

FCC PART 15.407
RSS-247, ISSUE 2, FEBRUARY 2017
DYNAMIC FREQUENCY SELECTION
TEST REPORT

For

Mikrotiks SIA

Brivibas gatve 214i, Riga, Latvia LV-1039

FCC ID: TV7RB952-5AC2ND
IC: 7442A-9525AC

Report Type: Class II Permissive Change	Product Type: hAP ac lite
Report Number: <u>SZ6210407-10237E-00BA1</u>	
Report Date: <u>2021-07-06</u>	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	hAP ac lite
Tested Model	RB952Ui-5ac2nD-US
Multiple Model	RB952Ui-5ac2nD-TC-US
Model Differences	Refer to the DoS letter
HVIN	RB952Ui-5ac2nD-US, RB952Ui-5ac2nD-TC-US
Frequency Range	5GHz Wi-Fi: 5250-5350 MHz; 5470-5725MHz Note: frequency range 5600-5650MHz can't be use in Canada
Maximum Conducted Average Ouput Power	5250-5350 MHz: 18.22dBm 5470-5725 MHz: 17.18dBm
Modulation Technique	OFDM
Antenna Specification*	2 dBi (provided by the applicant)
Voltage Range	DC 10~28V
Date of Test	2021-04-24
Sample serial number	SZ6210407-10237E-RFA1 (Assigned by BACL, Shenzhen)
Received date	2021-04-07
Sample/EUT Status	Good condition

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts E of the Federal Communications Commission's rules, and RSS-247, Issue 2, February 2017 of the Innovation, Science and Economic Development Canada..

The objective is to determine compliance with FCC Part 15, Subpart E, section 15.407 Dynamic Frequency Selection (DFS) for devices operating in the bands 5250-5350 MHz, 5470-5725 MHz.

The objective is to determine compliance with Dynamic Frequency Selection (DFS) of the RSS-247, Issue 2, February 2017 of the Innovation, Science and Economic Development Canada for devices operating in the bands 5250-5350 MHz, 5470-5600MHz and 5650-5725 MHz.

This is a CIIPC application of the device; the differences between the original device and the current one are as follows:

- (1) Update the applicant's address.
- (2) Added series model "RB952UI-5AC2ND-TC-US".
- (3) Added 5250-5350MHz and 5470-5725MHz band.

Based on above differences, it will affected partial test data, so the changed items were performed.

Test Methodology

FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) ,6F,7F,the 3rd Phase of Wan Li Industrial Building D,Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

EUT Exercise Software

“LanTest.exe” software was used.

Equipment Modifications

N/A

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	PC	Latitude E5430	26913508589
IN ONE SMART TECHNOLOGY (H.K.) LTD	Phone	E11	101642

External I/O Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	no	no	2	EUT	PC

SUMMARY OF TEST RESULTS

The following result table represents the list of measurements required under the CFR §47 Part 15.407(h), RSS-247 Issue 2 §6.3 and KDB: 905462 D02 UNII DFS Compliance Procedures New Rules v02

Items	Description of Test	Result
Detection Bandwidth	UNII Detection Bandwidth	Compliant
Performance Requirements Check	Initial Channel Availability Check Time (CAC)	Compliant
	Radar Burst at the Beginning of the CAC	Compliant
	Radar Burst at the End of the CAC	Compliant
In-Service Monitoring	Channel Move Time	Compliant
	Channel Closing Transmission Time	Compliant
	Non-Occupancy Period	Compliant
Radar Detection	Statistical Performance Check	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Tonscend Corporation	RF control Unit	JS0806-2	19D8060154	2020/08/04	2021/08/03
Rohde & Schwarz	Signal and Spectrum Analyzer	FSV40	101473	2020/08/04	2021/08/03
Unknown	RF Cable	Unknown	2301 276	2020/11/29	2021/11/28
Agilent	MXG Vector Signal Generator	N5182B	MY53051503	2020/08/04	2021/08/03

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

APPLICABLE STANDARDS

DFS Requirement

CFR §47 Part 15.407(h) & RSS-247, Issue 2, February 2017 section 6.3

FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

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.		

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.	

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: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> 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 <i>U-NII Detection Bandwidth</i> 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.	

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	Roundup $\left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	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 usec is selected, the number of pulses

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

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 $(82.9\% + 60\% + 90\% + 88\%)/4 = 80.2\%$			

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

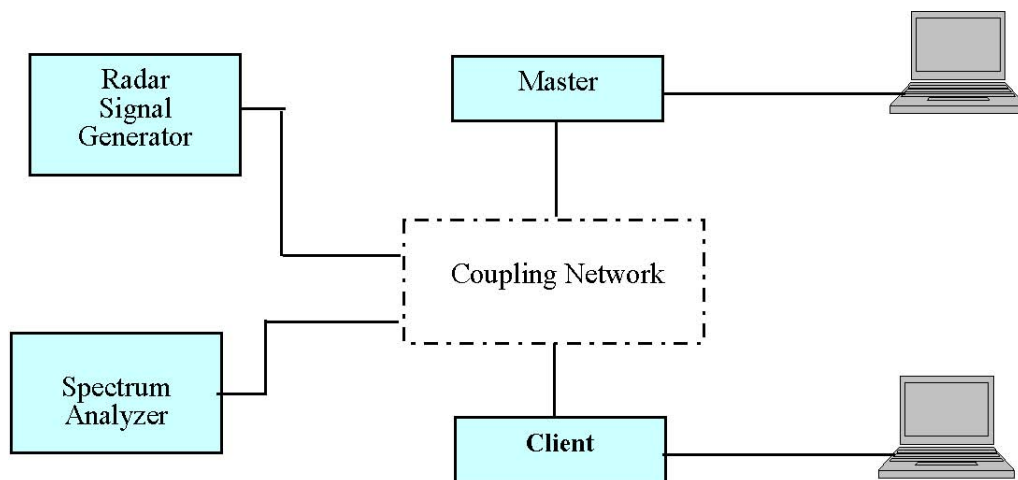
Table 7 – Frequency Hopping Radar Test Waveform

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

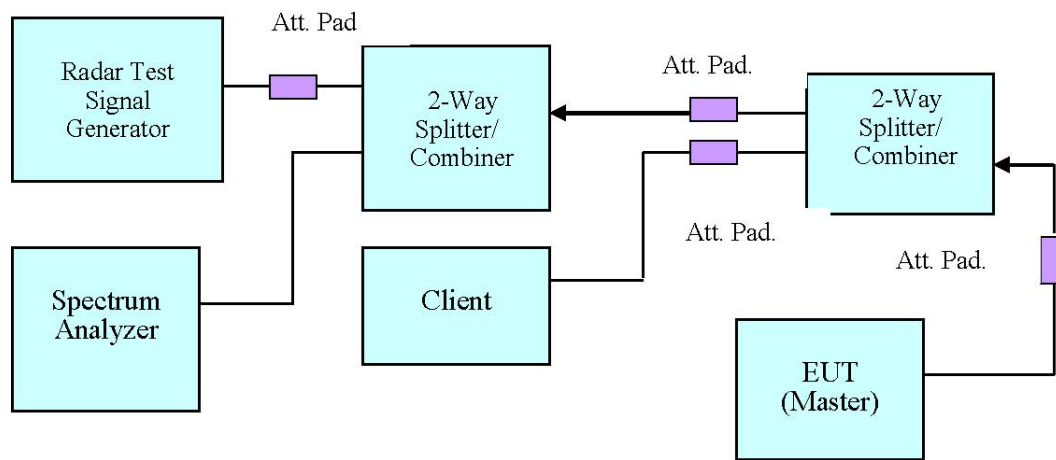
DFS Measurement System

BACL DFS measurement system consists of two subsystems: (1) The radar signal generating subsystem and (2) the traffic monitoring subsystem.

