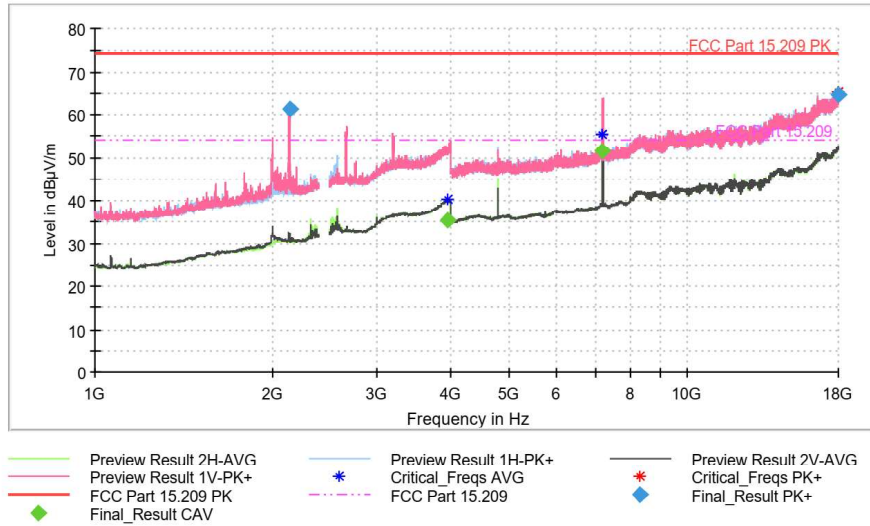


EUT Information

EUT: Festool CT MIDI I AC
Operating mode: TX, 2402 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
2132.750000	61.18	---	74.00	12.82	175.0	V	200.0
3942.500000	---	35.41	54.00	18.59	175.0	H	36.0
7205.750000	---	51.39	54.00	2.61	175.0	V	2.0
17978.000000	64.72	---	74.00	9.28	175.0	H	0.0

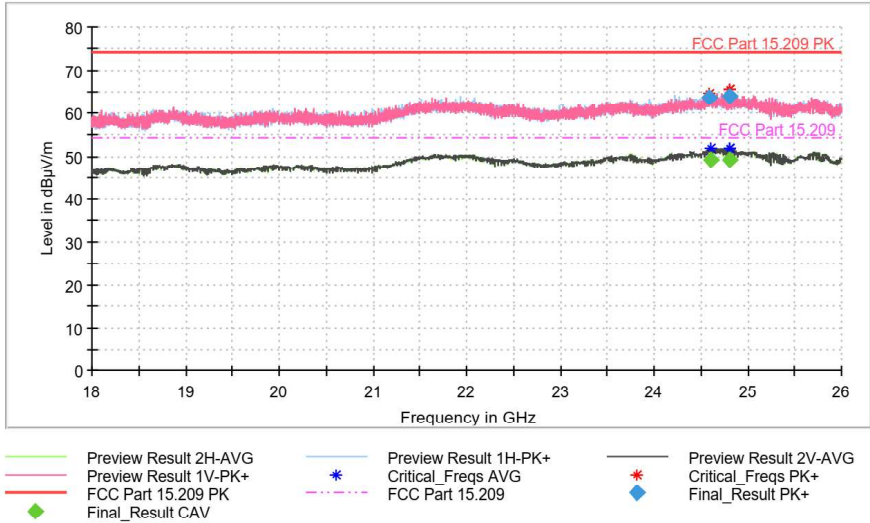


EUT Information

EUT:
Operating mode:

Festool CT MIDI I AC
TX, 2402 MHz

Full Spectrum



Final Result

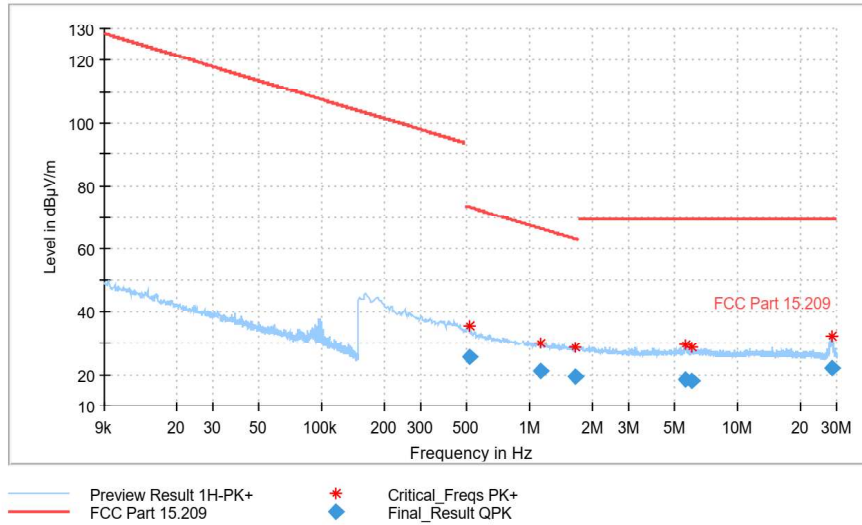
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
24592.000000	63.47	---	74.00	10.53	175.0	V	192.0
24604.500000	---	49.24	54.00	4.76	175.0	H	351.0
24801.750000	64.09	---	74.00	9.91	175.0	H	271.0
24802.500000	---	49.31	54.00	4.69	175.0	H	351.0

Channel 2440 MHz:

EUT Information

EUT: FESTOOL CT MIDI I AC
Operating mode: TX 2440 MHz

Full Spectrum



Final Result

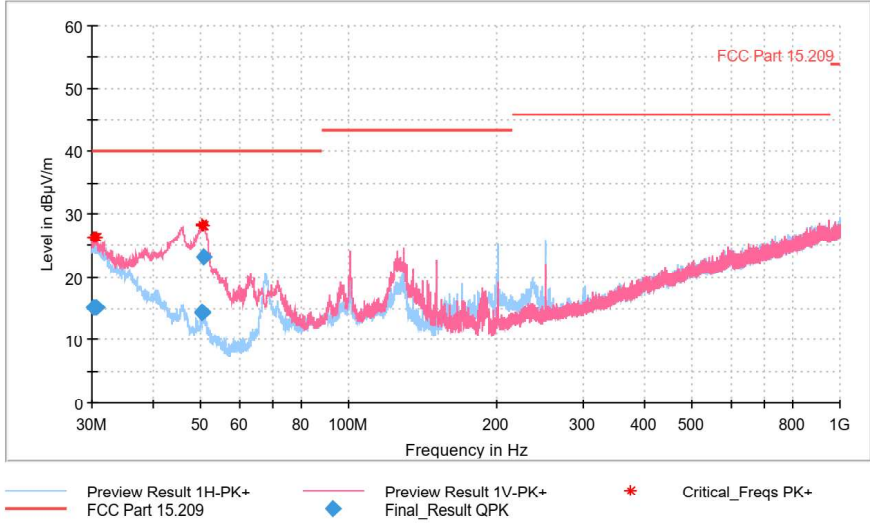
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol
0.512250	25.74	73.42	47.67	1000.0	9.000	H
1.128750	20.97	66.57	45.60	1000.0	9.000	H
1.671000	19.41	63.17	43.76	1000.0	9.000	H
5.651250	18.40	69.50	51.10	1000.0	9.000	H
5.993250	18.06	69.50	51.44	1000.0	9.000	H
28.371750	22.14	69.50	47.36	1000.0	9.000	H



