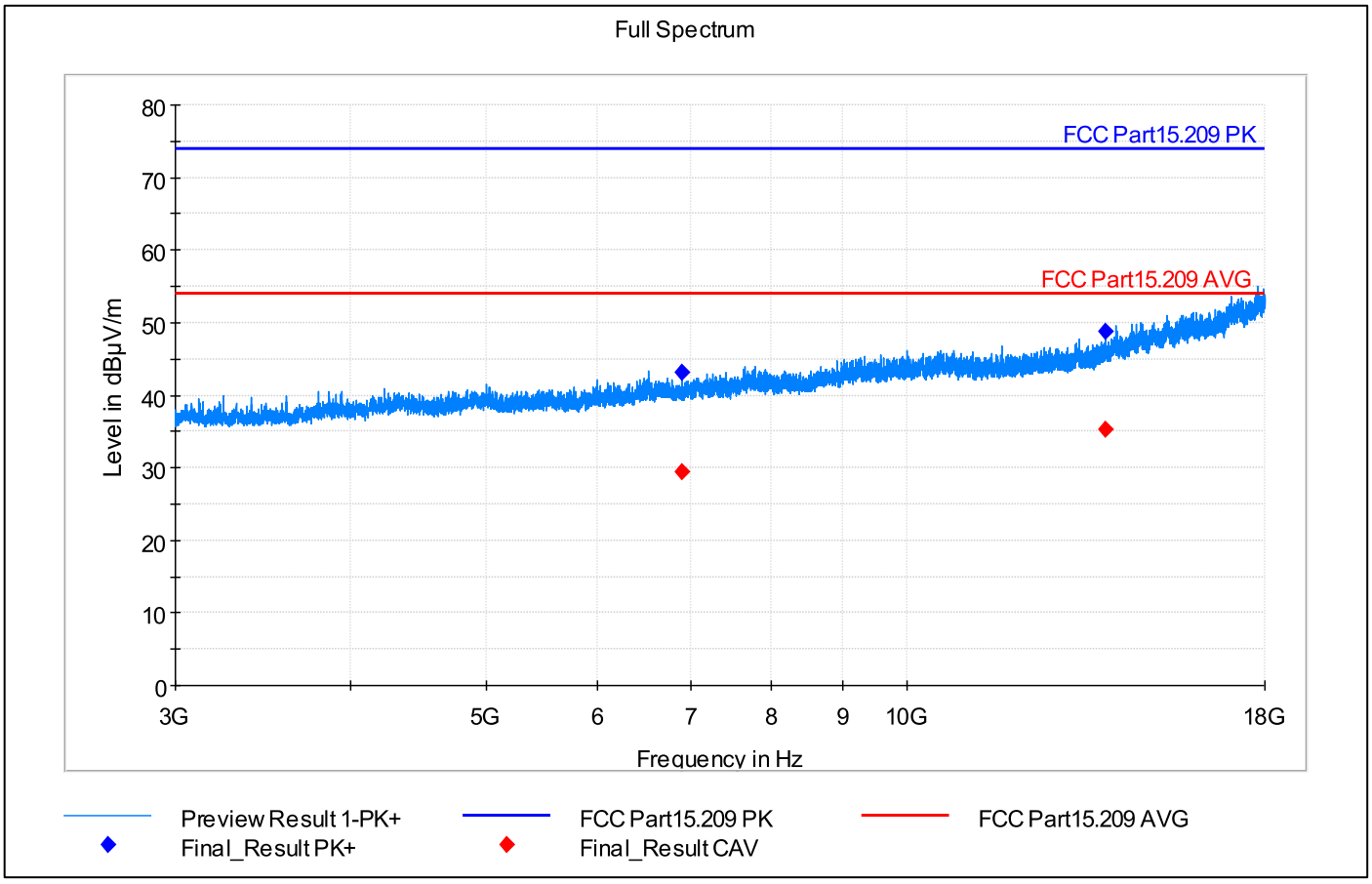
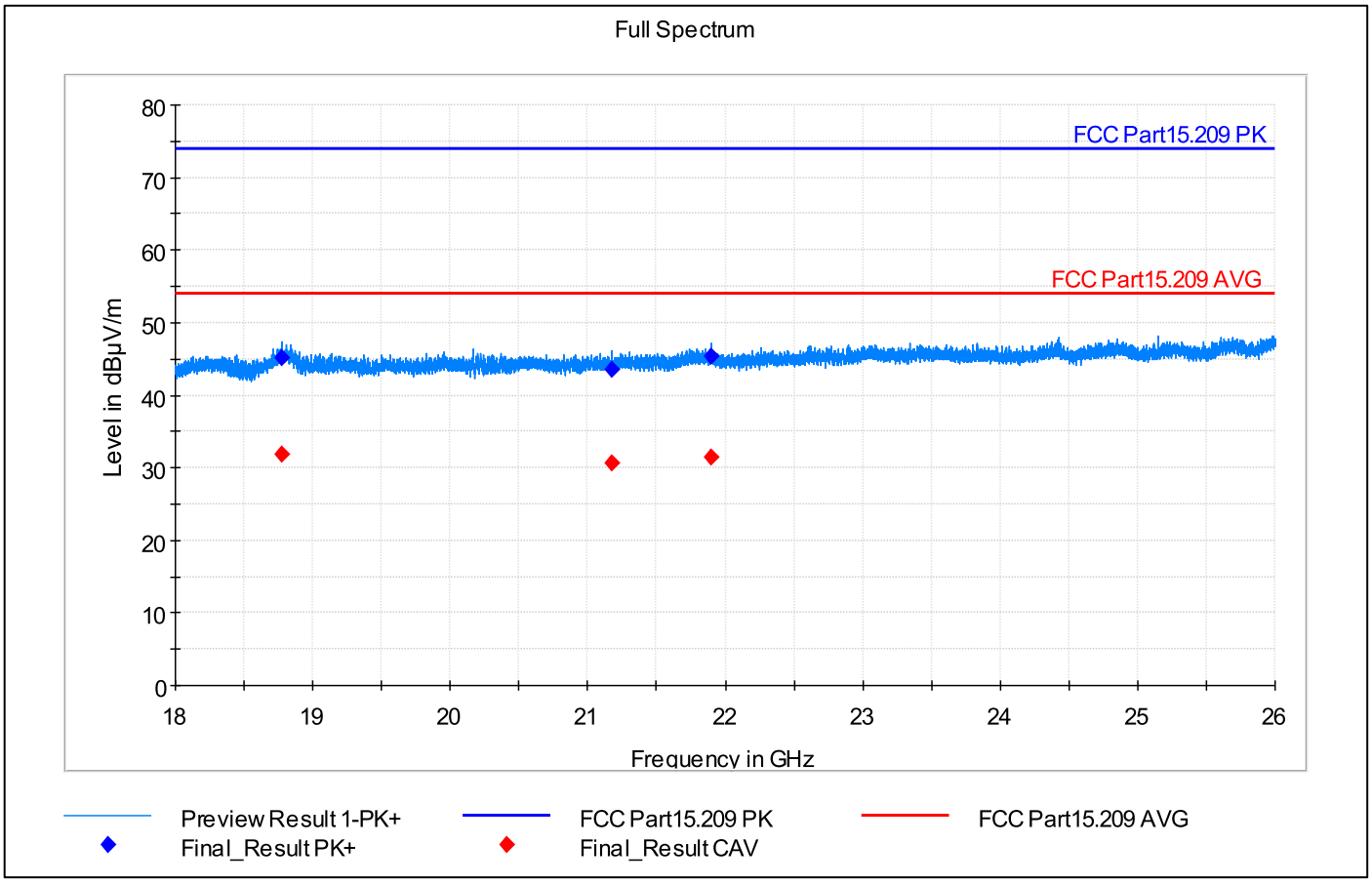
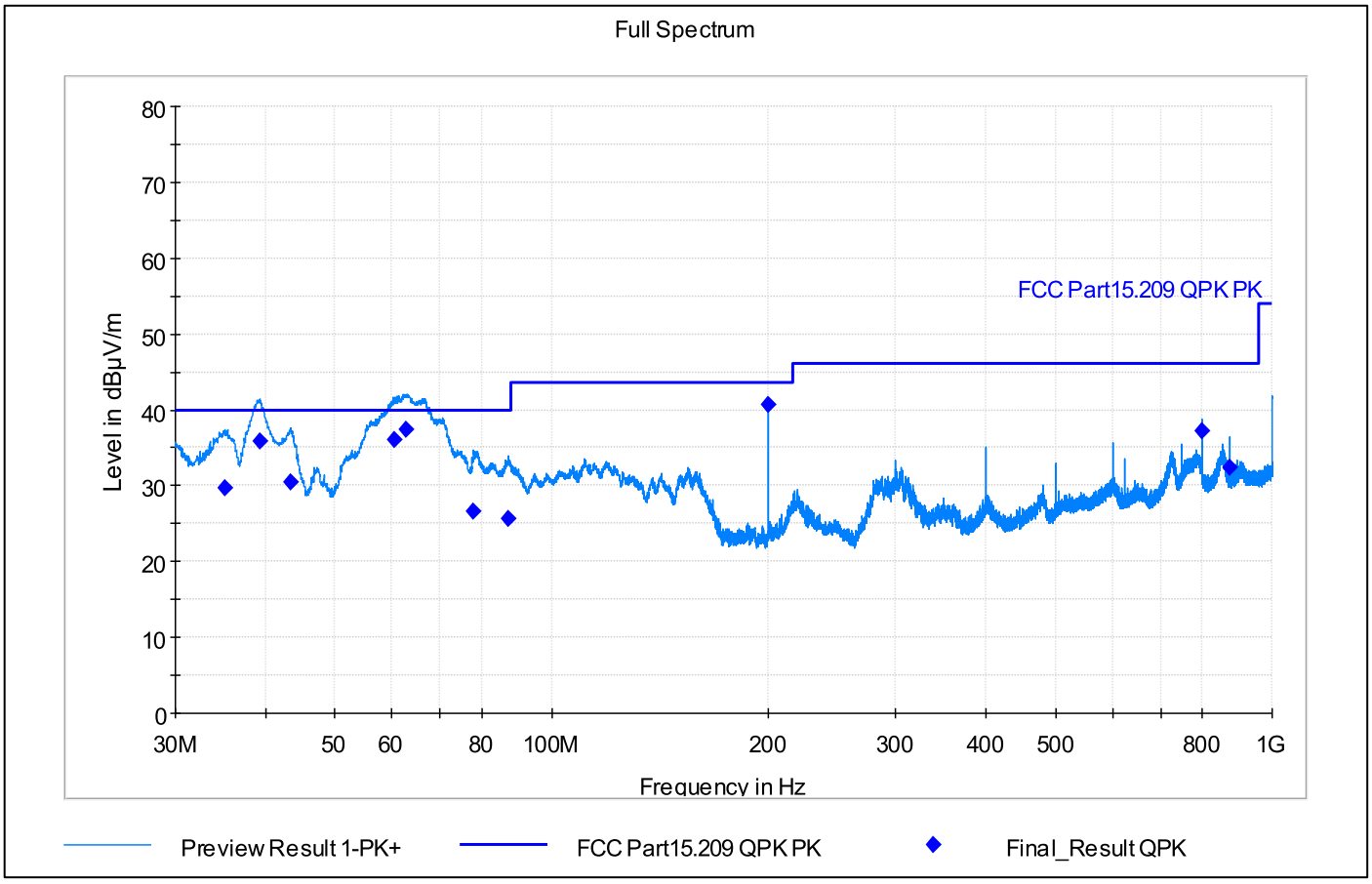
802.11b Mid channel, 3–18 GHz



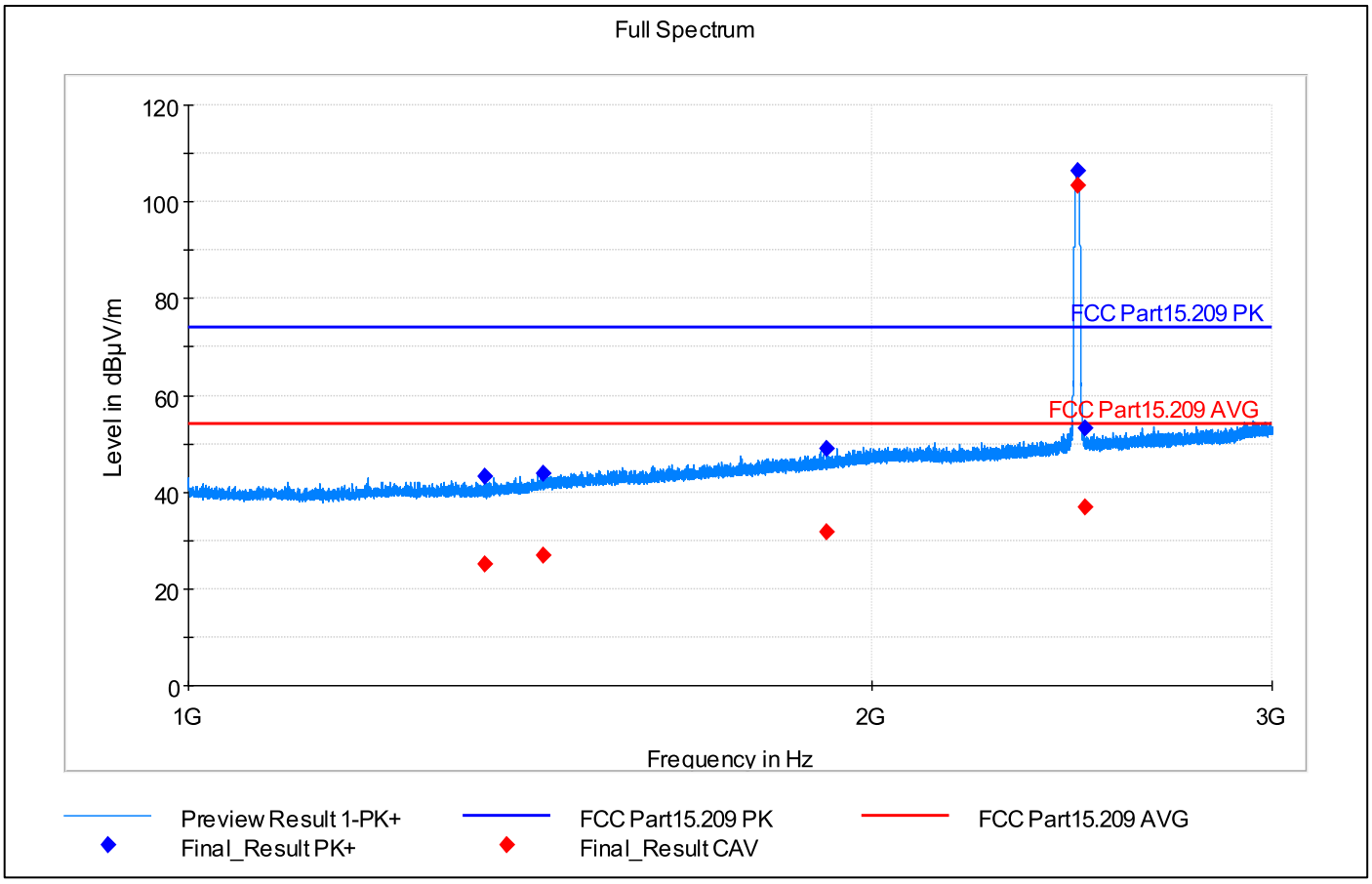
802.11b Mid channel, 18–26 GHz



802.11b High channel, 30 MHz – 1 GHz

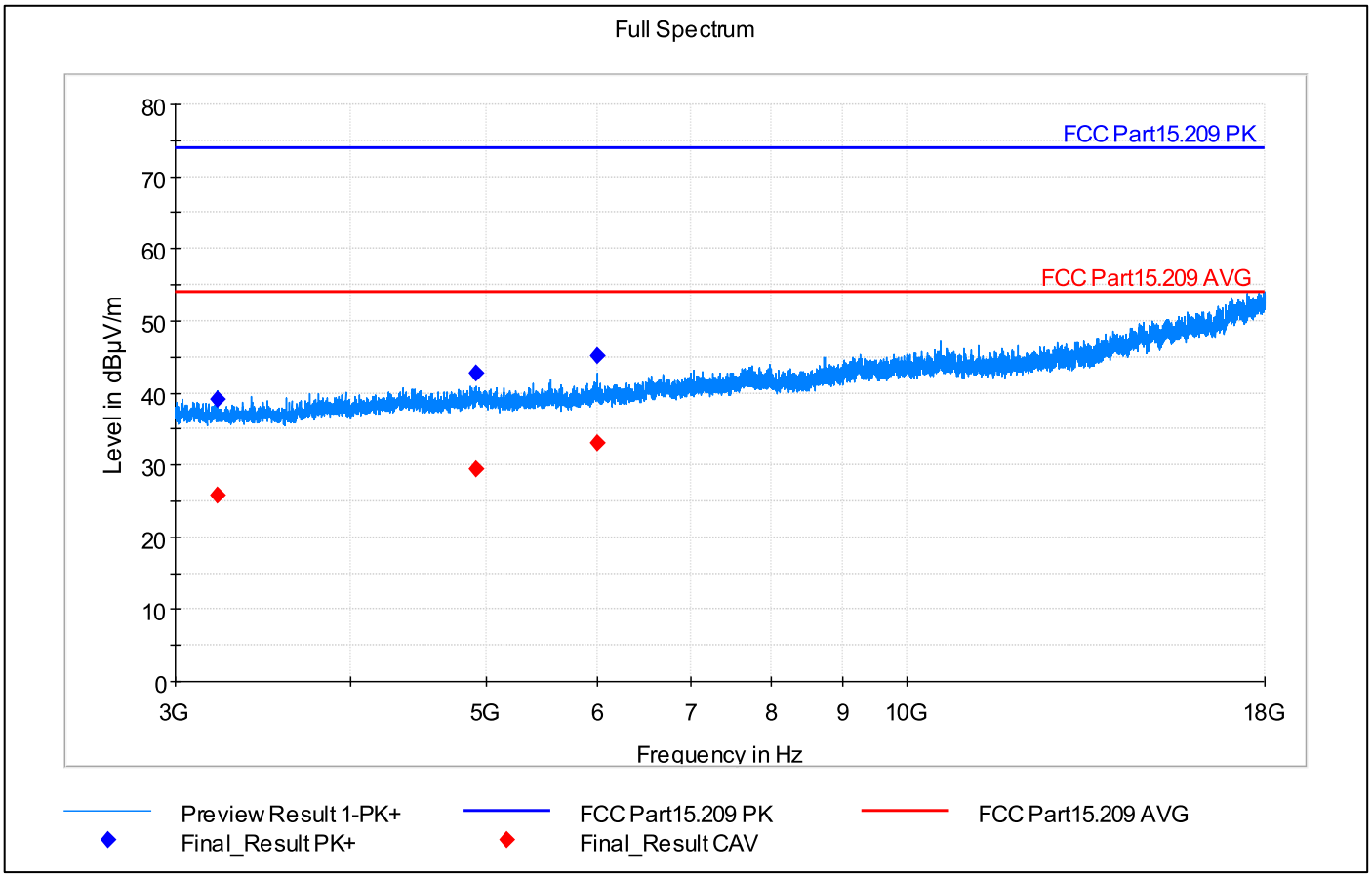


802.11b High channel, 1 – 3 GHz

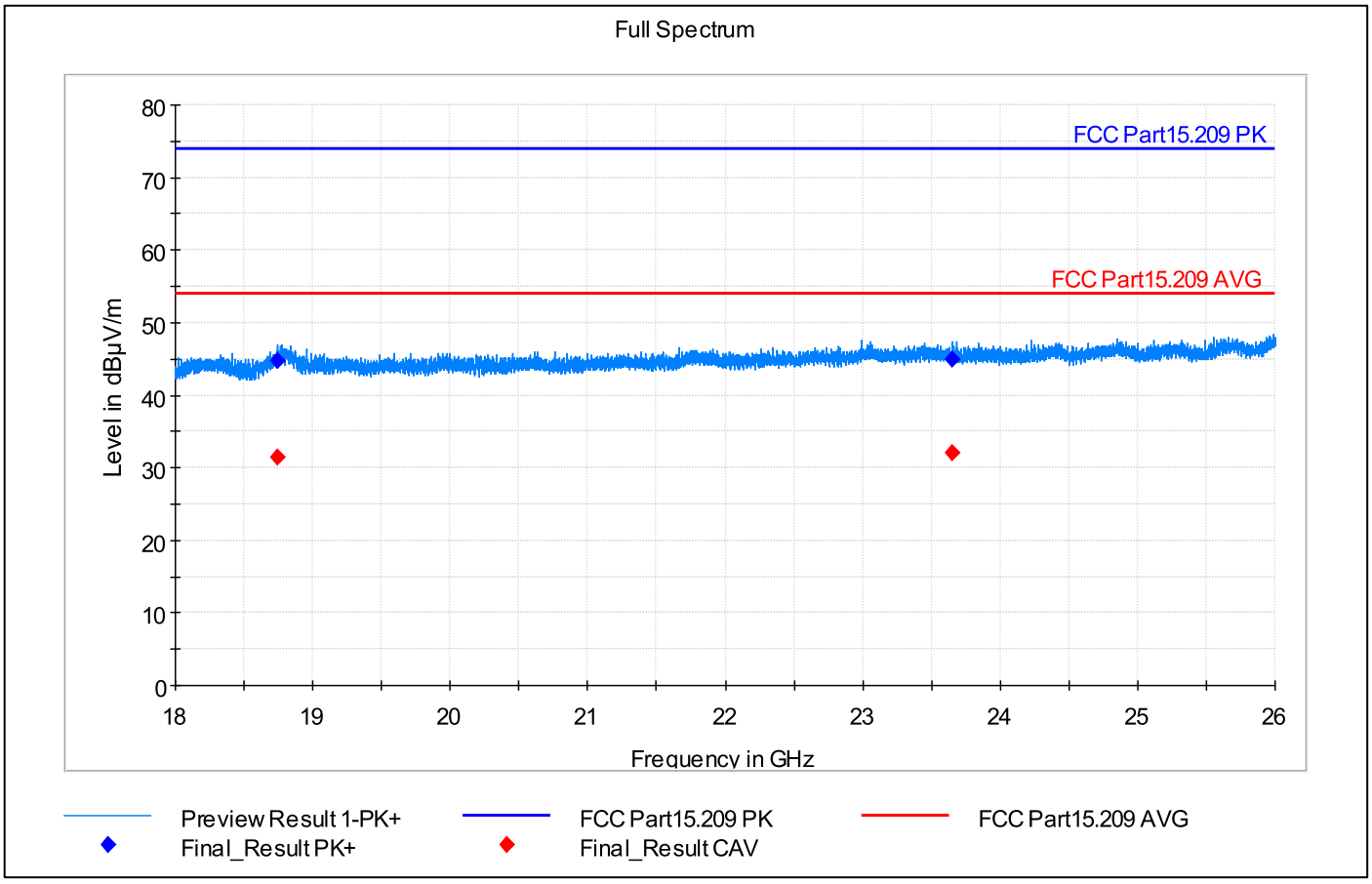


Note: Fundamental TZ frequency 2463 MHz is excluded from spurious domain measurements and ignored.

