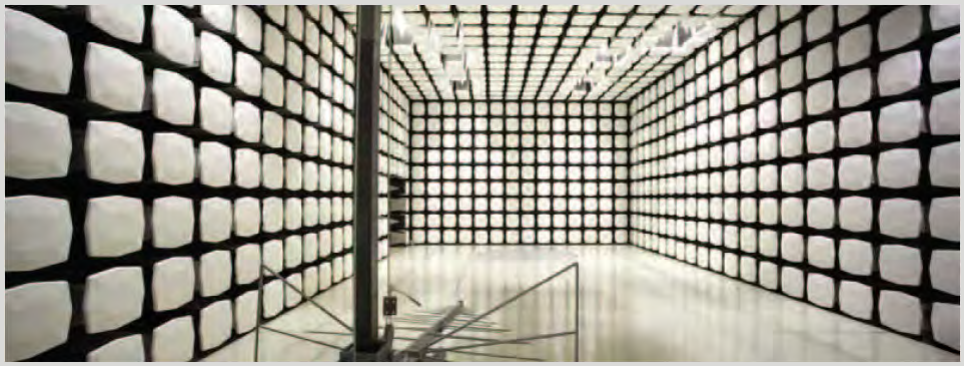
Summit Semiconductor LLC

444-2250

FCC 15.407:2014

Report #: FOCU0168 Rev.1



Report Prepared By Northwest EMC Inc.

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

California – Minnesota – Oregon – New York – Washington

CERTIFICATE OF TEST

WTD 12.5.23

Last Date of Test: June 17, 2014
Summit Semiconductor LLC
Model: 444-2250

Emissions

Test Description	Specification	Test Method	Pass/Fail
Moving Time	FCC 15.407:2014	ANSI C63.10:2009	Pass
Closing Time	FCC 15.407:2014	ANSI C63.10:2009	Pass
Non Occupancy Period	FCC 15.407:2014	ANSI C63.10:2009	Pass

Deviations From Test Standards

None

Approved By:

Kyle Holgate, Operations Manager

NVLAP Lab Code: 200630-0

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.

REVISION HISTORY

Revision Number	Description	Date	Page Number
01	Added “Rev.1” to the Job #	8/25/2014	Cover Page
02	Corrected a Serial Number in the peripherals	8/25/2014	Pg. 9

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

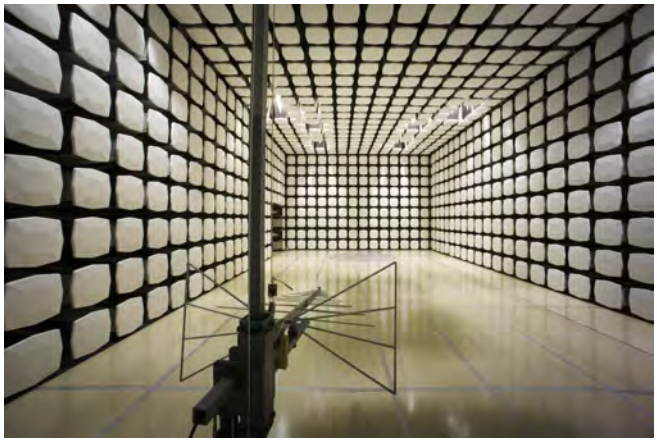
For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/

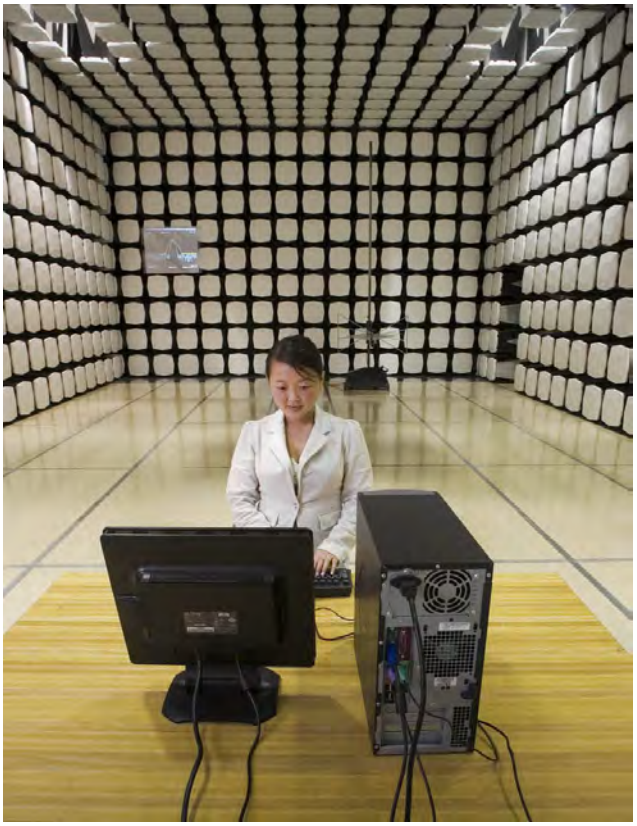
NORTHWEST EMC

REV 2013.06.28

FACILITIES

Oregon	California	New York	Minnesota	Washington
Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Labs MN01-08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Labs NC01-05,SU02,SU07 19201 120th Ave. NE Bothell, WA 98011 (425) 984-6600
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-*2*	2834B-1, 2834B-2, 2834B-3		2834E-1	2834F-1
NVLAP				
NVLAP Lab Code: 200630-0	NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200629-0





PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Summit Semiconductor LLC
Address:	22867 NW Bennett St, Suite 200
City, State, Zip:	Hillsboro, OR 97124
Test Requested By:	Paul Hamilton
Model:	444-2250
First Date of Test:	June 16, 2014
Last Date of Test:	June 17, 2014
Receipt Date of Samples:	June 11, 2014
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

Client device, it has 4 antennas with diversity, there is only one radio (no monitor), the channel bandwidth is 20 MHz

Hardware, Firmware, and OS Versions:

Hardware version: Sherwood Master R104, Athena4XC Client R102
Firmware version: FW193.7
OS versions: N/A

The operating frequency band(s) of the equipment.

