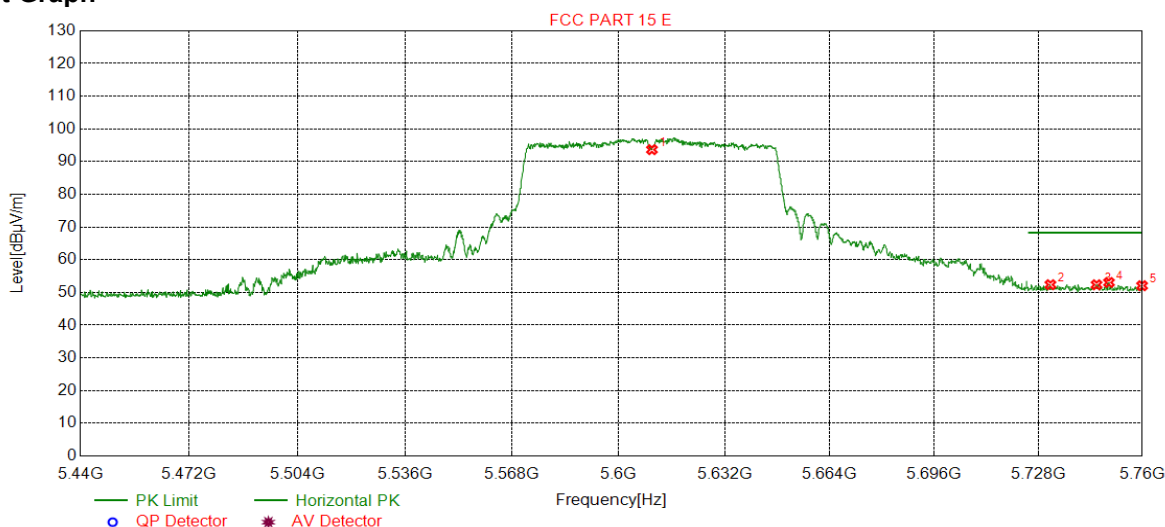


4.11.1.91 802.11AC80_Channel 122

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5610.00	93.67	16.58	0.00	-93.67	150	239	Horizontal
2	5731.66	52.38	17.00	68.30	15.92	150	267	Horizontal
3	5745.91	52.36	17.09	68.30	15.94	150	79	Horizontal
4	5749.75	53.05	17.12	68.30	15.25	150	106	Horizontal
5	5760.00	52.07	17.13	68.30	16.23	150	344	Horizontal

Final Data List

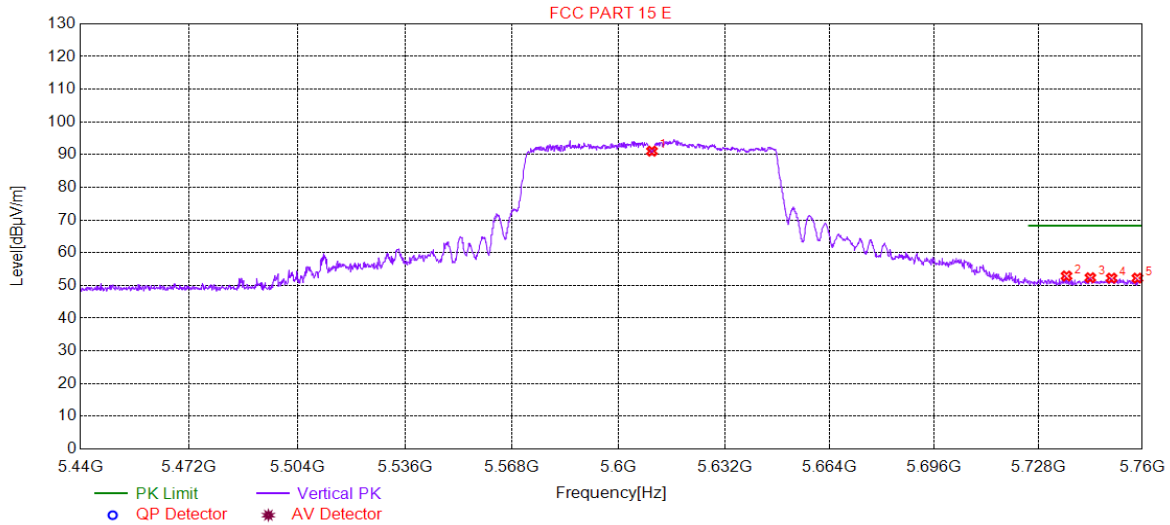


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4.11.1.92 802.11AC80_Channel 122

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5610.00	91.07	16.58	0.00	-91.07	150	103	Vertical
2	5736.62	52.91	17.03	68.30	15.39	150	84	Vertical
3	5743.99	52.38	17.08	68.30	15.92	150	66	Vertical
4	5750.55	52.25	17.12	68.30	16.05	150	38	Vertical
5	5758.55	52.25	17.13	68.30	16.05	150	305	Vertical

