

TEST REPORT

Application No.: SUCR2603000279MO
FCC ID: XMR2026FGA66X
Applicant: Quectel Wireless Solutions Co., Ltd.
Address of Applicant: No. 8 Waipojing Road, Sijing Town, Songjiang District, Shanghai 201601, China
Manufacturer: Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer: No. 8 Waipojing Road, Sijing Town, Songjiang District, Shanghai 201601, China
Equipment Under Test (EUT):
EUT Name: Wi-Fi & Bluetooth Module
Model No.: FGA66X
Trade Mark: QUECTEL
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2026-03-27
Date of Test: 2026-05-16 to 2026-06-16
Date of Issue: 2026-06-17

Test Result:**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

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Revision Record			
Version	Description	Date	Remark
00	Original	2026-06-17	/

Authorized for issue by:				
Prepared By		Nature Shen		
		Nature Shen/Project Engineer		
Approved By		Cedar cheng		
		Cedar Cheng /Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Customer Declaration

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2020) Section 6.10.5 & 11.12	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2020) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2020) Section 6.6 & 11.12	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Maximum Conducted Output Power		ANSI C63.10 (2020) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2020) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectral Density		ANSI C63.10 (2020) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2020) Section 6.10.4	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2020) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass

Remark: The FGA66X module is equipped with five test antennas: PCB antennas (Model: Wi-Fi PCB Antenna and PCB-mounted PIFA), IPEX antennas (Model: 2229320-00-B and 2229321-00-B), and dipole antenna (Model: YEBT038WFA).

The IPEX antenna (2229320-00-B) supports 802.15.4 (Thread/Zigbee) and BLE. The PCB antennas (Wi-Fi PCB Antenna and PCB-mounted PIFA) and IPEX antenna (2229321-00-B) support Wi-Fi. The dipole antenna (YEBT038WFA) supports Wi-Fi, BLE and 802.15.4 (Thread/Zigbee).

The five antennas fall into three types with different specifications and gains, therefore RSE measurements were re-performed separately. The two IPEX antennas are of the same structural type but support different wireless protocols, so both were tested. The two PCB antennas share the same type and specifications; only the PCB-mounted PIFA with higher gain was selected for testing. Only the worst-case gain and power operating conditions were adopted for conducted testing.

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4 General Information

4.1 Details of E.U.T.

Hardware Version:	R1.0
Software Version:	FGA66XAAMD_RK3568_L4.19_LINUX_REDDA
SN:	D1Y25LN2X000587/ D1Y25LN2X000520
Power supply:	3.3V
Operation Frequency:	2405MHz to 2480MHz
Modulation Type:	O-QPSK
Number of Channels:	16
Channel Spacing:	5MHz
Antenna Type:	Ant0(Model: 2229320-00-B): Ipex Antenna Ant3(Model: YEBT038WFA): Dipole Antenna
Antenna Number:	1
Antenna Gain:	Ant0: 5.16dBi (Provided by the manufacturer) Ant3: 0.2dBi (Provided by the manufacturer)

4.2 Environment Parameter

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	25	3.3
Note:		
NV:Normal Voltage	LV:Low Extreme Test Voltage	HV:High Extreme Test Voltage
NT:Normal Temperature	LT:Low Extreme Test Temperature	HT:High Extreme Test Temperature

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Computer	Lenovo	T14	2YK6GR
Mouse	Lenovo	3D optical Mouse	N/A

4.4 Measurement Uncertainty & Decision Rule

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	Conduction emission	$\pm 3.0\text{dB}$ (150kHz to 30MHz)
5	RF conducted power	$\pm 0.75\text{dB}$
6	RF power density	$\pm 2.84\text{dB}$
7	Conducted Spurious emissions	$\pm 0.75\text{dB}$
8	RF Radiated power	$\pm 1.56\text{dB}$ (9KHz-30MHz)
		$\pm 4.80\text{dB}$ (30MHz-1GHz)
		$\pm 4.80\text{dB}$ (1GHz-18GHz)
		$\pm 4.80\text{dB}$ (18GHz-40GHz)
9	Temperature test	$\pm 1^\circ\text{C}$
10	Humidity test	$\pm 3\%$
11	Supply voltages	$\pm 1\%$
12	Time	$\pm 3\%$
Remark: The U_{lab} (lab Uncertainty) is less than $U_{\text{CISPR/ETSI}}$ (CISPR/ETSI Uncertainty), so the test results – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit; – non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.		

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.

South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu)
Pilot Free Trade Zone

No tests were sub-contracted.

Note:

1.SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).

2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

3. Sample source: sent by customer.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **A2LA (Certificate No. 6336.01)**

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.is accredited by the American Association for Laboratory Accreditation (A2LA).

• **FCC (Designation Number: CN1312)**

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd. has been recognized as an accredited testing laboratory. Test Firm Registration Number:717327

• **ISED (CAB Identifier: CN0120)**

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 27594

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
RF Conducted Test						
1	Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	1/14/2026	1/13/2027
2	Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-15	11/21/2025	11/20/2026
3	MXG Vector signal genitor	KEYSIGHT	N5182B	SUWI-01-38-01	1/14/2026	1/13/2027
4	Signal Generator	ROHDE&SCHWARZ	SMW200A	SUWI-01-07-08	1/14/2026	1/13/2027
5	Signal Generator	ROHDE&SCHWARZ	SMW100A	SUWI-01-08-01	1/14/2026	1/13/2027
6	MXG Vector Signal Generator	ROHDE&SCHWARZ	SMR20	SUWI-01-33-01	11/21/2025	11/20/2026
7	Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	SUWI-01-16-13	4/22/2026	4/21/2027
8	Wideband Radio Communication Test Station	Anritsu	MT8000A	SUWI-01-34-02	11/21/2025	11/20/2026
9	Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	11/21/2025	11/20/2026
10	Power meter	Anritsu	ML2495A	SUWI-01-31-01	11/21/2025	11/20/2026
11	Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	11/21/2025	11/20/2026
12	DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	1/14/2026	1/13/2027
13	Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2/11/2026	2/10/2027
14	Temperature Chamber	GIANT FORCE	ICT-017-40-SP-SD	SUWI-01-13-02	5/7/2026	5/6/2027
15	Measurement Software	TST	TST 272 V2.02	SUWI-03-55-03	NCR	NCR
16	RF Control unit	TST	TSCB3023R2	SUWI-02-20-01	NCR	NCR
17	RFCables	Tonscend	NA	SUWI-01-03-01	1/15/2026	1/14/2027
RF Radiated Test						
1	Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	6/3/2023 6/3/2026	6/2/2026 6/2/2029
2	Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	1/14/2026	1/13/2027
3	Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-07	11/20/2025	11/19/2026
4	Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	1/14/2026	1/13/2027
5	Signal Generator	ROHDE&SCHWARZ	SMW100A	SUWI-01-18-01	1/14/2026	1/13/2027
6	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9168	SUWI-01-11-04	11/29/2025	11/28/2027
7	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	5/7/2025	5/6/2027
8	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	5/7/2025	5/6/2027
9	Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	5/7/2025	5/6/2027
10	Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	1/14/2026	1/13/2027
11	Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	1/14/2026	1/13/2027

12	Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	1/14/2026	1/13/2027
13	Wideband Radio Communication Tester	Anritsu	MT8820C	SUWI-01-26-01	8/25/2025	8/24/2026
14	Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	8/25/2025	8/24/2026
15	Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	SUWI-01-16-09	8/26/2025	8/25/2026
16	Radio Communication Analyzer	StarPoint	SP9500E	SUWI-01-28-06	11/21/2025	11/20/2026
17	Signal Generator	ROHDE&SCHWARZ	SMB100A	SUWI-01-08-01	1/14/2026	1/13/2027
18	DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	1/14/2026	1/13/2027
19	Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2/11/2026	2/10/2027
20	Measurement Software	Tonscend	JS32-RE 4.0.0.0	SUWI-02-09-06	NCR	NCR
21	RF Control unit	Tonscend	JS0806-1	SUWI-02-20-01	NCR	NCR
22	RFCables	Tonscend	NA	SUWI-01-03-02	1/15/2026	1/14/2027

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

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

EUT Antenna:

The antenna is Ant0: Ipex Antenna; Ant3: Dipole Antenna and no consideration of replacement. The best case gain of the Ant0: 5.16dBi; Ant3: 0.2dBi.

7 Radio Spectrum Matter Test Results

7.1 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2020) Section 6.10.5 & 11.12

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 21 °C

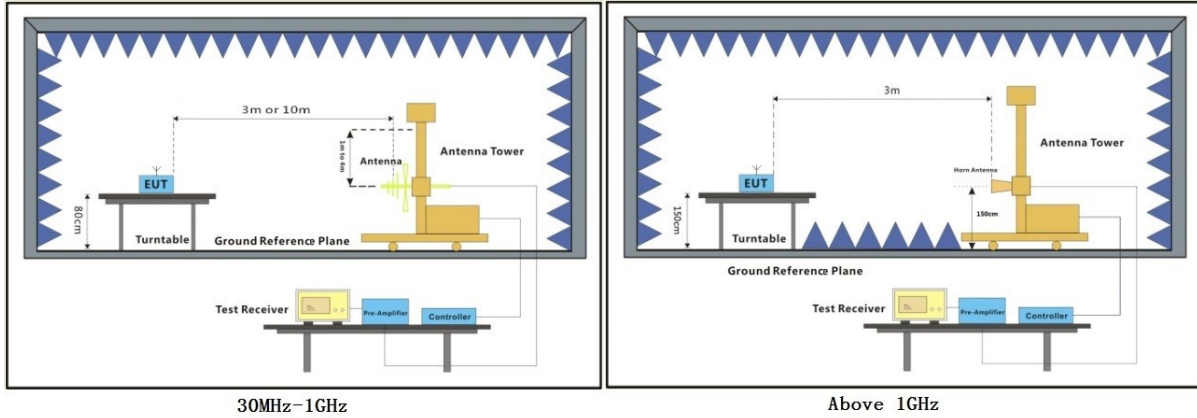
Humidity: 42 % RH

Atmospheric Pressure: 1001 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode 802.15.4 (Thread/Zigbee)_Keep the EUT in continuously transmitting with O-QPSK modulation mode.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

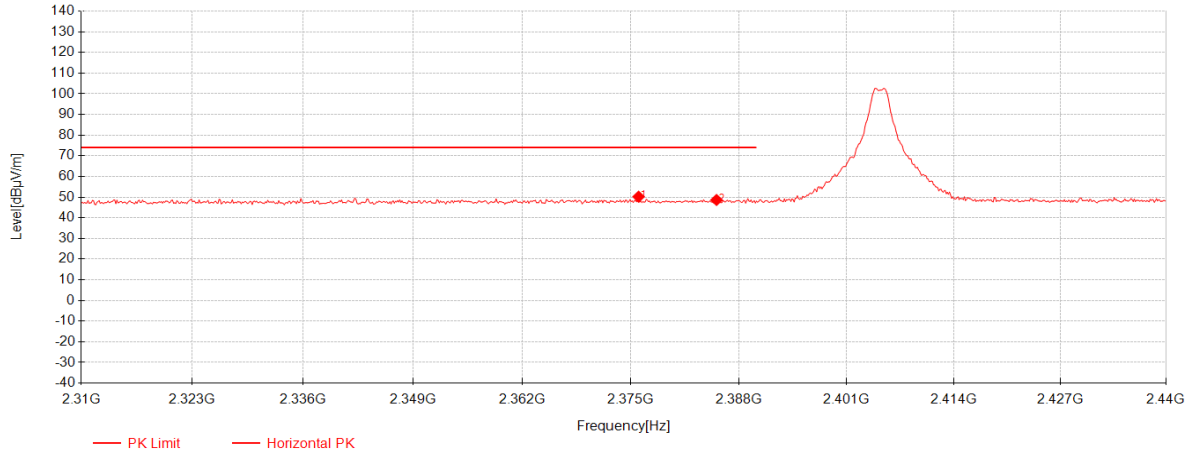
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Remark 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

Remark 4: For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

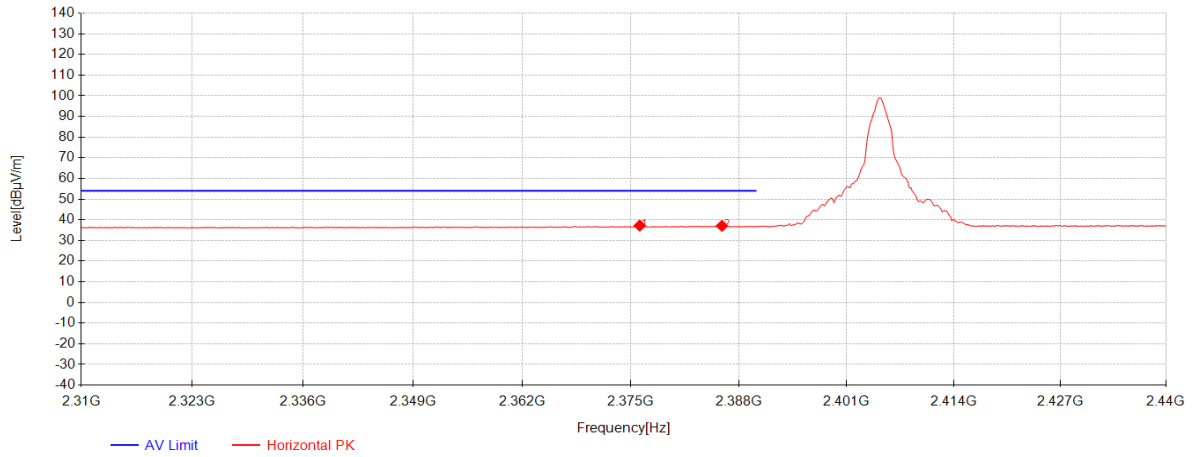
Ipex Antenna(Model: 2229320-00-B):

000-Ipex-802.15.4 (Thread/Zigbee)_TX_CH_11_Horizontal_Peak



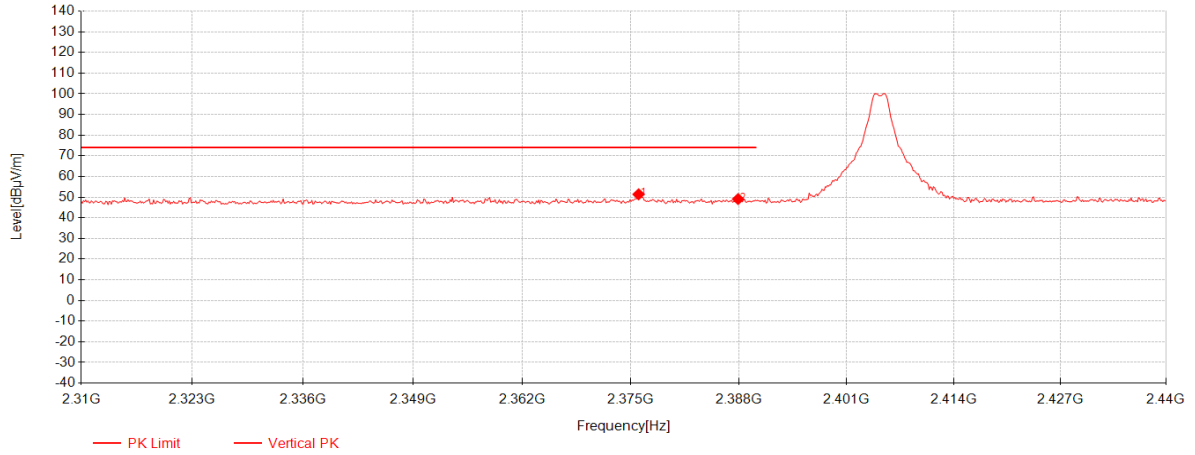
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2375.91	47.78	27.25	-24.83	50.21	74.00	23.79	Horizontal
2	2385.27	46.17	27.28	-24.82	48.63	74.00	25.37	Horizontal

