

8.5 場強度之計算

場強之計算公式如下：

結果值 Emission level (dBuV/m) = 機器讀值 Raw Value (dBuV) + 校正因子 Correction Factor (dB/m)

餘裕度 Margin(dB) = 結果值 Emission level (dBuV/m) - 限制值 Limit value (dBuV/m)

*有效等向輻射功率限制值轉換場強值如下：

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v02r01			Field Strength at 3 m	
			PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
操作頻帶	Applicable To		EIRP Limit	Equivalent Field Strength at 3 m
5150~5250 MHz	技術規範 4.7.4.1 節		PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
5250~5350 MHz	技術規範 4.7.4.1 節			
5470~5725 MHz	技術規範 4.7.4.1 節			
5725~5850 MHz	☒	技術規範 4.7.4.2 節	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}
	☐	技術規範 4.7.4.7 節	適用 3.10.1.5 節帶外發射限制	
*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.				

備註：有效等向輻射功率限制值轉換場強之公式如下：

$$E = (30PG)^{1/2} / d$$

E: 以最寬解析頻寬所測得之最大場強值，單位: V/m。

G: 發射天線相對於全向性輻射器之數值增益。

d: 測試場強的距離，單位: m。

P: 求得之功率，單位: W。

量測結果請見下頁。

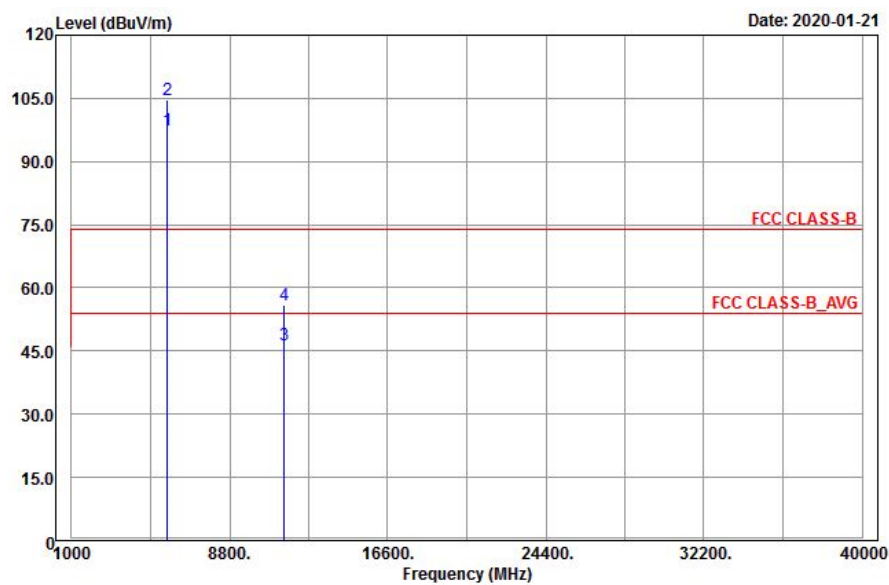
8.6 量測結果

8.6.1 發射諧波

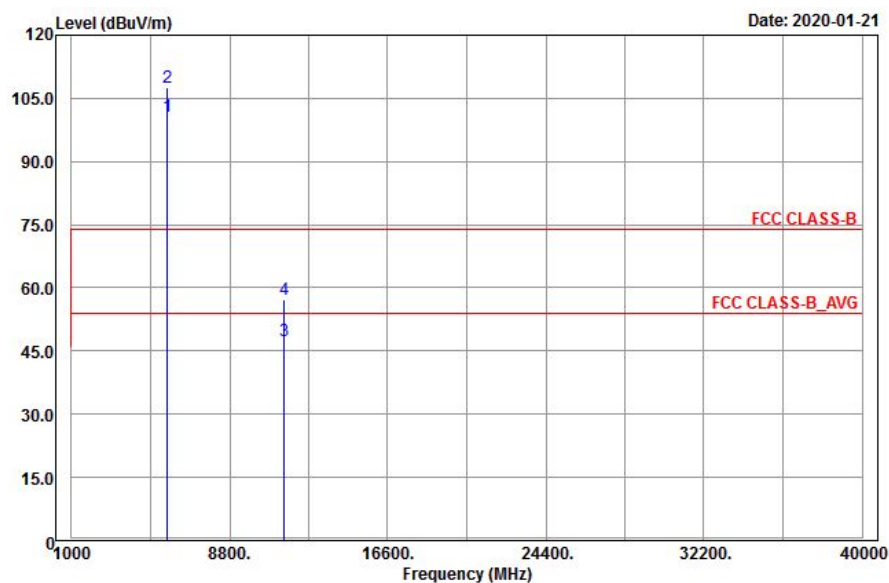
802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	1 GHz ~ 40 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

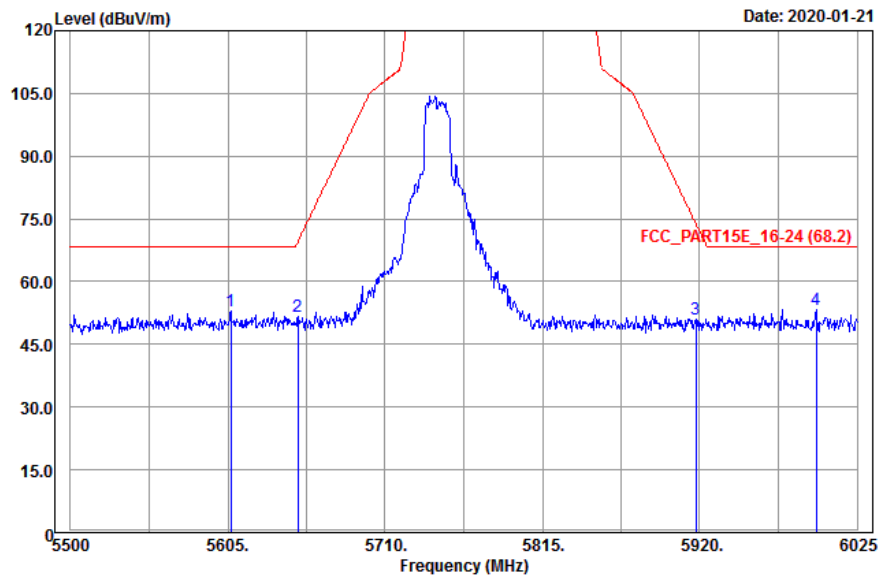
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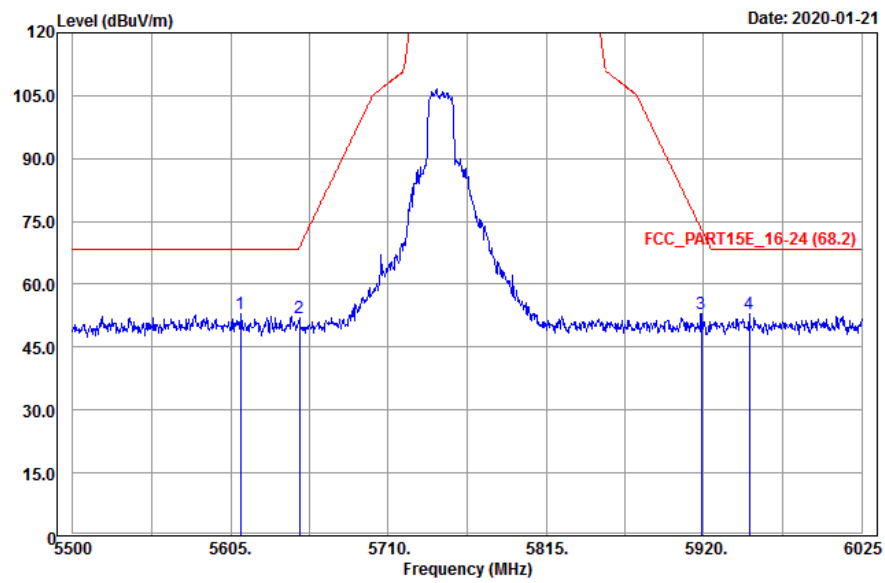
Vertical



<Out of Band Emission (OOBE)> Horizontal



Vertical



<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5745	97.49	86.61	10.88			100	231	Average
5745	104.77	93.89	10.88			100	231	Peak
11490	46.29	29.82	16.47	54	-7.71	183	134	Average
11490	55.94	39.47	16.47	74	-18.06	183	134	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5745	100.58	89.7	10.88			200	306	Average
5745	107.5	96.62	10.88			200	306	Peak
11490	47.48	31.01	16.47	54	-6.52	190	317	Average
11490	57.31	40.84	16.47	74	-16.69	190	317	Peak

<Out of Band Emission (OOBE)>

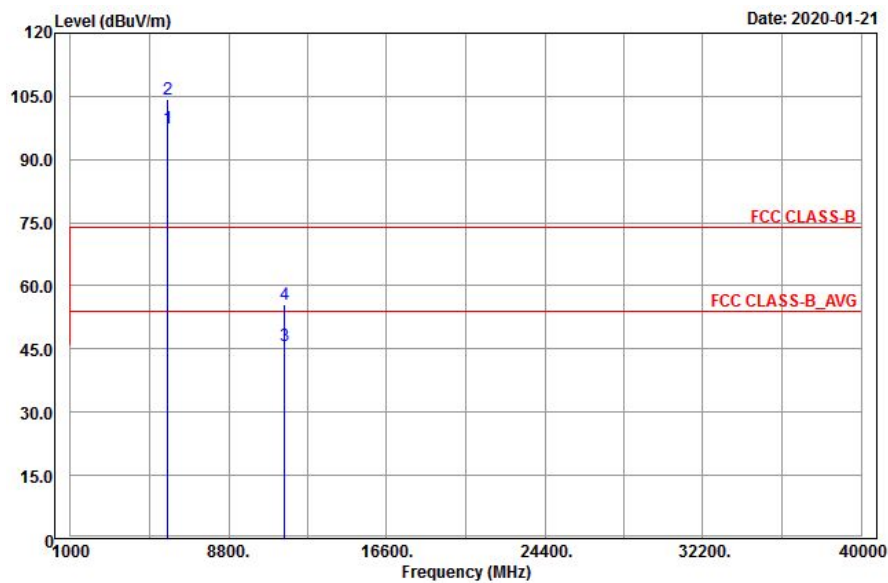
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5607.1	52.83	42.08	10.75	68.2	-15.37	100	231	Peak
5651.725	51.62	40.75	10.87	69.48	-17.86	100	231	Peak
5917.375	50.86	39.77	11.09	73.84	-22.98	100	231	Peak
*5997.7	53.29	41.96	11.33	68.2	-14.91	100	231	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5611.825	52.96	42.19	10.77	68.2	-15.24	200	306	Peak
5650.675	52.12	41.25	10.87	68.7	-16.58	200	306	Peak
5918.425	52.94	41.85	11.09	73.07	-20.13	200	306	Peak
*5950.45	53.12	41.94	11.18	68.2	-15.08	200	306	Peak

Remarks:

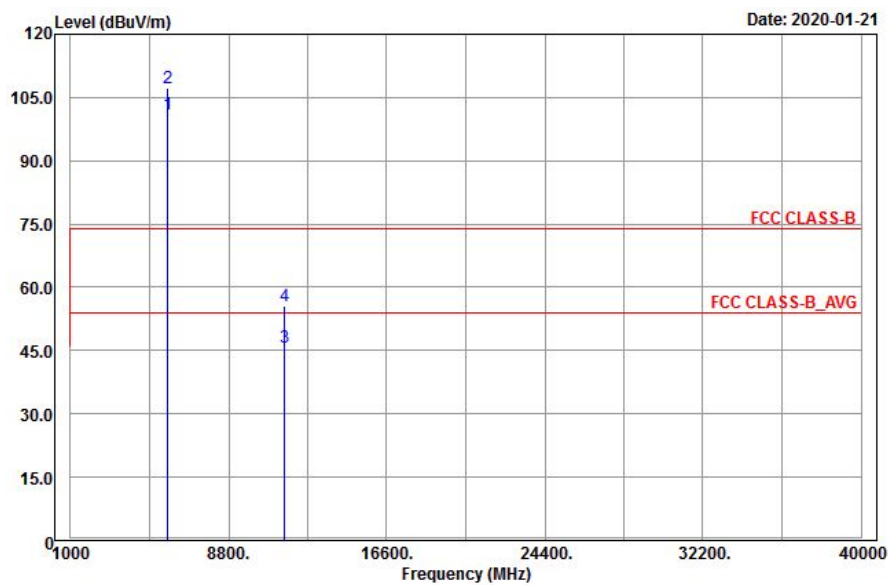
- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 5745 MHz: Fundamental Frequency
- *: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 157	Frequency Range	1 GHz ~ 40 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

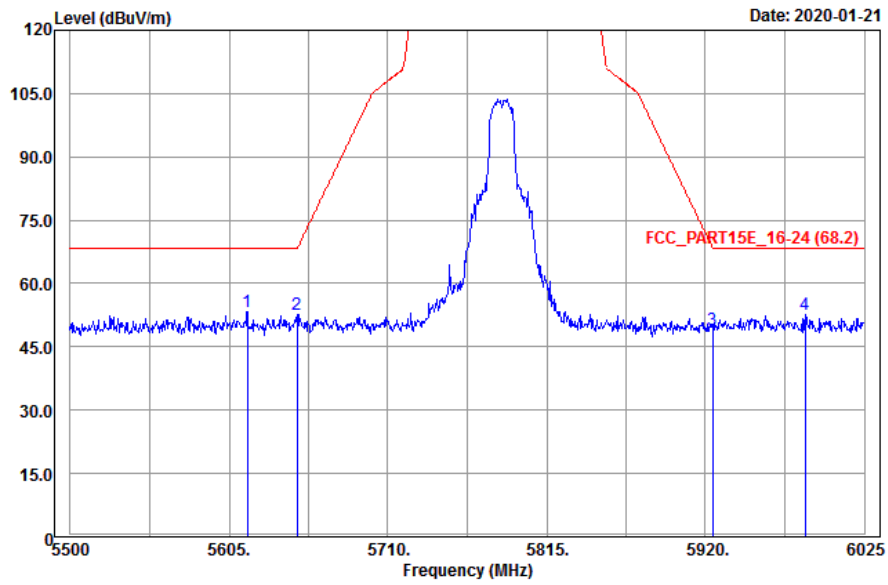
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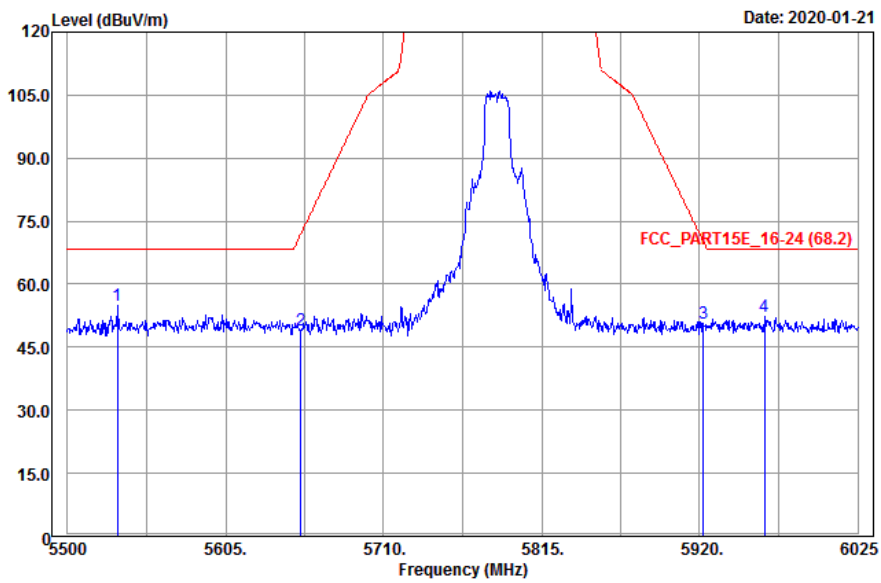
Vertical



<Out of Band Emission (OOBE)> Horizontal



Vertical



<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5785	97.49	86.68	10.81			100	231	Average
5785	104.3	93.49	10.81			100	231	Peak
11570	45.86	29.37	16.49	54	-8.14	105	41	Average
11570	55.51	39.02	16.49	74	-18.49	105	41	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5785	100.88	90.07	10.81			200	306	Average
5785	107.2	96.39	10.81			200	306	Peak
11570	45.72	29.23	16.49	54	-8.28	153	111	Average
11570	55.52	39.03	16.49	74	-18.48	153	111	Peak

<Out of Band Emission (OOBE)>

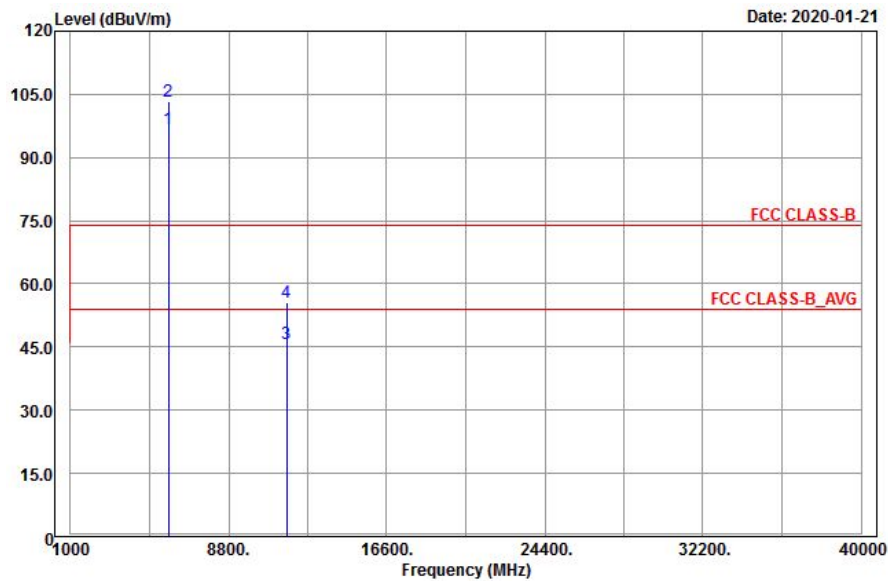
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5617.075	53.41	42.62	10.79	68.2	-14.79	100	231	Peak
5650.15	52.74	41.87	10.87	68.31	-15.57	100	231	Peak
5924.725	48.99	37.88	11.11	68.4	-19.41	100	231	Peak
*5986.15	52.61	41.32	11.29	68.2	-15.59	100	231	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5533.075	54.84	44.2	10.64	68.2	-13.36	200	306	Peak
5654.875	49.15	38.28	10.87	71.81	-22.66	200	306	Peak
5922.625	50.77	39.66	11.11	69.96	-19.19	200	306	Peak
*5963.05	52.23	41	11.23	68.2	-15.97	200	306	Peak

Remarks:

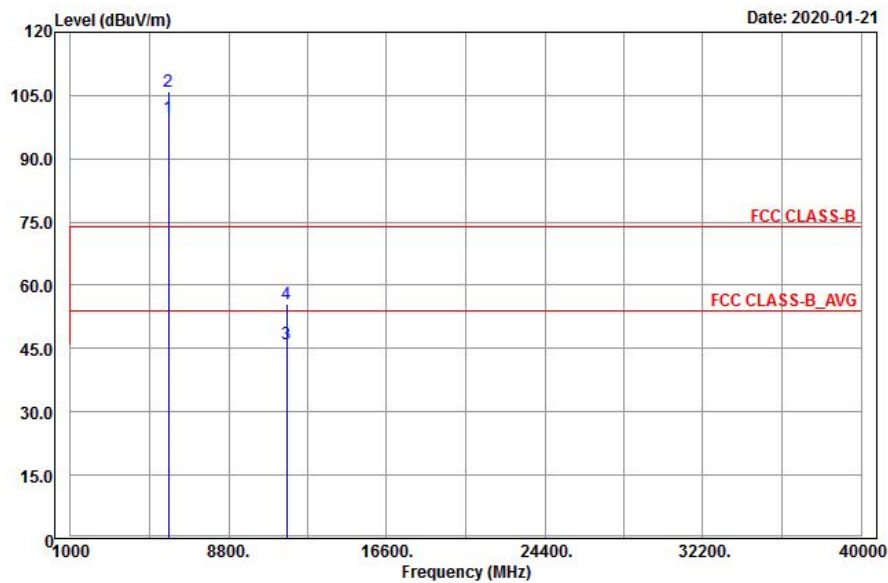
- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 5785 MHz: Fundamental Frequency
- *: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 165	Frequency Range	1 GHz ~ 40 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

