

FCC C2PC Test Report

FCC ID : SQG-LWB5PLUS
Equipment : Sterling-LWB5+ WiFi 5 + Bluetooth 5.2 USB Adapter PCBA
Model No. : Sterling LWB5+
Brand Name : Laird Connectivity
Applicant : Laird Connectivity LLC
Address : W66N220 Commerce Court, Cedarburg, WI 53012 United States Of America
Standard : 47 CFR FCC Part 15.407
Received Date : Nov. 21, 2022
Tested Date : Nov. 23 ~ Dec. 01, 2022

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager

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Release Record

Report No.	Version	Description	Issued Date
FR061103-09AD	Rev. 01	Initial issue	Dec. 16, 2022

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 17475.00MHz 63.28 (Margin -4.92dB) – PK	Pass
15.407(b) 15.209	Unwanted Emissions	[dBuV/m at 3m]: 0.343MHz 33.82 (Margin -15.31dB) - AV	Pass
15.407(a)	Emission Bandwidth	Meet the requirement of limit	Pass
15.407(e)	6dB bandwidth	Meet the requirement of limit	Pass
15.407(a)	Conducted Output Power	Max Power [dBm]: 5150~5250MHz: 17.67 5250~5350MHz: 19.12 5470~5725MHz: 19.66 5725~5850MHz: 19.80	Pass
15.407(a)	Power Spectral Density	Meet the requirement of limit	Pass
15.407(g)	Frequency Stability	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

This report is prepared for FCC class II change.

This report is issued as a duplicate report to original ICC report no. FR061103AN. The modification is concerned with following items:

- ✧ Adding a carrier board
- ✧ Changing product name and applicant
- ✧ Changing antenna model name

Therefore, related test items had been performed and presented in the following sections.

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate
5150-5250 5250-5350 5470-5725 5725-5850	a	5180-5240 5260-5320 5500-5720 5745-5825	36-48 [4] 52-64 [4] 100-144 [12] 149-165 [5]	1	6-54 Mbps
5150-5250 5250-5350 5470-5725 5725-5850	n (HT20)	5180-5240 5260-5320 5500-5720 5745-5825	36-48 [4] 52-64 [4] 100-144 [12] 149-165 [5]	1	MCS 0-7
5150-5250 5250-5350 5470-5725 5725-5850	n (HT40)	5190-5230 5270-5310 5510-5710 5755-5795	38-46 [2] 54-62 [2] 102-142 [6] 151-159 [2]	1	MCS 0-7
5150-5250 5250-5350 5470-5725 5725-5850	ac (VHT20)	5180-5240 5260-5320 5500-5720 5745-5825	36-48 [4] 52-64 [4] 100-144 [12] 149-165 [5]	1	MCS 0-9
5150-5250 5250-5350 5470-5725 5725-5850	ac (VHT40)	5190-5230 5270-5310 5510-5710 5755-5795	38-46 [2] 54-62 [2] 102-142 [6] 151-159 [2]	1	MCS 0-9
5150-5250 5250-5350 5470-5725 5725-5850	ac (VHT80)	5210 5290 5530~5690 5775	42 [1] 58 [1] 106-138 [3] 155 [1]	1	MCS 0-9

Note 1: OFDM BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

1.1.2 Antenna Details

Ant. No.	Manufacturer	Model	Laird Part Number	Type	Connector	Antenna Gain (dBi)	
						5.15 ~ 5.35 GHz	5.47 ~ 5.825 GHz

1	ACX	AD1608-A2455AA_LF	NA	Chip Antenna	N/A	4	4
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1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc
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1.1.4 Accessories

N/A

1.1.5 Channel List

802.11 a / HT20 / VHT20		HT40 / VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
36	5180	38	5190
40	5200	46	5230
44	5220	54	5270
48	5240	62	5310
52	5260	102	5510
56	5280	110	5550
60	5300	118	5590
64	5320	126	5630
100	5500	134	5670
104	5520	142	5710
108	5540	151	5755
112	5560	159	5795
116	5580	VHT80	
120	5600	42	5210
124	5620	58	5290
128	5640	106	5530
132	5660	122	5610
136	5680	138	5690
140	5700	155	5775
144	5720	---	---
149	5745	---	---
153	5765	---	---
157	5785	---	---
161	5805	---	---
165	5825	---	---

1.1.6 Test Tool and Duty Cycle

Test Tool	Putty, Version: 0.60.0.0		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11a	99.17%	0.04
	ac VHT20	99.59%	0.02
	ac VHT40	98.05%	0.09
	ac VHT80	96.08%	0.17

1.1.7 Power Index of Test Tool

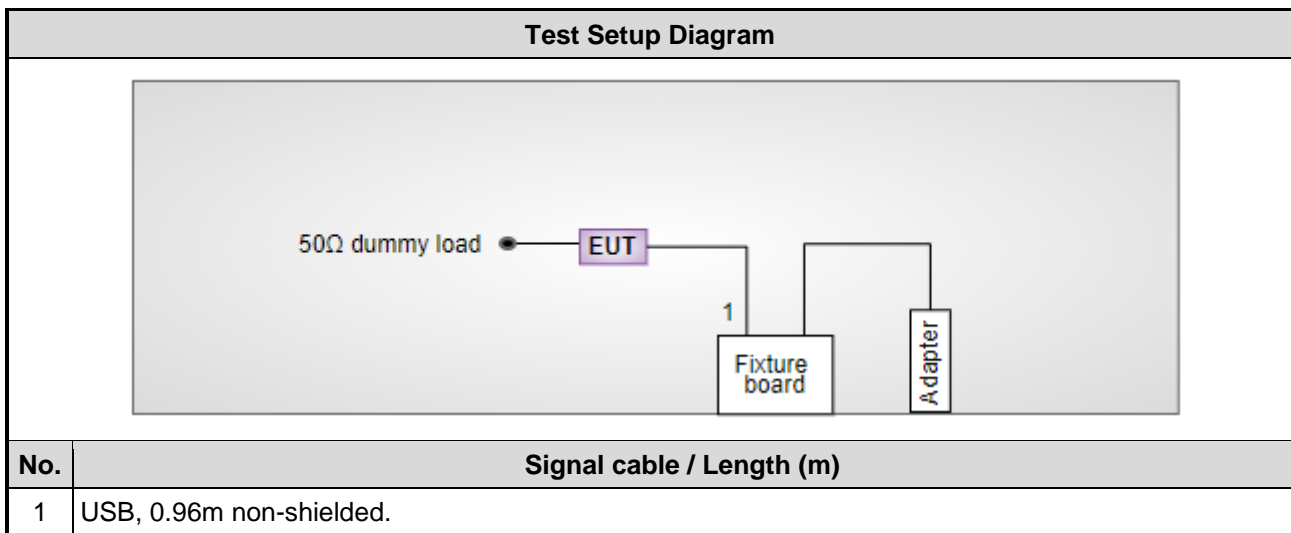
Modulation Mode	Test Frequency (MHz)	Power Index
11a	5180	56
11a	5200	64
11a	5240	68
11a	5260	74
11a	5300	78
11a	5320	64
11a	5500	56
11a	5580	74
11a	5700	58
11a	5720	78
11a	5745	82
11a	5785	82
11a	5825	82
VHT20	5180	52
VHT20	5200	62
VHT20	5240	68
VHT20	5260	72
VHT20	5300	76
VHT20	5320	62
VHT20	5500	46
VHT20	5580	74
VHT20	5700	50
VHT20	5720	78
VHT20	5745	82
VHT20	5785	82
VHT20	5825	82

