

Canada Test Report

(802.15.4)

Report No.: ICCDBM-WTW-P22030865-2

IC: 5123A-GM240P

Test Model: MGM240P22A, MGM240P32A, MGM240P32N

Series Model: BGM240P22A, BGM240P32A, BGM240P32N
(refer to item 3.1 for more details)

Received Date: Mar. 22, 2022

Test Date: Apr. 07 ~ Apr. 19, 2022

Issued Date: Aug. 15, 2022

Applicant: Silicon Laboratories Finland Oy

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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ISED# / CAB Identifier (1): 7450F / TW2021

ISED# / CAB Identifier (2): 27127 / TW2021



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Release Control Record

Issue No.	Description	Date Issued
ICCDBM-WTW-P22030865-2	Original Release	Aug. 15, 2022

1 Certificate of Conformity

Product: Bluetooth Low Energy and 802.15.4 wireless radio module

Brand: Silicon Labs

Test Model: MGM240P22A, MGM240P32A, MGM240P32N

Series Model: BGM240P22A, BGM240P32A, BGM240P32N (refer to item 3.1 for more details)

Sample Status: Engineering samples fully representing the production modules

Applicant: Silicon Laboratories Finland Oy

Test Date: Apr. 07 ~ Apr. 19, 2022

Standards: Canada RSS-247 Issue 2, February 2017

Canada RSS-Gen Issue 5, Amendment 2, February 2021

ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :

Gina Liu

Date:

Aug. 15, 2022

Gina Liu / Specialist

Approved by :

Jeremy Lin

Date:

Aug. 15, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

RSS-247; RSS-Gen			
Standard Section	Test Item	Result	Remarks
RSS-Gen 8.8	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -17.11 dB at 0.16148 MHz.
RSS-Gen 6.7	Occupied Bandwidth Measurement	Pass	Meet the requirement of limit.
RSS-247 5.5	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -0.20 dB at 2483.50 MHz.
RSS-247 5.5	Band Edge Measurement	Pass	Meet the requirement of limit.
RSS-247 5.2 (a)	6 dB bandwidth	Pass	Meet the requirement of limit.
RSS-247 5.4 (d)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
RSS-247 5.2 (b)	Power Spectral Density	Pass	Meet the requirement of limit.

Note:

- For 2.4G band compliance with rule RSS-247 of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.00 dB
	30 MHz ~ 200 MHz	2.91 dB
	200 MHz ~ 1000 MHz	2.92 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product (PMN)	Bluetooth Low Energy and 802.15.4 wireless radio module
Brand	Silicon Labs
Test Model (HVIN)	MGM240P22A, MGM240P32A, MGM240P32N
Series Model	BGM240P22A, BGM240P32A, BGM240P32N
Model Difference	Refer to Note as below
Status of EUT	Engineering samples fully representing the production modules
Power Supply Rating	1.8 ~ 3.8 Vdc from DC power supply 5.0 Vdc from host equipment
Modulation Type	O-QPSK
Modulation Technology	DSSS
Transfer Rate	250 kbps
Operating Frequency	2405 ~ 2480 MHz
Number of Channel	16
Output Power	95.719 mW
Antenna Type	Refer to Note as below
Antenna Connector	MGM240P22A and MGM240P32A: N/A (have integral antenna) / MGM240P32N: N/A (has RF pin)
FVIN Version	Firmware version 4.0.x (Gecko SDK)
RF Power Setting in Test SW	Refer to Note as below
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. All models are listed as below. Model MGM240P22A, MGM240P32A and MGM240P32N are the representative for final test.

Product Spec.	Model		
	MGM240P22A (covers BGM240P22A)	MGM240P32A (covers BGM240P32A)	MGM240P32N (covers BGM240P32N)
	Low-Power/ Bluetooth Low Energy and 802.15.4 (802.15.4 being disabled for BGM240P22A)	High-Power/ Bluetooth Low Energy and 802.15.4 (802.15.4 being disabled for BGM240P32A)	High-Power/ Bluetooth Low Energy and 802.15.4 (802.15.4 being disabled for BGM240P32N)
Max nominal RF TX power, as declared by manufacturer	10dBm	20dBm	20dBm
Antenna type	integral antenna	integral antenna	RF pin
Hardware	<p>MGM240P22A (and BGM240P22A) --> hardware variants with integral antenna and 10dBm max power, to be tested as DTS for both 802.15.4 and Bluetooth Low Energy</p> <p>MGM240P32A (and BGM240P32A) --> hardware variants with integral antenna and 20dBm max power, to be tested as DTS for 802.15.4 and FHSS for Bluetooth Low Energy</p> <p>MGM240P32N (and BGM240P32N) --> hardware variants with RF pin and 20dBm max power, to be tested as DTS for 802.15.4 and FHSS for Bluetooth Low Energy</p> <p>These three hardware variants should be RF tested separately, because PAs are configured differently and also antenna matching components are different between them, meaning for example</p>		

that conducted RF measurements cannot be assumed to deliver the exact same results across the three samples.
MGM modules are the ones under testing as they support both 802.15.4 and Bluetooth Low Energy, whereas the BGM modules are the series models because they are exactly the same except for the 802.15.4 being disabled.

1. The antenna information is listed as below.

No.	Type	Connector	Gain (dBi)	Remark
1	Integral antenna	NA	1.82	For model: MGM240P22A, MGM240P32A, BGM240P22A, BGM240P32A
2	External reference dipole antenna**	RP-SMA	2.80	For model: MGM240P32N, BGM240P32N

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

** The dipole antenna is not sold with the EUT, but is used during testing as a reference antenna for radiated measurements of the parts with the RF pin.

2. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

4. Power setting is as below:

Test Mode: MGM240P22A		Test Mode: MGM240P32A		Test Mode: MGM240P32N	
Channel	Power Setting	Channel	Power Setting	Channel	Power Setting
11	100	11	200	11	200
18	100	18	200	18	200
26	100	25	200	25	200
-	-	26	115	26	140

5. BT LE (DTS/FHSS) and 802.15.4 modes technology cannot transmit at same time.

3.2 Description of Test Modes

16 channels are provided to this EUT:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440	26	2480

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE \geq 1G	RE<1G	PLC	APCM	
A	√	√	√	√	MGM240P22A / integral antenna
B	√	√	√	√	MGM240P32A / integral antenna
C	√	√	√	√	MGM240P32N / Dipole antenna

Where **RE \geq 1G**: Radiated Emission above 1 GHz **RE<1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane** for Mode A / Mode C and **X-plane** for Mode B.

NOTE: “-” means no effect.

Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A	11 to 26	11, 18, 26	O-QPSK
B, C	11 to 26	11, 18, 25, 26	O-QPSK

Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A	11 to 26	11	O-QPSK
B	11 to 26	25	O-QPSK
C	11 to 26	18	O-QPSK

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A	11 to 26	11	O-QPSK
B	11 to 26	25	O-QPSK
C	11 to 26	18	O-QPSK

Bandedge Measurement:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A	11 to 26	11, 18, 26	O-QPSK
B, C	11 to 26	11, 18, 25, 26	O-QPSK

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A	11 to 26	11, 18, 26	O-QPSK
B, C	11 to 26	11, 18, 25, 26	O-QPSK

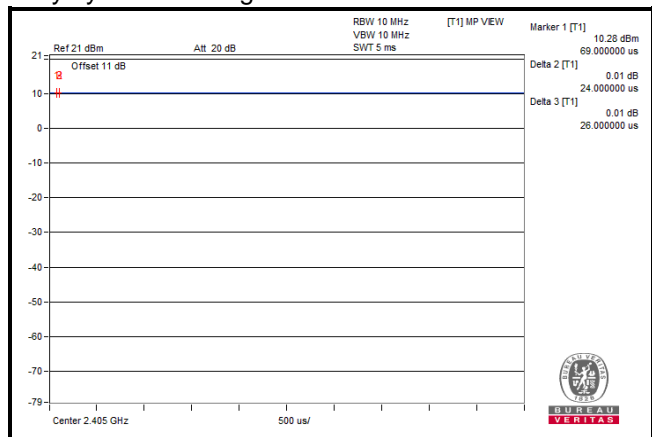
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE \geq 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz (System)	Wade Huang
RE<1G	23deg. C, 66% RH	120 Vac, 60 Hz (System)	Wade Huang
PLC	25 deg. C, 69 % RH	120 Vac, 60 Hz (System)	Wade Huang
APCM	25 deg. C, 60% RH	120 Vac, 60 Hz (System)	Alan Wu

3.3 Duty Cycle of Test Signal

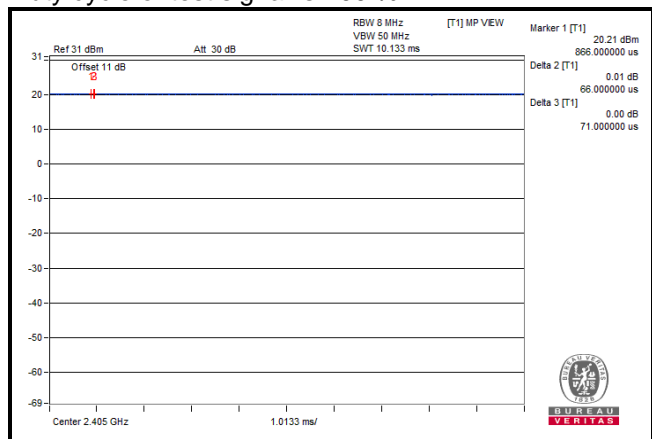
Mode A

Duty cycle of test signal is 100 %



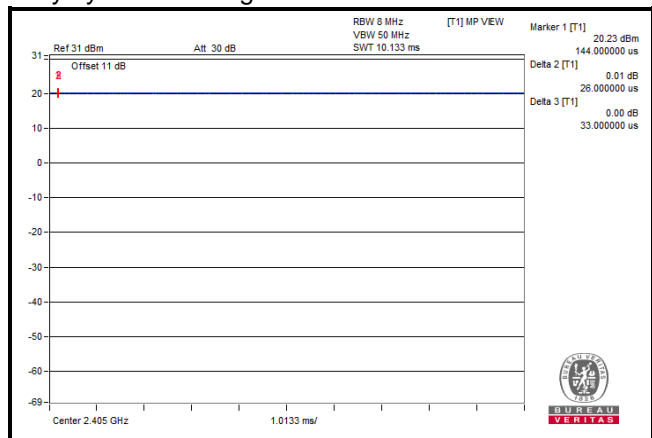
Mode B

Duty cycle of test signal is 100 %



Mode C

Duty cycle of test signal is 100 %



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

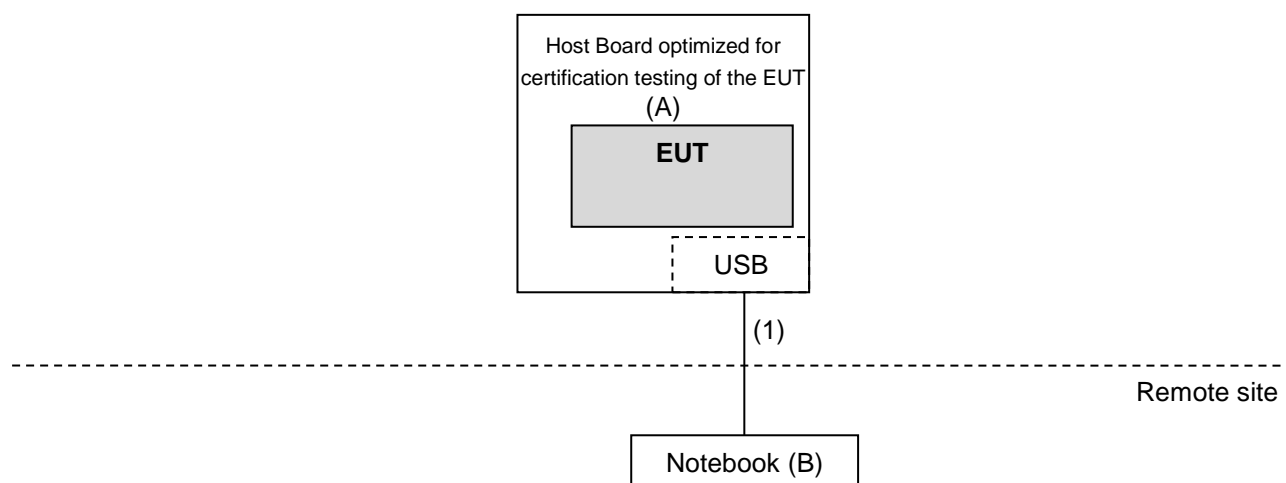
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Host Board optimized for certification testing of the EUT	Silicon Labs	NA	NA	NA	Provided by client
B.	Notebook	DELL	E5430	BPJVKV1	FCC DoC Approved	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item B acted as communication partners to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	1.5	Y	0	Provided by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

Canada RSS-247 Issue 2, February 2017

Canada RSS-Gen Issue 5, Amendment 2, February 2021

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Magnetic field strength (H-Field) ($\mu\text{A/m}$)	Measurement distance (meters)
0.009 ~ 0.490	6.37/F (F in kHz)	300
0.490 ~ 1.705	63.7/F (F in kHz)	30
1.705 ~ 30.0	0.08	30
Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level ($\mu\text{V/m}$).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, 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.
4. The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038B	MY60180018	Feb. 18, 2022	Feb. 17, 2023
Spectrum Analyzer KEYSIGHT	N9020B	MY60110462	Dec. 21, 2021	Dec. 20, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-995	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna RF SPIN	DRH18-E	210104A18E	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	9170-995	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier EMCI	EMC330N	980783	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980810	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980787	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM-(9 000+3000+2000+1 000)	201230+ 201242+201238+ 210101	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM-N M-(9000+3000+500 ++500)	201252+ 201250+201247+ 201245	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM- (5000+3000+2000)	201259+201256+20125 3	Jan. 17, 2022	Jan. 16, 2023
Software BV CPS	ADT_Radiated_V7. 6.15.9.5	NA	NA	NA
Turn Table Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208675	NA	NA
Antenna Tower KaiTuo	NA	NA	NA	NA
Antenna Tower Controller KaiTuo	KT-2000	NA	NA	NA
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 17, 2022	Jan. 16, 2023
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 18, 2022	Jan. 17, 2023
Spectrum Analyzer ROHDE & SCHWARZ	FSV40	100979	Mar. 25, 2022	Mar. 24, 2023

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in WM Chamber 7.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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 Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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.
- d. 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 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

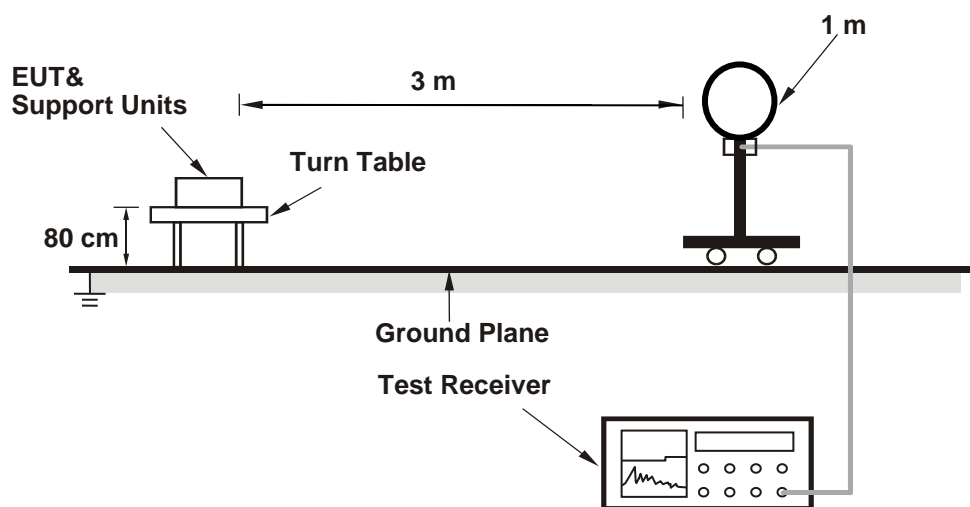
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

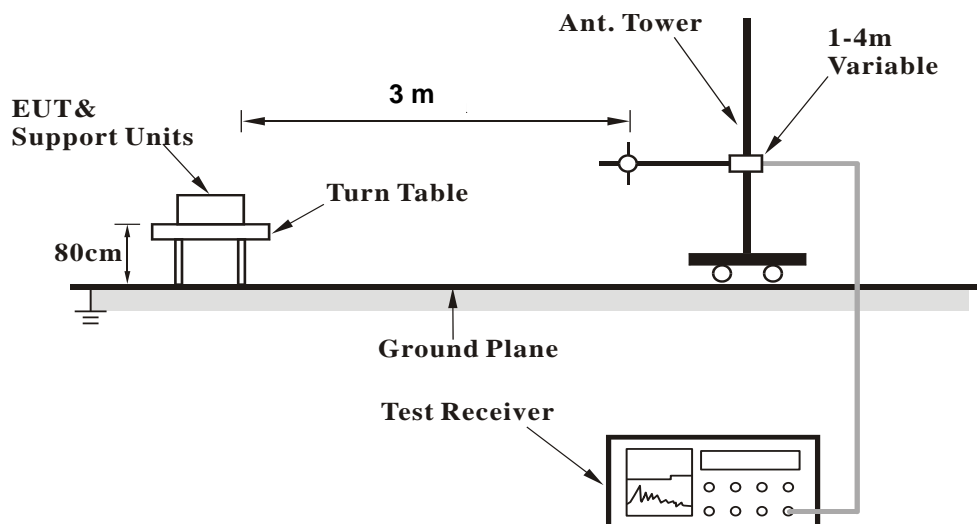
No deviation.