The radio operates on channel center frequencies of 5.18–5.32 GHz, 5.50–5.70 GHz, and 5.745-5.825 GHz with Maximum occupied channel bandwidth of 20 MHz

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

Master radio and client combination. Client has no radar detection 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.

Client does not have radar detection capability. Ad-hoc capability does not apply. A DFS-compliant Master device was used for testing.

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 14 dBm conducted.

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.

Stream the audio test file from the Master Device to the Client Device. Fixed talk/listen ratio, of 25%/75%

PRODUCT DESCRIPTION

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.

Load based system w/spectrum sharing mechanism based on IEEE 802.11 standard

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

Less than 4 seconds

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

Parameters of the detected radar signals is 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 Master device uses Dynamic Frequency Selection in its use of the wireless medium and selects channels as follows:

1. The Master unit, after power up, initializes its radios to a default radio channel determined from values preprogrammed in its flash memory. During the Network Beacon process (essential to synchronize the master and slave units for communication) two channels are selected randomly, one for non-DFS and one for DFS use.

2. Then onwards, new channels are derived by a pseudo-random channel selection process performed within each channel set. DFS system senses channel impairment by energy or radar detection on monitor or transmit radios. Channel impairment may also be detected by the transmitter radio by observing the packet loss/error rate as reported by the slave units.

3. When a prospective channel is selected for use, appropriate national regulations are adhered to. For example, when operating in U.S.A, FCC regulations are followed. These regulations govern how long a channel has to be left unused on detection of radar (30 minutes for FCC) and how long a channel has to be monitored for radar before being used (60 seconds for FCC).

4. When a new channel is used, a channel change is done within about 100 ms after detecting impairment (FCC regulations require the channel be vacated within 200 ms of detecting radar).

This channel selection method ensures uniformity of channel loading of all available channels.

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.

Master has one 50 ohm antenna (~1dBi), and client has four 50 ohm diversity antennas (~1dBi).

CONFIGURATIONS

Configuration FOCU0168- 4

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Digital Wireless Client Module	Summit Semiconductor LLC	444-2250	02EA41000012

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Digital Wireless Master Module	Summit Semiconductor LLC	444-2251	02EA4F00007D
Shielded Enclosure (Client)	Tescom	None	014
Shielded Enclosure (Master)	Ramsey	STE2900	1988
Power Supply (Master)	Artysen	SSL40C	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Remote Laptop (DFS)	Dell	Latitude	2007-0057

MODIFICATIONS

WTD 12.5.23

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	6/16/2014	Move Time	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	6/16/2014	Closing Time	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.
3	6/17/2014	Non Occupancy Period	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

INTRODUCTION & CLIENT DEVICE DFS CONFORMANCE

Overview

For a Client Device without DFS, the Channel Move Time and Channel Closing Transmission Time requirements are verified with one Short Pulse Radar and one Long Pulse Radar. Non-occupancy period can be confirmed with either short or long pulses.

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.

Non-Occupancy Period: Time during which both the client and master device shall not make any transmissions on a channel after a radar signal was detected on that channel. It should at least the minimum requirements but it can be more.

Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client (without DFS)	Client (with DFS)
Non-Occupancy Period	Yes	Yes	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.

INTRODUCTION & CLIENT DEVICE DFS CONFORMANCE

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

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.

7.2.2 Setup for Client with injection at the Master

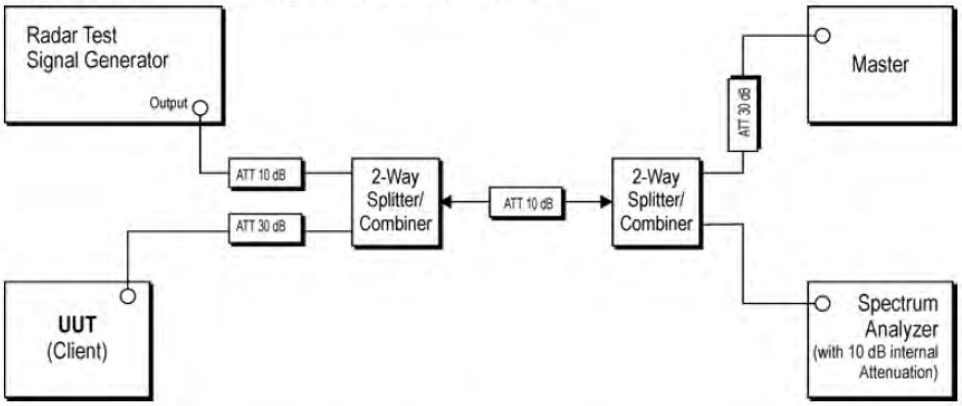


Figure 3: Example Conducted Setup where UUT is a Client and Radar Test Waveforms are injected into the Master

Move Time

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Step Attenuator	Aeroflex/Weinschel	3053	RKG	NCR	0
Step Attenuator	Aeroflex/Weinschel	3053	RKF	NCR	0
Power Divider/Combiner	Fairview Microwave	MP0208-2	IAJ	NCR	0
Power Divider/Combiner	Fairview Microwave	MP0208-2	IAI	NCR	0
MXG Analog Signal Generator	Agilent	N5181A	TIG	3/28/2014	36
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/2/2013	12
40GHz DC Block	Miteq	DCB4000	AMD	4/28/2014	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
DFS Signal Generator	Benchforge Manufacturing	Colt	TIN	NCR	0
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

TEST DESCRIPTION

FCC KDB 905462 describes the compliance measurement procedures including acceptable instrument system configurations for performing Dynamic Frequency Selection (DFS) tests under FCC Part 15 Subpart E Rules required for Unlicensed - National Information Infrastructure (U-NII) equipment that operates in the frequency bands 5.25 GHz to 5.35 GHz and/or 5.47 GHz to 5.725 GHz. The master and client were connected using the conducted method described in the procedure via a series of splitters and attenuators which allows the radar signals to be injected and monitored. Where required, an approved Media file was streamed through the master and client or an alternative method to load the channel may be used instead. Configuration and status of the master and client devices were monitored. The Move Time test was performed by starting a transmission between the Master and Slave device, and then injecting the appropriate radar signals and making sure both the Master and Slave device vacate the DFS channel within the time specified by the standard.