Final Data List



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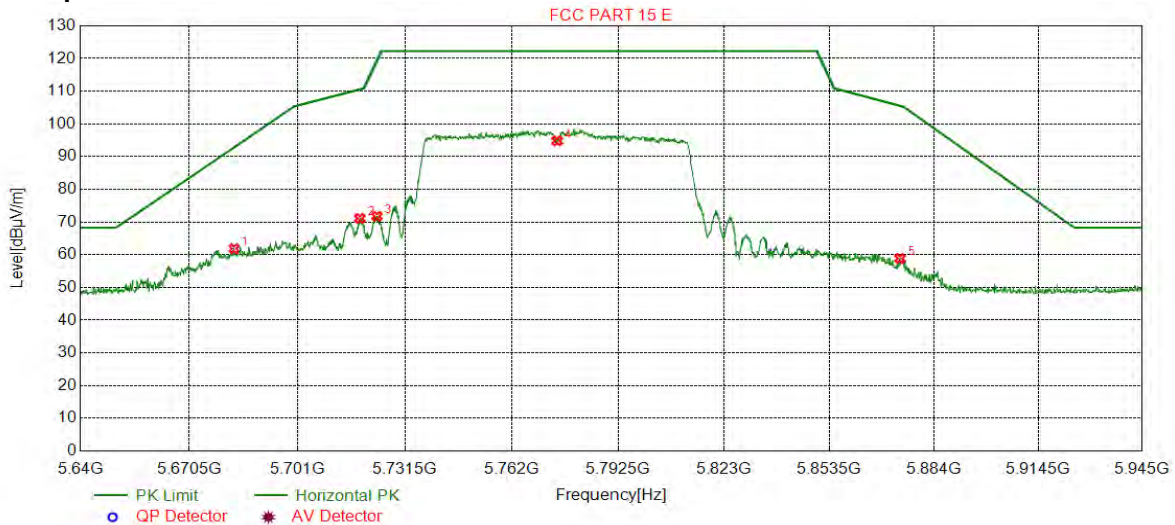
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4.11.1.93 802.11AC80_Channel 155

Test Graph



Suspected List

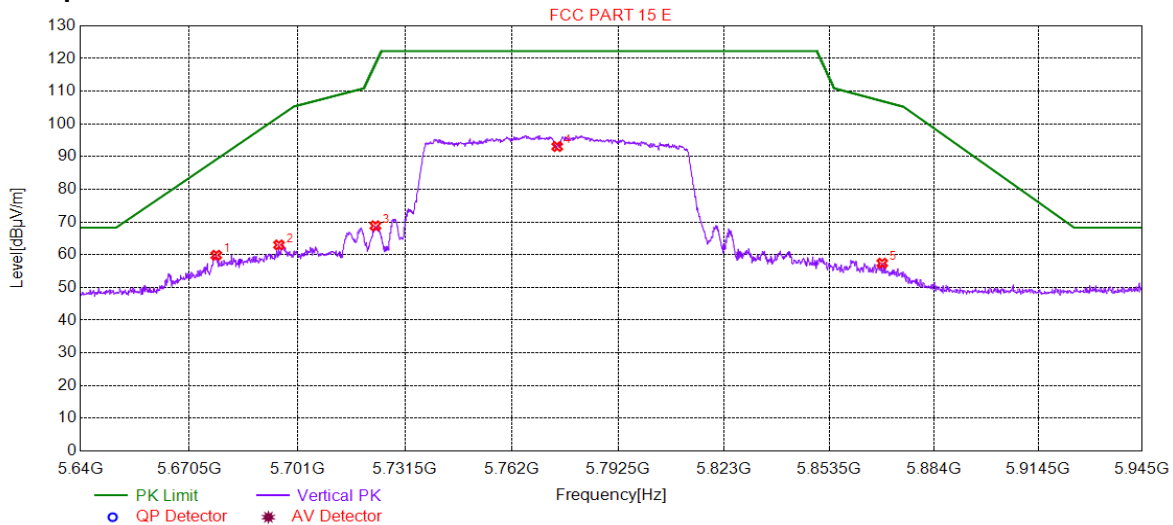
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5683.17	61.88	16.71	92.85	30.97	150	263	Horizontal
2	5718.72	71.14	16.92	110.54	39.40	150	263	Horizontal
3	5723.61	71.79	16.95	119.13	47.34	150	263	Horizontal
4	5775.00	94.83	17.16	122.30	27.47	150	263	Horizontal
5	5874.05	58.89	17.19	105.57	46.68	150	263	Horizontal

Final Data List



4.11.1.94 802.11AC80_Channel 155

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5678.14	59.86	16.68	89.13	29.27	150	66	Vertical
2	5695.84	63.02	16.78	102.22	39.20	150	66	Vertical
3	5723.15	68.86	16.95	118.09	49.23	150	98	Vertical
4	5775.00	93.10	17.16	122.30	29.20	150	70	Vertical
5	5868.86	57.44	17.20	107.02	49.58	150	66	Vertical

Final Data List

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

All modes have been tested, but only the worst case data displayed in this report.