EUT Information

EUT: Festool CT MIDI I AC
Operating mode: TX, 2440 MHz

Full Spectrum



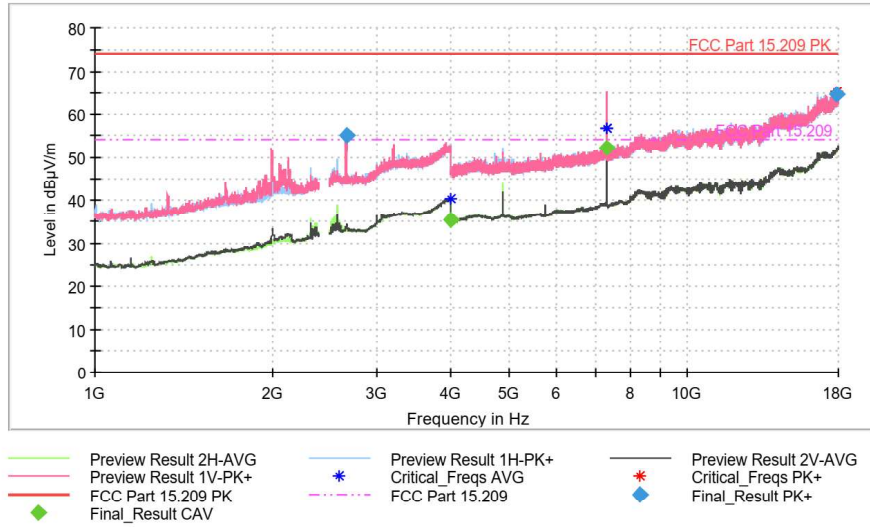
Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.120000	15.27	40.00	24.73	1000.0	120.000	100.0	V	98.0	19.8
30.390000	15.29	40.00	24.71	1000.0	120.000	100.0	V	351.0	19.6
30.780000	15.20	40.00	24.80	1000.0	120.000	100.0	V	145.0	19.4
50.220000	14.36	40.00	25.64	1000.0	120.000	100.0	V	0.0	7.7
50.370000	14.61	40.00	25.39	1000.0	120.000	100.0	V	0.0	7.6
50.790000	23.38	40.00	16.62	1000.0	120.000	100.0	V	356.0	7.4

EUT Information

EUT: Festool CT MIDI I AC
Operating mode: TX, 2440 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
2657.250000	55.15	---	74.00	18.85	175.0	V	146.0
3994.000000	---	35.52	54.00	18.48	175.0	H	300.0
7319.750000	---	52.03	54.00	1.97	175.0	V	140.0
17884.750000	64.72	---	74.00	9.28	175.0	H	0.0

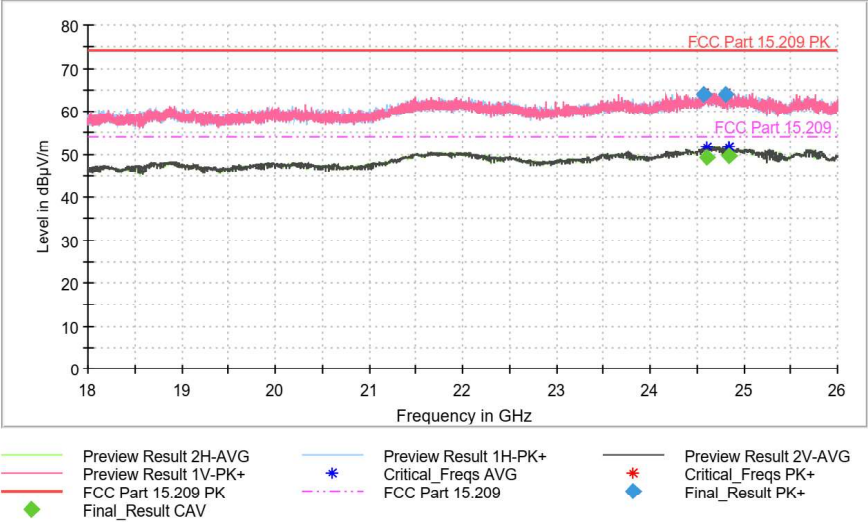


EUT Information

EUT:
Operating mode:

Festool CT MIDI I AC
TX, 2440 MHz

Full Spectrum



Final Result

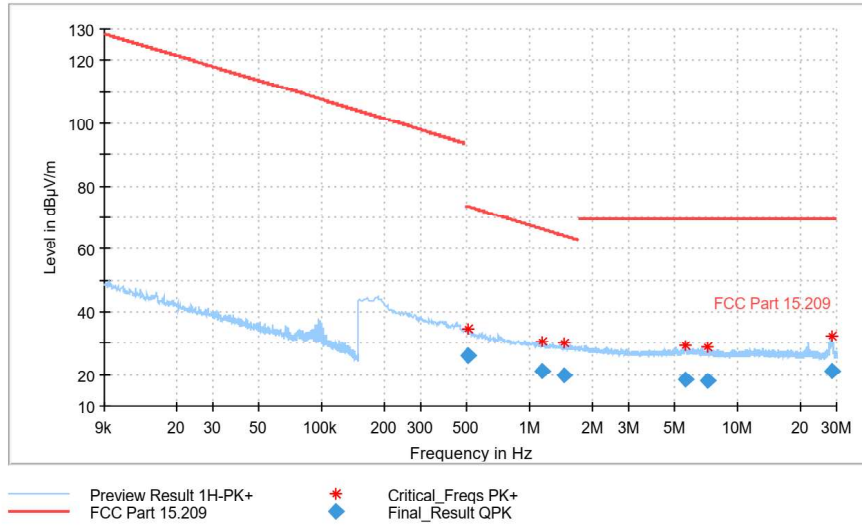
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
24579.750000	63.79	---	74.00	10.21	175.0	H	37.0
24604.000000	---	49.31	54.00	4.69	175.0	H	0.0
24800.250000	64.02	---	74.00	9.98	175.0	H	0.0
24832.500000	---	49.46	54.00	4.54	175.0	H	241.0

Channel 2480 MHz:

EUT Information

EUT: FESTOOL CT MIDI I AC
Operating mode: TX 2480 MHz

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol
0.505500	26.00	73.53	47.53	1000.0	9.000	H
1.142250	21.04	66.47	45.43	1000.0	9.000	H
1.479750	19.87	64.23	44.35	1000.0	9.000	H
5.642250	18.52	69.50	50.98	1000.0	9.000	H
7.145250	17.97	69.50	51.53	1000.0	9.000	H
28.263750	21.12	69.50	48.38	1000.0	9.000	H

