Microsoft Corporation

Model 1516

DFS Test Report #: MCSO1616

Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

CERTIFICATE OF TEST

Last Date of Test: July 19, 2012
Microsoft Corporation
Model: Model 1516

Emissions

Test Description	Specification	Test Method	Pass/Fail
Client Device DFS Conformance Test	FCC 15.407:2012	ANSI C63.10:2009	Pass
	EN 301 893 V1.6.1:2011	EN 301 893 V1.6.1:2011	Pass
	KN 22	KN 22	Pass
	VCCI:2011-04	VCCI:2011-04	Pass

Deviations From Test Standards

None

Approved By:

Greg Kiemel, Director of Engineering

NVLAP Lab Code: 200630-0

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834D-1).

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

NORTHWEST EMC
REV 2012.08.02

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

NORTHWEST EMC

REV 2012.05.24

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC Guide 65 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

KCC / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Hong Kong

OFTA – Recognized by OFTA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

Russia

GOST – Accredited by Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC to perform EMC and Hygienic testing for Information Technology products to GOST standards.

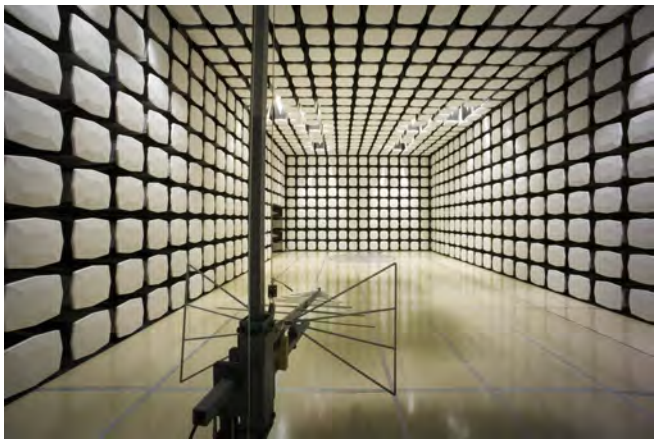
SCOPE

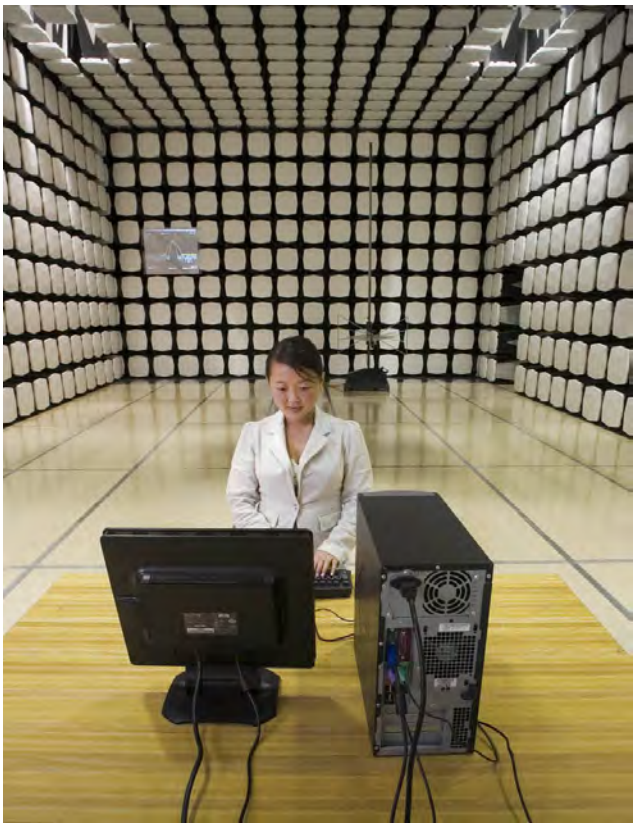
For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/

LOCATIONS

REV 2012.05.24

Oregon	California	New York	Minnesota	Washington
Labs EV01-EV12 22975 NW Evergreen Pkwy, #400 Hillsboro, OR 97124 (503) 844-4066	Labs OC01-OC13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs WA01-WA04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Labs MN01-MN08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Labs SU01-SU07 14128 339th Ave. SE Sultan, WA 98294 (360) 793-8675
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-*2*	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1





PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Microsoft Corporation
Address:	One Microsoft Way
City, State, Zip:	Redmond, WA 98052-6399
Test Requested By:	Mike Boucher
Model:	Model 1516
First Date of Test:	July 17, 2012
Last Date of Test:	July 19, 2012
Receipt Date of Samples:	July 17, 2012
Equipment Design Stage:	Preproduction
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

Tablet PC containing an 802.11a/b/g/n 2x2 MIMO radio module operating in both 20 MHz and 40 MHz channel bandwidths. There are two integral antennas in the tablet.

Hardware, Firmware, and OS Versions:

Hardware version: EV3E
Firmware version: Driver release 48
OS versions: Windows RT 8507_win8_gdr_soc.20120707

The operating frequency band(s) of the equipment.

2400 - 2483.5 MHz,
5150 - 5250 MHz
5250 - 5350 MHz (DFS Band)
5470 - 5600 MHz (DFS Band)
5650 - 5725 MHz (DFS Band)
5725 - 5825 MHz

The operating modes (Master and/or Client) of the U-NII device.

Client device with no radar detection and no ad-hoc capability

For Client devices, indicate whether or not it has DFS capabilities and indicate the FCC (and IC) identifier for the Master U-NII Device that is used with it for DFS testing.

The client device has no radar detection and no ad-hoc capability. A DFS-compliant Master device was used for testing. It's the CISCO Model AIR-AP1252AG-A-K9, FCC ID:LDK102061, IC: 2461B-102061

List the highest and the lowest possible power level (equivalent isotropic radiated power (EIRP) of the equipment.

The maximum EIRP of the 5 GHz equipment is 17.1 dBm, and the minimum possible EIRP is 14.8

dBm.

PRODUCT DESCRIPTION

Test sequences or messages that should be used for communication between Master and Client Devices, which are used for loading the Channel.

1. Stream the test file from the Master Device to the Client Device for IP based systems or frame based systems which dynamically allocate the talk/listen ratio.
2. For frame based systems with fixed talk/listen ratio, set the ratio to 45%/55% and stream the test file from the Master to the Client.
3. For other system architectures, supply appropriate Channel loading methodology.

The specified NTIA MPEG file was converted to an MP4 format with the following properties; Video Data rate = 9037 kbps, Video Frame Rate = 29 Frames/sec. Audio Bit Rate = 102 kbps, Audio Sample rate = 48 KHz. The player used is called "Video" published by Microsoft for the Windows RT App store. This player is similar to "Windows Media Player". The test file was downloaded to the tablet via a FCC certified CISCO access point (master device). This configuration provided the same or greater amount of channel loading than what is specified in Section 7.7 of the FCC's DFS procedure.

This alternative streaming method was submitted to the FCC and approved under KDB Inquiry Tracking Number 673358. The complete proposal if found in this report.

Transmit Power Control description.

This device does not exceed 27dBm EIRP, so no transmit power control is implemented.

System architectures, data rates, U-NII Channel bandwidths.

1. Indicate the type(s) of system architecture (e.g. IP based or Frame based) that the U-NII device employs. Each type of unique architecture must be tested.

The client device (EUT) employs IP based system architecture.

The time required for the Master Device and/or Client Device to complete its power-on cycle.

The Master device used in the test system requires 1.44 minutes to complete its power-on cycle. The client device (EUT) does not have radar detection, so its power-on time is not applicable, but was measured to be 40 seconds.

Manufacturer statement confirming that information regarding the parameters of the detected Radar Waveforms is not available to the end user.

The client device (EUT) does not have radar detection, so the parameters of the Radar Waveforms are not available to the end user.

Uniform Channel Spreading requirement for Master Devices. For Master Devices, indicate how the master provides, on aggregate, uniform Channel loading of the spectrum across all Channels.

The client device (EUT) does not have radar detection, so this requirement is not applicable.

PRODUCT DESCRIPTION

List all antenna assemblies and their corresponding gains.

1. If radiated tests are to be performed, the U-NII Device should be tested with the lowest gain antenna assembly (regardless of antenna type). The report should indicate which antenna assembly was used for the tests. For devices with adjustable output power, list the output power range and the maximum EIRP for each antenna assembly.
2. If conducted tests are to be performed, indicate which antenna port/connection was used for the tests and the antenna assembly gain that was used to set the DFS Detection Threshold level during calibration of the test setup.
    a. Indicate the calibrated conducted DFS Detection Threshold level.
    b. For devices with adjustable output power, list the output power range and the maximum EIRP for each antenna assembly.
    c. Indicate the antenna connector impedance. Ensure that the measurement instruments match (usually 50 Ohms) or use a minimum loss pad and take into account the conversion loss.
3. Antenna gain measurement verification for tested antenna.
    a. Describe procedure
    b. Describe the antenna configuration and how it is mounted
    c. If an antenna cable is supplied with the device, cable loss needs to be taken into account. Indicate the maximum cable length and either measure the gain with this cable or adjust the measured gain accordingly. State the cable loss.

The client device (EUT) has two 50 ohm antenna ports. A conducted DFS test was performed on each antenna port at both 20 MHz and 40 MHz channel bandwidths.

The antenna gain of the client device was measured by Microsoft. The maximum gain in the 5 GHz bands is 2.2 dBi. The antenna gain values were obtained with the antennas installed in the tablet. Testing was performed in a Satimo SG64 chamber which records full 3D antenna patterns.

The power levels to the antenna are measured at the antenna feed, so there is no additional loss to consider between the RF power output and the antenna input.

The calibrated conducted DFS detection threshold was set to -63 dBm at the antenna port of the Master. This is equal to the DFS Detection Threshold of the Master + 1 dB.

Response to Inquiry to FCC (Tracking Number 673358) (TCB)

oetech@fccsun27w.fcc.gov <oetech@fccsun27w.fcc.gov> Wed, Aug 1, 2012 at 12:45 PM

Office of Engineering and Technology

Inquiry on 07/27/2012 :

Inquiry:

Attached is a proposal for an alternative channel loading method for the DFS testing of a client device with no radar detection and no ad-hoc capability. The FCC ID is: C3K1516.

FCC response on 08/01/2012

Your alternative streaming proposal for the client device has been approved. Be sure to reference the KDB number in the application and include a copy of the proposal in the exhibits.

Attachment Details:

Do not reply to this message. Please select the Reply to an Inquiry Response link from the OET Inquiry System to add any additional information pertaining to this inquiry.

Proposal for an Alternative Streaming Method

1) A brief description of the device.

"UNII client device with no radar detection and no ad-hoc capability. It is a handheld tablet running Windows RT operating system. It does not support the NTIA specified codec and video format (reference: http://ntiacsd.ntia.doc.gov/dfs/)"

2) The reason you cannot stream the NTIA MPG or WAV file

Microsoft's Windows RT version of the operating system does not support codec for streaming NTIA MPEG file. NTIA certified tools and drivers cannot be used in the Windows-RT operating system as they are not compatible to run on Windows RT platforms. The medial file format specified by NTIA will not be supported by design and would require significant effort to modify the tools.

3) A description of how you propose to do the data streaming.

The specified NTIA MPEG file was converted to an MP4 format with the following properties; Video Data rate = 9037 kbps, Video Frame Rate = 29 Frames/sec. Audio Bit Rate = 102 kbps, Audio Sample rate = 48 KHz. The player used is called "Video" published by Microsoft for the Windows RT App store. This player is similar to "Windows Media Player". The test file was downloaded to the tablet via a FCC certified CISCO access point (master device). This configuration provided the same or greater amount of channel loading than what is specified in Section 7.7 of the FCC's DFS procedure.

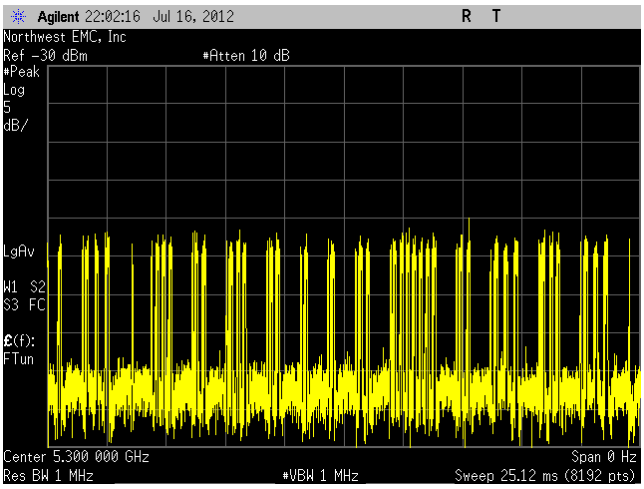
4) An estimate of the percentage of channel loading. Explain how you derived this estimate.

