TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart C (Section 15.247)**
Report No.:	RFBCMA-WTW-P25030861-4
FCC ID:	RAXTMOG5AR
Product:	5G Gateway
Brand:	T-Mobile
Model No.:	TMO-G5AR
Received Date:	2025/3/24
Test Date:	2025/5/6 ~ 2025/5/19
Issued Date:	2025/5/29
Applicant:	Arcadyan Technology Corporation
Address:	No.8, Sec.2, Guangfu Rd.,Hsinchu City 30071, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Approved by: _____ , **Date:** 2025/5/29

May Chen / Manager

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Prepared by : Phoenix Huang / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBCMA-WTW-P25030861-4	Original release.	2025/5/29

1 Certificate

Product:	5G Gateway
Brand:	T-Mobile
Test Model:	TMO-G5AR
Sample Status:	Engineering sample
Applicant:	Arcadyan Technology Corporation
Test Date:	2025/5/6 ~ 2025/5/19
Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247)
Measurement procedure:	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02

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 accur ate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Standard / Clause	Test Item	Result	Remark
15.247(b)	RF Output Power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
15.247(d)	Conducted Out of Band Emissions	Pass	Meet the requirement of limit.
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -8.46 dB at 0.76200 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -10.3 dB at 921.38 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.6 dB at 2483.50 MHz
15.203	Antenna Requirement	Pass	Antenna connector is MHF1 not a standard connector.

Note: 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	Specification	Expanded Uncertainty (k=2) (±)
RF Output Power	-	1.1 dB
Power Spectral Density	-	1.3 dB
6 dB Bandwidth	-	1050.00 Hz
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.6 dB
AC Power Conducted Emissions	150 kHz ~ 30 MHz	1.9 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.1 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 dB
	18 GHz ~ 40 GHz	5.3 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	5G Gateway
Brand	T-Mobile
Test Model	TMO-G5AR
Status of EUT	Engineering sample
Power Supply Rating	20 Vdc from power adapter
Modulation Type	O-QPSK
Modulation Technology	DTS
Transfer Rate	250 kb/s
Operating Frequency	2.405 GHz ~ 2.48 GHz
Number of Channel	16
Output Power	54.828 mW (17.39 dBm)

Note:

1. The IEEE 802.15.4 wireless standard supports Zigbee/Open Thread/Matter protocols. The RF specifications described and tested within this report are representative of all protocols supported.
2. The EUT uses following accessories.

Item	Brand	Model	Specification
AC Adapter 1	MOSO	P30-V3000R200-060Q0-US	AC Input: 100~240 Vac, 1.7 A, 50/60 Hz DC Output: 5.0 Vdc, 3.0 A; 9.0 Vdc, 3.0 A; 12.0 Vdc, 3.0 A; 15.0 Vdc, 3.0 A; 20.0 V, 3.0 A DC Output Cable: 1.85 m, non-shielded cable, W/O ferrite core Plug: US
AC Adapter 2	MASS POWER	PD065E-D1C0AVU	AC Input: 100~240 Vac, 1.5 A, 50/60 Hz DC Output: 5.0 Vdc, 3.0 A, 9.0 Vdc, 3.0 A; 12.0 Vdc, 3.0 A; 15.0 Vdc, 3.0 A; 20.0 Vdc, 2.25 A DC Output Cable: 1.8 m, non-shielded cable, W/O ferrite core Plug: US

3. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4	Radio 5	Radio 6
WLAN (2.4GHz + 5GHz)	WLAN (6 GHz)	BT-LE / 802.15.4 (Zigbee/Open Thread/Matter)	BT-LE	GPS	WWAN

4. Simultaneously transmission combination.

Combination	Technology
1	WLAN (2.4 GHz) + WLAN (5 GHz) + WLAN (6 GHz) + 802.15.4 (Zigbee/Open Thread/Matter) + BT-LE + WWAN (LTE)
2	WLAN (2.4 GHz) + WLAN (5 GHz) + WLAN (6 GHz) + 802.15.4 (Zigbee/Open Thread/Matter) + BT-LE + WWAN (5GNR)
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.	

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

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna NO.	RF Chain NO.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
T	0	ARC	120800158600J	3.56	2.4~2.4835	Dipole	MHF1

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.3 Channel List

16 channels are provided to this EUT:

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

3.4 Test Mode Applicability and Tested Channel Detail

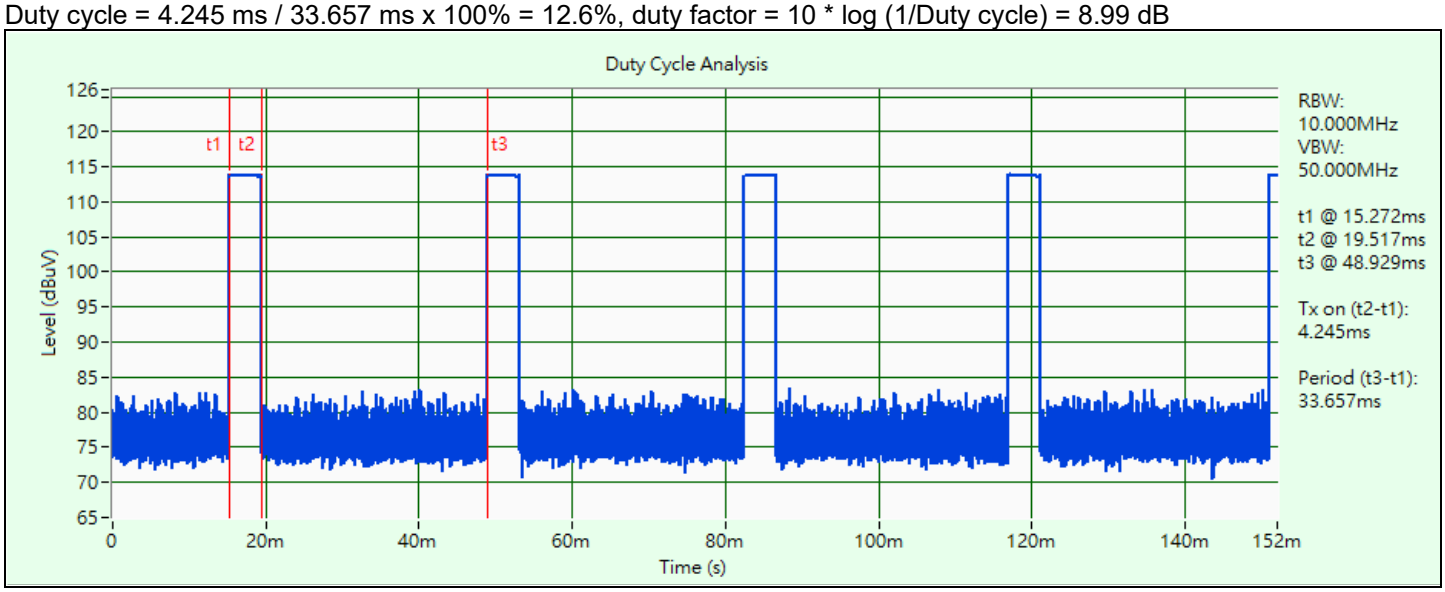
Pre-Scan:	1. The AC Adapter has the following models: P30-V3000R200-060Q0-US / PD065E-D1C0AVU. Pre-scan these models of AC Adapters and find the worst case as a representative test condition. 2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
Worst Case:	1. AC Adapter worst condition: P30-V3000R200-060Q0-US

