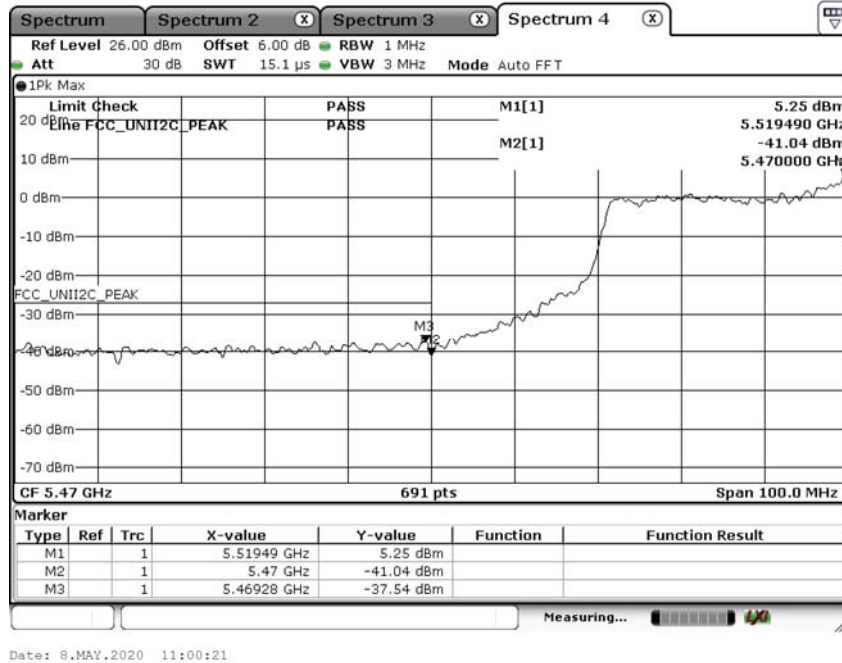


Product	:	Portable computer
Test Item	:	Band Edge Data
Test Date	:	2020/05/28
Test Mode	:	Mode 22 MIMO: Transmit (802.11ac-160BW_130Mbps) -Channel 114

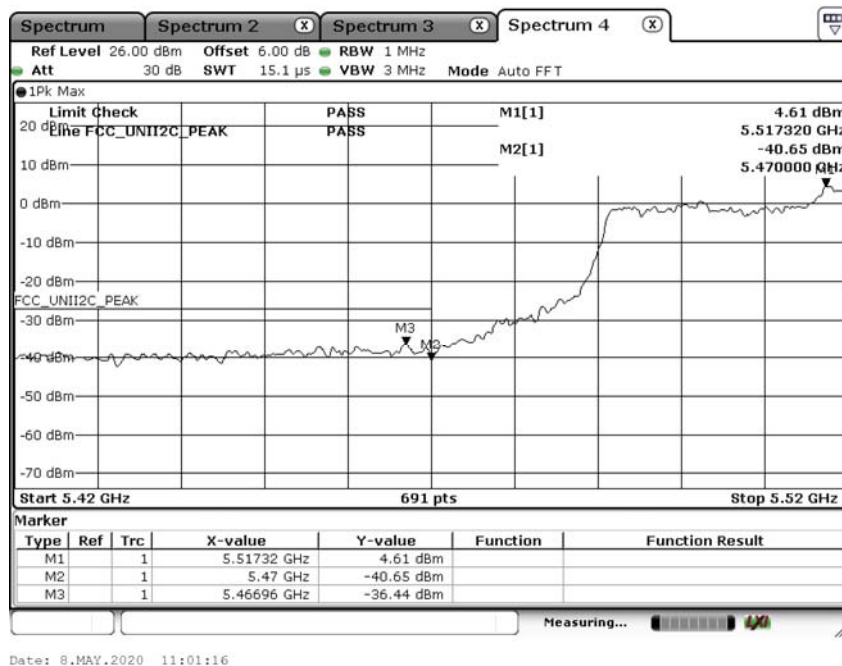
Chain A

Peak:



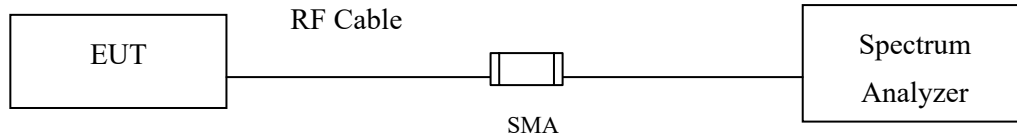
Chain B

Peak:



7. Occupied Bandwidth

7.1. Test Setup



7.2. Limits

For the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz

7.3. Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

7.4. Uncertainty

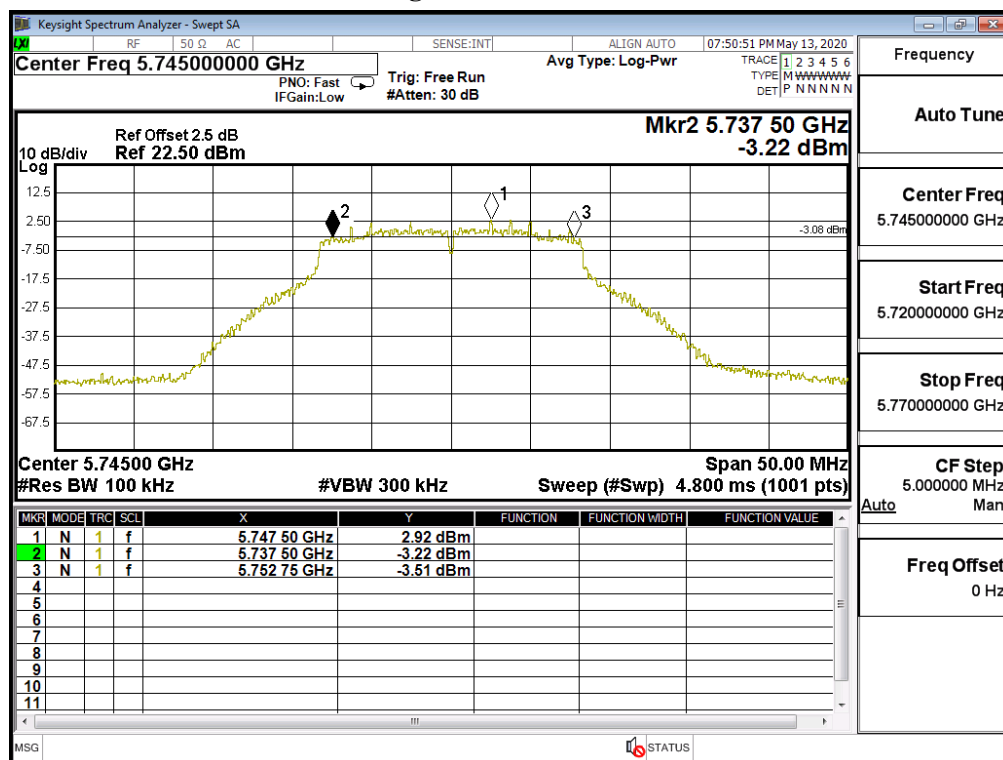
$\pm 681.6\text{Hz}$

7.5. Test Result of Occupied Bandwidth

Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 1 SISO A: Transmit (802.11a_6Mbps) (5745MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	15250	>500	Pass

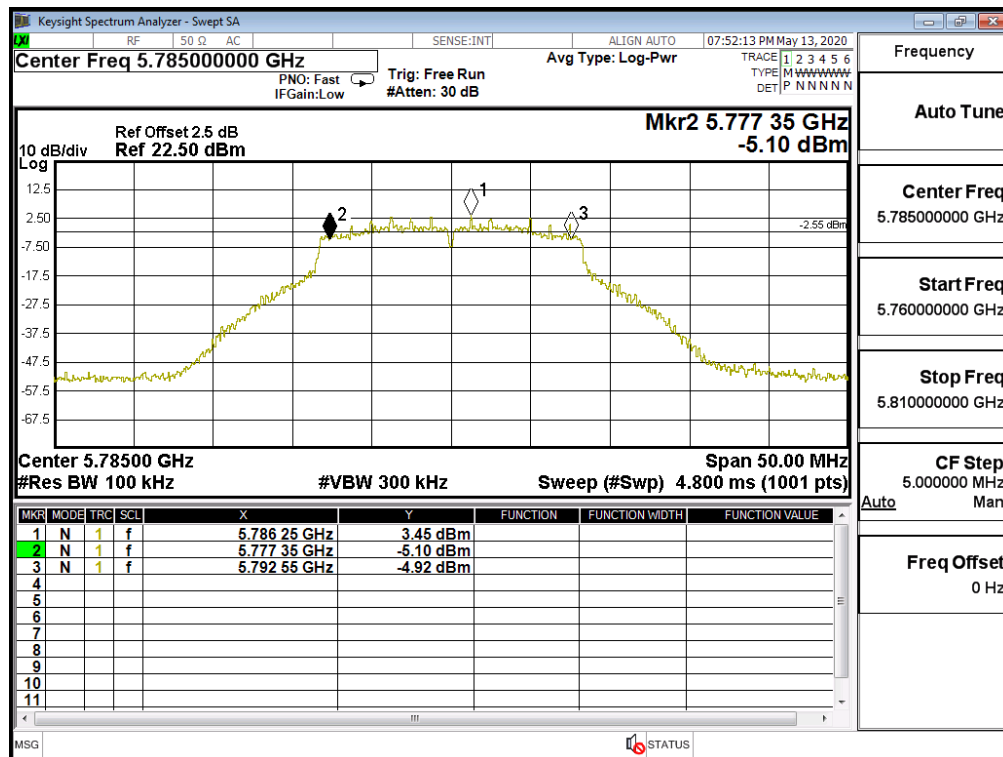
Figure Channel 149:



