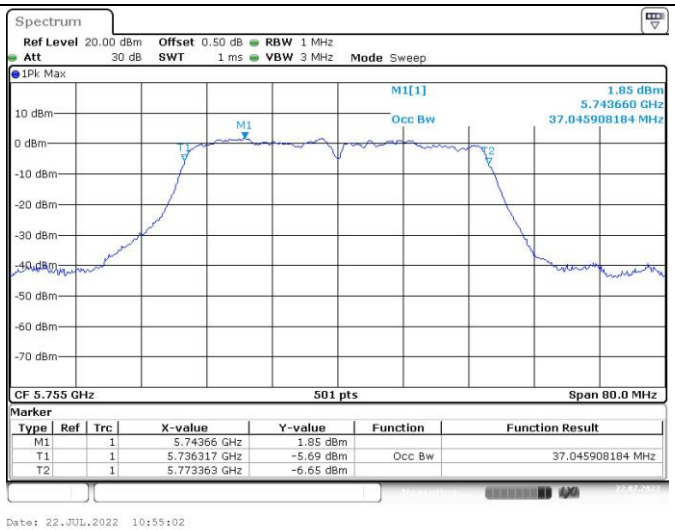
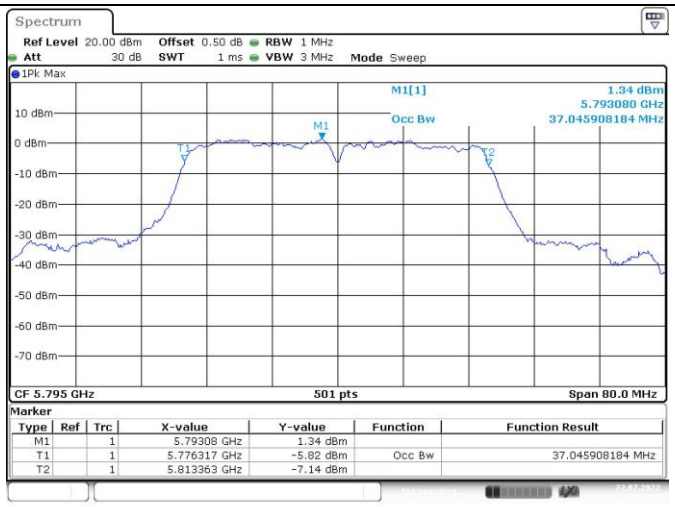
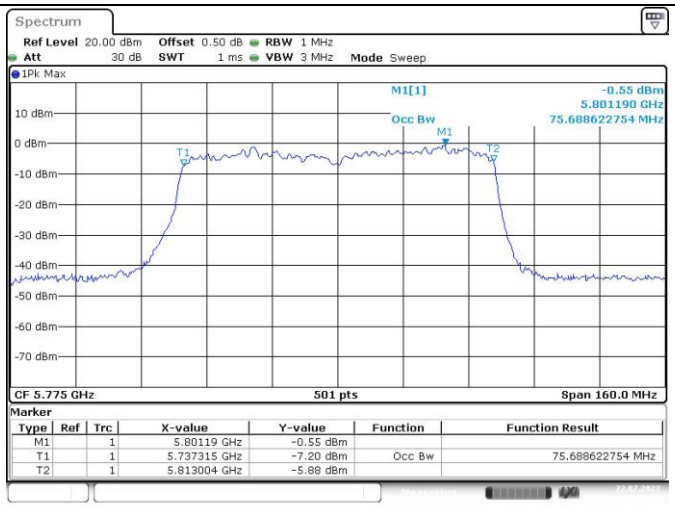
99% Emission Bandwidth	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

4.4 Maximum Conducted Output Power:

Serial Number:	CR22070014-RF-S1	Test Date:	2022-07-16~2022-07-22
Test Site:	RF	Test Mode:	Transmitting
Tester:	Julie Tan	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	26.8~27.2	Relative Humidity: (%)	45~54	ATM Pressure: (kPa)	100.2~100.9

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	USB Wideband Power Sensor	U2021XA	MY54080015	2022-07-15	2023-07-14
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060301	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100001	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:

Test Data:

5150-5250 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)				
		Chain 0	Chain 1	Total	Limit For Non-beamforming (dBm)	Limit For Beamforming (dBm)
802.11a	5180	18.79	18.6	/	30	/
	5200	18.65	18.79	/	30	/
	5240	18.33	18.47	/	30	/
802.11n ht20	5180	19.07	18.98	22.04	30	30
	5200	19.22	18.95	22.10	30	30
	5240	18.66	18.56	21.62	30	30
802.11n ht40	5190	18.97	18.83	21.91	30	30
	5230	18.91	19.06	22.00	30	30
802.11ac vht20	5180	14.14	13.54	16.86	30	30
	5200	13.43	13.96	16.71	30	30
	5240	13.57	13.81	16.70	30	30
802.11ac vht40	5190	13.45	12.76	16.13	30	30
	5230	12.78	12.63	15.72	30	30
802.11ac vht80	5210	11.68	11.74	14.72	30	30

Note:
The device is an indoor AP.
The duty cycle factor has been calculated into the test data.
The maximum antenna gain is 3.0dBi in 5GHz band. 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 measurements on IEEE 802.11 devices:

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

So:
For Non-beamforming mode:
Directional gain =3.0dBi

For Beamforming mode:
Directional gain = 3.0+3.0 =6.0 dBi

5725-5850 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)				
		Chain 0	Chain 1	Total	Limit For Non-beamforming (dBm)	Limit For Beamforming (dBm)
802.11a	5745	18.03	18.05	/	30	/
	5785	17.97	18.15	/	30	/
	5825	17.97	18.03	/	30	/
802.11n ht20	5745	18.09	18.12	21.01	30	30
	5785	17.95	18.16	21.12	30	30
	5825	17.99	18.03	21.07	30	30
802.11n ht40	5755	17.91	17.87	21.02	30	30
	5795	17.7	17.84	20.90	30	30
802.11ac vht20	5745	13.27	13.32	20.78	30	30
	5785	13.46	13.27	16.31	30	30
	5825	13.13	13.37	16.38	30	30
802.11ac vht40	5755	12.4	12.68	16.26	30	30
	5795	11.87	12.13	15.55	30	30
802.11ac vht80	5775	11.17	11.22	15.01	30	30

Note:
The duty cycle factor has been calculated into the test data.
The maximum antenna gain is 3.0dBi in 5GHz band. 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 measurements on IEEE 802.11 devices:

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

So:
For Non-beamforming mode:
Directional gain =3.0dBi

For Beamforming mode:
Directional gain = 3.0+3.0 =6.0 dBi

4.5 Maximum power spectral density:

Serial Number:	CR22070014-RF-S1	Test Date:	2022-08-08~2022-08-09
Test Site:	RF	Test Mode:	Transmitting
Tester:	Julie Tan	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	27.2~27.8	Relative Humidity: (%)	64~68	ATM Pressure: (kPa)	100.2

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2022-07-15	2023-07-14
YINSAIGE	Coaxial Cable	SS402	SJ0100001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	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:

Test Modes	Test Frequency (MHz)	Maximum Power Spectral Density (dBm/MHz)			
		Chain 0	Chain 1	Total	Limit
802.11a	5180	7.53	7.15	/	≤17.00
	5200	7.39	7.21	/	≤17.00
	5240	7.36	7.18	/	≤17.00
802.11n ht20	5180	8.86	8.63	11.76	≤14.00
	5200	8.57	8.61	11.60	≤14.00
	5240	8.85	8.7	11.79	≤14.00
802.11n ht40	5190	5.65	5.69	8.68	≤14.00
	5230	6.17	5.4	8.81	≤14.00
802.11ac vht20	5180	2.91	2.46	5.70	≤14.00
	5200	2.7	2.59	5.66	≤14.00
	5240	2.5	2.34	5.43	≤14.00
802.11ac vht40	5190	0.69	-0.31	3.23	≤14.00
	5230	-0.02	-0.2	2.90	≤14.00
802.11ac vht80	5210	-3.08	-3	-0.03	≤14.00

Note :

The maximum antenna gain is 3.0 dBi. And beamforming gain is 3.0 dBi. 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:

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

So:

Directional gain = G_{ANT} + Array Gain = 3.0+10*log(2/1)=6.0 dBi for Non-beamforming mode

Directional gain = G_{ANT} + Array Gain =3.0+3+10*log(2/1)=9.0 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 v02r01was used for PSD test.

5725-5850 MHz:

Test Modes	Test Frequency (MHz)	Reading (dBm/300kHz)		Maximum Power Spectral Density (dBm/500kHz)			
		Chain 0	Chain 1	Chain 0	Chain 1	Total	Limit
802.11a	5745	6.37	6.37	8.59	8.59	/	≤30.00
	5785	6.47	7.13	8.69	9.35	/	≤30.00
	5825	6.42	6.43	8.64	8.65	/	≤30.00
802.11n ht20	5745	6.65	6.30	8.87	8.52	11.71	≤27.00
	5785	6.61	6.98	8.83	9.2	12.03	≤27.00
	5825	6.96	6.68	9.18	8.9	12.05	≤27.00
802.11n ht40	5755	3.45	3.75	5.67	5.97	8.83	≤27.00
	5795	3.57	3.55	5.79	5.77	8.79	≤27.00
802.11ac vht20	5745	1.92	2.70	4.14	4.92	7.56	≤27.00
	5785	2.43	2.42	4.65	4.64	7.66	≤27.00
	5825	2.17	2.66	4.39	4.88	7.65	≤27.00
802.11ac vht40	5755	-1.11	-0.76	1.11	1.46	4.30	≤27.00
	5795	-0.64	-0.90	1.58	1.32	4.46	≤27.00
802.11ac vht80	5775	-4.52	-4.67	-2.3	-2.45	0.64	≤27.00

Note:
The maximum antenna gain is 3.0 dBi. And beamforming gain is 3.0 dBi. 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:

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

So:

Directional gain = G_{ANT} + Array Gain = 3.0+10*log(2/1)=6.0 dBi for Non-beamforming mode

