

Test Report

Product	DECT Handset with WiFi and Android
Name and address of the applicant	Ascom Sweden AB Grimbodalen 2 SE-41749 Gothenburg, Sweden
Name and address of the manufacturer	Ascom Sweden AB Grimbodalen 2 SE-41749 Gothenburg, Sweden
Model	SH2-ADAA
Rating	3.8 V _{DC} (Li-Ion Battery, 2935mAh)
Trademark	ASCOM
Serial number	See clause 1.1
Additional information	DECT 6.0, WiFi, Bluetooth
Tested according to	Parts of FCC Part 15.407 Unlicensed National Information Infrastructure Devices (U-NII) Parts of Industry Canada RSS-247, Issue 2 Licence-Exempt Local Area Network (LE-LAN) Devices
Order number	380626
Tested in period	2020-06-08 to 2020-06-11 and 2020-06-24 to 2020-07-28
Issue date	2020-07-29
Name and address of the testing laboratory	 Instituttveien 6 Kjeller, Norway www.nemko.com CAB Number FCC: NO0001 ISED: NO0470 TEL: +47 22 96 03 30 FAX: +47 22 96 05 50   An accredited technical test executed under the Norwegian accreditation scheme
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1 INFORMATION

1.1 Test Item

Name	Ascom
Model/version	SH2-ADAA
FCC ID	BXZSH2D
ISED ID	3724B-SH2D
Serial number	Radiated Sample: SK00010041 Conducted Sample: SK00025441
Hardware identity and/or version	SH2 P2A
Software identity and/or version	SH2_ADAA/2.0.0_alpha6
Frequency Ranges	U-NII 1 : 5180 – 5240 MHz: 4 channels U-NII 2A : 5260 – 5320 MHz: 4 channels U-NII 2C : 5500 – 5720 MHz: 12 channels U-NII 3 : 5745 – 5825 MHz: 5 channels
Operating Modes	802.11a 802.11n (20/40/80 MHz BW)
Type of Modulation	Digital (OFDM - Orthogonal frequency-division multiplexing)
Conducted Output Power	5180 – 5240 MHz: 25.7 mW 5260 – 5320 MHz: 26.9 mW 5500 – 5720 MHz: 16.6 mW 5745 – 5825 MHz: 16.6 mW 5190 – 5230 MHz: 24.0 mW 5270 – 5310 MHz: 26.3 mW 5510 – 5710 MHz: 15.8 mW 5755 – 5795 MHz: 17.4 mW 5210 – 5210 MHz: 23.4 mW 5290 – 5290 MHz: 25.1 mW 5530 – 5690 MHz: 17.0 mW 5765 – 5765 MHz: 15.5 mW
Antenna Connector	None
Number of Antennas	1
Antenna Diversity Supported	No
Smart Antennas Supported	No
TPC Supported	Not implemented, not required when EIRP is below 500 mW
DFS Supported	Not supported, Client Device without Radar Detection
Power Supply	Secondary Battery (3.8V Li-Ion, 2935 mAh)
Desktop Charger	DC5 with AC adaptor Model No. UBX310-0520

Description of Test Item

The tested device is a DECT Handset with 2.4GHz and 5GHz WiFi, and Bluetooth Basic Rate.

1.3 Normal test conditions

Temperature: 20 - 24 °C
Relative humidity: 20 - 50 %
Normal test voltage: 3.8 V_{DC} (Nominal Voltage)

The values are the limit registered during the test period.

All tests were performed with a fully charged battery.

1.4 Test Engineer(s)

Frode Sveinsen

1.5 Antenna Requirement

Is the antenna detachable?

☐ Yes ☒ No

If detachable, is the antenna connector non-standard?

☐ Yes ☐ No

Type of antenna connector: N/A, Integral Antenna

1.6 Worst-Case Configuration

Radiated Emissions and Power Line Conducted Emissions were performed with the EUT set to transmit at the channel with the highest output power as worst-case scenario.

The worst case data rates (duty cycle was 100% for all data rates):

802.11a mode: 6 Mbps
802.11n HT20/HT40 mode: MCS0
802.11ac HT80 mode : MCS0

1.7 EUT Operating Modes

Description of operating modes	Continuous TX, 5GHz, 802.11a 6Mb, 802.11n HT20/HT40 MCS0, 802.11ac HT80 MCS0
Additional information	A computer was connected by USB to the EUT. The selected channel, modulation, bitrate, bandwidth and output power was programmed from the WiFi Tool application.

1.8 Comments

All tested parameters are passed.

1.9 EUT Target Power

Channel	Freq (MHz)	802.11a	802.11n HT20	802.11n HT40	802.11ac HT80
36	5180	15.5	15.5		
40	5200	15.5	15.5		
44	5220	15.5	15.5		
48	5240	15.5	15.5		
52	5260	15.5	15.5		
56	5280	15.5	15.5		
60	5300	15.5	15.5		
64	5320	15.5	15.5		
100	5500	13.5	13.5		
104	5520	13.5	13.5		
108	5540	13.5	13.5		
112	5560	13.5	13.5		
116	5580	13.5	13.5		
120	5600	D	D		
124	5620	D	D		
128	5640	D	D		
132	5660	13.5	13.5		
136	5680	13.5	13.5		
140	5700	13.5	13.5		
144	5720	13.5	13.5		
149	5745	13.5	13.5		
153	5765	13.5	13.5		
157	5785	13.5	13.5		
161	5805	13.5	13.5		
165	5825	13.5	13.5		
38	5190			15.5	
46	5230			15.5	
54	5270			15.5	
62	5310			14.5	
102	5510			13.5	
110	5550			13.5	
118	5590			D	
126	5630			D	
134	5670			13.5	
142	5710			13.5	
151	5755			13.5	
159	5795			13.5	
42	5210				14.5
58	5290				14.5
106	5530				13.5
122	5610				D
138	5690				13.5
155	5775				13.5

D = Disabled/ Not Used

The WiFi part of the EUT is identical to the WiFi part of the already certified handset SH2-ABAA (FCC ID: BXZSH2, IC: 3724B-SH2), but the cellular radio is replaced by DECT.

The above target Power values above were used for all EMC tests on this model.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

The tests were conducted for demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.407 and ISSED RSS-247 Issue 2.

Tests were performed in accordance with ANSI C63.4-2014 and ANSI C63.10-2013.

Radiated tests were performed in a semi-anechoic chamber at measuring distance 3m.

☒ New Submission

☒ Production Unit

☐ Class II Permissive Change

☐ Pre-production Unit

NII Equipment Code

☐ Family Listing



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-247 Issue 2 RSS-GEN Issue 5 reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	Complies
Antenna Requirement	15.203	6.8 (RSS-GEN)	Complies
Power Line Conducted Emission	15.107(a) 15.207(a)	7.2 / 8.8 (RSS-GEN)	Complies
Maximum Output Power	15.407(a)	6.2	Complies
Power Spectral Density	15.407(a)	6.2	Complies
Emission Bandwidth	15.407(a)(2)	6.2	Complies
Unwanted Emissions	15.407(b)	6.2	Complies
Discontinuation of Transmission	15.407(c)	6.3	N/T ¹
6 dB Bandwidth	15.407(e)	6.2.4	Complies
Transmit Power Control	15.407(h)	6.2.3	N/A ²
Dynamic Frequency Selection	15.407(h)	6.3	Complies ³
Radiated Emissions	15.205 15.209	7.3 (RSS-GEN) 8.9 (RSS-GEN)	Complies

¹ See manufacturers declaration

² Transmit Power Control is not required when Max EIRP is below 500 mW

³ The EUT is a Client Device without Radar Detection.

Revision history

Revision	Date	Comment	Sign
00	2020-06-18	First edition	FS
01	2020-06-30	Added results for HT40/HT80	FS
02	2020-07-29	Updated Output Power results	FS

3 TEST RESULTS

3.1 Maximum Output Power (RMS)

FCC 15.407 (a)

ISED RSS-247, Issue 2, Clause 6.2

Measurement procedure: ANSI C63.10-2013 Clause 12.3, method SA-1

Test Results: Complies

Measurement Data:

Ch. No.	Nominal Frequency (MHz)	Maximum Conducted Output Power (dBm)			
		802.11a 6Mb	802.11n HT20	802.11n HT40	802.11ac HT80
36	5180	13.8	13.6		
48	5240	14.1	14.0		
52	5260	14.3	14.3		
64	5320	14.3	14.0		
100	5500	11.9	12.0		
112	5560	12.1	11.9		
140	5700	12.2	12.0		
144	5720	11.7	11.5		
149	5745	12.2	12.0		
165	5825	11.9	12.0		
38	5190			13.4	
46	5230			13.8	
54	5270			14.2	
62	5310			14.0	
102	5510			12.0	
110	5550			12.1	
134	5670			11.8	
142	5710			11.9	
151	5755			12.4	
159	5795			12.1	
42	5210				13.7
58	5290				14.0
106	5530				12.3
138	5690				12.0
155	5775				11.9

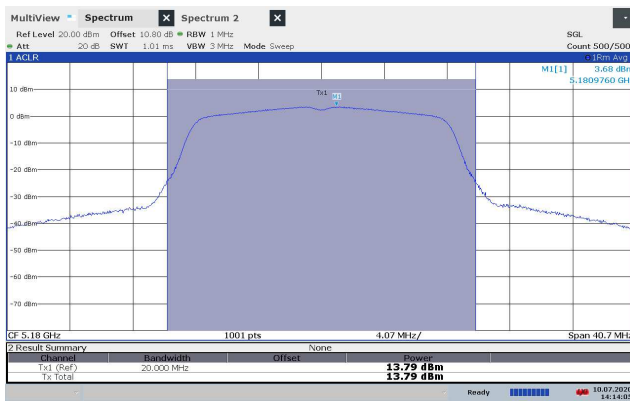
The EUT operates continuously; therefore, method SA-1 of ANSI C63.10-2013 clause 12.3 was used.

EIRP values were calculated from Field Strength values using the method described in KDB 412172 D01.

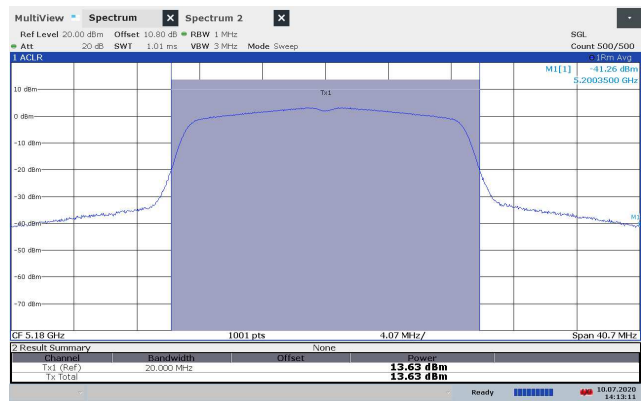
This is an indoor device with directional Antenna Gain less than 6 dBi.