Following channel(s) was (were) selected for the final test as listed below:

Test Item	Tested Channel	Modulation	Data Rate Parameter
RF Output Power	11, 18, 26	O-QPSK	250kb/s
Power Spectral Density	11, 18, 26	O-QPSK	250kb/s
6 dB Bandwidth	11, 18, 26	O-QPSK	250kb/s
Conducted Out of Band Emissions	11, 18, 26	O-QPSK	250kb/s
AC Power Conducted Emissions	11	O-QPSK	250kb/s
Unwanted Emissions below 1 GHz	11	O-QPSK	250kb/s
Unwanted Emissions above 1 GHz	11, 18, 26	O-QPSK	250kb/s
Note: The 802.15.4 wireless standard supports Zigbee/Open Thread/Matter protocols. The RF specifications described and tested within this report are representative of all protocols supported.			

3.5 Duty Cycle of Test Signal

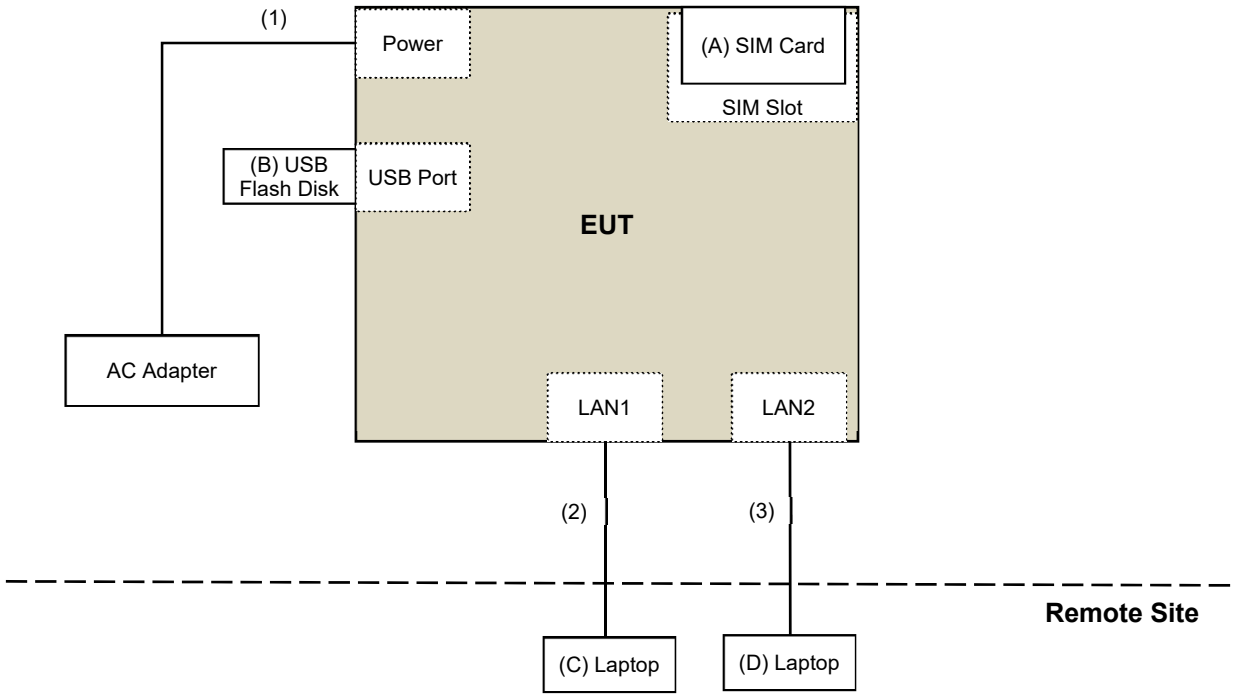
Duty cycle = 4.245 ms / 33.657 ms x 100% = 12.6%, duty factor = 10 * log (1/Duty cycle) = 8.99 dB



3.6 Test Program Used and Operation Descriptions

Controlling software (HyperTerminal paste XC33BE4443T-F100-T0 BT,ZB,Thread bring up SOP (by SSH) command) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	SIM Card	KeysSight	E7515-10910	N/A	N/A	Provided by Lab
B	USB	SANDISK	Ultra Luxe	N/A	N/A	Provided by Lab
C	Laptop	Lenovo	20U5S01X00 L14	PF-28LKK7	N/A	Provided by Lab
D	Laptop	DELL	E6420	H62T3R1	DoC	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.85	No	0	Supplied by applicant
2	RJ-45 Cable	1	10	No	0	Provided by Lab
3	RJ-45 Cable	1	10	No	0	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Pulse Power Sensor Anritsu	MA2411B	1726434	2024/6/7	2025/6/6
RF Power Meter Anritsu	ML2495A	1529002	2024/6/7	2025/6/6

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2025/5/14

4.2 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer Keysight	N9030A	MY55410176	2024/6/12	2025/6/11
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2025/5/14

4.3 6 dB Bandwidth

Refer to section 4.2 to get the tested date and information of the instruments.

4.4 Conducted Out of Band Emissions

Refer to section 4.2 to get the tested date and information of the instruments.

4.5 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance Telegartner	50 ohm	3	2024/11/1	2025/10/31
EMI Test Receiver R&S	ESCS 30	100375	2024/5/20	2025/5/19
Fixed Attenuator STI	STI02-2200-10	005	2025/2/17	2026/2/16
LISN R&S	ESH3-Z5	835239/001	2025/3/27	2026/3/26
		848773/004	2024/10/7	2025/10/6
RF Coaxial Cable JYEBAO	5D-FB	COCCAB-001	2025/2/17	2026/2/16
Software BVADT	BVADT_Cond_V7.3.7.4	N/A	N/A	N/A

Notes:

1. The test was performed in Conduction 1
2. Tested Date: 2025/5/16

4.6 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-0842	2024/10/8	2025/10/7
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
EMI Test Receiver R&S	ESR7	102026	2025/3/25	2026/3/24
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	2025/3/29	2026/3/28
Loop Antenna TESEQ	HLA 6121	63620	2024/10/17	2025/10/16
Preamplifier EMCI	EMC330N	980538	2025/3/29	2026/3/28
	EMC001340	980142	2025/2/17	2026/2/16
PXA Signal Analyzer Keysight	N9030B	MY57141948	2024/5/20	2025/5/19
RF Coaxial Cable PEWC	8D	966-5-1	2025/3/29	2026/3/28
		966-5-2	2025/3/29	2026/3/28
		966-5-3	2025/3/29	2026/3/28
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2025/5/16

4.7 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
EMI Test Receiver R&S	ESR7	102026	2025/3/25	2026/3/24
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1819	2024/11/10	2025/11/9
	BBHA 9170	9170-739	2024/11/10	2025/11/9
Preamplifier EMCI	EMC12630SE	980509	2025/1/18	2026/1/17
	EMC184045SE	980387	2024/8/8	2025/8/7
PXA Signal Analyzer Keysight	N9030B	MY57141948	2024/5/20	2025/5/19
RF Coaxial Cable EMCI	EMC102-KM-KM-1200	160924	2025/1/24	2026/1/23
	EMC102-KM-KM-4000	200214	2025/1/24	2026/1/23
	EMC104-SM-SM-1500	180503	2025/3/8	2026/3/7
	EMC104-SM-SM-2000	180501	2025/3/8	2026/3/7
	EMC104-SM-SM-6000	180506	2025/3/8	2026/3/7
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2025/5/6 ~ 2025/5/19

5 Limits of Test Items

5.1 RF Output Power

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

5.2 Power Spectral Density

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz.

