TEST REPORT

Applicant Name :	YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.
Address :	No.666 Hu'an Rd. Huli District Xiamen City, Fujian, P.R. China
Report Number :	SZNS220511-19758E-RFC
FCC ID:	T2C-M800
IC	10741A-M800

Test Standard (s)

FCC PART 15.407; RSS-247, ISSUE 2, FEBRUARY 2017

Sample Description

Product Type:	Video Conferencing Endpoint
Model No.:	MeetingEye 800
Multiple Model(s) No.:	N/A
Trade Mark:	Yealink
Date Received:	2022/05/11
Report Date:	2022/12/05
Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Audy Yu
EMC Engineer

Approved By:

Candy Li
EMC Engineer

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

HVIN	MeetingEye 800
FVIN	1.2.1.0
Frequency Range	5150-5250 MHz; 5250-5350 MHz ;5470-5725 MHz;5725-5850 MHz
Mode	802.11a/n20/n40/ac20/ac40/ac80
Maximum Conducted Average Ouput Power	module YL43455: 5250-5350MHz: 13.97dBm 5470-5725MHz: 9.13dBm module D845: 5250-5350MHz: 17.71dBm 5470-5725MHz: 15.57dBm
Modulation Technique	OFDM
Antenna Specification*	2.47dBi (It is provided by the applicant)
Voltage Range	DC48V from adapter
Sample serial number	SZNS220511-19758E-RF-S2 (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter 1 information	Model: NSA96EC-48020000 Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 48.0V, 2.0A ,96.0W
Adapter 2 information	Model: YLPS482000C Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 48.0V, 2.0A ,96.0W
Note 1: the device installed two RF module, module D845 and module YL43455, for module D845 use the 2.4GHz/5GHz Wi-Fi function, for module YL43455 use the BT/BLE/2.4GHz/5GHz Wi-Fi function. Note 2: the two adapters were electrical identical just difference with model number which was declared by manufacturer, the adapter 1 was selected to test.	

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.

Test Methodology

FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02.
Each test item follows test standards and with no deviation.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. 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.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A.

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

"AuthenticTool" software was used.

Equipment Modifications

N/A

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Grandstream	Router(FCC ID:YZZGWN7664LR)	GWN7664LR	Unknown
DELL	NoteBook	67CTQ12	1350545499398
GOSPELL	POE	G0720-480-050	212701319

External I/O Cable

Cable Description	Length (m)	From Port	To
RJ45 Cable	1.5	POE	Router
RF Cable	1.0	Open Switch and ControlUnit	Router
RF Cable	0.2	Open Switch and ControlUnit	EUT

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	Not Applicable
Performance Requirements Check	Initial Channel Availability Check Time (CAC)	Not Applicable
	Radar Burst at the Beginning of the CAC	Not Applicable
	Radar Burst at the End of the CAC	Not Applicable
In-Service Monitoring	Channel Move Time	Compliant
	Channel Closing Transmission Time	Compliant
	Non-Occupancy Period	Compliant
Radar Detection	Statistical Performance Check	Not Applicable

Note: EUT is client without radar detection

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Open Switch and ControlUnit	OSP120 + OSP-B157	101244 + 100866	2021/12/13	2022/12/12
Rohde & Schwarz	Signal and Spectrum Analyzer	FSV40	101495	2021/12/13	2022/12/12
Unknown	RF Coaxial Cable	No.33	RF-03	Each time	/
AGILENT	Vector Signal Generator	N5182A	MY50143401	2021/12/13	2022/12/12

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. 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
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.		

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.	

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.	

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	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	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

