7.6 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.			

7.6.1 E.U.T. Operation

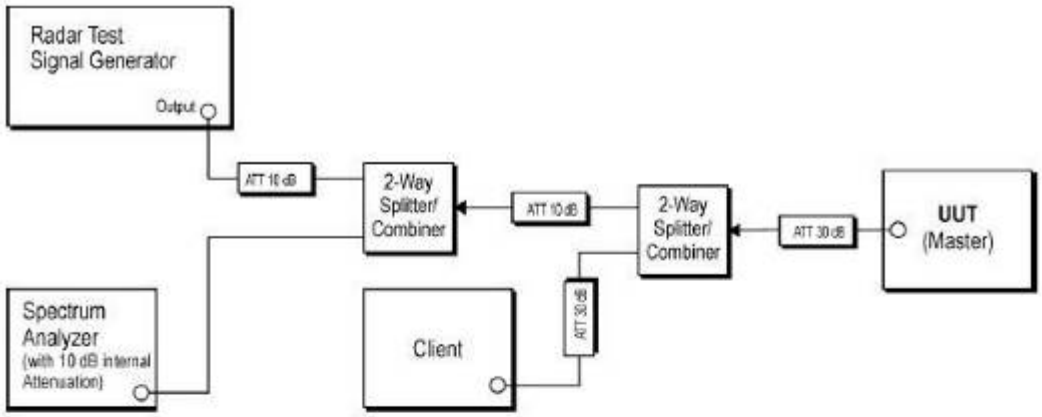
Operating Environment:

Temperature: 22.6 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar

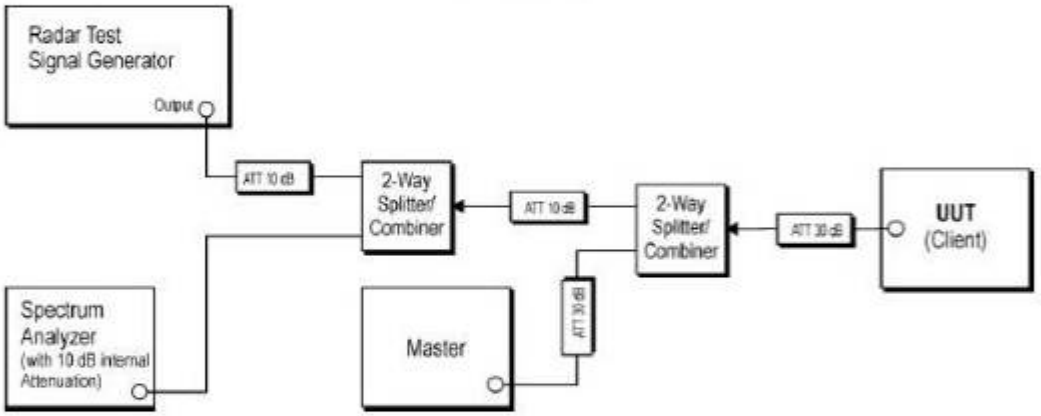
7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	40	On mode, keep EUT working normally.

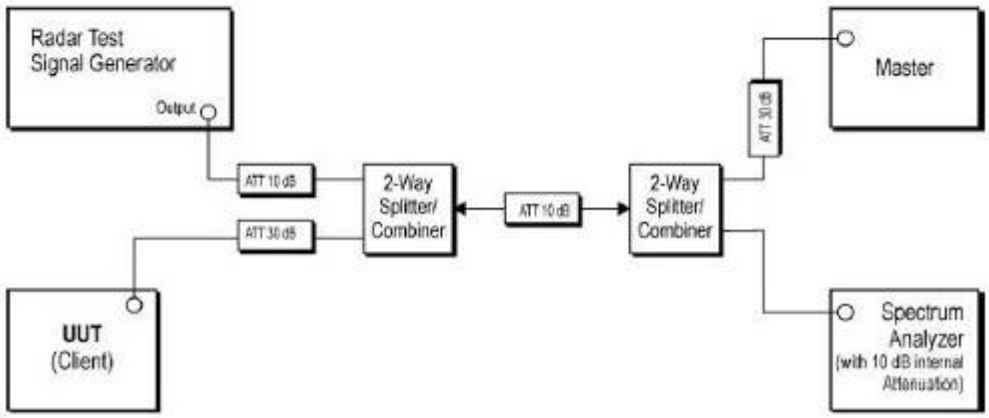
7.6.3 Test Setup Diagram



DFS master



DFS slave with radar detection



DFS slave without radar detection

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编:518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

7.6.4 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 X 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

7.7 Non-occupancy period

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.

7.7.1 E.U.T. Operation

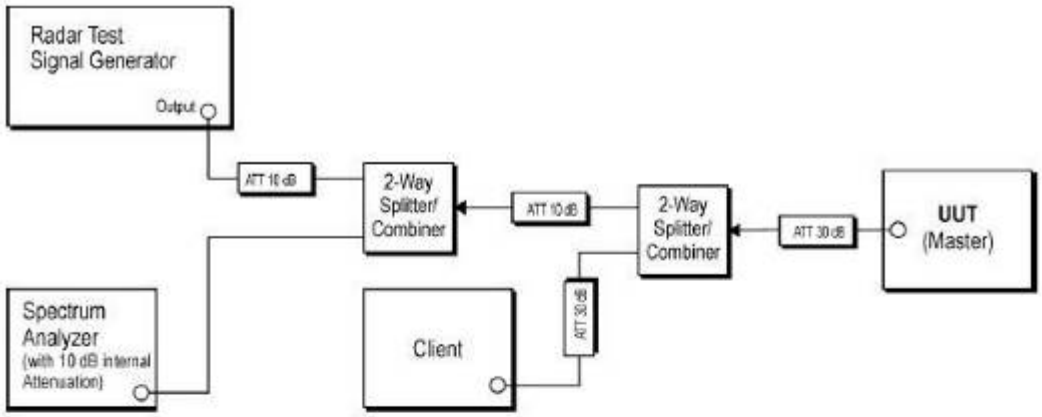
Operating Environment:

Temperature: 22.6 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar

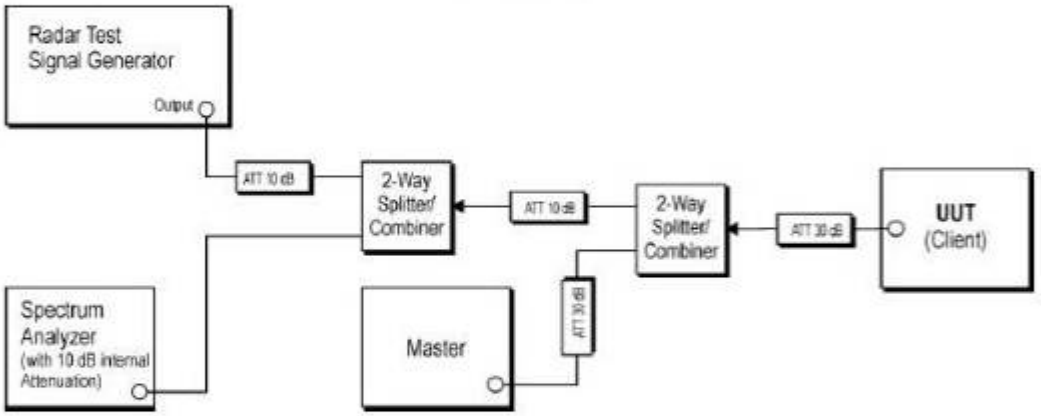
7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	40	On mode, keep EUT working normally.

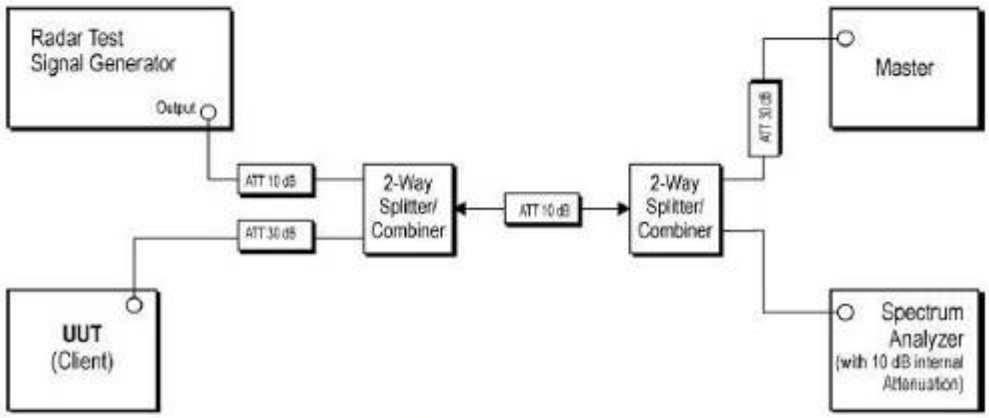
7.7.3 Test Setup Diagram



DFS master



DFS slave with radar detection



DFS slave without radar detection

7.7.4 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 X 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

7.8 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.			

