



Test report No. : 4790446225-US-R1-V0
Page : 54 of 250
Issued date : 2022/8/9
FCC ID : YAISB35

Mode	CH	Freq (MHz)	OBW (MHz)		Limit (MHz)	Result
			Chain 0	Chain 1		
802.11ac(V HT40)	38	5190	36.216	36.285	N/A	Pass
	46	5230	37.638	36.888	N/A	Pass
	54	5270	39.939	37.325	N/A	Pass
	62	5310	36.098	36.442	N/A	Pass
	102	5510	36.174	36.323	N/A	Pass
	110	5550	36.519	36.521	N/A	Pass
	134	5670	36.253	37.043	N/A	Pass
	151	5755	36.137	36.482	N/A	Pass
	159	5795	36.138	36.483	N/A	Pass

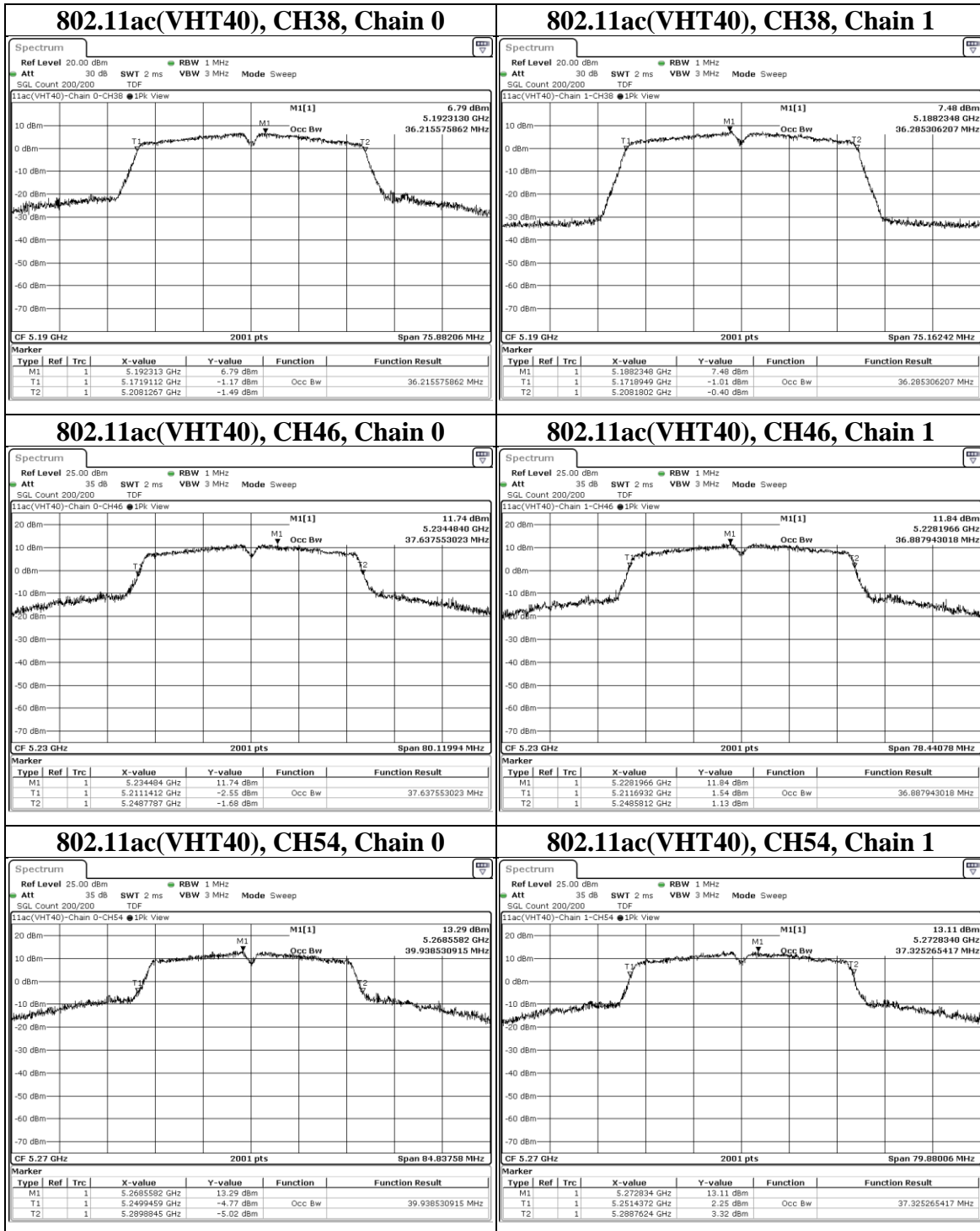
Underwriters Laboratories Taiwan Co., Ltd.

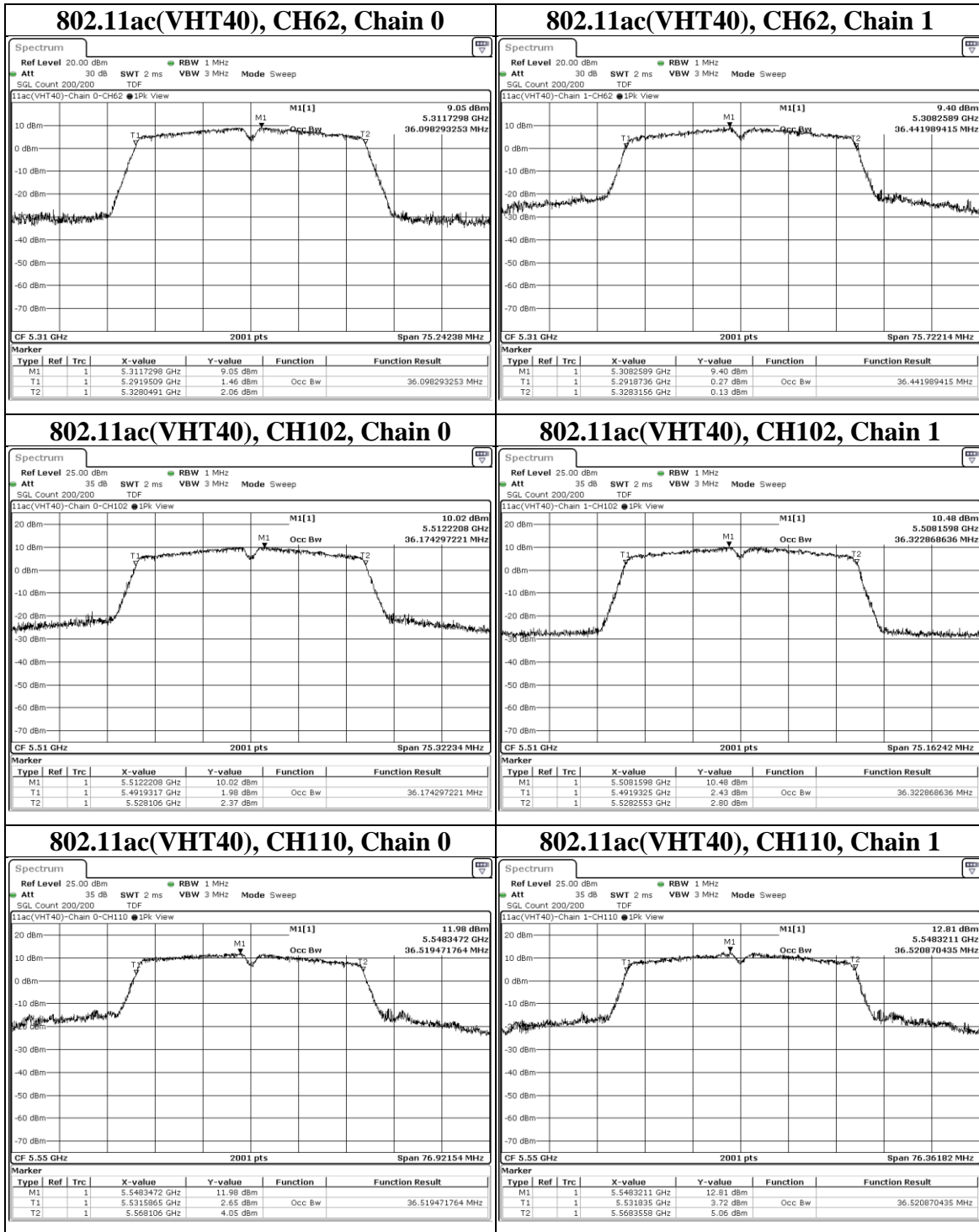
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0



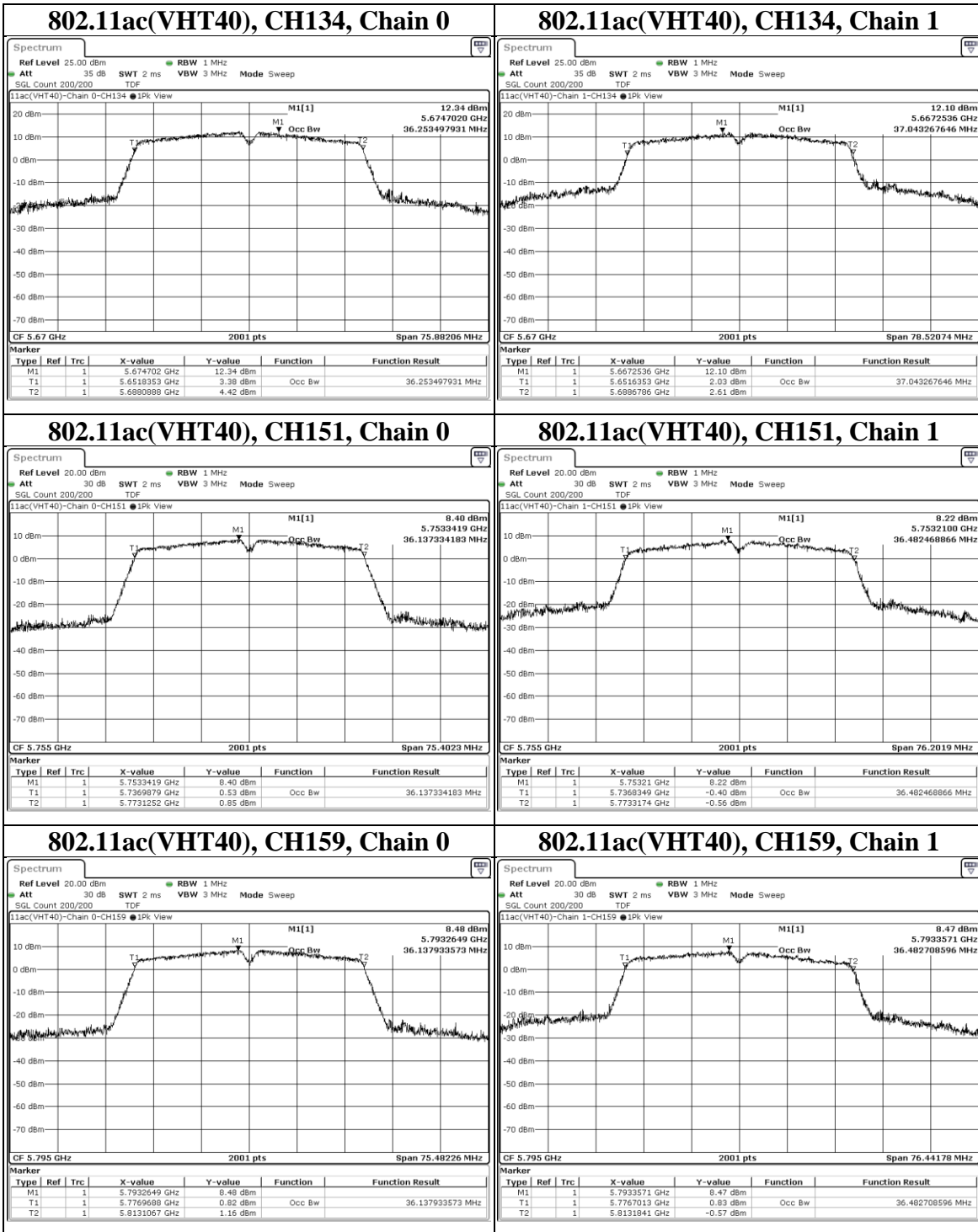


Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948





Test report No. : 4790446225-US-R1-V0
Page : 58 of 250
Issued date : 2022/8/9
FCC ID : YAISB35

