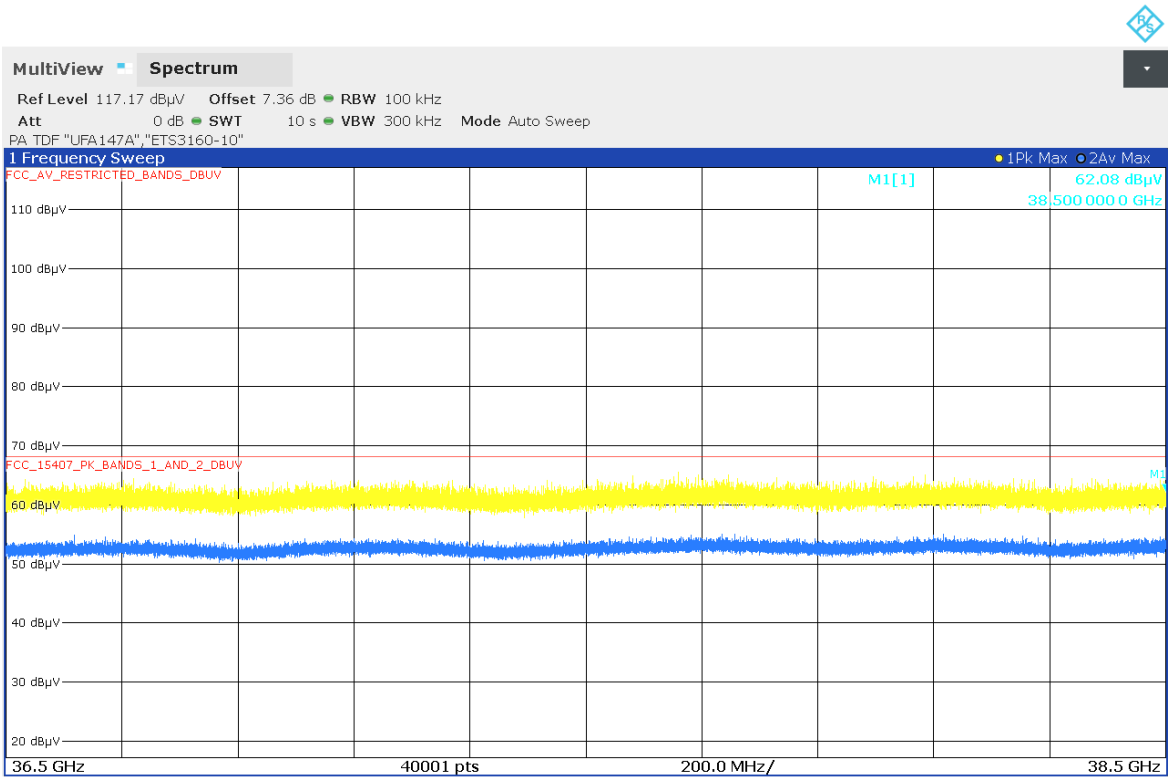
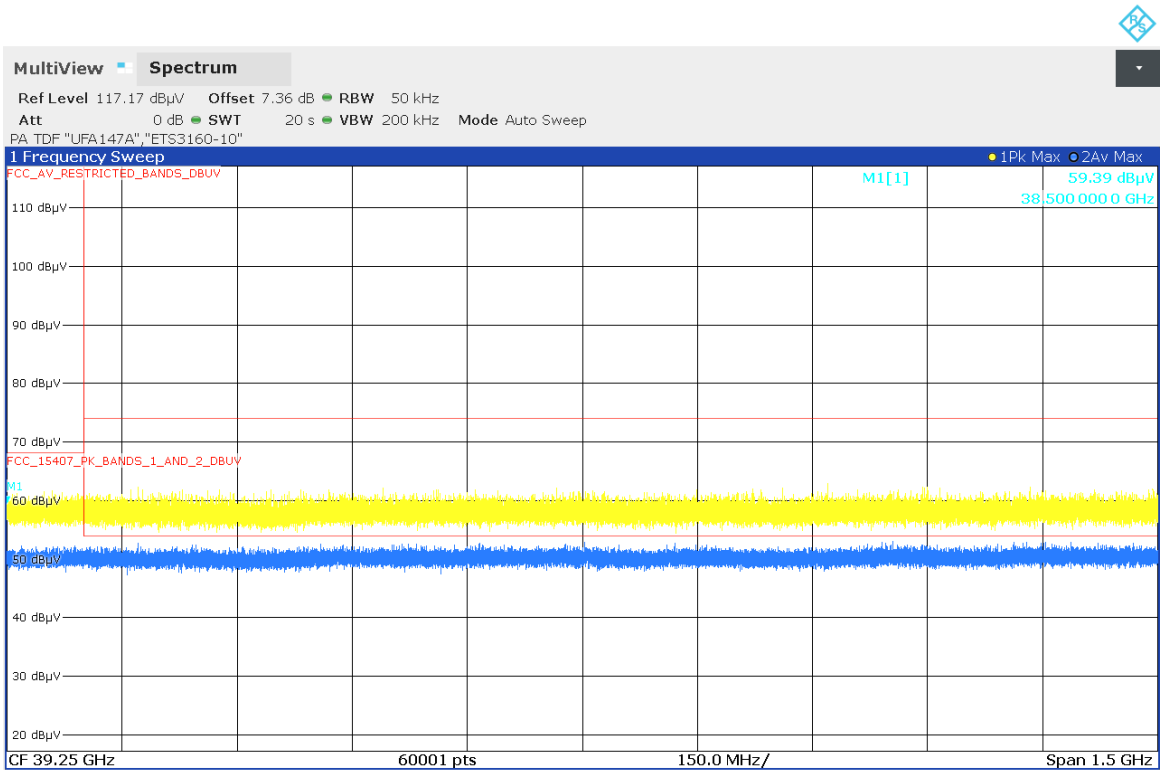


04:55:09 PM 11/12/2024

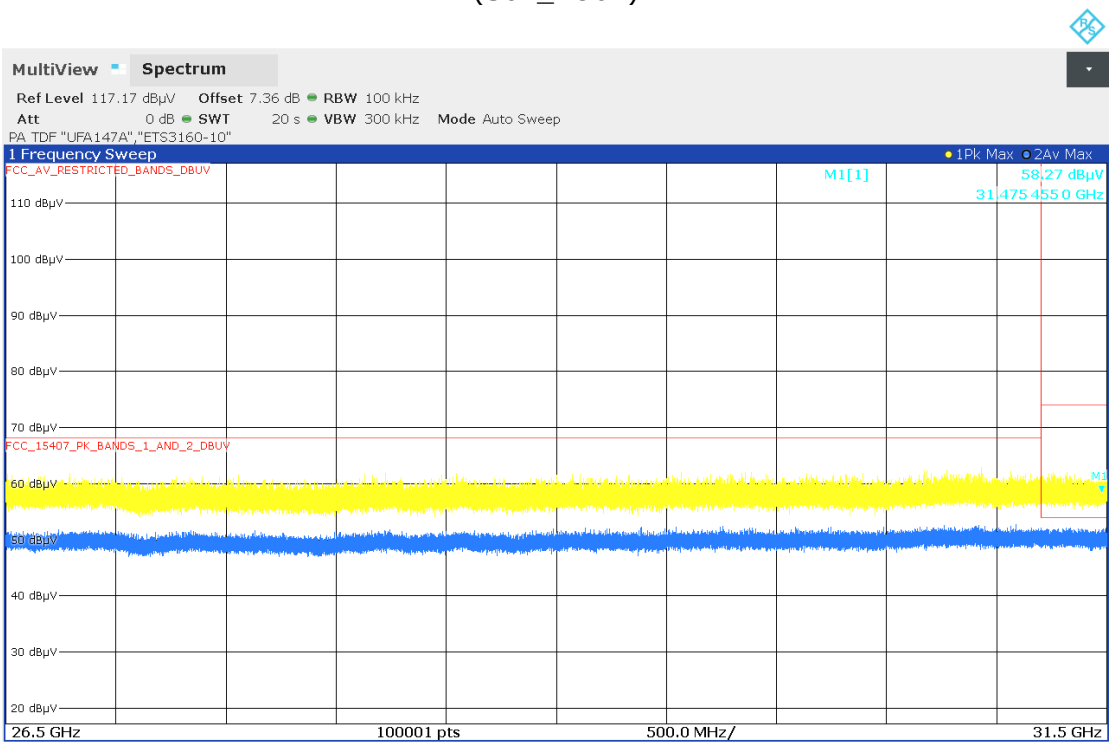
36.5 GHz – 38.5 GHz



04:56:28 PM 11/12/2024

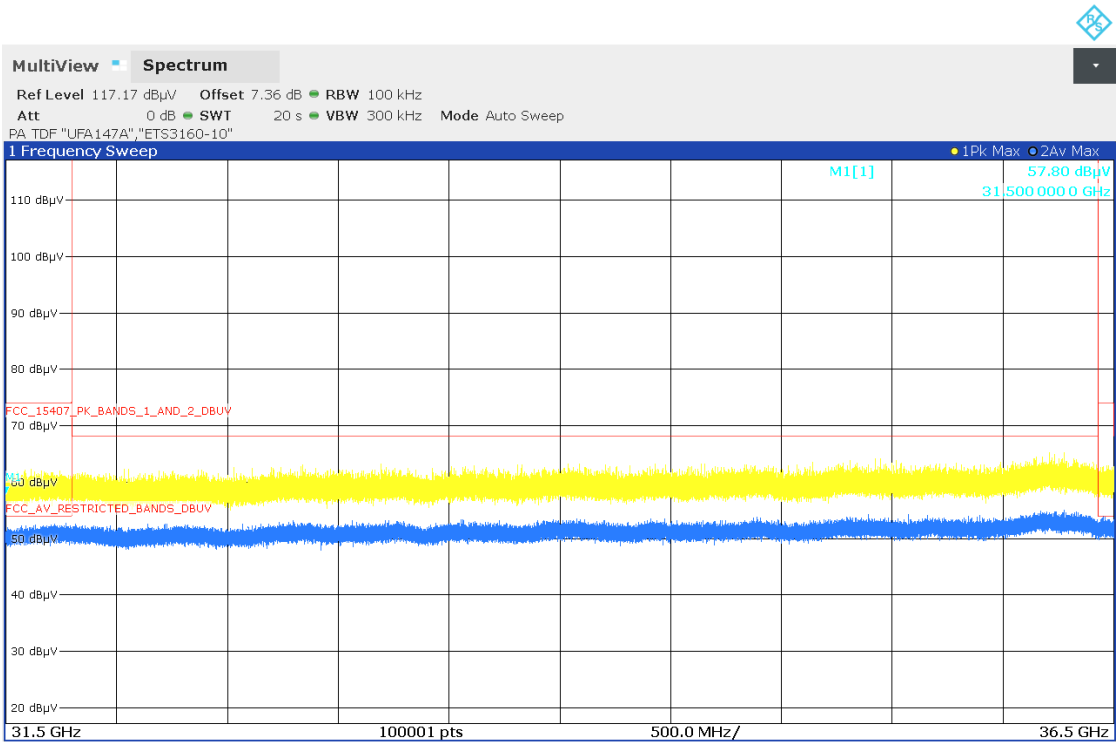
38.5 GHz – 40.0 GHz

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 26.5 GHz -40 GHz, Polarisation = horizontal (S02_AO04)



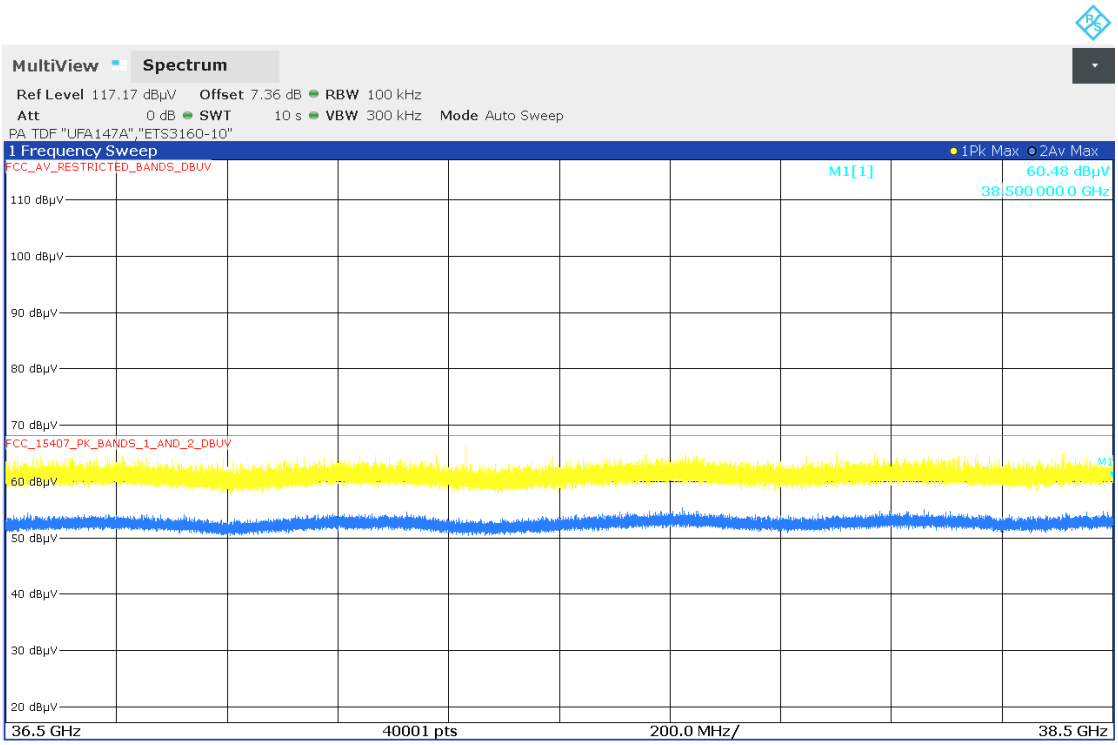
05:02:47 PM 11/12/2024

26.5 GHz – 31.5 GHz



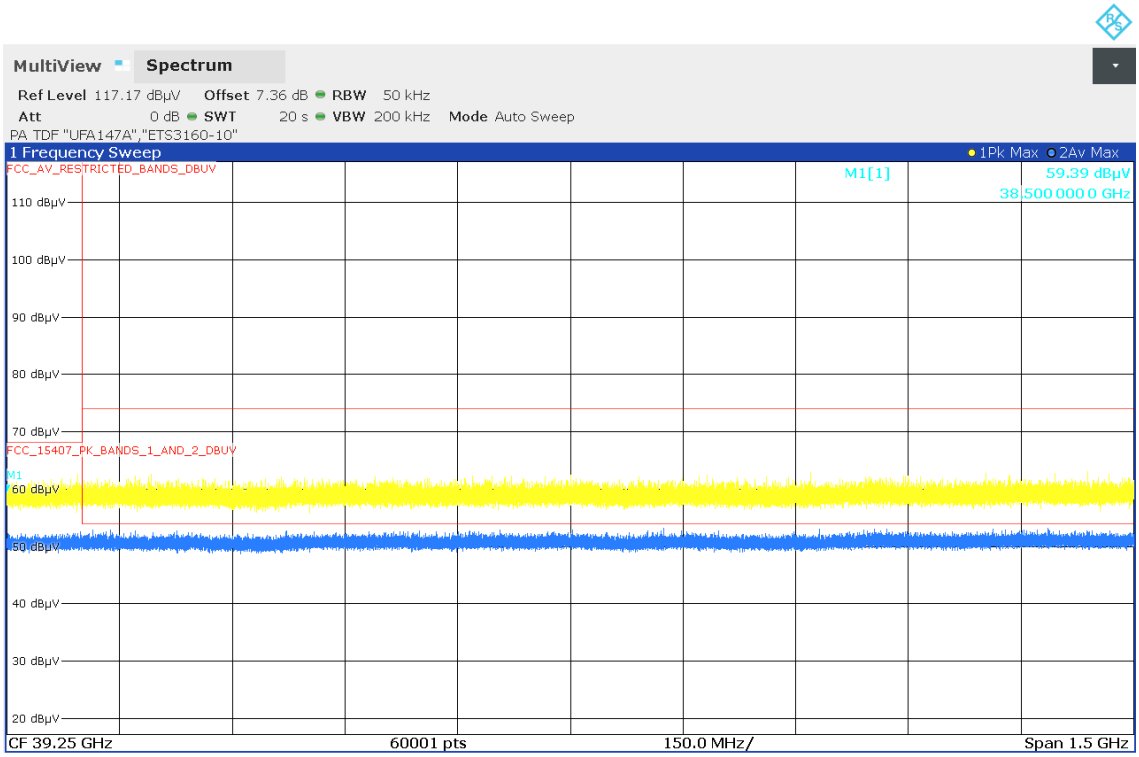
05:01:08 PM 11/12/2024

31.5 GHz – 36.5 GHz



04:59:45 PM 11/12/2024

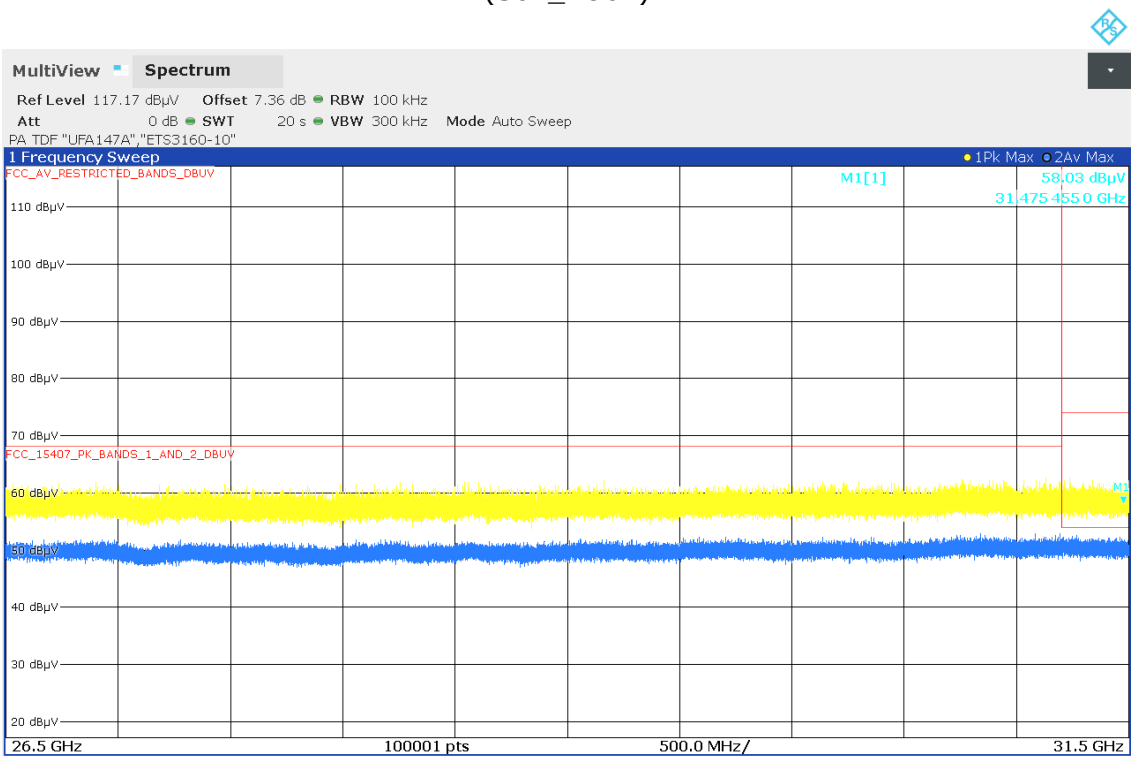
36.5 GHz – 38.5 GHz



04:58:29 PM 11/12/2024

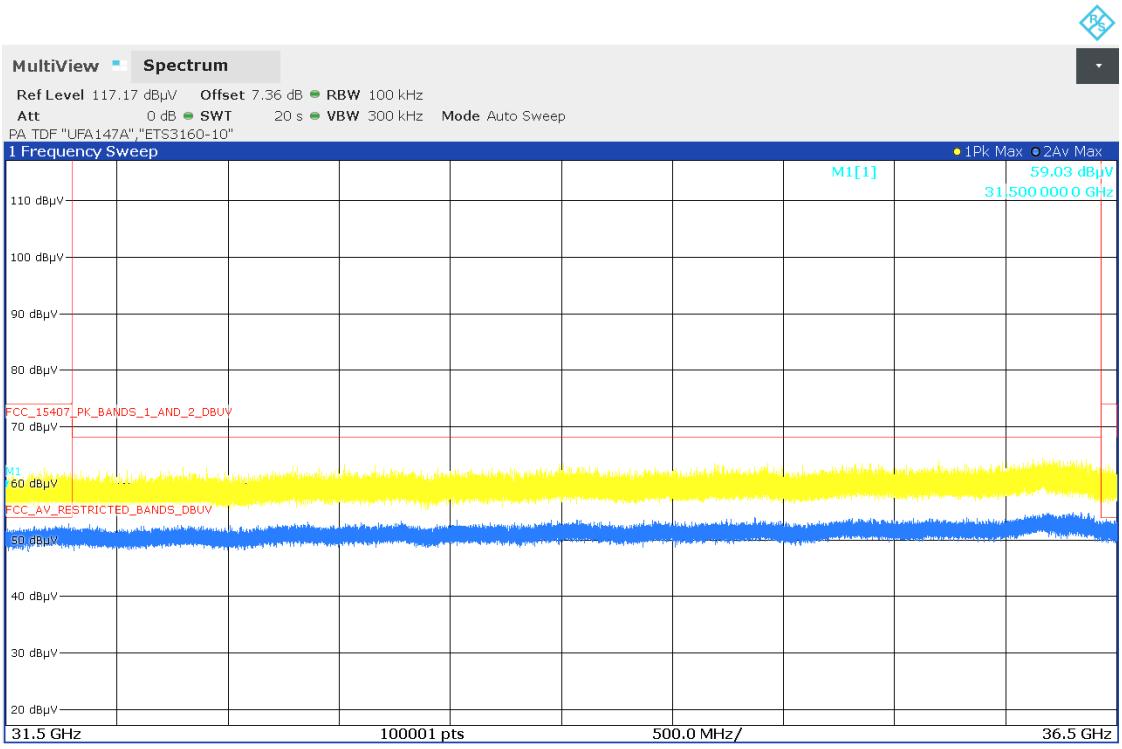
38.5 GHz – 40.0 GHz

Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-1, Frequency Range =26.5 GHz -40 GHz, Polarisation = horizontal (S02_AO04)



