)	Peak Conducted Output Power		Limit (W)	Result
		(dBm)	(W)		
BR Mode (GFSK)					
Low	2402	-3.15	0.0005	0.125	Compliance
Middle	2441	-2.81	0.0005	0.125	Compliance
High	2480	-5.29	0.0003	0.125	Compliance
EDR Mode (π/4-DQPSK)					
Low	2402	-2.70	0.0005	0.125	Compliance
Middle	2441	-2.30	0.0006	0.125	Compliance
High	2480	-2.10	0.0006	0.125	Compliance

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14. FCC §15.247(d) – 100 kHz Bandwidth of Frequency Band Edge

14.1. Applicable Standard

According to FCC §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum 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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emissions limits specified in §15.209(a) see §15.205(c).

14.2. Test Procedure

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.

RBW = 100 kHz VBW = 300 kHz

Sweep = coupled

Detector function = peak Trace = max hold

14.3. Test Results

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
BR Mode (GFSK)				
Low	2402	32.34	≥ 20	PASS
High	2480	40.35	≥ 20	PASS
BR Hopping Mode (GFSK)				
Low	2402-2480	32.39	≥ 20	PASS
High	2402-2480	42.27	≥ 20	PASS
EDR Mode (π/4-DQPSK)				
Low	2402	32.39	≥ 20	PASS
High	2480	41.85	≥ 20	PASS
EDR Hopping Mode (π/4-DQPSK)				
Low	2402-2480	33.54	≥ 20	PASS
High	2402-2480	41.59	≥ 20	PASS

Please refer to the following plots.

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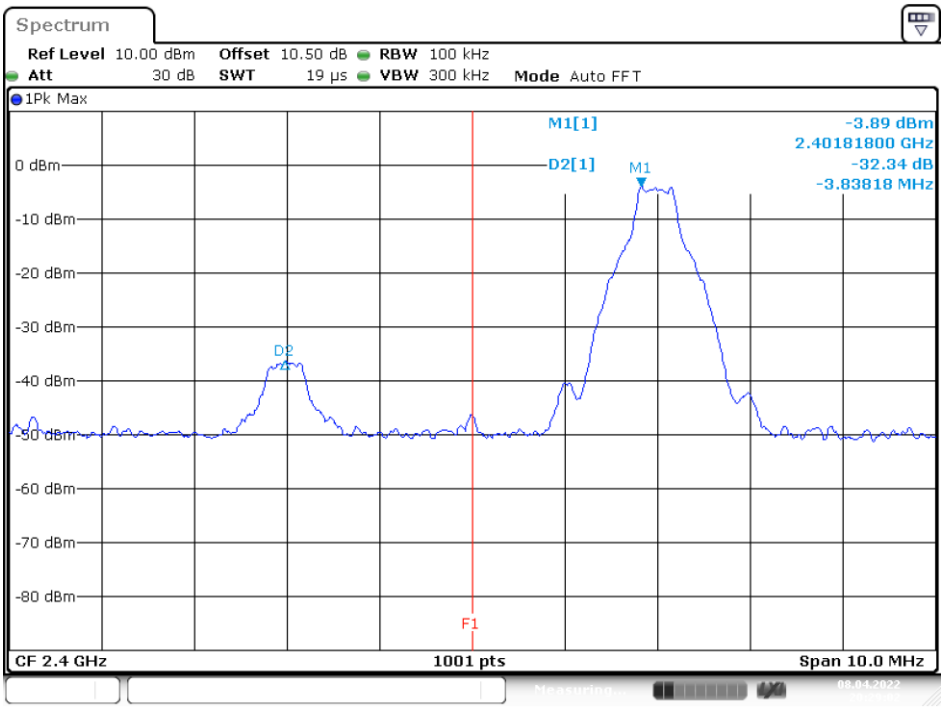
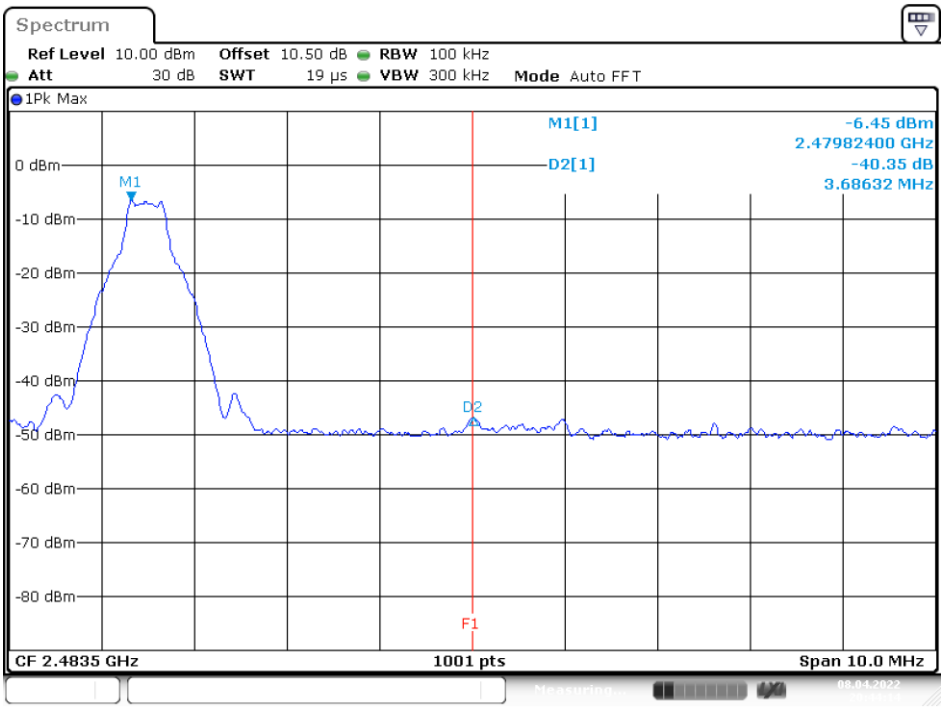
BR Mode (GFSK)

