

Test Report



INTENTIONAL RADIATOR TESTS ACCORDING TO FCC PART 15 C AND ISED CANADA REQUIREMENTS

Equipment Under Test: Personal Protection and Surveillance Device

Model: TLP54US

Trademark: TWIG

Manufacturer/Customer: Twig Com Ltd
Lairolantie 14
FI-24910, SALO
FINLAND

FCC Rule Part: 2.947(f), 15.209, 15.247(b), 15.247(d)

IC Rule Part: RSS-247, Issue 3, 2023
RSS-Gen Issue 5 Amendment 2, 2021

KDB: 558074 D01 15.247 Meas Guidance v05r02
Guidance for Compliance Measurements on Digital Transmission Systems,
Frequency Hopping Spread Spectrum System, and Hybrid System Devices
Operating Under §15.247 of the FCC rules (April 2, 2019)

Date: 10 July 2025

Issued by: 
Pekka Kälviäinen
Testing Engineer

Date: 10 July 2025

Checked by: 
Henri Mäki
Testing Engineer

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GENERAL REMARKS

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

RELEASE HISTORY

Version	Changes	Issued
1.0	Initial release	10 August 2023
1.1	Added test results for low and high channels for Wi-Fi, BT Classic and BLE RSS-Gen and RSS-247 standards added Updated to ANSI C63.10-2020	26 July 2024
1.2	“Product description” section updated e.i.r.p. test results for 2.4 GHz radios added ANSI C63.10-2020 version changed to 2013.	10 July 2025

PRODUCT DESCRIPTION

Equipment Under Test

Type:	Personal Protection and Surveillance Device
Model:	TLP54US
Trade Mark:	TWIG
Serial no:	122X4820027229
Software version:	-
Hardware version:	-
Power Requirements:	Integrated battery
EUT Dimensions:	62 x 47 x 22 mm
Cellular / GNSS module:	FCC ID: 2A95KPLS63X IC: 30482-PLS63X
Wi-Fi / Bluetooth module:	FCC ID: 2A95KNINAW15 IC: 30482-NINAW15
Wi-Fi / Bluetooth antenna:	Wi-Fi/Bluetooth module used with a new PCB antenna, gain -4.32 dBi
Peripherals	
AC adapter:	FW8005/EU/05, input voltage 100-240 V 50/60 Hz

The EUT was tested as a table-top unit.

General Description

The EUT is a personal tracking and alarm device. It contains:

- Cellular, Wi-Fi / Bluetooth transceivers and GNSS
- SRD 1: 918.219 MHz
- SRD 2: 918.675 MHz

Classification

- | | |
|--|-------------------------------------|
| Fixed device | ☐ |
| Mobile Device (Human body distance > 20cm) | ☐ |
| Portable Device (Human body distance < 20cm) | ☒ |

Modifications Incorporated in the EUT

Description
Programming interface to Wi-Fi / Bluetooth module added

SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.247(b) / RSS-247 5.4	Equivalent Isotropically Radiated Power (E.I.R.P.)	PASS
§15.209(a), §15.247(d) / RSS-247 5.5	Radiated Emissions Within the Restricted Bands	PASS

The decision rule applied for the tests results stated in this test report is according to the requirements of section 1.3 of ANSI C63.10-2013.

EUT Test Conditions during Testing

The EUT was configured into the wanted channel and was in continuous transmit mode during all the tests.

During the radiated measurements above 1 GHz the EUT was on 150 cm high styrofoam table.

The EUT was connected to the AC adapter during the tests. The AC adapter was connected to 120 V 60 Hz AC mains.

The BT Classic, BLE or Wi-Fi transmitters of the EUT were configured into the wanted channel using software provided by the manufacturer. The worst-case modulations/data rates were checked from the module test report (FCC ID: XPNINAW15):

Bluetooth Classic:	GFSK, 1 Mbps, DH5
Bluetooth Low Energy:	GFSK, 1 Mbps
Wi-Fi:	802.11b, 1 Mbps (tested frequency range 9 kHz – 1 GHz, 4 – 25 GHz)
	802.11n HT20 MCS5 (tested frequency range 1 – 4 GHz)

WCDMA or LTE communication was made with a system simulator.

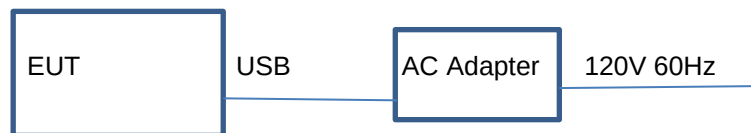


Figure 1: Test setup block diagram

Table 1: Test frequencies and modes for Unwanted emissions test

Test Mode	Radio	Channel	Frequency (MHz)
1	BT Classic	middle	2440
	WCDMA band 5	middle	836.6
2	BLE	middle	2440
	LTE band 2	middle	1880
3	WiFi	middle	2442
	LTE band 2	middle	1880
4	Wi-Fi	bottom	2412
5	Wi-Fi	top	2467
6	BT Classic	bottom	2402
7	BT Classic	top	2480
8	BLE	bottom	2402
9	BLE	top	2480

Summary of Testing

Test Facility

Testing Laboratory / address: FCC designation number: FI0002	SGS Fimko Ltd Takomotie 8 FI-00380, HELSINKI FINLAND
Test Site:	☐ K10LAB ☒ K5LAB ☐ T10LAB

Equivalent Isotropically Radiated Power (E.I.R.P.)

TEST RESULTS

Equivalent Isotropically Radiated Power (E.I.R.P.)

Standard:	ANSI C63.10-2013	
Tested by:	HEM	
Date:	6 September 2024	9 September 2024
Temperature:	20 °C	21 °C
Humidity:	60 %RH	56 %RH
Measurement uncertainty:	± 4.51 dB, level of confidence 95 % (k = 2)	

FCC Rule: §15.247(b)
RSS-247 5.4

The test is performed to ensure that the e.i.r.p. and antenna gain limits are satisfied with the new Wi-Fi/Bluetooth antenna of the EUT.

For frequency hopping systems and digital transmission systems operating in the band 2400-2483.5 MHz, the e.i.r.p. shall not exceed 4 W (36 dBm).

The test is performed as a radiated measurement in a semi-anechoic chamber with floor absorbers. The measurement distance is 3 meters. The EUT is placed on a table 1.5 m above the ground plane in its worst-case orientation with regard to radiated RF output power. The EUT is rotated 360° on the turntable, and the measurement antenna is scanned 1 – 4 m to find the highest emissions.

The measured field strength level at 3-meter distance is converted to e.i.r.p. with the following equation:

$$e.i.r.p. [dBm] = E [dB\mu V/m] - 95.2$$

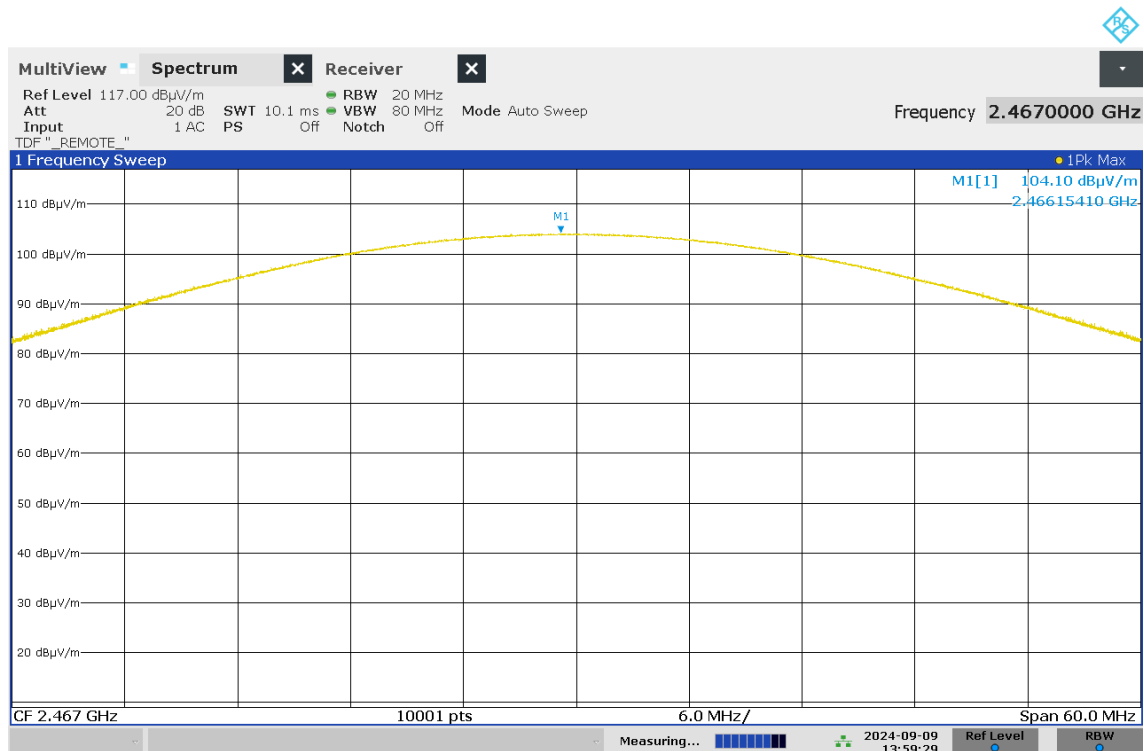
Test results

Table 2: Test results for equivalent isotropically radiated power

Radio	Channel	Frequency [MHz]	Field strength [dBμV/m]	E.I.R.P. [dBm]	Result
Wi-Fi 802.11b, 1 Mbps	1	2412	97.96	2.76	PASS
	6	2437	100.46	5.26	PASS
	11	2462	101.59	6.39	PASS
	12	2467	104.10	8.90	PASS
Wi-Fi 802.11g, 24 Mbps	1	2412	104.22	9.02	PASS
	6	2437	106.48	11.28	PASS
	11	2462	105.79	10.59	PASS
	12	2467	104.47	9.27	PASS
Wi-Fi 802.11n, MCS3	1	2412	103.51	8.31	PASS
	6	2437	106.11	10.91	PASS
	11	2462	105.02	9.82	PASS
	12	2467	103.95	8.75	PASS
BT Classic, 1 Mbps, DH5	0	2402	90.16	-5.04	PASS
	39	2441	88.83	-6.37	PASS
	78	2480	89.11	-6.09	PASS
BT Classic, 2 Mbps, 2DH5	0	2402	91.92	-3.28	PASS
	39	2441	90.80	-4.40	PASS
	78	2480	91.45	-3.75	PASS
BT Classic, 3 Mbps, 3DH5	0	2402	92.10	-3.10	PASS
	39	2441	91.42	-3.78	PASS
	78	2480	91.77	-3.43	PASS
BLE, 1 Mbps	37	2402	90.89	-4.31	PASS
	17	2440	89.68	-5.52	PASS
	39	2480	86.64	-8.56	PASS

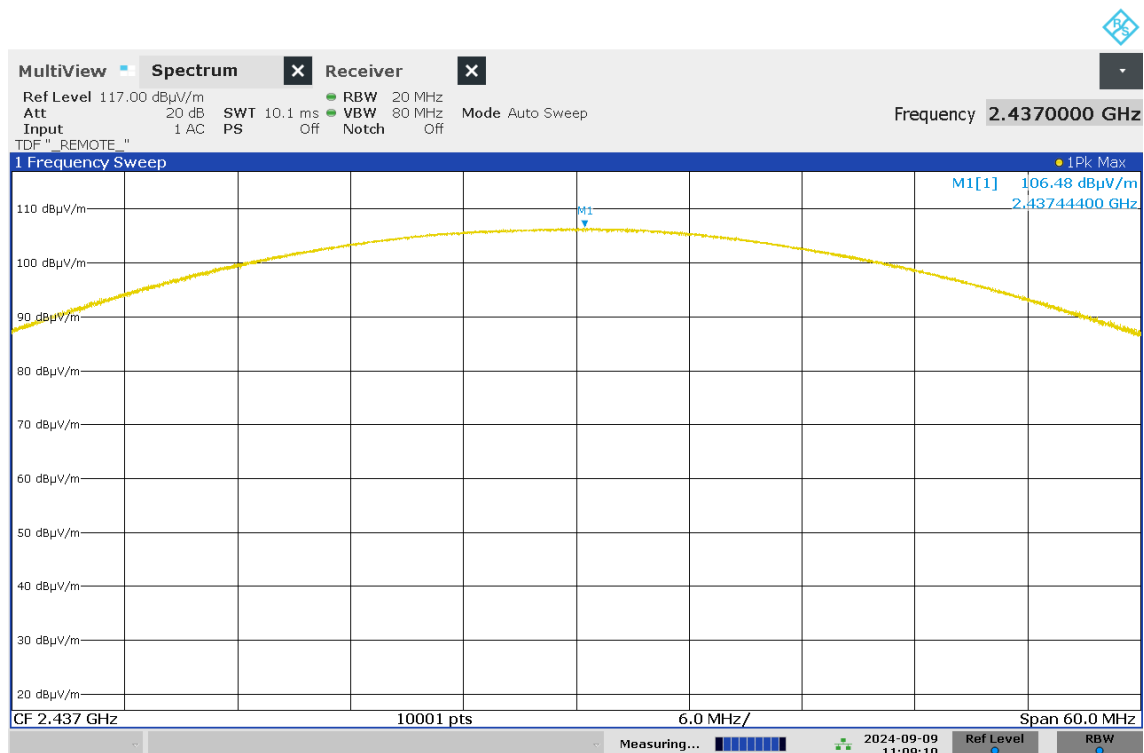
The figures for worst-case channel for every radio configuration are presented.

Equivalent Isotropically Radiated Power (E.I.R.P.)



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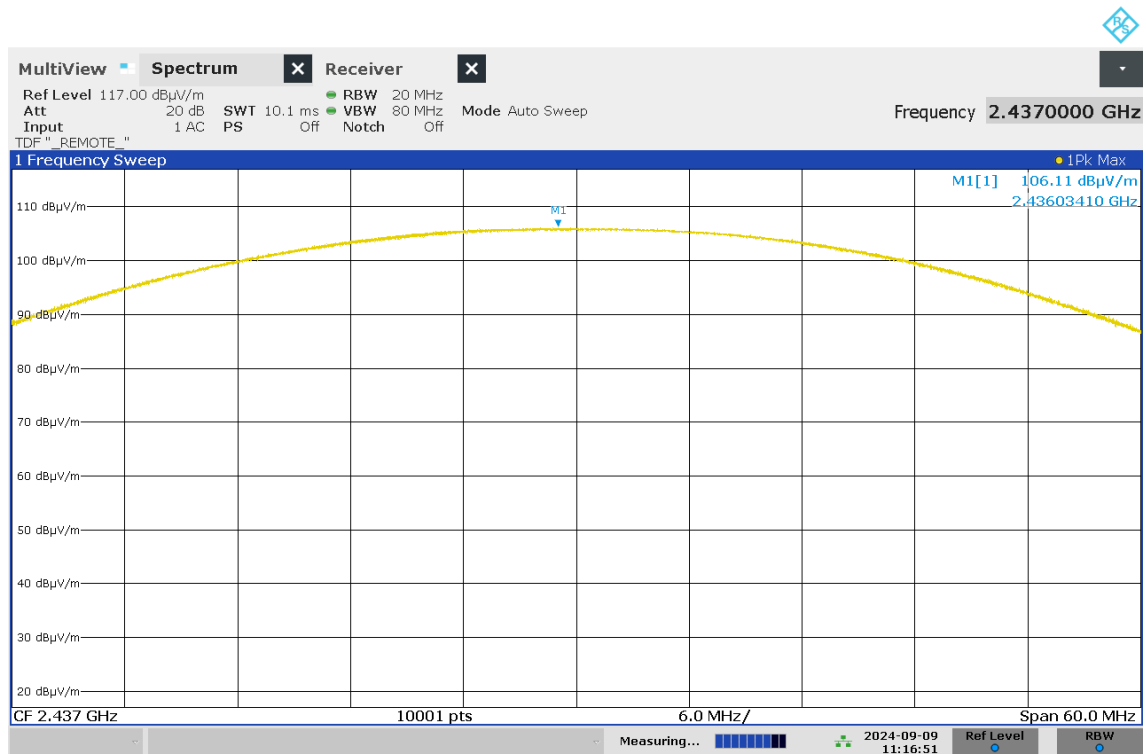
Figure 2: Wi-Fi 802.11b (ch.12)



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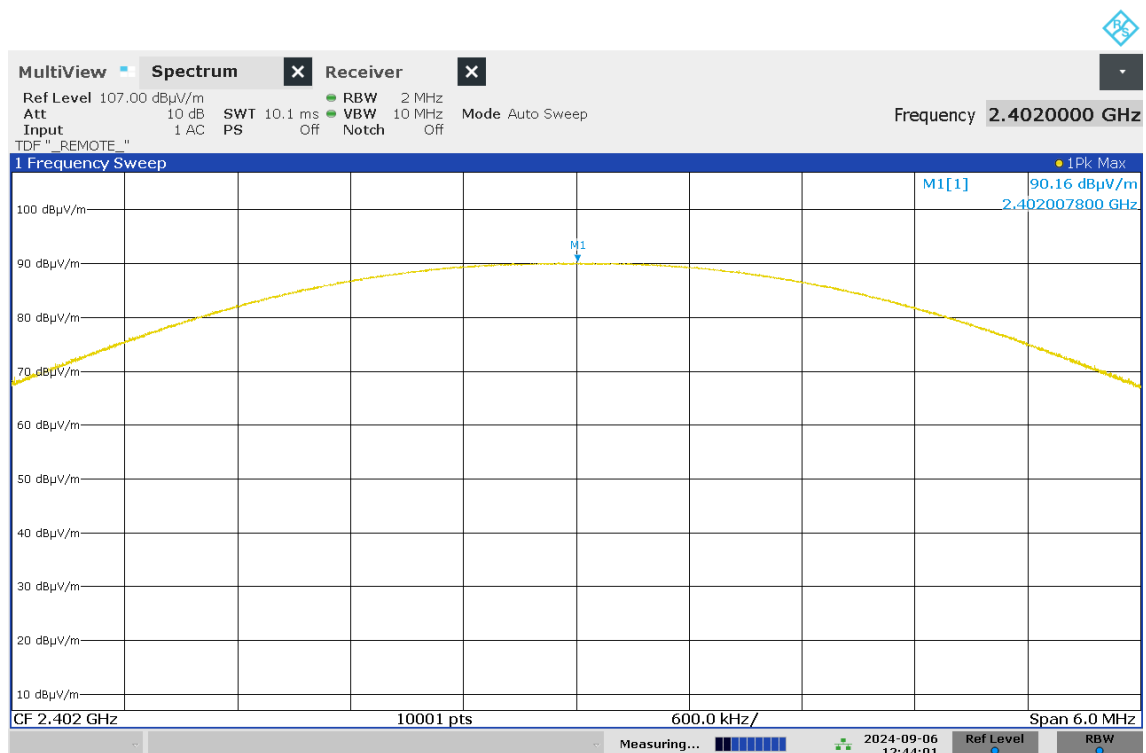
Figure 3: Wi-Fi 802.11g (ch.6)

Equivalent Isotropically Radiated Power (E.I.R.P.)



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Figure 4: Wi-Fi 802.11g (ch.6)



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Figure 5: BT Classic 1 Mbps (ch.0)

Equivalent Isotropically Radiated Power (E.I.R.P.)

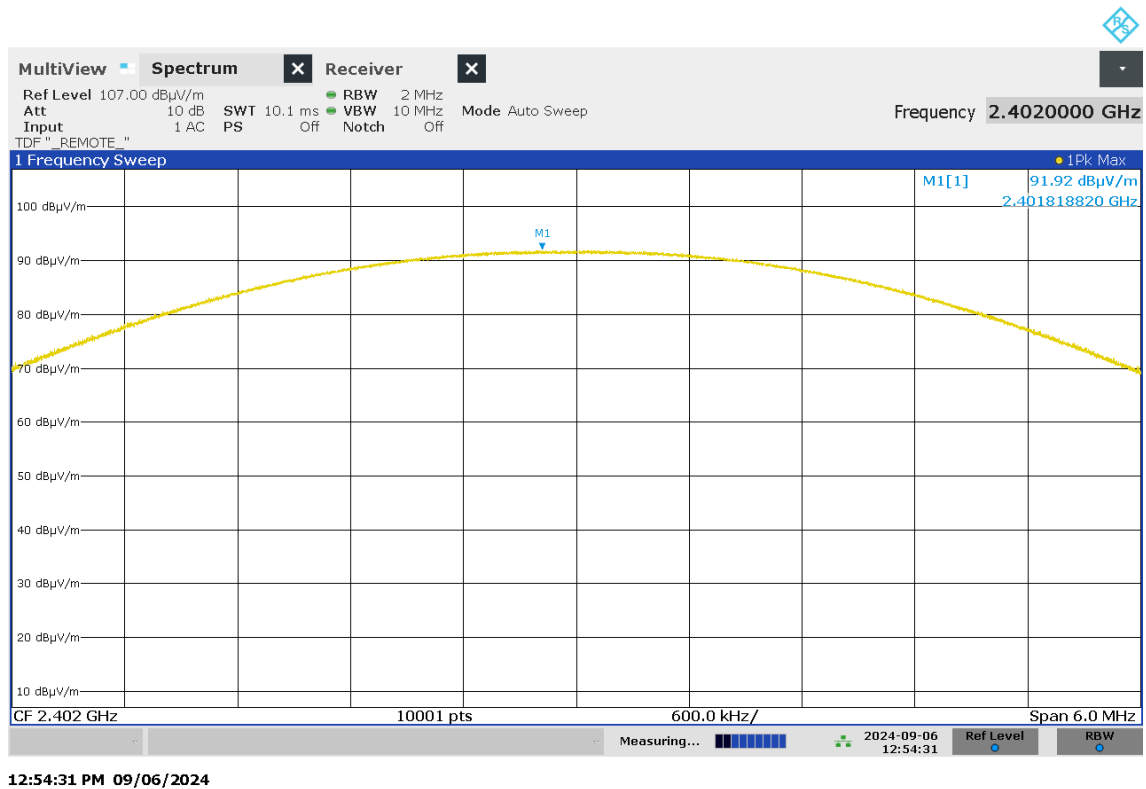


Figure 6: BT Classic 2 Mbps (ch.0)

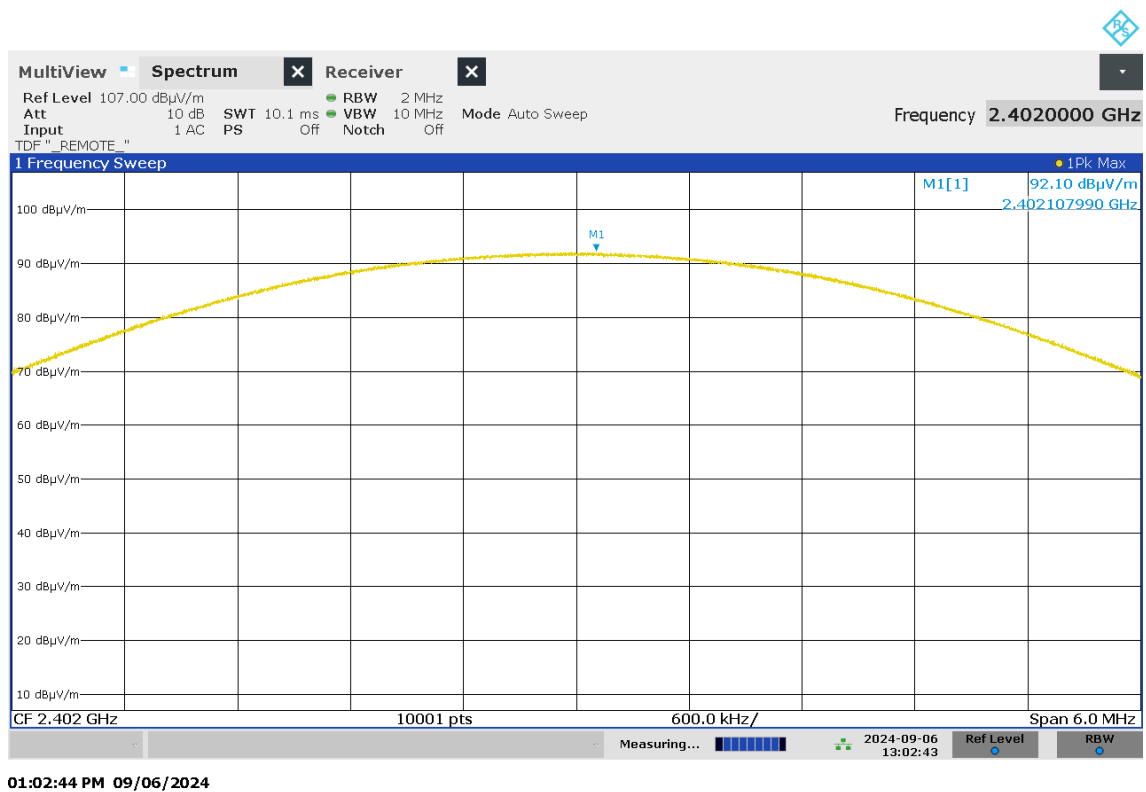
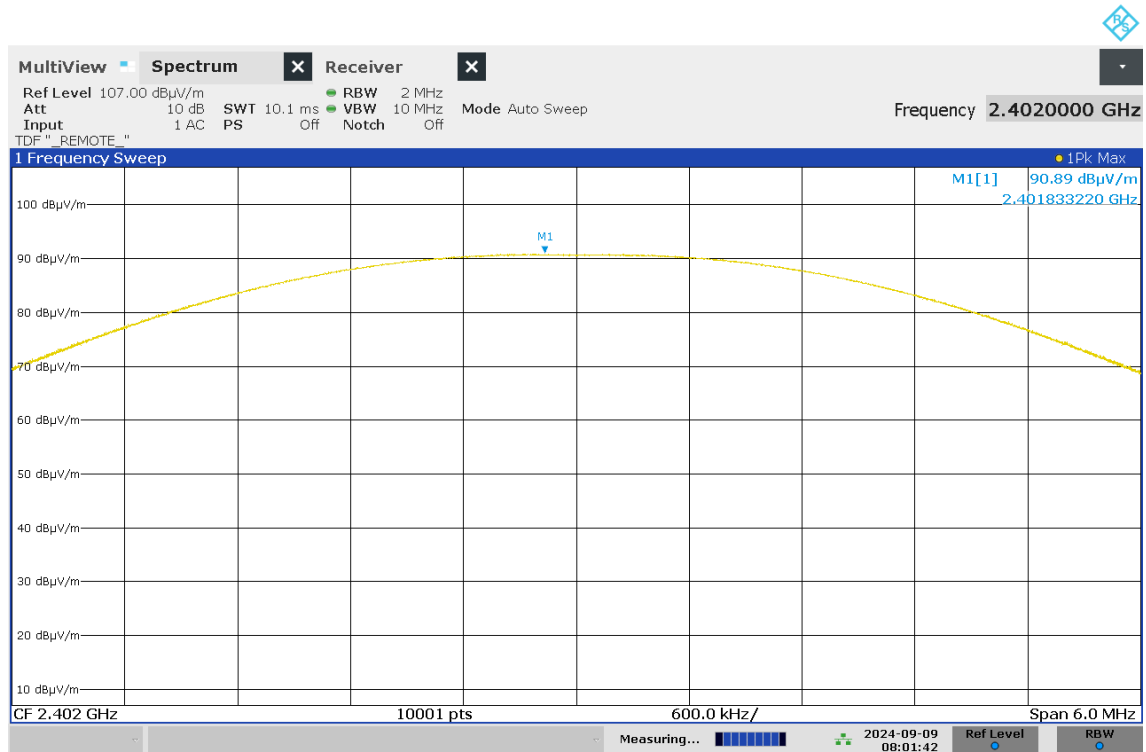


Figure 7: BT Classic 3 Mbps (ch.0)

Equivalent Isotropically Radiated Power (E.I.R.P.)