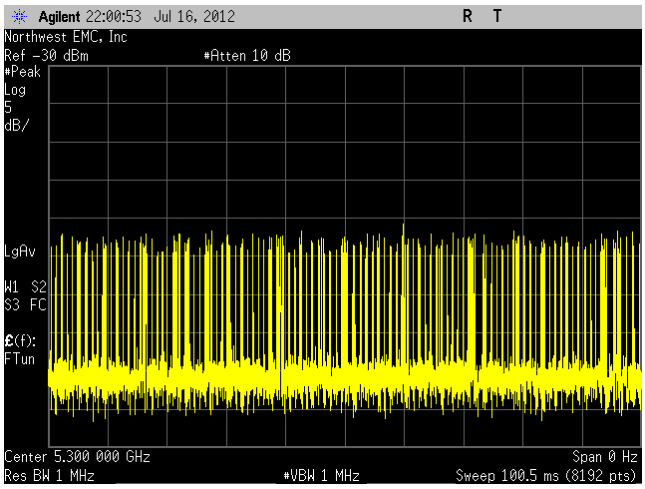
Transmitted data rate/max throughput rate = 9 Mbps/25 Mbps = **36% channel loading**

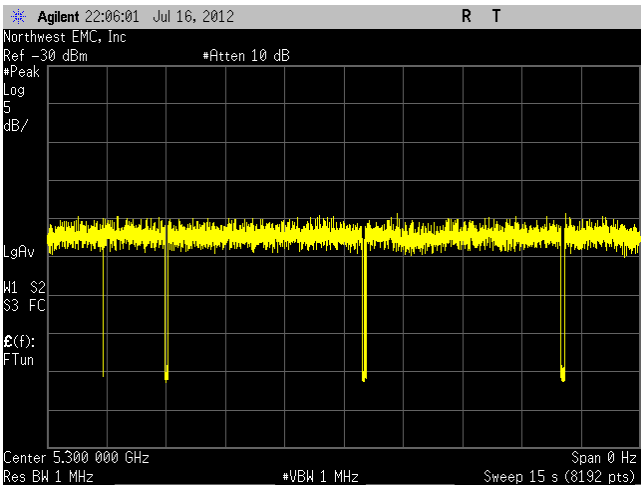
This is based upon the following:

- The approximate maximum throughput on a single channel for the CISCO access point is 25 Mbps.
- In order to meet the FCC requirement of a minimum data rate which streams data smoothly across an IEEE 802.11a medium, the data rate was set at 9 Mbps. This allowed the MP4 file to be streamed smoothly and thus utilize the maximum transmission time (reference: FCC – TCBC Workshop Presentation "Dynamic Frequency Selection (DFS) Test and Compliance Issues", October 2007, Slide 7).

5) Timing plots







Please confirm that this channel loading method is acceptable. Your attention to this matter is greatly appreciated.

INTRODUCTION

Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client (without DFS)	Client (with DFS)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client (without DFS)	Client (with DFS)
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

DFS Response Requirement Values

Parameter	Value
Non-occupancy	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 80% of the UNII 99% transmission power bandwidth. (See Note 3).

Note 1: The instant that the Channel Move Time and the Channel Closing Transmission Time begins is as follows:

- For the Short Pulse Radar Test Signals this instant is the end of the Burst.
- For the Frequency Hopping radar Test Signal, this instant is the end of the last radar Burst generated.
- For the Long Pulse Radar Test Signal this instant is the end of the 12 second period defining the Radar Waveform.

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 1 is used and for each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

DFS Detection Thresholds for Master or Client Devices Incorporating DFS

Maximum Transmit Power	Value (See Notes 1 and 2)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 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.	

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
1	1	1428	18	60%	30
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

Long Pulse Radar Test Waveforms

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

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

CONFIGURATIONS

Configuration MCSO1616- 1

Software/Firmware Running during test	
Description	**Version**
Windows RT	8507_win8_gdr_soc.20120707
Windows RT Video	
Test File MP4-9.14 Mbps.mp4	7/16/2012 6:19pm

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Tablet PC	Microsoft	1516	DFS Sample 1

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adapter	Microsoft	PA-1240-06MX	0D21005802219

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
WLAN Master Access Point	Cisco	AIR-LAP1252G-A-K9	FTX123590JT

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	PA	1.5m	PA	AC Adapter	Tablet PC
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

MODIFICATIONS

WTD 12.5.23

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	7/17/2012	Client Device DFS Conformance Test	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	7/19/2012	Client Device DFS Conformance Test	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Client Device DFS Conformance Test

For a Client Device without DFS, the Channel Move Time and Channel Closing Transmission Time requirements are verified with one Short Pulse Radar.

Channel Closing Transmission Time: The total duration of transmissions, consisting of data signals and the aggregate of control signals, by a U-NII device during the Channel Move Time.

Channel Move Time: The time to cease all transmissions on the current Channel upon detection of a Radar Waveform above the DFS Detection Threshold. A Client Device will not transmit before having received appropriate control signals from a Master Device.

A Client Device will stop all its transmissions whenever instructed by a Master Device to which it is associated and will meet the Channel Move Time and Channel Closing Transmission Time requirements. The Client Device will not resume any transmissions until it has again received control signals from a Master Device.

DFS Detection Thresholds for Master or Client Devices Incorporating DFS

Maximum Transmit Power	Value (See Notes 1 and 2)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 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.	

DFS Response Requirement Value

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.

Setting the Test Signal Level

The radar test signal level is set at the Master Device, or the Client Device with In-Service Monitoring, as appropriate for the particular test. This device is known as the Radar Detection Device (RDD).

- When a Client Device without In-Service Monitoring is the UUT, the Master Device is the RDD.
- When a Client Device with In-Service Monitoring is the UUT, and is tested for response to the Master Device detections, the Master Device is the RDD.
- When a Client Device with In-Service Monitoring is the UUT, and is tested for independent response to detections by the Client Device, the Client Device is the RDD.

A spectrum analyzer is used to establish the test signal level for each radar type. During this process, there are no transmissions by either the Master Device or Client Device. The spectrum analyzer is switched to the zero span (time domain) mode at the frequency of the Radar Waveform generator. The peak detector function of the spectrum analyzer is utilized. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) are set to at least 3 MHz.
The signal generator amplitude and/or step attenuators are set so that the power level measured at the spectrum analyzer is equal to the DFS Detection Threshold that is required for the tests. The signal generator and attenuator settings are recorded for use during the test.

Client Device DFS Conformance Test

DFS MONITORING

System testing will be performed with the designated MPEG test file that streams full motion video at 30 frames per second for Channel loading. If the designated MPEG test file is not utilized then an equivalent test file will be used, subject to FCC approval.

CHANNEL LOADING

System testing will be performed with the designated MPEG test file that streams full motion video at 30 frames per second for Channel loading. If the designated MPEG test file is not utilized then an equivalent test file will be used, subject to FCC approval.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440	AFE	1/23/2012	12
RF Vector Signal Generator	Agilent	V2920A	TIH	NCR	0
SMA Power Divider	S.M. Electronics	MP0208-2	none	NCR	0
SMA Power Divider	S.M. Electronics	MP0208-2	none	NCR	0
Step Attenuator	Aeroflex / Weinschel	3053	26835	NCR	0
Step Attenuator	Aeroflex / Weinschel	3053	26834	NCR	0

TEST DESCRIPTION

The tests in this section are run sequentially and the UUT must pass all tests successfully. If the UUT fails any one of the tests it will count as a failure of compliance. To show compliance, all tests must be performed with waveforms randomly generated as specified with test results meeting the required percentage of successful detection criteria. All test results must be reported to the FCC. One frequency will be chosen from the operating Channels of the UUT within the 5.25-5.35 GHz and 5.47-5.725 GHz bands.

DFS CHANNEL SHUTDOWN, MOVE, NON-OCCUPANCY

EUT:	1516			**Work Order:**	MCSO1616
Serial Number:	DFS Sample 1			**Date:**	7/17/2012 - 7/19/2012
Customer:	Microsoft Corporation			**Temperature:**	24°C
Attendees:	Mike Boucher, Steve Stegner			**Humidity:**	45%
Project:	None			**Barometric Pres.:**	1010.5 mb
Tested by:	Rod Peloquin	**Power:**	120VAC/60Hz	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2012	ANSI C63.10:2009

COMMENTS

See test description for full details of testing.

DEVIATIONS FROM TEST STANDARD

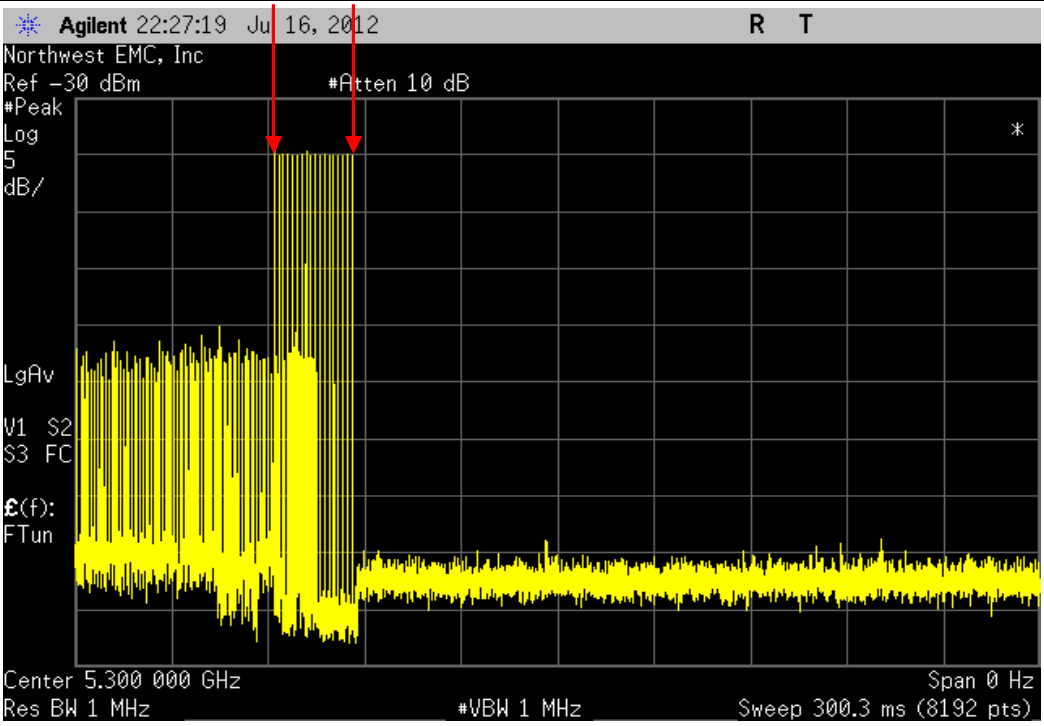
None

Configuration #	1	Signature

			Value	Limit	Result
Antenna A					
	802.11(a)				
		Lower Sub-Band 5250 MHz - 5350 MHz, Channel 60			
		300 ms period	25.7 ms	N/A	N/A
		1.2s period	13.3 ms	≤ 260 ms	Pass
		12.5s period	< 1 s	≤ 10 s	Pass
		30 minute period	> 30 minutes	≥ 30 minutes	Pass
		Upper Sub-Band 5470 MHz - 5725 MHz, Channel 140			
		300 ms period	25.7 ms	N/A	N/A
		1.2s period	44.8 ms	≤ 260 ms	Pass
		12.5s period	< 1 s	≤ 10 s	Pass
		30 minute period	> 30 Minutes	≥ 30 Minutes	Pass
	802.11(n) 40 MHz				
		Lower Sub-Band 5250 MHz - 5350 MHz, Channel 56 below (Channel 54 paired)			
		300 ms period	25.7 ms	N/A	N/A
		1.2s period	7.6 ms	≤ 260 ms	Pass
		12.5s period	< 1 s	≤ 10 s	Pass
		30 minute period	> 30 minutes	≥ 30 minutes	Pass
		Upper Sub-Band 5470 MHz - 5725 MHz, Channel 136 below (Channel 134 paired)			
		300 ms period	25.7 ms	N/A	N/A
		1.2s period	169.5 ms	≤ 260 ms	Pass
		12.5s period	< 1 s	≤ 10 s	Pass
		30 minute period	> 30 minutes	≥ 30 minutes	Pass
Antenna B					
	802.11(a)				
		Lower Sub-Band 5250 MHz - 5350 MHz, Channel 60			
		300 ms period	25.7 ms	N/A	N/A
		1.2s period	118 ms	≤ 260 ms	Pass
		12.5s period	< 1 s	≤ 10 s	Pass
		30 minute period	> 30 minutes	≥ 30 minutes	Pass
		Upper Sub-Band 5470 MHz - 5725 MHz, Channel 140			
		300 ms period	25.7 ms	N/A	N/A
		1.2s period	90.4 ms	≤ 260 ms	Pass
		12.5s period	< 1 s	≤ 10 s	Pass
		30 minute period	> 30 minutes	≥ 30 minutes	Pass
	802.11(n) 40 MHz				
		Lower Sub-Band 5250 MHz - 5350 MHz, Channel 56 below (Channel 54 paired)			
		300 ms period	25.7 ms	N/A	N/A
		1.2s period	155 ms	≤ 260 ms	Pass
		12.5s period	< 1 s	≤ 10 s	Pass
		30 minute period	> 30 minutes	≥ 30 minutes	Pass
		Upper Sub-Band 5470 MHz - 5725 MHz, Channel 136 below (Channel 134 paired)			
		300 ms period	25.7 ms	N/A	N/A
		1.2s period	71.2 ms	≤ 260 ms	Pass
		12.5s period	< 1 s	≤ 10 s	Pass
		30 minute period	> 30 minutes	≥ 30 minutes	Pass

