PSD NVNT a 5745MHz Ant1

PSD NVNT a 5825MHz Ant1

PSD NVNT n20 5180MHz Ant1

PSD NVNT n20 5240MHz Ant1

PSD NVNT n20 5260MHz Ant1

PSD NVNT n20 5320MHz Ant1

PSD NVNT n20 5500MHz Ant1

PSD NVNT n20 5700MHz Ant1

PSD NVNT n20 5745MHz Ant1

PSD NVNT n20 5825MHz Ant1

PSD NVNT n40 5190MHz Ant1

PSD NVNT n40 5230MHz Ant1

PSD NVNT n40 5270MHz Ant1

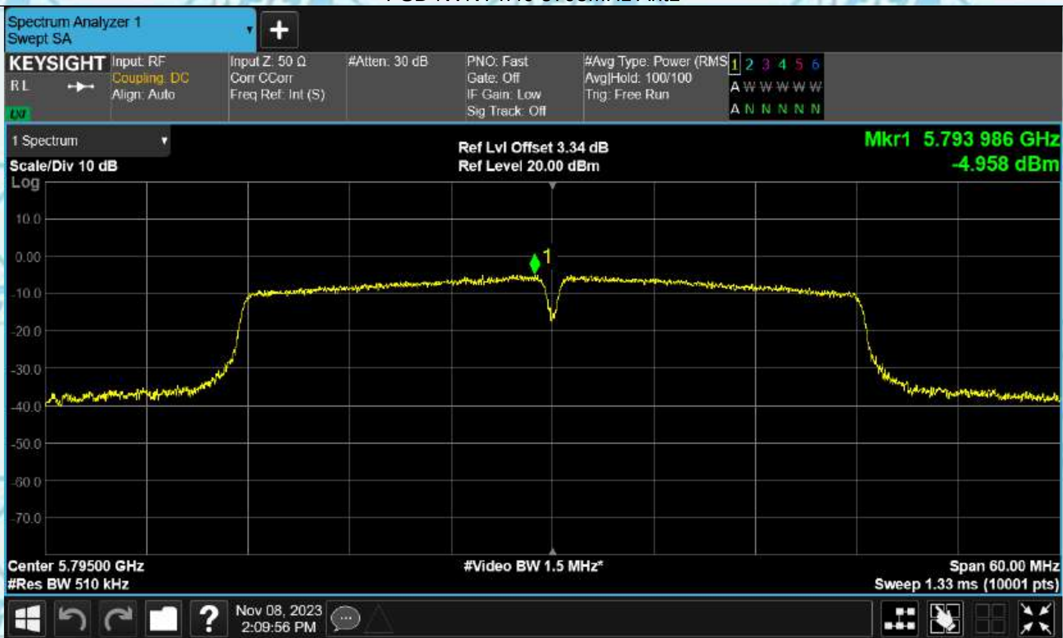
PSD NVNT n40 5310MHz Ant1

PSD NVNT n40 5510MHz Ant1

PSD NVNT n40 5670MHz Ant1

PSD NVNT n40 5755MHz Ant1

PSD NVNT n40 5795MHz Ant1



PSD NVNT ac20 5180MHz Ant1

PSD NVNT ac20 5240MHz Ant1

PSD NVNT ac20 5260MHz Ant1

PSD NVNT ac20 5320MHz Ant1

PSD NVNT ac20 5500MHz Ant1

PSD NVNT ac20 5700MHz Ant1

PSD NVNT ac20 5745MHz Ant1

PSD NVNT ac20 5825MHz Ant1

PSD NVNT ac40 5190MHz Ant1

PSD NVNT ac40 5230MHz Ant1

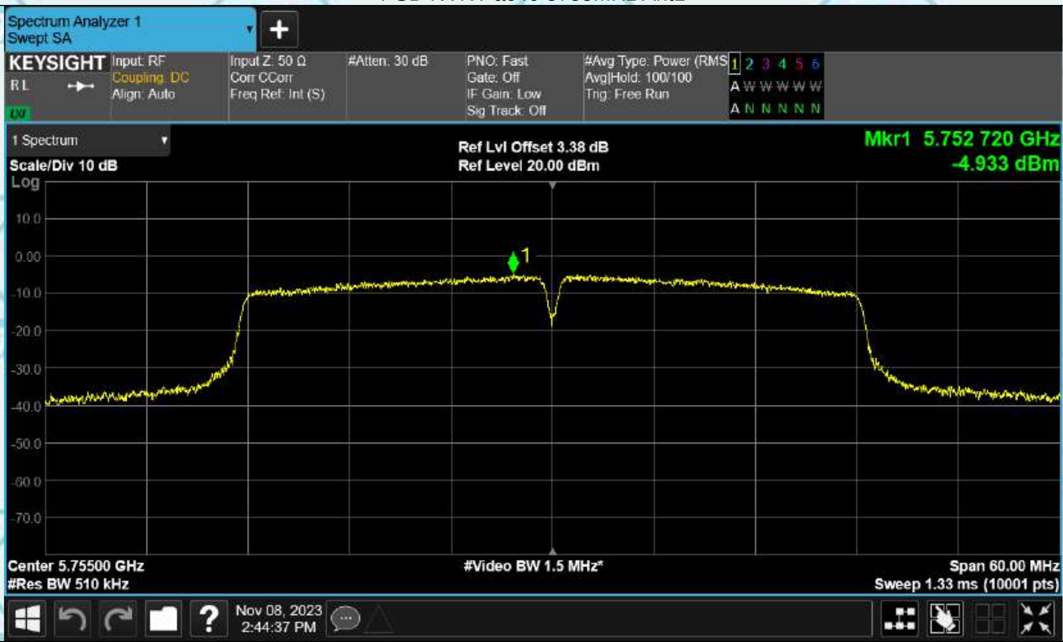
PSD NVNT ac40 5270MHz Ant1

PSD NVNT ac40 5310MHz Ant1

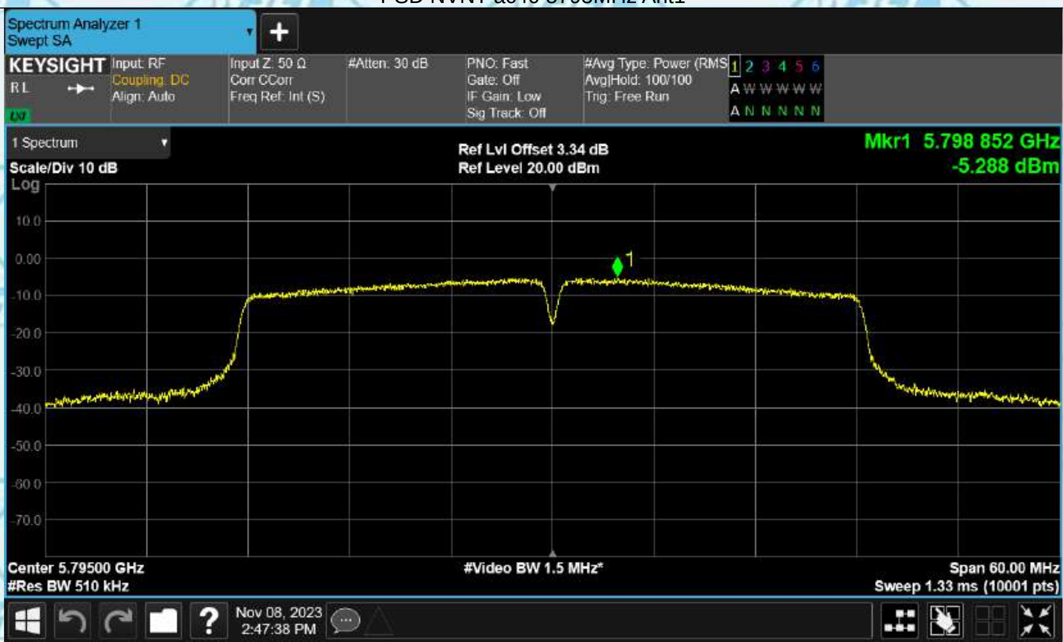
PSD NVNT ac40 5510MHz Ant1

PSD NVNT ac40 5670MHz Ant1

PSD NVNT ac40 5755MHz Ant1



PSD NVNT ac40 5795MHz Ant1



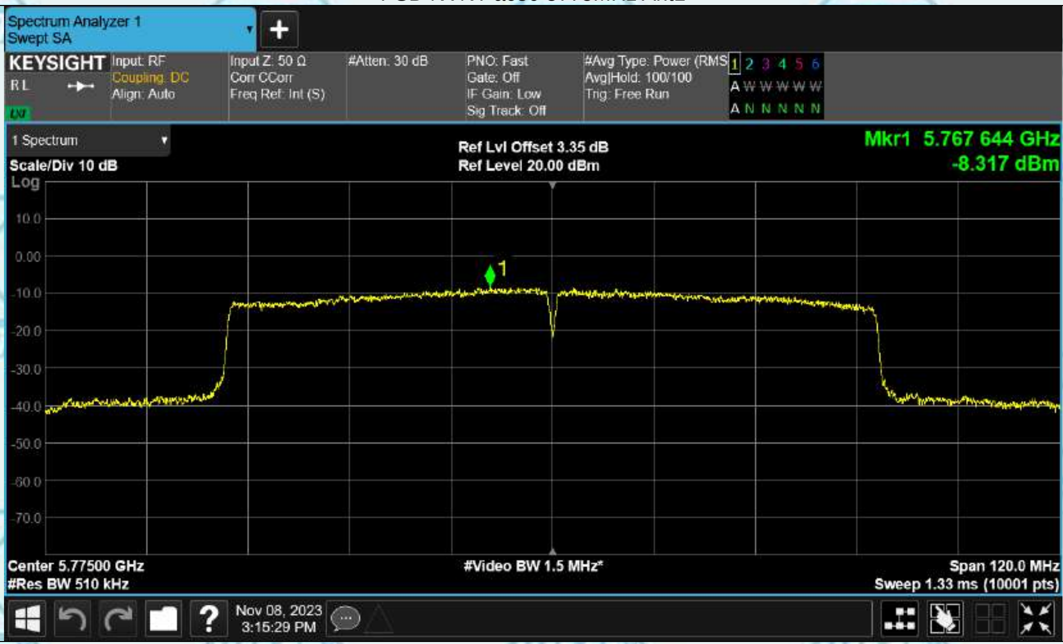
PSD NVNT ac80 5210MHz Ant1

PSD NVNT ac80 5290MHz Ant1

PSD NVNT ac80 5530MHz Ant1

PSD NVNT ac80 5610MHz Ant1

PSD NVNT ac80 5775MHz Ant1



7.8 FREQUENCY STABILITY

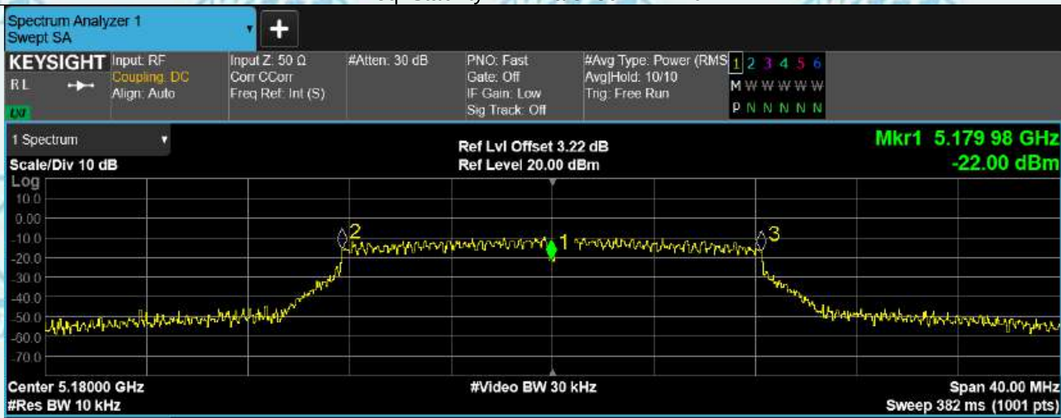
Product:	EUT-Sample	**Test Item:**	Frequency Stability
Temperature:	25 ℃	**Humidity:**	56%RH
Test Voltage:	DC 3.8V	**Test Result:**	PASS

Mode	Frequency (MHz)	Antenna	Measured Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
a	5180	Ant1	5179.98	-20000	-3.86	25	Pass
a	5240	Ant1	5239.96	-40000	-7.63	25	Pass
a	5260	Ant1	5259.96	-40000	-7.6	25	Pass
