FCC DFS Test Report

FCC ID: MCLCS-E340W

This report concerns (check one): ■ **Original Grant** □ **Class II Change**

Issued Date	:	Feb. 18, 2014
Project No.	:	1308C100
Equipment	:	Cisco Edge 340
Model Name	:	CS-E340W
Applicant	:	HON HAI Precision Ind. Co., Ltd.
Address	:	5F-1, 5, Hsin-An Road, Hsinchu Science-Based Industrial Park, Hsinchu,

Tested by: Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Aug. 12, 2013
Date of Test: Aug. 12, 2013 ~ Feb. 17, 2014

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Dalang Town, Dong Guan, China.
TEL: 0769-8318-3000
FAX: 0769-8319-6000

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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Neutron's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

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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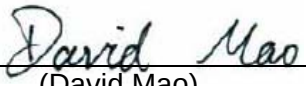
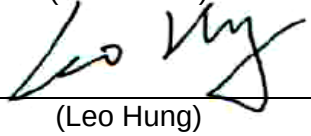
1. CERTIFICATION

Equipment	:	Cisco Edge 340
Trade Name		Cisco
Model Name.		CS-E340W
Applicant	:	HON HAI Precision Ind. Co., Ltd.
Manufacturer	:	Hon Hai Precision Ind Co, Ltd
Address	:	Hsinchu Science Park Branch Office 5F-1 5, Hsin-an Rd Hsinchu Science Based Industrial Park Hsinchu, Taiwan
Factory	:	HONG FU JIN PRECISION INDUSTRY (SHEN ZHEN) CO LTD
Address	:	Bldg D10, F21, No 2, 2 nd DONGGUAN RD, 10 th YOUSONG INDUSTRIAL DISTRICT, LONGHUA TOWN, BAOAN, SHENZHEN, GUANGDONG, CHINA.
Date of Test:	:	Aug. 12, 2013 ~ Feb. 17, 2014
Test Item	:	ENGINEERING SAMPLE
Standard(s)	:	FCC Part 15, Subpart E (Section 15.407) FCC 06-96

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.
This test report consists of 45 pages in total.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-7-1308C100) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

Test result included in this report is only for the DFS Slave Mode part of the product.

Testing Engineer : 
(David Mao)

Technical Manager : 
(Leo Hung)

Authorized Signatory : 
(Steven Lu)

2. EUT INFORMATION

2.1 EUT SPECIFICATION TABLE

Table 1: Specification of EUT

Product name	Cisco Edge 340
Brand Name	Cisco
Model	CS-E340W
FCC ID	MCLCS-E340W
Software Version	SW 0.8
Firmware Version	01S1
Operational Mode	Slave
Operating Frequency Range	5250MHz~5350MHz&5470MHz~5725MHz
Modulation	OFDM

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

2.2 DESCRIPTION OF AVAILABLE ANTENNAS TO THE EUT

Table 2: Antenna list.

Group 1

Ant.	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)
1	FOXCONN	FX01G64-0G-EF	Integral Antenna	N/A	3.7
2	FOXCONN	FX01G65-0G-EF	Integral Antenna	N/A	2.3

Group 2

Ant.	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)
3	FOXCONN	FX01G67-0G-EF	Dipole Antenna	SMA Connector	3.59
4	FOXCONN	FX01G67-0G-EF	Dipole Antenna	SMA Connector	3.59

Note:
This external dipole antenna can be connected to the EUT either directly or by a external cable, after assessing it is the worst case when the antenna is connected to the EUT by the external cable.

2.3 CONDUCTED OUTPUT POWER AND EIRP POWER

TABLE 3: THE CONDUCTED OUTPUT POWER LIST

TX (11a) for Integral Antenna

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5250~5350	15.00	31.6228
5470~5725	15.00	31.6228

TX (11n 40MHz) for Integral Antenna

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5250~5350	10.35	10.8393
5470~5725	10.75	11.8850

TX (11a) for Dipole Antenna with external cable

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5250~5350	15.03	31.8420
5470~5725	15.12	32.5087

TX (11n 40MHz) for Dipole Antenna with external cable

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5250~5350	10.40	10.9648
5470~5725	10.36	10.8643

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

TABLE 4: THE MAX EIRP LIST

TX (11a) for Integral Antenna

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5250~5350	18.70	74.1310
5470~5725	18.70	74.1310

TX (11n 40MHz) for Integral Antenna

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5250~5350	14.05	25.4097
5470~5725	14.45	27.8612

TX (11a) for Dipole Antenna with external cable

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5250~5350	18.73	76.6449
5470~5725	18.82	76.2079

TX (11n 40MHz) for Dipole Antenna with external cable

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER(dBm)	OUTPUT POWER(mW)
5250~5350	14.10	25.7040
5470~5725	14.06	25.4683

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	Calibration Until
EXA Specturm Analyzer	Agilent	N9010A	MY50520044	2014-04-25
Signal Generator	Agilent	E4438C	My49071316	2014-04-25
POWER SPLITTER	Mini-Cicuits	ZFRSC-123-S+	331000910	2014-04-25
POWER SPLITTER	Mini-Cicuits	ZN4PD1-63-S+	SF933501045	2014-04-25
POWER SPLITTER	Mini-Cicuits	ZN2PD-9G-S+	SF012700714	2014-04-25
attenuator	Mini-Cicuits	VAT-30+	30912	2014-04-25
attenuator	Mini-Cicuits	VAT-10+	30909	2014-04-25
Specturm Analyzer	R&S	FSL6	1004423	2014-11-24
PC	Dell 745	DCSM	G7K832X	--
Netbook	Hp	HSTNN-I69C-3	CNU02203XG	--

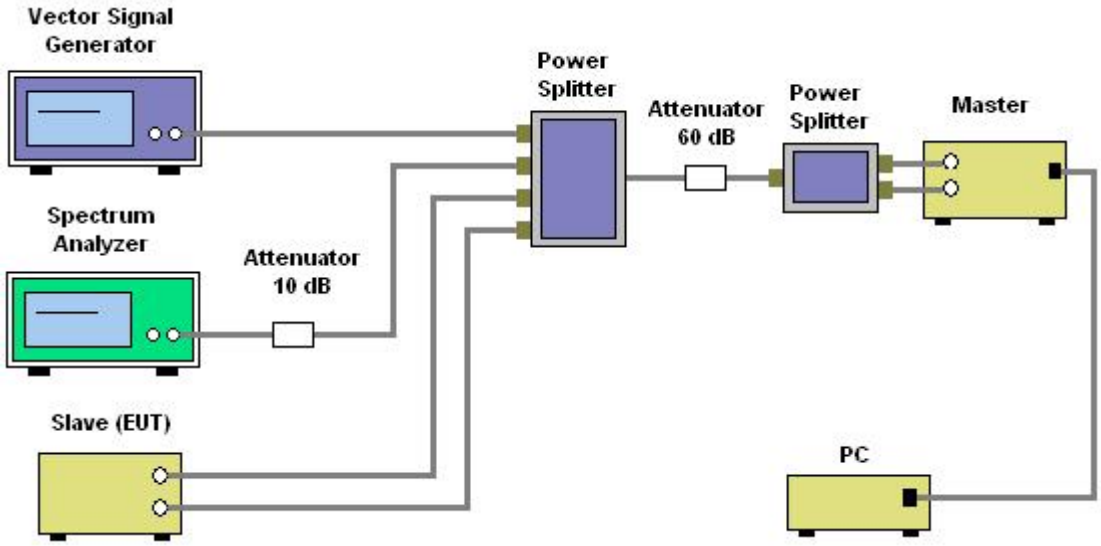
Note: Calibration interval of instruments listed above is one year.

5. EMC EMISSION TEST

5.1 DFS MEASUREMENT SYSTEM:

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM

Slave without Radar Detection Conducted Measurement



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.

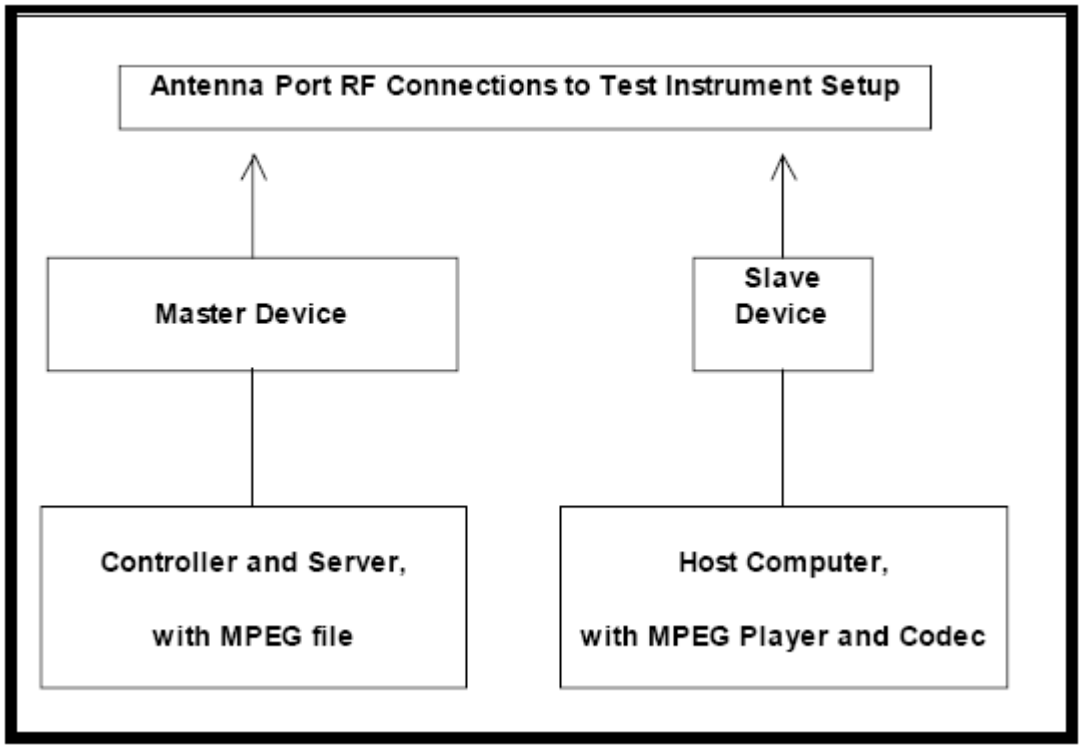
The signal monitoring equipment consists of a spectrum analyzer set to display 8001 bins on the horizontal axis. The time-domain resolution is 2 msec / bin with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. The aggregate ON time is calculated by multiplying the number 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	No Applicable	N/A
15.407	Channel Availability Check Time	Not Applicable	N/A
15.407	Channel Move Time	Applicable	Pass
15.407	Channel Closing Transmission Time	Applicable	Pass
15.407	Non- Occupancy Period	Not Applicable	N/A
15.407	Uniform Spreading	Not Applicable	N/A
15.407	U-NII Detection Bandwidth	Not Applicable	N/A

6.2 DETELED TEST RESULTS

Clause	Test Parameter	Remarks	Pass/Fail
15.407	DFS Detection Threshold	No Applicable	N/A
15.407	Channel Availability Check Time	Not Applicable	N/A
15.407	Channel Move Time	Applicable	Pass
15.407	Channel Closing Transmission Time	Applicable	Pass
15.407	Non- Occupancy Period	Not Applicable	N/A
15.407	Uniform Spreading	Not Applicable	N/A
15.407	U-NII Detection Bandwidth	Not Applicable	N/A

6.2.1 TEST MODE: DEVICE OPERATING IN MASTER MODE.

The EUT is slave equipment, it need a master device when testing.
Master with injection at the Master. (Radar Test Waveforms are injected into the Master)

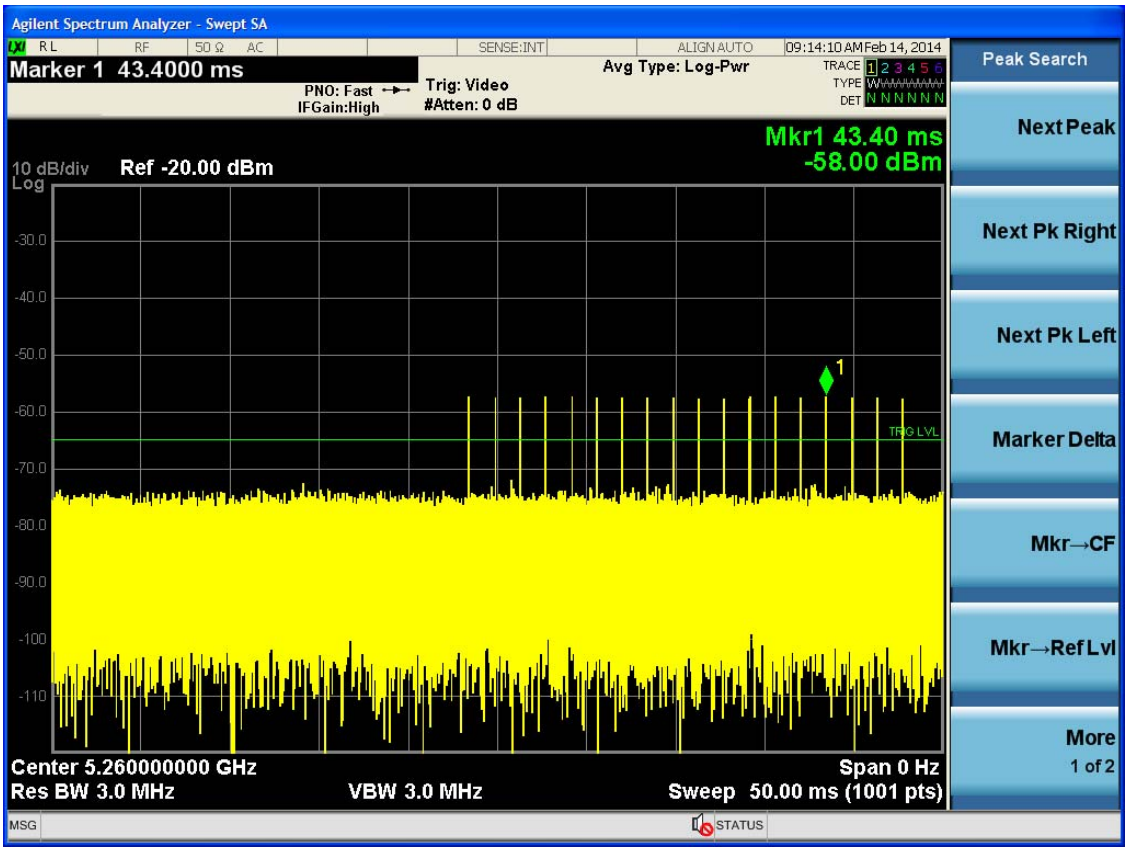
6.2.2 DFS DETECTION THRESHOLD

Calibration:

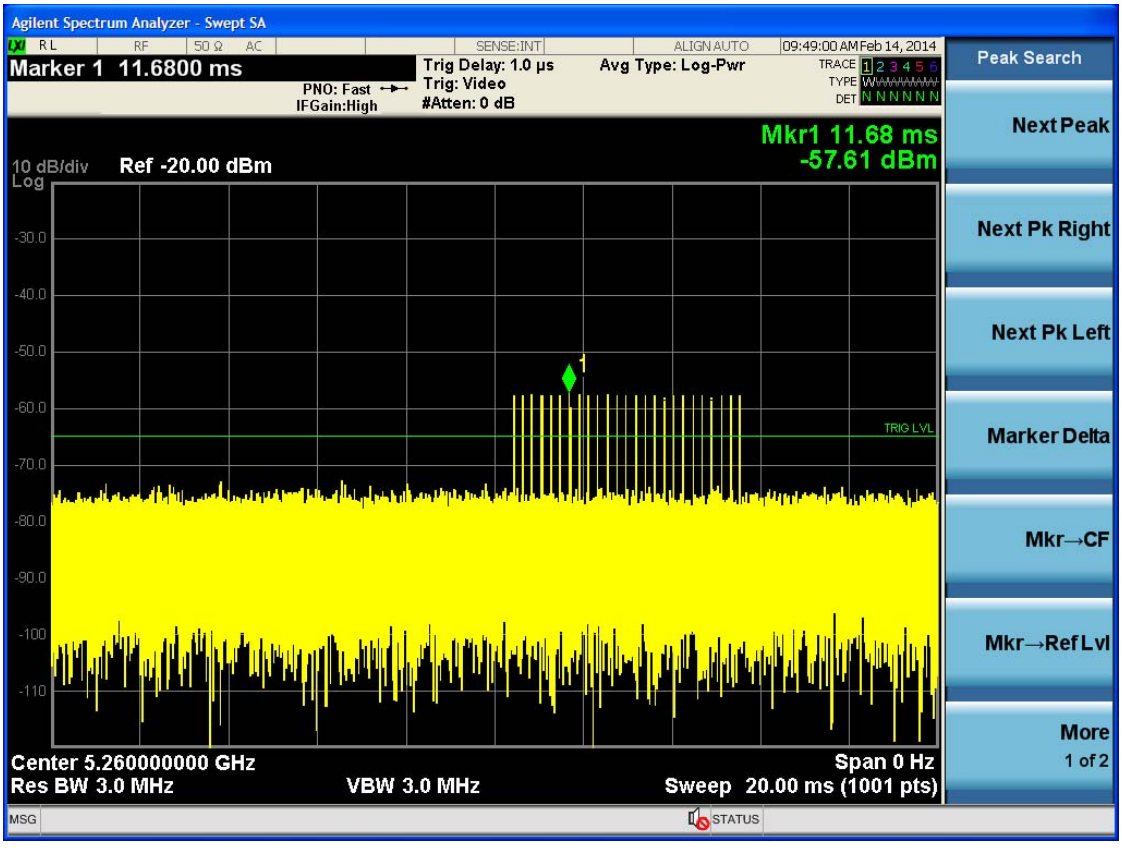
The EUT is slave equipment and it with a max gain is 3.7dBi of group 1 antenna.
For a detection threshold level of -62dBm and the master antenna gain is 4.4dBi, required detection threshold is -57.6dBm (= -62+4.4).

Note: Maximum Transmit Power is less than 200 milliwatt in this report, so detection threshold level is -62dBm (please refer to Table 7 [page 8]).