7.8.1 E.U.T. Operation

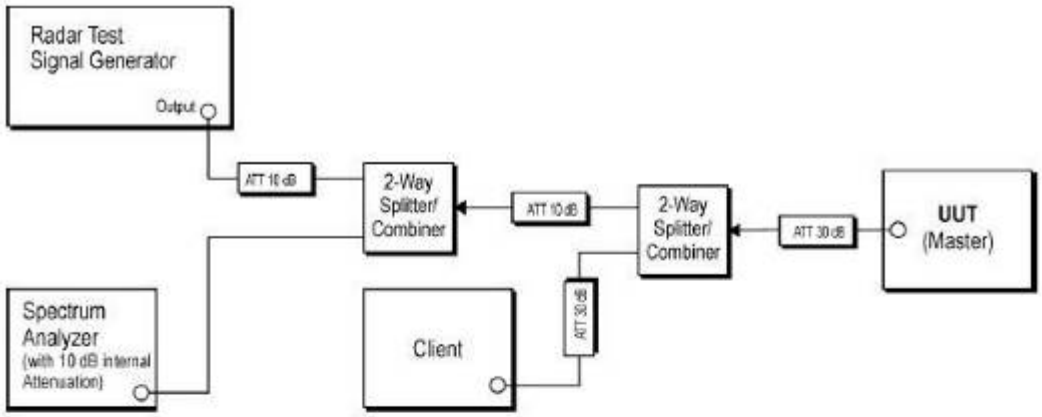
Operating Environment:

Temperature: 22.6 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar

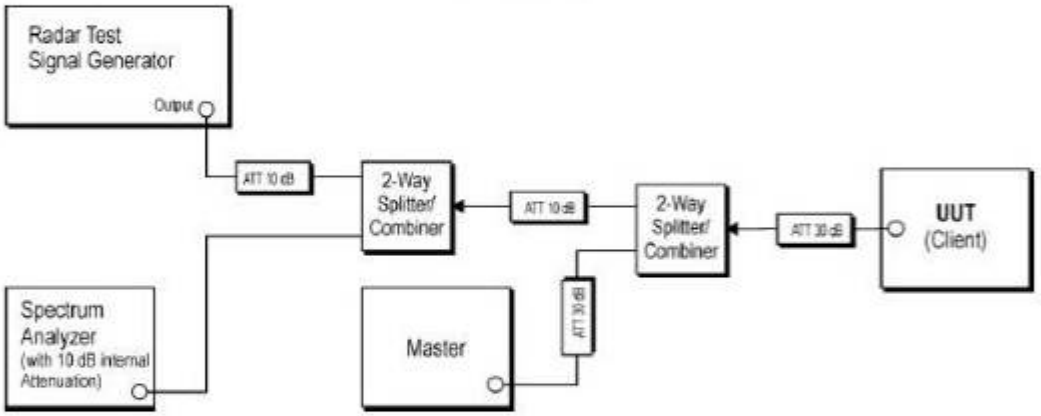
7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	40	On mode, keep EUT working normally.

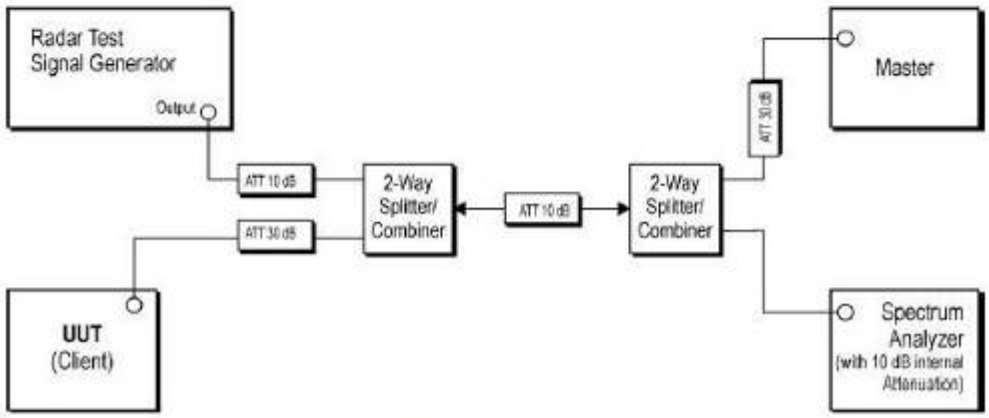
7.8.3 Test Setup Diagram



DFS master



DFS slave with radar detection



DFS slave without radar detection

7.8.4 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 X 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 Appendix - Test Setup Photo for SZCR2505001803AT

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for SZCR2505001803AT

10 Appendix

Note: Only the worst data are recorded.

1. Contention Based Protocol

1.1 Test Result

1.1.1 Duty Cycle_Band 5_Ant1

Ant1			
Mode	Freq. (MHz)	Incumbent Frequency (MHz)	Duty Cycle (%)
802.11be (EHT20)	6115	6115.000	21.78
802.11be (EHT320)	6105	5950.000	42.62
		6105.000	42.62
		6260.000	42.62

1.1.2 Contention Based Protocol_Detection Power_Band 5_Ant1

Ant1								
Mode	Freq. (MHz)	Incumbent Frequency (MHz)	EUT Status	Detected Power			Limit (dBm)	Verdict
				AWGN Power (dBm)	Antenna Gain (dBi)	Adjusted Power (dBm)		
802.11be (EHT20)	6115	6115.000	OFF	-62.62	1.93	-64.55	<=-62	Pass
			Minimal	-63.44	1.93	-65.37	<=-62	Pass
			ON	-63.45	1.93	-65.38	<=-62	Pass
802.11be (EHT320)	6105	5950.000	OFF	-70.25	1.93	-72.18	<=-62	Pass
			Minimal	-71.24	1.93	-73.17	<=-62	Pass
			ON	-71.23	1.93	-73.16	<=-62	Pass
		6105.000	OFF	-70.94	1.93	-72.87	<=-62	Pass
			Minimal	-71.92	1.93	-73.85	<=-62	Pass
			ON	-71.91	1.93	-73.84	<=-62	Pass
		6260.000	OFF	-69.51	1.93	-71.44	<=-62	Pass
			Minimal	-70.50	1.93	-72.43	<=-62	Pass
			ON	-70.49	1.93	-72.42	<=-62	Pass

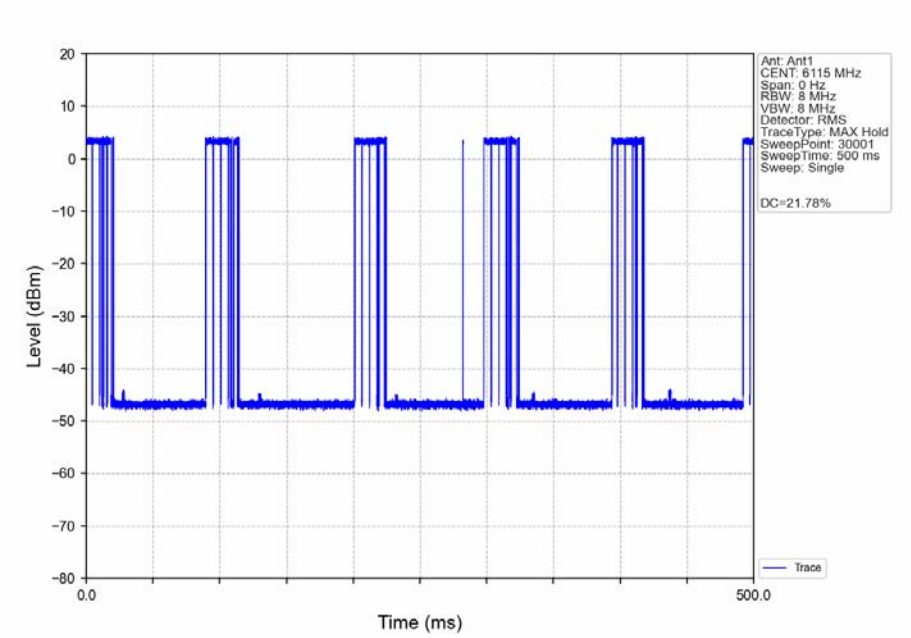
1.1.3 Contention Based Protocol_Detection Probability_Band 5_Ant1

