Partial FCC Test Report

Report No.:	RFBBGM-WTW-P22050652-2
FCC ID:	WIYSLM500QA
Test Model:	SLM500
Received Date:	May 20, 2022
Test Date:	Jun. 08 ~ Aug. 03, 2022
Issued Date:	Aug. 25, 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 (1):	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
Test Location (2):	B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan
FCC Registration / Designation Number:	788550 / TW0003 427177 / TW0011

Testing Laboratory
2021

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFBBGM-WTW-P22050652-2	Original Release	Aug. 25, 2022

1 Certificate of Conformity

Product:	Smart module
Brand:	CASTLES TECHNOLOGY
Test Model:	SLM500
Sample Status:	Identical Prototype
Applicant:	CASTLES TECHNOLOGY CO., LTD.
Test Date:	Jun. 08 ~ Aug. 03, 2022
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) 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 : Lena Wang , **Date:** Aug. 25, 2022

Lena Wang / Specialist

Approved by : Jeremy Lin , **Date:** Aug. 25, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	**Test Item**	**Result**	**Remarks**
15.407(b)(9)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -9.09 dB at 0.67873 MHz.
15.407(b) (1/2/3/4(i/ii)/ 9)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -2.19 dB at 5150.00 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	N/A	Refer to note
15.407(a)(1/2/3)	Peak Power Spectral Density	N/A	Refer to note
15.407(e)	6 dB Bandwidth	N/A	Refer to note
15.407(g)	Frequency Stability	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, Max Average Transmit Power and Radiated Emissions tests were verified and recorded in this report. Other testing data please refer to SGS report no.: SZCR210300003004.
2. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
3. For U-NII-1 band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.
4. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	**Frequency**	**Expanded Uncertainty (k=2) (±)**
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 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	SLM500
Status of EUT	Identical Prototype
Power Supply Rating	5.0 Vdc (host equipment) 3.85 Vdc (Li-ion battery)
Modulation Type	64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 72.2Mbps
Operating Frequency	5180 ~ 5240 MHz, 5745 ~ 5825 MHz
Number of Channel	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20)
Output Power	25.235 mW for 5180 ~ 5240 MHz 27.29 mW for 5745 ~ 5825 MHz
Antenna Type	PIFA antenna with -1.58 dBi gain (5180 ~ 5240 MHz) PIFA antenna with 0.03 dBi gain (5745 ~ 5825 MHz)
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 SGS report no.: SZCR210300003004. The differences from the original report are adding an End-product (POS Terminal (Brand: Adyen, Model: AMS1)), changing antenna type and disabling 802.11n (HT40) and 5260 ~ 5320MHz, 5500 ~ 5700MHz. Only AC Power Conducted Emission, Conducted Power and radiated emissions were verified and recorded in this report. Other testing data please refer to the original SGS report no.: SZCR210300003004. And Modular has C2PC the Major change is mainly for GSM power retest. When testing, the modified sample is used for testing.
2. The EUT was installed in POS Terminal (Brand: Adyen, Model: AMS1).
3. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	Tx Function
802.11a	1TX
802.11n (HT20)	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	S1AMS1	3.85 Vdc
USB Cable	CHANG YANG ELECTRONICS CO.,LTD	CY-AS-HK0059	0.95 m 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: WIYAMS1001) technology can transmit at same time.
8. WLAN 2.4G & WWAN & NFC (FCC ID: WIYAMS1001) technology can transmit at same time.
9. WLAN 5G & WWAN & NFC (FCC ID: WIYAMS1001) technology can transmit at same time.

3.2 Description of Test Modes

For 5180 ~ 5240 MHz

4 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
40	5200	48	5240

For 5745 ~ 5825 MHz:

5 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805
153	5765	165	5825
157	5785		

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:** Transmit Power

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-		802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	MCS0
-	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-		802.11n (HT20)	149 to 165	149, 157, 165	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	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	149 to 165	157	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	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	149 to 165	157	OFDM	BPSK	6.0

Transmit 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	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-		802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	MCS0
-	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-		802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	MCS0

Test Condition:

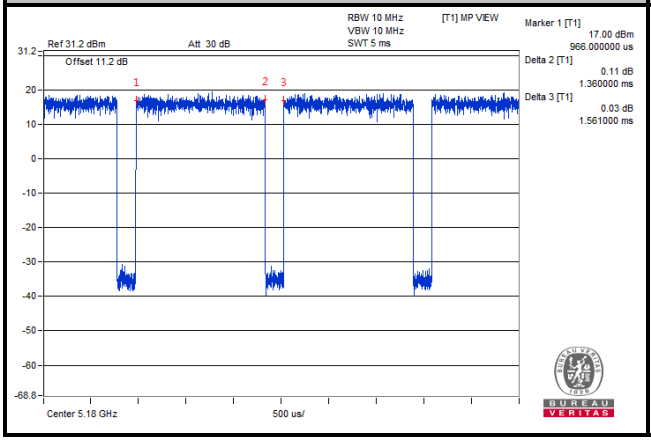
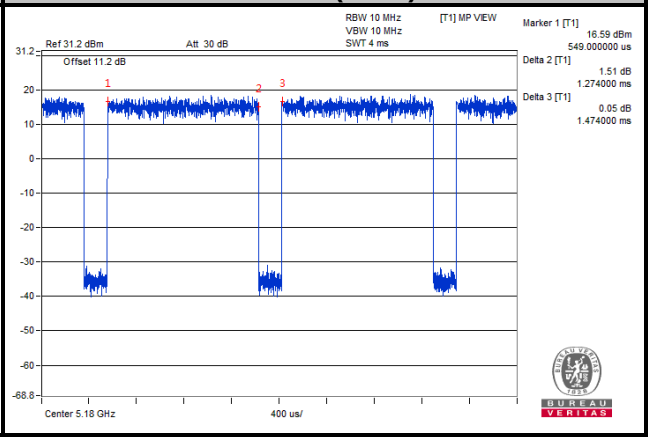
Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 60 % RH	120 Vac, 60 Hz	Charles Haaio
RE<1G	25 deg. C, 60 % RH	120 Vac, 60 Hz	Charles Haaio
PLC	25 deg. C, 75 % RH	120 Vac, 60 Hz	Noah Chang
Power	25 deg. C, 60 % RH	120 Vac, 60 Hz	Wayne Lin

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = 1.36/1.561 = 0.871, Duty factor = 10 * log(1/0.871) = 0.60

802.11n (HT20): Duty cycle = 1.274/1.474 = 0.864, Duty factor = 10 * log(1/0.864) = 0.63

802.11a	802.11n (HT20)
	

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.

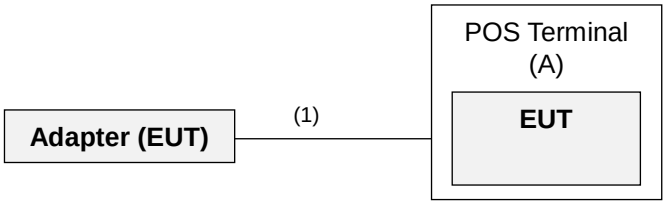
No.	Product	Brand	Model No.	Serial No.	FCC ID
A	POS Terminal	Adyen	AMS1	NA	NA

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	0.95	Y	0	Provided by client

Note:

1. All power cords of the above support units are non-shielded (1.8m).

3.4.1 Configuration of System under Test



Remote site

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 E (15.407)
ANSI C63.10-2013

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

References Test Guidance:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

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.

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.