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 1 SISO A: Transmit (802.11a_6Mbps) (5785MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	15200	>500	Pass

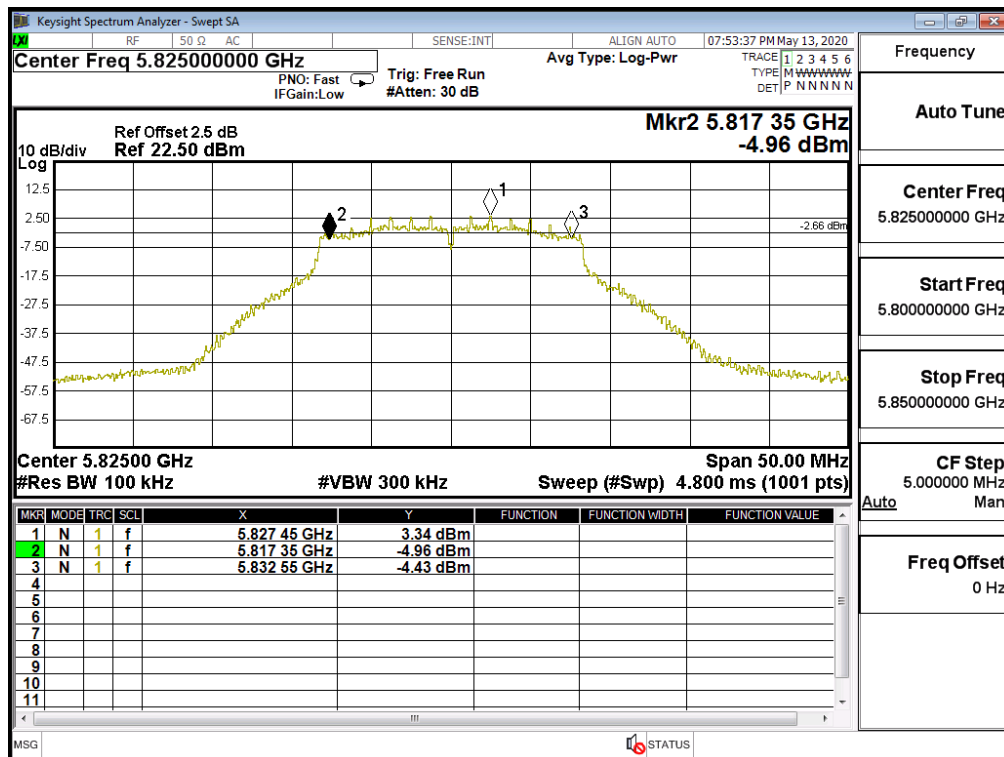
Figure Channel 157:



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 1 SISO A: Transmit (802.11a_6Mbps) (5825MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	15200	>500	Pass

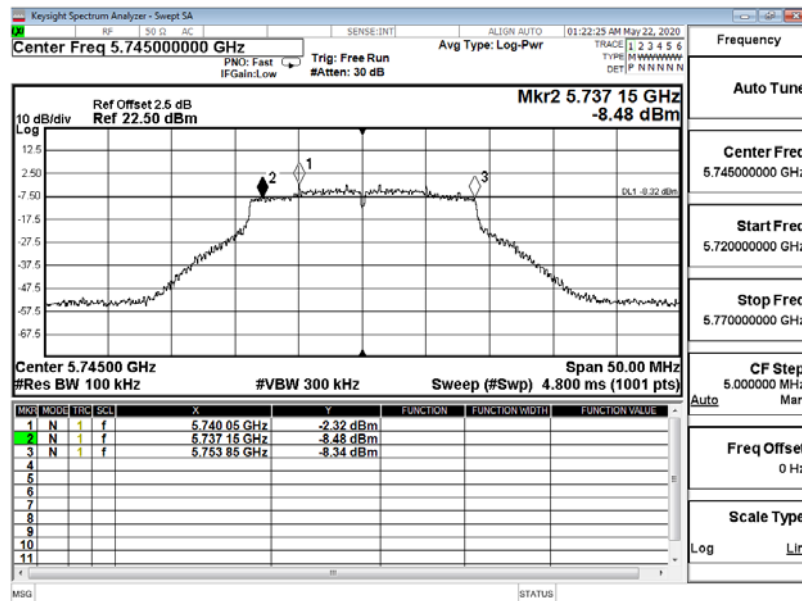
Figure Channel 165:



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 19 MIMO: Transmit (802.11n-20BW_14.4Mbps) (5745MHz)

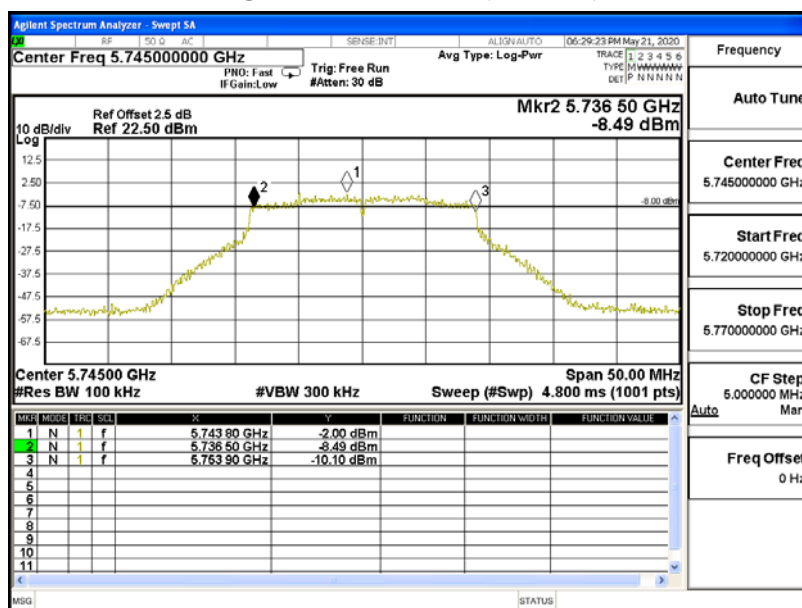
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	16700	>500	Pass

Figure Channel 149: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	17400	>500	Pass

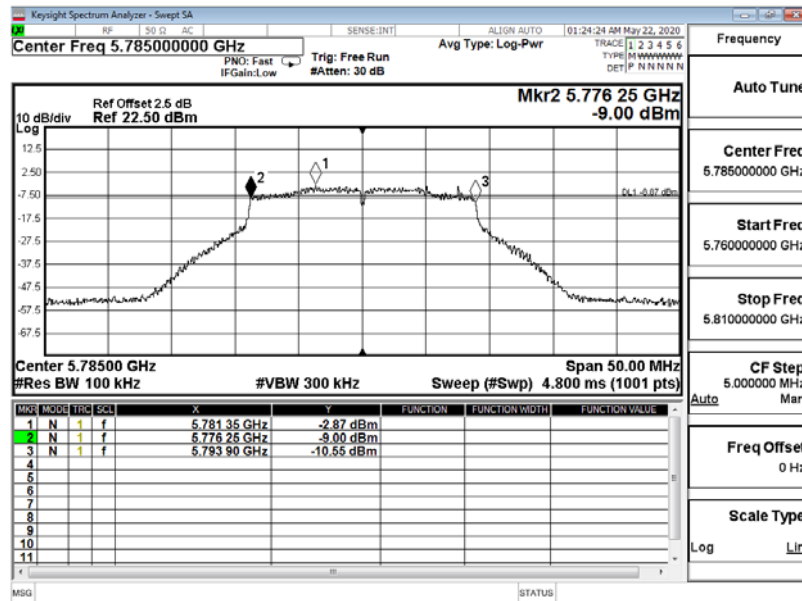
Figure Channel 149: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 19 MIMO: Transmit (802.11n-20BW_14.4Mbps) (5785MHz)

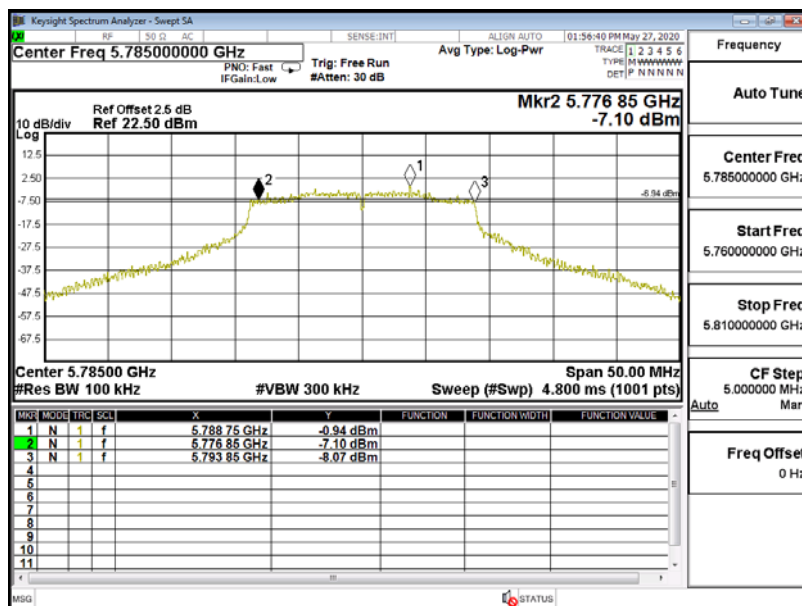
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	17650	>500	Pass

Figure Channel 157: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	17000	>500	Pass