a	5320	Ant1	5320	0	0	25	Pass
a	5500	Ant1	5499.98	-20000	-3.64	25	Pass
a	5700	Ant1	5700	0	0	25	Pass
a	5745	Ant1	5744.98	-20000	-3.48	25	Pass
a	5825	Ant1	5825	0	0	25	Pass
n20	5180	Ant1	5179.94	-60000	-11.58	25	Pass
n20	5240	Ant1	5239.96	-40000	-7.63	25	Pass
n20	5260	Ant1	5259.98	-20000	-3.8	25	Pass
n20	5320	Ant1	5319.98	-20000	-3.76	25	Pass
n20	5500	Ant1	5499.98	-20000	-3.64	25	Pass
n20	5700	Ant1	5699.96	-40000	-7.02	25	Pass
n20	5745	Ant1	5744.98	-20000	-3.48	25	Pass
n20	5825	Ant1	5824.98	-20000	-3.43	25	Pass
n40	5190	Ant1	5190	0	0	25	Pass
n40	5230	Ant1	5229.96	-40000	-7.65	25	Pass
n40	5270	Ant1	5269.96	-40000	-7.59	25	Pass
n40	5310	Ant1	5310	0	0	25	Pass
n40	5510	Ant1	5509.96	-40000	-7.26	25	Pass
n40	5670	Ant1	5670	0	0	25	Pass
n40	5755	Ant1	5754.96	-40000	-6.95	25	Pass
n40	5795	Ant1	5795	0	0	25	Pass
ac20	5180	Ant1	5179.98	-20000	-3.86	25	Pass
ac20	5240	Ant1	5240	0	0	25	Pass
ac20	5260	Ant1	5259.98	-20000	-3.8	25	Pass
ac20	5320	Ant1	5320	0	0	25	Pass
ac20	5500	Ant1	5499.98	-20000	-3.64	25	Pass
ac20	5700	Ant1	5699.96	-40000	-7.02	25	Pass
ac20	5745	Ant1	5744.98	-20000	-3.48	25	Pass
ac20	5825	Ant1	5825	0	0	25	Pass
ac40	5190	Ant1	5189.96	-40000	-7.71	25	Pass
ac40	5230	Ant1	5229.96	-40000	-7.65	25	Pass
ac40	5270	Ant1	5270	0	0	25	Pass
ac40	5310	Ant1	5309.96	-40000	-7.53	25	Pass
ac40	5510	Ant1	5509.96	-40000	-7.26	25	Pass
ac40	5670	Ant1	5669.96	-40000	-7.05	25	Pass
ac40	5755	Ant1	5754.96	-40000	-6.95	25	Pass
ac40	5795	Ant1	5794.96	-40000	-6.9	25	Pass
ac80	5210	Ant1	5210	0	0	25	Pass
ac80	5290	Ant1	5290	0	0	25	Pass
ac80	5530	Ant1	5529.92	-80000	-14.47	25	Pass
ac80	5610	Ant1	5610.08	80000	14.26	25	Pass
ac80	5775	Ant1	5775	0	0	25	Pass