Limits for Indoor Device:

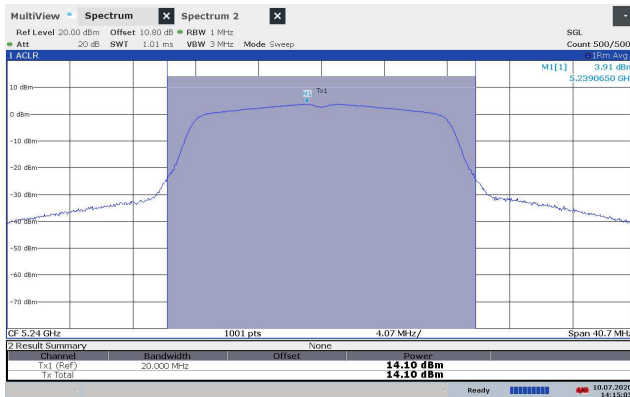
Frequency Band	FCC 15.407(a)	ISED RSS-247 Issue 2
5150 – 5250 MHz	Less than 250 mW (24 dBm) for client device Less than 1 W (30 dBm) for master device	Less than the lesser of 200 mW e.i.r.p. or $10 + 10 \log_{10} B$ dBm e.i.r.p.
5250 – 5350 MHz	Less than the lesser of 250 mW (24 dBm) or $11 + 10 \log_{10} B$ dBm	Less than the lesser of 250 mW or $11 + 10 \log_{10} B$ dBm, and Less than the lesser of 1 W e.i.r.p. or $17 + 10 \log_{10} B$ dBm e.i.r.p. Devices with e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W
5470 – 5725 MHz		
5725 – 5825 MHz	Less than 1 Watt	Less than 1 Watt If Antenna Gain is more than 6 dBi the Power Limit is reduced by the amount exceeding 6 dBi
	If Antenna Gain is more than 6 dBi the Power Limit is reduced by the amount exceeding 6 dBi	
	B is the 26dB emission bandwidth in MHz	B is the 99% emission bandwidth in MHz



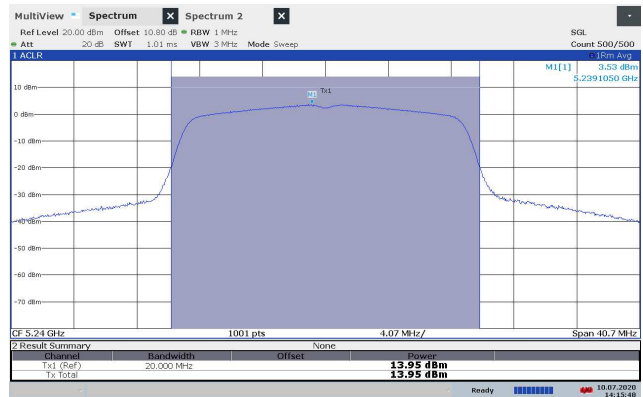
RMS Conducted Power, 5180 MHz, 802.11a, 6Mb



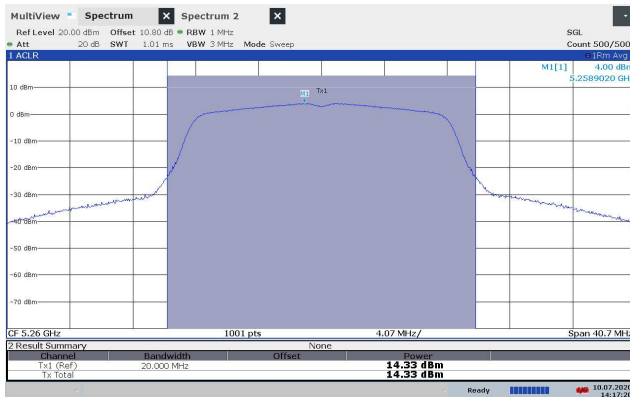
RMS Conducted Power, 5180 MHz, 802.11n, HT20



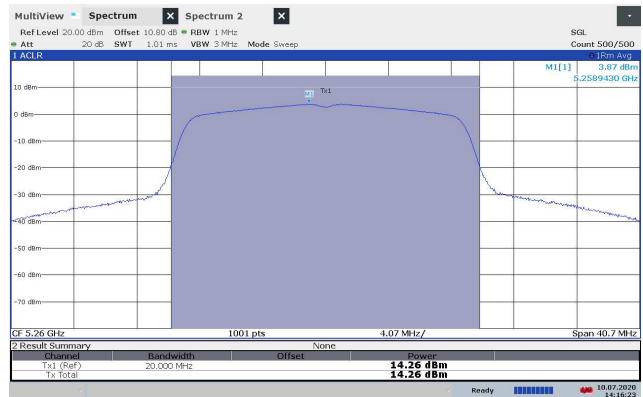
RMS Conducted Power, 5240 MHz, 802.11a, 6Mb



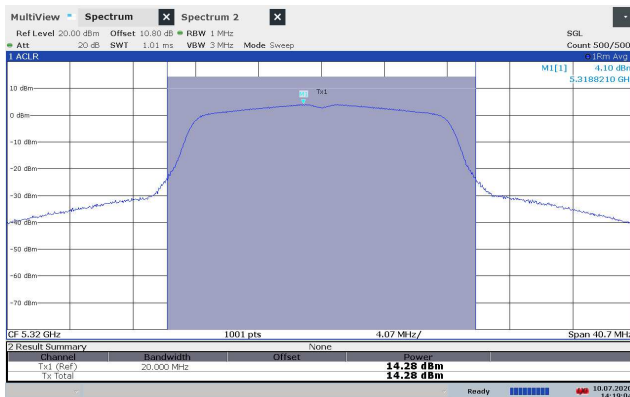
RMS Conducted Power, 5240 MHz, 802.11n, HT20



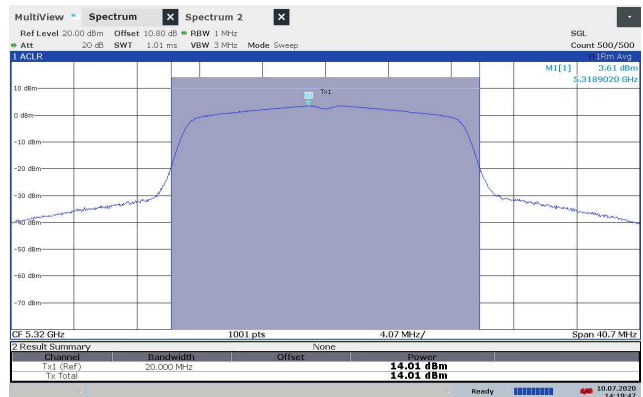
RMS Conducted Power, 5260 MHz, 802.11a, 6Mb



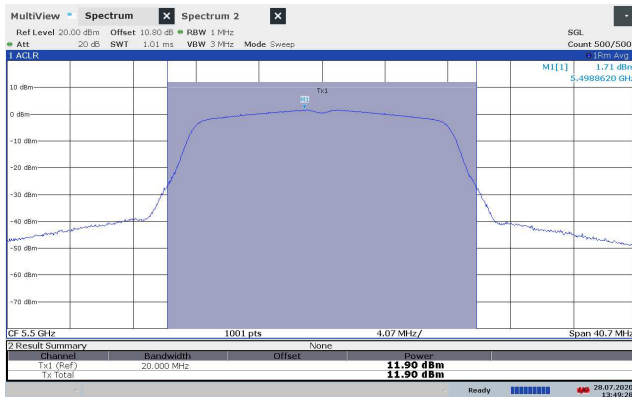
RMS Conducted Power, 5260 MHz, 802.11n, HT20



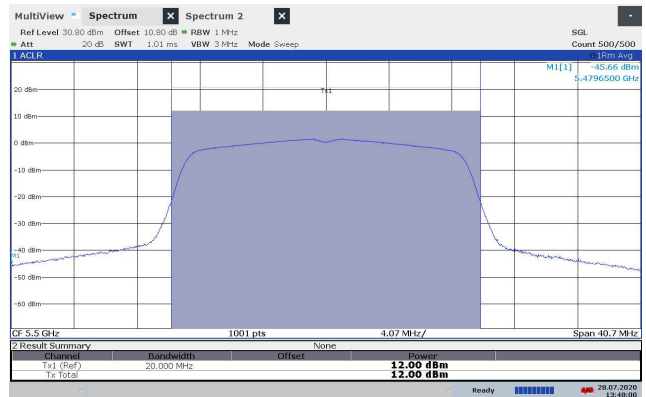
RMS Conducted Power, 5320 MHz, 802.11a, 6Mb



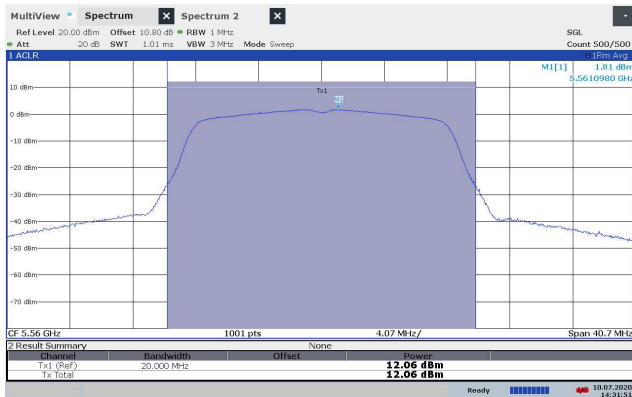
RMS Conducted Power, 5320 MHz, 802.11n, HT20



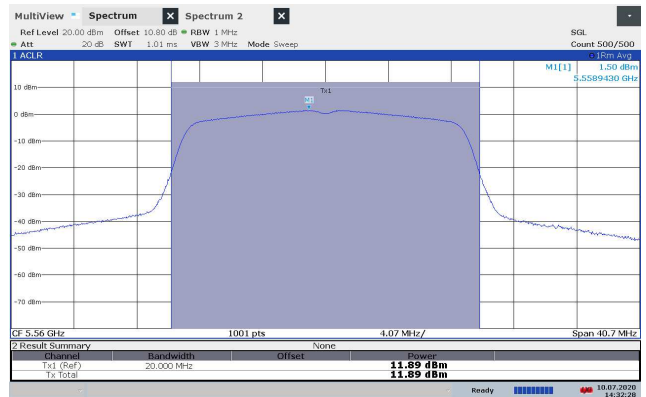
RMS Conducted Power, 5500 MHz, 802.11a, 6Mb



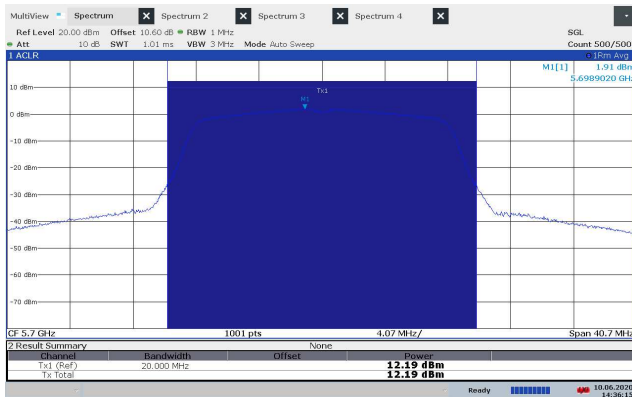
RMS Conducted Power, 5500 MHz, 802.11n, HT20



