

Produkte
Products

Prüfbericht - Nr.: 14047148 001

Test Report No.:

Seite 1 von 18

Page 1 of 18

Auftraggeber: Megabyte Limited
Client: Unit 507, Building 12W, No. 12 Science Park West Avenue
 Hong Kong Science Park, Shatin, N.T., Hong Kong

Gegenstand der Prüfung: UHF Portable RFID Reader
Test Item:

Bezeichnung: T8-01-MB
Identification: T8-01-39, T8-01-PH

Serien-Nr.:
Serial No.:

Engineering sample

Wareneingangs-Nr.: A000386196-002
Receipt No.:

Eingangsdatum: 30.06.2016
Date of Receipt:

Prüfort: EMTEK (Shenzhen) Co., Ltd.
Testing Location: Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

Zustand des Prüfgegenstandes bei Anlieferung: Test samples are not damaged and suitable for testing.
Condition of test item at delivery:

Prüfgrundlage: FCC Part 15 Subpart E
Test Specification: KDB 905462 D02 v02

Prüfergebnis: Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.

The above mentioned product was tested and **passed**.

Prüflaboratorium: TÜV Rheinland Hong Kong Ltd.
Testing Laboratory: 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong

geprüft/ tested by:

kontrolliert/ reviewed by:

23.12.2016

Benny Lau

Senior Project Manager



Sharon Li

Department Manager



Datum
Date

Name/Stellung
Name/Position

Unterschrift
Signature

23.12.2016

Name/Stellung
Name/Position

Unterschrift
Signature

Sonstiges:
Other Aspects

FCC ID: XEK-MTRAYT8

This device is a composite device. This report contains the test result of the DFS test of the 5GHz WIFI transceiver portion.

Abkürzungen: P(pass) = entspricht Prüfgrundlage
 F(fail) = entspricht nicht Prüfgrundlage
 N/A = nicht anwendbar
 N/T = nicht getestet

Abbreviations: P(pass) = passed
 F(fail) = failed
 N/A = not applicable
 N/T = not tested

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

Table of Content

	Page
Cover Page	1
Table of Content	2
Product information.....	4
Manufacturers declarations	4
Product function and intended use.....	4
Submitted documents.....	4
Independent Operation Modes	5
Related Submittal(s) Grants	5
Remark	5
Applicability.....	6
Applicability of DFS Requirements Prior to Use of a Channel	6
Applicability of DFS requirements during normal operation	6
DFS Detection Thresholds	7
DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection	7
Response Requirements.....	8
DFS Response Requirement Values	8
RADAR TEST WAVEFORMS	9
Short Pulse Radar Test Waveforms	9
Long Pulse Radar Test Waveform.....	9
Frequency Hopping Radar Test Waveform	9
Test Set-up and Test Procedure.....	10
Test Setup Diagram.....	10
Test Procedure	10
List of Test and Measurement Instruments.....	11
Test Equipment	11
Supporting equipment.....	11
Test Results	12
Summary of test results	12
DFS Detection Thresholds	13
Channel Move Time, Channel Closing Transmission Time	15
Non-Occupancy Period.....	17

Appendix 1 – Test setup 2 pages

Appendix 2 – EUT External Photos 4 pages

Appendix 3 – EUT Internal Photos 14 pages

Product information

Manufacturers declarations

	Transceiver
Operating frequency range	5180 - 5320 MHz 5500 - 5700 MHz 5745 - 5825 MHz
Operating mode	<input type="checkbox"/> Master Device <input checked="" type="checkbox"/> Client Device with No Radar Detection <input type="checkbox"/> Client Device with Radar Detection
Type of modulation	802.11a: OFDM (BPSK/QPSK/16QAM/64QAM) 802.11n: OFDM (BPSK/QPSK/16QAM/64QAM)
Maximum Conducted Output Power	17.78mW (12.5dBm) at band U-NII-2A 13.49mW (11.3dBm) at band U-NII-2C
Number of channels	23
Channel separation	20 MHz
Type of antenna	Integral PCB Antenna
Antenna gain (dBi)	2 dBi
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	Yes
Nominal voltage	100-240VAC/ 3.7VDC
Independent Operation Modes	Transmitting

Product function and intended use

The equipment under test (EUT) is a mobile RFID reader. It is a compact NFC and UHF RFID reader with Bluetooth and WIFI connectivity.