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Figure 8: BLE (ch.37)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Standard:	ANSI C63.10-2013		
Tested by:	PKA	HEM	HEM
Date:	25 – 28 July 2023	20 July 2024	21 July 2024
Temperature:	23 ± 3°C	20 °C	20 °C
Humidity:	20 - 60 % RH	58 %RH	57 %RH
Measurement uncertainty:	± 4.51 dB, level of confidence 95 % (k = 2)		

FCC Rule: 15.247(d), 15.209(a)

RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. In addition, 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).

The correction factor in the final result table contains the sum of the transducers (antenna + amplifier + cables).

Peak values of emissions below 1000 MHz measured for reference as well as transmitter fundamental.

Frequency range [MHz]	Limit [μV/m]	Limit [dBμV/m]	Detector
30 - 80	100	40.0	Quasi-peak
88 - 216	150	43.5	Quasi-peak
216 - 960	200	46.0	Quasi-peak
960 - 1000	500	54.0	Quasi-peak
Above 1000	500	54.0	Average
Above 1000	5000	74.0	Peak

Investigative measurements were made to determine the worst EUT orientation. The presented final results are the results in the worst orientation.

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Results

Mode 1, see Figures 9 - 14

Table 3: Quasi-peak results below 1 GHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
46.926000	28.30	40.00	11.70	1000.0	120.000	117.0	V	206.0	17.8
882.080000*)	45.28	46.00	0.72	1000.0	120.000	100.0	V	93.0	31.1
959.999000	38.90	46.00	7.10	1000.0	120.000	105.0	V	149.0	32.1

*) 3G system simulator

Table 4: Peak and average results above 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)
1671.800000	---	41.79	54.00	12.21	1000.0	1000.000	122.0	V	137.0	1.1
18781.550000	---	39.57	53.90	14.33	1000.0	1000.000	100.0	V	341.0	8.1

Mode 2, see figures 15 - 20

Table 5: Quasi-peak results below 1 GHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
47.303000	24.14	40.00	15.86	1000.0	120.000	109.0	V	257.0	17.8
959.999000	38.57	46.00	7.43	1000.0	120.000	100.0	V	150.0	31.9

Table 6: Peak and average results above 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)
3762.050000	---	38.26	54.00	15.74	1000.0	1000.000	138.0	V	131.0	7.2
18759.150000	---	39.86	53.90	14.04	1000.0	1000.000	100.0	H	321.0	8.2

Mode 3, see figures 21 - 26

Table 7: Quasi-peak results below 1 GHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
47.192000	25.62	40.00	14.38	1000.0	120.000	109.0	V	242.0	17.8
137.668000	20.04	43.50	23.46	1000.0	120.000	118.0	V	178.0	17.7
959.999000	44.91	46.00	1.09	1000.0	120.000	100.0	V	151.0	31.9

Table 8: Peak and average results above 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)
3756.650000	---	38.19	54.00	15.81	1000.0	1000.000	400.0	H	353.0	7.2
4879.100000	---	36.12	54.00	17.88	1000.0	1000.000	127.0	H	332.0	7.6
18724.850000	---	40.08	53.90	13.82	1000.0	1000.000	249.0	V	321.0	8.0

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 4, see figures 27 - 32

Table 9: Peak and average results above 1 GHz

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4823.200000	---	39.07	54.00	14.93	1000.0	1000.000	100.0	H	99.0	8.1
4824.200000	50.01	---	74.00	23.99	1000.0	1000.000	100.0	H	94.0	8.2

Table 10: Bottom channel band-edge

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2390.000000	---	40.50	54.00	13.50	1000.0	1000.000	165.0	V	183.0	14.3
2390.000000	57.80	---	74.00	16.20	1000.0	1000.000	169.0	V	183.0	14.3
2400.000000	65.21	---	74.00	8.79	1000.0	1000.000	146.0	V	183.0	14.3
2413.750000	92.81	---	---	---	1000.0	1000.000	146.0	V	179.0	14.3

Mode 5, see figures 33 - 38

Table 11: Peak and average results above 1 GHz

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4933.100000	---	50.56	54.00	3.44	1000.0	1000.000	100.0	H	104.0	8.3
4934.200000	60.39	---	74.00	13.61	1000.0	1000.000	107.0	H	106.0	8.2

Table 12: Top channel band-edge

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2468.750000	87.07	---	---	---	1000.0	1000.000	195.0	H	150.0	14.5
2483.500000	51.10	---	74.00	22.90	1000.0	1000.000	150.0	V	81.0	14.5

Mode 6, see figures 39 - 44

Table 13: Peak and average results above 1 GHz

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4804.000000	---	32.49	54.00	21.51	1000.0	1000.000	100.0	H	106.0	8.1

Table 14: Bottom channel band-edge

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2400.000000	49.77	---	74.00	24.23	1000.0	1000.000	126.0	V	167.0	14.3
2402.000000	77.52	---	---	---	1000.0	1000.000	165.0	V	179.0	14.4

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 7, see figures 45 - 50

Table 15: Peak and average results above 1 GHz

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4959.800000	47.26	---	74.00	26.74	1000.0	1000.000	107.0	V	107.0	8.1

Table 16: Top channel band-edge

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2480.000000	79.01	---	---	---	1000.0	1000.000	156.0	V	177.0	14.4
2483.500000	50.35	---	74.00	23.65	1000.0	1000.000	160.0	H	240.0	14.5

Mode 8, see figures 51 - 56

Table 17: Peak and average results above 1 GHz

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4804.000000	---	34.45	54.00	19.55	1000.0	1000.000	100.0	H	103.0	8.1

Table 18: Bottom channel band-edge

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2400.000000	50.07	---	74.00	23.93	1000.0	1000.000	245.0	V	201.0	14.3
2402.000000	82.65	---	---	---	1000.0	1000.000	165.0	V	179.0	14.4

Mode 9, see figures 57 - 62

Table 19: Quasi-peak results below 1 GHz

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.866000	21.81	40.00	18.19	1000.0	120.000	100.0	V	29.0	17.6
94.739000	21.61	43.50	21.89	1000.0	120.000	109.0	V	350.0	12.9
100.086000	24.00	43.50	19.50	1000.0	120.000	100.0	V	328.0	13.6
959.999000	35.88	46.00	10.12	1000.0	120.000	168.0	V	121.0	31.9

Table 20: Peak and average results above 1 GHz

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4960.500000	46.77	---	74.00	27.23	1000.0	1000.000	100.0	H	94.0	8.1

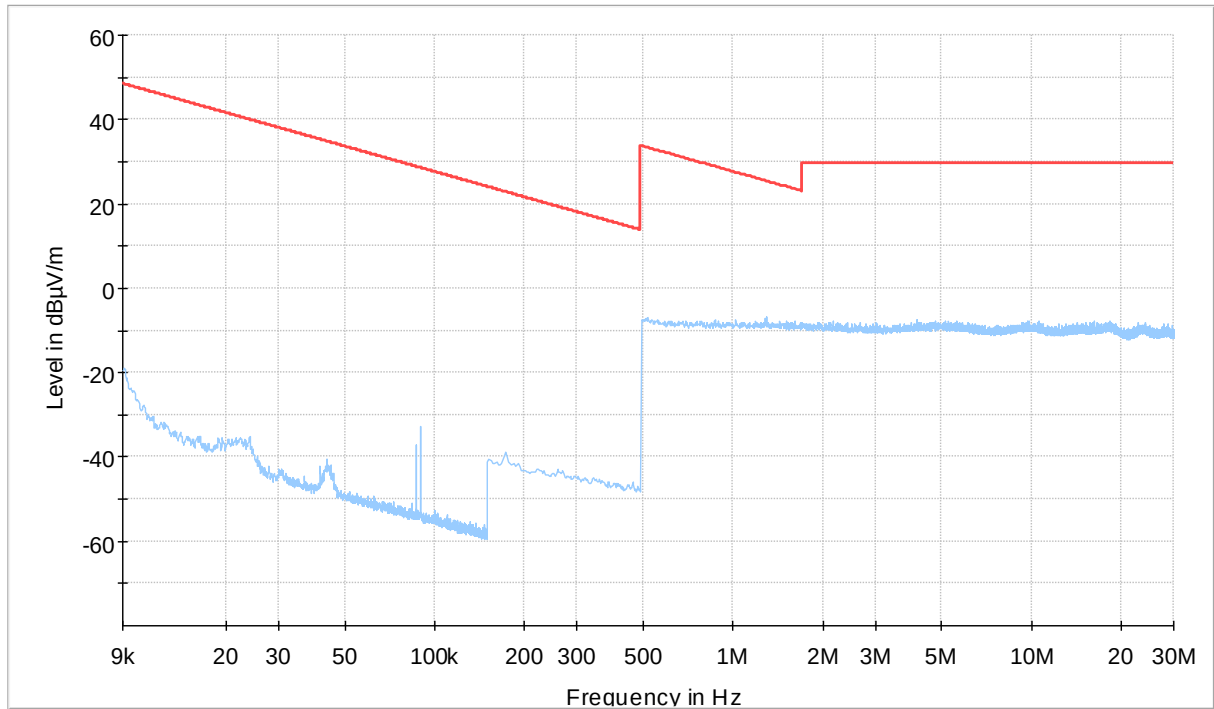
Table 21: Top channel band-edge

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2480.050000	75.96	---	---	---	1000.0	1000.000	156.0	V	178.0	14.4
2483.500000	50.03	---	74.00	23.97	1000.0	1000.000	223.0	H	213.0	14.5