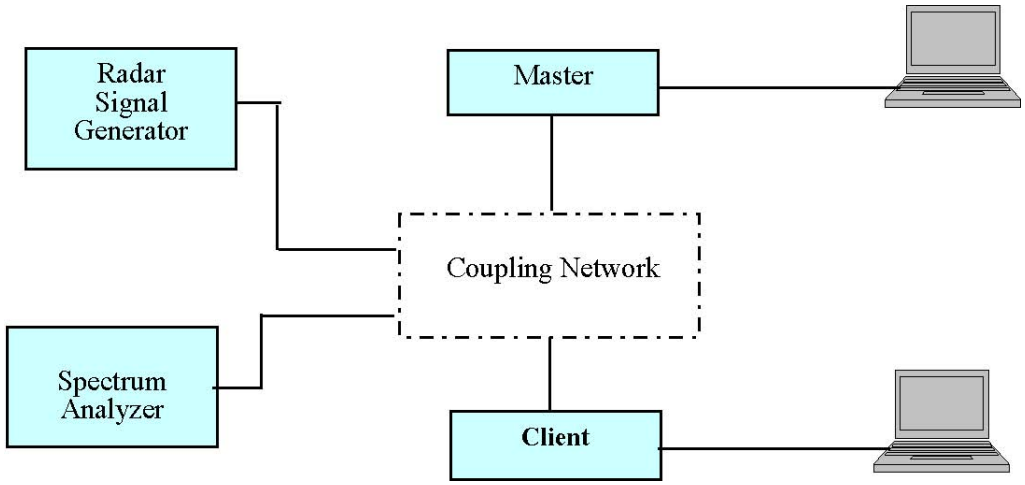
Table 7 – Frequency Hopping Radar Test Waveform

