



TESTING CERT #3478.01



TEST REPORT

EUT Description	1x1 802.11ac + BT 4.2 combo, PCIe M.2 2230 adapter card
Brand Name	Intel® Dual-Band Wireless-AC 3168
Model Name	3168NGW
Serial Number	TA#: H84692-006 WF MAC: 34:13:E8:4F:13:E3 BT MAC: 34:13:E8:4F:13:E7 (see section 4)
FCC/IC ID	FCC ID: PD93168NG / PD93168NGU IC ID: 1000M-3168NG
Antenna type	SkyCross WIMAX/WLAN Reference Antenna
Hardware/Software Version	HW: TF1 – cfg 51.12 Test SW: DRTU version 1.8.3-02432 Op SW: 99.0.17.7
Date of Sample Receipt	2015-08-18
Date of Test	2016-01-18 / 2016-02-12
Features	802.11 a/b/g/n/ac Wireless LAN + BDR/EDR 2.1 + BLE 4.2 (see section 5)

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Reference Standards	FCC CFR Title 47 Part 15E RSS 247 issue 1
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Test Report number	160107-01.TR04
Revision Control	Rev. 00

The test results relate only to the samples tested.

The test report shall not be reproduced in full, without written approval of the laboratory.

Issued by

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1. Standards, reference documents and applicable test methods

1. FCC 47 CFR part 15 - Subpart E – Unlicensed National Information Infrastructure Devices.
2. FCC OET KDB 905462 D02 UNII DFS Compliance Procedures New Rules v01r02 – Compliance measurement procedures for unlicensed-national information infrastructure devices operating in the 5250-5350 MHz and 5470-5725 MHz bands incorporating dynamic frequency selection.
3. RSS-247 Issue 1 — Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSS) and Licence-Exempt Local Area Network (LE-LAN) Devices
4. ANSI C63.10-2009 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

2. General conditions, competences and guarantees

- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is a testing laboratory accredited by the American Association for Laboratory Accreditation (A2LA).
- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm listed by the FCC, with Designation Number FR0011.
- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by IC, with IC Assigned Code 1000Y.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.
- ✓ Complete or partial reproduction of the report cannot be made without written permission of Intel WRF Lab.

3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature	22°C ± 2°C
Humidity	32% ± 5%

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of reception
#01	160107-01.S09	WiFi/BT Module	3168NGW	WF MAC: 34:13:E8:4F:13:E3	2016-01-07
	160107-01.S12	Extender board	PCB00495	ASS00495-001, 4955013-034	2016-01-07
	160107-01.S18	AC/DC Adapter	SPU60-102	087411640 1350	2016-01-07
	160107-01.S16	Desktop	DELL Optiplex 960	5KYN64J	2016-01-07

NA: Not Applicable

5. EUT features

These are the detailed bands and modes supported by the Equipment Under Test:

802.11b/g/n	2.4GHz (2400.0 – 2483.5 MHz)
802.11a/n/ac	5.2GHz (5150.0 – 5250.0 MHz) 5.3GHz (5250.0 – 5350.0 MHz) 5.6GHz (5470.0 – 5725.0 MHz) 5.8GHz (5725.0 – 5850.0 MHz)
BDR/EDR 2.1 BLE 4.2	2.4GHz (2400.0 – 2483.5 MHz)

6. Remarks and comments

1. The operating mode of the sample is only client without radar detection.
2. The maximum antenna gain is 5dBi

7. Test Verdicts summary

FCC part	RSS part	Test name	Verdict
15.407 (h) (2)	RSS-247 part 6.3	Non Occupancy Period	P
		DFS Detection Threshold	NA
		Channel Availability Check Time	NA
		Uniform Spreading	NA
		U-NII Detection Bandwidth	NA
		DFS Detection Threshold	NA
		Channel Closing Transmission Time	P
		Channel Move Time	P
		U-NII Detection Bandwidth	NA