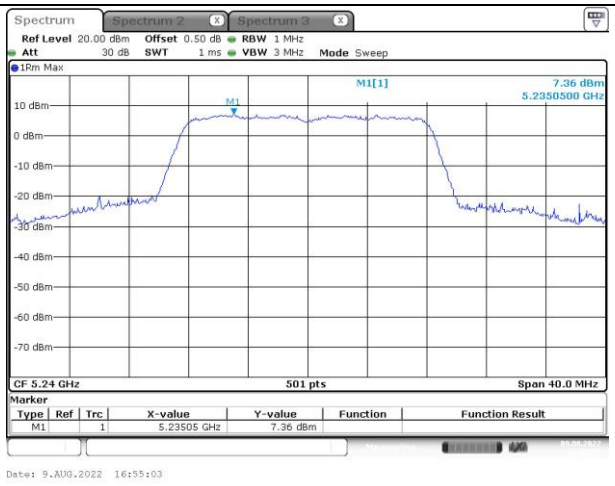
Directional gain = G_{ANT} + Array Gain =3.0+3+10*log(2/1)=9.0 dBi for Beamforming mode

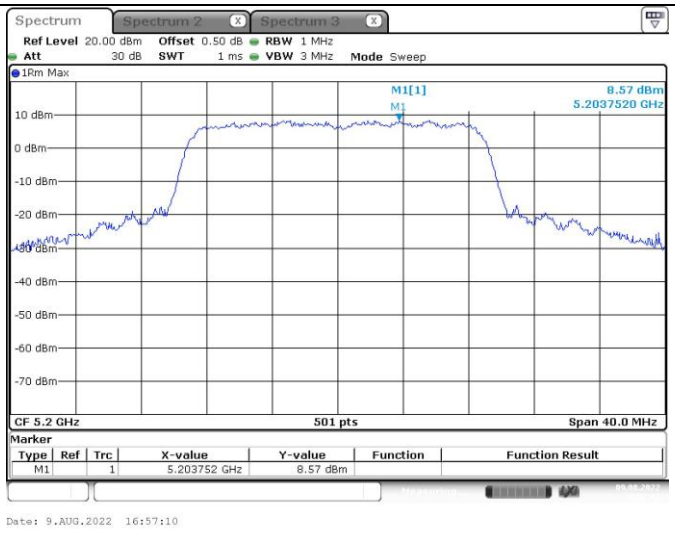
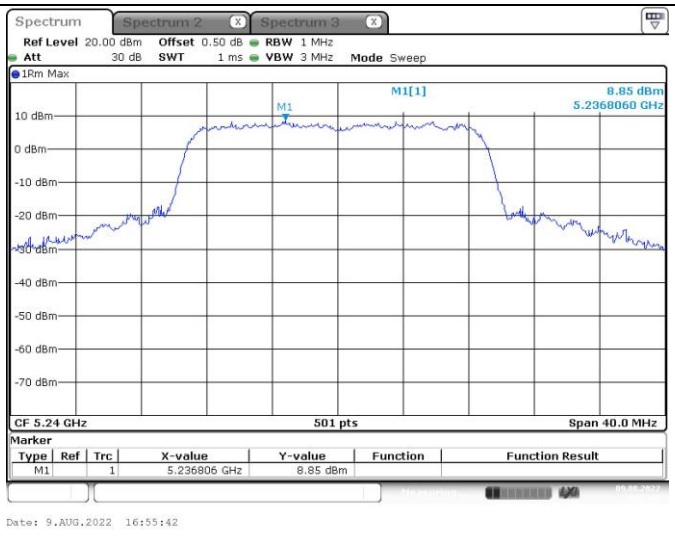
The worst limit Beamforming mode was used in the table.

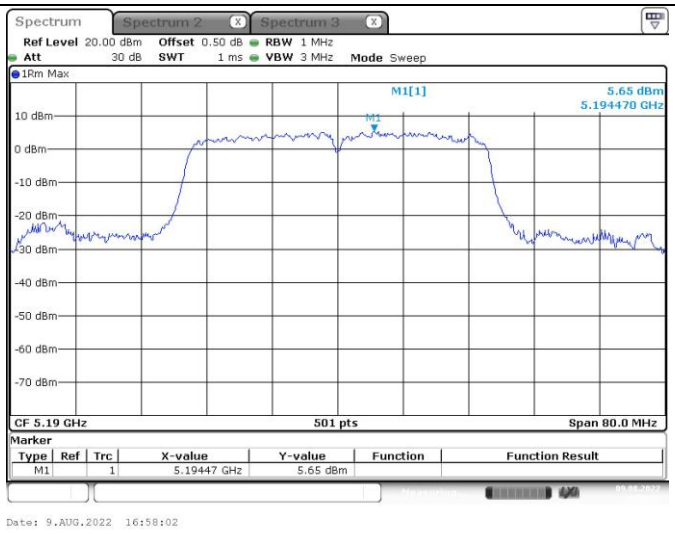
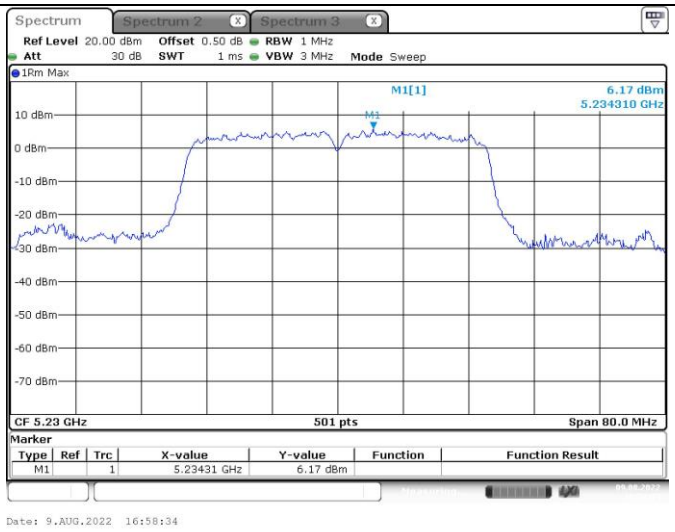
Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test.

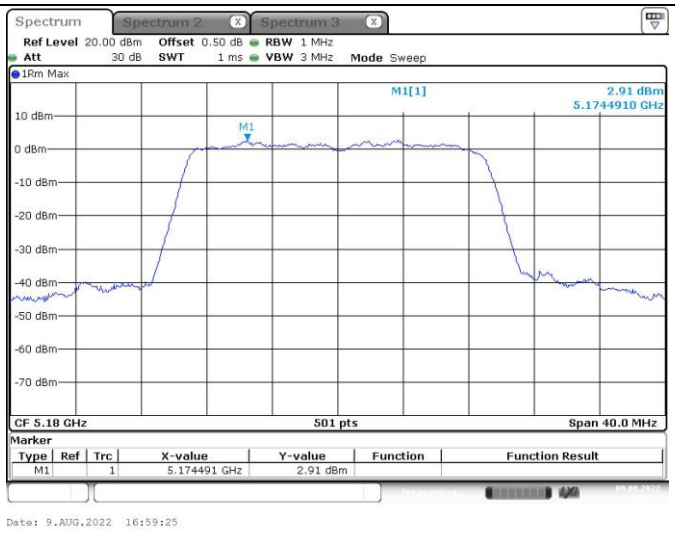
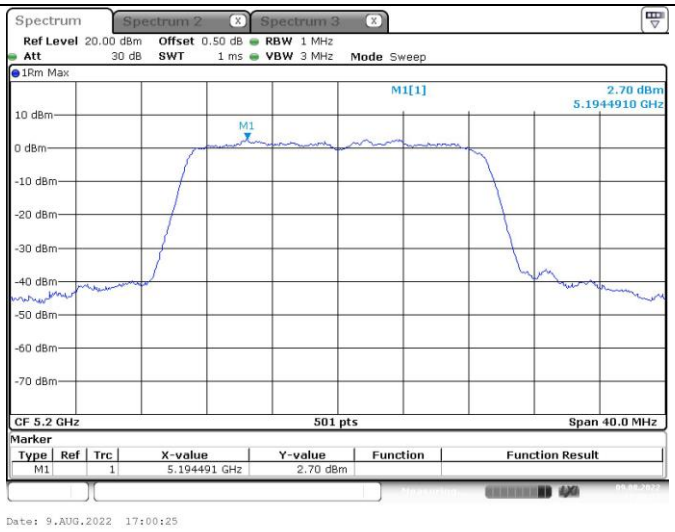
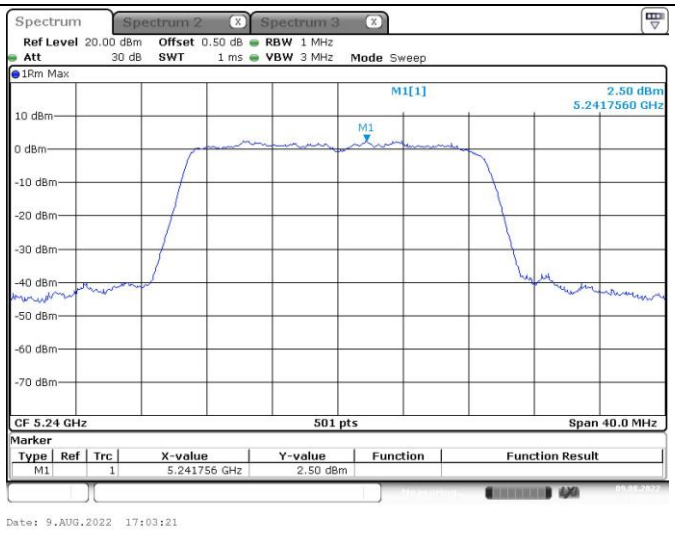
If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW)to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement

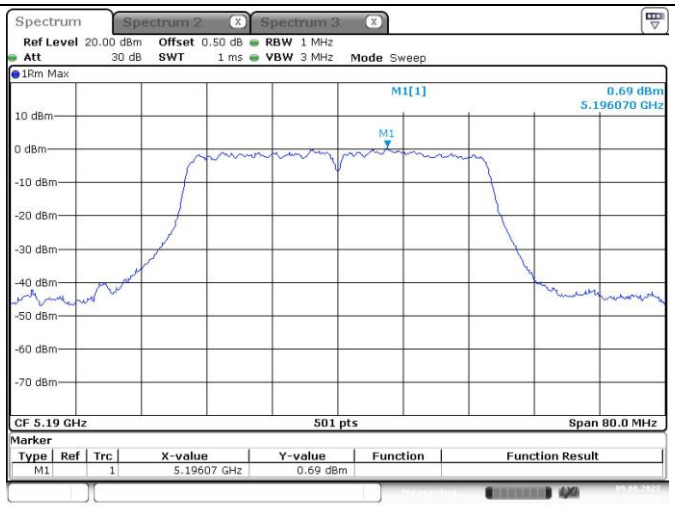
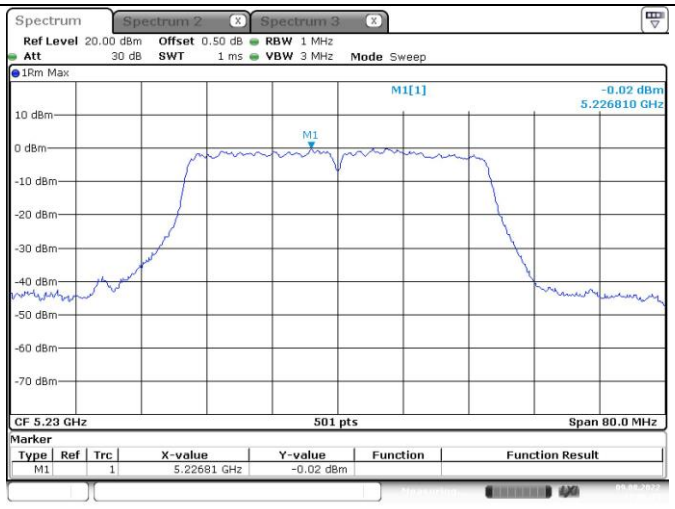
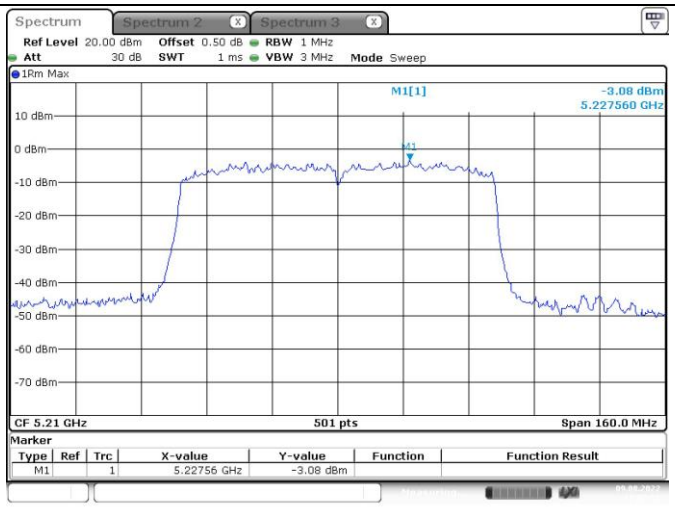
5150-5250MHz:
Chain0:

Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

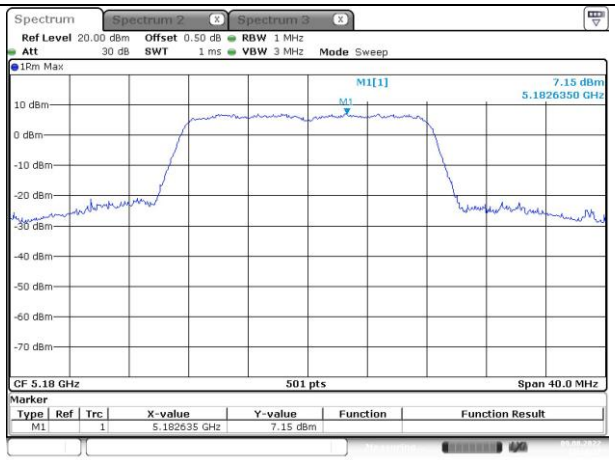
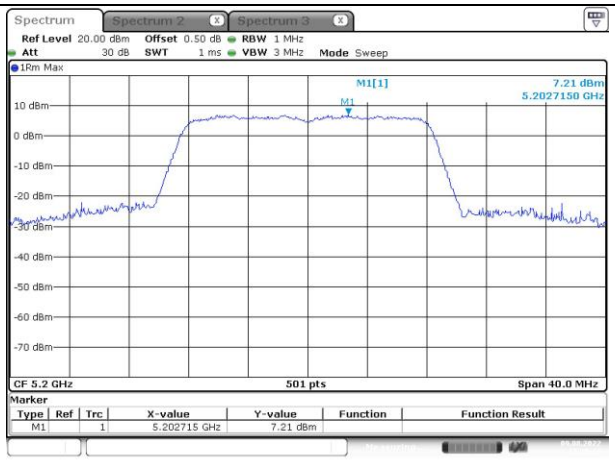
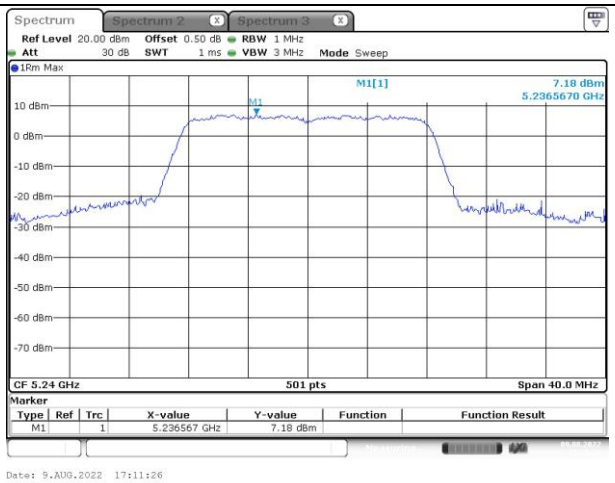
Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

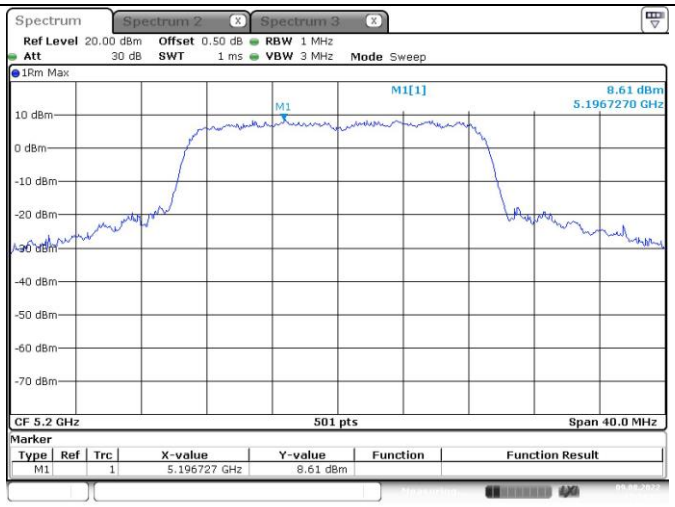
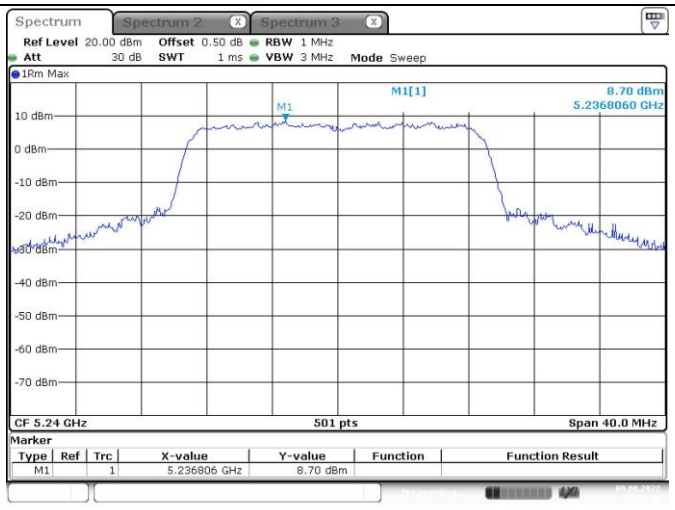
Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

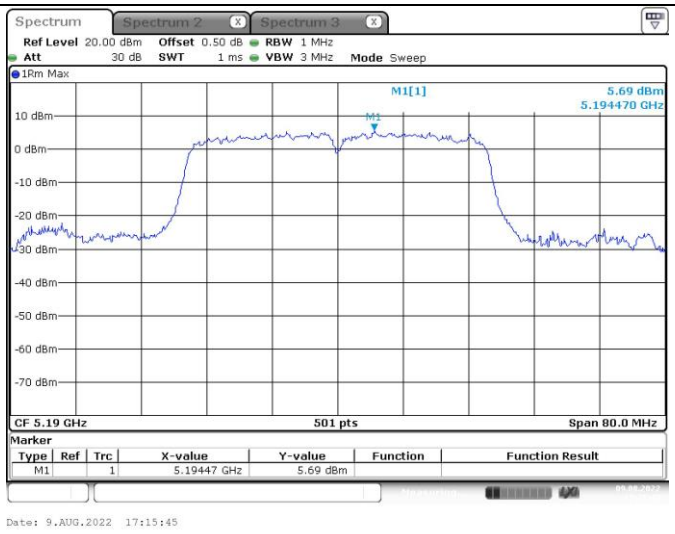
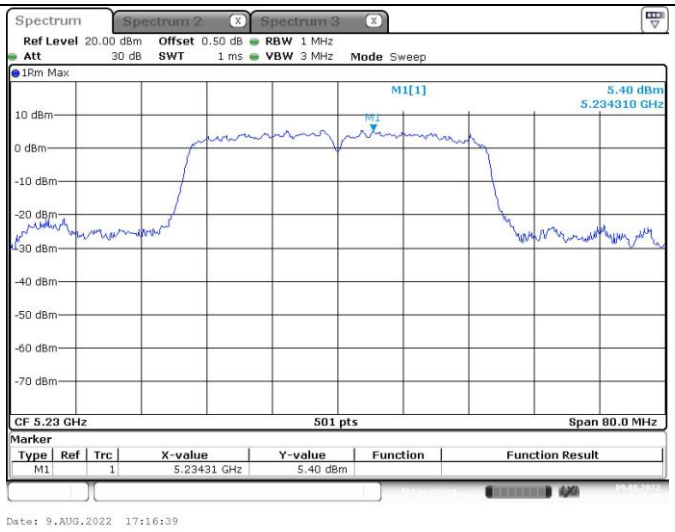
Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