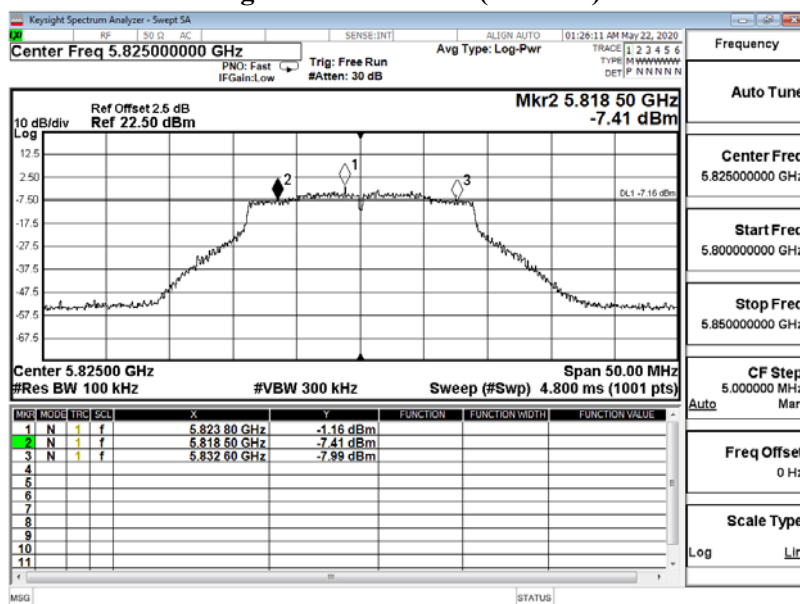
Figure Channel 157: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 19 MIMO: Transmit (802.11n-20BW_14.4Mbps) (5825MHz)

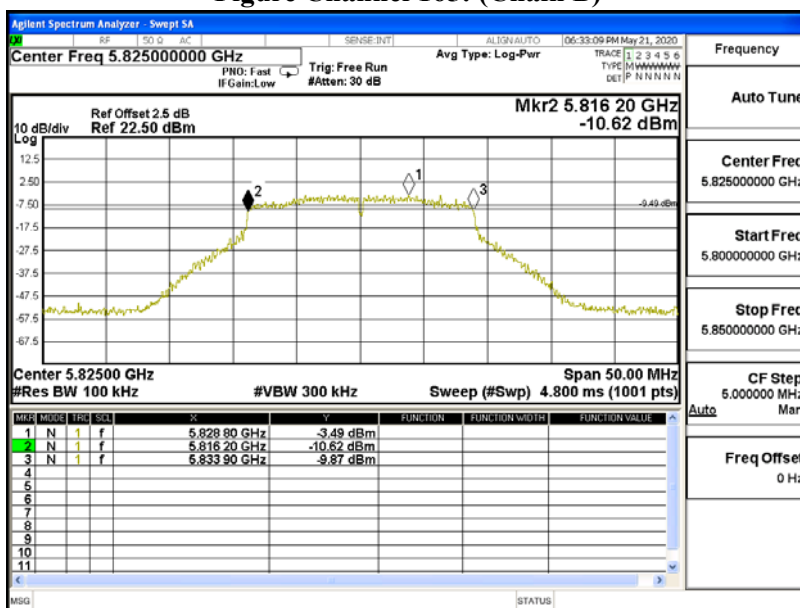
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	14100	>500	Pass

Figure Channel 165: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	17700	>500	Pass

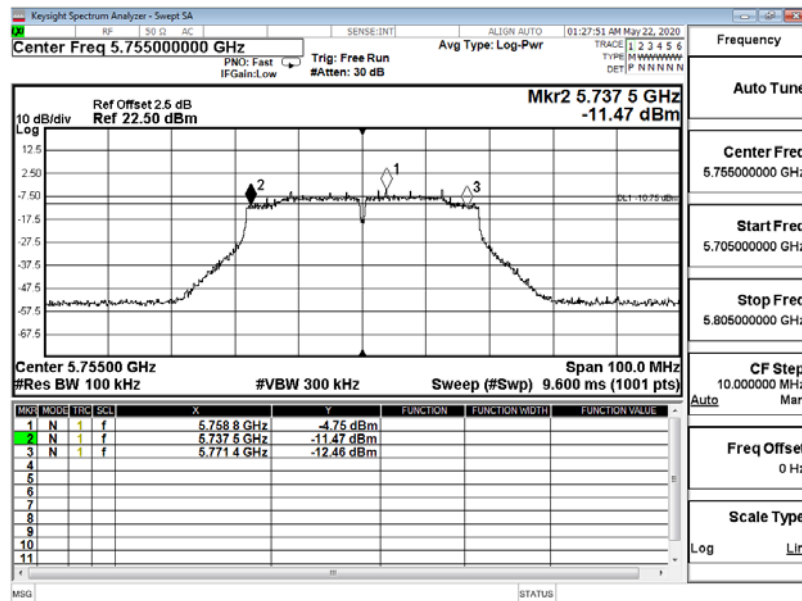
Figure Channel 165: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 20 MIMO: Transmit (802.11n-40BW_30Mbps) (5755MHz)

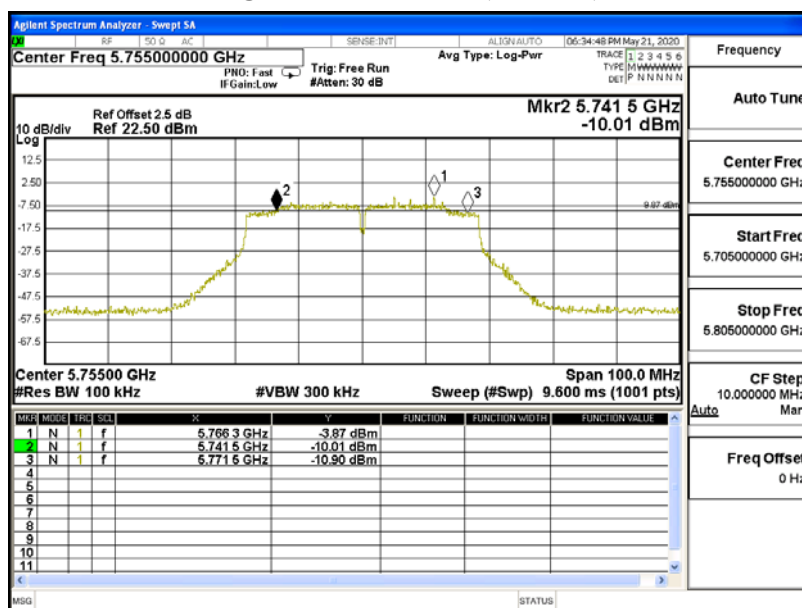
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755.00	33900	>500	Pass

Figure Channel 151: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755.00	30000	>500	Pass

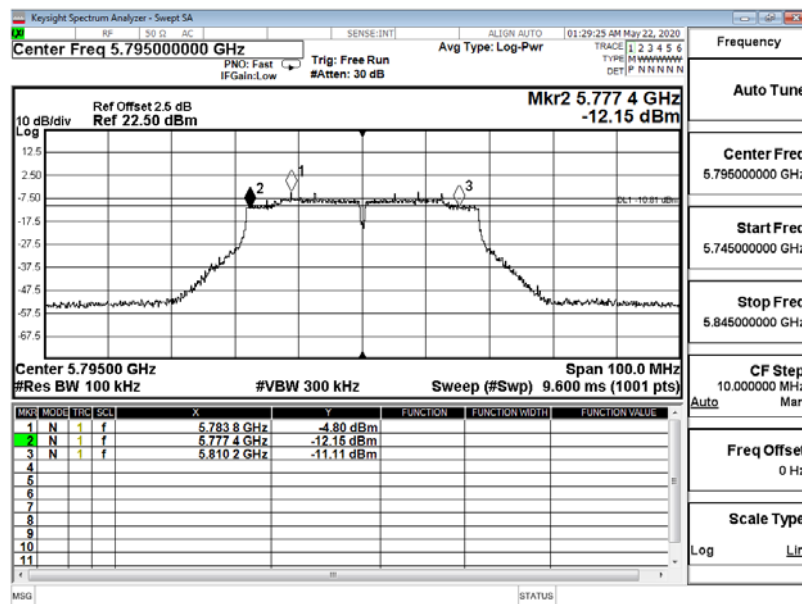
Figure Channel 151: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 20 MIMO: Transmit (802.11n-40BW_30Mbps) (5795MHz)

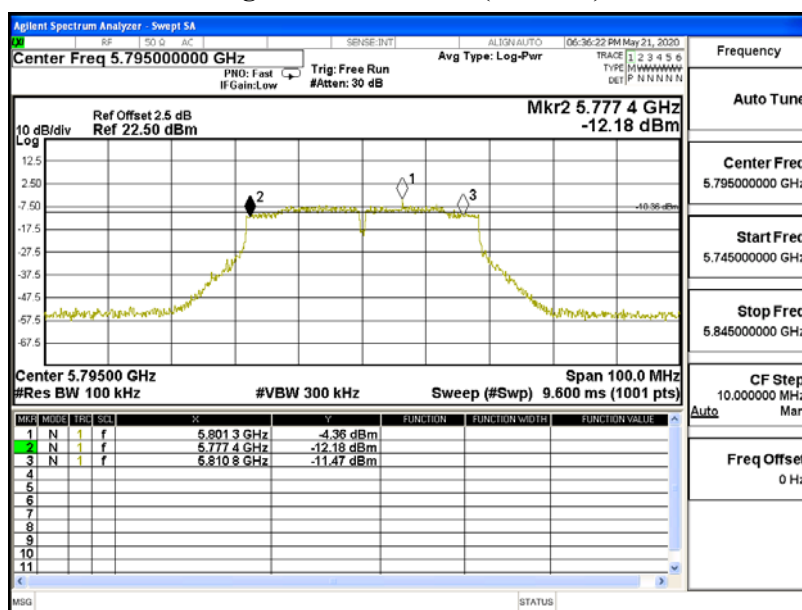
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
159	5795.00	32800	>500	Pass