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 1

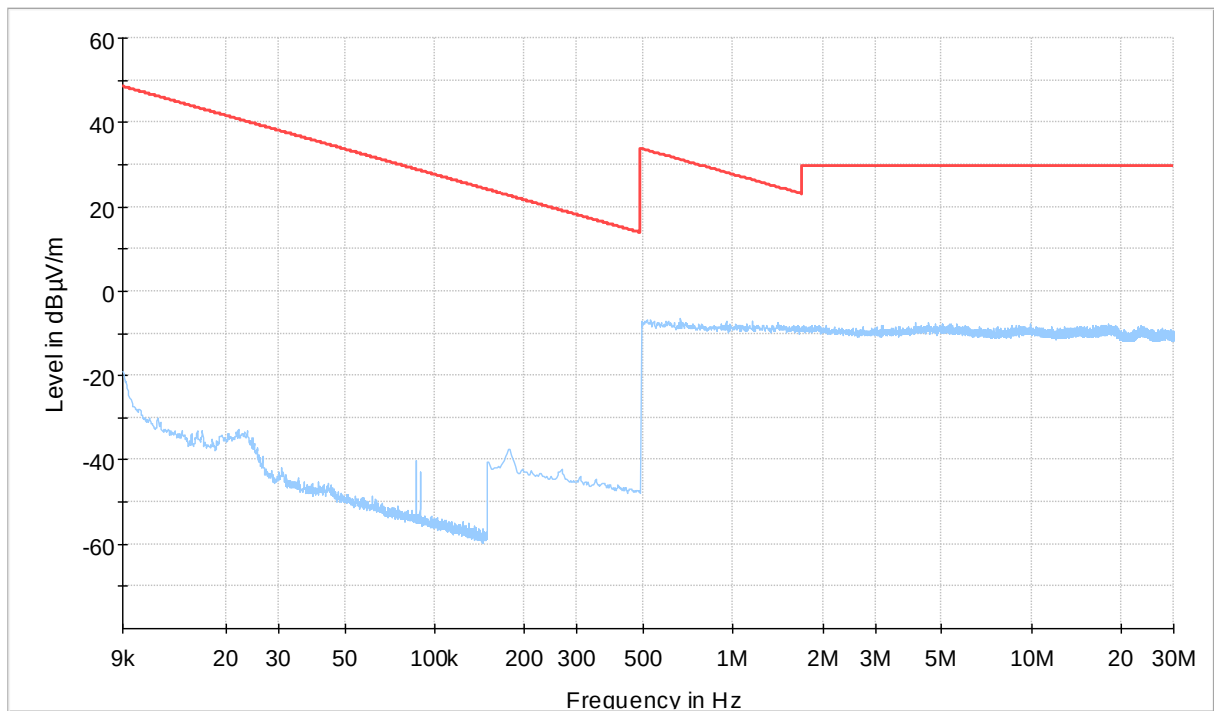
Full Spectrum



Preview Result 1-PK+ FCC 15.209 9kHz - 30 MHz Final_Result QPK

Figure 9: Result 9 kHz – 30 MHz coax, mode 1

Full Spectrum



Preview Result 1-PK+ FCC 15.209 9kHz - 30 MHz Final_Result QPK

Figure 10: Result 9 kHz – 30 MHz coplanar, mode 1

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Full Spectrum

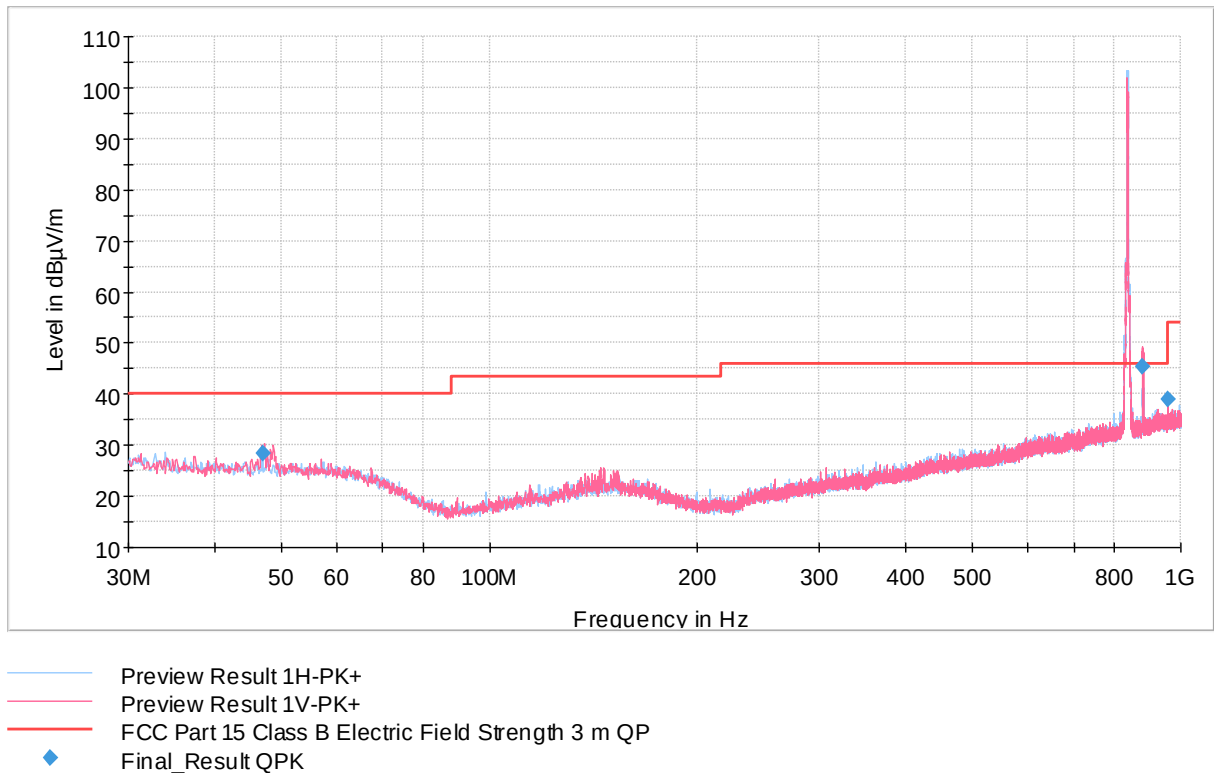


Figure 11: Result 30 – 1000 MHz, mode 1

Full Spectrum

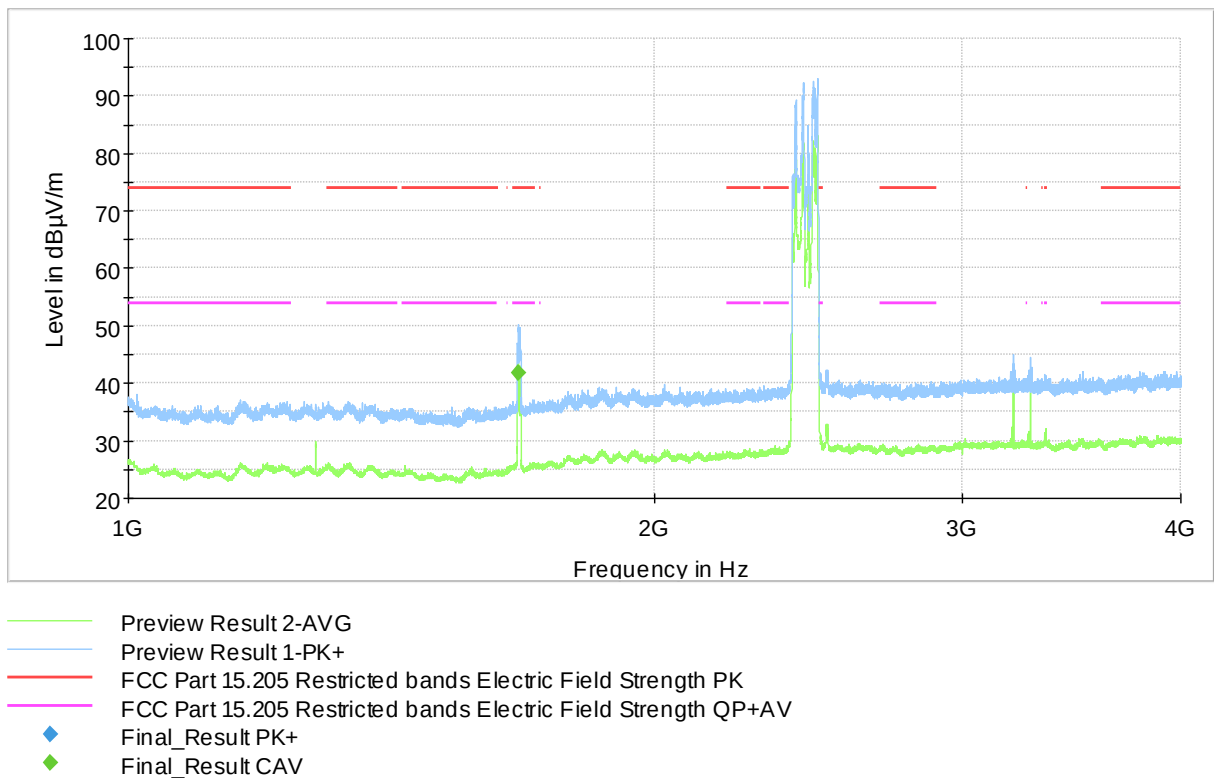


Figure 12: Result 1 – 4 GHz, mode 1

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

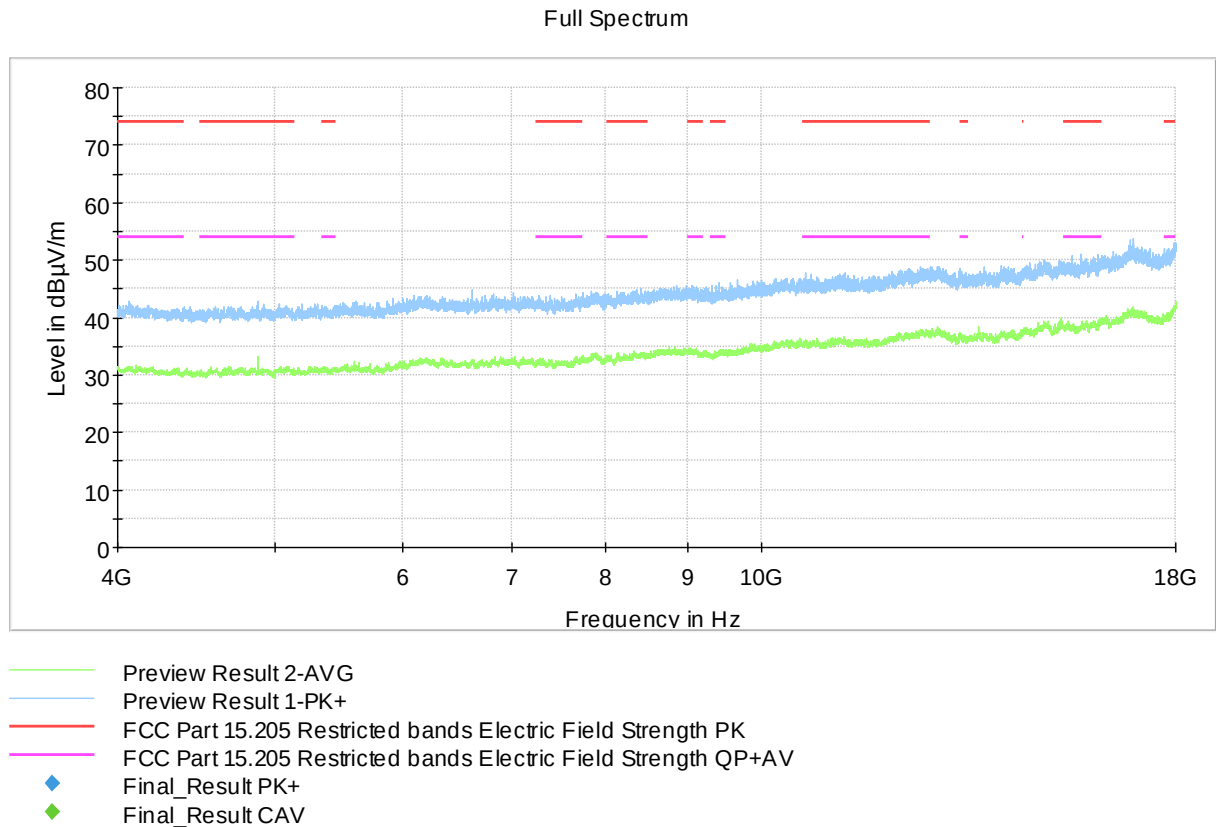


Figure 13: Result 4 – 18 GHz, mode 1

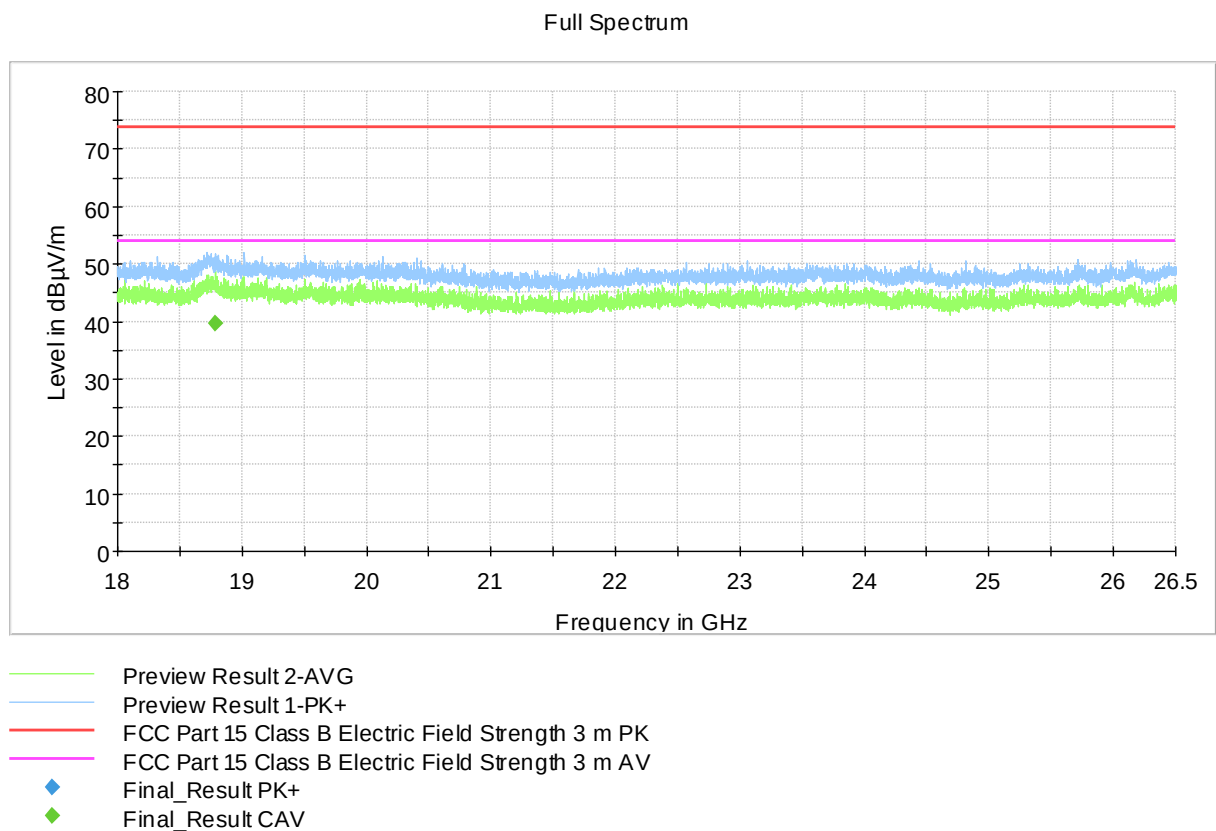
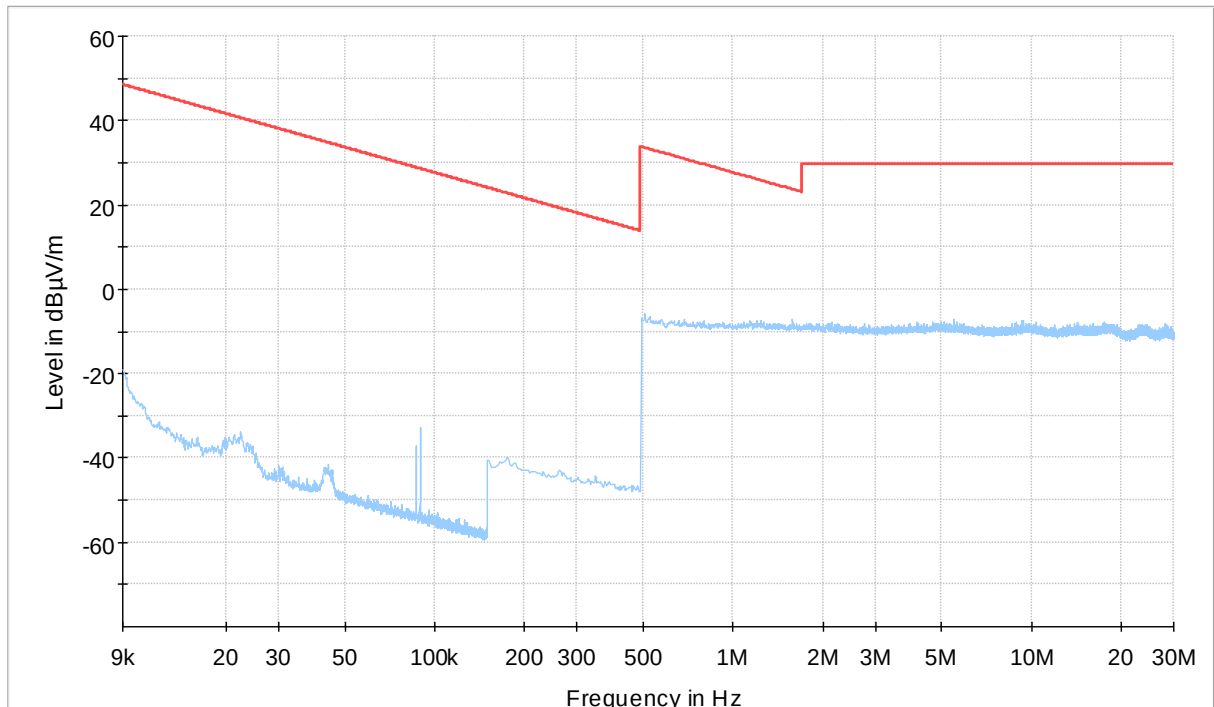


Figure 14: Result 18 – 26.5 GHz, mode 1

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 2

Full Spectrum



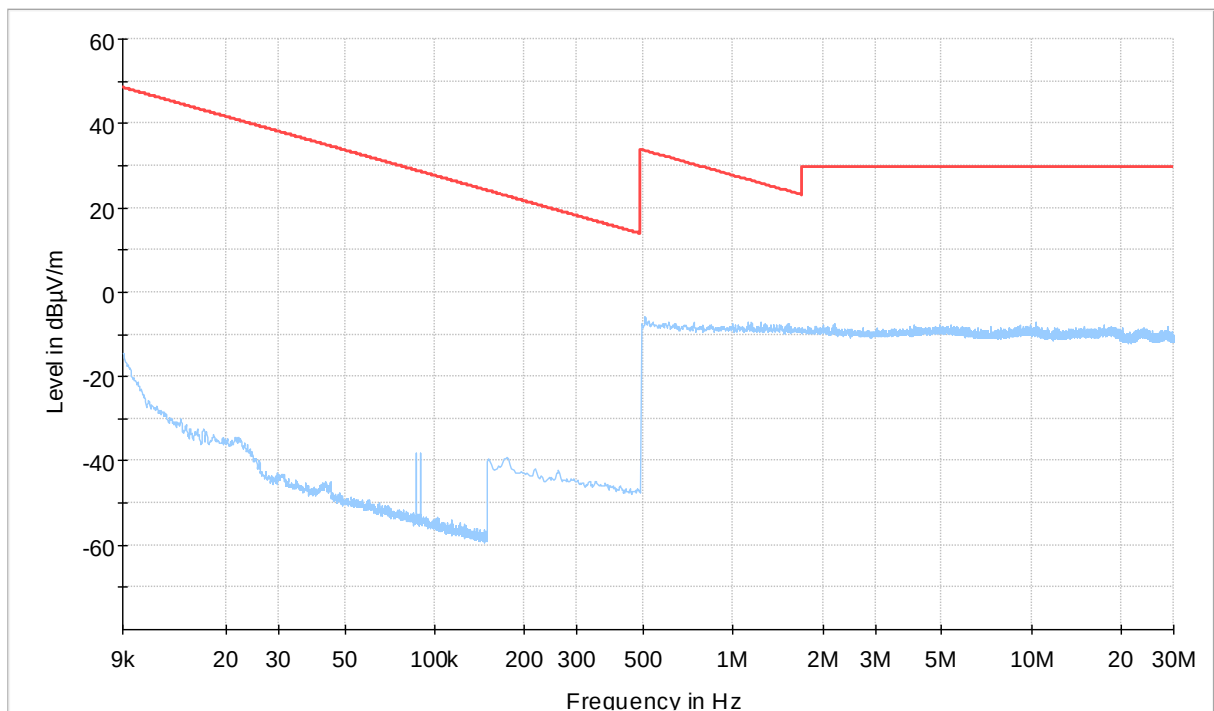
Preview Result 1-PK+

FCC 15.209 9kHz - 30 MHz

Final_Result QPK

Figure 15: Result 9 kHz – 30 MHz coax, mode 2

Full Spectrum



Preview Result 1-PK+

FCC 15.209 9kHz - 30 MHz

Final_Result QPK

Figure 16: Result 9 kHz – 30 MHz coplanar. mode 2

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Full Spectrum

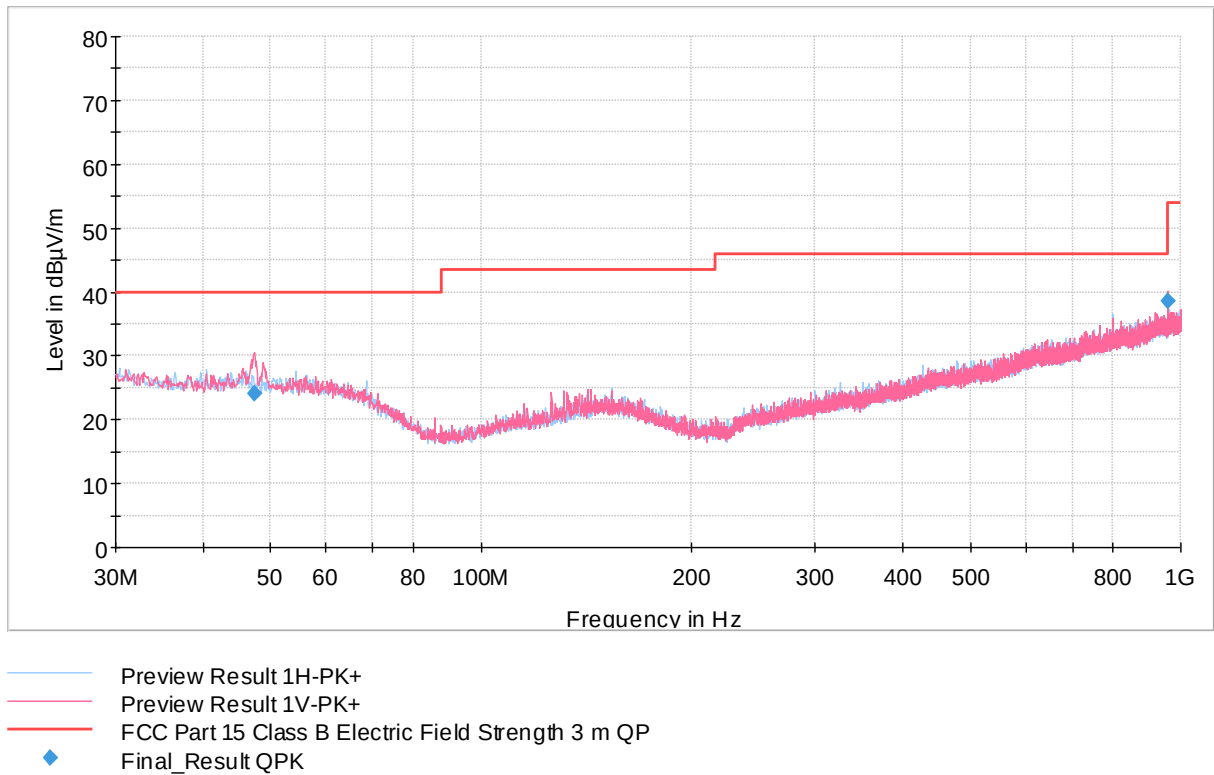


Figure 17: Result 30 – 1000 MHz, mode 2

Full Spectrum

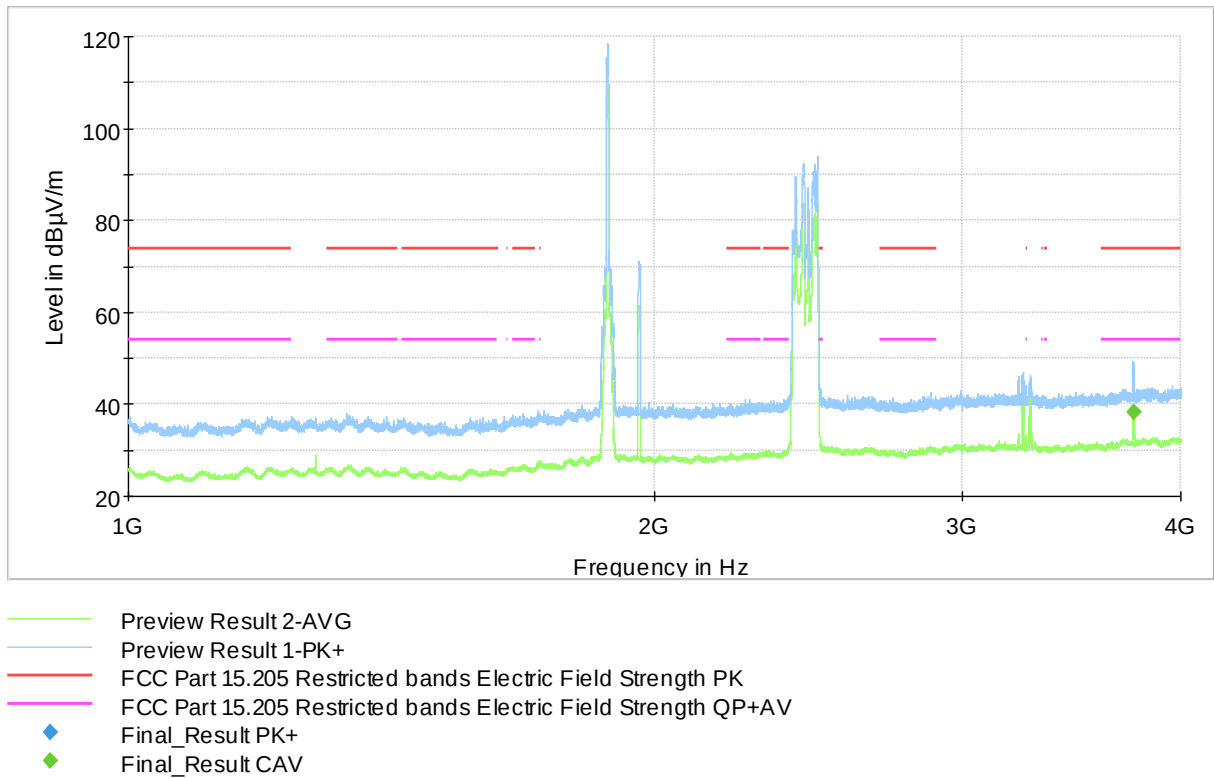


Figure 18: Result 1 – 4 GHz mode 2

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

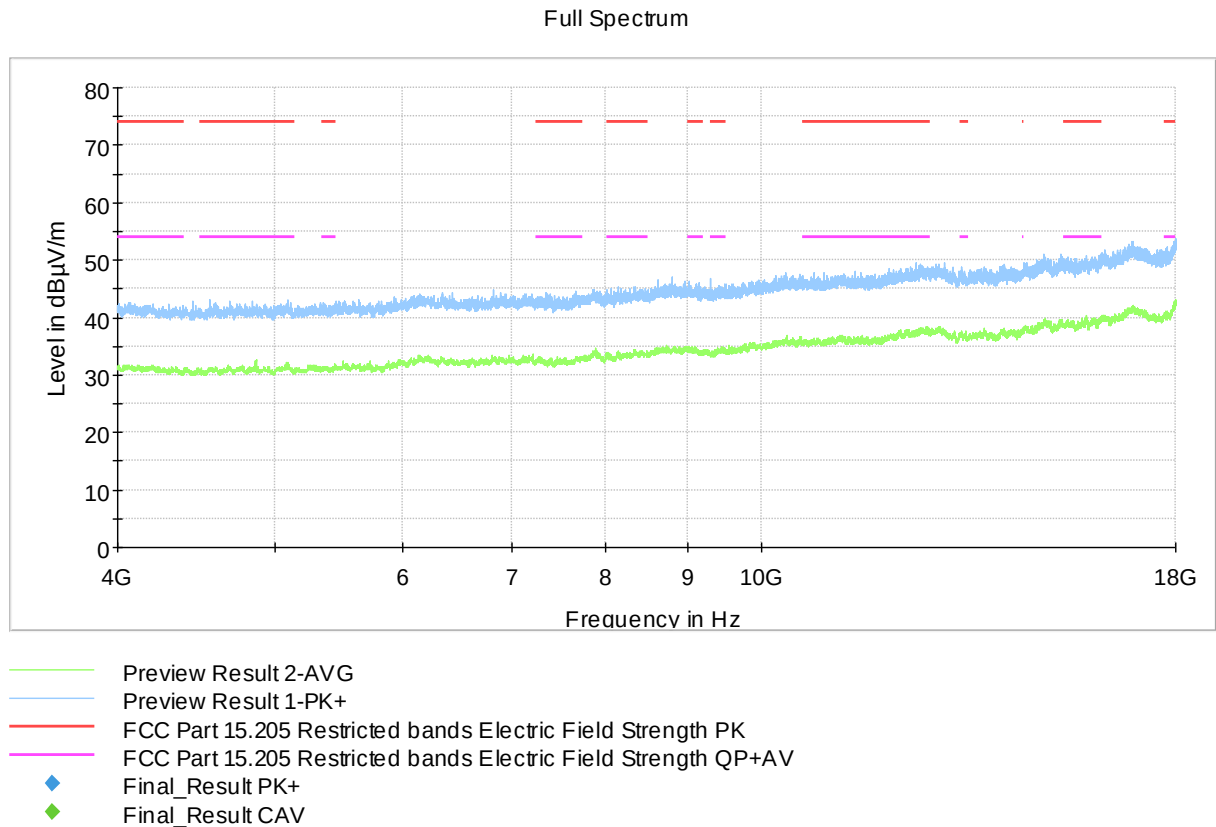


Figure 19: Result 4 – 18 GHz, mode 2

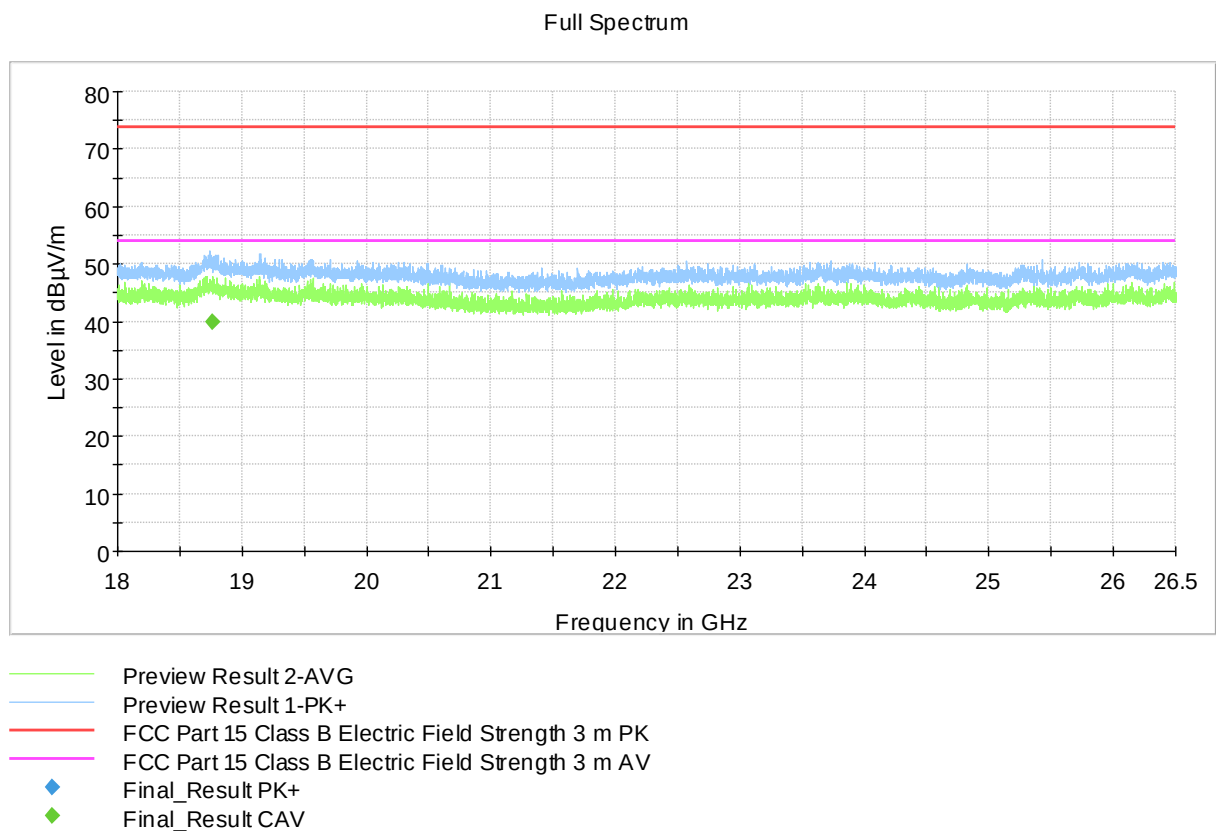
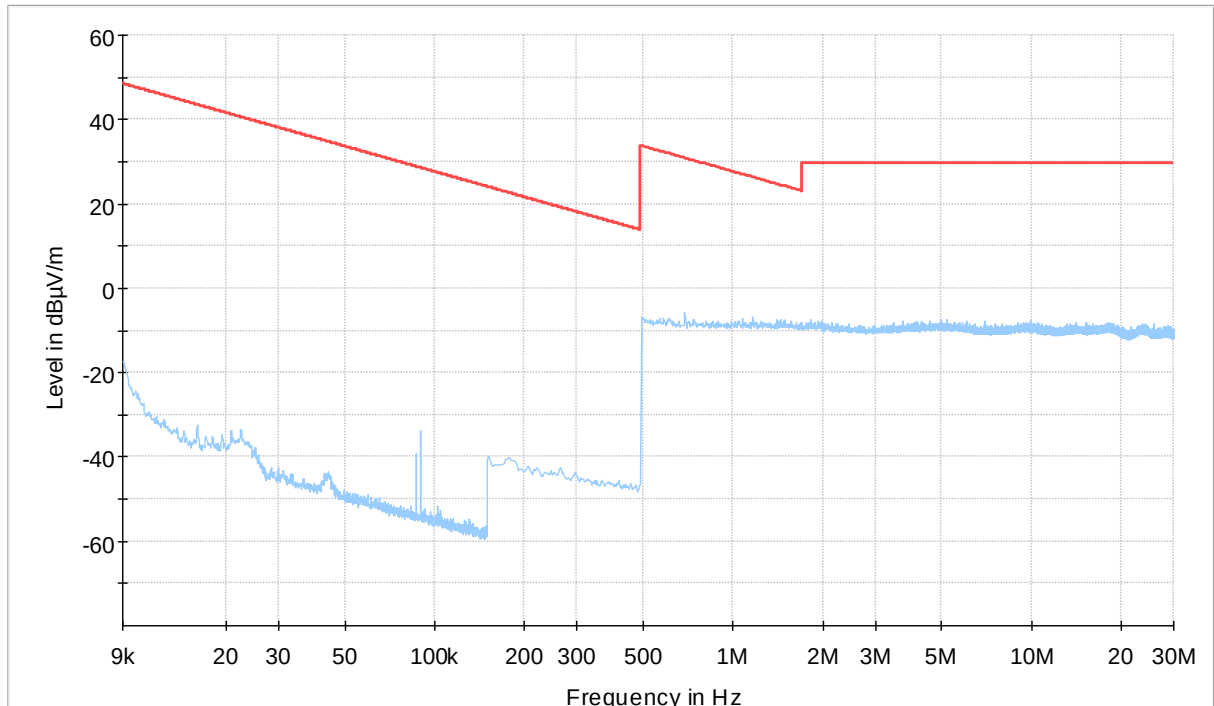


Figure 20: Result 18 – 26.5 GHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 3