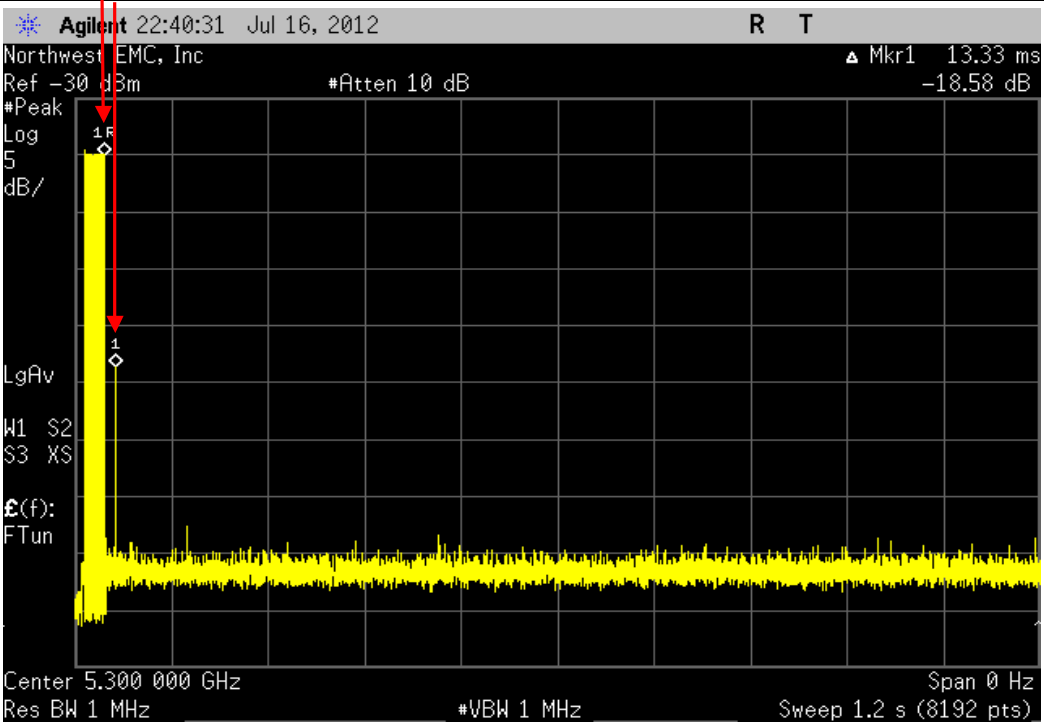
Antenna A, 802.11(a), Lower Sub-Band 5250 MHz - 5350 MHz, 300 ms period

			Value	Limit	Result
T0 – T1			25.7 ms	N/A	N/A



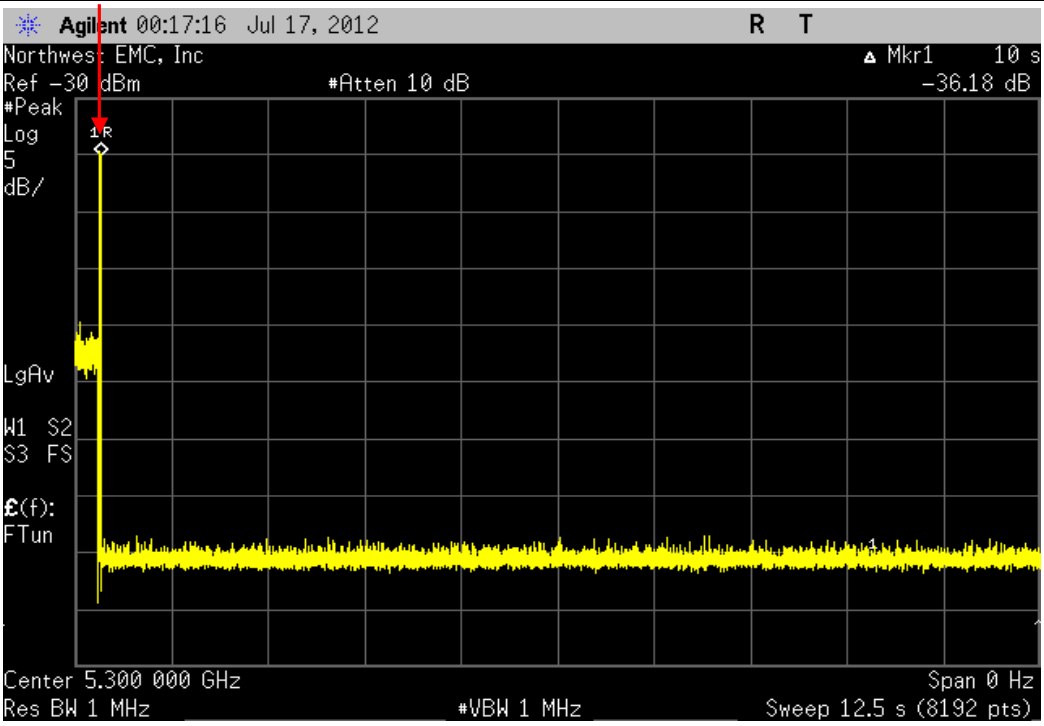
Antenna A, 802.11(a), Lower Sub-Band 5250 MHz - 5350 MHz, 1.2s period

			Value	Limit	Result
T1 – T2			13.3 ms	≤ 260 ms	Pass



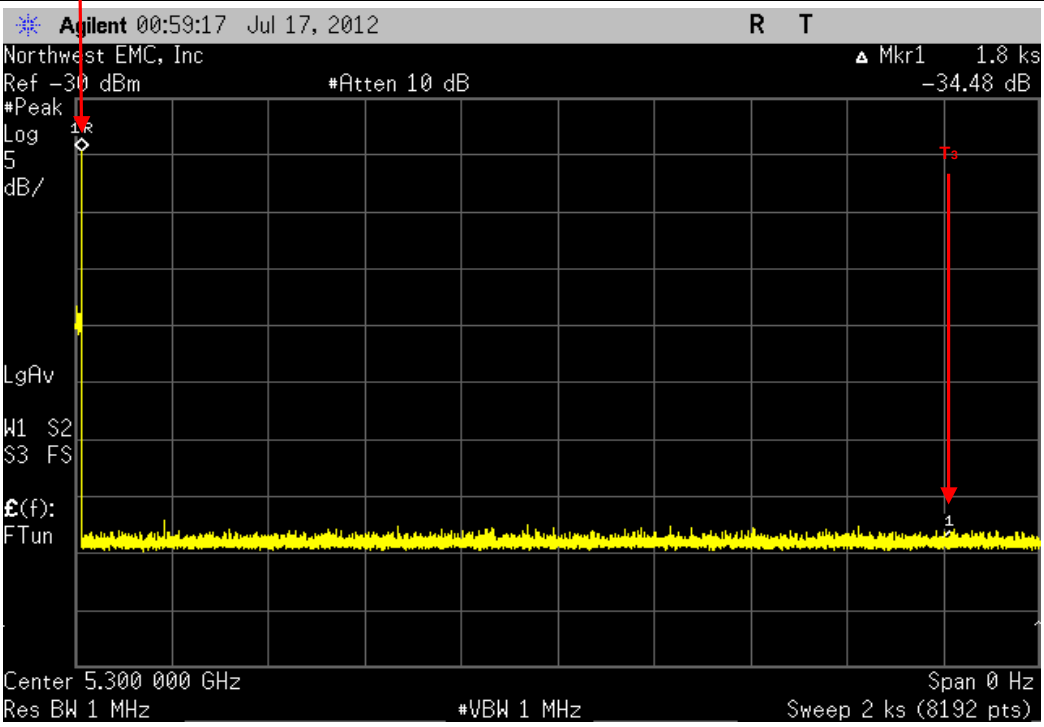
Antenna A, 802.11(a), Lower Sub-Band 5250 MHz - 5350 MHz, 12.5s period

				Value	Limit	Result
T1 / T2				< 1 s	≤ 10 s	Pass



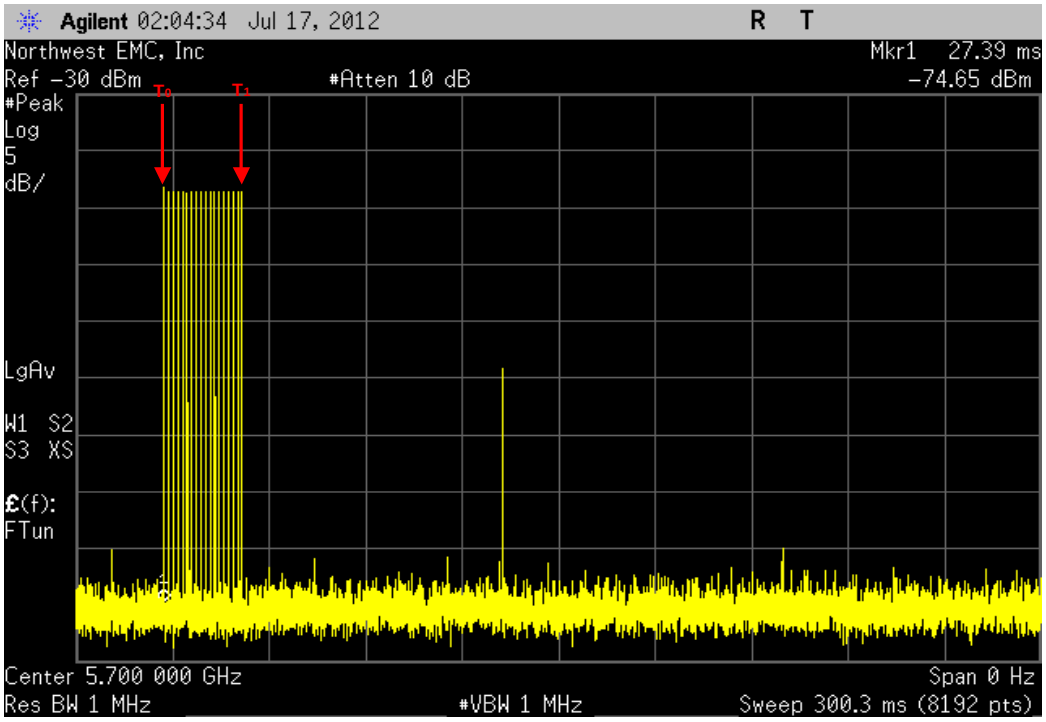
Antenna A, 802.11(a), Lower Sub-Band 5250 MHz - 5350 MHz, 30 minute period

				Value	Limit	Result
T2				> 30 minutes	≥ 30 minutes	Pass



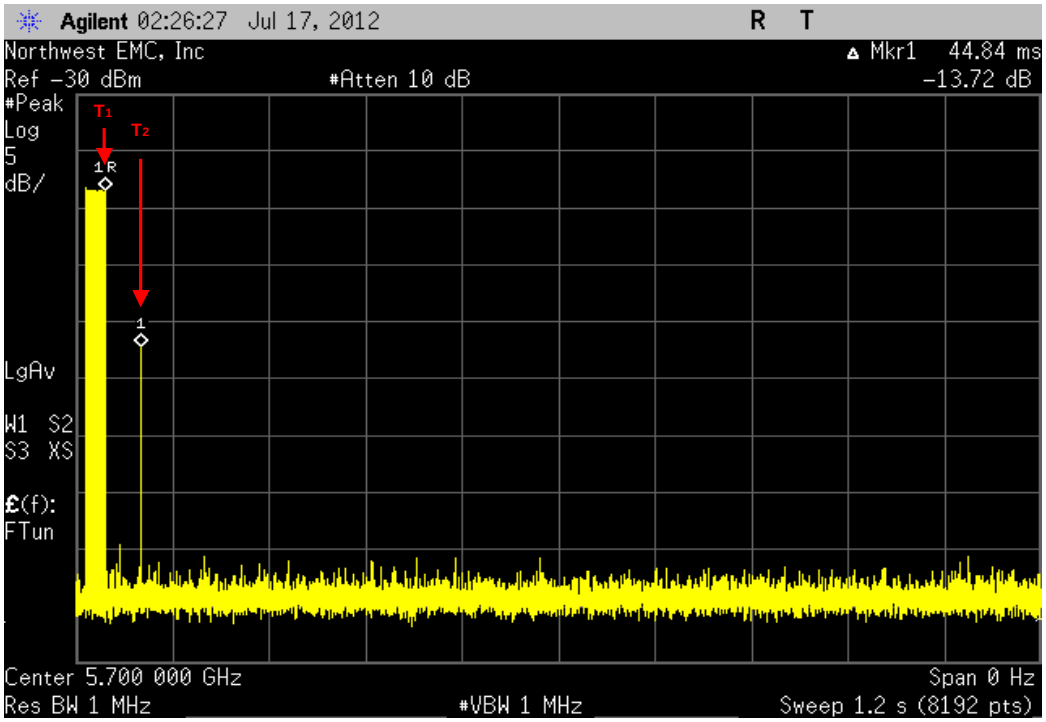
Antenna A, 802.11(a), Upper Sub-Band 5470 MHz - 5725 MHz, 300 ms period

