FCC 47 CFR PART 15 SUBPART E

for

802.11ac DOCSIS 3.0 Gateway
MODEL: SR808ac
Brand: SmartRG

Test Report Number:

C170830Z01-RP1-3

Issued Date: September 22, 2017

Issued for

SmartRG Inc.
501 SE Columbia Shores Boulevard, Suite 500 Vancouver, Washington 98661

Issued by:

Compliance Certification Services (Shenzhen) Inc.
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CNAS L4818

Certificate Number: 2861.01

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	September 22, 2017	Initial Issue	ALL	Sabrina Wang

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1. TEST CERTIFICATION

Product	802.11ac DOCSIS 3.0 Gateway
Model	SR808ac
Brand	SmartRG
Tested	July 7~August 30, 2017
Applicant	**SmartRG Inc.** 501 SE Columbia Shores Boulevard, Suite 500 Vancouver, Washington 98661
Manufacturer	**SmartRG Inc.** 501 SE Columbia Shores Boulevard, Suite 500 Vancouver, Washington 98661

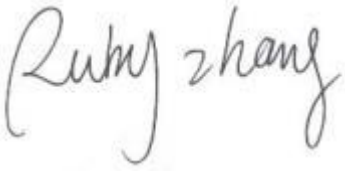
APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart E	No non-compliance noted

We hereby certify that:

Compliance Certification Services (Shenzhen) Inc. tested the above equipment. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.10: 2013** and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.407 and IC RSS-247.

The TEST RESULTS of this report relate only to the tested sample identified in this report.

Approved by: ***Reviewed by:***



Sunday Hu
Supervisor of EMC Dept.
Compliance Certification Services (Shenzhen) Inc.

Ruby Zhang
Supervisor of Report Dept.
Compliance Certification Services (Shenzhen) Inc.

2. EUT DESCRIPTION

<table>
<tr><td>Product</td><td colspan="4">802.11ac DOCSIS 3.0 Gateway</td></tr>
<tr><td>Model Number</td><td colspan="4">SR808ac</td></tr>
<tr><td>Brand</td><td colspan="4">SmartRG</td></tr>
<tr><td>Model Discrepancy</td><td colspan="4">N/A</td></tr>
<tr><td>Serial Number</td><td colspan="4">C170830Z01-RP1-3</td></tr>
<tr><td>Received Date</td><td colspan="4">July 7, 2017</td></tr>
<tr><td>Power Supply</td><td colspan="4">DC12V supplied by the adapter</td></tr>
<tr><td>Adapter Manufacturer /Model No.</td><td colspan="4">SOY-1200300US
I/P: AC100-240V, 50/60Hz, 1.2A
O/P: DC12V, 3.0A
DC Output Cable: Unshielded, 1.50m</td></tr>
<tr><td>Operating Frequency Range & Number of Channels</td><td colspan="4"><table>
<tr><td></td><td>Mode</td><td>Frequency Range(MHz)</td><td>Number of channel</td></tr>
<tr><td rowspan="4">UNII Band I:</td><td>IEEE 802.11a</td><td>5180-5240</td><td>4</td></tr>
<tr><td>IEEE 802.11n HT20</td><td>5180-5240</td><td>4</td></tr>
<tr><td>IEEE 802.11n HT40</td><td>5190-5230</td><td>2</td></tr>
<tr><td>IEEE 802.11ac 80</td><td>5210</td><td>1</td></tr>
<tr><td rowspan="4">UNII Band II:</td><td>IEEE 802.11a</td><td>5260-5320</td><td>4</td></tr>
<tr><td>IEEE 802.11n HT20</td><td>5260-5320</td><td>4</td></tr>
<tr><td>IEEE 802.11n HT40</td><td>5270-5310</td><td>2</td></tr>
<tr><td>IEEE 802.11ac 80</td><td>5290</td><td>1</td></tr>
<tr><td rowspan="4">UNII Band III:</td><td>IEEE 802.11a</td><td>5500-5580;
5660- 5700</td><td>8</td></tr>
<tr><td>IEEE 802.11n HT20</td><td>5500-5580;
5660- 5700</td><td>8</td></tr>
<tr><td>IEEE 802.11n HT40</td><td>5510-5550;
5670</td><td>3</td></tr>
<tr><td>IEEE 802.11ac 80</td><td>5530</td><td>1</td></tr>
<tr><td rowspan="4">UNII Band IV:</td><td>IEEE 802.11a</td><td>5745-5825</td><td>5</td></tr>
<tr><td>IEEE 802.11n HT20</td><td>5745-5825</td><td>5</td></tr>
<tr><td>IEEE 802.11n HT40</td><td>5755-5795</td><td>2</td></tr>
<tr><td>IEEE 802.11ac 80</td><td>5775</td><td>1</td></tr>
</table></td></tr>
<tr><td>Modulation Technique</td><td colspan="4">OFDM (QPSK, BPSK, 16-QAM, 64-QAM)</td></tr>
<tr><td>Antenna Specification</td><td colspan="4">Embedded Antenna with 3dBi gain (Max)</td></tr>
<tr><td>Channels Spacing</td><td colspan="4">IEEE 802.11a, 802.11n HT20 : 20MHz
IEEE 802.11n HT40: 40MHz
IEEE 802.11ac 80: 80MHz</td></tr>
<tr><td>Temperature Range</td><td colspan="4">0°C ~ +40°C</td></tr>
<tr><td>Hardware Version</td><td colspan="4">V1.0</td></tr>
<tr><td>Software Version</td><td colspan="4">1.0.0.4</td></tr>
</table>

Note: *1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*

Operation Frequency:

UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII)	
CHANNEL	**MHz**
36	5180
38	5190
40	5200
42	5210
44	5220
46	5230
48	5240
52	5260
54	5270
56	5280
58	5290
60	5300
62	5310
64	5320
100	5500
102	5510
104	5520
106	5530
108	5540
110	5550
112	5560
116	5580
132	5660
134	5670
136	5680
140	5700
149	5745
151	5755
153	5765
155	5775
157	5785
159	5795
161	5805
165	5825

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **VW7SR808A** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules and FCC 14-30.

3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 Radiated testing was performed at an antenna to EUT distance 3 meters. The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC CFR 47 Part 15.207, 15.209, 15.407 and FCC 14-30, IC RSS-247, Radio testing was performed according to KDB DA 02-2138、KDB 789033 D02、KDB 905462 D02, KDB 905462 D03, KDB 905462 D06；

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

3.2 EUT EXERCISE

The EUT is operated in the engineering mode to fix the TX frequency for the purposes of measurement.
According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E and IC RSS-247.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is positioned at 0.8 m above the ground plane. According to the requirements in Section 6.2 of ANSI C63.10, the conducted emission from the EUT is measured in the frequency range between 0.15 MHz and 30MHz, using the CISPR Quasi-Peak detector mode.

Radiated Emissions

The EUT is placed on the turntable, which is 0.8 m (below 1GHz) /1.5m (Above 1GHz) above the ground plane. The turntable is then rotated for 360 degrees to determine the proper orientation for the maximum emission level. The EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission level. And, each emission is to be maximized by changing the horizontal and vertical polarization of the receiving antenna. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.4 to Section 6.6 of ANSI C63.10.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

The EUT is a 3TX configuration without beam forming function.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

IEEE 802.11n HT20: 5300 MHz
Channel (5300MHz) with 13Mbps data rate was chosen for the final testing.

IEEE 802.11n HT20: 5500 MHz
Channel (5500MHz) with 13Mbps data rate was chosen for the final testing.

IEEE 802.11n HT40: 5310 MHz
Channel (5310MHz) with 27Mbps data rate was chosen for the final testing.

IEEE 802.11n HT40: 5510 MHz
Channel (5510MHz) with 27Mbps data rate was chosen for the final testing.