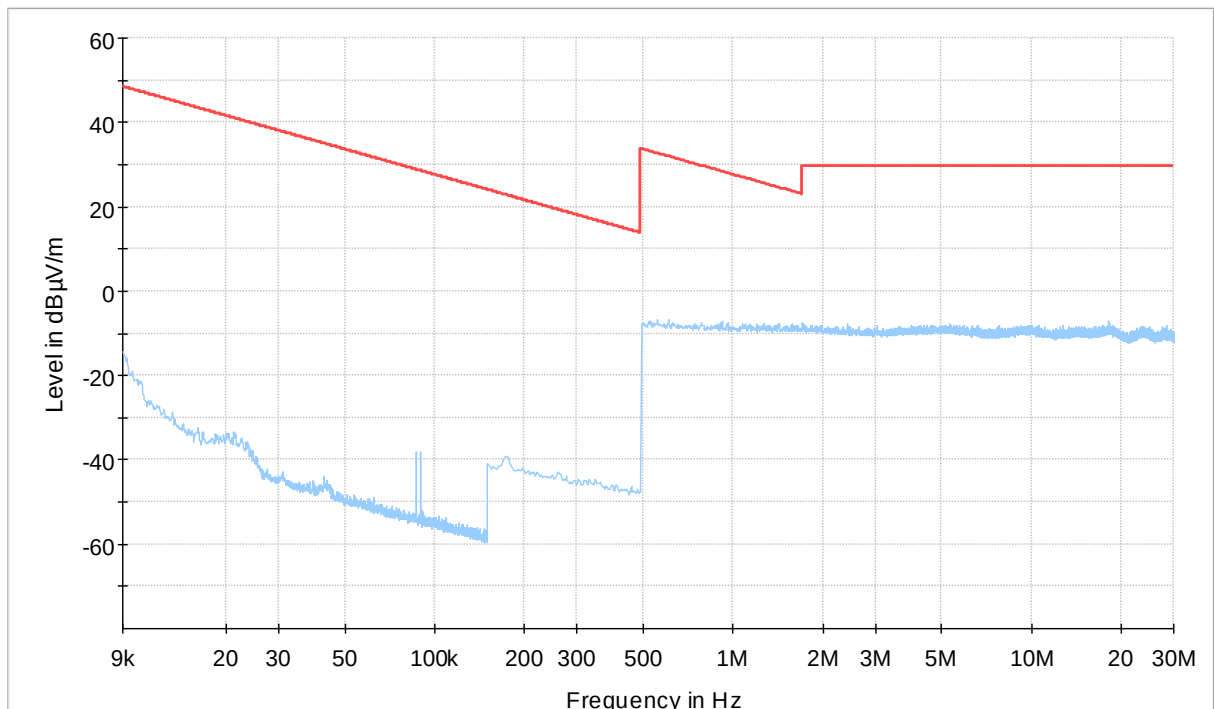
Full Spectrum



Preview Result 1-PK+ FCC 15.209 9kHz - 30 MHz Final_Result QPK

Figure 21: Result 9 kHz – 30 MHz coax, mode 3

Full Spectrum



Preview Result 1-PK+ FCC 15.209 9kHz - 30 MHz Final_Result QPK

Figure 22: Result 9 kHz – 30 MHz coplanar, mode 3

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Full Spectrum

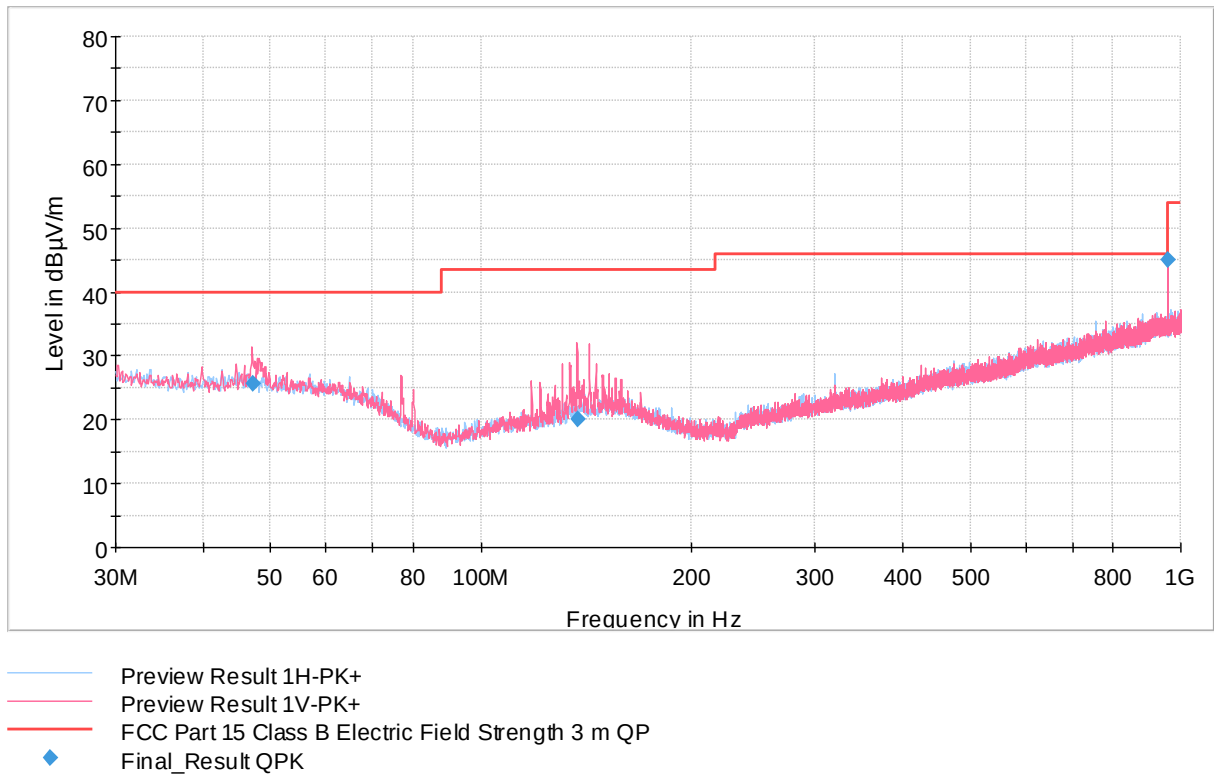


Figure 23: Result 30 – 1000 MHz, mode 3

Full Spectrum

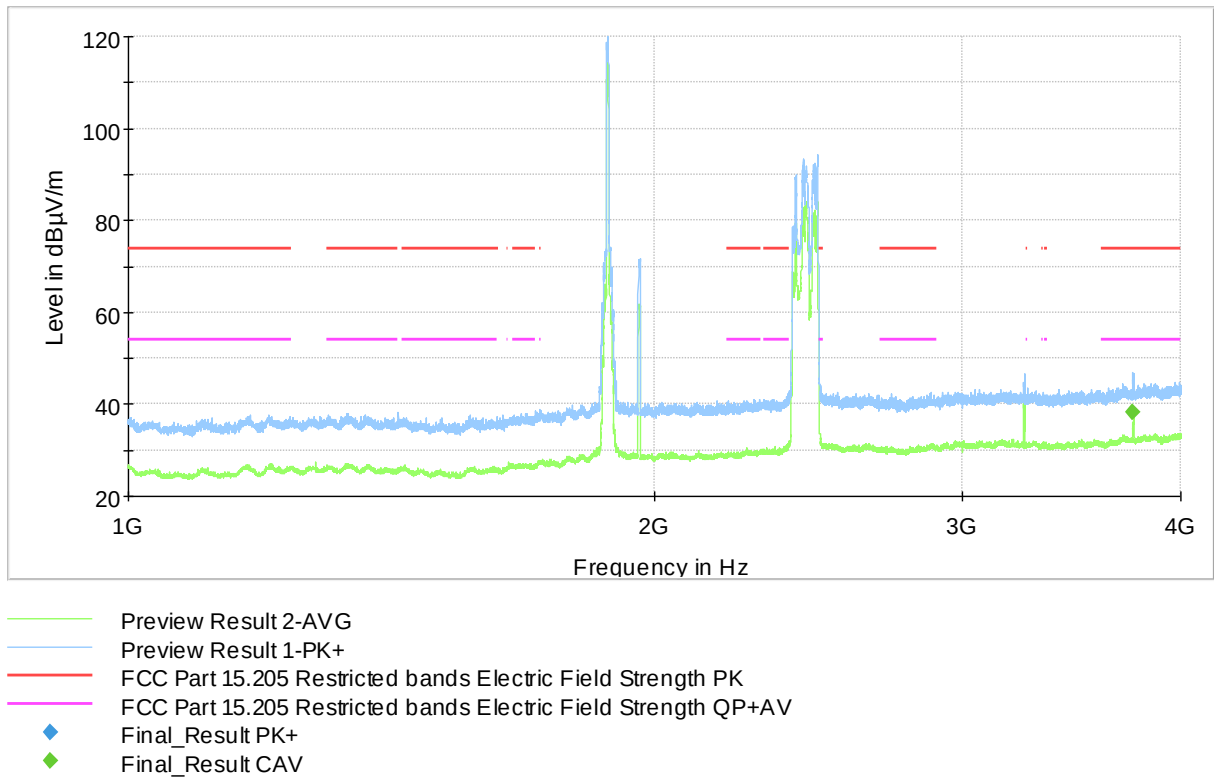


Figure 24: Result 1 – 4 GHz, mode 1

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

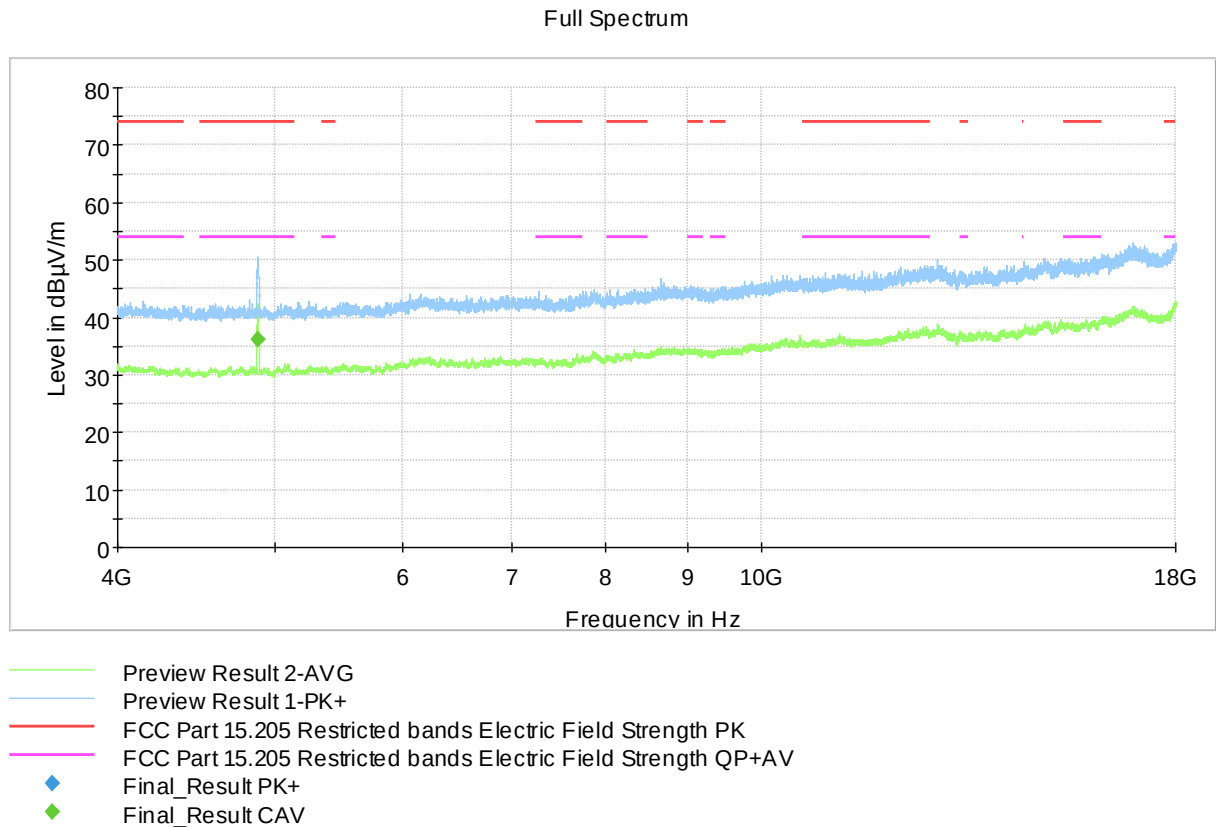


Figure 25: Result 4 – 18 GHz, mode 3

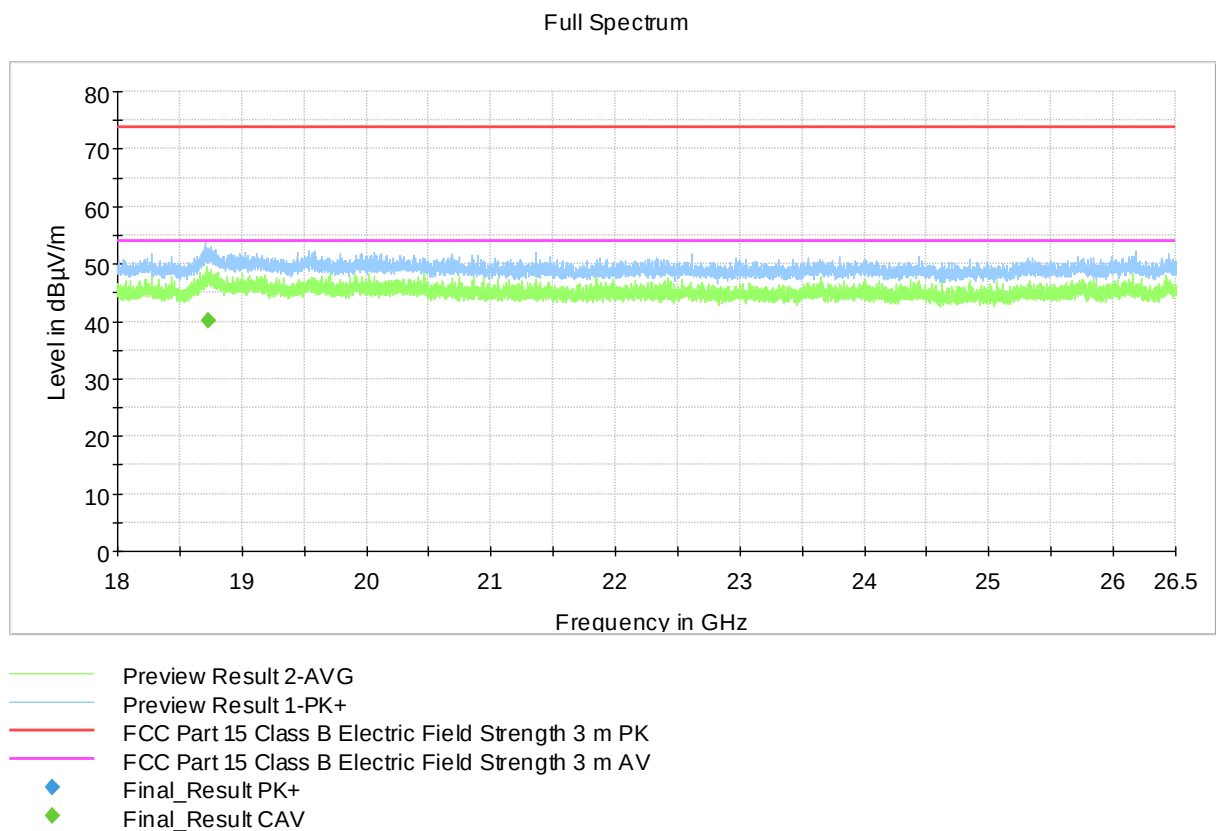


Figure 26: Result 18 – 26.5 GHz, mode 3

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 4

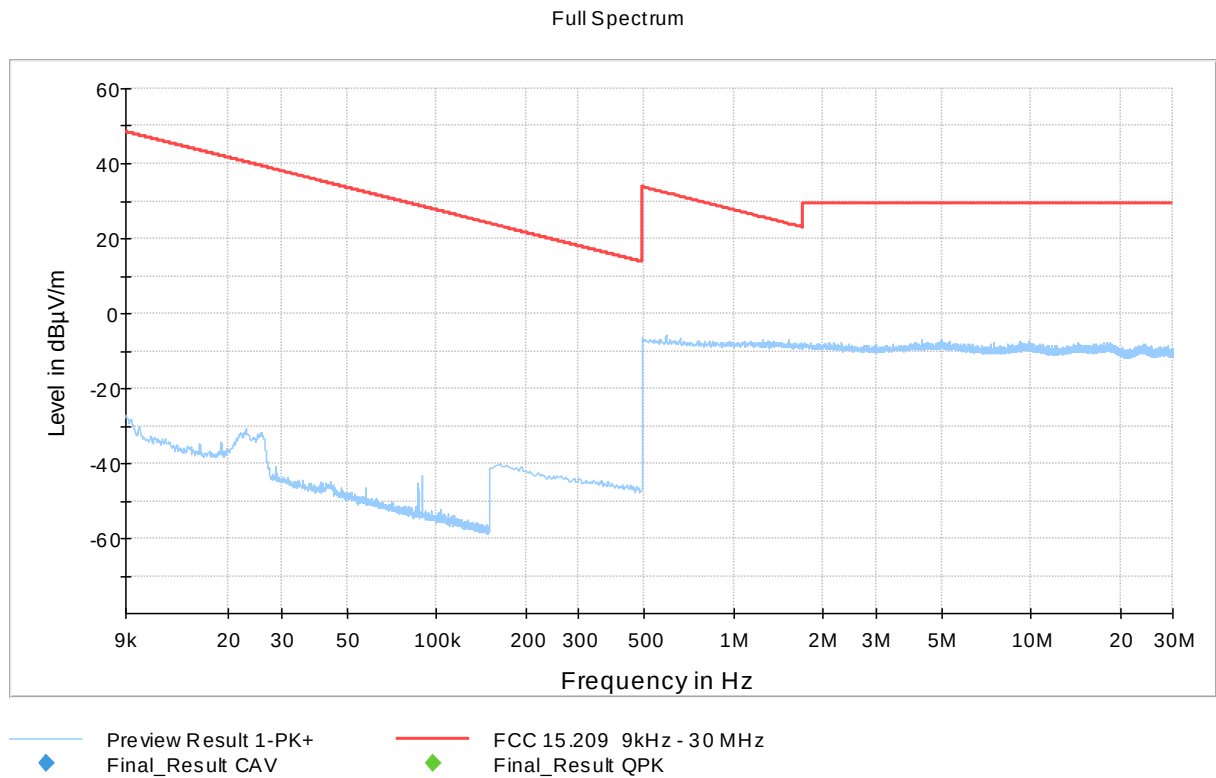


Figure 27: Result 9 kHz – 30 MHz

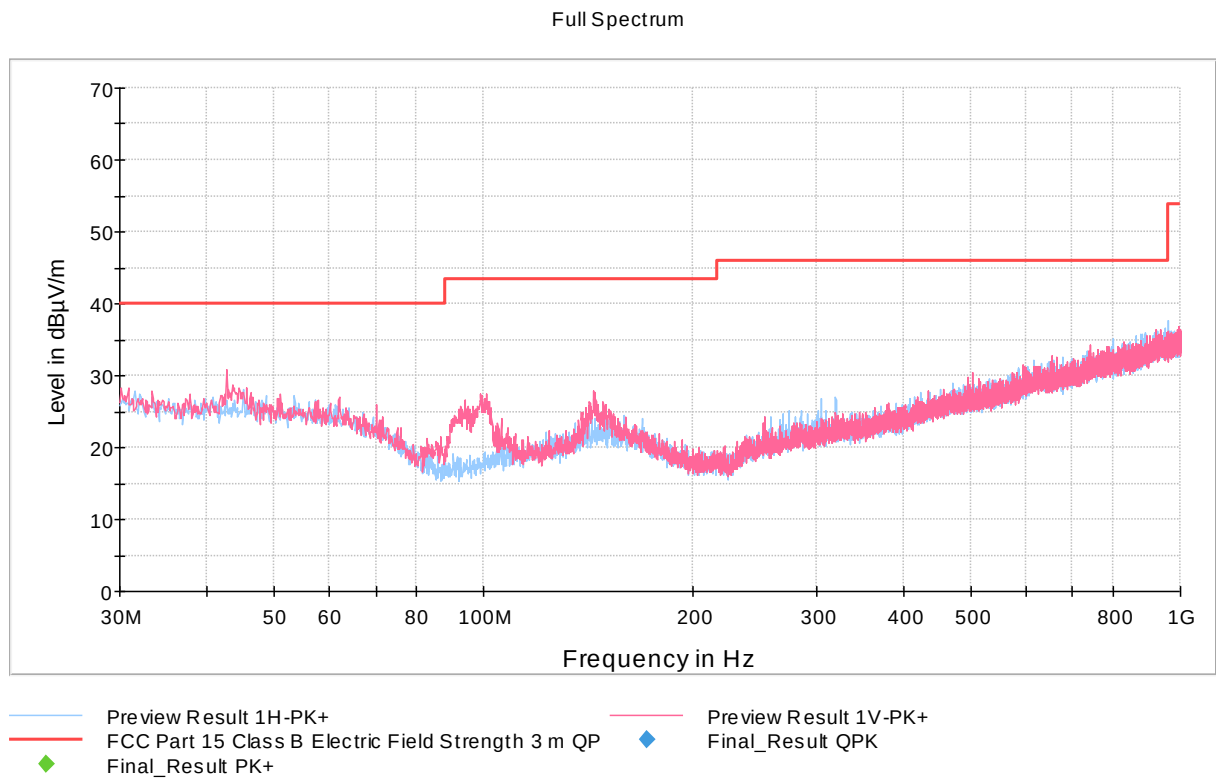


Figure 28: Result 30 – 1000 MHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