001-lpex-802.15.4 (Thread/Zigbee)_TX_CH_11_Horizontal_Average



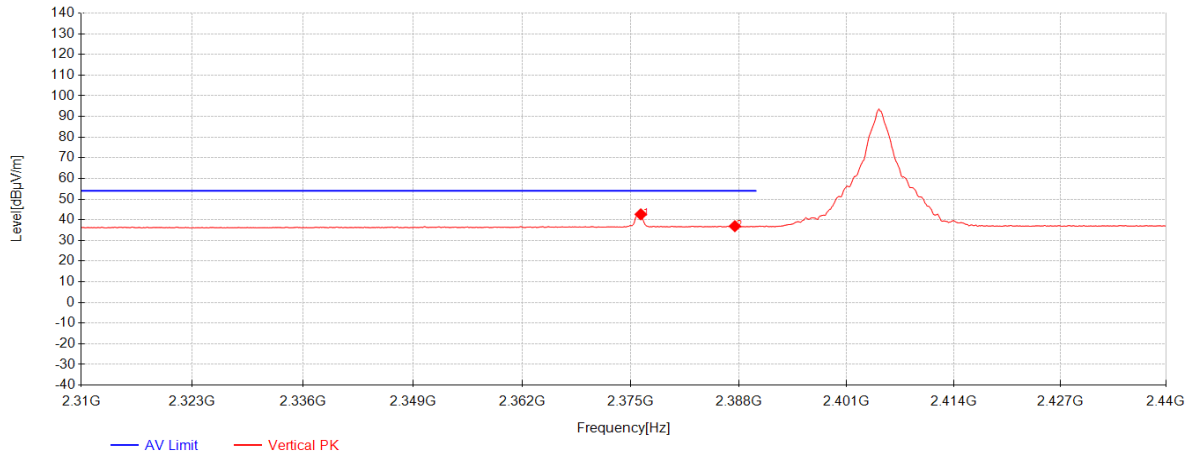
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2376.04	34.76	27.25	-24.83	37.19	54.00	16.81	Horizontal
2	2385.92	34.61	27.28	-24.82	37.07	54.00	16.93	Horizontal

002-lpex-802.15.4 (Thread/Zigbee)_TX_CH_11_Vertical_Peak



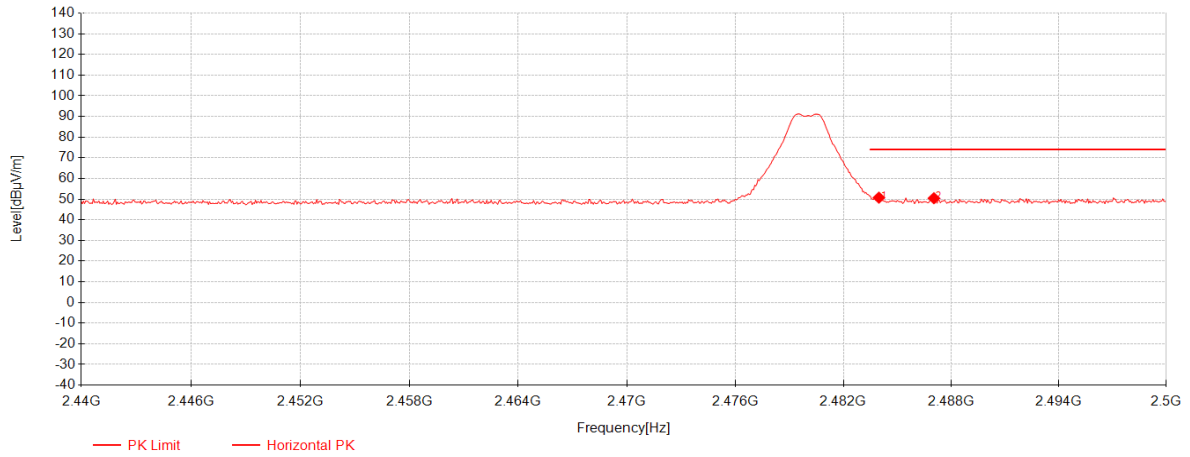
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2375.91	48.94	27.25	-24.83	51.37	74.00	22.63	Vertical
2	2387.87	46.60	27.29	-24.82	49.07	74.00	24.93	Vertical

003-lpex-802.15.4 (Thread/Zigbee)_TX_CH_11_Veritical_Average



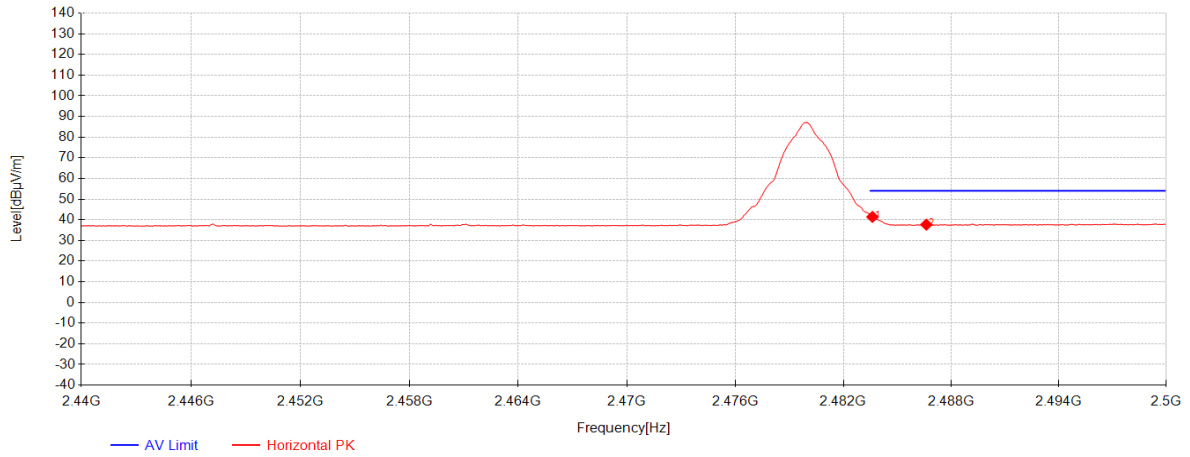
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2376.17	40.22	27.25	-24.83	42.65	54.00	11.35	Vertical
2	2387.48	34.43	27.28	-24.82	36.90	54.00	17.10	Vertical

004-lpex-802.15.4 (Thread/Zigbee)_TX_CH_26_Horizontal_Peak



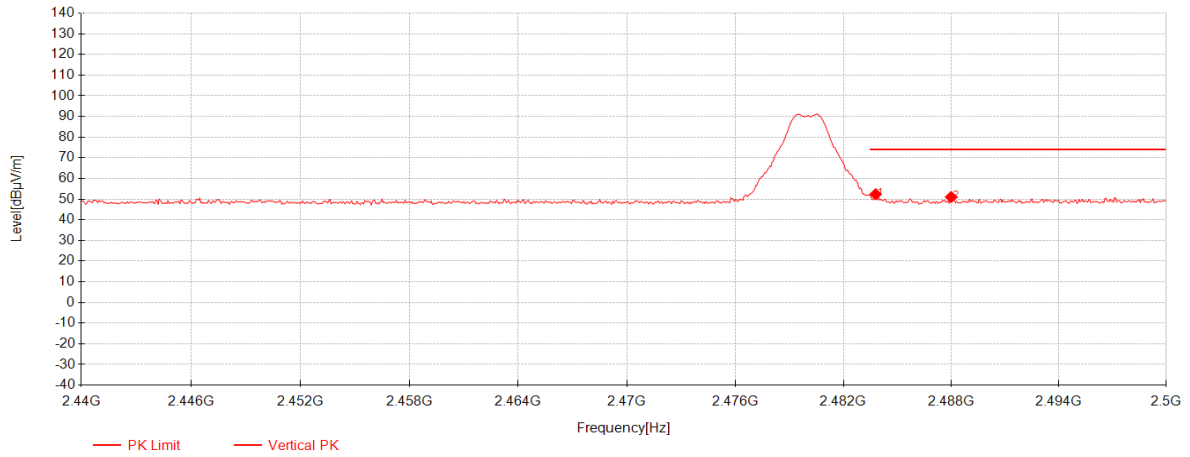
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.98	47.79	27.56	-24.63	50.71	74.00	23.29	Horizontal
2	2487.04	47.49	27.56	-24.63	50.43	74.00	23.57	Horizontal

005-lpex-802.15.4 (Thread/Zigbee)_TX_CH_26_Horizontal_Average



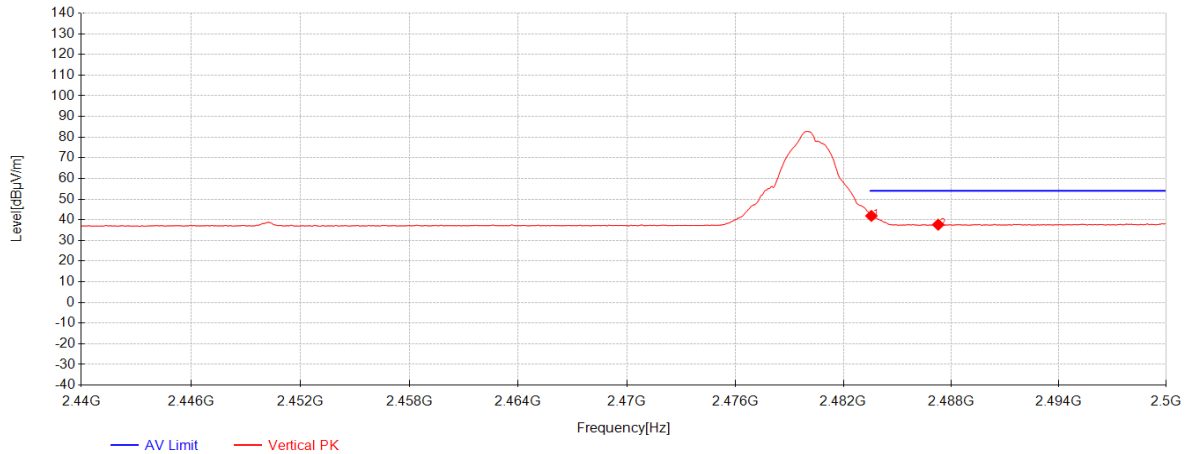
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.62	38.50	27.55	-24.63	41.42	54.00	12.58	Horizontal
2	2486.62	34.72	27.56	-24.63	37.65	54.00	16.35	Horizontal

006-lpex-802.15.4 (Thread/Zigbee)_TX_CH_26_Vertical_Peak



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.8	49.46	27.55	-24.63	52.38	74.00	21.62	Vertical
2	2488	48.07	27.57	-24.63	51.01	74.00	22.99	Vertical

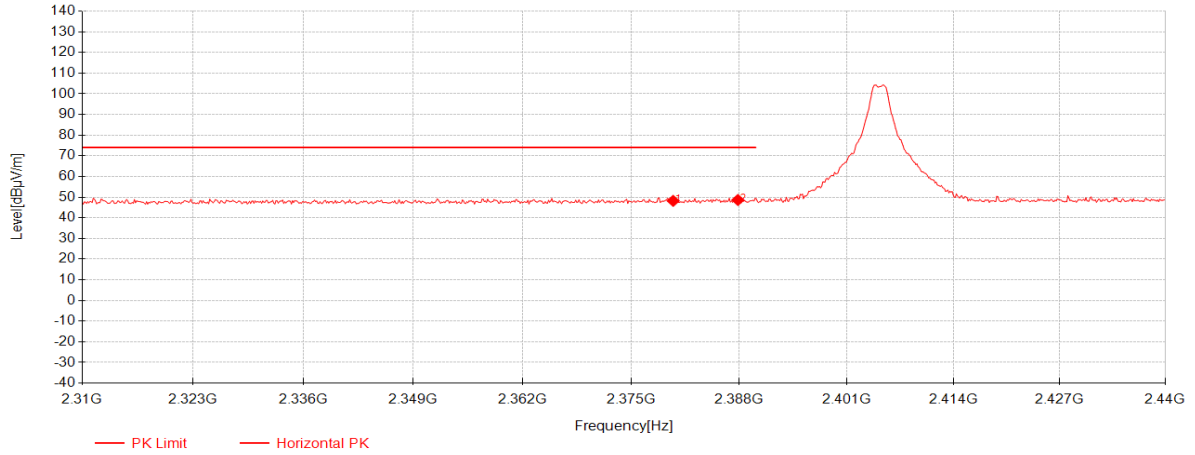
007-lpex-802.15.4 (Thread/Zigbee)_TX_CH_26_Veritical_Average



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.56	38.97	27.55	-24.63	41.89	54.00	12.11	Vertical
2	2487.28	34.69	27.56	-24.63	37.63	54.00	16.37	Vertical

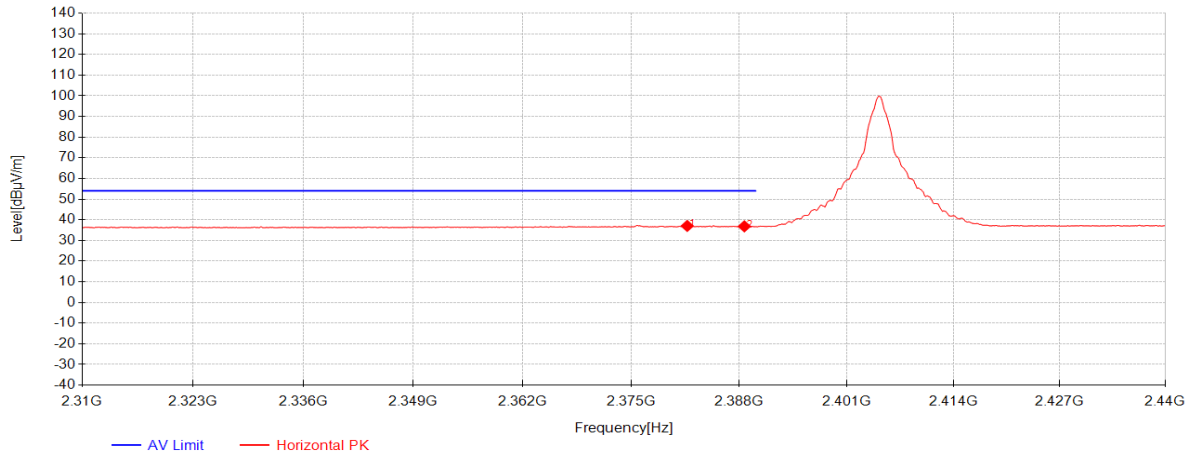
Dipole Antenna(Model: YEBT038WFA):

008-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_11_Horizontal_Peak



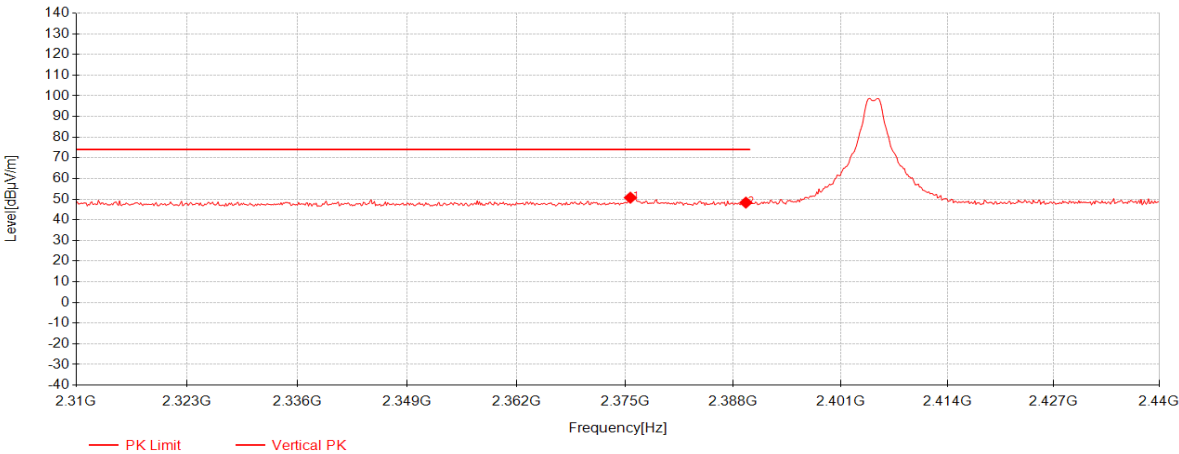
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2380.07	45.75	27.26	-24.82	48.19	74.00	25.81	Horizontal
2	2387.87	46.15	27.29	-24.82	48.62	74.00	25.38	Horizontal