Limits of Unwanted Emission Out of the Restricted Bands

Applicable To			Limit	
789033 D02 General UNII Test Procedures New Rules v02r01			Field Strength at 3 m	
			PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Frequency Band	**Applicable To**		**EIRP Limit**	**Equivalent Field Strength at 3 m**
5150~5250 MHz	15.407(b)(1)		PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2 (dBμV/m) *1 PK:105.2 (dBμV/m) *2 PK: 110.8 (dBμV/m) *3 PK:122.2 (dBμV/m) *4
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

*1 beyond 75 MHz or more above of the band edge.

*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts).

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY52260177	Sep. 01, 2021	Aug. 31, 2022
Spectrum Analyzer R&S	FSU43	101261	Apr. 11, 2022	Apr. 10, 2023
Horn Antenna ETS-Lindgren	3117	00143293	Nov. 14, 2021	Nov. 13, 2022
Bi_Log Antenna Schwarzbeck	VULB9168	9168-616	Oct. 27, 2021	Oct. 26, 2022
Horn Antenna Schwarzbeck	BBHA 9170	9170-480	Nov. 14, 2021	Nov. 13, 2022
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 05, 2022	Apr. 04, 2023
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2021	Nov. 24, 2022
Preamplifier Agilent	310N	187226	Jun. 17, 2021	Jun. 16, 2022
			Jun. 14, 2022	Jun. 13, 2023
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2021	Jun. 16, 2022
			Jun. 14, 2022	Jun. 13, 2023
Pre-Ammlifier EMCI	EMC 184045	980116	Oct. 05, 2021	Oct. 04, 2022
Power Meter Anritsu	ML2495A	1012010	Sep. 09, 2021	Sep. 08, 2022
Power Sensor Anritsu	MA2411B	1315050	Sep. 09, 2021	Sep. 08, 2022
RF Coaxial Cable ETS-Lindgren	EMC104-SM-SM-10000	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-4	Jun. 17, 2021	Jun. 16, 2022
			Jun. 14, 2022	Jun. 13, 2023
RF Coaxial Cable ETS-Lindgren	RFC-SMS-100-SMS-24-IN	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 17, 2021	Jun. 16, 2022
			Jun. 14, 2022	Jun. 13, 2023
Fix tool for Boresight antenna tower BV	BAF-01	10	NA	NA
E3 Software AUDIX	E3	NA	NA	NA
Software BVADT	ADT_Radiated_V8.7.08	NA	NA	NA
Software BVADT	ADT_RF Test Software V6.6.5.4	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Controller Max-Full	MF-7802	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 HsinTien 966 chamber 6

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:

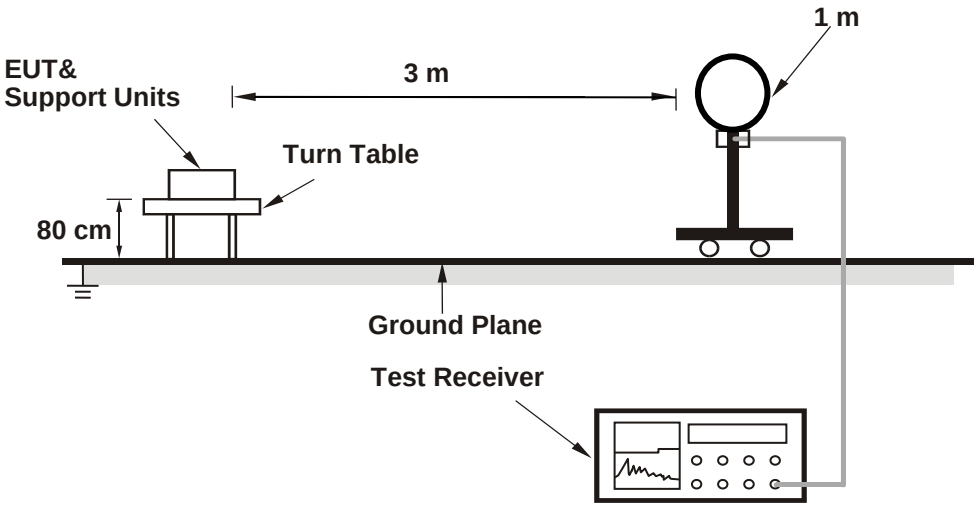
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) 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. (11a: RBW = 1 MHz, VBW = 1 kHz ; 11n (HT20): 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

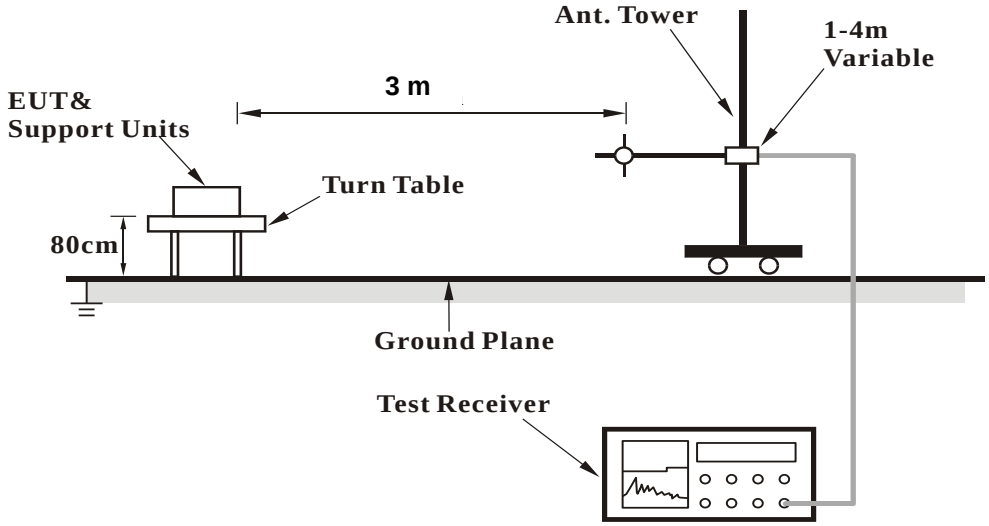
No deviation.

4.1.5 Test Setup

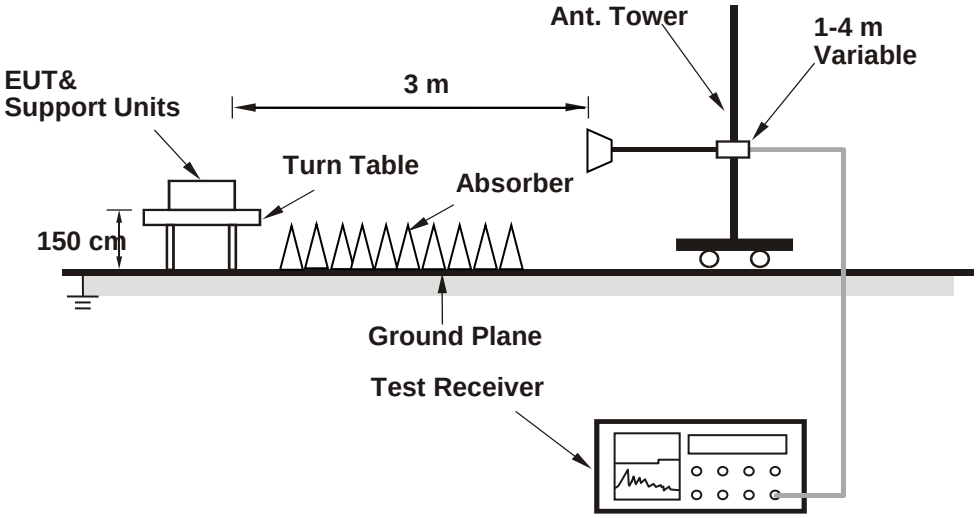
<Radiated Emission below 30 MHz>



<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：

802.11a

RF Mode	TX 802.11a	**Channel**	CH 36：5180 MHz
Frequency Range	1GHz ~ 40GHz	**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	5150.00	61.17 PK	74.00	-12.83	1.65 H	143	48.98	12.19
2	**5150.00**	**51.81 AV**	**54.00**	**-2.19**	**1.65 H**	**143**	**39.62**	**12.19**
3	*5180.00	101.92 PK			1.65 H	143	59.12	42.80
4	*5180.00	94.00 AV			1.65 H	143	51.20	42.80
5	#10360.00	56.41 PK	68.20	-11.79	1.62 H	204	38.68	17.73
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	5150.00	60.96 PK	74.00	-13.04	4.00 V	65	48.77	12.19
2	5150.00	51.25 AV	54.00	-2.75	4.00 V	65	39.06	12.19
3	*5180.00	98.30 PK			1.77 V	65	55.50	42.80
4	*5180.00	90.18 AV			1.77 V	65	47.38	42.80
5	#10360.00	56.08 PK	68.20	-12.12	1.96 V	240	38.35	17.73