The manufacturer declared that the model: T8-01-39 and T8-01-PH are identical to the model T8-01-MB except the logo plate.

FCC ID: XEK-MTRAYT8

Models	Product description
T8-01-MB T8-01-39, T8-01-PH	UHF Portable RFID Reader

Submitted documents

Circuit Diagram
Block Diagram
Technical Description
User manual
Label

Independent Operation Modes

The basic operation modes are:

- Transmitting mode.

For further information refer to User Manual

Related Submittal(s) Grants

This report contains the test result of the DFS test of the 5GHz WIFI transceiver portion and shall be read in conjunction with the test report 14047149 001 issued by TÜV Rheinland HK Ltd on 23.12.2016.

The RFID transmitter portion is authorized under the certification procedure (refer to test report 14045645 001 issued by TÜV Rheinland HK Ltd on 23.12.2016).

The NFC portion is authorized under the certification procedure (refer to test report 14045648 001 issued by TÜV Rheinland HK Ltd on 23.12.2016).

The Bluetooth portion is authorized under the certification procedure (refer to test report 14045646 001 and 14045647 001 and 14047147 001 issued by TÜV Rheinland HK Ltd on 23.12.2016).

The WIFI portion is authorized under the certification procedure (refer to test report 14045649 001 and 14047149 001 issued by TÜV Rheinland HK Ltd on 23.12.2016).

Remark

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production.

Applicability

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

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.		

DFS Detection Thresholds

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.

Response Requirements

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: *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.

RADAR TEST WAVEFORMS

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 $\{(1/360)^*(19*10^6/\text{PRI}_{\mu\text{sec}})\}$	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)					
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Long Pulse Radar Test Waveform

