FCC DFS TEST REPORT

FCC ID	:	**UIDW31**
Equipment	:	**Wireless Router**
Brand Name	:	**ARRIS**
Model Name	:	**W31, W30**
Applicant	:	**ARRIS** **3871 Lakefield Drive Suite 300,Suwanee, Georgia, 30024 United States**
Manufacturer	:	**ARRIS** **3871 Lakefield Drive Suite 300,Suwanee, Georgia, 30024 United States**
Standard	:	**47 CFR FCC Part 15.407**

The product was received on Sep. 13, 2018, and testing was started from Mar. 22, 2019 and completed on Mar. 23, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FZ842742-03	01	Initial issue of report	Jun. 28, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.3	FCC KDB 905462 7.8.1 FCC KDB 789033 Section IV.	DFS: Dynamic In-Service Monitoring (Zero-Wait CAC)	PASS	Note
3.1.4	FCC KDB 905462 8.1	User Access Restrictions	PASS	-
Note: The zero wait mechanism only switches from non-DFS channel to DFS channel. For the neighbor channel only achieve when the traffic duty cycle less than 1%. Above two conditions are declared by manufacturer.				

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer. 2. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Cindy Peng

1 General Description

1.1 Information

1.1.1 RF General Information

Specification Items	Description	
Frequency Range	5250 MHz – 5350 MHz 5470 MHz – 5725 MHz	
Product Type	WLAN (4TX, 4RX)	
Radio Type	Intentional Transceiver	
Power Type	From power adapter	
Modulation	IEEE 802.11a: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11n/ac/ax: see the below table	
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac/ax: see the below table	
Channel Bandwidth	20/40/80/160 MHz operating channel bandwidth	
Operating Mode	☒ Master (AP Router, Extender)	
	☒ Bridge (Client without radar detection)	
	☐ Client with radar detection	
	☒ Client without radar detection	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
TPC Function	☒ With TPC	☐ Without TPC
Weather Band (5600~5650MHz)	☒ With 5600~5650MHz	☐ Without 5600~5650MHz
Software / Firmware Version	AXR.0155.181108.0922-dev	
Note: EUT employ a TPC mechanism and TPC have the capability to operate at least 6 dB below highest RF output power.		

Note: The above information was declared by manufacturer.

TPC Power Result

Mode	Min Power (dBm)	Max Power (dBm)	Min EIRP (dBm)	Max EIRP (dBm)
802.11a_Nss1,(6Mbps)_4TX	-	-	-	-
5.25-5.35GHz	17.93	23.93	23.64	29.64
5.47-5.725GHz	17.14	23.14	22.96	28.96
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.94	23.94	23.65	29.65
5.47-5.725GHz	17.24	23.24	23.06	29.06
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.65	23.65	23.88	29.88
5.47-5.725GHz	16.98	22.98	23.91	29.91
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.88	23.88	23.59	29.59
5.47-5.725GHz	17.87	23.87	23.69	29.69
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.66	23.66	23.89	29.89
5.47-5.725GHz	17.02	23.02	23.95	29.95
802.11ac VHT80_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.95	23.95	23.66	29.66
5.47-5.725GHz	17.90	23.90	23.72	29.72
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.68	23.68	23.91	29.91
5.47-5.725GHz	17.02	23.02	23.95	29.95
802.11ac VHT160_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	13.15	19.15	18.86	24.86
5.47-5.725GHz	16.74	22.74	22.56	28.56
802.11ac VHT160-BF_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	14.12	20.12	20.35	26.35
5.47-5.725GHz	16.87	22.87	23.80	29.80
802.11ax HEW20_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.97	23.97	23.68	29.68
5.47-5.725GHz	17.29	23.29	23.11	29.11
802.11ax HEW20-BF_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.73	23.73	23.96	29.96

Mode	Min Power (dBm)	Max Power (dBm)	Min EIRP (dBm)	Max EIRP (dBm)
5.47-5.725GHz	16.96	22.96	23.89	29.89
802.11ax HEW40_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.91	23.91	23.62	29.62
5.47-5.725GHz	17.95	23.95	23.77	29.77
802.11ax HEW40-BF_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.71	23.71	23.94	29.94
5.47-5.725GHz	17.02	23.02	23.95	29.95
802.11ax HEW80_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.90	23.90	23.61	29.61
5.47-5.725GHz	17.92	23.92	23.74	29.74
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.64	23.64	23.87	29.87
5.47-5.725GHz	17.02	23.02	23.95	29.95
802.11ax HEW160_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	14.01	20.01	19.72	25.72
5.47-5.725GHz	15.61	21.61	21.43	27.43
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	15.02	21.02	21.25	27.25
5.47-5.725GHz	16.92	22.92	23.85	29.85