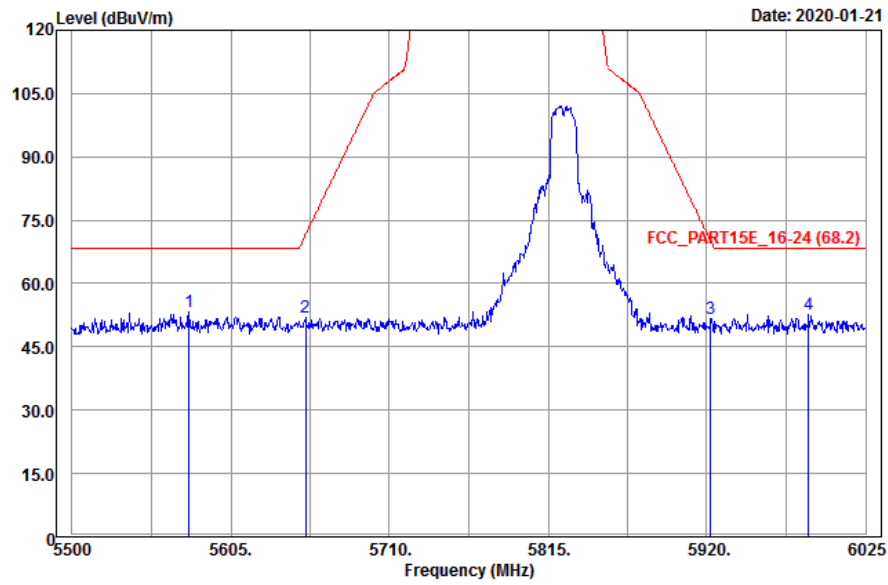
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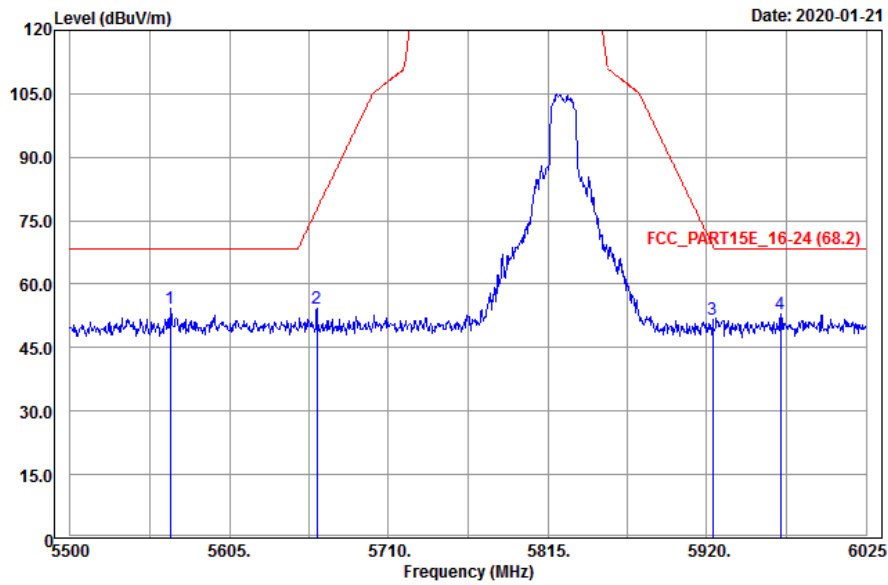
Vertical



<Out of Band Emission (OOBE)> Horizontal



Vertical



<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5825	96.64	85.76	10.88			100	231	Average
5825	103.16	92.28	10.88			100	231	Peak
11650	45.75	28.97	16.78	54	-8.25	192	131	Average
11650	55.53	38.75	16.78	74	-18.47	192	131	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5825	99.66	88.78	10.88			200	306	Average
5825	106.08	95.2	10.88			200	306	Peak
11650	46.13	29.35	16.78	54	-7.87	108	29	Average
11650	55.7	38.92	16.78	74	-18.3	108	29	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5577.175	53.16	42.43	10.73	68.2	-15.04	100	231	Peak
5654.35	51.94	41.07	10.87	71.42	-19.48	100	231	Peak
5922.625	51.61	40.5	11.11	69.96	-18.35	100	231	Peak
*5987.2	52.77	41.46	11.31	68.2	-15.43	100	231	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5566.15	54.43	43.73	10.7	68.2	-13.77	200	306	Peak
5662.75	54.35	43.48	10.87	77.63	-23.28	200	306	Peak
5923.675	51.7	40.59	11.11	69.18	-17.48	200	306	Peak
*5968.825	52.85	41.62	11.23	68.2	-15.35	200	306	Peak

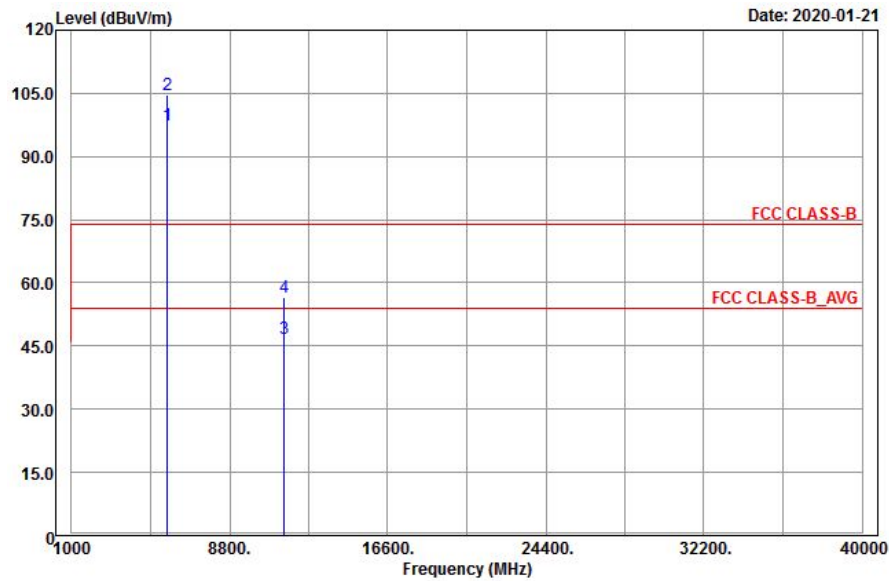
Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 5825 MHz: Fundamental Frequency
- *: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

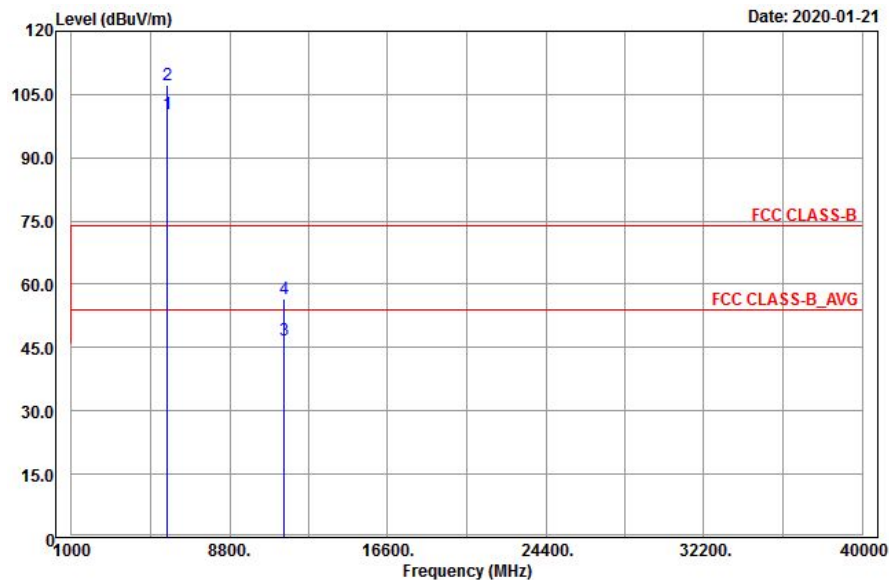
802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	1 GHz ~ 40 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

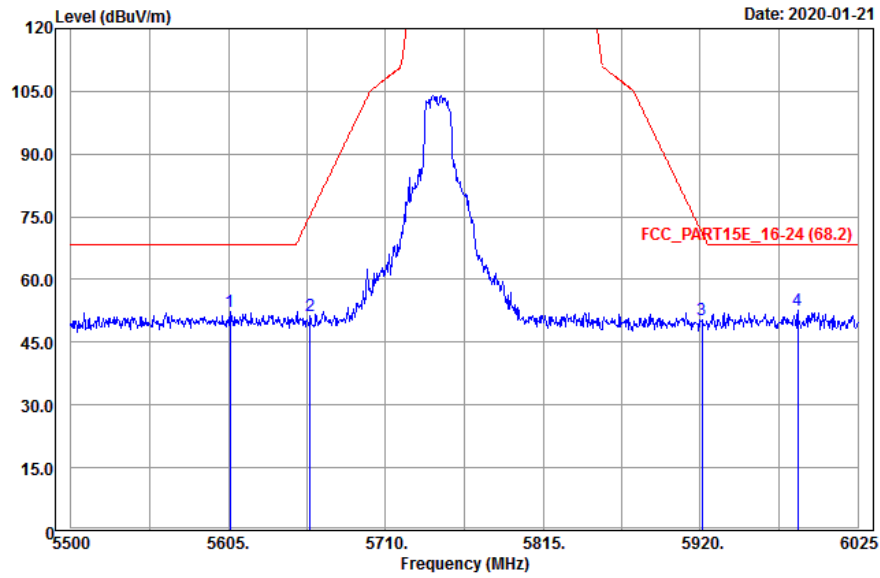
<Spurious Emission> Horizontal



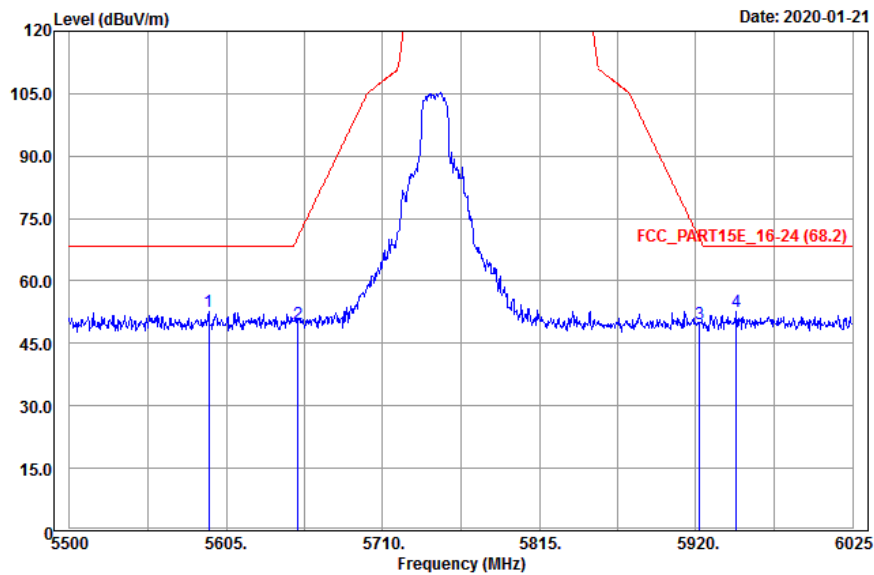
Vertical



<Out of Band Emission (OOBE)> Horizontal



Vertical



<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5745	97.55	86.67	10.88			100	231	Average
5745	104.62	93.74	10.88			100	231	Peak
11490	46.85	30.38	16.47	54	-7.15	172	46	Average
11490	56.43	39.96	16.47	74	-17.57	172	46	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5745	100.41	89.53	10.88			200	306	Average
5745	107.34	96.46	10.88			200	306	Peak
11490	46.92	30.45	16.47	54	-7.08	182	131	Average
11490	56.49	40.02	16.47	74	-17.51	182	131	Peak

<Out of Band Emission (OOBE)>

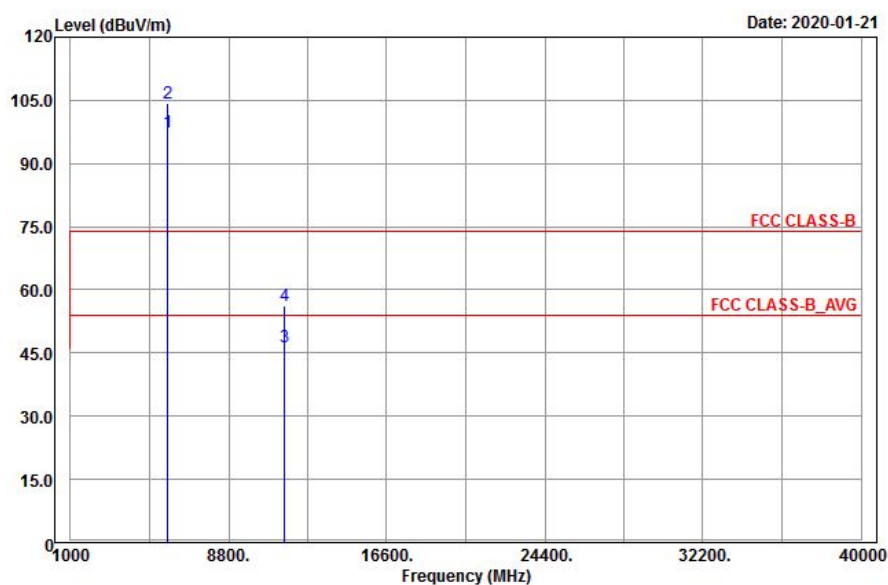
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5606.05	52.36	41.61	10.75	68.2	-15.84	100	231	Peak
5659.6	51.4	40.53	10.87	75.3	-23.9	100	231	Peak
5921.05	50.25	39.16	11.09	71.12	-20.87	100	231	Peak
*5985.1	52.57	41.31	11.26	68.2	-15.63	100	231	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5593.45	52.59	41.84	10.75	68.2	-15.61	200	306	Peak
5653.3	49.66	38.79	10.87	70.64	-20.98	200	306	Peak
5922.625	49.72	38.61	11.11	69.96	-20.24	200	306	Peak
*5947.3	52.73	41.55	11.18	68.2	-15.47	200	306	Peak

Remarks:

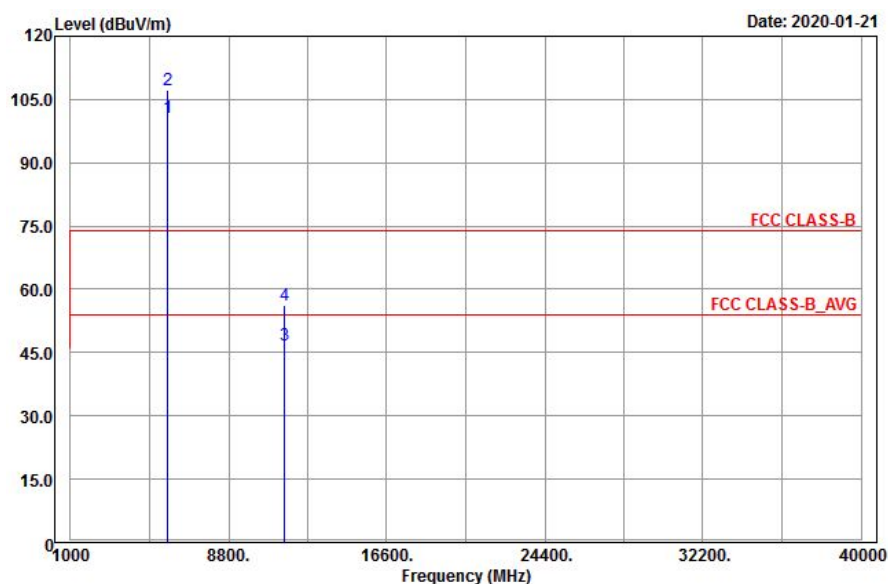
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 5745 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 157	Frequency Range	1 GHz ~ 40 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

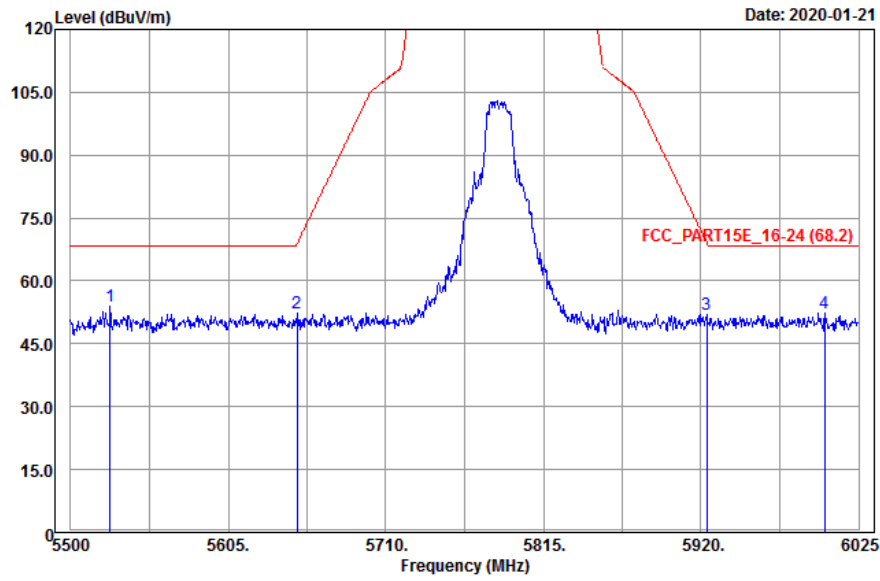
<Spurious Emission> Horizontal



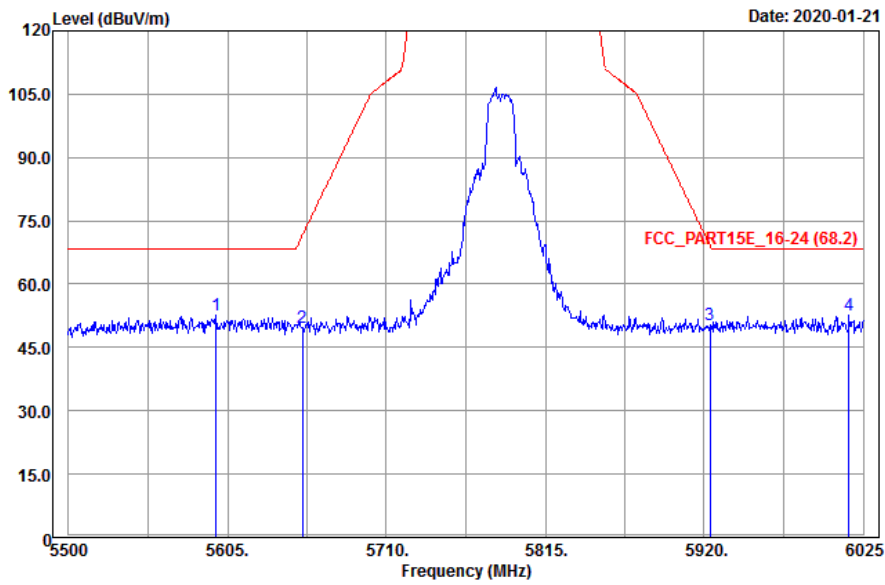
Vertical



<Out of Band Emission (OOBE)> Horizontal



Vertical



<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5785	97.41	86.6	10.81			100	231	Average
5785	104.41	93.6	10.81			100	231	Peak
11570	46.52	30.03	16.49	54	-7.48	156	239	Average
11570	56.2	39.71	16.49	74	-17.8	156	239	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5785	100.77	89.96	10.81			200	306	Average
5785	107.24	96.43	10.81			200	306	Peak
11570	46.74	30.25	16.49	54	-7.26	163	312	Average
11570	56.36	39.87	16.49	74	-17.64	163	312	Peak

