6. 峰值功率頻譜密度

6.1. 適用標準

依據國家通訊傳播委員會低功率射頻電機技術規範之第 4.7.3 節

4.7.3.1 使用於 5.15 GHz～5.25 GHz 頻段

(1) 供戶外操作使用:

(A) 最大傳導輸出功率應小於或等於 1 W。

(B) 在任何 1 MHz 頻帶中最大功率頻譜密度應小於或等於 17 dBm。

(C) 使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率及最大功率頻譜密度。

(D) 在水平面仰角超過 30 度時，其最大 EIRP 應小於或等於 21 dBm。

(2) 供室內操作使用:

(A) 最大傳導輸出功率應小於或等於 1 W。

(B) 在任何 1 MHz 頻帶中最大功率頻譜密度應小於或等於 17 dBm。

(C) 使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率及最大功率頻譜密度。

(3) 供固定式點對點操作使用:

(A) 最大傳導輸出功率應小於或等於 1 W。

(B) 在任何 1 MHz 頻帶中最大功率頻譜密度應小於或等於 17 dBm。

(C) 使用超過 23 dBi 方向增益之指向性天線時，應依超過 23 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率及最大功率頻譜密度。

(D) 固定式點對點操作，不包括點對多點系統、全方向性應用及多台共站發射機傳送相同資訊。

(4) 供用戶端裝置(Client Device)操作使用:

(A) 最大傳導輸出功率應小於或等於 250 mW。

(B) 在任何 1 MHz 頻帶中最大功率頻譜密度應小於或等於 11 dBm。

(C) 使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率及最大功率頻譜密度。

4.7.3.2 使用頻率於 5.25 GHz～5.35 GHz 與 5.470 GHz～5.725 GHz 頻段

(1) 最大傳導輸出功率應小於或等於 250 mW 或 11dBm+10log B (B 是 26 dB 發射頻寬，單位 MHz)之較小者。

(2) 最大功率頻譜密度在任何 1 MHz 頻帶中應小於或等於 11 dBm。

(3) 使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率及最大功率頻譜密度。

4.7.3.3 使用頻率於 5.725 GHz～5.850 GHz 頻段

(1) 最大傳導輸出功率應小於或等於 1 W。

(2) 在任何 500 kHz 頻帶中最大功率頻譜密度應小於或等於 30 dBm。

(3) 供固定式點對點操作時，使用方向增益超過 6 dBi 之發射天線，可不需對應減少發射器之傳導輸出功率限制值。

(4) 除(3)外，使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率及最大功率頻譜密度

6.2. 量測方法

(A) 應將測試儀器直接連接待測物，以傳導方式執行。

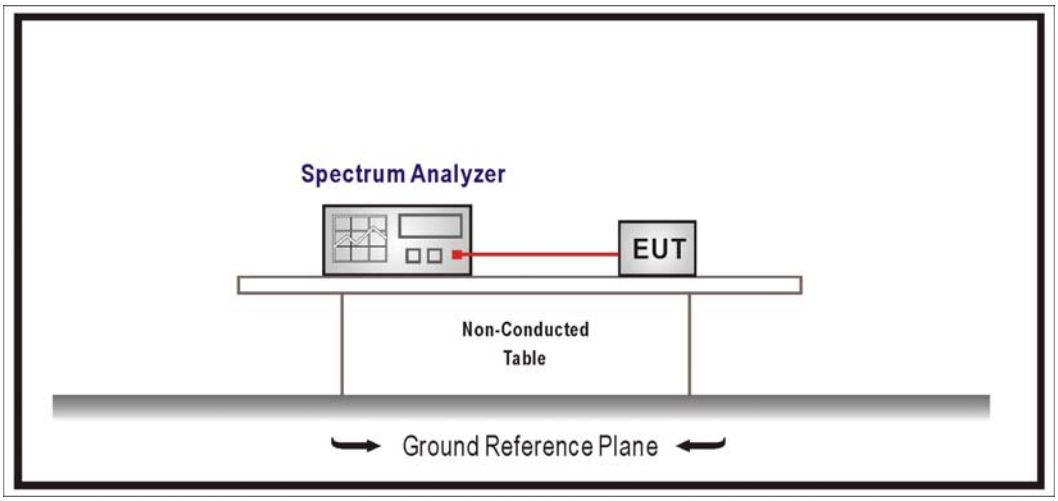
(B) 5.15 GHz～5.25 GHz、5.25 GHz～5.35 GHz 及 5.47 GHz～5.725 GHz 頻段，測試儀器之頻寬應設定為 1 MHz 頻寬或待測物之 26 dB 發射頻寬，兩者取較小者。

(C) 5.725 GHz～5.850 GHz 頻段，測試儀器之頻寬應設定為 500 kHz 或待測物之 26 dB 發射頻寬，兩者取較小者。

(D) 解析頻寬小於(B)或(C)時，應以補償方式計算總功率頻譜密度。

For the band 5.725-5.85 GHz, Scale the observed power level to an equivalent value in 500 kHz by adjusting (increase) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log (500 kHz/100 kHz) = 6.98 dB.

6.3. 測試架構圖



6.4. 量測不確定度

此項測試之量測不確定度為±1.62dB。

6.5. 峰值功率頻譜密度測試結果

待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 1: SISO A: 發射器 802.11a
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

Channel Number	Frequency (MHz)	PPSD (dBm)	Required Limit (dBm)	Result
36	5180	1.930	<11	Pass
44	5220	5.260	<11	Pass
48	5240	4.360	<11	Pass
52	5260	4.440	<11	Pass
60	5300	4.110	<11	Pass
64	5320	0.820	<11	Pass
100	5500	1.510	<11	Pass
116	5580	5.870	<11	Pass
140	5700	1.730	<11	Pass

Channel Number	Frequency (MHz)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
149	5745	-2.090	6.980	4.890	<30	Pass
157	5785	-2.230	6.980	4.750	<30	Pass
165	5825	-2.130	6.980	4.850	<30	Pass

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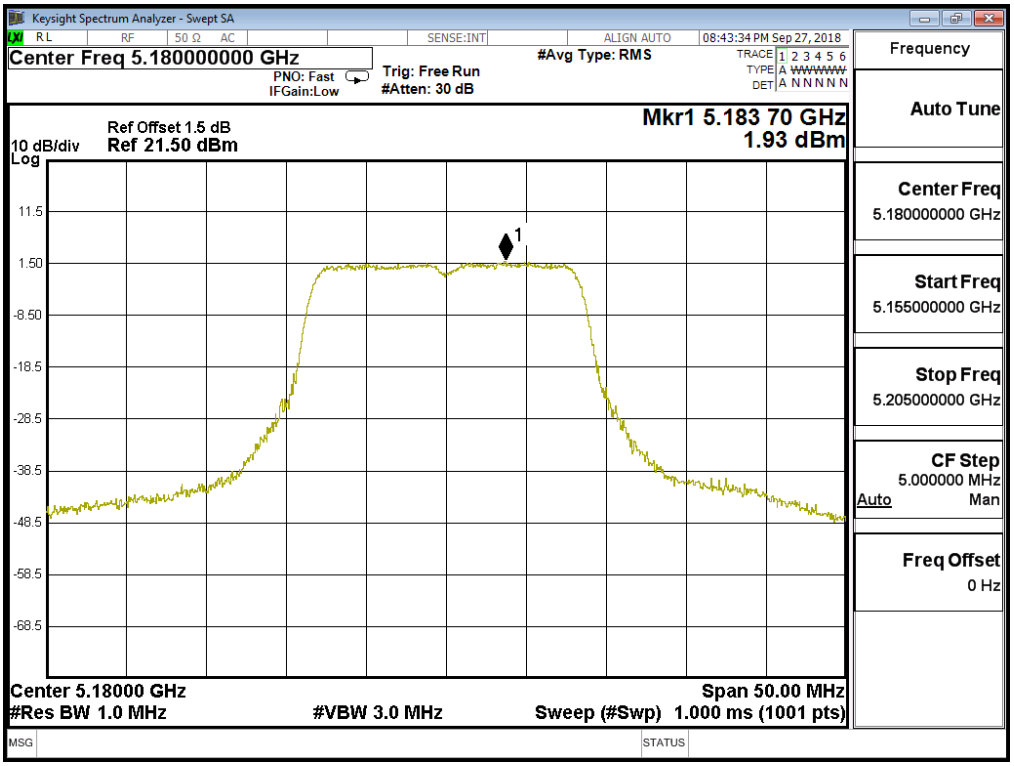
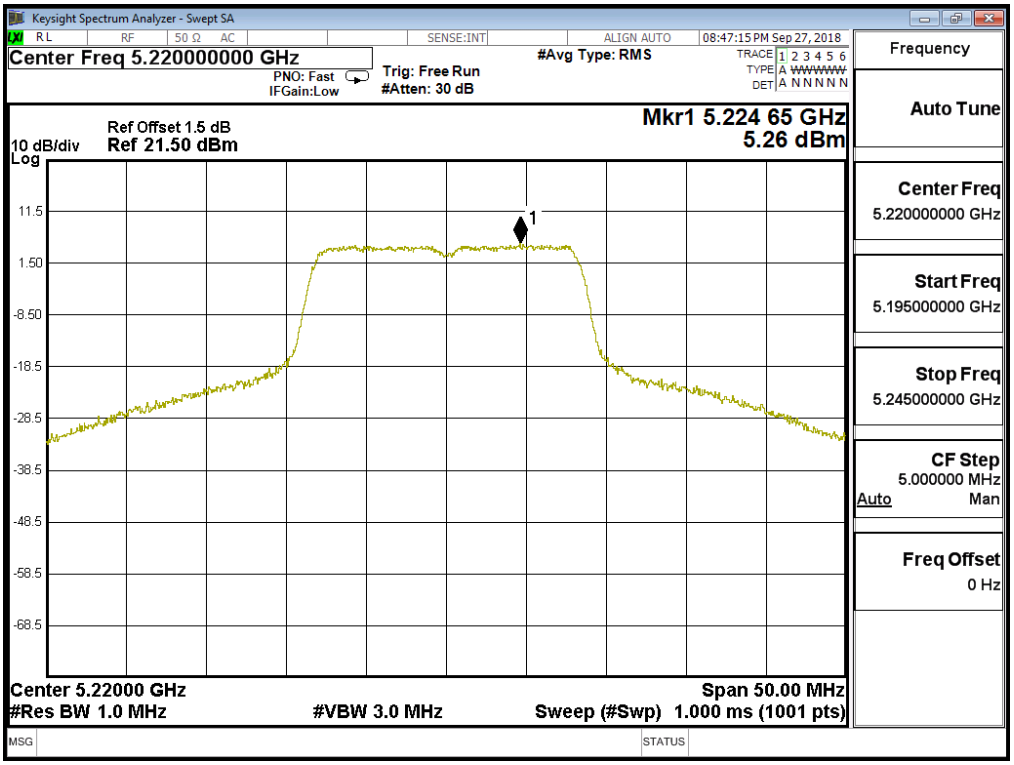
Channel 36



Channel 44



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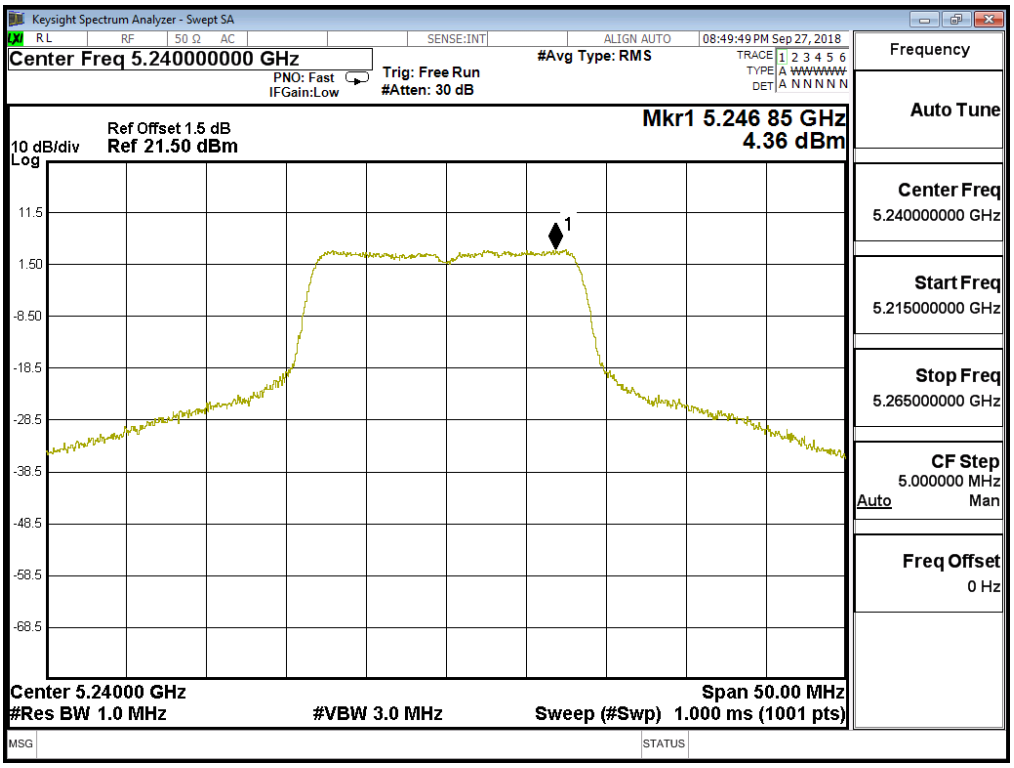

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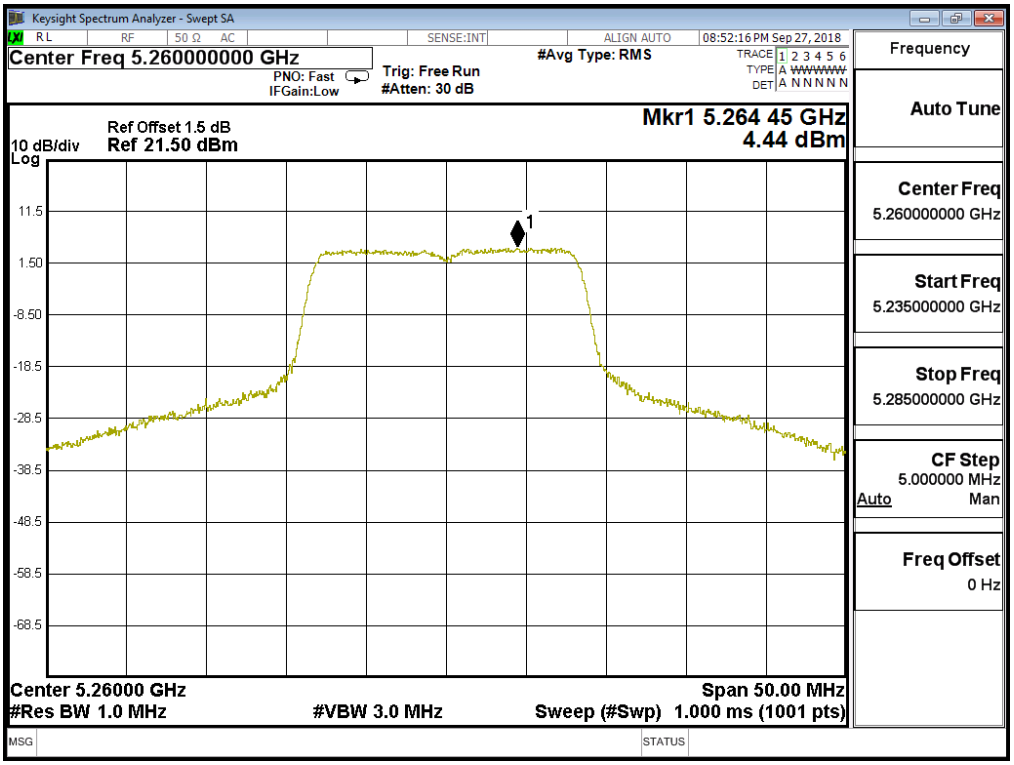

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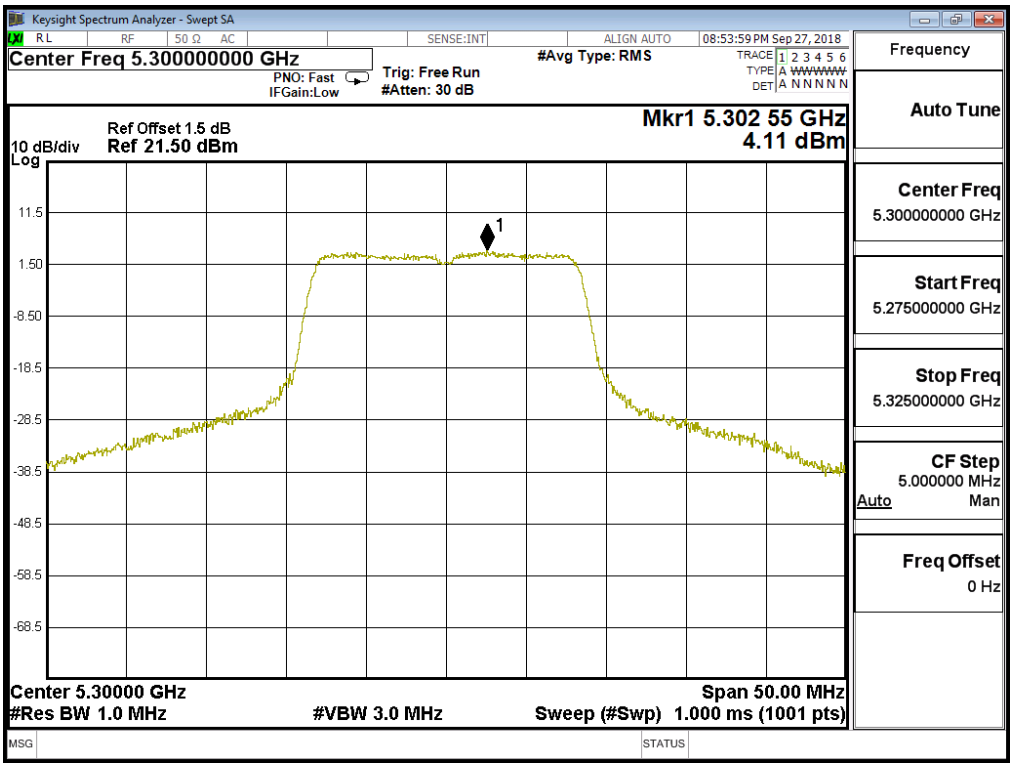
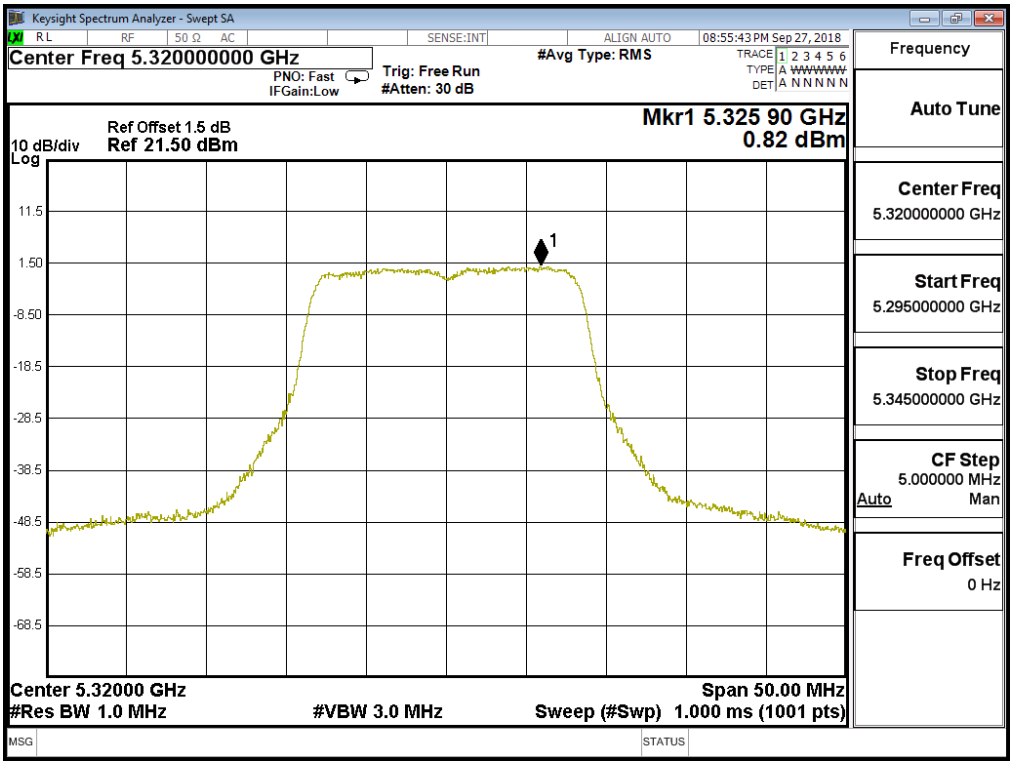
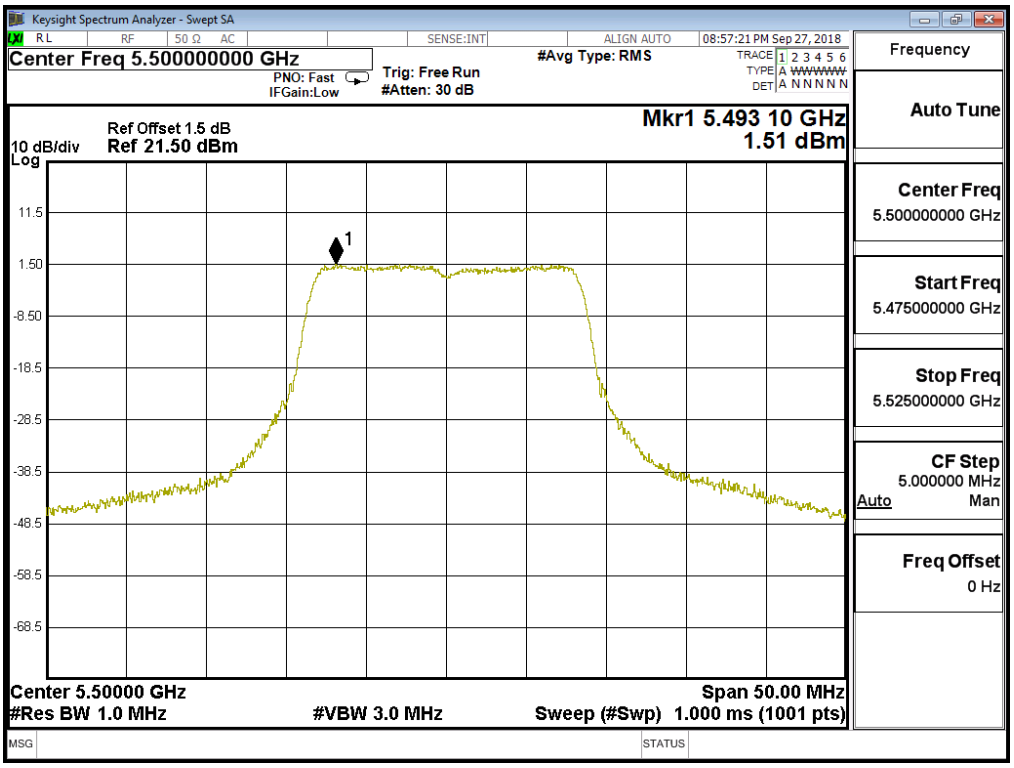


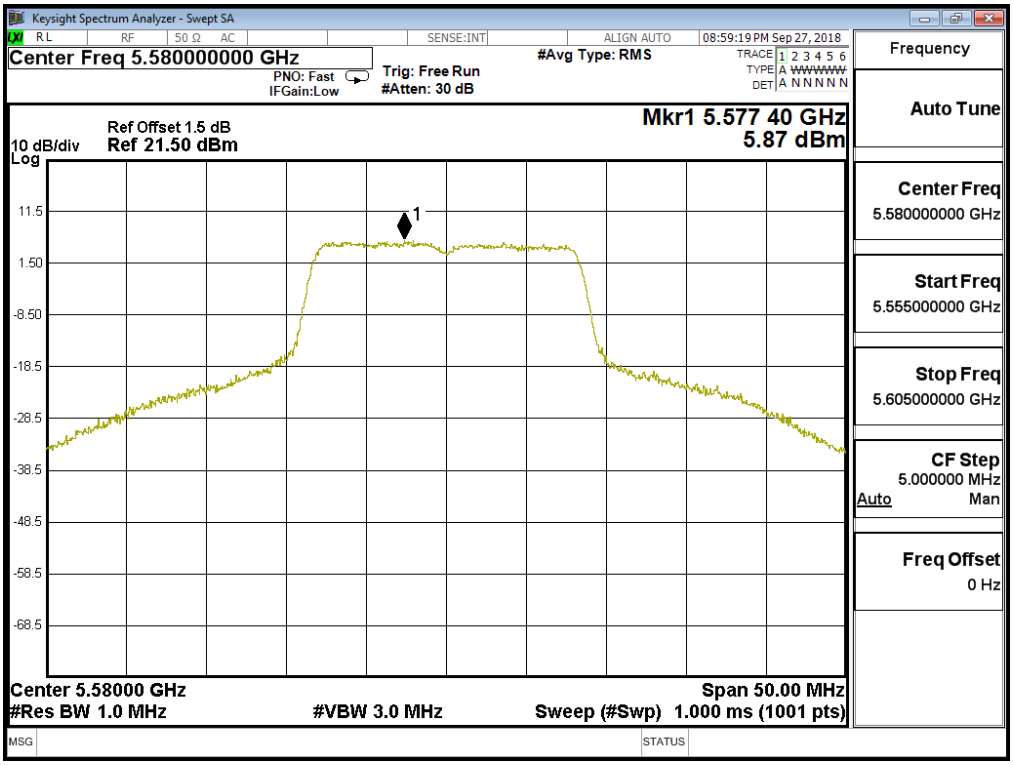
Channel 64



Channel 100



Channel 116



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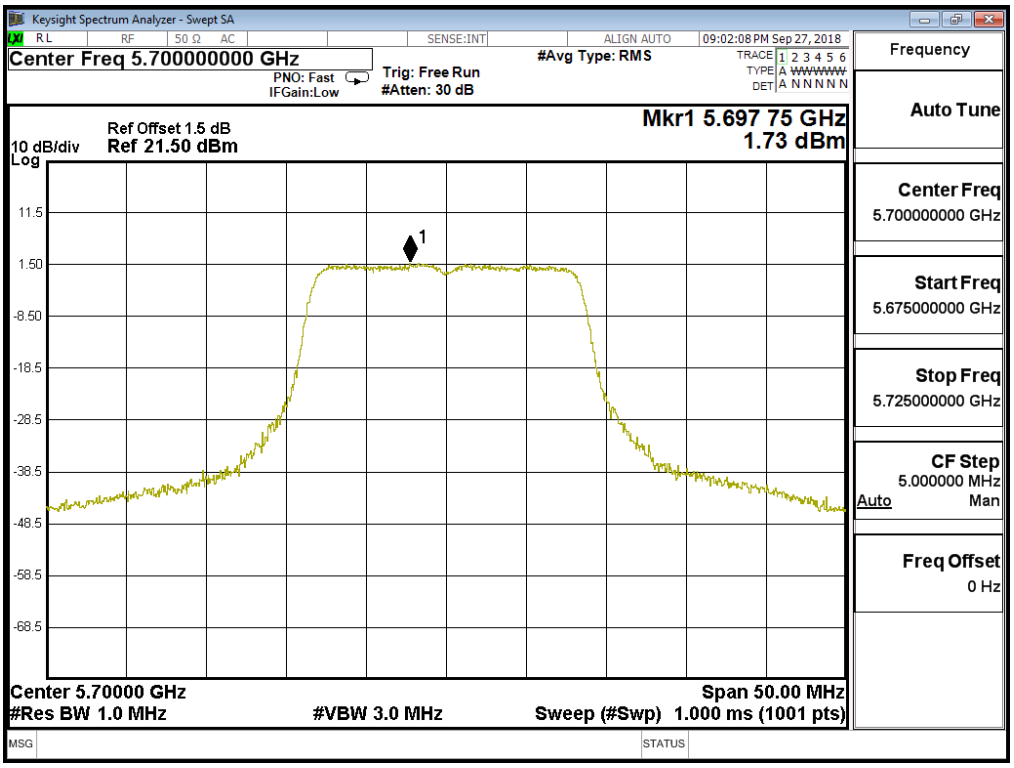

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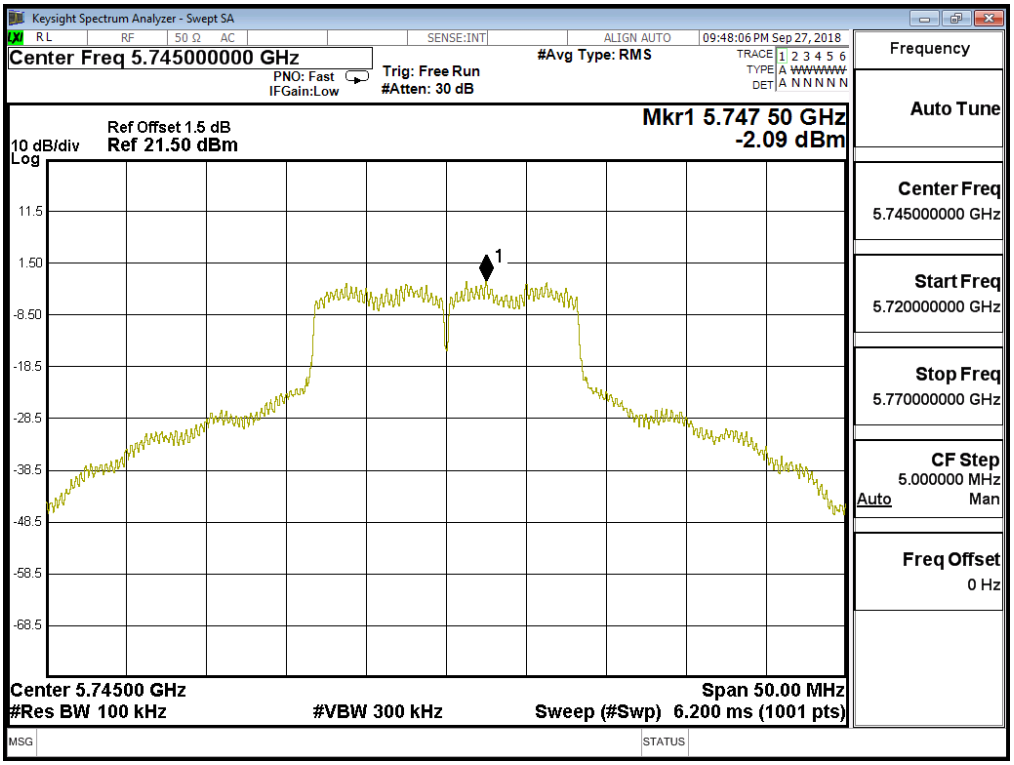

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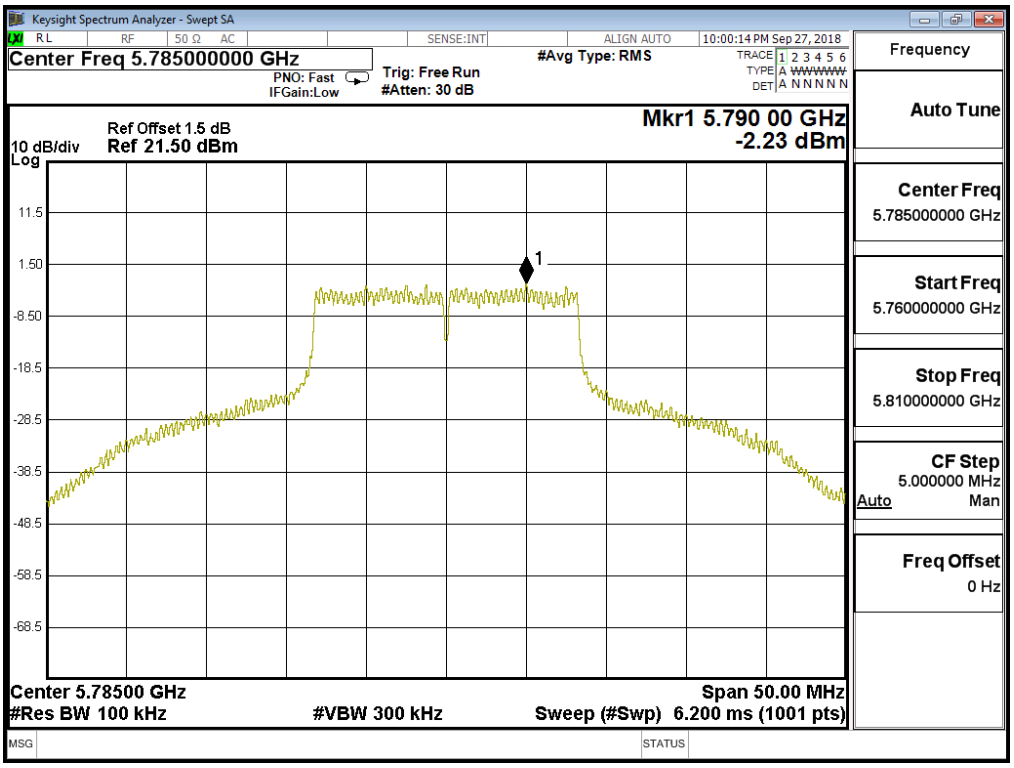
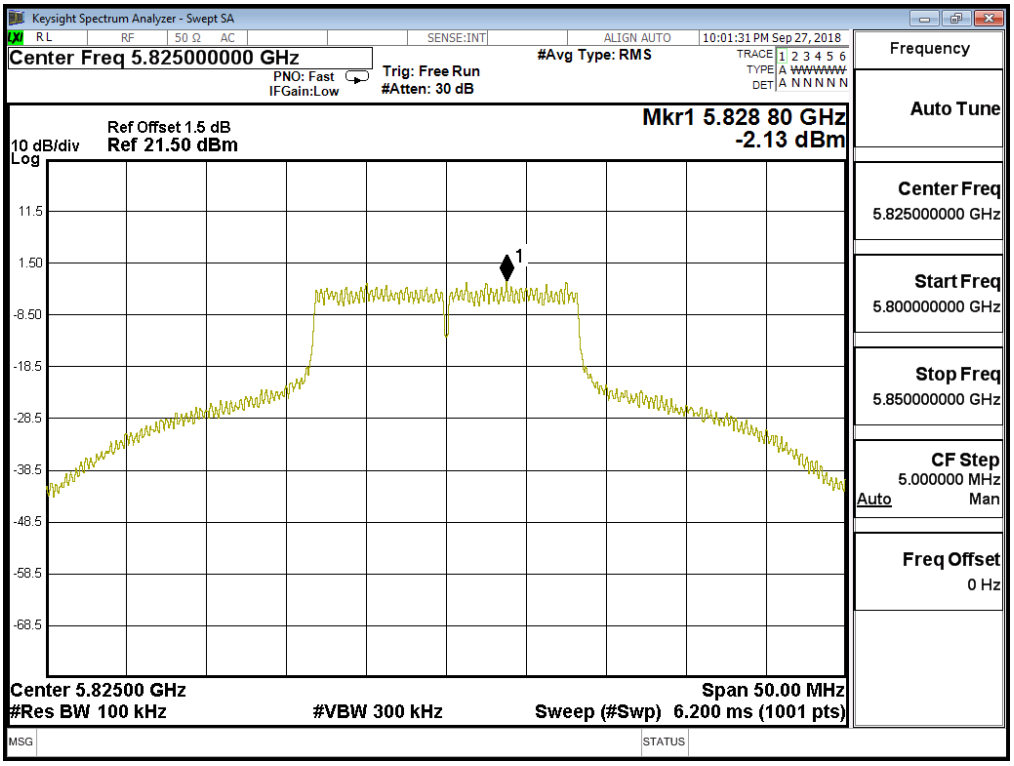


Channel 165

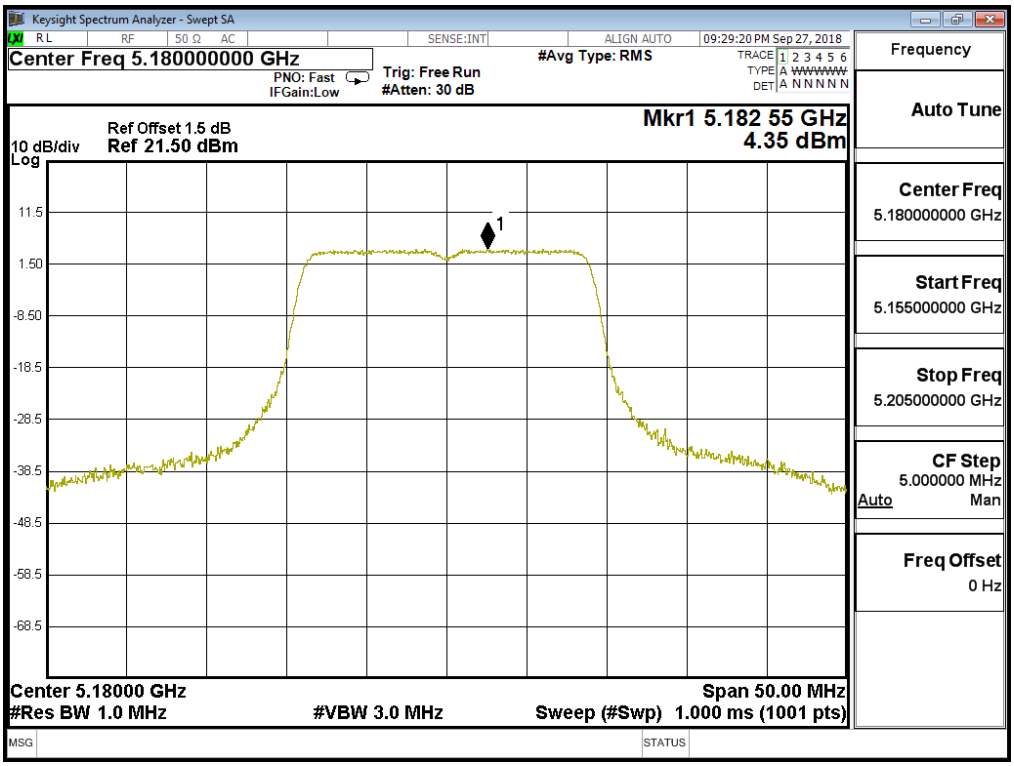


待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 1: SISO A: 發射器 802.11n-20BW
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