					Value	Limit	Result
					25.7 ms	N/A	N/A



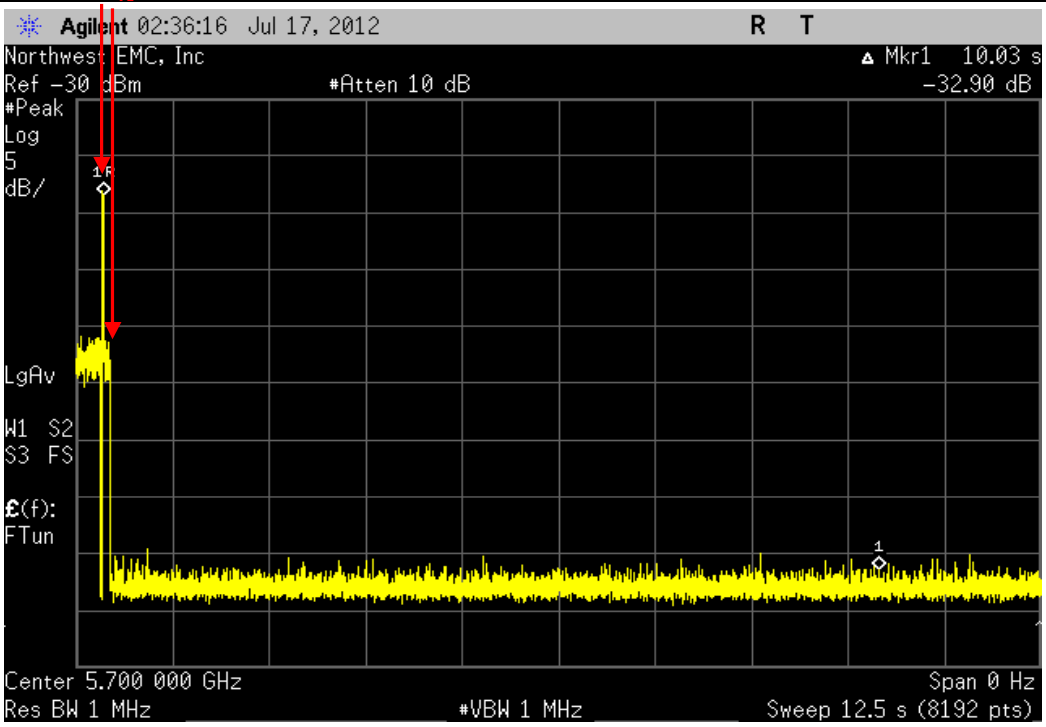
Antenna A, 802.11(a), Upper Sub-Band 5470 MHz - 5725 MHz, 1.2s period

					Value	Limit	Result
					44.8 ms	≤ 260 ms	Pass



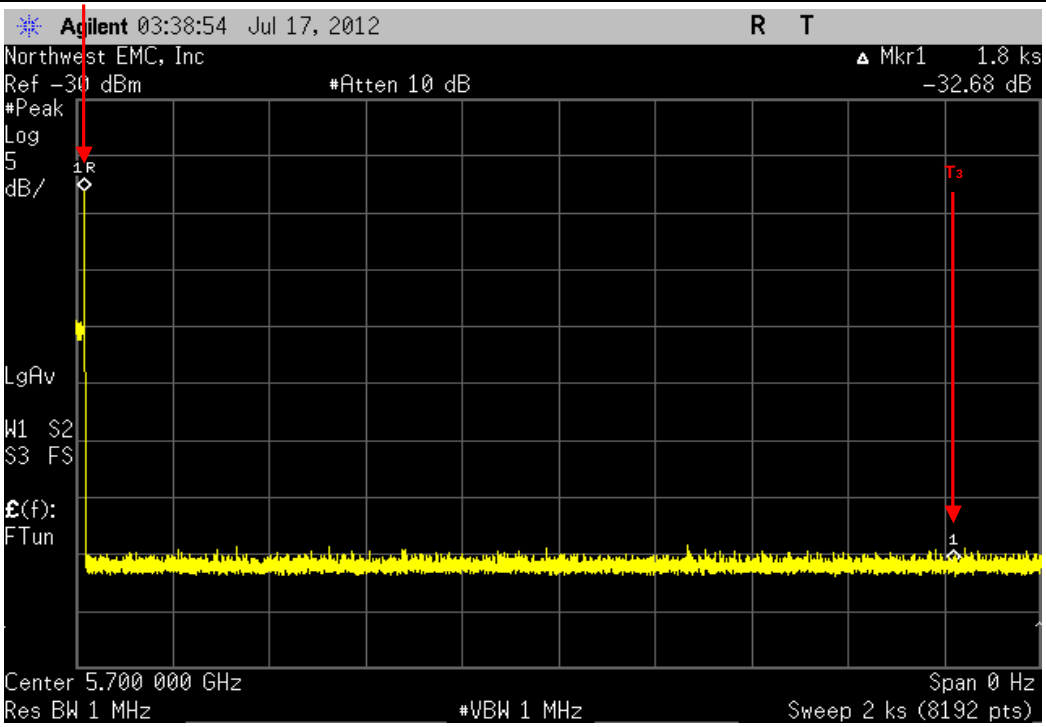
Antenna A, 802.11(a), Upper Sub-Band 5470 MHz - 5725 MHz, 12.5s period

				Value	Limit	Result
T1 T2				< 1 s	≤ 10 s	Pass



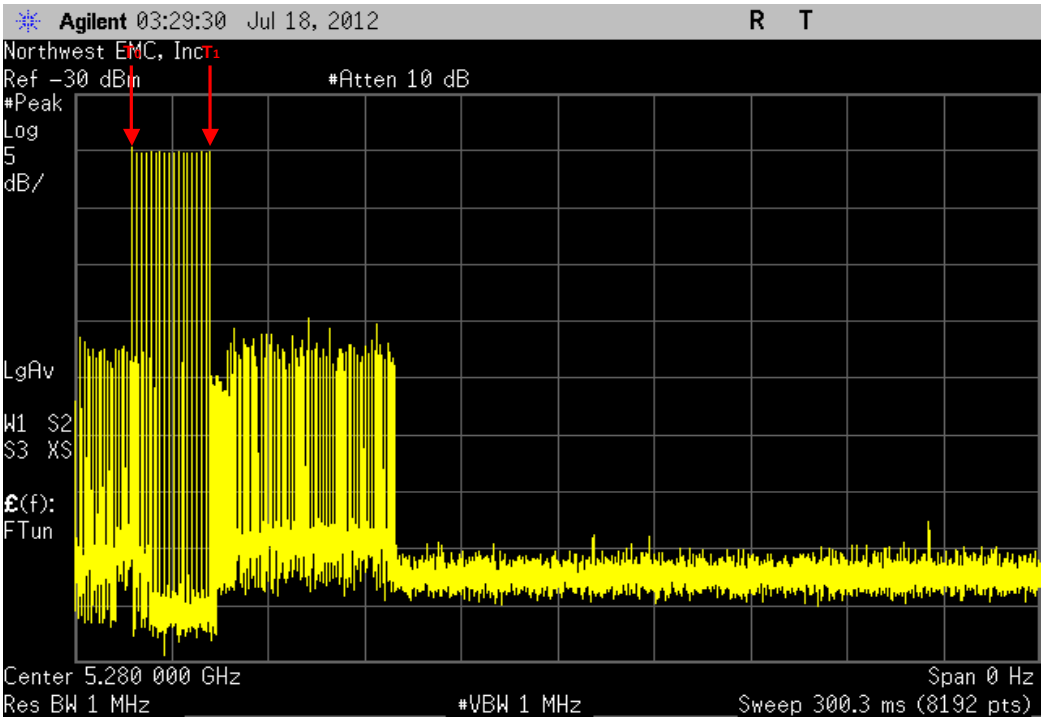
Antenna A, 802.11(a), Upper Sub-Band 5470 MHz - 5725 MHz, 30 minute period

				Value	Limit	Result
T2				> 30 Minutes	≥ 30 Minutes	Pass



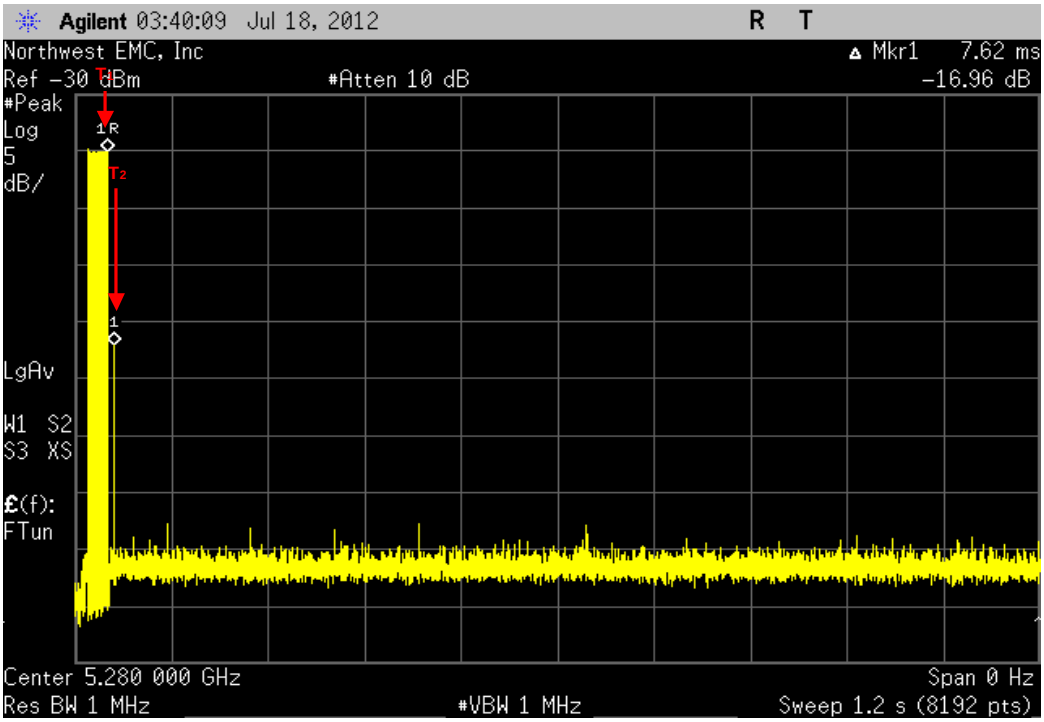
Antenna A, 802.11(n) 40 MHz, Lower Sub-Band 5250 MHz - 5350 MHz, 300 ms period

				Value	Limit	Result
				25.7 ms	N/A	N/A



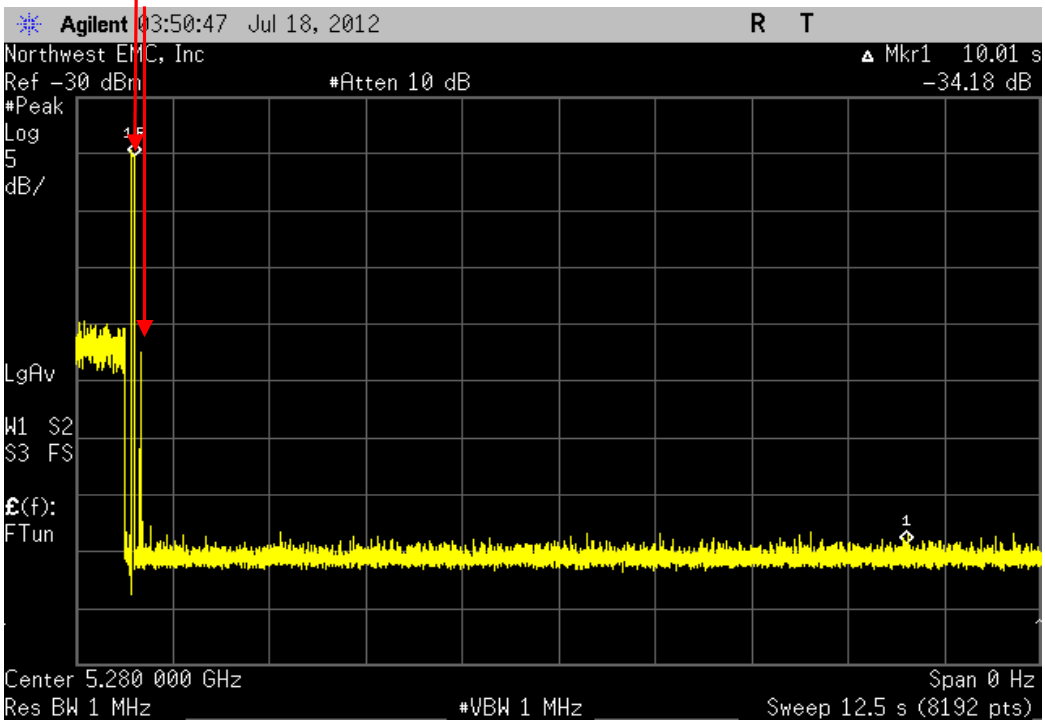
Antenna A, 802.11(n) 40 MHz, Lower Sub-Band 5250 MHz - 5350 MHz, 1.2s period

				Value	Limit	Result
				7.6 ms	≤ 260 ms	Pass



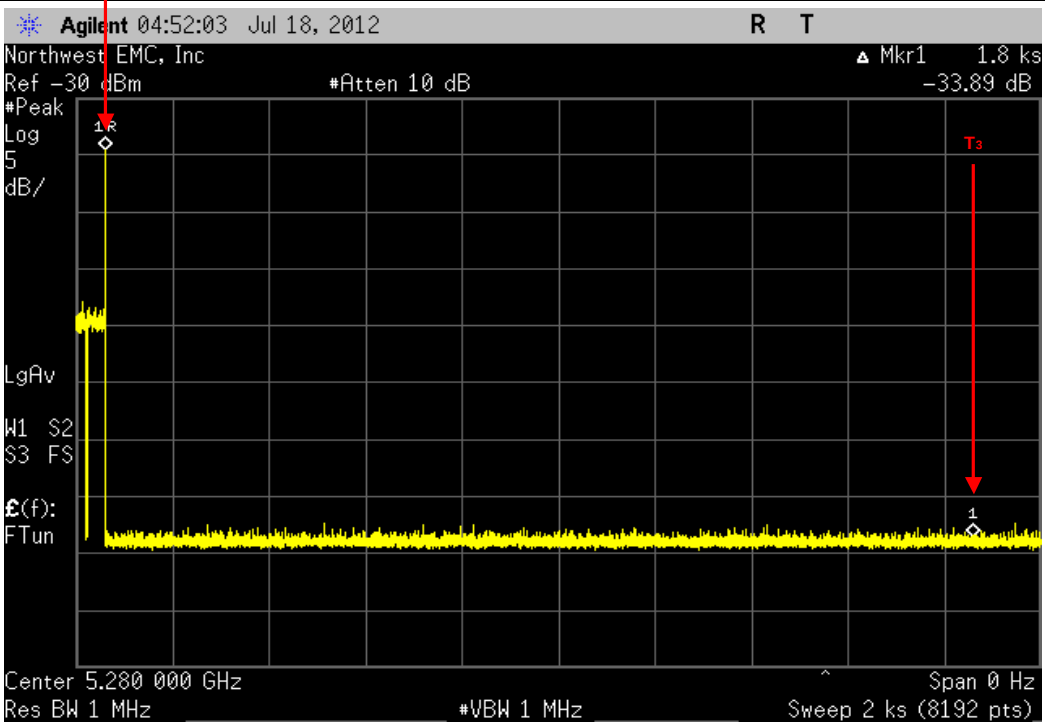
Antenna A, 802.11(n) 40 MHz, Lower Sub-Band 5250 MHz - 5350 MHz, 12.5s period