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

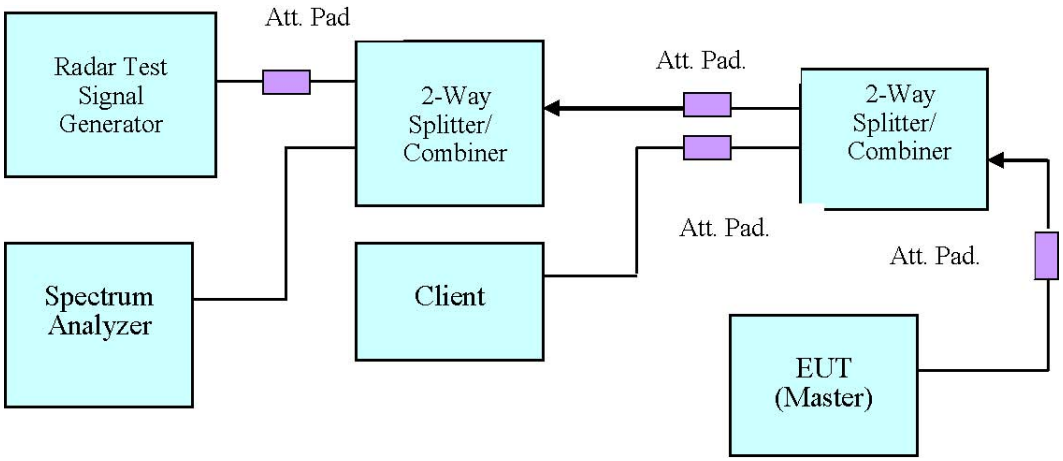
DFS Measurement System

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

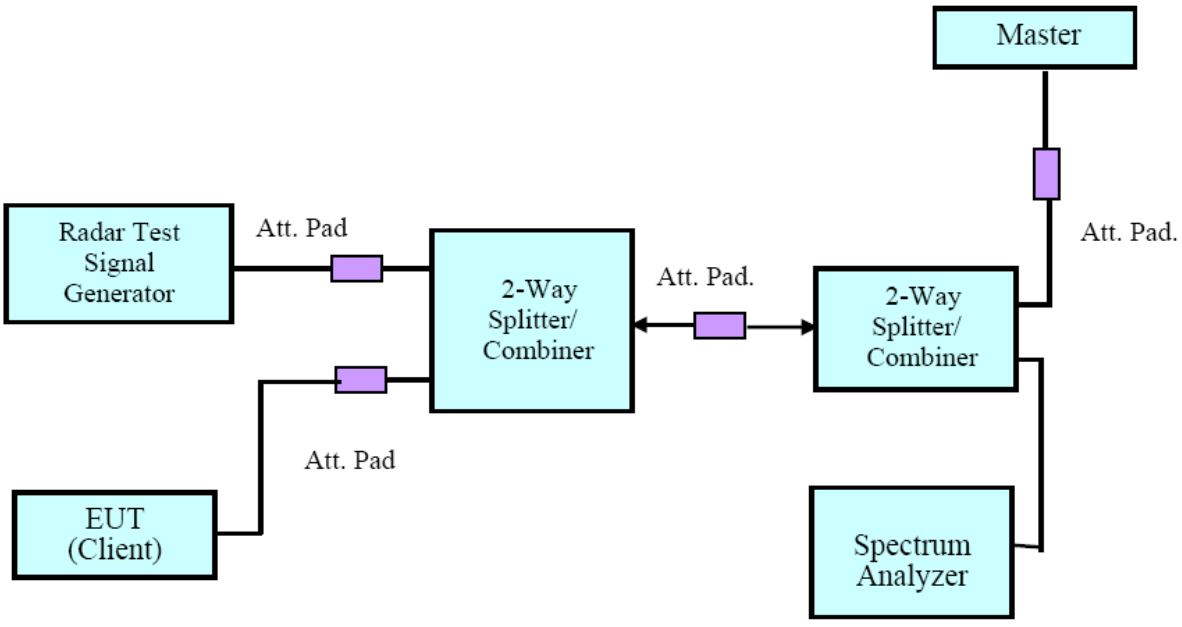
System Block Diagram



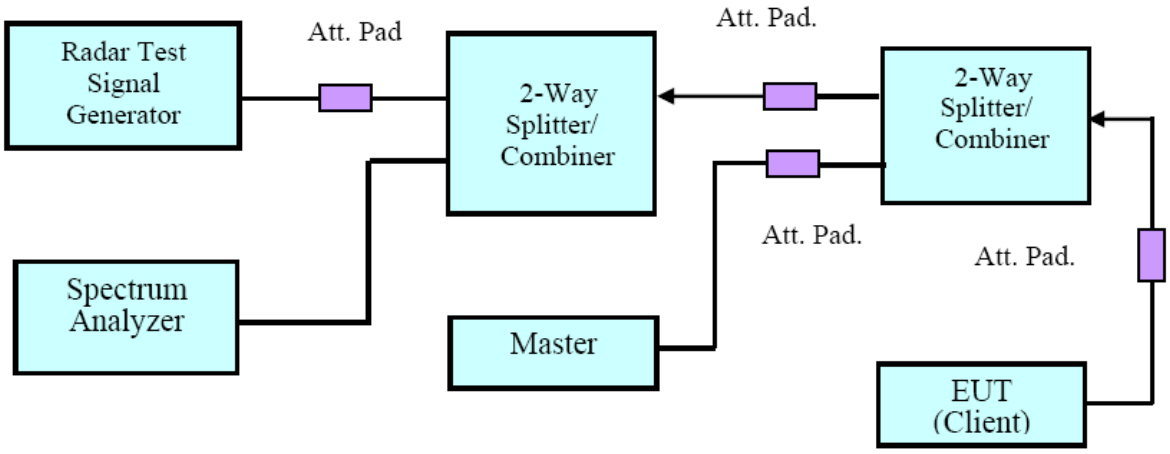
Conducted Method



Setup for Master with injection at the Master

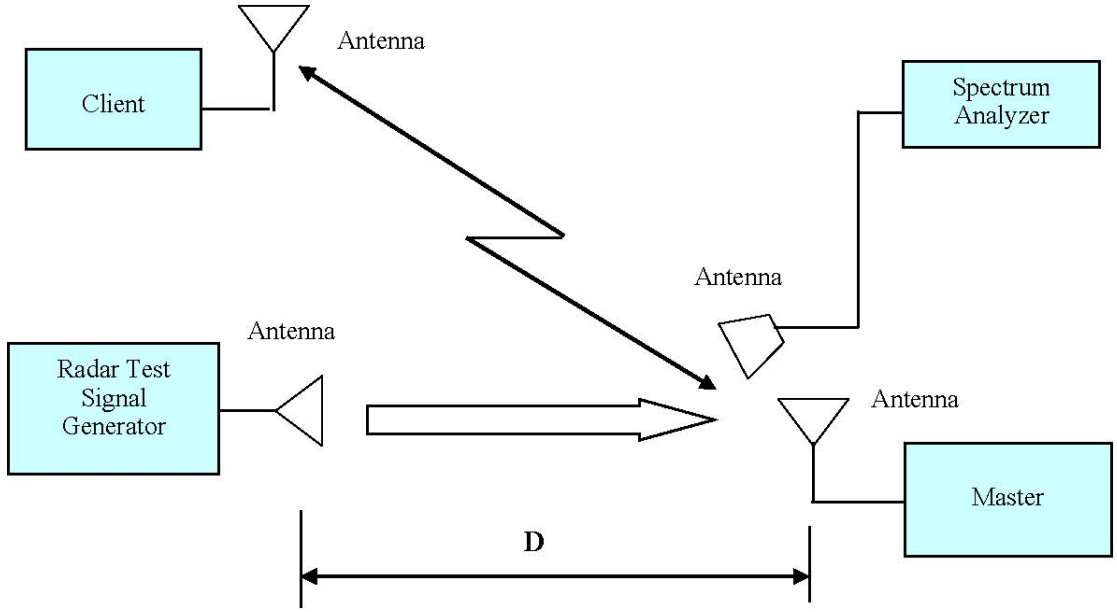


Setup for Client with injection at the Master



Setup for Client with injection at the Client

Radiated Method



Test Procedure

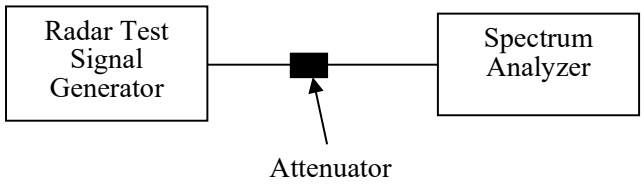
A spectrum analyzer is used as a monitor verifies that the EUT status including Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the diction and Channel move. It is also used to monitor EUT transmissions during the Channel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

RADAR WAVEFORM CALIBRATION

Description of EUT

The maximum EIRP is less than 200mW. The calibrated radiated DFS detection threshold level is set to -62 dBm.

Radar Waveform Calibration Block Diagram



Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Audy Yu on 2022-07-05.

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. repeat using a long pulse radar type5 waveform.

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*Dwell Time

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

Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Audy Yu on 2022-07-05.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

NON-OCCUPANCY PERIOD

Test Procedure

Measure the EUT for more than 30 minutes following the channel close/move time to very that the EUT does not resume any transmissions on this channel. Provide one plot to demonstrate no transmission on the channel for the non-occupancy period (30 minutes observation time)

Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Audy Yu on 2022-07-05.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

