

DFS TEST REPORT

REPORT NO.: RF991224C08A-1

MODEL NO.: APL23-081

FCC ID: QWU-081

RECEIVED: Apr. 19, 2011

TESTED: Apr. 29 ~ May 02, 2011

ISSUED: May 02, 2011

APPLICANT: SonicWALL, Inc.

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ISSUED BY: Bureau Veritas Consumer Products Services
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Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	May 02, 2011

1. LAB DECLARATION

PRODUCT: Access Point 802.11 a/b/g/n

MODEL: APL23-081

BRAND: SonicWALL

APPLICANT: SonicWALL, Inc.

TEST SAMPLE: ENGINEERING SAMPLE

TESTED: Apr. 29 ~ May 02, 2011

STANDARDS: FCC Part 15, Subpart E (Section 15.407)
FCC 06-96

The above equipment (Model: APL23-081) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Andrea Hsia , DATE : May 02, 2011
Andrea Hsia / Specialist

APPROVED BY : Gary Chang , DATE : May 02, 2011
Gary Chang / Assistant Manager

2. EUT INFORMATION

2.1 OPERATING FREQUENCY BANDS AND MODE OF EUT

Table 1: Operating frequency bands and mode of EUT.

Operational Mode	Operating Frequency Range	
	5250~5350MHz	5470~5725MHz
Master	✓	✓

The EUT has disabled the 5600 ~ 5650 MHz band

2.2 EUT SOFTWARE AND FIRMWARE VERSION

Table 2: The EUT software/firmware version.

No.	Product	Model No.	Software/Firmware Version
1	Access Point 802.11 a/b/g/n	APL21-081	SonicOS 7.0.1.0-3o

2.3 DESCRIPTION OF AVAILABLE ANTENNAS TO THE EUT

Table 3: Antenna list.

Ant NO.	Antenna	Operation Frequency Range(MHz)	Max. Gain (dBi)
1	Dipole	5250~5350	4
1	Dipole	5470~5725	4

2.4 EUT MAXIMUM AND MINIMUM CONDUCTED POWER

TABLE 4: THE MEASURED CONDUCTED OUTPUT POWER

802.11a

ANT NO.	FREQUENCY BAND (MHz)	MAX. POWER		MIN. POWER	
		OUTPUT POWER(dBm)	OUTPUT POWER(mW)	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
1	5250~5350	19.7	93.9	13.7	23.4
1	5470~5725	16.5	44.6	10.5	11.2

802.11n (20MHz)

ANT NO.	FREQUENCY BAND (MHz)	MAX. POWER		MIN. POWER	
		OUTPUT POWER(dBm)	OUTPUT POWER(mW)	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
1	5250~5350	19.0	79.8	13.0	19.95
1	5470~5725	16.3	42.8	10.3	10.72

802.11n (40MHz)

ANT NO.	FREQUENCY BAND (MHz)	MAX. POWER		MIN. POWER	
		OUTPUT POWER(dBm)	OUTPUT POWER(mW)	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
1	5250~5350	21.3	133.9	15.3	33.88
1	5470~5725	15.8	38.4	9.8	9.55

2.5 EUT MAXIMUM AND MINIMUM E.I.R.P. POWER

TABLE 5: THE E.I.R.P OUTPUT POWER LIST

802.11a

ANT NO.	FREQUENCY BAND (MHz)	MAX. POWER		MIN. POWER	
		OUTPUT POWER(dBm)	OUTPUT POWER(mW)	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
1	5250~5350	23.7	234.4	17.7	58.9
1	5470~5725	20.5	112.2	14.5	28.2

802.11n (20MHz)

ANT NO.	FREQUENCY BAND (MHz)	MAX. POWER		MIN. POWER	
		OUTPUT POWER(dBm)	OUTPUT POWER(mW)	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
1	5250~5350	23.0	200.5	17.0	50.12
1	5470~5725	20.3	107.4	14.3	26.92

802.11n (40MHz)

ANT NO.	FREQUENCY BAND (MHz)	MAX. POWER		MIN. POWER	
		OUTPUT POWER(dBm)	OUTPUT POWER(mW)	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
1	5250~5350	25.3	336.3	19.3	85.11
1	5470~5725	19.8	96.4	13.8	23.99

NOTE: EIRP is > 23dBm so detection threshold is -64dBm + 4dB = -60dBm

3. U-NII DFS RULE REQUIREMENTS

3.1 WORKING MODES AND REQUIRED TEST ITEMS

The manufacturer shall state whether the EUT is capable of operating as a Master and/or a Client. If the EUT is capable of operating in more than one operating mode then each operating mode shall be tested separately. See tables 1 and 2 for the applicability of DFS requirements for each of the operational modes.

Table 6: Applicability of DFS requirements prior to use a channel

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

Table 7: Applicability of DFS requirements during normal operation.

Requirement	Operational Mode		
	Master	Client without radar detection	Client with radar detection
DFS Detection Threshold	✓	Not required	✓
Channel Closing Transmission Time	✓	✓	✓
Channel Move Time	✓	✓	✓
U-NII Detection Bandwidth	✓	Not required	✓

3.2 TEST LIMITS AND RADAR SIGNAL PARAMETERS

DETECTION THRESHOLD VALUES

Table 8: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection.

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.

Table 9: DFS Response Requirement Values

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.
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.

PARAMETERS OF DFS TEST SIGNALS

Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Table 10: 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

Table 11: Long Pulse Radar Test Waveform

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

Table 12: 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

4. TEST & SUPPORT EQUIPMENT LIST

4.1 TEST INSTRUMENTS

Table 1: Test instruments list.

DESCRIPTION & MANUFACTURER	MODEL NO.	BRAND	CALIBRATED UNTIL
R&S Spectrum analyzer	FSP40	R&S	Jul. 16, 2011
Signal generator	8645A	Agilent	Jun. 07, 2011
Oscilloscope	TDS 5104	Tektronix	Sep. 02, 2011
Control PC	Pavilion a320d	HP	--

4.2 DESCRIPTION OF SUPPORT UNITS

TABLE 2: SUPPORT UNIT INFORMATION.

No.	Product	Brand	Model No.	ID	Spec.
1	IEEE 802.11a/b/g/n Cardbus	ATHEROS	AR5BCB-0072TA	PPD-AR5BCB-00072	

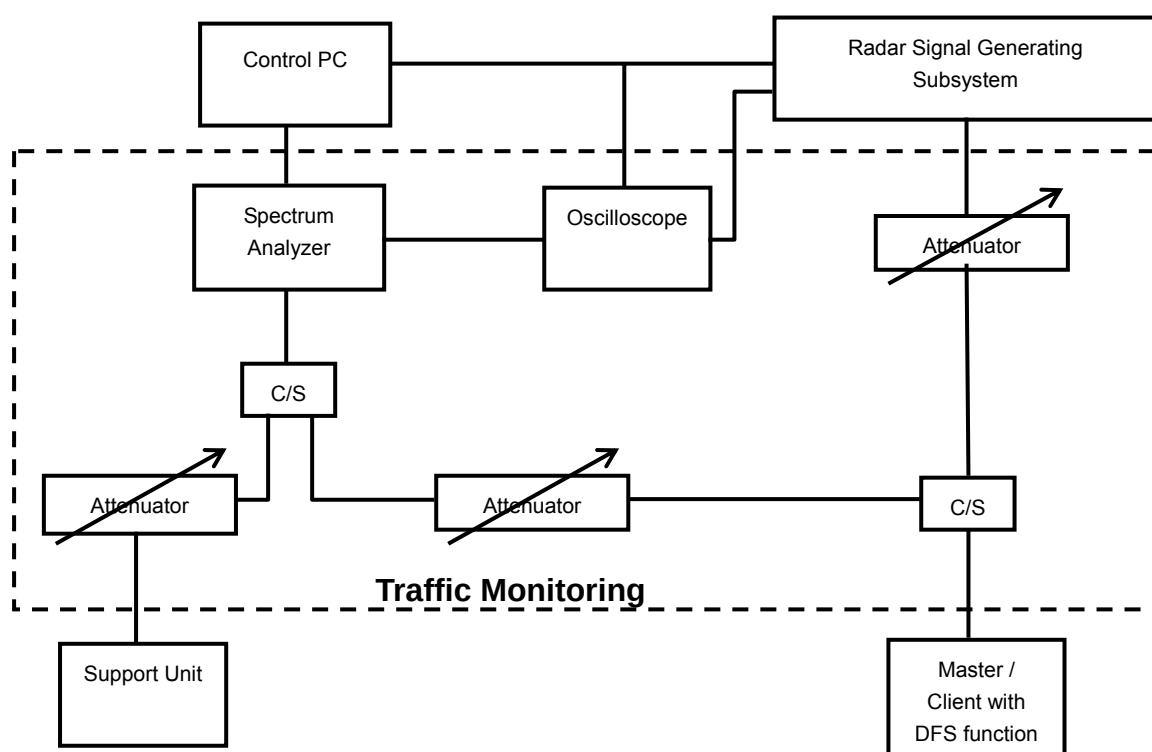
Note: This device was functioned as a ☐Master ☒Slave device during the DFS test.