Ant1														
Mode	Freq. (MHz)	Incumbent Freq. (MHz)	1	2	3	4	5	6	7	8	9	10	Detected Probability (%)		Verdict
													Result	Limit	
802.11be (EHT20)	6115	6115.000	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100	>=90	Pass
802.11be (EHT320)	6105	5950.000	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100	>=90	Pass
		6105.000	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100	>=90	Pass
		6260.000	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100	>=90	Pass
Note1: CBP Detection Trials (Y=Detection, N=No Detection)															

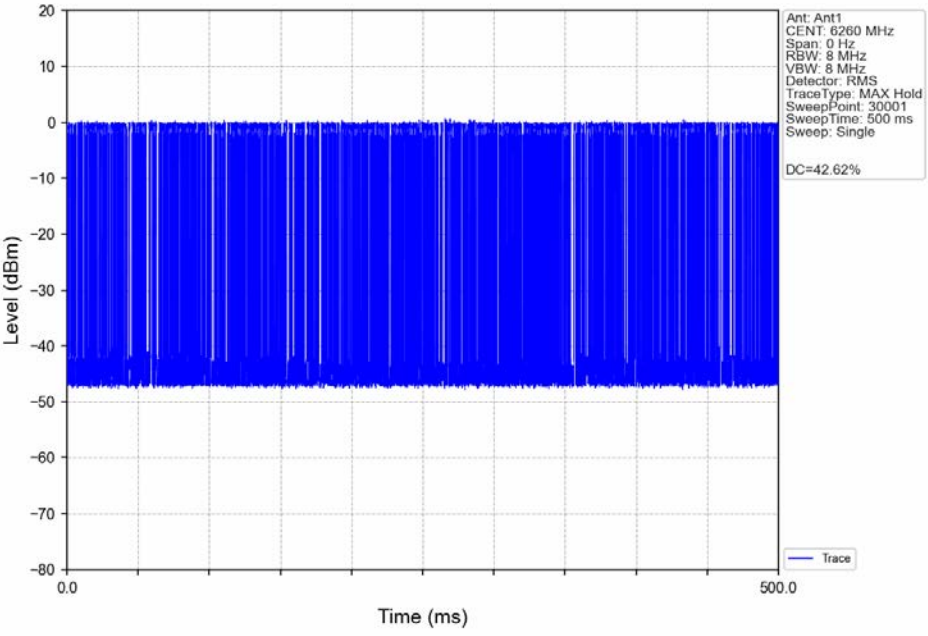
1.2 Test Graph

1.2.1 Duty Cycle_Band 5_Ant1

802.11be(EHT20)_LCH_6115MHz_Inject signal_6115MHz