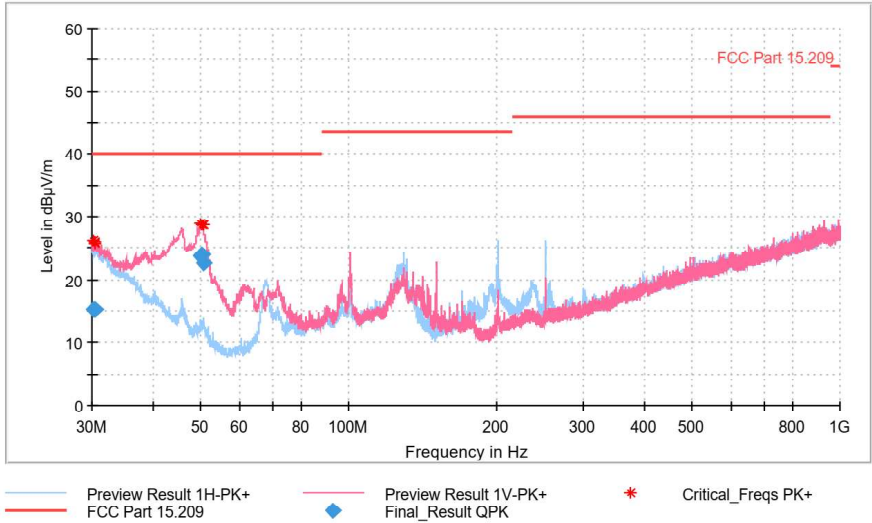


EUT Information

EUT:
Operating mode:

Festool CT MIDI I AC
TX, 2480 MHz

Full Spectrum



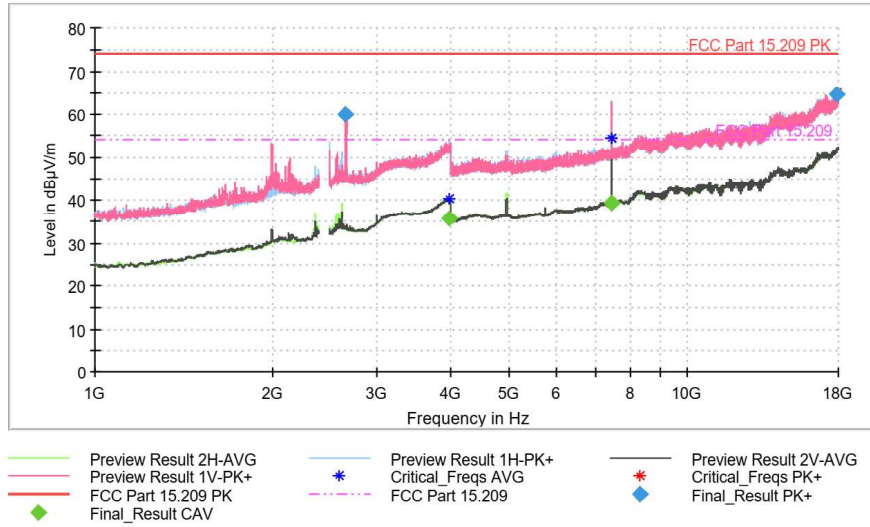
Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.240000	15.32	40.00	24.68	1000.0	120.000	100.0	V	227.0	19.7
30.390000	15.14	40.00	24.86	1000.0	120.000	100.0	V	43.0	19.6
30.540000	15.31	40.00	24.69	1000.0	120.000	100.0	V	301.0	19.6
50.100000	23.80	40.00	16.20	1000.0	120.000	100.0	V	240.0	7.7
50.250000	24.05	40.00	15.95	1000.0	120.000	100.0	V	233.0	7.7
50.550000	22.65	40.00	17.35	1000.0	120.000	100.0	V	240.0	7.5

EUT Information

EUT: Festool CT MIDI I AC
Operating mode: TX, 2480 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
2654.750000	59.86	---	74.00	14.14	175.0	V	198.0
3965.500000	---	35.58	54.00	18.42	175.0	H	103.0
7439.750000	---	39.41	54.00	14.59	175.0	V	105.0
17835.500000	64.65	---	74.00	9.35	175.0	V	333.0

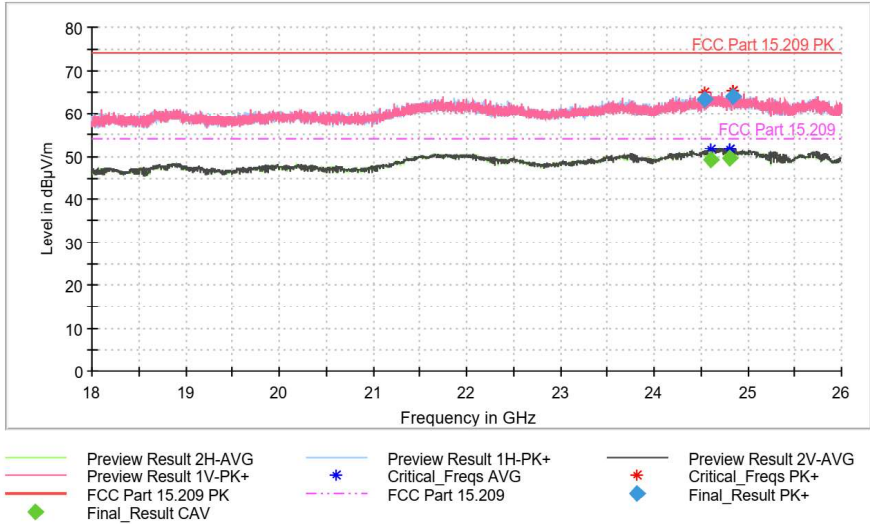


EUT Information

EUT:
Operating mode:

Festool CT MIDI I AC
TX, 2480 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
24542.750000	63.20	---	74.00	10.80	175.0	V	209.0
24603.500000	---	49.28	54.00	4.72	175.0	H	183.0
24802.500000	---	49.40	54.00	4.60	175.0	V	55.0
24841.000000	64.00	---	74.00	10.00	175.0	V	271.0

CT MIDI I

Channel 2402 MHz:

EUT Information

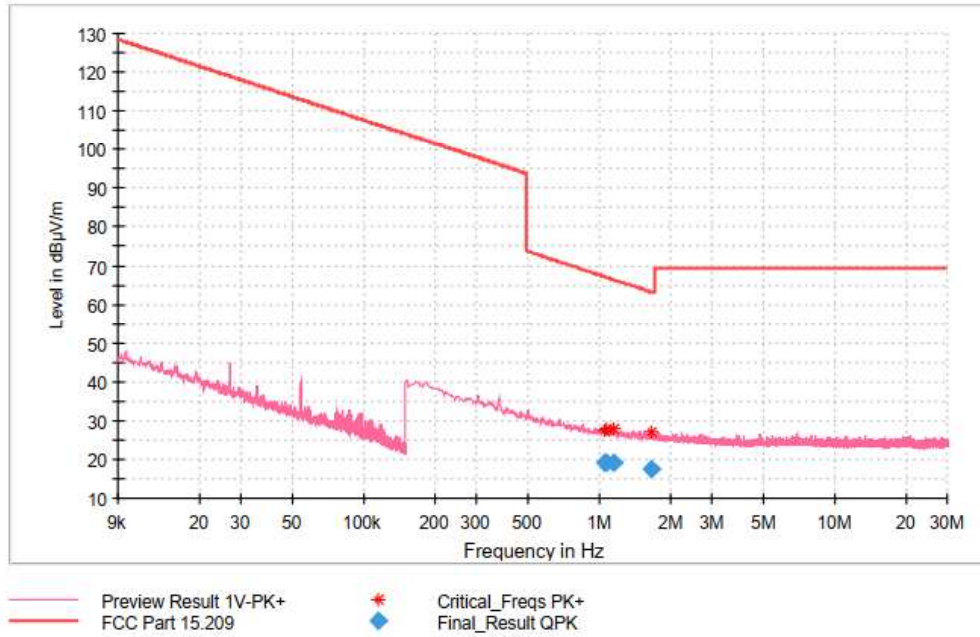
EUT:

Operating mode:

CT MIDI I

TX 2402 MHz

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (deg)
1.045500	19.21	67.24	48.03	42.0
1.063500	19.27	67.09	47.82	81.0
1.149000	18.96	66.42	47.46	290.0
1.646250	17.66	63.30	45.64	218.0

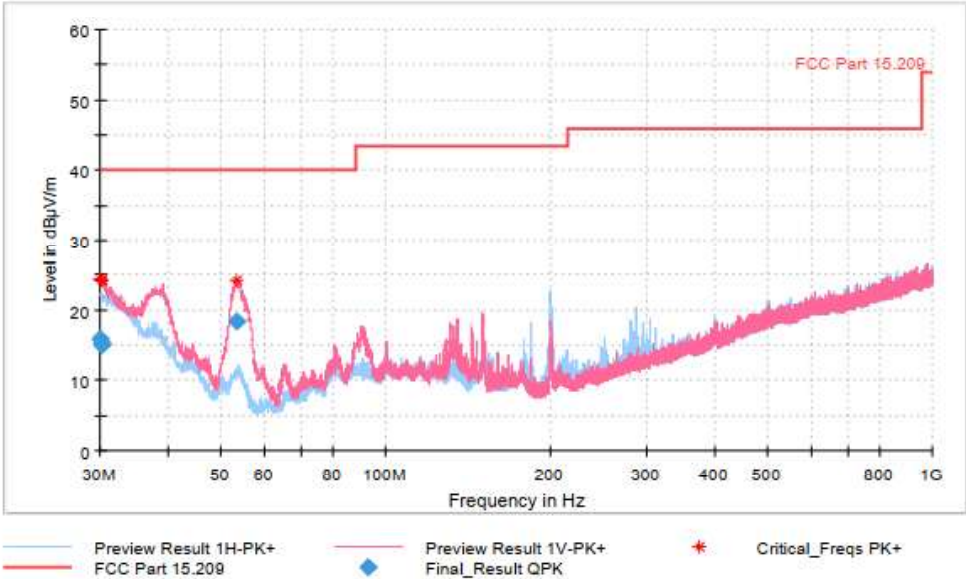


EUT Information

EUT:
Operating mode:

CT MIDI I
TX 2402 MHz

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.060000	15.80	40.00	24.20	1000.0	120.000	100.0	V	358.0	19.7
30.180000	15.12	40.00	24.88	1000.0	120.000	100.0	V	354.0	19.6
30.270000	14.98	40.00	25.02	1000.0	120.000	100.0	V	343.0	19.6
53.340000	18.40	40.00	21.60	1000.0	120.000	100.0	V	3.0	6.1

EUT Information

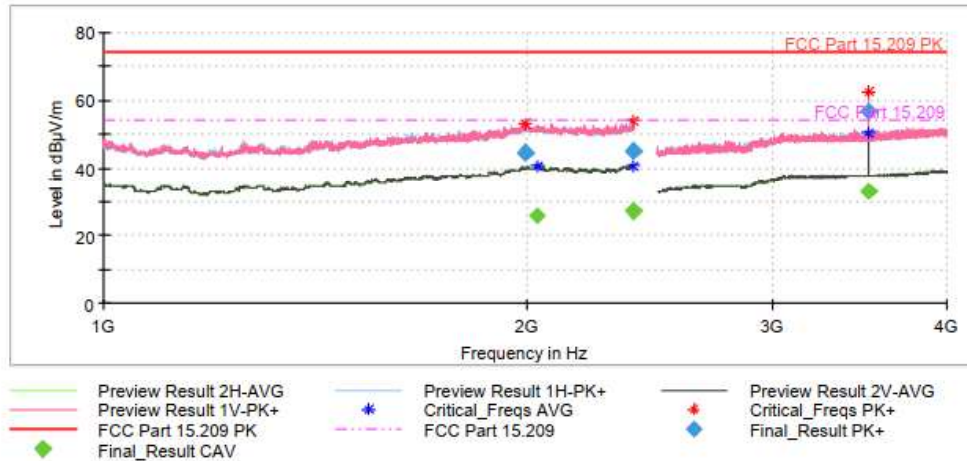
EUT:

CT MIDI I

Operating Mode:

Uin: 120 V 60 Hz; TX 2402 MHz

Full Spectrum



Comment

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1994.750000	44.49	---	74.00	29.51	175.0	V	335.0
2036.500000	---	26.06	54.00	27.94	175.0	V	137.0
2388.000000	---	27.07	54.00	26.93	175.0	H	132.0
2390.000000	45.28	---	74.00	28.72	175.0	H	279.0
3516.250000	56.96	---	74.00	17.04	175.0	V	53.0
3516.250000	---	33.21	54.00	20.79	175.0	V	53.0

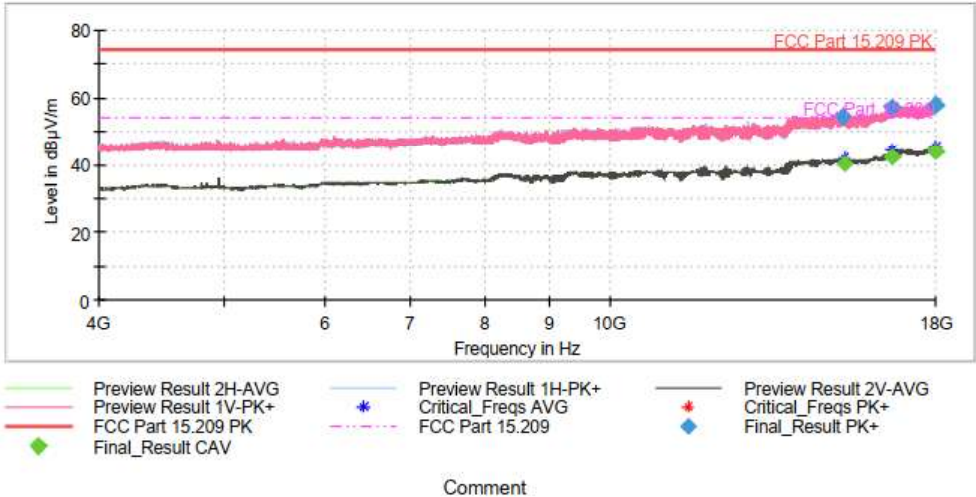


EUT Information

EUT:
Operating Mode:

CT MIDI I
Uin: 120 V 60 Hz; TX 2402 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
15218.000000	54.52	---	74.00	19.48	175.0	V	0.0
15251.250000	---	40.17	54.00	13.83	175.0	V	0.0
16636.250000	57.37	---	74.00	16.63	175.0	V	0.0
16637.500000	---	42.54	54.00	11.46	175.0	V	0.0
17979.000000	58.10	---	74.00	15.90	175.0	V	0.0
17999.250000	---	43.68	54.00	10.32	175.0	H	0.0