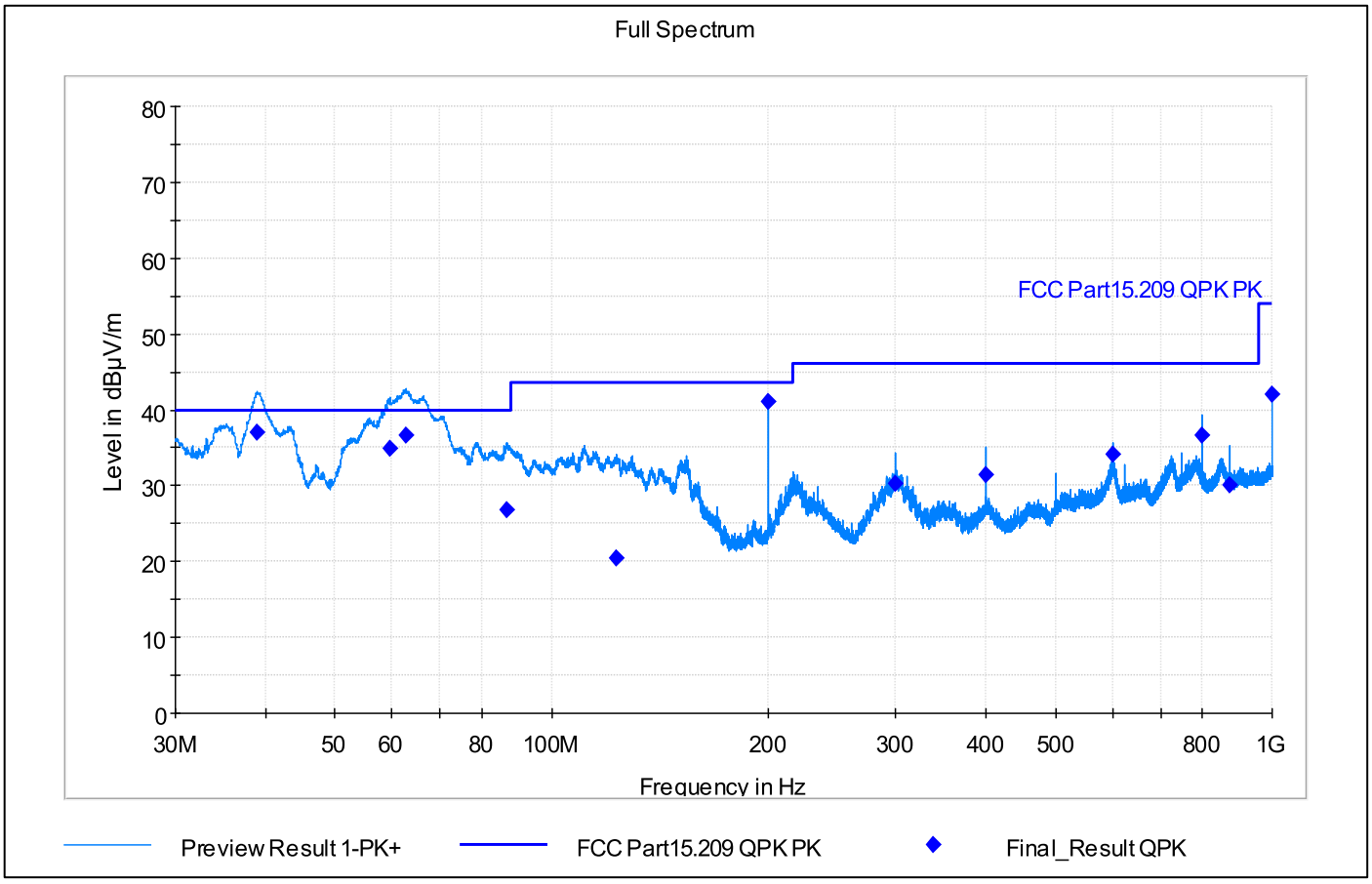
802.11b High channel, 3 – 18 GHz



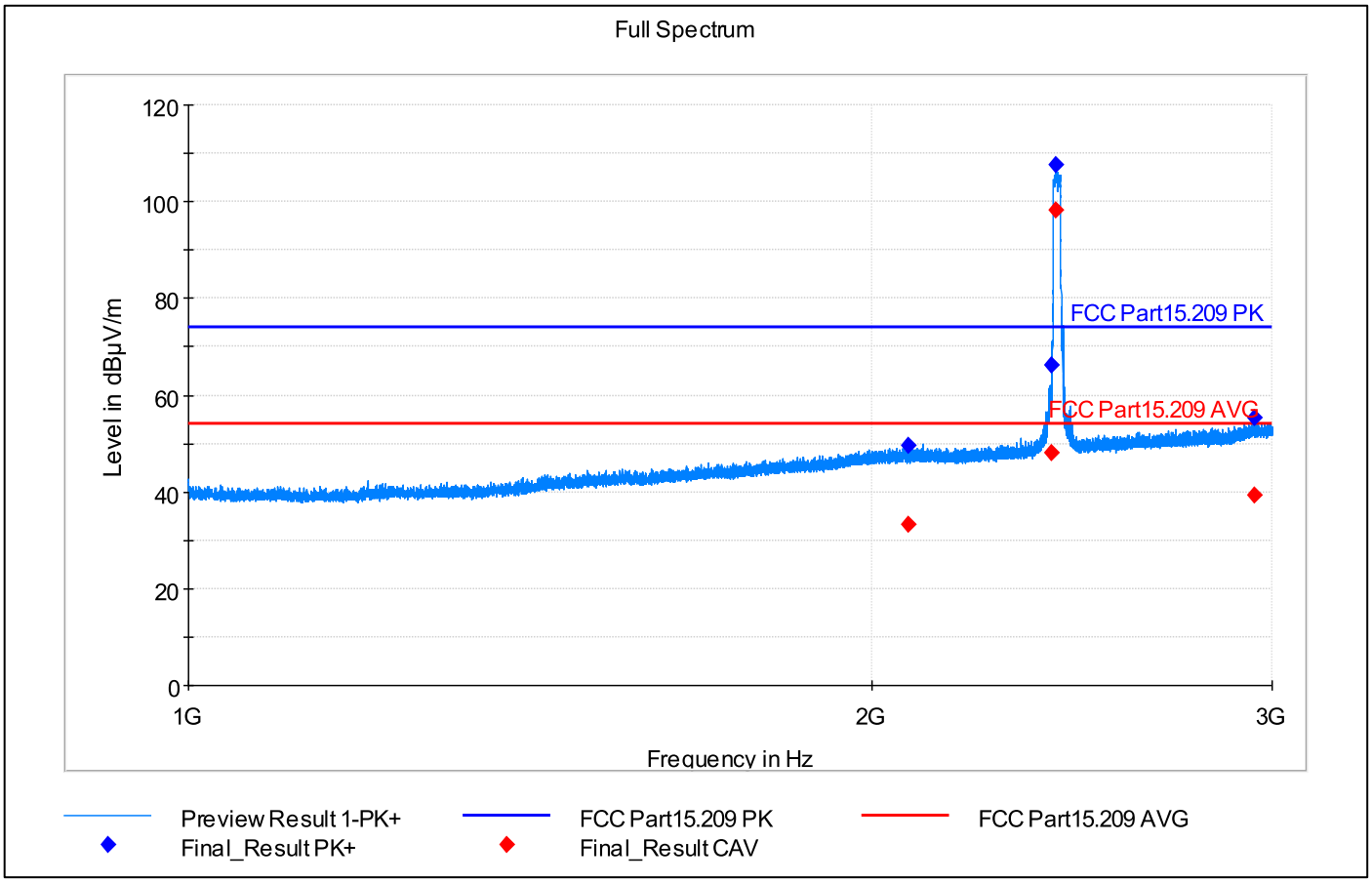
802.11b High channel, 18 – 26 GHz



802.11g Low channel, 30 MHz – 1 GHz

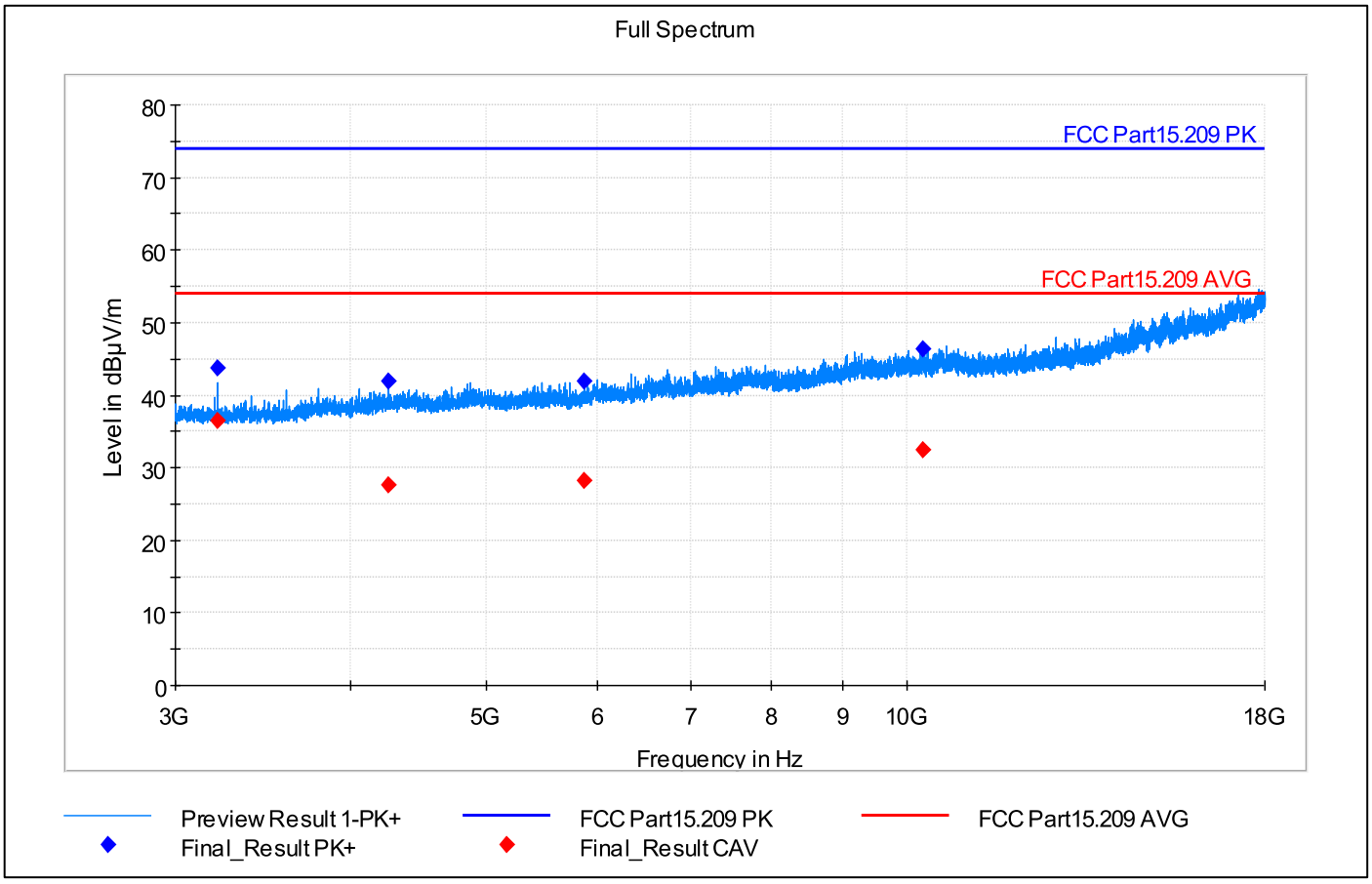


802.11g Low channel, 1 – 3 GHz

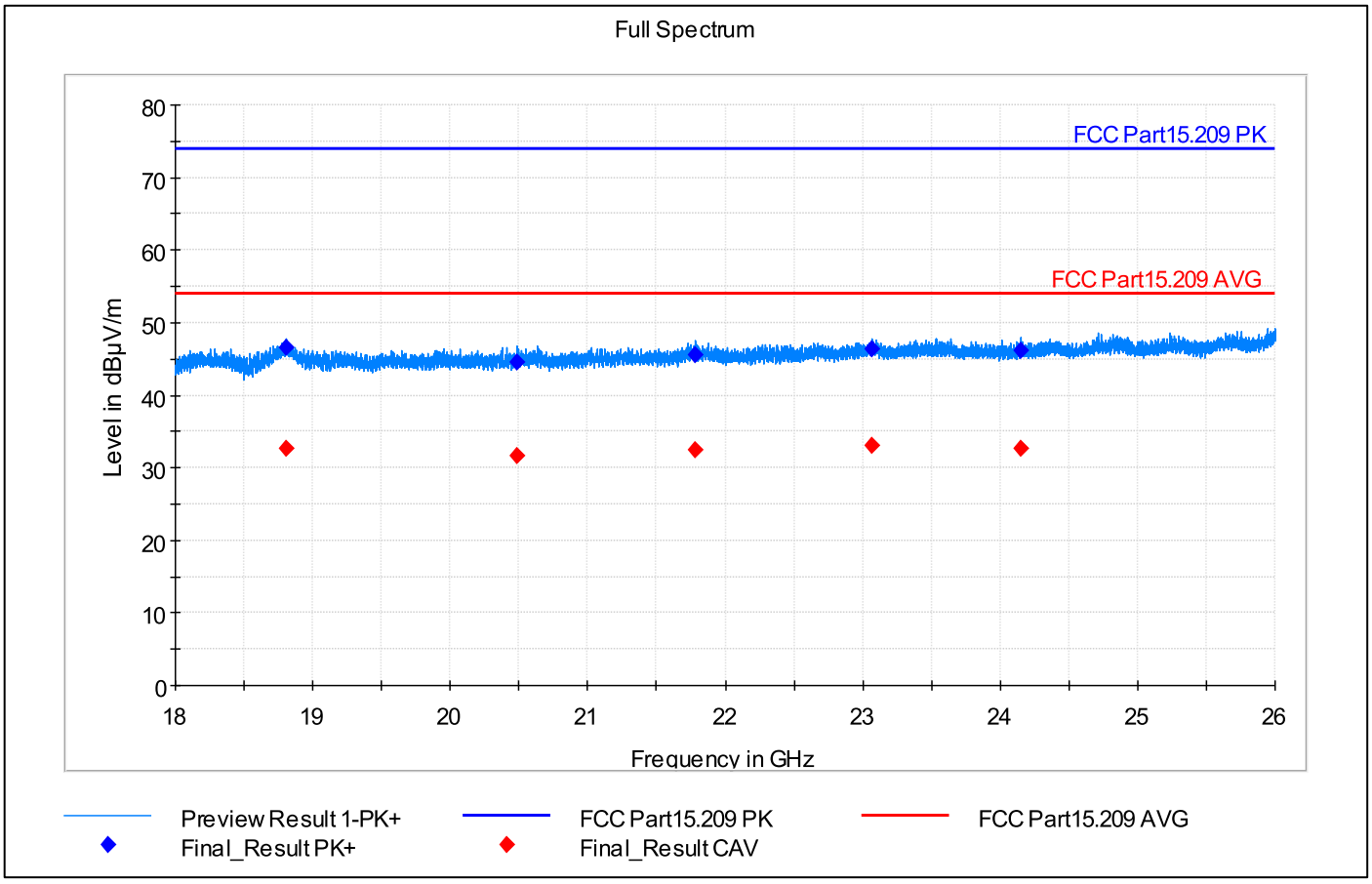


Note: Fumdamental TX frequency 2409,1 MHz is excluded from spurious domain measurements and ignored.

