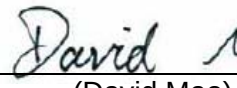
FCC/ IC DFS TEST REPORT

Issued Date	:	Jul. 18, 2012
Project No.	:	1204C047B
Equipment	:	Outdoor Wireless LAN Access Point
Model Name	:	AP6510DN-AGN-US
Applicant	:	Huawei Technologies Co.,Ltd.
Address for FCC	:	Bantian, Longgang District, Shenzhen China
Address for IC	:	Bantian, Longgang District, Shenzhen, 518129 China

Tested by:
Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Apr. 17, 2012
Date of Test: Apr. 17, 2012 ~ Jul. 17, 2012

Testing Engineer : 
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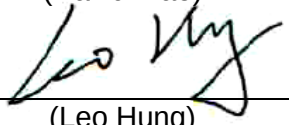
Technical Manager : 
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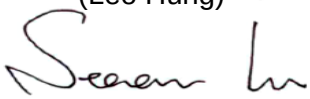
Authorized Signatory : 
(Steven Lu)

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Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**., or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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1. CERTIFICATION

Equipment	:	Outdoor Wireless LAN Access Point
Trade Name		HUAWEI
Model Name.		AP6510DN-AGN-US
Applicant	:	Huawei Technologies Co.,Ltd.
Date of Test:		Apr. 17, 2012 ~ Jul. 17, 2012
Test Item	:	ENGINEERING SAMPLE
Standards	:	FCC Part 15, Subpart E (Section 15.407) FCC 06-96 Canada RSS-210:2010

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FICP-1-1204C047B) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. EUT INFORMATION

2.1 EUT SPECIFICATION TABLE

Table 1: Specification of EUT

Product name	Outdoor Wireless LAN Access Point
Brand Name	HUAWEI
Model	AP6510DN-AGN-US
FCC ID	QISAP6510DN-AGN
IC ID	6369A-AP6510DN
Software Version	V200R001C00B012
Firmware Version	VER.C
Operational Mode	Master
Operating Frequency Range	5260~5320MHz&5500~5700MHz
Modulation	OFDM

Note: This device was functioned as a ■Master ☐Slave device during the DF

Channel List:

802.11a / 802.11n 20M					
Band 2		Band 3			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	100	5500	132	5660
56	5280	104	5520	136	5680
60	5300	108	5540	140	5700
64	5320	112	5560		

802.11n 40M					
Band 2		Band 3			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	102	5510	126	5580
62	5310	110	5550		

2.2 DESCRIPTION OF AVAILABLE ANTENNAS TO THE EUT

Table 2: Antenna list.

Ant.	Brand	Model Name	Antenna Type / Connector	function	Gain (dBi) 5.2GHz
1	LARSEN ANTENNAS	W5030	N Male	TX/RX	6.4
2	LARSEN ANTENNAS	W5030	N Male	TX/RX	6.4

2.3 CONDUCTED OUTPUT POWER AND EIRP POWER

TABLE 3: THE CONDUCTED OUTPUT POWER LIST

TX (11a)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5260~5320	21.05	127.35
5500~5700	21.25	133.35

TX (40MHz)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5260~5320	19.98	99.54
5500~5700	20.02	100.46

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

TABLE 4: THE CONDUCTED OUTPUT POWER LIST

TX (11a)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5260~5320	27.45	555.90
5500~5700	27.65	582.10

TX (40MHz)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5300~5320	26.38	434.51
5500~5700	26.42	438.53

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

TABLE 4: THE CONDUCTED OUTPUT POWER LIST

TX (11a)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5260~5320	27.45	555.90
5500~5700	27.65	582.10

TX (40MHz)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5300~5320	26.38	434.51
5500~5700	26.42	438.53

3. U-NII DFS RULE REQUIREMENTS

3.1 WORKING MODES AND REQUIRED TEST ITEMS

The manufacturer shall state whether the UUT is capable of operating as a Master and/or a Client. If the UUT 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 5: 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 6: 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 7: 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 8: 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 9: 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 10: Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Numberof Pulsesper Burst	Numberof Bursts	Minimum Percentage of Successful Detection	Minimum Number ofTrials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 11: Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Numberof Pulsesper Burst	Numberof Bursts	Minimum Percentage of Successful Detection	Minimum Number ofTrials
6	1	333	9	0.333	300	70%	30

4. TEST INSTRUMENTS

Table 1: Test instruments list.

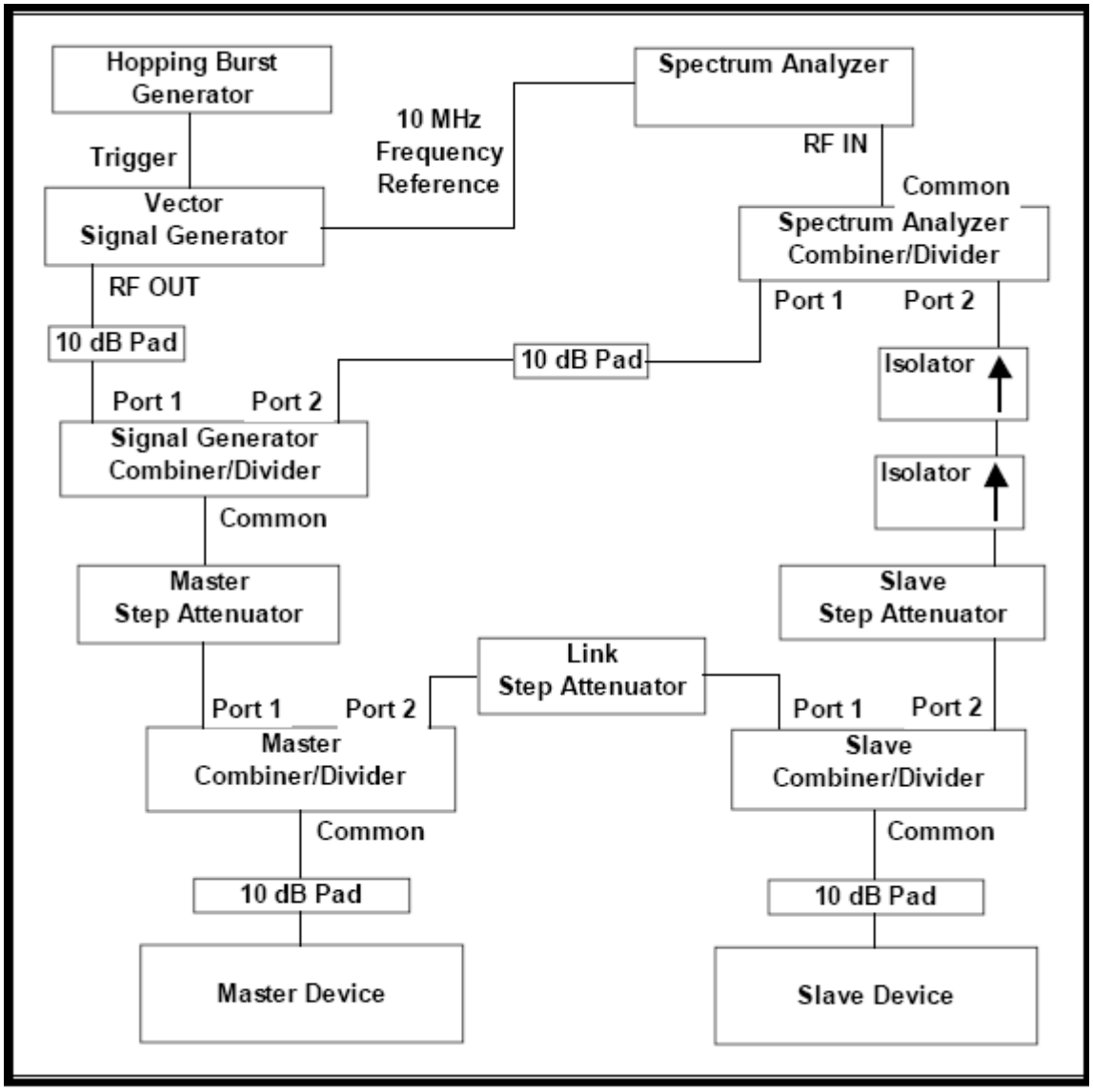
DESCRIPTION	MANUFACTURER	MODEL NO.	Serial No	CALIBRATED UNTIL
EXA Specturm Analyzer	Agilent	N9010A	MY50520044	2012-05-04
Signal Generator	Agilent	E4438C	My49071316	2012-05-04
POWER SPLITTER	Mini-Cicuits	ZFRSC-123-S+	331000910	2012-05-04
POWER SPLITTER	Mini-Cicuits	ZN4PD1-63-S+	SF933501045	2012-05-04
POWER SPLITTER	Mini-Cicuits	ZN2PD-9G-S+	SF012700714	2011-05-04
attenuator	Mini-Cicuits	VAT-30+	30912	2012-05-04
attenuator	Mini-Cicuits	VAT-10+	30909	2012-05-04
Specturm Analyzer	R&S	FSL6	1004423	2011-11-25
PC	Dell 745	DCSM	G7K832X	--
Netbook	Hp	HSTNN-I69C-3	CNU02203XG	--

Note: Calibration interval of instruments listed above is one year.

5. EMC EMISSION TEST

5.1 DFS MEASUREMENT SYSTEM:

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Freqeuncy Hopping Radar Waveform Generating Subsystem of FCC 06-96. The frequency of the signal generator is incremented in 1 MHz steps from FL to FH for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

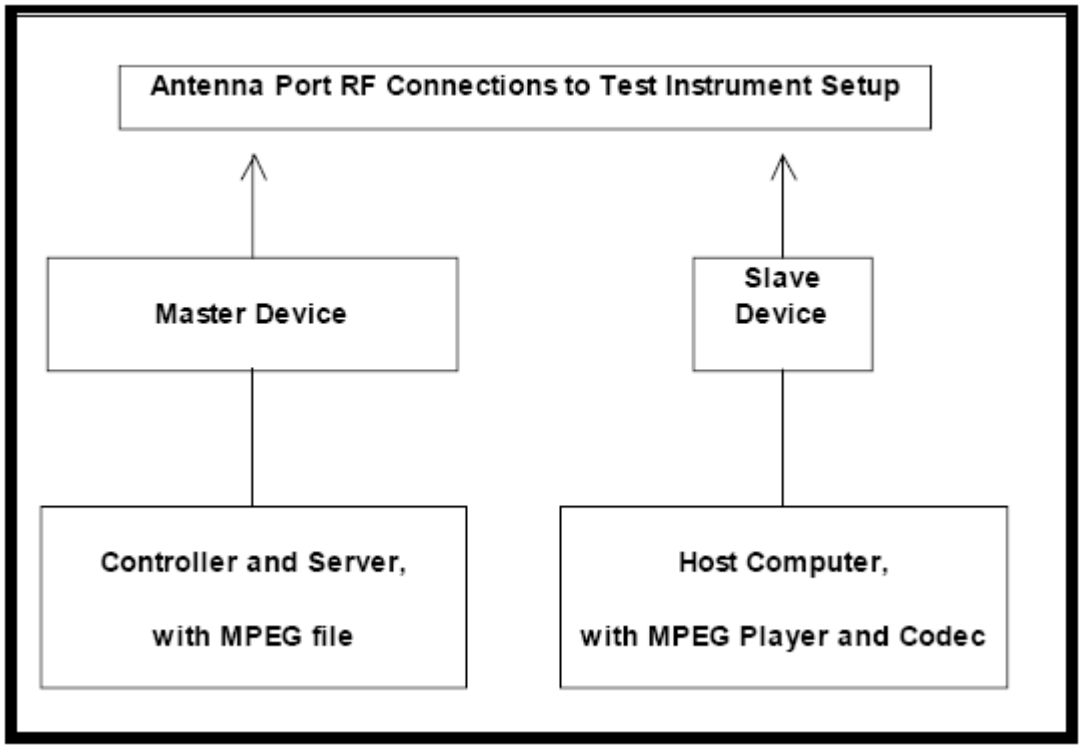
The signal monitoring equipment consists of a spectrum analyzer set to display 8001 bins on the horizontal axis. The time-domain resolution is 2 msec / bin with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

Should multiple RF ports be utilized for the Master and/or Slave devices (for example, for diversity or MIMO implementations), additional combiner/dividers are inserted between the Master Combiner/Divider and the pad connected to the Master Device (and/or between the Slave Combiner/Divider and the pad connected to the Slave Device). Additional pads are utilized such that there is one pad at each RF port on each EUT.

5.2 CALIBRATION OF DFS DETECTION THRESHOLD LEVEL:

A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected in place of the master device and the signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –62 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. Measure the amplitude and calculate the difference from –62 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference.
The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –62 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.
Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.



5.3 DEVIATION FROM TEST STANDARD

No deviation.

6. TEST RESULTS

6.1 SUMMARY OF TEST RESULT

Clause	Test Parameter	Remarks	Pass/Fail
15.407	DFS Detection Threshold	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
15.407	U-NII Detection Bandwidth	Applicable	Pass

6.2 DETELED TEST RESULTS

Clause	Test Parameter	Remarks	Pass/Fail
15.407	DFS Detection Threshold	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
15.407	U-NII Detection Bandwidth	Applicable	Pass

6.2.1 TEST MODE: DEVICE OPERATING IN MASTER MODE.

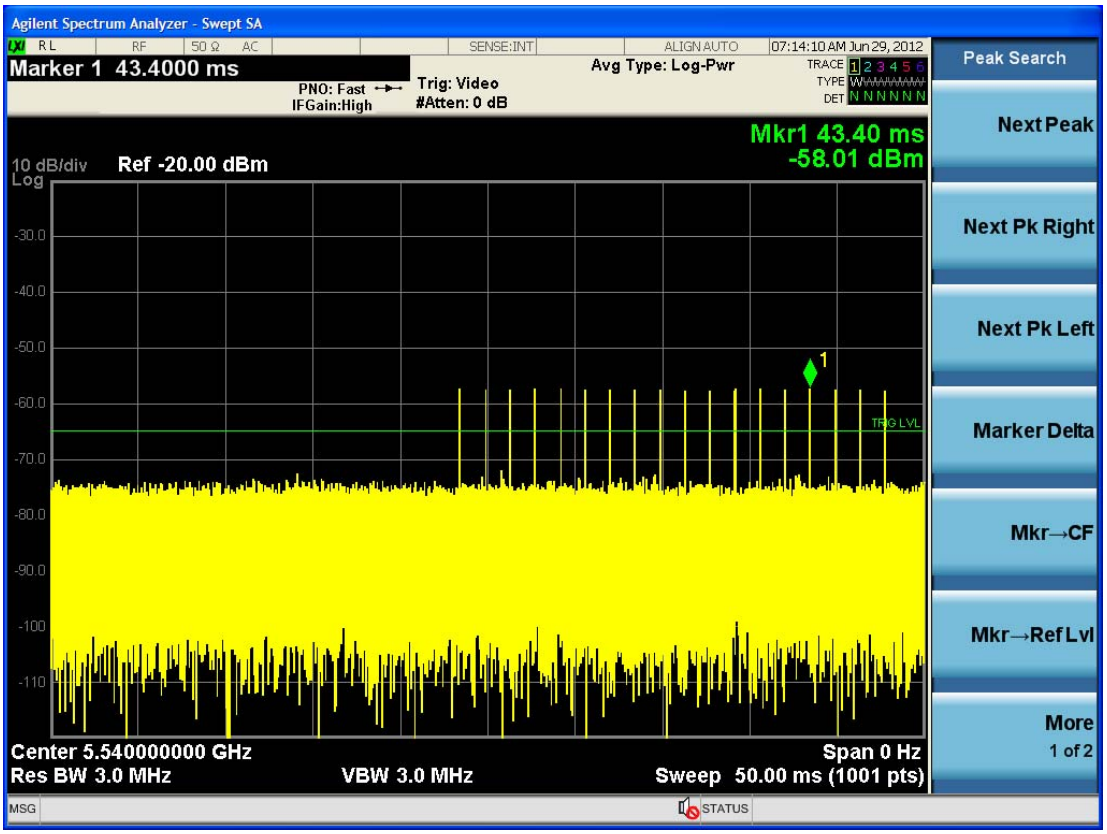
Master with injection at the Master. (Radar Test Waveforms are injected into the Master)

