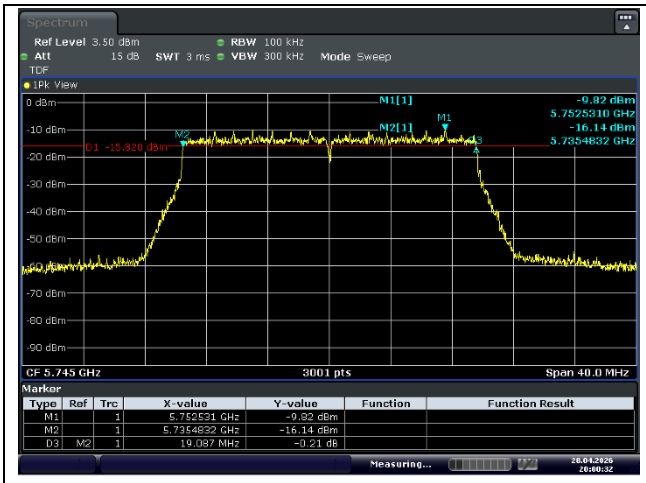
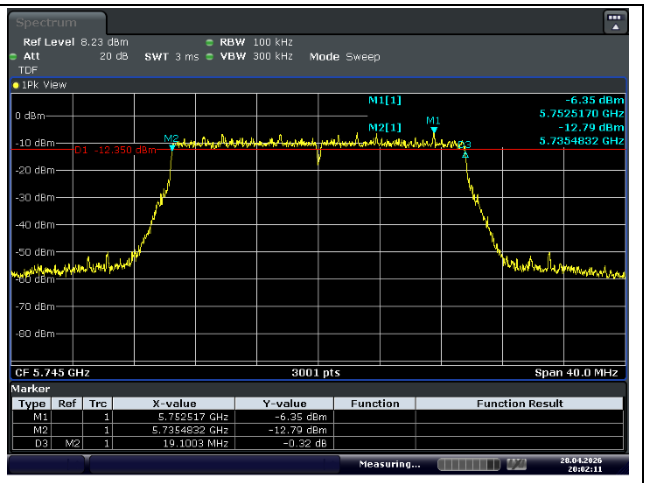
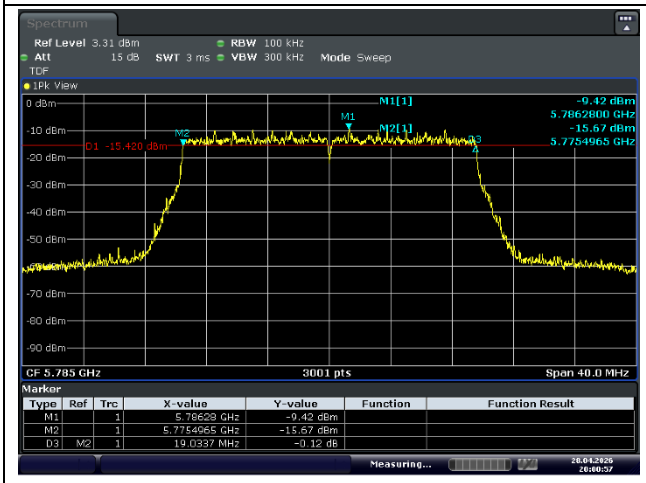
11ax_HE20 (U-NII 3)



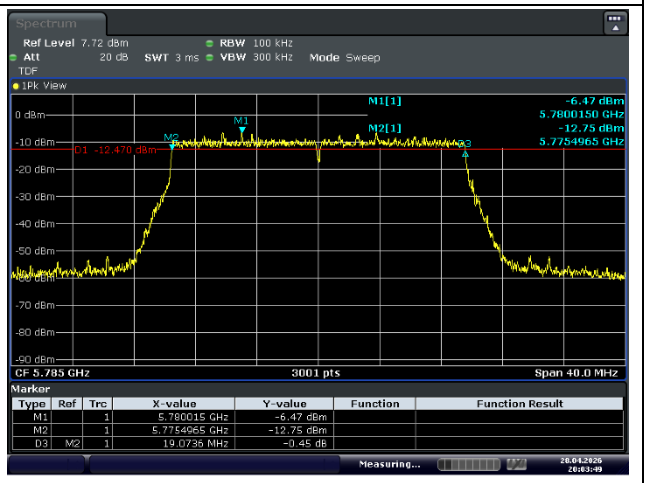
Ant. 0_Low Channel (5 745 ㎒)



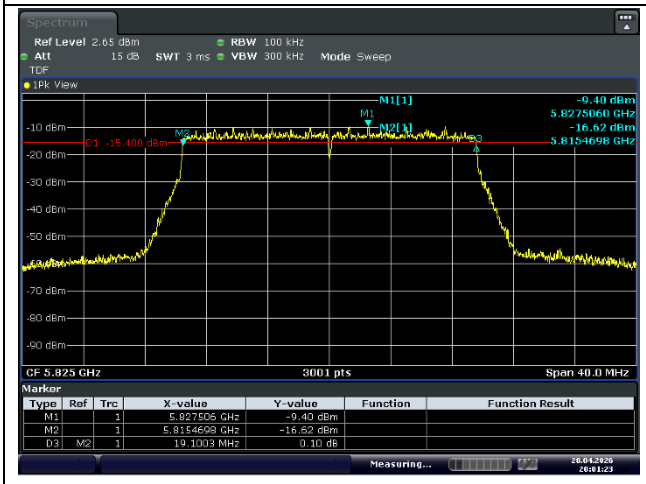
Ant. 1_Low Channel (5 745 ㎒)



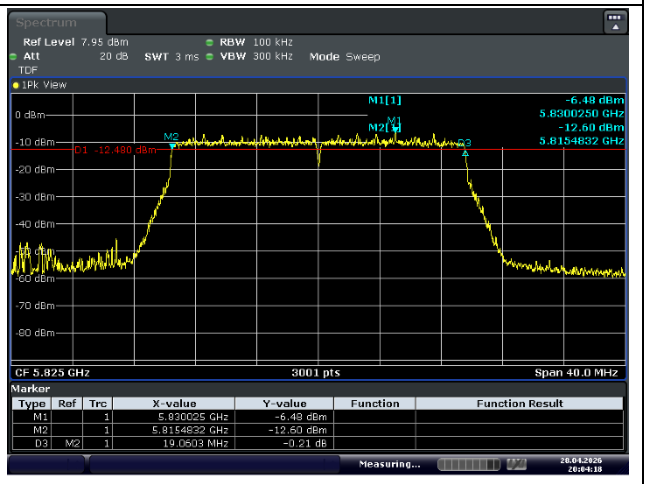
Ant. 0_Middle Channel (5 785 ㎒)



Ant. 1_Middle Channel (5 785 ㎒)

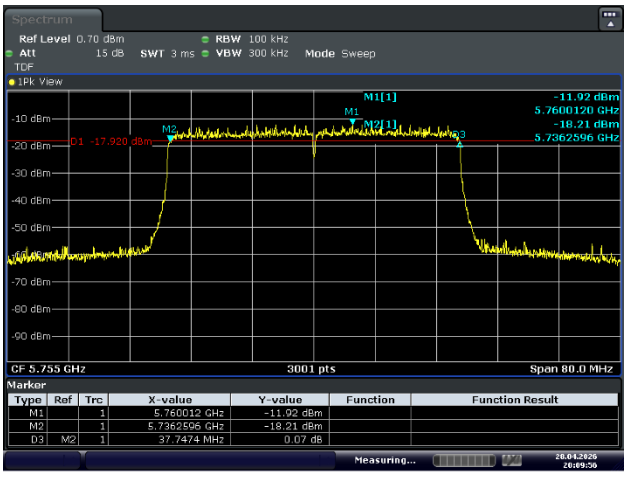


Ant. 0_High Channel (5 825 ㎒)

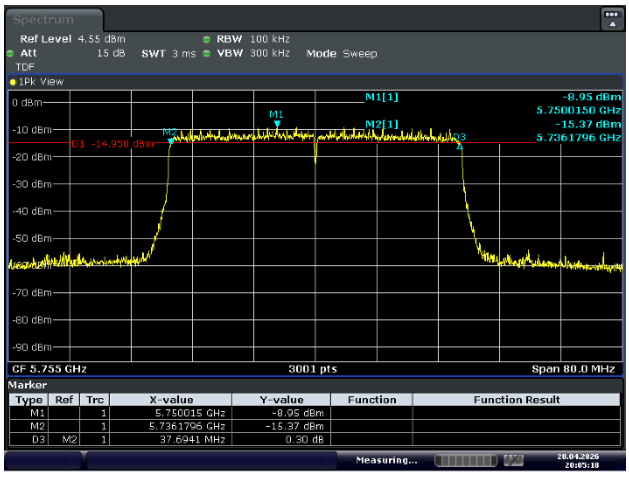


Ant. 1_High Channel (5 825 ㎒)

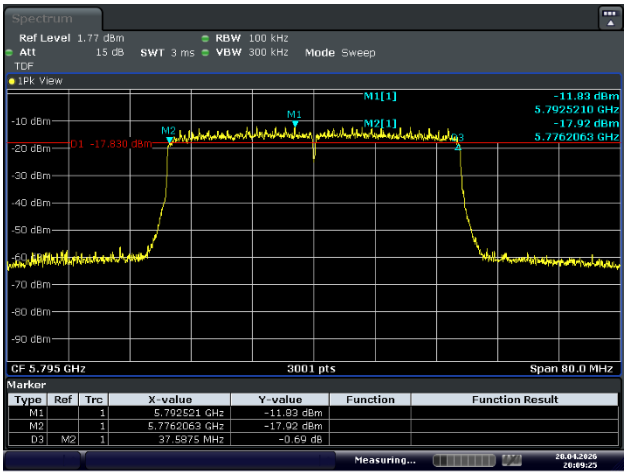
11ax_HE40 (U-NII 3)



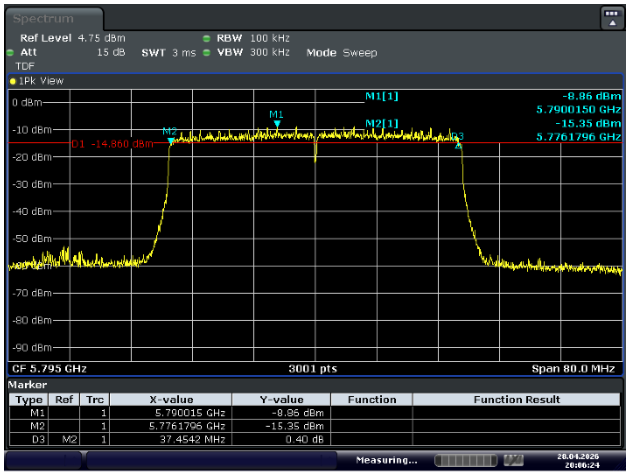
Ant. 0_Low Channel (5 755 ㎒)



Ant. 1_Low Channel (5 755 ㎒)

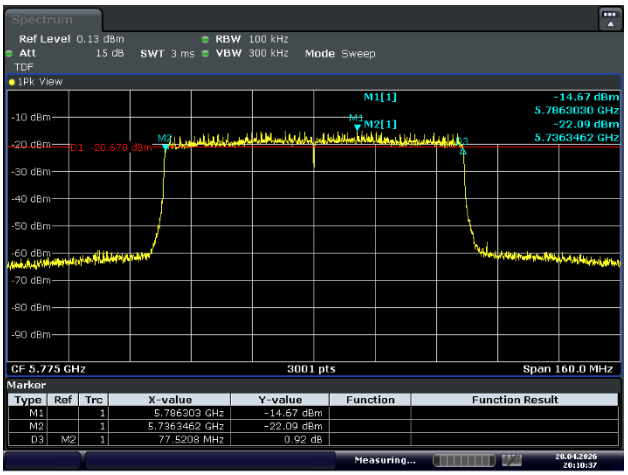


Ant. 0_High Channel (5 795 ㎒)

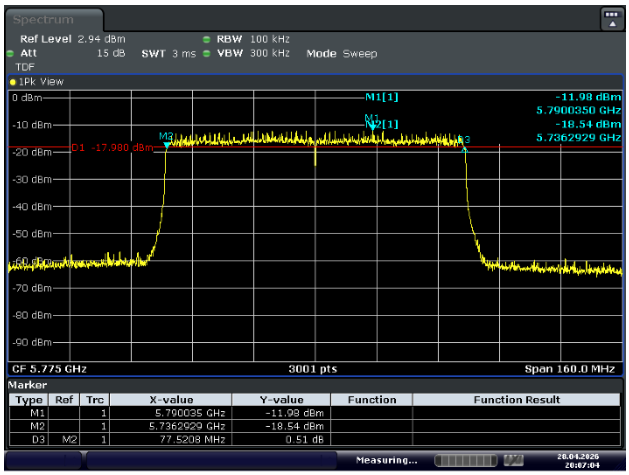


Ant. 1_High Channel (5 795 ㎒)

11ax_HE80 (U-NII 3)



Ant. 0_Middle Channel (5 775 ㎒)

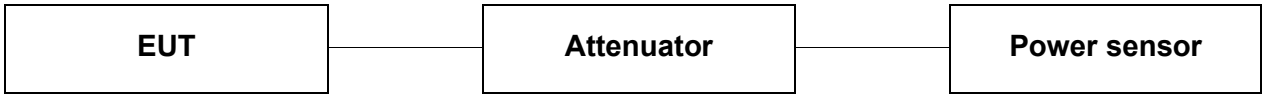


Ant. 1_Middle Channel (5 775 ㎒)

5. Maximum Conducted Output Power

5.1. Test Setup

5.1.1 RF Output Power



5.2. Limit

5.2.1. FCC

According to 15.407(a)(1)(i)

For an outdoor access point operating in the band 5.15-5.25 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 ㏈i. In addition, the maximum power spectral density shall not exceed 17 ㏈m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 ㎽ (21 ㏈m).

According to 15.407(a)(1)(iv)

For client devices in the 5.15-5.25 ㎓ band, the maximum conducted output power over the frequency band of operation shall not exceed 250 ㎽ provided the maximum antenna gain does not exceed 6 ㏈i. In addition, the maximum power spectral density shall not exceed 11 ㏈ m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

According to 15.407(a)(3)
For the band 5.725-5.85 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 ㏈m in any 500-㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

5.2.2. IC

According to RSS-247 Issue 4,
7.3.1.2 Frequency band 5 150-5 250 ㎒
For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed the lesser of:

a. 30 ㎽; or
b. 1.76 + 10 $\log_{10}$B, ㏈m.

OEM devices installed in vehicles with a maximum e.i.r.p. greater than 15 ㎽ shall implement TPC in order to have the capability to operate at least 3 ㏈ below the maximum permitted e.i.r.p. of 30 ㎽.
For all other devices the maximum e.i.r.p. spectral density shall not exceed 10 ㏈m/㎒. The maximum e.i.r.p. shall not exceed the lesser of:

a. 200 ㎽; or
b. 10 + 10 $\log_{10}$B, ㏈m.

7.3.4.3 Frequency band 5 725-5 850 ㎒
Equipment operating in the band 5 725-5 850 shall comply with the following power limits:

a. the maximum conducted output power shall not exceed 1 W; and
b. the maximum output power spectral density shall not exceed 30 ㏈m/500 ㎑.

When using transmitting antennas with a directional gain exceeding 6 ㏈i, the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 ㏈i.

However, FPTP devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter maximum conducted output power and the power spectral density. FPTP operations exclude the use of PTMP systems, omnidirectional applications and multiple collocated transmitters transmitting the same information. However, remote stations of PTMP systems shall be permitted to operate at e.i.r.p. greater than 4 W under the same conditions as for FPTP systems.