4.12 Frequencies Stability

4.12.1 Frequency Error vs. Voltage:

Test Conditions	Measured Frequency (MHz)	
	5180	5805
V nom(V)	5180.009852	5805.004923
V max(V)	5180.016965	5805.012364
V min(V)	5180.024723	5805.013668
Max. Deviation Frequency	0.024723	0.013668
Max. Frequency Error (ppm)	4.772718	2.346460

4.12.2 Frequency Error vs. Temperature:

Test Conditions(°C)	Measured Frequency (MHz)	
	5180	5805
-5	5180.009301	5805.009645
5	5180.015326	5805.015632
15	5180.024344	5805.023441
25	5180.025248	5805.030955
35	5180.028218	5805.037671
45	5180.031425	5805.040419
50	5180.034367	5805.041676
Max. Deviation Frequency	0.034367	0.041676
Max. Frequency Error (ppm)	6.634544	7.154677



4.13 Dynamic Frequency Selection

4.13.1 DFS Overview

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

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
<i>Non-Occupancy Period</i>	Yes	Not required	Yes
<i>DFS Detection Threshold</i>	Yes	Not required	Yes
<i>Channel Availability Check Time</i>	Yes	Not required	Not required
<i>U-NII Detection Bandwidth</i>	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
<i>DFS Detection Threshold</i>	Yes	Not required
<i>Channel Closing Transmission Time</i>	Yes	Yes
<i>Channel Move Time</i>	Yes	Yes
<i>U-NII Detection Bandwidth</i>	Yes	Not required
Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>U-NII Detection Bandwidth and Statistical Performance Check</i>	All BW modes must be tested	Not required
<i>Channel Move Time and Channel Closing Transmission Time</i>	Test using widest BW mode available	Test using the widest BW mode available for the link
<i>All other tests</i>	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.		



4.13.2 DFS Detection Thresholds

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 $\geq$ 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.	

4.13.3 Response Requirements

Table 4: DFS Response Requirement Values

Parameter	Value
<i>Non-occupancy period</i>	Minimum 30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds See Note 1.
<i>Channel Closing Transmission Time</i>	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
<i>U-NII Detection Bandwidth</i>	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.





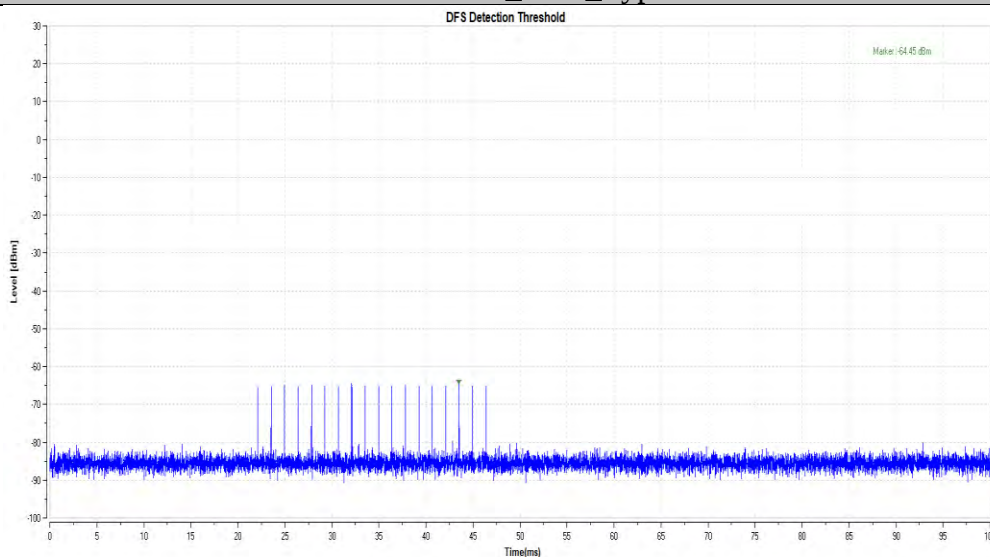
4.13.1 Test Result

TestMode	Channel	Radar Type	Result	Limit[dbm]	Verdict
11AC20SISO	5320	Type0	-64.45	-61.00	PASS
	5500	Type0	-63.73	-61.00	PASS
11AC80SISO	5290	Type0	-63.88	-61.00	PASS
	5530	Type0	-63.83	-61.00	PASS