6.2.2 DFS DETECTION THRESHOLD

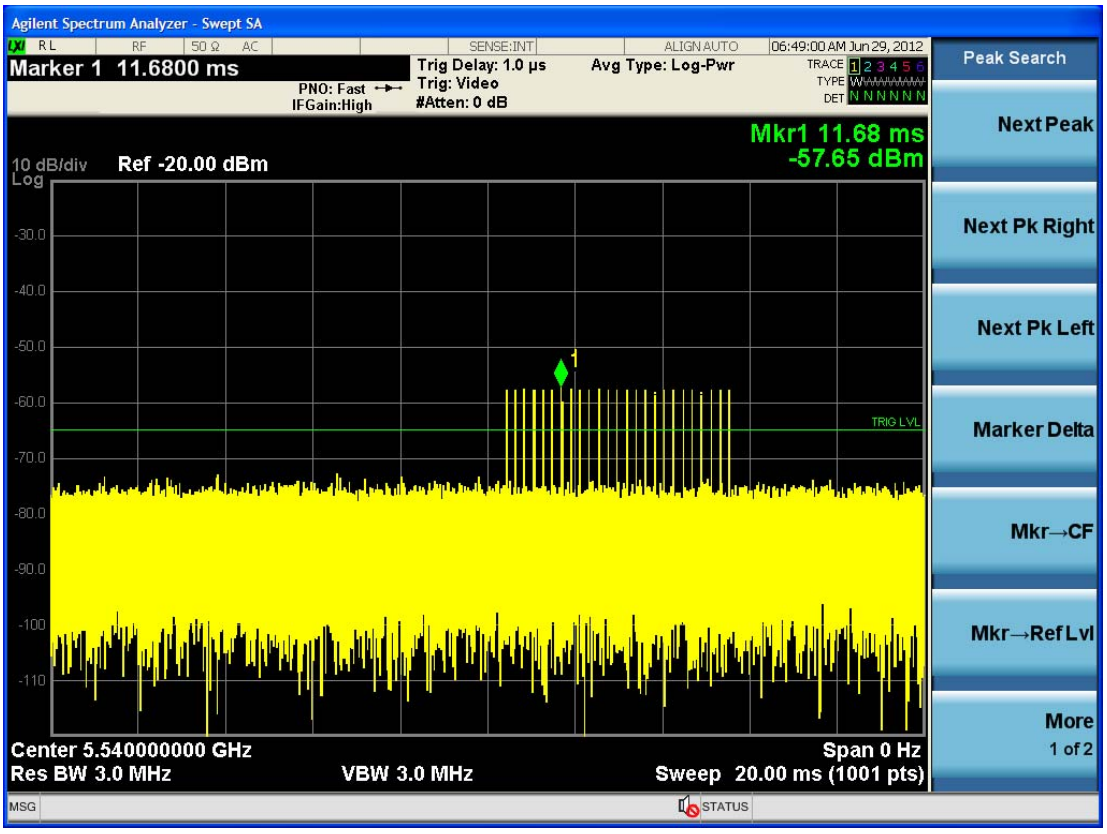
Calibration:

For a detection threshold level of -64dBm and the EUT antenna gain is 6.4dBi, required detection threshold is -57.6 dBm (= -64+6.4).