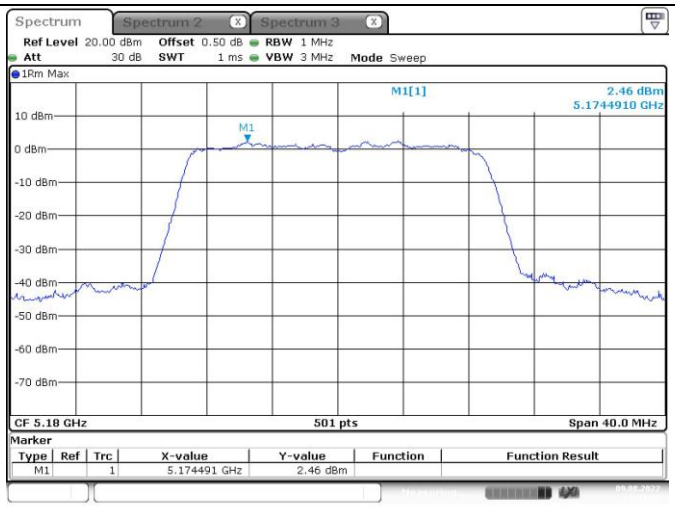
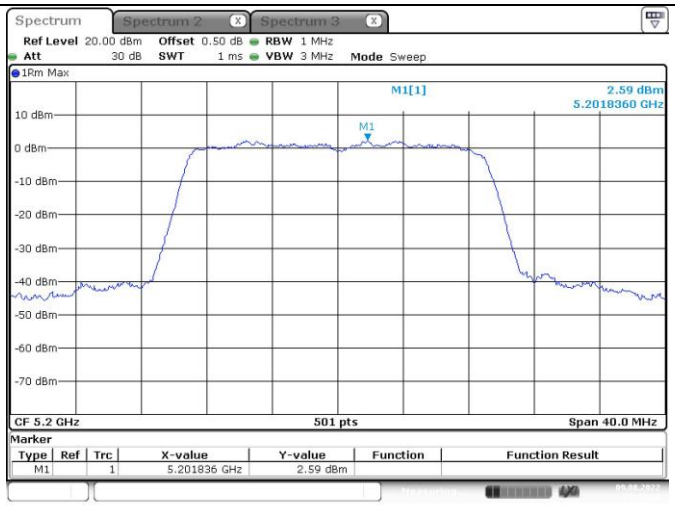
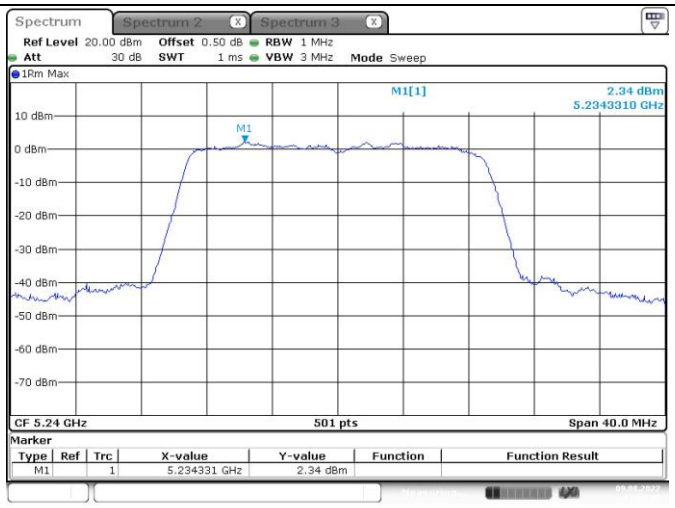
Maximum power spectral density	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

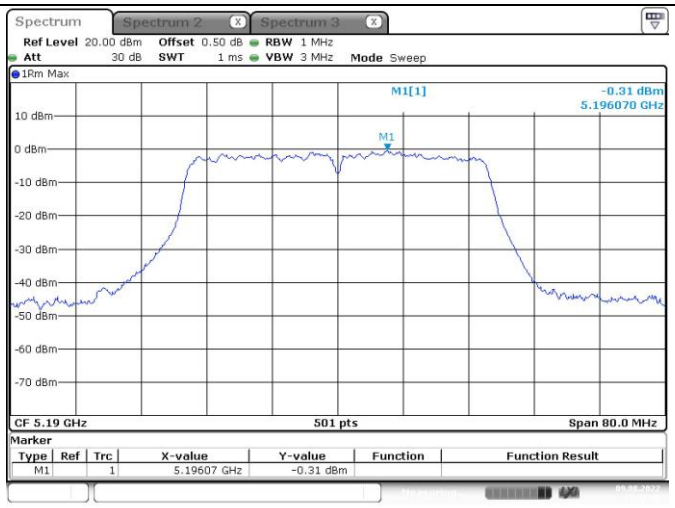
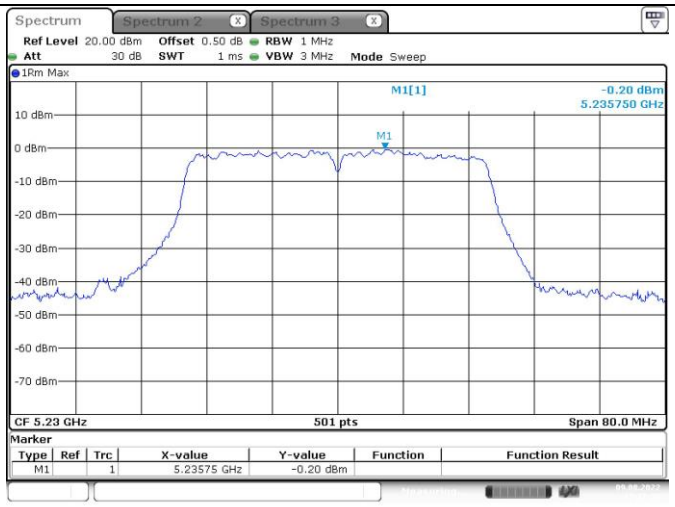
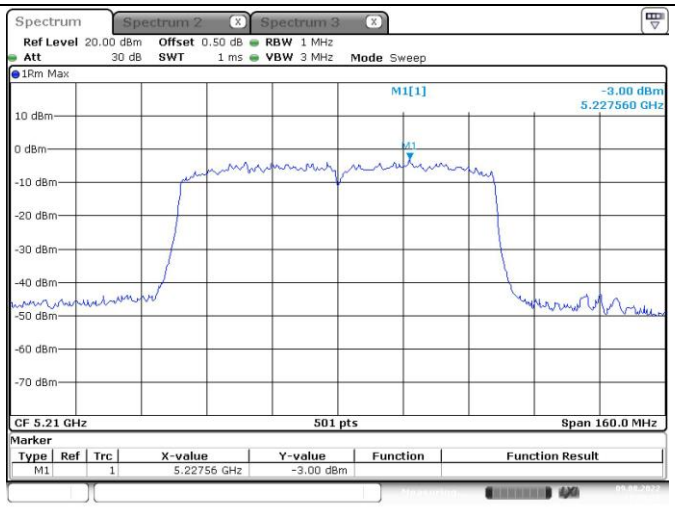
Chain1:

Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

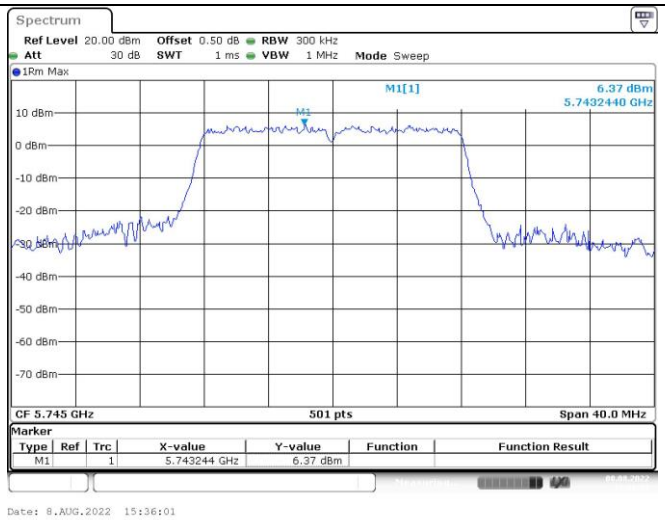
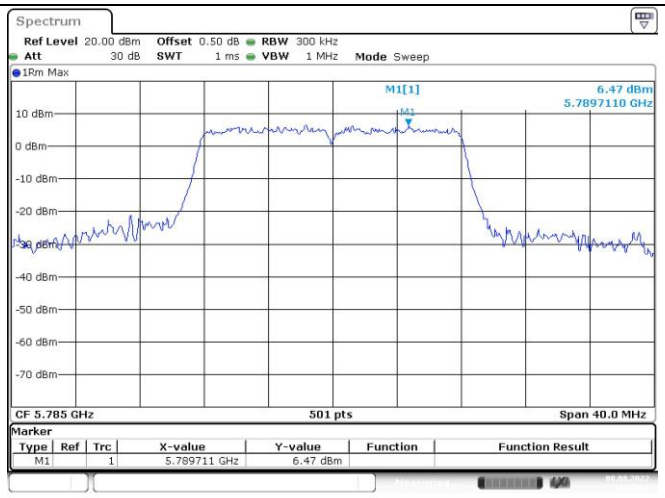
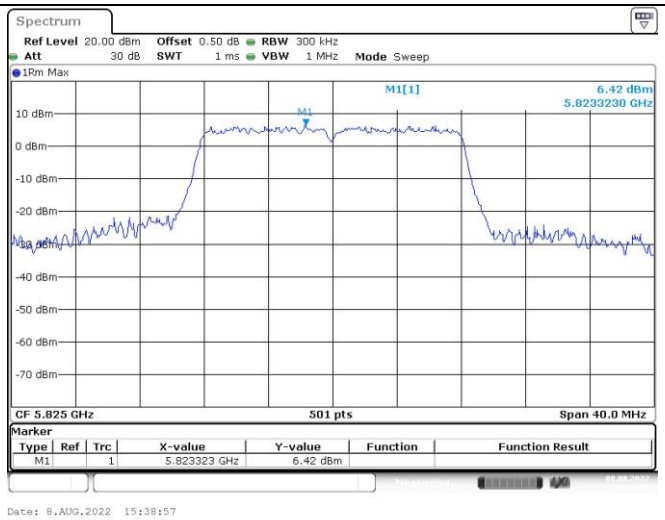
Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