Figure Channel 159: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
159	5795.00	33400	>500	Pass

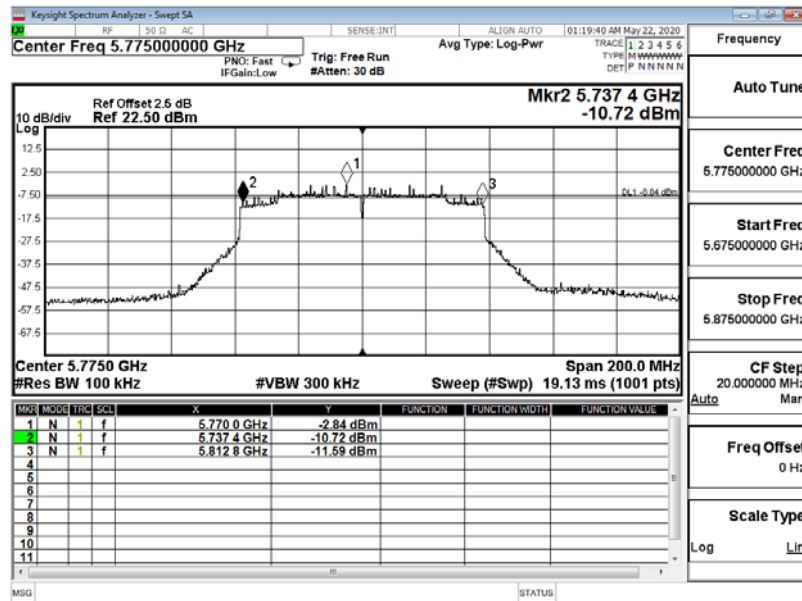
Figure Channel 159: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 21 MIMO: Transmit (802.11ac-80BW_65Mbps) (5775MHz)

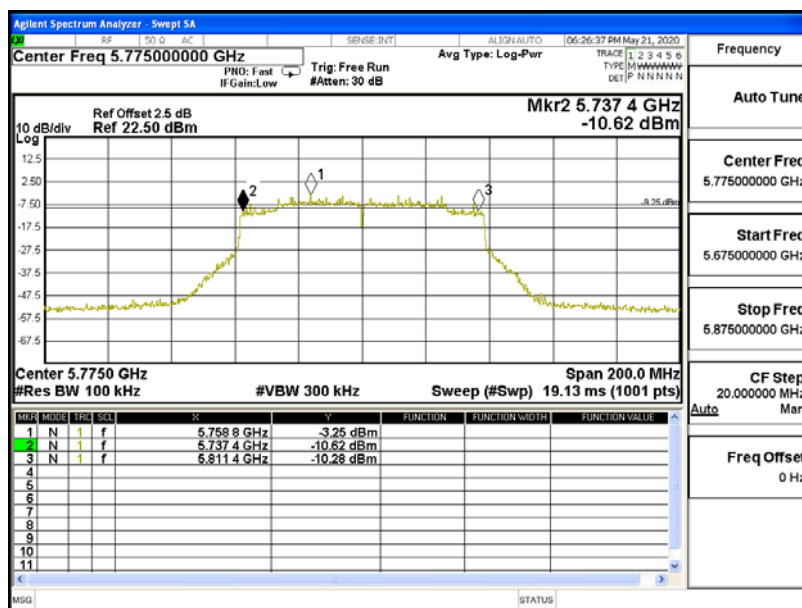
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
155	5775.00	75400	>500	Pass

Figure Channel 155: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
155	5775.00	74000	>500	Pass

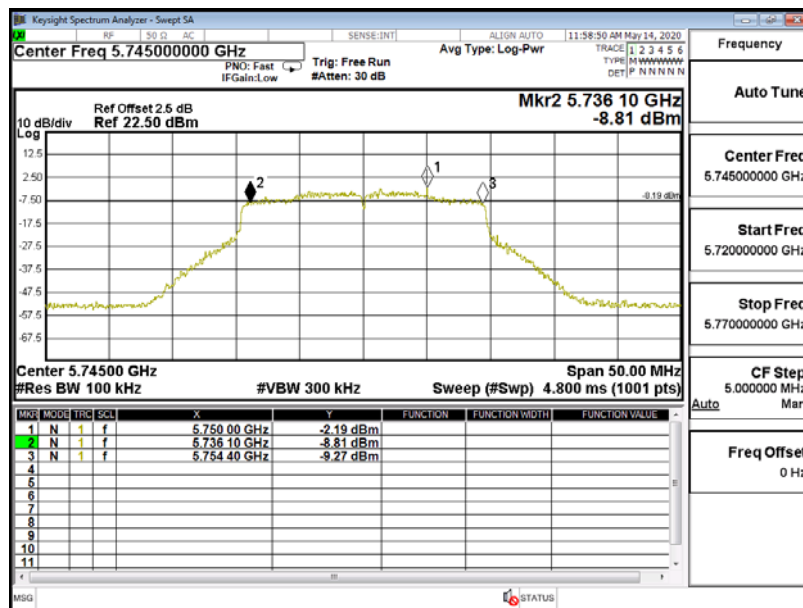
Figure Channel 155: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 23: MIMO: Transmit (802.11ax-20BW_17.2Mbps) (5745MHz)

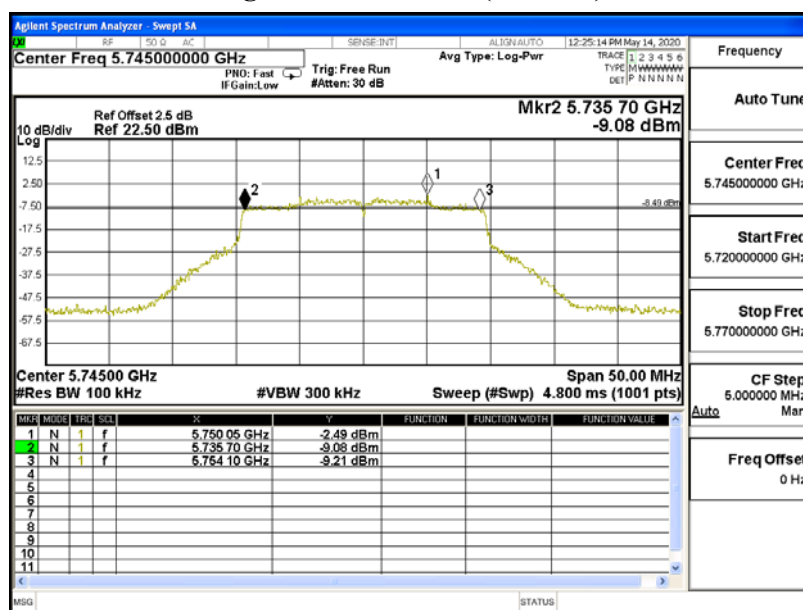
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	18300	>500	Pass

Figure Channel 149: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	18400	>500	Pass

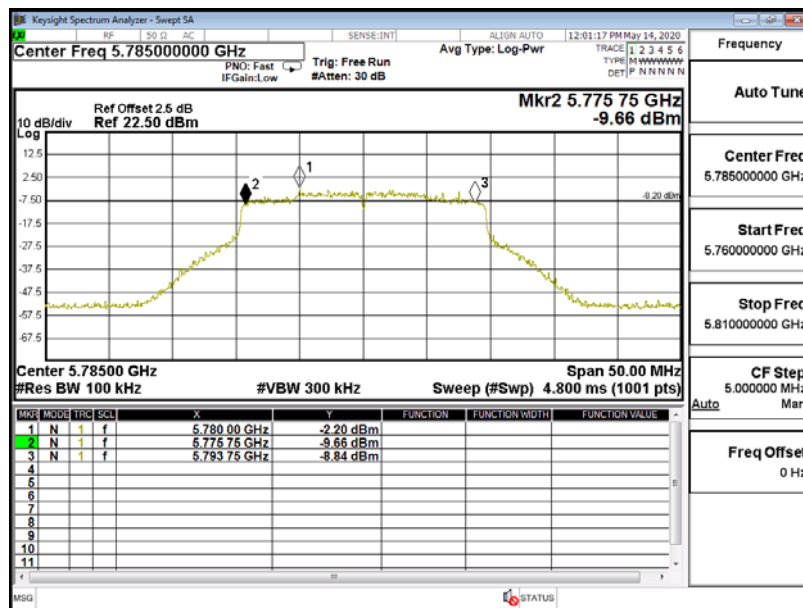
Figure Channel 149: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 23: MIMO: Transmit (802.11ax-20BW_17.2Mbps) (5785MHz)

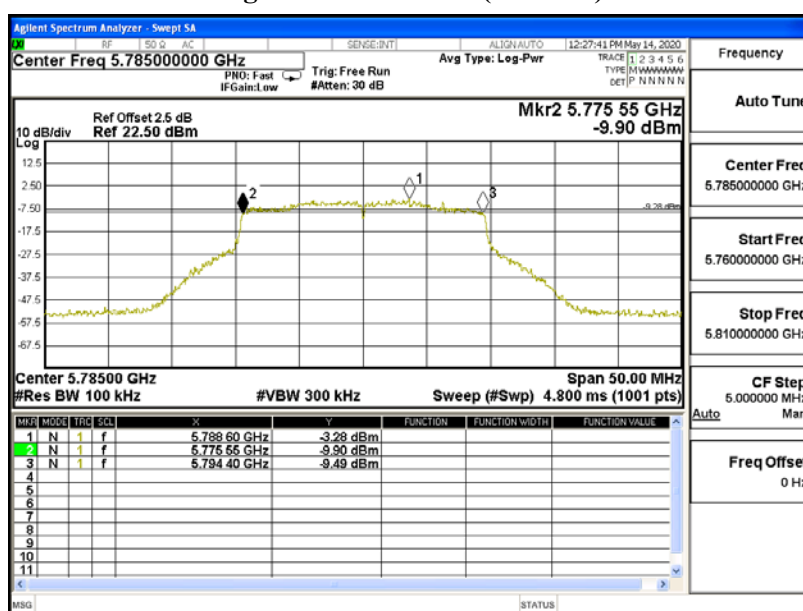
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	18000	>500	Pass