IEEE802.11ac 80: 5290 MHz
Channel (5290MHz) with 27Mbps data rate was chosen for the final testing.

IEEE 802.11ac 80: 5530 MHz
Channel (5530MHz) with 27Mbps data rate was chosen for the final testing.

4. SETUP OF EQUIPMENT UNDER TEST

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Remark: *Each piece of equipment is scheduled for calibration once a year.*

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	10/24/2017
Vector Signal Generator	KEYSIGHT	N5182B	MY53051596	04/11/2018

4.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Brand	Data Cable	Power Cord
1	GPON ONU	G-240W-B	N/A	2ADZRG240WB	Alcatel.Lucent	N/A	N/A
2	Notebook 1#	B475	WB04861612	DoC	THINKPAD	Unshielded, 1.50m	Unshielded, 1.60m (AC Cable) Shielded, 1.80m (DC Cable)
3	Notebook 2#	Probook 5310m	N/A	N/A	HP	Unshielded 1.50m	Shielded 0.80m (AC Cable) Shielded 1.20m (DC Cable

Note:

Grounding was established in accordance with the manufacturer’s requirements and conditions for the intended use.

4.4 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
RF frequency	+/-1 * 10-5
RF power conducted	+/- 1,5 dB
RF power radiated	+/- 6 dB
Spurious emissions, conducted	+/- 3 dB
Spurious emissions, radiated	+/- 6 dB
Humidity	+/- 5 %
Temperature	+/- 1°C
Time	+/-10 %

Remark: *This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at **No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd., Guan Lan Town, Baoan District, Shenzhen, China**

The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

USA	**A2LA**
China	**CNAS**

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

USA	**FCC**
Japan	**VCCI(C-4815,R-4320,T-2317, G-10624)**
Canada	**INDUSTRY CANADA**

Copies of granted accreditation certificates are available for downloading from our web site, http://www.ccssz.com

6. DYNAMIC FREQUENCY SELECTION

LIMIT

According to § 15.407 (h) and FCC 06-96 appendix "compliance measurement procedures for unlicensed-national information infrastructure devices operating in the 5250-5350 MHz and 5470-5725 MHz bands incorporating dynamic frequency selection".

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client(with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

Table 3: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Table 4: 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 100% of the U-NII 99% transmission power bandwidth. See Note 3.
Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. **Note 2:** The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. **Note 3:** During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Table 6 – 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 7 – 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

DESCRIPTION OF EUT

Overview Of EUT With Respect To §15.407 (H) Requirements

The firmware installed in the EUT during testing was:
Firmware Rev: 1.0.0.4

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Master Device.

The highest power level within these bands is 21.78dBm EIRP in the 5250-5350 MHz band and 21.60 dBm EIRP in the 5470-5725 MHz band.

The three antennas assembly utilized with the EUT has a gain of 3 dBi.

The rated output power of the Master unit is < 23dBm (EIRP). Therefore the required interference threshold level is –64 or -62 dBm. After correction for antenna gain and procedural adjustments, the required conducted threshold at the antenna port is -62+3= -59 dBm.

The calibrated conducted DFS Detection Threshold level is set to –64 or -62 dBm. The tested level is lower than the required level hence it provides margin to the limit.

The EUT uses one transmitter connected to two 50-ohm coaxial antenna ports via a diversity switch. Both antenna ports are connected to the test system via a power divider to perform conducted tests.

The Slave device associated with the EUT during these tests does not have radar detection capability.

WLAN traffic is generated by streaming the video file TestFile.mp2 “6 ½ Magic Hours” from the Master to the Slave in full motion video mode using the media player with the V2.61 Codec package.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11a architecture, with a nominal channel bandwidth of 20 MHz.

Test results show that the EUT requires 33.31 seconds to complete its initial power-up cycle

Manufacturer’s Statement Regarding Uniform Channel Spreading

The end product implements an automatic channel selection feature at startup such that operation commences on channels distributed across the entire set of allowed 5GHz channels. This feature will ensure uniform spreading is achieved while avoiding non-allowed channels due to prior radar events.

TEST AND MEASUREMENT SYSTEM

System Overview

The measurement system is based on a conducted test method.

The short pulse and long pulse signal generating system utilizes the NTIA software and the same manufacturer / model Vector Signal Generator as the NTIA. The hopping signal generating system utilizes the simulated hopping method.

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, with the initial starting point randomized at run-time.

The signal monitoring equipment consists of a spectrum analyzer with the capacity to display 8192 bins on the horizontal axis. A time-domain resolution of 2 msec / bin is achievable 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. A time-domain resolution of 3 msec / bin is achievable with a 24 second sweep time, meeting the 22 second long pulse reporting criteria and allowing a minimum of 10 seconds after the end of the long pulse waveform.

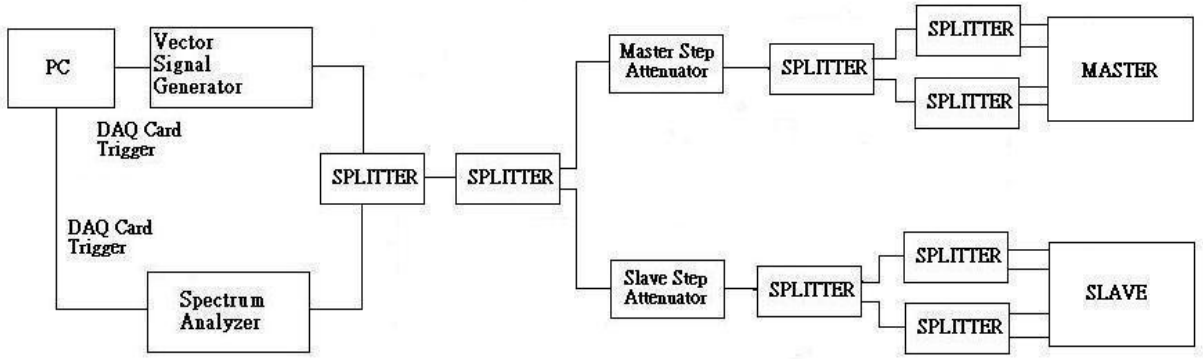
Frequency Hopping Signal Generation

The hopping burst generator is a High Speed Digital I/O card plugged into the control computer. This card utilizes an independent hardware clock reference therefore the output pulse timing is unaffected by host computer operating system latency times.

The software selects the hopping sequence as a 100-length segment of the August 2005 NTIA hopping frequency list. This list contains 274 unique pseudorandom sequences. Each such sequence contains 475 frequencies ordered on a random without replacement basis. Each successive trial uses a contiguous 100- length segment from within each successive 475-length sequence in the list. The initial starting point within the list is randomized at run-time such that the first 100-length segment is entirely contained within the first 475-length sequence. The starting point of each successive trial 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 Frequency Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. 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.

Conducted Method System Block Diagram



Measurement System Frequency Reference

Lock the signal generator and the spectrum analyzer to the same reference source as follows: Connect the 10 MHz OUT (SWITCHED) on the spectrum analyzer to the 10 MHz IN on the signal generator and set the spectrum analyzer 10 MHz Out to On.

System Calibration

Connect the spectrum analyzer to the test system in place of the master device. Set the signal generator to CW mode. Adjust the amplitude of the signal generator to yield a measured level of –62 dBm on the spectrum analyzer.

Without changing any of the instrument settings, reconnect the spectrum analyzer to the Common port of the Spectrum Analyzer Combiner/Divider and connect a 50 ohm load to the Master Device port of the test system.

Measure the amplitude and calculate the difference from –62 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference. Confirm that the signal is displayed at –62 dBm. Readjust the RBW and VBW to 3 MHz, set the span to 10 MHz, and confirm that the signal is still displayed at –62 dBm.

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.