Antenna & Band width

Antenna	Four (TX)			
Band width Mode	20 MHz	40 MHz	80 MHz	160 MHz
IEEE 802.11a	V	X	X	X
IEEE 802.11n	V	V	X	X
IEEE 802.11ac	V	V	V	V
IEEE 802.11ax	V	V	V	V

IEEE 11n/ac/ax Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	4	MCS0-31
802.11n (HT40)	4	MCS0-31
802.11ac (VHT20)	4	MCS0-11/Nss1-4
802.11ac (VHT40)	4	MCS0-11/Nss1-4
802.11ac (VHT80)	4	MCS0-11/Nss1-4
802.11ac (VHT160)	4	MCS0-11/Nss1-4
802.11ax (HEW20)	4	MCS0-11/Nss1-4
802.11ax (HEW40)	4	MCS0-11/Nss1-4
802.11ax (HEW80)	4	MCS0-11/Nss1-4
802.11ax (HEW160)	4	MCS0-11/Nss1-4

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40.

Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT support VHT20, VHT40, VHT80 and VHT160.

Note 3: IEEE Std. 802.11ax modulation consists of HEW20, HEW40, HEW80 and HEW160 (HEW: High Efficiency Wi-Fi). Then EUT support HEW20, HEW40, HEW80 and HEW160.

Note 4: Modulation modes consist of below configuration:
11a: IEEE 802.11a, HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80/VHT160: IEEE 802.11ac, HEW20/HEW40/HEW80/HEW160: IEEE 802.11ax

1.1.2 Table for EUT Functions

Type of Function	2.4GHz	5GHz Band 1~2	5GHz Band 3~4
Master (AP Router)	V	V	V
Master (Extender)	-	-	V
Bridge (Client without radar detection)	-	-	V
Client without radar detection	-	-	V

1.1.3 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	PEGATRON	RFPCA2620-01_Rev02	Dual band PCB dipole antenna	I-PEX	Note
2	PEGATRON	RFPCA2620-02_Rev02	Dual band PCB dipole antenna	I-PEX	
3	PEGATRON	RFPCA2620-03_Rev01	Dual band PCB dipole antenna	I-PEX	
4	PEGATRON	RFPCA2620-04_Rev02	Dual band PCB dipole antenna	I-PEX	
5	PEGATRON	RFPCA2307-02 Rev02	PCB dipole antenna	I-PEX	
6	PEGATRON	RFPCA2211-03 Rev01	PCB dipole antenna	I-PEX	
7	PEGATRON	RFPCA2211-04 Rev02	PCB dipole antenna	I-PEX	
8	PEGATRON	RFPCA1806-03 Rev01	PCB dipole antenna	I-PEX	
9	PEGATRON	RFPCA3508-05_Rev02	PCB antenna	I-PEX	
10	PEGATRON	RFPCA1806-03 Rev01	PCB dipole antenna	I-PEX	

Note:

Ant.	Port	Uncorrelated (dBi)			Correlated (dBi)			(dBi)
		2.4GHz	5GHz Band 1~2	5GHz Band 3~4	2.4GHz	5GHz Band 1~2	5GHz Band 3~4	Bluetooth
1	1	4.22	5.71	-	5.35	6.23		-
2	2	4.22	5.71	-	5.35	6.23		-
3	3	4.22	5.71	-	5.35	6.23		-
4	4	4.22	5.71	-	5.35	6.23		-
5	1	-	-	5.82	-	-	6.93	-
6	2	-	-	5.82	-	-	6.93	-
7	3	-	-	5.82	-	-	6.93	-
8	4	-	-	5.82	-	-	6.93	-
9	1	-	-	-	-	-	-	4.12
10	-	-	5.23	5.23	-	-	-	-

Note 1: The above information was declared by manufacturer.

Note 2: The EUT has ten antennas.

For Radio 1

WLAN 2.4GHz Functions

For IEEE 802.11b/g/n/ac/ax mode (4TX, 4RX):

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

WLAN 5GHz Functions (1RX):

Ant. 10 only supports the antenna receive function.

For Radio 3

WLAN 5GHz Band 1~2 Functions

For IEEE 802.11a/n/ac/ax mode (4TX, 4RX):

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For Radio 2

WLAN 5GHz Band 3~4 Functions

For IEEE 802.11a/n/ac/ax mode (4TX, 4RX):

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For Radio 4

Bluetooth Functions (1TX, 1RX):

Only Port 1 could transmit/receive simultaneously.

1.1.4 Table for Radio Type

Radio No.	2.4GHz	5GHz Band 1~2	5GHz Band 3~4	Bluetooth
Radio 1	V	Only RX function	Only RX function	-
Radio 2	-	-	V	-
Radio 3	-	V	-	-
Radio 4	-	-	-	V

1.1.5 DFS Band Carrier Frequencies

There are four bandwidth systems.

