TEST REPORT

Report Number: 103176725MPK-001
Project Numbers: G103176725, G103276501
November 22, 2017

Testing performed on the
Wireless Print Server
Model Number: LEX-M07-001
To

FCC Part 15, Subpart E
(DFS Report)

For

Lexmark International, Inc.

Test Performed by:	Test Authorized by:
Intertek	Lexmark International, Inc.
1365 Adams Court	740 W New Circle Rd.
Menlo Park, CA 94025 USA	F61/004-2
	Lexington, KY 40511 USA

Prepared by: _____ **Date:** November 22, 2017
Anderson Soungpanya

Reviewed by: _____ **Date:** November 22, 2017
Krishna K Vemuri

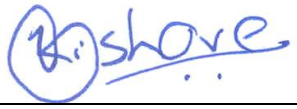
VERIFICATION OF COMPLIANCE
Report No. 103176725MPK-001

Verification is hereby issued to the named APPLICANT and is VALID ONLY for the equipment identified hereon for use under the rules and regulations listed below.

Equipment Under Test:	Wireless Print Server
Trade Name:	Lexmark International, Inc.
Model No.:	LEX-M07-001
Applicant:	Lexmark International, Inc.
Contact:	Tom Bugbee
Address:	740 W New Circle Rd. F61/004-2 Lexington, KY 40511
Country	USA
Tel. Number:	(859) 825-4432
Email:	Bugbee@lexmark.com
Applicable Regulation:	FCC Part 15, Subpart E
Date of Test:	November 20, 2017

We attest to the accuracy of this report:

Anderson Soungpanya
EMC Project Engineer



Krishna K Vemuri
Engineering Team Lead

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1.0 Introduction

1.1 Summary of Tests

Test	Reference FCC	Result
Dynamic Frequency Selection (DFS)		
U-NII Detection Bandwidth	15.407(h)	Not Applicable
Initial Channel Availability Check Time	15.407(h)	Not Applicable
Channel Availability Check Time in Beginning	15.407(h)	Not Applicable
Channel Availability Check Time at End	15.407(h)	Not Applicable
In Service Monitoring – Channel Closing Transmission Time	15.407(h)	Complies
In Service Monitoring – Channel Closing Move Time	15.407(h)	Complies
In Service Monitoring – Non-Occupancy Period	15.407(h)	Complies
In Service Monitoring – Statistical Performance Check	15.407(h)	Not Applicable

Not Applicable – EUT is a client without DFS detection capabilities.

EUT receive date: October 23, 2017
EUT received condition: The pre-production version of the EUT was received in good condition with no apparent damage. As declared by the Applicant, it is identical to the production units.
Test start date: November 20, 2017
Test end date: November 20, 2017

The test results in this report pertain only to the item tested.

2.0 General Description

2.1 Product Description

Lexmark supplied the following description of the EUT:

The Lexmark LEX-M07-001 Print Server Module provides IEEE 802.11ac/n/a/g/b and Bluetooth 4.2 (with Low Energy) communication capability to certain Lexmark laser printers and Multifunction printers in which the module is installed. The module is to be tested in each of the modes.

For more information, see user's manual provided by the manufacturer.

The information about the 5GHz radio, installed in the model LEX-M07-001, is presented below.

Applicant	Lexmark International, Inc.
Model No.	LEX-M07-001
Use of Product	WIFI Radio Module
FCC ID	IYLLEXM07001
Modulation Technique	OFDM
Rated RF Output	802.11a: 15.39 dBm 802.11n 20MHz: 15.41 dBm 802.11n 40MHz: 17.70 dBm
Master or Client Device	Client with no DFS detection capabilities
Frequency Range	U-NII 2A: 5250 – 5350 MHz U-NII 2C: 5470 – 5725 MHz
Type of modulation	OFDM
Nominal Channel Bandwidth	20 MHz, 40 MHz & 80MHz
Antenna(s) & Gain	Internal PCB antenna 2x2 MIMO, 2.6 dBi & 3.3 dBi peak gain
Manufacturer Name & Address	Lexmark International, Inc. 740 W New Circle Rd. F61/004-2 Lexington, KY 40511 USA

The EUT supports a wide range of data rates in the 5GHz band:

IEEE 802.11a
IEEE 802.11n 20MHz BW and 40 MHz BW
IEEE 802.11ac 80MHz BW

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Antenna conducted measurements were performed according to the FCC documents "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E" (789033 D02 General U-NII Test Procedures New Rules v01r04 & 905462 D02 UNII DFS Compliance Procedures New Rules v02).

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4. Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application.

All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The test site used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC, IC and A2LA accredited.

2.5 Measurement Uncertainty

Compliance with the limits was based on the results of the measurements and doesn't take into account the measurement uncertainty.

Estimated Measurement Uncertainty

Measurement	Expanded Uncertainty (k=2)		
	0.15 MHz – 1 GHz	1 GHz – 6 GHz	> 6 GHz
RF Power and Power Density – antenna conducted	1.1 dB	1.5 dB	–
Unwanted emissions - antenna conducted	1.2 dB	1.7 dB	2.0 dB
Bandwidth – antenna conducted	50 Hz	100 Hz	–
Radiated emissions	4.2 dB	5.4 dB	
AC mains conducted emissions	2.4 dB	-	-

3.0 System Test Configuration

3.1 Equipment Under Test

Equipment Under Test (EUT)

Description	Manufacturer	Model Number	Serial Number
WIFI Radio Module	Lexmark International	LEX-M07-001	C7765E

3.2 Support Equipment and description

Description	Manufacturer	Model No.
Laptop	HP	ProBook 455 G4
HP Laptop	EliteBook 8460p	CNU14429SL
Ruckus Wireless, Inc.	R710 Access Point FCC ID: S9GR710	421503700725

3.3 Justification

EUT was tested as a Client with no DFS detection capabilities. A radiated setup was used in accordance with 905462 D02 UNII DFS Compliance Procedures New Rules v02.

