

7.13 Channel Move Time

Test Requirement KDB 905462 D02 Section 5.1
Test Method: KDB 905462 D02 Section 7.8.3

Limit:

Test item	Limit	Applicability	
		Master Device or client with Radar Detection	Client without Radar Detection
Non-occupancy period	Minimum 30 minutes	Yes	Not required
Channel Availability Check Time	60 seconds	Yes	Not required
Channel Move Time	10 seconds See Note 1.	Yes	Yes
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.	Yes	Yes
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.	Yes	Not required

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

7.13.4 Measurement Procedure and Data

- 1) The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.
- 2) The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device.
- 3) A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.
- 4) EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Media Player Classic Ver. 6.4.8.6 in order to properly load the network for the entire period of the test.
- 5) When radar burst with a level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold +1dB.
- 6) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type.
- 7) Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: $Dwell (0.3ms) = S (12000ms) / B (4000)$; where Dwell is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: $C (ms) = N \times Dwell (0.3ms)$; where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.
- 8) Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.

Please Refer to Appendix for Details

7.14 Channel Closing Transmission Time

Test Requirement KDB 905462 D02 Section 5.1

Test Method: KDB 905462 D02 Section 7.8.3

Limit:

Test item	Limit	Applicability	
		Master Device or client with Radar Detection	Client without Radar Detection
Non-occupancy period	Minimum 30 minutes	Yes	Not required
Channel Availability Check Time	60 seconds	Yes	Not required
Channel Move Time	10 seconds See Note 1.	Yes	Yes
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.	Yes	Yes
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.	Yes	Not required

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

7.14.4 Measurement Procedure and Data

- 1) The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.
- 2) The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device.
- 3) A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.
- 4) EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Media Player Classic Ver. 6.4.8.6 in order to properly load the network for the entire period of the test.
- 5) When radar burst with a level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold +1dB.
- 6) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type.
- 7) Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: $Dwell (0.3ms) = S (12000ms) / B (4000)$; where Dwell is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: $C (ms) = N \times Dwell (0.3ms)$; where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.
- 8) Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.

Please Refer to Appendix for Details



8 Test Setup Photo

Refer to Setup Photo for SZCR2311003756AT

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for SZCR2311003756AT



10 Appendix

1. Duty Cycle

1.1 Ant1

1.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11a	MIMO	5180	1.362	1.863	73.11	1.36	0.03
		5200	1.362	1.863	73.11	1.36	0.03
		5240	1.361	1.862	73.09	1.36	0.02
		5260	1.361	1.862	73.09	1.36	0.03
		5300	1.362	1.863	73.11	1.36	0.03
		5320	1.361	1.862	73.09	1.36	0.02
		5500	1.361	1.862	73.09	1.36	0.03
		5580	1.361	1.862	73.09	1.36	0.03
		5700	1.362	1.863	73.11	1.36	0.03
		5745	1.361	1.862	73.09	1.36	0.03
		5785	1.362	1.863	73.11	1.36	0.03
		5825	1.362	1.863	73.11	1.36	0.03
802.11n (HT20)	MIMO	5180	1.273	1.774	71.76	1.44	0.03
		5200	1.274	1.775	71.77	1.44	0.02
		5240	1.274	1.774	71.82	1.44	0.03
		5260	1.274	1.775	71.77	1.44	0.02
		5300	1.273	1.774	71.76	1.44	0.03
		5320	1.273	1.774	71.76	1.44	0.03
		5500	1.274	1.775	71.77	1.44	0.03
		5580	1.273	1.774	71.76	1.44	0.03
		5700	1.273	1.774	71.76	1.44	0.02
		5745	1.274	1.775	71.77	1.44	0.02
		5785	1.273	1.774	71.76	1.44	0.02
		5825	1.273	1.774	71.76	1.44	0.03
802.11n (HT40)	MIMO	5190	0.634	1.134	55.91	2.53	0.03
		5230	0.633	1.134	55.82	2.53	0.01
		5270	0.633	1.134	55.82	2.53	0.03



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		5310	0.634	1.135	55.86	2.53	0.05
		5510	0.634	1.135	55.86	2.53	0.03
		5550	0.634	1.135	55.86	2.53	0.03
		5670	0.634	1.135	55.86	2.53	0.03
		5755	0.634	1.134	55.91	2.53	0.01
		5795	0.634	1.134	55.91	2.53	0.03
802.11ac (VHT20)	MIMO	5180	1.278	1.779	71.84	1.44	0.03
		5200	1.277	1.778	71.82	1.44	0.03
		5240	1.278	1.779	71.84	1.44	0.03
		5260	1.278	1.779	71.84	1.44	0.03
		5300	1.277	1.778	71.82	1.44	0.03
		5320	1.277	1.778	71.82	1.44	0.03
		5500	1.277	1.778	71.82	1.44	0.03
		5580	1.277	1.778	71.82	1.44	0.03
		5700	1.278	1.779	71.84	1.44	0.03
		5745	1.278	1.779	71.84	1.44	0.03
		5785	1.277	1.778	71.82	1.44	0.03
		5825	1.277	1.778	71.82	1.44	0.03
802.11ac (VHT40)	MIMO	5190	0.638	1.139	56.01	2.52	0.03
		5230	0.638	1.139	56.01	2.52	0.05
		5270	0.638	1.139	56.01	2.52	0.03
		5310	0.638	1.139	56.01	2.52	0.03
		5510	0.638	1.138	56.06	2.51	0.01
		5550	0.638	1.138	56.06	2.51	0.01
		5670	0.638	1.138	56.06	2.51	0.01
		5755	0.637	1.138	55.98	2.52	0.03
802.11ac (VHT80)	MIMO	5795	0.638	1.138	56.06	2.51	0.03
		5210	0.318	0.818	38.88	4.10	0.03
		5290	0.318	0.818	38.88	4.10	0.03
		5530	0.317	0.818	38.75	4.12	0.03
		5610	0.317	0.818	38.75	4.12	0.03
		5775	0.318	0.819	38.83	4.11	0.03



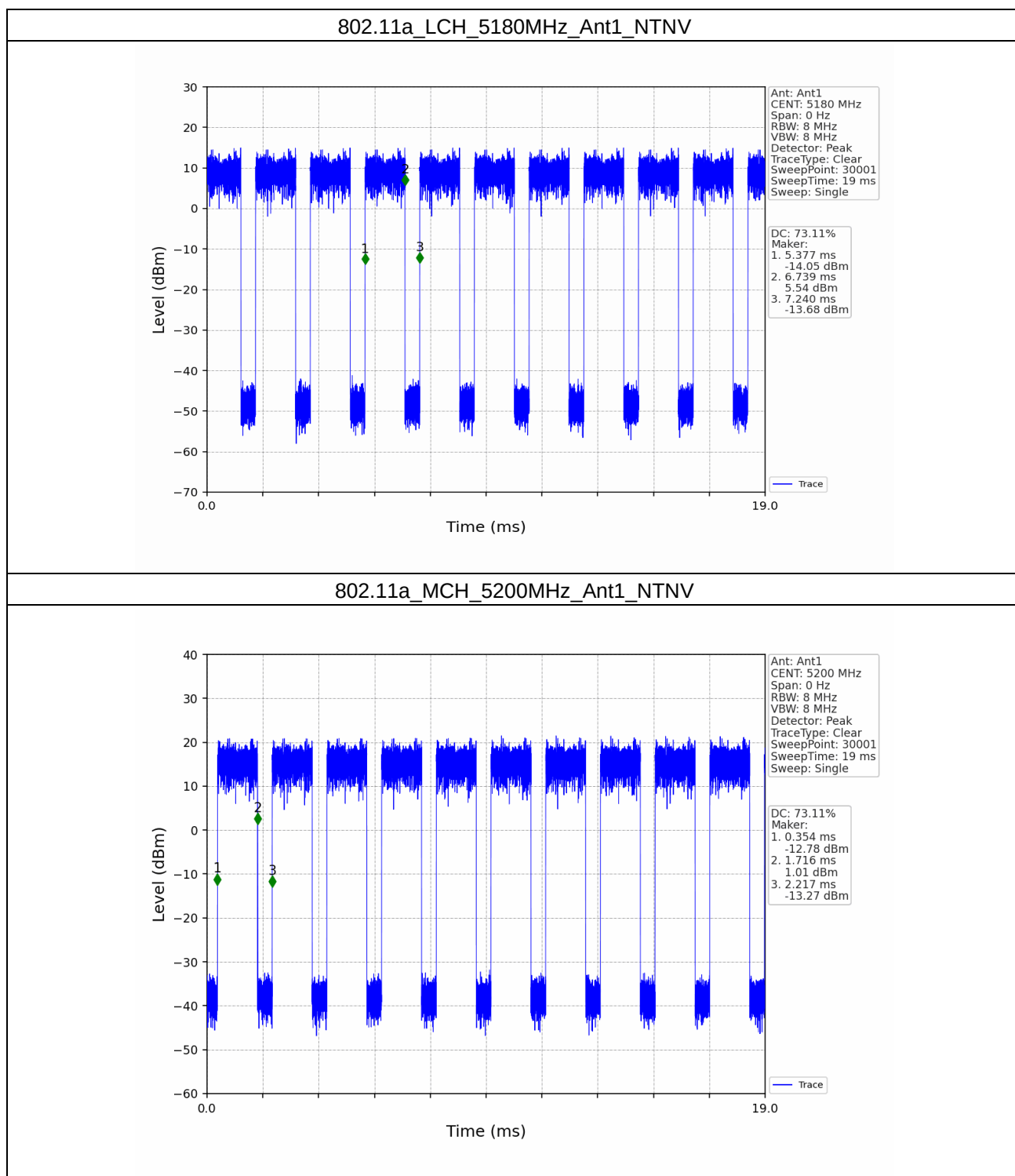
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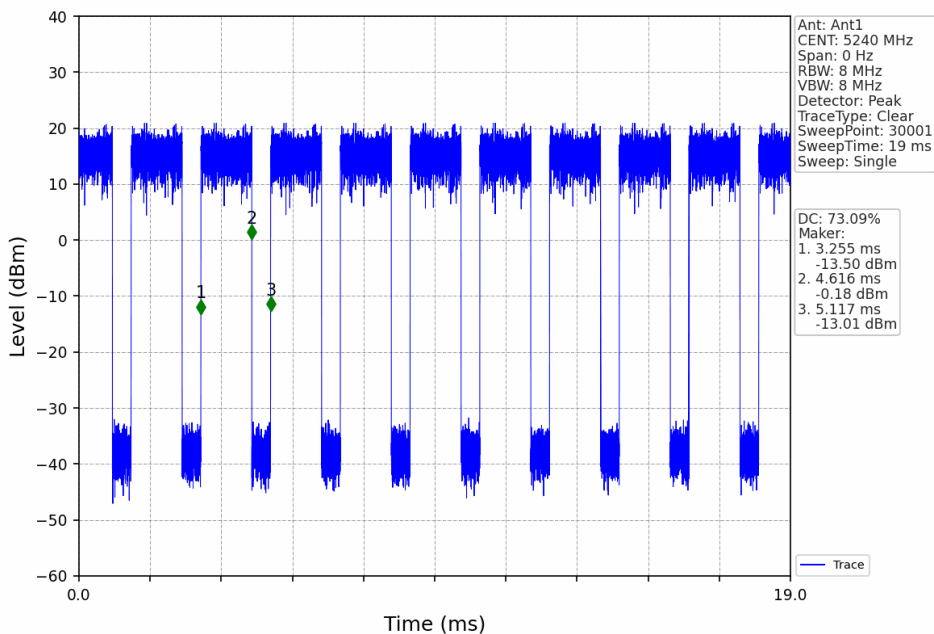
1.1.2 Test Graph