				Value	Limit	Result
T1 T2				< 1 s	≤ 10 s	Pass



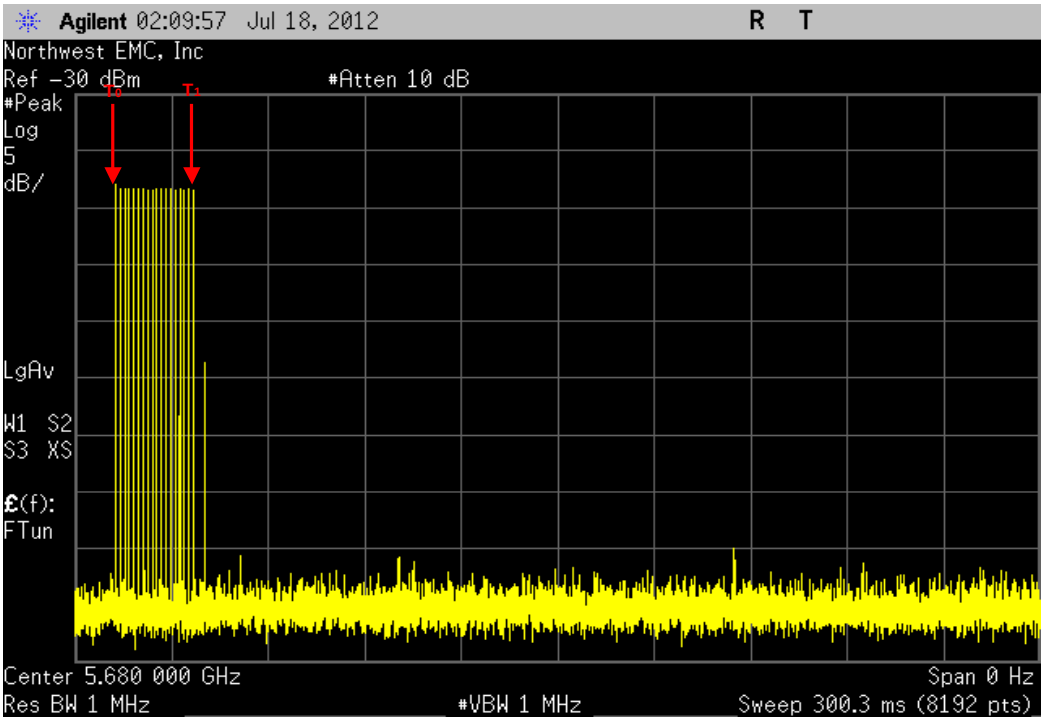
Antenna A, 802.11(n) 40 MHz, Lower Sub-Band 5250 MHz - 5350 MHz, 30 minute period

				Value	Limit	Result
T2				> 30 minutes	≥ 30 minutes	Pass



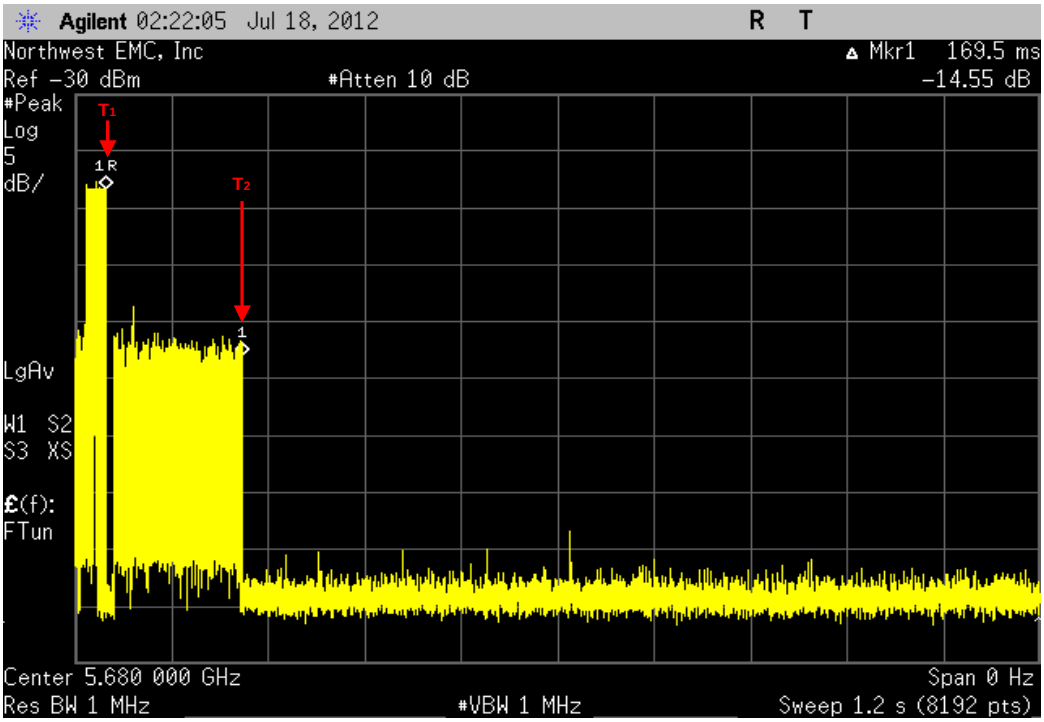
Antenna A, 802.11(n) 40 MHz, Upper Sub-Band 5470 MHz - 5725 MHz, 300 ms period

				Value	Limit	Result
				25.7 ms	N/A	N/A



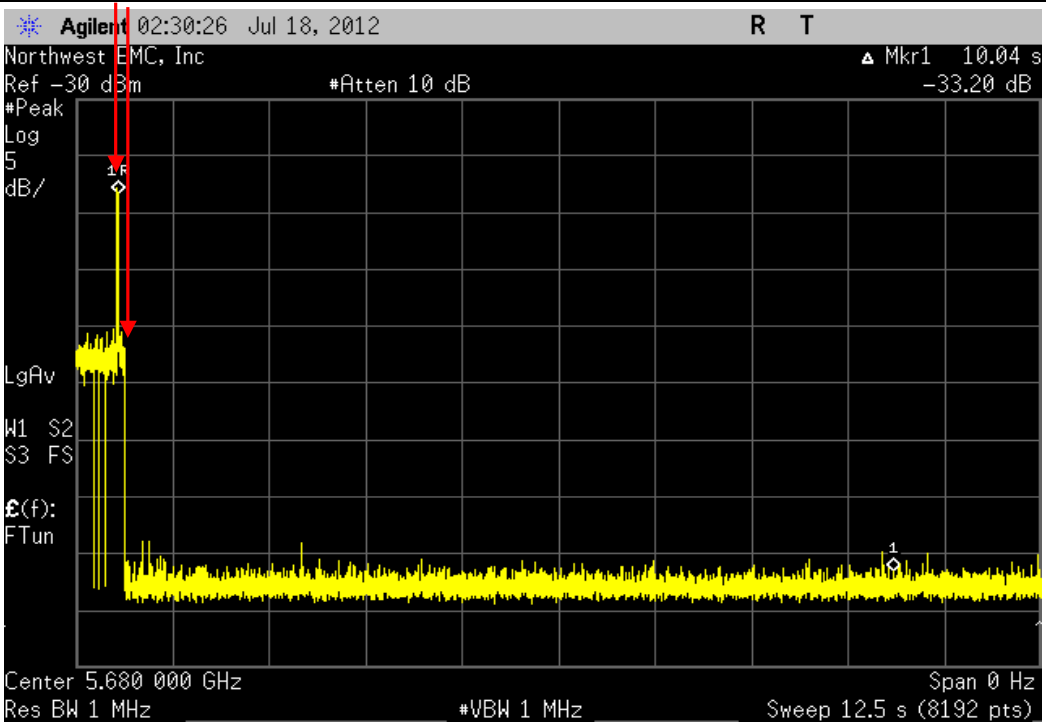
Antenna A, 802.11(n) 40 MHz, Upper Sub-Band 5470 MHz - 5725 MHz, 1.2s period

				Value	Limit	Result
				169.5 ms	≤ 260 ms	Pass



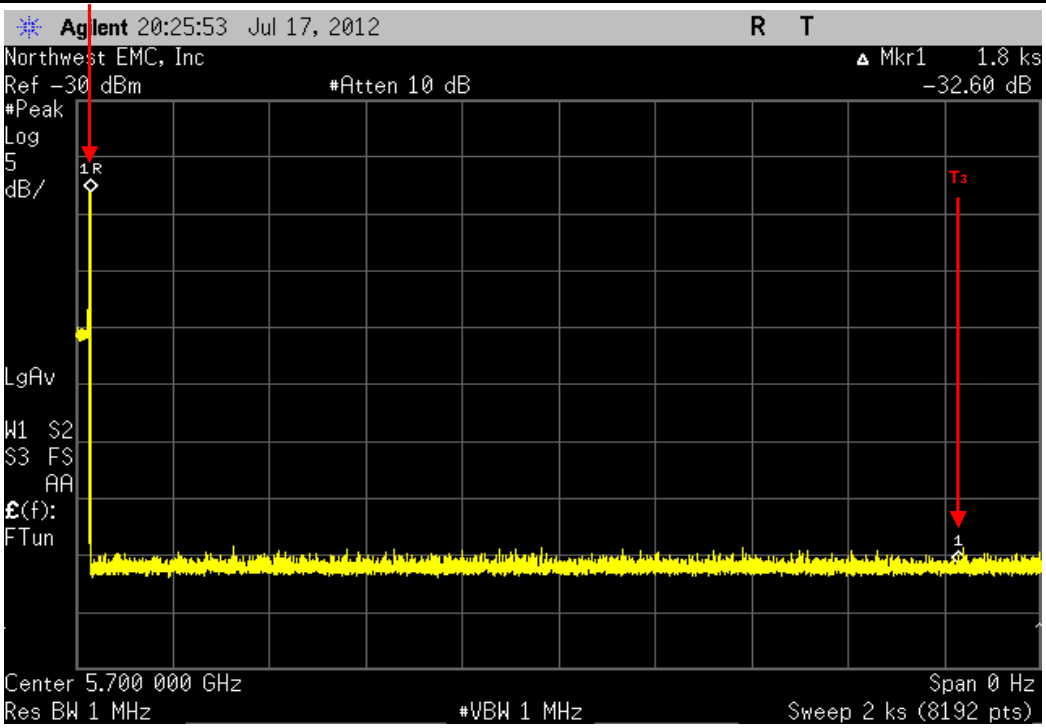
Antenna A, 802.11(n) 40 MHz, Upper Sub-Band 5470 MHz - 5725 MHz, 12.5s period

					Value	Limit	Result
T1 T2					< 1 s	≤ 10 s	Pass



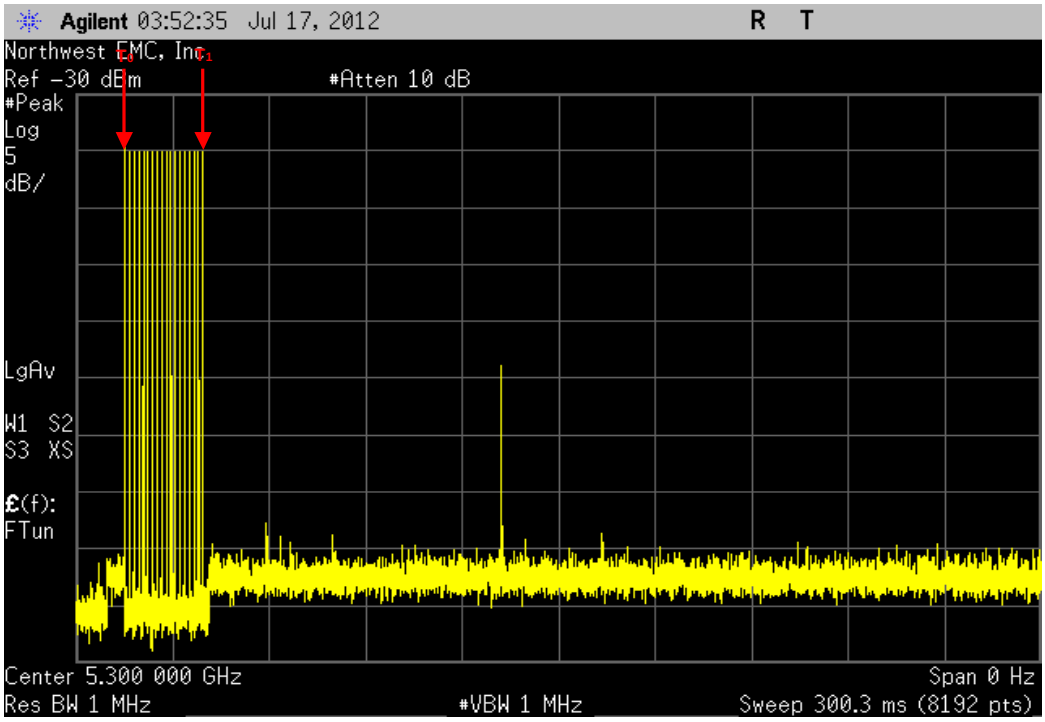
Antenna A, 802.11(n) 40 MHz, Upper Sub-Band 5470 MHz - 5725 MHz, 30 minute period