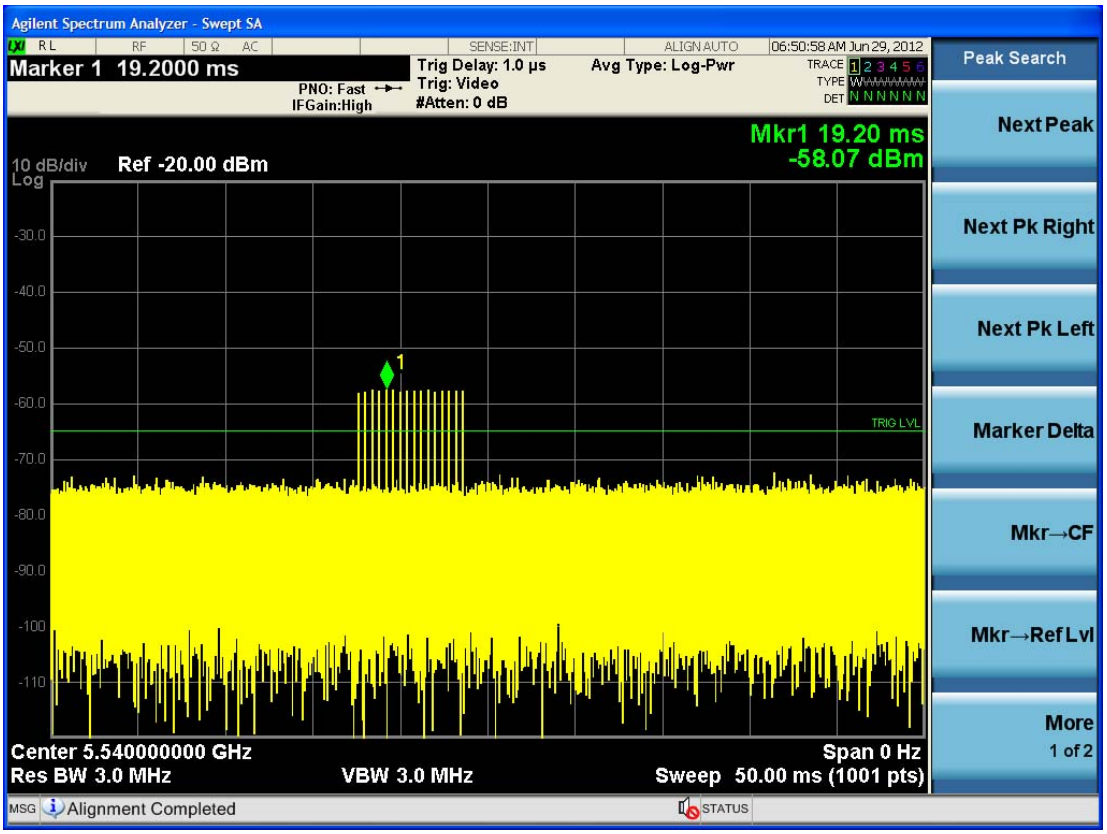
Radar Signal 1



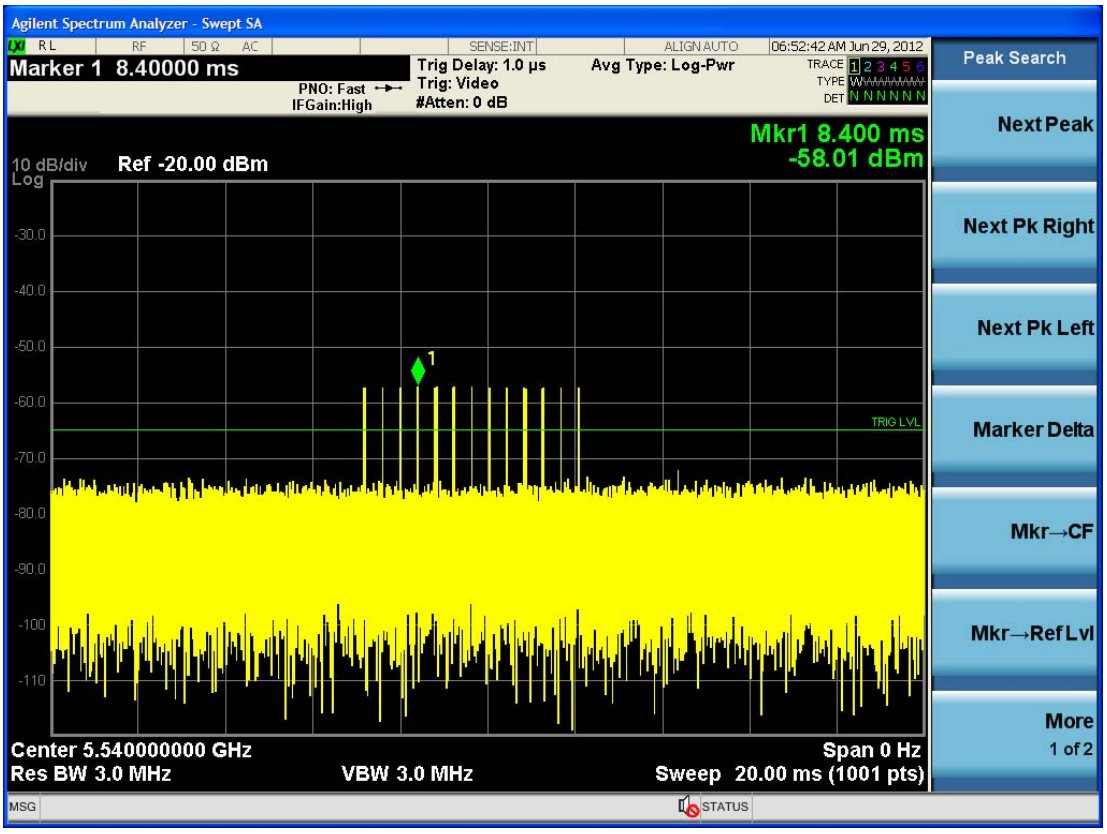
Radar Signal 2



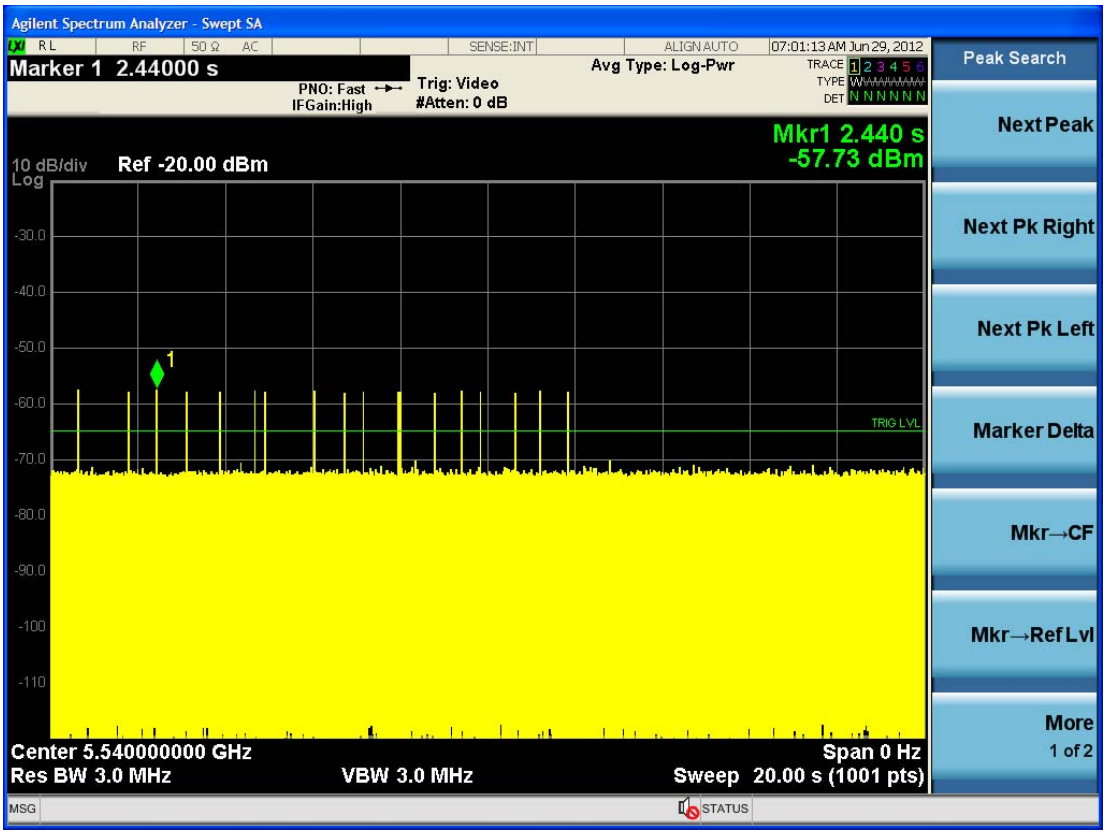
Radar Signal 3



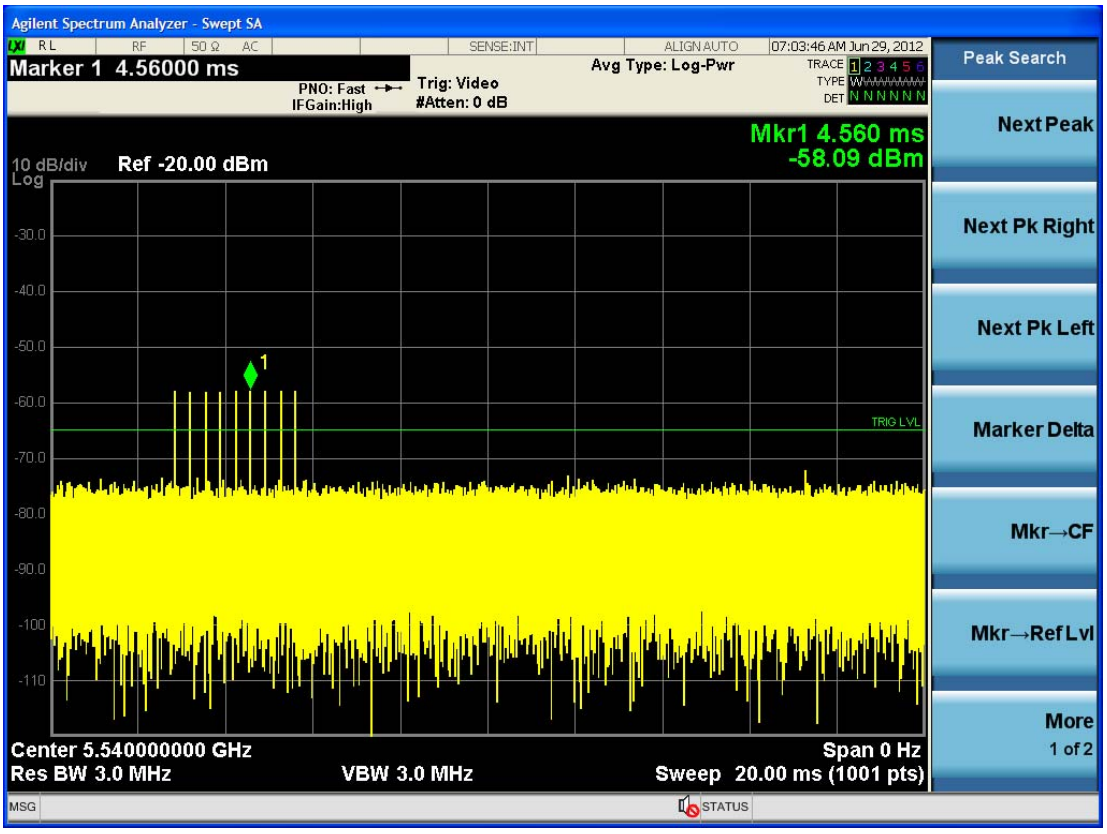
Radar Signal 4



Radar Signal 5



Radar Signal 6



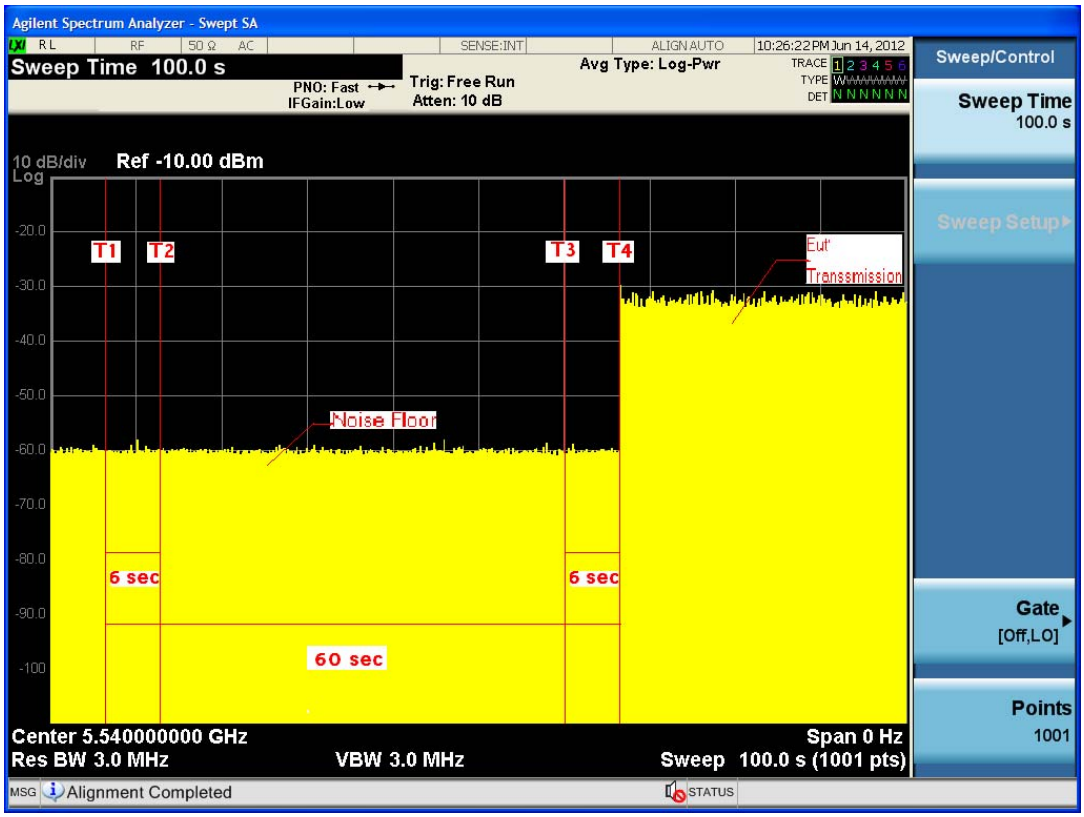
6.2.3 CHANNEL AVAILABILITY CHECK TIME

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

Timing of Radar Signal	Observation	
	UUT	Spectrum Analyzer
Spectrum Analyzer	Spectrum Analyzer	Spectrum Analyzer
Spectrum Analyzer	Spectrum Analyzer	Spectrum Analyzer

A Mode

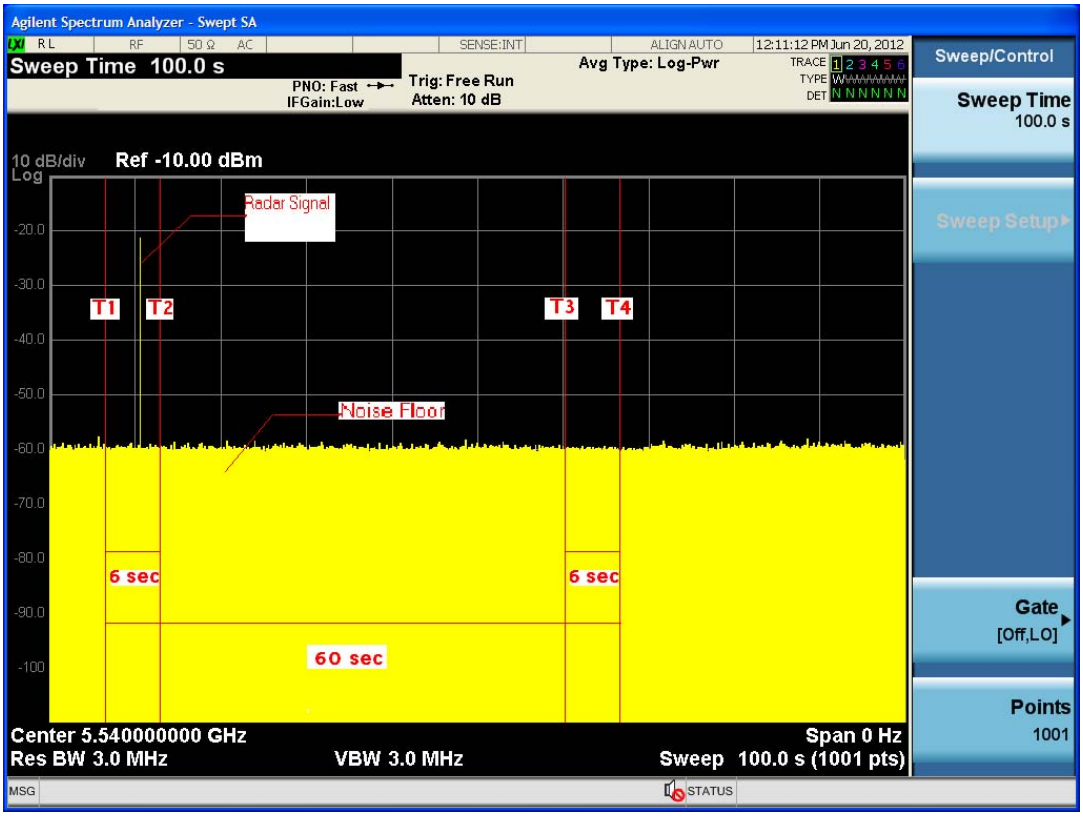
Initial Channel Availability Check Time



Note: T1 denotes the end of power-up time period is 7 second. T4 denotes the end of Channel Availability Check time is 67 second. Channel Availability Check time is equal to (T4 – T1) 60 seconds.

A Mode

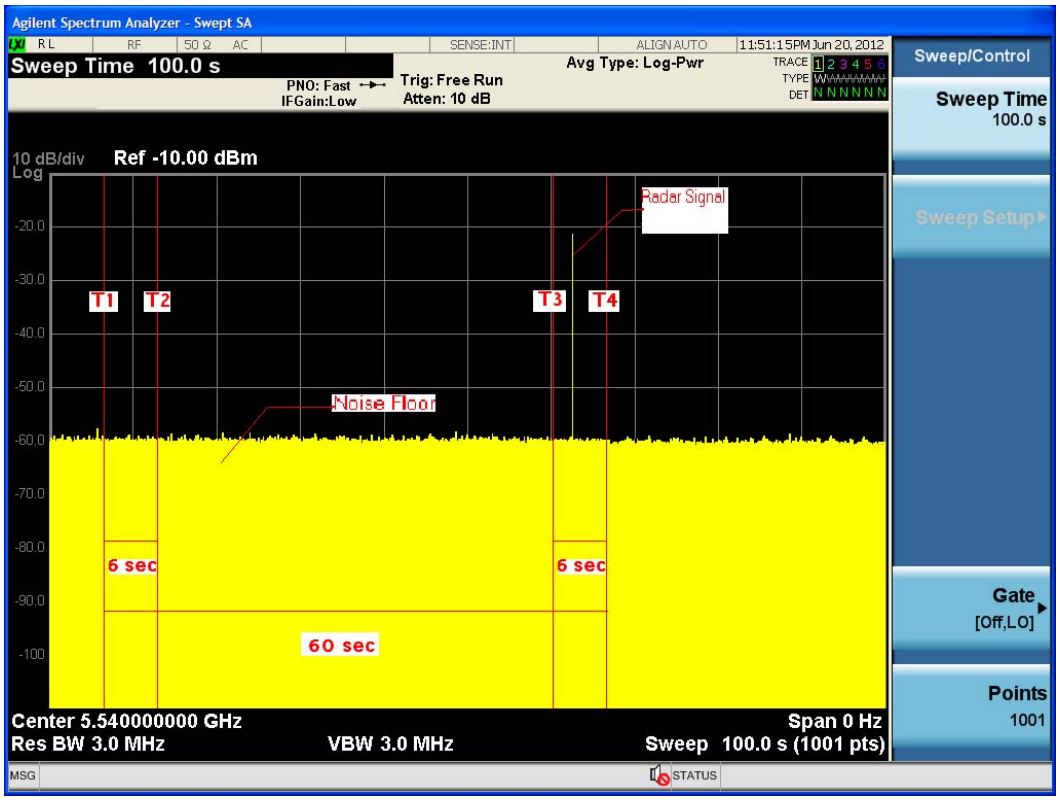
Radar Burst at the Beginning of the Channel Availability Check Time



Note: T1 denotes the end of power up time period is 7 second.
T2 denotes 13 second. the radar burst was commenced within a 6 second window starting from the end of power-up sequence.
T4 denotes the 67 second.

A Mode

Radar Burst at the End of the Channel Availability Check Time



Note: T1 denotes the end of power up time period is 7 second.

T3 denotes 63 second and radar burst was commenced within 54th second to 60th second window starting from the end of power-up sequence.

T4 denotes the 67 second.

6.2.4 CHANNEL CLOSING TRANSMISSION AND CHANNEL MOVE TIME WLAN TRAFFIC

TX (A Mode)

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	27	3	90%
2	1-5	150-230	28	2	93%
3	6-10	200-500	26	4	87%
4	11-20	200-500	29	1	97%
Aggregate (Radar Types 1-4)			110	10	92%

Table 2: Long Pulse Radar Test Waveform

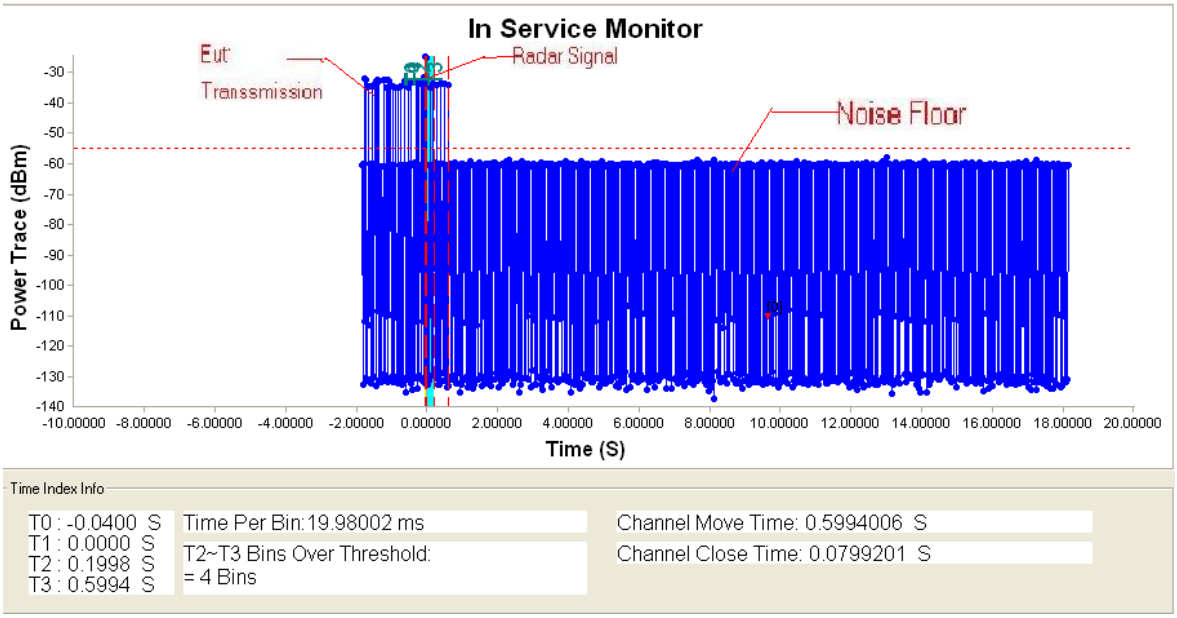
Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Numberof Pulses Per Burst	Number of Bursts	Number of Trials (Times)	Percentage of Successful Detection (%)
5	50-100	5-20	1000-2000	1-3	26	4	87%

Table 3: Frequency Hopping Radar Test Waveform

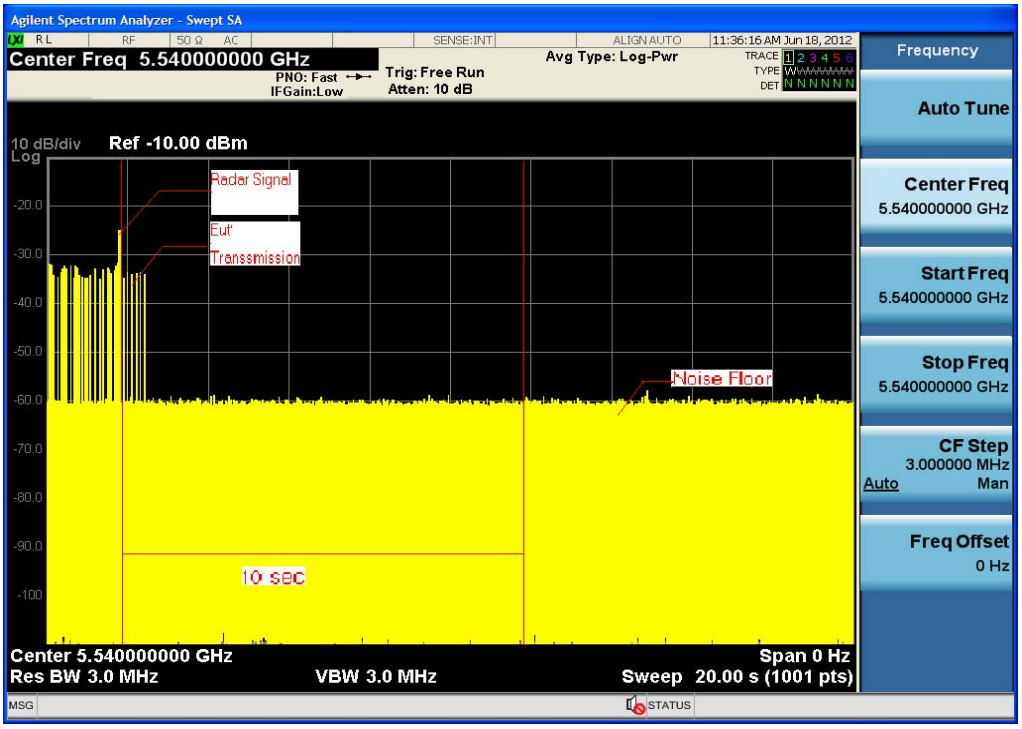
Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Number of Trials(Times)	Percentage of Successful Detection (%)
6	1	333	9	0.333	300	30	83%