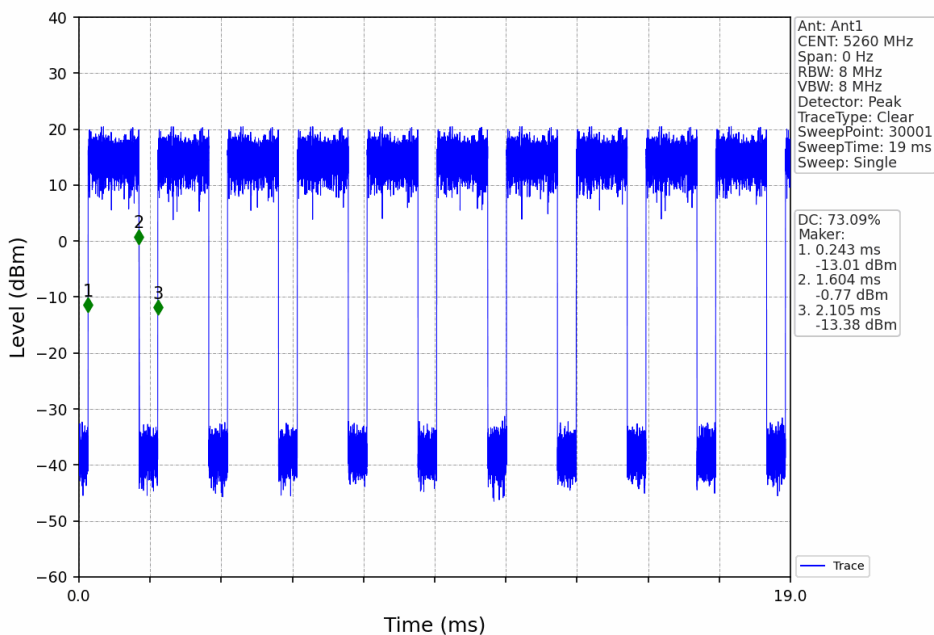
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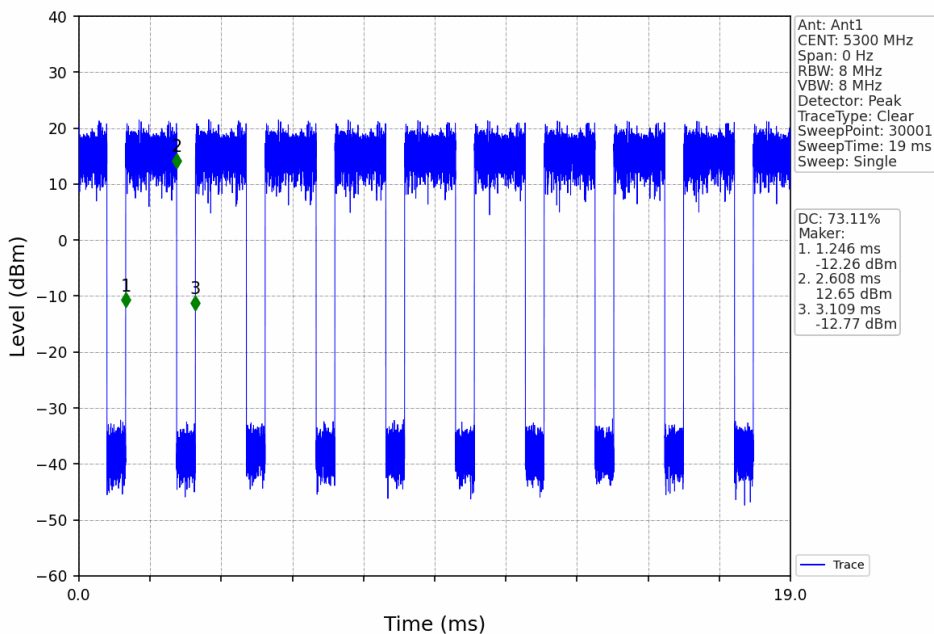
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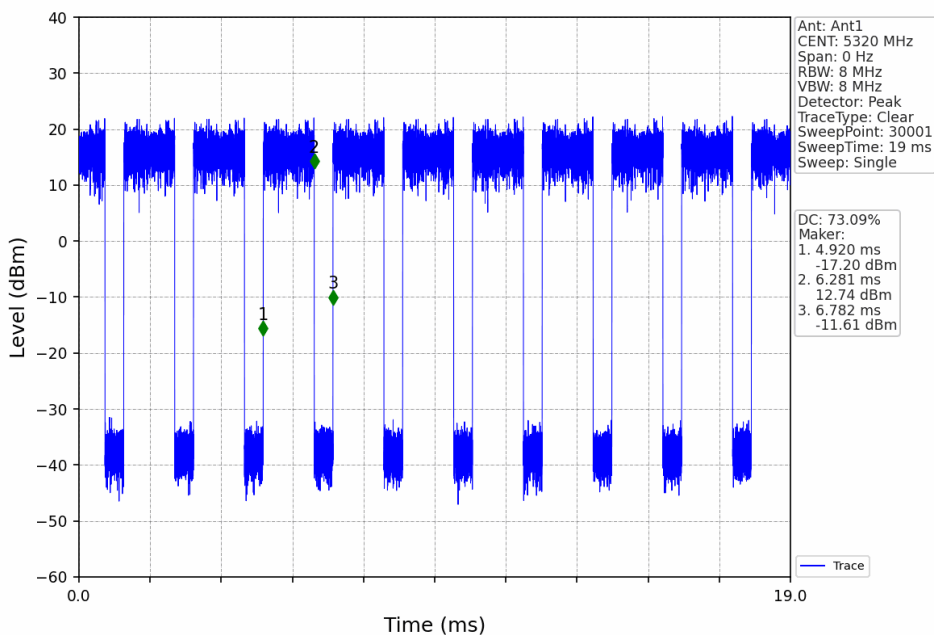
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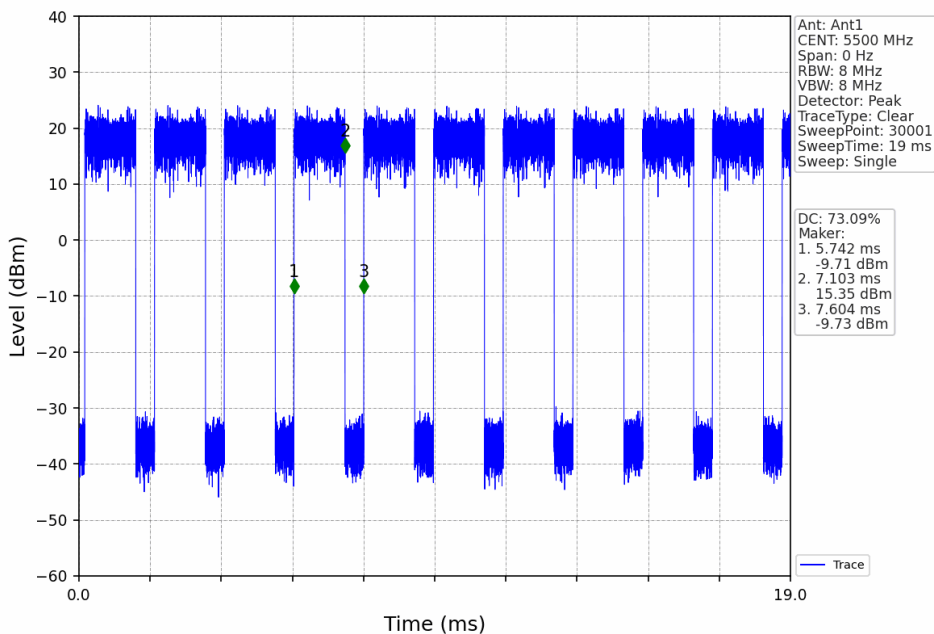
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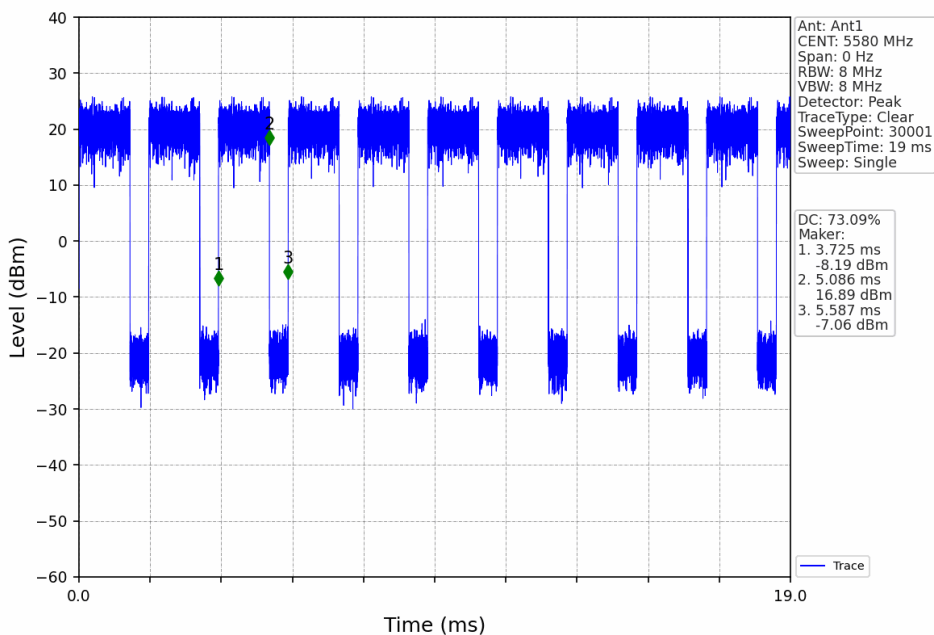
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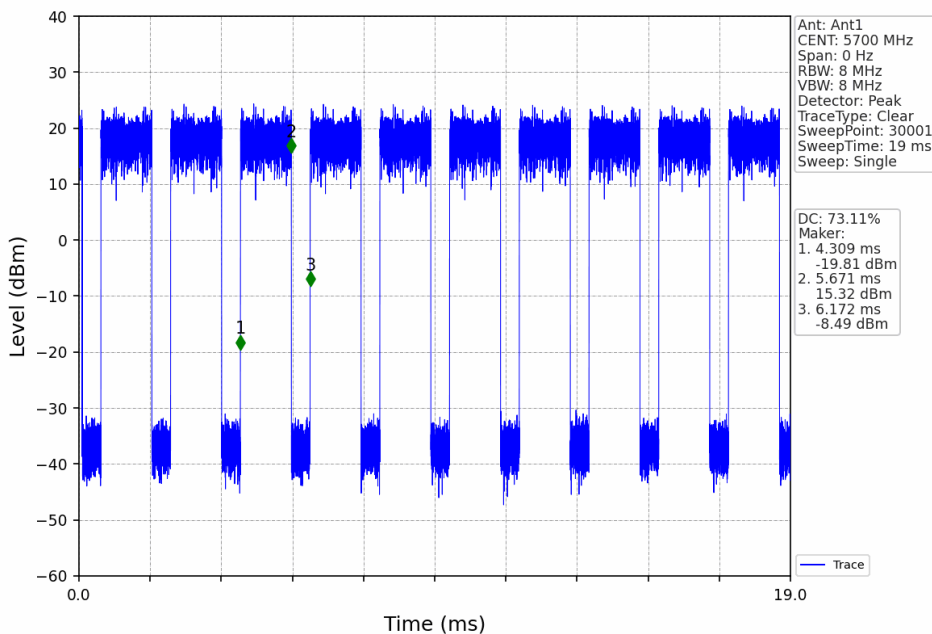
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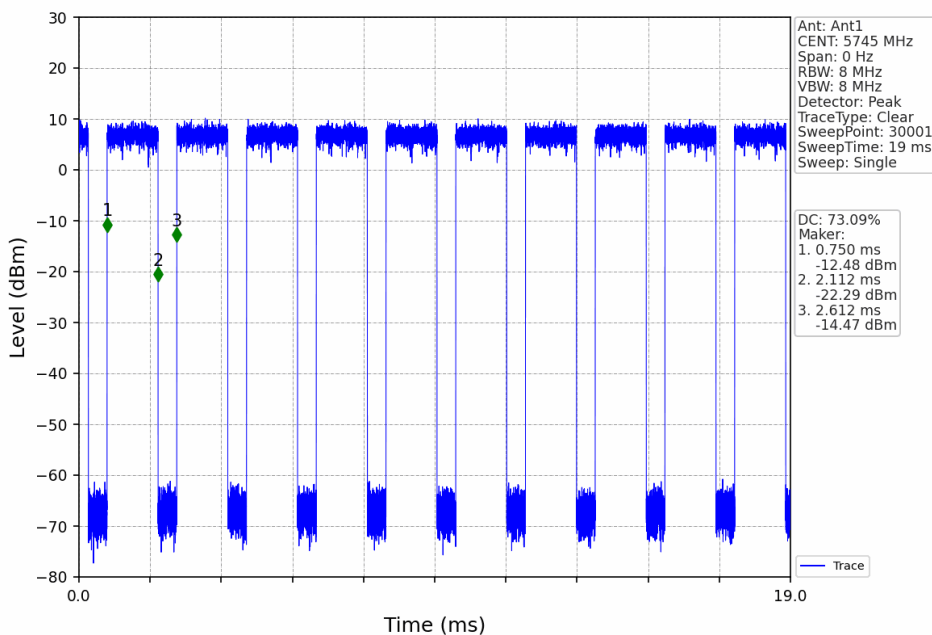
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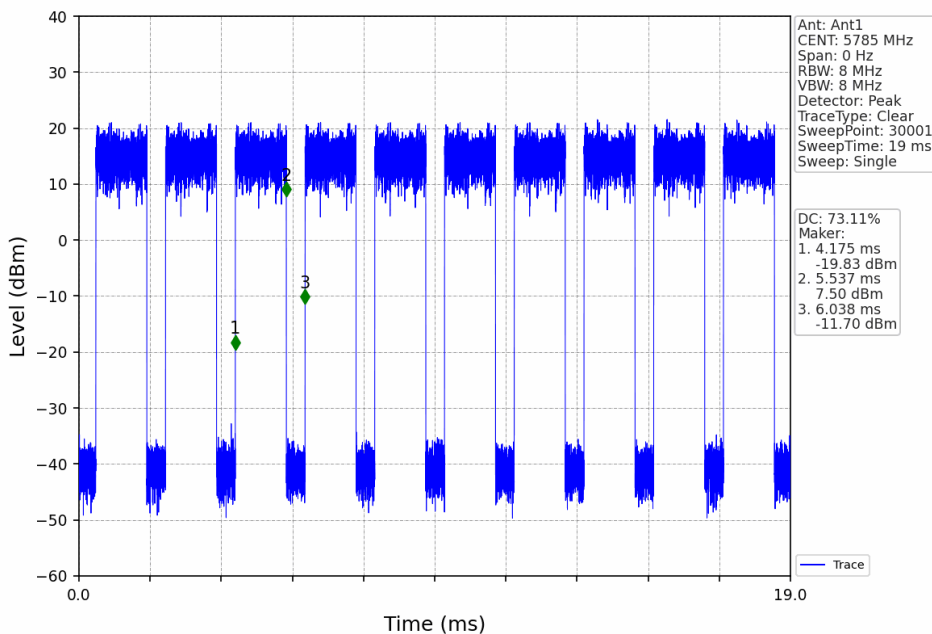
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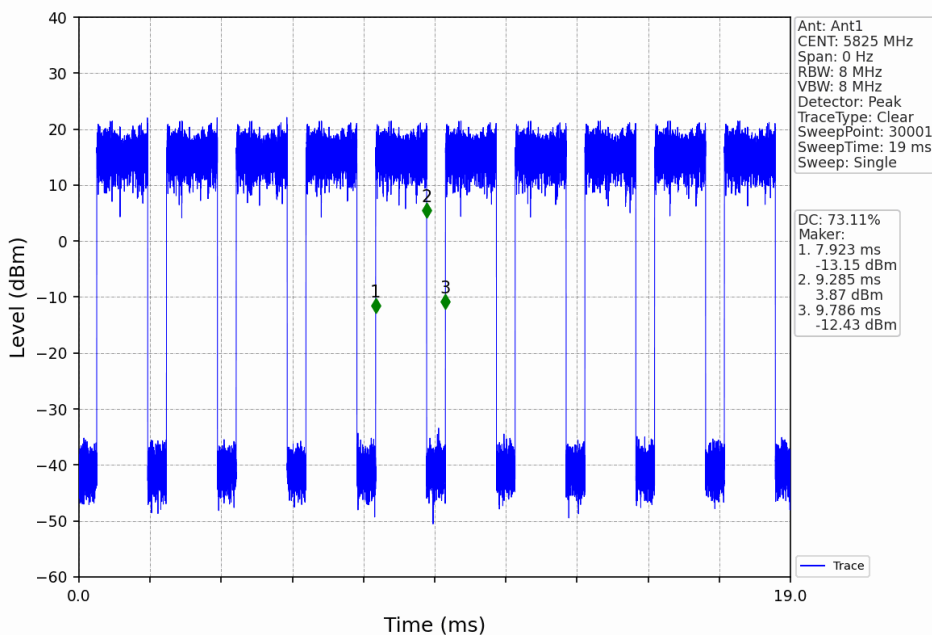
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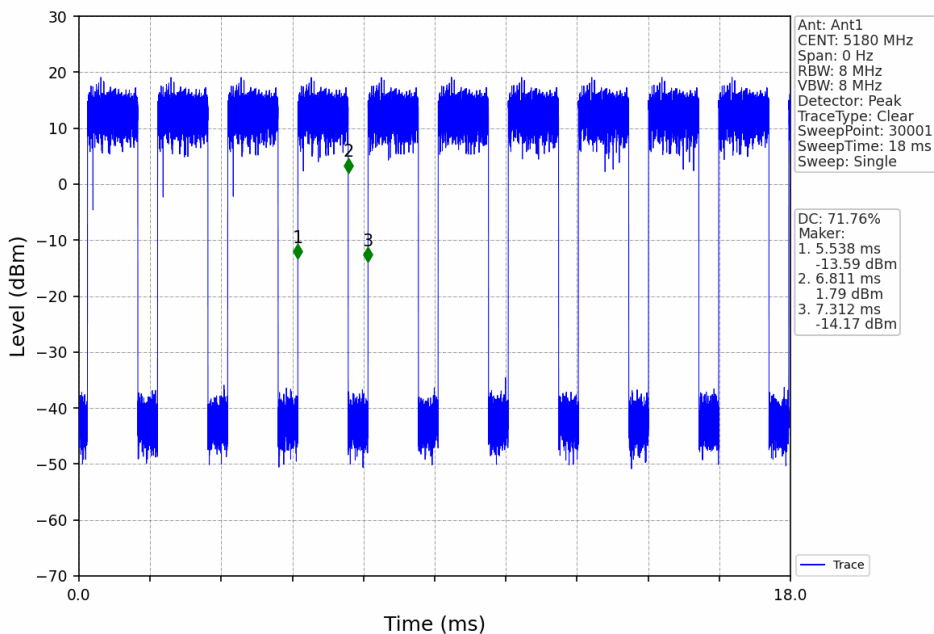
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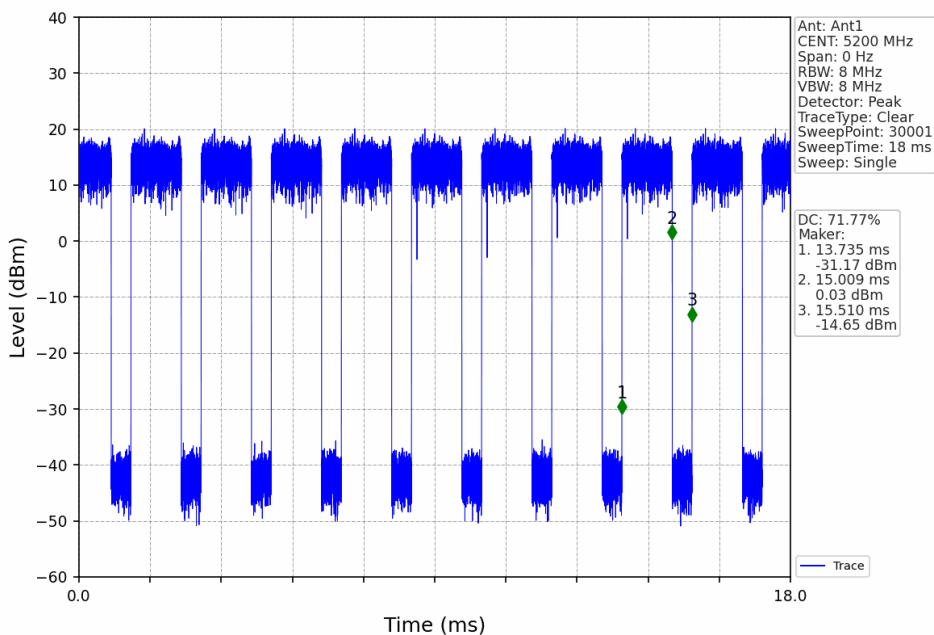
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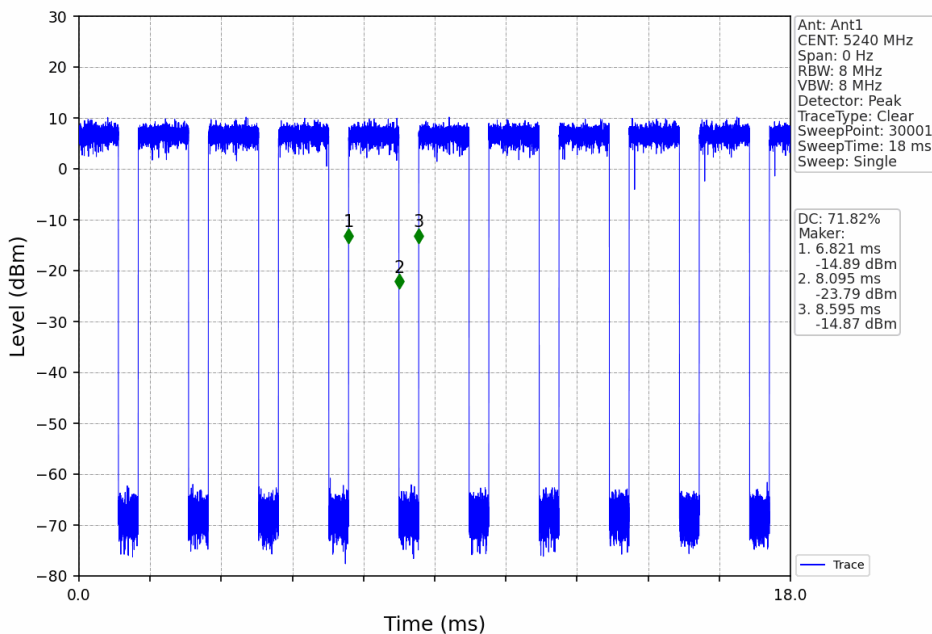
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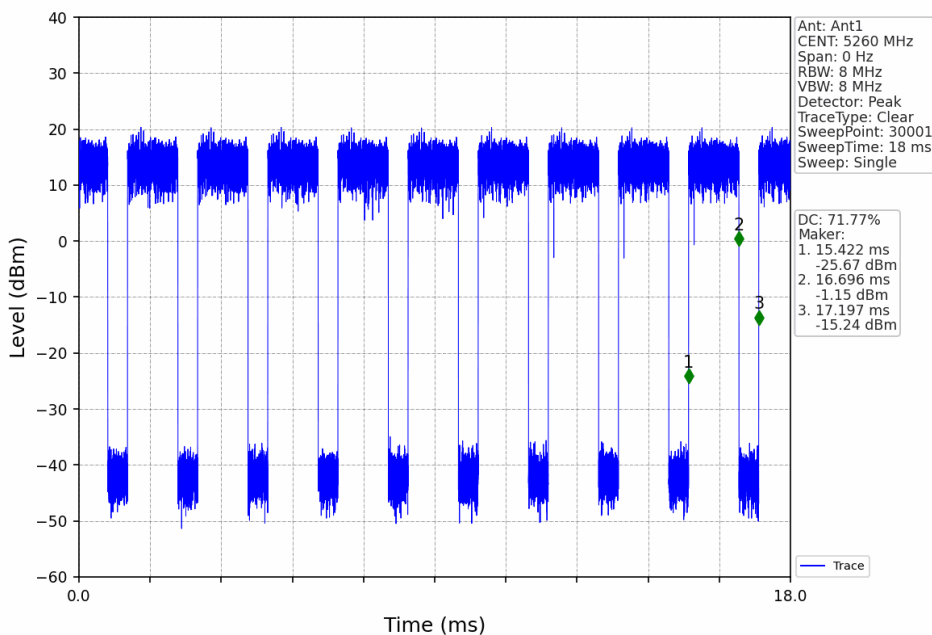
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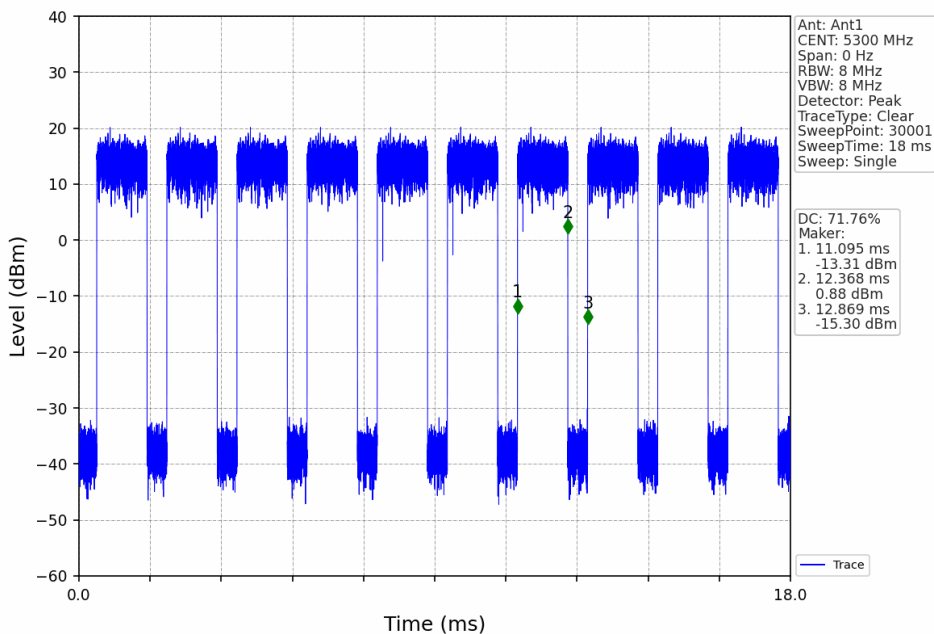
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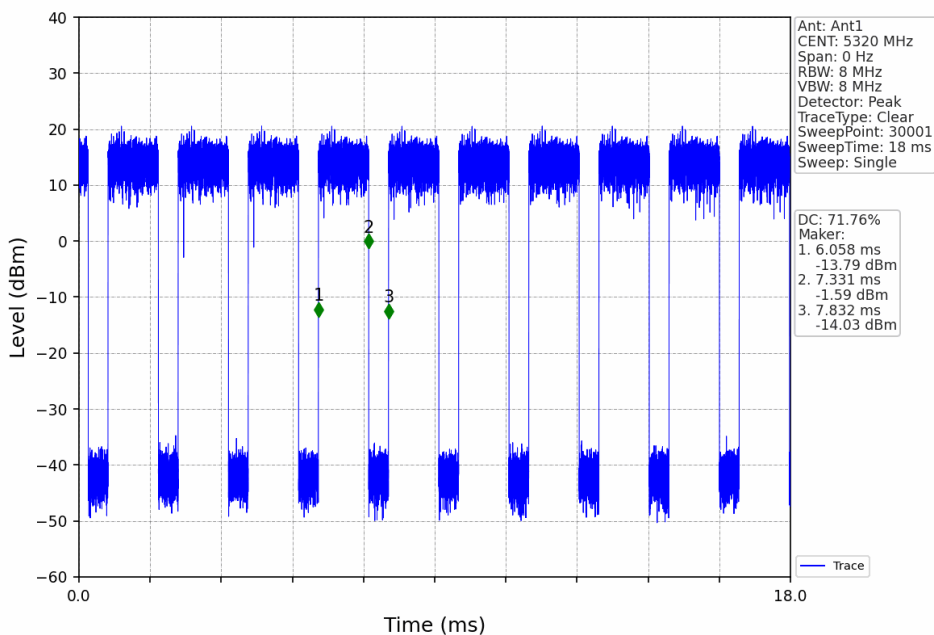
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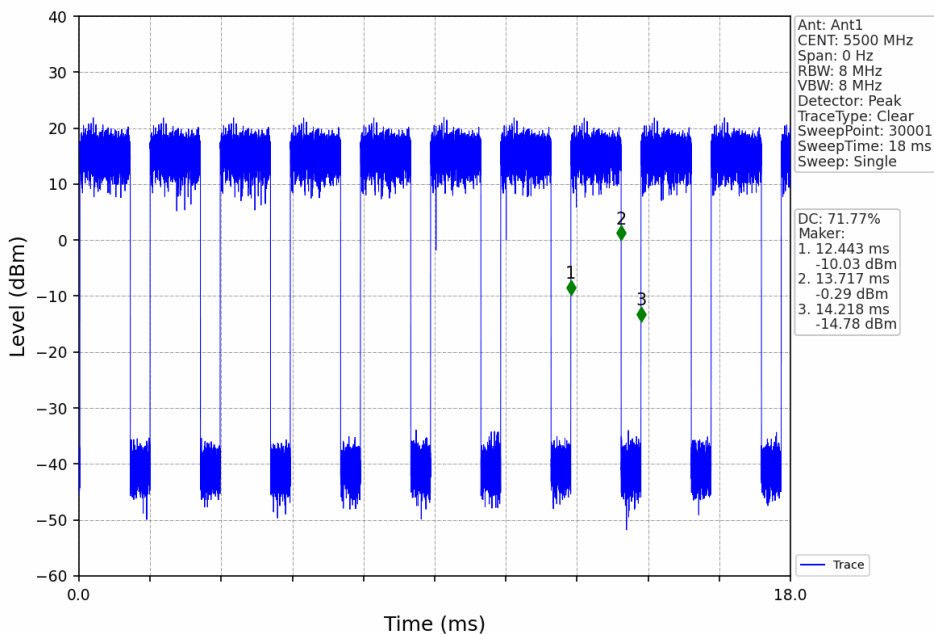
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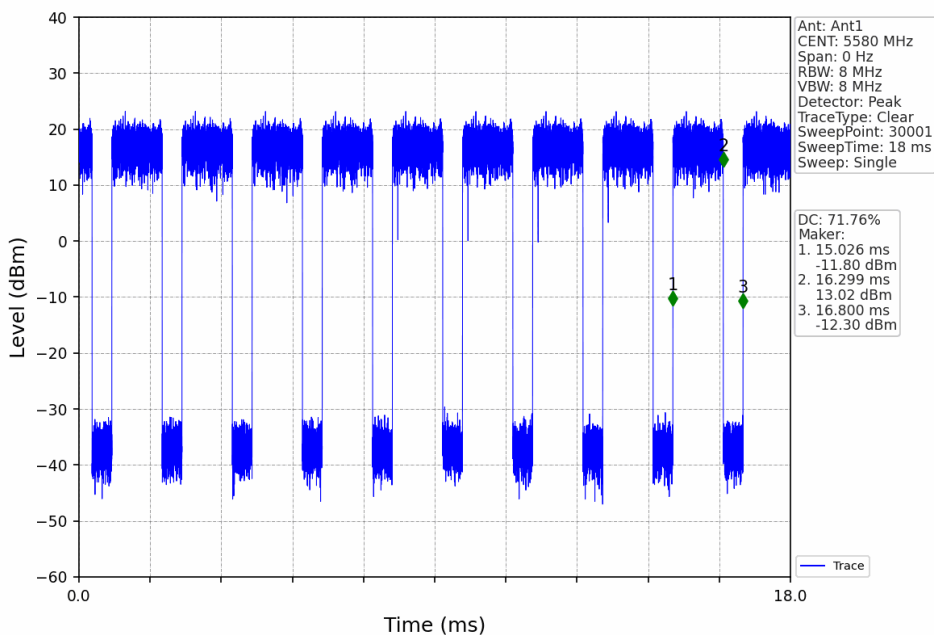