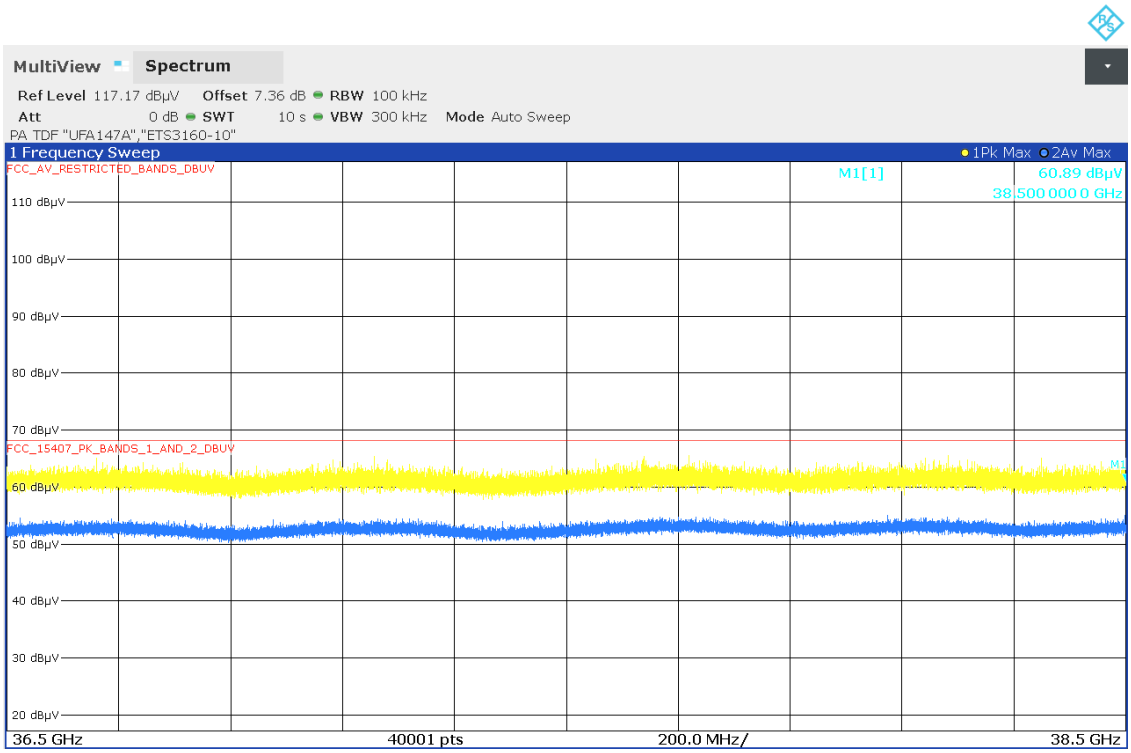
04:50:07 PM 11/12/2024

26.5 GHz – 31.5 GHz



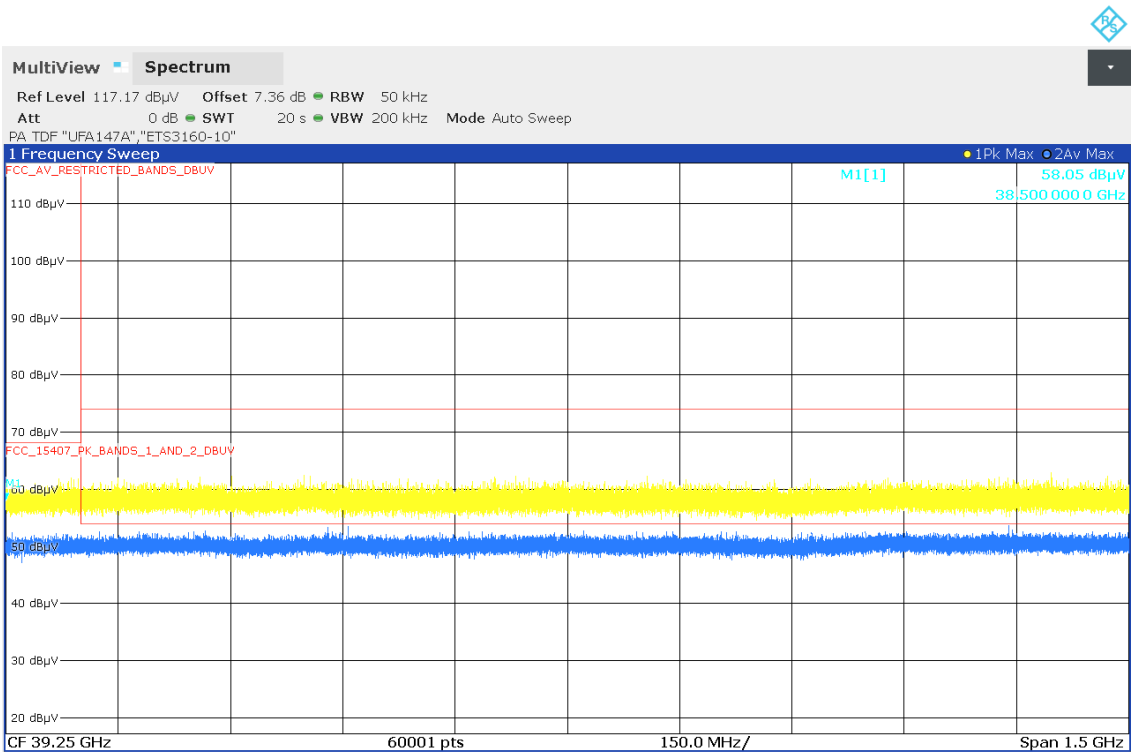
04:48:23 PM 11/12/2024

31.5 GHz – 36.5 GHz



04:46:57 PM 11/12/2024

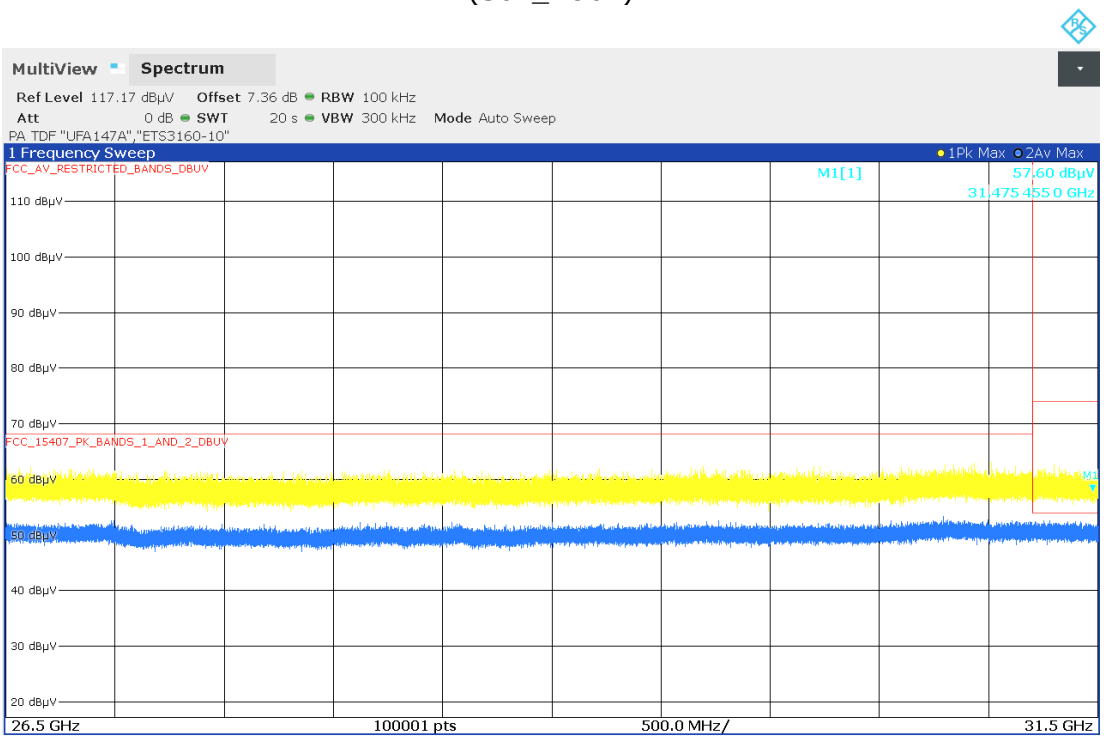
36.5 GHz – 38.5 GHz



04:44:24 PM 11/12/2024

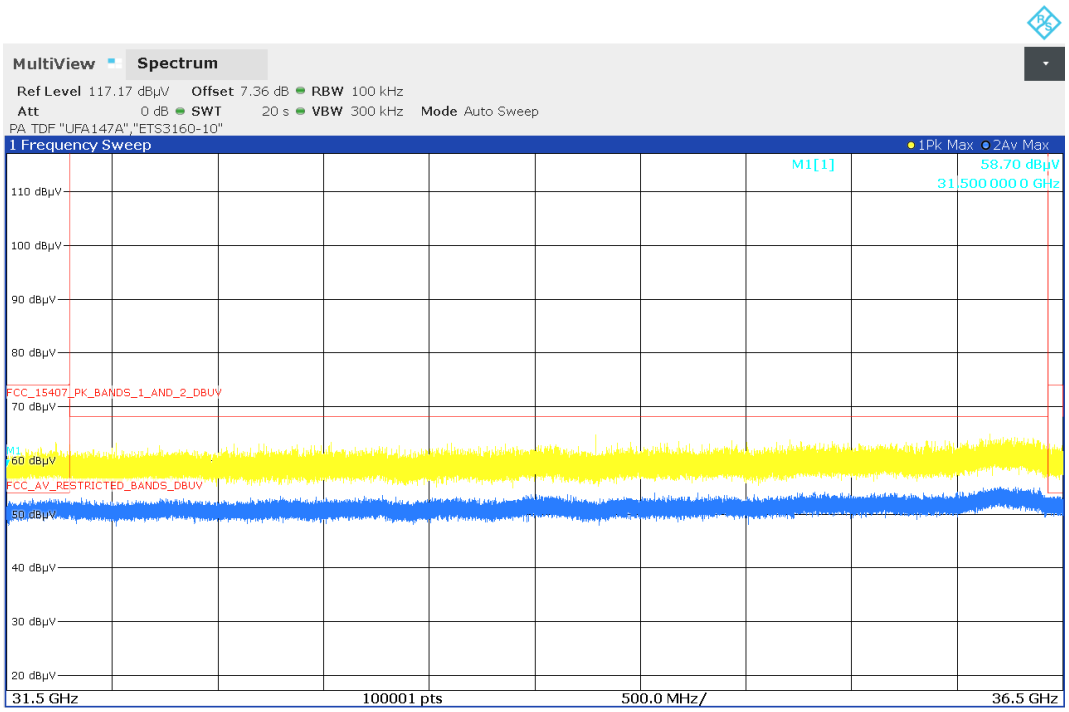
38.5 GHz – 40.0 GHz

Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 26.5 GHz -40 GHz, Polarisation = horizontal (S02_AO04)



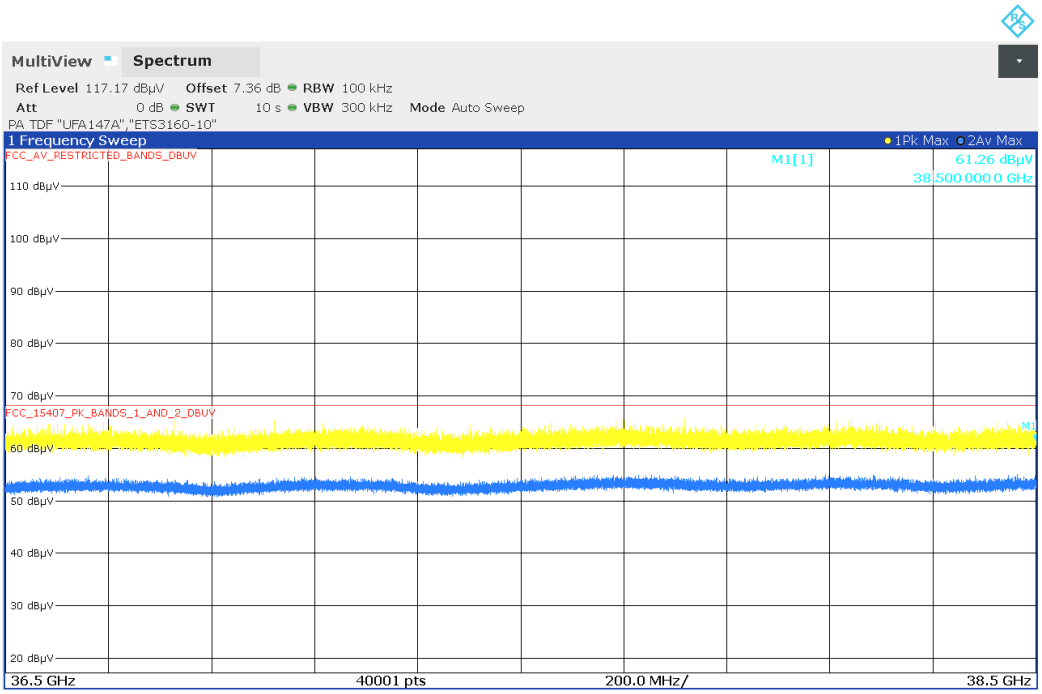
04:32:18 PM 11/12/2024

26.5 GHz – 31.5 GHz



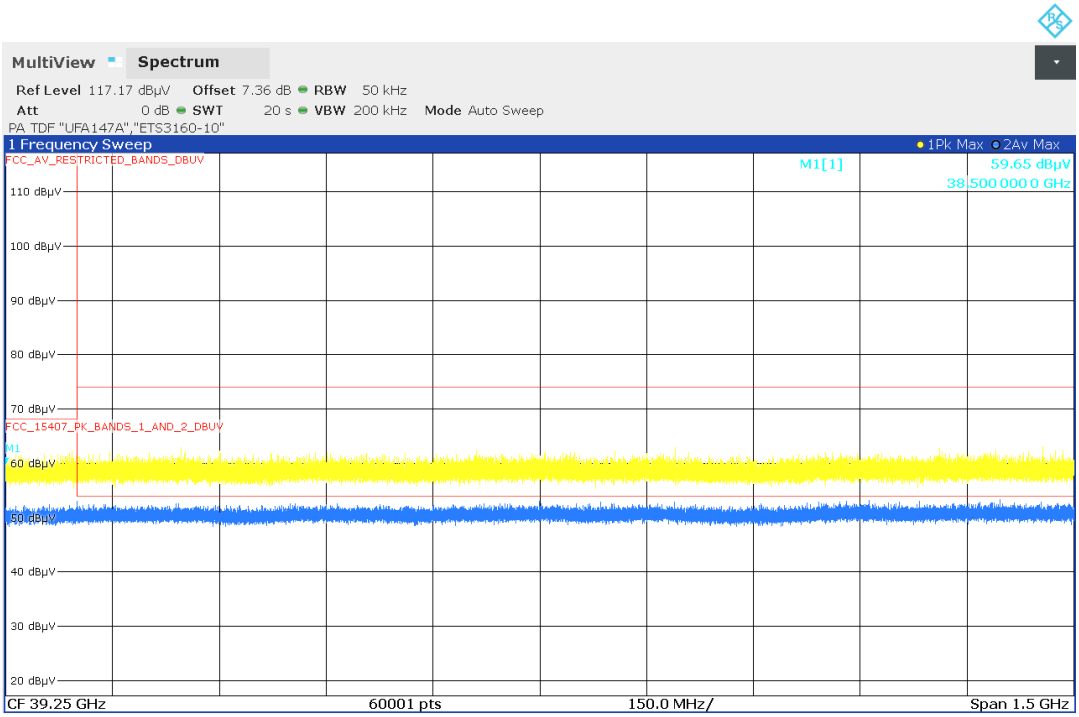
04:34:23 PM 11/12/2024

31.5 GHz – 36.5 GHz



04:37:50 PM 11/12/2024

36.5 GHz – 38.5 GHz



04:42:00 PM 11/12/2024

38.5 GHz – 40.0 GHz

5.3.5 TEST PROTOCOL - NÜRNBERG

Ambient temperature: 19 °C
Air Pressure: 986 hPa
Humidity: 50 %

WLAN a-Mode; 20 MHz; 6 Mbit/s
Applied duty cycle correction (AV): 0.6 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
-	-	-	-	-	-	-	-	-

WLAN n-Mode; 20 MHz; MCS0
Applied duty cycle correction (AV): 0.5 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
-	-	-	-	-	-	-	-	-

WLAN n-Mode; 40 MHz; MCS0
Applied duty cycle correction (AV): 0.5 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
-	-	-	-	-	-	-	-	-

WLAN ac-Mode; 20 MHz; MCS0
Applied duty cycle correction (AV): 0.5 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
-	-	-	-	-	-	-	-	-

WLAN ac-Mode; 40 MHz; MCS0
Applied duty cycle correction (AV): 0.5 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
-	-	-	-	-	-	-	-	-

WLAN ac-Mode; 80 MHz; MCS0
Applied duty cycle correction (AV): 0.5 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
-	-	-	-	-	-	-	-	-

WLAN ax-Mode; 20 MHz; MCS0
Applied duty cycle correction (AV): 1.3 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
-	-	-	-	-	-	-	-	-

WLAN ax-Mode; 40 MHz; MCS0
Applied duty cycle correction (AV): 1.3 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
-	-	-	-	-	-	-	-	-

WLAN ax-Mode; 80 MHz; MCS0
Applied duty cycle correction (AV): 1.3 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
-	-	-	-	-	-	-	-	-

COMMENT:

- There have not found any emissions from the EUT which are higher than the ambient noise in the frequency range 9 kHz – 40 GHz.
- The spectrum analyser transducers “TDF SUCOFLEX 126B”, “TDS TS_DUT_CAL” and “TDS UFA147A” contains the attenuation of the used measurement cable.
- The spectrum analyser transducers “HFH2-Z2”, “VUBA916”, “HF906_001”, ETS3160-09”, “ETS3160-10” contains the antenna factor of the used measurement antenna.
- The spectrum analyser transducer “AMP_BV_1_40G” contains the amplification of the used Low Noise Amplifier in the frequency range 26.5 GHz – 40.0 GHz.
- For this location no measurement distance correction required, because the measurement distance is equal to the limit distance (3.0 m).

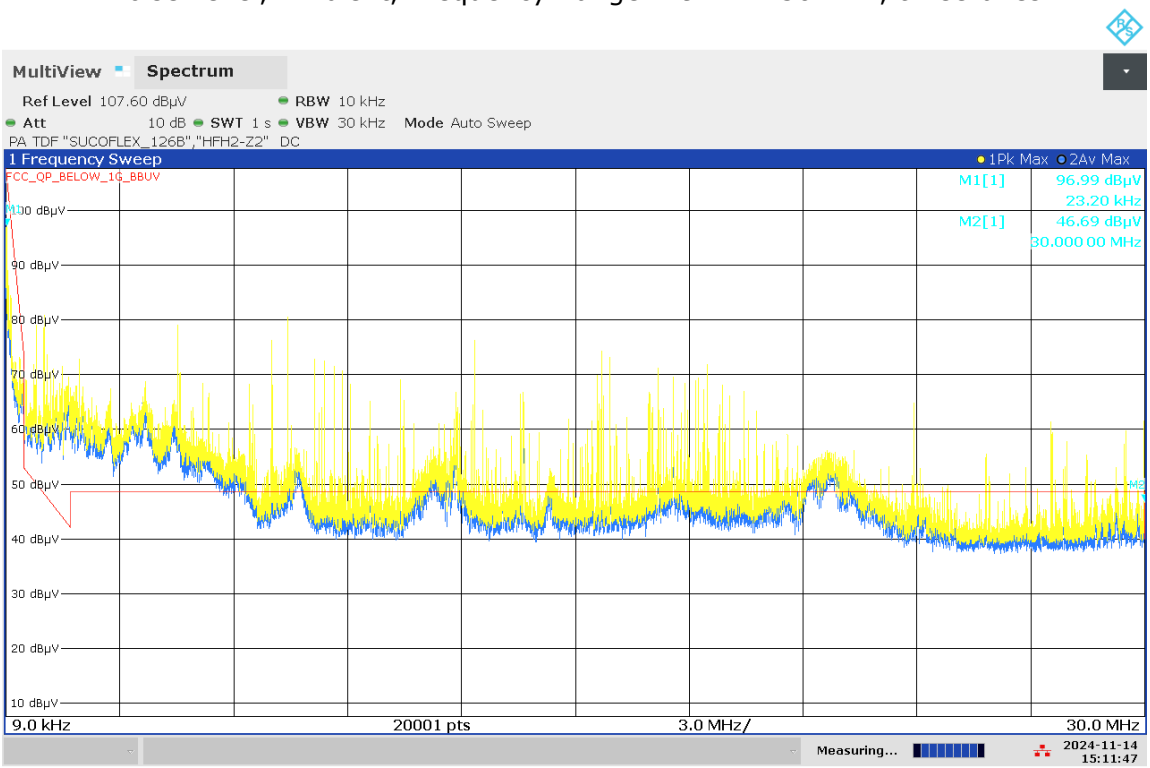
5.3.5.1 RESULTS OF WORST-CASE SEARCH

$D_{STABLE\ DECREASE}$ = 23.0 m

Worst- case receiving antenna polarisation: horizontal

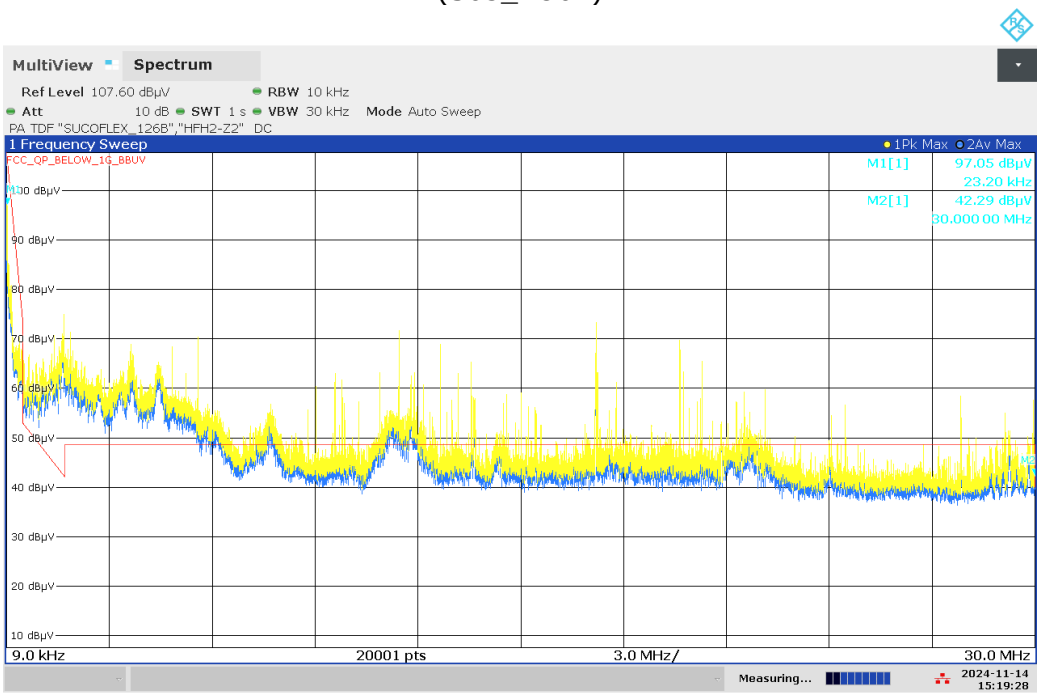
5.3.5.2 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Noise Level, Ambient, Frequency Range = 9 kHz -30 MHz, three-axes



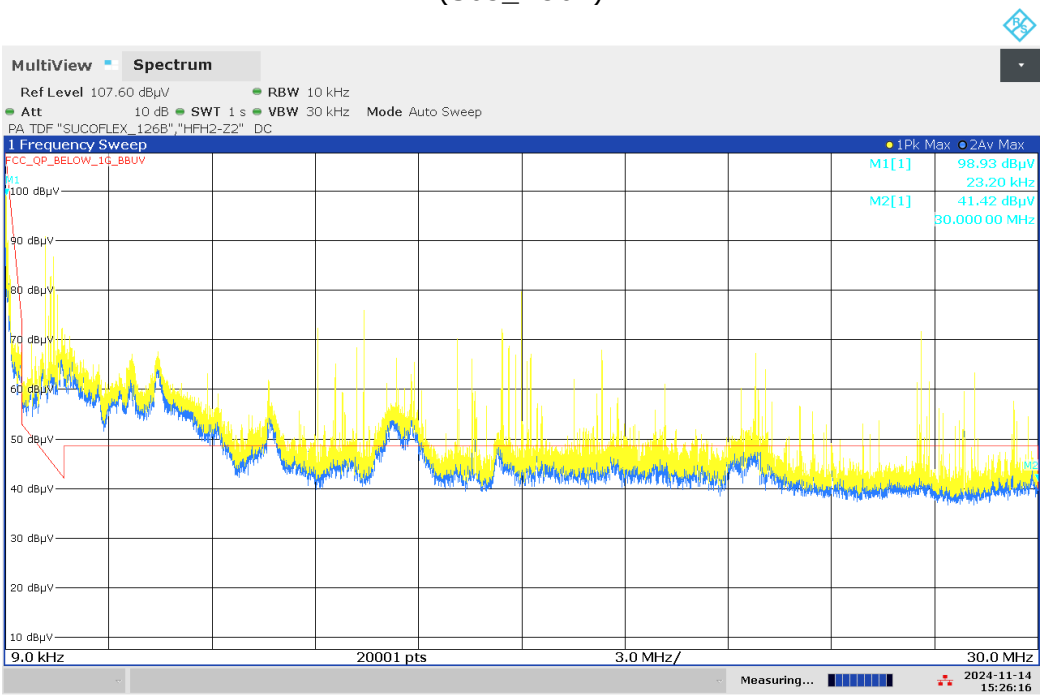
03:11:47 PM 11/14/2024

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 9 kHz – 30 MHz, three-axes
(S03_AO04)



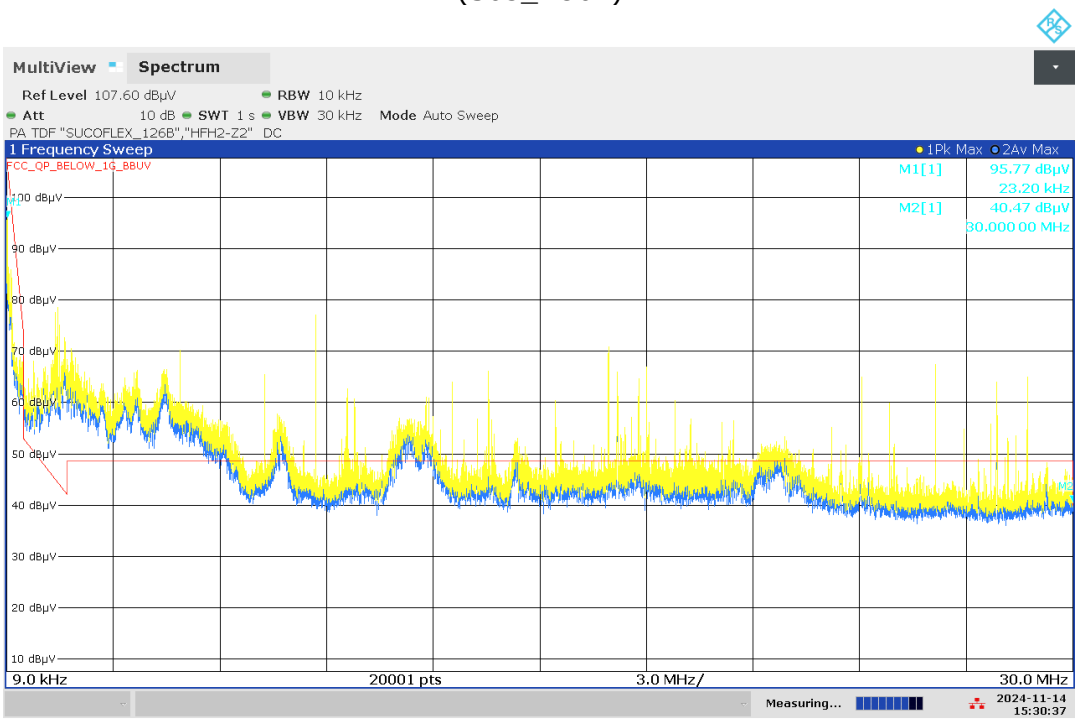
03:19:29 PM 11/14/2024

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 9 kHz – 30 MHz, three-axes
(S03_AO04)



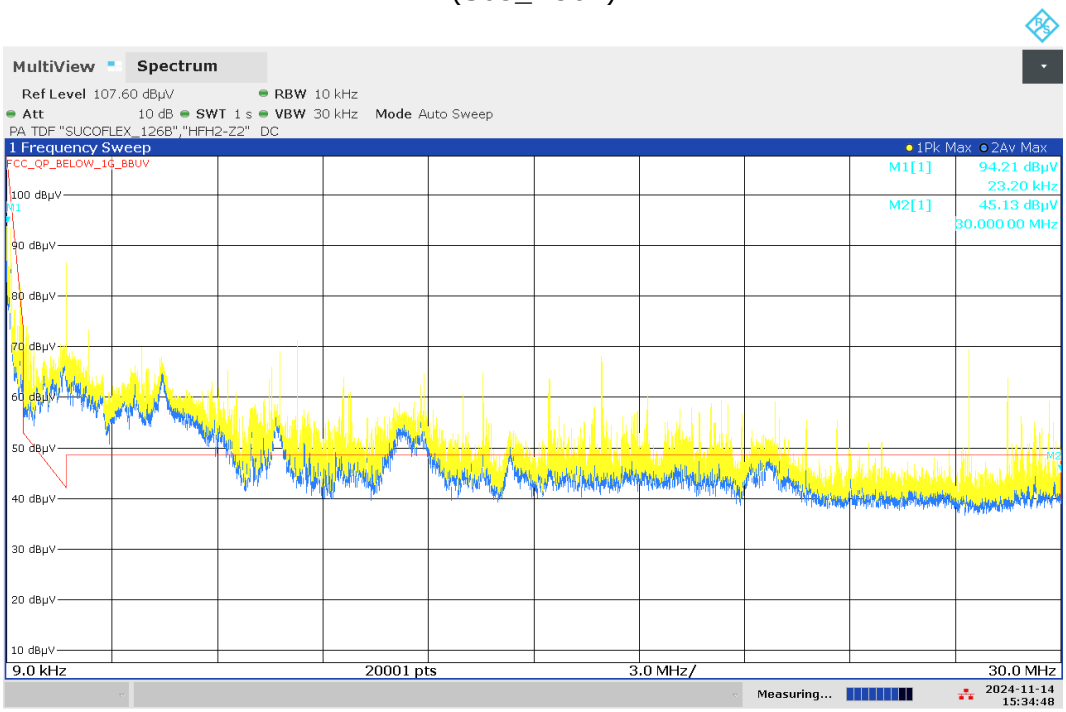
03:26:17 PM 11/14/2024

Radio Technology = WLAN ax 20 MHz, Operating Frequency = mid, Subband = U-NII-1
Frequency Range = 9 kHz – 30 MHz, three-axes
(S03_AO04)



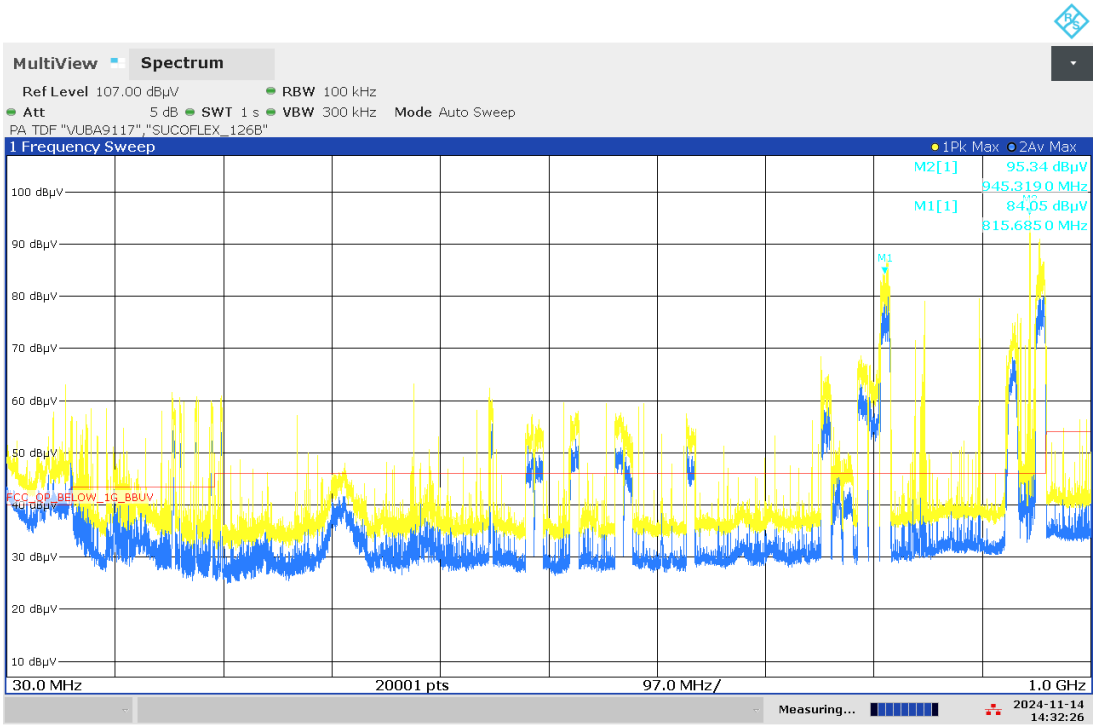
03:30:37 PM 11/14/2024

Radio Technology = WLAN ax 20 MHz, Operating Frequency = mid, Subband = U-NII-3
Frequency Range = 9 kHz – 30 MHz, three-axes
(S03_AO04)