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 40：5200 MHz
Frequency Range	1GHz ~ 40GHz	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	*5200.00	101.92 PK			1.62 H	139	59.04	42.88
2	*5200.00	94.01 AV			1.62 H	139	51.13	42.88
3	#10400.00	56.23 PK	68.20	-11.97	1.35 H	242	38.69	17.54
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	*5200.00	98.33 PK			1.79 V	72	55.45	42.88
2	*5200.00	90.20 AV			1.79 V	72	47.32	42.88
3	#10400.00	55.48 PK	68.20	-12.72	1.53 V	326	37.94	17.54

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 48：5240 MHz
Frequency Range	1GHz ~ 40GHz	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	*5240.00	102.15 PK			1.65 H	141	59.22	42.93
2	*5240.00	94.63 AV			1.65 H	141	51.70	42.93
3	5350.00	61.02 PK	74.00	-12.98	1.65 H	141	48.68	12.34
4	5350.00	51.40 AV	54.00	-2.60	1.65 H	141	39.06	12.34
5	#10480.00	56.08 PK	68.20	-12.12	1.58 H	156	38.34	17.74
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	*5240.00	98.35 PK			1.81 V	75	55.42	42.93
2	*5240.00	90.79 AV			1.81 V	75	47.86	42.93
3	5350.00	61.52 PK	74.00	-12.48	1.81 V	75	49.18	12.34
4	5350.00	51.32 AV	54.00	-2.68	1.81 V	75	38.98	12.34
5	#10480.00	56.00 PK	68.20	-12.20	2.25 V	174	38.26	17.74

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 149：5745 MHz
Frequency Range	1GHz ~ 40GHz	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	#5637.64	60.90 PK	68.20	-7.30	1.48 H	160	48.21	12.69
2	*5745.00	94.71 PK			1.48 H	160	51.05	43.66
3	*5745.00	87.37 AV			1.48 H	160	43.71	43.66
4	#5996.80	60.41 PK	68.20	-7.79	1.48 H	160	47.06	13.35
5	11490.00	57.90 PK	74.00	-16.10	2.27 H	104	39.22	18.68
6	11490.00	48.30 AV	54.00	-5.70	2.27 H	104	29.62	18.68
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	#5612.41	59.74 PK	68.20	-8.46	2.31 V	58	47.04	12.70
2	*5745.00	90.60 PK			2.31 V	58	46.94	43.66
3	*5745.00	83.07 AV			2.31 V	58	39.41	43.66
4	#5957.96	60.38 PK	68.20	-7.82	2.31 V	58	47.15	13.23
5	11490.00	57.22 PK	74.00	-16.78	1.33 V	48	38.54	18.68
6	11490.00	47.51 AV	54.00	-6.49	1.33 V	48	28.83	18.68

Remarks:

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

RF Mode	TX 802.11a	Channel	CH 157：5785 MHz
Frequency Range	1GHz ~ 40GHz	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	#5632.83	60.42 PK	68.20	-7.78	1.34 H	160	47.73	12.69
2	*5785.00	94.44 PK			1.34 H	160	50.67	43.77
3	*5785.00	86.94 AV			1.34 H	160	43.17	43.77
4	#5987.59	60.32 PK	68.20	-7.88	1.34 H	160	47.00	13.32
5	11570.00	57.24 PK	74.00	-16.76	1.74 H	342	38.61	18.63
6	11570.00	47.51 AV	54.00	-6.49	1.74 H	342	28.88	18.63
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	#5635.24	59.93 PK	68.20	-8.27	2.36 V	58	47.25	12.68
2	*5785.00	90.64 PK			2.36 V	58	46.87	43.77
3	*5785.00	83.15 AV			2.36 V	58	39.38	43.77
4	#5993.99	60.00 PK	68.20	-8.20	2.36 V	58	46.66	13.34
5	11570.00	57.33 PK	74.00	-16.67	2.06 V	121	38.70	18.63
6	11570.00	47.65 AV	54.00	-6.35	2.06 V	121	29.02	18.63

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 165：5825 MHz
Frequency Range	1GHz ~ 40GHz	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	#5602.00	60.15 PK	68.20	-8.05	1.16 H	158	47.45	12.70
2	*5825.00	93.18 PK			1.16 H	158	49.27	43.91
3	*5825.00	85.58 AV			1.16 H	158	41.67	43.91
4	#5995.60	60.09 PK	68.20	-8.11	1.16 H	158	46.74	13.35
5	11650.00	57.05 PK	74.00	-16.95	1.73 H	335	38.25	18.80
6	11650.00	47.24 AV	54.00	-6.76	1.73 H	335	28.44	18.80
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	#5617.22	60.59 PK	68.20	-7.61	2.26 V	57	47.90	12.69
2	*5825.00	90.18 PK			2.26 V	57	46.27	43.91
3	*5825.00	82.07 AV			2.26 V	57	38.16	43.91
4	#5936.34	60.37 PK	68.20	-7.83	2.26 V	57	47.15	13.22
5	11650.00	57.25 PK	74.00	-16.75	2.16 V	108	38.45	18.80
6	11650.00	47.51 AV	54.00	-6.49	2.16 V	108	28.71	18.80

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.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (HT20)

RF Mode	TX 802.11n (HT20)	Channel	CH 36：5180 MHz
Frequency Range	1GHz ~ 40GHz	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	5150.00	60.77 PK	74.00	-13.23	1.65 H	143	48.58	12.19
2	5150.00	51.35 AV	54.00	-2.65	1.65 H	143	39.16	12.19
3	*5180.00	101.06 PK			1.65 H	143	58.26	42.80
4	*5180.00	93.63 AV			1.65 H	143	50.83	42.80
5	#10360.00	56.24 PK	68.20	-11.96	1.65 H	251	38.51	17.73
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	5150.00	60.90 PK	74.00	-13.10	1.77 V	65	48.71	12.19
2	5150.00	51.24 AV	54.00	-2.76	1.77 V	65	39.05	12.19
3	*5180.00	97.57 PK			1.77 V	65	54.77	42.80
4	*5180.00	89.85 AV			1.77 V	65	47.05	42.80
5	#10360.00	56.48 PK	68.20	-11.72	1.07 V	223	38.75	17.73

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 40：5200 MHz
Frequency Range	1GHz ~ 40GHz	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	*5200.00	101.02 PK			1.62 H	139	58.14	42.88
2	*5200.00	93.60 AV			1.62 H	139	50.72	42.88
3	#10400.00	55.90 PK	68.20	-12.30	2.14 H	107	38.36	17.54
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	*5200.00	97.49 PK			1.79 V	72	54.61	42.88
2	*5200.00	89.77 AV			1.79 V	72	46.89	42.88
3	#10400.00	56.39 PK	68.20	-11.81	1.82 V	49	38.85	17.54

