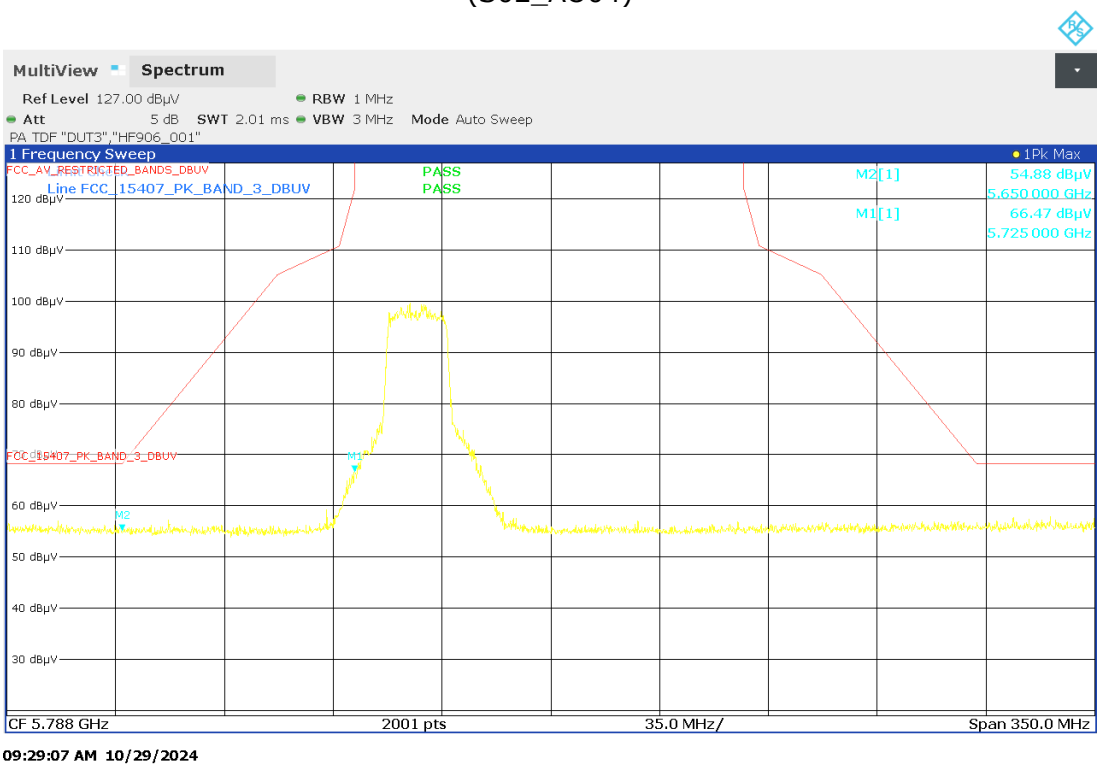
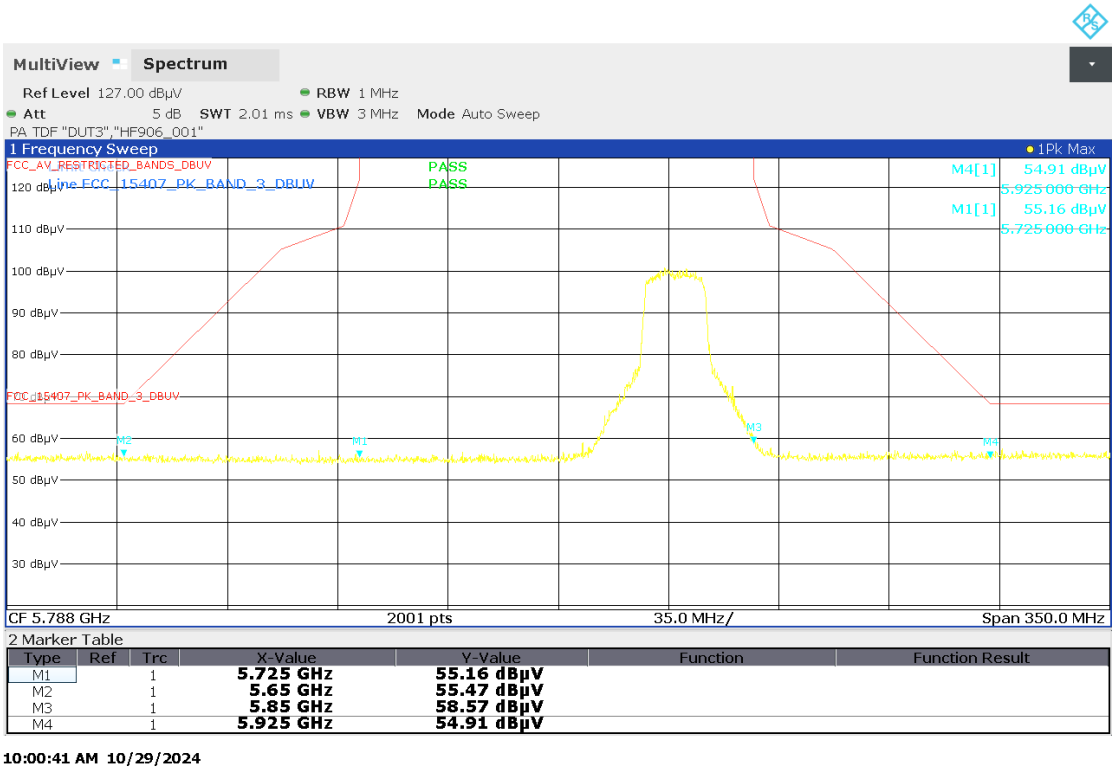
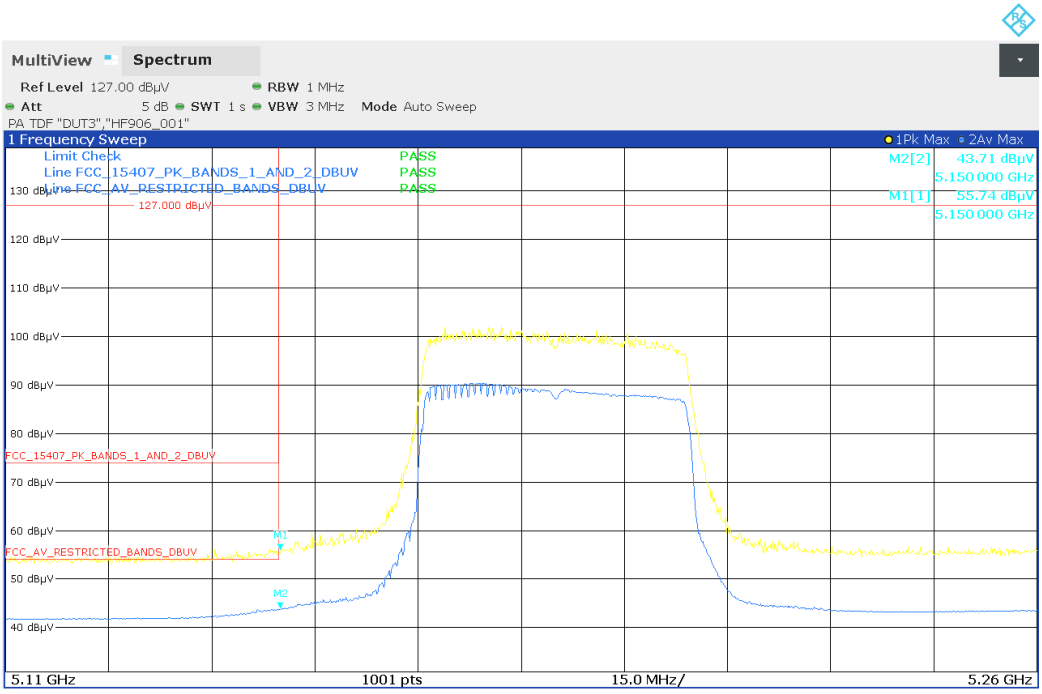
Radio Technology = WLAN ax 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S02_AO04)



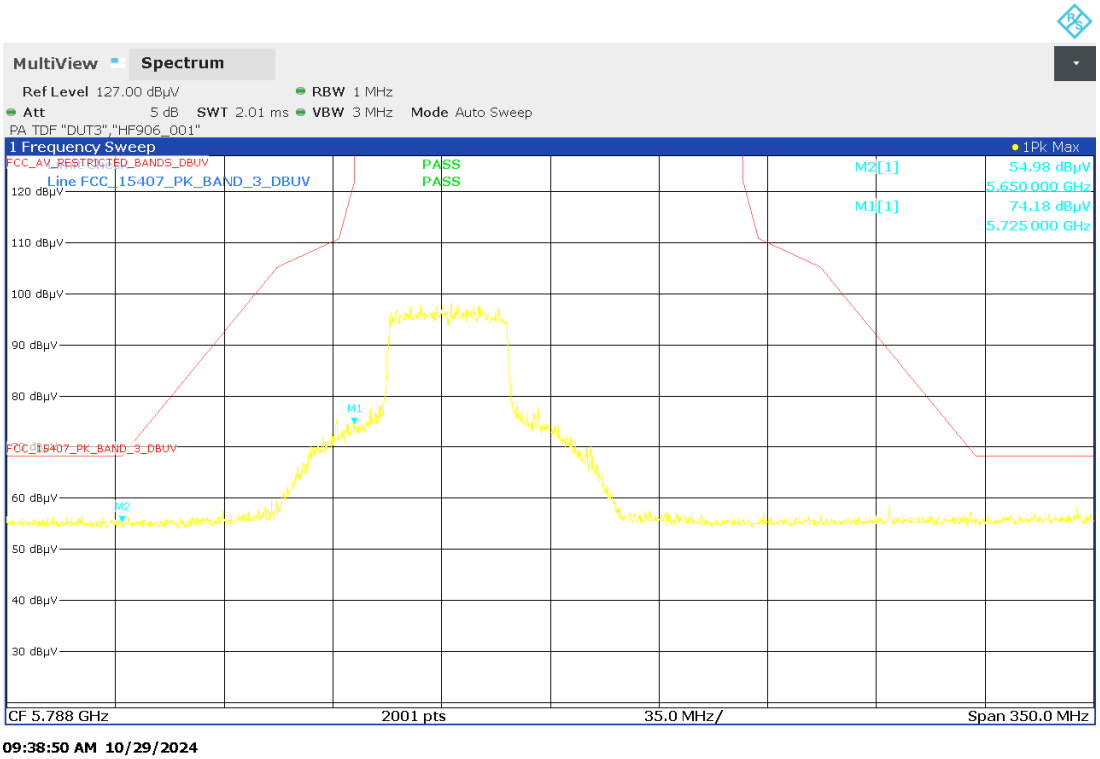
Radio Technology = WLAN ax 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S02_AO04)



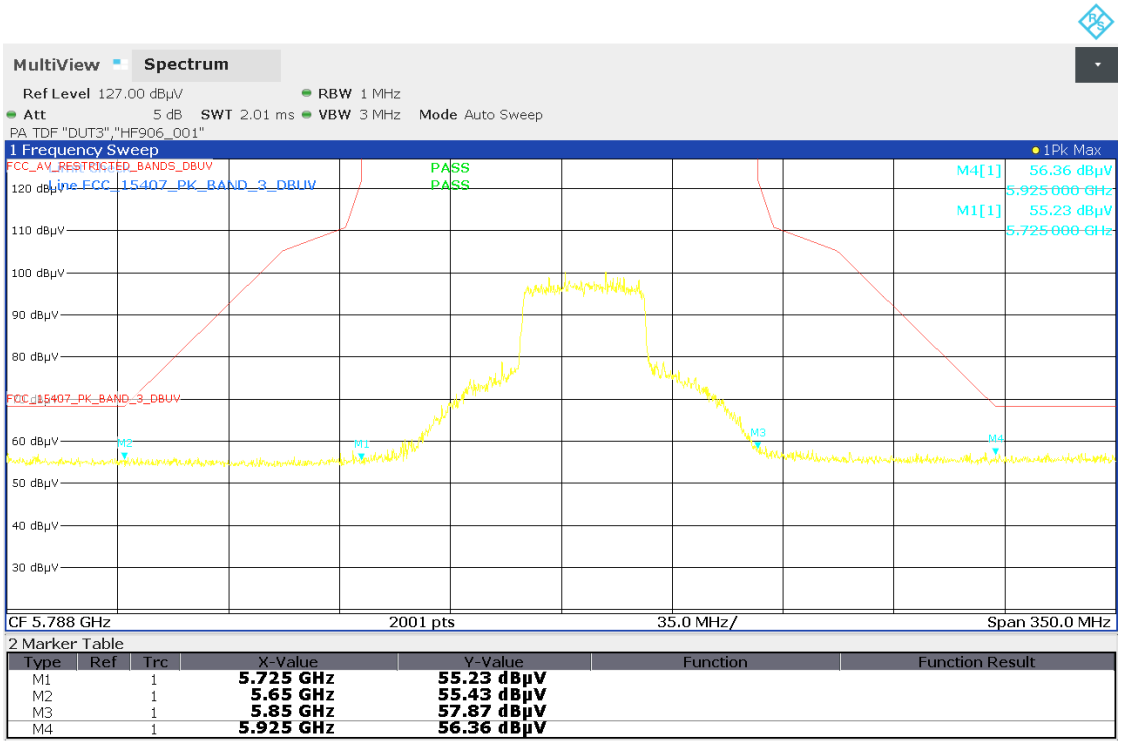
Radio Technology = WLAN ax 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S02_AO04)



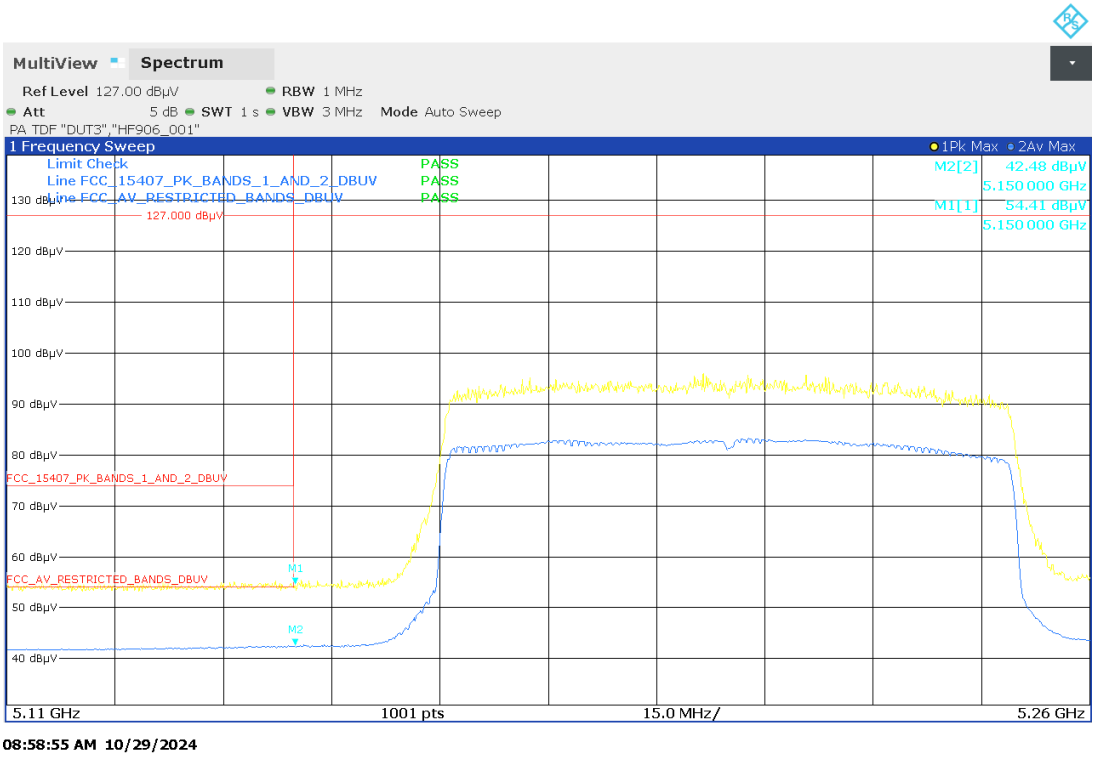
Radio Technology = WLAN ax 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S02_AO04)



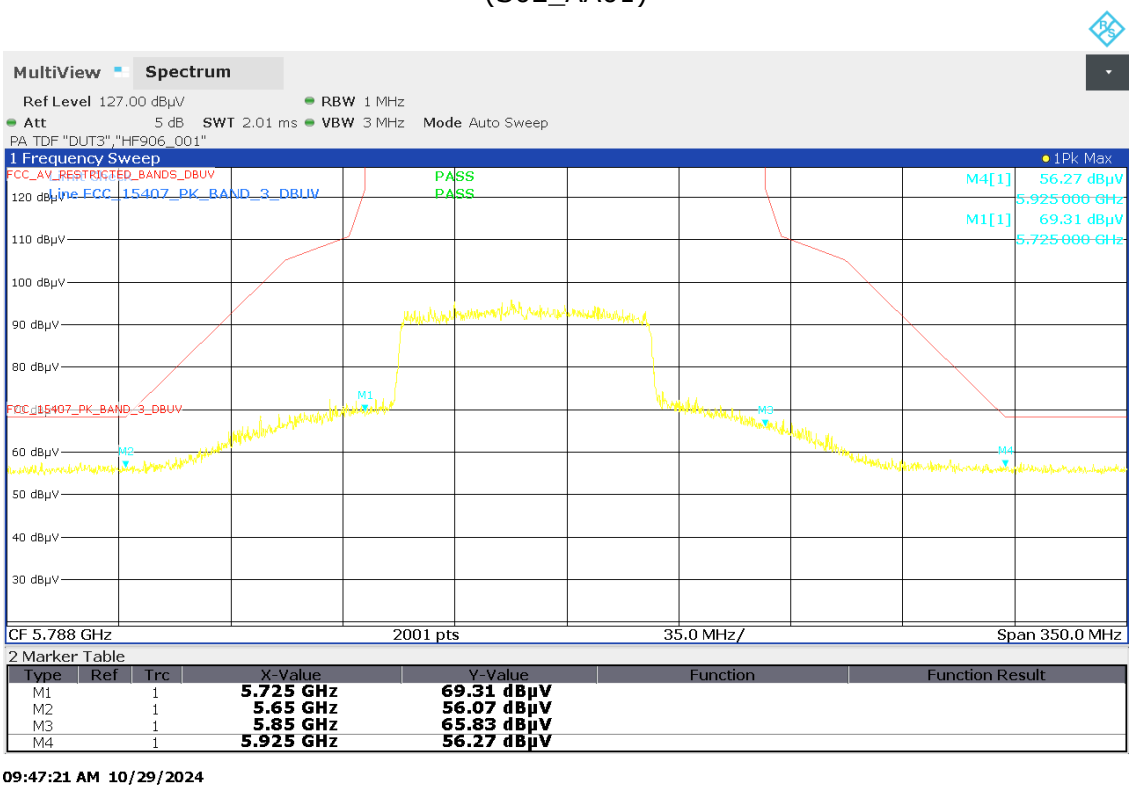
Radio Technology = WLAN ax 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S02_AO04)



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



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



5.4.4 TEST PROTOCOL ERLANGEN

Ambient temperature:	20 °C
Air Pressure:	992 hPa
Humidity:	46 %

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	56.9	PEAK	1000	74.0	17.1	BE-RB	FCC&IC
1	36	5180	5150.0	44.7	AV	1000	54.0	9.3	BE-RB	FCC&IC
3	149	5745	5725.0	60.4	PEAK	1000	122.2	61.9	BE-UE	FCC&IC
3	165	5825	5850.0	56.9	PEAK	1000	122.2	65.3	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	56.1	PEAK	1000	74.0	17.9	BE-RB	FCC&IC
1	36	5180	5150.0	44.6	AV	1000	54.0	9.4	BE-RB	FCC&IC
3	149	5745	5725.0	58.5	PEAK	1000	122.2	63.7	BE-UE	FCC&IC
3	165	5825	5850.0	57.6	PEAK	1000	122.2	64.6	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	55.8	PEAK	1000	74.0	18.2	BE-RB	FCC&IC
1	38	5190	5150.0	44.8	AV	1000	54.0	9.2	BE-RB	FCC&IC
3	151	5755	5725.0	62.1	PEAK	1000	122.2	60.1	BE-UE	FCC&IC
3	159	5795	5850.0	57.6	PEAK	1000	122.2	64.6	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	56.3	PEAK	1000	74.0	17.7	BE-RB	FCC&IC
1	36	5180	5150.0	44.7	AV	1000	54.0	9.3	BE-RB	FCC&IC
3	149	5745	5725.0	59.3	PEAK	1000	122.2	62.9	BE-UE	FCC&IC
3	165	5825	5850.0	58.6	PEAK	1000	122.2	63.6	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	55.5	PEAK	1000	74.0	18.5	BE-RB	FCC&IC
1	38	5190	5150.0	44.8	AV	1000	54.0	9.3	BE-RB	FCC&IC
3	151	5755	5725.0	63.6	PEAK	1000	122.2	58.6	BE-UE	FCC&IC
3	159	5795	5850.0	57.3	PEAK	1000	122.2	64.9	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	56.0	PEAK	1000	74.0	18.0	BE-RB	FCC&IC
1	42	5210	5150.0	44.6	AV	1000	54.0	9.4	BE-RB	FCC&IC
3	155	5775	5725.0	61.5	PEAK	1000	122.2	60.7	BE-UE	FCC&IC
3	155	5775	5850.0	59.2	PEAK	1000	122.2	63.0	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	55.5	PEAK	1000	74.0	18.5	BE-RB	FCC&IC
1	36	5180	5150.0	44.7	AV	1000	54.0	9.3	BE-RB	FCC&IC
3	149	5745	5725.0	58.5	PEAK	1000	122.2	63.7	BE-UE	FCC&IC
3	165	5825	5850.0	58.0	PEAK	1000	122.2	64.2	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	55.7	PEAK	1000	74.0	18.3	BE-RB	FCC&IC
1	38	5190	5150.0	44.8	AV	1000	54.0	9.2	BE-RB	FCC&IC
3	151	5755	5725.0	62.3	PEAK	1000	122.2	59.9	BE-UE	FCC&IC
3	159	5795	5850.0	57.9	PEAK	1000	122.2	64.3	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	55.8	PEAK	1000	74.0	18.3	BE-RB	FCC&IC
1	42	5210	5150.0	44.8	AV	1000	54.0	9.2	BE-RB	FCC&IC
3	155	5775	5725.0	60.7	PEAK	1000	122.2	61.5	BE-UE	FCC&IC
3	155	5775	5850.0	60.3	PEAK	1000	122.2	61.9	BE-UE	FCC&IC