For 20MHz bandwidth systems, use Channel 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144.

For 40MHz bandwidth systems, use Channel 54, 62, 102, 110, 118, 126, 134, 142.

For 80MHz bandwidth systems, use Channel 58, 106, 122, 138.

For 160MHz bandwidth systems, use Channel 50, 114

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5250~5350 MHz Band 2	50	5250 MHz	58	5290 MHz
	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
5470~5725 MHz Band 3	100	5500 MHz	122	5610 MHz
	102	5510 MHz	124	5620 MHz
	104	5520 MHz	126	5630 MHz
	106	5530 MHz	128	5640 MHz
	108	5540 MHz	132	5660 MHz
	110	5550 MHz	134	5670 MHz
	112	5560 MHz	136	5680 MHz
	114	5570 MHz	138	5690 MHz
	116	5580 MHz	140	5700 MHz
	118	5590 MHz	142	5710 MHz
	120	5600 MHz	144	5720 MHz

1.1.6 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Color of Device's Bottom
W31	Matte Black
W30	Silver

From the above models, model name "W31" was selected as representative model for the test and its data was recorded in this report.

1.1.7 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FZ842742-01

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding Zero-Wait function.	Dynamic In-Service Monitoring test (Zero-Wait CAC). Note: Test result please refer to Appendix A.
2. Adding the beamforming function for 802.11n/ac/ax.	It doesn't need to verify DFS test.

1.2 Accessories

Accessories					
No.	**Equipment Name**	**Brand Name**	**Model Name**	**P/N**	**Rating**
1	Adapter 1	APD	WA-36L12FU	AREP05681	INPUT: 100-120V ~, 60Hz, 0.9A Max OUTPUT: 12V, 3A
2	Adapter 2	NetBit	NBS42D120 350VU	AREP05751	INPUT: 100-120V ~, 50/60Hz, 1.0A OUTPUT: 12.0V, 3.5A

Note: The adapter does not affect the test result of DFS tests, so only adapter 2 was tested and recorded in this report.

1.3 Support Equipment

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E4300	N/A
2	Notebook	DELL	E4300	N/A
3	Rx device	ARRIS	Retail	N/A

1.4 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

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

1.5 Testing Location Information

Testing Location					
☐	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL : 886-3-327-3456 FAX : 886-3-327-0973			
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085			
Test Condition		**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
DFS Site		DF01-CB	Nyle Chang	24~26°C / 56~58%	Mar. 22, 2019~Mar. 23, 2019

Test site Designation No. TW0006 with FCC
Test site registered number IC 4086D with Industry Canada.

2 Test Configuration of EUT

2.1 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration	
IEEE Std.	**Test Channel Freq. (MHz)**
802.11ac (VHT80)	5290 MHz, 5530 MHz

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Dynamic Frequency Selection (DFS)
Test Condition	Radiated measurement The EUT shall be configured to operate at the highest transmitter output power setting. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the lowest gain shall be used. The DFS radar test signals have been aligned to the direction corresponding to the EUT's maximum antenna gain.
Modulation Mode	802.11ac (VHT80)

Note: The Master supports AP Router and Extender, use the Master (AP Router) to performed test only.

3 Dynamic Frequency Selection (DFS) Test Result

3.1 General DFS Information

3.1.1 DFS Parameters

Table D.1: DFS requirement values	
Parameter	**Value**
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (Note 1).
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second periods. (Notes 1 and 2).
U-NII Detection Bandwidth	Minimum 100% of the 99% power bandwidth (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 Channel changes (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 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.	

Table D.2: Interference threshold values	
Maximum Transmit Power	**Value (see note)**
EIRP ≥ 200 mW	-64 dBm
EIRP < 200 mW and PSD < 10dBm/MHz	-62 dBm
EIRP < 200 mW and PSD >= 10dBm/MHz	-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 662911D01.	

3.1.2 Applicability of DFS Requirements Prior to Use of a Channel

Requirement	DFS 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

3.1.3 Applicability of DFS Requirements during Normal Operation

Requirement	DFS Operational mode		
	Master	Client without radar detection	Client with radar detection
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

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.

3.1.4 User Access Restrictions

User Access Restrictions	
☒	DFS controls (hardware or software) related to radar detection are NOT accessible to the user. Manufacturer statement confirming that information regarding the parameters of the detected Radar Waveforms is not available to the end user.

3.1.5 Channel Loading/Data Streaming

☐	The data file (MPEG-4) has been transmitting in a streaming mode.
☒	Software to ping the client is permitted to simulate data transfer with random ping intervals.
☒	Minimum channel loading of approximately 17%.
☐	Unicast protocol has been used.