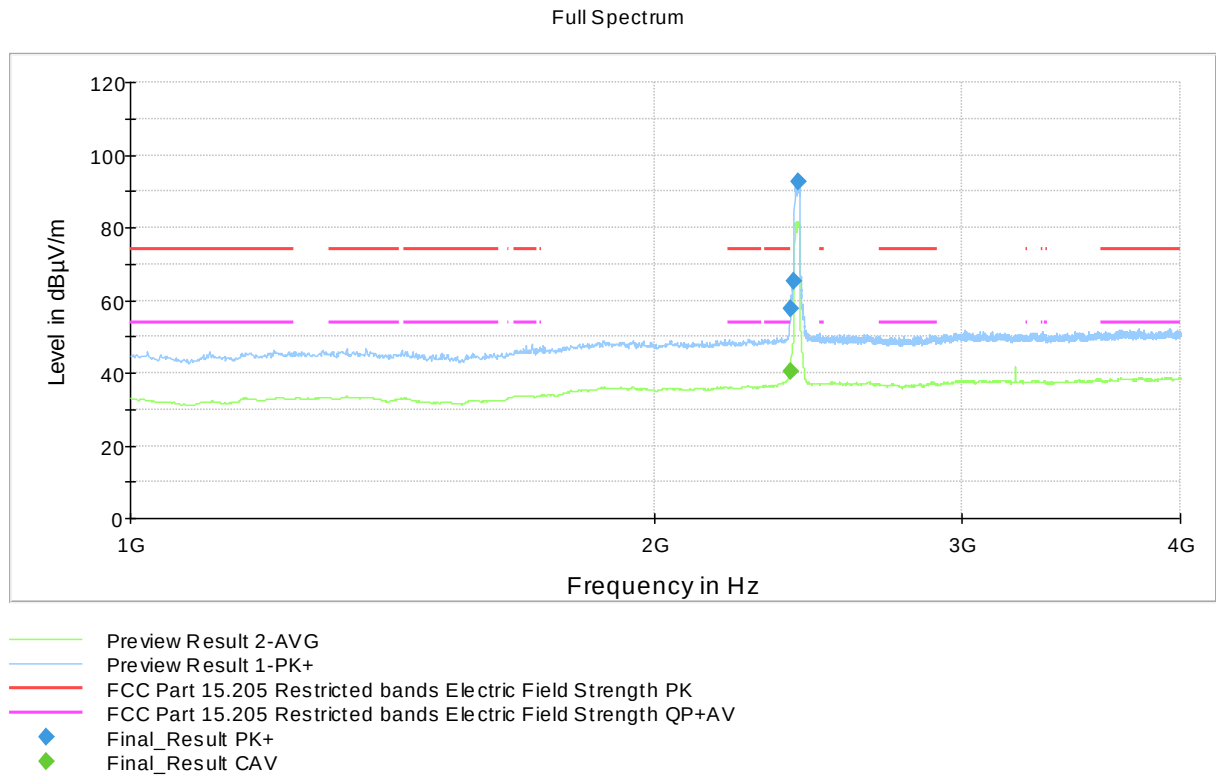


Figure 29: Result 1 – 4 GHz

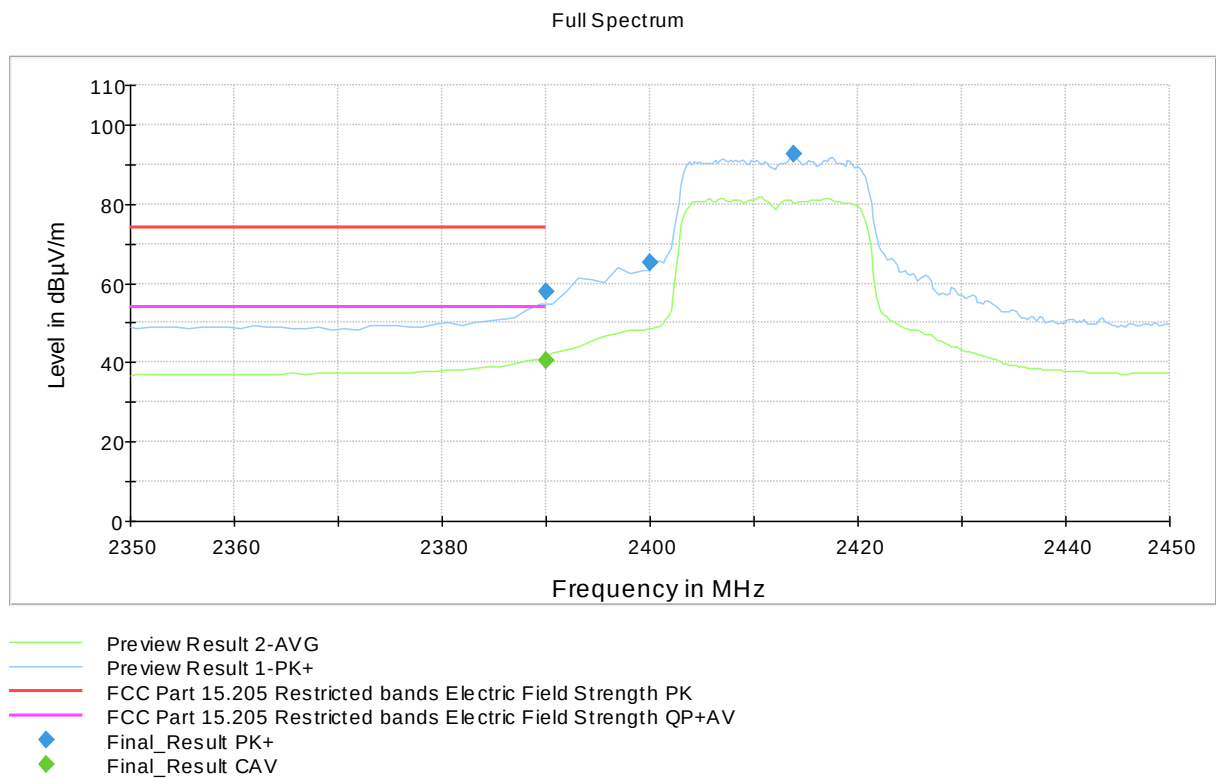


Figure 30: Result Bottom channel band-edge

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

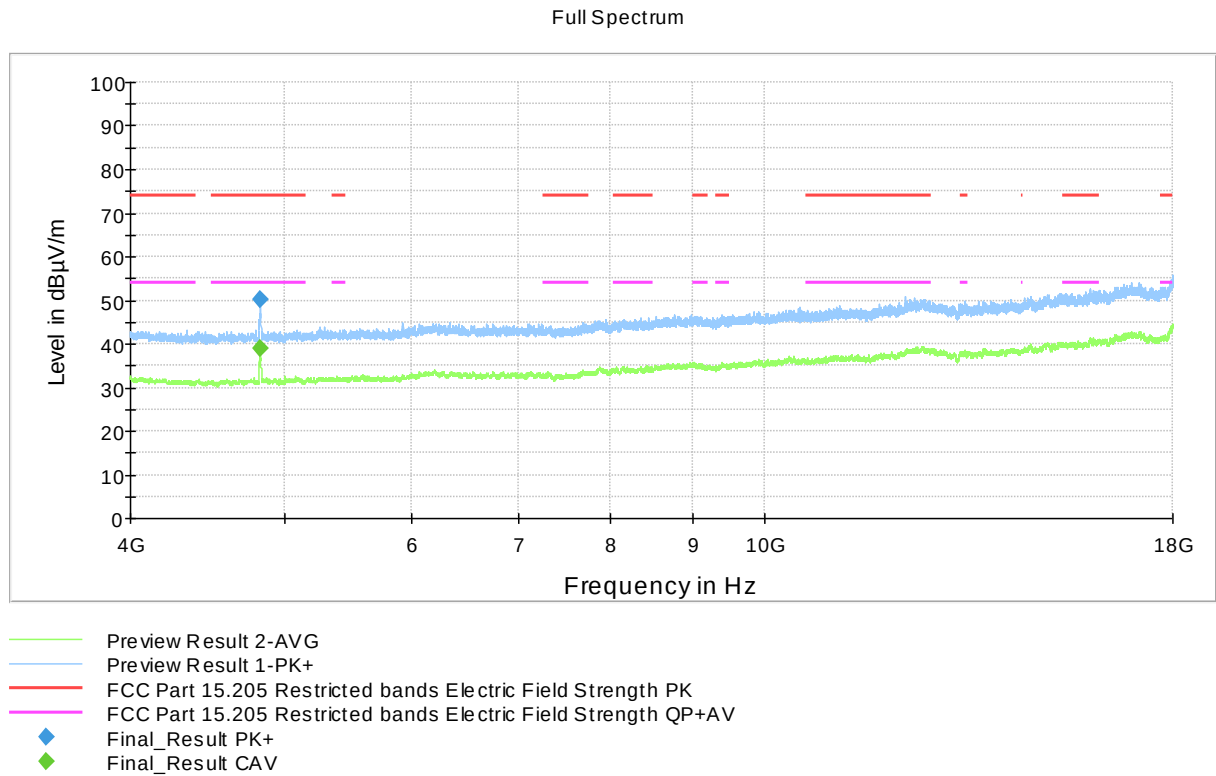


Figure 31: Result 4 – 18 GHz

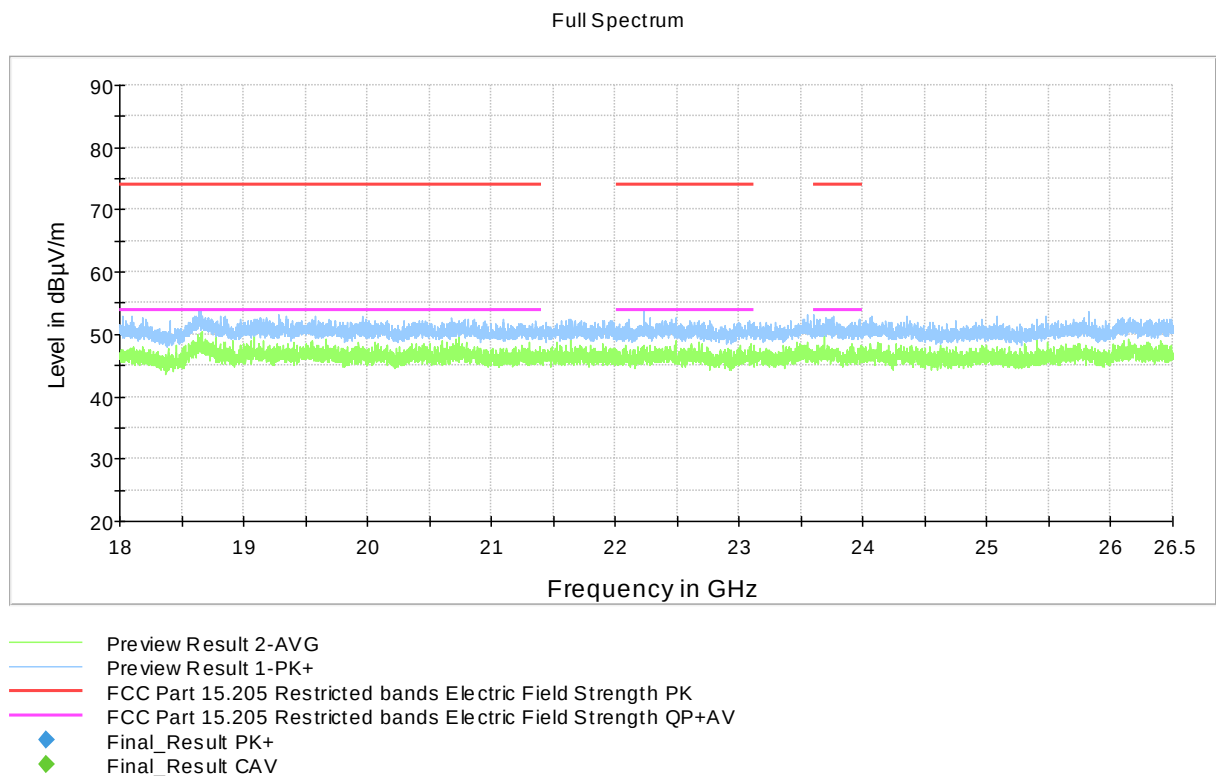


Figure 32: Result 18 – 26.5 GHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 5

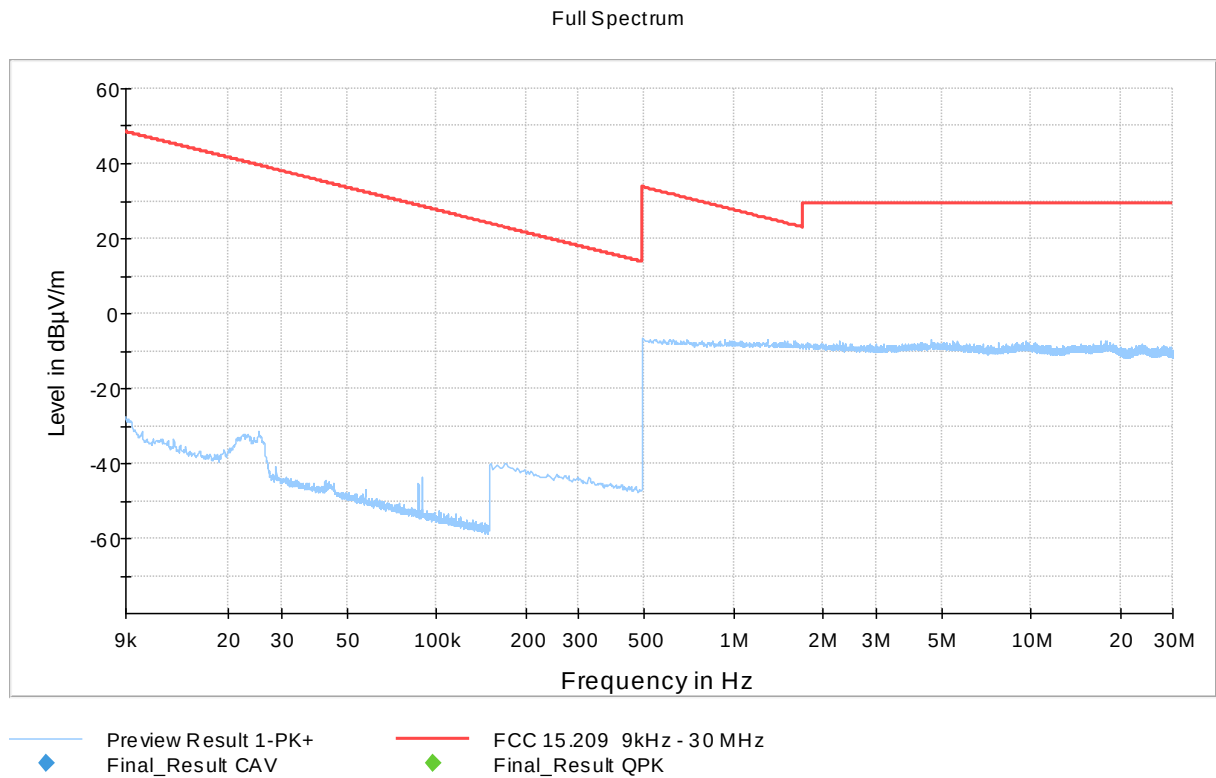


Figure 33: Result 9 kHz – 30 MHz

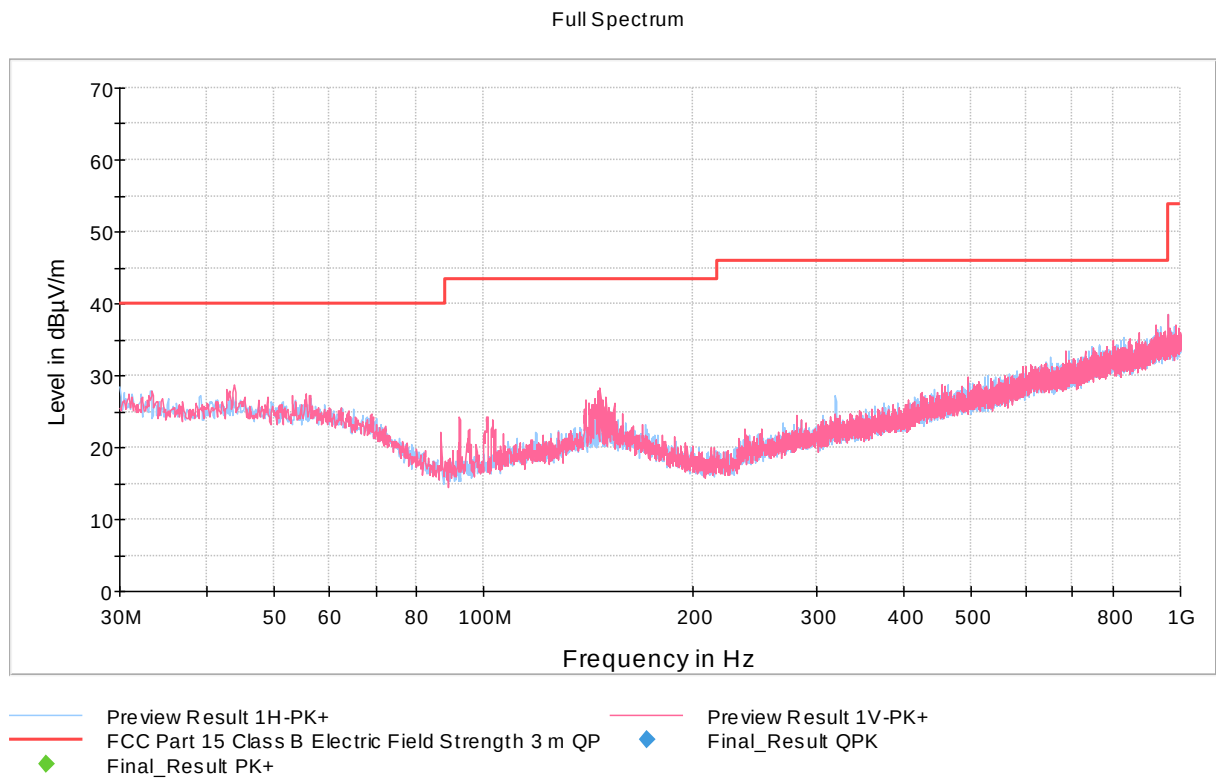


Figure 34: Result 30 – 1000 MHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

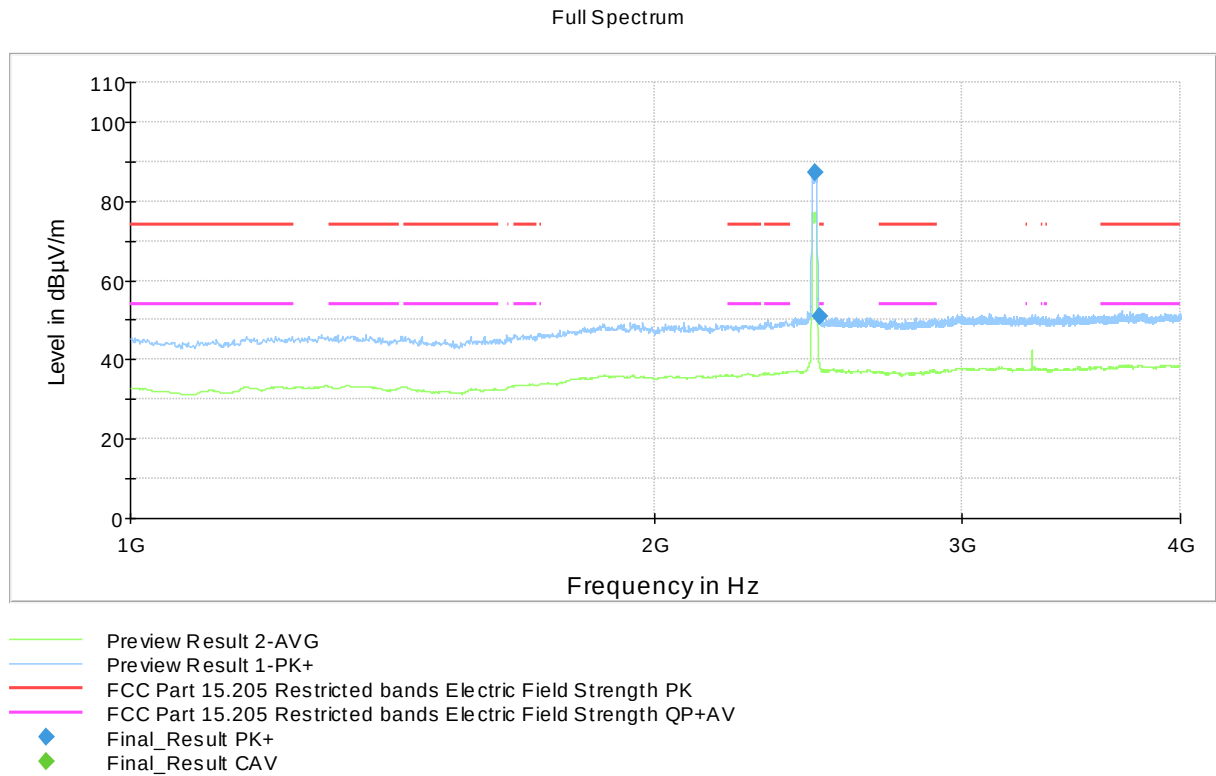


Figure 35: Result 1 – 4 GHz

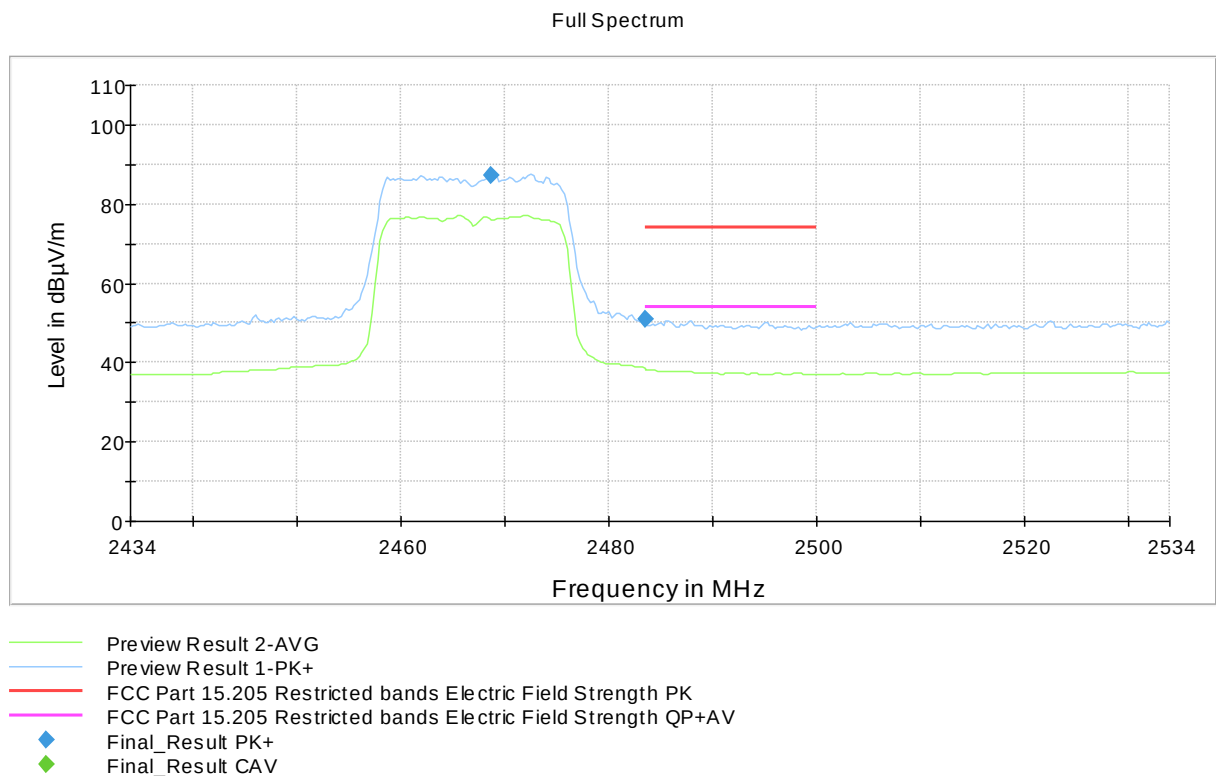


Figure 36: Result Top channel band-edge

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

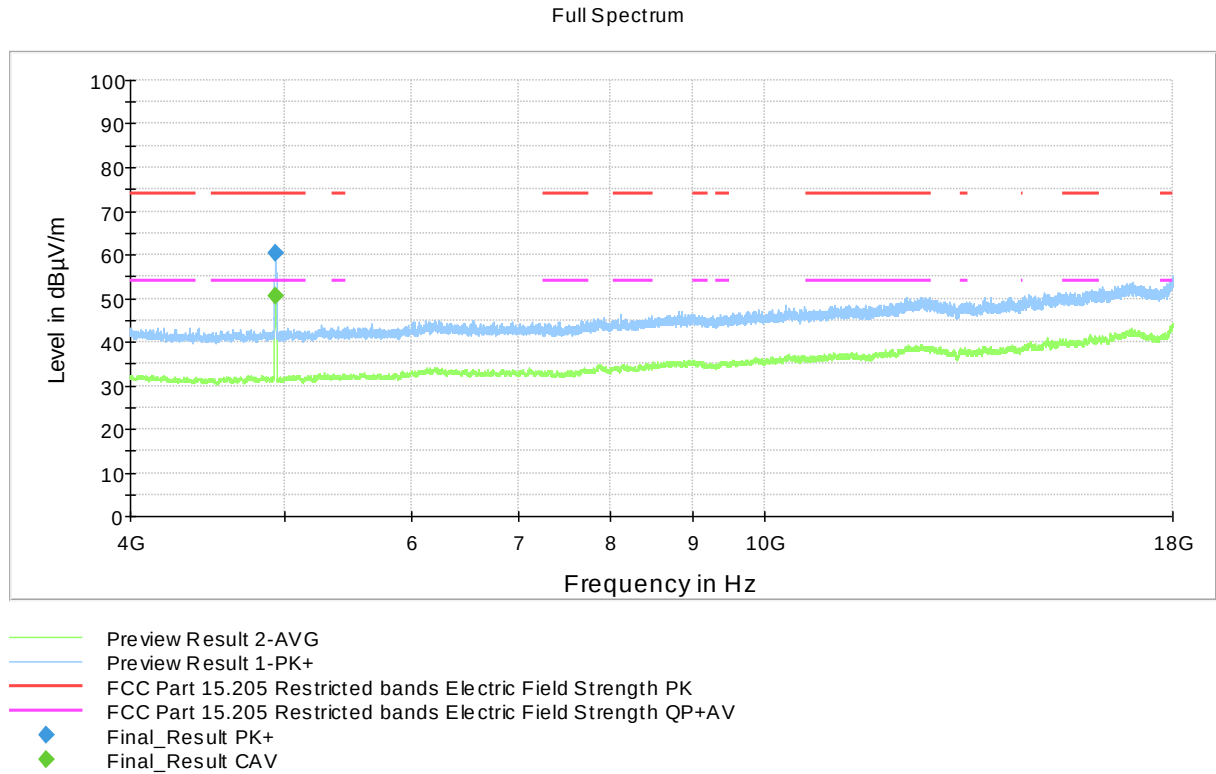


Figure 37: Result 4 – 18 GHz

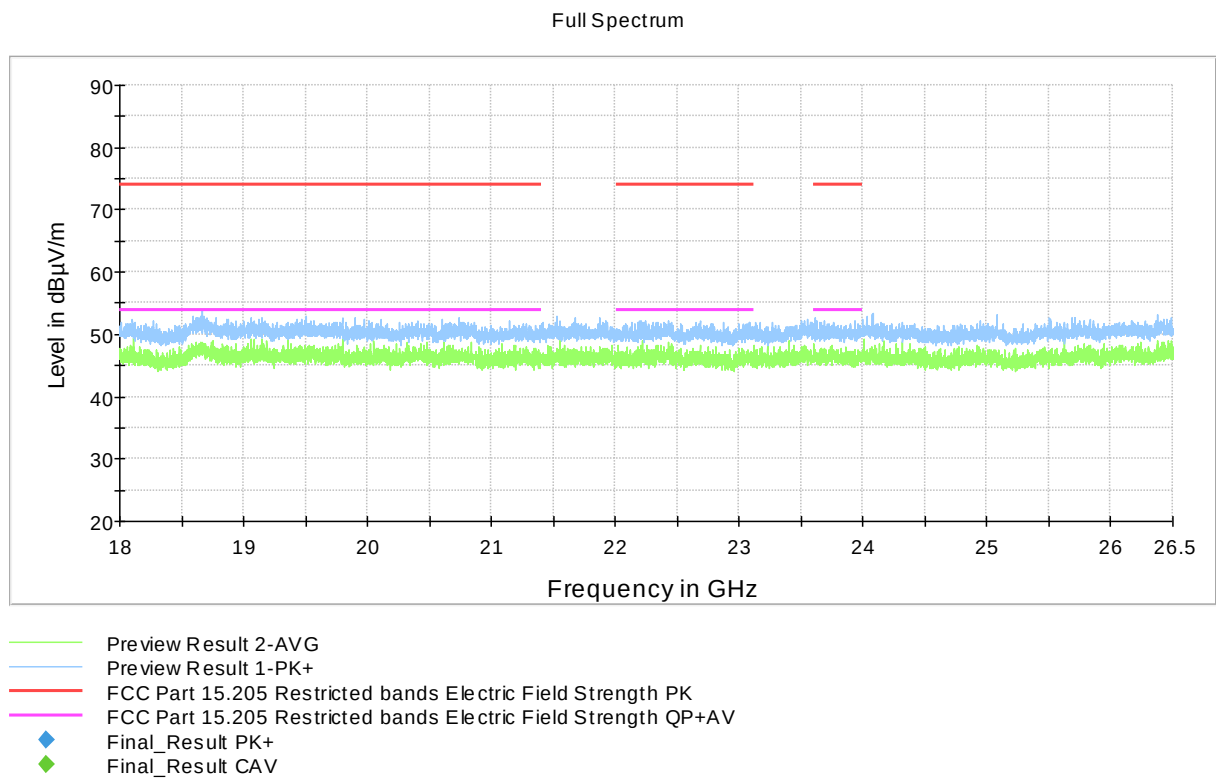


Figure 38: Result 18 – 26.5 GHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 6