5.3 6 dB Bandwidth

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

5.4 Conducted Out of Band Emissions

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

5.5 AC Power Conducted Emissions

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

Notes:

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.

5.6 Unwanted Emissions below 1 GHz

Radiated emissions up to 1 GHz 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)	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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.7 Unwanted Emissions above 1 GHz

Radiated emissions above 1 GHz 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)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

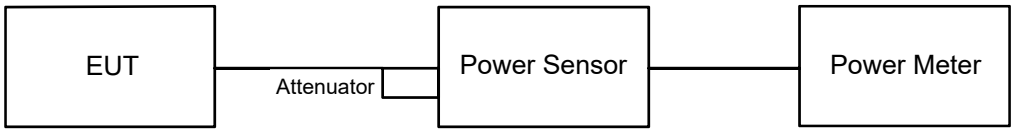
Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/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.

6 Test Arrangements

6.1 RF Output Power

6.1.1 Test Setup



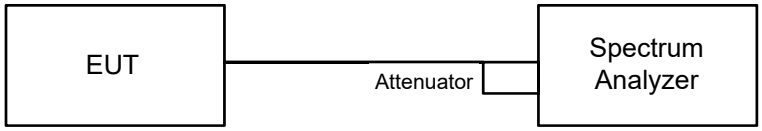
6.1.2 Test Procedure

Peak Power:
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:
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.

6.2 Power Spectral Density

6.2.1 Test Setup

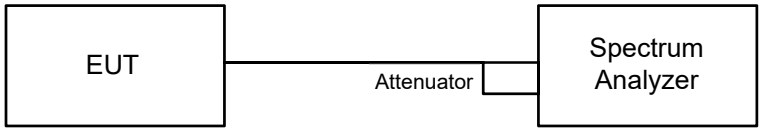


6.2.2 Test Procedure

a. Set analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to: 3 kHz.
d. Set the VBW ≥ 3 × RBW.
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.

6.3 6 dB Bandwidth

6.3.1 Test Setup

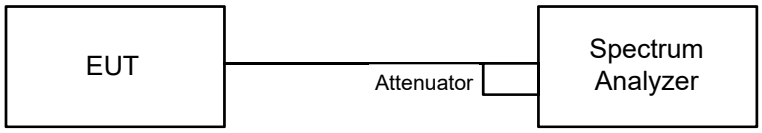


6.3.2 Test Procedure

a. Set resolution bandwidth (RBW) = 100 kHz.
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. 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.

6.4 Conducted Out of Band Emissions

6.4.1 Test Setup



6.4.2 Test Procedure

MEASUREMENT PROCEDURE REF

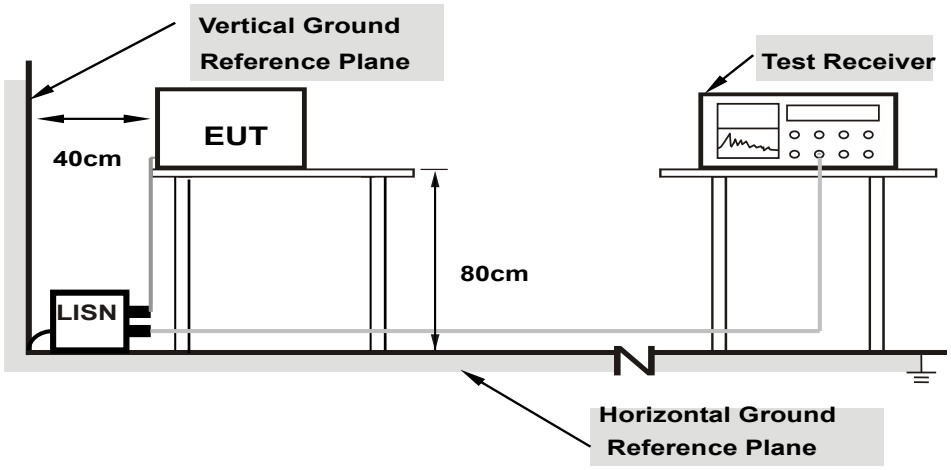
a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep time = auto couple.
e. Trace mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

6.5 AC Power Conducted Emissions

6.5.1 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).

6.5.2 Test Procedure

a. The EUT was placed on a 0.8 meter to the top of table and 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.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

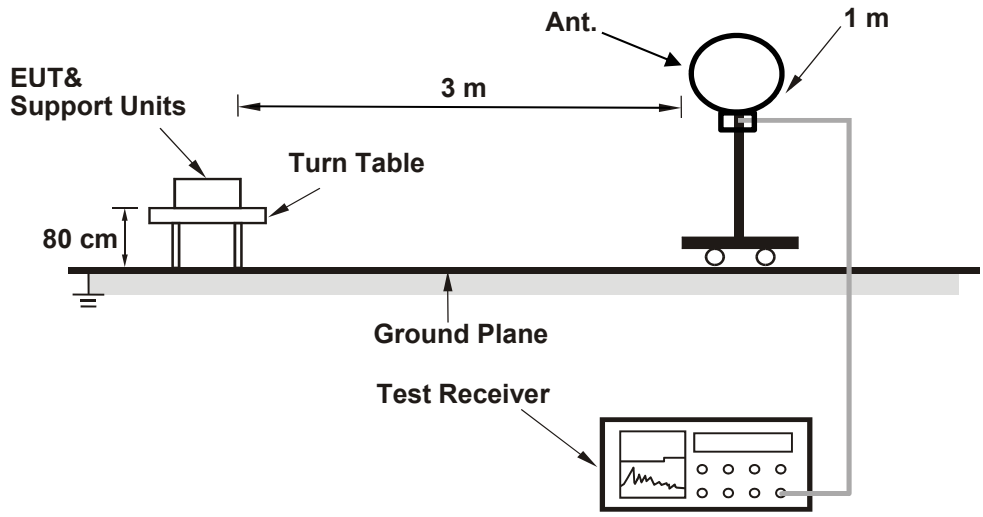
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz-30 MHz.