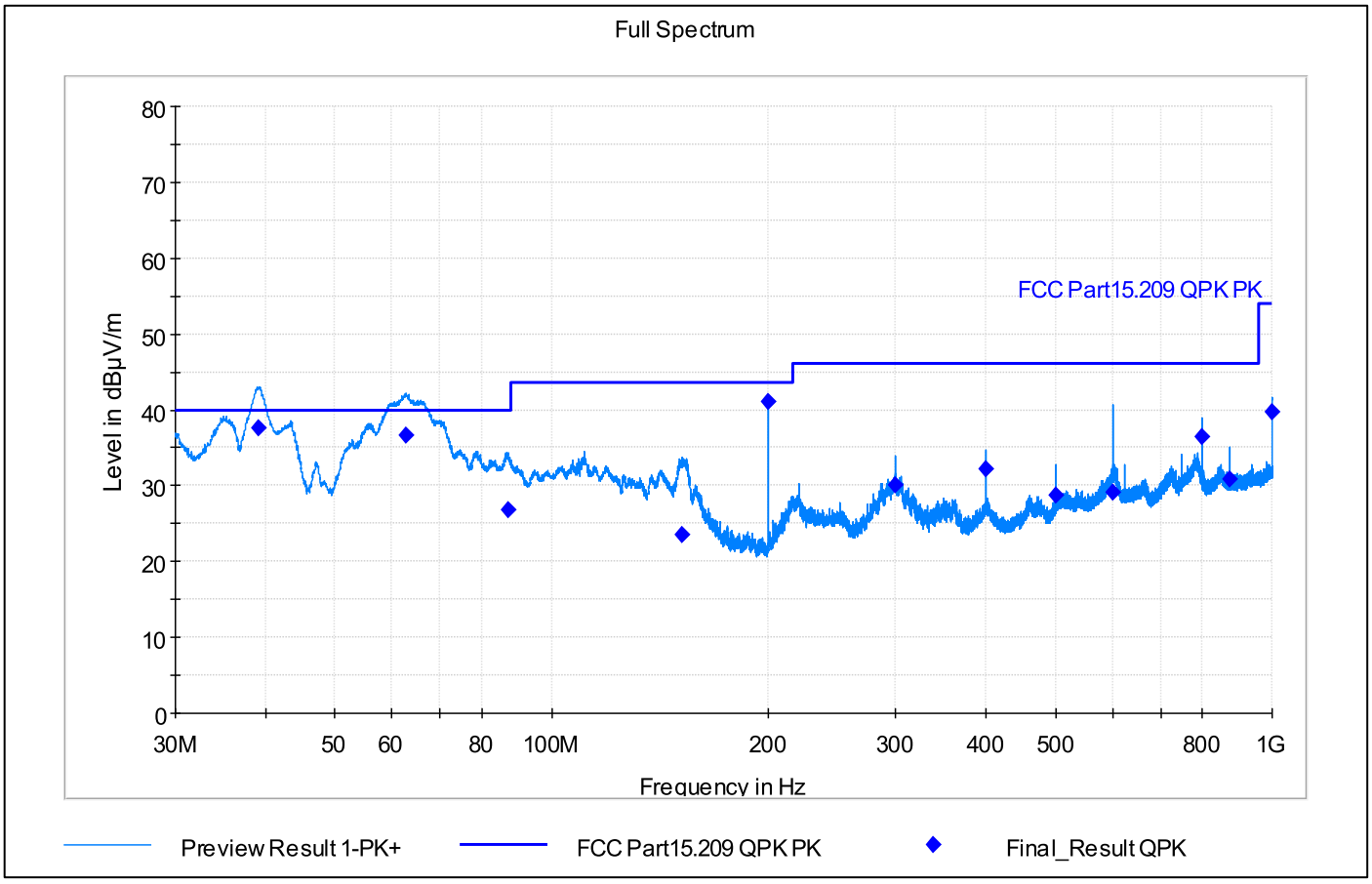
802.11g Low channel, 3 – 18 GHz



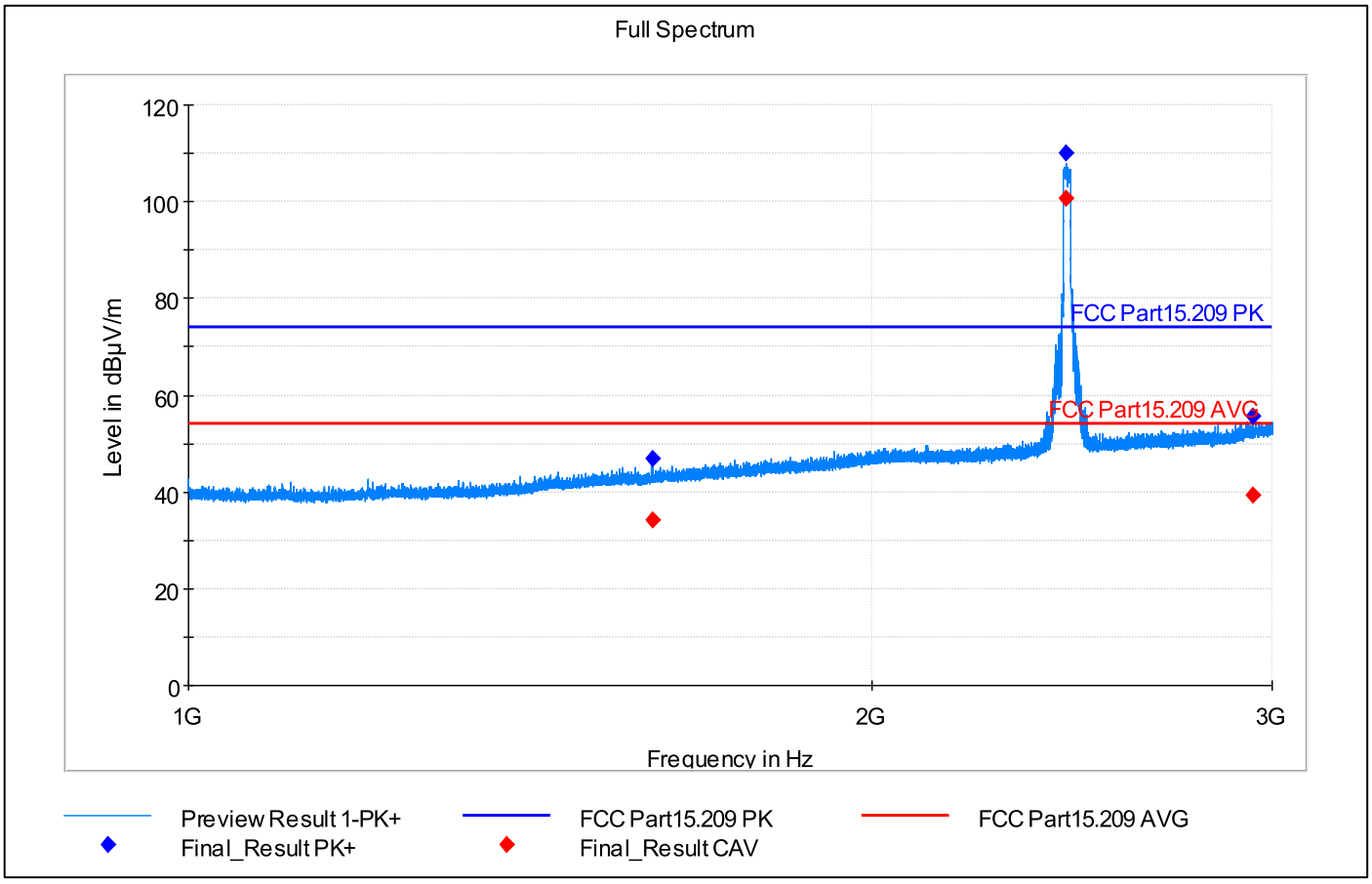
802.11g Low channel, 18 – 26 GHz



802.11g Mid channel, 30 MHz – 1 GHz

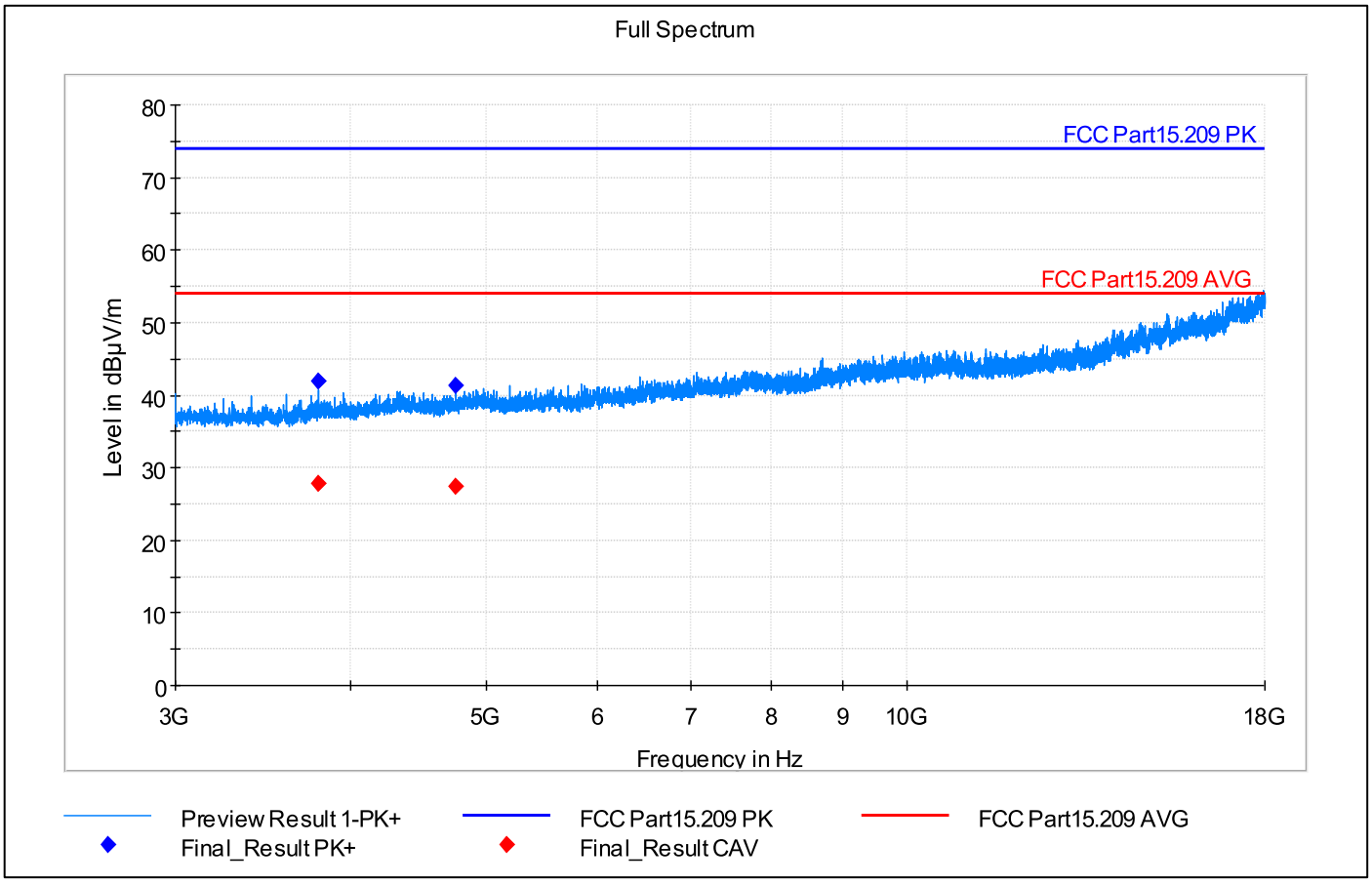


802.11g Mid channel, 1-3 GHz

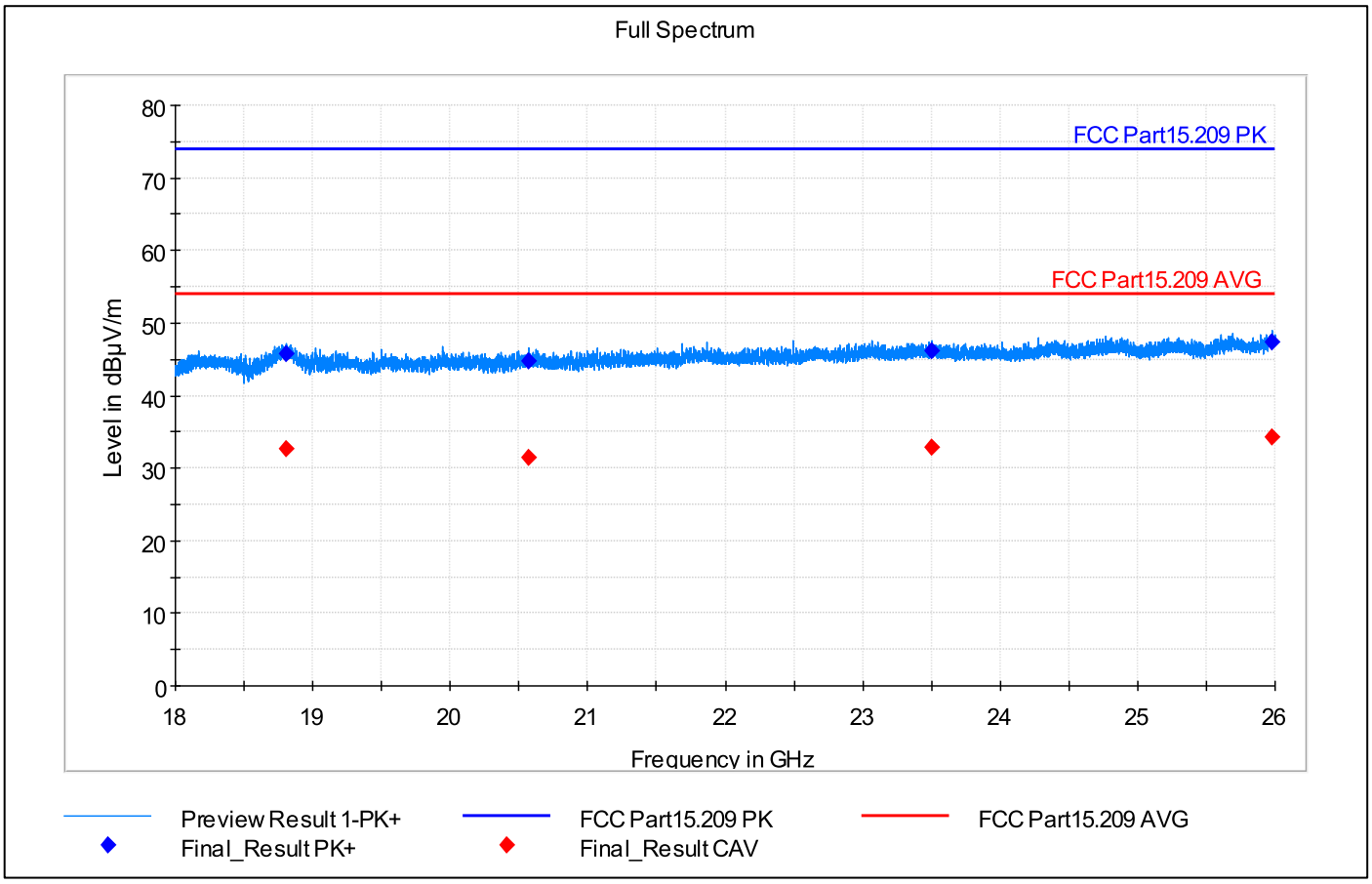


Note: Fundamental TX frequency 2434,05 MHz is excluded from spurious domain measurements and ignored. See table below.

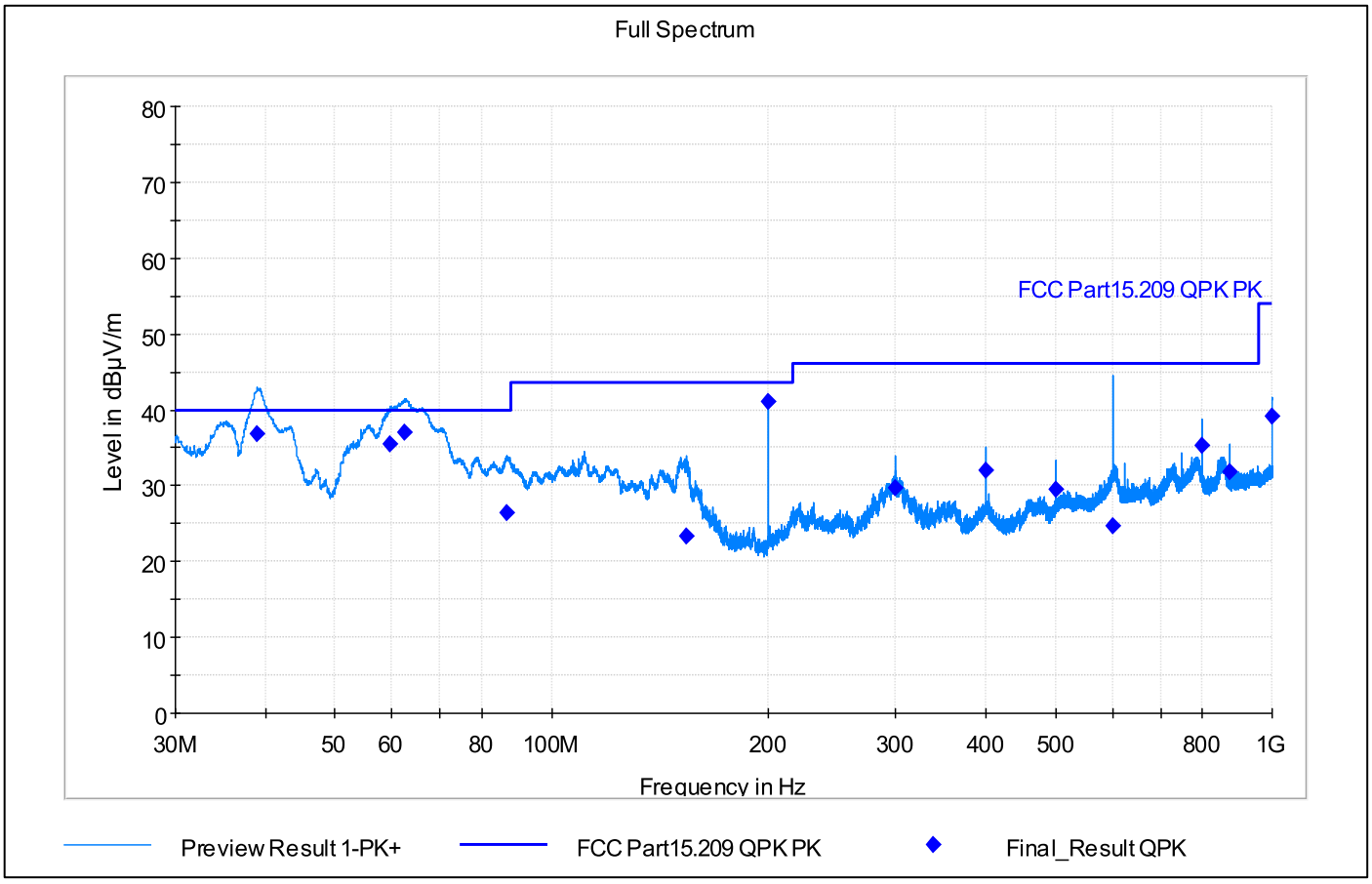
802.11g Mid channel, 3–18 GHz



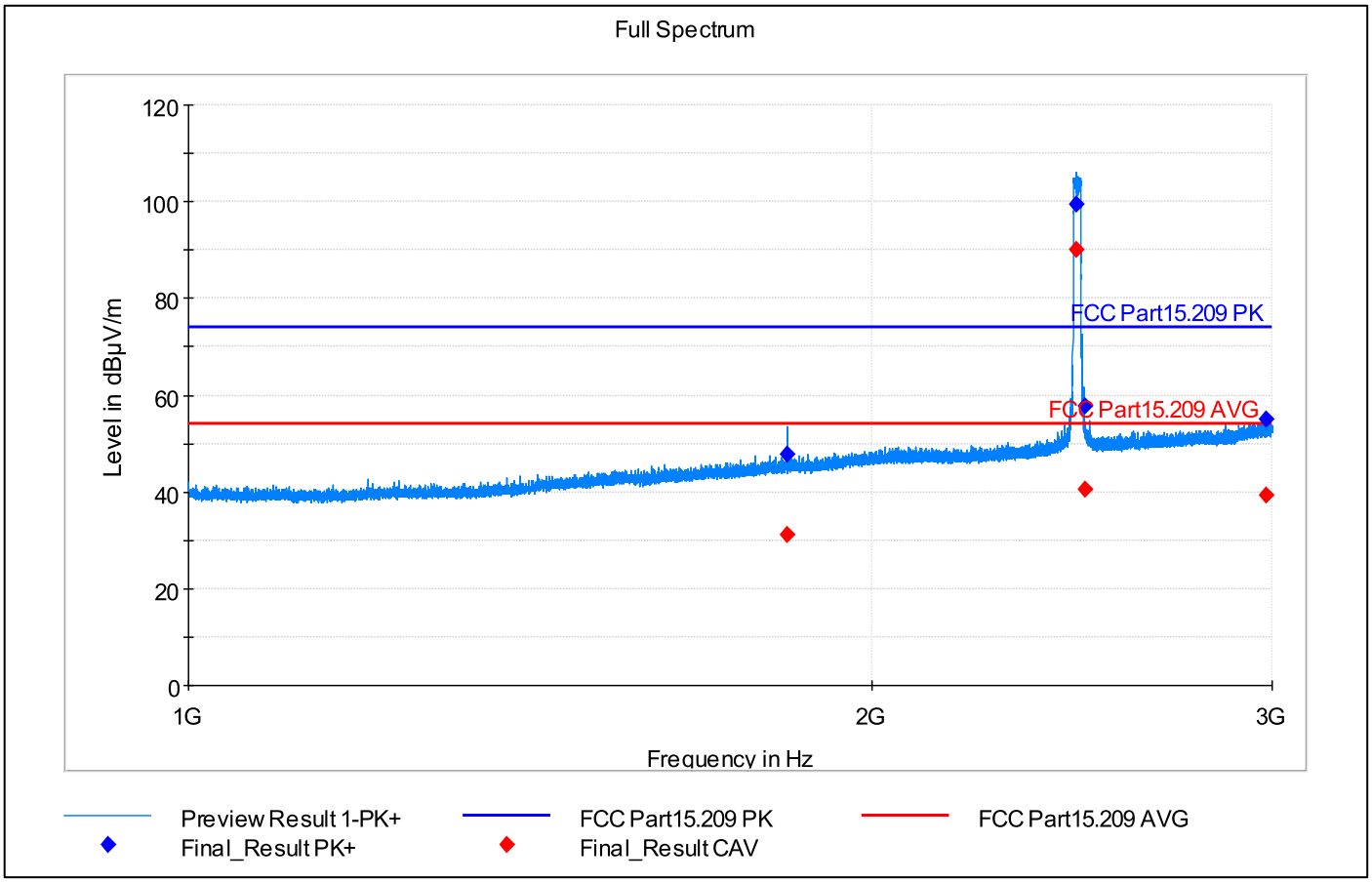
802.11g Mid channel, 18–26 GHz



802.11g High channel, 30 MHz – 1 GHz

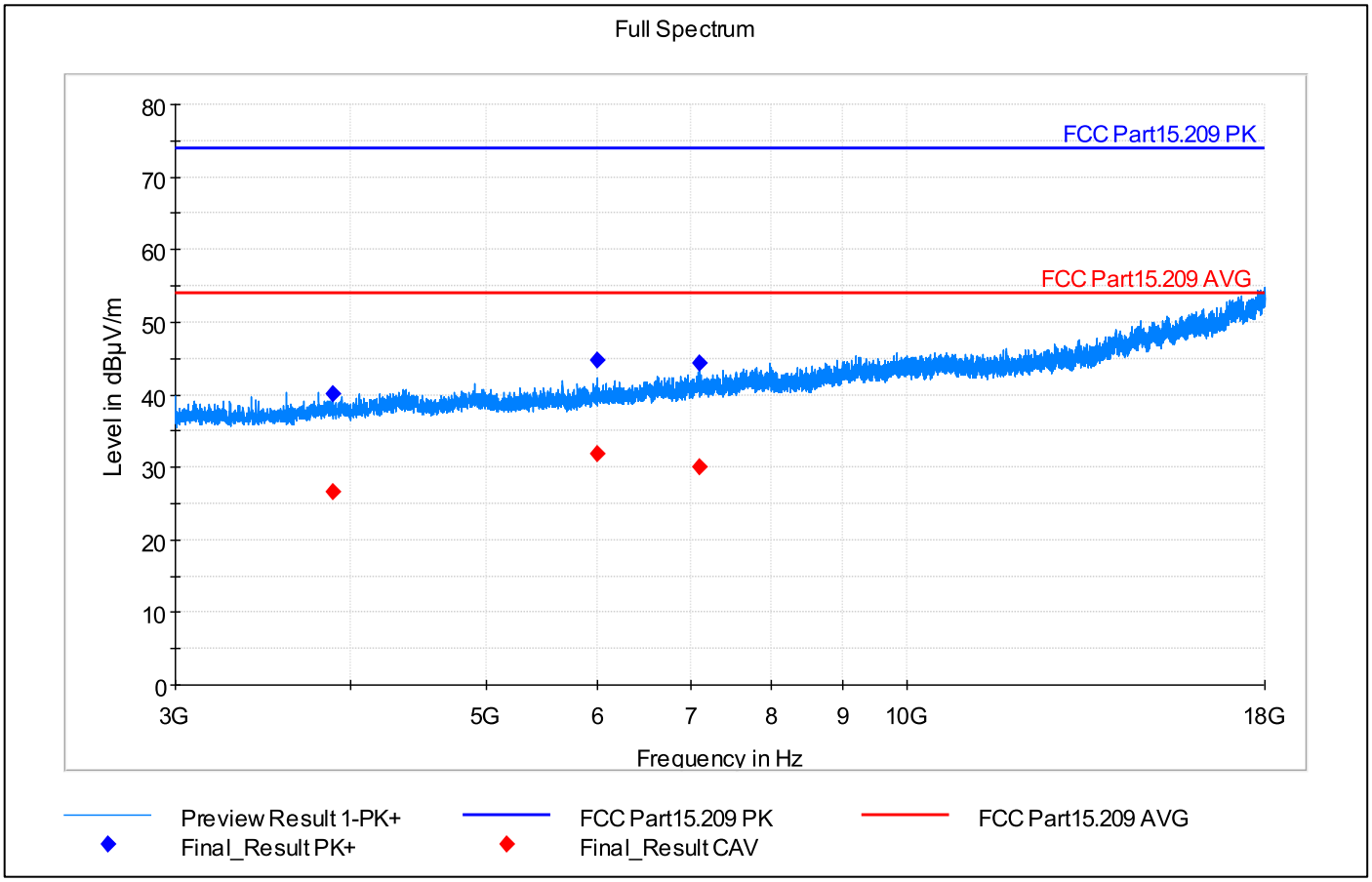


802.11g High channel, 1 – 3 GHz

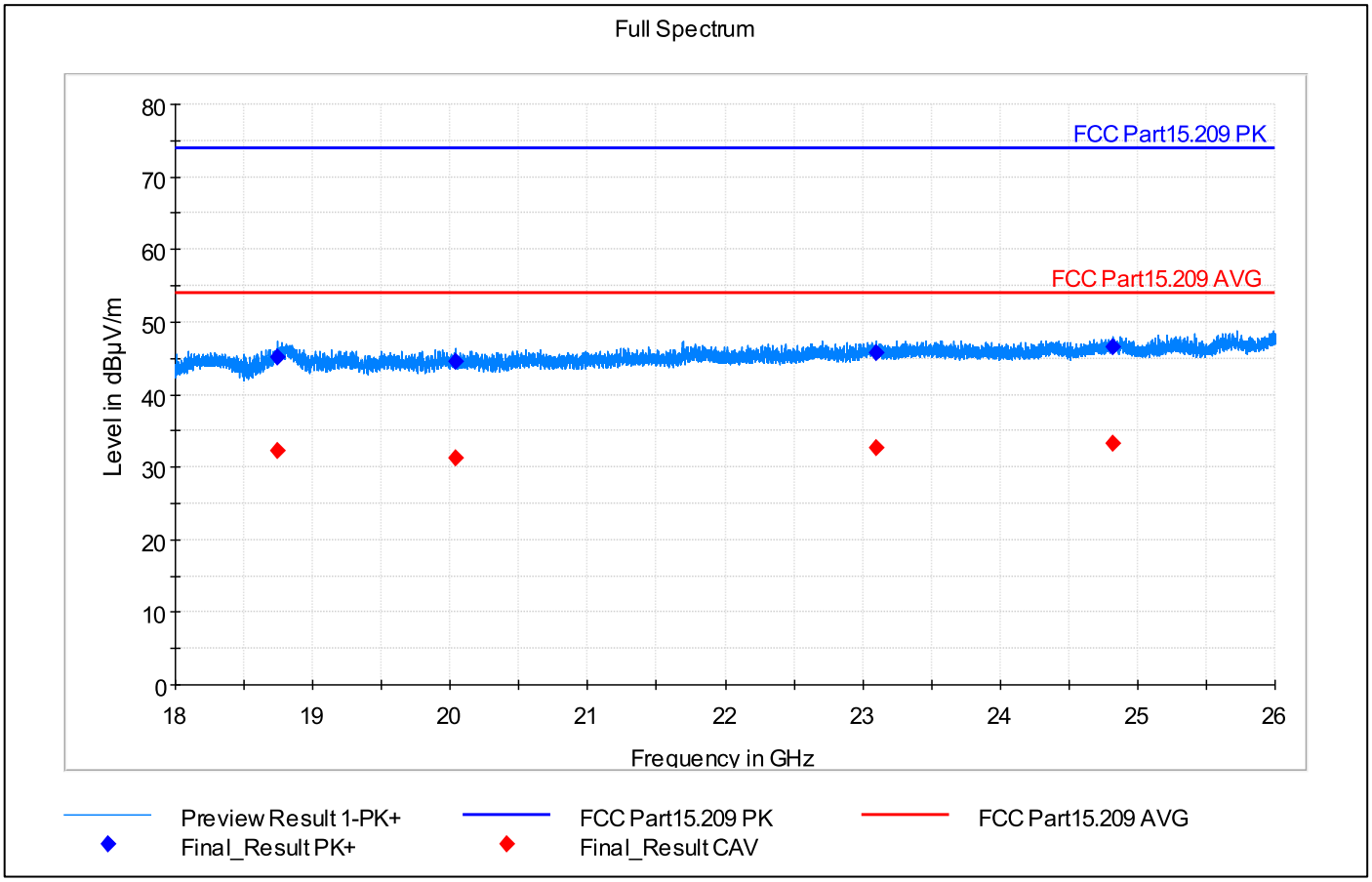


Note: Fundamental TX frequency 2460,60 MHz is excluded from spurious domain measurements and ignored.