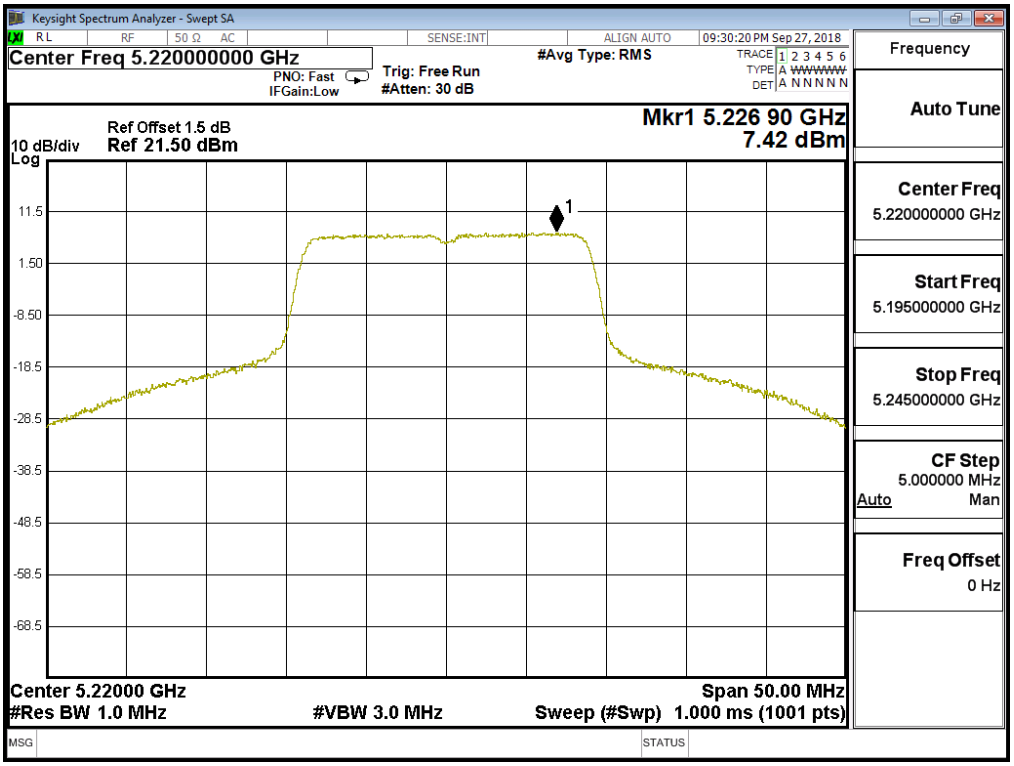
Channel Number	Frequency (MHz)	PPSD (dBm)	Required Limit (dBm)	Result
36	5180	4.350	<11	Pass
44	5220	7.420	<11	Pass
48	5240	6.710	<11	Pass
52	5260	6.940	<11	Pass
60	5300	6.030	<11	Pass
64	5320	2.930	<11	Pass
100	5500	3.680	<11	Pass
116	5580	7.610	<11	Pass
140	5700	3.780	<11	Pass

Channel Number	Frequency (MHz)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
144(U-NII-2C)	5720	6.990	--	6.990	<11	Pass
144(U-NII-3)	5720	-2.020	6.980	4.960	<30	Pass
149	5745	-0.830	6.980	6.150	<30	Pass
157	5785	-0.380	6.980	6.600	<30	Pass
165	5825	-0.720	6.980	6.260	<30	Pass

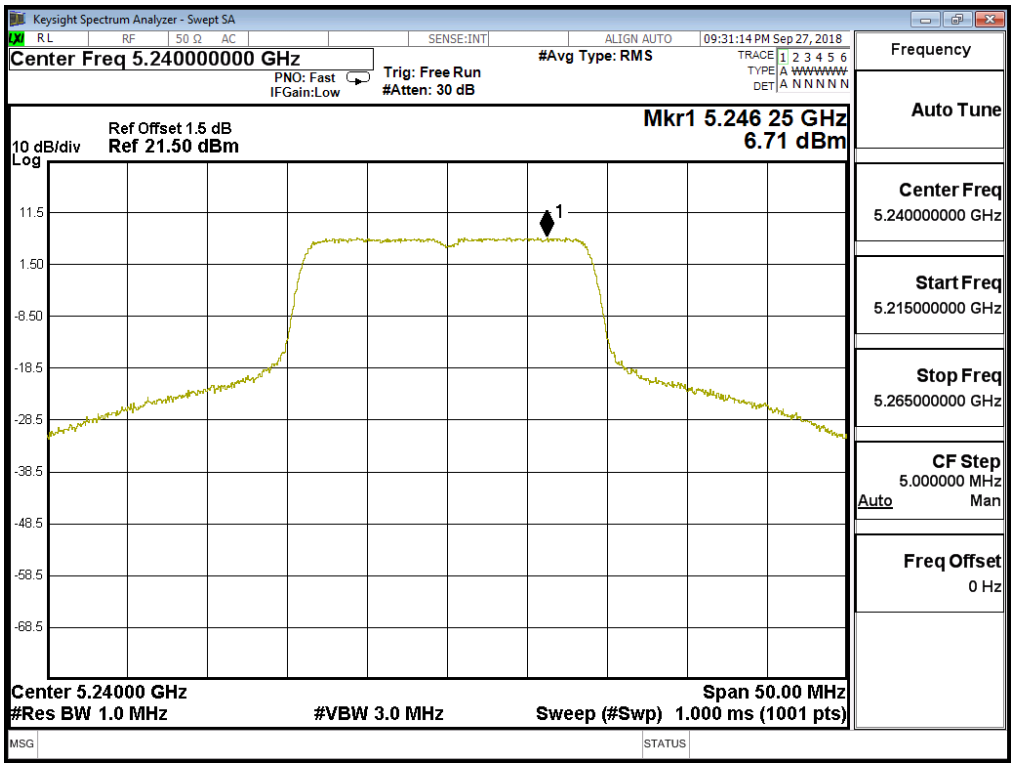
Channel 36



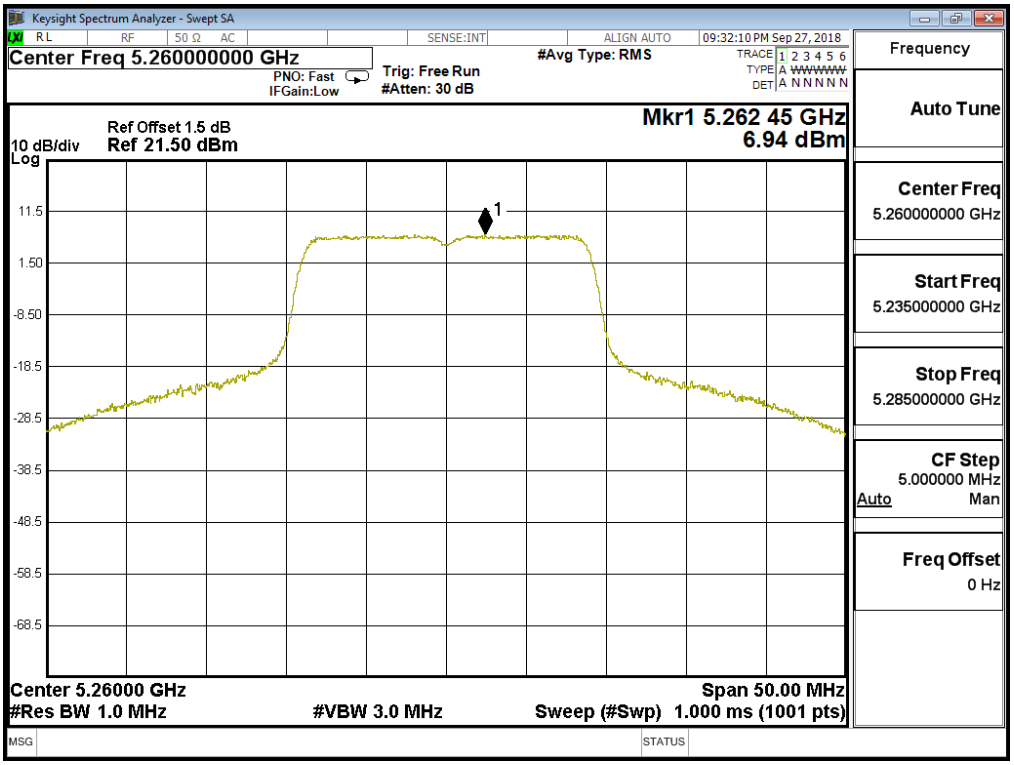
Channel 44



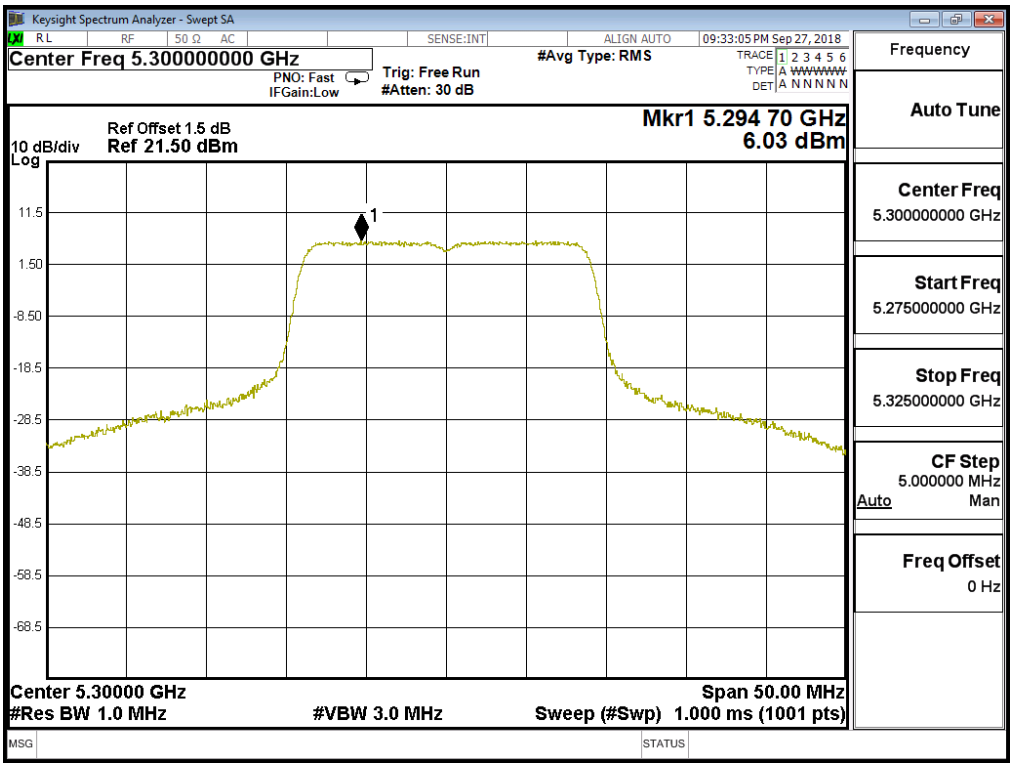
Channel 48



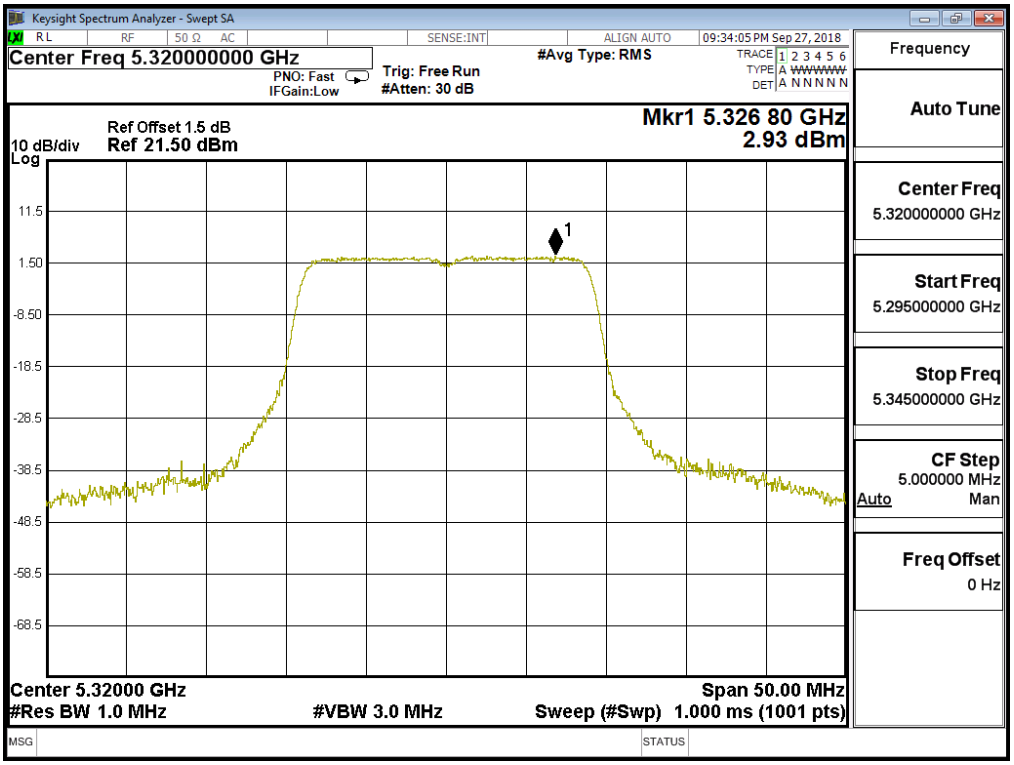
Channel 52



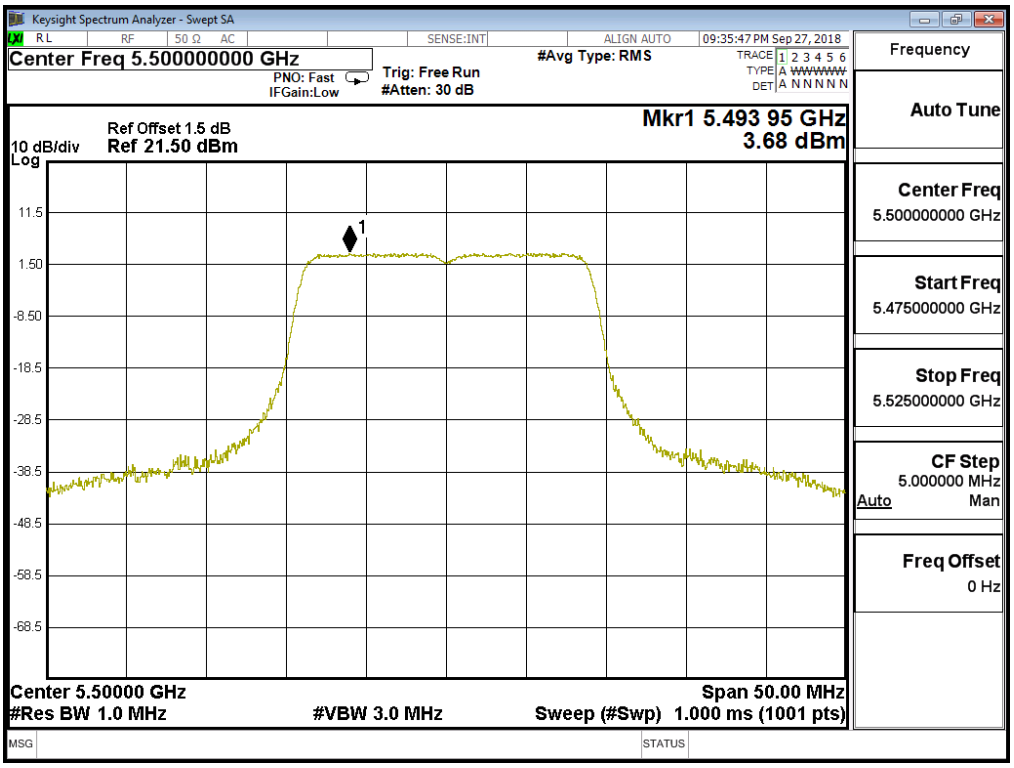
Channel 60



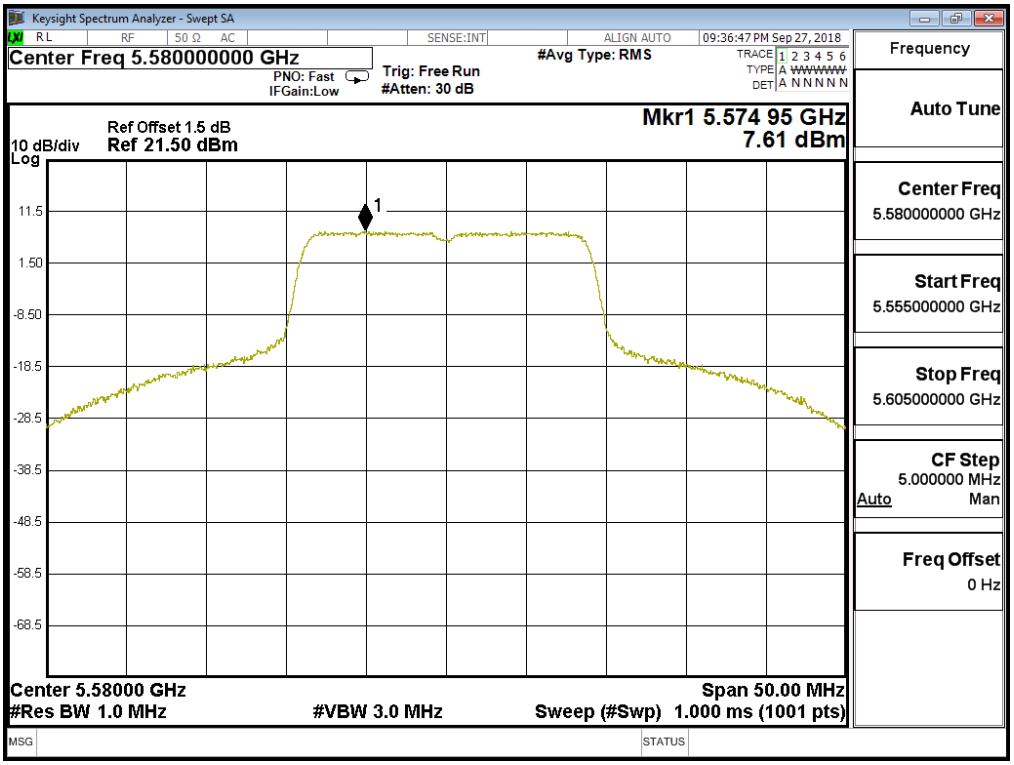
Channel 64



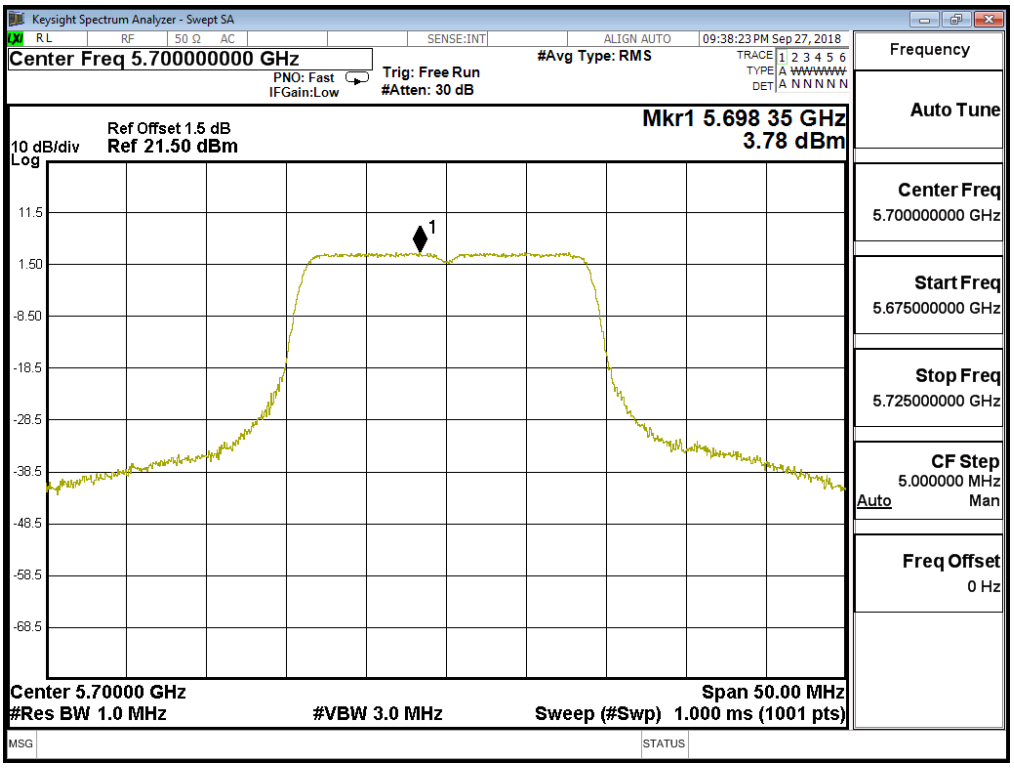
Channel 100



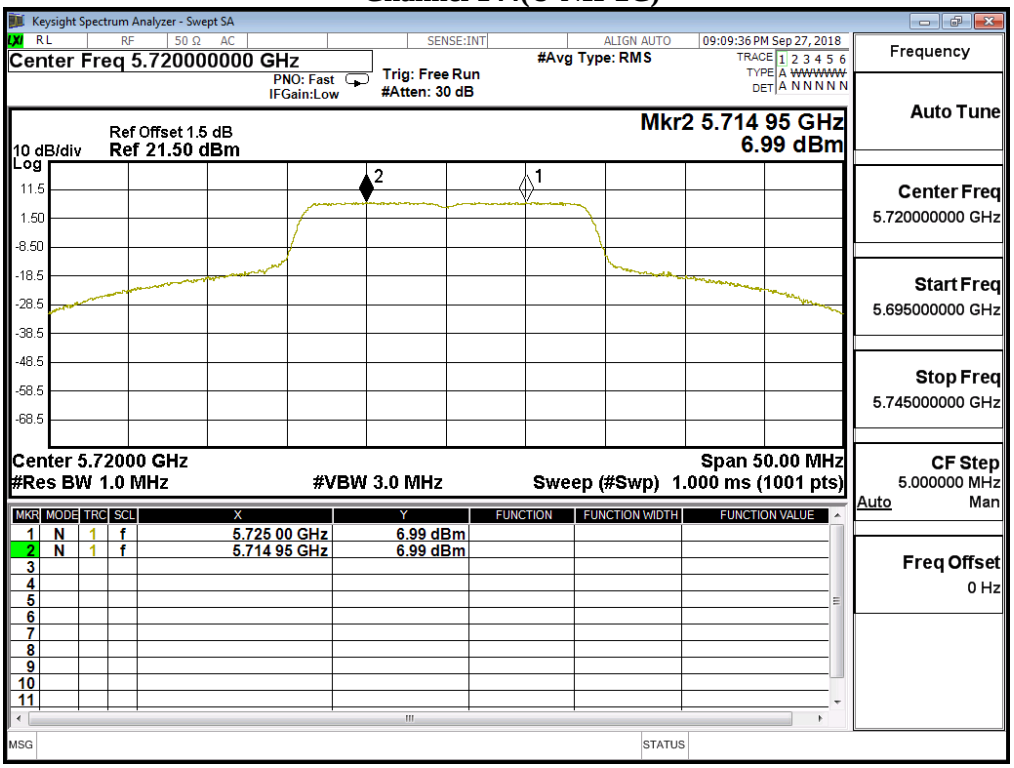
Channel 116



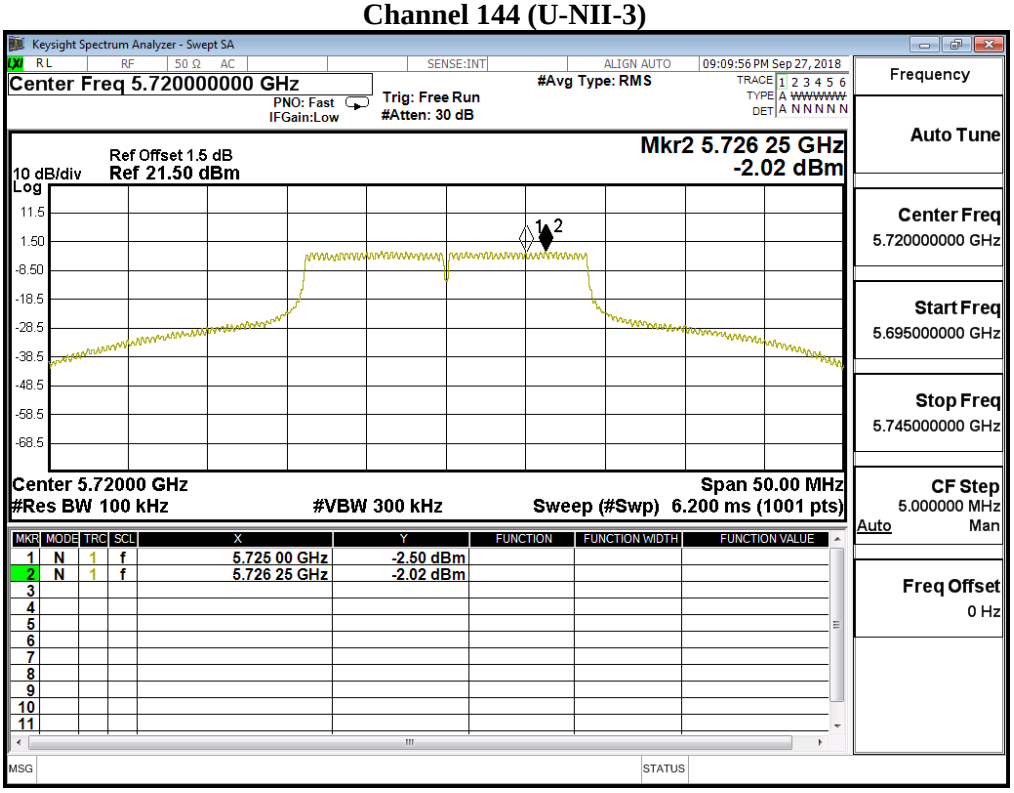
Channel 140



Channel 144(U-NII-2C)



Channel 144 (U-NII-3)



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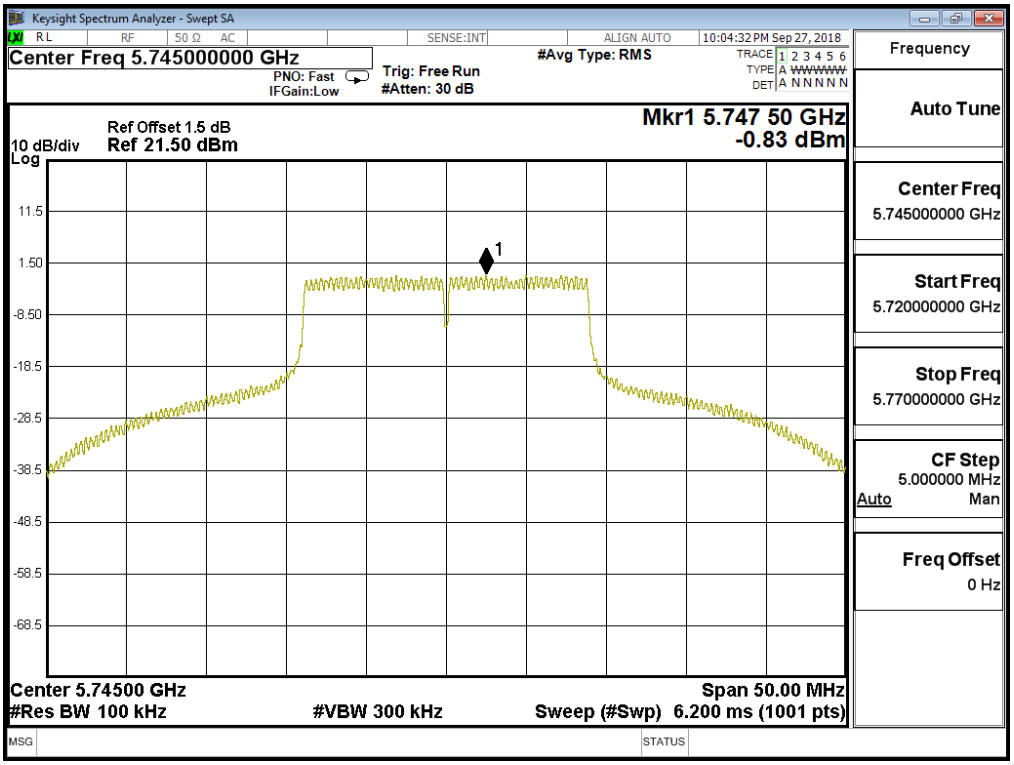
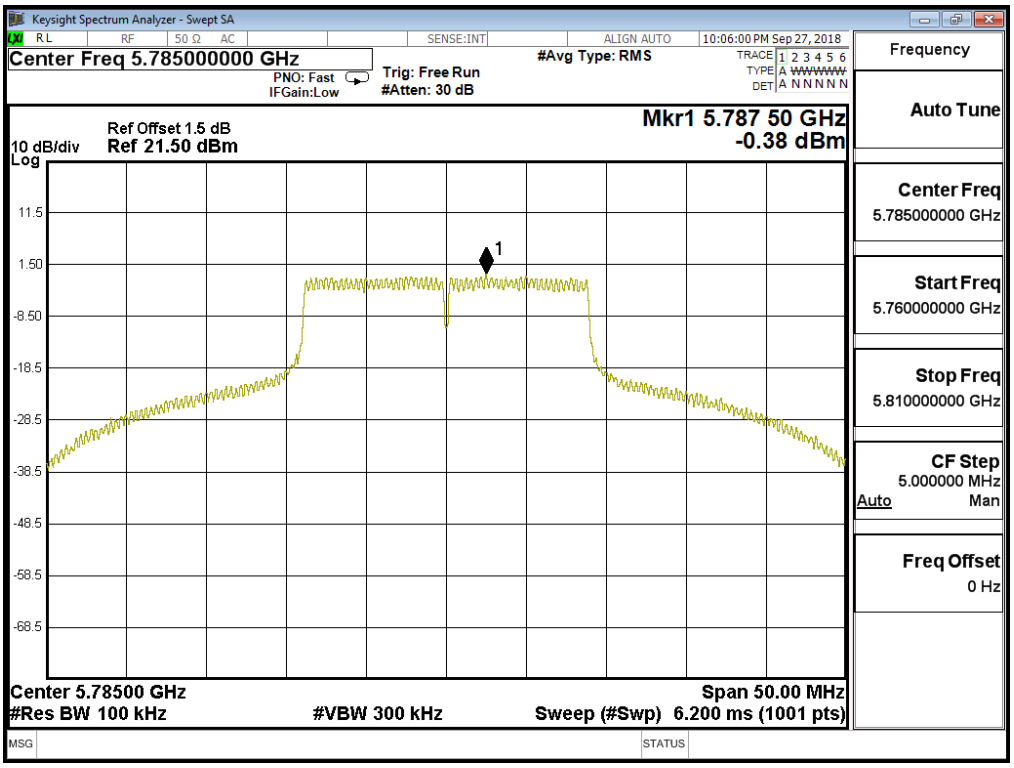
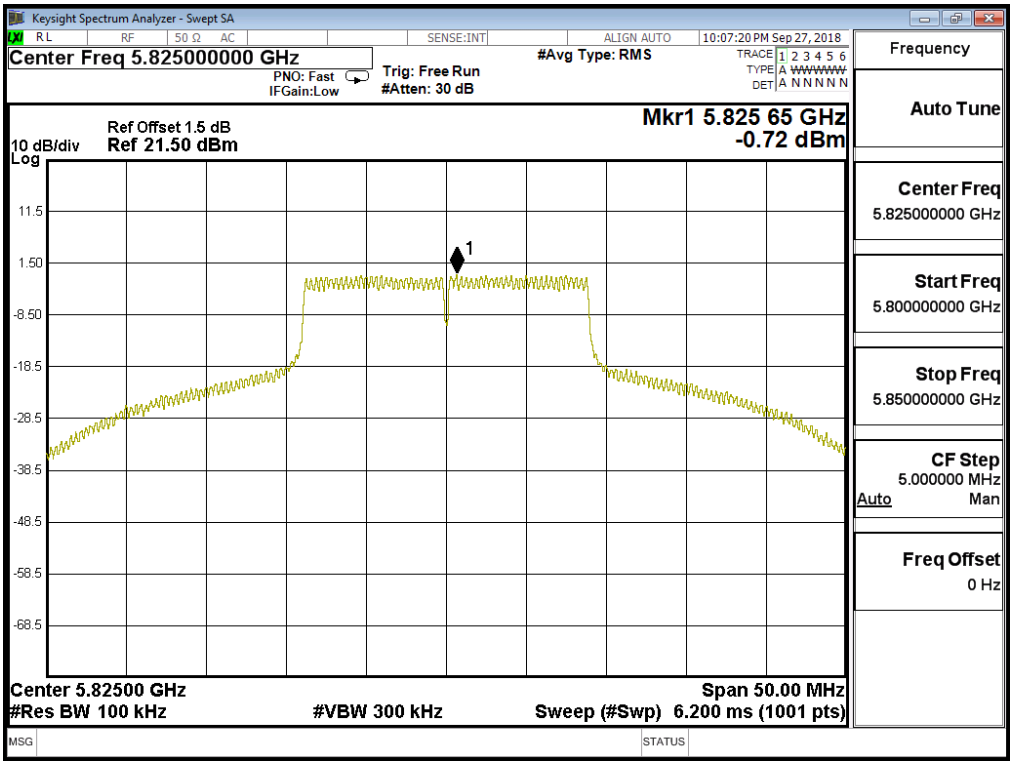


Channel 157



Channel 165

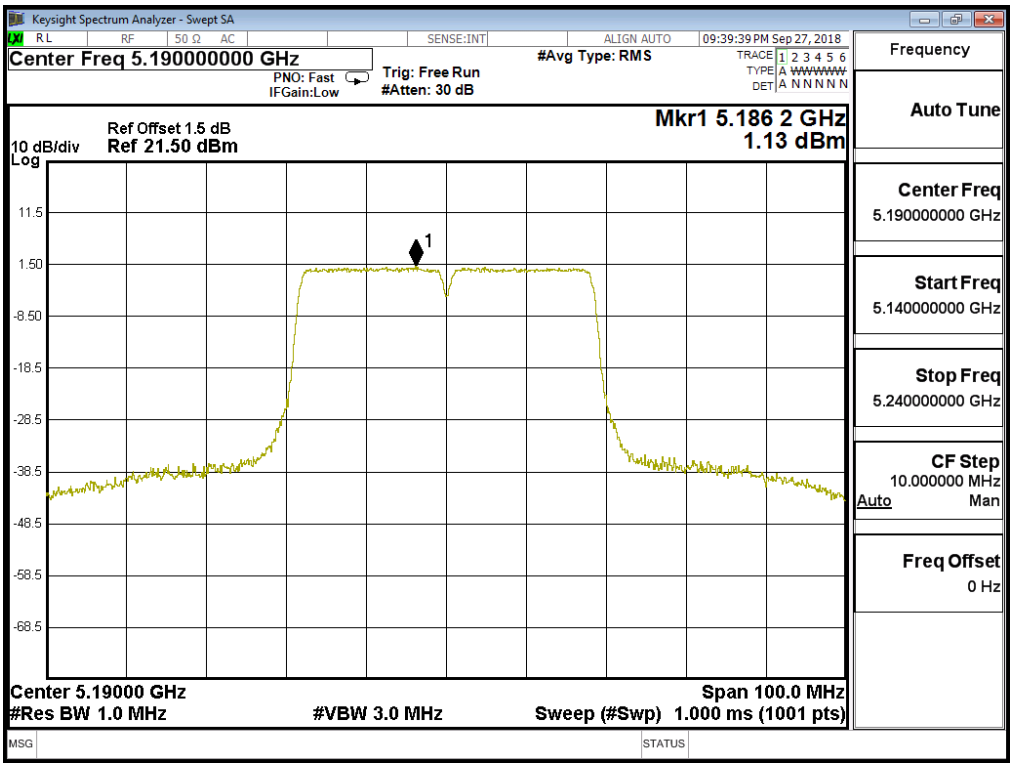


待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 1: SISO A: 發射器 802.11n-40BW
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

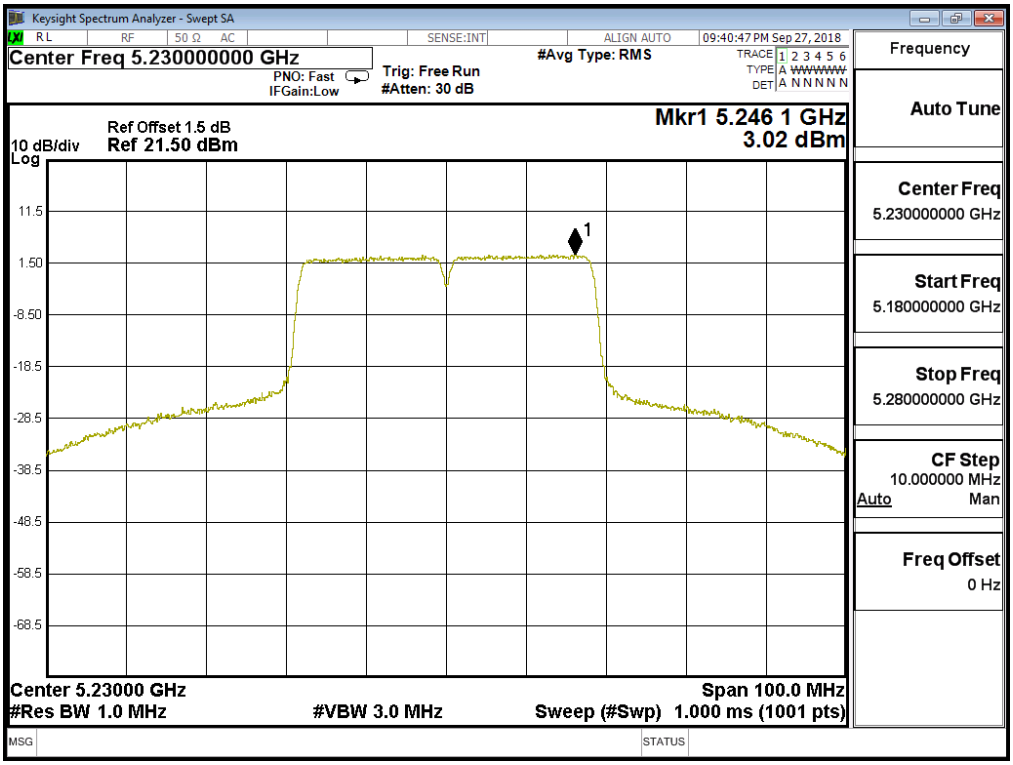
Channel Number	Frequency (MHz)	PPSD (dBm)	Required Limit (dBm)	Result
38	5190	1.130	<11	Pass
46	5230	3.020	<11	Pass
54	5270	2.870	<11	Pass
62	5310	-0.330	<11	Pass
102	5510	0.520	<11	Pass
110	5550	4.120	<11	Pass
134	5670	2.770	<11	Pass