<Out of Band Emission (OOBE)>

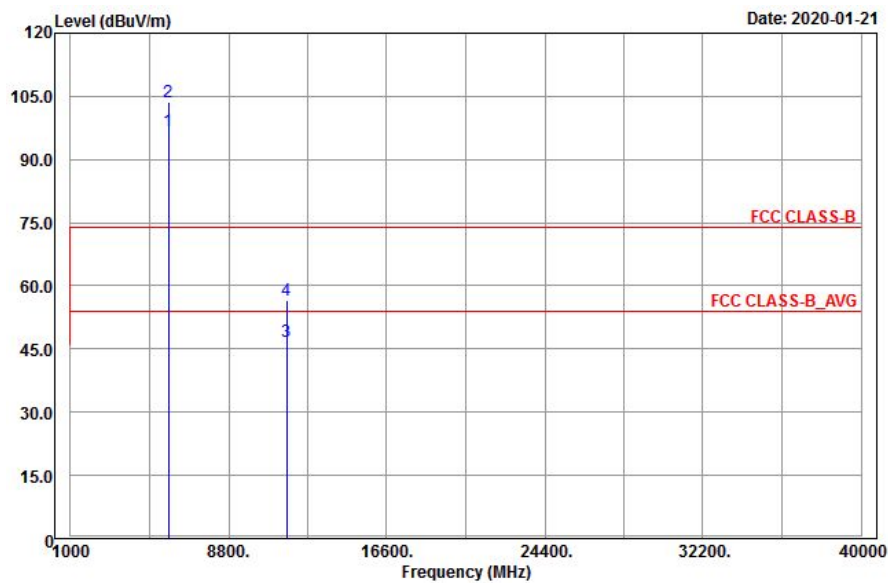
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5526.25	53.9	43.27	10.63	68.2	-14.3	100	231	Peak
5650.675	52.32	41.45	10.87	68.7	-16.38	100	231	Peak
5923.675	52.05	40.94	11.11	69.18	-17.13	100	231	Peak
*6002.425	52.41	41.08	11.33	68.2	-15.79	100	231	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5597.65	52.62	41.87	10.75	68.2	-15.58	200	306	Peak
5654.35	49.7	38.83	10.87	71.42	-21.72	200	306	Peak
5923.675	50.22	39.11	11.11	69.18	-18.96	200	306	Peak
*6015.55	52.59	41.24	11.35	68.2	-15.61	200	306	Peak

Remarks:

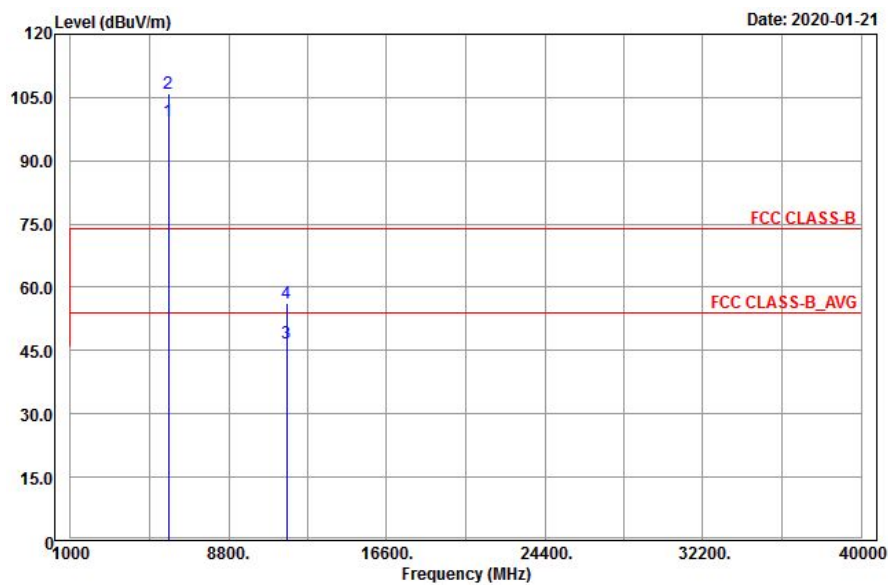
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 5785 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 165	Frequency Range	1 GHz ~ 40 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

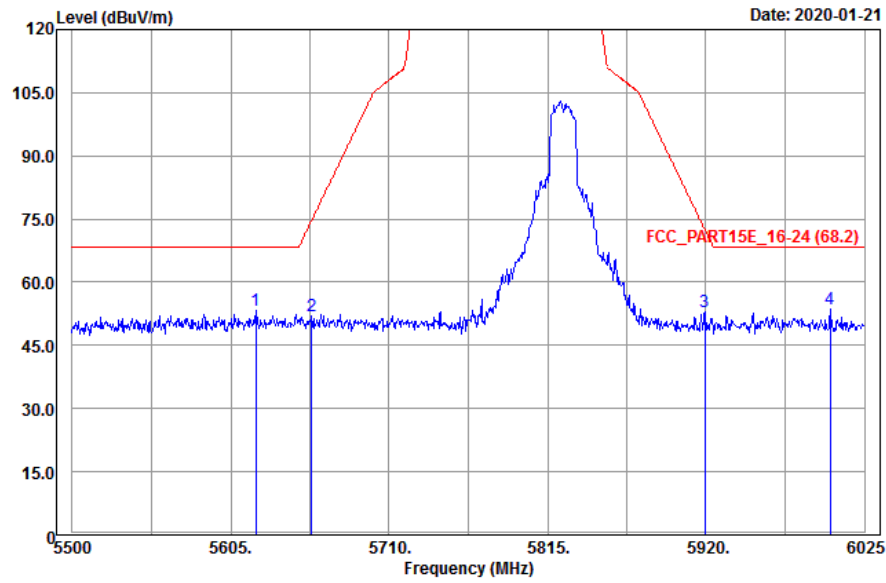
<Spurious Emission> Horizontal



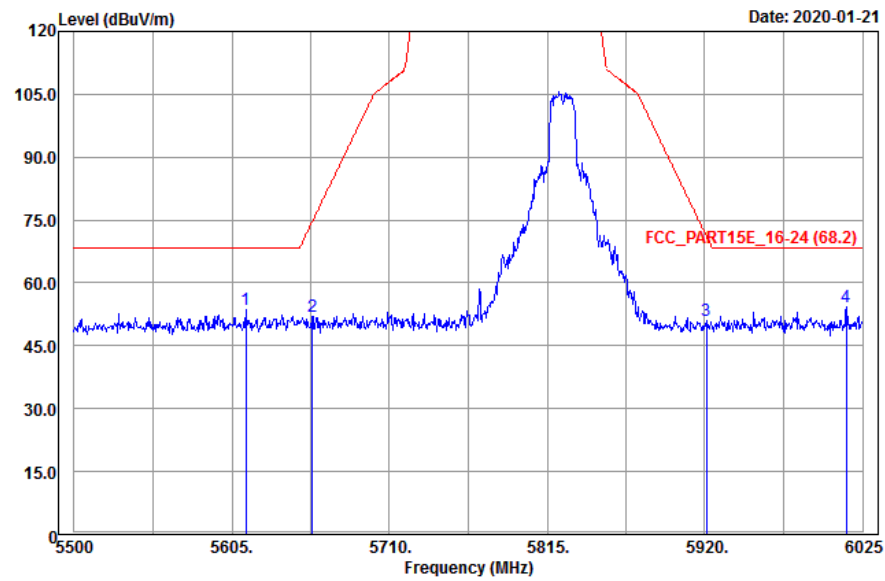
Vertical



<Out of Band Emission (OOBE)> Horizontal



Vertical



<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5825	96.77	85.89	10.88			100	231	Average
5825	103.76	92.88	10.88			100	231	Peak
11650	46.83	30.05	16.78	54	-7.17	120	227	Average
11650	56.67	39.89	16.78	74	-17.33	120	227	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5825	99.38	88.5	10.88			200	306	Average
5825	106.07	95.19	10.88			200	306	Peak
11650	46.69	29.91	16.78	54	-7.31	124	157	Average
11650	56.37	39.59	16.78	74	-17.63	124	157	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5621.8	53.15	42.36	10.79	68.2	-15.05	100	231	Peak
5658.55	51.9	41.03	10.87	74.53	-22.63	100	231	Peak
5919.475	52.91	41.82	11.09	72.29	-19.38	100	231	Peak
*6002.425	53.57	42.24	11.33	68.2	-14.63	100	231	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5614.45	53.61	42.84	10.77	68.2	-14.59	200	306	Peak
5658.55	51.97	41.1	10.87	74.53	-22.56	200	306	Peak
5921.05	50.91	39.82	11.09	71.12	-20.21	200	306	Peak
*6014.5	54.35	43	11.35	68.2	-13.85	200	306	Peak

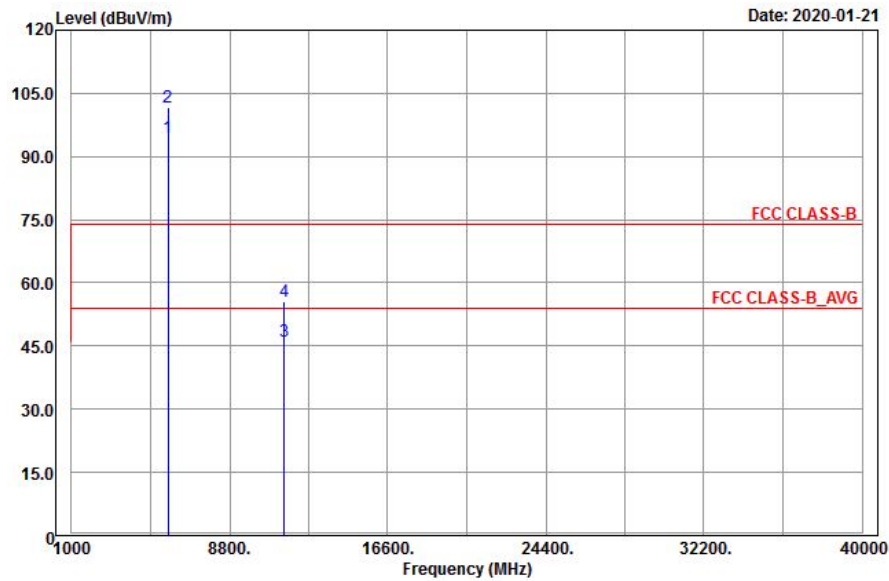
Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 5825 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

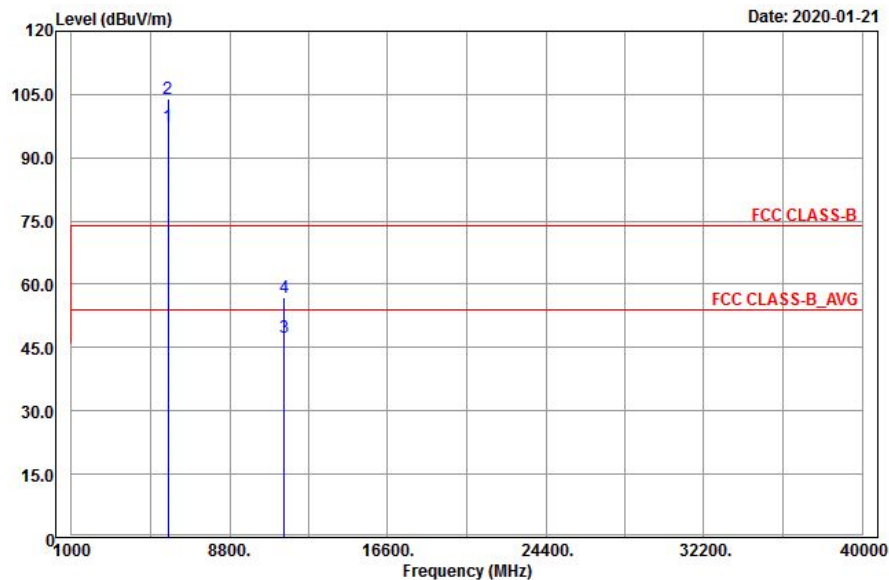
802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 151	Frequency Range	1 GHz ~ 40 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

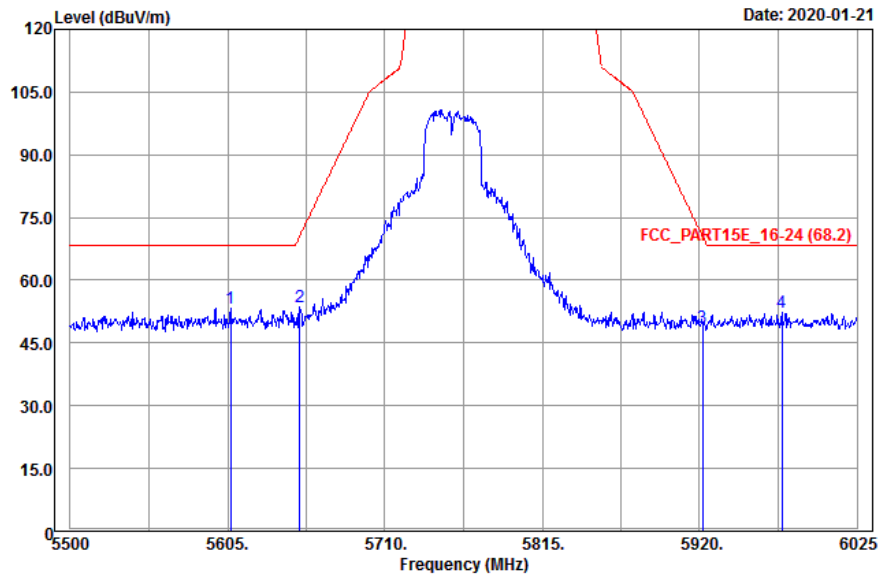
<Spurious Emission> Horizontal



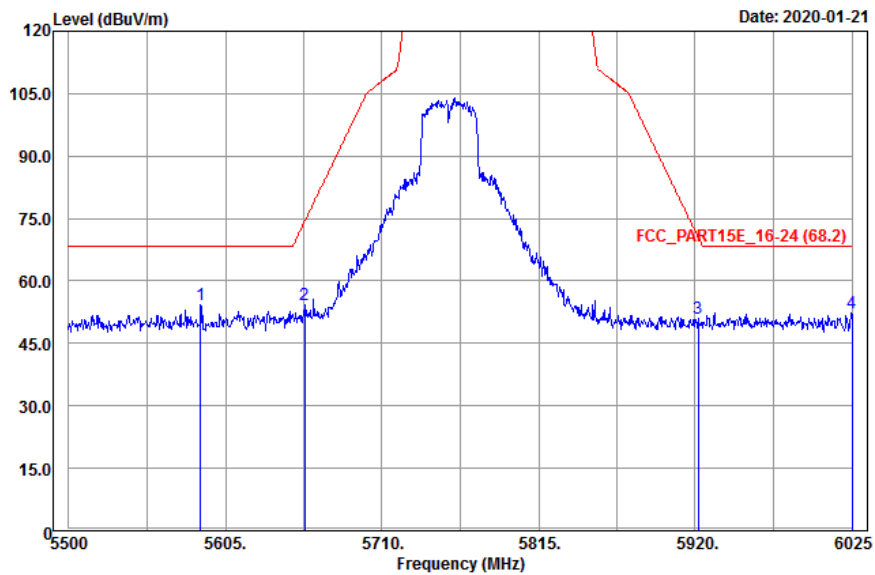
Vertical



<Out of Band Emission (OOBE)> Horizontal



Vertical



<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5755	94.52	83.62	10.9			100	231	Average
5755	101.73	90.83	10.9			100	231	Peak
11510	45.96	29.45	16.51	54	-8.04	131	180	Average
11510	55.61	39.1	16.51	74	-18.39	131	180	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5755	97.36	86.46	10.9			200	306	Average
5755	104.08	93.18	10.9			200	306	Peak
11510	47.46	30.95	16.51	54	-6.54	174	205	Average
11510	57.04	40.53	16.51	74	-16.96	174	205	Peak

<Out of Band Emission (OOBE)>

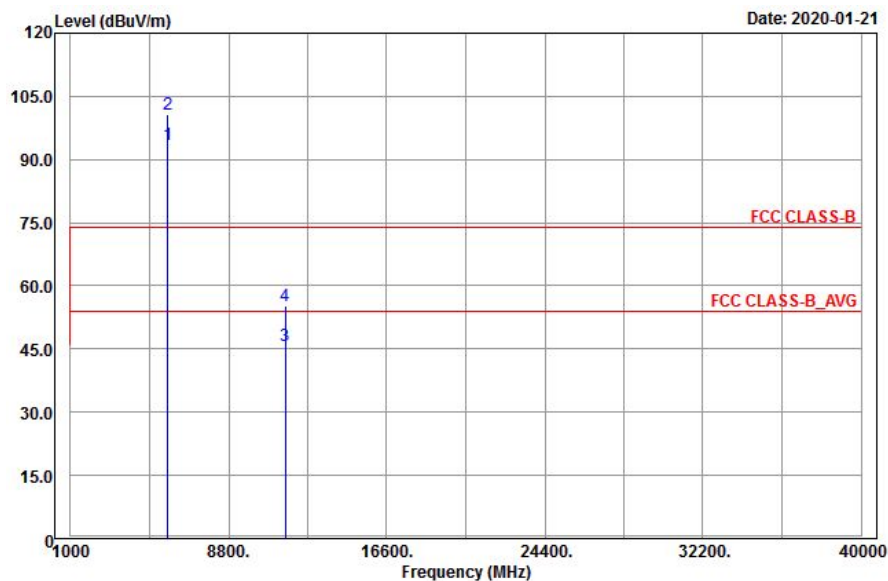
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5607.1	53.32	42.57	10.75	68.2	-14.88	100	231	Peak
5653.3	53.58	42.71	10.87	70.64	-17.06	100	231	Peak
5922.1	48.61	37.5	11.11	70.35	-21.74	100	231	Peak
*5975.125	52.37	41.11	11.26	68.2	-15.83	100	231	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5588.2	54.17	43.44	10.73	68.2	-14.03	200	306	Peak
5658.025	54.23	43.36	10.87	74.14	-19.91	200	306	Peak
5922.1	51.08	39.97	11.11	70.35	-19.27	200	306	Peak
*6025	52.26	40.89	11.37	68.2	-15.94	200	306	Peak

Remarks:

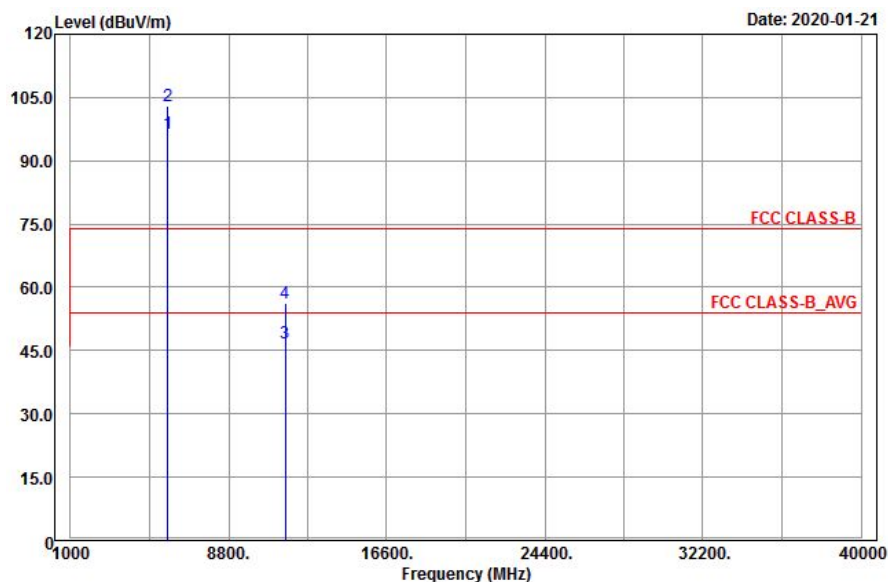
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 5755 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 159	Frequency Range	1 GHz ~ 40 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