3.4 Mode of Operation During Test

The EUT was configured to communicate with a master device. The test file was streamed from the Master to the Client (EUT) on the selected test channel.

3.5 Modifications required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance.

3.6 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

4.0 Dynamic Frequency Selection (DFS)

4.1 Requirement

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 With 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 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.		

4.1.1 DFS Detection Thresholds for Master or Client Devices with DFS Detection

Maximum Transmit Power	Values (See Notes 1, 2, and 3)
EIRP ≥ 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	

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 ms + an aggregate of 60 ms over remaining 10 Second period. (see note 1 and 2)
U-NII Detection Bandwidth	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.	

4.1.2 Test Waveform

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	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	60.00%	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)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355.0	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139.0	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4. For example, the following table indicates how to compute the aggregate of percentage of successful detections.

Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detection
1	35	29	82.9%
2	30	18	60.0%
3	30	27	90.0%
4	50	44	88.0%
Aggregate (82.9% + 60% + 90% + 88%)/4 = 80.2%			

Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chrip Width (MHz)	PRI (µsec)	Number of Pulses per Burst	Number of Burst	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

1. The transmission period for the Long Pulse Radar test signal is 12 seconds.

2. There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.

3. Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.

4. The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.
5. Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *transmission period* will have the same chirp width. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.

6. If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the random time interval between the first and second pulses is chosen independently of the random time interval between the second and third pulses.

7. The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst Count*. Each interval is of length (12,000,000 / *Burst Count*) microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and [(12,000,000 / *Burst Count*) – (Total *Burst* Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen randomly.

A representative example of a Long Pulse Radar Type waveform:

1) The total test waveform length is 12 seconds.

2) Eight (8) *Bursts* are randomly generated for the *Burst Count*.

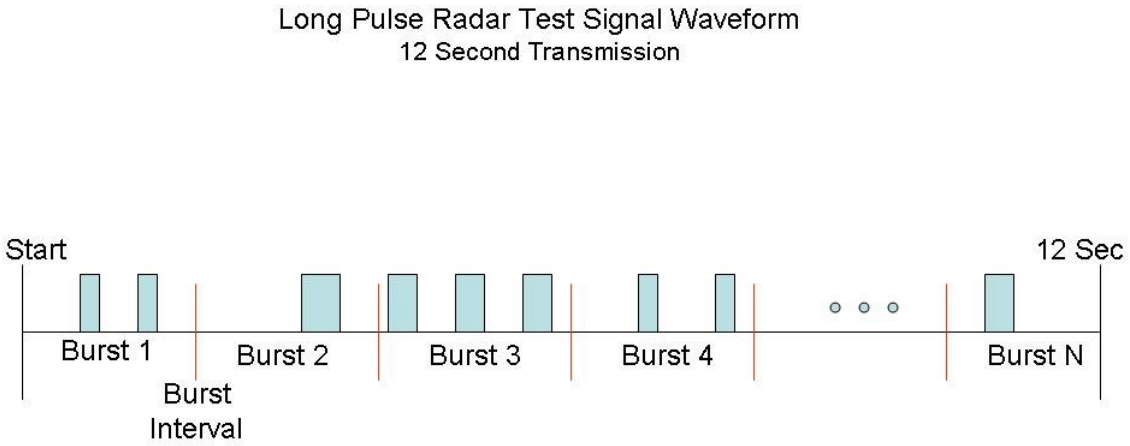
3) *Burst* 1 has 2 randomly generated pulses.

4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.

5) The PRI is randomly selected to be at 1213 microseconds.

6) *Bursts* 2 through 8 are generated using steps 3 – 5.

7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).



Graphical Representation of a Long Pulse Radar Type Waveform

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

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

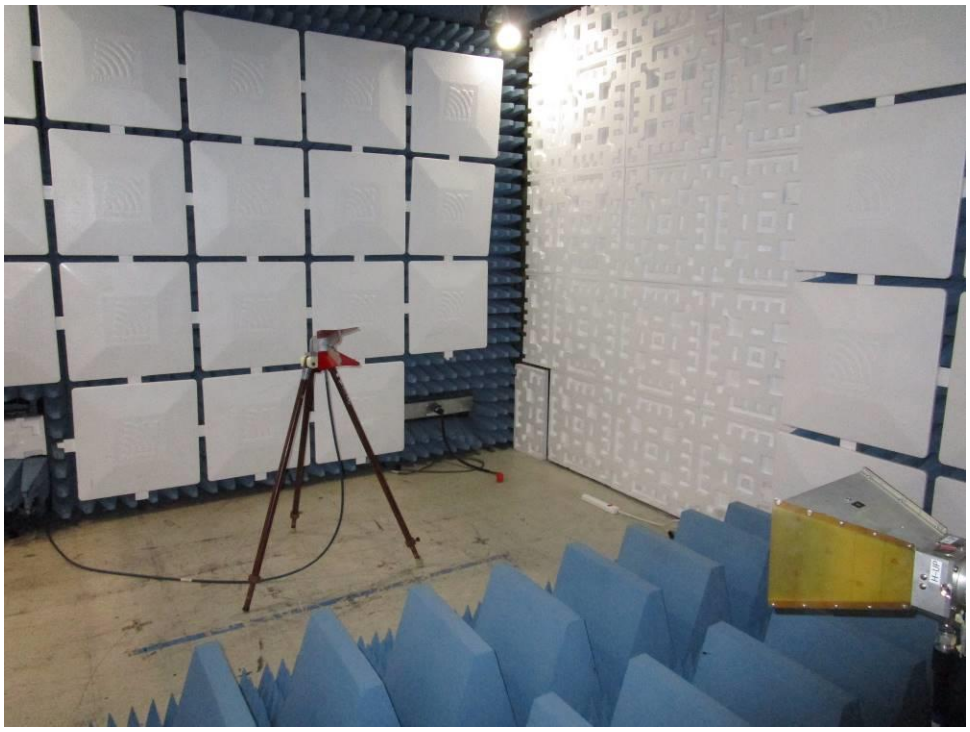
The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