5.3. Test Procedure

5.3.1 RF Output Power

1. This measurement settings are specified in section Ⅱ.E.3.b of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

2. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

5.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 %

- Ant. 0
Test mode: 11a

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 180	48 Mbps	7.43	0.29	7.72
	5 220		7.50		7.79
	5 240		7.69		7.98
U-NII 3	5 745		7.14	0.05	7.19
	5 785		6.89		6.94
	5 825		7.14		7.19

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 180	23.98	30			0.29	23.98	30	21
	5 220								
	5 240								
U-NII 3	5 745	30				0.05	30		-
	5 785								
	5 825								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	16.863	14.03	0.29	14.03
	5 220					
	5 240					
U-NII 3	5 745	30			0.05	30
	5 785					
	5 825					

Remark;
1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

- Ant. 1
Test mode: 11a

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 180	48 Mbps	7.28	0.78	8.06
	5 220		6.95		7.73
	5 240		6.89		7.67
U-NII 3	5 745		7.14	0.08	7.22
	5 785		7.34		7.42
	5 825		6.75		6.83

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 180	23.98	30			0.78	23.98	30	21
	5 220								
	5 240								
U-NII 3	5 745	30				0.08	30		-
	5 785								
	5 825								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	16.863	14.03	0.78	14.03
	5 220					
	5 240					
U-NII 3	5 745	30			0.08	30
	5 785					
	5 825					

Remark;
1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

- Ant. 2
Test mode: 11a

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 180	54 Mbps	7.41	0.68	8.09
	5 220		7.37		8.05
	5 240		7.46		8.14
U-NII 3	5 745		6.55	0.69	7.24
	5 785		6.44		7.13
	5 825		6.67		7.36

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 180	23.98	30			0.68	23.98	30	21
	5 220								
	5 240								
U-NII 3	5 745	30				0.69	30		-
	5 785								
	5 825								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	16.823	14.02	0.68	14.02
	5 220					
	5 240					
U-NII 3	5 745	30			0.69	30
	5 785					
	5 825					

Remark;
1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

Test mode: 11ac_VHT20

Band	Frequency (㎒)	Data Rate	Average Power (㏈m)	Antenna Gain (㏈i)	E.I.R.P. (㏈m)
U-NII 1	5 180	MCS 8	7.34	0.68	8.02
	5 220		7.89		8.57
	5 240		7.43		8.11
U-NII 3	5 745		6.61	0.69	7.30
	5 785		6.45		7.14
	5 825		6.31		7.00

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (㏈m)		Min. 26 ㏈ BW (㎒)	11+10LogB (㏈m)	Antenna Gain (㏈i)	Limit (㏈m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 180	23.98	30			0.68	23.98	30	21
	5 220								
	5 240								
U-NII 3	5 745	30				0.69	30		-
	5 785								
	5 825								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (㏈m)	Min. 99 % BW (㎒)	1.76+10LogB (㏈m)	Antenna Gain (㏈i)	Limit (㏈m)
U-NII 1	5 180	14.77	18.022	14.32	0.68	14.32
	5 220					
	5 240					
U-NII 3	5 745	30			0.69	30
	5 785					
	5 825					

Remark;

1. E.I.R.P. (㏈m) = Average Power Result (㏈m) + Antenna Gain (㏈i)

Test mode: 11ac_VHT40

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 190	MCS 8	7.34	0.68	8.02
	5 230		7.44		8.12
U-NII 3	5 755		6.98	3.08	7.67
	5 795		6.77		7.46

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 190	23.98	30			0.68	23.98	30	21
	5 230								
U-NII 3	5 755	30				0.69	30		-
	5 795								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 190	14.77	36.364	17.37	0.68	14.77
	5 230					
U-NII 3	5 755	30			0.69	30
	5 795					

Remark;

1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

Test mode: 11ac_VHT80

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 210	MCS 9	7.87	0.68	8.55
U-NII 3	5 775		6.88	0.69	7.57

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 210	23.98	30			0.68	23.98	30	21
U-NII 3	5 775	30				0.69	30		-

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 210	14.77	75.764	20.55	0.68	14.77
U-NII 3	5 775	30			0.69	30

Remark;

1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

Test mode: 11ax_HE20

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 180	MCS 8	7.45	0.68	8.13
	5 220		7.46		8.14
	5 240		7.87		8.55
U-NII 3	5 745		6.84	0.69	7.53
	5 785		6.67		7.36
	5 825		6.29		6.98

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 180	23.98	30			0.68	23.98	30	21
	5 220								
	5 240								
U-NII 3	5 745	30				0.69	30		-
	5 785								
	5 825								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	19.141	14.58	0.68	14.58
	5 220					
	5 240					
U-NII 3	5 745	30			0.69	30
	5 785					
	5 825					

Remark;

1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

Test mode: 11ax_HE40

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 190	MCS 8	7.51	0.68	8.19
	5 230		7.87		8.55
U-NII 3	5 755		7.07	0.69	7.76
	5 795		6.80		7.49

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 190	23.98	30			0.68	23.98	30	21
	5 230								
U-NII 3	5 755	30				0.69	30		-
	5 795								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 190	14.77	37.562	17.51	0.68	14.77
	5 230					
U-NII 3	5 755	30			0.69	30
	5 795					

Remark;

1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

Test mode: 11ax_HE80

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 210	MCS 8	7.72	0.68	8.40
U-NII 3	5 775		6.76	0.69	7.45

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 210	23.98	30			0.68	23.98	30	21
U-NII 3	5 775	30				0.69	30		-

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 210	14.77	77.043	20.63	0.68	14.77
U-NII 3	5 775	30			0.69	30

Remark;

1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

- Ant. 0 + Ant. 1

Test mode: 11ac_VHT20

Band	Frequency (㎒)	Data Rate	Ant. 0 Average Power (㏈ m)	Ant. 1 Average Power (㏈ m)	MIMO Average Power (㏈ m)	Directional Antenna Gain (㏈ i)	MIMO E.I.R.P. (㏈ m)
U-NII 1	5 180	MCS 6	4.58	4.84	7.72	3.55	11.27
	5 220		4.88	4.57	7.74		11.29
	5 240		5.01	5.27	8.15		11.70
U-NII 3	5 745		4.56	6.21	8.47	3.08	11.55
	5 785		4.80	5.89	8.39		11.47
	5 825		4.91	6.54	8.81		11.89

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (㏈ m)		Min. 26 ㏈ BW (㎒)	11+10LogB (㏈ m)	Directional Antenna Gain (㏈ i)	Limit (㏈ m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 180	23.98	30			3.55	23.98	30	21
	5 220								
	5 240								
U-NII 3	5 745	30				3.08	30		-
	5 785								
	5 825								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (㏈ m)	Min. 99 % BW (㎒)	1.76+10LogB (㏈ m)	Directional Antenna Gain (㏈ i)	Limit (㏈ m)
U-NII 1	5 180	14.77	18.022	14.32	3.55	14.32
	5 220					
	5 240					
U-NII 3	5 745	30			3.08	30
	5 785					
	5 825					

Remark;

1. According to KDB 662911, Average power of each port and antenna gain was combined by using below calculation.

   - Average power: 10 log {10^(Port 1 power / 10)+10^(Port 2 power / 10)}

   - Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N ㏈ i (i) If transmit signals are correlated, then
   Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/N_{ANT}$] ㏈ i [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2. E.I.R.P. (㏈ m) = Average Power Result (㏈ m) + Directional Antenna Gain (㏈ i)

Test mode: 11ac_VHT40

Band	Frequency (㎒)	Data Rate	Ant. 0 Average Power (dB m)	Ant. 1 Average Power (dB m)	MIMO Average Power (dB m)	Directional Antenna Gain (dB i)	MIMO E.I.R.P. (dB m)
U-NII 1	5 190	MCS 9	4.58	4.71	7.66	3.55	11.21
	5 230		4.66	4.75	7.72		11.27
U-NII 3	5 755		4.20	6.08	8.25	3.08	11.33
	5 795		4.02	6.38	8.37		11.45

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 190	23.98	30			355	23.98	30	21
	5 230								
U-NII 3	5 755	30				3.08	30		-
	5 795								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 190	14.77	36.364	17.37	3.55	14.77
	5 230					
U-NII 3	5 755	30			3.08	30
	5 795					

Remark;

1. According to KDB 662911, Average power of each port and antenna gain was combined by using below calculation.

   - Average power: 10 log {10^(Port 1 power / 10)+10^(Port 2 power / 10)}

   - Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dBi
   (i) If transmit signals are correlated, then
   Directional gain = 10 log[$(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2/N_{ANT}$] dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2. E.I.R.P. (dBm) = Average Power Result (dBm) + Directional Antenna Gain (dBi)

Test mode: 11ac_VHT80

Band	Frequency (㎒)	Data Rate	Ant. 0 Average Power (dB m)	Ant. 1 Average Power (dB m)	MIMO Average Power (dB m)	Directional Antenna Gain (dB i)	MIMO E.I.R.P. (dB m)
U-NII 1	5 210	MCS 5	4.26	4.84	7.57	3.55	11.12
U-NII 3	5 775		4.31	5.32	7.85	3.08	10.93

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 210	23.98	30			3.55	23.98	30	21
U-NII 3	5 775	30				3.08	30		-

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 210	14.77	75.764	20.55	3.55	14.77
U-NII 3	5 775	30			3.08	30

Remark;

1. According to KDB 662911, Average power of each port and antenna gain was combined by using below calculation.

   - Average power: 10 log {10^(Port 1 power / 10)+10^(Port 2 power / 10)}

   - Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dB i
   (i) If transmit signals are correlated, then
   Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N_{ANT}$] dB i [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2. E.I.R.P. (dB m) = Average Power Result (dB m) + Directional Antenna Gain (dB i)

Test mode: 11ax_HE20

Band	Frequency (㎒)	Data Rate	Ant. 0 Average Power (dB m)	Ant. 1 Average Power (dB m)	MIMO Average Power (dB m)	Directional Antenna Gain (dB i)	MIMO E.I.R.P. (dB m)
U-NII 1	5 180	MCS 2	4.60	4.83	7.73	3.55	11.28
	5 220		5.05	4.49	7.79		11.34
	5 240		4.87	4.31	7.61		11.16
U-NII 3	5 745		3.90	5.01	7.50	3.08	10.58
	5 785		3.64	5.21	7.51		10.59
	5 825		3.85	6.05	8.10		11.18

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 180	23.98	30			3.55	23.98	30	21
	5 220								
	5 240								
U-NII 3	5 745	30				3.08	30		-
	5 785								
	5 825								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	19.101	14.57	3.55	14.57
	5 220					
	5 240					
U-NII 3	5 745	30			3.08	30
	5 785					
	5 825					

Remark;

1. According to KDB 662911, Average power of each port and antenna gain was combined by using below calculation.

   - Average power: 10 log {10^(Port 1 power / 10)+10^(Port 2 power / 10)}

   - Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dB i
   (i) If transmit signals are correlated, then
   Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N_{ANT}$] dB i [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2. E.I.R.P. (dB m) = Average Power Result (dB m) + Directional Antenna Gain (dB i)

Test mode: 11ax_HE40

Band	Frequency (㎒)	Data Rate	Ant. 0 Average Power (dB m)	Ant. 1 Average Power (dB m)	MIMO Average Power (dB m)	Directional Antenna Gain (dB i)	MIMO E.I.R.P. (dB m)
U-NII 1	5 190	MCS 7	5.15	4.69	7.94	3.55	11.49
	5 230		5.25	4.73	8.01		11.56
U-NII 3	5 755		5.02	5.16	8.10	3.08	11.18
	5 795		5.16	4.99	8.09		11.17

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 190	23.98	30			3.55	23.98	30	21
	5 230								
U-NII 3	5 755	30				3.08	30		-
	5 795								

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 190	14.77	37.562	17.51	3.55	14.77
	5 230					
U-NII 3	5 755	30			3.08	30
	5 795					

Remark;

1. According to KDB 662911, Average power of each port and antenna gain was combined by using below calculation.

   - Average power: 10 log {10^(Port 1 power / 10)+10^(Port 2 power / 10)}

   - Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dB i
   (i) If transmit signals are correlated, then
   Directional gain = 10 log[$(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2/N_{ANT}$] dB i [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2. E.I.R.P. (dB m) = Average Power Result (dB m) + Directional Antenna Gain (dB i)

Test mode: 11ax_HE80

Band	Frequency (㎒)	Data Rate	Ant. 0 Average Power (dB m)	Ant. 1 Average Power (dB m)	MIMO Average Power (dB m)	Directional Antenna Gain (dB i)	MIMO E.I.R.P. (dB m)
U-NII 1	5 210	MCS 4	4.73	5.23	8.00	3.55	11.55
U-NII 3	5 775		4.33	5.30	7.85	3.08	10.93

Band	FCC Limit								
	Frequency (㎒)	Fixed Limit (dB m)		Min. 26 dB BW (㎒)	11+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)		
		Client	Access Point				Client	Access Point	
							Cond.	Cond.	E.I.R.P.
U-NII 1	5 210	23.98	30			3.55	23.98	30	21
U-NII 3	5 775	30				3.08	30		-

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Directional Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 210	14.77	77.043	20.63	3.55	14.77
U-NII 3	5 775	30			3.08	30

Remark;

1. According to KDB 662911, Average power of each port and antenna gain was combined by using below calculation.

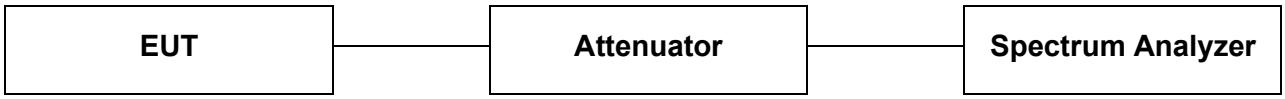
   - Average power: 10 log {10^(Port 1 power / 10)+10^(Port 2 power / 10)}

   - Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dB i
   (i) If transmit signals are correlated, then
   Directional gain = 10 log[$(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2/N_{ANT}$] dB i [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2. E.I.R.P. (dB m) = Average Power Result (dB m) + Directional Antenna Gain (dB i)

6. Maximum Power Spectral Density

6.1. Test Setup



6.2. Limit

6.2.1. FCC

According to 15.407(a)(1)(i)
For an outdoor access point operating in the band 5.15-5.25 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 ㏈i. In addition, the maximum power spectral density shall not exceed 17 ㏈m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 ㎽ (21 ㏈m).

According to 15.407(a)(1)(iv)
For client devices in the 5.15-5.25 ㎓ band, the maximum conducted output power over the frequency band of operation shall not exceed 250 ㎽ provided the maximum antenna gain does not exceed 6 ㏈i. In addition, the maximum power spectral density shall not exceed 11 ㏈m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

According to 15.407(a)(3)
For the band 5.725-5.85 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 ㏈m in any 500-㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

6.2.2. IC

According to RSS-247 Issue 4,

7.3.1.2 Frequency band 5 150-5 250 ㎒

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed the lesser of:

c. 30 ㎽; or

d. 1.76 + 10 $\log_{10}$B, ㏈m.

OEM devices installed in vehicles with a maximum e.i.r.p. greater than 15 ㎽ shall implement TPC in order to have the capability to operate at least 3 ㏈ below the maximum permitted e.i.r.p. of 30 ㎽.

For all other devices the maximum e.i.r.p. spectral density shall not exceed 10 ㏈m/㎒. The maximum e.i.r.p. shall not exceed the lesser of:

c. 200 ㎽; or

d. 10 + 10 $\log_{10}$B, ㏈m.