EUT Information

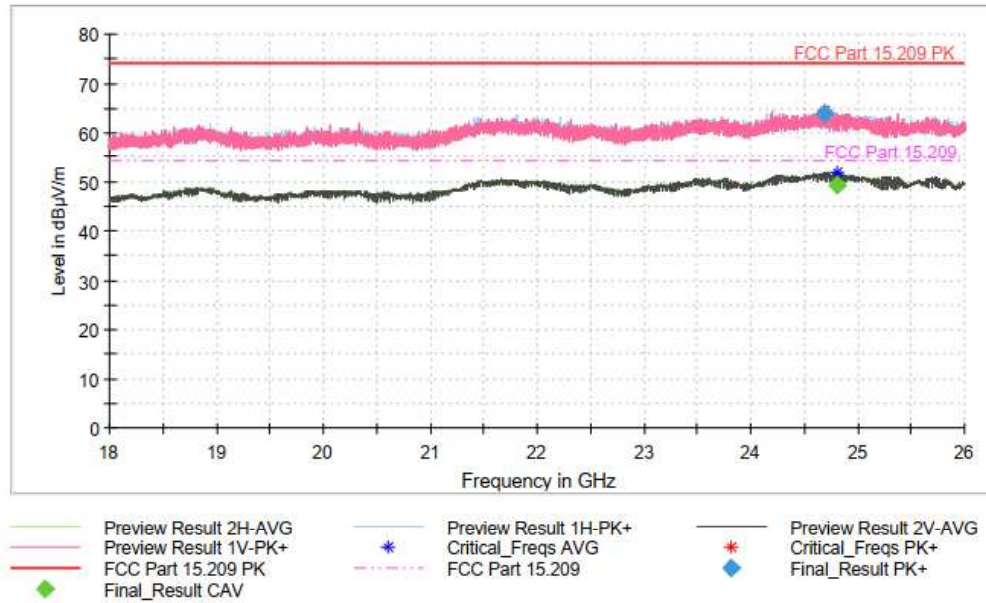
EUT:

CT MIDI I

Operating Mode:

Uin: 120 V, 60 Hz TX 2402 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
24687.750000	63.84	---	74.00	10.16	150.0	H	338.0
24802.250000	---	49.25	54.00	4.75	150.0	H	73.0

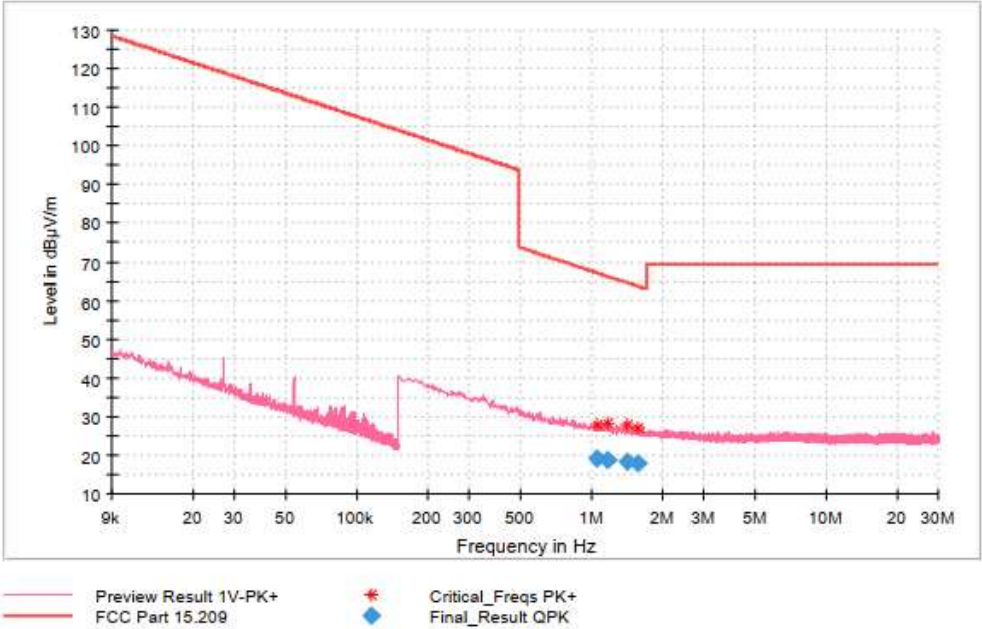


Channel 2440 MHz:

EUT Information

EUT: CT MIDI I
Operating mode: TX 2440 MHz

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Azimuth (deg)
1.047750	19.22	67.22	47.99	289.0
1.169250	18.87	66.27	47.40	112.0
1.412250	18.38	64.63	46.25	178.0
1.578750	18.04	63.67	45.63	322.0

EUT Information

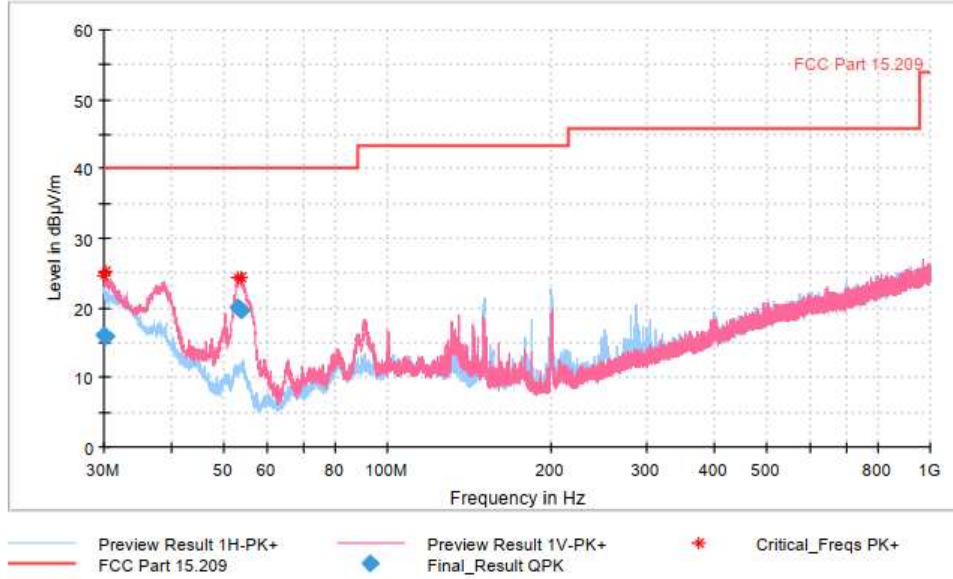
EUT:

CT MIDI I

Operating mode:

TX 2440 MHz

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.030000	16.02	40.00	23.98	1000.0	120.000	100.0	V	333.0	19.7
30.150000	15.88	40.00	24.12	1000.0	120.000	100.0	V	0.0	19.6
53.100000	20.25	40.00	19.75	1000.0	120.000	100.0	V	358.0	6.2
53.940000	19.61	40.00	20.39	1000.0	120.000	100.0	V	8.0	6.0