					Value	Limit	Result
T2					> 30 minutes	≥ 30 minutes	Pass



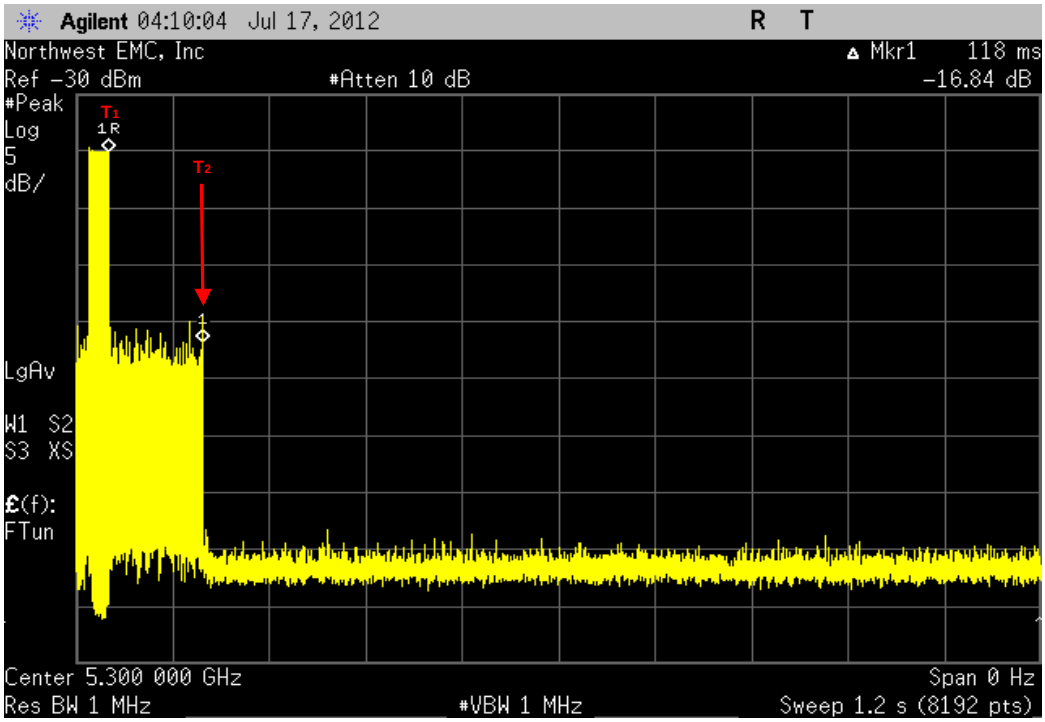
Antenna B, 802.11(a), Lower Sub-Band 5250 MHz - 5350 MHz, 300 ms period

				Value	Limit	Result
				25.7 ms	N/A	N/A



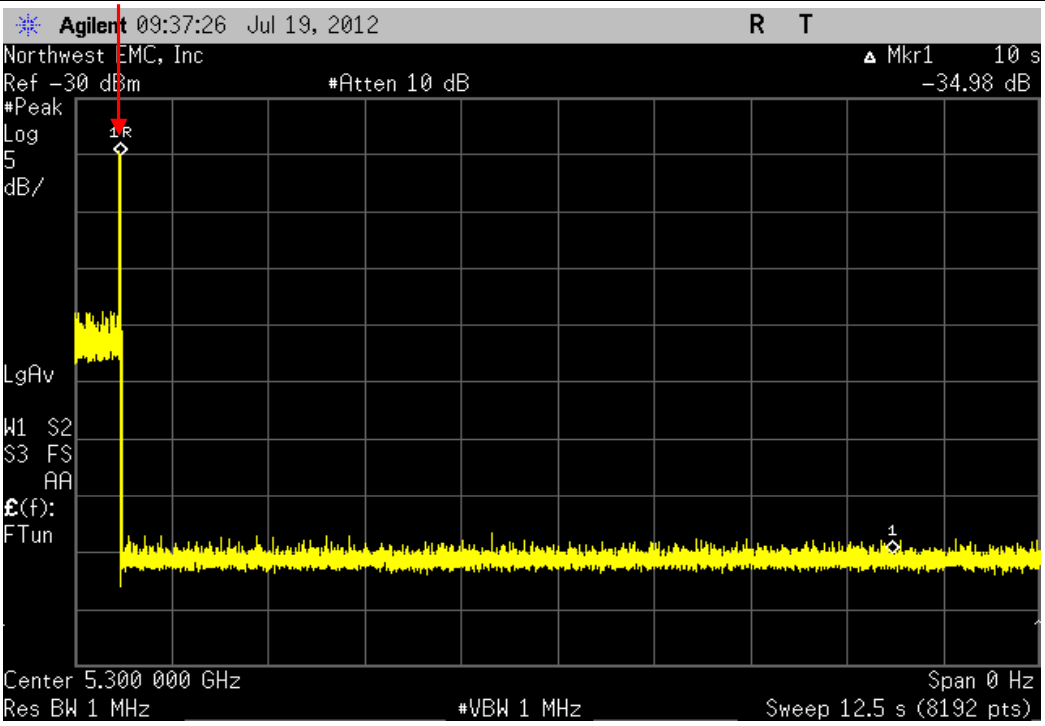
Antenna B, 802.11(a), Lower Sub-Band 5250 MHz - 5350 MHz, 1.2s period

				Value	Limit	Result
				118 ms	≤ 260 ms	Pass



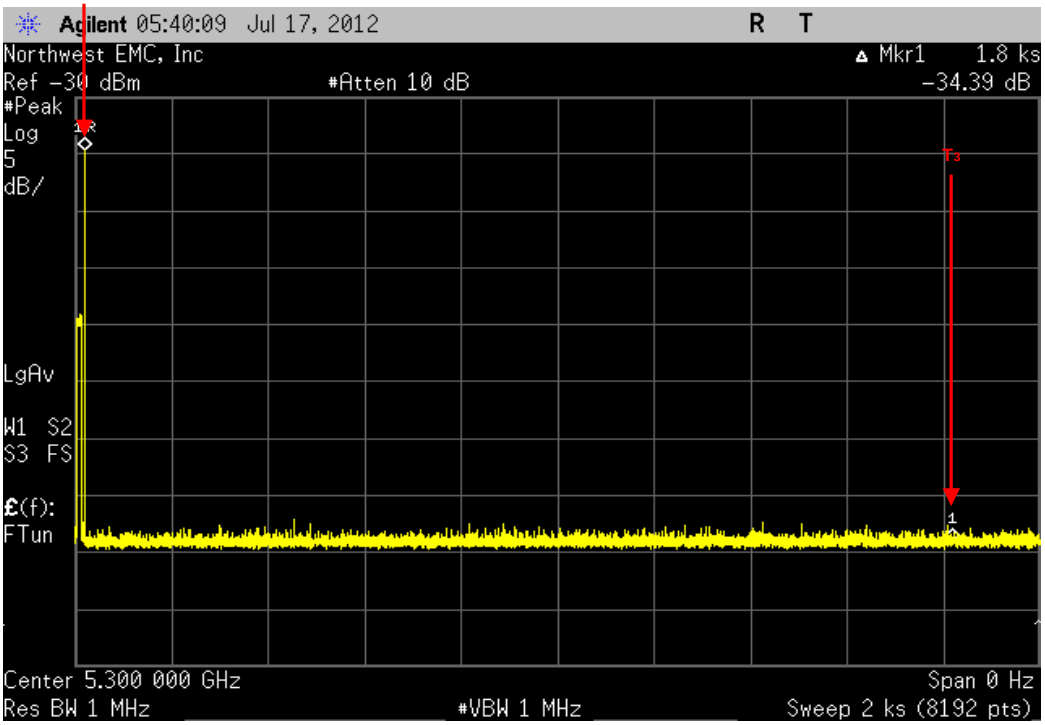
Antenna B, 802.11(a), Lower Sub-Band 5250 MHz - 5350 MHz, 12.5s period

				Value	Limit	Result
T_1/T_2				< 1 s	≤ 10 s	Pass



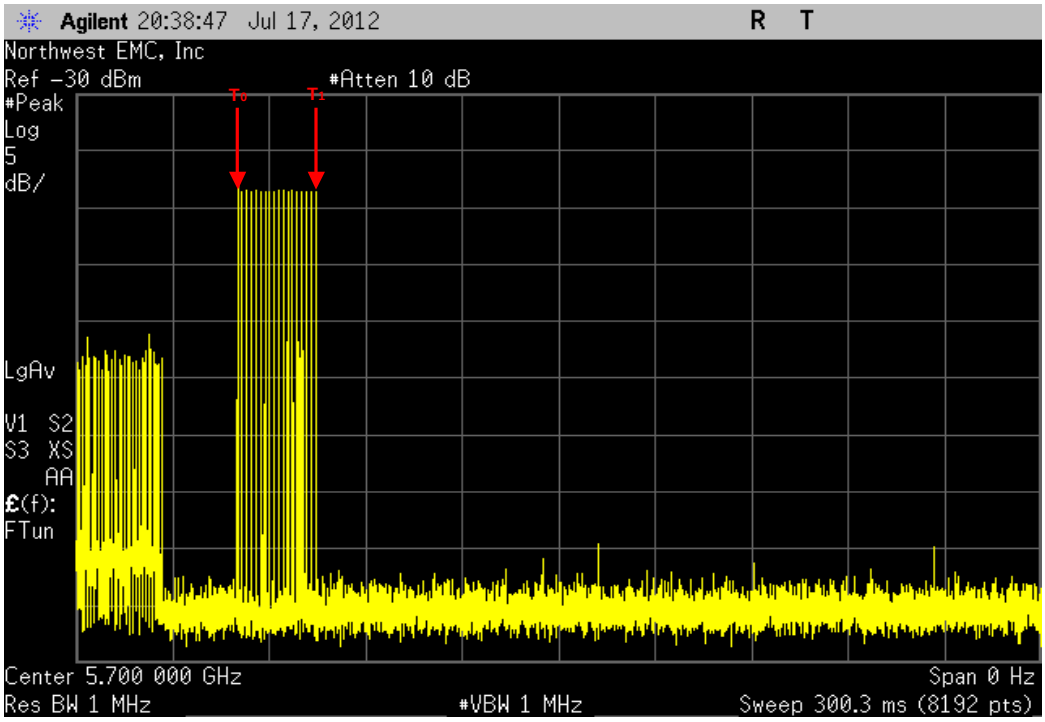
Antenna B, 802.11(a), Lower Sub-Band 5250 MHz - 5350 MHz, 30 minute period

				Value	Limit	Result
T_2				> 30 minutes	≥ 30 minutes	Pass



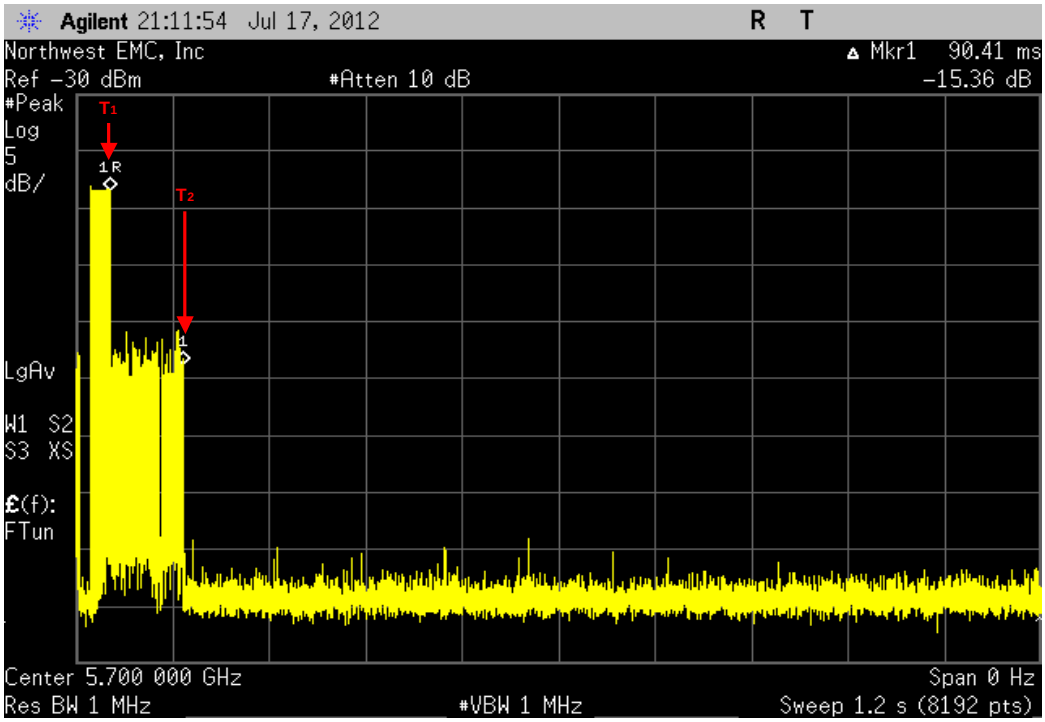
Antenna B, 802.11(a), Upper Sub-Band 5470 MHz - 5725 MHz, 300 ms period