009-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_11_Horizontal_Average



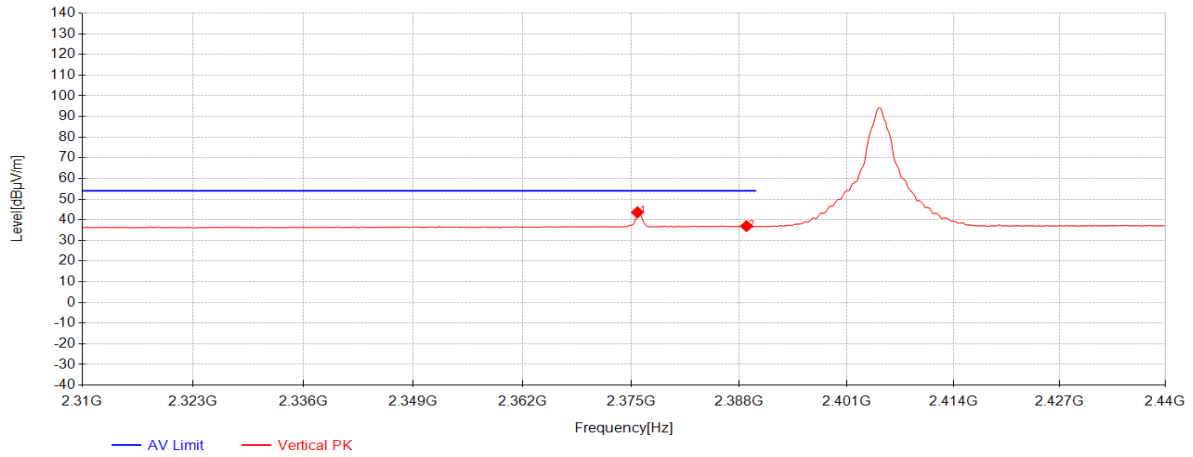
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2381.76	34.57	27.27	-24.82	37.02	54.00	16.98	Horizontal
2	2388.65	34.35	27.29	-24.82	36.82	54.00	17.18	Horizontal

010-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_11_Vertical_Peak



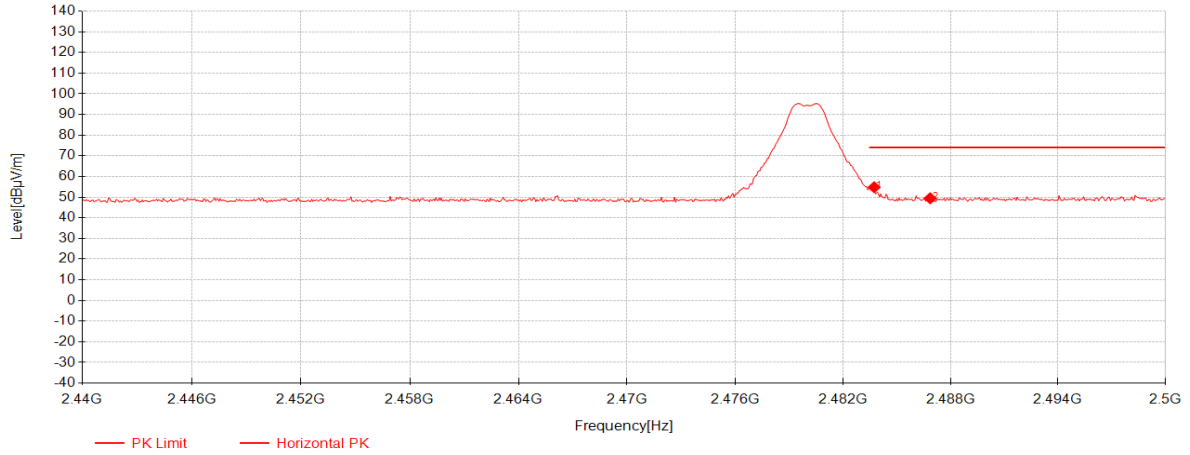
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2375.65	48.27	27.25	-24.83	50.69	74.00	23.31	Vertical
2	2389.56	45.84	27.29	-24.82	48.31	74.00	25.69	Vertical

011-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_11_Vertical_Average



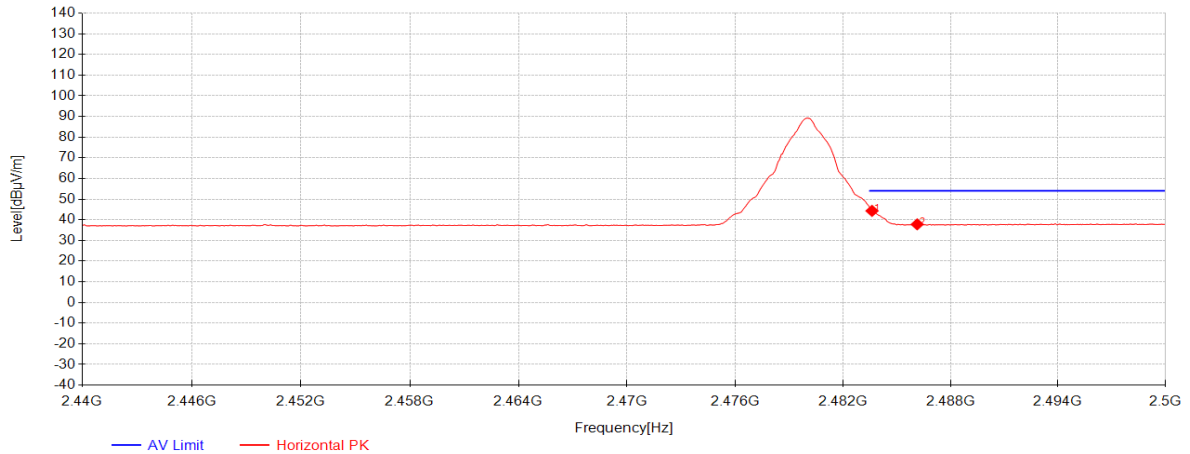
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2375.78	41.19	27.25	-24.83	43.62	54.00	10.38	Vertical
2	2388.91	34.47	27.29	-24.82	36.94	54.00	17.06	Vertical

012-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_26_Horizontal_Peak



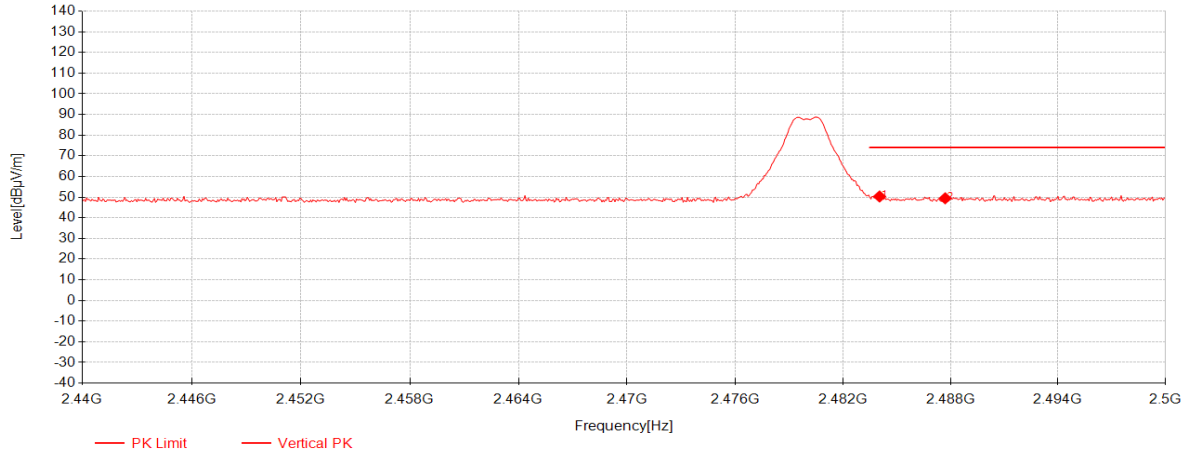
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.74	51.85	27.55	-24.63	54.77	74.00	19.23	Horizontal
2	2486.86	46.50	27.56	-24.63	49.44	74.00	24.56	Horizontal

013-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_26_Horizontal_Average



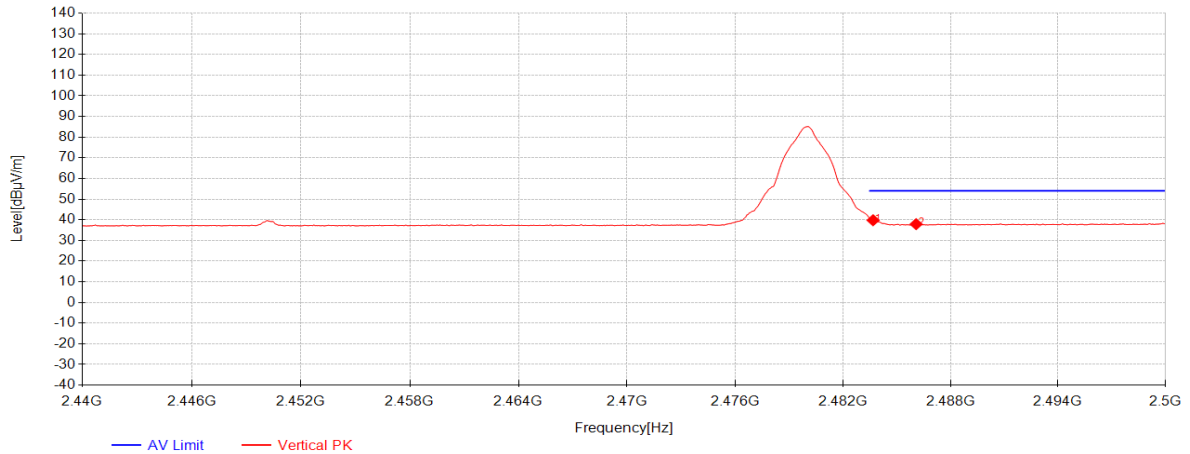
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.62	41.40	27.55	-24.63	44.32	54.00	9.68	Horizontal
2	2486.14	34.88	27.56	-24.63	37.81	54.00	16.19	Horizontal

014-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_26_Vertical_Peak



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2484.04	47.39	27.56	-24.63	50.31	74.00	23.69	Vertical
2	2487.7	46.49	27.57	-24.63	49.43	74.00	24.57	Vertical

015-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_26_Vertical_Average



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.68	36.87	27.55	-24.63	39.79	54.00	14.21	Vertical
2	2486.08	34.97	27.56	-24.63	37.90	54.00	16.10	Vertical

7.2 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2020) Section 6.4,6.5

Limit:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	Field strength (dBμV/m@3m)
0.009-0.490	2400/F(kHz)	300	128.5 to 93.8
0.490-1.705	24000/F(kHz)	30	73.8 to 62.9
1.705-30.0	30	30	69.60
30-88	100	3	40.0
88-216	150	3	43.5
216-960	200	3	46.0
960-1000	500	3	54.0

Note : The above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 21 °C

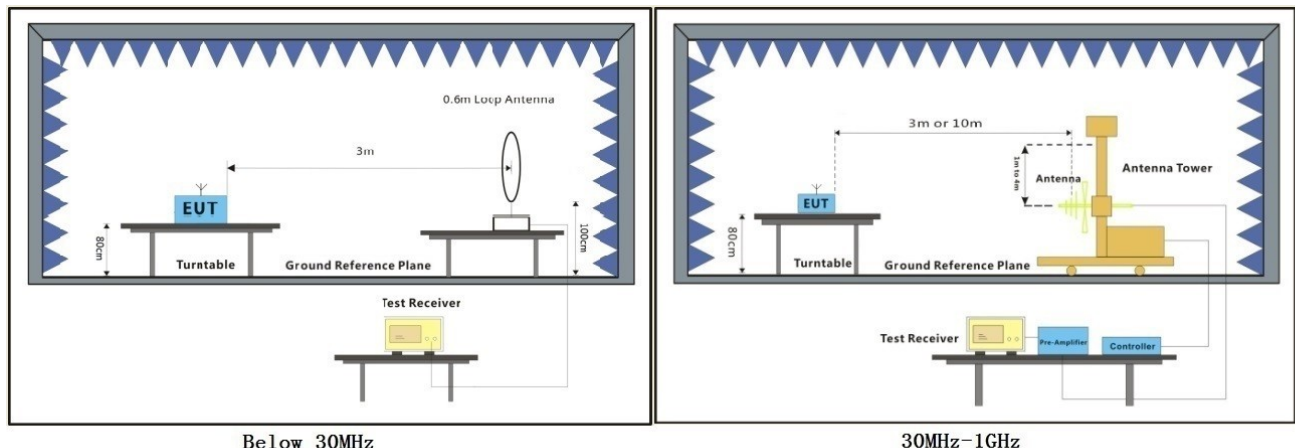
Humidity: 43 % RH

Atmospheric Pressure: 1001 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode 802.15.4 (Thread/Zigbee)_Keep the EUT in continuously transmitting with O-QPSK modulation mode.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8m above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3m or 10m away from the interference-receiving antenna, which was mounted on the variable-height antenna tower.
- c. The antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1m to 4m (for the test frequency of below 30MHz, the antenna was tuned to heights 1m) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. At frequencies below 1GHz, measurements may be performed at a distance different to specified in the regulations.

Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor+ Aux Factor (if applicable)

The aux factor needs to be added when measurements are performed at a distance other than the limit distance provided.

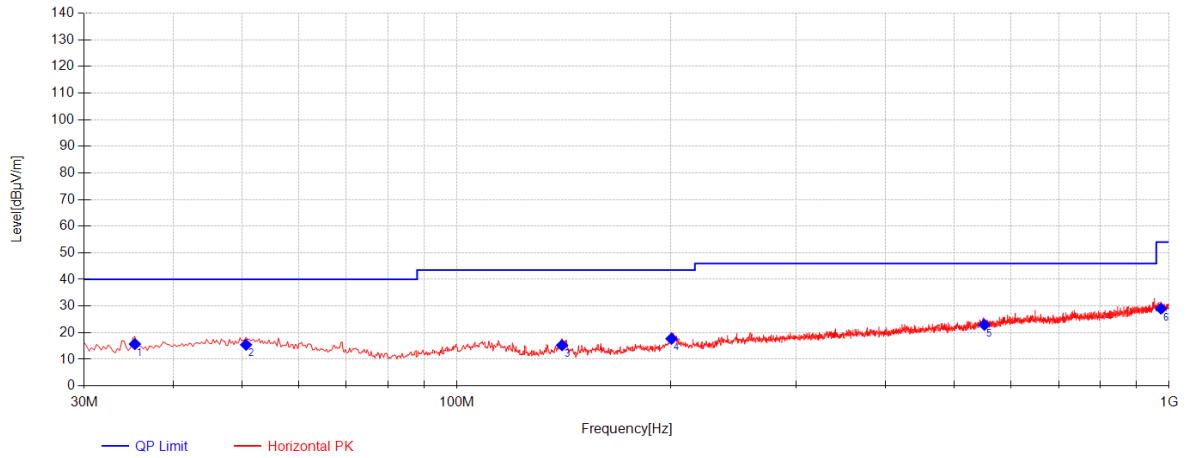
EX. Below 30MHz, Aux Factor = 40 dB/decade of distance, the aux factor is $40\log(3/300) = -80\text{dB}$ (for 3m test distance).

EX. Above 30MHz, Aux Factor = 20 dB/decade of distance, the aux factor is $20\log(10/3) = 10.46\text{dB}$ (for 10m test distance).