7.3.4.3 Frequency band 5 725-5 850 ㎒

Equipment operating in the band 5 725-5 850 shall comply with the following power limits:

c. the maximum conducted output power shall not exceed 1 W; and

d. the maximum output power spectral density shall not exceed 30 ㏈m/500 ㎑.

When using transmitting antennas with a directional gain exceeding 6 ㏈i, the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 ㏈i.

However, FPTP devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter maximum conducted output power and the power spectral density. FPTP operations exclude the use of PTMP systems, omnidirectional applications and multiple collocated transmitters transmitting the same information. However, remote stations of PTMP systems shall be permitted to operate at e.i.r.p. greater than 4 W under the same conditions as for FPTP systems.

6.3. Test Procedure

1. This measurement settings are specified in section Ⅱ.F of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

2. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”. (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)

3. Use the peak search function on the instrument to find the peak of the spectrum and record its value.

4. Make the following adjustments to the peak value of the spectrum, if applicable:

   a) **If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.**
   b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 ㏈ to the final result to compensate for the difference between linear averaging and power averaging.

5. The result is the Maximum PSD over 1 ㎒ reference bandwidth.

6. For devices operating in the bands 5.15-5.25 ㎓, 5.25-5.35 ㎓, and 5.47-5.725 ㎓, the above procedures make use of 1 ㎒ RBW to satisfy directly the 1 ㎒ reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 ㎓, the rules specify a measurement bandwidth of 500 ㎑. Many spectrum analyzers do not have 500 ㎑ RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 ㎒, or 500 ㎑, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (*i.e.,* 1 ㎒, or 500 ㎑). If measurements are performed using a reduced resolution bandwidth (< 1 ㎒, or < 500 ㎑) and integrated over 1 ㎒, or 500 ㎑ bandwidth, the following adjustments to the procedures apply:

   a) Set RBW ≥ 1/*T*, where *T* is defined in section II.B.1.a).
   b) Set VBW ≥ 3 RBW.
   c) If measurement bandwidth of Maximum PSD is specified in 500 ㎑, add 10 log(500 ㎑/RBW) to the measured result, whereas RBW (< 500 ㎑) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
   d) If measurement bandwidth of Maximum PSD is specified in 1 ㎒, add 10 log(1 ㎒/RBW) to the measured result, whereas RBW (< 1 ㎒) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
   e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

6.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 %

- Ant. 0

Test mode: 11a

Band	Frequency (㎒)	Ch.	Data Rate	PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 180	36	48 Mbps	-8.37	4.21	-4.16	0.29	11
	5 220	44		-6.56		-2.35		
	5 240	48		-6.32		-2.11		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 745	149	48 Mbps	-11.90	4.21	-7.69	0.05	30
	5 785	157		-11.70		-7.49		
	5 825	165		-11.46		-7.25		

- Ant. 1

Test mode: 11a

Band	Frequency (㎒)	Ch.	Data Rate	PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 180	36	48 Mbps	-8.00	4.21	-3.79	0.78	11
	5 220	44		-7.79		-3.58		
	5 240	48		-8.18		-3.97		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 745	149	48 Mbps	-11.74	4.21	-7.53	0.08	30
	5 785	157		-11.25		-7.04		
	5 825	165		-11.96		-7.75		

Remark;

1. Final PSD (㏈ m) = PSD (㏈ m) + Duty Cycle Correction Factor (㏈)

- Ant. 2

Test mode: 11a

Band	Frequency (㎒)	Ch.	Data Rate	PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 180	36	54 Mbps	-8.15	4.23	-3.92	0.68	11
	5 220	44		-8.11		-3.88		
	5 240	48		-7.98		-3.75		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 745	149	54 Mbps	-13.42	4.23	-9.19	0.69	30
	5 785	157		-13.66		-9.43		
	5 825	165		-13.29		-9.06		

Test mode: 11ac_VHT20

Band	Frequency (㎒)	Ch.	Data Rate	PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 180	36	MCS 8	-9.86	2.84	-7.02	0.68	11
	5 220	44		-9.88		-7.04		
	5 240	48		-10.04		-7.20		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 745	149	MCS 8	-11.37	2.84	-8.53	0.69	30
	5 785	157		-11.35		-8.51		
	5 825	165		-11.47		-8.63		

Test mode: 11ac_VHT40

Band	Frequency (㎒)	Ch.	Data Rate	PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 190	38	MCS 8	-12.21	2.14	-10.07	0.68	11
	5 230	46		-11.94		-9.80		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 755	151	MCS 8	-13.61	2.14	-11.47	0.69	30
	5 795	159		-13.74		-11.60		

Test mode: 11ac_VHT80

Band	Frequency (㎒)	Ch.	Data Rate	PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 210	42	MCS 9	-15.71	3.38	-12.33	0.68	11
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 775	155	MCS 9	-17.61	3.38	-14.23	0.69	30

Remark;

1. Final PSD (dB m) = PSD (dB m) + Duty Cycle Correction Factor (dB)

Test mode: 11ax_HE20

Band	Frequency (㎒)	Ch.	Data Rate	PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 180	36	MCS 8	-6.96	1.42	-5.54	0.68	11
	5 220	44		-6.60		-5.18		
	5 240	48		-6.85		-5.43		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 745	149	MCS 8	-6.77	1.42	-5.35	0.69	30
	5 785	157		-6.75		-5.33		
	5 825	165		-7.03		-5.61		

Test mode: 11ax_HE40

Band	Frequency (㎒)	Ch.	Data Rate	PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 190	38	MCS 8	-10.32	1.46	-8.86	0.68	11
	5 230	46		-9.75		-8.29		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 755	151	MCS 8	-9.05	1.46	-7.59	0.69	30
	5 795	159		-8.70		-7.24		

Test mode: 11ax_HE80

Band	Frequency (㎒)	Ch.	Data Rate	PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 210	42	MCS 8	-15.74	1.91	-13.83	0.68	11
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 775	155	MCS 8	-14.63	1.91	-12.72	0.69	30

Remark;

1. Final PSD (dB m) = PSD (dB m) + Duty Cycle Correction Factor (dB)

- Ant. 0 + Ant. 1

Test mode: 11ac_VHT20

Band	Frequency (㎒)	Ch.	Data Rate	Ant. 0 Measured PSD	Ant. 1 Measured PSD	MIMO PSD (㏈ m)	Duty Cycle Correction Factor (㏈)	MIMO Final PSD (㏈ m)	Directional Antenna Gain (㏈ i)	Limit (㏈ m/1 ㎒)
U-NII 1	5 180	36	MCS 6	-12.32	-15.35	-10.57	3.72	-6.85	3.55	11
	5 220	44		-11.76	-15.05	-10.09		-6.37		
	5 240	48		-11.60	-15.15	-10.01		-6.29		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Ant. 0 Measured PSD**	**Ant. 1 Measured PSD**	**MIMO PSD (㏈ m)**	**Duty Cycle Correction Factor (㏈)**	**MIMO Final PSD (㏈ m)**	**Directional Antenna Gain (㏈ i)**	**Limit (㏈ m/500 ㎑)**
U-NII 3	5 745	149	MCS 6	-12.81	-13.77	-10.25	3.72	-6.53	3.08	30
	5 785	157		-13.02	-13.62	-10.30		-6.58		
	5 825	165		-12.94	-13.54	-10.22		-6.50		

Test mode: 11ac_VHT40

Band	Frequency (㎒)	Ch.	Data Rate	Ant. 0 Measured PSD	Ant. 1 Measured PSD	MIMO PSD (㏈ m)	Duty Cycle Correction Factor (㏈)	MIMO Final PSD (㏈ m)	Directional Antenna Gain (㏈ i)	Limit (㏈ m/1 ㎒)
U-NII 1	5 190	38	MCS 9	-14.50	-17.04	-12.58	3.75	-8.83	3.55	11
	5 230	46		-14.30	-16.94	-12.41		-8.66		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Ant. 0 Measured PSD**	**Ant. 1 Measured PSD**	**MIMO PSD (㏈ m)**	**Duty Cycle Correction Factor (㏈)**	**MIMO Final PSD (㏈ m)**	**Directional Antenna Gain (㏈ i)**	**Limit (㏈ m/500 ㎑)**
U-NII 3	5 755	151	MCS 9	-15.69	-15.94	-12.80	3.75	-9.05	3.08	30
	5 795	159		-15.77	-15.99	-12.87		-9.12		

Test mode: 11ac_VHT80

Band	Frequency (㎒)	Ch.	Data Rate	Ant. 0 Measured PSD	Ant. 1 Measured PSD	MIMO PSD (㏈ m)	Duty Cycle Correction Factor (㏈)	MIMO Final PSD (㏈ m)	Directional Antenna Gain (㏈ i)	Limit (㏈ m/1 ㎒)
U-NII 1	5 210	42	MCS 5	-17.76	-21.17	-16.13	3.79	-12.34	3.55	11
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Ant. 0 Measured PSD**	**Ant. 1 Measured PSD**	**MIMO PSD (㏈ m)**	**Duty Cycle Correction Factor (㏈)**	**MIMO Final PSD (㏈ m)**	**Directional Antenna Gain (㏈ i)**	**Limit (㏈ m/500 ㎑)**
U-NII 3	5 775	155	MCS 5	-19.20	-19.91	-16.53	3.79	-12.74	3.08	30

Remark;

1. According to KDB 662911, power spectral density of each port and antenna gain was combined by using below calculation.

   - PSD: 10 log {10^(Port 1 PSD / 10)+10^(Port 2 PSD / 10)}

   - Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N ㏈ i
   (i) If transmit signals are correlated, then
   Directional gain = 10 log[$(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2/N_{ANT}$] ㏈ I [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2. Final PSD (㏈ m) = PSD (㏈ m) + Duty Cycle Correction Factor (㏈)

Test mode: 11ax_HE20

Band	Frequency (㎒)	Ch.	Data Rate	Ant. 0 Measured PSD	Ant. 1 Measured PSD	MIMO PSD (㏈ m)	Duty Cycle Correction Factor (㏈)	MIMO Final PSD (㏈ m)	Directional Antenna Gain (㏈ i)	Limit (㏈ m/1 ㎒)
U-NII 1	5 180	36	MCS 2	-11.85	-14.96	-10.12	3.09	-7.03	3.55	11
	5 220	44		-11.03	-14.25	-9.34		-6.25		
	5 240	48		-10.76	-14.47	-9.22		-6.13		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Ant. 0 Measured PSD**	**Ant. 1 Measured PSD**	**MIMO PSD (㏈ m)**	**Duty Cycle Correction Factor (㏈)**	**MIMO Final PSD (㏈ m)**	**Directional Antenna Gain (㏈ i)**	**Limit (㏈ m/500 ㎑)**
U-NII 3	5 745	149	MCS 2	-9.64	-9.20	-6.40	3.09	-3.31	3.08	30
	5 785	157		-9.69	-9.15	-6.40		-3.31		
	5 825	165		-9.65	-9.18	-6.40		-3.31		

Test mode: 11ax_HE40

Band	Frequency (㎒)	Ch.	Data Rate	Ant. 0 Measured PSD	Ant. 1 Measured PSD	MIMO PSD (㏈ m)	Duty Cycle Correction Factor (㏈)	MIMO Final PSD (㏈ m)	Directional Antenna Gain (㏈ i)	Limit (㏈ m/1 ㎒)
U-NII 1	5 190	38	MCS 7	-12.93	-17.25	-11.56	3.14	-8.42	3.55	11
	5 230	46		-12.48	-17.02	-11.17		-8.03		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Ant. 0 Measured PSD**	**Ant. 1 Measured PSD**	**MIMO PSD (㏈ m)**	**Duty Cycle Correction Factor (㏈)**	**MIMO Final PSD (㏈ m)**	**Directional Antenna Gain (㏈ i)**	**Limit (㏈ m/500 ㎑)**
U-NII 3	5 755	151	MCS 7	-11.97	-11.15	-8.53	3.14	-5.39	3.08	30
	5 795	159		-12.16	-11.82	-8.98		-5.84		

Test mode: 11ax_HE80

Band	Frequency (㎒)	Ch.	Data Rate	Ant. 0 Measured PSD	Ant. 1 Measured PSD	MIMO PSD (㏈ m)	Duty Cycle Correction Factor (㏈)	MIMO Final PSD (㏈ m)	Directional Antenna Gain (㏈ i)	Limit (㏈ m/1 ㎒)
U-NII 1	5 210	42	MCS 4	-17.74	-18.69	-15.18	3.89	-11.29	3.55	11
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Ant. 0 Measured PSD**	**Ant. 1 Measured PSD**	**MIMO PSD (㏈ m)**	**Duty Cycle Correction Factor (㏈)**	**MIMO Final PSD (㏈ m)**	**Directional Antenna Gain (㏈ i)**	**Limit (㏈ m/500 ㎑)**
U-NII 3	5 775	155	MCS 4	-18.70	-20.00	-16.29	3.89	-12.40	3.08	30

Remark;

1. According to KDB 662911, power spectral density of each port and antenna gain was combined by using below calculation.

   - PSD: 10 log {10^(Port 1 PSD / 10)+10^(Port 2 PSD / 10)}

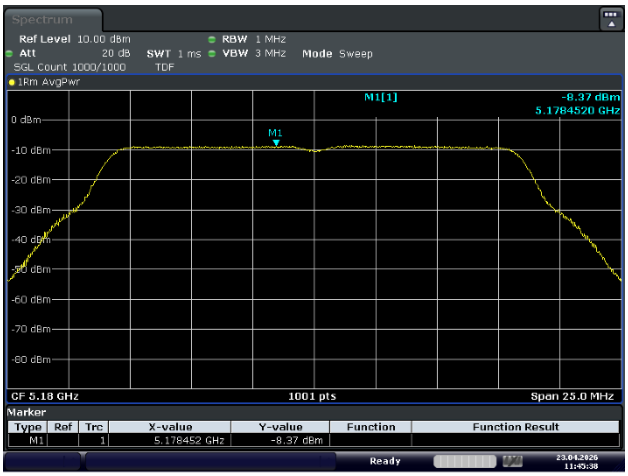
   - Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N ㏈ i
   (i) If transmit signals are correlated, then
   Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N_{ANT}$] ㏈ i [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2. Final PSD (㏈ m) = PSD (㏈ m) + Duty Cycle Correction Factor (㏈)

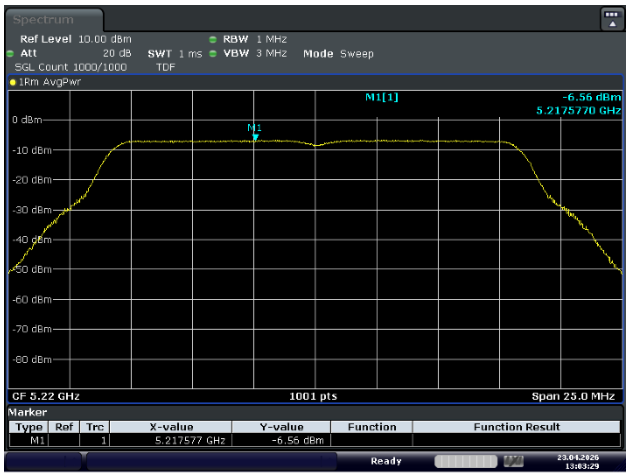
Test plots

- Ant. 0

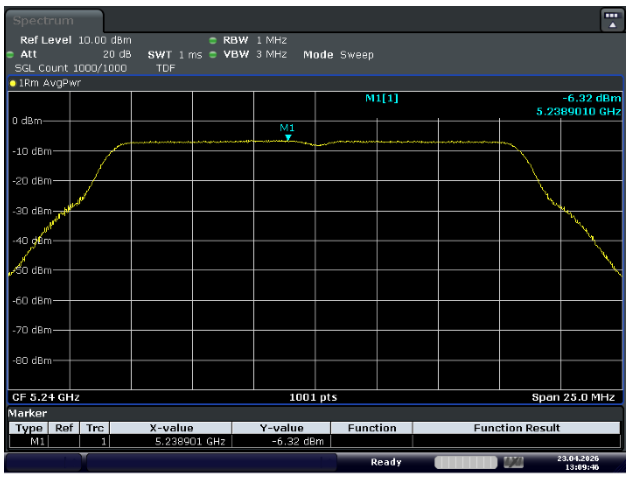
11a (U-NII 1)