3.2 Radar Test Waveform Calibration

3.2.1 Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1	See Note 1
1A	1	15 unique PRI in KDB 905462 D02 Table 5a	$Roundup\left\{\left(\frac{1}{360}\right)\times\left(\frac{19\times10^6}{PRI}\right)\right\}$	60%	15
1B	1	15 unique PRI within 518-3066, Excluding 1A PRI		60%	15
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 1 through 4. If more than 30 waveforms are used for short pulse radar types 1 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

3.2.2 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 Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Each waveform is defined as follows:

- The transmission period for the Long Pulse Radar test signal is 12 seconds.
- 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.
- 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.
- 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.
- Each pulse has a linear FM 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.

- 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 time between the first and second pulses is chosen independently of the time between the second and third pulses.
- 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 independently.

3.2.3 Frequency Hopping Radar Test Waveform

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

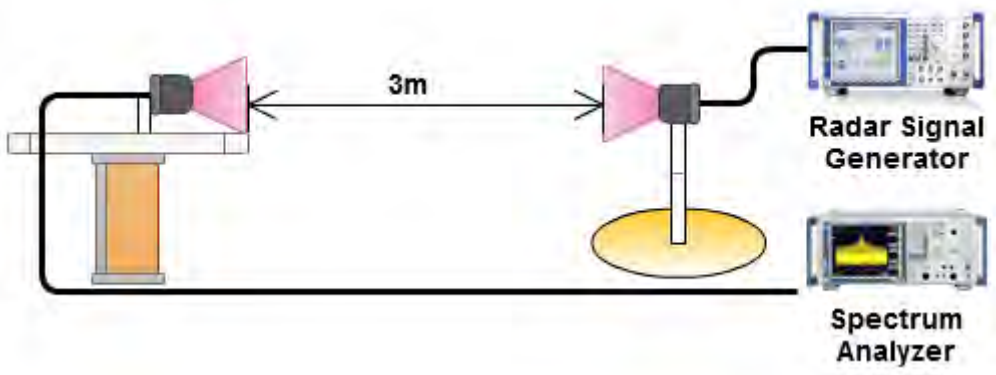
The FCC Type 6 waveform uses a static waveform with 100 bursts in the instruments ARB. In addition, the RF list mode is operated with a list containing 100 frequencies from a randomly generated list and it had be ensured that at least one of the random frequencies falls into the UNII Detection Bandwidth of the DUT. Each burst from the waveform file initiates a trigger pulse at the beginning that switches the RF list from one item to the next one.

3.2.4 DFS Threshold Level

DFS Threshold Level	
DFS Threshold level: -63 dBm	☐ at the antenna connector
	☒ in front of the antenna
The Interference **Radar Detection Threshold Level** is is *-64 dBm + 0 [dBi] + 1 dB* = -63 dBm. That had been been taken into account the output power range and antenna gain.	