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

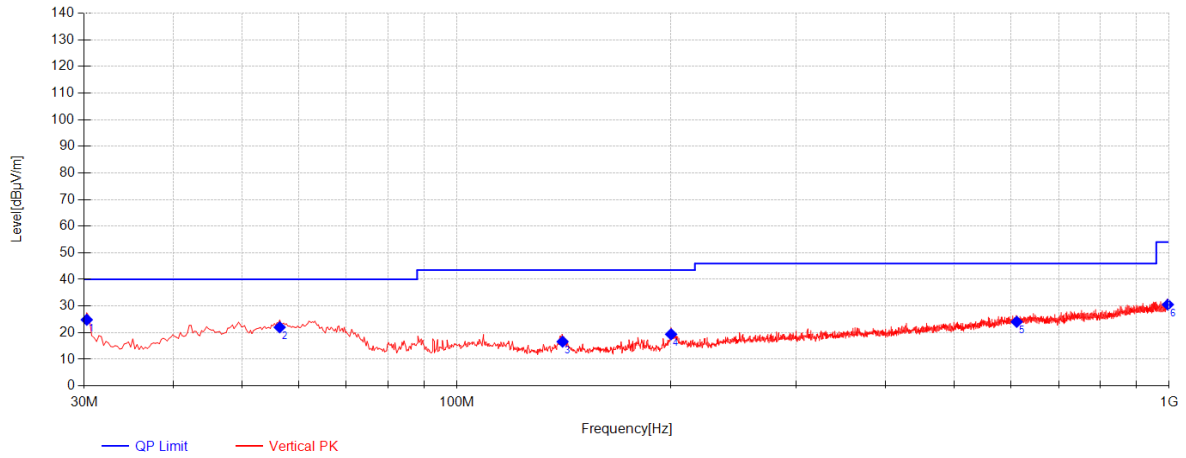
3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the worst-case test curve is displayed.

Test Mode: 04; Polarity: Horizontal



Final Data List										
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.335	39.49	17.50	-41.28	15.71	40.00	24.29	189	262	Horizontal
2	50.6125	36.07	20.36	-40.98	15.45	40.00	24.55	175	342	Horizontal
3	140.58	35.83	19.28	-39.86	15.25	43.50	28.25	108	160	Horizontal
4	200.235	35.51	21.47	-39.26	17.72	43.50	25.78	113	141	Horizontal
5	550.6475	35.7	23.71	-36.47	22.94	46.00	23.06	126	50	Horizontal
6	974.78	34.98	27.80	-33.77	29.01	54.00	24.99	190	342	Horizontal

Test Mode: 04; Polarity: Vertical



Final Data List										
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.2425	49.58	16.65	-41.39	24.84	40.00	15.16	127	0	Vertical
2	56.4325	43.8	19.17	-40.96	22.01	40.00	17.99	146	94	Vertical
3	140.8225	37.22	19.24	-39.85	16.61	43.50	26.89	139	336	Vertical
4	199.9925	37.08	21.58	-39.27	19.39	43.50	24.11	158	101	Vertical
5	611.2725	35.64	24.65	-36.22	24.07	46.00	21.93	194	213	Vertical
6	996.605	36.16	28.10	-33.72	30.54	54.00	23.46	186	318	Vertical

7.3 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2020) Section 6.6 & 11.12

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

Note:

At Above 18GHz, measurements may be performed at a distance shorter than that specified in the regulations

Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor+ Aux Factor (if applicable)

The aux factor needs to be added when measurements are performed at a distance other than the limit distance provided.

EX. Above 18GHz, Aux Factor = 20 dB/decade of distance, the aux factor is $20\log(1/3) = -9.54\text{dB}$ (for 1m test distance).

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C

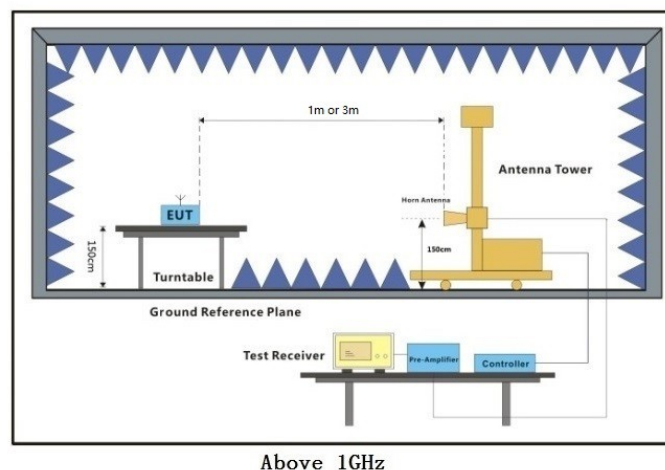
Humidity: 43 % RH

Atmospheric Pressure: 1001 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode 802.15.4 (Thread/Zigbee)_Keep the EUT in continuously transmitting with O-QPSK modulation mode.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

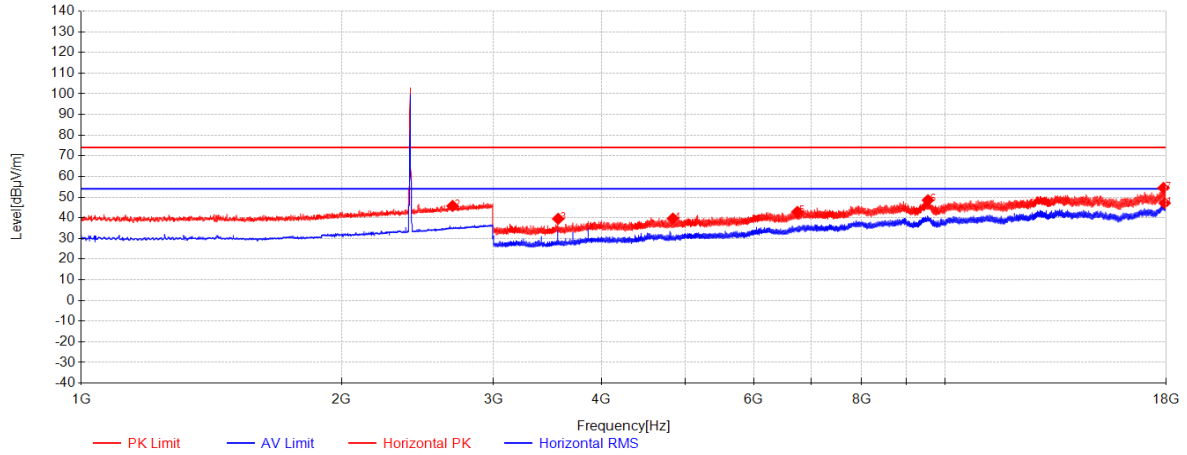
- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5m above the ground at a 3m fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3m away from the interference-receiving antenna from 1GHz to 18GHz, and 1m away from the interference-receiving antenna above 18GHz.
- b. The interference-receiving antenna was mounted on the variable-height antenna tower, with its boresight facing the EUT throughout the test.
- c. The antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1m to 4m and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- g. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- h. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Scan from 1GHz to 10th harmonic of the highest frequency or 40 GHz, whichever is lower.
2. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.
3. For the frequency above 18GHz, testing had been executed under all test modes, only the worst-case test curve is displayed in the report.
4. For devices with multiple operating modes, measurements on the middle channel is used to determine the worst-case mode(s).

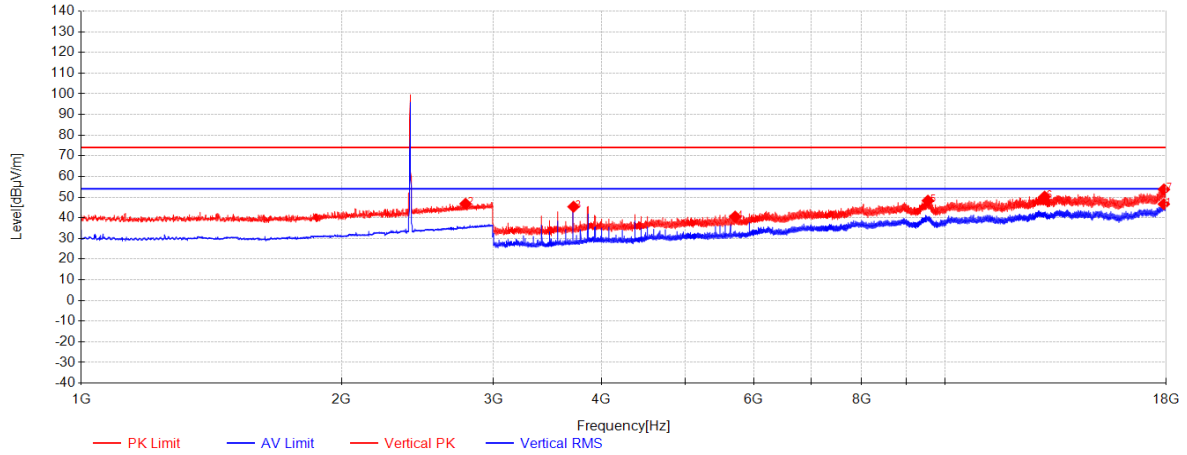
Ipex Antenna(Model: 2229320-00-B):

000-Ipex-802.15.4 (Thread/Zigbee)_TX_CH_11_Horizontal



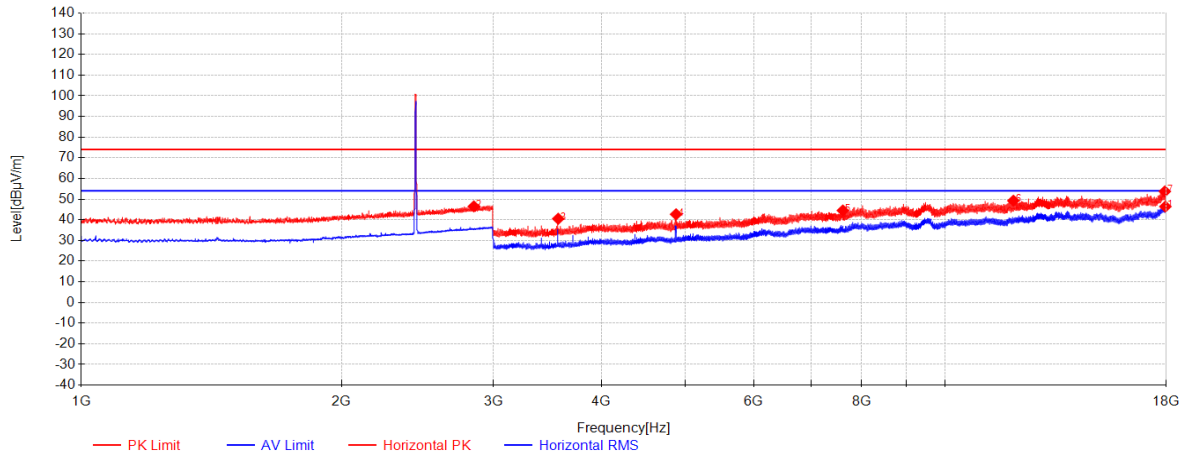
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17935.125	36.66	41.51	-31.08	47.09	54.00	6.91	Horizontal
2	2689.5	41.69	28.36	-24.30	45.74	74.00	28.26	Horizontal
3	3563.625	54.96	29.53	-44.97	39.52	74.00	34.48	Horizontal
4	4837.875	51.97	32.71	-45.04	39.64	74.00	34.36	Horizontal
5	6741.375	50.09	35.89	-43.08	42.90	74.00	31.10	Horizontal
6	9546	48.96	38.05	-38.48	48.53	74.00	25.47	Horizontal
7	17883	44.10	41.36	-31.00	54.46	74.00	19.54	Horizontal

001-lpex-802.15.4 (Thread/Zigbee)_TX_CH_11_Vertical



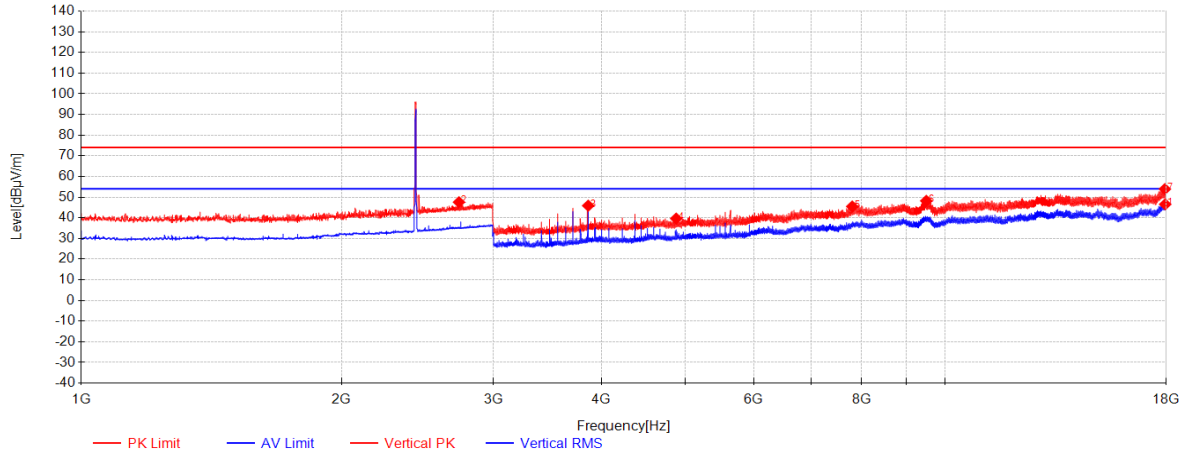
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17898	36.33	41.40	-31.10	46.64	54.00	7.36	Vertical
2	2784.5	42.17	28.74	-24.15	46.76	74.00	27.24	Vertical
3	3712.5	60.66	30.07	-45.37	45.35	74.00	28.65	Vertical
4	5710.5	50.94	33.63	-44.01	40.56	74.00	33.44	Vertical
5	9544.5	48.71	38.05	-38.49	48.28	74.00	25.72	Vertical
6	13025.25	45.51	39.91	-35.20	50.22	74.00	23.78	Vertical
7	17904.75	43.39	41.42	-31.11	53.71	74.00	20.29	Vertical

002-lpex-802.15.4 (Thread/Zigbee)_TX_CH_18_Horizontal



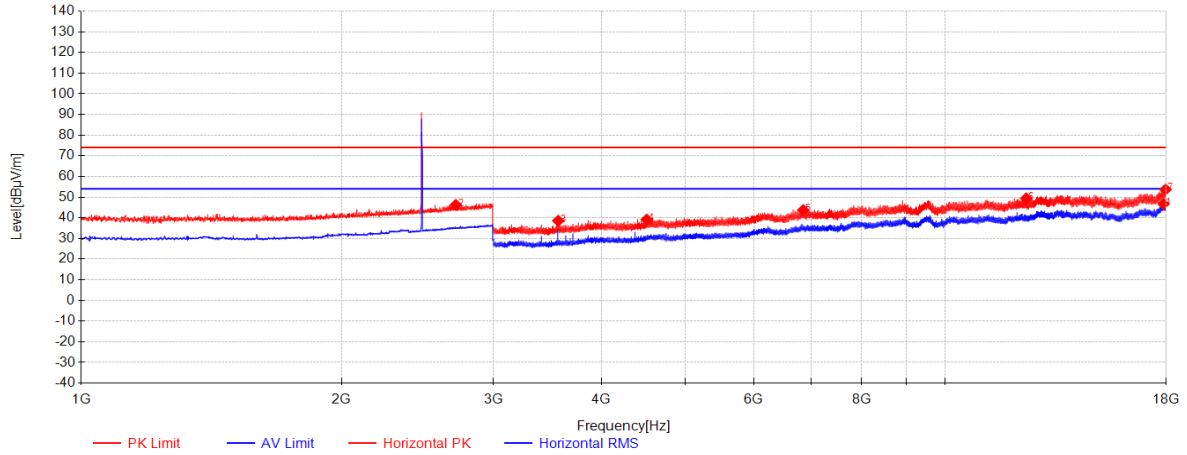
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17970	35.83	41.61	-31.05	46.40	54.00	7.60	Horizontal
2	2846.5	41.36	28.99	-23.84	46.51	74.00	27.49	Horizontal
3	3564	55.94	29.53	-44.96	40.51	74.00	33.49	Horizontal
4	4879.125	54.75	32.81	-44.90	42.66	74.00	31.34	Horizontal
5	7609.5	49.78	36.52	-41.81	44.49	74.00	29.51	Horizontal
6	11985.75	46.42	38.71	-35.90	49.23	74.00	24.77	Horizontal
7	17947.5	43.27	41.55	-31.07	53.75	74.00	20.25	Horizontal