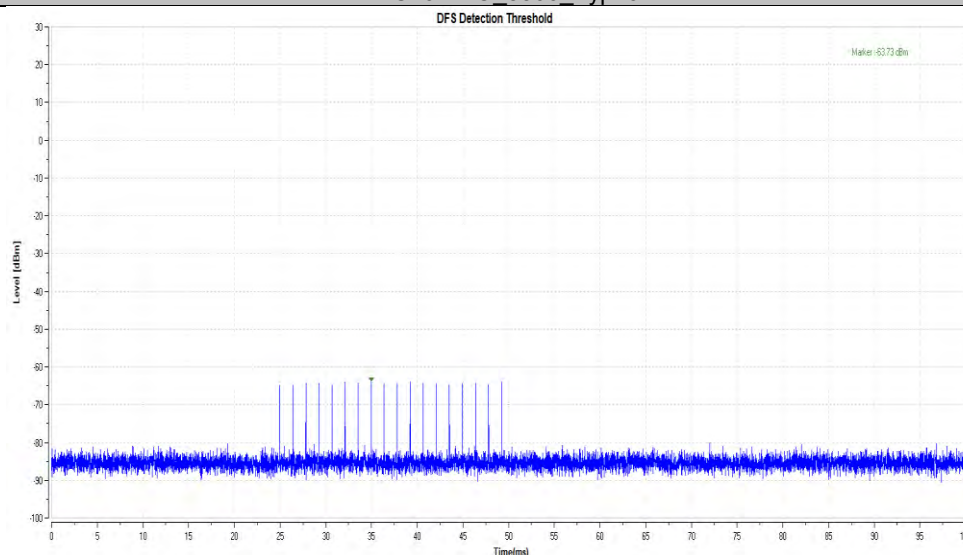


4.13.2 Test Graphs

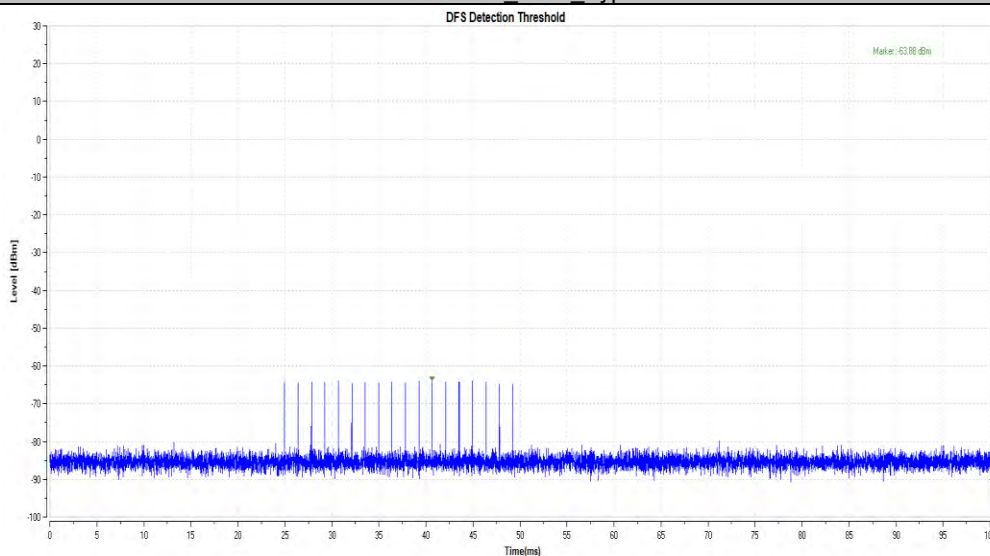
11AC20SISO_5320_Type0



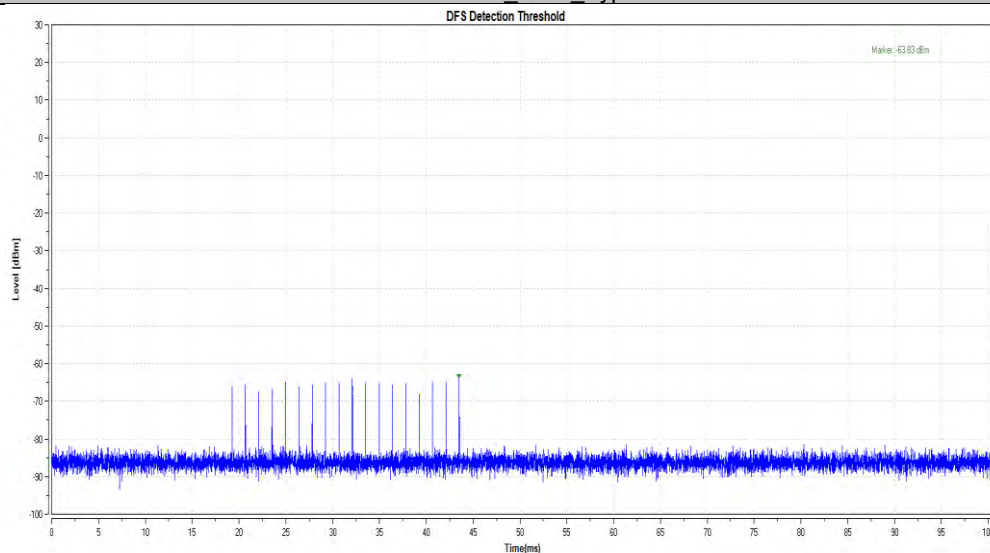
11AC20SISO_5500_Type0



11AC80SISO_5290_Type0



11AC80SISO_5530_Type0



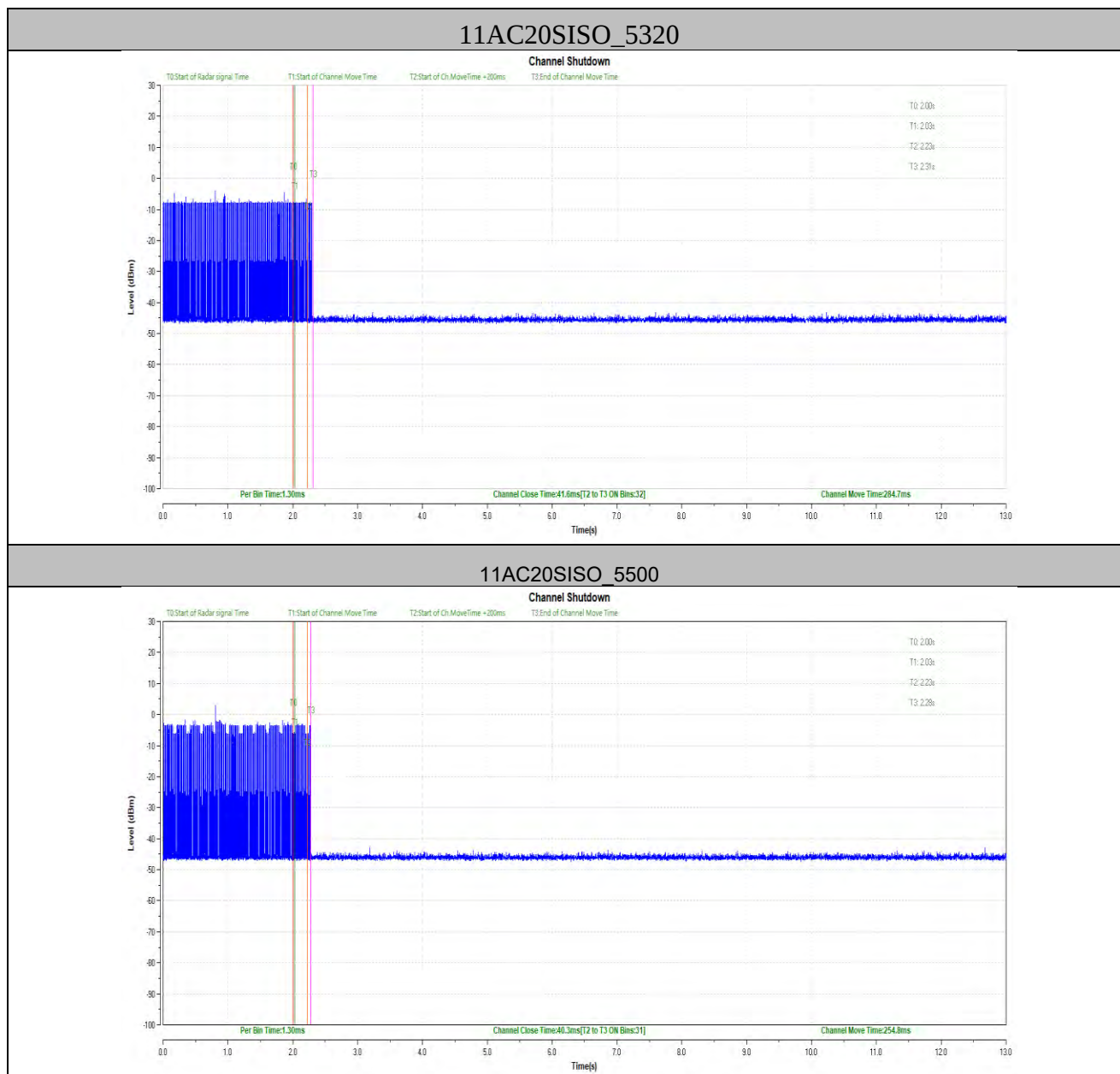