Interference Detection Threshold Adjustment

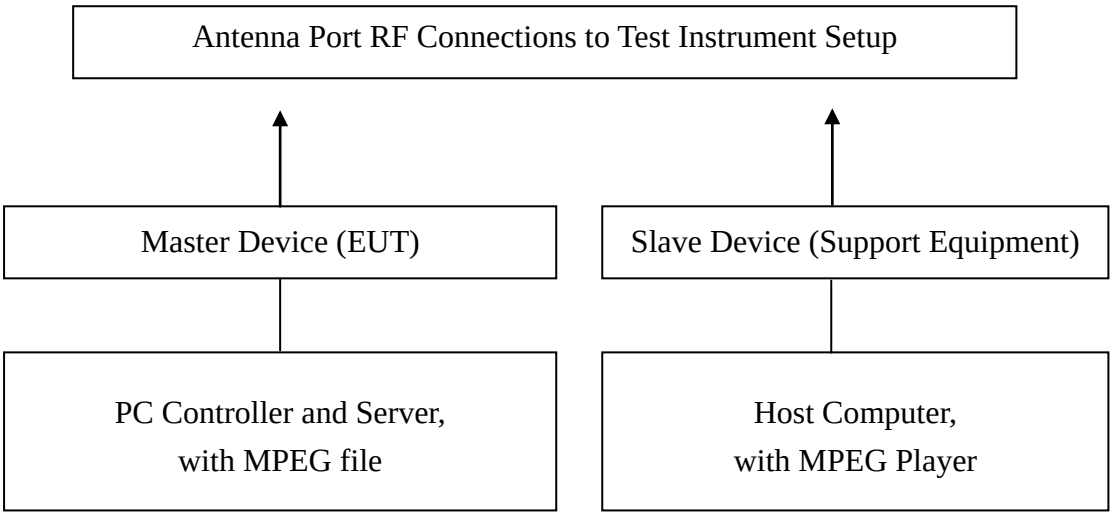
Download the applicable radar waveforms to the signal generator. Select the radar waveform, trigger a burst manually and measure the amplitude on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

Adjustment Of Displayed Traffic Level

Establish a link between the Master and Slave, adjusting the Link Step Attenuator as needed to provide a suitable received level at the Master and Slave devices. Stream the video test file to generate WLAN traffic. Confirm that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold. Confirm that the displayed traffic is from the Master Device. For Master Device testing confirm that the displayed traffic does not include Slave Device traffic. For Slave Device testing confirm that the displayed traffic does not include Master Device traffic.

If a different setting of the Master Step Attenuator is required to meet the above conditions, perform a new System Calibration for the new Master Step Attenuator setting.