Test plots as follows:

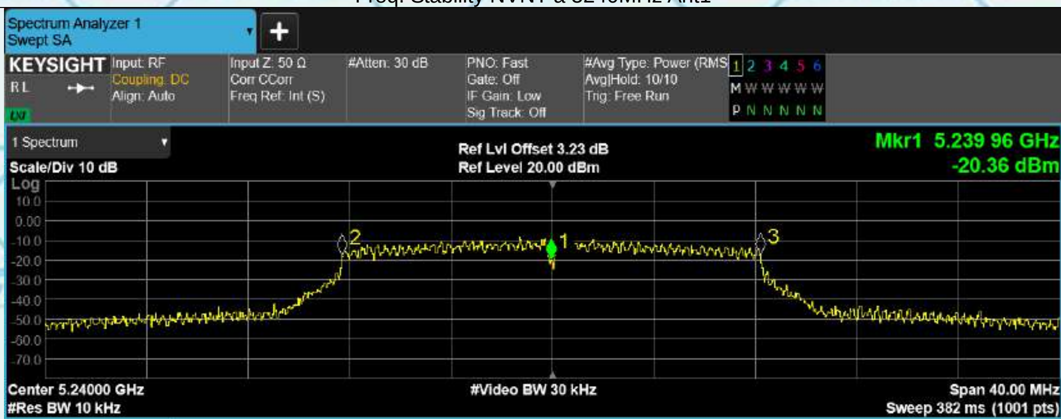
Test Graphs

Freq. Stability NVNT a 5180MHz Ant1



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.179 98 GHz	-22.00 dBm			
2	N	1	f	5.171 72 GHz	-16.46 dBm			
3	N	1	f	5.188 24 GHz	-17.86 dBm			
4								
5								
6								

Freq. Stability NVNT a 5240MHz Ant1



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.239 96 GHz	-20.36 dBm			
2	N	1	f	5.231 72 GHz	-18.01 dBm			
3	N	1	f	5.248 20 GHz	-17.71 dBm			
4								
5								
6								

Freq. Stability NVNT a 5260MHz Ant1

Freq. Stability NVNT a 5320MHz Ant1

Freq. Stability NVNT a 5500MHz Ant1

Freq. Stability NVNT a 5700MHz Ant1

Freq. Stability NVNT a 5745MHz Ant1

Freq. Stability NVNT a 5825MHz Ant1

Freq. Stability NVNT n20 5180MHz Ant1

Freq. Stability NVNT n20 5240MHz Ant1

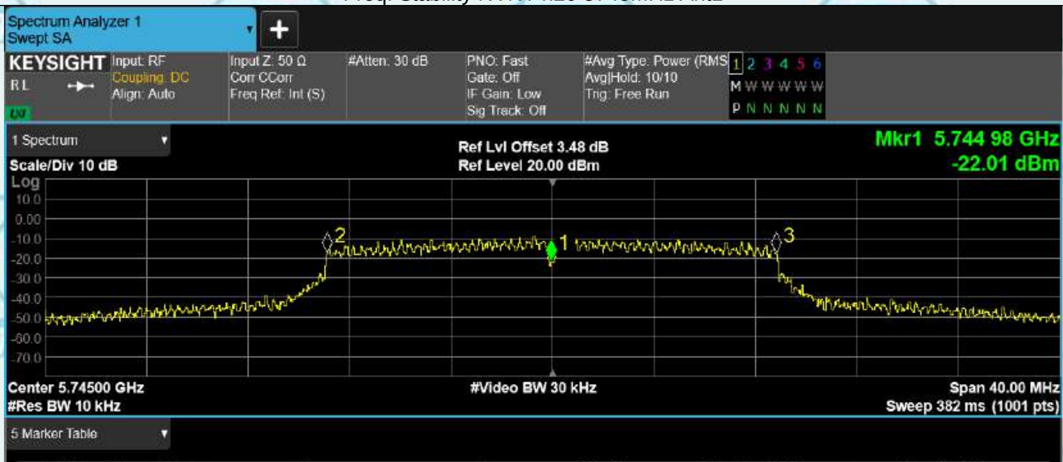
Freq. Stability NVNT n20 5260MHz Ant1

Freq. Stability NVNT n20 5320MHz Ant1

Freq. Stability NVNT n20 5500MHz Ant1

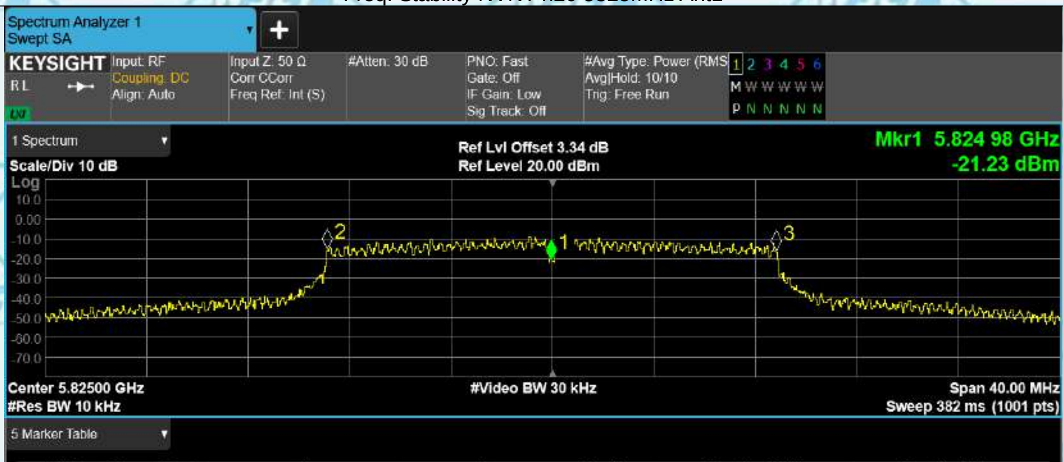
Freq. Stability NVNT n20 5700MHz Ant1

Freq. Stability NVNT n20 5745MHz Ant1



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.744 98 GHz	-22.01 dBm			
2	N	1	f	5.736 12 GHz	-18.27 dBm			
3	N	1	f	5.753 84 GHz	-17.99 dBm			
4								
5								
6								

Freq. Stability NVNT n20 5825MHz Ant1



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.824 98 GHz	-21.23 dBm			
2	N	1	f	5.816 12 GHz	-15.80 dBm			
3	N	1	f	5.833 84 GHz	-16.79 dBm			
4								
5								
6								