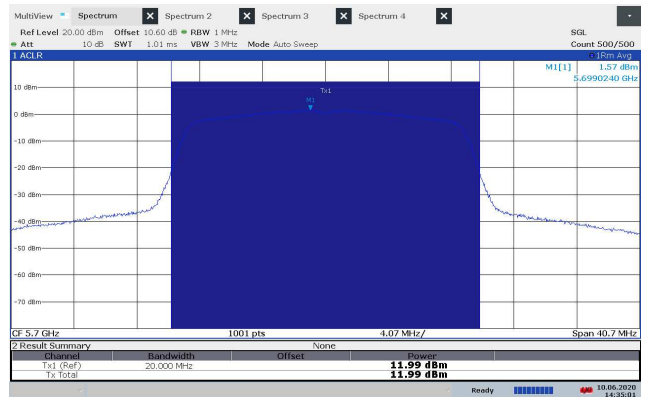
RMS Conducted Power, 5560 MHz, 802.11a, 6Mb



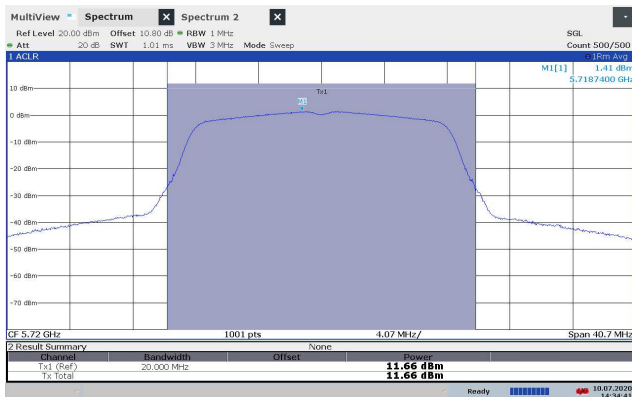
RMS Conducted Power, 5560 MHz, 802.11n, HT20



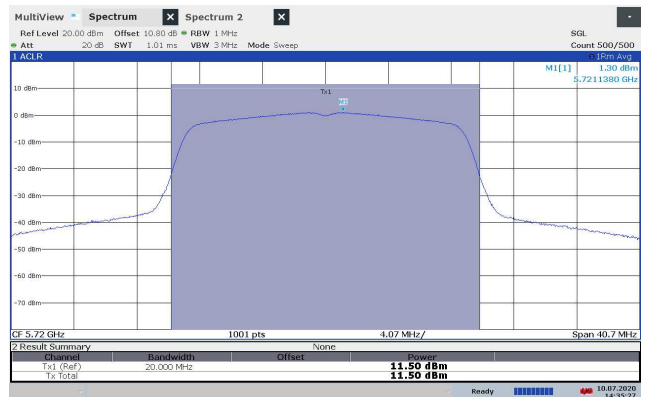
RMS Conducted Power, 5700 MHz, 802.11a, 6Mb



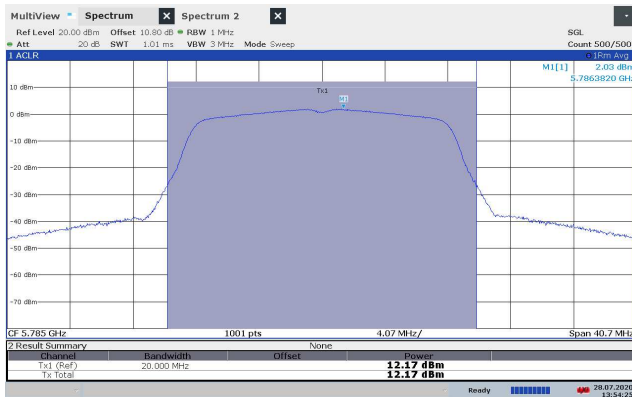
RMS Conducted Power, 5700 MHz, 802.11n, HT20



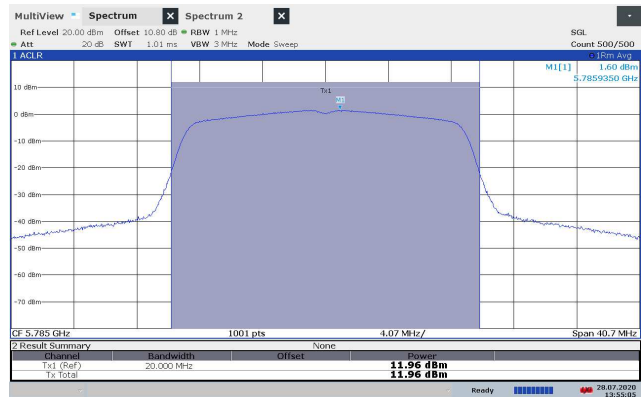
RMS Conducted Power, 5720 MHz, 802.11a, 6Mb



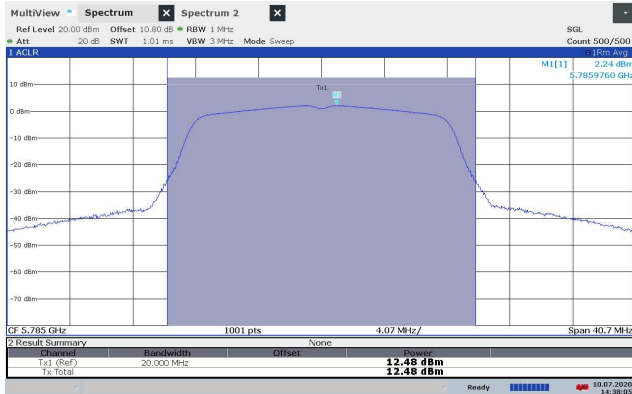
RMS Conducted Power, 5720 MHz, 802.11n, HT20



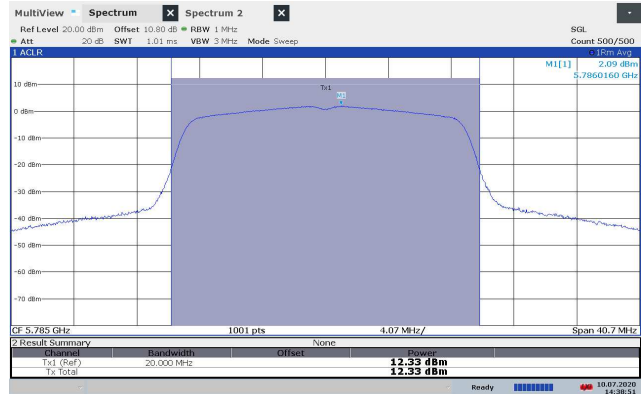
RMS Conducted Power, 5745 MHz, 802.11a, 6Mb



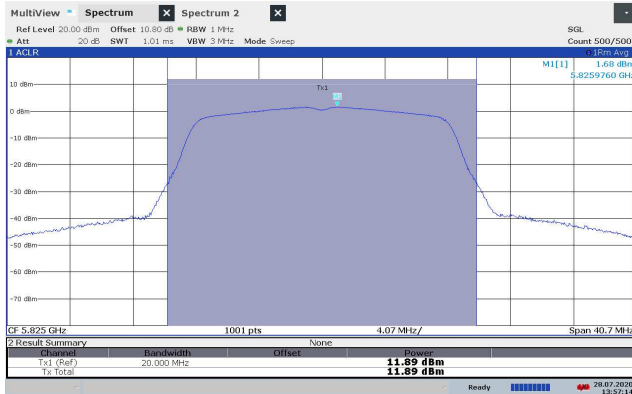
RMS Conducted Power, 5745 MHz, 802.11n, HT20



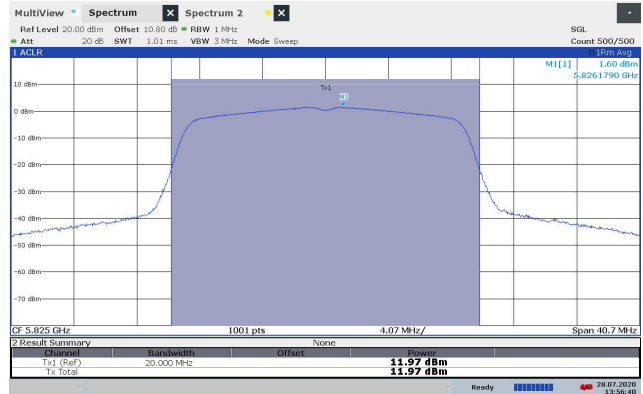
RMS Conducted Power, 5785 MHz, 802.11a, 6Mb



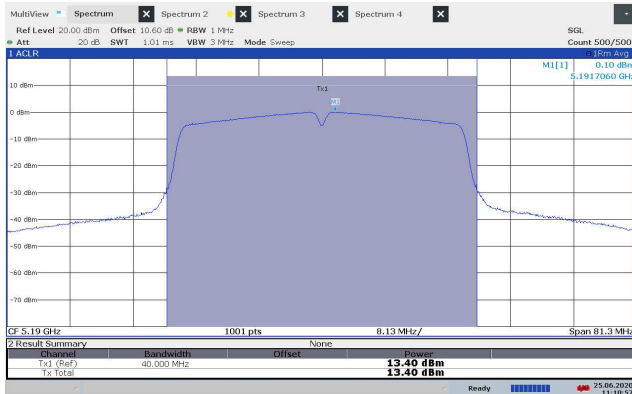
RMS Conducted Power, 5785 MHz, 802.11n, HT20



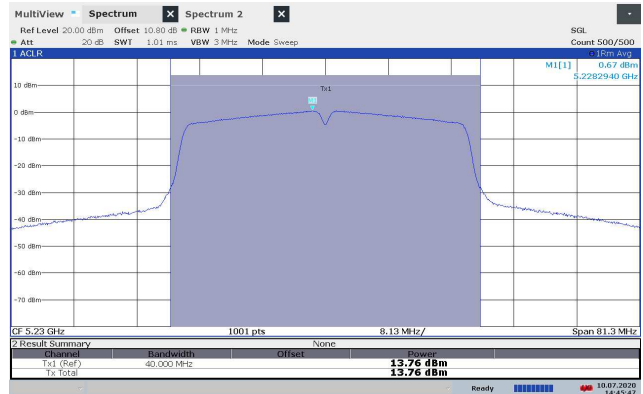
RMS Conducted Power, 5825 MHz, 802.11a, 6Mb



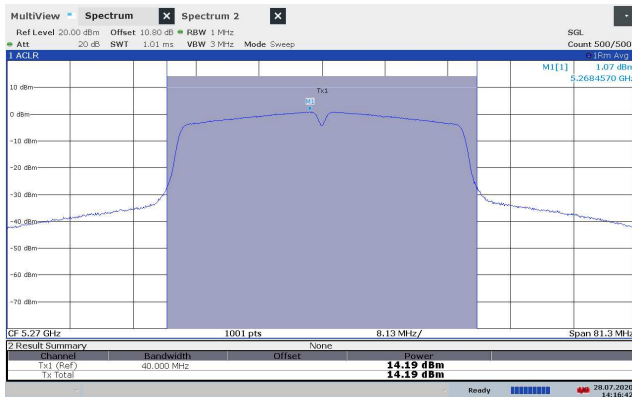
RMS Conducted Power, 5825 MHz, 802.11n, HT20



