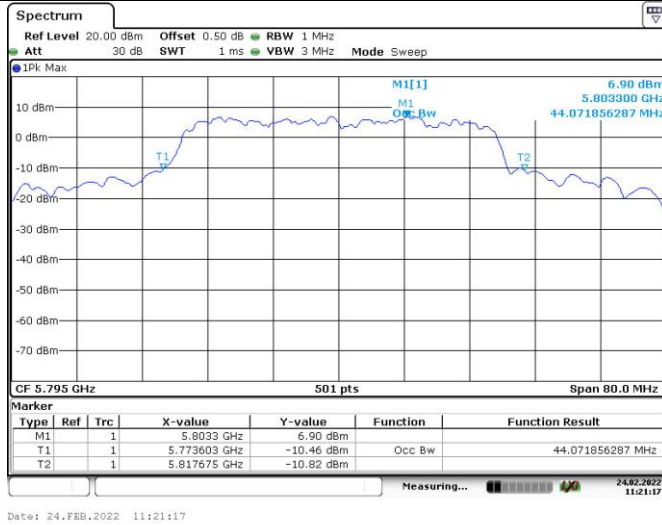


99% Occupied Bandwidth

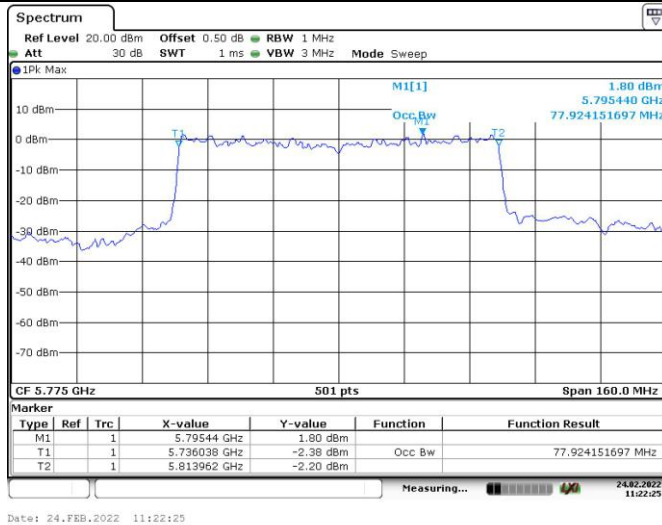
802.11ax hew40
Lowest Channel



802.11ax hew40
Highest Channel



802.11ax hew80
Middle Channel



4.4 Maximum Conducted Output Power:

Serial Number:	CR22010047-RF-S1	Test Date:	2022-02-28
Test Site:	RF	Test Mode:	Transmitting
Tester:	Le Joe	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	19.5	Relative Humidity: (%)	57	ATM Pressure: (kPa)	101.74
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060302	Each time	N/A
Agilent	USB Wideband Power Sensor	U2021XA	MY54080015	2021/7/22	2022/7/21
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A

* *Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

5150-5250 MHz:

Mode	Frequency (MHz)	Conducted Average Output Power (dBm)			Limit For Non-beamforming (dBm)	Limit For Beamforming (dBm)
		Chain 0	Chain 1	Total		
802.11a	5180	15.55	15.05	/	≤30	/
	5200	15.33	14.93	/	≤30	/
	5240	15.01	14.89	/	≤30	/
802.11n ht20	5180	14.86	14.36	17.63	≤30	≤28
	5200	14.74	14.09	17.44	≤30	≤28
	5240	14.56	14.29	17.44	≤30	≤28
802.11n ht40	5190	11.88	10.96	14.45	≤30	≤28
	5230	12.65	11.69	15.21	≤30	≤28
802.11ac vht20	5180	12.64	11.95	15.32	≤30	≤28
	5200	12.43	11.78	15.13	≤30	≤28
	5240	12.55	11.86	15.23	≤30	≤28
802.11ac vht40	5190	10.21	9.27	12.78	≤30	≤28
	5230	10.82	10.08	13.48	≤30	≤28
802.11ac vht80	5210	12.81	12.6	15.72	≤30	≤28
802.11ax hew20	5180	12.85	12.31	15.60	≤30	≤28
	5200	12.68	12.01	15.37	≤30	≤28
	5240	8.33	8.17	11.26	≤30	≤28
802.11ax hew40	5190	8.55	8.18	11.38	≤30	≤28
	5230	7.73	6.99	10.39	≤30	≤28
802.11ax hew80	5210	8.38	7.56	11.00	≤30	≤28

Note:

The device is a indoor AP.

The maximum antenna gain is 5.0dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

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

So:

For Non-beamforming mode:

$$\text{Directional gain} = 5.0 \text{ dBi}$$

For Beamforming mode:

$$\text{Directional gain} = 5.0 + 3.0 = 8.0 \text{ dBi}$$

5725-5850 MHz:

Mode	Frequency (MHz)	Conducted Average Output Power (dBm)			Limit For Non-beamforming (dBm)	Limit For Beamforming (dBm)
		Chain 0	Chain 1	Total		
802.11a	5745	17.35	16.56	/	≤30	/
	5785	16.83	16.32	/	≤30	/
	5825	16.69	16.44	/	≤30	/
802.11n ht20	5745	17.01	16.41	19.73	≤30	≤28
	5785	16.57	16.01	19.31	≤30	≤28
	5825	16.36	16.21	19.30	≤30	≤28
802.11n ht40	5755	14.27	13.68	17.00	≤30	≤28
	5795	14.39	13.88	17.15	≤30	≤28
802.11ac vht20	5745	17.08	16.62	19.87	≤30	≤28
	5785	16.77	16.53	19.66	≤30	≤28
	5825	16.36	16.43	19.41	≤30	≤28
802.11ac vht40	5755	14.35	12.06	16.36	≤30	≤28
	5795	14.26	12.16	16.35	≤30	≤28
802.11ac vht80	5775	8.97	8.42	11.71	≤30	≤28
802.11ax hew20	5745	16.1	16.11	19.12	≤30	≤28
	5785	16.03	16.8	19.44	≤30	≤28
	5825	17.36	16.89	20.14	≤30	≤28
802.11ax hew40	5755	12.78	11.87	15.36	≤30	≤28
	5795	12.22	11.37	14.83	≤30	≤28
802.11ax hew80	5775	9.94	7.88	12.04	≤30	≤28

Note:

The maximum antenna gain is 5.0dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

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

So:

For Non-beamforming mode:

$$\text{Directional gain} = 5.0 \text{ dBi}$$

For Beamforming mode:

$$\text{Directional gain} = 5.0 + 3.0 = 8.0 \text{ dBi}$$

4.5 Maximum power spectral density:

Serial Number:	CR22010047-RF-S1	Test Date:	2022-02-23~2022-02-28
Test Site:	RF	Test Mode:	Transmitting
Tester:	Le Joe	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	19.5	Relative Humidity: (%)	57	ATM Pressure: (kPa)	101.74
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2021/7/22	2022/7/21
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

5150-5250 MHz:

Mode	Frequency (MHz)	Maximum Power Spectral Density (dBm/MHz)			Limit (dBm/MHz)
		Chain 0	Chain 1	Total	
802.11a	5180	7.80	7.11	\	≤17.00
	5200	7.43	7.03	\	≤17.00
	5240	7.17	6.67	\	≤17.00
802.11n ht20	5180	7.41	6.23	9.87	≤12.00
	5200	7.02	5.97	9.52	≤12.00
	5240	6.90	6.20	9.57	≤12.00
802.11n ht40	5190	0.77	0.73	3.76	≤12.00
	5230	1.47	0.99	4.25	≤12.00
802.11ac vht20	5180	5.86	5.35	8.62	≤12.00
	5200	5.50	5.07	8.30	≤12.00
	5240	5.36	4.85	8.12	≤12.00
802.11ac vht40	5190	0.91	0.89	3.91	≤12.00
	5230	1.93	1.55	4.75	≤12.00
802.11ac vht80	5210	-1.39	-1.72	1.46	≤12.00
802.11ax hew20	5180	6.49	6.21	9.36	≤12.00
	5200	6.48	5.95	9.23	≤12.00
	5240	6.31	5.92	9.13	≤12.00
802.11ax hew40	5190	1.20	1.63	4.43	≤12.00
	5230	1.98	2.22	5.11	≤12.00
802.11ax hew80	5210	-2.25	-2.02	0.88	≤12.00

Note:

The maximum antenna gain is 5 dBi. And beamforming gain is 3dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

$$\text{Array Gain} = 10 \log(N_{\text{ANT}}/N_{\text{SS}}) \text{ dB.}$$

So:

Directional gain = $G_{\text{ANT}} + \text{Array Gain} = 5 + 10 * \log(2/1) = 8 \text{ dBi}$ for Non-beamforming mode

Directional gain = $G_{\text{ANT}} + \text{Array Gain} = 5 + 3 + 10 * \log(2/1) = 11 \text{ dBi}$ for Beamforming mode

The worst limit Beamforming mode was used in the table.

Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01 was used for PSD test.

5725-5850 MHz:

Mode	Frequency (MHz)	Reading (dBm/300kHz)		Maximum Power Spectral Density (dBm/500kHz)			Limit (dBm/500kHz)
		Chain 0	Chain 1	Chain 0	Chain 1	Total	
802.11a	5745	6.71	6.38	8.93	8.6	\	≤30.0
	5785	6.09	6.08	8.31	8.3	\	≤30.0
	5825	5.85	5.64	8.07	7.86	\	≤30.0
802.11n ht20	5745	6.09	5.82	8.31	8.04	11.19	≤25.0
	5785	5.45	5.26	7.67	7.48	10.59	≤25.0
	5825	5.02	5.21	7.24	7.43	10.35	≤25.0
802.11n ht40	5755	0.71	-0.43	2.93	1.79	5.41	≤25.0
	5795	0.61	-0.63	2.83	1.59	5.26	≤25.0
802.11ac vht20	5745	6.89	6.35	9.11	8.57	11.86	≤25.0
	5785	6.25	6.05	8.47	8.27	11.38	≤25.0
	5825	6.14	6.09	8.36	8.31	11.35	≤25.0
802.11ac vht40	5755	1.52	-0.47	3.74	1.75	5.87	≤25.0
	5795	1.50	-0.70	3.71	1.52	5.76	≤25.0
802.11ac vht80	5775	-5.33	-5.84	-3.11	-3.62	-0.35	≤25.0
802.11ax hew20	5745	6.86	7.86	9.08	10.08	12.62	≤25.0
	5785	6.40	7.62	8.62	9.84	12.28	≤25.0
	5825	6.11	7.72	8.33	9.94	12.22	≤25.0
802.11ax hew40	5755	0.93	-0.54	3.15	1.68	5.49	≤25.0
	5795	0.78	-0.52	3	1.7	5.41	≤25.0
802.11ax hew80	5775	-6.19	-5.77	-3.97	-3.55	-0.74	≤25.0

Note:

The maximum antenna gain is 5 dBi. And beamforming gain is 3dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

$$\text{Array Gain} = 10 \log(N_{\text{ANT}}/N_{\text{SS}}) \text{ dB.}$$

So:

$$\text{Directional gain} = G_{\text{ANT}} + \text{Array Gain} = 5 + 10 * \log(2/1) = 8 \text{ dBi for Non-beamforming mode}$$

$$\text{Directional gain} = G_{\text{ANT}} + \text{Array Gain} = 5 + 3 + 10 * \log(2/1) = 11 \text{ dBi for Beamforming mode}$$

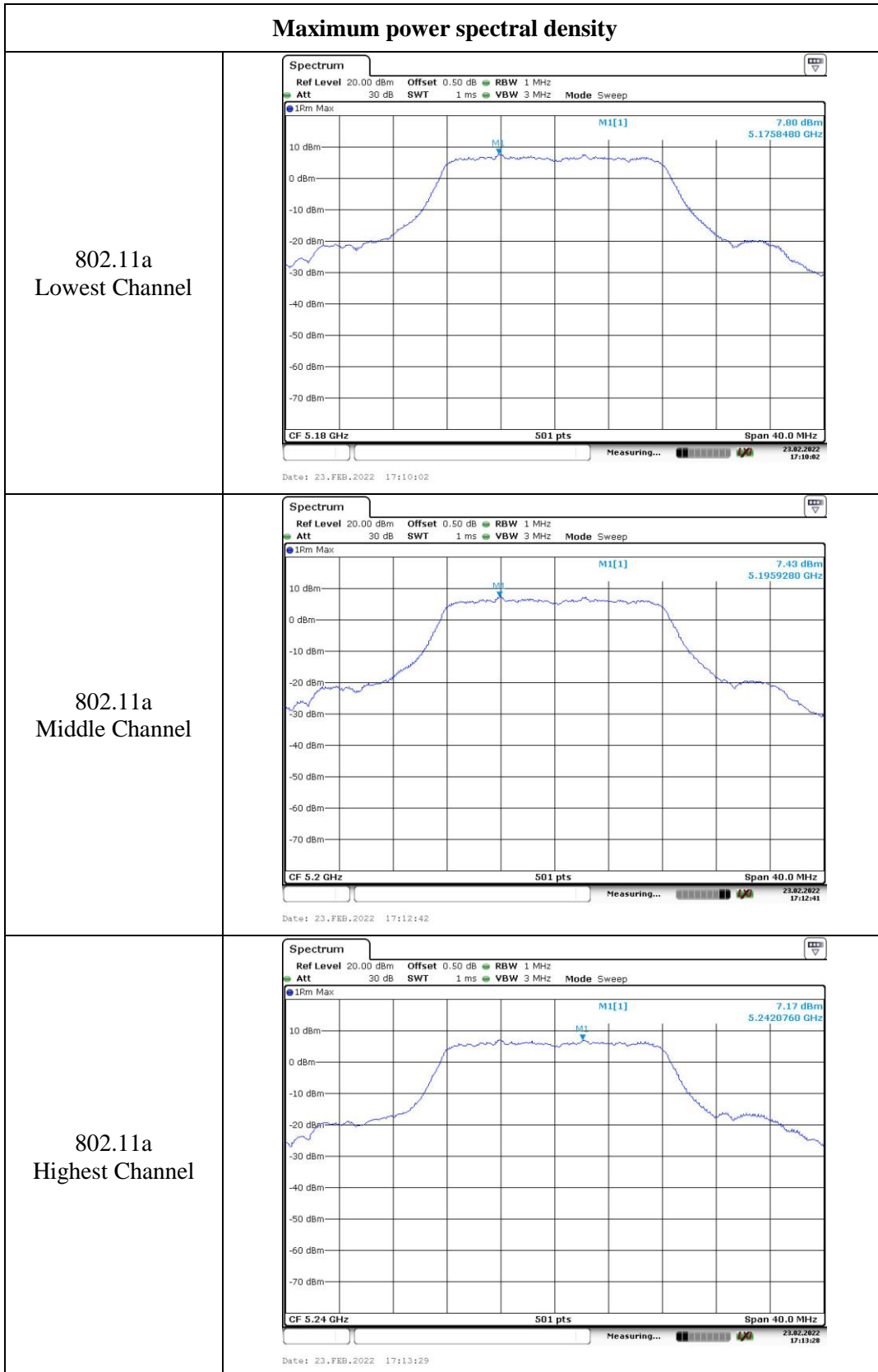
The worst limit Beamforming mode was used in the table.

Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01 was used for PSD test.

If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log(500 \text{ kHz} / \text{RBW})$ to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement

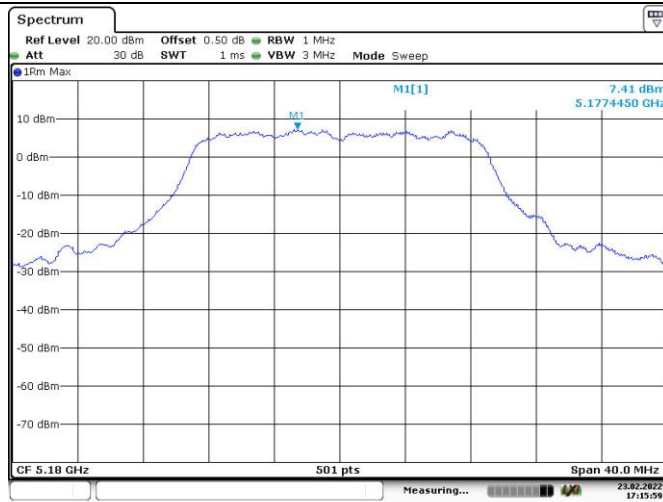
5150-5250MHz:

Chain 0:



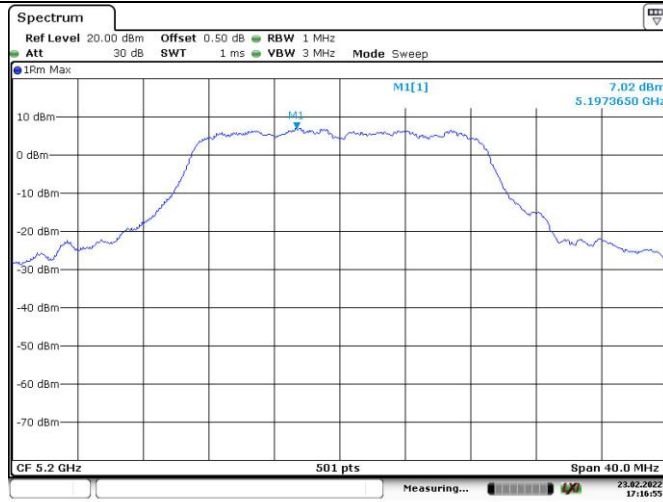
Maximum power spectral density

802.11n ht20
Lowest Channel



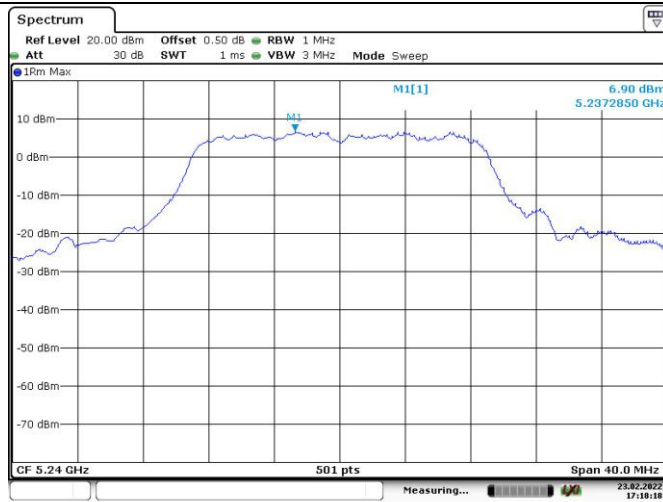
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802.11n ht20
Middle Channel



Date: 23.FEB.2022 17:16:55

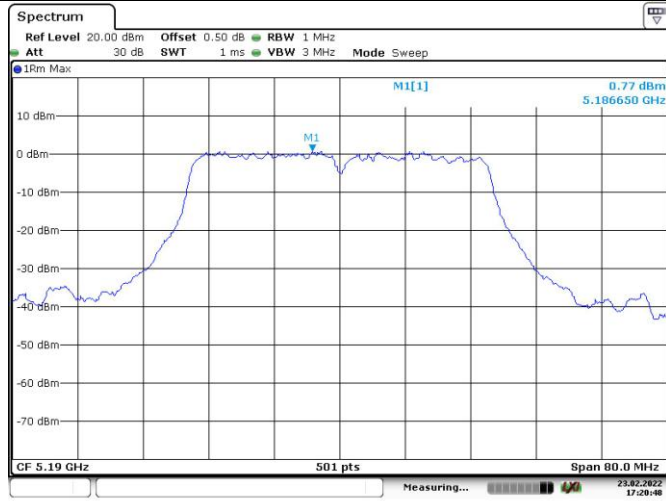
802.11n ht20
Highest Channel



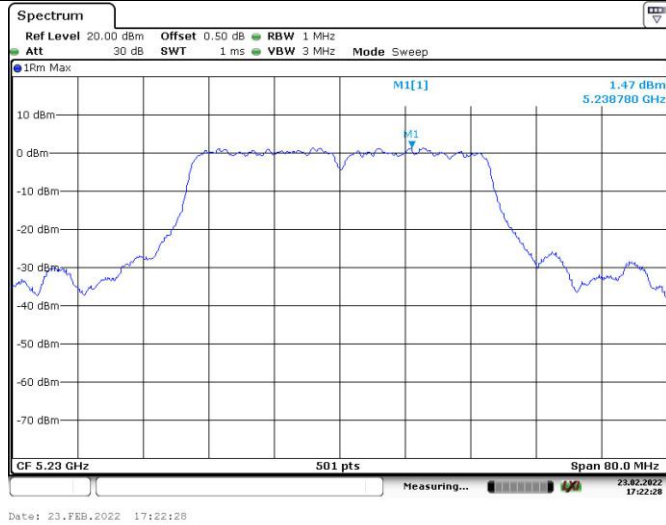
Date: 23.FEB.2022 17:18:19

Maximum power spectral density

802.11n ht40
Lowest Channel

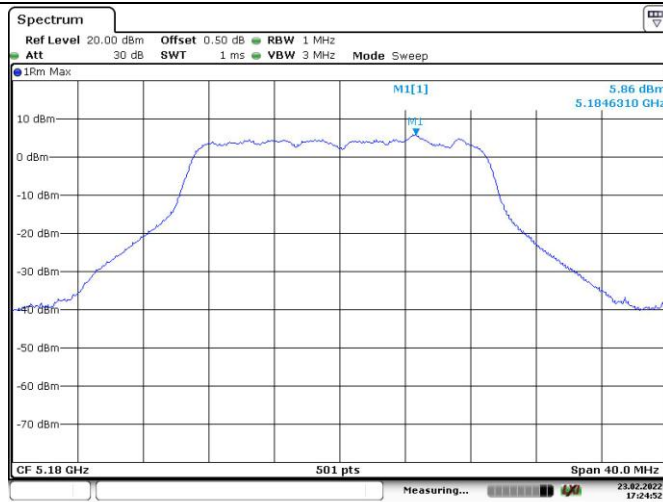


802.11n ht40
Highest Channel

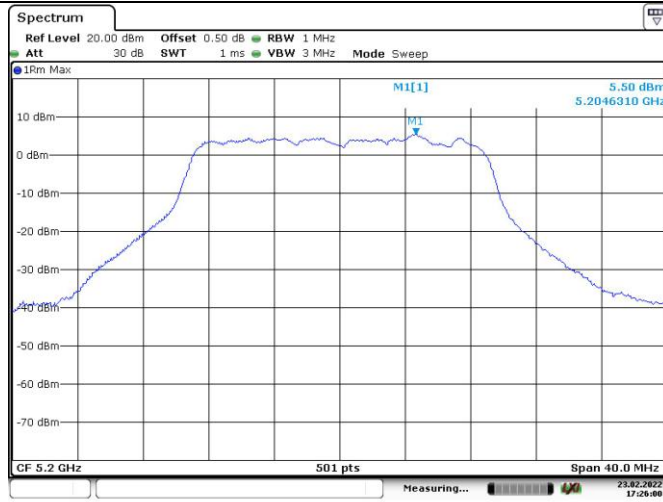


Maximum power spectral density

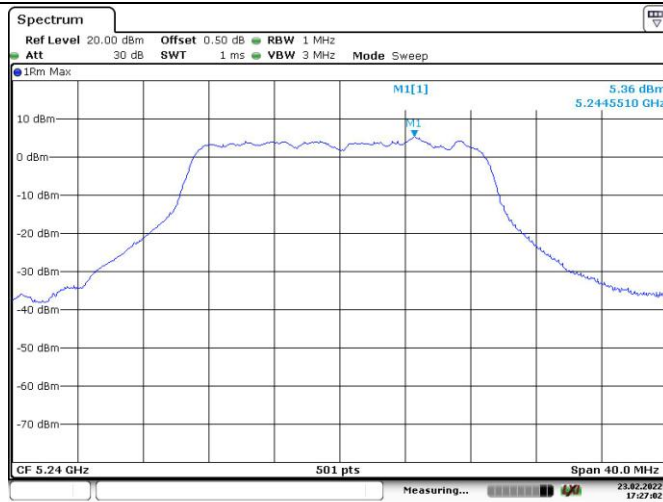
802.11ac vht20
Lowest Channel



802.11ac vht20
Middle Channel



802.11ac vht20
Highest Channel



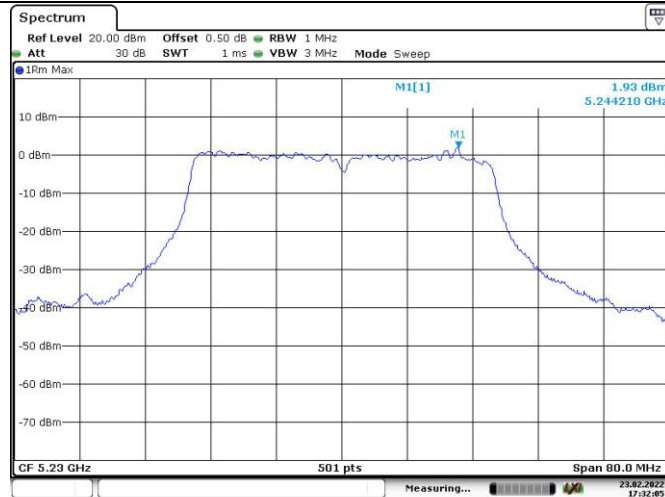
Maximum power spectral density

802.11ac vht40
Lowest Channel



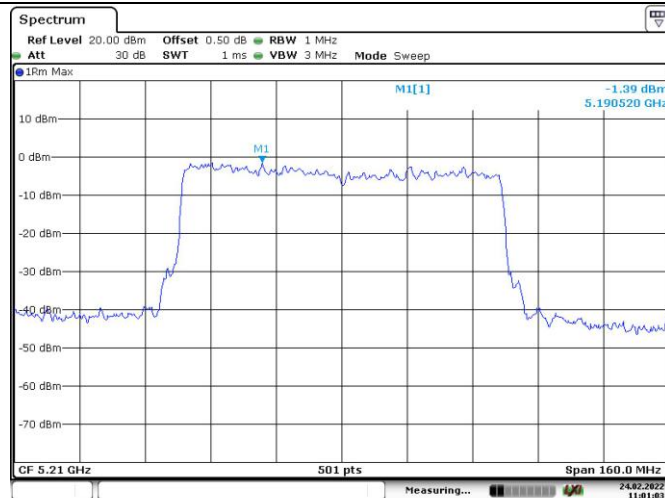
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802.11ac vht40
Highest Channel



Date: 23.FEB.2022 17:32:05

802.11ac vht80
Middle Channel



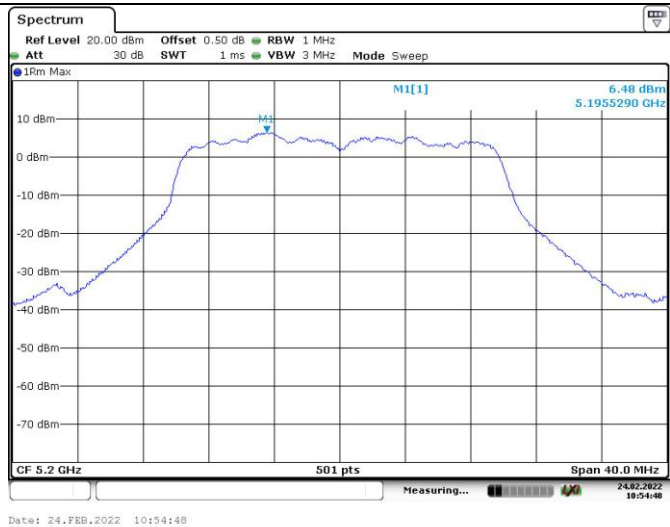
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Maximum power spectral density