4.1.5 Test Set Up

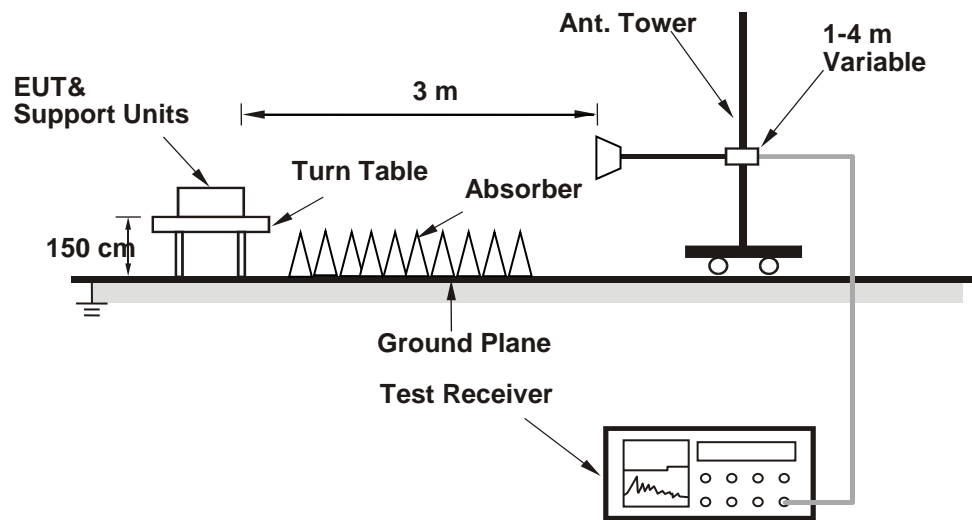
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Mode A

Above 1 GHz Data :

RF Mode	TX 802.15.4	Channel	CH 11 : 2405 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/7

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	57.68 PK	74.00	-16.32	1.36 H	14	25.75	31.93
2	2390.00	44.44 AV	54.00	-9.56	1.36 H	14	12.51	31.93
3	*2405.00	108.86 PK			1.36 H	14	76.95	31.91
4	*2405.00	105.17 AV			1.36 H	14	73.26	31.91
5	4810.00	48.35 PK	74.00	-25.65	1.50 H	223	46.26	2.09
6	4810.00	37.22 AV	54.00	-16.78	1.50 H	223	35.13	2.09
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	57.31 PK	74.00	-16.69	1.47 V	305	25.38	31.93
2	2390.00	44.54 AV	54.00	-9.46	1.47 V	305	12.61	31.93
3	*2405.00	102.08 PK			1.47 V	305	70.17	31.91
4	*2405.00	98.65 AV			1.47 V	305	66.74	31.91
5	4810.00	47.78 PK	74.00	-26.22	1.89 V	47	45.69	2.09
6	4810.00	37.68 AV	54.00	-16.32	1.89 V	47	35.59	2.09

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.15.4	Channel	CH 18 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/7

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	108.60 PK			1.22 H	14	76.77	31.83
2	*2440.00	104.98 AV			1.22 H	14	73.15	31.83
3	4880.00	45.25 PK	74.00	-28.75	1.50 H	237	43.12	2.13
4	4880.00	34.75 AV	54.00	-19.25	1.50 H	237	32.62	2.13
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	102.48 PK			1.51 V	297	70.65	31.83
2	*2440.00	98.78 AV			1.51 V	297	66.95	31.83
3	4880.00	44.95 PK	74.00	-29.05	1.90 V	50	42.82	2.13
4	4880.00	34.30 AV	54.00	-19.70	1.90 V	50	32.17	2.13

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.15.4	Channel	CH 26 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/7

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	108.81 PK			1.15 H	15	76.94	31.87
2	*2480.00	105.22 AV			1.15 H	15	73.35	31.87
3	2483.50	66.13 PK	74.00	-7.87	1.15 H	15	34.26	31.87
4	2483.50	53.41 AV	54.00	-0.59	1.15 H	15	21.54	31.87
5	4960.00	45.18 PK	74.00	-28.82	1.51 H	235	42.93	2.25
6	4960.00	33.54 AV	54.00	-20.46	1.51 H	235	31.29	2.25
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	102.97 PK			1.59 V	304	71.10	31.87
2	*2480.00	99.40 AV			1.59 V	304	67.53	31.87
3	2483.50	61.96 PK	74.00	-12.04	1.59 V	304	30.09	31.87
4	2483.50	48.75 AV	54.00	-5.25	1.59 V	304	16.88	31.87
5	4960.00	46.23 PK	74.00	-27.77	1.85 V	52	43.98	2.25
6	4960.00	33.48 AV	54.00	-20.52	1.85 V	52	31.23	2.25

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

Below 1 GHz Worst-Case Data:

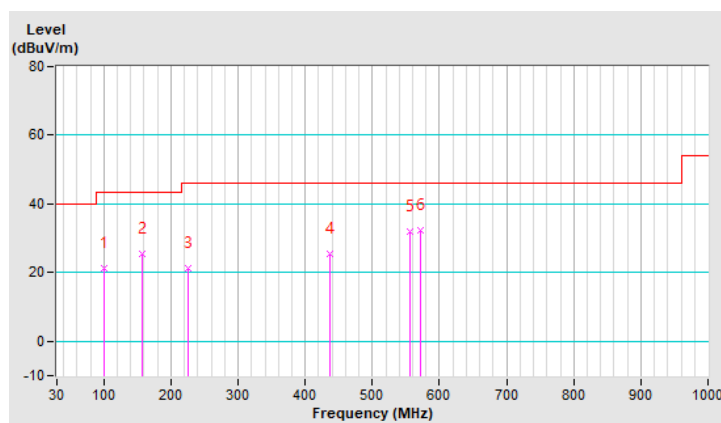
RF Mode	TX 802.15.4	Channel	CH 11 : 2405 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	99.84	21.26 QP	43.50	-22.24	1.99 H	221	38.97	-17.71
2	158.04	25.60 QP	43.50	-17.90	1.99 H	276	38.74	-13.14
3	225.94	21.33 QP	46.00	-24.67	1.51 H	3	37.97	-16.64
4	437.40	25.56 QP	46.00	-20.44	1.01 H	267	34.82	-9.26
5	556.71	32.10 QP	46.00	-13.90	1.51 H	76	39.14	-7.04
6	572.23	32.22 QP	46.00	-13.78	1.51 H	76	38.90	-6.68

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

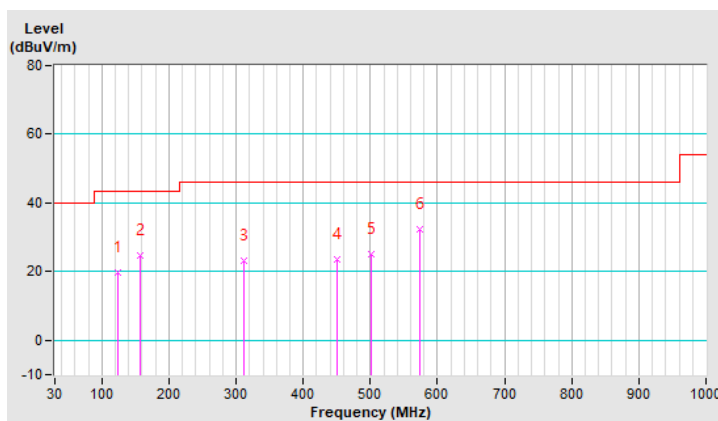


RF Mode	TX 802.15.4	Channel	CH 11 : 2405 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	124.09	19.66 QP	43.50	-23.84	1.49 V	184	34.80	-15.14
2	157.07	24.73 QP	43.50	-18.77	1.01 V	2	37.88	-13.15
3	312.27	23.07 QP	46.00	-22.93	1.49 V	152	35.75	-12.68
4	450.98	23.68 QP	46.00	-22.32	1.49 V	18	32.66	-8.98
5	500.45	25.06 QP	46.00	-20.94	1.01 V	36	33.27	-8.21
6	573.20	32.37 QP	46.00	-13.63	1.01 V	193	39.01	-6.64

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



Mode B

Above 1 GHz Data :

RF Mode	TX 802.15.4	Channel	CH 11 : 2405 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2366.64	59.19 PK	74.00	-14.81	1.37 H	25	27.24	31.95
2	2366.64	47.33 AV	54.00	-6.67	1.37 H	25	15.38	31.95
3	*2405.00	119.40 PK			1.37 H	25	87.49	31.91
4	*2405.00	115.78 AV			1.37 H	25	83.87	31.91
5	4810.00	48.69 PK	74.00	-25.31	1.72 H	88	46.60	2.09
6	4810.00	38.87 AV	54.00	-15.13	1.72 H	88	36.78	2.09

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2366.64	58.12 PK	74.00	-15.88	3.77 V	89	26.17	31.95
2	2366.64	44.78 AV	54.00	-9.22	3.77 V	89	12.83	31.95
3	*2405.00	111.58 PK			3.77 V	89	79.67	31.91
4	*2405.00	108.04 AV			3.77 V	89	76.13	31.91
5	4810.00	50.00 PK	74.00	-24.00	3.60 V	162	47.91	2.09
6	4810.00	38.90 AV	54.00	-15.10	3.60 V	162	36.81	2.09

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.

RF Mode	TX 802.15.4	Channel	CH 18 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	118.36 PK			1.31 H	23	86.53	31.83
2	*2440.00	114.75 AV			1.31 H	23	82.92	31.83
3	4880.00	50.68 PK	74.00	-23.32	1.81 H	141	48.55	2.13
4	4880.00	39.71 AV	54.00	-14.29	1.81 H	141	37.58	2.13
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	111.02 PK			3.52 V	65	79.19	31.83
2	*2440.00	107.40 AV			3.52 V	65	75.57	31.83
3	4880.00	49.01 PK	74.00	-24.99	3.16 V	184	46.88	2.13
4	4880.00	37.30 AV	54.00	-16.70	3.16 V	184	35.17	2.13

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.

RF Mode	TX 802.15.4	Channel	CH 25 : 2475 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2475.00	119.42 PK			1.55 H	48	87.57	31.85
2	*2475.00	115.85 AV			1.55 H	48	84.00	31.85
3	2483.50	63.44 PK	74.00	-10.56	1.55 H	48	31.57	31.87
4	2483.50	52.24 AV	54.00	-1.76	1.55 H	48	20.37	31.87
5	4950.00	48.55 PK	74.00	-25.45	1.71 H	138	46.31	2.24
6	4950.00	37.63 AV	54.00	-16.37	1.71 H	138	35.39	2.24
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2475.00	111.06 PK			3.47 V	65	79.21	31.85
2	*2475.00	107.55 AV			3.47 V	65	75.70	31.85
3	2483.50	59.21 PK	74.00	-14.79	3.47 V	65	27.34	31.87
4	2483.50	46.61 AV	54.00	-7.39	3.47 V	65	14.74	31.87
5	4950.00	48.75 PK	74.00	-25.25	3.21 V	180	46.51	2.24
6	4950.00	36.94 AV	54.00	-17.06	3.21 V	180	34.70	2.24

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.15.4	Channel	CH 26 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/6/9

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	109.43 PK			1.35 H	26	77.56	31.87
2	*2480.00	105.78 AV			1.35 H	26	73.91	31.87
3	2483.50	65.61 PK	74.00	-8.39	1.35 H	26	33.74	31.87
4	2483.50	53.80 AV	54.00	-0.20	1.35 H	26	21.93	31.87
5	4960.00	49.25 PK	74.00	-24.75	1.76 H	140	47.00	2.25
6	4960.00	36.75 AV	54.00	-17.25	1.76 H	140	34.50	2.25
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	102.47 PK			3.39 V	62	70.60	31.87
2	*2480.00	98.47 AV			3.39 V	62	66.60	31.87
3	2483.50	59.47 PK	74.00	-14.53	3.39 V	62	27.60	31.87
4	2483.50	48.87 AV	54.00	-5.13	3.39 V	62	17.00	31.87
5	4960.00	48.45 PK	74.00	-25.55	3.11 V	190	46.20	2.25
6	4960.00	36.25 AV	54.00	-17.75	3.11 V	190	34.00	2.25

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

Below 1 GHz Worst-Case Data:

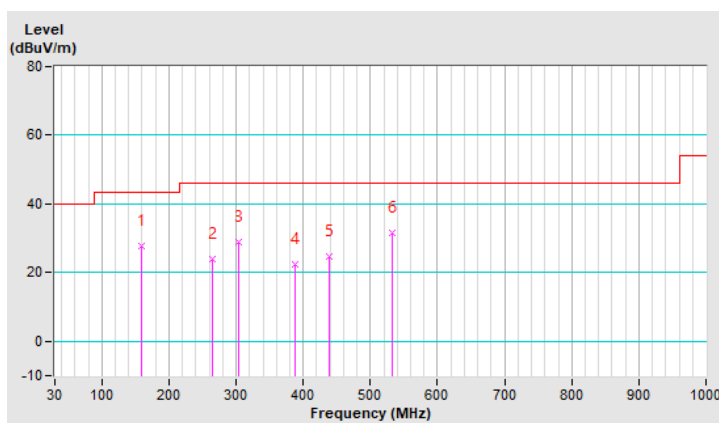
RF Mode	TX 802.15.4	Channel	CH 25 : 2475 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	159.98	27.59 QP	43.50	-15.91	1.51 H	85	40.77	-13.18
2	264.74	23.82 QP	46.00	-22.18	1.51 H	266	38.01	-14.19
3	303.54	28.80 QP	46.00	-17.20	1.01 H	159	41.75	-12.95
4	387.93	22.31 QP	46.00	-23.69	1.99 H	143	32.97	-10.66
5	438.37	24.72 QP	46.00	-21.28	1.99 H	117	33.95	-9.23
6	533.43	31.54 QP	46.00	-14.46	1.51 H	220	39.11	-7.57

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

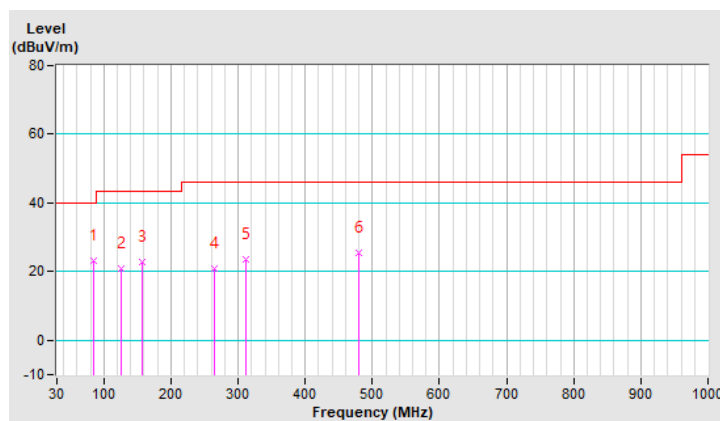


RF Mode	TX 802.15.4	Channel	CH 25 : 2475 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	84.32	23.14 QP	40.00	-16.86	1.00 V	212	42.18	-19.04
2	126.03	20.71 QP	43.50	-22.79	1.00 V	323	35.53	-14.82
3	158.04	22.81 QP	43.50	-20.69	1.49 V	319	35.95	-13.14
4	264.74	21.00 QP	46.00	-25.00	1.00 V	38	35.19	-14.19
5	311.30	23.54 QP	46.00	-22.46	1.99 V	4	36.26	-12.72
6	479.11	25.58 QP	46.00	-20.42	1.00 V	158	34.22	-8.64

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



Mode C

Above 1 GHz Data :

RF Mode	TX 802.15.4	Channel	CH 11 : 2405 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2366.80	57.39 PK	74.00	-16.61	1.66 H	39	25.44	31.95
2	2366.80	44.55 AV	54.00	-9.45	1.66 H	39	12.60	31.95
3	*2405.00	108.07 PK			1.66 H	39	76.16	31.91
4	*2405.00	104.51 AV			1.66 H	39	72.60	31.91
5	4810.00	50.84 PK	74.00	-23.16	3.35 H	62	48.75	2.09
6	4810.00	41.35 AV	54.00	-12.65	3.35 H	62	39.26	2.09

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2366.80	58.61 PK	74.00	-15.39	3.23 V	70	26.66	31.95
2	2366.80	46.72 AV	54.00	-7.28	3.23 V	70	14.77	31.95
3	*2405.00	117.22 PK			3.23 V	70	85.31	31.91
4	*2405.00	113.61 AV			3.23 V	70	81.70	31.91
5	4810.00	50.83 PK	74.00	-23.17	1.47 V	272	48.74	2.09
6	4810.00	40.85 AV	54.00	-13.15	1.47 V	272	38.76	2.09

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.