TX (A Mode)

Radar signal 1



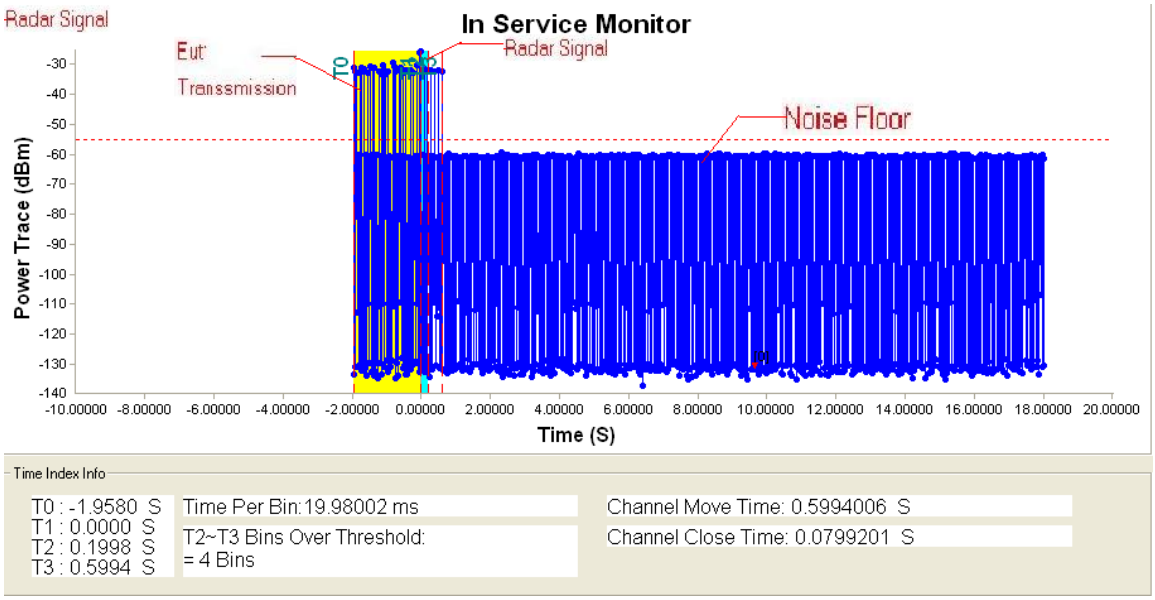
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



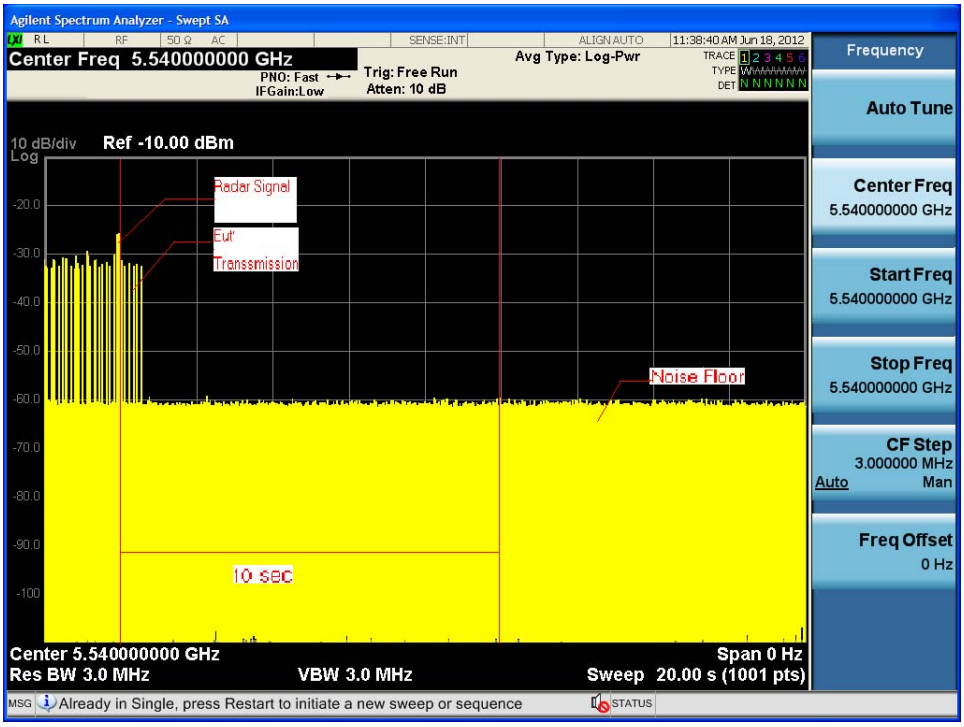
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (A Mode)

Radar signal 2



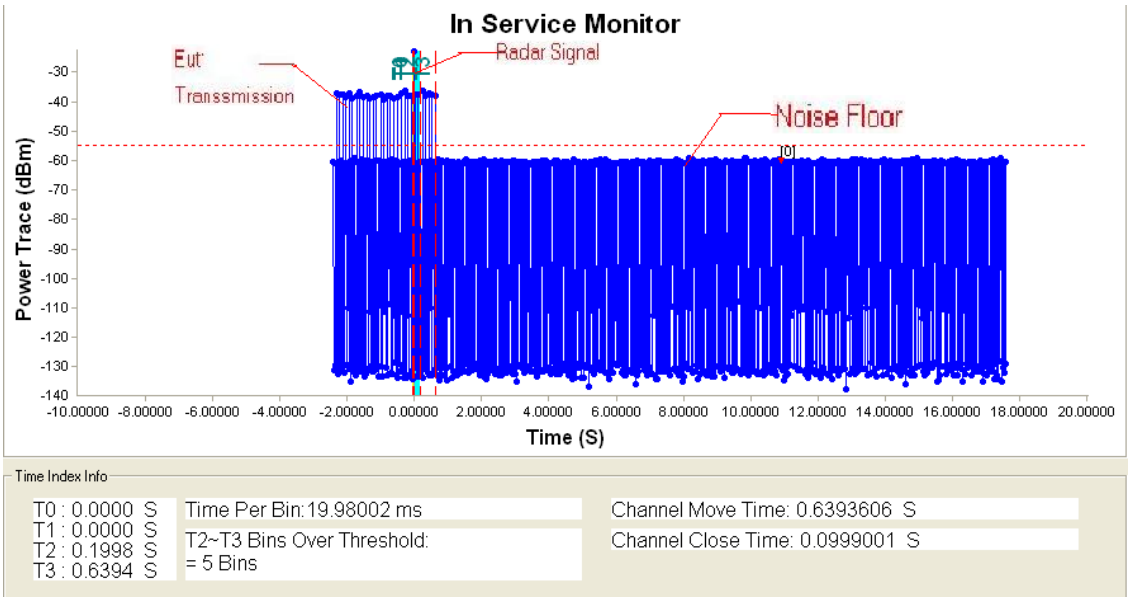
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



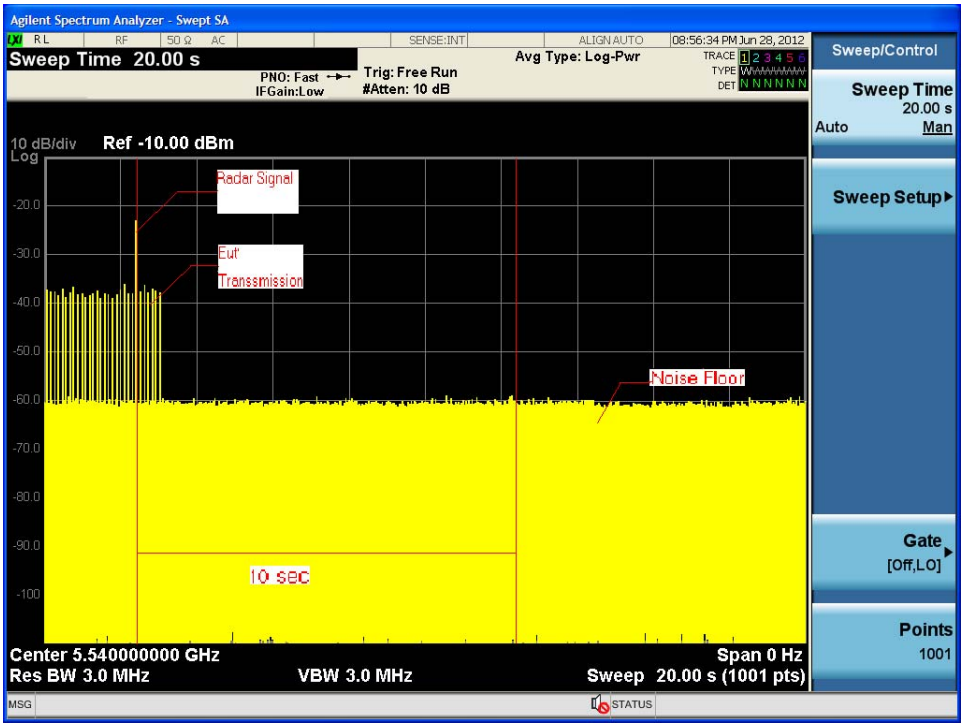
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (A Mode)

Radar signal 3



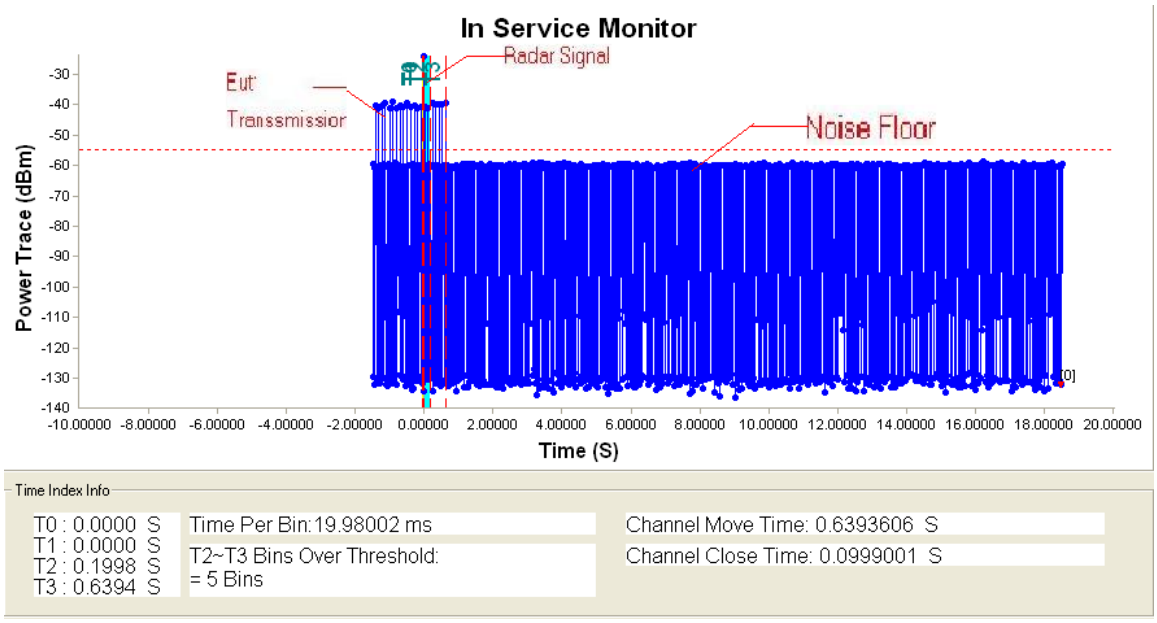
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



Note: An expanded plot for the device vacates the channel in the required 500ms

TX (A Mode)

Radar signal 4

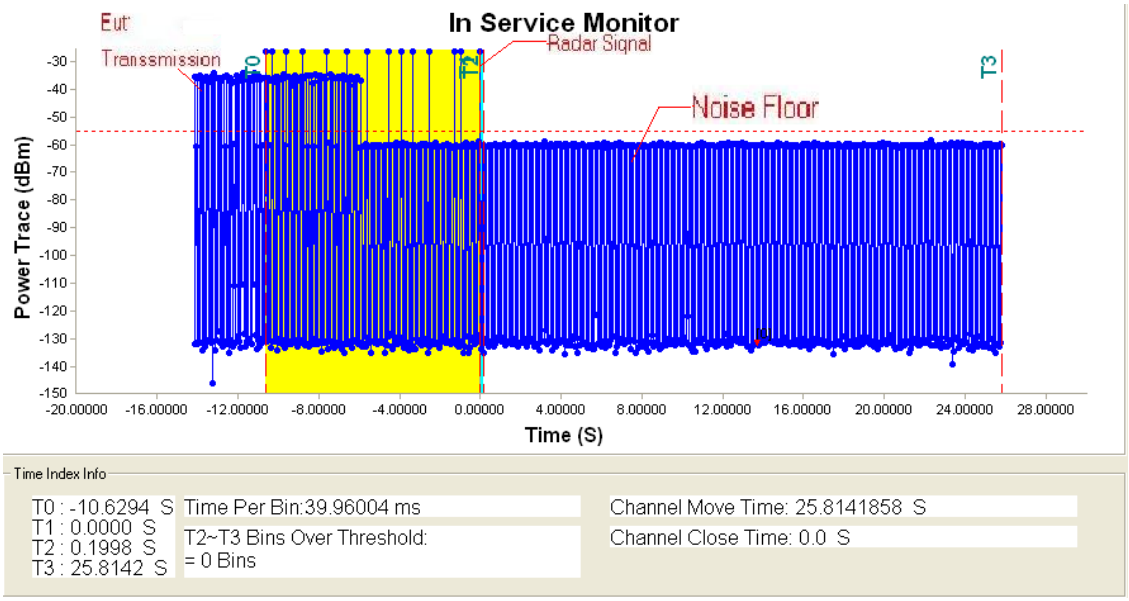


Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.