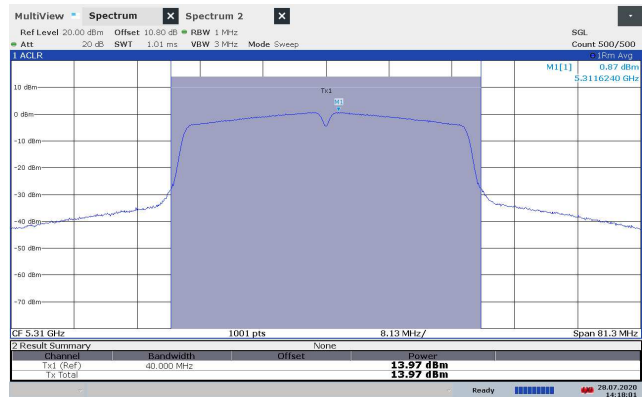
RMS Conducted Power, 5190 MHz, 802.11n, HT40



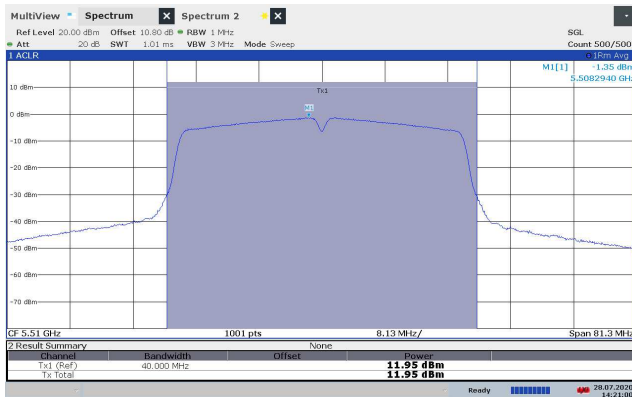
RMS Conducted Power, 5230 MHz, 802.11n, HT40



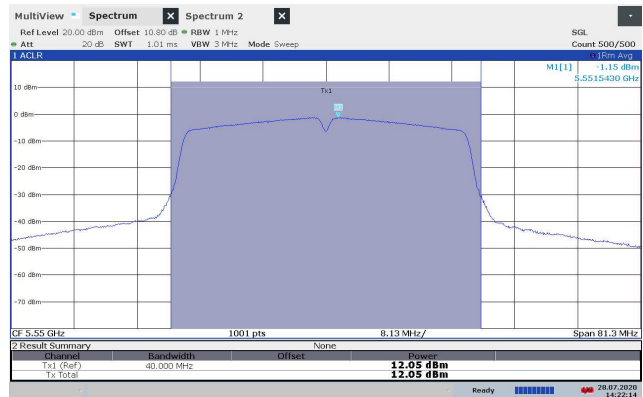
RMS Conducted Power, 5270 MHz, 802.11n, HT40



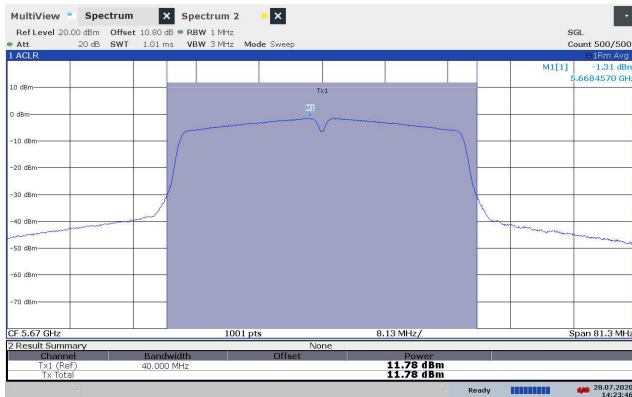
RMS Conducted Power, 5310 MHz, 802.11n, HT40



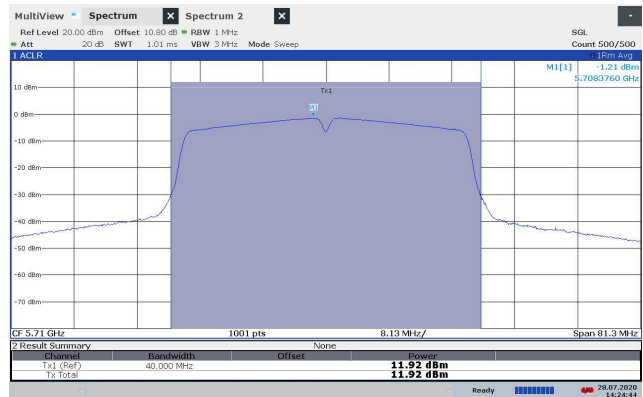
RMS Conducted Power, 5510 MHz, 802.11n, HT40



RMS Conducted Power, 5550 MHz, 802.11n, HT40



RMS Conducted Power, 5670 MHz, 802.11n, HT40



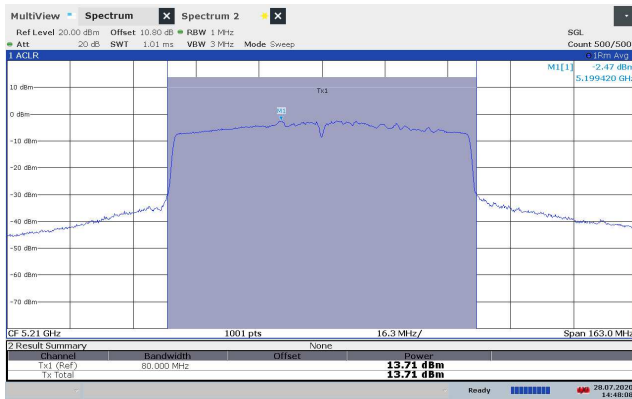
RMS Conducted Power, 5710 MHz, 802.11n, HT40



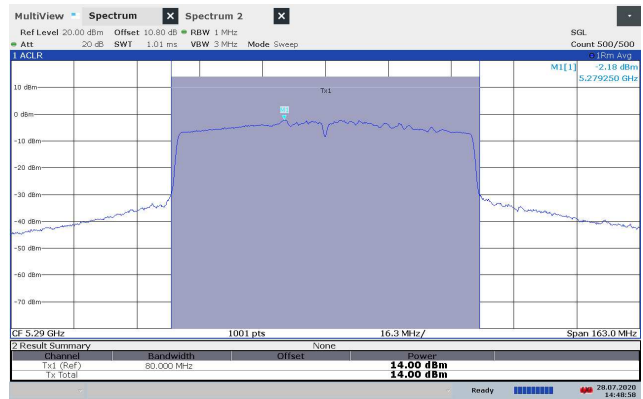
RMS Conducted Power, 5755 MHz, 802.11n, HT40



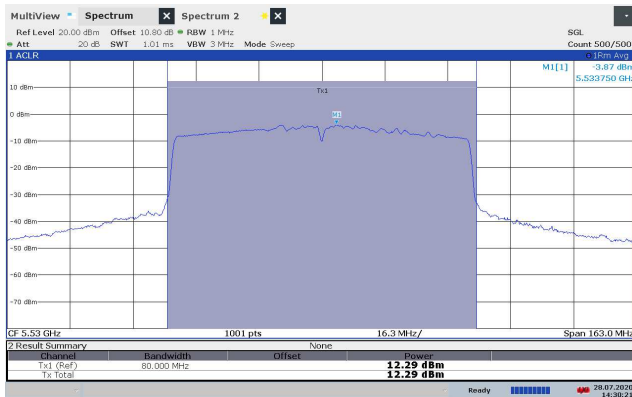
RMS Conducted Power, 5795 MHz, 802.11n, HT40



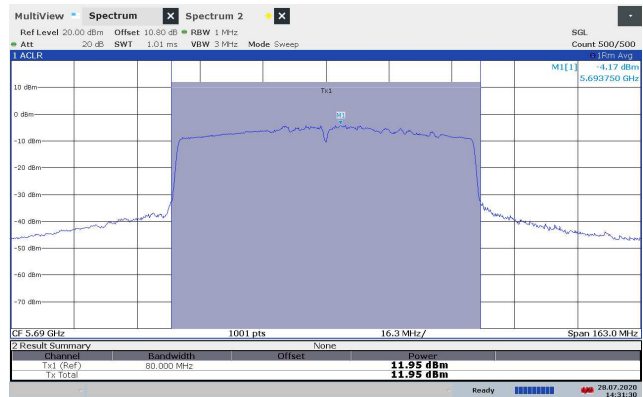
RMS Conducted Power, 5210 MHz, 802.11ac, HT80



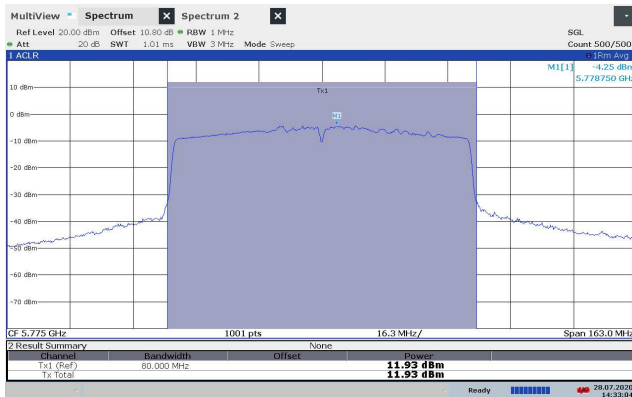
RMS Conducted Power, 5290 MHz, 802.11ac, HT80



RMS Conducted Power, 5530 MHz, 802.11ac, HT80



RMS Conducted Power, 5690 MHz, 802.11ac, HT80



RMS Conducted Power, 5775 MHz, 802.11ac, HT80

3.2 Emission Bandwidth

Para. No.: 15.407(a)(2)

ISED RSS-247, Issue 2, Clause 6.2

Measurement procedure: ANSI C63.10-2013 Clause 6.9.3 and 12.4.1

Test Results: Complies

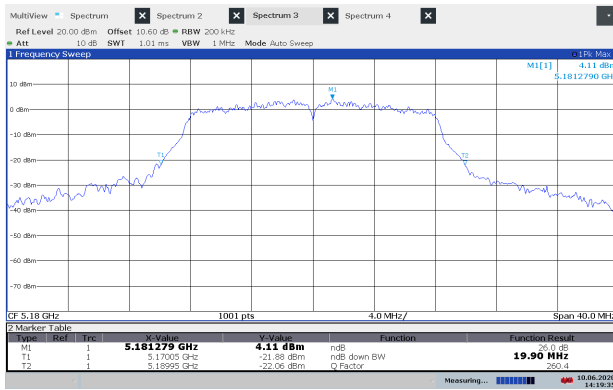
Measurement Data:

Ch. No.	Nominal Frequency (MHz)	FCC 26dB Bandwidth, Measured Values (MHz)			
		802.11a 6Mb	802.11n HT20	802.11n HT40	802.11ac HT80
36	5180	19.9	20.0		
52	5260	19.8	20.0		
64	5320	19.9	19.9		
100	5500	19.9	19.9		
112	5560	19.8	19.9		
140	5700	19.9	19.9		
38	5190			40.8	
54	5270			42.5	
62	5310			40.9	
102	5510			40.9	
110	5550			40.8	
134	5670			41.2	
42	5210				81.5
58	5290				81.8
106	5530				81.2

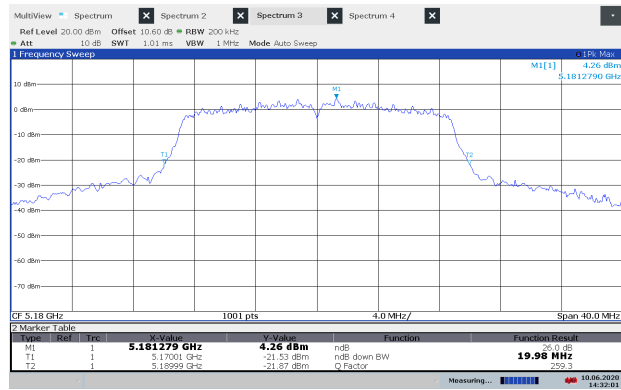
Ch. No.	Nominal Frequency (MHz)	ISED Canada 99% Bandwidth, Measured Values (MHz)			
		802.11a 6Mb	802.11n HT20	802.11n HT40	802.11ac HT80
36	5180	16.5	17.5		
52	5260	16.5	17.6		
64	5320	16.5	17.5		
100	5500	16.5	17.5		
112	5560	16.5	17.5		
140	5700	16.5	17.5		
149	5745	16.5	17.6		
165	5825	16.5	17.6		
38	5190			36.1	
54	5270			36.3	
62	5310			36.1	
102	5510			36.1	
110	5550			36.2	
134	5670			36.2	
151	5755			36.2	
159	5795			36.2	
42	5210				75.4
58	5290				75.5
106	5530				75.3
155	5775				76.0

Limit:

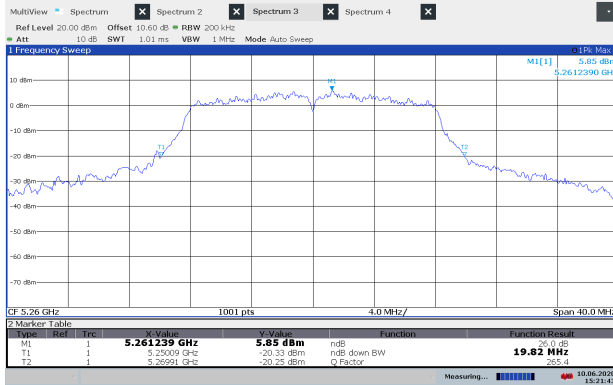
No requirements as long as the emissions are within the band-edges.