RF Mode	TX 802.15.4	Channel	CH 18 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	108.43 PK			1.60 H	41	76.60	31.83
2	*2440.00	104.85 AV			1.60 H	41	73.02	31.83
3	4880.00	50.55 PK	74.00	-23.45	3.29 H	65	48.42	2.13
4	4880.00	39.88 AV	54.00	-14.12	3.29 H	65	37.75	2.13
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	117.43 PK			3.13 V	71	85.60	31.83
2	*2440.00	113.79 AV			3.13 V	71	81.96	31.83
3	4880.00	50.19 PK	74.00	-23.81	1.43 V	272	48.06	2.13
4	4880.00	40.08 AV	54.00	-13.92	1.43 V	272	37.95	2.13

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.15.4	Channel	CH 25 : 2475 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2475.00	109.18 PK			1.55 H	39	77.33	31.85
2	*2475.00	105.58 AV			1.55 H	39	73.73	31.85
3	2483.50	58.70 PK	74.00	-15.30	1.55 H	39	26.83	31.87
4	2483.50	46.27 AV	54.00	-7.73	1.55 H	39	14.40	31.87
5	4950.00	47.93 PK	74.00	-26.07	2.87 H	100	45.69	2.24
6	4950.00	37.93 AV	54.00	-16.07	2.87 H	100	35.69	2.24
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2475.00	116.64 PK			2.26 V	75	84.79	31.85
2	*2475.00	113.05 AV			2.26 V	75	81.20	31.85
3	2483.50	63.38 PK	74.00	-10.62	2.26 V	75	31.51	31.87
4	2483.50	50.17 AV	54.00	-3.83	2.26 V	75	18.30	31.87
5	4950.00	48.54 PK	74.00	-25.46	1.73 V	275	46.30	2.24
6	4950.00	38.07 AV	54.00	-15.93	1.73 V	275	35.83	2.24

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.15.4	Channel	CH 26 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/6/9

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	99.27 PK			1.69 H	48	67.40	31.87
2	*2480.00	95.27 AV			1.69 H	48	63.40	31.87
3	2483.50	58.67 PK	74.00	-15.33	1.69 H	48	26.80	31.87
4	2483.50	47.37 AV	54.00	-6.63	1.69 H	48	15.50	31.87
5	4960.00	47.05 PK	74.00	-26.95	3.09 H	62	44.80	2.25
6	4960.00	37.45 AV	54.00	-16.55	3.09 H	62	35.20	2.25
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	107.74 PK			3.11 V	76	75.87	31.87
2	*2480.00	104.12 AV			3.11 V	76	72.25	31.87
3	2483.50	65.33 PK	74.00	-8.67	3.11 V	76	33.46	31.87
4	2483.50	53.30 AV	54.00	-0.70	3.11 V	76	21.43	31.87
5	4960.00	47.26 PK	74.00	-26.74	1.57 V	277	45.01	2.25
6	4960.00	37.66 AV	54.00	-16.34	1.57 V	277	35.41	2.25

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

Below 1 GHz Worst-Case Data:

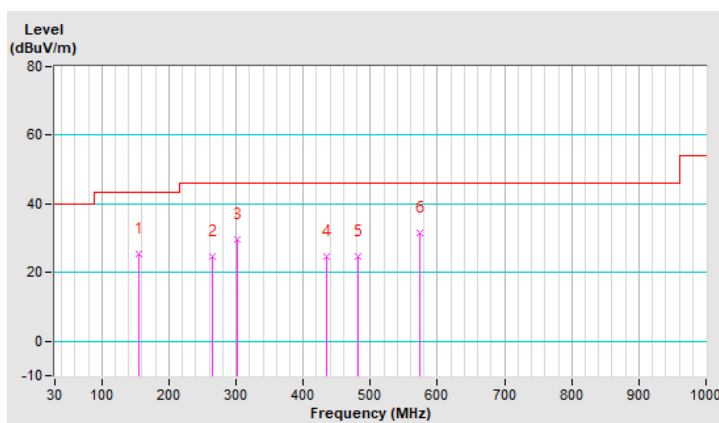
RF Mode	TX 802.15.4	Channel	CH 18 : 2440 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	156.10	25.58 QP	43.50	-17.92	1.99 H	97	38.78	-13.20
2	263.77	24.80 QP	46.00	-21.20	1.51 H	279	39.04	-14.24
3	302.57	29.50 QP	46.00	-16.50	1.01 H	156	42.47	-12.97
4	435.46	24.81 QP	46.00	-21.19	1.51 H	121	34.14	-9.33
5	481.05	24.76 QP	46.00	-21.24	1.99 H	105	33.38	-8.62
6	573.20	31.54 QP	46.00	-14.46	1.51 H	167	38.18	-6.64

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

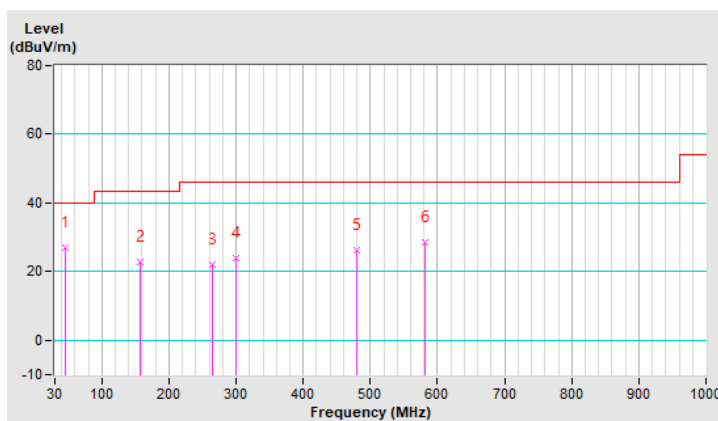


RF Mode	TX 802.15.4	Channel	CH 18 : 2440 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	46.49	26.88 QP	40.00	-13.12	1.00 V	61	40.14	-13.26
2	157.07	22.74 QP	43.50	-20.76	1.00 V	345	35.89	-13.15
3	264.74	22.11 QP	46.00	-23.89	2.00 V	231	36.30	-14.19
4	300.63	24.07 QP	46.00	-21.93	1.00 V	302	37.09	-13.02
5	480.08	26.37 QP	46.00	-19.63	1.00 V	171	35.00	-8.63
6	581.93	28.65 QP	46.00	-17.35	1.49 V	224	35.04	-6.39

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Jan. 22, 2022	Jan. 21, 2023
RF Coaxial Cable WORKEN	5D-FB	Cable-cond2-01	Sep. 4, 2021	Sep. 3, 2022
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 17, 2022	Feb. 16, 2023
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Sep. 17, 2021	Sep. 16, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 2.
 3. The VCCI Site Registration No. is C-12047.

4.2.3 Test Procedures

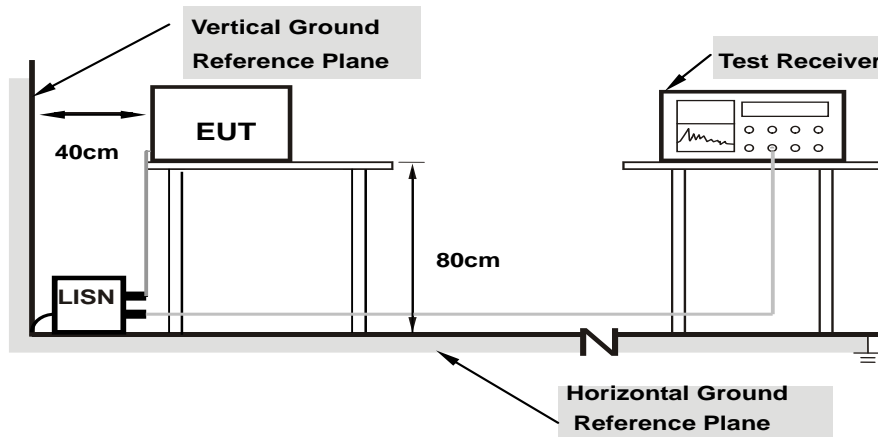
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.2.7 Test Results

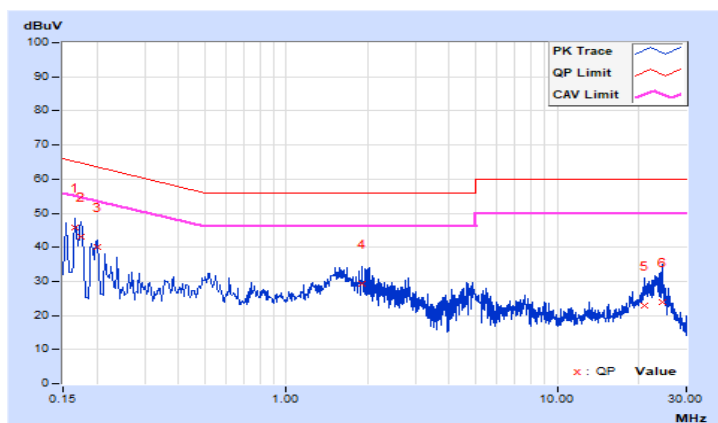
Mode A

Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16600	10.13	35.64	22.90	45.77	33.03	65.16	55.16	-19.39	-22.13
2	0.17400	10.13	32.93	15.61	43.06	25.74	64.77	54.77	-21.71	-29.03
3	0.20095	10.14	30.02	13.90	40.16	24.04	63.57	53.57	-23.41	-29.53
4	1.89800	10.22	18.98	11.00	29.20	21.22	56.00	46.00	-26.80	-24.78
5	21.00600	10.37	12.44	4.60	22.81	14.97	60.00	50.00	-37.19	-35.03
6	24.33400	10.25	13.51	3.75	23.76	14.00	60.00	50.00	-36.24	-36.00

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

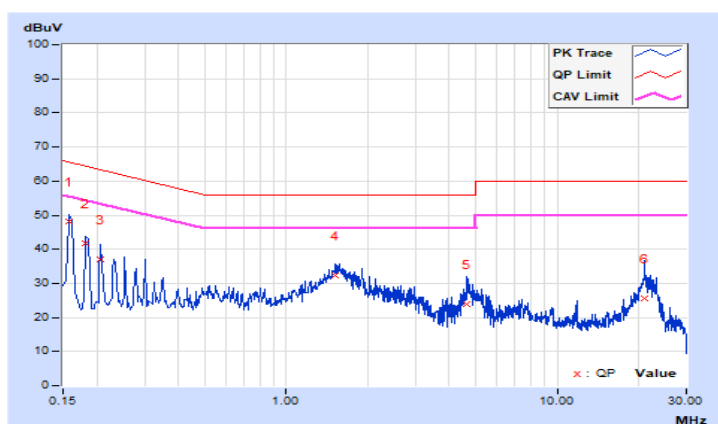


Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	10.14	38.03	23.15	48.17	33.29	65.57	55.57	-17.40	-22.28
2	0.18200	10.15	31.47	17.09	41.62	27.24	64.39	54.39	-22.77	-27.15
3	0.20600	10.15	26.90	12.82	37.05	22.97	63.37	53.37	-26.32	-30.40
4	1.52200	10.22	22.07	17.37	32.29	27.59	56.00	46.00	-23.71	-18.41
5	4.65400	10.28	13.77	5.18	24.05	15.46	56.00	46.00	-31.95	-30.54
6	21.03400	10.51	15.01	5.66	25.52	16.17	60.00	50.00	-34.48	-33.83

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



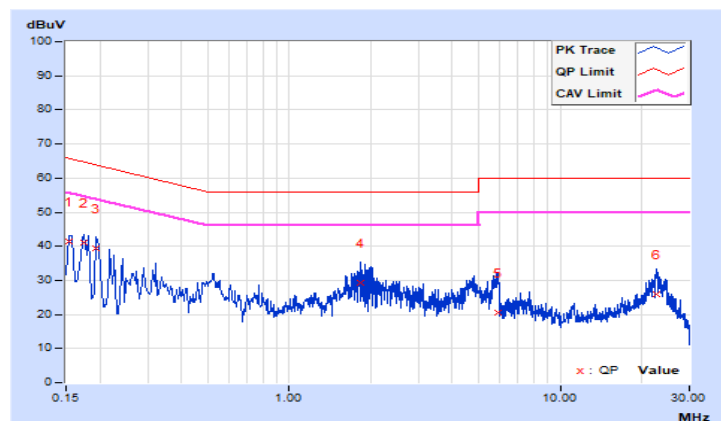
Mode B

Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	10.13	31.15	18.88	41.28	29.01	65.78	55.78	-24.50	-26.77
2	0.17400	10.13	30.78	16.35	40.91	26.48	64.77	54.77	-23.86	-28.29
3	0.19400	10.14	29.36	15.50	39.50	25.64	63.86	53.86	-24.36	-28.22
4	1.84200	10.22	18.93	8.02	29.15	18.24	56.00	46.00	-26.85	-27.76
5	5.89400	10.26	10.27	1.54	20.53	11.80	60.00	50.00	-39.47	-38.20
6	22.75000	10.31	15.63	5.75	25.94	16.06	60.00	50.00	-34.06	-33.94

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

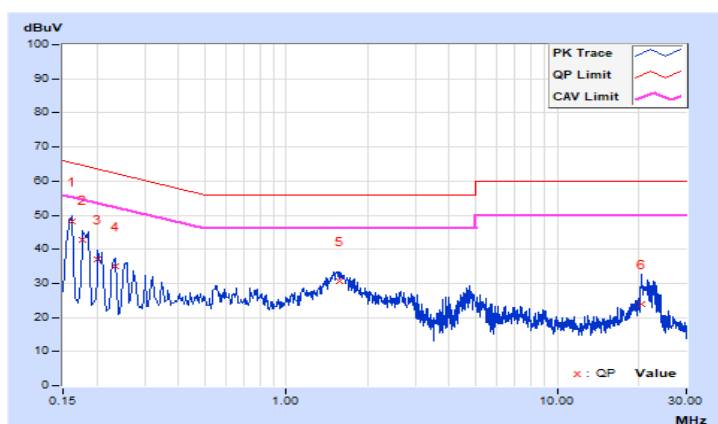


Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16148	10.14	38.14	21.24	48.28	31.38	65.39	55.39	-17.11	-24.01
2	0.17800	10.15	32.72	15.55	42.87	25.70	64.58	54.58	-21.71	-28.88
3	0.20200	10.15	26.89	13.24	37.04	23.39	63.53	53.53	-26.49	-30.14
4	0.23351	10.15	24.84	10.00	34.99	20.15	62.32	52.32	-27.33	-32.17
5	1.57702	10.22	20.45	16.01	30.67	26.23	56.00	46.00	-25.33	-19.77
6	20.56200	10.53	13.35	4.04	23.88	14.57	60.00	50.00	-36.12	-35.43