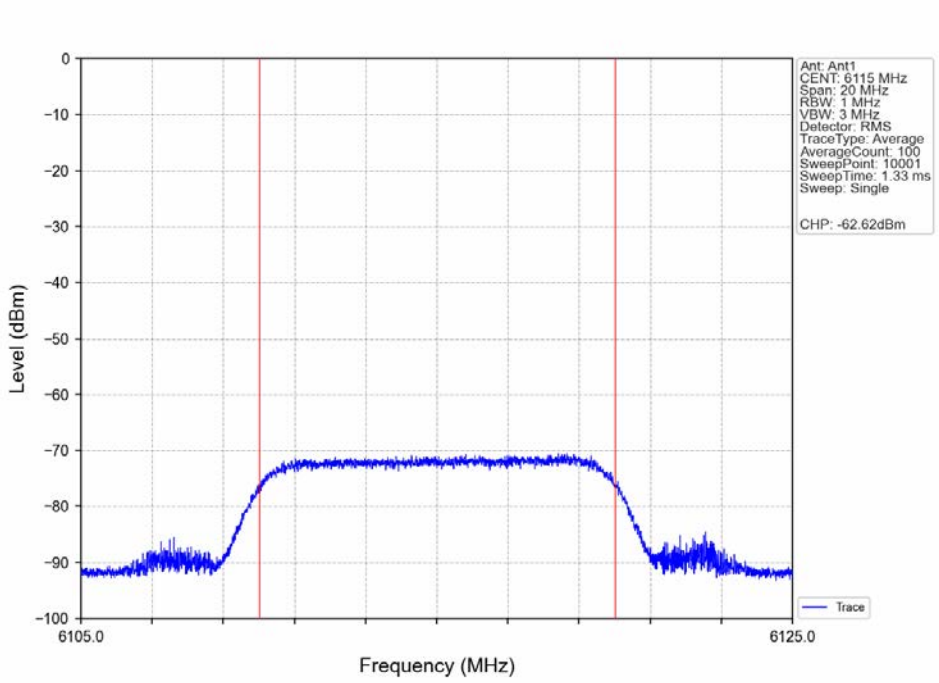


802.11be(EHT320)_LCH_6105MHz_Inject signal_5950MHz

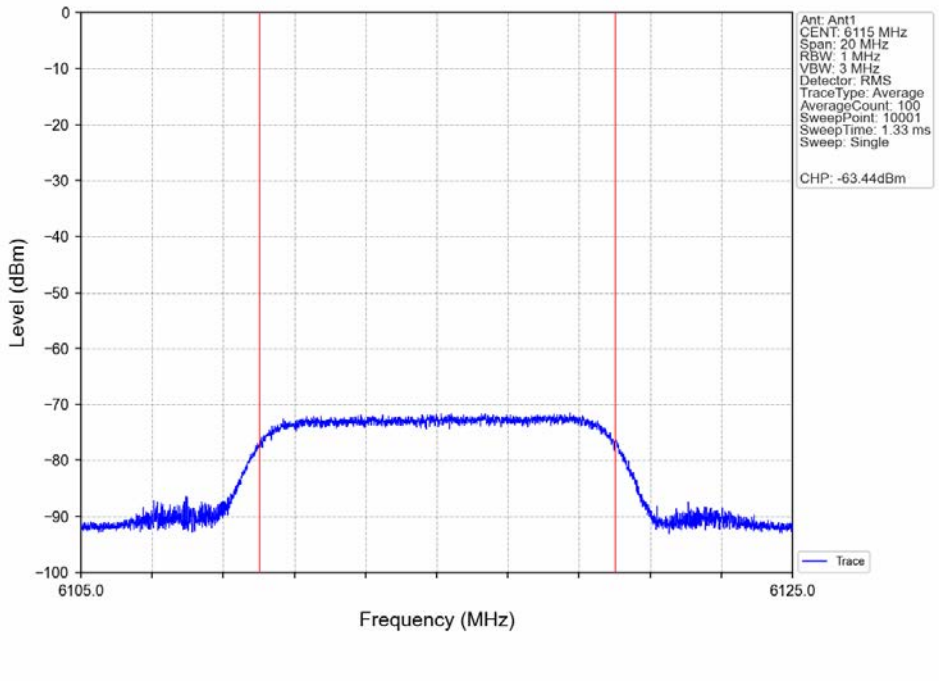


1.2.2 Contention Based Protocol_Detection Power_Band 5_Ant1

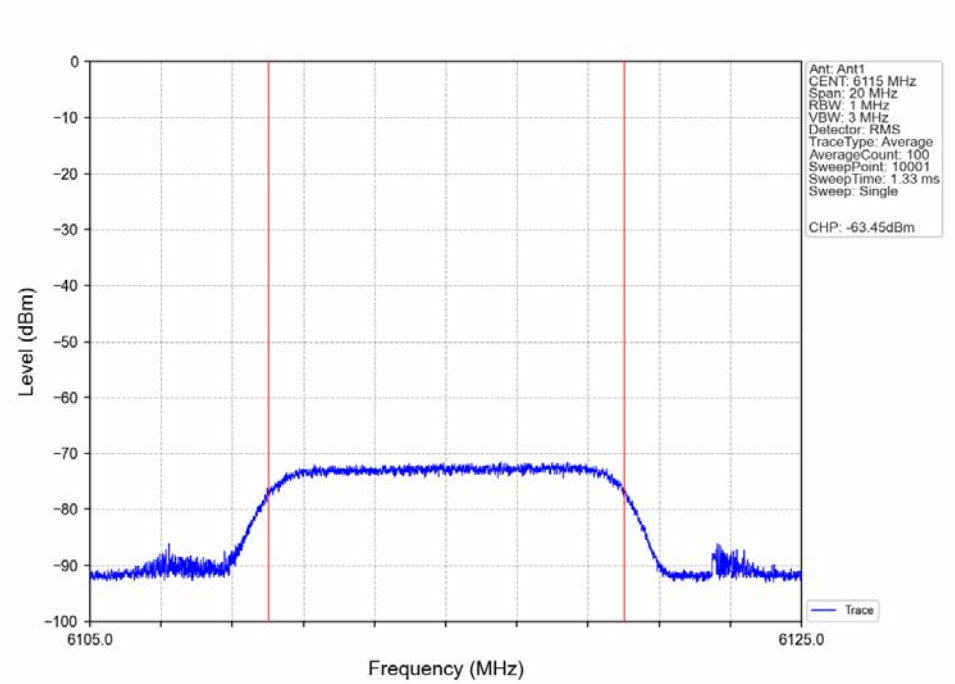
802.11be(EHT20)_LCH_6115MHz_Inject signal_6115MHz_Detection status_ON



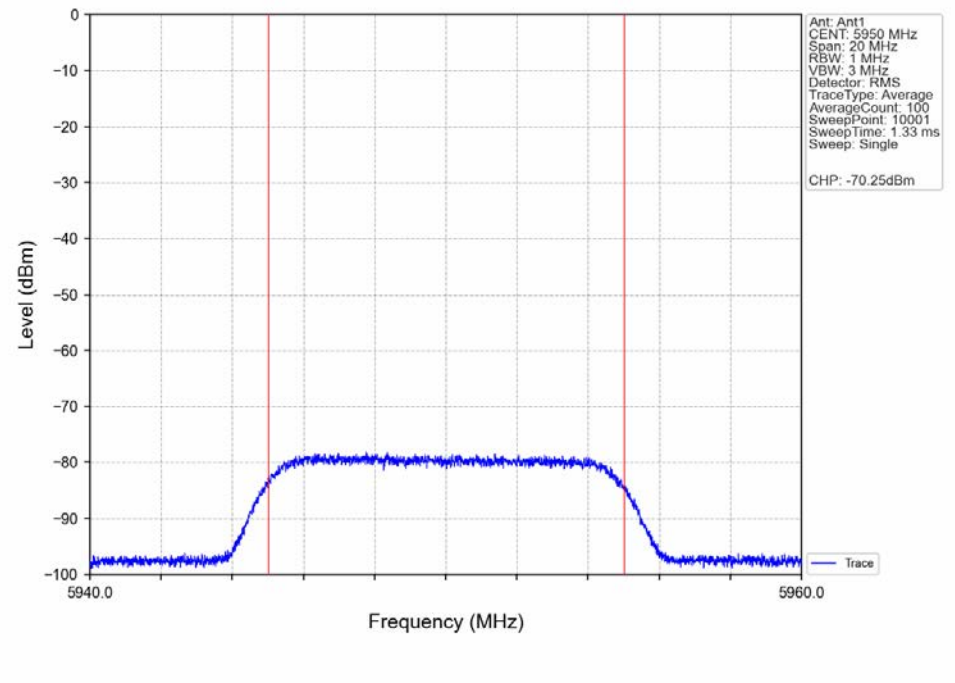
802.11be(EHT20)_LCH_6115MHz_Inject signal_6115MHz_Detection status_ON



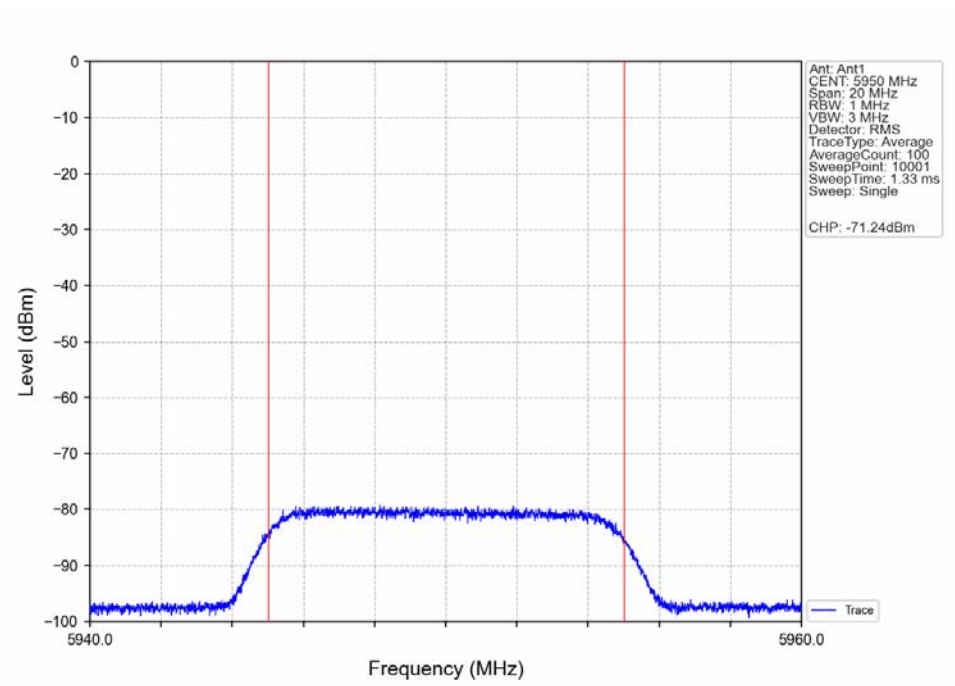
802.11be(EHT20)_LCH_6115MHz_Inject signal_6115MHz_Detection status_ON



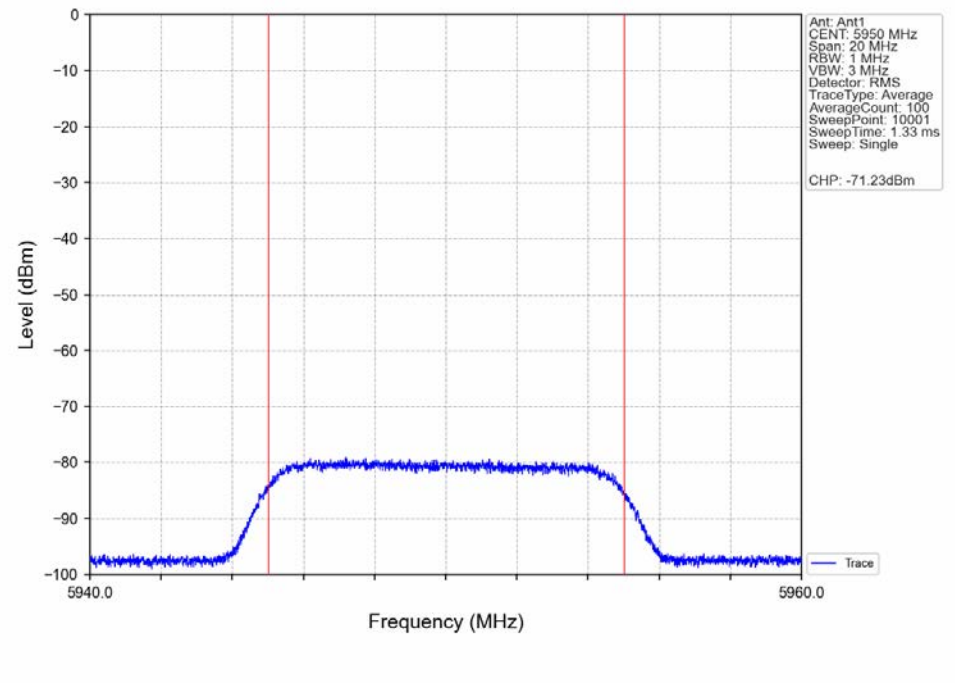
802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz_Detection status_ON