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 48：5240 MHz
Frequency Range	1GHz ~ 40GHz	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	*5240.00	101.89 PK			1.65 H	141	58.96	42.93
2	*5240.00	94.36 AV			1.65 H	141	51.43	42.93
3	5350.00	61.84 PK	74.00	-12.16	1.65 H	141	49.50	12.34
4	5350.00	51.39 AV	54.00	-2.61	1.65 H	141	39.05	12.34
5	#10480.00	56.38 PK	68.20	-11.82	1.38 H	104	38.64	17.74
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	*5240.00	98.22 PK			1.81 V	75	55.29	42.93
2	*5240.00	90.58 AV			1.81 V	75	47.65	42.93
3	5350.00	61.25 PK	74.00	-12.75	1.79 V	72	48.91	12.34
4	5350.00	51.34 AV	54.00	-2.66	1.79 V	72	39.00	12.34
5	#10480.00	56.29 PK	68.20	-11.91	1.43 V	36	38.55	17.74

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 149：5745 MHz
Frequency Range	1GHz ~ 40GHz	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	#5636.84	60.01 PK	68.20	-8.19	1.48 H	160	47.32	12.69
2	*5745.00	94.42 PK			1.48 H	160	50.76	43.66
3	*5745.00	86.18 AV			1.48 H	160	42.52	43.66
4	#5990.79	60.68 PK	68.20	-7.52	1.48 H	160	47.35	13.33
5	11490.00	57.05 PK	74.00	-16.95	1.75 H	181	38.37	18.68
6	11490.00	47.23 AV	54.00	-6.77	1.75 H	181	28.55	18.68
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	#5634.43	61.26 PK	68.20	-6.94	2.31 V	58	48.57	12.69
2	*5745.00	89.60 PK			2.31 V	0	45.94	43.66
3	*5745.00	81.96 AV			2.31 V	0	38.30	43.66
4	#5983.98	60.01 PK	68.20	-8.19	2.31 V	58	46.71	13.30
5	11490.00	57.10 PK	74.00	-16.90	1.63 V	145	38.42	18.68
6	11490.00	47.42 AV	54.00	-6.58	1.63 V	145	28.74	18.68

Remarks:

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

RF Mode	TX 802.11n (HT20)	Channel	CH 157：5785 MHz
Frequency Range	1GHz ~ 40GHz	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	#5637.24	60.58 PK	68.20	-7.62	1.34 H	160	47.89	12.69
2	*5785.00	94.16 PK			1.34 H	160	50.39	43.77
3	*5785.00	86.75 AV			1.34 H	160	42.98	43.77
4	#5985.19	60.53 PK	68.20	-7.67	1.34 H	160	47.21	13.32
5	11570.00	56.74 PK	74.00	-17.26	1.82 H	230	38.11	18.63
6	11570.00	47.06 AV	54.00	-6.94	1.82 H	230	28.43	18.63
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	#5624.42	60.36 PK	68.20	-7.84	2.36 V	57	47.67	12.69
2	*5785.00	91.01 PK			2.36 V	57	47.24	43.77
3	*5785.00	82.95 AV			2.36 V	57	39.18	43.77
4	#5995.60	59.88 PK	68.20	-8.32	2.36 V	57	46.53	13.35
5	11570.00	56.37 PK	74.00	-17.63	1.28 V	321	37.74	18.63
6	11570.00	46.69 AV	54.00	-7.31	1.28 V	321	28.06	18.63

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 165：5825 MHz
Frequency Range	1GHz ~ 40GHz	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	#5644.84	60.39 PK	68.20	-7.81	1.65 H	158	47.70	12.69
2	*5825.00	93.27 PK			1.16 H	185	49.36	43.91
3	*5825.00	85.33 AV			1.16 H	185	41.42	43.91
4	#5947.95	60.32 PK	68.20	-7.88	1.65 H	158	47.11	13.21
5	11650.00	57.19 PK	74.00	-16.81	1.06 H	254	38.39	18.80
6	11650.00	47.40 AV	54.00	-6.60	1.06 H	254	28.60	18.80
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	#5610.01	60.35 PK	68.20	-7.85	2.26 V	57	47.65	12.70
2	*5825.00	89.90 PK			2.26 V	57	45.99	43.91
3	*5825.00	81.77 AV			2.26 V	57	37.86	43.91
4	#5927.13	60.35 PK	68.20	-7.85	2.26 V	57	47.12	13.23
5	11650.00	57.49 PK	74.00	-16.51	1.43 V	185	38.69	18.80
6	11650.00	47.61 AV	54.00	-6.39	1.43 V	185	28.81	18.80

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.
6. " # ": The radiated frequency is out of the restricted band.

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

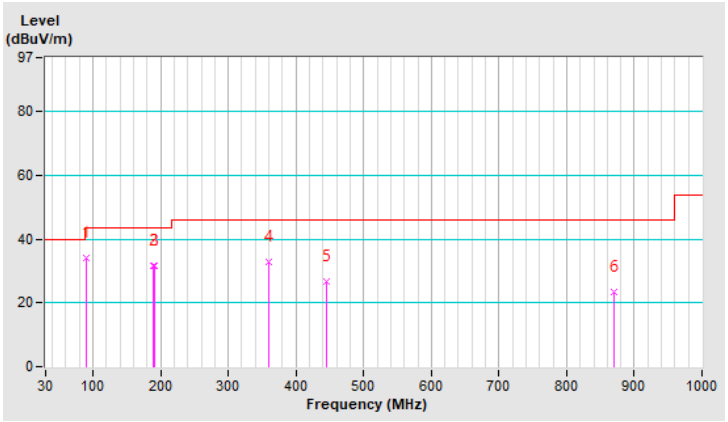
802.11a

RF Mode	TX 802.11a	Channel	CH 157：5785 MHz
Frequency Range	30MHz ~ 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	89.94	34.10 QP	43.50	-9.40	1.89 H	9	57.03	-22.93
2	189.85	31.66 QP	43.50	-11.84	1.16 H	151	51.04	-19.38
3	190.56	31.58 QP	43.50	-11.92	1.21 H	141	51.01	-19.43
4	360.39	32.78 QP	46.00	-13.22	1.14 H	145	47.05	-14.27
5	444.40	26.85 QP	46.00	-19.15	1.37 H	180	38.74	-11.89
6	870.90	23.26 QP	46.00	-22.74	1.23 H	326	27.90	-4.64

Remarks:

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

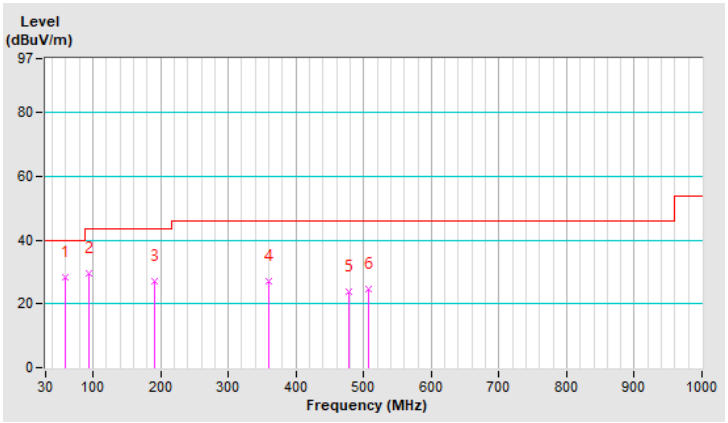


RF Mode	TX 802.11a	Channel	CH 157：5785 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	60.00	28.48 QP	40.00	-11.52	1.79 V	340	46.30	-17.82
2	94.44	29.63 QP	43.50	-13.87	1.12 V	211	51.98	-22.35
3	190.63	27.31 QP	43.50	-16.19	1.15 V	11	46.74	-19.43
4	358.85	26.96 QP	46.00	-19.04	1.14 V	170	41.30	-14.34
5	477.77	23.73 QP	46.00	-22.27	1.05 V	347	35.07	-11.34
6	506.30	24.50 QP	46.00	-21.50	1.97 V	9	35.41	-10.91

