Partial FCC Test Report

Report No.:	RFBBGM-WTW-P22090842-1
FCC ID:	WIYSLM758A
Test Model:	SLM758
Received Date:	Sep. 26, 2022
Test Date:	Oct. 03, 2022 ~ Oct. 24, 2022
Issued Date:	Nov. 18, 2022
Applicant:	CASTLES TECHNOLOGY CO., LTD.
Address:	6F, NO. 207-5, SEC. 3, BEIXIN RD., XINDIAN DISTRICT, NEW TAIPEI CITY 23143, TAIWAN (R. O. C.)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Table of Contents

Release Control Record 3

1 Certificate of Conformity 4

2 Summary of Test Results 5

2.1 Measurement Uncertainty 5
2.2 Modification Record 5

3 General Information 6

3.1 General Description of EUT 6
3.2 Description of Test Modes 8
3.2.1 Test Mode Applicability and Tested Channel Detail 9
3.3 Duty Cycle of Test Signal 11
3.4 Description of Support Units 12
3.4.1 Configuration of System under Test 12
3.5 General Description of Applied Standards and References 12

4 Test Types and Results 13

4.1 Radiated Emission and Bandedge Measurement 13
4.1.1 Limits of Radiated Emission and Bandedge Measurement 13
4.1.2 Test Instruments 14
4.1.3 Test Procedures 15
4.1.4 Deviation from Test Standard 16
4.1.5 Test Set Up 16
4.1.6 EUT Operating Conditions 17
4.1.7 Test Results 18
4.2 Conducted Emission Measurement 32
4.2.1 Limits of Conducted Emission Measurement 32
4.2.2 Test Instruments 32
4.2.3 Test Procedures 33
4.2.4 Deviation from Test Standard 33
4.2.5 Test Setup 33
4.2.6 EUT Operating Conditions 33
4.2.7 Test Results 34
4.3 Conducted Output Power Measurement 36
4.3.1 Limits of Conducted Output Power Measurement 36
4.3.2 Test Setup 36
4.3.3 Test Instruments 36
4.3.4 Test Procedures 36
4.3.5 Deviation from Test Standard 36
4.3.6 EUT Operating Conditions 36
4.3.7 Test Results 37

5 Pictures of Test Arrangements 38

Annex A- Band Edge Measurement 39

Appendix – Information of the Testing Laboratories 43

Release Control Record

Issue No.	Description	Date Issued
RFBBGM-WTW-P22090842-1	Original Release	Nov. 18, 2022

1 Certificate of Conformity

Product:	Smart module
Brand:	CASTLES TECHNOLOGY
Test Model:	SLM758
Sample Status:	Identical Prototype
Applicant:	CASTLES TECHNOLOGY CO., LTD.
Test Date:	Oct. 03, 2022 ~ Oct. 24, 2022
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) 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 : Vera Huang , **Date:** Nov. 18, 2022

Vera Huang / Specialist

Approved by : Jeremy Lin , **Date:** Nov. 18, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	**Test Item**	**Result**	**Remarks**
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -8.50 dB at 0.67800 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.2 dB at 2483.50 MHz.
15.247(d)	Antenna Port Emission	N/A	Refer to note
15.247(a)(2)	6 dB Bandwidth	N/A	Refer to note
---	Occupied Bandwidth Measurement	N/A	Refer to note
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	N/A	Refer to note
15.203	Antenna Requirement	N/A	Refer to note

Note:

1. This report is a partial report, and only test items of AC Power Conducted Emission, Conducted power and Radiated Emissions tests were verified and recorded in this report. Other testing data please refer to Sporton lab report no.: FR970101C.
2. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
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	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smart module
Brand	CASTLES TECHNOLOGY
Test Model	SLM758
Status of EUT	Identical Prototype
Power Supply Rating	5.0 Vdc (host equipment)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to 150Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	156.675 mW
Antenna Type	Dipole antenna with 0.611 dBi gain
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of Sporton lab report no.: FR970101C. The differences from the original report are adding an End-product (POS Terminal (Brand: CASTLES TECHNOLOGY, Model: S1E2)), changing antenna type & gain, and disable BLE, UNII-2A, UNII-2C function via software. Therefore, only AC Power Conducted Emission, Maximum Peak Output Power, and radiated emissions were verified and recorded in this report. Other testing data please refer to the original Sporton lab report no.: FR970101C.
2. The EUT was installed in POS Terminal (Brand: CASTLES TECHNOLOGY, Model: S1E2).
3. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	Tx Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

4. The POS Terminal contains following accessory devices.

Product	Brand	Model	Description
Adapter	CASTLES TECHNOLOGY	1A52-UB52A	I/P: 100-240 Vac, 50-60 Hz, 0.3 A O/P: 5 Vdc, 2 A
Battery	CASTLES TECHNOLOGY	S1E	3.75 Vdc
USB Cable	N/A	N/A	2m shielded cable w/o core

5. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.
6. 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.
7. BT & WWAN & NFC (FCC ID: WIYS1E2001) technology can transmit at same time.
8. WLAN 2.4G & WWAN & NFC (FCC ID: WIYS1E2001) technology can transmit at same time.
9. WLAN 5G & WWAN & NFC (FCC ID: WIYS1E2001) technology can transmit at same time.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

7 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	Power	
-	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1 GHz **RE<1G:** Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **Power:** Maximum Output Power

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
2. For radiated emission (below 1GHz) and power line conducted emission test items chosen the worst maximum power.

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	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

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	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11g	1 to 11	1	OFDM	BPSK	6.0

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	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11g	1 to 11	1	OFDM	BPSK	6.0

Conducted Output Power 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	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

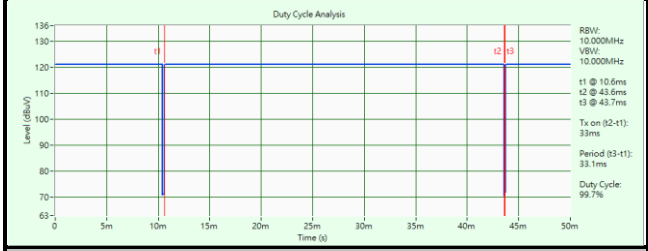
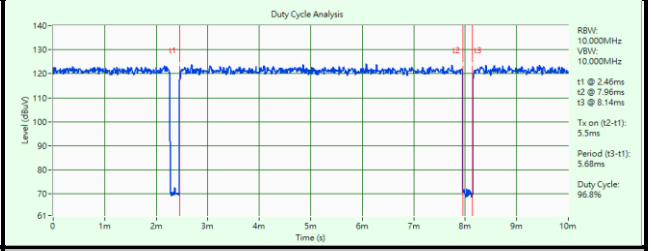
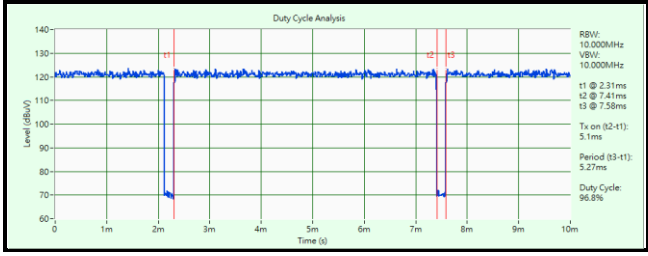
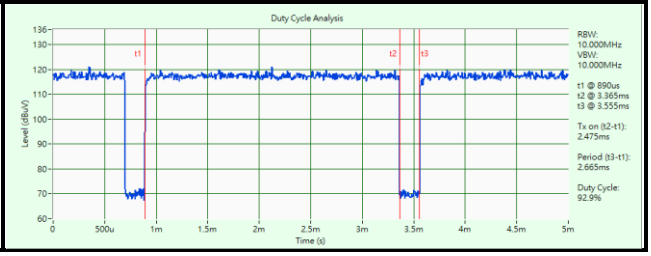
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	24 deg. C, 69 % RH	120 Vac, 60 Hz	Luis Lee
RE<1G	23 deg. C, 66 % RH	120 Vac, 60 Hz	Titan Hsu
PLC	23 deg. C, 66 % RH	120 Vac, 60 Hz	Titan Hsu
Power	25 deg. C, 60 % RH	120 Vac, 60 Hz	Noah Chang