APPENDIX

Appendix A: DFS Detection Thresholds

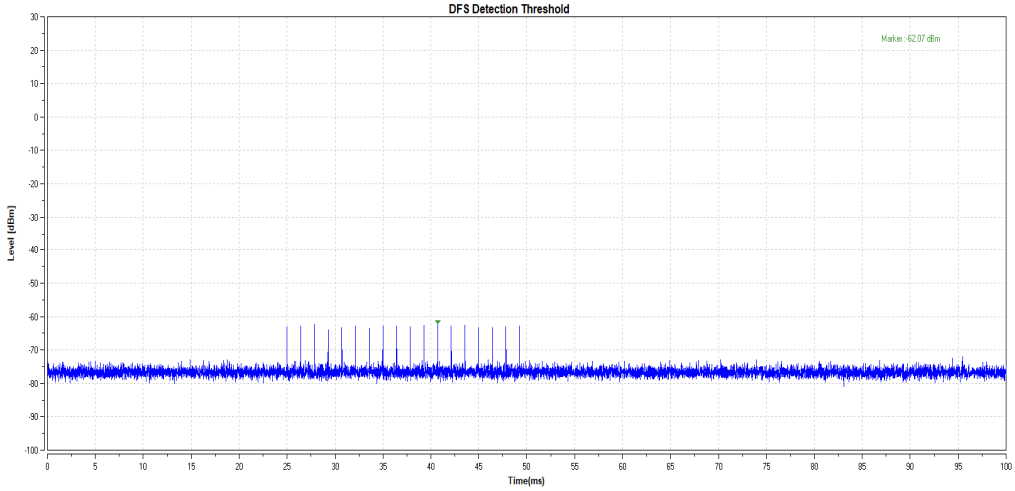
For Module:YL-43455

Test Result

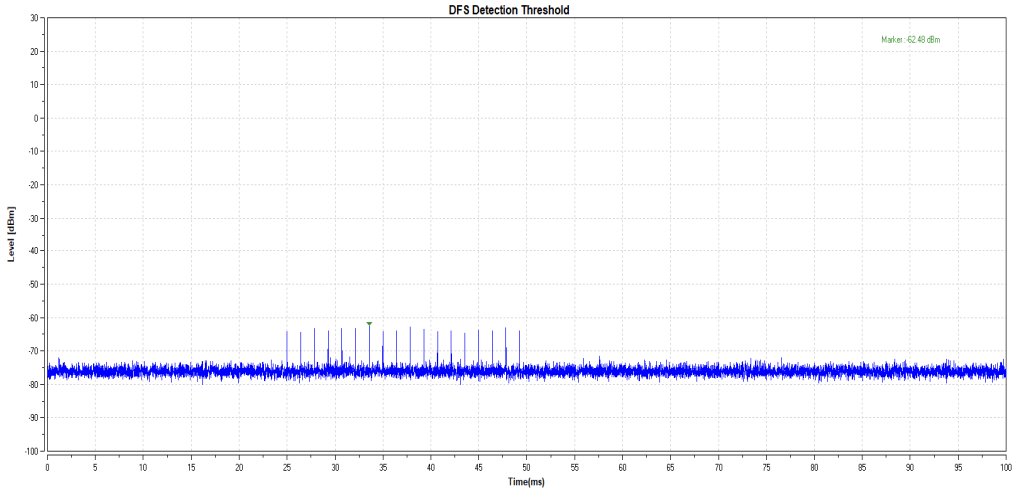
Test Mode	Channel	Radar Type	Result	Limit[dbm]	Verdict
80	5290	Type0	-62.07	-62.00	PASS
	5530	Type0	-62.48	-62.00	PASS