003-lpex-802.15.4 (Thread/Zigbee)_TX_CH_18_Vertical



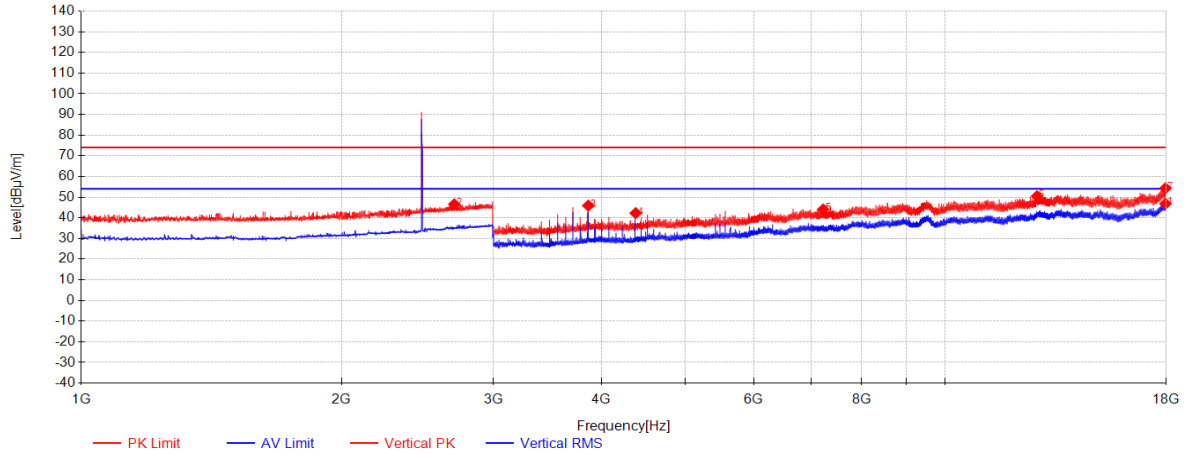
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17963.625	36.00	41.59	-31.05	46.54	54.00	7.46	Vertical
2	2736	43.26	28.54	-24.23	47.58	74.00	26.42	Vertical
3	3860.625	60.21	30.60	-44.93	45.88	74.00	28.12	Vertical
4	4881	51.71	32.81	-44.89	39.63	74.00	34.37	Vertical
5	7802.25	49.63	36.90	-41.06	45.48	74.00	28.52	Vertical
6	9503.625	48.81	38.05	-38.66	48.21	74.00	25.79	Vertical
7	17948.25	43.42	41.55	-31.07	53.90	74.00	20.10	Vertical

004-lpex-802.15.4 (Thread/Zigbee)_TX_CH_26_Horizontal



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17883.75	36.37	41.36	-31.01	46.72	54.00	7.28	Horizontal
2	2713	42.04	28.45	-24.27	46.22	74.00	27.78	Horizontal
3	3564	53.99	29.53	-44.96	38.56	74.00	35.44	Horizontal
4	4511.25	52.41	31.93	-45.22	39.12	74.00	34.88	Horizontal
5	6846.375	50.63	36.05	-42.96	43.72	74.00	30.28	Horizontal
6	12402.75	45.43	39.18	-35.20	49.41	74.00	24.59	Horizontal
7	17980.875	43.11	41.64	-31.04	53.72	74.00	20.28	Horizontal

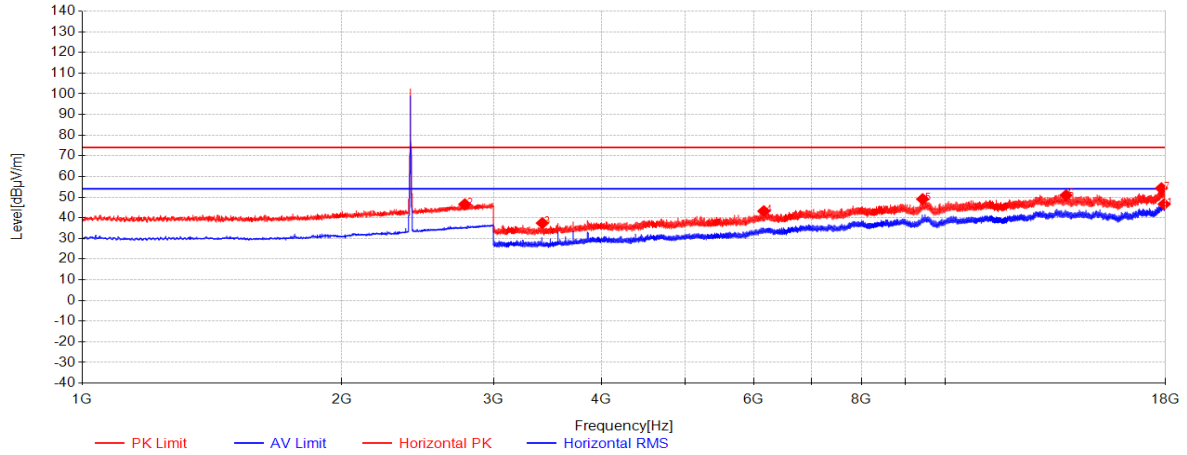
005-lpex-802.15.4 (Thread/Zigbee)_TX_CH_26_Vertical



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17974.875	36.23	41.63	-31.04	46.81	54.00	7.19	Vertical
2	2702	42.42	28.41	-24.29	46.54	74.00	27.46	Vertical
3	3861.375	60.23	30.60	-44.93	45.90	74.00	28.10	Vertical
4	4380.75	55.96	31.71	-45.40	42.27	74.00	31.73	Vertical
5	7219.875	50.20	36.30	-42.48	44.02	74.00	29.98	Vertical
6	12765.375	45.77	39.62	-34.95	50.43	74.00	23.57	Vertical
7	17974.5	43.74	41.63	-31.04	54.32	74.00	19.68	Vertical

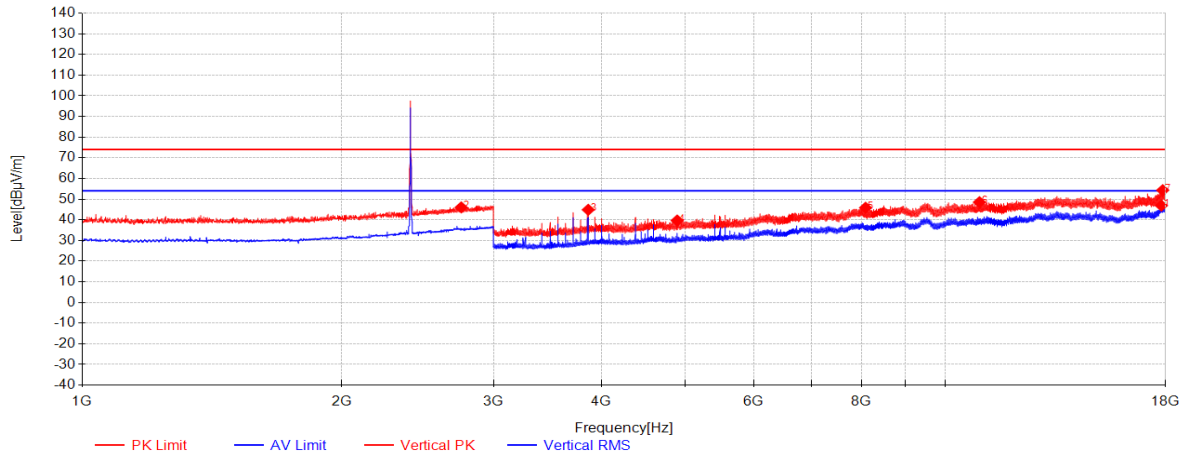
Dipole Antenna(Model: YEBT038WFA):

006-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_11_Horizontal



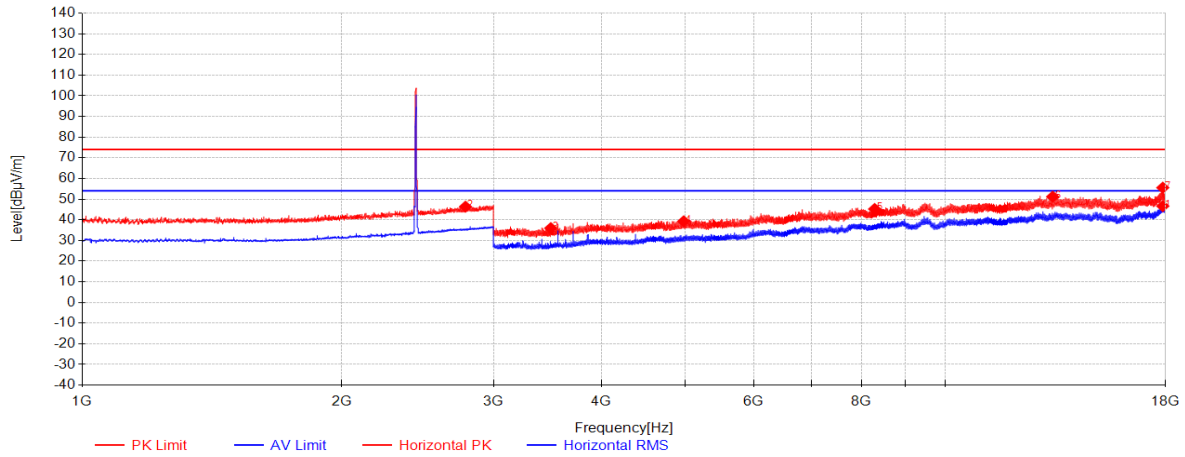
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17956.875	36.10	41.57	-31.06	46.62	54.00	7.38	Horizontal
2	2777	42.00	28.71	-24.16	46.55	74.00	27.45	Horizontal
3	3415.125	53.84	29.35	-45.76	37.44	74.00	36.56	Horizontal
4	6168.375	52.25	34.84	-43.86	43.22	74.00	30.78	Horizontal
5	9424.5	49.77	38.04	-38.78	49.03	74.00	24.97	Horizontal
6	13821.75	45.81	40.31	-35.19	50.93	74.00	23.07	Horizontal
7	17825.25	43.76	41.19	-30.65	54.31	74.00	19.69	Horizontal

007-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_11_Vertical



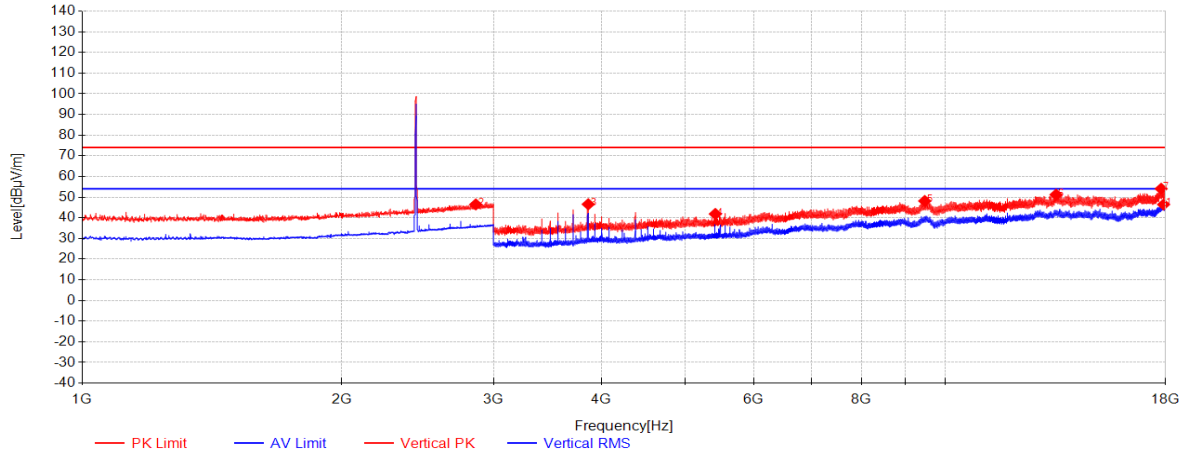
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17823.75	36.34	41.19	-30.64	46.89	54.00	7.11	Vertical
2	2751	41.61	28.60	-24.20	46.01	74.00	27.99	Vertical
3	3861	59.17	30.60	-44.93	44.84	74.00	29.16	Vertical
4	4895.25	51.65	32.85	-44.85	39.65	74.00	34.35	Vertical
5	8093.625	49.55	37.37	-41.09	45.83	74.00	28.17	Vertical
6	10968	45.44	39.26	-36.18	48.52	74.00	25.48	Vertical
7	17891.625	43.99	41.39	-31.06	54.32	74.00	19.68	Vertical

008-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_18_Horizontal



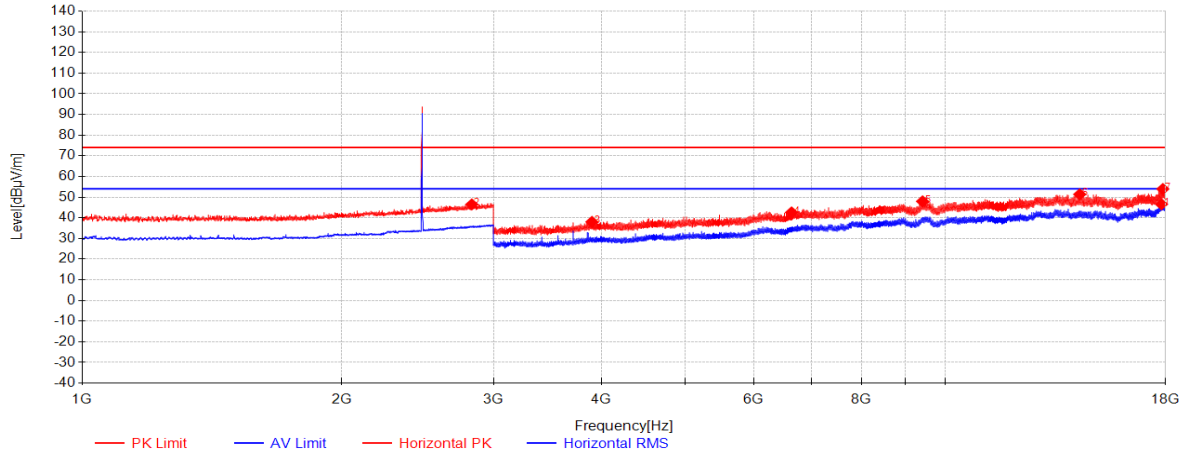
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17892.75	36.30	41.39	-31.07	46.62	54.00	7.38	Horizontal
2	2782	41.78	28.73	-24.15	46.36	74.00	27.64	Horizontal
3	3493.5	52.13	29.30	-45.47	35.96	74.00	38.04	Horizontal
4	4980.75	51.06	33.05	-44.85	39.26	74.00	34.74	Horizontal
5	8290.875	48.45	37.50	-40.74	45.22	74.00	28.78	Horizontal
6	13335	46.26	40.07	-35.16	51.17	74.00	22.83	Horizontal
7	17892.375	45.20	41.39	-31.06	55.53	74.00	18.47	Horizontal