4.2 DFS Waveform Calibration

4.2.1 Calibration Procedure

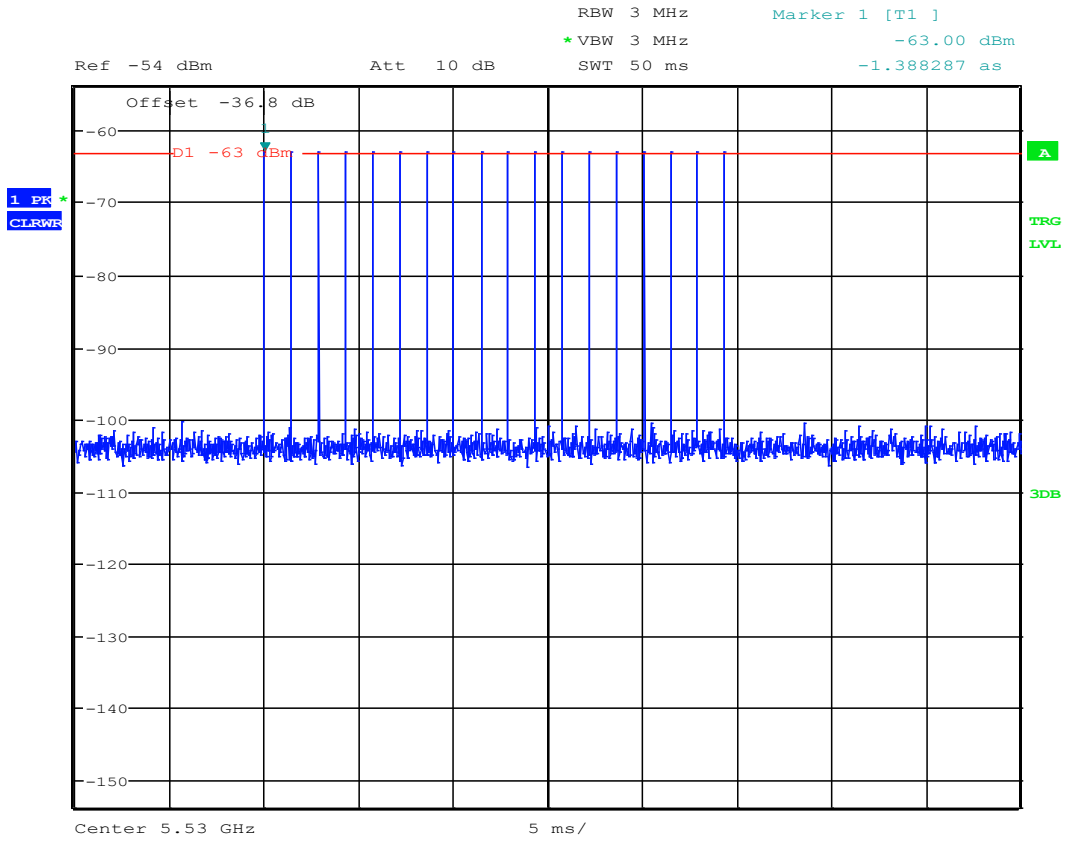
For the DFS signal, horn antenna was attached to a signal generator (RS SMU700A). On the Receive side another horn antenna was attached to a spectrum analyzer with a preamp inline. The spectrum analyzer's resolution bandwidth was set to 3 MHz and the video bandwidth was set to 3 MHz with peak detection. The field was corrected to account for cable loss, antenna gain and preamp. The DFS signal was calibrated to a field strength of -63 dBm. Test wave form 0 was utilized. The calibration setup is diagrammed below along with a setup picture.

4.2.2 Calibration setup



4.2.3 Calibration Results

Radar Type 0 Calibration



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The Spectrum Analyzer Reference Level Offset is System Gain + Cable Loss

Frequency	Cable loss	System Gain (Preamp and Antenna Gain)	Reference Offset
MHz	dB	dBi	dB
5530	8.6	-45.4	-36.8

4.3 DFS Test Procedures

Test procedures were made in accordance to 905462 D02 UNII DFS Compliance Procedures New Rules v02.