5. TEST PROCEDURE

5.1 ADT DFS MEASUREMENT SYSTEM:

A complete ADT DFS Measurement System consists of two subsystems: (1) the Radar Signal Generating Subsystem and (2) the Traffic Monitoring Subsystem. The control PC is necessary for generating the Radar waveforms in Table 10, 11 and 12. The traffic monitoring subsystem is specified to the type of unit under test (EUT).

Conducted setup configuration of ADT DFS Measurement System



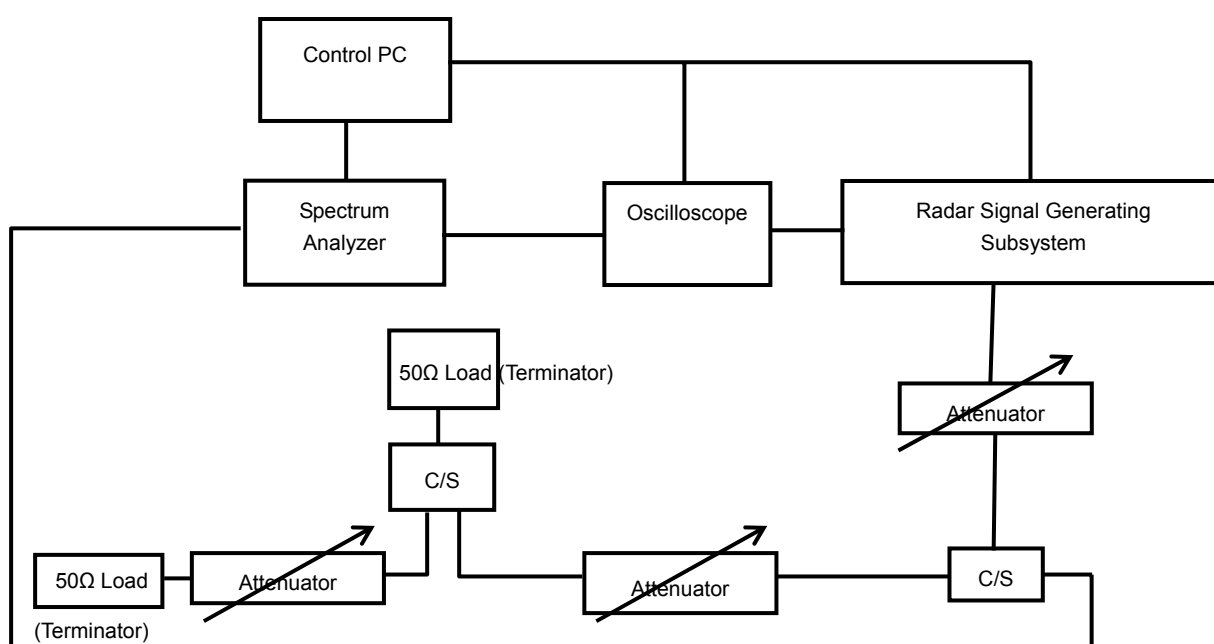
The test transmission will always be from the Master Device to the Client Device. While the Client device is set up to associate with the Master device and play the MPEG file (6 $\frac{1}{2}$ Magic Hours) from Master device, the designated MPEG test file and instructions are located at:

<http://ntiacsd.ntia.doc.gov/dfs/>.

5.2 CALIBRATION OF DFS DETECTION THRESHOLD LEVEL:

The measured channel is 5500MHz and 5510MHz, The radar signal was the same as transmitted channels, and injected into the antenna port of AP (master) or Client Device with Radar Detection, measured the channel closing transmission time and channel move time. The Master minimum antenna gain is 4.0 dBi, and required detection threshold is -60dBm.

Conducted setup configuration of Calibration of DFS Detection Threshold Level

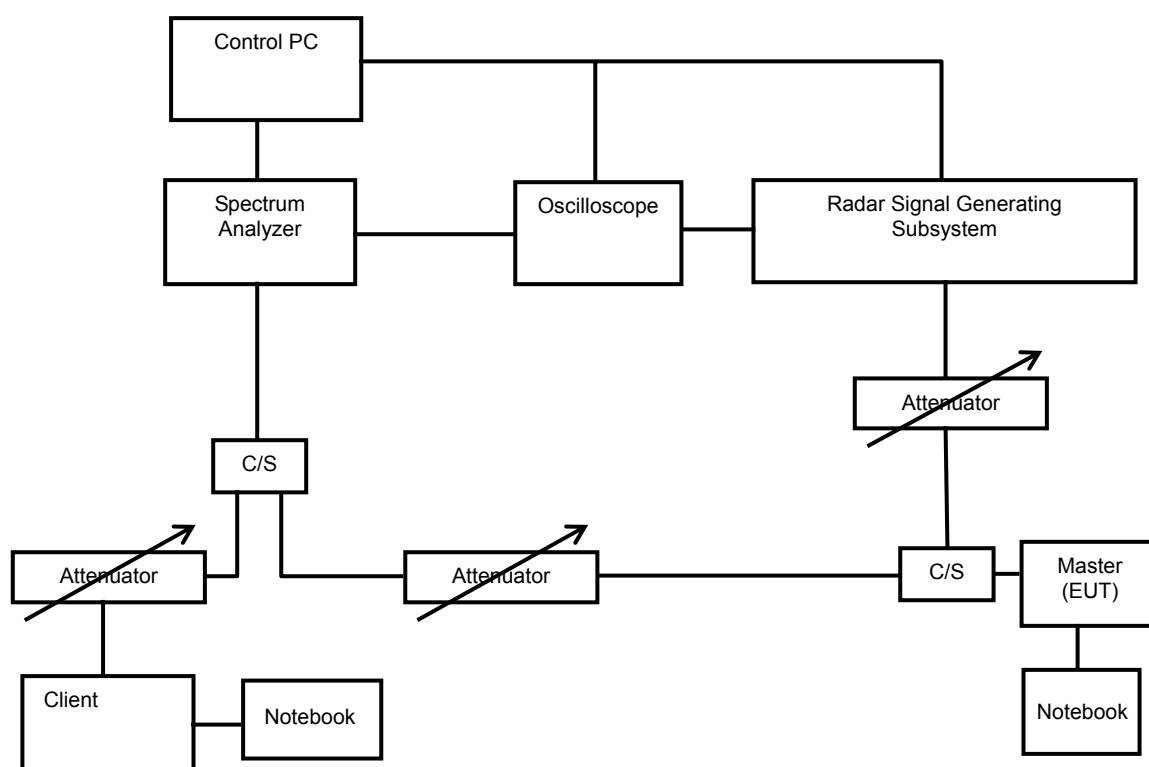


5.3 DEVIATION FROM TEST STANDARD

No deviation.

5.4 CONDUCTED TEST SETUP CONFIGURATION

5.4.1 MASTER MODE



The EUT is a U-NII Device operating in Master mode. The radar test signals are injected into the Master Device.