009-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_18_Vertical



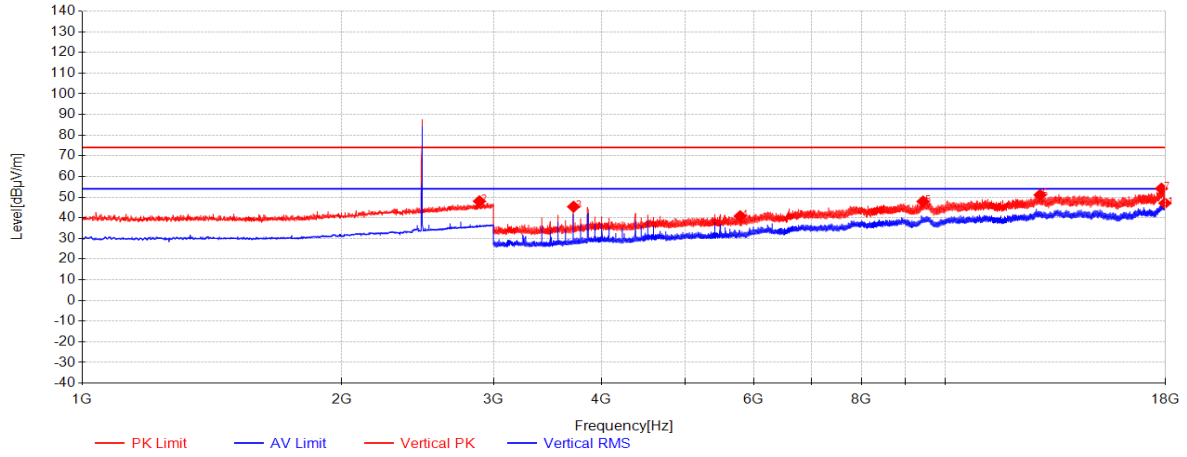
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17929.875	36.02	41.50	-31.08	46.43	54.00	7.57	Vertical
2	2859.5	41.21	29.04	-23.76	46.49	74.00	27.51	Vertical
3	3861	60.89	30.60	-44.93	46.56	74.00	27.44	Vertical
4	5419.875	53.45	33.02	-44.62	41.85	74.00	32.15	Vertical
5	9478.125	48.79	38.05	-38.70	48.13	74.00	25.87	Vertical
6	13456.125	45.95	40.13	-34.91	51.17	74.00	22.83	Vertical
7	17813.25	43.47	41.16	-30.57	54.06	74.00	19.94	Vertical

010-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_26_Horizontal



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17828.625	36.03	41.20	-30.67	46.57	54.00	7.43	Horizontal
2	2829.5	41.49	28.92	-23.94	46.47	74.00	27.53	Horizontal
3	3899.25	52.18	30.74	-44.91	38.01	74.00	35.99	Horizontal
4	6642	50.00	35.73	-43.11	42.61	74.00	31.39	Horizontal
5	9422.625	48.69	38.04	-38.79	47.95	74.00	26.05	Horizontal
6	14332.875	45.80	40.20	-34.66	51.34	74.00	22.66	Horizontal
7	17895	43.62	41.40	-31.08	53.94	74.00	20.06	Horizontal

011-Dipole-802.15.4 (Thread/Zigbee)_TX_CH_26_Vertical



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	17994.375	36.42	41.68	-31.03	47.08	54.00	6.92	Vertical
2	2887.5	42.45	29.15	-23.60	48.01	74.00	25.99	Vertical
3	3712.5	60.67	30.07	-45.37	45.36	74.00	28.64	Vertical
4	5791.5	51.07	33.87	-44.16	40.78	74.00	33.22	Vertical
5	9434.625	48.64	38.04	-38.77	47.92	74.00	26.08	Vertical
6	12892.875	46.58	39.77	-35.30	51.05	74.00	22.95	Vertical
7	17829	43.60	41.20	-30.67	54.13	74.00	19.87	Vertical

7.4 Maximum Conducted Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2020) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ hopping channels < 50
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C

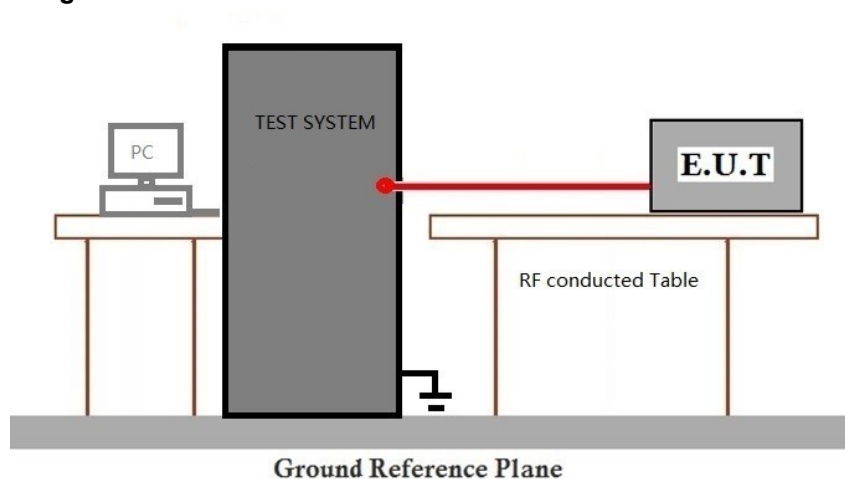
Humidity: 50.5 % RH

Atmospheric Pressure: 1001 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode 802.15.4 (Thread/Zigbee)_Keep the EUT in continuously transmitting with O-QPSK modulation mode.

7.4.3 Test Setup Diagram





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7.4.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details

7.5 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)

Test Method: ANSI C63.10 (2020) Section 11.8.1

Limit:

≥500 kHz

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C

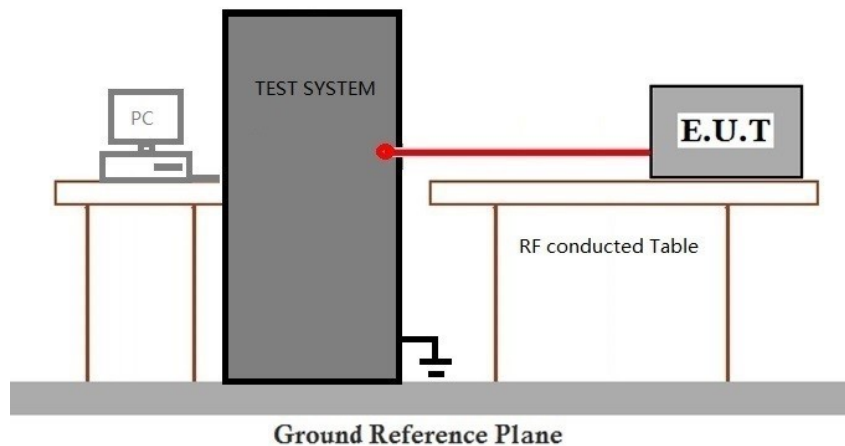
Humidity: 50.5 % RH

Atmospheric Pressure: 1001 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode 802.15.4 (Thread/Zigbee)_Keep the EUT in continuously transmitting with O-QPSK modulation mode.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.6 Power Spectral Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)

Test Method: ANSI C63.10 (2020) Section 11.10.2

Limit:

≤8dBm in any 3 kHz band during any time interval of continuous transmission

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C

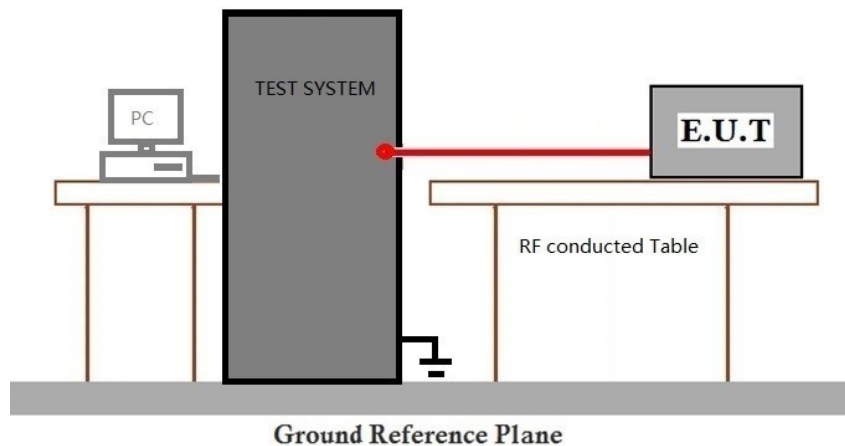
Humidity: 50.5 % RH

Atmospheric Pressure: 1001 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode 802.15.4 (Thread/Zigbee)_Keep the EUT in continuously transmitting with O-QPSK modulation mode.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2020) Section 6.10.4

Limit:

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)).

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C

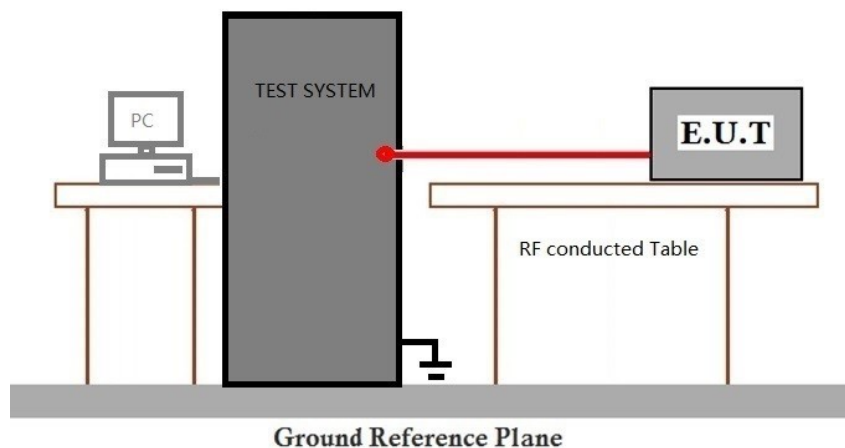
Humidity: 50.5 % RH

Atmospheric Pressure: 1001 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode 802.15.4 (Thread/Zigbee)_Keep the EUT in continuously transmitting with O-QPSK modulation mode.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.8 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2020) Section 11.11

Limit:

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)).

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C

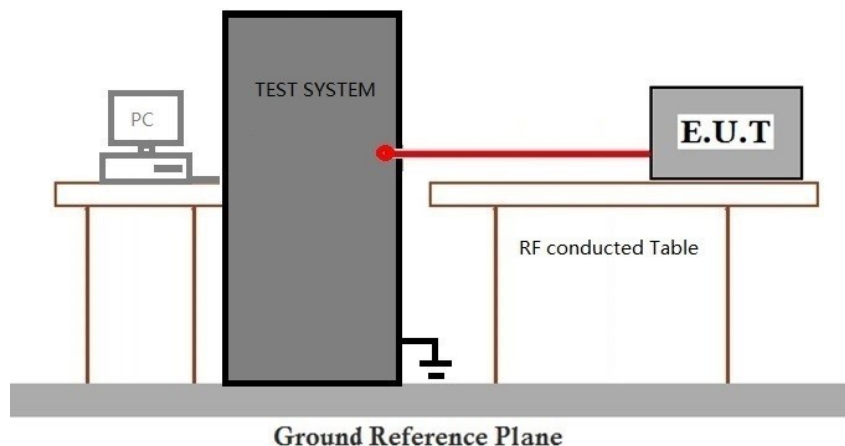
Humidity: 50.5 % RH

Atmospheric Pressure: 1001 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode 802.15.4 (Thread/Zigbee)_Keep the EUT in continuously transmitting with O-QPSK modulation mode.

7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SUCR2603000279MO

9 EUT Constructional Details (EUT Photos)

Refer to Appendix_Photographs of EUT Constructional Details for SUCR2603000279MO



10 Appendix

1. Duty Cycle

1.1 Test Result

1.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.15.4 (Thread/Zigbee)	SISO	2405	2.663	10.000	26.63	5.75	0.01

2. Bandwidth

2.1 Test Result

2.1.1 OBW

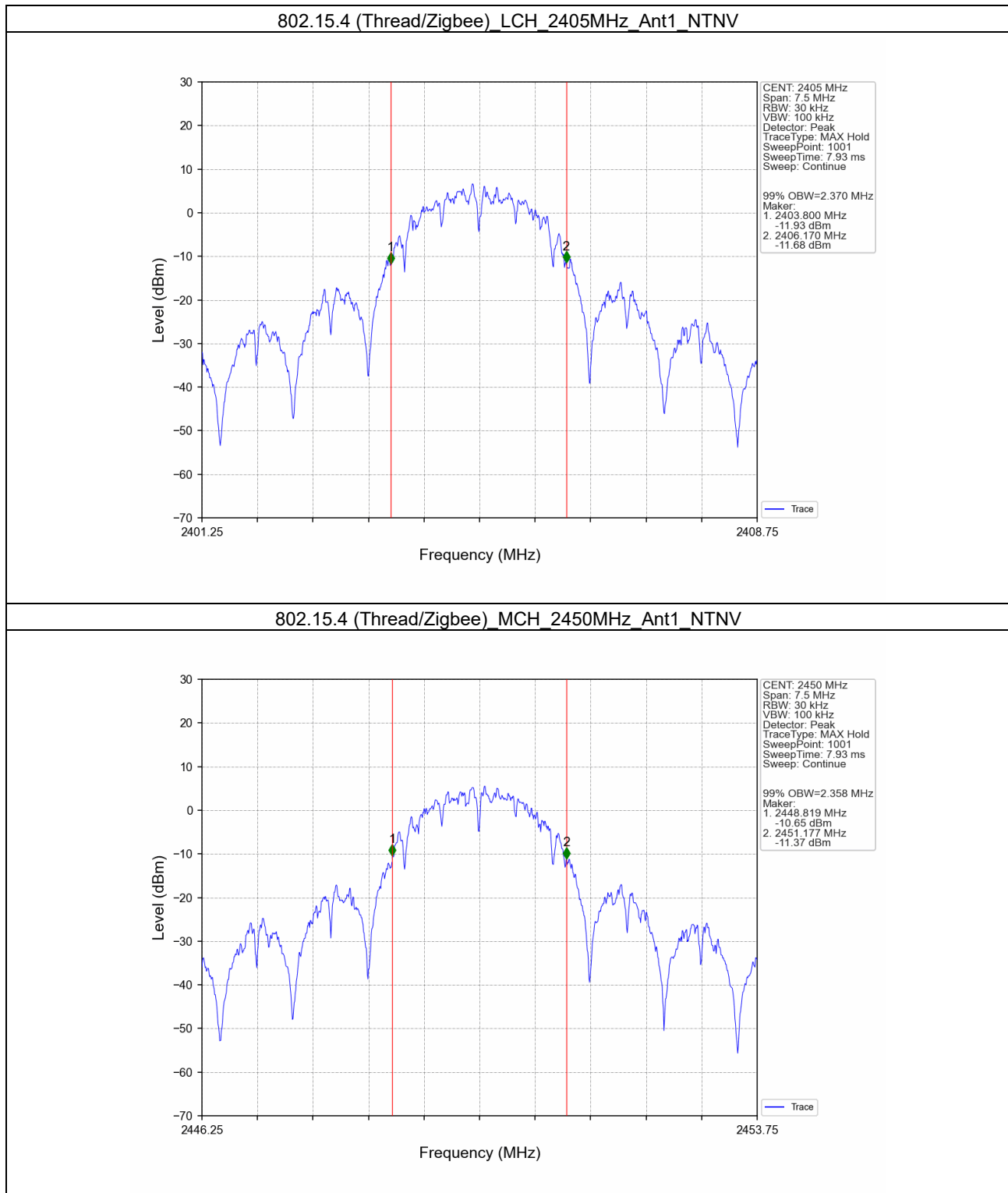
Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
802.15.4 (Thread/Zigbee)	SISO	2405	1	2.370	/	Pass
		2450	1	2.358	/	Pass
		2480	1	2.238	/	Pass

2.1.2 6dB BW

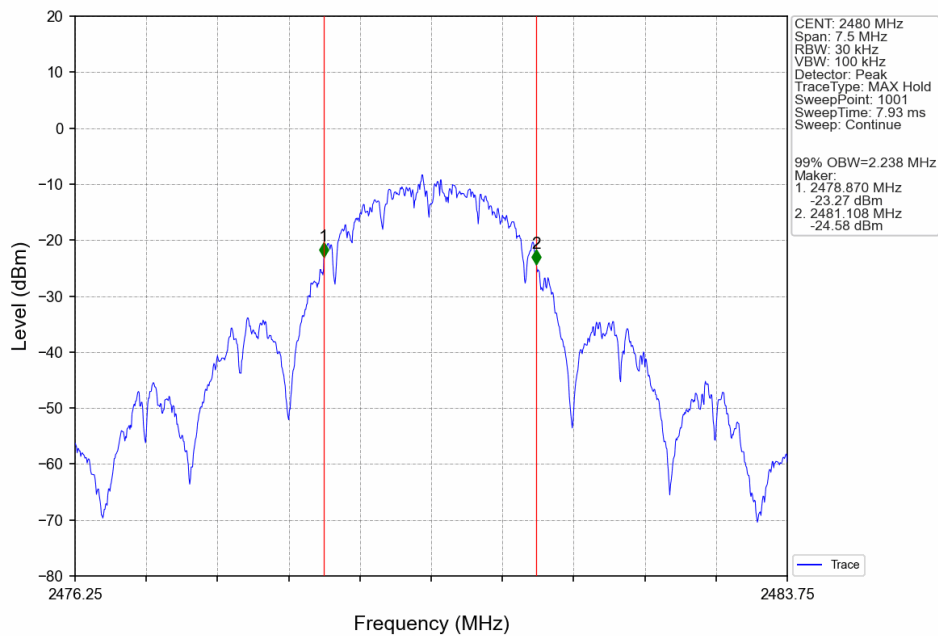
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.15.4 (Thread/Zigbee)	SISO	2405	1	1.628	≥ 0.5	Pass
		2450	1	1.628	≥ 0.5	Pass
		2480	1	1.571	≥ 0.5	Pass