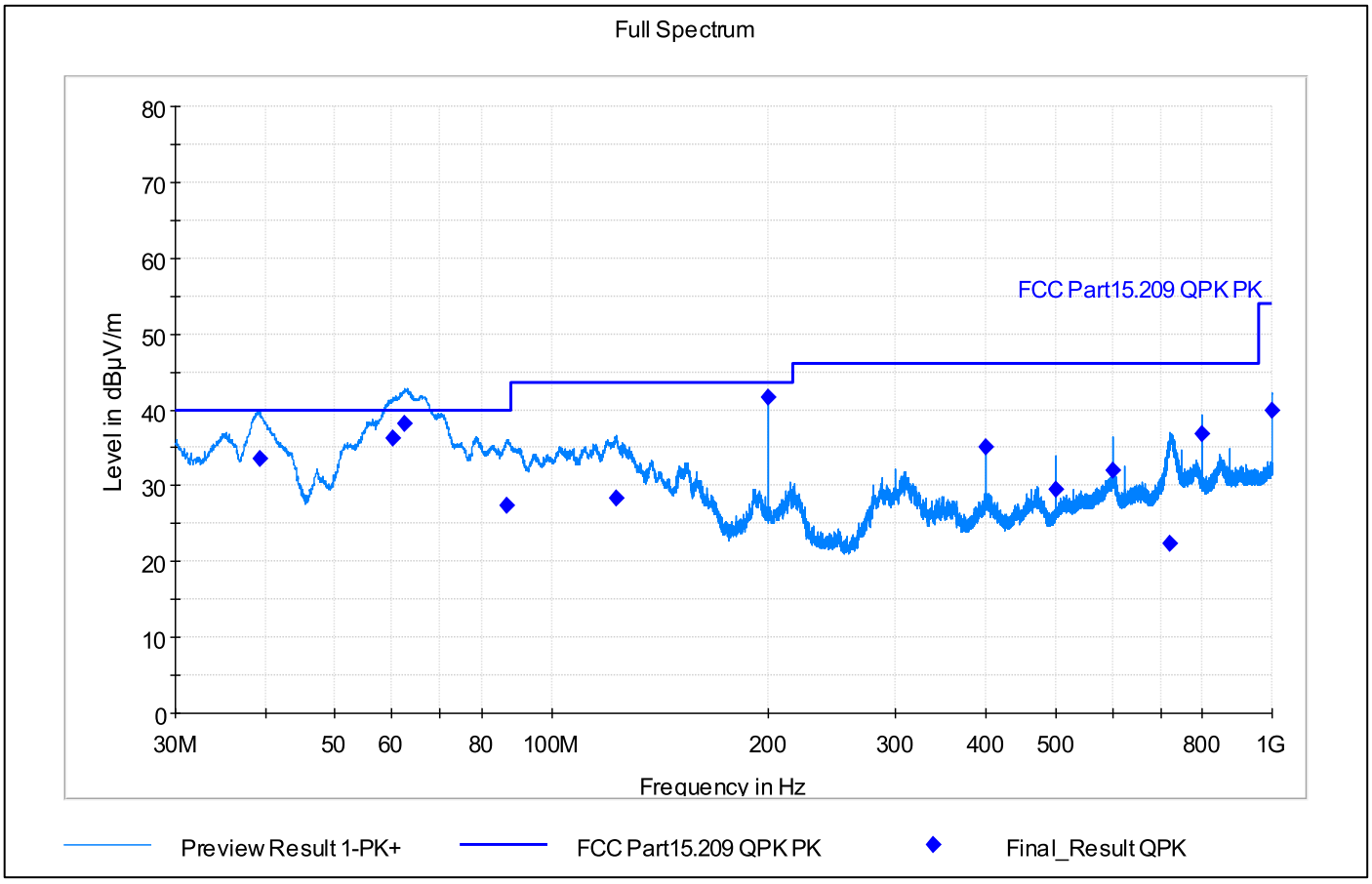
802.11g High channel, 3 – 18 GHz



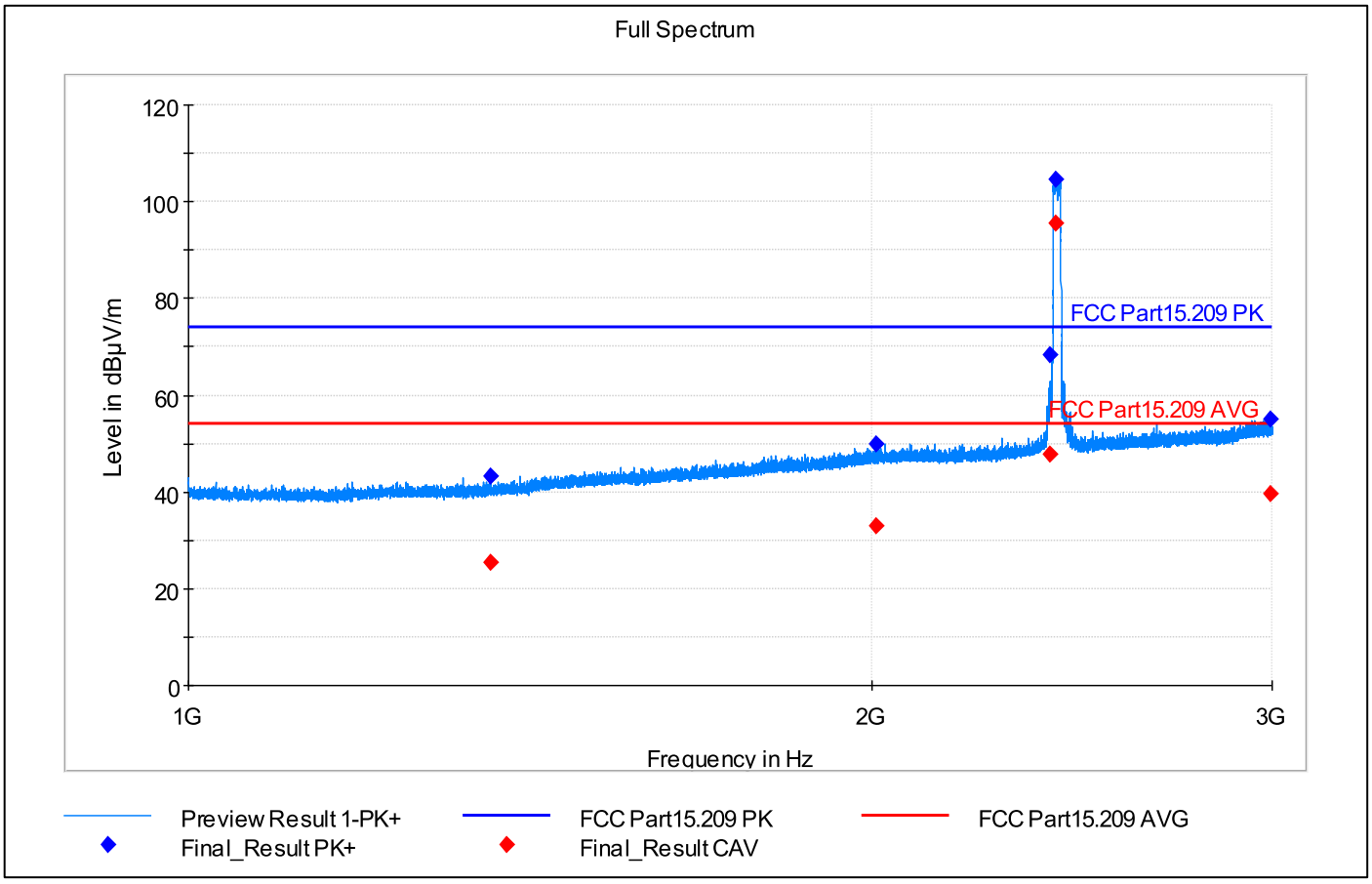
802.11g High channel, 18 – 26 GHz



802.11n Low channel, 30 MHz – 1 GHz

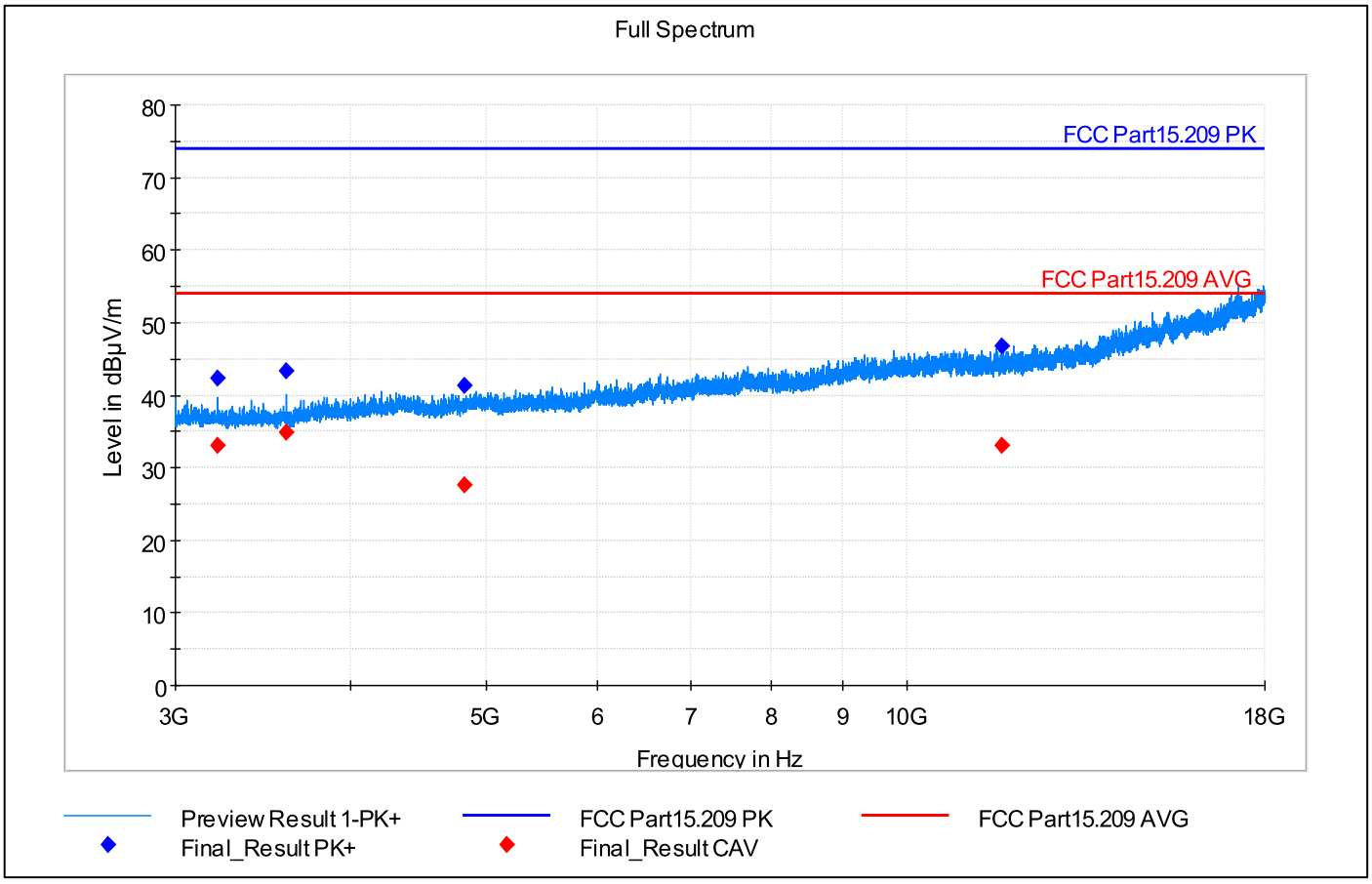


802.11n Low channel, 1 – 3 GHz

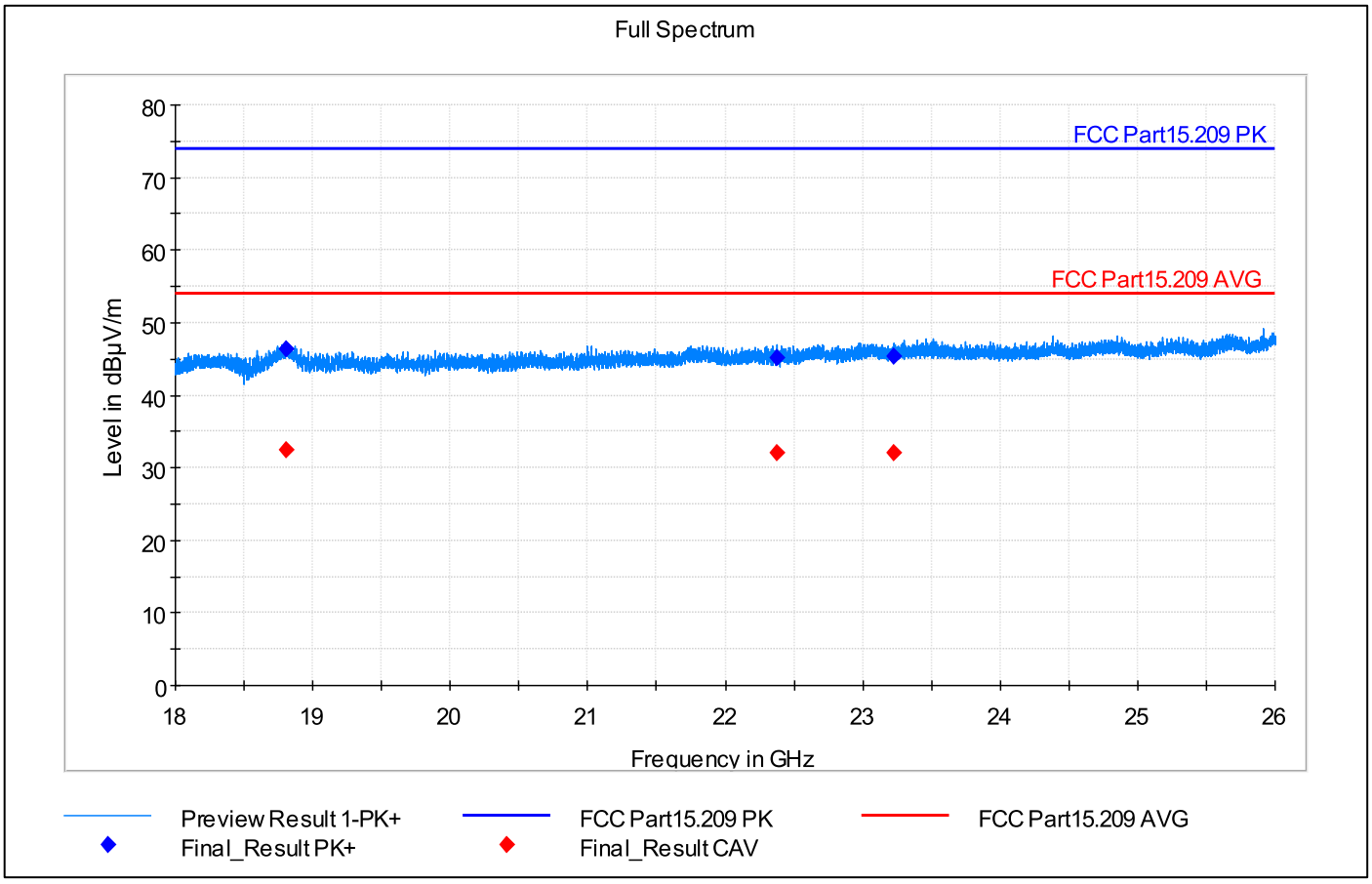


Note: Fundamental TX frequency 2409,95 MHz is excluded from spurious domain measurements and ignored.