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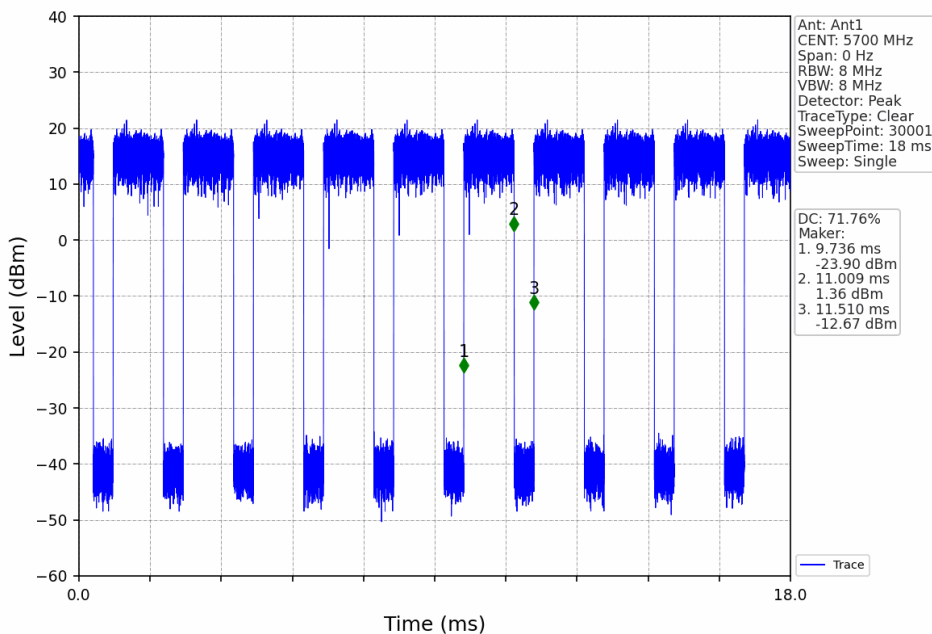
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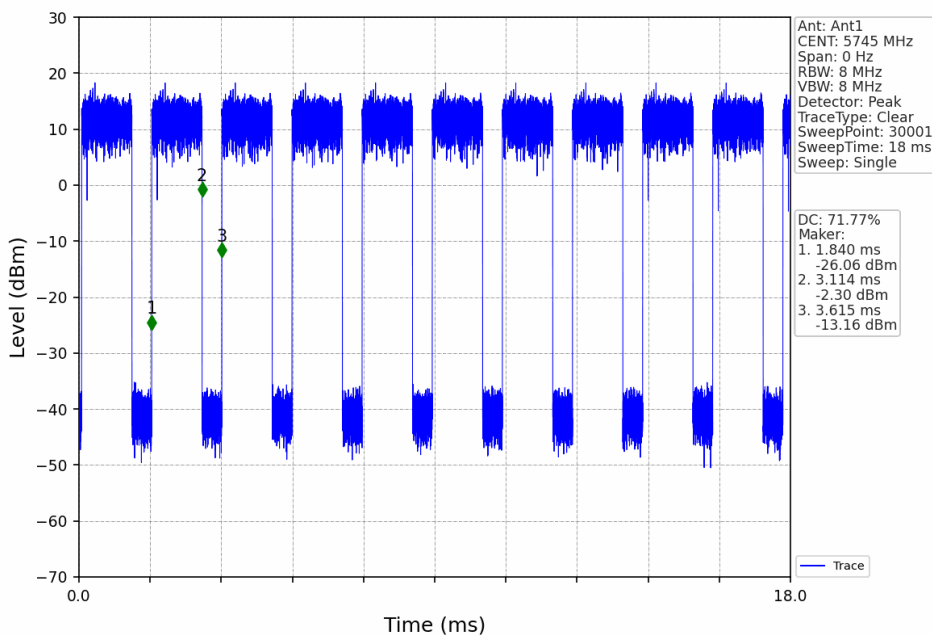
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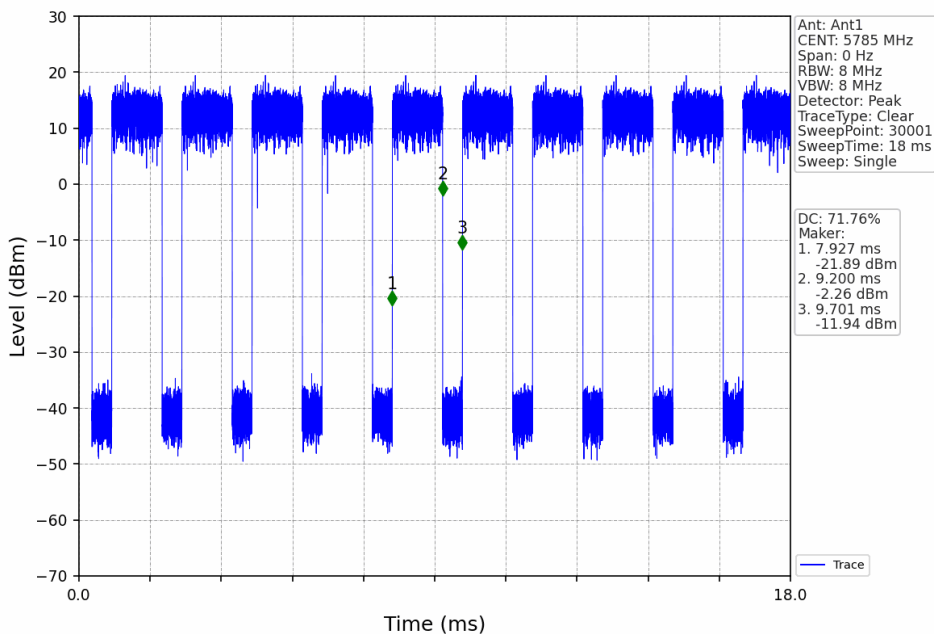
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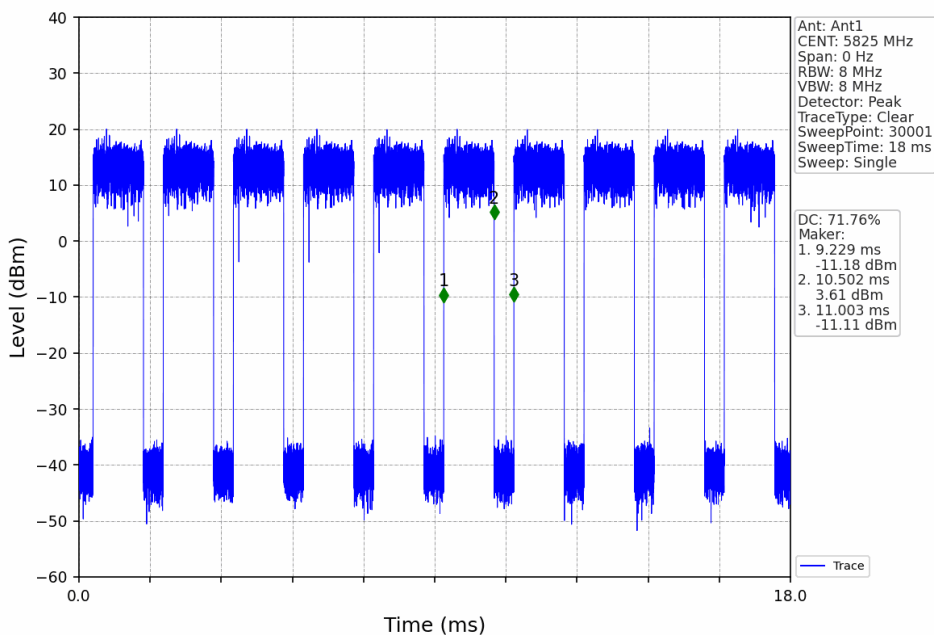
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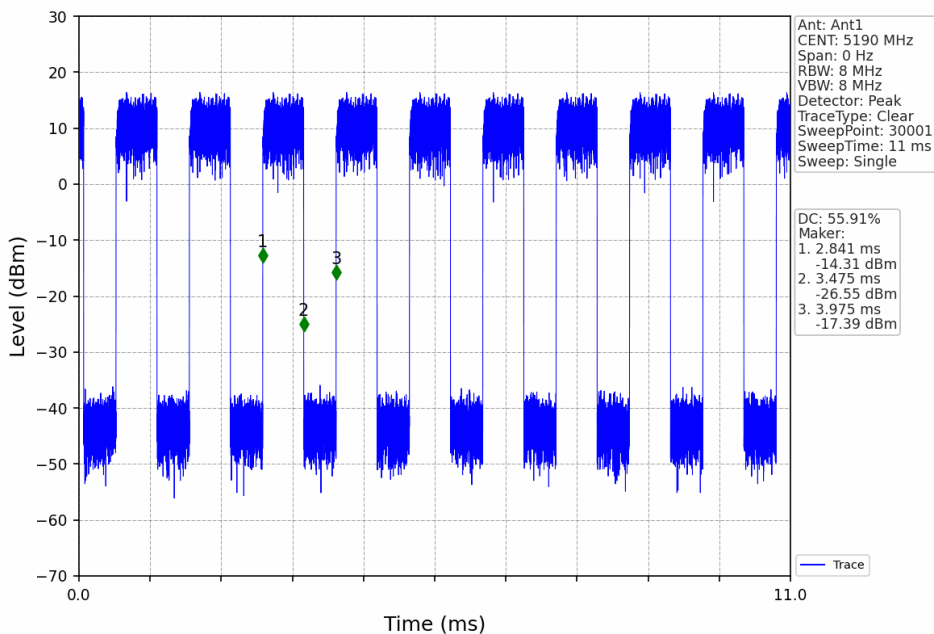
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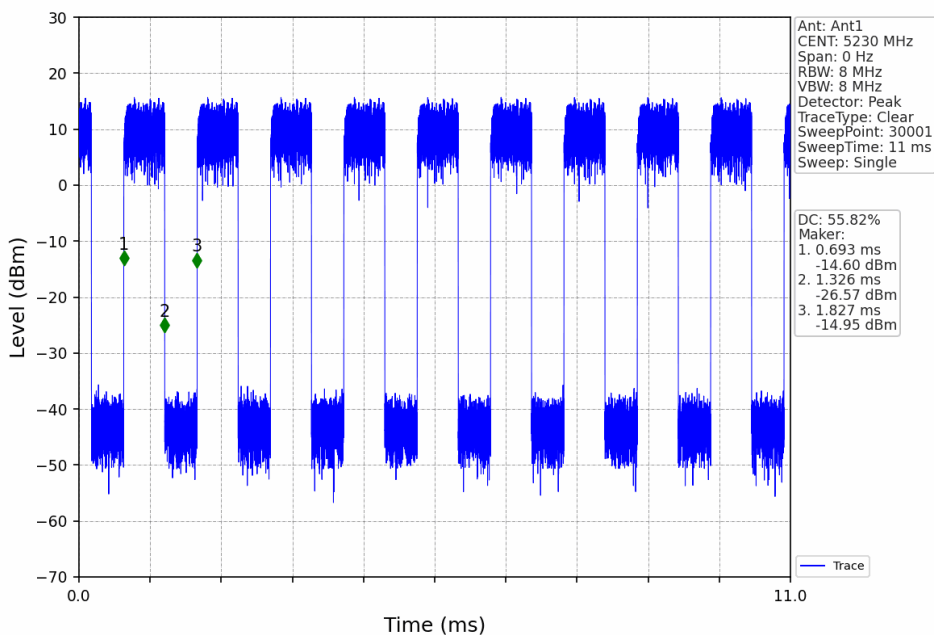
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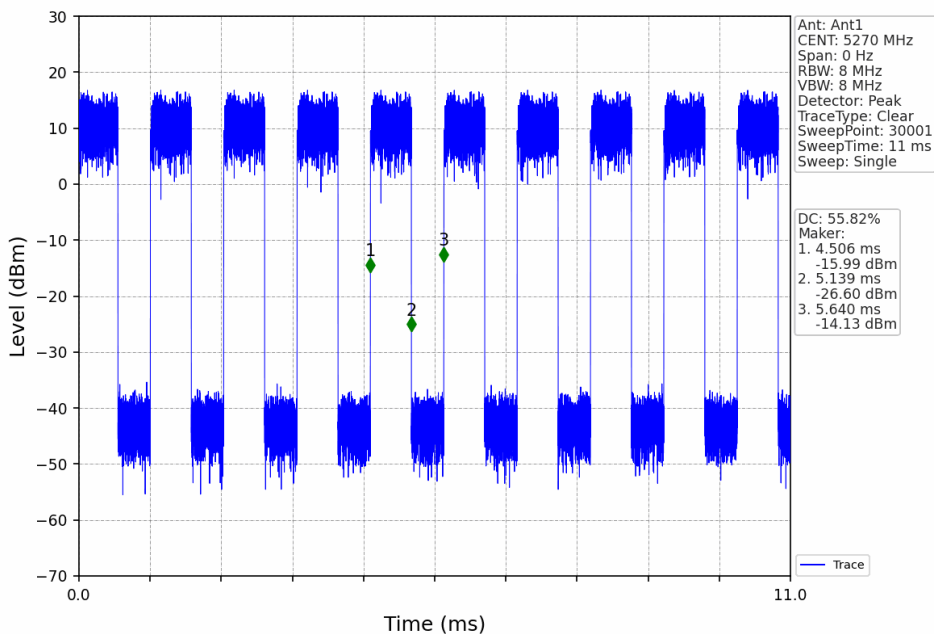
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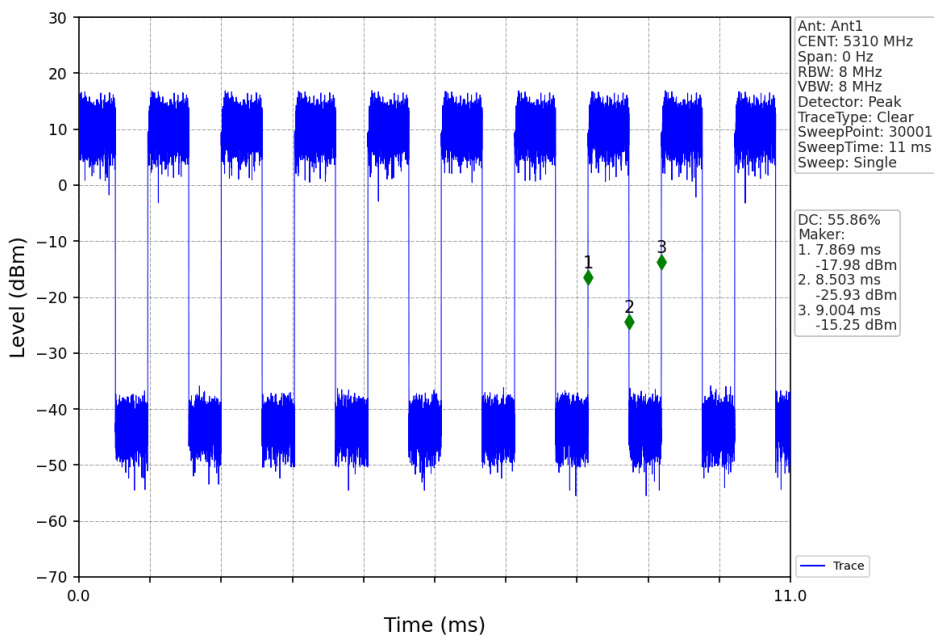
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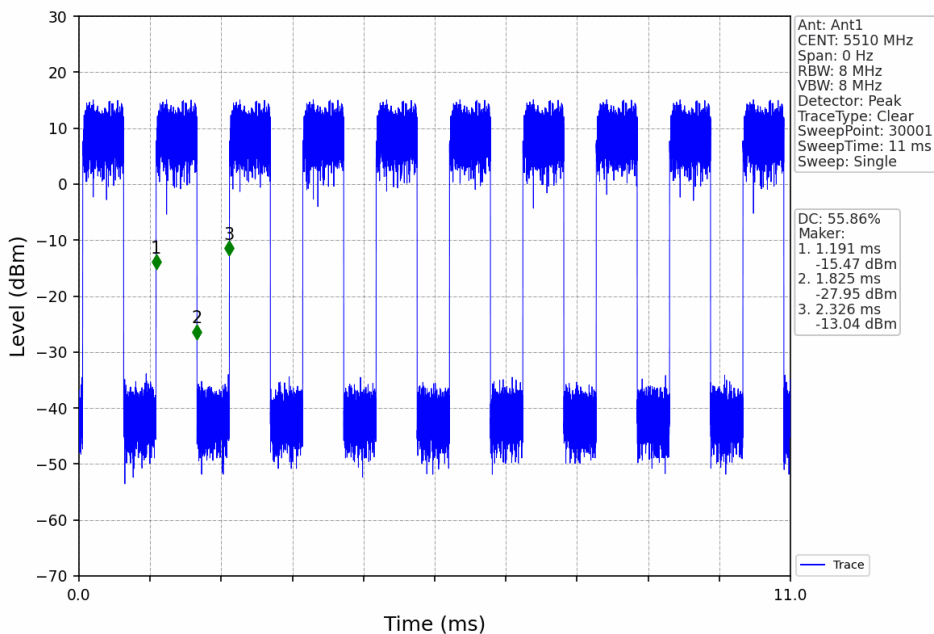
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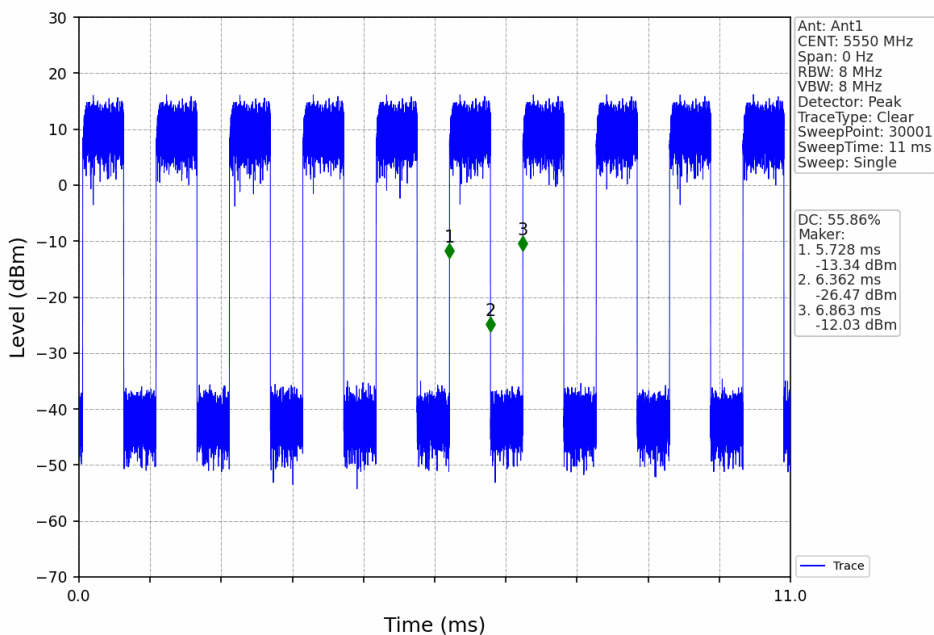
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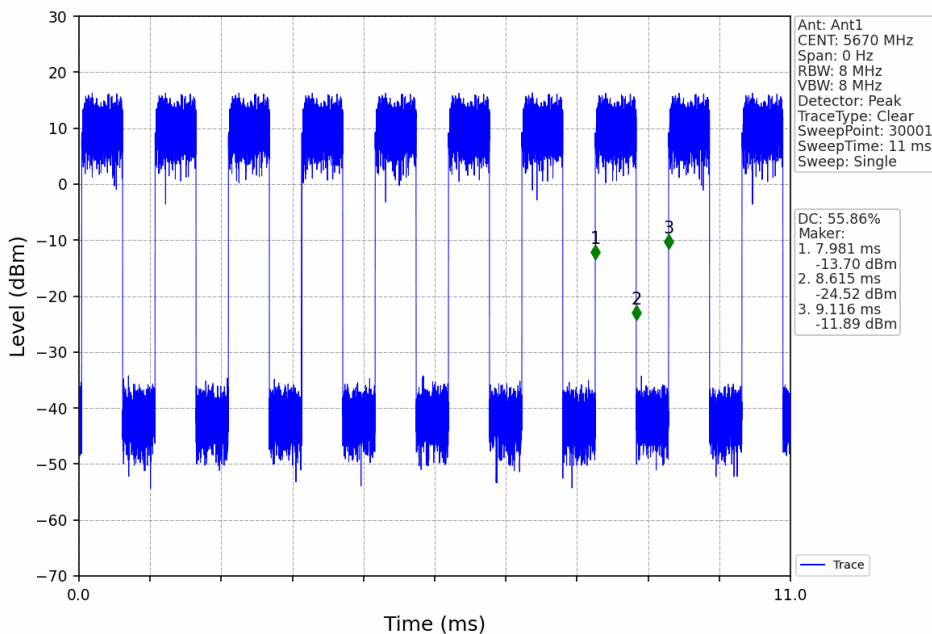
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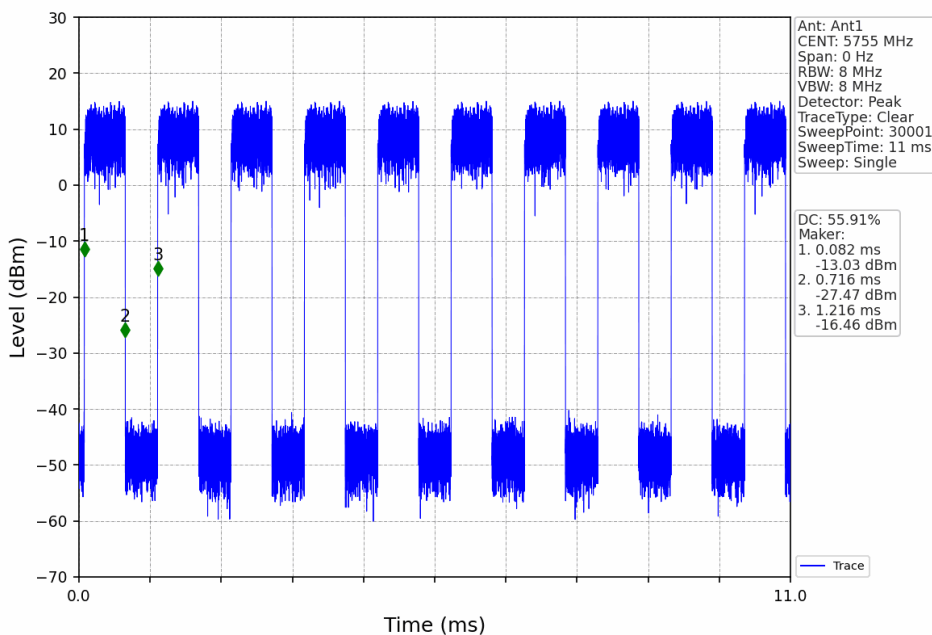
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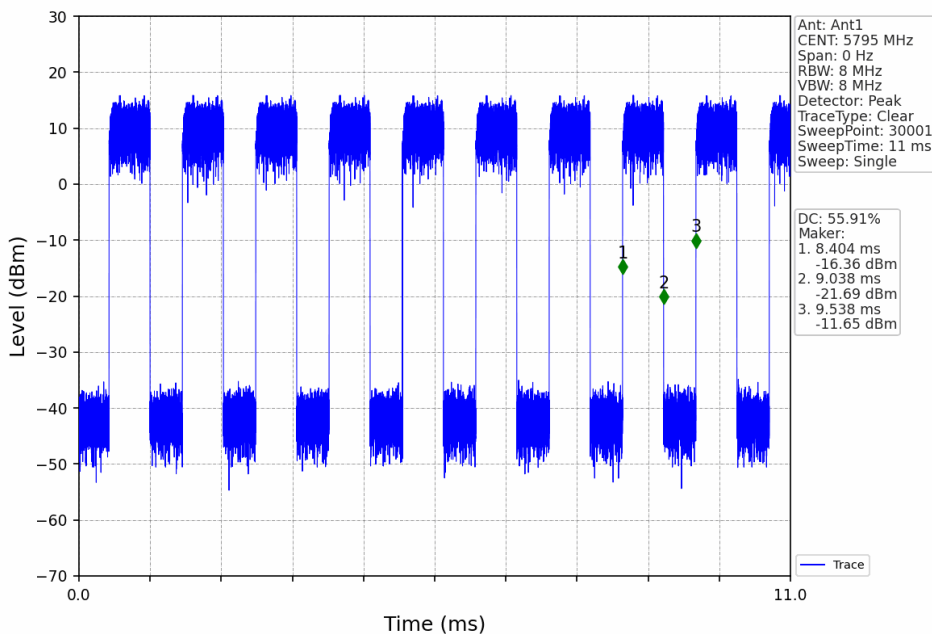
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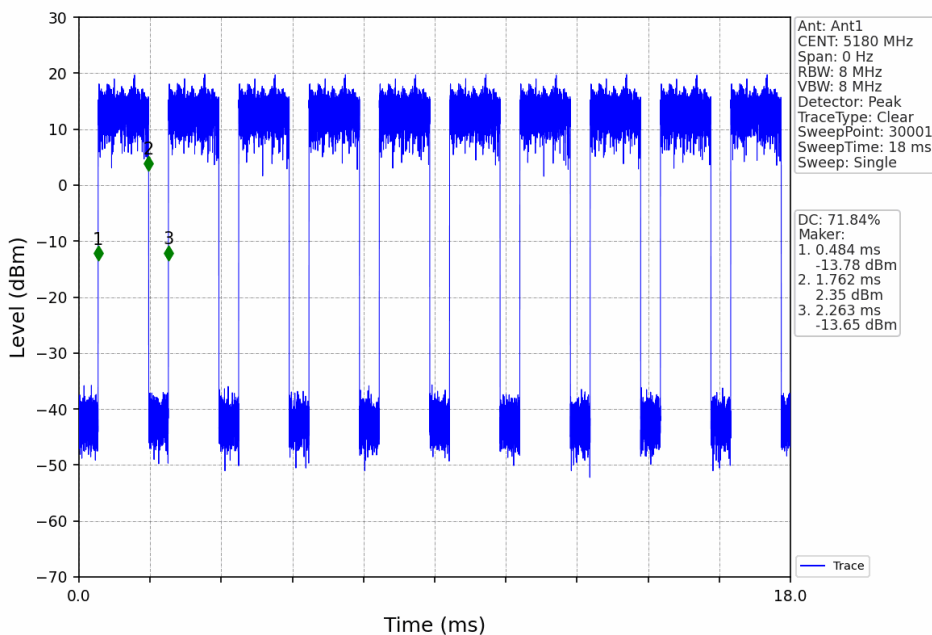
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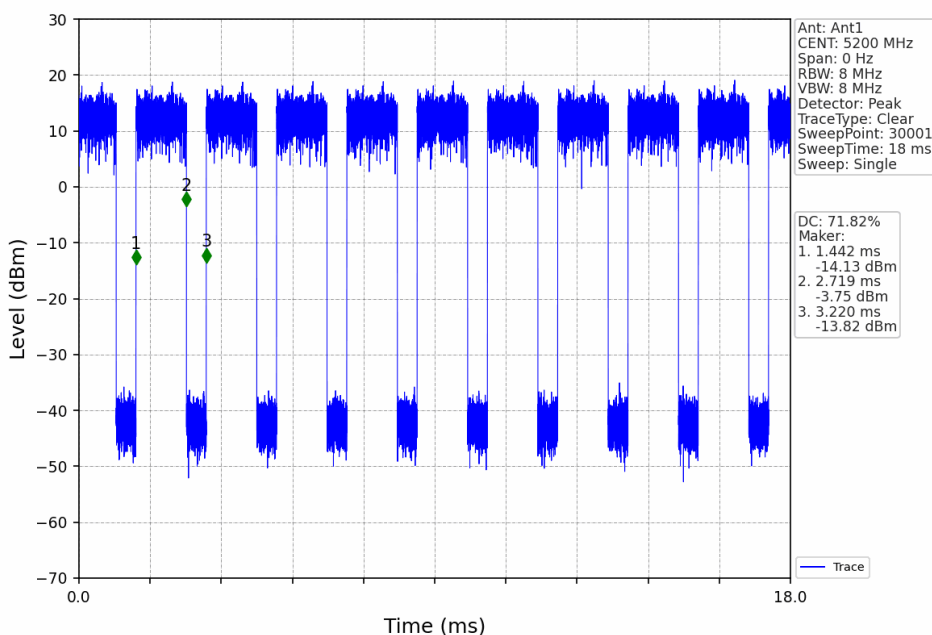
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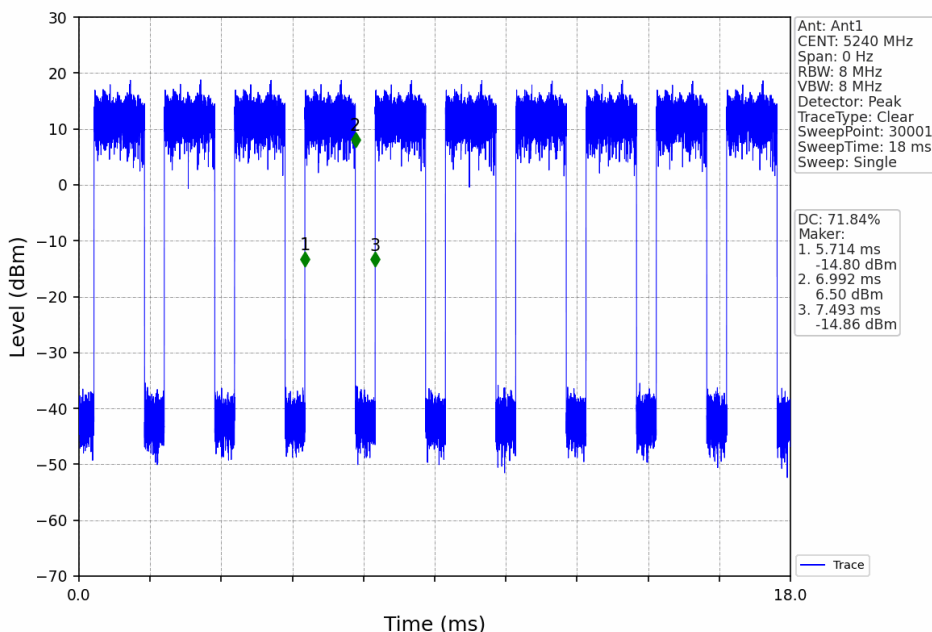
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802.11ac(VHT20)_MCH_5200MHz_Ant1_NTNV