Test Graphs

80_5290_Type0



80_5530_Type0



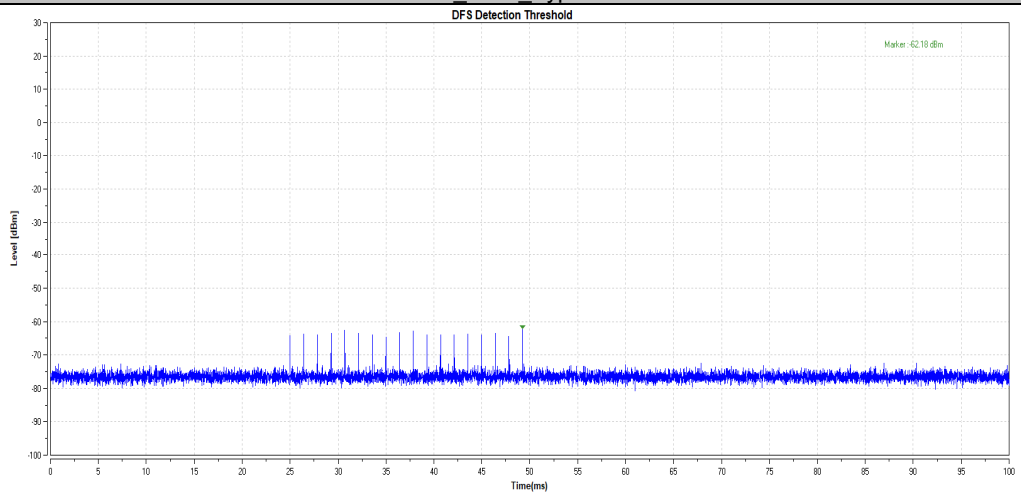
For Module:D848

Test Result

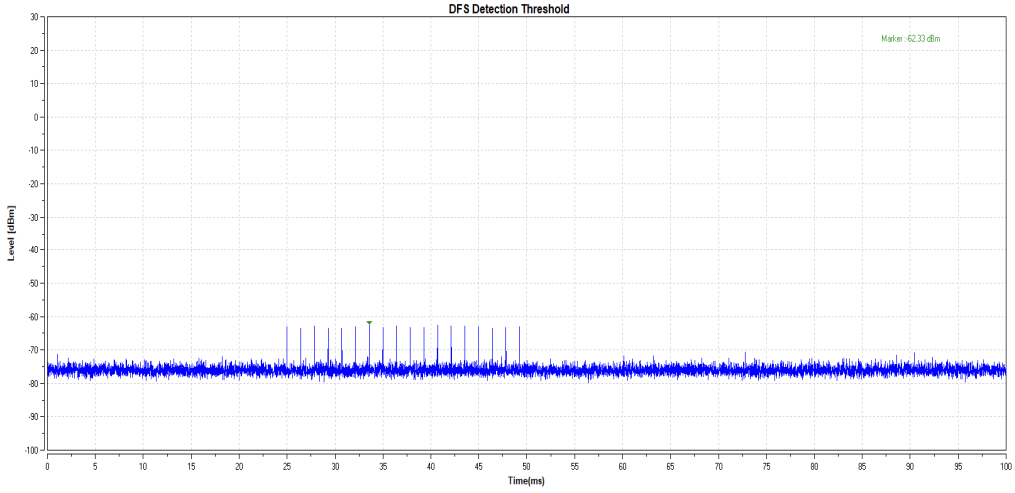
Test Mode	Channel	Radar Type	Result	Limit[dbm]	Verdict
80	5290	Type0	-62.18	-62.00	PASS
	5530	Type0	-62.33	-62.00	PASS

Test Graphs

80_5290_Type0



80_5530_Type0



Appendix B: Channel Move Time and Channel Closing Transmission Time

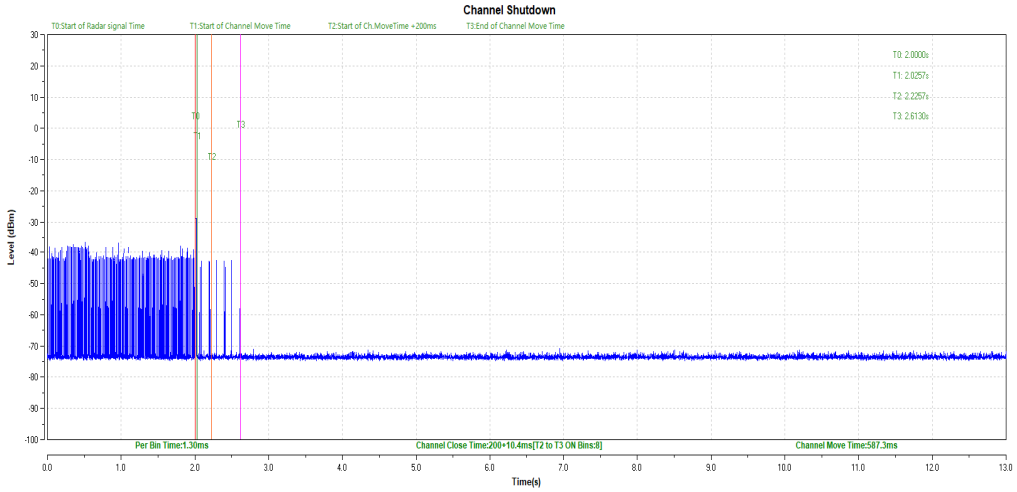
For Module:YL-43455

Test Result

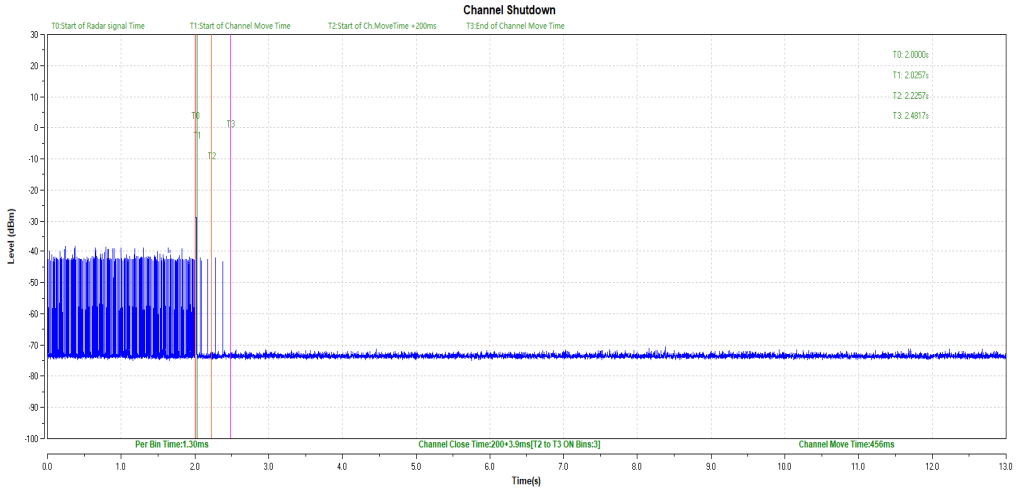
Test Mode	Channel	CCT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11AC80SISO	5290	200+10.4	200+60	587.3	10000	PASS
	5530	200+3.9	200+60	456	10000	PASS