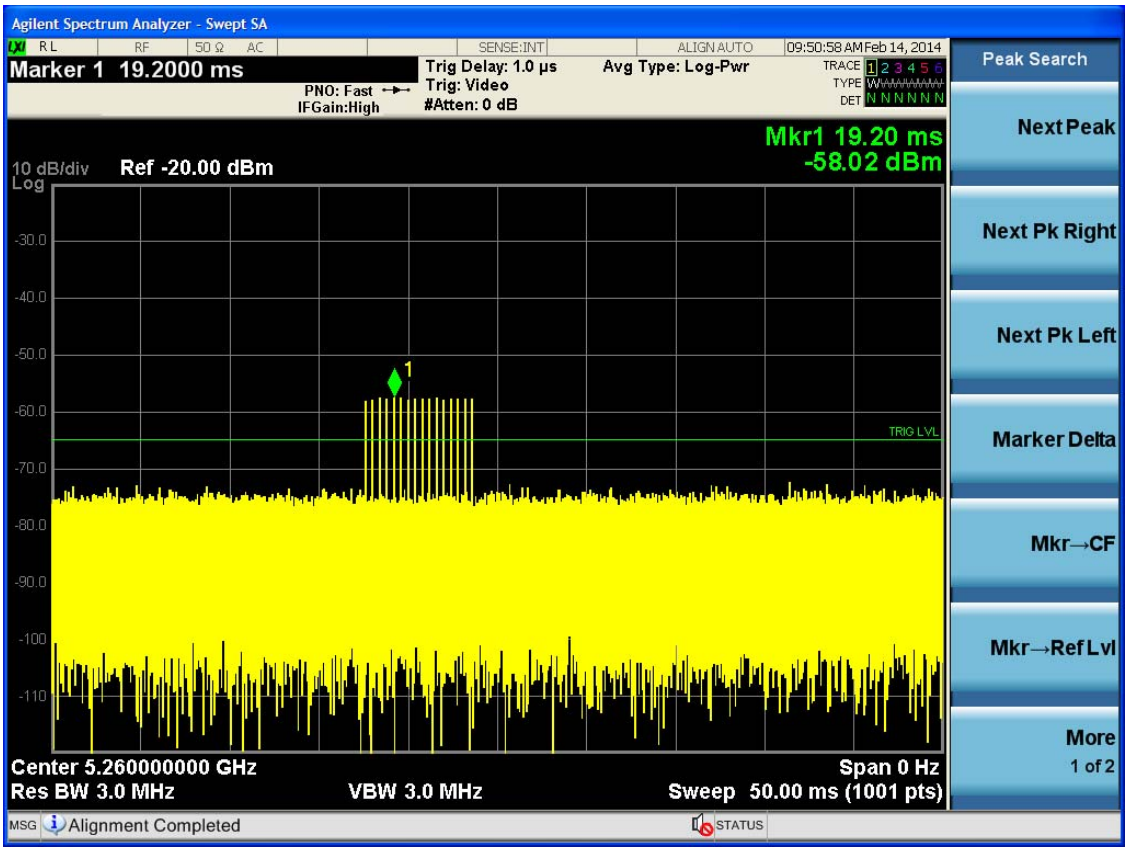
Radar Signal 1



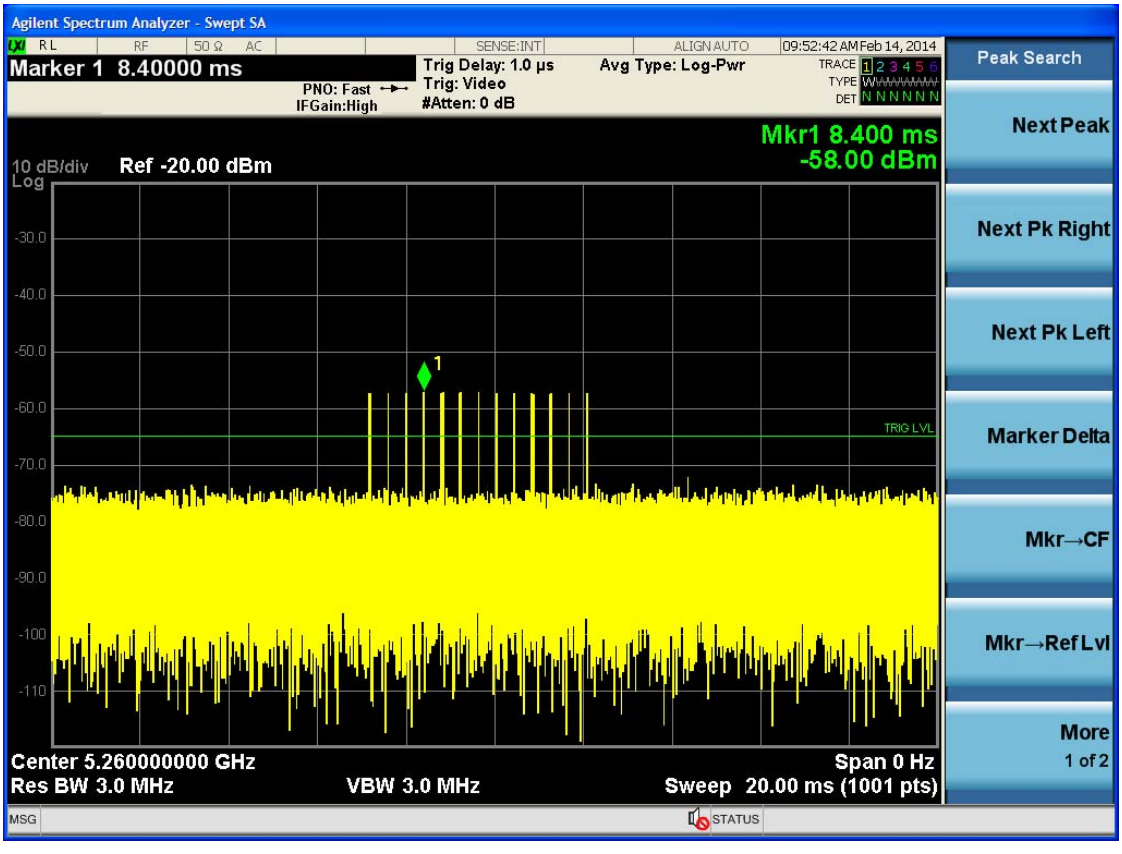
Radar Signal 2



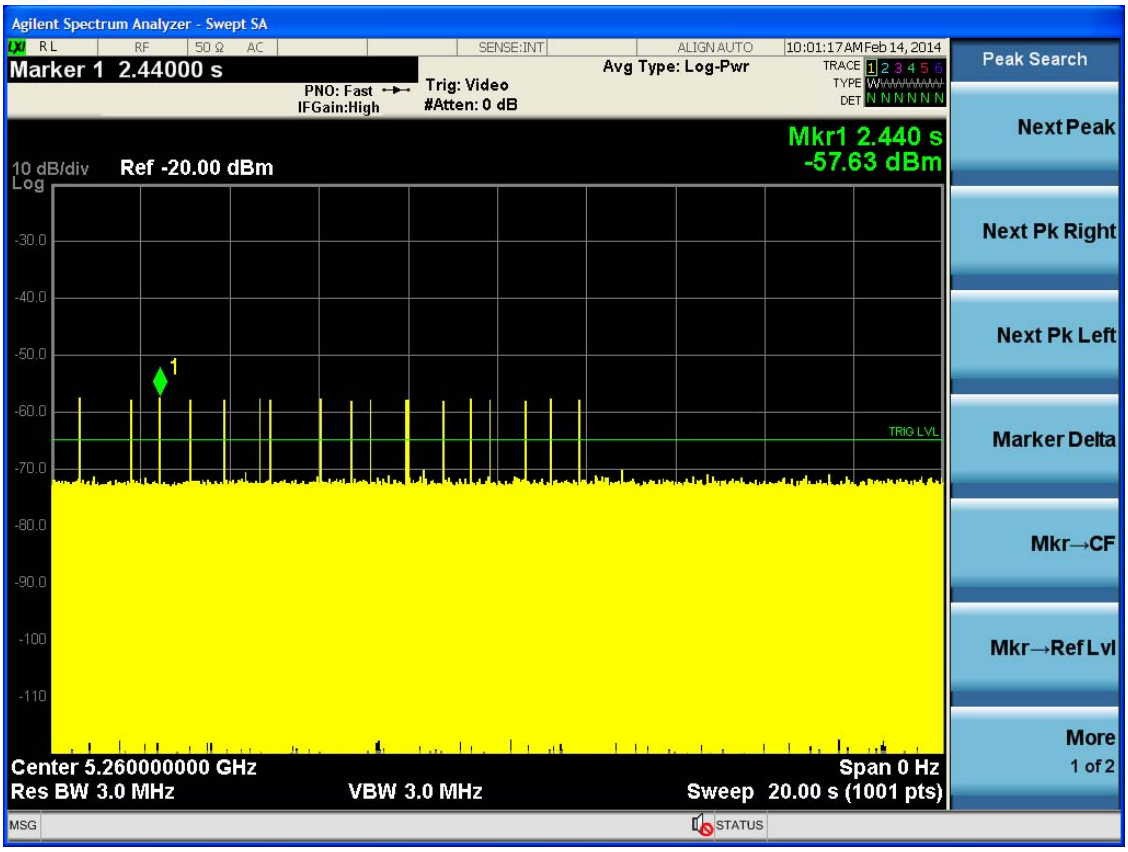
Radar Signal 3



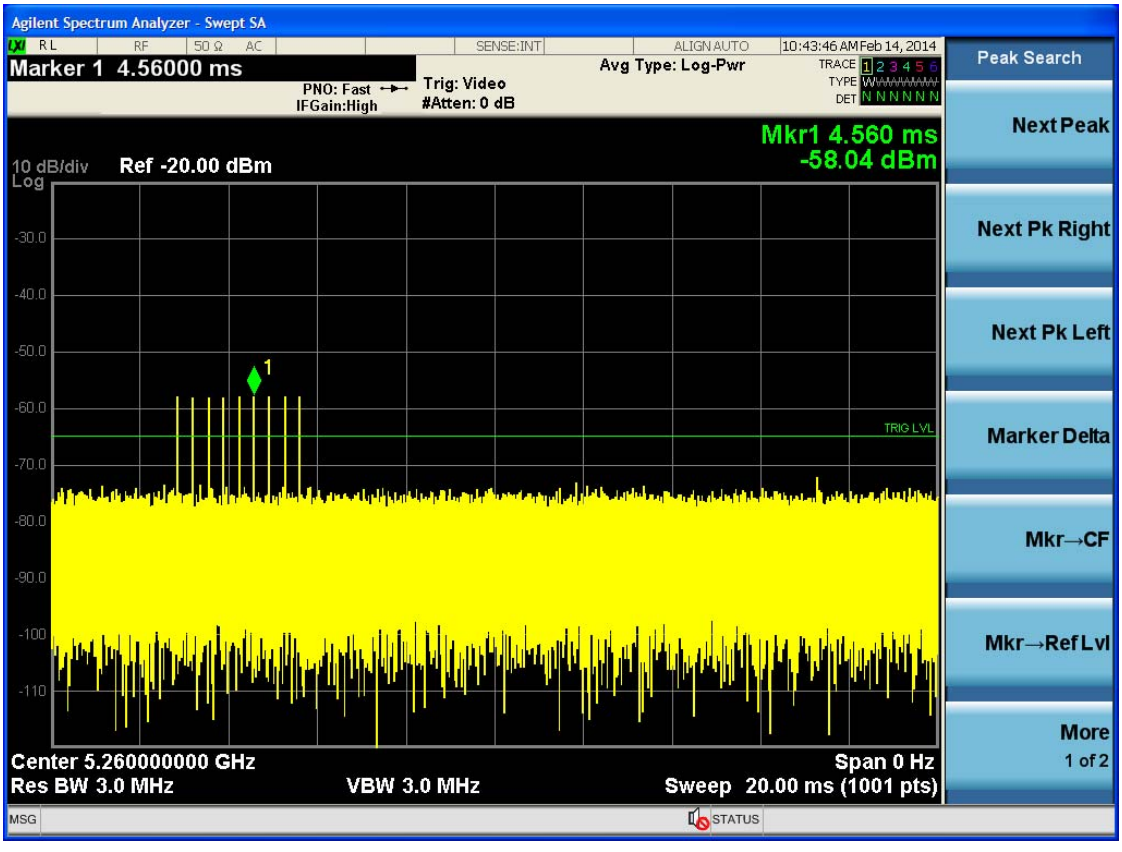
Radar Signal 4



Radar Signal 5



Radar Signal 6



6.2.4 CHANNEL CLOSING TRANSMISSION AND CHANNEL MOVE TIME WLAN TRAFFIC

TX (11a Mode)

Table 1: Short Pulse Radar Test Waveforms.

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Pass times	Fail times	Percentage of Successful Detection (%)
1	1	1428	18	27	3	90
2	1-5	150-230	23-29	27	3	90
3	6-10	200-500	16-18	28	2	93
4	11-20	200-500	12-16	28	2	93
Aggregate (Radar Types 1-4)			-	110	10	92

Table 2: Long Pulse Radar Test Waveform

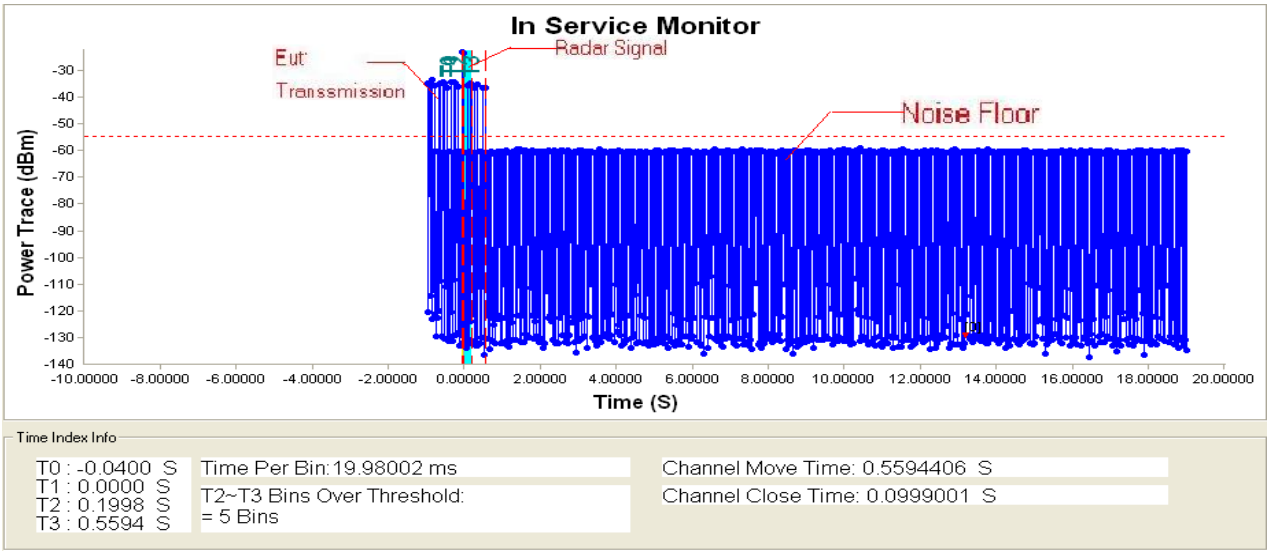
Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Numberof Pulses Per Burst	Numbe rof Bursts	Pass times	Fail times	Percentage of SuccessfulD etection (%)
5	50-100	5-20	1000-2000	1-3	8-20	28	2	93

Table 3: Frequency Hopping Radar Test Waveform

Rad ar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Pass times	Fail times	Percentage of SuccessfulD etection (%)
6	1	333	9	0.333	300	28	2	93

TX (11a Mode)

Radar signal 1



Time Index Info

T0 : -0.0400 S
T1 : 0.0000 S
T2 : 0.1998 S
T3 : 0.5594 S

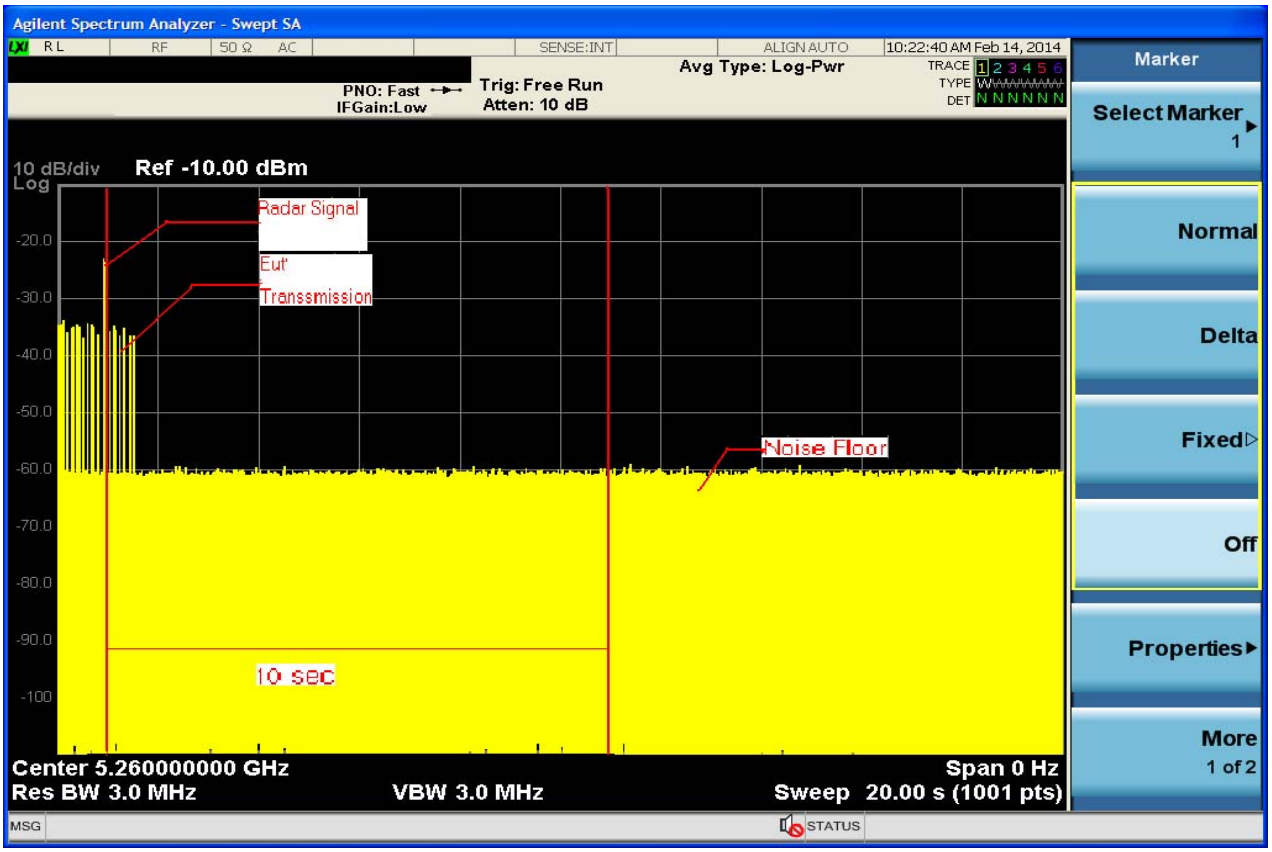
Time Per Bin: 19.98002 ms

T2~T3 Bins Over Threshold:
= 5 Bins

Channel Move Time: 0.5594406 S

Channel Close Time: 0.0999001 S

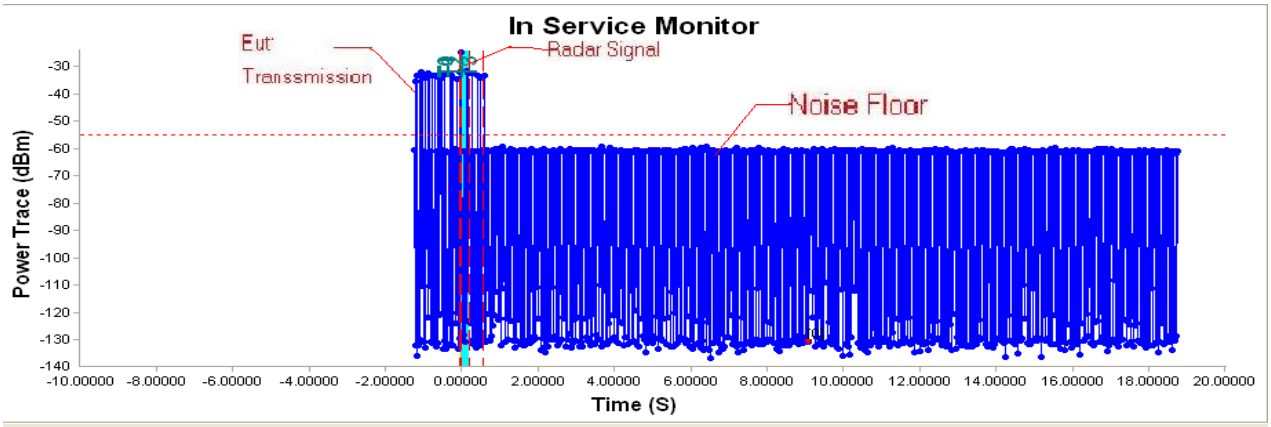
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



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

TX (11a Mode)