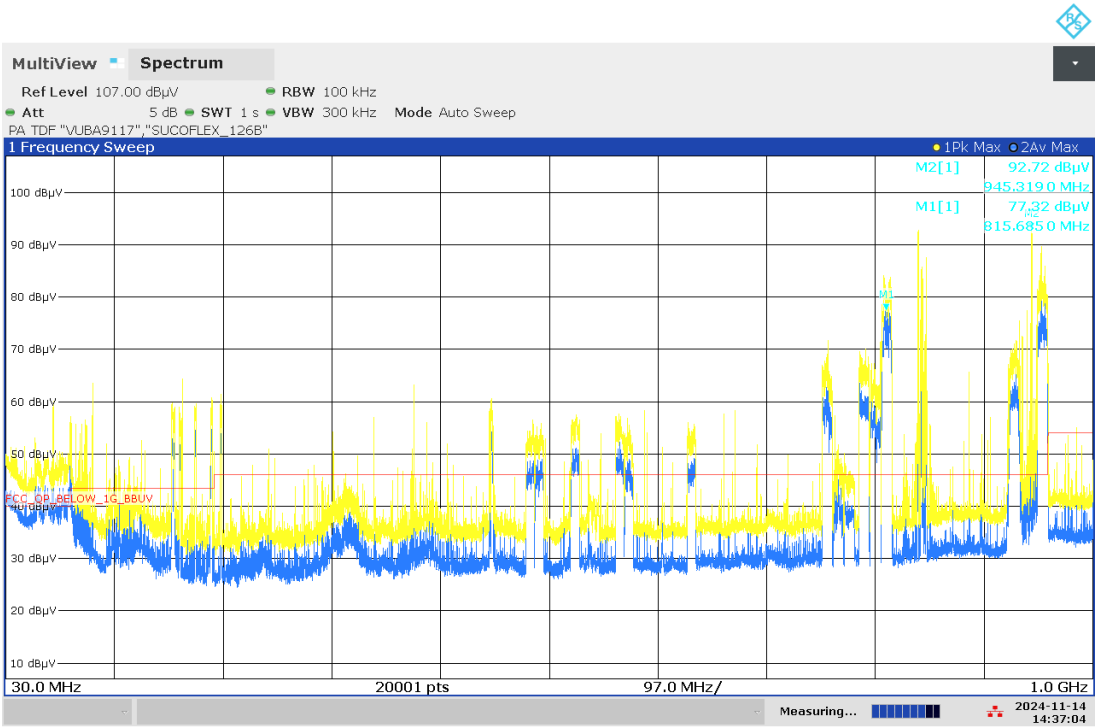
03:34:48 PM 11/14/2024

Noise Level, Ambient, Frequency Range = 30 MHz -1 GHz, Polarisation = horizontal



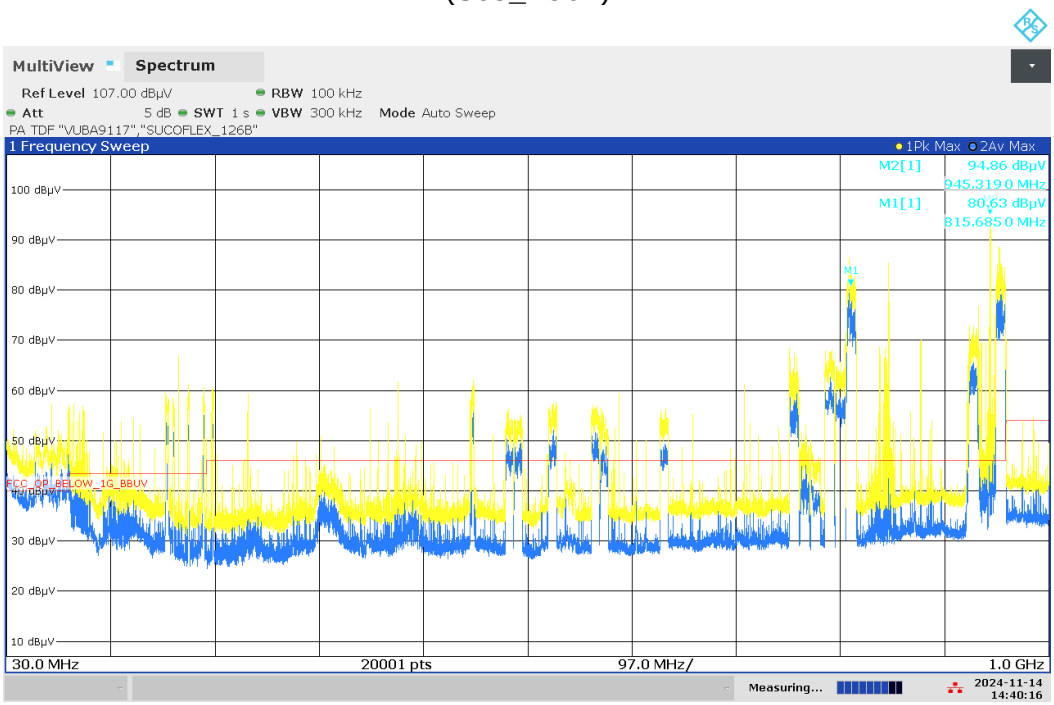
02:32:26 PM 11/14/2024

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 30 MHz – 1 GHz, Polarisation = horizontal (S03_AO04)



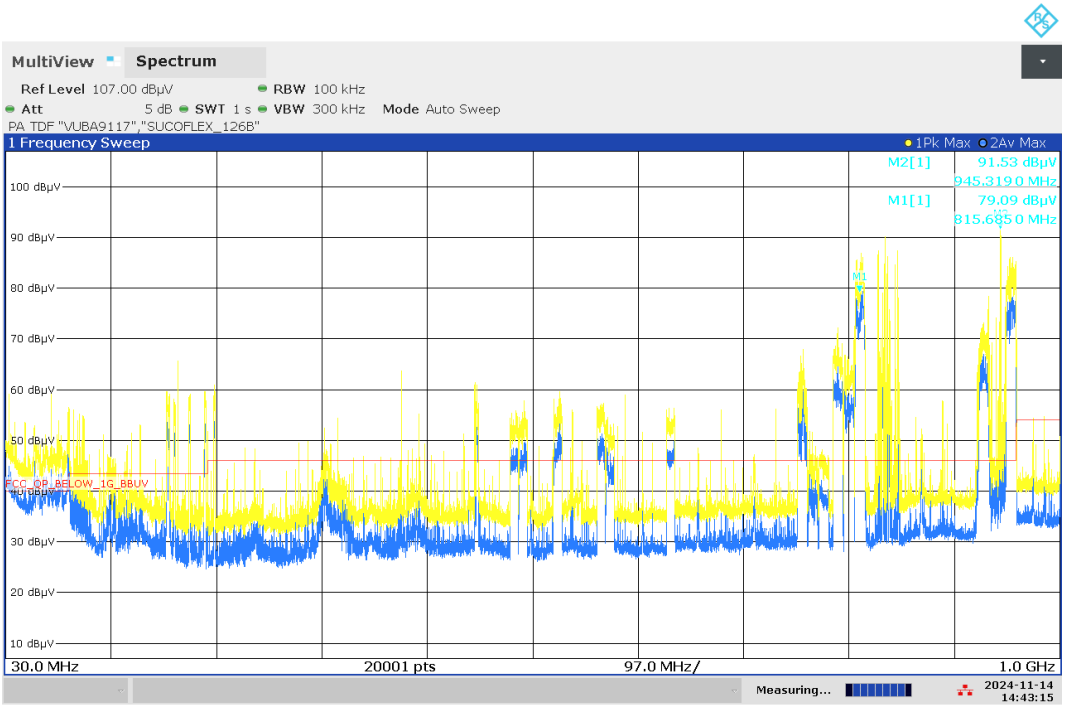
02:37:04 PM 11/14/2024

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 30 MHz – 1 GHz, Polarisation = horizontal (S03_AO04)



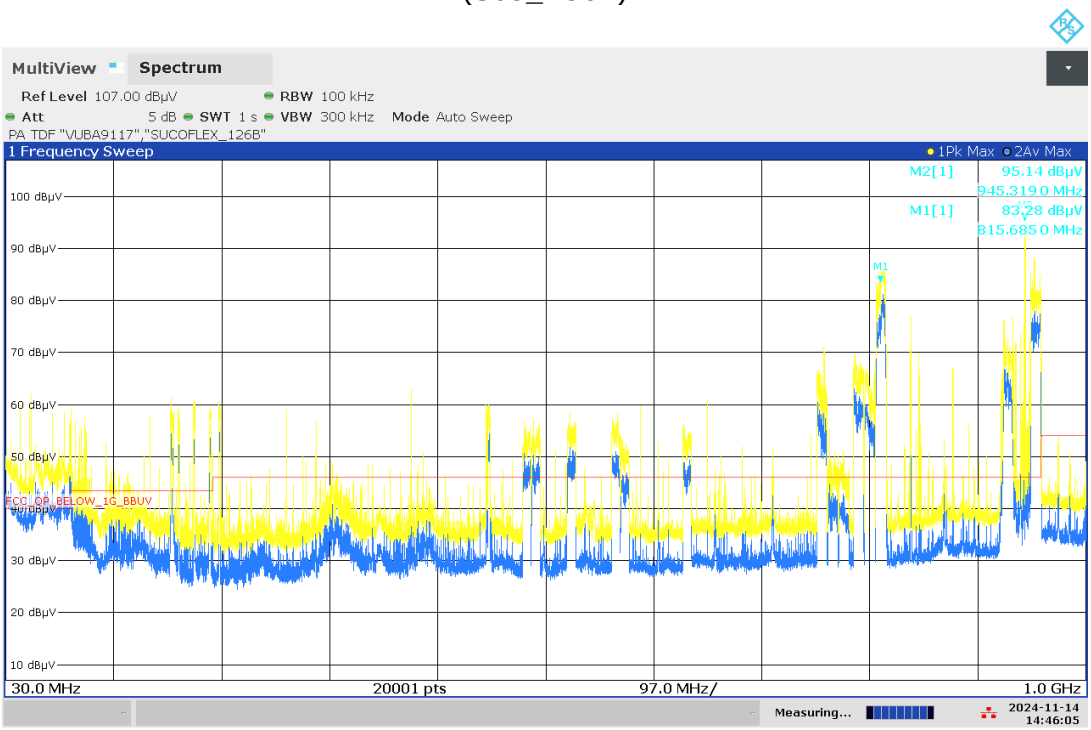
02:40:16 PM 11/14/2024

Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 30 MHz – 1 GHz, Polarisation = horizontal (S03_AO04)



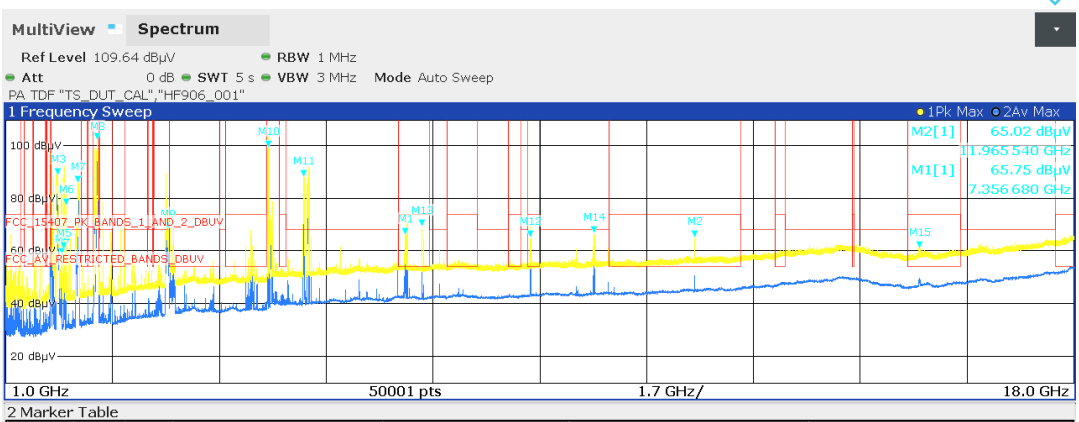
02:43:15 PM 11/14/2024

Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 30 MHz – 1 GHz, Polarisation = horizontal
(S03_AO04)



02:46:06 PM 11/14/2024

(Noise_1G_18G_2)
Noise Level, Ambient, Frequency Range = 1 GHz -18 GHz, Polarisation = horizontal

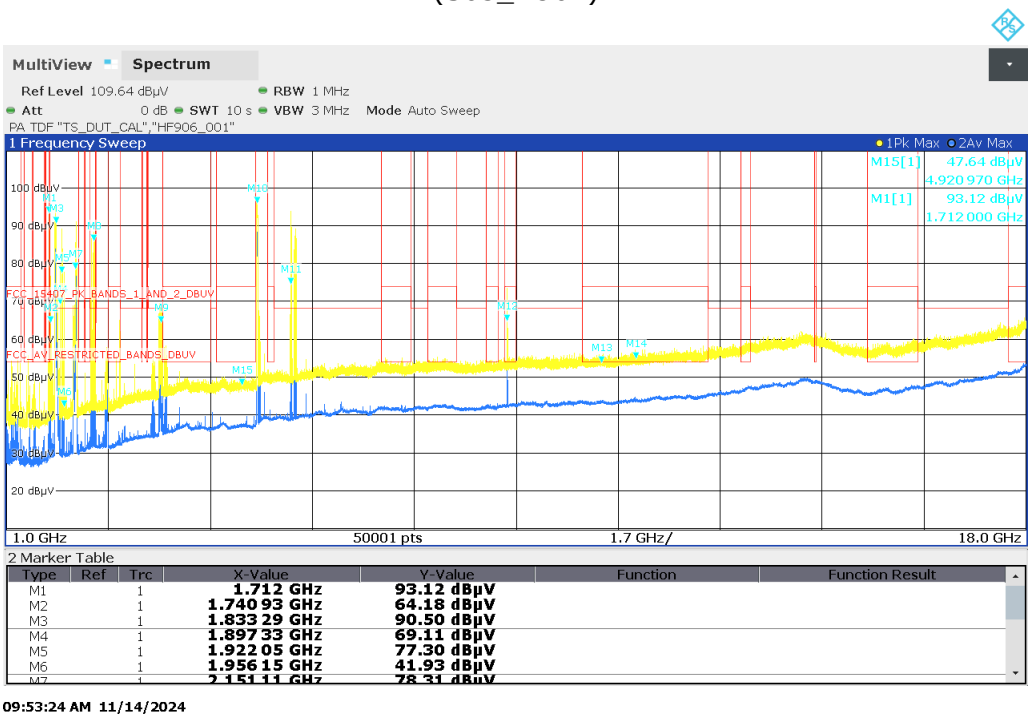


2 Marker Table

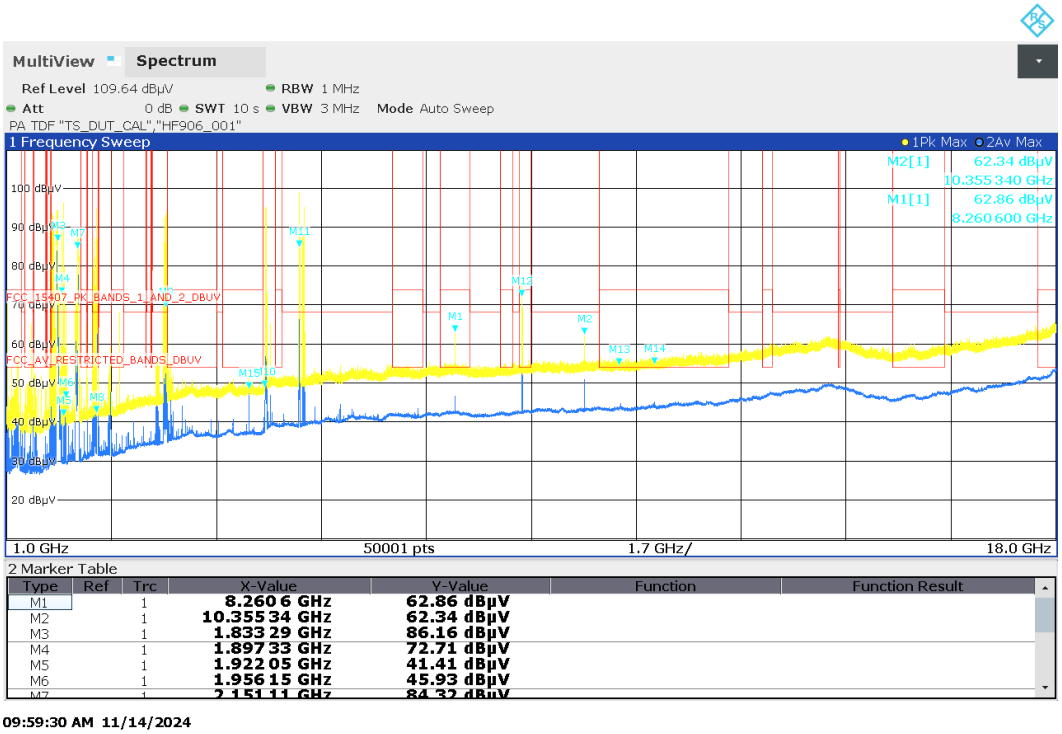
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	7.356 68 GHz	65.75 dBµV		
M2		1	11.965 54 GHz	65.02 dBµV		
M3		1	1.833 29 GHz	88.62 dBµV		
M4		1	1.897 33 GHz	58.09 dBµV		
M5		1	1.922 05 GHz	60.54 dBµV		
M6		1	1.956 15 GHz	77.15 dBµV		
M7		1	2.151 11 GHz	85.60 dBµV		
M8		1	2.449 9 GHz	101.90 dBµV		
M9		1	3.573 24 GHz	67.66 dBµV		
M10		1	5.178 7 GHz	99.09 dBµV		
M11		1	5.744 78 GHz	88.00 dBµV		
M12		1	9.350 4 GHz	65.01 dBµV		
M13		1	7.628 68 GHz	69.14 dBµV		
M14		1	10.364 6 GHz	66.36 dBµV		
M15		1	15.541 GHz	60.76 dBµV		

01:02:47 PM 11/14/2024

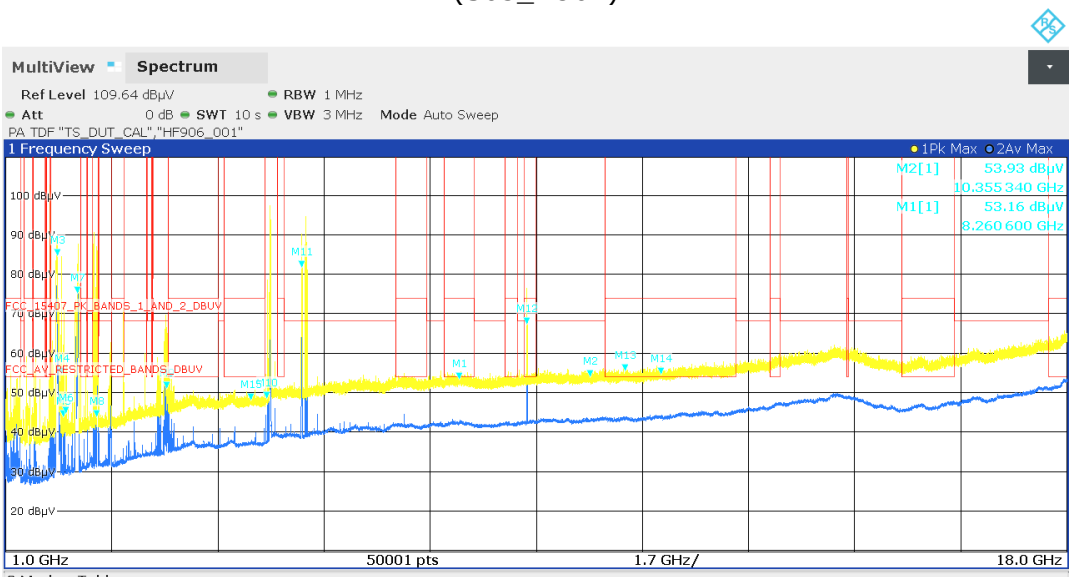
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)

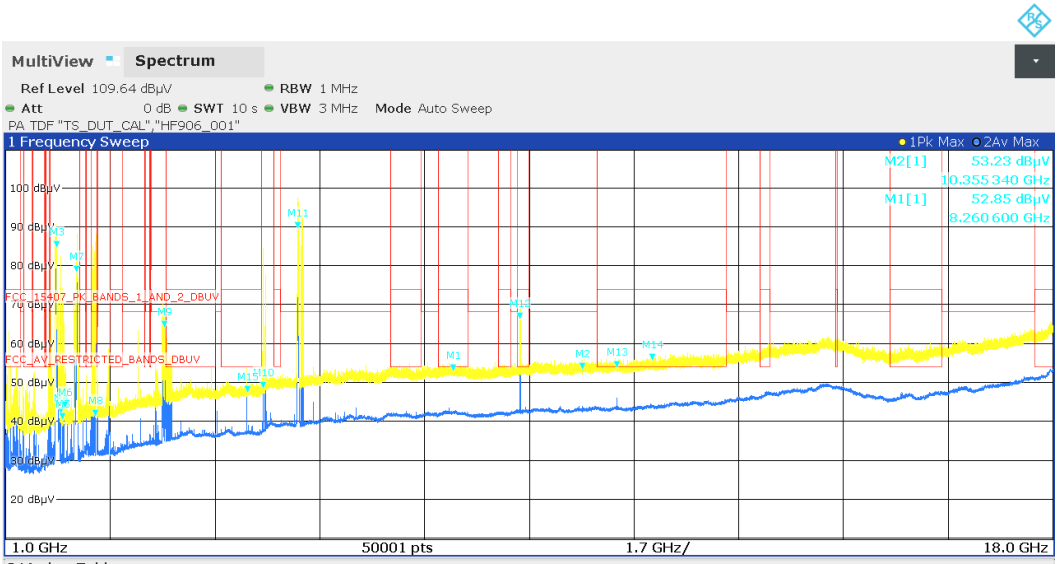


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	8.260 6 GHz	53.16 dBµV		
M2		1	10.355 34 GHz	53.93 dBµV		
M3		1	1.833 29 GHz	84.38 dBµV		
M4		1	1.897 33 GHz	54.43 dBµV		
M5		1	1.922 05 GHz	43.65 dBµV		
M6		1	1.956 15 GHz	44.47 dBµV		
M7		1	2.151 11 GHz	75.07 dBµV		

10:03:29 AM 11/14/2024

Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-3, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)

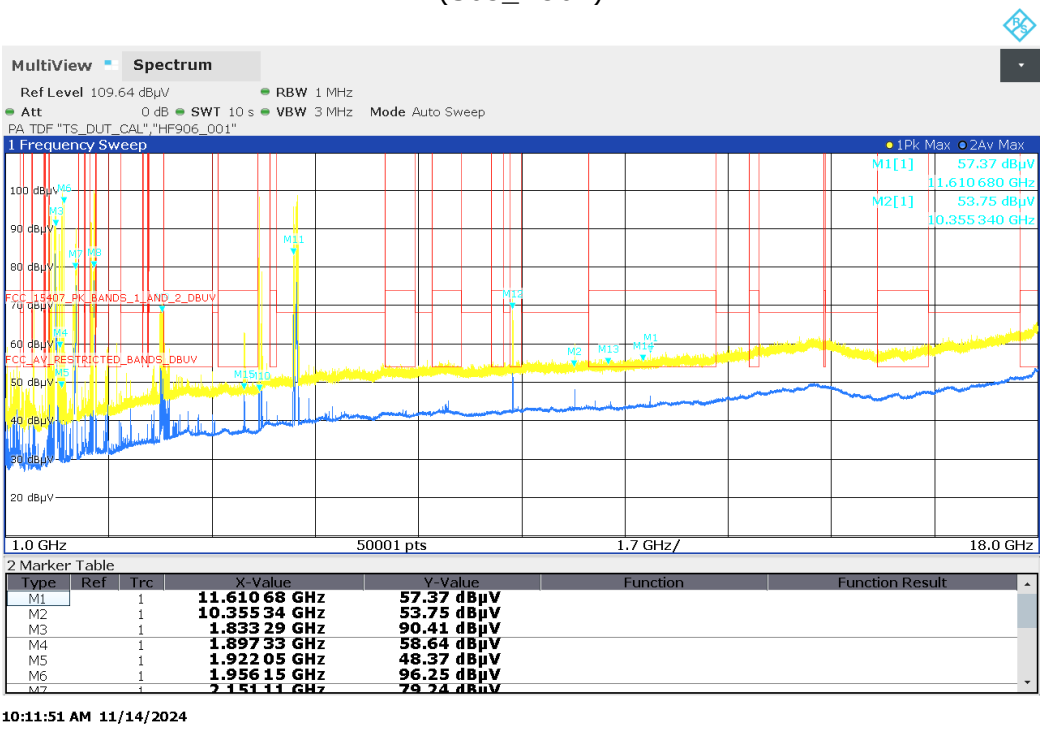


2 Marker Table

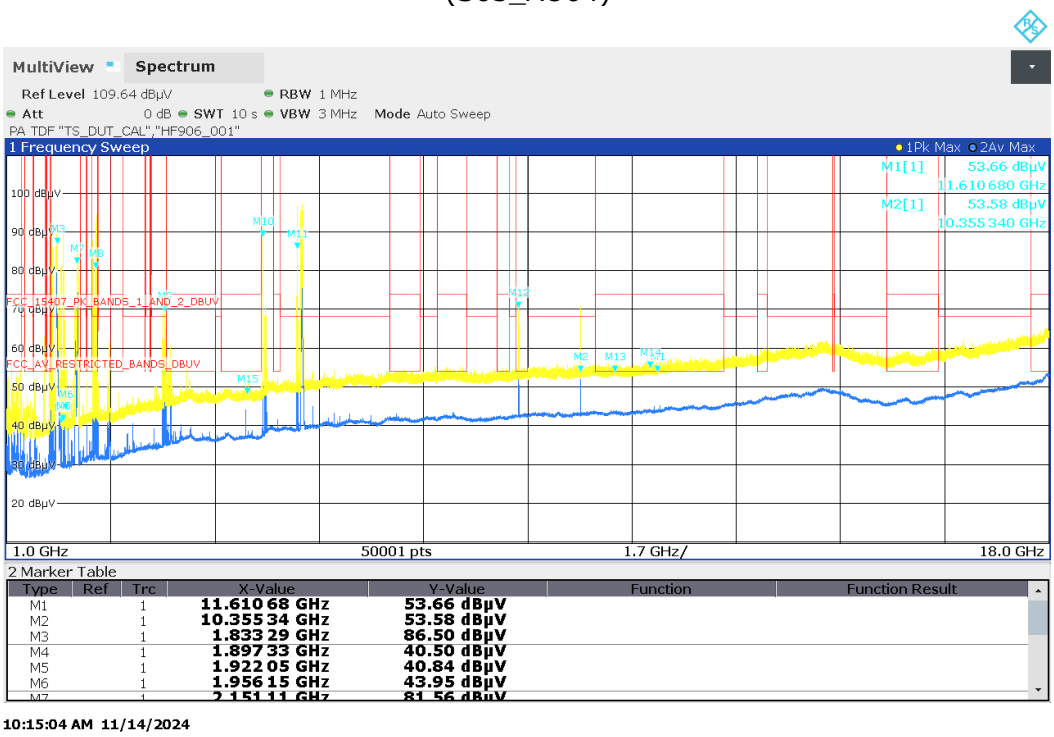
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	8.260 6 GHz	52.85 dBµV		
M2		1	10.355 34 GHz	53.23 dBµV		
M3		1	1.833 29 GHz	84.55 dBµV		
M4		1	1.897 33 GHz	41.83 dBµV		
M5		1	1.922 05 GHz	40.26 dBµV		
M6		1	1.956 15 GHz	43.17 dBµV		
M7		1	2.151 11 GHz	78.20 dBµV		