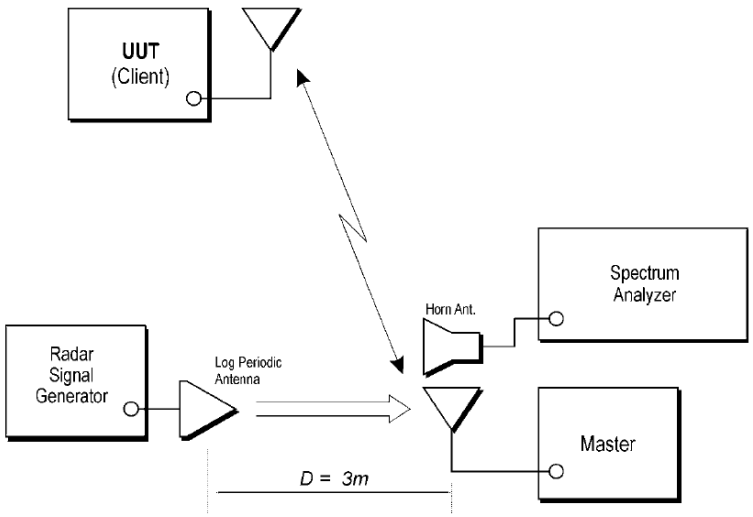
A radiated test method was used and the test setup was made as depicted in the diagram below. DFS testing was setup as a client with injection into the master.

The Master and Client (EUT) were placed in a semi-anechoic chamber. The simulated radar waveform was transmitted from a horn antenna towards the Master. The signal level of the simulated radar waveform was set 1 dB higher than calibrated level and was applied to the Master. The horn antenna was connected to the spectrum analyzer and positioned towards the client with a level higher than emissions from the Master.

A Rhode & Schwarz Vector Signal Generator with Pulse Sequencer Software was used to generate the DFS radar signals. A Rhode & Schwarz Spectrum Analyzer was used to monitor the transmissions of the Client. The trigger of the spectrum analyzer was aligned with the end of the radar waveform burst from the signal generator.

The EUT (client without DFS detection) was configured to communicate with a Master wirelessly. The test file/data was streamed from the Master to the Client. The channel load is recorded and presented in test results below.

Measurement equipment used for compliance testing utilized the equipment on the following list:



4.4 U-NII Detection Bandwidth

4.4.1 Test Procedure

The equipment is setup for conducted test. The generating equipment is setup to produce a single burst of the Short Pulse Radar Type 0 at the center frequency of the UUT Operating Channel. The test level is set to the DFS Detection Threshold. The EUT is setup as a standalone device (no associated Client) and with no traffic.

A single radar Burst is sent to the EUT and the response of the EUT is noted. This is repeated for a minimum of 10 trials.

Radar test frequency selected is started at the center frequency of the EUT operating Channel. The center channel of the radar frequency is increased and decreased in 5 MHz steps until the detection rate falls below the U-NII Detection Bandwidth criterion. When rate falls below the U-NII Detection Bandwidth criterion the radar frequency is increased and decreased in 1MHz steps. The highest (f_H) and lowest (f_L) frequency at which detection is greater than or equal to the U-NII Detection Bandwidth criterion is recorded.

The U-NII Detection Bandwidth is calculated as follows: U-NII Detection Bandwidth = $f_H - f_L$

The U-NII Detection Bandwidth must meet the U-NII Detection Bandwidth criterion which is 100% of the EUT 99% Bandwidth. Otherwise, the UUT does not comply with DFS requirements.

4.4.2 Test Results

Not Applicable – EUT is a client without DFS detection capabilities.

4.5 Initial Channel Availability Check Time

4.5.1 Test Procedure

The Initial Channel Availability Check Time (CACT) tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms and only needs to be performed one time.

a) The U-NII devices was powered on and instructed to operate on the appropriate U-NII Channel that incorporated DFS functions. At the same time the UUT is powered on, the spectrum analyzer was set to zero span mode with a 3 MHz RBW and 3 MHz VBW on the Channel occupied by the radar with a 2.5-minute sweep time. The spectrum analyzer's sweep was started at the same time power is applied to the U-NII device.

b) The UUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle.

c) Marker 1 shows the begging of the power-on cycle. Marker 2 shows 60 seconds prior to the power-on cycle which is beginning of the CACT.

d) The plot shall be confirmed for power-on cycle.

4.5.2 Test Results

Not Applicable – EUT is a client without DFS detection capabilities.

4.6 Radar Burst at the Beginning of the Channel Availability Check Time

4.6.1 Test Procedure

The Initial Channel Availability Check Time (CACT) tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms and only needs to be performed one time.

a) The U-NII devices was powered on and instructed to operate on the appropriate U-NII Channel that incorporated DFS functions. At the same time the UUT is powered on, the spectrum analyzer was set to zero span mode with a 3 MHz RBW and 3 MHz VBW on the Channel occupied by the radar with a 2.5-minute sweep time. The spectrum analyzer's sweep was started at the same time power is applied to the U-NII device.

b) The UUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle.

c) A single type 0 Radar (threshold +1dB) was transmitted to the EUT at the beginning of the CACT time. Radar was sent within 2 seconds after marker 2 in plot below.

d) The plot shall be confirmed for no transmission after Marker 1 (power-on cycle)

4.6.2 Test Results

Not Applicable – EUT is a client without DFS detection capabilities.

4.7 Radar Burst at the End of the Channel Availability Check Time

4.7.1 Test Procedure

The Initial Channel Availability Check Time (CACT) tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms and only needs to be performed one time.

a) The U-NII devices was powered on and instructed to operate on the appropriate U-NII Channel that incorporated DFS functions. At the same time the UUT is powered on, the spectrum analyzer was set to zero span mode with a 3 MHz RBW and 3 MHz VBW on the Channel occupied by the radar with a 2.5-minute sweep time. The spectrum analyzer's sweep was started at the same time power is applied to the U-NII device.

b) The UUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle.

c) A single type 0 Radar (threshold +1dB) was transmitted to the EUT at the beginning of the CACT time. Radar was sent within 2 seconds prior to marker 1 in plot below.

d) The plot shall be confirmed for no transmission after Marker 1 (power-on cycle)

4.7.2 Test Results

Not Applicable – EUT is a client without DFS detection capabilities.