3.2.5 Calibration Setup

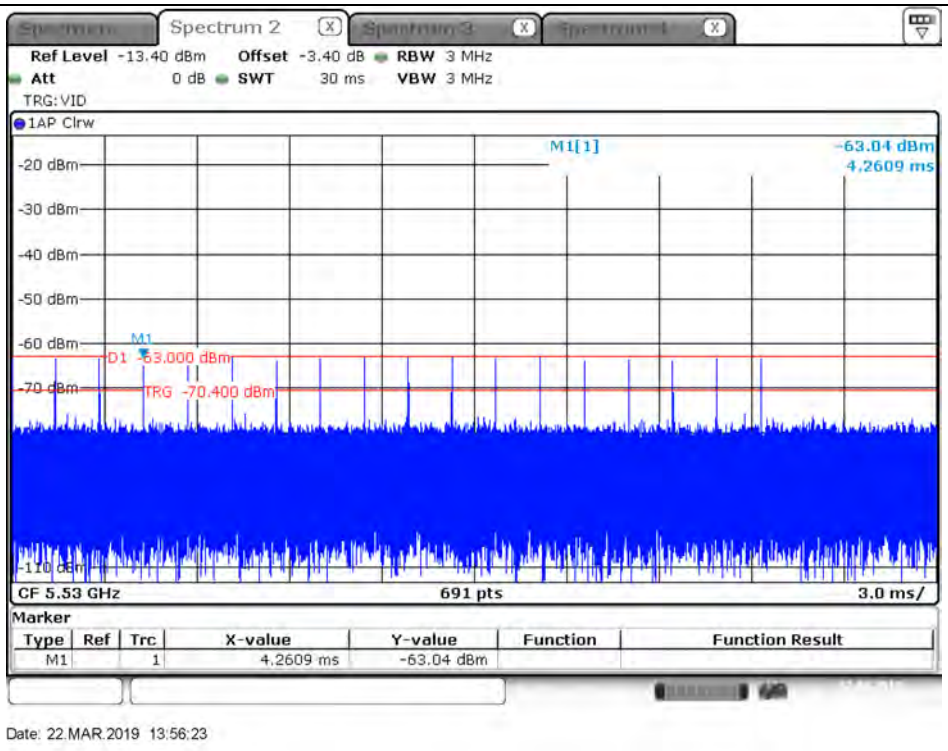
Master Radiated Calibration Setup



3.2.6 Radar Waveform calibration Plot

Test Frequency: 5530 MHz

Radar #0 DFS detection threshold level



3.3 Dynamic In-Service Monitoring Test (Zero-Wait CAC)

3.3.1 Measuring Instruments

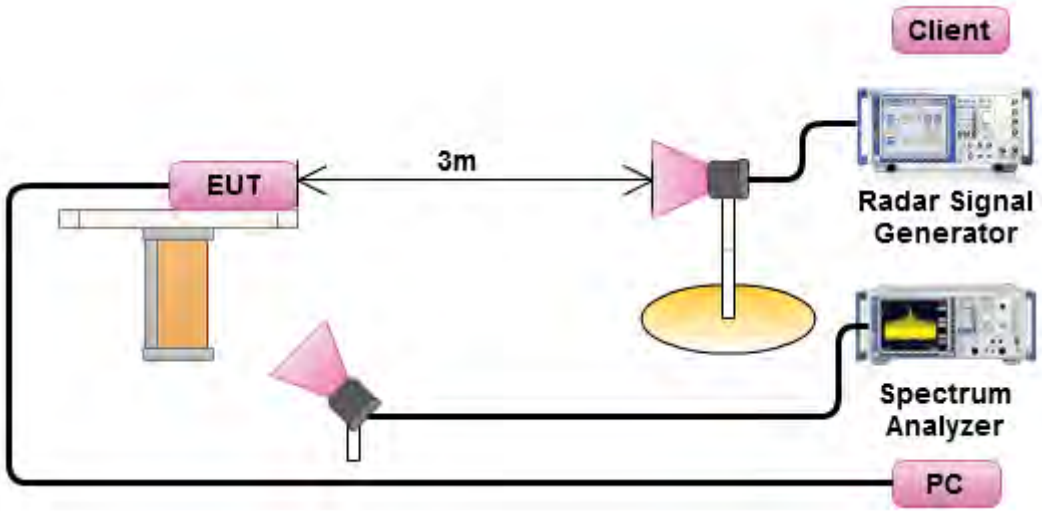
Refer a test equipment and calibration data table in this test report.

3.3.2 Test Procedure

Pre-clearing a DFS channel for zero time switching from a non-DFS channel
Before the operation channel moves from non-DFS channels to DFS channels for zero time switching, one minute CAC should be performed on the targeted switching channel to make sure no radar presence. When CAC completed with no radar presence, channel move to targeted channel immediately. If radar detected at any time during CAC, EUT stays on the original non-DFS channel.

3.3.3 Test Setup

Master Radiated Measurement



3.3.4 Test Result of Dynamic In-Service Monitoring

Refer as Appendix A

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101025	9kHz ~ 40GHz	Jul. 20, 2018	Jul. 19, 2019	Radiated (DF01-CB)
Vector Signal generator	R&S	SMU200A	102782	100kHz-6GHz	Jan. 16, 2019	Jan. 15, 2020	Radiated (DF01-CB)
Horn Antenna	COM-POWER	AH-118	071187	1GHz – 18GHz	Jun. 29, 2018	Jun. 28, 2019	Radiated (DF01-CB)
Horn Antenna	COM-POWER	AH-118	071042	1GHz – 18GHz	Dec. 24, 2018	Dec. 23, 2019	Radiated (DF01-CB)
RF Power Divider	ANAREN	2 Way	DFS-01-DV-02	1GHz ~ 6GHz	Oct. 08, 2018	Oct. 07, 2019	Radiated (DF01-CB)
RF Power Divider	MTJ	2 Way	DFS-01-DV-03	1GHz ~ 6GHz	Oct. 08, 2018	Oct. 07, 2019	Radiated (DF01-CB)
RF Power Divider	ANAREN	4 Way	DFS-01-DV-01	1GHz ~ 6GHz	Oct. 08, 2018	Oct. 07, 2019	Radiated (DF01-CB)
RF Cable-high	Woken	RG402	High Cable-57	1 GHz –18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiated (DF01-CB)
RF Cable-high	Woken	RG402	High Cable-58	1 GHz –18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiated (DF01-CB)

Note: Calibration Interval of instruments listed above is one year.