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



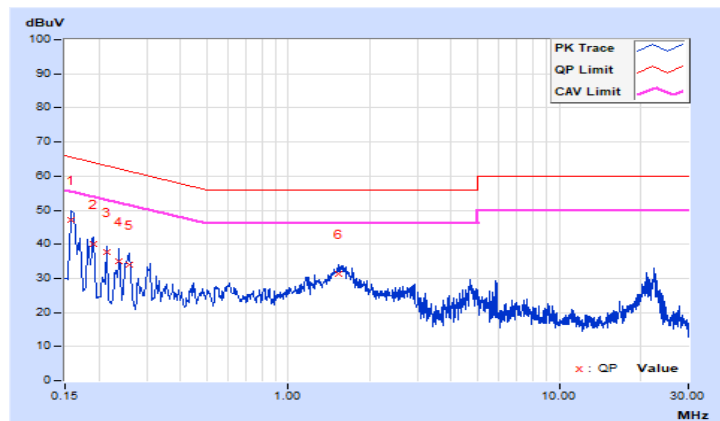
Mode C

Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	10.13	36.92	20.49	47.05	30.62	65.57	55.57	-18.52	-24.95
2	0.19000	10.14	30.09	17.19	40.23	27.33	64.04	54.04	-23.81	-26.71
3	0.21400	10.14	27.55	12.49	37.69	22.63	63.05	53.05	-25.36	-30.42
4	0.23800	10.14	24.71	9.68	34.85	19.82	62.17	52.17	-27.32	-32.35
5	0.25800	10.15	23.81	10.74	33.96	20.89	61.50	51.50	-27.54	-30.61
6	1.53400	10.21	21.08	16.23	31.29	26.44	56.00	46.00	-24.71	-19.56

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

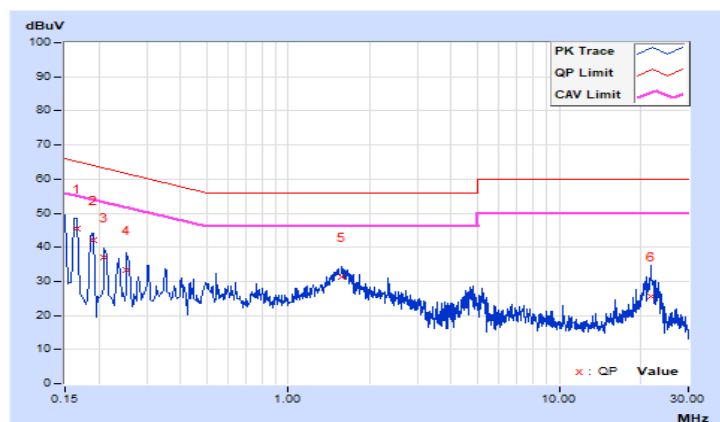


Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16535	10.14	35.35	18.29	45.49	28.43	65.19	55.19	-19.70	-26.76
2	0.19000	10.15	31.97	16.13	42.12	26.28	64.04	54.04	-21.92	-27.76
3	0.21000	10.15	26.98	11.68	37.13	21.83	63.21	53.21	-26.08	-31.38
4	0.25400	10.16	23.14	11.05	33.30	21.21	61.63	51.63	-28.33	-30.42
5	1.57000	10.22	21.10	16.43	31.32	26.65	56.00	46.00	-24.68	-19.35
6	21.80600	10.48	15.02	4.70	25.50	15.18	60.00	50.00	-34.50	-34.82

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

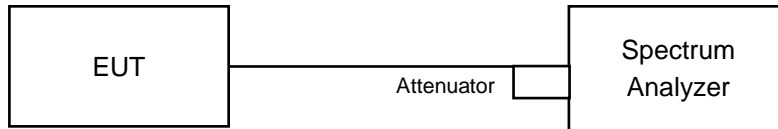


4.3 6 dB Bandwidth Measurement

4.3.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- Set resolution bandwidth (RBW) = 100 kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

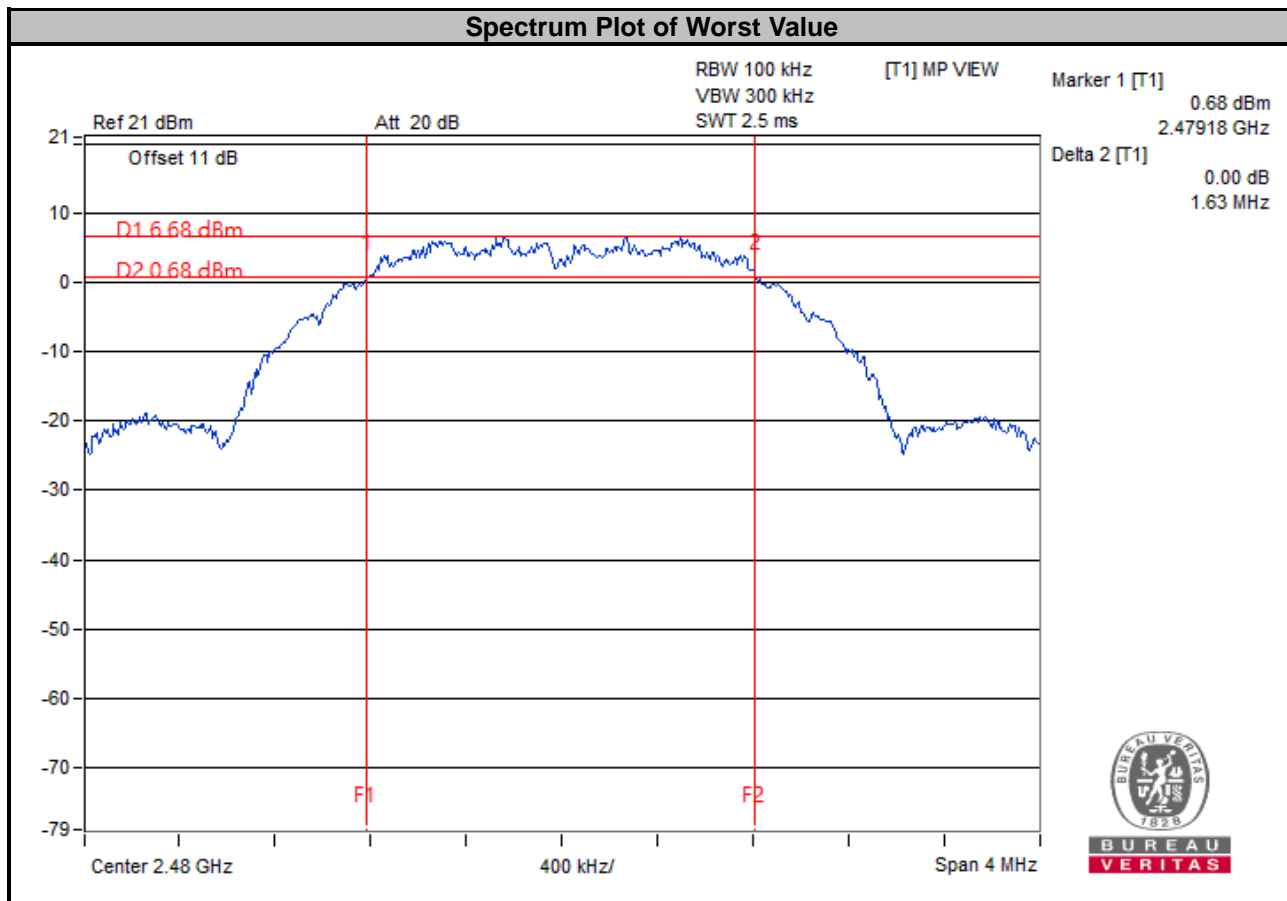
4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

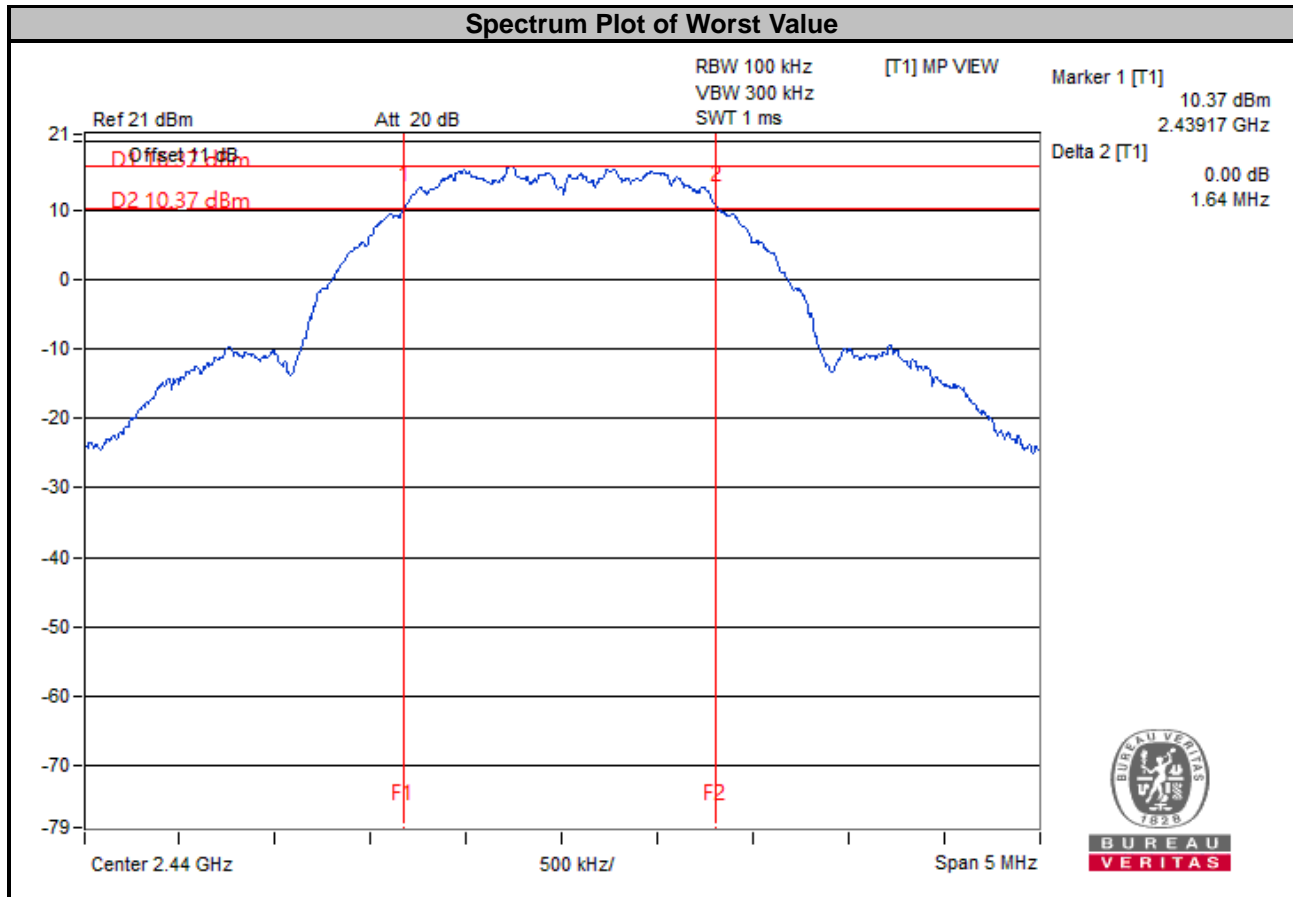
Mode A

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
11	2405	1.64	0.5	Pass
18	2440	1.65	0.5	Pass
26	2480	1.63	0.5	Pass



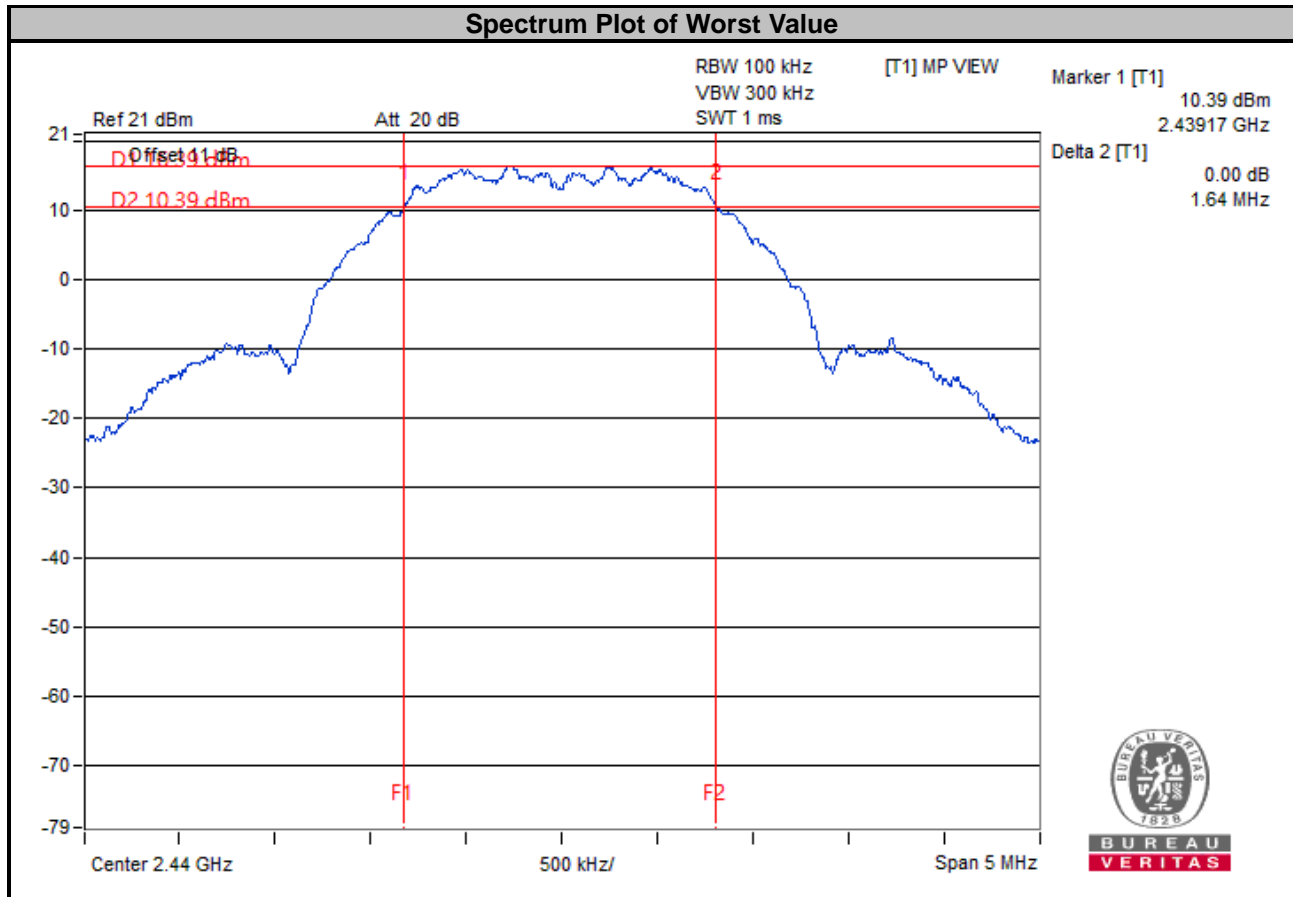
Mode B

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
11	2405	1.65	0.5	Pass
18	2440	1.64	0.5	Pass
25	2475	1.64	0.5	Pass
26	2480	1.64	0.5	Pass



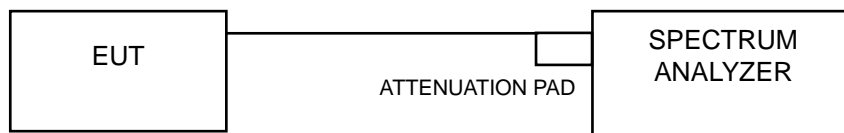
Mode C

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
11	2405	1.65	0.5	Pass
18	2440	1.64	0.5	Pass
25	2475	1.64	0.5	Pass
26	2480	1.65	0.5	Pass



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.4 Deviation From Test Standard

No deviation.