COMMENT:

- The spectrum analyser transducer "TDF DUT_CAL" 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 regarded via the "reference level offset" in the analyser.
  Example calculation:
  Measurement distance: 7.0 m, Limit distance: 3.0 m
  Correction factor: 20 LOG(1.81/3) = -4.4 dB

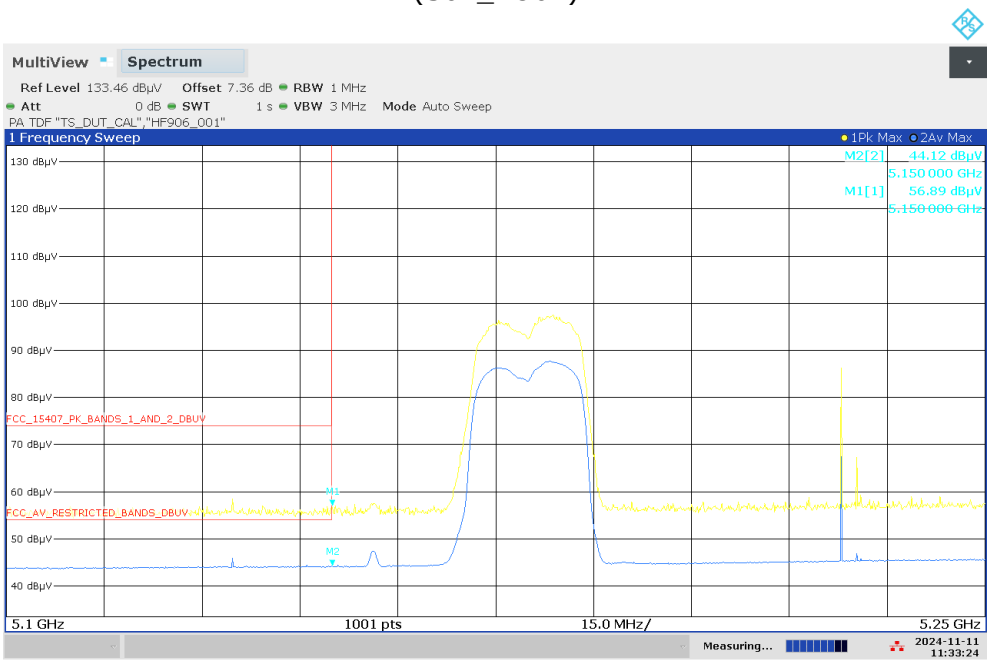
5.4.4.1 RESULTS OF WORST-CASE SEARCH

$D_{STABLE\ DECREASE}$ = 23.0 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	7.0	2.0	horizontal	8.3
	5200	7.0	2.0	horizontal	11.9
	5240	7.0	2.0	horizontal	8.3
	5745	7.0	2.0	horizontal	14.5
	5785	7.0	2.0	horizontal	11.2
	5825	7.0	2.0	horizontal	10.9
40	5190	7.0	2.0	horizontal	8.3
	5230	7.0	2.0	horizontal	8.5
	5755	7.0	2.0	horizontal	13.1
	5795	7.0	2.0	horizontal	14.6
80	5210	7.0	2.0	horizontal	8.3
	5775	7.0	2.0	horizontal	16.1

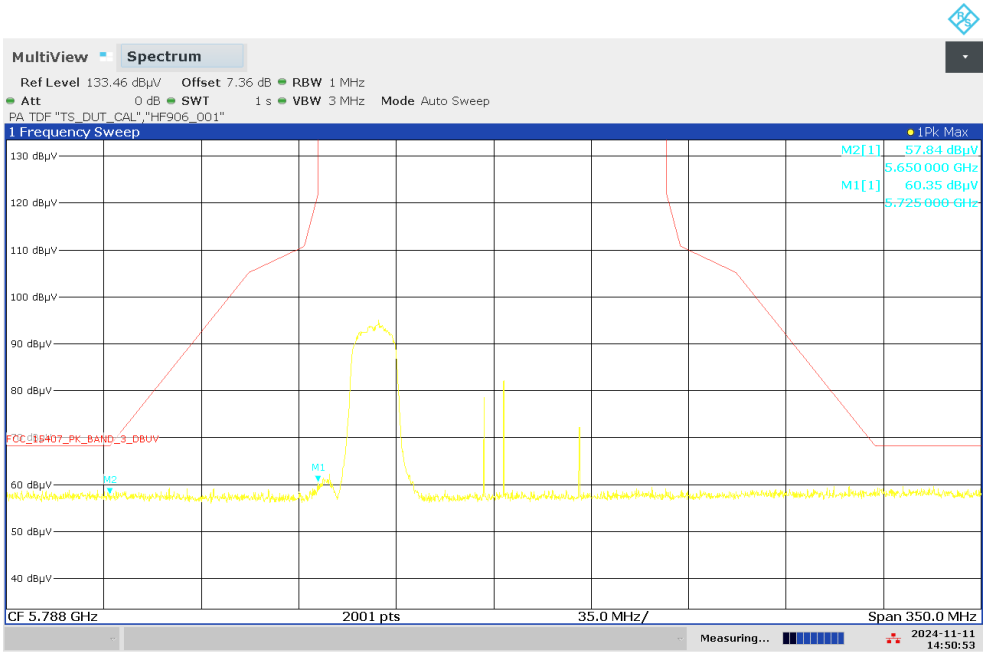
5.4.4.2 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