5 Measurement Uncertainty

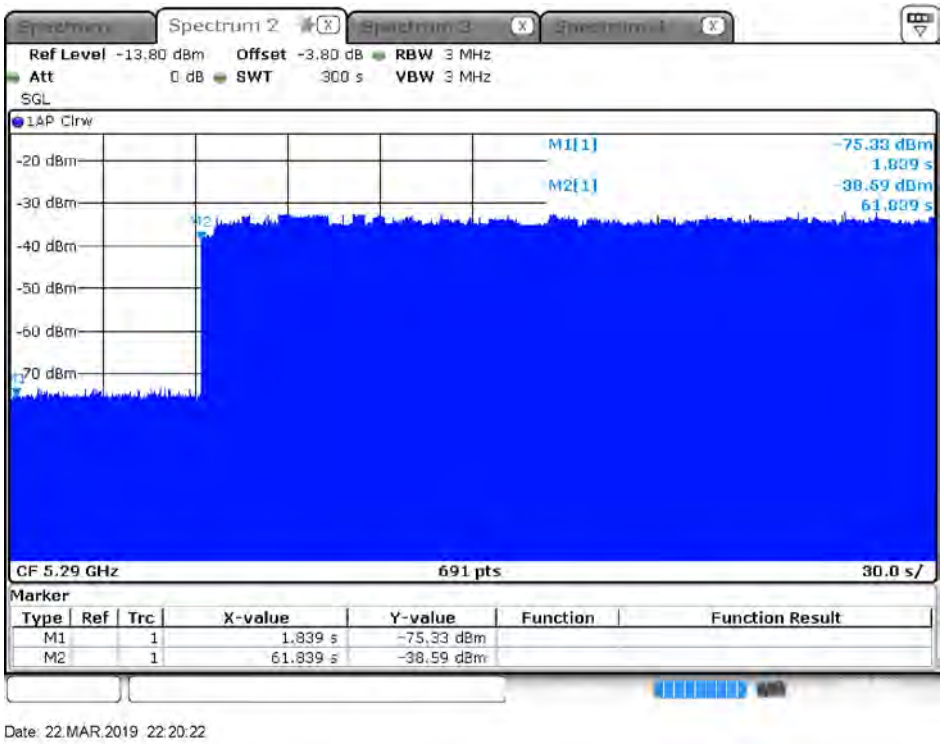
Test Items	Uncertainty	Remark
Radiated Emission	2.9 dB	Confidence levels of 95%

Appendix A. Test Result of Dynamic In-Service Monitoring (Zero-Wait CAC)

Dynamic In-Service Monitoring Test Result						
Detection Threshold Level (dBm)			-63			
Modulation Mode	Operation Freq.(MHz)	Targeted Channel Freq.(MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 20)	Detection Probability (%)	Detection Probability Limit (%)
802.11ac (VHT80)	5210	5290	0	18	90.00	60
802.11ac (VHT80)	5775	5530	0	18	90.00	60

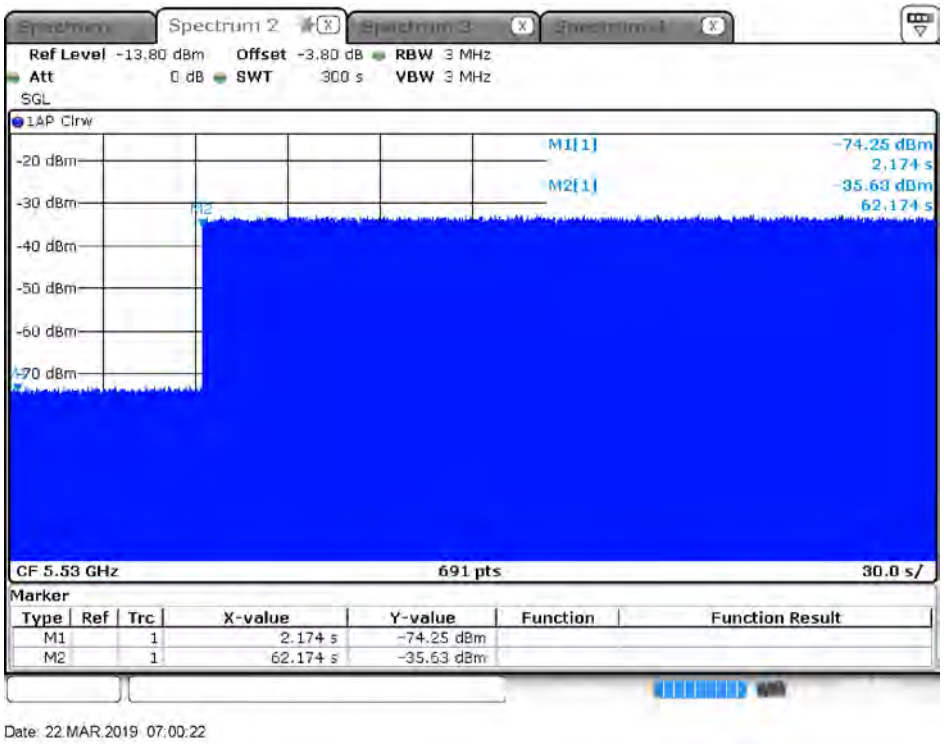
Initial CAC – Zero Wait		
Modulation Mode	**Zero-Wait Freq.**	**Radar Type**
802.11ac (VHT80)	5290 MHz	0