Channel Number	Frequency (MHz)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
142(U-NII-2C)	5710	3.930	--	3.930	<11	Pass
142(U-NII-3)	5710	-5.290	6.980	1.690	<30	Pass
151	5755	-4.090	6.980	2.890	<30	Pass
159	5795	-3.910	6.980	3.070	<30	Pass

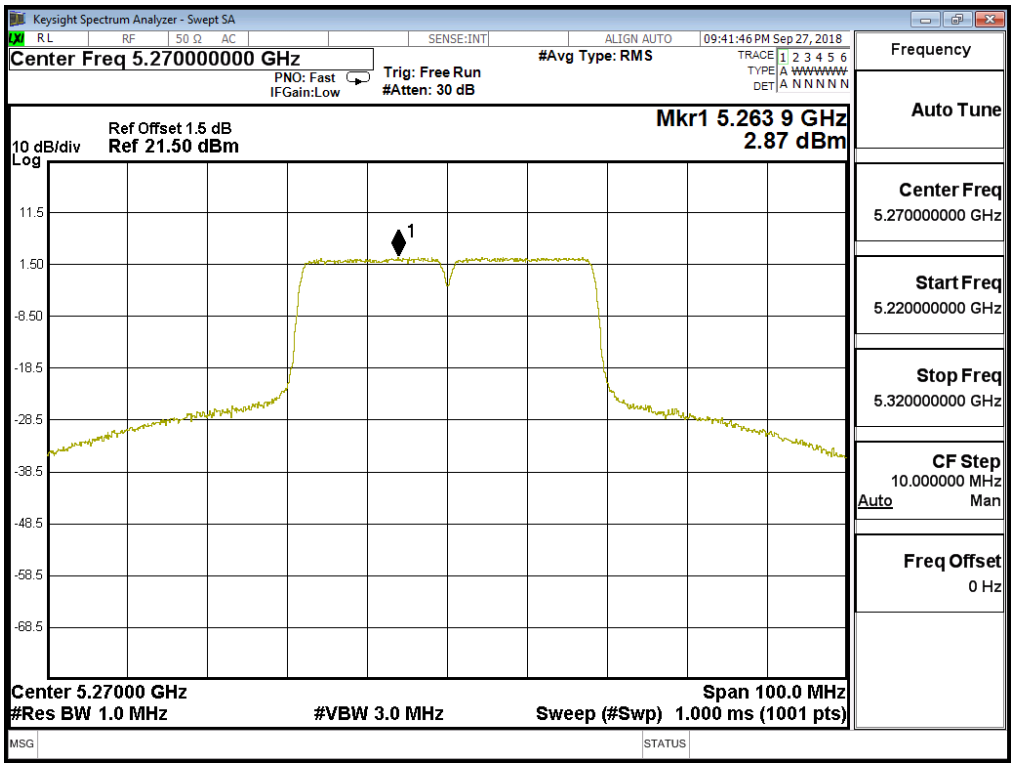
Channel 38



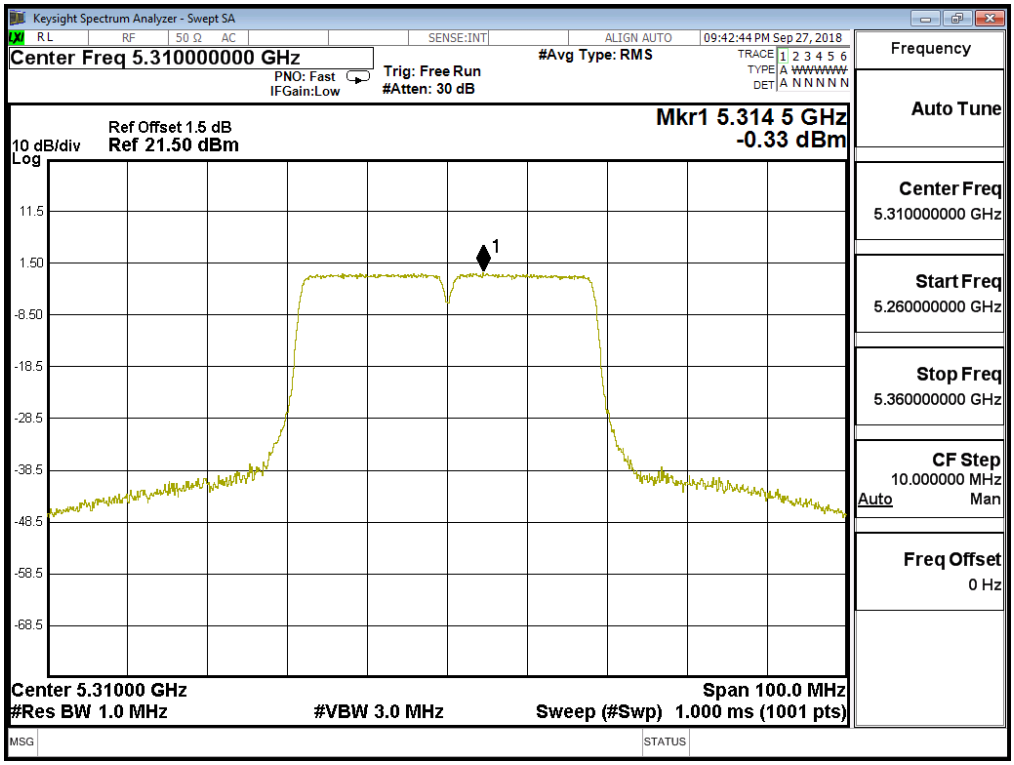
Channel 46



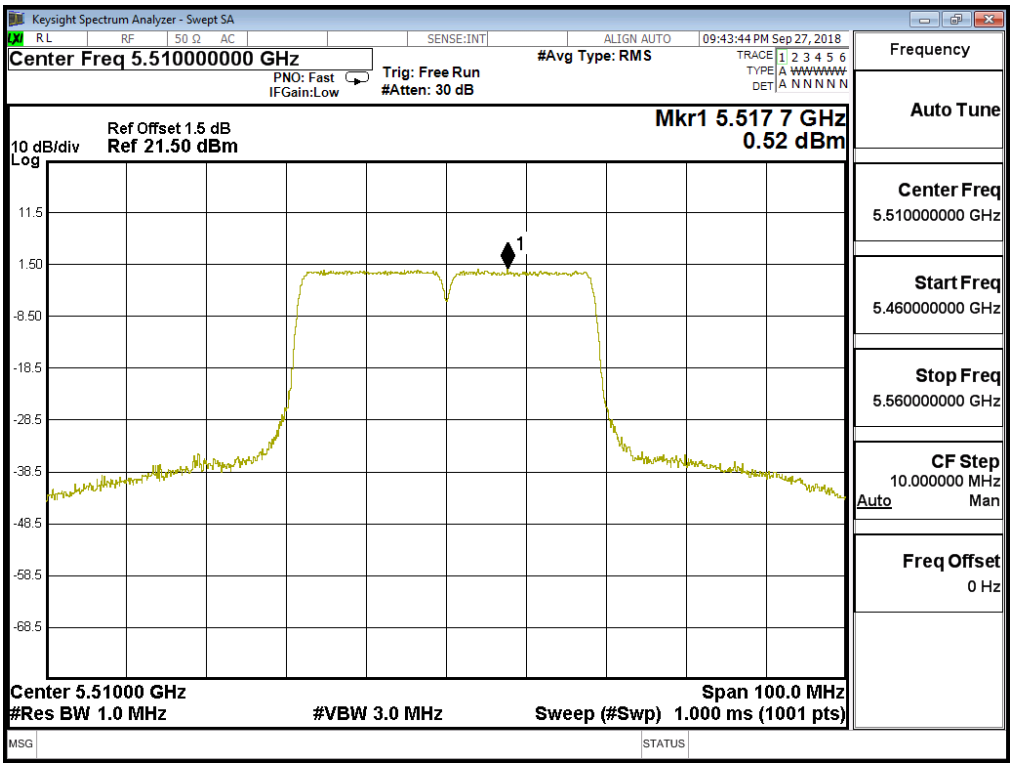
Channel 54



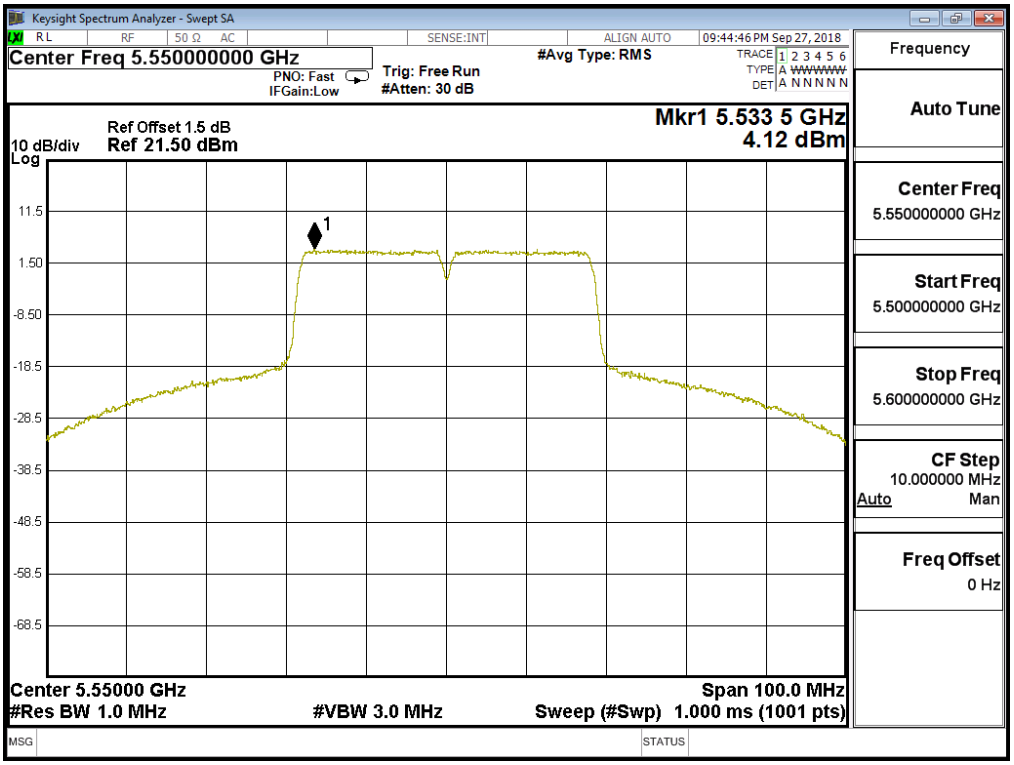
Channel 62



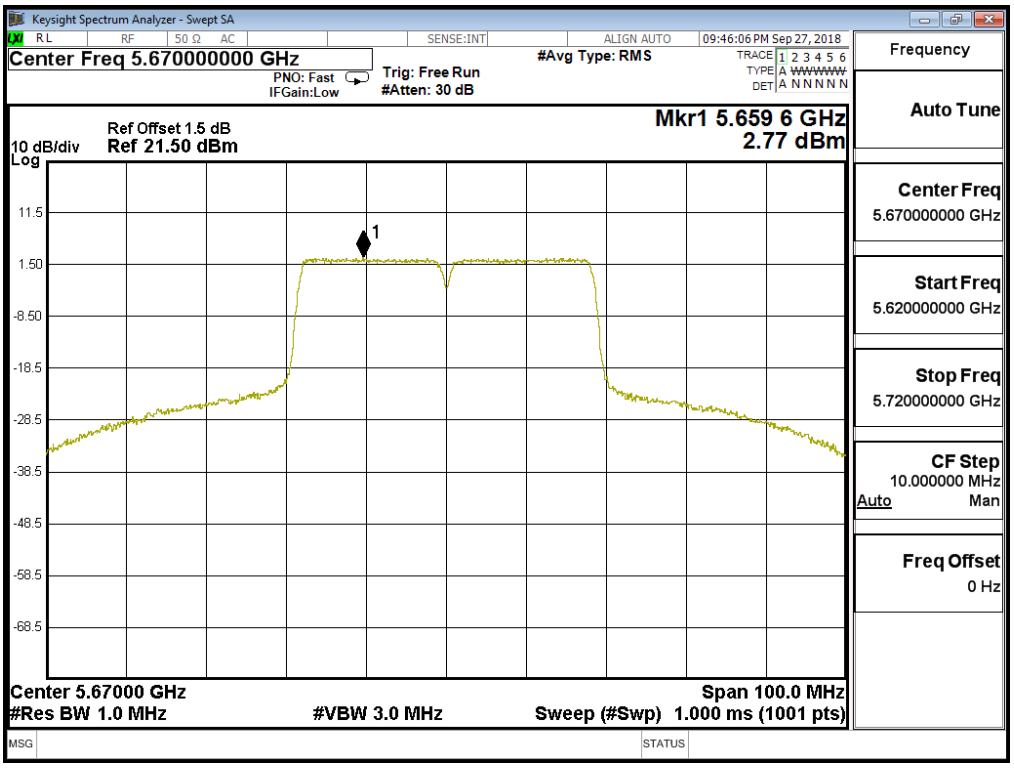
Channel 102



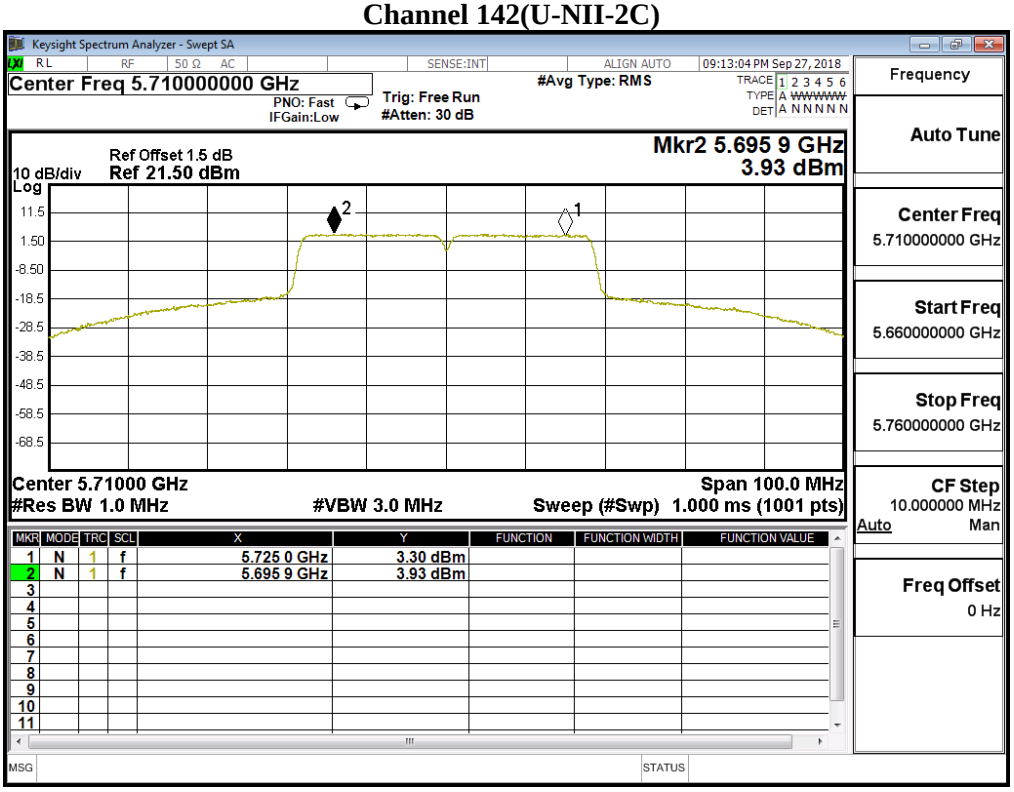
Channel 110



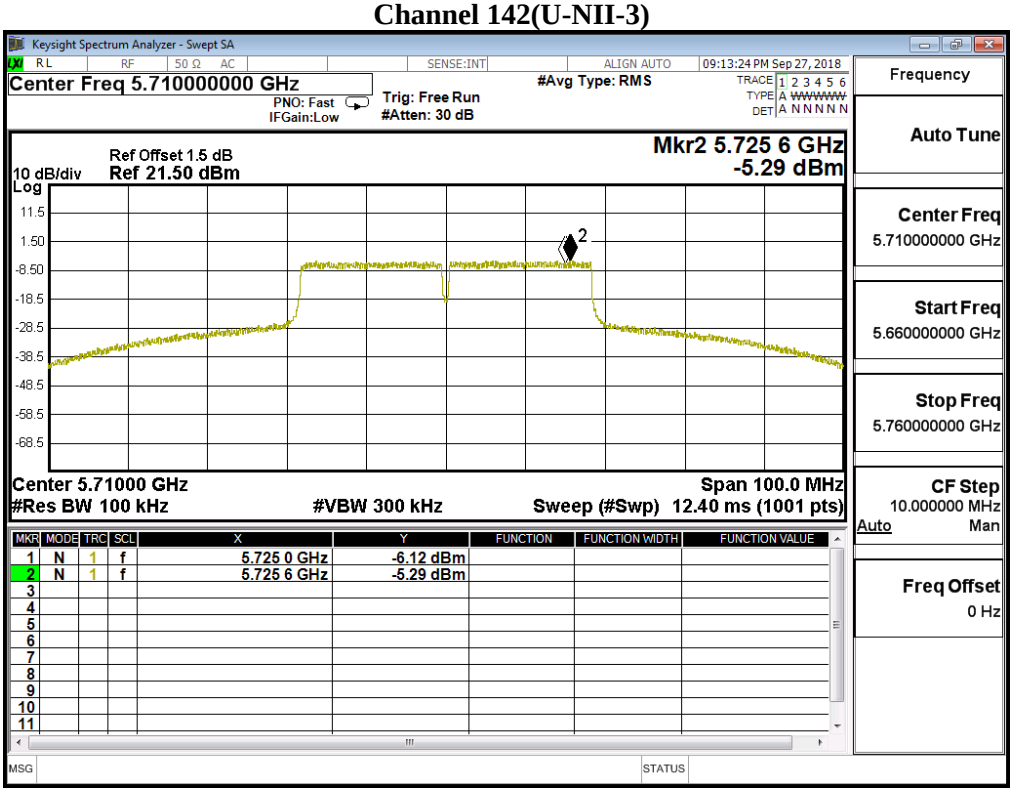
Channel 134



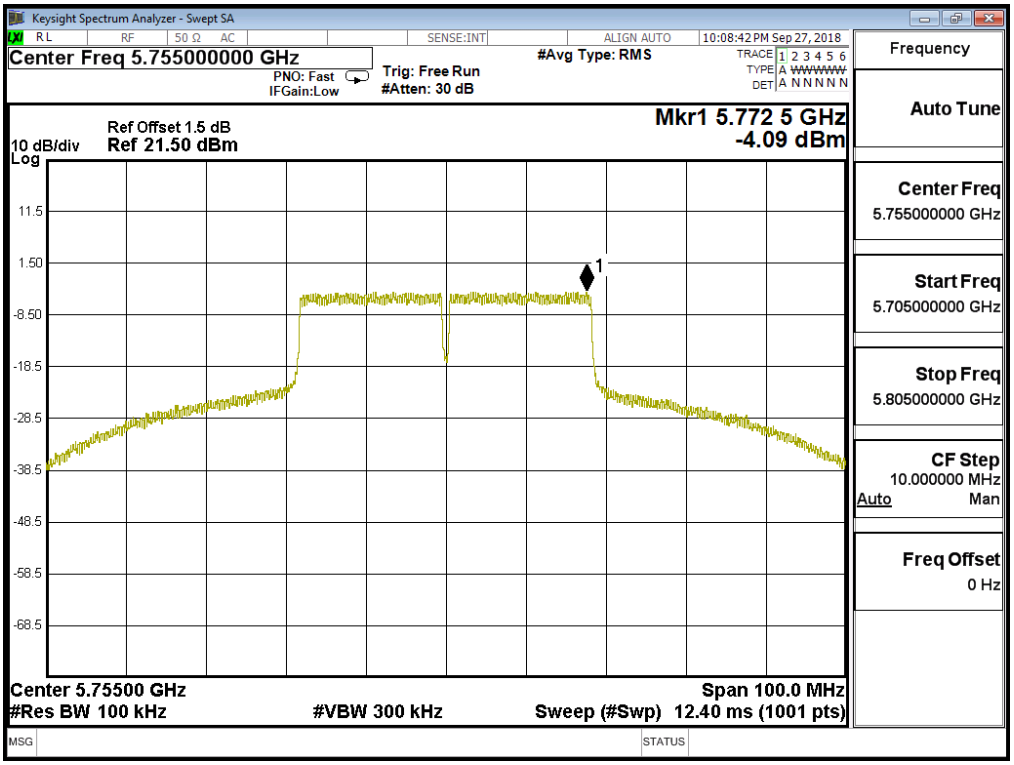
Channel 142(U-NII-2C)



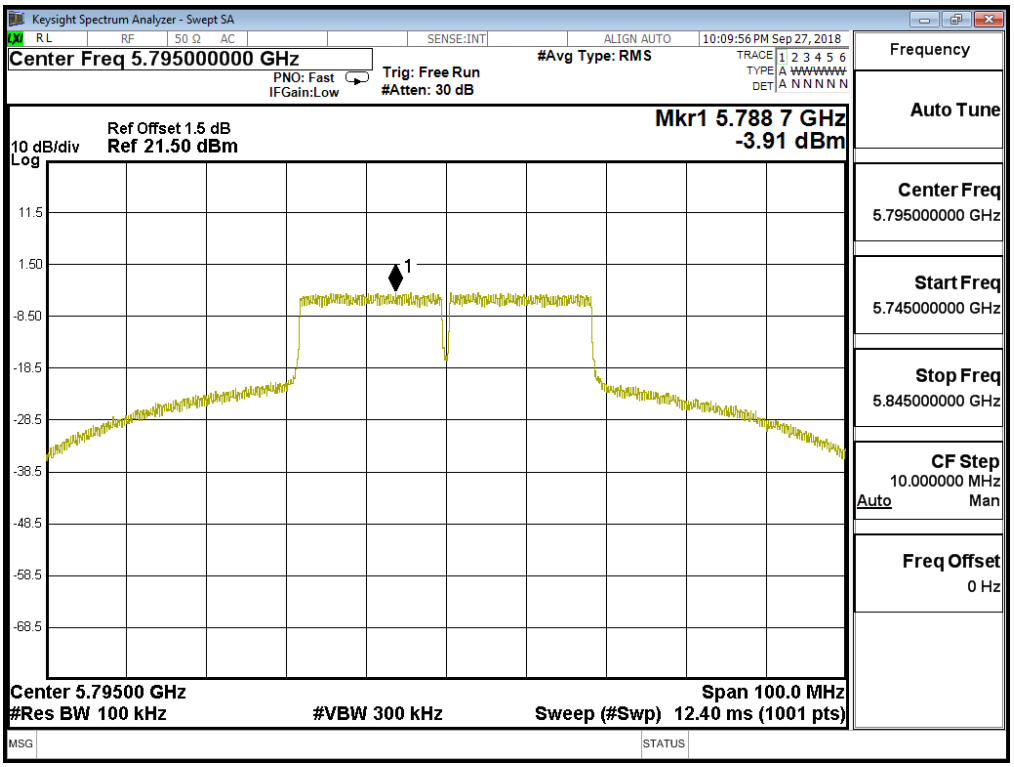
Channel 142(U-NII-3)



Channel 151



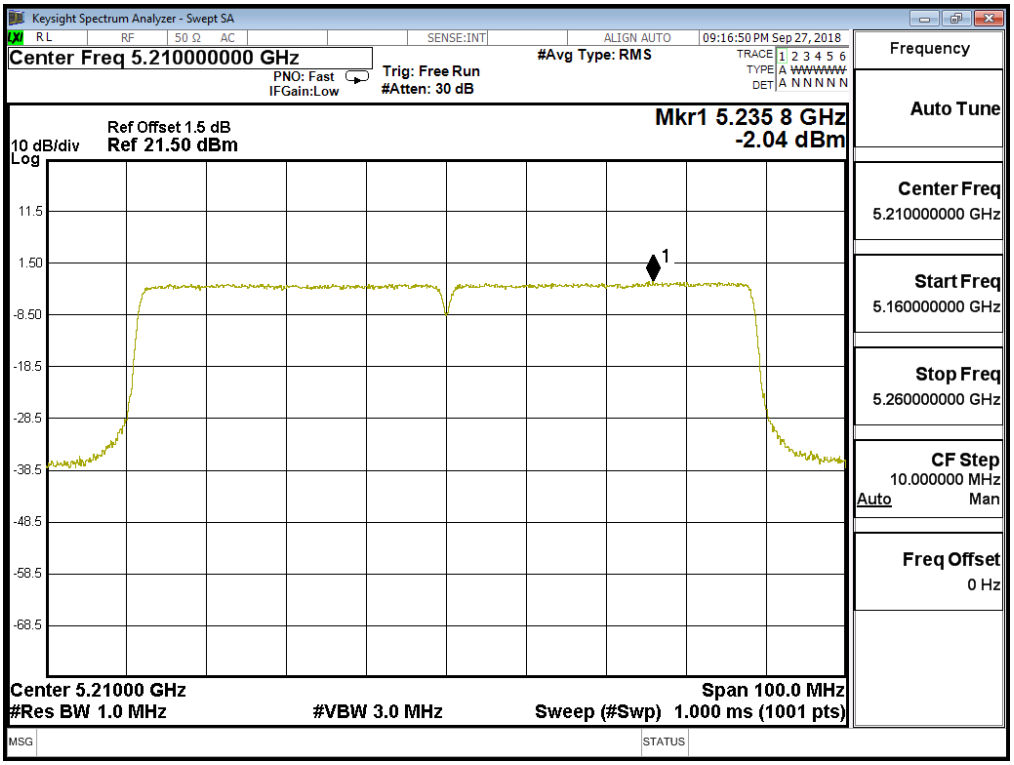
Channel 159


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.795000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
10:09:56 PM Sep 27, 2018
Ref Offset 1.5 dB
10 dB/div
Ref 21.50 dBm
Log
Mkr1 5.788 7 GHz
-3.91 dBm
11.5
1.50
-8.50
-18.5
-28.5
-38.5
-48.5
-58.5
-68.5
Center 5.79500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 100.0 MHz
Sweep (#Swp) 12.40 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.795000000 GHz
Start Freq
5.745000000 GHz
Stop Freq
5.845000000 GHz
CF Step
10.000000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

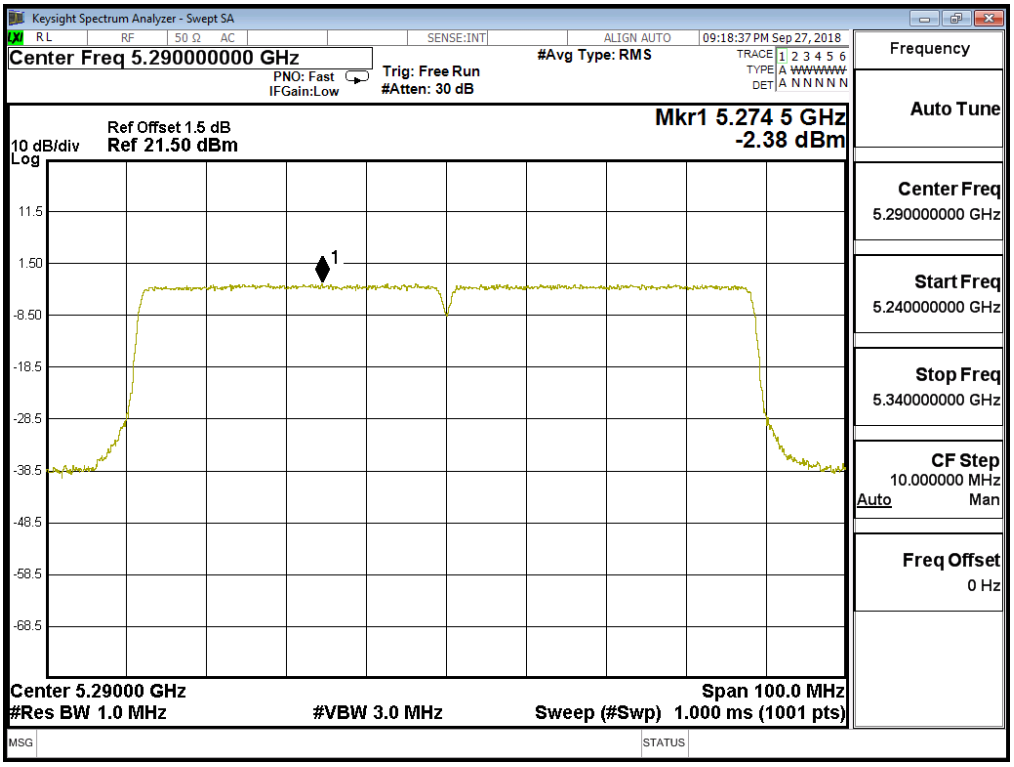
待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 1: SISO A: 發射器 802.11ac-80BW
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

Channel Number	Frequency (MHz)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
42	5210	-2.040	--	-2.040	<11	Pass
58	5290	-2.380	--	-2.380	<11	Pass
106	5530	-2.690	--	-2.690	<11	Pass
122	5610	0.720	--	0.720	<11	Pass
138(U-NII-2C)	5690	0.690	--	0.690	<11	Pass
138(U-NII-3)	5690	-8.570	6.98	-8.570	<30	Pass
155	5775	-10.220	6.98	-10.220	<30	Pass

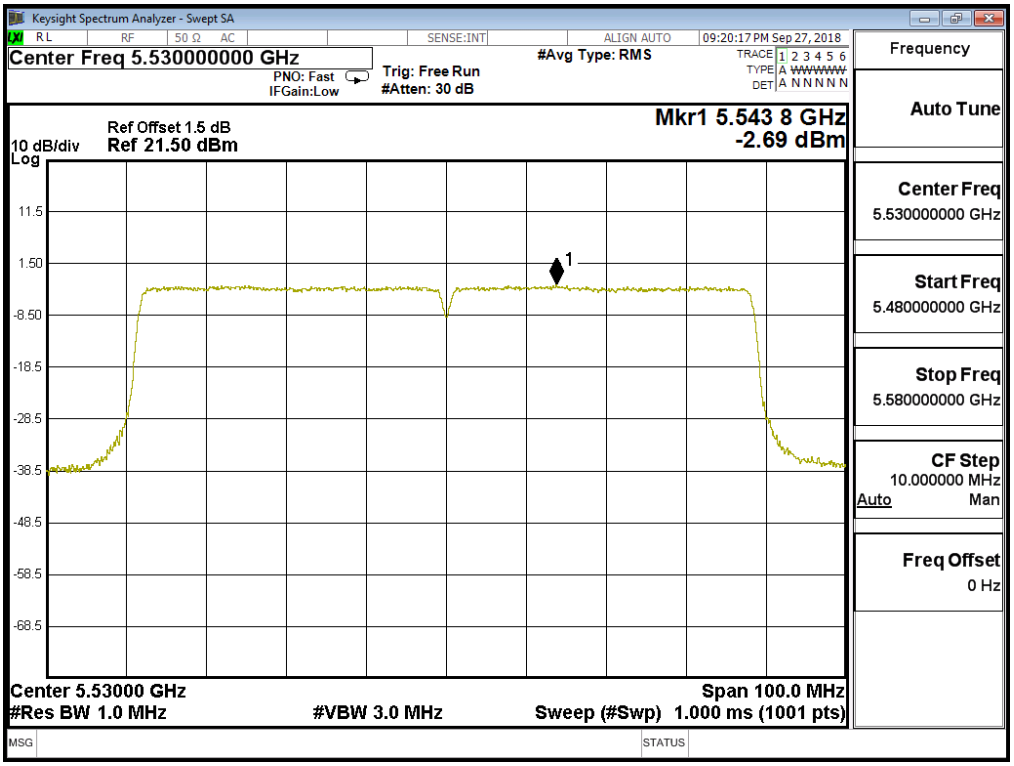
Channel 42



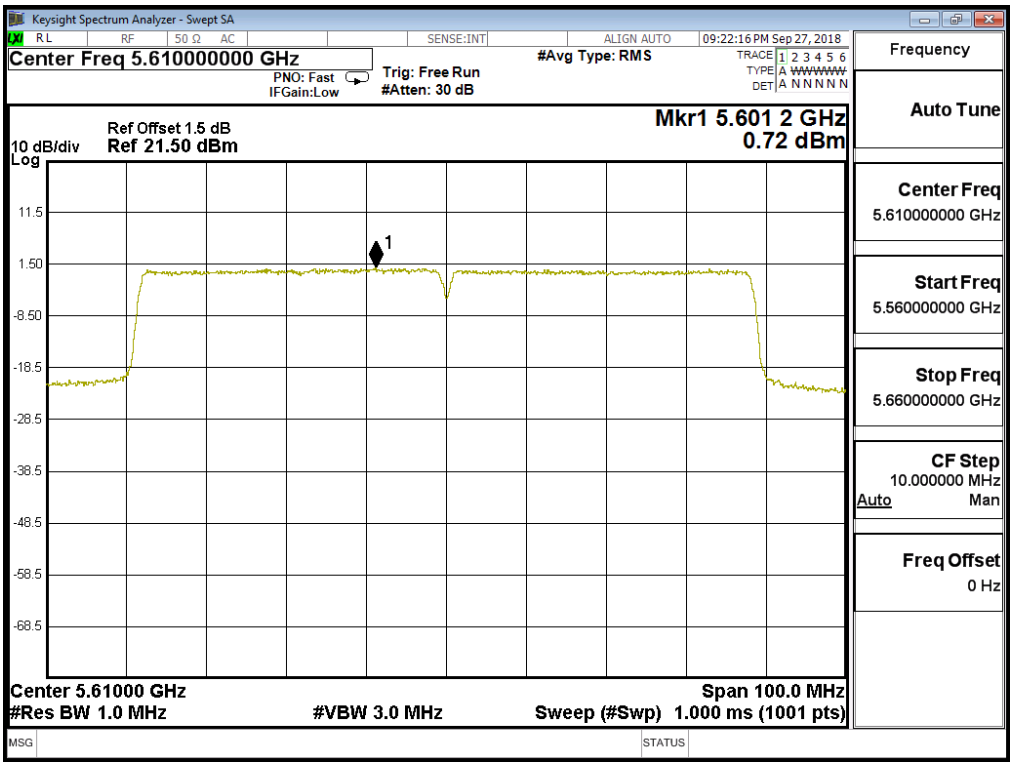
Channel 58



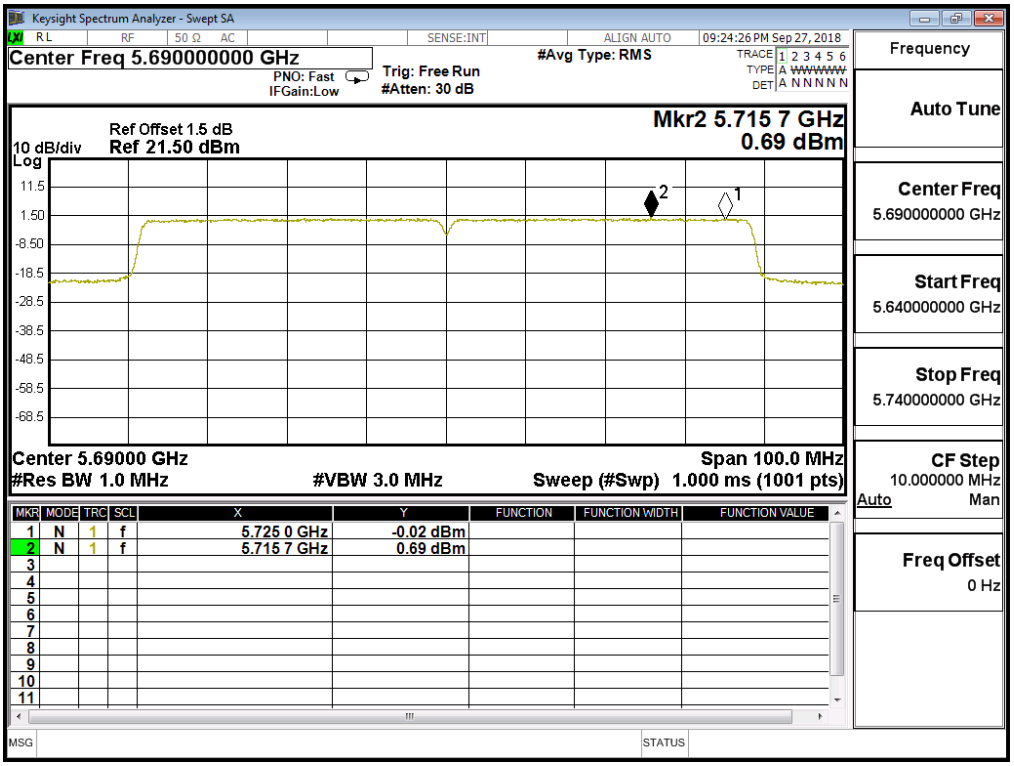
Channel 106



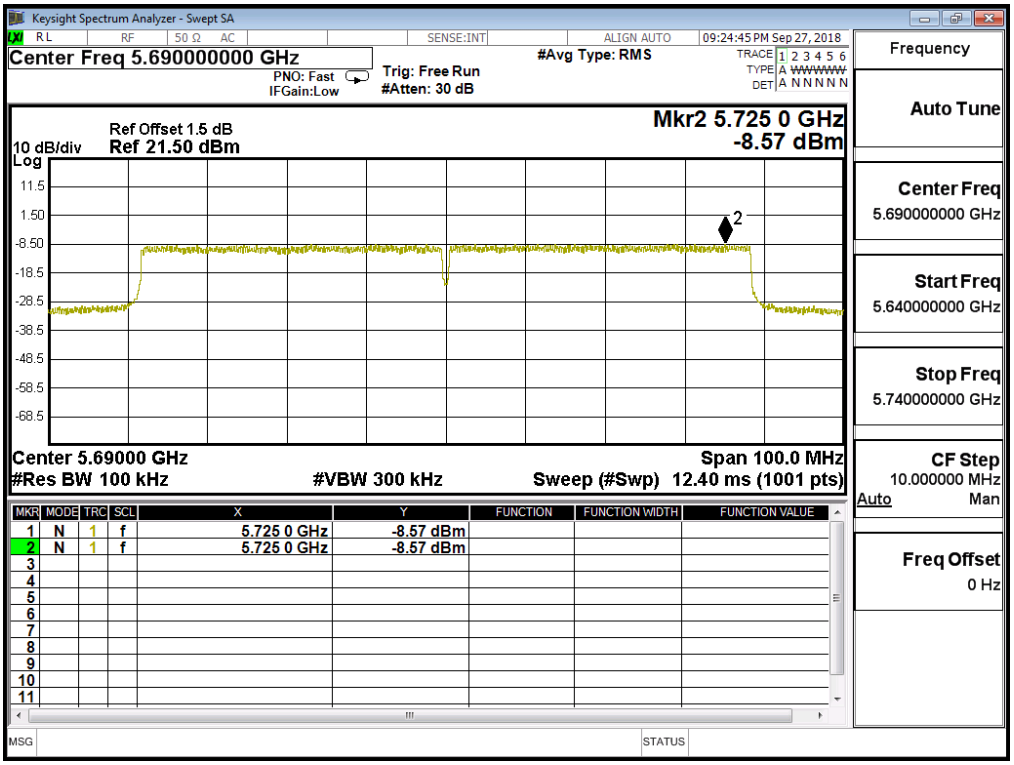
Channel 122



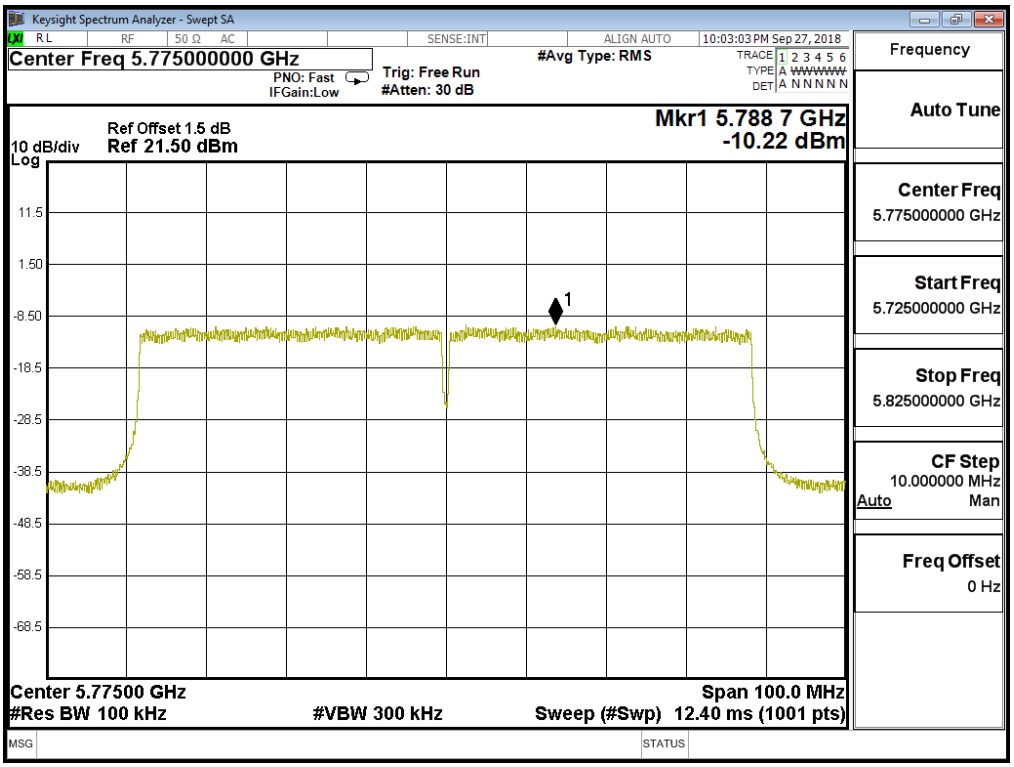
Channel 138 (U-NII-2C)