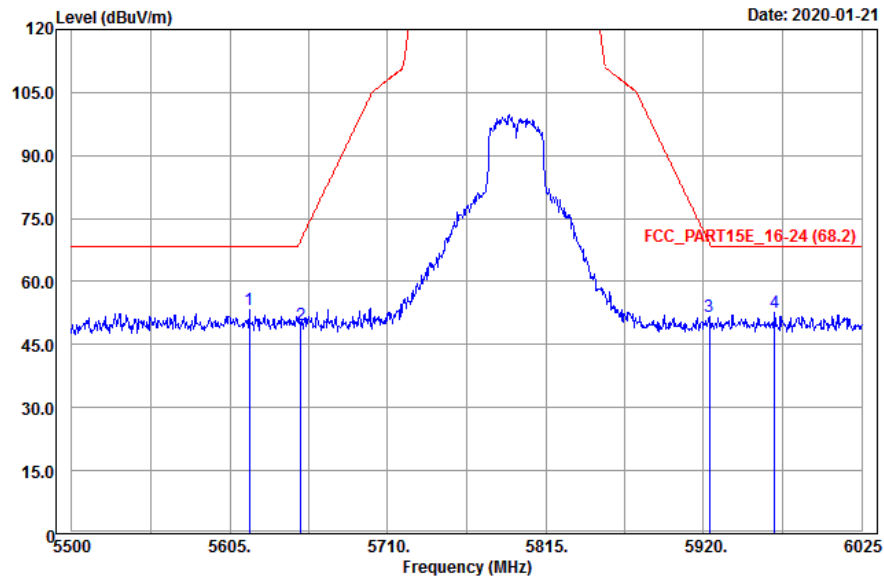
<Spurious Emission> Horizontal



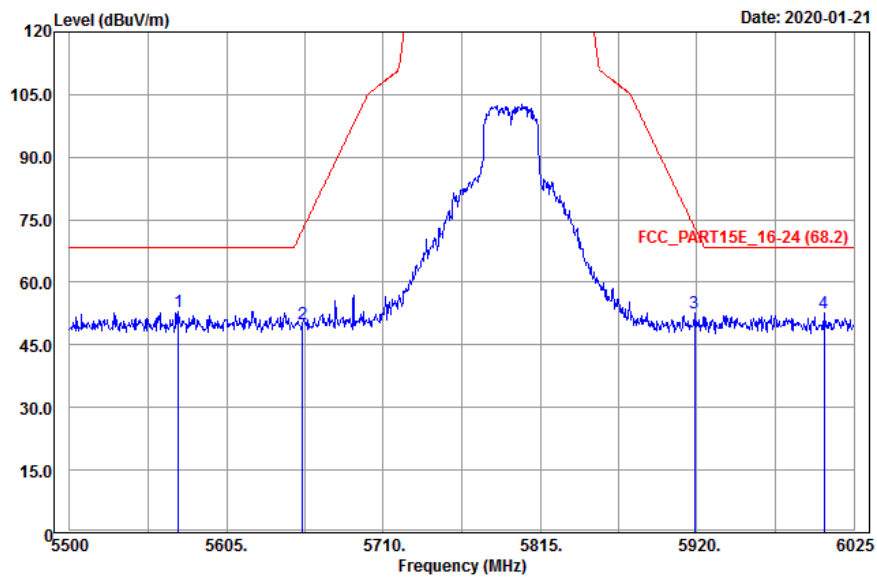
Vertical



<Out of Band Emission (OOBE)> Horizontal



Vertical



<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5795	93.41	82.59	10.82			100	231	Average
5795	100.72	89.9	10.82			100	231	Peak
11590	45.77	29.26	16.51	54	-8.23	123	346	Average
11590	55.28	38.77	16.51	74	-18.72	123	346	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5795	96.47	85.65	10.82			200	306	Average
5795	103.11	92.29	10.82			200	306	Peak
11590	46.64	30.13	16.51	54	-7.36	184	112	Average
11590	56.16	39.65	16.51	74	-17.84	184	112	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5618.125	53.16	42.37	10.79	68.2	-15.04	100	231	Peak
5652.25	49.55	38.68	10.87	69.86	-20.31	100	231	Peak
5923.675	51.69	40.58	11.11	69.18	-17.49	100	231	Peak
*5967.25	52.78	41.55	11.23	68.2	-15.42	100	231	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
*5572.975	52.98	42.28	10.7	68.2	-15.22	200	306	Peak
5655.925	50.19	39.32	10.87	72.58	-22.39	200	306	Peak
5918.425	52.67	41.58	11.09	73.07	-20.4	200	306	Peak
*6005.05	52.51	41.18	11.33	68.2	-15.69	200	306	Peak

Remarks:

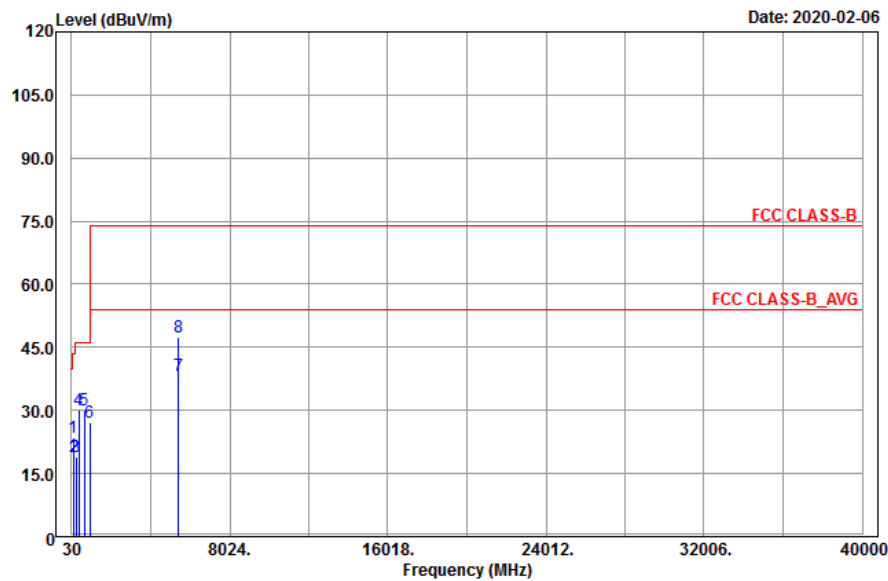
- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 5795 MHz: Fundamental Frequency
- *: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

8.6.2 接收諧波

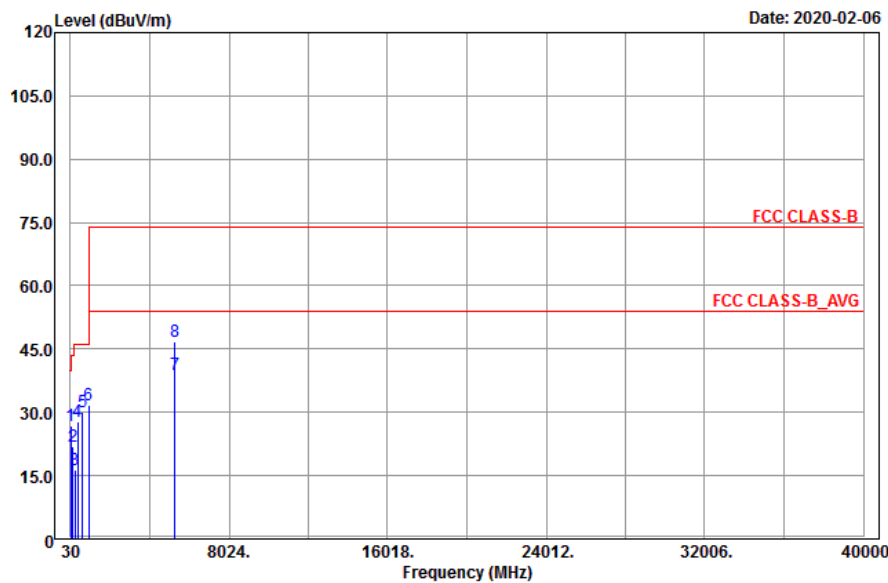
802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	30 MHz ~ 40 GHz
Input Power	12 Vdc	Detector Function	Above 1 GHz: Peak (PK) & Average (AV) Below 1 GHz: Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
102.9	23.68	42.3	-18.62	43.5	-19.82	125	304	Peak
157.17	18.92	41.03	-22.11	43.5	-24.58	148	176	Peak
257.07	18.84	36.56	-17.72	46	-27.16	150	86	Peak
411.3	29.94	44.61	-14.67	46	-16.06	171	23	Peak
666.1	30.08	40.51	-10.43	46	-15.92	189	105	Peak
937	27.05	32.99	-5.94	46	-18.95	133	56	Peak
5428	38.36	29.17	9.19	54	-15.64	196	311	Average
5428	47.36	38.17	9.19	74	-26.64	196	311	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
52.68	26.81	43.76	-16.95	40	-13.19	190	122	Peak
154.2	21.75	43.97	-22.22	43.5	-21.75	169	340	Peak
257.07	16.48	34.2	-17.72	46	-29.52	170	224	Peak
401	27.69	42.57	-14.88	46	-18.31	151	100	Peak
623	30.1	41.19	-11.09	46	-15.9	127	115	Peak
937.7	31.59	37.51	-5.92	46	-14.41	164	139	Peak
5302	38.76	29.81	8.95	54	-15.24	128	66	Average
5302	46.76	37.81	8.95	74	-27.24	128	66	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

8.6.3 其它不必要之訊號

9 kHz ~ 30 MHz Data:

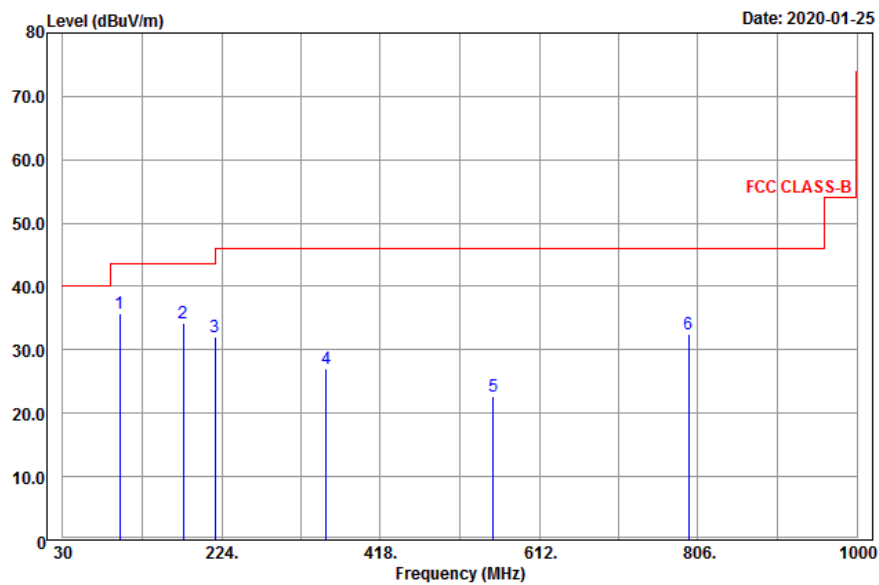
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Data:

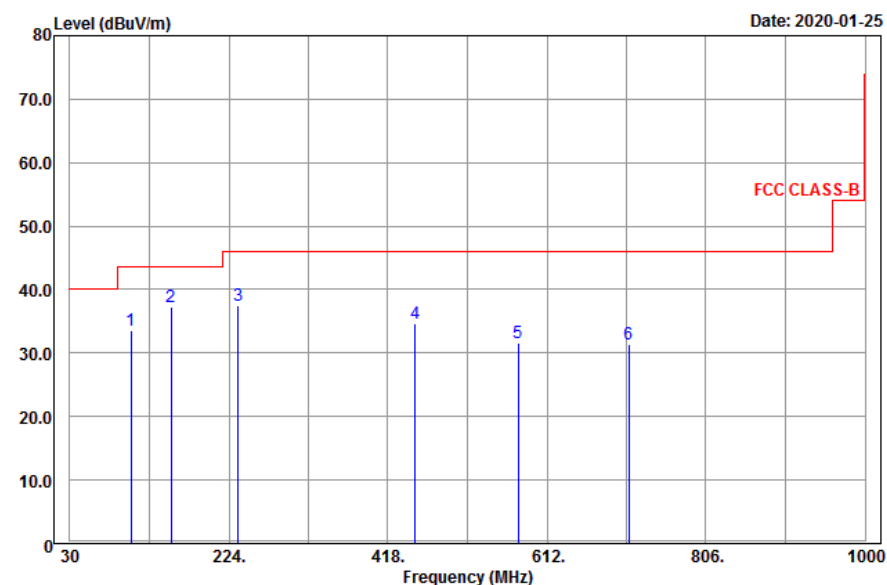
802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	30 MHz ~ 1 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
99.66	35.79	52.99	-17.2	43.5	-7.71	154	180	Peak
176.88	34.15	54.05	-19.9	43.5	-9.35	113	207	Peak
216.03	31.97	49.92	-17.95	46	-14.03	169	217	Peak
351.8	26.94	41.64	-14.7	46	-19.06	188	203	Peak
555.5	22.68	34.15	-11.47	46	-23.32	195	111	Peak
794.2	32.5	40.2	-7.7	46	-13.5	185	3	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
104.25	33.54	50.65	-17.11	43.5	-9.96	125	76	Peak
153.39	37.24	58.11	-20.87	43.5	-6.26	119	267	Peak
235.47	37.42	54.65	-17.23	46	-8.58	106	118	Peak
451.2	34.68	47.94	-13.26	46	-11.32	185	119	Peak
577.2	31.55	42.55	-11	46	-14.45	174	133	Peak
712.3	31.37	40.39	-9.02	46	-14.63	121	28	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. The emission levels of other frequencies were very low against the limit

8.7 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

9 峰值傳導輸出功率量測及發射頻寬之要求

9.1 適用標準

待測物操作頻帶	適用標準
☐ 5.15 GHz~5.25 GHz	☐ 請見本報告 3.1 節第 6 項(2)(A)及 4 項(2)(A)的規定(供戶外操作使用)
	☐ 請見本報告 3.1 節第 6 項(2)(A)及 4 項(2)(B)的規定(供室內操作使用)
	☐ 請見本報告 3.1 節第 6 項(2)(A)及 4 項(2)(C)的規定(供固定式點對點操作使用)
	☐ 請見本報告 3.1 節第 6 項(2)(B)及 4 項(2)(D)的規定(供用戶端裝置使用)
☐ 5.25 GHz~5.35 GHz	請見本報告 3.1 節第(4)項(3)及(6)項(3)的規定
☐ 5.470 GHz~5.725 GHz	請見本報告 3.1 節第(4)項(3)及(6)項(3)的規定
☒ 5.725 GHz~5.850 GHz	請見本報告 3.1 節第(4)項(4)及(6)項(4)的規定

9.2 量測方法

輸出峰值功率量測方法：

- 將待測物輸出經由衰減器接到功率計上。
- 設定待測物處於連續發射狀態，設置功率計的 gate 功能確保量測功率皆為 Burst on 的功率。
- 計算其輸出功率峰值。

For transmission above 5.725 GHz where the EBW crosses 5.725 GHz

- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 設定頻譜掃瞄寬為 26 dB occupied bandwidth。
- 設置解析頻寬為 1 MHz，視訊頻寬為 3 倍的解析頻寬。
- 設置測試掃瞄點數要大於 2 倍的(span/RBW)。
- 設置檢波器為 RMS。
- 設置掃瞄時間為 auto。
- 設置 Trigger 模式為 free run (當 Duty cycle 大於 98 %)；設置 Trigger 模式為 Video trigger (當 Duty cycle 小於 98 %)。
- 設置 Trace mode 為 average 至少 100 次。
- 待掃描結果穩定。
- 使用頻譜的內建 band power 功能，量測 26 dB bandwidth 內最大功率值。

發射頻寬量測方法：

- 將待測物輸出經由衰減器接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 最大輸出功率峰值減 26 dB 的最大頻率範圍。

9.3 量測儀器

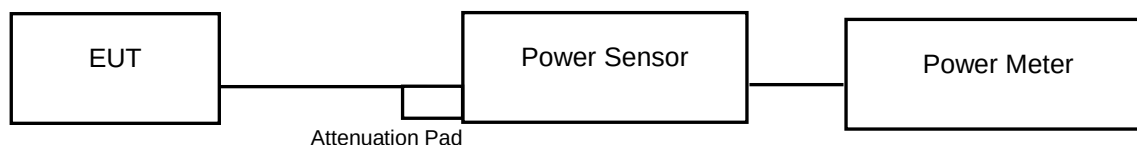
Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter	ML2495A	1232002	Dec. 10, 2019	Dec. 09, 2020
Power Sensor	MA2411B	1207325	Dec. 10, 2019	Dec. 09, 2020
Spectrum Analyzer R&S	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020

Note:

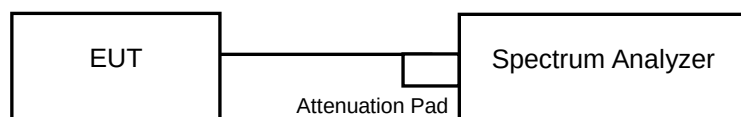
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The spectrum measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.
3. The power meter measurement uncertainty is 1.393dB, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

9.4 測試配置

輸出峰值功率測試配置:



發射頻寬之測試配置:



9.5 量測結果

操作模式	發射	測試日期	109 年 02 月 04 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Gavin Wu		

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	21.232	13.27	30	Pass
157	5785	18.45	12.66	30	Pass
165	5825	17.701	12.48	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	21.38	13.30	30	Pass
157	5785	17.906	12.53	30	Pass
165	5825	15.885	12.01	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
151	5755	19.011	12.79	30	Pass
159	5795	16.866	12.27	30	Pass

9.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

10 功率頻譜密度之量測

10.1 適用標準

待測物操作頻帶	適用標準
☐ 5.15 GHz~5.25 GHz	☐ 請見本報告 3.1 節第 7 項(2) (A)及 4 項(2)(A)的規定(供戶外操作使用)
	☐ 請見本報告 3.1 節第 7 項(2)(A)及 4 項(2)(B)的規定(供室內操作使用)
	☐ 請見本報告 3.1 節第 7 項(2)(A)及 4 項(2)(C)的規定(供固定式點對點操作使用)
	☐ 請見本報告 3.1 節第 7 項(2)(B)及 4 項(2)(D)的規定(供用戶端裝置使用)
☐ 5.25 GHz~5.35 GHz	請見本報告 3.1 節第(4)項(3)及(7)項(3)的規定
☐ 5.470 GHz~5.725 GHz	請見本報告 3.1 節第(4)項(3)及(7)項(3)的規定
☒ 5.725 GHz~5.850 GHz	請見本報告 3.1 節第(4)項(4)及(7)項(4)的規定

10.2 量測方法

※For U-NII-3: with duty cycle & Duty cycle <98 %時

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW $\geq$ 1 RBW, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. 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 $BWCF = 10\log(500 \text{ kHz}/300 \text{ kHz})$
5. Sweep time = auto, trigger set to "free run".
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add $10 \log (1/\text{duty cycle})$

10.3 量測儀器

同 7.3 節。

10.4 測試配置

同 7.4 節

10.5 量測結果

操作模式	發射	測試日期	109 年 02 月 04 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Gavin Wu		

For U-NII-3 Band

802.11a

Channel	Frequency (MHz)	PSD w/o Duty Factor		Duty Factor (dB)	PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
		(dBm/300 kHz)	(dBm/500 kHz)				
149	5745	-4.09	-1.87	0.36	-1.51	30	Pass
157	5785	-4.18	-1.96	0.36	-1.60	30	Pass
165	5825	-4.70	-2.48	0.36	-2.12	30	Pass

Note: Refer to section 2.1 註7 for duty cycle spectrum plot.