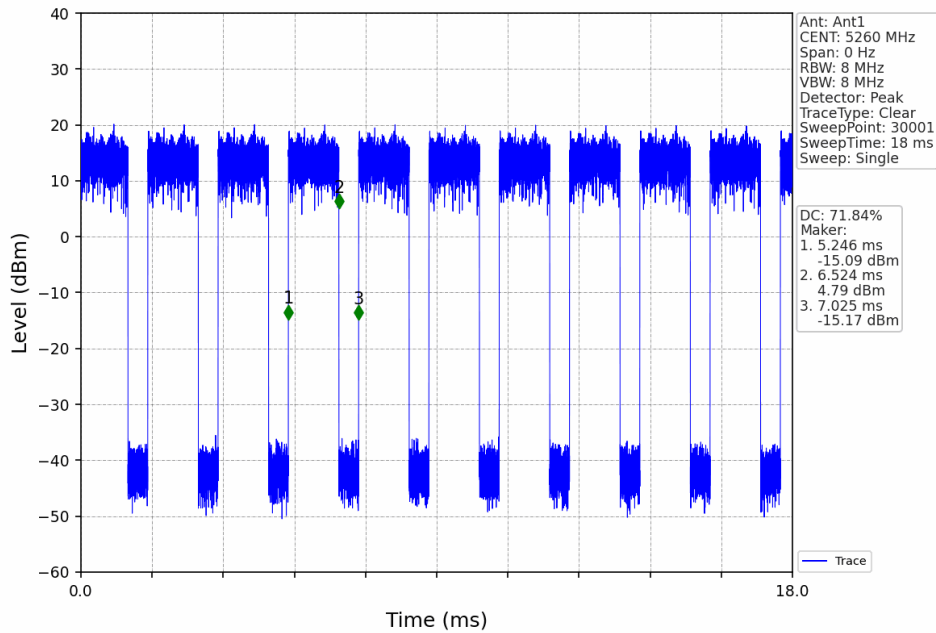


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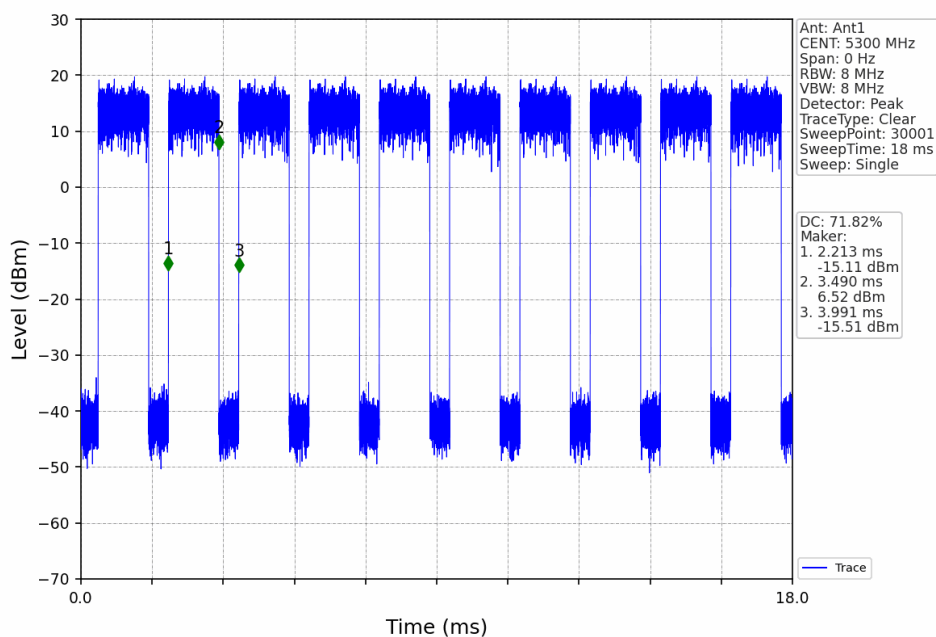


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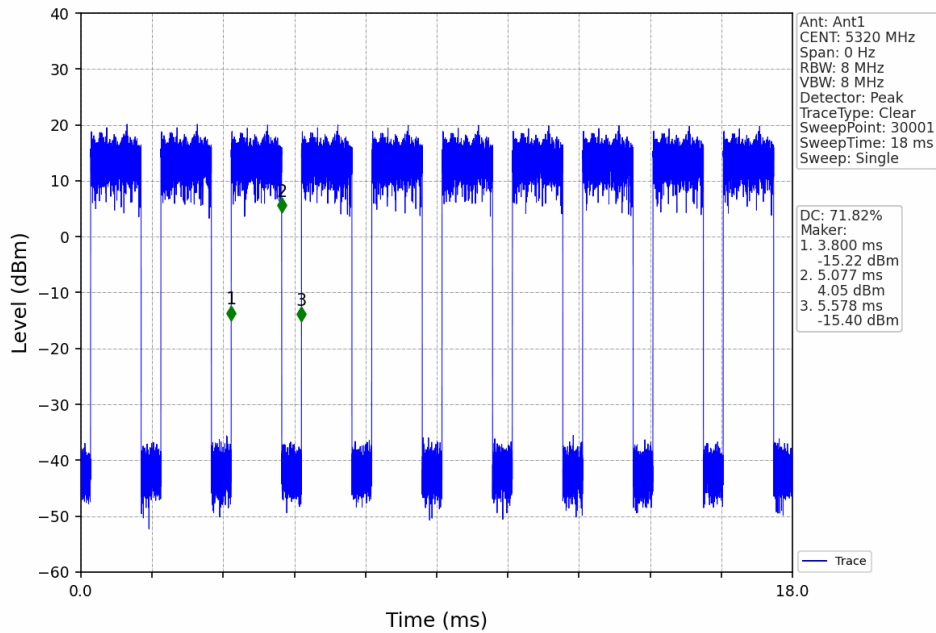