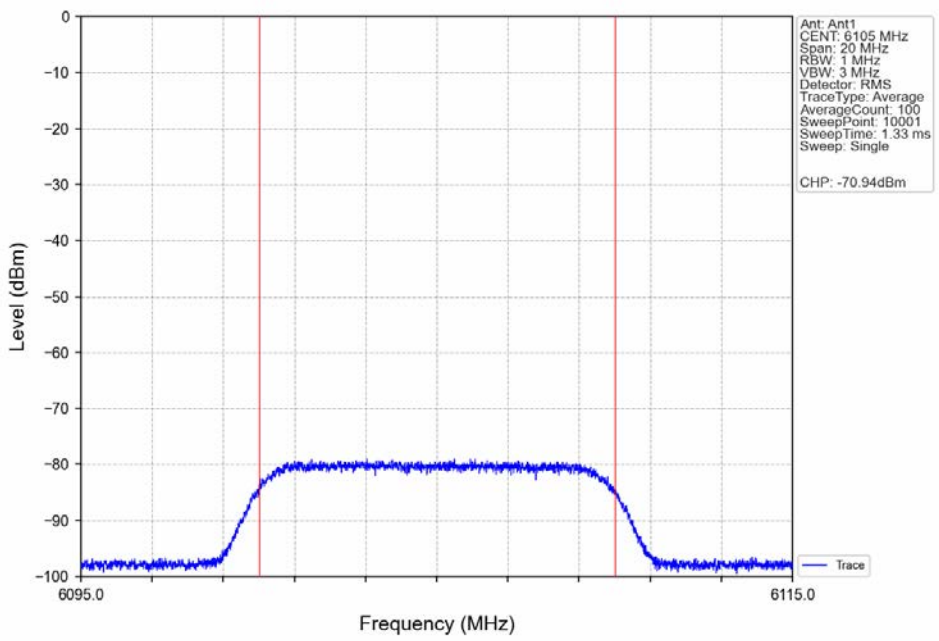
802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz_Detection status_ON



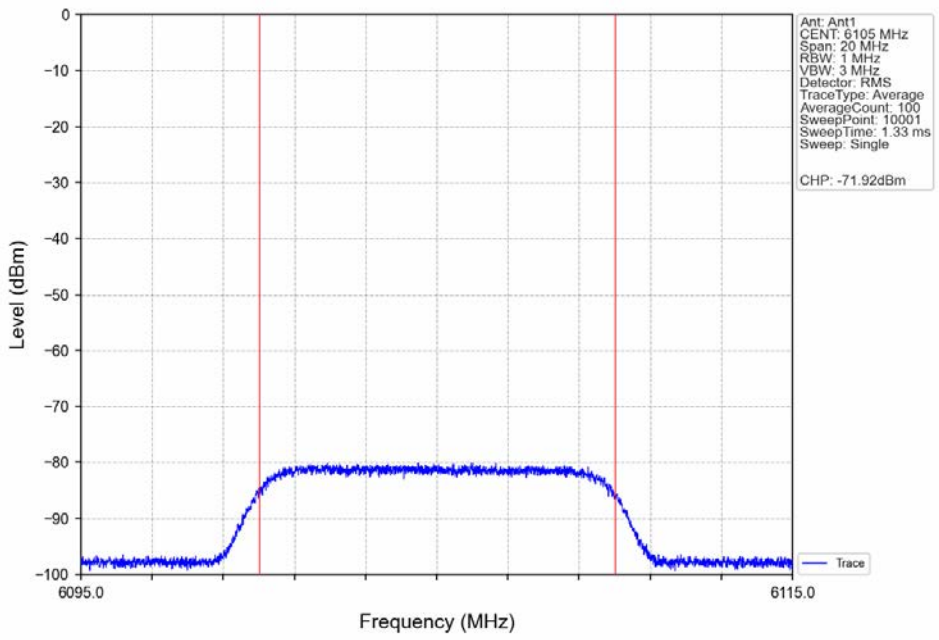
802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz_Detection status_ON



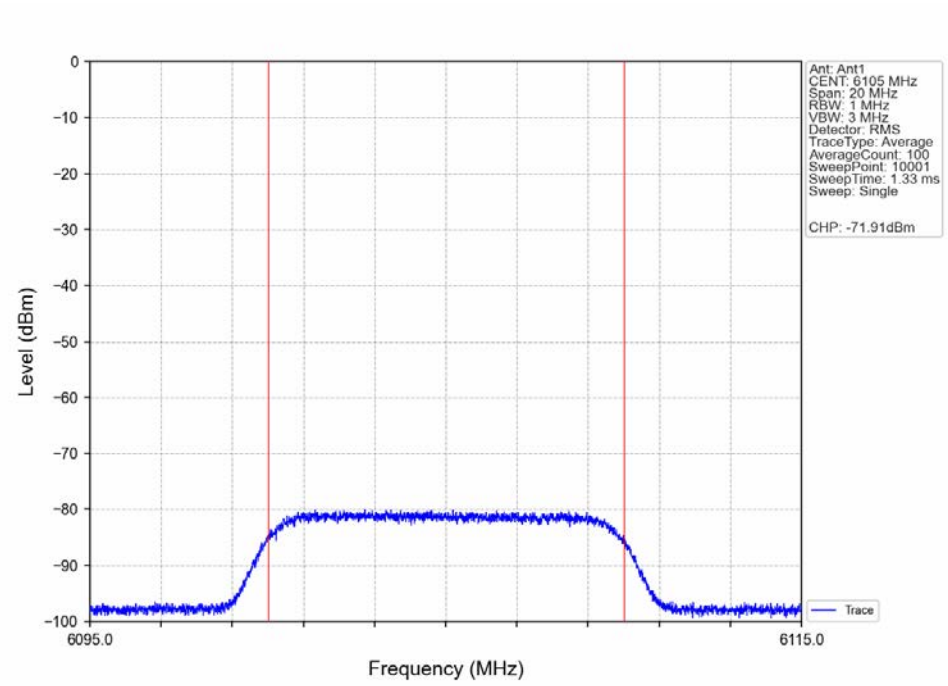
802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz_Detection status_ON



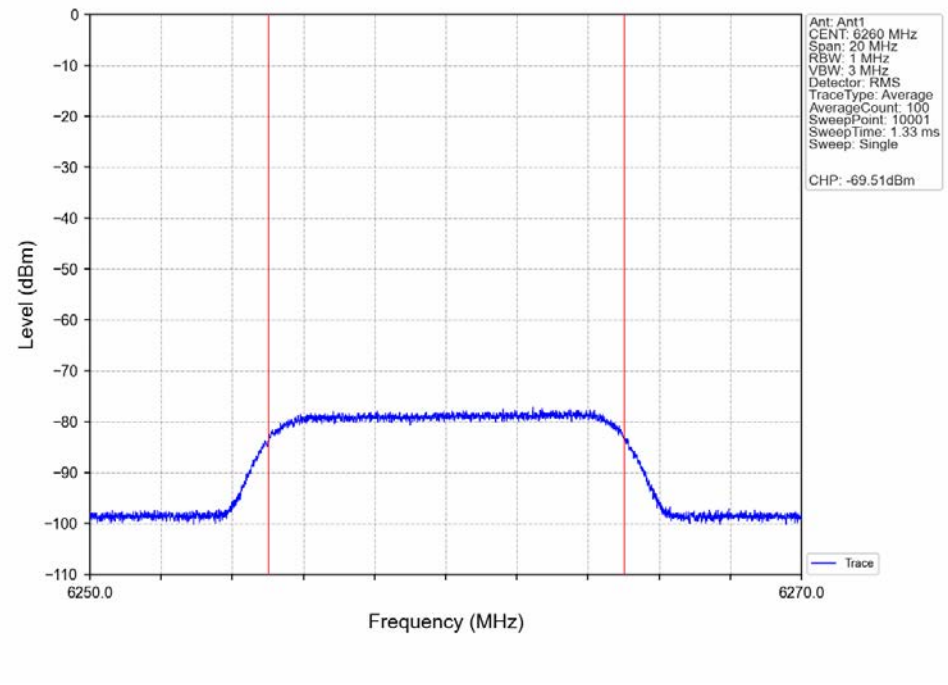
802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz_Detection status_ON