6. TEST RESULTS

6.1 SUMMARY OF TEST RESULT

Clause	Test Parameter	Remarks	Pass/Fail
15.407	DFS Detection Threshold	Applicable	Pass
15.407	U-NII Detection Bandwidth	Applicable	Pass
15.407	Channel Availability Check Time	Applicable	Pass
15.407	Channel Move Time	Applicable	Pass
15.407	Channel Closing Transmission Time	Applicable	Pass
15.407	Non- Occupancy Period	Applicable	Pass
15.407	Uniform Spreading	Applicable	Pass

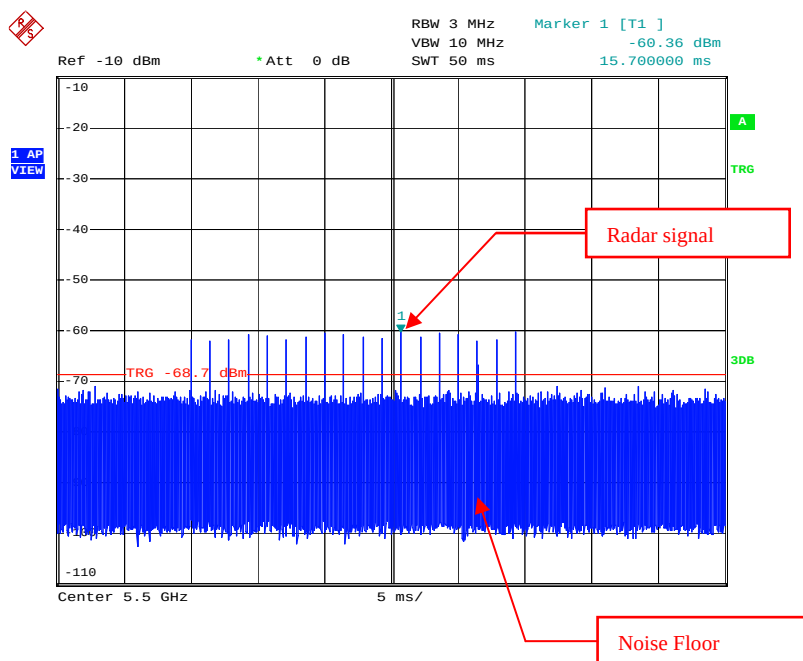
6.2 DETELED TEST RESULTS

6.2.1 TEST MODE: DEVICE OPERATING IN MASTER MODE.

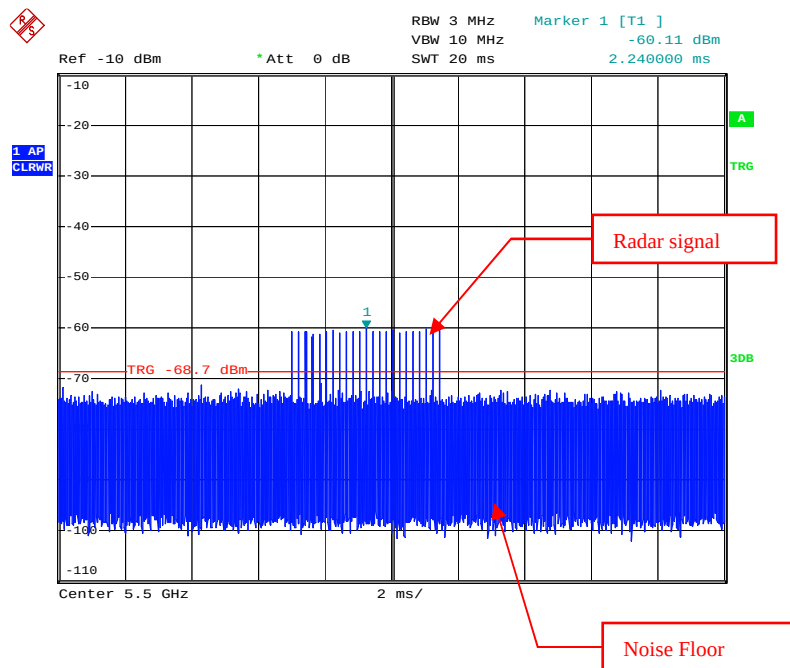
Radar Test Waveforms are injected into the Master.

DFS DETECTION THRESHOLD

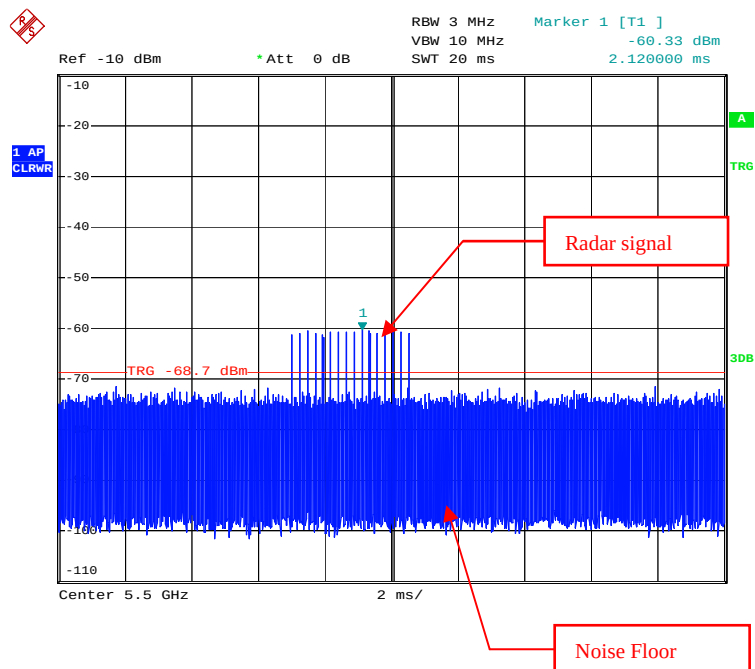
EIRP of EUT is higher than 23dBm and gain is 4dBi (Refer to section 2.1). Detection thresholds is $-64\text{dBm} + 4\text{dBi} = -60\text{dBm}$