The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (1.839 sec). The initial CAC time of the EUT is indicated by marker 1 (1.839 sec). Initial beacons/data transmissions are indicated by marker 2 (61.839 sec).

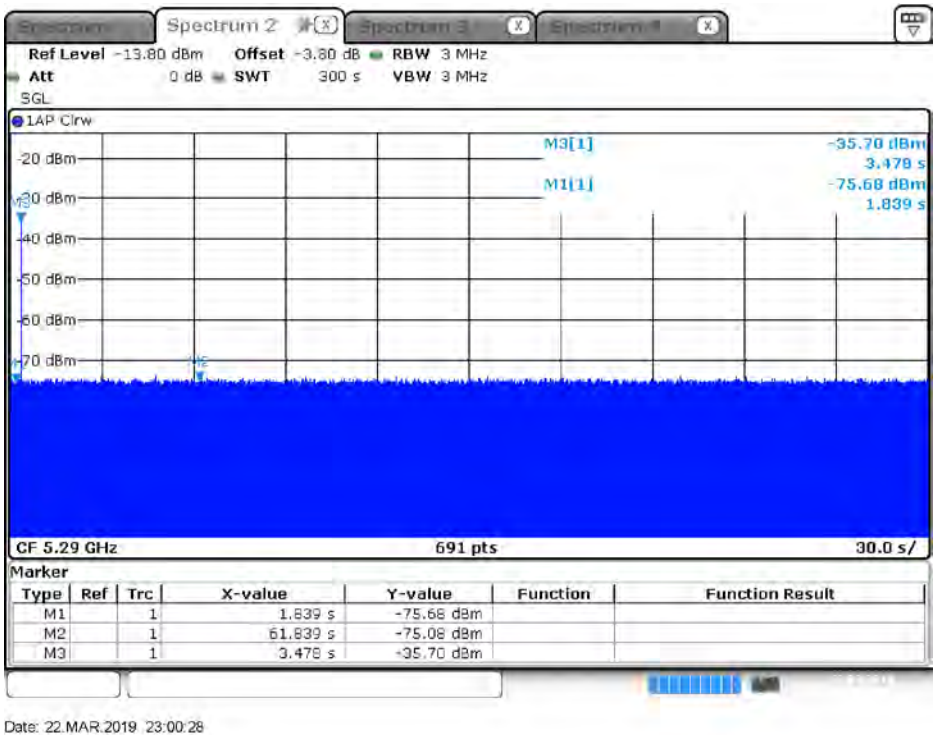


Initial CAC – Zero Wait		
Modulation Mode	**Zero-Wait Freq.**	**Radar Type**
802.11ac (VHT80)	5530 MHz	0

