

## DFS Testing Solution

**Dynamic Frequency Selection (DFS)** is a technique used in wireless networks to detect and avoid operating on frequencies that are currently being used by radar systems.

DFS testing is used to ensure that wireless devices that operate in the 5GHz band are compliant with DFS requirements set by various governing bodies such as FCC in the United States or ETSI in Europe.

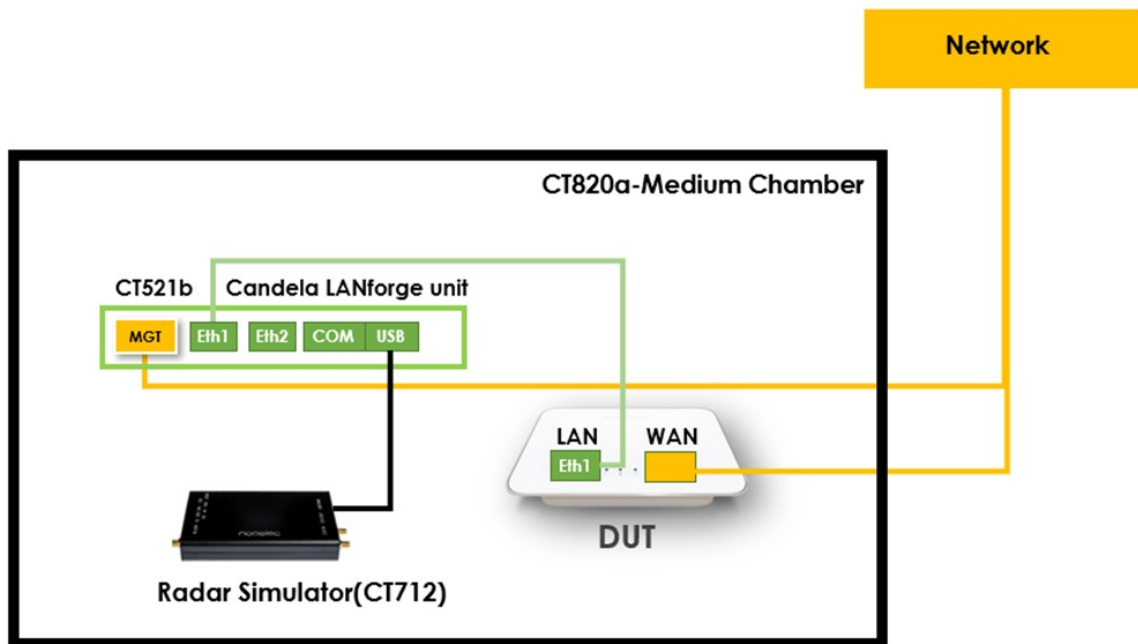
[Video on DFS Testing](#)

All Access Points wanting to use the DFS channels should be able to detect any radar activity and move off the channel and stay off the channel for a certain period time to ensure there is no interference with critical radar communications.

It is important to properly test and validate the DFS functionality of a wireless device before submitting it for certification. The certification process is costly and time consuming—failure can cause huge delays in product releases.

Candela is offering a solution to this problem by developing the most compact and affordable automated DFS test solution in the industry. Introducing the Candela LANforge DFS Test product.

### **DFS Testbed Wiring Diagram:**



Candela DFS test setup comes in a very compact form factor. This setup includes:

- The Candela **CT712** Radar Signal Generator to generate all the Radar pulses.
- Candela CT521b chassis
  - To control the signal generator
  - Run all the automation
  - Create background traffic
  - Generate test reports
- A small RF chamber to provide RF isolation for this test setup.

- DFS Test Automation Software

## DFS Testbed Images:



Candela DFS solution covers most of the standard FCC, ETSI, Japan and Korea radar pulse types.

## Supported Signals

FCC	ETSI	Japan W53	Japan W56	Korea
FCC0	ETSI0	Japan W53-1	Japan W56-1	Korea1
FCC1	ETSI1	Japan W53-2	Japan W56-2	Korea2
FCC2	ETSI2	Japan W53-3	Japan W56-3	Korea3
FCC3	ETSI3	Japan W53-4	Japan W56-4	Korea4
FCC4	ETSI4	Japan W53-5	Japan W56-5	
FCC5	ETSI5	Japan W53-6	Japan W56-6	
FCC6	ETSI6	Japan W53-7		
		Japan W53-8		

The DFS Test automation software is a Web GUI that allows the users to configure and run various fully automated standard tests which include:

- Detection Probability Test
- Detection Bandwidth Test

## Web-UI Automation Tab:

Active User : ianforge →

**Detection Probability Test**

Test Label:   Enable Traffic Desired Detection:  Trials:

Shift  Center  Random

Clear

▼ USA  
 ▶ FCC  
 ▼ Europe  
 ▶ ETSI  
 ▼ Japan  
 ▶ MIC  
 ▼ Korea  
 ▶ KCC

Various country standards

To mention the number of trails and desired detections to run the test.

Total Selected: 13

Country	Spec	Type
USA	FCC	0
USA	FCC	1
USA	FCC	2
USA	FCC	3
Europe	ETSI	0
Europe	ETSI	1
Europe	ETSI	2
Japan	W53	0
Japan	W53	1
Japan	W53	2
Japan	W53	3
Korea	KCC	1
Korea	KCC	2

Previous Run Test

In the WebGUI the user can select one or more **standard body** tests and select one or more Radar Types for

each standards body and run the tests. The GUI will run the tests as per the certification body testing standards and provide clear PASS/FAIL test results and reports.