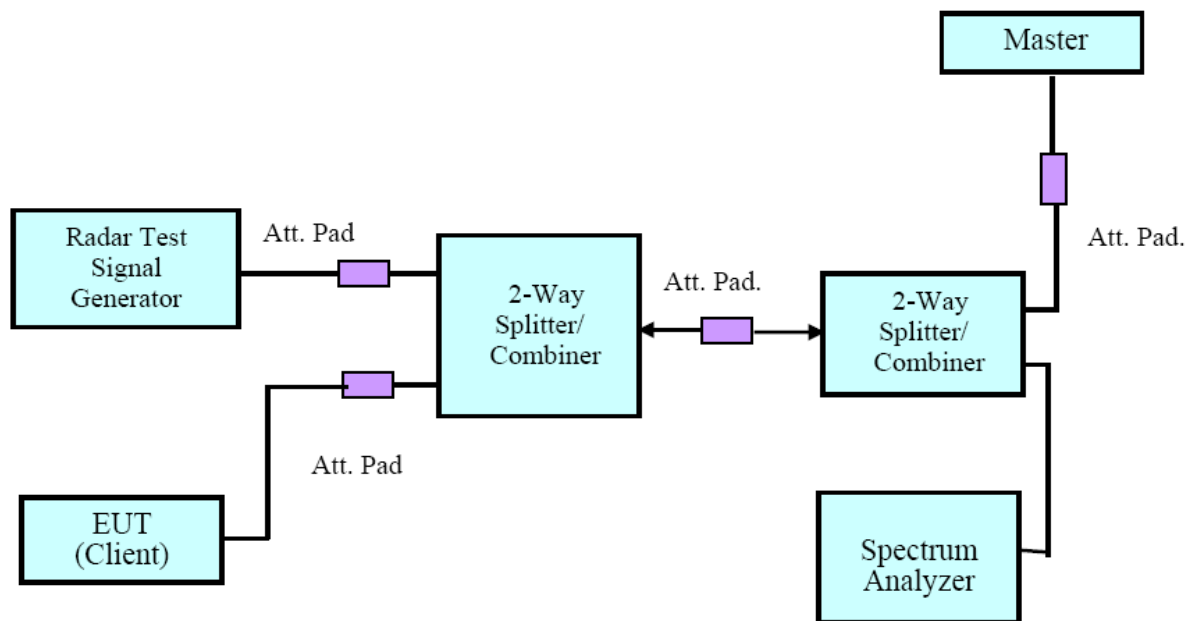
System Block Diagram



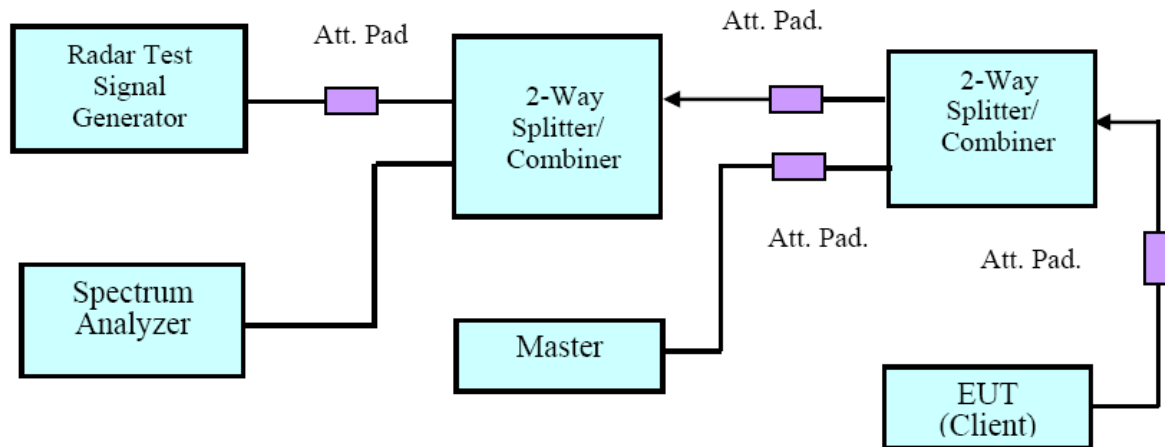
Conducted Method



Setup for Master with injection at the Master

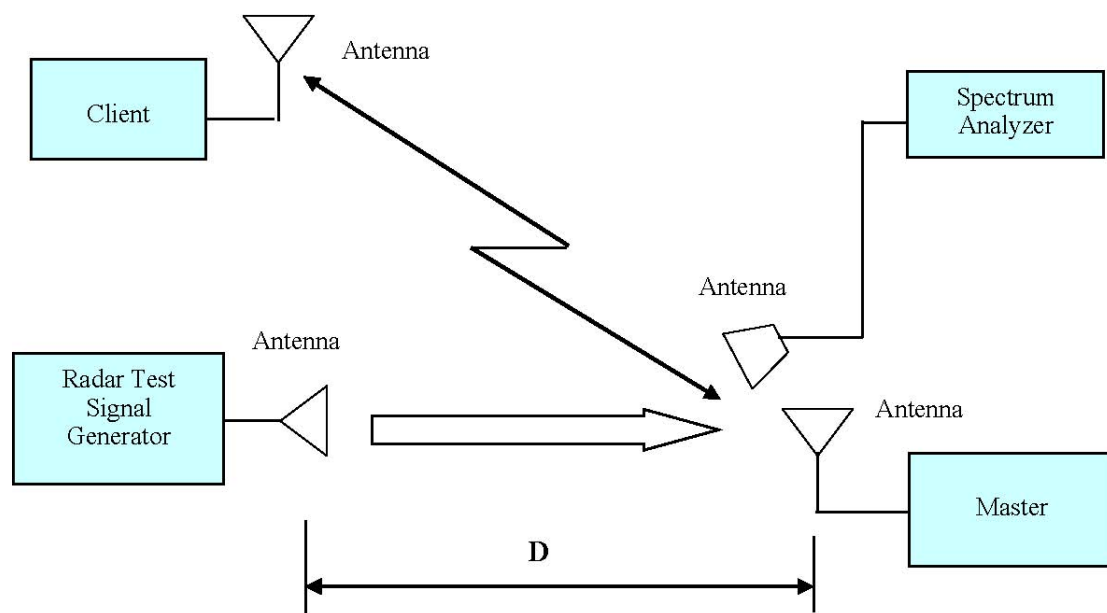


Setup for Client with injection at the Master



Setup for Client with injection at the Client

Radiated Method



Test Procedure

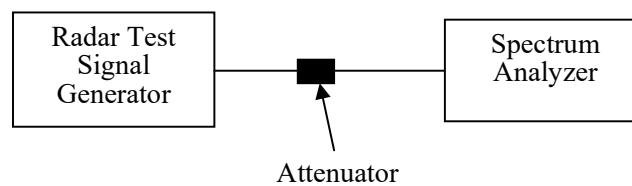
A spectrum analyzer is used as a monitor verifies that the EUT status including Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the diction and Channel move. It is also used to monitor EUT transmissions during the Channel Availability Check Time.

TEST RESULTS

Description of EUT

The calibrated radiated DFS detection threshold level is set to -62 dBm.

Radar Waveform Calibration



Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Bravos Zhao on 2021-04-24.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

Test Procedure

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.

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.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = $N \times \text{Dwell Time}$

N is the number of spectrum analyzer bins showing a device transmission Dwell Time is the dwell time per bin (i.e. $\text{Dwell Time} = S/B$, S is the sweep time and B is the number of bin, i.e. 8192)

Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Bravos Zhao on 2021-06-22.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