Freq. Stability NVNT n40 5190MHz Ant1

Freq. Stability NVNT n40 5230MHz Ant1

Freq. Stability NVNT n40 5270MHz Ant1

Freq. Stability NVNT n40 5310MHz Ant1

Freq. Stability NVNT n40 5510MHz Ant1

Freq. Stability NVNT n40 5670MHz Ant1

Freq. Stability NVNT n40 5755MHz Ant1

Freq. Stability NVNT n40 5795MHz Ant1

Freq. Stability NVNT ac20 5180MHz Ant1

Freq. Stability NVNT ac20 5240MHz Ant1

Freq. Stability NVNT ac20 5260MHz Ant1

Freq. Stability NVNT ac20 5320MHz Ant1

Freq. Stability NVNT ac20 5500MHz Ant1

Freq. Stability NVNT ac20 5700MHz Ant1

Freq. Stability NVNT ac20 5745MHz Ant1

Freq. Stability NVNT ac20 5825MHz Ant1

Freq. Stability NVNT ac40 5190MHz Ant1

Freq. Stability NVNT ac40 5230MHz Ant1

Freq. Stability NVNT ac40 5270MHz Ant1

Freq. Stability NVNT ac40 5310MHz Ant1

Freq. Stability NVNT ac40 5510MHz Ant1

Freq. Stability NVNT ac40 5670MHz Ant1

Freq. Stability NVNT ac40 5755MHz Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.754 96 GHz	-27.15 dBm			
2	N	1	f	5.736 76 GHz	-21.04 dBm			
3	N	1	f	5.773 16 GHz	-21.02 dBm			
4								
5								
6								

Freq. Stability NVNT ac40 5795MHz Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.794 96 GHz	-26.48 dBm			
2	N	1	f	5.776 76 GHz	-21.46 dBm			
3	N	1	f	5.813 16 GHz	-18.66 dBm			
4								
5								
6								

Freq. Stability NVNT ac80 5210MHz Ant1

Freq. Stability NVNT ac80 5290MHz Ant1

Freq. Stability NVNT ac80 5530MHz Ant1

Freq. Stability NVNT ac80 5610MHz Ant1

Freq. Stability NVNT ac80 5775MHz Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.775 00 GHz	-29.06 dBm			
2	N	1	f	5.736 76 GHz	-22.96 dBm			
3	N	1	f	5.813 24 GHz	-23.70 dBm			
4								
5								
6								

7.9 BAND EDGE EMISSIONS

7.9.1 TEST EQUIPMENT

Please refer to Section 4 this report.

7.9.2 TEST PROCEDURE

Band Edge Emissions Measurement:	
Test Method:	a.)The EUT was tested according to ANSI C63.10. b)The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 1.5 m. All set up is according to ANSI C63.10. c)The frequency spectrum from 9 kHz to 40 GHz was investigated. All readings from 9 kHz to 150 kHz are quasi-peak values with a resolution bandwidth of 200 Hz. All readings from 150 kHz to 30 MHz are quasi-peak values with a resolution bandwidth of 9 KHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters. d)The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. The Receiving antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency. Emissions below 30MHz were measured with a loop antenna while emission above 30MHz were measured using a broadband E-field antenna. e) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table. f)Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.10.

Band Edge Emissions Measurement:	
Test Equipment Setting:	
a)Attenuation: Auto b)Span Frequency: 100 MHz c)RBW/VBW (Emission in restricted band): 1MHz / 3MHz for Peak, 1MHz / 1/T for Average	d)RBW/VBW(Emission in non-restricted band) 1MHz / 3MHz for peak

7.9.3 TEST SETUP

Same as section 3.4 of this report

7.9.4 CONFIGURATION OF THE EUT

Same as section 3.4 of this report

7.9.5 EUT OPERATING CONDITION

Same as section 3.4 of this report.

7.9.6 LIMIT

Spurious Radiated Emission & Band Edge Emissions Measurement:	
Limit:	For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz. In any 100 KHz bandwidth outside the operating frequency band, the radio frequency power that is produced by modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 KHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in section 15.209(a), which lesser attenuation. All other emissions inside restricted bands specified in section 15.205(a) shall not exceed the general radiated emission limits specified in section 15.209(a)
Note: Applies to harmonics/spurious emissions that fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209. 47 CFR § 15.237(c): The emission limits as specified above are based on measurement instrument employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.	

7.9.7 TEST RESULT

Band Edge and Fundamental Emissions

Product:	EUT-Sample	Test Mode:	20MHzIEEE 802.11a/n/ac
Test Item:	Band Edge and Fundamental Emissions	Temperature:	25 ℃
Test Voltage:	DC 3.8V	Humidity:	56%RH
Test Result:	PASS		

Test Graphs

Band Edge NVNT a 5180MHz Low Ant1

Band Edge NVNT a 5240MHz High Ant1

Band Edge NVNT a 5260MHz Low Ant1

Band Edge NVNT a 5320MHz High Ant1

Band Edge NVNT a 5500MHz Low Ant1

Band Edge NVNT a 5700MHz High Ant1

Band Edge NVNT a 5745MHz Low Ant1

Band Edge NVNT a 5825MHz High Ant1

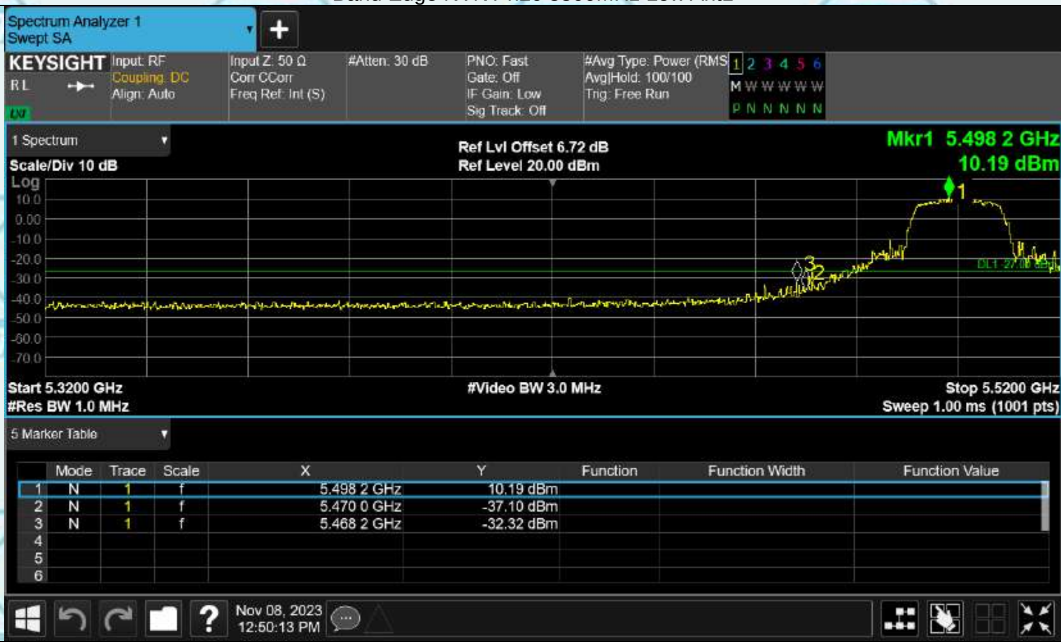
Band Edge NVNT n20 5180MHz Low Ant1

Band Edge NVNT n20 5240MHz High Ant1

Band Edge NVNT n20 5260MHz Low Ant1

Band Edge NVNT n20 5320MHz High Ant1

Band Edge NVNT n20 5500MHz Low Ant1



Band Edge NVNT n20 5700MHz High Ant1

Band Edge NVNT n20 5745MHz Low Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.744 4 GHz	11.52 dBm			
2	N	1	f	5.725 0 GHz	-21.97 dBm			
3	N	1	f	5.724 6 GHz	-17.80 dBm			
4								
5								
6								

Band Edge NVNT n20 5825MHz High Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.826 2 GHz	11.82 dBm			
2	N	1	f	5.850 0 GHz	-29.73 dBm			
3								
4								
5								
6								

Band Edge NVNT n40 5190MHz Low Ant1

Band Edge NVNT n40 5230MHz High Ant1

Band Edge NVNT n40 5270MHz Low Ant1

Band Edge NVNT n40 5310MHz High Ant1

Band Edge NVNT n40 5510MHz Low Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.507 8 GHz	5.104 dBm			
2	N	1	f	5.470 0 GHz	-37.72 dBm			
3	N	1	f	5.465 2 GHz	-30.00 dBm			
4								
5								
6								