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is ≥ 98 %, duty factor is not required.
Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11b: Duty cycle = 33/33.1 = 0.997
802.11g: Duty cycle = 5.5/5.68 = 0.968, Duty factor = 10 * log(1/0.968) = 0.14
802.11n (HT20): Duty cycle = 5.1/5.27 = 0.968, Duty factor = 10 * log(1/0.968) = 0.14
802.11n (HT40): Duty cycle = 2.475/2.665 = 0.929, Duty factor = 10 * log(1/0.929) = 0.32

802.11b	802.11g
	
802.11n (HT20)	**802.11n (HT40)**
	

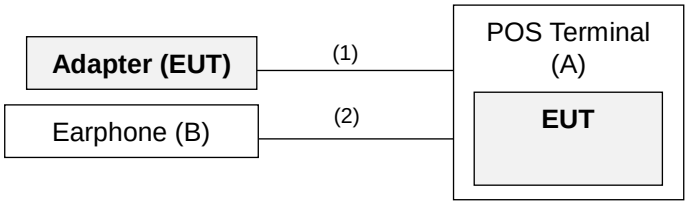
3.4 Description of Support Units

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.

No.	Product	Brand	Model No.	Serial No.	FCC ID
A	POS Terminal	CASTLES TECHNOLOGY	S1E2	N/A	N/A
B	Earphone	APPLE	MB77PFEB	N/A	N/A

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	2	Y	0	Provided by client
2.	Audio Cable	1	1.2	N	0	Provided by Lab

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:

FCC Part 15, Subpart C (15.247)
ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 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)	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

NOTE:

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.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102579	2022/07/01	2023/06/30
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	2022/04/11	2023/04/10
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	2021/10/29	2022/10/28
HORN Antenna SCHWARZBECK	9120D	209	2021/11/14	2022/11/13
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	2021/11/14	2022/11/13
Loop Antenna TESEQ	HLA 6121	45745	2022/07/27	2023/07/26
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	2022/07/09	2023/07/08
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	2022/03/19	2023/03/18
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	2022/05/14	2023/05/13
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	2022/07/09	2023/07/08
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104- SM-SM-8000	Cable-CH3-03 (309224+170907)	2022/07/09	2023/07/08
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	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 Chamber 3.

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:

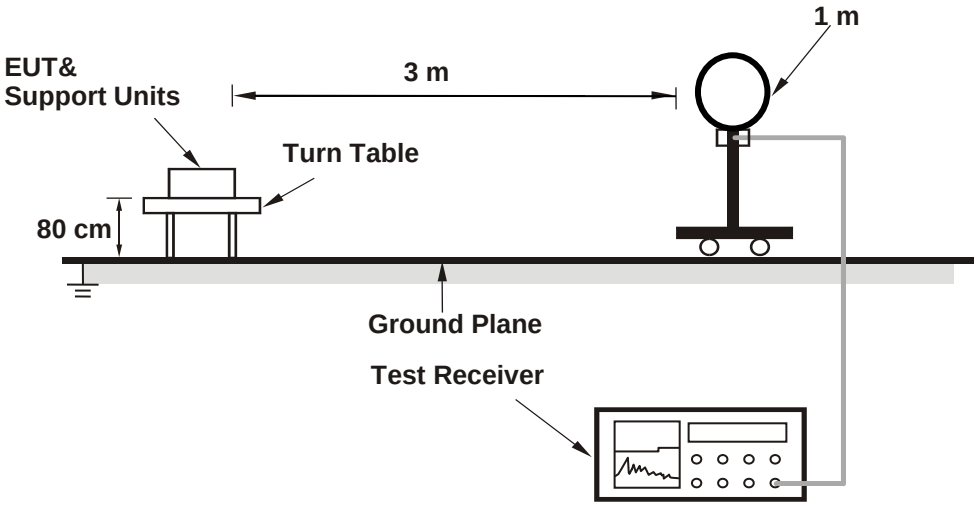
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz. (11b: RBW = 1 MHz, VBW =10 Hz ; 11g: RBW = 1 MHz, VBW = 1 kHz ;
   11n (HT20): RBW = 1 MHz, VBW = 1 kHz; 11n (HT40): RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

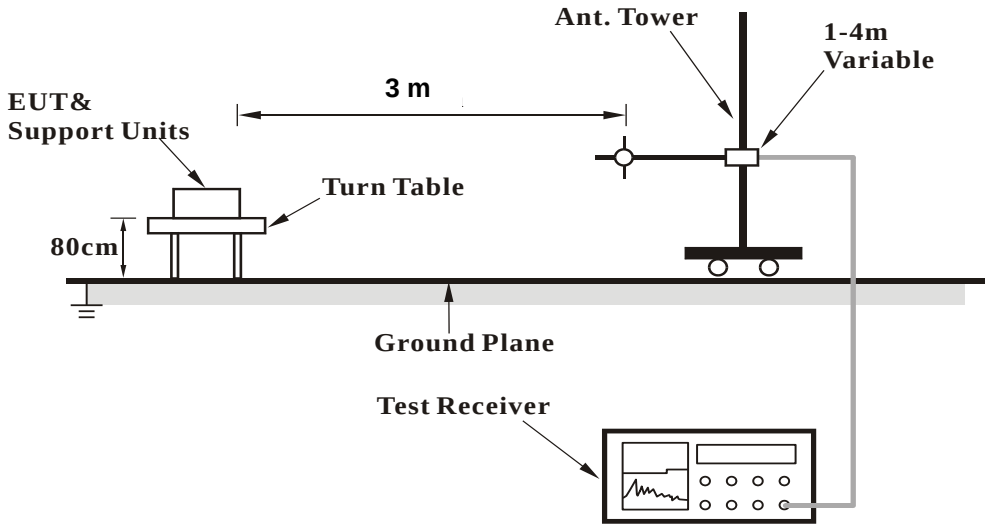
No deviation.