Move Time

EUT:	444-2250			**Work Order:**	FOCU0168
Serial Number:	02EA41000012			**Date:**	06/16/14
Customer:	Summit Semiconductor LLC			**Temperature:**	22.5°C
Attendees:	None			**Humidity:**	43%
Project:	None			**Barometric Pres.:**	1019
Tested by:	Jared Ison	**Power:**	18 VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2014	ANSI C63.10:2009

COMMENTS

Streaming NTIA MPEG at sample rate of 96kHz from Master to the Client.

DEVIATIONS FROM TEST STANDARD

None

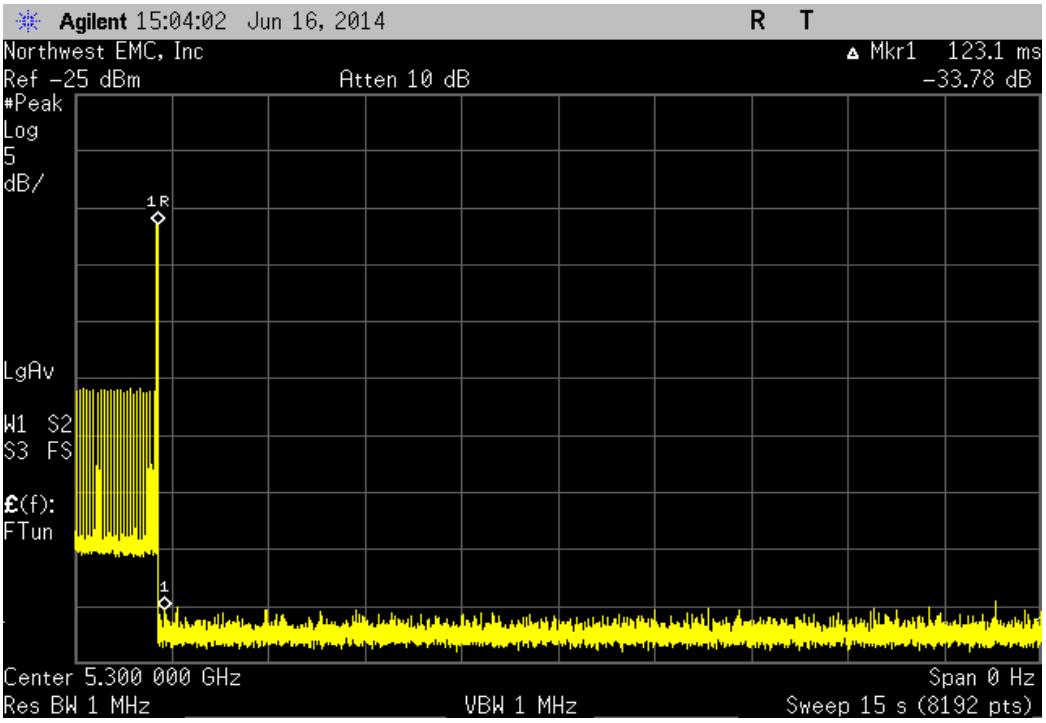
Configuration #	4	*Signature*

		Value	Limit	Result
20MHz				
	Ch. 60, 5300MHz			
	Radar1	123.1 ms	< 10 s	Pass
	Ch. 112, 5560MHz			
	Radar1	116.3 ms	< 10 s	Pass