Channel 138 (U-NII-3)



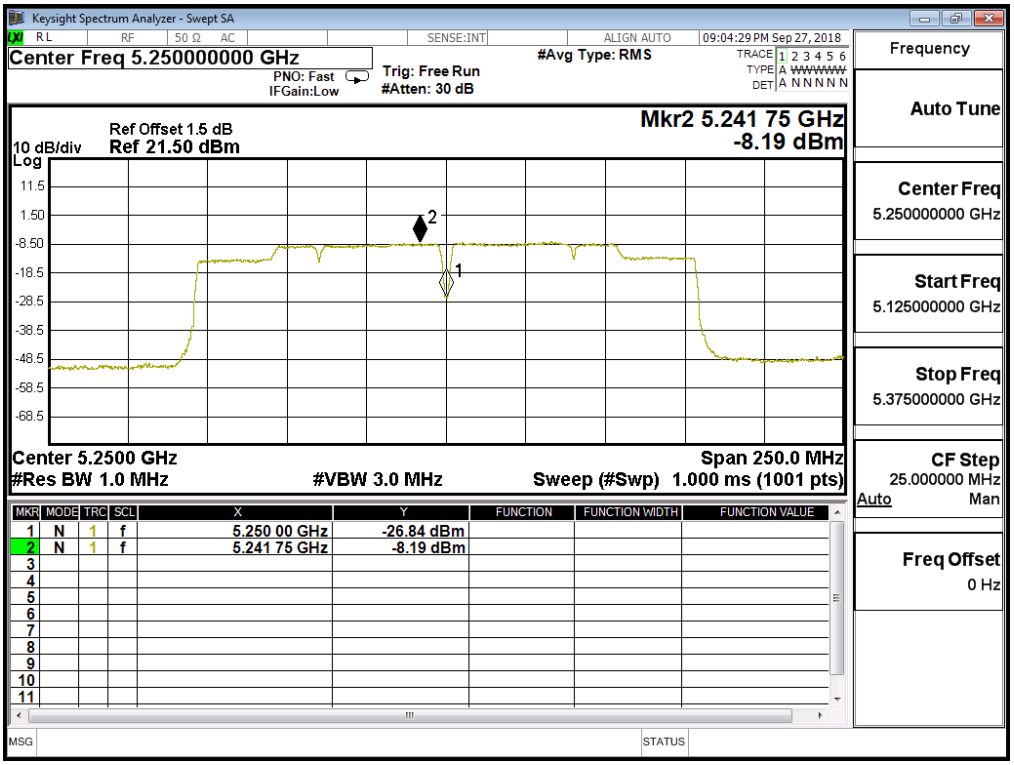
Channel 155


Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
10:03:03 PM Sep 27, 2018
Center Freq 5.775000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
TRACE 1 2 3 4 5 6
TYPE A WWWWWW
DET A N N N N N
Ref Offset 1.5 dB
10 dB/div
Ref 21.50 dBm
Log
Mkr1 5.788 7 GHz
-10.22 dBm
11.5
1.50
-8.50
-18.5
-28.5
-38.5
-48.5
-58.5
-68.5
1
Center 5.77500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 100.0 MHz
Sweep (#Swp) 12.40 ms (1001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
5.775000000 GHz
Start Freq
5.725000000 GHz
Stop Freq
5.825000000 GHz
CF Step
10.000000 MHz
Auto
Man
Freq Offset
0 Hz

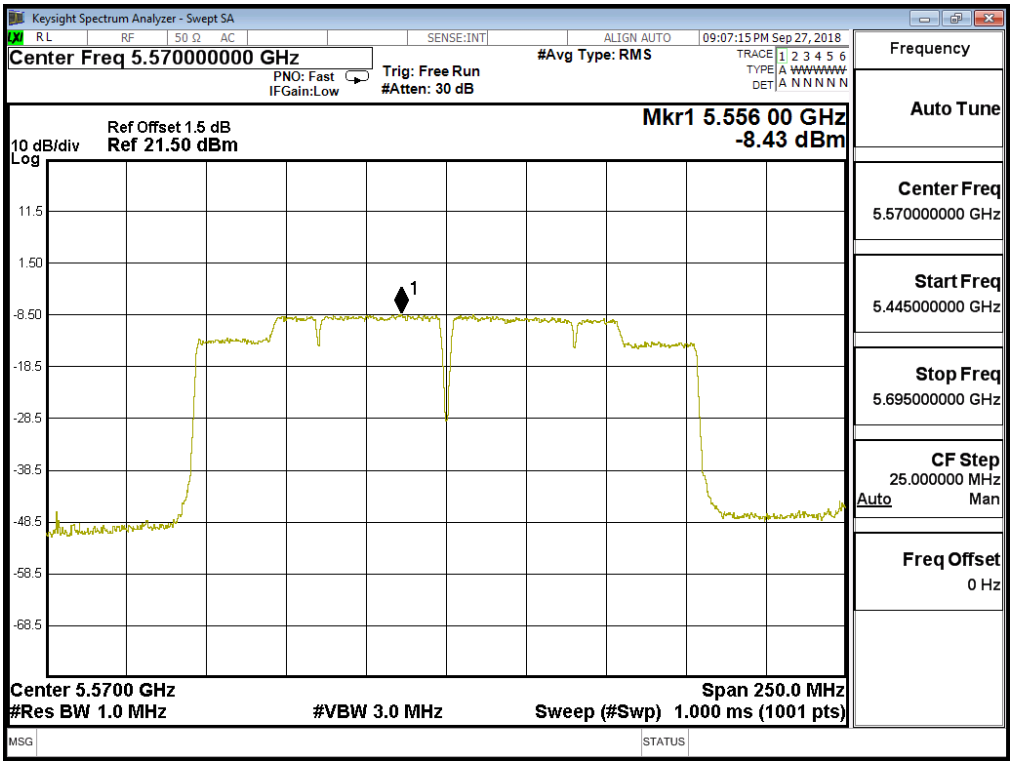
待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 1: SISO A: 發射器 802.11ac-160BW
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

Channel Number	Frequency (MHz)	PPSD (dBm)	Required Limit (dBm)	Result
50	5250	-8.190	<11	Pass
114	5570	-8.430	<11	Pass

Channel 50



Channel 114



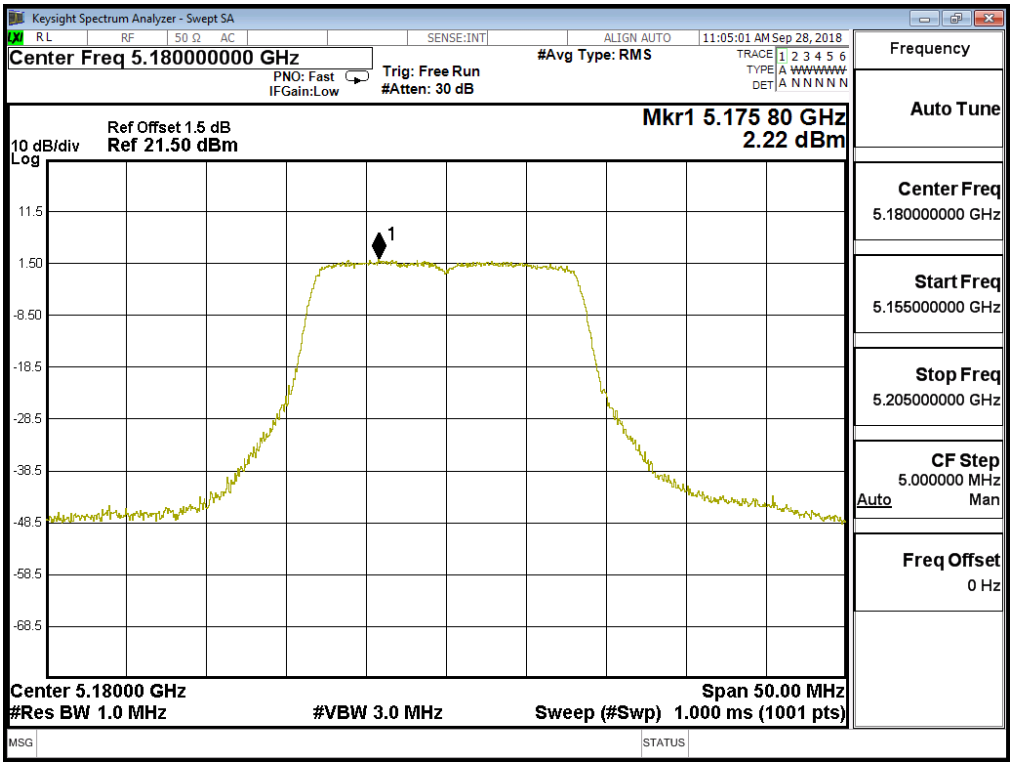
待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 2: SISO B: 發射器 802.11a
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

Channel Number	Frequency (MHz)	PPSD (dBm)	Required Limit (dBm)	Result
36	5180	2.220	<11	Pass
44	5220	5.340	<11	Pass
48	5240	4.050	<11	Pass
52	5260	4.720	<11	Pass
60	5300	3.710	<11	Pass
64	5320	0.270	<11	Pass
100	5500	1.020	<11	Pass
116	5580	4.830	<11	Pass
140	5700	0.710	<11	Pass

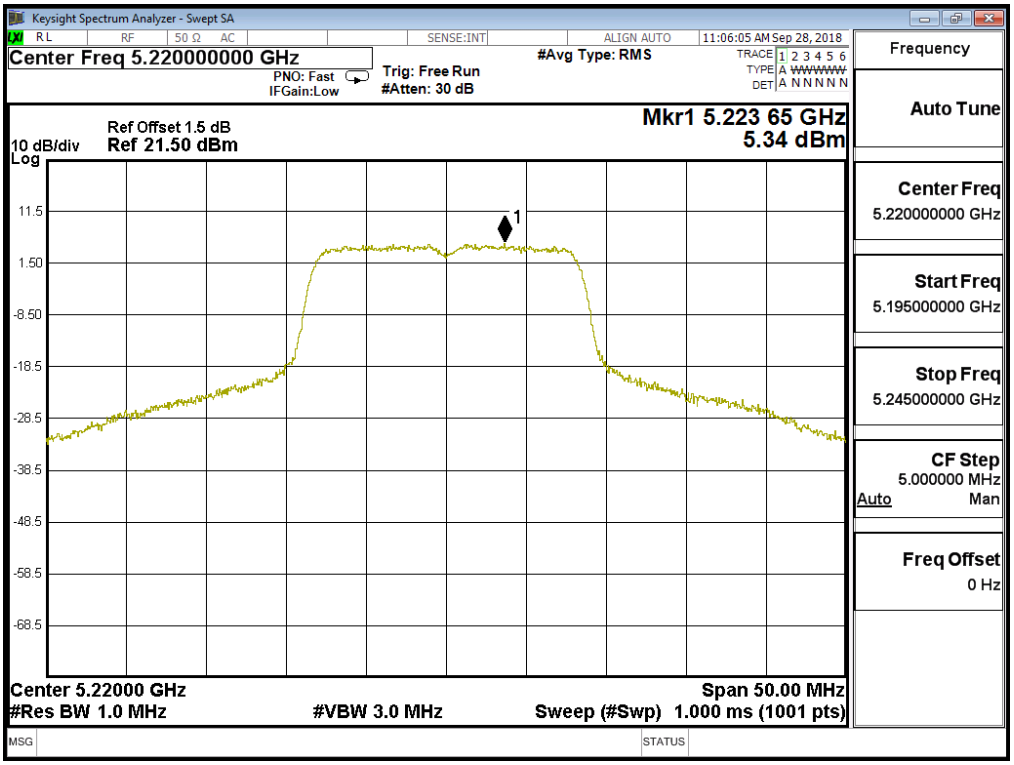
Channel Number	Frequency (MHz)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
149	5745	-3.160	6.980	3.820	<30	Pass
157	5785	-3.470	6.980	3.510	<30	Pass
165	5825	-2.650	6.980	4.330	<30	Pass

.

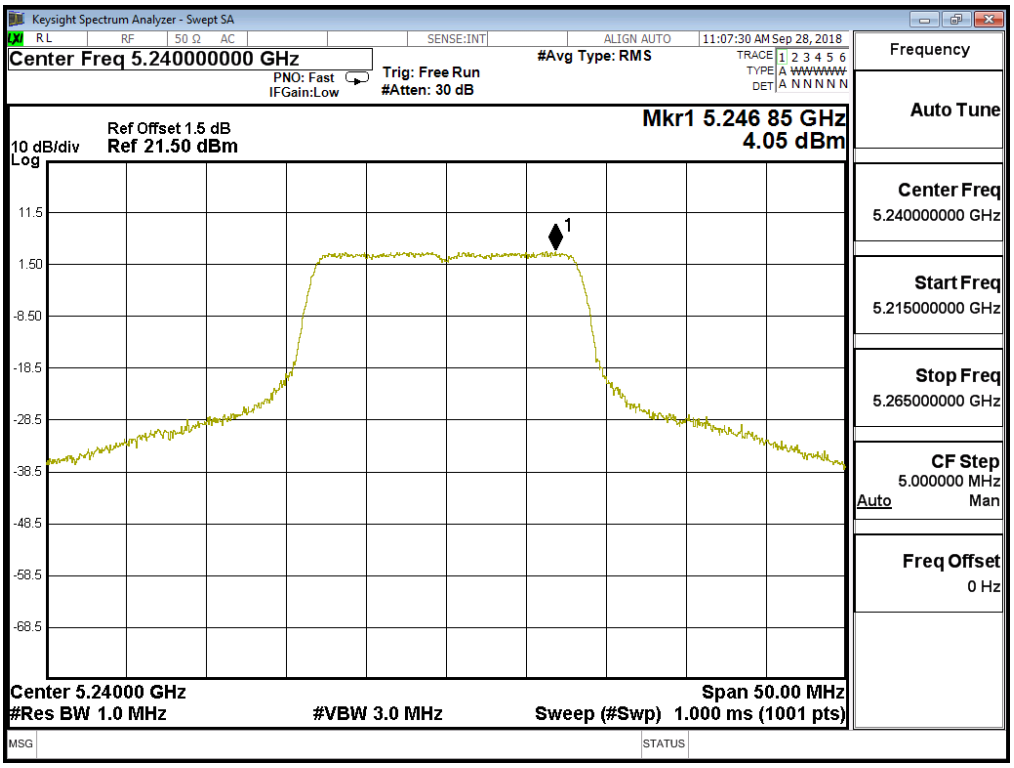
Channel 36



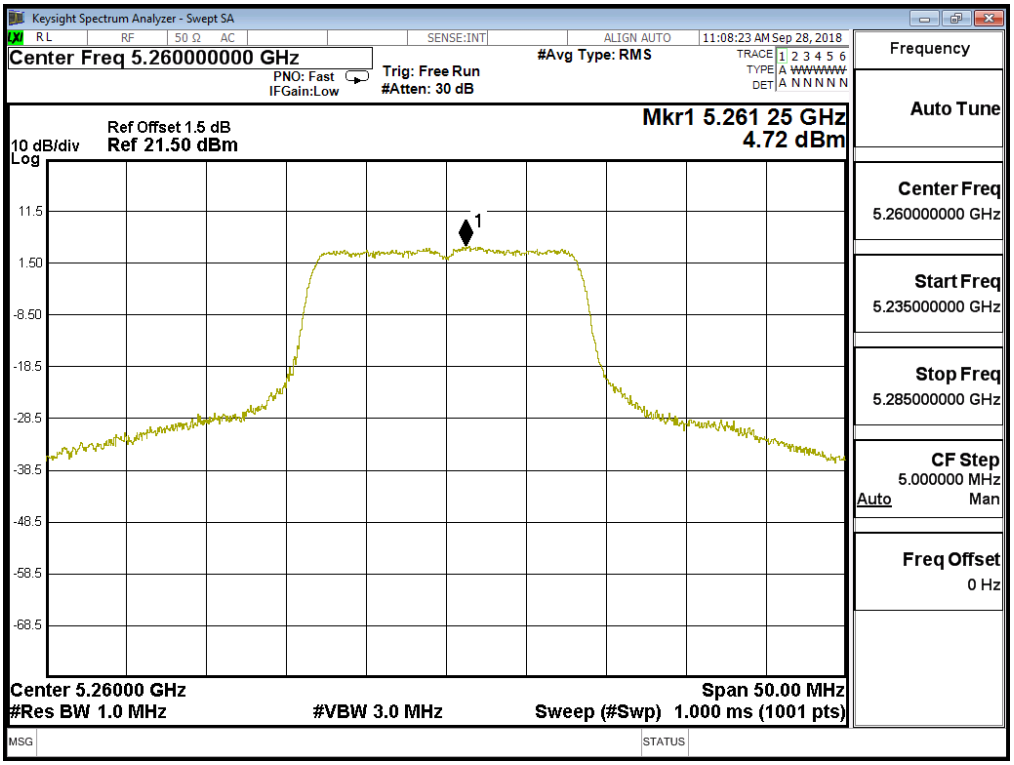
Channel 44



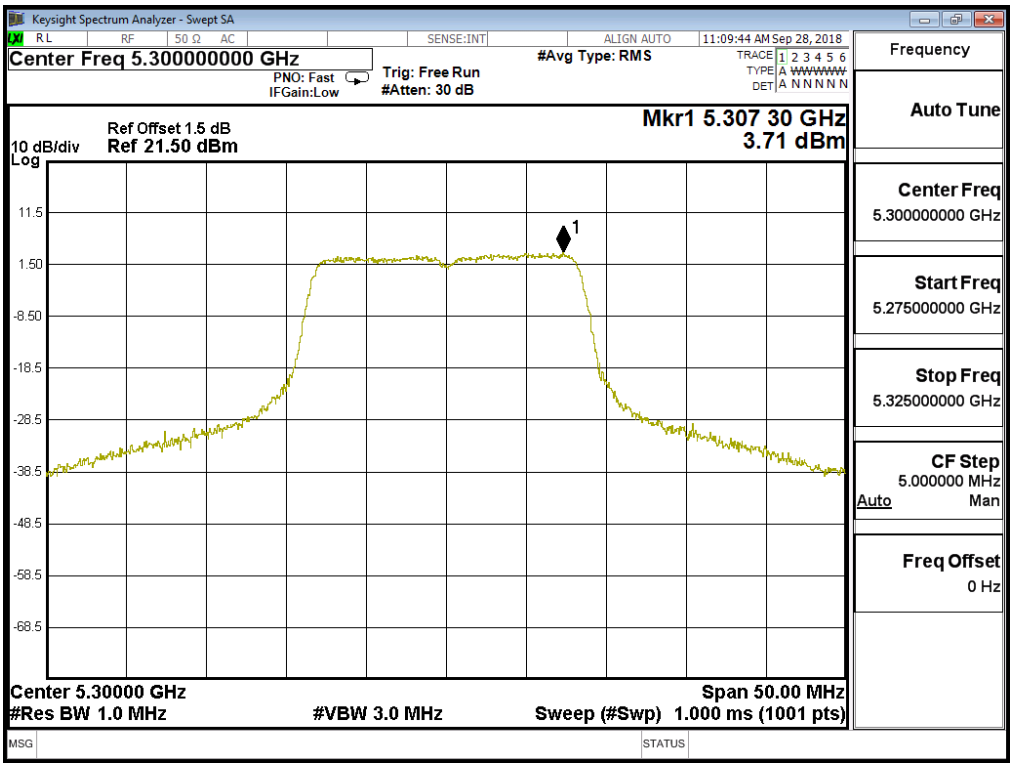
Channel 48



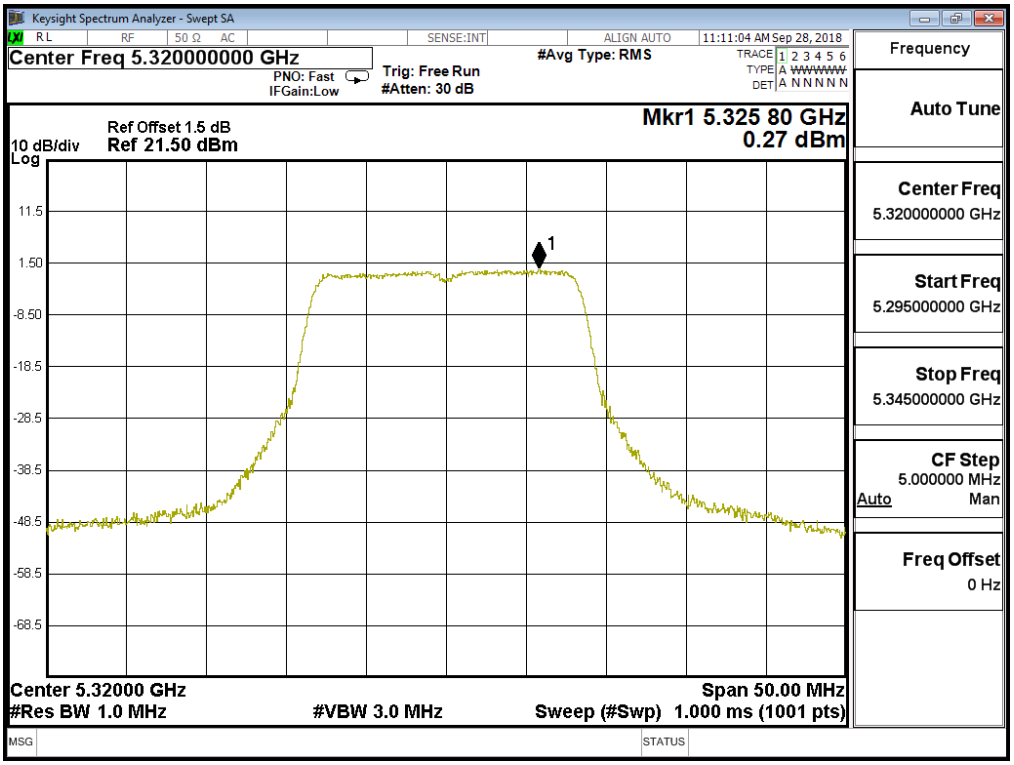
Channel 52



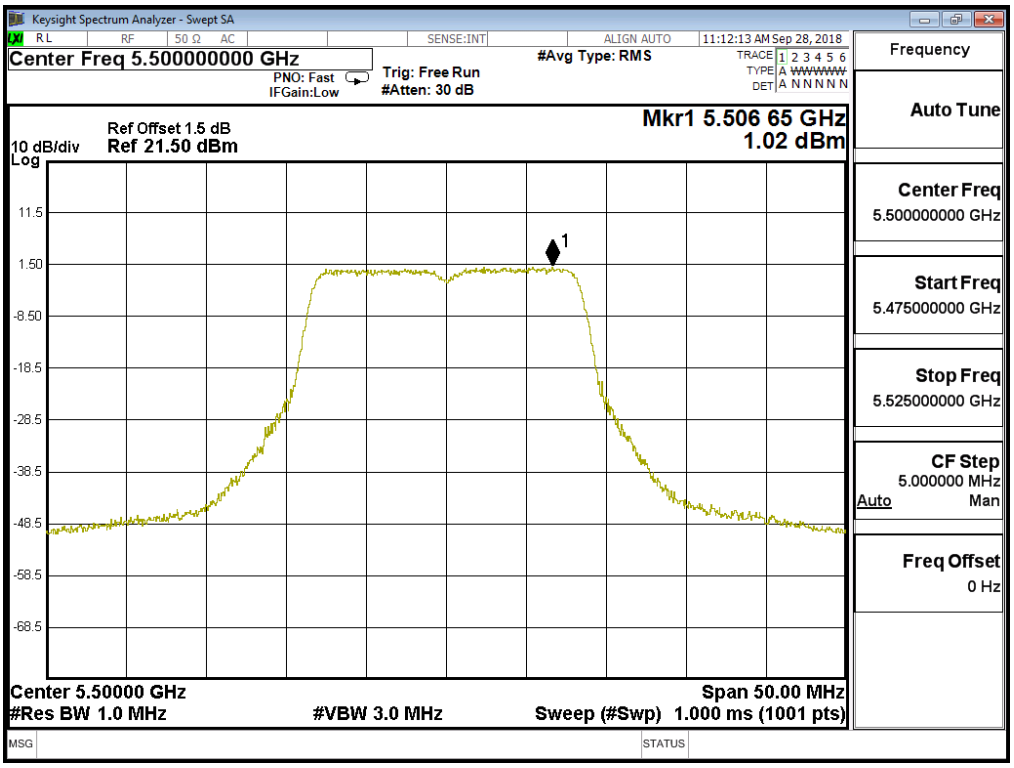
Channel 60



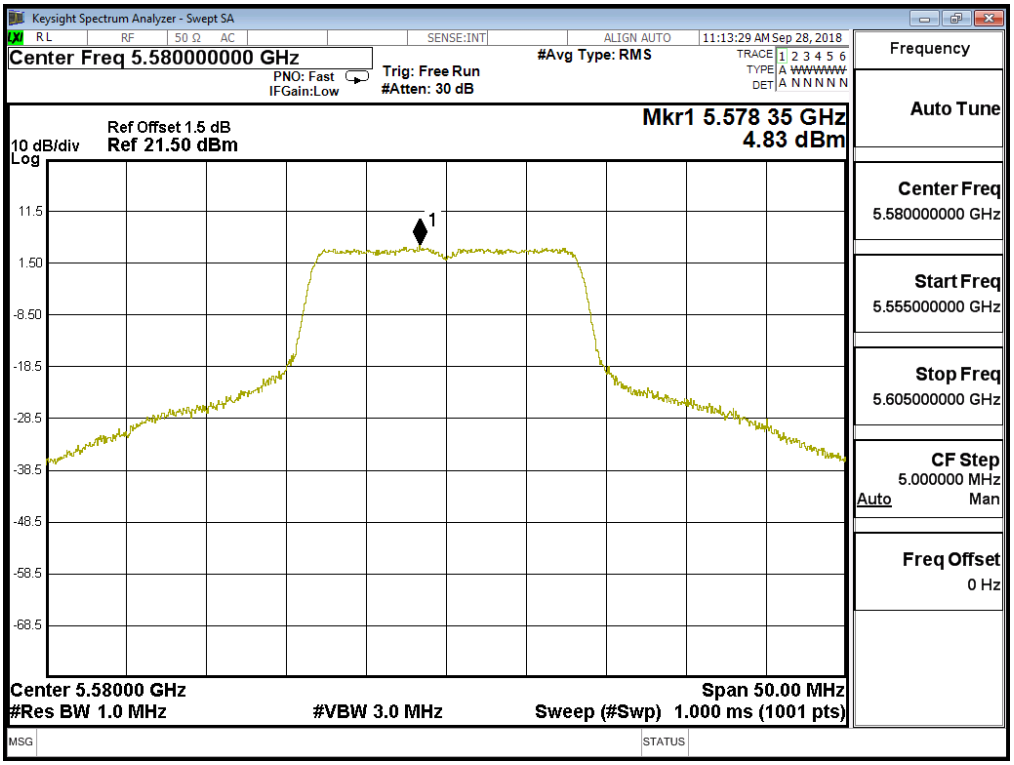
Channel 64



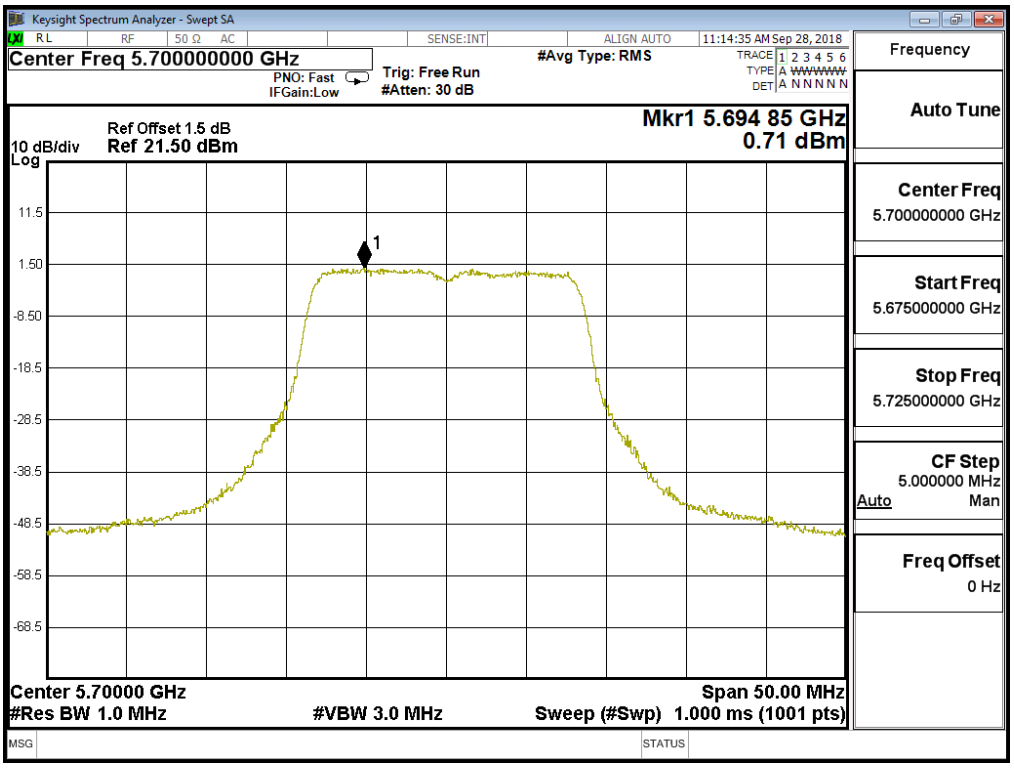
Channel 100



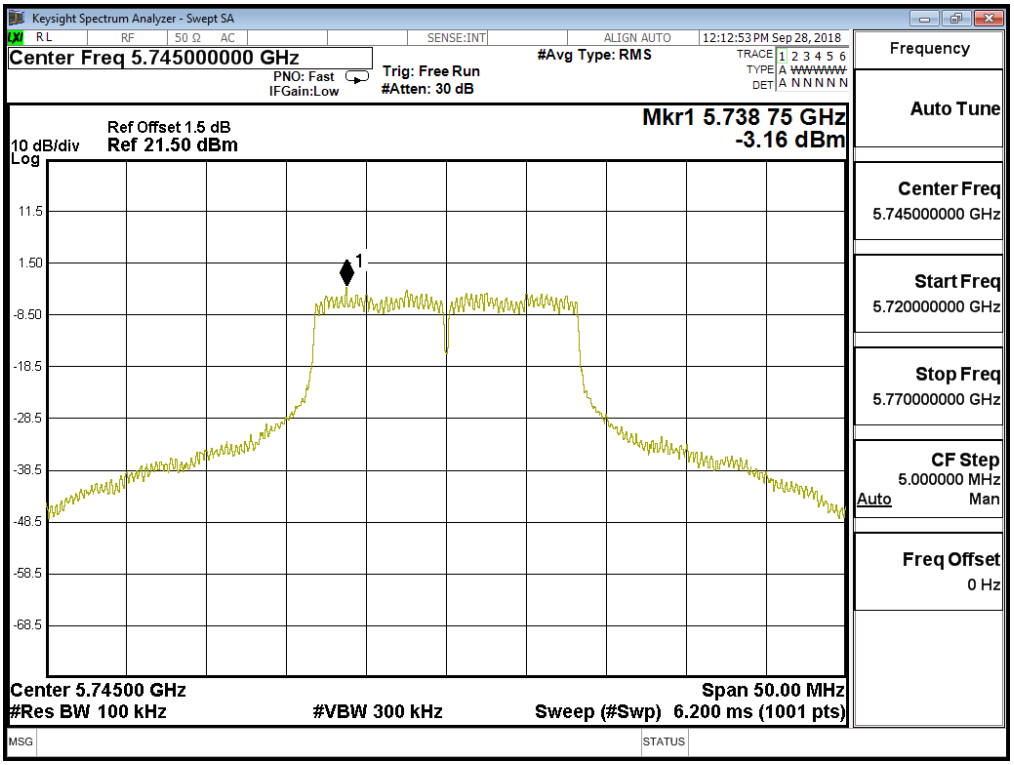
Channel 116



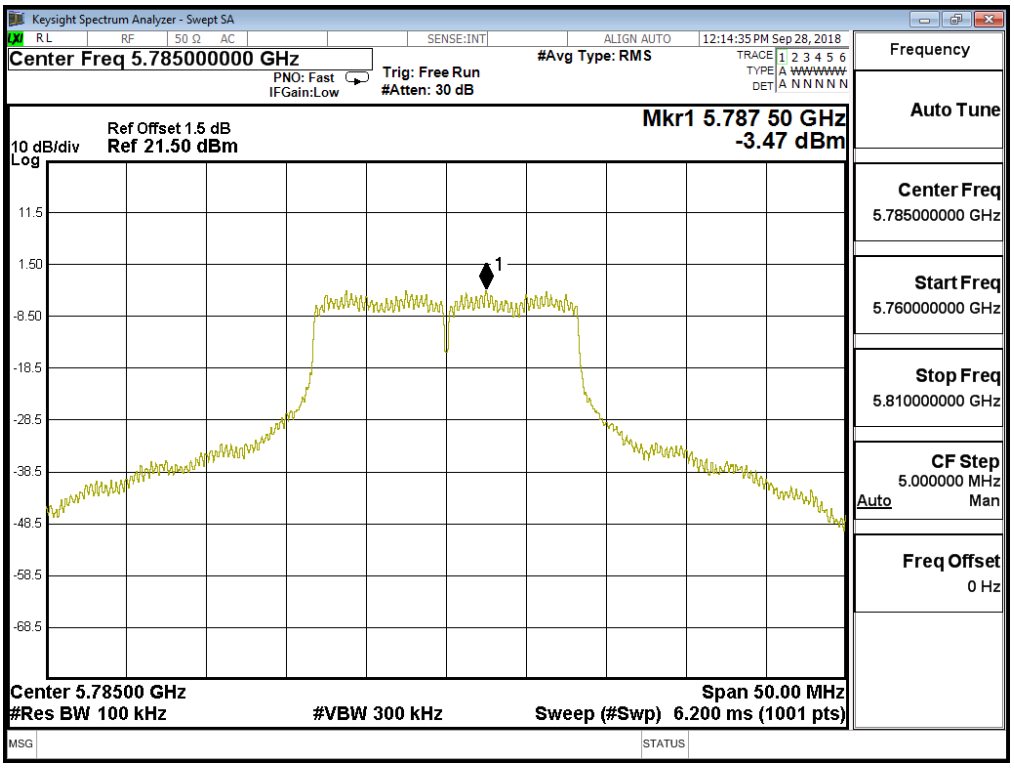
Channel 140



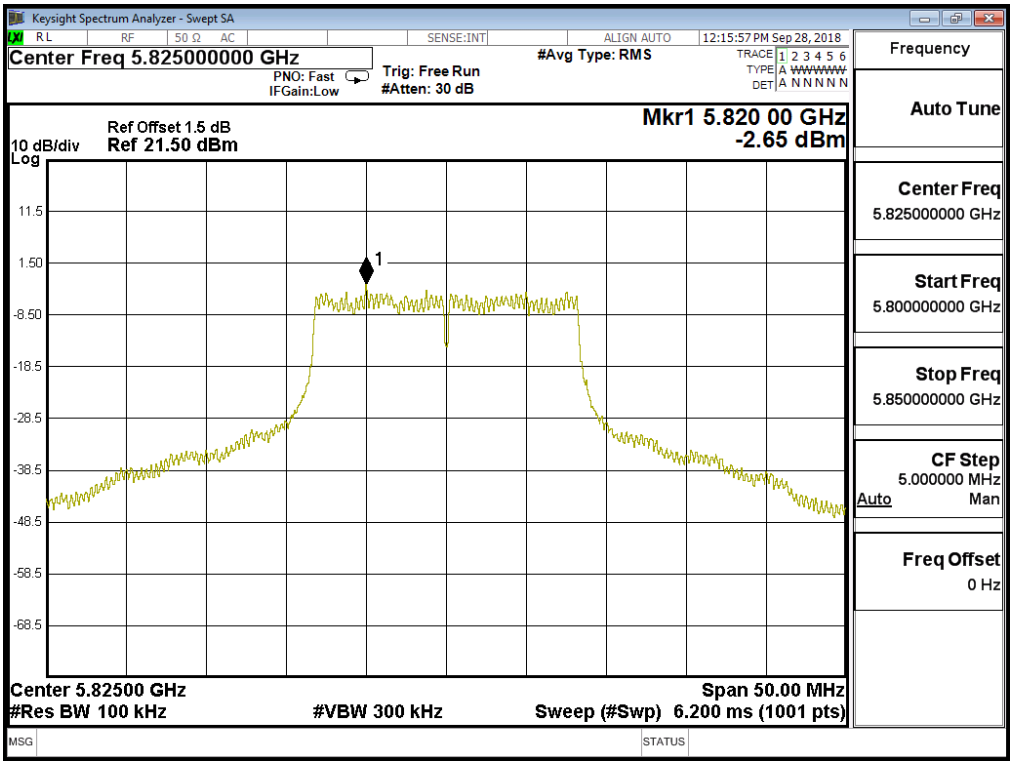
Channel 149



Channel 157



Channel 165

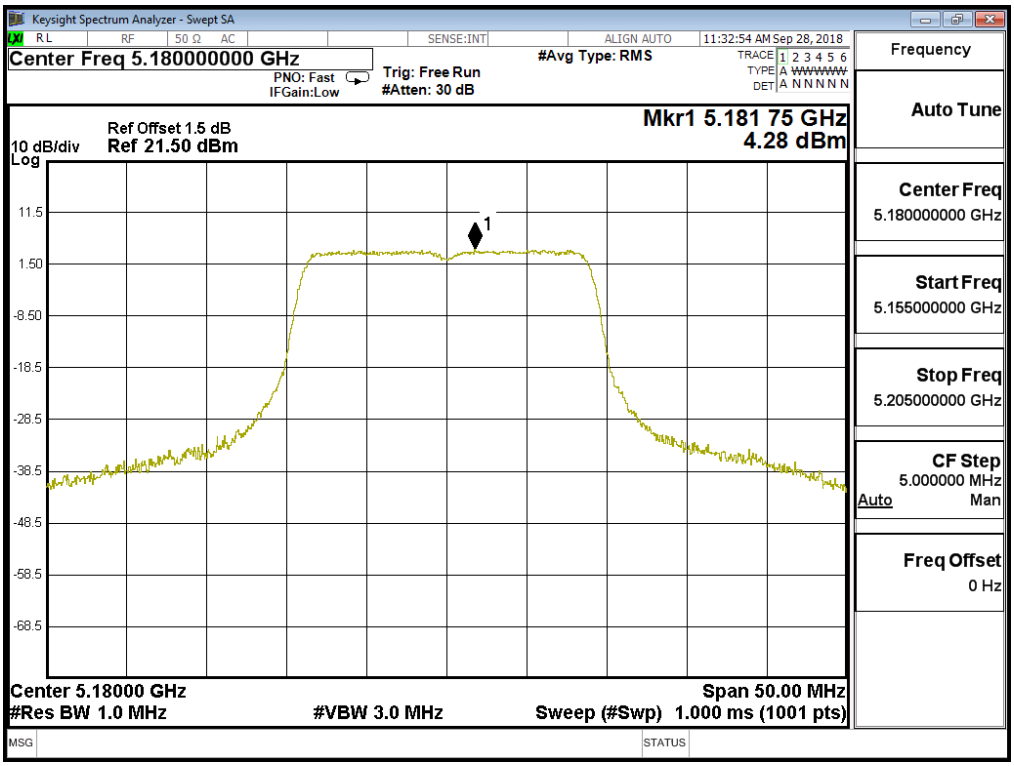


待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 2: SISO B: 發射器 802.11n-20BW
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