Low Channel (5 180 ㎒)

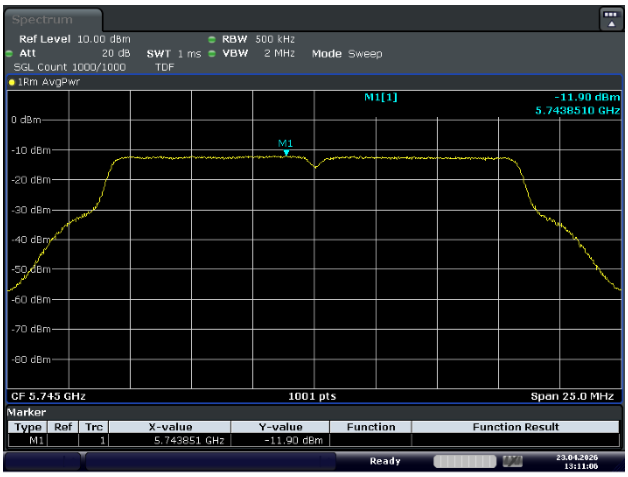


Middle Channel (5 220 ㎒)

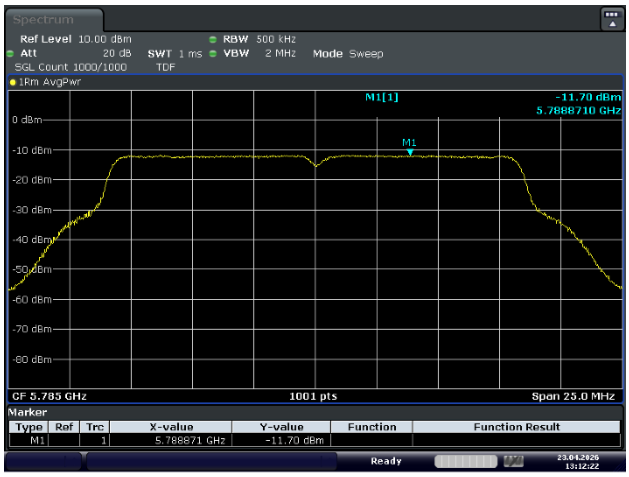


High Channel (5 240 ㎒)

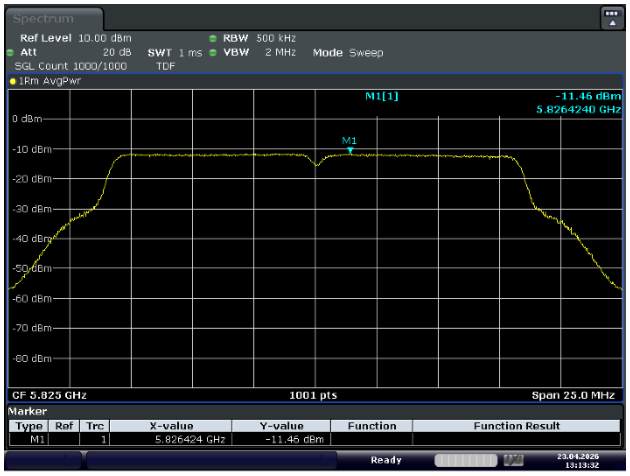
11a (U-NII 3)



Low Channel (5 745 ㎒)



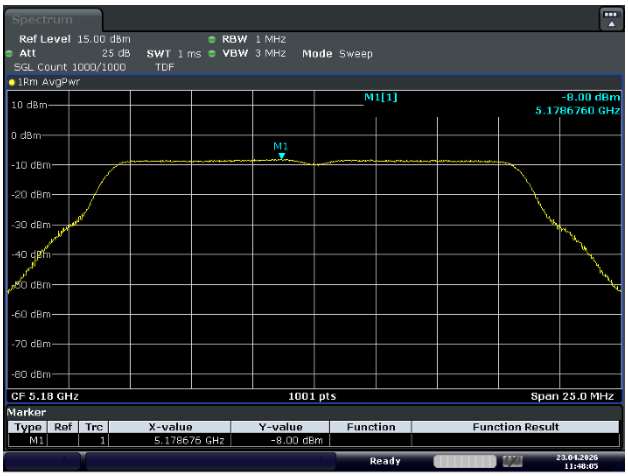
Middle Channel (5 785 ㎒)



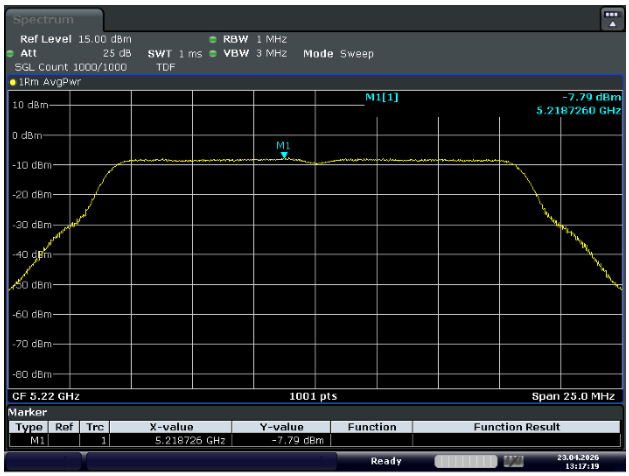
High Channel (5 825 ㎒)

- Ant. 1

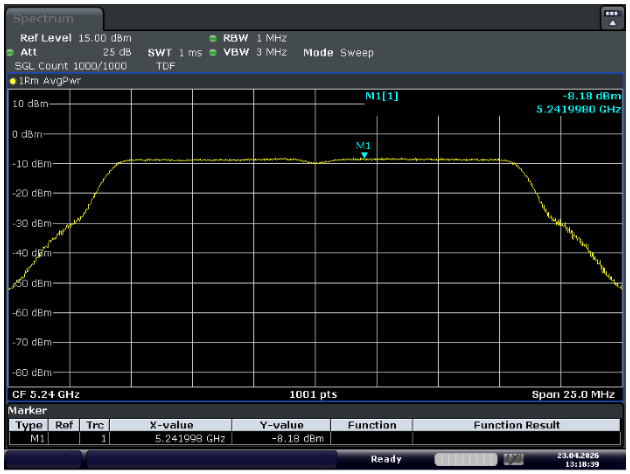
11a (U-NII 1)



Low Channel (5 180 ㎒)

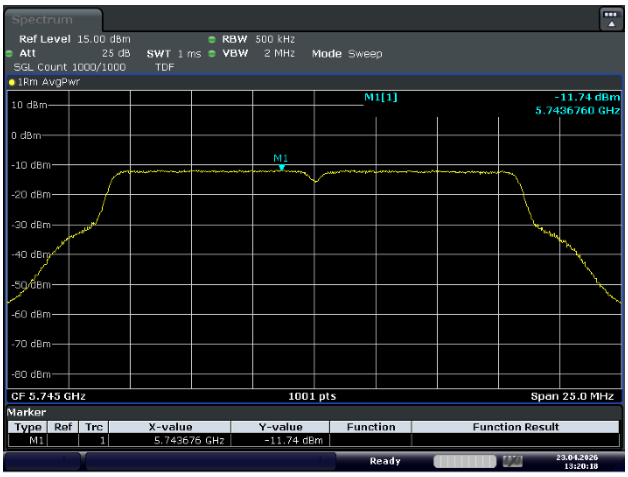


Middle Channel (5 220 ㎒)

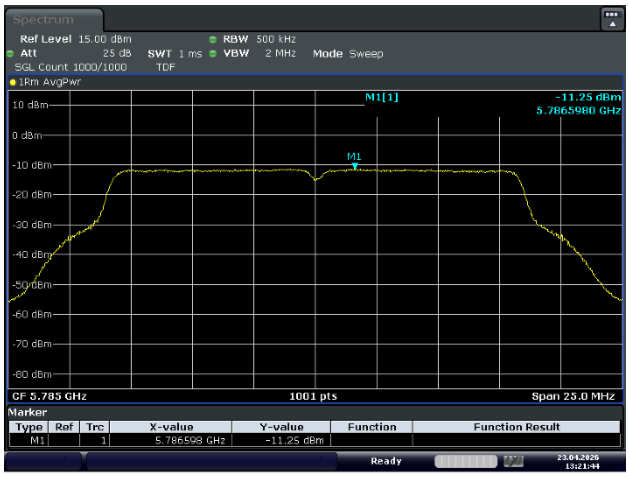


High Channel (5 240 ㎒)

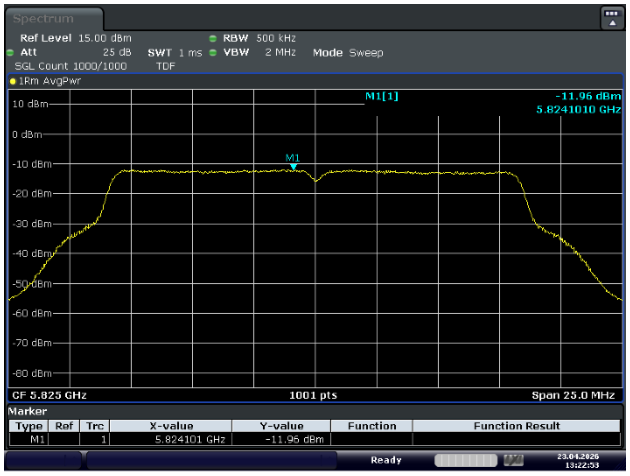
11a (U-NII 3)



Low Channel (5 745 ㎒)



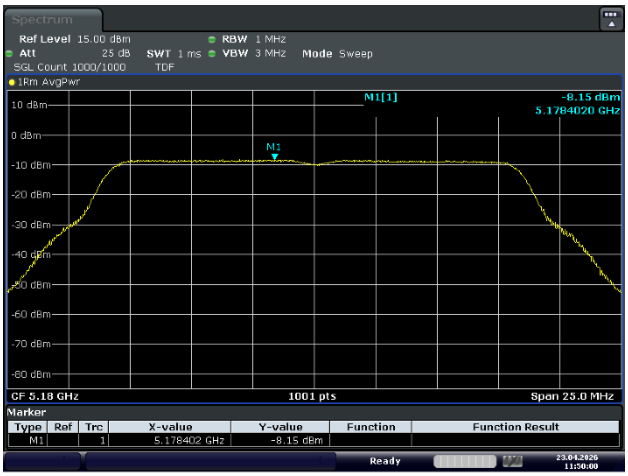
Middle Channel (5 785 ㎒)



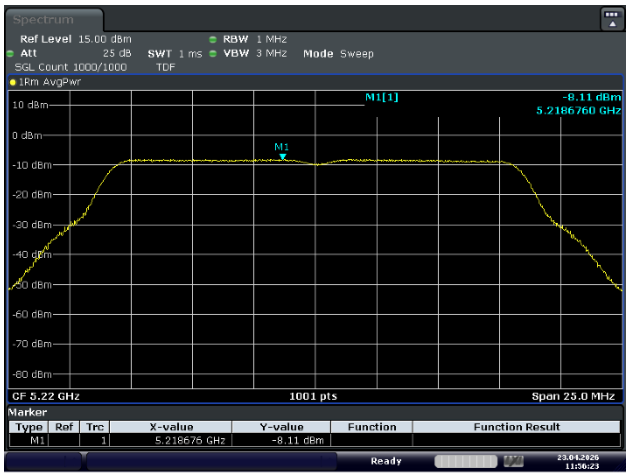
High Channel (5 825 ㎒)

- Ant. 2

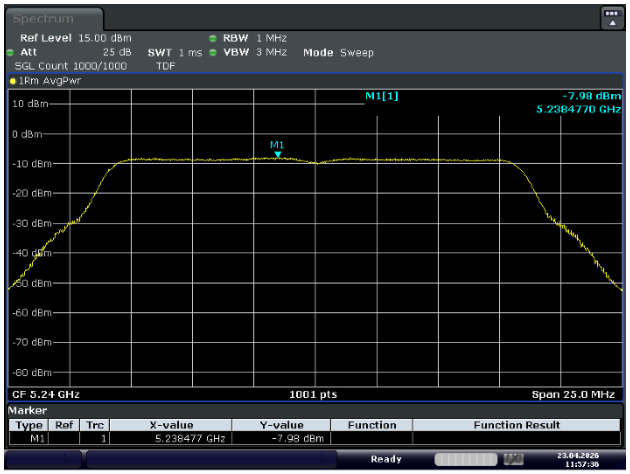
11a (U-NII 1)



Low Channel (5 180 ㎒)

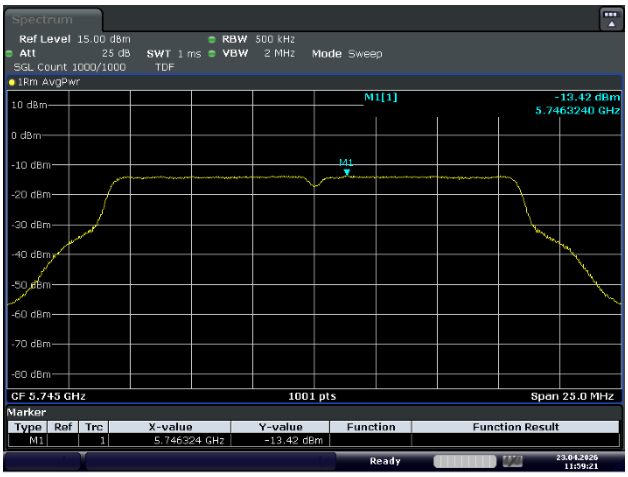


Middle Channel (5 220 ㎒)

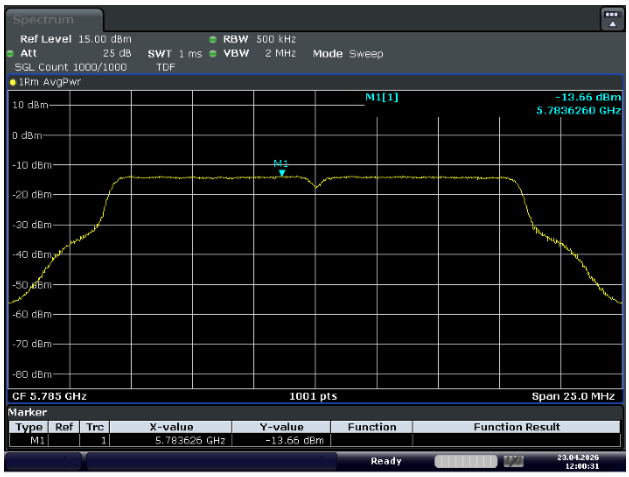


High Channel (5 240 ㎒)