Figure Channel 157: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	18850	>500	Pass

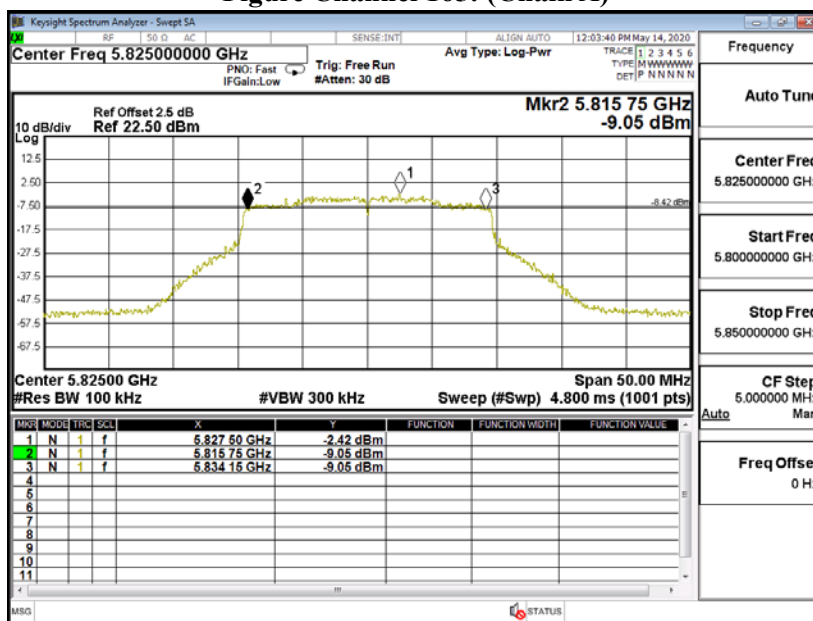
Figure Channel 157: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 23: MIMO: Transmit (802.11ax-20BW_17.2Mbps) (5825MHz)

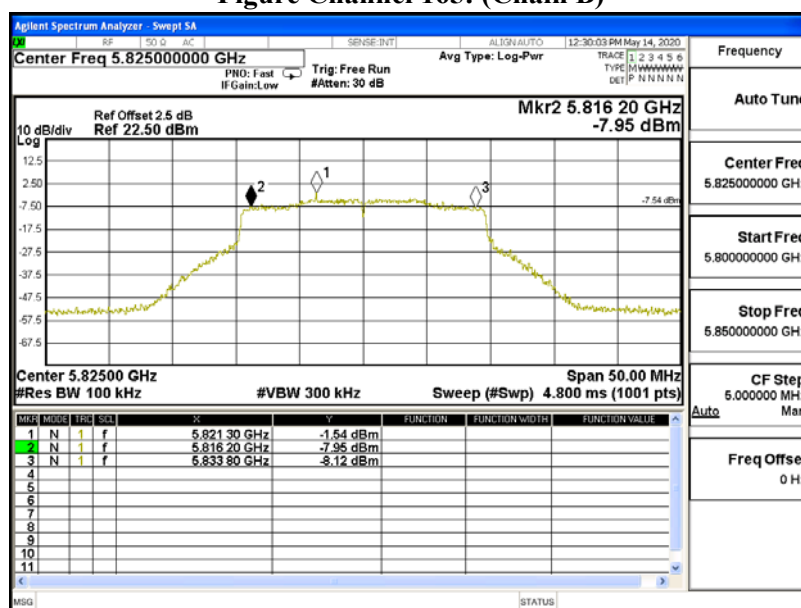
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	18400	>500	Pass

Figure Channel 165: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	17600	>500	Pass

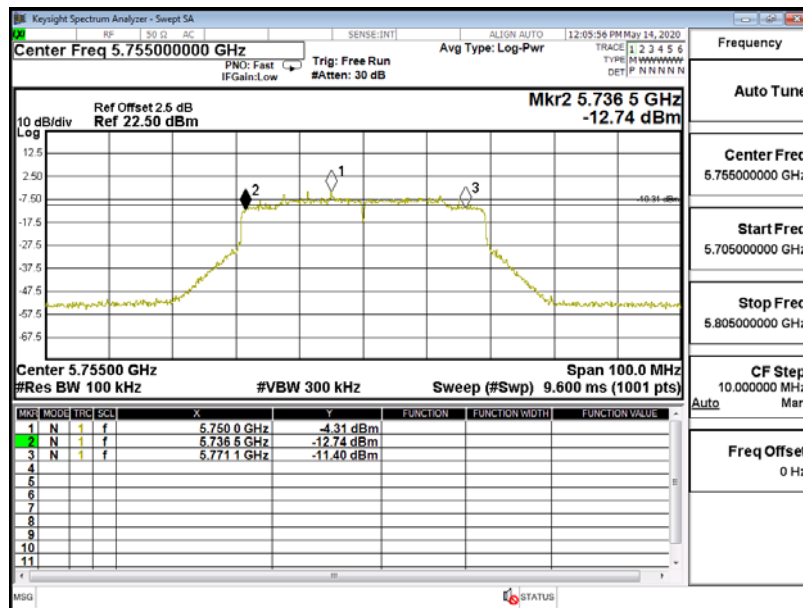
Figure Channel 165: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 24: MIMO: Transmit (802.11ax-40BW_34.4Mbps) (5755MHz)

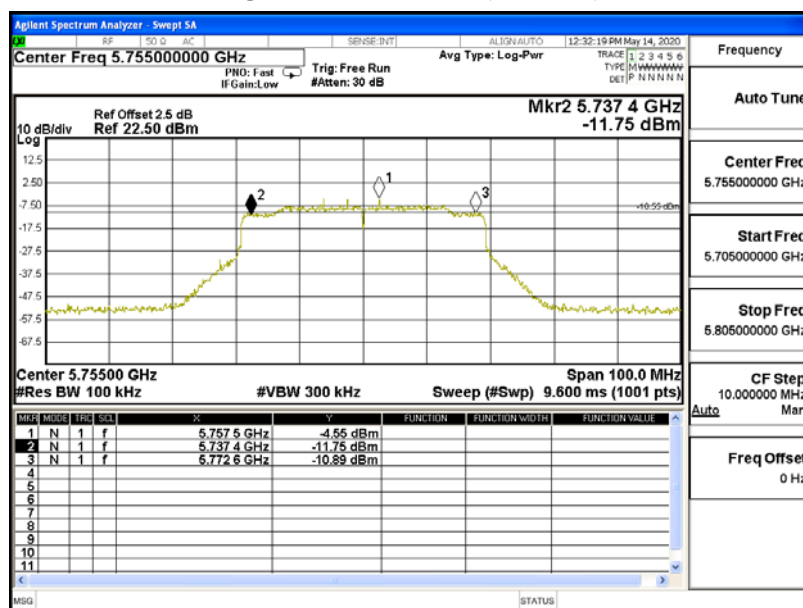
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755.00	34600	>500	Pass

Figure Channel 151: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755.00	35200	>500	Pass

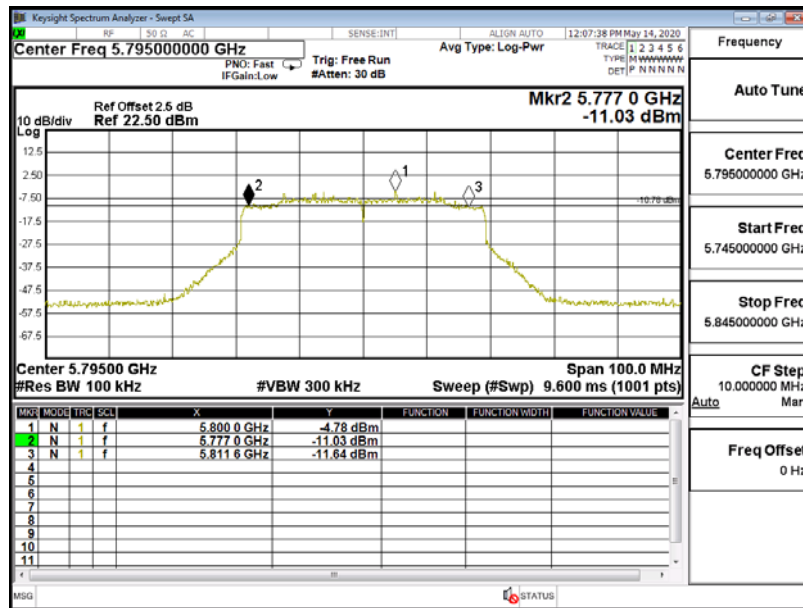
Figure Channel 151: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 24: MIMO: Transmit (802.11ax-40BW_34.4Mbps) (5795MHz)