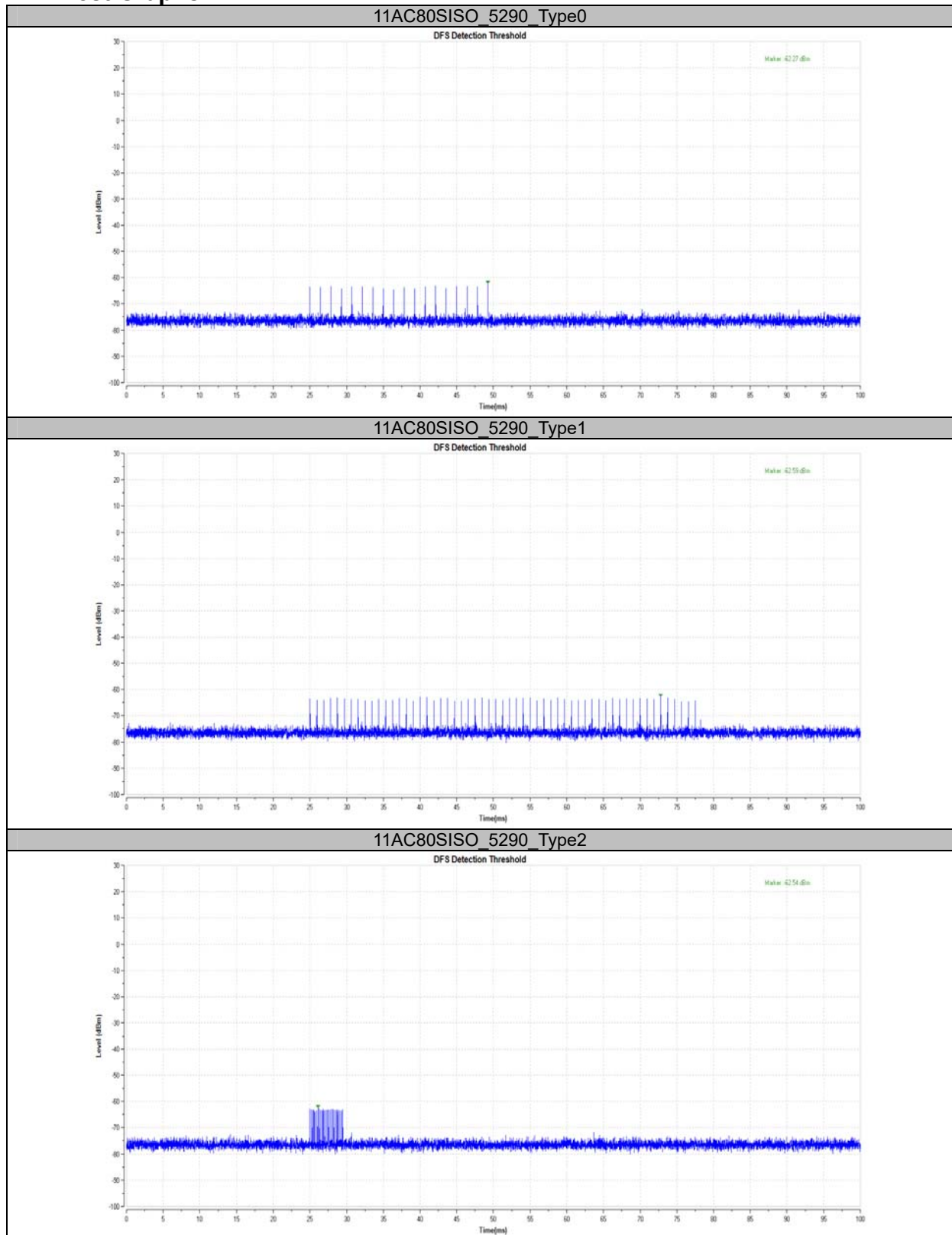
APPENDIX

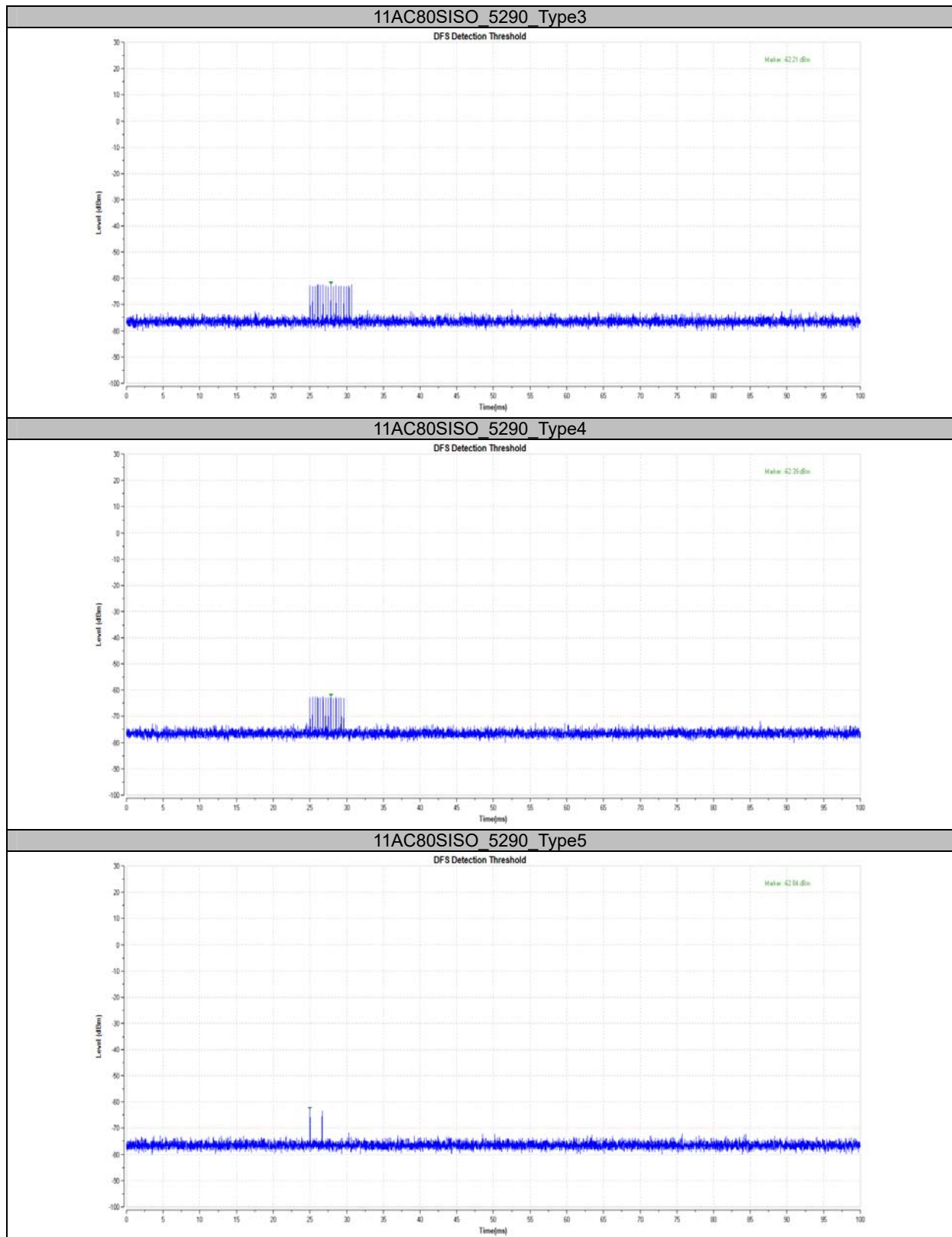
Appendix A: DFS Detection Thresholds

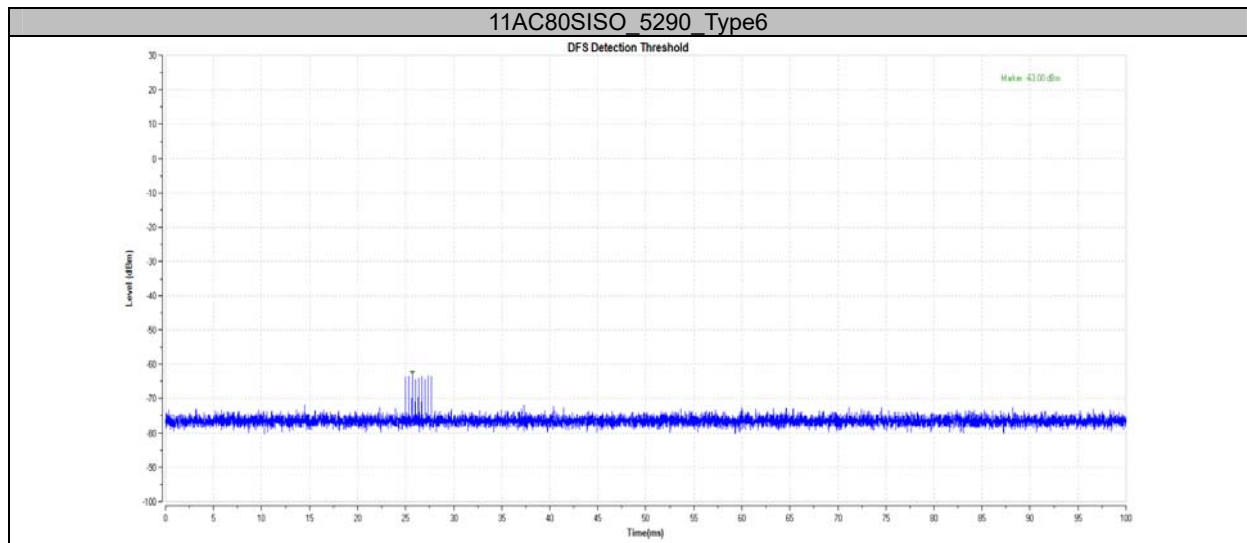
Test Result

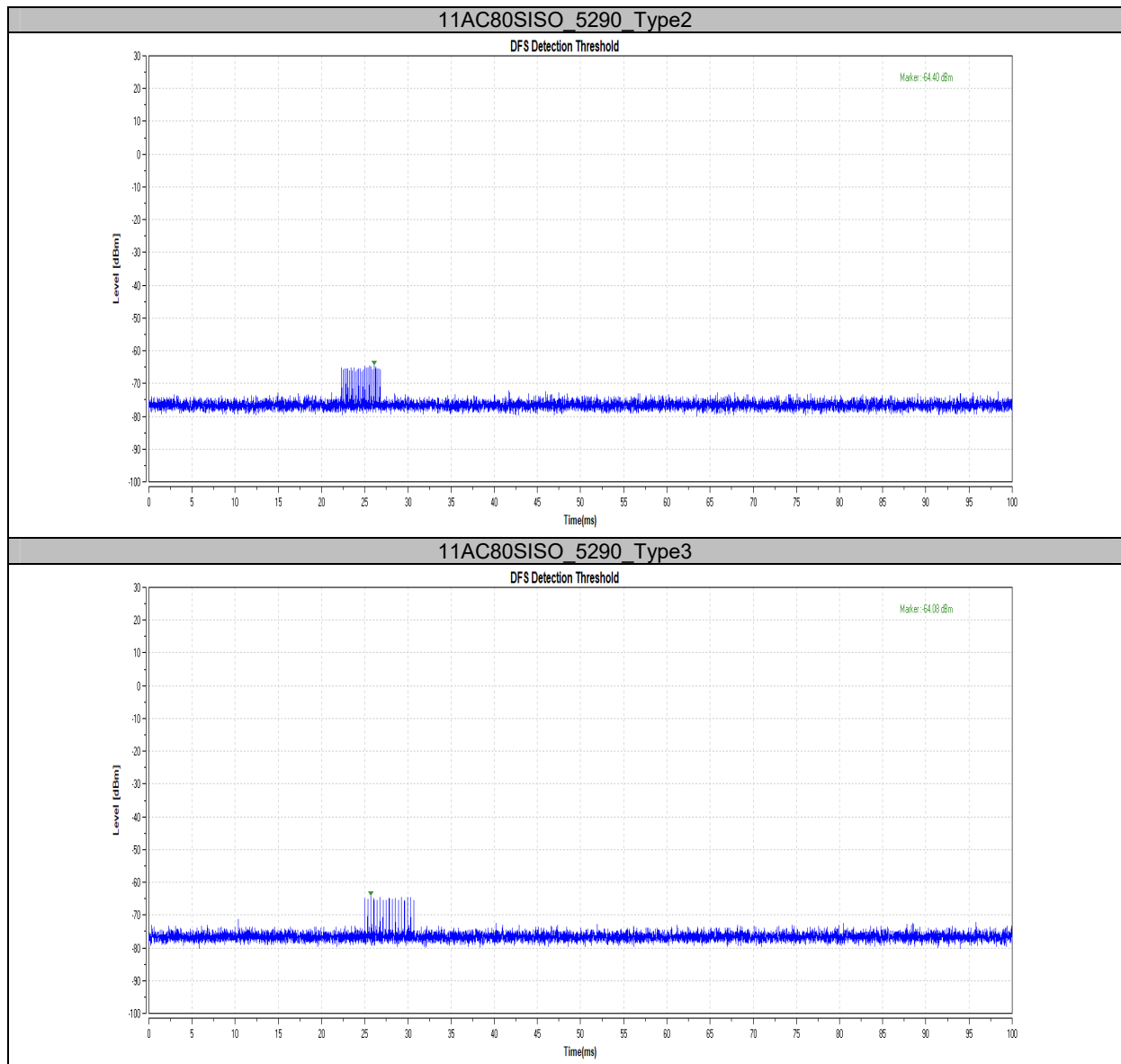
TestMode	Channel	Radar Type	Result	Limit[dbm]	Verdict
11AC80SISO	5290	Type0	-62.27	-62.00	PASS
		Type1	-62.59	-62.00	PASS
		Type2	-62.54	-62.00	PASS
		Type3	-62.21	-62.00	PASS
		Type4	-62.39	-62.00	PASS
		Type5	-62.84	-62.00	PASS
		Type6	-63.00	-62.00	PASS