10:06:17 AM 11/14/2024

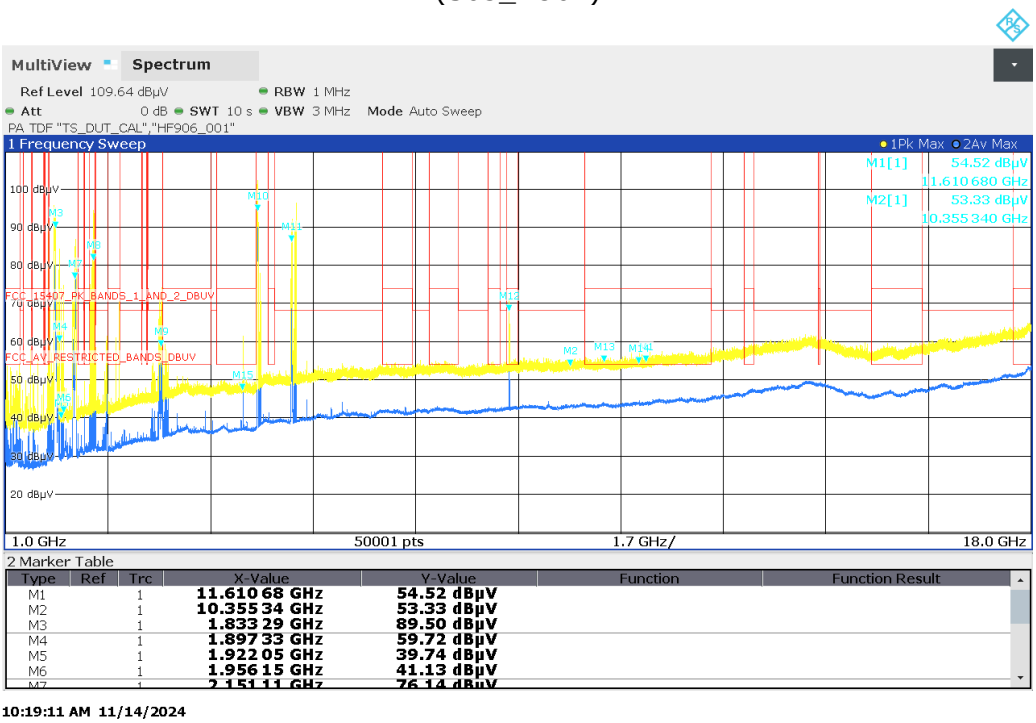
Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



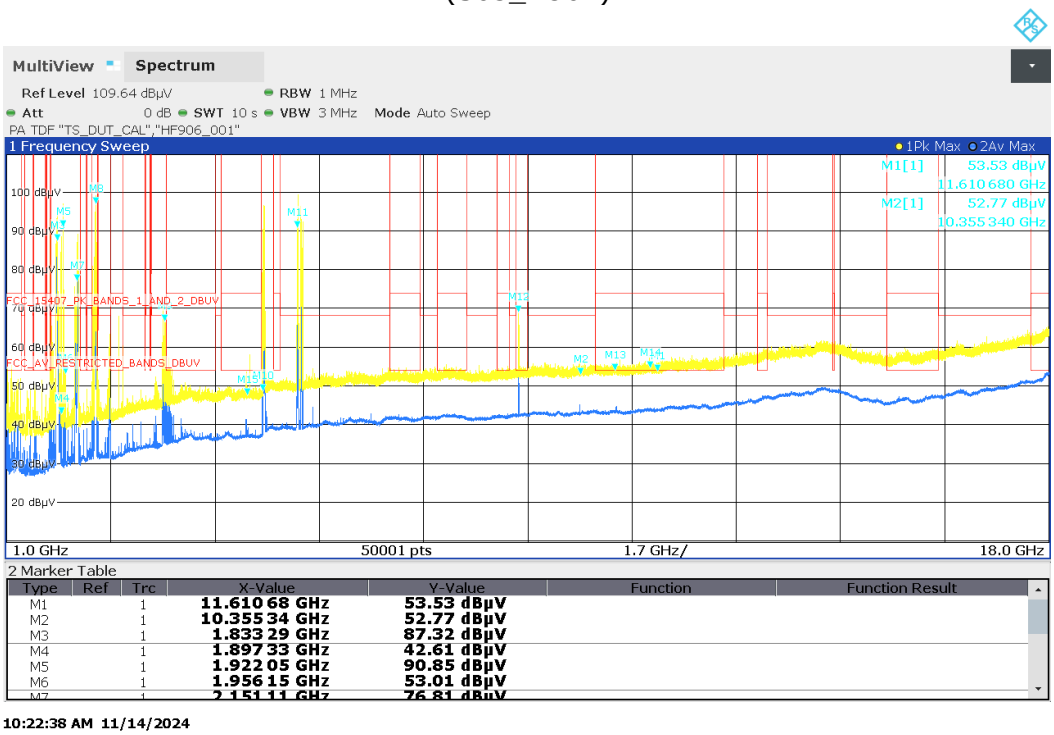
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



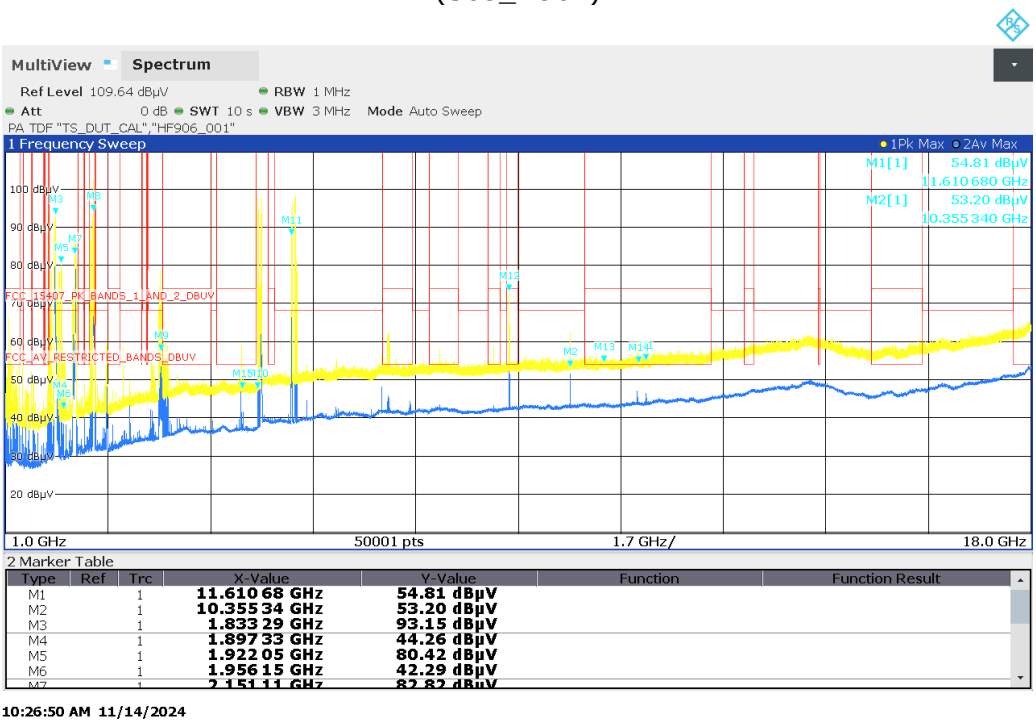
Radio Technology = WLAN n 20, Operating Frequency = low, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



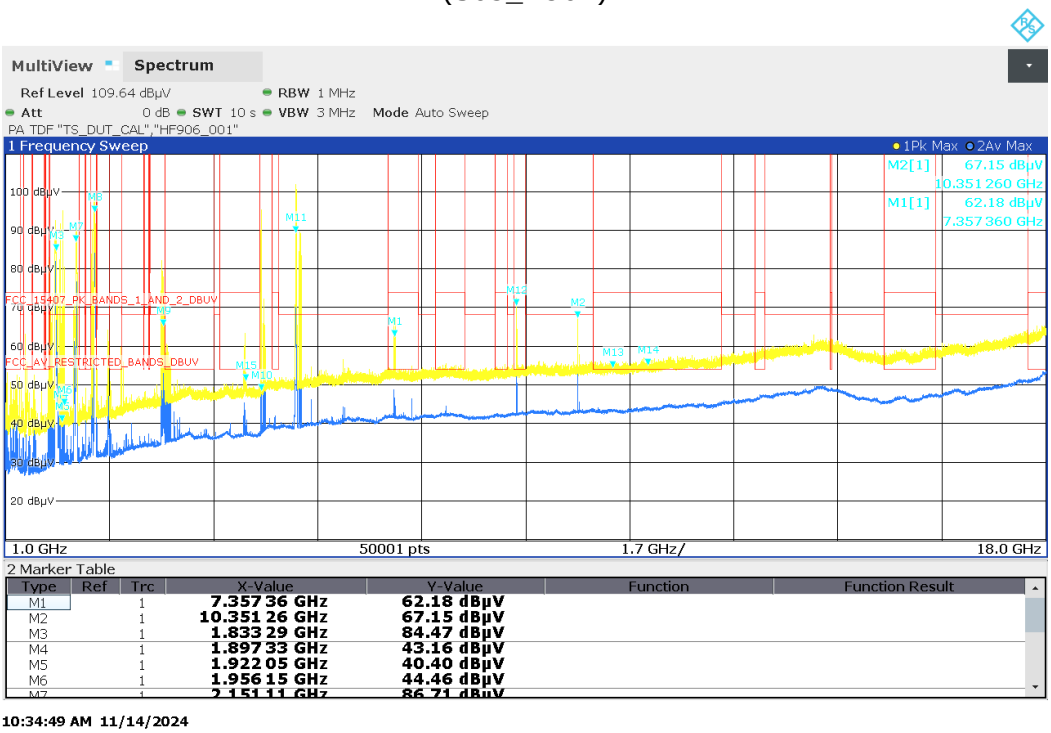
Radio Technology = WLAN n 20, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



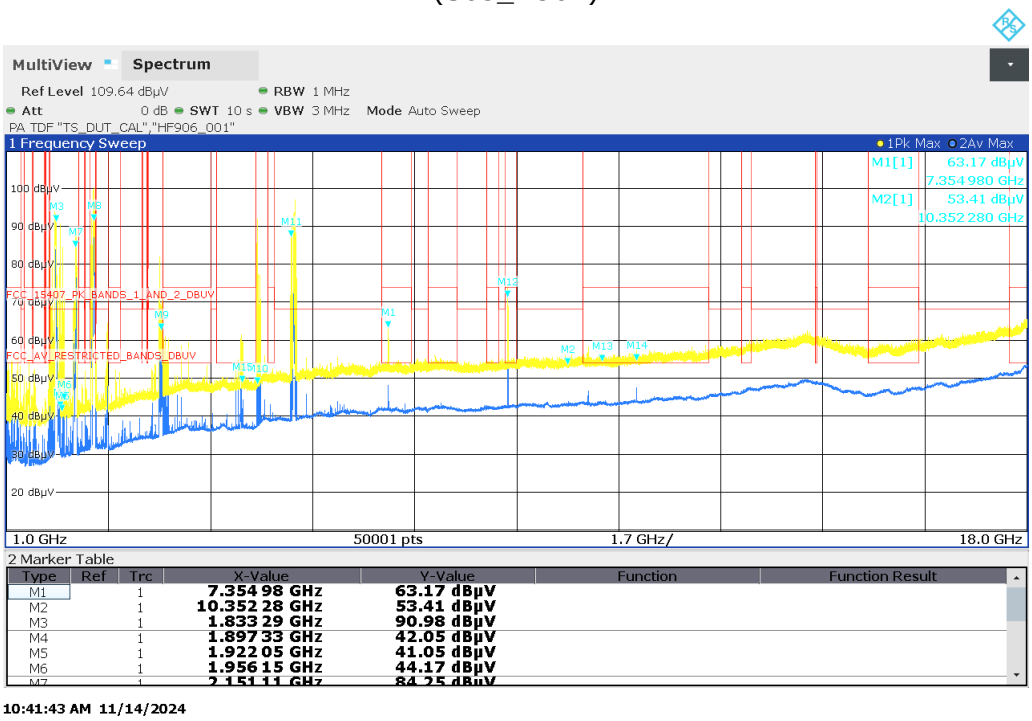
Radio Technology = WLAN n 20, Operating Frequency = high, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



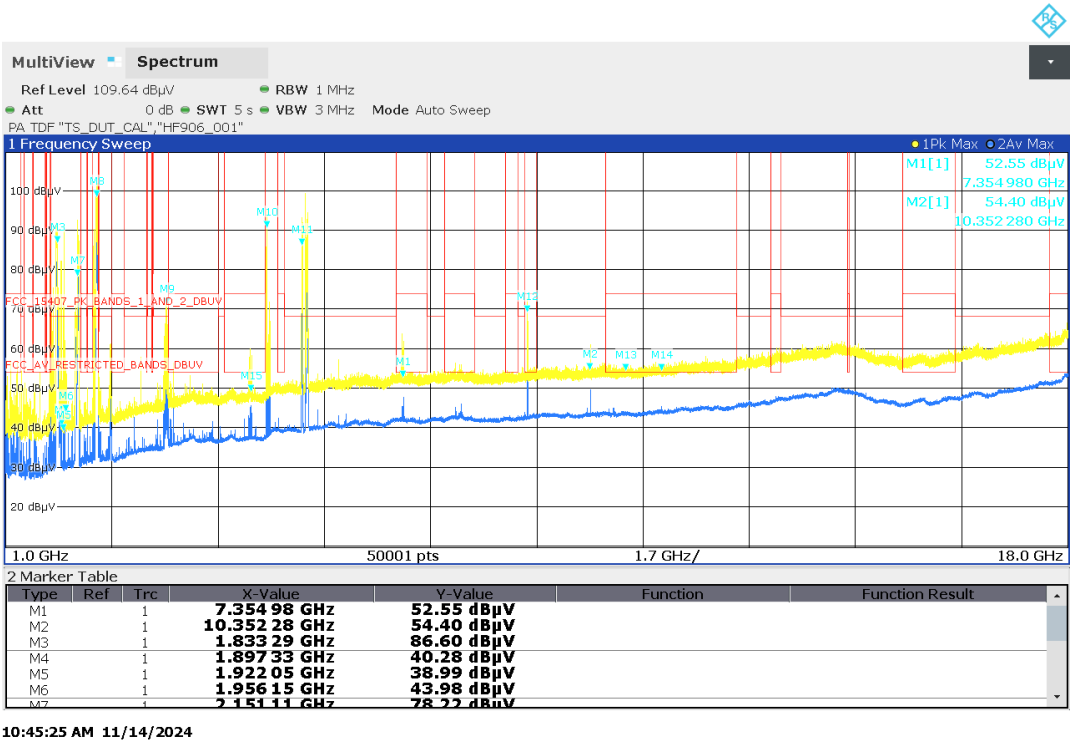
Radio Technology = WLAN n 20, Operating Frequency = low, Subband = U-NII-3, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



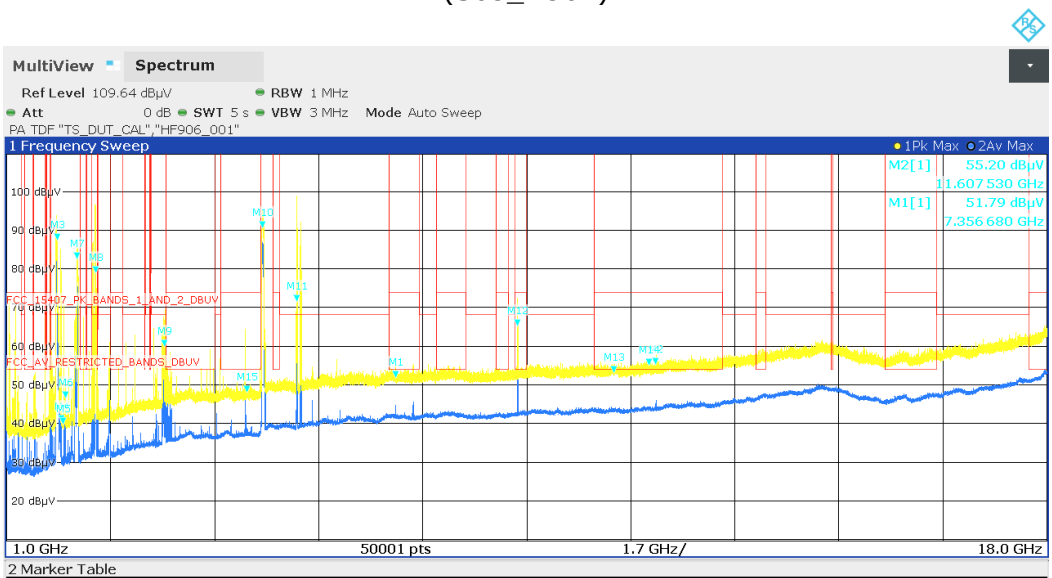
Radio Technology = WLAN n 20, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



Radio Technology = WLAN n 20, Operating Frequency = high, Subband = U-NII-3, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



Radio Technology = WLAN n 40, Operating Frequency = low, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)

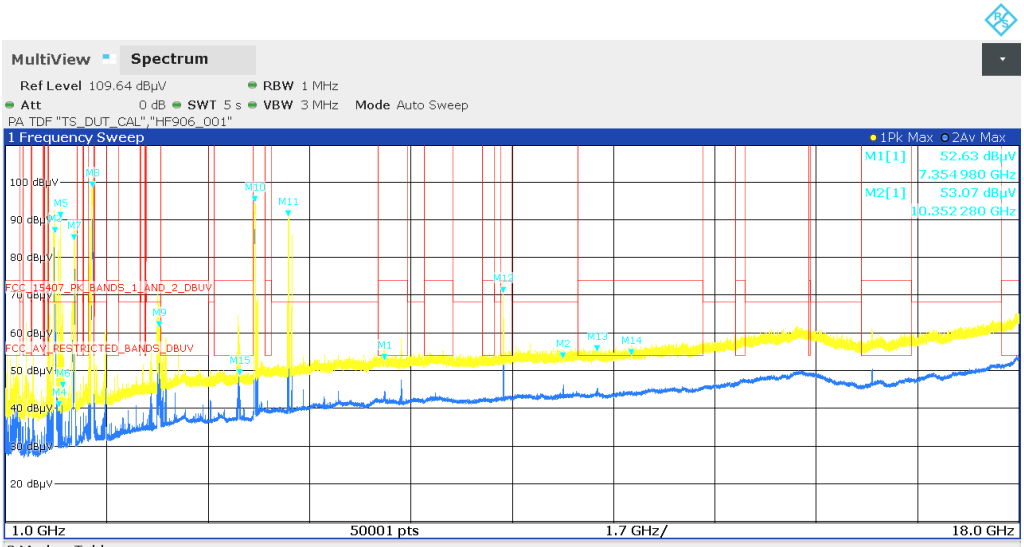


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	7.356 68 GHz	51.79 dBµV		
M2		1	11.607 53 GHz	55.20 dBµV		
M3		1	1.833 29 GHz	87.21 dBµV		
M4		1	1.897 33 GHz	40.22 dBµV		
M5		1	1.922 05 GHz	39.57 dBµV		
M6		1	1.956 15 GHz	46.43 dBµV		
M7		1	2.151 11 GHz	82.35 dBµV		

11:51:02 AM 11/14/2024

Radio Technology = WLAN ac 20, Operating Frequency = low, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)

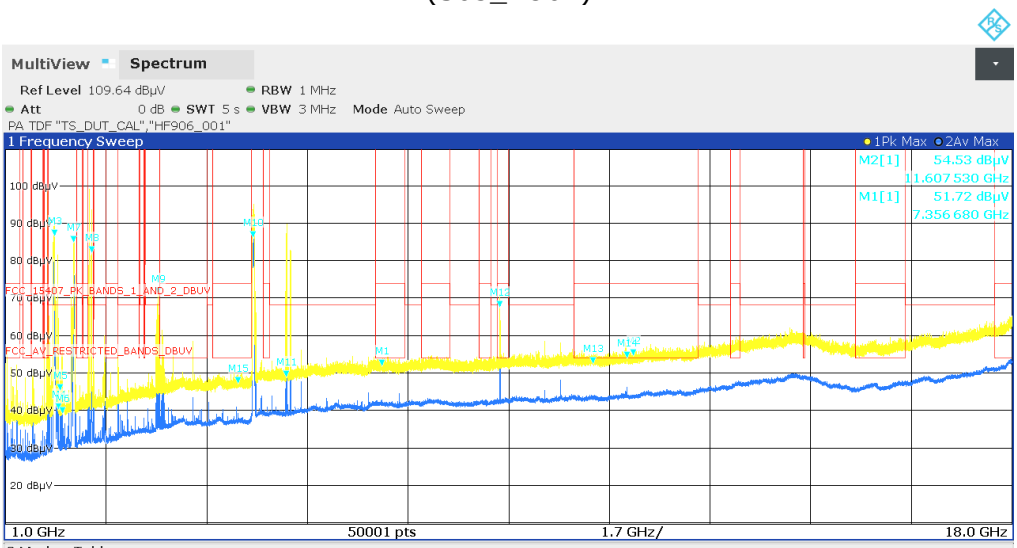


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	7.354 98 GHz	52.63 dBµV		
M2		1	10.352 28 GHz	53.07 dBµV		
M3		1	1.833 29 GHz	86.26 dBµV		
M4		1	1.897 33 GHz	40.07 dBµV		
M5		1	1.922 05 GHz	90.18 dBµV		
M6		1	1.956 15 GHz	45.25 dBµV		
M7		1	2.151 11 GHz	84.18 dBµV		

10:48:22 AM 11/14/2024

Radio Technology = WLAN ac 40, Operating Frequency = low, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)

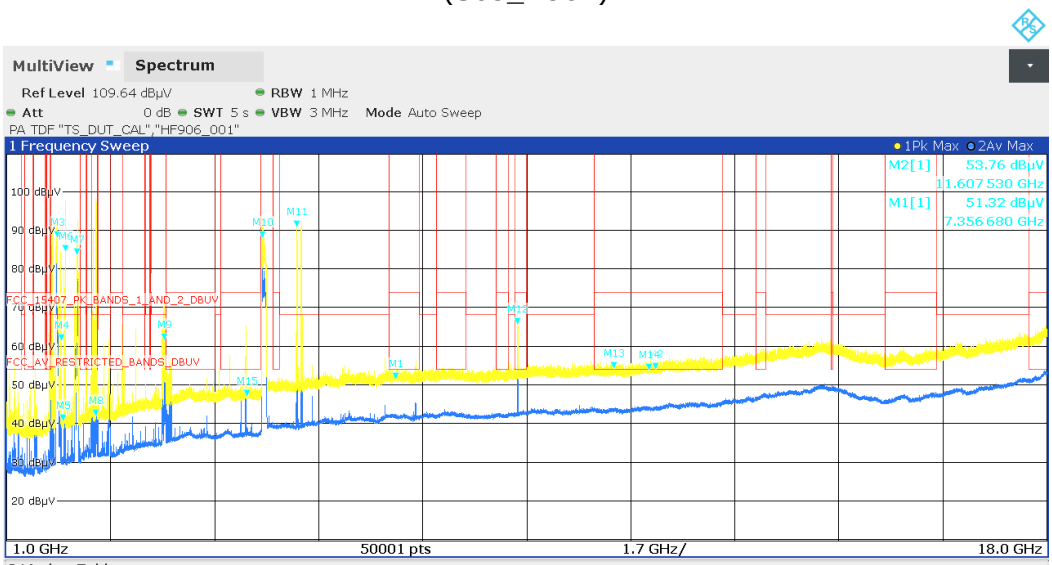


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	7.356 68 GHz	51.72 dBµV		
M2		1	11.607 53 GHz	54.53 dBµV		
M3		1	1.833 29 GHz	86.35 dBµV		
M4		1	1.897 33 GHz	40.07 dBµV		
M5		1	1.922 05 GHz	45.23 dBµV		
M6		1	1.956 15 GHz	38.98 dBµV		
M7		1	2.151 11 GHz	84.70 dBµV		

11:54:31 AM 11/14/2024

Radio Technology = WLAN ac 80, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)

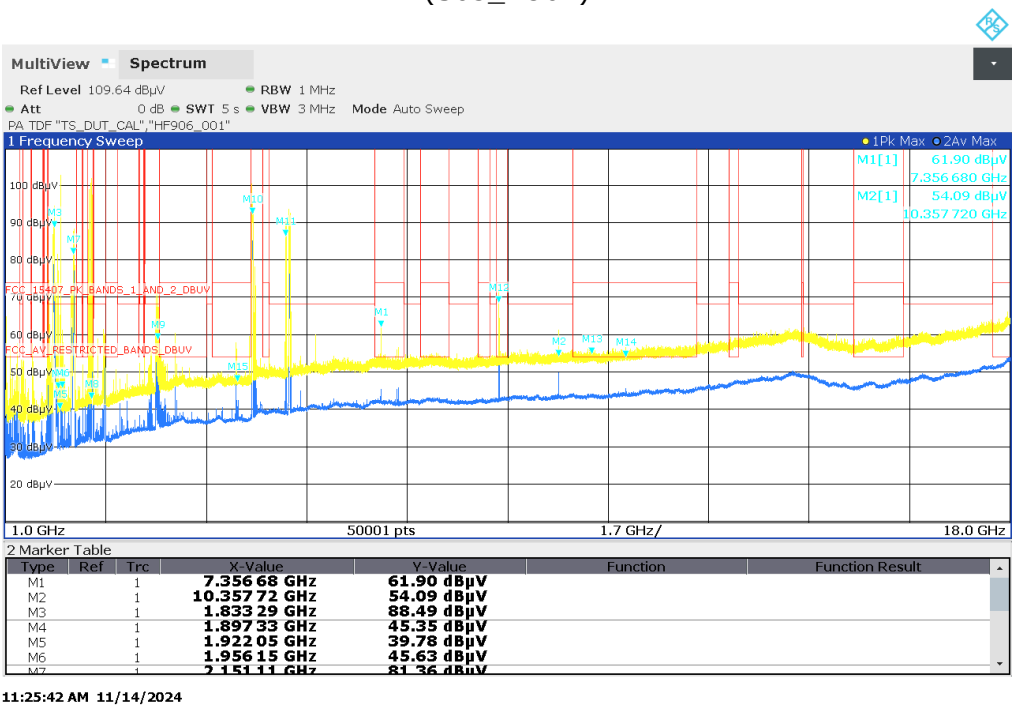


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	7.356 68 GHz	51.32 dBµV		
M2		1	11.607 53 GHz	53.76 dBµV		
M3		1	1.833 29 GHz	87.89 dBµV		
M4		1	1.897 33 GHz	61.31 dBµV		
M5		1	1.922 05 GHz	40.50 dBµV		
M6		1	1.956 15 GHz	84.37 dBµV		
M7		1	2.151 11 GHz	83.34 dBµV		