4.8 In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

4.8.1 Test Procedure

The EUT was configured to communicate with a master device. The test file was streamed from the Master to the Client (EUT) on the selected test channel. Measurements were made while utilizing the widest bandwidth of the EUT.

Channel closing transmission time and channel move time were measured by applying a radar type 0 at threshold + 1dB to the EUT. The EUT transmissions were observed on the EUT center channel. The time between the end of the applied radar waveform and the final transmission on the channel is the channel move time. The channel closing transmission time comprises only those fragments of the channel move time during which the EUT transmits.

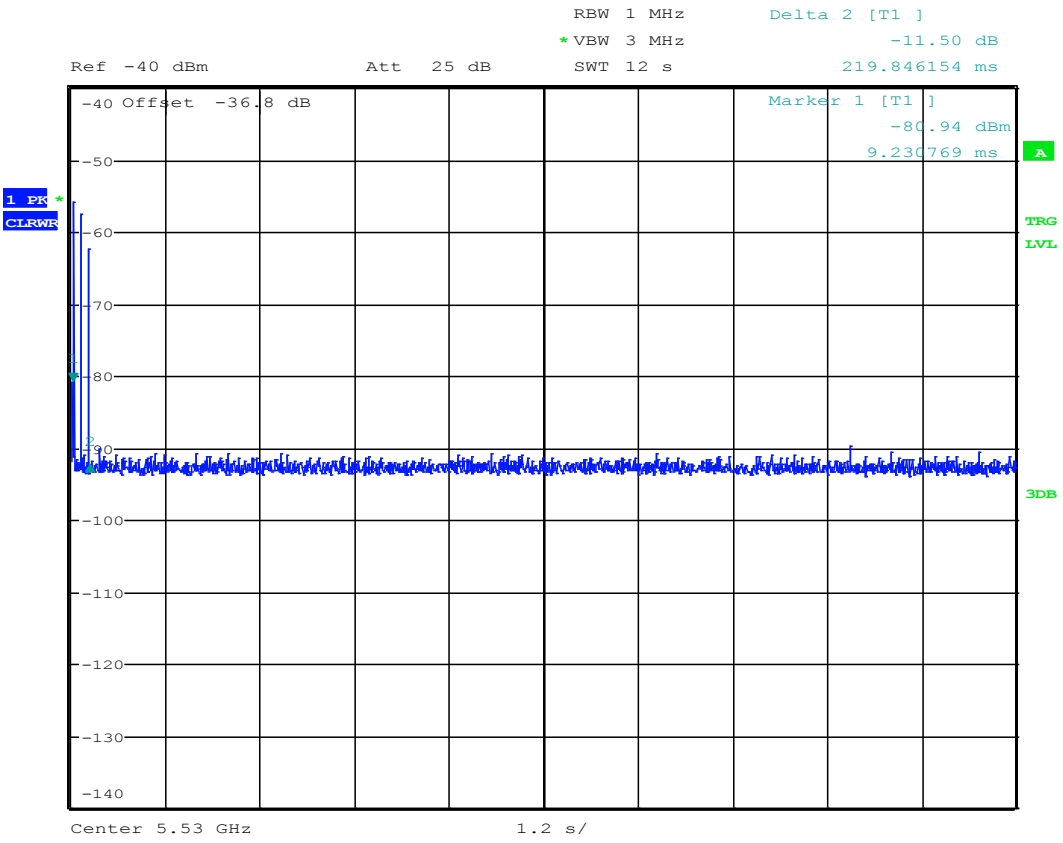
The Channel Move time shall be less than 10 seconds.

The Channel Close time shall be 200ms +60ms of aggregate time.

The Non-occupancy time shall 30 minutes or greater.

The Channel Loading shall be approximately 17% or greater.

4.8.1 Test Results Channel Move time



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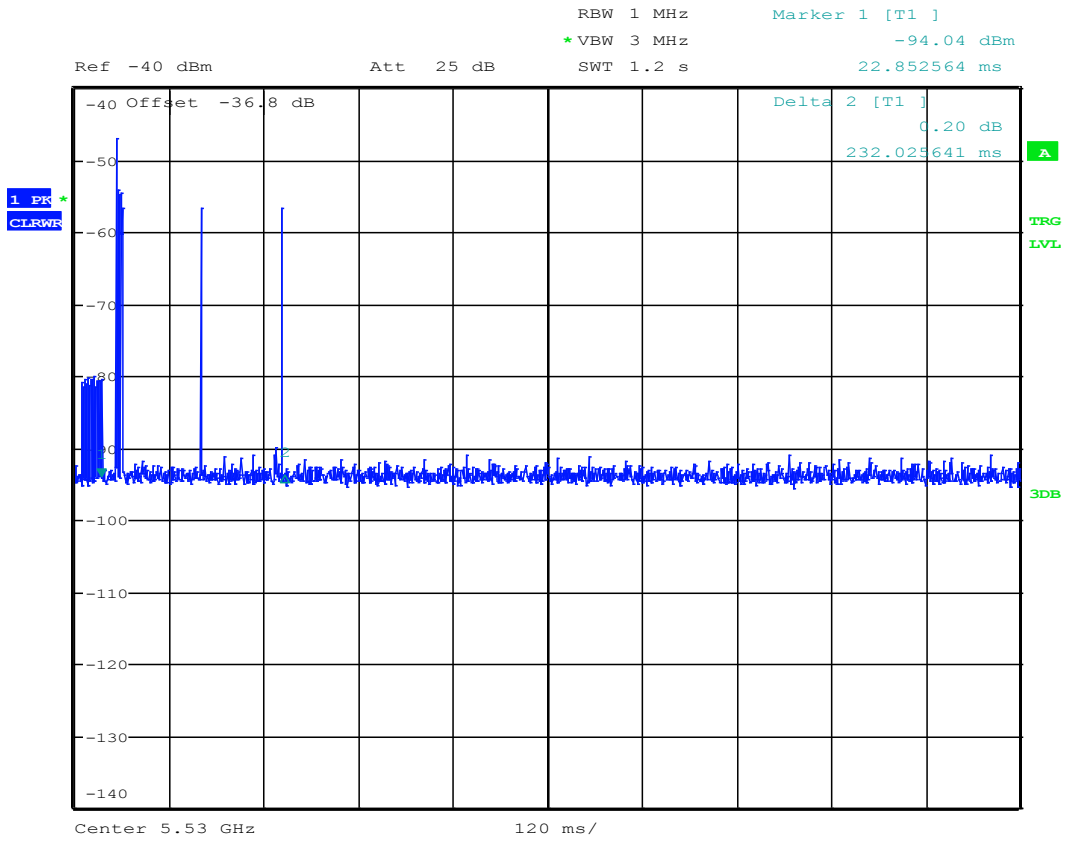
Frequency	Bandwidth	Measured Value	Limit Requirements	Results
5530 MHz	80 MHz	219.84 ms	10 s	Pass