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

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
1	333	9	0.333	300	70%	30	1

Test Set-up and Test Procedure

Test Setup Diagram

Slave Mode

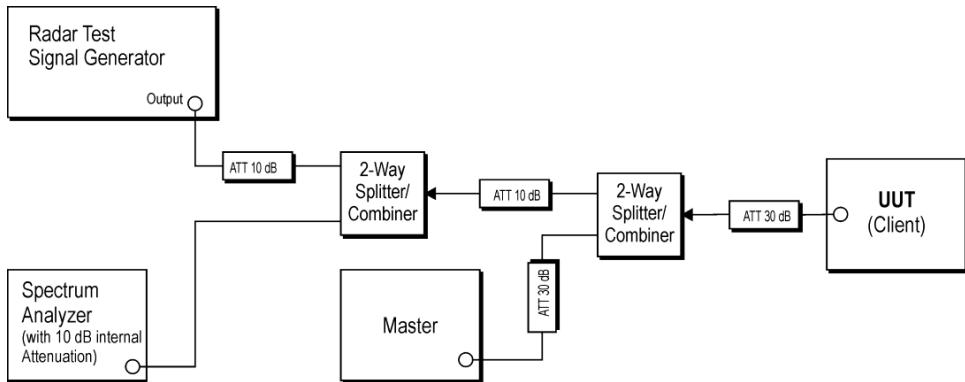


Figure 1. Conducted test Setup for DFS

Test Procedure

1. A DFS measurement system consists of the Radar Signal Generator and the traffic monitoring subsystem is used for the testing.
2. The conducted test setup described in KDB 905462 D02 is used as shown in figure 1.
3. In band 2A, one channel between 5250 and 5350 MHz is selected for the testing. In band 2C, one channel between 5470 and 5725 MHz is selected for the testing.
4. Software that have random ping intervals is used to simulate data transfer.
5. A type-0 radar pulse was generated by the measurement system.
6. The signal level of the Radar waveform as received by the client device is set in accordance with the DFS Detection Threshold specified by the DFS technical requirement and section 7.8.3 of the KDB 905462 D02.