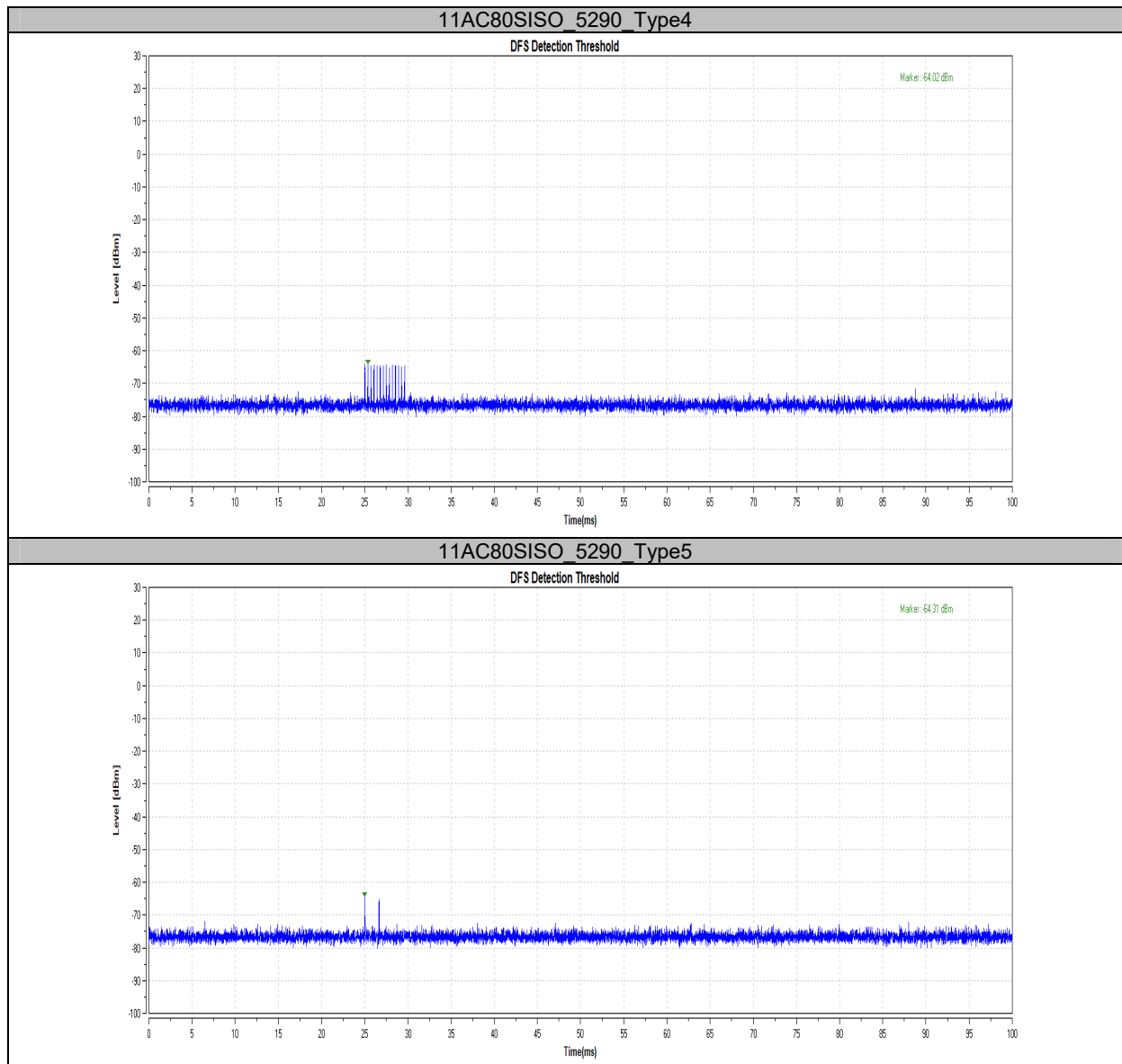
Test Graphs

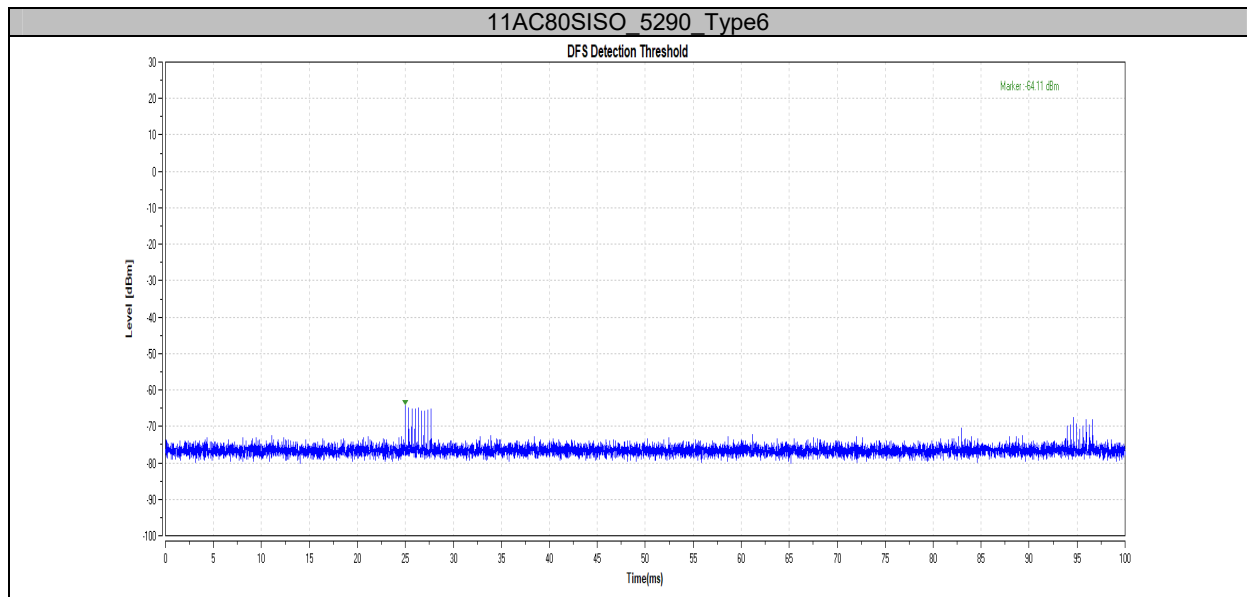












**Appendix B: Channel Availability Check Time
Test Result**

Initial Channel Availability Check Time

TestMode	Channel	Result	Verdict
11AC80SISO	5290	See test Graph	PASS

TestMode	Channel	EUT Initial Power-up Cycle(s)
11AC80SISO	5290	29

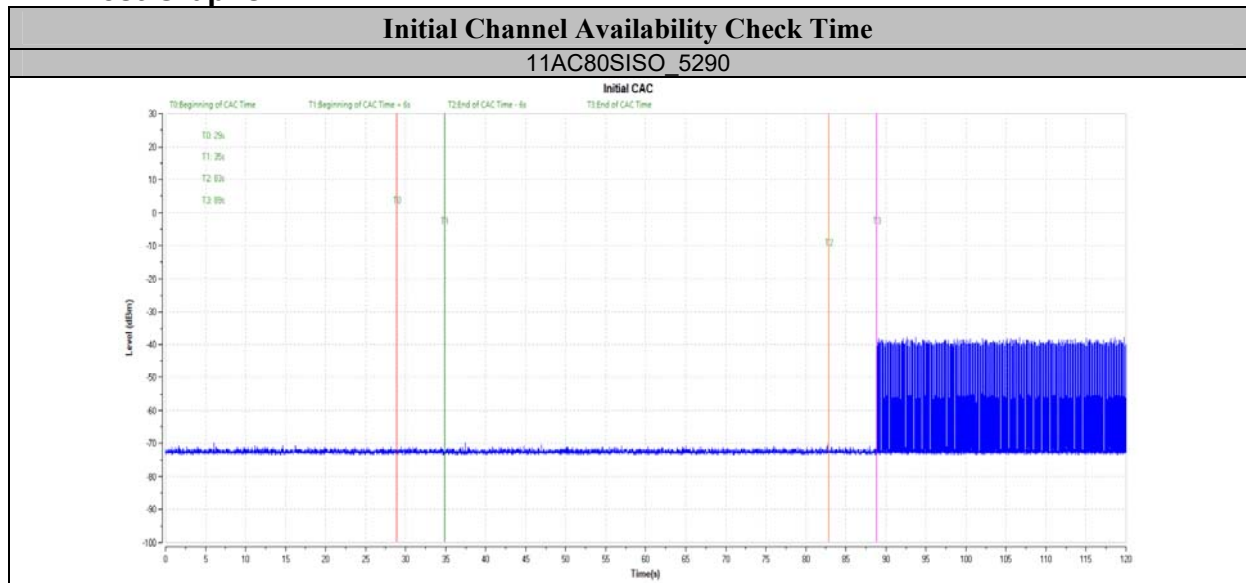
Beginning of Channel Availability Check Time