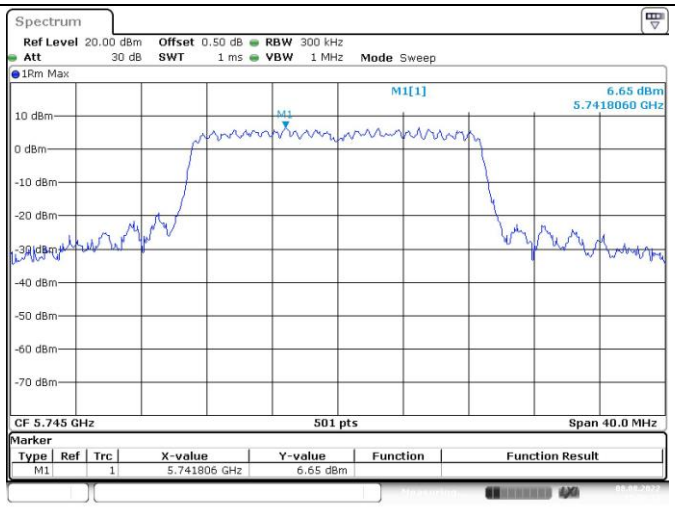
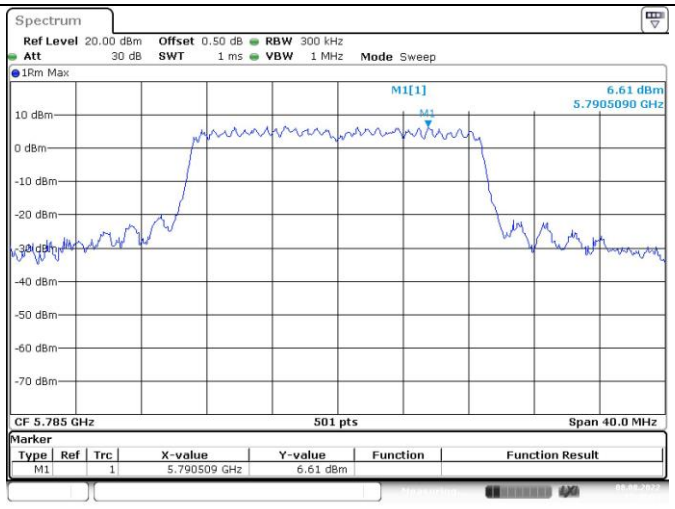
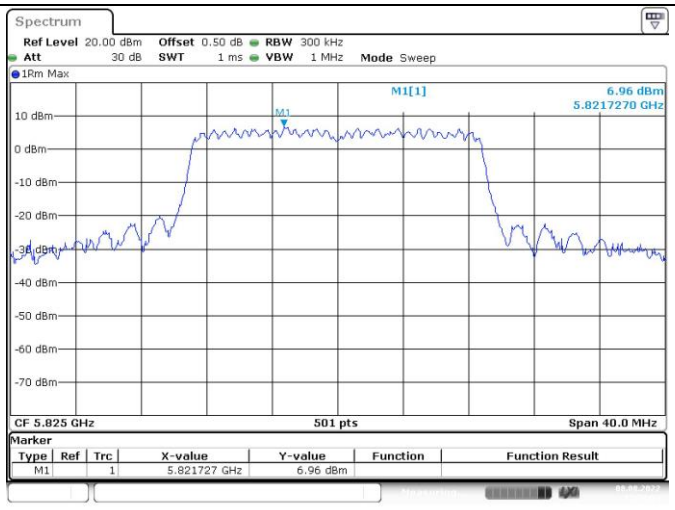
Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

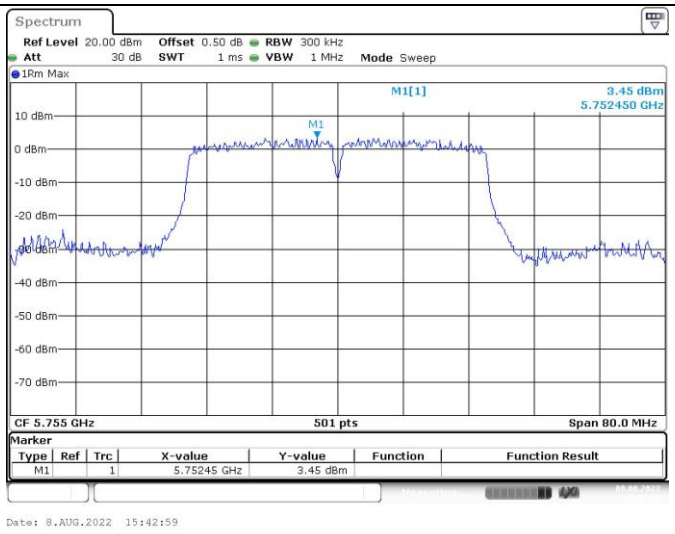
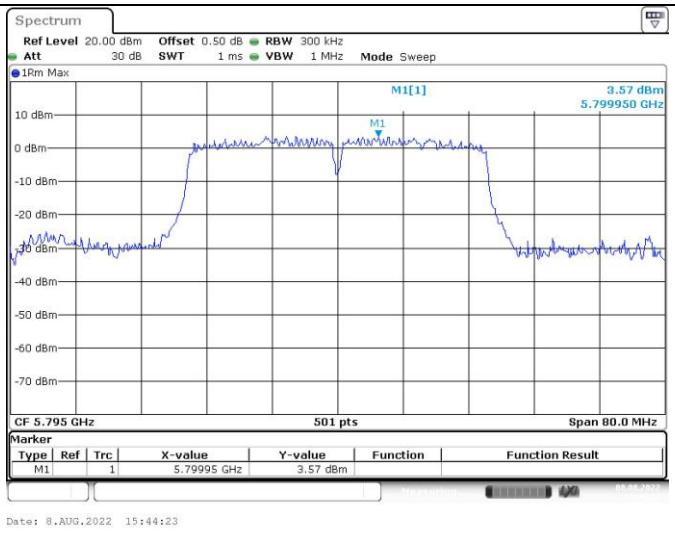
Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

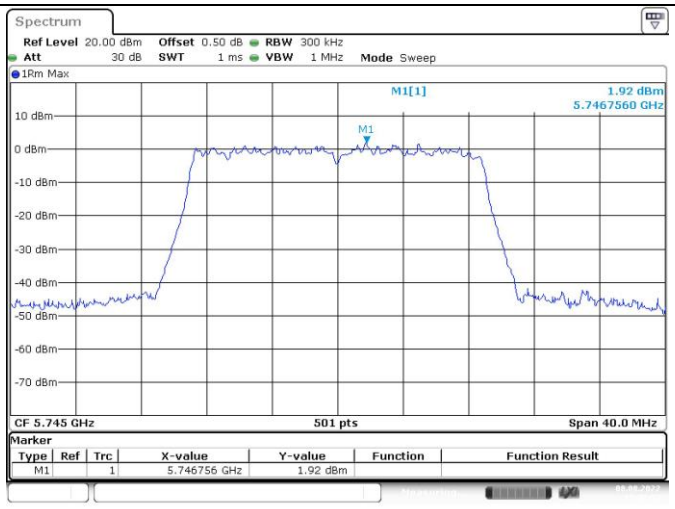
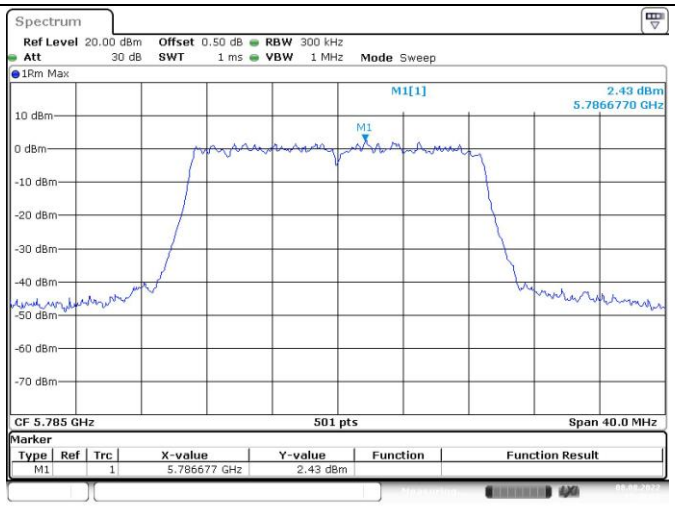
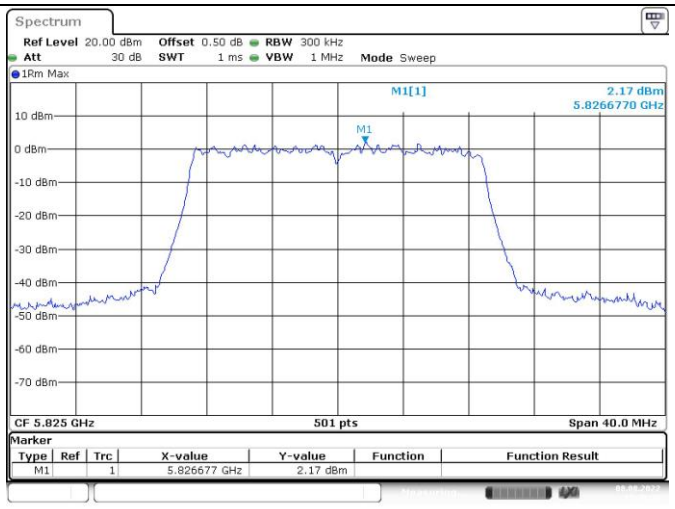
Maximum power spectral density	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