7. Observe the transmissions of the UUT at the end of the radar *Burst* on the *Operating Channel* for duration greater than 10 seconds. Measure and record the transmissions from the UUT during the observation time (*Channel Move Time*). Measure and record the *Channel Move Time* and *Channel Closing Transmission Time* if radar detection occurs.
8. Monitor the UUT for more than 30 minutes following instant T2 to verify that the UUT does not resume any transmissions on this *Channel*.

List of Test and Measurement Instruments

EMTEK (Shenzhen) Co., Ltd. (Registration number: 406365)

Test Equipment

EQUIPMENT TYPE	MFR/ Brand	MODEL NUMBER	SERIAL NUMBER	LAST CAL.
Vector Signal Generator	Agilent	N5182B	My53050553	05/28/2016
Analog Signal Generator	Agilent	N5171B	My53050878	05/28/2016
Signal Analyzer	Agilent	N9010A	My53470879	05/28/2016
Power Analyzer	Agilent	PS-X10-200	N/A	05/28/2016
Test Accessories	Agilent	PS-X10-100	N/A	05/28/2016

Remark: Each piece of equipment is scheduled for calibration once a year.

Supporting equipment

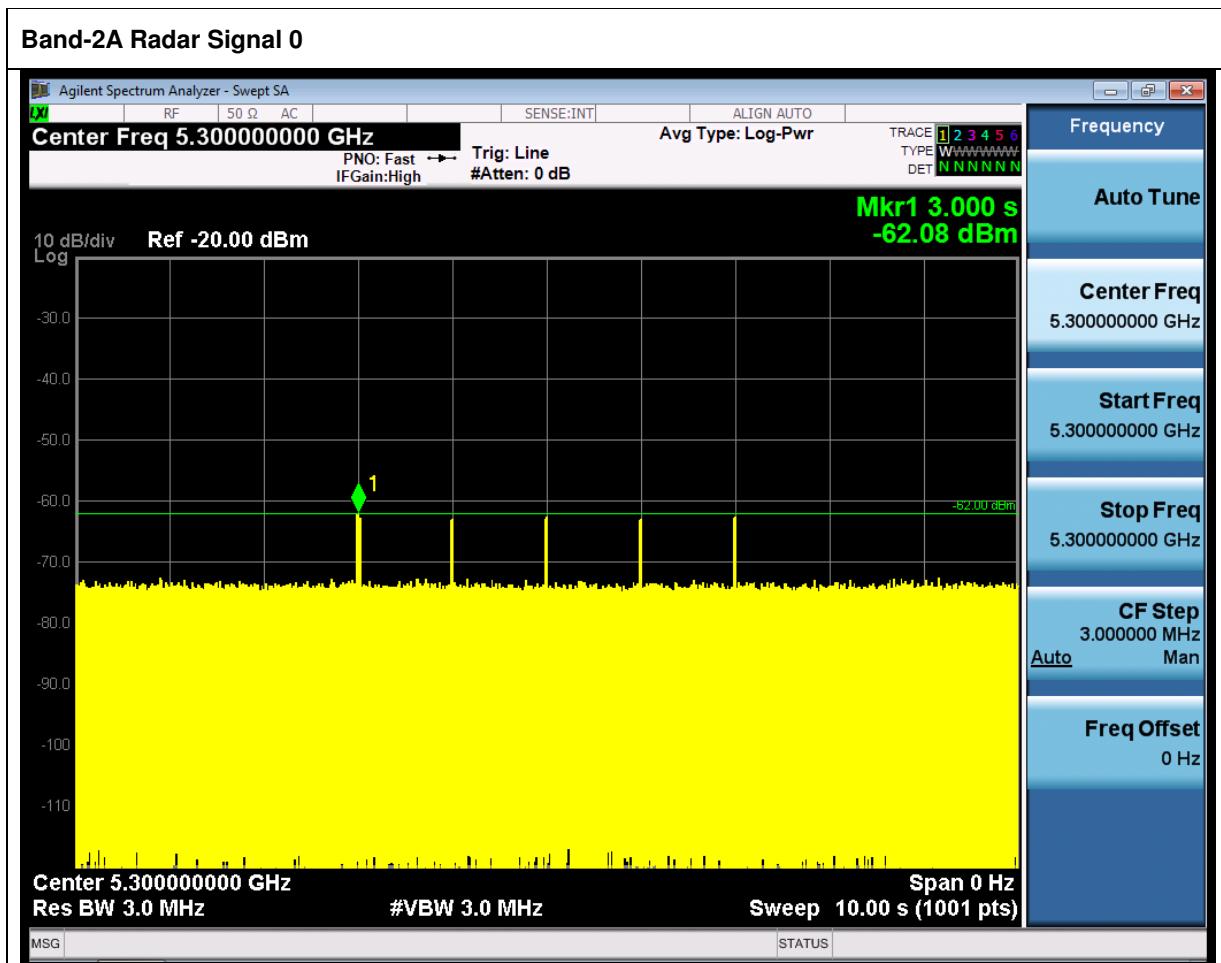
Equipment Type	Mfr/Brand	Model/Type No.	Series No.	Note
Notebook	ASUS	P45V	N/A	
Wireless Access Point	Cisco	AIR-CAP3702E-A-K9	FTX182276QD	