Mode	CH	Freq (MHz)	OBW (MHz)		Limit (MHz)	Result
			Chain 0	Chain 1		
802.11ac(V HT80)	42	5210	75.882	76.362	N/A	Pass
	58	5290	76.042	75.722	N/A	Pass
	106	5530	75.642	75.722	N/A	Pass
	122	5610	76.122	76.922	N/A	Pass
	155	5775	76.202	76.362	N/A	Pass

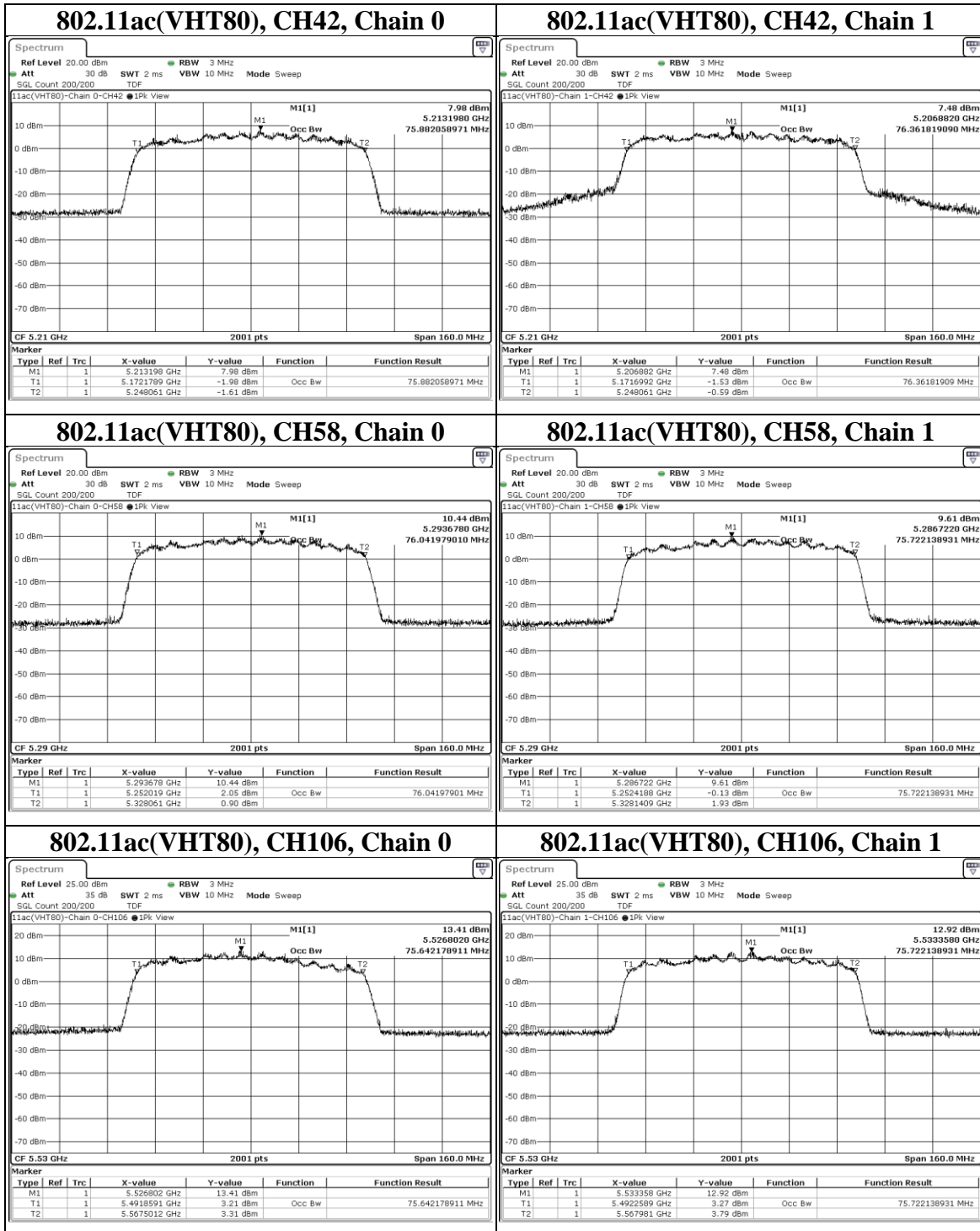
Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0

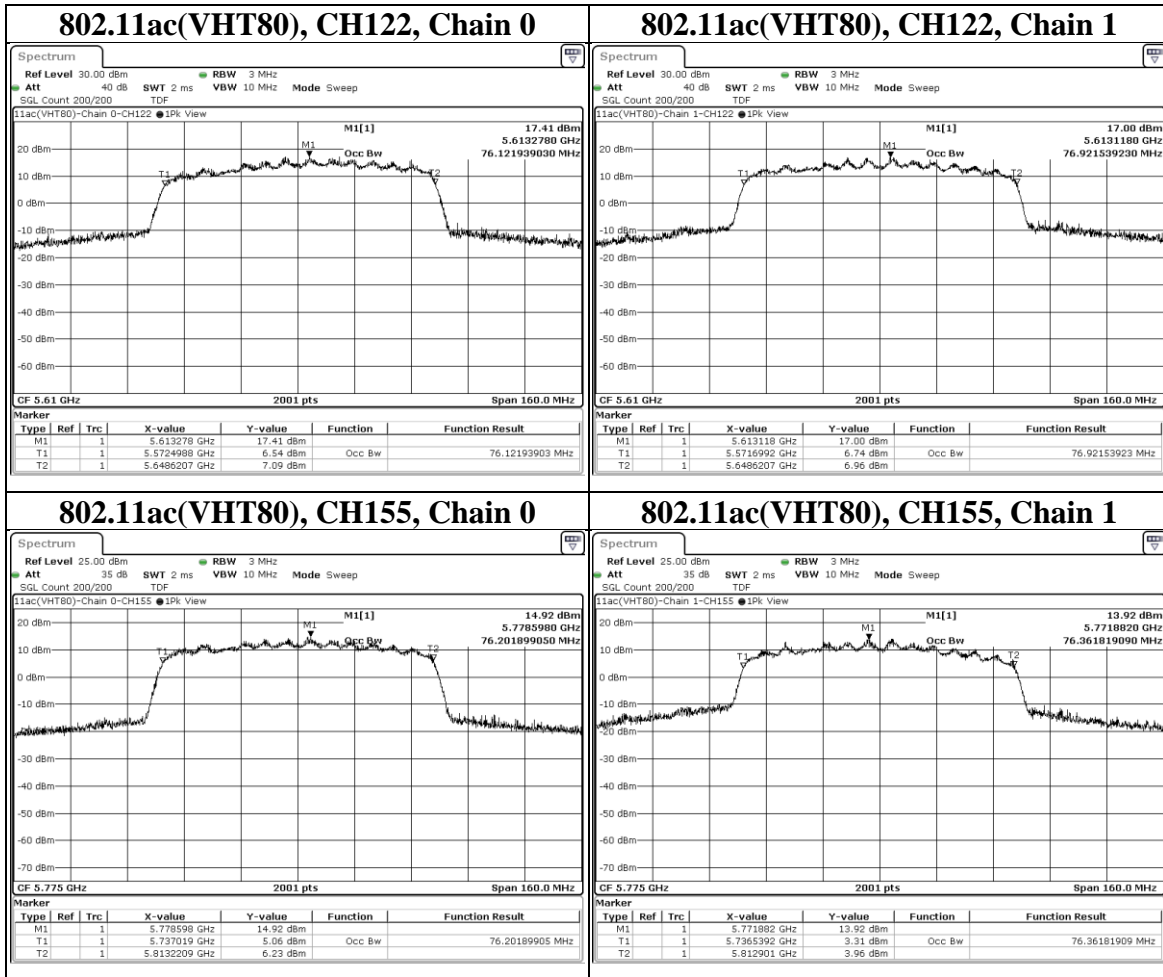


Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



9.4. Conducted output power

Requirements

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) Max. e.i.r.p \leq 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$
		Fixed point-to-point Access Point	1 Watt (30 dBm) If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$
		Indoor Access Point	1 Watt (30 dBm) If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$
	√	Client device	250mW (24 dBm) If $G_{TX} > 6$ dBi, then $P_{Out} = 23.98 - (G_{TX} - 6)$
U-NII-2A		√	250mW (24 dBm) or 11 dBm+10 log B* If $G_{TX} > 6$ dBi, then $P_{Out} = 23.98 - (G_{TX} - 6)$
U-NII-2C		√	250mW (24 dBm) or 11 dBm+10 log B* If $G_{TX} > 6$ dBi, then $P_{Out} = 23.98 - (G_{TX} - 6)$
U-NII-3		√	For Point-to-multipoint systems (P2M): 1 Watt (30 dBm). If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ For Point-to-point systems (P2P): 1 Watt (30 dBm)

Note:

- P_{Out} = maximum conducted output power in dBm,
- G_{TX} = the maximum transmitting antenna directional gain in dBi.
- B is the 26 dB emission bandwidth in megahertz
- Directional Gain = $G_{ant} + 10 \log(N_{ant})$ dBi.

Nant: Number of Transmit Antennas

G1, G2,..., Gn: Gain of Individual Antennas (Same for Each Antenna)

- Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Test Procedure

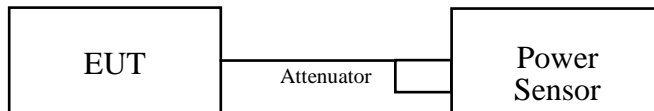
For Average Power Measurement

Test method PM

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 and set the detector to AVERAGE. Duty factor is not added to measured value.