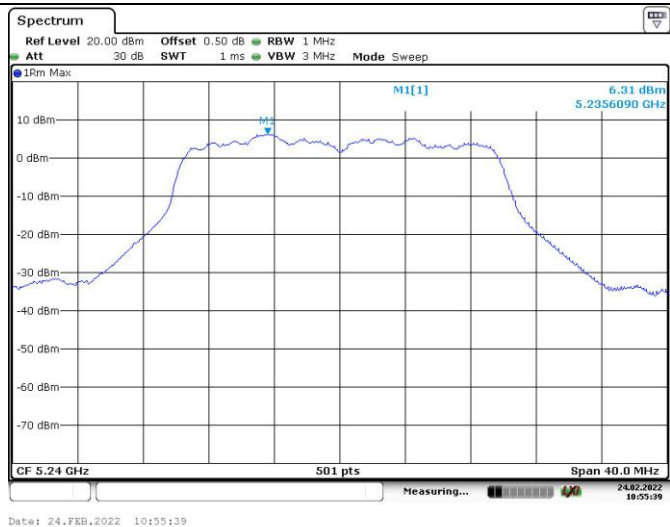
802.11ax hew20
Lowest Channel



802.11ax hew20
Middle Channel

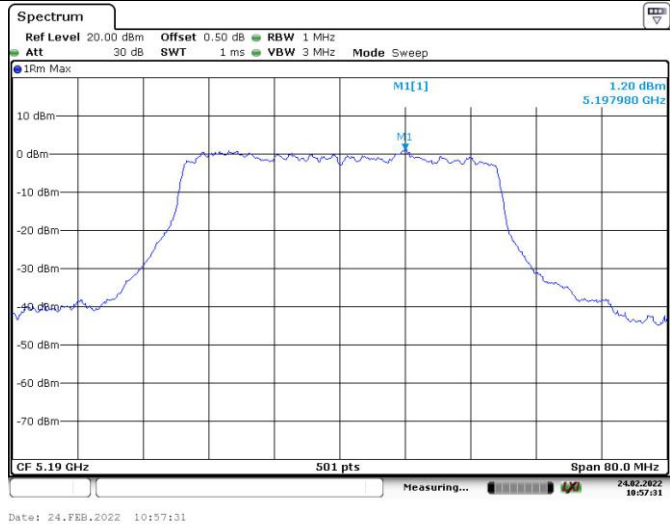


802.11ax hew20
Highest Channel

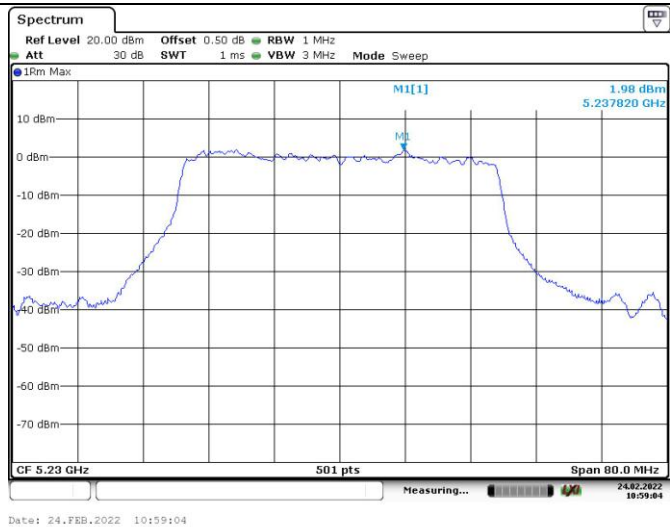


Maximum power spectral density

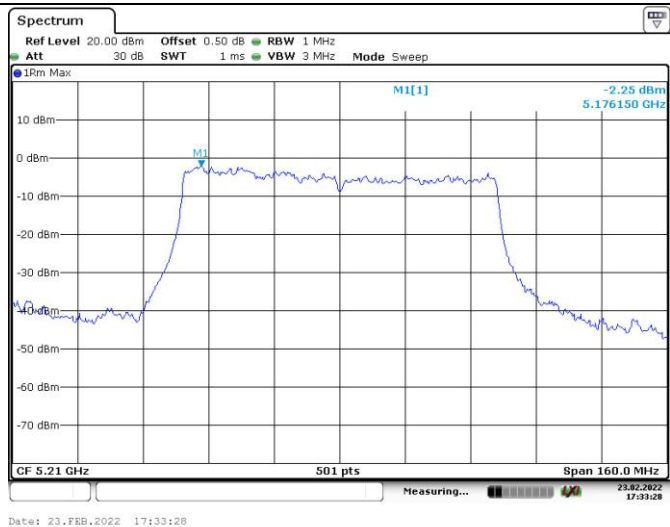
802.11ax hew40
Lowest Channel



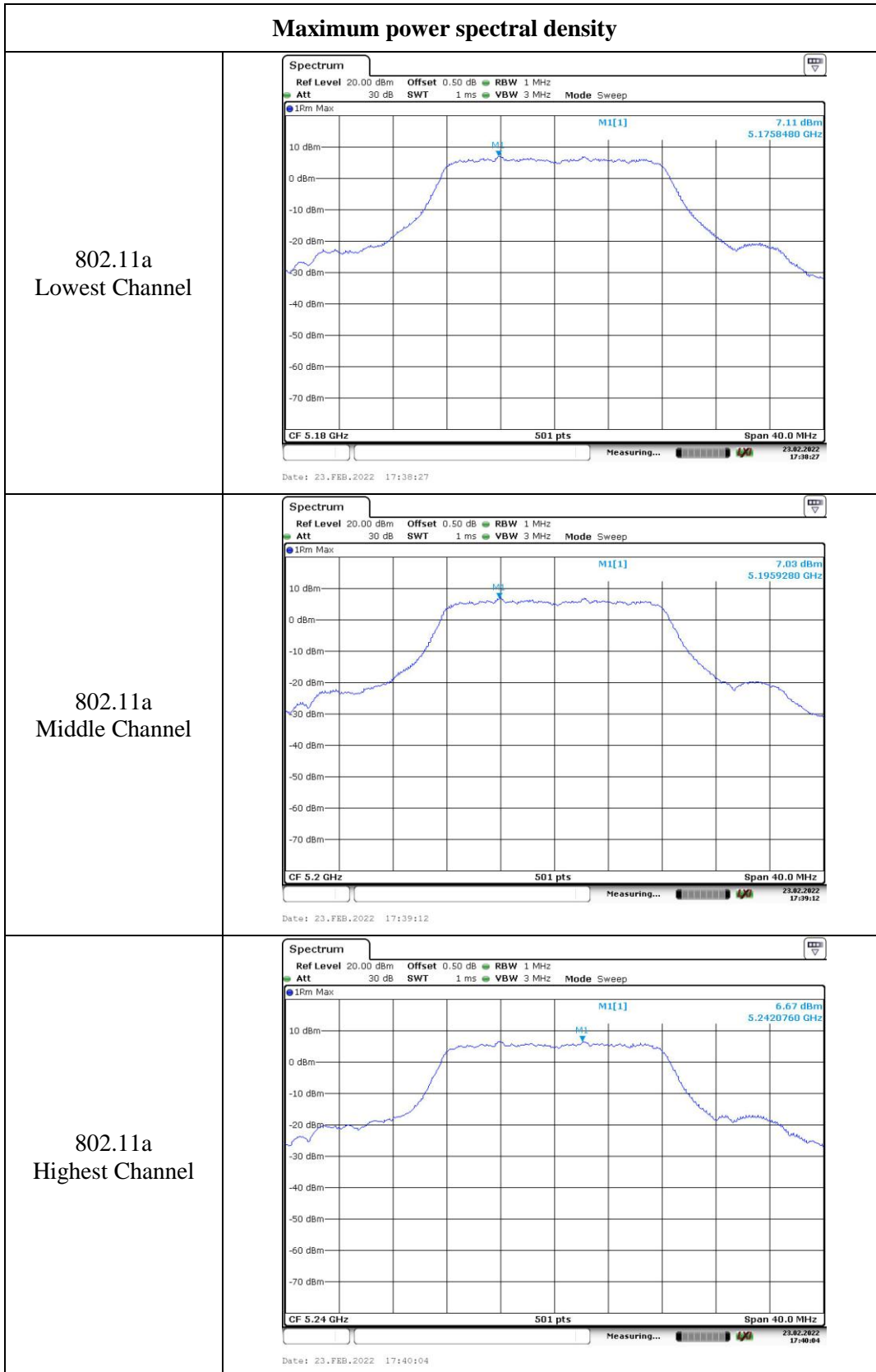
802.11ax hew40
Highest Channel



802.11ax hew80
Middle Channel

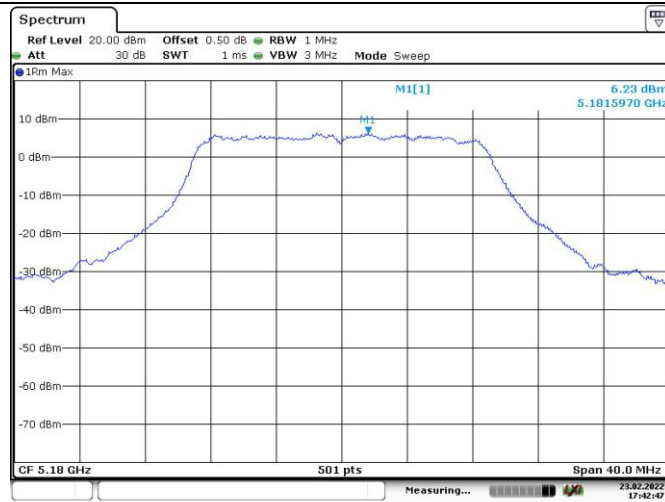


Chain 1:



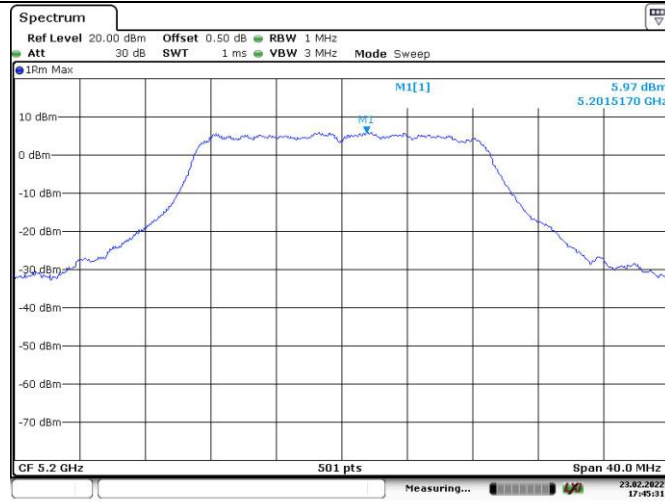
Maximum power spectral density

802.11n ht20
Lowest Channel



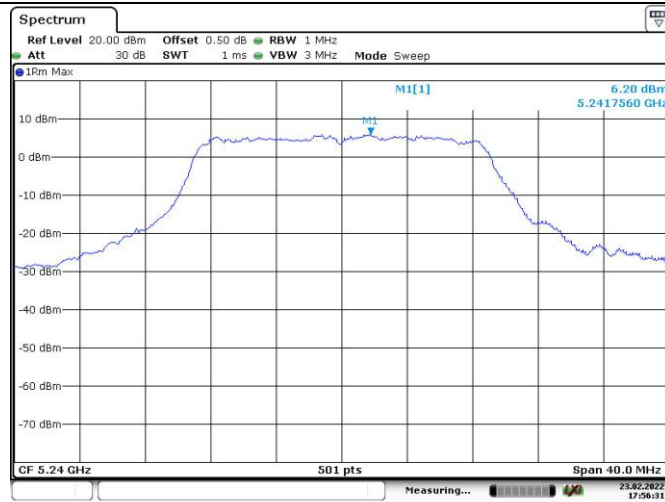
Date: 23.FEB.2022 17:42:47

802.11n ht20
Middle Channel



Date: 23.FEB.2022 17:45:31

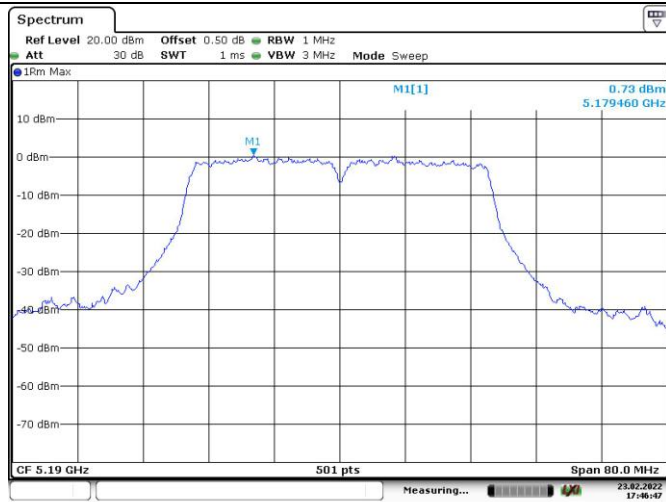
802.11n ht20
Highest Channel



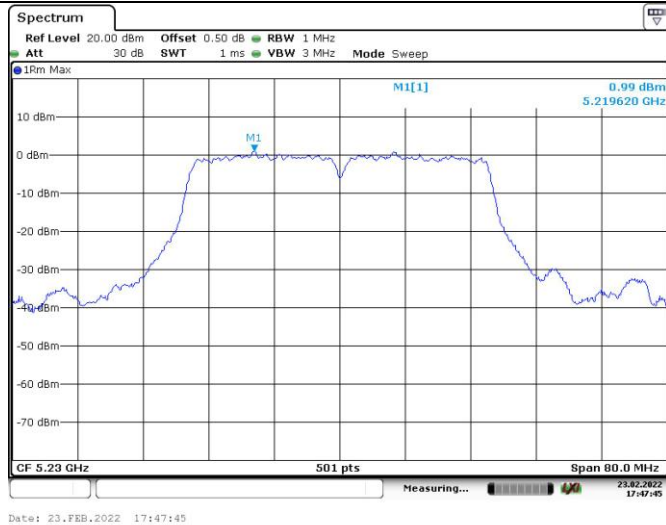
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Maximum power spectral density