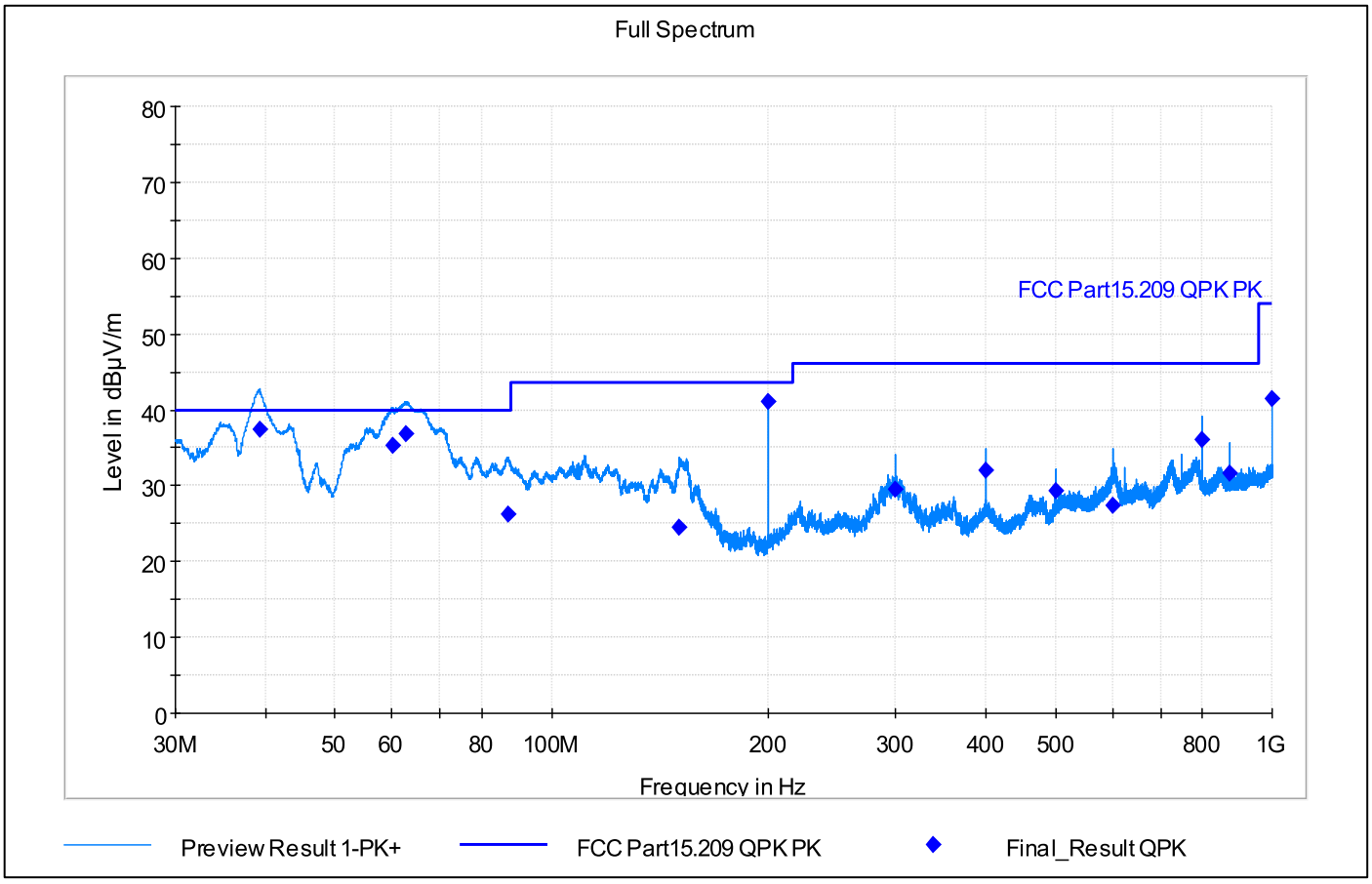
802.11n Low channel, 3 – 18 GHz



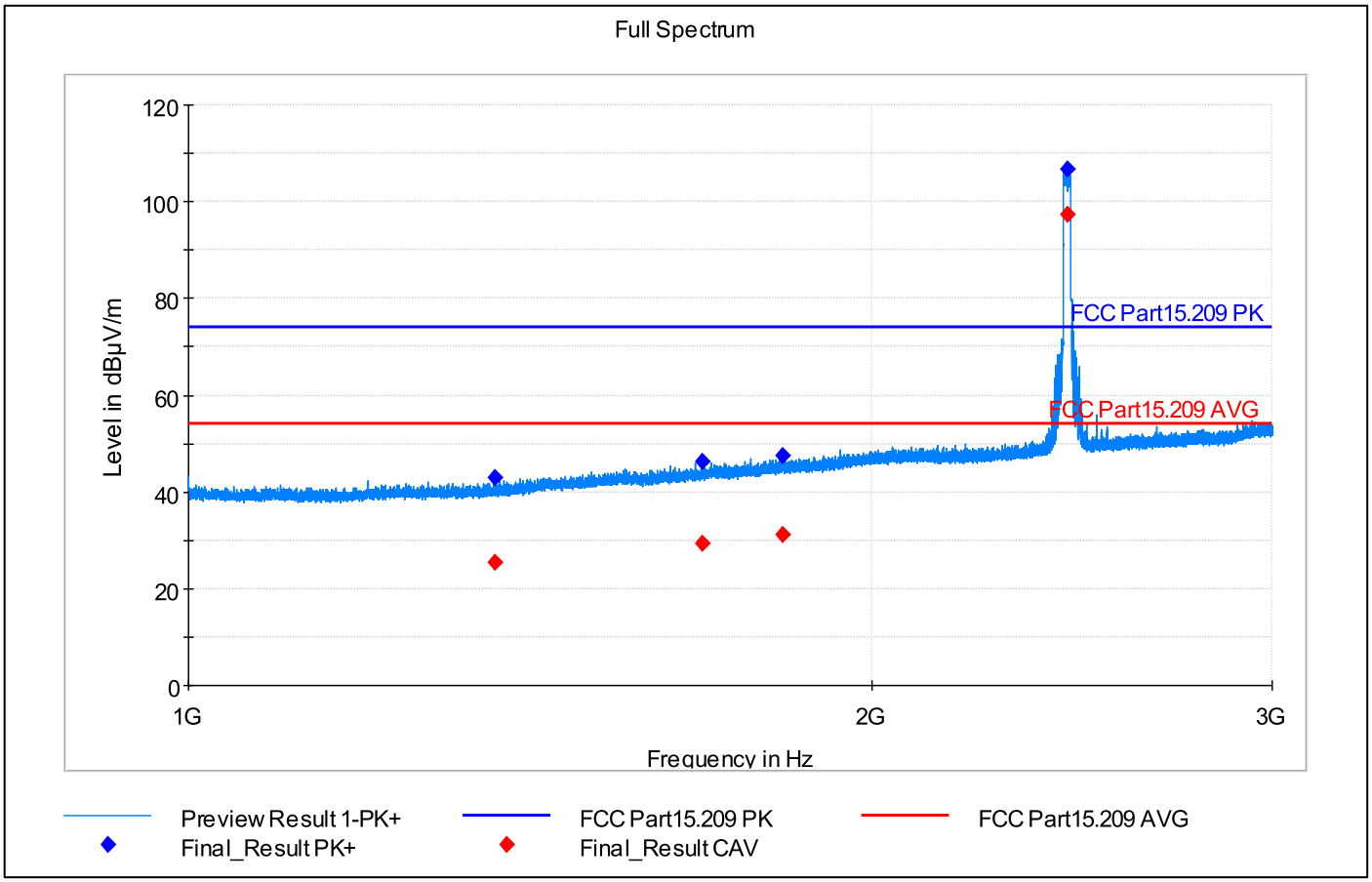
802.11n Low channel, 18 – 26 GHz



802.11n Mid channel, 30 MHz – 1 GHz

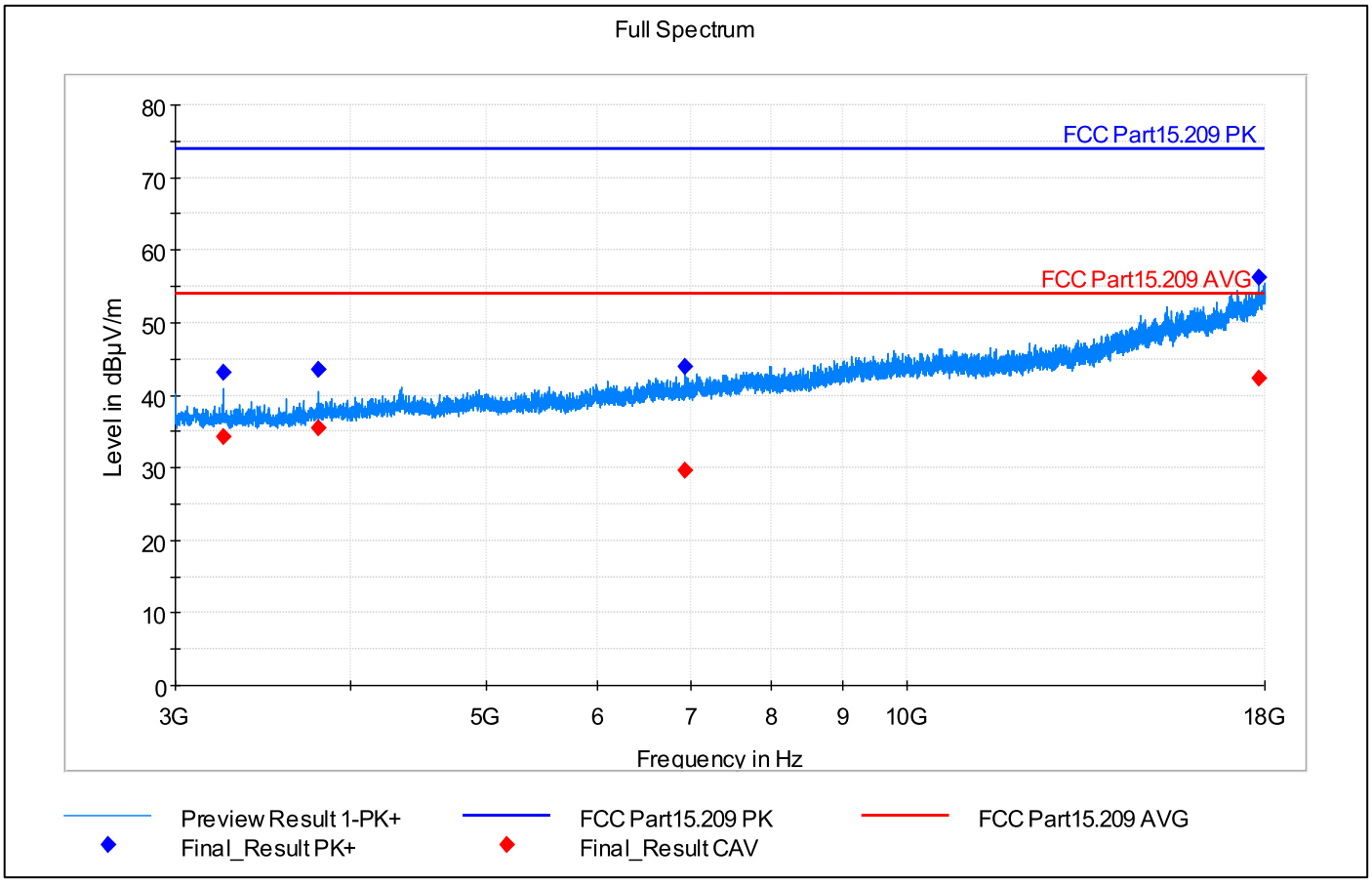


802.11n Mid channel, 1-3 GHz

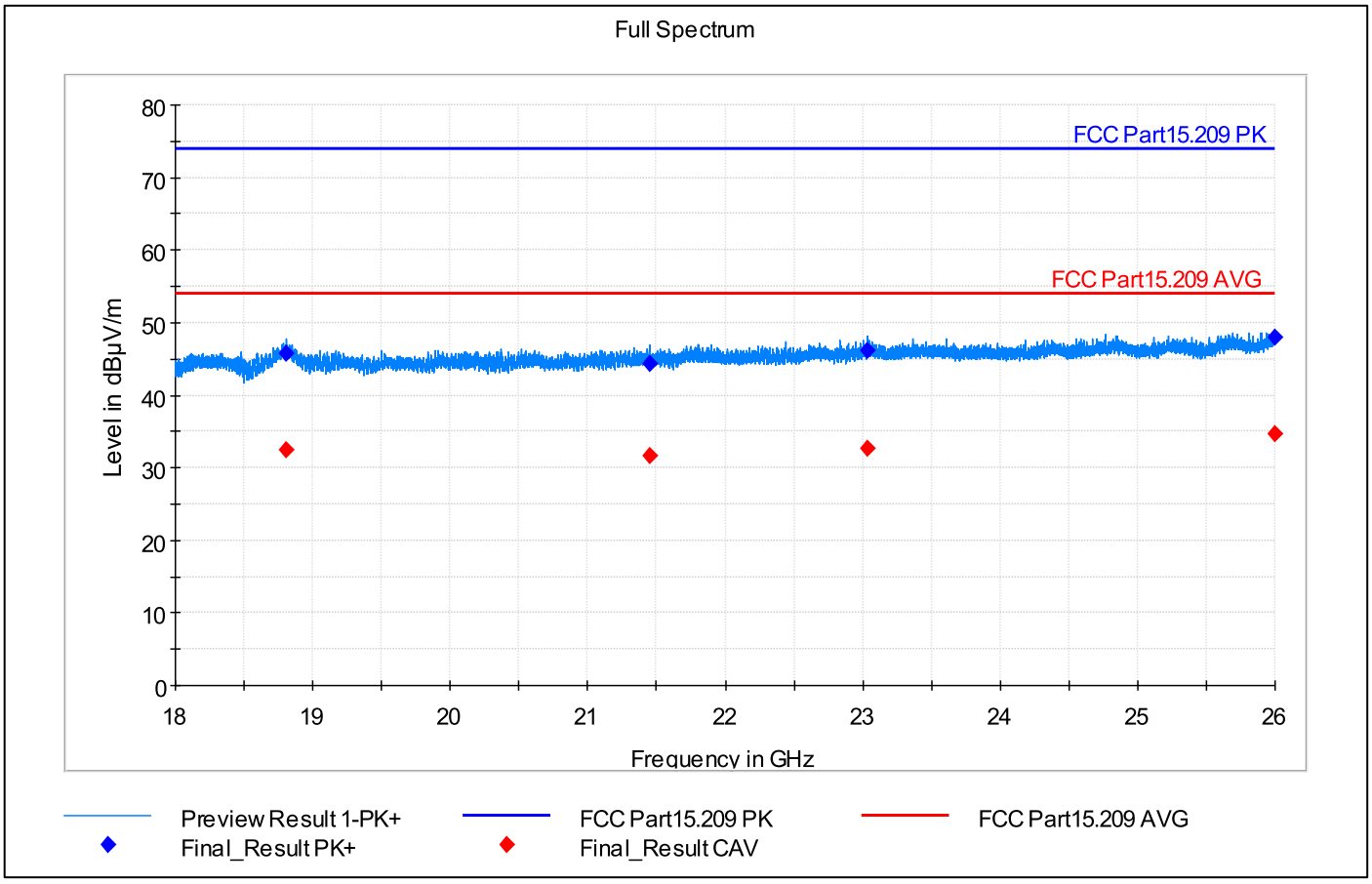


Note: Fundamental TX frequency 2439,60 MHz is excluded from spurious domain measurements and ignored.

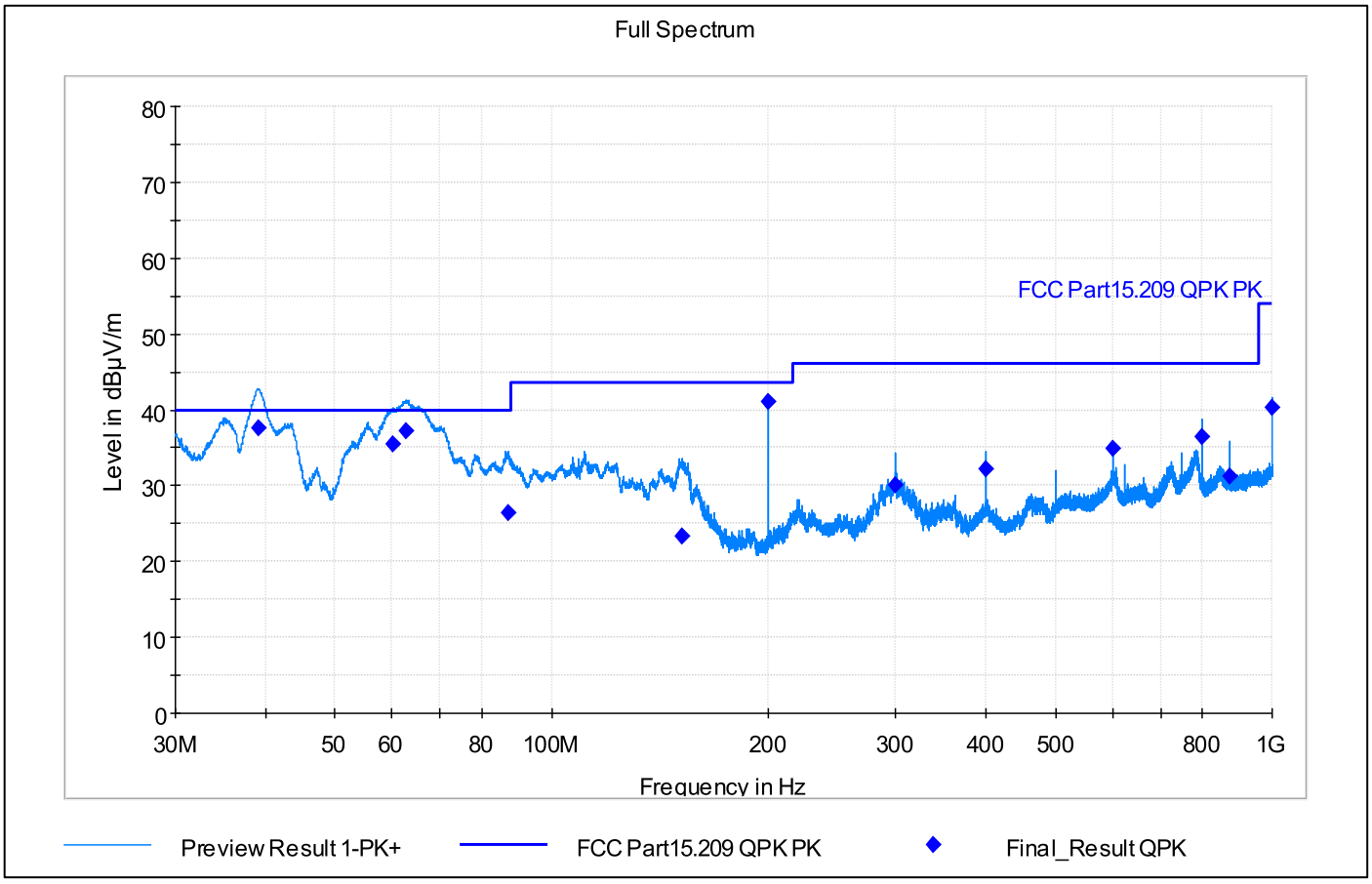
802.11n Mid channel, 3–18 GHz



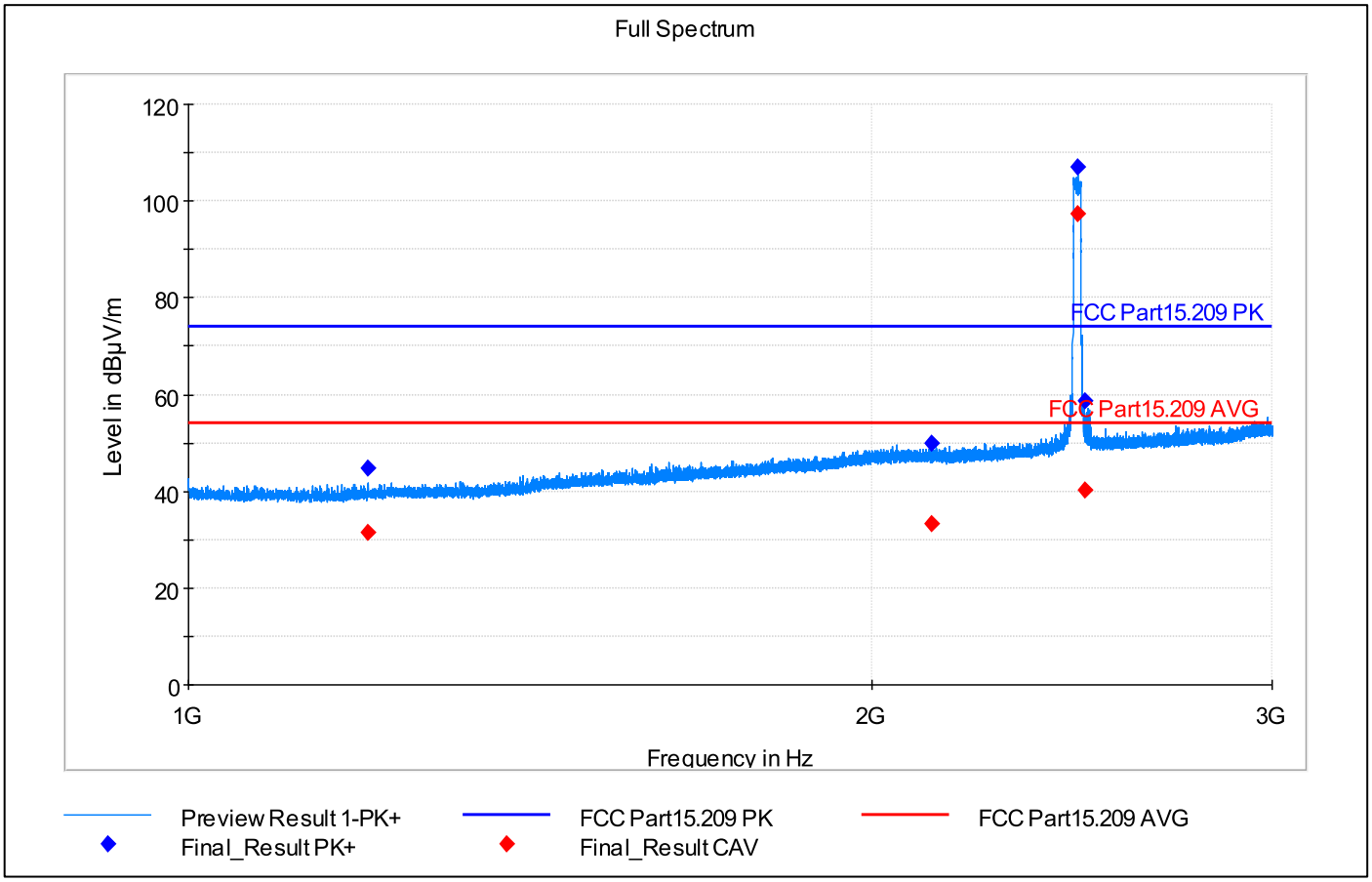
802.11n Mid channel, 18–26 GHz



802.11n High channel, 30 MHz – 1 GHz

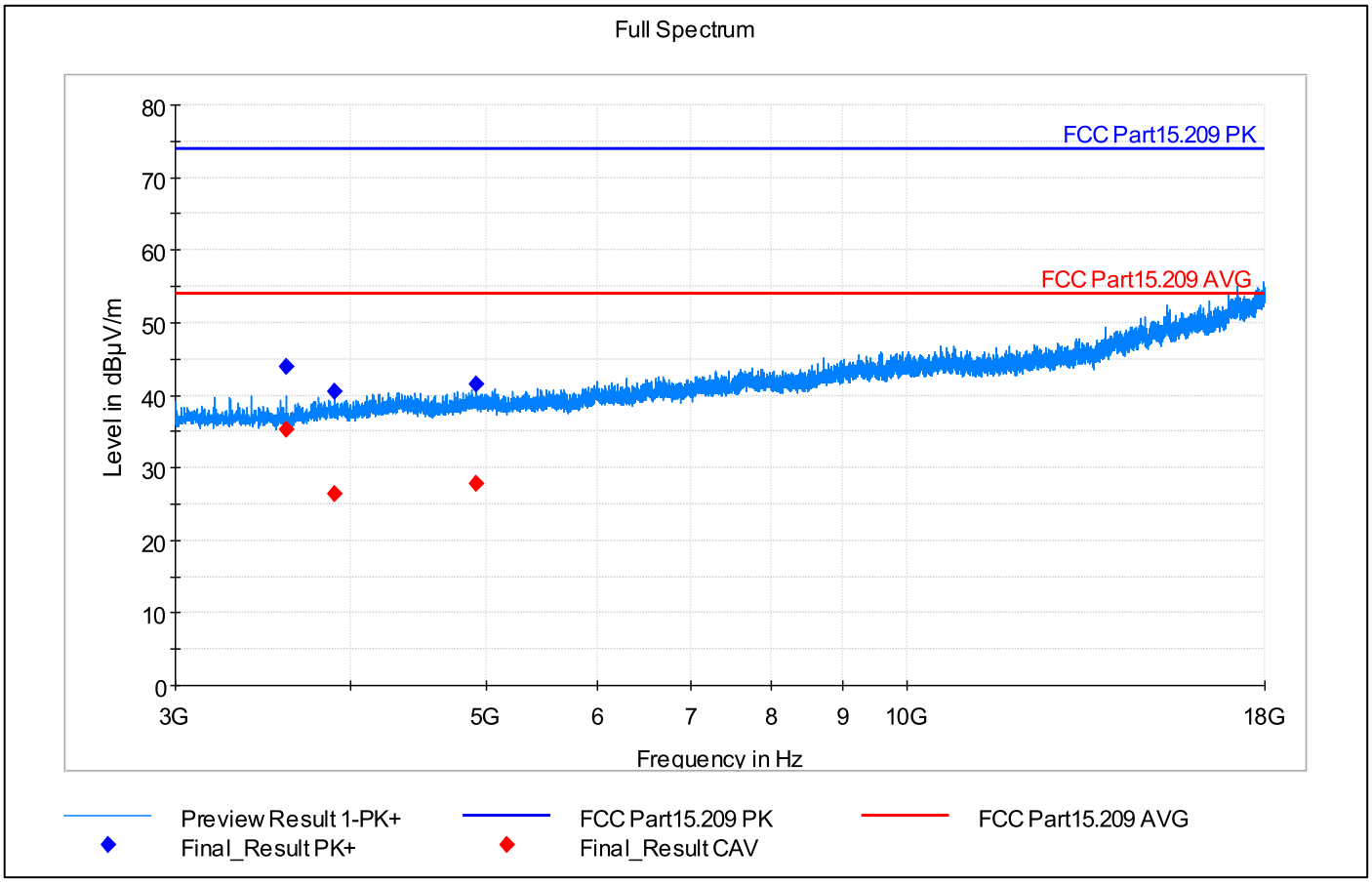


802.11n High channel, 1 – 3 GHz

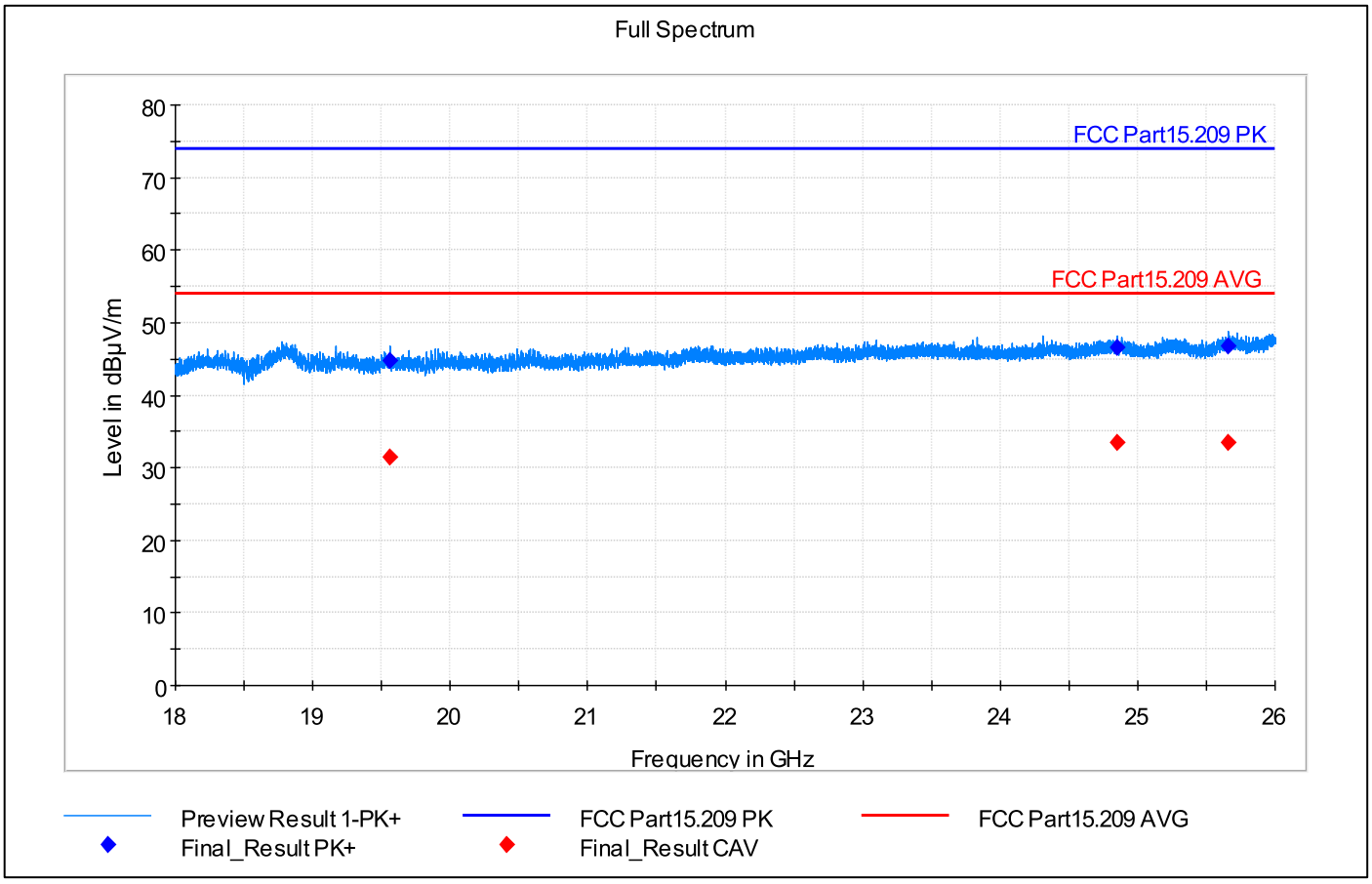


Note: Fundamental TX frequency 2464,75 MHz is excluded from spurious domain measurements and ignored.