TestMode	Channel	Result	Verdict
11AC80SISO	5290	See test Graph, No transmissions found after radar signal applied.	PASS

End of Channel Availability Check Time

TestMode	Channel	Result	Verdict
11AC80SISO	5290	See test Graph, No transmissions found after radar signal applied.	PASS

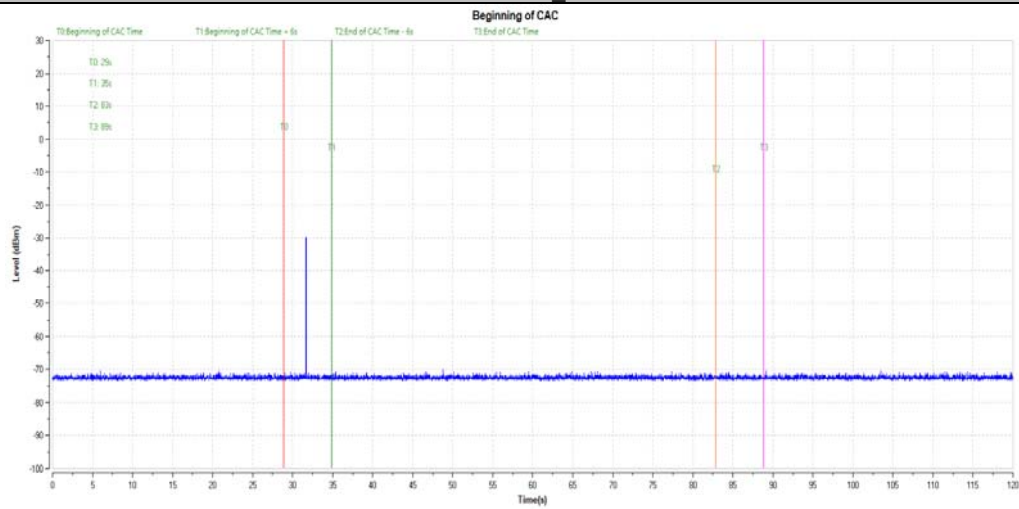
Test Graphs



Note: the power up cycle time is 29s

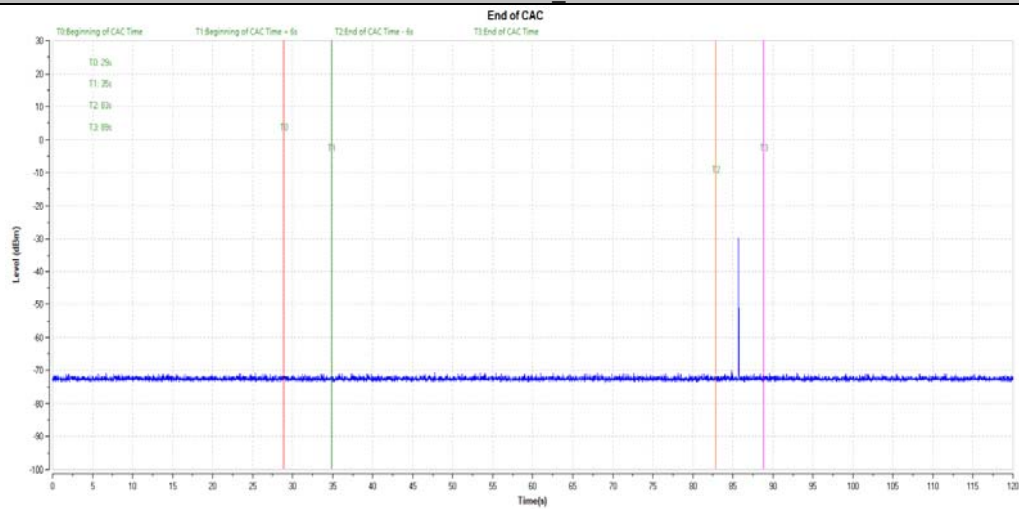
Beginning of Channel Availability Check Time

11AC80SISO 5290



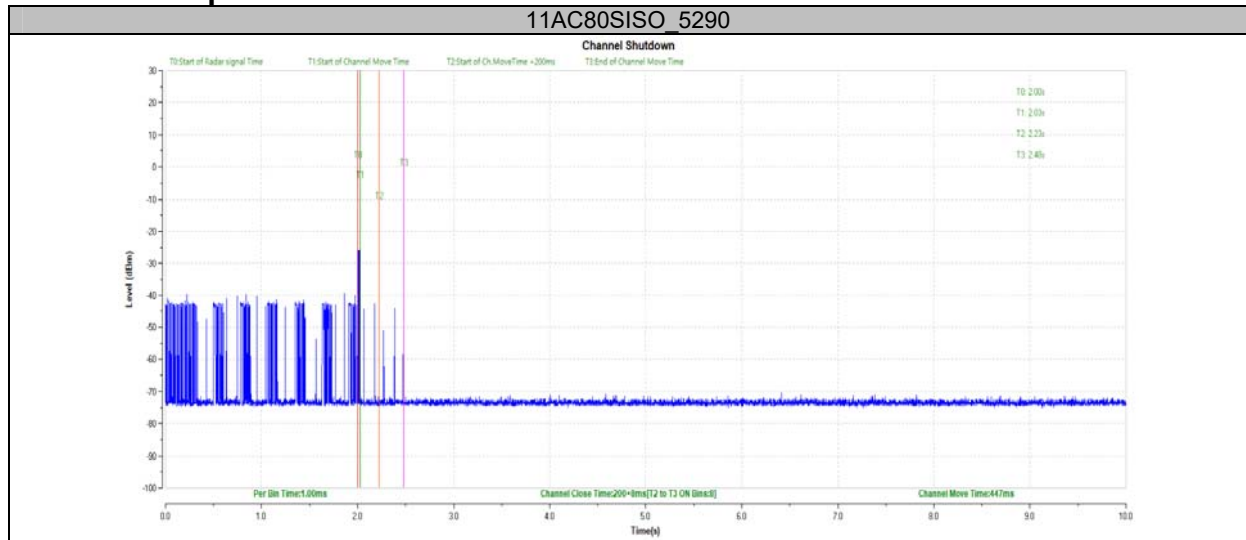
End of Channel Availability Check Time

11AC80SISO 5290



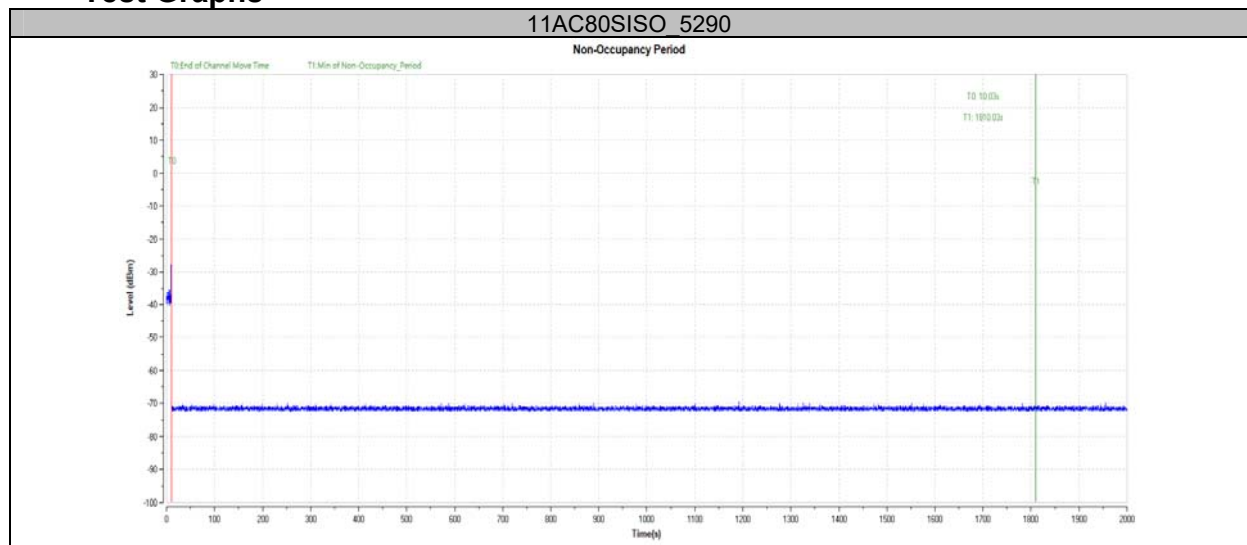
Appendix C: Channel Move Time and Channel Closing Transmission Time**Test Result**

TestMode	Channel	CCT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11AC80SISO	5290	200+8	200+60	447	10000	PASS

Test Graphs

Appendix D: Non-Occupancy Period**Test Result**

TestMode	Channel	Result	Limit[s]	Verdict
11AC80SISO	5290	see test graph	>=1800	PASS

Test Graphs

Appendix E: U-NII Detection Bandwidth**Test Result**

TestMode	Channel	FL[MHz]	FH[MHz]	Detection Bandwidth [MHz]	OCB [MHz]	Ratio [%]	Limit [%]	Verdict
11AC20SISO	5260	5250	5270	20	18.70	100.00	>=100	PASS
11AC40SISO	5270	5250	5289	39	37.56	100.00	>=100	PASS
11AC80SISO	5290	5250	5330	80	77.36	100.00	>=100	PASS