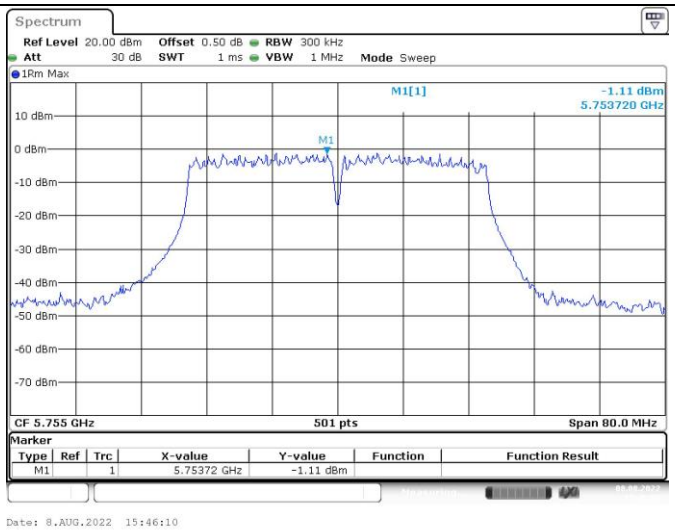
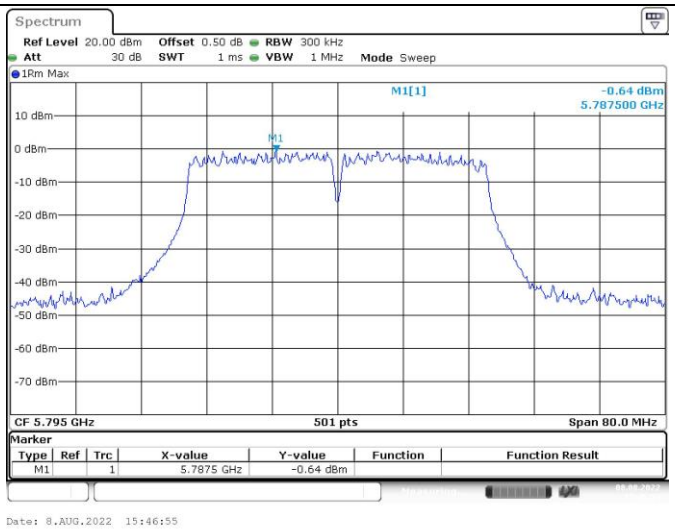
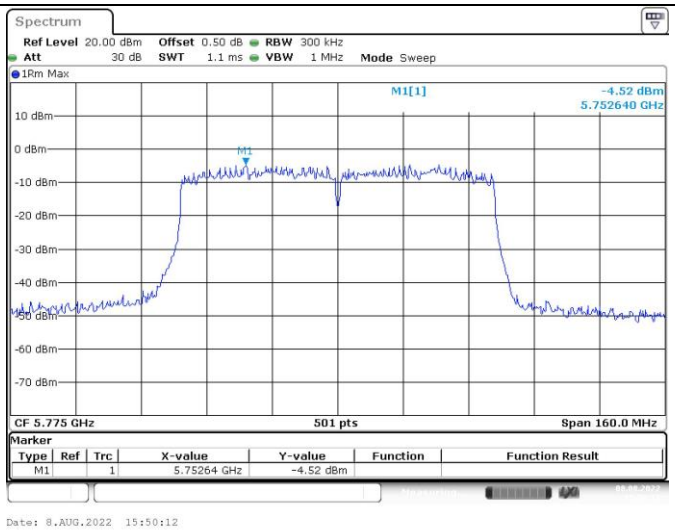
5725-5850MHz
Chain0：

Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

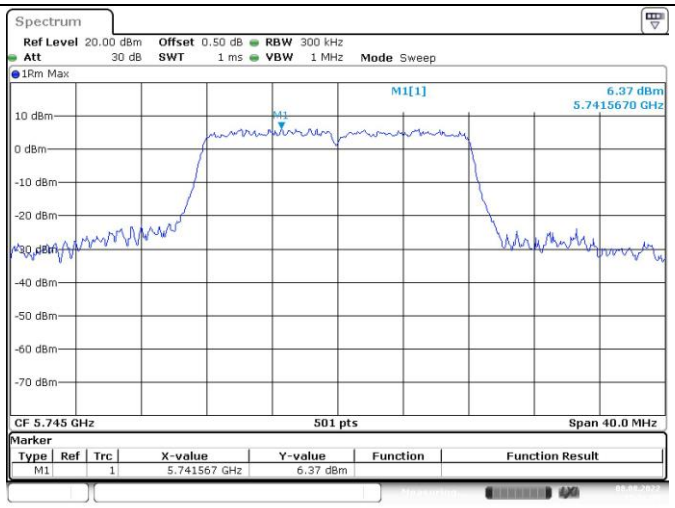
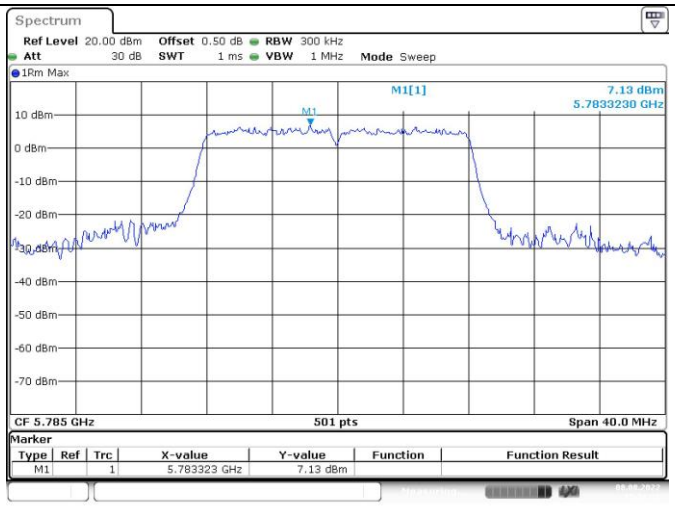
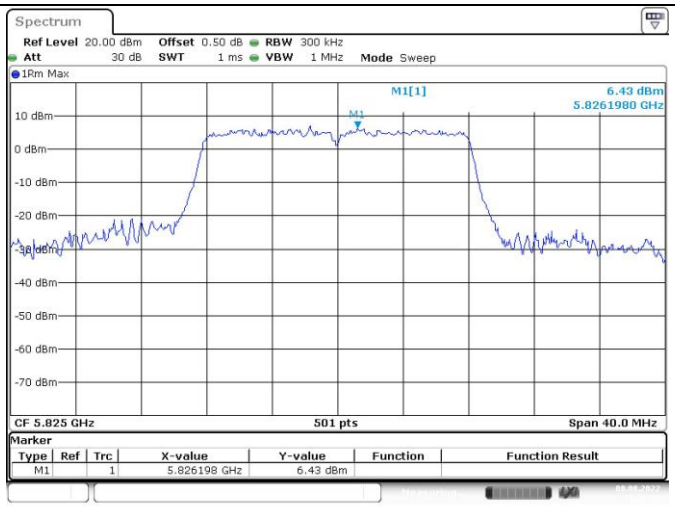
Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

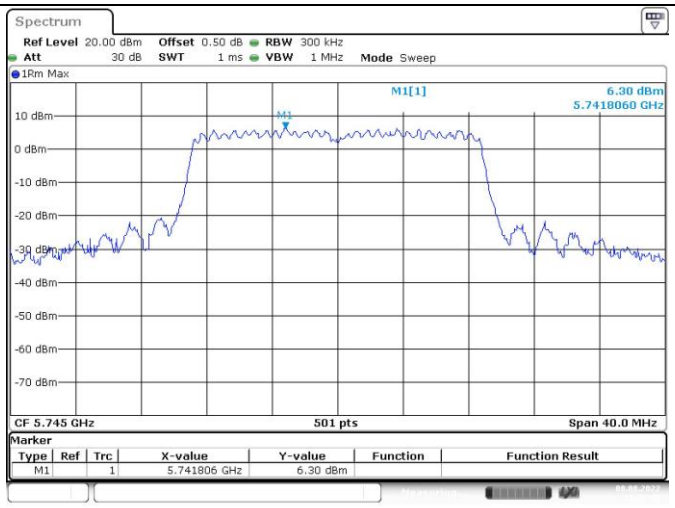
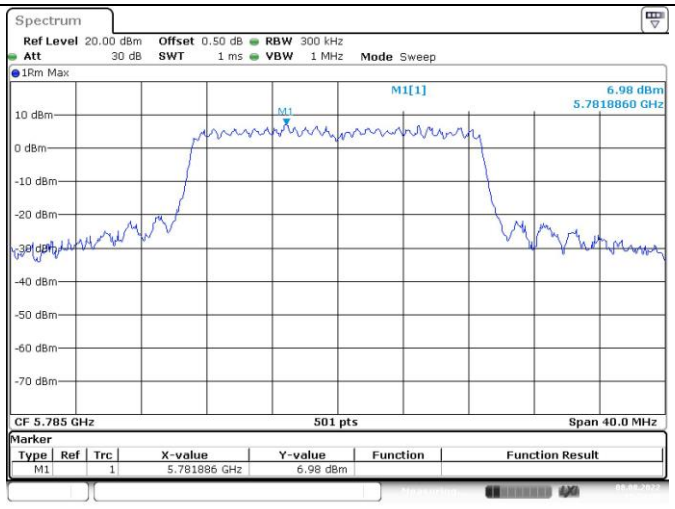
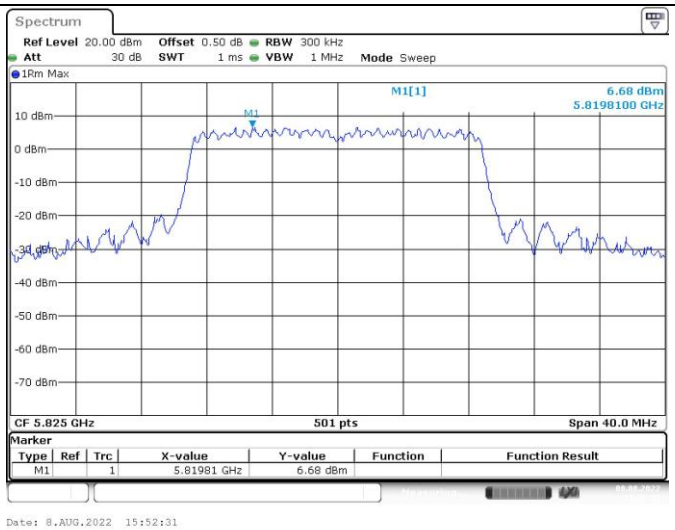
Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