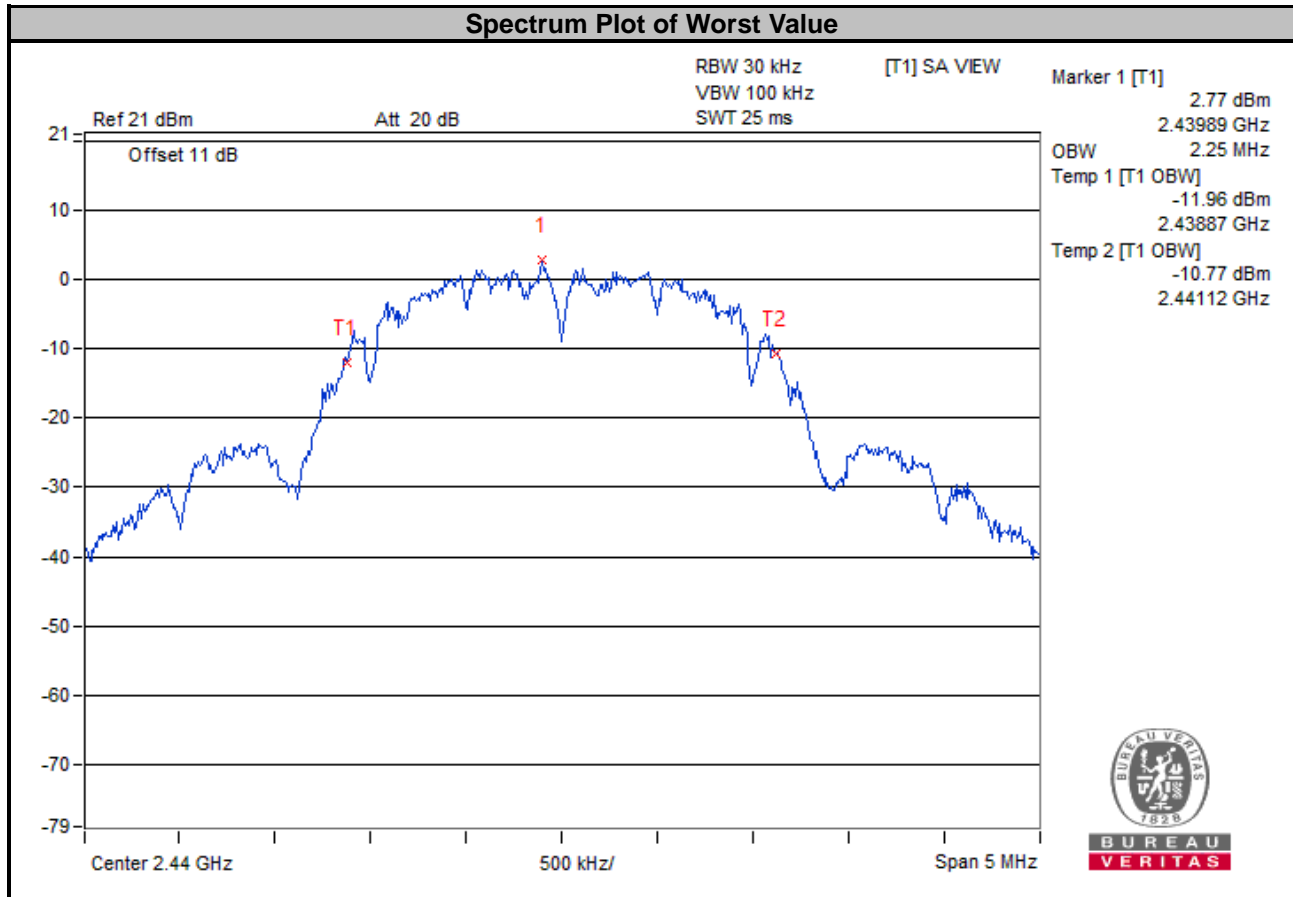
4.4.5 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.4.6 Test Results

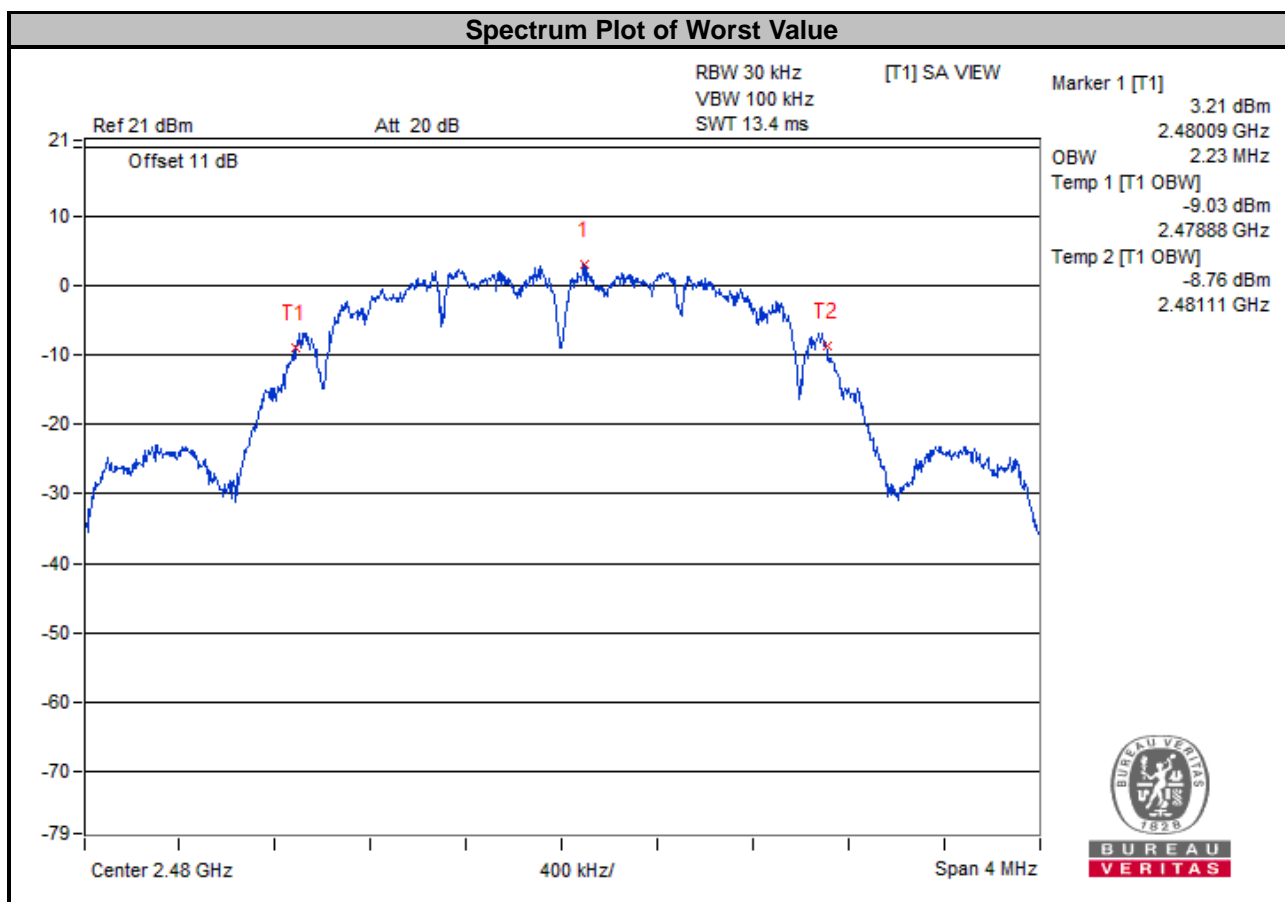
Mode A

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
11	2405	2.23	Pass
18	2440	2.25	Pass
26	2480	2.25	Pass



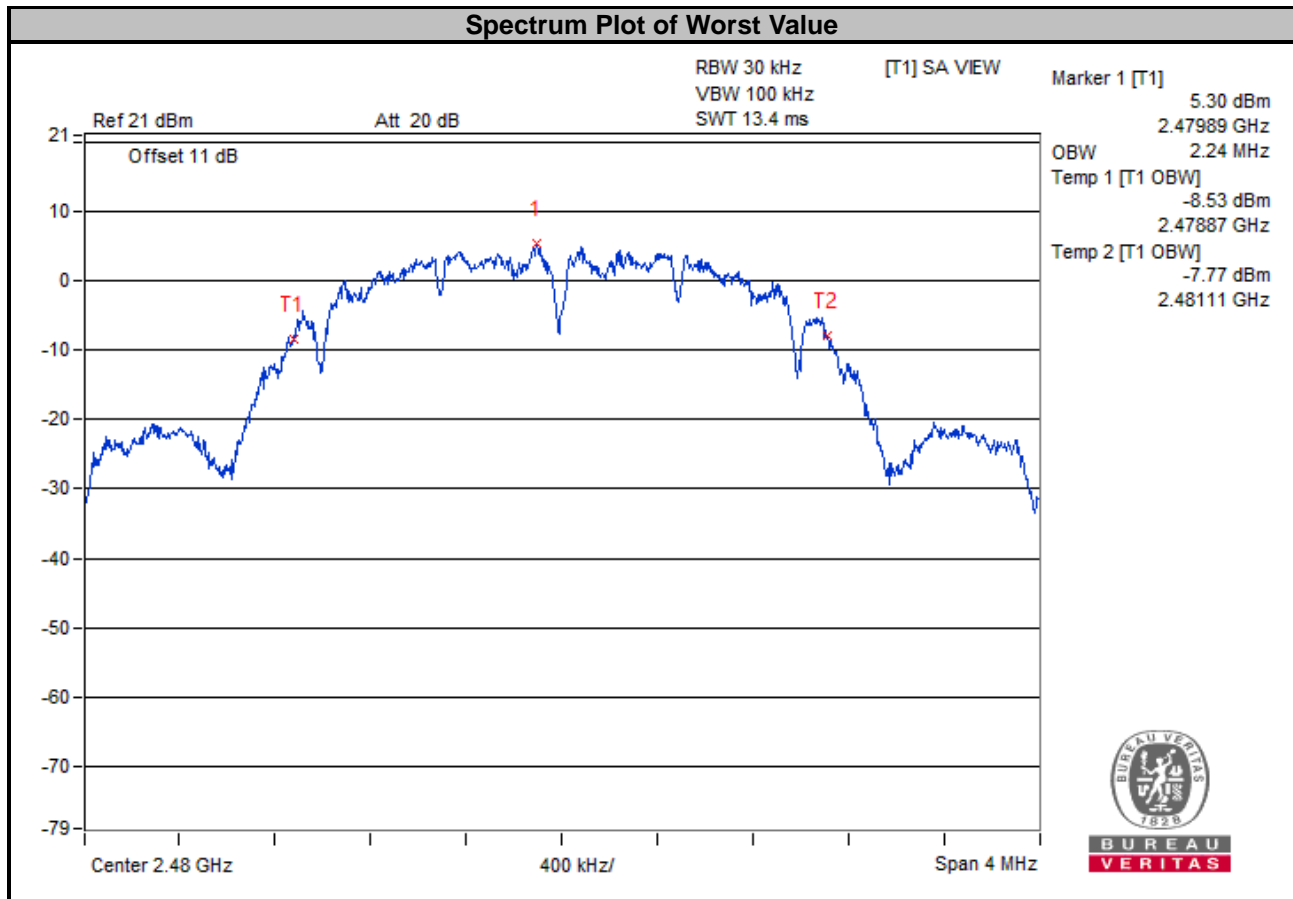
Mode B

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
11	2405	2.22	Pass
18	2440	2.22	Pass
25	2475	2.22	Pass
26	2480	2.23	Pass



Mode C

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
11	2405	2.22	Pass
18	2440	2.23	Pass
25	2475	2.23	Pass
26	2480	2.24	Pass

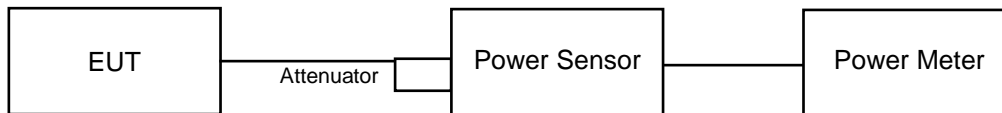


4.5 Conducted Output Power Measurement

4.5.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results

Mode A

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
11	2405	11.143	10.47	30	Pass
18	2440	10.864	10.36	30	Pass
26	2480	10.765	10.32	30	Pass

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
11	2405	10.116	10.05
18	2440	9.931	9.97
26	2480	9.683	9.86

Mode B

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
11	2405	94.406	19.75	30	Pass
18	2440	93.325	19.70	30	Pass
25	2475	94.406	19.75	30	Pass
26	2480	15.74	11.97	30	Pass

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
11	2405	90.365	19.56
18	2440	89.743	19.53
25	2475	90.782	19.58
26	2480	14.588	11.64

Mode C

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
11	2405	95.719	19.81	30	Pass
18	2440	95.499	19.80	30	Pass
25	2475	94.406	19.75	30	Pass
26	2480	23.823	13.77	30	Pass

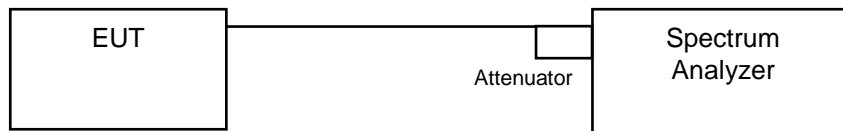
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
11	2405	92.47	19.66
18	2440	92.045	19.64
25	2475	91.411	19.61
26	2480	22.856	13.59

4.6 Power Spectral Density Measurement

4.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

4.6.5 Deviation from Test Standard

No deviation.

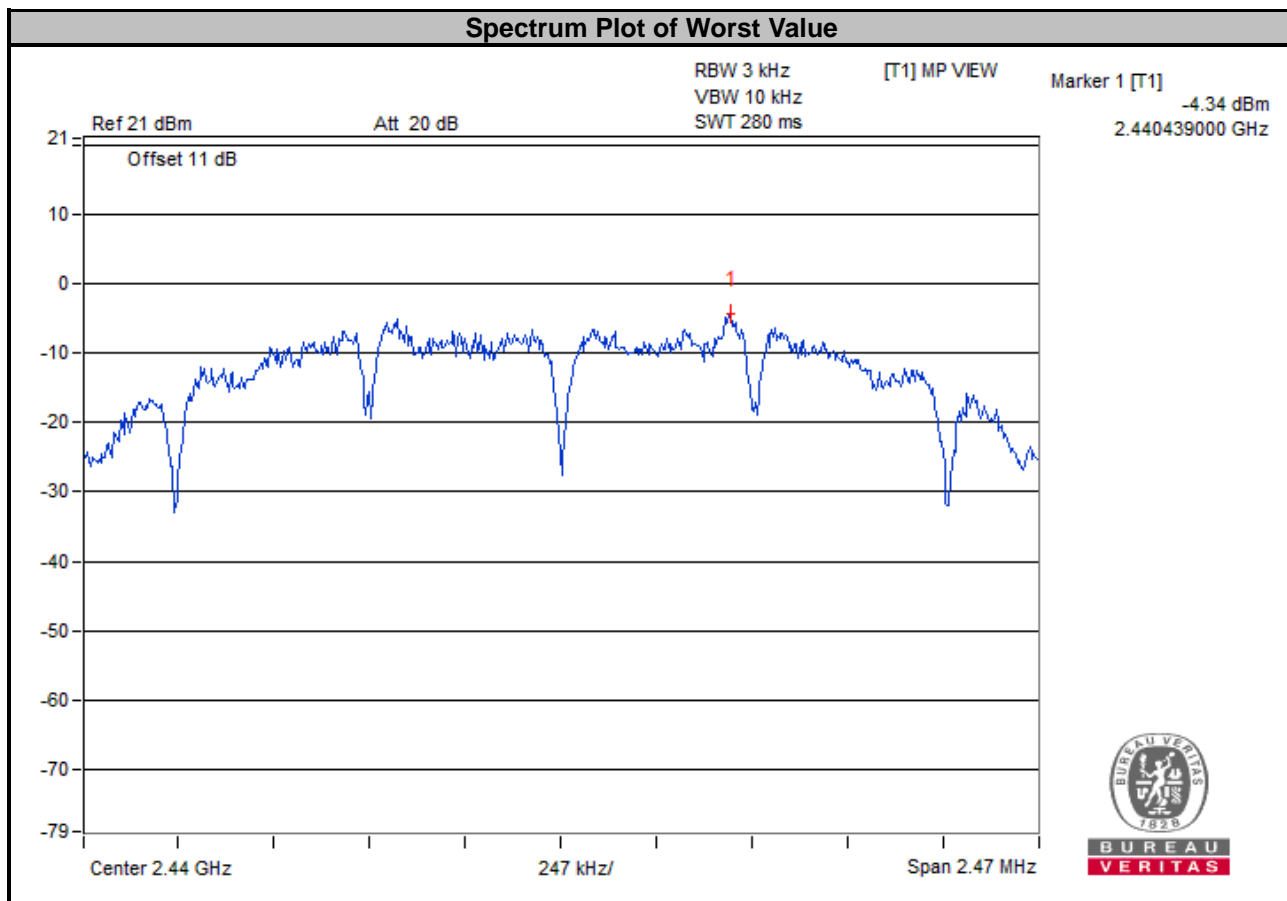
4.6.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.6.7 Test Results