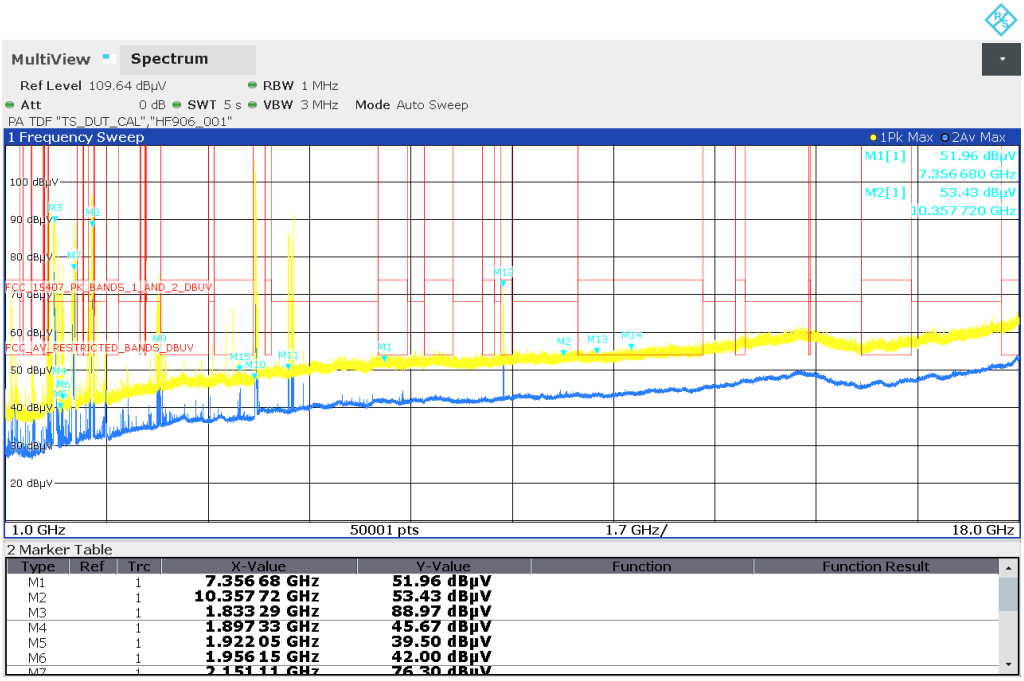
11:56:58 AM 11/14/2024

Radio Technology = WLAN ax 20, Operating Frequency = low, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



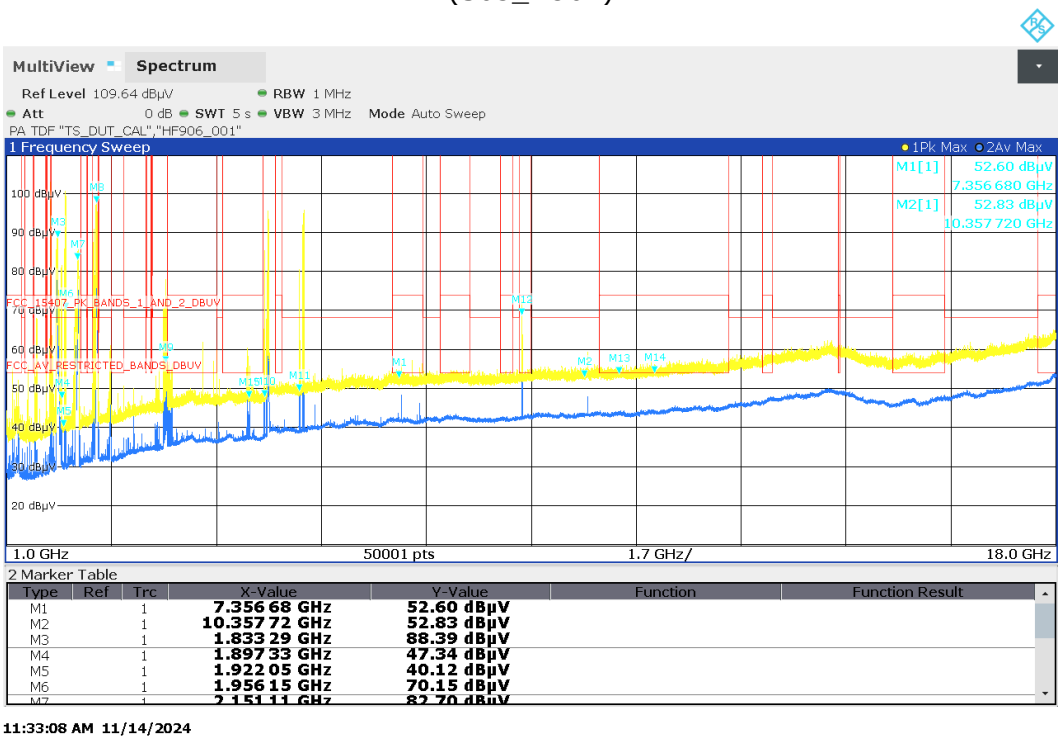
11:25:42 AM 11/14/2024

Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)

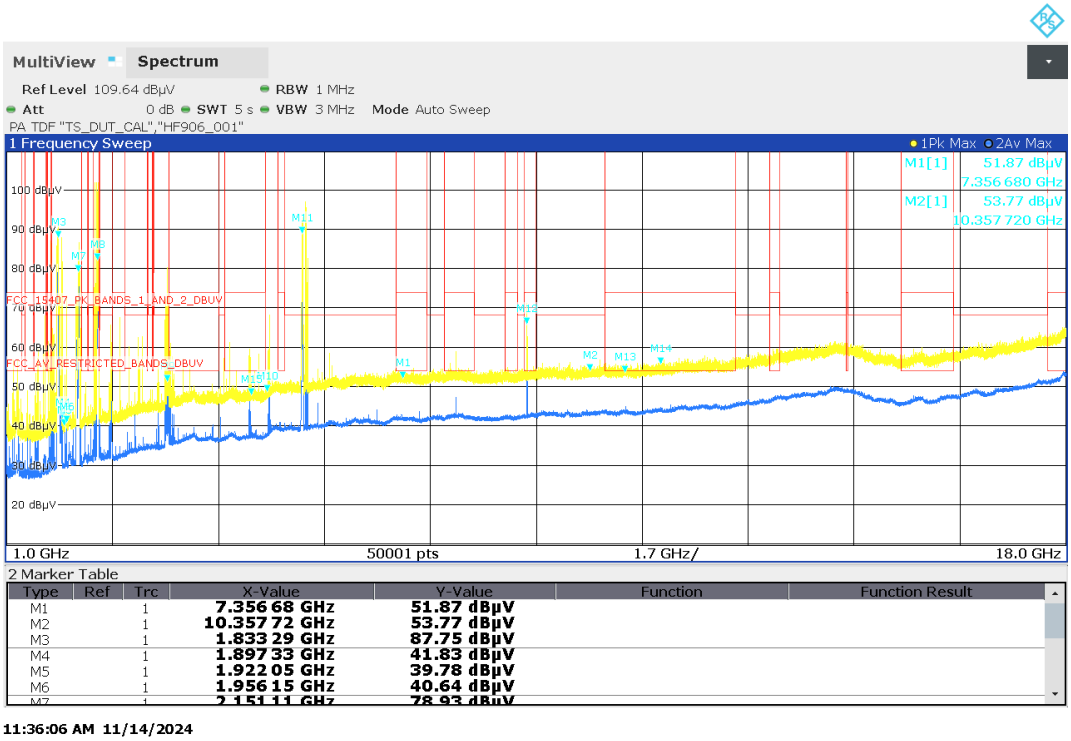


11:30:23 AM 11/14/2024

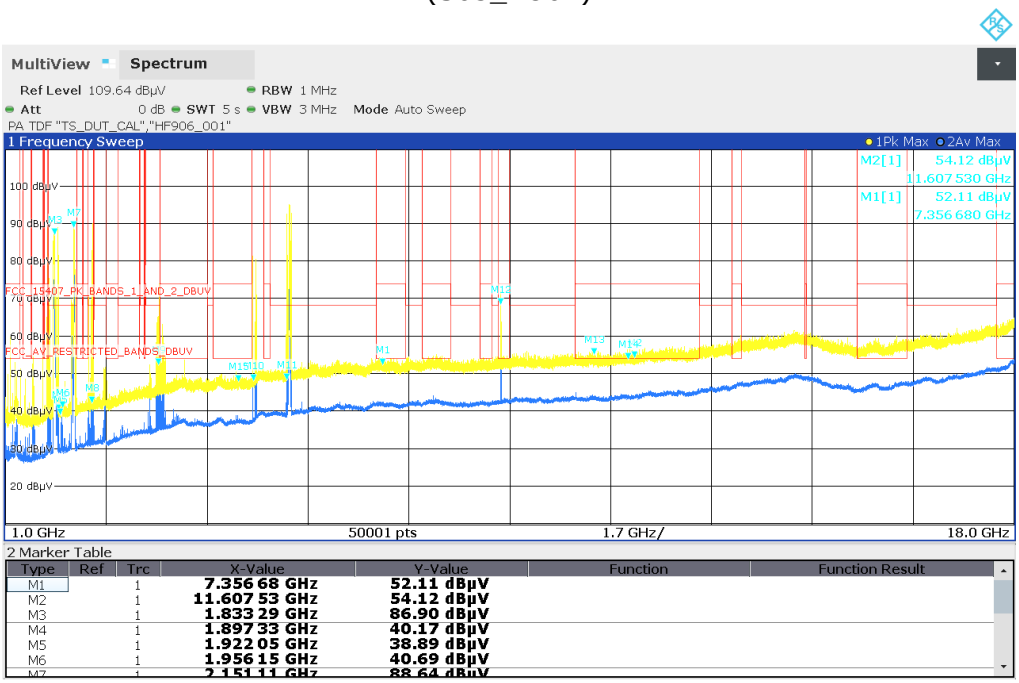
Radio Technology = WLAN ax 20, Operating Frequency = high, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



Radio Technology = WLAN ax 20, Operating Frequency = low, Subband = U-NII-3, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)

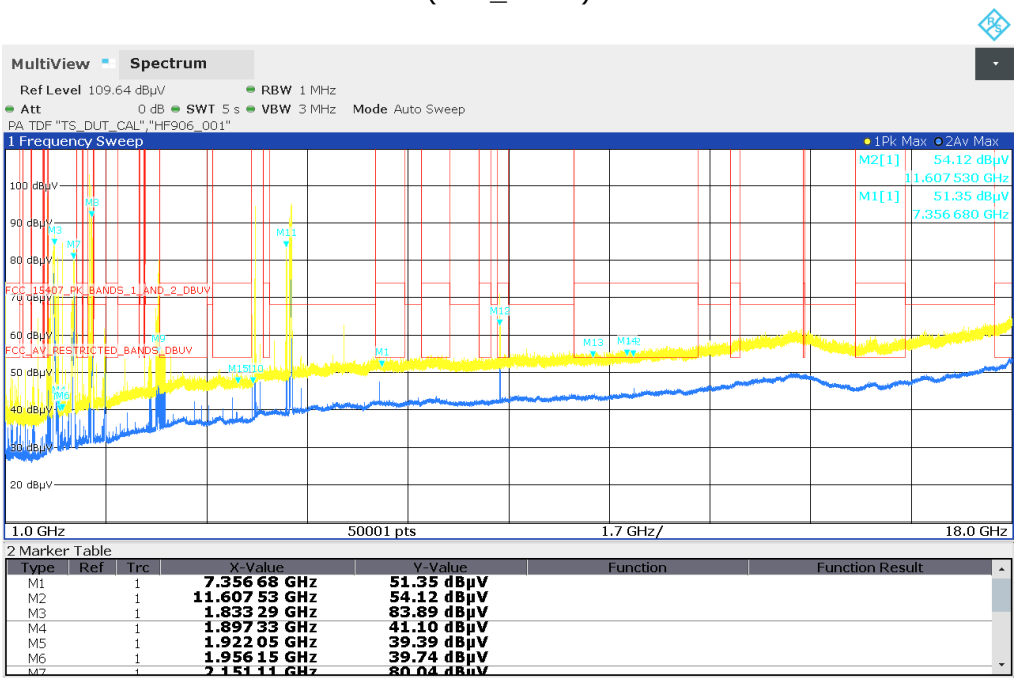


Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



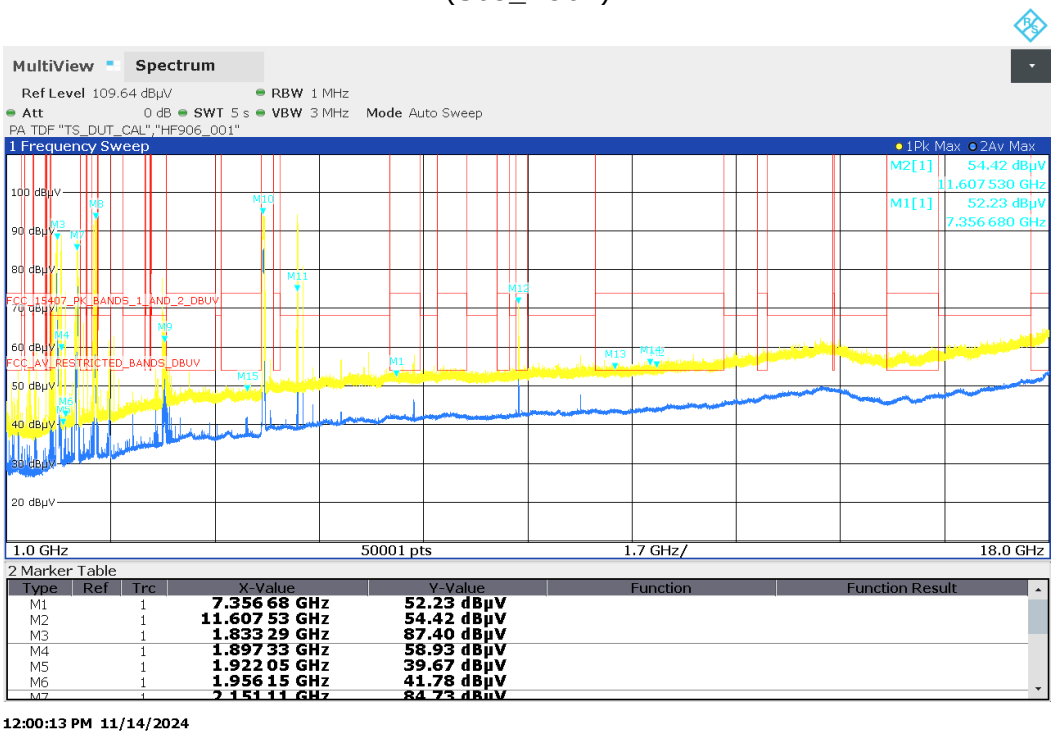
11:43:19 AM 11/14/2024

Radio Technology = WLAN ax 20, Operating Frequency = high, Subband = U-NII-3, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)

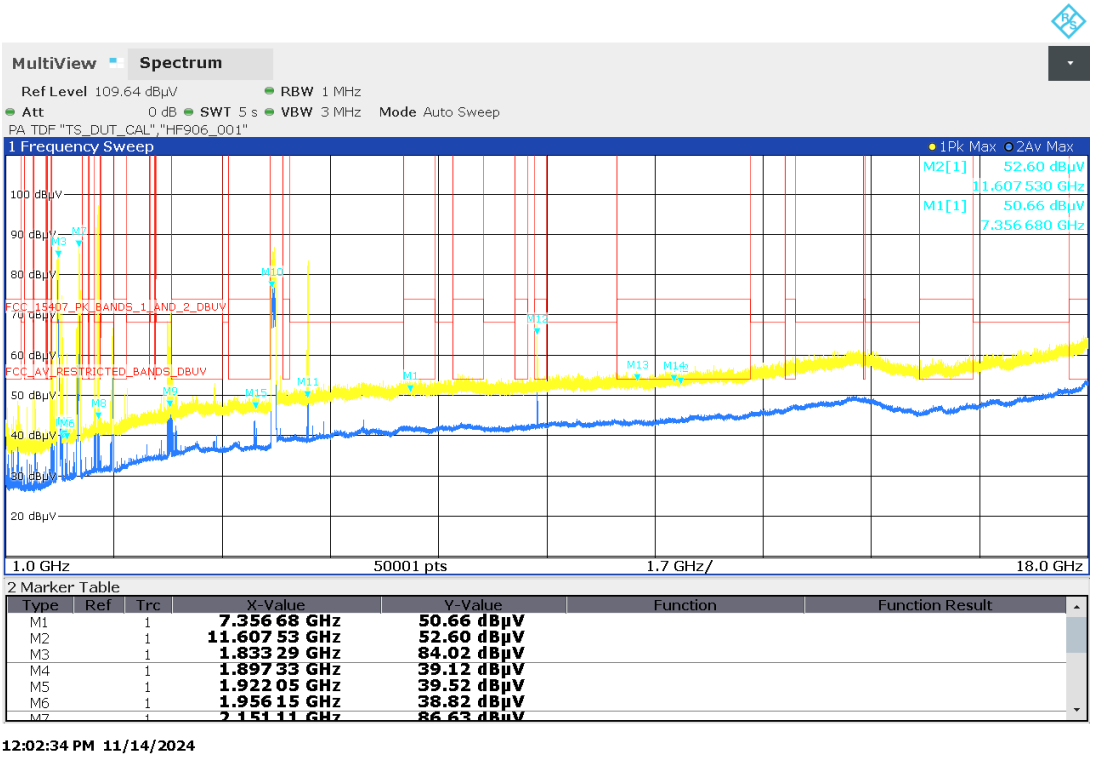


11:46:00 AM 11/14/2024

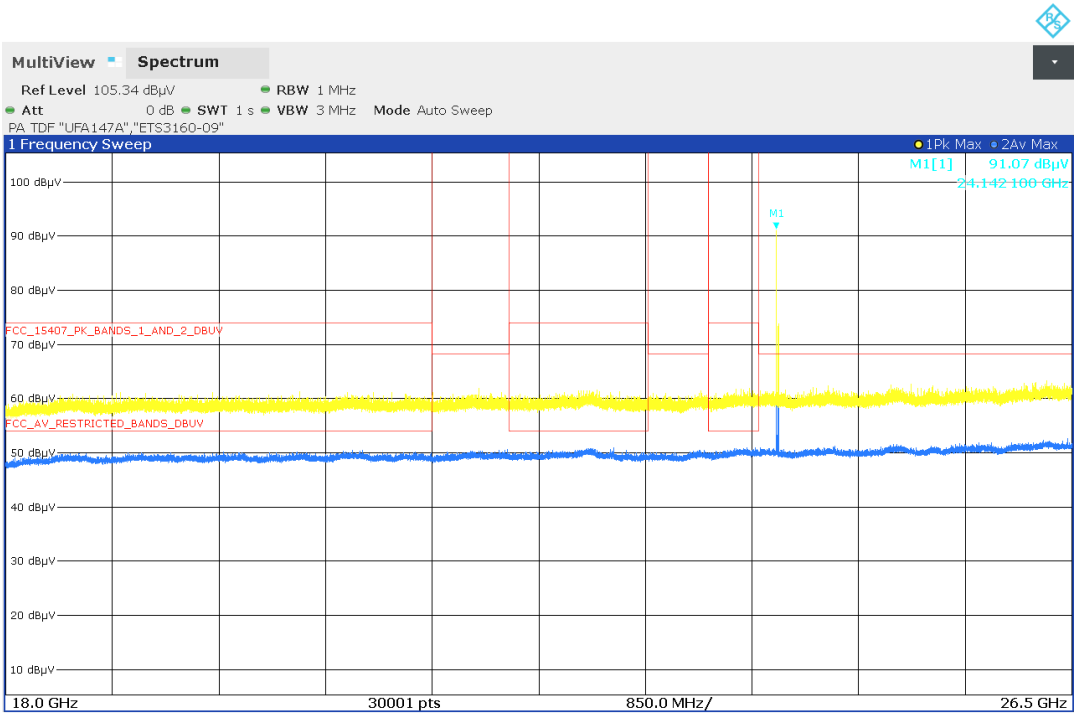
Radio Technology = WLAN ax 40, Operating Frequency = low, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S03_AO04)



Radio Technology = WLAN ax 80, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 1 GHz – 18 GHz, Polarisation = horizontal (S02_AO04)

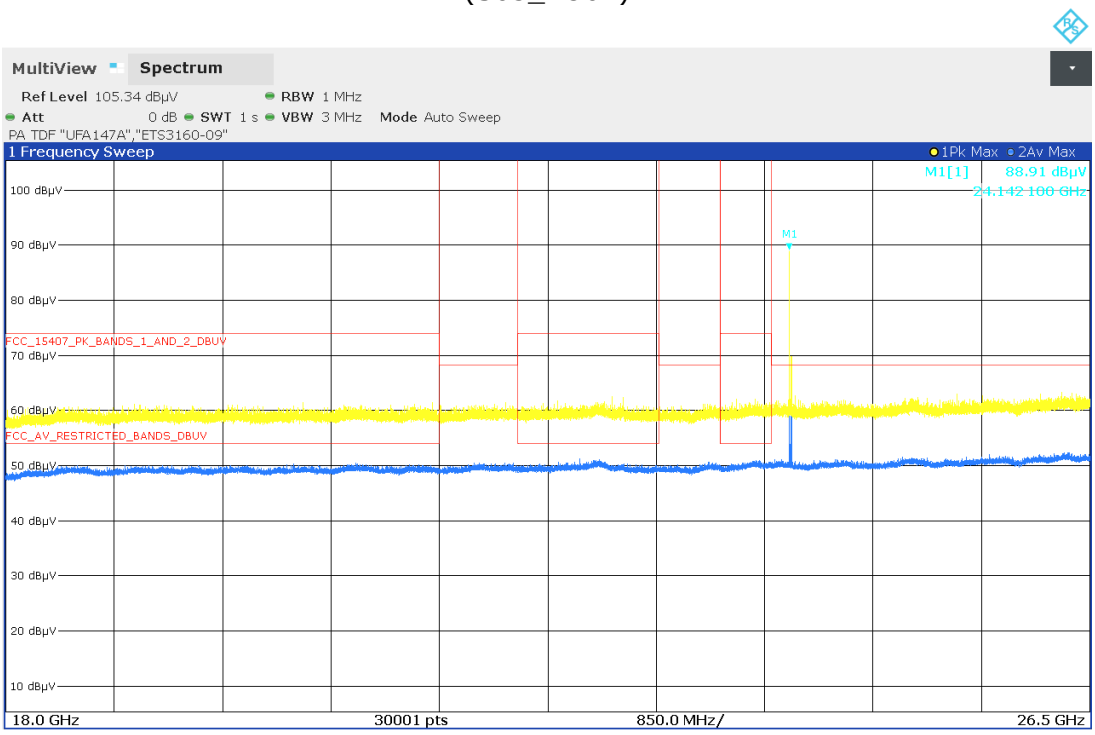


Noise Level, Ambient, Frequency Range = 18 GHz -26.5 GHz, Polarisation = horizontal



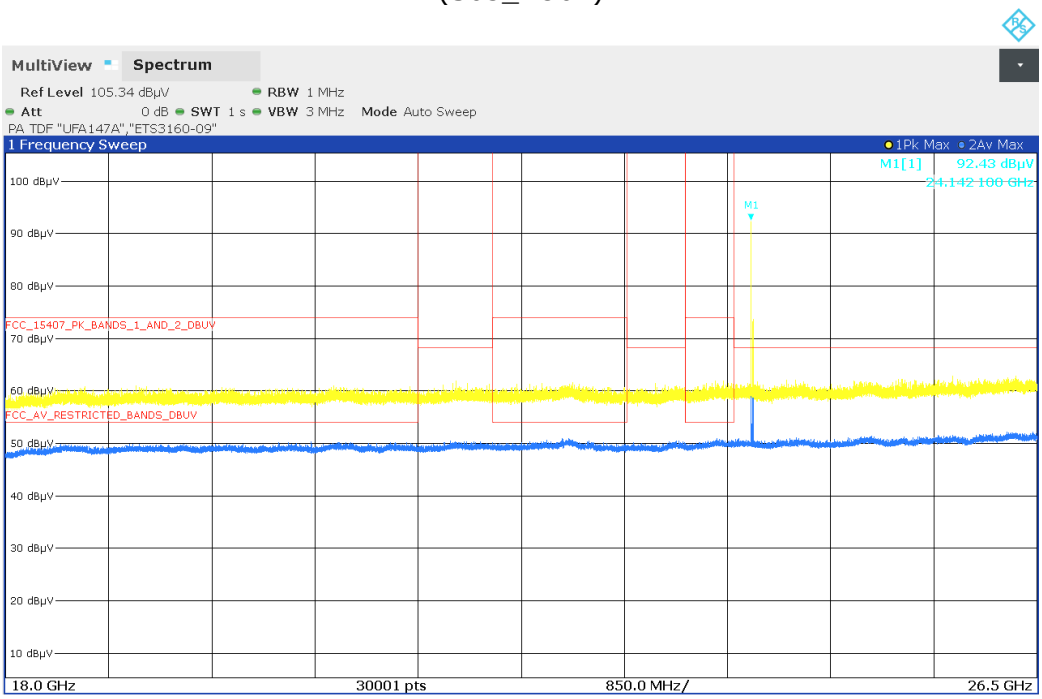
01:26:34 PM 11/14/2024

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 18 GHz – 26.5 GHz, Polarisation = horizontal (S03_AO04)



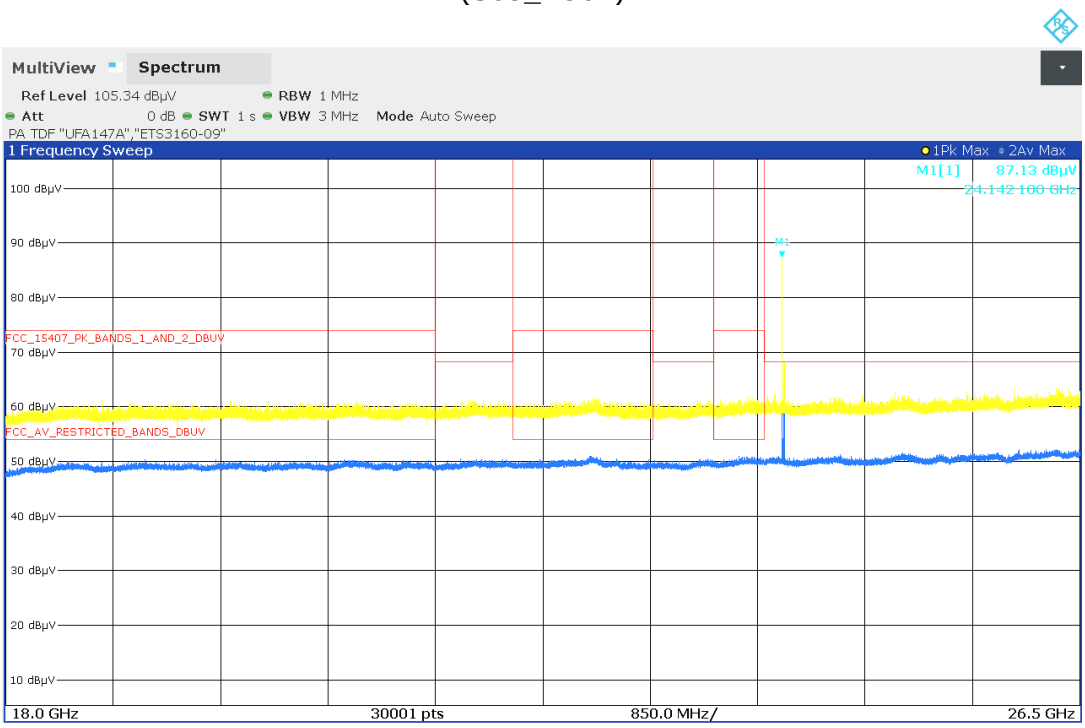
01:34:13 PM 11/14/2024

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 18 GHz – 26.5 GHz, Polarisation = horizontal (S03_AO04)