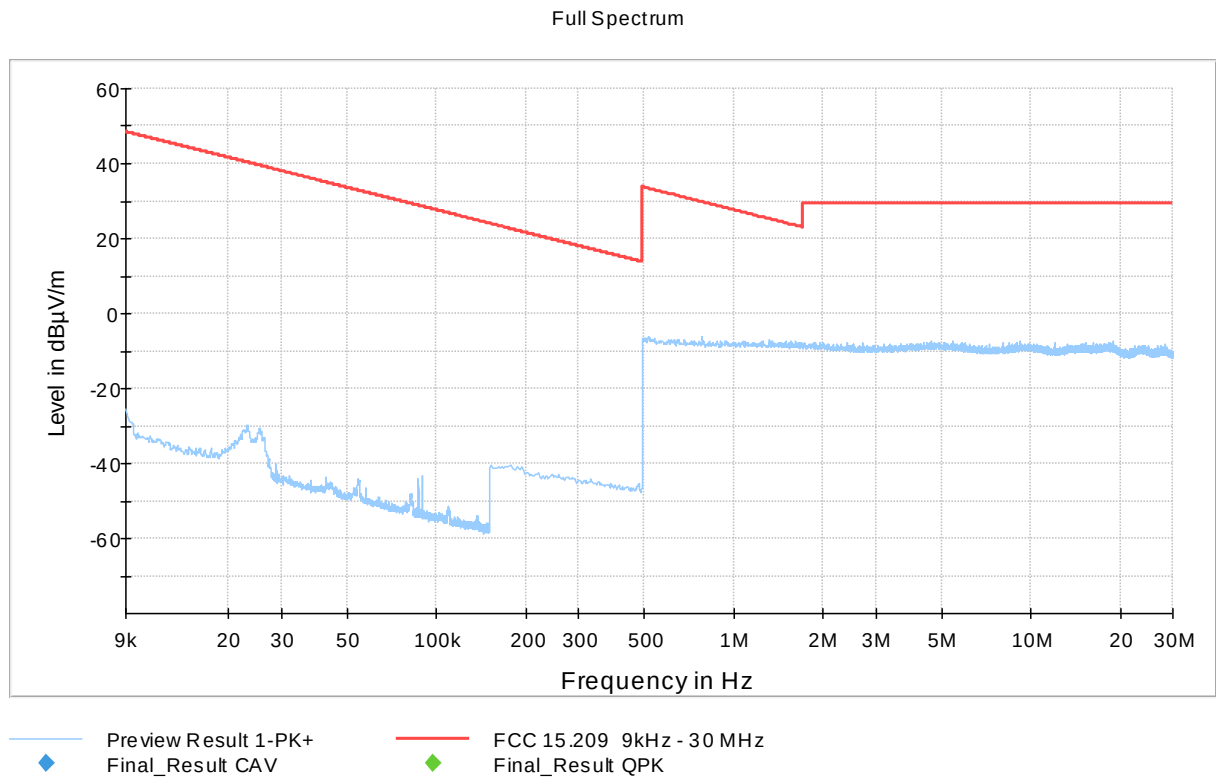


Figure 39: Result 9 kHz – 30 MHz

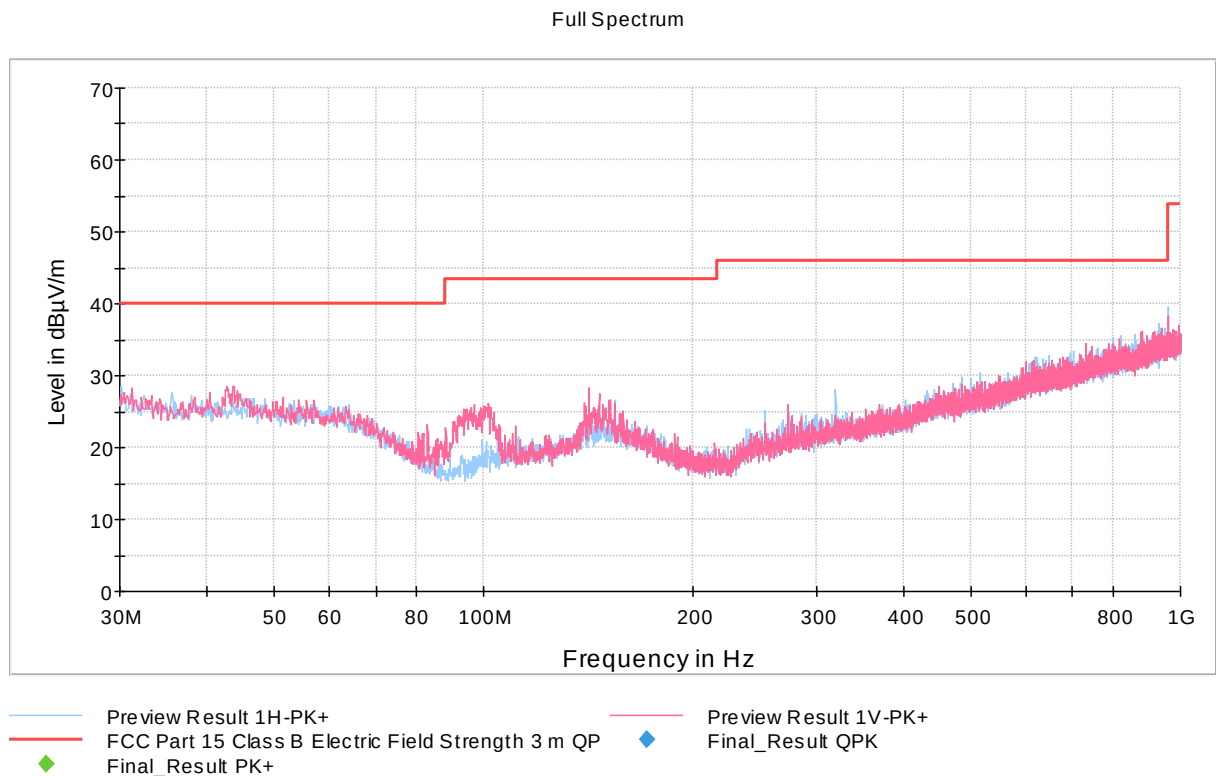


Figure 40: Result 30 – 1000 MHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

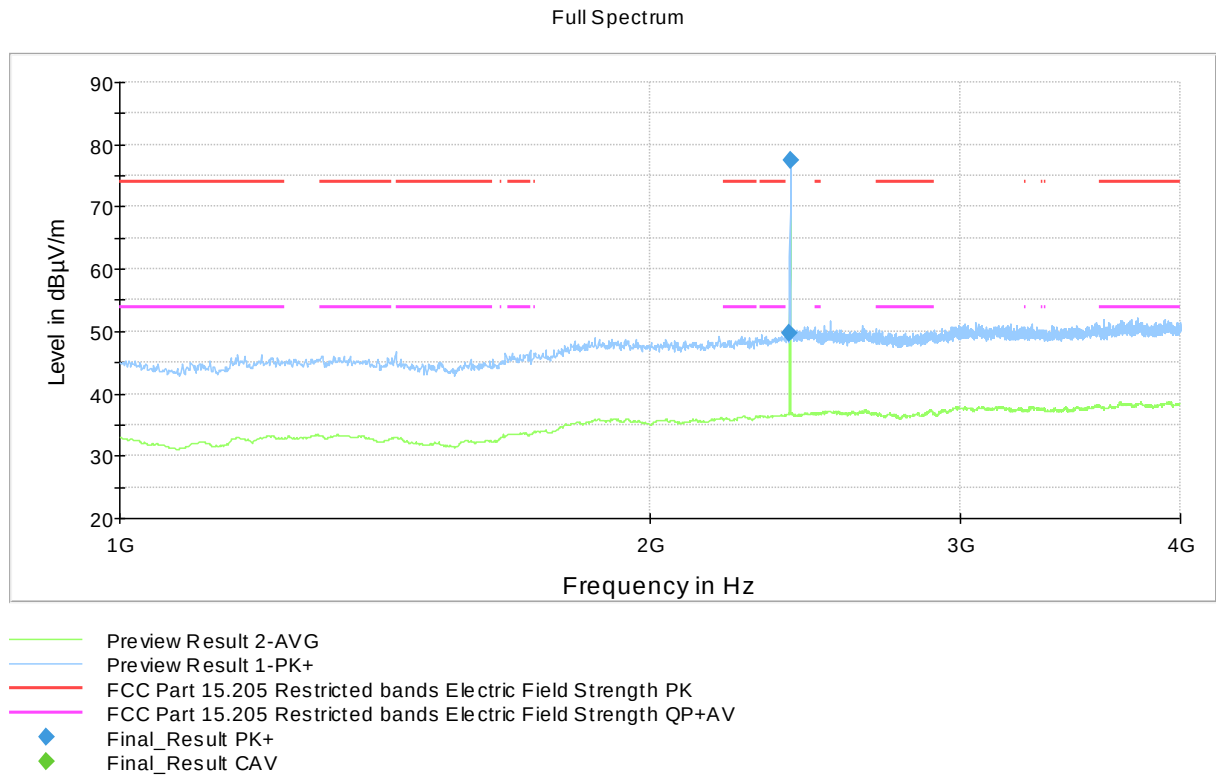


Figure 41: Result 1 – 4 GHz

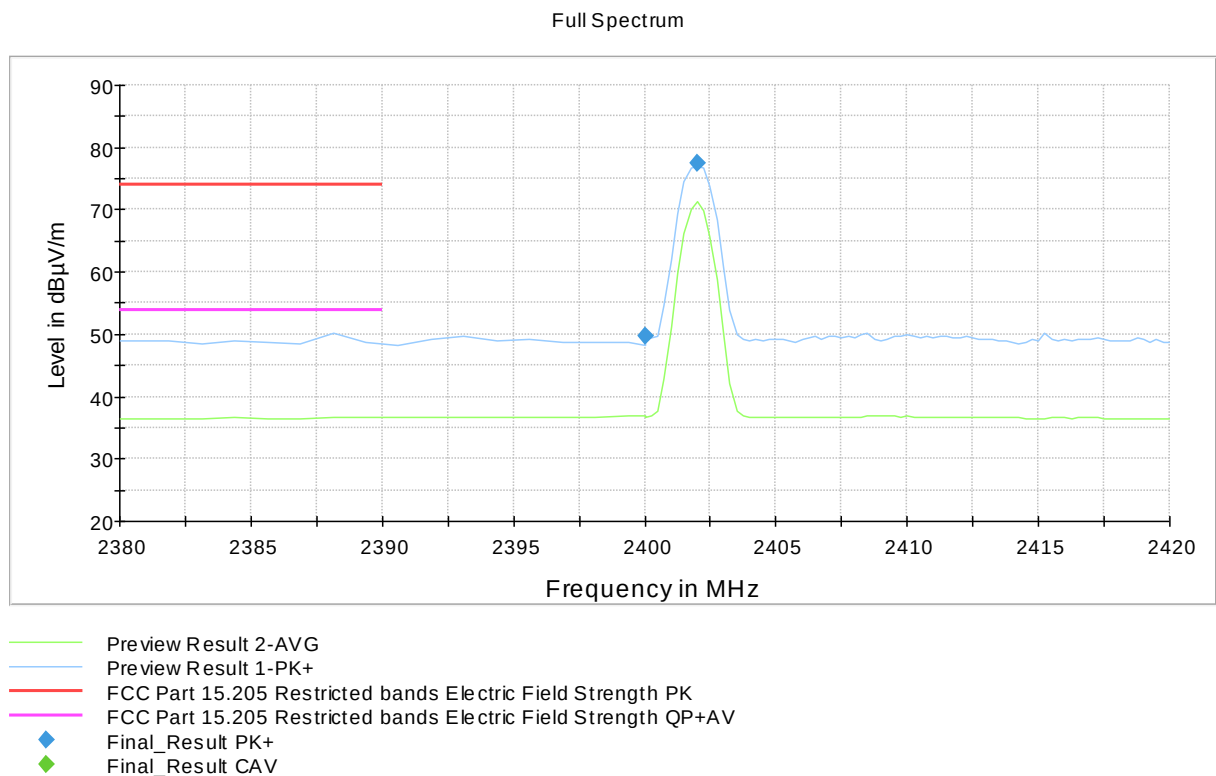


Figure 42: Result Bottom channel band-edge

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

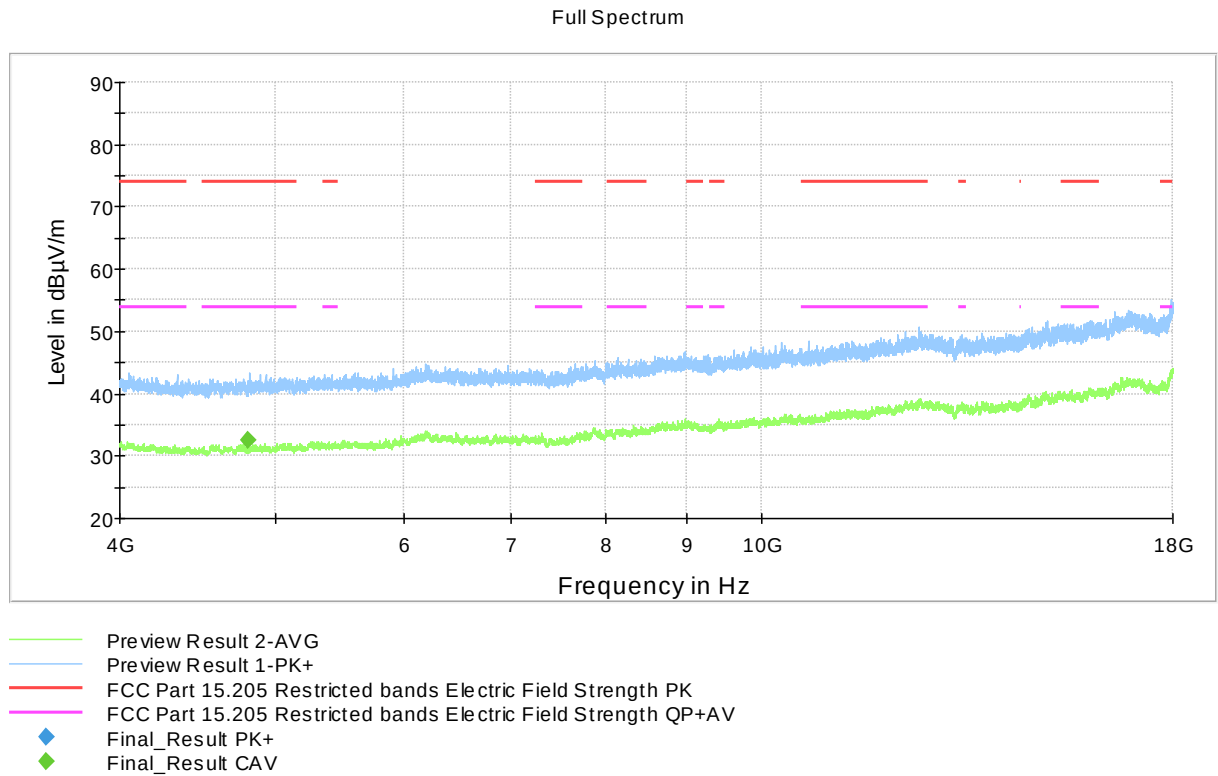


Figure 43: Result 4 – 18 GHz

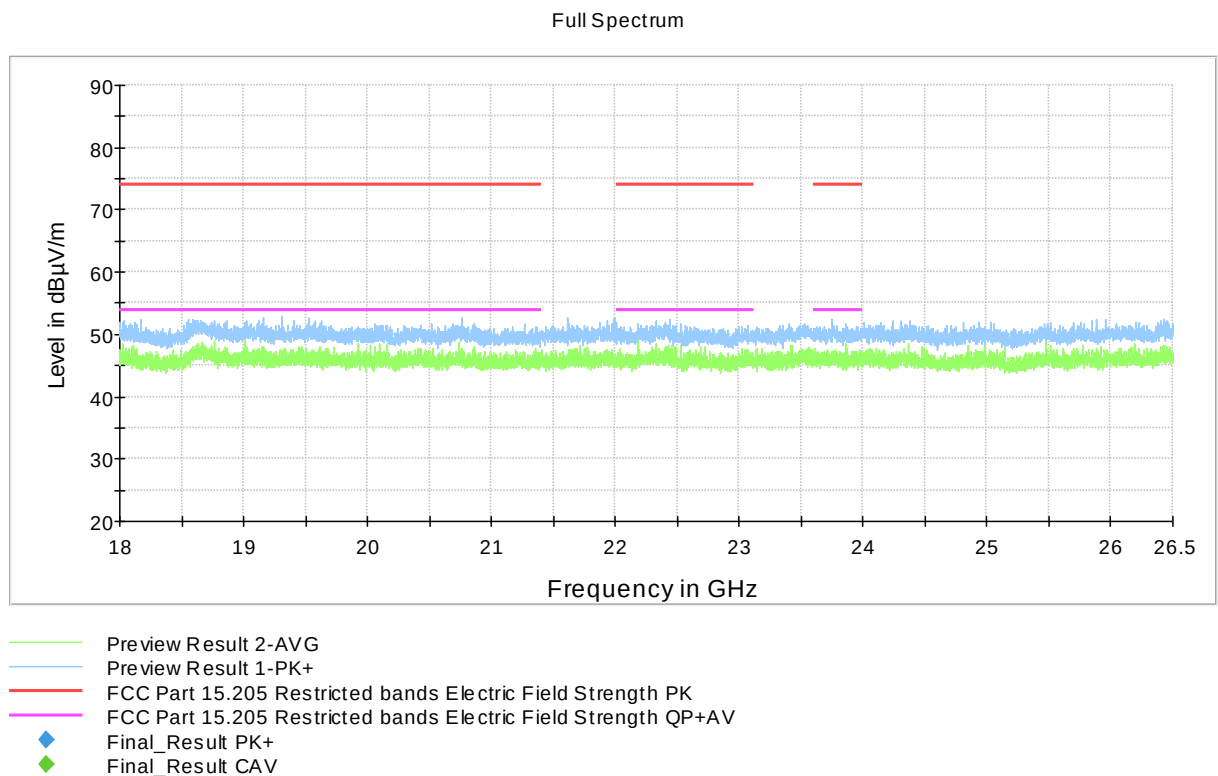


Figure 44: Result 18 – 26.5 GHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 7

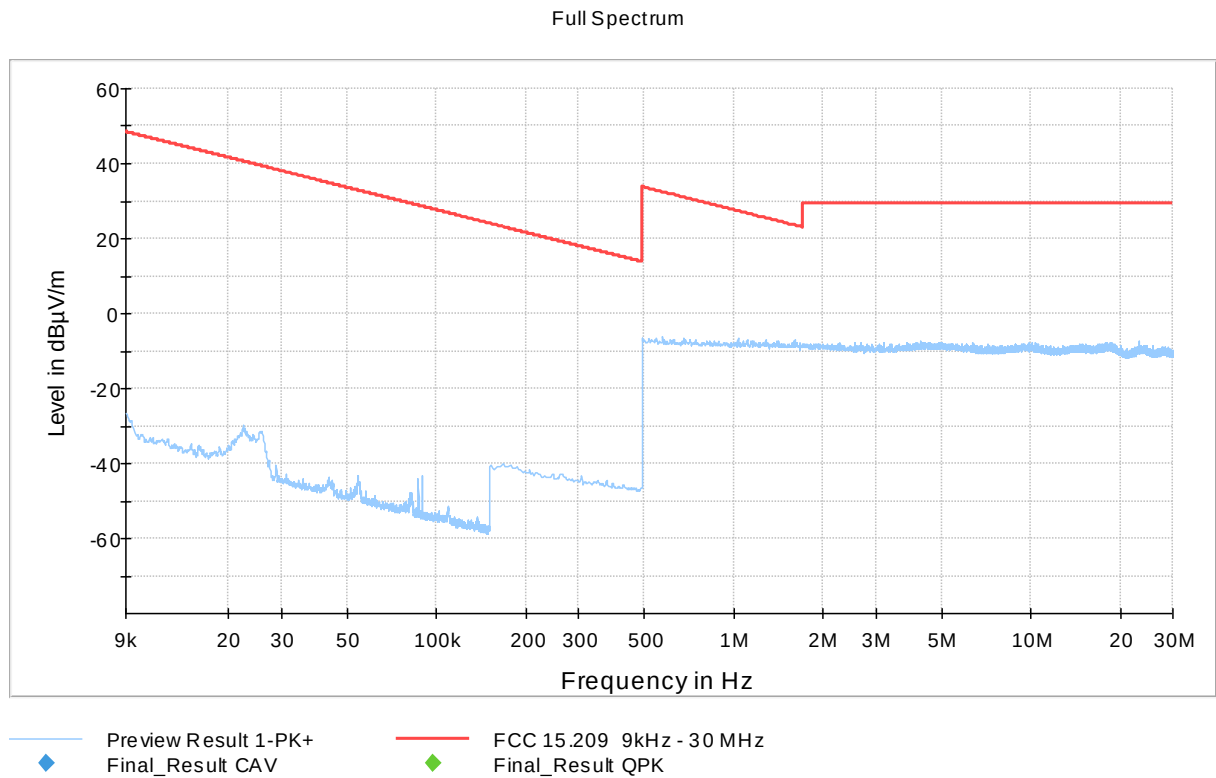


Figure 45: Result 9 kHz – 30 MHz

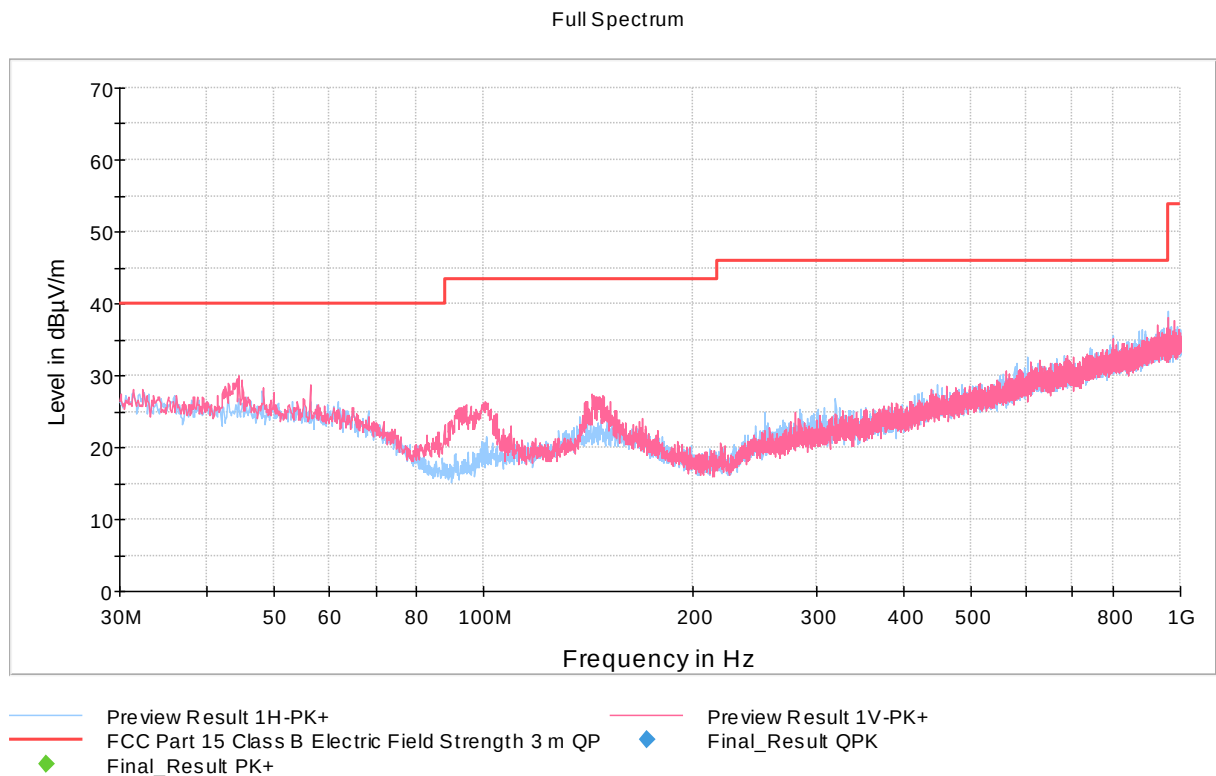


Figure 46: Result 30 – 1000 MHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