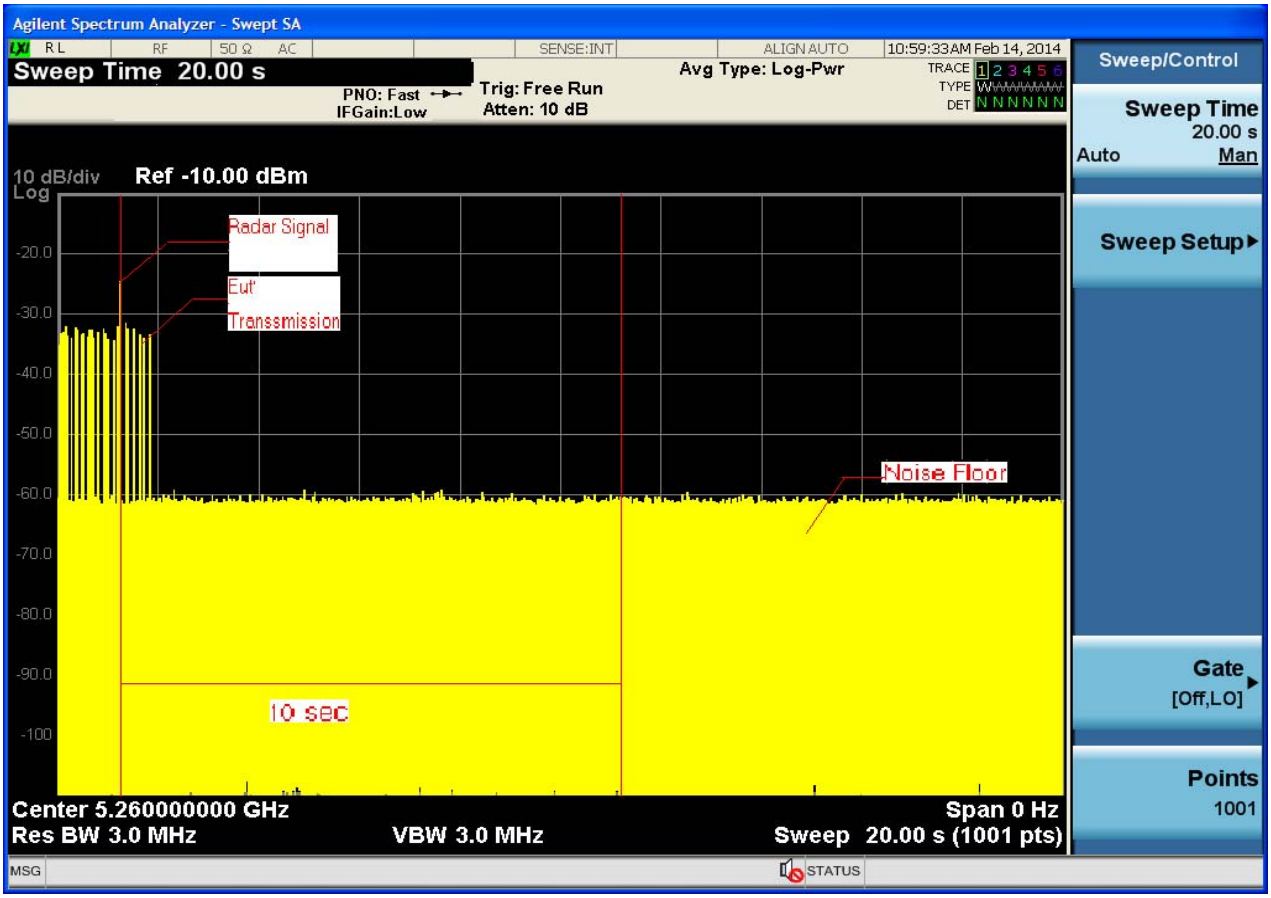
Radar signal 2



Time Index Info

T0 : 0.0000 S	Time Per Bin: 19.98002 ms	Channel Move Time: 0.5994006 S
T1 : 0.0000 S	T2~T3 Bins Over Threshold:	Channel Close Time: 0.0799201 S
T2 : 0.1998 S	= 4 Bins	
T3 : 0.5994 S		

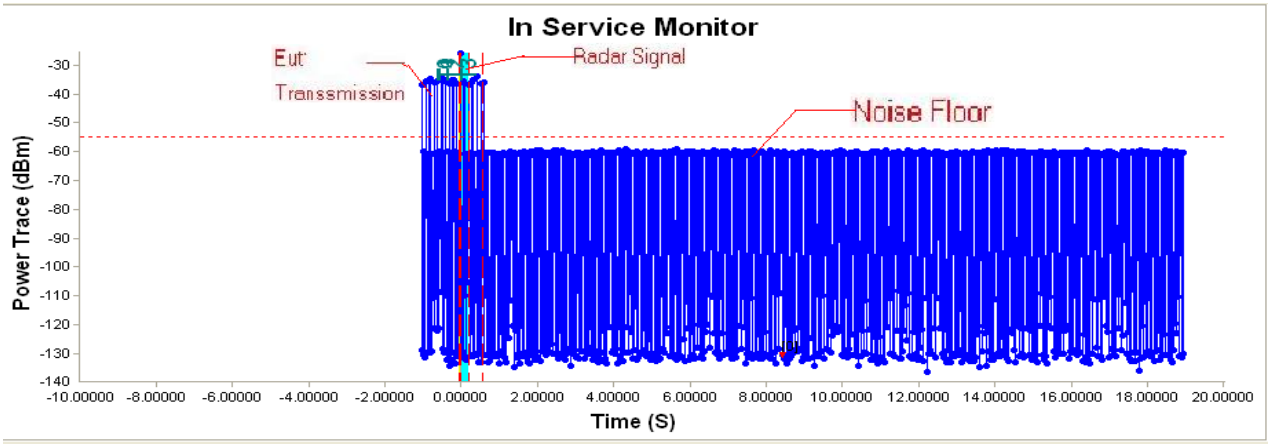
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



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

TX (11a Mode)

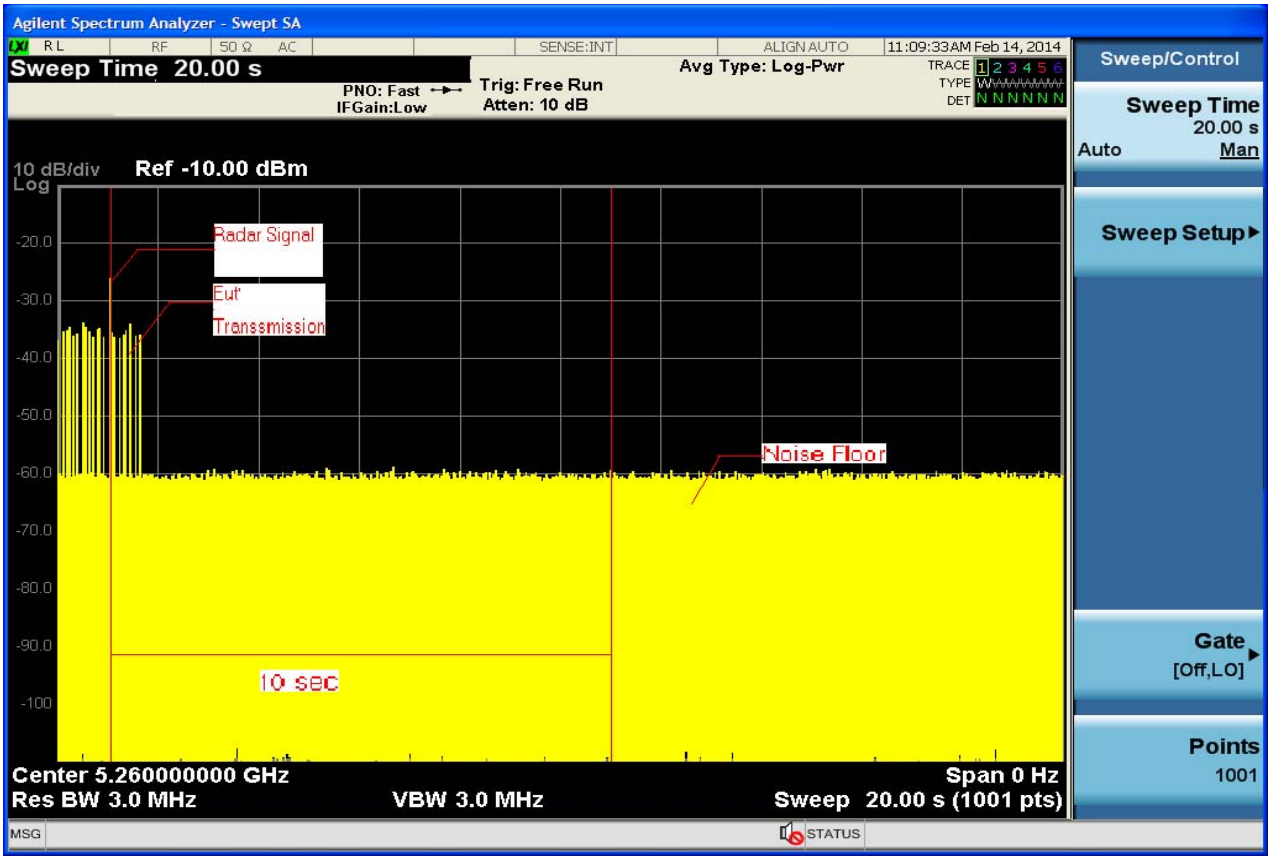
Radar signal 3



Time Index Info

T0 : 0.0000 S T1 : 0.0000 S T2 : 0.1998 S T3 : 0.5994 S	Time Per Bin: 19.98002 ms T2~T3 Bins Over Threshold: = 6 Bins	Channel Move Time: 0.5994006 S Channel Close Time: 0.1198801 S

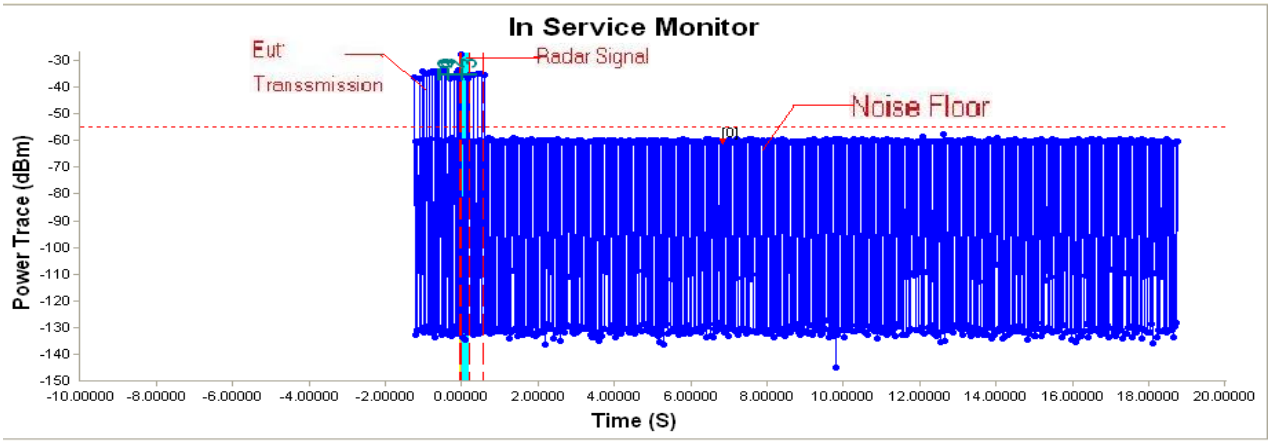
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



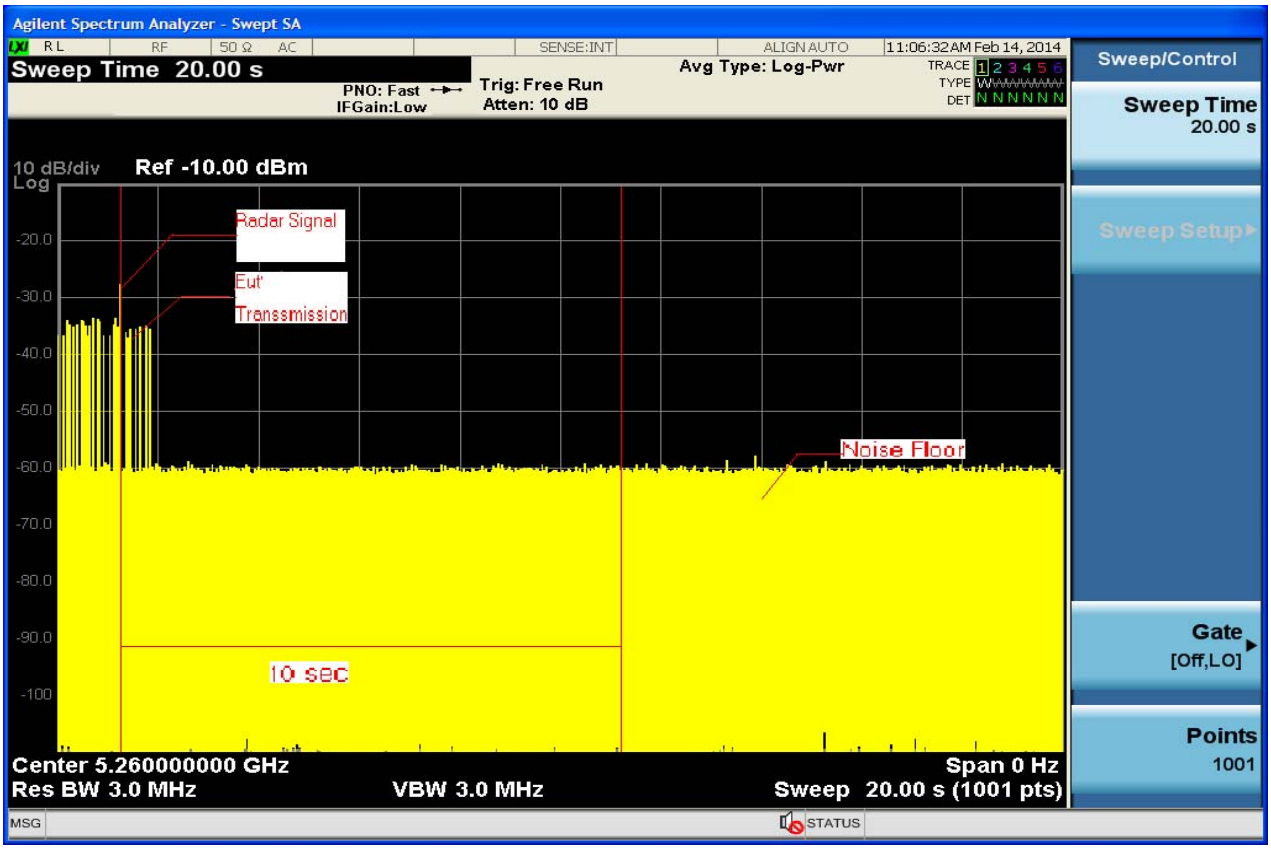
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (11a Mode)