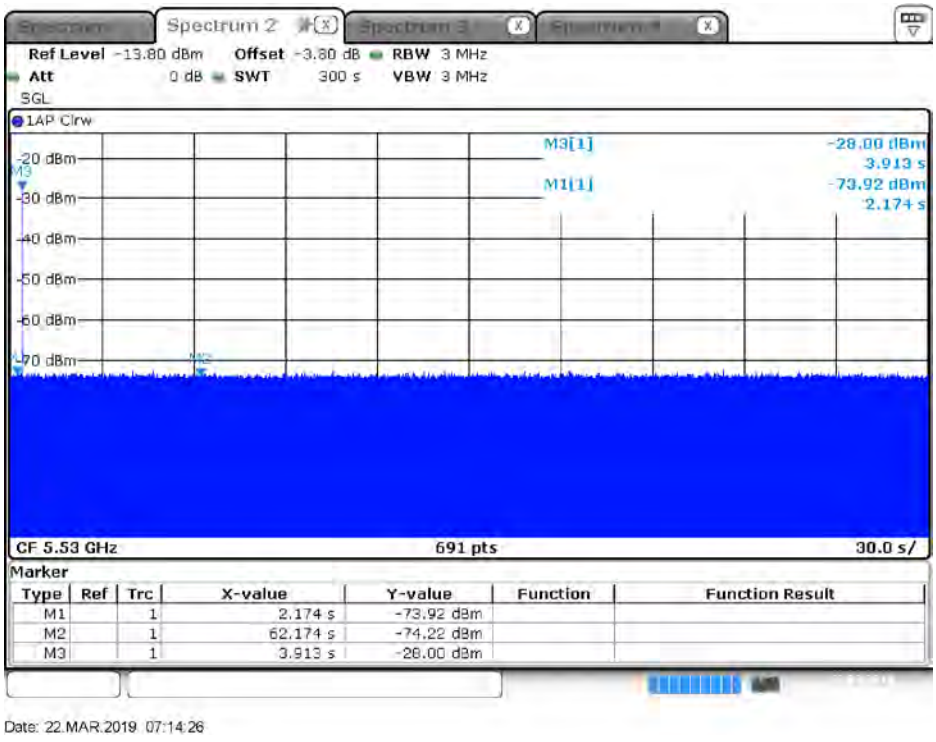
The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (2.174 sec). The initial CAC time of the EUT is indicated by marker 1 (2.174 sec). Initial beacons/data transmissions are indicated by marker 2 (62.174 sec).



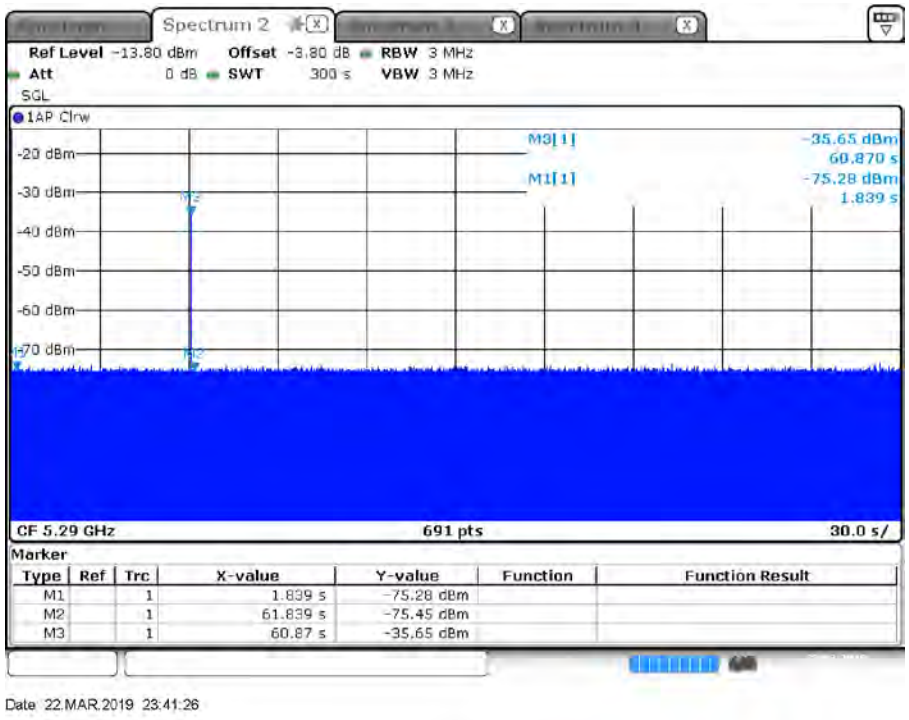
Begin CAC – Zero Wait		
Modulation Mode	**Zero-Wait Freq.**	**Radar Type**
802.11ac (VHT80)	5290 MHz	0
Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions will continue for 296.522 seconds after the radar Burst has been generated. Verify that during the 300 seconds measurement window no EUT transmissions occurred.		



Begin CAC – Zero Wait		
Modulation Mode	**Zero-Wait Freq.**	**Radar Type**
802.11ac (VHT80)	5530 MHz	0
Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions will continue for 296.087 seconds after the radar Burst has been generated. Verify that during the 300 seconds measurement window no EUT transmissions occurred.		



End CAC – Zero Wait		
Modulation Mode	**Zero-Wait Freq.**	**Radar Type**
802.11ac (VHT80)	5290 MHz	0
Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions will continue for 239.130 seconds after the radar Burst has been generated. Verify that during the 300 seconds measurement window no EUT transmissions occurred.		



End CAC – Zero Wait		
Modulation Mode	**Zero-Wait Freq.**	**Radar Type**
802.11ac (VHT80)	5530 MHz	0
Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions will continue for 238.696 seconds after the radar Burst has been generated. Verify that during the 300 seconds measurement window no EUT transmissions occurred.