Modulation Mode	Test Frequency (MHz)	Power Index
VHT40	5190	44
VHT40	5230	68
VHT40	5270	72
VHT40	5310	56
VHT40	5510	38
VHT40	5590	70
VHT40	5670	58
VHT40	5710	78
VHT40	5755	70
VHT40	5795	80
VHT80	5210	40
VHT80	5290	52
VHT80	5530	42
VHT80	5610	60
VHT80	5690	76
VHT80	5775	60

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Fixture board	Laird	SU60-SOMC	---	Provided by applicant.
2	Fixture board adapter	I.T.E POWER SUPPLY	MU12AY12010 0-A1	---	Provided by applicant.
3	50Ω terminator	---	---	---	---

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Dec. 01, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 16, 2022	Feb. 15, 2023
LISN	R&S	ENV216	101579	Apr. 21, 2022	Apr. 20, 2023
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127667	Jan .07, 2022	Jan .06, 2023
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 17, 2022	Oct. 16, 2023
50 ohm terminal (Support Unit)	NA	50	01	May 10, 2022	May 09, 2023
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Nov. 28, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 15, 2022	Mar. 14, 2023
Spectrum Analyzer	R&S	FSV40	101498	Nov. 21, 2022	Nov. 20, 2023
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 01, 2022	Oct. 31, 2023
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Aug. 03, 2022	Aug. 02, 2023
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Sep. 16, 2022	Sep. 15, 2023
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 27, 2022	Oct. 26, 2023
Preamplifier	EMC	EMC02325	980225	Jun. 28, 2022	Jun. 27, 2023
Preamplifier	EMC	EMC118A45SE	980898	Jul. 16, 2022	Jul. 15, 2023
Preamplifier	EMC	EMC184045SE	980903	Jul. 16, 2022	Jul. 15, 2023
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 04, 2022	Oct. 03, 2023
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 04, 2022	Oct. 03, 2023
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 04, 2022	Oct. 03, 2023
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 04, 2022	Oct. 03, 2023
RF Cable	EMC	EMC104-35M-35M- 8000	210920	Oct. 04, 2022	Oct. 03, 2023
RF Cable	EMC	EMC104-35M-35M- 3000	210922	Oct. 04, 2022	Oct. 03, 2023
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Nov. 23, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101910	Apr. 08, 2022	Apr. 07, 2023
Power Meter	Anritsu	ML2495A	1241002	Nov. 23, 2022	Nov. 22, 2023
Power Sensor	Anritsu	MA2411B	1207366	Nov. 23, 2022	Nov. 22, 2023
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Jun. 22, 2022	Jun. 21, 2023
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 03, 2021	Dec. 02, 2022
Measurement Software	Sporton	SENSE-15407_NII	V5.10.8.7.3	NA	NA

Note: Calibration Interval of instruments listed above is one year.

1.5 Test Standards

47 CFR FCC Part 15.407
ANSI C63.10-2013

1.6 Reference Guidance

FCC KDB 412172 D01 Determining ERP and EIRP v01r01
FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

1.7 Deviation from Test Standard and Measurement Procedure

None

1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.130 Hz
Conducted power	±0.808 dB
Frequency error	±1×10 ⁻⁹
Power density	±0.583 dB
Conducted emission	±2.715 dB
AC conducted emission	±2.92 dB
Unwanted Emission ≤ 1GHz	±3.41 dB
Unwanted Emission > 1GHz	±4.59 dB
Time	±0.1%
Temperature	±0.4 °C

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Detai

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
AC Power Line Conducted Emissions	ac VHT40	5795	MCS 0	---
Unwanted Emissions ≤1GHz	ac VHT40	5795	MCS 0	---
Unwanted Emissions >1GHz	11a	5825	6 Mbps	---
Conducted Output Power	11a	5180 / 5200 / 5240 / 5260 / 5300 5320 / 5500 / 5580 / 5700 / 5720 5745 / 5785 / 5825	6 Mbps	---
	ac VHT20	5180 / 5200 / 5240 / 5260 / 5300 5320 / 5500 / 5580 / 5700 / 5720 5745 / 5785 / 5825	MCS 0	
	ac VHT40	5190 / 5230 / 5270 / 5310 / 5510 5590 / 5670 / 5710 5755 / 5795	MCS 0	
	ac VHT80	5210 / 5290 / 5530 / 5610 / 5690 5775	MCS 0	

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.
2. 50Ω terminator was connected to antenna port of EUT for radiated emission measurement.

3 Transmitter Test Results

3.1 Conducted Output Power

3.1.1 Limit of Conducted Output Power

Frequency band 5150-5250 MHz	
Operating Mode	Limit
<input type="checkbox"/> Outdoor access point	Conducted Power: 1 W The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm)
<input checked="" type="checkbox"/> Indoor access point	Conducted Power: 1 W
<input type="checkbox"/> Fixed point-to-point access points	Conducted Power: 1 W
<input type="checkbox"/> Client devices	Conducted Power: 250 mW

Frequency Band (MHz)	Limit
<input checked="" type="checkbox"/> 5250 ~ 5350	Conducted Power: 250mW or 11dBm+10 log B
<input checked="" type="checkbox"/> 5470 ~ 5725	Conducted Power: 250mW or 11dBm+10 log B
<input checked="" type="checkbox"/> 5725 ~ 5850	Conducted Power: 1 W

Note: "B" is the 26dB emission bandwidth in MHz.

3.1.2 Test Procedures

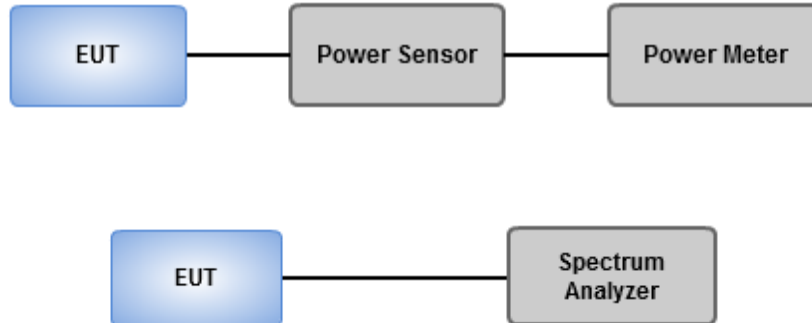
Method PM-G (Measurement using a gated RF average power meter)

Measurements is performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

Spectrum analyzer (For channel that extends across the 5.725 GHz boundary)

1. Set RBW = 1MHz, VBW = 3MHz, Sweep time = Auto, Detector = RMS.
2. Trace average at least 100 traces in power averaging mode.
3. Compute power by integrating the spectrum across the 26 dB EBW.
4. Add $10 \log(1/X)$, X:duty cycle) if duty cycle is <98%).

3.1.3 Test Setup



3.1.4 Test Results

Ambient Condition	22°C / 64%	Tested By	Akun Chung
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Refer to Appendix A.