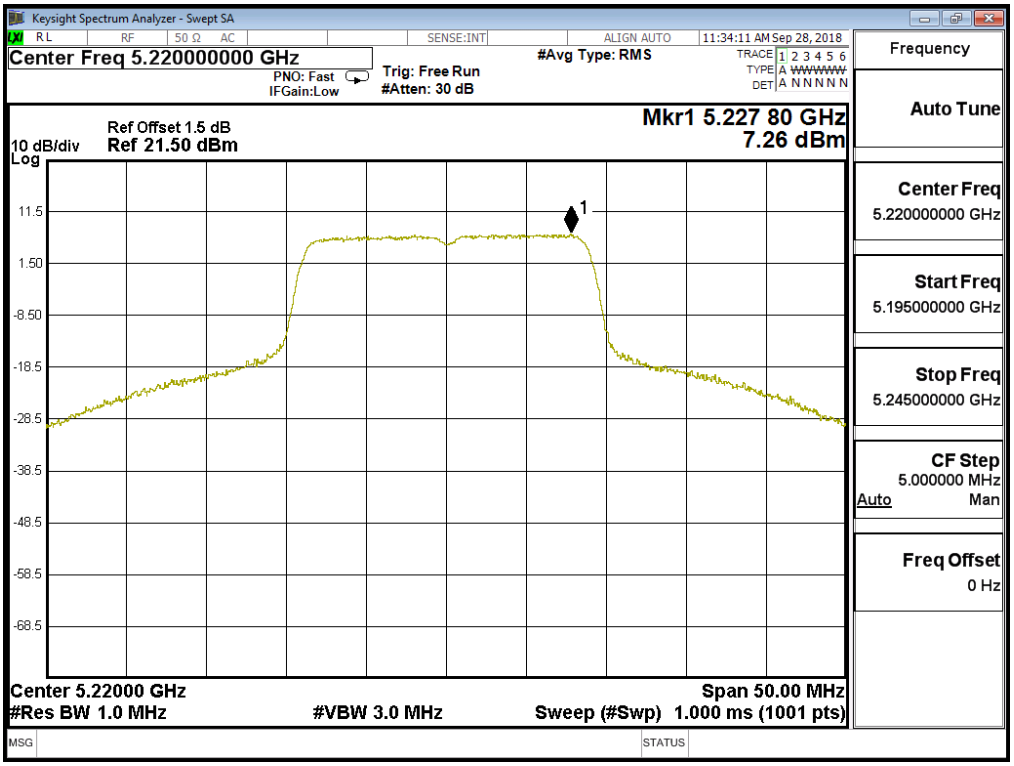
Channel Number	Frequency (MHz)	PPSD (dBm)	Required Limit (dBm)	Result
36	5180	4.280	<11	Pass
44	5220	7.260	<11	Pass
48	5240	6.400	<11	Pass
52	5260	6.540	<11	Pass
60	5300	6.070	<11	Pass
64	5320	2.490	<11	Pass
100	5500	3.190	<11	Pass
116	5580	6.840	<11	Pass
140	5700	2.850	<11	Pass

Channel Number	Frequency (MHz)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
144(U-NII-2C)	5720	6.690	--	6.690	<11	Pass
144(U-NII-3)	5720	-2.250	6.980	4.730	<30	Pass
149	5745	-1.980	6.980	5.000	<30	Pass
157	5785	-2.340	6.980	4.640	<30	Pass
165	5825	-2.100	6.980	4.880	<30	Pass

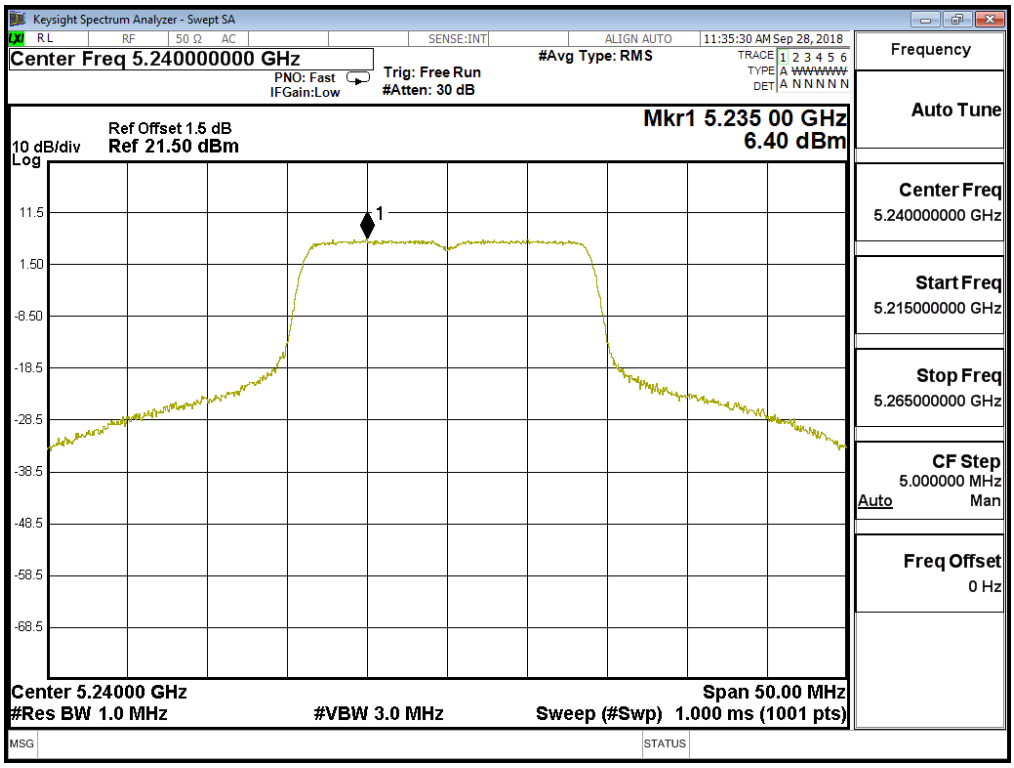
Channel 36



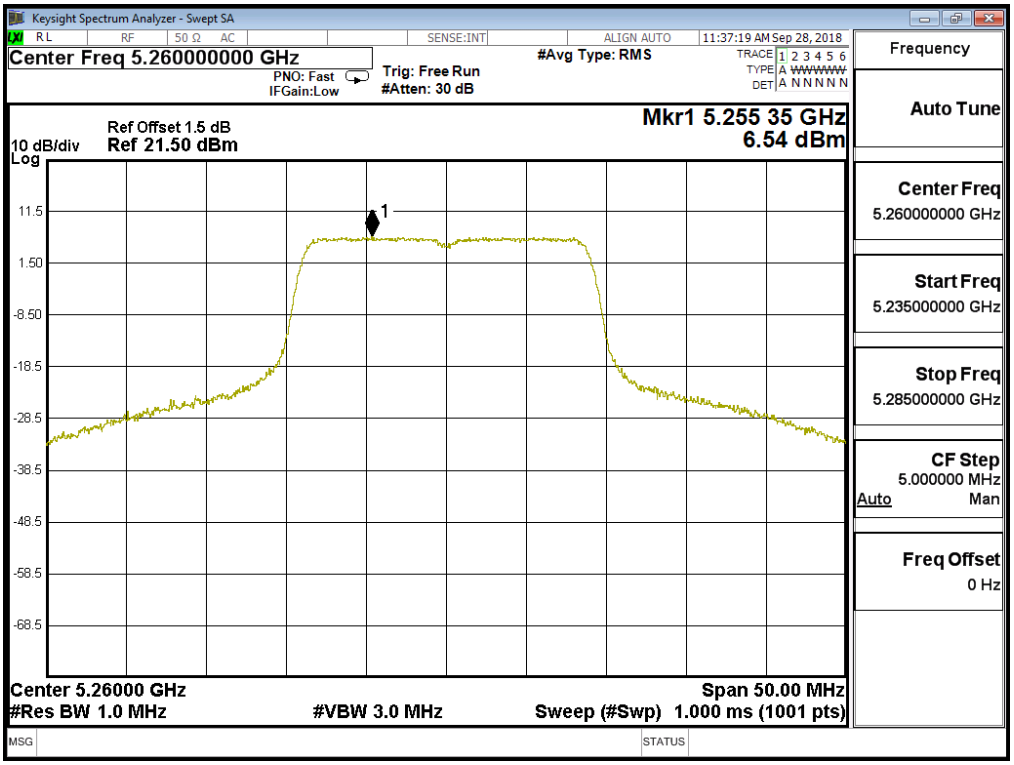
Channel 44



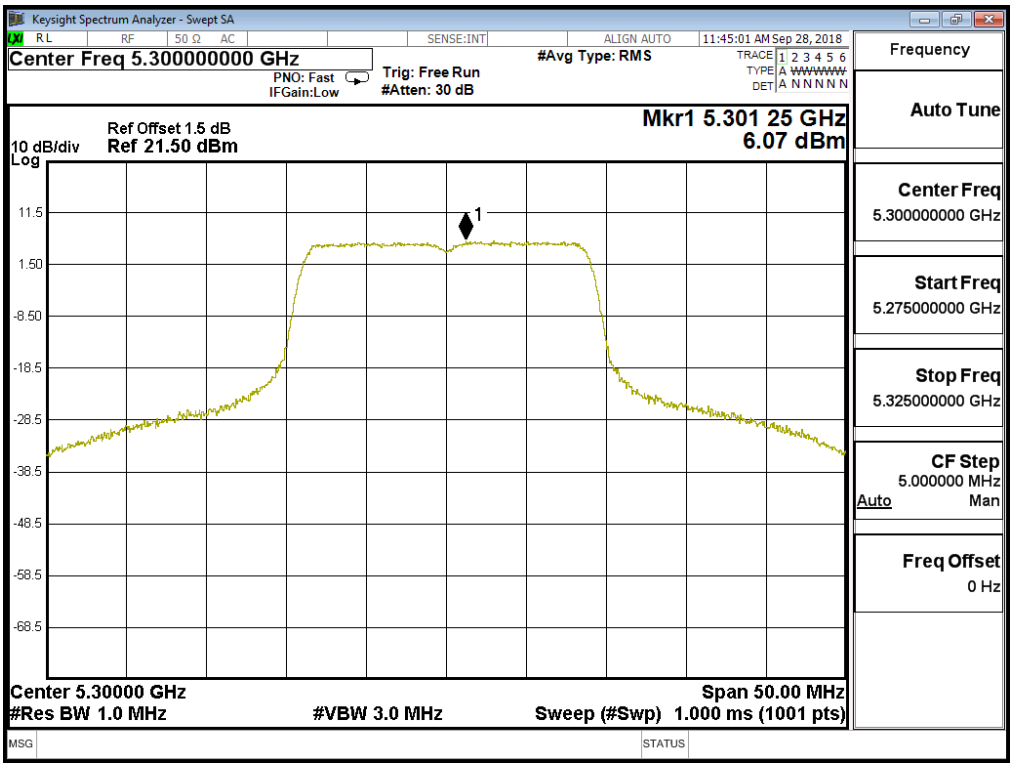
Channel 48



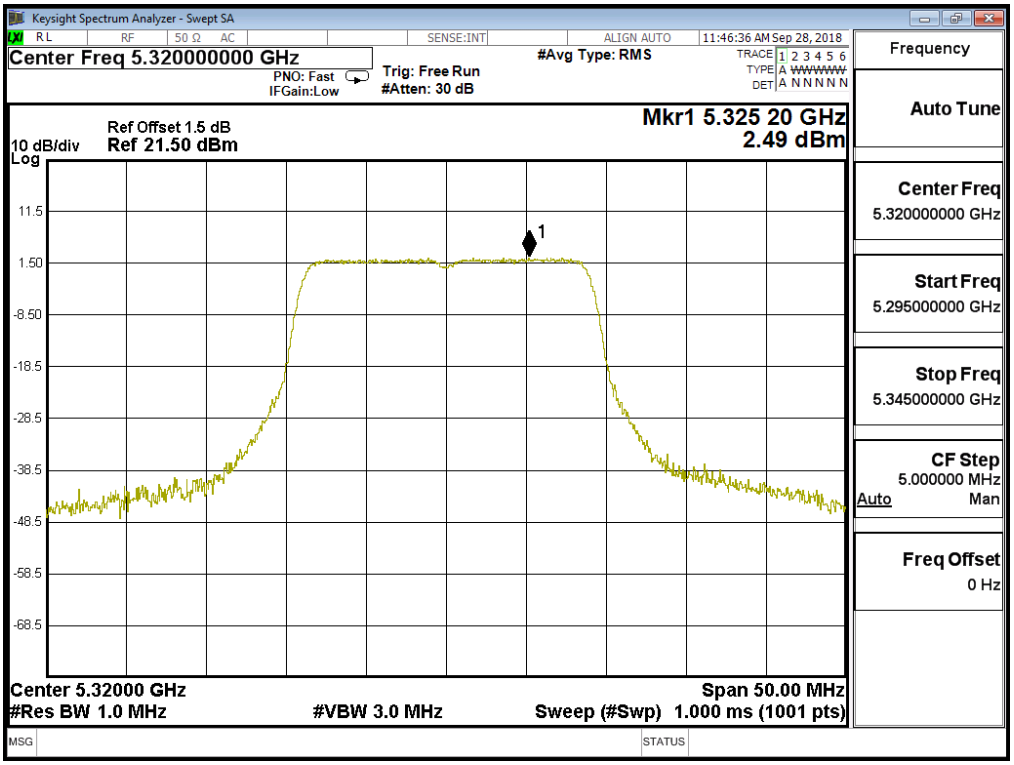
Channel 52



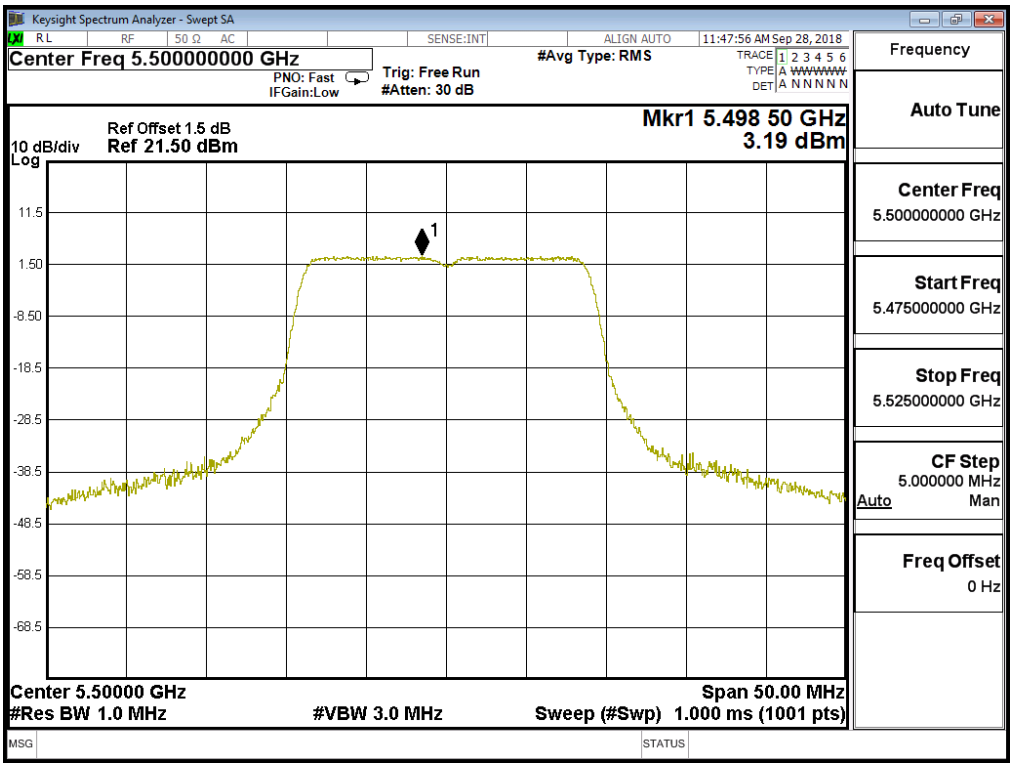
Channel 60



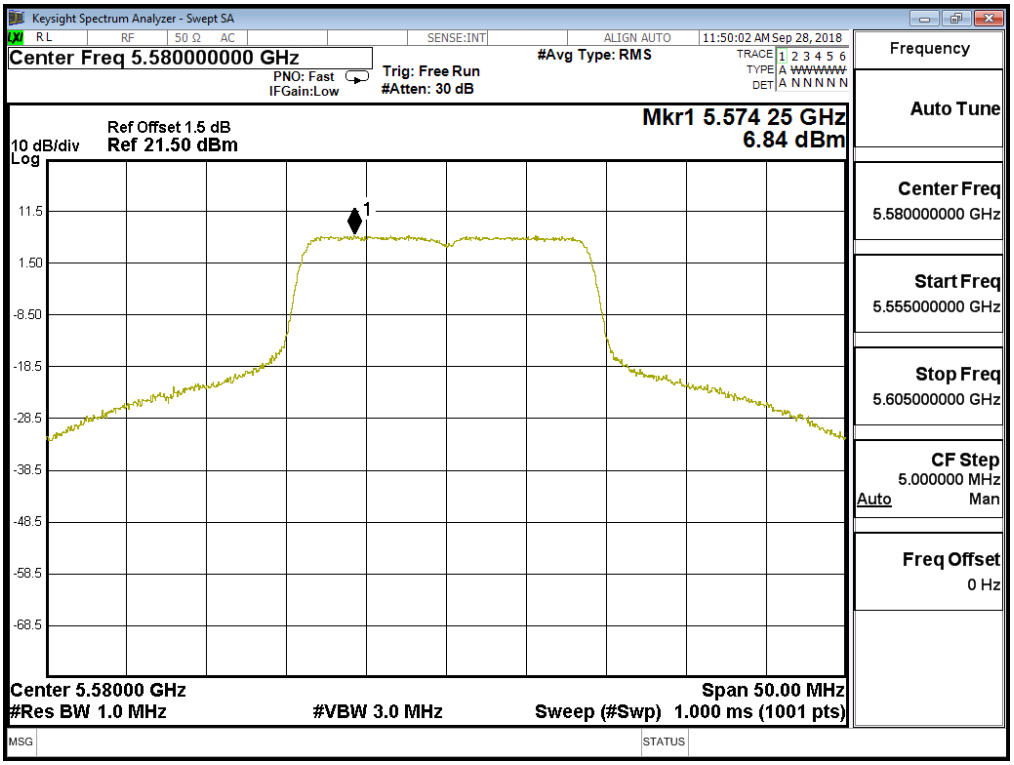
Channel 64



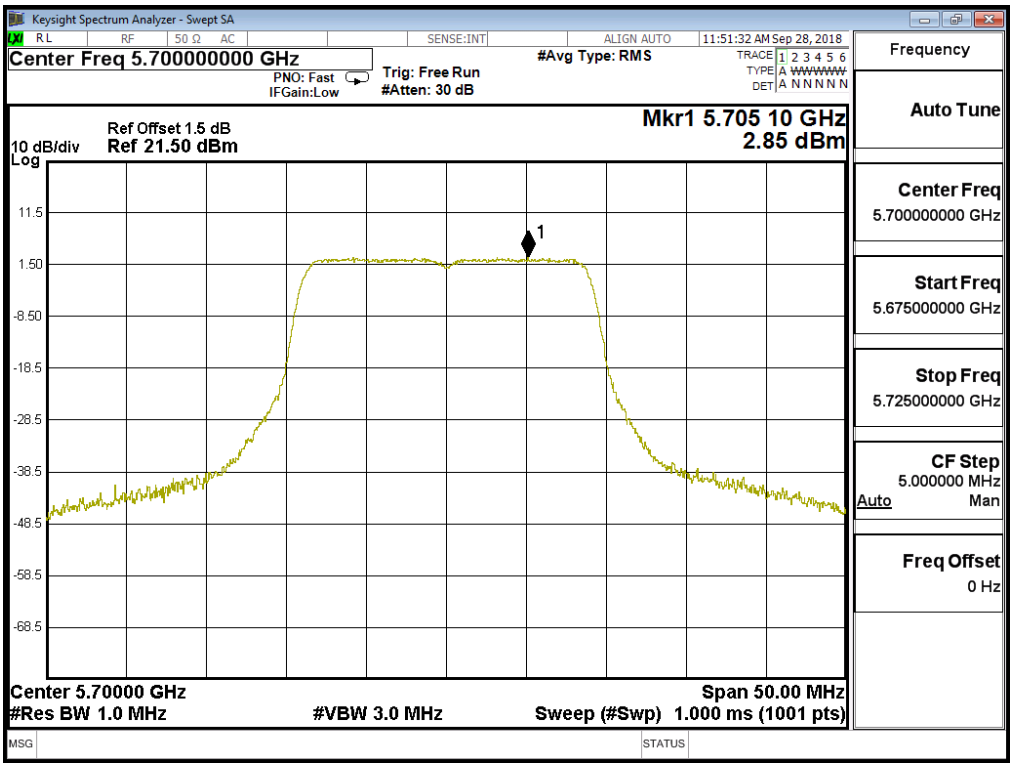
Channel 100



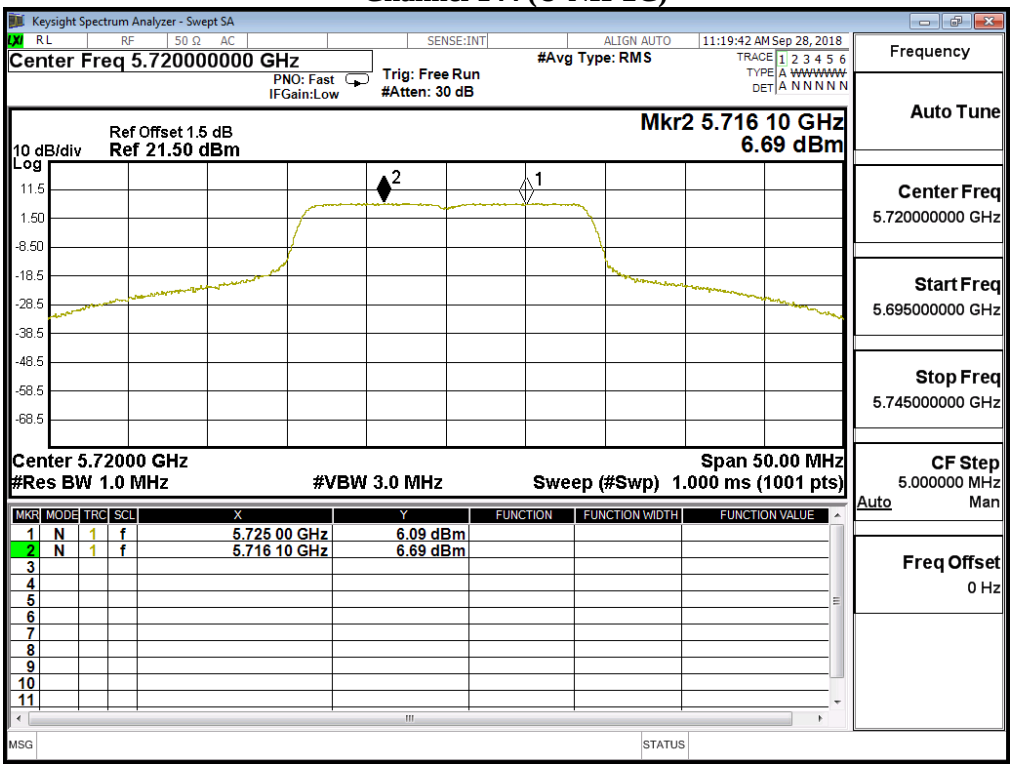
Channel 116



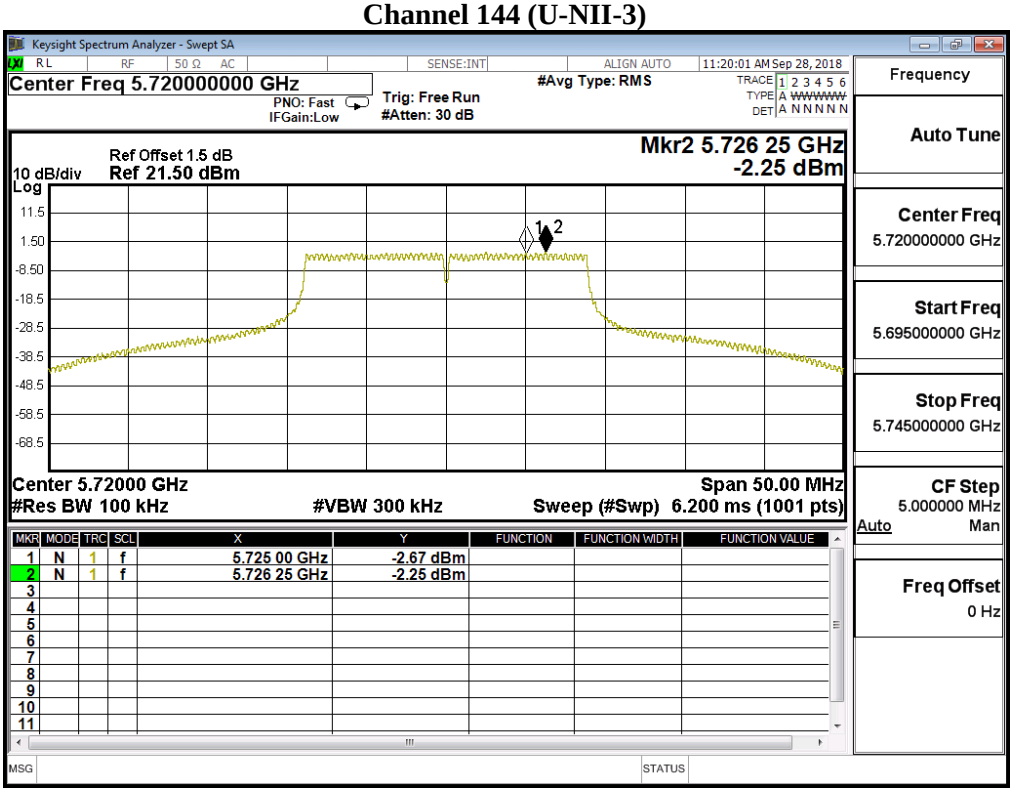
Channel 140



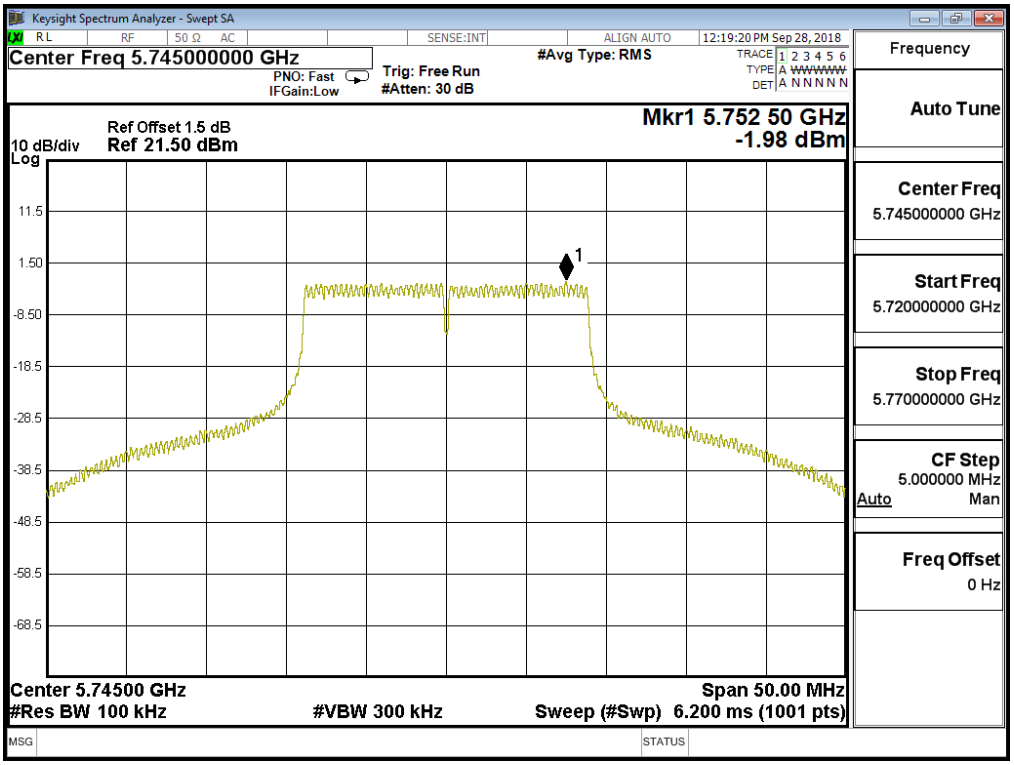
Channel 144 (U-NII-2C)



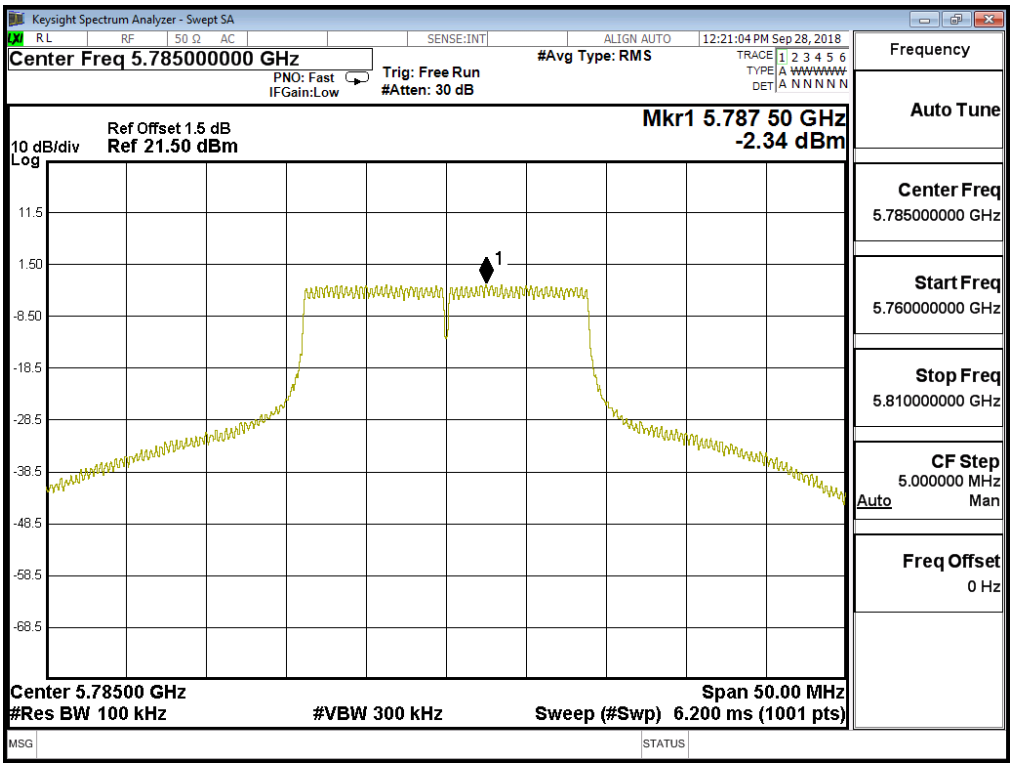
Channel 144 (U-NII-3)



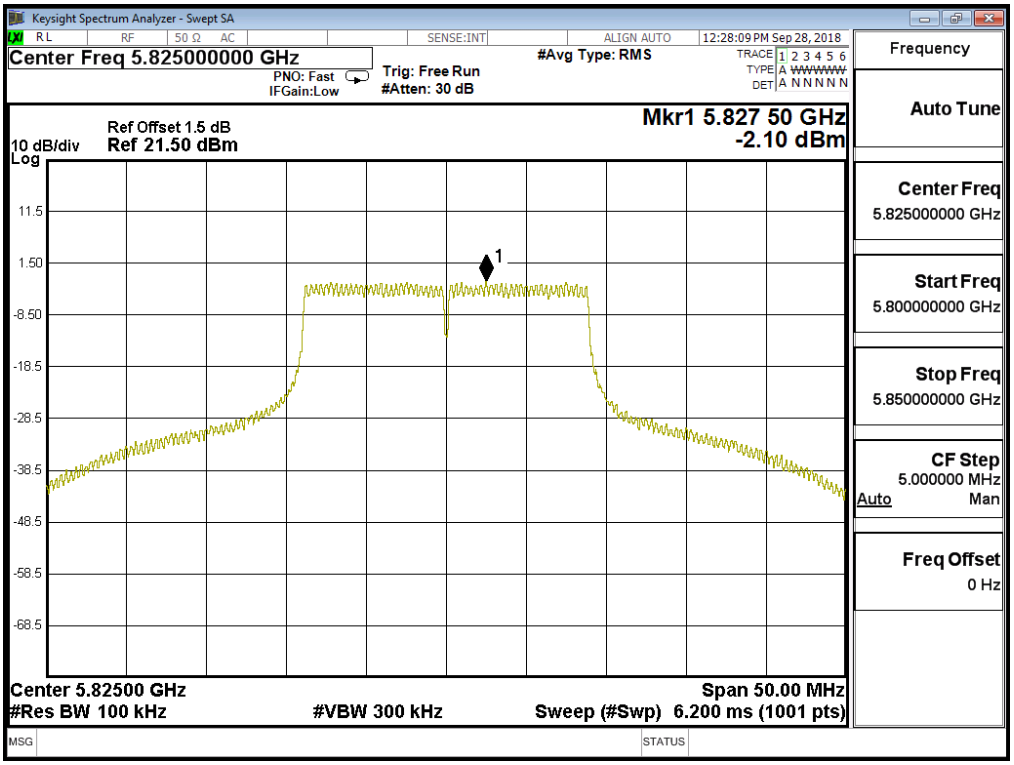
Channel 149



Channel 157



Channel 165

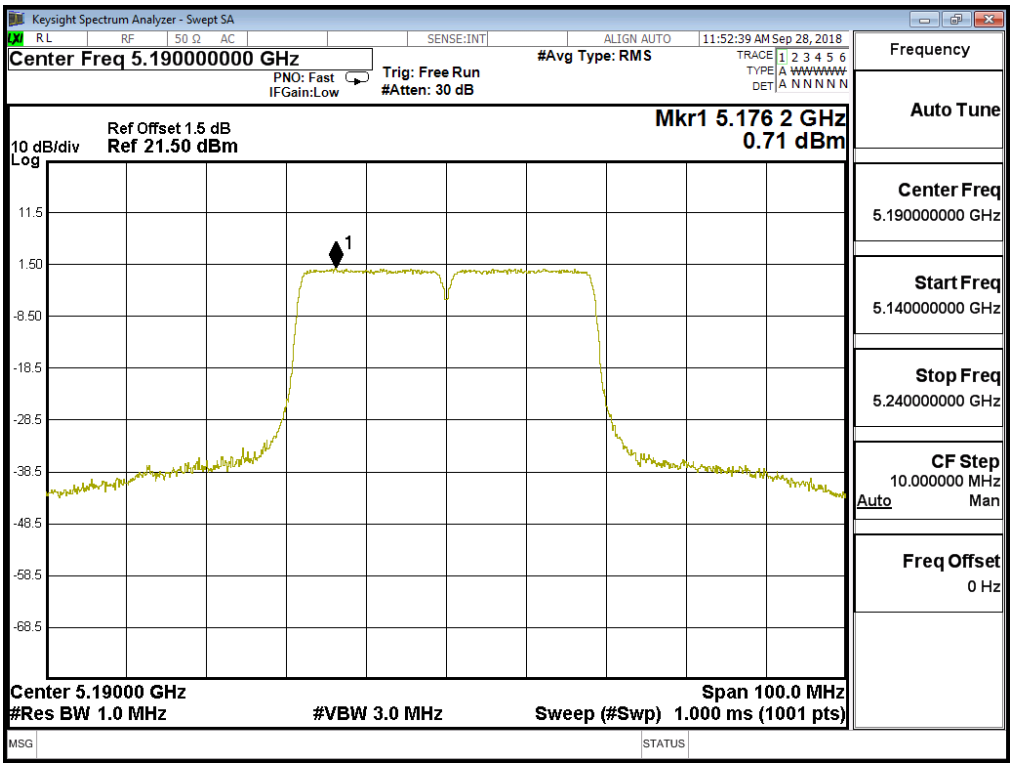


待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 2: SISO B: 發射器 802.11n-40BW
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