4.1.5 Test Set Up

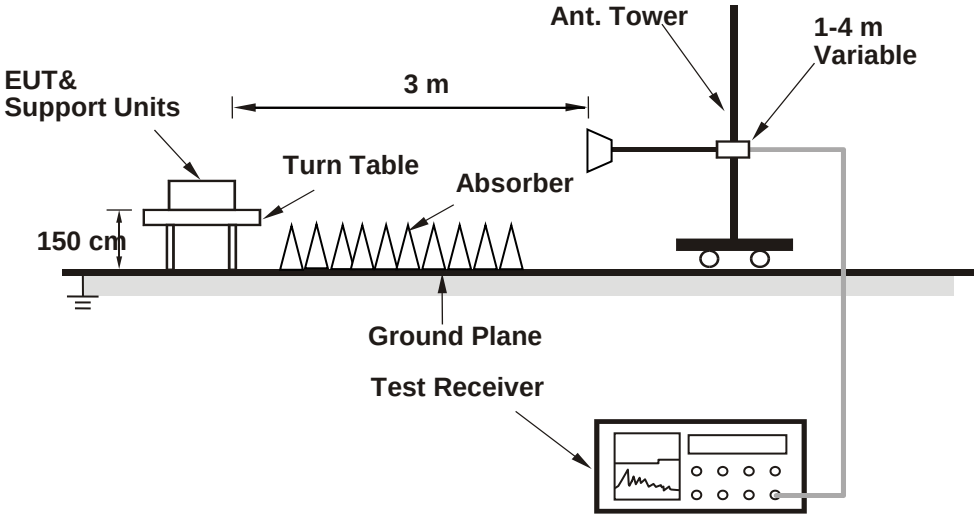
<Radiated Emission below 30 MHz>



<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

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

4.1.7 Test Results

Above 1 GHz Data：

RF Mode	TX 802.11b	Channel	CH 1：2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	59.1 PK	74.0	-14.9	1.36 H	159	24.2	34.9
2	2390.00	46.3 AV	54.0	-7.7	1.36 H	159	11.4	34.9
3	*2412.00	103.2 PK			1.36 H	159	68.3	34.9
4	*2412.00	99.1 AV			1.36 H	159	64.2	34.9
5	4824.00	52.2 PK	74.0	-21.8	2.41 H	198	38.6	13.6
6	4824.00	39.5 AV	54.0	-14.5	2.41 H	198	25.9	13.6
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	59.8 PK	74.0	-14.2	1.03 V	300	24.9	34.9
2	2390.00	46.3 AV	54.0	-7.7	1.03 V	300	11.4	34.9
3	*2412.00	98.4 PK			1.03 V	300	63.5	34.9
4	*2412.00	94.3 AV			1.03 V	300	59.4	34.9
5	4824.00	51.3 PK	74.0	-22.7	2.41 V	186	37.7	13.6
6	4824.00	38.8 AV	54.0	-15.2	2.41 V	186	25.2	13.6

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 802.11b	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	*2437.00	102.9 PK			1.44 H	152	68.0	34.9
2	*2437.00	98.8 AV			1.44 H	152	63.9	34.9
3	4874.00	52.4 PK	74.0	-21.6	2.36 H	188	38.9	13.5
4	4874.00	39.2 AV	54.0	-14.8	2.36 H	188	25.7	13.5
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	*2437.00	98.0 PK			1.08 V	303	63.1	34.9
2	*2437.00	93.6 AV			1.08 V	303	58.7	34.9
3	4874.00	51.1 PK	74.0	-22.9	2.61 V	153	37.6	13.5
4	4874.00	38.8 AV	54.0	-15.2	2.61 V	153	25.3	13.5

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 802.11b	Channel	CH 11：2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	*2462.00	97.5 PK			1.38 H	167	62.6	34.9
2	*2462.00	95.0 AV			1.38 H	167	60.1	34.9
3	2483.50	59.5 PK	74.0	-14.5	1.38 H	167	24.7	34.8
4	2483.50	47.8 AV	54.0	-6.2	1.38 H	167	13.0	34.8
5	4924.00	51.9 PK	74.0	-22.1	2.24 H	183	38.7	13.2
6	4924.00	39.0 AV	54.0	-15.0	2.24 H	183	25.8	13.2
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	*2462.00	89.8 PK			1.12 V	298	54.9	34.9
2	*2462.00	87.3 AV			1.12 V	298	52.4	34.9
3	2483.50	59.5 PK	74.0	-14.5	1.11 V	298	24.7	34.8
4	2483.50	47.7 AV	54.0	-6.3	1.11 V	298	12.9	34.8
5	4924.00	50.7 PK	74.0	-23.3	2.39 V	178	37.5	13.2
6	4924.00	38.5 AV	54.0	-15.5	2.39 V	178	25.3	13.2

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 802.11g	Channel	CH 1：2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	67.5 PK	74.0	-6.5	1.90 H	159	32.6	34.9
2	2390.00	51.0 AV	54.0	-3.0	1.90 H	159	16.1	34.9
3	*2412.00	106.1 PK			1.92 H	159	71.2	34.9
4	*2412.00	95.8 AV			1.92 H	159	60.9	34.9
5	4824.00	52.5 PK	74.0	-21.5	2.48 H	186	38.9	13.6
6	4824.00	39.3 AV	54.0	-14.7	2.48 H	186	25.7	13.6
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	64.2 PK	74.0	-9.8	1.16 V	257	29.3	34.9
2	2390.00	48.5 AV	54.0	-5.5	1.16 V	257	13.6	34.9
3	*2412.00	101.0 PK			1.16 V	257	66.1	34.9
4	*2412.00	90.8 AV			1.16 V	257	55.9	34.9
5	4824.00	51.8 PK	74.0	-22.2	3.12 V	152	38.2	13.6
6	4824.00	38.9 AV	54.0	-15.1	3.12 V	152	25.3	13.6

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 802.11g	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	*2437.00	105.8 PK			1.91 H	158	70.9	34.9
2	*2437.00	95.6 AV			1.91 H	158	60.7	34.9
3	4874.00	52.2 PK	74.0	-21.8	2.26 H	174	38.7	13.5
4	4874.00	39.4 AV	54.0	-14.6	2.26 H	174	25.9	13.5
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	*2437.00	99.4 PK			1.24 V	258	64.5	34.9
2	*2437.00	89.1 AV			1.24 V	258	54.2	34.9
3	4874.00	51.4 PK	74.0	-22.6	3.02 V	142	37.9	13.5
4	4874.00	38.9 AV	54.0	-15.1	3.02 V	142	25.4	13.5

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 802.11g	Channel	CH 11：2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	*2462.00	102.4 PK			2.18 H	160	67.5	34.9
2	*2462.00	92.8 AV			2.18 H	160	57.9	34.9
3	2483.50	64.3 PK	74.0	-9.7	2.18 H	160	29.5	34.8
4	2483.50	50.2 AV	54.0	-3.8	2.18 H	160	15.4	34.8
5	4924.00	51.9 PK	74.0	-22.1	2.53 H	179	38.7	13.2
6	4924.00	38.8 AV	54.0	-15.2	2.53 H	179	25.6	13.2
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	*2462.00	95.3 PK			1.08 V	297	60.4	34.9
2	*2462.00	84.9 AV			1.08 V	297	50.0	34.9
3	2483.50	59.5 PK	74.0	-14.5	1.08 V	297	24.7	34.8
4	2483.50	48.5 AV	54.0	-5.5	1.08 V	297	13.7	34.8
5	4924.00	52.1 PK	74.0	-21.9	2.49 V	177	38.9	13.2
6	4924.00	38.9 AV	54.0	-15.1	2.49 V	177	25.7	13.2

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 802.11n (HT20)	Channel	CH 1：2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	64.4 PK	74.0	-9.6	1.91 H	160	29.5	34.9
2	2390.00	49.0 AV	54.0	-5.0	1.91 H	160	14.1	34.9
3	*2412.00	104.2 PK			1.91 H	160	69.3	34.9
4	*2412.00	93.5 AV			1.91 H	160	58.6	34.9
5	4824.00	52.4 PK	74.0	-21.6	2.45 H	188	38.8	13.6
6	4824.00	39.5 AV	54.0	-14.5	2.45 H	188	25.9	13.6
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	60.6 PK	74.0	-13.4	1.19 V	257	25.7	34.9
2	2390.00	47.5 AV	54.0	-6.5	1.19 V	257	12.6	34.9
3	*2412.00	98.6 PK			1.19 V	257	63.7	34.9
4	*2412.00	88.7 AV			1.19 V	257	53.8	34.9
5	4824.00	51.8 PK	74.0	-22.2	3.11 V	147	38.2	13.6
6	4824.00	38.8 AV	54.0	-15.2	3.11 V	147	25.2	13.6