3.2 Unwanted Emissions

3.2.1 Limit of Unwanted Emissions

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

Un-restricted band emissions above 1GHz Limit	
Operating Band	Limit
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.850 GHz	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

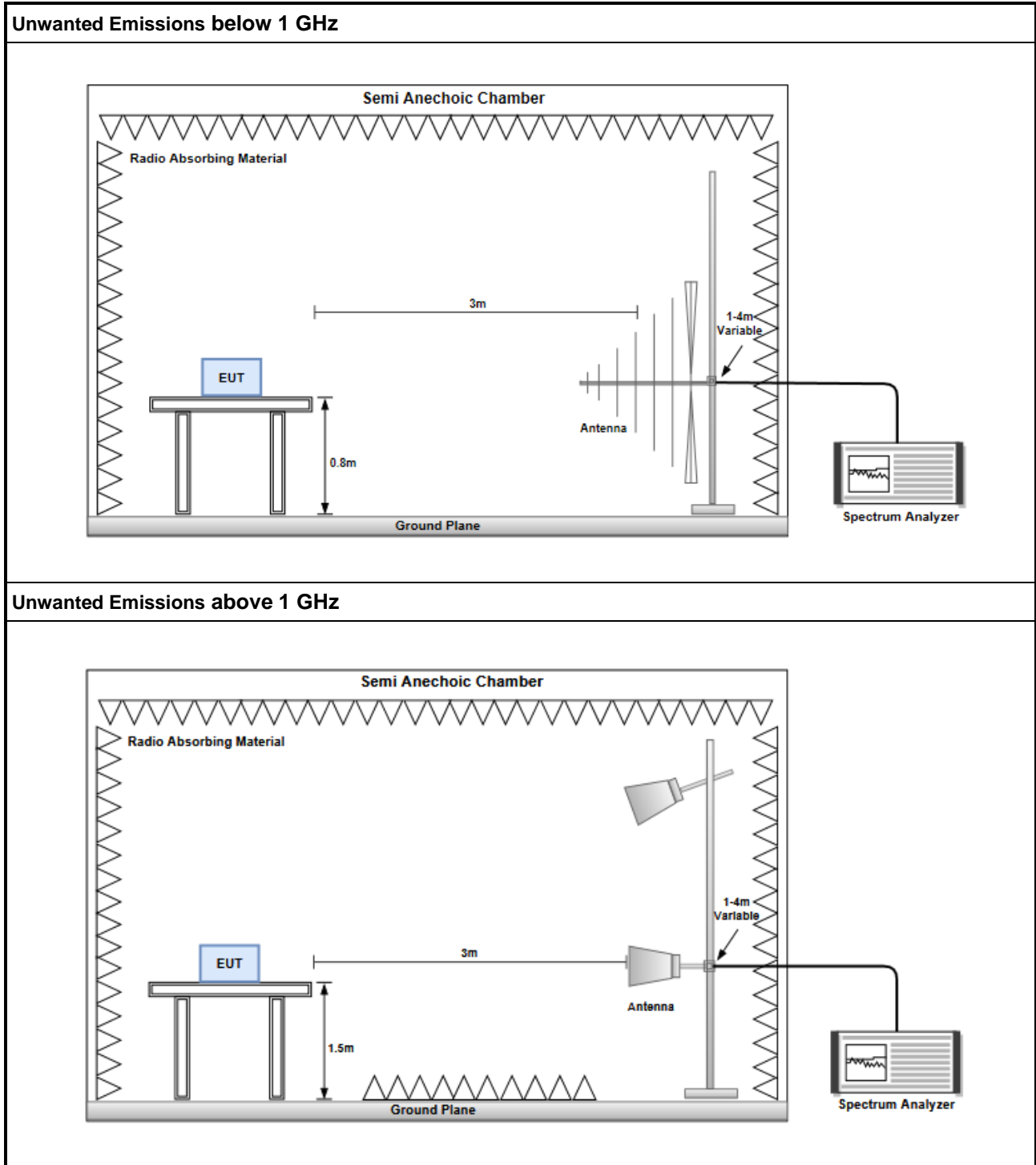
3.2.2 Test Procedures

1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.2.3 Test Setup



3.2.4 Test Results

Refer to Appendix B.

3.3 AC Power Line Conducted Emissions

3.3.1 Limit of AC Power Line Conducted Emissions

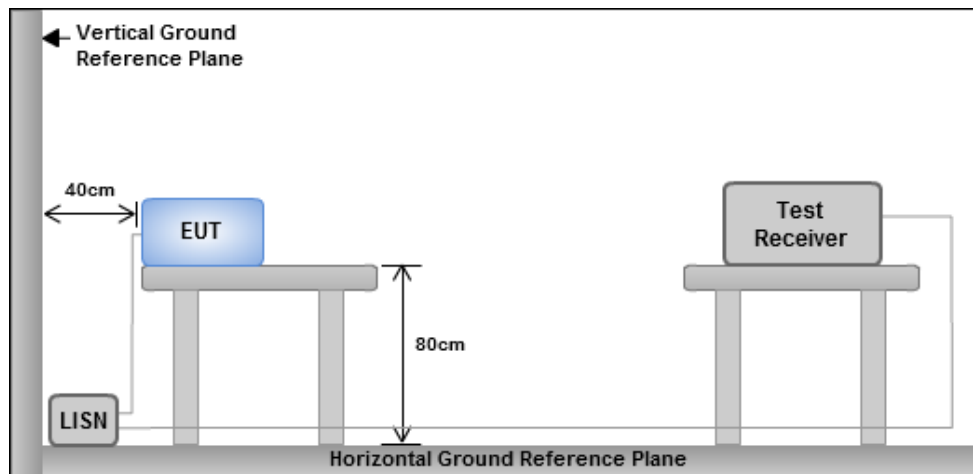
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

3.3.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V/60Hz

3.3.3 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 cm from other units and other metal planes

3.3.4 Test Results

Refer to Appendix C.

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan
(R.O.C.)

Kwei Shan

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

Fax: 886-3-318-0345

Email: ICC_Service@icertifi.com.tw

==END==



Summary

Mode	Total Power (dBm)	Total Power (W)	EIRP (dBm)	EIRP (W)
5.15-5.25GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	17.20	0.05248	21.20	0.13183
802.11ac VHT20_Nss1,(MCS0)_1TX	17.30	0.05370	21.30	0.13490
802.11ac VHT40_Nss1,(MCS0)_1TX	17.67	0.05848	21.67	0.14689
802.11ac VHT80_Nss1,(MCS0)_1TX	10.10	0.01023	14.10	0.02570
5.25-5.35GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	19.12	0.08166	23.12	0.20512
802.11ac VHT20_Nss1,(MCS0)_1TX	18.79	0.07568	22.79	0.19011
802.11ac VHT40_Nss1,(MCS0)_1TX	18.13	0.06501	22.13	0.16331
802.11ac VHT80_Nss1,(MCS0)_1TX	12.50	0.01778	16.50	0.04467
5.47-5.725GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	18.60	0.07244	22.60	0.18197
802.11ac VHT20_Nss1,(MCS0)_1TX	18.39	0.06902	22.39	0.17338
802.11ac VHT40_Nss1,(MCS0)_1TX	19.66	0.09247	23.66	0.23227
802.11ac VHT80_Nss1,(MCS0)_1TX	18.22	0.06637	22.22	0.16672
5.725-5.85GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	19.55	0.09016	23.55	0.22646
802.11ac VHT20_Nss1,(MCS0)_1TX	19.80	0.09550	23.80	0.23988
802.11ac VHT40_Nss1,(MCS0)_1TX	19.70	0.09333	23.70	0.23442
802.11ac VHT80_Nss1,(MCS0)_1TX	14.20	0.02630	18.20	0.06607