Test Setup

For Average Power Measurement



The loss between RF output port of the EUT and the input port of the Power Meter has been taken into consideration.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0



Test Data

802.11a

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
36	5180	14.60	15.02	60.674	17.83	23.98	PASS
44	5220	17.27	17.60	110.917	20.45	23.98	PASS
48	5240	17.69	17.67	117.22	20.69	23.98	PASS
52	5260	17.79	17.39	114.815	20.60	23.98	PASS
60	5300	16.65	16.09	86.896	19.39	23.98	PASS
64	5320	16.37	15.90	82.224	19.15	23.95	PASS
100	5500	17.24	17.34	107.152	20.30	23.94	PASS
116	5580	16.92	17.21	101.859	20.08	23.96	PASS
140	5700	14.08	13.16	46.238	16.65	23.94	PASS
149	5745	14.14	13.54	48.529	16.86	30	PASS
157	5785	14.23	13.49	48.865	16.89	30	PASS
165	5825	14.04	13.31	46.774	16.70	30	PASS

Note: The directional gain = 5 dBi < 6 dBi, so the power limit shall not be reduced.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0



802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
36	5180	14.32	14.97	58.479	17.67	23.98	PASS
44	5220	17.51	18.07	120.504	20.81	23.98	PASS
48	5240	17.41	17.67	113.501	20.55	23.98	PASS
52	5260	17.73	17.43	114.551	20.59	23.98	PASS
60	5300	16.96	16.52	94.624	19.76	23.98	PASS
64	5320	16.67	16.63	92.47	19.66	23.98	PASS
100	5500	17.74	17.64	117.49	20.70	23.98	PASS
116	5580	17.23	17.74	112.202	20.50	23.98	PASS
140	5700	14.44	13.77	51.642	17.13	23.98	PASS
149	5745	13.94	13.48	47.098	16.73	30	PASS
157	5785	14.10	13.45	47.863	16.80	30	PASS
165	5825	13.85	13.31	45.709	16.60	30	PASS

Note: The directional gain = 5 dBi < 6 dBi, so the power limit shall not be reduced.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0



802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
38	5190	13.34	13.63	44.668	16.50	23.98	PASS
46	5230	17.75	17.92	121.619	20.85	23.98	PASS
54	5270	19.54	19.05	170.216	22.31	23.98	PASS
62	5310	16.02	15.26	73.621	18.67	23.98	PASS
102	5510	16.98	16.75	97.275	19.88	23.98	PASS
110	5550	18.90	18.73	152.405	21.83	23.98	PASS
134	5670	19.01	18.54	151.008	21.79	23.98	PASS
151	5755	15.27	14.64	62.806	17.98	30	PASS
159	5795	15.20	14.56	61.66	17.90	30	PASS

Note: The directional gain = 5 dBi < 6 dBi, so the power limit shall not be reduced.

802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
42	5210	10.17	10.42	21.429	13.31	23.98	PASS
58	5290	12.62	11.92	33.806	15.29	23.98	PASS
106	5530	15.11	14.90	63.387	18.02	23.98	PASS
122	5610	19.48	19.39	175.792	22.45	23.98	PASS
155	5775	16.93	16.27	91.622	19.62	30	PASS

Note: The directional gain = 5 dBi < 6 dBi, so the power limit shall not be reduced.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



9.5. Power Spectral Density

Requirements

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 17 - (G_{TX} - 6)$
		Fixed point-to-point Access Point	17dBm/ MHz If $G_{TX} > 23$ dBi, then $PSD = 17 - (G_{TX} - 23)$
		Indoor Access Point	17dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 17 - (G_{TX} - 6)$
	√	Client device	11dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 11 - (G_{TX} - 6)$
U-NII-2A		√	11dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 11 - (G_{TX} - 6)$
U-NII-2C		√	11dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 11 - (G_{TX} - 6)$
U-NII-3		√	For Point-to-multipoint systems (P2M): 30dBm/ 500kHz. If $G_{TX} > 6$ dBi, then $PSD = 30 - (G_{TX} - 6)$ For Point-to-point systems (P2P): 30dBm/ 500kHz

Note:

- PSD = power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz
- G_{TX} = the maximum transmitting antenna directional gain in dBi.
- Directional Gain = $G_{ant} + 10 \log (Nant)$ dBi.
Nant: Number of Transmit Antennas
 G_1, G_2, \dots, G_n : Gain of Individual Antennas (Same for Each Antenna)
- "PSD per chain" of the report shown is maximum value for each chain, at the "Total PSD" is summing entire spectra across corresponding frequency bins on the various outputs by computer, refer KDB 662911 Method a) for calculating total power density.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Telephone :+886-2-7737-3000
Facsimile (FAX) :+886-3-583-7948



Test procedure

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method as below:

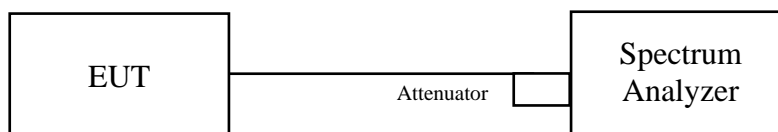
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW \geq 3 RBW, Detector = RMS
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value. (if Duty cycle $<$ 98 %, add 10 log (1/duty cycle))

For U-NII-3 band:

Using method as below:

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz, Set VBW \geq 1 MHz, Detector = RMS
- Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10 log (500 kHz/300kHz)
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value. (if Duty cycle $<$ 98 %, add 10 log (1/duty cycle))

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

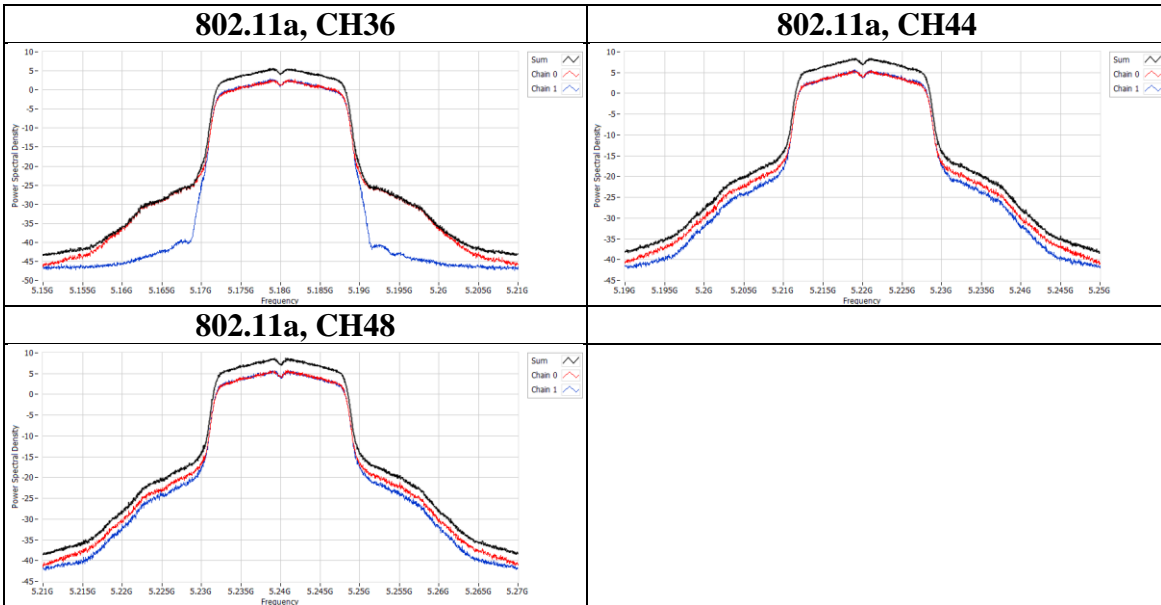
Doc No: 17-EM-F0878 / 6.0



Test Data

Mode (U-NII-1)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	36	5180	8.01	5.73	8.99	Pass
	44	5220	8.01	8.48	8.99	Pass
	48	5240	8.01	8.72	8.99	Pass

Mode (U-NII-1)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11a	36	5180	2.75	2.905
	44	5220	5.562	5.685
	48	5240	5.83	5.82



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

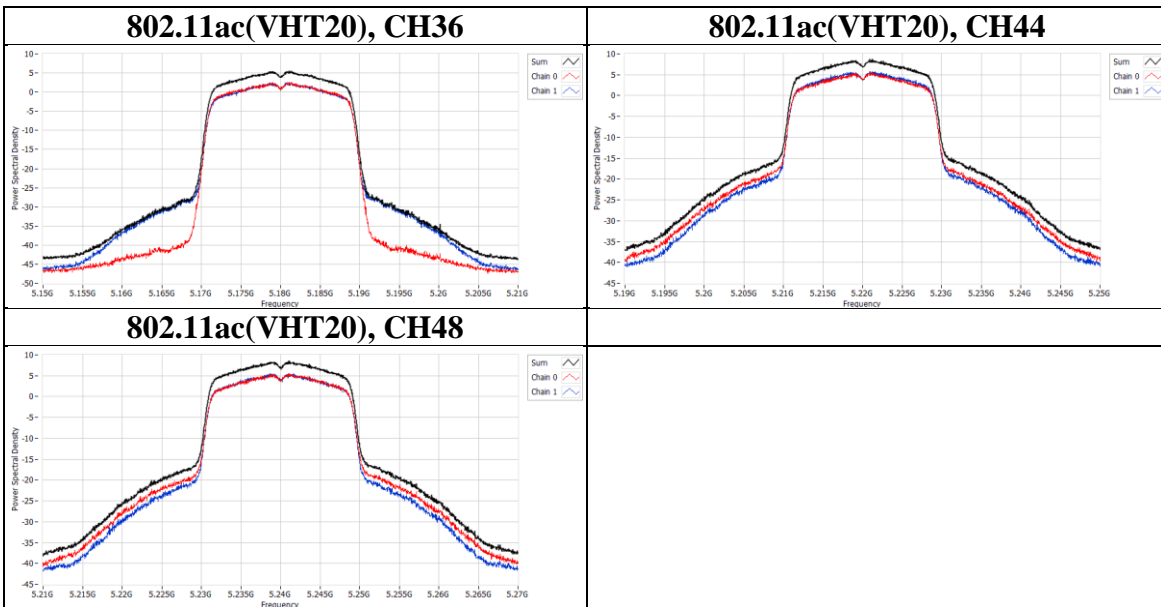
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948



Mode (U-NII-1)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11ac(VHT20)	36	5180	8.01	5.54	8.99	Pass
	44	5220	8.01	8.69	8.99	Pass
	48	5240	8.01	8.54	8.99	Pass

Mode (U-NII-1)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11ac(VHT20)	36	5180	2.495	2.644
	44	5220	5.608	5.801
	48	5240	5.474	5.592



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

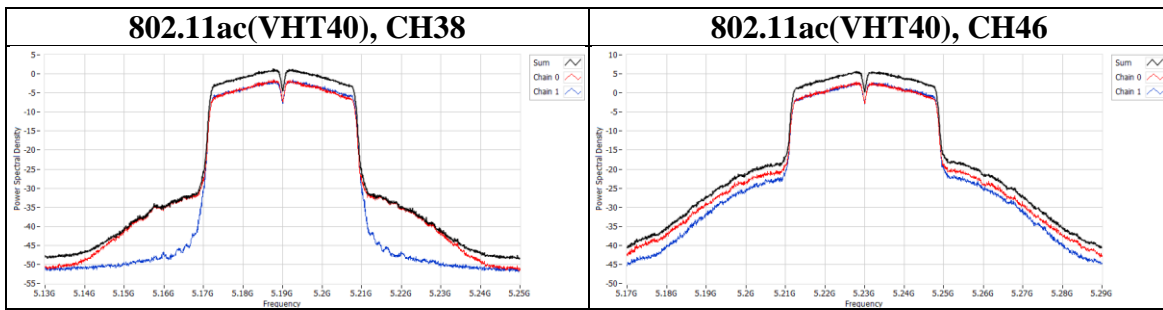
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-1)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11ac(VHT40)	38	5190	8.01	1.35	8.99	Pass
	46	5230	8.01	5.63	8.99	Pass

Mode (U-NII-1)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11ac(VHT40)	38	5190	-1.499	-1.588
	46	5230	2.878	2.678