Test Result

Test Mode	Channel	Radar Freq.	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial8	Trial 9	Trial 10	Ratio (%)
11AC20SIS O	5260	5249	0	0	0	0	0	0	0	0	0	0	0
		5250	1	1	1	1	1	1	1	1	1	1	100
		5255	1	1	1	1	1	1	1	1	1	1	100
		5260	1	1	1	1	1	1	1	1	1	1	100
		5265	1	1	1	1	1	1	1	1	1	1	100
		5270	1	1	1	1	1	1	1	1	1	1	100
		5271	0	0	0	0	0	0	0	0	0	0	0
11AC40SIS O	5270	5249	0	0	0	0	0	0	0	0	0	0	0
		5250	1	1	1	1	1	1	1	1	1	1	100
		5255	1	1	1	1	1	1	1	1	1	1	100
		5260	1	1	1	1	1	1	1	1	1	1	100
		5265	1	1	1	1	1	1	1	1	1	1	100
		5270	1	1	1	1	1	1	1	1	1	1	100
		5275	1	1	1	1	1	1	1	1	1	1	100
		5280	1	1	1	1	1	1	1	1	1	1	100
		5285	1	1	1	1	1	1	1	1	1	1	100
		5286	1	1	1	1	1	1	1	1	1	1	100
		5287	1	1	1	1	1	1	1	1	1	1	100
		5288	1	1	1	1	1	1	1	1	1	1	100
		5289	1	1	1	1	1	1	1	1	1	1	100
		5290	0	1	1	1	1	1	0	0	1	1	70
11AC80SIS O	5290	5249	0	0	0	0	0	0	0	0	0	0	0
		5250	1	1	1	1	1	1	1	1	1	1	100
		5255	1	1	1	1	1	1	1	1	1	1	100
		5260	1	1	1	1	1	1	1	1	1	1	100
		5265	1	1	1	1	1	1	1	1	1	1	100
		5270	1	1	1	1	1	1	1	1	1	1	100
		5275	1	1	1	1	1	1	1	1	1	1	100
		5280	1	1	1	1	1	1	1	1	1	1	100
		5285	1	1	1	1	1	1	1	1	1	1	100
		5290	1	1	1	1	1	1	1	1	1	1	100
		5295	1	1	1	1	1	1	1	1	1	1	100
		5300	1	1	1	1	1	1	1	1	1	1	100
		5305	1	1	1	1	1	1	1	1	1	1	100
		5310	1	1	1	1	1	1	1	1	1	1	100
		5315	1	1	1	1	1	1	1	1	1	1	100
		5320	1	1	1	1	1	1	1	1	1	1	100
		5325	1	1	1	1	1	1	1	1	1	1	100
		5330	1	1	1	1	1	1	1	1	1	1	100
		5331	0	0	0	0	0	0	0	0	0	0	0

Appendix F: Statistical Performance check**Test Result**

TestMode	Channel	Radar Type	Pass Times	Fail Times	Probability(%)	Limit(%)	Verdict
11AC20SISO	5260	Type1	30	0	100.00	60	PASS
		Type2	28	2	93.33	60	PASS
		Type3	29	1	96.67	60	PASS
		Type4	27	3	90.00	60	PASS
		Aggregate (Type1-4)	114	6	95.00	80	PASS
		Type5	30	0	100.00	70	PASS
		Type6	29	1	96.67	80	PASS
11AC40SISO	5270	Type1	30	0	100.00	60	PASS
		Type2	28	2	93.33	60	PASS
		Type3	29	1	96.67	60	PASS
		Type4	29	1	96.67	60	PASS
		Aggregate (Type1-4)	116	4	96.67	80	PASS
		Type5	29	1	96.67	70	PASS
		Type6	30	0	100.00	80	PASS
11AC80SISO	5290	Type1	28	2	93.33	60	PASS
		Type2	29	1	96.67	60	PASS
		Type3	28	2	93.33	60	PASS
		Type4	30	0	100.00	60	PASS
		Aggregate (Type1-4)	115	5	95.83	80	PASS
		Type5	30	0	100.00	70	PASS
		Type6	29	1	96.67	80	PASS

TestMode	Channel	Radar Type	Trial ID	Pulse width(μ s)	PRI(μ s)	Pulses per Burst	Detection (1: Yes; 0: No)
11AC20SI SO	5260	Type1	0	1.0	938.0	57	1
		Type1	1	1.0	698.0	76	1
		Type1	2	1.0	618.0	86	1
		Type1	3	1.0	538.0	99	1
		Type1	4	1.0	878.0	61	1
		Type1	5	1.0	3066.0	18	1
		Type1	6	1.0	638.0	83	1
		Type1	7	1.0	918.0	58	1
		Type1	8	1.0	838.0	63	1
		Type1	9	1.0	858.0	62	1
		Type1	10	1.0	798.0	67	1
		Type1	11	1.0	718.0	74	1
		Type1	12	1.0	578.0	92	1
		Type1	13	1.0	598.0	89	1
		Type1	14	1.0	558.0	95	1
		Type1	15	1.0	2536.0	21	1
		Type1	16	1.0	966.0	55	1
		Type1	17	1.0	827.0	64	1
		Type1	18	1.0	2501.0	22	1
		Type1	19	1.0	2595.0	21	1
		Type1	20	1.0	1114.0	48	1
		Type1	21	1.0	1302.0	41	1
		Type1	22	1.0	3045.0	18	1
		Type1	23	1.0	1624.0	33	1
		Type1	24	1.0	2878.0	19	1
		Type1	25	1.0	1027.0	52	1
		Type1	26	1.0	2485.0	22	1
		Type1	27	1.0	1600.0	33	1
		Type1	28	1.0	1172.0	46	1
		Type1	29	1.0	1177.0	45	1
		Type2	0	3.2	179.0	26	1
		Type2	1	1.1	207.0	23	1
		Type2	2	2.1	230.0	24	1
		Type2	3	4.8	200.0	29	1
		Type2	4	3.9	214.0	28	1
		Type2	5	2.9	222.0	26	1
		Type2	6	3.2	204.0	26	1
		Type2	7	2.5	192.0	25	1
		Type2	8	3.1	164.0	26	1
		Type2	9	1.2	156.0	23	1
		Type2	10	3.9	210.0	27	1
		Type2	11	4.6	201.0	29	1
		Type2	12	3.2	162.0	26	1
		Type2	13	2.2	197.0	25	1
		Type2	14	4.5	163.0	29	1
		Type2	15	3.0	203.0	26	1
		Type2	16	5.0	168.0	29	1
		Type2	17	2.4	217.0	25	1
		Type2	18	2.9	191.0	26	1
		Type2	19	2.3	166.0	25	1
		Type2	20	3.7	150.0	27	1
		Type2	21	2.2	176.0	25	1
		Type2	22	4.9	195.0	29	1
		Type2	23	2.9	202.0	26	1
		Type2	24	2.5	178.0	25	0
		Type2	25	1.1	206.0	23	1
		Type2	26	3.8	155.0	27	1
		Type2	27	4.7	157.0	29	1

	Type2	28	2.4	224.0	25	0
	Type2	29	4.2	159.0	28	1
	Type3	0	8.2	355.0	17	1
	Type3	1	6.1	487.0	16	1
	Type3	2	7.1	344.0	16	1
	Type3	3	9.8	288.0	18	1
	Type3	4	8.9	230.0	18	1
	Type3	5	7.9	432.0	17	1
	Type3	6	8.2	207.0	17	1
	Type3	7	7.5	443.0	17	1
	Type3	8	8.1	439.0	17	1
	Type3	9	6.2	223.0	16	1
	Type3	10	8.9	208.0	18	1
	Type3	11	9.6	463.0	18	1
	Type3	12	8.2	441.0	17	1
	Type3	13	7.2	323.0	16	1
	Type3	14	9.5	297.0	18	1
	Type3	15	8.0	412.0	17	1
	Type3	16	10.0	324.0	18	1
	Type3	17	7.4	271.0	17	1
	Type3	18	7.9	349.0	17	1
	Type3	19	7.3	409.0	16	1
	Type3	20	8.7	373.0	18	1
	Type3	21	7.2	254.0	16	1
	Type3	22	9.9	274.0	18	1
	Type3	23	7.9	278.0	17	1
	Type3	24	7.5	317.0	17	1
	Type3	25	6.1	260.0	16	0
	Type3	26	8.8	211.0	18	1
	Type3	27	9.7	272.0	18	1
	Type3	28	7.4	264.0	17	1
	Type3	29	9.2	284.0	18	1
	Type4	0	16.0	355.0	14	1
	Type4	1	11.3	487.0	12	1
	Type4	2	13.5	344.0	13	1
	Type4	3	19.4	288.0	16	1
	Type4	4	17.5	230.0	15	1
	Type4	5	15.3	432.0	14	1
	Type4	6	15.9	207.0	14	1
	Type4	7	14.3	443.0	13	1
	Type4	8	15.8	439.0	14	1
	Type4	9	11.5	223.0	12	0
	Type4	10	17.4	208.0	15	1
	Type4	11	19.0	463.0	16	1
	Type4	12	16.0	441.0	14	1
	Type4	13	13.8	323.0	13	0
	Type4	14	18.9	297.0	16	0
	Type4	15	15.5	412.0	14	1
	Type4	16	19.9	324.0	16	1
	Type4	17	14.1	271.0	13	1
	Type4	18	15.2	349.0	14	1
	Type4	19	13.8	409.0	13	1
	Type4	20	17.1	373.0	15	1
	Type4	21	13.8	254.0	13	1
	Type4	22	19.8	274.0	16	1
	Type4	23	15.3	278.0	14	1
	Type4	24	14.5	317.0	13	1
	Type4	25	11.3	260.0	12	1
	Type4	26	17.3	211.0	15	1
	Type4	27	19.2	272.0	16	1
	Type4	28	14.2	264.0	13	1