Conducted Output Power(Average)

Appendix A

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11a_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
5180MHz	Pass	4.00	14.29	14.29	24.00	18.29	30.00
5200MHz	Pass	4.00	16.22	16.22	24.00	20.22	30.00
5240MHz	Pass	4.00	17.2	17.20	24.00	21.20	30.00
5260MHz	Pass	4.00	17.95	17.95	24.00	21.95	30.00
5300MHz	Pass	4.00	19.12	19.12	24.00	23.12	30.00
5320MHz	Pass	4.00	15.41	15.41	24.00	19.41	30.00
5500MHz	Pass	4.00	13.39	13.39	24.00	17.39	30.00
5580MHz	Pass	4.00	17.6	17.60	24.00	21.60	30.00
5700MHz	Pass	4.00	13.92	13.92	24.00	17.92	30.00
5720MHz Straddle 5.47-5.725GHz	Pass	4.00	18.6	18.60	24.00	22.60	30.00
5720MHz Straddle 5.725-5.85GHz	Pass	4.00	12.76	12.76	30.00	16.76	36.00
5745MHz	Pass	4.00	19.55	19.55	30.00	23.55	36.00
5785MHz	Pass	4.00	19.49	19.49	30.00	23.49	36.00
5825MHz	Pass	4.00	19.42	19.42	30.00	23.42	36.00
802.11ac VHT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
5180MHz	Pass	4.00	13.6	13.60	24.00	17.60	30.00
5200MHz	Pass	4.00	16.27	16.27	24.00	20.27	30.00
5240MHz	Pass	4.00	17.3	17.30	24.00	21.30	30.00
5260MHz	Pass	4.00	17.71	17.71	24.00	21.71	30.00
5300MHz	Pass	4.00	18.79	18.79	24.00	22.79	30.00
5320MHz	Pass	4.00	14.7	14.70	24.00	18.70	30.00
5500MHz	Pass	4.00	11.23	11.23	24.00	15.23	30.00
5580MHz	Pass	4.00	17.95	17.95	24.00	21.95	30.00
5700MHz	Pass	4.00	11.72	11.72	24.00	15.72	30.00
5720MHz Straddle 5.47-5.725GHz	Pass	4.00	18.39	18.39	24.00	22.39	30.00
5720MHz Straddle 5.725-5.85GHz	Pass	4.00	12.99	12.99	30.00	16.99	36.00
5745MHz	Pass	4.00	19.8	19.80	30.00	23.80	36.00
5785MHz	Pass	4.00	19.59	19.59	30.00	23.59	36.00
5825MHz	Pass	4.00	19.5	19.50	30.00	23.50	36.00
802.11ac VHT40_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
5190MHz	Pass	4.00	11.02	11.02	24.00	15.02	30.00
5230MHz	Pass	4.00	17.67	17.67	24.00	21.67	30.00
5270MHz	Pass	4.00	18.13	18.13	24.00	22.13	30.00
5310MHz	Pass	4.00	13.7	13.70	24.00	17.70	30.00
5510MHz	Pass	4.00	9.1	9.10	24.00	13.10	30.00
5590MHz	Pass	4.00	17.2	17.20	24.00	21.20	30.00
5670MHz	Pass	4.00	13.9	13.90	24.00	17.90	30.00
5710MHz Straddle 5.47-5.725GHz	Pass	4.00	19.66	19.66	24.00	23.66	30.00
5710MHz Straddle 5.725-5.85GHz	Pass	4.00	9.75	9.75	30.00	13.75	36.00
5755MHz	Pass	4.00	16.95	16.95	30.00	20.95	36.00
5795MHz	Pass	4.00	19.7	19.70	30.00	23.70	36.00



Conducted Output Power(Average)

Appendix A

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11ac VHT80_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
5210MHz	Pass	4.00	10.1	10.10	24.00	14.10	30.00
5290MHz	Pass	4.00	12.5	12.50	24.00	16.50	30.00
5530MHz	Pass	4.00	10.15	10.15	24.00	14.15	30.00
5610MHz	Pass	4.00	14.39	14.39	24.00	18.39	30.00
5690MHz Straddle 5.47-5.725GHz	Pass	4.00	18.22	18.22	24.00	22.22	30.00
5690MHz Straddle 5.725-5.85GHz	Pass	4.00	4.18	4.18	30.00	8.18	36.00
5775MHz	Pass	4.00	14.2	14.20	30.00	18.20	36.00

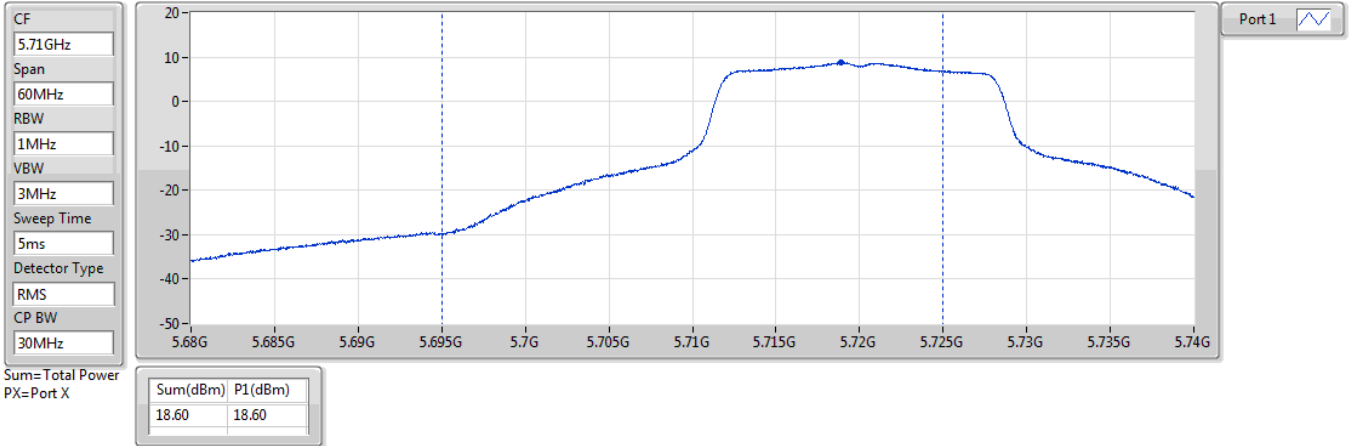
DG = Directional Gain; Port X = Port X output power