Test Graphs

11AC80SISO_5290



11AC80SISO_5530



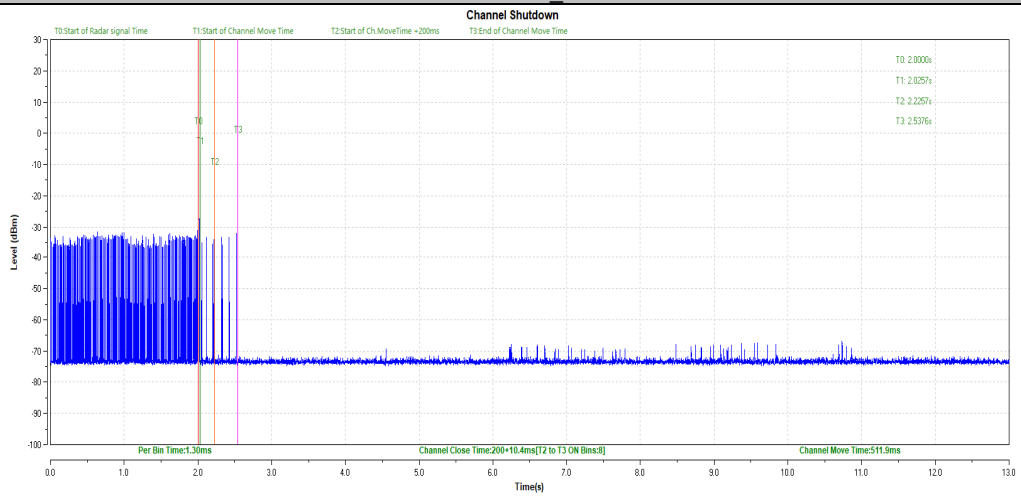
For Module:D848

Test Result

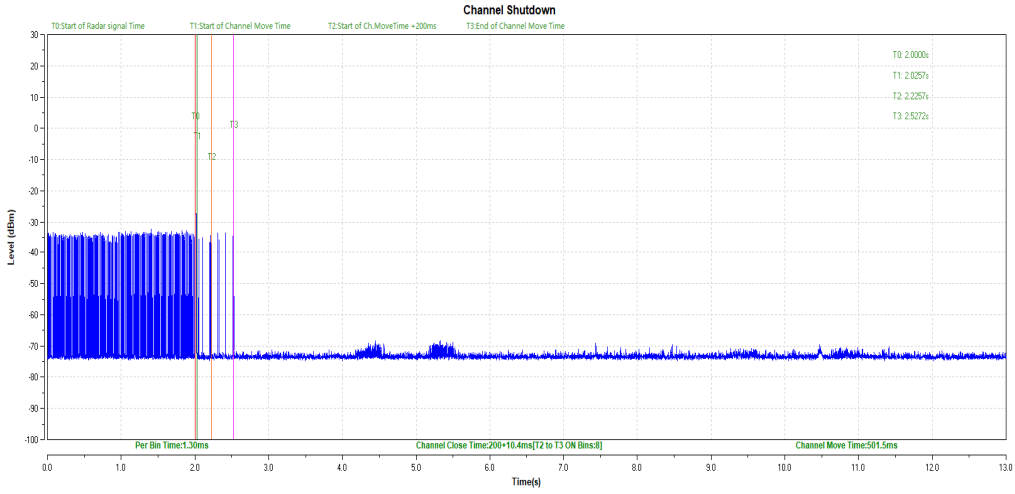
Test Mode	Channel	CCT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11AC80SISO	5290	200+10.4	200+60	511.9	10000	PASS
	5530	200+10.4	200+60	501.5	10000	PASS