Test Setup

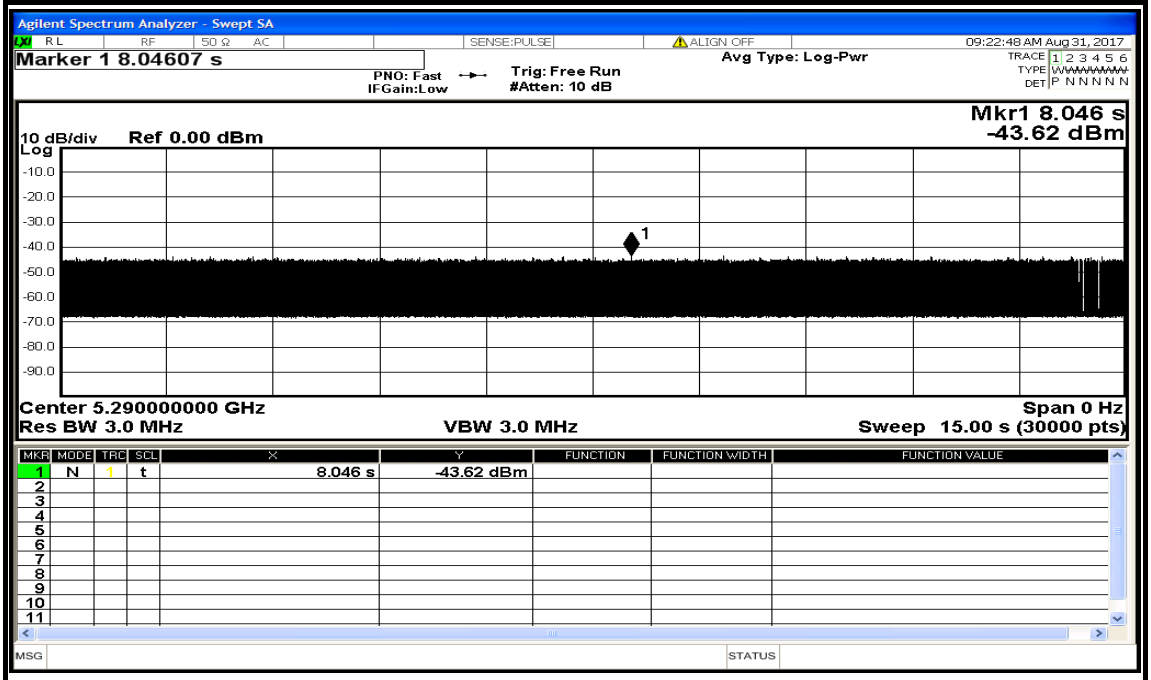


TEST RESULTS

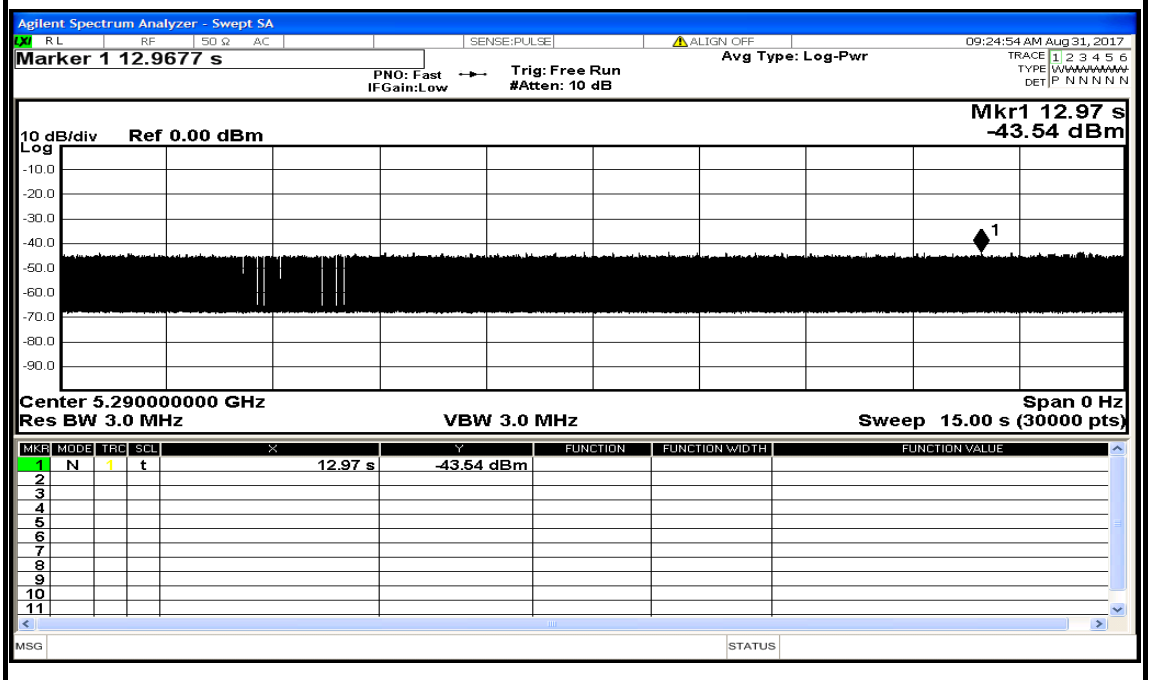
No non-compliance noted

Test plot

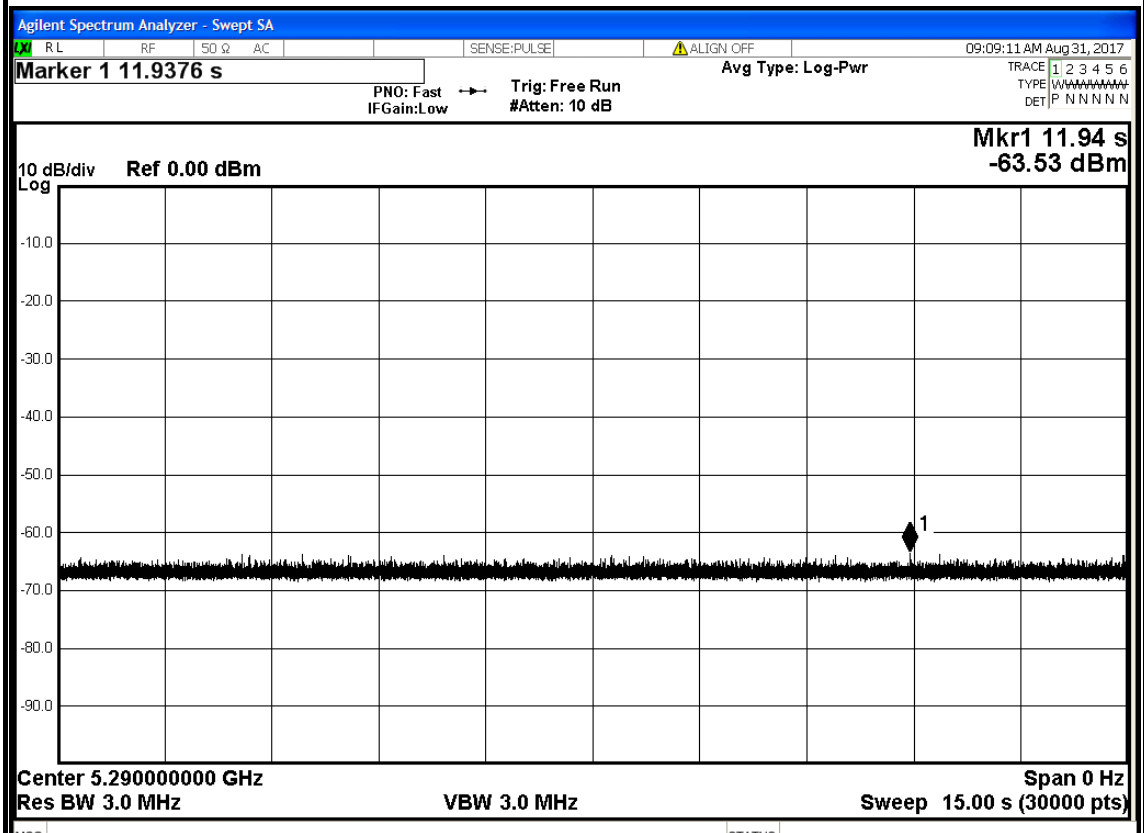
Master Throughput



Slave Throughput

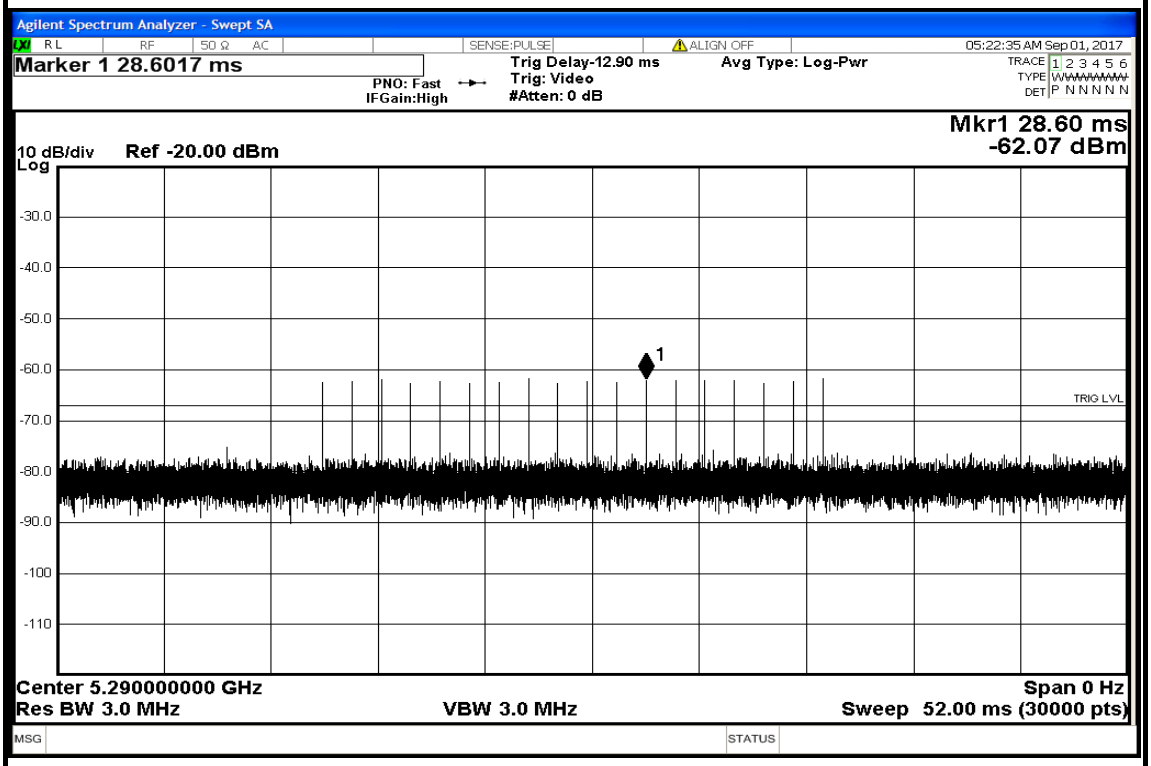


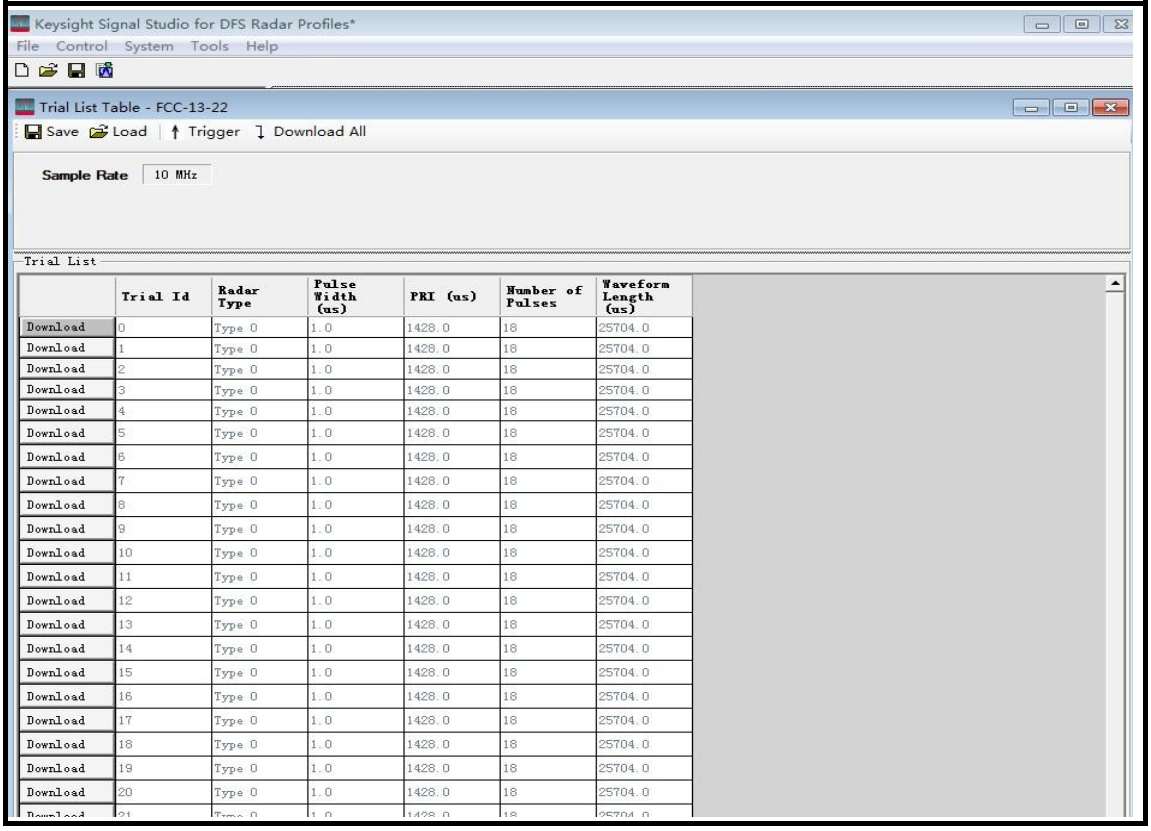
No Throughput



PLOTS OF RADAR WAVEFORMS

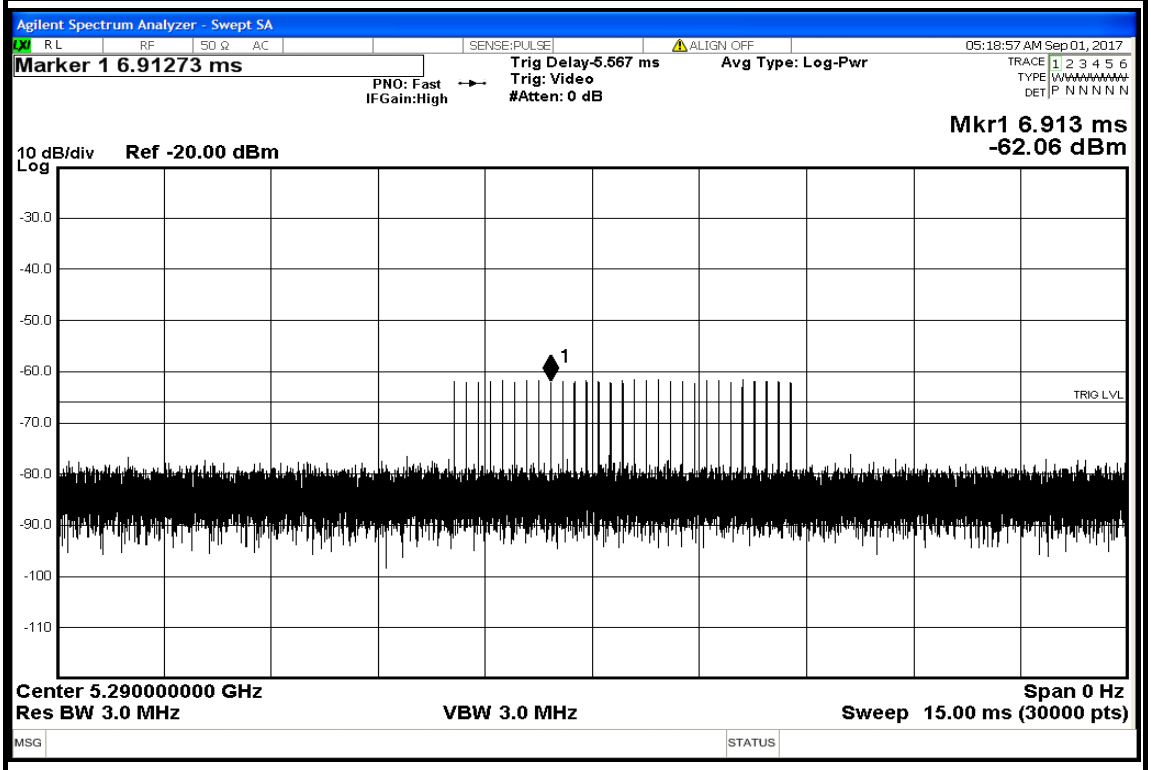
Sample of Short Pulse Radar Type 0

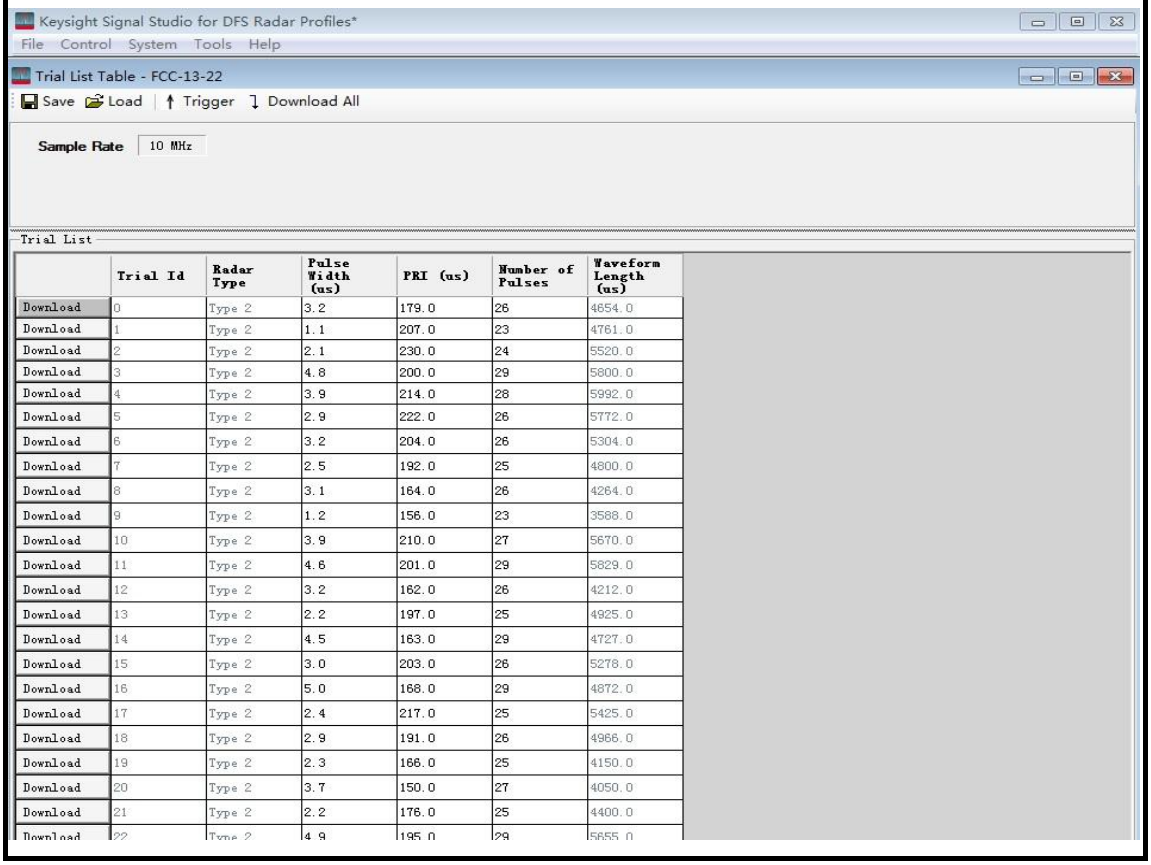




	Trial Id	Radar Type	Pulse Width (us)	PRI (us)	Number of Pulses	Waveform Length (us)
Download	0	Type 0	1.0	1428.0	18	25704.0
Download	1	Type 0	1.0	1428.0	18	25704.0
Download	2	Type 0	1.0	1428.0	18	25704.0
Download	3	Type 0	1.0	1428.0	18	25704.0
Download	4	Type 0	1.0	1428.0	18	25704.0
Download	5	Type 0	1.0	1428.0	18	25704.0
Download	6	Type 0	1.0	1428.0	18	25704.0
Download	7	Type 0	1.0	1428.0	18	25704.0
Download	8	Type 0	1.0	1428.0	18	25704.0
Download	9	Type 0	1.0	1428.0	18	25704.0
Download	10	Type 0	1.0	1428.0	18	25704.0
Download	11	Type 0	1.0	1428.0	18	25704.0
Download	12	Type 0	1.0	1428.0	18	25704.0
Download	13	Type 0	1.0	1428.0	18	25704.0
Download	14	Type 0	1.0	1428.0	18	25704.0
Download	15	Type 0	1.0	1428.0	18	25704.0
Download	16	Type 0	1.0	1428.0	18	25704.0
Download	17	Type 0	1.0	1428.0	18	25704.0
Download	18	Type 0	1.0	1428.0	18	25704.0
Download	19	Type 0	1.0	1428.0	18	25704.0
Download	20	Type 0	1.0	1428.0	18	25704.0