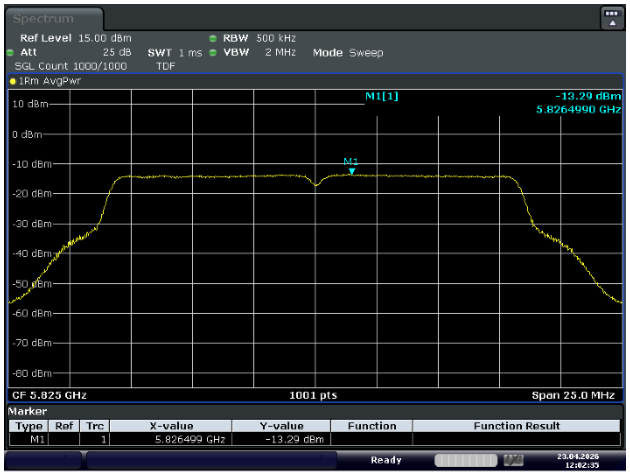
11a (U-NII 3)



Low Channel (5 745 ㎒)

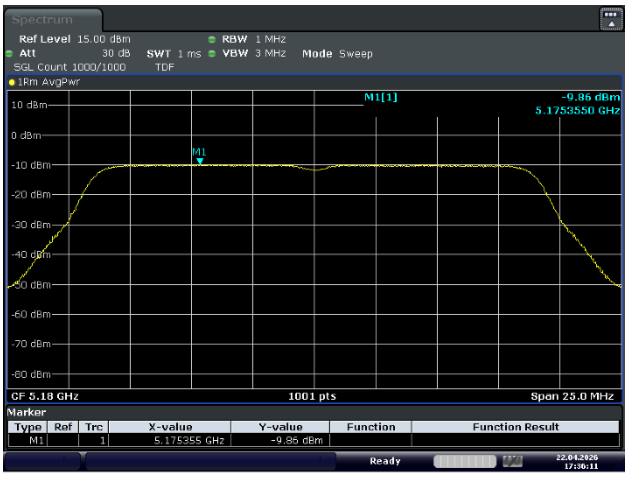


Middle Channel (5 785 ㎒)

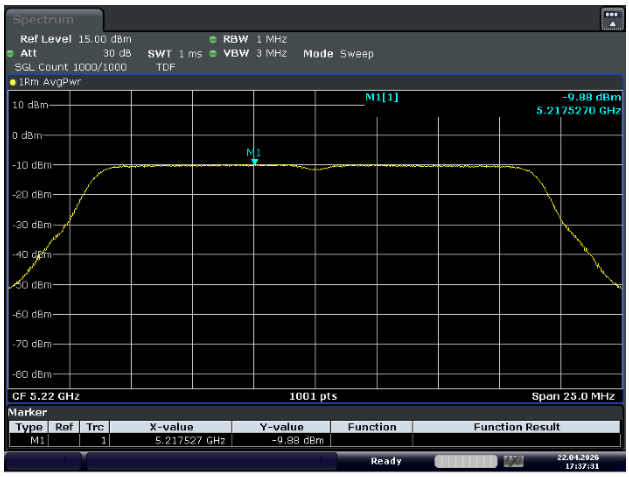


High Channel (5 825 ㎒)

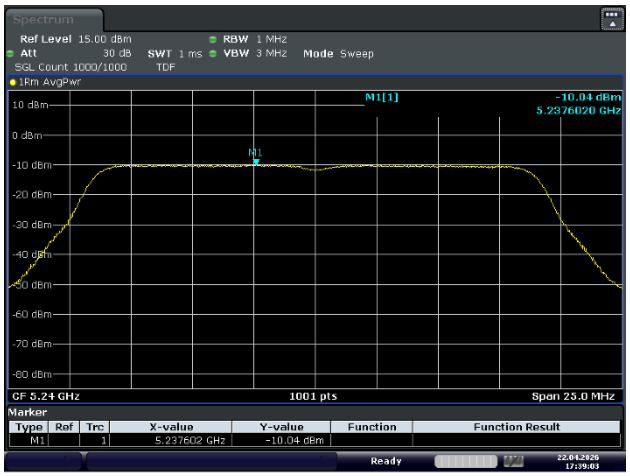
11ac_VHT20 (U-NII 1)



Low Channel (5 180 ㎒)



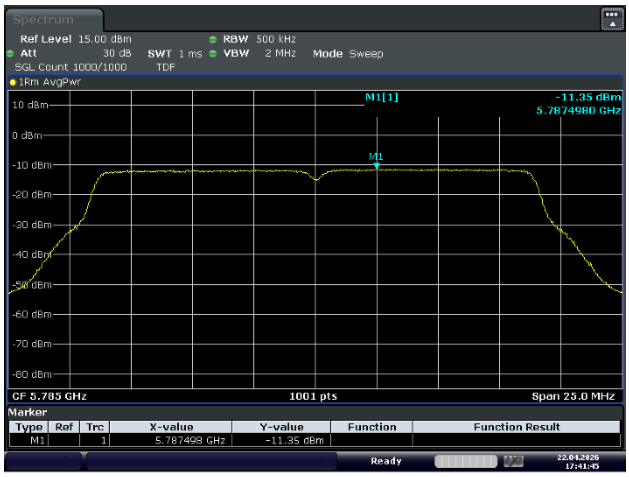
Middle Channel (5 220 ㎒)



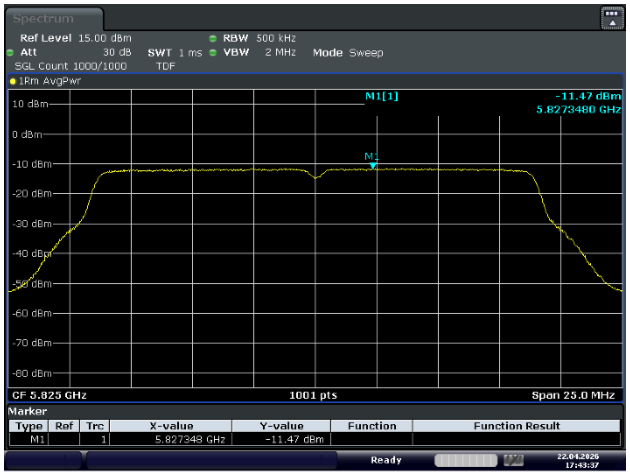
High Channel (5 240 ㎒)

11ac_VHT20 (U-NII 3)

Low Channel (5 745 ㎒)

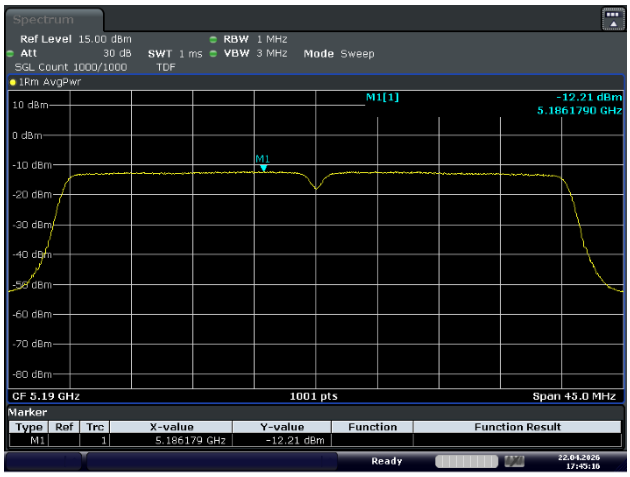
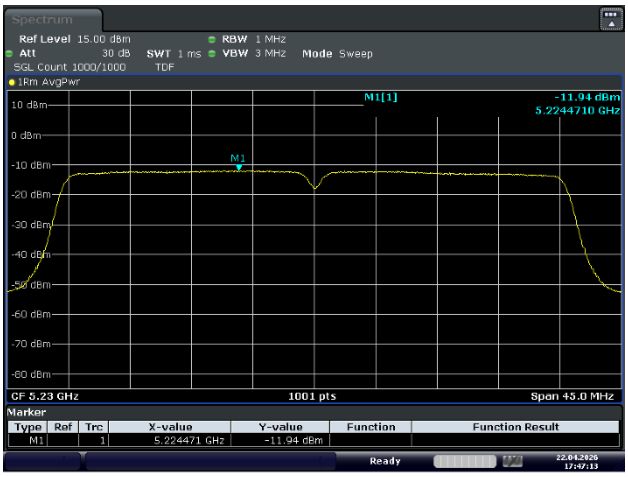


Middle Channel (5 785 ㎒)

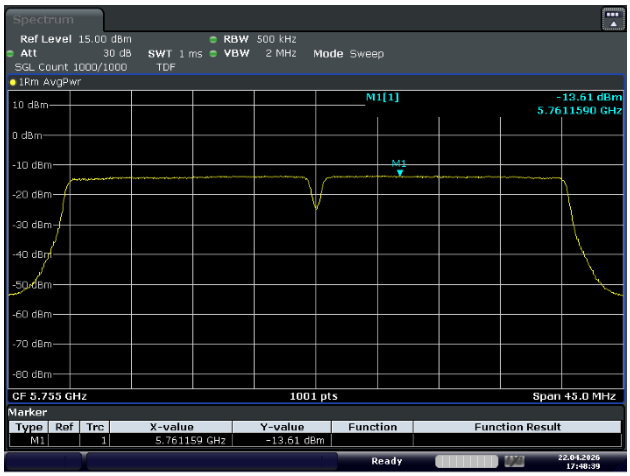
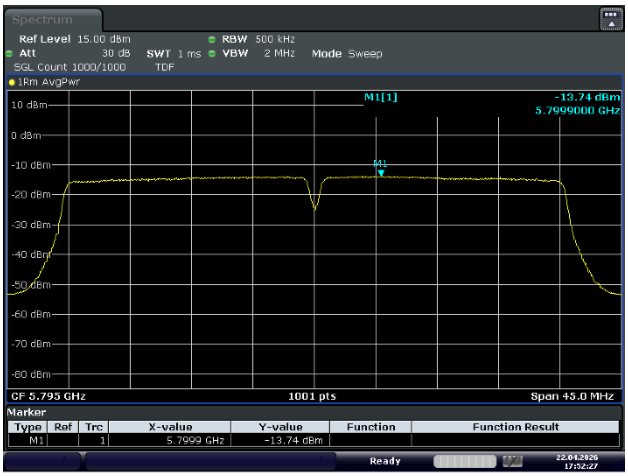


High Channel (5 825 ㎒)

11ac_VHT40 (U-NII 1)

	
Low Channel (5 190 ㎒)	High Channel (5 230 ㎒)

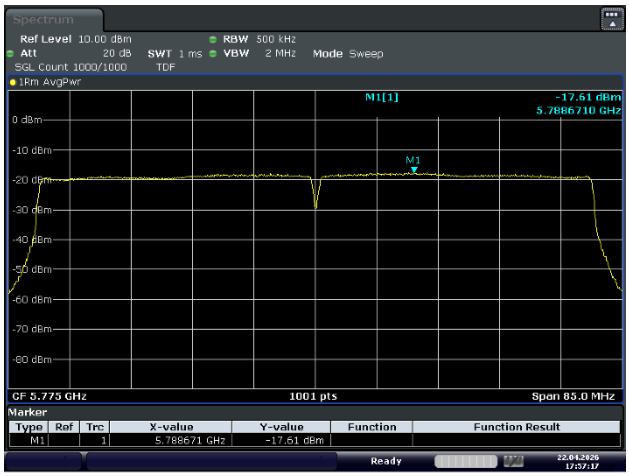
11ac_VHT40 (U-NII 3)

	
Low Channel (5 755 ㎒)	High Channel (5 795 ㎒)

11ac_VHT80 (U-NII 1)

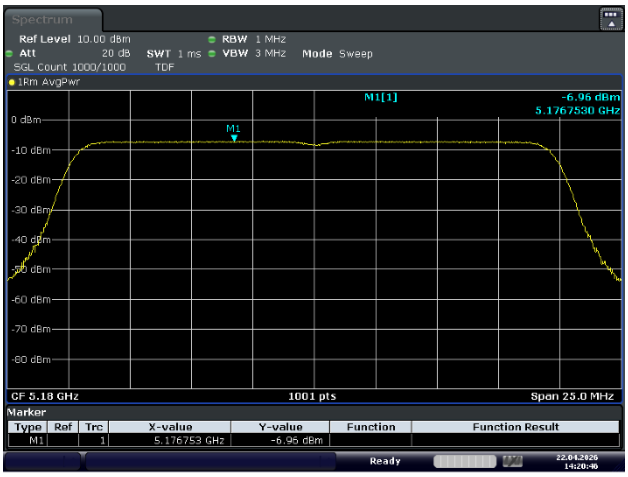
Middle Channel (5 210 ㎒)

11ac_VHT80 (U-NII 3)

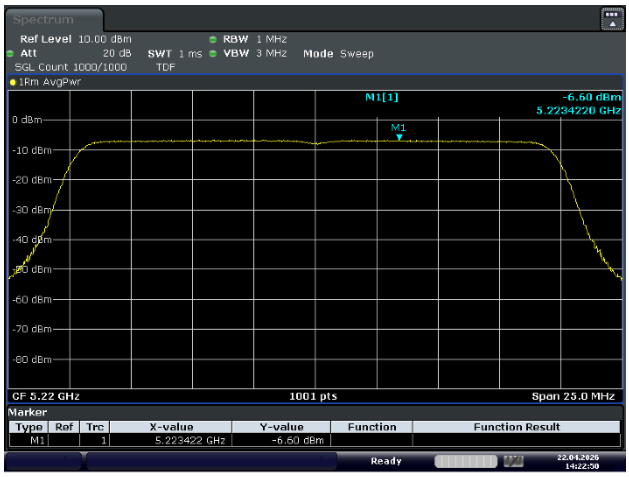


Low Channel (5 775 ㎒)

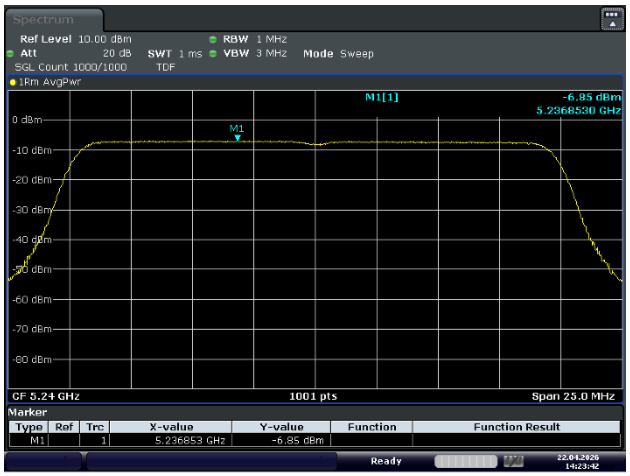
11ax_HE20 (U-NII 1)



Low Channel (5 180 ㎒)



Middle Channel (5 220 ㎒)



High Channel (5 240 ㎒)

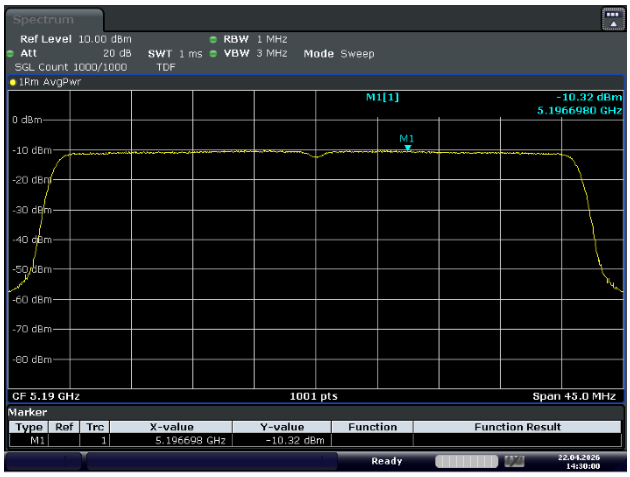
11ax_HE20 (U-NII 3)

Low Channel (5 745 ㎒)