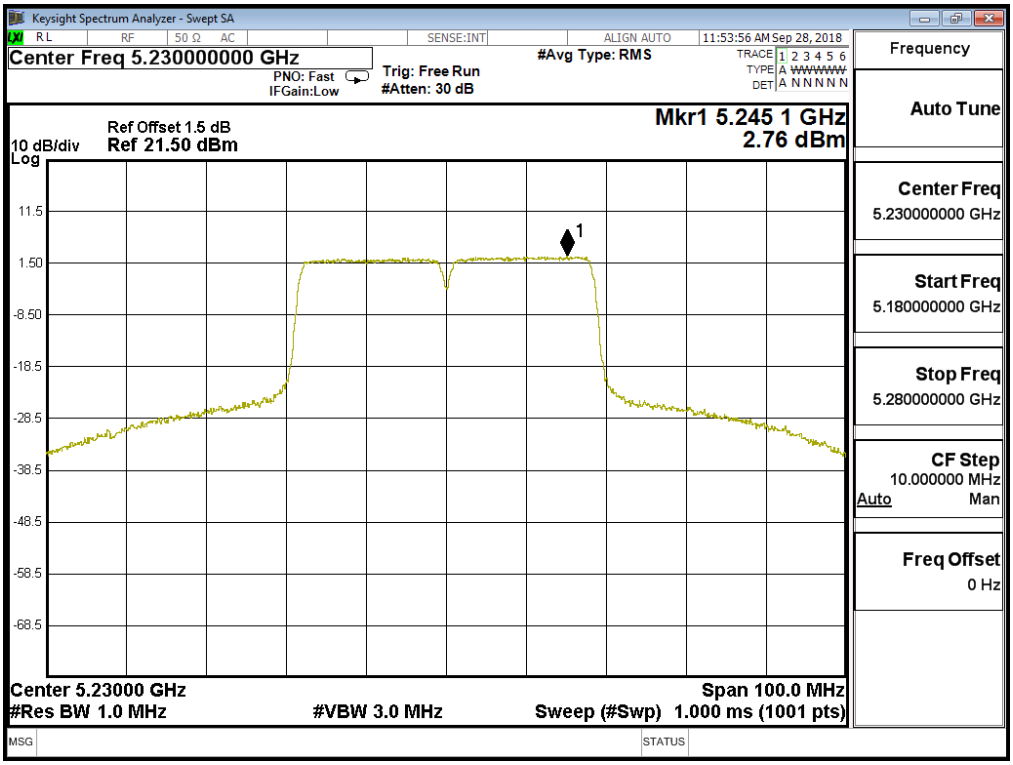
Channel Number	Frequency (MHz)	PPSD (dBm)	Required Limit (dBm)	Result
38	5190	0.710	<11	Pass
46	5230	2.760	<11	Pass
54	5270	2.620	<11	Pass
62	5310	-0.870	<11	Pass
102	5510	-0.110	<11	Pass
110	5550	3.290	<11	Pass
134	5670	1.870	<11	Pass

Channel Number	Frequency (MHz)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
142(U-NII-2C)	5710	3.790	--	3.790	<11	Pass
142(U-NII-3)	5710	-5.830	6.980	1.150	<30	Pass
151	5755	-5.330	6.980	1.650	<30	Pass
159	5795	-5.490	6.980	1.490	<30	Pass

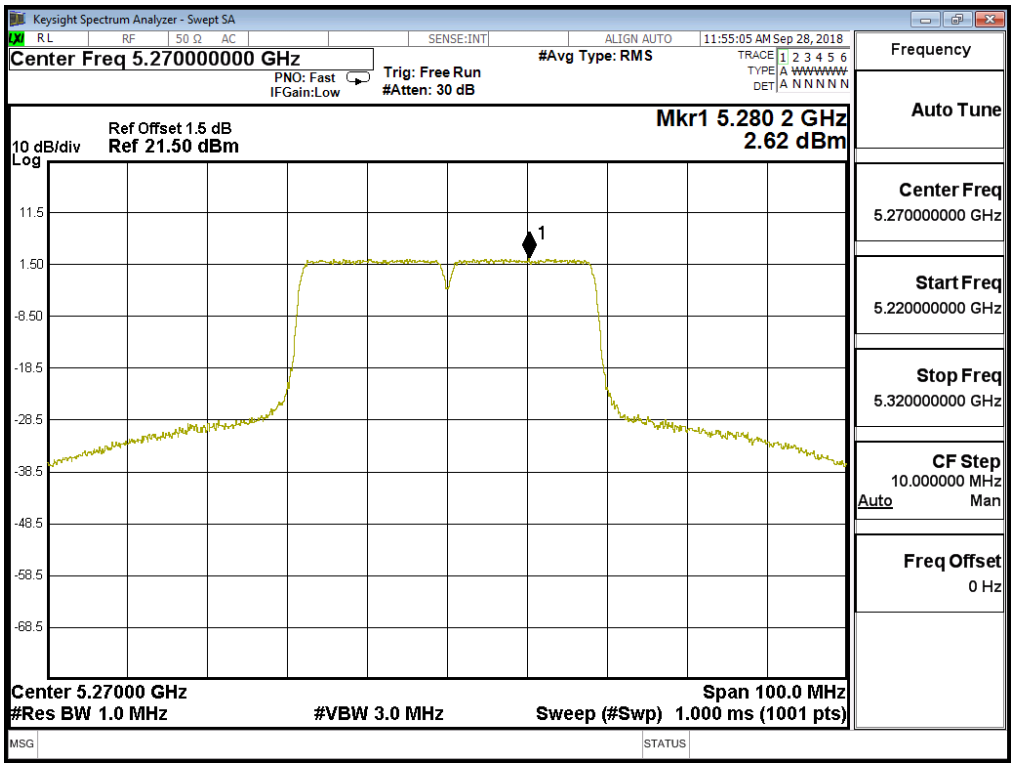
Channel 38



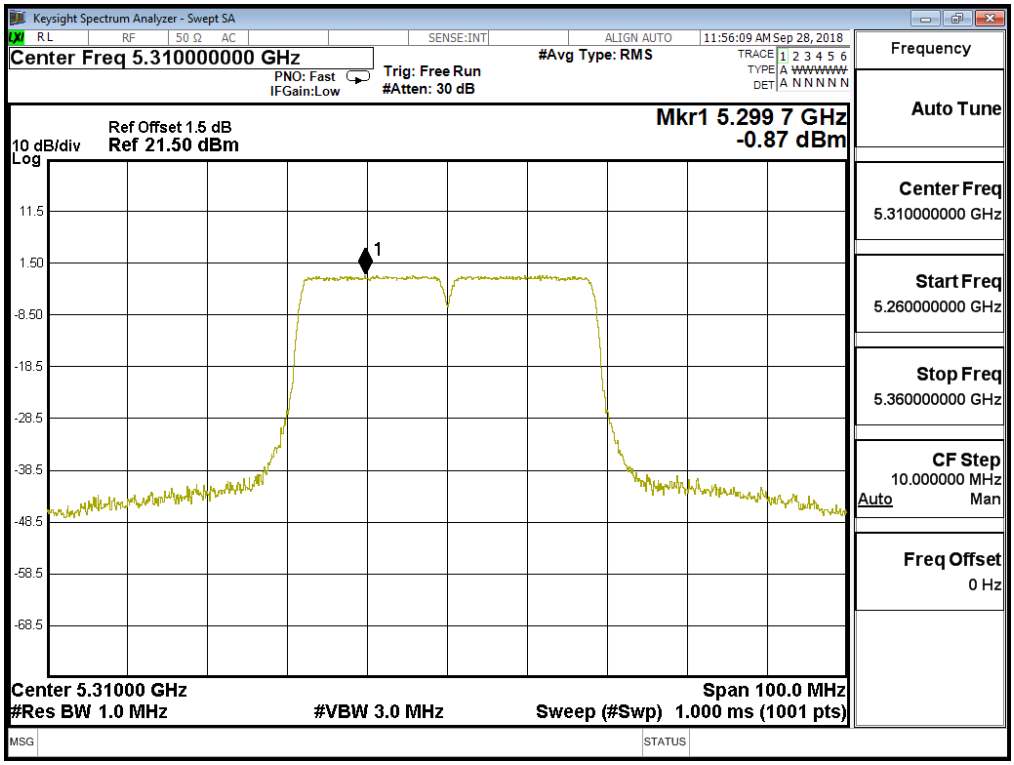
Channel 46



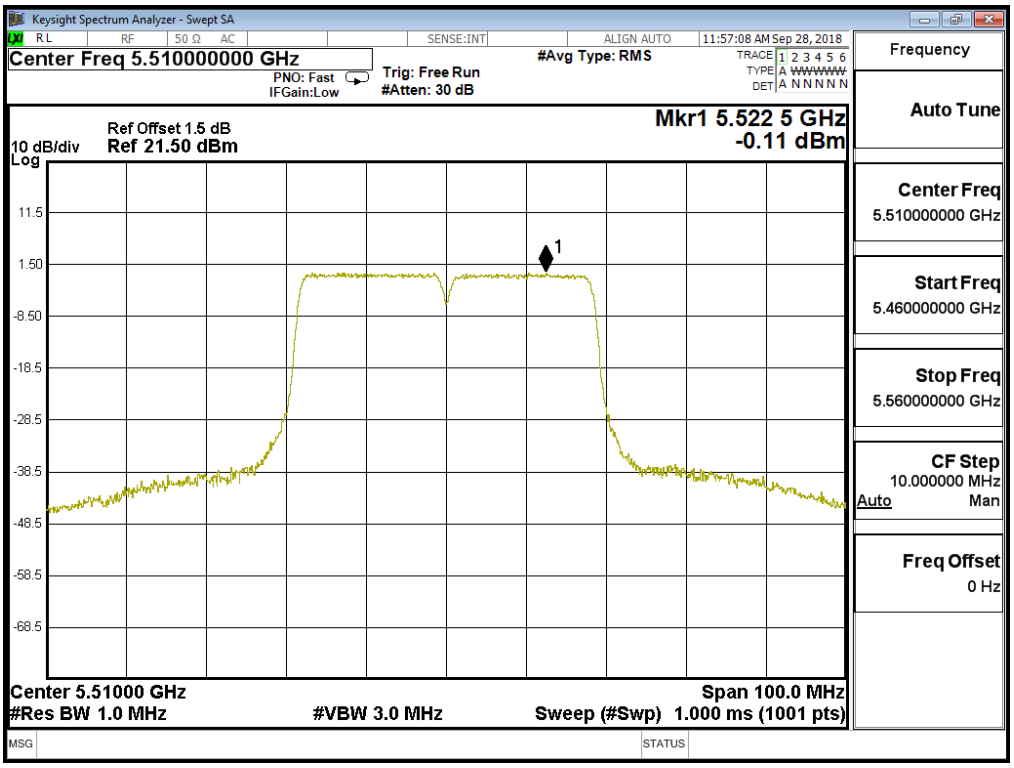
Channel 54



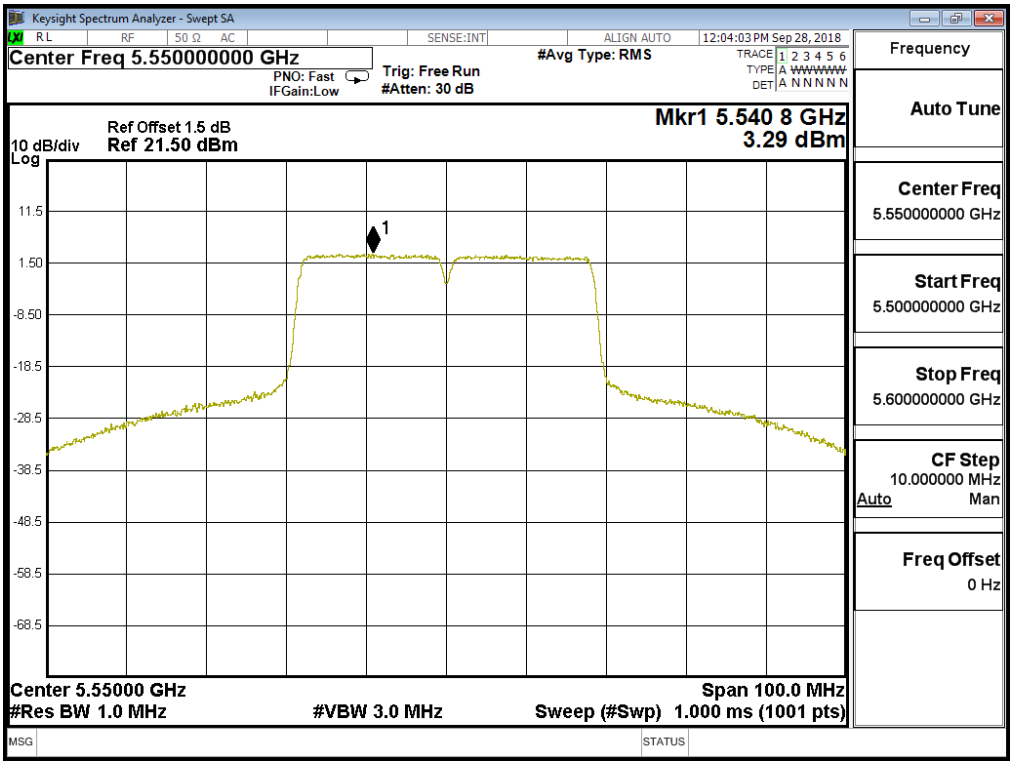
Channel 62



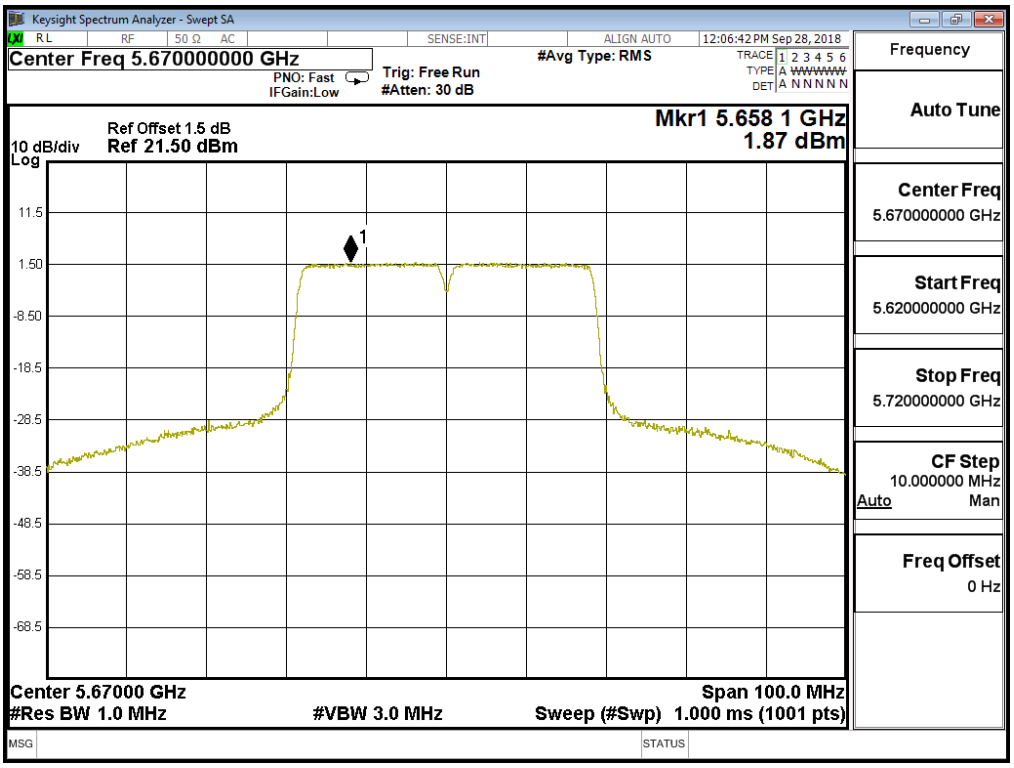
Channel 102



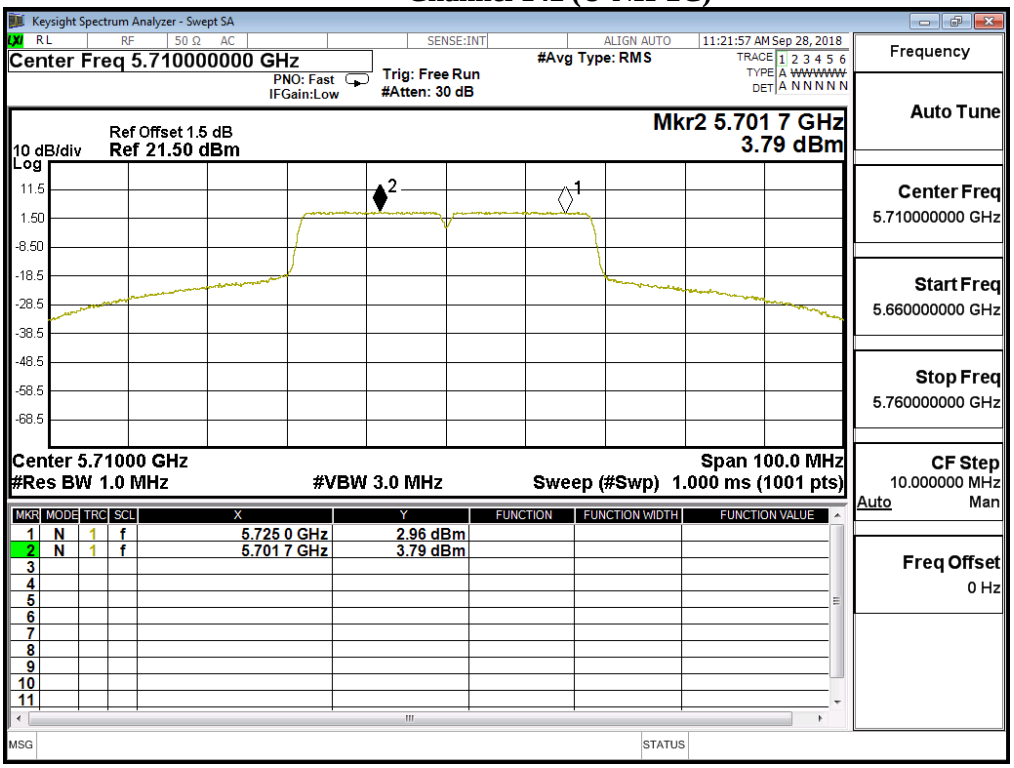
Channel 110



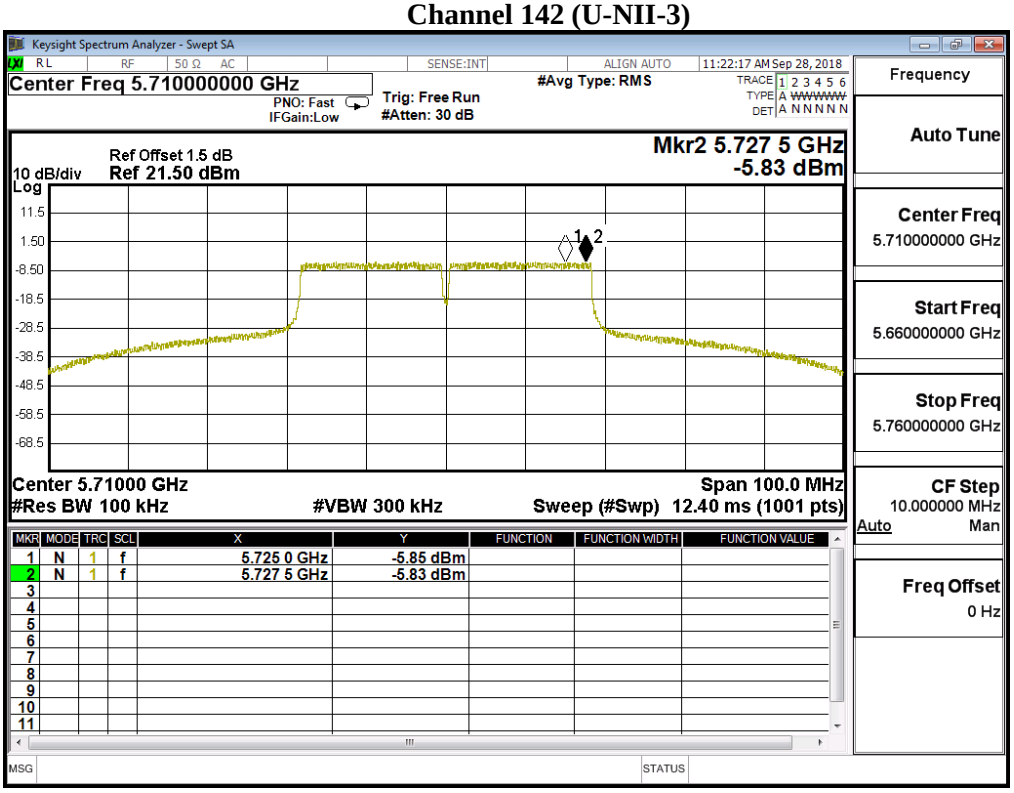
Channel 134



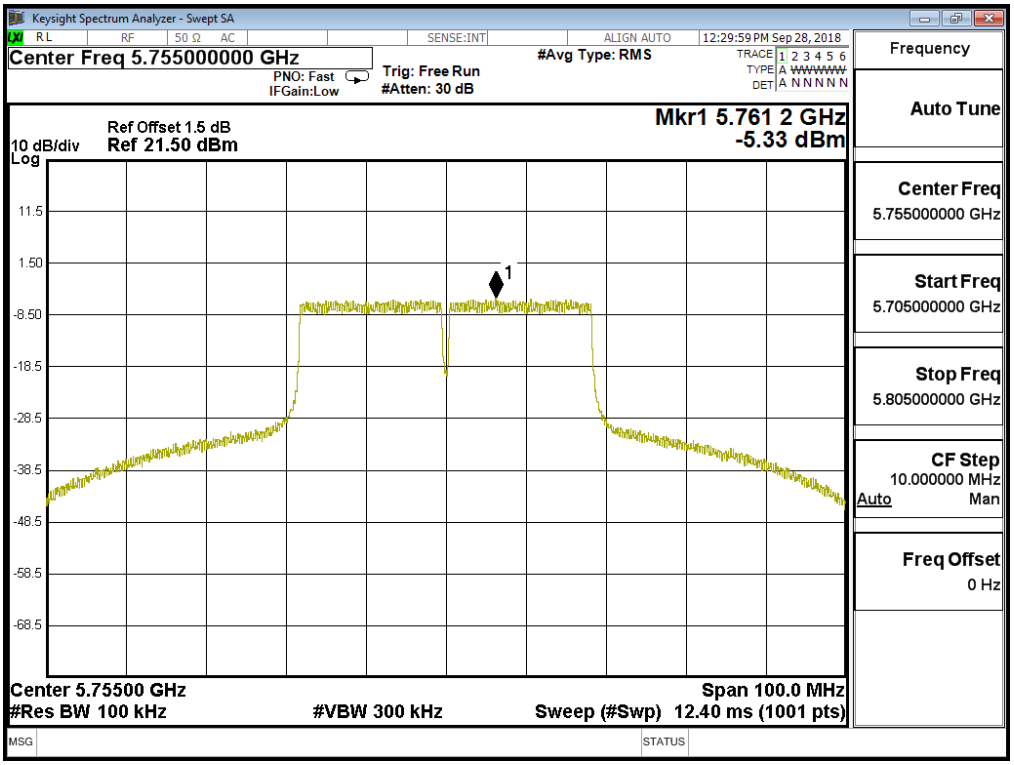
Channel 142 (U-NII-2C)



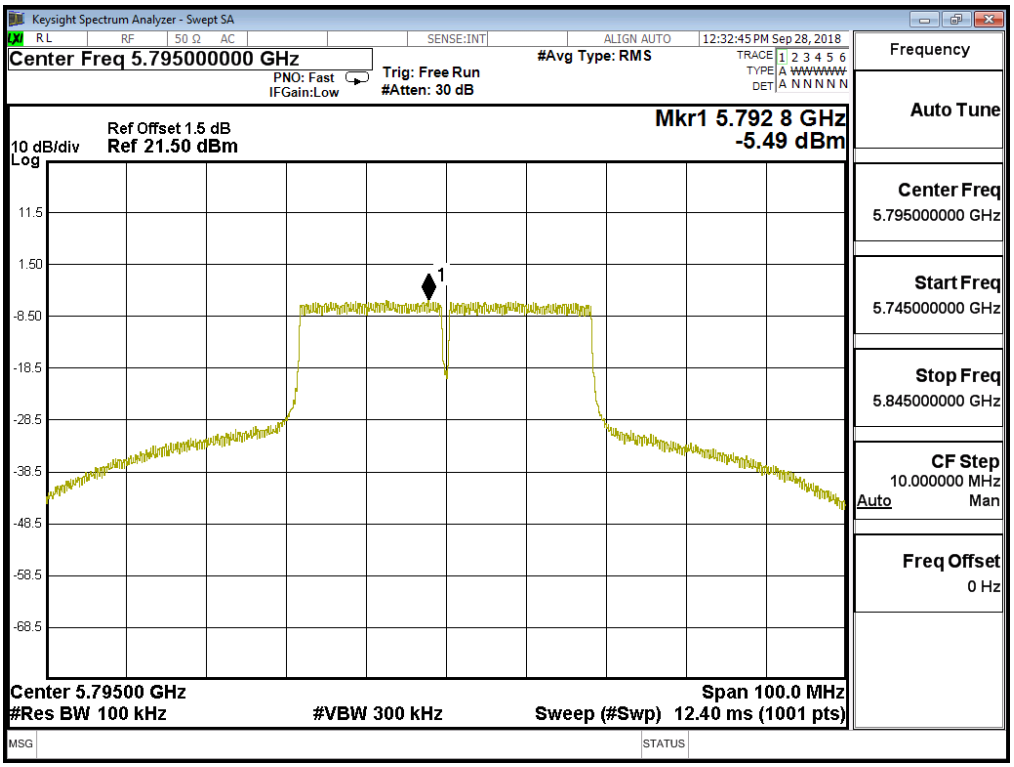
Channel 142 (U-NII-3)



Channel 151



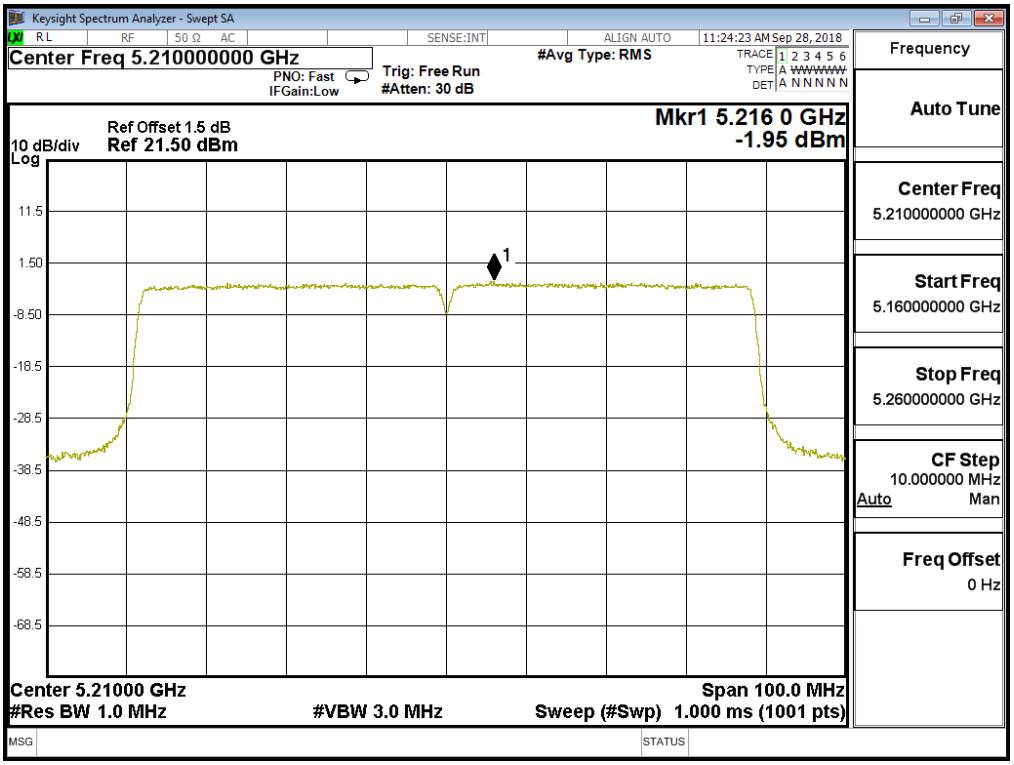
Channel 159


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.795000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
12:32:45 PM Sep 28, 2018
Ref Offset 1.5 dB
10 dB/div
Ref 21.50 dBm
Log
Mkr1 5.792 8 GHz
-5.49 dBm
Center 5.79500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 100.0 MHz
Sweep (#Swp) 12.40 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.795000000 GHz
Start Freq
5.745000000 GHz
Stop Freq
5.845000000 GHz
CF Step
10.000000 MHz
Auto
Man
Freq Offset
0 Hz

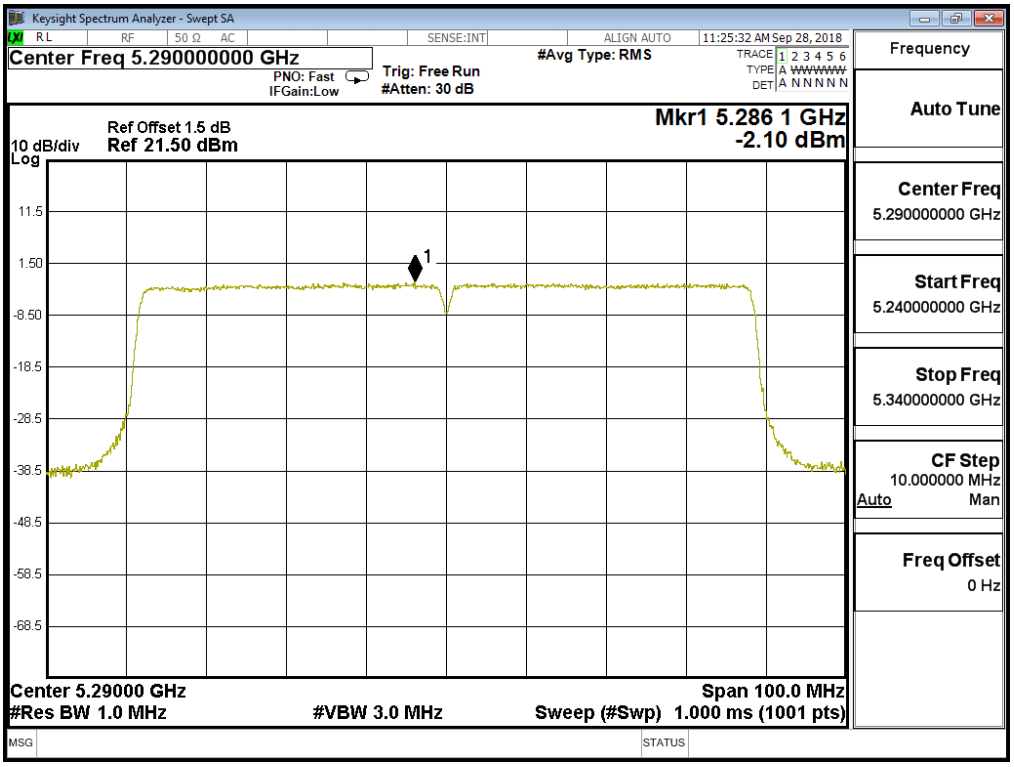
待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 2: SISO B: 發射器 802.11ac-80BW
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

Channel Number	Frequency (MHz)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
42	5210	-1.950	--	-1.950	<11	Pass
58	5290	-2.100	--	-2.100	<11	Pass
106	5530	-2.720	--	-2.720	<11	Pass
122	5610	0.750	--	0.750	<11	Pass
138(U-NII-2C)	5690	0.800	--	0.800	<11	Pass
138(U-NII-3)	5690	-8.430	6.98	-8.430	<30	Pass
155	5775	-15.500	6.98	-15.500	<30	Pass