802.11ac(VHT20)_MCH_5300MHz_Ant1_NTNV

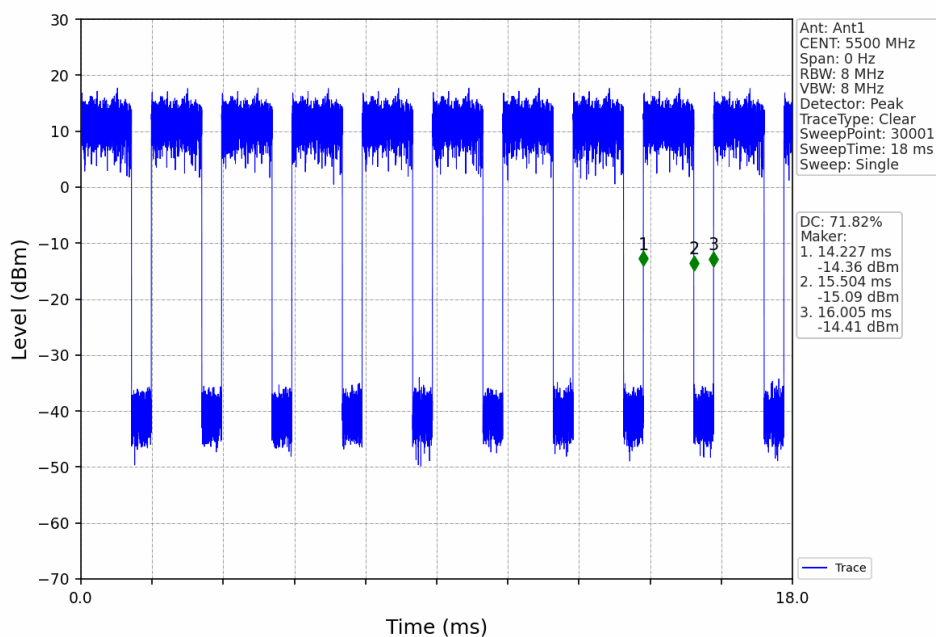


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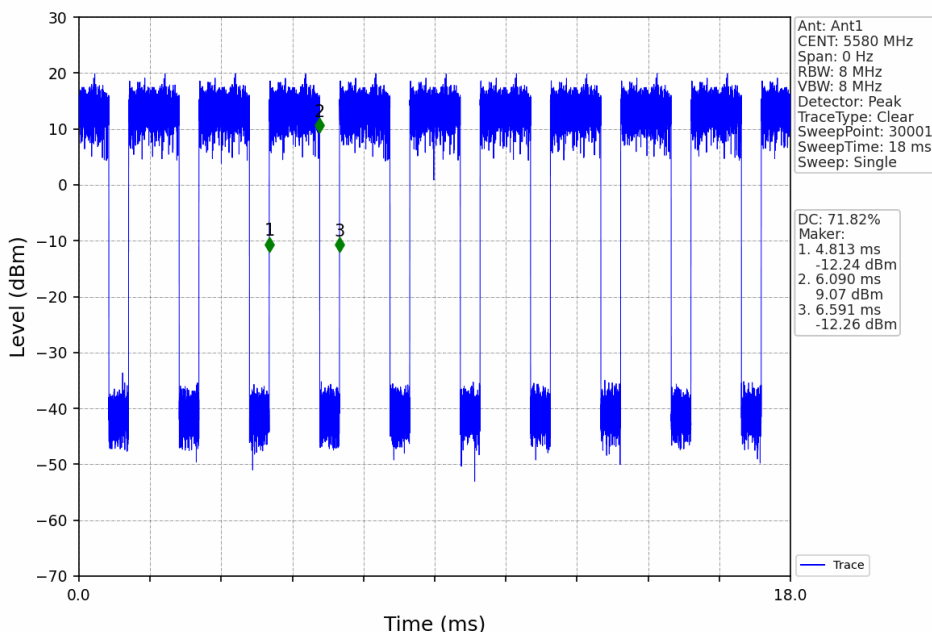


802.11ac(VHT20)_LCH_5500MHz_Ant1_NTNV

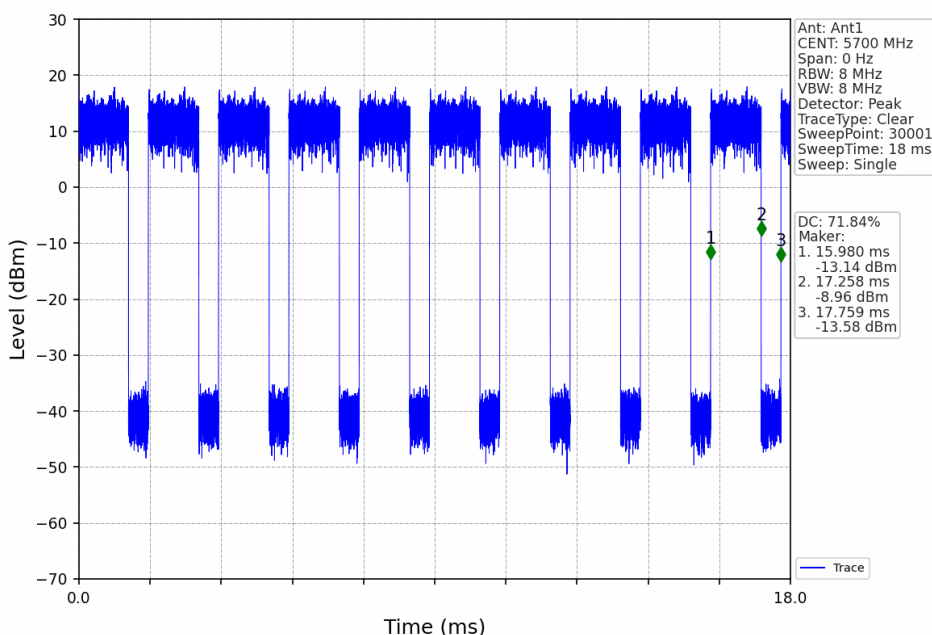


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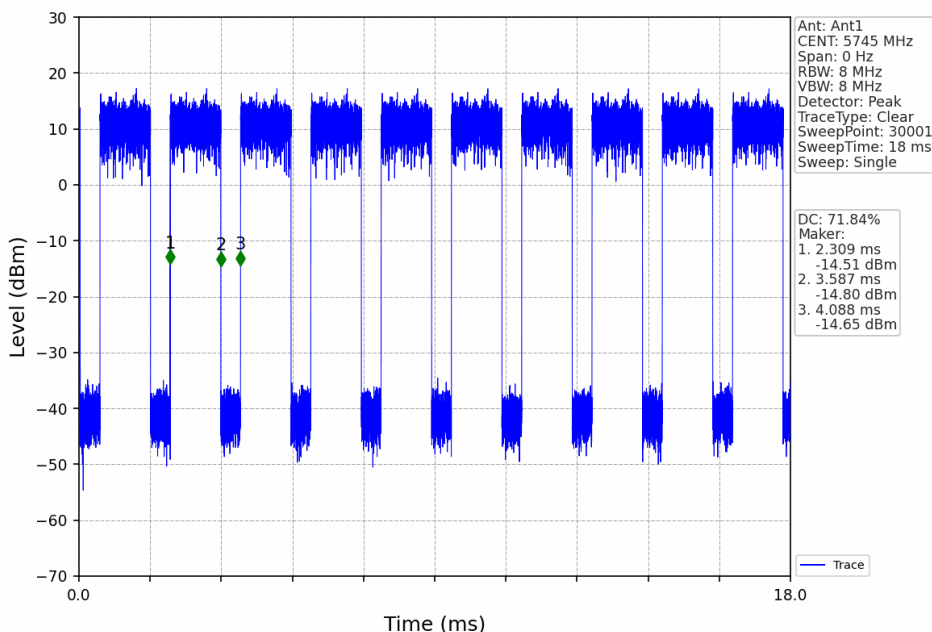


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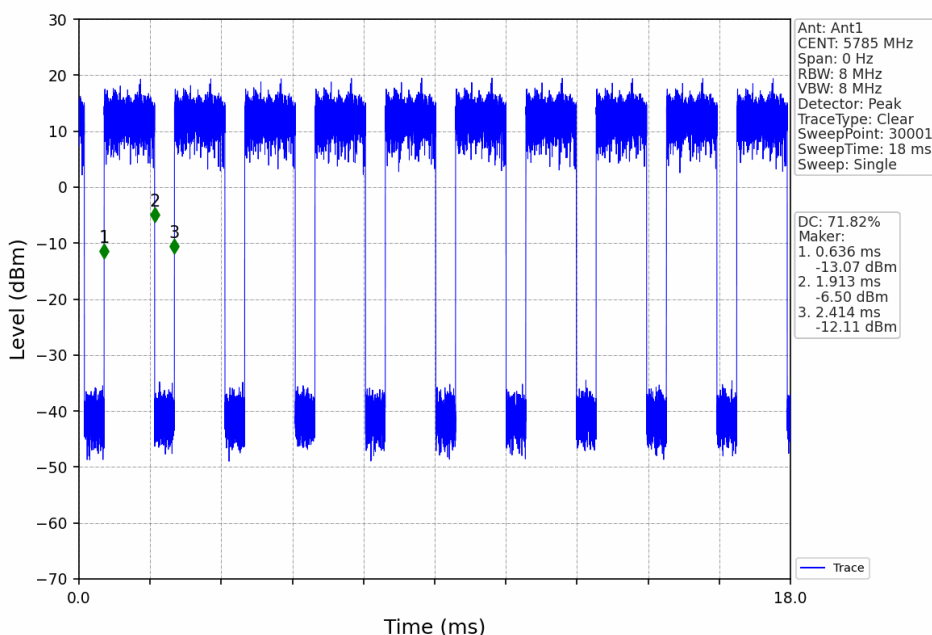


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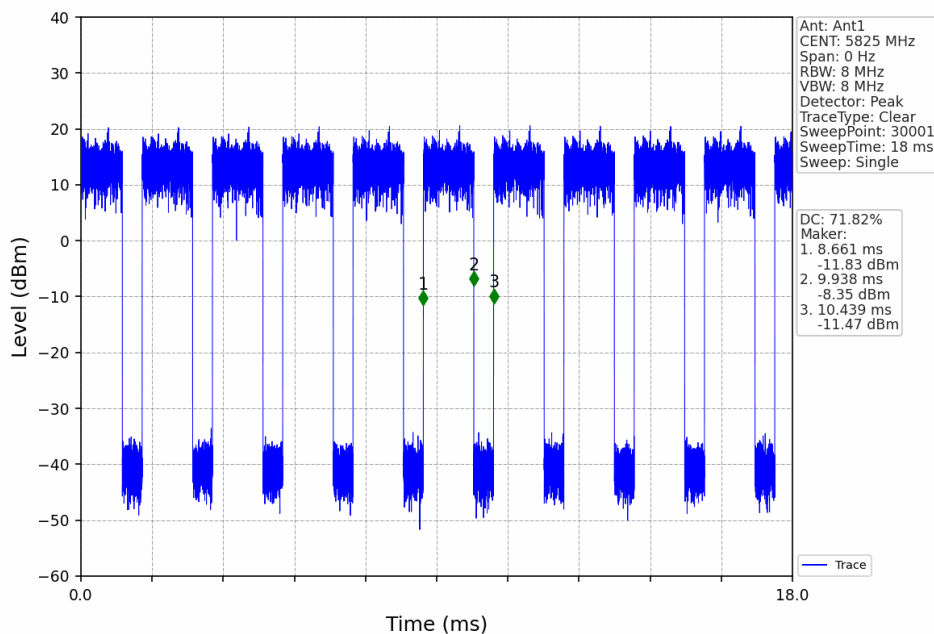


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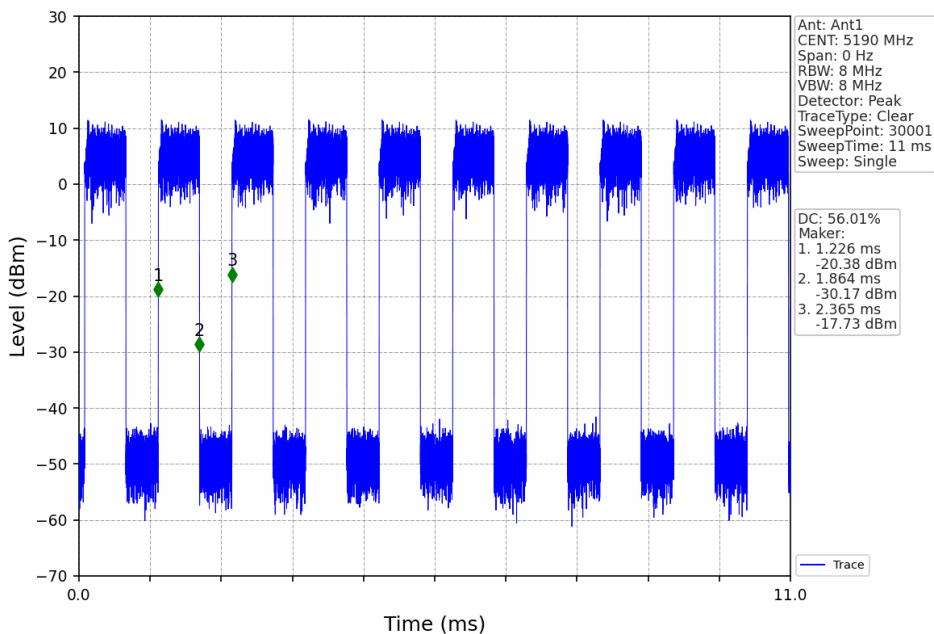


802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV

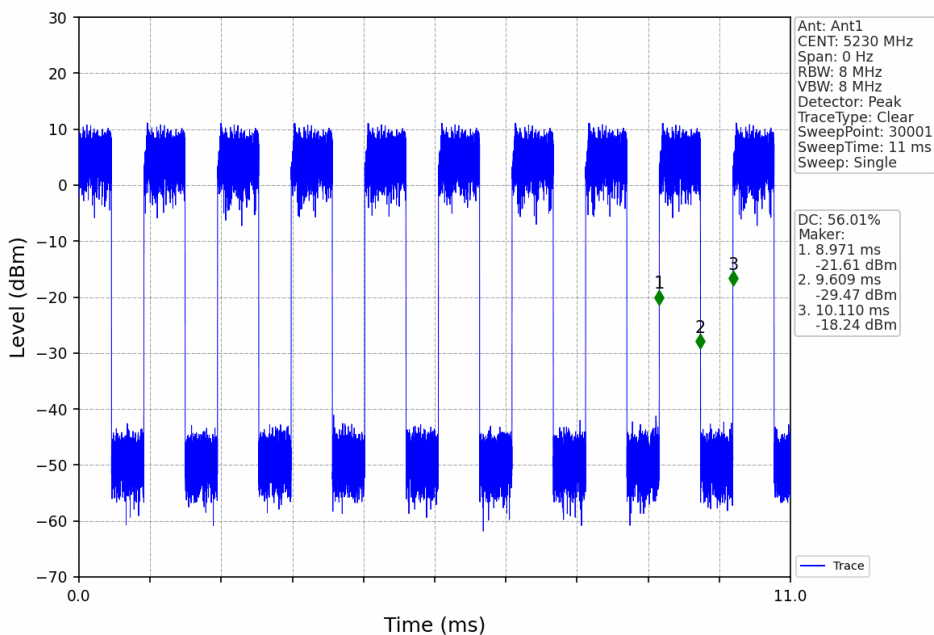




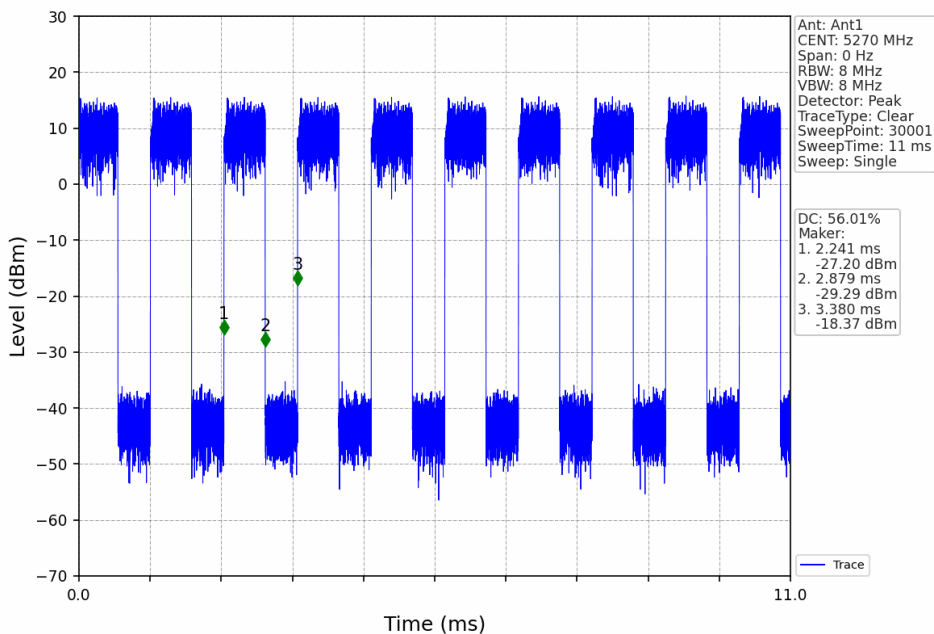
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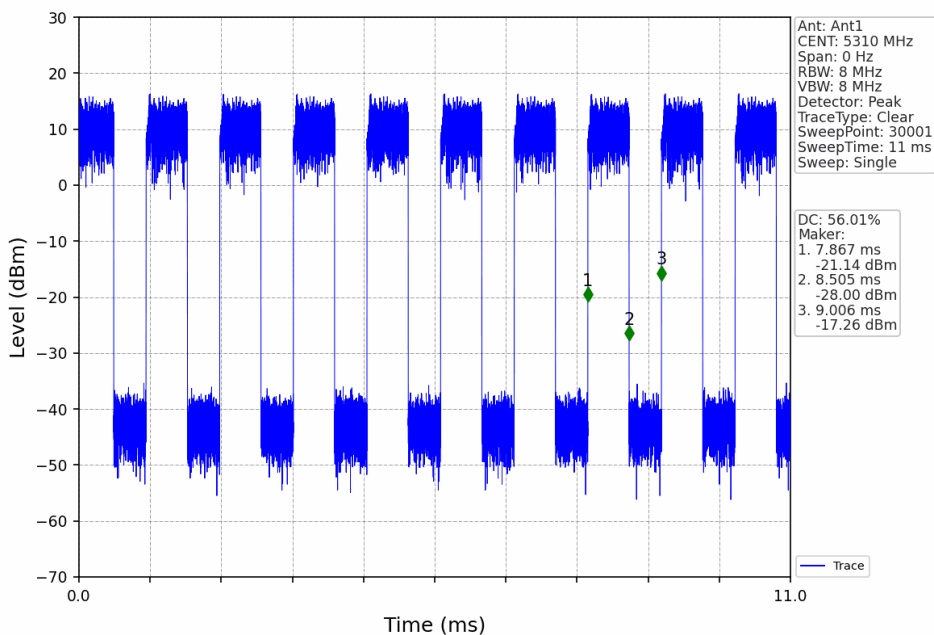
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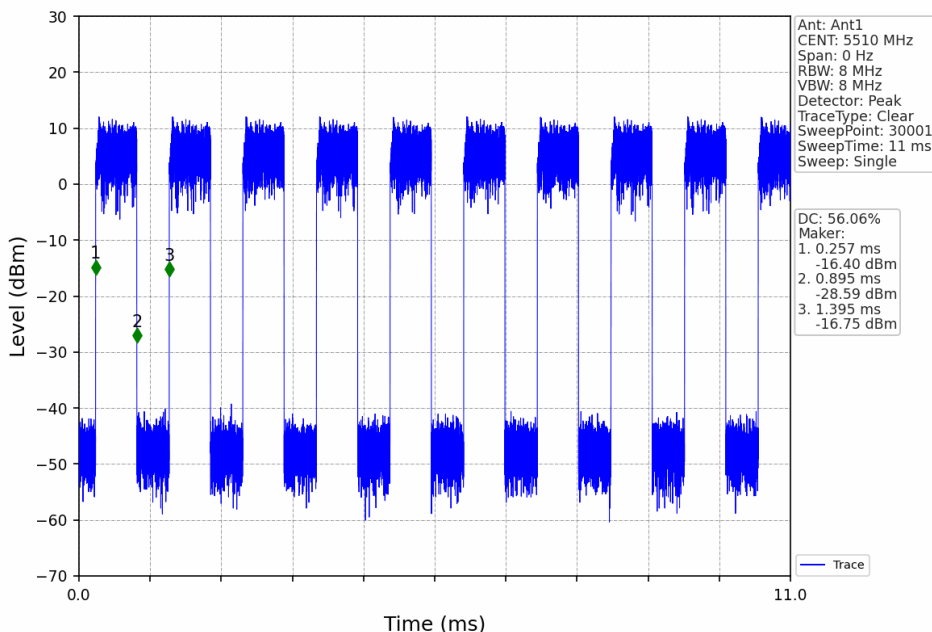
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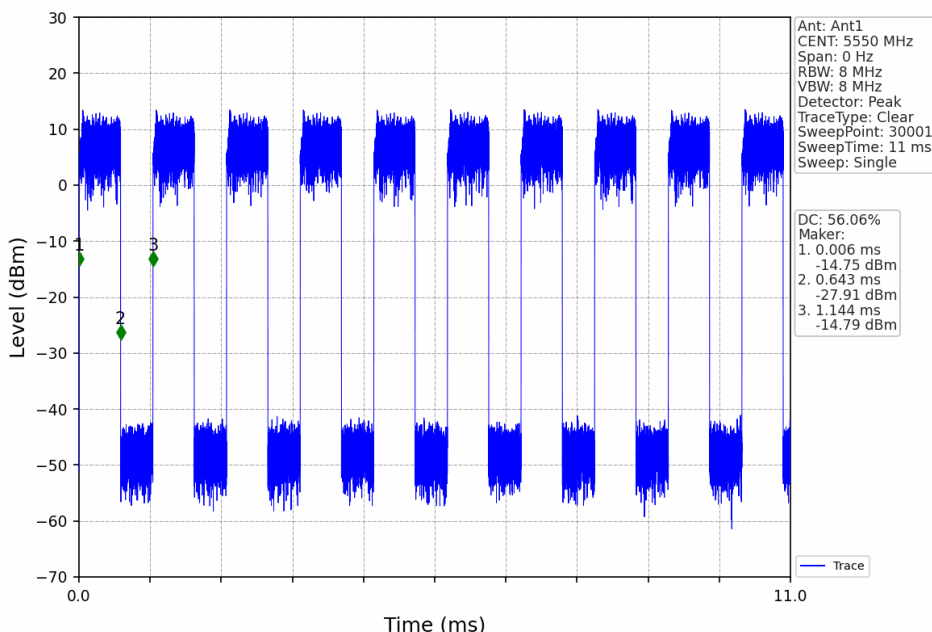
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802.11ac(VHT40)_LCH_5510MHz_Ant1_NTNV