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 802.11n (HT20)	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	*2437.00	104.7 PK			1.89 H	159	69.8	34.9
2	*2437.00	93.8 AV			1.89 H	159	58.9	34.9
3	4874.00	52.4 PK	74.0	-21.6	2.24 H	179	38.9	13.5
4	4874.00	39.3 AV	54.0	-14.7	2.24 H	179	25.8	13.5
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	*2437.00	98.1 PK			1.20 V	254	63.2	34.9
2	*2437.00	86.9 AV			1.20 V	254	52.0	34.9
3	4874.00	51.8 PK	74.0	-22.2	2.93 V	161	38.3	13.5
4	4874.00	38.9 AV	54.0	-15.1	2.93 V	161	25.4	13.5

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 802.11n (HT20)	Channel	CH 11：2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	*2462.00	101.0 PK			2.15 H	162	66.1	34.9
2	*2462.00	90.9 AV			2.15 H	162	56.0	34.9
3	2483.50	62.7 PK	74.0	-11.3	2.15 H	162	27.9	34.8
4	2483.50	49.3 AV	54.0	-4.7	2.15 H	162	14.5	34.8
5	4924.00	51.9 PK	74.0	-22.1	2.46 H	185	38.7	13.2
6	4924.00	39.0 AV	54.0	-15.0	2.46 H	185	25.8	13.2
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	*2462.00	92.7 PK			1.38 V	258	57.8	34.9
2	*2462.00	82.9 AV			1.38 V	258	48.0	34.9
3	2483.50	59.3 PK	74.0	-14.7	1.38 V	258	24.5	34.8
4	2483.50	47.9 AV	54.0	-6.1	1.38 V	258	13.1	34.8
5	4924.00	51.1 PK	74.0	-22.9	2.99 V	158	37.9	13.2
6	4924.00	38.5 AV	54.0	-15.5	2.99 V	158	25.3	13.2

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 802.11n (HT40)	Channel	CH 3：2422 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	64.4 PK	74.0	-9.6	1.87 H	161	29.5	34.9
2	2390.00	50.8 AV	54.0	-3.2	1.87 H	161	15.9	34.9
3	*2422.00	100.1 PK			1.87 H	161	65.2	34.9
4	*2422.00	90.0 AV			1.87 H	161	55.1	34.9
5	4844.00	52.3 PK	74.0	-21.7	2.41 H	189	38.7	13.6
6	4844.00	39.4 AV	54.0	-14.6	2.41 H	189	25.8	13.6
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	60.7 PK	74.0	-13.3	1.05 V	256	25.8	34.9
2	2390.00	47.9 AV	54.0	-6.1	1.05 V	256	13.0	34.9
3	*2422.00	95.9 PK			1.05 V	256	61.0	34.9
4	*2422.00	85.7 AV			1.05 V	256	50.8	34.9
5	4844.00	51.5 PK	74.0	-22.5	2.99 V	157	37.9	13.6
6	4844.00	38.9 AV	54.0	-15.1	2.99 V	157	25.3	13.6

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 802.11n (HT40)	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	*2437.00	100.4 PK			1.88 H	160	65.5	34.9
2	*2437.00	90.2 AV			1.88 H	160	55.3	34.9
3	4874.00	52.4 PK	74.0	-21.6	2.39 H	184	38.9	13.5
4	4874.00	39.4 AV	54.0	-14.6	2.39 H	184	25.9	13.5
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	*2437.00	95.0 PK			1.09 V	258	60.1	34.9
2	*2437.00	84.9 AV			1.09 V	258	50.0	34.9
3	4874.00	52.2 PK	74.0	-21.8	3.14 V	153	38.7	13.5
4	4874.00	39.3 AV	54.0	-14.7	3.14 V	153	25.8	13.5

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 802.11n (HT40)	Channel	CH 9：2452 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

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	*2452.00	98.5 PK			1.84 H	157	63.6	34.9
2	*2452.00	88.7 AV			1.84 H	157	53.8	34.9
3	2483.50	69.7 PK	74.0	-4.3	1.84 H	157	34.9	34.8
4	**2483.50**	**53.8 AV**	**54.0**	**-0.2**	**1.84 H**	**157**	**19.0**	**34.8**
5	4904.00	52.3 PK	74.0	-21.7	2.34 H	188	38.9	13.4
6	4904.00	39.3 AV	54.0	-14.7	2.34 H	188	25.9	13.4
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	*2452.00	92.5 PK			1.05 V	258	57.6	34.9
2	*2452.00	82.5 AV			1.05 V	258	47.6	34.9
3	2483.50	61.9 PK	74.0	-12.1	1.05 V	258	27.1	34.8
4	2483.50	49.6 AV	54.0	-4.4	1.05 V	258	14.8	34.8
5	4904.00	51.3 PK	74.0	-22.7	3.00 V	148	37.9	13.4
6	4904.00	38.7 AV	54.0	-15.3	3.00 V	148	25.3	13.4

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.

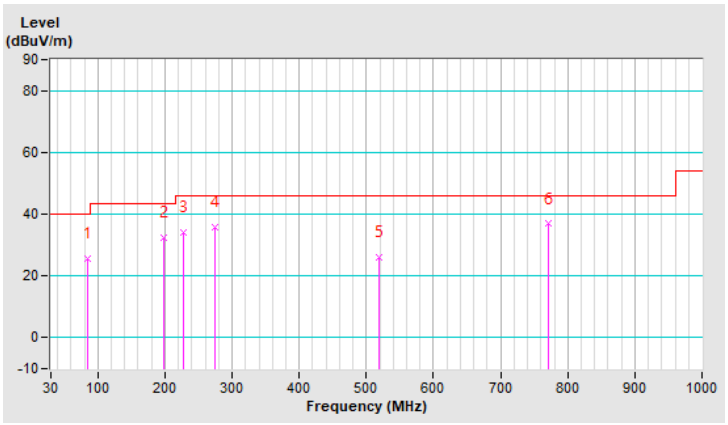
Below 1 GHz Worst-Case Data:

RF Mode	TX 802.11g	Channel	CH 1：2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	84.32	25.5 QP	40.0	-14.5	1.50 H	135	39.4	-13.9
2	198.78	32.4 QP	43.5	-11.1	1.01 H	107	43.9	-11.5
3	227.88	34.0 QP	46.0	-12.0	1.50 H	90	45.1	-11.1
4	274.44	35.8 QP	46.0	-10.2	1.01 H	132	43.8	-8.0
5	518.88	25.9 QP	46.0	-20.1	1.50 H	70	29.7	-3.8
6	771.08	36.8 QP	46.0	-9.2	1.01 H	183	34.5	2.3

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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

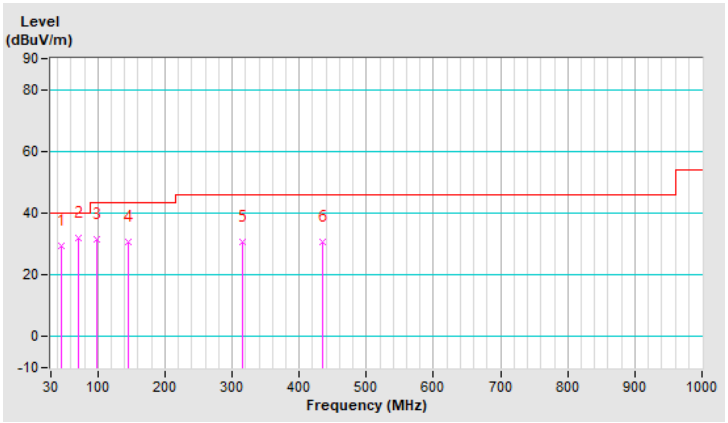


RF Mode	TX 802.11g	Channel	CH 1：2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	45.52	29.2 QP	40.0	-10.8	1.00 V	306	38.2	-9.0
2	70.74	31.8 QP	40.0	-8.2	1.00 V	306	42.7	-10.9
3	97.90	31.7 QP	43.5	-11.8	1.00 V	306	45.3	-13.6
4	144.46	30.6 QP	43.5	-12.9	1.49 V	228	39.4	-8.8
5	315.18	30.5 QP	46.0	-15.5	1.00 V	117	37.6	-7.1
6	435.46	30.5 QP	46.0	-15.5	1.00 V	148	35.4	-4.9