Radar signal 4



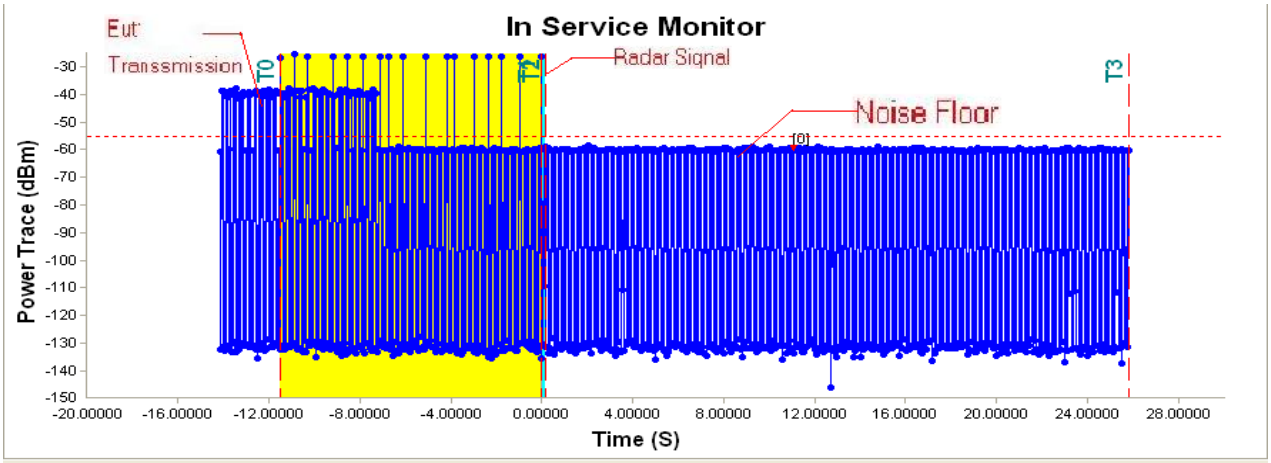
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



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

TX (11a Mode)

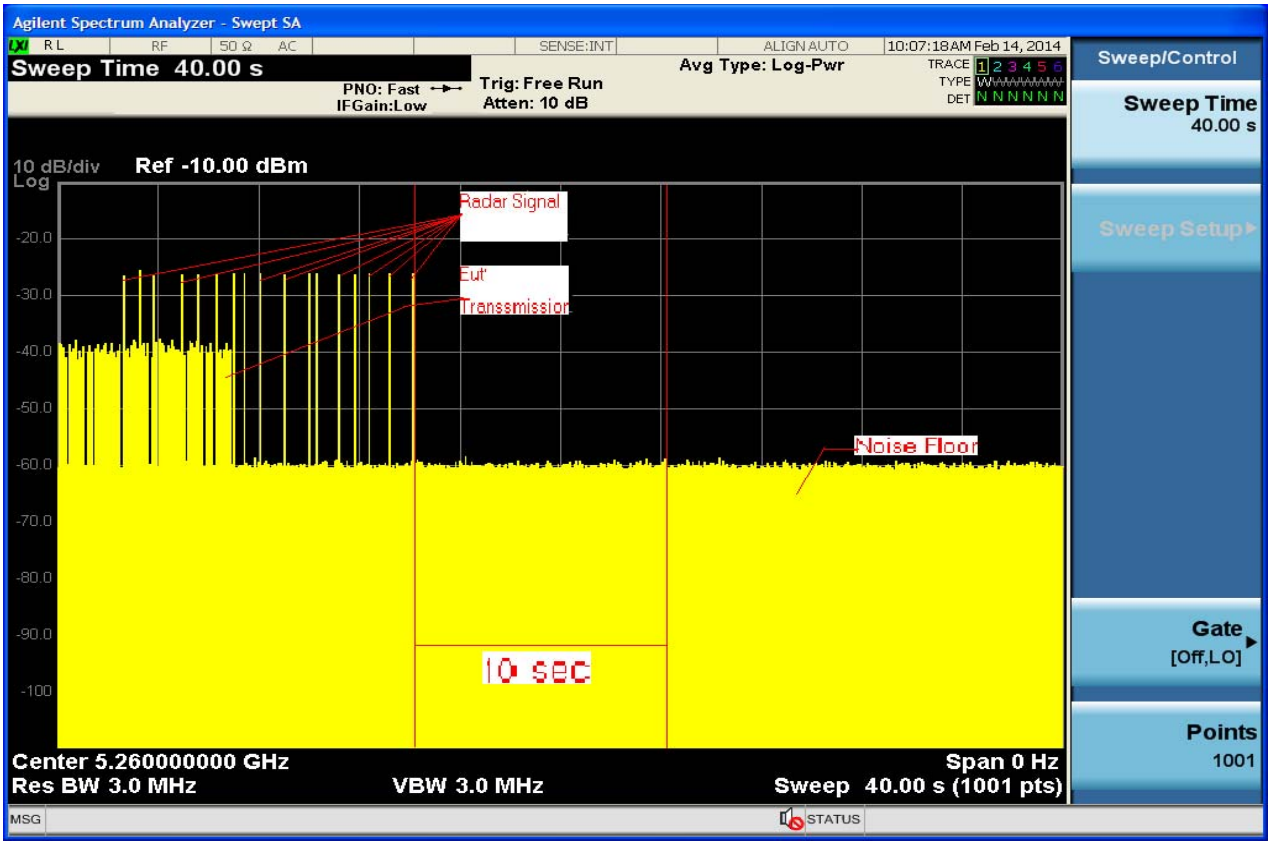
Radar signal 5



Time Index Info

T0 : -11.5085 S	Time Per Bin:39.96004 ms	Channel Move Time: 25.8141858 S
T1 : 0.0000 S	T2~T3 Bins Over Threshold:	Channel Close Time: 0.0 S
T2 : 0.1998 S	= 0 Bins	
T3 : 25.8142 S		

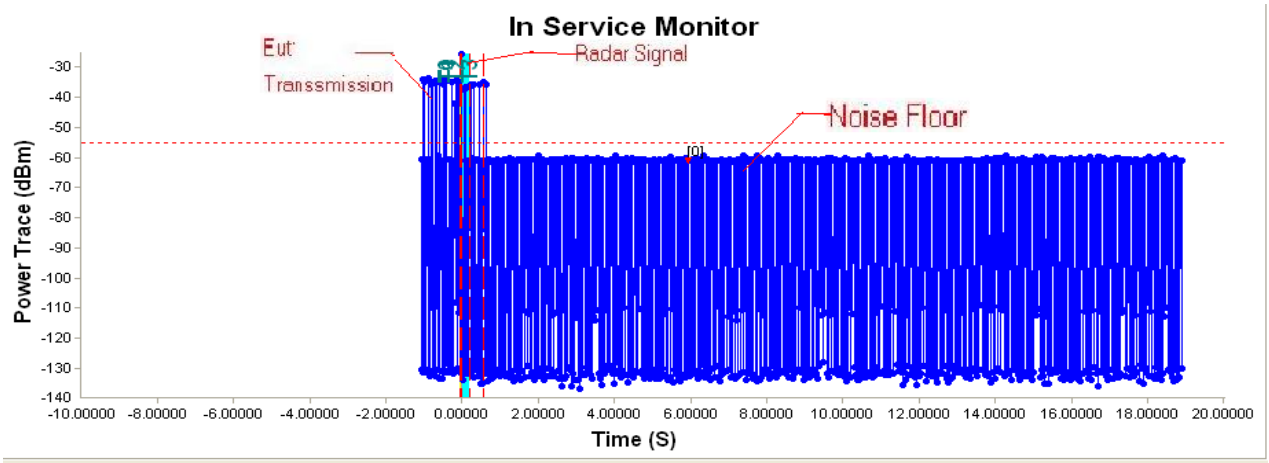
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



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

TX (11a Mode)

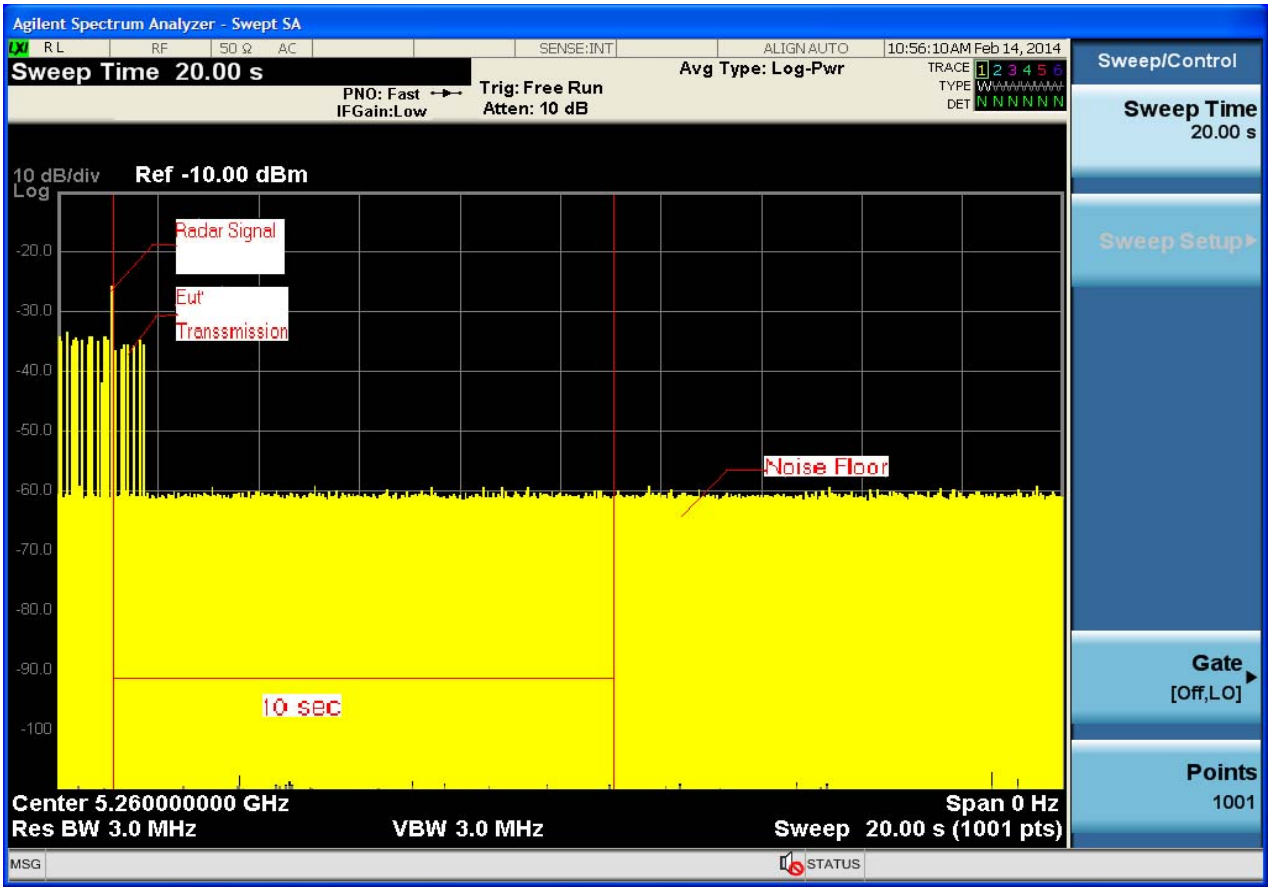
Radar signal 6



Time Index Info

T0 : 0.0000 S	Time Per Bin:19.98002 ms	Channel Move Time: 0.6393606 S
T1 : 0.0000 S	T2~T3 Bins Over Threshold:	Channel Close Time: 0.1198801 S
T2 : 0.1998 S	= 6 Bins	
T3 : 0.6394 S		

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 (11a 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	NO
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	YES
10	18	1.0u	1.428	YES
11	18	1.0u	1.428	YES
12	18	1.0u	1.428	NO
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	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	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	23	3.4u	222	YES
2	25	4.0u	200	YES
3	25	2.1u	193	YES
4	26	3.4u	228	YES
5	23	4.0u	216	NO
6	23	2.7u	225	YES
7	28	2.7u	221	YES
8	29	2.2u	227	YES
9	27	1.3u	169	YES
10	26	1.4u	158	NO
11	24	4.5u	220	YES
12	28	3.3u	168	YES
13	25	2.4u	209	YES
14	24	2.8u	204	YES
15	26	2.7u	225	YES
16	28	2.9u	224	YES
17	27	1.8u	207	YES
18	23	2.0u	158	YES
19	25	2.3u	208	YES
20	27	3.0u	160	YES
21	25	2.3u	189	YES
22	24	3.0u	186	YES
23	28	1.2u	176	NO
24	29	1.0u	176	YES
25	29	1.3u	221	YES
26	28	1.4u	159	YES
27	24	4.5u	220	YES
28	26	3.3u	201	YES
29	25	2.4u	163	YES
30	26	3.8u	151	YES
Detection Rate 90%				

Radar3 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	16	6.6u	492	YES
2	17	8.8u	480	YES
3	16	9.5u	216	NO
4	18	9.5u	224	YES
5	16	8.6u	477	YES
6	17	8.2u	246	YES
7	17	8.7u	213	YES
8	17	9.0u	482	YES
9	18	8.2u	436	YES
10	16	8.7u	447	NO
11	18	9.0u	310	YES
12	18	9.8u	481	YES
13	17	10.0u	269	YES
14	16	7.9u	447	YES
15	16	8.8u	310	YES
16	18	7.6u	481	YES
17	18	7.9u	269	YES
18	16	6.0u	463	YES
19	18	9.9u	445	YES
20	18	8.5u	442	YES
21	17	8.0u	414	YES
22	16	8.6u	450	YES
23	17	8.4u	206	YES
24	16	9.3u	248	YES
25	17	8.5u	386	YES
26	17	8.2u	258	YES
27	18	8.7u	269	YES
28	18	9.0u	431	YES
29	17	9.8u	330	YES
30	16	7.5u	420	YES
				Detection Rate 93%

Radar4 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	16	12.7u	365	YES
2	15	19.8u	282	YES
3	16	11.0u	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	NO
8	15	14.9u	463	YES
9	15	15.8u	445	YES
10	14	14.6u	409	YES
11	14	13.9u	398	YES
12	15	16.0u	364	YES
13	16	16.6u	367	YES
14	15	12.7u	258	YES
15	14	12.0u	445	YES
16	13	13.8u	442	YES
17	15	14.9u	405	YES
18	15	15.8u	463	YES
19	15	14.6u	445	YES
20	12	13.9u	447	YES
21	13	16.0u	410	NO
22	16	17.0u	481	YES
23	15	15.3u	492	YES
24	15	14.0u	463	YES
25	15	15.3u	445	YES
26	13	14.0u	442	YES
27	14	15.6u	250	YES
28	15	17.0u	478	YES
29	16	19.3u	350	YES
30	15	13.0u	496	YES
				Detection Rate 93%

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	Yes
7	LP_Signal_07	Yes
8	LP_Signal_08	Yes
9	LP_Signal_09	Yes
10	LP_Signal_10	No
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	Yes
22	LP_Signal_22	Yes
23	LP_Signal_23	No
24	LP_Signal_24	Yes
25	LP_Signal_25	Yes
26	LP_Signal_26	Yes
27	LP_Signal_27	Yes
28	LP_Signal_28	Yes
29	LP_Signal_29	Yes
30	LP_Signal_30	Yes
Detection Rate		93%

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	Yes
4	HOP_FREQ_SEQ_04	No
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	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	Yes
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	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		93%

TX (11n 40MHz Mode)

Table 1: Short Pulse Radar Test Waveforms.