P: Pass

F: Fail

NM: Not Measured

NA: Not Applicable

8. Document Revision History

Revision #	Date	Modified by	Details
Rev. 00	2016-02-22	O. Fargant	First Issue

Annex A. Test & System Description

A.1 Test Conditions

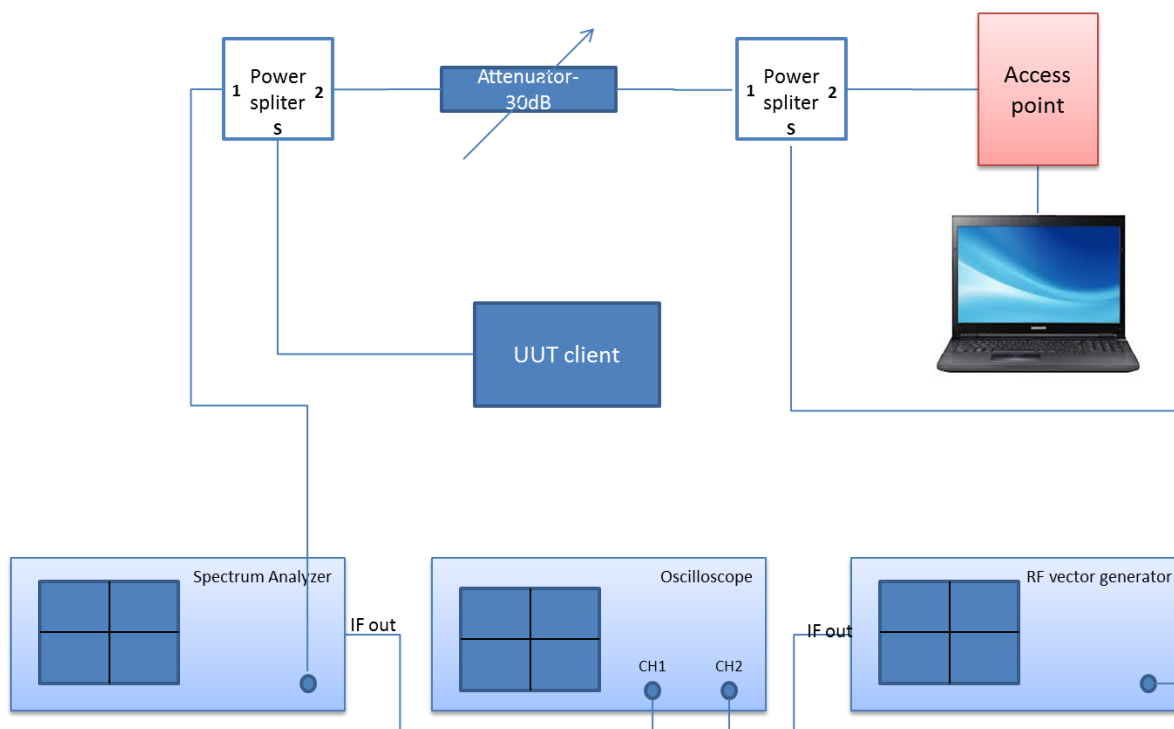
The EUT power supply was provided by the Extender test board, $V_{\text{nominal}} = 3.3 V_{\text{DC}}$. The Intel ProSet Wifi software was used to set the EUT in normal operation mode.

A.2 Measurement system

Measurements were performed using the following setups, made in accordance to the general provisions of FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v01r02.

The DUT was installed in a test fixture and this test fixture is connected to a laptop computer and AC/DC power adapter. A second laptop computer was used to configure the access point on the DFS channels; a channel was selected randomly by the access point. To enable channel loading, this second laptop computer is also used as a server host, a video was streamed on the UUT.