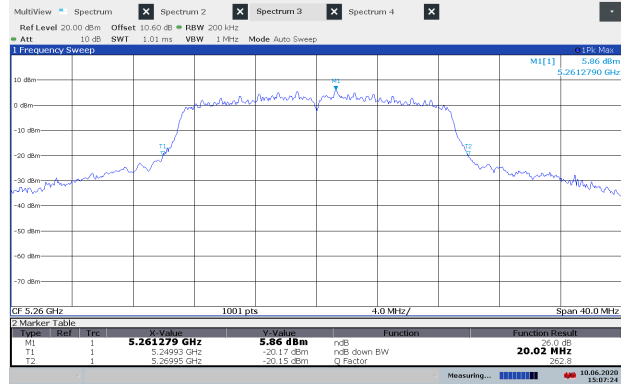
Emission BW, 5180 MHz, 802.11a, 6Mb



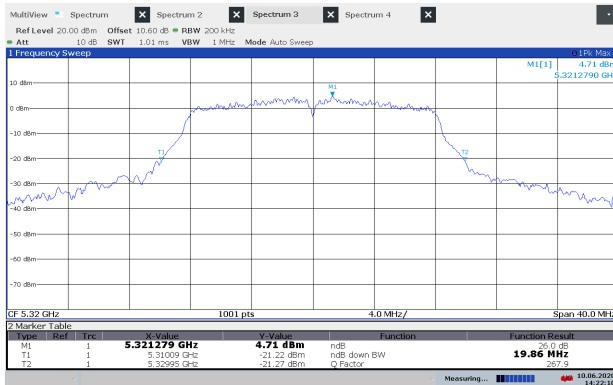
Emission BW, 5180 MHz, 802.11n, HT20



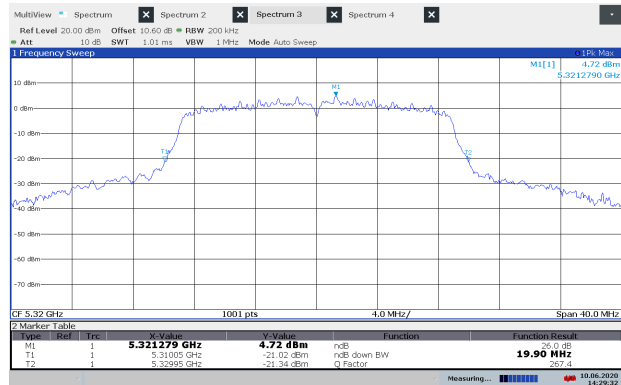
Emission BW, 5260 MHz, 802.11a, 6Mb



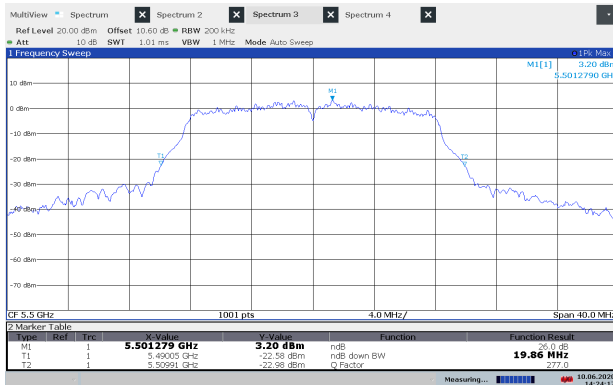
Emission BW, 5260 MHz, 802.11n, HT20



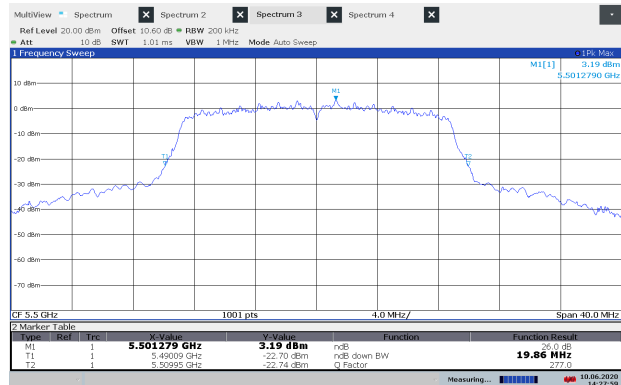
Emission BW, 5320 MHz, 802.11a, 6Mb



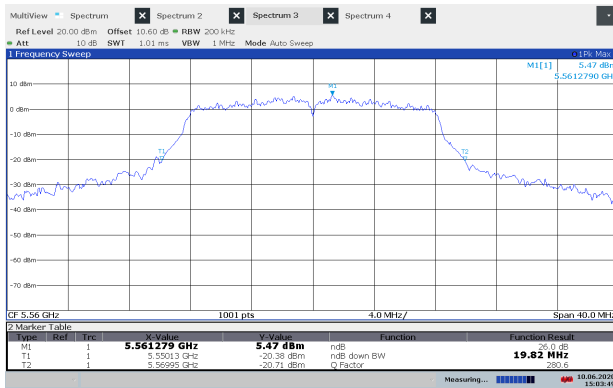
Emission BW, 5320 MHz, 802.11n, HT20



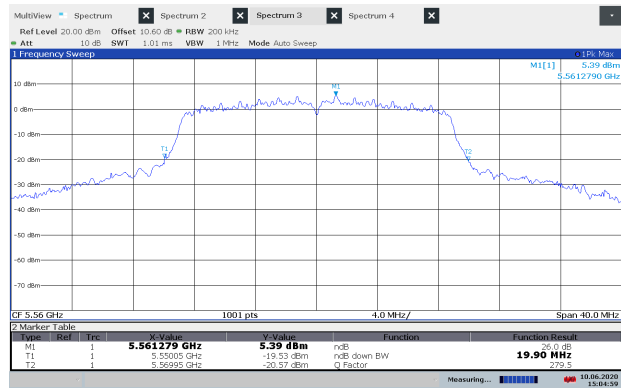
Emission BW, 5500 MHz, 802.11a, 6Mb



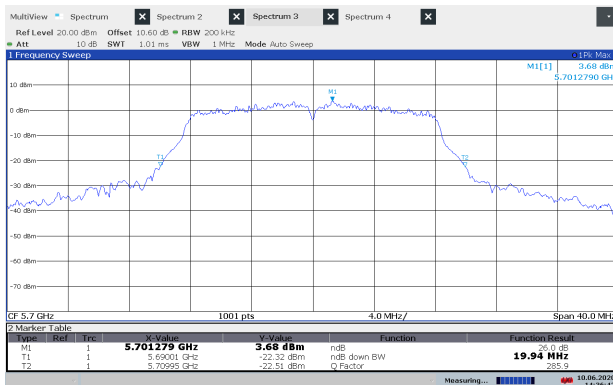
Emission BW, 5500 MHz, 802.11n, HT20



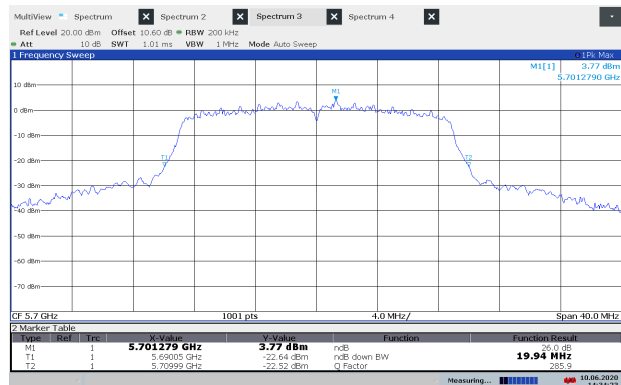
Emission BW, 5560 MHz, 802.11a, 6Mb



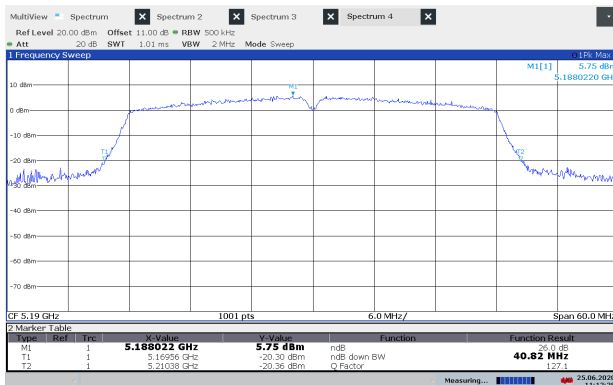
Emission BW, 5560 MHz, 802.11n, HT20



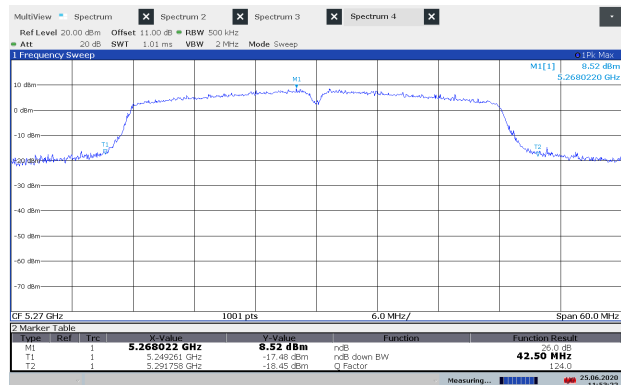
Emission BW, 5700 MHz, 802.11a, 6Mb



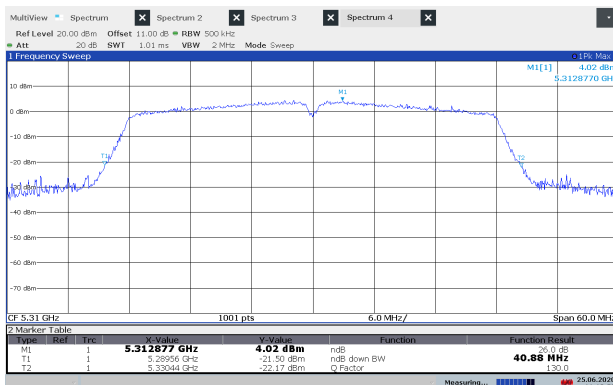
Emission BW, 5700 MHz, 802.11n, HT20



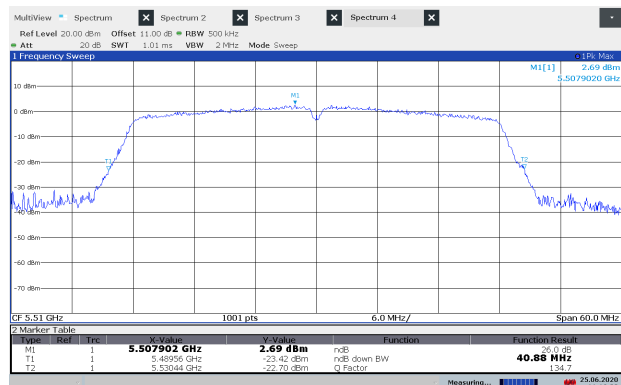
Emission BW, 5190 MHz, 802.11n, HT40



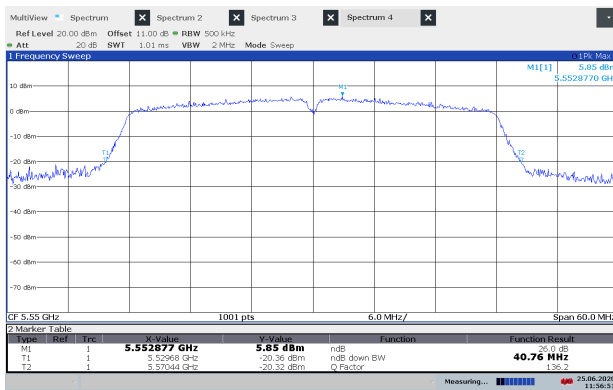
Emission BW, 5270 MHz, 802.11n, HT40



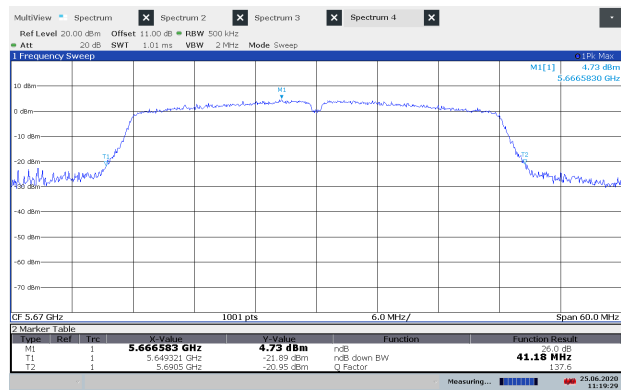
Emission BW, 5310 MHz, 802.11n, HT40



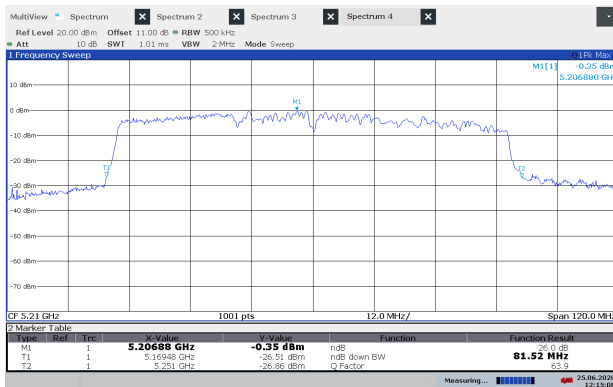
Emission BW, 5510 MHz, 802.11n, HT40



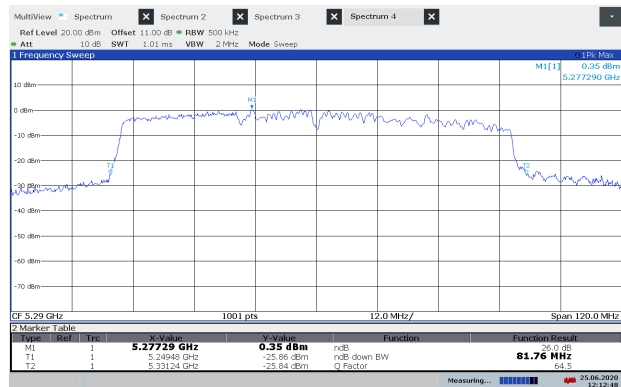
Emission BW, 5550 MHz, 802.11n, HT40



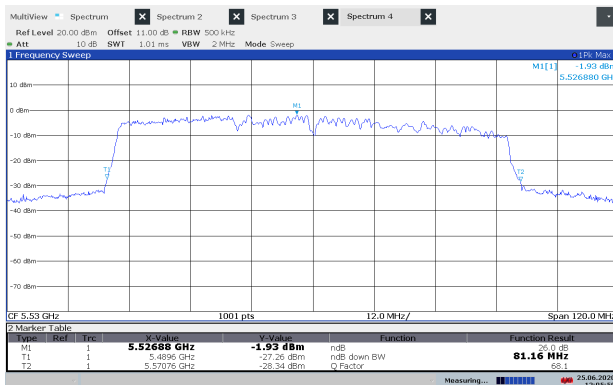
Emission BW, 5670 MHz, 802.11n, HT40



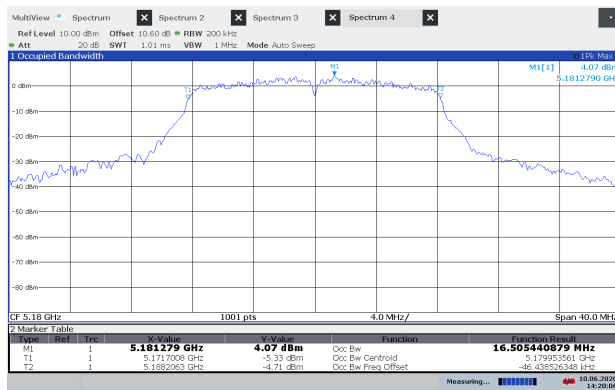
Emission BW, 5210 MHz, 802.11ac, HT80



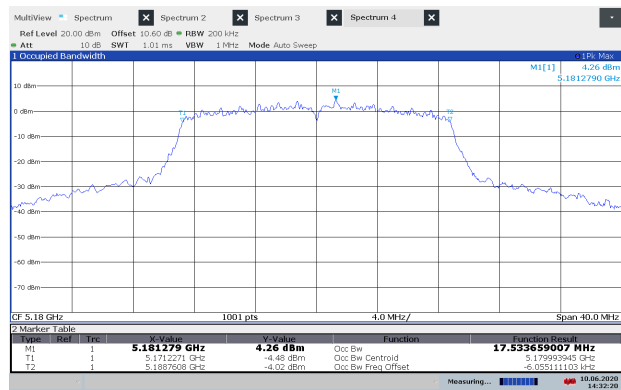
Emission BW, 5290 MHz, 802.11ac, HT80



Emission BW, 5530 MHz, 802.11ac, HT80



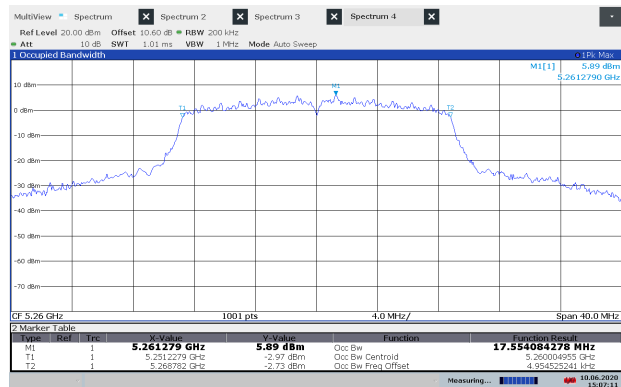
99% Occupied BW, 5180 MHz, 802.11a, 6Mb



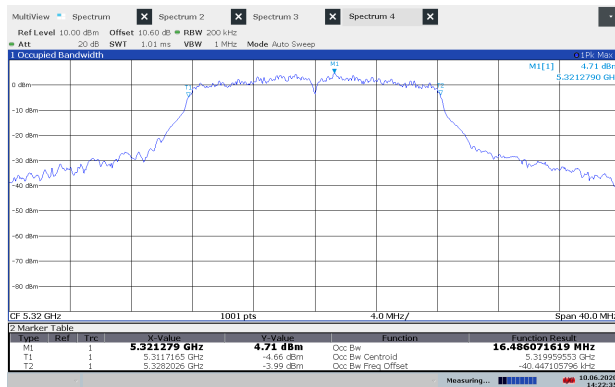
99% Occupied BW, 5180 MHz, 802.11n, HT20