### Sample Test Reports:

#### Detection Probability Test Report

2023-10-04 06:53:51

---

**Test Setup Information**

Device under test	DUT Name	Test_AP
	SSID	candelatest
	Test Duration	1:34:45

**Objective**

Detection Probability Test is compliance to the Dynamic Frequency Selection (DFS) Regulation, it creates regulatory specified radar pulses to the DUT repeatedly to measure the probability of detection.

**Result Summary**

The below graph provides information regarding detection probability percentage for various RADAR Types.

#### Detection Bandwidth Test Report

2023-02-12 09:42:41

---

**Test Setup Information**

Device under test	DUT Name	Test DUT
	SSID	candelatest
	Test Duration	1:26:07

**Objective**

Detection Bandwidth Test is compliance to the Dynamic Frequency Selection (DFS) Regulation, the purpose of this test is to subject the DUT to a Type 0 FCC radar pulse while moving the frequency of the radar signal through the channel to characterized range of frequencies over which the DUT can detect the radar pulse.

**Result Summary**

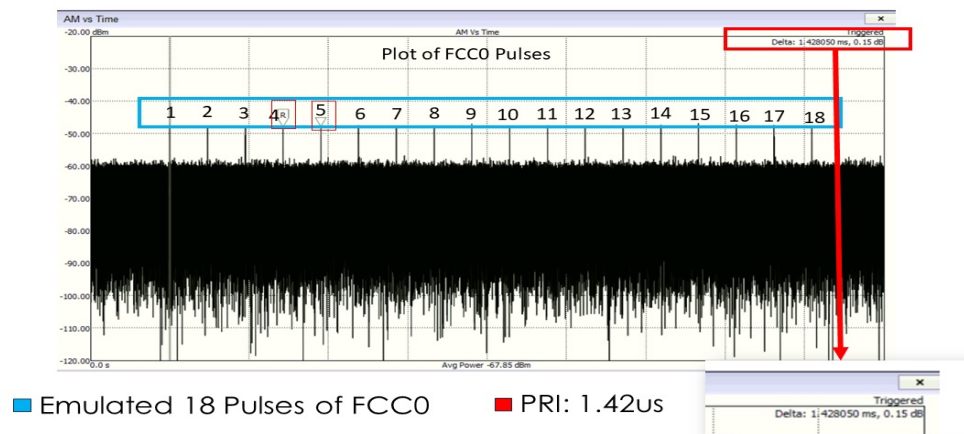
The below graph provides information regarding detection probability percentage for various RADAR Types.

### Detection Probability test :

The detection probability test aims to check if an AP can detect radar pulses generated on the active channel of the AP. The radar pulses will be generated based on different parameters like pulse width, number of pulses and Pulse Repeating Interval. For a given test case, certain number of trials must be conducted to see if AP detects radar for at least a certain percentage of the pulses. The parameters of pulses might vary for every trial based on the type of radar pulse being tested. The detection percentage of radar must be greater than or equal to the specified value by the respective governing bodies.

[Sample Test Report](#)

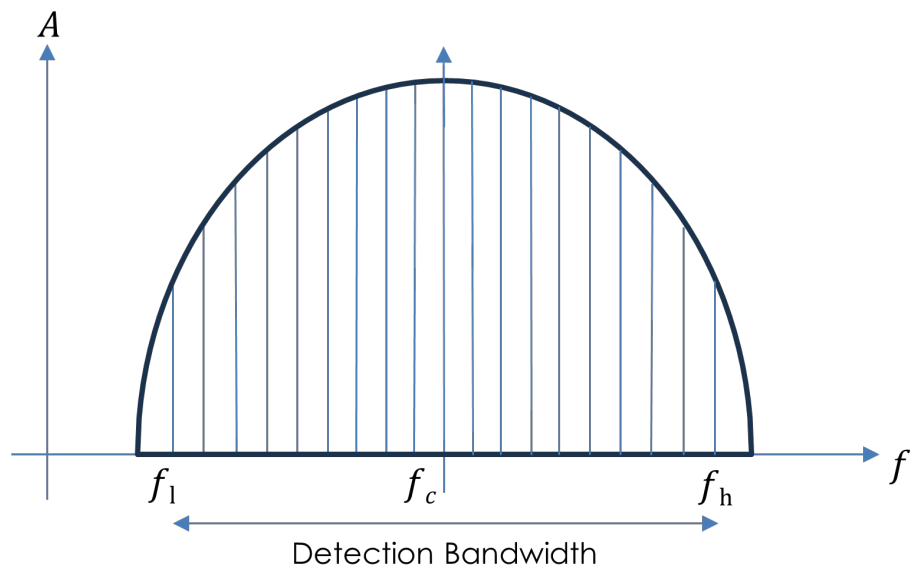
### Pulse Captures from Spectrum Analyser



### Detection Bandwidth test:

The detection bandwidth test will measure the range of frequencies in which the device can detect radar signals. The bandwidth must be at least 20 MHz wide around the center frequency of the DUT. Radar signals are injected in step increments of 1 MHz in both the directions starting from the Centre frequency. This process is done until the DUT fails to detect the signal. The Total range in between the upper frequency limit and lower frequency limit is called as the detection bandwidth. The detection bandwidth should be greater than or equal to the total bandwidth specified by the respective governing bodies to pass the test.

[Sample Test Report](#)



### Key Measurements:

- Detailed reporting for pulse parameters for every trail.
- Pass/Fail results table for each test signal as per the standards.

### TaaS/Onsite Support:

Customers with only occasional test needs can use our Test as a Service option. Candela Engineers can do the testing for you in our fully equipped test house and provide a detailed test report with recommendations.

Candela Technologies, Inc., 2417 Main Street, Suite 201, Ferndale, WA 98248, USA  
www.candelatech.com | sales@candelatech.com | +1.360.380.1618