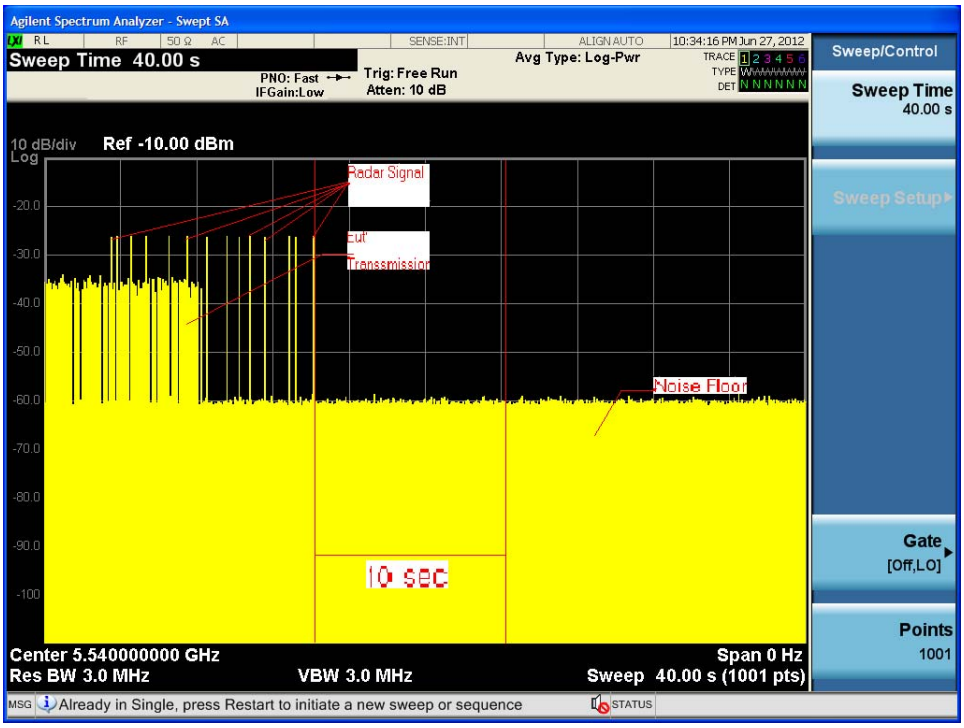
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (A Mode)

Radar signal 5



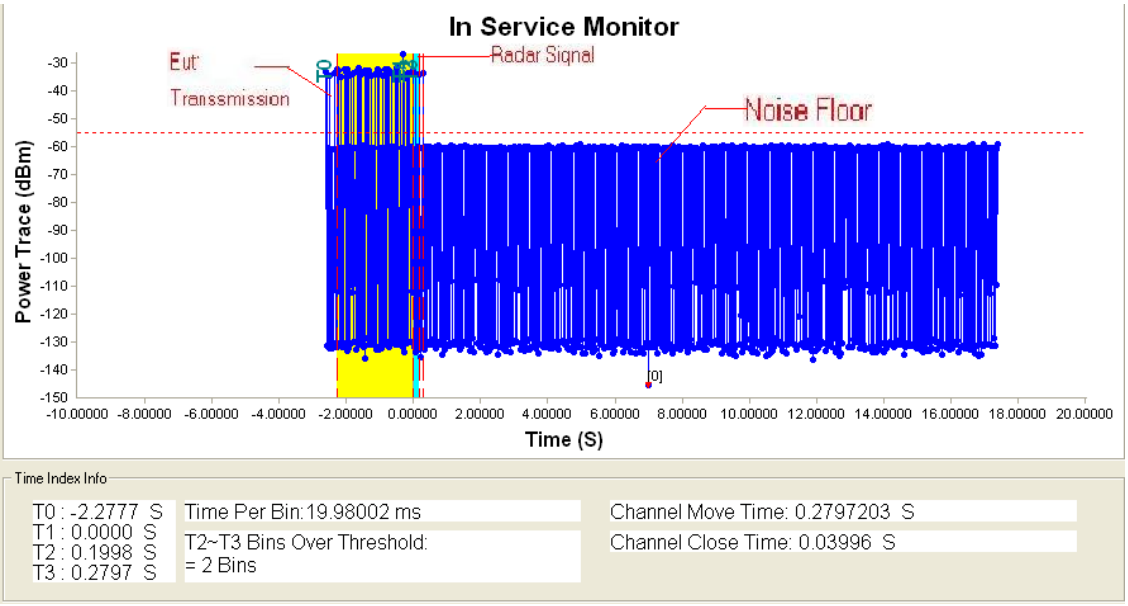
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



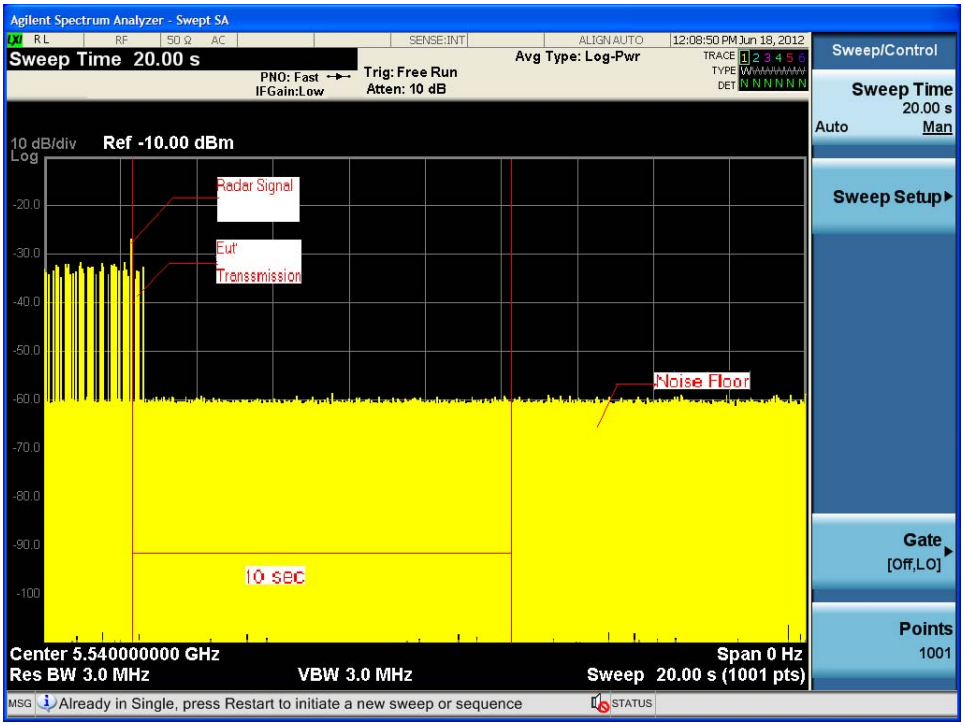
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (A Mode)

Radar signal 6



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: An expanded plot for the device vacates the channel in the required 500ms

TX (A Mode)

Radar1 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	18	1.0u	1.428	YES
2	18	1.0u	1.428	YES
3	18	1.0u	1.428	YES
4	18	1.0u	1.428	No
5	18	1.0u	1.428	YES
6	18	1.0u	1.428	YES
7	18	1.0u	1.428	YES
8	18	1.0u	1.428	NO
9	18	1.0u	1.428	NO
10	18	1.0u	1.428	YES
11	18	1.0u	1.428	YES
12	18	1.0u	1.428	YES
13	18	1.0u	1.428	YES
14	18	1.0u	1.428	YES
15	18	1.0u	1.428	YES
16	18	1.0u	1.428	NO
17	18	1.0u	1.428	YES
18	18	1.0u	1.428	YES
19	18	1.0u	1.428	YES
20	18	1.0u	1.428	YES
21	18	1.0u	1.428	YES
22	18	1.0u	1.428	NO
23	18	1.0u	1.428	YES
24	18	1.0u	1.428	YES
25	18	1.0u	1.428	YES
26	18	1.0u	1.428	YES
27	18	1.0u	1.428	YES
28	18	1.0u	1.428	YES
29	18	1.0u	1.428	YES
30	18	1.0u	1.428	YES
Detection Rate 83%				

Radar2 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	23	1.2u	222	YES
2	24	1.0u	198	YES
3	25	1.3u	193	YES
4	26	1.4u	228	NO
5	26	4.5u	216	YES
6	23	3.3u	225	YES
7	28	2.4u	221	YES
8	26	3.8u	227	YES
9	26	2.7u	169	YES
10	27	2.2u	208	YES
11	28	1.3u	220	YES
12	28	1.4u	168	YES
13	25	4.5u	209	YES
14	24	3.3u	204	YES
15	26	2.4u	225	YES
16	27	3.8u	224	YES
17	27	2.7u	207	YES
18	23	2.9u	158	NO
19	28	1.8u	208	YES
20	28	2.0u	160	YES
21	25	2.3u	189	YES
22	24	3.0u	186	YES
23	28	3.4u	176	YES
24	29	4.0u	176	YES
25	29	2.1u	221	YES
26	29	3.4u	225	YES
27	24	4.0u	198	YES
28	26	2.7u	201	YES
29	25	2.9u	193	YES
30	27	1.8u	151	YES
Detection Rate 93%				

Radar3 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	18	6.0u	490	YES
2	18	8.3u	388	YES
3	17	8.2u	443	YES
4	18	6.6u	408	YES
5	16	8.8u	492	YES
6	17	9.5u	480	YES
7	17	9.8u	216	NO
8	17	8.6u	224	YES
9	18	8.2u	477	NO
10	18	8.7u	246	YES
11	16	9.0u	213	YES
12	16	9.8u	482	YES
13	17	7.9u	436	YES
14	18	8.8u	447	YES
15	16	7.6u	310	YES
16	18	7.9u	481	YES
17	18	8.0u	269	NO
18	16	9.9u	463	YES
19	18	8.5u	445	YES
20	18	8.0u	442	YES
21	16	8.6u	414	YES
22	18	8.4u	409	YES
23	18	9.3u	398	YES
24	16	8.0u	364	YES
25	17	9.6u	386	YES
26	17	8.0u	258	NO
27	18	9.3u	269	YES
28	18	7.2u	431	YES
29	16	7.2u	330	YES
30	16	6.9u	440	YES
Detection Rate 87%				

Radar4 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	16	12.7u	319	YES
2	16	19.8u	274	YES
3	16	16.0u	377	YES
4	12	16.6u	463	YES
5	13	12.7u	445	YES
6	13	12.0u	445	YES
7	15	13.8u	405	YES
8	15	14.9u	409	YES
9	15	15.8u	436	YES
10	14	14.6u	447	YES
11	14	13.9u	410	YES
12	15	16.0u	481	YES
13	15	17.0u	492	YES
14	15	15.8u	463	YES
15	13	14.6u	445	YES
16	13	17.0u	442	YES
17	15	17.5u	405	YES
18	15	16.0u	463	YES
19	15	13.6u	445	NO
20	12	14.4u	409	YES
21	13	15.3u	398	YES
22	13	14.0u	364	YES
23	13	15.3u	367	YES
24	15	14.0u	258	YES
25	15	15.6u	270	YES
26	15	17.0u	441	YES
27	15	19.3u	332	YES
28	15	18.5u	478	YES
29	16	20.0u	332	YES
30	14	14.0u	480	YES
Detection Rate 97%				

Radar5 Statical Performances		
Trial #	Test Signal name	Detection(Yes / No)
1	LP_Signal_01	Yes
2	LP_Signal_02	Yes
3	LP_Signal_03	Yes
4	LP_Signal_04	Yes
5	LP_Signal_05	Yes
6	LP_Signal_06	NO
7	LP_Signal_07	Yes
8	LP_Signal_08	Yes
9	LP_Signal_09	Yes
10	LP_Signal_10	Yes
11	LP_Signal_11	Yes
12	LP_Signal_12	Yes
13	LP_Signal_13	Yes
14	LP_Signal_14	Yes
15	LP_Signal_15	Yes
16	LP_Signal_16	Yes
17	LP_Signal_17	Yes
18	LP_Signal_18	Yes
19	LP_Signal_19	Yes
20	LP_Signal_20	Yes
21	LP_Signal_21	NO
22	LP_Signal_22	NO
23	LP_Signal_23	Yes
24	LP_Signal_24	Yes
25	LP_Signal_25	Yes
26	LP_Signal_26	NO
27	LP_Signal_27	Yes
28	LP_Signal_28	Yes
29	LP_Signal_29	Yes
30	LP_Signal_30	Yes
Detection Rate 87%		

Radar6 Statical Performances		
Trial #	Hoping Frequency Sequence Name	Detection(Yes / No)
1	HOP_FREQ_SEQ_01	Yes
2	HOP_FREQ_SEQ_02	Yes
3	HOP_FREQ_SEQ_03	No
4	HOP_FREQ_SEQ_04	Yes
5	HOP_FREQ_SEQ_05	Yes
6	HOP_FREQ_SEQ_06	Yes
7	HOP_FREQ_SEQ_07	Yes
8	HOP_FREQ_SEQ_08	Yes
9	HOP_FREQ_SEQ_09	No
10	HOP_FREQ_SEQ_10	Yes
11	HOP_FREQ_SEQ_11	Yes
12	HOP_FREQ_SEQ_12	Yes
13	HOP_FREQ_SEQ_13	Yes
14	HOP_FREQ_SEQ_14	Yes
15	HOP_FREQ_SEQ_15	Yes
16	HOP_FREQ_SEQ_16	No
17	HOP_FREQ_SEQ_17	Yes
18	HOP_FREQ_SEQ_18	Yes
19	HOP_FREQ_SEQ_19	Yes
20	HOP_FREQ_SEQ_20	Yes
21	HOP_FREQ_SEQ_21	No
22	HOP_FREQ_SEQ_22	Yes
23	HOP_FREQ_SEQ_23	Yes
24	HOP_FREQ_SEQ_24	Yes
25	HOP_FREQ_SEQ_25	Yes
26	HOP_FREQ_SEQ_26	No
27	HOP_FREQ_SEQ_27	Yes
28	HOP_FREQ_SEQ_28	Yes
29	HOP_FREQ_SEQ_29	Yes
30	HOP_FREQ_SEQ_30	Yes
Detection Rate 83%		

TX (40MHz Mode)

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	27	3	90%
2	1-5	150-230	28	2	93%
3	6-10	200-500	27	3	90%
4	11-20	200-500	29	1	97%
Aggregate (Radar Types 1-4)			111	9	93%

Table 2: Long Pulse Radar Test Waveform

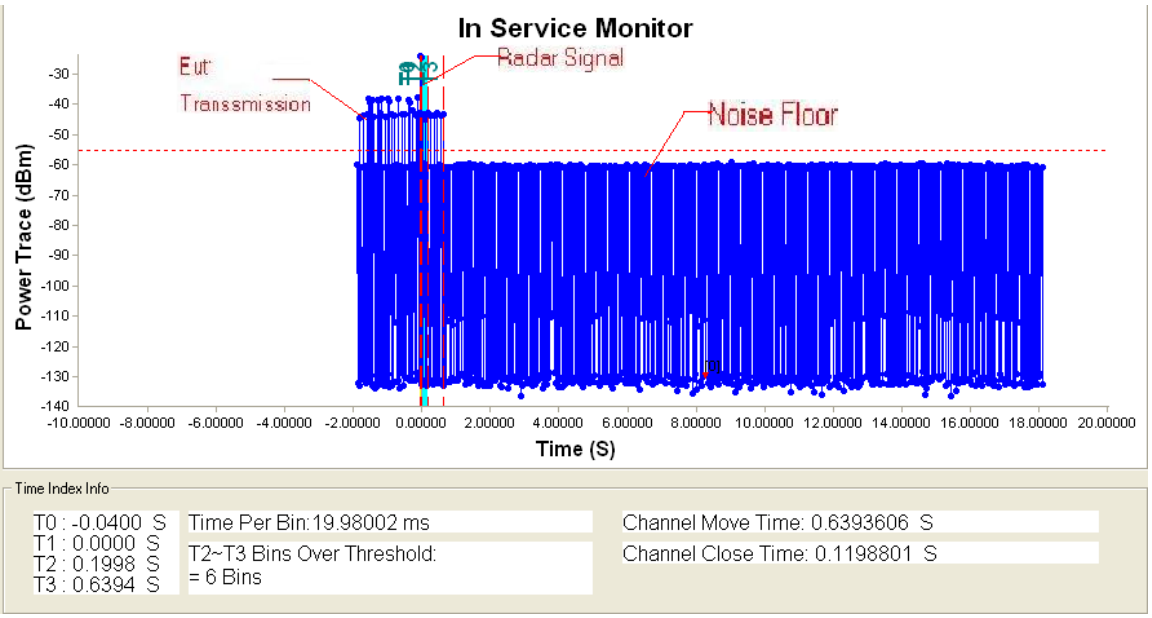
Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Numberof Pulses Per Burst	Number of Bursts	Number of Trials (Times)	Percentage of Successful Detection (%)
5	50-100	5-20	1000-2000	1-3	25	5	83%