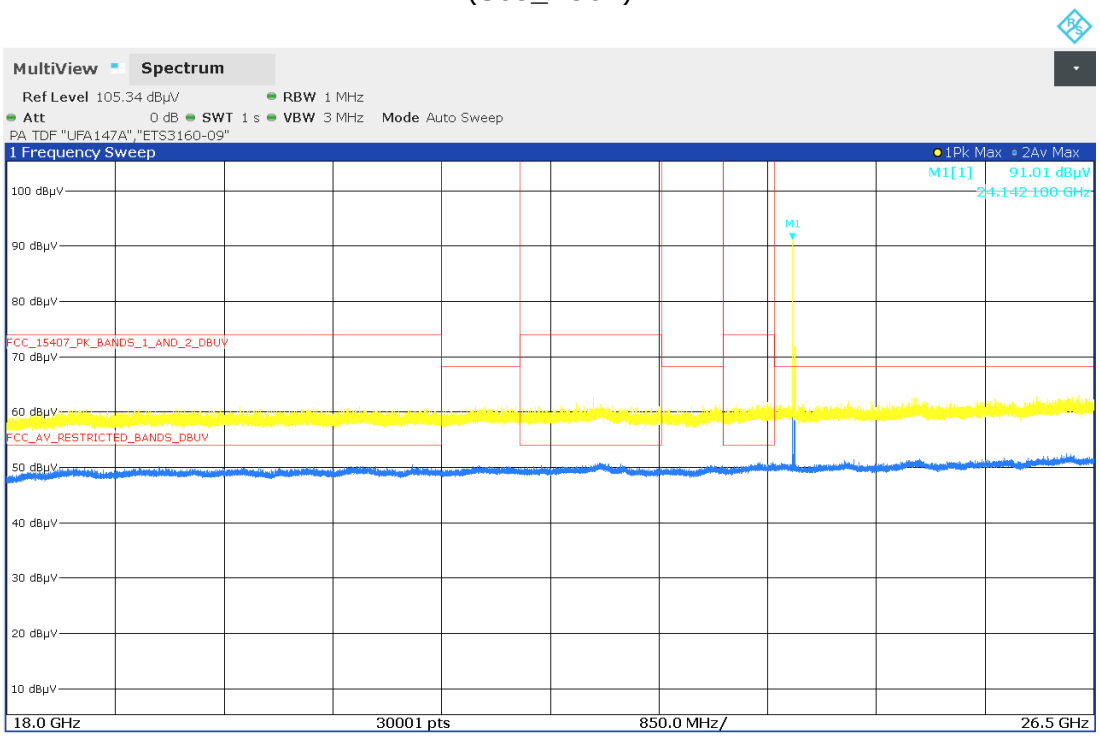
01:37:26 PM 11/14/2024

Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 18 GHz – 26.5 GHz, Polarisation = horizontal (S03_AO04)



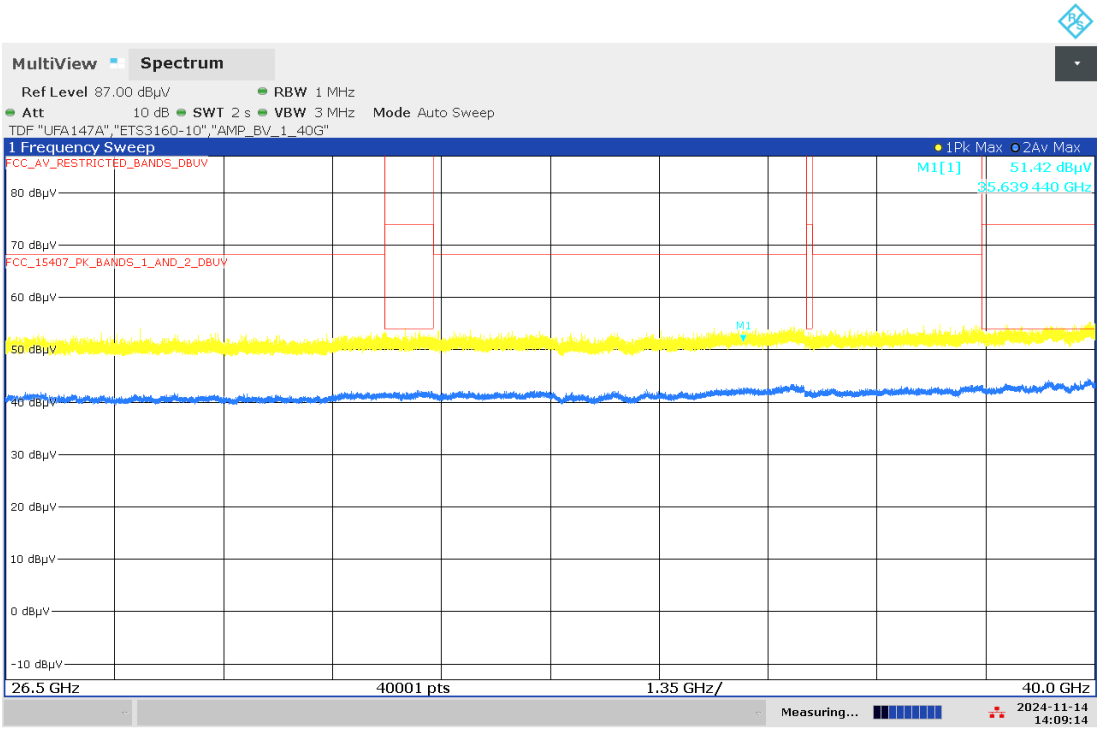
01:41:01 PM 11/14/2024

Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 18 GHz – 26.5 GHz, Polarisation = horizontal (S03_AO04)



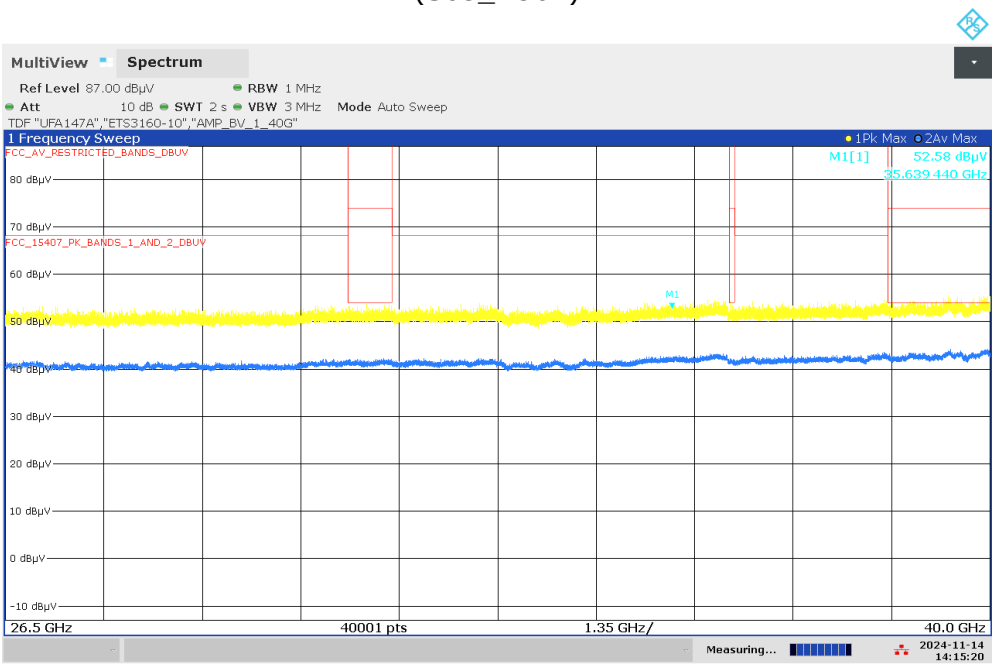
01:44:06 PM 11/14/2024

Noise Level, Ambient, Frequency Range = 26.5 GHz -40 GHz, Polarisation = horizontal



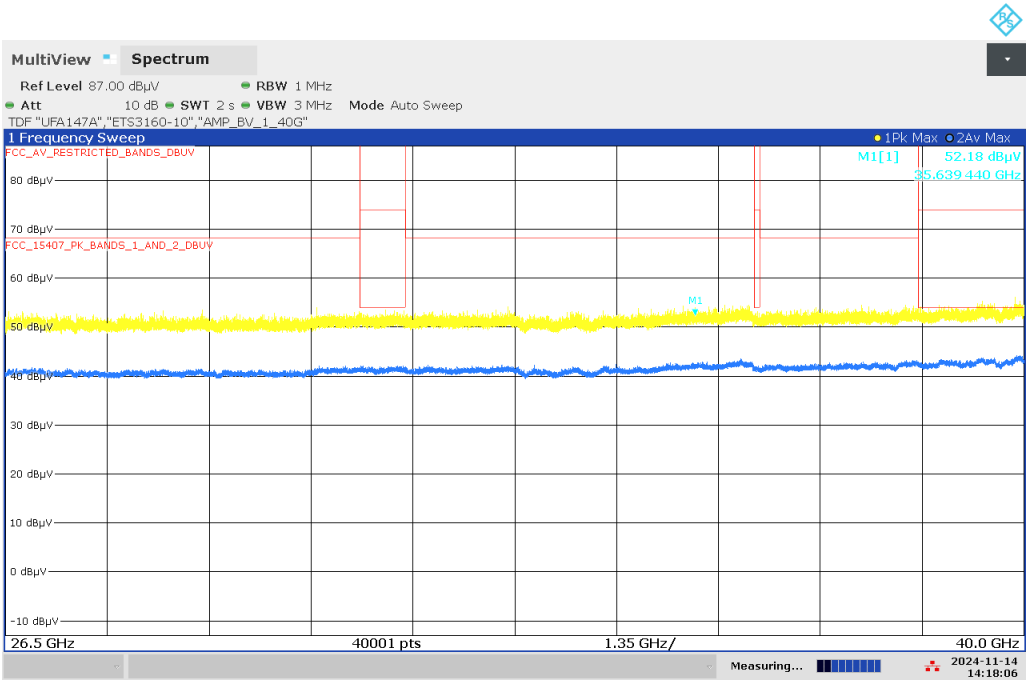
02:09:14 PM 11/14/2024

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-1, Frequency Range = 26.5 GHz -40 GHz, Polarisation = horizontal (S03_AO04)



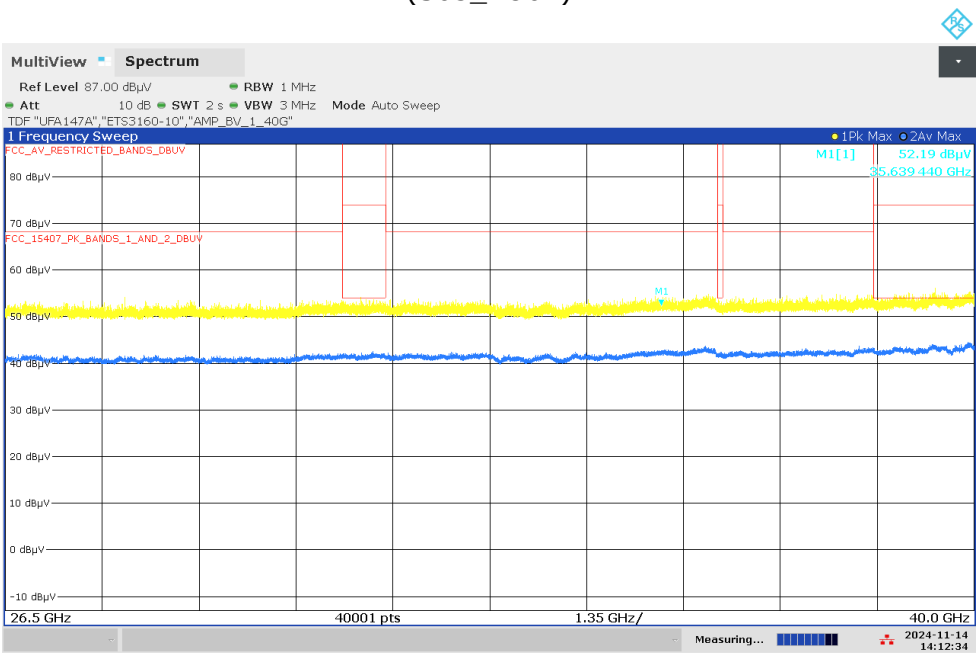
02:15:21 PM 11/14/2024

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 26.5 GHz -40 GHz, Polarisation = horizontal (S03_AO04)



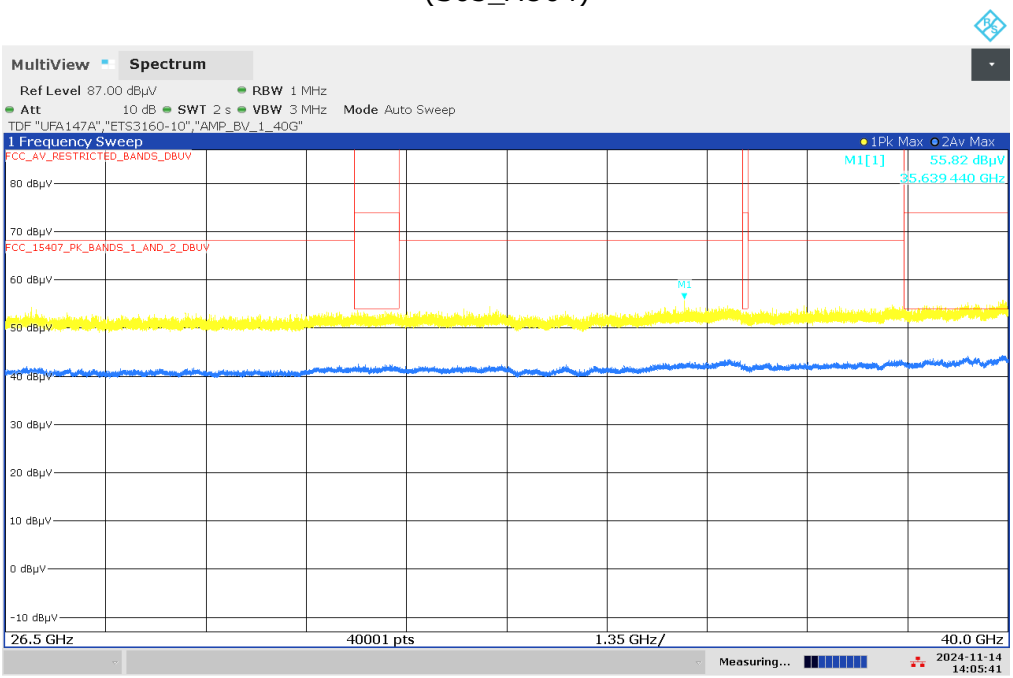
02:18:06 PM 11/14/2024

Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-1, Frequency Range =26.5 GHz -40 GHz, Polarisation = horizontal (S03_AO04)



02:12:35 PM 11/14/2024

Radio Technology = WLAN ax 20, Operating Frequency = mid, Subband = U-NII-3, Frequency Range = 26.5 GHz -40 GHz, Polarisation = horizontal (S03_AO04)



02:05:42 PM 11/14/2024

5.3.6 TEST EQUIPMENT USED

- FCC In-Situ measurement equipment

5.4 BAND EDGE

Standard **FCC Part 15 Subpart E**

The test was performed according to:

- Measurement setup: ANSI C63.10, chapter 6.11.3

5.4.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was installed in a typical installation in the test location. A RCoax cable was connected to one antenna connector (Port A). The other antenna output was terminated with 50 Ohm.

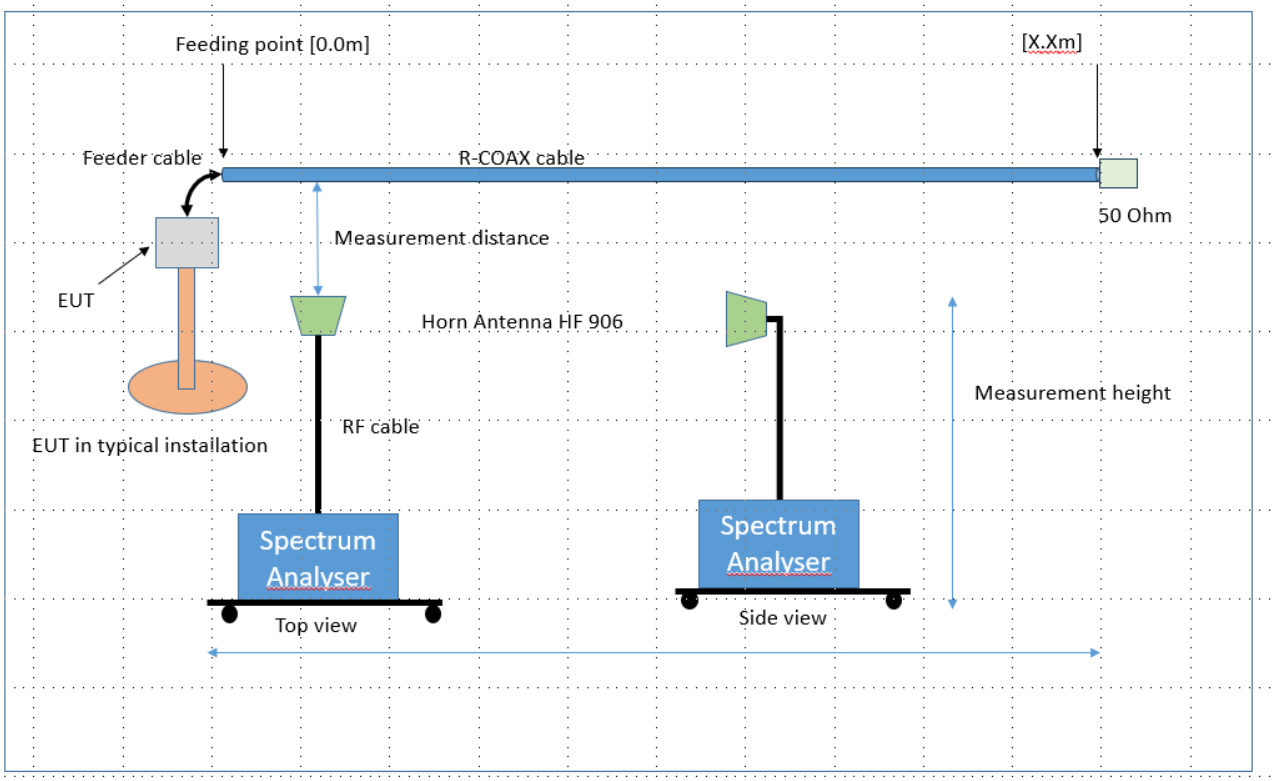
The following information can be found in the description of each measurement location.

- Length of the connected RCoax cable (chapter 3.5)
- Installation height of the RCoax cable (chapter 3.5)
- Length of the feeder cable (chapter 3.5)
- Measurement distance
- Maximum measurement distance from feeding point
- Maximum measurement height of the receiving antenna (during worst-case search)
- Worst-case measurement polarisation

Measurement procedure:

4. Determining of the worst-case position – highest emission of the fundamental – for both receiving antenna polarisations between:
    a. Determination of the maximum measurement distance [$D_{STABLE\ DECREASE}$] from the feeding point
    b. Search of worst-case distance between 0.0 m and maximum measurement distance from the feeding point of RCoax cable for both measurement polarisations.
    c. Height variation of the Receiving antenna: continuously from 1.0 m to maximum receiving antenna height for both polarisations.
    d. Determination of worst-case receiving antenna polarisation
5. Measurement of the output power at the worst-case position.
6. Measurement of the environmental electromagnetic spectrum – with EUT switched off – at worst-case position for both polarisations.

The following diagram shows the basic measurement set up:



Basic Test Setup In-Situ Measurements

Spectrum analyser settings:
- Detector: Peak, Average
- RBW = 1 MHz
- VBW = 3 MHz

5.4.2 TEST REQUIREMENTS / LIMITS

A) FCC

FCC Part 15 Subpart E, §15.407 (b)(1)
For transmitters operating in the 5150–5250 MHz band:
Limit: –27 dBm/MHz EIRP outside of the band 5150–5350 MHz.

FCC Part 15 Subpart E, §15.407 (b)(2)
For transmitters operating in the 5250–5350 MHz band:
Limit: –27 dBm/MHz EIRP outside of the band 5150–5350 MHz.

FCC Part 15 Subpart E, §15.407 (b)(3)
For transmitters operating in the 5470–5725 MHz band:
Limit: –27 dBm/MHz EIRP outside of the band 5470–5725 MHz.

FCC Part 15 Subpart E, §15.407 (b)(4)
For transmitters operating in the 5725–5850 MHz band:
Limit: −27 dBm/MHz at 75 MHz or more above or below the band edge
increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge
increasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edge
increasing linearly to 27 dBm/MHz at the band edge.

FCC Part 15 Subpart E, §15.407 (b) (5)
For transmitters operating within the 5.925-7.125 GHz band:
Limit: –27 dBm/MHz EIRP outside of the band 5.925-7.125 GHz.

FCC Part 15 Subpart E, §15.407 (b) (6)
For transmitters operating within the 5.925-7.125 GHz bands:
Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

B) IC
Different frequency bands and limits apply, as compared to the FCC requirements.

RSS-247, 6.2.1.2, Emissions outside the band 5150-5250 MHz, indoor operation only:
Limit: –27 dBm/MHz EIRP outside of the band 5150–5250 MHz.

RSS-247, 6.2.2.2, Emissions outside the band 5250-5350 MHz:
Limit: –27 dBm/MHz EIRP outside of the band 5250–5350 MHz.

RSS-247, 6.2.3.2, Emissions outside the bands 5470-5600 MHz and 5650-5725 MHz:
Limit: –27 dBm/MHz EIRP outside of the band 5470–5725 MHz.
However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p.at 5850 MHz instead of 5725 MHz.
Note: No operation is permitted for the frequency range 5600–5650 MHz.

RSS-247, 6.2.4.2, Emissions outside the band 5725-5850 MHz:

a. 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 Bm/MHz at 5 MHz above or below the band edges;
b. 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
c. 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
d. -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

C) FCC & IC

For band edges connected to a restricted band, the limits are specified in Section 15.209(a)

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limits (dBµV/m)
0.009 – 0.49	2400/F(kHz)@300m	3	(48.5 – 13.8)@300m
0.49 – 1.705	24000/F(kHz)@30m	3	(33.8 – 23.0)@30m
1.705 – 30	30@30m	3	29.5@30m

The measured values are corrected with an inverse linear distance extrapolation factor (40 dB/decade) according FCC 15.31 (2).

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limits (dBµV/m)
30 – 88	100@3m	3	40.0@3m
88 – 216	150@3m	3	43.5@3m
216 – 960	200@3m	3	46.0@3m
960 - 26000	500@3m	3	54.0@3m
26000 - 40000	500@3m	1	54.0@3m

The measured values above 26 GHz are corrected with an inverse linear distance extrapolation factor (20 dB/decade).