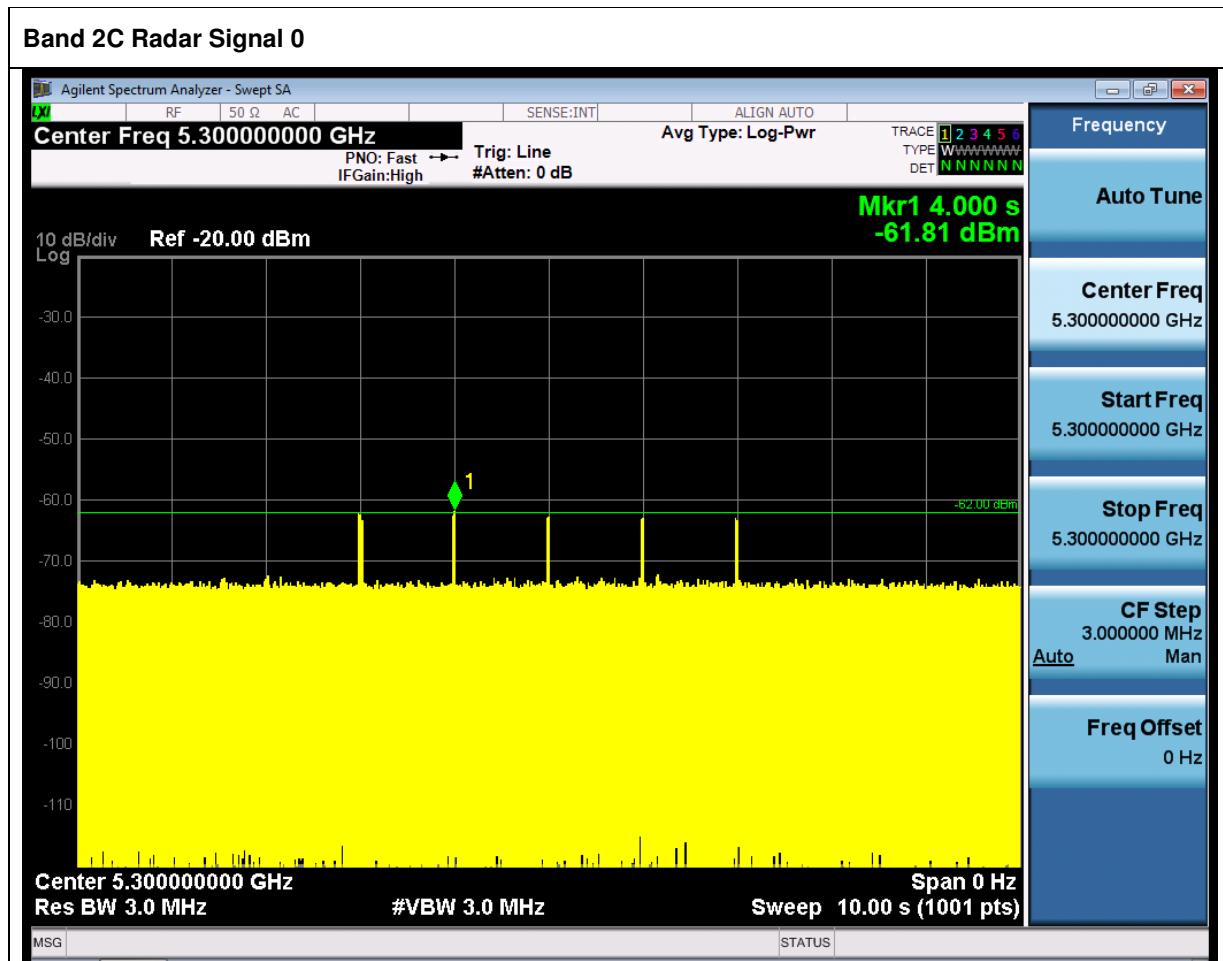
Test Results

Summary of test results

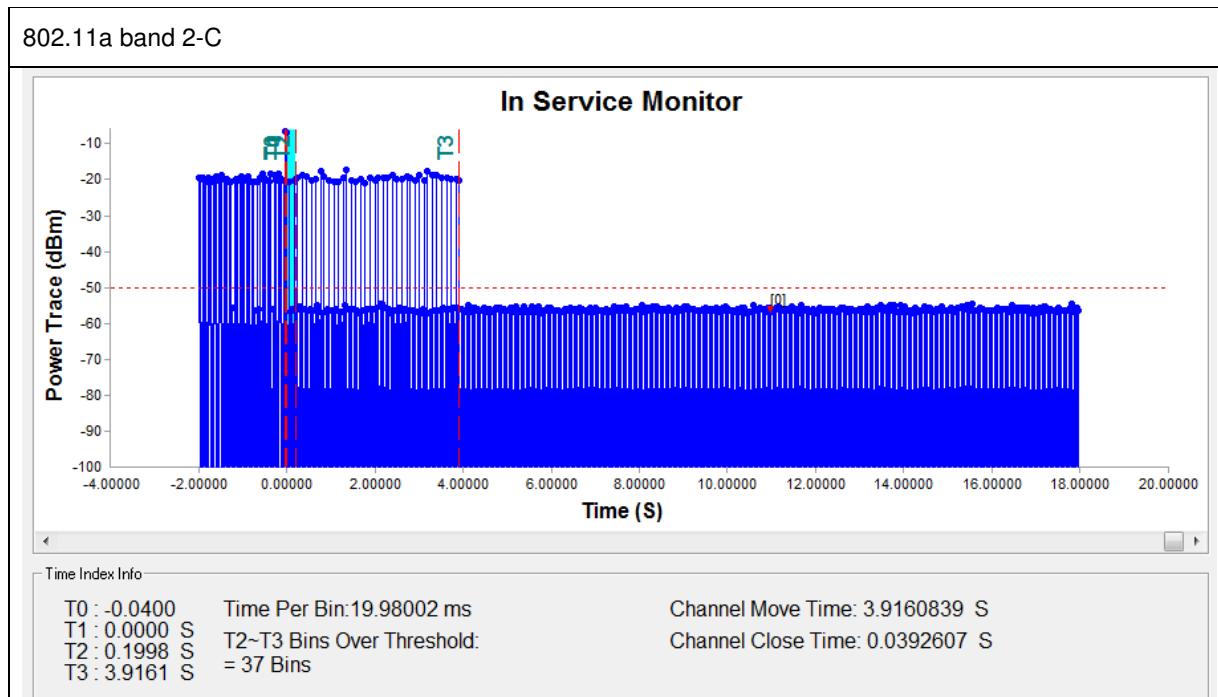
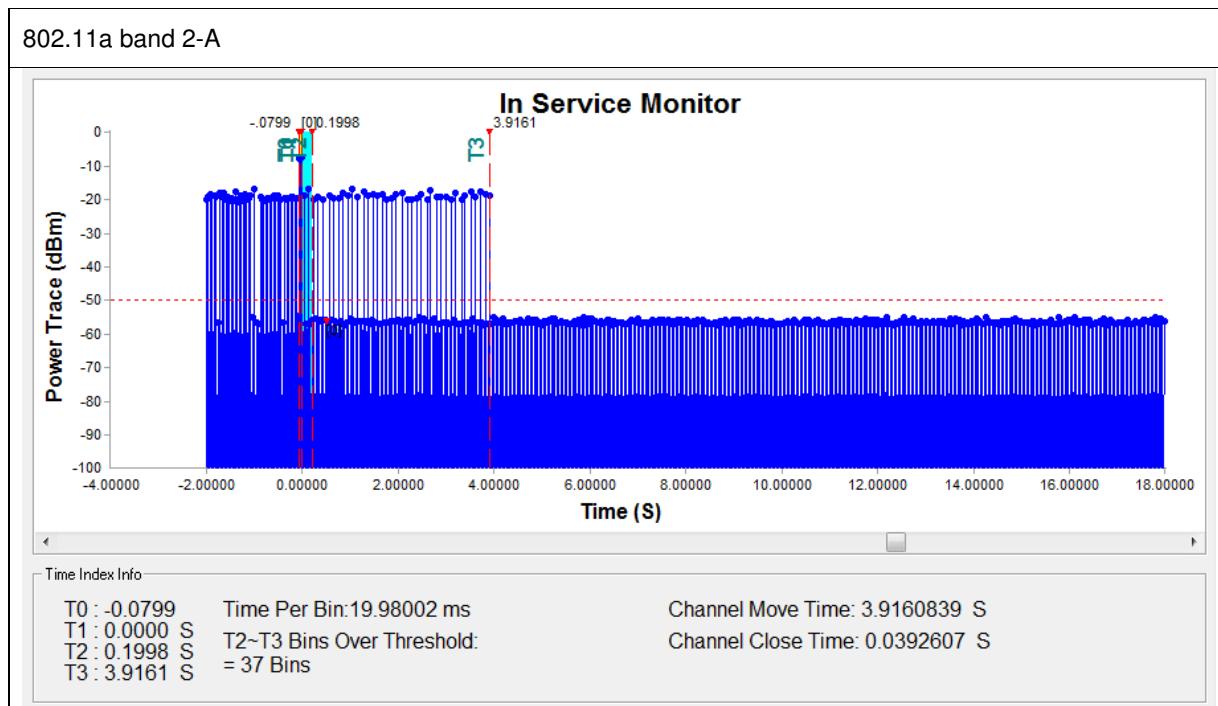
	Mode	Parameter	Measured	Limit	Verdict
5.25 – 5.35 GHz UNII-2A	802.11a	Channel Move Time	3.916 sec.	10 sec.	Pass
		Channel Closing Transmission Time	<200ms + 39.26 ms (aggregate)	200ms + an aggregate of 60ms over remaining 10 second period	Pass
		Non-occupancy Period	>30 minutes	30 minutes	Pass
	802.11n	Channel Move Time	0.587 sec.	10 sec.	Pass
		Channel Closing Transmission Time	<200ms + 2.25 ms (aggregate)	200ms + an aggregate of 60ms over remaining 10 second period	Pass
		Non-occupancy Period	>30 minutes	30 minutes	Pass
5.25 – 5.35 GHz UNII-2C	802.11a	Channel Move Time	3.916 sec.	10 sec.	Pass
		Channel Closing Transmission Time	<200ms + 39.26 ms (aggregate)	200ms + an aggregate of 60ms over remaining 10 second period	Pass
		Non-occupancy Period	>30 minutes	30 minutes	Pass
	802.11n	Channel Move Time	0.652 sec.	10 sec.	Pass
		Channel Closing Transmission Time	<200ms + 2.25 ms (aggregate)	200ms + an aggregate of 60ms over remaining 10 second period	Pass
		Non-occupancy Period	>30 minutes	30 minutes	Pass