2.2 Test Graph

2.2.1 OBW

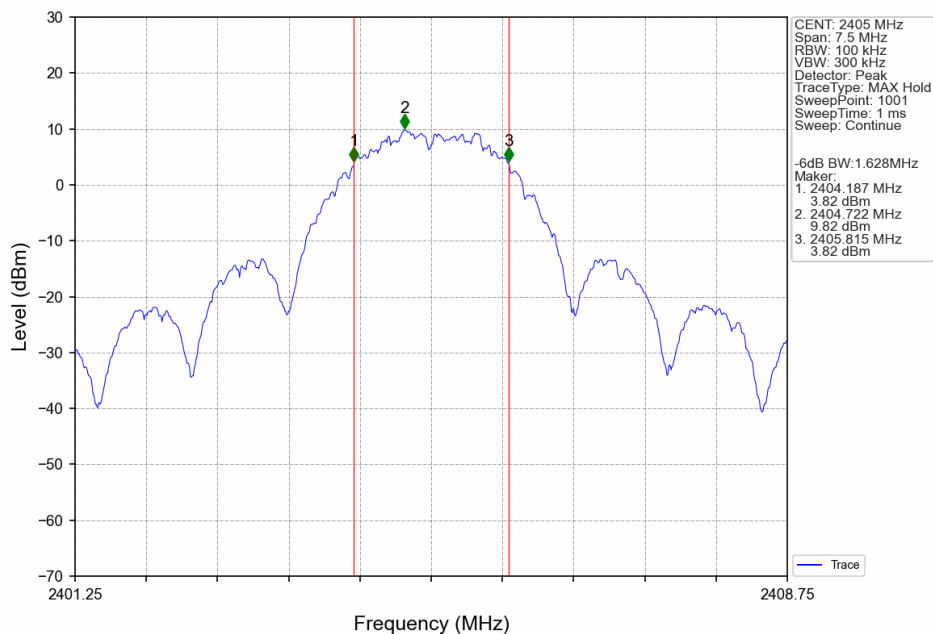


802.15.4 (Thread/Zigbee) HCH 2480MHz Ant1 NTN

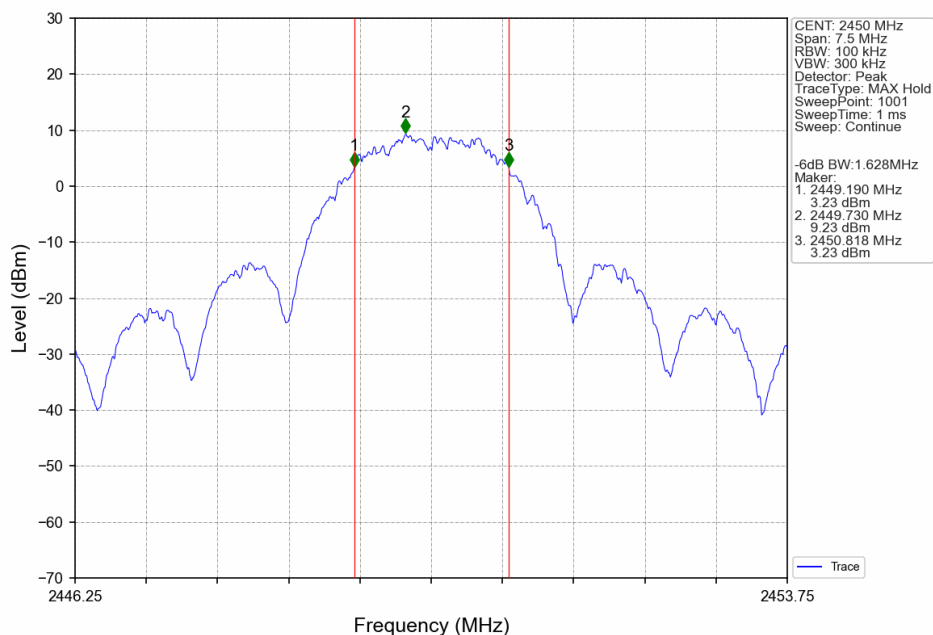


2.2.2 6dB BW

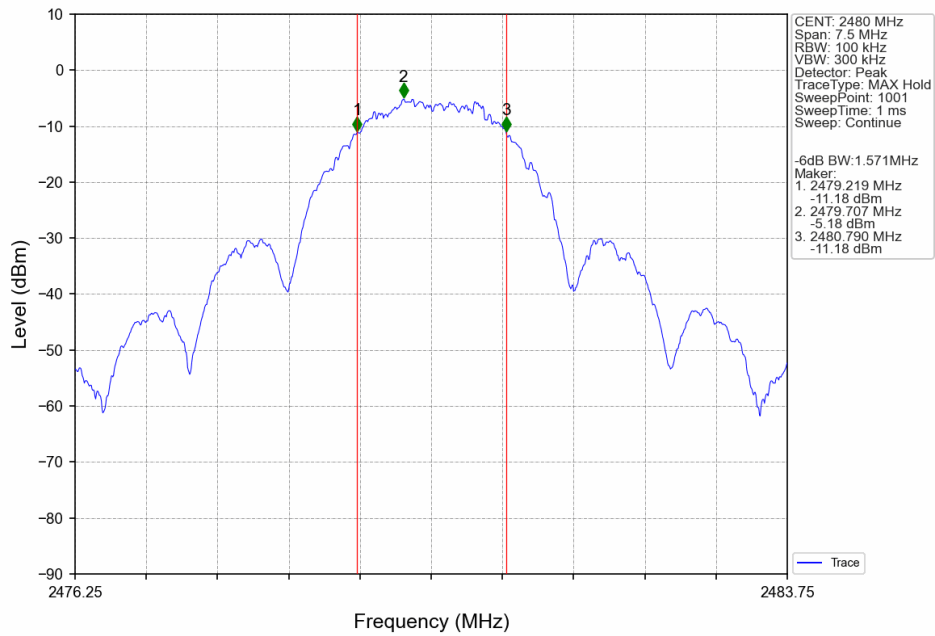
802.15.4 (Thread/Zigbee) LCH 2405MHz Ant1 NTN



802.15.4 (Thread/Zigbee) MCH 2450MHz Ant1 NTN



802.15.4 (Thread/Zigbee) HCH 2480MHz Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Dipole Power(Model: YEBT038WFA)

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
802.15.4 (Thread/Zigbee)	SISO	2405	13.67	<=30	Pass
		2450	13.16	<=30	Pass
		2480	-1.23	<=30	Pass

3.1.2 Ipex Power(Model: 2229320-00-B)

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
802.15.4 (Thread/Zigbee)	SISO	2405	13.67	<=30	Pass
		2450	13.16	<=30	Pass
		2480	-1.23	<=30	Pass

4. Maximum Power Spectral Density

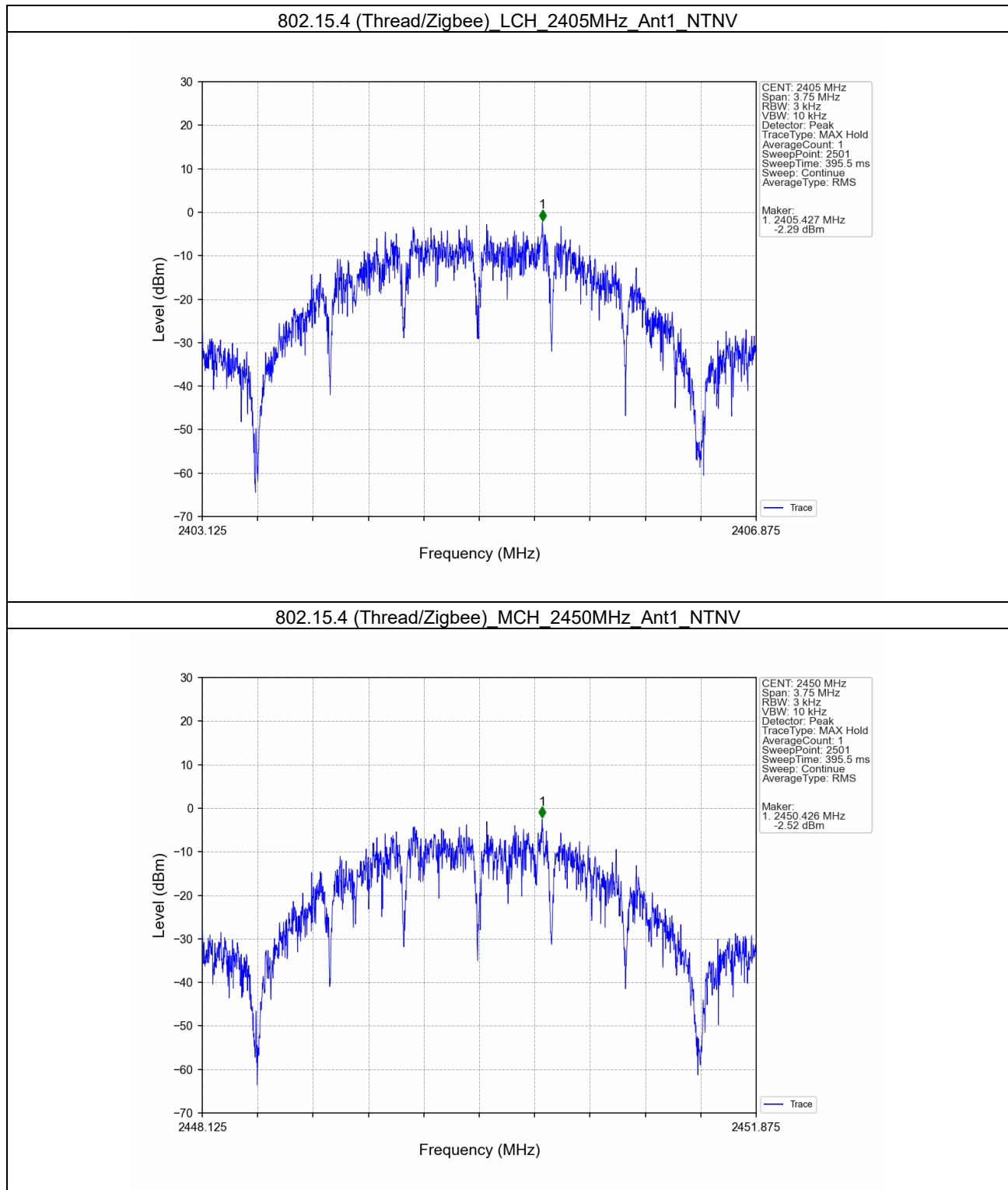
4.1 Test Result

4.1.1 PSD

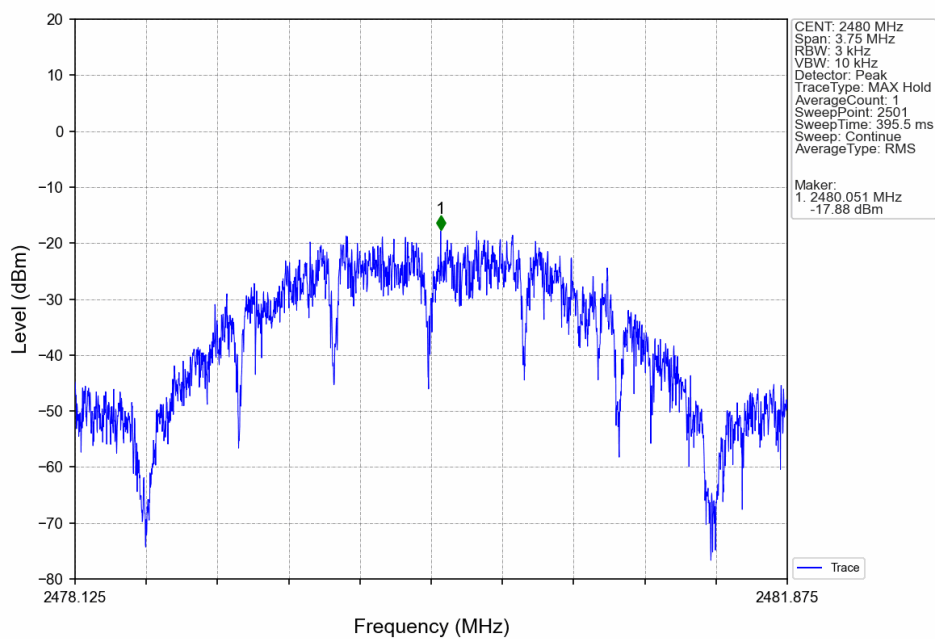
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm)		Verdict
			ANT1	Limit(dBm/3kHz)	
802.15.4 (Thread/Zigbee)	SISO	2405	-2.29dBm/3kHz	<=8	Pass
		2450	-2.52dBm/3kHz	<=8	Pass
		2480	-17.88dBm/3kHz	<=8	Pass

4.2 Test Graph

4.2.1 PSD



802.15.4 (Thread/Zigbee) HCH_2480MHz_Ant1_NTNV



5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

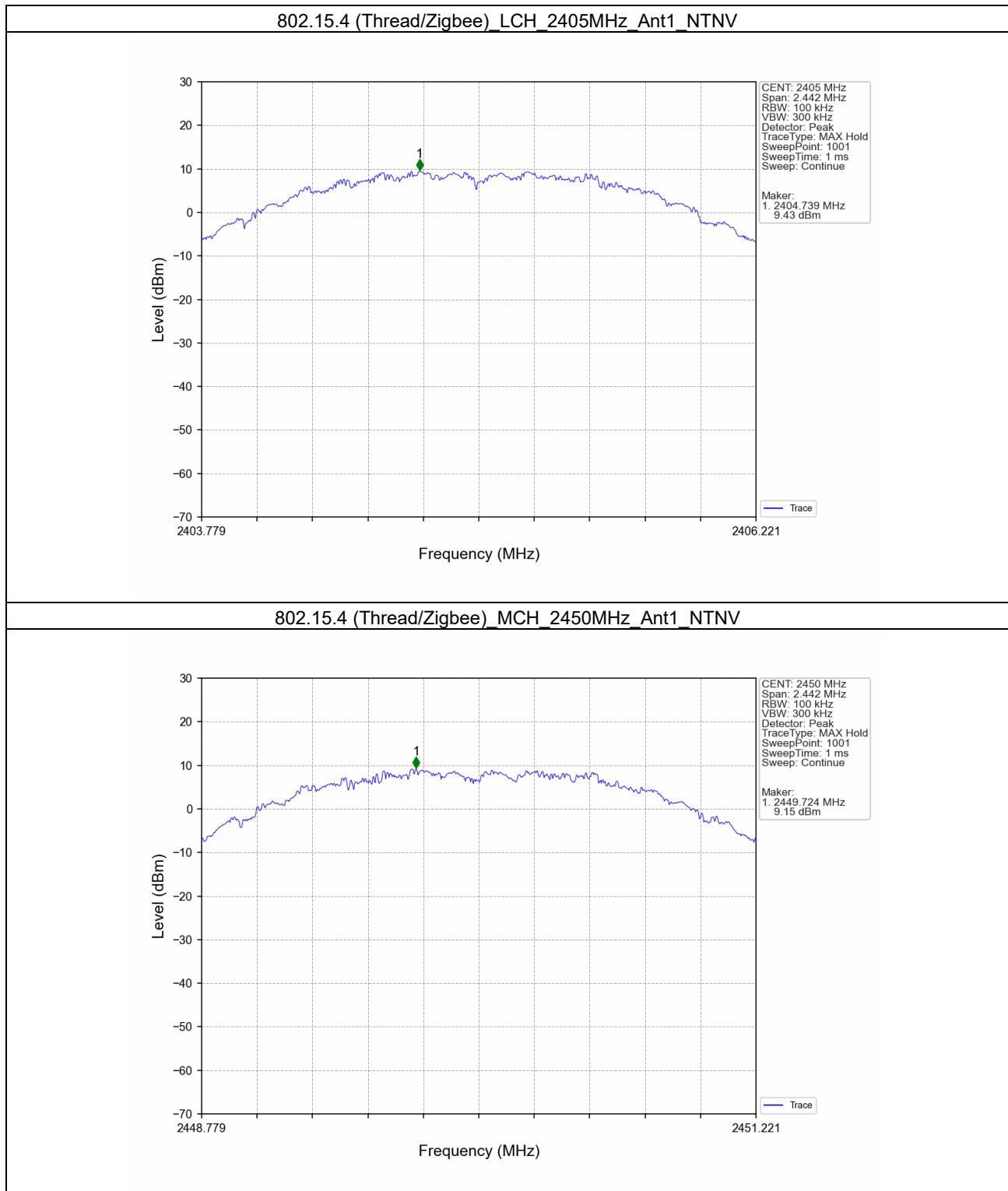
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
802.15.4 (Thread/Zigbee)	SISO	2405	1	9.43
		2450	1	9.15
		2480	1	-5.27