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



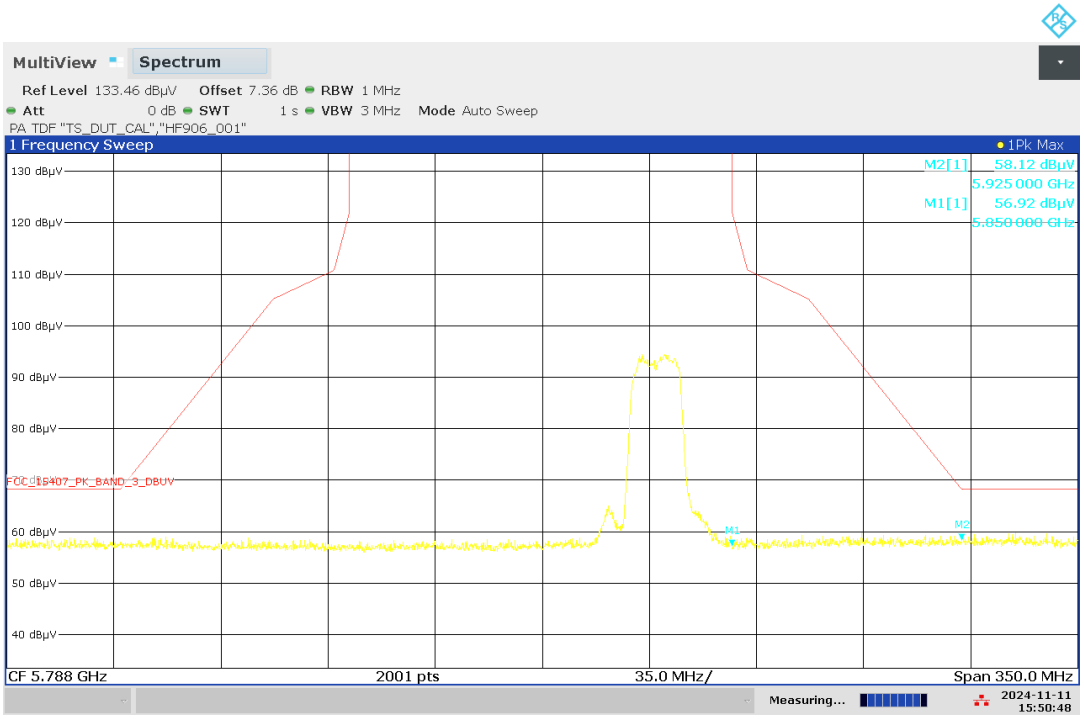
11:33:25 AM 11/11/2024

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



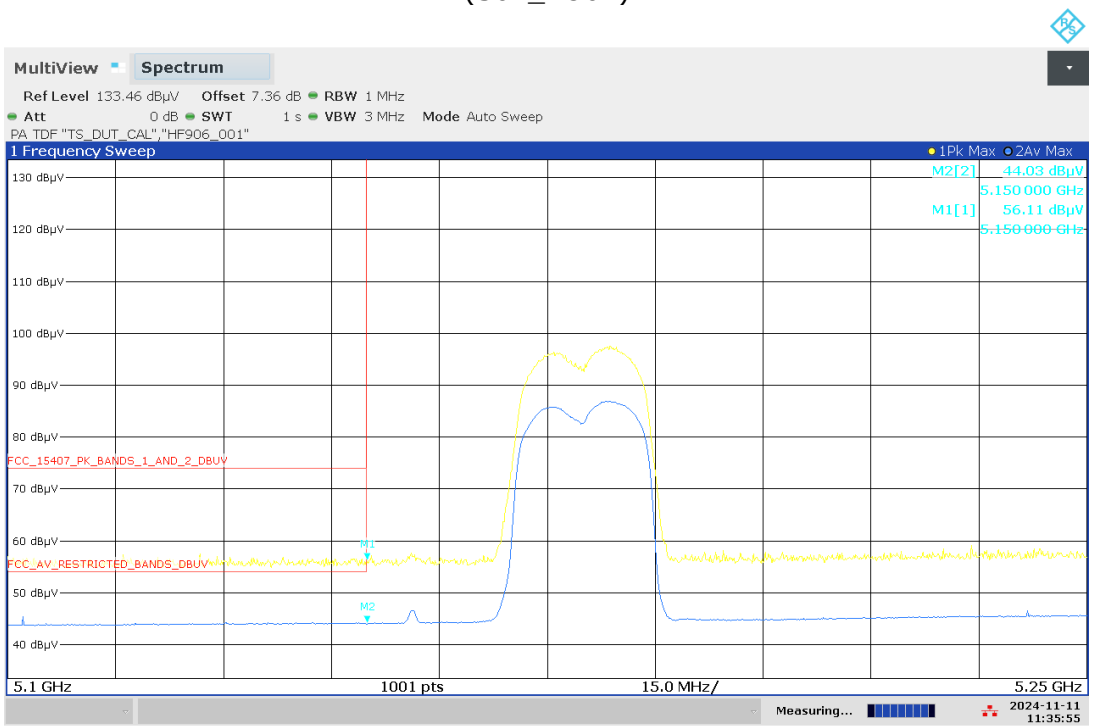
02:50:53 PM 11/11/2024

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



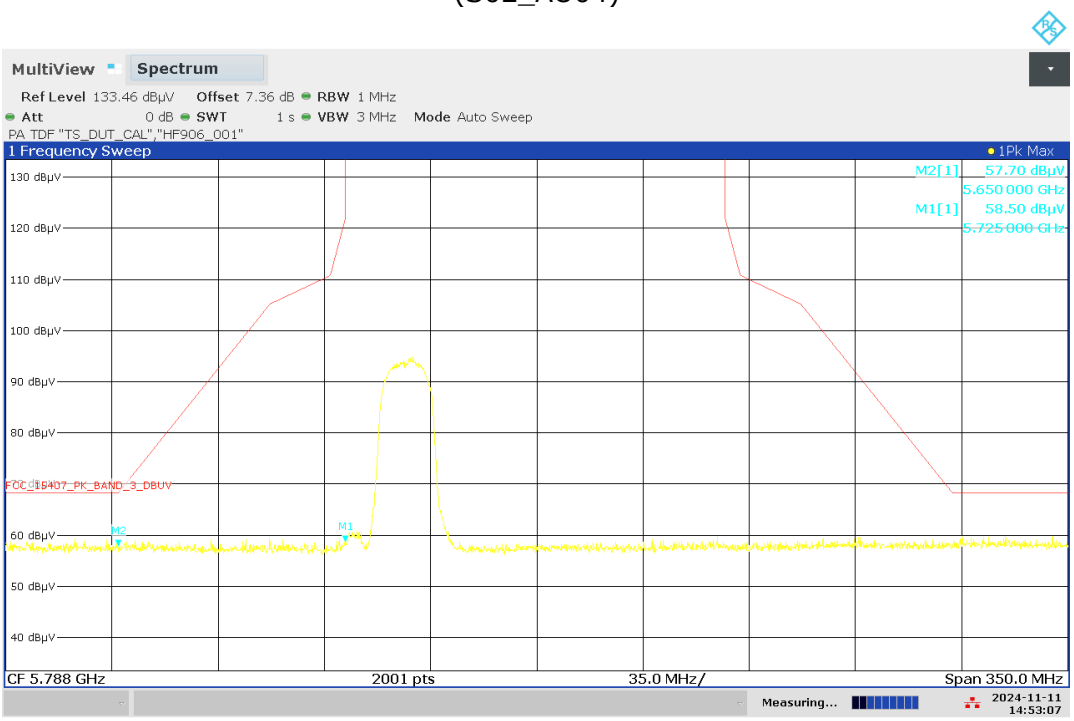
03:50:48 PM 11/11/2024

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



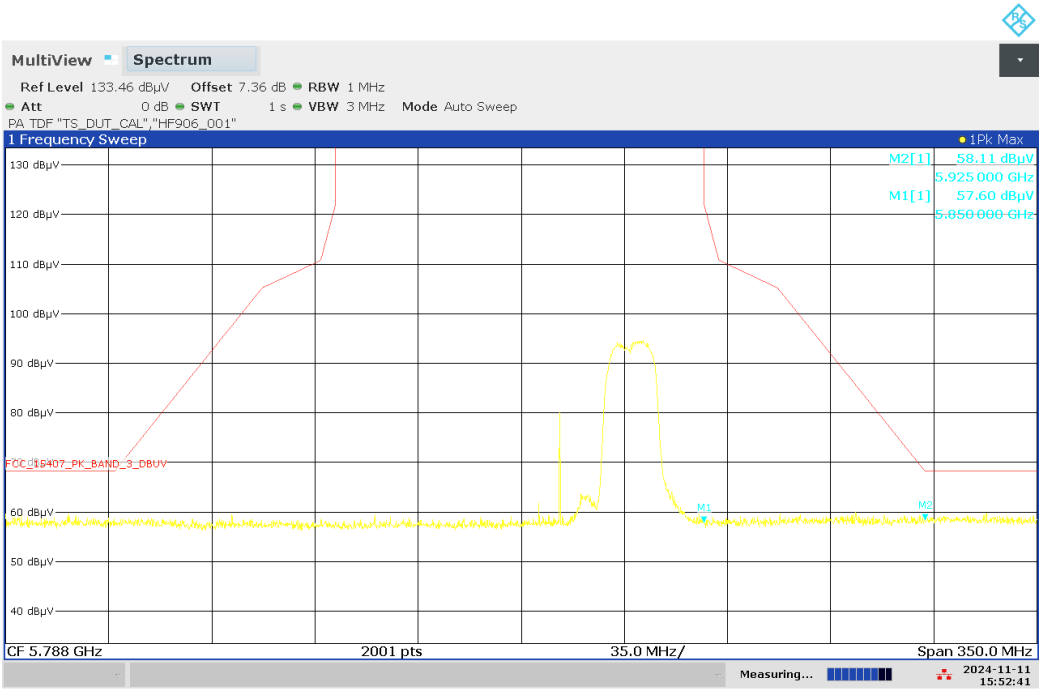
11:35:56 AM 11/11/2024

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



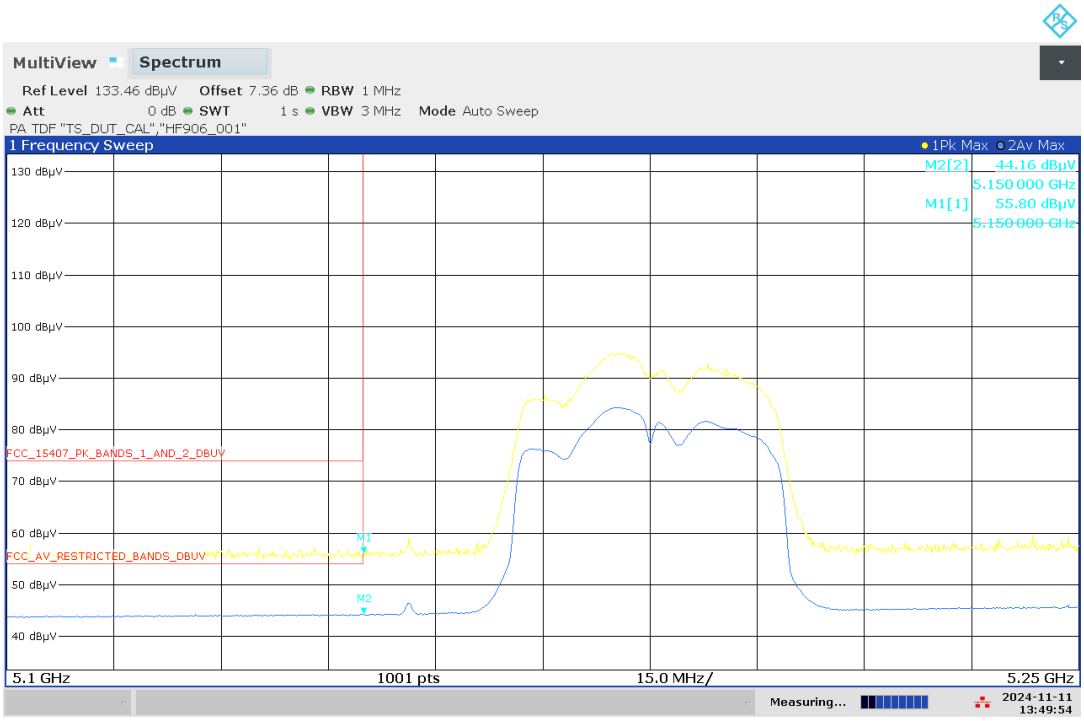
02:53:08 PM 11/11/2024

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



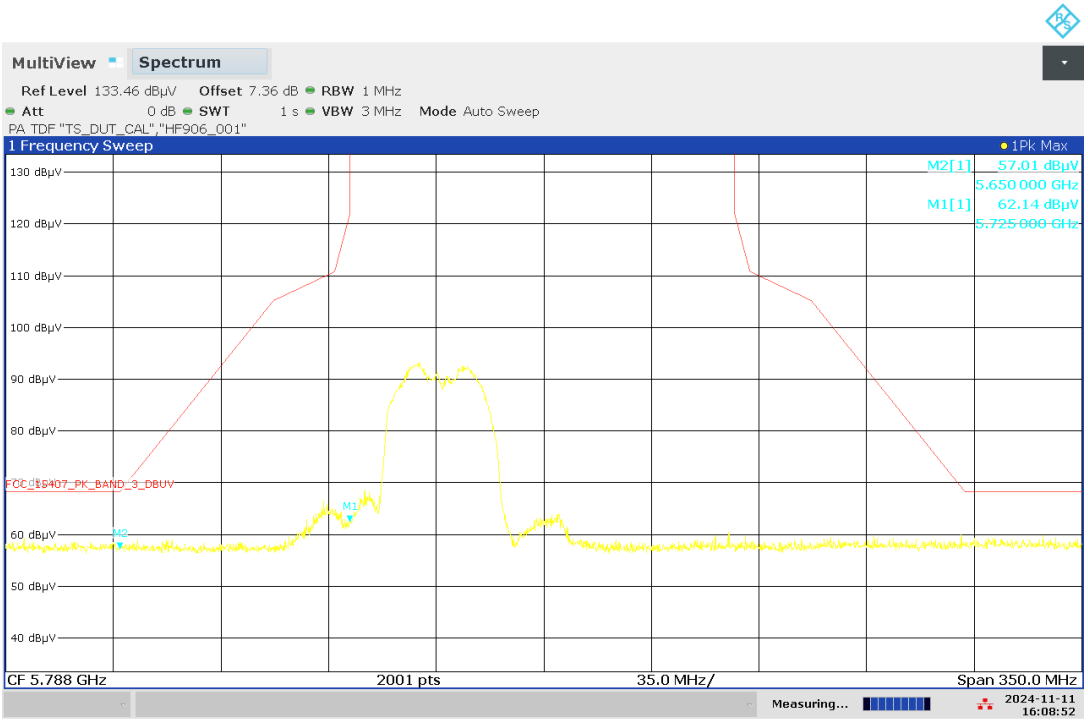
03:52:42 PM 11/11/2024

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



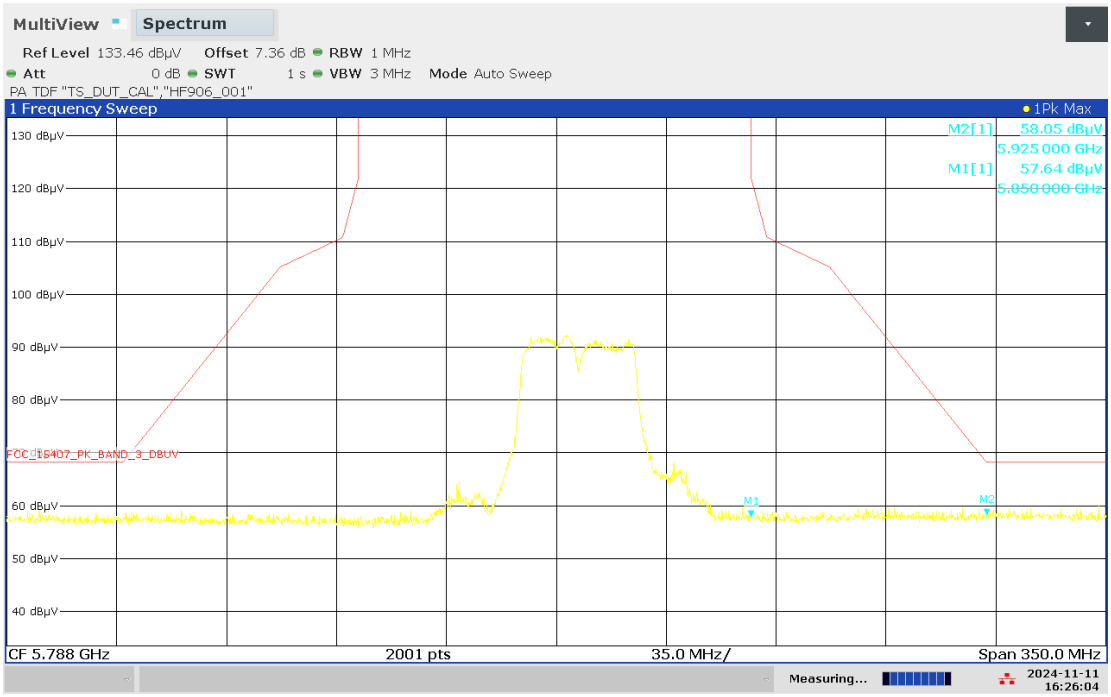
01:49:54 PM 11/11/2024

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



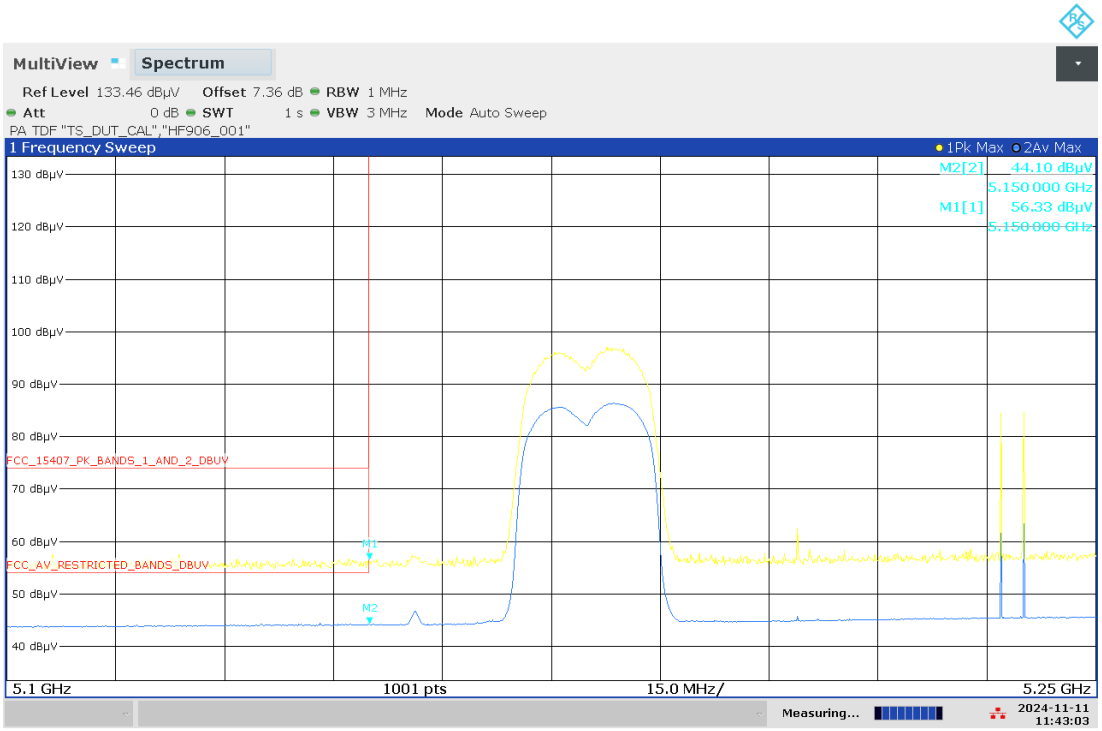
04:08:52 PM 11/11/2024

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



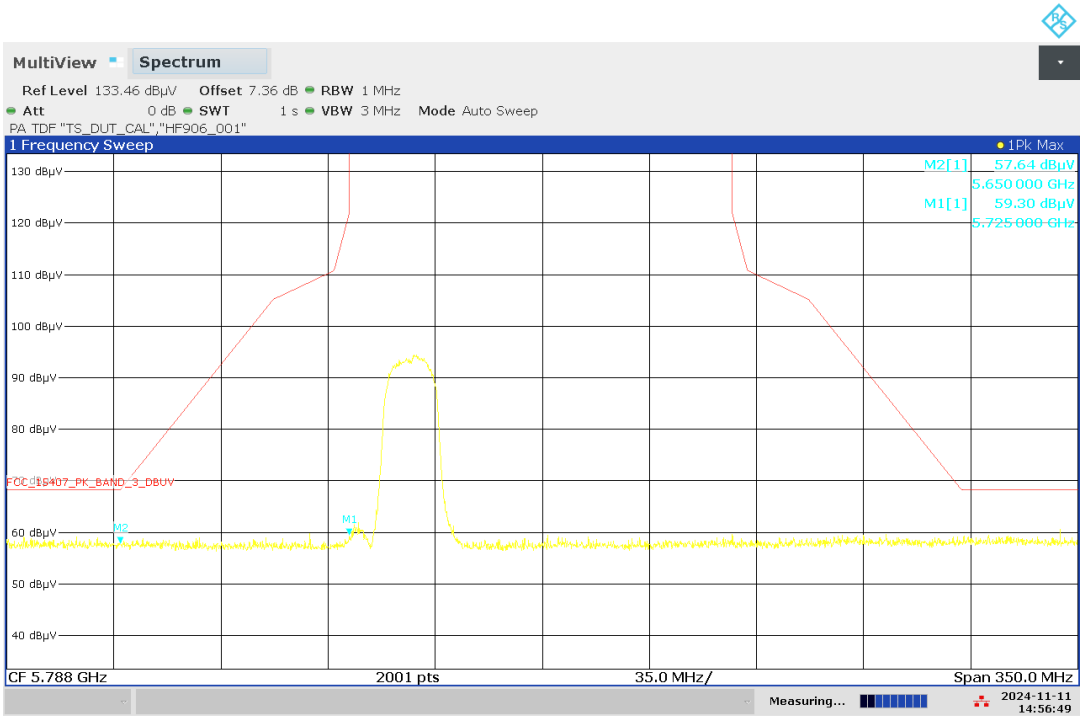
04:26:04 PM 11/11/2024

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



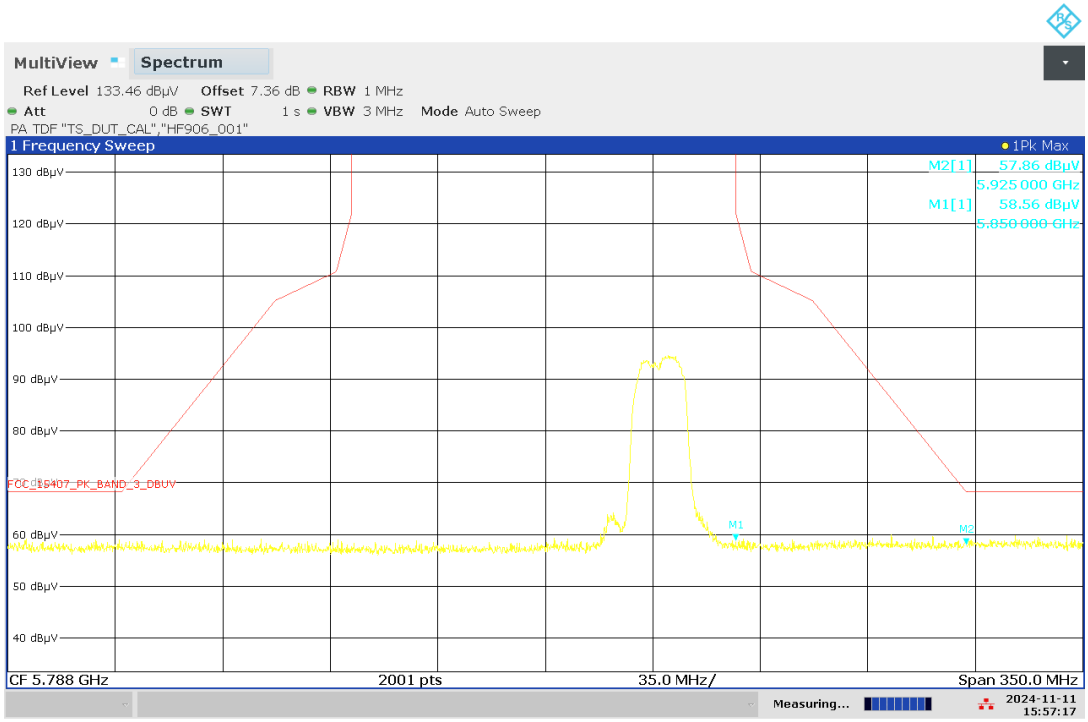
11:43:04 AM 11/11/2024

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



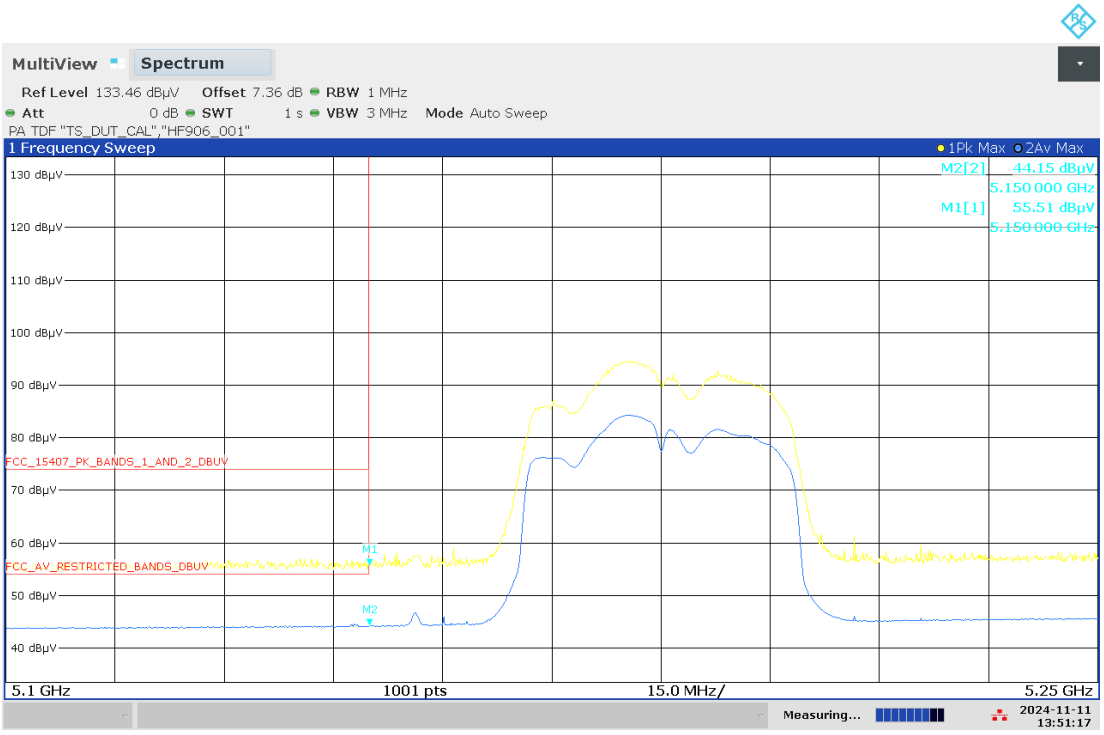
02:56:49 PM 11/11/2024

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



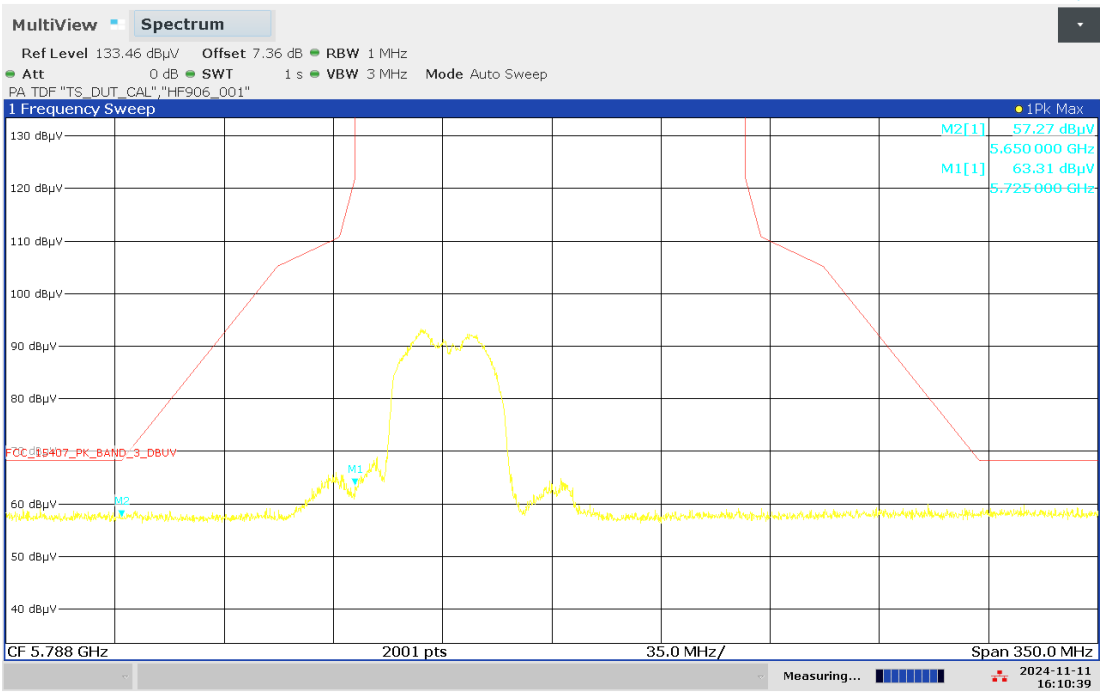
03:57:18 PM 11/11/2024

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



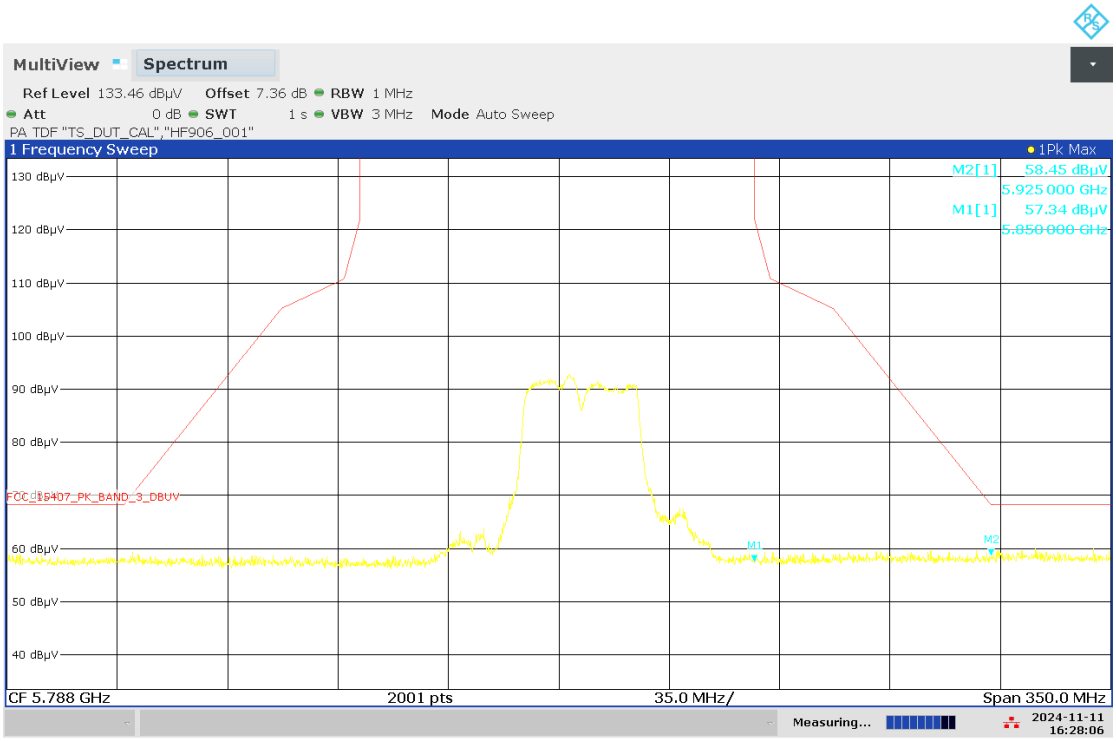
01:51:17 PM 11/11/2024

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



04:10:39 PM 11/11/2024

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

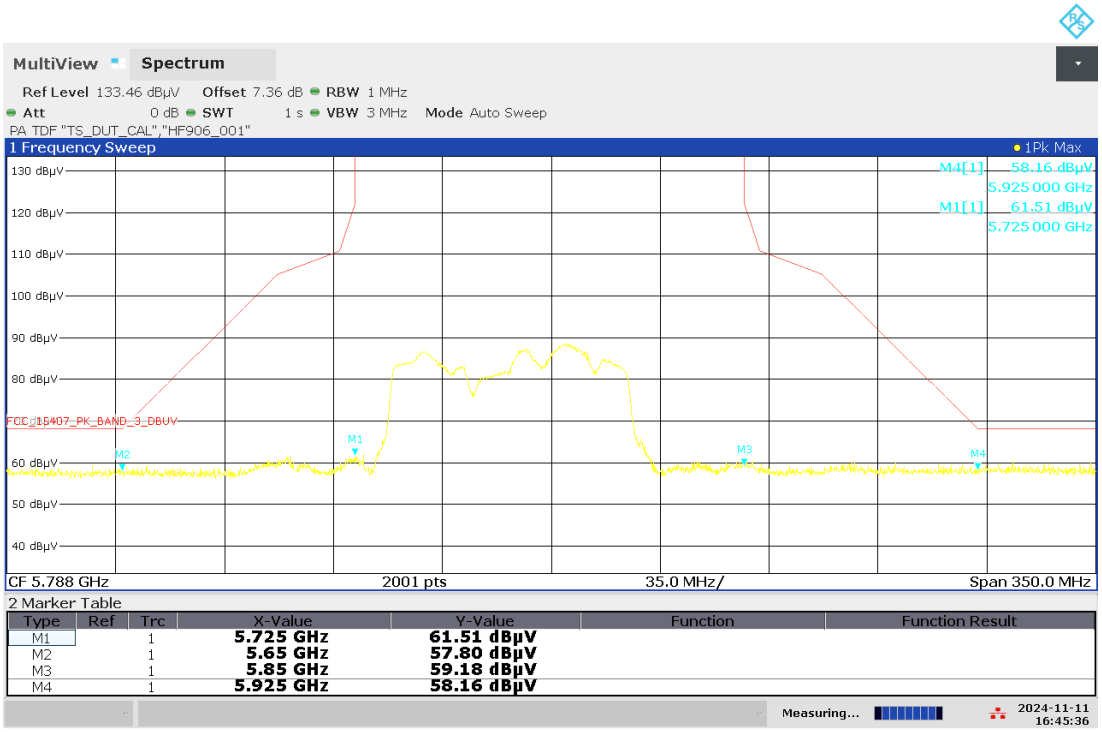


04:28:06 PM 11/11/2024

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

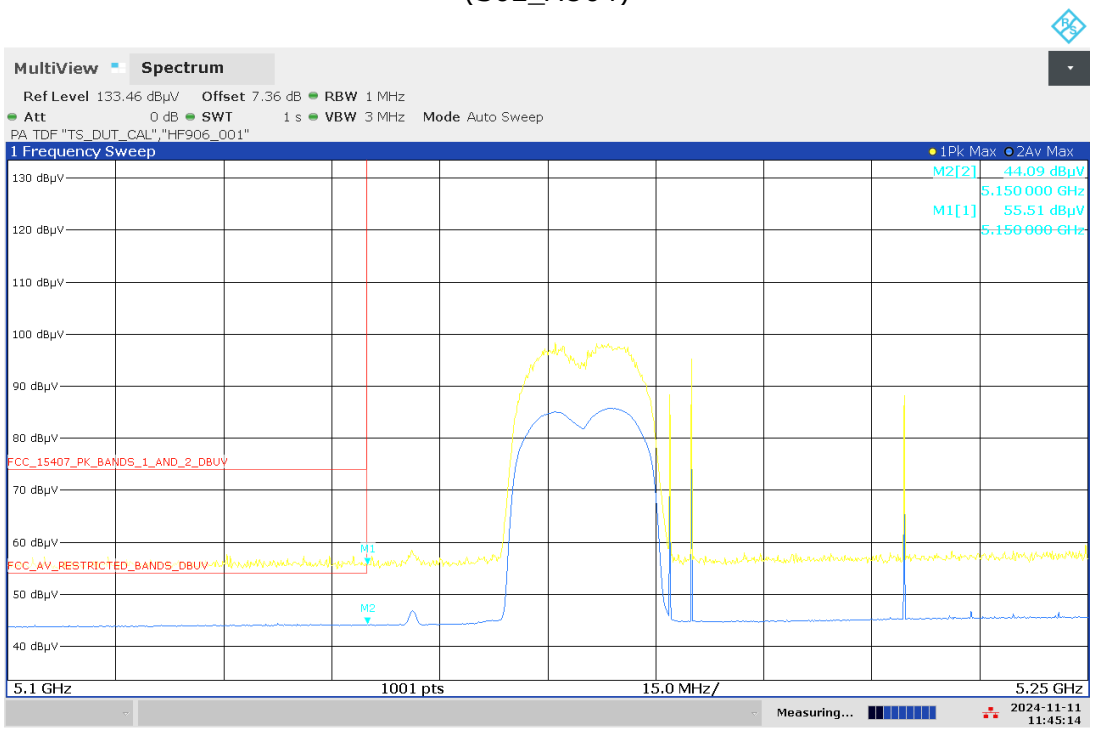
02:24:42 PM 11/11/2024

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



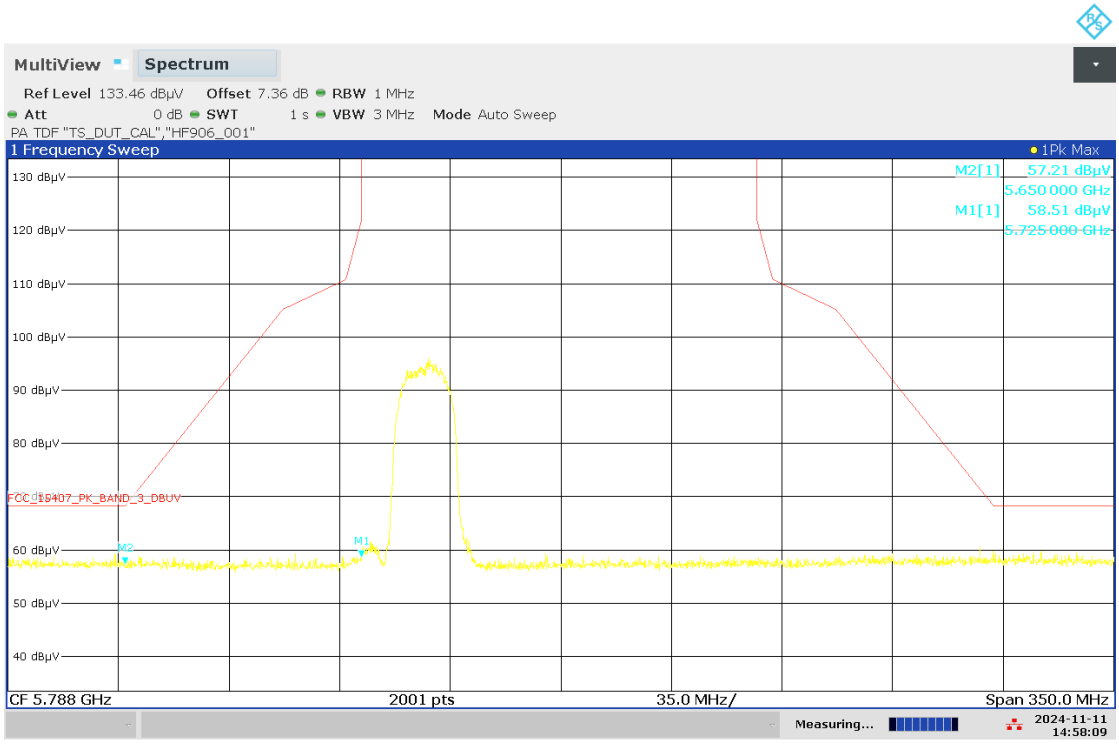
04:45:37 PM 11/11/2024

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

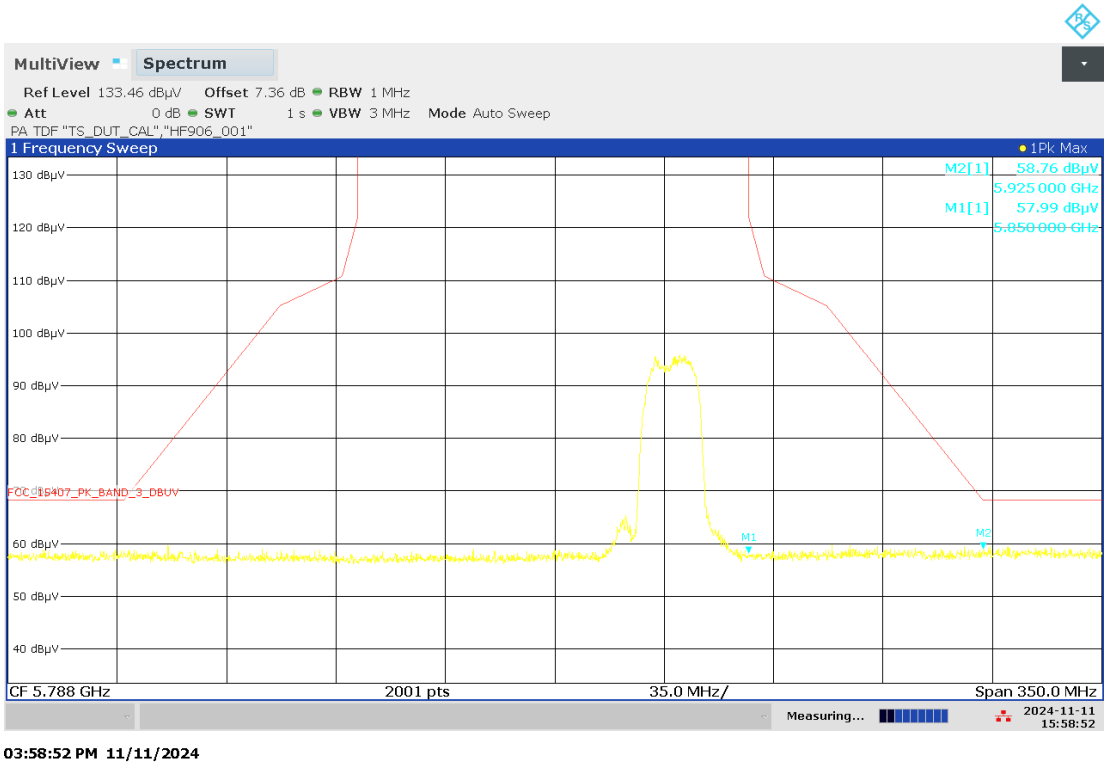


11:45:15 AM 11/11/2024

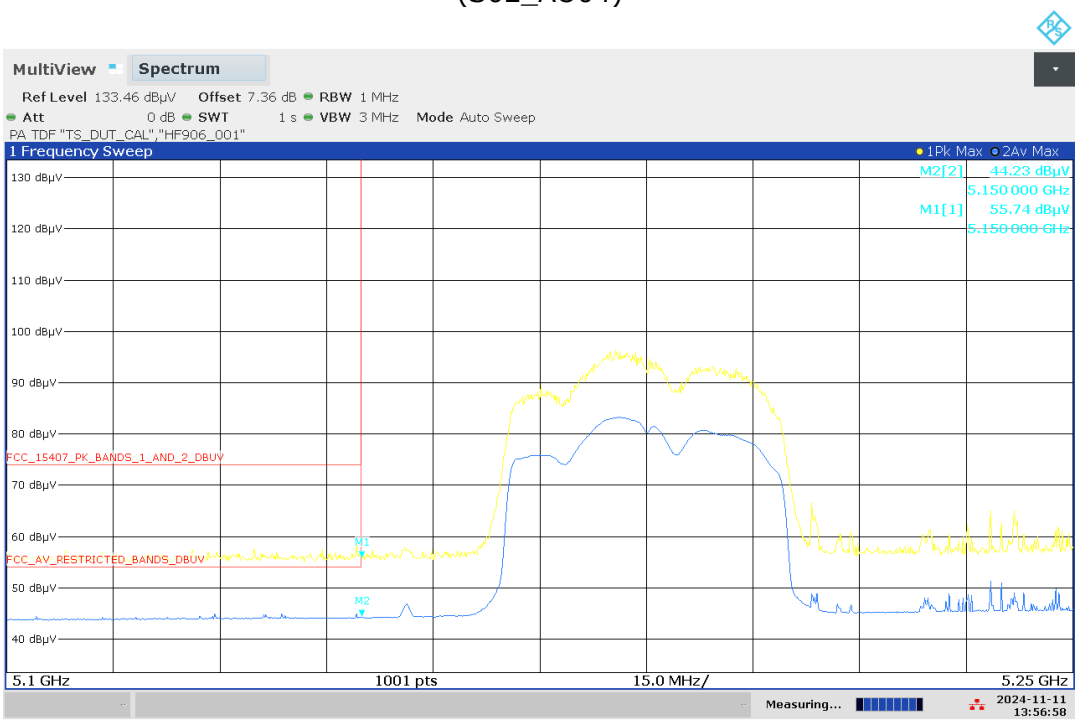
Radio Technology = WLAN ax 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S02_AO04)



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

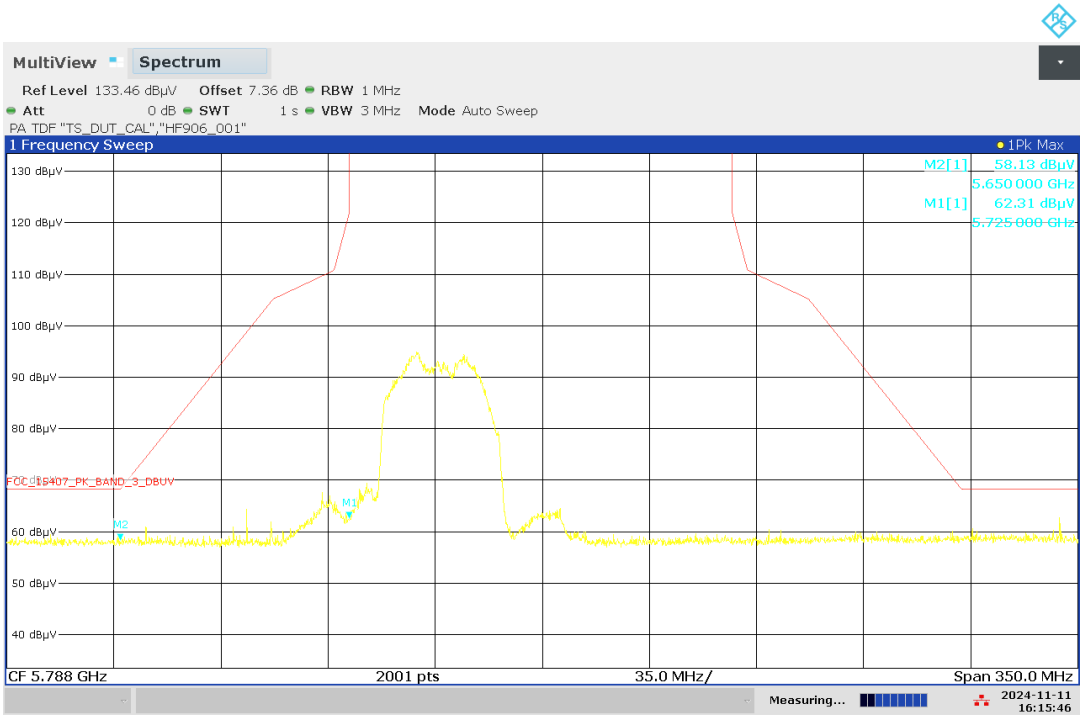


Radio Technology = WLAN ax 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S02_AO04)



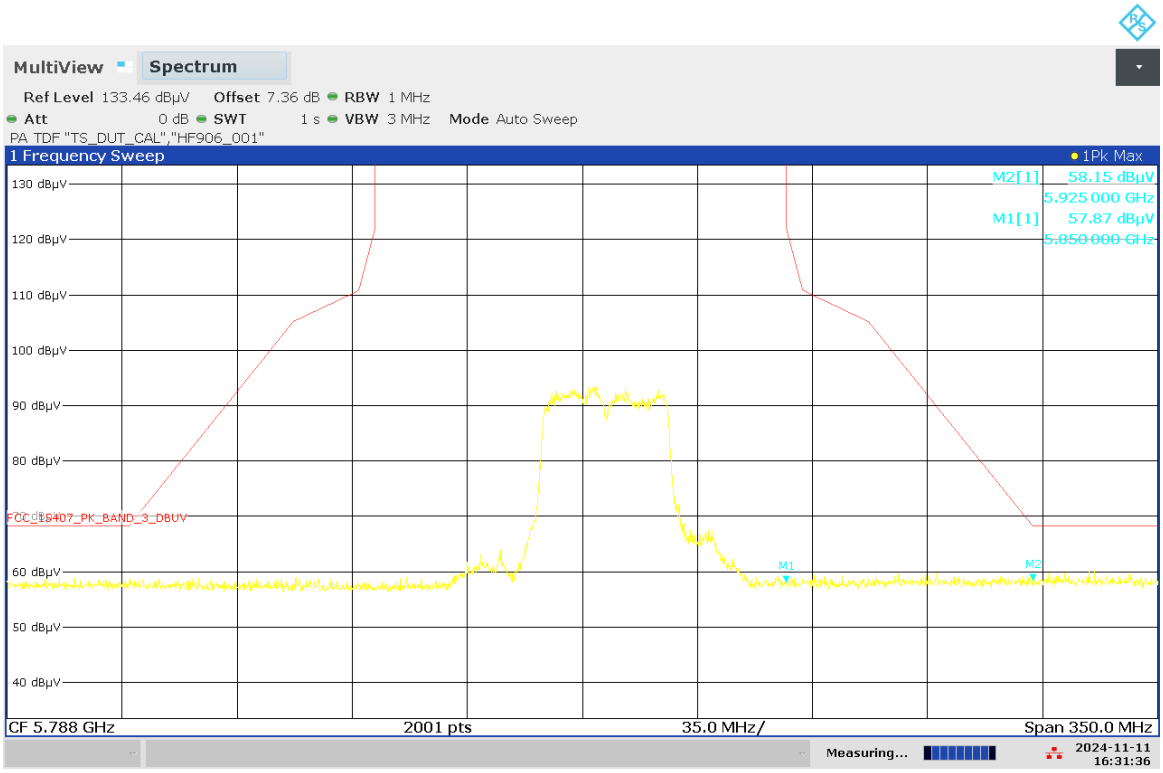
01:56:59 PM 11/11/2024

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



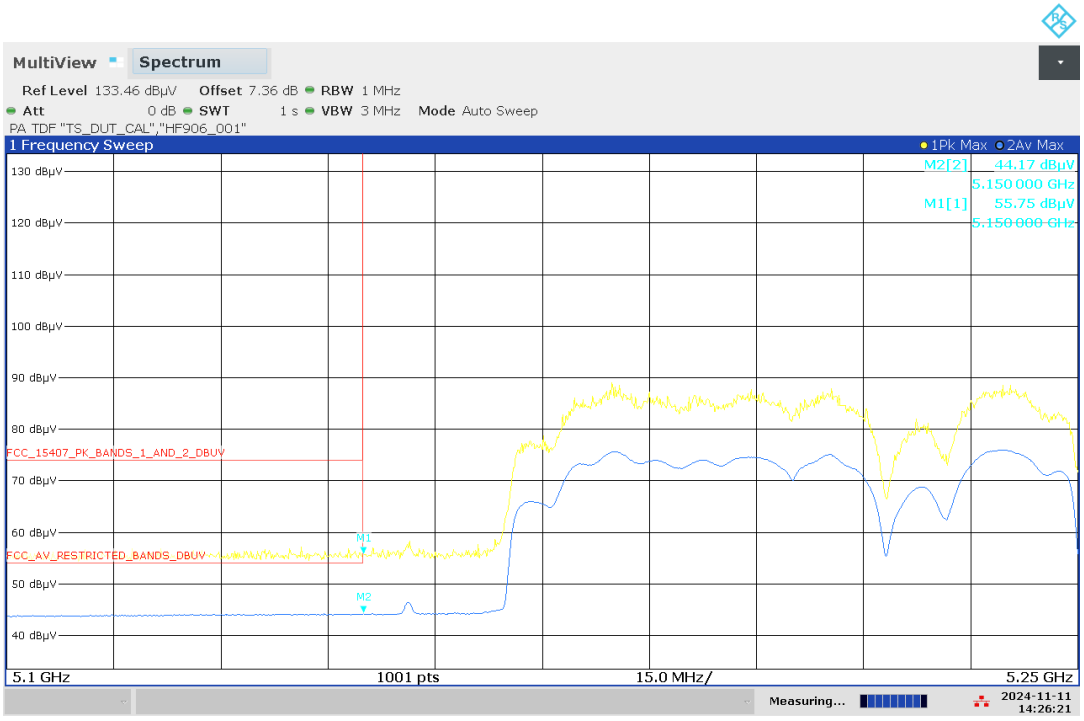
04:15:47 PM 11/11/2024

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



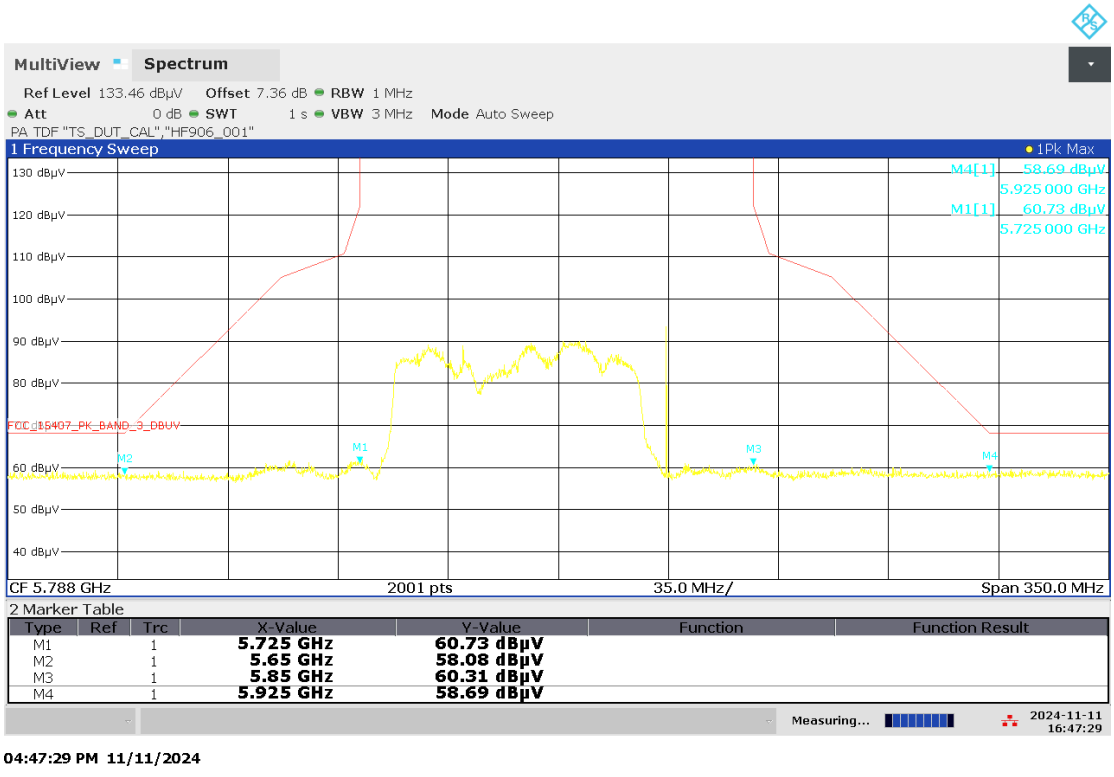
04:31:37 PM 11/11/2024