DFS Detection Thresholds

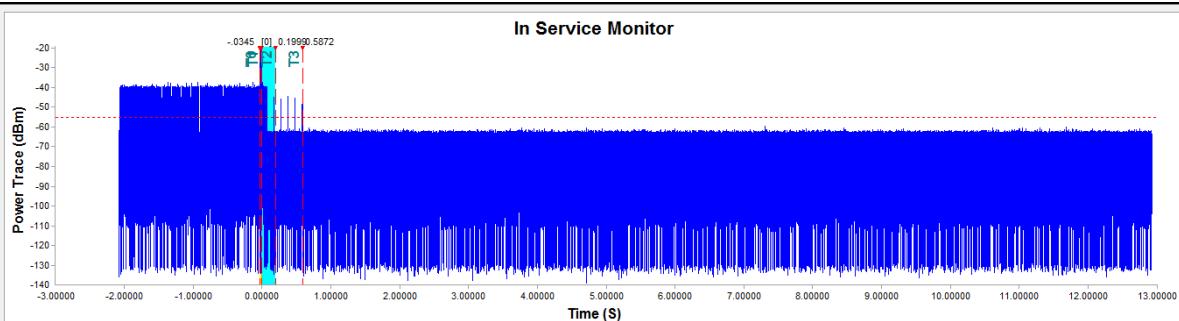




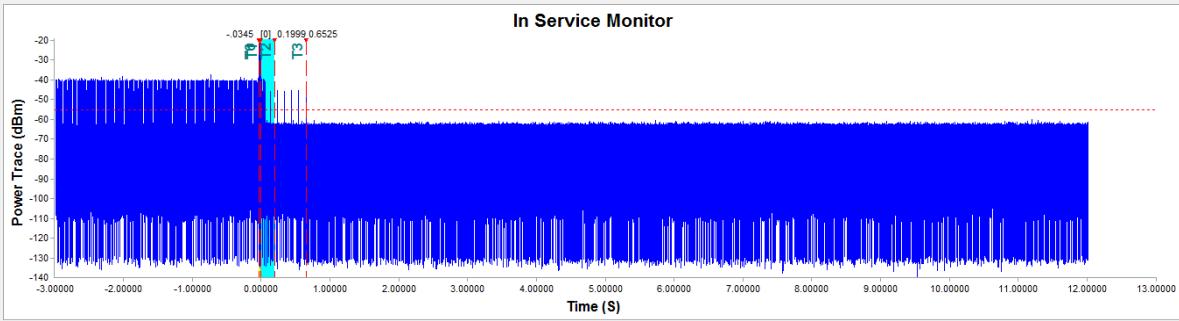
Channel Move Time, Channel Closing Transmission Time



802.11n band 2-A



802.11n band 2-C



Non-Occupancy Period