Band Edge NVNT n40 5670MHz High Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.672 6 GHz	9.343 dBm			
2	N	1	f	5.725 0 GHz	-37.17 dBm			
3	N	1	f	5.742 0 GHz	-31.80 dBm			
4								
5								
6								

Band Edge NVNT n40 5755MHz Low Ant1

Band Edge NVNT n40 5795MHz High Ant1

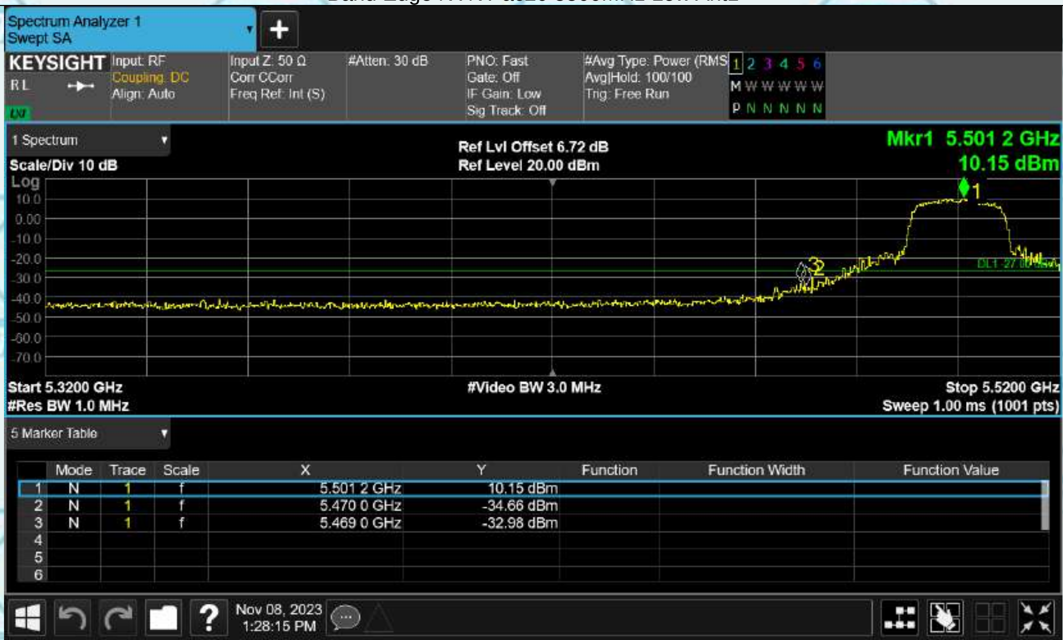
Band Edge NVNT ac20 5180MHz Low Ant1

Band Edge NVNT ac20 5240MHz High Ant1

Band Edge NVNT ac20 5260MHz Low Ant1

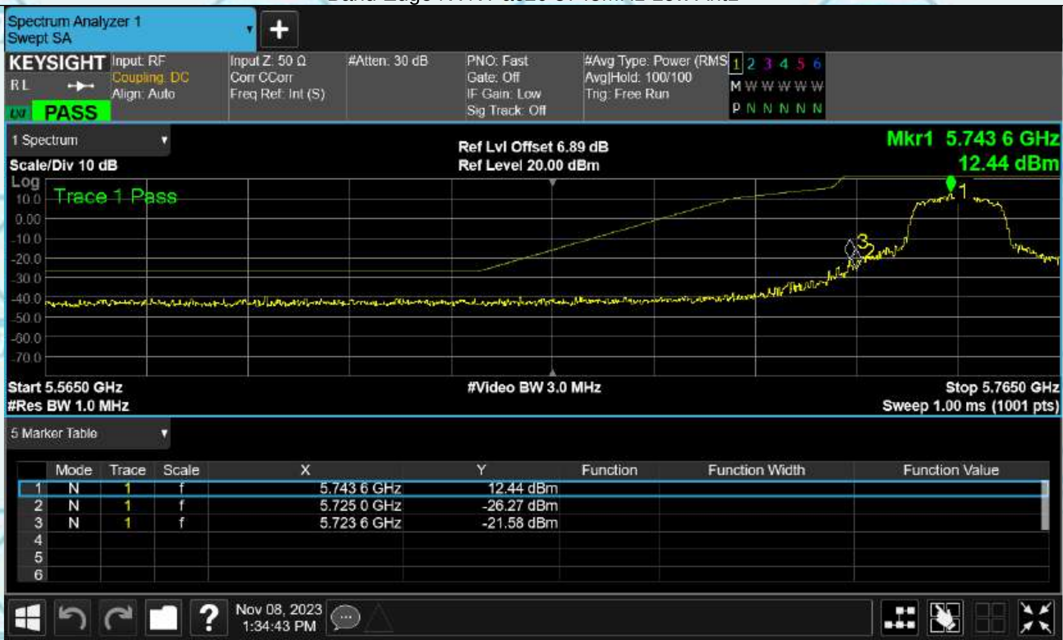
Band Edge NVNT ac20 5320MHz High Ant1

Band Edge NVNT ac20 5500MHz Low Ant1



Band Edge NVNT ac20 5700MHz High Ant1

Band Edge NVNT ac20 5745MHz Low Ant1



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.743 6 GHz	12.44 dBm			
2	N	1	f	5.725 0 GHz	-26.27 dBm			
3	N	1	f	5.723 6 GHz	-21.58 dBm			
4								
5								
6								

Band Edge NVNT ac20 5825MHz High Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.823 4 GHz	11.77 dBm			
2	N	1	f	5.850 0 GHz	-31.08 dBm			
3	N	1	f	5.850 8 GHz	-30.89 dBm			
4								
5								
6								

Band Edge NVNT ac40 5190MHz Low Ant1

Band Edge NVNT ac40 5230MHz High Ant1

Band Edge NVNT ac40 5270MHz Low Ant1

Band Edge NVNT ac40 5310MHz High Ant1

Band Edge NVNT ac40 5510MHz Low Ant1

Band Edge NVNT ac40 5670MHz High Ant1

Band Edge NVNT ac40 5755MHz Low Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.757 6 GHz	8.654 dBm			
2	N	1	f	5.725 0 GHz	-23.27 dBm			
3	N	1	f	5.719 0 GHz	-20.09 dBm			
4								
5								
6								

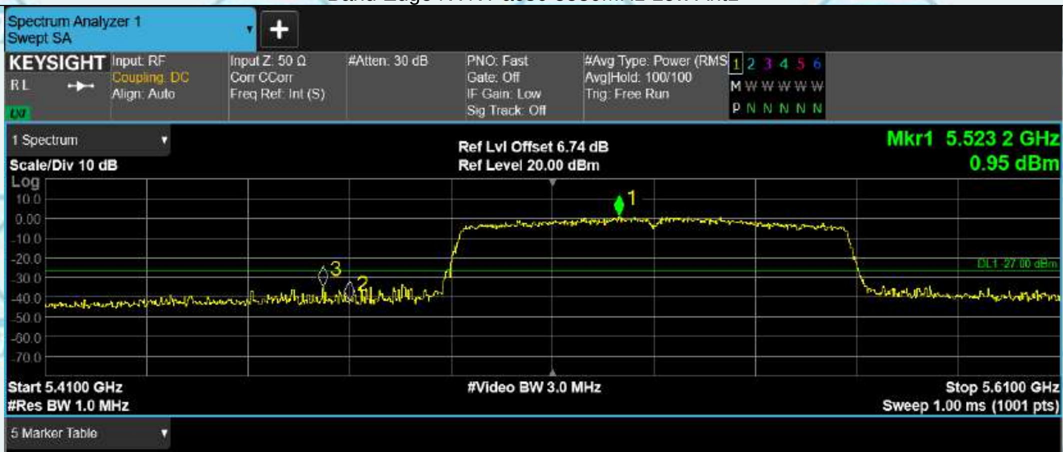
Band Edge NVNT ac40 5795MHz High Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.792 8 GHz	8.713 dBm			
2	N	1	f	5.850 0 GHz	-36.41 dBm			
3	N	1	f	5.851 4 GHz	-36.29 dBm			
4								
5								
6								