§15.35(b) ..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor: Limit (dBµV/m) = 20 log (Limit (µV/m)/1µV/m)

5.4.3 TEST PROTOCOL EUPEN

Ambient temperature:	12 – 13 °C
Air Pressure:	990 – 994 hPa
Humidity:	83 – 84 %

WLAN a-Mode; 20 MHz; 6 Mbit/s

Applied duty cycle correction (AV): 0.6 dB										
U-NII-Sub band	**Ch. No.**	**Ch. Center Freq. [MHz]**	**Band Edge Freq. [MHz]**	**Spurious Level [dBµV/m]**	**Detec-tor**	**RBW [kHz]**	**Limit [dBµV/m]**	**Margin [dB]**	**Limit Type**	**FCC /IC?**
1	36	5180	5150.0	50.6	PEAK	1000	74.0	23.4	BE-RB	FCC&IC
1	36	5180	5150.0	38.2	AV	1000	54.0	15.8	BE-RB	FCC&IC
3	149	5745	5725.0	61.4	PEAK	1000	122.2	60.8	BE-UE	FCC&IC
3	165	5825	5850.0	54.3	PEAK	1000	122.2	67.9	BE-UE	FCC&IC

WLAN n-Mode; 20 MHz; MCS0; SISO

Applied duty cycle correction (AV): 0.5 dB										
U-NII-Sub band	**Ch. No.**	**Ch. Center Freq. [MHz]**	**Band Edge Freq. [MHz]**	**Spurious Level [dBµV/m]**	**Detec-tor**	**RBW [kHz]**	**Limit [dBµV/m]**	**Margin [dB]**	**Limit Type**	**FCC /IC?**
1	36	5180	5150.0	49.4	PEAK	1000	74.0	24.6	BE-RB	FCC&IC
1	36	5180	5150.0	38.1	AV	1000	54.0	15.9	BE-RB	FCC&IC
3	149	5745	5725.0	59.7	PEAK	1000	122.2	62.5	BE-UE	FCC&IC
3	165	5825	5850.0	52.7	PEAK	1000	122.2	69.5	BE-UE	FCC&IC

WLAN n-Mode; 40 MHz; MCS0; SISO

Applied duty cycle correction (AV): 0.9 dB										
U-NII-Sub band	**Ch. No.**	**Ch. Center Freq. [MHz]**	**Band Edge Freq. [MHz]**	**Spurious Level [dBµV/m]**	**Detec-tor**	**RBW [kHz]**	**Limit [dBµV/m]**	**Margin [dB]**	**Limit Type**	**FCC /IC?**
1	38	5190	5150.0	50.5	PEAK	1000	74.0	23.5	BE-RB	FCC&IC
1	38	5190	5150.0	39.9	AV	1000	54.0	14.1	BE-RB	FCC&IC
3	151	5755	5725.0	70.7	PEAK	1000	122.2	51.5	BE-UE	FCC&IC
3	159	5795	5850.0	66.8	PEAK	1000	122.2	55.4	BE-UE	FCC&IC

WLAN ac-Mode; 20 MHz; MCS0; SISO

Applied duty cycle correction (AV): 0.5 dB										
U-NII-Sub band	**Ch. No.**	**Ch. Center Freq. [MHz]**	**Band Edge Freq. [MHz]**	**Spurious Level [dBµV/m]**	**Detec-tor**	**RBW [kHz]**	**Limit [dBµV/m]**	**Margin [dB]**	**Limit Type**	**FCC /IC?**
1	36	5180	5150.0	51.1	PEAK	1000	74.0	22.9	BE-RB	FCC&IC
1	36	5180	5150.0	38.1	AV	1000	54.0	15.9	BE-RB	FCC&IC
3	149	5745	5725.0	59.6	PEAK	1000	122.2	62.6	BE-UE	FCC&IC
3	165	5825	5850.0	53.1	PEAK	1000	122.2	69.1	BE-UE	FCC&IC

WLAN ac-Mode; 40 MHz; MCS0; SISO

Applied duty cycle correction (AV): 0.5 dB										
U-NII-Sub band	**Ch. No.**	**Ch. Center Freq. [MHz]**	**Band Edge Freq. [MHz]**	**Spurious Level [dBµV/m]**	**Detec-tor**	**RBW [kHz]**	**Limit [dBµV/m]**	**Margin [dB]**	**Limit Type**	**FCC /IC?**
1	38	5190	5150.0	50.5	PEAK	1000	74.0	23.5	BE-RB	FCC&IC
1	38	5190	5150.0	39.9	AV	1000	54.0	14.1	BE-RB	FCC&IC
3	151	5755	5725.0	68.9	PEAK	1000	122.2	53.3	BE-UE	FCC&IC
3	159	5795	5850.0	57.9	PEAK	1000	122.2	64.3	BE-UE	FCC&IC

WLAN ac-Mode; 80 MHz; MCS0; SISO

Applied duty cycle correction (AV): 0.6 dB										
U-NII-Sub band	**Ch. No.**	**Ch. Center Freq. [MHz]**	**Band Edge Freq. [MHz]**	**Spurious Level [dBµV/m]**	**Detec-tor**	**RBW [kHz]**	**Limit [dBµV/m]**	**Margin [dB]**	**Limit Type**	**FCC /IC?**
1	42	5210	5150.0	49.7	PEAK	1000	74.0	24.3	BE-RB	FCC&IC
1	42	5210	5150.0	38.6	AV	1000	54.0	15.4	BE-RB	FCC&IC
3	155	5775	5725.0	65.4	PEAK	1000	122.2	56.8	BE-UE	FCC&IC
3	155	5775	5850.0	63.0	PEAK	1000	122.2	59.2	BE-UE	FCC&IC

WLAN ax-Mode; 20 MHz; MCS0; SISO

Applied duty cycle correction (AV): 1.3 dB										
U-NII-Sub band	**Ch. No.**	**Ch. Center Freq. [MHz]**	**Band Edge Freq. [MHz]**	**Spurious Level [dBµV/m]**	**Detec-tor**	**RBW [kHz]**	**Limit [dBµV/m]**	**Margin [dB]**	**Limit Type**	**FCC /IC?**
1	36	5180	5150.0	49.9	PEAK	1000	74.0	24.1	BE-RB	FCC&IC
1	36	5180	5150.0	38.9	AV	1000	54.0	15.1	BE-RB	FCC&IC
3	149	5745	5725.0	62.1	PEAK	1000	122.2	60.1	BE-UE	FCC&IC
3	165	5825	5850.0	54.2	PEAK	1000	122.2	68.0	BE-UE	FCC&IC

WLAN ax-Mode; 40 MHz; MCS0; SISO

Applied duty cycle correction (AV): 1.3 dB										
U-NII-Sub band	**Ch. No.**	**Ch. Center Freq. [MHz]**	**Band Edge Freq. [MHz]**	**Spurious Level [dBµV/m]**	**Detec-tor**	**RBW [kHz]**	**Limit [dBµV/m]**	**Margin [dB]**	**Limit Type**	**FCC /IC?**
1	38	5190	5150.0	51.4	PEAK	1000	74.0	22.6	BE-RB	FCC&IC
1	38	5190	5150.0	40.6	AV	1000	54.0	13.4	BE-RB	FCC&IC
3	151	5755	5725.0	69.8	PEAK	1000	122.2	52.4	BE-UE	FCC&IC
3	159	5795	5850.0	53.5	PEAK	1000	122.2	68.7	BE-UE	FCC&IC

WLAN ax-Mode; 80 MHz; MCS0; SISO

Applied duty cycle correction (AV): 1.3 dB										
U-NII-Sub band	**Ch. No.**	**Ch. Center Freq. [MHz]**	**Band Edge Freq. [MHz]**	**Spurious Level [dBµV/m]**	**Detec-tor**	**RBW [kHz]**	**Limit [dBµV/m]**	**Margin [dB]**	**Limit Type**	**FCC /IC?**
1	42	5210	5150.0	50.0	PEAK	1000	74.0	24.0	BE-RB	FCC&IC
1	42	5210	5150.0	39.4	AV	1000	54.0	14.6	BE-RB	FCC&IC
3	155	5775	5725.0	65.4	PEAK	1000	122.2	56.8	BE-UE	FCC&IC
3	155	5775	5850.0	63.0	PEAK	1000	122.2	59.2	BE-UE	FCC&IC

COMMENT:

- The spectrum analyser transducer "TDF DUT3" contains the attenuation of the measurement cable
- The spectrum analyser transducer contains "HF906_001" contains the antenna factor of the used antenna
- The measurement plot contains no measurement distance correction.
- The correction factor for the difference between measurement distance and limit has been subtracted in the result tables within this chapter.
  Example calculation:
  Measurement distance: 1.81 m, Limit distance: 3 m
  Correction factor: 20 LOG(1.81/3) = -4.4 dB
  Value in plot: 65.75 dBµV/m
  Value in table: 65.75 dBµV/m – 4.4 dB = 61.35 dBµV/m

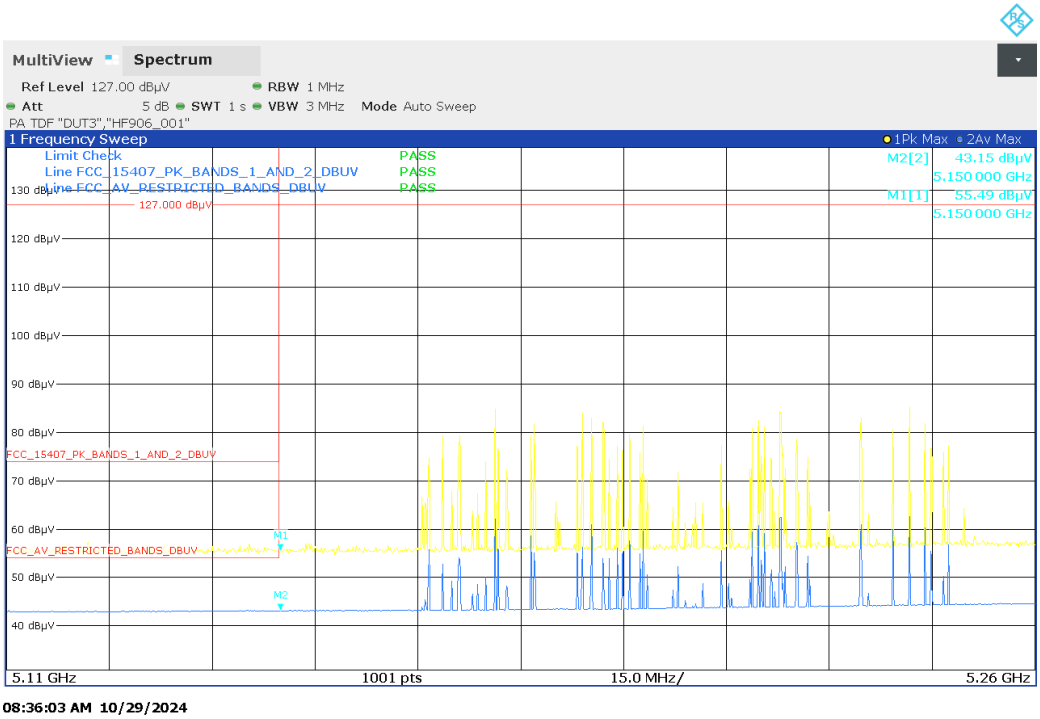
5.4.3.1 RESULTS OF WORST-CASE SEARCH

$D_{STABLE\ DECREASE}$ = 21.0 m

Channel Bandwidth [MHz]	Center Frequency [MHz]	Measurement Distance [m]	Measurement height [m]	Polarisation of receiving antenna	Worst-Case distance from feeding point [m]
20	5180	1.81	1.90	horizontal	8.41
	5200	1.81	1.90	horizontal	8.40
	5240	1.81	1.90	horizontal	8.43
	5745	1.81	1.90	horizontal	9.31
	5785	1.81	1.90	horizontal	9.32
	5825	1.81	1.90	horizontal	9.34
40	5190	1.81	1.90	horizontal	8.40
	5230	1.81	1.90	horizontal	8.43
	5755	1.81	1.90	horizontal	9.32
	5795	1.81	1.90	horizontal	9.33
80	5210	1.81	1.90	horizontal	8.42
	5775	1.81	1.90	horizontal	8.70

5.4.3.2 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

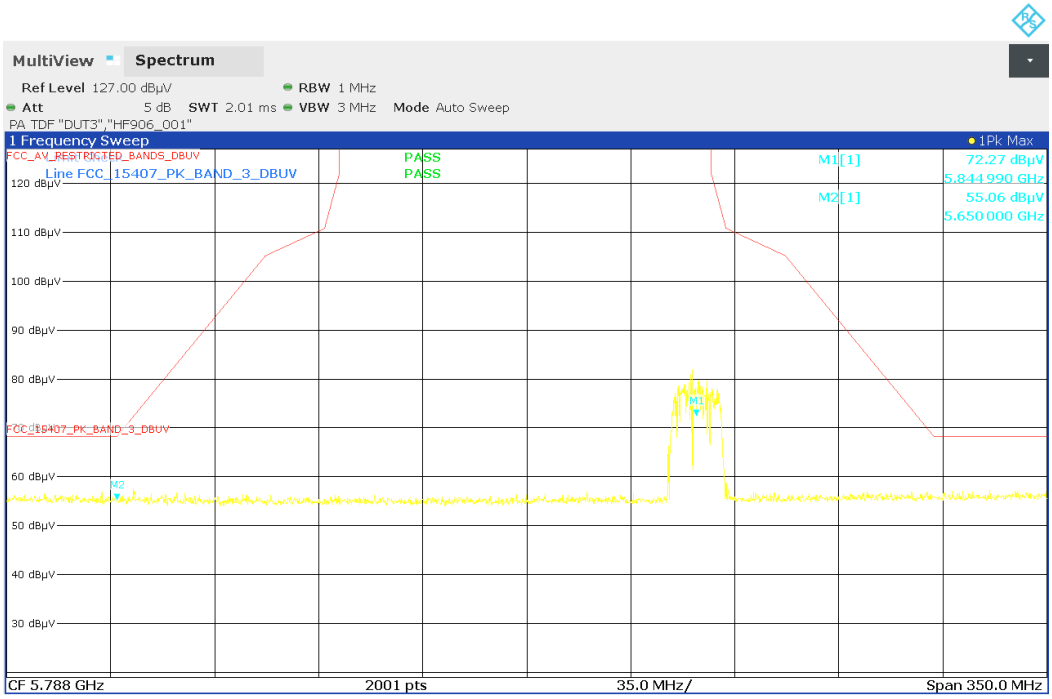
Noise Level, Ambient, Band Edge = 5150 MHz, Subband = U-NII-1



08:36:03 AM 10/29/2024

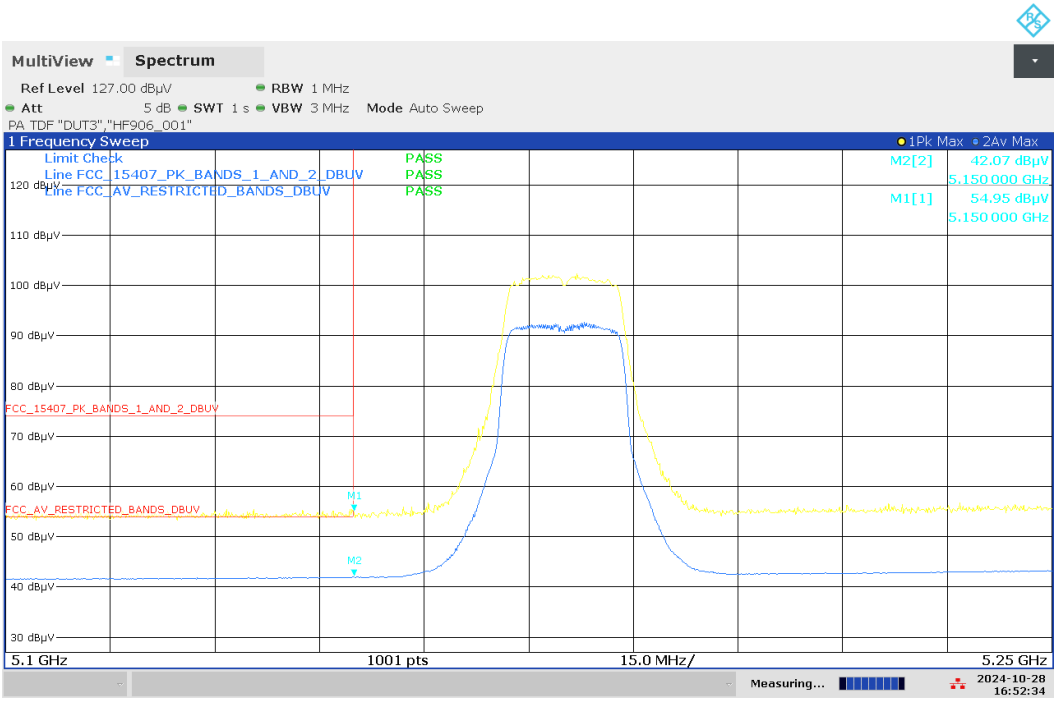
Worst case, this interferer is not permanent visible

Noise Level, Ambient, Band Edge = 5150 MHz, Subband = U-NII-1



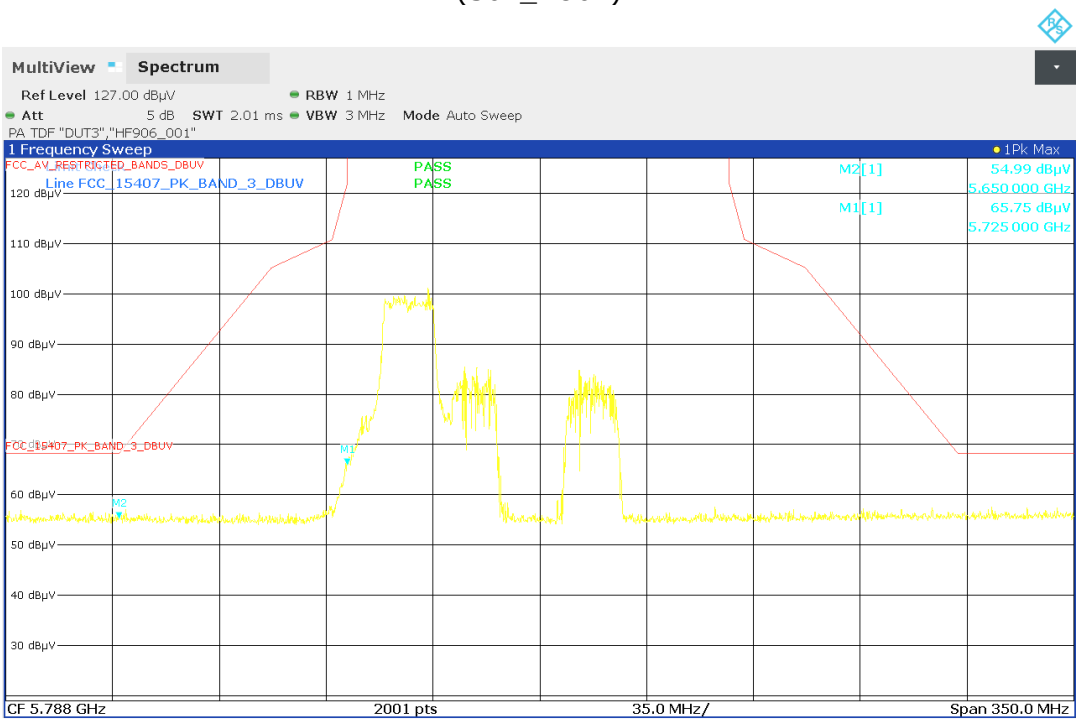
09:24:30 AM 10/29/2024

Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-1 (S01_AO04)



04:52:34 PM 10/28/2024

Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-3 (S01_AO04)

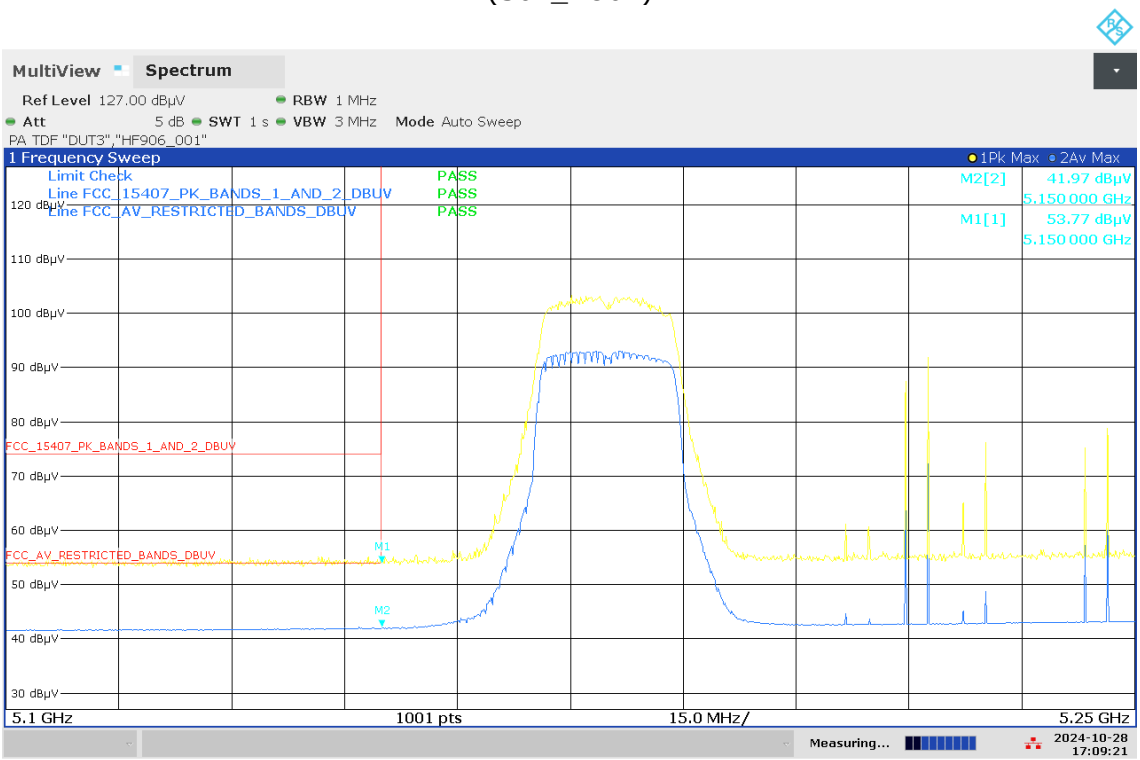


09:10:27 AM 10/29/2024

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3 (S01_AO04)

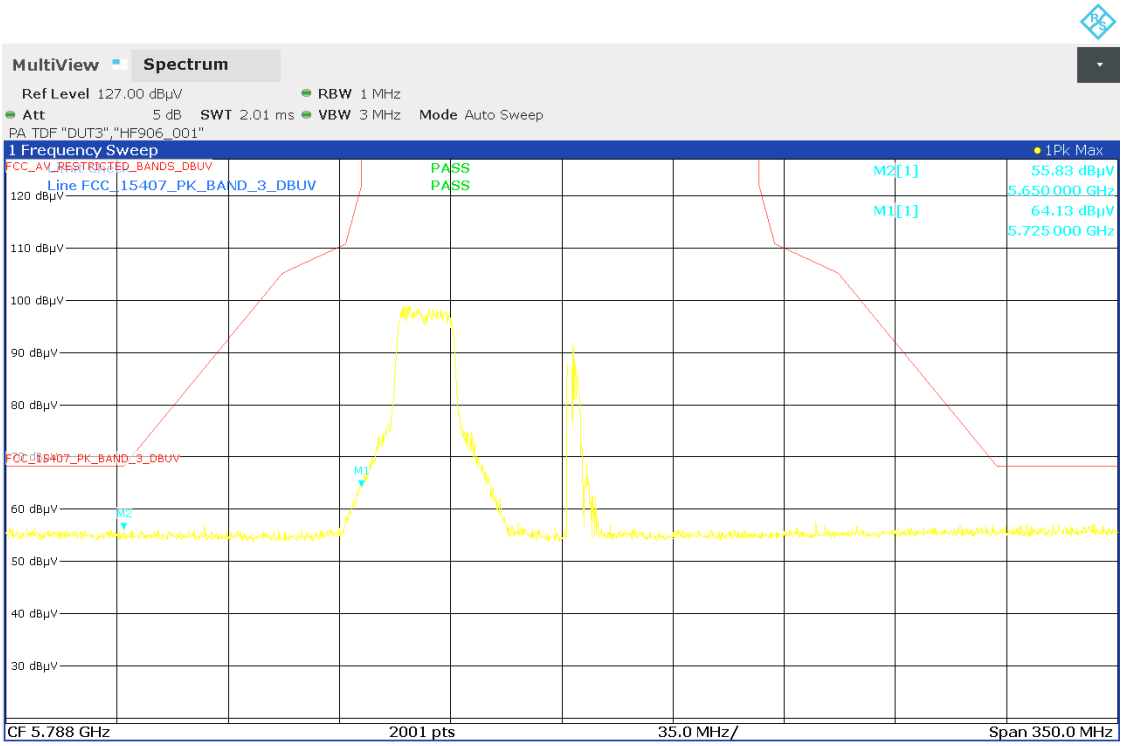
09:50:29 AM 10/29/2024

Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-1 (S02_AO04)



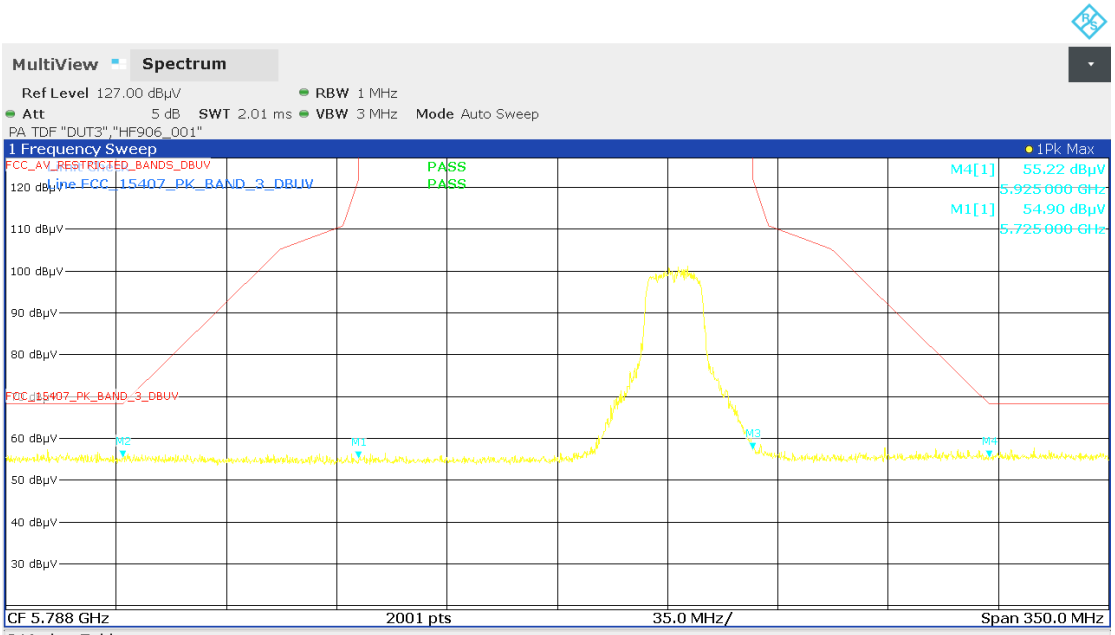
05:09:22 PM 10/28/2024

Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S02_AO04)



09:14:43 AM 10/29/2024

Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S02_AO04)

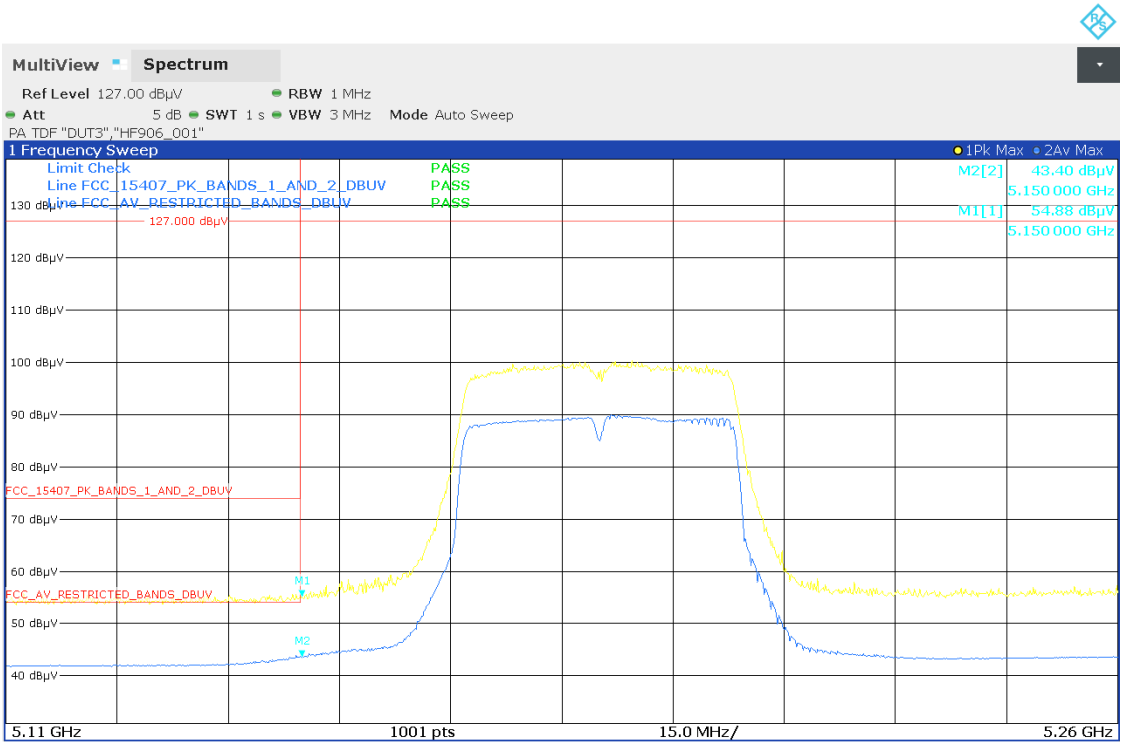


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	5.725 GHz	54.90 dBµV		
M2		1	5.65 GHz	55.20 dBµV		
M3		1	5.85 GHz	57.07 dBµV		
M4		1	5.925 GHz	55.22 dBµV		