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

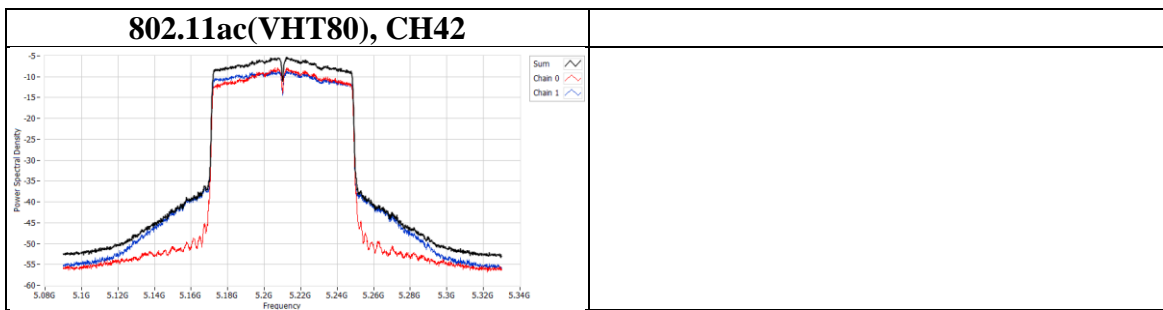
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-1)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11ac(VHT80)	42	5210	8.01	-5.28	8.99	Pass

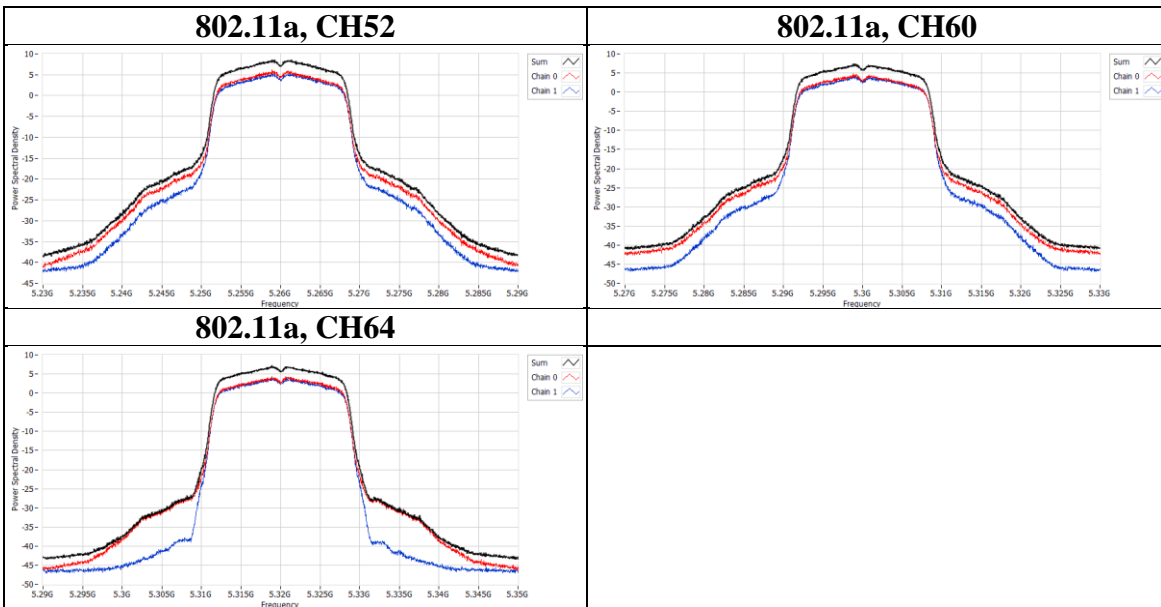
Mode (U-NII-1)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11ac(VHT80)	42	5210	-7.77	-8.66





Mode (U-NII-2A)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	52	5260	8.01	8.64	8.99	Pass
	60	5300	8.01	7.38	8.99	Pass
	64	5320	8.01	7.23	8.99	Pass

Mode (U-NII-2A)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11a	52	5260	6.178	5.303
	60	5300	4.768	4.159
	64	5320	4.241	4.276



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

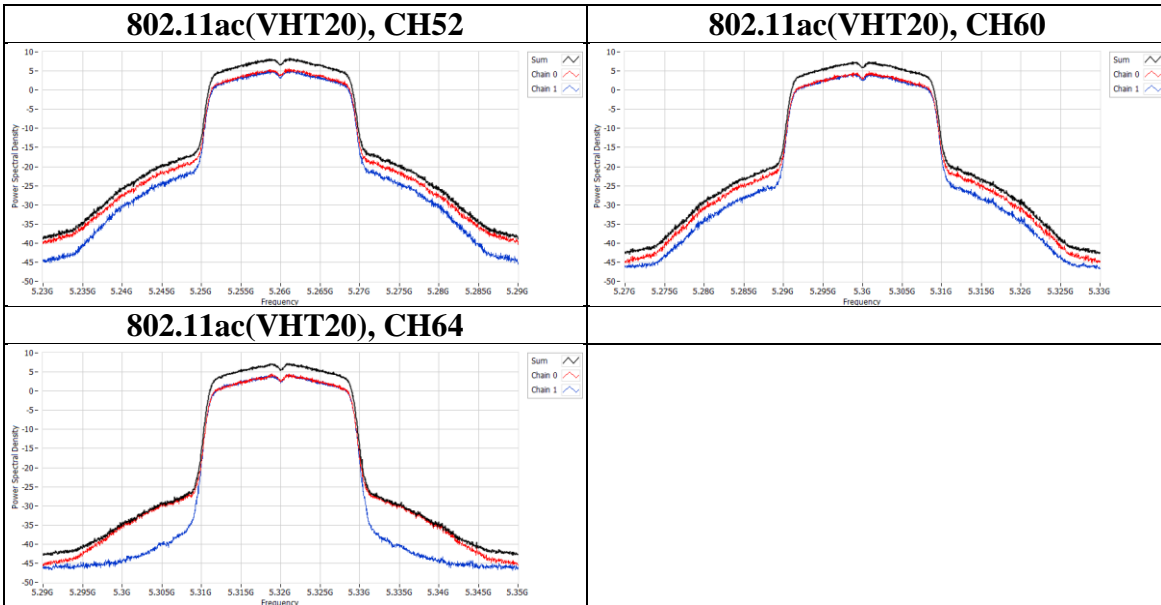
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-2A)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11ac(VHT20)	52	5260	8.01	8.33	8.99	Pass
	60	5300	8.01	7.4	8.99	Pass
	64	5320	8.01	7.2	8.99	Pass

Mode (U-NII-2A)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11ac(VHT20)	52	5260	5.704	5.264
	60	5300	4.804	4.368
	64	5320	4.435	4.43



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

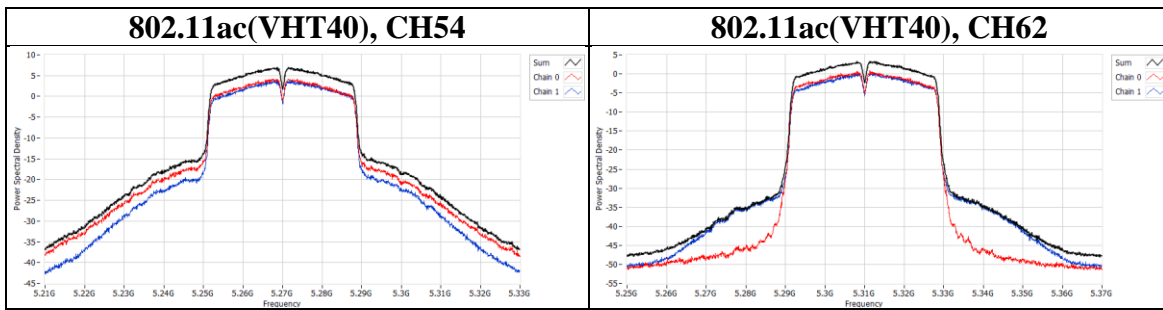
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948



Mode (U-NII-2A)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11ac(VHT40)	54	5270	8.01	6.95	8.99	Pass
	62	5310	8.01	3.25	8.99	Pass

Mode (U-NII-2A)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11ac(VHT40)	54	5270	4.237	3.892
	62	5310	0.806	0.168



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

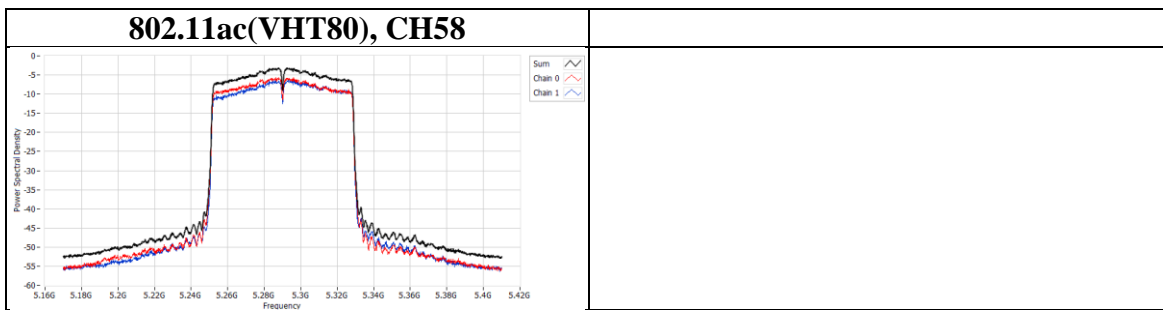
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-2A)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11ac(VHT80)	58	5290	8.01	-3.08	8.99	Pass

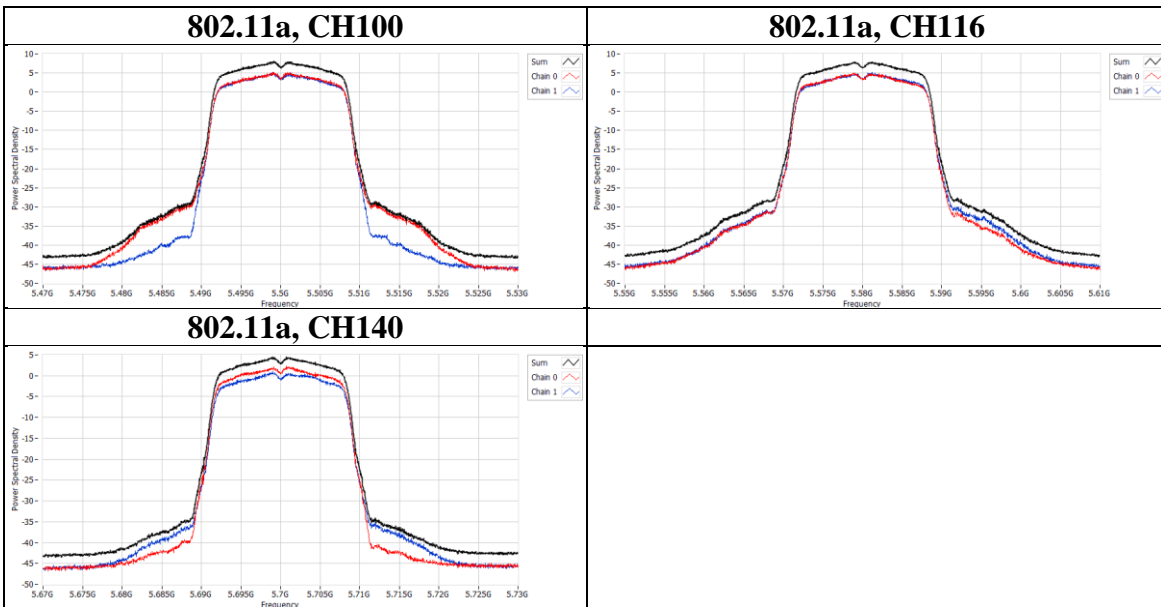
Mode (U-NII-2A)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11ac(VHT80)	58	5290	-5.686	-6.345





Mode (U-NII-2C)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	100	5500	8.01	8.07	8.99	Pass
	116	5580	8.01	7.93	8.99	Pass
	140	5700	8.01	4.5	8.99	Pass