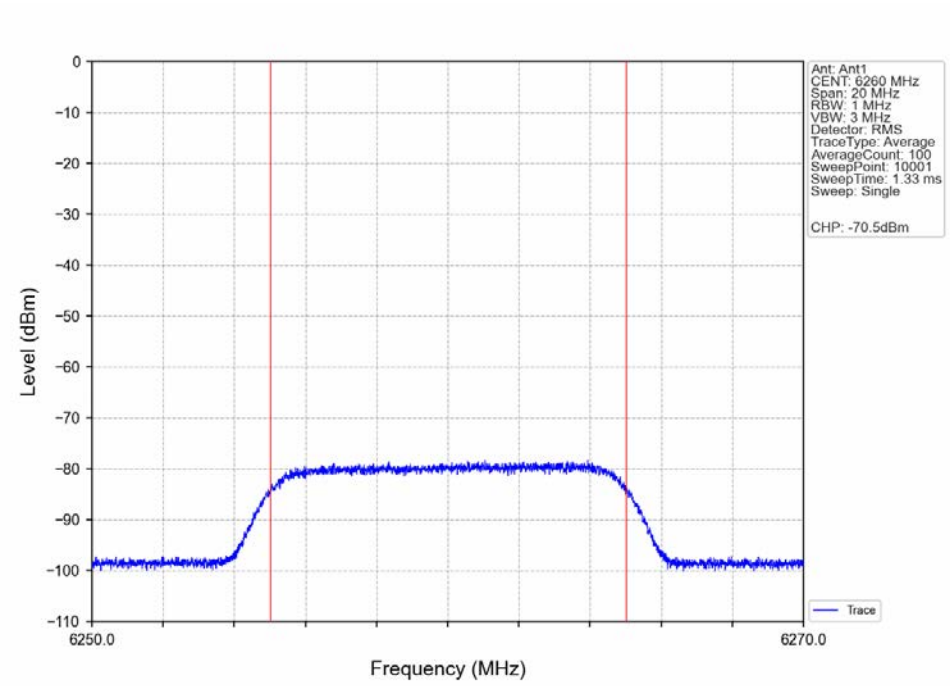
802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz_Detection status_ON



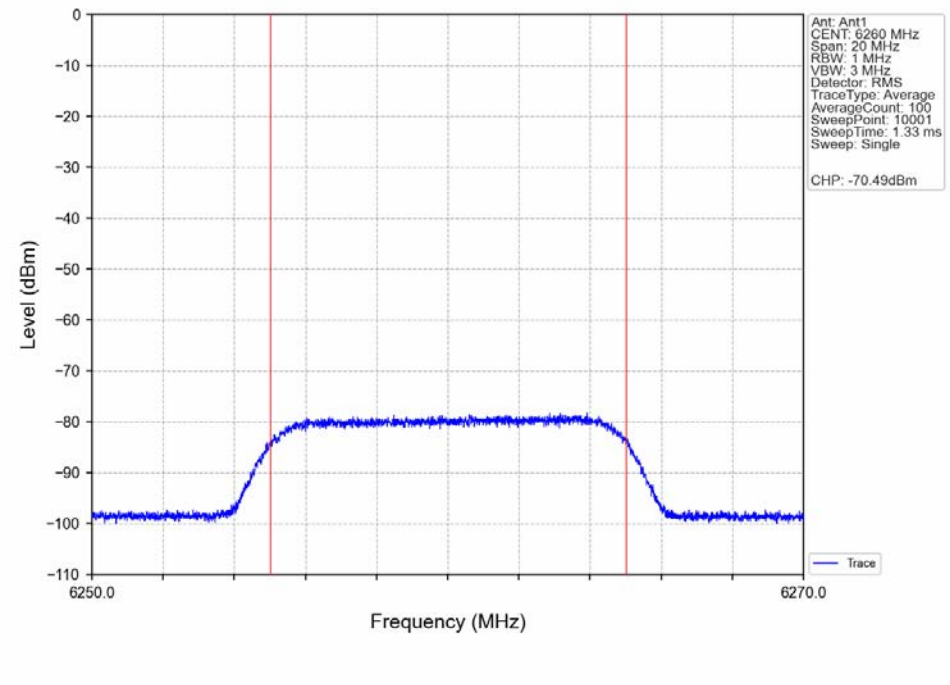
802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz_Detection status_ON