					Value	Limit	Result
					25.7 ms	N/A	N/A



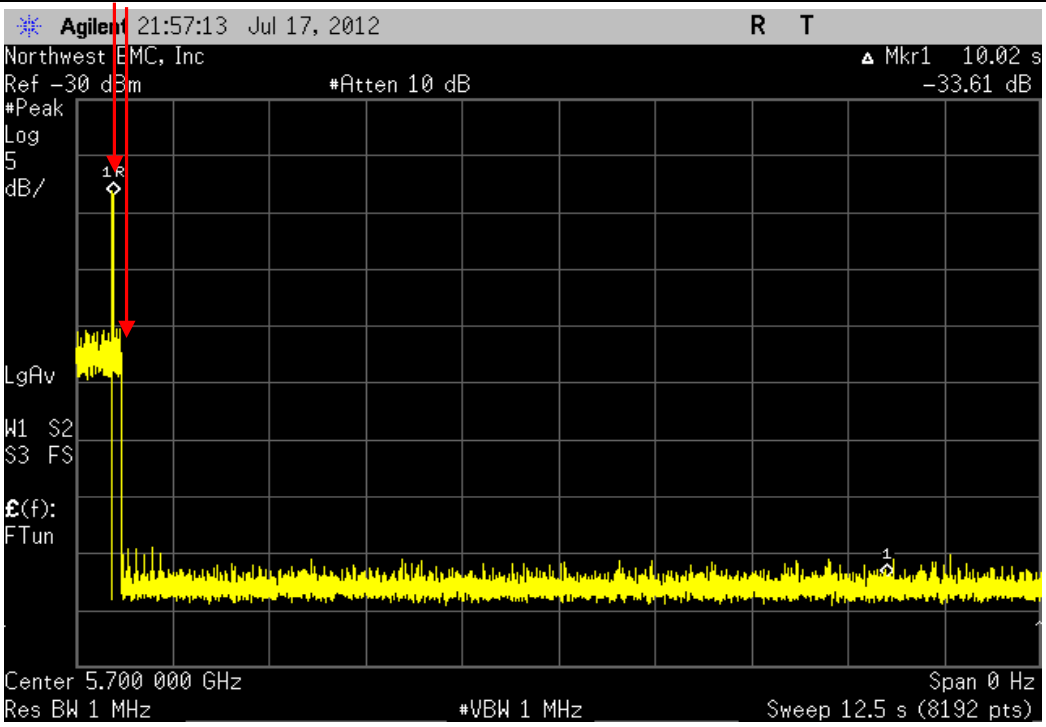
Antenna B, 802.11(a), Upper Sub-Band 5470 MHz - 5725 MHz, 1.2s period

					Value	Limit	Result
					90.4 ms	≤ 260 ms	Pass



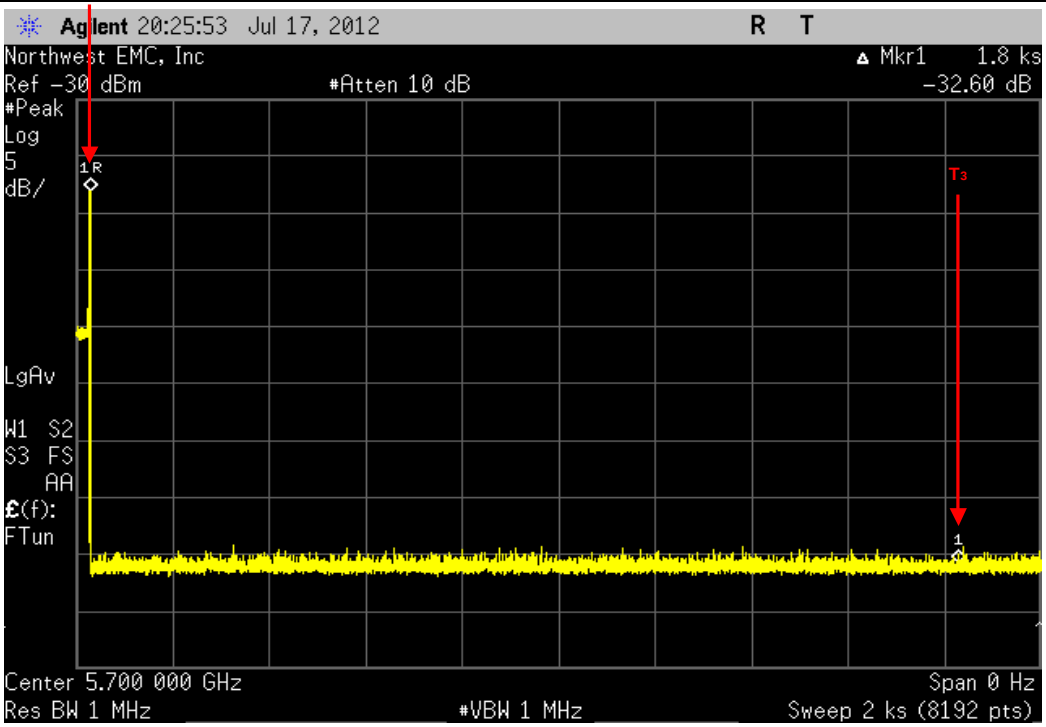
Antenna B, 802.11(a), Upper Sub-Band 5470 MHz - 5725 MHz, 12.5s period

				Value	Limit	Result
T1 T2				< 1 s	≤ 10 s	Pass



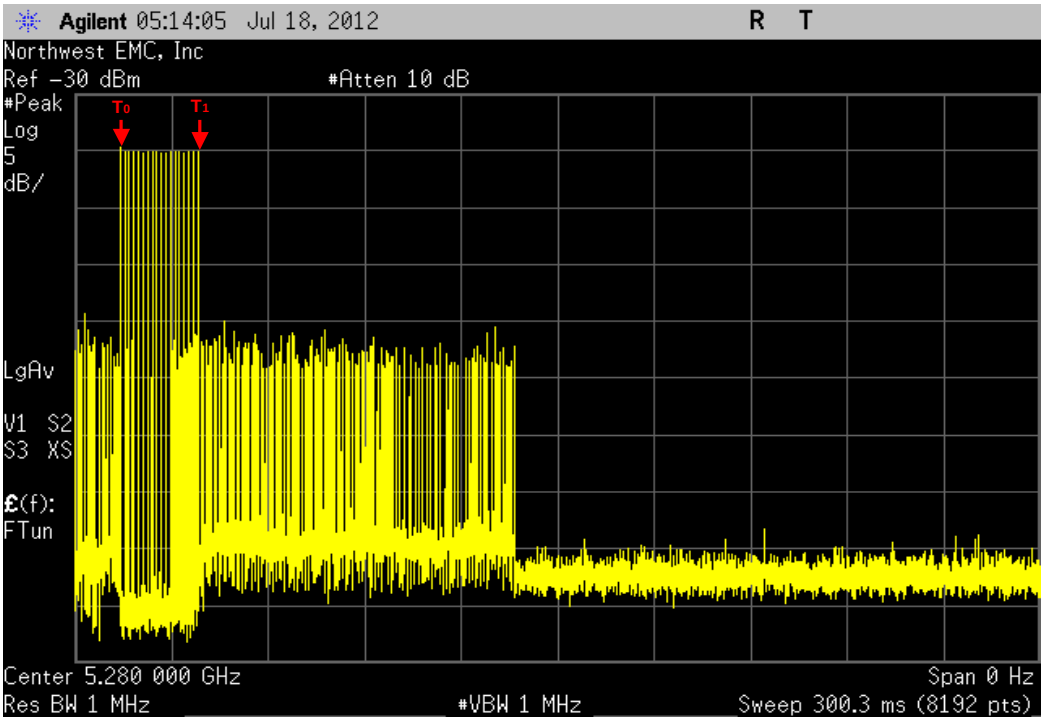
Antenna B, 802.11(a), Upper Sub-Band 5470 MHz - 5725 MHz, 30 minute period

				Value	Limit	Result
T2				> 30 minutes	≥ 30 minutes	Pass



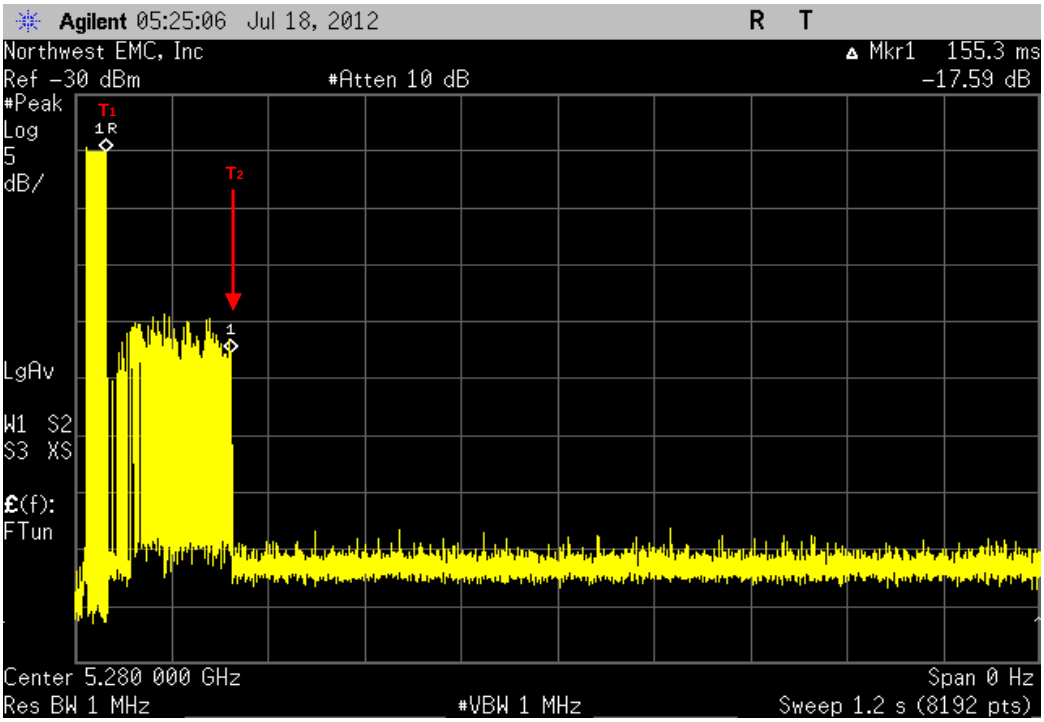
Antenna B, 802.11(n) 40 MHz, Lower Sub-Band 5250 MHz - 5350 MHz, 300 ms period

				Value	Limit	Result
				25.7 ms	N/A	N/A



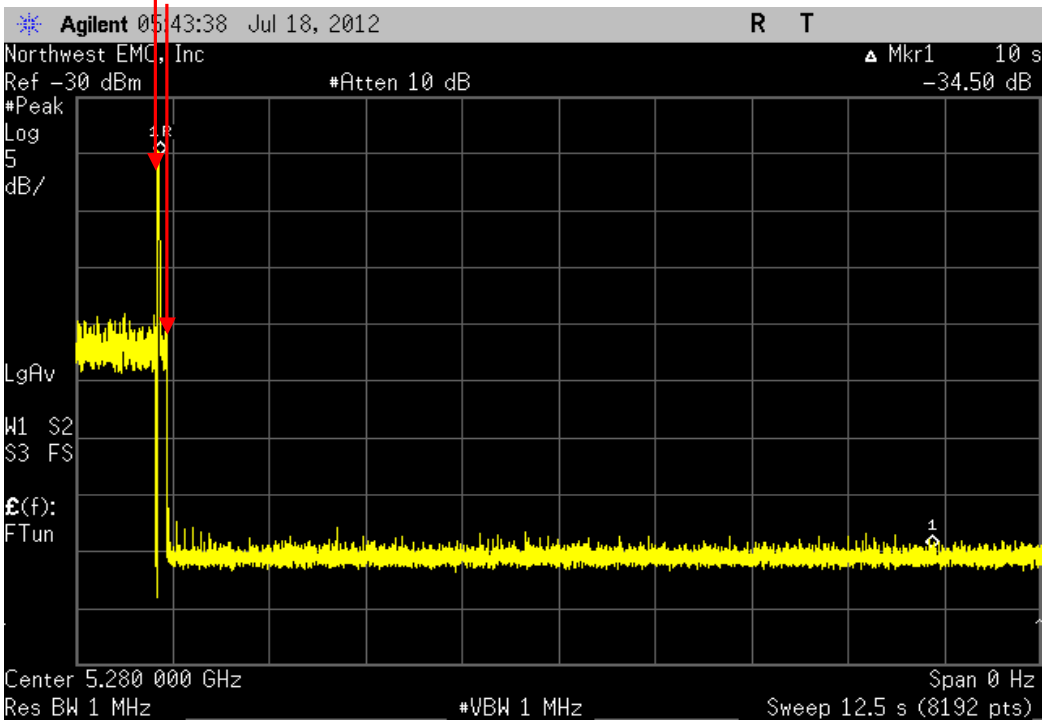
Antenna B, 802.11(n) 40 MHz, Lower Sub-Band 5250 MHz - 5350 MHz, 1.2s period