Mode (U-NII-2C)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11a	100	5500	5.218	5.217
	116	5580	4.973	5.171
	140	5700	2.296	1.12



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

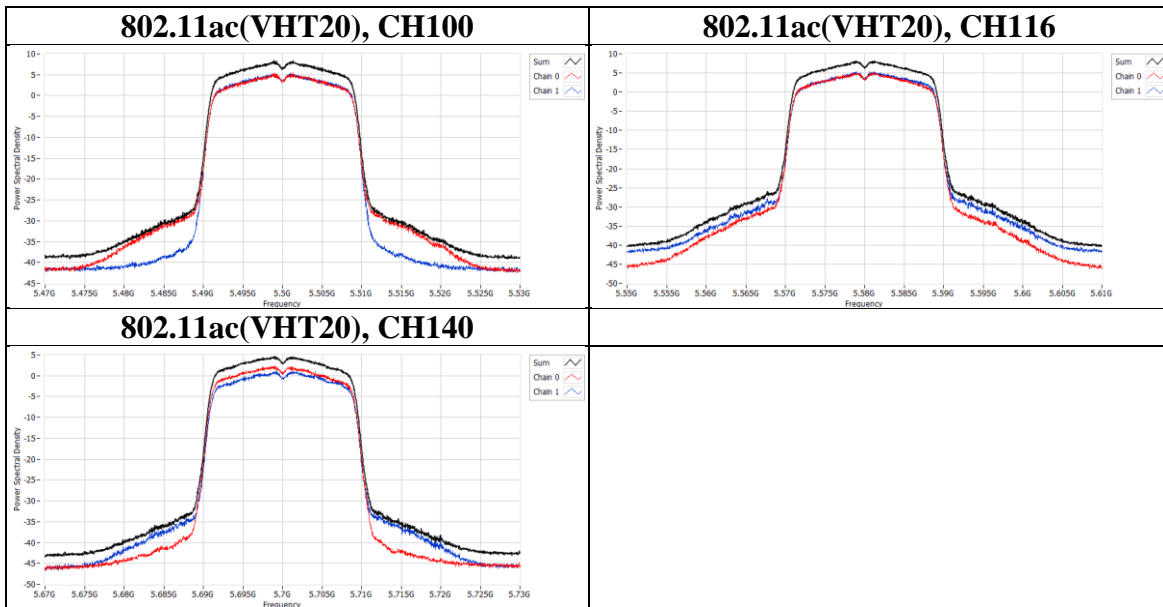
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-2C)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11ac(VHT20)	100	5500	8.01	8.4	8.99	Pass
	116	5580	8.01	8.14	8.99	Pass
	140	5700	8.01	4.62	8.99	Pass

Mode (U-NII-2C)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11ac(VHT20)	100	5500	5.45	5.501
	116	5580	5.068	5.377
	140	5700	2.402	1.024



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

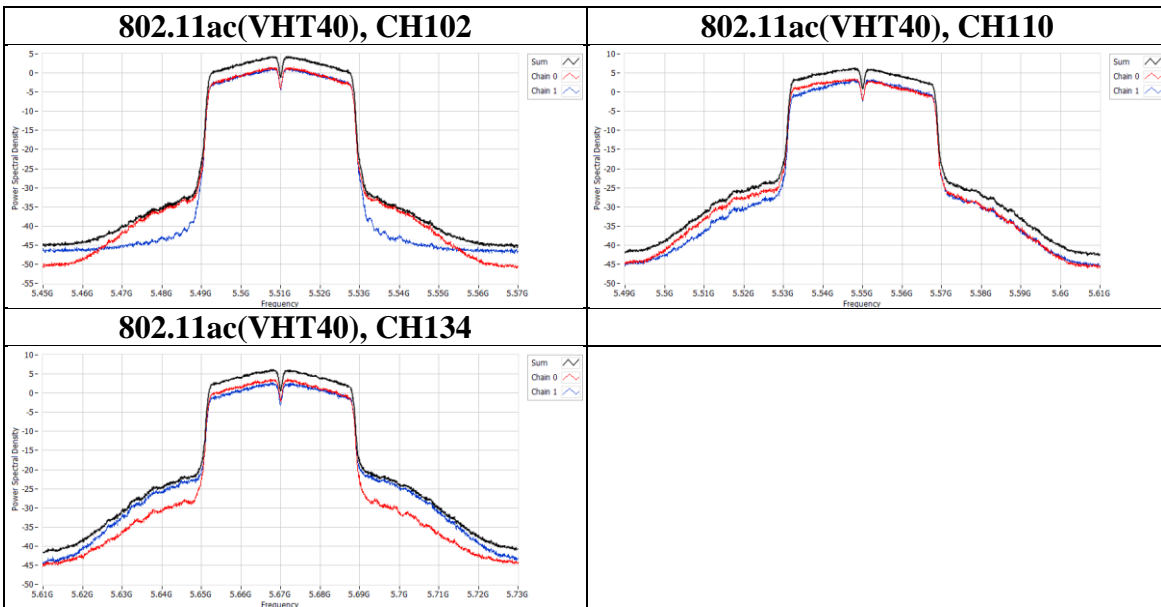
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-2C)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11ac(VHT40)	102	5510	8.01	4.37	8.99	Pass
	110	5550	8.01	6.43	8.99	Pass
	134	5670	8.01	6.17	8.99	Pass

Mode (U-NII-2C)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11ac(VHT40)	102	5510	1.598	1.358
	110	5550	3.423	3.486
	134	5670	3.74	2.978



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

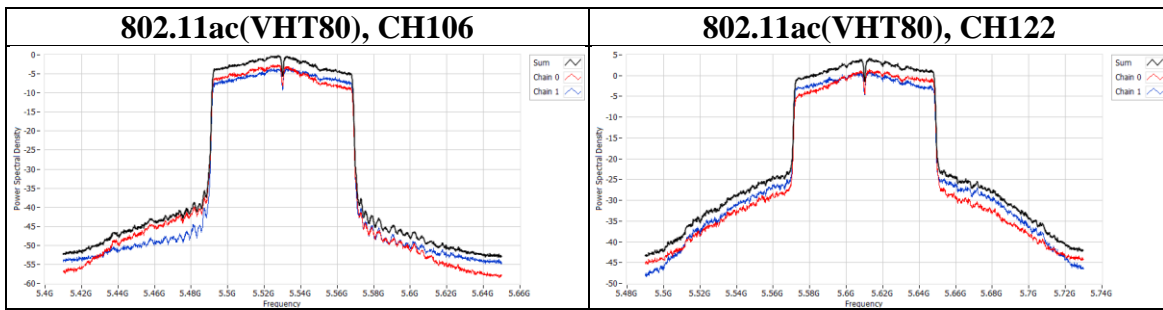
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-2C)	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11ac(VHT80)	106	5530	8.01	-0.21	8.99	Pass
	122	5610	0	4.14	11	Pass

Mode (U-NII-2C)	CH	Freq (MHz)	PSD per Chain (dBm/MHz)	
			Chain 0	Chain 1
802.11ac(VHT80)	106	5530	-2.571	-3.513
	122	5610	1.458	0.875



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

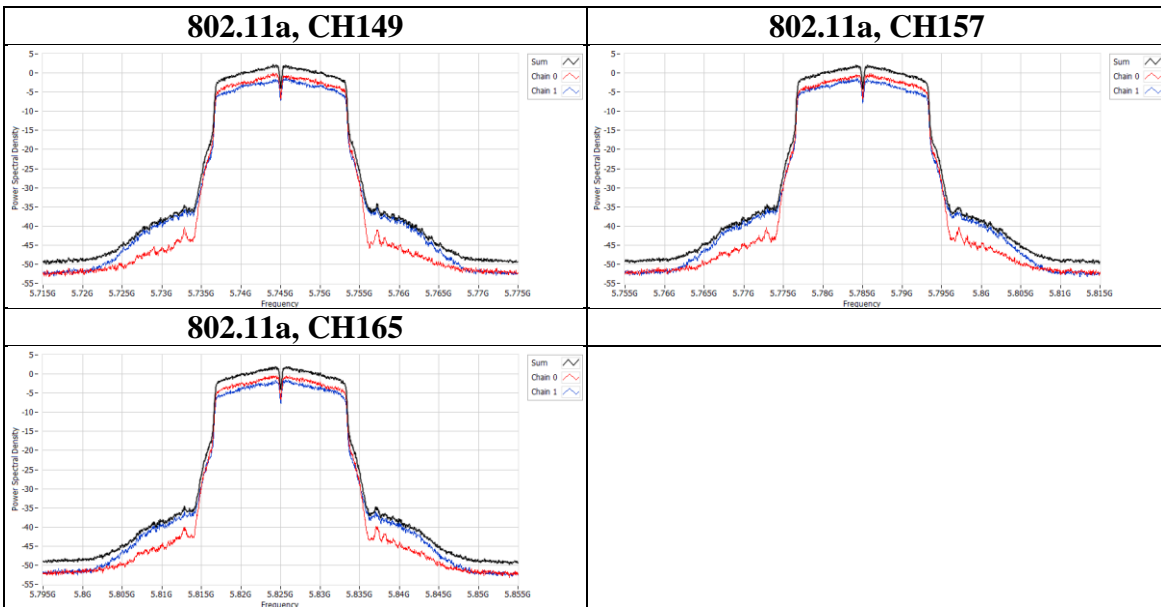
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-3)	CH	Freq (MHz)	BWCF	Directional Gain (dBi)	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Result
802.11a	149	5745	2.22	8.01	4.43	27.99	Pass
	157	5785	2.22	8.01	4.25	27.99	Pass
	165	5825	2.22	8.01	4.18	27.99	Pass

Mode (U-NII-3)	CH	Freq (MHz)	PSD per Chain (dBm/500kHz)	
			Chain 0	Chain 1
802.11a	149	5745	0.079	-1.18
	157	5785	-0.139	-1.406
	165	5825	-0.418	-1.532



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

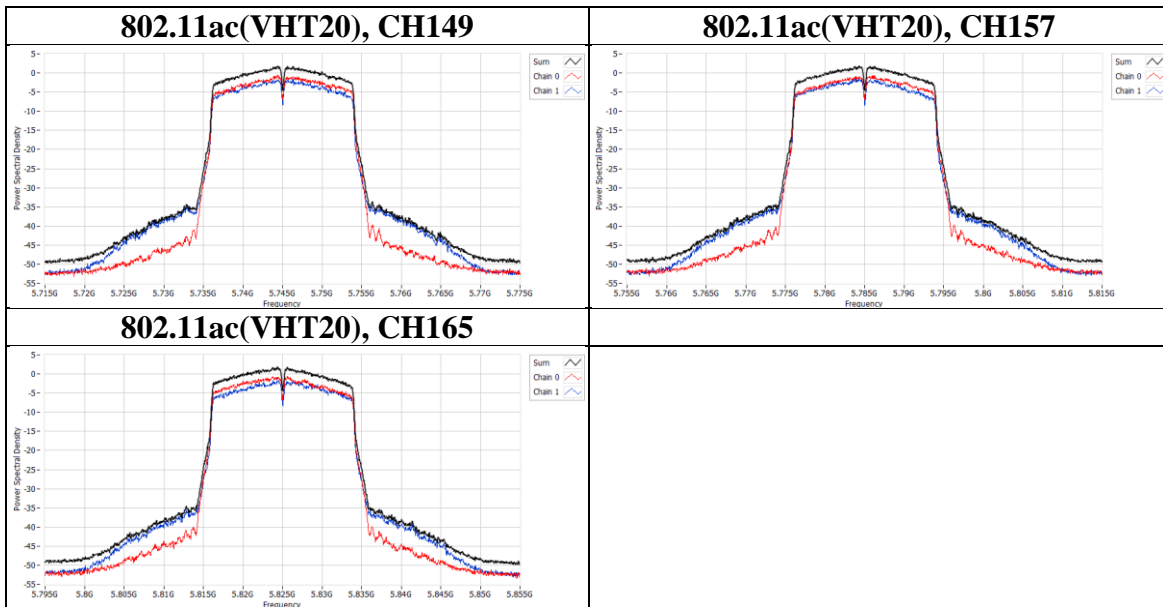
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-3)	CH	Freq (MHz)	BWCF	Directional Gain (dBi)	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Result
802.11ac(VHT20)	149	5745	2.22	8.01	4.03	27.99	Pass
	157	5785	2.22	8.01	4.07	27.99	Pass
	165	5825	2.22	8.01	4.18	27.99	Pass