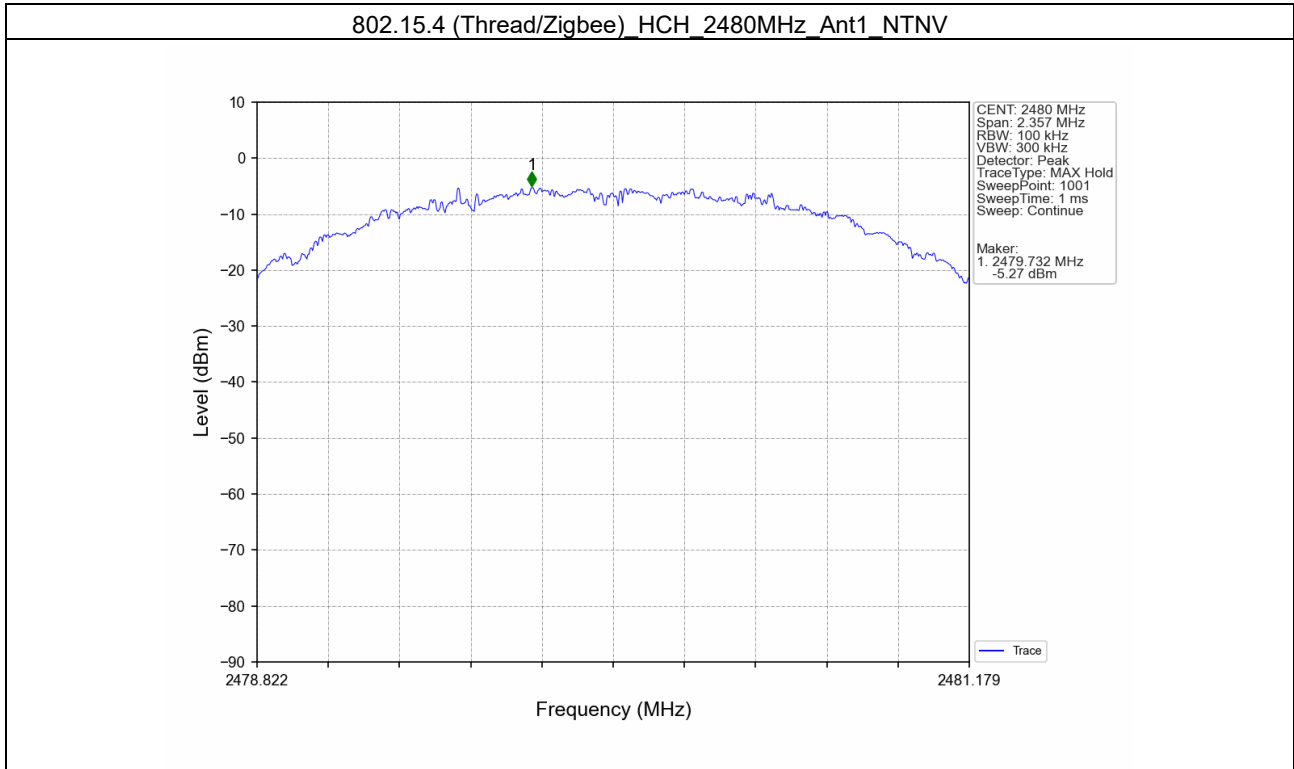
5.1.2 CSE

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
802.15.4 (Thread/Zigbee)	SISO	2405	1	9.43	-10.57	Pass
		2450	1	9.43	-10.57	Pass
		2480	1	9.43	-10.57	Pass

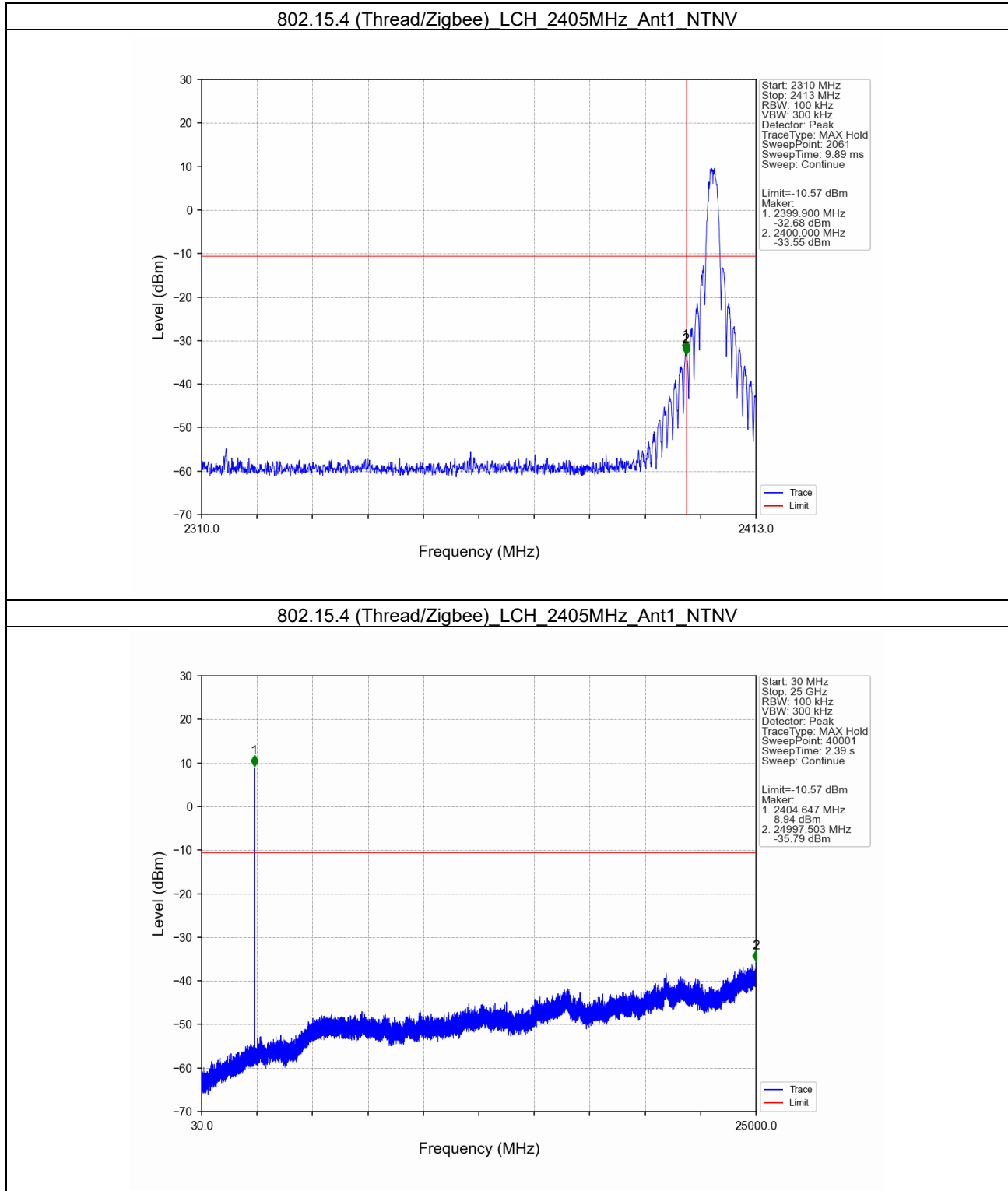
5.2 Test Graph

5.2.1 Ref

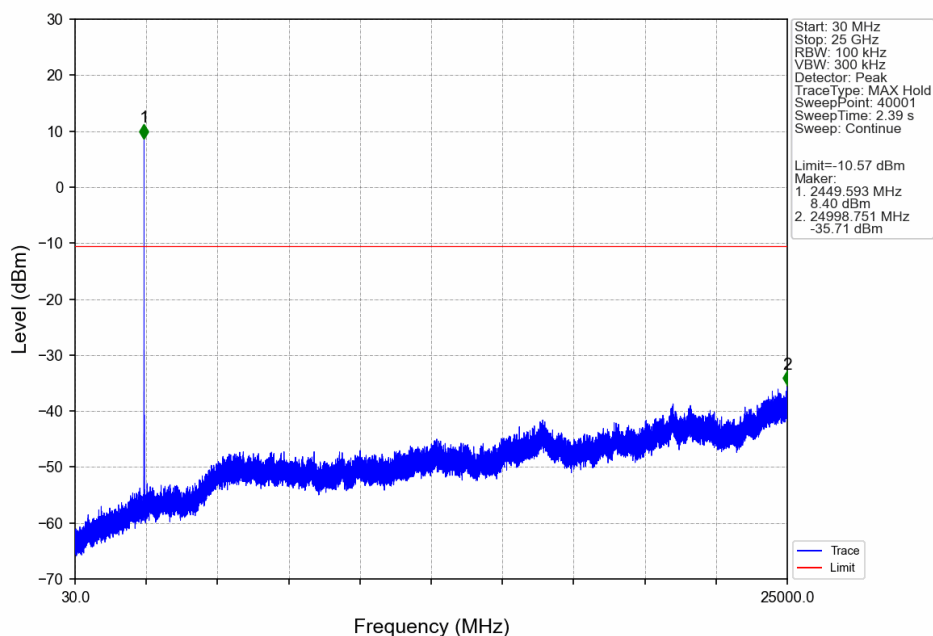




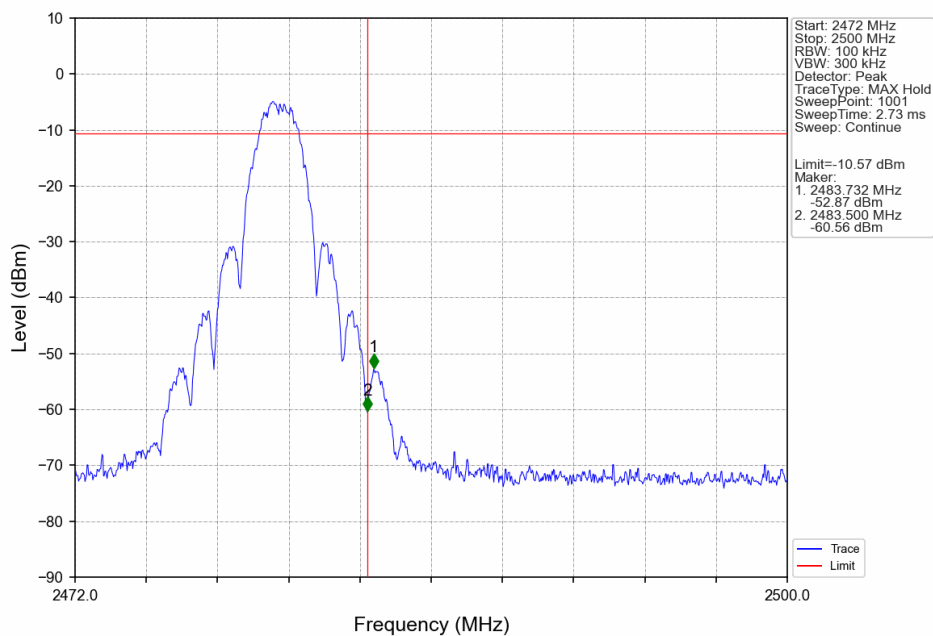
5.2.2 CSE

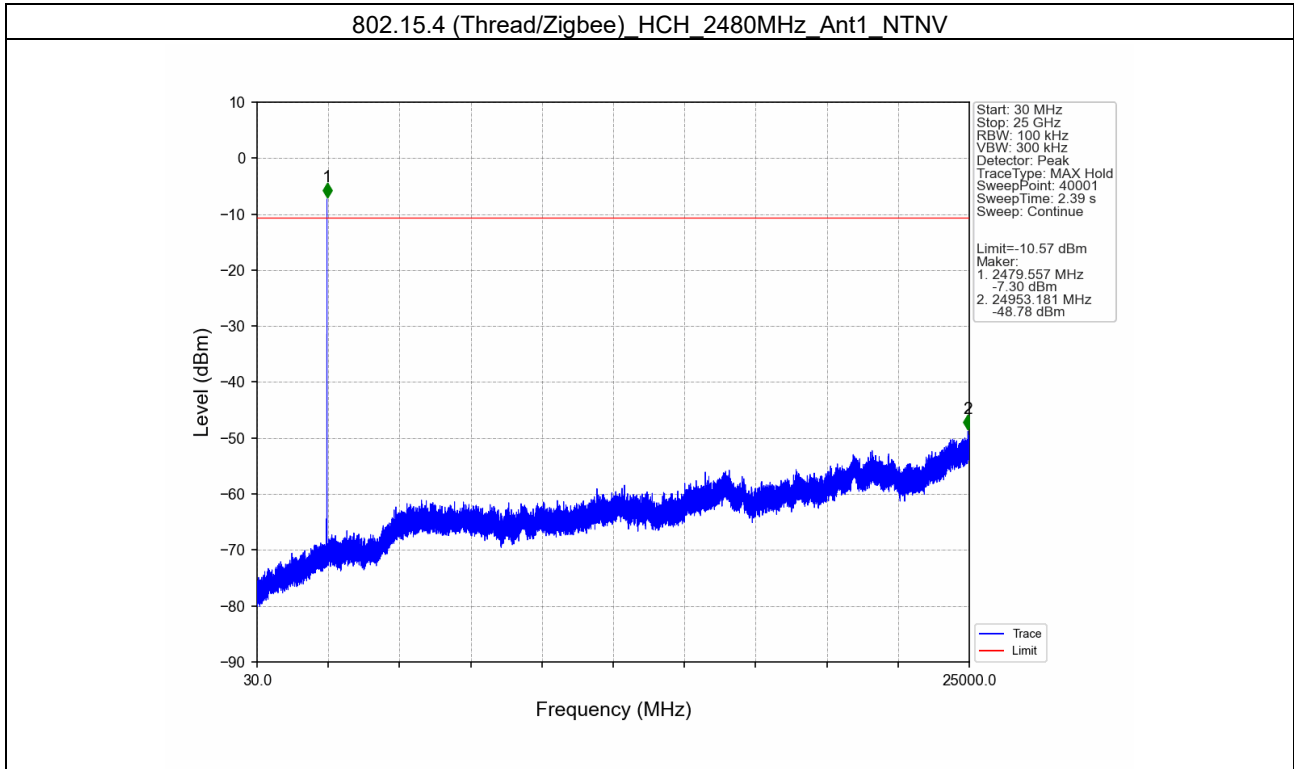


802.15.4 (Thread/Zigbee) MCH_2450MHz_Ant1_NTNV



802.15.4 (Thread/Zigbee) HCH_2480MHz_Ant1_NTNV





- End of the Report -