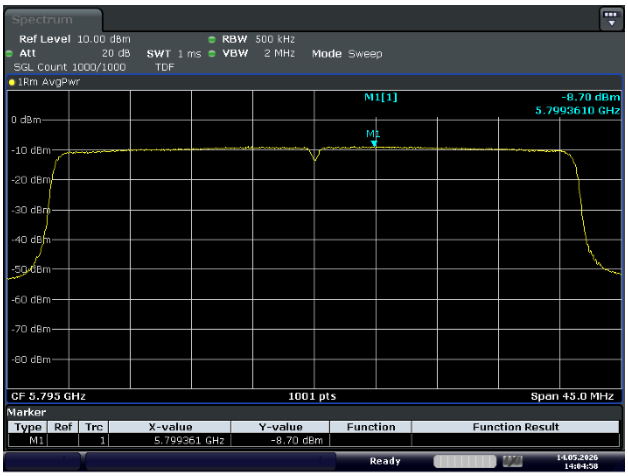
Middle Channel (5 785 ㎒)

High Channel (5 825 ㎒)

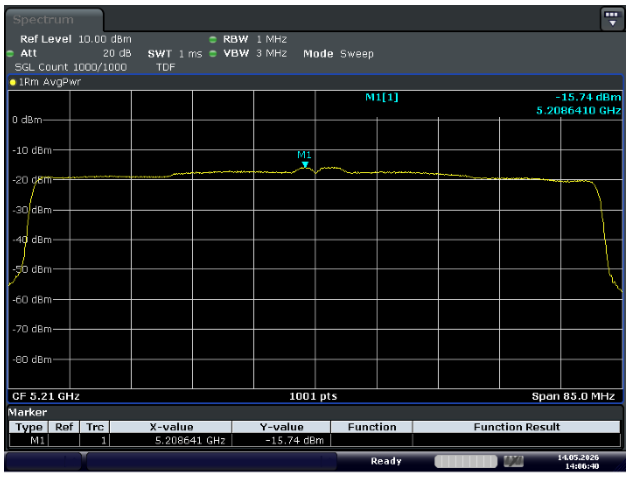
11ax_HE40 (U-NII 1)

	
Low Channel (5 190 ㎒)	High Channel (5 230 ㎒)

11ax_HE40 (U-NII 3)

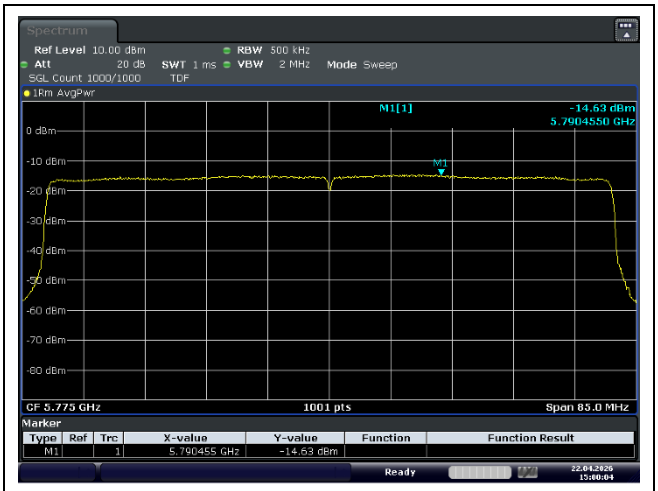
	
Low Channel (5 755 ㎒)	High Channel (5 795 ㎒)

11ax_HE80 (U-NII 1)



Middle Channel (5 210 ㎒)

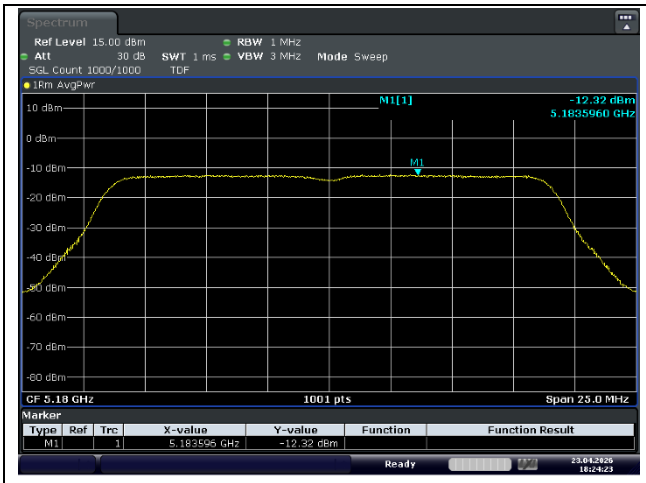
11ax_HE80 (U-NII 3)



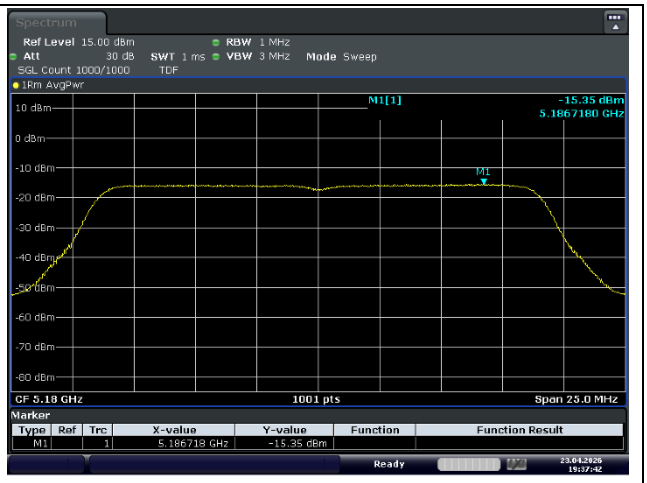
Low Channel (5 775 ㎒)

- Ant. 0 + Ant. 1

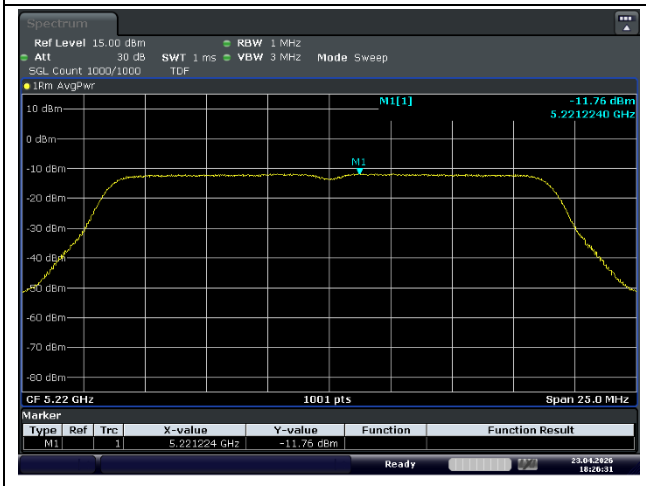
11ac_VHT20 (U-NII 1)



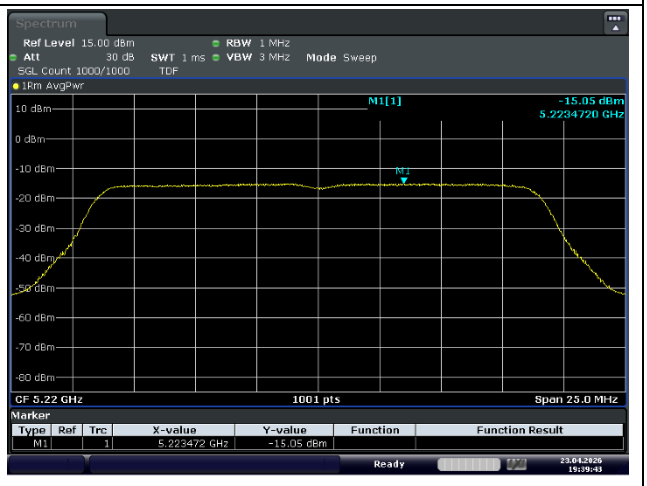
Ant. 0_Low Channel (5 180 ㎒)



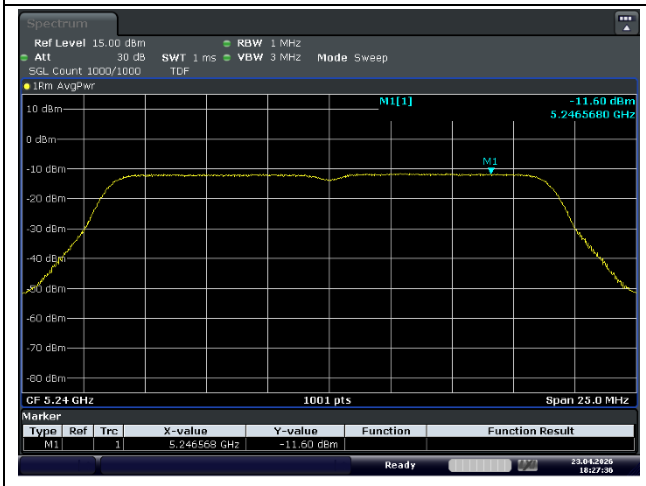
Ant. 1_Low Channel (5 180 ㎒)



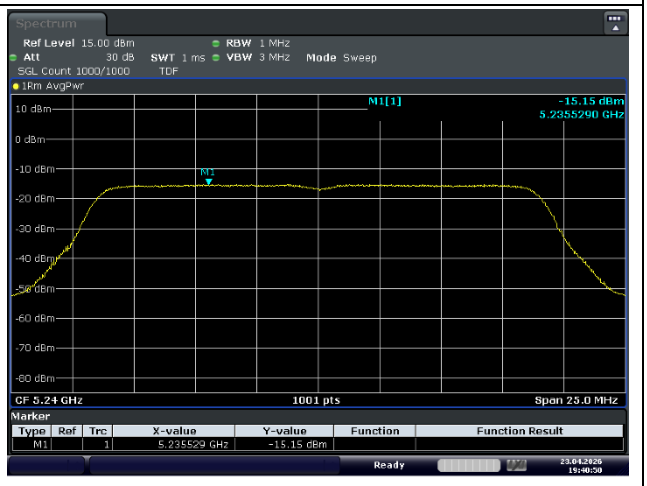
Ant. 0_Middle Channel (5 220 ㎒)



Ant. 1_Middle Channel (5 220 ㎒)

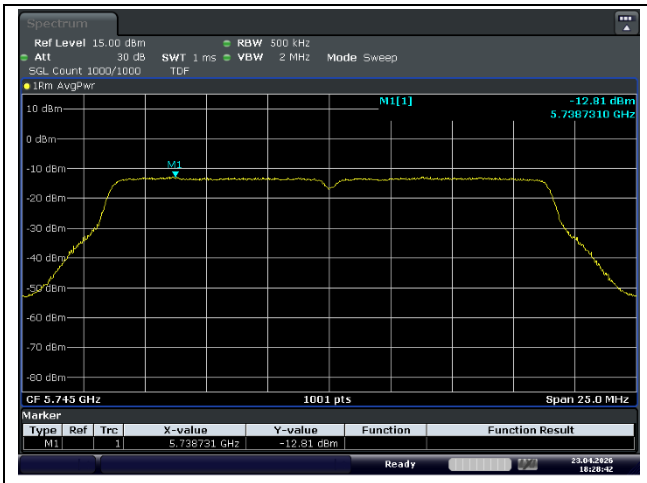


Ant. 0_High Channel (5 240 ㎒)

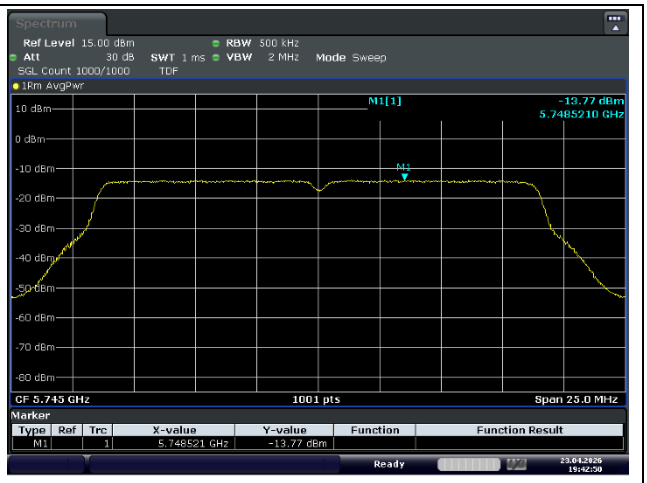


Ant. 1_High Channel (5 240 ㎒)

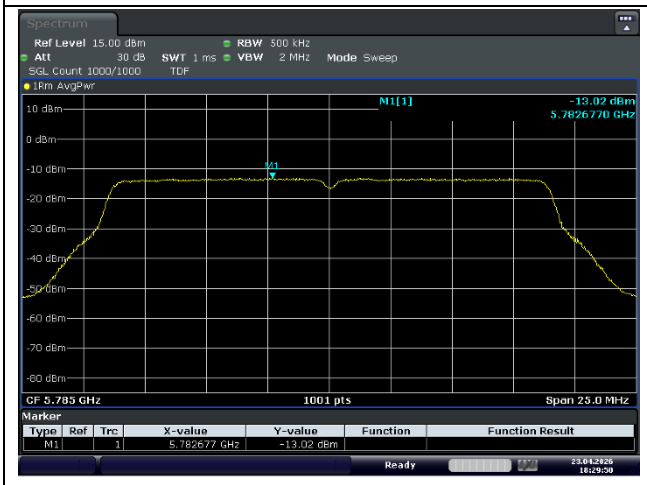
11ac_VHT20 (U-NII 3)



Ant. 0_Low Channel (5 745 ㎒)

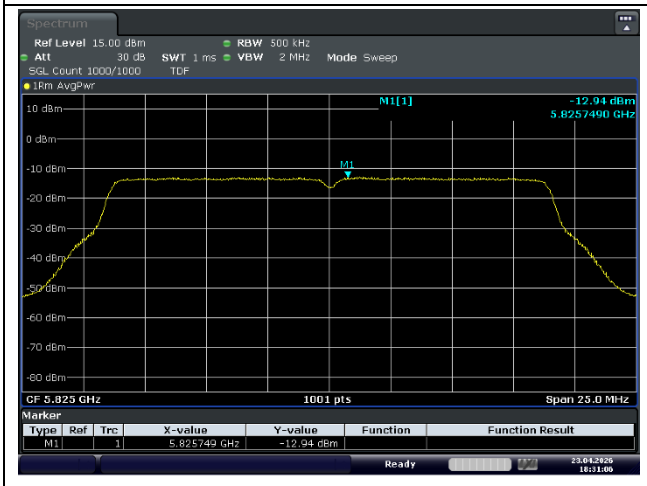


Ant. 1_Low Channel (5 745 ㎒)

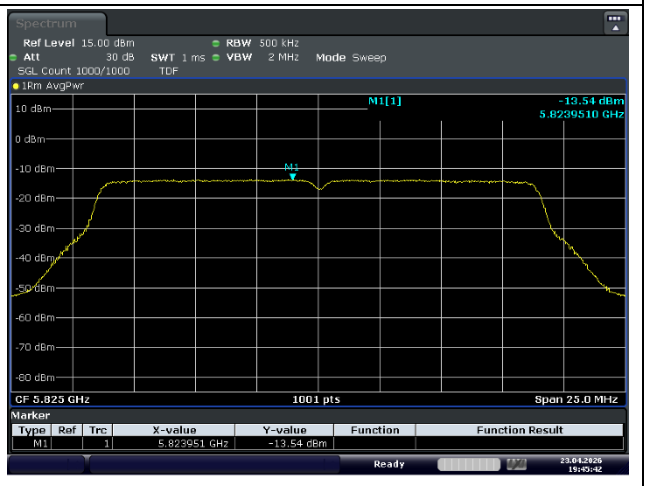


Ant. 0_Middle Channel (5 785 ㎒)