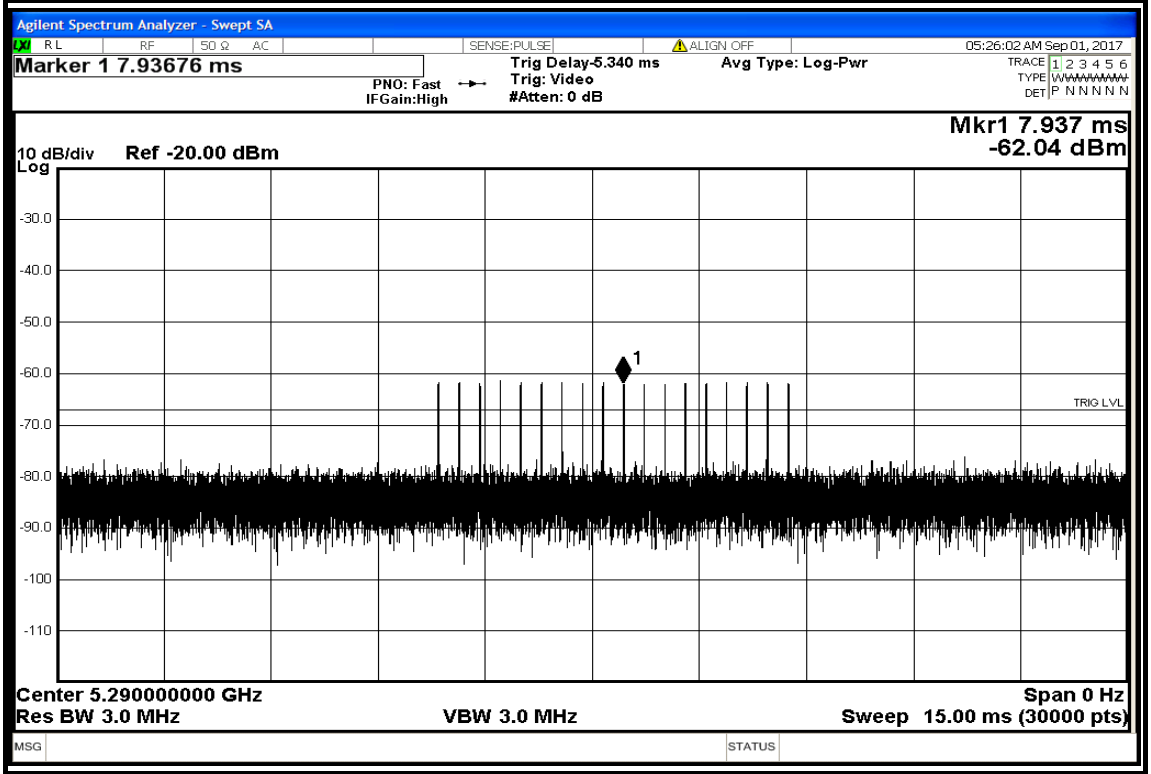
Sample of Short Pulse Radar Type 2

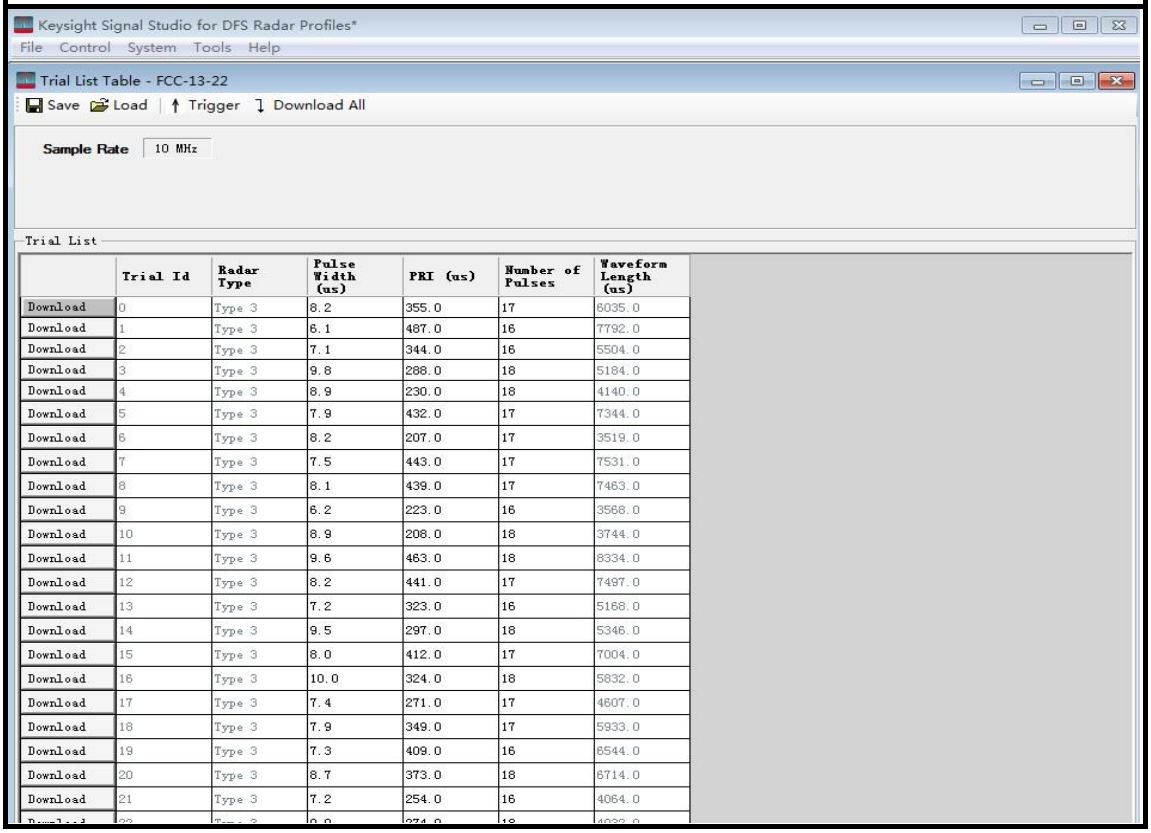




	Trial Id	Radar Type	Pulse Width (us)	PRI (us)	Number of Pulses	Waveform Length (us)
Download	0	Type 2	3.2	179.0	26	4654.0
Download	1	Type 2	1.1	207.0	23	4761.0
Download	2	Type 2	2.1	230.0	24	5520.0
Download	3	Type 2	4.8	200.0	29	5800.0
Download	4	Type 2	3.9	214.0	28	5992.0
Download	5	Type 2	2.9	222.0	26	5772.0
Download	6	Type 2	3.2	204.0	26	5304.0
Download	7	Type 2	2.5	192.0	25	4800.0
Download	8	Type 2	3.1	164.0	26	4264.0
Download	9	Type 2	1.2	156.0	23	3588.0
Download	10	Type 2	3.9	210.0	27	5670.0
Download	11	Type 2	4.6	201.0	29	5829.0
Download	12	Type 2	3.2	162.0	26	4212.0
Download	13	Type 2	2.2	197.0	25	4925.0
Download	14	Type 2	4.5	163.0	29	4727.0
Download	15	Type 2	3.0	203.0	26	5278.0
Download	16	Type 2	5.0	168.0	29	4872.0
Download	17	Type 2	2.4	217.0	25	5425.0
Download	18	Type 2	2.9	191.0	26	4966.0
Download	19	Type 2	2.3	166.0	25	4150.0
Download	20	Type 2	3.7	150.0	27	4050.0
Download	21	Type 2	2.2	176.0	25	4400.0
Download	22	Type 2	4.9	195.0	29	5655.0