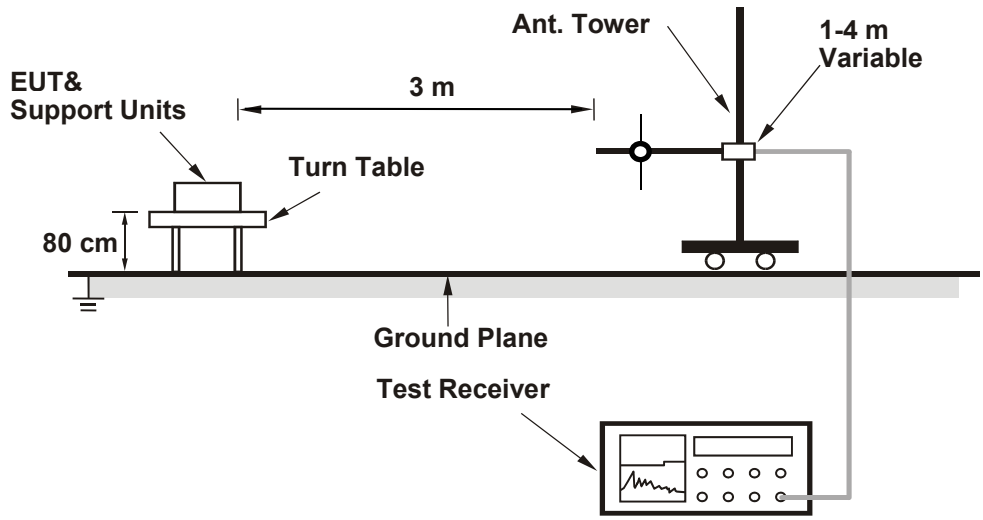
6.6 Unwanted Emissions below 1 GHz

6.6.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



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

6.6.2 Test Procedure

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 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. 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, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters 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.

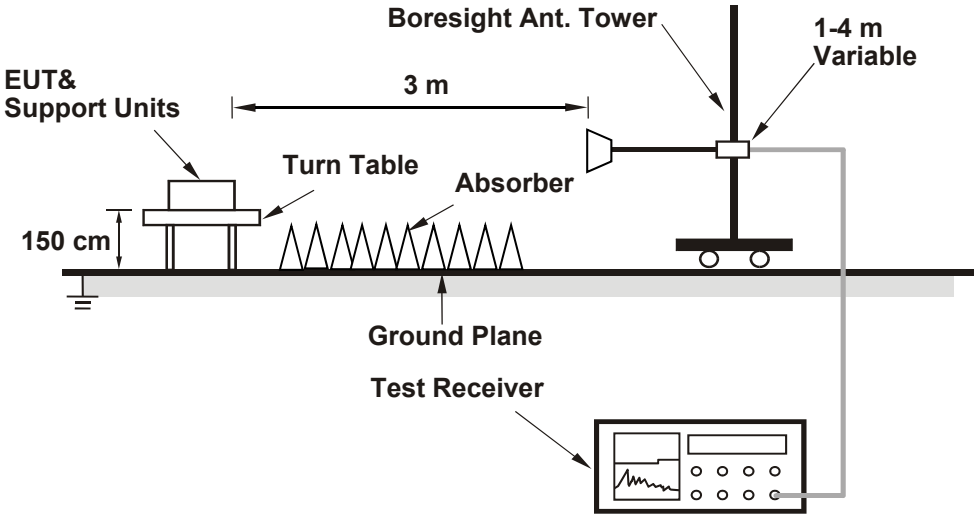
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Notes:

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

6.7 Unwanted Emissions above 1 GHz

6.7.1 Test Setup



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

6.7.2 Test Procedure

a. The EUT was placed on the top of a rotating table 1.5 meters 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/spectrum analyzer was set to peak and average detects 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.

Notes:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
2. For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10 Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1 GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	21°C, 67% RH	Tested By:	Dolly Chung

For Peak Power

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
11	2405	54.828	17.39	30	Pass
18	2440	50.699	17.05	30	Pass
26	2480	12.134	10.84	30	Pass

Note: The antenna gain is 3.56 dBi < 6 dBi, so the output power limit shall not be reduced.

For Average Power

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
11	2405	53.58	17.29
18	2440	49.431	16.94
26	2480	11.803	10.72

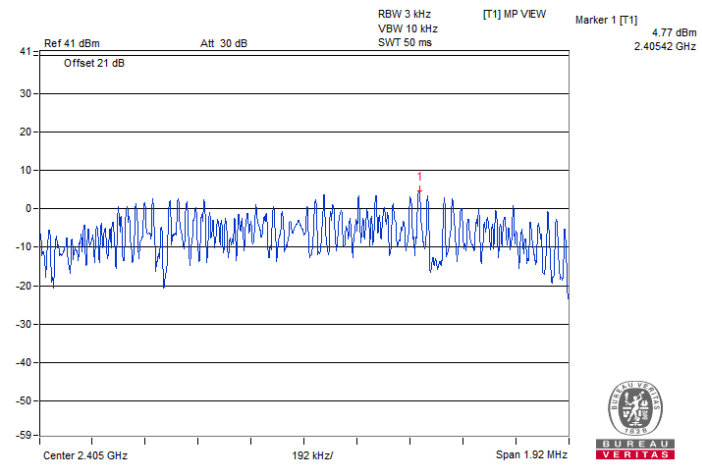
7.2 Power Spectral Density

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	21°C, 67% RH	Tested By:	Dolly Chung

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
11	2405	4.77	8	Pass
18	2440	4.25	8	Pass
26	2480	-2.34	8	Pass

Note: The antenna gain is 3.56 dBi < 6 dBi, so the power density limit shall not be reduced.

Spectrum Plot of Maximum Value



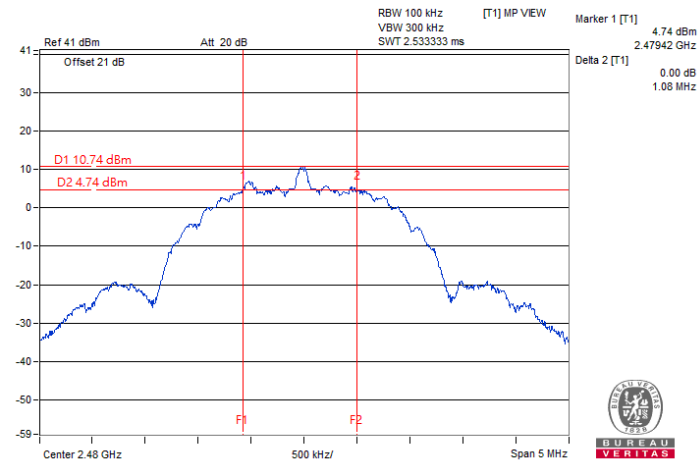
CH 11

7.3 6 dB Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	21°C, 67% RH	Tested By:	Dolly Chung

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
11	2405	1.28	0.5	Pass
18	2440	1.09	0.5	Pass
26	2480	1.08	0.5	Pass