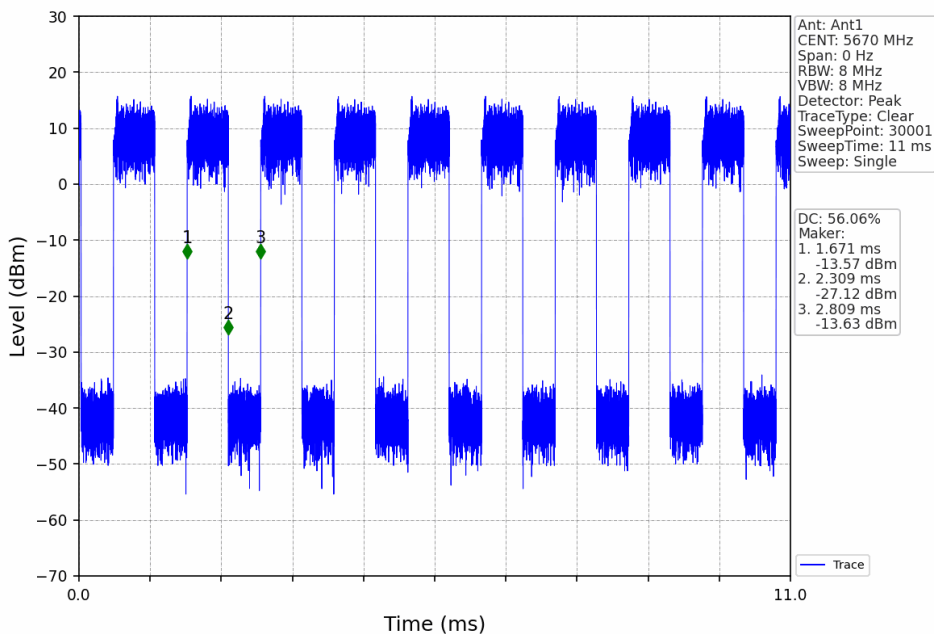
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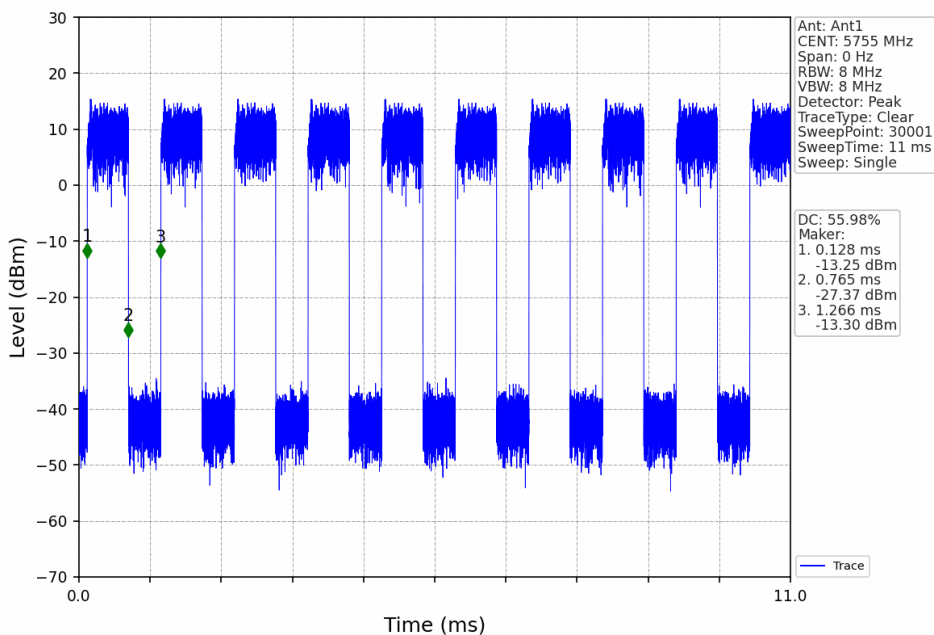
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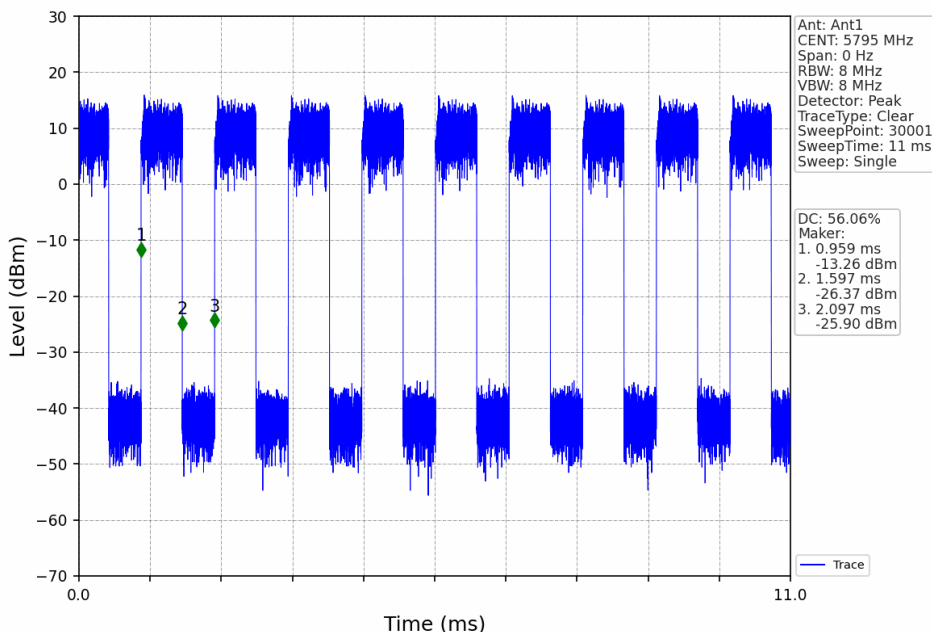
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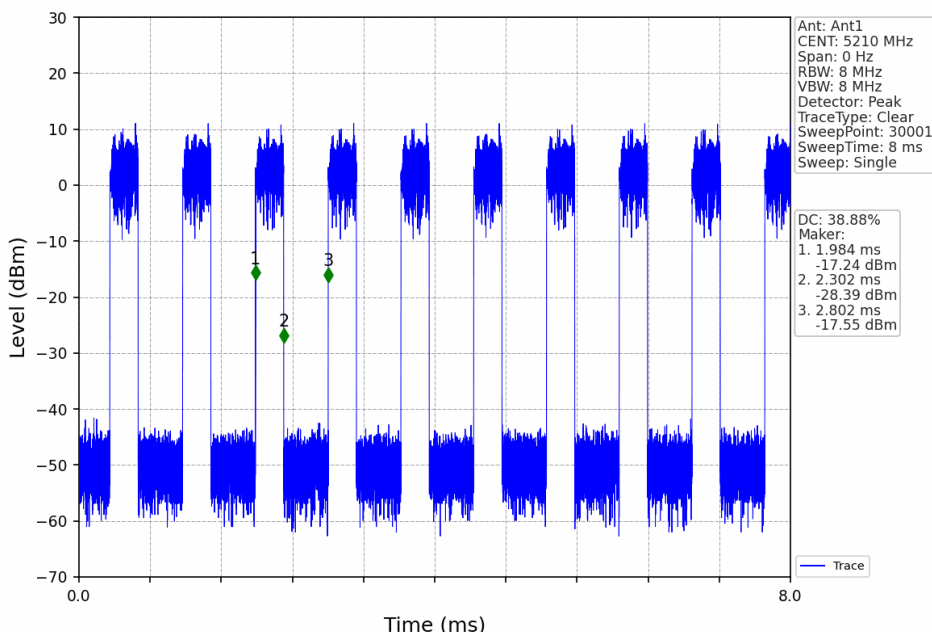
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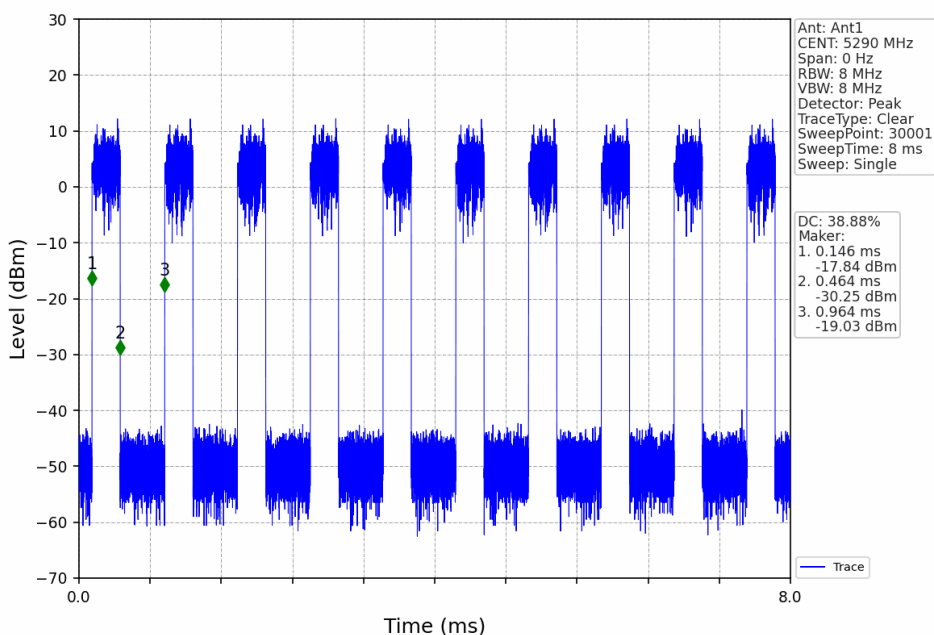
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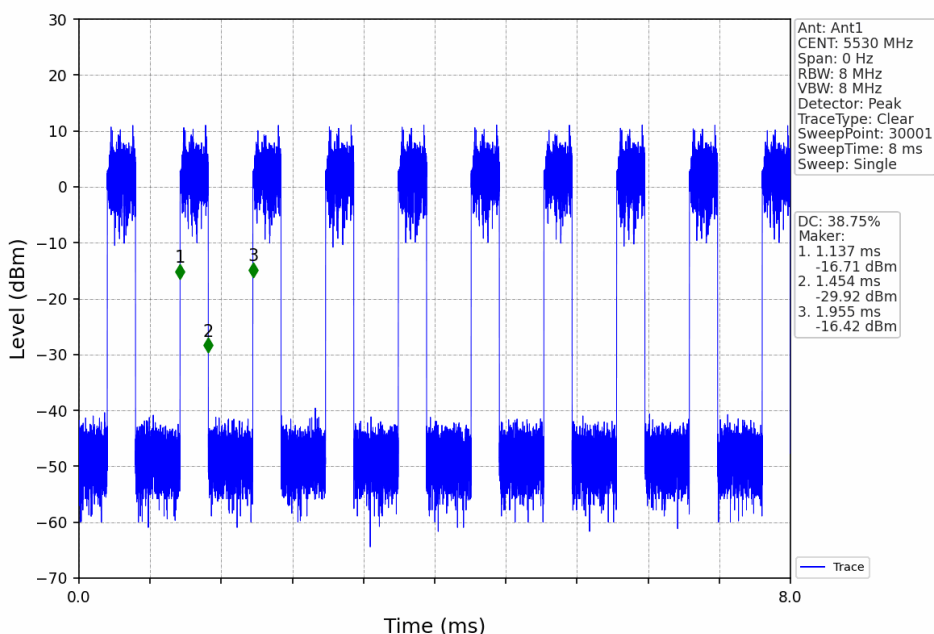
802.11ac(VHT80)_MCH_5210MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5290MHz_Ant1_NTNV

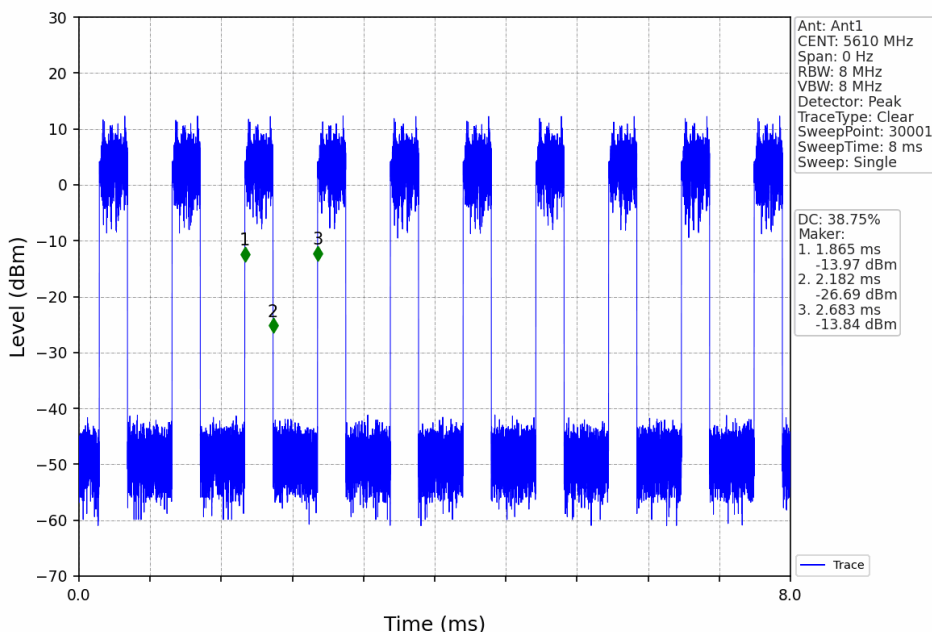


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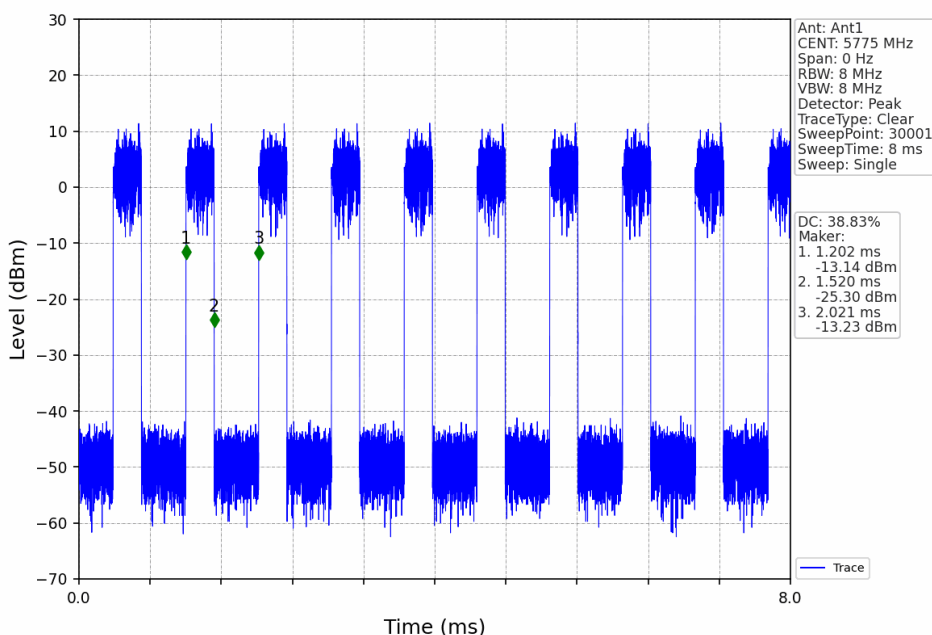


802.11ac(VHT80)_HCH_5610MHz_Ant1_NTNV





802.11ac(VHT80)_MCH_5775MHz_Ant1_NTNV



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2. Bandwidth

2.1 OBW

2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
802.11a	MIMO	5180	1	16.691	/	Pass
		5200	1	16.713	/	Pass
		5240	1	16.710	/	Pass
		5260	1	16.694	/	Pass
		5300	1	16.697	/	Pass
		5320	1	16.699	/	Pass
		5500	1	16.768	/	Pass
		5580	1	17.229	/	Pass
		5700	1	16.807	/	Pass
		5745	1	16.643	/	Pass
		5785	1	16.686	/	Pass
802.11n (HT20)	MIMO	5180	1	17.777	/	Pass
		5200	1	17.772	/	Pass
		5240	1	17.792	/	Pass
		5260	1	17.759	/	Pass
		5300	1	17.775	/	Pass
		5320	1	17.803	/	Pass
		5500	1	17.793	/	Pass
		5580	1	17.794	/	Pass
		5700	1	17.809	/	Pass
		5745	1	17.786	/	Pass
		5785	1	17.805	/	Pass
802.11n (HT40)	MIMO	5190	1	36.526	/	Pass
		5230	1	36.492	/	Pass
		5270	1	36.545	/	Pass
		5310	1	36.552	/	Pass
		5510	1	36.512	/	Pass
		5550	1	36.482	/	Pass
		5670	1	36.441	/	Pass



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SZEMC-TRF-01 Rev. A/1

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		5755	1	36.660	/	Pass
		5795	1	36.615	/	Pass
802.11ac (VHT20)	MIMO	5180	1	17.729	/	Pass
		5200	1	17.738	/	Pass
		5240	1	17.743	/	Pass
		5260	1	17.735	/	Pass
		5300	1	17.733	/	Pass
		5320	1	17.752	/	Pass
		5500	1	17.756	/	Pass
		5580	1	17.734	/	Pass
		5700	1	17.746	/	Pass
		5745	1	17.761	/	Pass
		5785	1	17.725	/	Pass
		5825	1	17.767	/	Pass
802.11ac (VHT40)	MIMO	5190	1	36.313	/	Pass
		5230	1	36.333	/	Pass
		5270	1	36.352	/	Pass
		5310	1	36.375	/	Pass
		5510	1	36.334	/	Pass
		5550	1	36.304	/	Pass
		5670	1	36.236	/	Pass
		5755	1	36.522	/	Pass
802.11ac (VHT80)	MIMO	5795	1	36.337	/	Pass
		5210	1	74.926	/	Pass
		5290	1	74.914	/	Pass
		5530	1	74.992	/	Pass
		5610	1	74.807	/	Pass
		5775	1	74.944	/	Pass