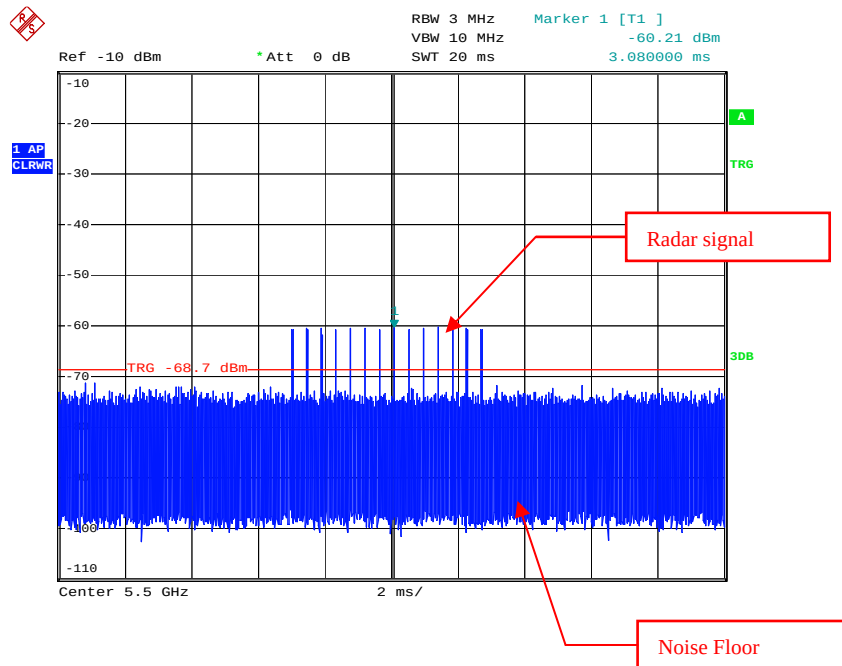
Radar Signal 1



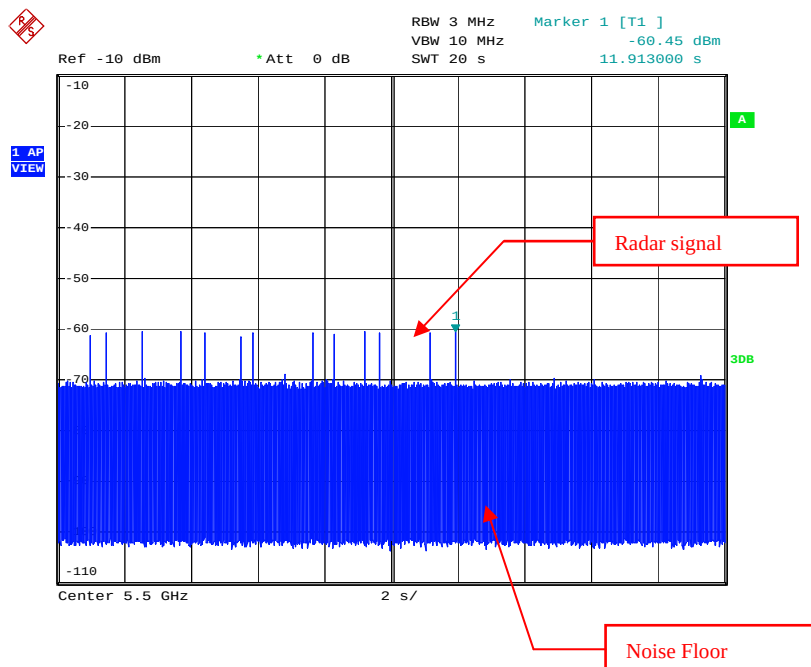
Radar Signal 2



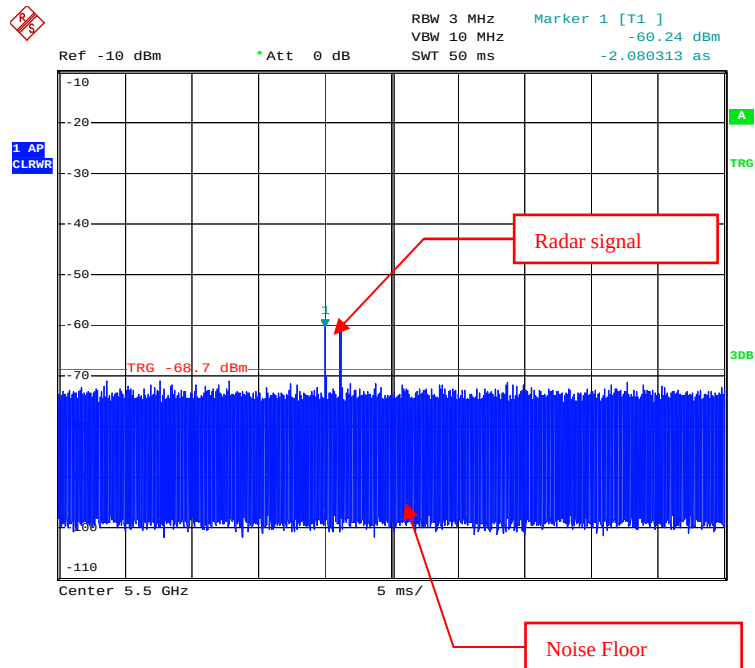
Radar Signal 3



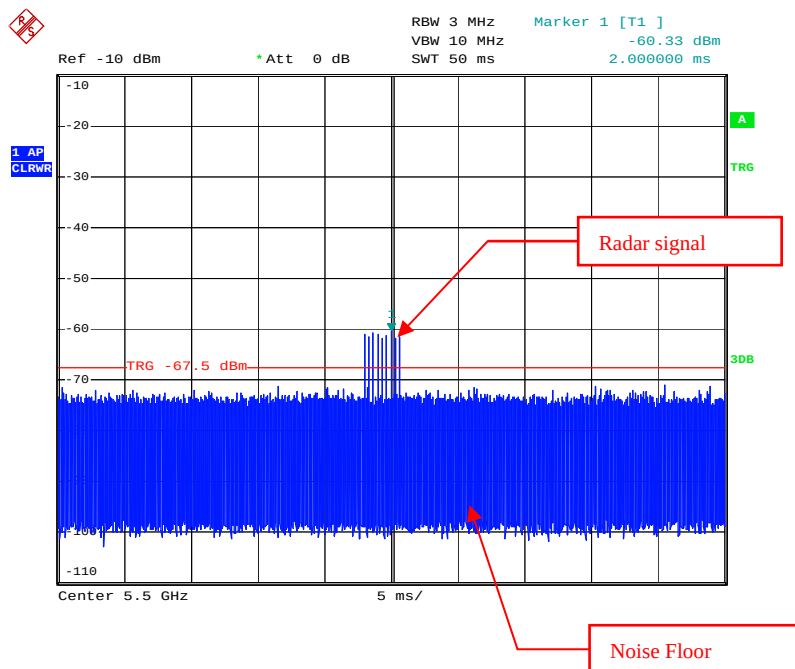
Radar Signal 4



Radar Signal 5



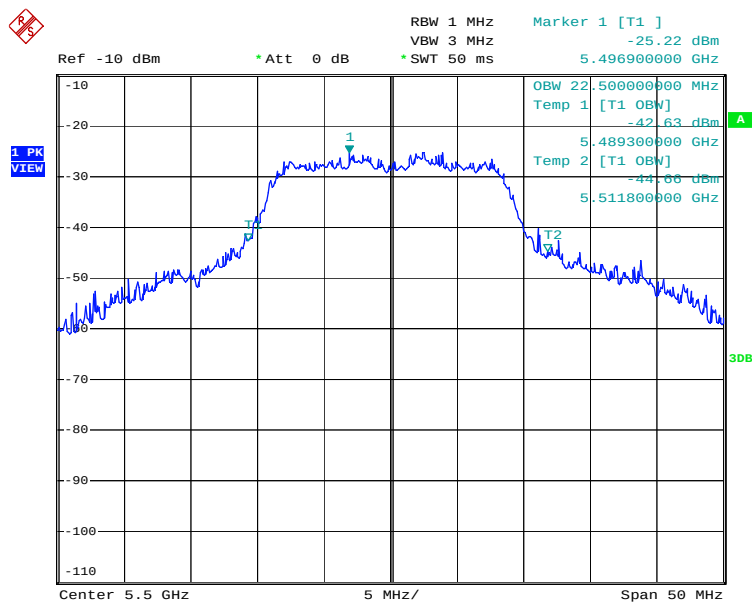
Single Burst of Radar Signal 5



Radar Signal 6

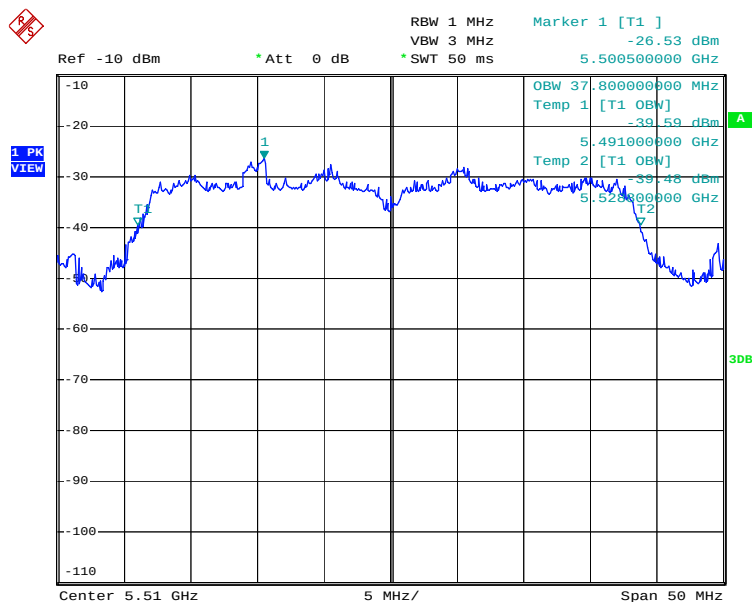
6.2.2 U-NII DETECTION BANDWIDTH

802.11n (20MHz)



U-NII 99% Channel bandwidth

802.11n (40MHz)



U-NII 99% Channel bandwidth

Detection Bandwidth Test - IEEE 802.11N 20MHz											
EUT Frequency: 5500MHz											
EUT 99% Power bandwidth: 22.5MHz											
Detection bandwidth limit (80% of EUT 99% Power bandwidth): 18MHz											
Detection bandwidth (5510(FH) – 5490(FL)) : 20 MHz											
Test Result : PASS											
Radar Frequency (MHz)	Trial Number / Detection										Detection Rate (%)
	1	2	3	4	5	6	7	8	9	10	
5489	N	N	N	N	N	N	N	N	N	N	0
5490(FL)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5491	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5492	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5493	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5494	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5495	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5496	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5497	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5498	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5499	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5500	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5501	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5502	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5503	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5504	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5505	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5506	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5507	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5508	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5509	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5510(FL)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5511	N	N	N	N	N	N	N	N	N	N	0



A D T

Detection Bandwidth Test - IEEE 802.11N 40MHz**EUT Frequency: 5510MHz****EUT 99% Power bandwidth: 37.8MHz****Detection bandwidth limit (80% of EUT 99% Power bandwidth): 30.24MHz****Detection bandwidth (5530(FH) – 5490(FL)) : 40MHz****Test Result : PASS**

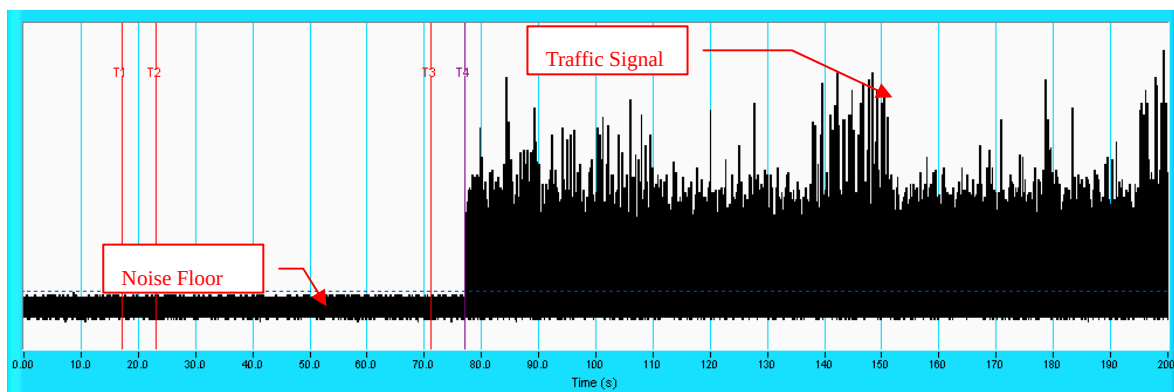
Radar Frequency (MHz)	Trial Number / Detection										Detection Rate (%)
	1	2	3	4	5	6	7	8	9	10	
5489	N	N	N	N	N	N	N	N	N	N	0
5490(FL)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5491	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5492	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5493	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5494	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5495	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5496	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5497	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5498	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5499	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5500	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5501	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5502	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5503	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5504	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5505	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5506	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5507	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5508	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5509	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5510	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5511	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5512	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5513	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5514	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5515	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5516	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5517	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5518	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5519	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5520	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5521	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5522	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5523	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5524	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5525	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5526	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5527	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5528	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5529	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5530(FH)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5531	N	N	N	N	N	N	N	N	N	N	0

6.2.3 CHANNEL AVAILABILITY CHECK TIME

If the EUT successfully detected the radar burst, it should be observed as the EUT has no transmissions occurred until the EUT starts transmitting on another channel.