Conducted Setup



A.3 Test Equipment List

Conducted Setup

ID#	Device	Type/Model	Serial Number	Manufacturer	Cal. Date	Cal. Due Date
0315	Spectrum analyzer	FSV30	103307	Rohde & Schwarz	2015-03-20	2017-03-20
0017	Vector Signal Generator	SMJ100A	100458	Rohde & Schwarz	2015-10-21	2017-10-21
0312	Digital Oscilloscope	RTE1052	101135	Rohde & Schwarz	2015-05-25	2017-03-25
0261	Access point*	Aironet IOS	FTX134390GV	Cisco	NA	NA
-	Laptop DELL	Lattitude 5440	-	DELL	NA	NA

*: FCC ID: LDK102061

A.4 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

Measurement type	Uncertainty
Timing domain	$\pm 1\text{ms}$

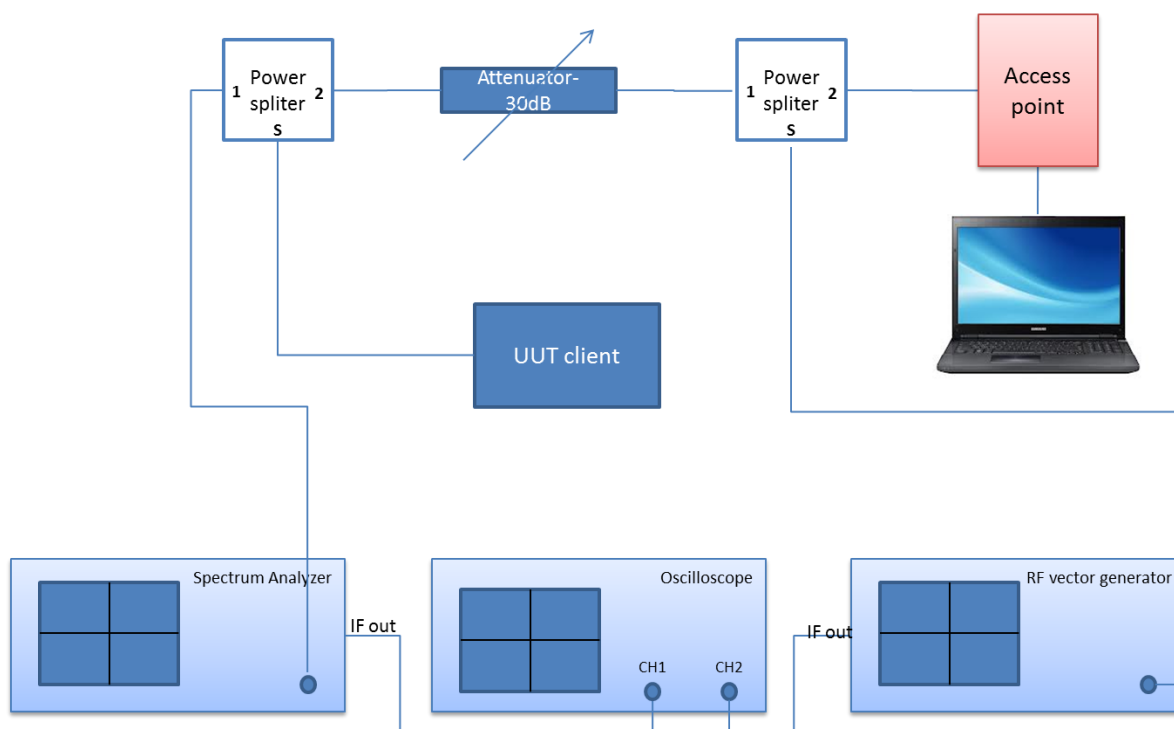
Annex B. Test Results

B.1 Test results for Dynamic Frequency Selection (DFS)

Test procedure

The setup below was used to measure verify measure the Non Occupancy Period, Channel Closing Transmission Time and Channel Move Time. Before sending the radar signal with the vector signal generator, the video streaming is launched to establish the channel loading.