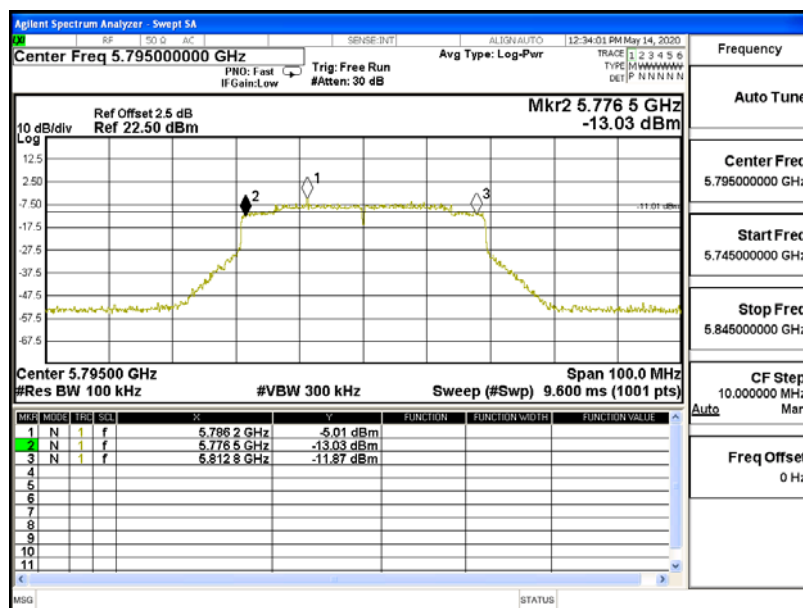
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
159	5795.00	34600	>500	Pass

Figure Channel 159: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
159	5795.00	36300	>500	Pass

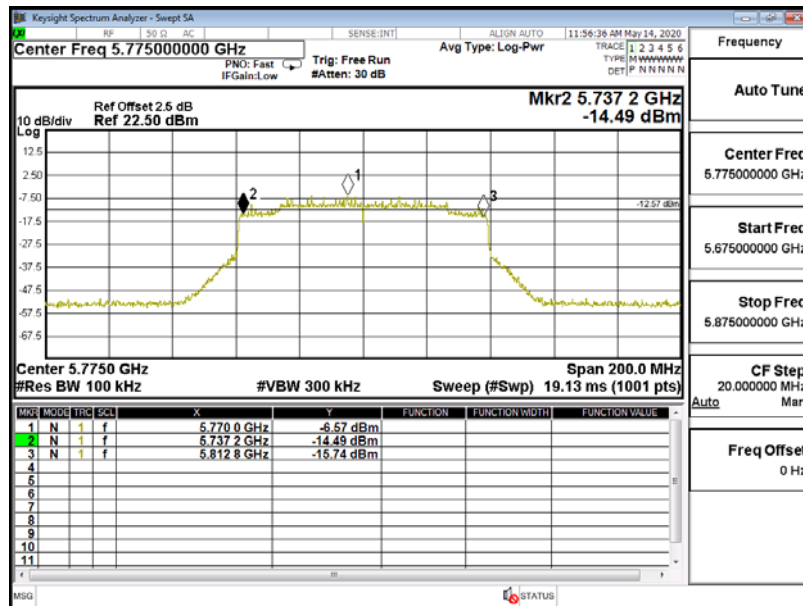
Figure Channel 159: (Chain B)



Product : Portable computer
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 25: MIMO: Transmit (802.11ax-80BW_72.1Mbps) (5775MHz)

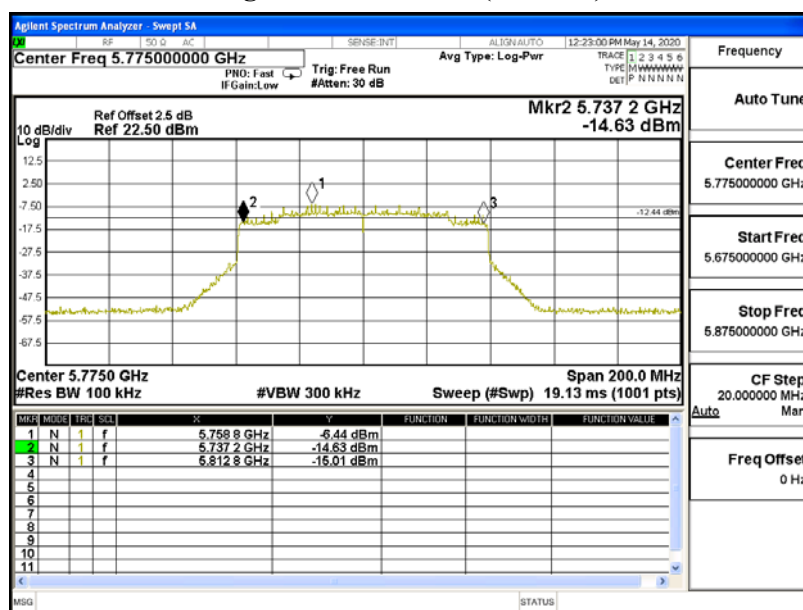
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
155	5775.00	75600	>500	Pass

Figure Channel 155: (Chain A)



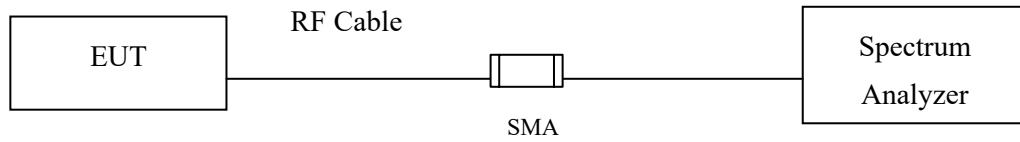
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
155	5775.00	75600	>500	Pass

Figure Channel 155: (Chain B)



8. Duty Cycle

8.1. Test Setup



8.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to test procedure of KDB789033 for compliance to FCC 47CFR 15.407 requirements.

8.3. Uncertainty

$\pm 2.31\text{msec}$

8.4. Test Result of Duty Cycle

Product : Portable computer
 Test Item : Duty Cycle
 Test Mode : Transmit

Duty Cycle Formula:

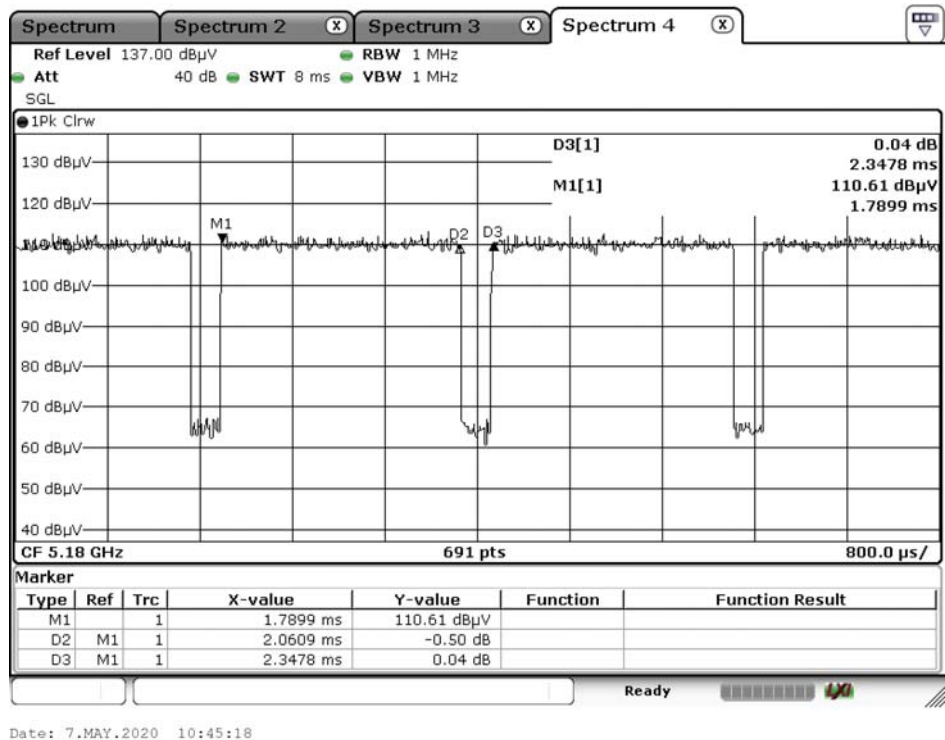
Duty Cycle = $T_{on} / (T_{on} + T_{off})$

Duty Factor = 10 Log (1/Duty Cycle)

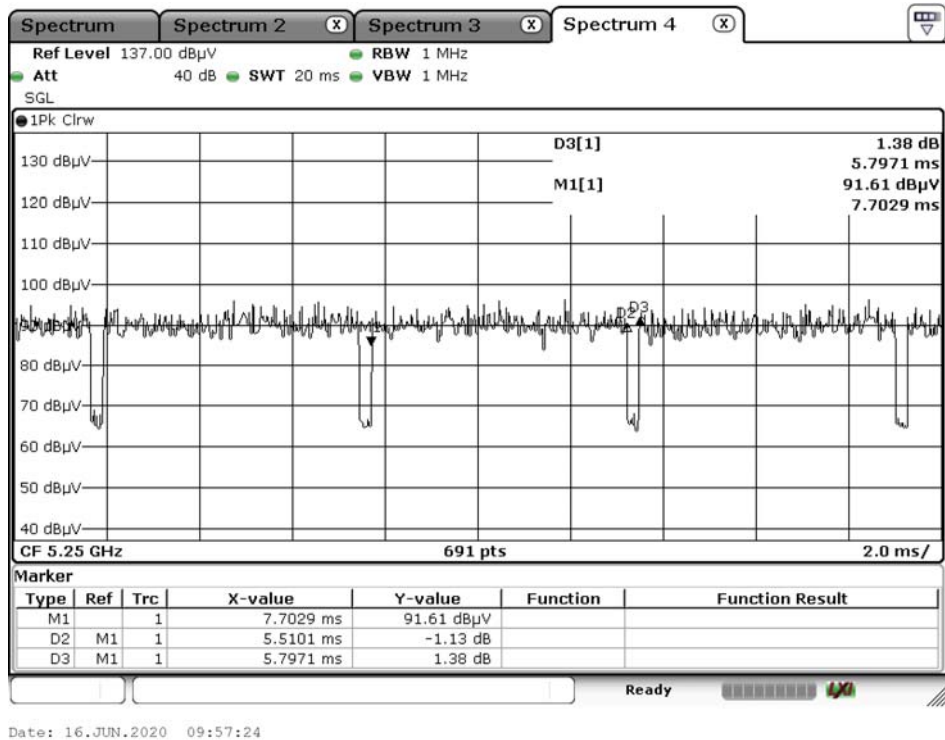
Results:

5GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11 a-SISOA	2.0609	2.3478	87.78	0.57
802.11 ac160-SISOA	5.5101	5.7971	95.05	0.22
802.11 ax160-SISOA	4.4957	4.7594	94.46	0.25
802.11 n20-MIMO	18.5507	18.8406	98.46	0.07
802.11 n40-MIMO	8.8899	9.2377	96.23	0.17
802.11 ac80-MIMO	5.4348	5.7681	94.22	0.26
802.11 ac160-MIMO	2.7594	3.0348	90.93	0.41
802.11 ax20-MIMO	18.7058	18.9928	98.49	0.07
802.11 ax40-MIMO	9.3333	9.6522	96.70	0.15
802.11 ax80-MIMO	4.4638	4.7826	93.33	0.30
802.11 ax160-MIMO	2.2522	2.5420	88.60	0.53

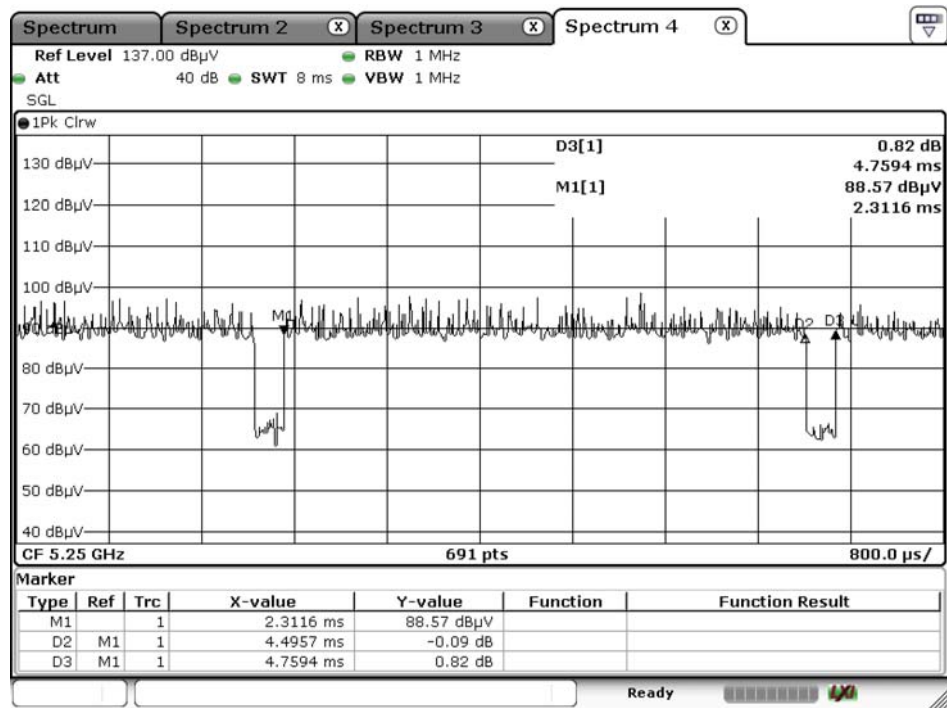
802.11a-SISOA



802.11ac160-SISOA

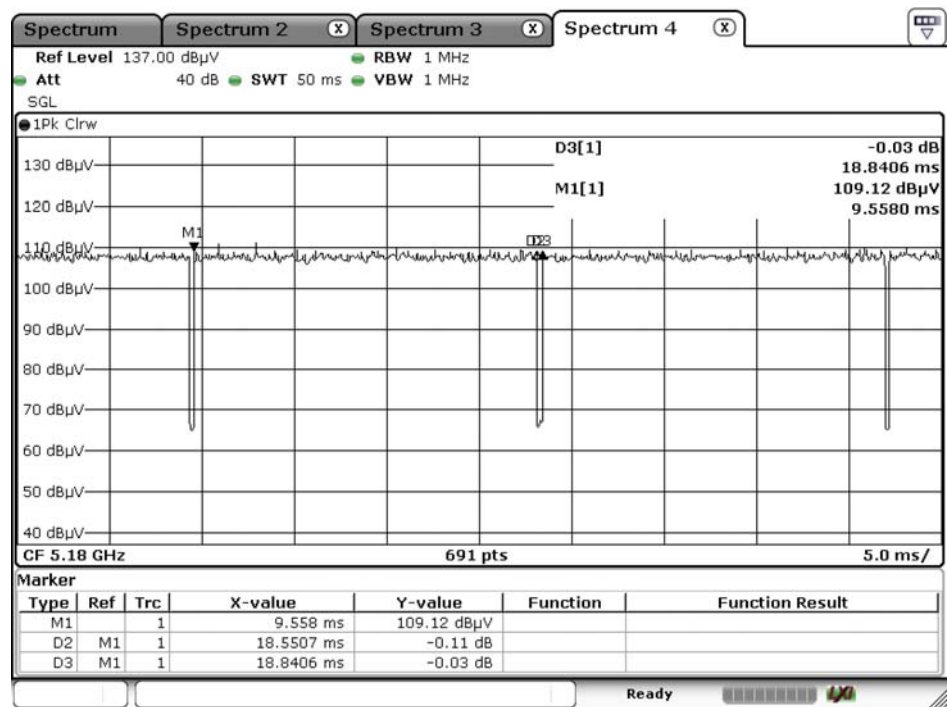


802.11ax160-SISOA



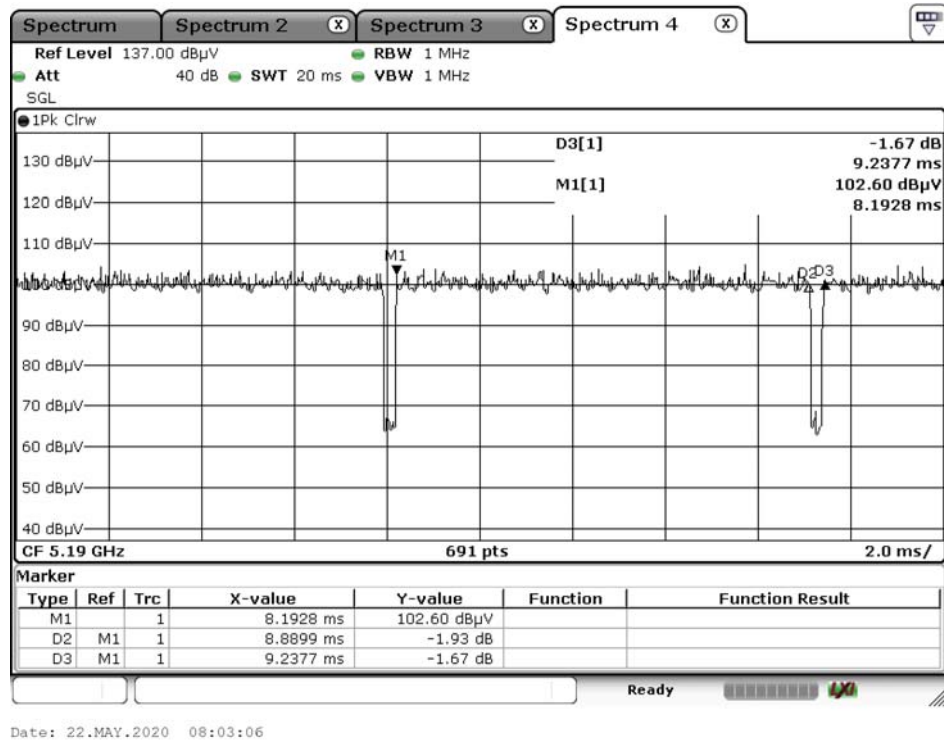
Date: 16.JUN.2020 10:08:17

802.11n20-MIMO

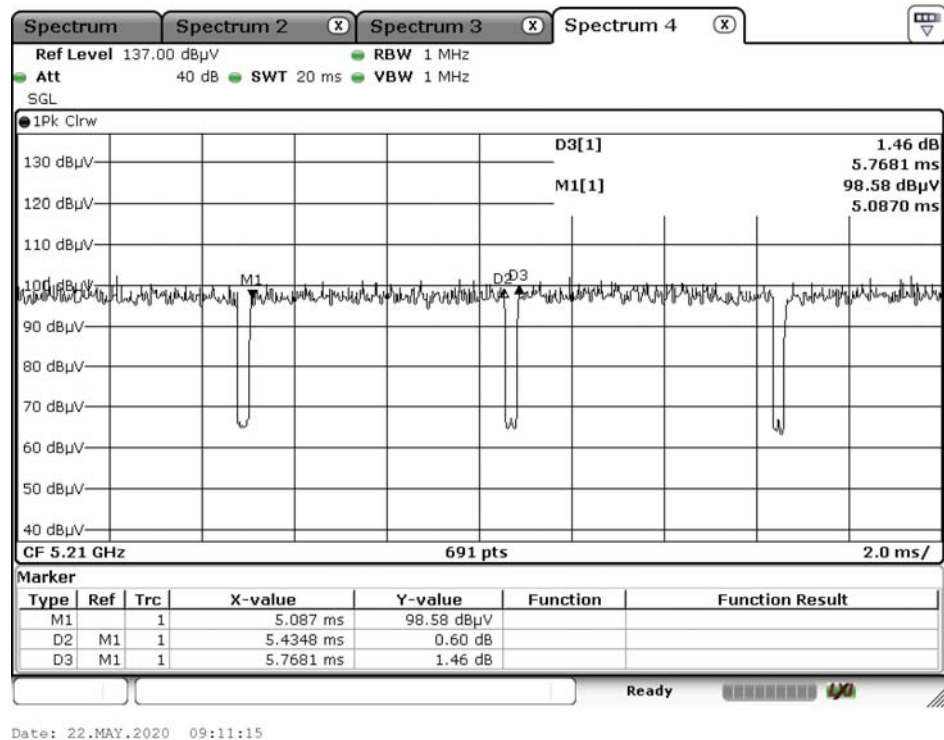


Date: 22.MAY.2020 07:22:31

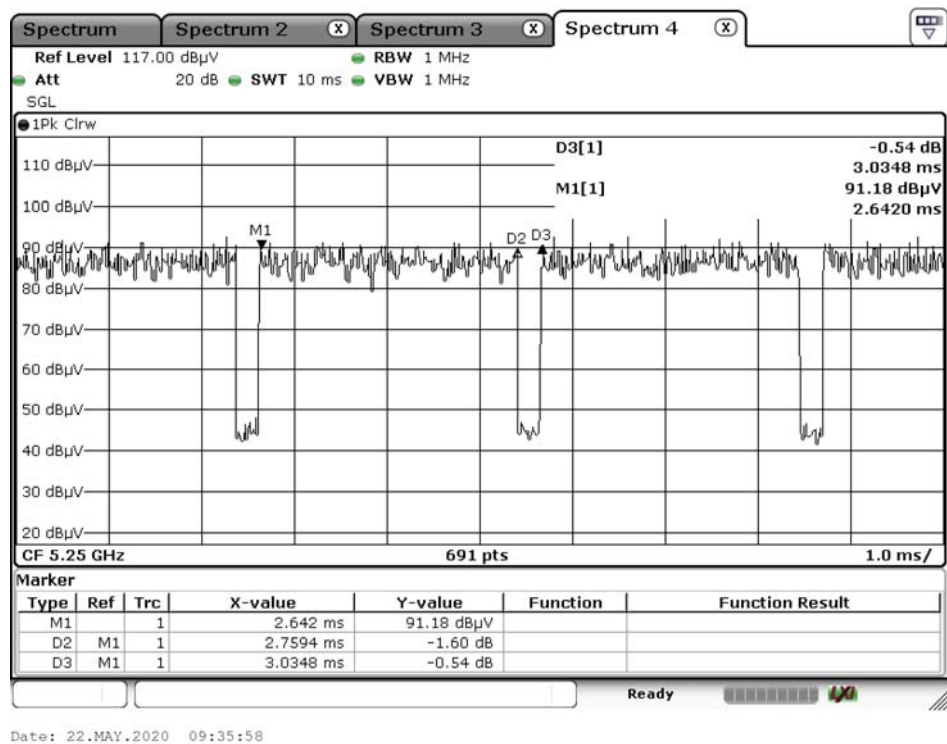
802.11n40-MIMO



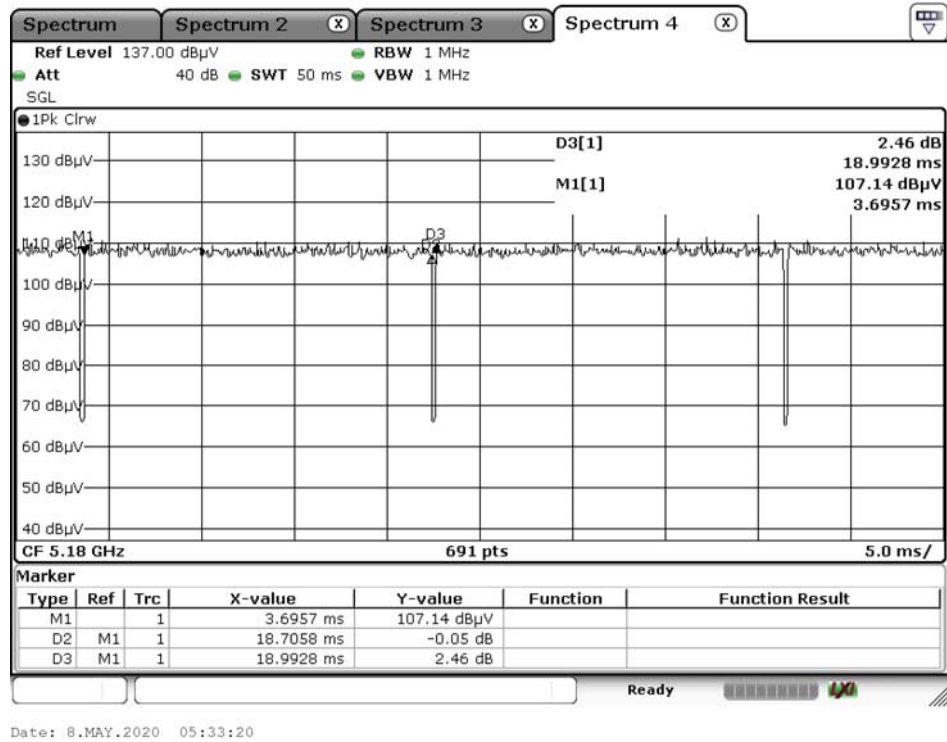
802.11ac80-MIMO



802.11ac160-MIMO



802.11ax20-MIMO