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. 07, 2021	Sep. 06, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-12040.
4. Test Date: 2022/8/3

4.2.3 Test Procedures

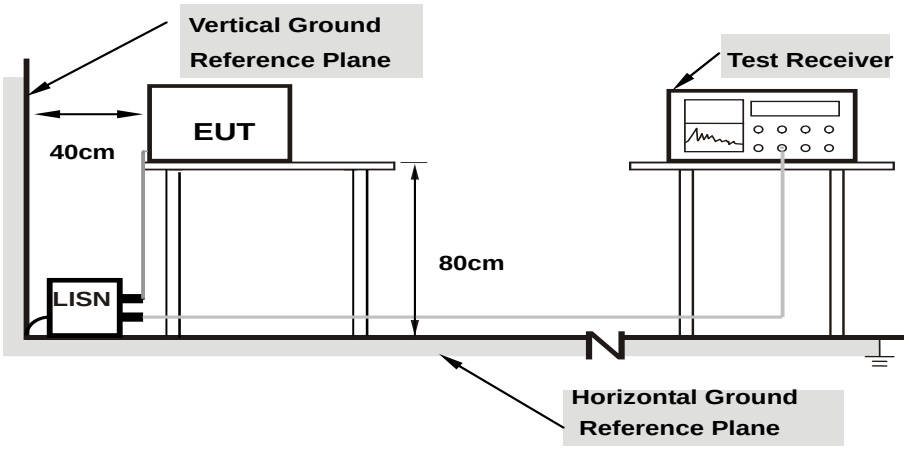
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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.

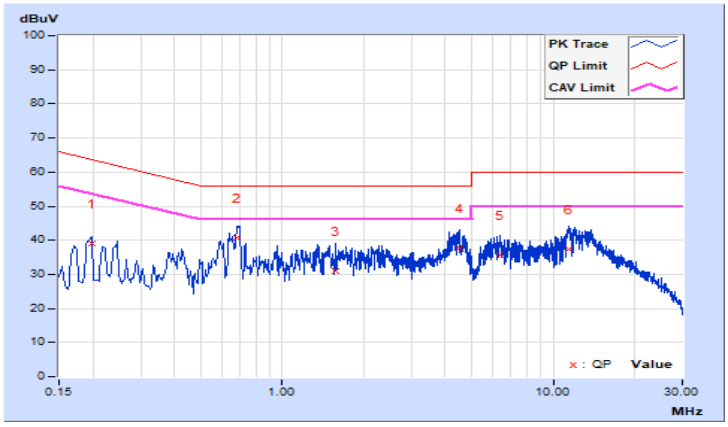
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	25 °C, 75% RH
Tested by	Noah Chang	**Test Date**	2022/8/3

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	0.19800	9.72	29.21	19.08	38.93	28.80	63.69	53.69	-24.76	-24.89
2	**0.67873**	**9.82**	**31.06**	**27.09**	**40.88**	**36.91**	**56.00**	**46.00**	**-15.12**	**-9.09**
3	1.57400	9.87	21.22	14.74	31.09	24.61	56.00	46.00	-24.91	-21.39
4	4.49000	9.96	27.89	20.96	37.85	30.92	56.00	46.00	-18.15	-15.08
5	6.33000	9.99	25.65	18.23	35.64	28.22	60.00	50.00	-24.36	-21.78
6	11.43400	10.08	27.40	15.98	37.48	26.06	60.00	50.00	-22.52	-23.94

Remarks:

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

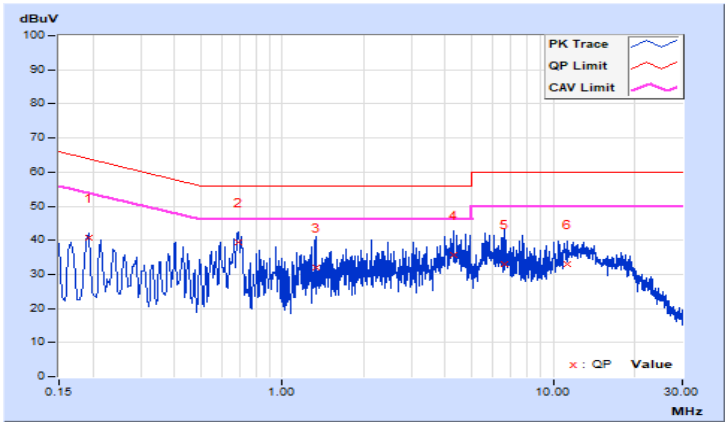


Frequency Range	150kHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	25 °C, 75% RH
Tested by	Noah Chang	**Test Date**	2022/8/3

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	0.19367	9.71	31.13	18.13	40.84	27.84	63.88	53.88	-23.04	-26.04
2	0.68954	9.83	29.60	24.76	39.43	34.59	56.00	46.00	-16.57	-11.41
3	1.32600	9.88	22.25	12.45	32.13	22.33	56.00	46.00	-23.87	-23.67
4	4.27000	9.97	25.72	16.59	35.69	26.56	56.00	46.00	-20.31	-19.44
5	6.64600	10.01	22.91	13.06	32.92	23.07	60.00	50.00	-27.08	-26.93
6	11.26600	10.08	23.00	13.35	33.08	23.43	60.00	50.00	-26.92	-26.57

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 Transmit Power Measurement

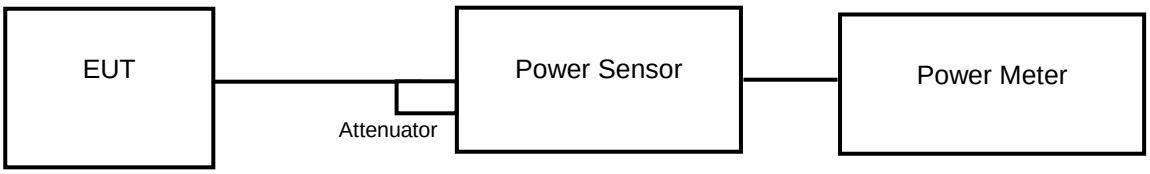
4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125 mW (21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Mobile and Portable client device	250 mW (24 dBm)
U-NII-2A			250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-2C			250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup

<Power Output Measurement>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

Method PM is 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

Power Output:

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	**25.235**	**14.02**	24	Pass
40	5200	23.281	13.67	24	Pass
48	5240	23.496	13.71	24	Pass
149	5745	21.184	13.26	30	Pass
157	5785	**27.29**	**14.36**	30	Pass
165	5825	19.724	12.95	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	24.322	13.86	24	Pass
40	5200	22.182	13.46	24	Pass
48	5240	23.121	13.64	24	Pass
149	5745	24.717	13.93	30	Pass
157	5785	25.645	14.09	30	Pass
165	5825	20.749	13.17	30	Pass