802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz_Detection status_ON

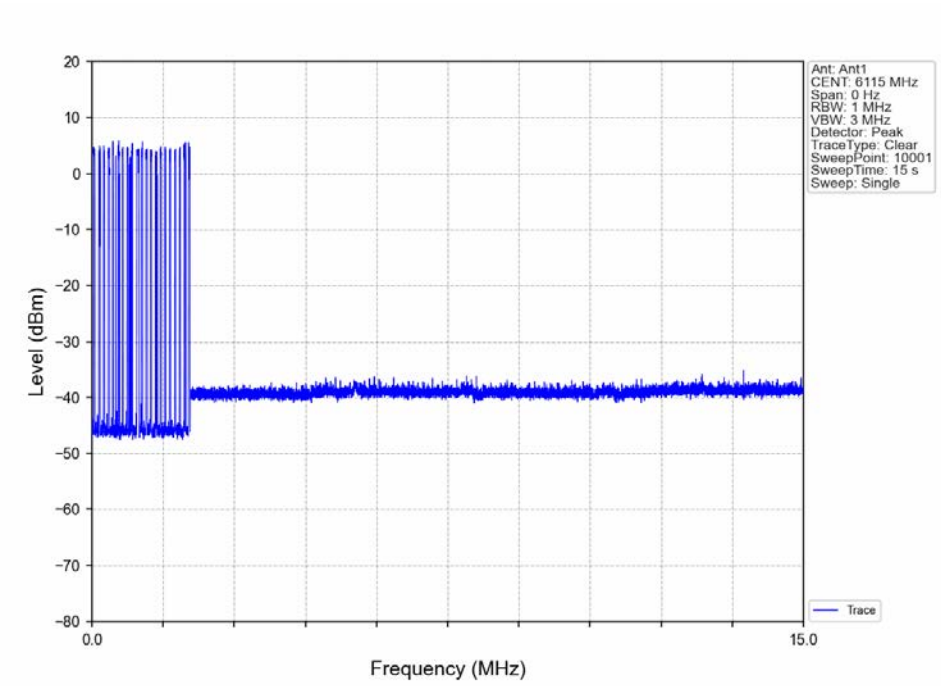


802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz_Detection status_ON

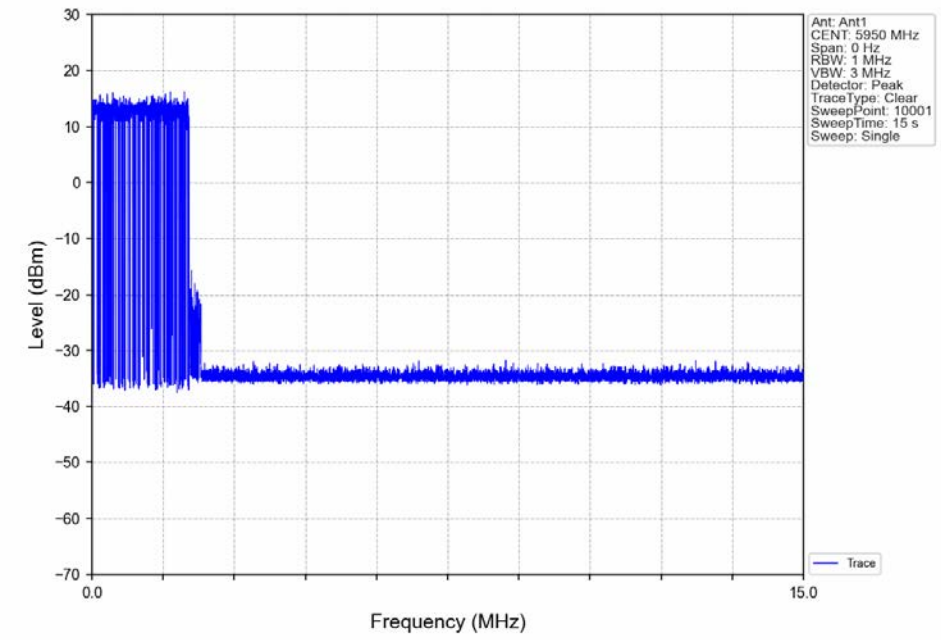


1.2.3 Contention Based Protocol_Detection Probability_Band 5_Ant1

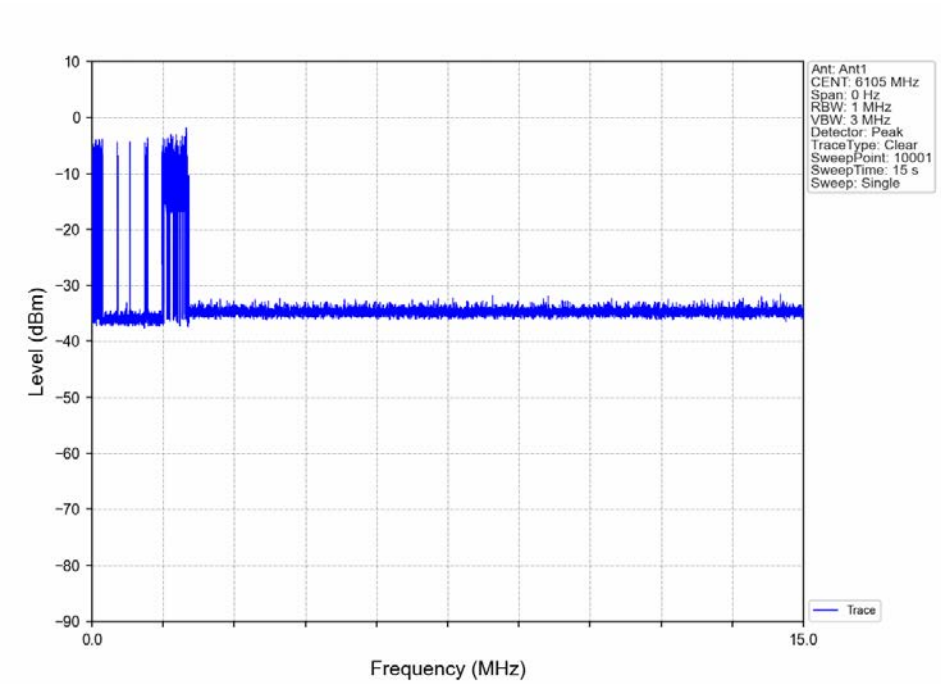
802.11be(EHT20)_LCH_6115MHz_Inject signal_6115MHz



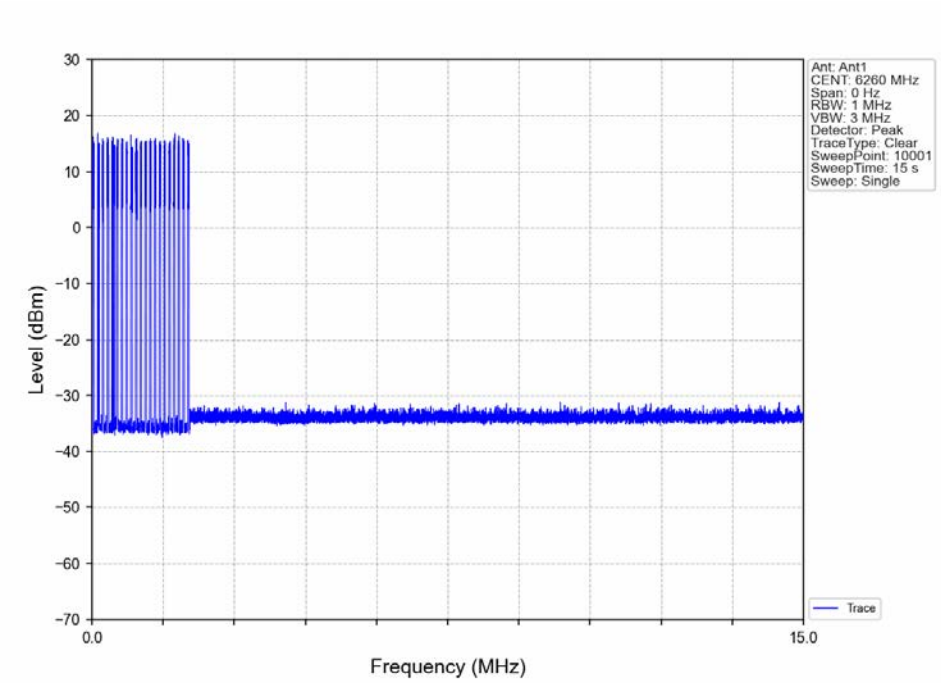
802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz



802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz



802.11be(EHT320)_LCH_6105MHz_Inject signal_6260MHz



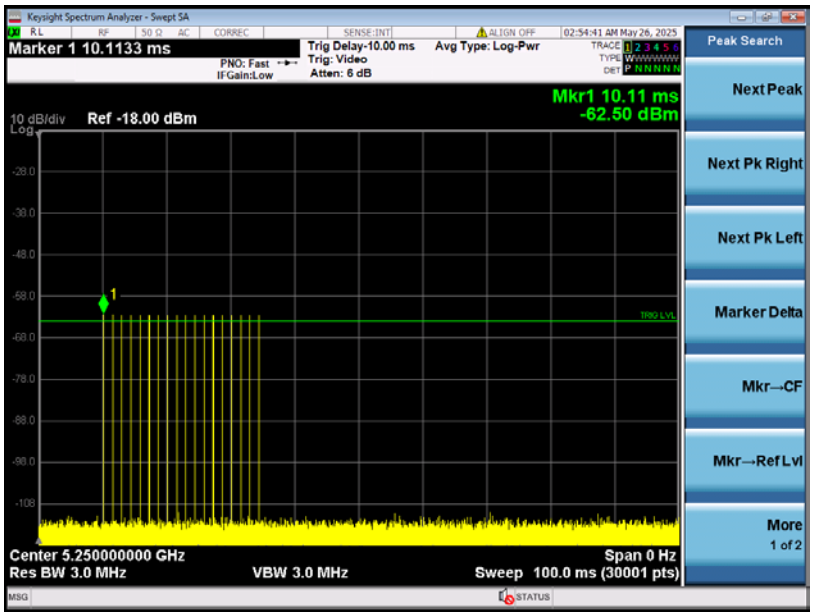
2. DFS

(DFS: Non-occupancy period; Channel Move Time; Channel Closing Transmission Time)
Note: All antennas type has been tested and we found the antenna 1 has the worst result.
Only record the worst test result.

Test plots as follows:

Radar Waveform Calibration Result

Radar Type 0

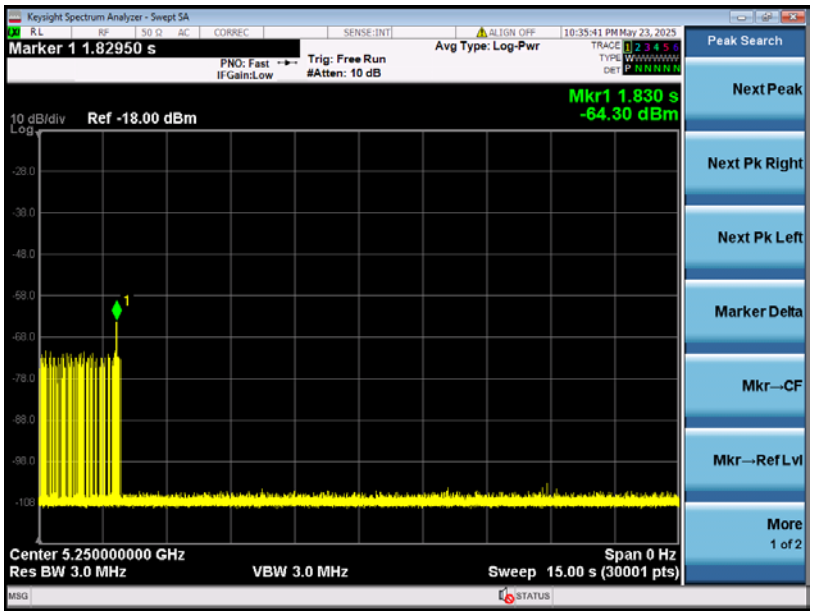


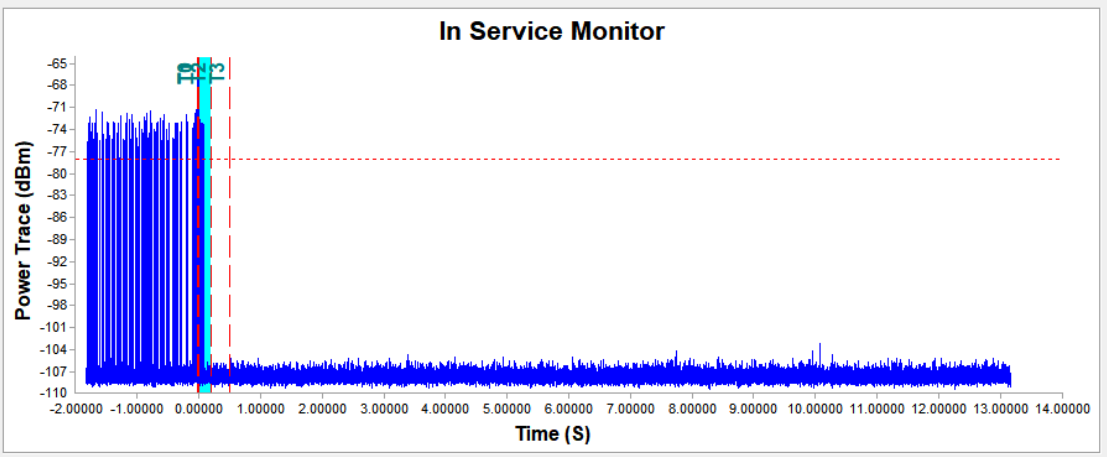
Test Data:

BW/Channel	Test Item	Test data	Limit	Results
160MHz/ 5250MHz	Non-occupancy period	Refer to test plots	>30 min	pass
	Channel Move Time	0.0s	＜10 s	Pass
	Channel Closing Transmission Time	0.0s	＜60ms	Pass

BW/Channel	Test Item	Test data	Limit	Results
160MHz/ 5570MHz	Non-occupancy period	Refer to test plots	>30 min	pass
	Channel Move Time	0.0s	＜10 s	Pass
	Channel Closing Transmission Time	0.0s	＜60ms	Pass

Test plots as follows(5250MHz):





Time Index Info

T0 : -0.0245 S (Radar Injection Start)
T1 : 0.0000 S (Radar Injection Stop)
T2 : 0.2000 S (200msec Interval)
T3 : 0.0000 S (Channel Move Time)

Time Per Bin:0.4999833
T2~T3 Bins Over Threshold:
= 0 Bins

Channel Move Time: 0.0 S
Channel Close Time: 0.0 S

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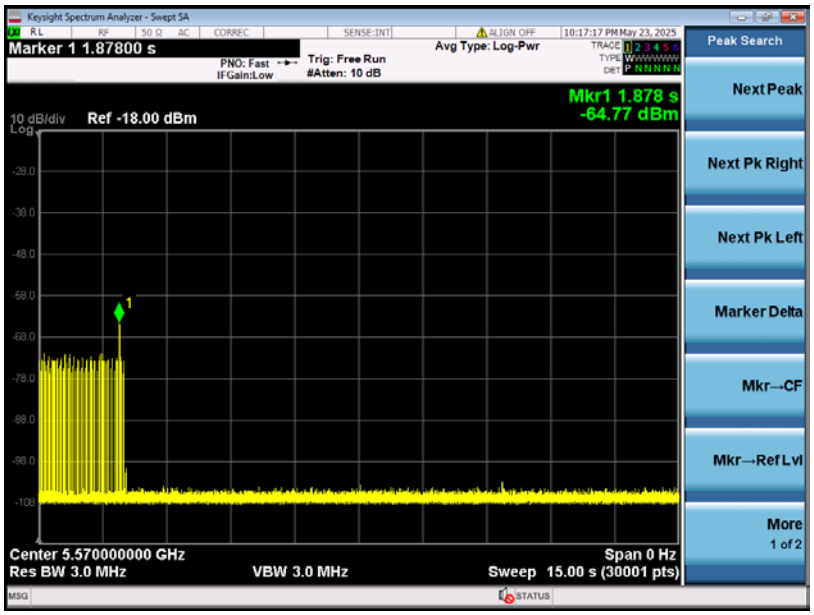
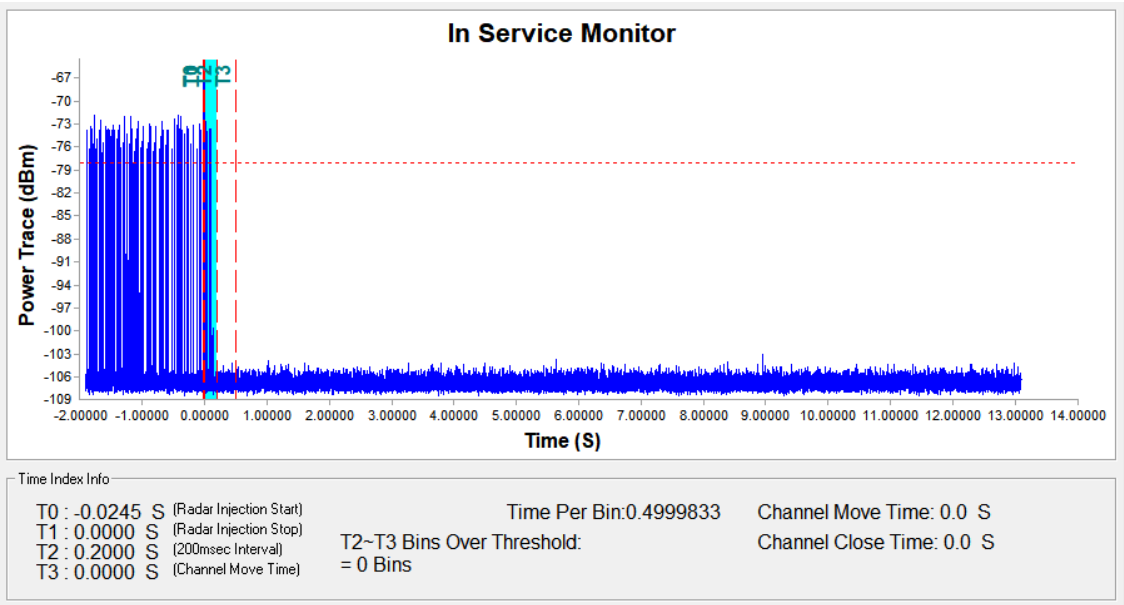
Test plots as follows(5570MHz):





Time Index Info

T0 : -0.0245 S (Radar Injection Start)
T1 : 0.0000 S (Radar Injection Stop)
T2 : 0.2000 S (200msec Interval)
T3 : 0.0000 S (Channel Move Time)

Time Per Bin:0.4999833
T2~T3 Bins Over Threshold:
= 0 Bins

Channel Move Time: 0.0 S
Channel Close Time: 0.0 S

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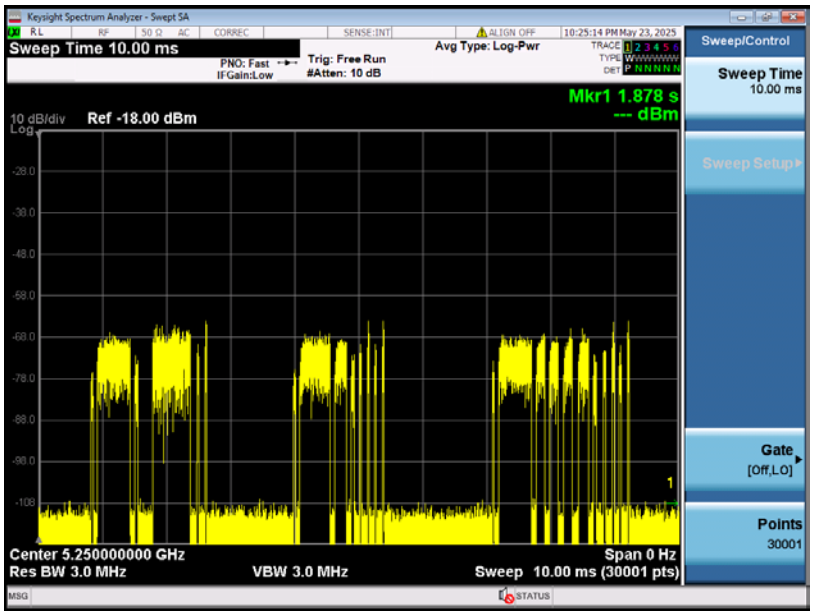
Duty Cycle:



- End of the Report -