5.47-5.725GHz_802.11a_Nss1,(6Mbps)_1TX

AV Power

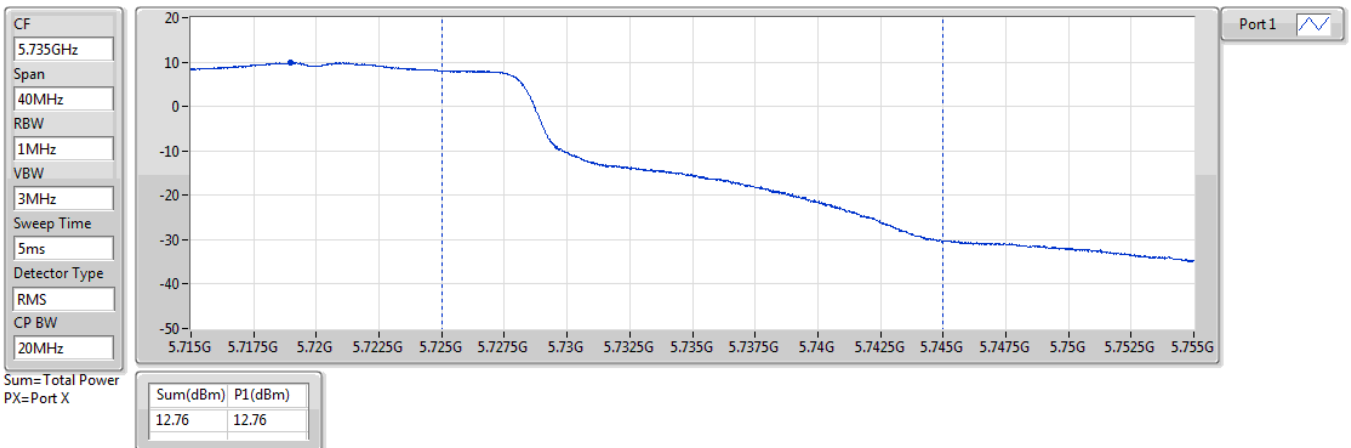
5720MHz Straddle 5.47-5.725GHz_TX



5.725-5.85GHz_802.11a_Nss1,(6Mbps)_1TX

AV Power

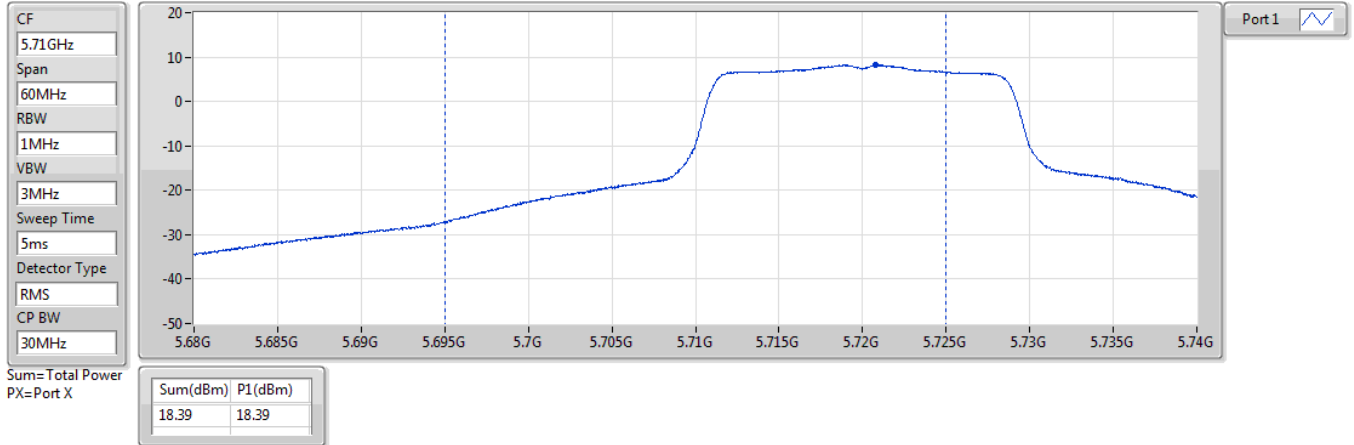
5720MHz Straddle 5.725-5.85GHz_TX





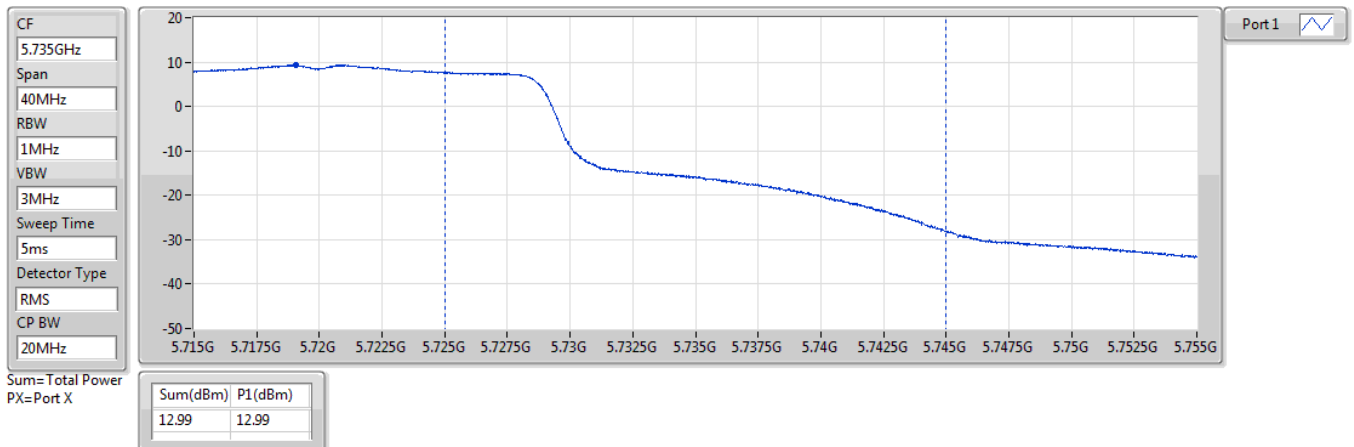
5.47-5.725GHz_802.11ac VHT20_Nss1,(MCS0)_1TX
5720MHz Straddle 5.47-5.725GHz_TX