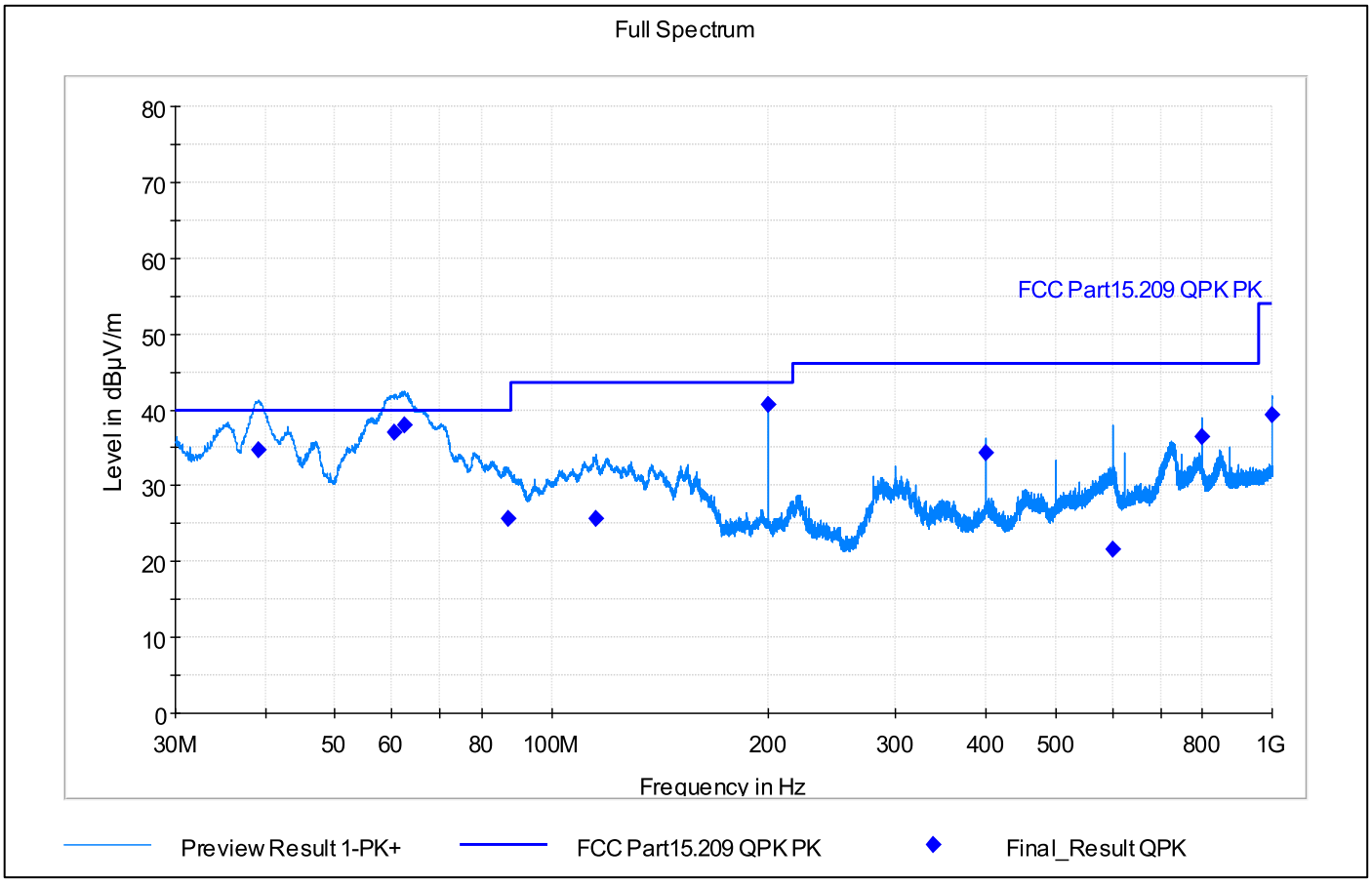
802.11n High channel, 3 – 18 GHz



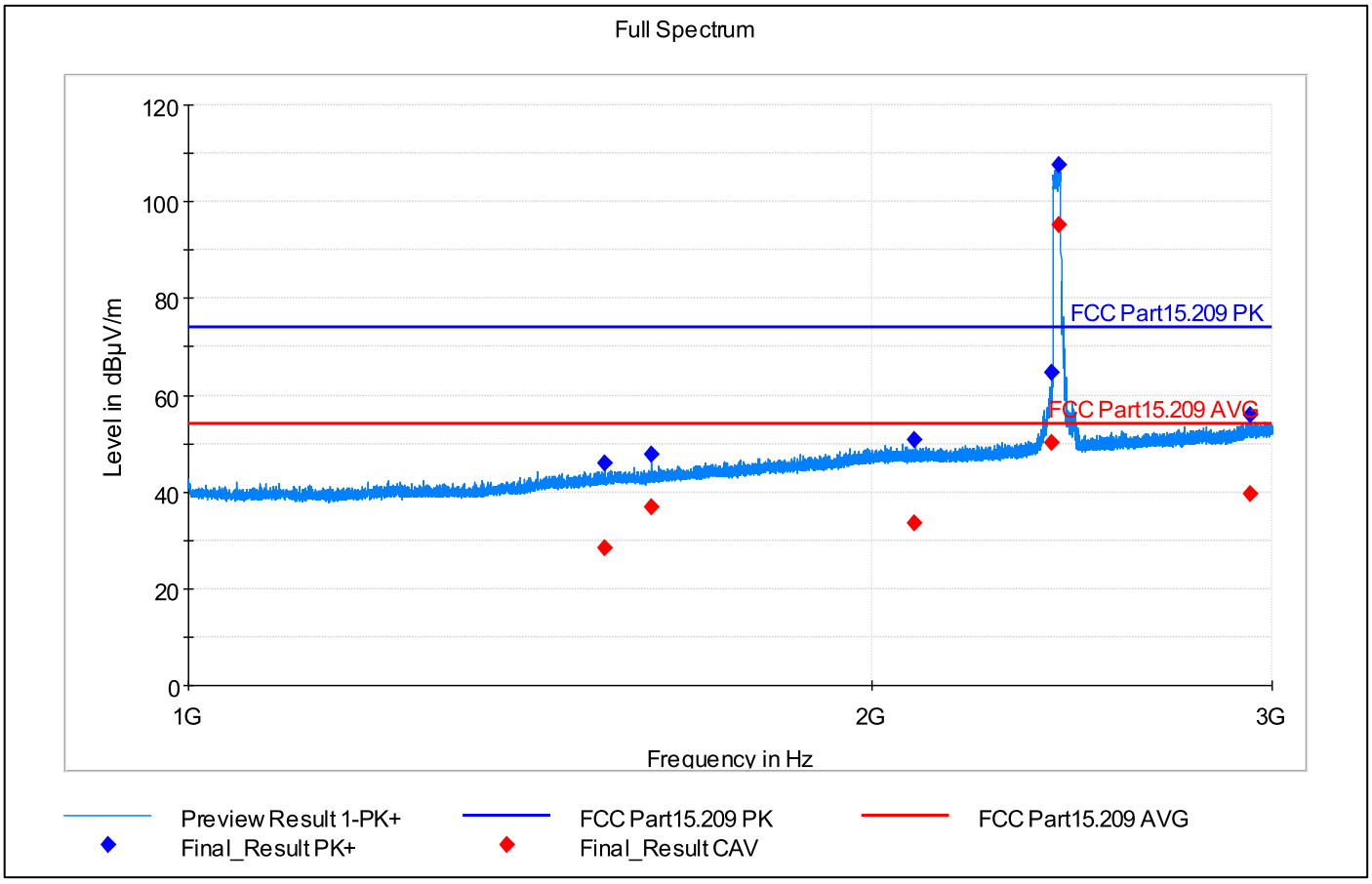
802.11n High channel, 18 – 26 GHz



802.11ax Low channel, 30 MHz – 1 GHz

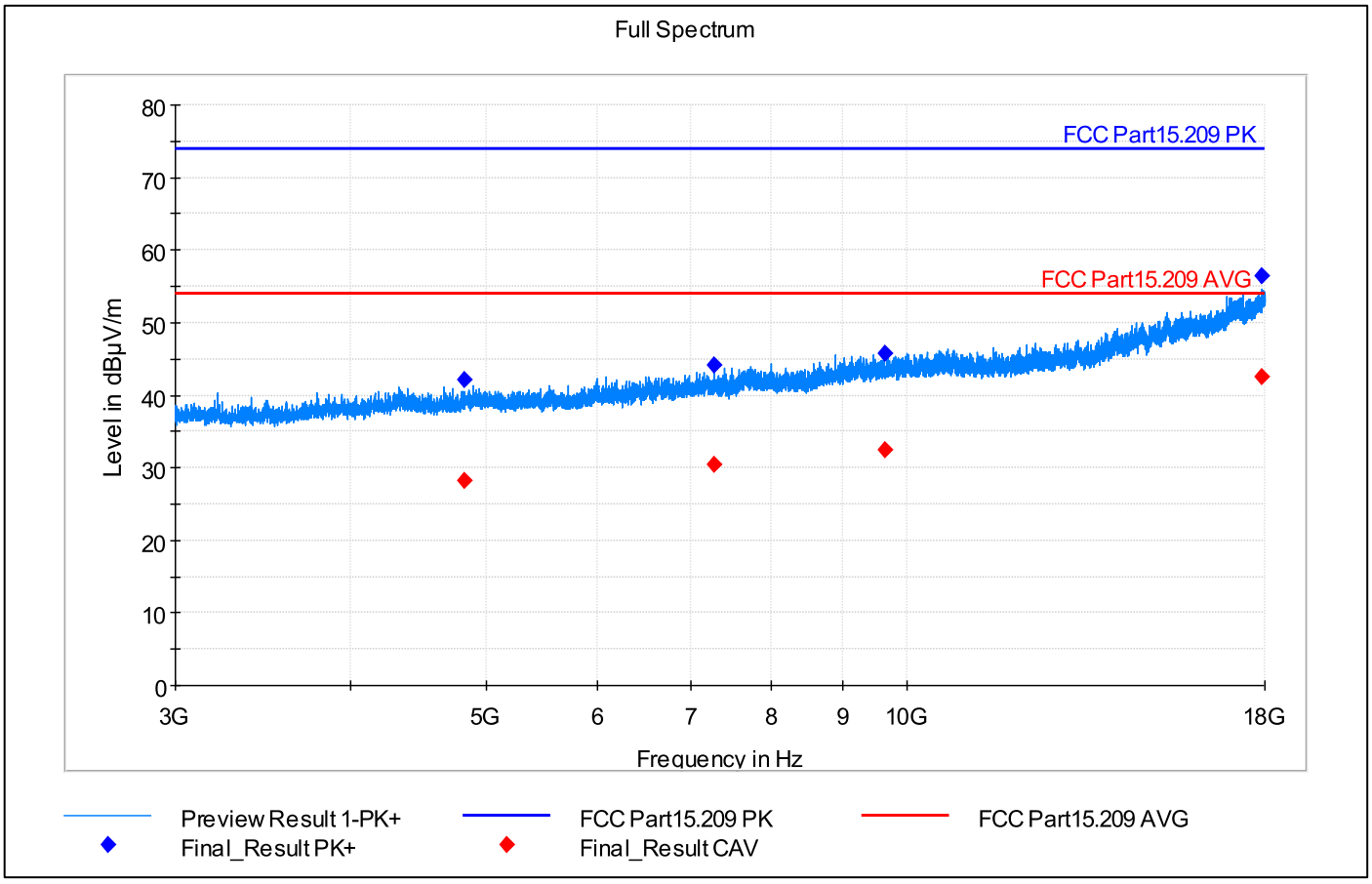


802.11ax Low channel, 1 – 3 GHz

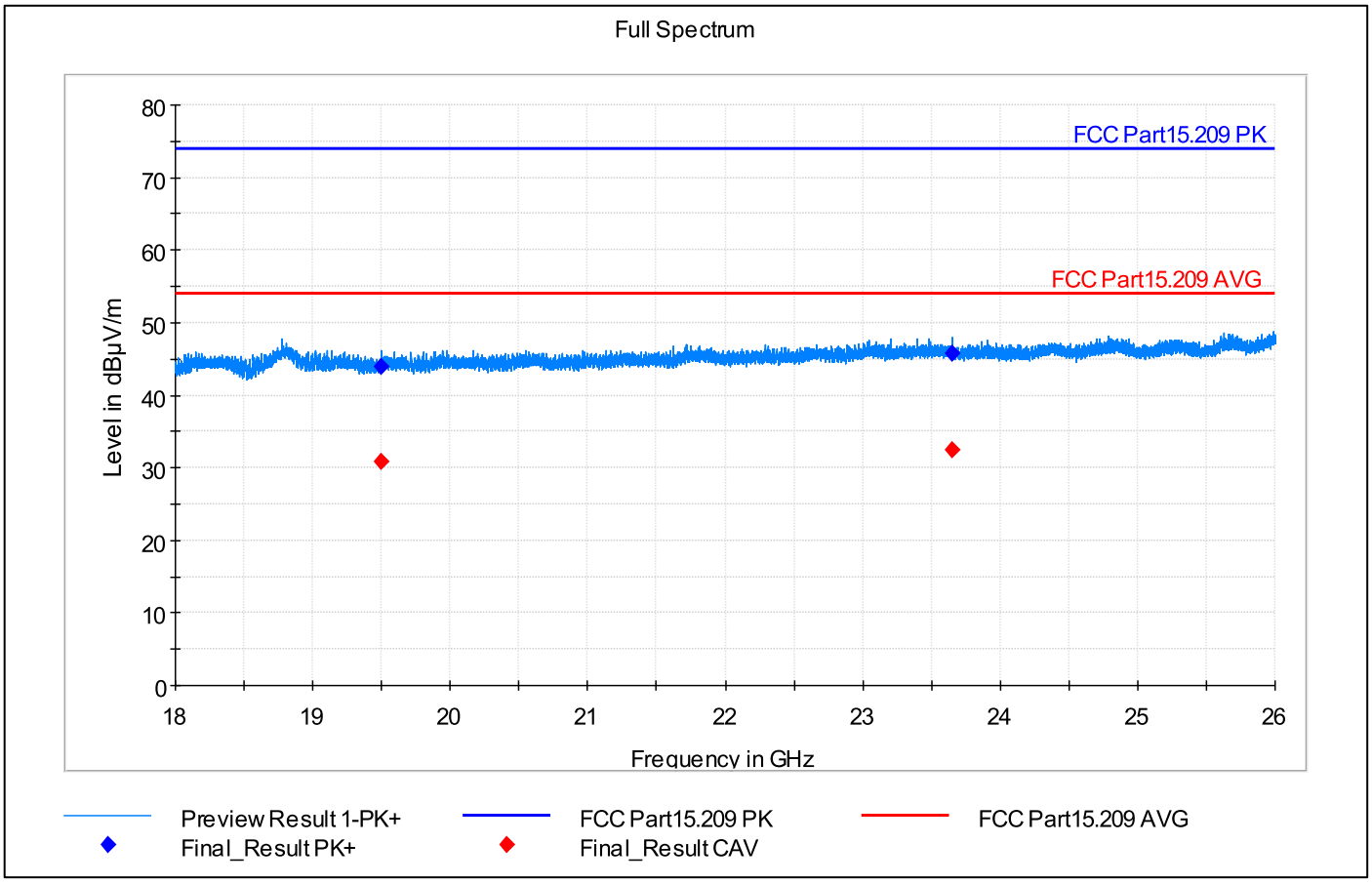


Note: Fundamental TX frequency 2417,8 MHz is excluded from spurious domain measurements and ignored.