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Pass times	Fail times	Percentage of Successful Detection (%)
1	1	1428	18	28	2	93%
2	1-5	150-230	23-29	27	3	90%
3	6-10	200-500	16-18	28	2	93%
4	11-20	200-500	12-16	28	2	93%
Aggregate (Radar Types 1-4)			-	113	7	93%

Table 2: Long Pulse Radar Test Waveform

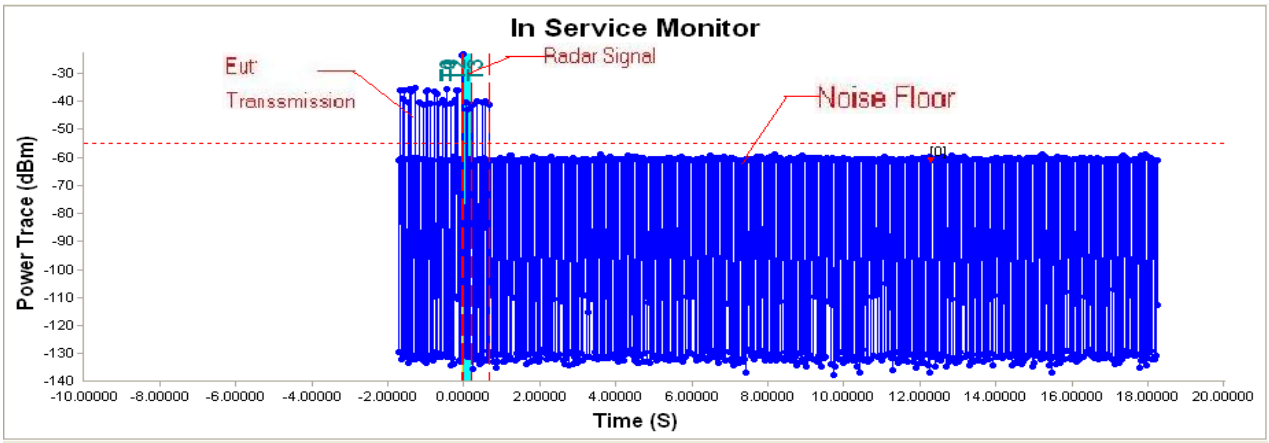
Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Numberof Pulses Per Burst	Numbe rof Bursts	Pass times	Fail times	Percentage of SuccessfulD etection (%)
5	50-100	5-20	1000-2000	1-3	8-20	28	2	93%

Table 3: Frequency Hopping Radar Test Waveform

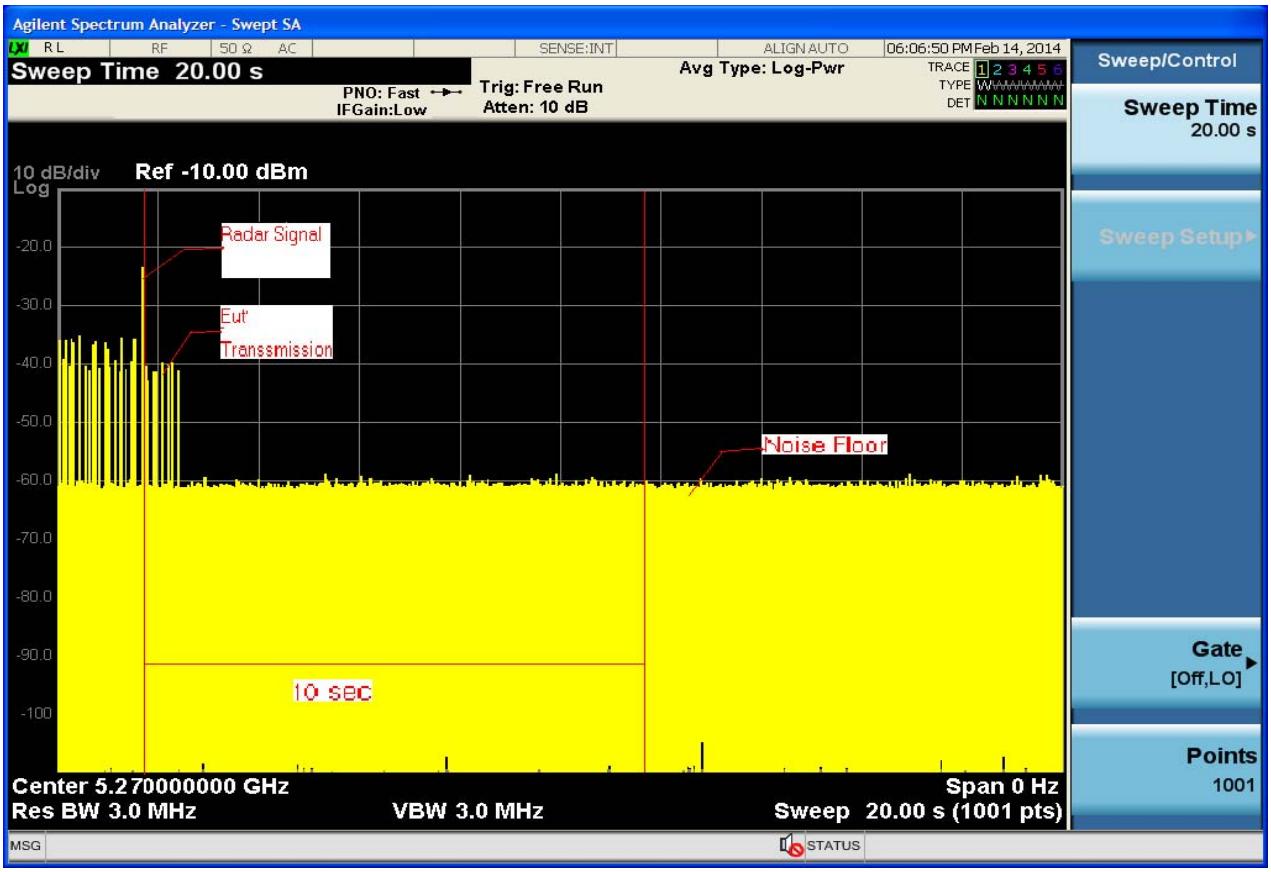
Rad ar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Pass times	Fail times	Percentage of SuccessfulD etection (%)
6	1	333	9	0.333	300	27	3	90%

TX (11n 40MHz Mode)

Radar signal 1



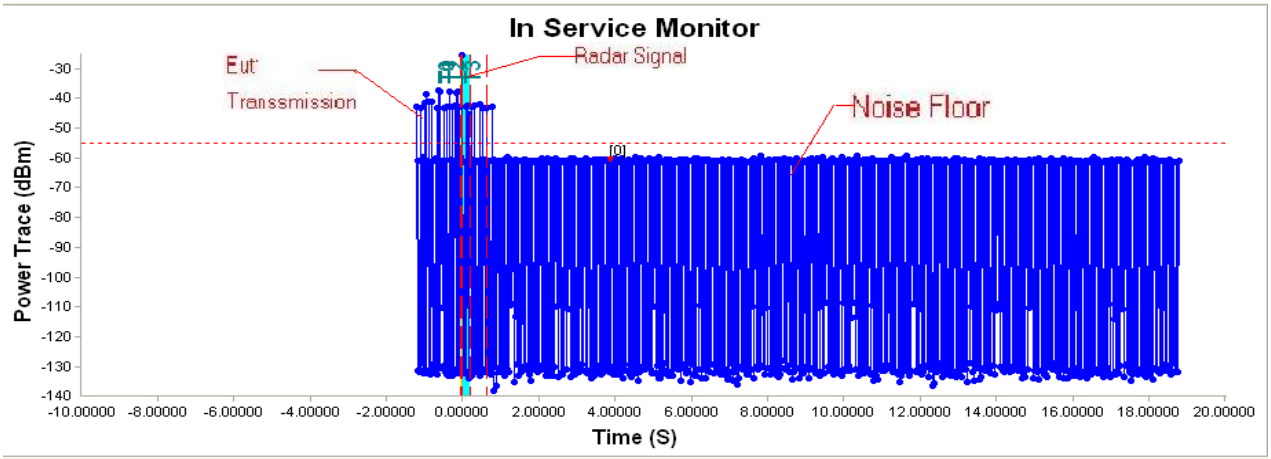
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



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

TX (11n 40MHz Mode)

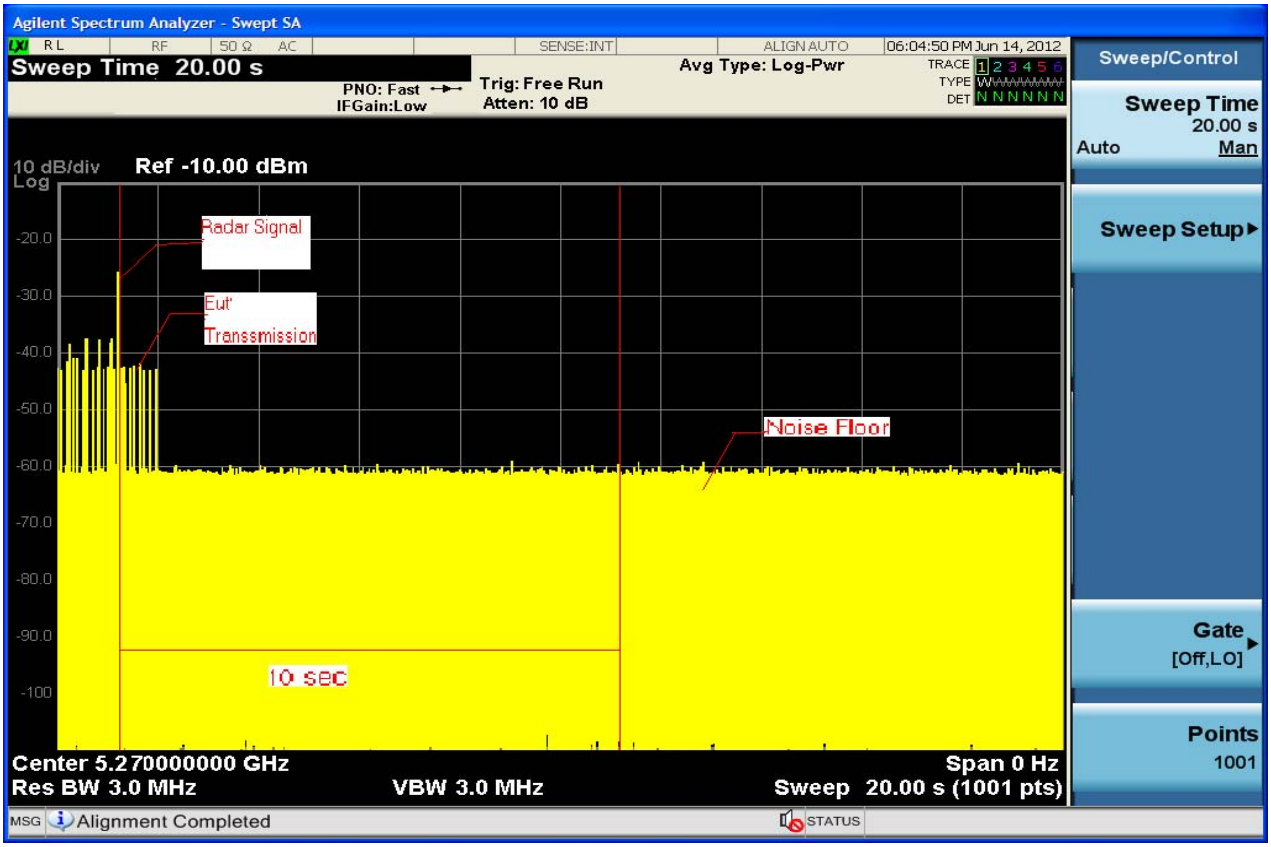
Radar signal 2



Time Index Info

T0 : 0.0000 S T1 : 0.0000 S T2 : 0.1998 S T3 : 0.7592 S	Time Per Bin:19.98002 ms T2~T3 Bins Over Threshold: = 6 Bins	Channel Move Time: 0.7592408 S Channel Close Time: 0.1198801 S