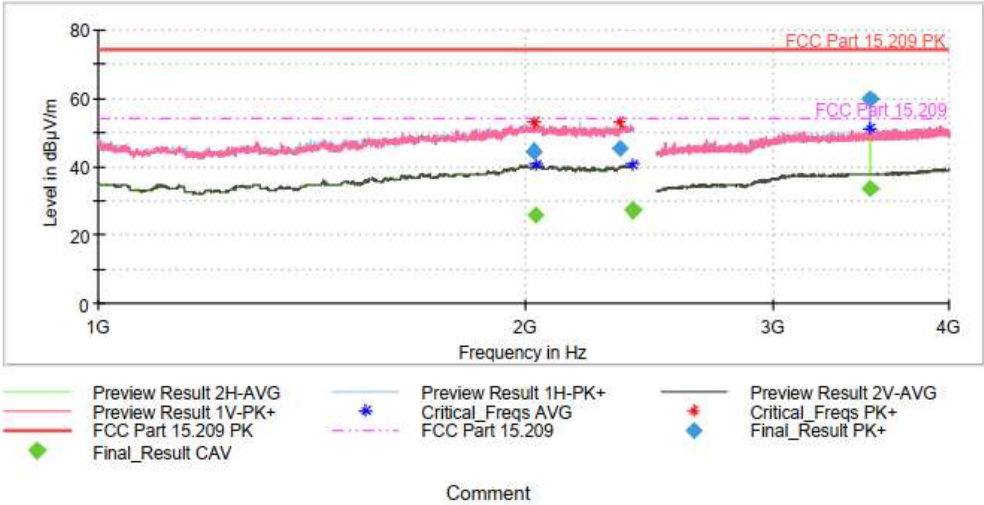


EUT Information

EUT:
Operating Mode:

CT MIDI I
Uin: 120 V 60 Hz; TX 2440 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
2031.250000	44.79	---	74.00	29.21	175.0	V	-7.0
2038.500000	---	26.04	54.00	27.96	175.0	H	-16.0
2338.250000	45.59	---	74.00	28.41	175.0	H	7.0
2389.250000	---	27.12	54.00	26.88	175.0	H	-12.0
3519.000000	---	33.39	54.00	20.61	175.0	H	18.0
3519.000000	60.00	---	74.00	14.00	175.0	H	18.0

EUT Information

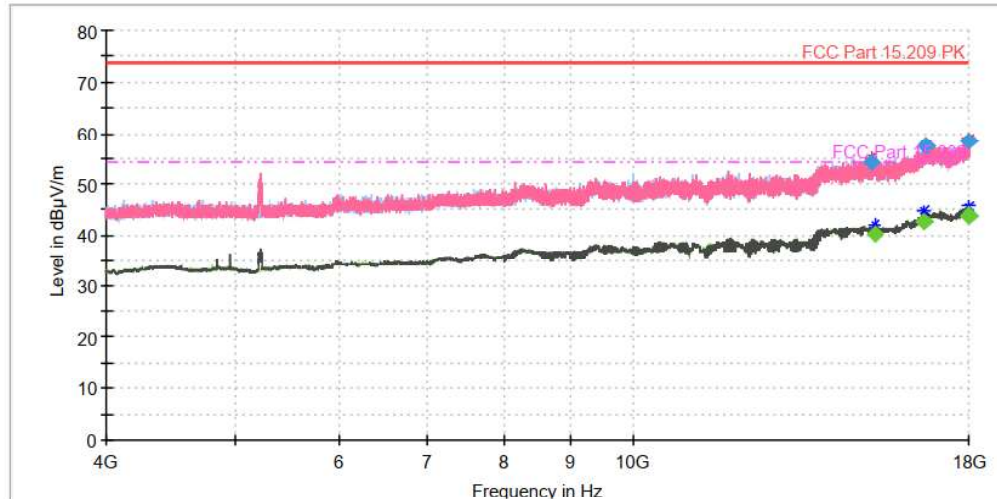
EUT:

CT MIDI I

Operating Mode:

Uin: 120 V 60 Hz; TX 2440 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
15173.000000	54.09	---	74.00	19.91	175.0	H	0.0
15249.250000	---	40.25	54.00	13.75	175.0	V	200.0
16636.250000	---	42.50	54.00	11.50	175.0	H	0.0
16654.750000	57.61	---	74.00	16.39	175.0	H	297.0
17999.000000	58.38	---	74.00	15.62	175.0	H	0.0
18000.000000	---	43.72	54.00	10.28	175.0	H	0.0

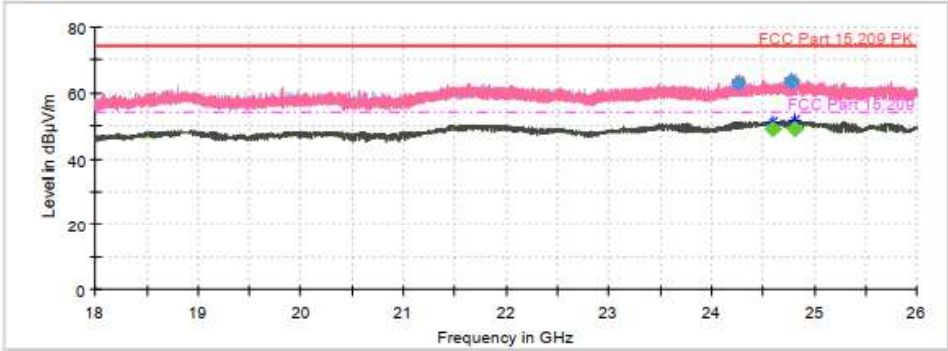


EUT Information

EUT:
Operating Mode:

CT MIDI I
Uin: 120 V 60 Hz; TX 2440 MHz

Full Spectrum



Preview Result 2H-AVG

Preview Result 1V-PK+

FCC Part 15.209 PK

Final_Result CAV

Preview Result 1H-PK+

Critical_Freqs AVG

FCC Part 15.209

Preview Result 2V-AVG

Critical_Freqs PK+

Final_Result PK+

Comment

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
24265.250000	62.99	---	74.00	11.01	175.0	V	0.0
24602.500000	---	49.28	54.00	4.72	175.0	H	0.0
24772.500000	63.38	---	74.00	10.62	175.0	V	0.0
24801.500000	---	49.23	54.00	4.77	175.0	V	0.0

Channel 2480 MHz:

EUT Information

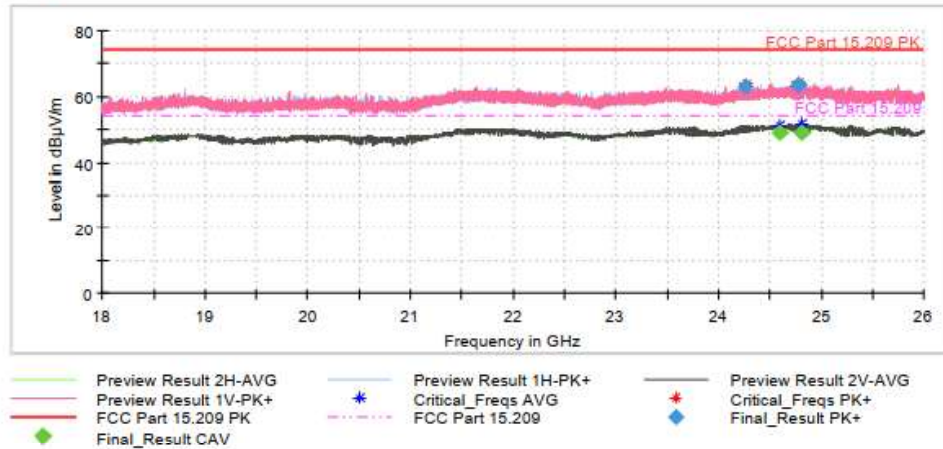
EUT:

CT MIDI I

Operating Mode:

Uin: 120 V 60 Hz; TX 2440 MHz

Full Spectrum



Comment

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
24265.250000	62.99	---	74.00	11.01	175.0	V	0.0
24602.500000	---	49.20	54.00	4.72	175.0	H	0.0
24772.500000	63.38	---	74.00	10.62	175.0	V	0.0
24801.500000	---	49.23	54.00	4.77	175.0	V	0.0

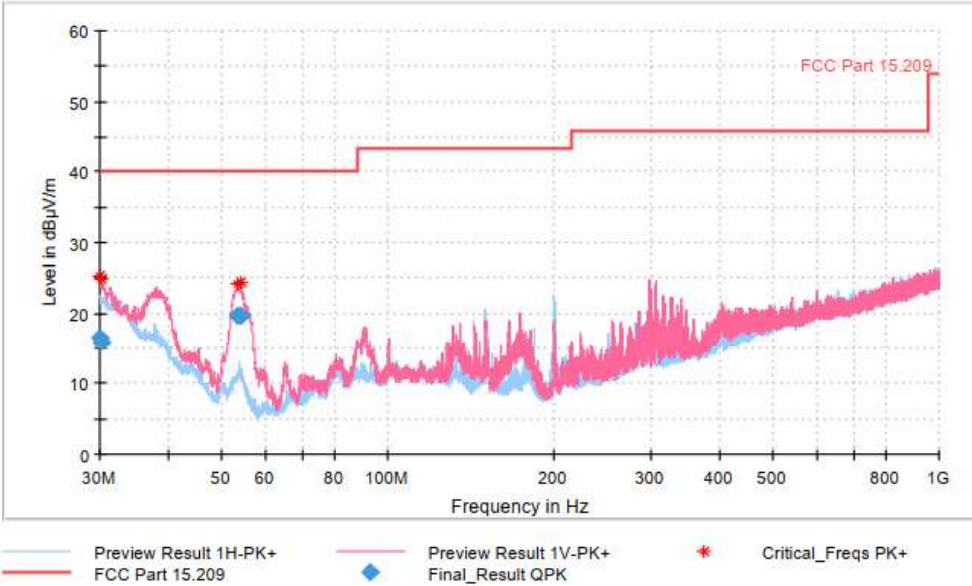


EUT Information

EUT:
Operating mode:

CT MIDI I
TX 2480 MHz

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.030000	16.47	40.00	23.53	1000.0	120.000	100.0	V	358.0	19.7
30.120000	15.93	40.00	24.07	1000.0	120.000	100.0	V	5.0	19.6
53.280000	19.73	40.00	20.27	1000.0	120.000	100.0	V	358.0	6.1
54.030000	19.62	40.00	20.38	1000.0	120.000	100.0	V	32.0	6.0

EUT Information

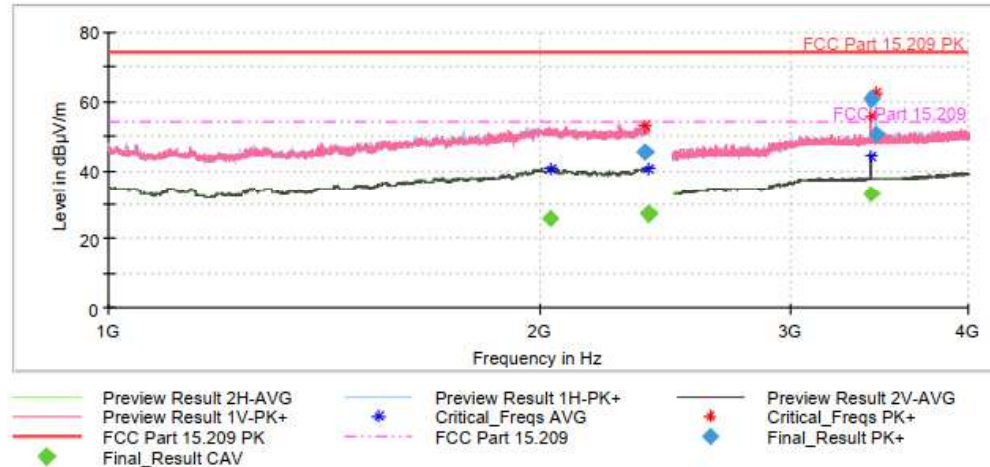
EUT:

CT MIDI I

Operating Mode:

Uin: 120 V 60 Hz; TX 2480 MHz

Full Spectrum



Comment

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
2036.750000	---	26.06	54.00	27.94	175.0	H	-10.0
2375.500000	45.66	---	74.00	28.34	175.0	H	-6.0
2387.750000	---	27.12	54.00	26.88	175.0	V	9.0
3421.000000	---	33.17	54.00	20.83	175.0	V	18.0
3421.000000	60.75	---	74.00	13.25	175.0	V	18.0
3447.000000	50.31	---	74.00	23.69	175.0	H	4.0

EUT Information

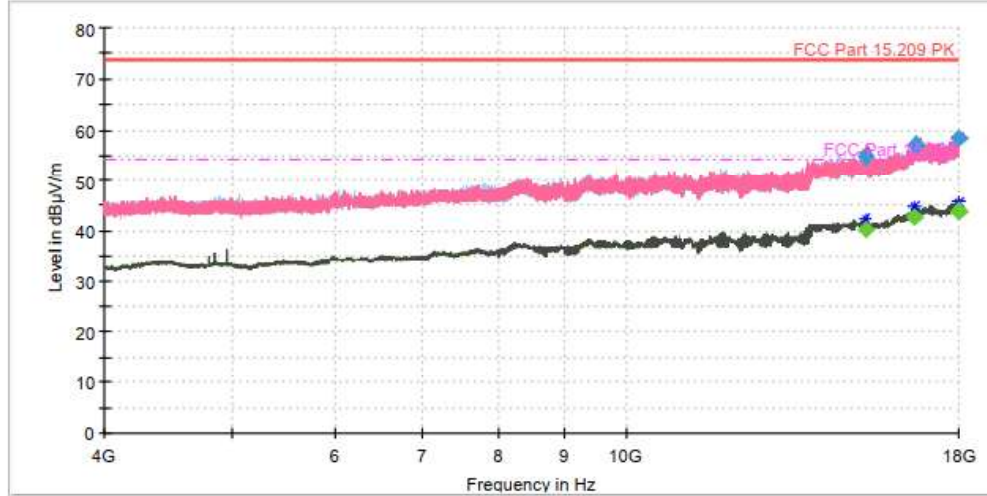
EUT:

CT MIDI I

Operating Mode:

Uin: 120 V 60 Hz; TX 2480 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
15250.750000	---	40.26	54.00	13.74	175.0	V	67.0
15260.750000	54.88	---	74.00	19.12	175.0	H	0.0
16638.500000	---	42.56	54.00	11.44	175.0	H	39.0
16651.250000	57.24	---	74.00	16.76	175.0	V	206.0
17998.000000	58.26	---	74.00	15.74	175.0	H	39.0
17999.000000	---	43.80	54.00	10.20	175.0	H	0.0

EUT Information

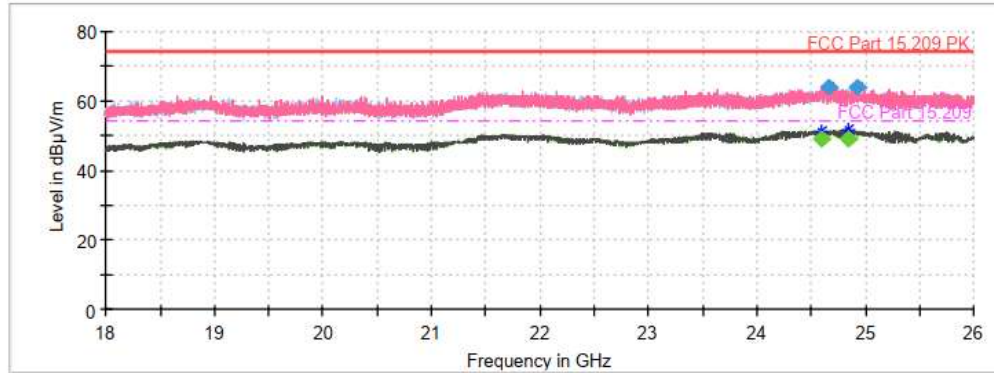
EUT:

CT MIDI I

Operating Mode:

Uin: 120 V 60 Hz; TX 2480 MHz

Full Spectrum



— Preview Result 2H-AVG — Preview Result 1H-PK+ Critical_Freqs AVG — Preview Result 2V-AVG Critical_Freqs PK+
— Preview Result 1V-PK+ — FCC Part 15.209 — Final_Result PK+
◆ Final_Result CAV

Comment

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
24604.500000	---	49.34	54.00	4.66	175.0	V	0.0
24657.000000	63.87	---	74.00	10.13	175.0	H	0.0
24832.000000	---	49.21	54.00	4.79	175.0	V	0.0
24923.000000	64.05	---	74.00	9.95	175.0	V	0.0



3.5 47 CFR § 15.247 (a) (2) – 6 dB Emission Bandwidth

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

3.5.1 Test procedure

According to ANSI C63.10-2013:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (OBW/RBW)]$ below the reference level. Specific guidance is given in 4.1.5.2.
- d) Steps a) through c) might require iteration to adjust within the specified tolerances.
- e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
- f) Set detection mode to peak and trace mode to max hold.
- g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyser marker to the highest level of the displayed trace (this is the reference value).
- h) Determine the “-xx dB down amplitude” using $[(\text{reference value}) - xx]$. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
- i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyser and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
- j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the “-xx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
- k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

3.5.2 Test setup

For the test setup refer to chapter 1.4.

3.5.3 Test equipment

For the test setup refer to chapter 1.3.

3.5.4 Test results

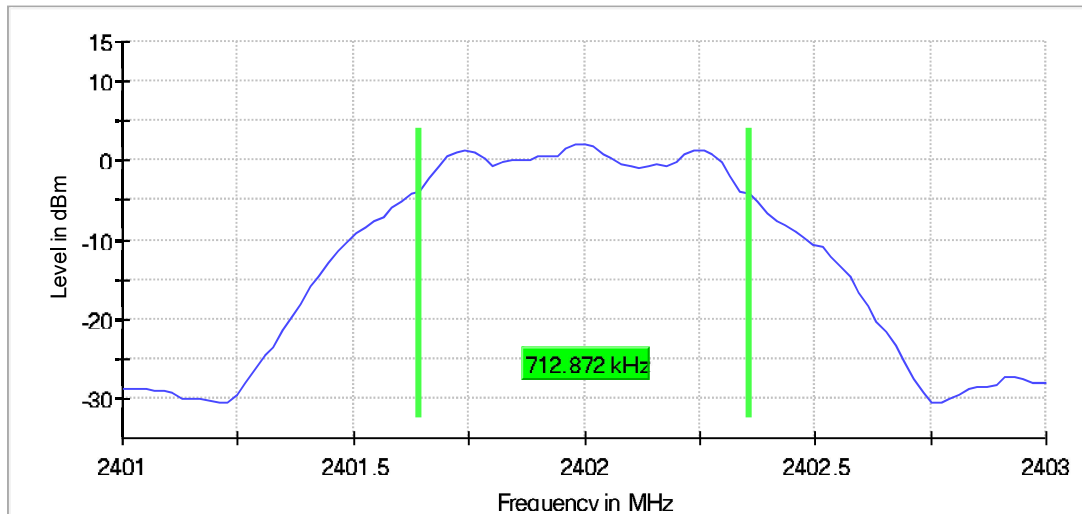
Channel 2402 MHz:

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	0.712872	0.500000	---	2401.643564	2402.356436

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	2.0	PASS

6 dB Bandwidth



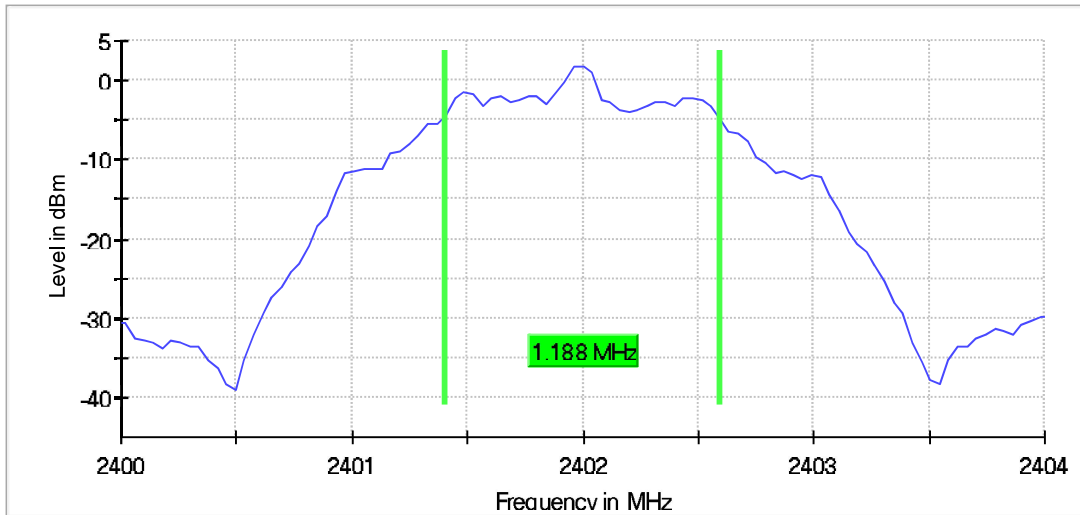


DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	1.188118	0.500000	---	2401.405941	2402.594059

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	1.8	PASS

6 dB Bandwidth





Channel 2440 MHz:

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	0.732674	0.500000	---	2439.623762	2440.356436

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2440.000000	2.3	PASS

6 dB Bandwidth