Move Time

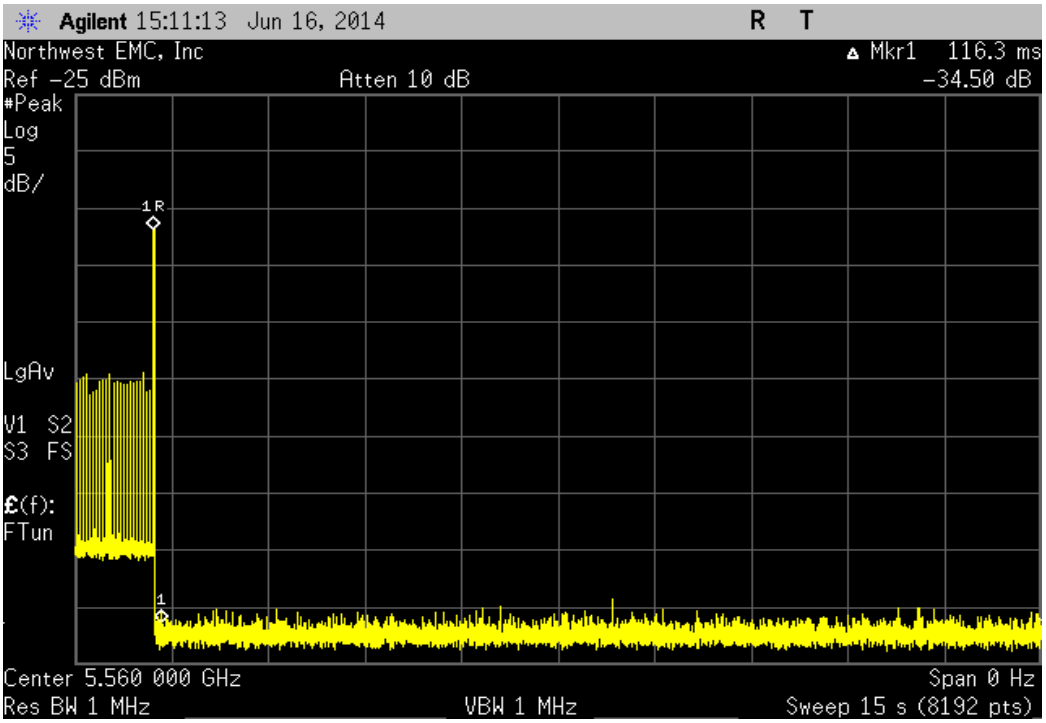
20MHz, Ch. 60, 5300MHz, Radar1

				Value	Limit	Result
				123.1 ms	< 10 s	Pass



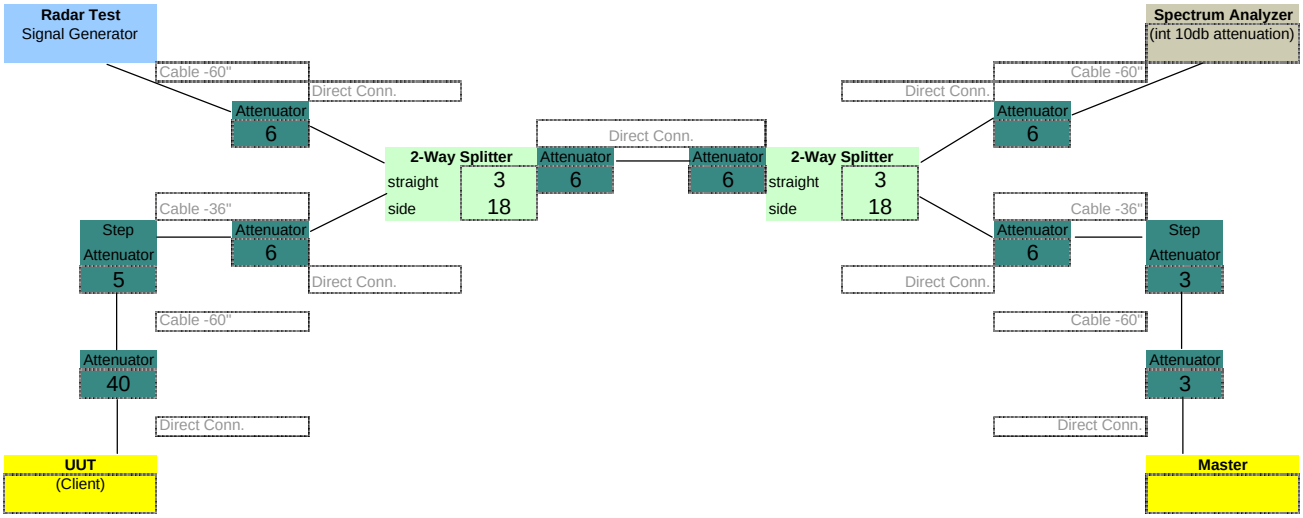
20MHz, Ch. 112, 5560MHz, Radar1

				Value	Limit	Result
				116.3 ms	< 10 s	Pass



Move Time

1/0/1900



Attenuation

Master Radar Sim	Master Spec. Anal.	Client Spec. Anal.	Client Radar Sim	Master Client	Radar Sim Spec. Anal.
3	3	40	40	3	6
3	3	5	5	3	3
6	6	6	6	6	6
3	18	3	18	3	6
6	6	6	6	6	3
6		6		6	6
3		3		3	
6		6		6	
				5	
				40	
========	========	========	========	========	========
36	36	75	75	81	30

Closing Time

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/2/2013	12
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
MXG Analog Signal Generator	Agilent	N5181A	TIG	3/28/2014	36
Attenuator 6 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-6	AUX	7/30/2013	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
40GHz DC Block	Miteq	DCB4000	AMD	4/28/2014	12
Step Attenuator	Aeroflex/Weinschel	3053	RKG	NCR	0
Step Attenuator	Aeroflex/Weinschel	3053	RKG	NCR	0
Power Divider/Combiner	Fairview Microwave	MP0208-2	IAJ	NCR	0
Power Divider/Combiner	Fairview Microwave	MP0208-2	IAI	NCR	0
DFS Signal Generator	Benchforge Manufacturing	Colt	TIN	NCR	0
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

TEST DESCRIPTION

FCC KDB 905462 describes the compliance measurement procedures including acceptable instrument system configurations for performing Dynamic Frequency Selection (DFS) tests under FCC Part 15 Subpart E Rules required for Unlicensed - National Information Infrastructure (U-NII) equipment that operates in the frequency bands 5.25 GHz to 5.35 GHz and/or 5.47 GHz to 5.725 GHz. The master and client were connected using the conducted method described in the procedure via a series of splitters and attenuators which allows the radar signals to be injected and monitored. Where required, an approved Media file was streamed through the master and client or an alternative method to load the channel may be used instead. Configuration and status of the master and client devices were monitored. The Closing Time test was performed by starting a transmission between the Master and Client device, and then injecting the appropriate radar signals. All transmission signals between the Master and Client in the first 200mS are allowed. After this time period, the number of transmissions signals are counted and multiplied by the pulse width value. This aggregate is then added to the 200mS allowance for the final value.

Closing Time

EUT:	444-2250			**Work Order:**	FOCU0168
Serial Number:	02EA41000012			**Date:**	06/16/14
Customer:	Summit Semiconductor LLC			**Temperature:**	22.5°C
Attendees:	None			**Humidity:**	43%
Project:	None			**Barometric Pres.:**	1019
Tested by:	Jared Ison	**Power:**	18 VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	**Test Method**
FCC 15.407:2014	ANSI C63.10:2009

COMMENTS

Streaming NTIA MPEG at sample rate of 96kHz from Master to the Client.