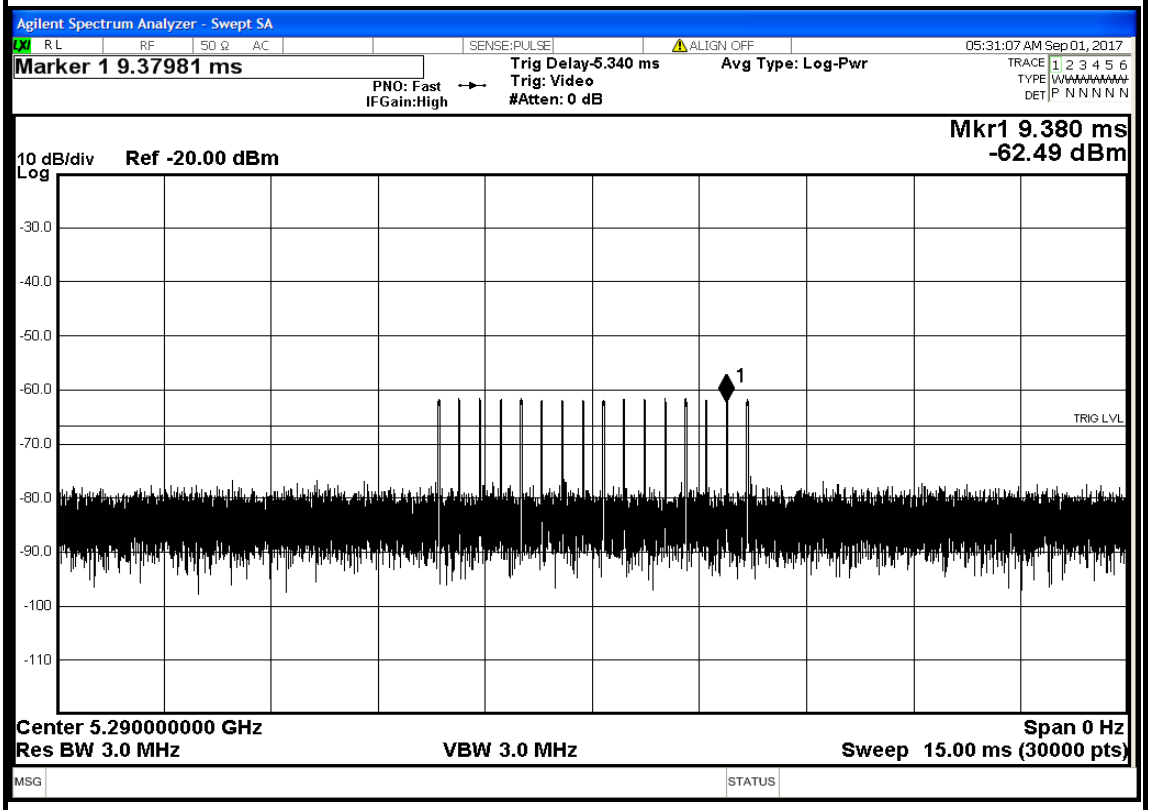
Sample of Short Pulse Radar Type 3

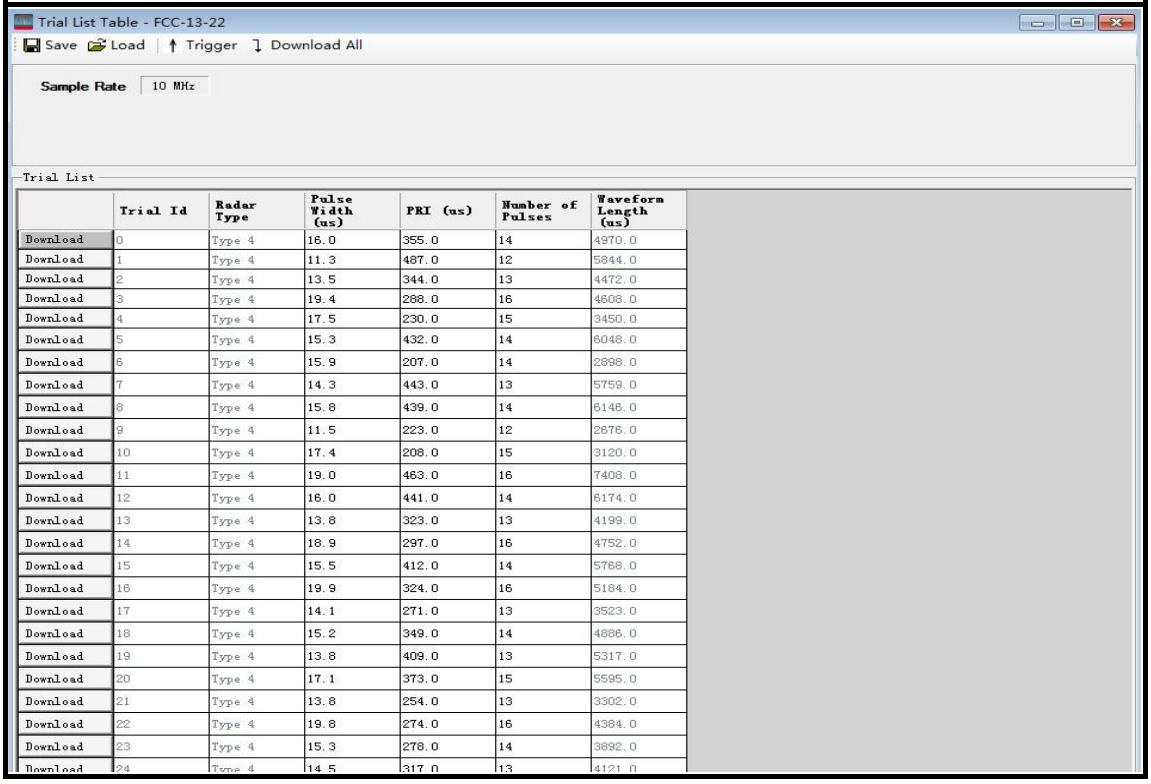




	Trial Id	Radar Type	Pulse Width (us)	PRI (us)	Number of Pulses	Waveform Length (us)
Download	0	Type 3	8.2	355.0	17	6035.0
Download	1	Type 3	6.1	487.0	16	7792.0
Download	2	Type 3	7.1	344.0	16	5504.0
Download	3	Type 3	9.8	288.0	18	5184.0
Download	4	Type 3	8.9	230.0	18	4140.0
Download	5	Type 3	7.9	432.0	17	7344.0
Download	6	Type 3	8.2	207.0	17	3519.0
Download	7	Type 3	7.5	443.0	17	7531.0
Download	8	Type 3	8.1	439.0	17	7463.0
Download	9	Type 3	6.2	223.0	16	3568.0
Download	10	Type 3	8.9	208.0	18	3744.0
Download	11	Type 3	9.6	463.0	18	8334.0
Download	12	Type 3	8.2	441.0	17	7497.0
Download	13	Type 3	7.2	323.0	16	5168.0
Download	14	Type 3	9.5	297.0	18	5346.0
Download	15	Type 3	8.0	412.0	17	7004.0
Download	16	Type 3	10.0	324.0	18	5832.0
Download	17	Type 3	7.4	271.0	17	4607.0
Download	18	Type 3	7.9	349.0	17	5933.0
Download	19	Type 3	7.3	409.0	16	6544.0
Download	20	Type 3	8.7	373.0	18	6714.0
Download	21	Type 3	7.2	254.0	16	4064.0