802.11n (HT20)

Channel	Frequency (MHz)	PSD w/o Duty Factor		Duty Factor (dB)	PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
		(dBm/300 kHz)	(dBm/500 kHz)				
149	5745	-4.11	-1.89	0.24	-1.65	30	Pass
157	5785	-5.19	-2.97	0.24	-2.73	30	Pass
165	5825	-5.35	-3.13	0.24	-2.89	30	Pass

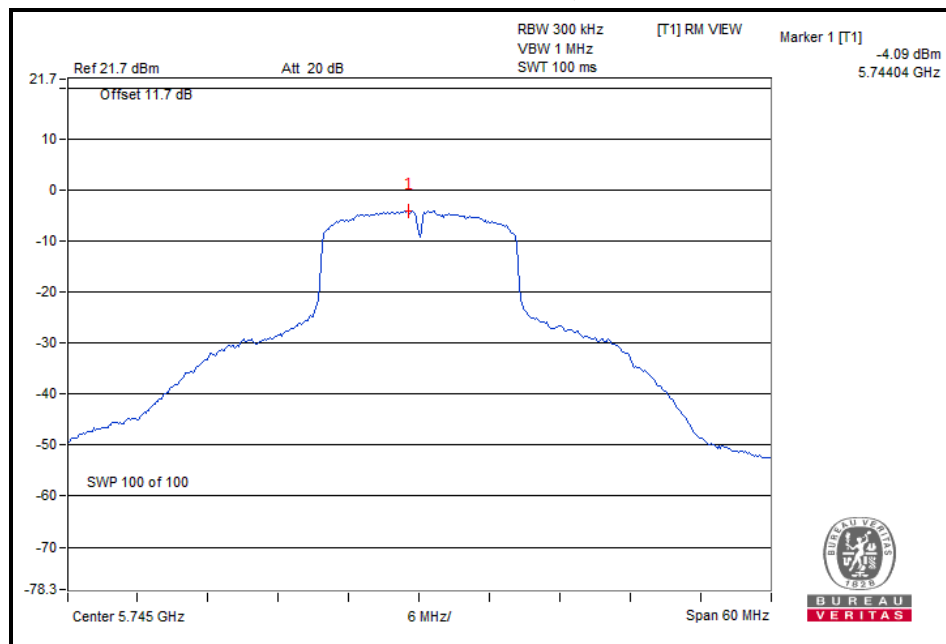
NOTE: Refer to section 2.1 註7 for duty cycle spectrum plot.

802.11n (HT40)

Channel	Frequency (MHz)	PSD w/o Duty Factor		Duty Factor (dB)	PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
		(dBm/300 kHz)	(dBm/500 kHz)				
151	5755	-8.38	-6.16	0.46	-5.70	30	Pass
159	5795	-9.13	-6.91	0.46	-6.45	30	Pass

NOTE: Refer to section 2.1 註7 for duty cycle spectrum plot.

**此測試圖僅放測試結果最差的頻道。



10.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

11 6 dB 頻寬之要求

11.1 適用標準

待測物操作頻帶	適用標準
☒ 5.725 GHz ~ 5.850 GHz	請見本報告 3.1 節第(5)項(2)的規定

11.2 量測方法

- 將待測物輸出經由衰減器接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 計算由最大輸出功率峰值減 6 dB 的最大頻率範圍。

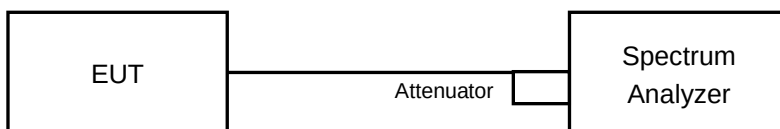
11.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

11.4 測試配置



11.5 量測結果

操作模式	發射	測試日期	109 年 02 月 04 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Gavin Wu		

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.17	0.5	Pass
157	5785	15.16	0.5	Pass
165	5825	15.15	0.5	Pass

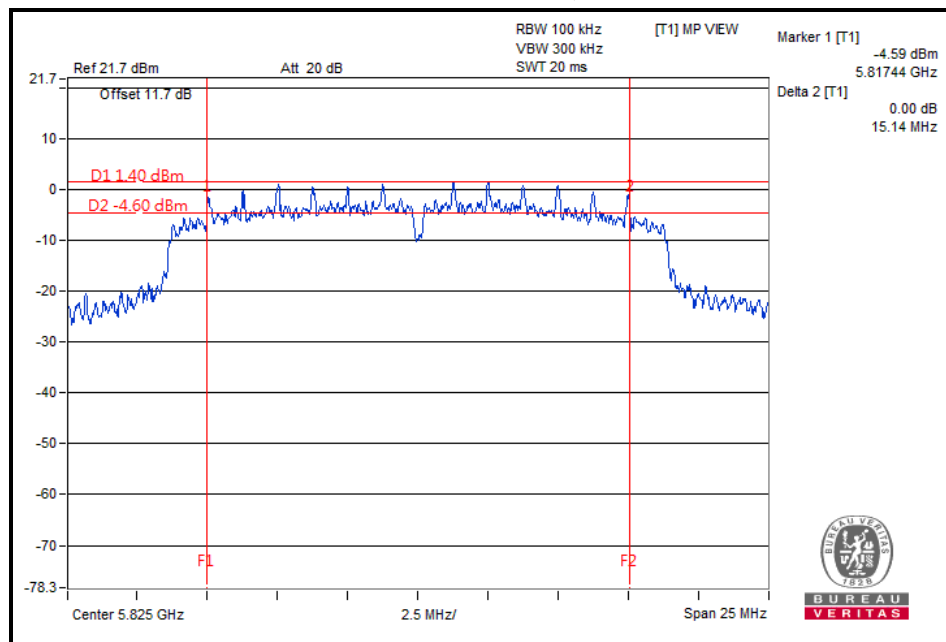
802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.15	0.5	Pass
157	5785	15.16	0.5	Pass
165	5825	15.14	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.12	0.5	Pass
159	5795	35.24	0.5	Pass

**此測試圖僅放測試結果最差的頻道。



11.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

BLUETOOTH EDR 頻段測試紀錄結果

12 帶外發射之量測

12.1 適用標準

請見本報告 3.1 節第(14)項的規定。

12.2 量測方法

在電波暗室，將待測物置於 0.8 米高的非金屬桌面，使其操作在工作狀態。接收天線置於 3 米距離。桌面要 360 度旋轉，另外接收天線從離地 1 米至 4 米升降變化，以找出最大的輻射電場強度，接收天線分別置於水平、垂直極化各執行測試一次。

Note: 對於 1 GHz 以上場強輻射的測試，待測物則置於 1.5 米高的非金屬桌面。

發射諧波：

Peak 為 RBW = 1 MHz, VBW = 3 MHz；

Average 為 RBW = 1 MHz, VBW = 1 kHz

接收諧波：

Below 1 GHz

Peak 為 RBW = 120 kHz, VBW = 360 kHz；Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

Above 1 GHz:

Peak 為 RBW = 1 MHz, VBW = 3 MHz；Average 為 RBW = 1 MHz, VBW = 1 kHz

其它不必要之訊號

Peak 為 RBW = 120 kHz, VBW = 360 kHz；Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

12.3 量測儀器

同 4.3 節

12.4 測試配置

同 0 節

12.5 場強度之計算

同 4.5 節

量測結果請見下頁。

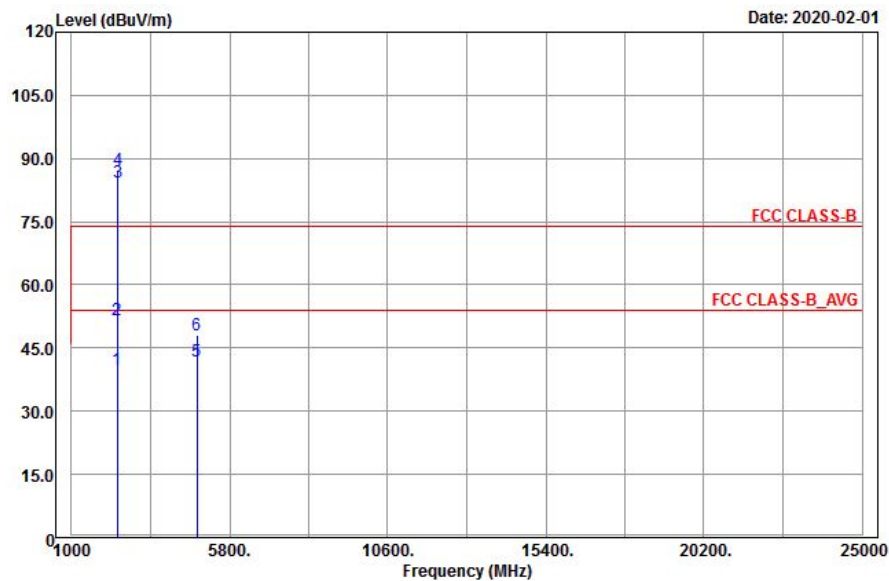
12.6 量測結果

12.6.1 發射諧波

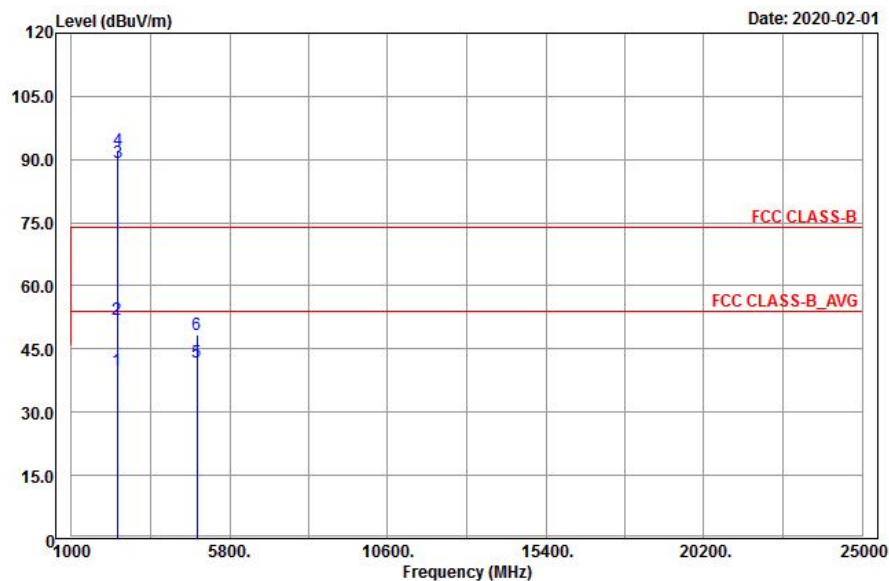
GFSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



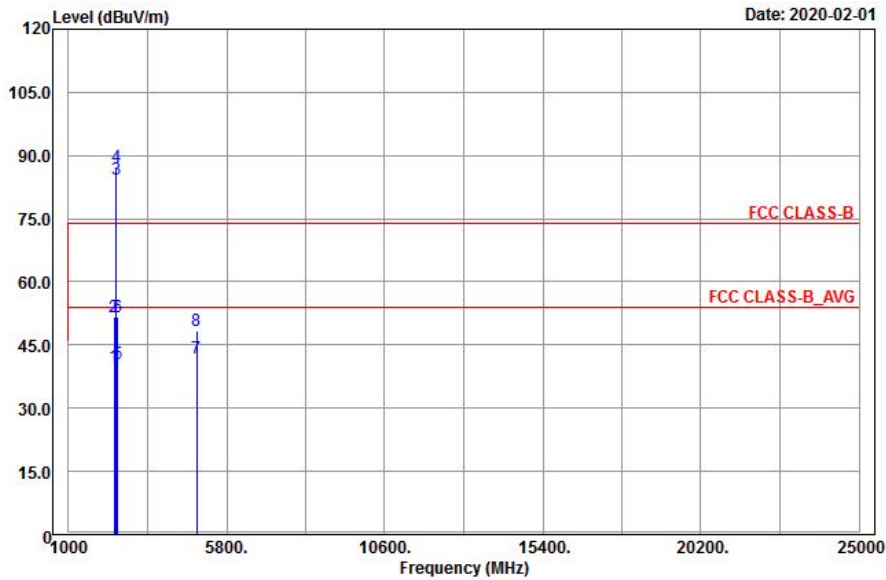
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2378.67	40.03	35.56	4.47	54	-13.97	245	317	Average
2378.67	51.77	47.3	4.47	74	-22.23	245	317	Peak
2402	84.44	79.92	4.52			245	317	Average
2402	87.16	82.64	4.52			245	317	Peak
4804	41.93	31.58	10.35	54	-12.07	168	8	Average
4804	48.15	37.8	10.35	74	-25.85	168	8	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2385.96	39.97	35.48	4.49	54	-14.03	107	45	Average
2385.96	52.1	47.61	4.49	74	-21.9	107	45	Peak
2402	89.11	84.59	4.52			107	45	Average
2402	92.18	87.66	4.52			107	45	Peak
4804	41.99	31.64	10.35	54	-12.01	132	255	Average
4804	48.48	38.13	10.35	74	-25.52	132	255	Peak

Remarks:

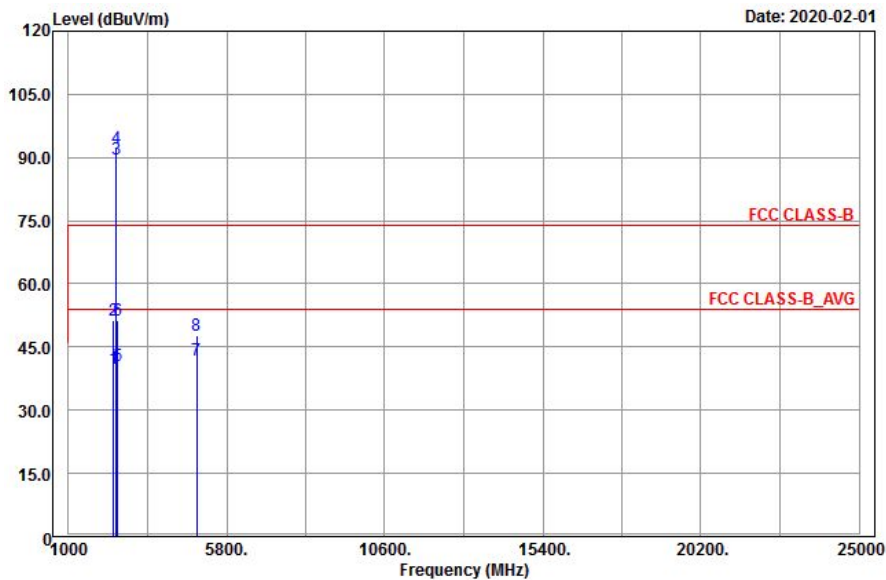
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2402 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



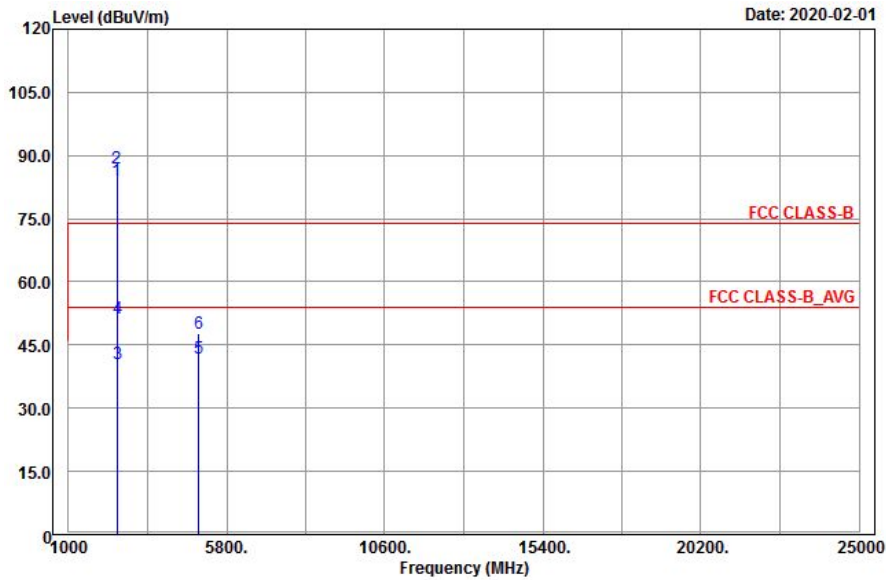
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.47	39.95	35.46	4.49	54	-14.05	245	317	Average
2389.47	51.74	47.25	4.49	74	-22.26	245	317	Peak
2441	84.39	79.81	4.58			245	317	Average
2441	87.35	82.77	4.58			245	317	Peak
2485.68	40.46	35.8	4.66	54	-13.54	245	317	Average
2485.68	51.7	47.04	4.66	74	-22.3	245	317	Peak
4882	41.82	31.61	10.21	54	-12.18	135	26	Average
4882	48.39	38.18	10.21	74	-25.61	135	26	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2363.19	40.04	35.62	4.42	54	-13.96	107	45	Average
2363.19	51.35	46.93	4.42	74	-22.65	107	45	Peak
2441	89.74	85.16	4.58			107	45	Average
2441	92.13	87.55	4.58			107	45	Peak
2486.24	40.61	35.95	4.66	54	-13.39	107	45	Average
2486.24	51.33	46.67	4.66	74	-22.67	107	45	Peak
4882	41.84	31.63	10.21	54	-12.16	124	208	Average
4882	47.88	37.67	10.21	74	-26.12	124	208	Peak

Remarks:

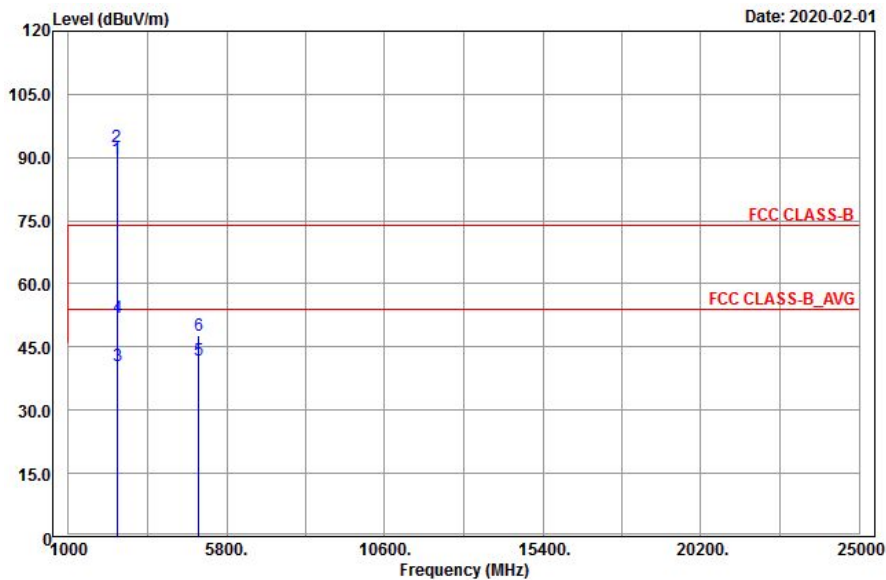
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2441 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	84.14	79.5	4.64			245	317	Average
2480	87.09	82.45	4.64			245	317	Peak
2488.92	40.5	35.82	4.68	54	-13.5	245	317	Average
2488.92	51.23	46.55	4.68	74	-22.77	245	317	Peak
4960	41.78	31.42	10.36	54	-12.22	134	333	Average
4960	47.58	37.22	10.36	74	-26.42	134	333	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	89.64	85	4.64			107	45	Average
2480	92.68	88.04	4.64			107	45	Peak
2499.2	40.59	35.92	4.67	54	-13.41	107	45	Average
2499.2	51.87	47.2	4.67	74	-22.13	107	45	Peak
4960	42.01	31.65	10.36	54	-11.99	134	255	Average
4960	47.88	37.52	10.36	74	-26.12	134	255	Peak