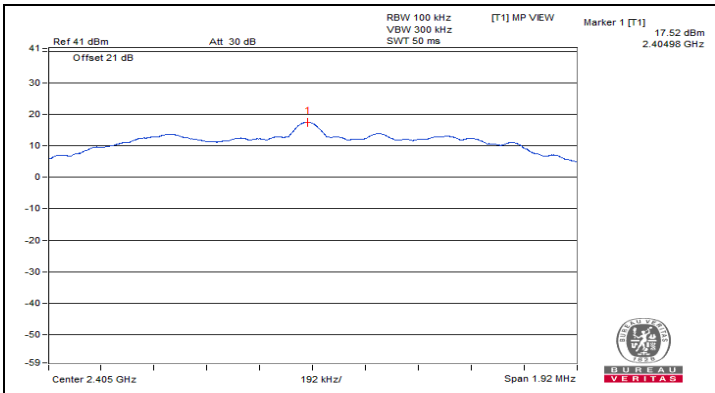
Spectrum Plot of Minimum Value



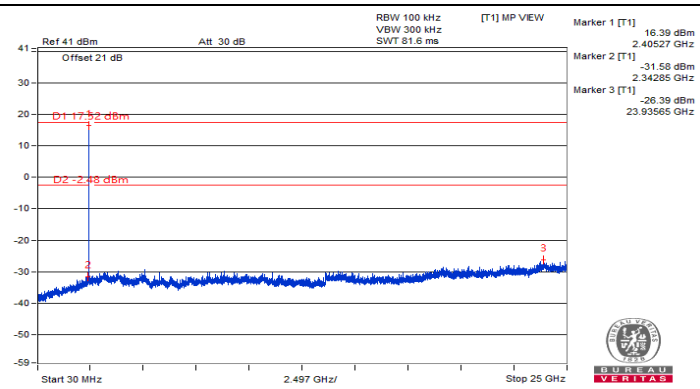
CH 26

7.4 Conducted Out of Band Emissions

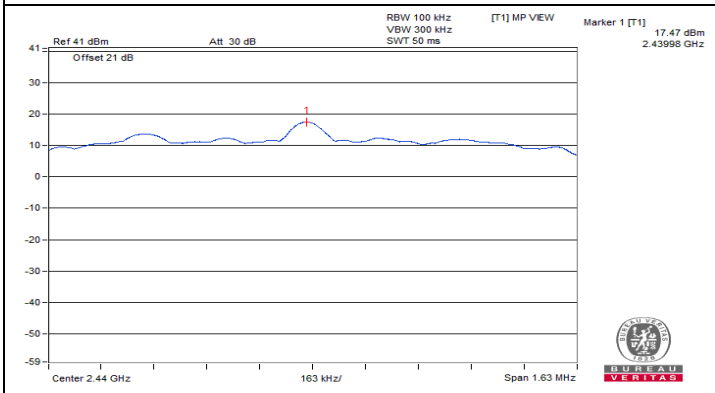
Input Power:	120 Vac, 60 Hz	Environmental Conditions:	21°C, 67% RH	Tested By:	Dolly Chung