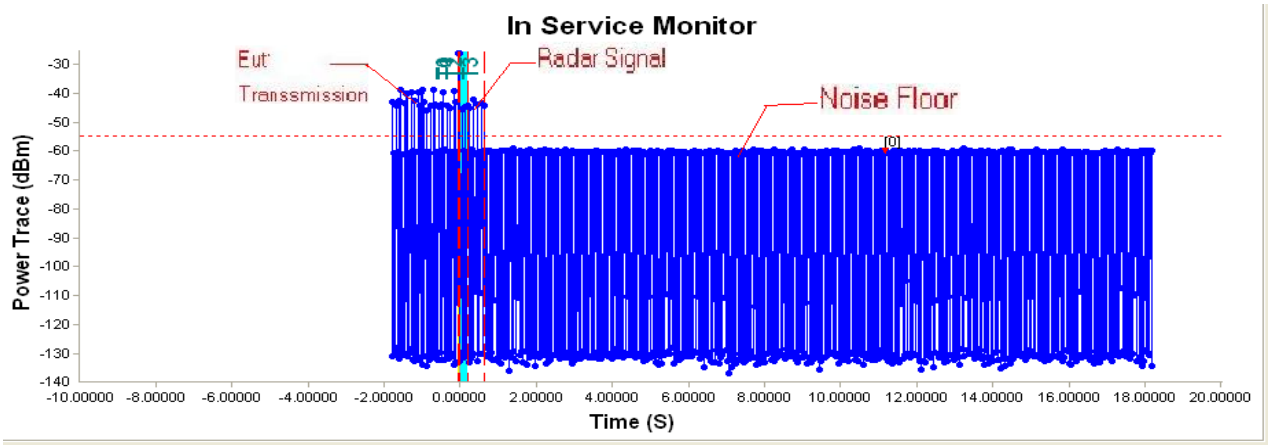
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



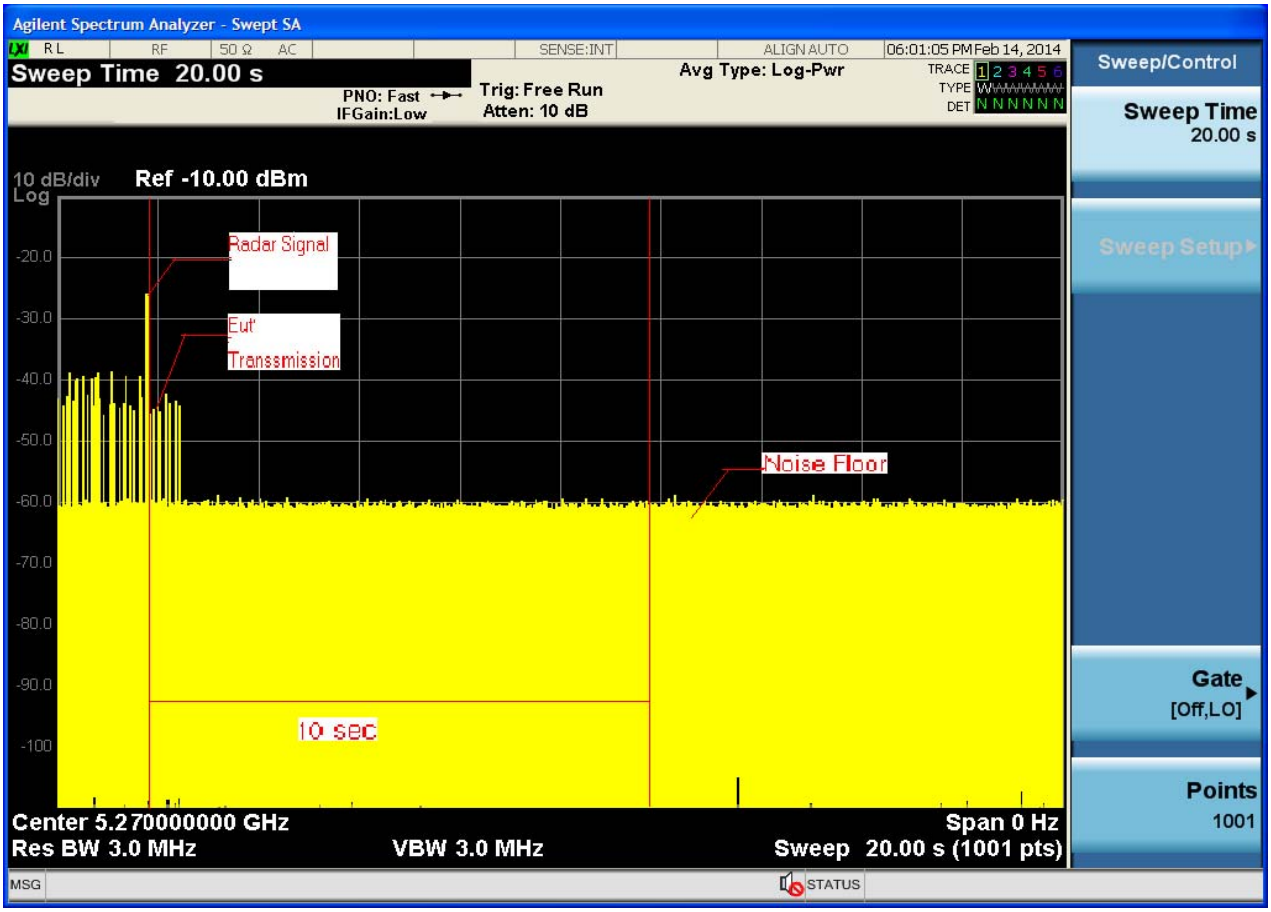
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (11n 40MHz Mode)

Radar signal 3



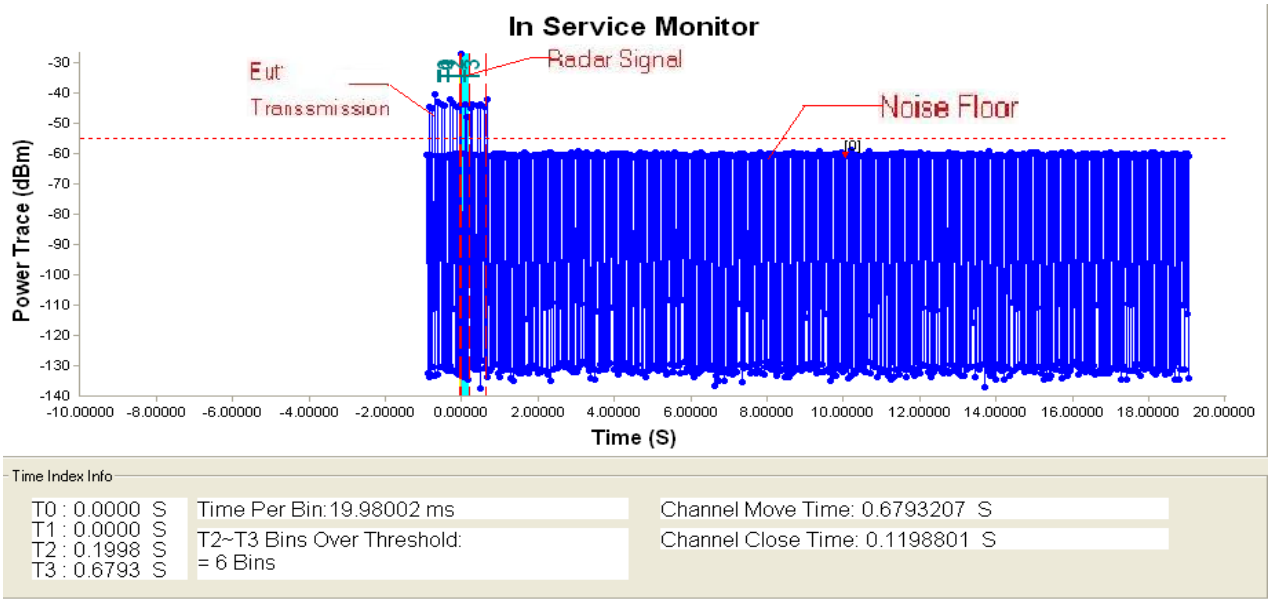
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



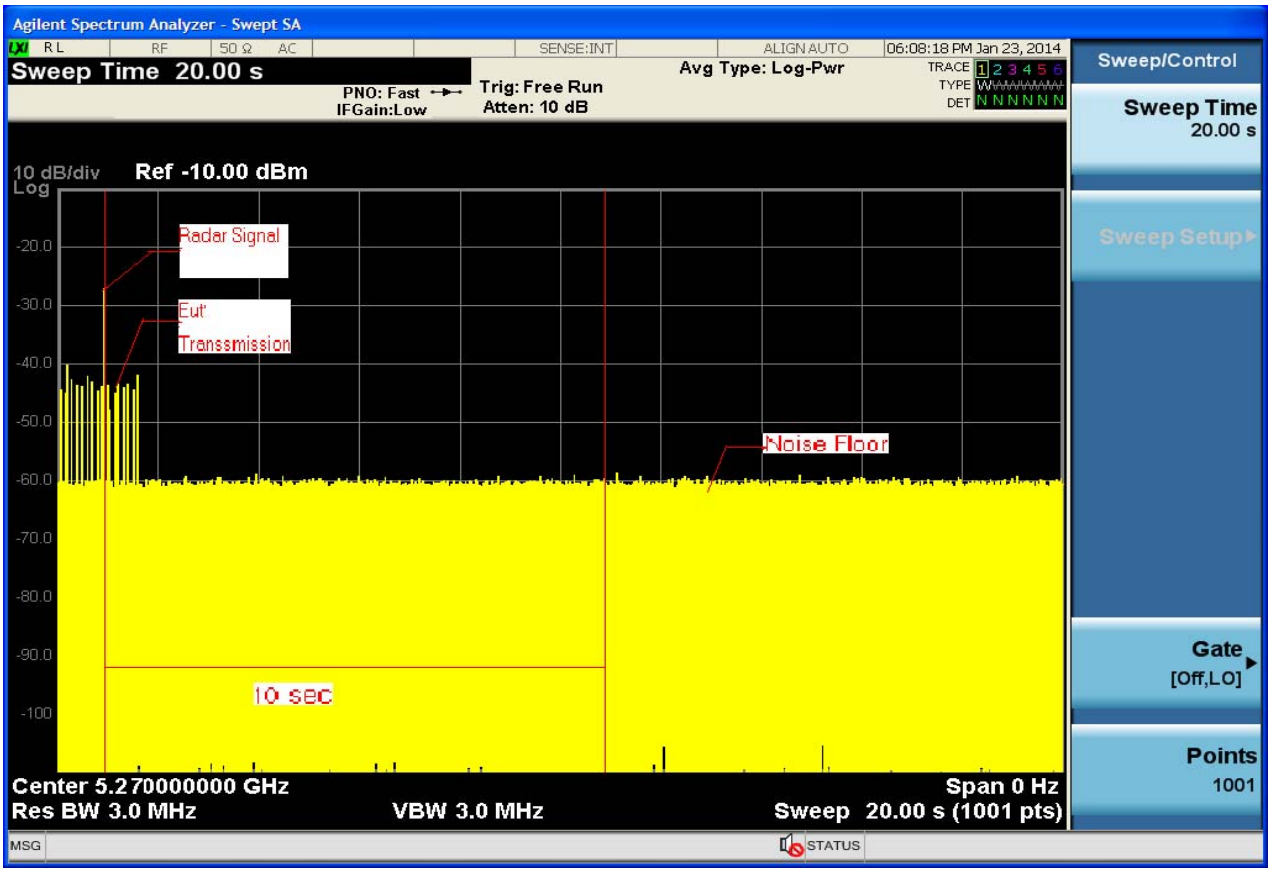
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (11n 40MHz Mode)

Radar signal 4



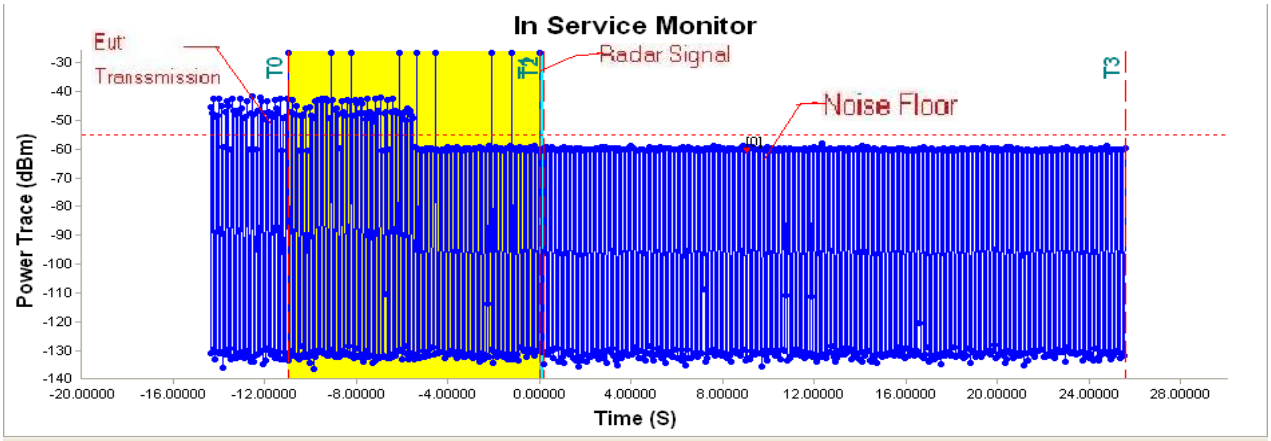
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