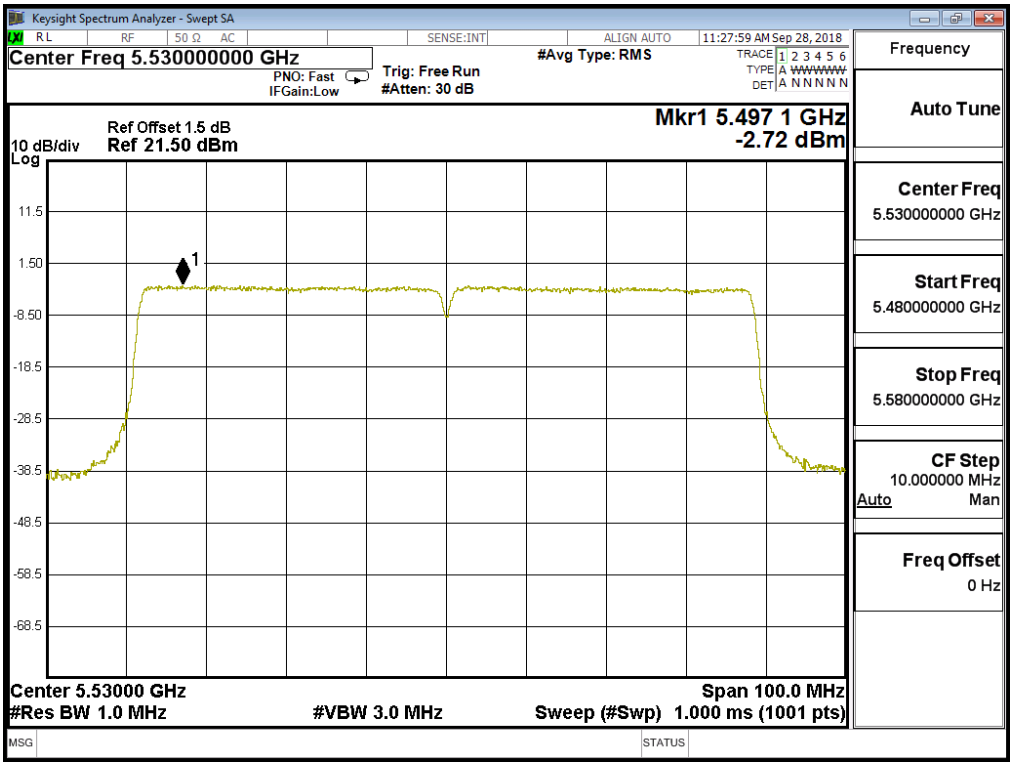
Channel 42



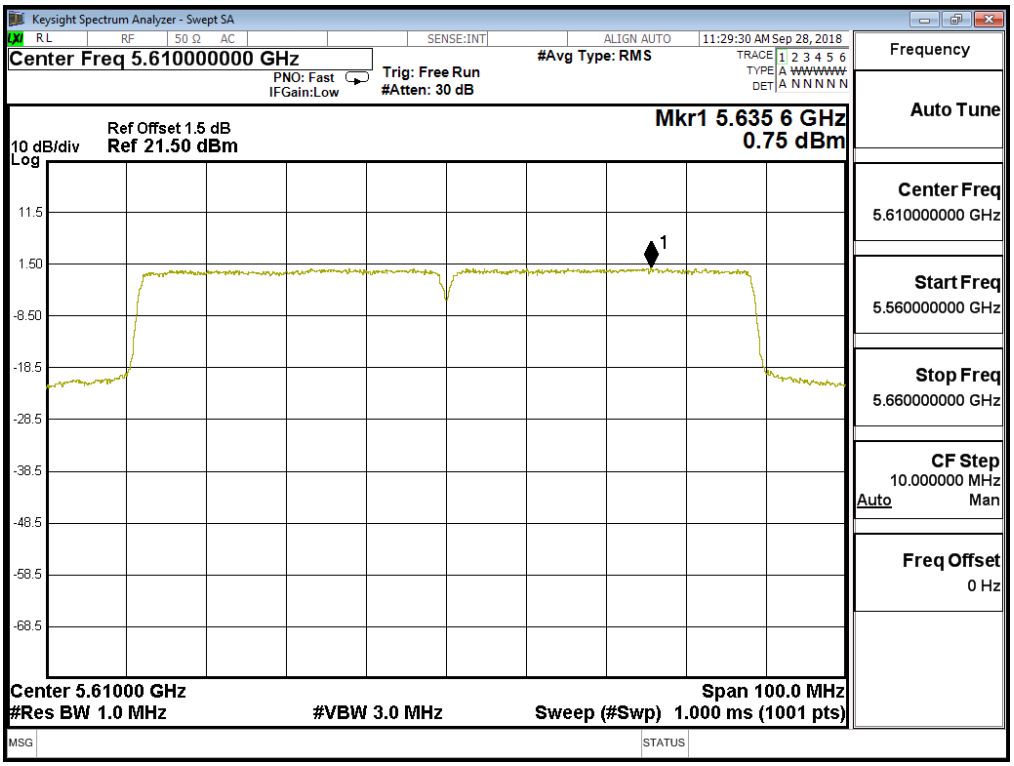
Channel 58



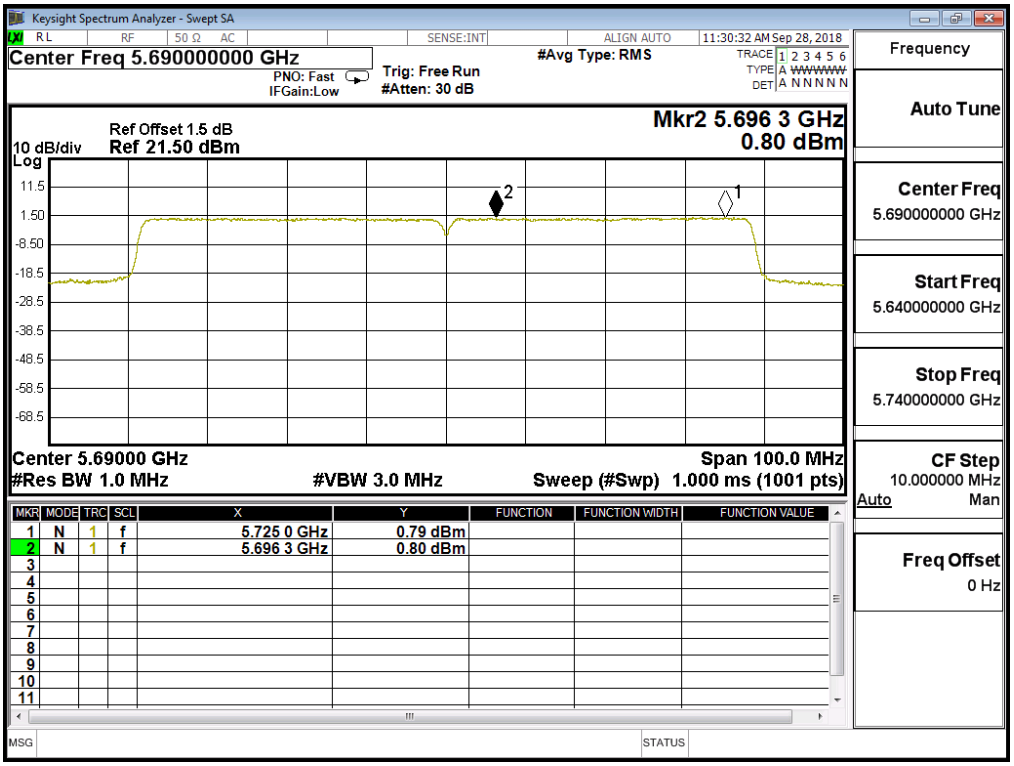
Channel 106



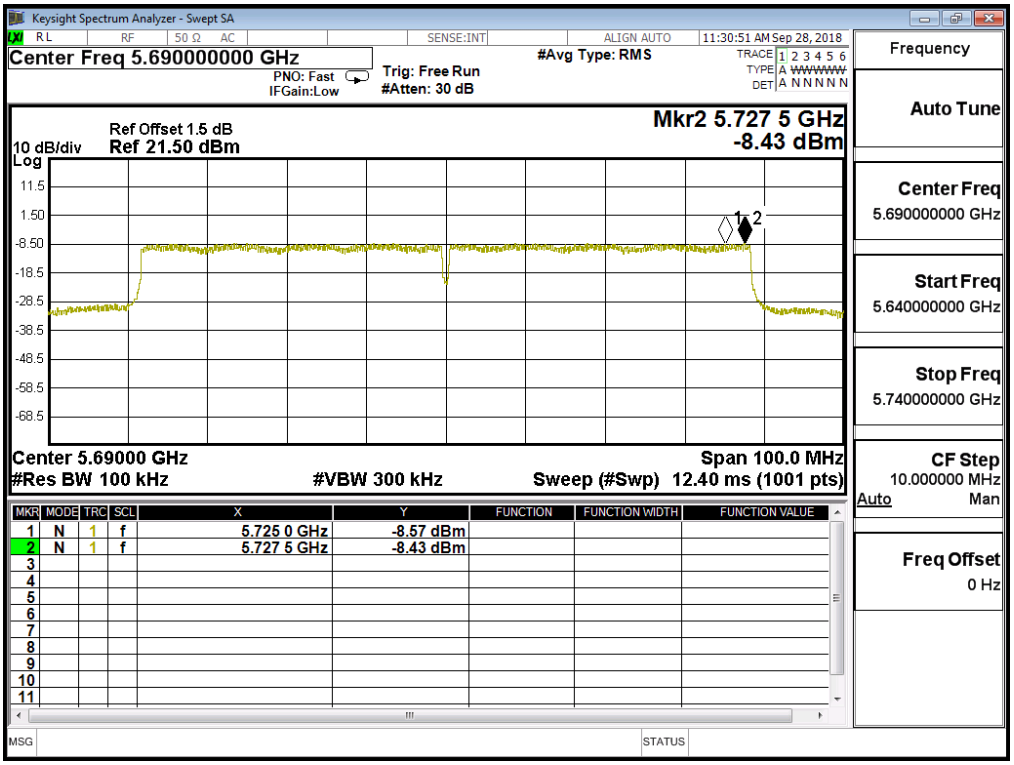
Channel 122



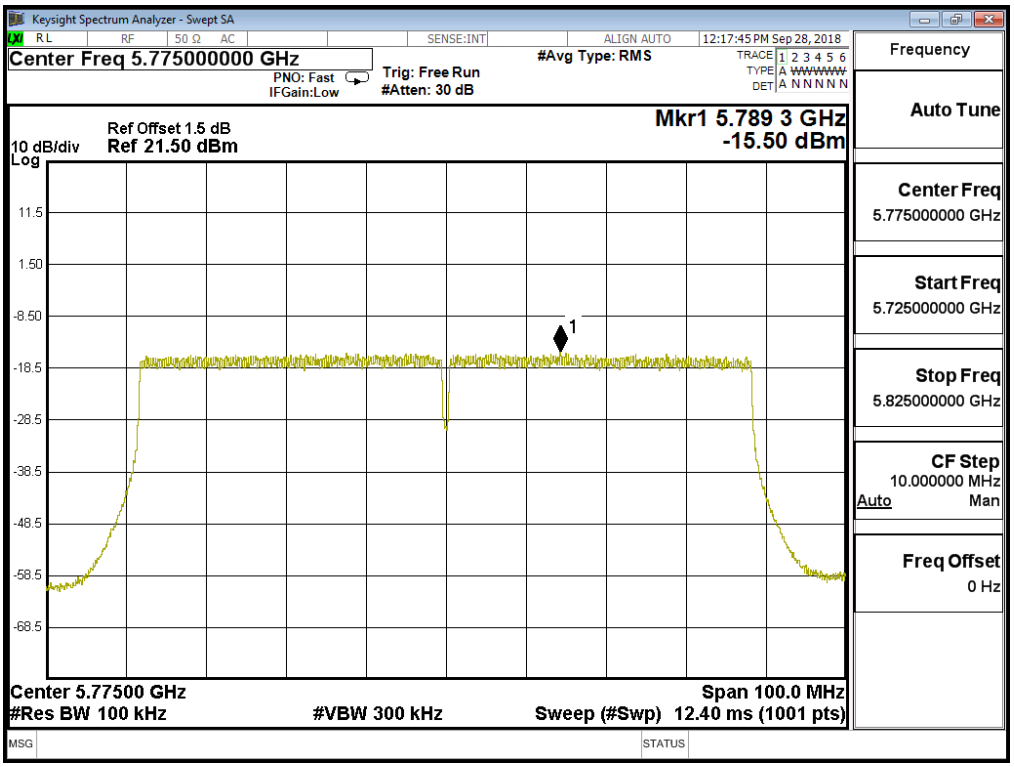
Channel 138 (U-NII-2C)



Channel 138 (U-NII-3)



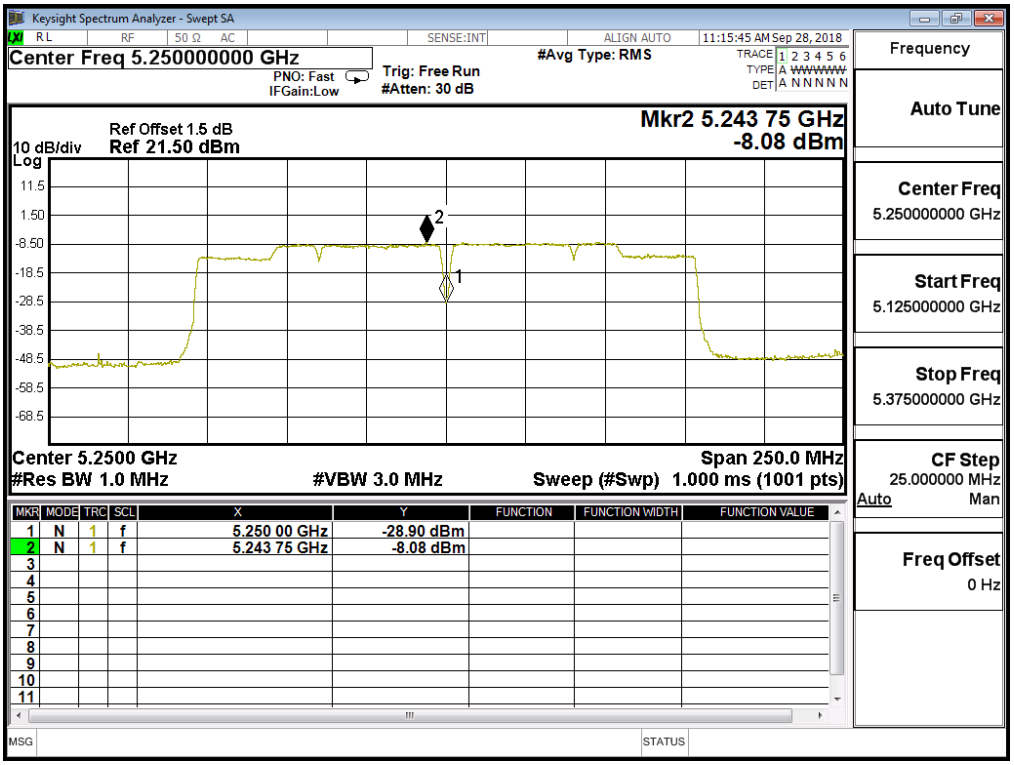
Channel 155


Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
12:17:45 PM Sep 28, 2018
Center Freq 5.775000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
TRACE 1 2 3 4 5 6
TYPE A WWWWWW
DET A N N N N N
Ref Offset 1.5 dB
10 dB/div
Ref 21.50 dBm
Log
Mkr1 5.789 3 GHz
-15.50 dBm
11.5
1.50
-8.50
-18.5
-28.5
-38.5
-48.5
-58.5
-68.5
1
Center 5.77500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 100.0 MHz
Sweep (#Swp) 12.40 ms (1001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
5.775000000 GHz
Start Freq
5.725000000 GHz
Stop Freq
5.825000000 GHz
CF Step
10.000000 MHz
Auto
Man
Freq Offset
0 Hz

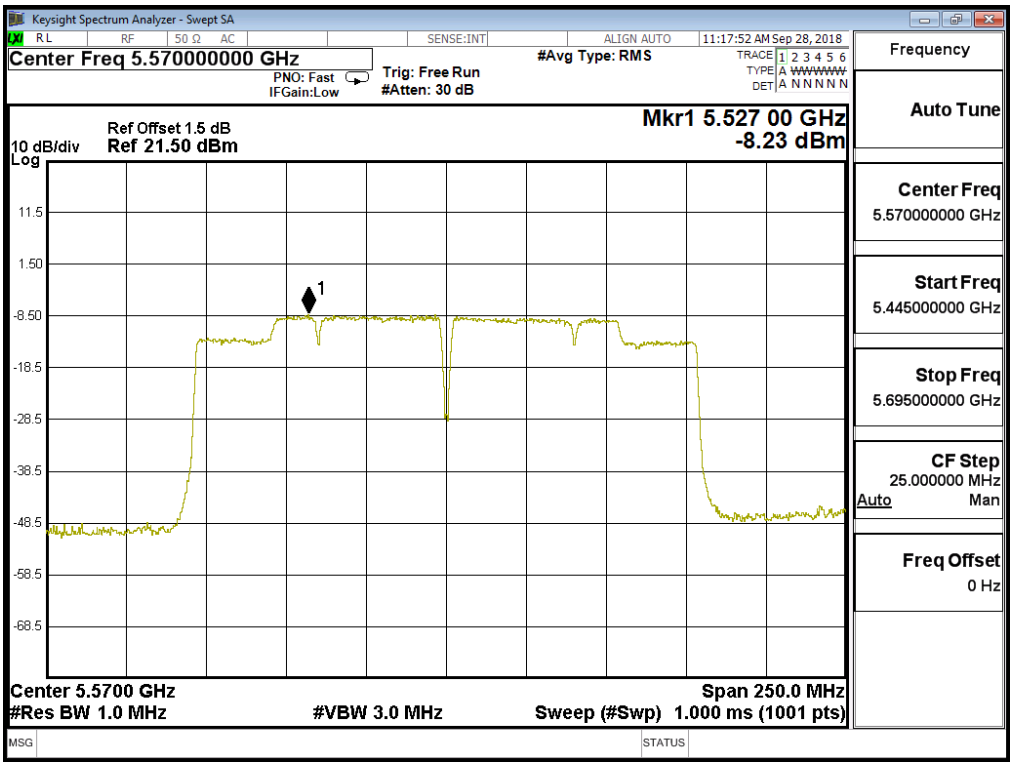
待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 2: SISO B: 發射器 802.11ac-160BW
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

Channel Number	Frequency (MHz)	PPSD (dBm)	Required Limit (dBm)	Result
50	5250	-8.080	<11	Pass
114	5570	-8.230	<11	Pass

Channel 50



Channel 114



待測物名稱：Intel® Wi-Fi 6 AX201
待測物型號：AX201NGW　　測試項目：峰值功率頻譜密度
測試頻道：--　　測試模式：Mode 3: MIMO: 發射器 802.11n-20BW
6 dB 頻寬：1MHz　　視頻頻寬：3MHz
檢測器：峰值　　環境溫度：21 ℃
測試日期：107 年 10 月 03 日　　環境濕度：53 %

Channel Number	Frequency (MHz)	Chain (dBm)	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)	Required Limit (dBm)	Result
36	5180	A	1.840	4.850	<11	Pass
		B	0.540	3.550	<11	Pass
44	5220	A	5.020	8.030	<11	Pass
		B	3.970	6.980	<11	Pass
48	5240	A	4.330	7.340	<11	Pass
		B	2.950	5.960	<11	Pass
52	5260	A	4.410	7.420	<11	Pass
		B	3.110	6.120	<11	Pass
60	5300	A	3.610	6.620	<11	Pass
		B	2.330	5.340	<11	Pass
64	5320	A	0.460	3.470	<11	Pass
		B	-0.620	2.390	<11	Pass
100	5500	A	0.930	3.940	<11	Pass
		B	-0.460	2.550	<11	Pass
116	5580	A	4.770	7.780	<11	Pass
		B	3.600	6.610	<11	Pass
140	5700	A	0.650	3.660	<11	Pass
		B	-0.760	2.250	<11	Pass

Note:

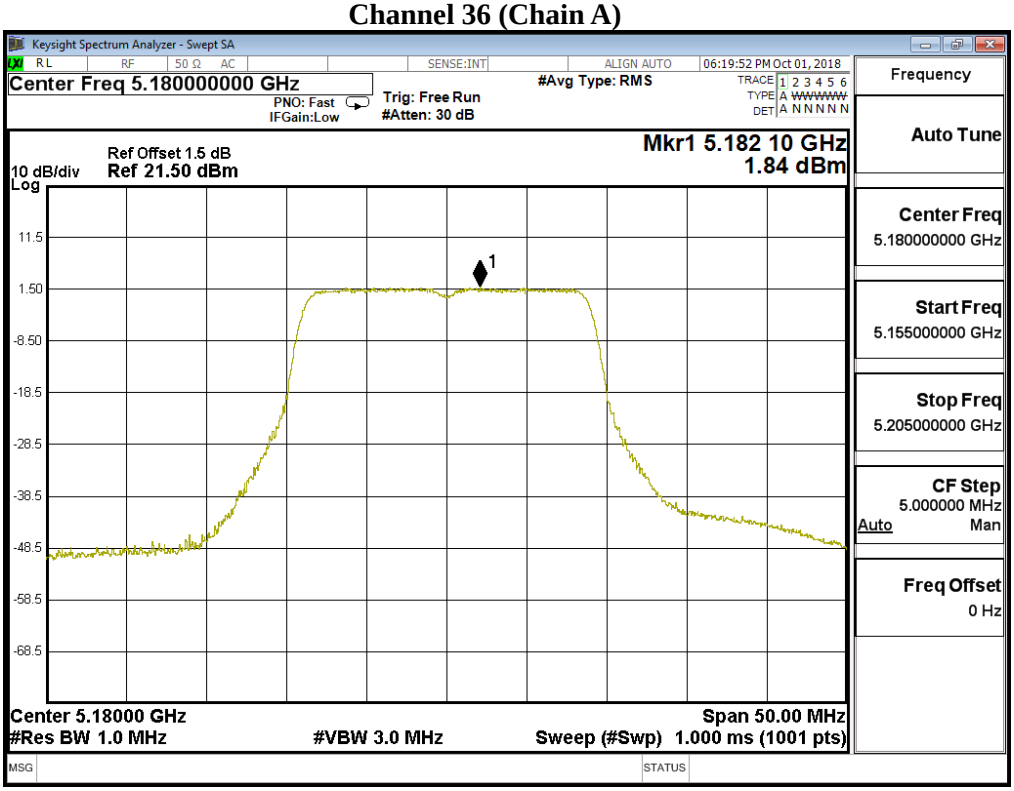
The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Channel Number	Frequency (MHz)	Chain (dBm)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
144 (U-NII-2C)	5720	A	4.980	--	7.990	<11	Pass
		B	3.410	--	6.420	<11	Pass
144 (U-NII-3)	5720	A	-4.150	6.980	5.840	<30	Pass
		B	-5.770	6.980	4.220	<30	Pass
149	5745	A	-4.340	6.980	5.650	<30	Pass
		B	-5.530	6.980	4.460	<30	Pass
157	5785	A	-4.160	6.980	5.830	<30	Pass
		B	-5.450	6.980	4.540	<30	Pass
165	5825	A	-4.230	6.980	5.760	<30	Pass
		B	-5.420	6.980	4.570	<30	Pass

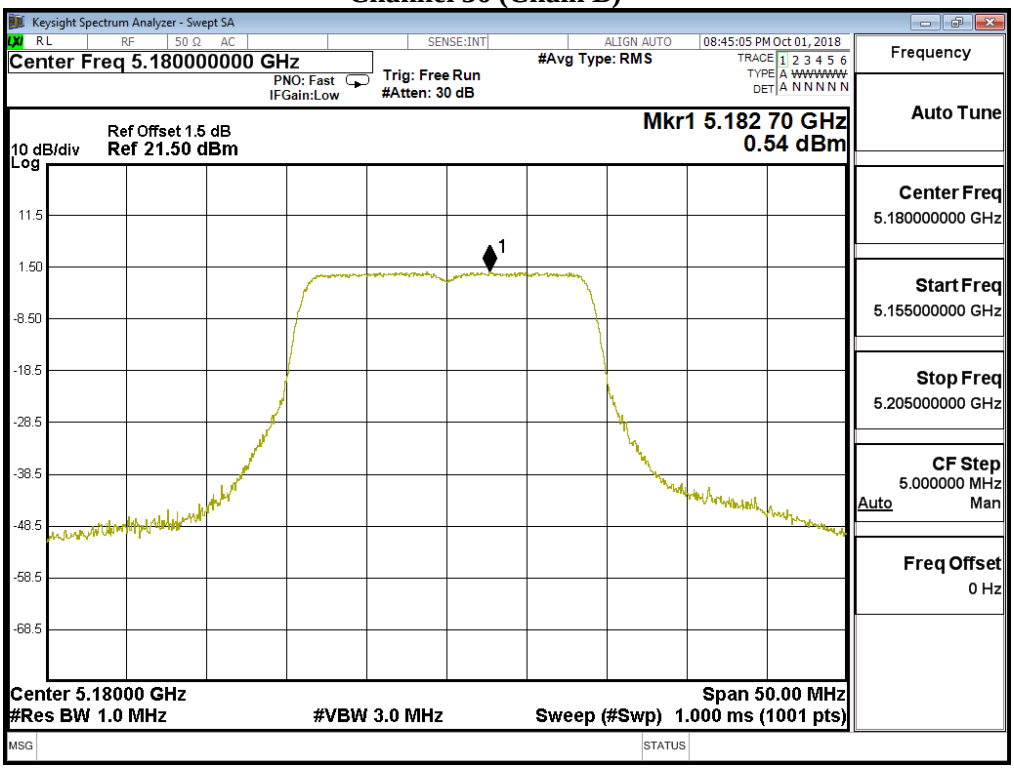
Note:

The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

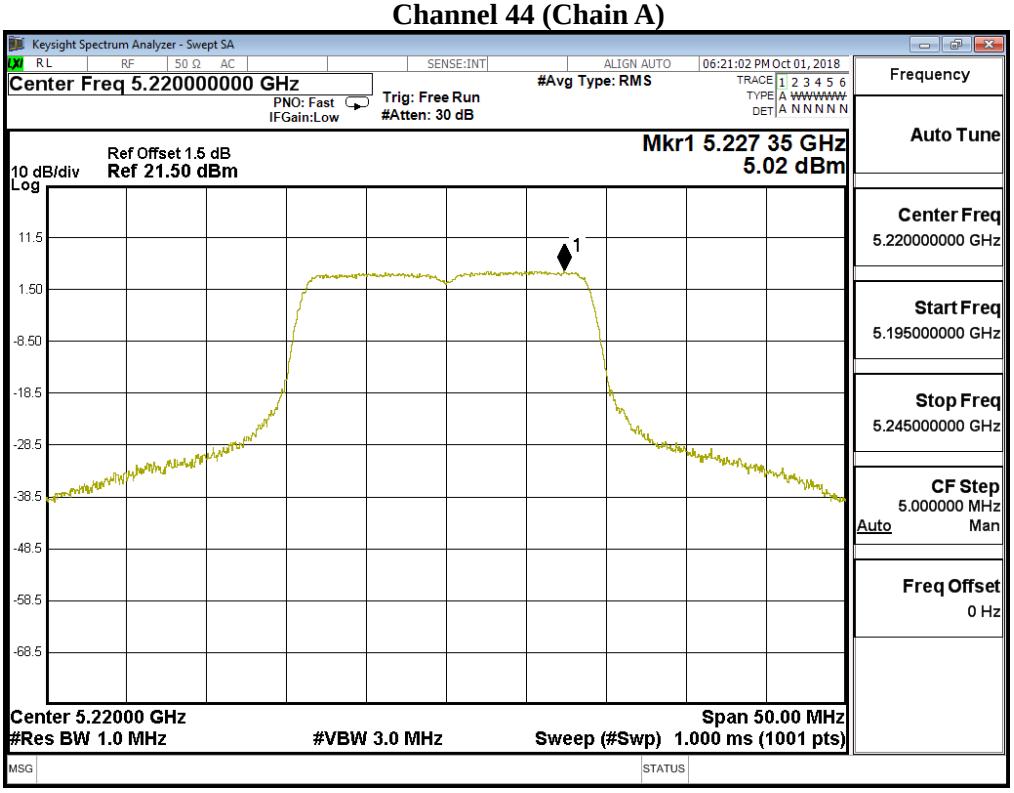
Channel 36 (Chain A)



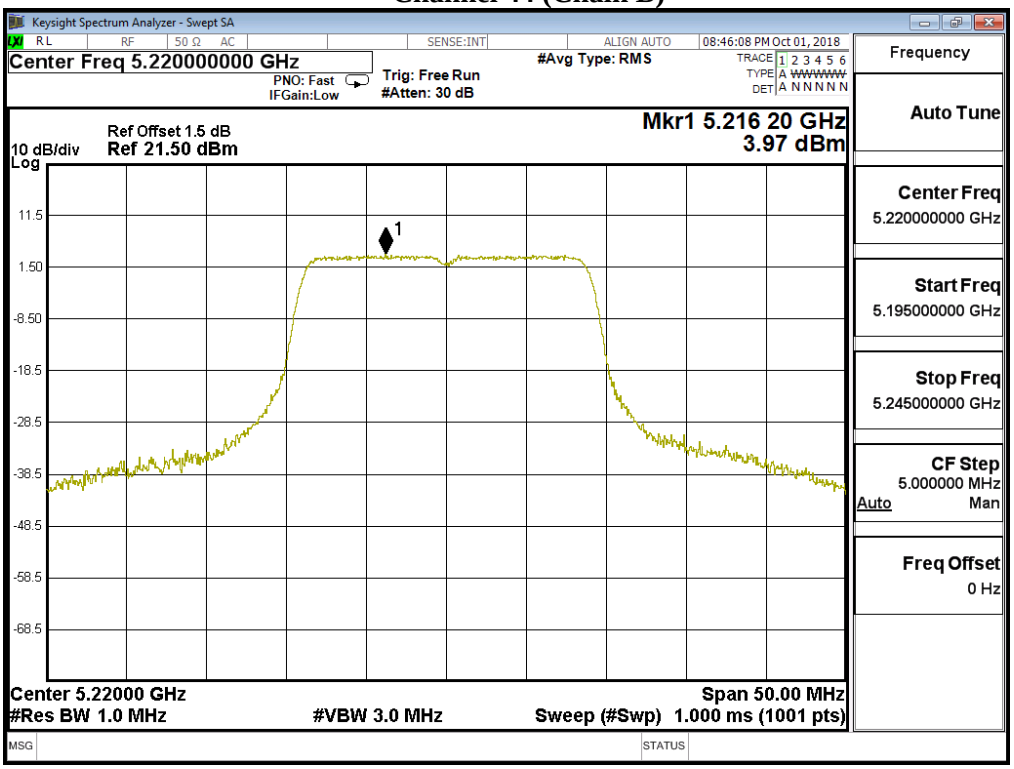
Channel 36 (Chain B)



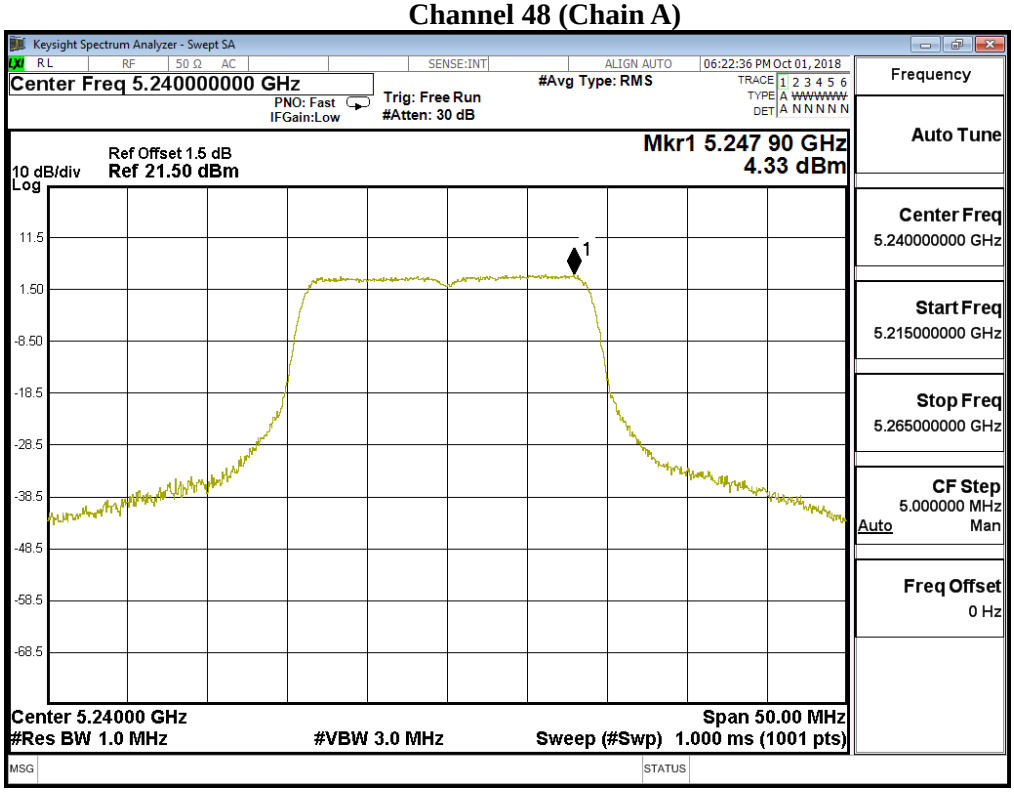
Channel 44 (Chain A)



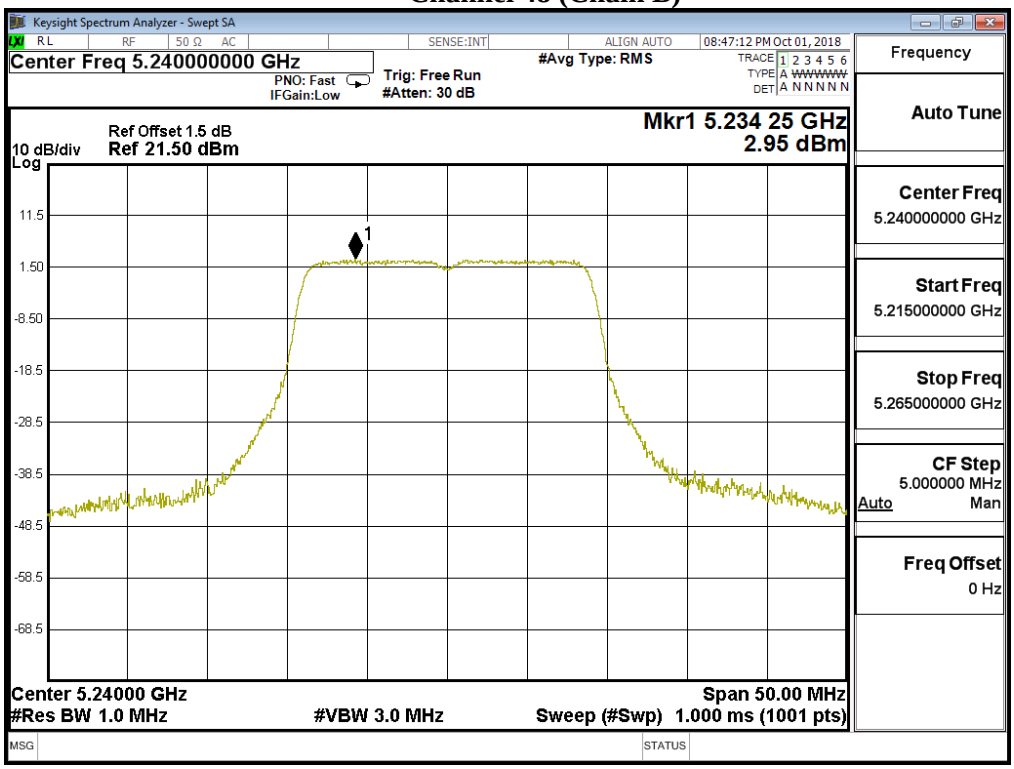
Channel 44 (Chain B)



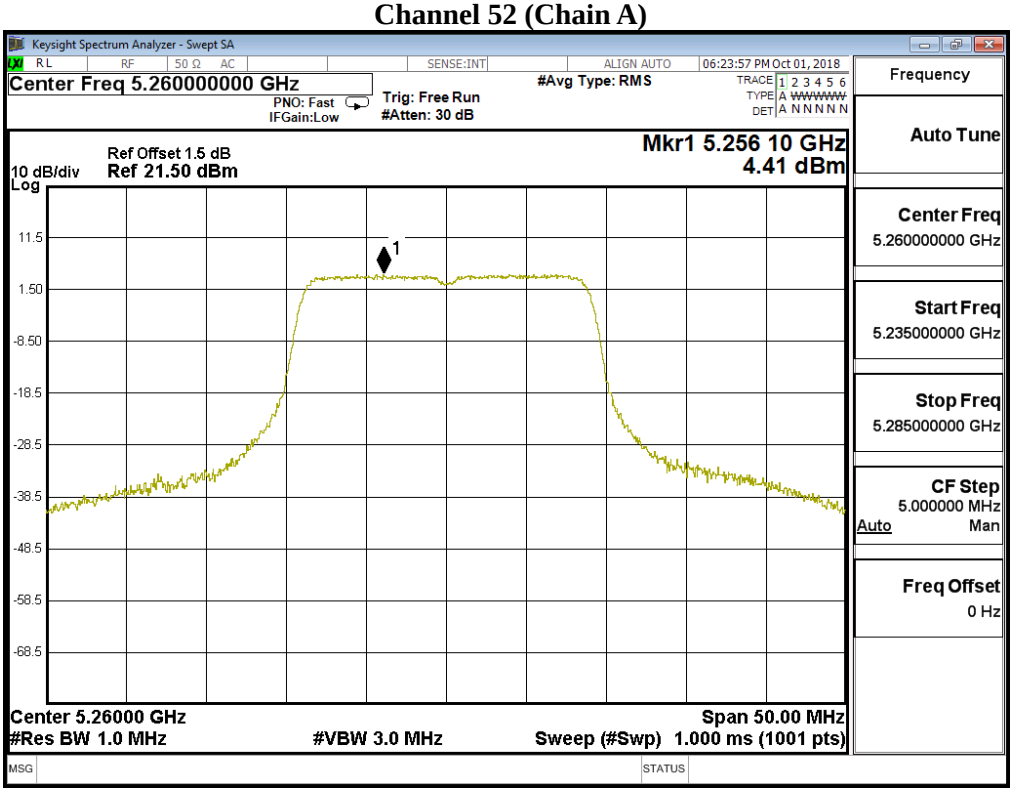
Channel 48 (Chain A)



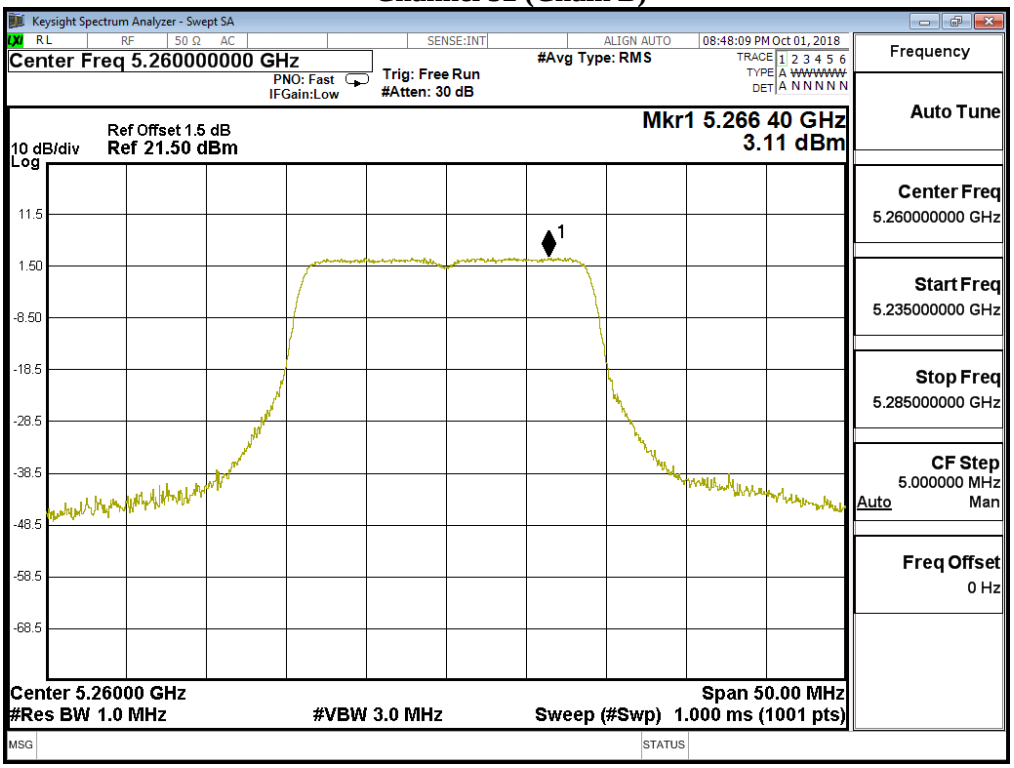
Channel 48 (Chain B)



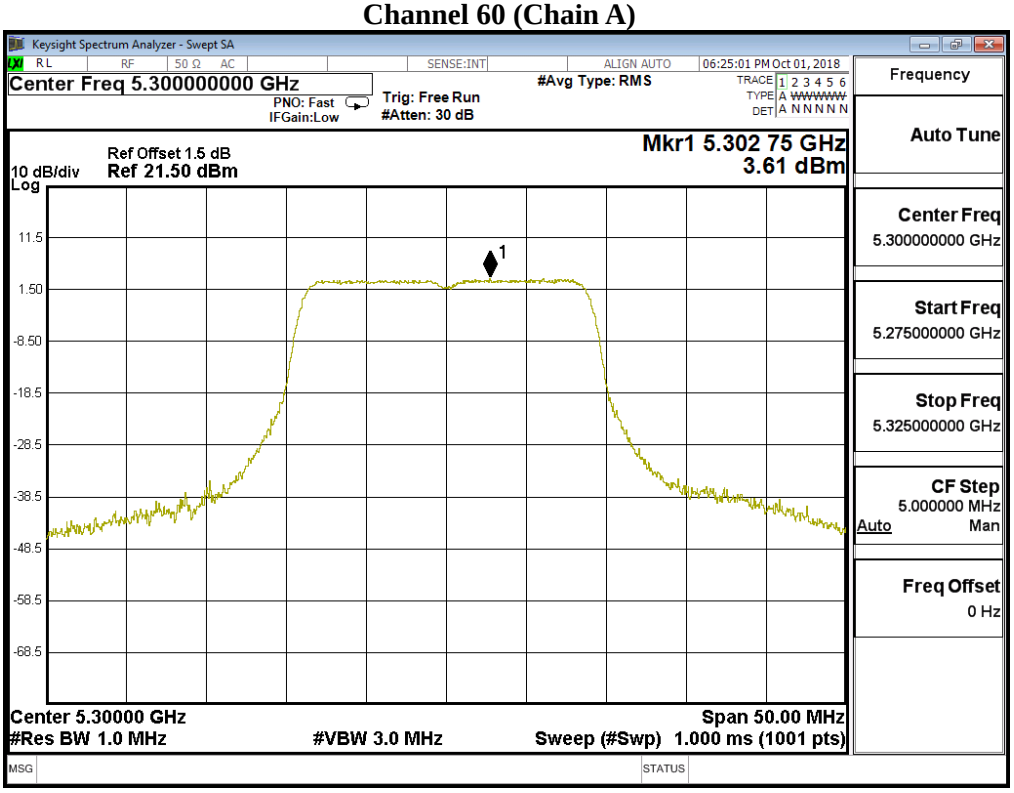
Channel 52 (Chain A)