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



02:26:21 PM 11/11/2024

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



5.4.5 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										
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	54.0	PEAK	1000	74.0	20.0	BE-RB	FCC&IC
1	36	5180	5150.0	42.5	AV	1000	54.0	11.5	BE-RB	FCC&IC
3	149	5745	5725.0	58.0	PEAK	1000	122.2	64.2	BE-UE	FCC&IC
3	165	5825	5850.0	57.0	PEAK	1000	122.2	65.2	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	53.3	PEAK	1000	74.0	20.7	BE-RB	FCC&IC
1	36	5180	5150.0	42.7	AV	1000	54.0	11.3	BE-RB	FCC&IC
3	149	5745	5725.0	56.4	PEAK	1000	122.2	65.8	BE-UE	FCC&IC
3	165	5825	5850.0	57.7	PEAK	1000	122.2	64.5	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	56.0	PEAK	1000	74.0	18.0	BE-RB	FCC&IC
1	38	5190	5150.0	42.8	AV	1000	54.0	11.2	BE-RB	FCC&IC
3	151	5755	5725.0	68.1	PEAK	1000	122.2	54.1	BE-UE	FCC&IC
3	159	5795	5850.0	50.6	PEAK	1000	122.2	71.6	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	53.7	PEAK	1000	74.0	20.3	BE-RB	FCC&IC
1	36	5180	5150.0	42.7	AV	1000	54.0	11.3	BE-RB	FCC&IC
3	149	5745	5725.0	57.1	PEAK	1000	122.2	65.1	BE-UE	FCC&IC
3	165	5825	5850.0	58.9	PEAK	1000	122.2	63.3	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	54.0	PEAK	1000	74.0	20.0	BE-RB	FCC&IC
1	38	5190	5150.0	42.8	AV	1000	54.0	11.2	BE-RB	FCC&IC
3	151	5755	5725.0	67.7	PEAK	1000	122.2	54.5	BE-UE	FCC&IC
3	159	5795	5850.0	50.4	PEAK	1000	122.2	71.8	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	53.7	PEAK	1000	74.0	20.3	BE-RB	FCC&IC
1	42	5210	5150.0	42.6	AV	1000	54.0	11.4	BE-RB	FCC&IC
3	155	5775	5725.0	63.1	PEAK	1000	122.2	59.1	BE-UE	FCC&IC
3	155	5775	5850.0	57.7	PEAK	1000	122.2	64.5	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	53.9	PEAK	1000	74.0	53.9	BE-RB	FCC&IC
1	36	5180	5150.0	42.6	AV	1000	54.0	42.6	BE-RB	FCC&IC
3	149	5745	5725.0	57.6	PEAK	1000	122.2	57.6	BE-UE	FCC&IC
3	165	5825	5850.0	58.9	PEAK	1000	122.2	58.9	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	54.2	PEAK	1000	74.0	19.8	BE-RB	FCC&IC
1	38	5190	5150.0	42.7	AV	1000	54.0	11.3	BE-RB	FCC&IC
3	151	5755	5725.0	69.0	PEAK	1000	122.2	53.2	BE-UE	FCC&IC
3	159	5795	5850.0	52.2	PEAK	1000	122.2	70.1	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	53.9	PEAK	1000	74.0	20.1	BE-RB	FCC&IC
1	42	5210	5150.0	42.6	AV	1000	54.0	11.4	BE-RB	FCC&IC
3	155	5775	5725.0	61.5	PEAK	1000	122.2	60.7	BE-UE	FCC&IC
3	155	5775	5850.0	54.5	PEAK	1000	122.2	67.8	BE-UE	FCC&IC

COMMENT:

- The spectrum analyser transducer "TDF TS_DUT_CAL" contains the attenuation of the measurement cable
- The spectrum analyser transducer contains "HF906_001" contains the antenna factor of the used antenna
- For this location no measurement distance correction required, because the measurement distance is equal to the limit distance (3.0 m).