4.8.2 Test Results Channel Close Time



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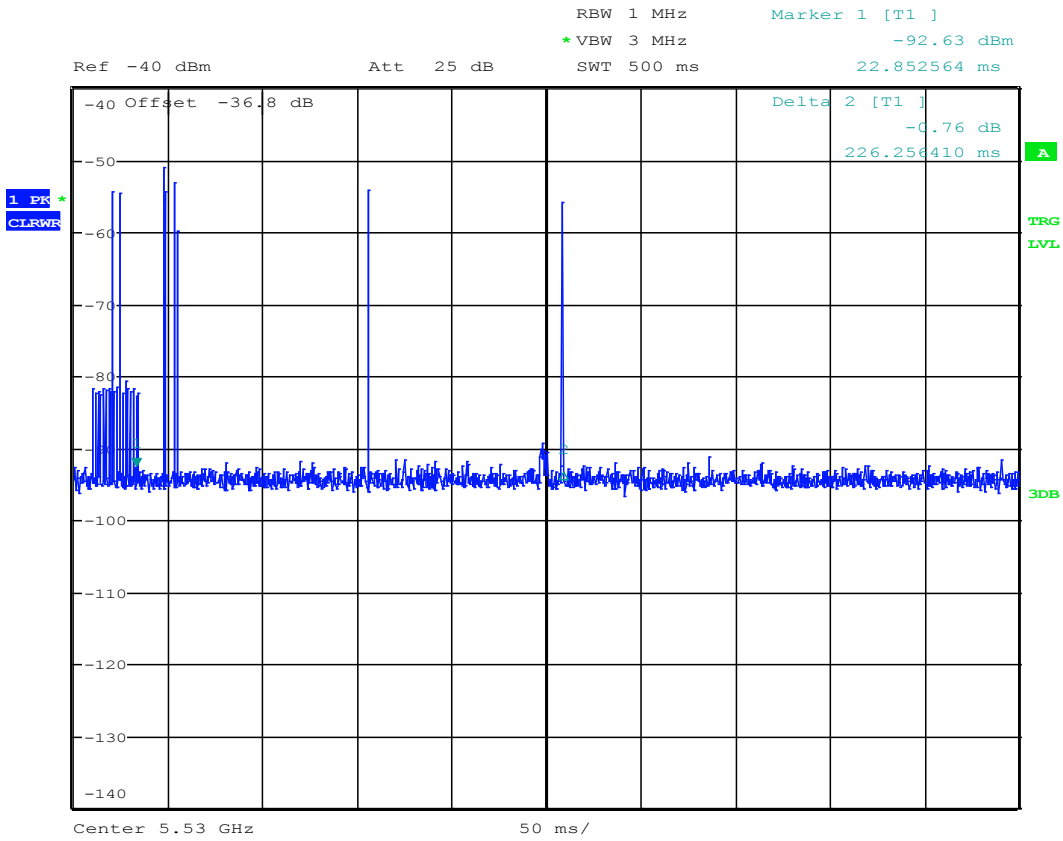
4.8.2 Test Results Channel Close Time (Continued)