Band Edge NVNT ac80 5210MHz Low Ant1

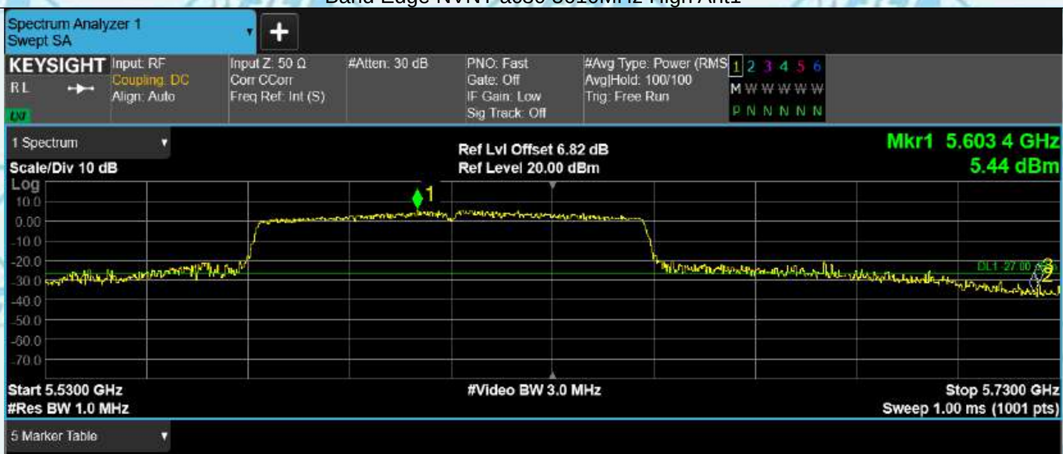
Band Edge NVNT ac80 5290MHz Low Ant1

Band Edge NVNT ac80 5530MHz Low Ant1



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.523 2 GHz	0.9520 dBm			
2	N	1	f	5.470 0 GHz	-42.56 dBm			
3	N	1	f	5.464 8 GHz	-35.28 dBm			
4								
5								
6								

Band Edge NVNT ac80 5610MHz High Ant1



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.603 4 GHz	5.442 dBm			
2	N	1	f	5.725 0 GHz	-36.74 dBm			
3	N	1	f	5.725 8 GHz	-32.48 dBm			
4								
5								
6								

Band Edge NVNT ac80 5775MHz Low Ant1

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.768 6 GHz	6.207 dBm			
2	N	1	f	5.725 0 GHz	-21.19 dBm			
3	N	1	f	5.724 0 GHz	-19.77 dBm			
4								
5								
6								

7.10 DYNAMIC FREQUENCY SELECTION (DFS)

7.10.1 DFS OVERVIEW

A U-NII network will employ a DFS function to detect signals from radar systems and to avoid co-channel operation with these systems. This applies to the 5250-5350 MHz and/or 5470-5725 MHz bands.

Within the context of the operation of the DFS function, a U-NII device will operate in either *Master Mode* or *Client Mode*. U-NII devices operating in *Client Mode* can only operate in a network controlled by a U-NII device operating in *Master Mode*.

Tables 1 and 2 shown below summarize the information contained in sections 5.1.1 and 5.1.2

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

The operational behavior and individual DFS requirements that are associated with these modes are as follows:

DFS Detection Thresholds

Table 3 below provides the *DFS Detection Thresholds* for *Master Devices* as well as *Client Devices* incorporating *In-Service Monitoring*.

Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Response Requirements

Table 4 provides the response requirements for *Master* and *Client Devices* incorporating DFS.

Table 4: DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.
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.	

RADAR TEST WAVEFORMS

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu sec}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

For example if in Short Pulse Radar Type 1 Test B a PRI of 3066 µsec is selected, the number of pulses would be

Roundup $\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{3066}\right)\right\}$ = Round up {17.2} = 18.

Table 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4. For example, the following table indicates how to compute the aggregate of percentage of successful detections.

Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detection
1	35	29	82.9%
2	30	18	60%
3	30	27	90%
4	50	44	88%
Aggregate (82.9% + 60% + 90% + 88%)/4 = 80.2%			

Long Pulse Radar Test Waveform

Table 6 – Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per *Burst*	Number of *Bursts*	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, then each additional waveform must also be unique and not repeated from the previous waveforms.

Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.

2) There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.

3) Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.

4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.

5) Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *transmission period* will have the same chirp width. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.

6) If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the random time interval between the first and second pulses is chosen independently of the random time interval between the second and third pulses.

7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst Count*. Each interval is of length (12,000,000 / *Burst Count*) microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and [(12,000,000 / *Burst Count*) – (Total *Burst* Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen randomly.

A representative example of a Long Pulse Radar Type waveform:

1) The total test waveform length is 12 seconds.

2) Eight (8) *Bursts* are randomly generated for the *Burst Count*.

3) *Burst* 1 has 2 randomly generated pulses.

4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.

5) The PRI is randomly selected to be at 1213 microseconds.

6) *Bursts* 2 through 8 are generated using steps 3 – 5.

7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random

PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).

Figure 1 provides a graphical representation of the Long Pulse Radar Test Waveform.