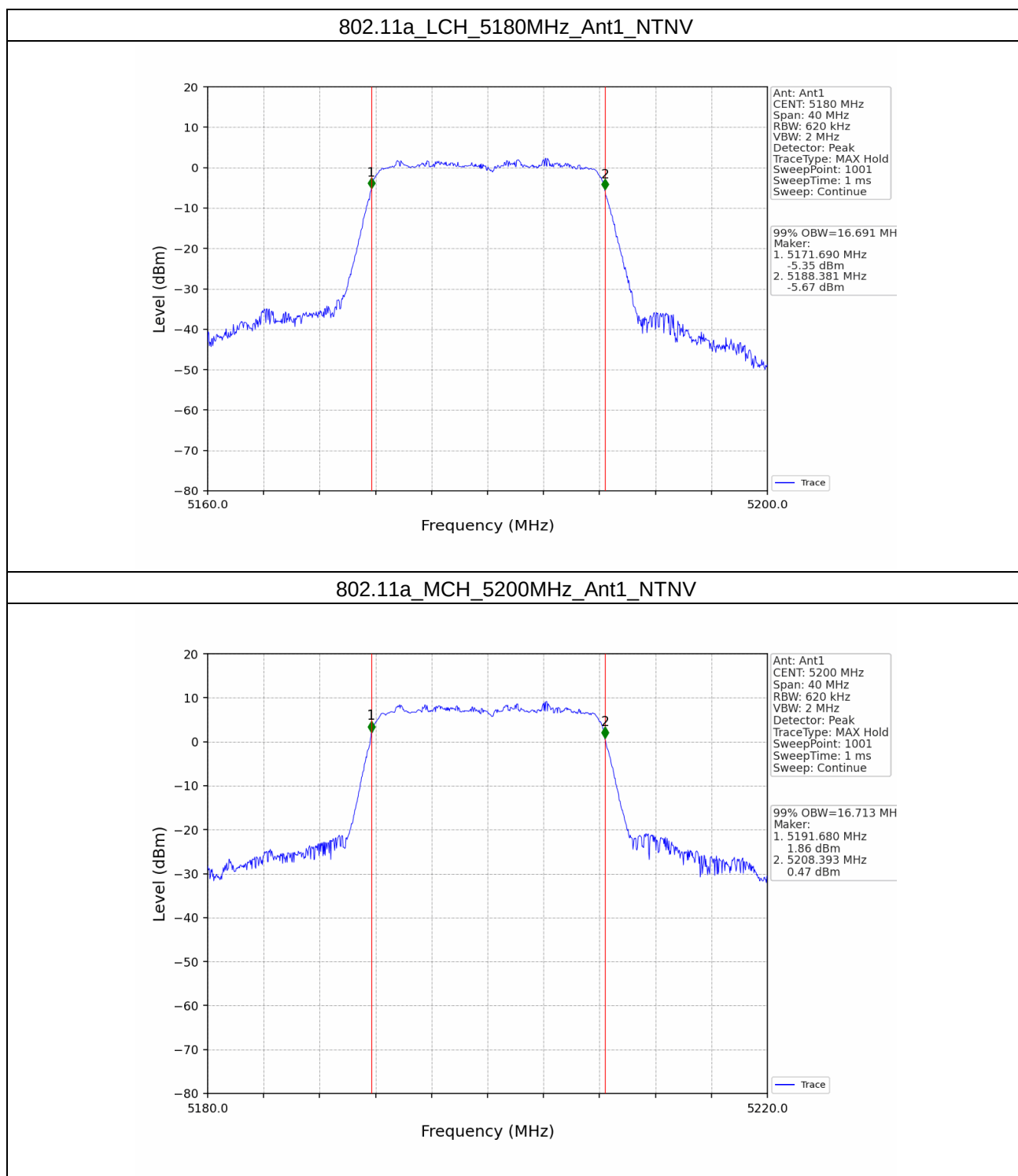
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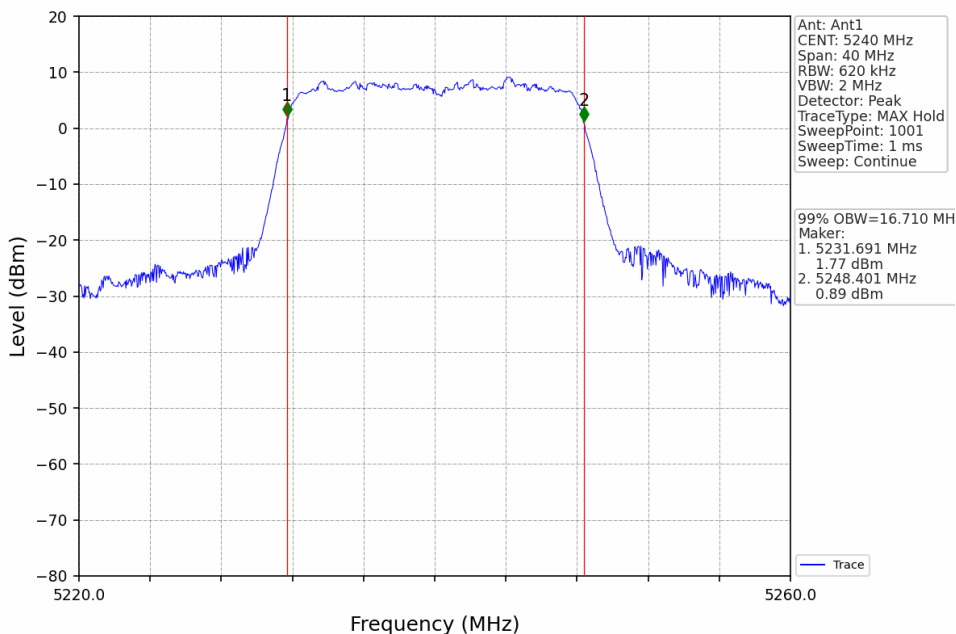
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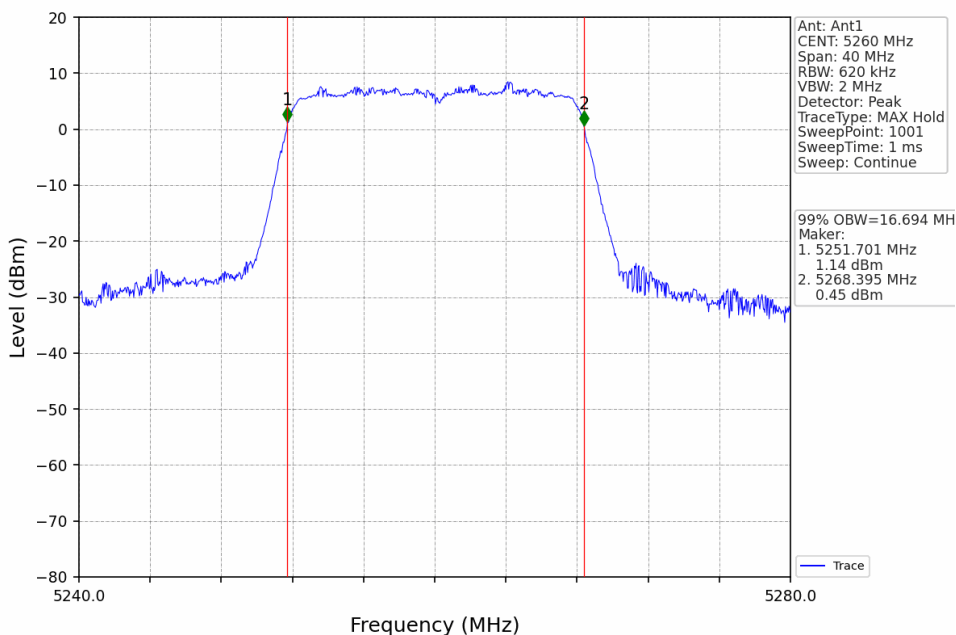
2.1.2 Test Graph



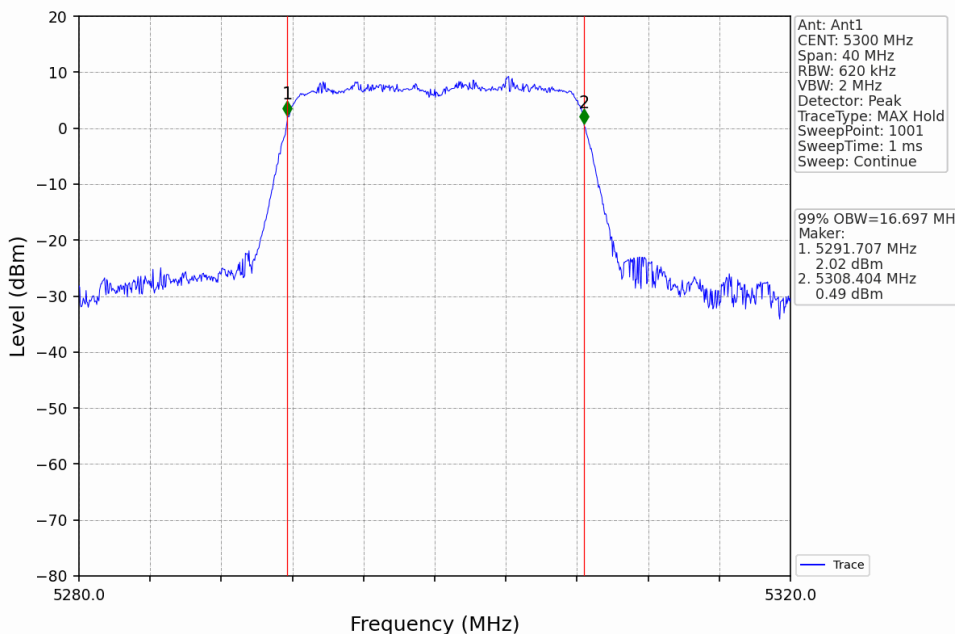
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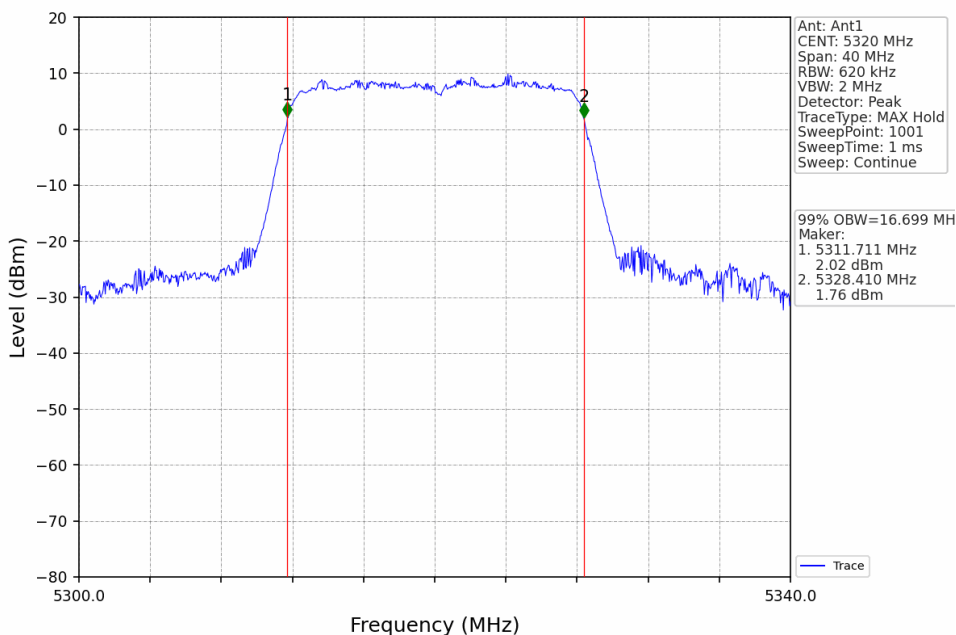
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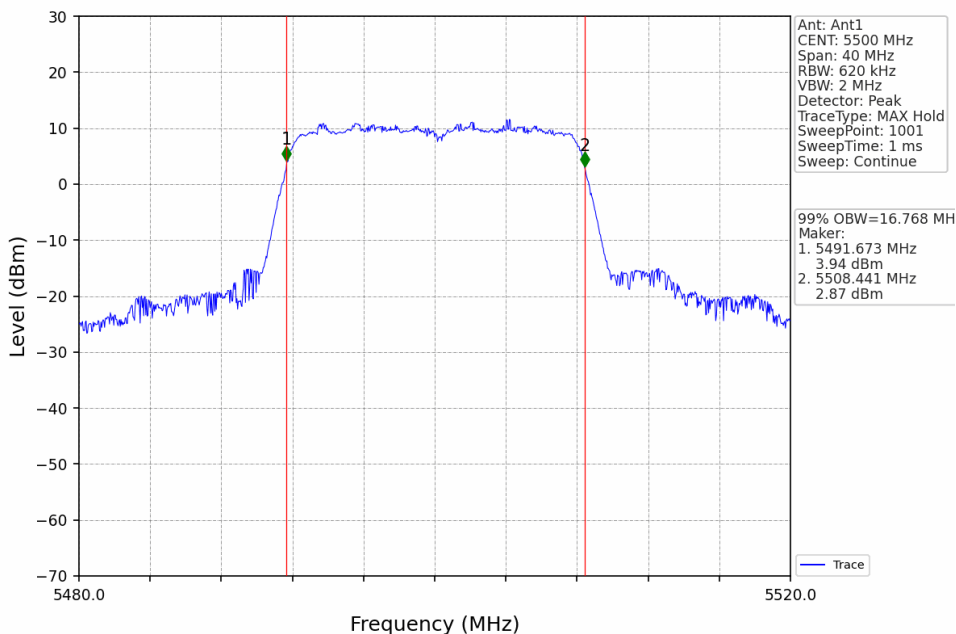
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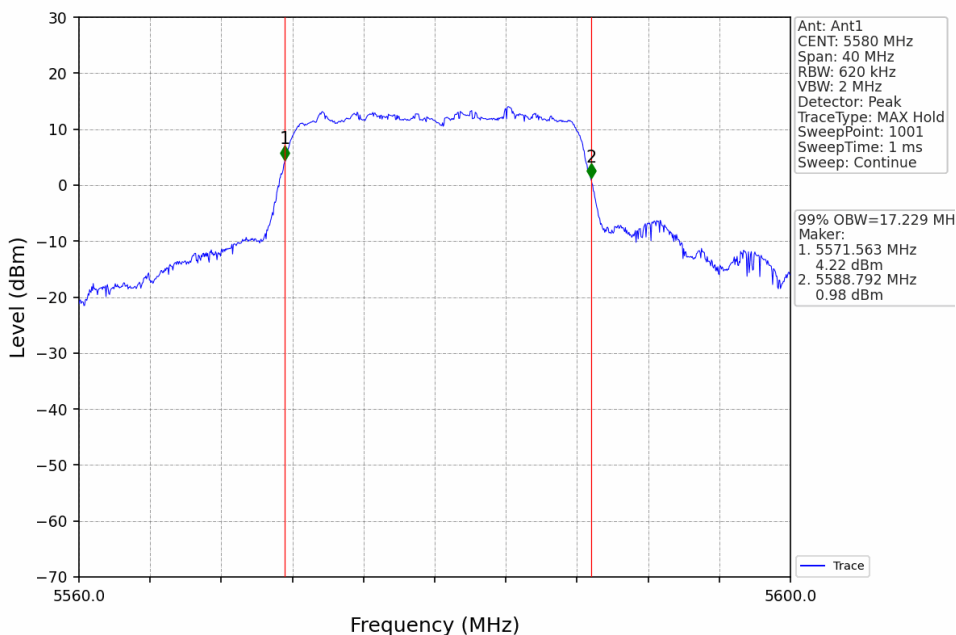
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802.11a_LCH_5500MHz_Ant1_NTNV