99% Occupied BW, 5260 MHz, 802.11a, 6Mb



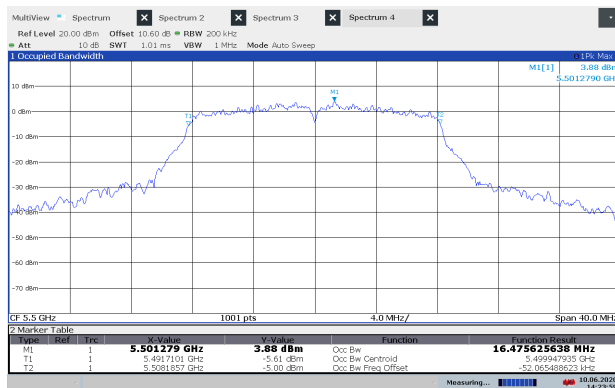
99% Occupied BW, 5260 MHz, 802.11n, HT20



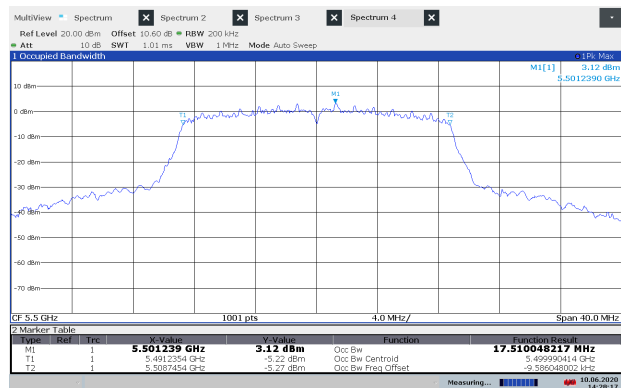
99% Occupied BW, 5320 MHz, 802.11a, 6Mb



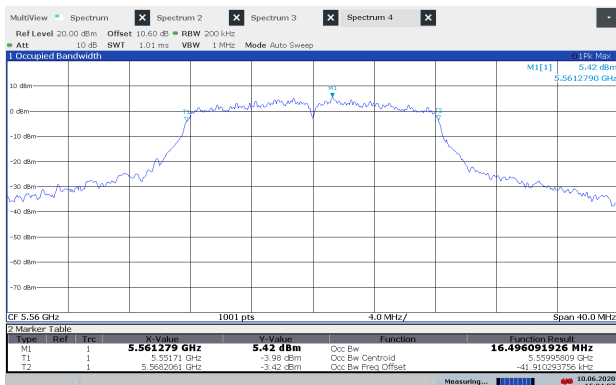
99% Occupied BW, 5320 MHz, 802.11n, HT20



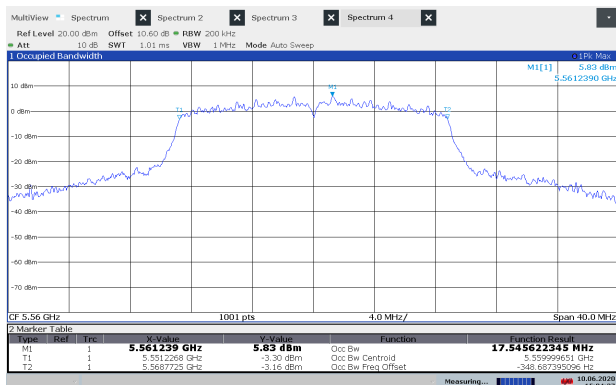
99% Occupied BW, 5500 MHz, 802.11a, 6Mb



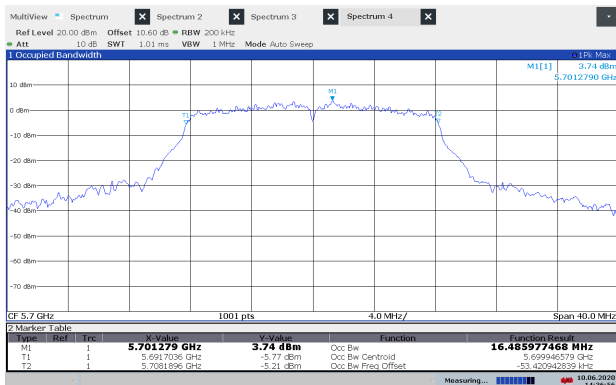
99% Occupied BW, 5500 MHz, 802.11n, HT20



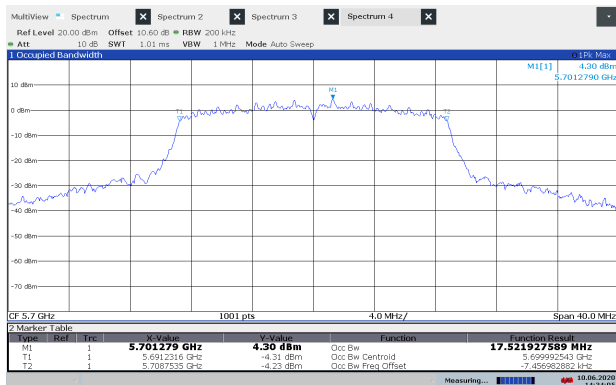
99% Occupied BW, 5560 MHz, 802.11a, 6Mb



99% Occupied BW, 5560 MHz, 802.11n, HT20



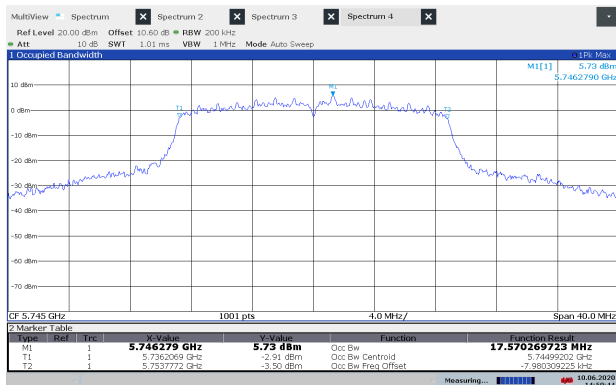
99% Occupied BW, 5700 MHz, 802.11a, 6Mb



99% Occupied BW, 5700 MHz, 802.11n, HT20



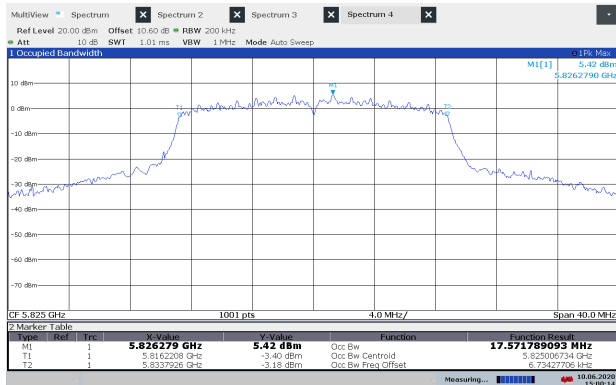
99% Occupied BW, 5745 MHz, 802.11a, 6Mb



99% Occupied BW, 5745 MHz, 802.11n, HT20



99% Occupied BW, 5825 MHz, 802.11a, 6Mb



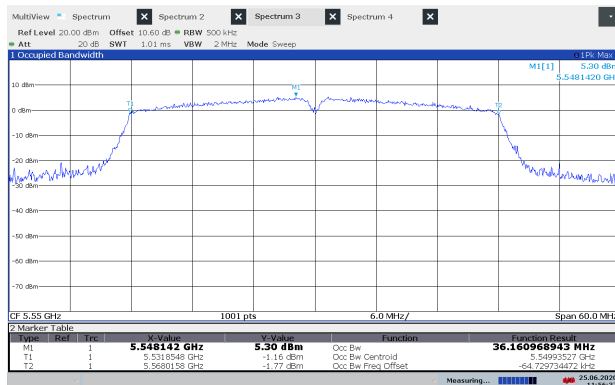
99% Occupied BW, 5825 MHz, 802.11n, HT20



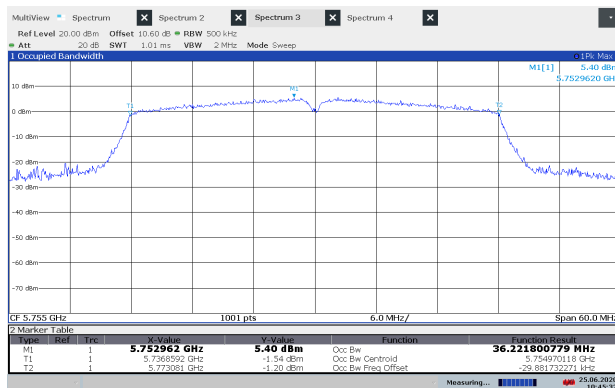
99% Occupied BW, 5190 MHz, 802.11n, HT40



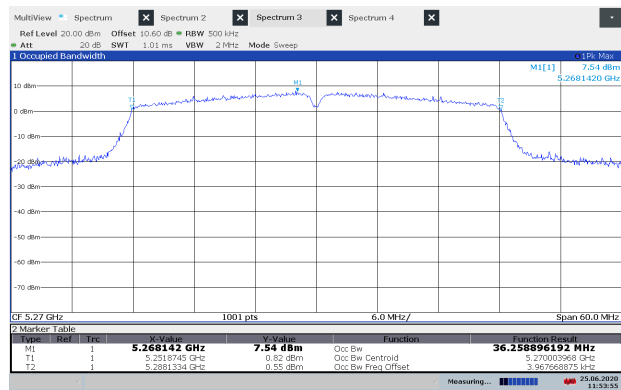
99% Occupied BW, 5310 MHz, 802.11n, HT40



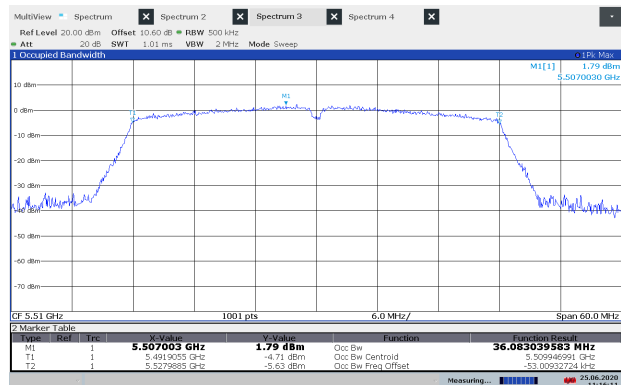
99% Occupied BW, 5530 MHz, 802.11n, HT40



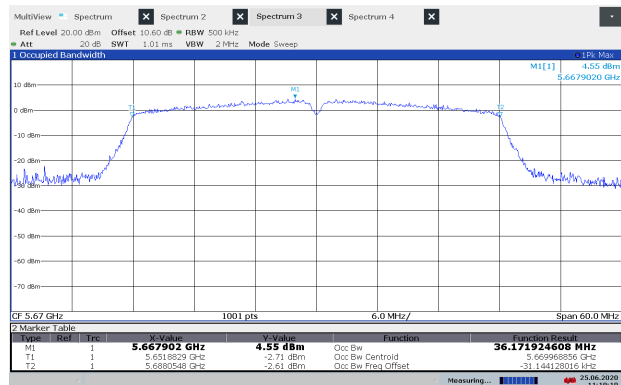
99% Occupied BW, 5550 MHz, 802.11n, HT40