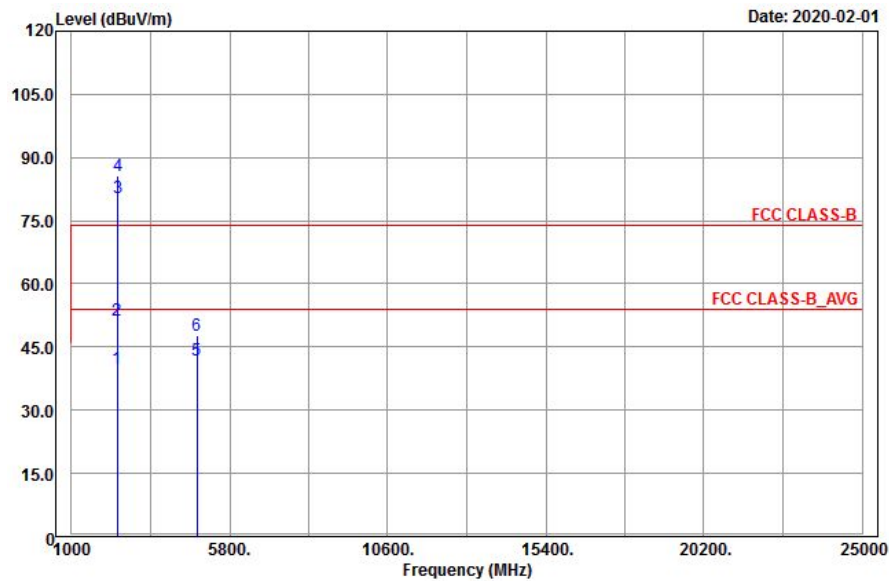
Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2480 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

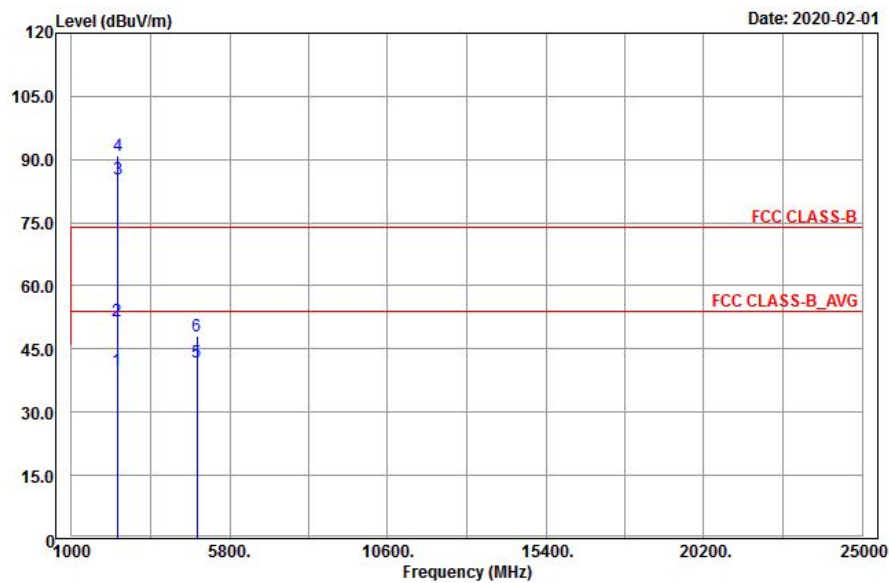
8DPSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



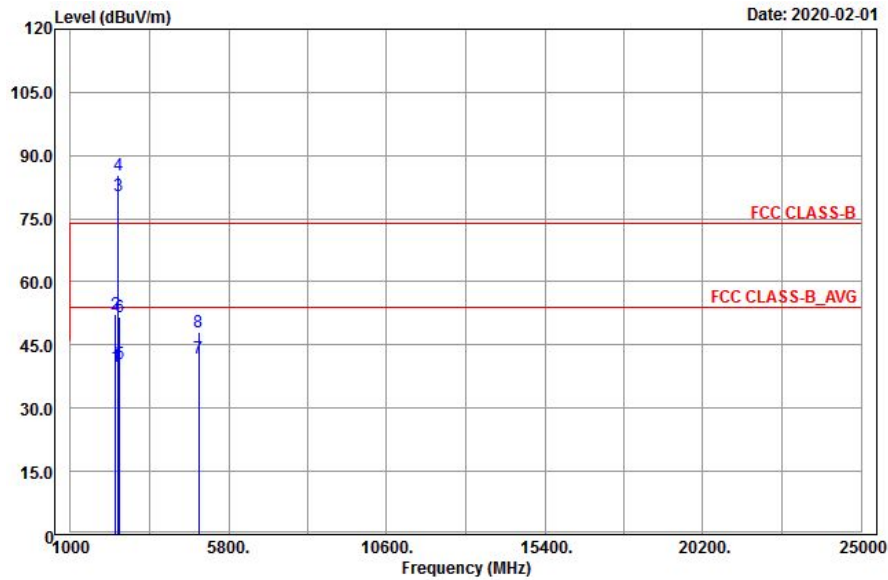
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.21	40.04	35.55	4.49	54	-13.96	245	317	Average
2388.21	51.18	46.69	4.49	74	-22.82	245	317	Peak
2402	80.45	75.93	4.52			245	317	Average
2402	85.74	81.22	4.52			245	317	Peak
4804	41.9	31.55	10.35	54	-12.1	132	2	Average
4804	47.83	37.48	10.35	74	-26.17	132	2	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.39	40	35.51	4.49	54	-14	107	45	Average
2388.39	51.55	47.06	4.49	74	-22.45	107	45	Peak
2402	85.49	80.97	4.52			107	45	Average
2402	90.79	86.27	4.52			107	45	Peak
4804	41.91	31.56	10.35	54	-12.09	174	19	Average
4804	48.08	37.73	10.35	74	-25.92	174	19	Peak

Remarks:

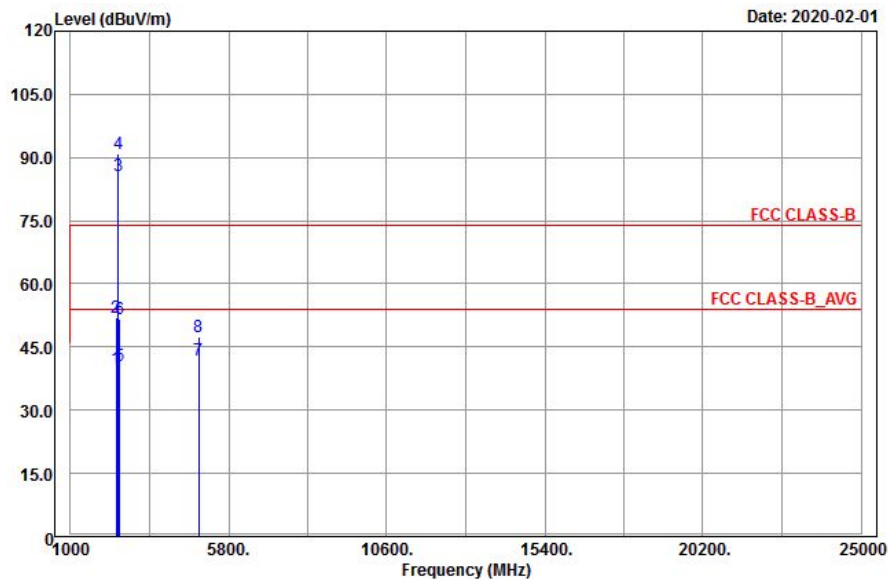
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2402 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



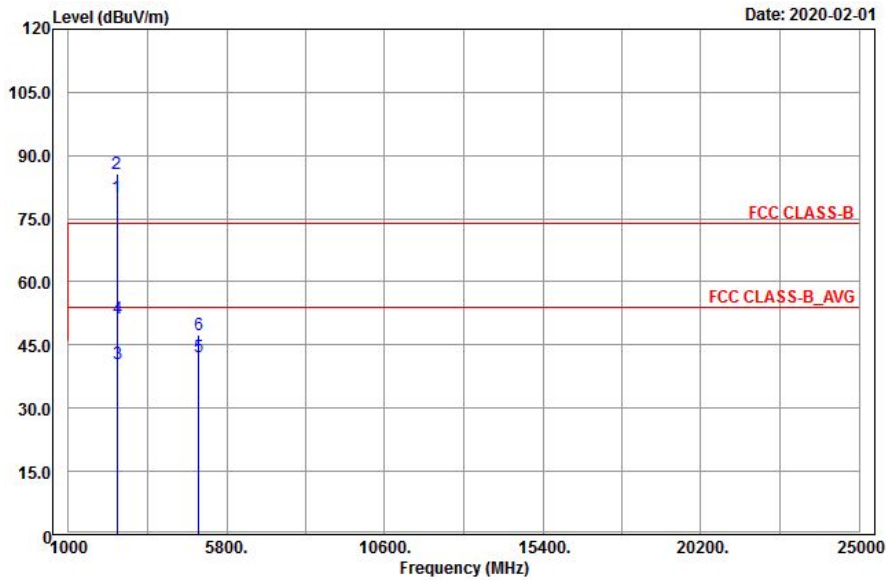
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2366.79	40	35.57	4.43	54	-14	245	317	Average
2366.79	52.24	47.81	4.43	74	-21.76	245	317	Peak
2441	80.54	75.96	4.58			245	317	Average
2441	85.31	80.73	4.58			245	317	Peak
2483.68	40.59	35.93	4.66	54	-13.41	245	317	Average
2483.68	51.82	47.16	4.66	74	-22.18	245	317	Peak
4882	41.8	31.59	10.21	54	-12.2	188	193	Average
4882	47.92	37.71	10.21	74	-26.08	188	193	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.3	40.03	35.54	4.49	54	-13.97	107	45	Average
2388.3	52.05	47.56	4.49	74	-21.95	107	45	Peak
2441	85.66	81.08	4.58			107	45	Average
2441	90.96	86.38	4.58			107	45	Peak
2498.12	40.53	35.86	4.67	54	-13.47	107	45	Average
2498.12	51.74	47.07	4.67	74	-22.26	107	45	Peak
4882	41.77	31.56	10.21	54	-12.23	197	311	Average
4882	47.54	37.33	10.21	74	-26.46	197	311	Peak

Remarks:

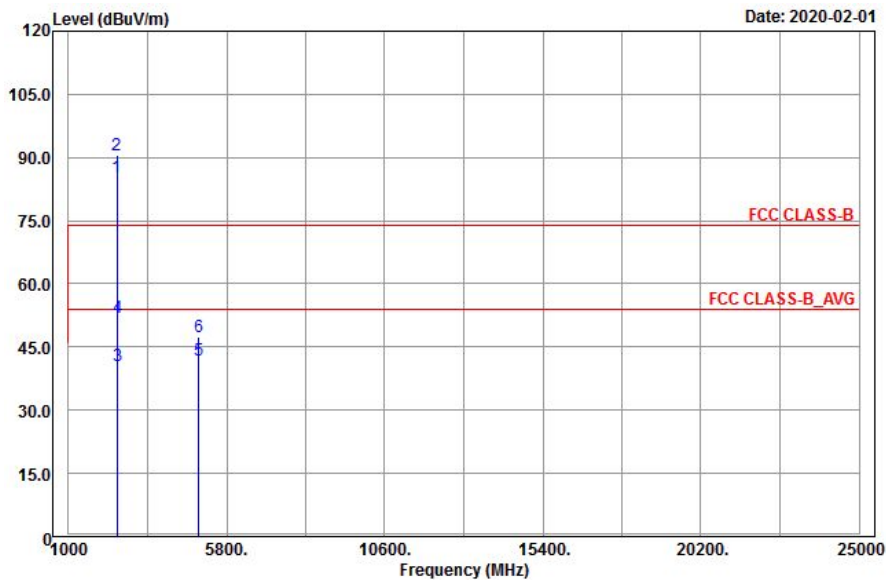
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2441 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	80.11	75.47	4.64			245	317	Average
2480	85.71	81.07	4.64			245	317	Peak
2490.4	40.5	35.82	4.68	54	-13.5	245	317	Average
2490.4	51.41	46.73	4.68	74	-22.59	245	317	Peak
4960	42.06	31.7	10.36	54	-11.94	135	285	Average
4960	47.44	37.08	10.36	74	-26.56	135	285	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	85.49	80.85	4.64			107	45	Average
2480	90.55	85.91	4.64			107	45	Peak
2494.4	40.64	35.97	4.67	54	-13.36	107	45	Average
2494.4	51.88	47.21	4.67	74	-22.12	107	45	Peak
4960	41.89	31.53	10.36	54	-12.11	127	7	Average
4960	47.46	37.1	10.36	74	-26.54	127	7	Peak

Remarks:

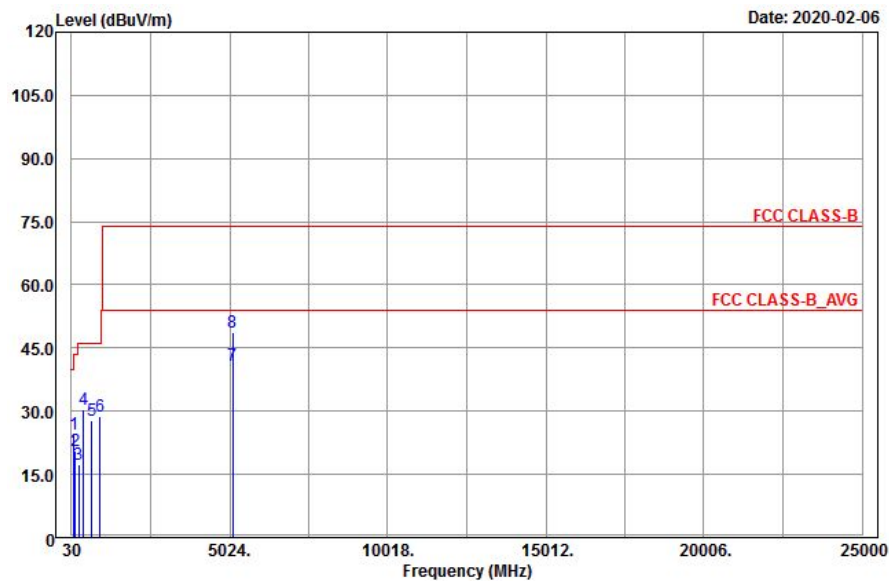
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2480 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

12.6.2 接收諧波

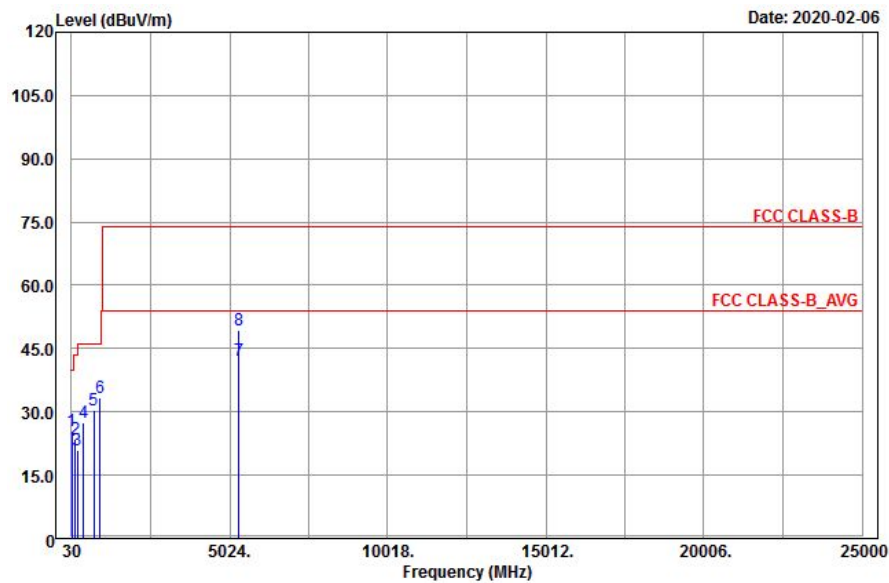
8DPSK

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	30 MHz ~ 25 GHz
Input Power	12 Vdc	Detector Function	Above 1 GHz: Peak (PK) & Average (AV) Below 1 GHz: Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
102.9	24.37	42.99	-18.62	43.5	-19.13	165	190	Peak
158.79	20.51	42.55	-22.04	43.5	-22.99	155	134	Peak
257.07	17.32	35.04	-17.72	46	-28.68	111	174	Peak
415	30.26	44.88	-14.62	46	-15.74	158	166	Peak
666.1	27.63	38.06	-10.43	46	-18.37	124	130	Peak
937	28.76	34.7	-5.94	46	-17.24	163	320	Peak
5122	40.85	32.27	8.58	54	-13.15	190	321	Average
5122	48.85	40.27	8.58	74	-25.15	190	321	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
49.71	25.4	42.17	-16.77	40	-14.6	149	166	Peak
154.2	23.4	45.62	-22.22	43.5	-20.1	148	129	Peak
205.77	20.81	40.31	-19.5	43.5	-22.69	112	130	Peak
411.3	27.43	42.1	-14.67	46	-18.57	152	174	Peak
729.1	30.42	39.77	-9.35	46	-15.58	163	326	Peak
922	33.26	39.48	-6.22	46	-12.74	125	180	Peak
5326	42.22	33.24	8.98	54	-11.78	128	74	Average
5326	49.22	40.24	8.98	74	-24.78	128	74	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

12.6.3 其它不必要之讯号

9 kHz ~ 30 MHz Data:

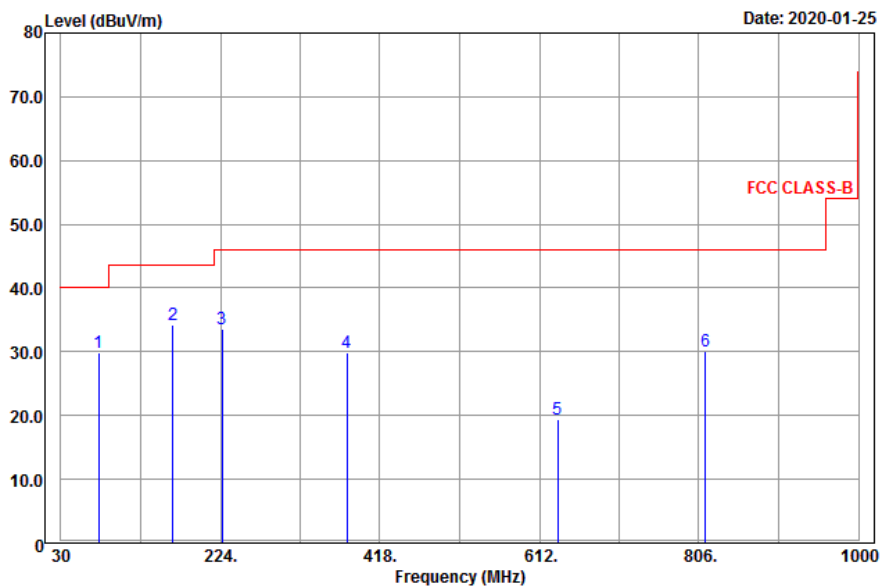
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Data:

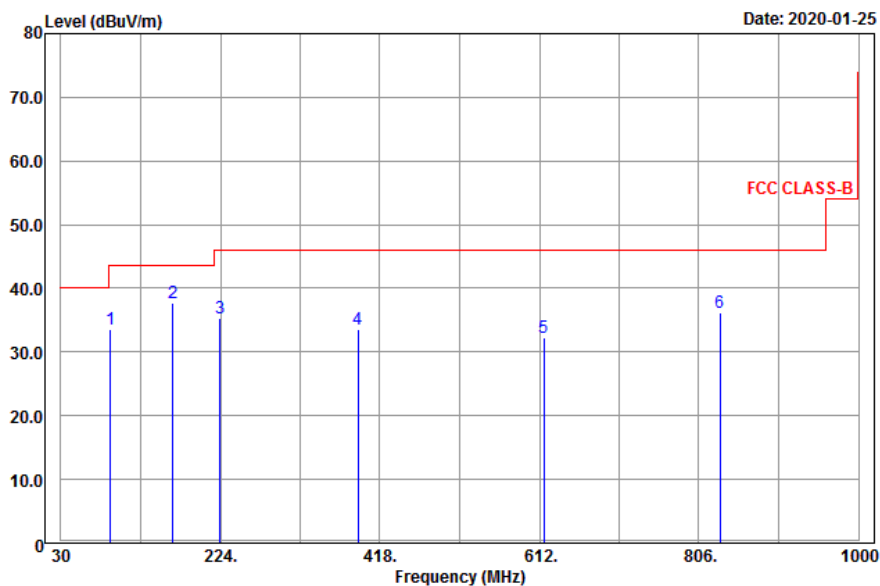
8DPSK

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	30 MHz ~ 1 GHz
Input Power	12 Vdc	Detector Function	Peak (PK) or Quask-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
76.17	29.94	51.19	-21.25	40	-10.06	183	65	Peak
166.08	34.29	54.72	-20.43	43.5	-9.21	136	215	Peak
225.75	33.55	51.13	-17.58	46	-12.45	152	184	Peak
377.7	29.86	44.15	-14.29	46	-16.14	180	136	Peak
634.6	19.4	29.76	-10.36	46	-26.6	175	115	Peak
813.8	30.05	37.51	-7.46	46	-15.95	116	215	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
89.94	33.65	52.68	-19.03	43.5	-9.85	149	63	Peak
166.08	37.75	58.18	-20.43	43.5	-5.75	120	56	Peak
223.59	35.37	53.03	-17.66	46	-10.63	148	275	Peak
391.7	33.51	47.58	-14.07	46	-12.49	151	236	Peak
617.1	32.17	42.51	-10.34	46	-13.83	146	206	Peak
832	36.18	43.22	-7.04	46	-9.82	123	49	Peak

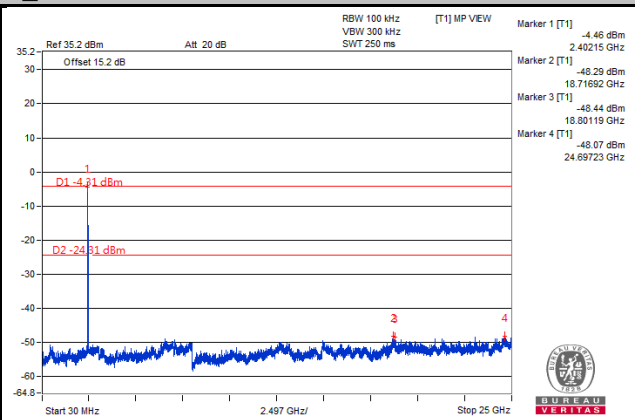
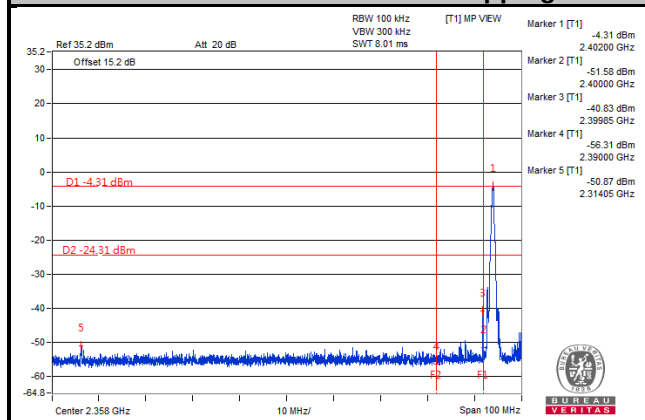
Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. The emission levels of other frequencies were very low against the limit.

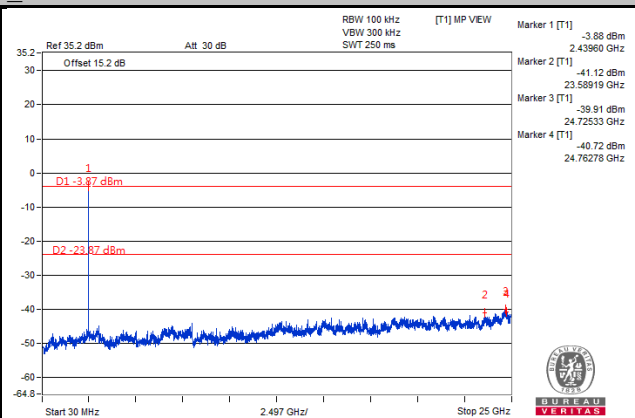
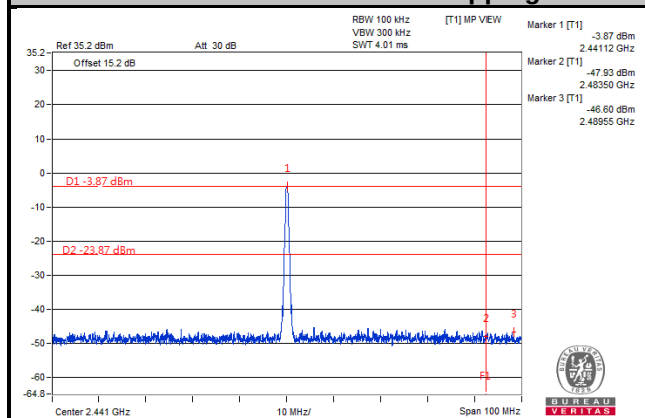
12.7 帶外發射之量測 (傳導)

GFSK

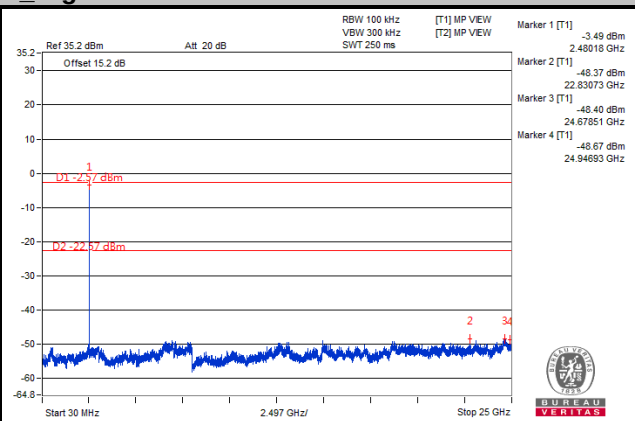
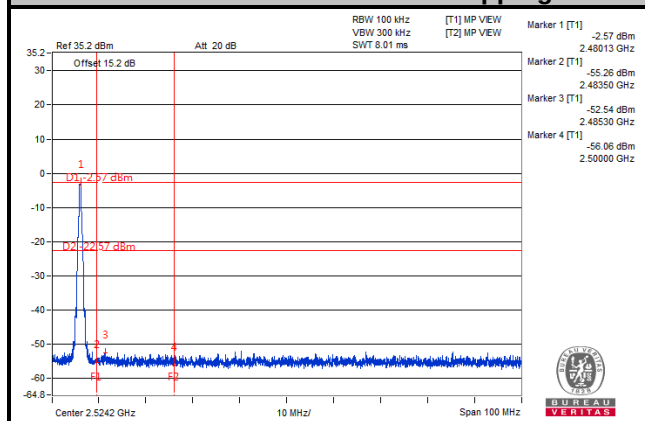
Hopping Disabled_Low Channel



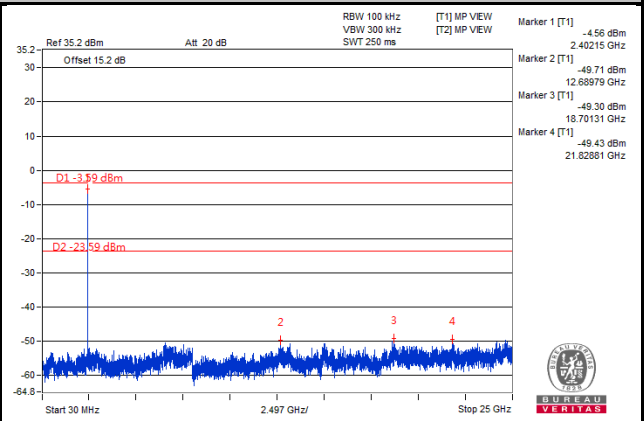
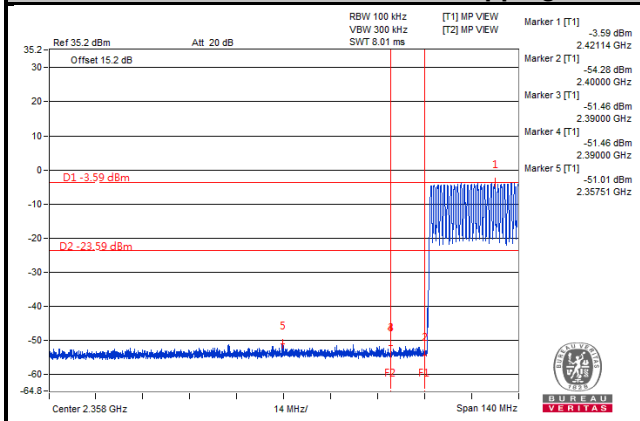
Hopping Disabled_Middle Channel



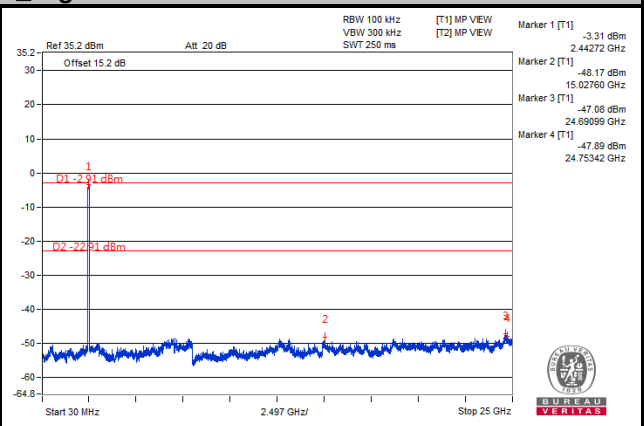
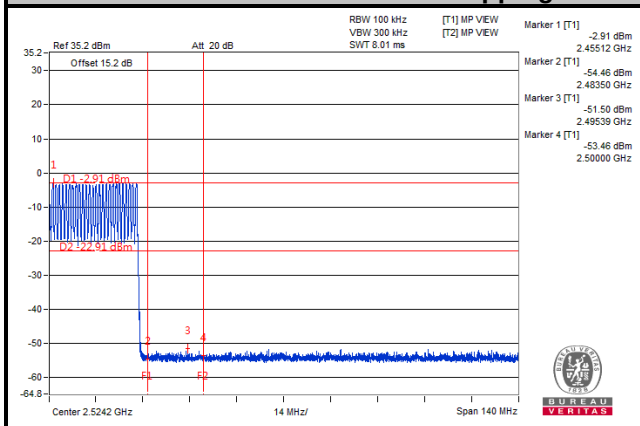
Hopping Disabled_High Channel



Hopping Enabled_Low Channel

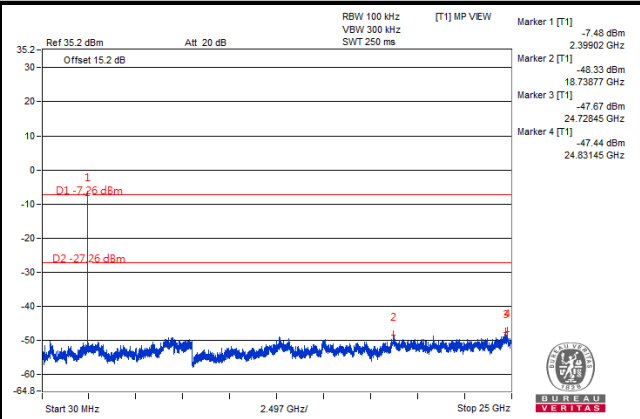
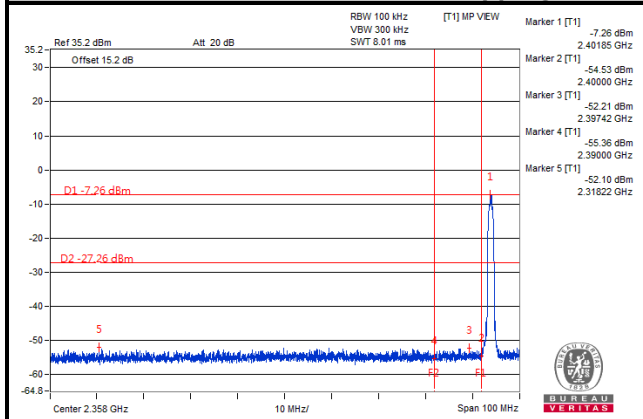


Hopping Enabled_High Channel

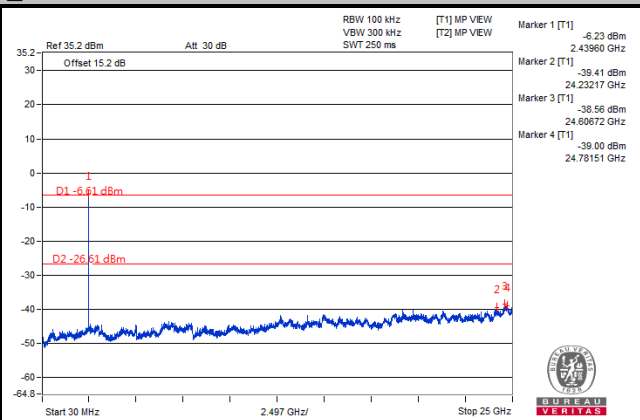
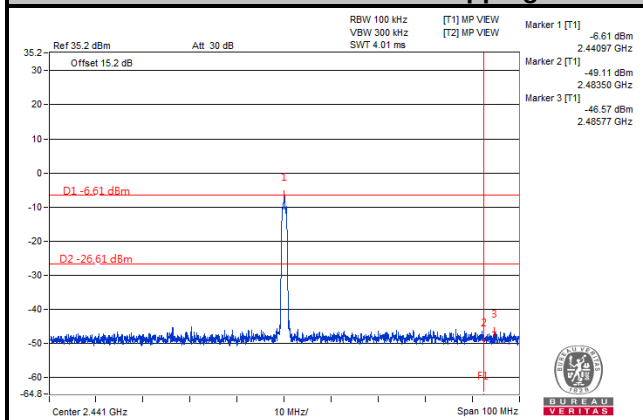


8DPSK

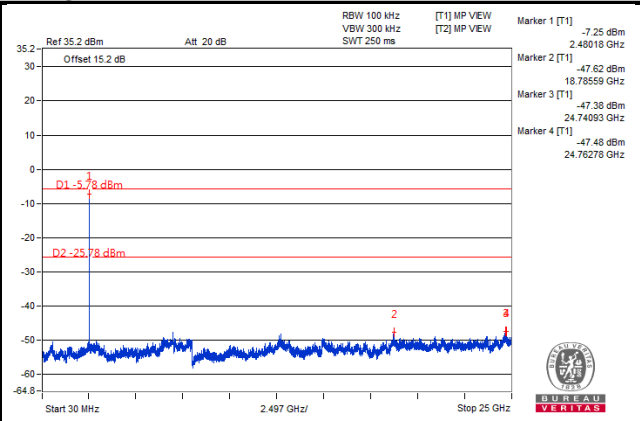
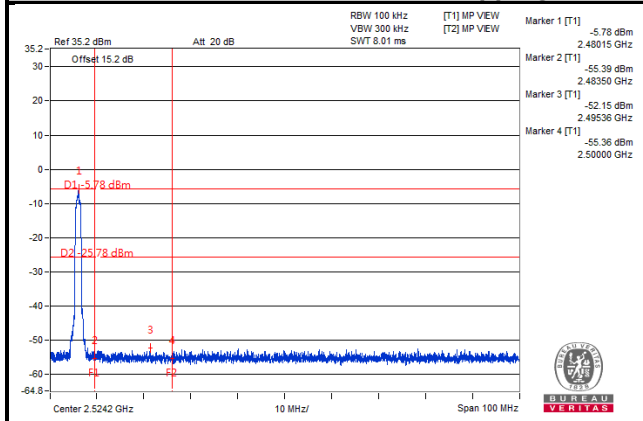
Hopping Disabled_Low Channel



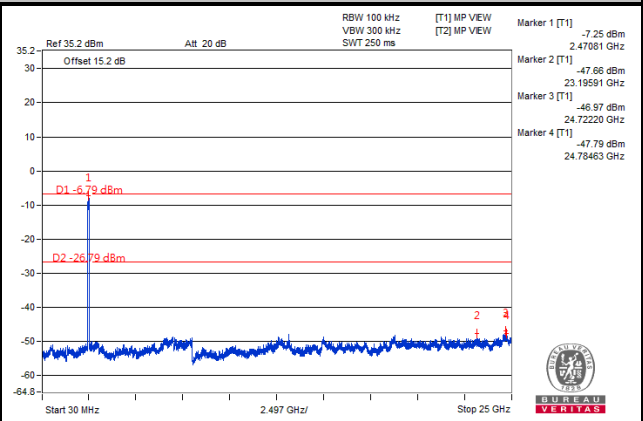
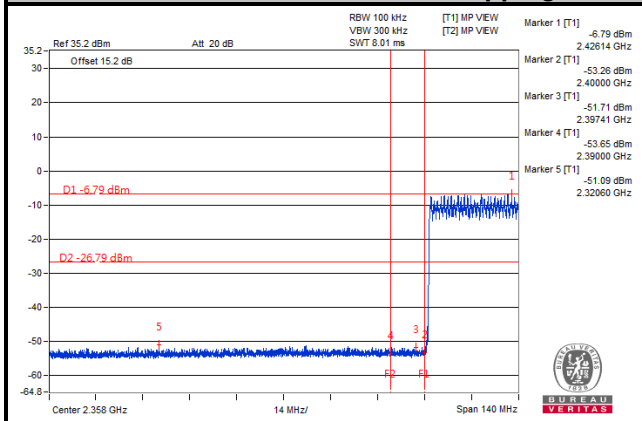
Hopping Disabled_Middle Channel



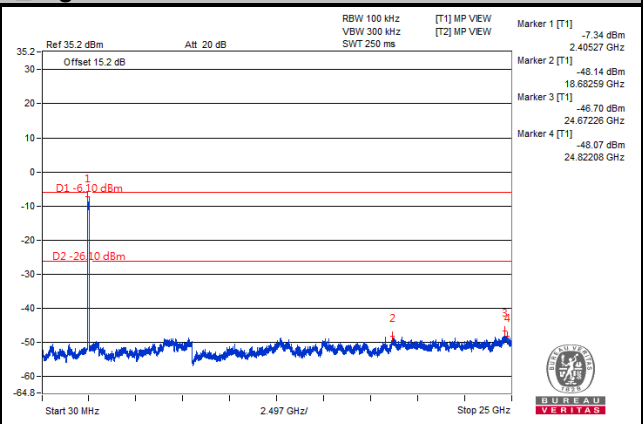
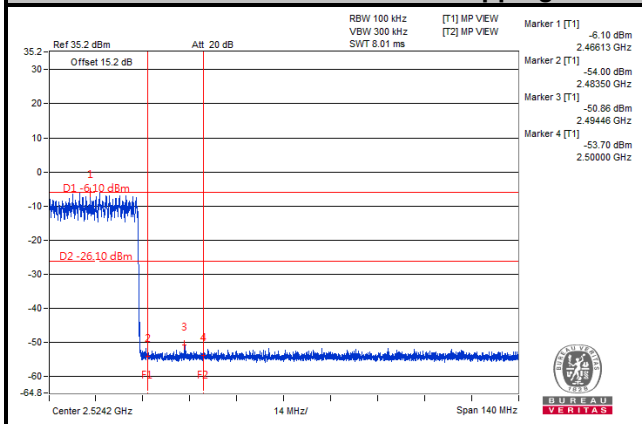
Hopping Disabled_High Channel



Hopping Enabled_Low Channel



Hopping Enabled_High Channel



12.8 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

13 20 dB 頻寬之要求

13.1 適用標準

請見本報告 3.1 節第(19)項的規定。

13.2 量測方法

- 將待測物輸出經由衰減器接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 計算由最大輸出功率峰值減 20 dB 的最大頻率範圍。