AV Power



5.725-5.85GHz_802.11ac VHT20_Nss1,(MCS0)_1TX
5720MHz Straddle 5.725-5.85GHz_TX

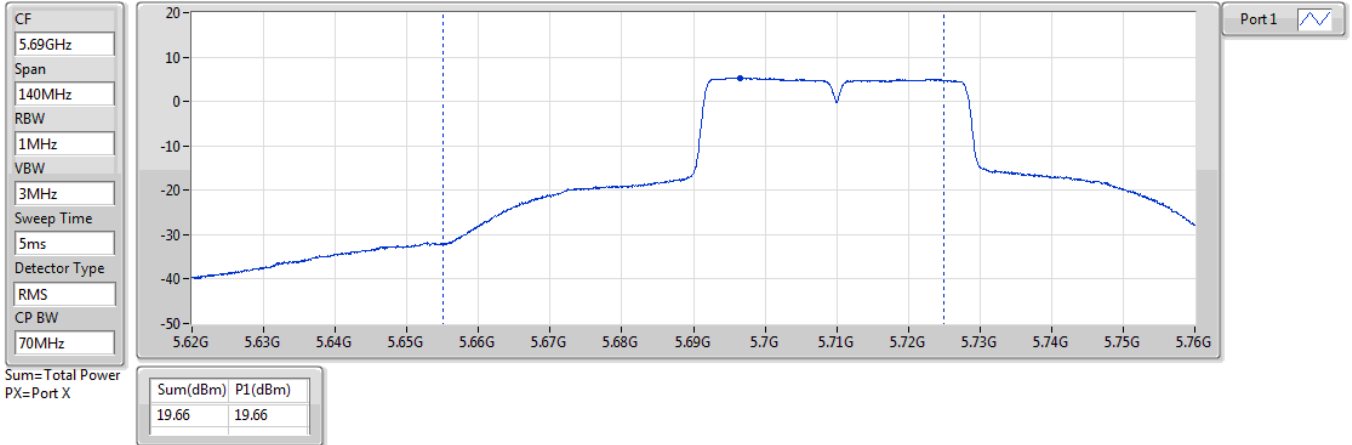
AV Power





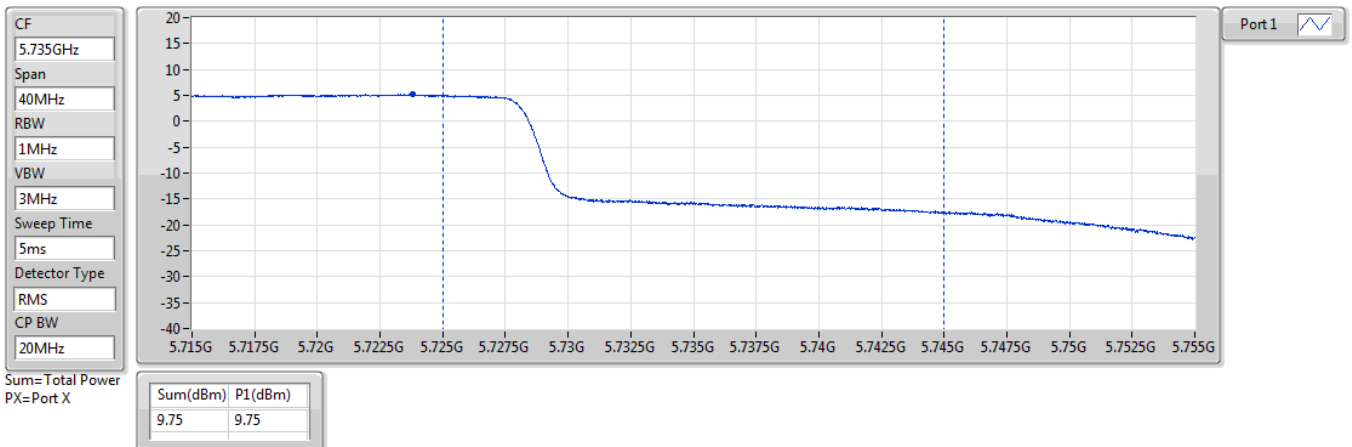
5.47-5.725GHz_802.11ac VHT40_Nss1,(MCS0)_1TX
5710MHz Straddle 5.47-5.725GHz_TX

AV Power



5.725-5.85GHz_802.11ac VHT40_Nss1,(MCS0)_1TX
5710MHz Straddle 5.725-5.85GHz_TX

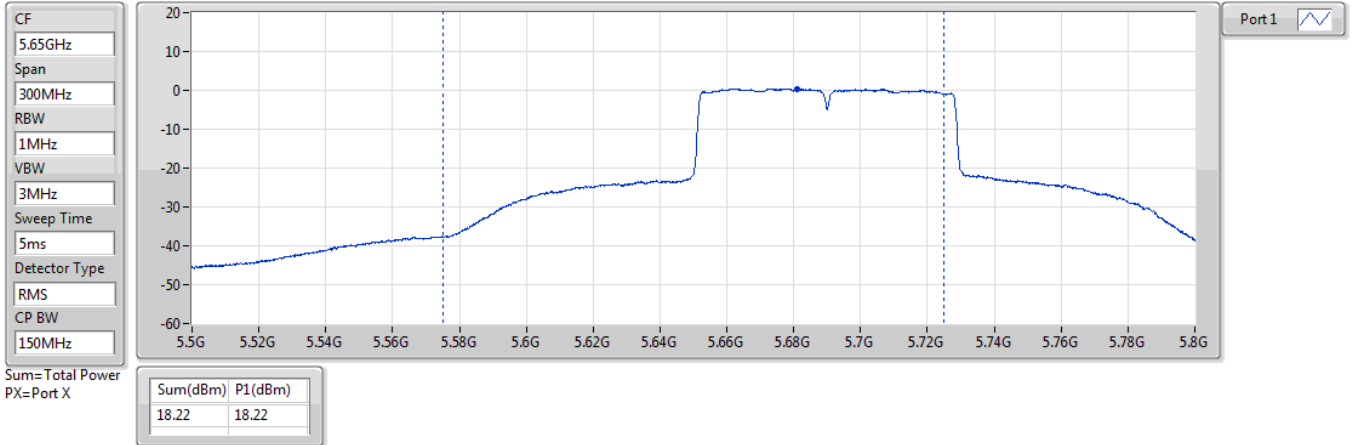
AV Power





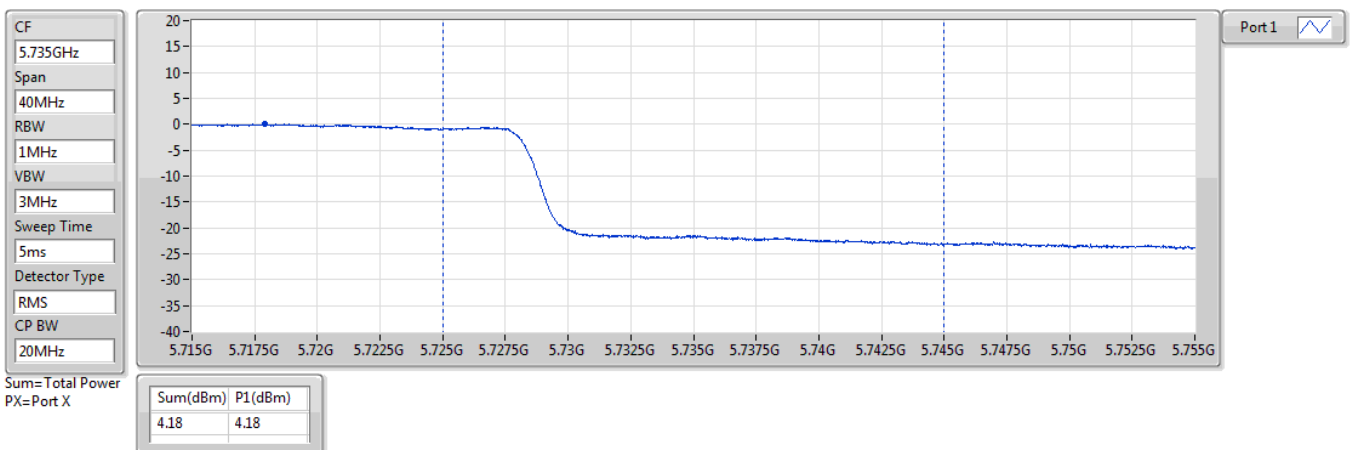
5.47-5.725GHz_802.11ac VHT80_Nss1,(MCS0)_1TX
5690MHz Straddle 5.47-5.725GHz_TX