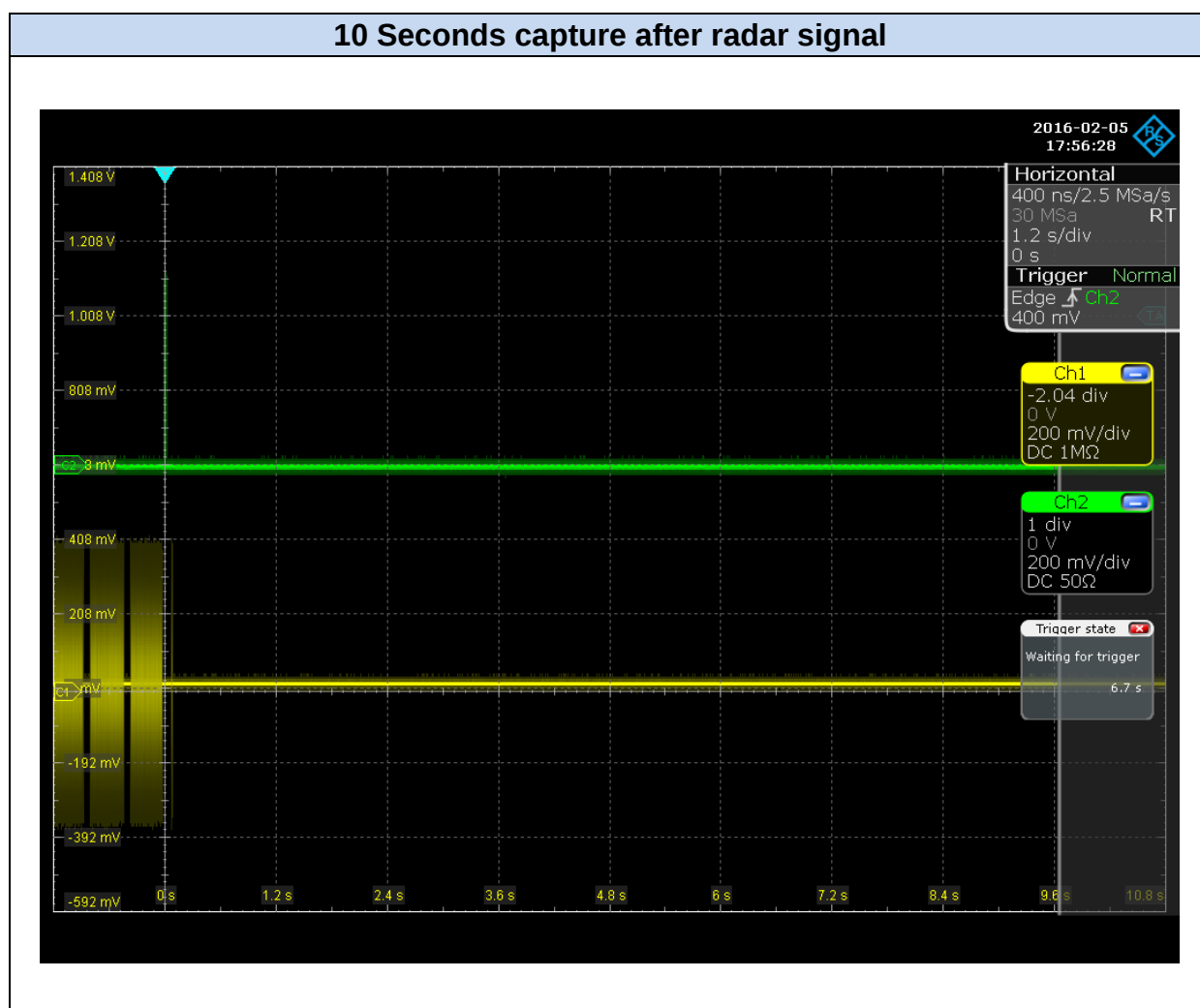
The Non Occupancy Period is observed on the spectrum analyzer, and the radar signal, the Channel Closing Transmission Time and Channel Move Time are observed on the oscilloscope.