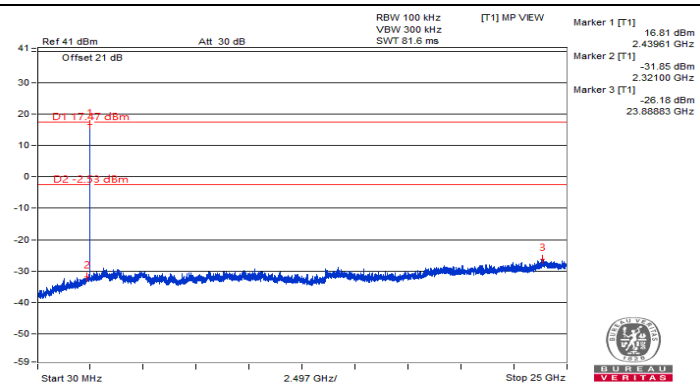
CH 11



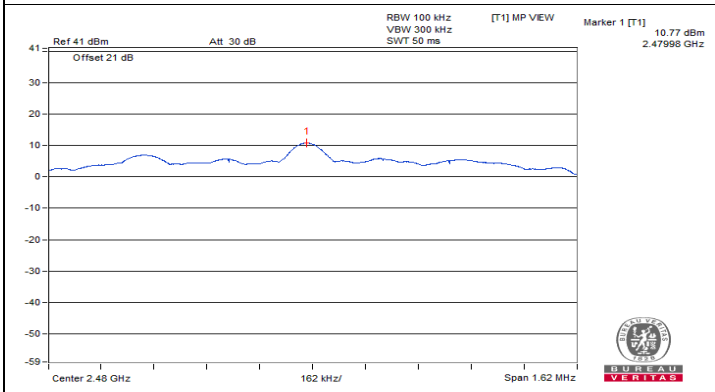
CH 11



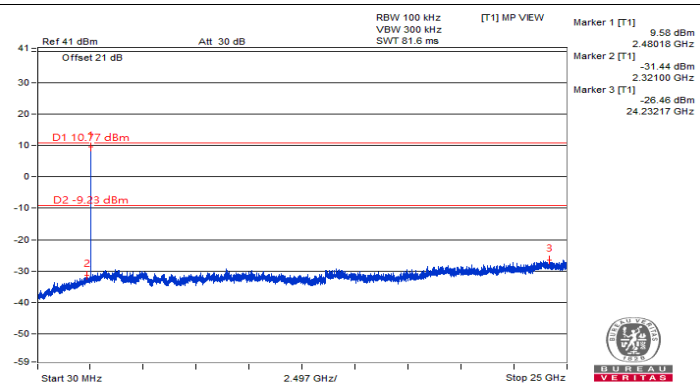
CH 18



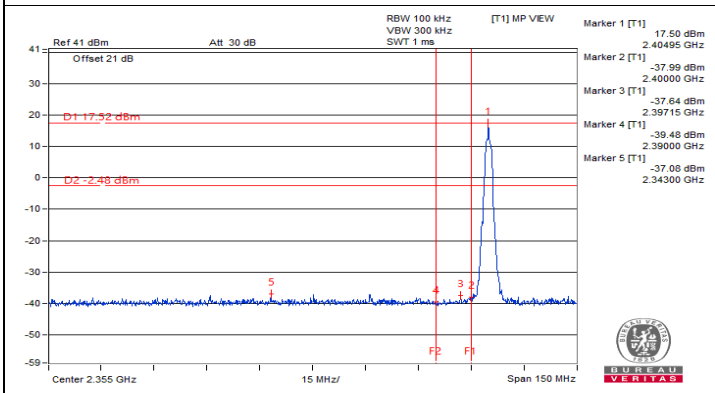
CH 18



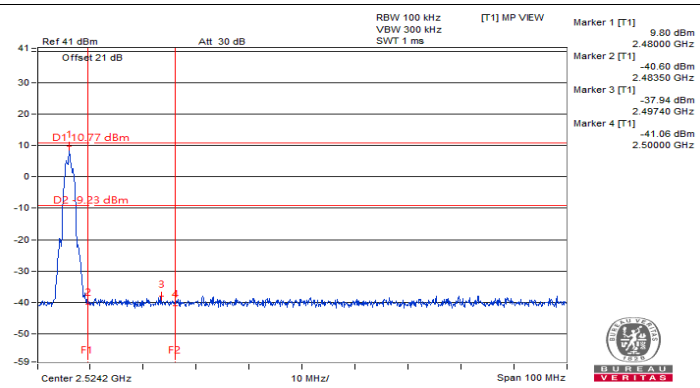
CH 26



CH 26



CH 11 Band edge



CH 26 Band edge

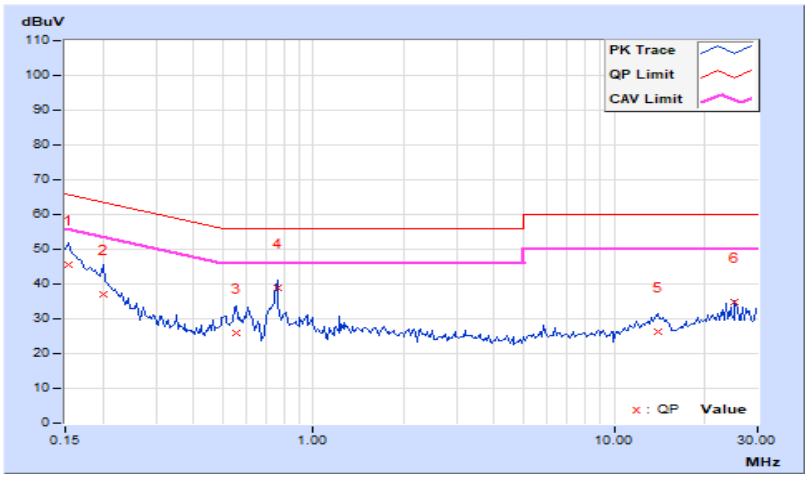
7.5 AC Power Conducted Emissions

RF Mode	802.15.4	**Channel**	CH 11：2405 MHz
Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23 °C, 76 % RH
Tested By	Andy Ho		

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	0.15391	10.00	35.54	20.20	45.54	30.20	65.79	55.79	-20.25	-25.59
2	0.20078	10.03	26.89	14.45	36.92	24.48	63.58	53.58	-26.66	-29.10
3	0.55234	10.05	15.85	6.80	25.90	16.85	56.00	46.00	-30.10	-29.15
4	**0.76200**	**10.07**	**28.87**	**27.47**	**38.94**	**37.54**	**56.00**	**46.00**	**-17.06**	**-8.46**
5	13.96094	10.87	15.46	10.87	26.33	21.74	60.00	50.00	-33.67	-28.26
6	25.14453	11.20	23.71	20.68	34.91	31.88	60.00	50.00	-25.09	-18.12

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

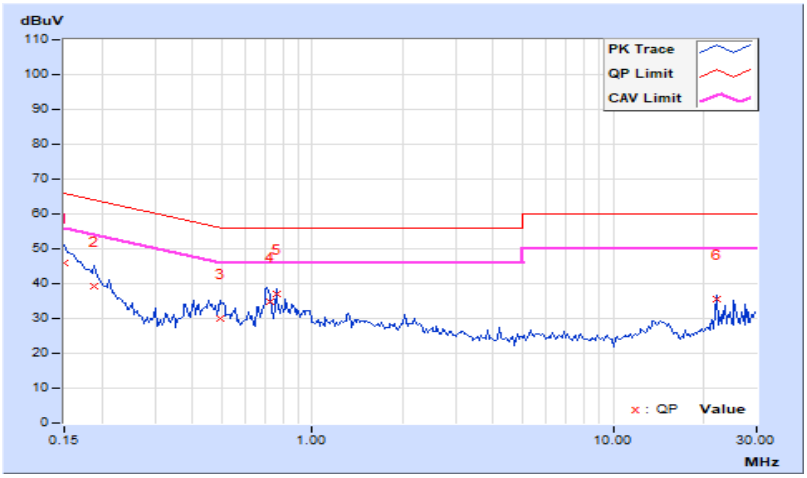


RF Mode	802.15.4	Channel	CH 11：2405 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 76 % RH
Tested By	Andy Ho		

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	0.15000	10.02	36.04	21.06	46.06	31.08	66.00	56.00	-19.94	-24.92
2	0.18906	10.03	29.32	17.75	39.35	27.78	64.08	54.08	-24.73	-26.30
3	0.49375	10.03	19.80	13.01	29.83	23.04	56.10	46.10	-26.27	-23.06
4	0.72347	10.05	24.81	21.63	34.86	31.68	56.00	46.00	-21.14	-14.32
5	0.76328	10.06	27.14	26.97	37.20	37.03	56.00	46.00	-18.80	-8.97
6	22.09766	11.01	24.49	23.59	35.50	34.60	60.00	50.00	-24.50	-15.40

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



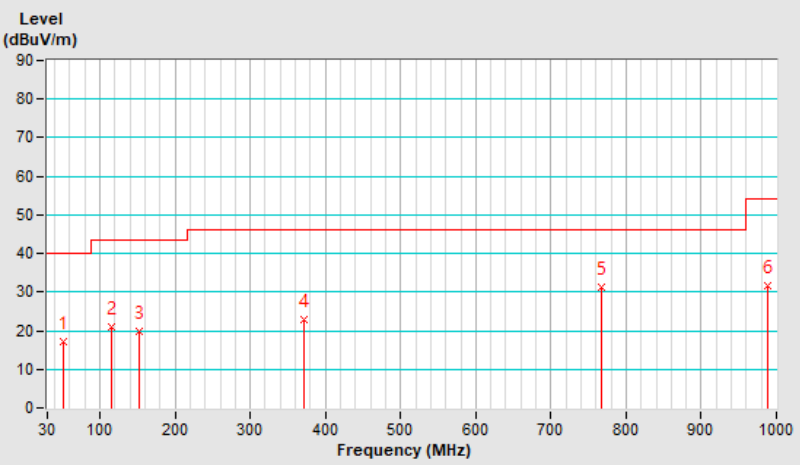
7.6 Unwanted Emissions below 1 GHz

RF Mode	802.15.4	**Channel**	CH 11：2405 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22 °C, 70 % RH
Tested By	Louis Yang		

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	51.64	17.1 QP	40.0	-22.9	3.97 H	281	29.7	-12.6
2	115.70	21.0 QP	43.5	-22.5	1.97 H	258	35.9	-14.9
3	151.57	19.9 QP	43.5	-23.6	1.00 H	264	32.2	-12.3
4	370.58	23.0 QP	46.0	-23.0	1.02 H	248	33.0	-10.0
5	767.76	31.1 QP	46.0	-14.9	3.88 H	12	32.6	-1.5
6	988.85	31.5 QP	54.0	-22.5	2.06 H	90	30.4	1.1