Band Edge, CH Low



Date: 8.APR.2022 20:29:02

Band Edge, CH High



Date: 8.APR.2022 20:44:14

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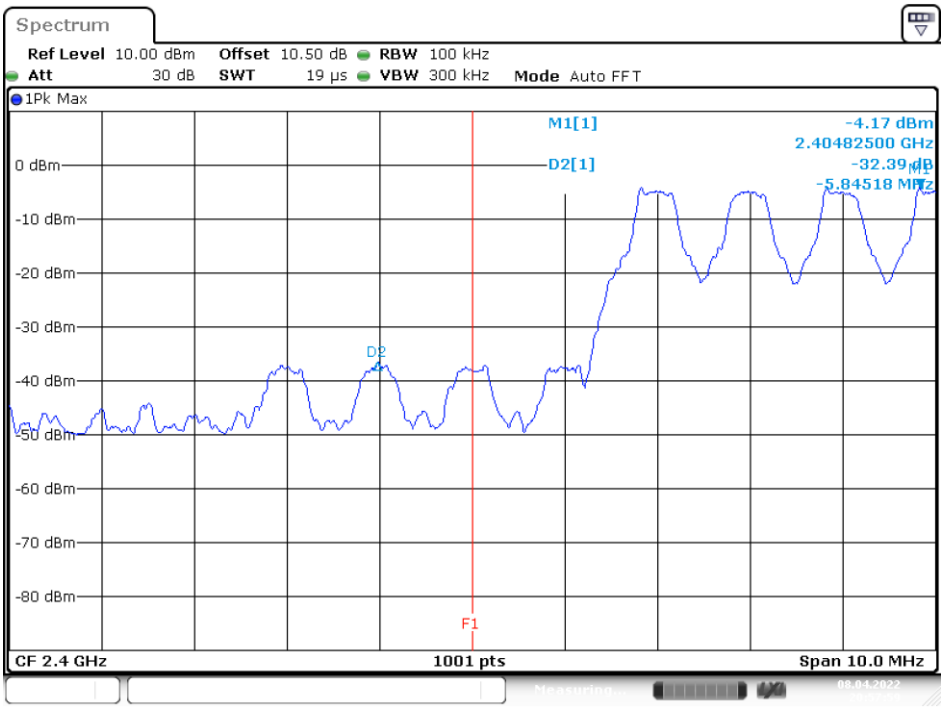
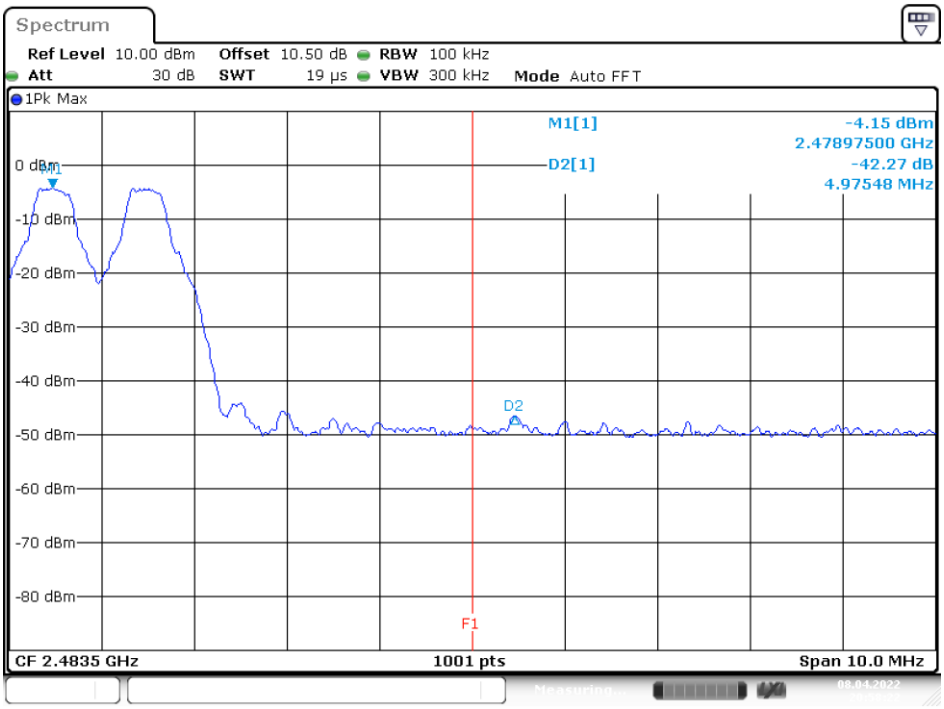
BR Hopping Mode (GFSK)