Results tables

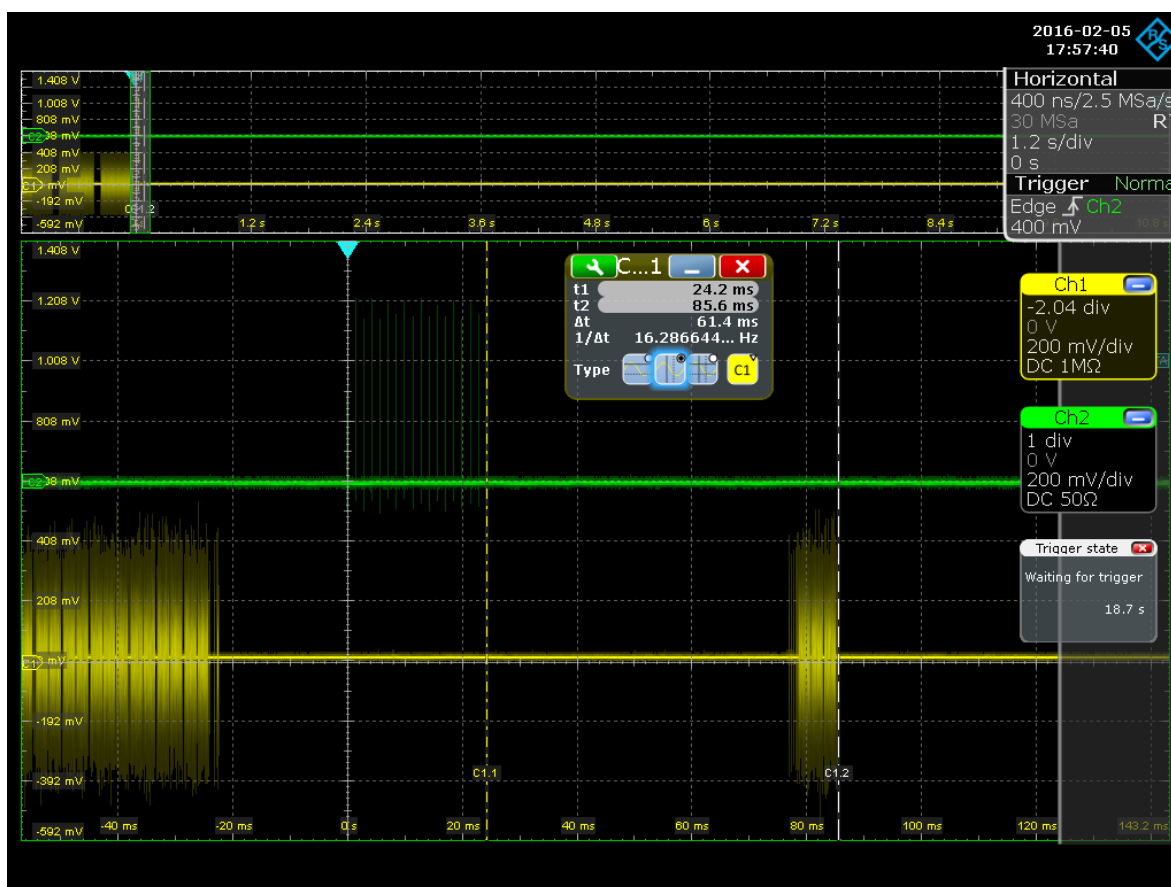
Tested Channel: 112, Frequency: 5560 MHz

Test item	Results	Limit
Channel Closing Transmission Time	< 61.4 ms	200 milliseconds + an aggregate of 60milliseconds over remaining 10 seconds period.
Channel Move Time	61.4 ms	10 seconds
Non-occupancy period	> 30 minutes	Minimum 30 minutes