Mode (U-NII-3)	CH	Freq (MHz)	PSD per Chain (dBm/500kHz)	
			Chain 0	Chain 1
802.11ac(VHT20)	149	5745	-0.491	-1.593
	157	5785	-0.684	-1.389
	165	5825	-0.618	-1.094



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

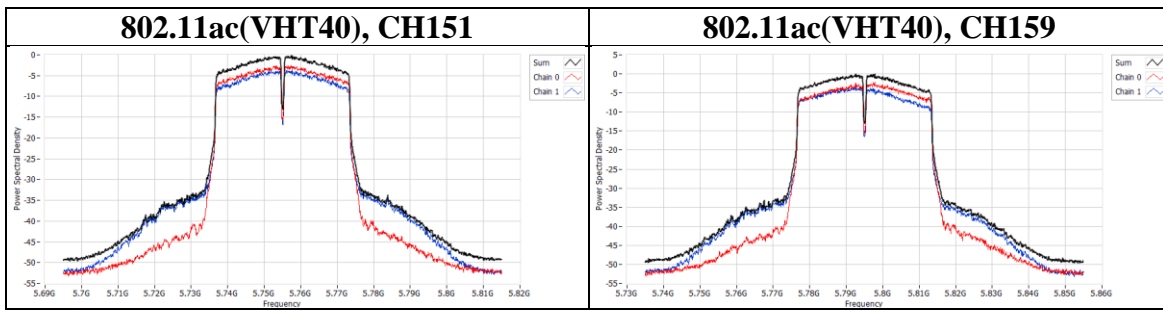
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-3)	CH	Freq (MHz)	BWCF	Directional Gain (dBi)	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Result
802.11ac(VHT40)	151	5755	2.22	8.01	2.03	27.99	Pass
	159	5795	2.22	8.01	2.31	27.99	Pass

Mode (U-NII-3)	CH	Freq (MHz)	PSD per Chain (dBm/500kHz)	
			Chain 0	Chain 1
802.11ac(VHT40)	151	5755	-2.58	-3.667
	159	5795	-2.171	-3.489



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

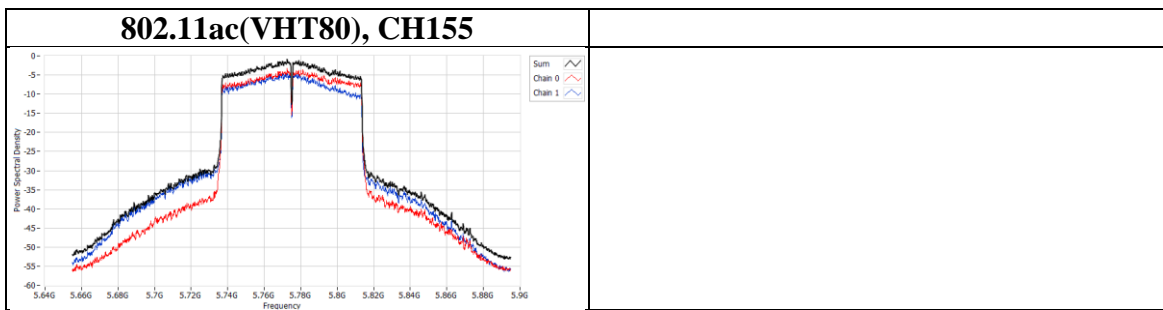
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948



Mode (U-NII-3)	CH	Freq (MHz)	BWCF	Directional Gain (dBi)	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Result
802.11ac(VHT80)	155	5775	2.22	8.01	1.43	27.99	Pass

Mode (U-NII-3)	CH	Freq (MHz)	PSD per Chain (dBm/500kHz)	
			Chain 0	Chain 1
802.11ac(VHT80)	155	5775	-3.339	-4.314



9.6. Frequency Stability

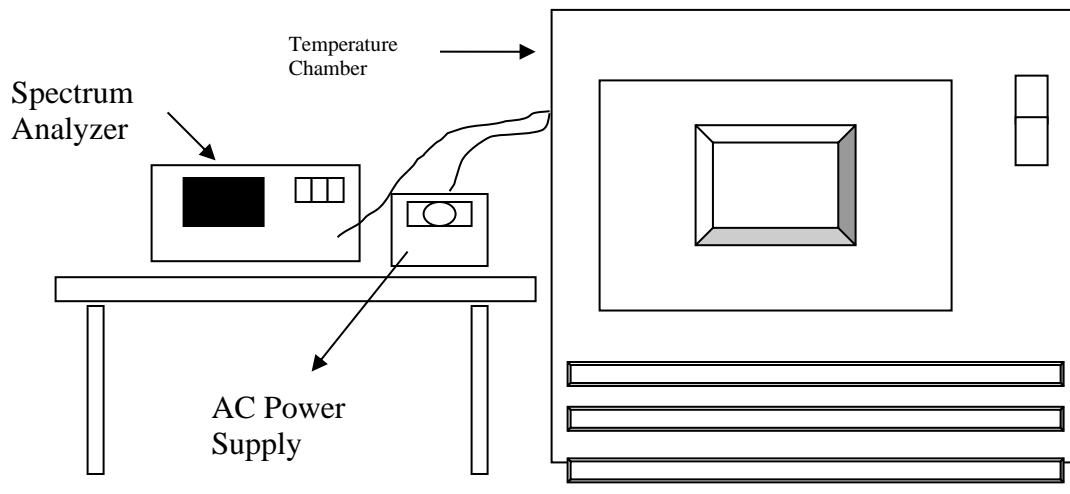
Requirements

The frequency of the carrier signal shall be maintained within band of operation.

Test procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

Test Setup





Test Data

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)
50	120	5179.9918	-1.58	5179.9945	-1.06	5179.9926	-1.43	5179.9933	-1.29
40	120	5180.0177	3.42	5180.0168	3.24	5180.0152	2.93	5180.0172	3.32
30	120	5179.9942	-1.12	5179.9977	-0.44	5179.9957	-0.83	5179.9979	-0.41
20	120	5179.9814	-3.59	5179.9828	-3.32	5179.9805	-3.76	5179.9794	-3.98
10	120	5180.0248	4.79	5180.0227	4.38	5180.0277	5.35	5180.0251	4.85
0	120	5180.0164	3.17	5180.0187	3.61	5180.0147	2.84	5180.0177	3.42
-10	120	5179.9952	-0.93	5179.9949	-0.98	5179.9961	-0.75	5179.9975	-0.48
-20	120	5179.9976	-0.46	5179.9982	-0.35	5179.9963	-0.71	5179.9939	-1.18
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)
20	138	5179.9805	-3.76	5179.9822	-3.44	5179.9795	-3.96	5179.9798	-3.90
20	120	5179.9814	-3.59	5179.9828	-3.32	5179.9805	-3.76	5179.9794	-3.98
20	102	5179.9805	-3.76	5179.982	-3.47	5179.9811	-3.65	5179.9785	-4.15

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0



9.7. Radiated Spurious Emission

Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequency(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 1000MHz, 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 20dB under any condition of modulation.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0



Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBμ V/m)	AV:54 (dBμ V/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμ V/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(dBμ V/m) *1 PK:105.2 (dBμ V/m) *2 PK: 110.8(dBμ V/m) *3 PK:122.2 (dBμ V/m) *4
*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 effective isotropic radiated power (eirp) to field strength:

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

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0



Test Procedures

[For 9 kHz ~ 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. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:

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

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) 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. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0



Note:

- a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- b. 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 1GHz.
- c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

Configuration	Average	
	RBW	VBW
802.11a	1MHz	Refer to section 6.6 for duty cycle.
802.11n (HT20)		
802.11n (HT40)		
802.11ac (VHT80)		

- d. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
- e. Test data of Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
- f. Test data of Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
- g. Test data of Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
- h. Test data of Notation "@" = Fundamental Frequency
- i. Test data of Notation "*" = Only required peak limit or the peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.

Underwriters Laboratories Taiwan Co., Ltd.

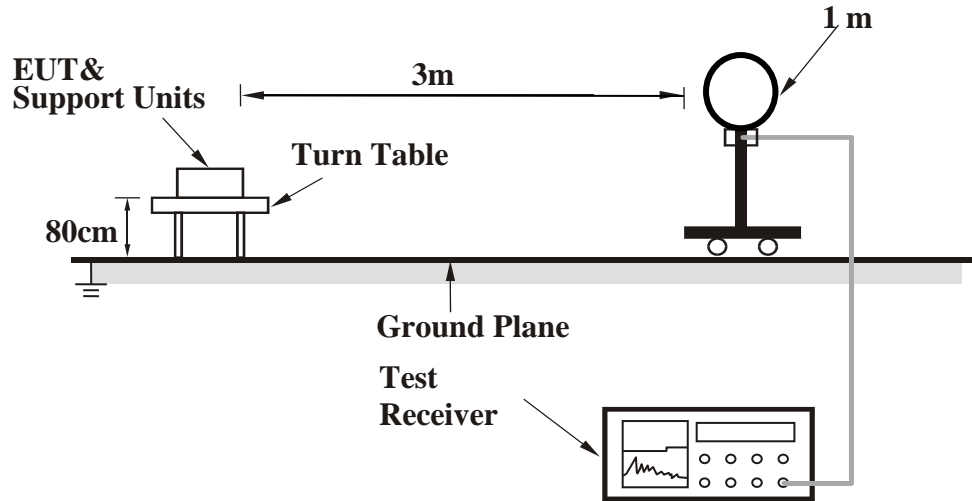
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