Test Graphs

11AC80SISO_5290



11AC80SISO_5530



Appendix C: Non-Occupancy Period

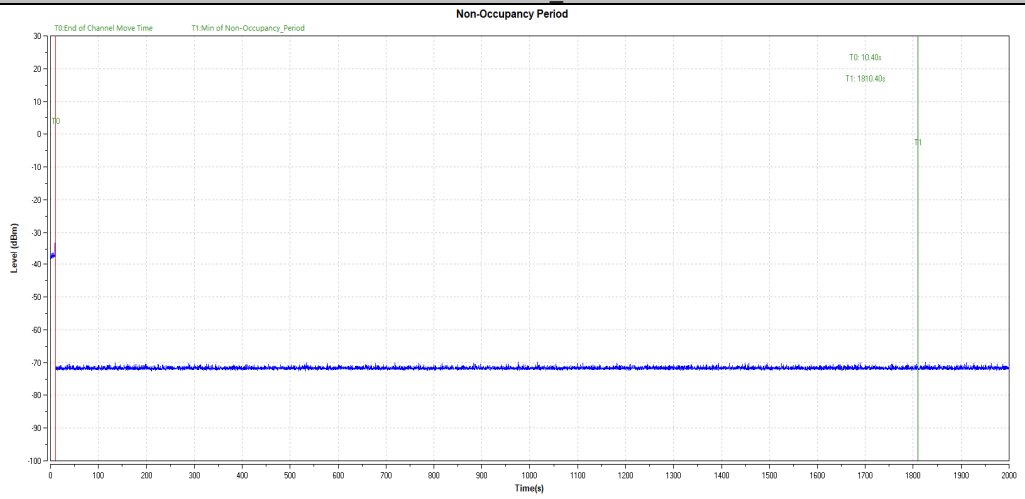
For Module:YL-43455

Test Result

Test Mode	Channel	Result	Limit[s]	Verdict
11AC80SISO	5290	see test graph	≥1800	PASS

Test Graphs

11AC80SISO_5290



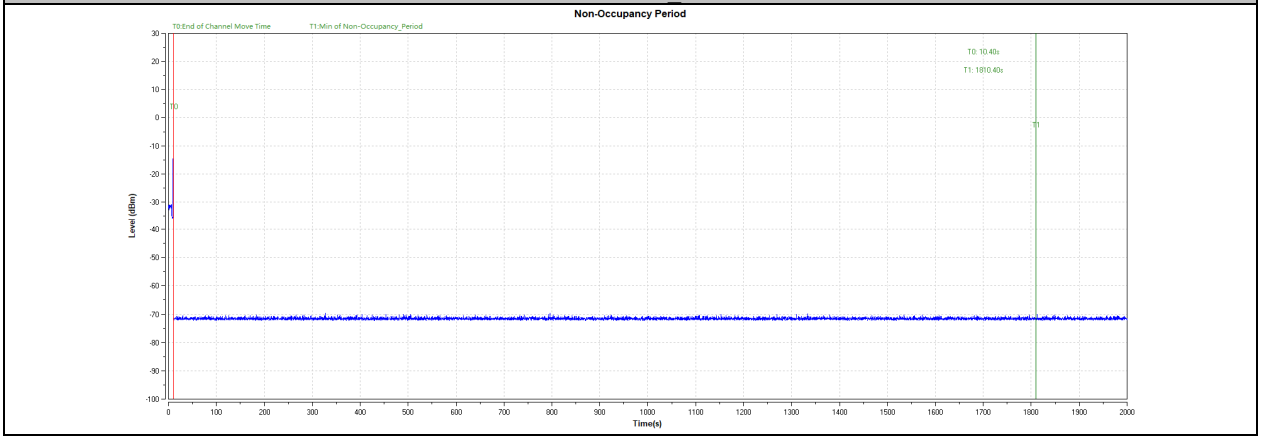
For Module:D848

Test Result

Test Mode	Channel	Result	Limit[s]	Verdict
11AC80SISO	5290	see test graph	≥1800	PASS

Test Graphs

11AC80SISO_5290



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