802.11n ht40
Lowest Channel

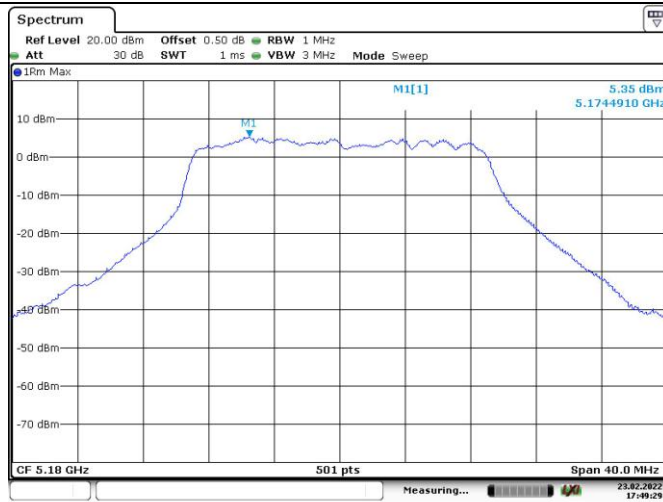


802.11n ht40
Highest Channel



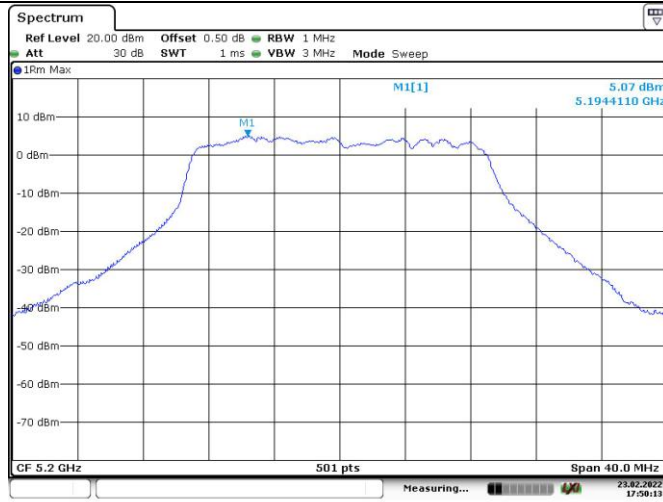
Maximum power spectral density

802.11ac vht20
Lowest Channel



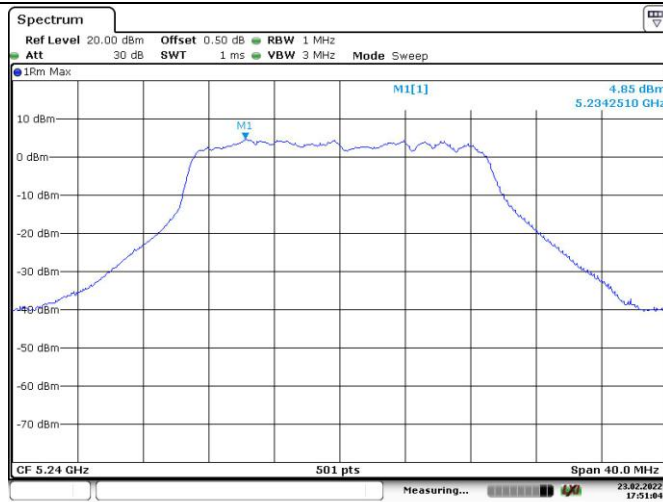
Date: 23.FEB.2022 17:49:30

802.11ac vht20
Middle Channel



Date: 23.FEB.2022 17:50:13

802.11ac vht20
Highest Channel



Date: 23.FEB.2022 17:51:04

Maximum power spectral density

802.11ac vht40
Lowest Channel



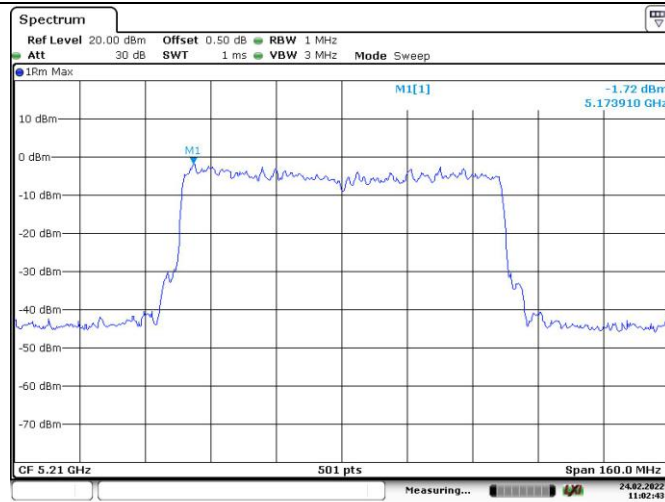
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802.11ac vht40
Highest Channel



Date: 23.FEB.2022 17:53:40

802.11ac vht80
Middle Channel



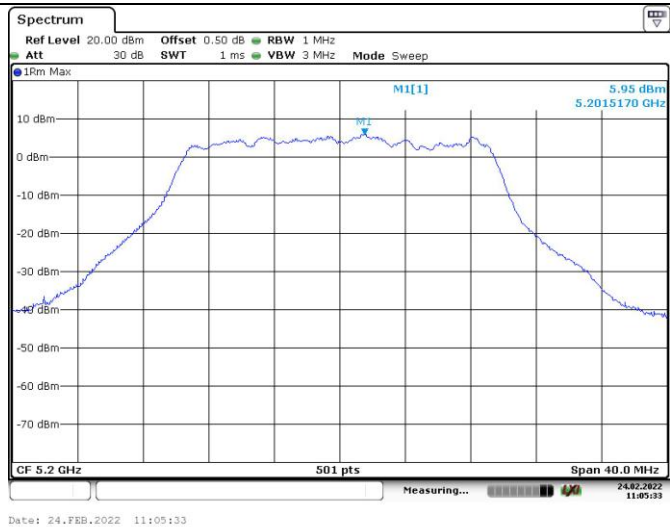
Date: 24.FEB.2022 11:02:43

Maximum power spectral density

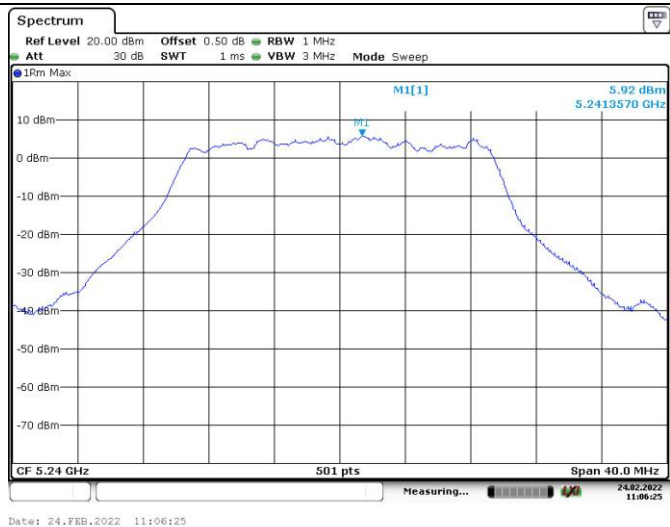
802.11ax hew20
Lowest Channel



802.11ax hew20
Middle Channel

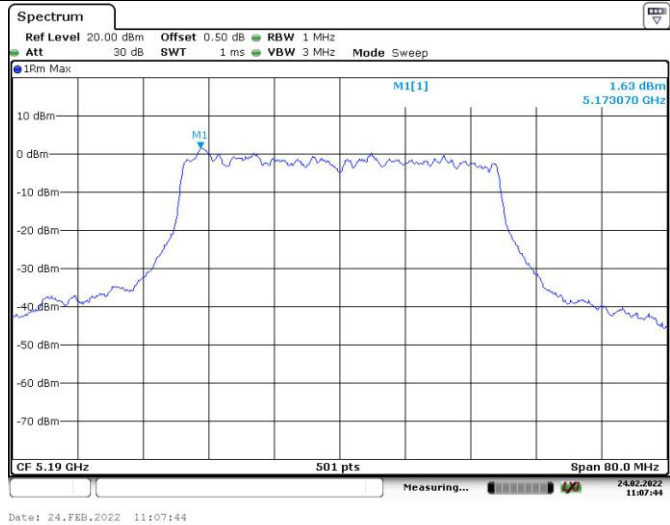


802.11ax hew20
Highest Channel

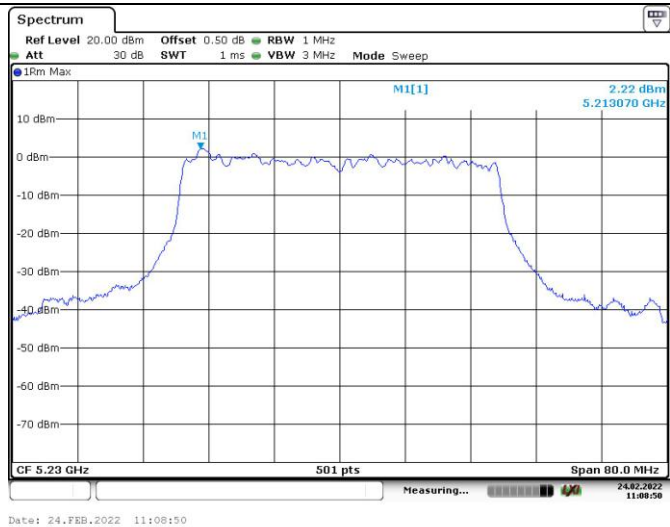


Maximum power spectral density

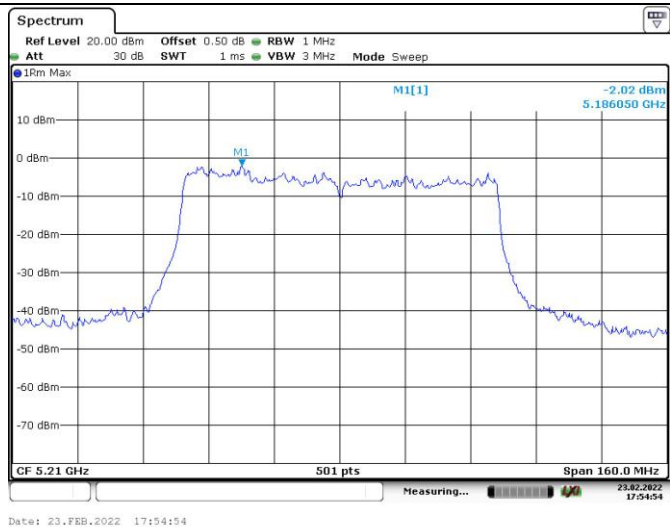
802.11ax hew40
Lowest Channel



802.11ax hew40
Highest Channel

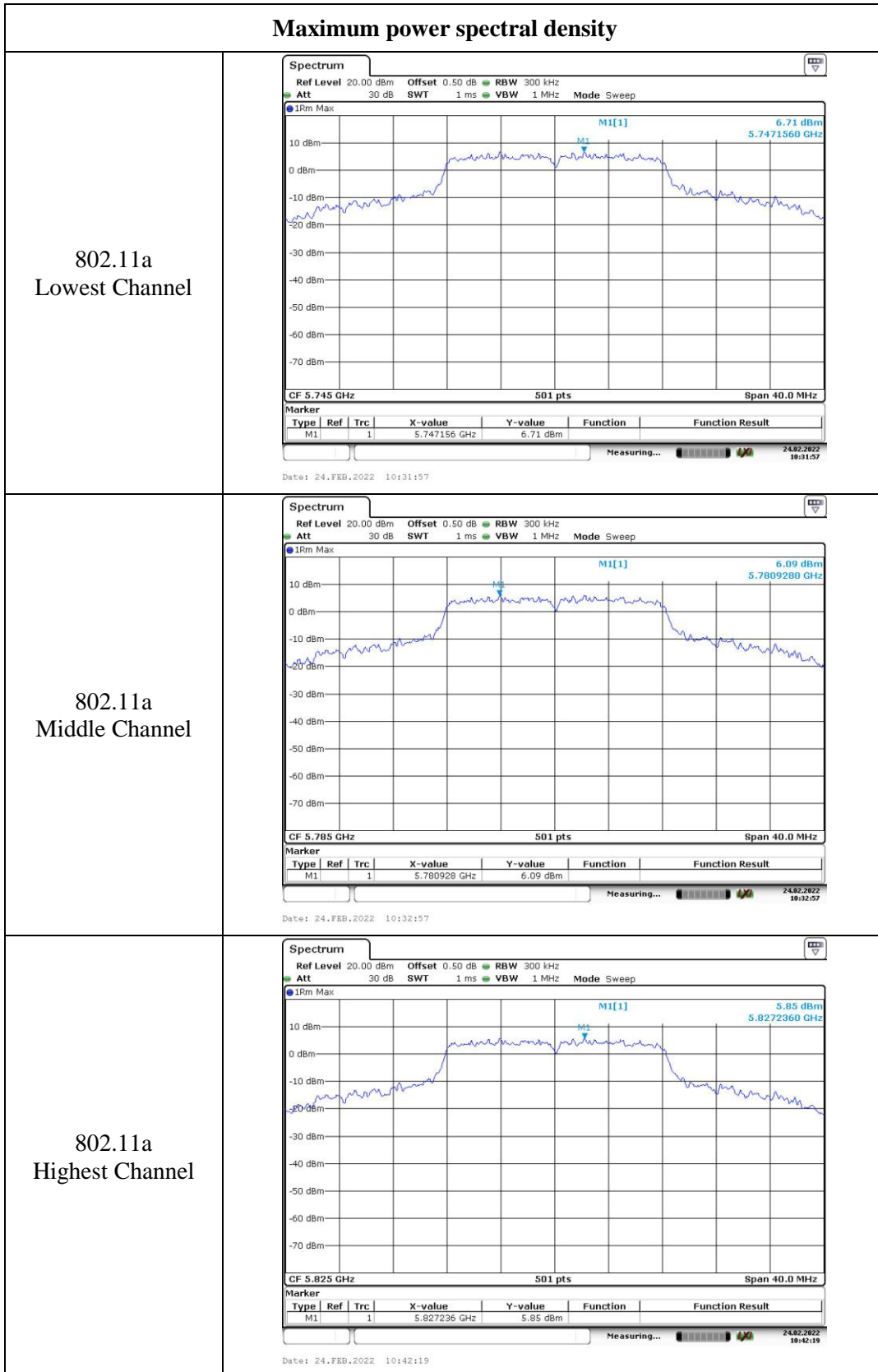


802.11ax hew80
Middle Channel



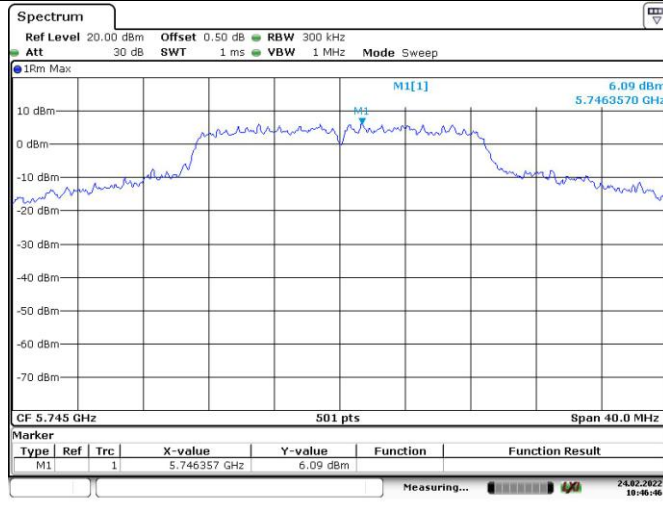
5725-5850MHz

Chain 0:

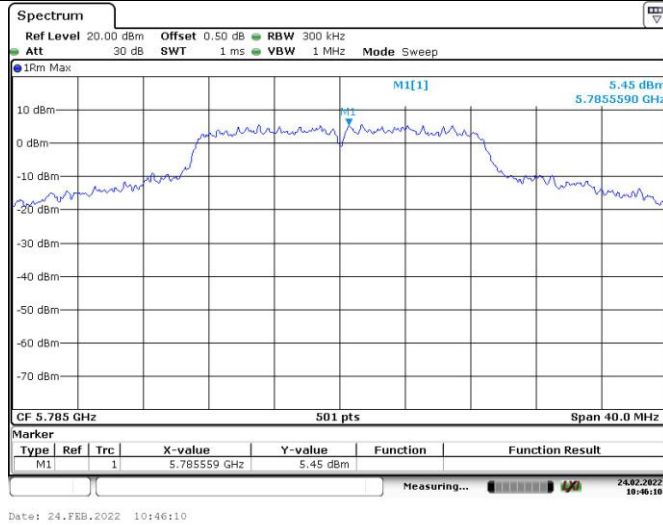


Maximum power spectral density

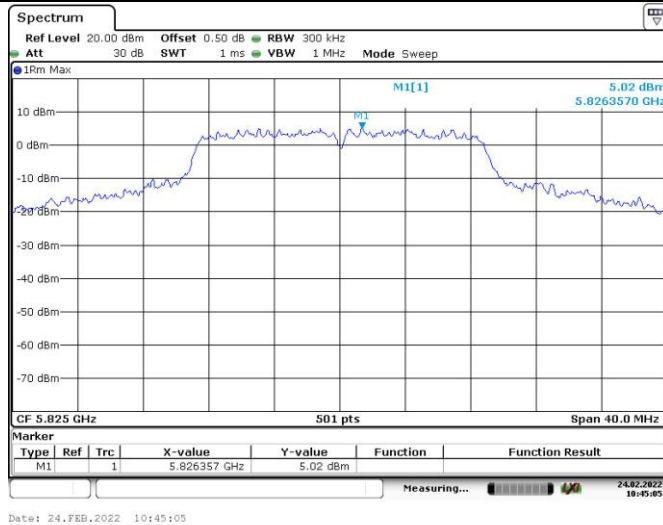
802.11n ht20
Lowest Channel



802.11n ht20
Middle Channel

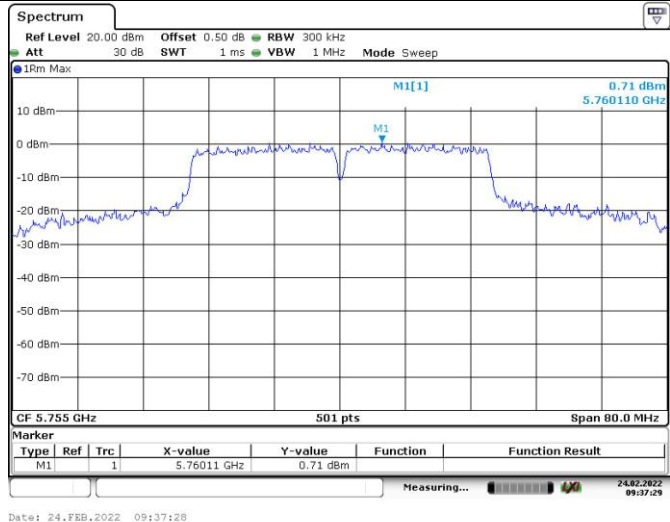


802.11n ht20
Highest Channel

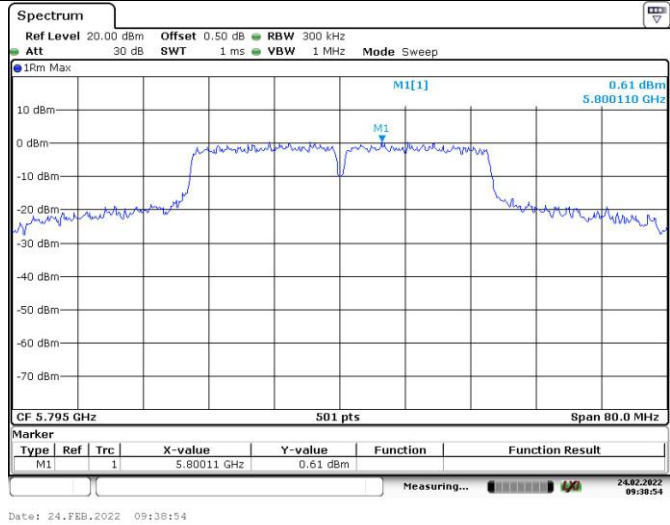


Maximum power spectral density

802.11n ht40
Lowest Channel

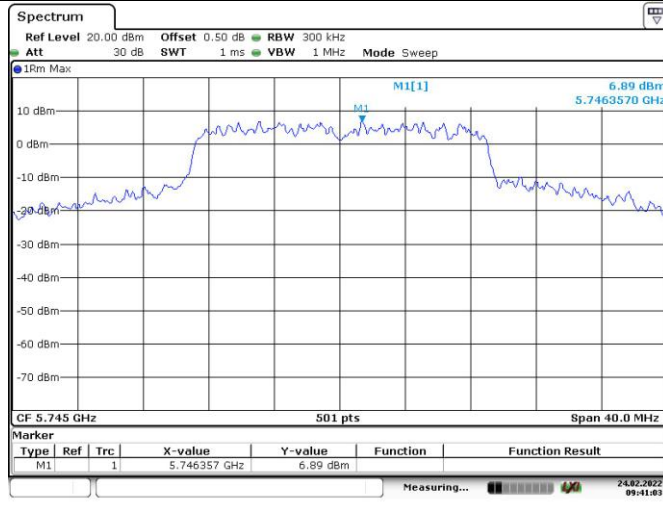


802.11n ht40
Highest Channel

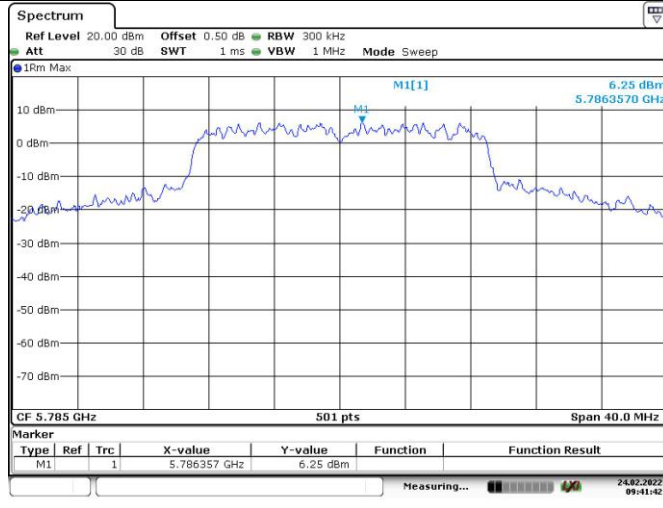


Maximum power spectral density

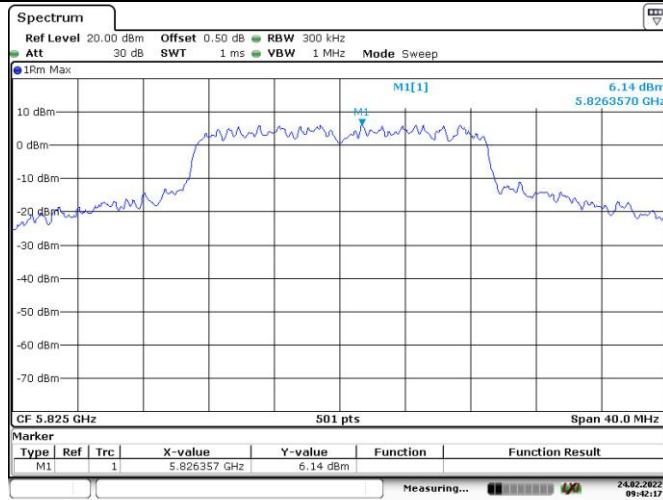
802.11ac vht20
Lowest Channel



802.11ac vht20
Middle Channel

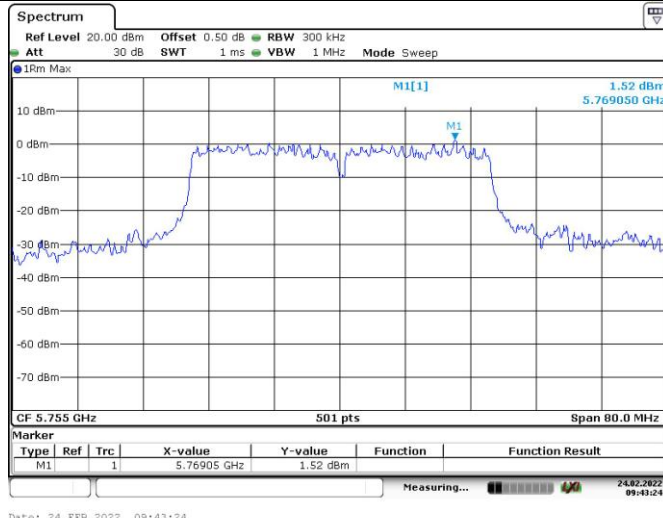


802.11ac vht20
Highest Channel

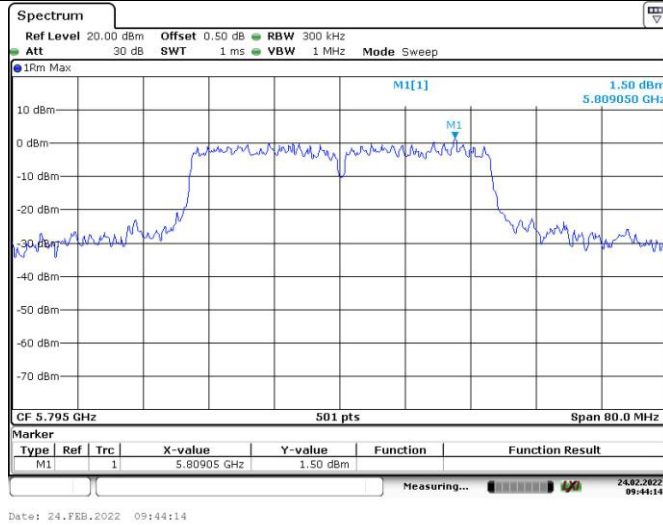


Maximum power spectral density