AV Power



5.725-5.85GHz_802.11ac VHT80_Nss1,(MCS0)_1TX
5690MHz Straddle 5.725-5.85GHz_TX

AV Power

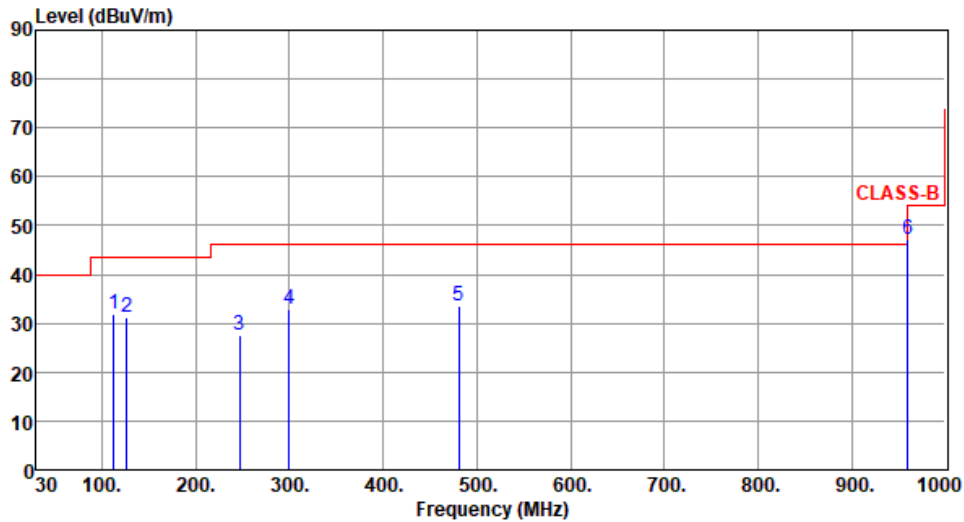




Unwanted Emissions (Below 1GHz)

Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Horizontal		

Test By :Akun Chung- Temperature(°C):24 Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	112.56	31.74	43.50	-11.76	43.38	-11.64	Peak	---	---
2	126.57	31.27	43.50	-12.23	41.93	-10.66	Peak	---	---
3	247.11	27.68	46.00	-18.32	37.82	-10.14	Peak	---	---
4	300.11	32.79	46.00	-13.21	40.98	-8.19	Peak	---	---
5	481.06	33.41	46.00	-12.59	37.08	-3.67	Peak	---	---
6	960.23	47.27	54.00	-6.73	42.06	5.21	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

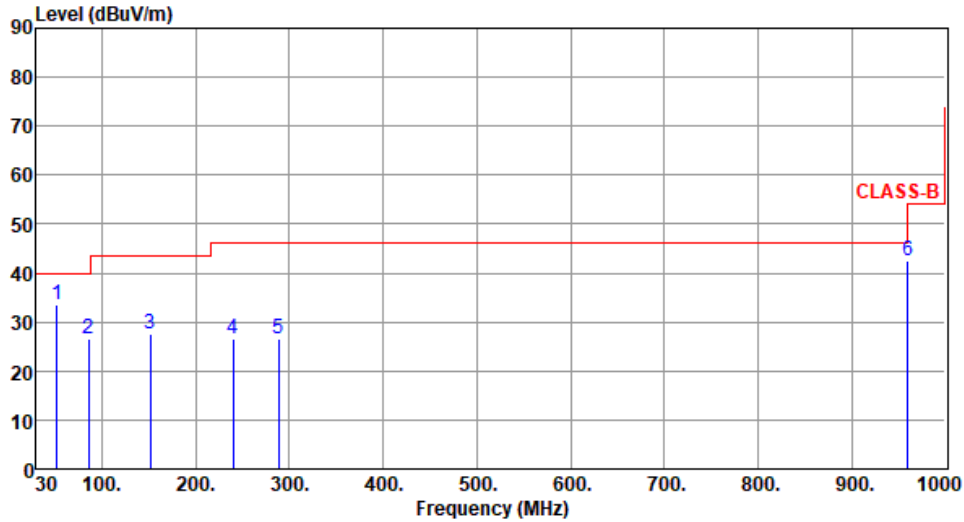
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Vertical		

Test By :Akun Chung- Temperature(°C):24 Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	52.18	33.47	40.00	-6.53	41.87	-8.40	Peak	---	---
2	85.43	26.55	40.00	-13.45	41.11	-14.56	Peak	---	---
3	151.44	27.69	43.50	-15.81	36.61	-8.92	Peak	---	---
4	240.36	26.61	46.00	-19.39	37.08	-10.47	Peak	---	---
5	288.67	26.58	46.00	-19.42	35.04	-8.46	Peak	---	---
6	960.23	42.37	54.00	-11.63	37.16	5.21	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

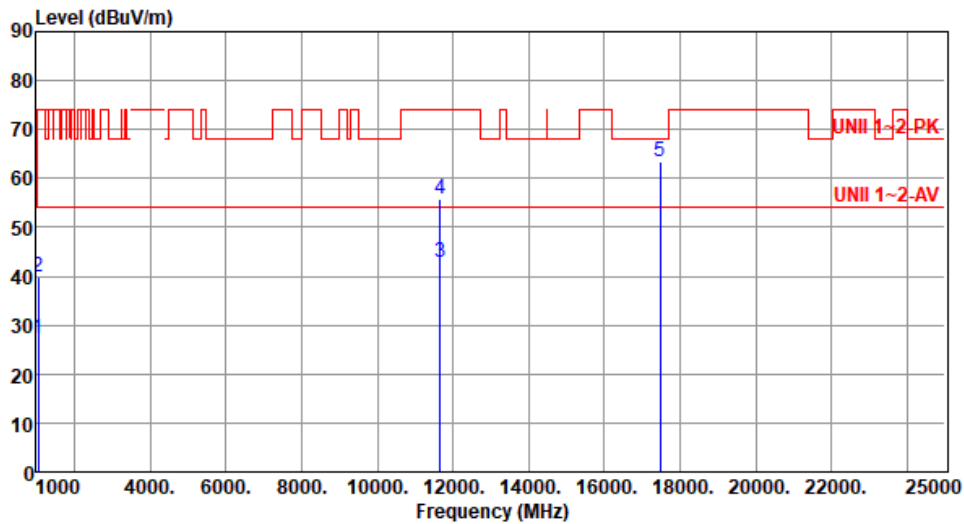
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Unwanted Emissions (Above 1GHz) for 11a

Modulation	11a	Test Freq. (MHz)	5825
Polarization	Horizontal		

Test By :Akun Chung- Temperature(°C):24 Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	1056.00	27.12	54.00	-26.88	35.30	-8.18	Average	100	72
2	1056.00	39.88	74.00	-34.12	48.06	-8.18	Peak	100	72
3	11650.00	42.92	54.00	-11.08	36.45	6.47	Average	100	64
4	11650.00	55.82	74.00	-18.18	49.35	6.47	Peak	100	64
5	17475.00	63.28	68.20	-4.92	56.15	7.13	Peak	100	26

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

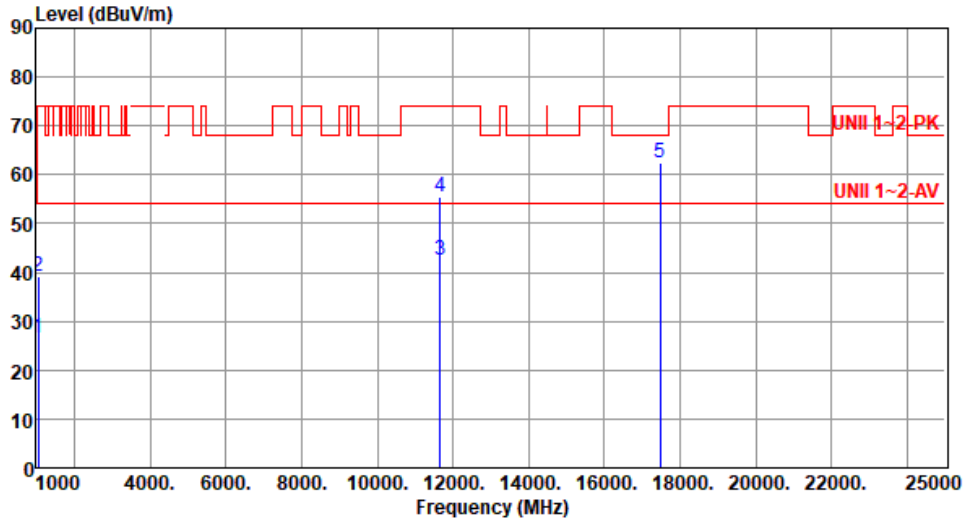
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	11a	Test Freq. (MHz)	5180
Polarization	Vertical		