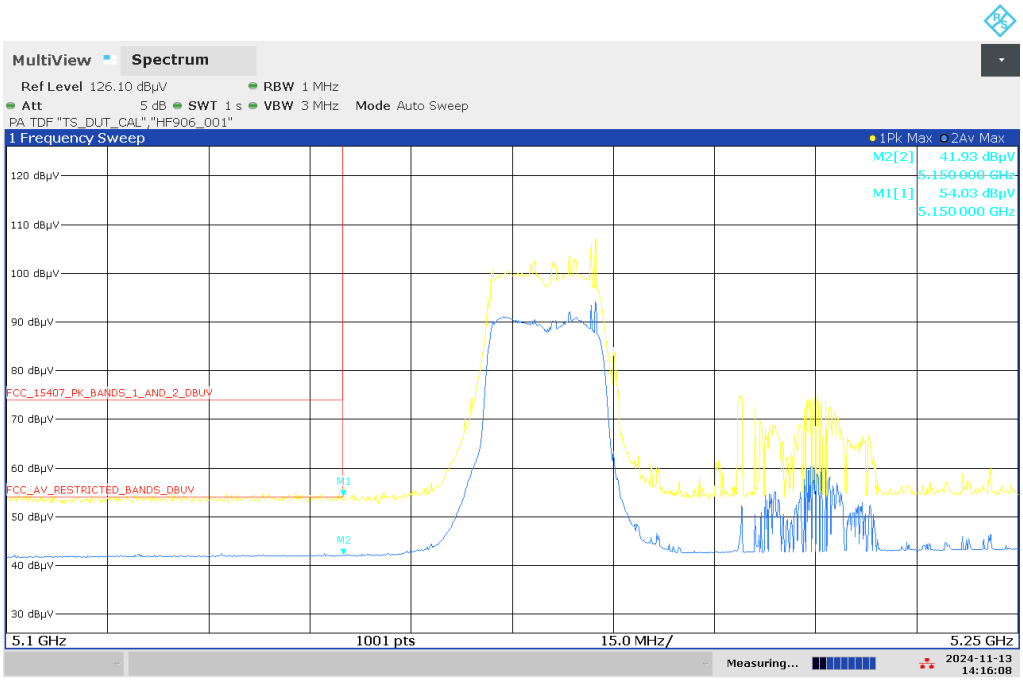
5.4.5.1 RESULTS OF WORST-CASE SEARCH

$D_{STABLE\ DECREASE}$ = 20.0 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	3.0	1.48	horizontal	11.59
	5200	3.0	1.48	horizontal	11.56
	5240	3.0	1.48	horizontal	11.62
	5745	3.0	1.48	horizontal	7.97
	5785	3.0	1.48	horizontal	7.98
	5825	3.0	1.48	horizontal	9.40
40	5190	3.0	1.48	horizontal	11.57
	5230	3.0	1.48	horizontal	11.64
	5755	3.0	1.48	horizontal	10.55
	5795	3.0	1.48	horizontal	10.80
80	5210	3.0	1.48	horizontal	11.67
	5775	3.0	1.48	horizontal	10.70

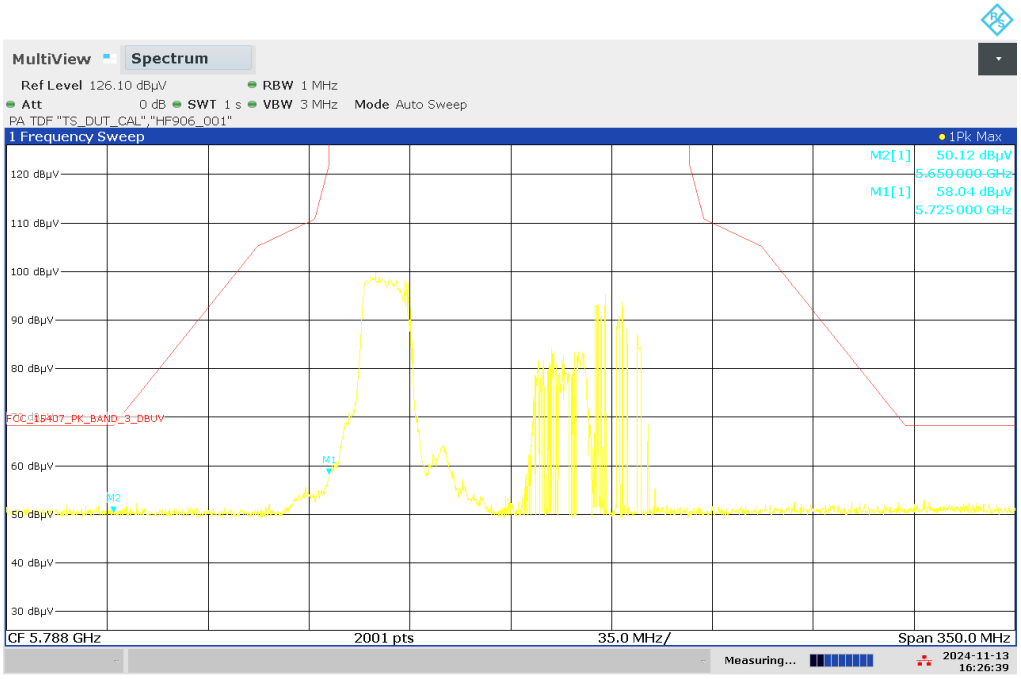
5.4.5.2 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-1 (S03_AO04)



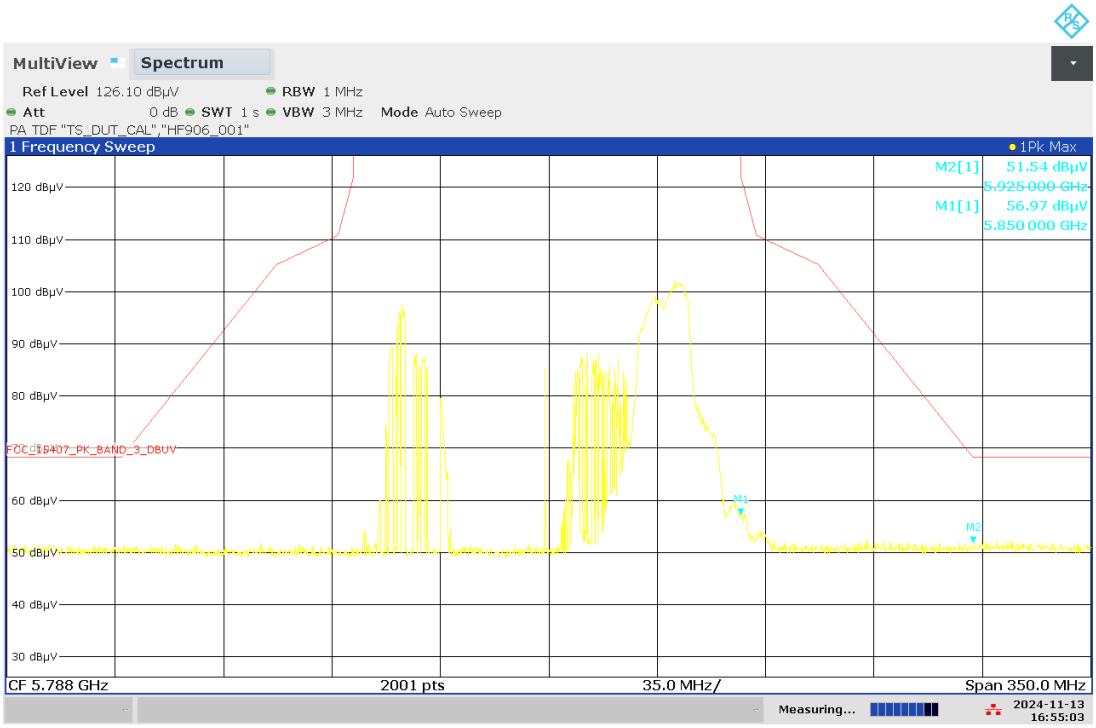
02:16:08 PM 11/13/2024

Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-3 (S03_AO04)



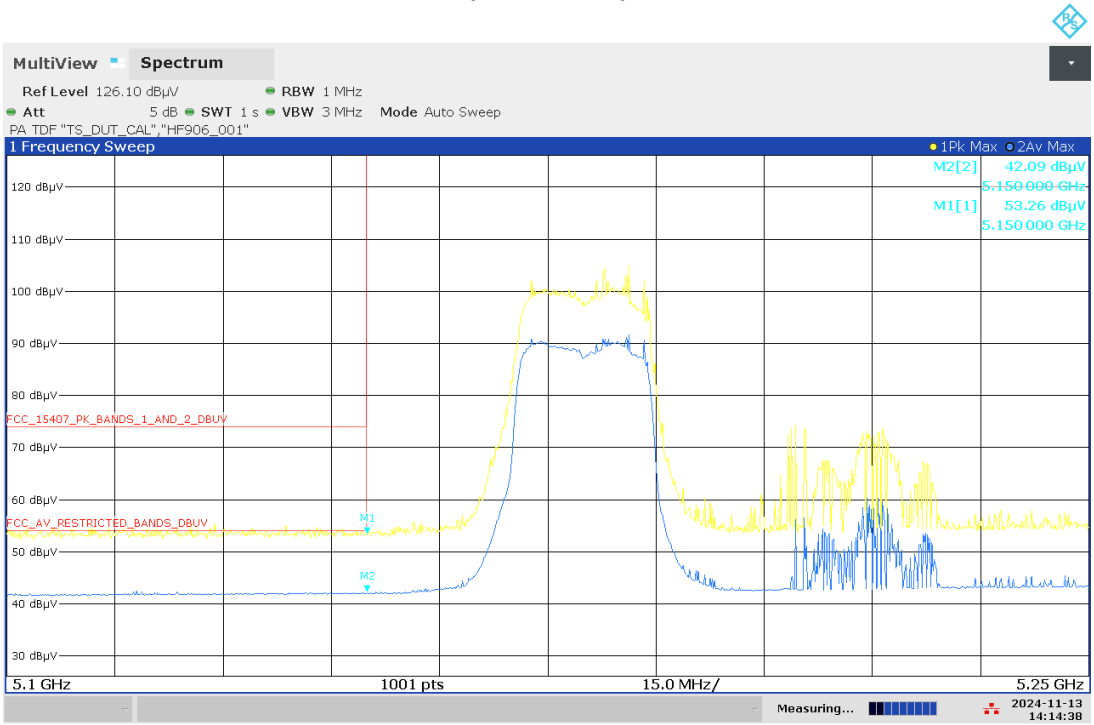
04:26:39 PM 11/13/2024

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3 (S03_AO04)



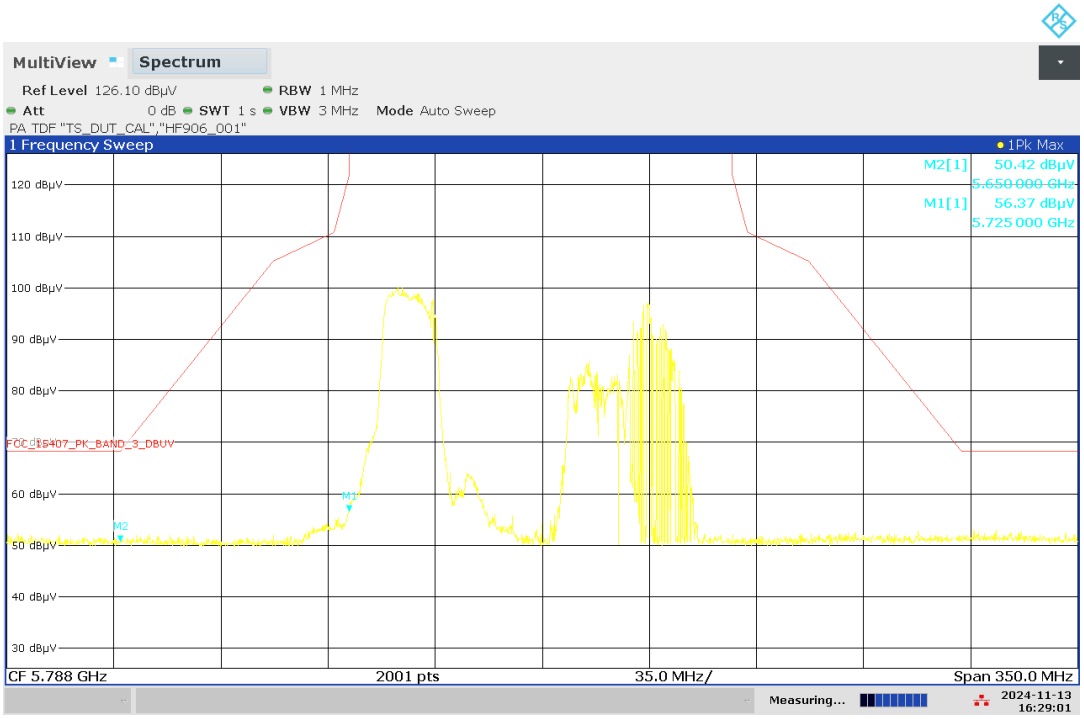
04:55:04 PM 11/13/2024

Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-1 (S03_AO04)



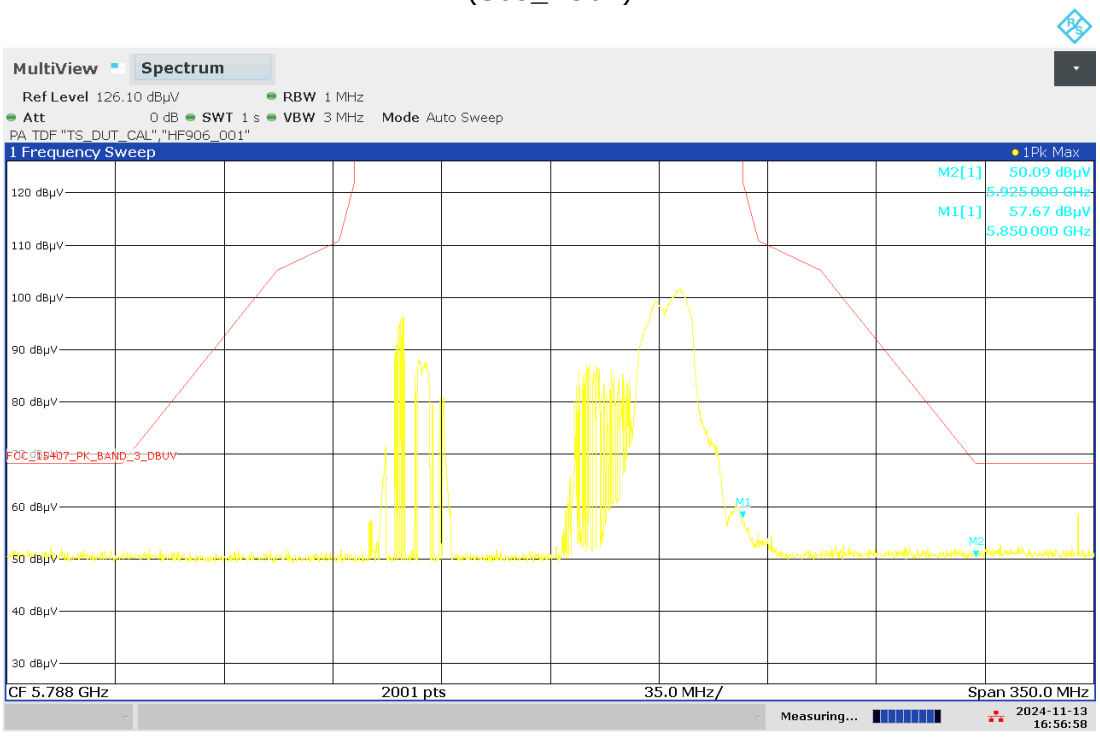
02:14:39 PM 11/13/2024

Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S03_AO04)



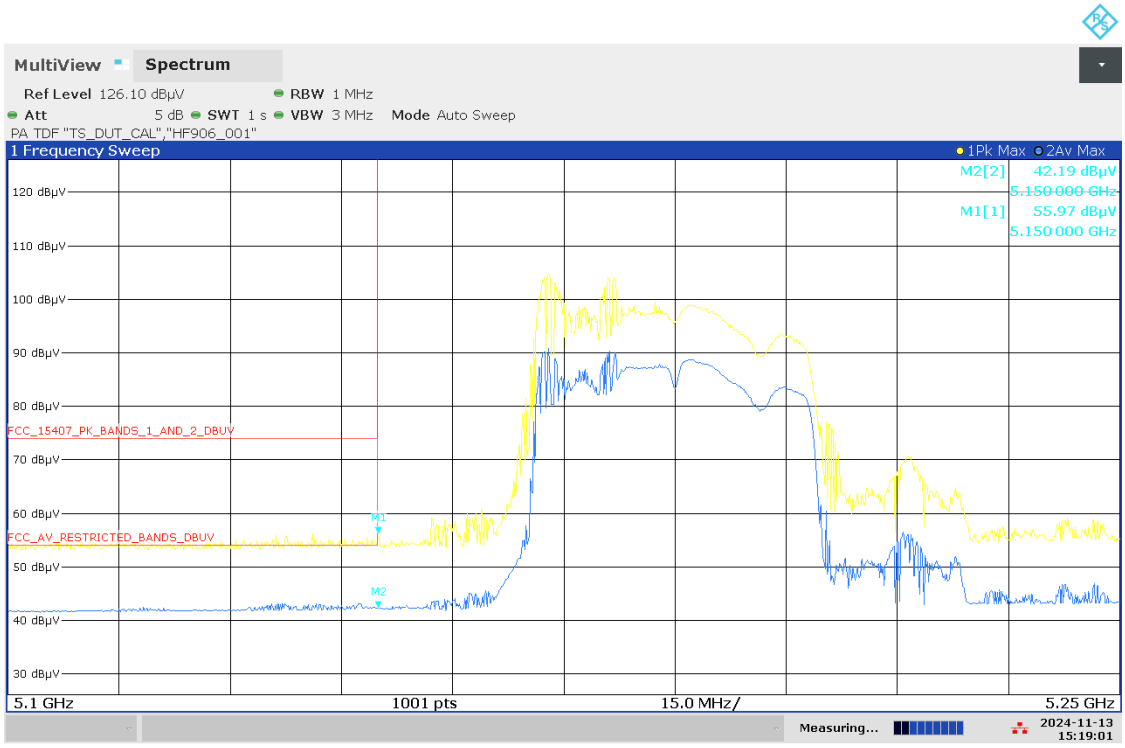
04:29:02 PM 11/13/2024

Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S03_AO04)



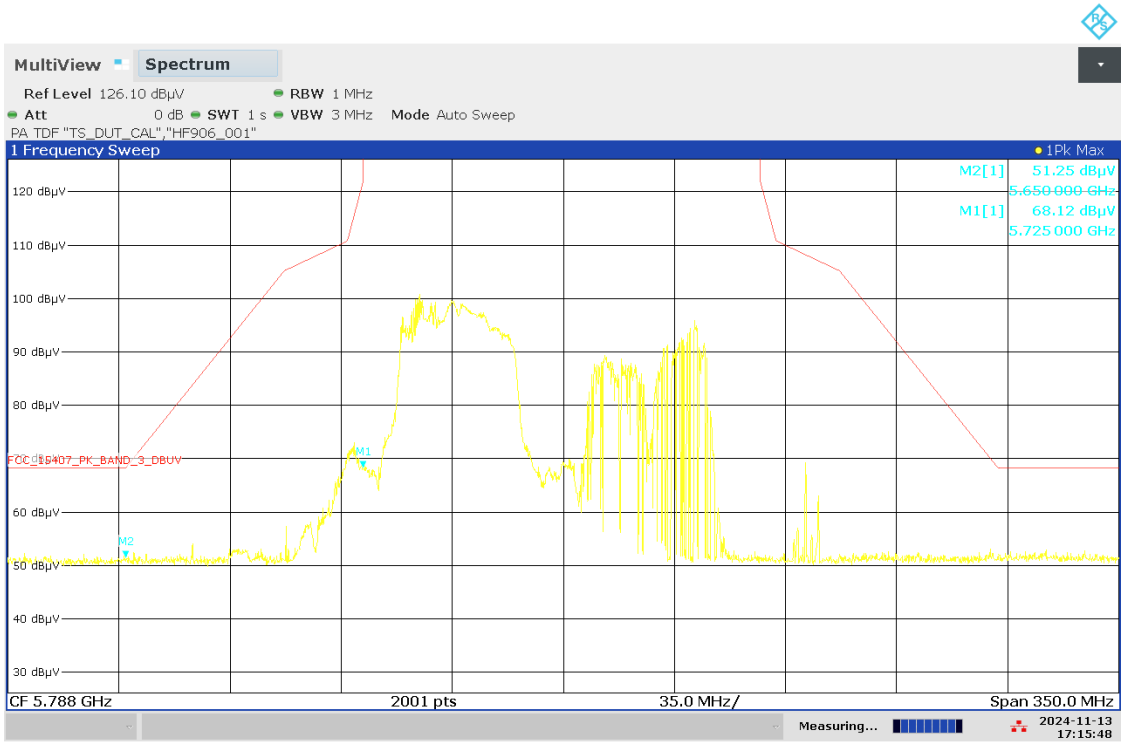
04:56:59 PM 11/13/2024

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S03_AO04)