Band Edge, CH Low



Date: 8.APR.2022 20:57:59

Band Edge, CH High



Date: 8.APR.2022 20:58:22

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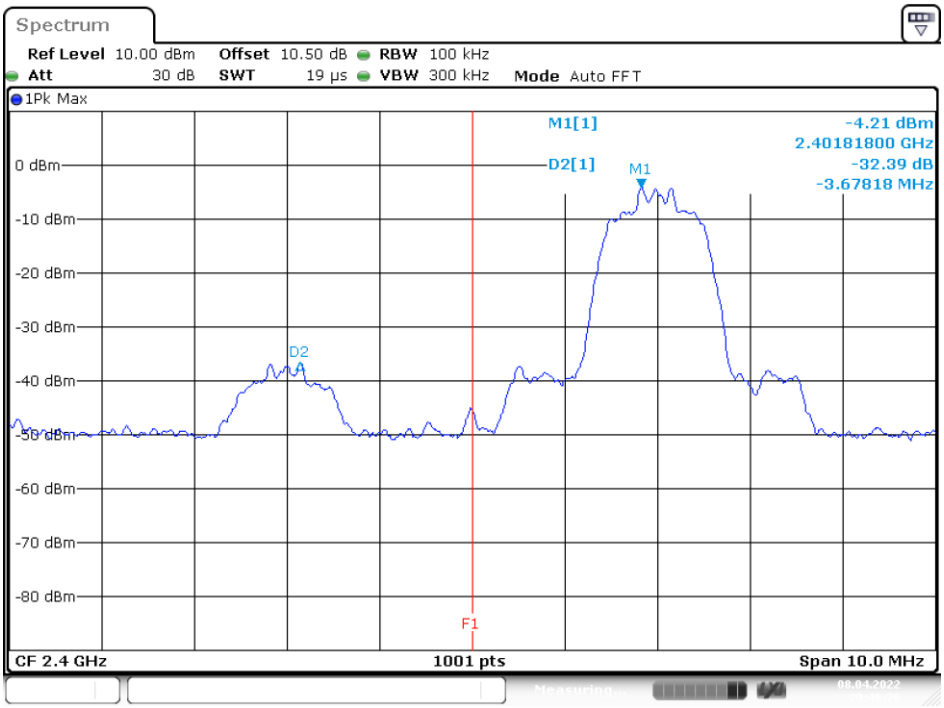
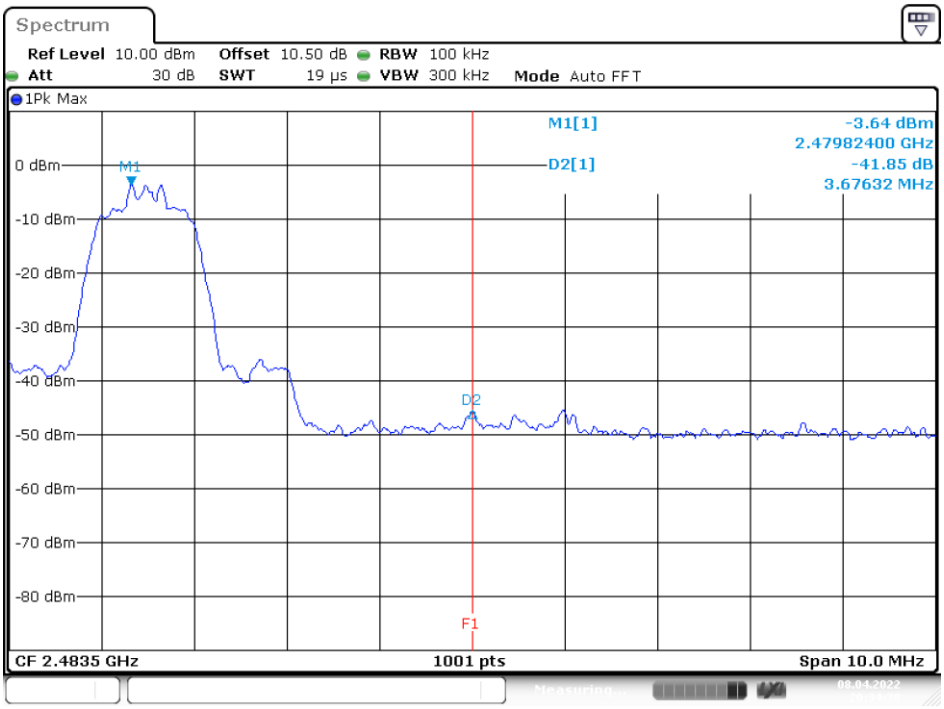
EDR Mode (π/4-DQPSK)