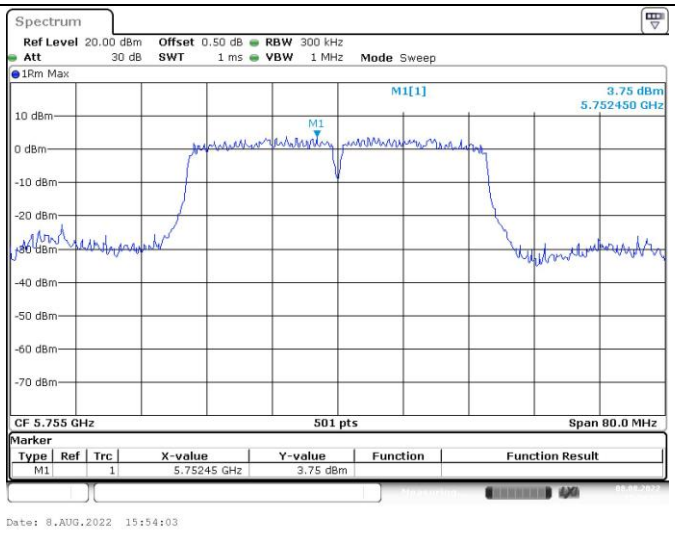
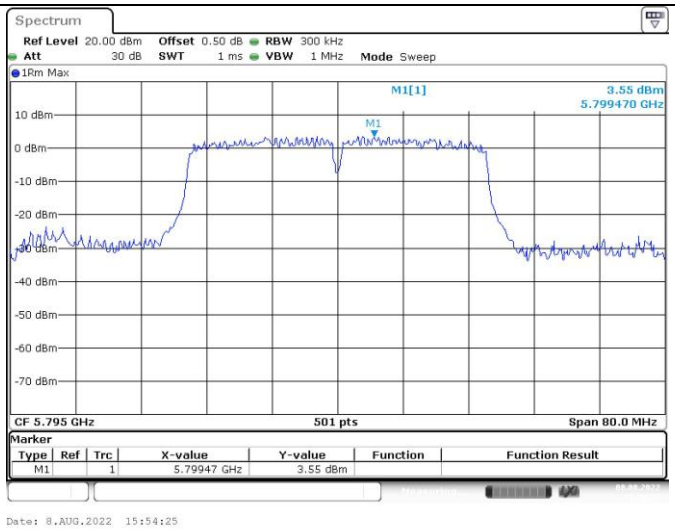
Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

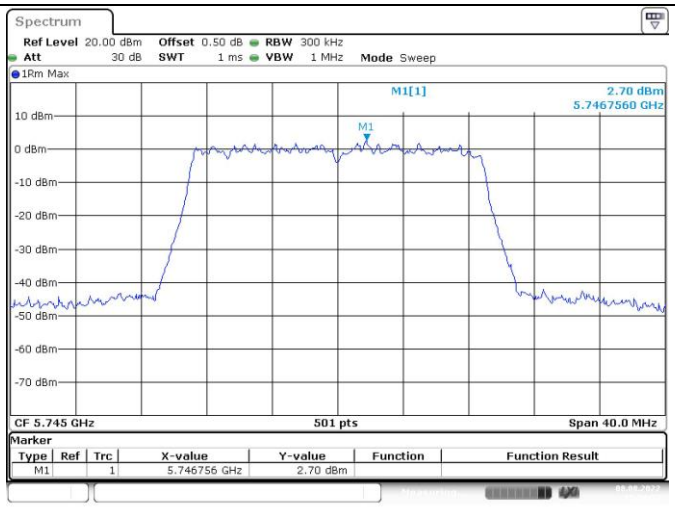
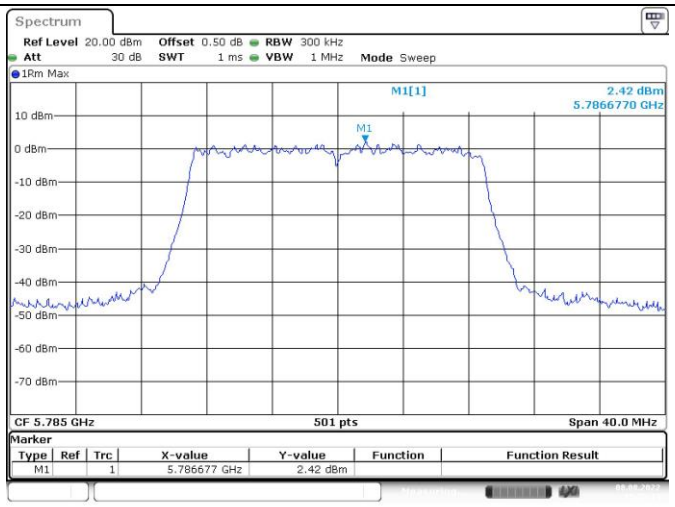
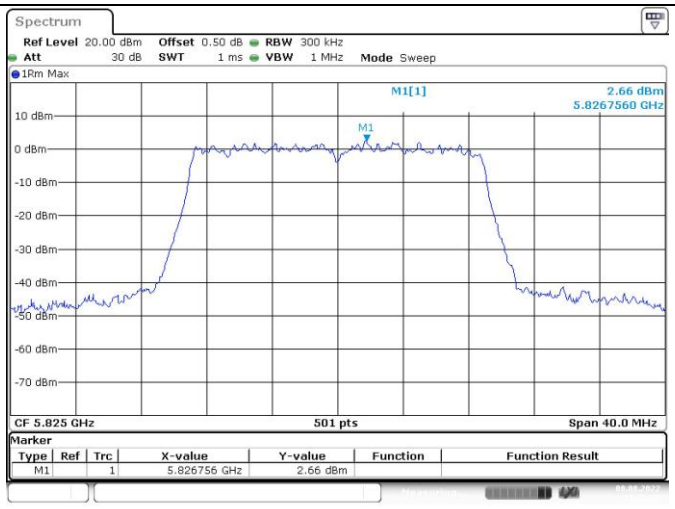
Maximum power spectral density	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

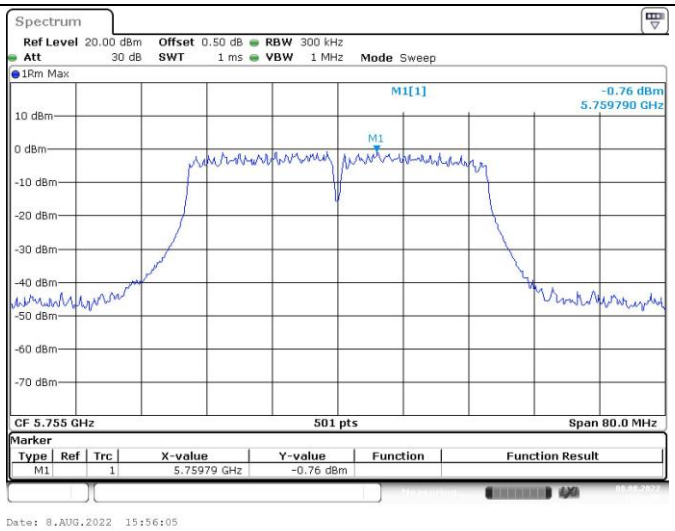
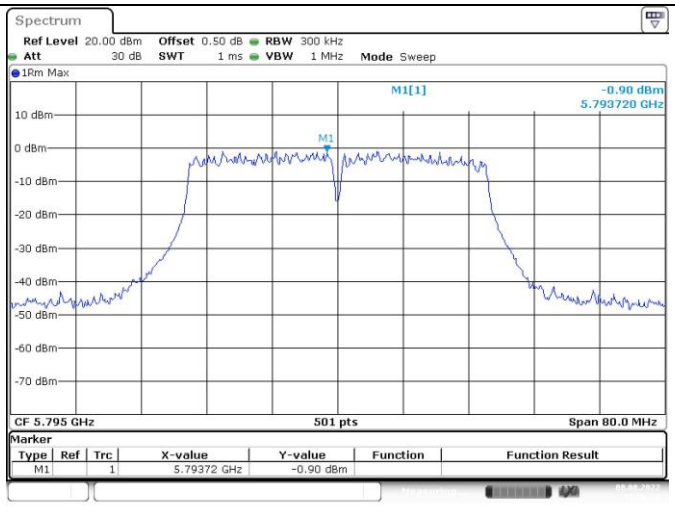
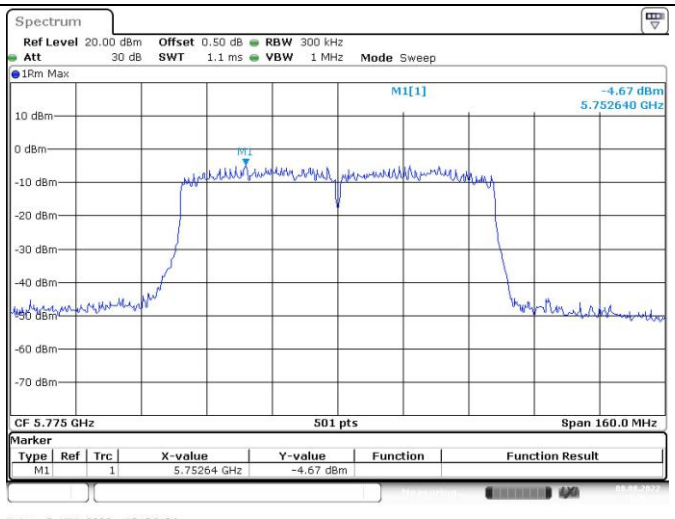
Chain1：

Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

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	

4.6 Duty Cycle:

Serial Number:	CR22070014-RF-S1	Test Date:	2022-07-16
Test Site:	RF	Test Mode:	Transmitting
Tester:	Julie Tan	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	26.8	Relative Humidity: (%)	45	ATM Pressure: (kPa)	100.2

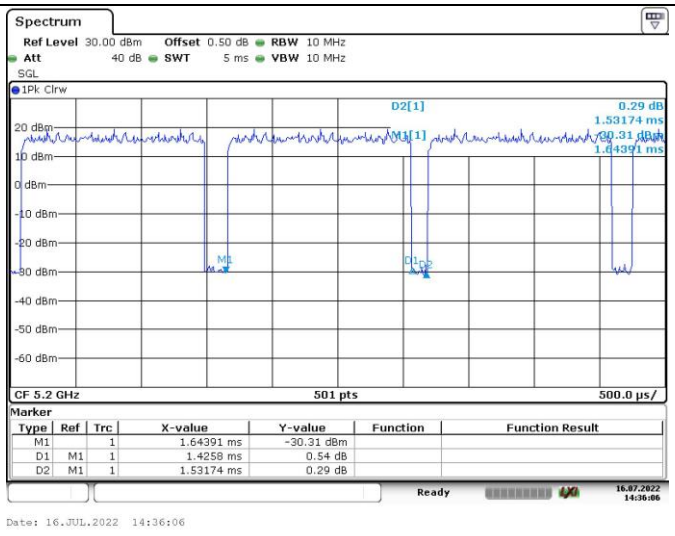
Test Equipment List and Details:

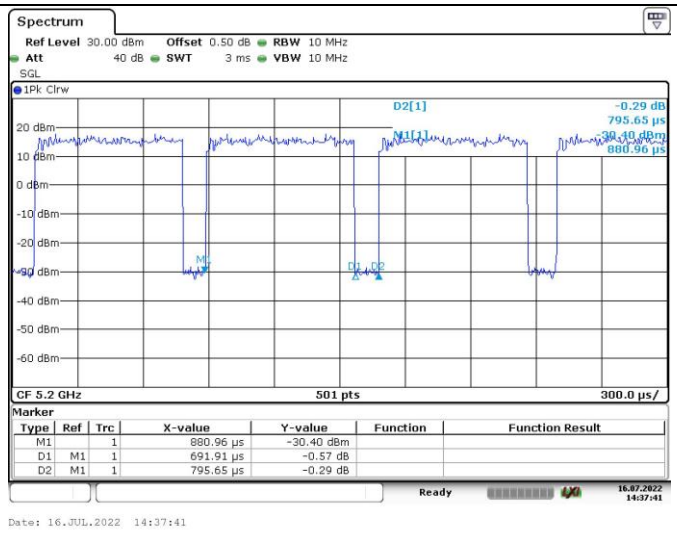
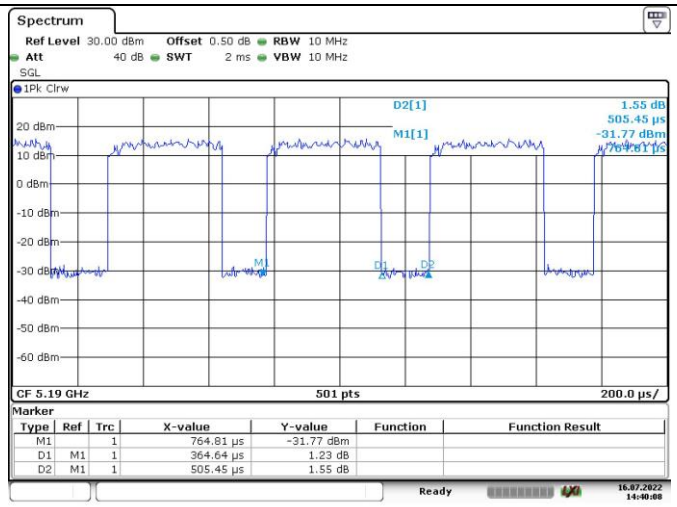
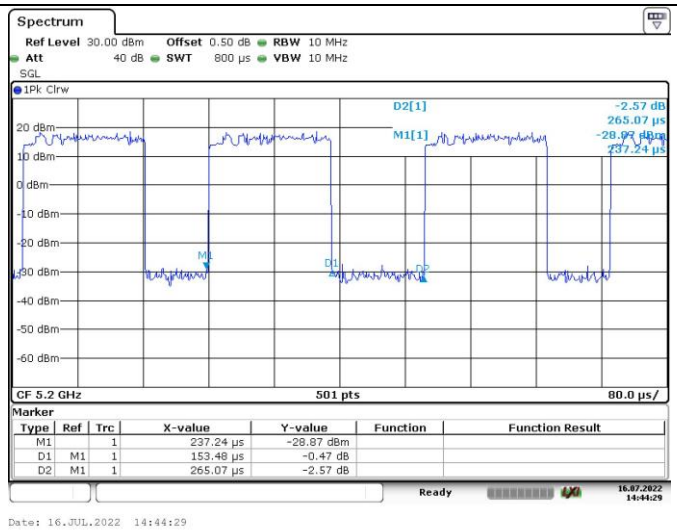
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2022-07-15	2023-07-14
YINSAIGE	Coaxial Cable	SS402	SJ0100001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A

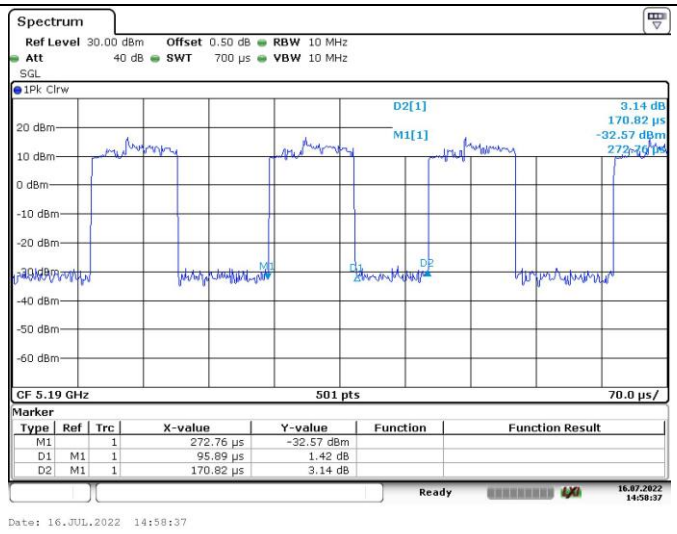
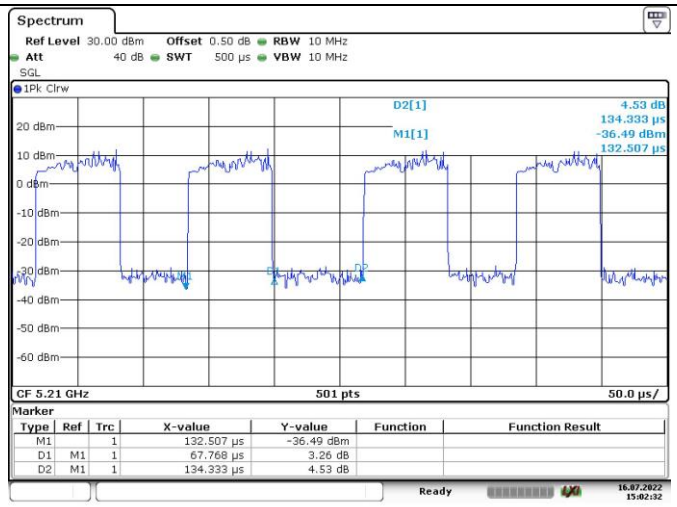
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Modes	Ton (ms)	Ton+off (ms)	Duty Cycle (%)
802.11a	1.426	1.532	93.08
802.11n ht20	0.692	0.796	86.93
802.11n ht40	0.365	0.505	72.28
802.11ac vht20	0.153	0.265	57.74
802.11ac vht40	0.096	0.171	56.14
802.11ac vht80	0.068	0.134	50.75

Duty Cycle	
802.11a	

Duty Cycle	
802.11n ht20	
802.11n ht40	
802.11ac vht20	

Duty Cycle	
802.11ac vht40	
802.11ac vht80	

5. RF EXPOSURE EVALUATION

5.1 Applicable Standard

FCC §15.407 (f) and subpart §1.1307

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 level in excess of the Commission's guidelines.

5. 2 Procedure

According to §1.1307(b)(3)(i)

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\,cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\,cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

5.3 Measurement Result

Operation Modes	Frequency (MHz)	Distance (mm)	P_{th}		Maximum Conducted Power including Tune-up Tolerance (dBm)	Antenna Gain (dBi)	ERP (dBm)	Exemption
			(mW)	(dBm)				
WLAN 2.4G	2412-2462	200	3060	**34.86**	25	4.5	30.35	Compliant
WLAN 5.2G	5150-5250	200	3060	**34.86**	23	3.0	26.85	Compliant
WLAN 5.8G	5725-5850	200	3060	**34.86**	22	3.0	25.85	Compliant

Note: the 2.4G and 5G WLAN can`t transmit simultenuously. Beamforming Gain is 3dBi.

Result: The device compliant the RF exposure at 20cm distances.

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