Table 3: Frequency Hopping Radar Test Waveform

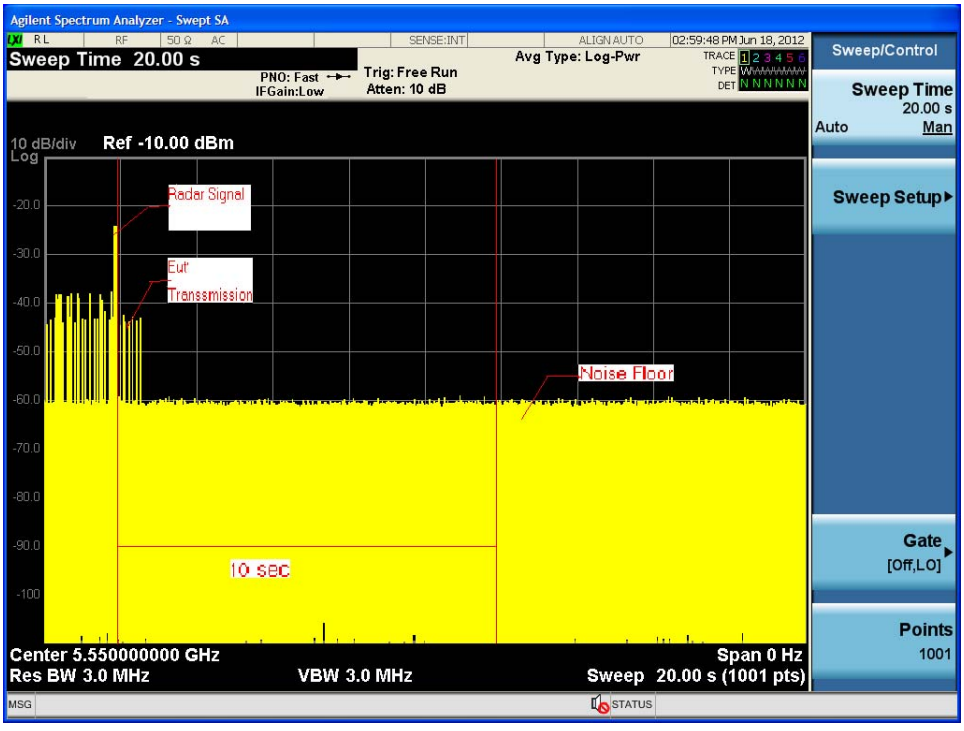
Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Number of Trials(Times)	Percentage of Successful Detection (%)
6	1	333	9	0.333	300	30	83%

TX (N40 Mode)

Radar signal 1



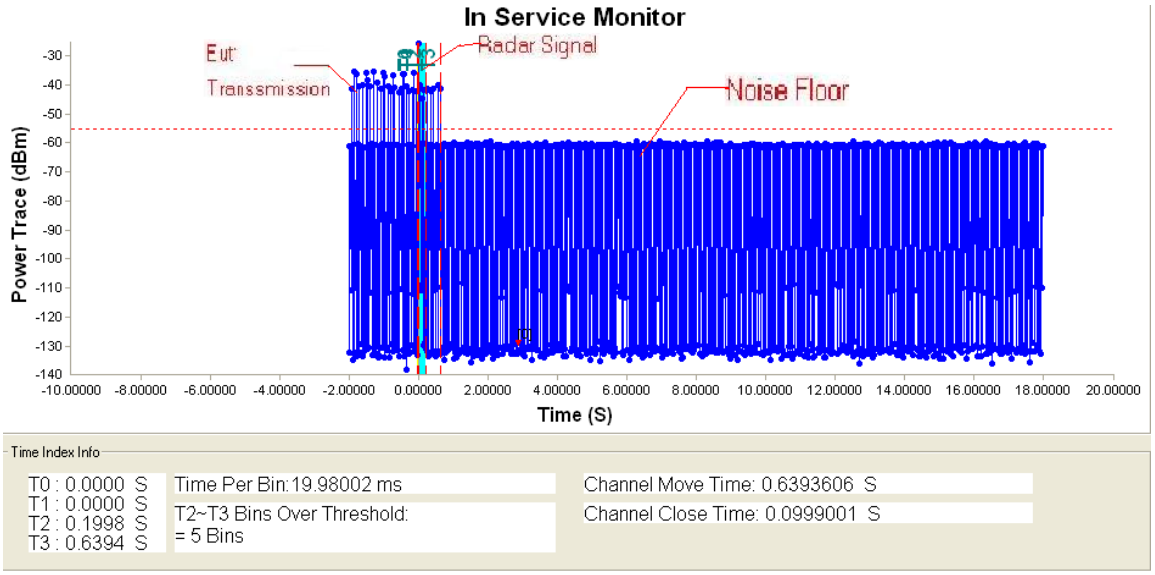
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



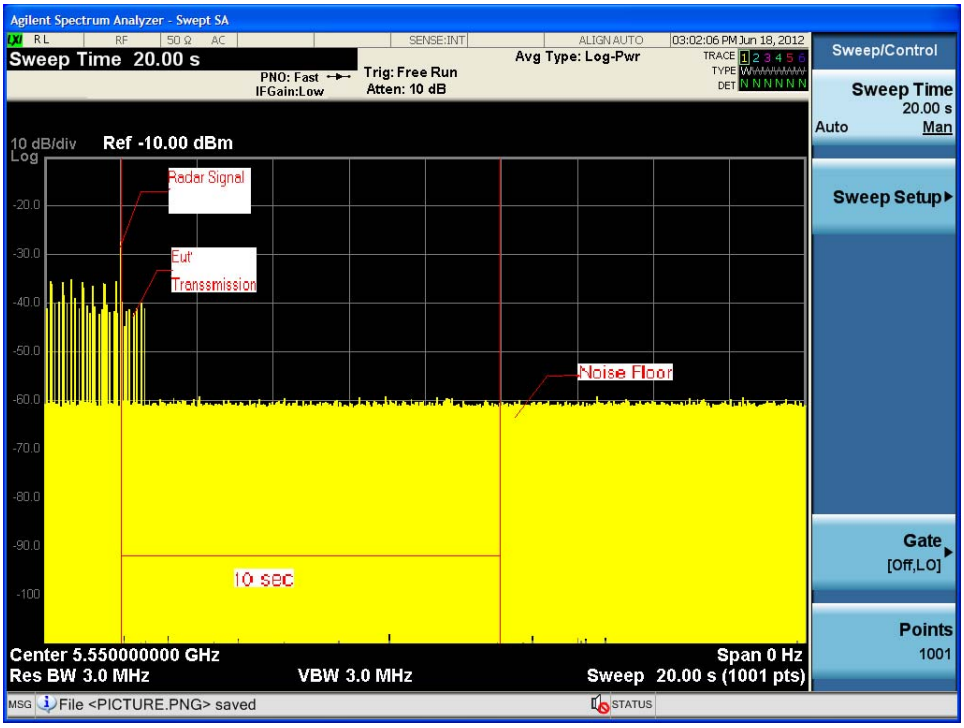
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (N40 Mode)

Radar signal 2



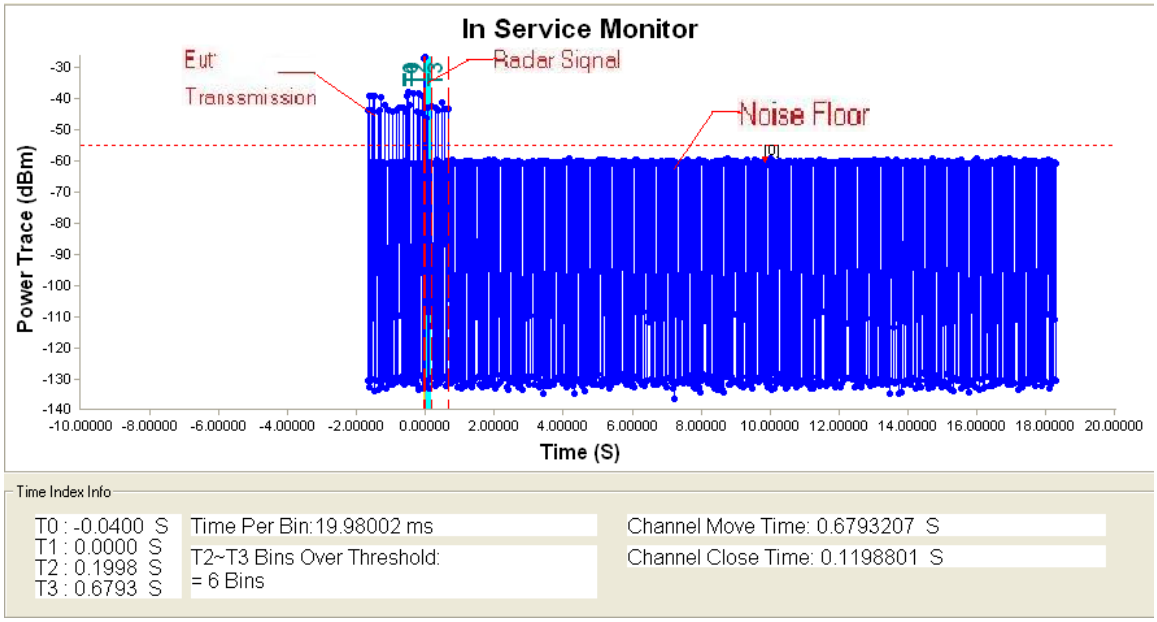
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



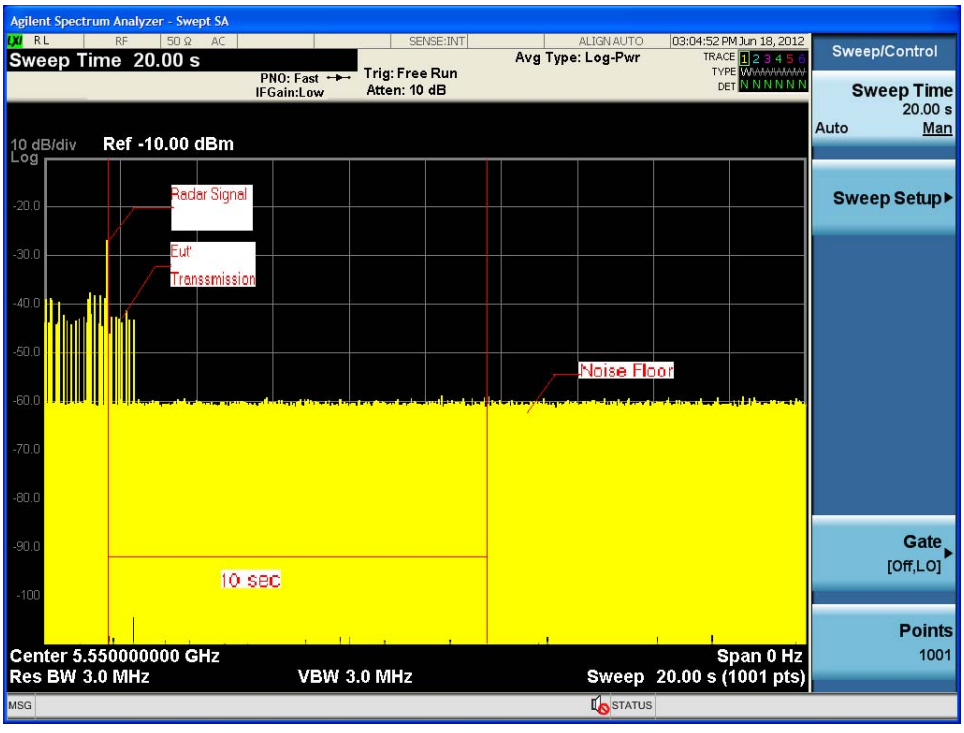
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (N40 Mode)

Radar signal 3



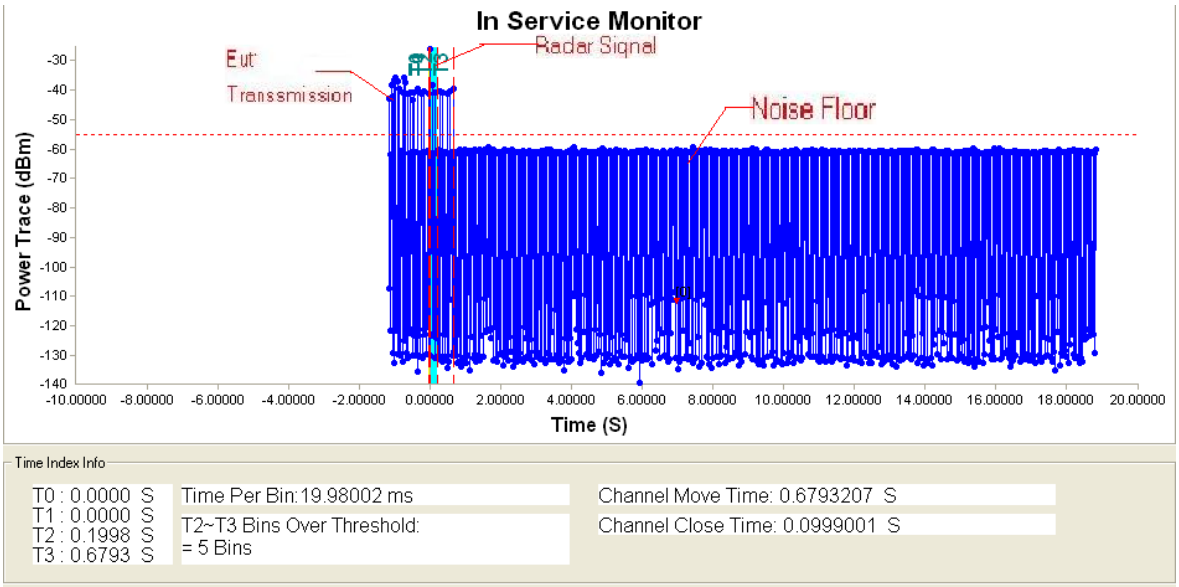
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