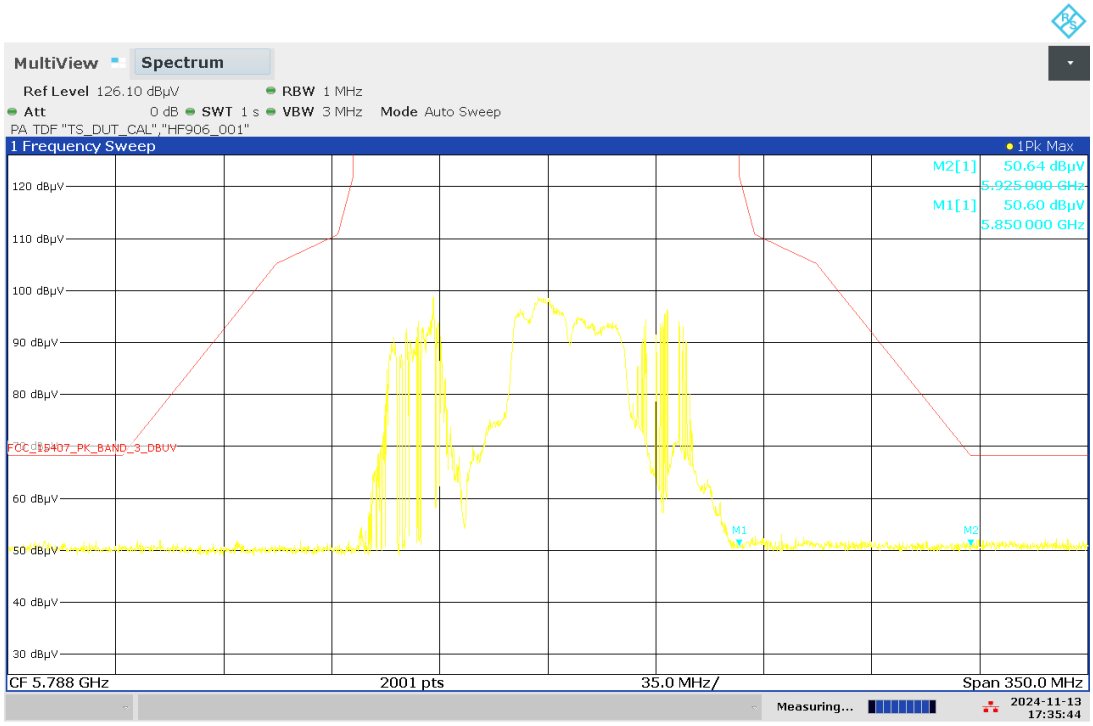
03:19:02 PM 11/13/2024

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S03_AO04)



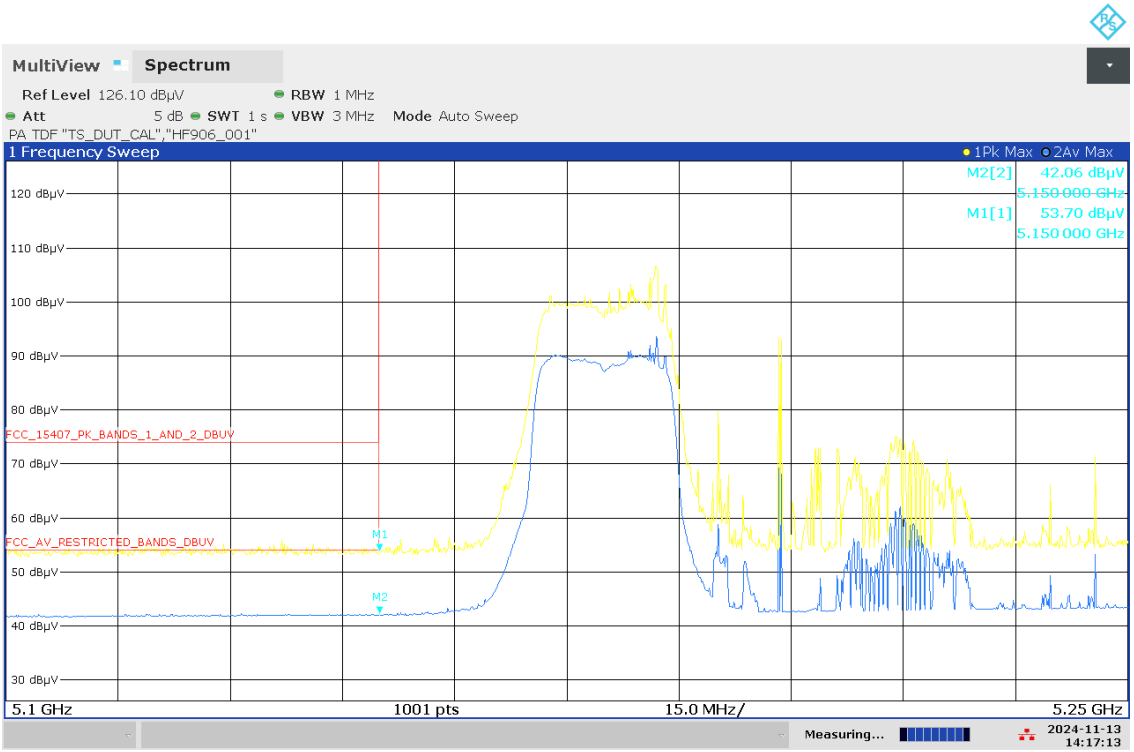
05:15:48 PM 11/13/2024

Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S03_AO04)



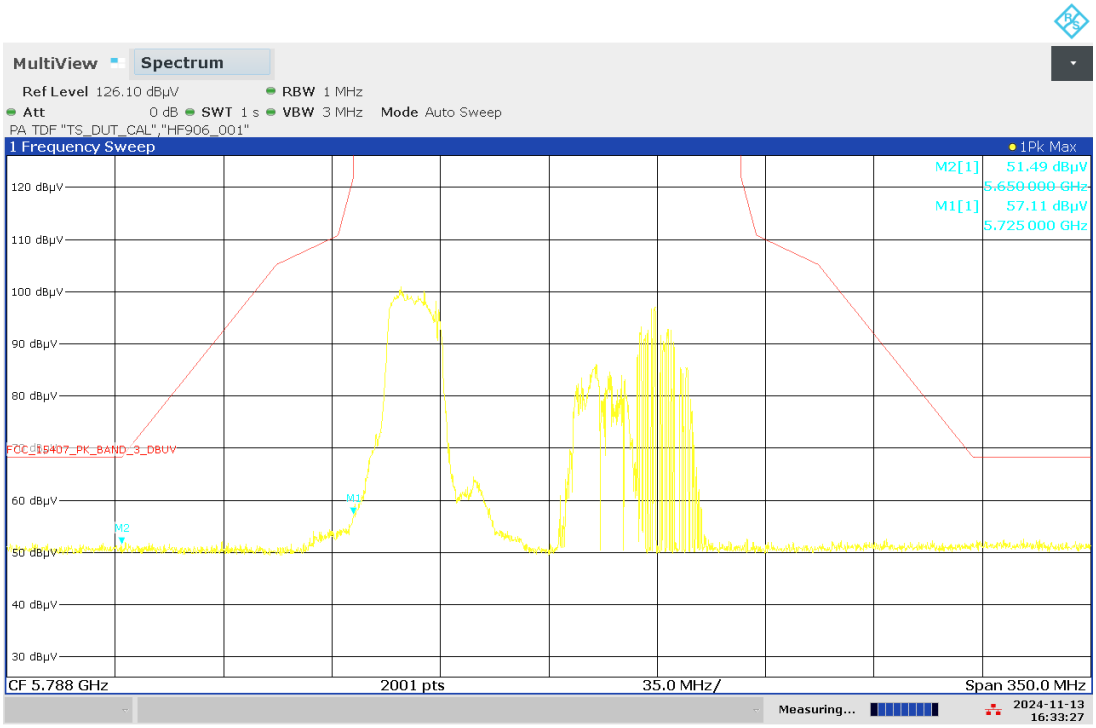
05:35:44 PM 11/13/2024

Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Subband = U-NII-1 (S03_AO04)



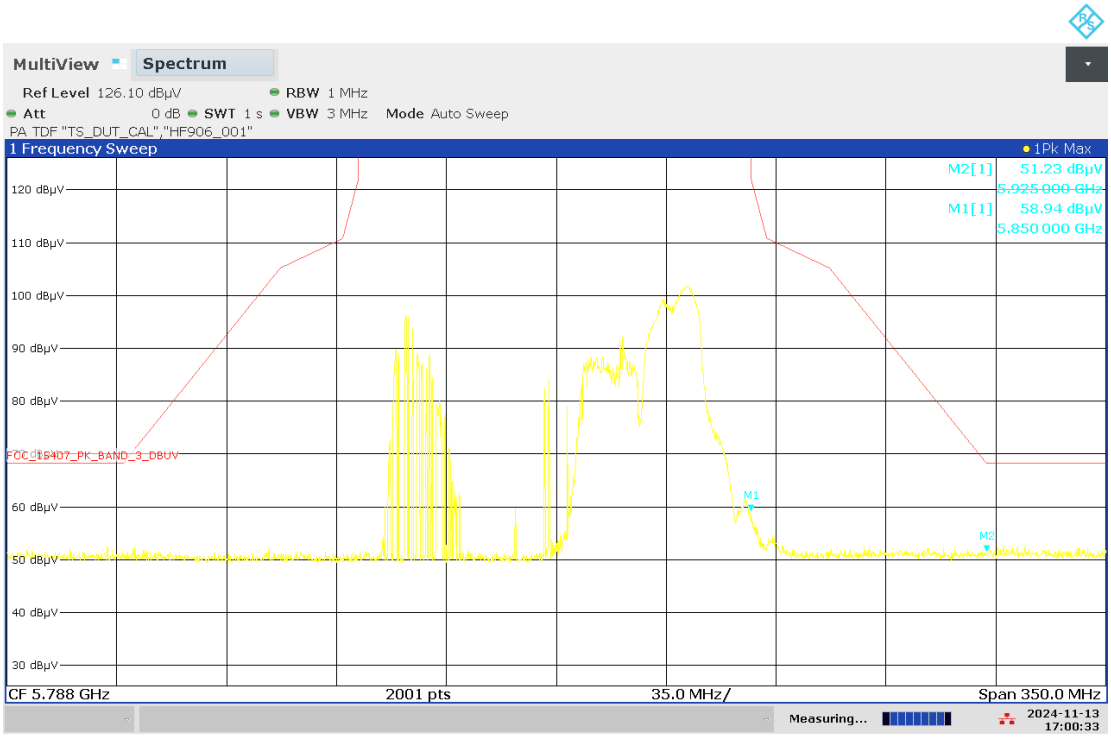
02:17:13 PM 11/13/2024

Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S03_AO04)



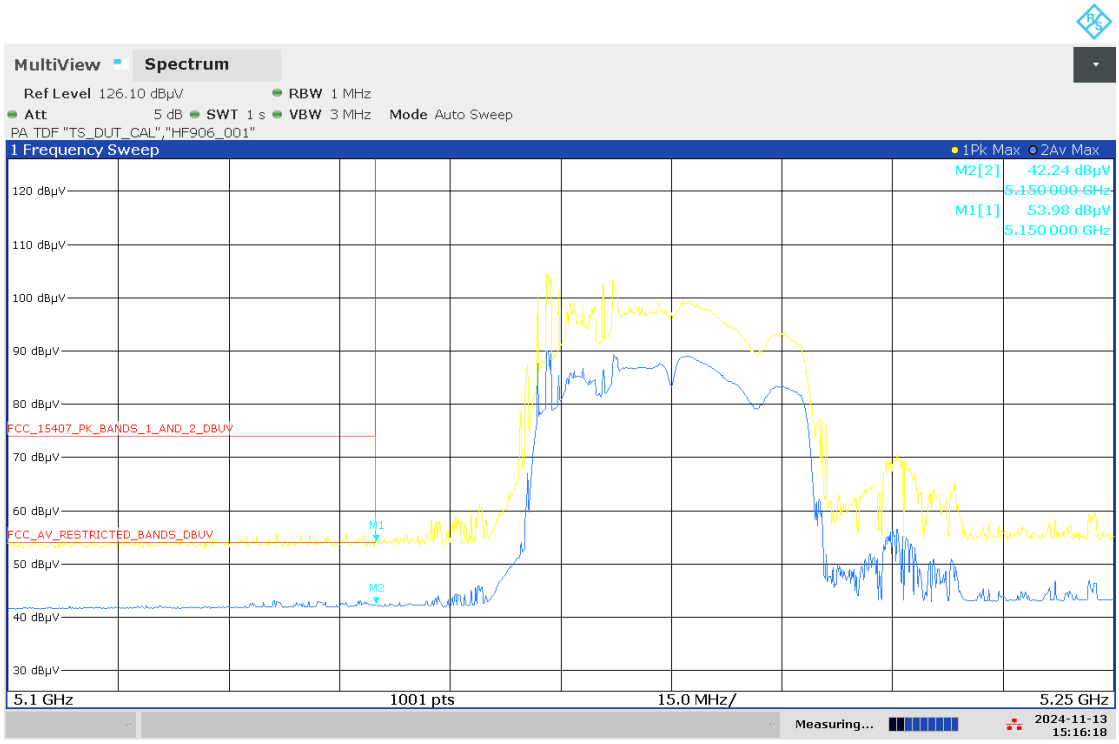
04:33:28 PM 11/13/2024

Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S03_AO04)



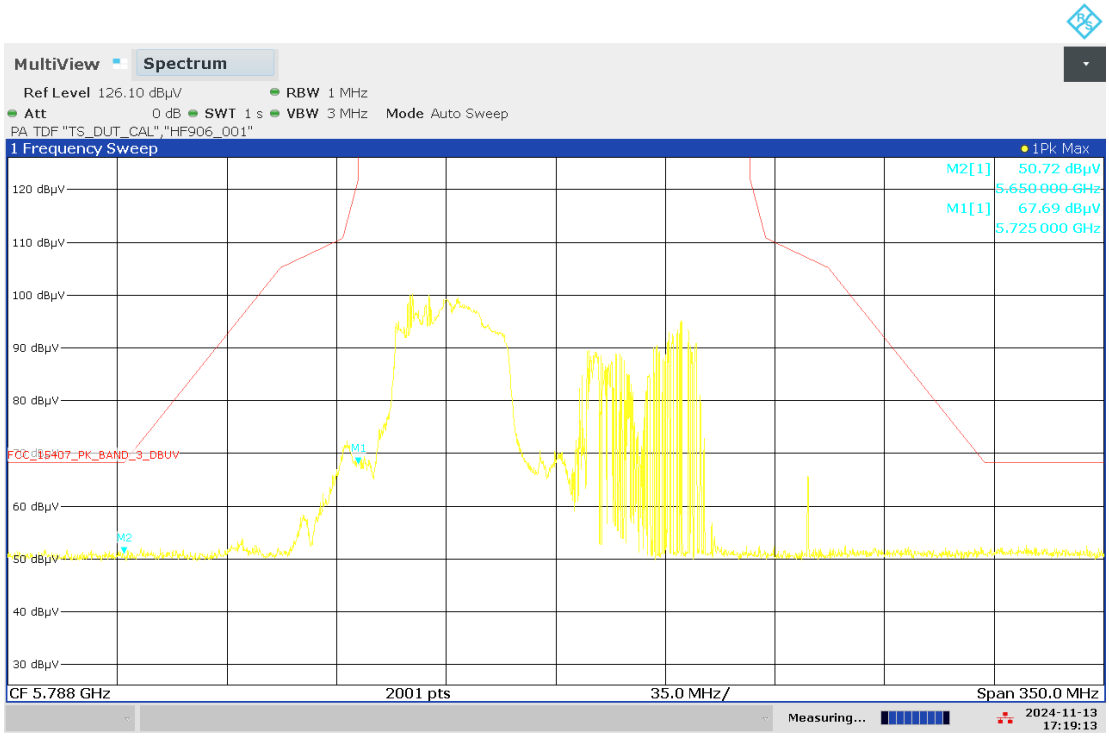
05:00:34 PM 11/13/2024

Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S03_AO04)



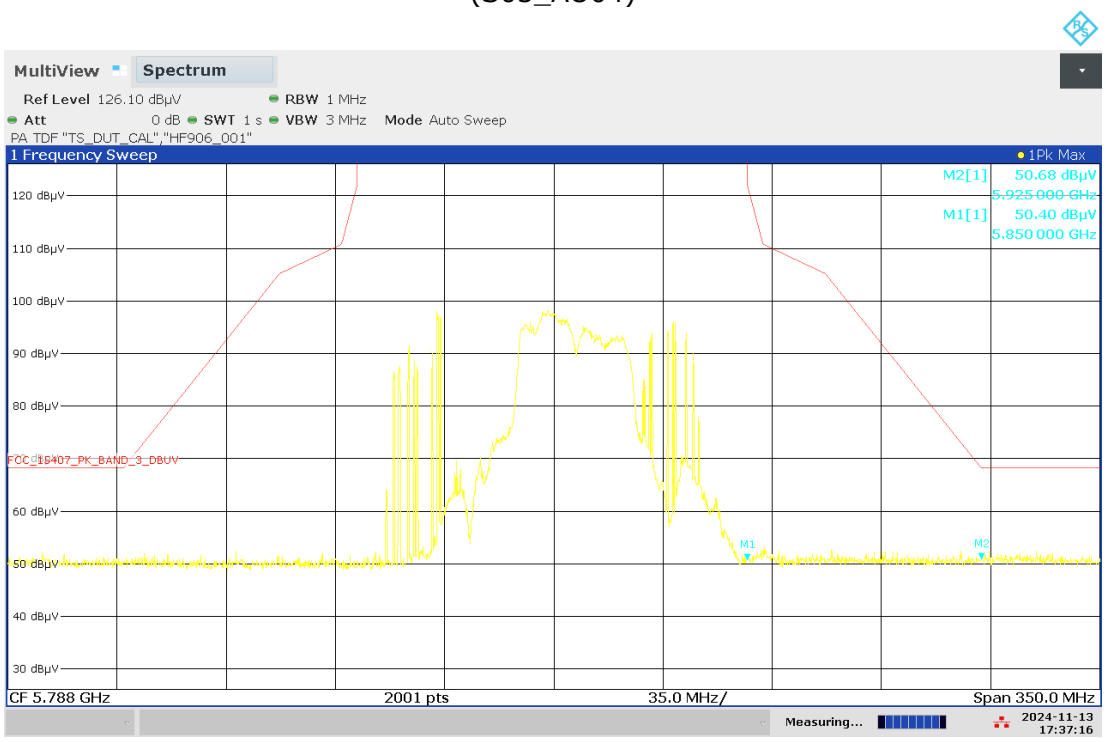
03:16:19 PM 11/13/2024

Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S03_AO04)



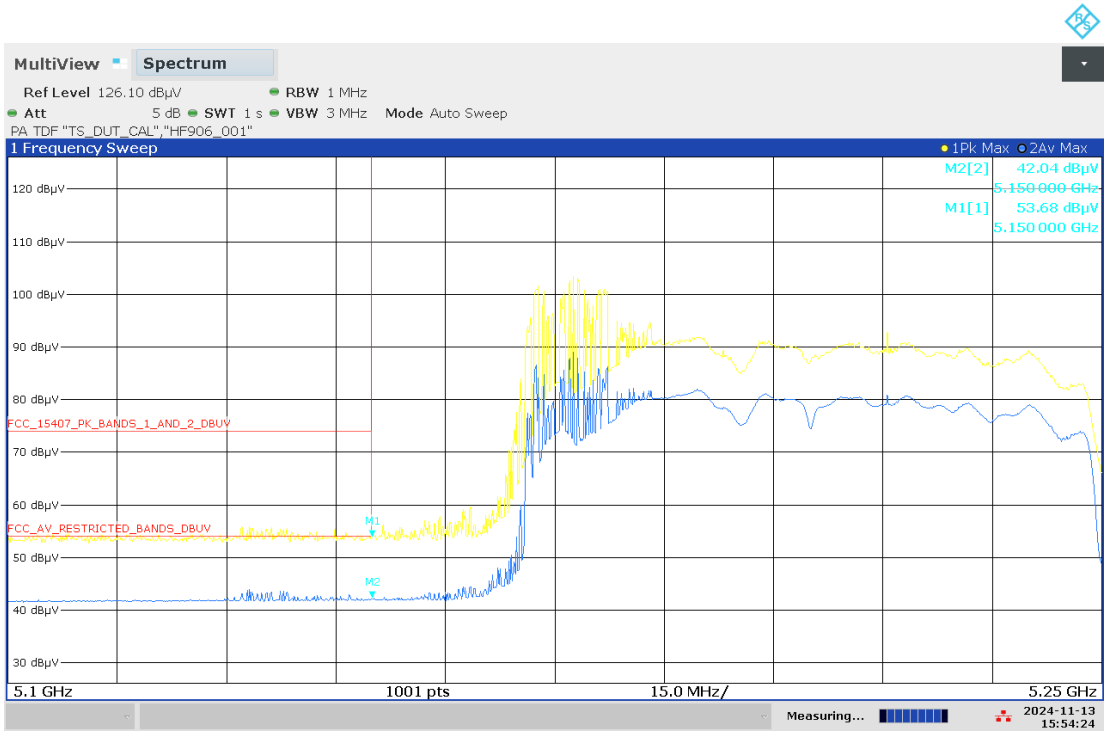
05:19:14 PM 11/13/2024

Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S03_AO04)



05:37:17 PM 11/13/2024

Radio Technology = WLAN ac 80 MHz, Operating Frequency = low, Subband = U-NII-1 (S03_AA01)

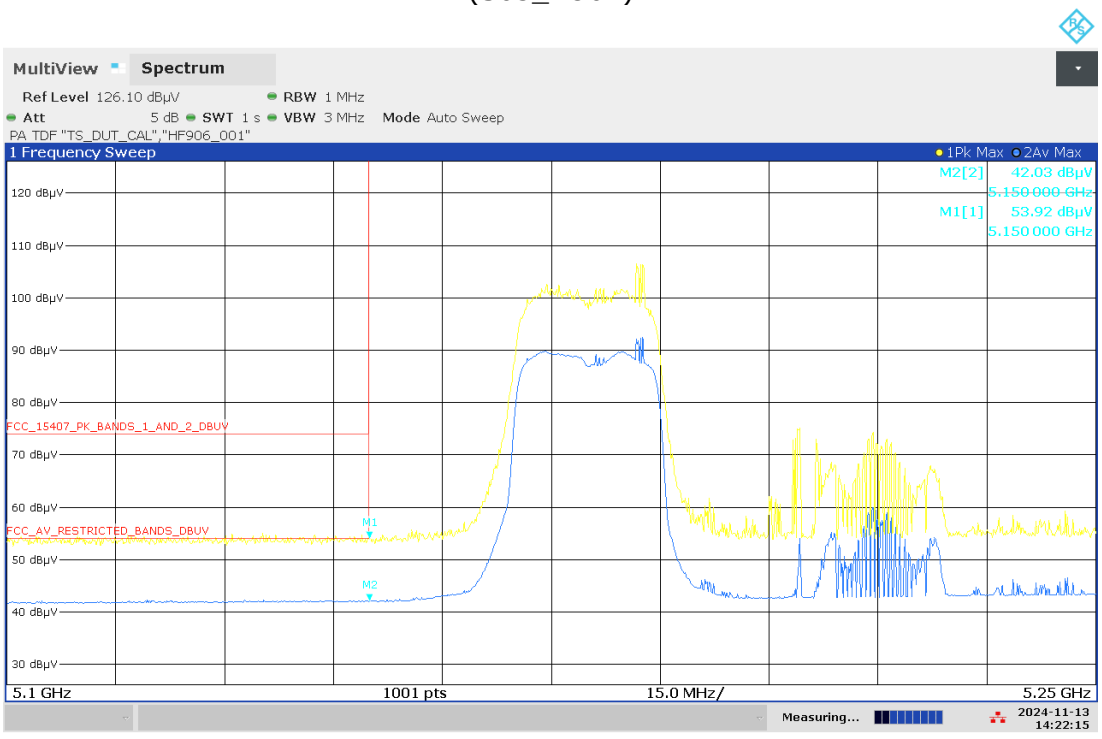


03:54:25 PM 11/13/2024

Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Subband = U-NII-3 (S03_AA01)