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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: 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	ESCI	100613	Dec. 03, 2021	Dec. 02, 2022
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 15, 2022	Jan. 14, 2023
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Mar. 14, 2022	Mar. 13, 2023
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 12, 2022	Sep. 11, 2023
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 1 (Conduction 1).
3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

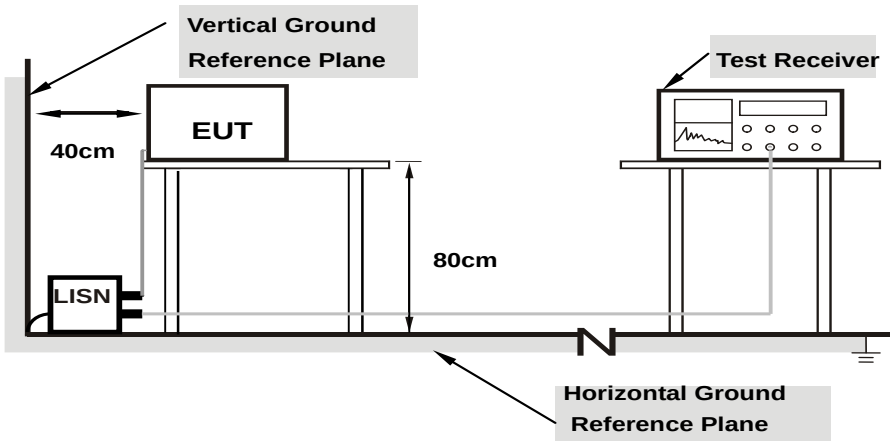
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
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.

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

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

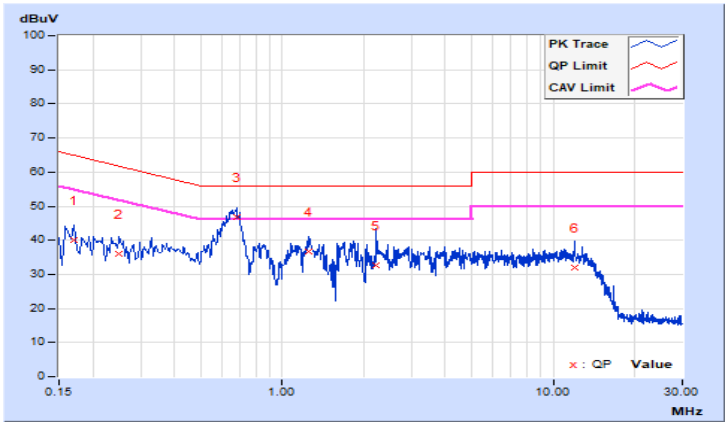
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23 °C, 66% RH
Tested by	Titan Hsu		

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	0.16977	9.70	30.35	17.18	40.05	26.88	64.97	54.97	-24.92	-28.09
2	0.25000	9.74	26.36	15.61	36.10	25.35	61.76	51.76	-25.66	-26.41
3	**0.67800**	**9.82**	**36.96**	**27.68**	**46.78**	**37.50**	**56.00**	**46.00**	**-9.22**	**-8.50**
4	1.25400	9.86	26.91	17.50	36.77	27.36	56.00	46.00	-19.23	-18.64
5	2.22600	9.91	22.87	13.00	32.78	22.91	56.00	46.00	-23.22	-23.09
6	11.98200	10.08	21.98	11.61	32.06	21.69	60.00	50.00	-27.94	-28.31

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

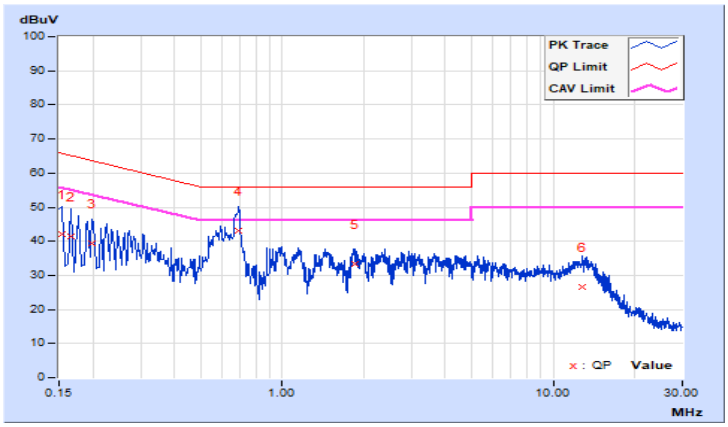


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23 °C, 66% RH
Tested by	Titan Hsu		

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	0.15400	9.68	32.33	18.05	42.01	27.73	65.78	55.78	-23.77	-28.05
2	0.16600	9.69	31.68	17.88	41.37	27.57	65.16	55.16	-23.79	-27.59
3	0.19800	9.72	29.78	17.97	39.50	27.69	63.69	53.69	-24.19	-26.00
4	0.69000	9.83	33.38	27.45	43.21	37.28	56.00	46.00	-12.79	-8.72
5	1.84600	9.91	23.41	17.27	33.32	27.18	56.00	46.00	-22.68	-18.82
6	12.83800	10.10	16.41	6.34	26.51	16.44	60.00	50.00	-33.49	-33.56

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

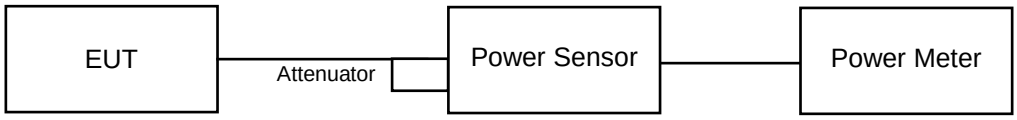


4.3 Conducted Output Power Measurement

4.3.1 Limits of Conducted Output Power Measurement

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

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 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.

4.3.5 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 Results

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	55.59	17.45	31.046	14.92	30	Pass
6	2437	46.989	16.72	26.002	14.15	30	Pass
11	2462	49.659	16.96	27.04	14.32	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	**156.675**	**21.95**	39.994	16.02	30	Pass
6	2437	142.561	21.54	25.41	14.05	30	Pass
11	2462	140.281	21.47	34.834	15.42	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	119.95	20.79	25.177	14.01	30	Pass
6	2437	123.595	20.92	19.454	12.89	30	Pass
11	2462	113.763	20.56	23.714	13.75	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	121.339	20.84	18.967	12.78	30	Pass
6	2437	125.603	20.99	19.099	12.81	30	Pass
9	2452	146.893	21.67	29.376	14.68	30	Pass