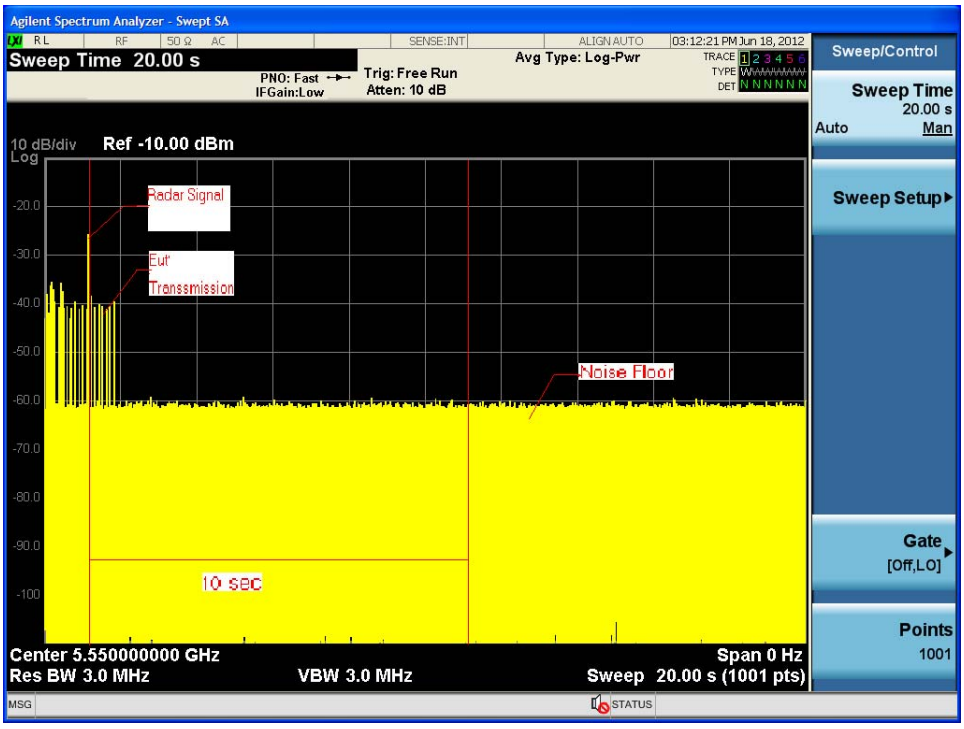
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (N40 Mode)

Radar signal 4



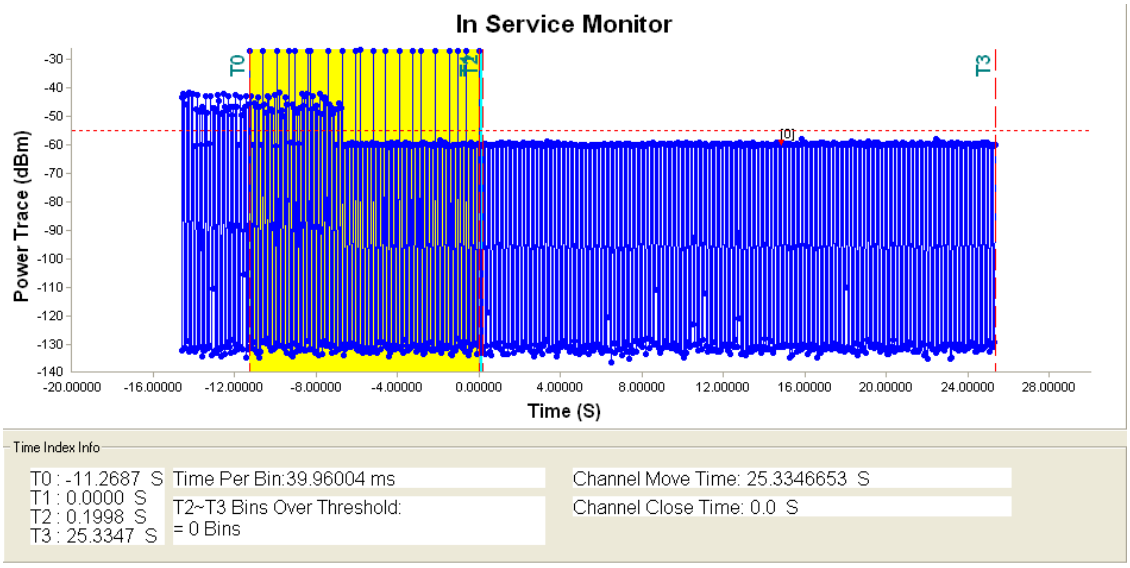
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



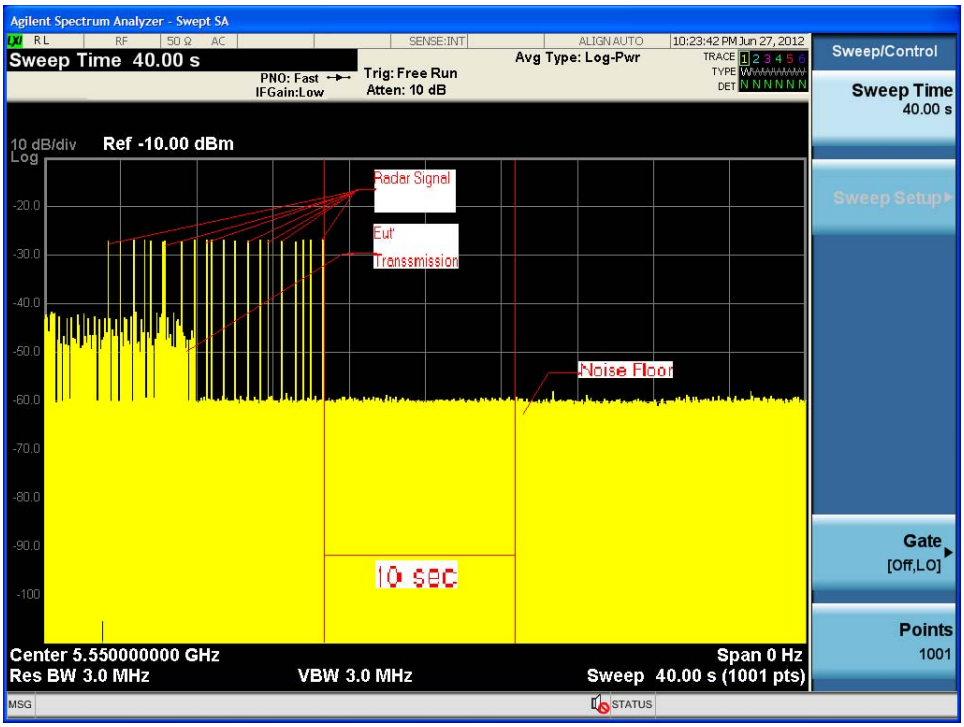
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (N40 Mode)

Radar signal 5



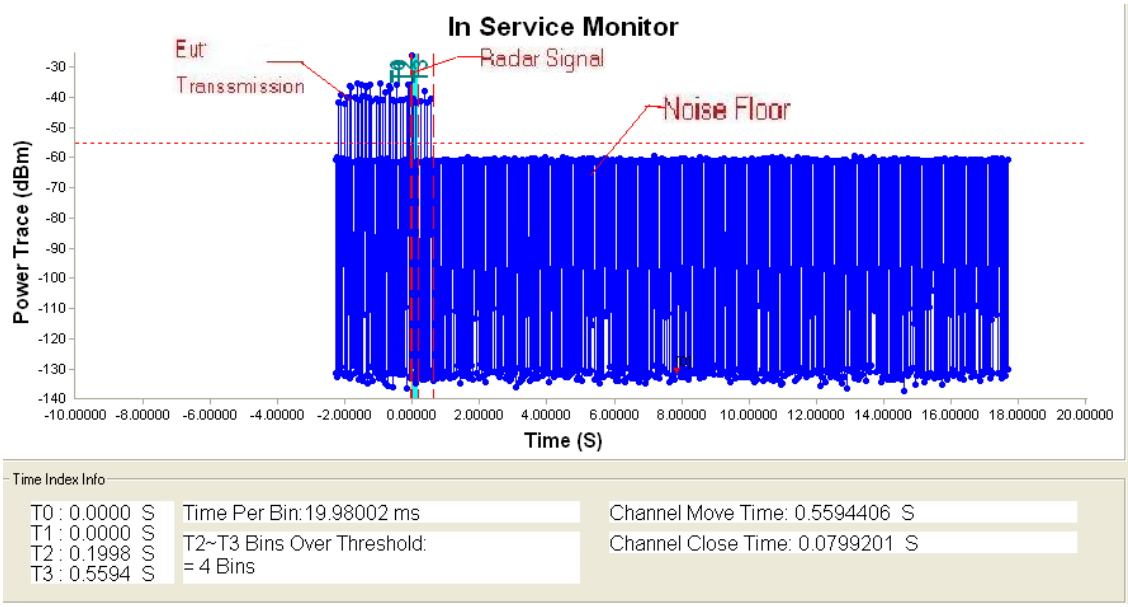
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



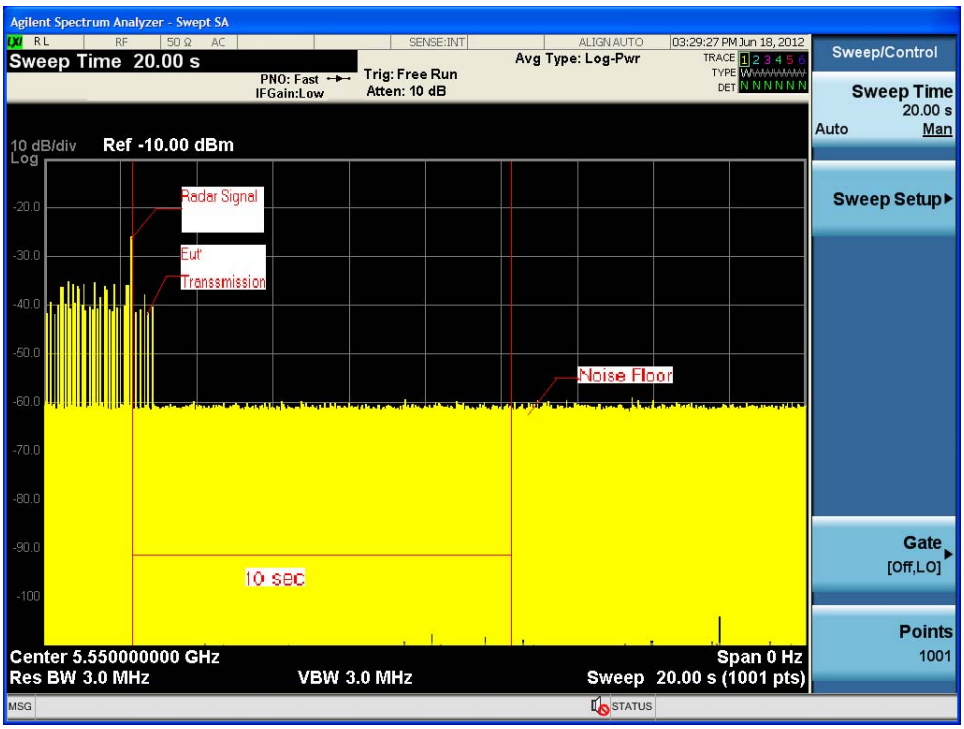
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (N40 Mode)

Radar signal 6



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: An expanded plot for the device vacates the channel in the required 500ms

TX (N40 Mode)

Radar1 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	18	1.0u	1.428	YES
2	18	1.0u	1.428	YES
3	18	1.0u	1.428	YES
4	18	1.0u	1.428	YES
5	18	1.0u	1.428	YES
6	18	1.0u	1.428	YES
7	18	1.0u	1.428	YES
8	18	1.0u	1.428	YES
9	18	1.0u	1.428	NO
10	18	1.0u	1.428	YES
11	18	1.0u	1.428	YES
12	18	1.0u	1.428	YES
13	18	1.0u	1.428	YES
14	18	1.0u	1.428	YES
15	18	1.0u	1.428	YES
16	18	1.0u	1.428	YES
17	18	1.0u	1.428	YES
18	18	1.0u	1.428	NO
19	18	1.0u	1.428	YES
20	18	1.0u	1.428	YES
21	18	1.0u	1.428	YES
22	18	1.0u	1.428	YES
23	18	1.0u	1.428	YES
24	18	1.0u	1.428	NO
25	18	1.0u	1.428	YES
26	18	1.0u	1.428	YES
27	18	1.0u	1.428	YES
28	18	1.0u	1.428	YES
29	18	1.0u	1.428	YES
30	18	1.0u	1.428	YES
Detection Rate 90%				

Radar2 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	26	1.4u	218	YES
2	24	4.9u	225	YES
3	27	3.0u	168	YES
4	28	4.9u	209	YES
5	28	2.7u	157	YES
6	29	2.9u	170	YES
7	26	2.8u	192	YES
8	25	1.0u	224	YES
9	25	2.5u	207	YES
10	23	4.9u	158	YES
11	27	1.4u	208	NO
12	23	2.8u	160	YES
13	29	2.6u	198	YES
14	27	2.5u	224	YES
15	24	4.9u	207	YES
16	29	2.7u	158	YES
17	25	3.2u	210	YES
18	25	4.3u	170	YES
19	28	3.1u	210	YES
20	25	2.2u	170	NO
21	27	1.3u	218	YES
22	26	1.4u	221	YES
23	26	4.5u	227	YES
24	25	4.5u	186	YES
25	24	3.3u	172	YES
26	25	2.4u	170	YES
27	24	4.0u	221	YES
28	23	3.3u	203	YES
29	25	2.4u	190	YES
30	28	4.9u	229	YES
Detection Rate 93%				

Radar3 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(s)	PRI(us)	Detection(Yes / No)
1	16	8.0u	405	YES
2	18	7.6u	364	YES
3	18	7.9u	366	YES
4	18	8.0u	364	YES
5	16	9.9u	366	YES
6	17	8.5u	258	YES
7	17	8.0u	269	YES
8	18	9.6u	431	YES
9	16	6.0u	213	YES
10	16	9.9u	482	NO
11	17	8.5u	436	YES
12	18	8.0u	463	YES
13	16	6.0u	492	YES
14	16	9.5u	382	YES
15	17	6.0u	430	YES
16	16	8.8u	447	YES
17	16	8.5u	286	NO
18	17	8.0u	206	YES
19	18	6.0u	213	YES
20	18	9.5u	482	YES
21	18	6.0u	436	YES
22	17	8.8u	447	YES
23	16	9.5u	269	YES
24	18	9.8u	431	YES
25	16	8.6u	330	NO
26	16	8.0u	230	YES
27	18	7.6u	364	YES
28	16	7.9u	366	YES
29	17	8.0u	445	YES
30	18	7.0u	442	YES