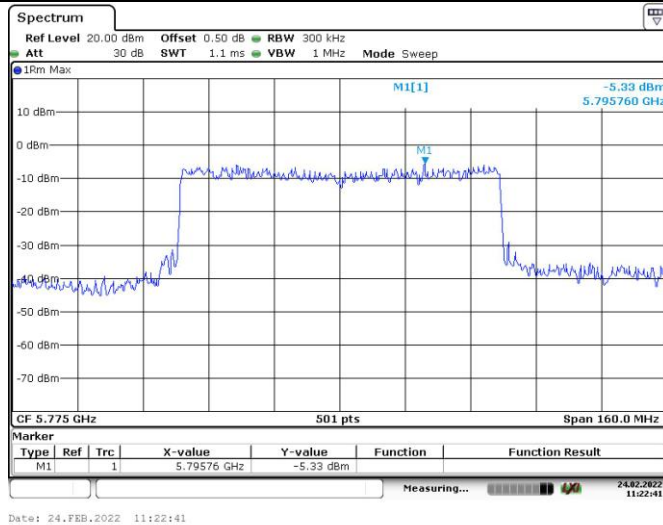
802.11ac vht40
Lowest Channel



802.11ac vht40
Highest Channel

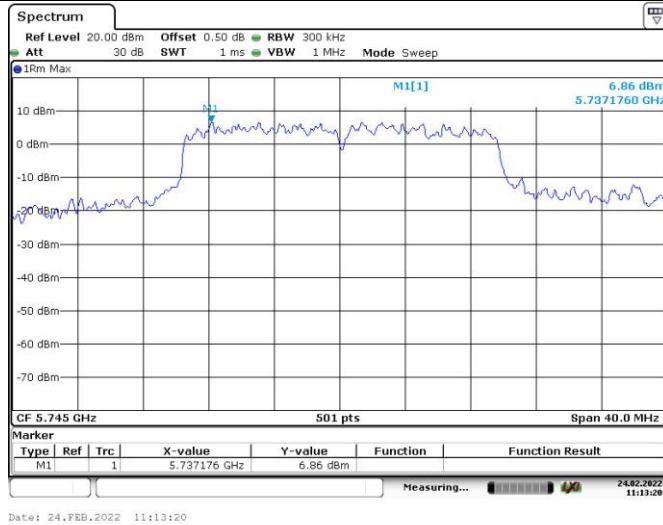


802.11ac vht80
Middle Channel

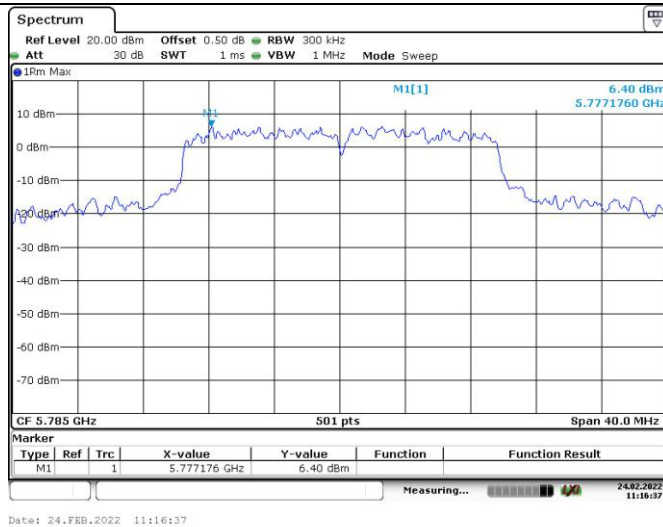


Maximum power spectral density

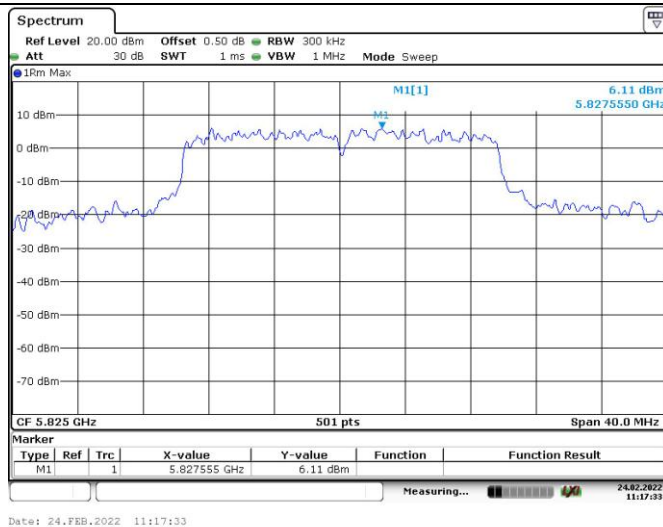
802.11ax hew20
Lowest Channel



802.11ax hew20
Middle Channel

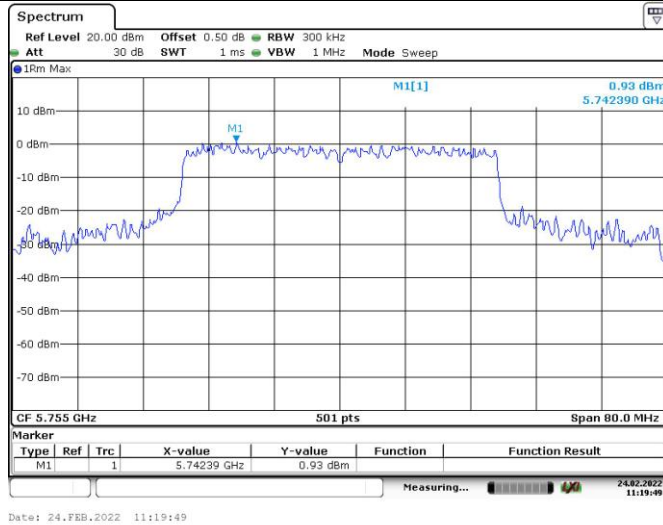


802.11ax hew20
Highest Channel

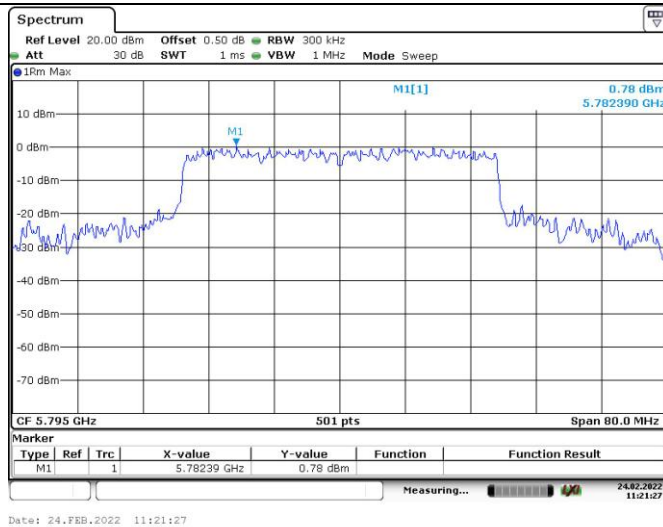


Maximum power spectral density

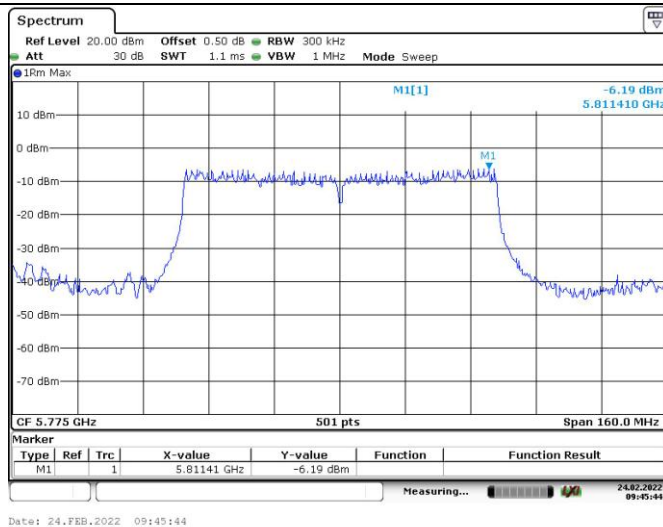
802.11ax hew40
Lowest Channel



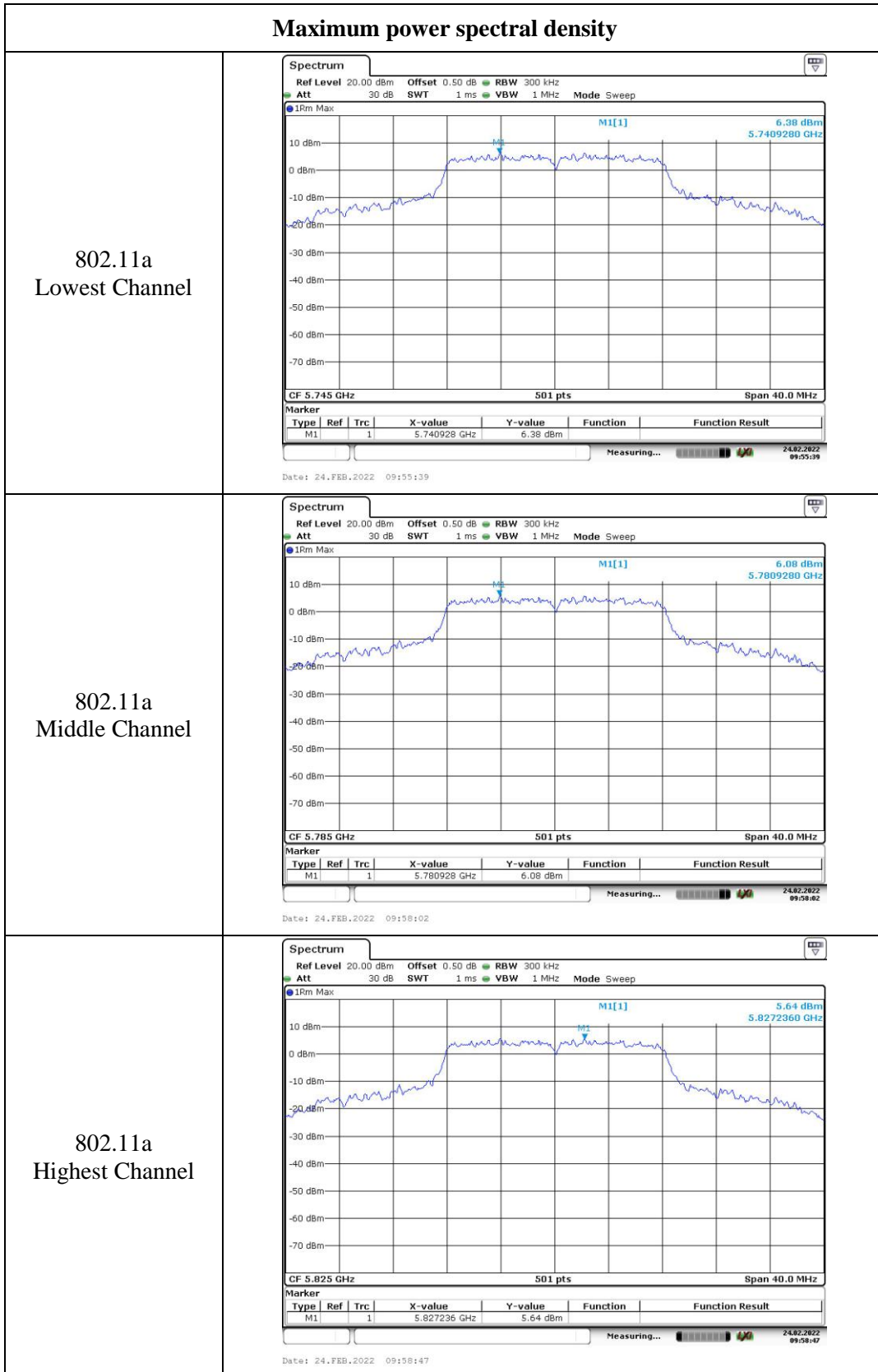
802.11ax hew40
Highest Channel



802.11ax hew80
Middle Channel

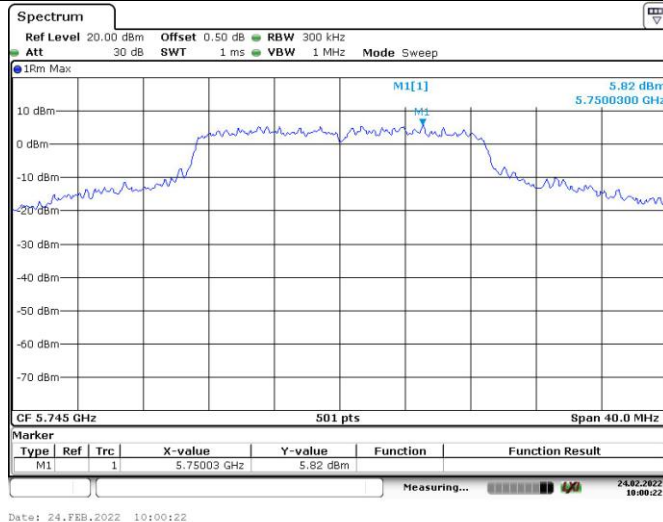


Chain 1:

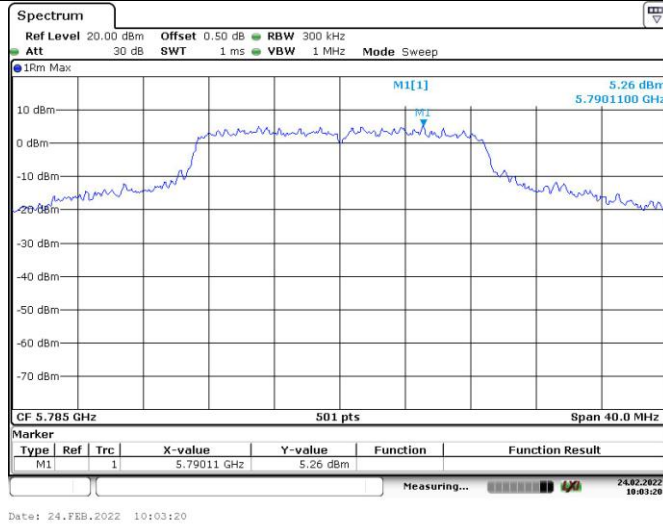


Maximum power spectral density

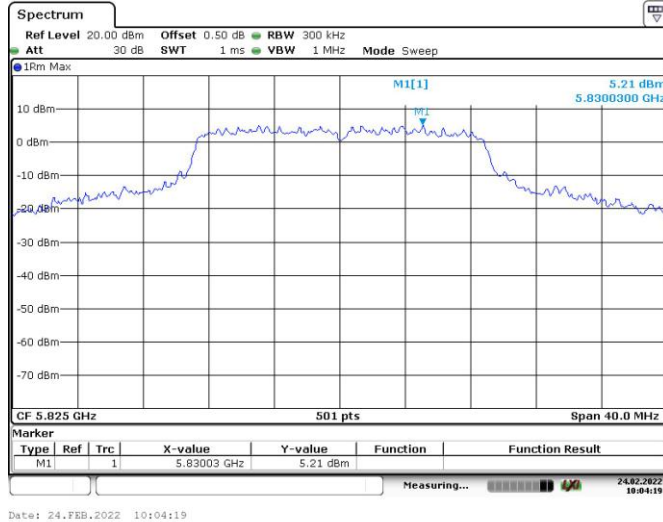
802.11n ht20
Lowest Channel



802.11n ht20
Middle Channel

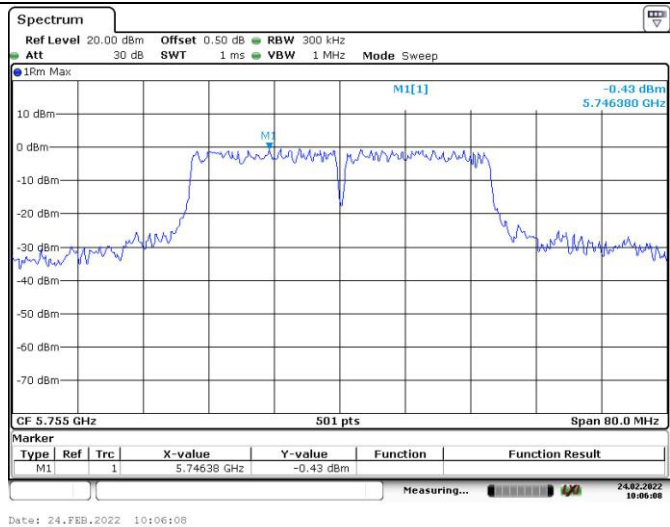


802.11n ht20
Highest Channel

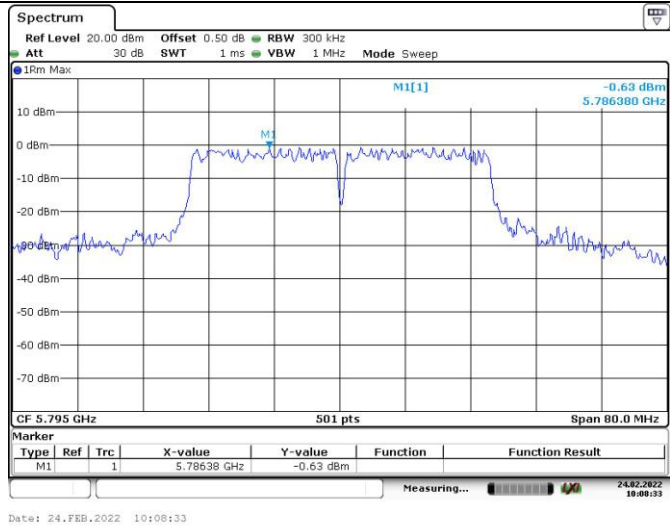


Maximum power spectral density

802.11n ht40
Lowest Channel

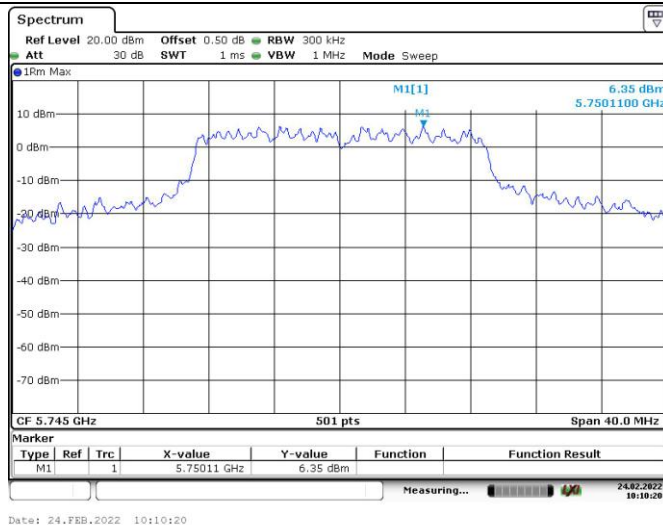


802.11n ht40
Highest Channel

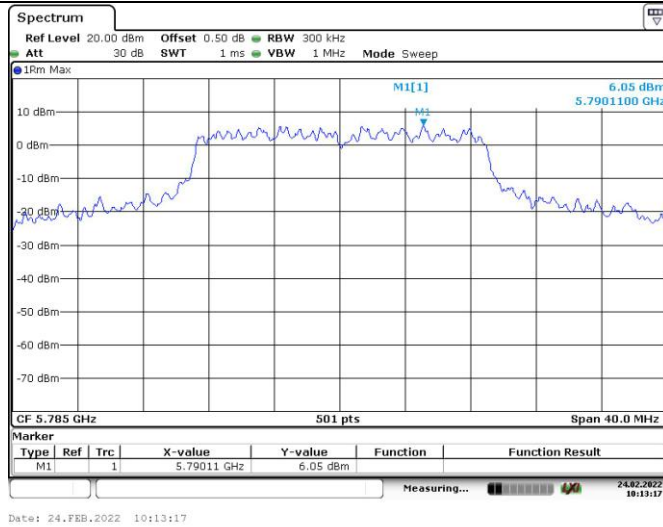


Maximum power spectral density

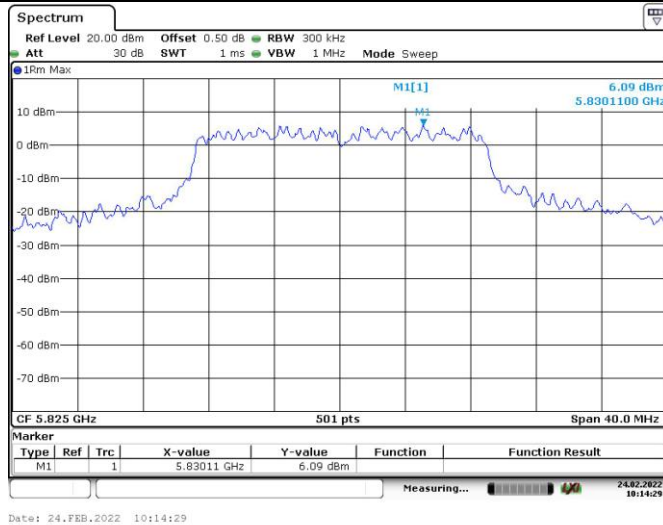
802.11ac vht20
Lowest Channel



802.11ac vht20
Middle Channel

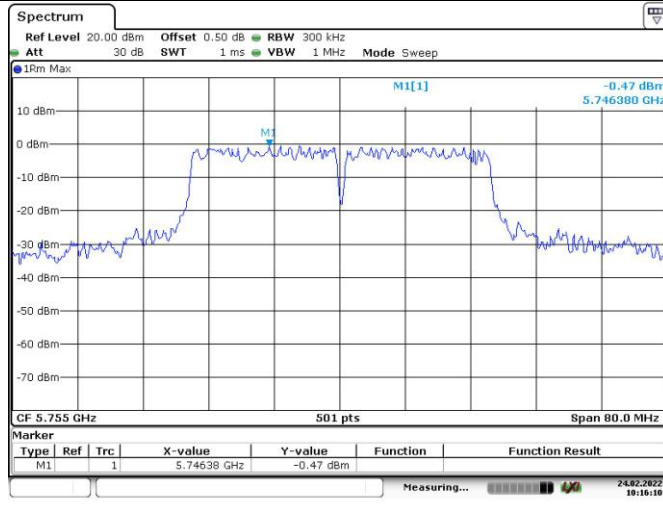


802.11ac vht20
Highest Channel

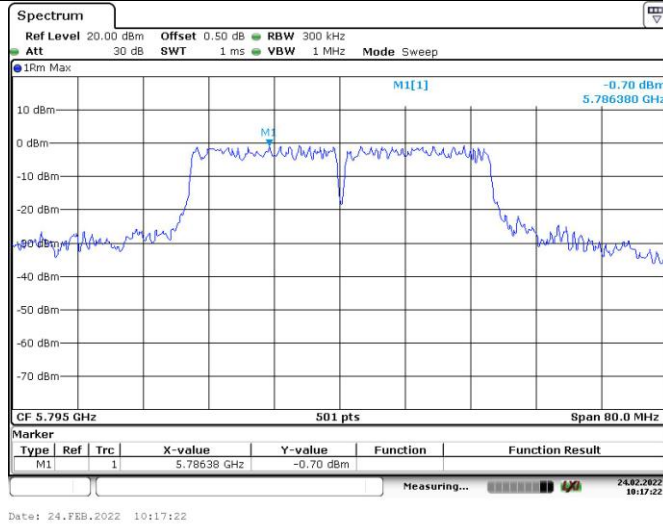


Maximum power spectral density

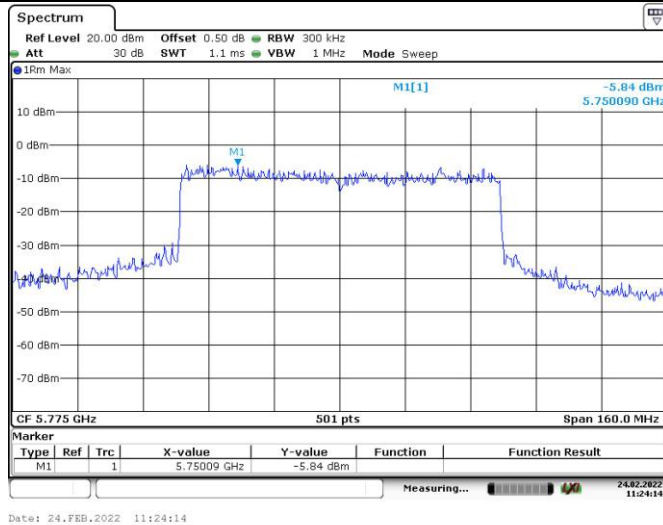
802.11ac vht40
Lowest Channel



802.11ac vht40
Highest Channel

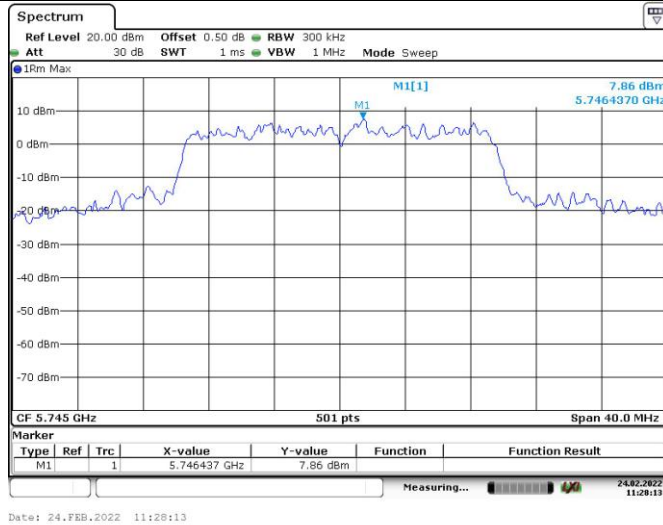


802.11ac vht80
Middle Channel

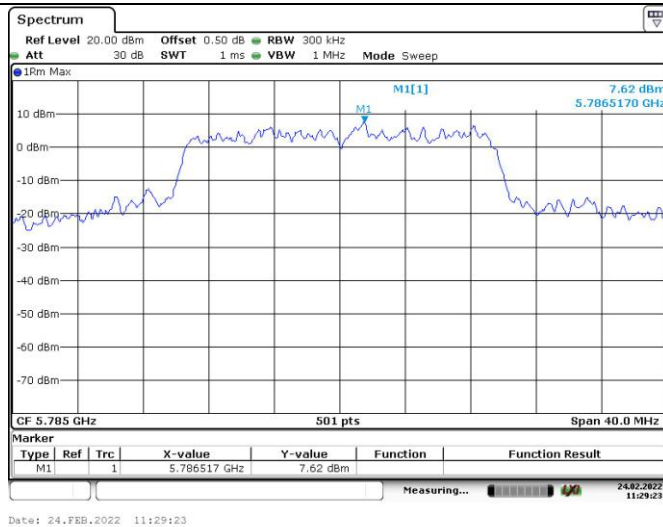


Maximum power spectral density

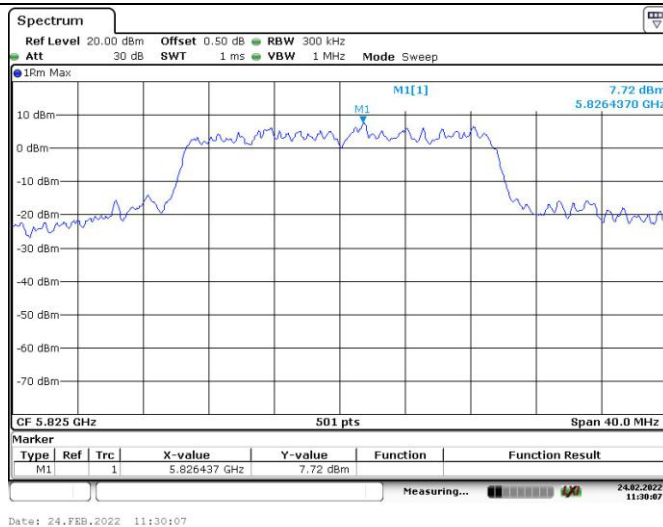
802.11ax hew20
Lowest Channel



802.11ax hew20
Middle Channel

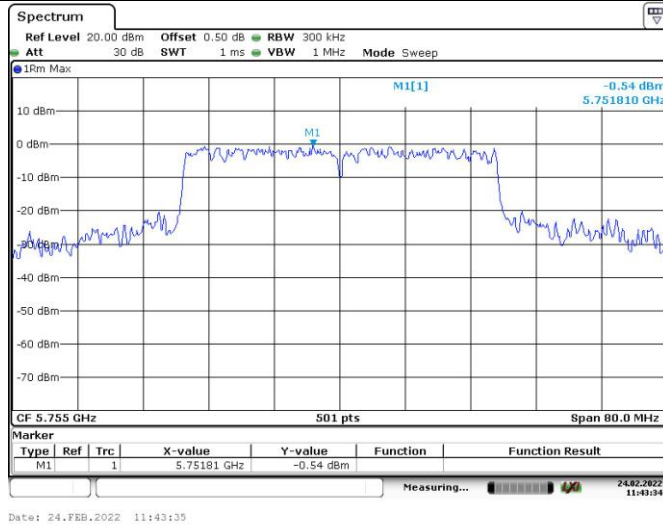


802.11ax hew20
Highest Channel

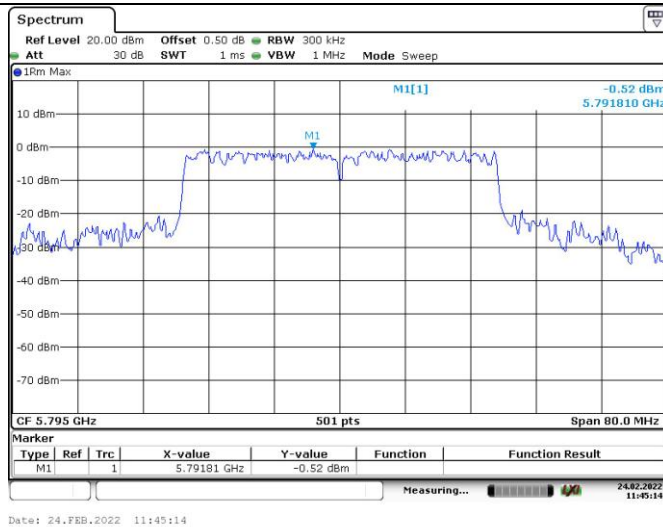


Maximum power spectral density

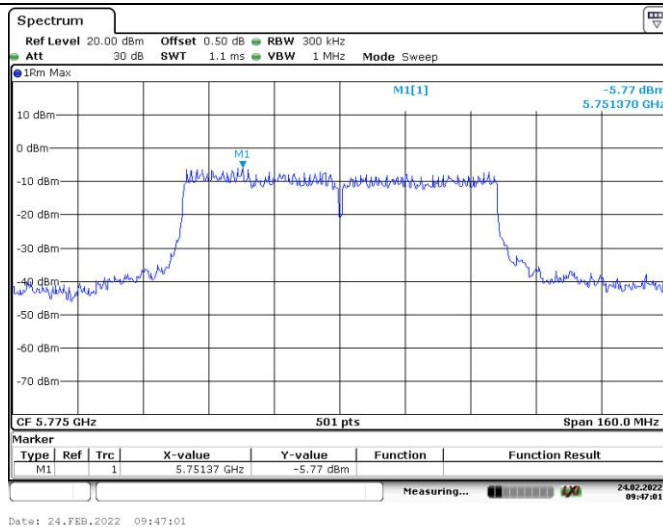
802.11ax hew40
Lowest Channel



802.11ax hew40
Highest Channel



802.11ax hew80
Middle Channel



4.6 Duty Cycle:

Serial Number:	CR22010047-RF-S1	Test Date:	2022-02-26-2022-02-26
Test Site:	RF	Test Mode:	Transmitting
Tester:	Le Joe	Test Result:	N/A