				Value	Limit	Result
				155 ms	≤ 260 ms	Pass



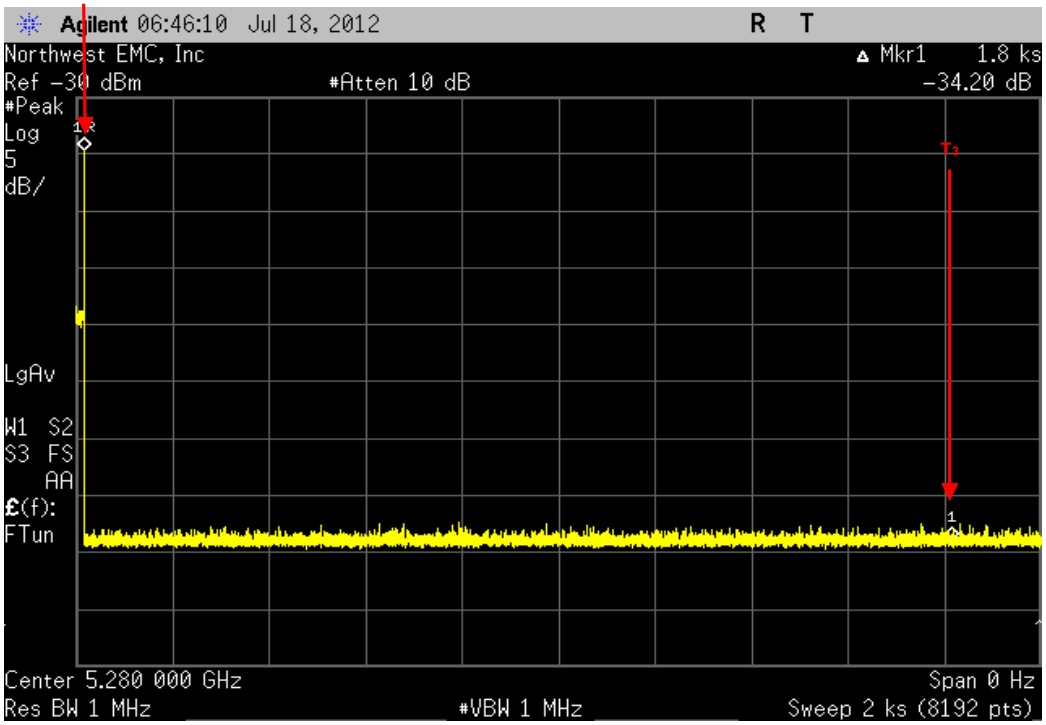
Antenna B, 802.11(n) 40 MHz, Lower Sub-Band 5250 MHz - 5350 MHz, 12.5s period

				Value	Limit	Result
T1 T2				< 1 s	≤ 10 s	Pass



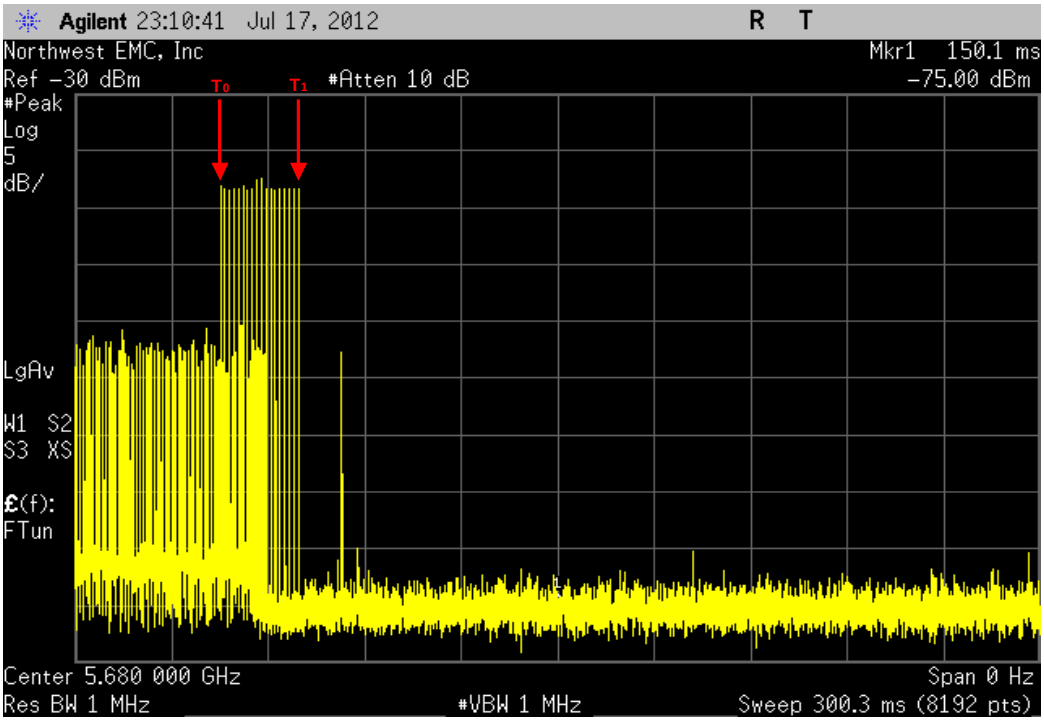
Antenna B, 802.11(n) 40 MHz, Lower Sub-Band 5250 MHz - 5350 MHz, 30 minute period

				Value	Limit	Result
T2				> 30 minutes	≥ 30 minutes	Pass



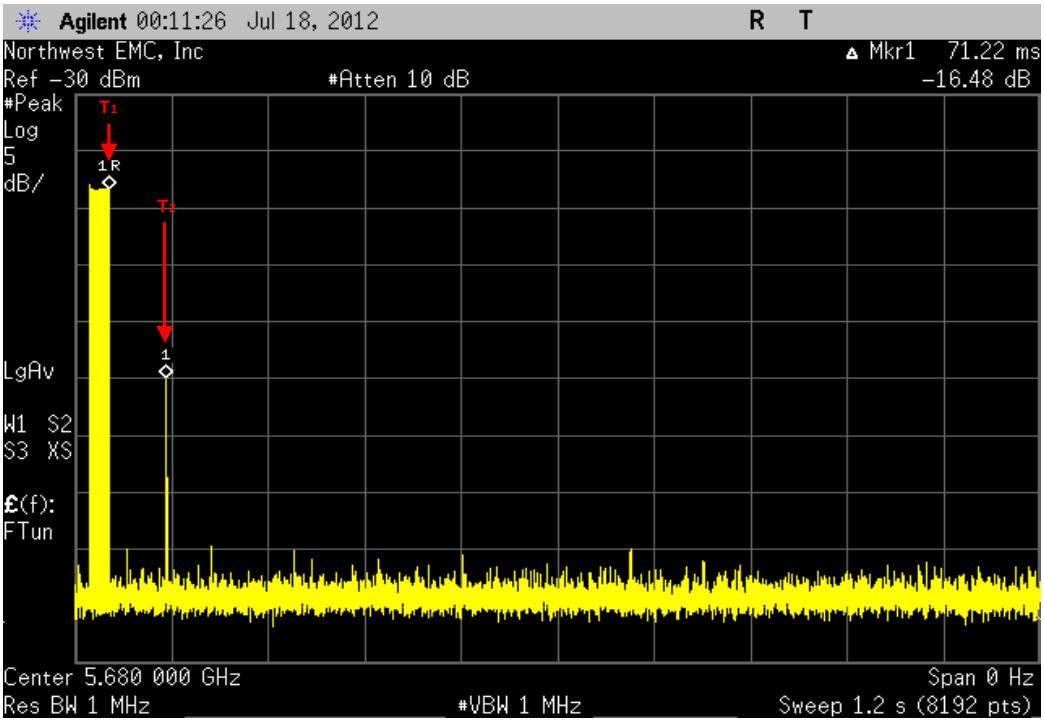
Antenna B, 802.11(n) 40 MHz, Upper Sub-Band 5470 MHz - 5725 MHz, 300 ms period

				Value	Limit	Result
				25.7 ms	N/A	N/A



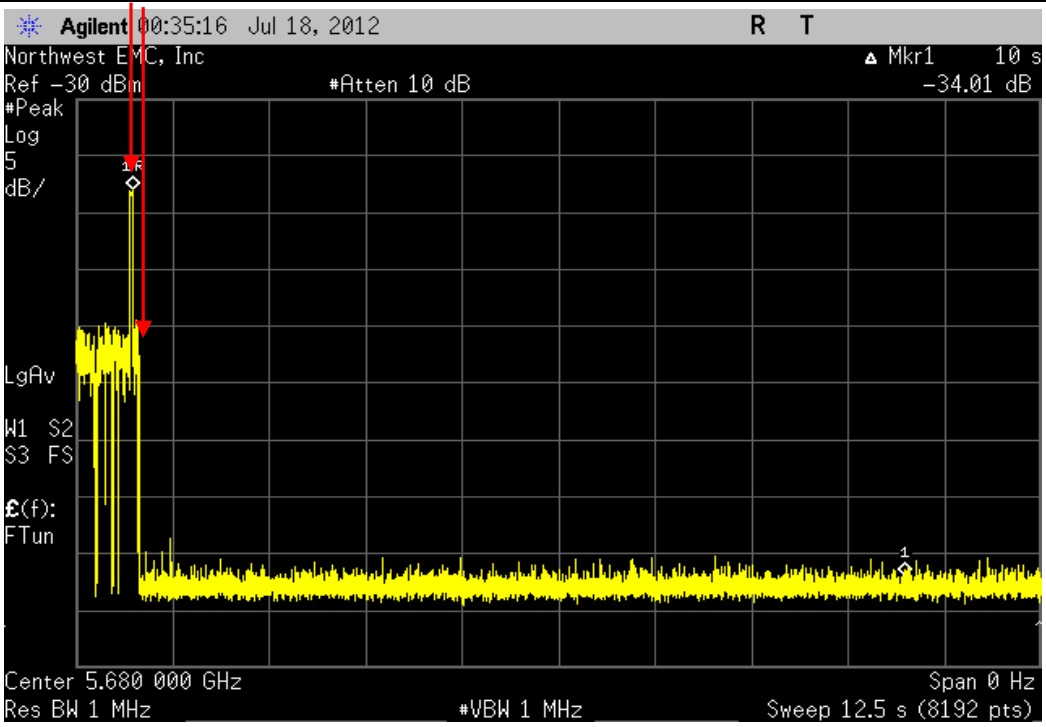
Antenna B, 802.11(n) 40 MHz, Upper Sub-Band 5470 MHz - 5725 MHz, 1.2s period

				Value	Limit	Result
				71.2 ms	≤ 260 ms	Pass



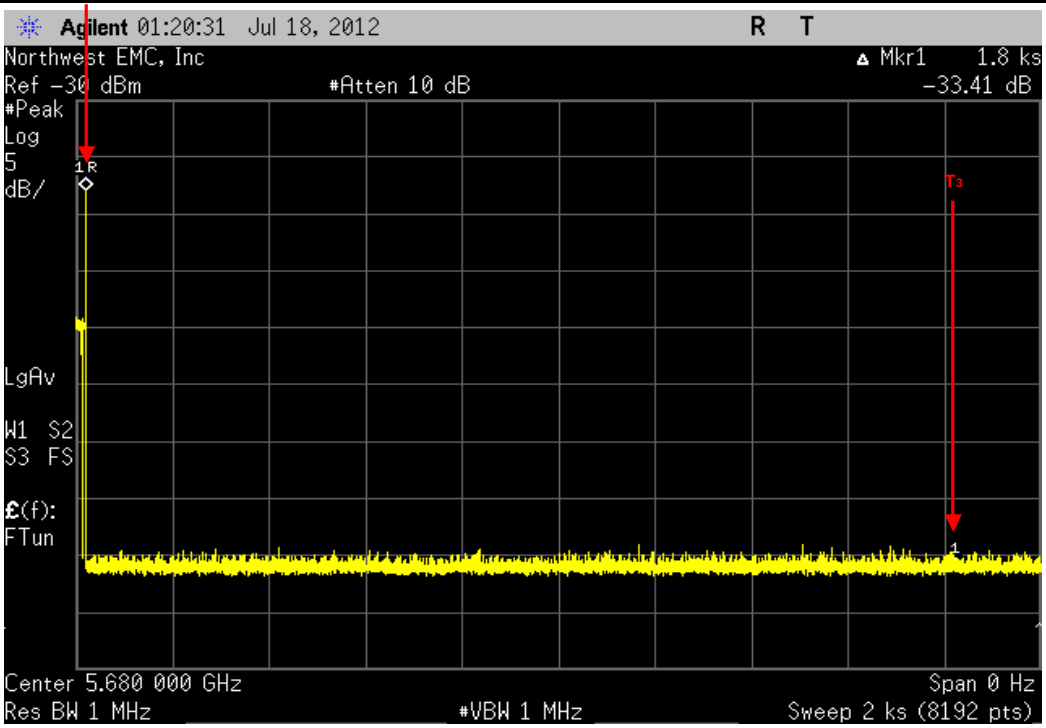
Antenna B, 802.11(n) 40 MHz, Upper Sub-Band 5470 MHz - 5725 MHz, 12.5s period

				Value	Limit	Result
T1 T2				< 1 s	≤ 10 s	Pass



Antenna B, 802.11(n) 40 MHz, Upper Sub-Band 5470 MHz - 5725 MHz, 30 minute period

				Value	Limit	Result
T2				> 30 minutes	≥ 30 minutes	Pass



System Block Diagram