4.13.2.1 Channel Move Time and Channel Closing Transmission Time
4.13.1 Test Result

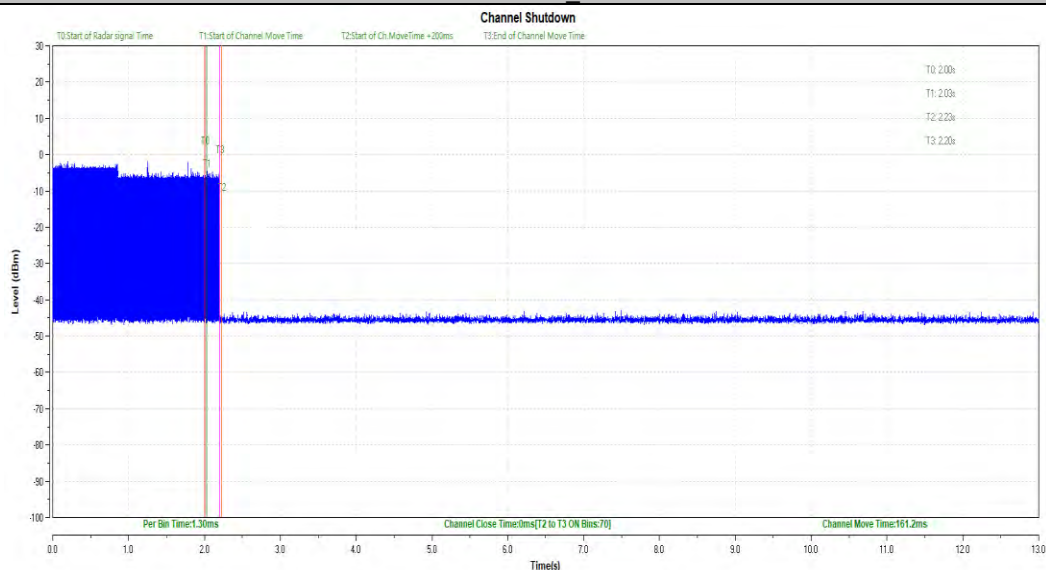
TestMode	Channel	CCT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11AC20SISO	5320	41.6	60	284.7	10000	PASS
	5500	40.3	60	254.8	10000	PASS
11AC80SISO	5290	0	60	161.2	10000	PASS
	5530	53.3	60	343.2	10000	PASS