Spectrum **Spectrum 2** **Spectrum 3** **Spectrum 4**

Ref Level 137.00 dBμV RBW 1 MHz
 Att 40 dB SWT 20 ms VBW 1 MHz
 SGL

● 1Pk Clr

130 dBμV 120 dBμV 110 dBμV 100 dBμV 90 dBμV 80 dBμV 70 dBμV 60 dBμV 50 dBμV 40 dBμV

D3[1] 2.20 dB
 M1[1] 102.82 dBμV
 D2 5.7391 ms

CF 5.19 GHz 691 pts 2.0 ms/

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.7391 ms	102.82 dBμV		
D2	M1	1	9.3333 ms	1.93 dB		
D3	M1	1	9.6522 ms	2.20 dB		

Ready

Date: 8.MAY.2020 11:28:10

Spectrum **Spectrum 2** **Spectrum 3** **Spectrum 4**

Ref Level 117.00 dBμV RBW 1 MHz
 Att 20 dB SWT 10 ms VBW 1 MHz
 SGL

● 1Pk Clr

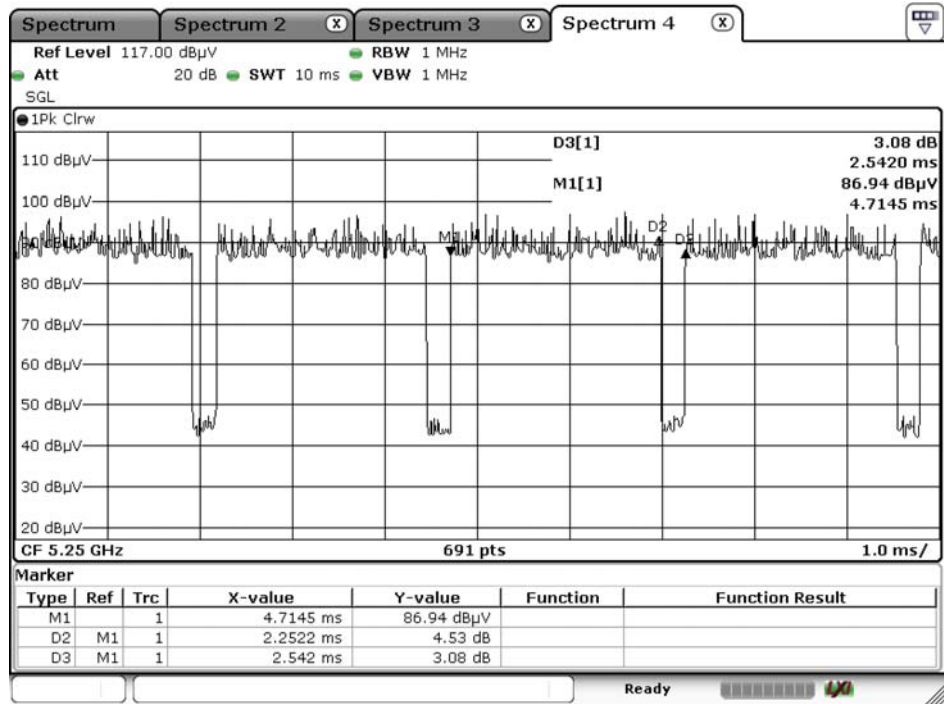
110 dBμV
 90 dBμV
 80 dBμV
 70 dBμV
 60 dBμV
 50 dBμV
 40 dBμV
 30 dBμV
 20 dBμV

CF 5.21 GHz 691 pts 1.0 ms/

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	3.4058 ms	99.72 dBμV		
D2	M1	1	4.4638 ms	-0.29 dB		
D3	M1	1	4.7826 ms	0.37 dB		

802.11ax160-MIMO



Date: 8.MAY.2020 10:39:54

9. EMI Reduction Method During Compliance Testing

No modification was made during testing.