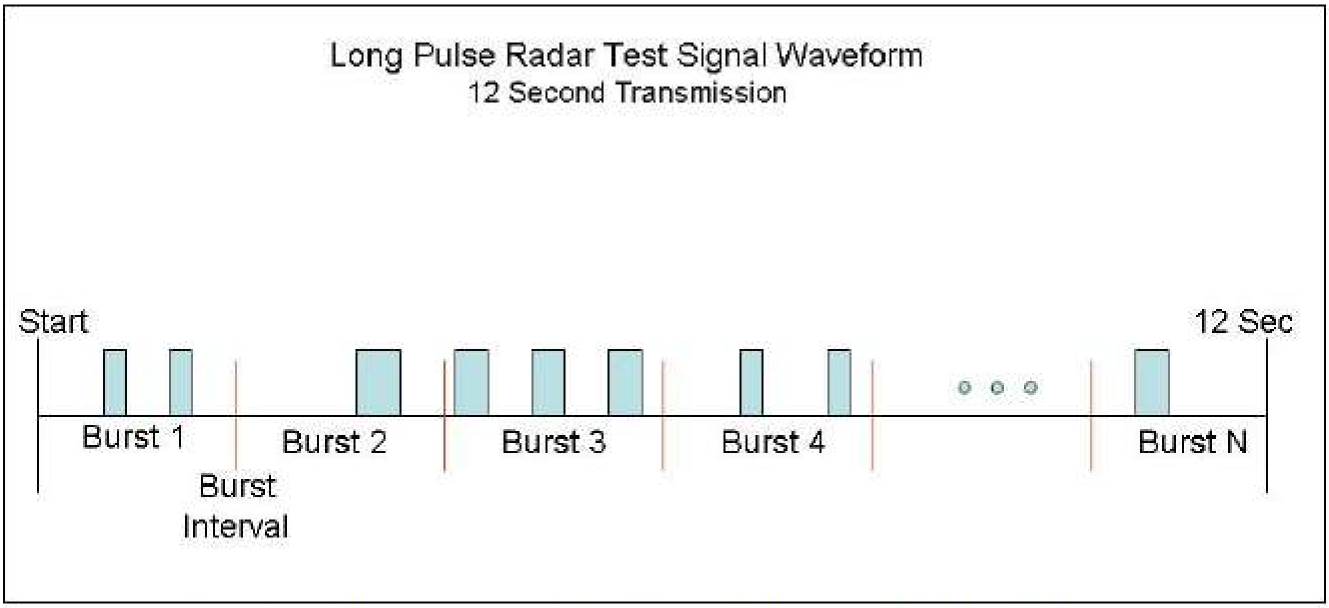


Figure 1: Graphical Representation of a Long Pulse Radar Type Waveform

Frequency Hopping Radar Test Waveform

Table 7 – Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

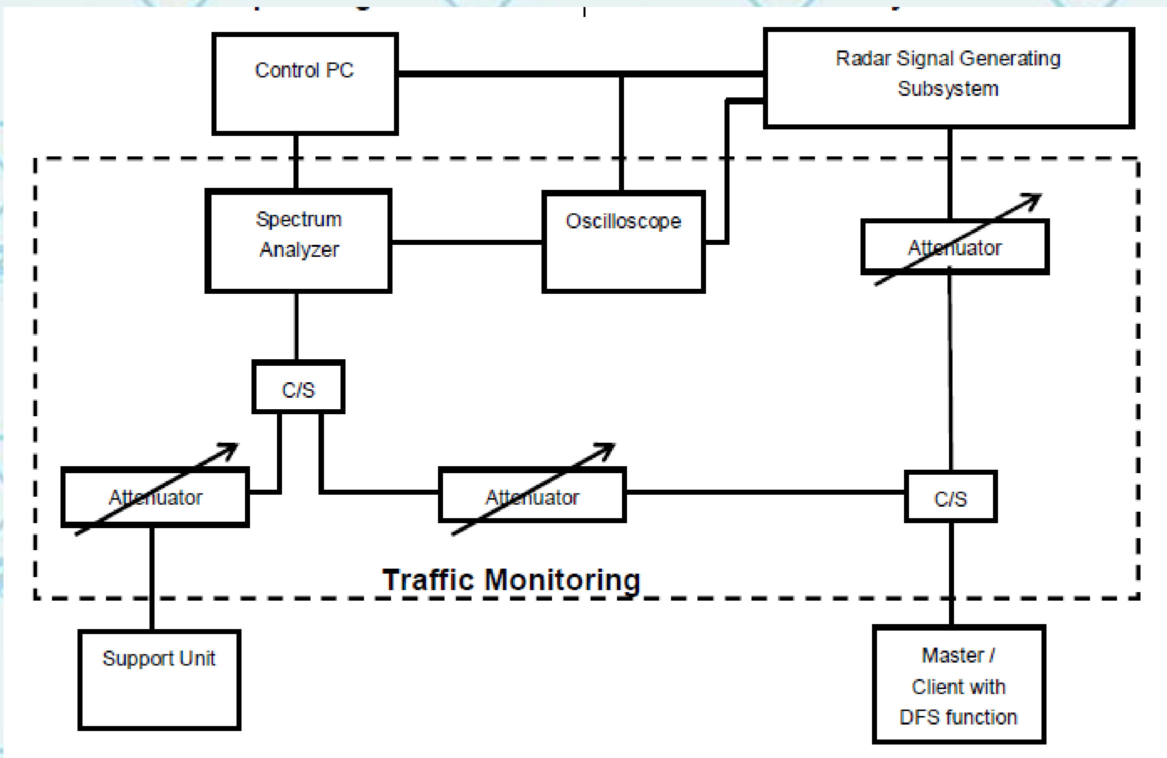
For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm: 4

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

7.10.2 TEST PROCEDURE

DFS MEASUREMENT SYSTEM

A complete DFS Measurement System consists of two subsystems:
(1) The Radar Signal Generating Subsystem and
(2) The Traffic Monitoring Subsystem.
The control PC is necessary for generating the Radar waveforms in Table 10, 11 and 12. The traffic monitoring subsystem is specified to the type of unit under test (UUT).



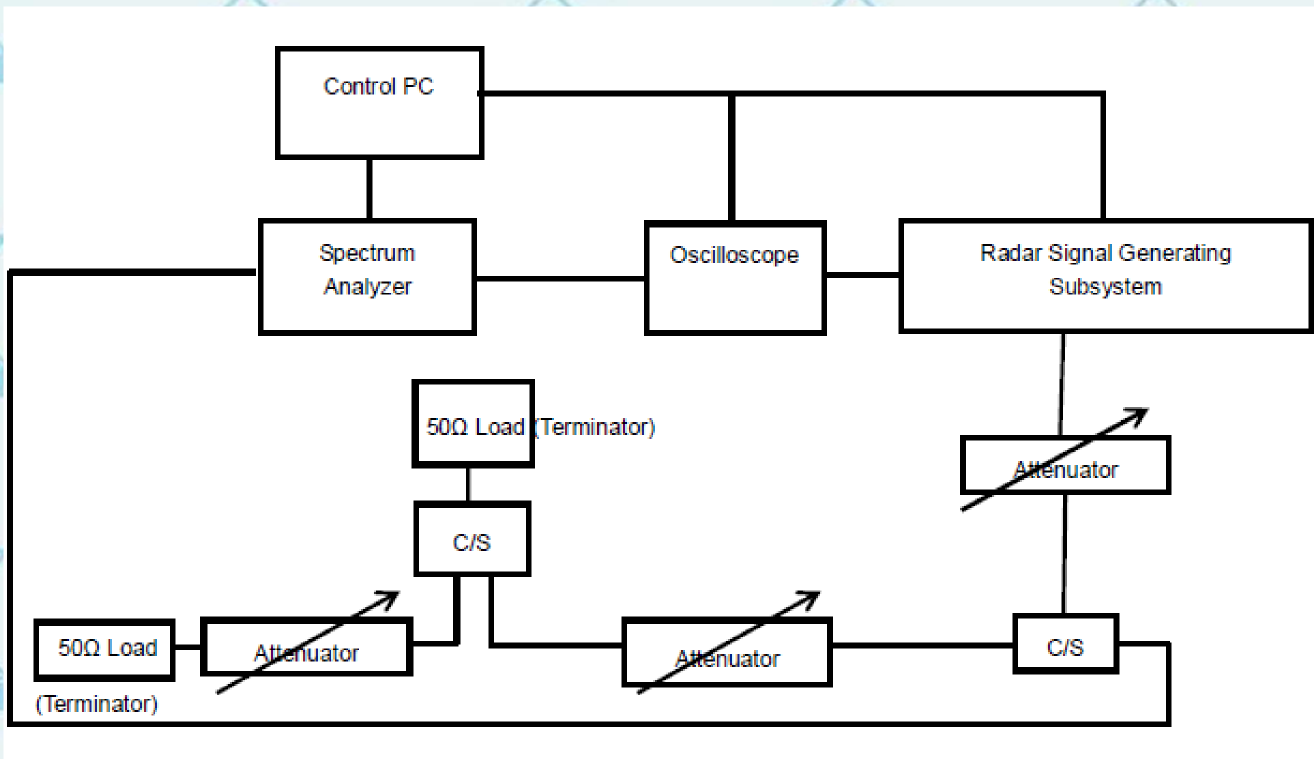
The test transmission will always be from the Master Device to the Client Device. While the Client device is set up to associate with the Master device and play the MPEG file (6 y Magic Hours) from Master device, the designated MPEG test file and instructions are located at: http://ntiacsd.ntia.doc.gov/dfs/.