Band Edge, CH Low



Date: 8.APR.2022 20:46:26

Band Edge, CH High



Date: 8.APR.2022 20:34:38

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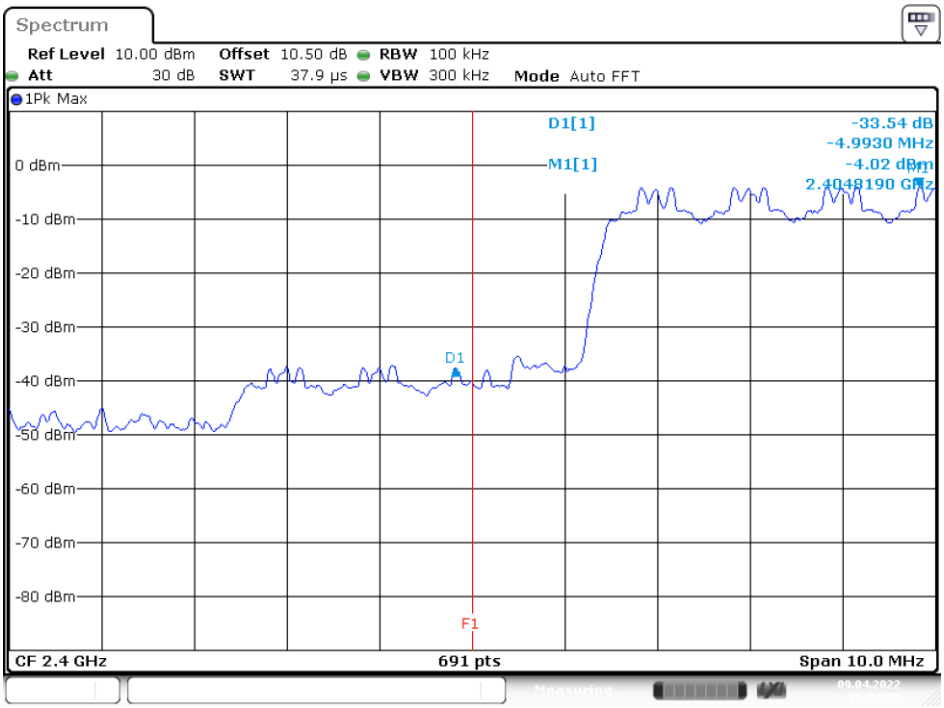
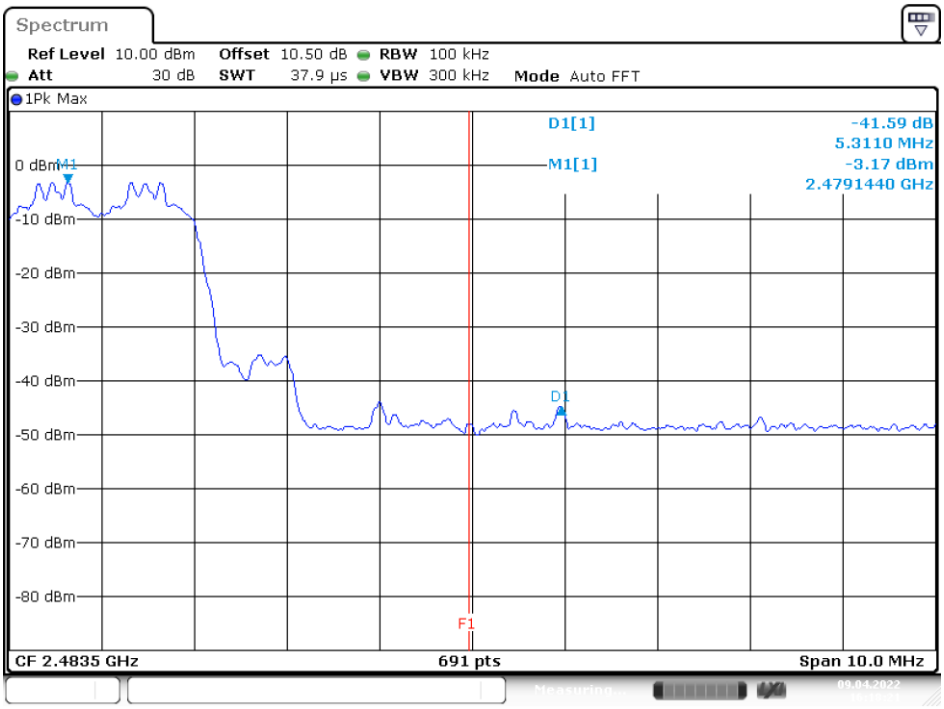
EDR Hopping Mode (π/4-DQPSK)

Band Edge, CH Low



Date: 9.APR.2022 16:24:07

Band Edge, CH High



Date: 9.APR.2022 16:18:22

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