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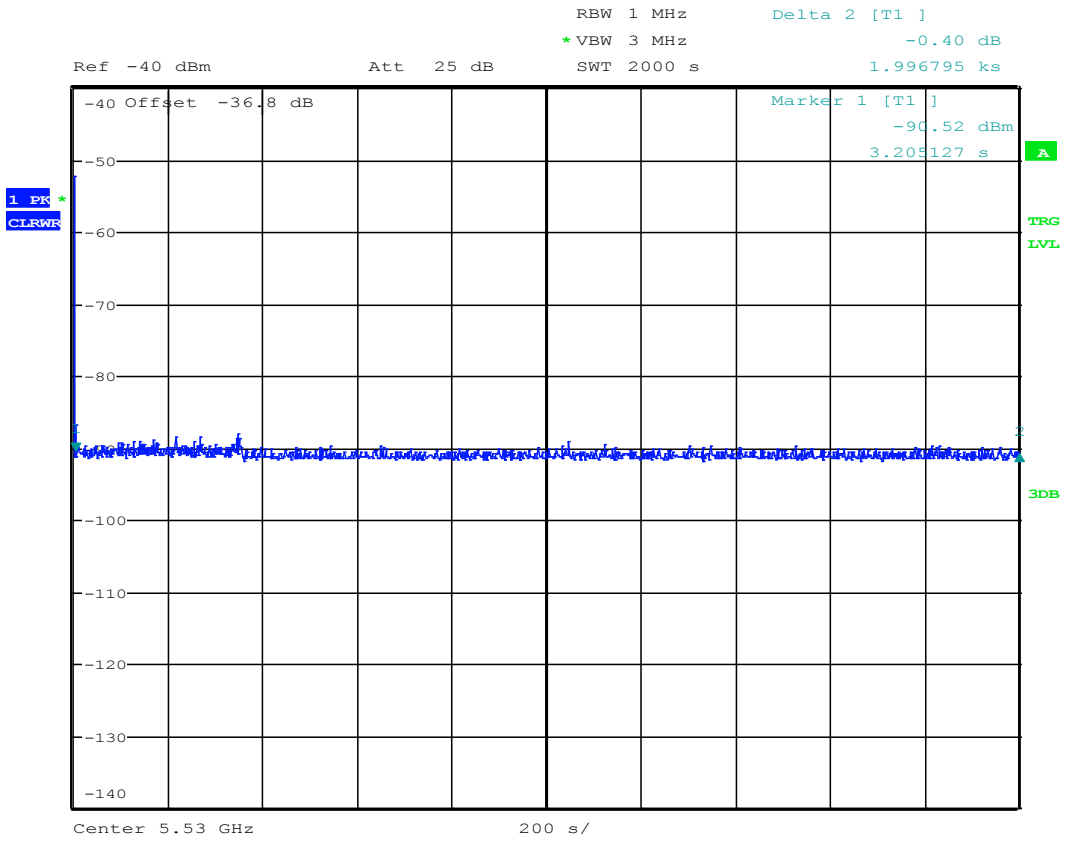
Frequency	Bandwidth	Measured Value	Limit Requirements	Results
5530 MHz	80 MHz	232 ms	260 ms	Pass

4.8.3 Test Results Non-Occupancy Period



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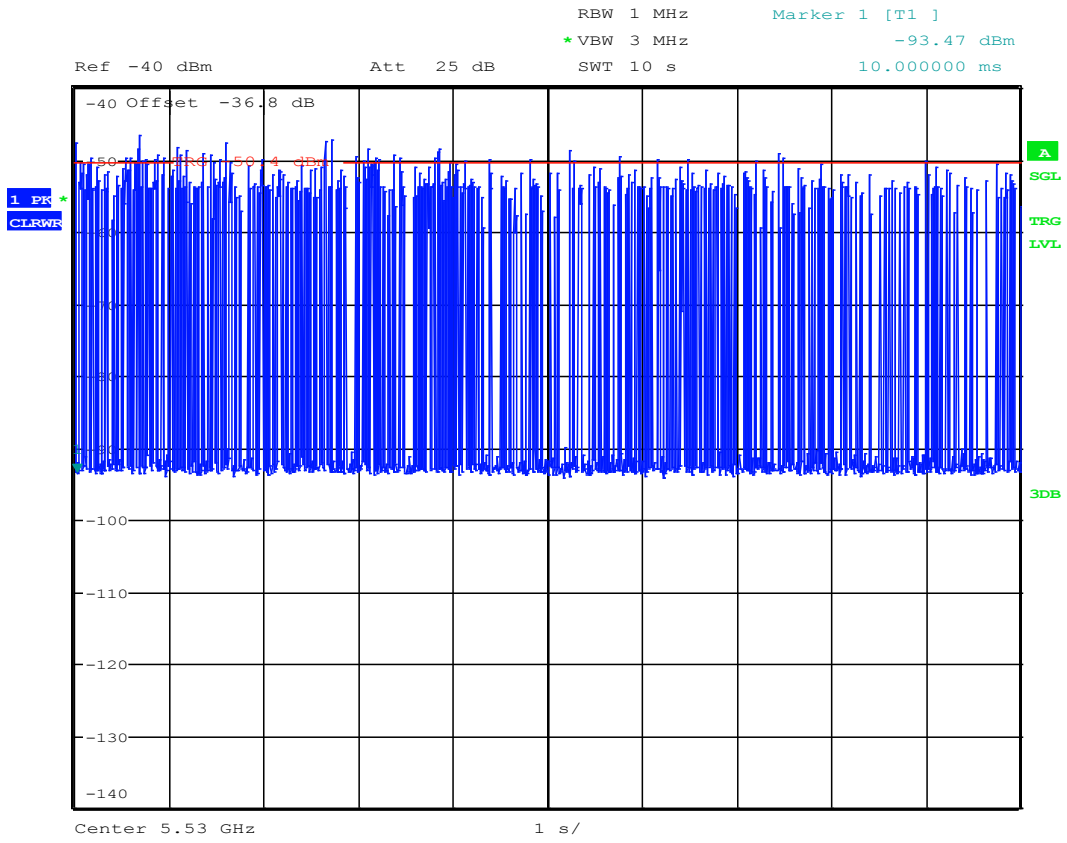
Frequency	Bandwidth	Measured Value	Limit Requirements	Results
5530 MHz	80 MHz	> 30min	30min	Pass