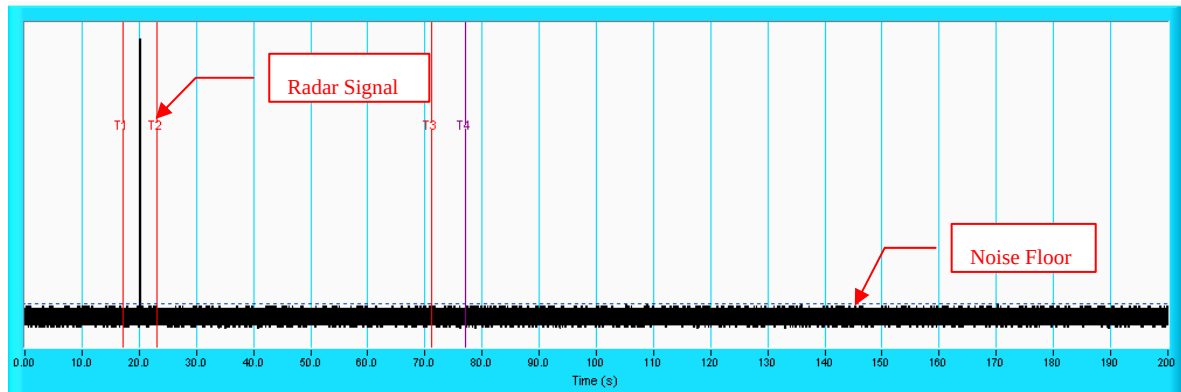
Timing of Radar Signal	Observation	
	EUT	Spectrum Analyzer
Within 1 to 6 second	Detected	No transmissions
Within 54 to 60 second	Detected	No transmissions

Initial Channel Availability Check Time



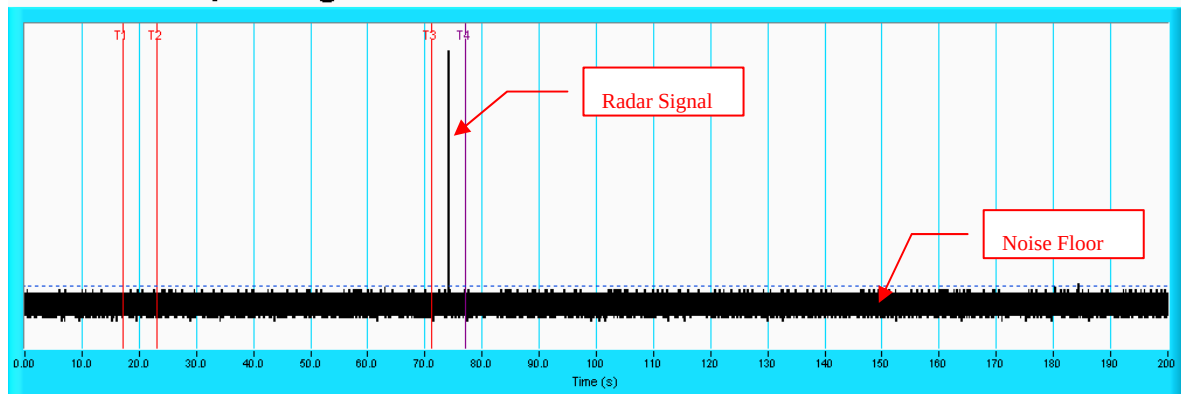
NOTE: T1 denotes the end of power-up time period is 17 second. T4 denotes the end of Channel Availability Check time is 77 second. Channel Availability Check time is equal to (T4 – T1) 60 seconds.

Radar Burst at the Beginning of the Channel Availability Check Time



NOTE: T1 denotes the end of power up time period is 17 second. T2 denotes 23 second , the radar burst was commenced within a 6 second window starting from the end of power-up sequence. T4 denotes the 77 second.

Radar Burst at the End of the Channel Availability Check Time

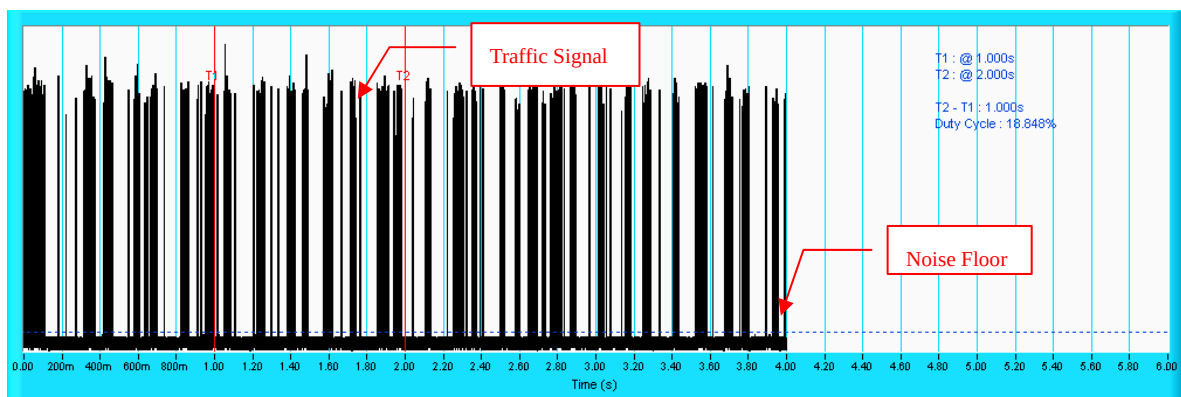


NOTE: T1 denotes the end of power up time period is 17 second. T3 denotes 71 second and radar burst was commenced within 54th second to 60th second window starting from the end of power-up sequence. T4 denotes the 77 second.

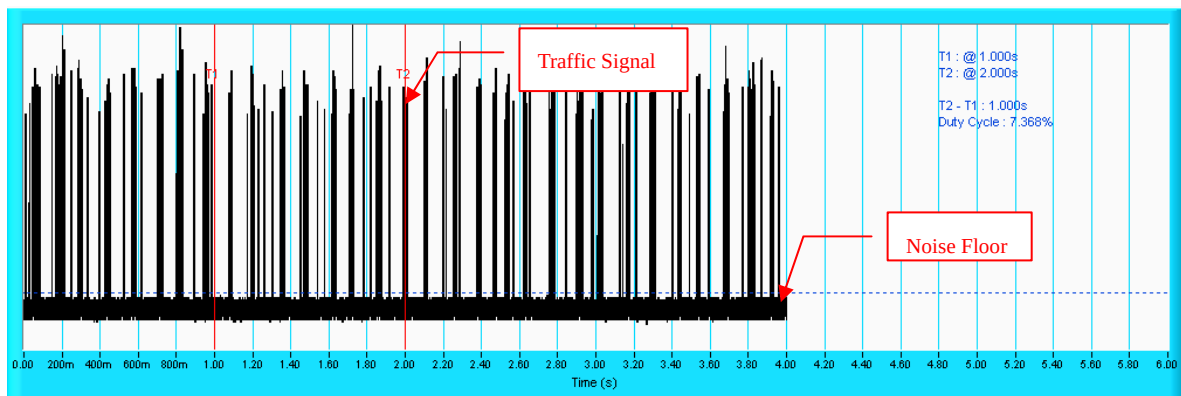
6.2.4 CHANNEL CLOSING TRANSMISSION AND CHANNEL MOVE TIME

Wireless Traffic Loading

IEEE 802.11N 20MHz



IEEE 802.11N 40MHz



IEEE 802.11N 20MHz

Table 1: Short Pulse Radar Test Waveforms.