11AC40SI SO	5270	Type4	29	18.2	284.0	15	1
		Type1	0	1.0	938.0	57	1
		Type1	1	1.0	698.0	76	1
		Type1	2	1.0	618.0	86	1
		Type1	3	1.0	538.0	99	1
		Type1	4	1.0	878.0	61	1
		Type1	5	1.0	3066.0	18	1
		Type1	6	1.0	638.0	83	1
		Type1	7	1.0	918.0	58	1
		Type1	8	1.0	838.0	63	1
		Type1	9	1.0	858.0	62	1
		Type1	10	1.0	798.0	67	1
		Type1	11	1.0	718.0	74	1
		Type1	12	1.0	578.0	92	1
		Type1	13	1.0	598.0	89	1
		Type1	14	1.0	558.0	95	1
		Type1	15	1.0	2536.0	21	1
		Type1	16	1.0	966.0	55	1
		Type1	17	1.0	827.0	64	1
		Type1	18	1.0	2501.0	22	1
		Type1	19	1.0	2595.0	21	1
		Type1	20	1.0	1114.0	48	1
		Type1	21	1.0	1302.0	41	1
		Type1	22	1.0	3045.0	18	1
		Type1	23	1.0	1624.0	33	1
		Type1	24	1.0	2878.0	19	1
		Type1	25	1.0	1027.0	52	1
		Type1	26	1.0	2485.0	22	1
		Type1	27	1.0	1600.0	33	1
		Type1	28	1.0	1172.0	46	1
		Type1	29	1.0	1177.0	45	1
		Type2	0	3.2	179.0	26	0
		Type2	1	1.1	207.0	23	1
		Type2	2	2.1	230.0	24	1
		Type2	3	4.8	200.0	29	1
		Type2	4	3.9	214.0	28	1
		Type2	5	2.9	222.0	26	1
		Type2	6	3.2	204.0	26	1
		Type2	7	2.5	192.0	25	1
		Type2	8	3.1	164.0	26	1
		Type2	9	1.2	156.0	23	1
		Type2	10	3.9	210.0	27	1
		Type2	11	4.6	201.0	29	1
		Type2	12	3.2	162.0	26	0
		Type2	13	2.2	197.0	25	1
		Type2	14	4.5	163.0	29	1
		Type2	15	3.0	203.0	26	1
		Type2	16	5.0	168.0	29	1
		Type2	17	2.4	217.0	25	1
		Type2	18	2.9	191.0	26	1
		Type2	19	2.3	166.0	25	1
		Type2	20	3.7	150.0	27	1
		Type2	21	2.2	176.0	25	1
		Type2	22	4.9	195.0	29	1
		Type2	23	2.9	202.0	26	1
		Type2	24	2.5	178.0	25	1
		Type2	25	1.1	206.0	23	1
		Type2	26	3.8	155.0	27	1
		Type2	27	4.7	157.0	29	1
		Type2	28	2.4	224.0	25	1
		Type2	29	4.2	159.0	28	1

11AC80SI	5290	Type3	0	8.2	355.0	17	1
		Type3	1	6.1	487.0	16	1
		Type3	2	7.1	344.0	16	1
		Type3	3	9.8	288.0	18	1
		Type3	4	8.9	230.0	18	1
		Type3	5	7.9	432.0	17	1
		Type3	6	8.2	207.0	17	1
		Type3	7	7.5	443.0	17	1
		Type3	8	8.1	439.0	17	1
		Type3	9	6.2	223.0	16	1
		Type3	10	8.9	208.0	18	1
		Type3	11	9.6	463.0	18	1
		Type3	12	8.2	441.0	17	1
		Type3	13	7.2	323.0	16	1
		Type3	14	9.5	297.0	18	1
		Type3	15	8.0	412.0	17	1
		Type3	16	10.0	324.0	18	0
		Type3	17	7.4	271.0	17	1
		Type3	18	7.9	349.0	17	1
		Type3	19	7.3	409.0	16	1
		Type3	20	8.7	373.0	18	1
		Type3	21	7.2	254.0	16	1
		Type3	22	9.9	274.0	18	1
		Type3	23	7.9	278.0	17	1
		Type3	24	7.5	317.0	17	1
		Type3	25	6.1	260.0	16	1
		Type3	26	8.8	211.0	18	1
		Type3	27	9.7	272.0	18	1
		Type3	28	7.4	264.0	17	1
		Type3	29	9.2	284.0	18	1
		Type4	0	16.0	355.0	14	1
		Type4	1	11.3	487.0	12	1
		Type4	2	13.5	344.0	13	1
		Type4	3	19.4	288.0	16	1
		Type4	4	17.5	230.0	15	1
		Type4	5	15.3	432.0	14	1
		Type4	6	15.9	207.0	14	0
		Type4	7	14.3	443.0	13	1
		Type4	8	15.8	439.0	14	1
		Type4	9	11.5	223.0	12	1
		Type4	10	17.4	208.0	15	1
		Type4	11	19.0	463.0	16	1
		Type4	12	16.0	441.0	14	1
		Type4	13	13.8	323.0	13	1
		Type4	14	18.9	297.0	16	1
		Type4	15	15.5	412.0	14	1
		Type4	16	19.9	324.0	16	1
		Type4	17	14.1	271.0	13	1
		Type4	18	15.2	349.0	14	1
		Type4	19	13.8	409.0	13	1
		Type4	20	17.1	373.0	15	1
		Type4	21	13.8	254.0	13	1
		Type4	22	19.8	274.0	16	1
		Type4	23	15.3	278.0	14	1
		Type4	24	14.5	317.0	13	1
		Type4	25	11.3	260.0	12	1
		Type4	26	17.3	211.0	15	1
		Type4	27	19.2	272.0	16	1
		Type4	28	14.2	264.0	13	1
		Type4	29	18.2	284.0	15	1
11AC80SI	5290	Type1	0	1.0	938.0	57	1

SO	Type1	1	1.0	698.0	76	1
	Type1	2	1.0	618.0	86	1
	Type1	3	1.0	538.0	99	1
	Type1	4	1.0	878.0	61	1
	Type1	5	1.0	3066.0	18	1
	Type1	6	1.0	638.0	83	1
	Type1	7	1.0	918.0	58	1
	Type1	8	1.0	838.0	63	1
	Type1	9	1.0	858.0	62	1
	Type1	10	1.0	798.0	67	1
	Type1	11	1.0	718.0	74	1
	Type1	12	1.0	578.0	92	1
	Type1	13	1.0	598.0	89	1
	Type1	14	1.0	558.0	95	1
	Type1	15	1.0	2536.0	21	1
	Type1	16	1.0	966.0	55	1
	Type1	17	1.0	827.0	64	1
	Type1	18	1.0	2501.0	22	1
	Type1	19	1.0	2595.0	21	1
	Type1	20	1.0	1114.0	48	1
	Type1	21	1.0	1302.0	41	1
	Type1	22	1.0	3045.0	18	1
	Type1	23	1.0	1624.0	33	1
	Type1	24	1.0	2878.0	19	0
	Type1	25	1.0	1027.0	52	0
	Type1	26	1.0	2485.0	22	1
	Type1	27	1.0	1600.0	33	1
	Type1	28	1.0	1172.0	46	1
	Type1	29	1.0	1177.0	45	1
	Type2	0	3.2	179.0	26	1
	Type2	1	1.1	207.0	23	1
	Type2	2	2.1	230.0	24	1
	Type2	3	4.8	200.0	29	1
	Type2	4	3.9	214.0	28	1
	Type2	5	2.9	222.0	26	1
	Type2	6	3.2	204.0	26	1
	Type2	7	2.5	192.0	25	1
	Type2	8	3.1	164.0	26	1
	Type2	9	1.2	156.0	23	1
	Type2	10	3.9	210.0	27	1
	Type2	11	4.6	201.0	29	1
	Type2	12	3.2	162.0	26	0
	Type2	13	2.2	197.0	25	1
	Type2	14	4.5	163.0	29	1
	Type2	15	3.0	203.0	26	1
	Type2	16	5.0	168.0	29	1
	Type2	17	2.4	217.0	25	1
	Type2	18	2.9	191.0	26	1
	Type2	19	2.3	166.0	25	1
	Type2	20	3.7	150.0	27	1
	Type2	21	2.2	176.0	25	1
	Type2	22	4.9	195.0	29	1
	Type2	23	2.9	202.0	26	1
	Type2	24	2.5	178.0	25	1
	Type2	25	1.1	206.0	23	1
	Type2	26	3.8	155.0	27	1
	Type2	27	4.7	157.0	29	1
	Type2	28	2.4	224.0	25	1
	Type2	29	4.2	159.0	28	1
	Type3	0	8.2	355.0	17	1
	Type3	1	6.1	487.0	16	1