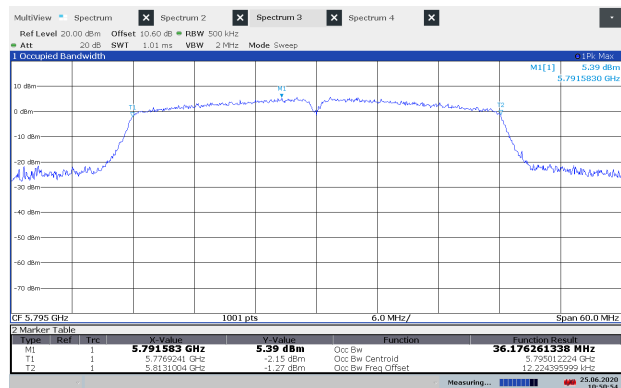
99% Occupied BW, 5270 MHz, 802.11n, HT40



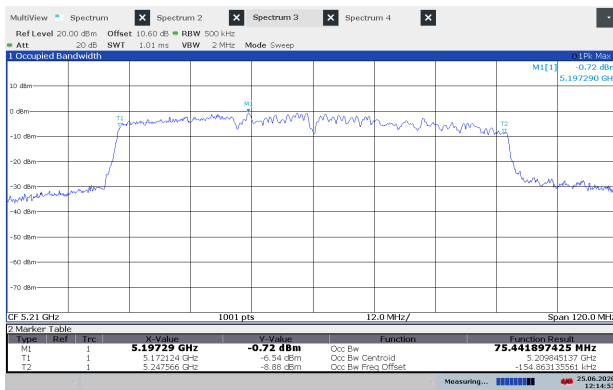
99% Occupied BW, 5510 MHz, 802.11n, HT40



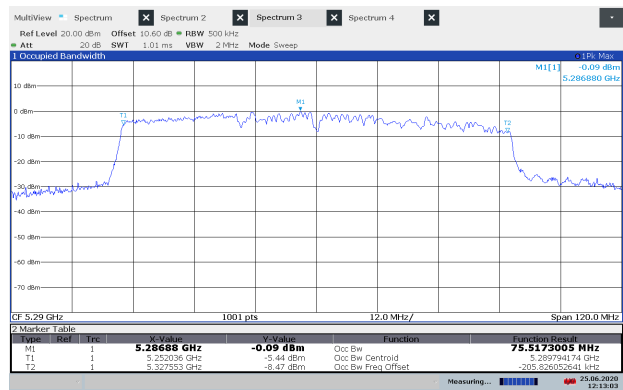
99% Occupied BW, 5670 MHz, 802.11n, HT40



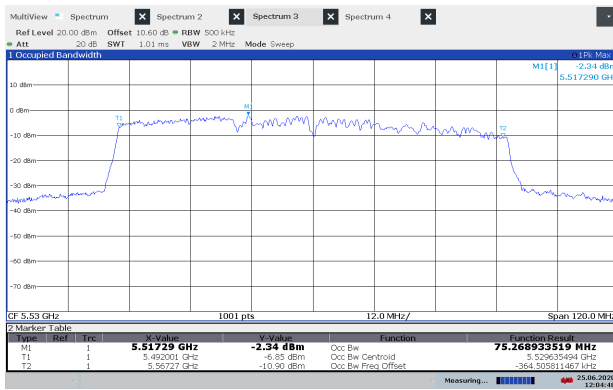
99% Occupied BW, 5795 MHz, 802.11n, HT40



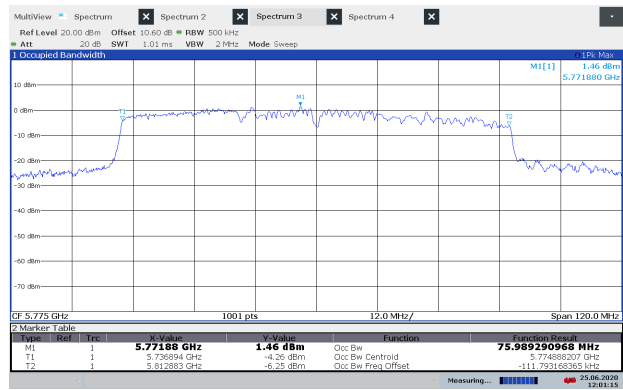
99% Occupied BW, 5210 MHz, 802.11ac, HT80



99% Occupied BW, 5290 MHz, 802.11ac, HT80



99% Occupied BW, 5530 MHz, 802.11ac, HT80



99% Occupied BW, 5775 MHz, 802.11ac, HT80

3.3 DTS Bandwidth

Para. No.: 15.407(e)

ISED RSS-247, Issue 2, Clause 6.2.4

Measurement procedure: ANSI C63.10-2013 Clause 11.8, Option 1

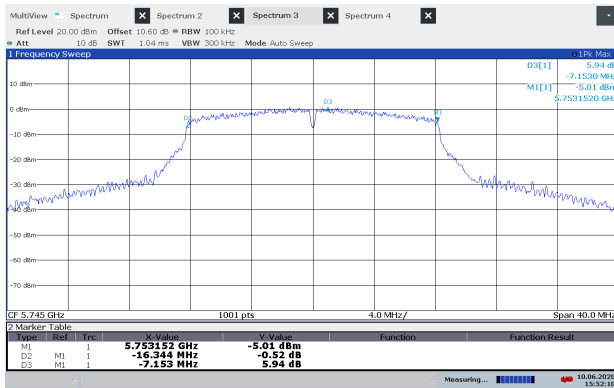
Test Results: Complies

Measurement Data:

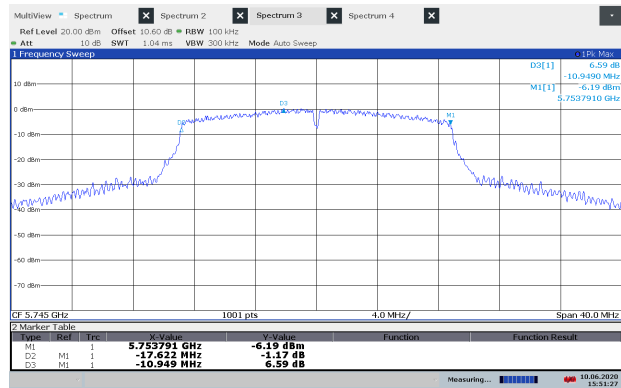
Ch. No.	Nominal Frequency (MHz)	DTS Bandwidth, Measured Values (MHz)			
		802.11a 6Mb	802.11n HT20	802.11n HT40	802.11ac HT80
149	5745	16.3	17.6		
165	5825	16.4	17.6		
151	5755			36.3	
159	5795			35.7	
155	5775				73.5

Limit:

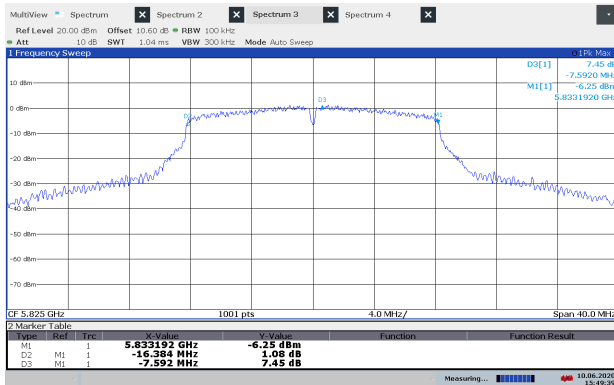
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.



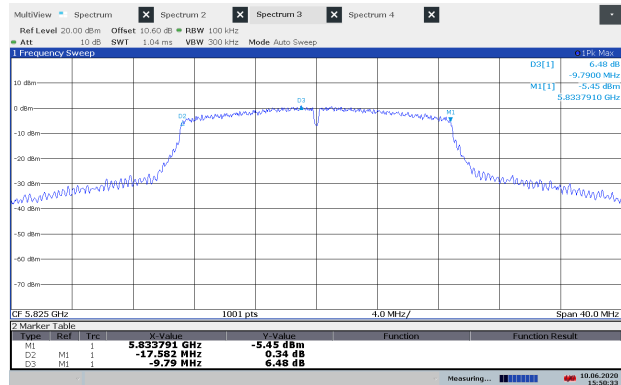
DTS BW, 5745 MHz, 802.11a, 6MB



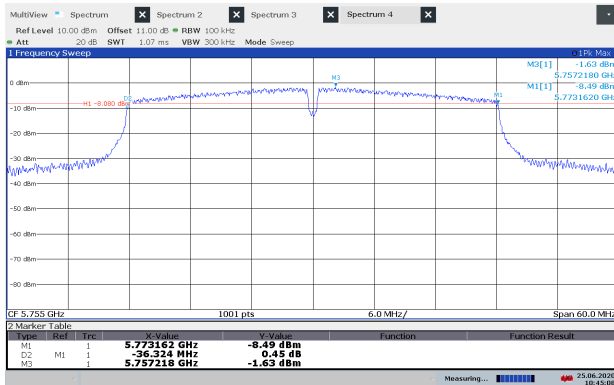
DTS BW, 5745 MHz, 802.11n, HT20



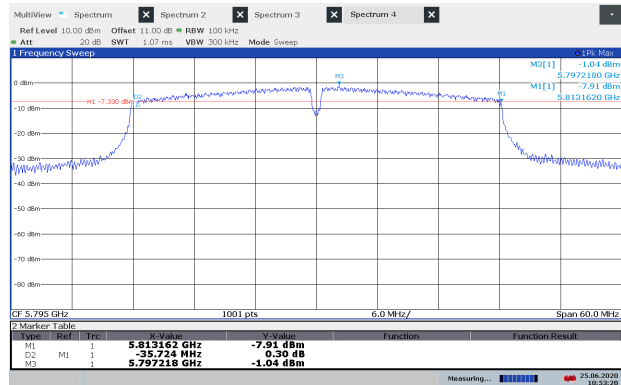
DTS BW, 5825 MHz, 802.11a, 6MB



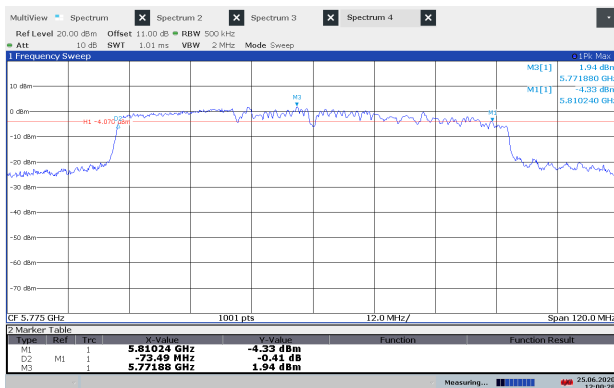
DTS BW, 5825 MHz, 802.11n, HT20



DTS BW, 5755 MHz, 802.11n, HT40



DTS BW, 5795 MHz, 802.11n, HT40



Emission BW, 5775 MHz, 802.11ac, HT80