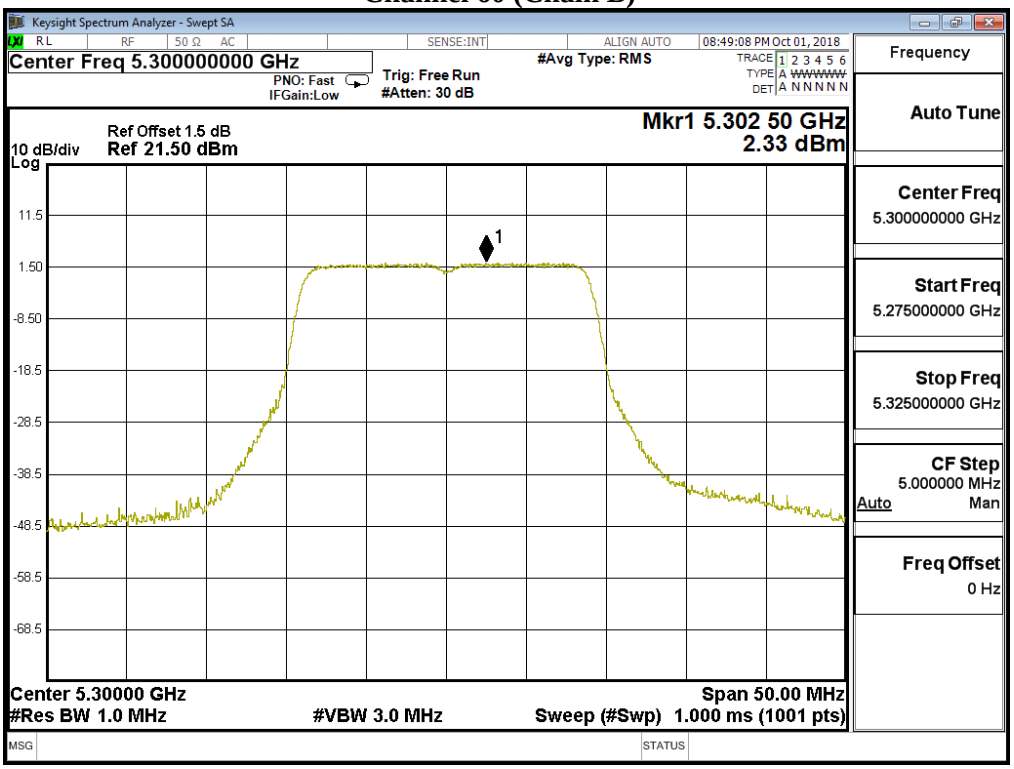
Channel 52 (Chain B)



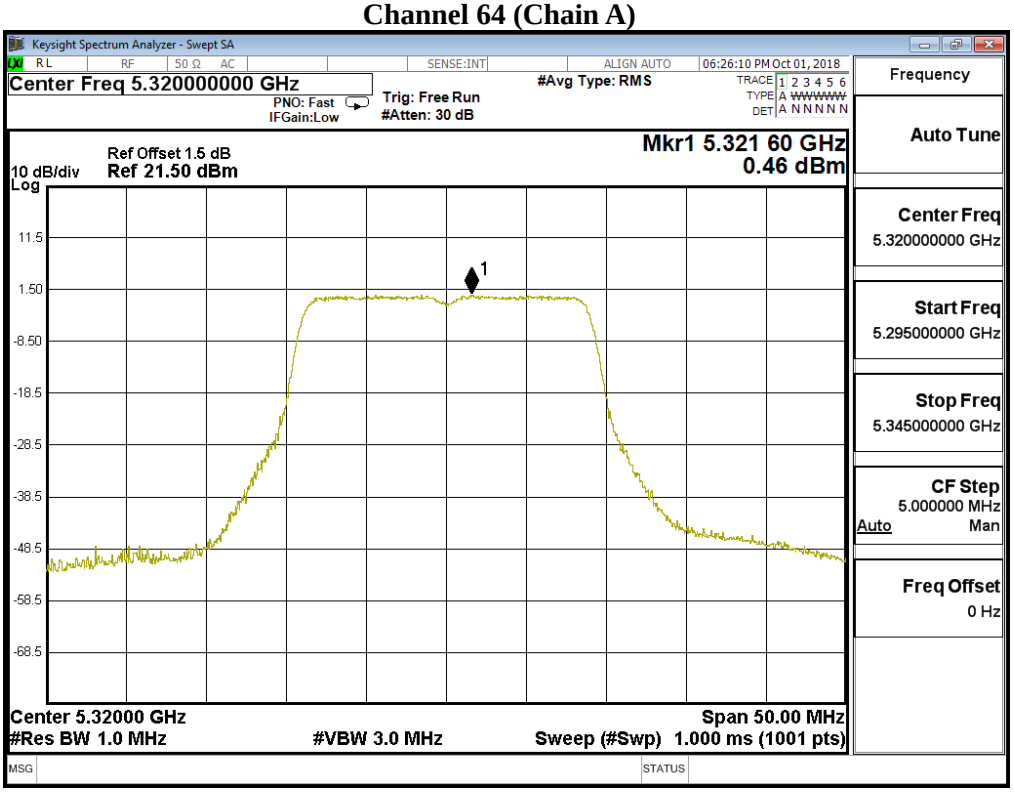
Channel 60 (Chain A)



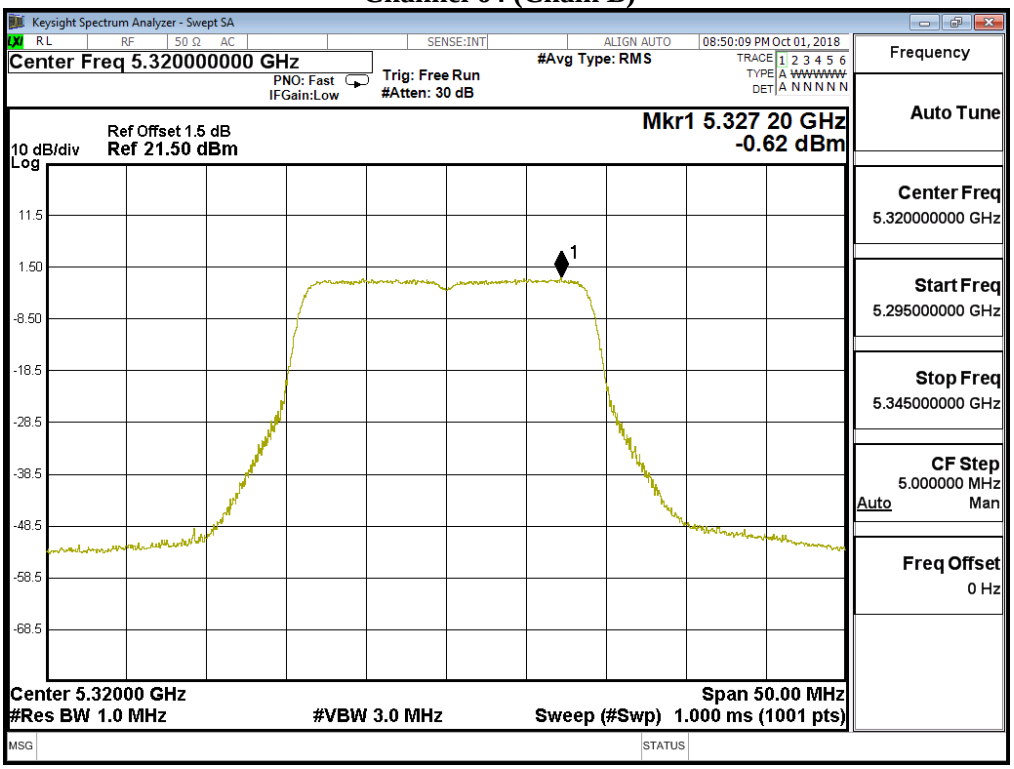
Channel 60 (Chain B)



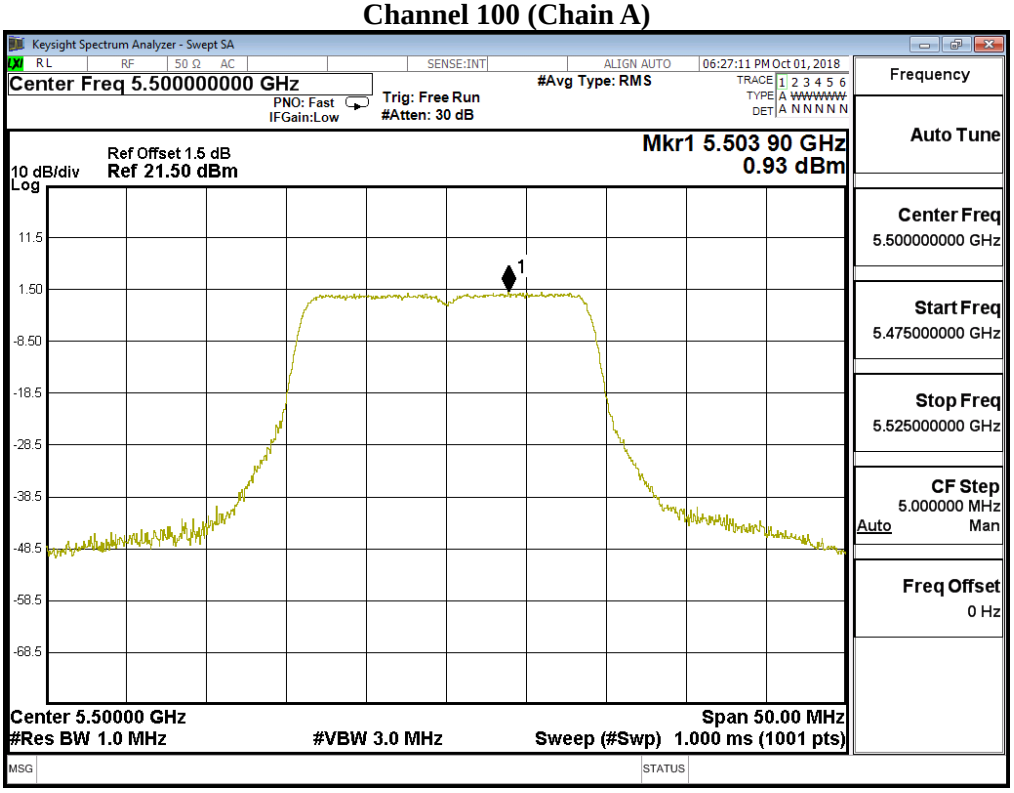
Channel 64 (Chain A)



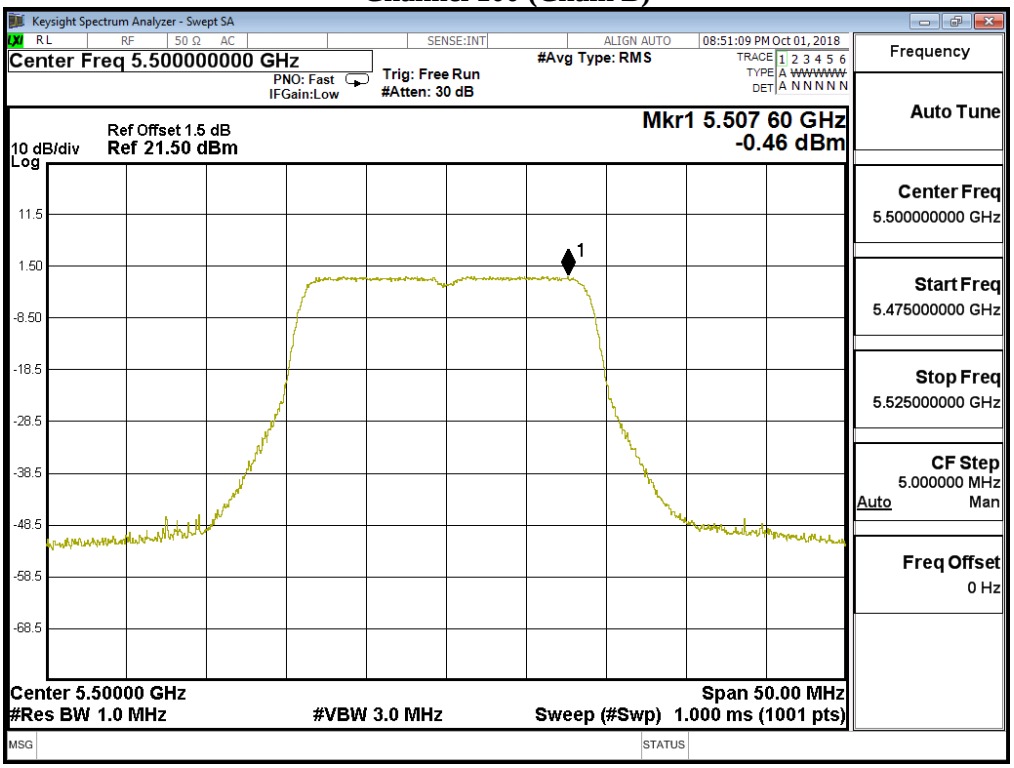
Channel 64 (Chain B)



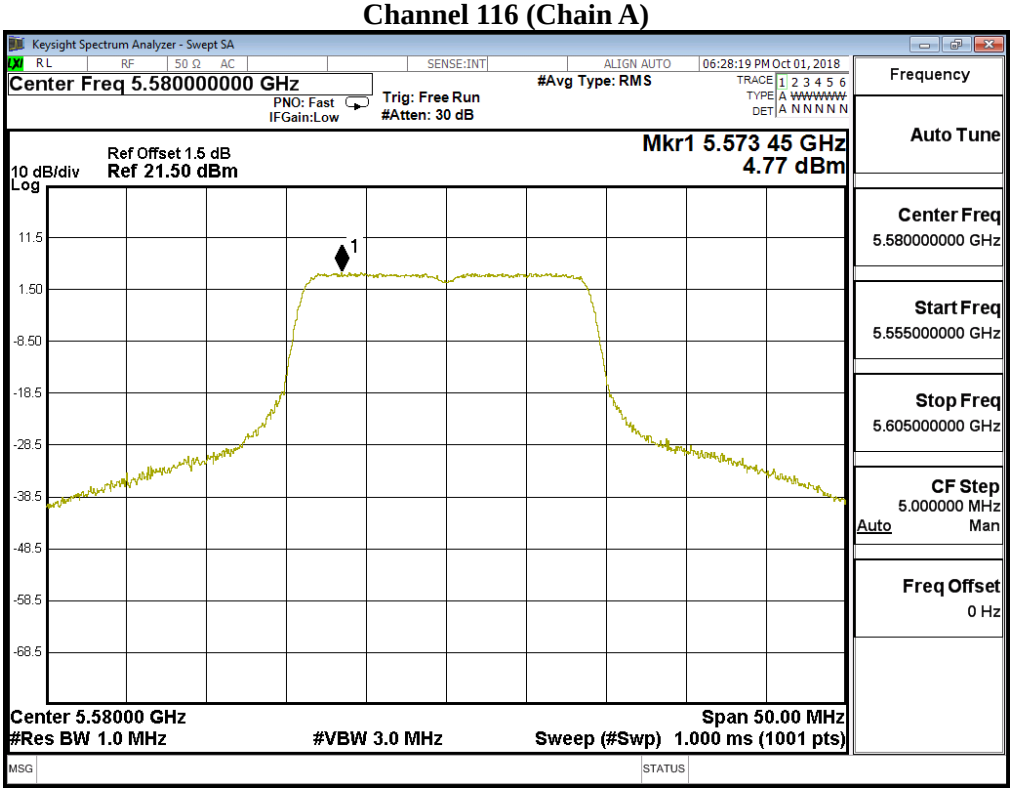
Channel 100 (Chain A)



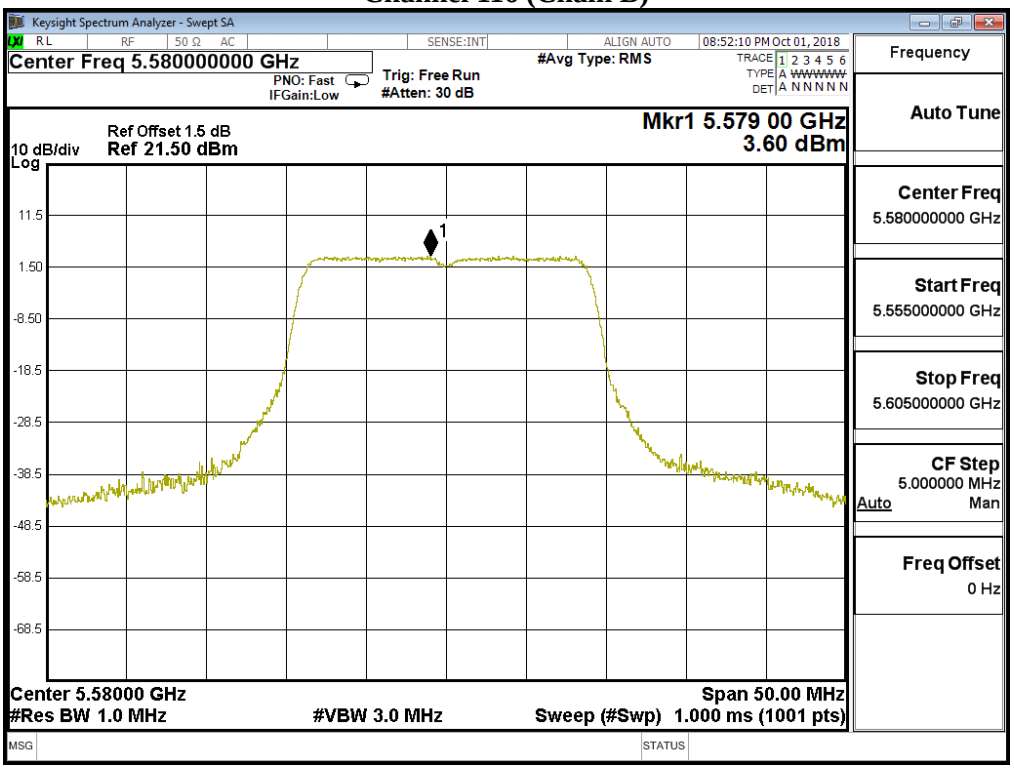
Channel 100 (Chain B)



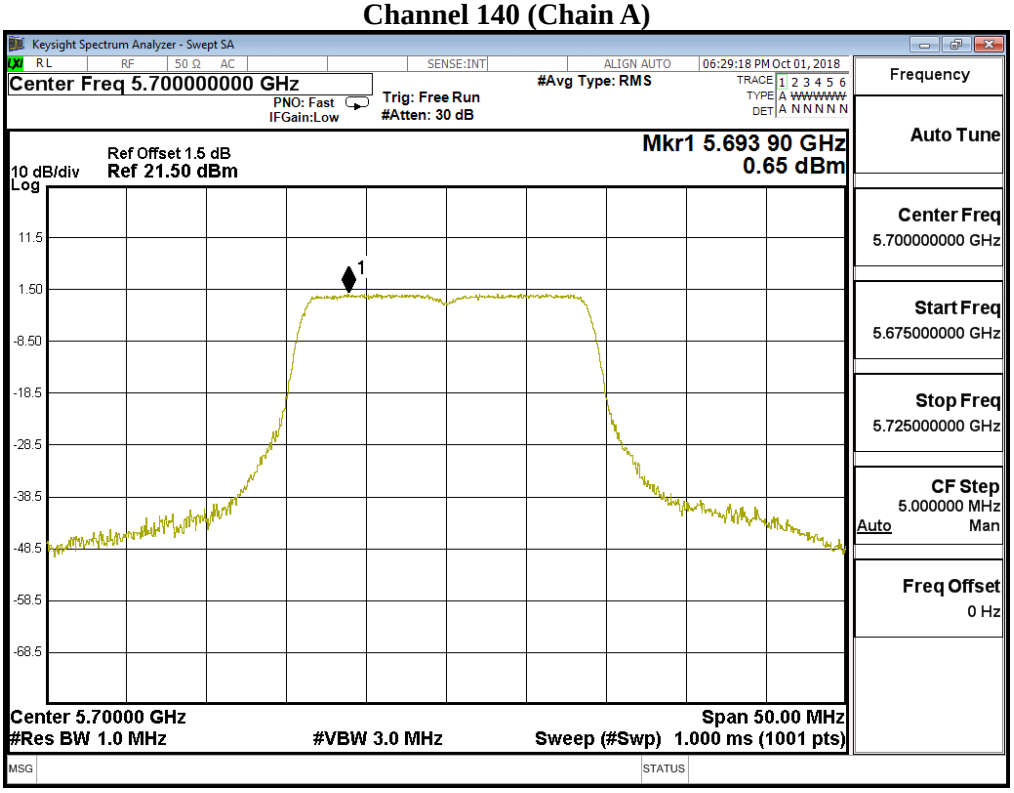
Channel 116 (Chain A)



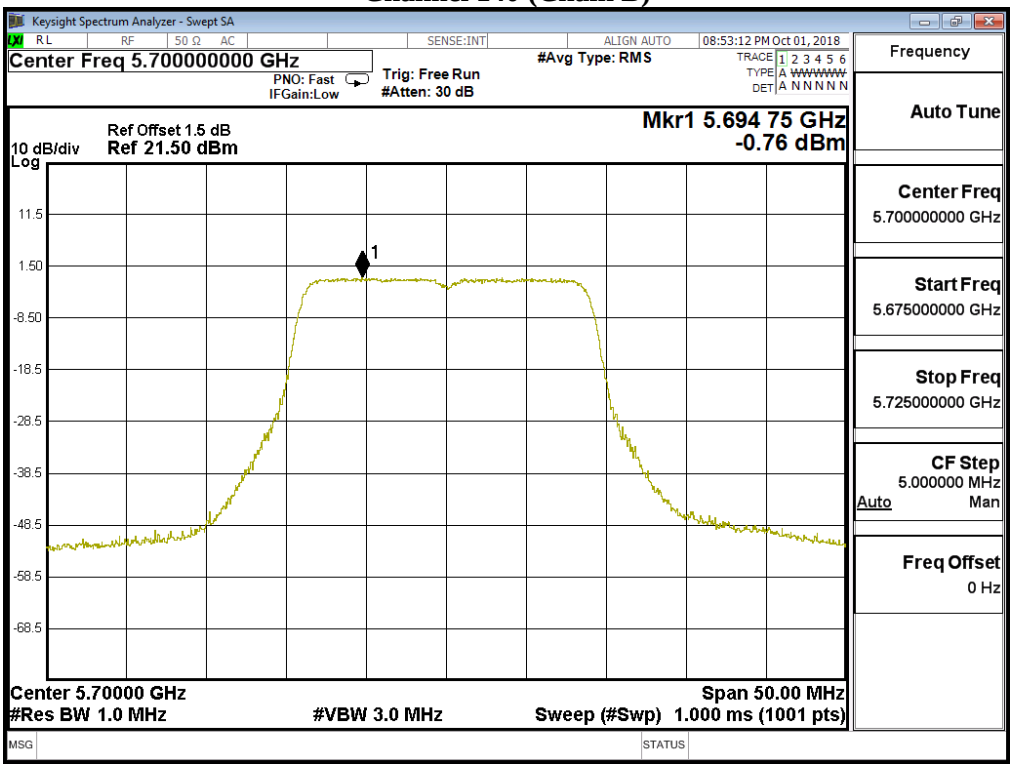
Channel 116 (Chain B)



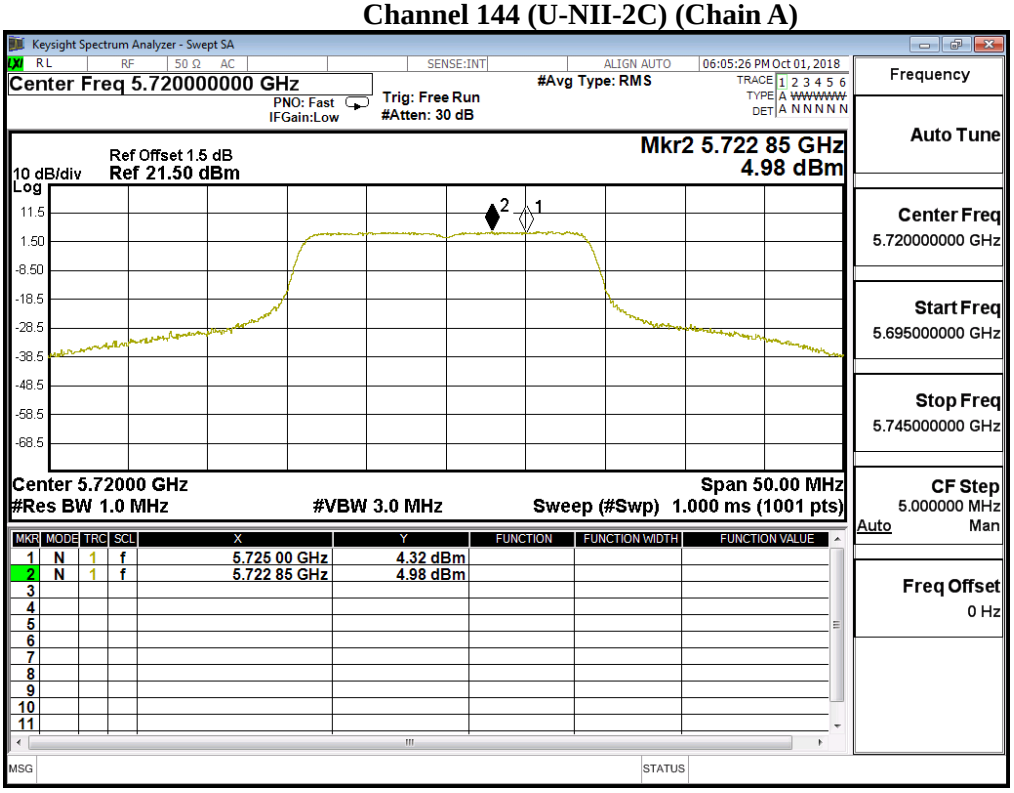
Channel 140 (Chain A)



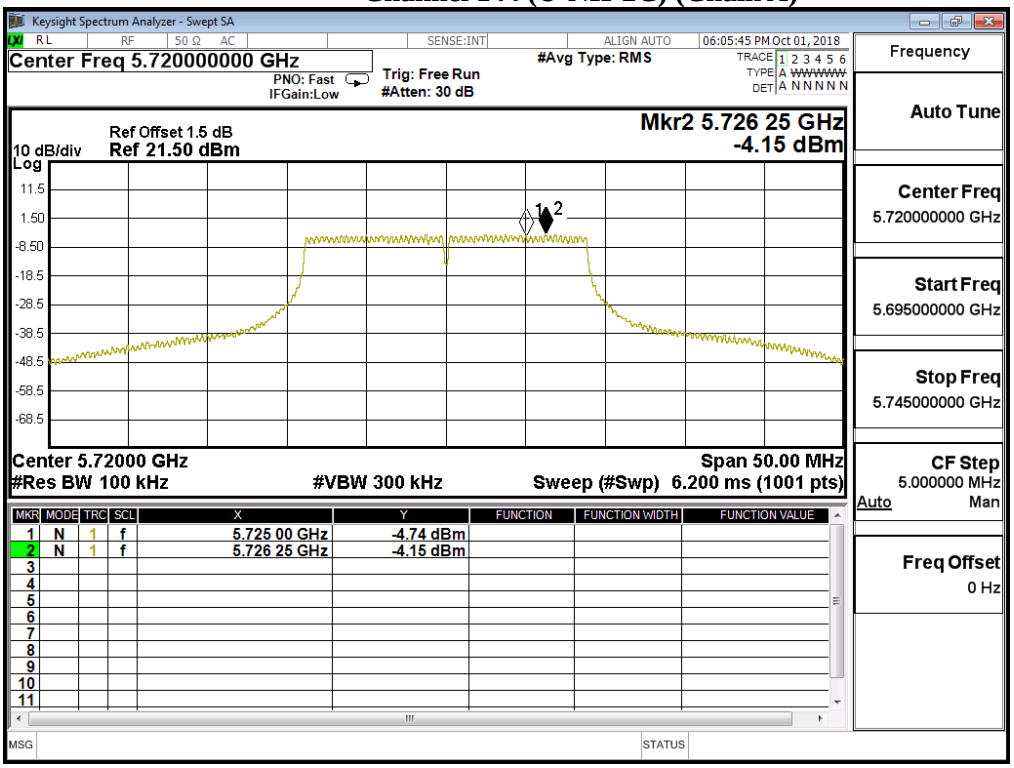
Channel 140 (Chain B)



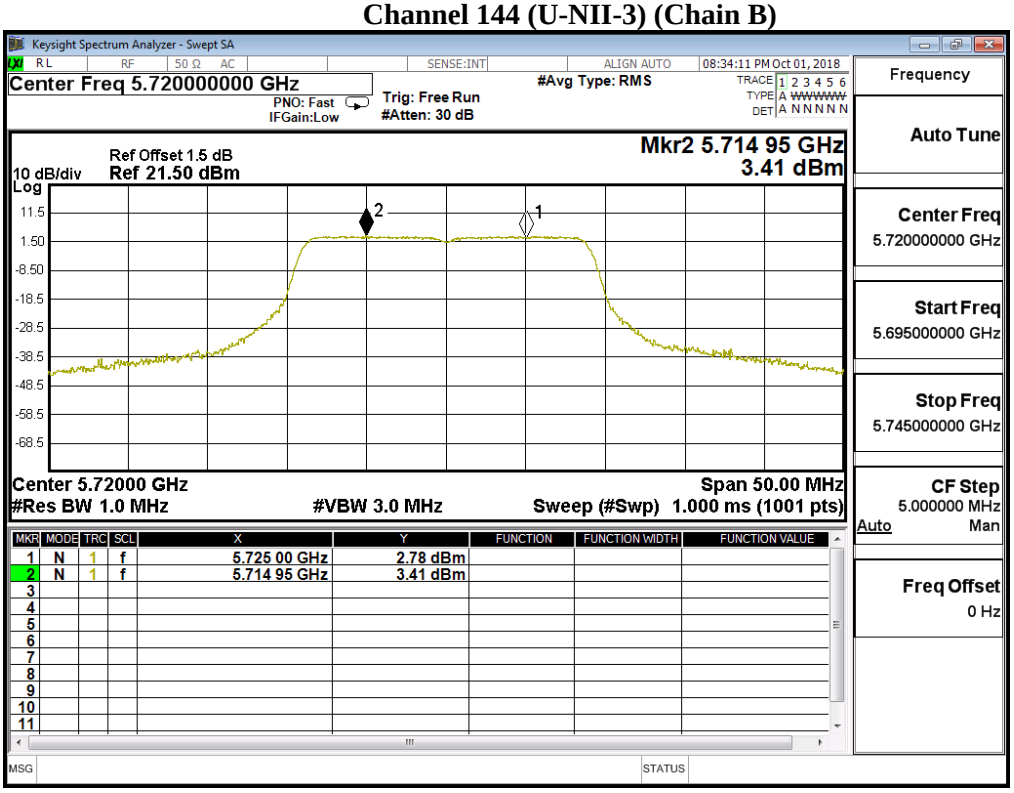
Channel 144 (U-NII-2C) (Chain A)



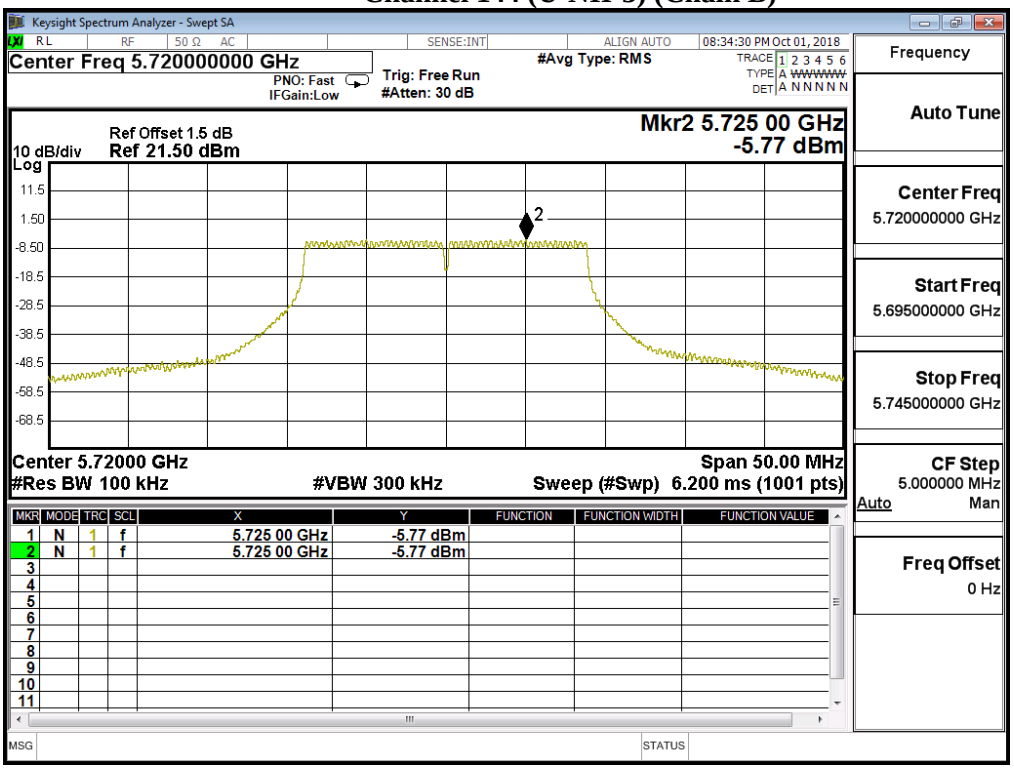
Channel 144 (U-NII-2C) (Chain A)



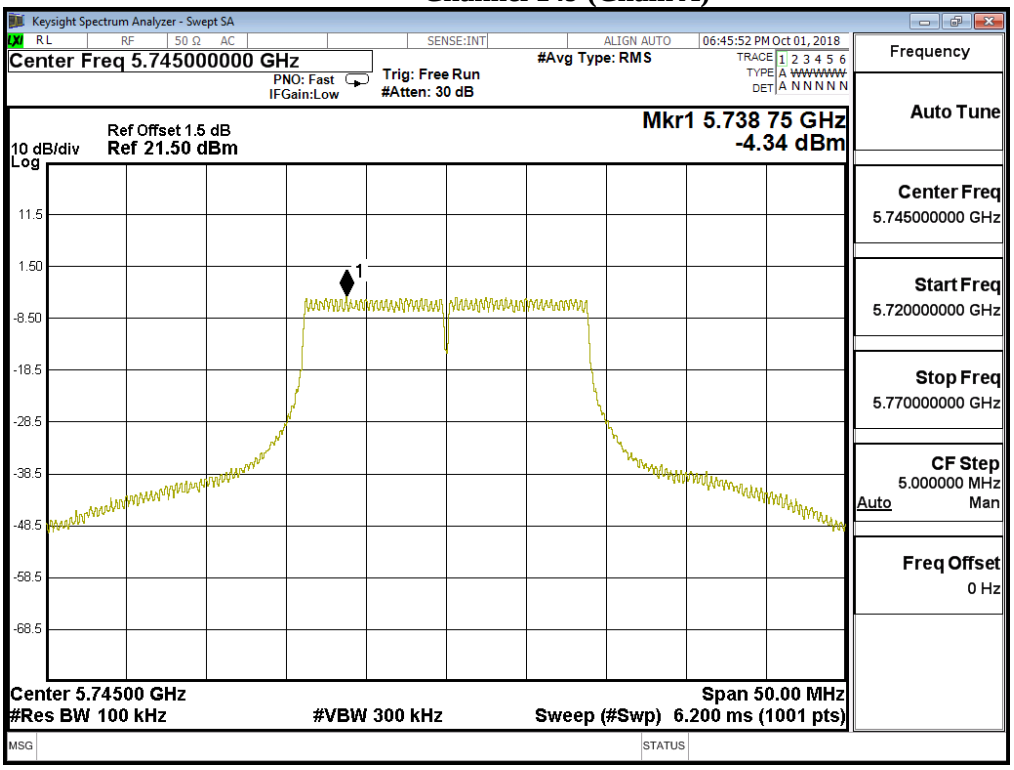
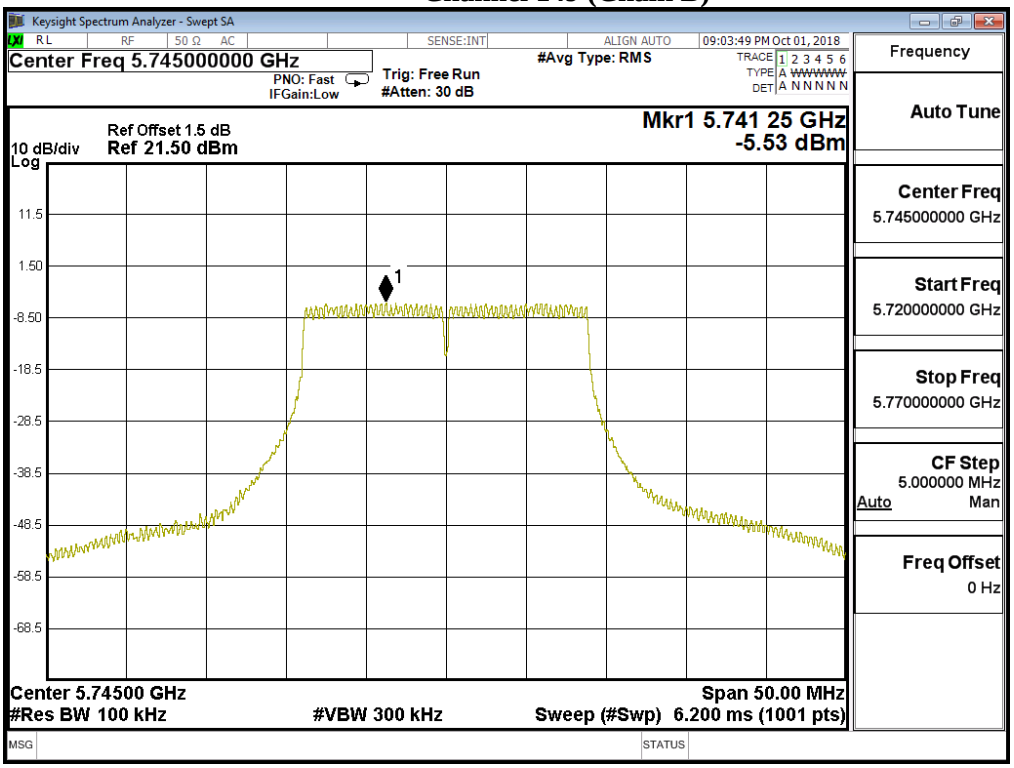
Channel 144 (U-NII-3) (Chain B)



Channel 144 (U-NII-3) (Chain B)



Channel 149 (Chain A)



Channel 149 (Chain B)