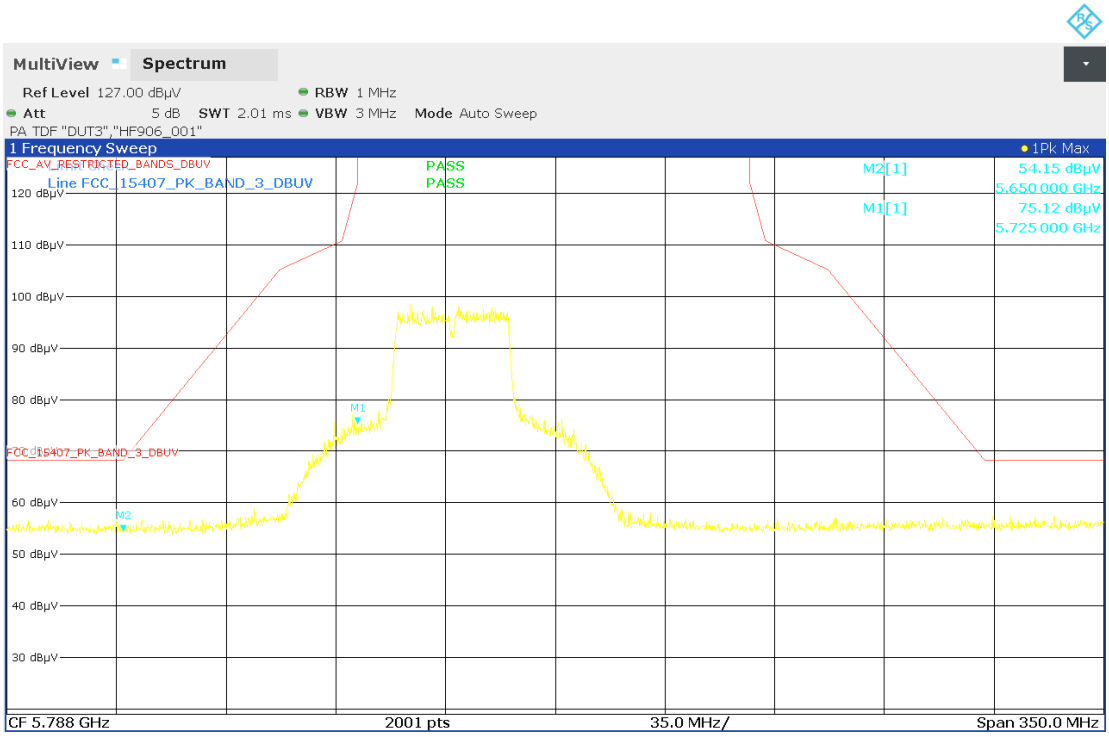
09:53:41 AM 10/29/2024

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S02_AO04)



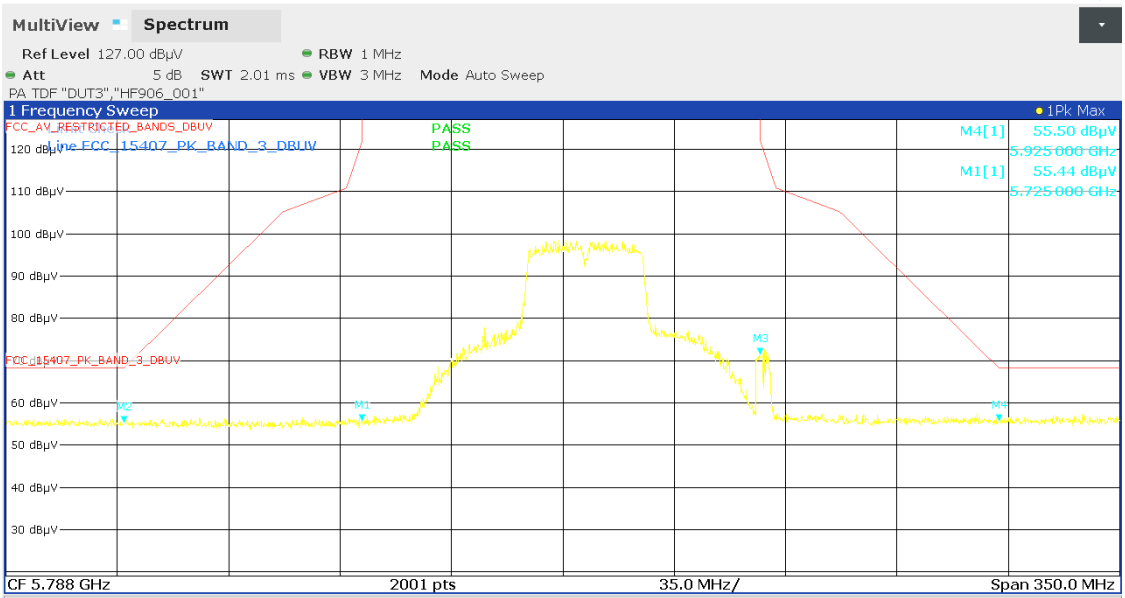
08:46:16 AM 10/29/2024

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S02_AO04)



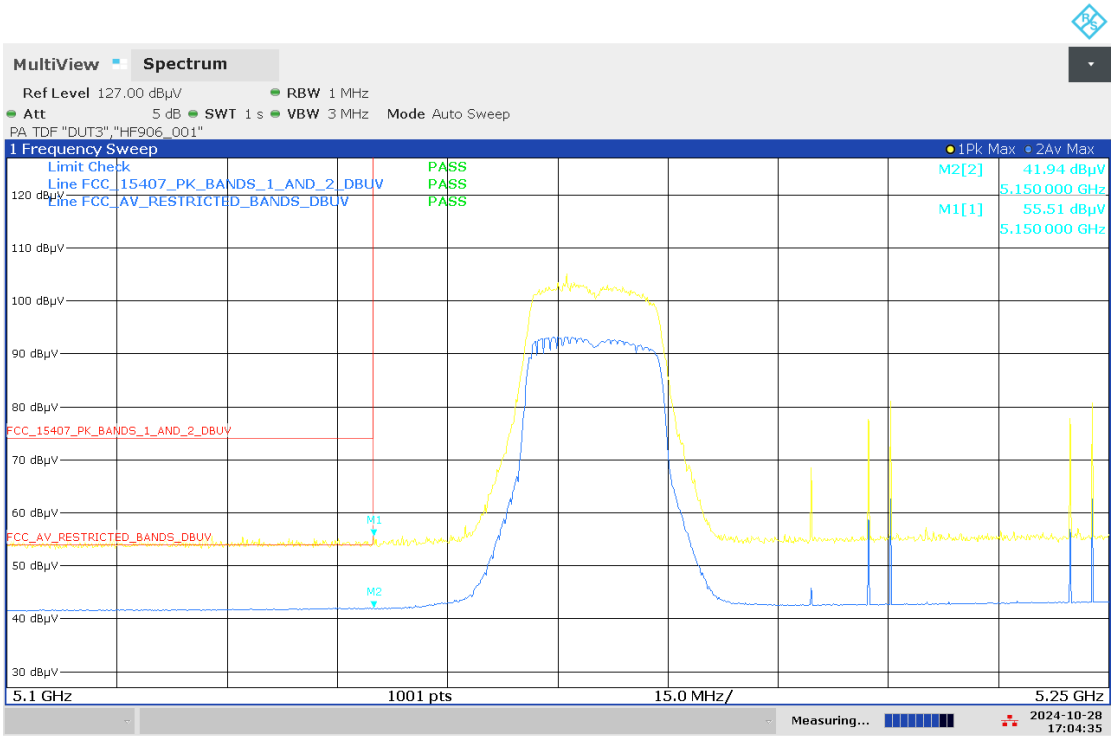
09:32:25 AM 10/29/2024

Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S02_AO04)



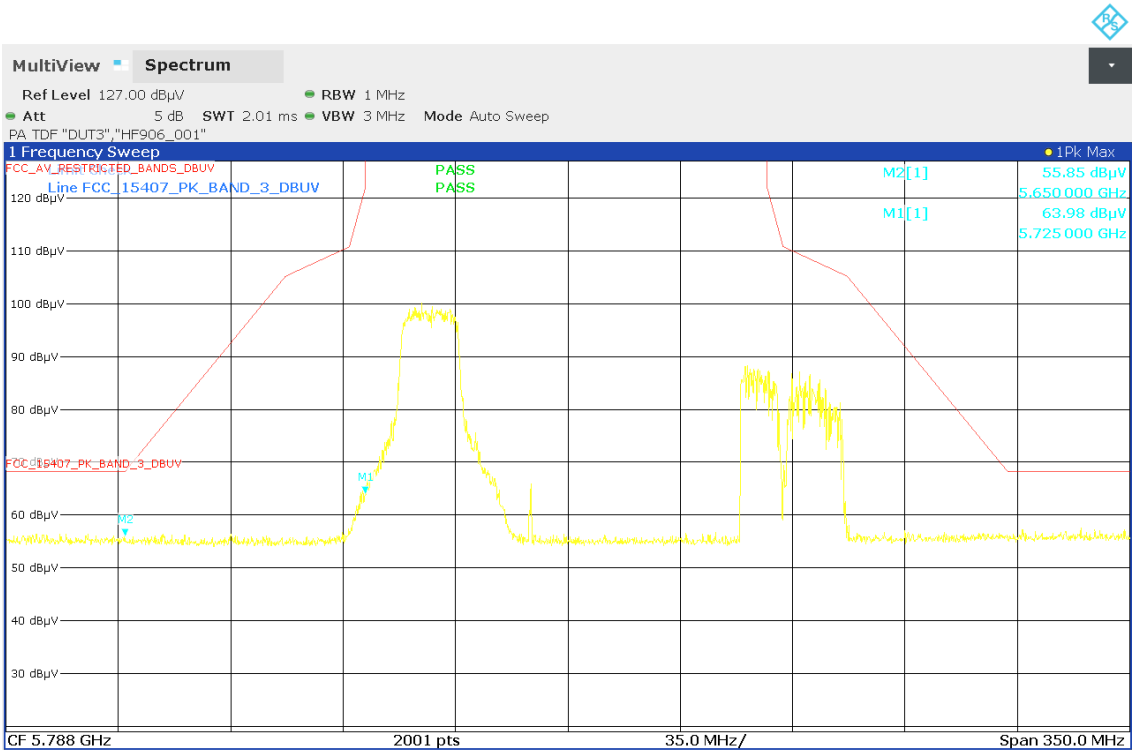
10:04:29 AM 10/29/2024

Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Subband = U-NII-1 (S02_AO04)



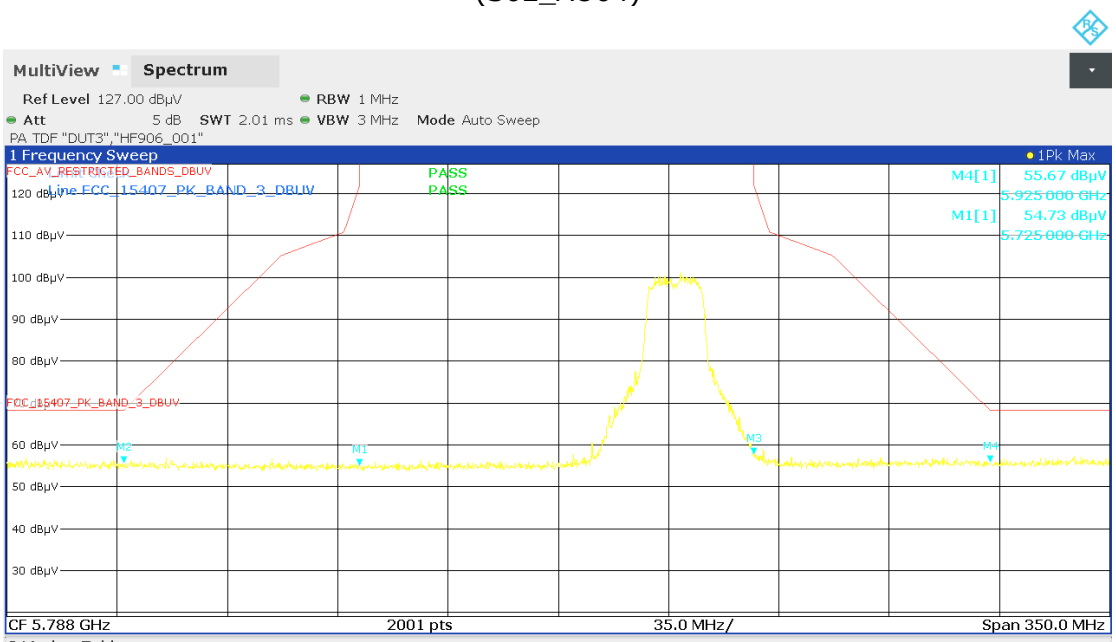
05:04:35 PM 10/28/2024

Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S02_AO04)



09:19:18 AM 10/29/2024

Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S02_AO04)

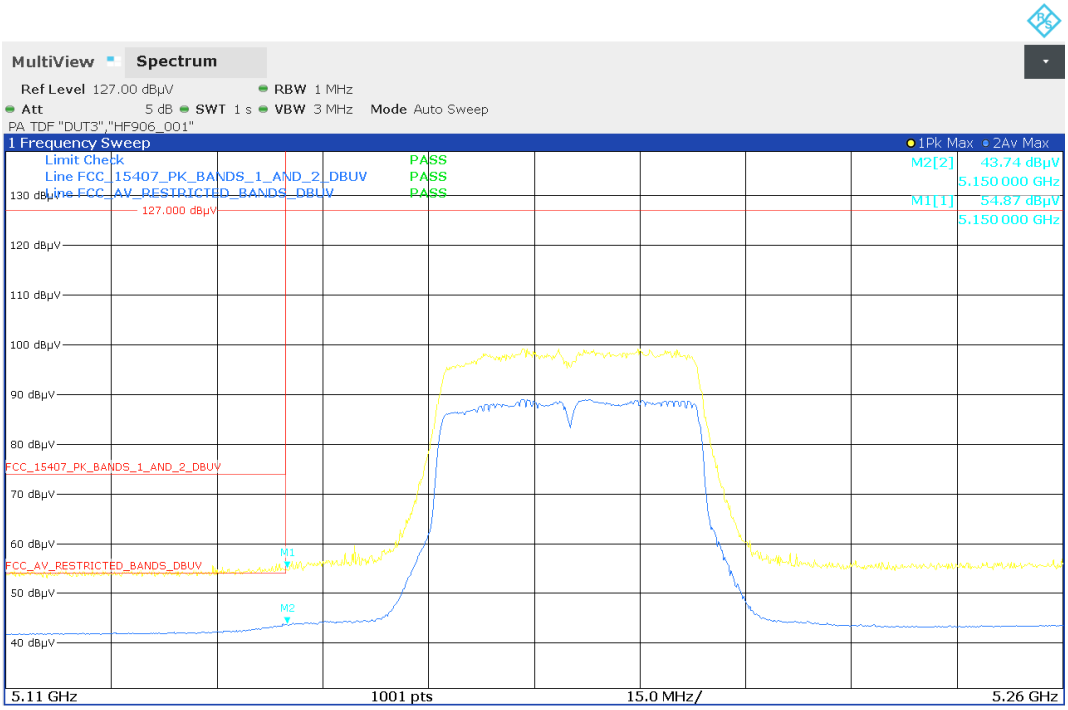


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	5.725 GHz	54.73 dBµV		
M2		1	5.65 GHz	55.34 dBµV		
M3		1	5.85 GHz	57.44 dBµV		
M4		1	5.925 GHz	55.67 dBµV		

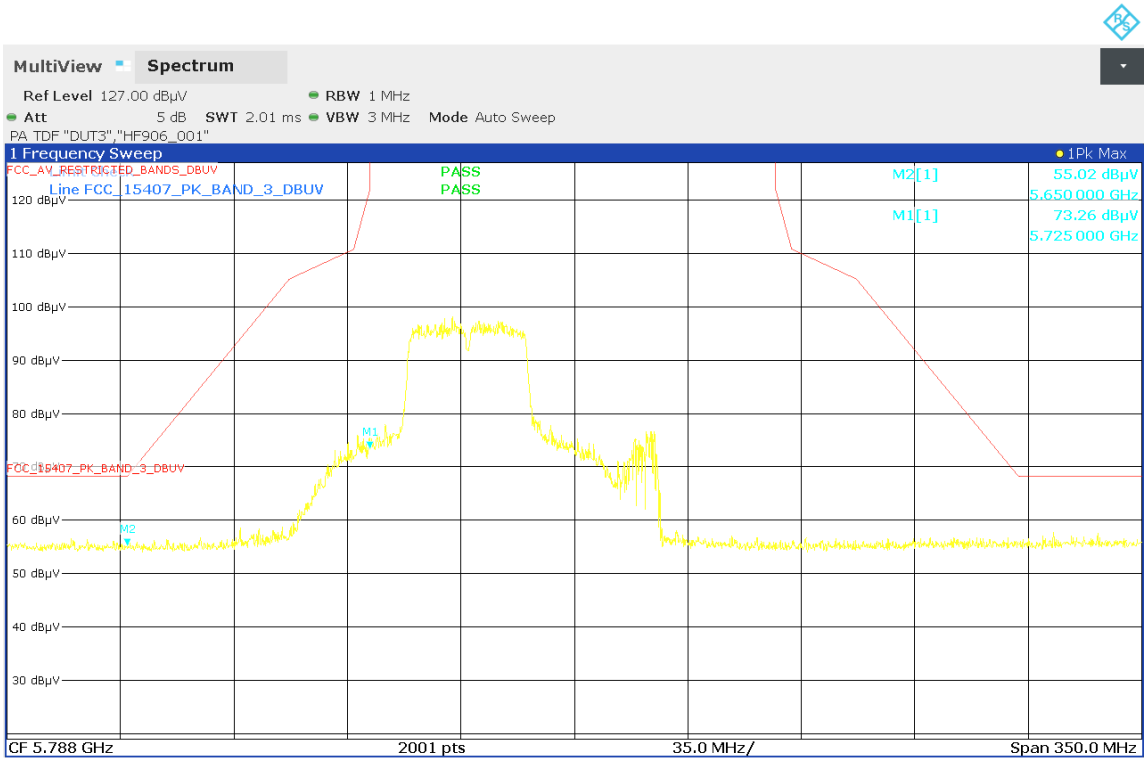
09:57:28 AM 10/29/2024

Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S02_AO04)



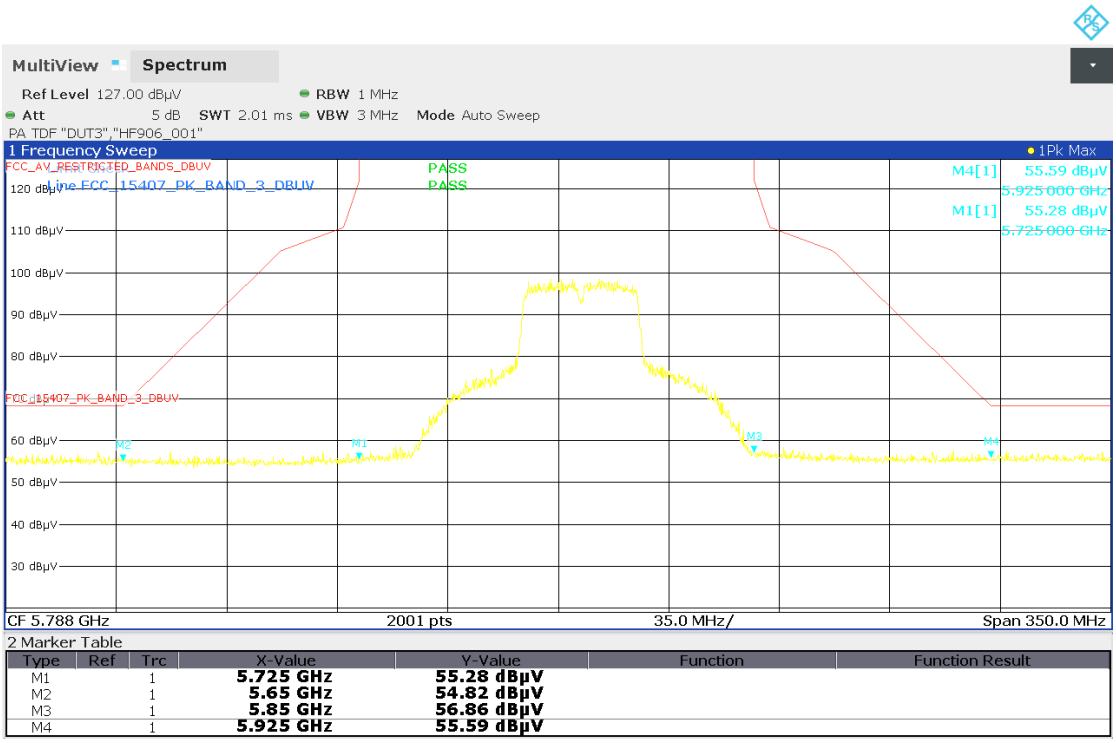
08:49:25 AM 10/29/2024

Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S02_AO04)

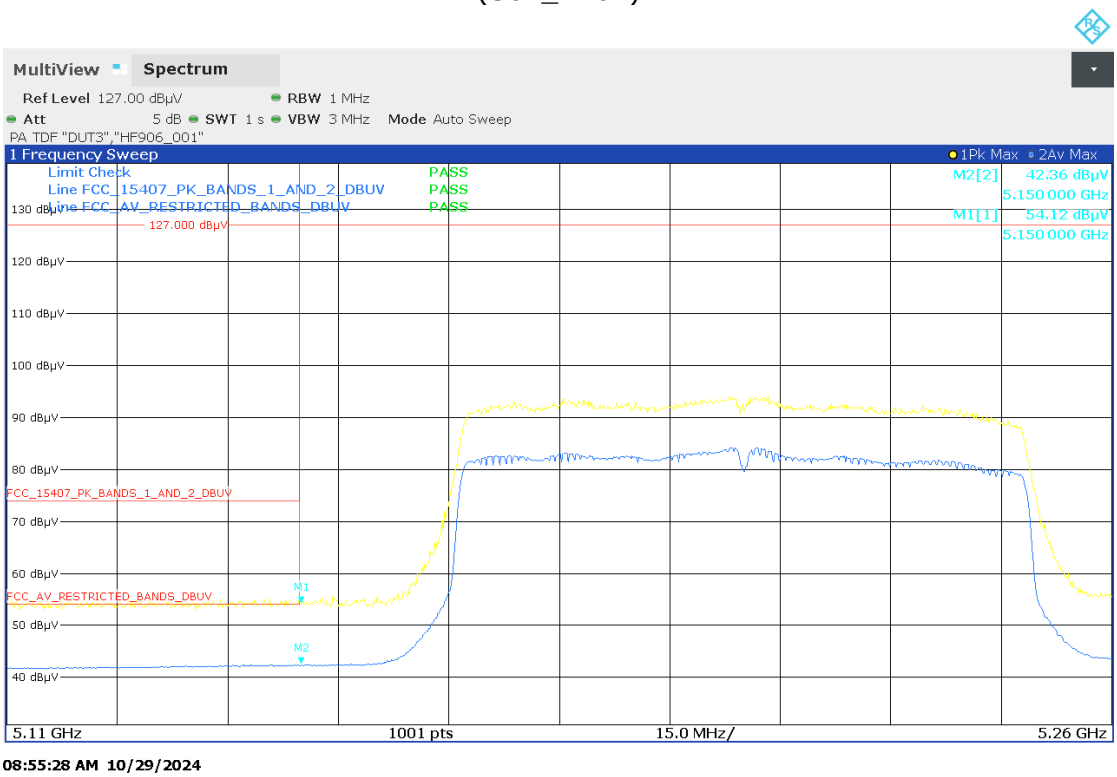


09:35:41 AM 10/29/2024

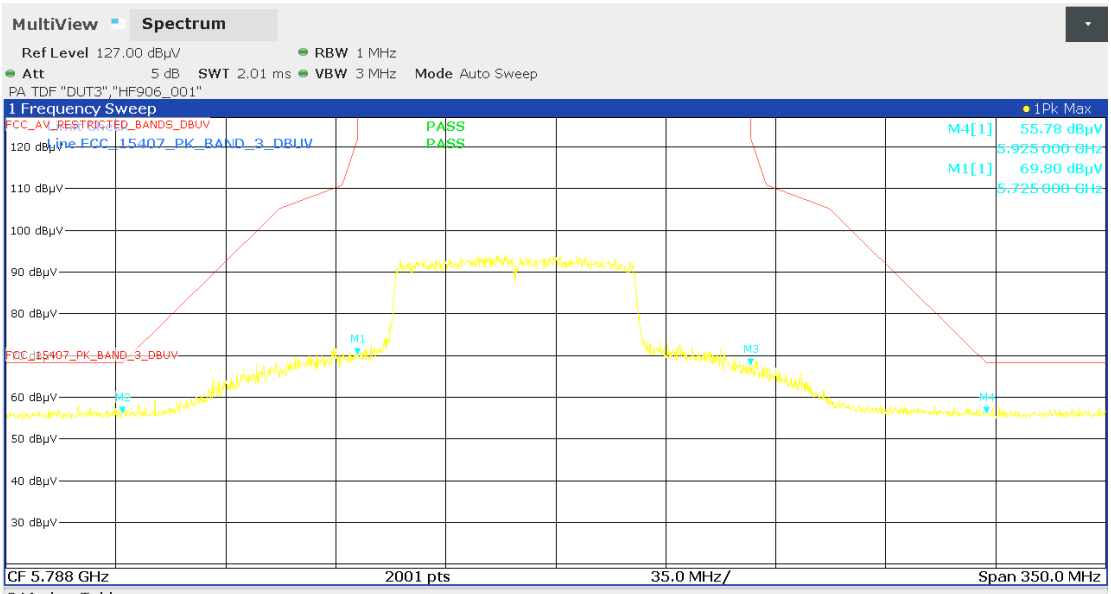
Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S02_AO04)



Radio Technology = WLAN ac 80 MHz, Operating Frequency = low, Subband = U-NII-1 (S02_AA01)

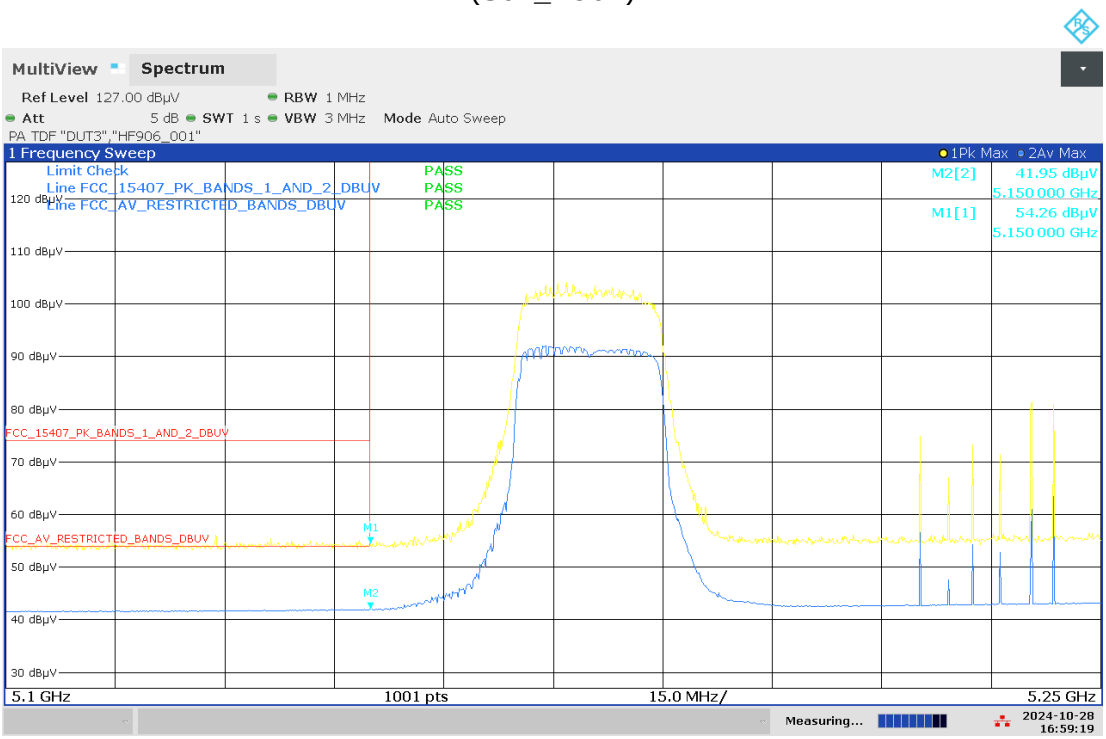


Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Subband = U-NII-3 (S02_AA01)



09:43:48 AM 10/29/2024

Radio Technology = WLAN ax 20 MHz, Operating Frequency = low, Subband = U-NII-1 (S02_AO04)



04:59:19 PM 10/28/2024