Ant. 1_Middle Channel (5 785 ㎒)



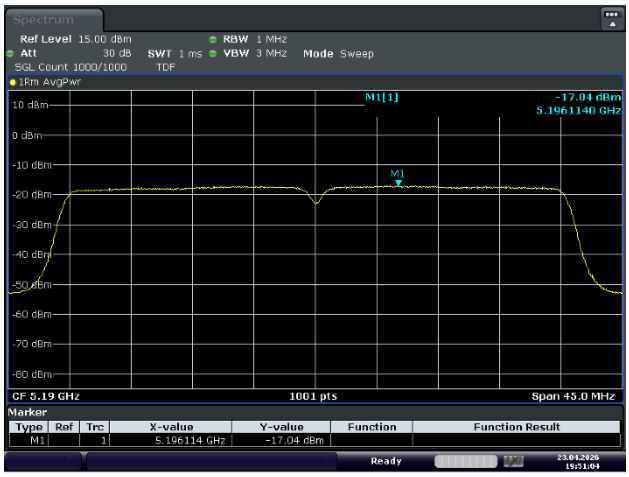
Ant. 0_High Channel (5 825 ㎒)



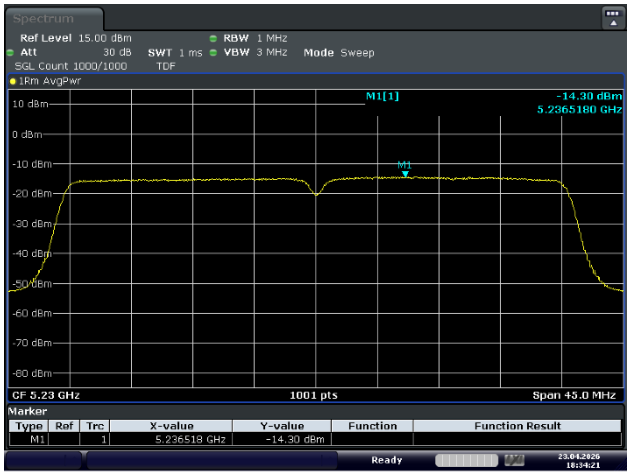
Ant. 1_High Channel (5 825 ㎒)

11ac_VHT40 (U-NII 1)

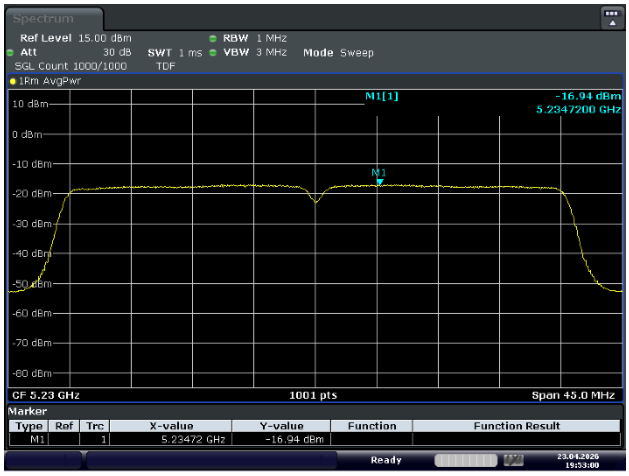
Ant. 0_Low Channel (5 190 ㎒)



Ant. 1_Low Channel (5 190 ㎒)

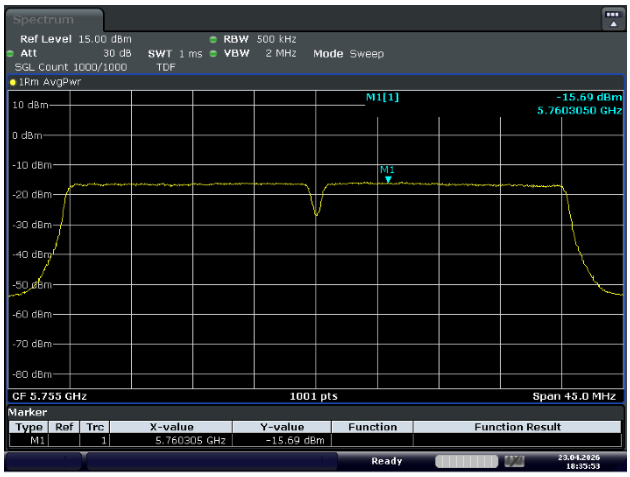


Ant. 0_High Channel (5 230 ㎒)



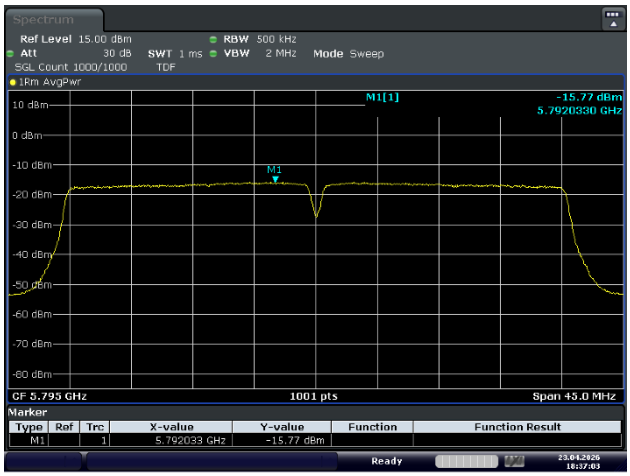
Ant. 1_High Channel (5 230 ㎒)

11ac_VHT40 (U-NII 3)

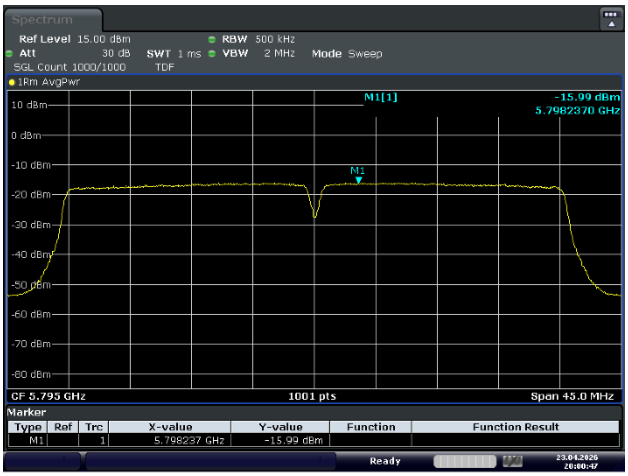


Ant. 0_Low Channel (5 755 ㎒)

Ant. 1_Low Channel (5 755 ㎒)

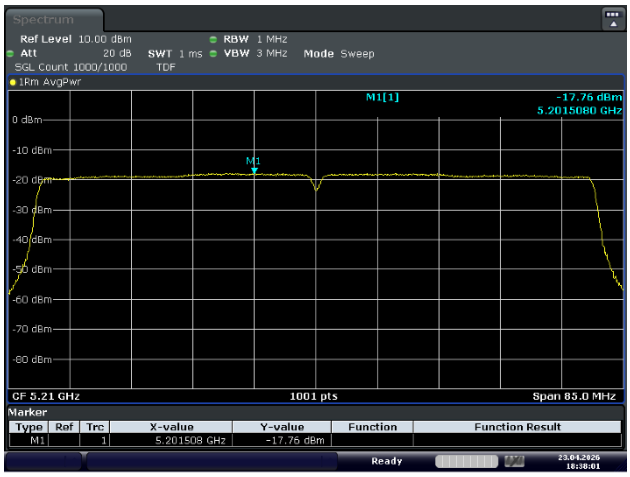
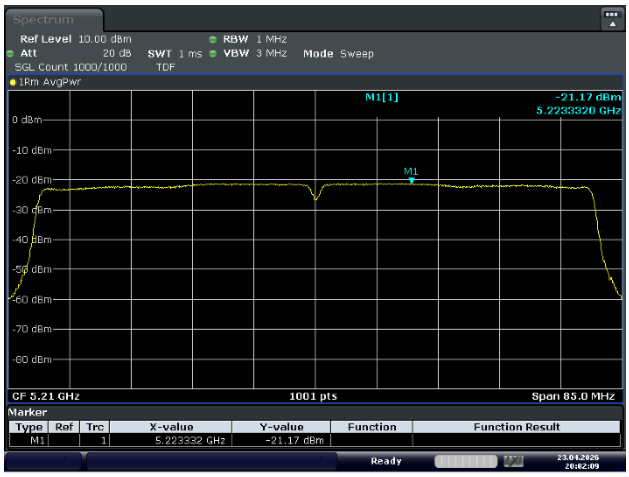


Ant. 0_High Channel (5 795 ㎒)

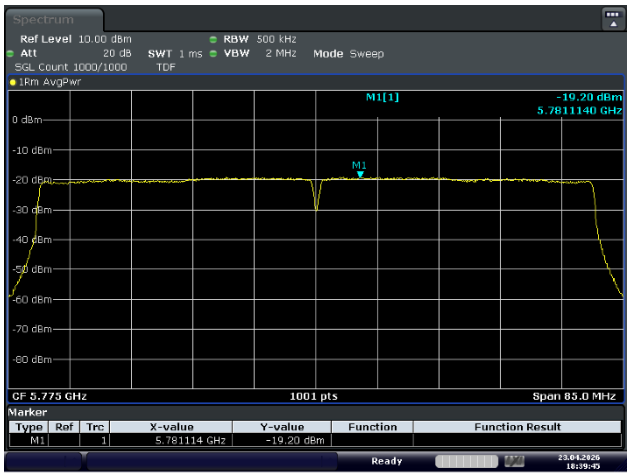


Ant. 1_High Channel (5 795 ㎒)

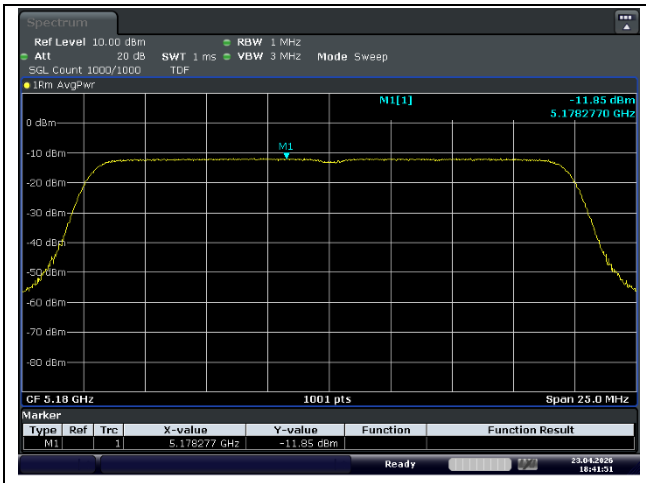
11ac_VHT80 (U-NII 1)

	
Ant. 0_Middle Channel (5 210 ㎒)	Ant. 1_Middle Channel (5 210 ㎒)

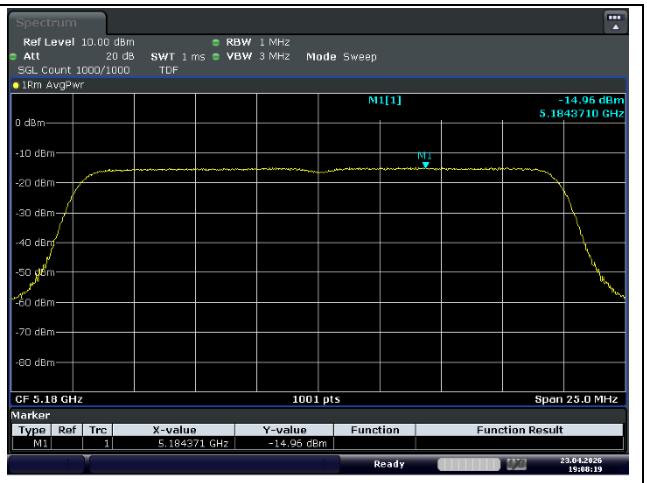
11ac_VHT80 (U-NII 3)

	
Ant. 0_Middle Channel (5 775 ㎒)	Ant. 1_Middle Channel (5 775 ㎒)

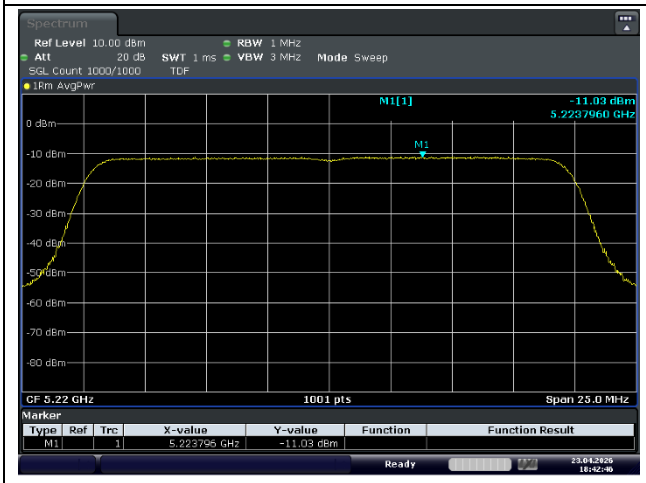
11ax_HE20 (U-NII 1)



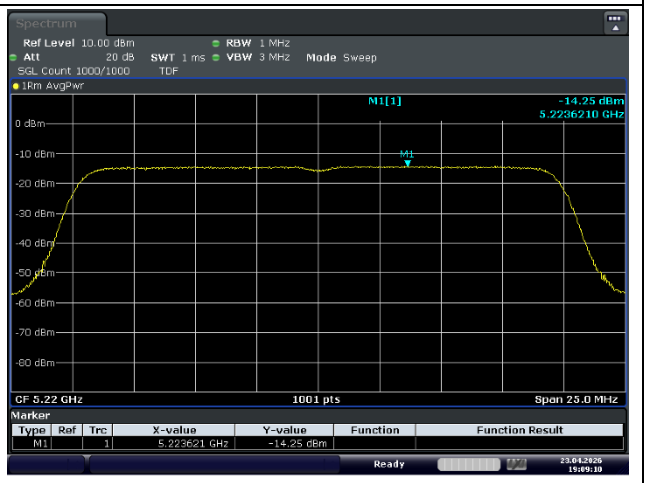
Ant. 0_Low Channel (5 180 ㎒)



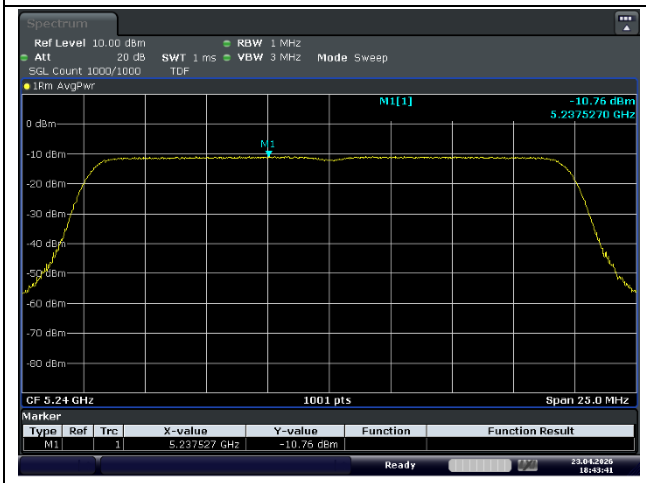
Ant. 1_Low Channel (5 180 ㎒)