DEVIATIONS FROM TEST STANDARD

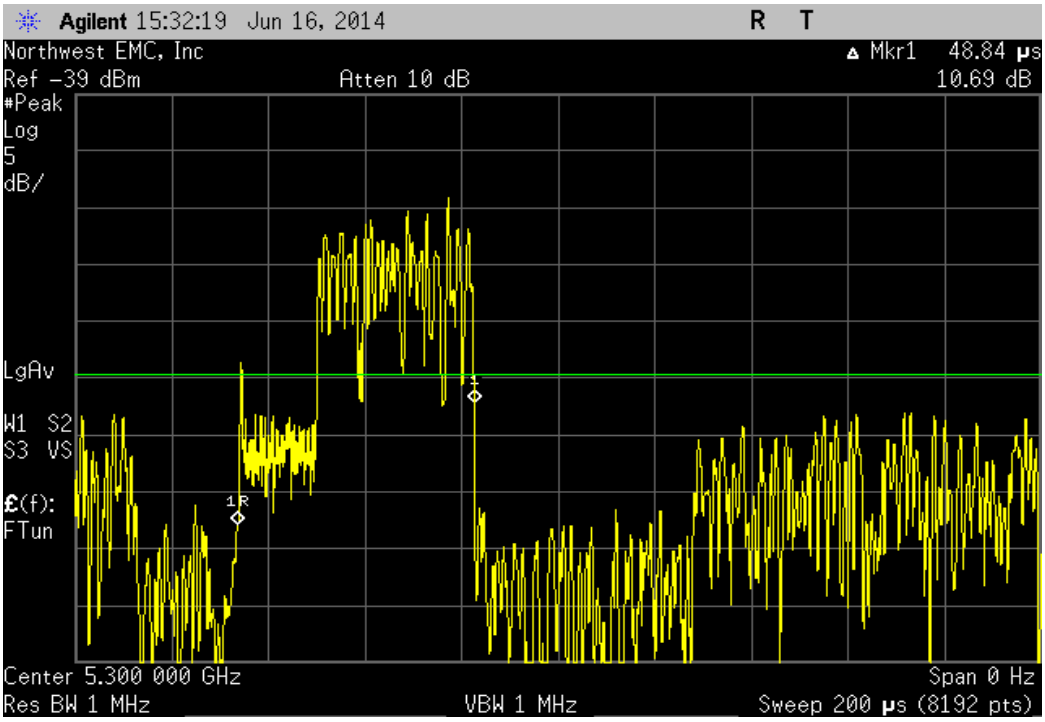
None

Configuration #	4	*Signature*

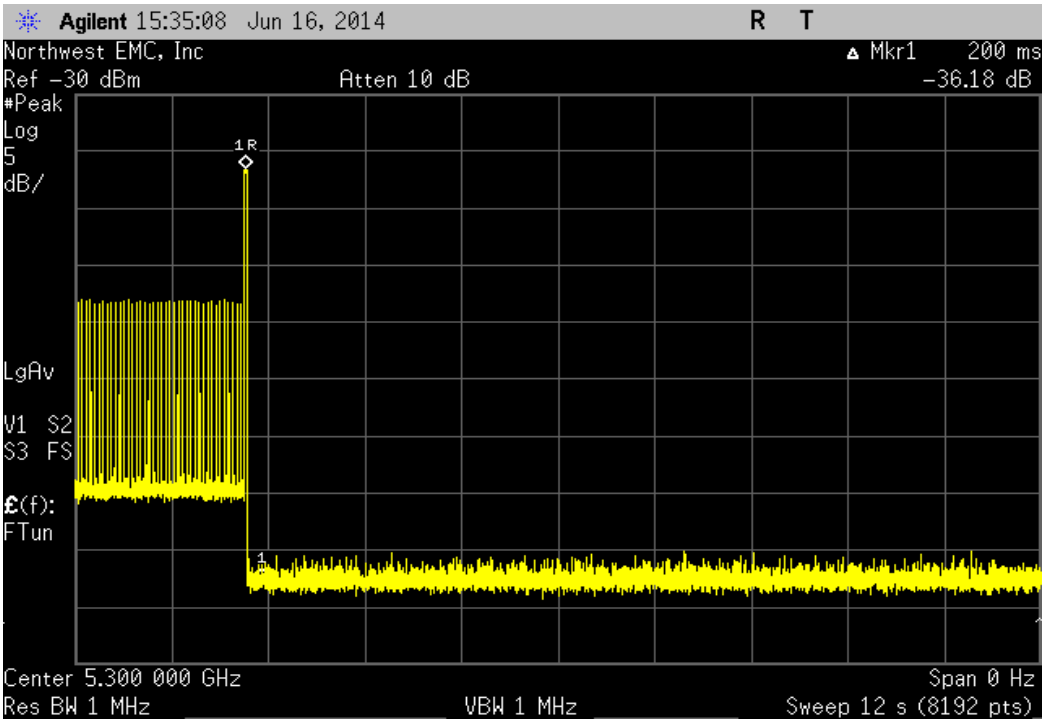
		# of Pulses	PW (mSec)	Value	Limit (mSec)	Result
20MHz						
	Ch. 60, 5300 MHz					
	Radar1 Control Signal Pulse Width	N/A	0.04884	N/A	N/A	N/A
	Radar1 200ms + Aggregate	0	0.04884	200	260	Pass
	Ch. 112, 5560 MHz					
	Radar1 Control Signal Pulse Width	N/A	0.04862	N/A	N/A	N/A
	Radar1 200ms + Aggregate	0	0.04862	200	260	Pass

Closing Time

20MHz, Ch. 60, 5300 MHz, Radar1 Control Signal Pulse Width						
	# of Pulses	PW (mSec)		Value	Limit (mSec)	Result
	N/A	0.04884		N/A	N/A	N/A