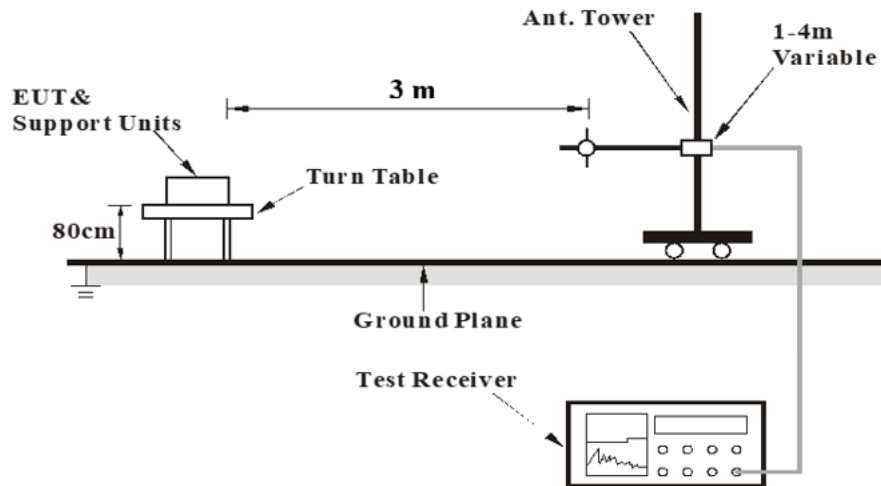
Facsimile (FAX) :+886-3-583-7948

Test Setup

<Frequency Range 9 kHz ~ 30 MHz>

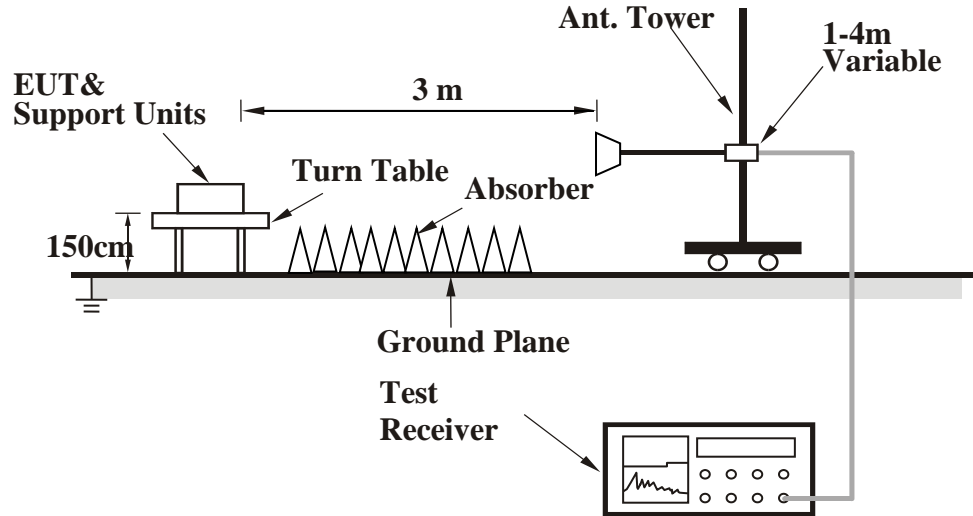


<Frequency Range 30 MHz ~ 1 GHz >





<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.



Test Data

Dipole Antenna

Above 1 GHz

Mode	802.11a	Channel	36
------	---------	---------	----

Polarization	Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
		(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
Horizontal		5042.35	43.86	19.02	62.88	74	-11.12	PK
		5105	31.17	19.44	50.61	54	-3.39	AVG
	@	5180	85.91	19.31	105.22	N/A	N/A	PK
	@	5180	76.8	19.31	96.11	N/A	N/A	AVG
	*	10360	37.31	17.51	54.82	68.2	-13.38	PK
Vertical		5149.1	43.97	19.4	63.37	74	-10.63	PK
		5149.8	34.4	19.4	53.8	54	-0.2	AVG
	@	5180	94.36	19.31	113.67	N/A	N/A	PK
	@	5180	88.26	19.31	107.57	N/A	N/A	AVG
	*	10360	44.29	17.51	61.8	68.2	-6.4	PK

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

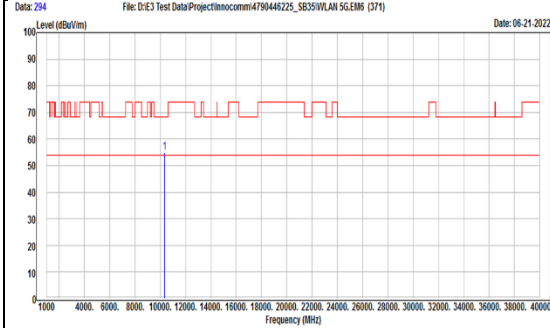
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

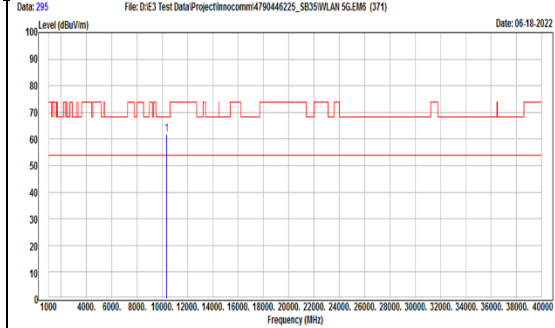
Doc No: 17-EM-F0878 / 6.0



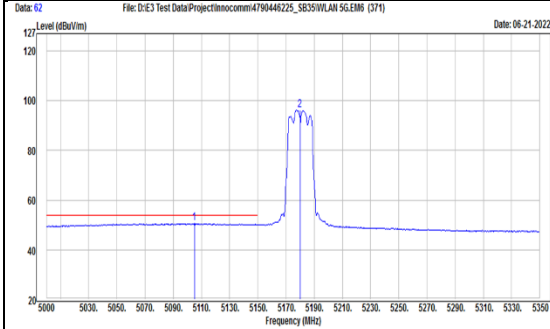
TX, 802.11a (Ch 36)
Radiated Spurious Emission, Horizontal



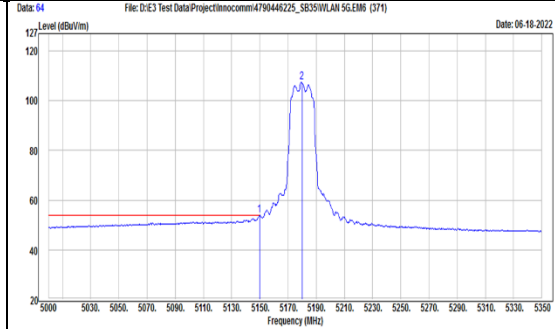
TX, 802.11a (Ch 36)
Radiated Spurious Emission, Vertical



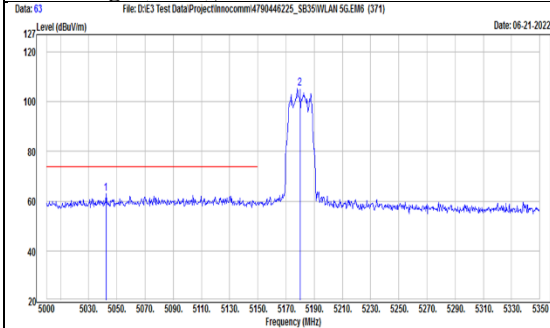
TX, 802.11a (Ch 36)
Band Edge (Average), Horizontal



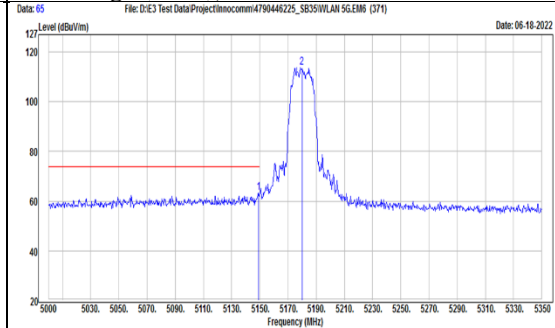
TX, 802.11a (Ch 36)
Band Edge (Average), Vertical



TX, 802.11a (Ch 36)
Band Edge (Peak), Horizontal



TX, 802.11a (Ch 36)
Band Edge (Peak), Vertical





Test report No. : 4790446225-US-R1-V0
Page : 94 of 250
Issued date : 2022/8/9
FCC ID : YAISB35

Mode	802.11a	Channel	44
------	---------	---------	----

Polarization	Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
		(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
Horizontal		5097.65	31.13	19.43	50.56	54	-3.44	AVG
		5145.95	43.16	19.41	62.57	74	-11.43	PK
	@	5220	89.24	19.12	108.36	N/A	N/A	PK
	@	5220	80.87	19.12	99.99	N/A	N/A	AVG
	*	10440	39.55	17.81	57.36	68.2	-10.84	PK
Vertical		5143.15	43.43	19.4	62.83	74	-11.17	PK
		5147.7	31.69	19.4	51.09	54	-2.91	AVG
	@	5220	97.7	19.12	116.82	N/A	N/A	PK
	@	5220	89.58	19.12	108.7	N/A	N/A	AVG
	*	10440	48.82	17.81	66.63	68.2	-1.57	PK

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

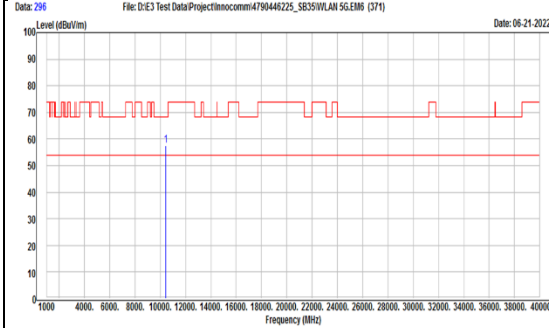
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

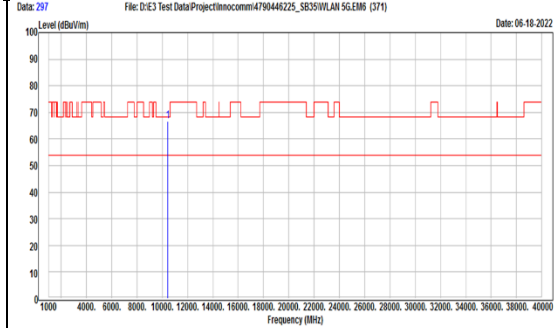
Doc No: 17-EM-F0878 / 6.0



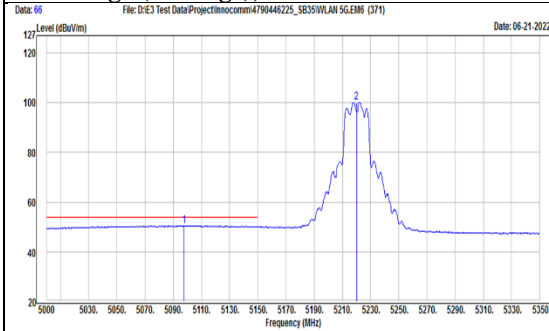
TX, 802.11a (Ch 44)
Radiated Spurious Emission, Horizontal



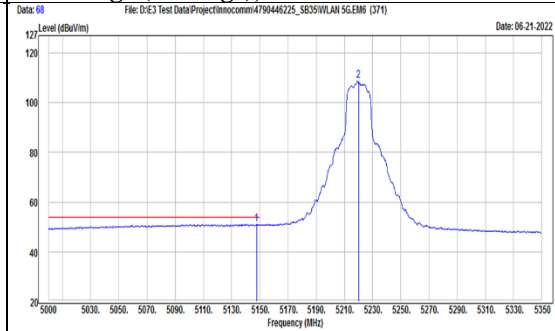
TX, 802.11a (Ch 44)
Radiated Spurious Emission, Vertical



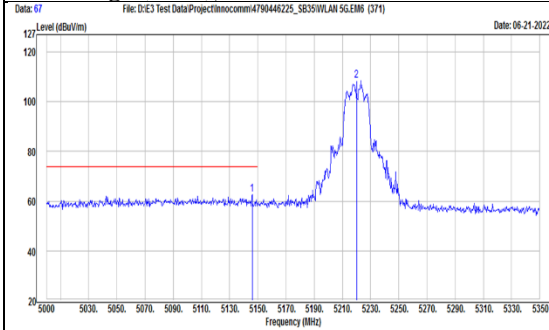
TX, 802.11a (Ch 44)
Band Edge (Average), Horizontal