Radar4 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	16	18.0u	270	YES
2	12	13.2u	482	YES
3	15	12.0u	330	YES
4	16	12.0u	335	YES
5	16	13.8u	328	YES
6	12	14.9u	445	YES
7	14	15.8u	442	YES
8	15	14.6u	332	YES
9	15	13.9u	478	YES
10	13	16.5u	442	YES
11	15	14.0u	405	YES
12	13	15.6u	405	YES
13	15	17.0u	409	YES
14	14	19.3u	477	YES
15	12	18.2u	206	YES
16	15	15.3u	216	NO
17	16	19.0u	213	YES
18	12	13.8u	482	YES
19	13	14.9u	436	YES
20	16	15.8u	447	YES
21	16	19.6u	258	YES
22	14	13.9u	408	YES
23	14	16.0u	465	YES
24	13	11.5u	490	YES
25	16	12.0u	447	YES
26	14	13.8u	405	YES
27	14	14.9u	375	YES
28	14	19.8u	470	YES
29	15	14.6u	325	YES
30	15	13.9u	496	YES
Detection Rate 97%				

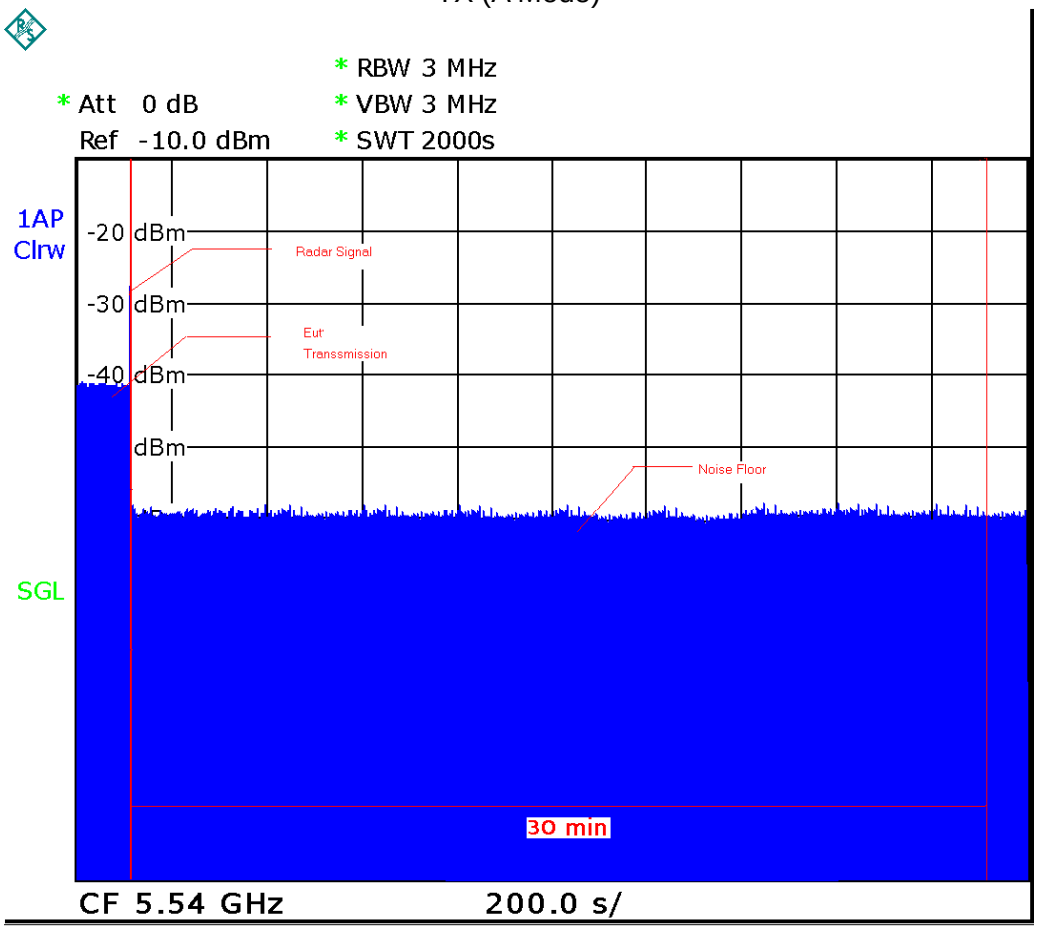
Radar5 Statical Performances		
Trial #	Test Signal name	Detection(Yes / No)
1	LP_Signal_01	Yes
2	LP_Signal_02	Yes
3	LP_Signal_03	NO
4	LP_Signal_04	Yes
5	LP_Signal_05	Yes
6	LP_Signal_06	Yes
7	LP_Signal_07	Yes
8	LP_Signal_08	Yes
9	LP_Signal_09	Yes
10	LP_Signal_10	Yes
11	LP_Signal_11	Yes
12	LP_Signal_12	Yes
13	LP_Signal_13	Yes
14	LP_Signal_14	NO
15	LP_Signal_15	Yes
16	LP_Signal_16	No
17	LP_Signal_17	Yes
18	LP_Signal_18	Yes
19	LP_Signal_19	Yes
20	LP_Signal_20	Yes
21	LP_Signal_21	NO
22	LP_Signal_22	Yes
23	LP_Signal_23	Yes
24	LP_Signal_24	Yes
25	LP_Signal_25	Yes
26	LP_Signal_26	NO
27	LP_Signal_27	Yes
28	LP_Signal_28	Yes
29	LP_Signal_29	Yes
30	LP_Signal_30	Yes
Detection Rate		83%

Radar6 Statical Performances		
Trial #	Hoping Frequency Sequence Name	Detection(Yes / No)
1	HOP_FREQ_SEQ_01	Yes
2	HOP_FREQ_SEQ_02	Yes
3	HOP_FREQ_SEQ_03	NO
4	HOP_FREQ_SEQ_04	Yes
5	HOP_FREQ_SEQ_05	Yes
6	HOP_FREQ_SEQ_06	Yes
7	HOP_FREQ_SEQ_07	Yes
8	HOP_FREQ_SEQ_08	Yes
9	HOP_FREQ_SEQ_09	Yes
10	HOP_FREQ_SEQ_10	Yes
11	HOP_FREQ_SEQ_11	NO
12	HOP_FREQ_SEQ_12	NO
13	HOP_FREQ_SEQ_13	Yes
14	HOP_FREQ_SEQ_14	Yes
15	HOP_FREQ_SEQ_15	Yes
16	HOP_FREQ_SEQ_16	Yes
17	HOP_FREQ_SEQ_17	Yes
18	HOP_FREQ_SEQ_18	Yes
19	HOP_FREQ_SEQ_19	NO
20	HOP_FREQ_SEQ_20	Yes
21	HOP_FREQ_SEQ_21	Yes
22	HOP_FREQ_SEQ_22	Yes
23	HOP_FREQ_SEQ_23	Yes
24	HOP_FREQ_SEQ_24	Yes
25	HOP_FREQ_SEQ_25	NO
26	HOP_FREQ_SEQ_26	Yes
27	HOP_FREQ_SEQ_27	Yes
28	HOP_FREQ_SEQ_28	Yes
29	HOP_FREQ_SEQ_29	Yes
30	HOP_FREQ_SEQ_30	Yes
Detection Rate		83%

6.2.5 NON- OCCUPANCY PERIOD

During the 30 minutes observation time, UUT 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.

TX (A Mode)



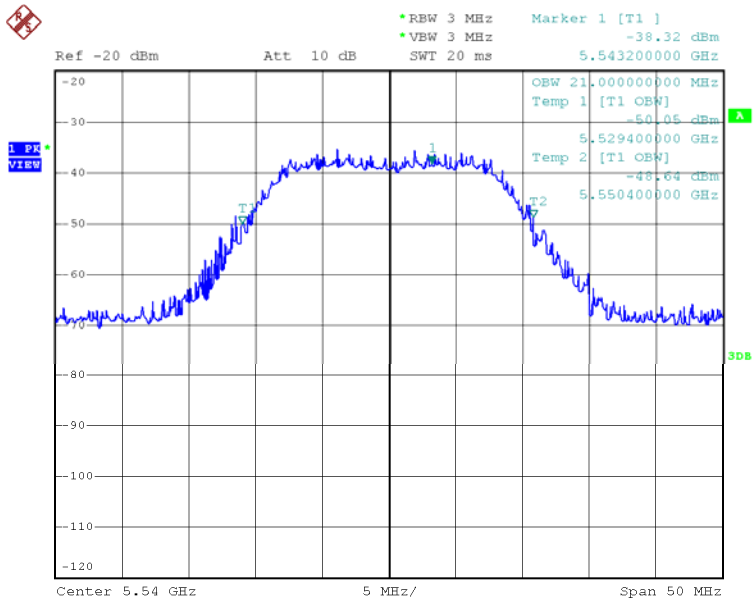
Date: 3.JUN.2012 21:19:42

6.2.6 UNIFORM SPREADING

The intention of the uniform spreading is to provide, on aggregate, a uniform loading of the spectrum. The UUT using the bands 5250 to 5350MHz and 5470 to 5600 MHz channels so that the probability of selecting a given channel shall be the same for channels. The UUT will select channel by random mode and remember this channel when detect radar signal, so that will select unused channel by random mode.

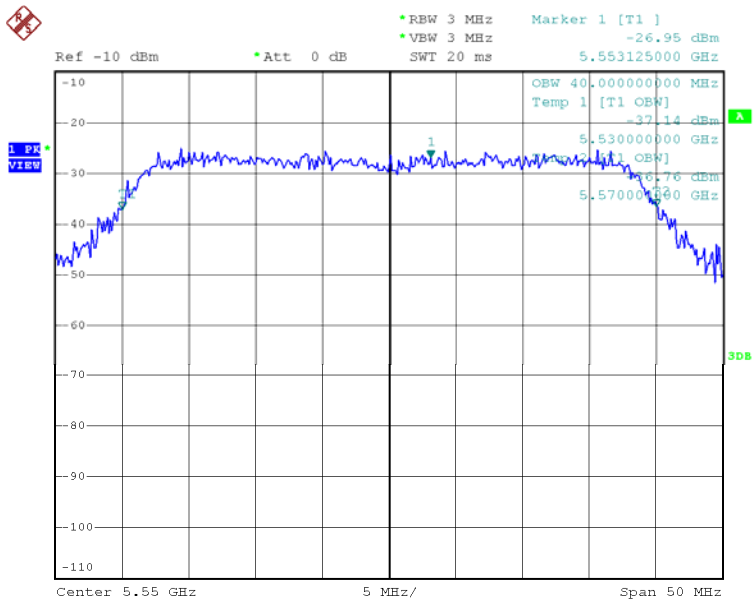
6.2.7 U-NII DETECTION BANDWIDTH

TX (A Mode)
U-NII 99% Channel bandwidth



Date: 29.JUN.2012 02:21:40

TX (N40MHz Mode)
U-NII 99% Channel bandwidth



Date: 29.JUN.2012 02:32:48

A Mode

Detection Bandwith test tranmission 20M											
EUT FREQUENCY 5540M	5540M										
EUT power bandwith :	21MHz										
Detection Bandwith limit(80%of EUT 99% Power bandwith)						16.8					
Detection Bandwith(5550(fh)-5529(fl))				21							
Test Result:	PASS										
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Freq (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5529(FL)	1	1	0	1	1	1	1	0	1	0	70
5530	1	1	1	1	1	1	1	1	0	1	90
5531	1	1	1	1	1	1	1	1	1	1	100
5532	1	1	1	1	1	1	1	1	1	1	100
5533	1	1	1	1	1	1	1	1	1	1	100
5534	1	1	1	1	1	1	1	1	1	1	100
5535	1	1	1	1	1	1	1	1	1	1	100
5536	1	1	1	1	1	1	1	1	1	1	100
5537	1	1	1	1	1	1	1	1	1	1	100
5538	1	1	1	1	1	1	1	1	1	1	100
5539	1	1	1	1	1	1	1	1	1	1	100
5540	1	1	1	1	1	1	1	1	1	1	100
5541	1	1	1	1	1	1	1	1	1	1	100
5542	1	1	1	1	1	1	1	1	1	1	100
5543	1	1	1	1	1	1	1	1	1	1	100
5544	1	1	1	1	1	1	1	1	1	1	100
5545	1	1	1	1	1	1	1	1	1	1	100
5546	1	1	1	1	1	1	1	1	1	1	100
5547	1	1	1	1	1	1	1	1	1	1	100
5548	1	1	1	1	1	1	1	1	1	1	100
5549	1	0	1	1	1	1	1	1	1	1	90
5550(FH)	1	1	1	1	1	0	1	1	1	1	90
5551	1	1	1	0	1	0	0	1	1	1	70

N40 Mode

Detection Bandwith test tranmission 40M											
EUT FREQUENCY	5550M										
EUT power bandwith :	40MHz										
Detection Bandwith limit(80%of EUT 99% Power bandwith)	32MHz										
Detection Bandwith(5700(fh)-5530(fl))	40										
Test Result:	PASS										
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Freq (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5529	1	1	0	1	1	0	1	0	1	0	60
5530(FL)	1	1	1	1	0	1	1	0	0	1	60
5531	1	1	1	0	1	1	1	1	0	1	80
5532	1	1	1	1	1	1	1	1	1	1	90
5533	1	1	1	1	1	1	1	0	1	1	100
5534	1	1	1	1	1	1	1	1	1	1	100
5535	1	1	1	1	1	1	1	1	1	1	100
5536	1	1	1	1	1	1	1	1	1	1	100
5537	1	1	1	1	1	1	1	1	1	1	100
5538	1	1	1	1	1	1	1	1	1	1	100
5539	1	1	1	1	1	1	1	1	1	1	100
5540	1	1	1	1	1	1	1	1	1	1	100
5541	1	1	1	1	1	1	1	1	1	1	100
5542	1	1	1	1	1	1	1	1	1	1	100
5543	1	1	1	1	1	1	1	1	1	1	100
5544	1	1	1	1	1	1	1	1	1	1	100
5545	1	1	1	1	1	1	1	1	1	1	100
5546	1	1	1	1	1	1	1	1	1	1	100
5547	1	1	1	1	1	1	1	1	1	1	100
5548	1	1	1	1	1	1	1	1	1	1	100
5549	1	1	1	1	1	1	1	1	1	1	100
5550	1	1	1	1	1	1	1	1	1	1	100
5551	1	1	1	1	1	1	1	1	1	1	100
5552	1	1	1	1	1	1	1	1	1	1	100
5553	1	1	1	1	1	1	1	1	1	1	100
5554	1	1	1	1	1	1	1	1	1	1	100
5555	1	1	1	1	1	1	1	1	1	1	100
5556	1	1	1	1	1	1	1	1	1	1	100
5557	1	1	1	1	1	1	1	1	1	1	100
5558	1	1	1	1	1	1	1	1	1	1	100
5559	1	1	1	1	1	1	1	1	1	1	100
5560	1	1	1	1	1	1	1	1	1	1	100
5561	1	1	1	1	1	1	1	1	1	1	100
5562	1	1	1	1	1	1	1	1	1	1	100
5563	1	1	1	1	1	1	1	1	1	1	100
5564	1	1	1	1	1	1	1	1	1	1	100
5565	1	1	1	1	1	1	1	1	1	1	100
5566	1	1	1	1	1	1	1	1	1	1	100
5567	1	1	1	1	1	1	0	1	1	1	90
5568	1	1	0	1	1	1	0	1	1	1	80
5569	1	0	1	0	0	1	0	1	0	1	50
5570(FH)	1	0	0	0	1	0	1	0	0	1	40

6.2.8 TEST SETUP PHOTOS