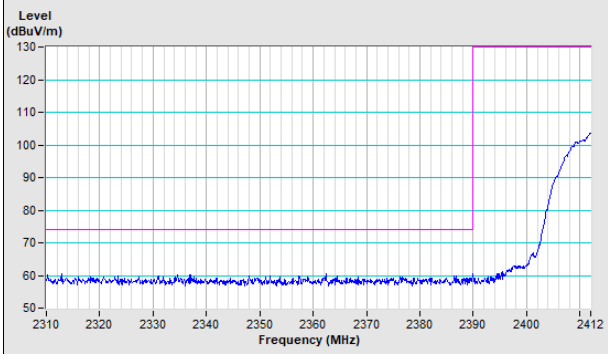
5 Pictures of Test Arrangements

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

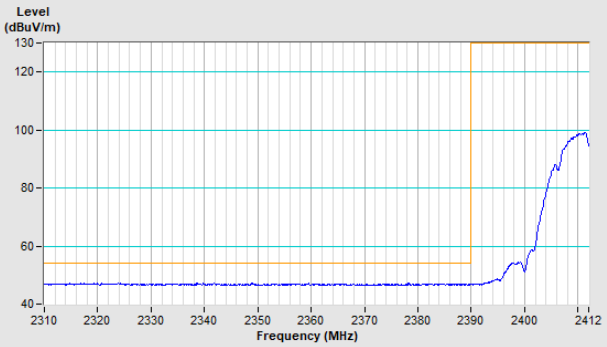
Annex A- Band Edge Measurement

802.11b Channel 1

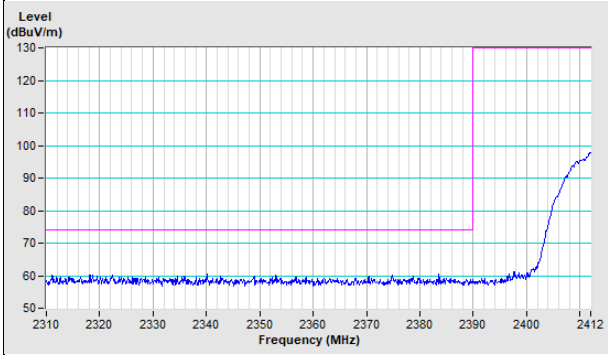
Horizontal (Peak)



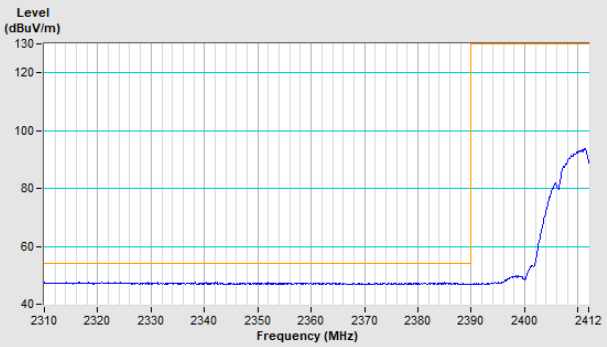
Horizontal (Average)



Vertical (Peak)

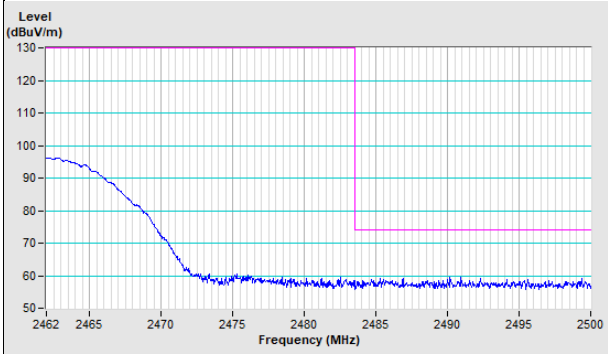


Vertical (Average)

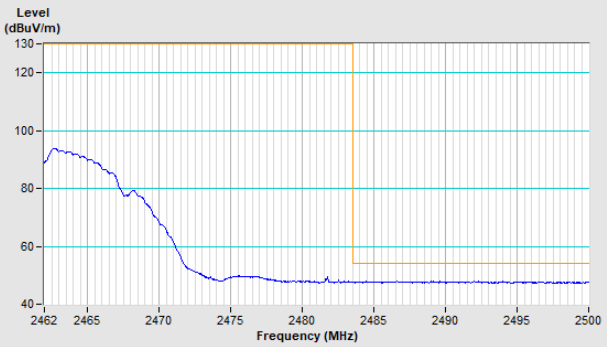


802.11b Channel 11

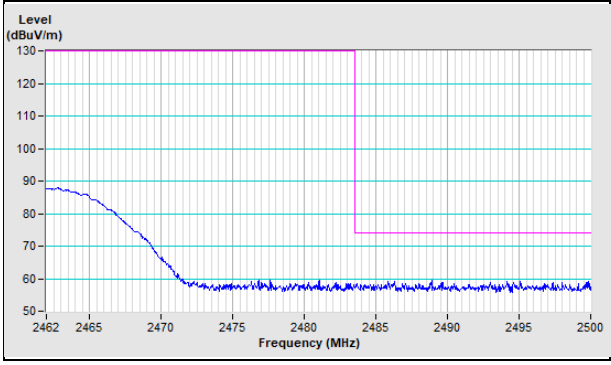
Horizontal (Peak)



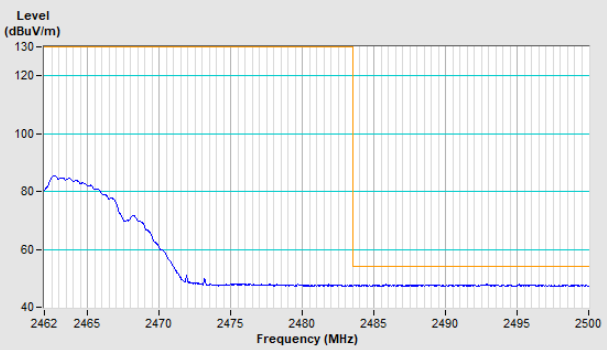
Horizontal (Average)