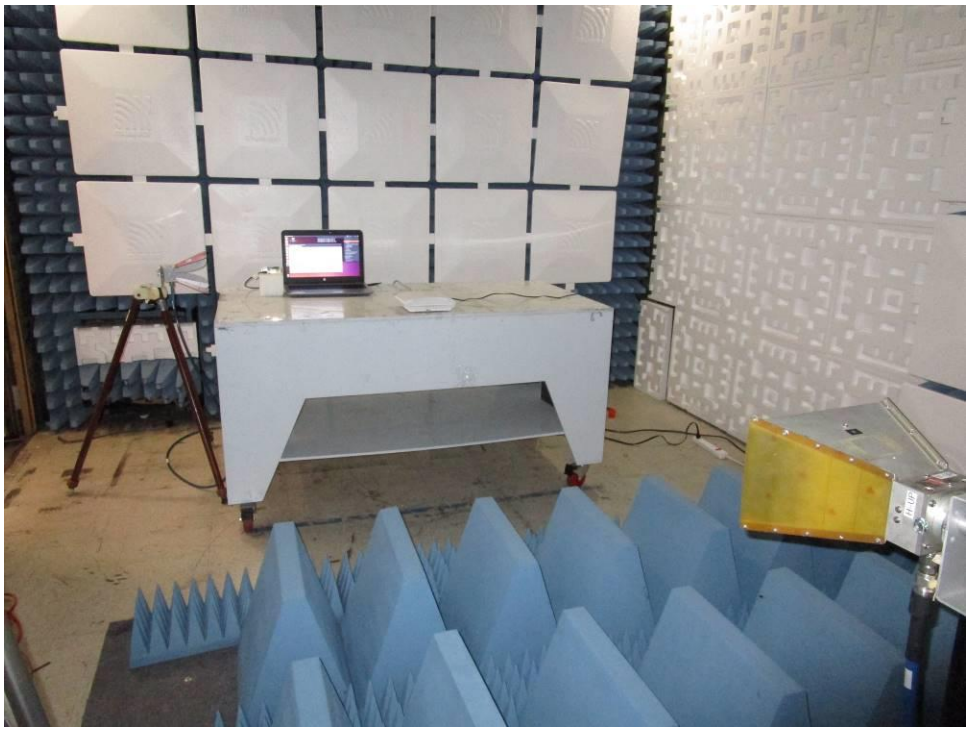
4.8.4 Test Results Channel Loading



Date: 20.NOV.2017 11:08:15

Frequency	Bandwidth	Requirements	Results
5530 MHz	80 MHz	>17 %	Pass

4.8.5 Test Setup



4.9 Statistical Performance Check

4.9.1 Test Procedure

The EUT was configured to communicate with a client device. The MPEG test file was streamed from the Master (EUT) to the Client on the selected test channel. Channel move was disabled. Measurements were made while utilizing all the bandwidths of the EUT.

Short Pulse Radar Test
Once the performance requirements check is complete, statistical data was gathered, to determine the ability of the device to detect the radar test waveforms (Short Pulse Radar Types 1-4). The percentage of successful detection is calculated. In addition, an aggregate minimum percentage of successful detection across all Short Pulse Radar Types 1-4 is calculated.

Long Pulse Radar Test
Statistical data were gathered to determine the ability of the device to detect the Long Pulse Radar Type 5. Three subsets of trials were performed with a minimum of ten trials per subset. The subset of trials differ in where the Long Pulse Type 5 Signal is tuned in frequency:

For subset case 1: the center frequency of the signal generator will remain fixed at the center of the UUT Channel.

For subset case 2: to retain 90% frequency overlap between the radar signal and the UUT Occupied Bandwidth, the center frequency of the signal generator will vary for each of the ten trials in subset case 2. The center frequency of the signal generator for each trial is calculated by:
$FL+(0.4*Ch\ irp\ Width\ \ [in\ MHz])$

For subset case 3: to retain 90% frequency overlap between the radar signal and the UUT Occupied Bandwidth, the center frequency of the signal generator will vary for each of the ten trials in subset case 3. The center frequency of the signal generator for each trial is calculated by:
$FH-(0.4*Ch\ irp\ Width\ \ [in\ MHz])$

Frequency Hopping Radar Test
Statistical data will be gathered to determine the ability of the device to detect the Frequency Hopping radar test signal (radar type 6).

4.9.2 Test Results

Not Applicable – EUT is a client without DFS detection capabilities.

5.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model/Type	Asset #	Cal Int	Cal Due
Spectrum Analyzer	Rohde and	FSU	00913	12	01/12/18
RF Cable	Megaphase	EMC1-K1K1-236	01538	12	06/13/18
RF Cable	Megaphase	TM40-K1K1-19	01154	12	01/26/18
RF Cable	Megaphase	TM40-K1K1-59 RF	01156	12	01/26/18
Signal Generator	Rohde and	SMU 200A	00880	12	10/16/18
Horn Antenna	ETS-Lindgren	3117	01325	12	09/26/18
Horn Antenna	EMCO	3115	01595	12	02/13/18
Pre-Amplifier (1-18GHz)	Miteq	AMF-4D-001180-24-10P	00526	12	01/04/18

Software used for emission compliance testing utilized the following:

Name	Manufacturer	Version	Template/Profile
RS Commander	Rohde Schwarz	1.9.3, 1.16.2017	Not Applicable (Screen grabber)
K6 Pulse Sequencer	Rohde Schwarz	4.1, 9.29.2014	FCC0696-Type1-4

6.0 Document History

Revision/ Job Number	Writer Initials	Reviewer Initials	Date	Change
1.0 / G103176725	AS	KV	November 22, 2017	Original document