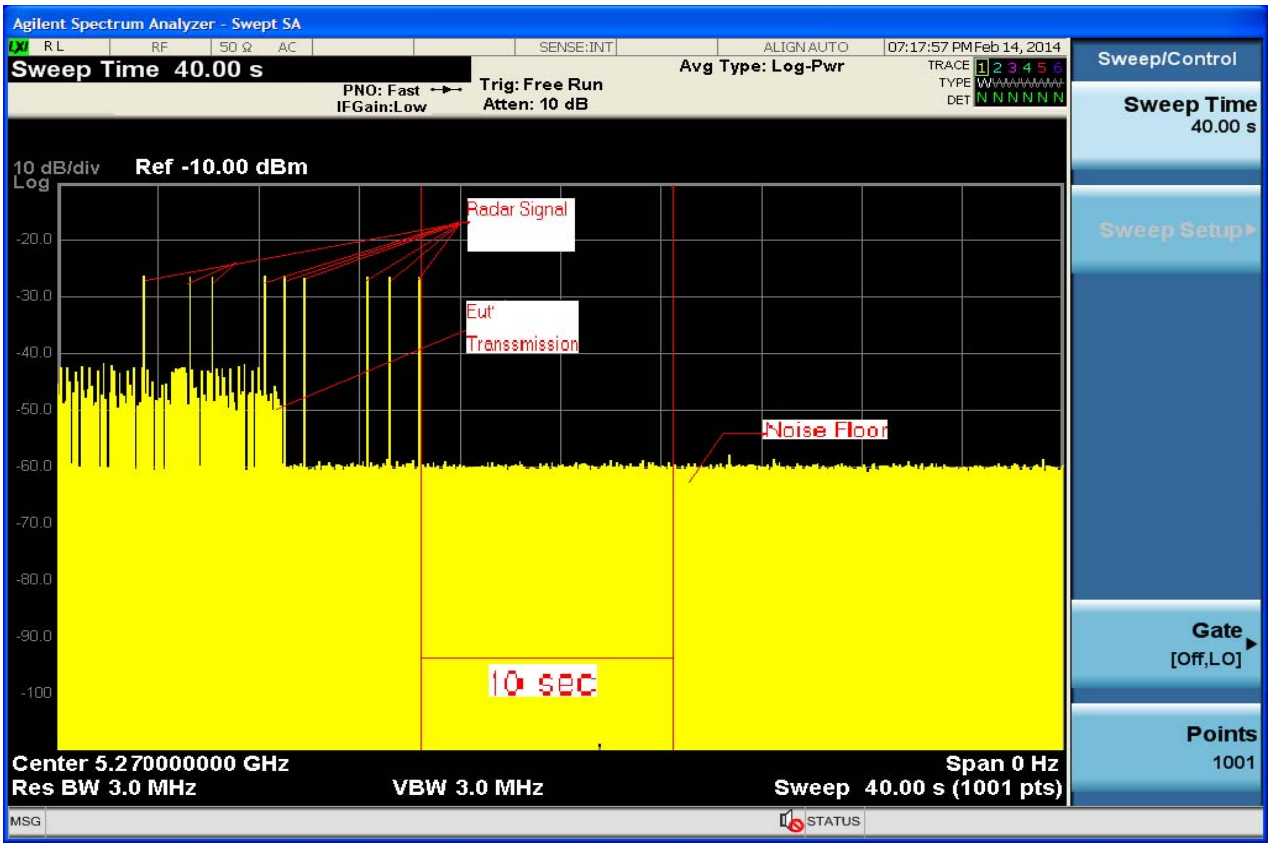
Note: An expanded plot for the device vacates the channel in the required 500ms

TX (11n 40MHz Mode)

Radar signal 5



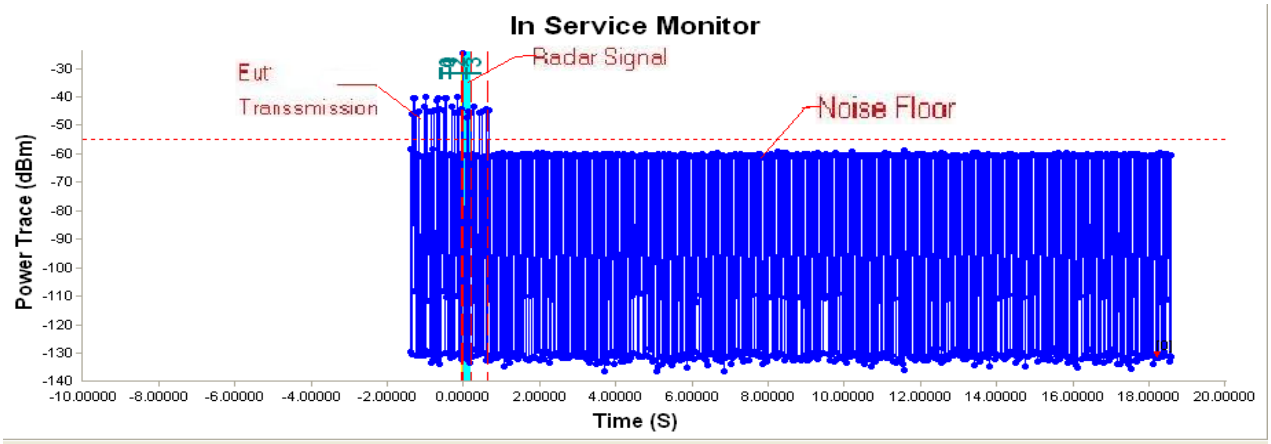
Note: T1 denotes the start of Channel Move Time upon the end of the last Radar burst.
T2 denotes the data transmission time of 200ms from T1.
T3 denotes the end of Channel Move Time.
T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.



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

TX (11n 40MHz Mode)

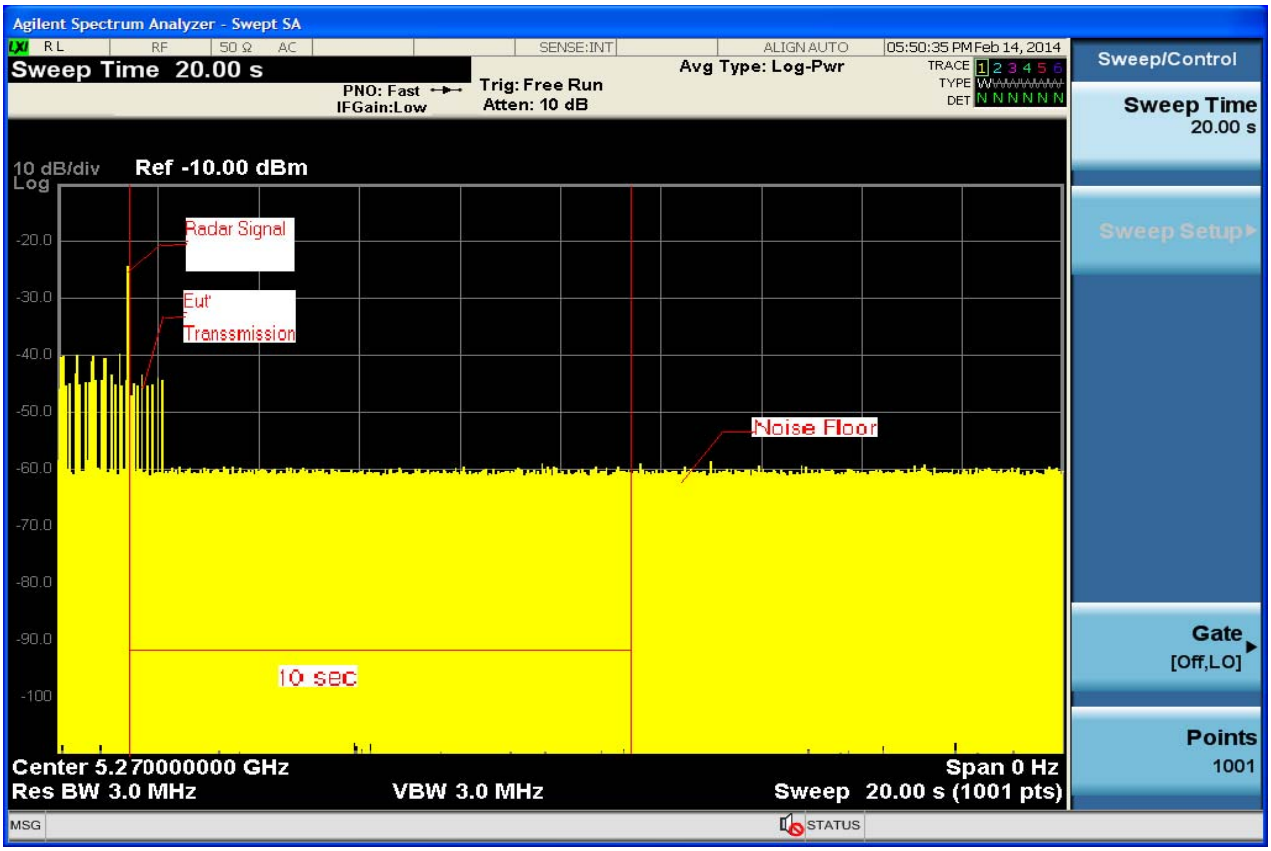
Radar signal 6



Time Index Info

T0 : 0.0000 S	Time Per Bin:19.98002 ms	Channel Move Time: 0.6793207 S
T1 : 0.0000 S	T2~T3 Bins Over Threshold:	Channel Close Time: 0.1198801 S
T2 : 0.1998 S	= 6 Bins	
T3 : 0.6793 S		

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 (11n 40MHz 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	NO
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	YES
10	18	1.0u	1.428	YES
11	18	1.0u	1.428	YES
12	18	1.0u	1.428	NO
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	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	YES
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 93%				

Radar2 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	28	4.5u	226	YES
2	27	4.5u	224	YES
3	26	3.3u	157	YES
4	26	2.4u	170	YES
5	28	4.0u	192	YES
6	24	2.6u	224	YES
7	25	2.5u	207	YES
8	23	4.9u	227	NO
9	23	2.7u	186	YES
10	26	3.2u	172	YES
11	28	4.3u	170	YES
12	27	3.1u	221	YES
13	29	4.9u	203	YES
14	29	2.7u	190	NO
15	23	2.9u	229	YES
16	25	2.8u	158	YES
17	28	1.0u	170	YES
18	27	2.5u	192	YES
19	26	4.9u	224	YES
20	24	1.4u	207	YES
21	24	4.9u	158	NO
22	26	3.0u	208	YES
23	26	4.5u	160	YES
24	25	4.5u	198	YES
25	24	4.3u	224	YES
26	25	3.1u	207	YES
27	24	2.2u	158	YES
28	23	1.3u	210	YES
29	27	1.4u	170	YES
30	28	4.5u	186	YES
				Detection Rate 90%

Radar3 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(s)	PRI(us)	Detection(Yes / No)
1	17	8.0u	255	YES
2	16	9.9u	324	YES
3	16	8.5u	316	YES
4	18	8.0u	264	YES
5	16	9.6u	216	YES
6	17	6.0u	495	YES
7	17	9.9u	269	YES
8	18	8.5u	431	YES
9	17	8.0u	213	YES
10	16	6.0u	482	YES
11	17	9.5u	336	YES
12	18	6.0u	463	NO
13	18	8.8u	392	YES
14	16	8.5u	352	YES
15	17	8.0u	430	YES
16	16	6.6u	486	YES
17	16	7.9u	286	YES
18	17	8.0u	206	YES
19	16	7.0u	213	YES
20	18	7.6u	482	NO
21	18	7.9u	436	YES
22	17	8.0u	447	YES
23	16	9.9u	269	YES
24	18	8.5u	331	YES
25	17	8.0u	330	YES
26	16	9.6u	230	YES
27	18	6.0u	364	YES
28	16	6.8u	366	YES
29	18	7.1u	445	YES
30	16	9.3u	440	YES
				Detection Rate 93%

Radar4 Statical Performances				
Trial #	Pluse per Burst	Pluse Width(us)	PRI(us)	Detection(Yes / No)
1	16	18.2u	220	YES
2	14	15.3u	482	YES
3	14	19.0u	331	YES
4	13	13.8u	335	YES
5	16	14.9u	328	YES
6	14	15.8u	445	YES
7	14	19.6u	352	YES
8	14	13.9u	332	YES
9	15	16.0u	478	YES
10	13	11.5u	472	YES
11	15	14.0u	405	YES
12	13	15.6u	405	YES
13	15	17.0u	409	YES
14	14	18.0u	477	NO
15	12	13.2u	206	YES
16	15	12.0u	216	YES
17	16	12.0u	213	YES
18	12	13.8u	482	YES
19	13	14.9u	336	YES
20	16	15.8u	447	YES
21	16	14.6u	258	NO
22	16	13.9u	308	YES
23	12	16.5u	425	YES
24	15	14.0u	490	YES
25	16	15.6u	445	YES
26	16	11.8u	305	YES
27	12	14.9u	375	YES
28	14	12.5u	488	YES
29	15	14.6u	375	YES
30	15	12.0u	497	YES
				Detection Rate 93%

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	Yes
22	LP_Signal_22	Yes
23	LP_Signal_23	Yes
24	LP_Signal_24	NO
25	LP_Signal_25	Yes
26	LP_Signal_26	Yes
27	LP_Signal_27	Yes
28	LP_Signal_28	Yes
29	LP_Signal_29	Yes
30	LP_Signal_30	Yes
Detection Rate		93%

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	Yes
4	HOP_FREQ_SEQ_04	Yes
5	HOP_FREQ_SEQ_05	No
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	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	Yes
17	HOP_FREQ_SEQ_17	Yes
18	HOP_FREQ_SEQ_18	No
19	HOP_FREQ_SEQ_19	Yes
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	No
25	HOP_FREQ_SEQ_25	Yes
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		90%