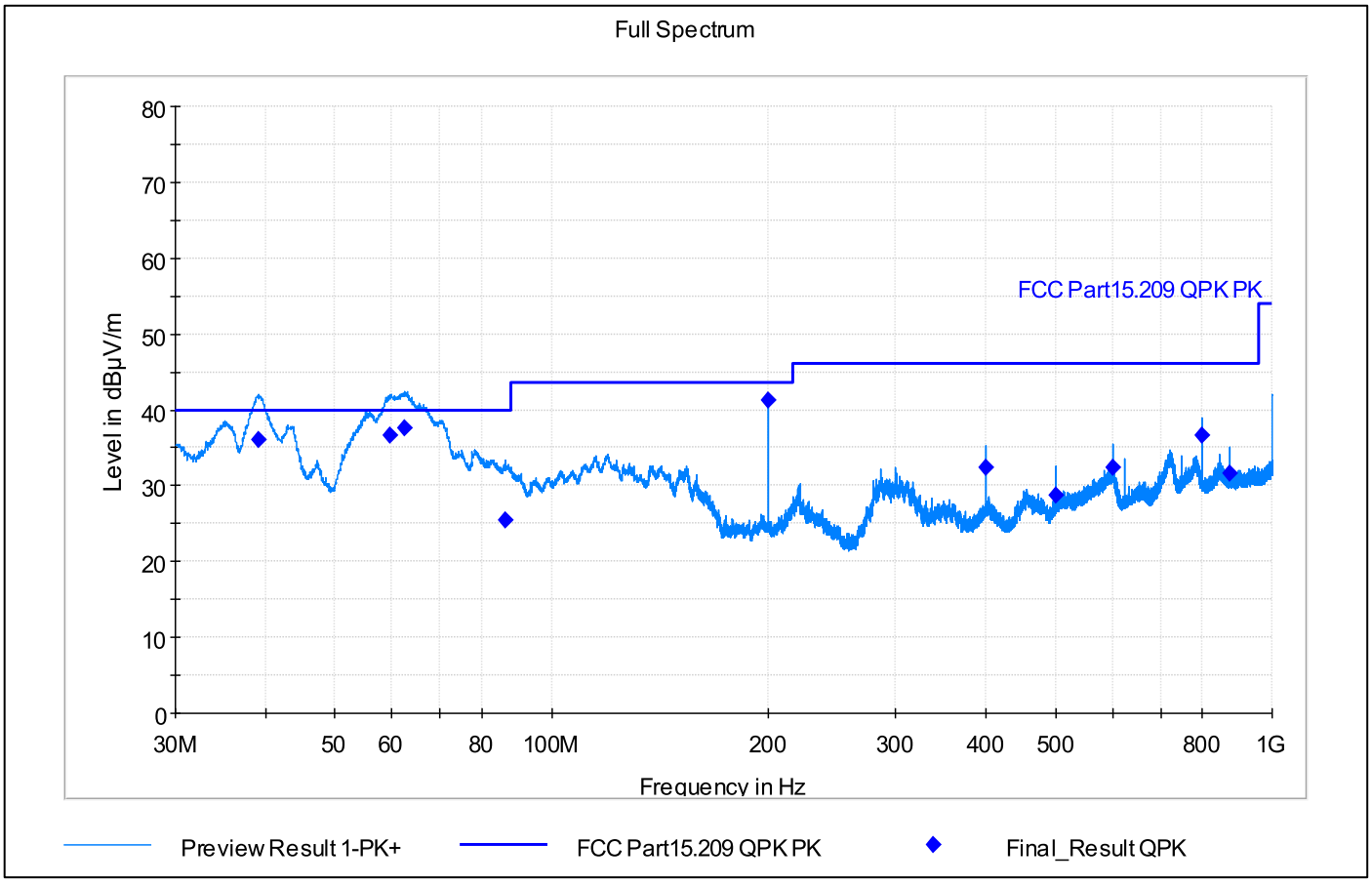
802.11ax Low channel, 3 – 18 GHz



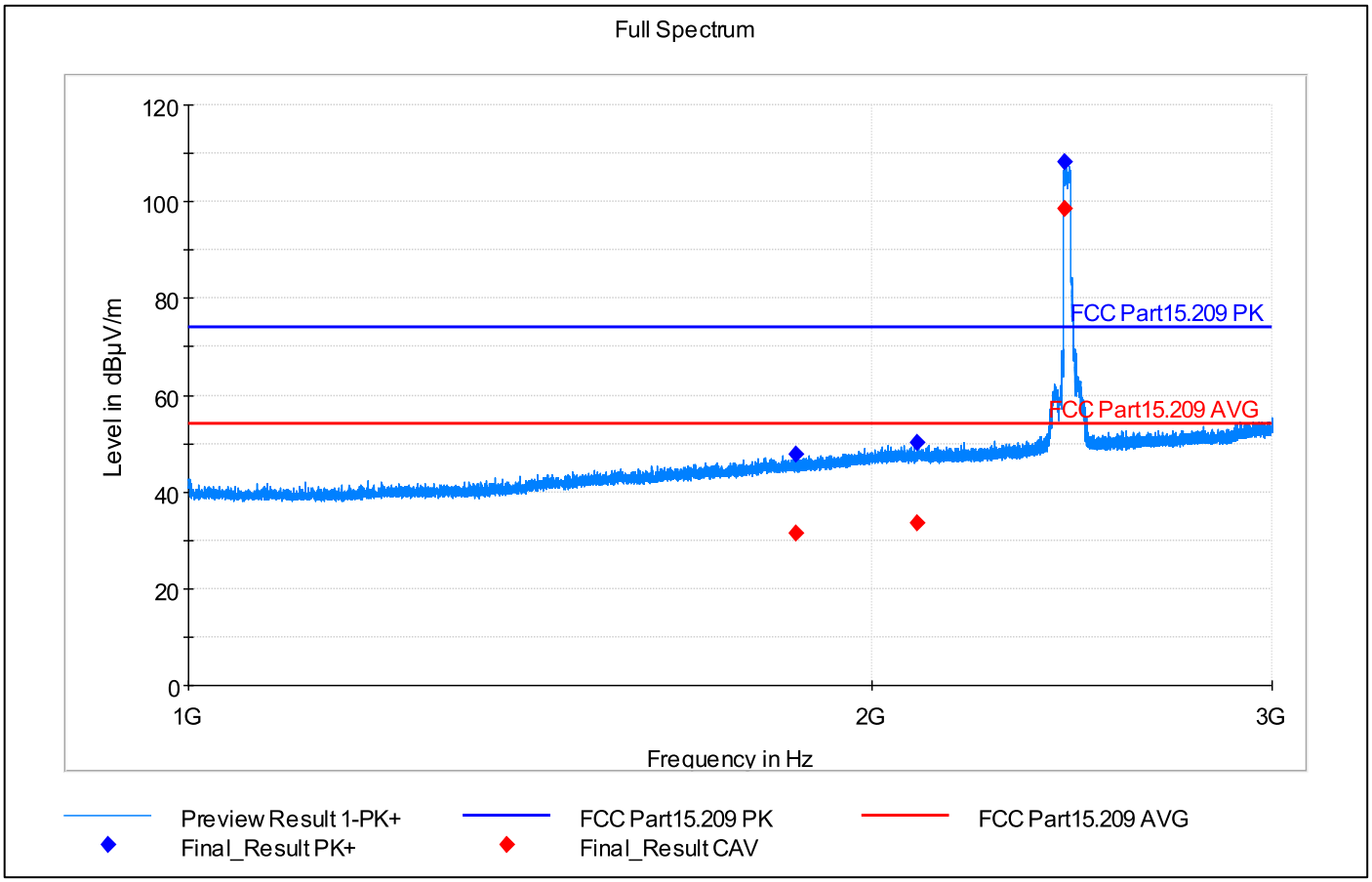
802.11ax Low channel, 18 – 26 GHz



802.11ax Mid channel, 30 MHz – 1 GHz

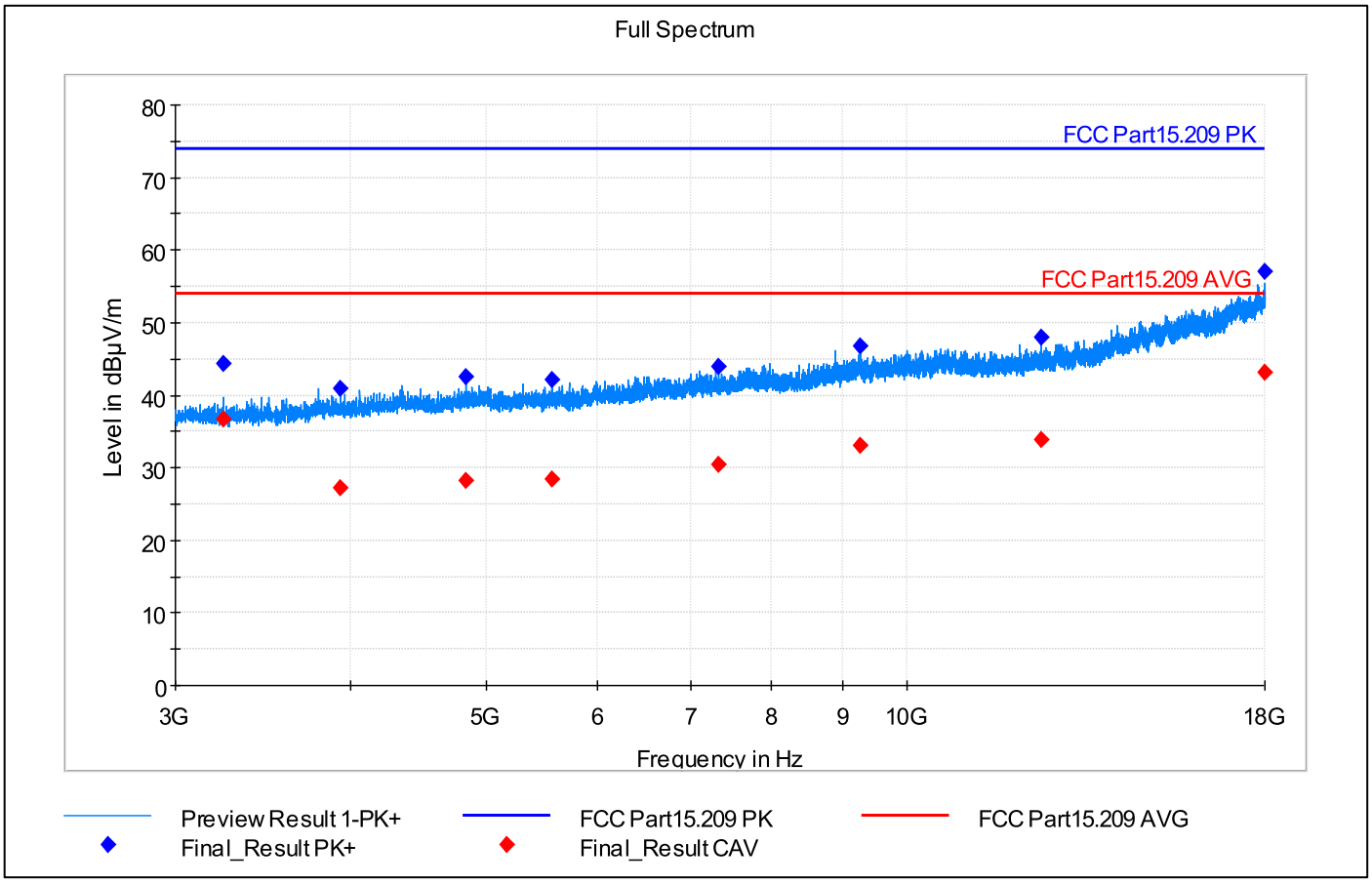


802.11ax Mid channel, 1-3 GHz

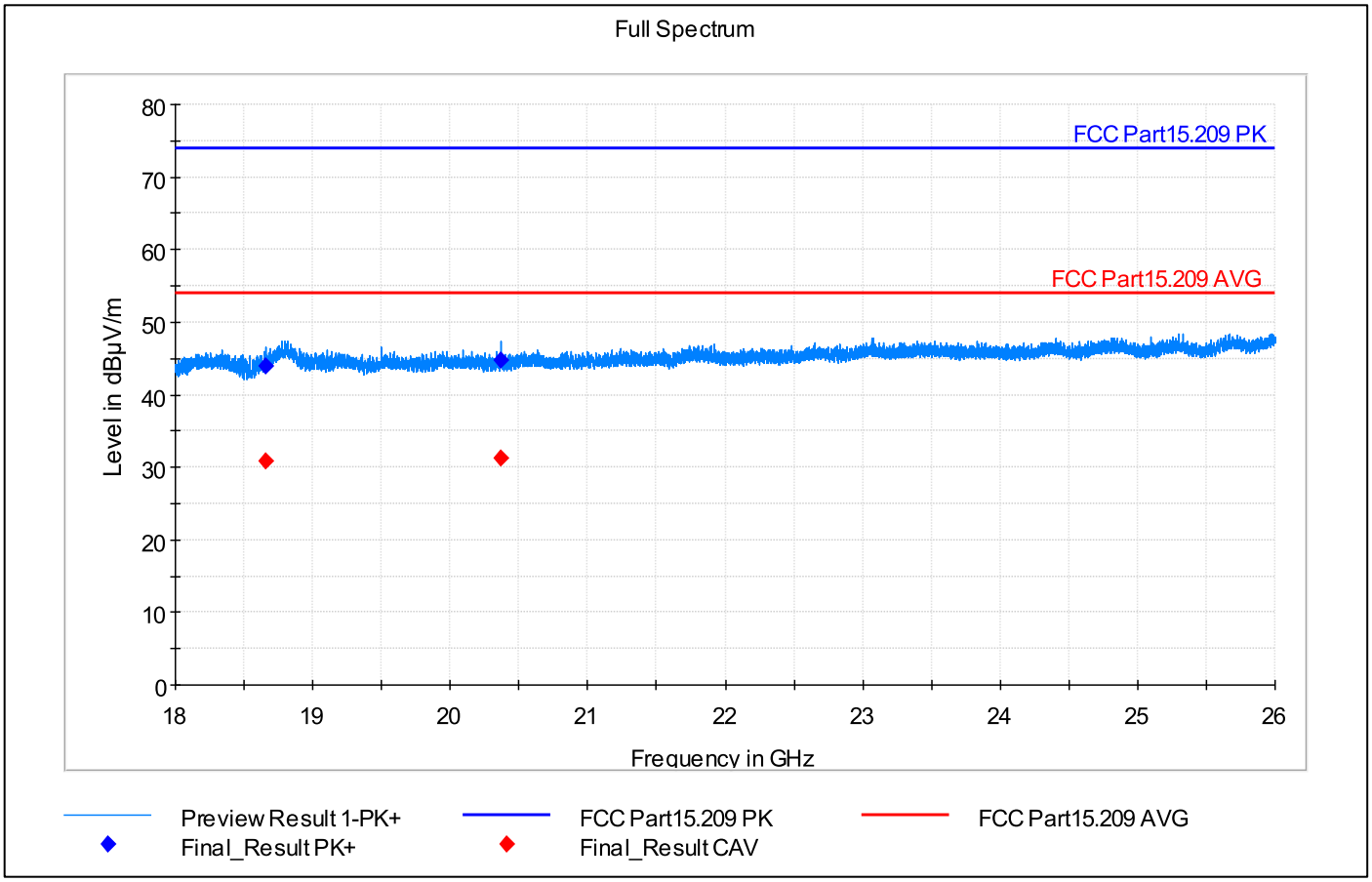


Note: Fundamental TX frequency 2430,4 MHz is excluded from spurious domain measurements and ignored.

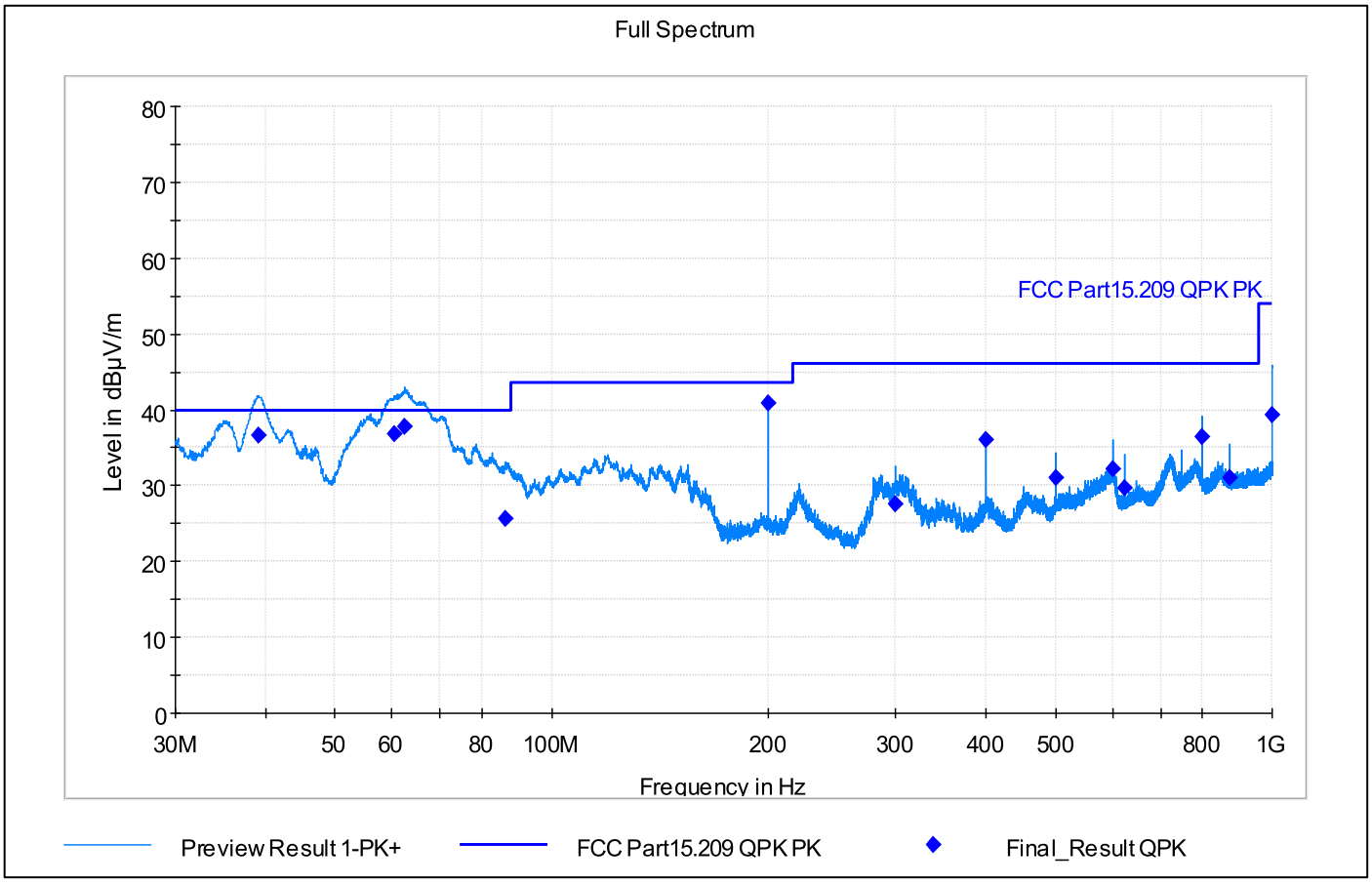
802.11ax Mid channel, 3–18 GHz



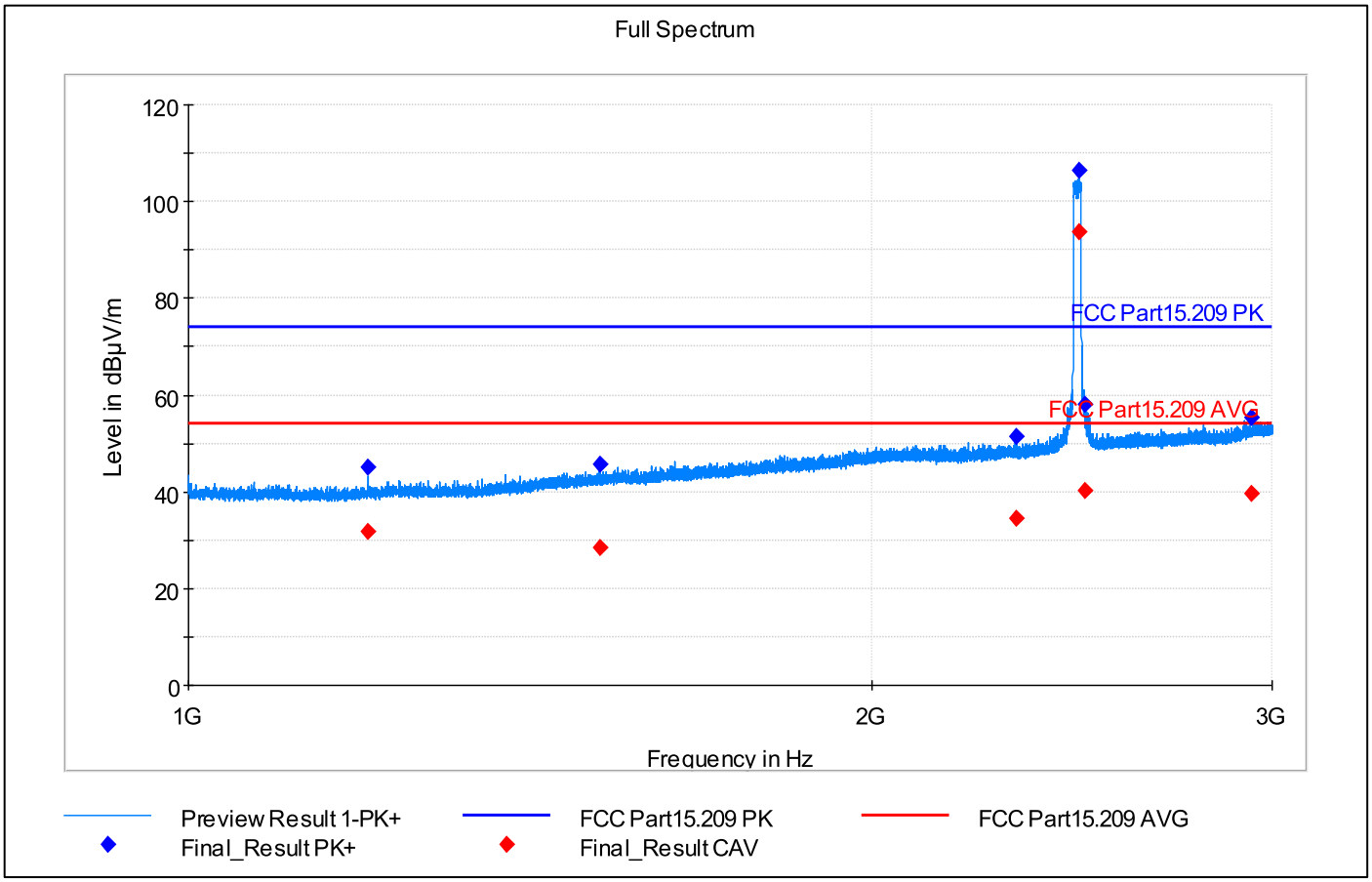
802.11ax Mid channel, 18–26 GHz



802.11ax High channel, 30 MHz – 1 GHz

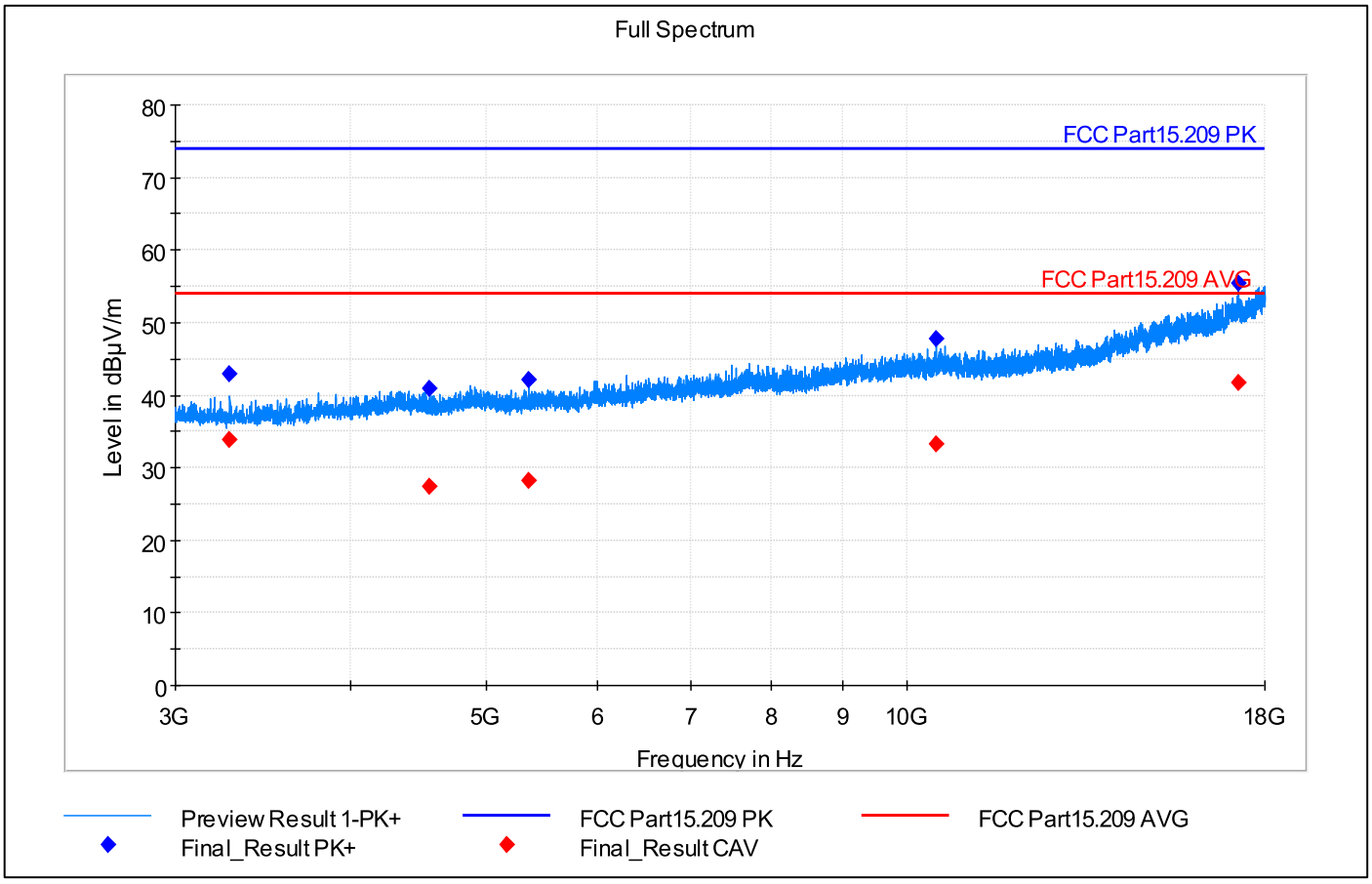


802.11ax High channel, 1 – 3 GHz

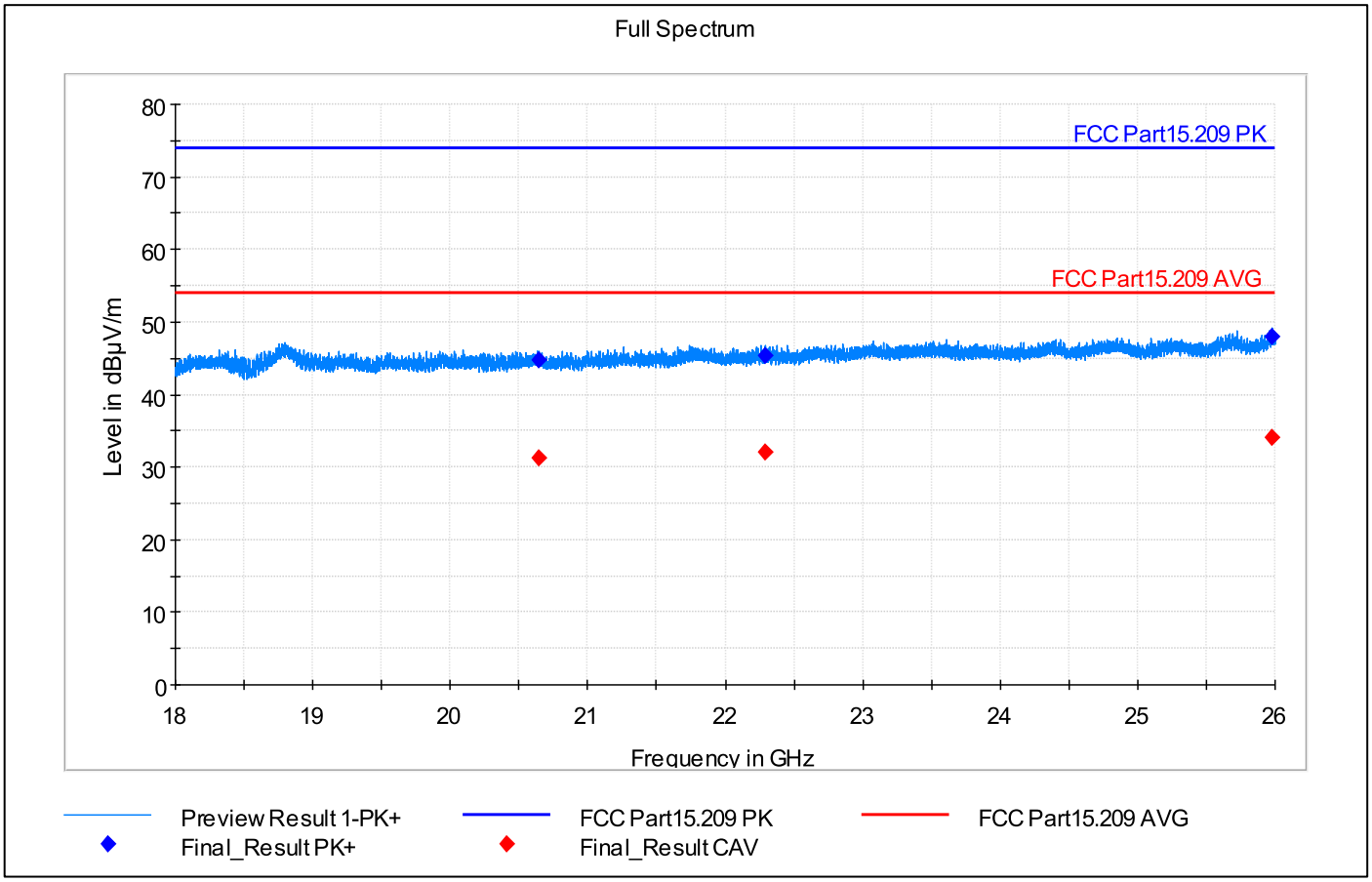


Note: Fundamental TX frequency 2467,80 MHz is excluded from spurious domain measurements and ignored.

802.11ax High channel, 3 – 18 GHz



802.11ax High channel, 18 – 26 GHz



20. Optional antenna spot check results

Reference: FCC §15.247(d), FCC §15.209, ISED RSS-Gen Issue 5 A2 (section 6.13)
Test method: KDB 558074 D01 DTS Meas Guidance v05r02 8.5 and ANSI C63.10-2013 (6.4, 6.5, 6.6 & 11.12)

Specification: Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)/RSS-Gen):

Limits				
Frequency range (MHz)	Detector	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
0.009 – 0.09	Average	2400/F(kHz)	-	300
0.09 – 0.110	Quasi-Peak	2400/F(kHz)	-	300
0.110 – 0.490	Average	2400/F(kHz)	-	300
0.490 – 1.705	Quasi-Peak	24000/F(kHz)	-	30
1.705 – 30.0	Quasi-Peak	30	-	30
30 - 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 - 1000	Quasi-Peak	500	54	3
>1000	Average	500	54	3

Test procedure 30 MHz -1 GHz
7. EUT is placed on a non conducting support at the center of a turn table 0.8m above the ground 8. EUT set to test mode 9. The receiver is set to peak detection with max hold 10. The EUT is rotated through 360 degrees (orientation varied), measurements were made in both horizontal and vertical planes of polarization 11. Found peak values were further maximized by adjusting turntable position ±22,5 degrees around detected value and scanning the antenna height 1 to 4m 12. For maximized values, final measurement was done with the corresponding final detector.

Test procedure > 1 GHz
7. EUT is placed on a non conducting support at the center of a turn table 1.5m above the ground 8. EUT set to test mode 9. The receiver is set to peak detection with max hold 10. The EUT is rotated through 360 degrees (orientation varied), measurements were made in both horizontal and vertical planes of polarization. 11. Found peak values were further maximized by adjusting turntable position ±22,5 degrees around detected value and scanning the antenna height 1 to 4m 12. For maximized values, final measurement was done with the corresponding final detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function. RSS-247: Attenuation below the general field strength limits specified in RSS-Gen is not required.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

For the modular integration test of the Panasonic module on the M2 host, only the mode that created the worse-case spurious emission from the original modular approval test reports will be required. The host integration should only affect the coupling efficiency of spurious signals as well as antenna performance. The worse-case modulation is not expected to be different. So, this typically requires only testing 1 worse-case frequency.