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 frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

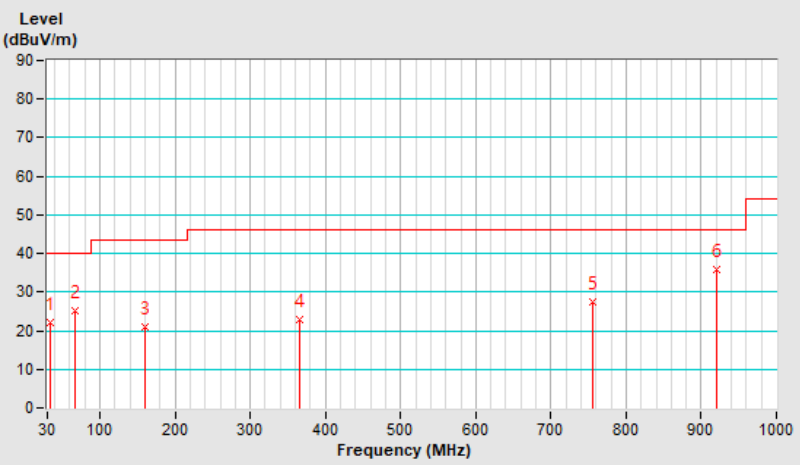


RF Mode	802.15.4	**Channel**	CH 11：2405 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22 °C, 70 % RH
Tested By	Louis Yang		

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	34.45	22.2 QP	40.0	-17.8	1.57 V	360	35.5	-13.3
2	65.94	25.1 QP	40.0	-14.9	2.29 V	207	39.2	-14.1
3	160.78	20.9 QP	43.5	-22.6	1.01 V	0	33.2	-12.3
4	365.99	22.9 QP	46.0	-23.1	1.00 V	356	33.0	-10.1
5	755.53	27.4 QP	46.0	-18.6	1.70 V	359	29.2	-1.8
6	**921.38**	**35.7 QP**	**46.0**	**-10.3**	**2.03 V**	**191**	**35.0**	**0.7**

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 frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.7 Unwanted Emissions above 1 GHz

RF Mode	802.15.4	**Channel**	CH 11：2405 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=300 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	24 °C, 75 % RH
Tested By	Louis Yang		

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	47.3 PK	74.0	-26.7	1.27 H	152	50.4	-3.1
2	2390.00	33.6 AV	54.0	-20.4	1.27 H	152	36.7	-3.1
3	*2405.00	104.0 PK			1.27 H	152	107.2	-3.2
4	*2405.00	99.2 AV			1.27 H	152	102.4	-3.2
5	4810.00	39.9 PK	74.0	-34.1	1.99 H	161	37.8	2.1
6	4810.00	28.8 AV	54.0	-25.2	1.99 H	161	26.7	2.1
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	54.8 PK	74.0	-19.2	2.42 V	74	57.9	-3.1
2	2390.00	41.1 AV	54.0	-12.9	2.42 V	74	44.2	-3.1
3	*2405.00	113.7 PK			2.42 V	74	116.9	-3.2
4	*2405.00	109.1 AV			2.42 V	74	112.3	-3.2
5	4810.00	39.5 PK	74.0	-34.5	1.82 V	196	37.4	2.1
6	4810.00	28.0 AV	54.0	-26.0	1.82 V	196	25.9	2.1

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.

RF Mode	802.15.4	Channel	CH 18：2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=300 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	24 °C, 75 % RH
Tested By	Louis Yang		

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	102.9 PK			1.24 H	142	106.2	-3.3
2	*2440.00	98.2 AV			1.24 H	142	101.5	-3.3
3	4880.00	39.5 PK	74.0	-34.5	2.04 H	149	37.4	2.1
4	4880.00	28.5 AV	54.0	-25.5	2.04 H	149	26.4	2.1
5	7320.00	53.5 PK	74.0	-20.5	2.04 H	149	46.1	7.4
6	7320.00	44.1 AV	54.0	-9.9	2.04 H	149	36.7	7.4
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	112.6 PK			2.08 V	76	115.9	-3.3
2	*2440.00	108.1 AV			2.08 V	76	111.4	-3.3
3	4880.00	39.1 PK	74.0	-34.9	1.81 V	206	37.0	2.1
4	4880.00	27.8 AV	54.0	-26.2	1.81 V	206	25.7	2.1
5	7320.00	53.2 PK	74.0	-20.8	1.81 V	206	45.8	7.4
6	7320.00	43.5 AV	54.0	-10.5	1.81 V	206	36.1	7.4

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.

RF Mode	802.15.4	Channel	CH 26：2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=300 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	24 °C, 75 % RH
Tested By	Louis Yang		

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	98.4 PK			1.28 H	137	101.5	-3.1
2	*2480.00	93.6 AV			1.28 H	137	96.7	-3.1
3	2483.50	56.9 PK	74.0	-17.1	1.28 H	137	60.0	-3.1
4	2483.50	45.1 AV	54.0	-8.9	1.28 H	137	48.2	-3.1
5	4960.00	39.5 PK	74.0	-34.5	2.01 H	161	37.1	2.4
6	4960.00	28.5 AV	54.0	-25.5	2.01 H	161	26.1	2.4
7	7440.00	53.6 PK	74.0	-20.4	2.09 H	137	45.9	7.7
8	7440.00	43.9 AV	54.0	-10.1	2.09 H	137	36.2	7.7
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	108.1 PK			2.49 V	64	111.2	-3.1
2	*2480.00	103.5 AV			2.49 V	64	106.6	-3.1
3	2483.50	63.6 PK	74.0	-10.4	2.49 V	64	66.7	-3.1
4	**2483.50**	**53.4 AV**	**54.0**	**-0.6**	**2.49 V**	**64**	**56.5**	**-3.1**
5	4960.00	39.4 PK	74.0	-34.6	1.83 V	216	37.0	2.4
6	4960.00	27.9 AV	54.0	-26.1	1.83 V	216	25.5	2.4
7	7440.00	53.3 PK	74.0	-20.7	1.79 V	208	45.6	7.7
8	7440.00	43.8 AV	54.0	-10.2	1.79 V	208	36.1	7.7

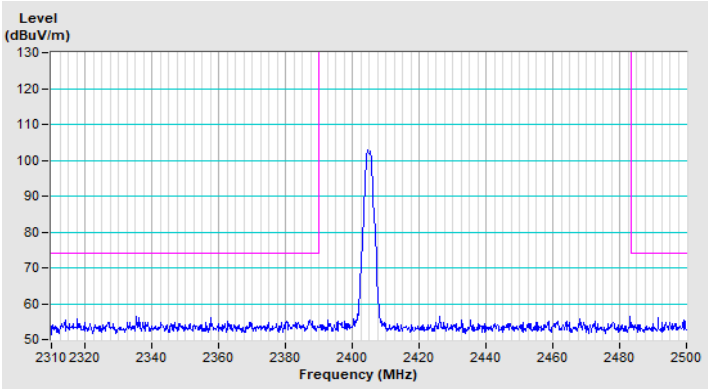
Remarks:

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.