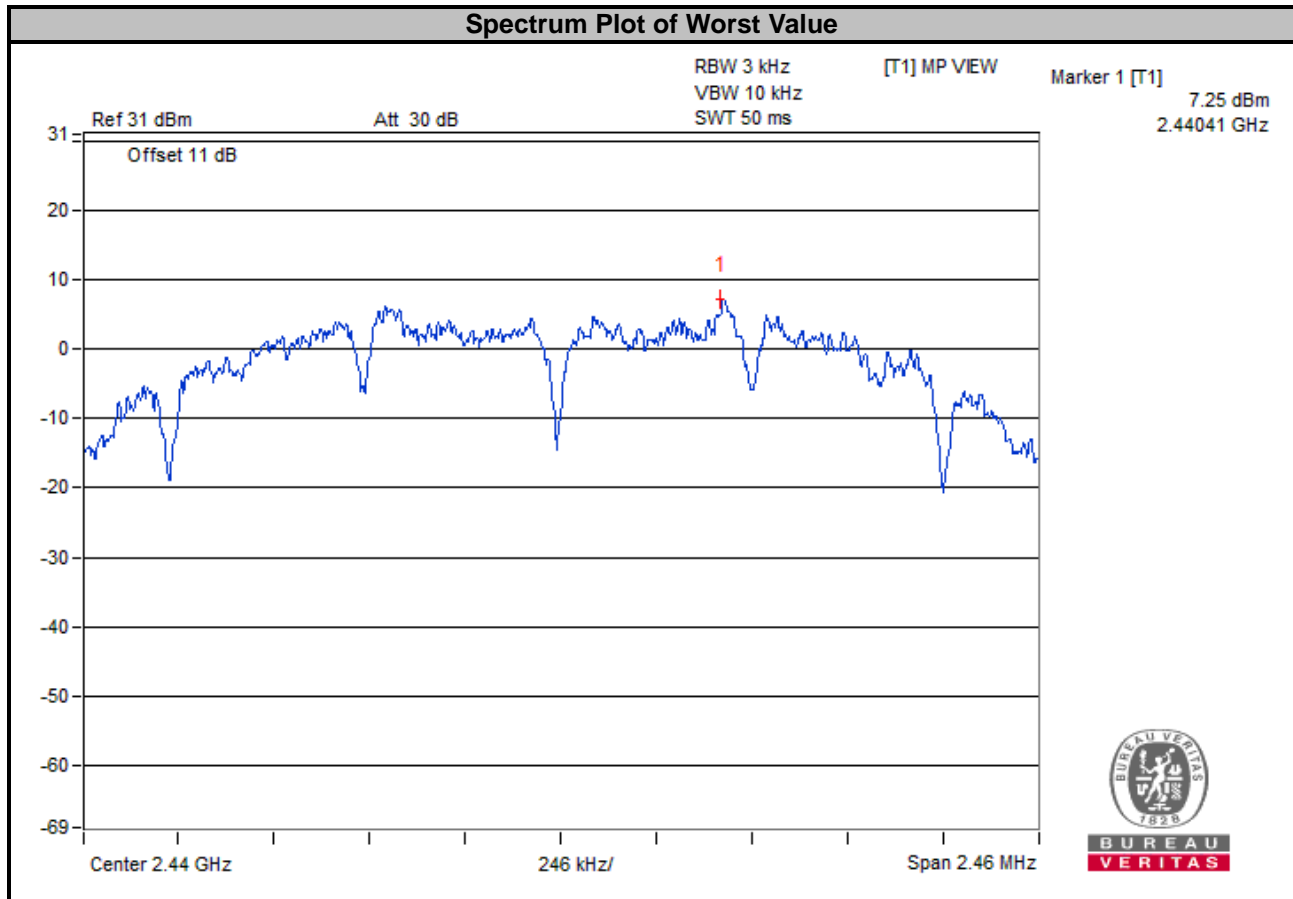
Mode A

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
11	2405	-4.42	8	Pass
18	2440	-4.34	8	Pass
26	2480	-4.88	8	Pass



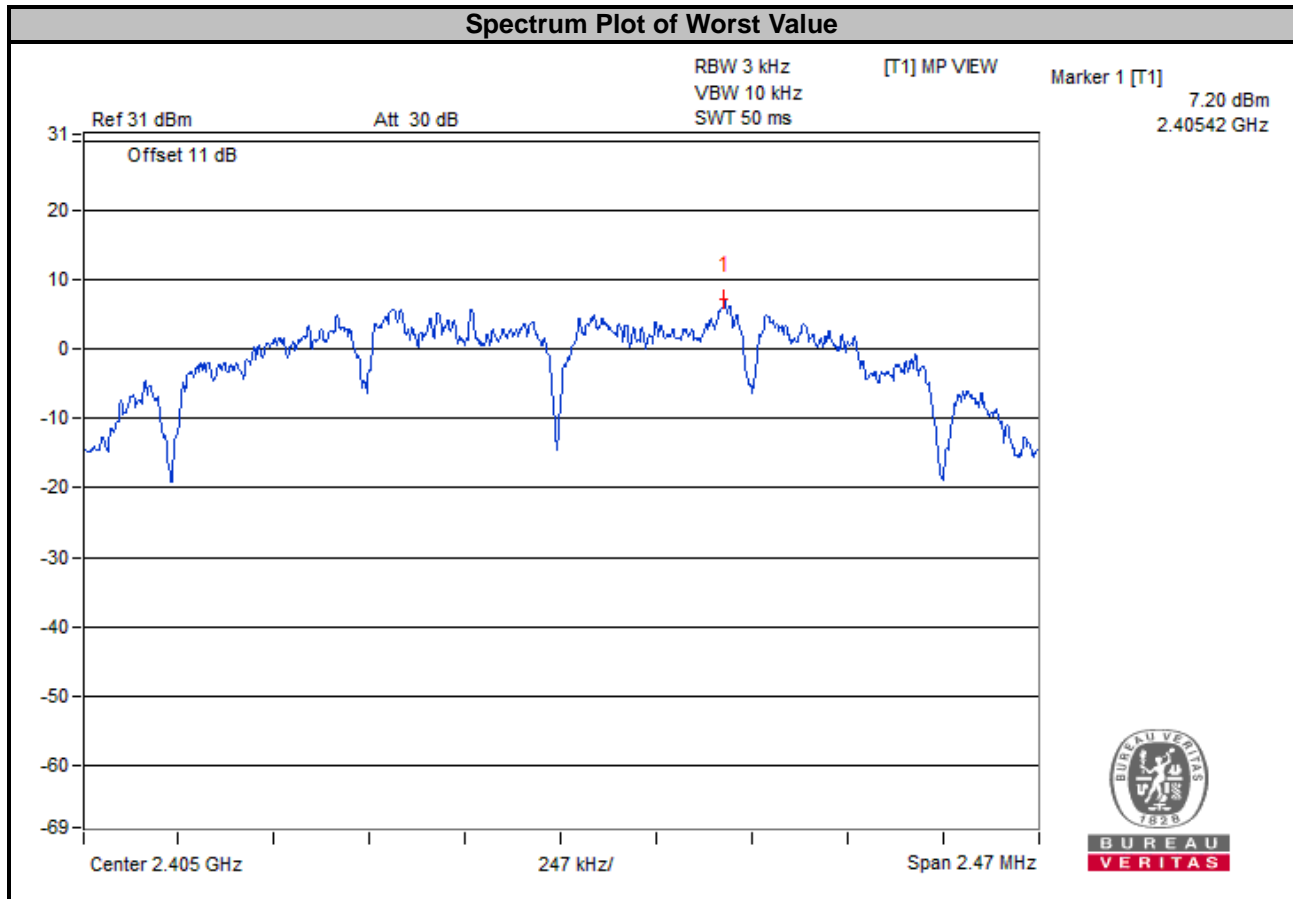
Mode B

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
11	2405	7.00	8	Pass
18	2440	7.25	8	Pass
25	2475	7.08	8	Pass
26	2480	-1.47	8	Pass



Mode C

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
11	2405	7.20	8	Pass
18	2440	6.80	8	Pass
25	2475	6.50	8	Pass
26	2480	0.42	8	Pass

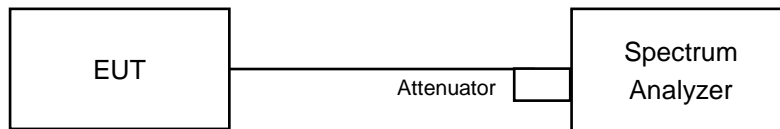


4.7 Conducted Out of Band Emission Measurement

4.7.1 Limits of Conducted Out of Band Emission Measurement

Below 20 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW \geq 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW \geq 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.7.5 Deviation from Test Standard

No deviation.

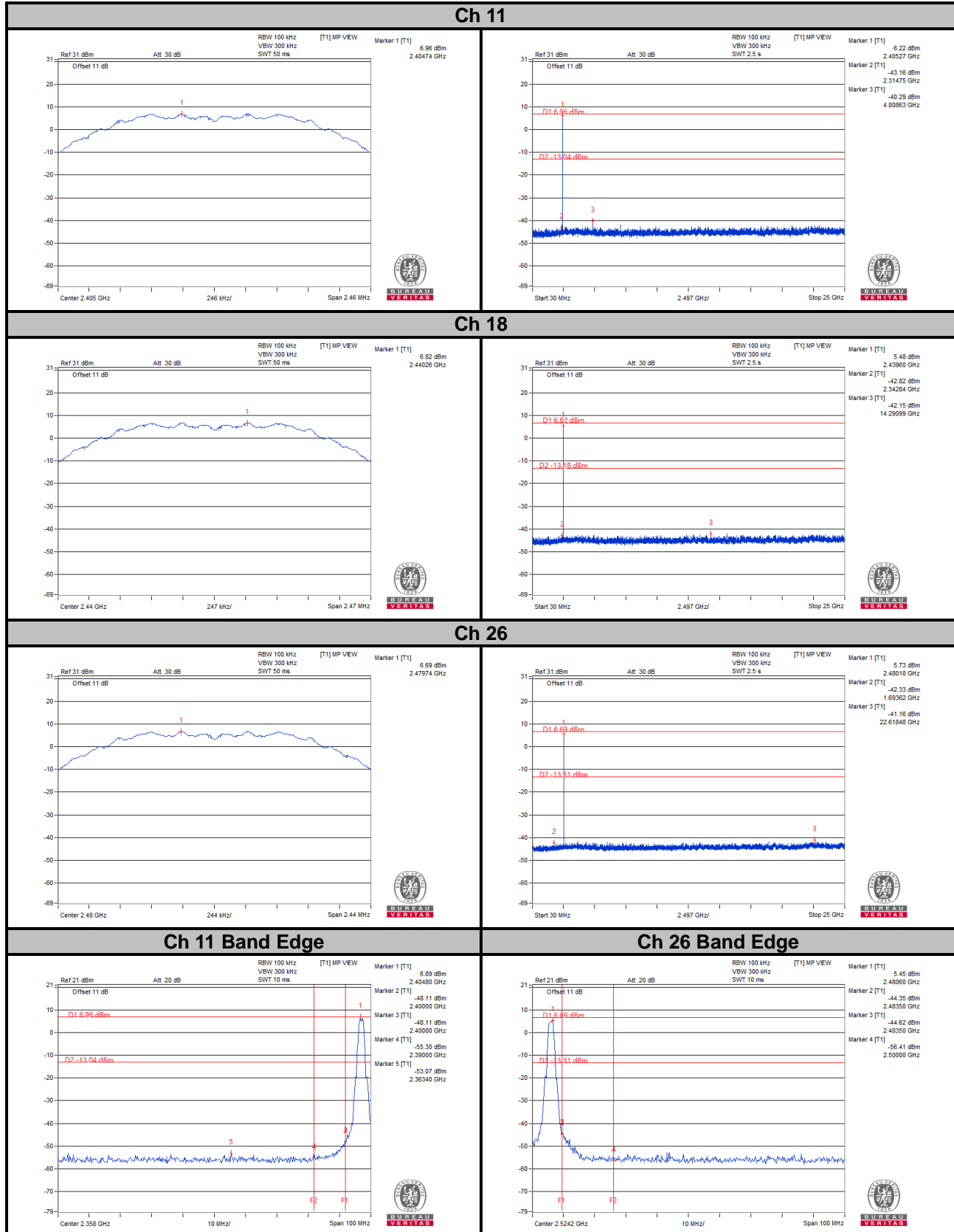
4.7.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

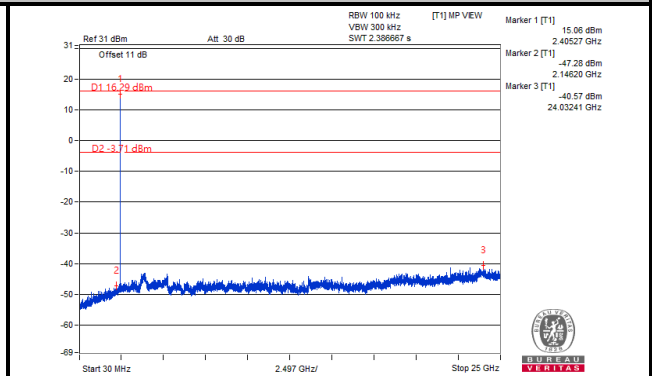
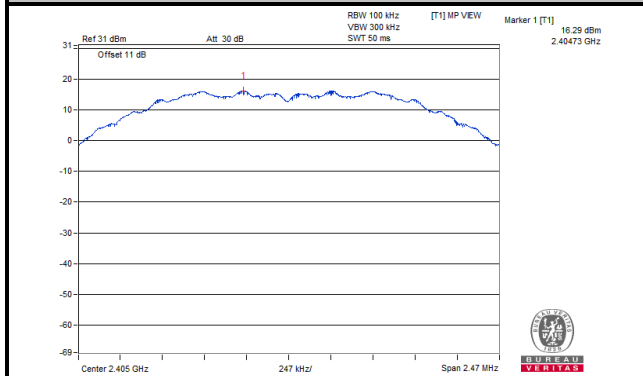
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20 dB offset below D1. It shows compliance with the requirement.