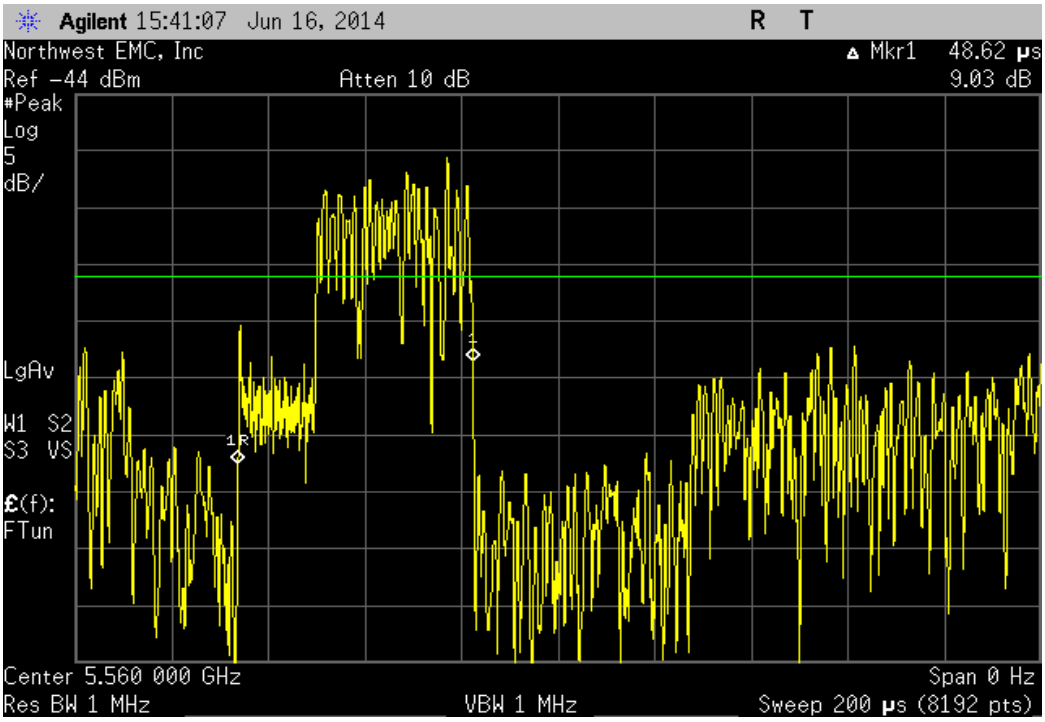


20MHz, Ch. 60, 5300 MHz, Radar1 200ms + Aggregate						
	# of Pulses	PW (mSec)		Value	Limit (mSec)	Result
	0	0.04884		200	260	Pass

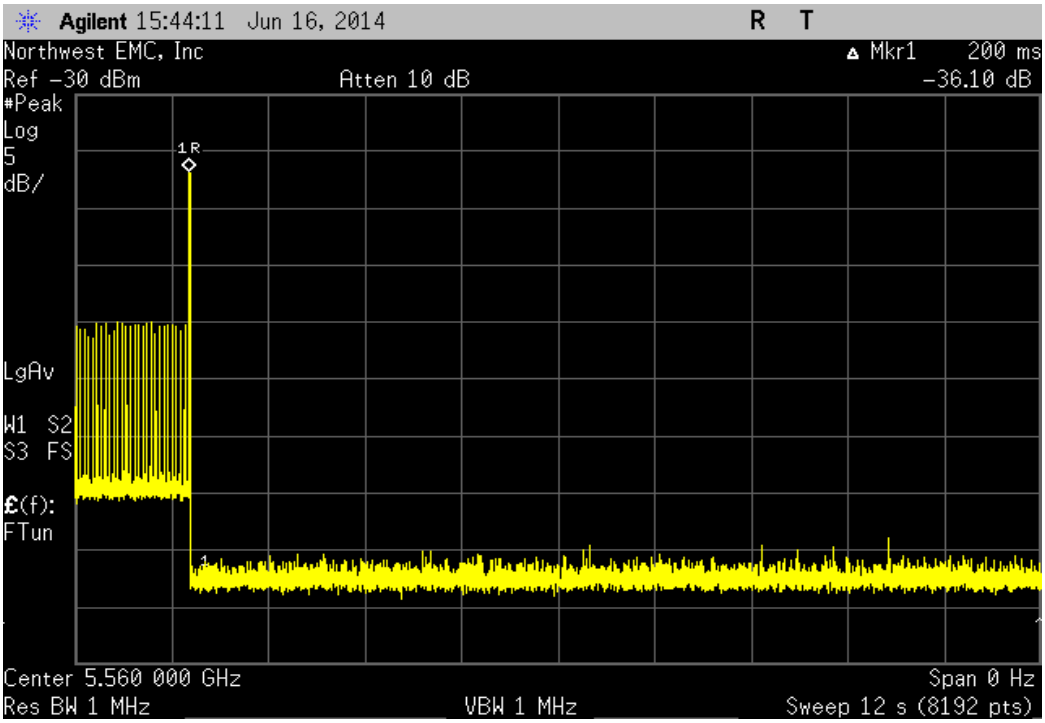


Closing Time

20MHz, Ch. 112, 5560 MHz, Radar1 Control Signal Pulse Width						
	# of Pulses	PW (mSec)		Value	Limit (mSec)	Result
	N/A	0.04862		N/A	N/A	N/A