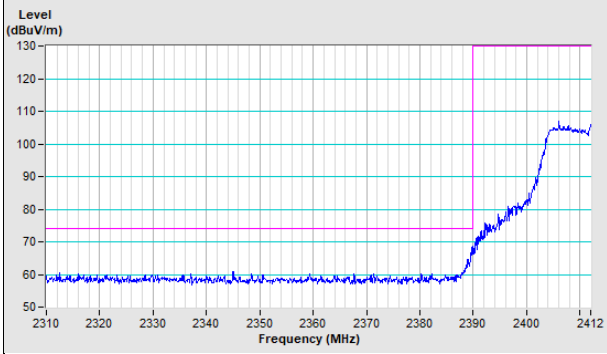
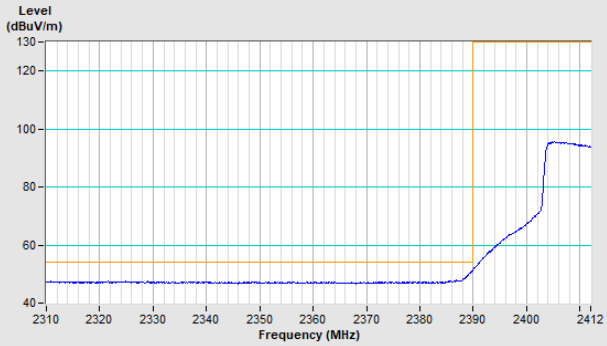
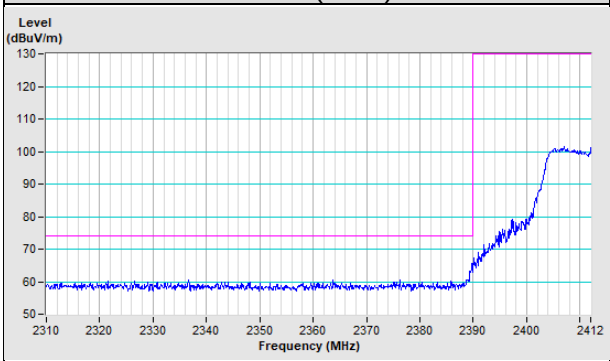
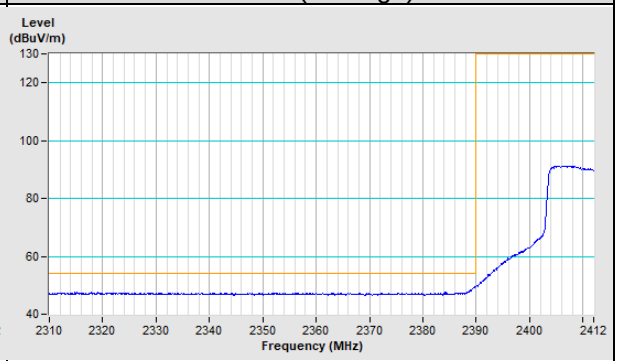
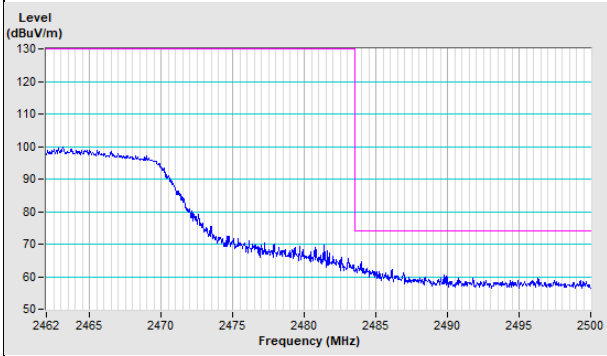
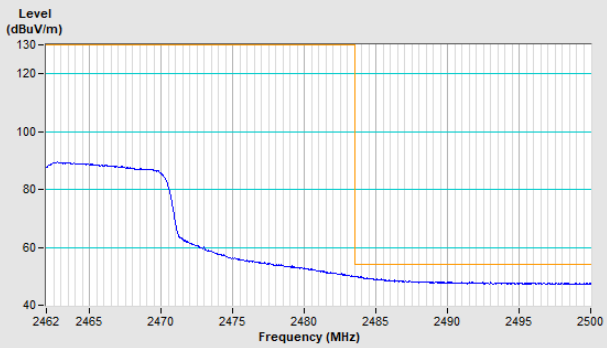
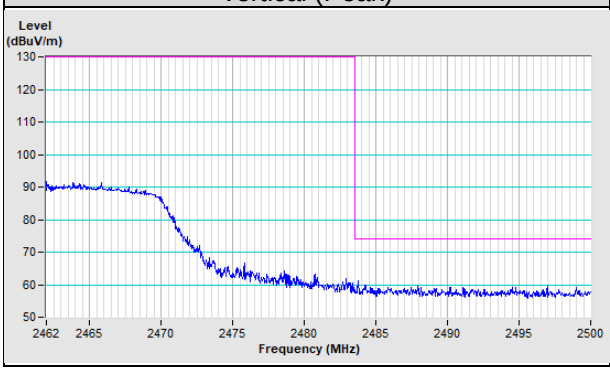
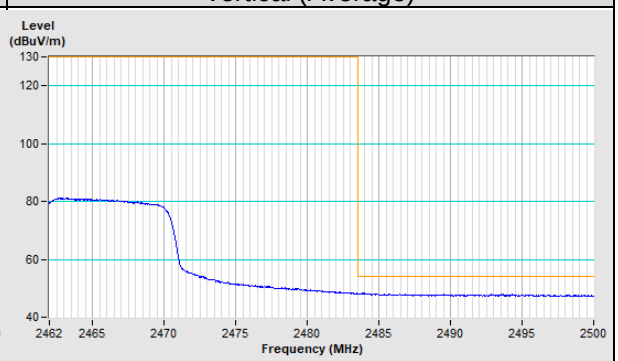


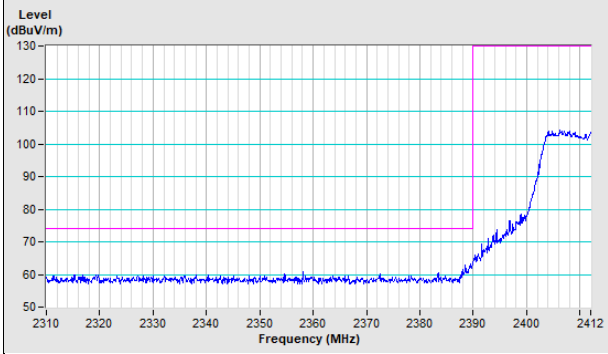
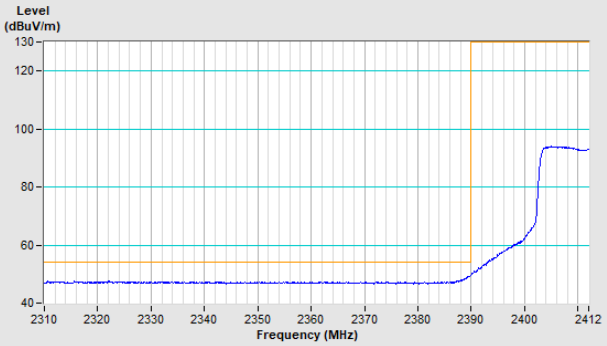
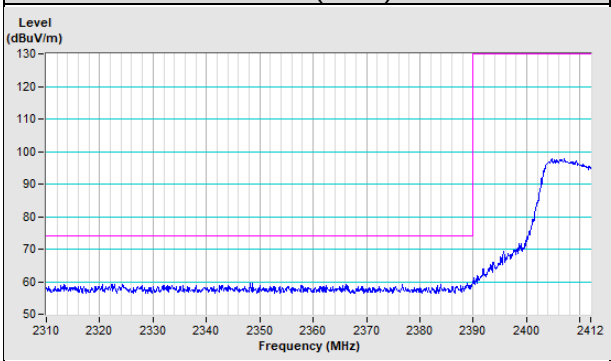
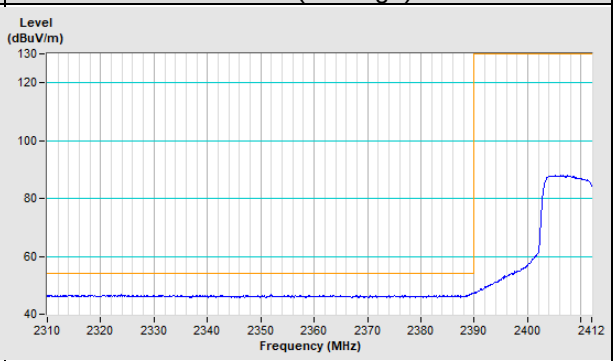
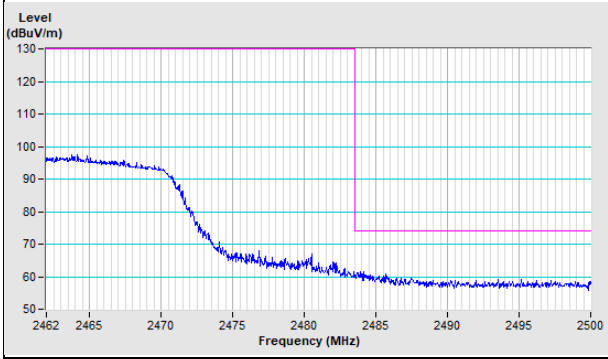
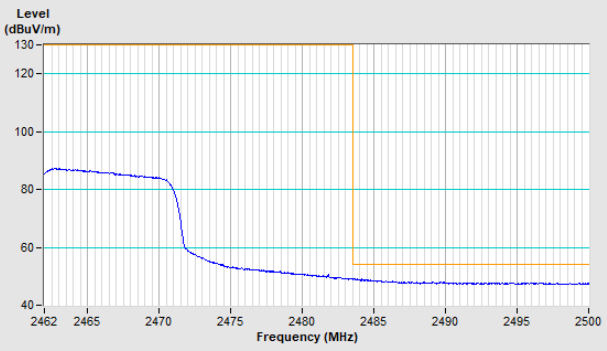
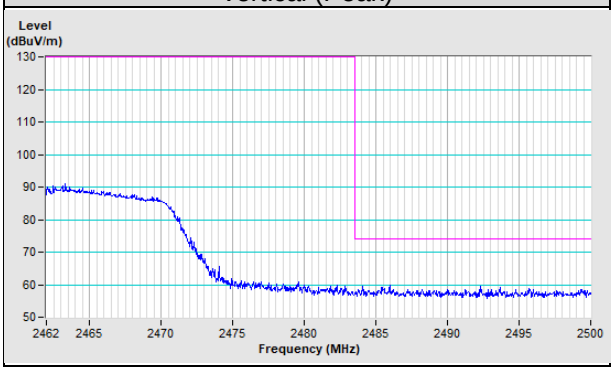
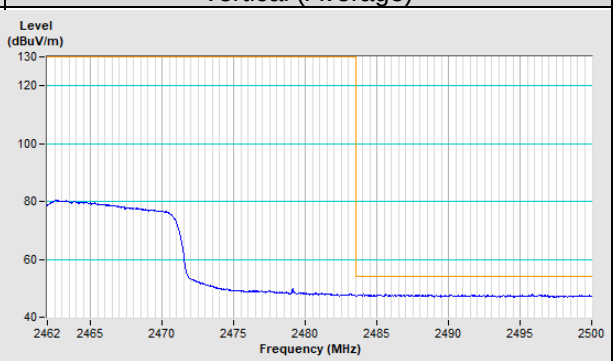
Vertical (Peak)