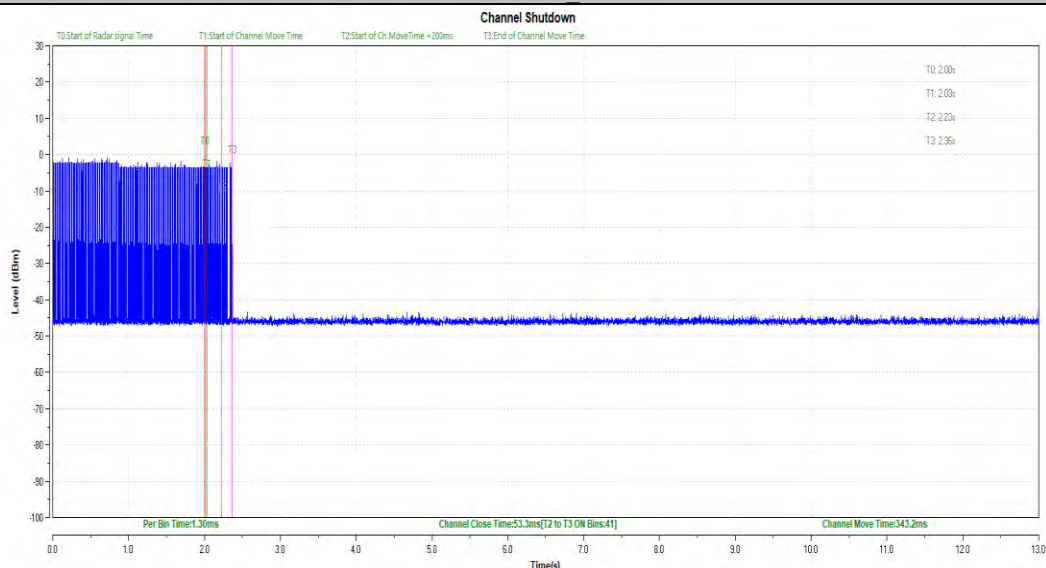
4.13.2 Test Graphs



11AC80SISO 5290



11AC80SISO 5530



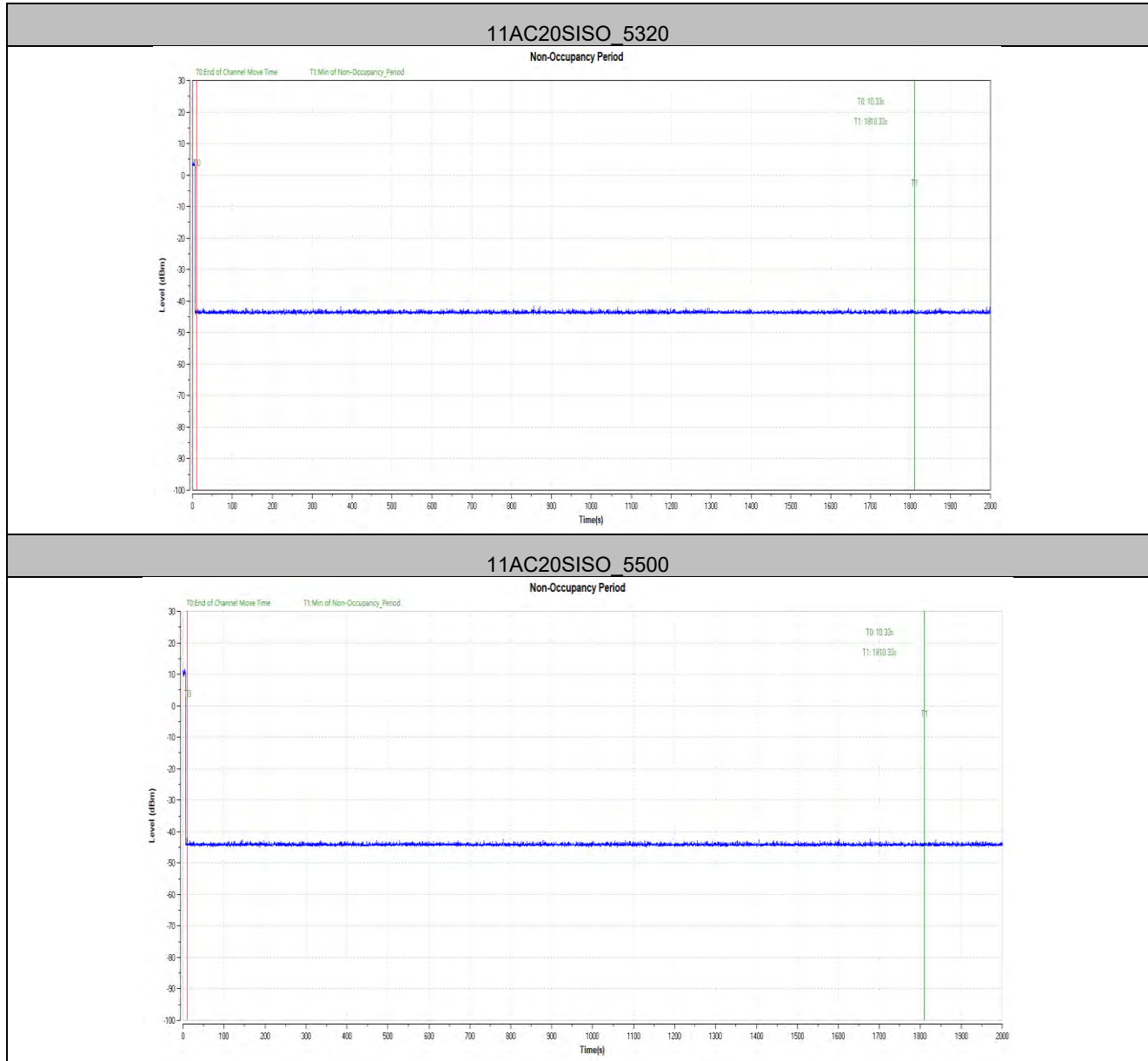


**4.13.3 Non-Occupancy Period
Test Result**

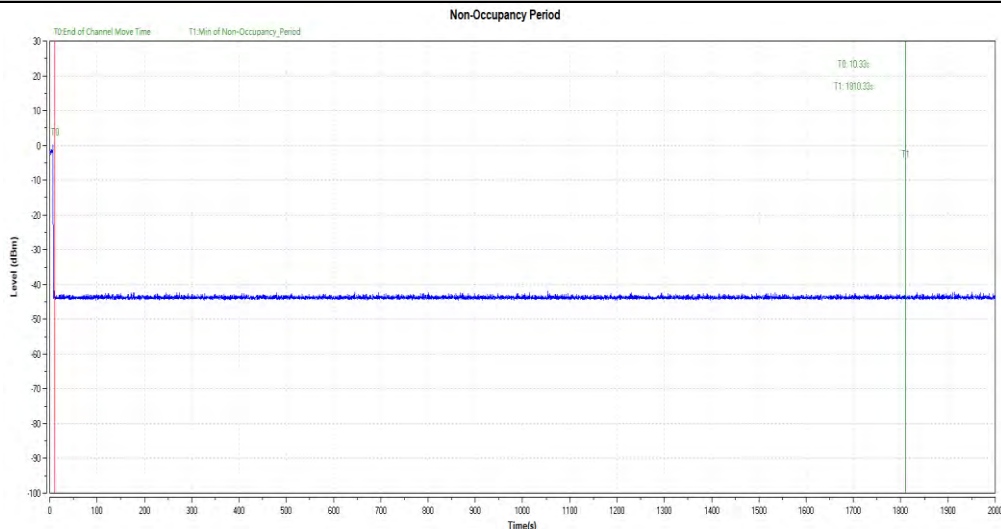
TestMode	Channel	Result	Limit[s]	Verdict
11AC20SISO	5320	see test graph	≥ 1800	PASS
	5500	see test graph	≥ 1800	PASS
11AC80SISO	5290	see test graph	≥ 1800	PASS
	5530	see test graph	≥ 1800	PASS