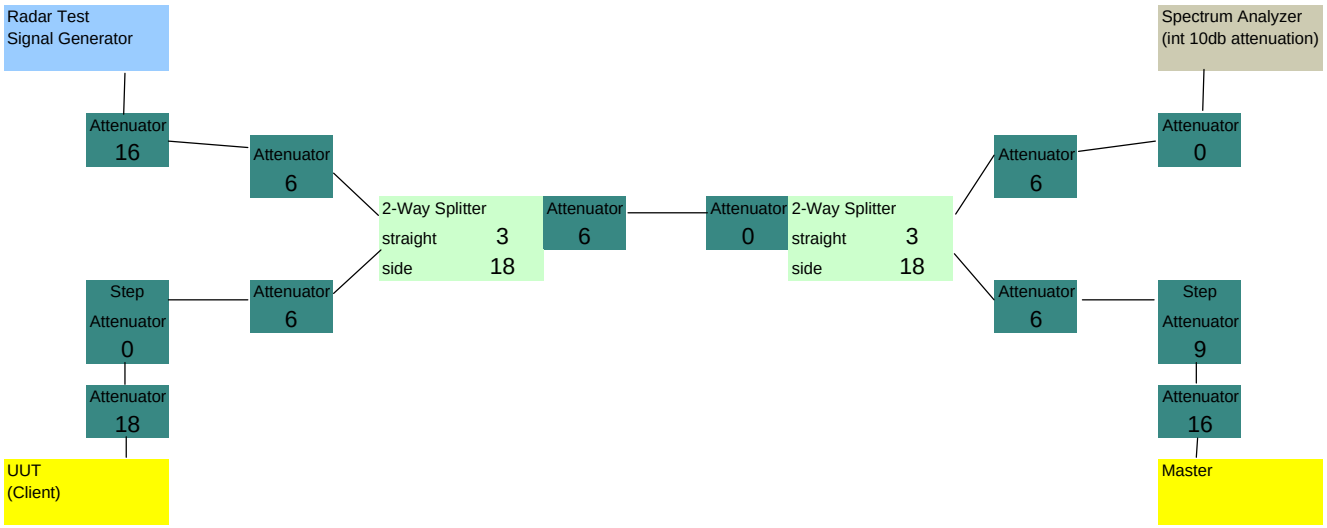


20MHz, Ch. 112, 5560 MHz, Radar1 200ms + Aggregate						
	# of Pulses	PW (mSec)		Value	Limit (mSec)	Result
	0	0.04862		200	260	Pass



Closing Time

1/0/1900



Master Radar Sim	Master Spec. Anal.	Client Spec. Anal.	Client Radar Sim	Master Client	Radar Sim Spec. Anal.
16	16	18	18	16	16
9	9	0	0	9	6
6	6	6	6	6	3
3	18	3	18	3	6
0	6	6	6	0	0
6	0	0	16	6	3
3		3		3	6
6		6		6	0
16		0		0	
				18	
========	========	========	========	========	========
65	55	42	64	67	40

Non Occupancy Period

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40GHz DC Block	Miteq	DCB4000	AMD	4/28/2014	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
Step Attenuator	Aeroflex/Weinschel	3053	RKG	NCR	0
Step Attenuator	Aeroflex/Weinschel	3053	RKG	NCR	0
Power Divider/Combiner	Fairview Microwave	MP0208-2	IAJ	NCR	0
Power Divider/Combiner	Fairview Microwave	MP0208-2	IAI	NCR	0
DFS Signal Generator	Benchforge Manufacturing	Colt	TIN	NCR	0
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/2/2013	12
MXG Analog Signal Generator	Agilent	N5181A	TIG	3/28/2014	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

TEST DESCRIPTION

FCC KDB 905462 describes the compliance measurement procedures including acceptable instrument system configurations for performing Dynamic Frequency Selection (DFS) tests under FCC Part 15 Subpart E Rules required for Unlicensed - National Information Infrastructure (U-NII) equipment that operates in the frequency bands 5.25 GHz to 5.35 GHz and/or 5.47 GHz to 5.725 GHz. The master and client were connected using the conducted method described in the procedure via a series of splitters and attenuators which allows the radar signals to be injected and monitored. Where required, an approved Media file was streamed through the master and client or an alternative method to load the channel may be used instead. Configuration and status of the master and client devices were monitored. The Move Time test was performed by starting a transmission between the Master and Slave device, and then injecting the appropriate radar signals and making sure both the Master and Slave device vacate the DFS channel within the time specified by the standard.

Non Occupancy Period

EUT:	444-2250			**Work Order:**	FOCU0168
Serial Number:	02EA41000012			**Date:**	06/17/14
Customer:	Summit Semiconductor LLC			**Temperature:**	22.5°C
Attendees:	None			**Humidity:**	43%
Project:	None			**Barometric Pres.:**	1019
Tested by:	Jared Ison	**Power:**	18 VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	**Test Method**
FCC 15.407:2014	ANSI C63.10:2009

COMMENTS

Streaming NTIA MPEG at sample rate of 96kHz from Master to the Client.

DEVIATIONS FROM TEST STANDARD

None

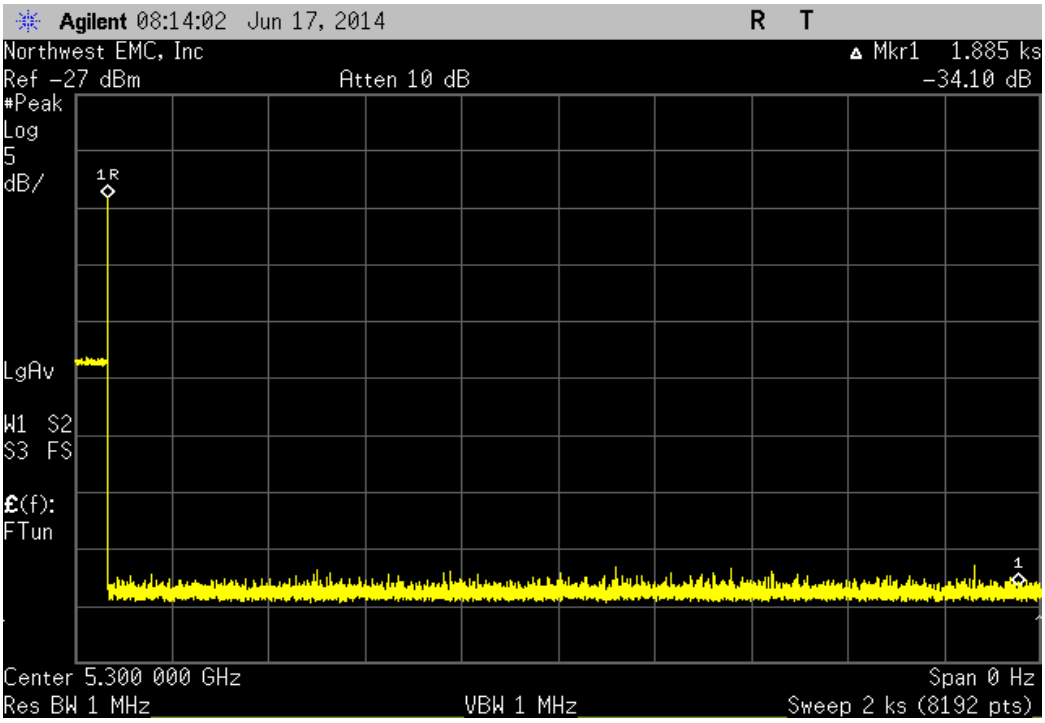
Configuration #	4	*Signature*

		Value	**Limit**	**Result**
20MHz				
	Ch. 60, 5300 MHz			
	30min Non Occupancy Period	> 30 min	≥ 30 min	Pass
	Ch. 112, 5560 MHz			
	30min Non Occupancy Period	> 30 min	≥ 30 min	Pass