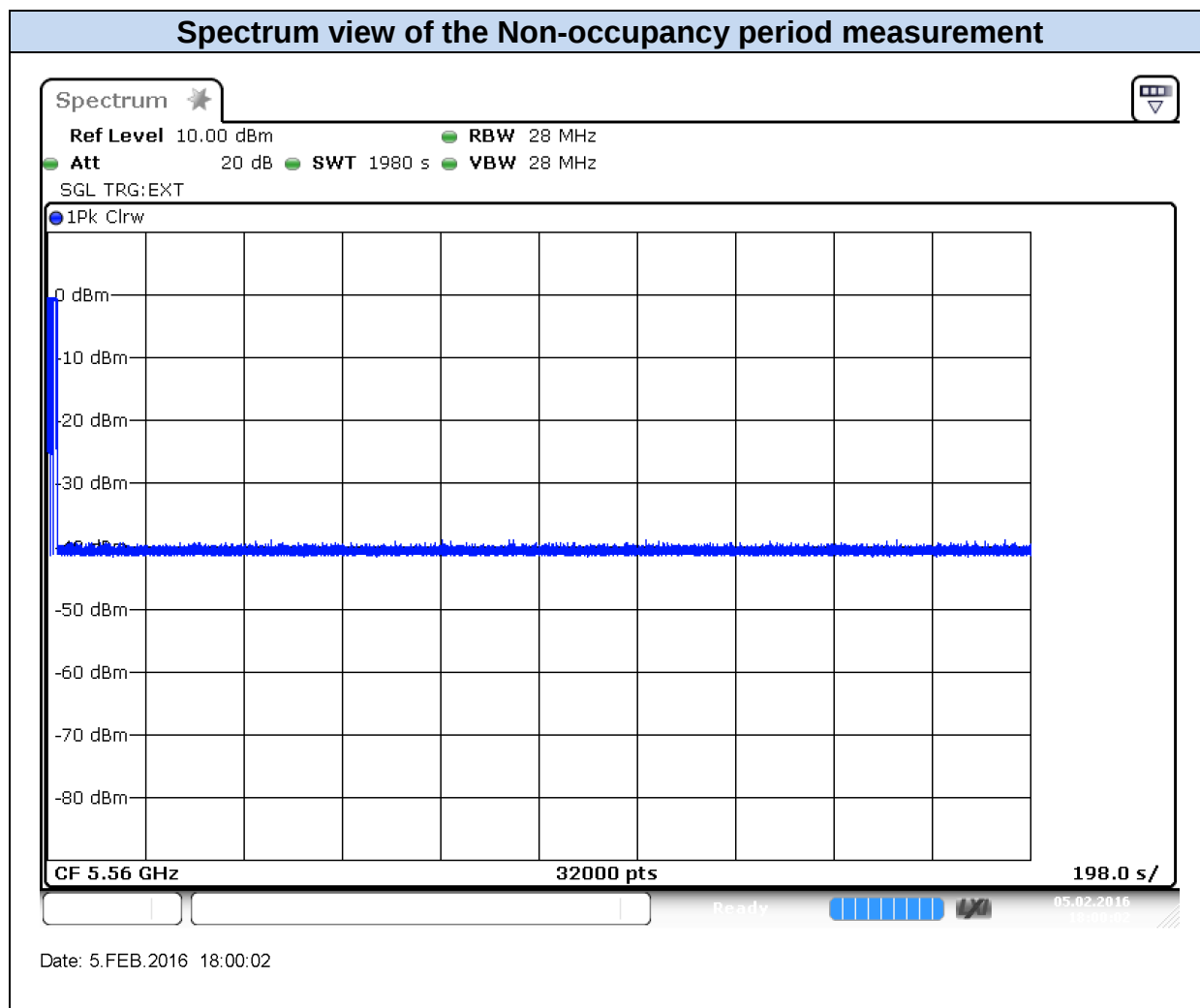
Results screenshot

The screenshot above shows that no transmission from the EUT occurs after 200ms the radar signal is present.

Zoom view to show the channel move time



The cursors are placed between the latest radar signal and the latest data packet transmitted by the EUT to the master device. The time delta value shows the actual channel move time. The value here is 61.4 ms.



The screenshot above shows the Non occupancy period for 30 minutes. No transmission from the EUT occurs during this period.