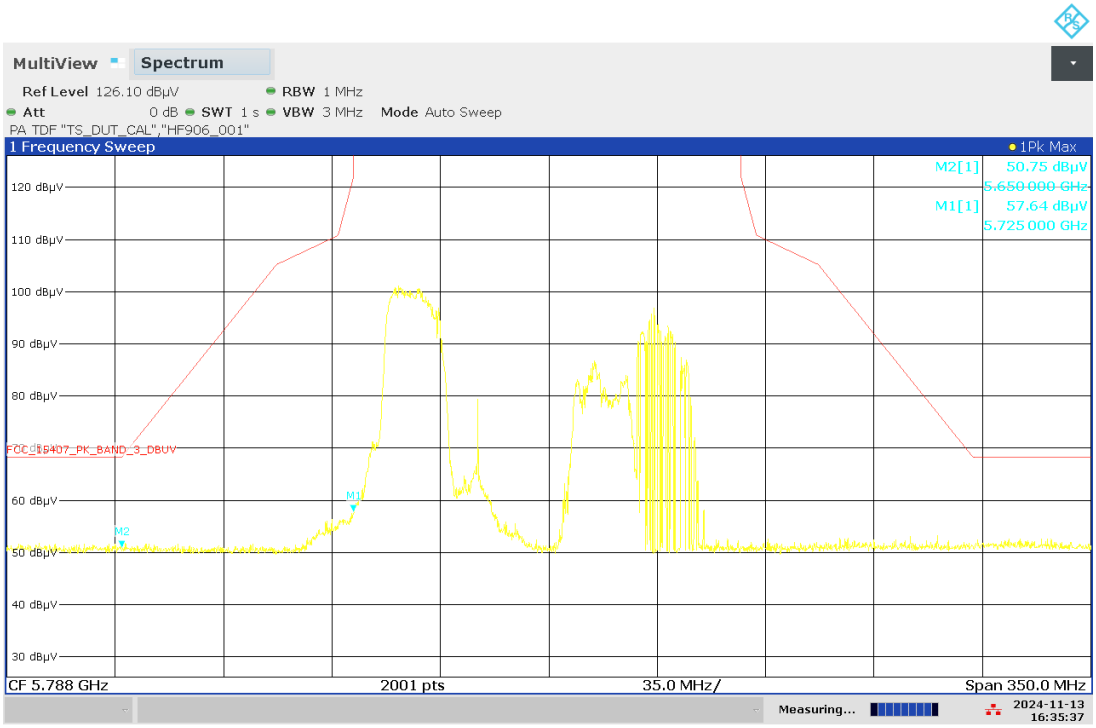
05:52:42 PM 11/13/2024

Radio Technology = WLAN ax 20 MHz, Operating Frequency = low, Subband = U-NII-1 (S03_AO04)



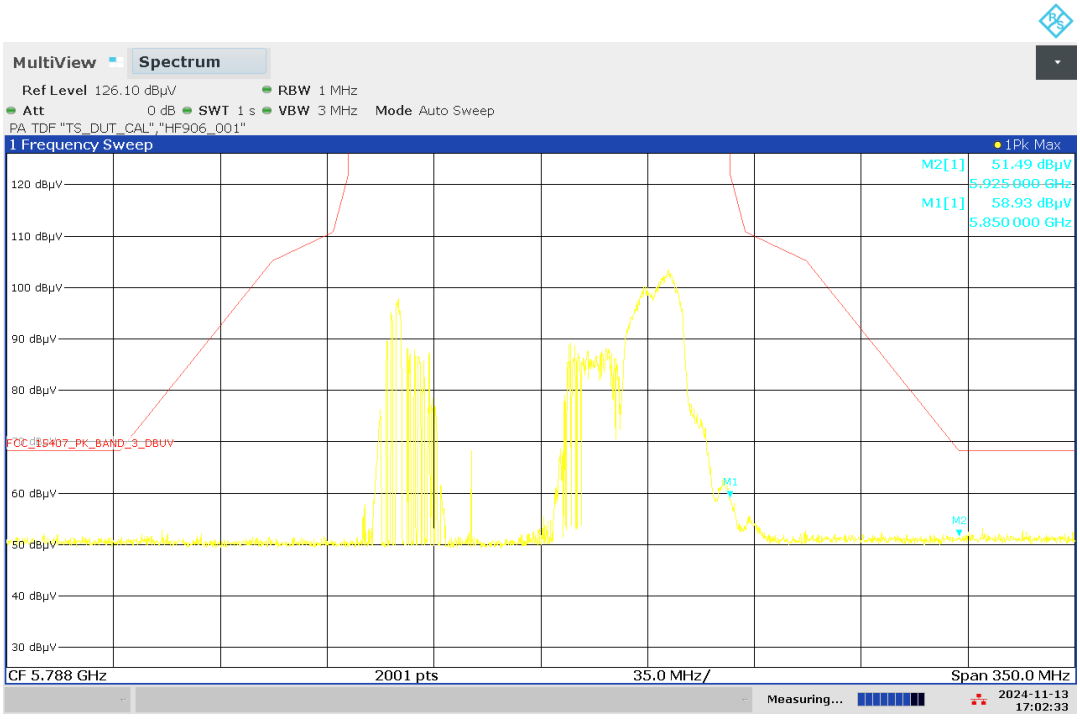
02:22:15 PM 11/13/2024

Radio Technology = WLAN ax 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S03_AO04)



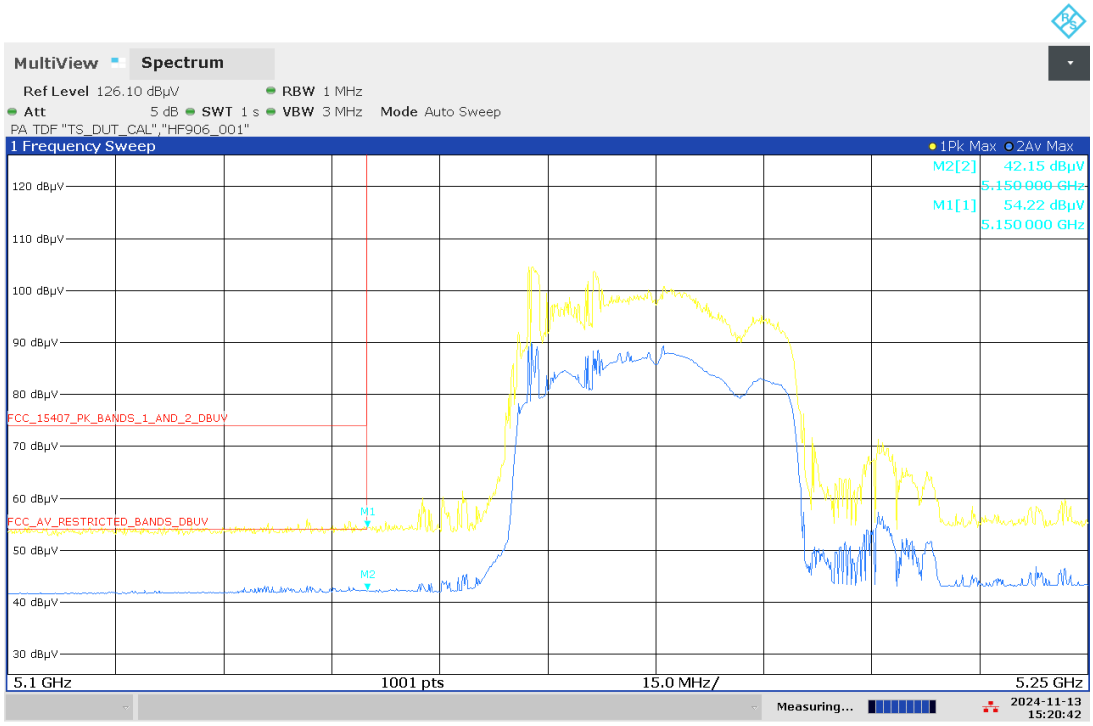
04:35:38 PM 11/13/2024

Radio Technology = WLAN ax 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S03_AO04)



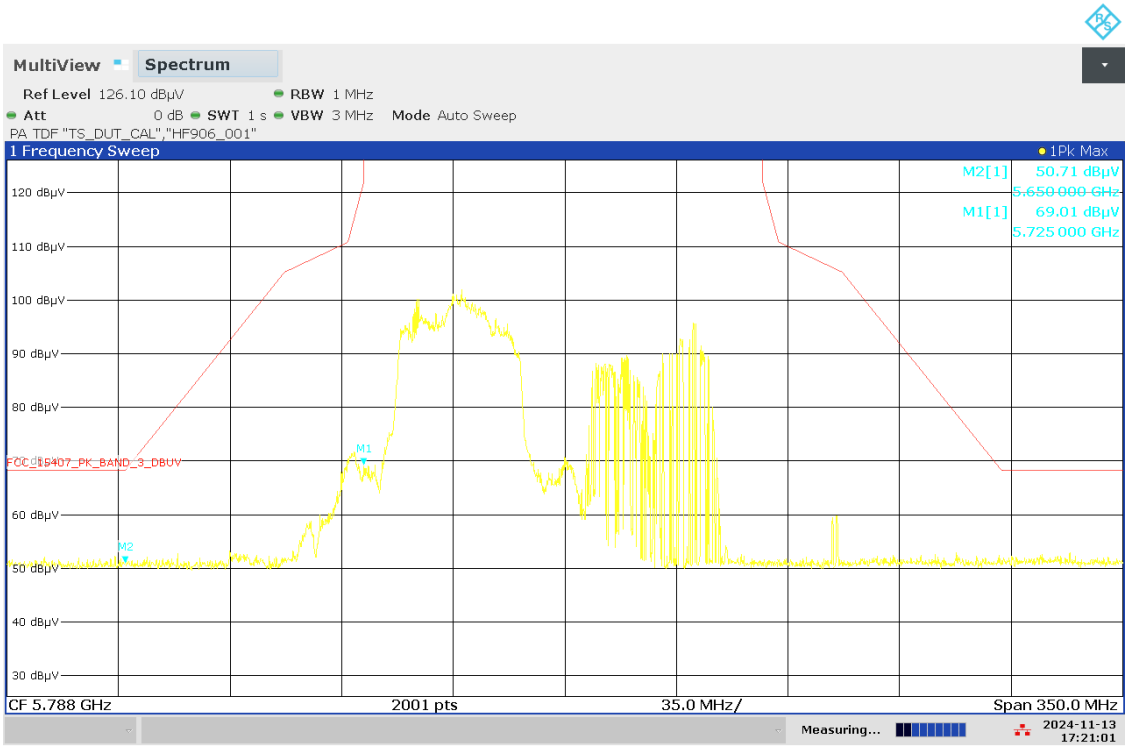
05:02:33 PM 11/13/2024

Radio Technology = WLAN ax 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S03_AO04)



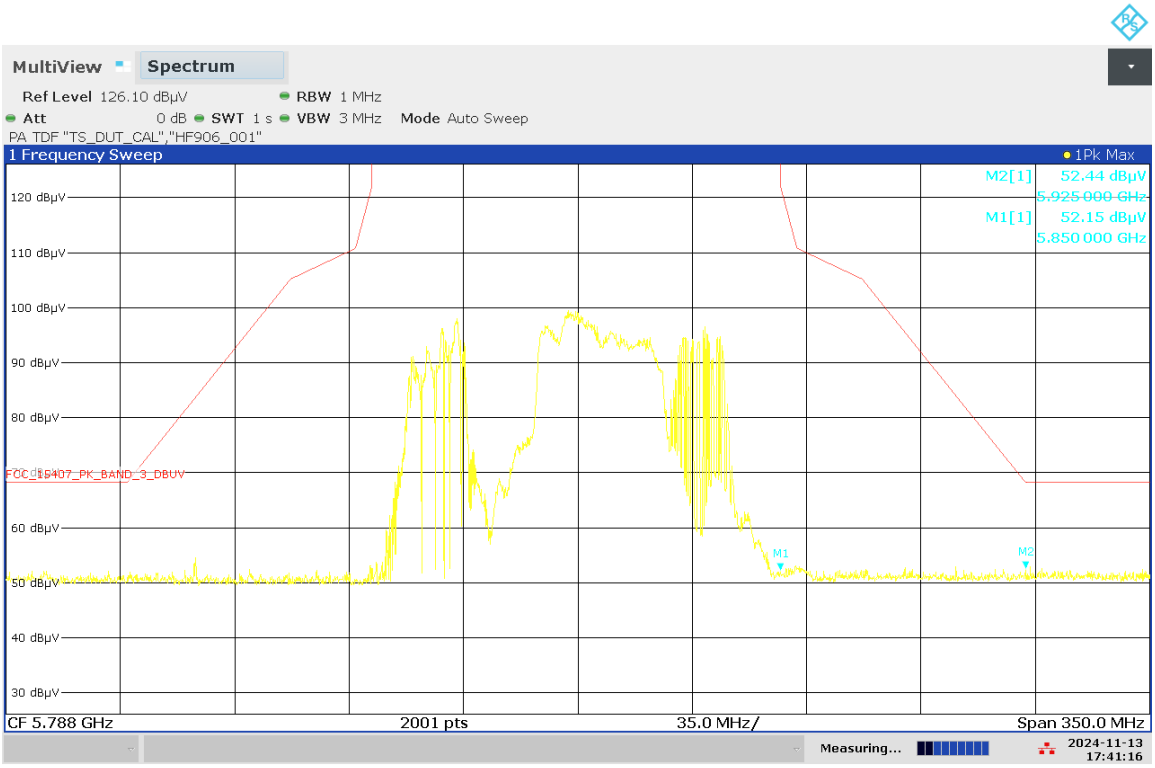
03:20:43 PM 11/13/2024

Radio Technology = WLAN ax 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S03_AO04)



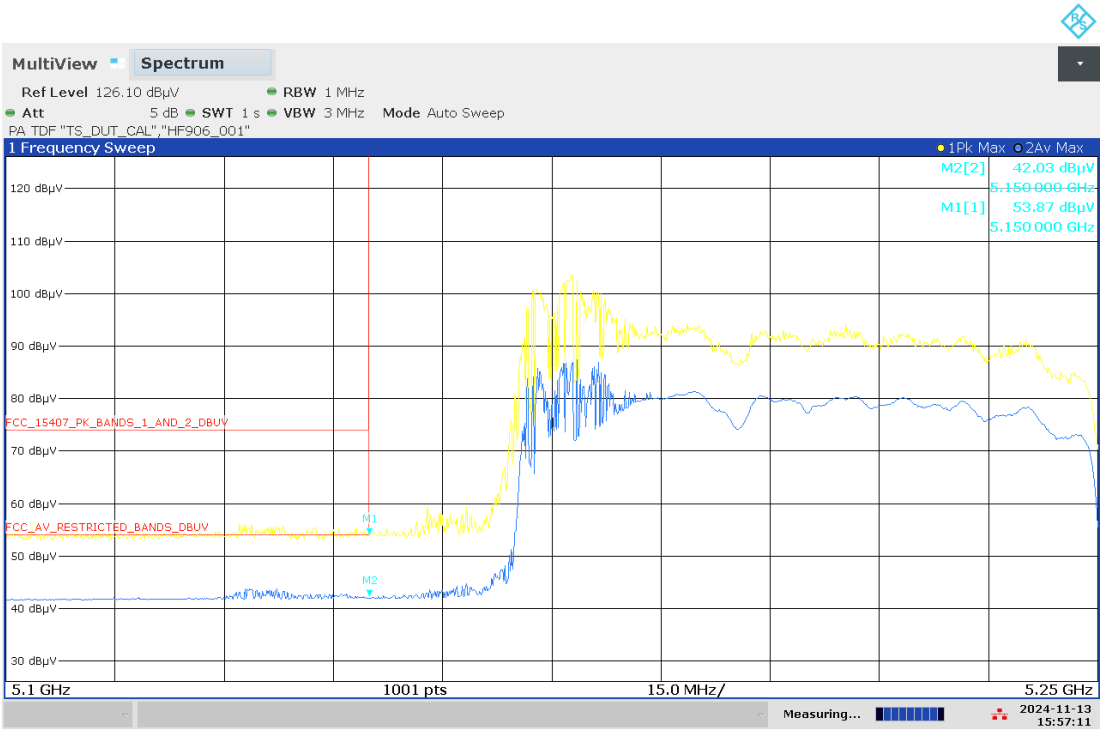
05:21:01 PM 11/13/2024

Radio Technology = WLAN ax 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S03_AO04)



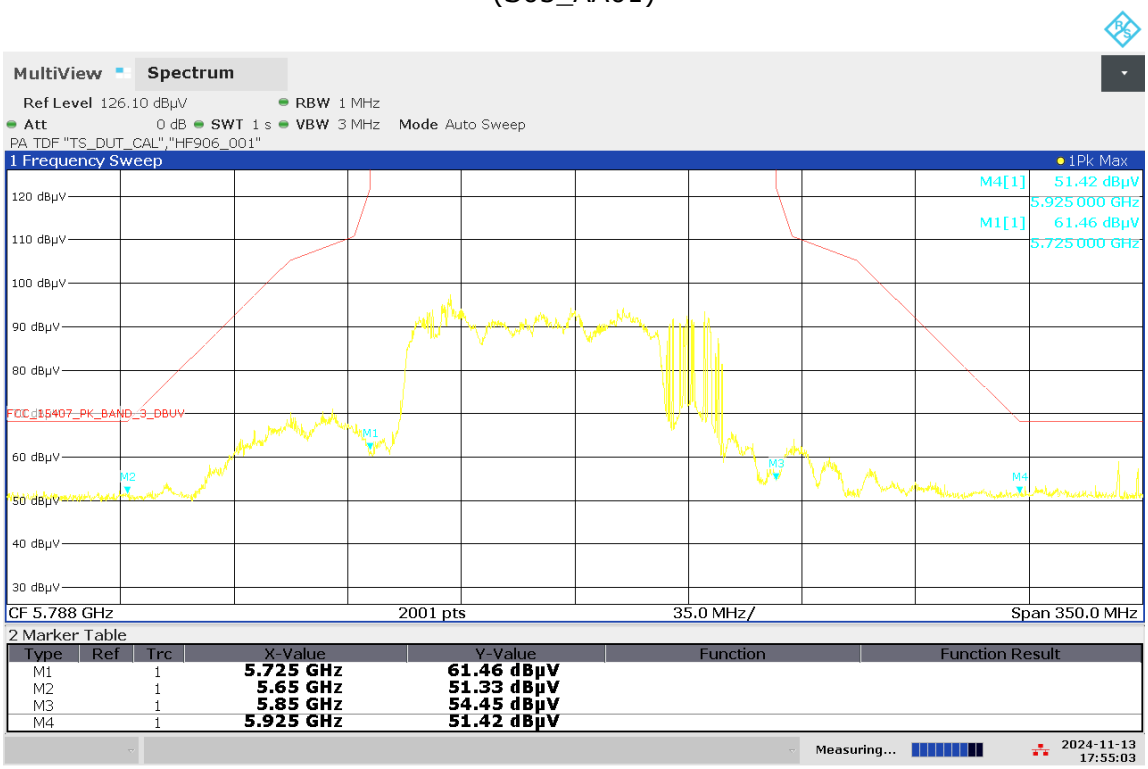
05:41:17 PM 11/13/2024

Radio Technology = WLAN ax 80 MHz, Operating Frequency = low, Subband = U-NII-1 (S03_AA01)



03:57:12 PM 11/13/2024

Radio Technology = WLAN ax 80 MHz, Operating Frequency = mid, Subband = U-NII-3 (S03_AA01)



5.4.6 TEST EQUIPMENT USED

- FCC In-Situ measurement equipment

6 TEST EQUIPMENT

6.1 TEST EQUIPMENT HARDWARE

1 FCC In-Situ measurement equipment

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
1.1	Opus10 TPR (8253.00)	T/P Logger 13	Lufft Mess- und Regeltechnik GmbH	13936	2023-12	2025-12
1.2	SMB100A	Signal Generator 100 kHz - 40 GHz	Rohde & Schwarz GmbH & Co. KG	181486	2023-01	2026-01
1.3	EX520	Digital Multimeter 12	Extech Instruments Corp	05157876	2022-06	2025-06
1.4	FSW43	Spectrum Analyzer	Rohde & Schwarz GmbH & Co. KG	103779	2024-10	2026-10
1.5	Opus10 THI (8152.00)	T/H Logger 14	Lufft Mess- und Regeltechnik GmbH	13993	2023-12	2025-12
1.6	SMBV100A	Vector Signal Generator 9 kHz - 6 GHz	Rohde & Schwarz	259291	2023-01	2026-01
1.7	HF 906	Double-ridged horn	Rohde & Schwarz	357357/002	2022-07	2025-07
1.8	HFH2-Z2	Loop Antenna + 3 Axis Tripod	Rohde & Schwarz GmbH & Co. KG	829324/006	2024-04	2027-04
1.9	VUBA 9117	Biconical Dipole	Schwarzbeck Mess-Elektronik	9117-108	2023-03	2026-03
1.10	3160-09	Standard Gain / Pyramidal Horn Antenna 26.5 GHz	EMCO Elektronic GmbH	00083069	N/A	N/A
1.11	3160-10	Standard Gain / Pyramidal Horn Antenna 40 GHz	EMCO Elektronic GmbH	00083069	N/A	N/A
1.12	AMP-18000-40000-60-18 2.9-F	LNA 18 GHz – 40 GHz	TTE Europe	ACJU02	N/A	N/A

The calibration interval is the time interval between “Last Calibration” and “Calibration Due”

7 ANTENNA FACTORS, CABLE LOSS AND SAMPLE CALCULATIONS

This chapter contains the antenna factors with their corresponding path loss of the used measurement path for all antennas as well as the insertion loss of the LISN.