Non Occupancy Period

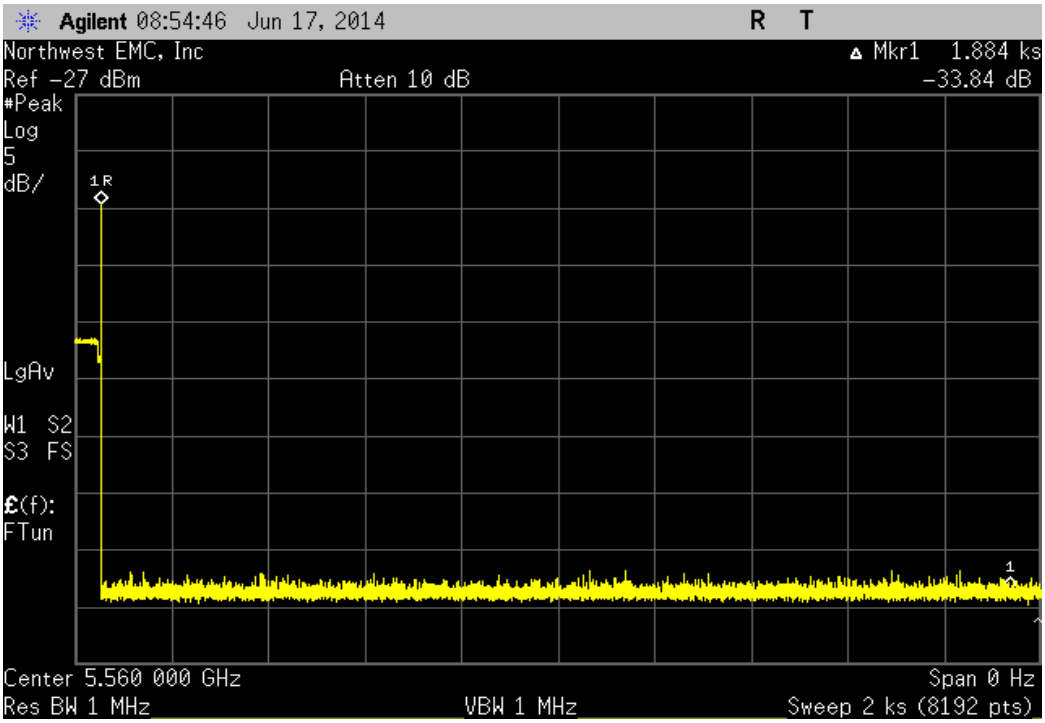
20MHz, Ch. 60, 5300 MHz, 30min Non Occupancy Period

				Value	Limit	Result
				> 30 min	≥ 30 min	Pass



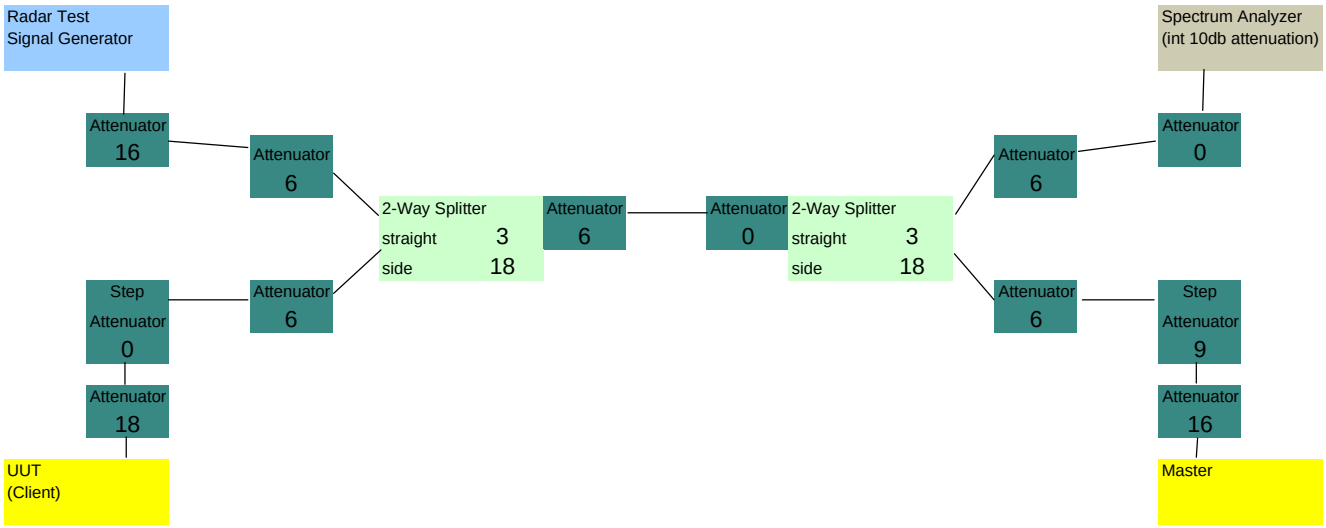
20MHz, Ch. 112, 5560 MHz, 30min Non Occupancy Period

				Value	Limit	Result
				> 30 min	≥ 30 min	Pass



Non Occupancy Period

1/0/1900



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6	0	0	16	6	3
3		3		3	6
6		6		6	0
16		0		0	
				18	
========	========	========	========	========	========
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