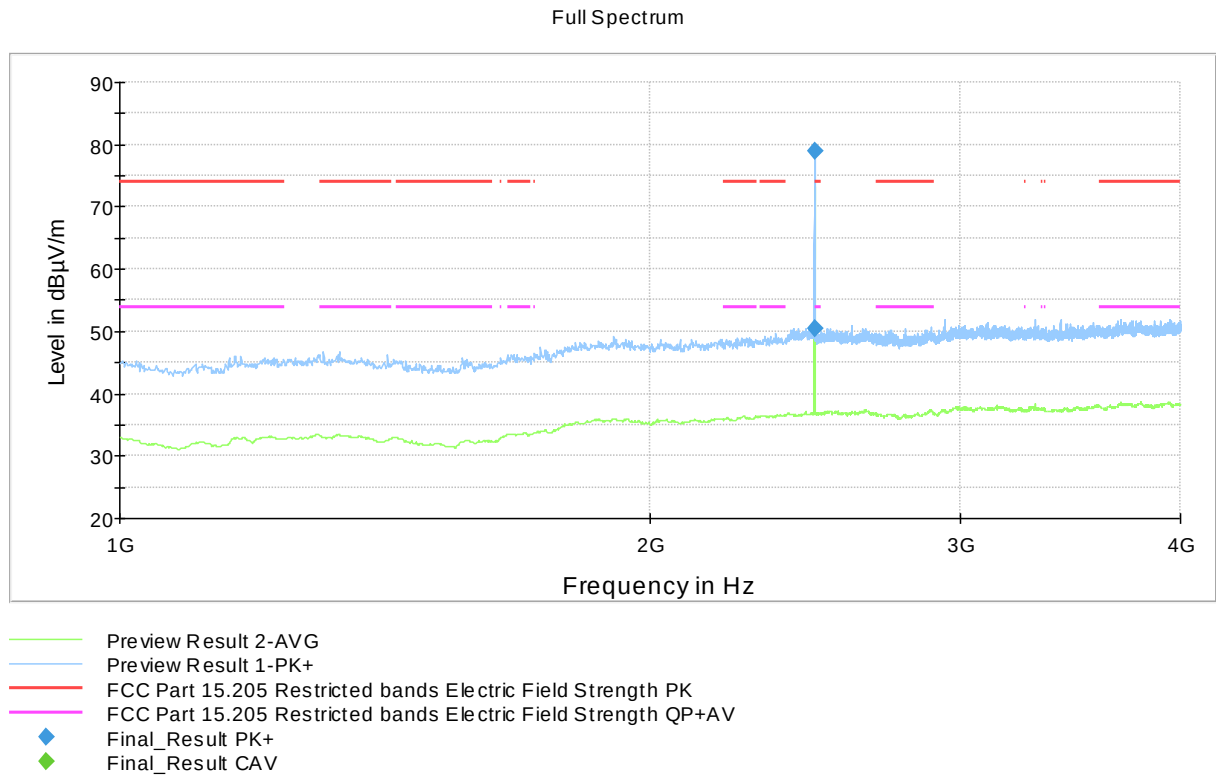


Figure 47: Result 1 – 4 GHz

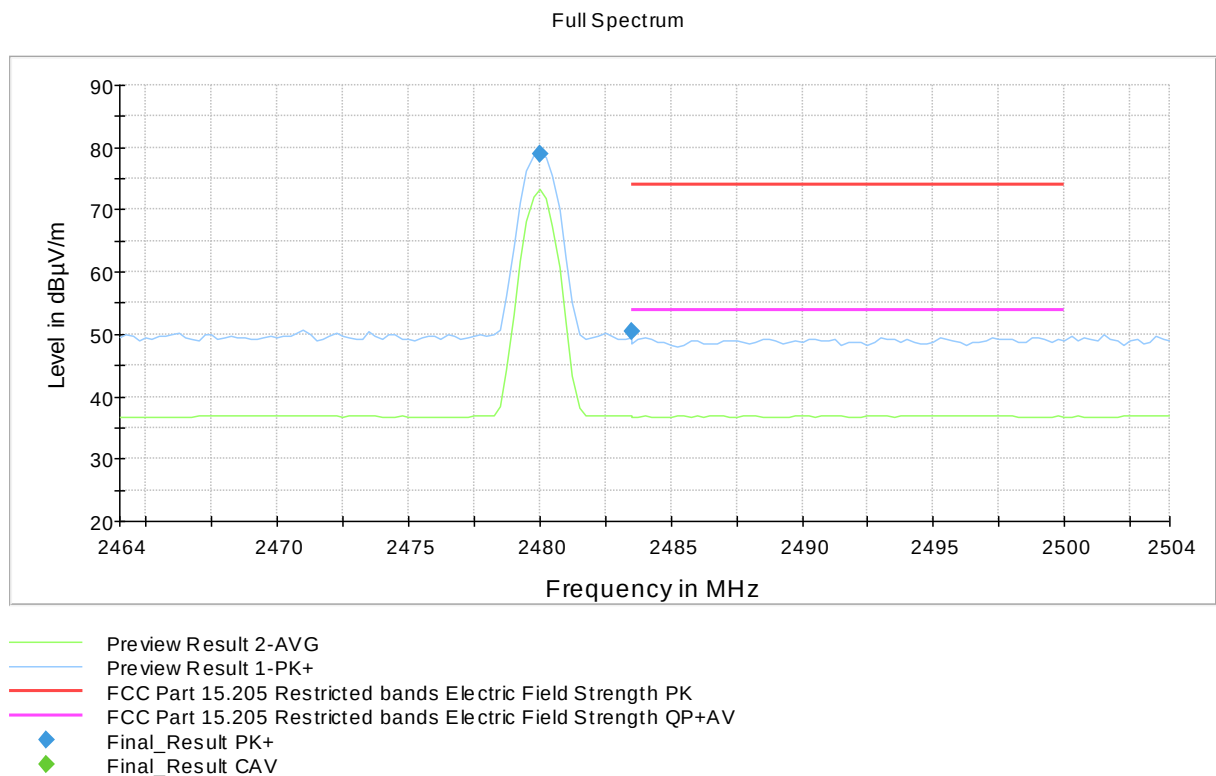


Figure 48: Result Top channel band-edge

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

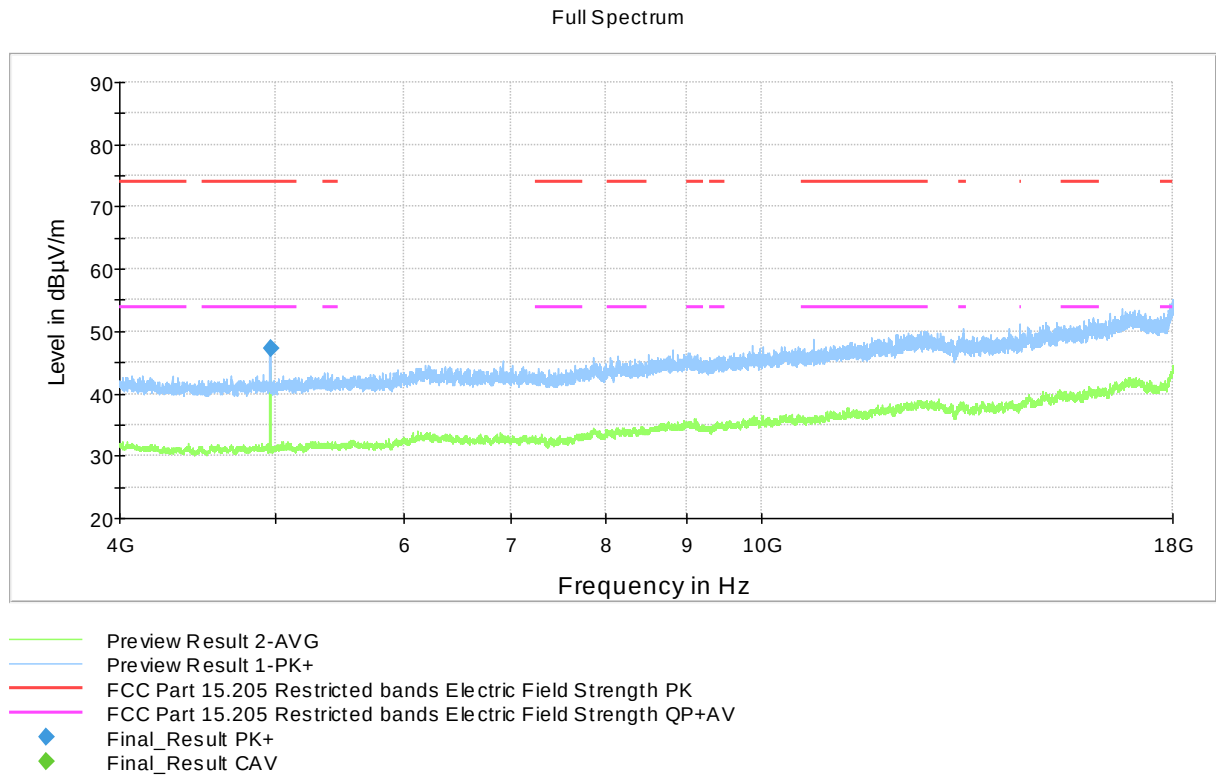


Figure 49: Result 4 – 18 GHz

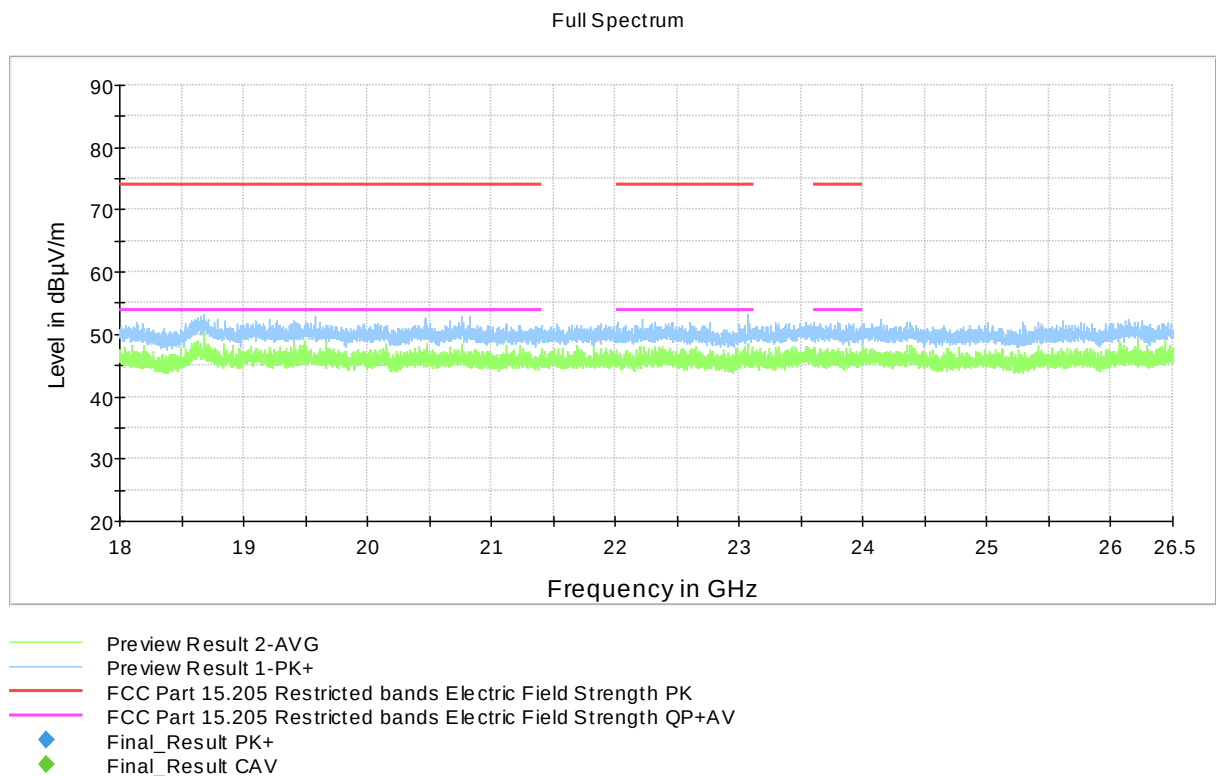


Figure 50: Result 18 – 26.5 GHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 8

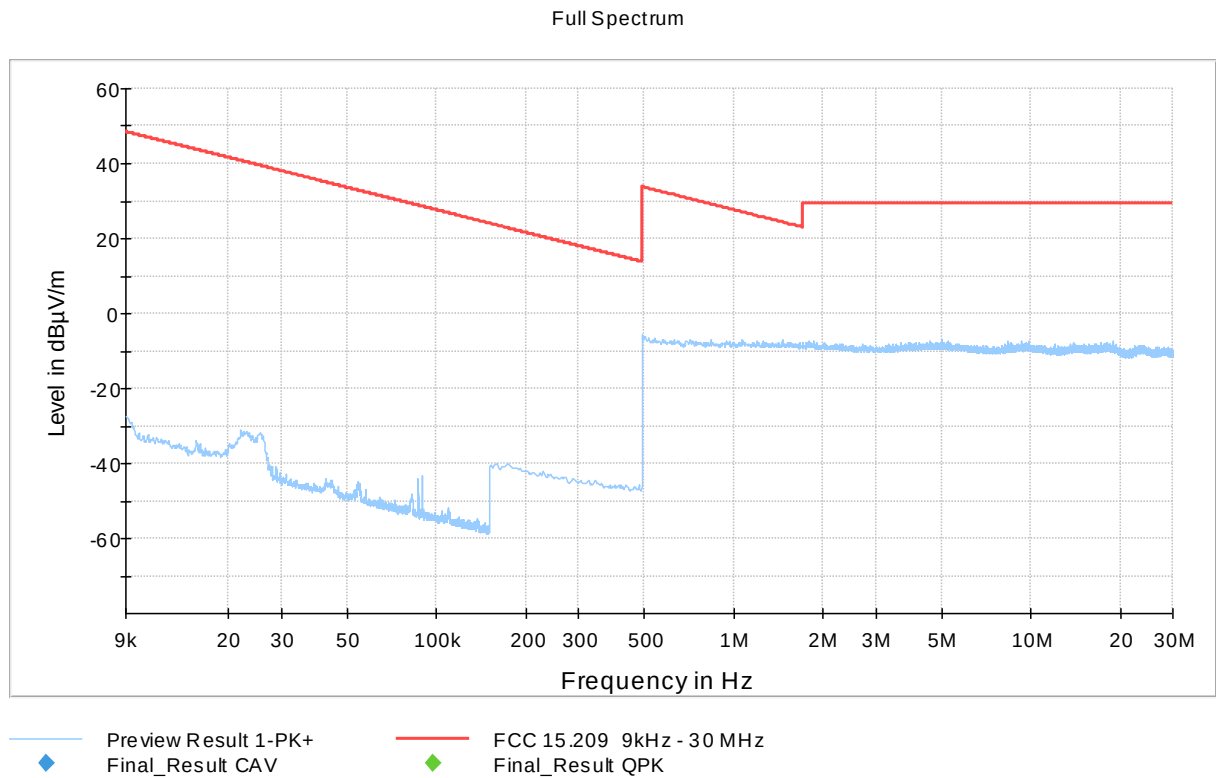


Figure 51: Result 9 kHz – 30 MHz

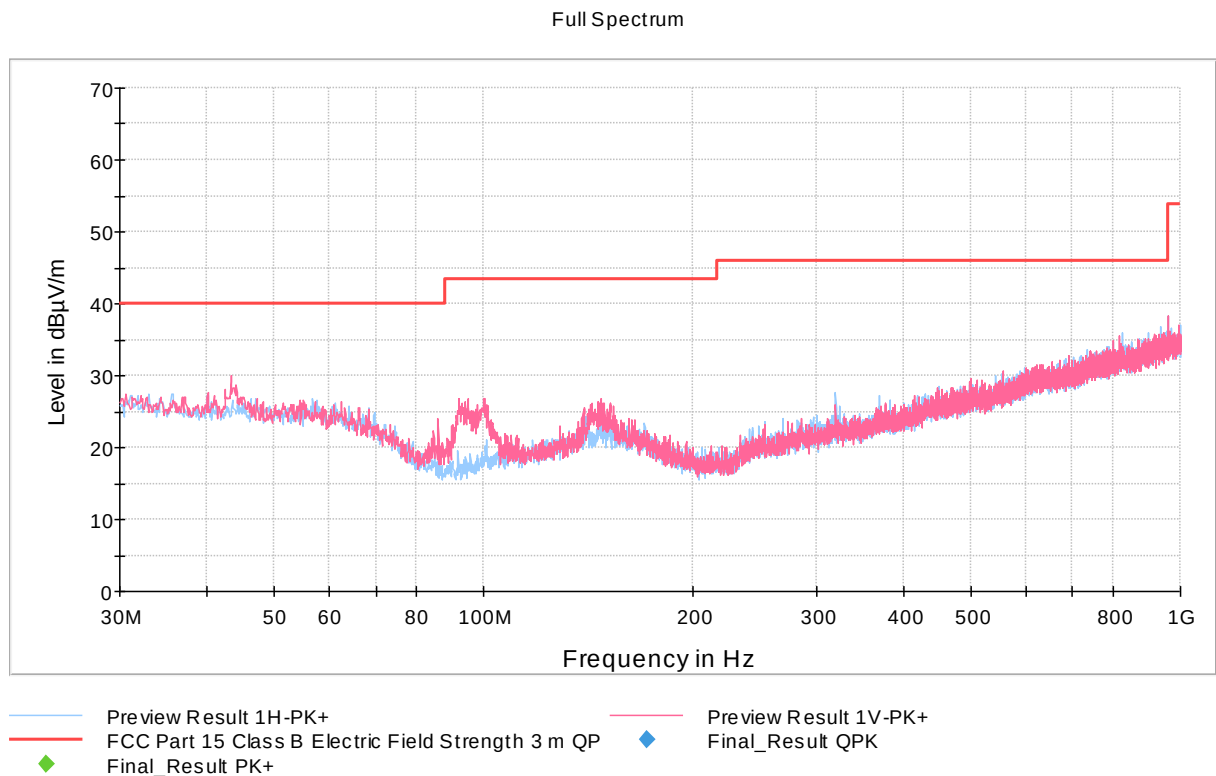


Figure 52: Result 30 – 1000 MHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

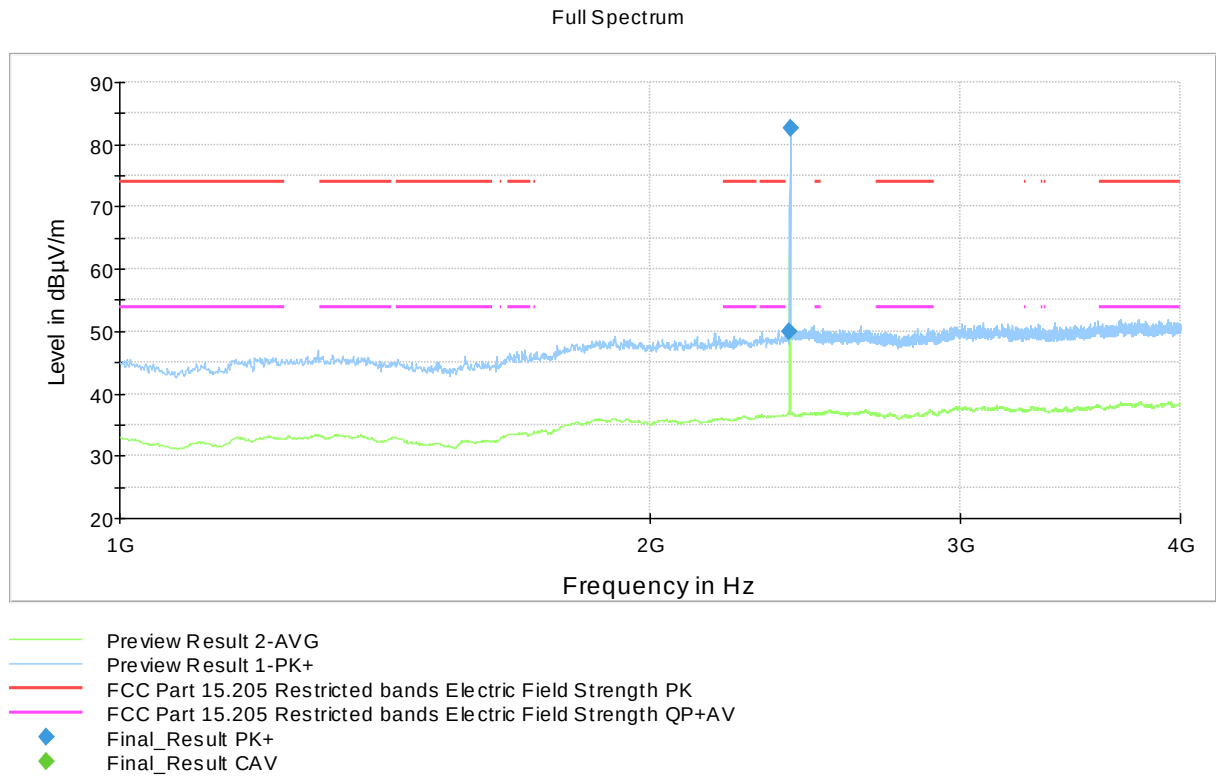


Figure 53: Result 1 – 4 GHz

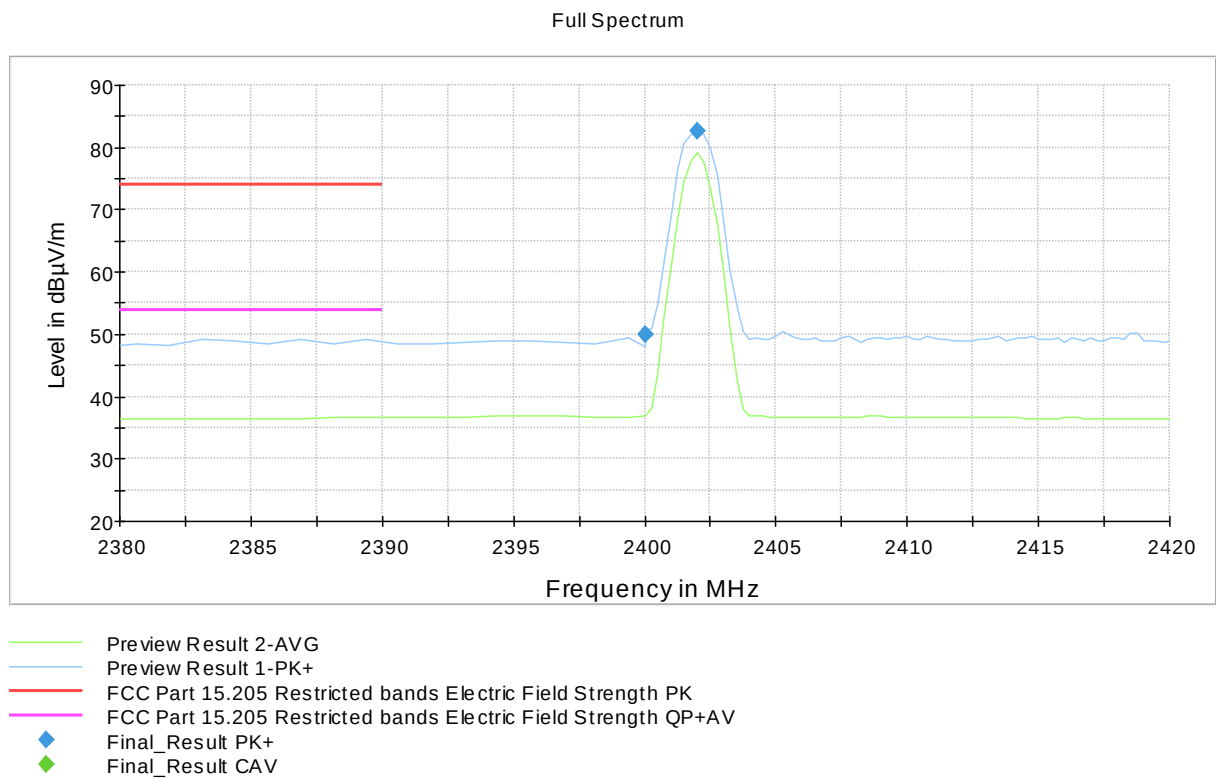


Figure 54: Result Bottom channel band-edge

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

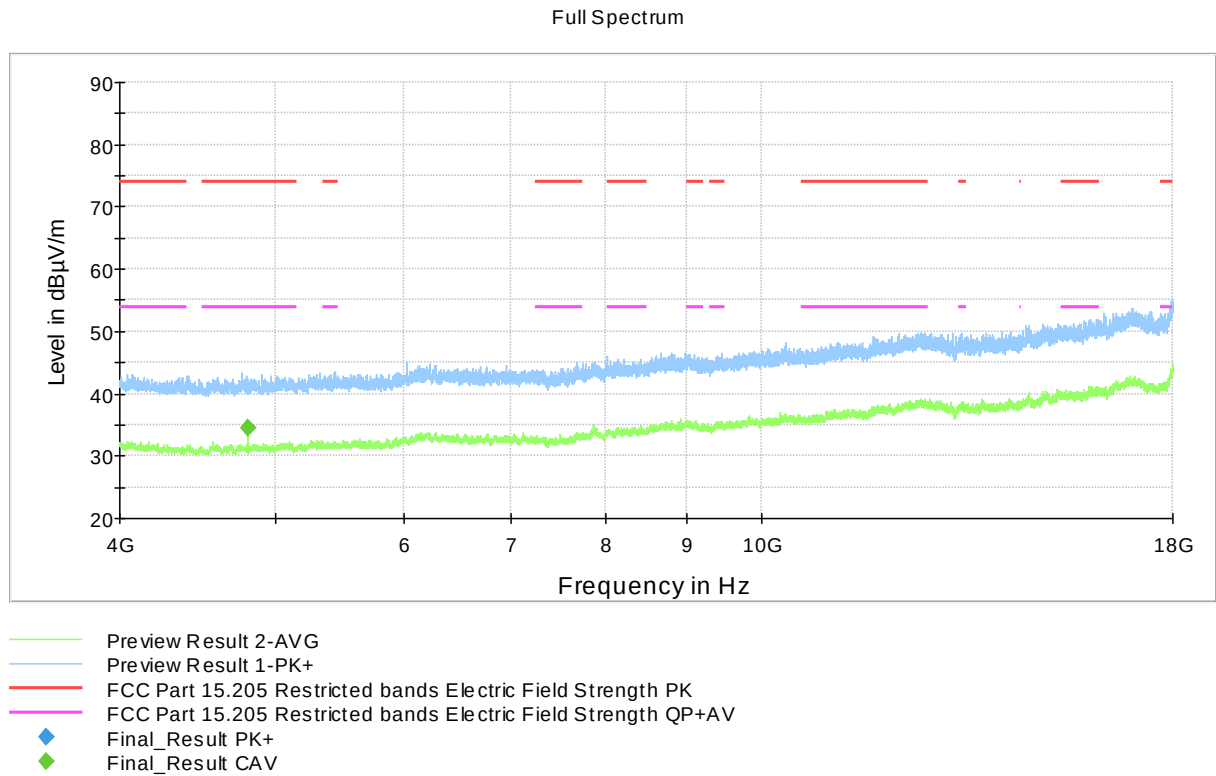


Figure 55: Result 4 – 18 GHz

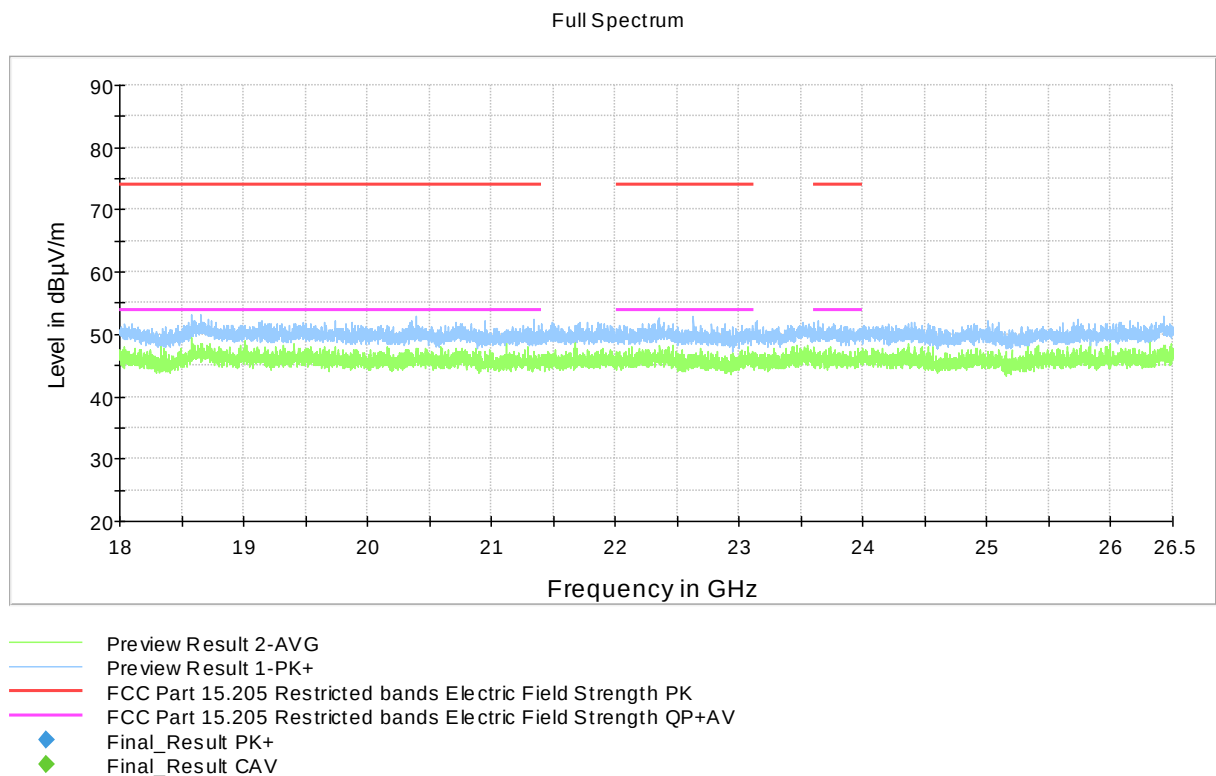


Figure 56: Result 18 – 26.5 GHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Mode 9