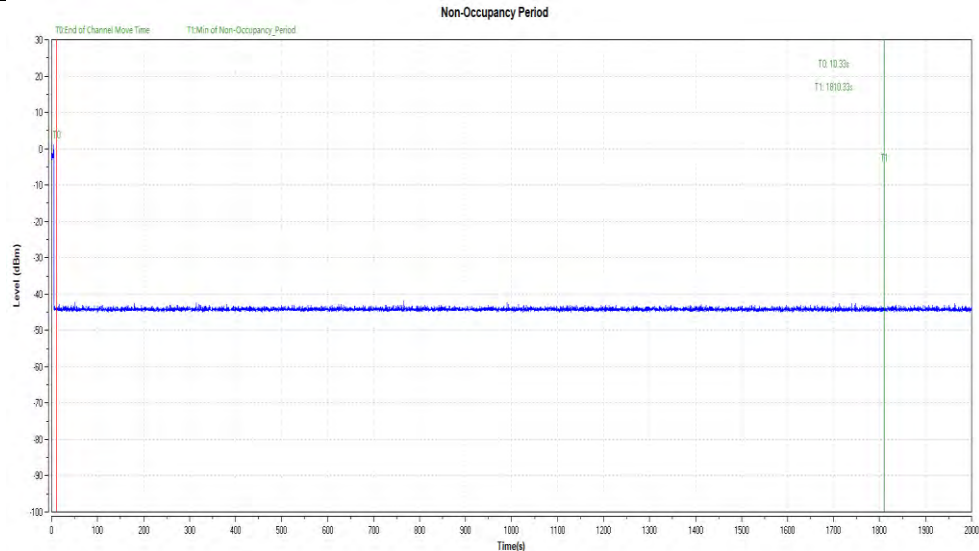
4.13.4 Test Graphs



11AC80SISO_5290



11AC80SISO_5530



5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	$\pm 0.75\text{dB}$





2	RF power density, conducted	±2.84dB
3	Spurious emissions, conducted	±0.75dB
4	Radiated Spurious emission test	±4.5dB (30MHz-1GHz)
		±4.8dB (1GHz-25GHz)
5	Conduct emission test	±3.12 dB(9KHz- 30MHz)
6	Temperature test	±1°C
7	Humidity test	±3%
8	DC and low frequency voltages	±0.5%





6 Equipment List

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2020/5/10	2023/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2020/7/14	2021/7/14
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2020/3/2	2021/3/1
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2020/6/12	2021/6/11
8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2020/2/11	2021/2/10
4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2020/2/11	2021/2/10
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2020/2/11	2021/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2020/3/2	2021/3/1

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2020/7/14	2021/7/14
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2020/3/2	2021/3/1
Coaxial Cable	SGS	N/A	SEM031-01	2020/6/12	2021/6/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2020/7/14	2021/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2019/10/27	2020/10/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2020/7/14	2021/7/14
Master Device	Linksys pte.Ltd	WRT32X	FCC ID:Q87-WRT3200ACM IC ID:3839A-WRT3200ACM	N/A	N/A





RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2020/8/5	2023/8/4
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2020/6/12	2021/6/11
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2020/7/14	2021/7/14
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2020/6/27	2023/6/26
Pre-amplifier (0.1-1.3GHz)	Agilent Technologies	8447D	SEM005-01	2020/3/2	2021/3/1

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018/3/13	2021/3/12
Spectrum Analyzer (20Hz-43GHz)	Rohde & Schwarz	FSU43	SEM004-08	2020/3/2	2021/3/1
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2020/6/27	2023/6/26
Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/4/13	2021/4/12
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017/10/17	2020/10/16
Amplifier(0.1-1300MHz)	HP	8447D	SEM005-02	2020/7/14	2021/7/14
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2020/7/14	2021/7/14
Pre-Amplifier(0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	EMC2063	2019/10/20	2020/10/19
Pre-amplifier(26-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2020/3/2	2021/3/1
Band filter	N/A	N/A	N/A	N/A	N/A
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020/6/12	2021/6/11





7 Photographs - EUT Test Setup Details

Refer to Appendix A - Photographs of EUT Test Setup Details for AR/2020/90010.

The End