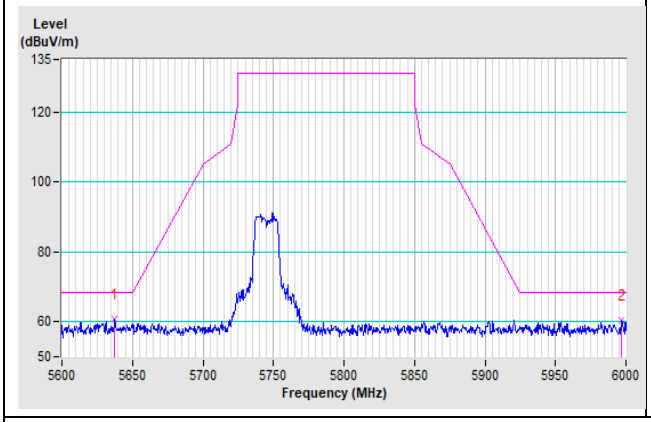
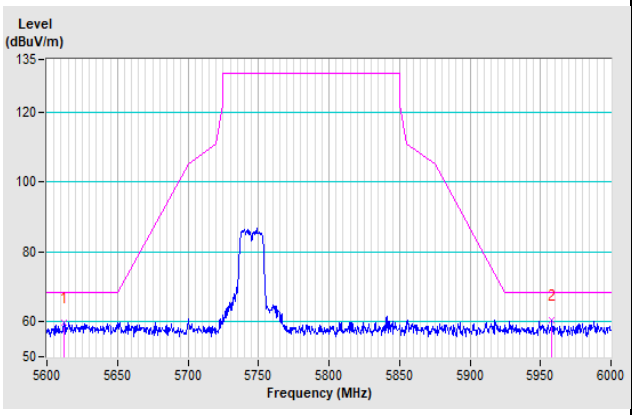
5 Pictures of Test Arrangements

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

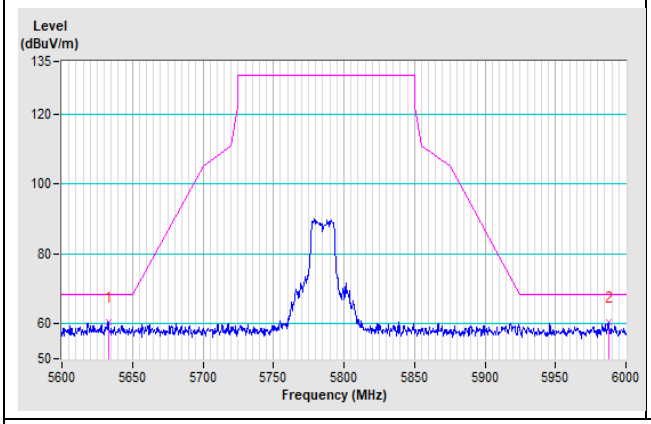
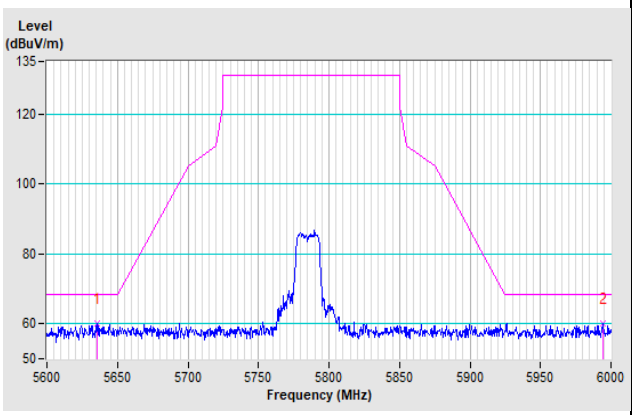
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

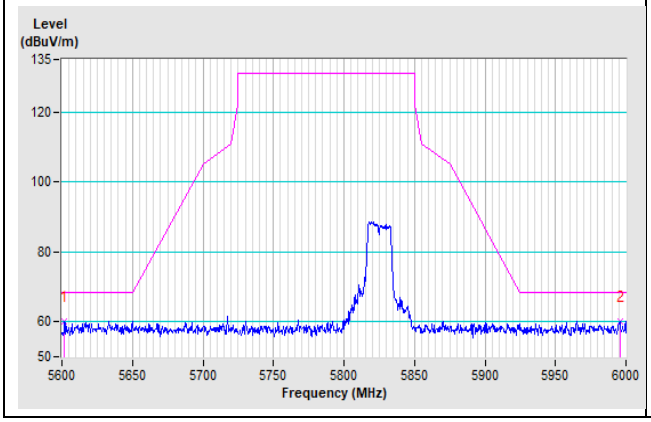
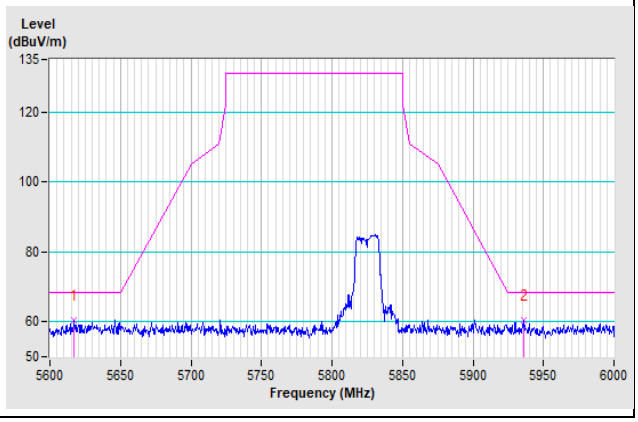
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

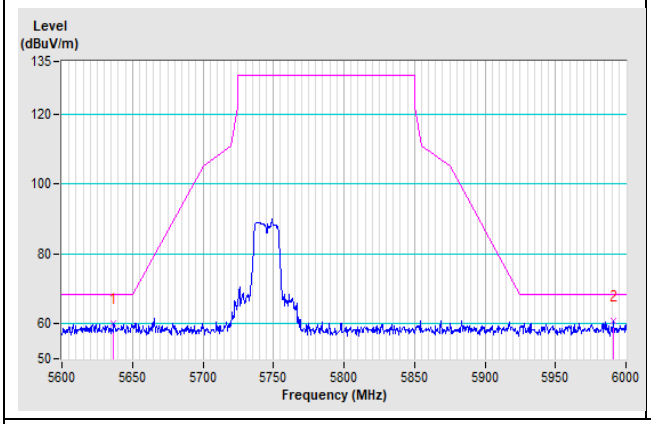
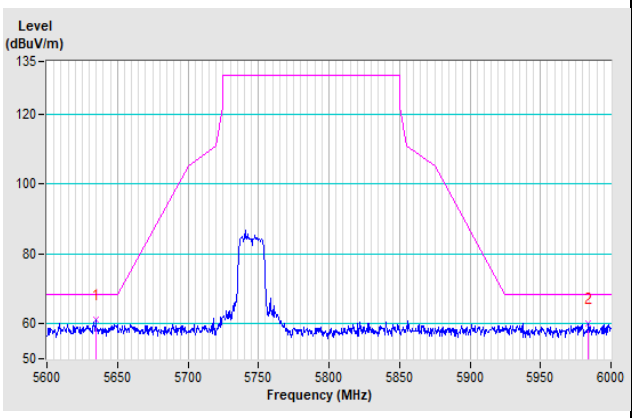
Horizontal	Vertical
	