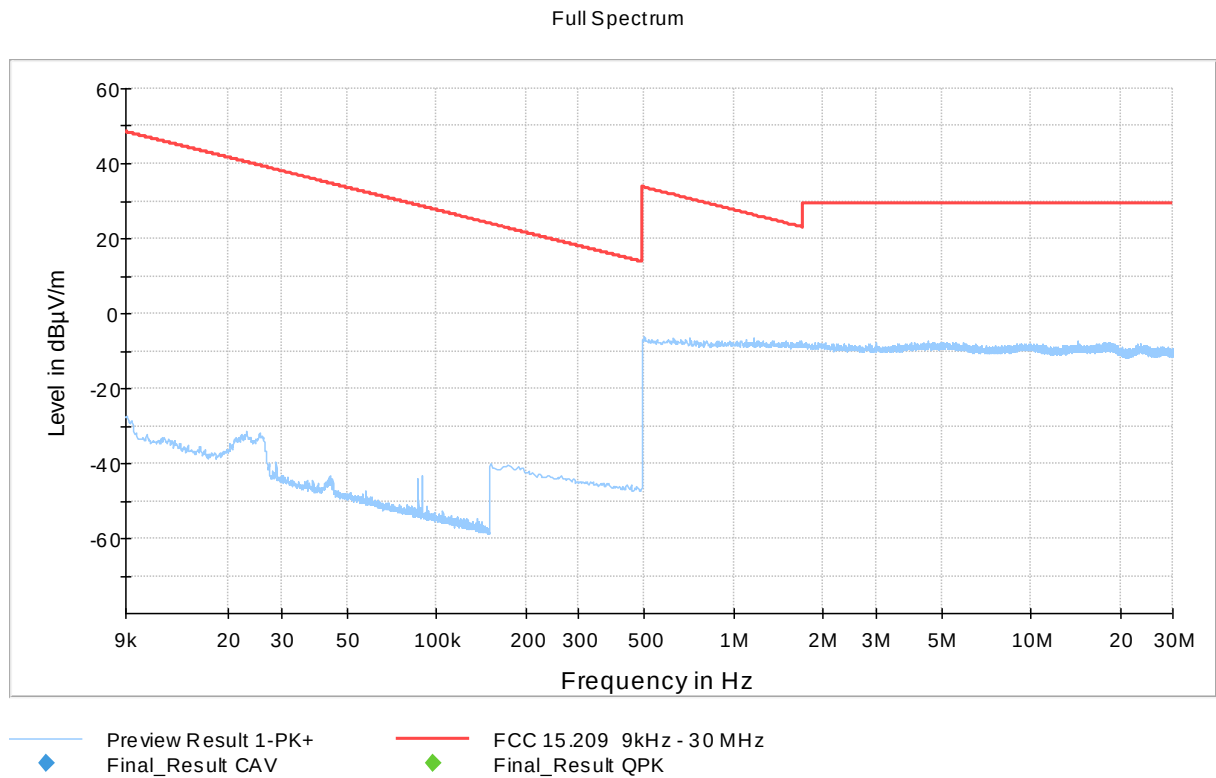


Figure 57: Result 9 kHz – 30 MHz

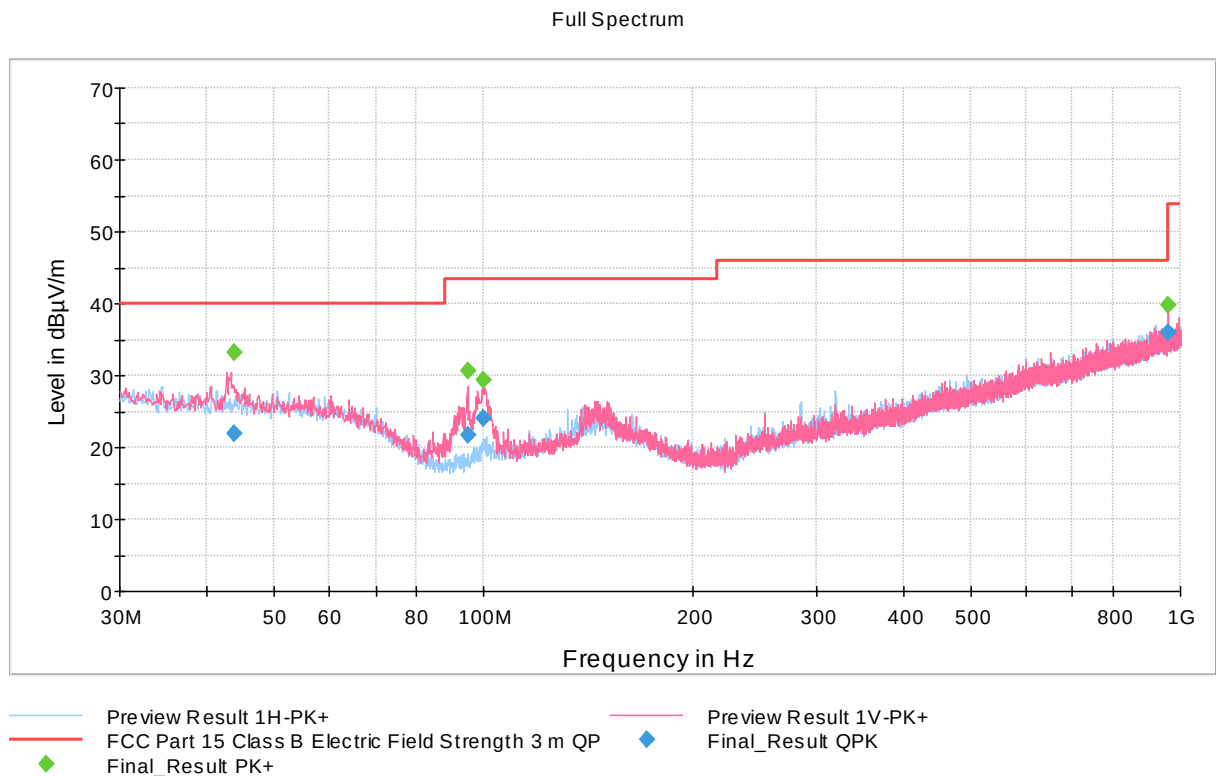


Figure 58: Result 30 – 1000 MHz

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

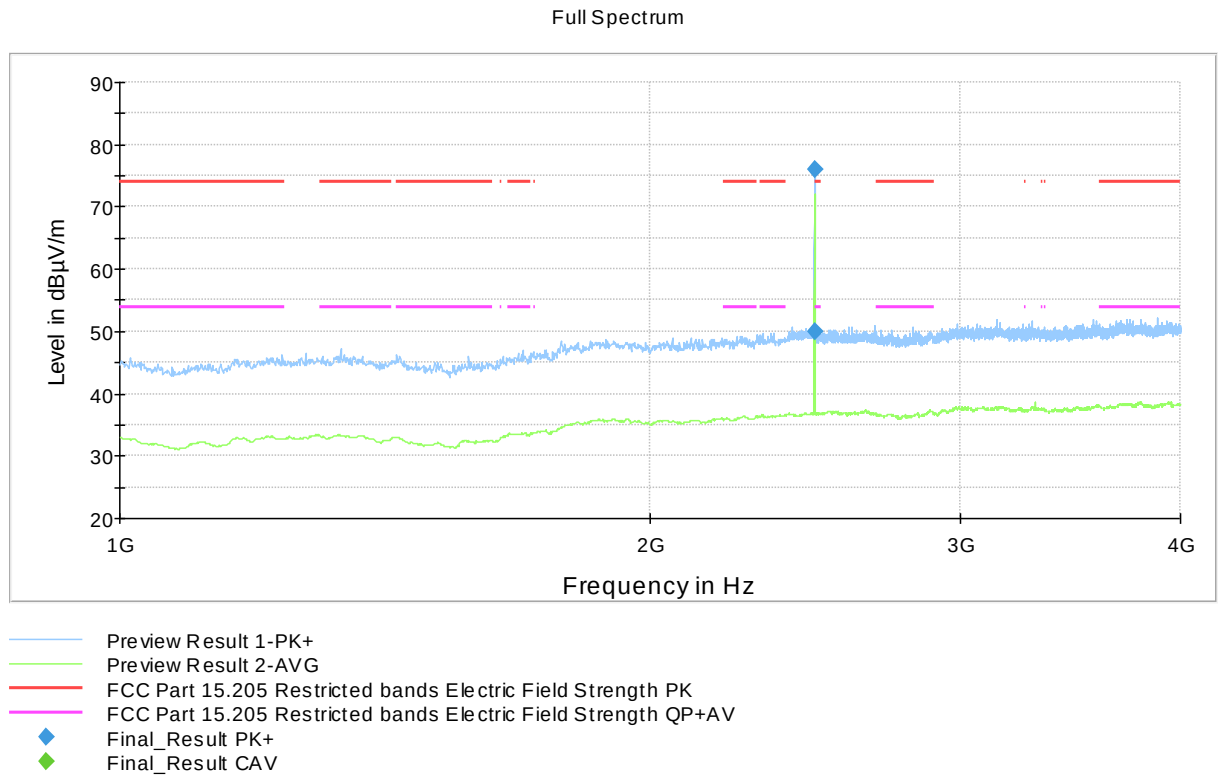


Figure 59: Result 1 – 4 GHz

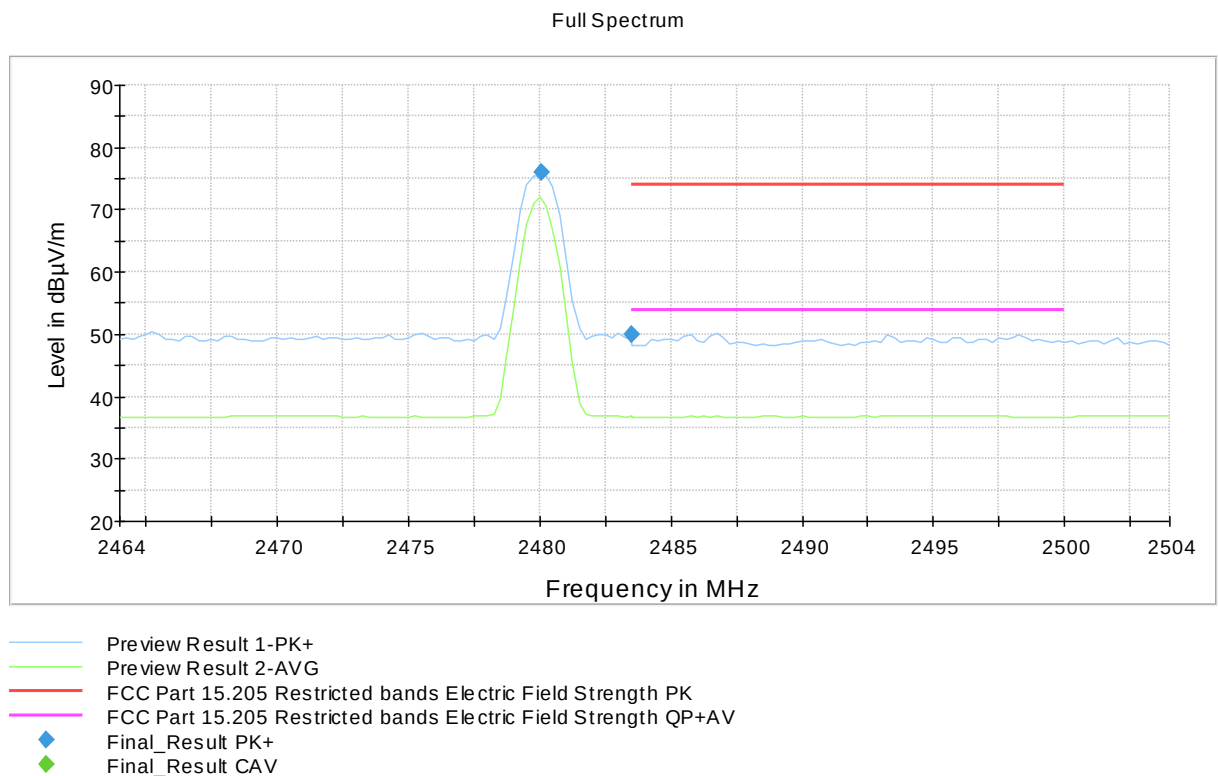


Figure 60: Result Top channel band-edge

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

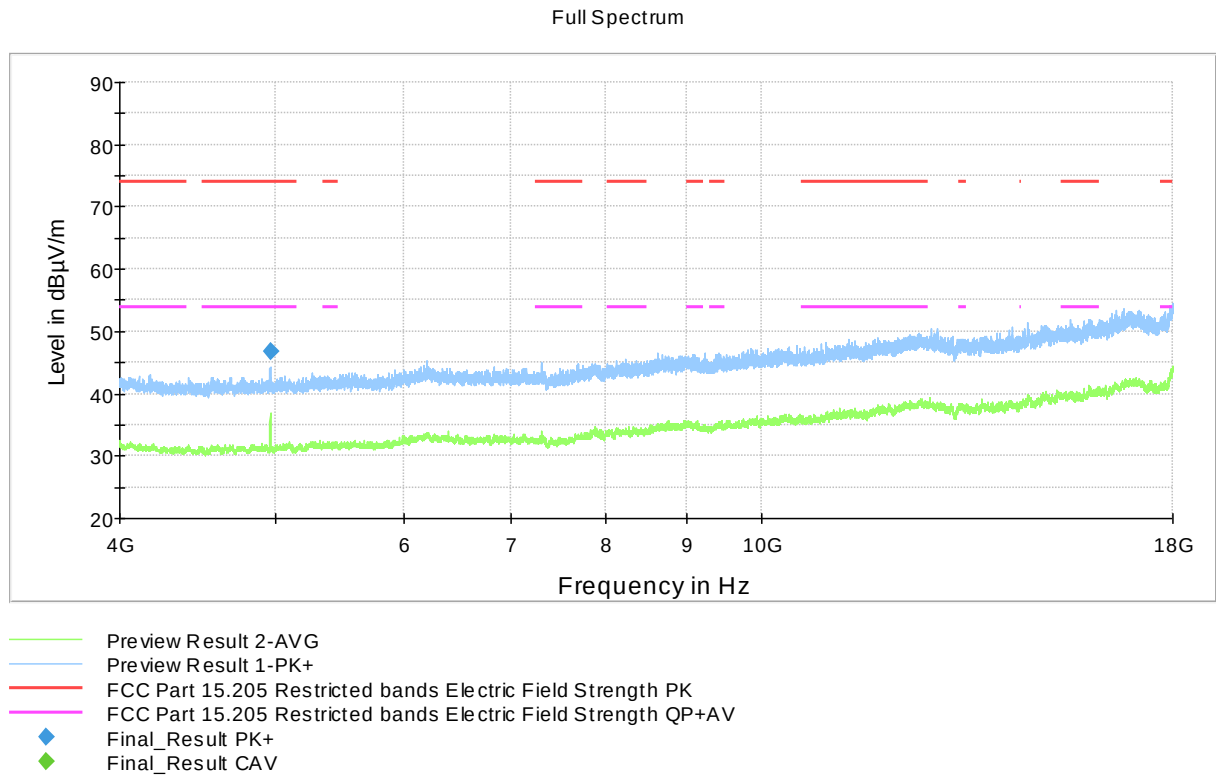


Figure 61: Result 4 – 18 GHz

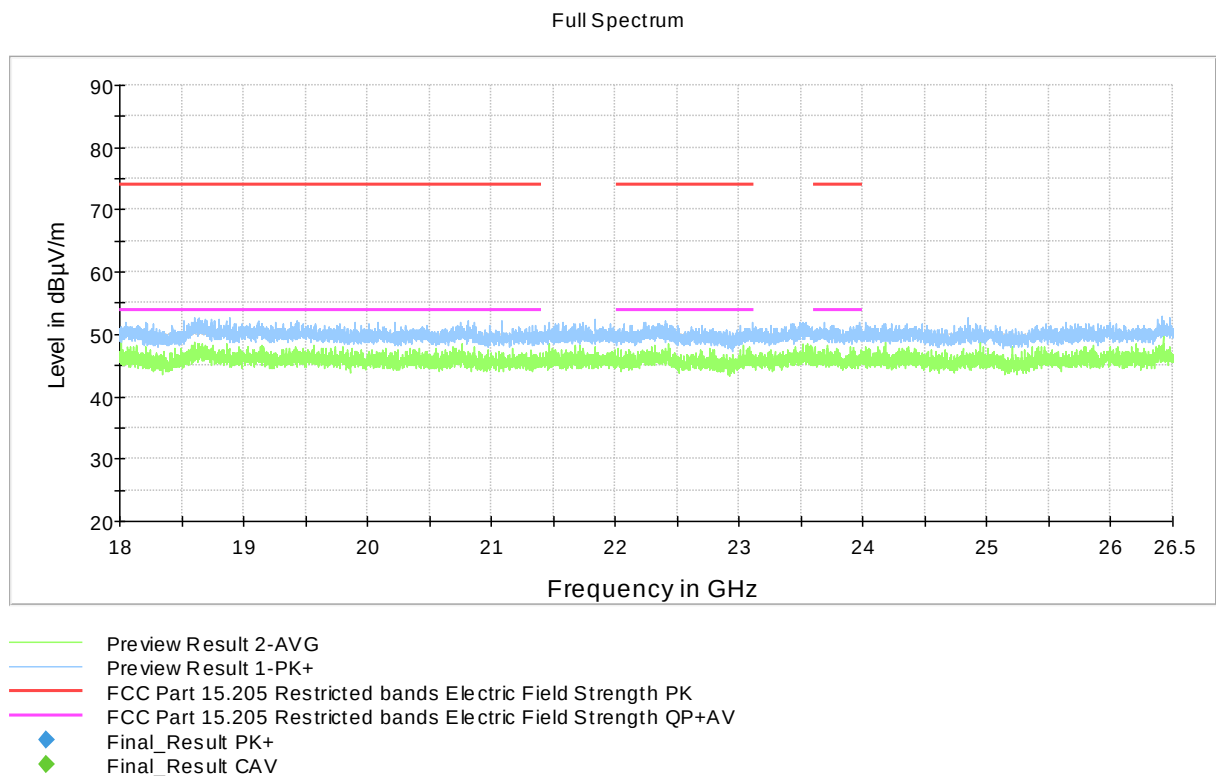


Figure 62: Result 18 – 26.5 GHz

TEST EQUIPMENT

25 – 28 July 2023

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
TEMPERATURE/ HUMIDITY SENSOR	EDS	OW-ENV-TH, K5 SAC	inv:10517	2022-10-27	2023-10-27
TURNTABLE	MATURO	DS430 UPGRADED	inv:10182	NCR	NCR
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv:10183	NCR	NCR
ANTENNA MAST	MATURO	TAM 4.0E	inv:10181	NCR	NCR
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	NCR	NCR
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv:10670	2023-06-19	2024-06-19
ANTENNA	ROHDE & SCHWARZ	HFH2-Z2 , 335.4711.52	inv:8013	2022-10-25	2024-10-25
ANTENNA	SCHWARZBECK	VULB 9168	inv:8911	2022-11-29	2024-11-29
ATTENUATOR	ZYSEN	ZSJ70/1-06-2A2	inv:10332	NCR	NCR
ANTENNA	EMCO	3117, emi 1-18GHz	inv:7293	2022-06-16	2024-06-16
RF PREAMPLIFIER	CIAO	CA118-3123	inv:10278	2022-09-21	2023-09-21
ANTENNA	EMCO	3160-09, emi 18-26.5GHz	inv:7294	2023-02-23	2024-02-23
RF PREAMPLIFIER	CIAO	CA1840-5019	inv:10593	2022-09-21	2023-09-21
FILTER	WAINWRIGHT	HP, WHKX4.0/18G-10SS	inv:10403	2023-01-09	2025-01-09
FILTER	WAINWRIGHT	BR, WRCG2400/2483-2490/2493-35/10SS	inv:8027	2023-01-04	2025-01-04
FILTER	WAINWRIGHT	BR, WRCD1877.5/1882.5-1875/1885-40/10SS	inv:10613	2023-01-09	2025-01-09
FILTER	WAINWRIGHT	BR, WRCT834.1/839.1-831.6/841.6-40/8SS	inv:10899	2023-01-09	2025-01-09
CABLE	SUHNER	SUCOFLEX 126E 18-26.5GHz	inv. C134	2023-04-05	2024-04-05
CABLE	SUHNER	SUCOFLEX 126E 1-18GHz	inv. C137	2023-04-05	2024-04-05
COAX CHAIN K5 EMI < 1GHz	-	C053+FP3AirC+C138	-	2023-03-28	2024-03-28
COAX CHAIN K5 EMI 1GHz-26.5GHz	-	C135+C149	-	2023-03-28	2024-03-28

20 – 21 July 2024

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
ANTENNA	ROHDE & SCHWARZ	HFH2-Z2 , 335.4711.52	inv. 8013	2022-10-25	2024-10-25
ANTENNA	SCHWARZBECK	VULB 9168	inv. 8911	2022-11-29	2024-11-29
ANTENNA	EMCO	3160-09, emi 18-26.5GHz	inv. 7294	2024-01-31	2025-01-31
ANTENNA	ETS LINDGREN	3117	inv. 9569	2023-05-05	2025-05-05
ANTENNA MAST	MATURO	TAM 4.0E	inv. 10181	NCR	NCR
ATTENUATOR	HUBER & SUHNER	6610.19.AA (10dB)	sn. A3	2023-01-04	2025-01-04
ATTENUATOR	PASTERNAK	PE 7004-4 (4dB)	inv. 10126	2024-02-16	2025-02-16
CABLE	SUHNER	SUCOFLEX 126E 18-26.5GHz	inv. C134	2024-04-05	2025-04-05
CABLE	SUHNER	SUCOFLEX 126E 1-18GHz	inv. C137	2024-04-05	2025-04-05
COAX CHAIN K5 EMI < 1GHz	-	C053+FP3AirC+C138	-	2024-03-28	2025-03-28
COAX CHAIN K5 EMI 1GHz-26.5GHz	-	C135+C149	-	2024-03-28	2025-03-28
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv. 10679	2024-06-12	2025-06-11
FILTER	WAINWRIGHT	HP, WHKX4.0/18G-10SS	inv. 10403	2023-01-09	2025-01-09
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv. 10183	NCR	NCR
POWER SUPPLY	CALIFORNIA INSTR.	5001 iX Series II	inv. 7826	-	-
RF PREAMPLIFIER	CIAO	CA1840-5019	inv. 10593	2023-09-15	2024-09-15
RF PREAMPLIFIER	CIAO	CA118-3123	inv. 10278	2023-09-15	2024-09-15
TEMPERATURE/ HUMIDITY SENSOR	EDS	OW-ENV-TH, K5 SAC	inv. 10517	2023-10-30	2024-10-30
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
TURNTABLE	MATURO	DS430 UPGRADED	inv. 10182	NCR	NCR

6-9 September 2024 (E.I.R.P. measurement)

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
ANTENNA	ETS LINDGREN	3117	inv. 9569	2023-05-05	2025-05-05
ANTENNA MAST	MATURO	TAM 4.0E	inv. 10181	NA	NA
ATTENUATOR	HUBER & SUHNER	6610.19.AA (10dB)	sn. A3	2023-01-04	2025-01-04
CABLE	SUHNER	SUCOFLEX 126E 1-18GHz	inv. C137	2024-04-05	2025-04-05
COAX CHAIN K5 EMI 1GHz-26.5GHz	-	C135+C149	-	2024-03-28	2025-03-28
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv. 10679	2024-06-12	2025-06-11
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv. 10183	NA	NA
RF PREAMPLIFIER	CIAO	CA1840-5019	inv. 10593	2023-09-15	2024-09-15
TEMPERATURE/ HUMIDITY SENSOR	EDS	OW-ENV-TH, K5 SAC	inv. 10517	2023-10-30	2024-10-30
TURNTABLE	MATURO	DS430 UPGRADED	inv. 10182	NA	NA

NCR = No calibration required

END OF REPORT