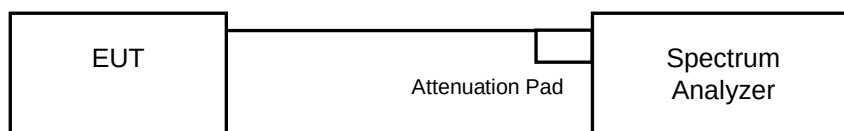
13.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

13.4 測試配置



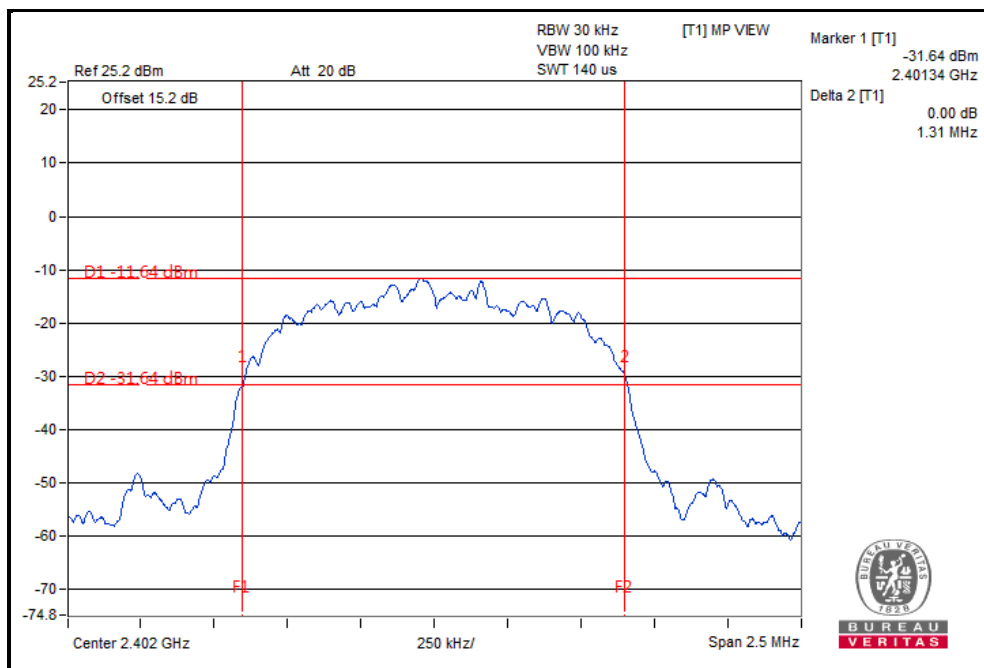
13.5 量測結果

操作模式	發射	測試日期	109 年 02 月 04 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Gavin Wu		

Channel	Channel Frequency (MHz)	20 dB Bandwidth (MHz)		>= 25 kHz
		GFSK	8DPSK	
0	2402	1.04	1.31	Yes
39	2441	1.04	1.31	Yes
78	2480	1.04	1.31	Yes

註：對操作於 2400~2483.5 MHz 頻段的跳頻系統技術之低功率發射機，依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.6 節之(1)(A)條規定，跳頻系統之載波頻率頻道間隔應至少 25 千赫(kHz)或跳頻頻道之 20 dB 頻寬之三分之二，兩者取較寬者。依據上述條文之規定，對操作於 2400~2483.5 MHz 頻段的跳頻產品之頻寬乃為該產品載波頻率頻道間隔的判定限制之一。

**此測試圖僅放測試結果最差的頻道。



13.6 量測結果判定

依據測試數據結果，三分之二 20 dB 頻寬值乃為此產品之載波頻率頻道間隔的判定限制值。

14 峰值傳導輸出功率之量測

14.1 適用標準

請見本報告 3.1 節第(17)項的規定。

14.2 量測方法

- 將待測物輸出接到功率計上。
- 設定待測物處於連續發射狀態。
- 量測待測物輸出功率峰值。

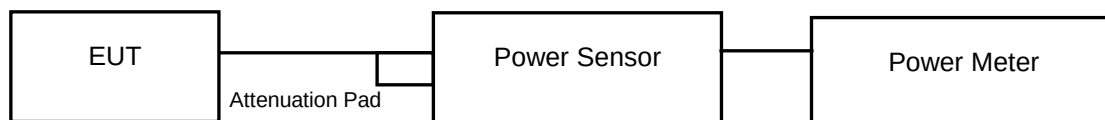
14.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter Anritsu	ML2495A	1232002	Dec. 10, 2019	Dec. 09, 2020
Power Sensor Anritsu	MA2411B	1207325	Dec. 10, 2019	Dec. 09, 2020

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 1.393 dB, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

14.4 測試配置



14.5 量測結果

操作模式	發射	測試日期	109 年 02 月 04 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Gavin Wu		

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)		Peak Power Limit (dBm)	Pass / Fail
		GFSK	8DPSK		
0	2402	-2.74	-3.97	21	Pass
39	2441	-2.18	-3.38	21	Pass
78	2480	-1.56	-2.67	21	Pass

14.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

15 跳頻頻道數之量測

15.1 適用標準

請見本報告 3.1 節第(18)項的規定。

15.2 量測方法

- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於正常傳輸跳頻模式下。
- 設定 RBW = 100 kHz，VBW = 300 kHz，量測跳頻頻道數。

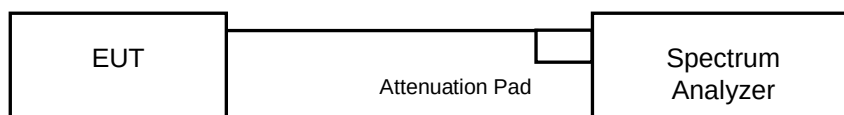
15.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

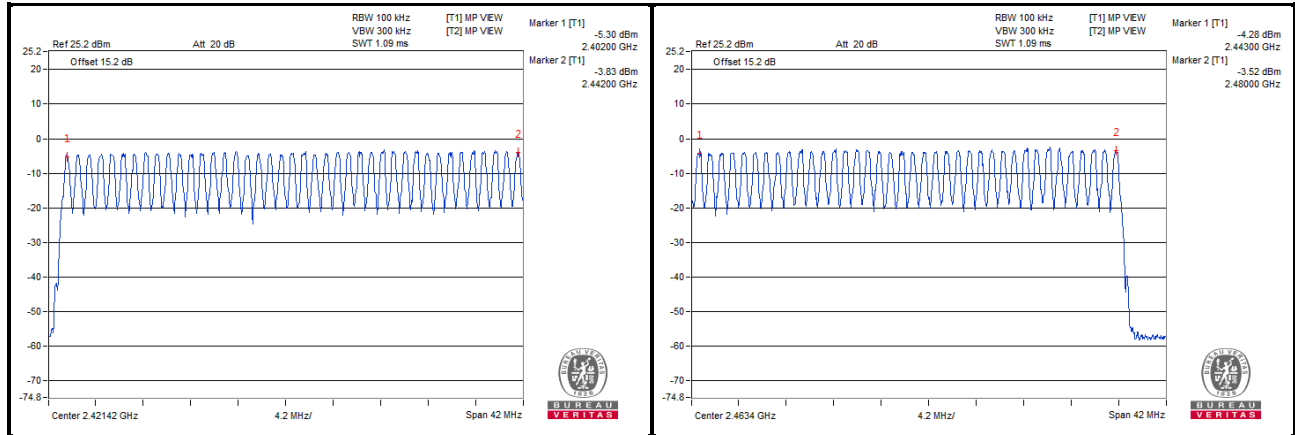
15.4 測試配置



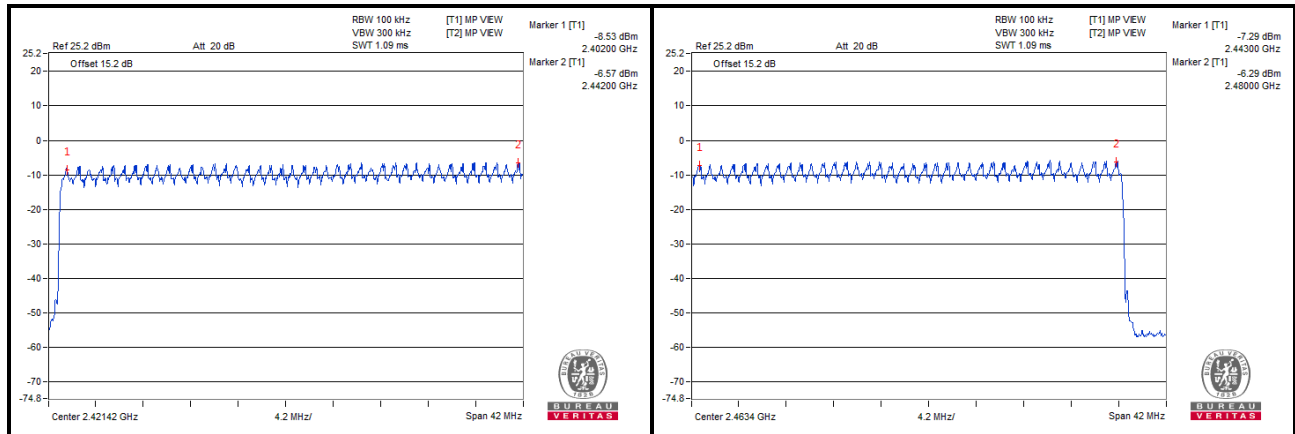
15.5 量測結果

其掃描圖請參閱下圖。跳頻頻道數共有 79 個，符合至少 15 個的規定。

<GFSK>



<8DPSK>



15.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

16 跳頻頻道間隔之量測

16.1 適用標準

請見本報告 3.1 節第(18)項規定。

16.2 量測方法

- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 設定 RBW = 30 kHz，VBW = 100 kHz，量測相鄰兩個頻道間的間隔。

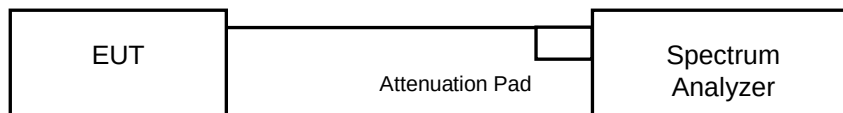
16.3 量測場強輻射之儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

16.4 測試配置



16.5 量測結果

操作模式	發射	測試日期	109 年 02 月 04 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Gavin Wu		

GFSK

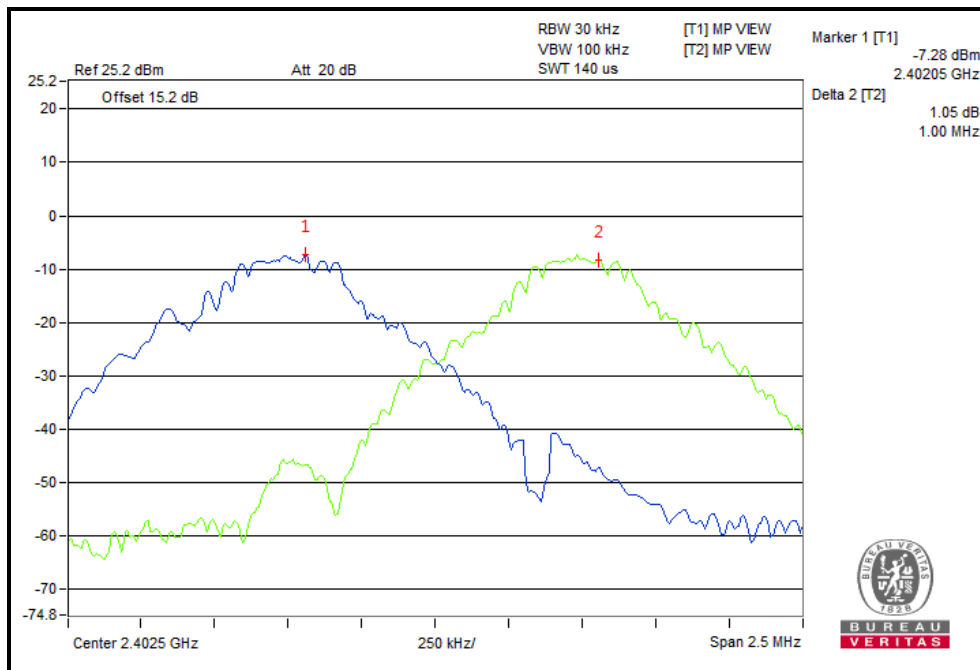
Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.00	1.04	0.7	Pass
39	2441	1.00	1.04	0.7	Pass
78	2480	1.00	1.04	0.7	Pass

8DPSK

Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.00	1.31	0.88	Pass
39	2441	1.00	1.31	0.88	Pass
78	2480	1.00	1.31	0.88	Pass

本項測試的 limit 為至少為三分之二 20 dB 頻寬。

**此測試圖僅放測試結果最差的頻道。



16.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

17 每一頻道停留時間之量測

17.1 適用標準

請見本報告 3.1 節第(20)項的規定。

17.2 量測方法

- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於正常傳輸跳頻模式下。
- 設定 RBW = 100 kHz, VBW = 300 kHz, 量測在不同傳輸模式下的頻道停留時間。

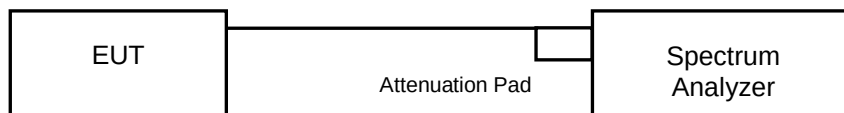
17.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

17.4 測試配置



17.5 量測結果

GFSK

Mode	Number of transmission in a 31.6 (79 Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (sec)
DH1	50 (times / 5 sec) * 6.32 = 316 times	0.456	144.1	0.4
DH3	26 (times / 5 sec) * 6.32 = 164.32 times	1.69	277.7	0.4
DH5	16 (times / 5 sec) * 6.32 = 101.12 times	2.992	302.55	0.4

註:因為 Bluetooth 每秒跳 1600 次，會平均落在每個頻道，所以僅測試 Ch 39 作為代表。

其掃描圖請參閱下方

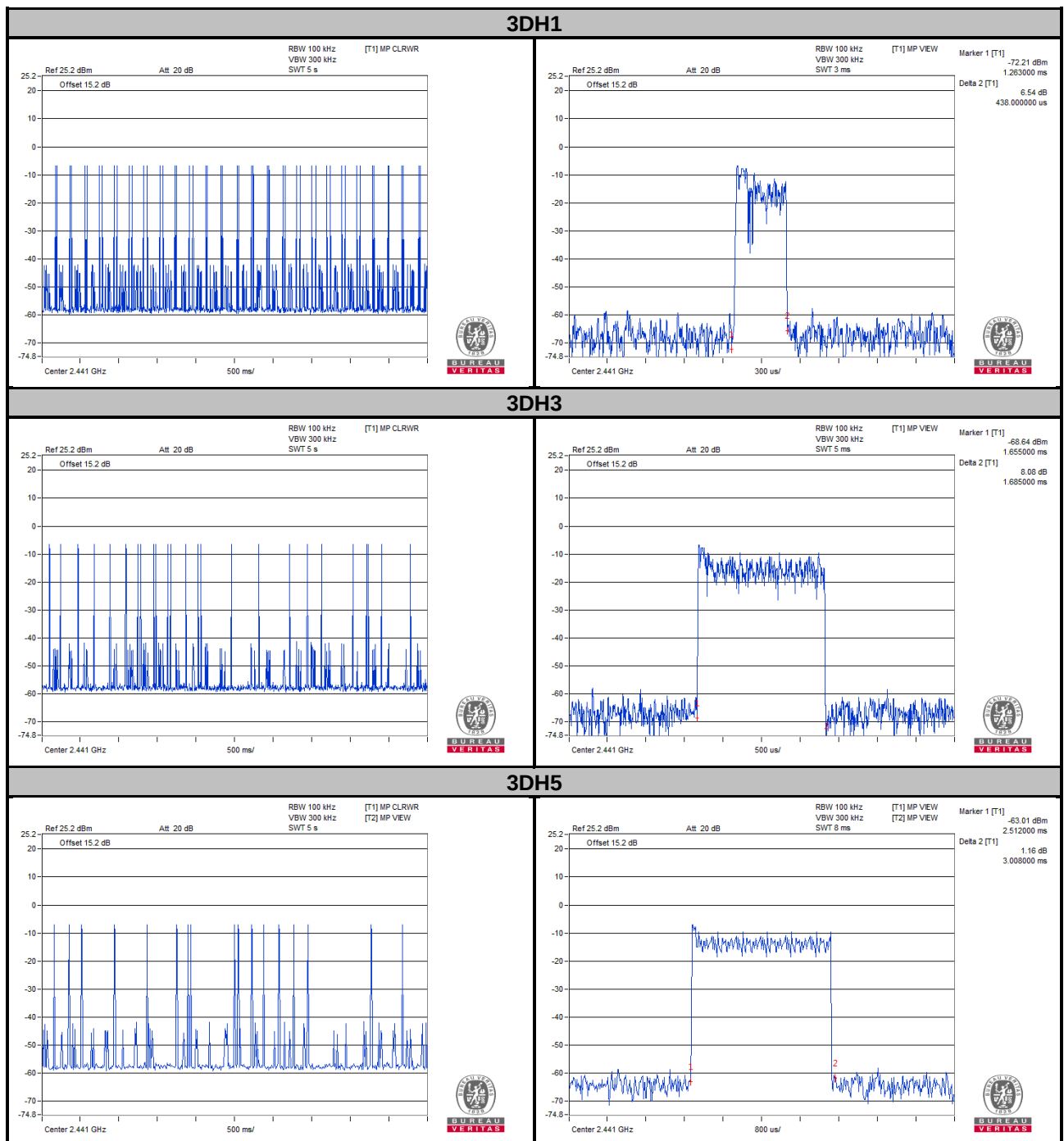


8DPSK

Mode	Number of transmission in a 31.6 (79 Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (sec)
3DH1	50 (times / 5 sec) * 6.32 = 316 times	0.438	138.41	0.4
3DH3	25 (times / 5 sec) * 6.32 = 158 times	1.685	266.23	0.4
3DH5	17 (times / 5 sec) * 6.32 = 107.44 times	3.008	323.18	0.4

註:因為 Bluetooth 每秒跳 1600 次，會平均落在每個頻道，所以僅測試 Ch 39 作為代表。

其掃描圖請參閱下方



17.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

18 電波暴露量之評估

18.1 適用標準

請見本報告 3.1 節第(12)&(21)項的規定。

18.2 評估方法

a) 以 6.5、9.5 節所測得的最大輸出功率值再加上待測物天線的增益值(Gain)帶入下面公式換算出待測物所輻射的功率密度。

$$b) P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

r = distance between observation point and center of the radiator in cm

18.3 評估結果

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Pass/Fail
2412 ~ 2472	16.51	3.4	20	0.019	1	Pass
5725 ~ 5825	13.30	3.4	20	0.009	1	Pass

CONCLUSION:

Both of the WLAN 2.4G & WLAN 5G can transmit simultaneously, the formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$$WLAN\ 2.4G + WLAN\ 5.0G = 0.019/1 + 0.009/1 = 0.028$$

Therefore, the maximum calculation of this situation is 0.028, which is less than the “1” limit.

19 待測物照片

請參照 BV CPS 報告編號：191108C22

20 檢測實驗室基本資料

立德國際商品試驗有限公司桃園分公司提供產業界最佳的檢測以及諮詢服務。
本公司為 ISO/IEC 17025 認可實驗室。

如您有任何問題或建議，請與下列實驗室聯絡：

林口 EMC / RF 實驗室：

Tel: 886-2-26052180

Fax: 886-2-26051924

新竹 EMC / RF 及通訊實驗室：

Tel: 886-3-6668565

Fax: 886-3-6668323

華亞 EMC / RF / Safety 實驗室：

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

您也可以在我們的網站內找到各實驗室的地圖。

---END---