CH 165 5825 MHz

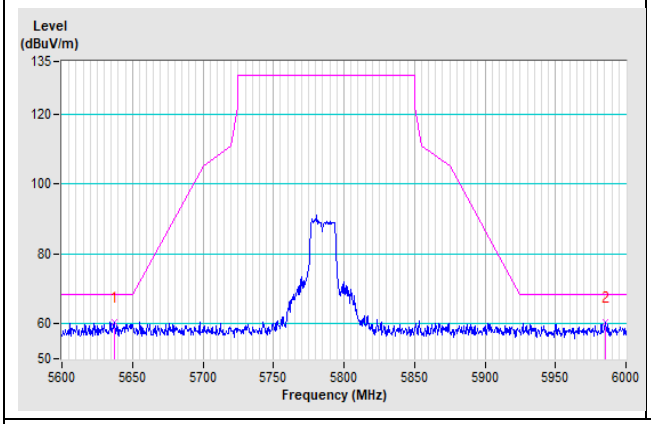
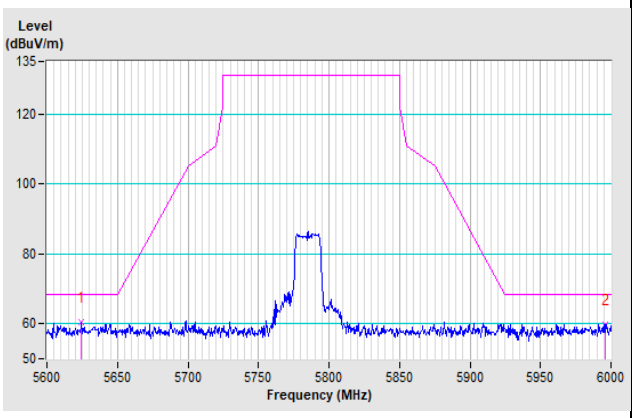
Horizontal	Vertical
	

802.11n (HT20)

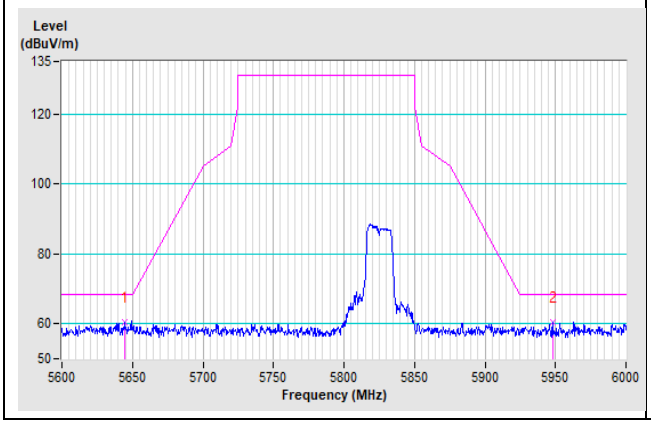
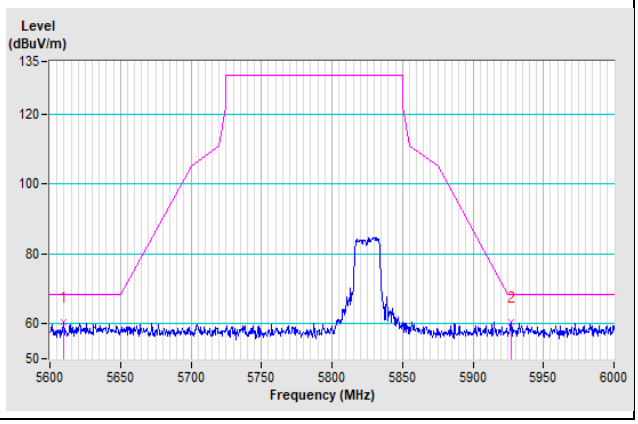
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

Horizontal	Vertical
	

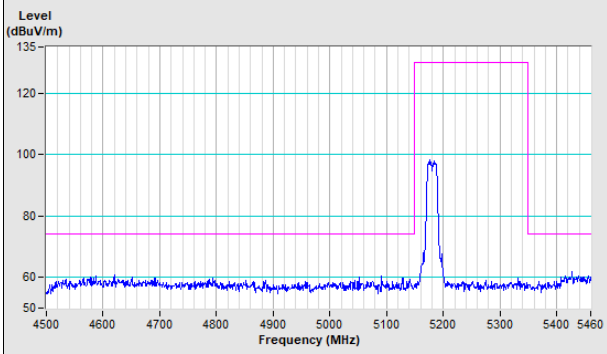
CH 165 5825 MHz

Horizontal	Vertical
	

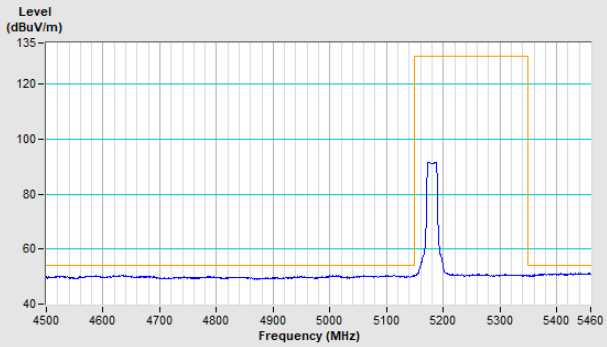
Annex B- Band Edge Measurement

802.11a Channel 36

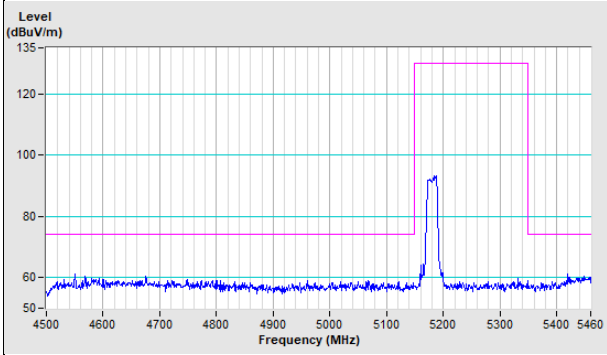
Horizontal (Peak)



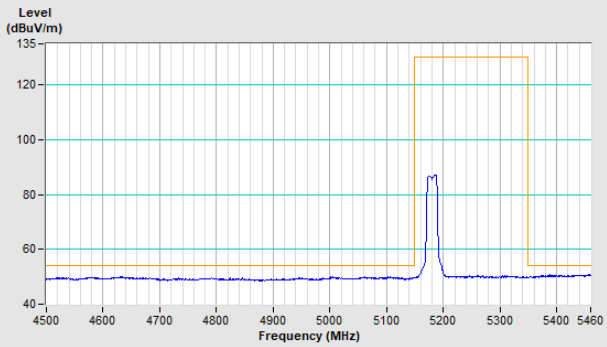
Horizontal (Average)



Vertical (Peak)

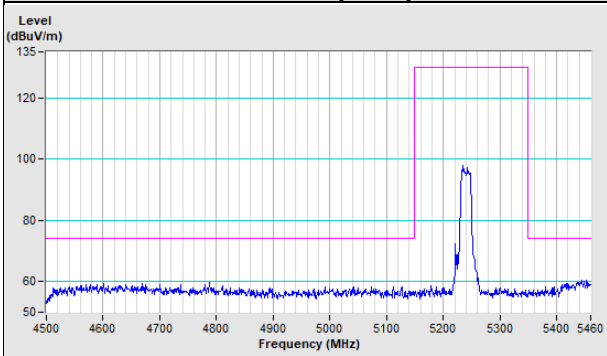


Vertical (Average)