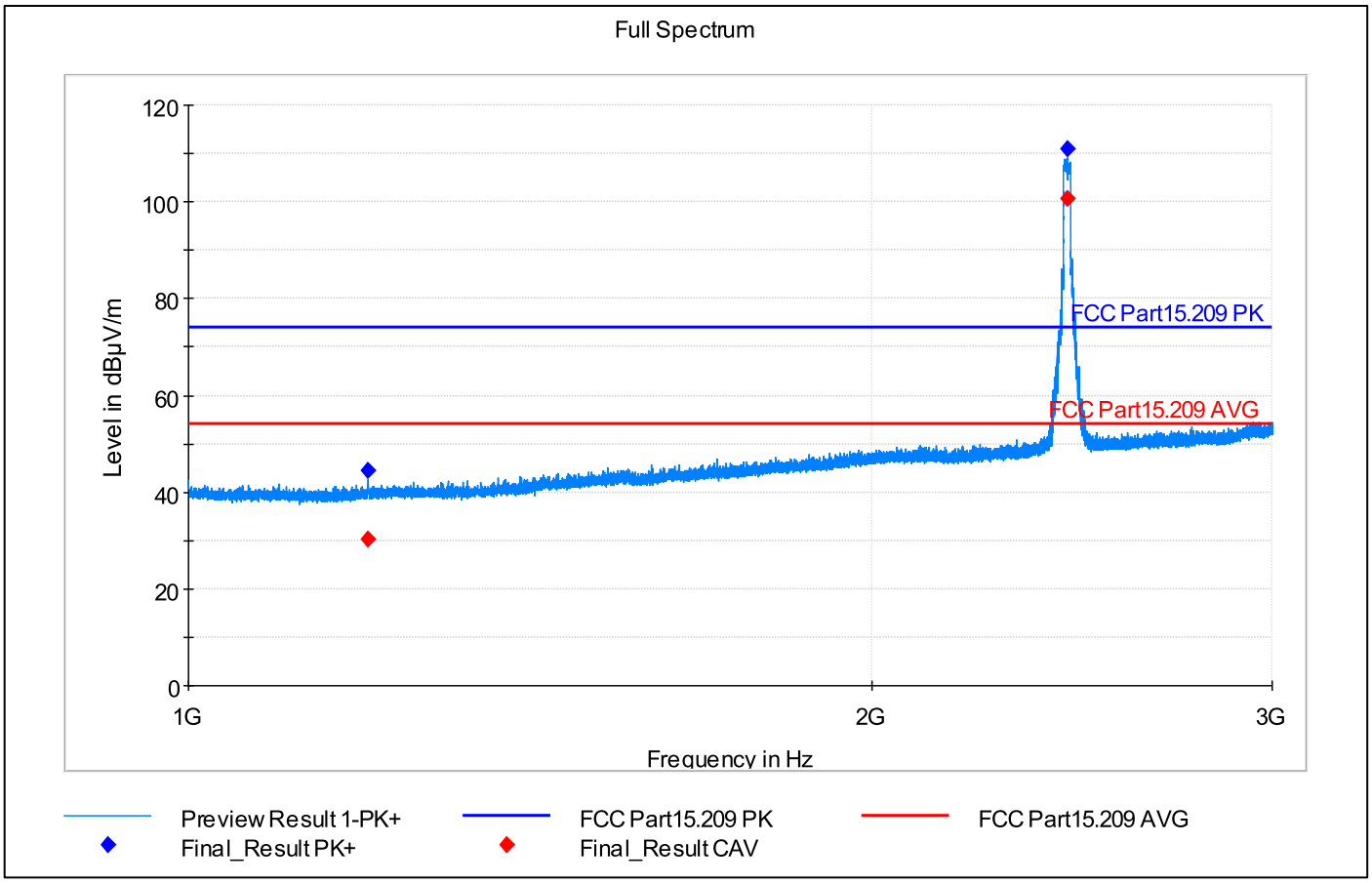
According to radiated modular tests with highest gain antenna, highest output power was with 802.11g middle channel. This is selected as a worst case for spot check test.

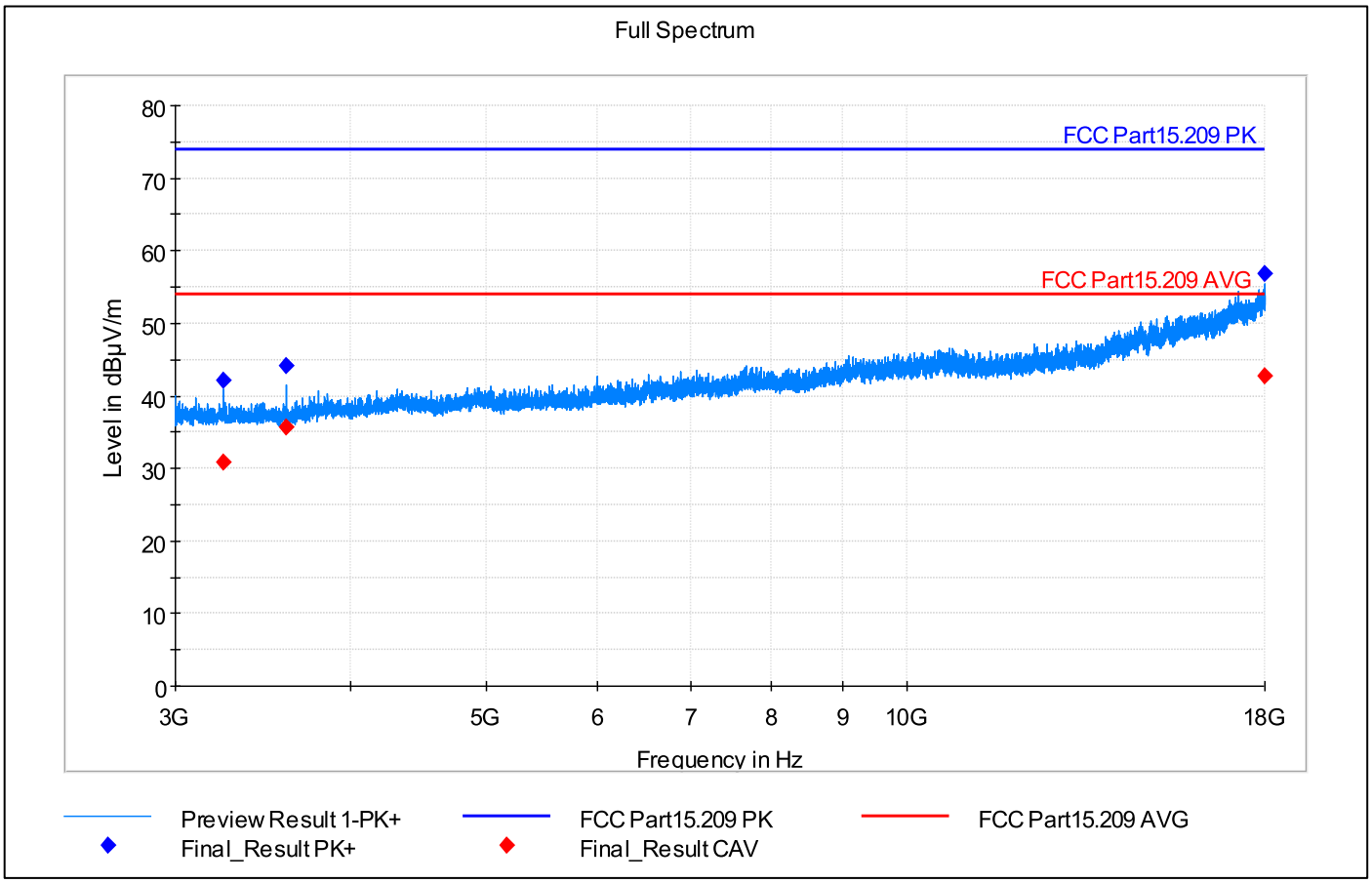
Spot check has been done at frequency range 1 – 18 GHz thus modulation has no effect below 1 GHz and no spurious emissions closer than 6 dB to limits detected at 18 – 26 GHz frequency range in main antenna measurements.

Operation mode(s)	Configuration	Test Verdict	Note
WLAN 802.11g, BW 20MHz, 6 Mbps	3938ER004 + 3938ER008. Mid channel 6, 2437 MHz	PASS	2JF1002P antenna
WLAN 802.11g, BW 20MHz, 6 Mbps	3938ER003 + 3938ER008. Mid channel 6, 2437 MHz	PASS	ANT162442DT-2001A2 antenna

Test data for sample with 2JF1002P antenna, 802.11g channel 6

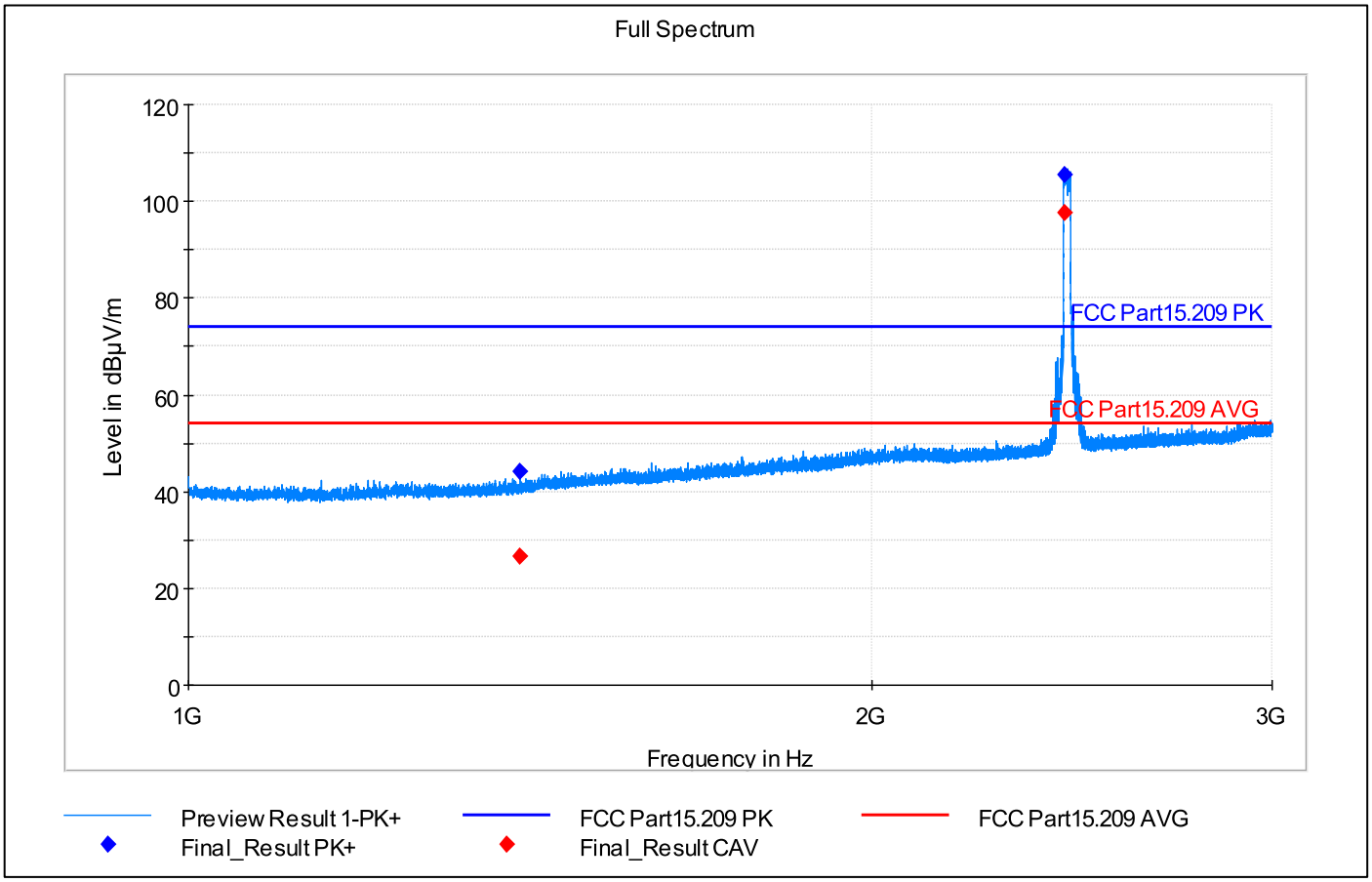
802.11g, 6 Mbps, 20MHz													
Channel	Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas, Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr, (dB)	Comment
6	1199,75	---	30,32	54	23,68	15000	1000	204	V	28	180	31,30	PASS
6	1199,75	44,31	---	74	29,69	15000	1000	204	V	28	180	31,30	PASS
6	2439,25	---	100,75	54	-46,75	15000	1000	143	V	317	180	38,90	TX Signal
6	2439,25	110,98	---	74	-36,98	15000	1000	143	V	317	180	38,90	TX Signal
6	3248,75	---	30,89	54	23,11	15000	1000	151	H	34	0	5,60	PASS
6	3248,75	42,12	---	74	31,88	15000	1000	151	H	34	0	5,60	PASS
6	3599,75	---	35,76	54	18,24	15000	1000	197	V	195	180	6,30	PASS
6	3599,75	44,12	---	74	29,88	15000	1000	197	V	195	180	6,30	PASS
6	17997,00	---	42,73	54	11,27	15000	1000	404	V	231	180	39,20	PASS
6	17997,00	56,78	---	74	17,22	15000	1000	404	V	231	180	39,20	PASS

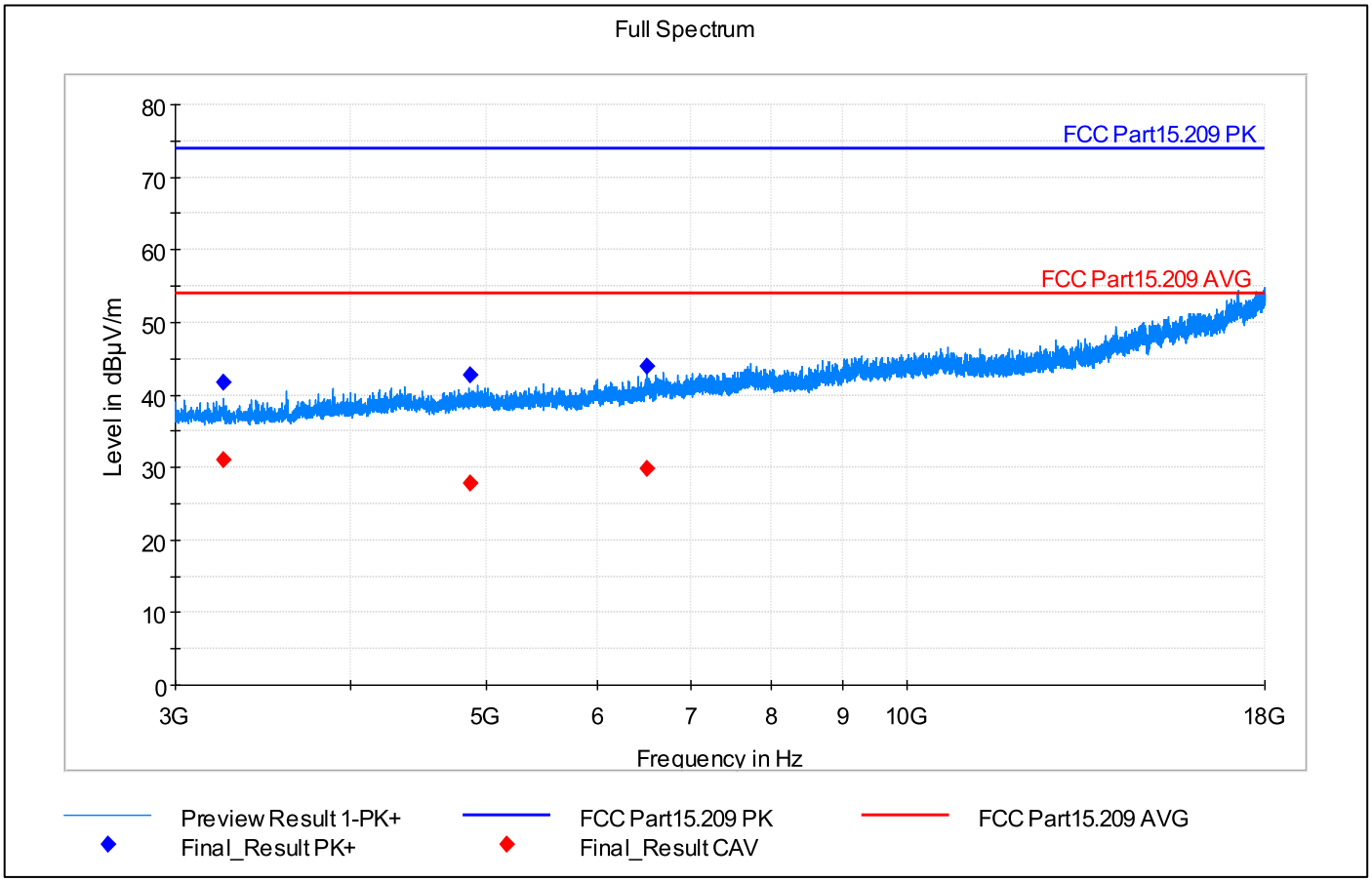




Test data for sample with ANT162442DT-2001A2 antenna, 802.11g channel 6

802.11g, 6 Mbps, 20MHz													
Channel	Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas, Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr, (dB)	Comment
6	1400,00	44,20	---	74	29,80	15000	1000	158	H	345	90	32,40	PASS
6	1400,00	---	26,57	54	27,43	15000	1000	158	H	345	90	32,40	PASS
6	2429,85	105,62	---	74	-31,62	15000	1000	135	H	246	0	38,90	TX signal
6	2429,85	---	97,57	54	-43,57	15000	1000	135	H	246	0	38,90	TX signal
6	3249,25	41,74	---	74	32,26	15000	1000	355	V	306	0	5,60	PASS
6	3249,25	---	31,07	54	22,93	15000	1000	355	V	306	0	5,60	PASS
6	4874,25	42,69	---	74	31,31	15000	1000	350	V	210	180	10,10	PASS
6	4874,25	---	27,89	54	26,11	15000	1000	350	V	210	180	10,10	PASS
6	6519,75	43,96	---	74	30,04	15000	1000	192	H	91	180	13,50	PASS
6	6519,75	---	29,73	54	24,27	15000	1000	192	H	91	180	13,50	PASS


Full Spectrum
120
100
80
60
40
20
0
Level in dBµV/m
1G
2G
3G
Frequency in Hz
FCC Part15.209 PK
FCC Part15.209 AVG
Preview Result 1-PK+
Final_Result PK+
FCC Part15.209 PK
Final_Result CAV
FCC Part15.209 AVG


Full Spectrum
FCC Part15.209 PK
FCC Part15.209 AVG
Level in dBµV/m
80
70
60
50
40
30
20
10
0
3G
5G
6
7
8
9
10G
18G
Frequency in Hz
Preview Result 1-PK+
Final_Result PK+
FCC Part15.209 PK
Final_Result CAV
FCC Part15.209 AVG

21. Receiver spurious emissions, radiated

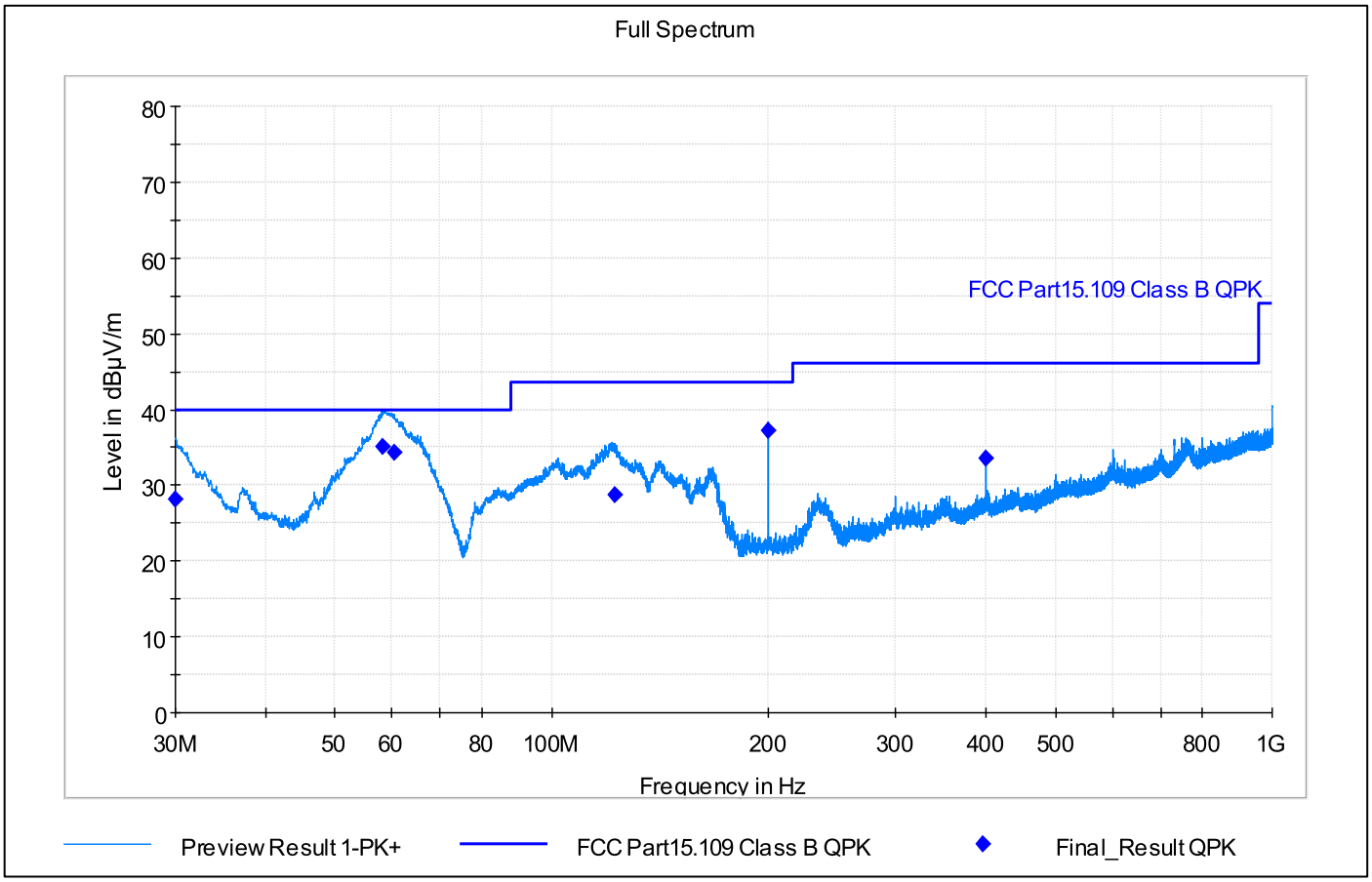
Reference: ISED RSS-247, Issue 3 (section 3.1)
Test method: ANSI C63.4-2014 (8.1 – 8.3)

Limits			
Frequency (MHz)	Detector	Field strength (uV/m)	Measurement distance (m)
30 – 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
> 1000	Average	500	3

Test procedure
1. EUT is placed on a non conducting support at the center of a turn table 0.8m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360 degrees (orientation varied), measurements were made in both horizontal and vertical planes of polarization 5. Found peak values were further maximized by adjusting turntable position ±22,5 degrees around detected value and scanning the antenna height 1 to 4m 6. For maximized values, final measurement was done with the corresponding final detector.

Operation mode(s)	Configuration	Test Verdict
WLAN 802.11b/g/n station mode	3938ER005 + 3938ER008	PASS

WLAN 802.11b/g/n station mode 30 MHz – 1 GHz



Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas, Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr, (dB/m)	Comment
30	28,20	40,00	11,80	15000,00	120	103	V	141	0	17,40	PASS
58	35,14	40,00	4,86	15000,00	120	124	V	109	0	20,30	PASS
60	34,34	40,00	5,66	15000,00	120	101	V	138	0	19,80	PASS
122	28,65	43,50	14,85	15000,00	120	104	V	118	0	17,50	PASS
200	37,30	43,50	6,20	15000,00	120	100	V	240	0	20,10	PASS
400	33,47	46,00	12,53	15000,00	120	126	V	44	0	25,20	PASS