Mode A

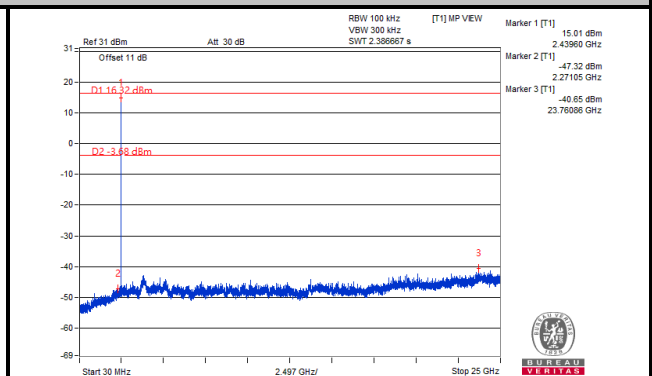
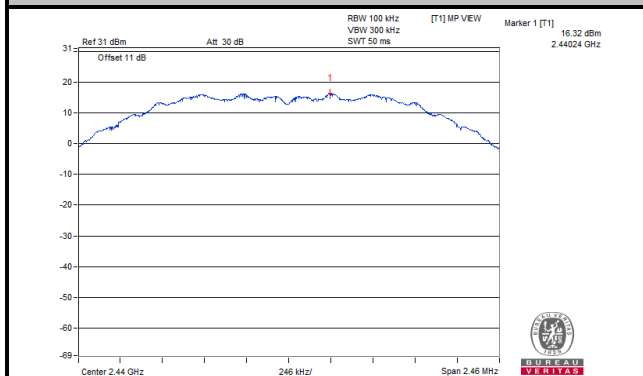


Mode B

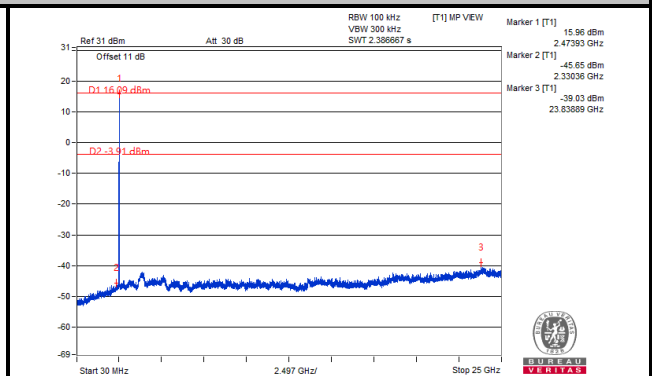
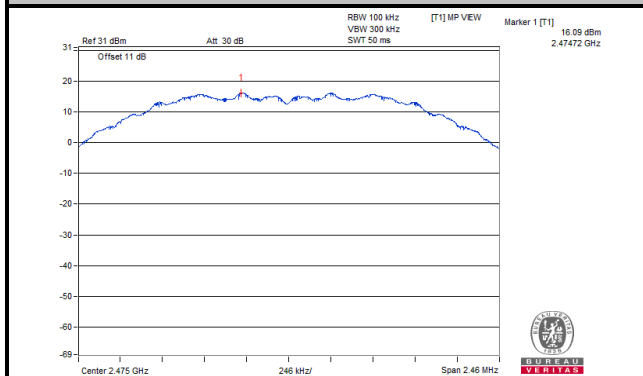
Ch 11



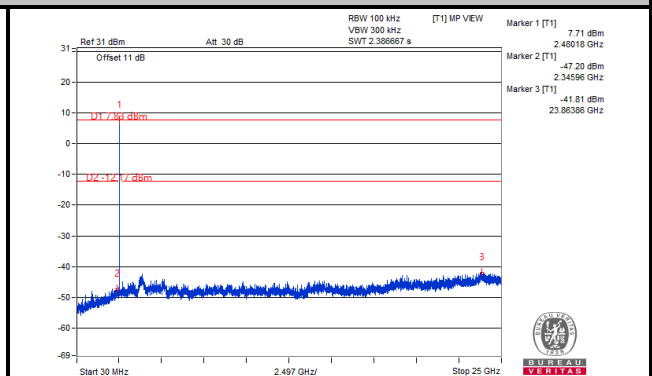
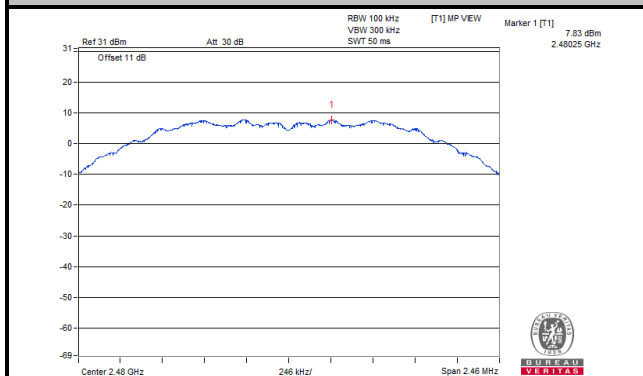
Ch 18



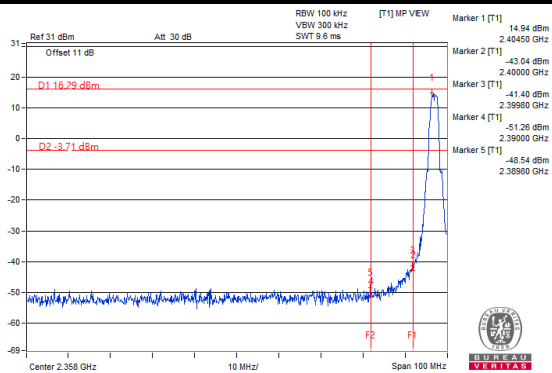
Ch 25



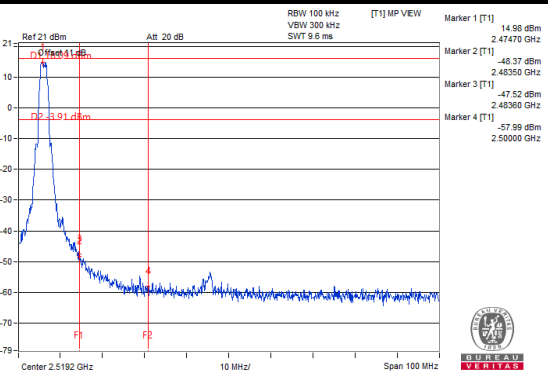
Ch 26



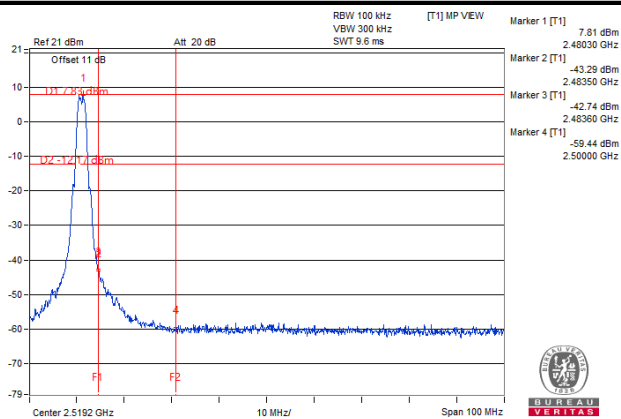
Ch 11 Band Edge



Ch 25 Band Edge

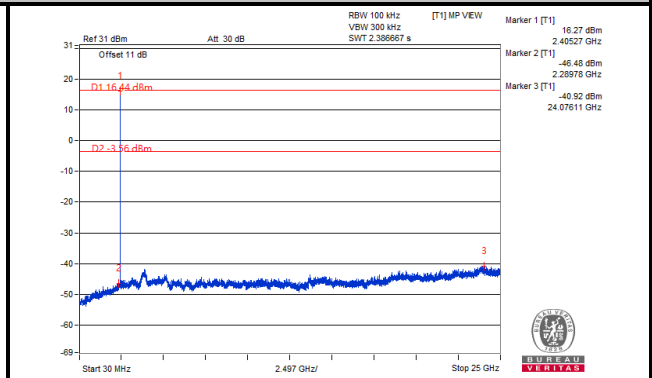
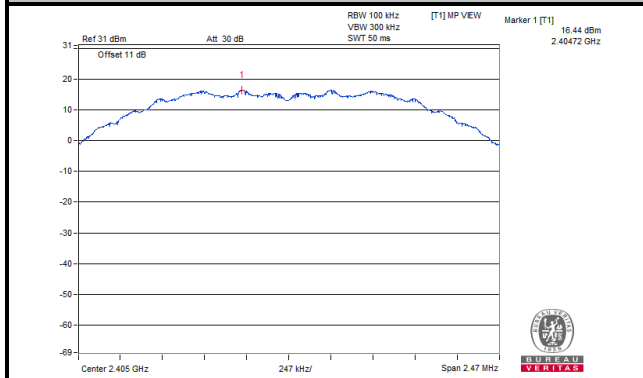


Ch 26 Band Edge

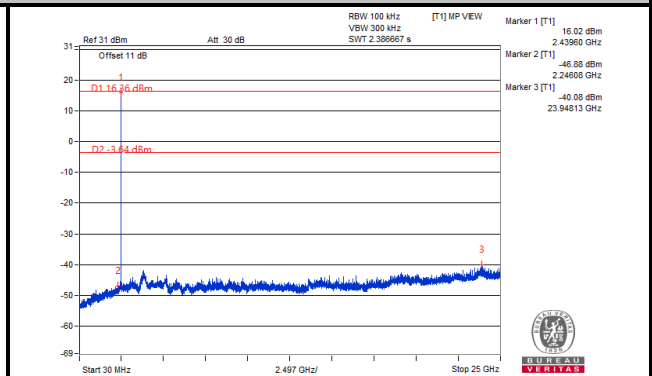
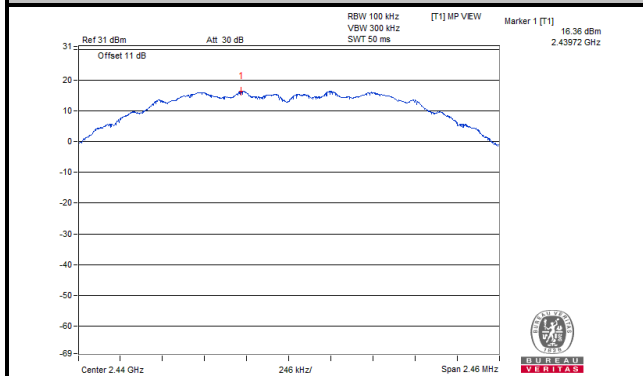


Mode C

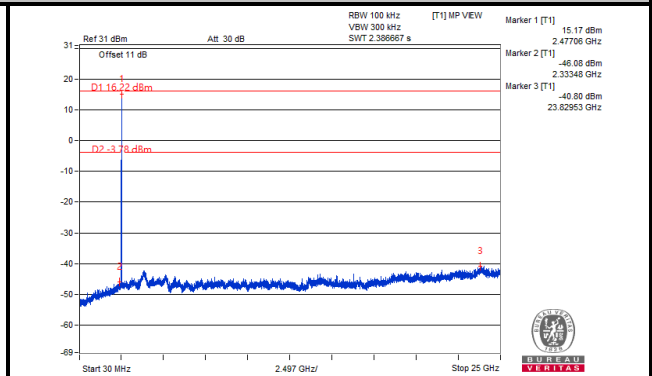
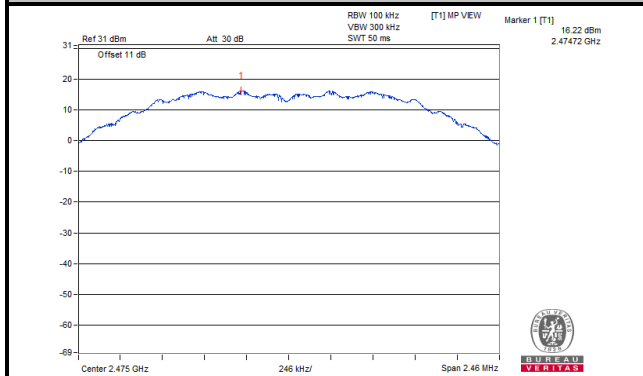
Ch 11



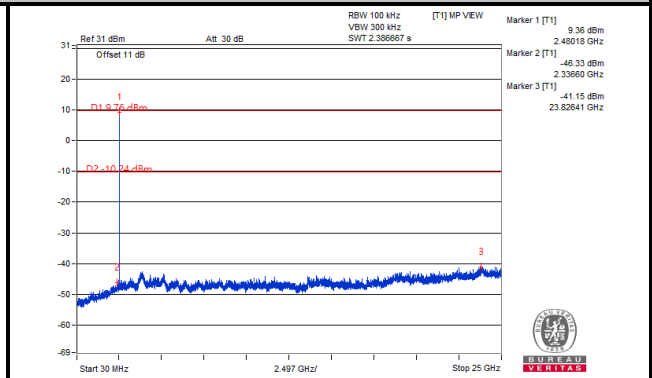
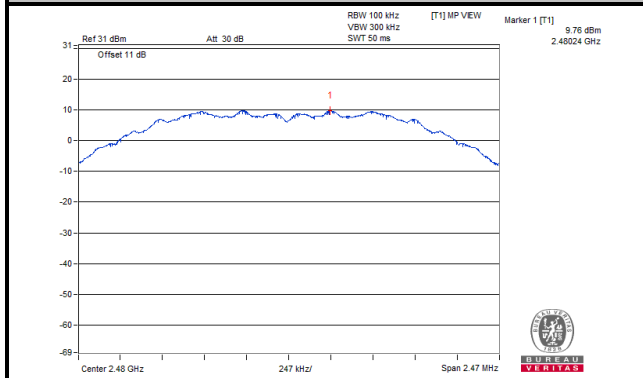
Ch 18