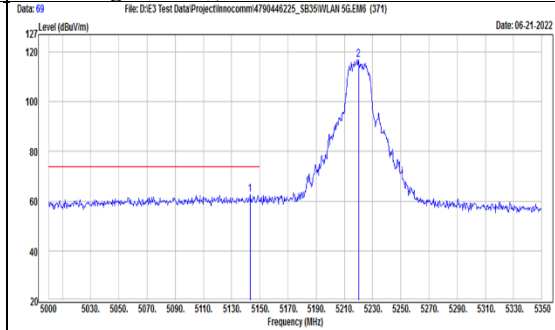
TX, 802.11a (Ch 44)
Band Edge (Average), Vertical



TX, 802.11a (Ch 44)
Band Edge (Peak), Horizontal



TX, 802.11a (Ch 44)
Band Edge (Peak), Vertical





Test report No. : 4790446225-US-R1-V0
Page : 96 of 250
Issued date : 2022/8/9
FCC ID : YAISB35

Mode	802.11a	Channel	48
------	---------	---------	----

Polarization	Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
		(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
Horizontal		5103.95	31.22	19.44	50.66	54	-3.34	AVG
		5124.25	42.25	19.43	61.68	74	-12.32	PK
	@	5240	87.79	18.97	106.76	N/A	N/A	PK
	@	5240	81.18	18.97	100.15	N/A	N/A	AVG
	*	10480	38.52	17.92	56.44	68.2	-11.76	PK
Vertical		5054.6	43.37	19.12	62.49	74	-11.51	PK
		5129.85	31.52	19.41	50.93	54	-3.07	AVG
	@	5240	99.06	18.97	118.03	N/A	N/A	PK
	@	5240	90.2	18.97	109.17	N/A	N/A	AVG
	*	10480	47.66	17.92	65.58	68.2	-2.62	PK

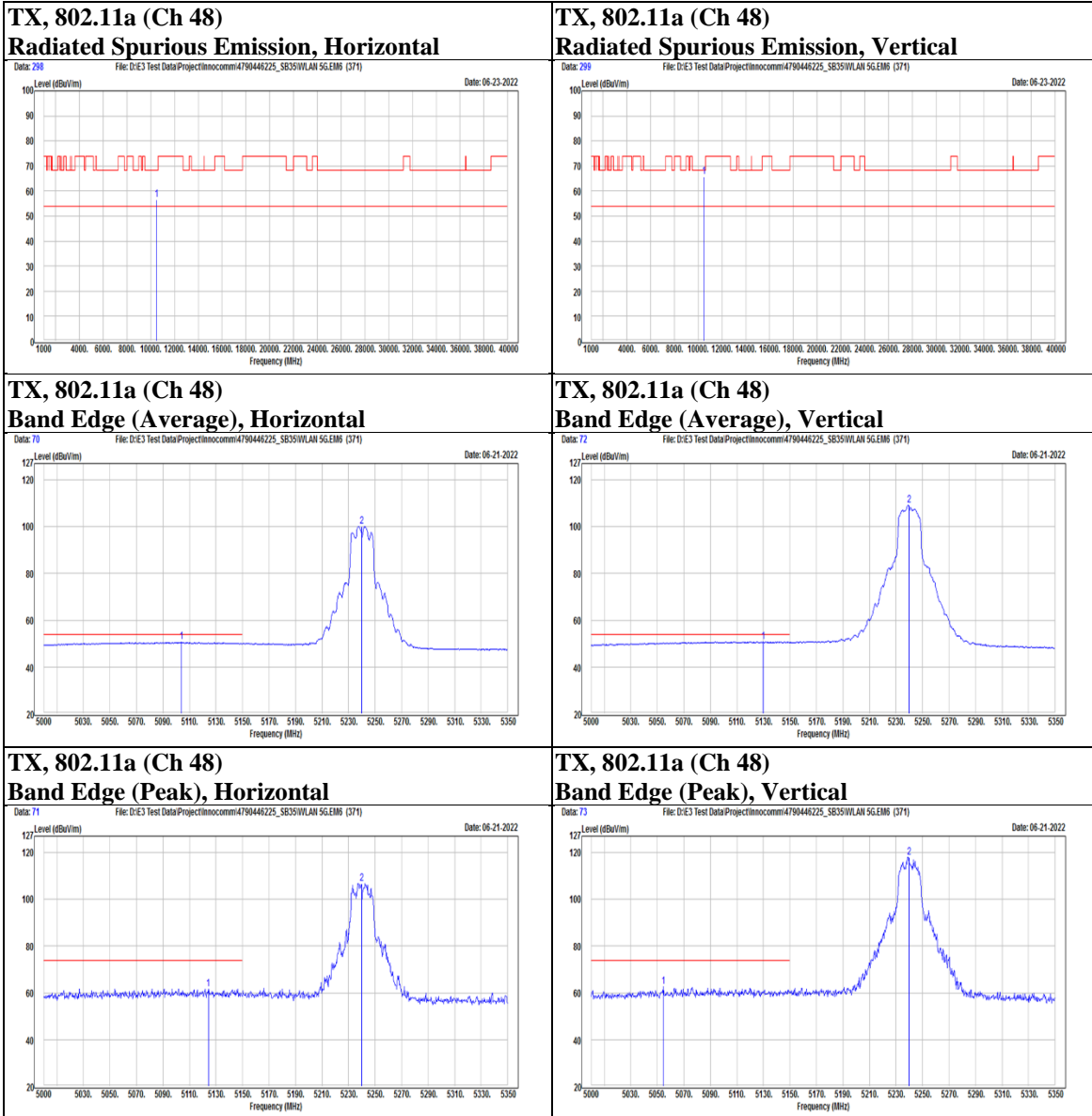
Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948



Test report No. : 4790446225-US-R1-V0

Page : 98 of 250

Issued date : 2022/8/9

FCC ID : YAISB35

Mode	802.11a	Channel	52
------	---------	---------	----

Polarization	Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
		(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
Horizontal	@	5260	87.55	18.88	106.43	N/A	N/A	PK
	@	5260	81.52	18.88	100.4	N/A	N/A	AVG
		5361.3	40.43	19.08	59.51	74	-14.49	PK
		5456.4	28.72	19.55	48.27	54	-5.73	AVG
	*	10520	38.74	17.99	56.73	68.2	-11.47	PK
Vertical	@	5260	98.65	18.88	117.53	N/A	N/A	PK
	@	5260	89.83	18.88	108.71	N/A	N/A	AVG
		5351.7	29.72	19.02	48.74	54	-5.26	AVG
		5458.8	40.09	19.57	59.66	74	-14.34	PK
	*	10520	46.8	17.99	64.79	68.2	-3.41	PK

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

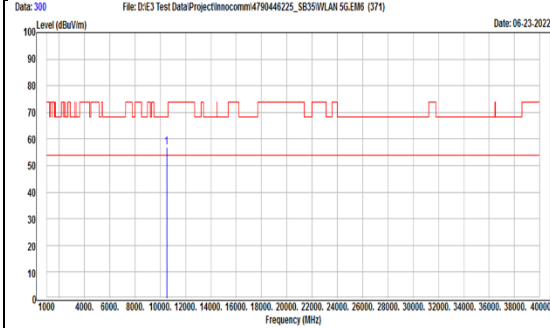
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

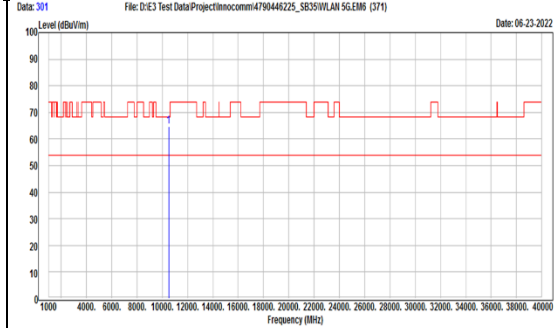
Doc No: 17-EM-F0878 / 6.0



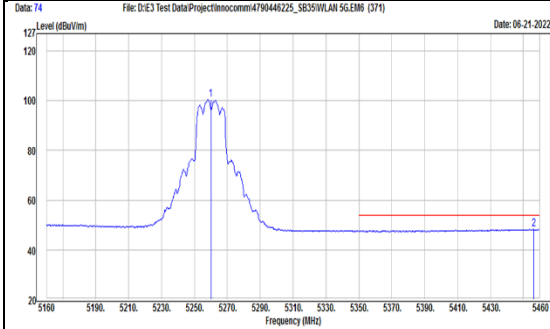
TX, 802.11a (Ch 52)
Radiated Spurious Emission, Horizontal



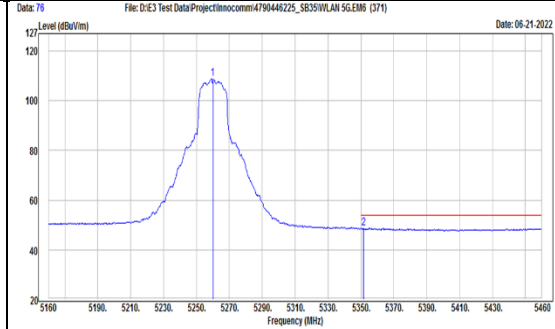
TX, 802.11a (Ch 52)
Radiated Spurious Emission, Vertical



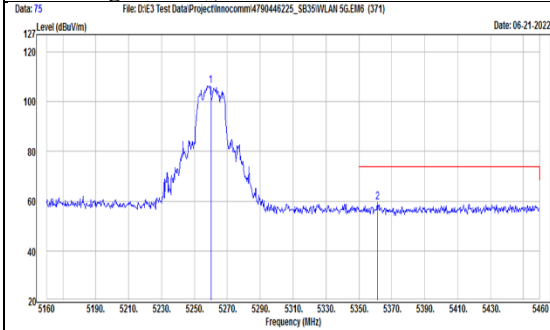
TX, 802.11a (Ch 52)
Band Edge (Average), Horizontal



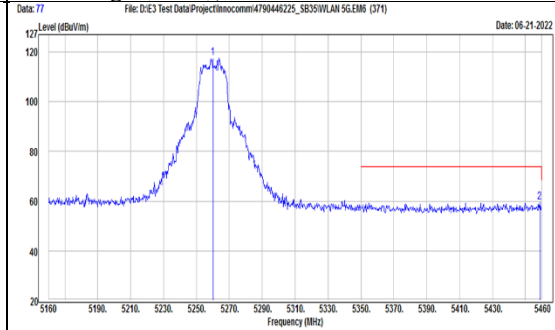
TX, 802.11a (Ch 52)
Band Edge (Average), Vertical



TX, 802.11a (Ch 52)
Band Edge (Peak), Horizontal



TX, 802.11a (Ch 52)
Band Edge (Peak), Vertical





Test report No. : 4790446225-US-R1-V0
Page : 100 of 250
Issued date : 2022/8/9
FCC ID : YAISB35

Mode	802.11a	Channel	60
------	---------	---------	----

Polarization	Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
		(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
Horizontal	@	5300	85.86	18.77	104.63	N/A	N/A	PK
	@	5300	79.07	18.77	97.84	N/A	N/A	AVG
		5421	40.04	19.37	59.41	74	-14.59	PK
		5451.3	28.8	19.53	48.33	54	-5.67	AVG
	*	10600	32.59	18.04	50.63	68.2	-17.57	PK
Vertical	@	5300	96.91	18.77	115.68	N/A	N/A	PK
	@	5300	88.1	18.77	106.87	N/A	N/A	AVG
		5350.8	30.18	19.01	49.19	54	-4.81	AVG
		5437.2	40.15	19.46	59.61	74	-14.39	PK
		10600	40.45	18.04	58.49	68.2	-9.71	PK
		10600	34.67	18.04	52.71	54	-1.29	AVG

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0878 / 6.0