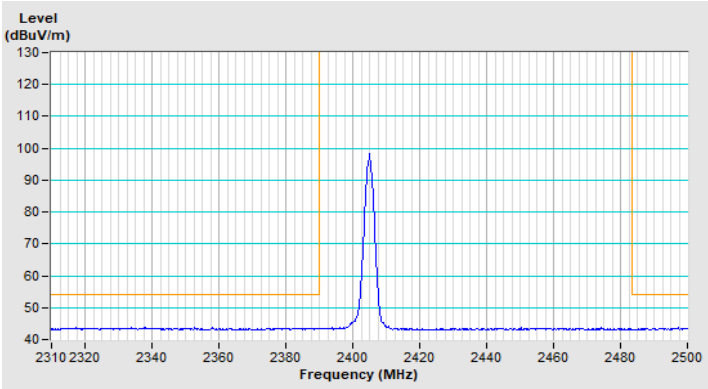
Plot of Band Edge

Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=300 Hz, DET=Peak

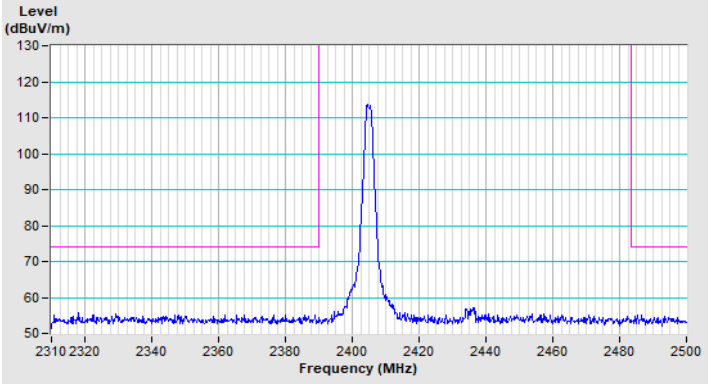
802.15.4 Channel 11



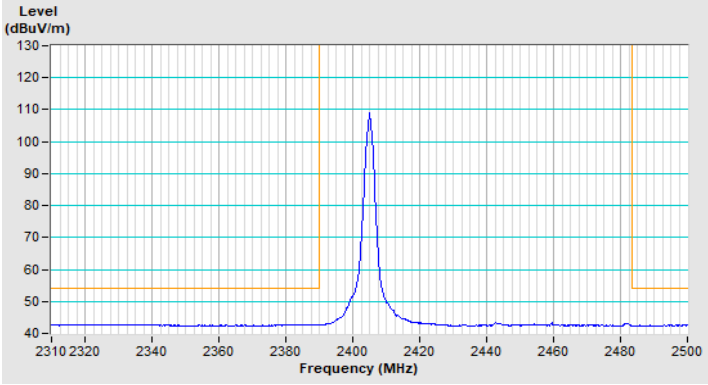
Horizontal (Peak)



Horizontal (Average)

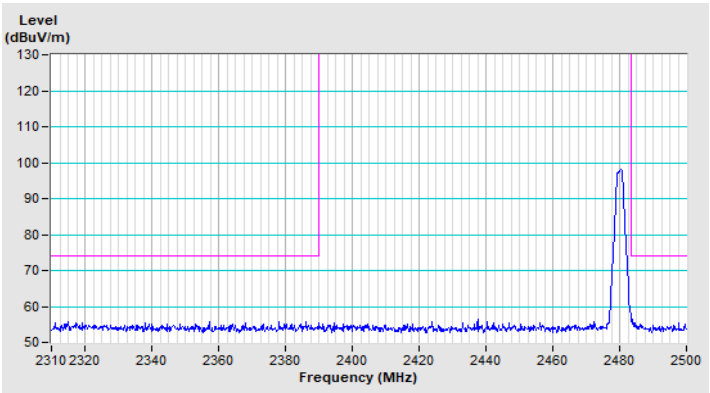


Vertical (Peak)

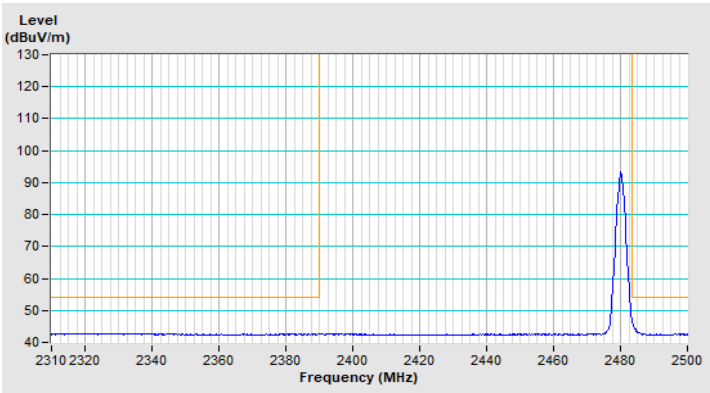


Vertical (Average)

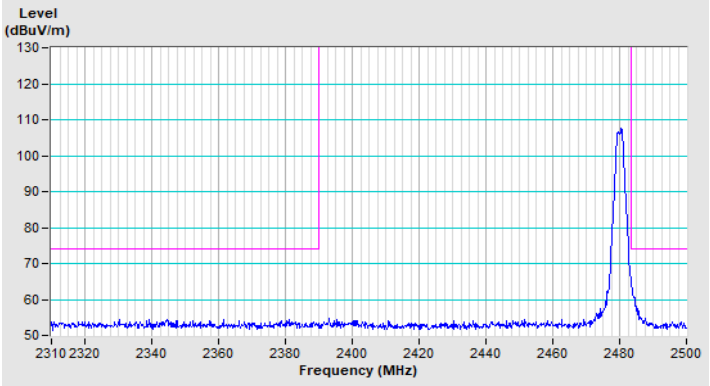
802.15.4 Channel 26



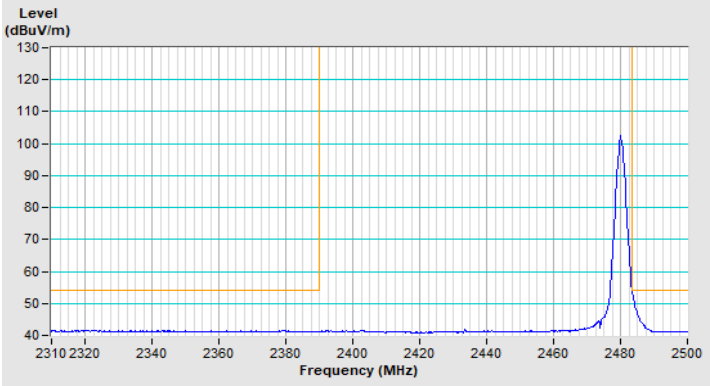
Horizontal (Peak)



Horizontal (Average)



Vertical (Peak)



Vertical (Average)

8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 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.

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

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