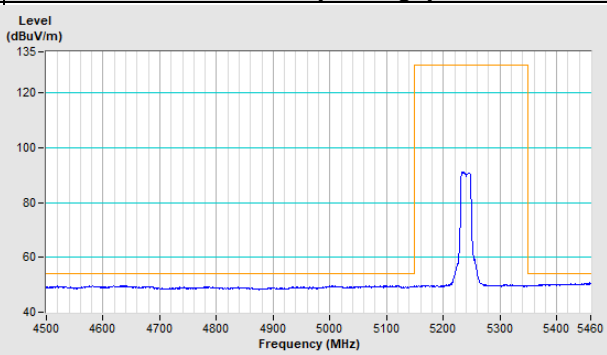


802.11a Channel 48

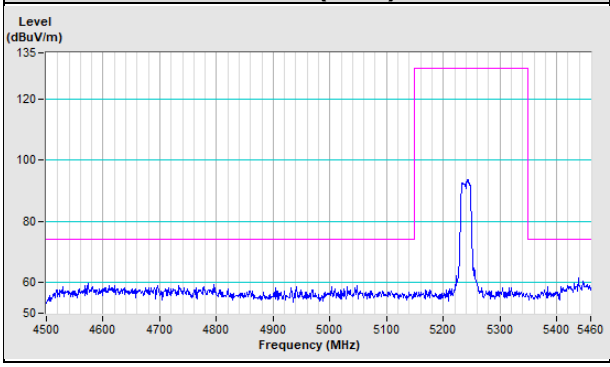
Horizontal (Peak)



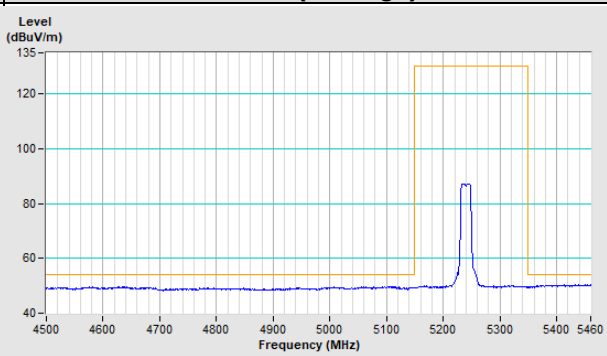
Horizontal (Average)



Vertical (Peak)

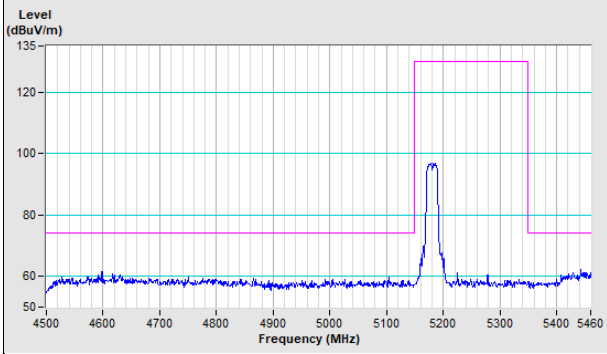


Vertical (Average)

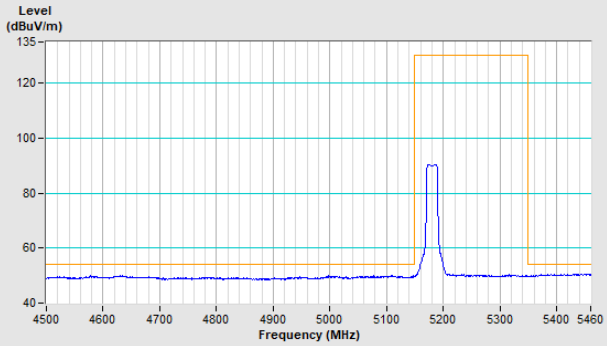


802.11n (HT20) Channel 36

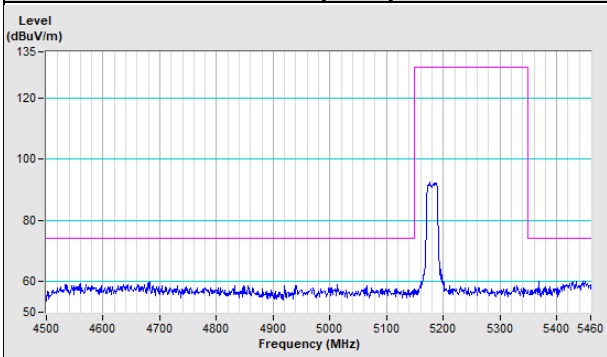
Horizontal (Peak)



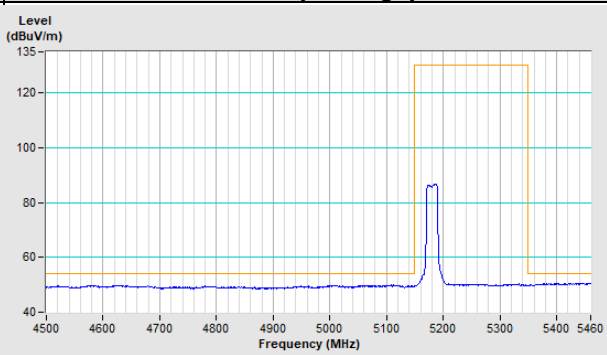
Horizontal (Average)



Vertical (Peak)

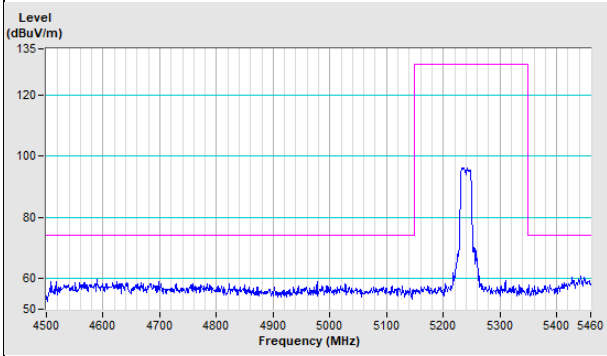


Vertical (Average)

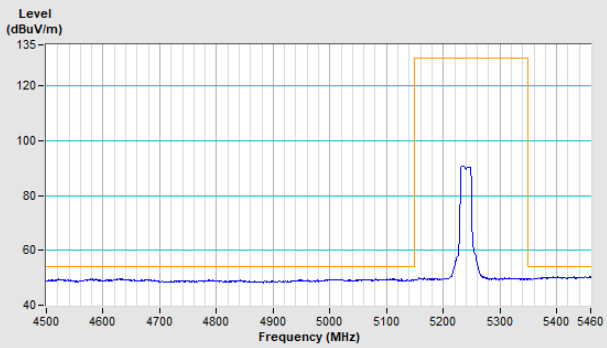


802.11n (HT20) Channel 48

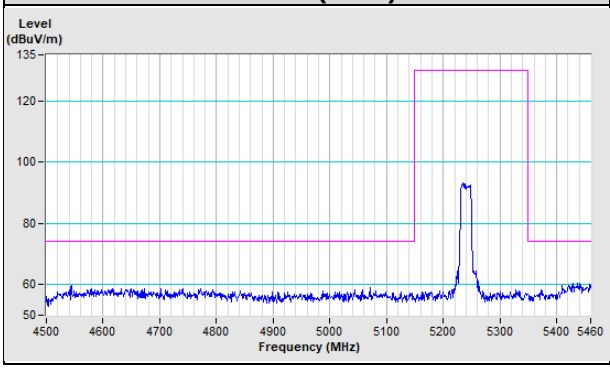
Horizontal (Peak)



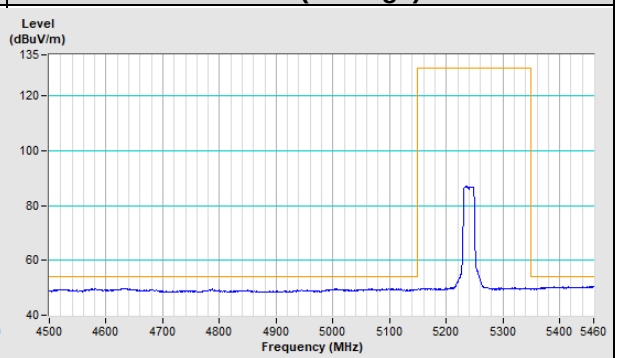
Horizontal (Average)



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:

Lin Kou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

--- END ---