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Number of Trials(Times)	Percentage of Successful Detection (%)
1	1	1428	18	30	100
2	1-5	150-230	23-29	30	76.7
3	6-10	200-500	16-18	30	83.3
4	11-20	200-500	12-16	30	90
Aggregate (Radar Types 1-4)				120	87.5

Table 2: Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Number of Trials(Times)	Percentage of Successful Detection (%)
5	50-100	5-20	1000-2000	1-3	8-20	30	90

Table 3: Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Number of Trials(Times)	Percentage of Successful Detection (%)
6	1	333	9	0.333	300	30	100

The Detailed Radar pattern and Statistical Performance showed in Annex A.

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Table 1: Short Pulse Radar Test Waveforms.

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Number of Trials(Times)	Percentage of Successful Detection (%)
1	1	1428	18	30	96.7
2	1-5	150-230	23-29	30	76.7
3	6-10	200-500	16-18	30	86.7
4	11-20	200-500	12-16	30	83.3
Aggregate (Radar Types 1-4)				120	93.3

Table 2: Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Number of Trials(Times)	Percentage of Successful Detection (%)
5	50-100	5-20	1000-2000	1-3	8-20	30	96.7

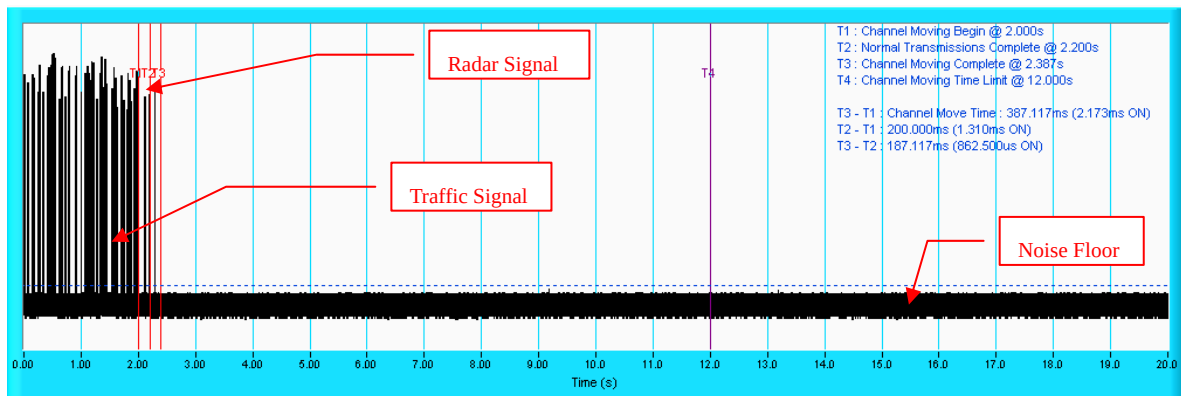
Table 3: Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Number of Trials(Times)	Percentage of Successful Detection (%)
6	1	333	9	0.333	300	30	100

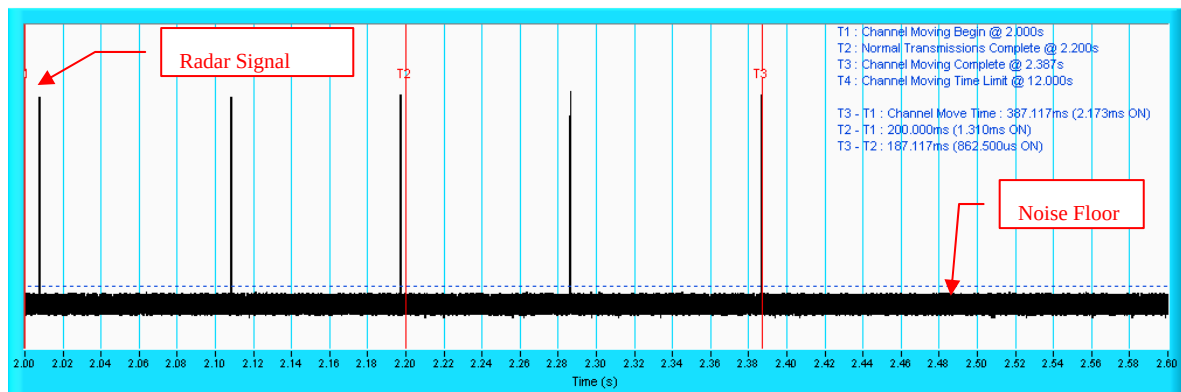
The Detailed Radar pattern and Statistical Performance showed in Annex A.

Radar signal 1

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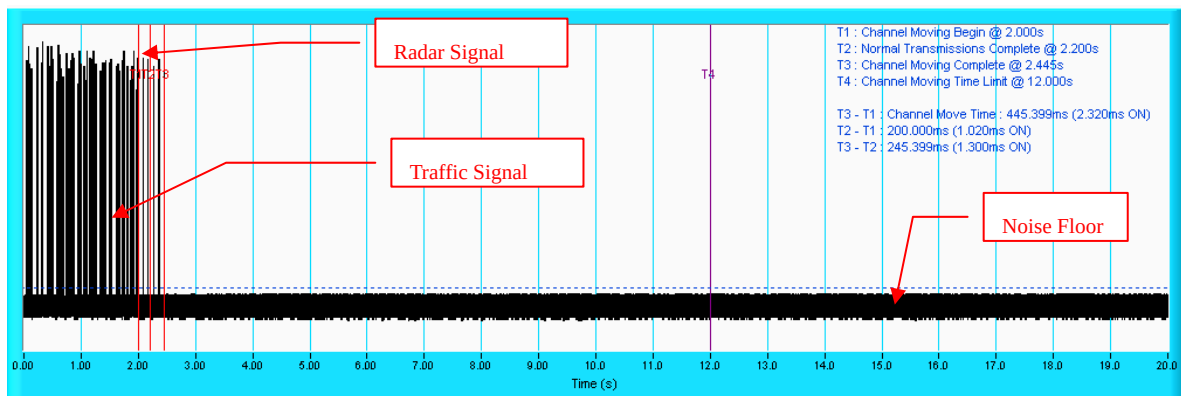
NOTE: T1 denotes the start of Channel Move Time upon the end of the last Radar burst. T2 denotes the data transmission time of 200ms from T1. T3 denotes the end of Channel Move Time. T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



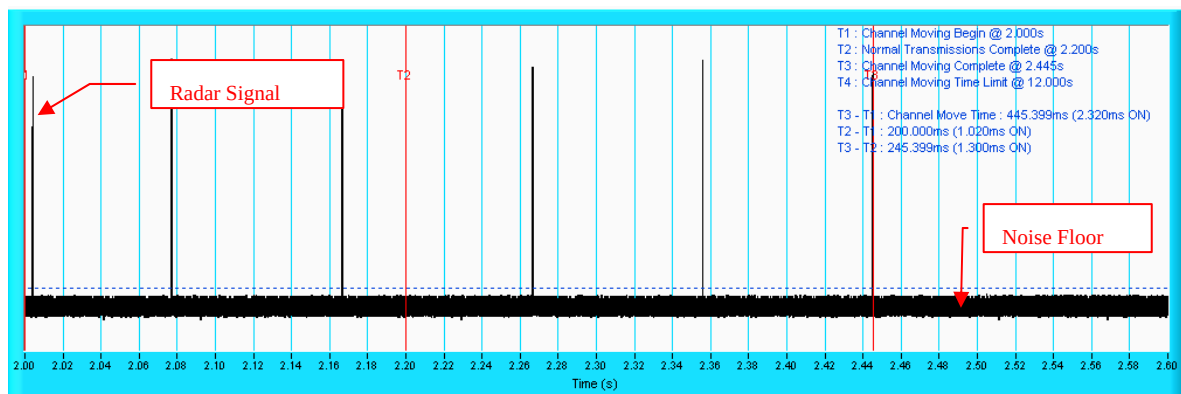
Note: Room-in of the first 600ms after radar signal applied.