CALIBRATION OF DFS DETECTION THRESHOLD LEVEL

The measured channel is 5260MHz. The radar signal was the same as transmitted channels, and injected into the antenna port of Client Device with Radar Detection, measured the channel closing transmission time and channel move time.

SLAVE WITHOUT RADAR DETECTION MODE

The antenna gain is -4dBi and required detection threshold is -65dBm (= -62 +1 - 4)dBm. The calibrated conducted detection threshold level is set to -65dBm.



DEVIATION FROM TEST STANDARD

No deviation.

7.10.3 TEST RESULT

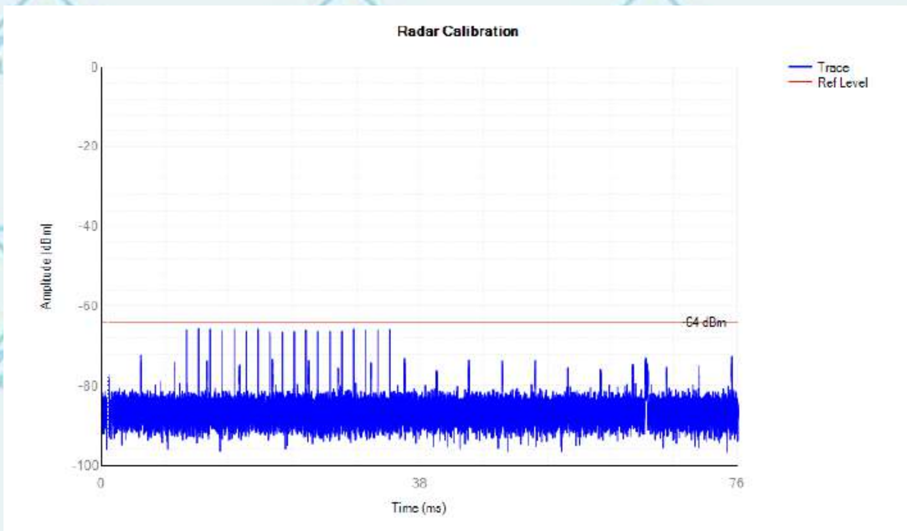
Test Items	Remark	Result
Channel Closing Transmission Time	Applicable	PASS
Channel Move Time	Applicable	PASS

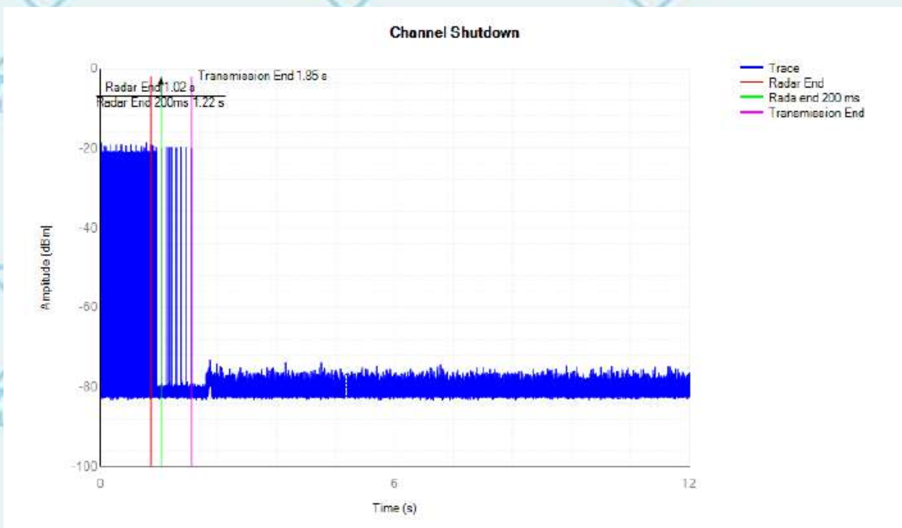
Note: This phone can only be used as a slave without radar detection function, and no signal was recovered in 30 minutes for Non-Occupancy period.

Measurement Record (the wost case)

Measurement data below:

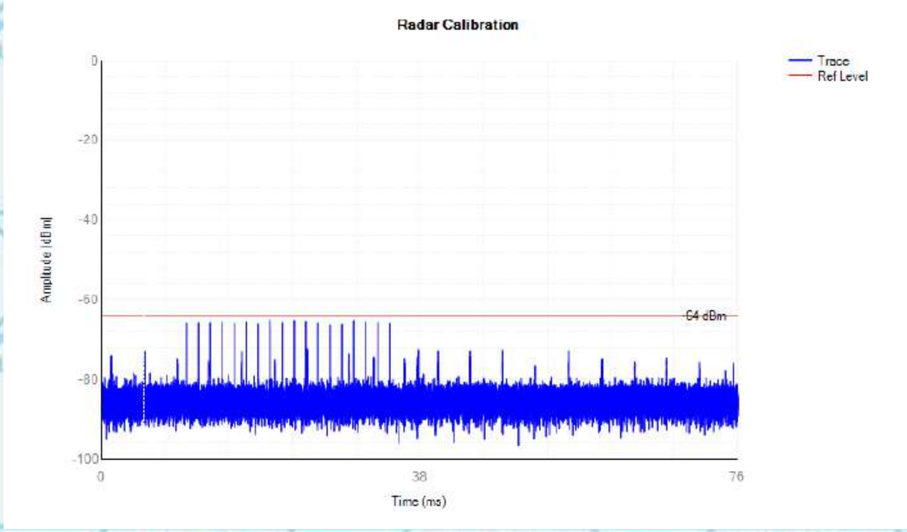
5320MHz			
Test Items	**Value（s）**	**Limit（s）**	**Test Result**
Channel Closing Transmission Time	0.026	1	Pass
Channel Move Time	0.8221	10	Pass

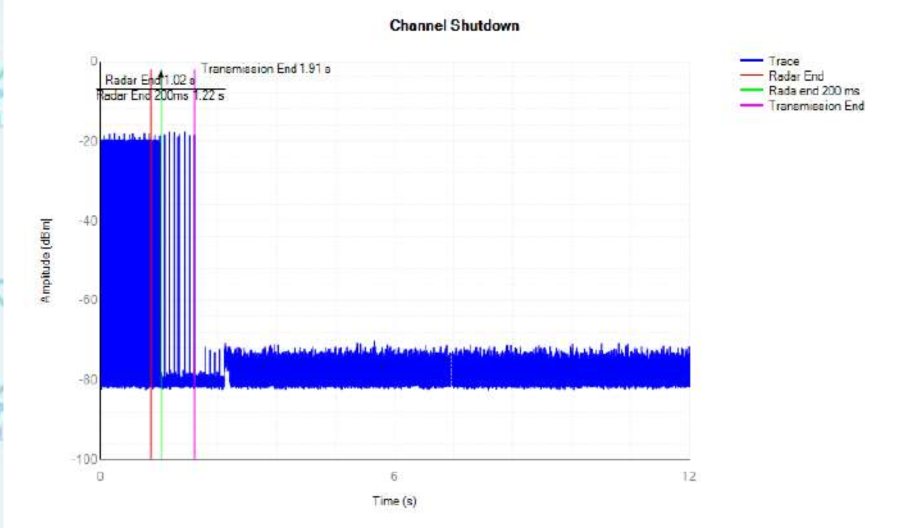




Measurement data below:

5500MHz			
Test Items	**Value（s）**	**Limit（s）**	**Test Result**
Channel Closing Transmission Time	0.0276	1	Pass
Channel Move Time	0.8897	10	Pass





*****END OF REPORT*****