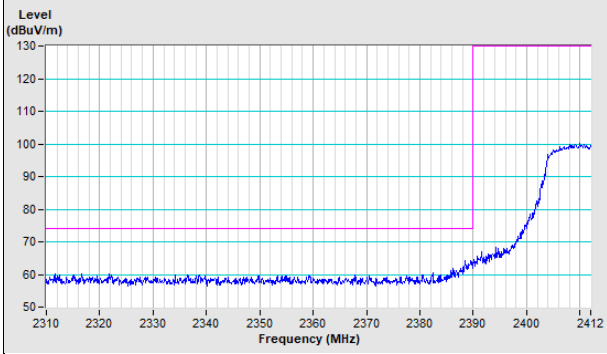
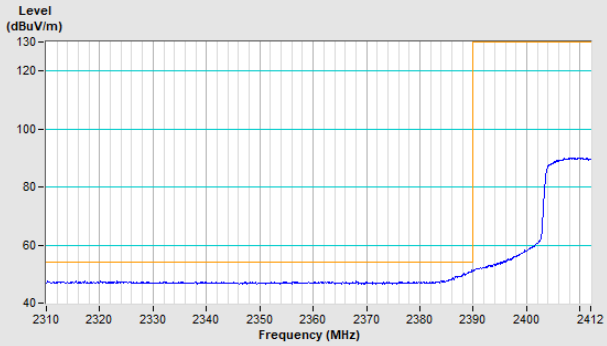
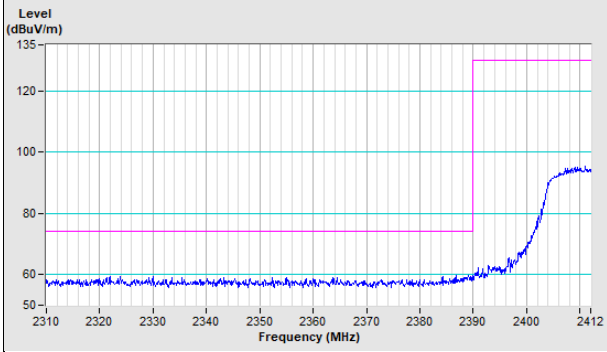
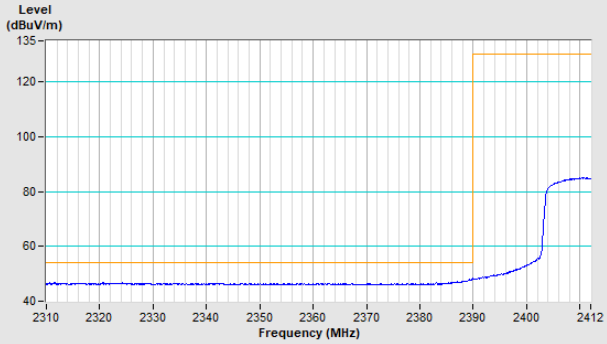
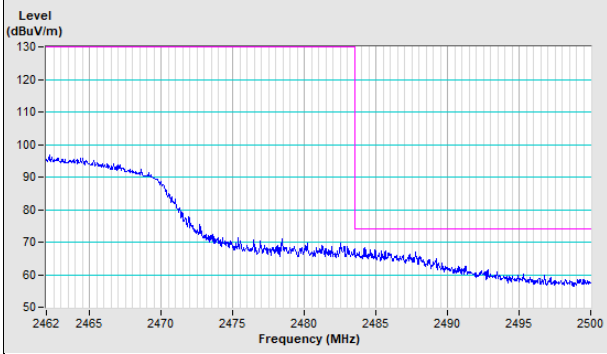
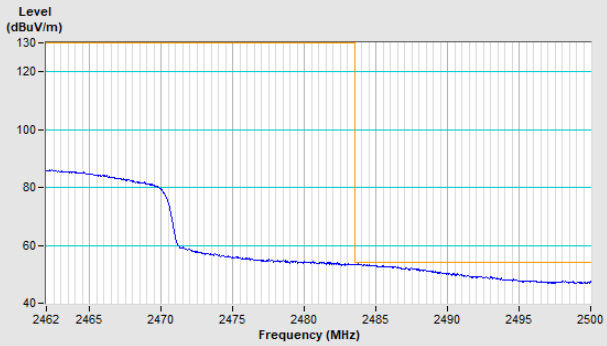
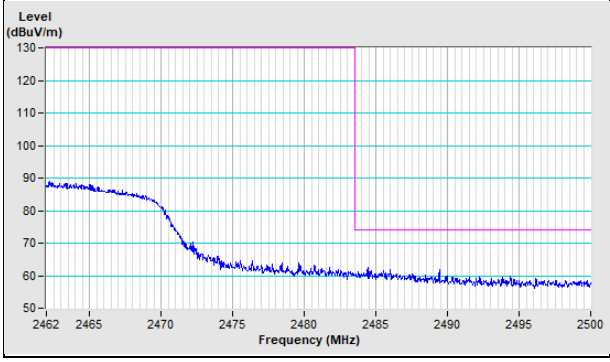
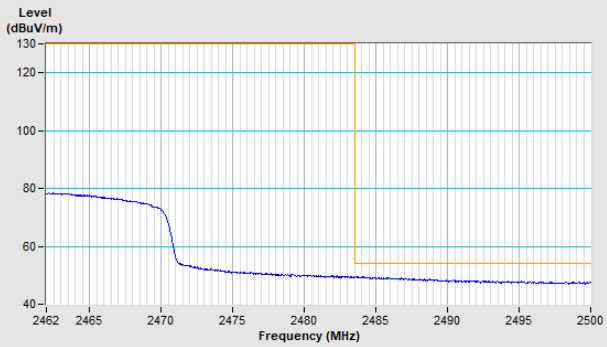


Vertical (Average)



802.11g Channel 1	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
802.11g Channel 11	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

802.11n (HT20) Channel 1	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
802.11n (HT20) Channel 11	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

802.11n (HT40) Channel 3	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
802.11n (HT40) Channel 9	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

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:

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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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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