802.11a_MCH_5580MHz_Ant1_NTNV



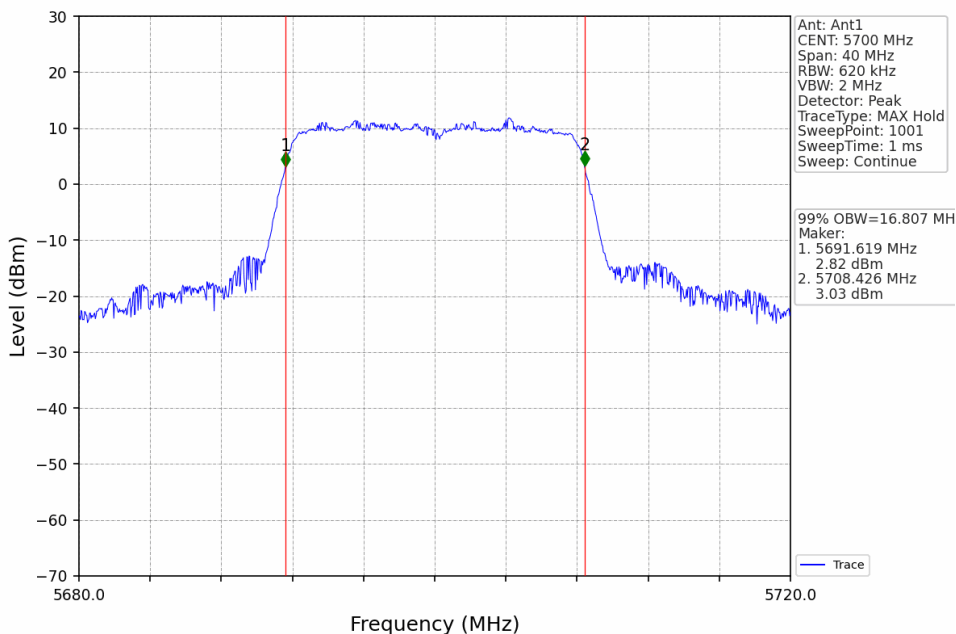
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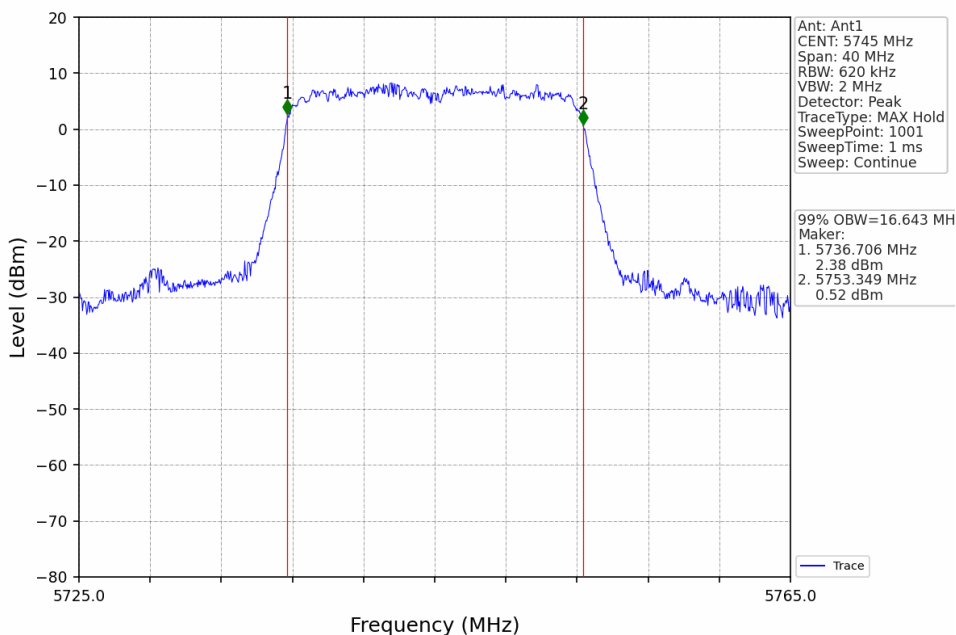
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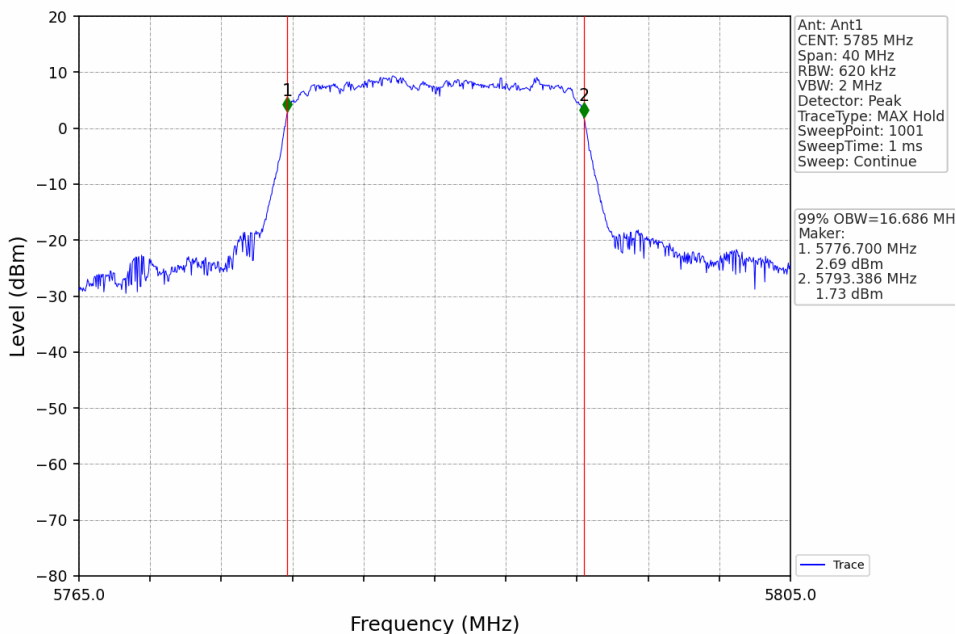
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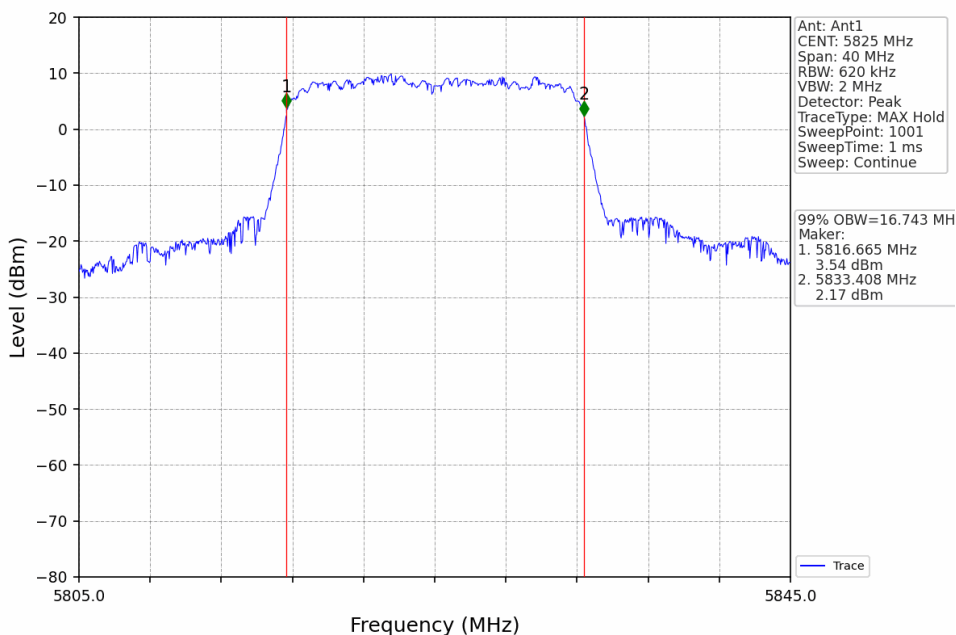
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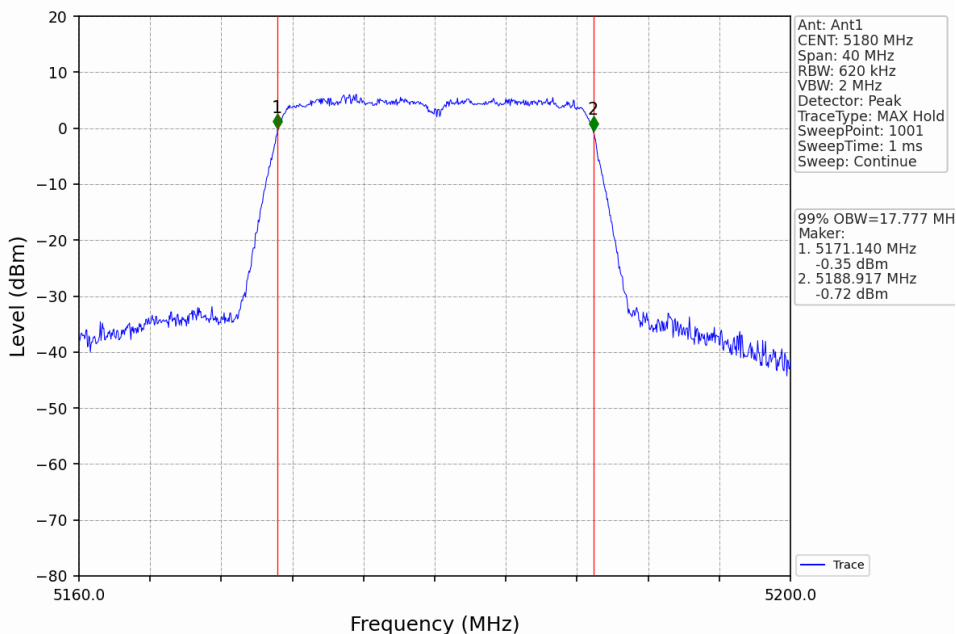
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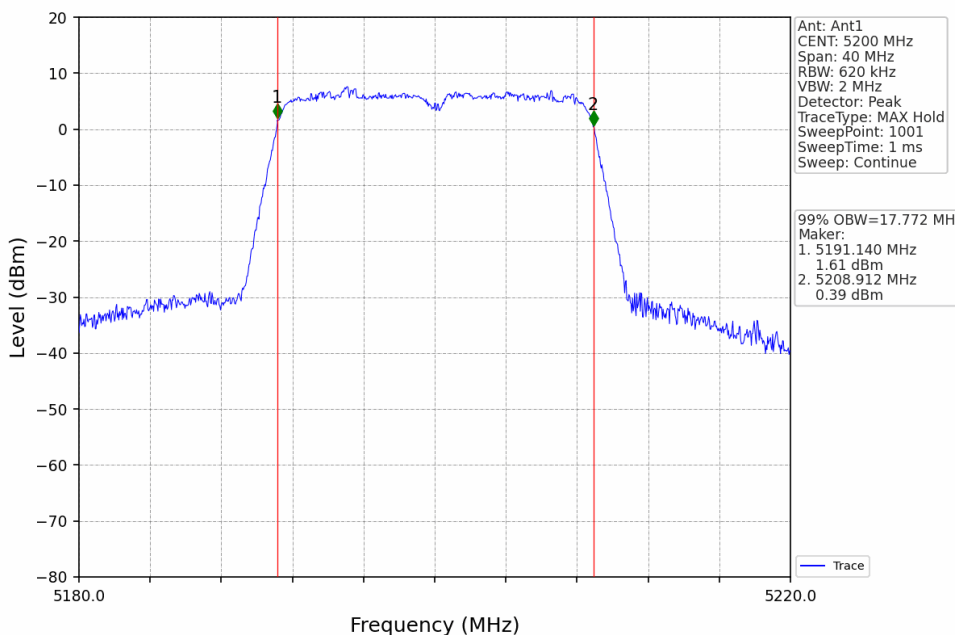
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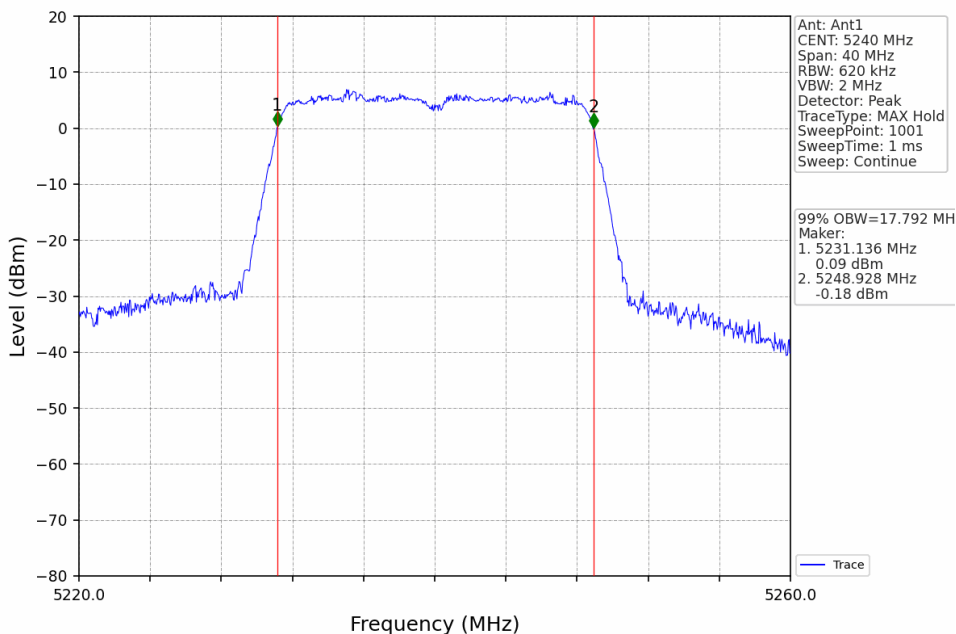
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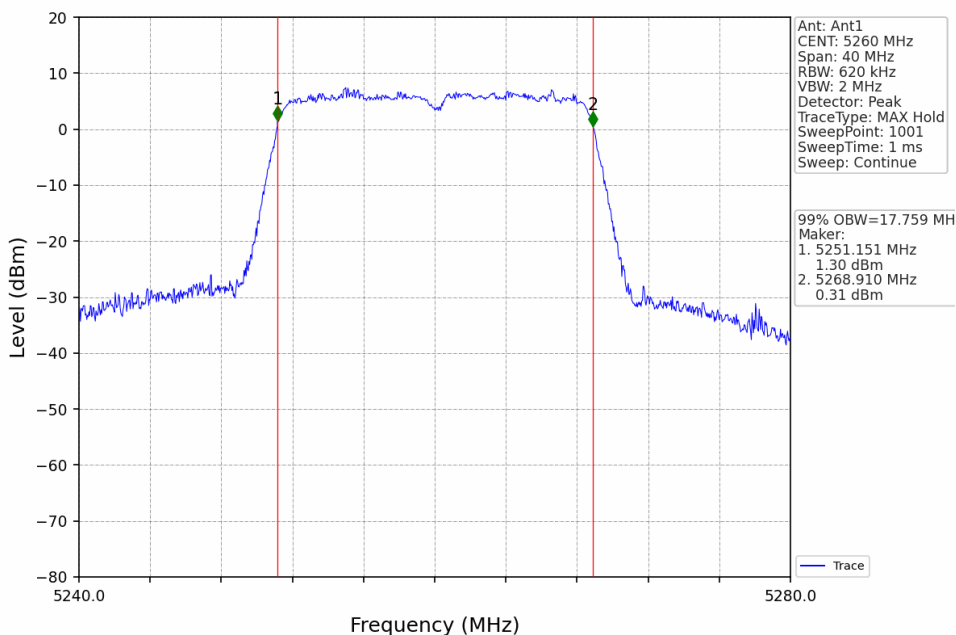
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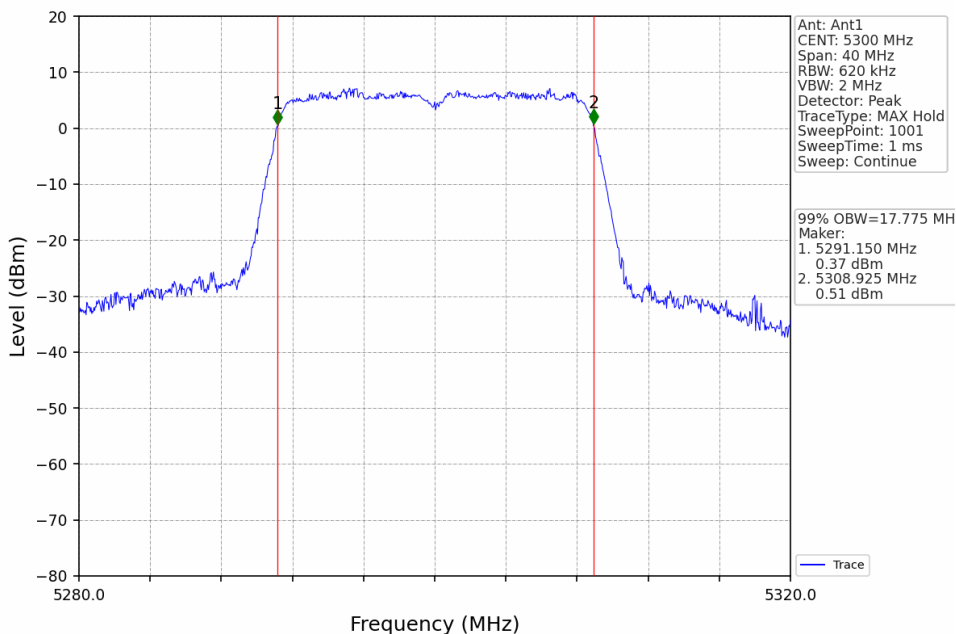
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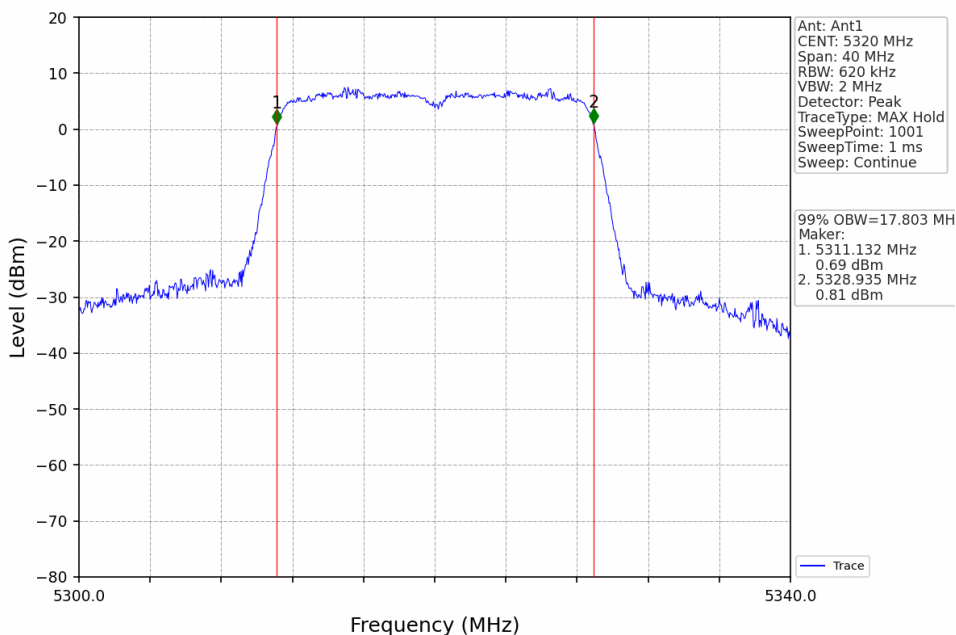
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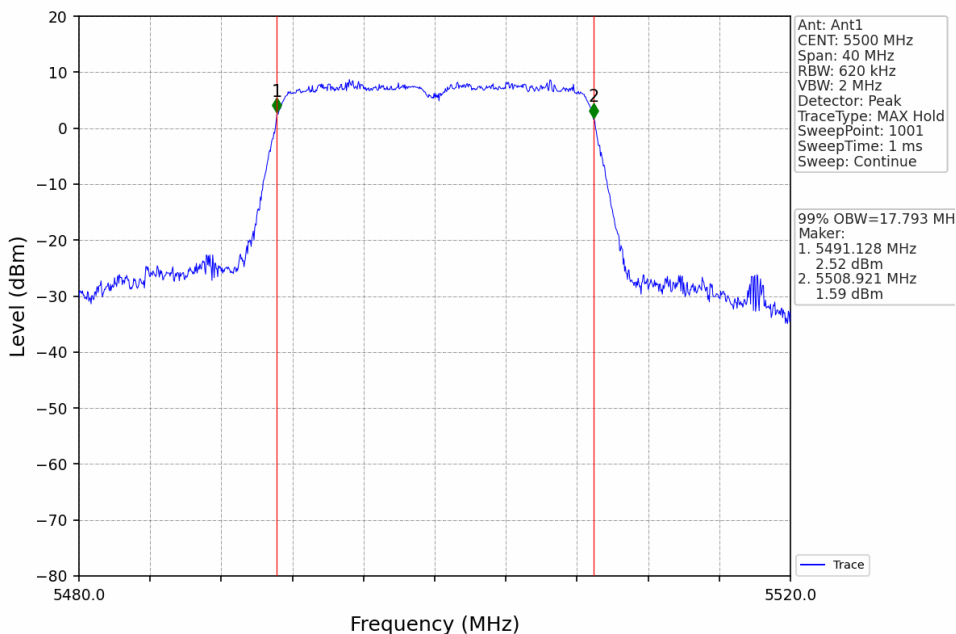
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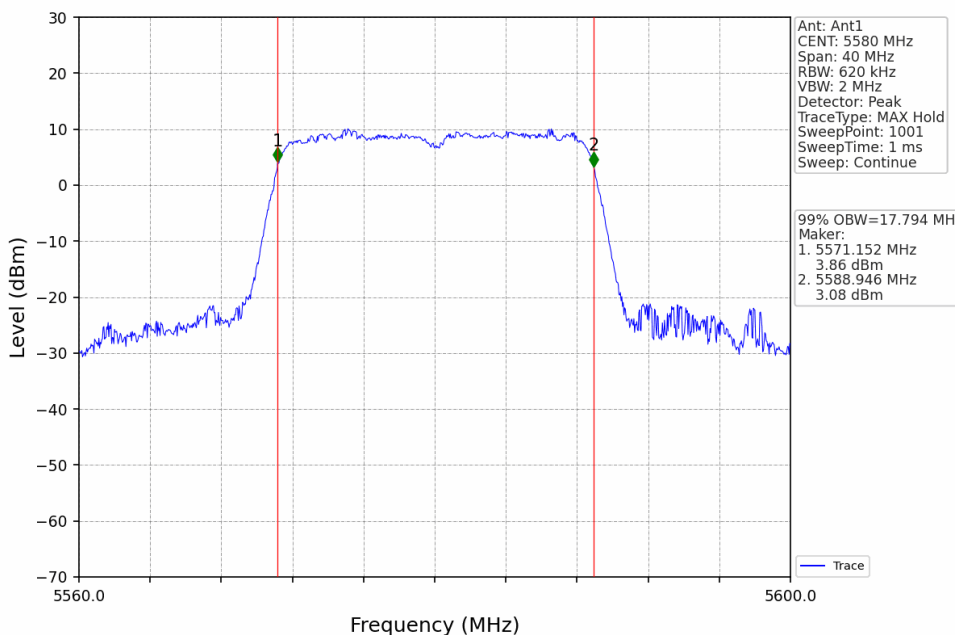
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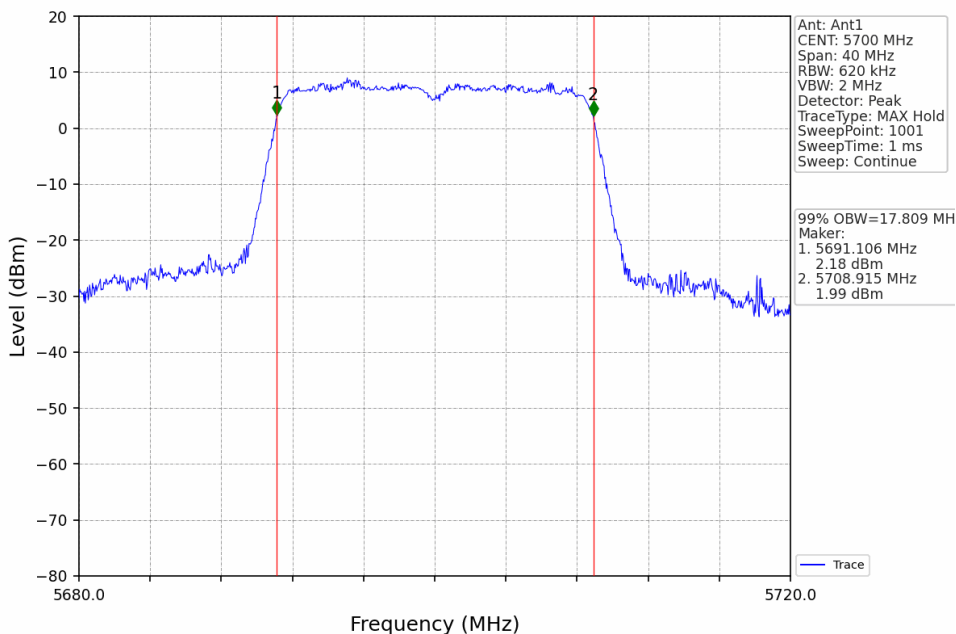
802.11n(HT20)_LCH_5500MHz_Ant1_NTNV



802.11n(HT20)_MCH_5580MHz_Ant1_NTNV



802.11n(HT20)_HCH_5700MHz_Ant1_NTNV



802.11n(HT20)_LCH_5745MHz_Ant1_NTNV