Environmental Conditions:

Temperature: (°C)	19.5	Relative Humidity: (%)	57	ATM Pressure: (kPa)	101.74
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2021/7/22	2022/7/21
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	2021/8/8	2022/8/7

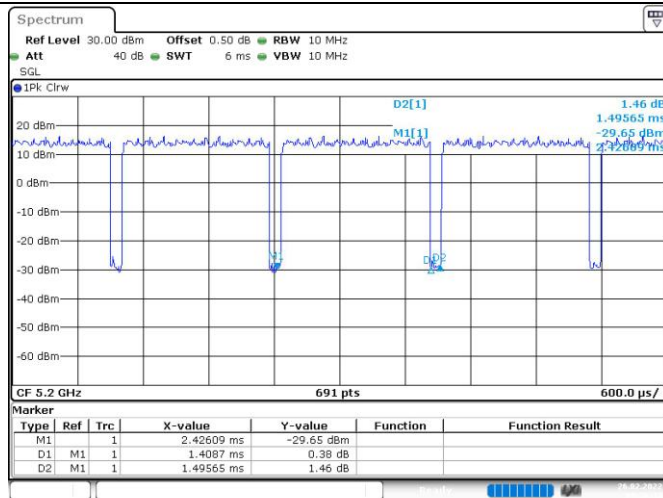
* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

Test Modes	Ton (ms)	Ton+off (ms)	Duty Cycle (%)
802.11a	1.409	1.496	94.18
802.11n ht20	0.622	0.713	87.24
802.11n ht40	0.322	0.413	77.97
802.11ac vht20	0.099	0.199	49.75
802.11ac vht40	0.084	0.181	46.41
802.11ax hew20	0.106	0.203	52.22
802.11ax hew40	0.074	0.183	40.44
802.11ac vht80	0.058	0.157	36.94
802.11ax hew80	0.084	0.171	49.12

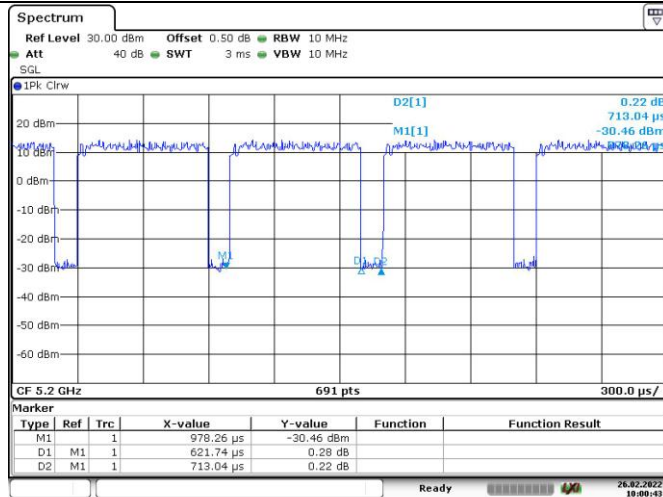
Duty Cycle

802.11a



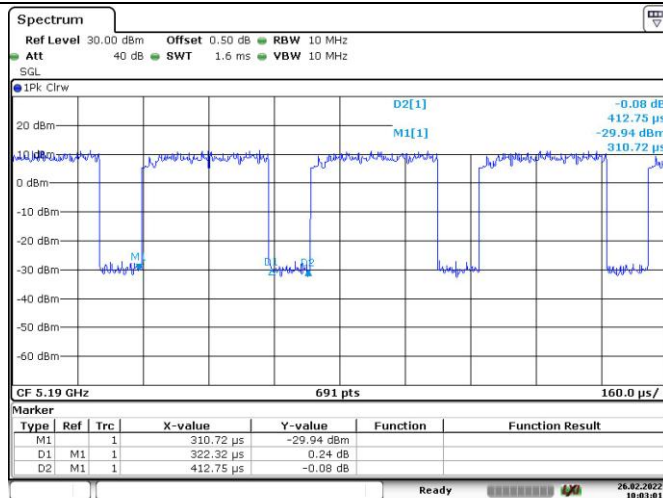
Date: 26.FEB.2022 09:58:15

802.11n ht20



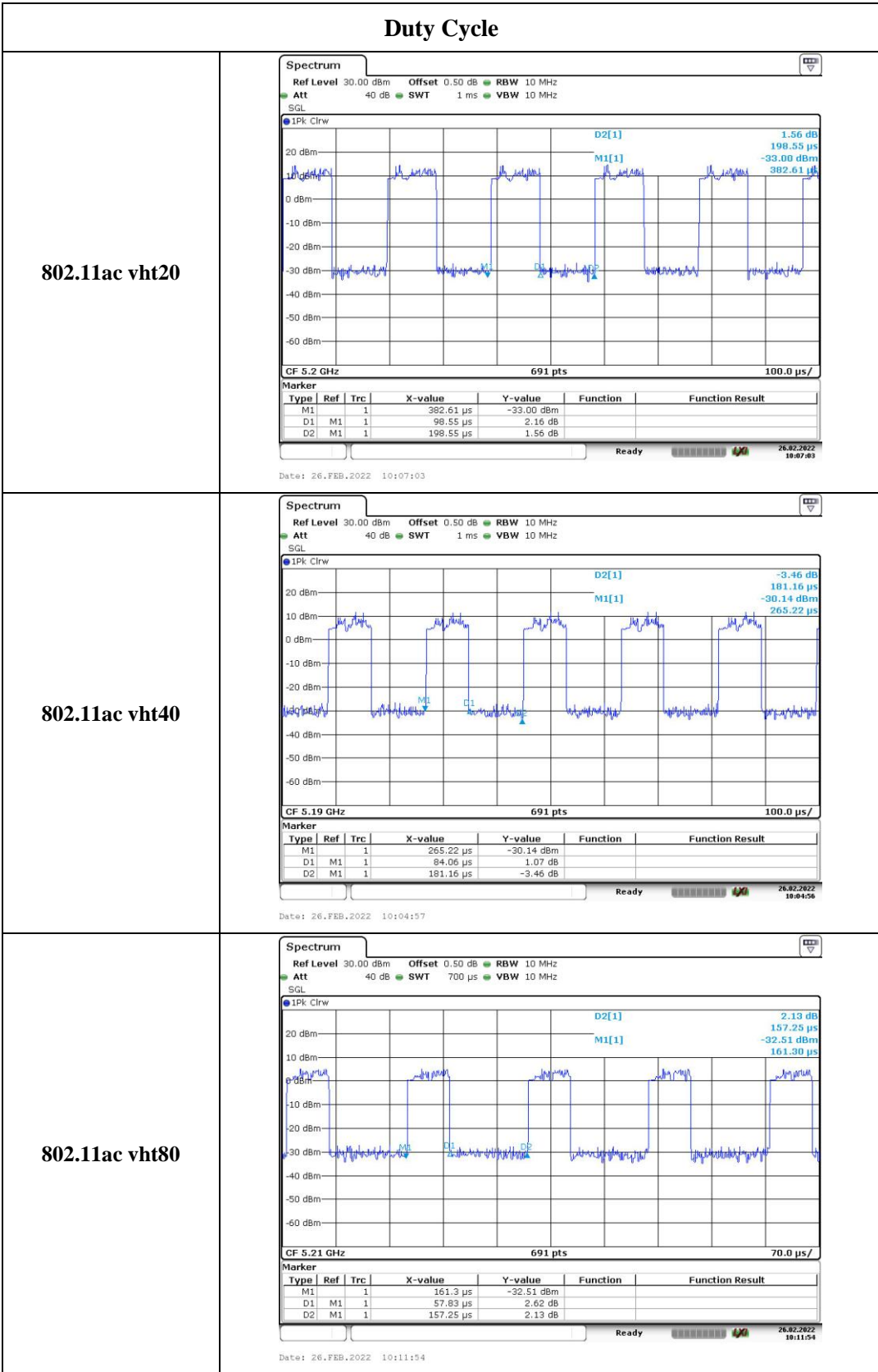
Date: 26.FEB.2022 10:00:44

802.11n ht40



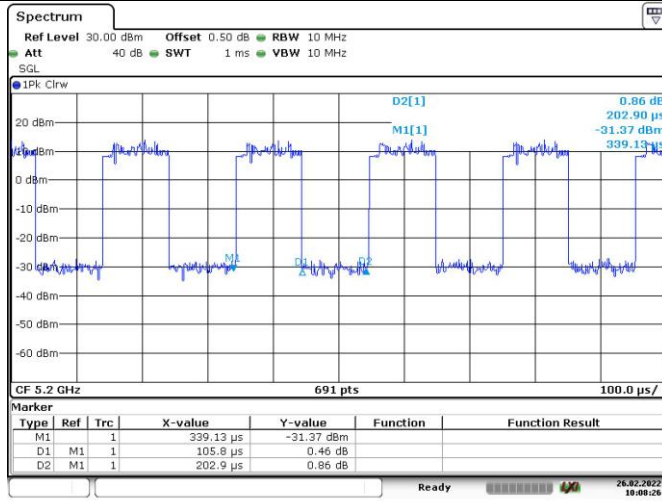
Date: 26.FEB.2022 10:03:01

Duty Cycle



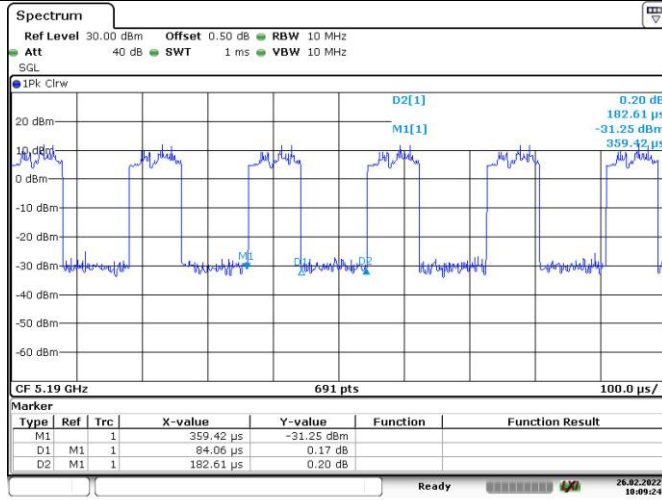
Duty Cycle

802.11ax hew20



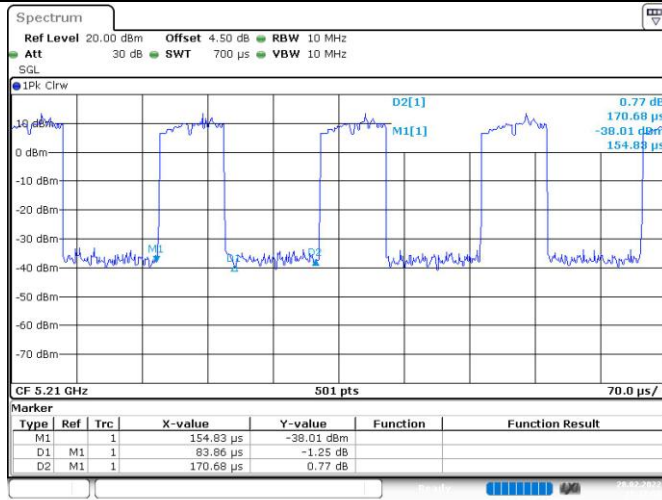
Date: 26.FEB.2022 10:08:26

802.11ax hew40



Date: 26.FEB.2022 10:09:25

802.11ax hew80



Date: 28.FEB.2022 15:17:58

5. RF EXPOSURE EVALUATION

5.1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

5.1.1 Applicable Standard

FCC §15.407 (f) & §1.1310 & §2.1091

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See §1.1307(b)(1) of this chapter.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

5.1.2 Procedure

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

5.1.3 Calculated Result

Operation Bands	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
2.4GHz	2412-2462	4.2	2.63	26	398.11	20.00	0.2084	1.0
5.2GHz	5150-5250	5	3.16	18	63.10	20.00	0.0397	1.0
5.8GHz	5725-5850	5	3.16	21	125.89	20.00	0.0792	1.0

Note: Non simultaneously transmission in the band 2.4GHz, 5.2GHz or 5.8GHz.

Result: The device meet FCC MPE at 20 cm distance.

===== END OF REPORT =====