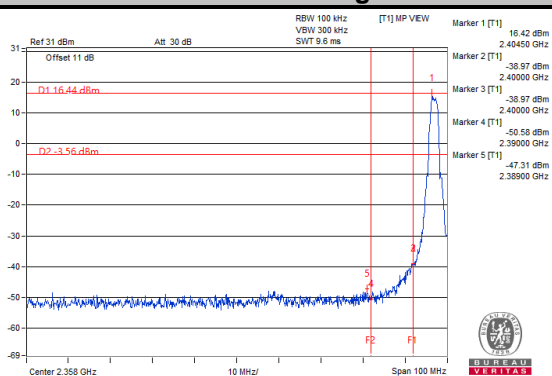
Ch 25



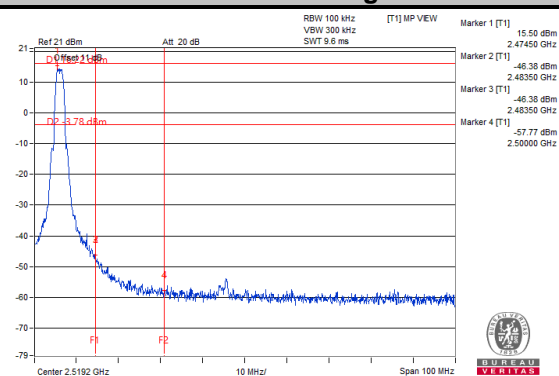
Ch 26



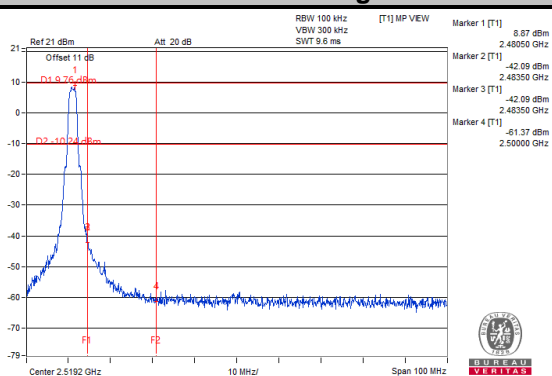
Ch 11 Band Edge



Ch 25 Band Edge

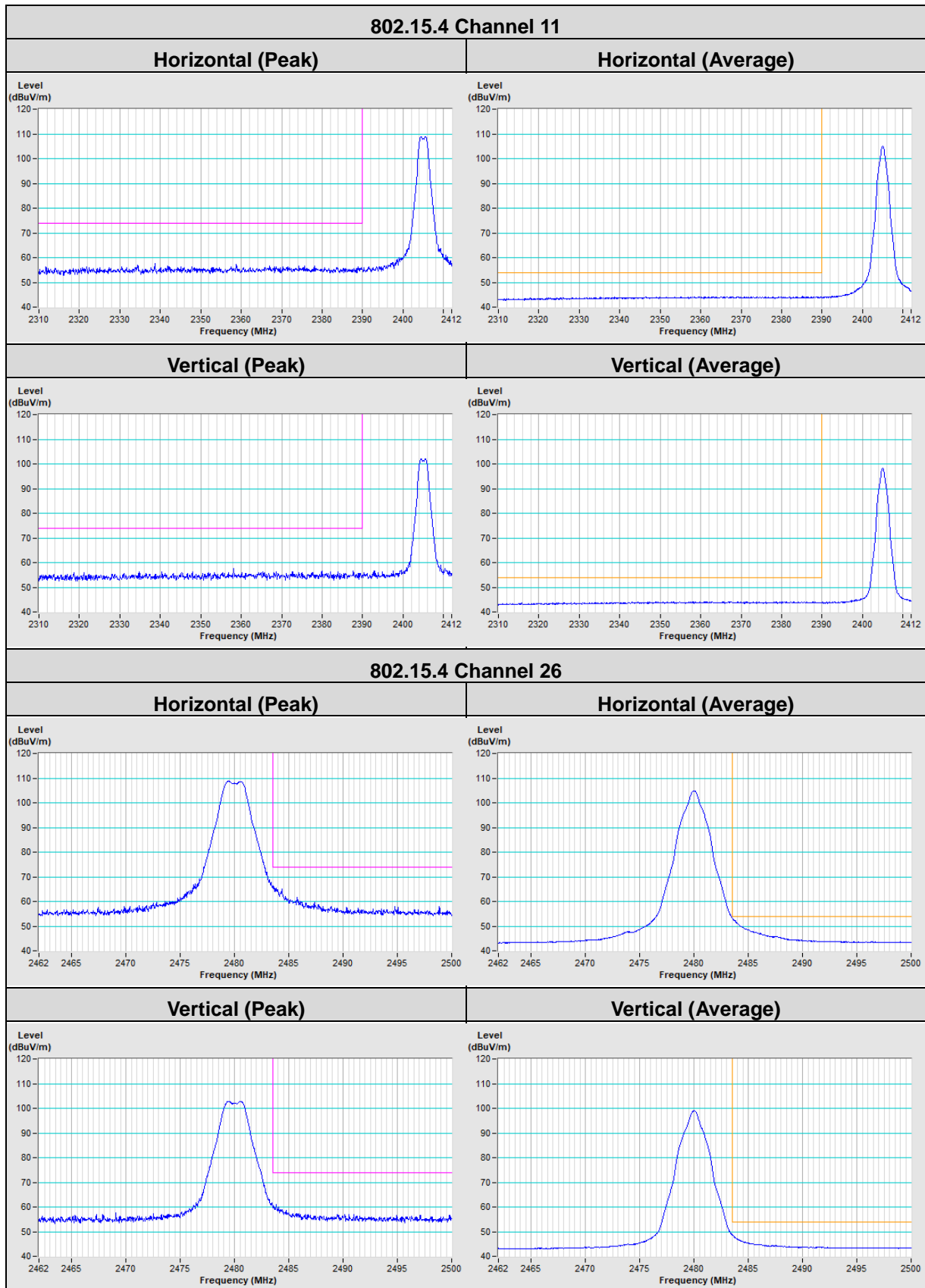


Ch 26 Band Edge

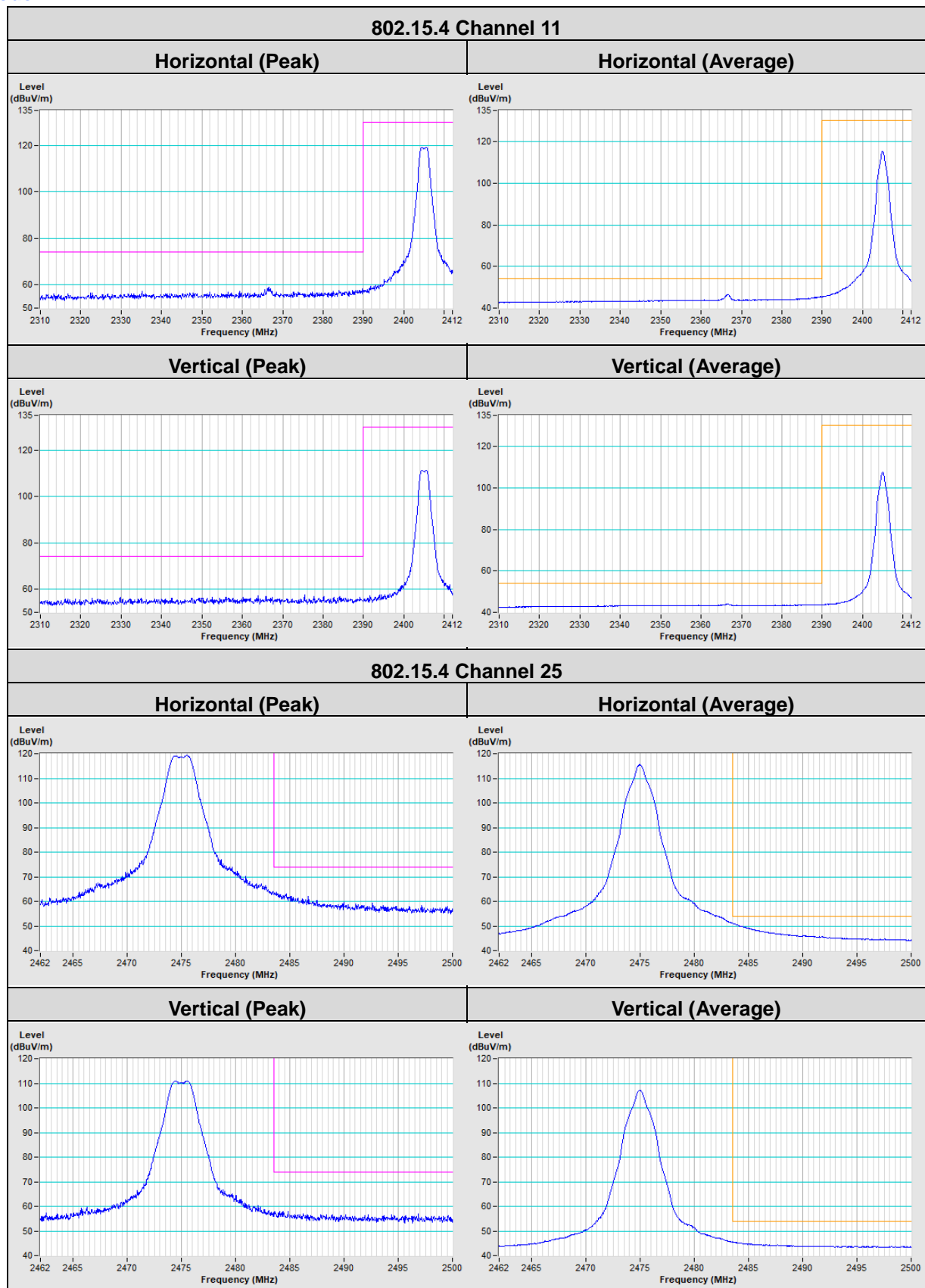


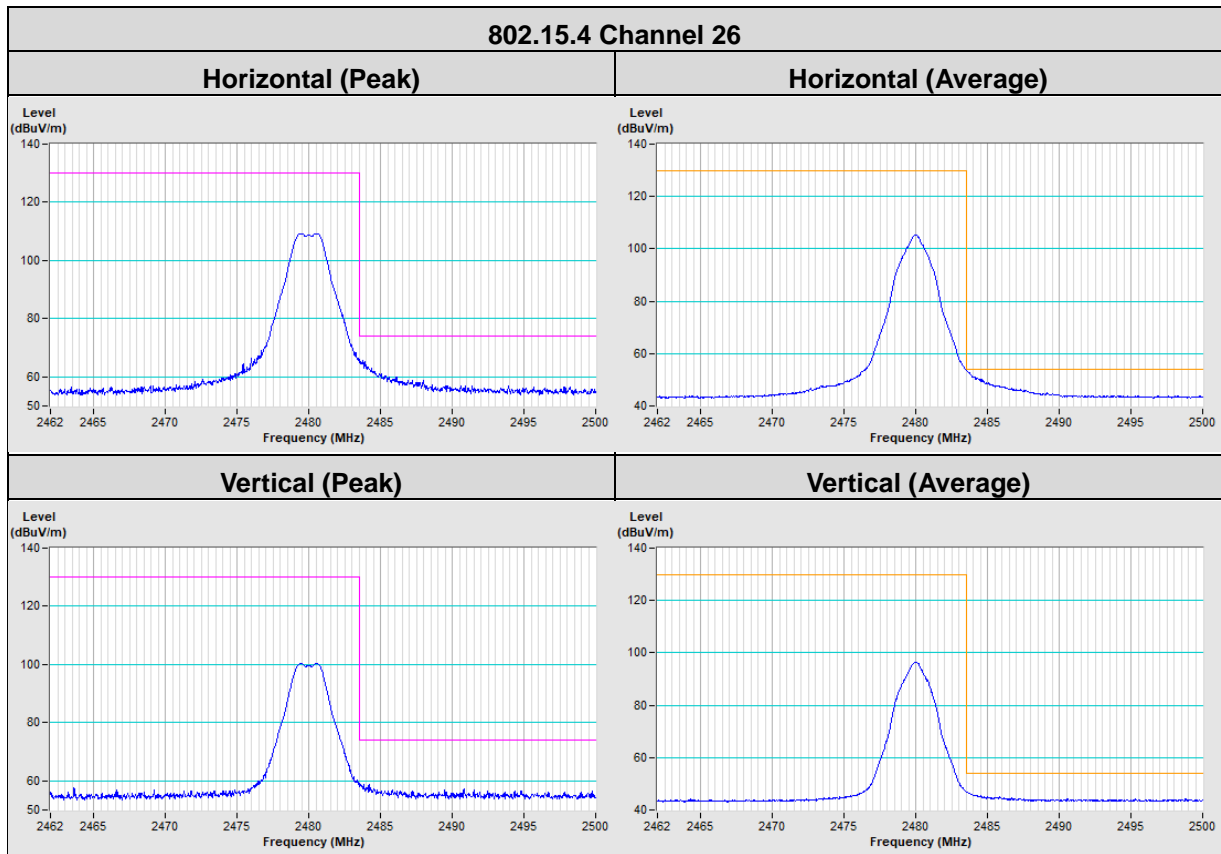
Annex A- Band Edge Measurement

Mode A

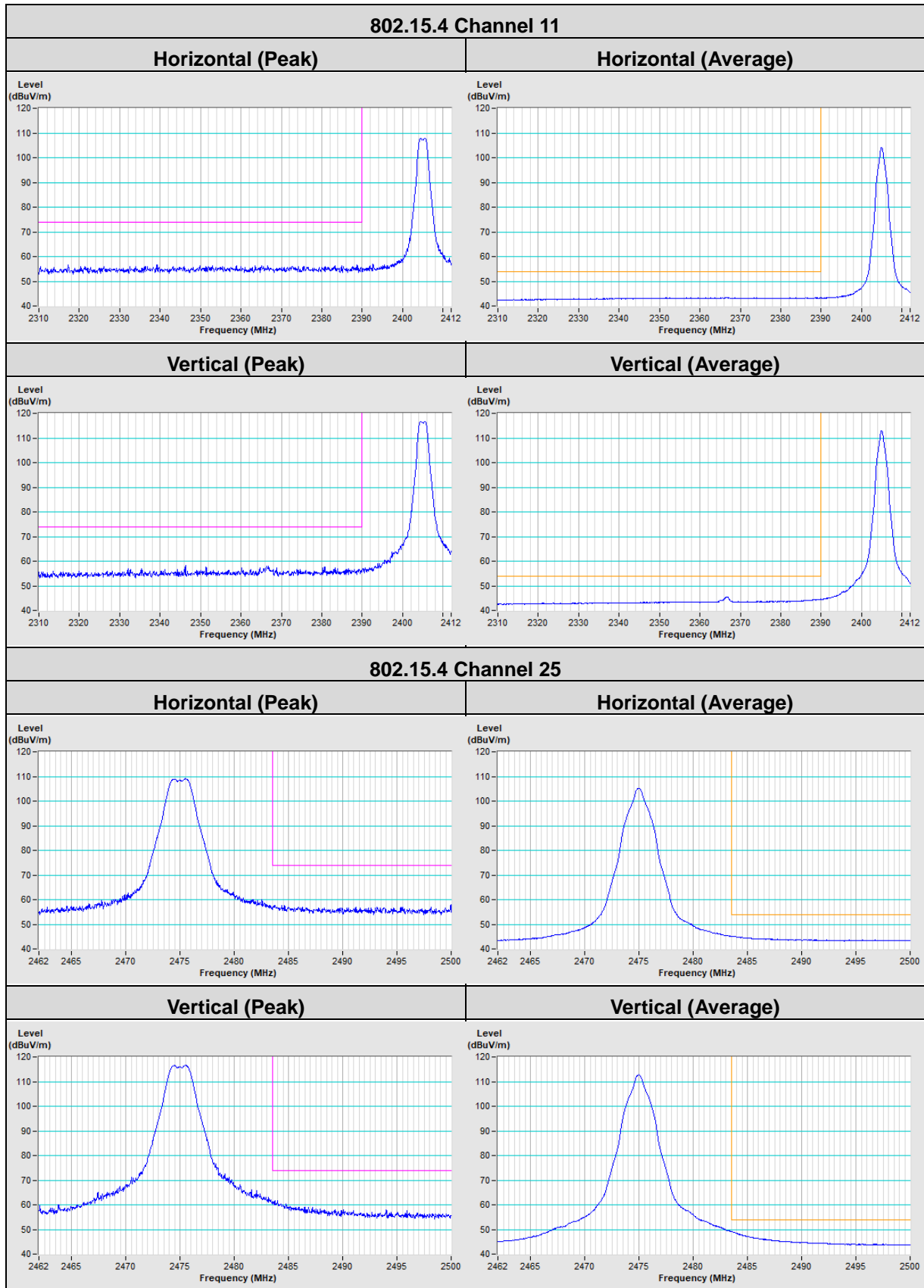


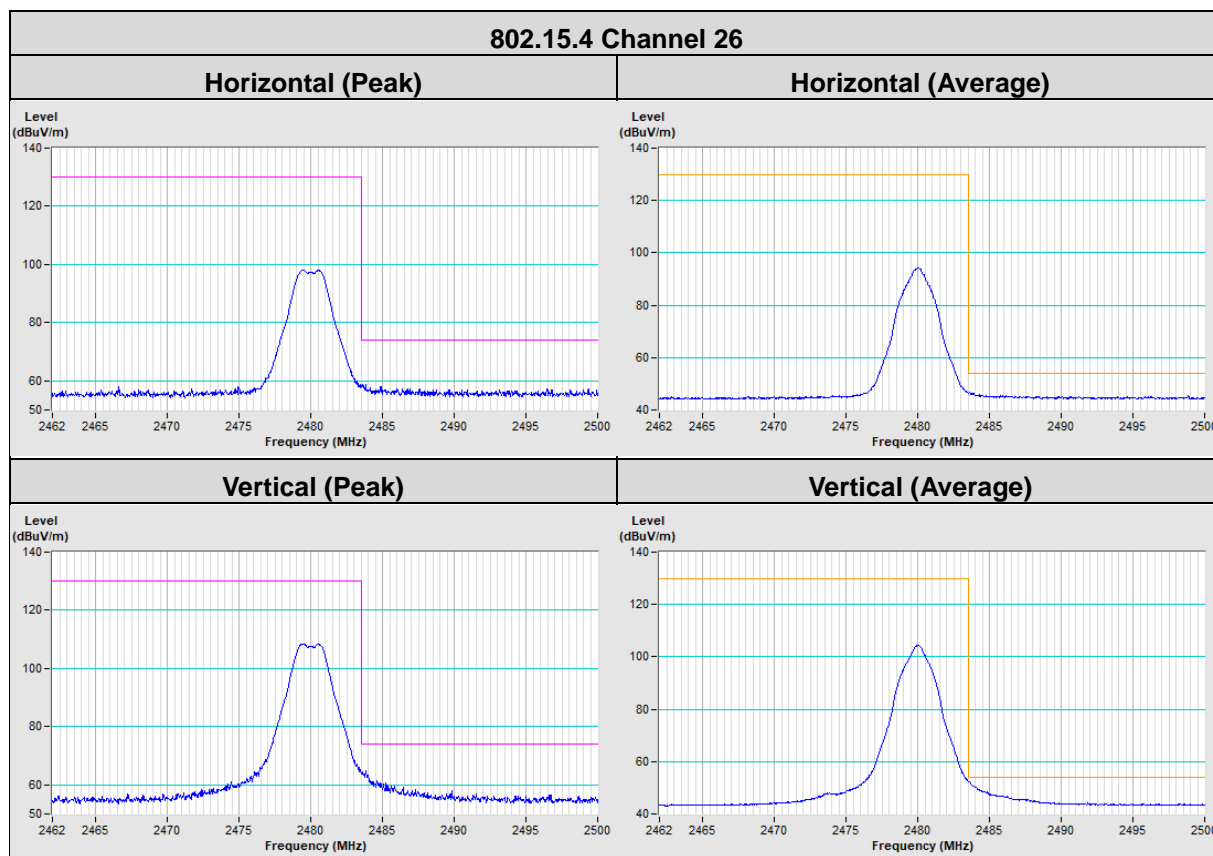
Mode B





Mode C





5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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