	Type3	2	7.1	344.0	16	1
	Type3	3	9.8	288.0	18	1
	Type3	4	8.9	230.0	18	1
	Type3	5	7.9	432.0	17	1
	Type3	6	8.2	207.0	17	1
	Type3	7	7.5	443.0	17	1
	Type3	8	8.1	439.0	17	1
	Type3	9	6.2	223.0	16	1
	Type3	10	8.9	208.0	18	1
	Type3	11	9.6	463.0	18	1
	Type3	12	8.2	441.0	17	1
	Type3	13	7.2	323.0	16	1
	Type3	14	9.5	297.0	18	1
	Type3	15	8.0	412.0	17	1
	Type3	16	10.0	324.0	18	1
	Type3	17	7.4	271.0	17	0
	Type3	18	7.9	349.0	17	1
	Type3	19	7.3	409.0	16	1
	Type3	20	8.7	373.0	18	1
	Type3	21	7.2	254.0	16	1
	Type3	22	9.9	274.0	18	0
	Type3	23	7.9	278.0	17	1
	Type3	24	7.5	317.0	17	1
	Type3	25	6.1	260.0	16	1
	Type3	26	8.8	211.0	18	1
	Type3	27	9.7	272.0	18	1
	Type3	28	7.4	264.0	17	1
	Type3	29	9.2	284.0	18	1
	Type4	0	16.0	355.0	14	1
	Type4	1	11.3	487.0	12	1
	Type4	2	13.5	344.0	13	1
	Type4	3	19.4	288.0	16	1
	Type4	4	17.5	230.0	15	1
	Type4	5	15.3	432.0	14	1
	Type4	6	15.9	207.0	14	1
	Type4	7	14.3	443.0	13	1
	Type4	8	15.8	439.0	14	1
	Type4	9	11.5	223.0	12	1
	Type4	10	17.4	208.0	15	1
	Type4	11	19.0	463.0	16	1
	Type4	12	16.0	441.0	14	1
	Type4	13	13.8	323.0	13	1
	Type4	14	18.9	297.0	16	1
	Type4	15	15.5	412.0	14	1
	Type4	16	19.9	324.0	16	1
	Type4	17	14.1	271.0	13	1
	Type4	18	15.2	349.0	14	1
	Type4	19	13.8	409.0	13	1
	Type4	20	17.1	373.0	15	1
	Type4	21	13.8	254.0	13	1
	Type4	22	19.8	274.0	16	1
	Type4	23	15.3	278.0	14	1
	Type4	24	14.5	317.0	13	1
	Type4	25	11.3	260.0	12	1
	Type4	26	17.3	211.0	15	1
	Type4	27	19.2	272.0	16	1
	Type4	28	14.2	264.0	13	1
	Type4	29	18.2	284.0	15	1

TestMode	Channel	Radar Type	Trial ID	Number Of Bursts	Waveform Length (s)	Radar Frequency	Detection (1: Yes; 0: No)
11AC20SI SO	5260	Type5	0	15	12	5260	1
		Type5	1	8	12	5260	1
		Type5	2	11	12	5260	1
		Type5	3	20	12	5260	1
		Type5	4	17	12	5260	1
		Type5	5	14	12	5260	1
		Type5	6	15	12	5260	1
		Type5	7	12	12	5260	1
		Type5	8	14	12	5260	1
		Type5	9	8	12	5260	1
		Type5	10	17	12	5256	1
		Type5	11	19	12	5258	1
		Type5	12	15	12	5255	1
		Type5	13	12	12	5254	1
		Type5	14	19	12	5257	1
		Type5	15	14	12	5255	1
		Type5	16	20	12	5258	1
		Type5	17	12	12	5254	1
		Type5	18	14	12	5255	1
		Type5	19	12	12	5254	1
		Type5	20	16	12	5264	1
		Type5	21	12	12	5266	1
		Type5	22	20	12	5262	1
		Type5	23	14	12	5265	1
		Type5	24	13	12	5266	1
		Type5	25	8	12	5268	1
		Type5	26	17	12	5264	1
		Type5	27	19	12	5262	1
		Type5	28	12	12	5266	1
		Type5	29	18	12	5263	1
11AC40SI SO	5270	Type5	0	15	12	5270	1
		Type5	1	8	12	5270	1
		Type5	2	11	12	5270	1
		Type5	3	20	12	5270	1
		Type5	4	17	12	5270	1
		Type5	5	14	12	5270	1
		Type5	6	15	12	5270	1
		Type5	7	12	12	5270	1
		Type5	8	14	12	5270	1
		Type5	9	8	12	5270	1
		Type5	10	17	12	5256	1
		Type5	11	19	12	5258	1
		Type5	12	15	12	5255	1
		Type5	13	12	12	5254	1
		Type5	14	19	12	5257	1
		Type5	15	14	12	5255	0
		Type5	16	20	12	5258	1
		Type5	17	12	12	5254	1
		Type5	18	14	12	5255	1
		Type5	19	12	12	5254	1
		Type5	20	16	12	5284	1
		Type5	21	12	12	5286	1
		Type5	22	20	12	5282	1
		Type5	23	14	12	5285	1
		Type5	24	13	12	5286	1
		Type5	25	8	12	5288	1
		Type5	26	17	12	5284	1

		Type5	27	19	12	5282	1
		Type5	28	12	12	5286	1
		Type5	29	18	12	5283	1
11AC80SI SO	5290	Type5	0	15	12	5290	1
		Type5	1	8	12	5290	1
		Type5	2	11	12	5290	1
		Type5	3	20	12	5290	1
		Type5	4	17	12	5290	1
		Type5	5	14	12	5290	1
		Type5	6	15	12	5290	1
		Type5	7	12	12	5290	1
		Type5	8	14	12	5290	1
		Type5	9	8	12	5290	1
		Type5	10	17	12	5256	1
		Type5	11	19	12	5258	1
		Type5	12	15	12	5255	1
		Type5	13	12	12	5254	1
		Type5	14	19	12	5257	1
		Type5	15	14	12	5255	1
		Type5	16	20	12	5258	1
		Type5	17	12	12	5254	1
		Type5	18	14	12	5255	1
		Type5	19	12	12	5254	1
		Type5	20	16	12	5324	1
		Type5	21	12	12	5326	1
		Type5	22	20	12	5322	1
		Type5	23	14	12	5325	1
		Type5	24	13	12	5326	1
		Type5	25	8	12	5328	1
		Type5	26	17	12	5324	1
		Type5	27	19	12	5322	1
		Type5	28	12	12	5326	1
		Type5	29	18	12	5323	1

TestMode	Channel	Radar Type	Trial ID	Pulse width (μs)	PRI (μs)	Pulses per Hop	Detection (1: Yes; 0: No)
11AC20SI SO	5260	Type6	0	1	333.3	9	1
		Type6	1	1	333.3	9	1
		Type6	2	1	333.3	9	1
		Type6	3	1	333.3	9	1
		Type6	4	1	333.3	9	1
		Type6	5	1	333.3	9	1
		Type6	6	1	333.3	9	1
		Type6	7	1	333.3	9	1
		Type6	8	1	333.3	9	1
		Type6	9	1	333.3	9	1
		Type6	10	1	333.3	9	1
		Type6	11	1	333.3	9	1
		Type6	12	1	333.3	9	1
		Type6	13	1	333.3	9	1
		Type6	14	1	333.3	9	1
		Type6	15	1	333.3	9	1
		Type6	16	1	333.3	9	1
		Type6	17	1	333.3	9	1
		Type6	18	1	333.3	9	1
		Type6	19	1	333.3	9	1
		Type6	20	1	333.3	9	1
		Type6	21	1	333.3	9	1
		Type6	22	1	333.3	9	1
		Type6	23	1	333.3	9	1
		Type6	24	1	333.3	9	1
		Type6	25	1	333.3	9	1
		Type6	26	1	333.3	9	1
		Type6	27	1	333.3	9	1
		Type6	28	1	333.3	9	0
		Type6	29	1	333.3	9	1
11AC40SI SO	5270	Type6	0	1	333.3	9	1
		Type6	1	1	333.3	9	1
		Type6	2	1	333.3	9	1
		Type6	3	1	333.3	9	1
		Type6	4	1	333.3	9	1
		Type6	5	1	333.3	9	1
		Type6	6	1	333.3	9	1
		Type6	7	1	333.3	9	1
		Type6	8	1	333.3	9	1
		Type6	9	1	333.3	9	1
		Type6	10	1	333.3	9	1
		Type6	11	1	333.3	9	1
		Type6	12	1	333.3	9	1
		Type6	13	1	333.3	9	1
		Type6	14	1	333.3	9	1
		Type6	15	1	333.3	9	1
		Type6	16	1	333.3	9	1
		Type6	17	1	333.3	9	1
		Type6	18	1	333.3	9	1
		Type6	19	1	333.3	9	1
		Type6	20	1	333.3	9	1
		Type6	21	1	333.3	9	1
		Type6	22	1	333.3	9	1
		Type6	23	1	333.3	9	1
		Type6	24	1	333.3	9	1
		Type6	25	1	333.3	9	1
		Type6	26	1	333.3	9	1

11AC80SI SO	5290	Type6	27	1	333.3	9	1
		Type6	28	1	333.3	9	1
		Type6	29	1	333.3	9	1
		Type6	0	1	333.3	9	1
		Type6	1	1	333.3	9	1
		Type6	2	1	333.3	9	1
		Type6	3	1	333.3	9	1
		Type6	4	1	333.3	9	1
		Type6	5	1	333.3	9	1
		Type6	6	1	333.3	9	1
		Type6	7	1	333.3	9	1
		Type6	8	1	333.3	9	1
		Type6	9	1	333.3	9	1
		Type6	10	1	333.3	9	1
		Type6	11	1	333.3	9	1
		Type6	12	1	333.3	9	1
		Type6	13	1	333.3	9	1
		Type6	14	1	333.3	9	1
		Type6	15	1	333.3	9	1
		Type6	16	1	333.3	9	1
		Type6	17	1	333.3	9	1
		Type6	18	1	333.3	9	1
		Type6	19	1	333.3	9	1
		Type6	20	1	333.3	9	1
		Type6	21	1	333.3	9	1
		Type6	22	1	333.3	9	1
		Type6	23	1	333.3	9	1
		Type6	24	1	333.3	9	1
		Type6	25	1	333.3	9	0
		Type6	26	1	333.3	9	1
		Type6	27	1	333.3	9	1
		Type6	28	1	333.3	9	1
		Type6	29	1	333.3	9	1

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