All measurements distances will be adjusted after the measurements

7.1 ANTENNA R&S HFH2-Z2 (9 KHZ – 30 MHZ)

Frequency	AF HFH-Z2)	Corr.	cable loss	distance corr. (-40 dB/ decade)	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
MHz	dB (1/m)	dB	dB	dB	m	m
0.009	20.50		0.1	-80	300	1.81
0.01	20.45		0.1	-80	300	1.81
0.015	20.37		0.1	-80	300	1.81
0.02	20.36		0.1	-80	300	1.81
0.025	20.38		0.1	-80	300	1.81
0.03	20.32		0.1	-80	300	1.81
0.05	20.35		0.1	-80	300	1.81
0.08	20.30		0.1	-80	300	1.81
0.1	20.20		0.1	-80	300	1.81
0.2	20.17		0.1	-80	300	1.81
0.3	20.14		0.1	-80	300	1.81
0.49	20.12		0.1	-80	300	1.81
0.490001	20.12		0.1	-40	30	1.81
0.5	20.11		0.1	-40	30	1.81
0.8	20.10		0.1	-40	30	1.81
1	20.09		0.1	-40	30	1.81
2	20.08		0.1	-40	30	1.81
3	20.06		0.1	-40	30	1.81
4	20.05		0.2	-40	30	1.81
5	20.05		0.2	-40	30	1.81
6	20.02		0.2	-40	30	1.81
8	19.95		0.2	-40	30	1.81
10	19.83		0.2	-40	30	1.81
12	19.71		0.2	-40	30	1.81
14	19.54		0.2	-40	30	1.81
16	19.53		0.3	-40	30	1.81
18	19.50		0.3	-40	30	1.81
20	19.57		0.3	-40	30	1.81
22	19.61		0.3	-40	30	1.81
24	19.61		0.3	-40	30	1.81
26	19.54		0.3	-40	30	1.81
28	19.46		0.3	-40	30	1.81
30	19.73		0.4	-40	30	1.81

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
distance correction = -40 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values

7.2 ANTENNA VUBA 9117 (30 MHZ – 1 GHZ)

(d_{Limit} = 3 m)

Frequency	AF VUBA 9117	Corr.	cable loss	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
MHz	dB (1/m)	dB	dB	m	m
30	18.6	-4.11	0.29	3	1.81
50	6.0	-4.01	0.39	3	1.81
100	9.7	-3.84	0.56	3	1.81
150	7.9	-3.67	0.73	3	1.81
200	7.6	-3.56	0.84	3	1.81
250	9.5	-3.42	0.98	3	1.81
300	11.0	-3.36	1.04	3	1.81
350	12.4	-3.22	1.18	3	1.81
400	13.6	-3.12	1.28	3	1.81
450	14.7	-3.01	1.39	3	1.81
500	15.6	-2.96	1.44	3	1.81
550	16.3	-2.85	1.55	3	1.81
600	17.2	-2.81	1.59	3	1.81
650	18.1	-2.73	1.67	3	1.81
700	18.5	-2.73	1.67	3	1.81
750	19.1	-2.53	1.87	3	1.81
800	19.6	-2.5	1.90	3	1.81
850	20.1	-2.41	1.99	3	1.81
900	20.8	-2.26	2.14	3	1.81
950	21.1	-2.18	2.22	3	1.81
1000	21.6	-2.17	2.23	3	1.81

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
distance correction = -20 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Tables show an extract of values.

7.3 ANTENNA R&S HF906 (1 GHZ – 18 GHZ)

Frequency	AF R&S HF907	Corr.	cable loss	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
MHz	dB (1/m)	dB	dB	m	m
1000	24.4	-3.8	0.6	3	1.81
2000	28.5	-3.5	0.9	3	1.81
3000	31.0	-3.3	1.1	3	1.81
4000	33.1	-3.1	1.3	3	1.81
5000	34.4	-2.9	1.5	3	1.81
6000	34.7	-2.7	1.7	3	1.81
7000	35.6	-2.6	1.8	3	1.81
8000	36.3	-2.4	2.0	3	1.81
9000	37.1	-2	2.4	3	1.81
10000	37.5	-1.9	2.5	3	1.81
11000	37.5	-2	2.4	3	1.81
12000	37.6	-2	2.4	3	1.81
13000	38.2	-1.7	2.7	3	1.81
14000	39.9	-1.4	3.0	3	1.81
15000	40.9	-1.2	3.2	3	1.81
16000	41.3	-1.2	3.2	3	1.81
17000	42.8	-1	3.4	3	1.81
18000	44.2	-0.9	3.5	3	1.81

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
Tables show an extract of values.

7.4 ANTENNA EMCO 3160-09 (18 GHZ – 26.5 GHZ)

Frequency	AF EMCO 3160-09	Corr.	cable loss	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
MHz	dB (1/m)	dB	dB	m	m
18000	40.2	-3.68	0.72	3	1.81
18500	40.2	-3.71	0.69	3	1.81
19000	40.2	-3.64	0.76	3	1.81
19500	40.3	-3.66	0.74	3	1.81
20000	40.3	-3.68	0.72	3	1.81
20500	40.3	-3.62	0.78	3	1.81
21000	40.3	-3.53	0.87	3	1.81
21500	40.3	-3.5	0.90	3	1.81
22000	40.3	-3.51	0.89	3	1.81
22500	40.4	-3.53	0.87	3	1.81
23000	40.4	-3.52	0.88	3	1.81
23500	40.4	-3.5	0.90	3	1.81
24000	40.4	-3.52	0.88	3	1.81
24500	40.4	-3.49	0.91	3	1.81
25000	40.4	-3.52	0.88	3	1.81
25500	40.5	-3.51	0.89	3	1.81
26000	40.5	-3.54	0.86	3	1.81
26500	40.5	-3.5	0.90	3	1.81

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

7.5 ANTENNA EMCO 3160-10 (26.5 GHZ – 40 GHZ)

Frequency	AF EMCO 3160-10	Corr.	cable loss	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
GHz	dB (1/m)	dB	dB	m	m
26.5	43.4	0	4.4	3	1.81
27.0	43.4	0	4.4	3	1.81
28.0	43.4	0.1	4.5	3	1.81
29.0	43.5	0.2	4.6	3	1.81
30.0	43.5	0.3	4.7	3	1.81
31.0	43.5	0.3	4.7	3	1.81
32.0	43.5	0.4	4.8	3	1.81
33.0	43.6	0.5	4.9	3	1.81
34.0	43.6	0.6	5.0	3	1.81
35.0	43.6	0.7	5.1	3	1.81
36.0	43.6	0.7	5.1	3	1.81
37.0	43.7	0.8	5.2	3	1.81
38.0	43.7	0.9	5.3	3	1.81
39.0	43.7	1.0	5.4	3	1.81
40.0	43.8	1.1	5.5	3	1.81

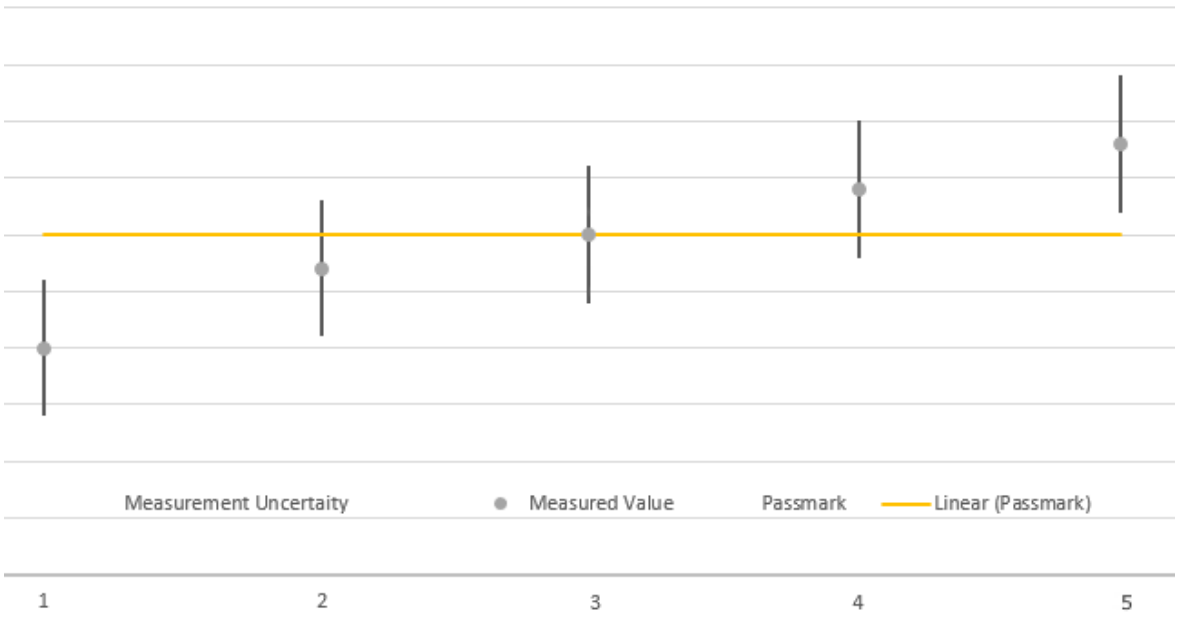
Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
distance correction = -20 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

8 MEASUREMENT UNCERTAINTIES

Test Case	Parameter	Uncertainty
Field Strength of spurious radiation	Field strength	± 5.5 dB
Output Power	Power	± 5.5 dB
Power Spectral Density	Power	± 5.5 dB

The measurement uncertainties for all parameters are calculated with an expansion factor (coverage factor) k = 1.96. This means, that the true value is in the corresponding interval with a probability of 95 %.



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	on pass mark	within pass mark	Passed
4	above pass mark	within pass mark	Failed
5	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.

9 PHOTO REPORT

9.1 LOCATION EUPEN

Photo 1: Installation of EUT with connection to RCoax cable

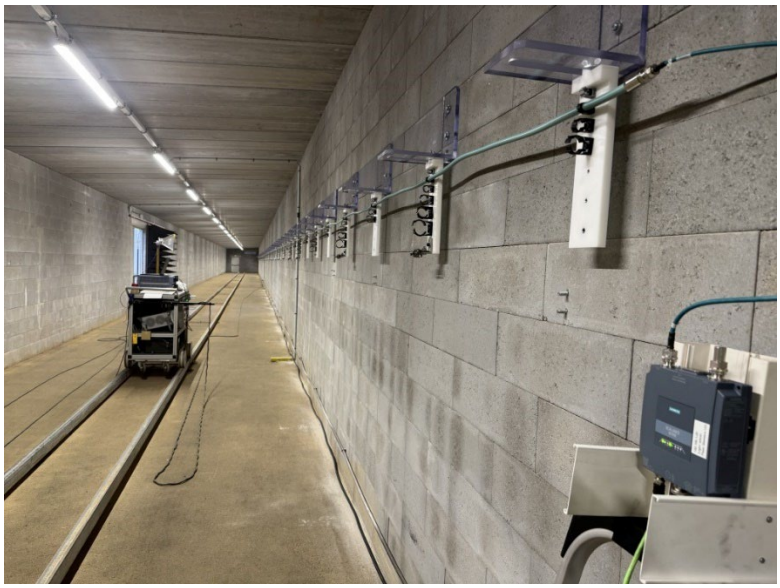


Photo 2: Installation of RCoax cable in the test location

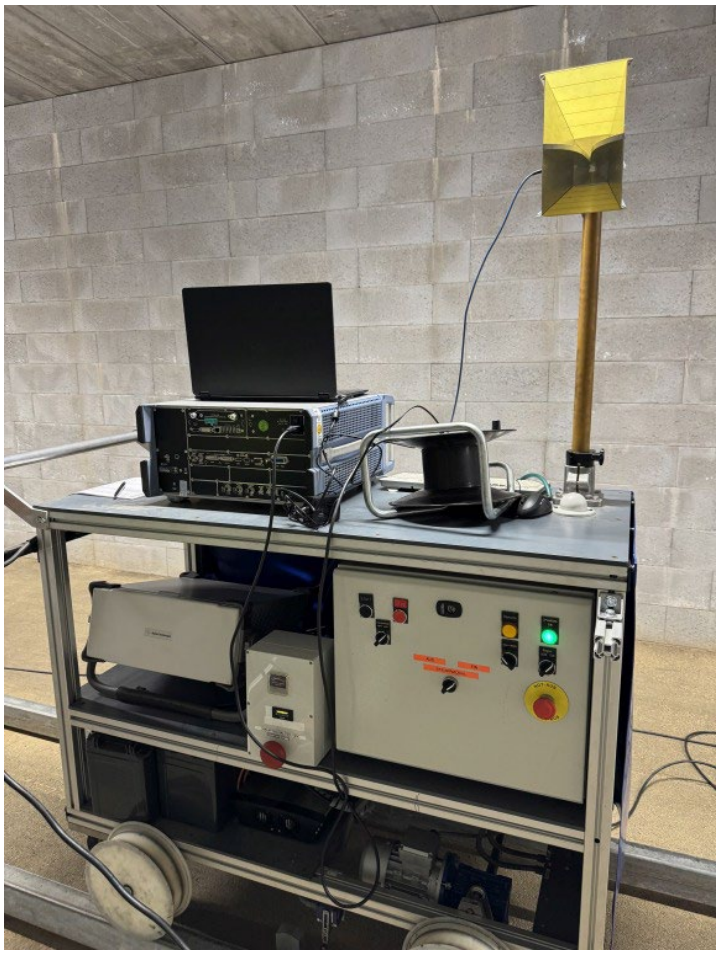


Photo 3: Measurement equipment on automatic trolley, horn antenna HF 906, 1 GHz – 18 GHz

Photo 4: Tracks on the floor for the trolley, with marks for worst-case positions

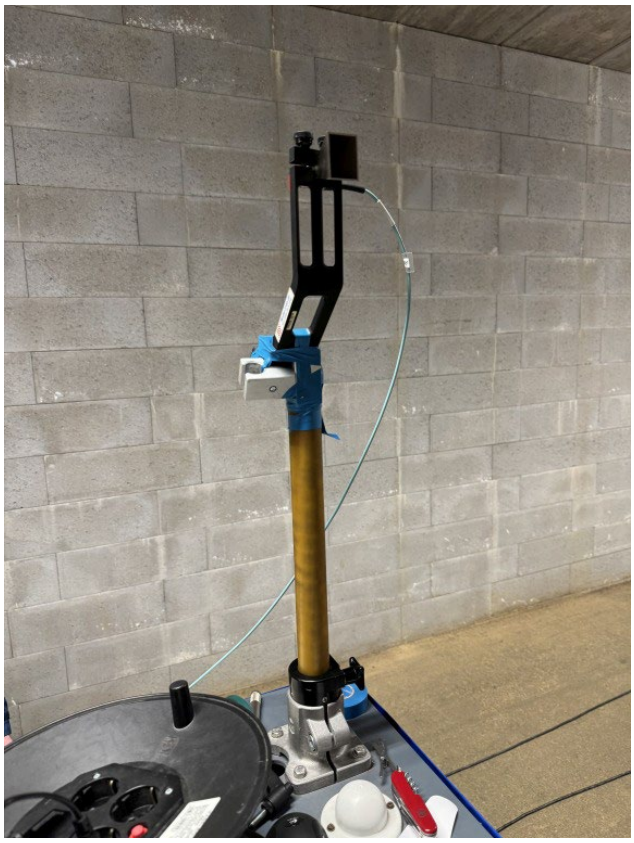


Photo 5: Standard gain horn 18 GHz – 26.5 GHz on trolley

Photo 6: Standard gain horn 26.5 GHz – 40.0 GHz on trolley

Photo 6: VUBA 9117 biconical dipole antenna 30.0 MHz – 1.0 GHz on trolley

Photo 7: HFH2-Z2 magnetic field antenna 9.0 kHz – 30 MHz

9.2 LOCATION ERLANGEN

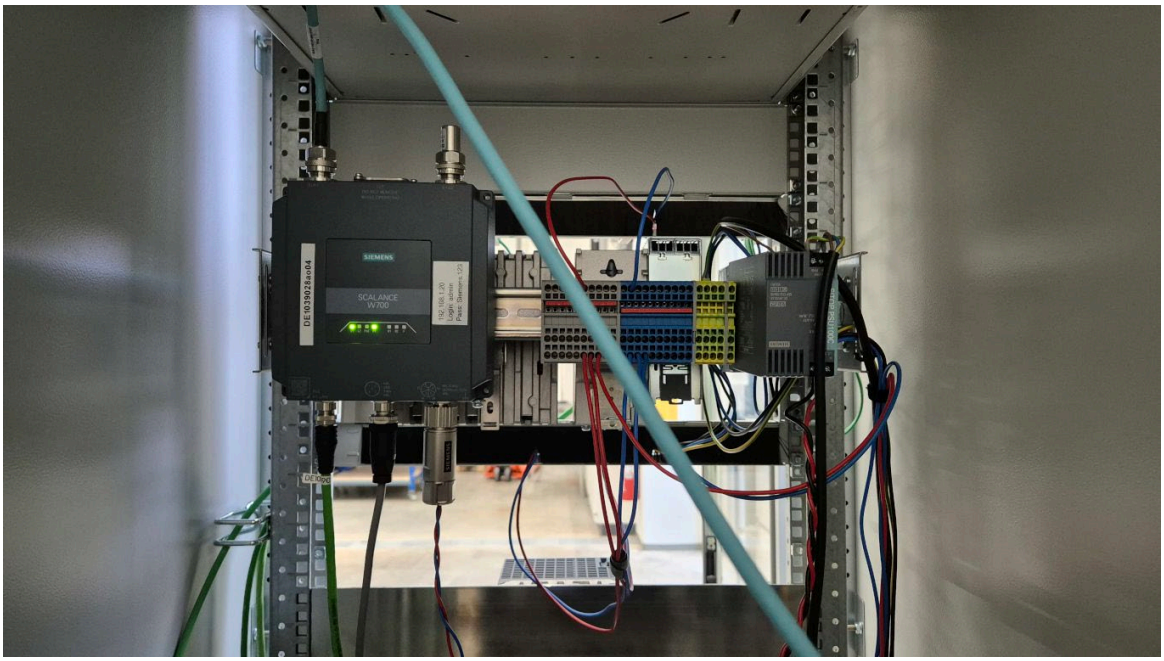


Photo 1: Installation of EUT with connection to RCoax cable

Photo 2: Installation of RCoax x cable in the test location; the yellow arrows point to place where the RCoax cable is installed

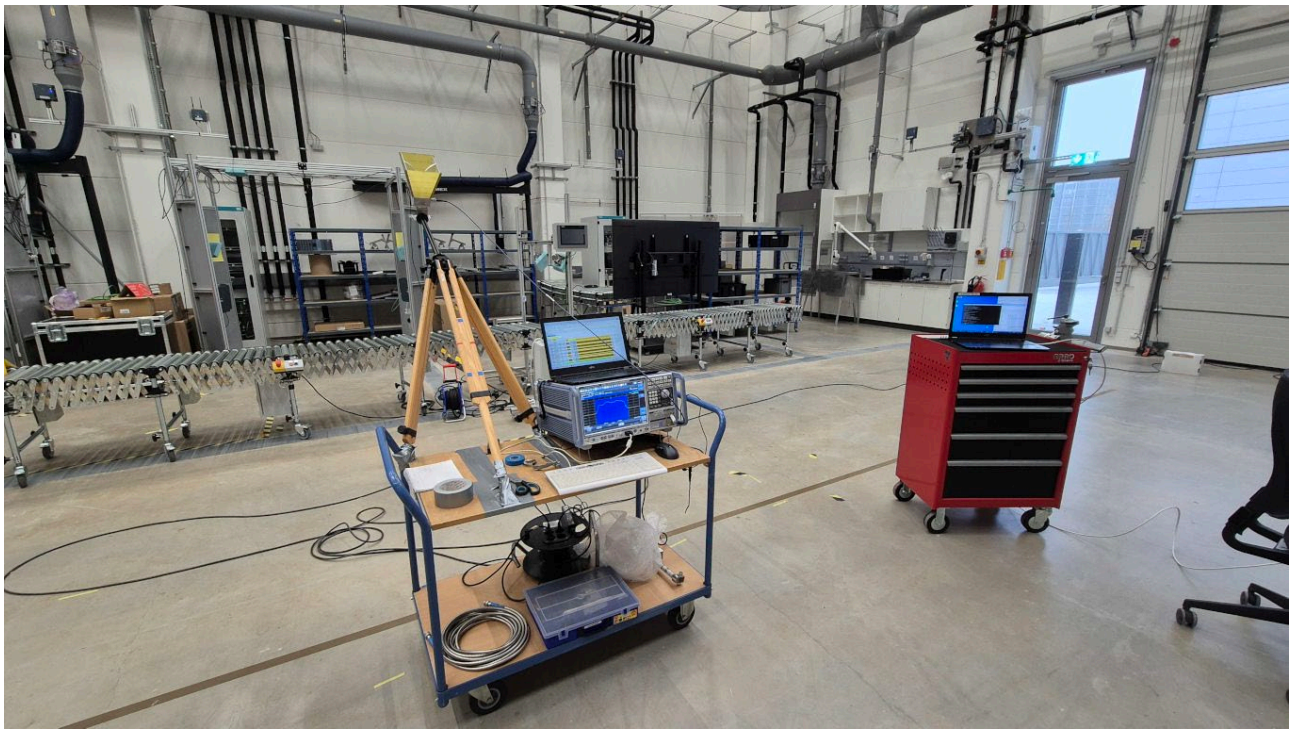


Photo 3: Measurement equipment on trolley

Photo 4: Test location overview