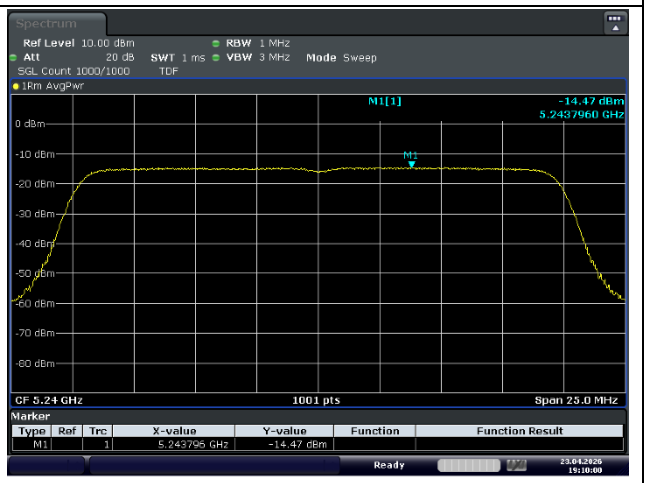
Ant. 0_Middle Channel (5 220 ㎒)



Ant. 1_Middle Channel (5 220 ㎒)

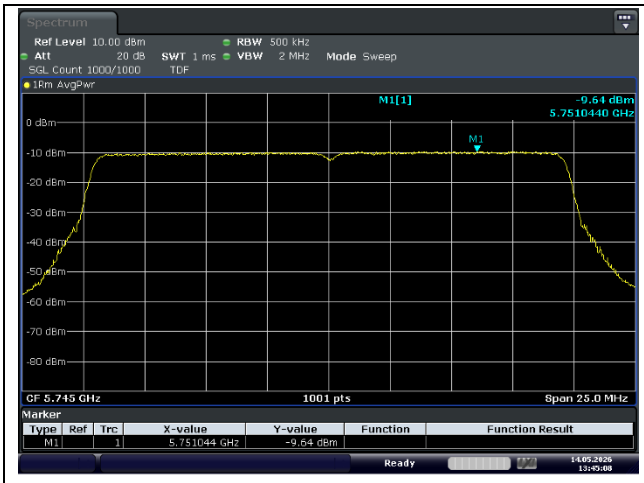


Ant. 0_High Channel (5 240 ㎒)



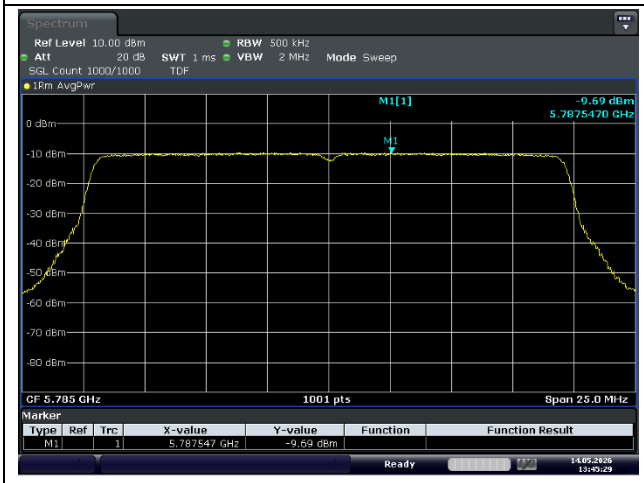
Ant. 1_High Channel (5 240 ㎒)

11ax_HE20 (U-NII 3)

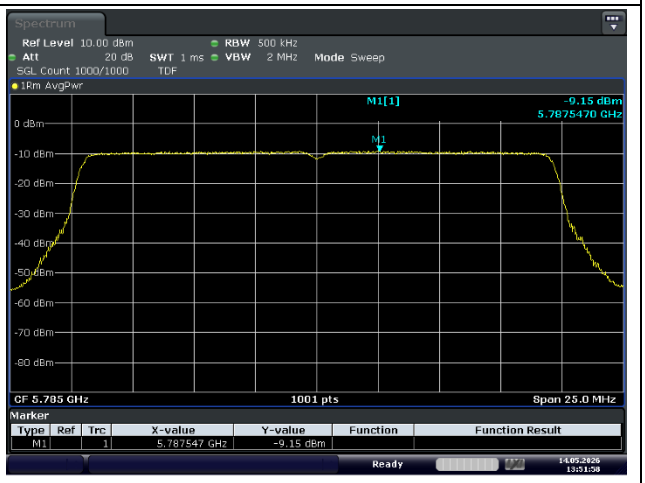


Ant. 0_Low Channel (5 745 ㎒)

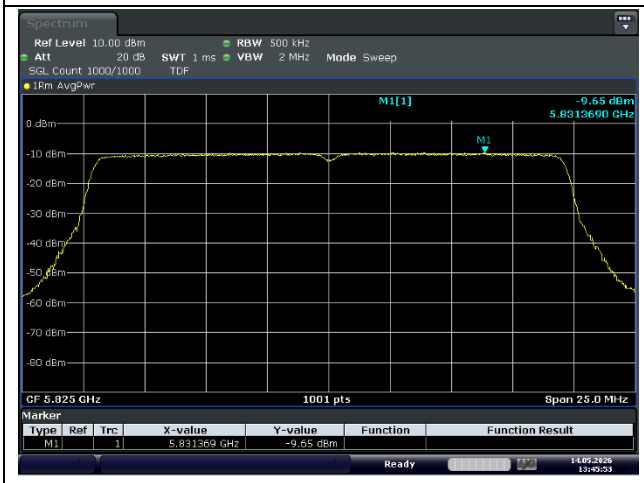
Ant. 1_Low Channel (5 745 ㎒)



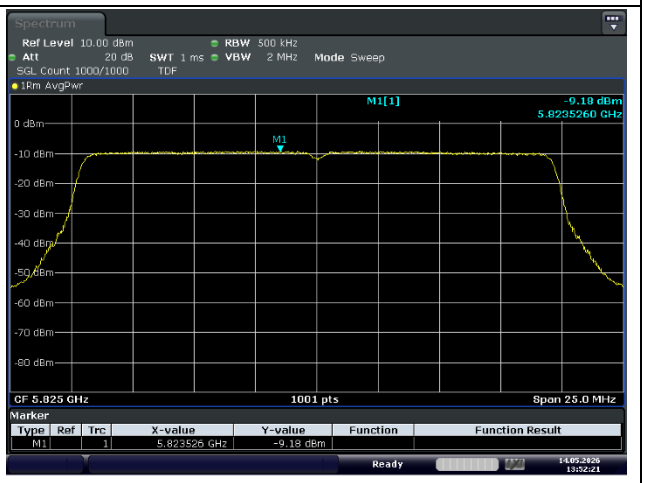
Ant. 0_Middle Channel (5 785 ㎒)



Ant. 1_Middle Channel (5 785 ㎒)

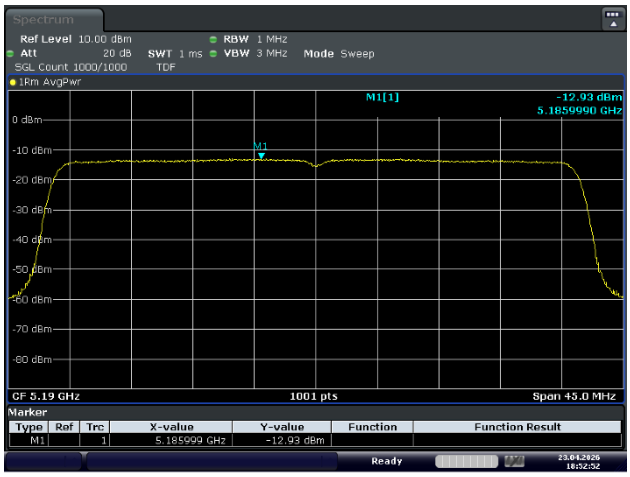


Ant. 0_High Channel (5 825 ㎒)

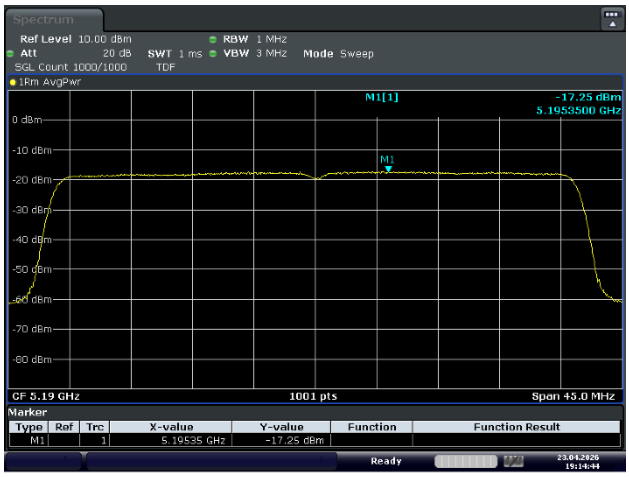


Ant. 1_High Channel (5 825 ㎒)

11ax_HE40 (U-NII 1)



Ant. 0_Low Channel (5 190 ㎒)

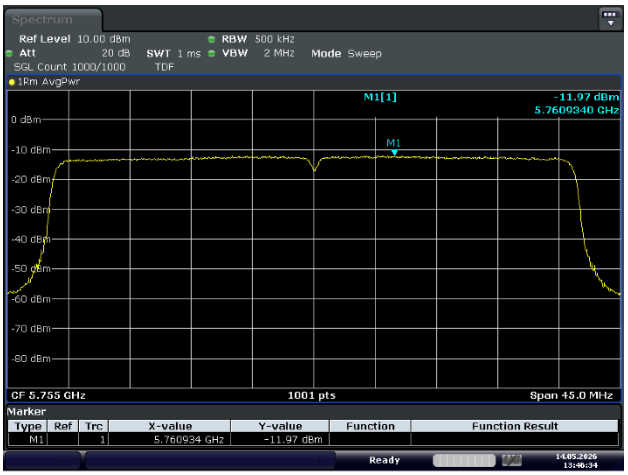


Ant. 1_Low Channel (5 190 ㎒)

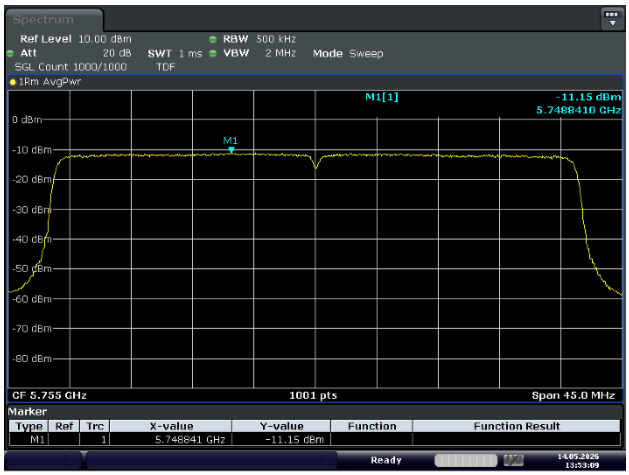
Ant. 0_High Channel (5 230 ㎒)

Ant. 1_High Channel (5 230 ㎒)

11ax_HE40 (U-NII 3)

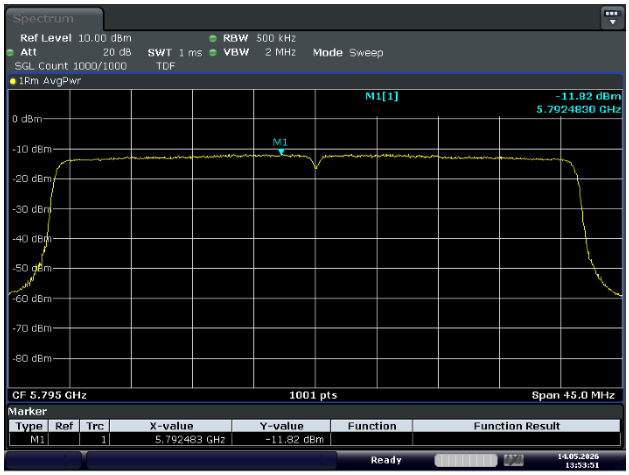


Ant. 0_Low Channel (5 755 ㎒)



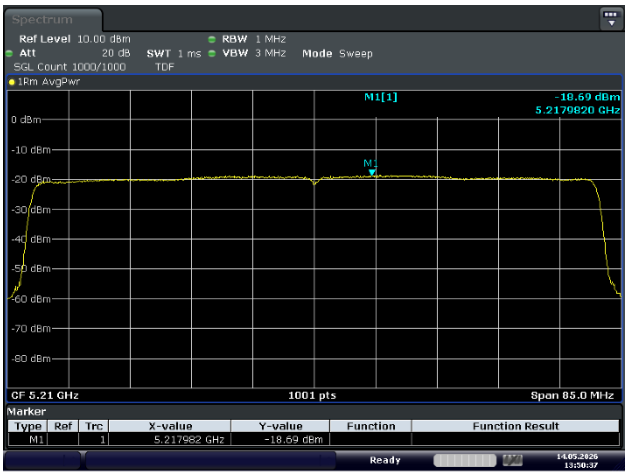
Ant. 1_Low Channel (5 755 ㎒)

Ant. 0_High Channel (5 795 ㎒)

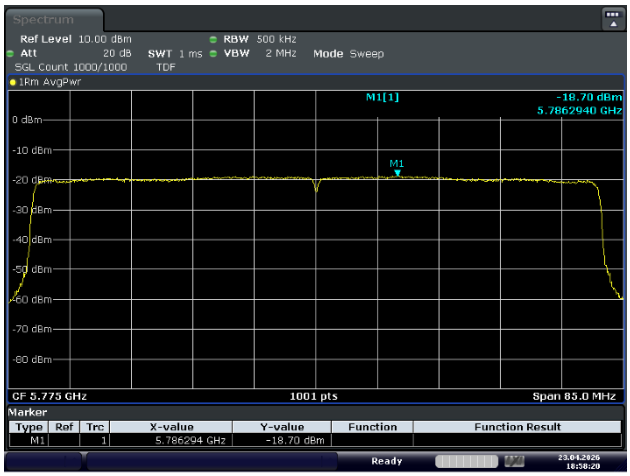


Ant. 1_High Channel (5 795 ㎒)

11ax_HE80 (U-NII 1)

	
Ant. 0_Middle Channel (5 210 ㎒)	Ant. 1_Middle Channel (5 210 ㎒)

11ax_HE80 (U-NII 3)

	
Ant. 0_Middle Channel (5 775 ㎒)	Ant. 1_Middle Channel (5 775 ㎒)

7. Antenna Requirement

7.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. And according to FCC 47 CFR Section §15.407(a) If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.2. Antenna Connected Construction

Antenna used in this product is Pattern antenna and peak max gain of antenna as below.

Band		5 150 ㎒ ~ 5 250 ㎒	5 725 ㎒ ~ 5 850 ㎒
Mode		11a/n_HT20, HT40, 11ac_VHT20, VHT40, VHT80, 11ax_HE20 , HE40, HE80	
Ant. 0 Gain (dB i)		0.29	0.05
Ant. 1 Gain (dB i)		0.78	0.08
Ant. 2 Gain (dB i)		0.68	0.69
Directional Gain (dB i)	Ant. 0 + Ant. 1	3.55	3.08

According to ANSI C63.10-2020 (for FCC) and ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024 (for ISED), unequal antenna gains with equal transmit powers.

a) If transmit signals are correlated, then
Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/N_{ANT}$] dB i

Note that the purpose of the factor 20 in the denominator of each exponent and the square of the sum of terms is to combine the signal levels coherently.

- End of the Test Report -