Radar signal 2

IEEE 802.11N 20MHz



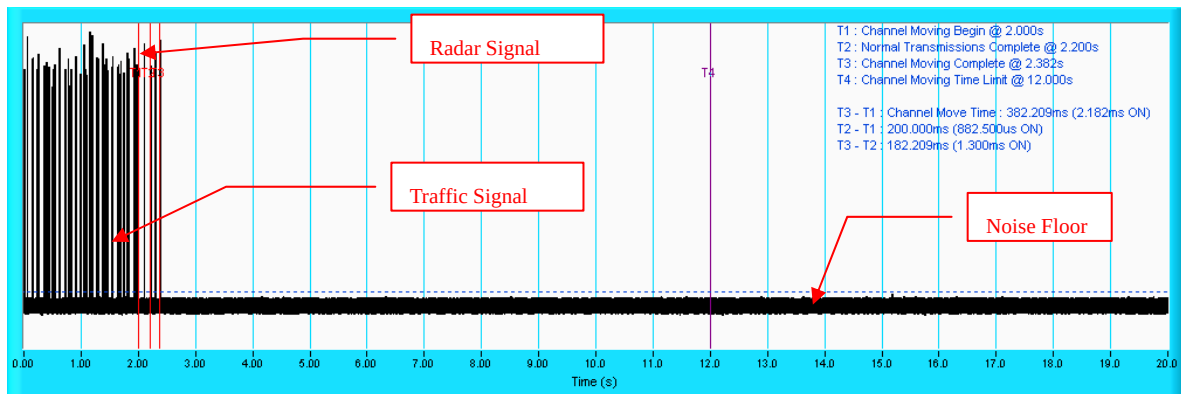
NOTE: T1 denotes the start of Channel Move Time upon the end of the last Radar burst. T2 denotes the data transmission time of 200ms from T1. T3 denotes the end of Channel Move Time. T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



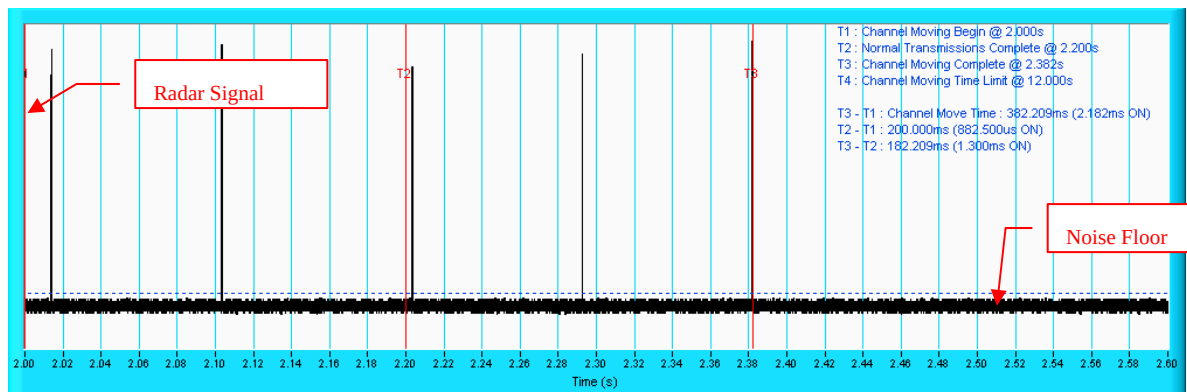
Note: Room-in of the first 600ms after radar signal applied.

Radar signal 3

IEEE 802.11N 20MHz



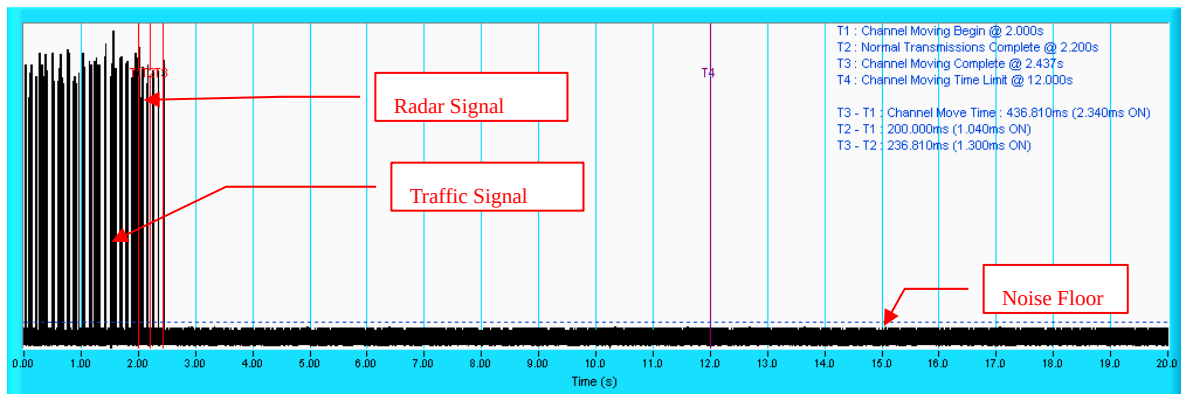
NOTE: T1 denotes the start of Channel Move Time upon the end of the last Radar burst. T2 denotes the data transmission time of 200ms from T1. T3 denotes the end of Channel Move Time. T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



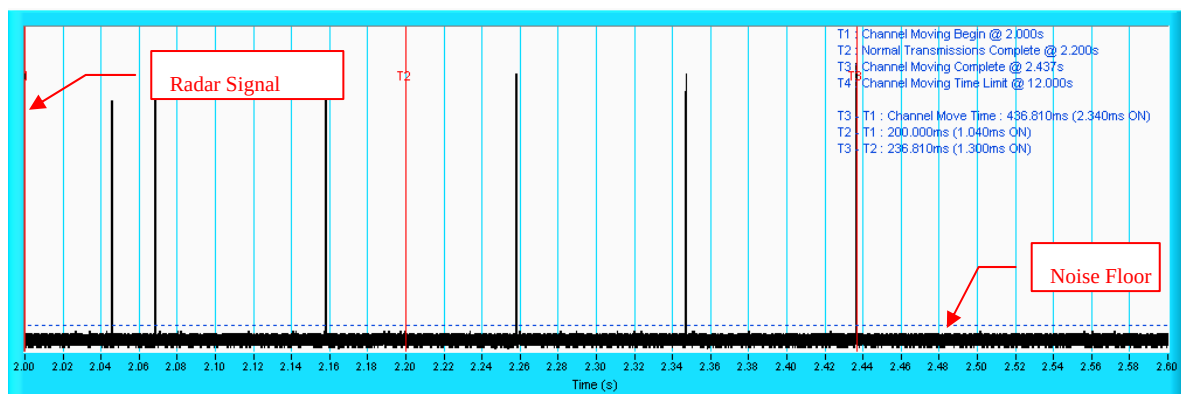
Note: Room-in of the first 600ms after radar signal applied.

Radar signal 4

IEEE 802.11N 20MHz



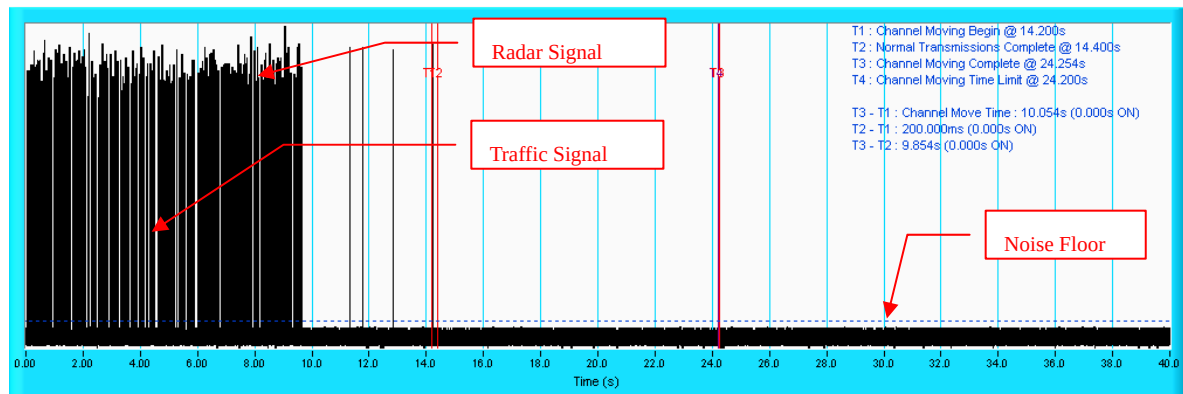
NOTE: T1 denotes the start of Channel Move Time upon the end of the last Radar burst. T2 denotes the data transmission time of 200ms from T1. T3 denotes the end of Channel Move Time. T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



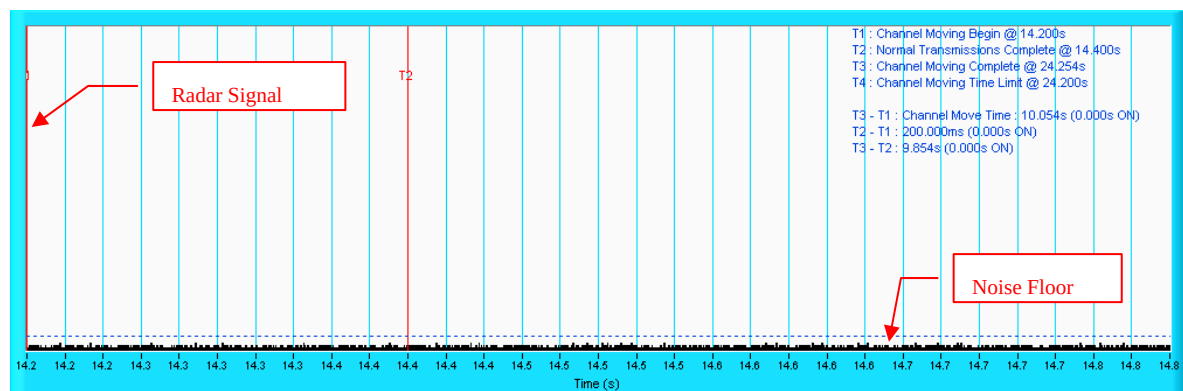
Note: Room-in of the first 600ms after radar signal applied.