Test By :Akun Chung- Temperature(°C):24 Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	1056.00	26.56	54.00	-27.44	34.74	-8.18	Average	100	51
2	1056.00	39.27	74.00	-34.73	47.45	-8.18	Peak	100	51
3	11650.00	42.42	54.00	-11.58	35.95	6.47	Average	100	116
4	11650.00	55.31	74.00	-18.69	48.84	6.47	Peak	100	116
5	17475.00	62.45	68.20	-5.75	55.32	7.13	Peak	100	226

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

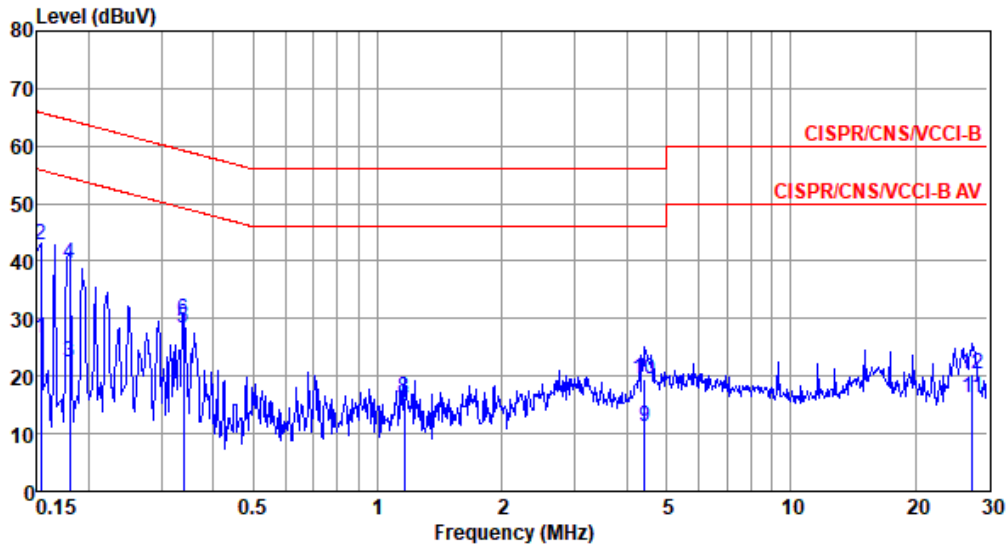
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation Mode	VHT40	Test Freq. (MHz)	5795
Power Phase	Line		

Test by : Joe Liao Temperature: 26°C Humidity: 57%



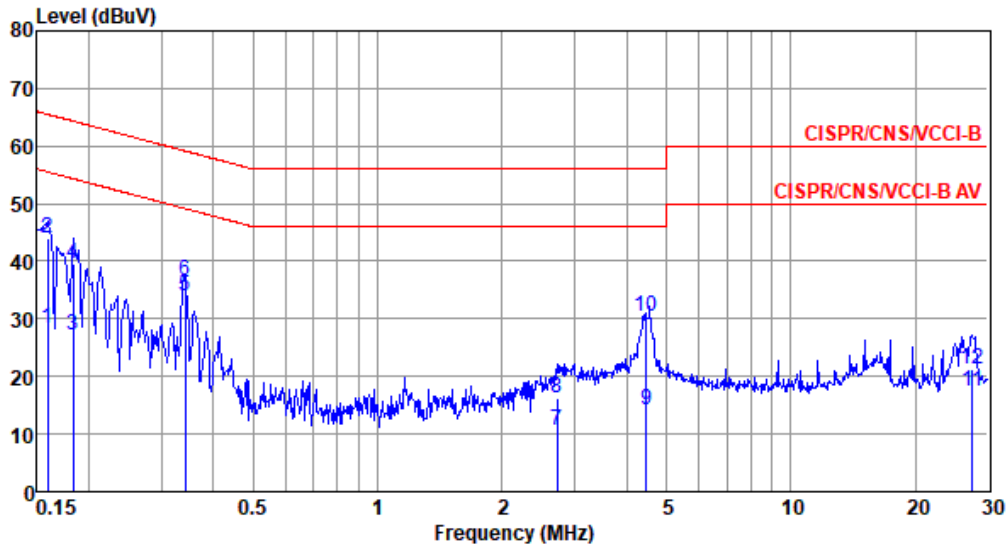
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.153	26.69	55.82	-29.13	16.77	9.68	0.06	0.18	Average
2	0.153	42.94	65.82	-22.88	33.02	9.68	0.06	0.18	QP
3	0.180	22.44	54.50	-32.06	12.51	9.68	0.06	0.19	Average
4	0.180	39.51	64.50	-24.99	29.58	9.68	0.06	0.19	QP
5*	0.339	28.23	49.22	-20.99	18.23	9.67	0.06	0.27	Average
6	0.339	29.90	59.22	-29.32	19.90	9.67	0.06	0.27	QP
7	1.160	13.97	46.00	-32.03	3.84	9.68	0.11	0.34	Average
8	1.160	16.33	56.00	-39.67	6.20	9.68	0.11	0.34	QP
9	4.430	11.31	46.00	-34.69	0.99	9.70	0.20	0.42	Average
10	4.430	19.60	56.00	-36.40	9.28	9.70	0.20	0.42	QP
11	27.562	16.28	50.00	-33.72	5.29	9.68	0.58	0.73	Average
12	27.562	20.29	60.00	-39.71	9.30	9.68	0.58	0.73	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).



Modulation Mode	VHT40	Test Freq. (MHz)	5795
Power Phase	Neutral		

Test by : Joe Liao Temperature: 26°C Humidity: 57%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.159	28.40	55.52	-27.12	18.55	9.61	0.06	0.18	Average
2	0.159	44.00	65.52	-21.52	34.15	9.61	0.06	0.18	QP
3	0.183	27.26	54.33	-27.07	17.40	9.61	0.06	0.19	Average
4	0.183	39.63	64.33	-24.70	29.77	9.61	0.06	0.19	QP
5*	0.343	33.82	49.13	-15.31	23.87	9.61	0.06	0.28	Average
6	0.343	36.54	59.13	-22.59	26.59	9.61	0.06	0.28	QP
7	2.721	10.70	46.00	-35.30	0.53	9.63	0.15	0.39	Average
8	2.721	16.10	56.00	-39.90	5.93	9.63	0.15	0.39	QP
9	4.477	14.19	46.00	-31.81	3.92	9.65	0.20	0.42	Average
10	4.477	30.32	56.00	-25.68	20.05	9.65	0.20	0.42	QP
11	27.562	17.45	50.00	-32.55	6.37	9.77	0.58	0.73	Average
12	27.562	21.35	60.00	-38.65	10.27	9.77	0.58	0.73	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).