Radar signal 5

IEEE 802.11N 20MHz



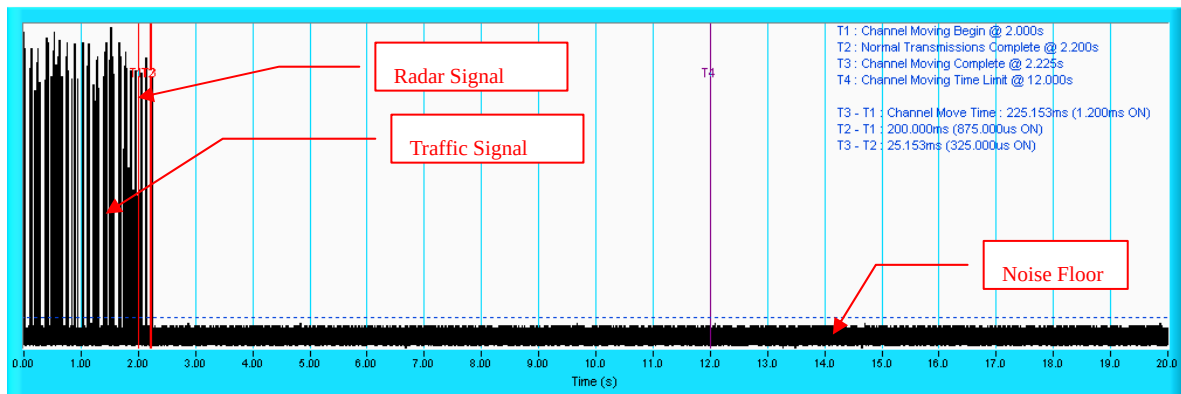
NOTE: T1 denotes the start of Channel Move Time upon the end of the last Radar burst. T2 denotes the data transmission time of 200ms from T1. T3 denotes the end of Channel Move Time. T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



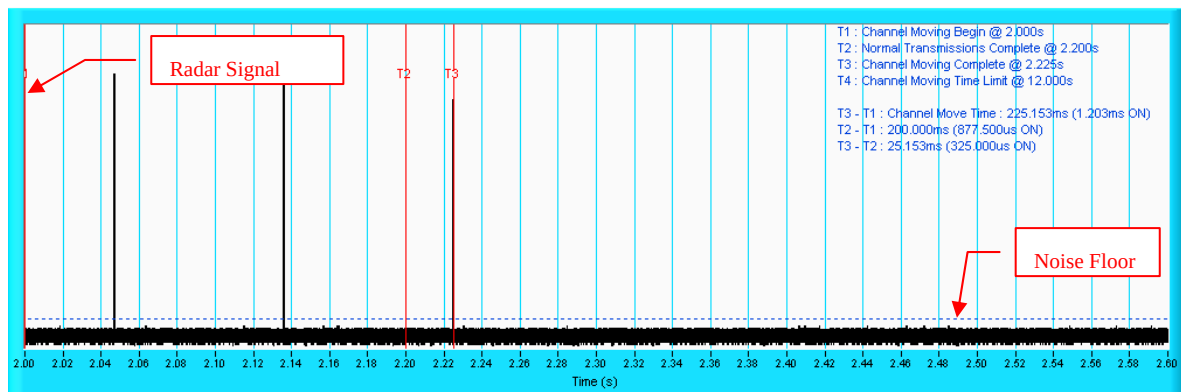
Note: Room-in of the first 600ms after radar signal applied.

Radar signal 6

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NOTE: T1 denotes the start of Channel Move Time upon the end of the last Radar burst. T2 denotes the data transmission time of 200ms from T1. T3 denotes the end of Channel Move Time. T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



Note: Room-in of the first 600ms after radar signal applied.

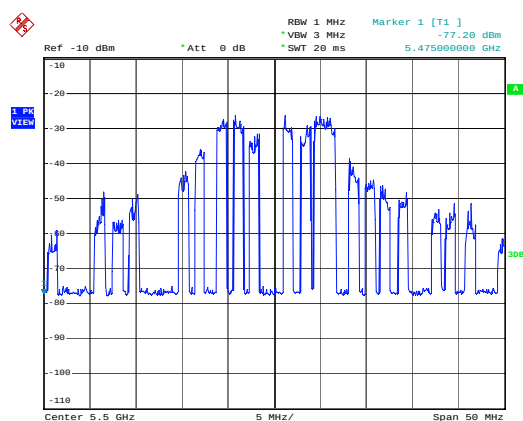
6.2.5 NON- OCCUPANCY PERIOD

Associate test:

During the 30 minutes observation time, EUT did not make any transmissions on a channel after a radar signal was detected on that channel by either the Channel Availability Check or the In-Service Monitoring.

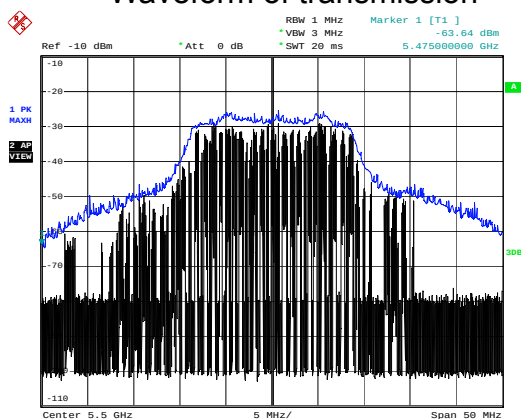
1) EUT links up with Client at 5500MHz.

Waveform of EUT links up with Client



2) Client plays a specified file via master.

Waveform of transmission



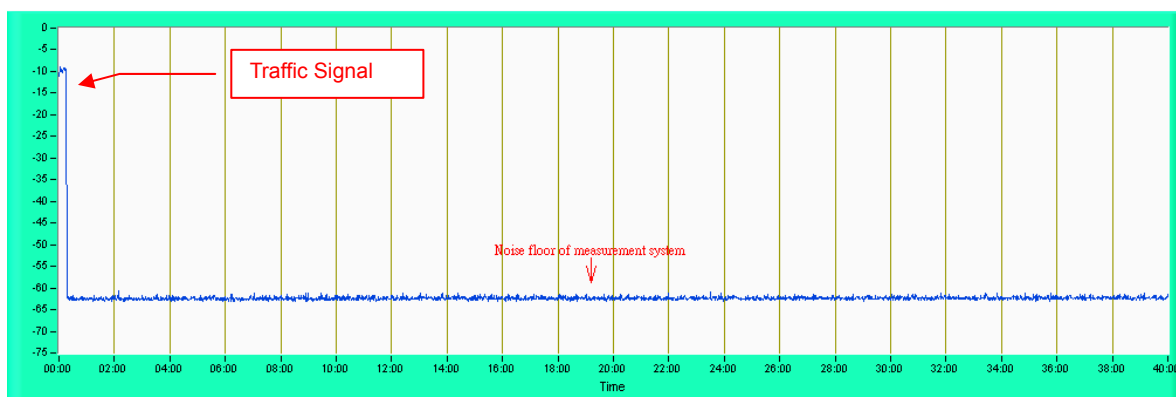
3) Radar 1~6 is used for DFS testing



4) 5500MHz has been monitored in 30 minutes period. In this period, no any transmission occurs.

Plot of 30minutes period

IEEE 802.11n 20MHz



NOTE: Test setup is shown on Test set up photo. pdf

7. TESTING LABORATORIES INFORMATION

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

www.adt.com.tw/index.5.phtml. If you have any comments, please feel free to contact us at the following:

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