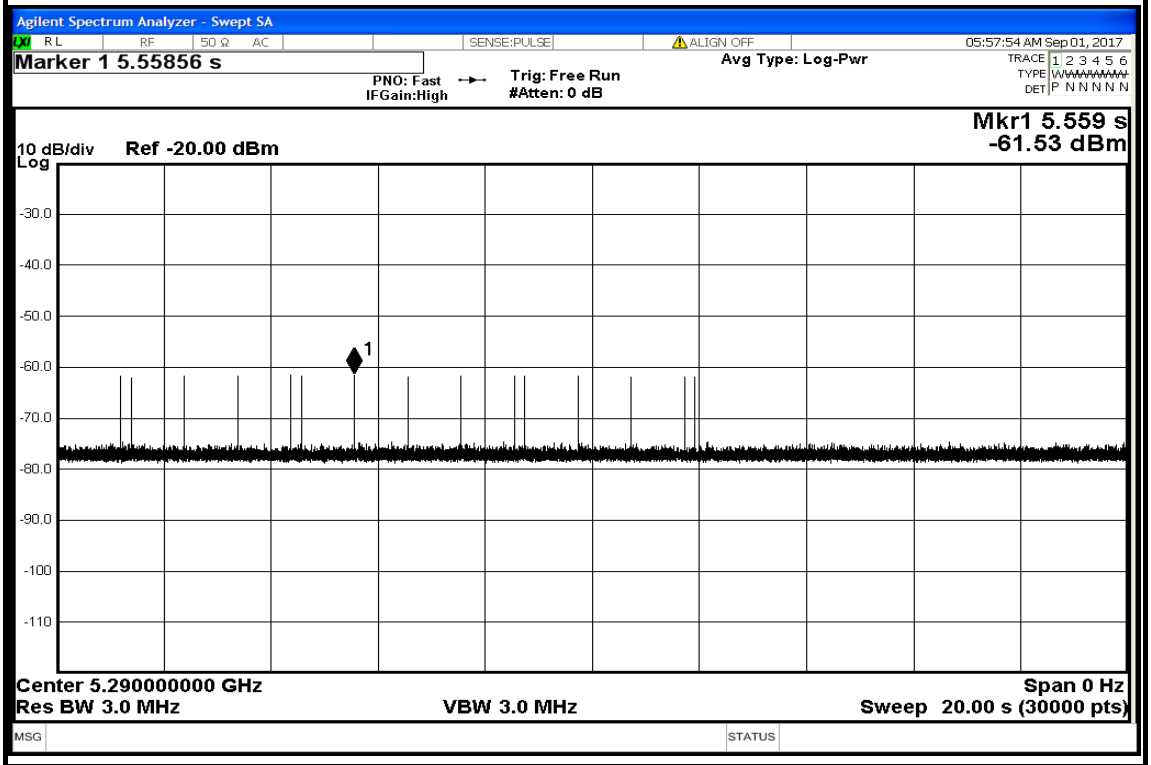
Sample of Short Pulse Radar Type 4

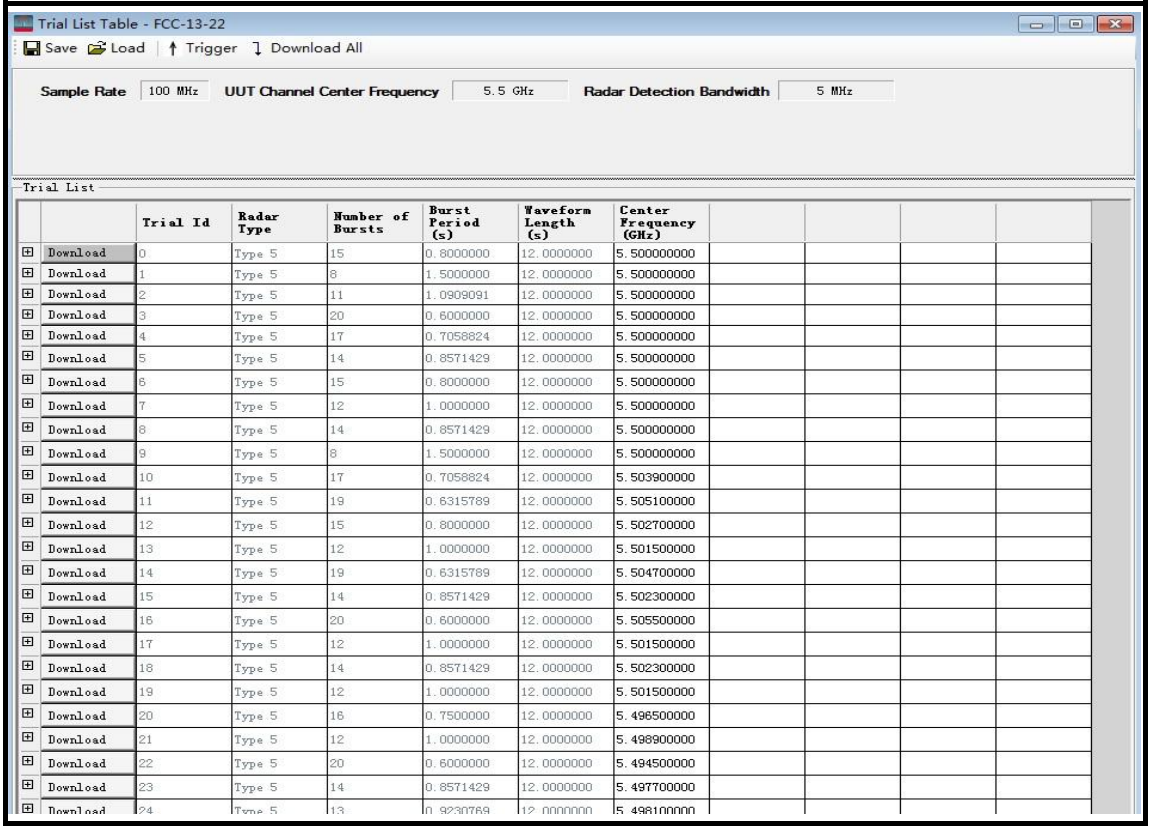




	Trial Id	Radar Type	Pulse Width (us)	PRI (us)	Number of Pulses	Waveform Length (us)
Download	0	Type 4	16.0	355.0	14	4970.0
Download	1	Type 4	11.3	487.0	12	5844.0
Download	2	Type 4	13.5	344.0	13	4472.0
Download	3	Type 4	19.4	288.0	16	4608.0
Download	4	Type 4	17.5	230.0	15	3450.0
Download	5	Type 4	15.3	432.0	14	6048.0
Download	6	Type 4	15.9	207.0	14	2898.0
Download	7	Type 4	14.3	443.0	13	5759.0
Download	8	Type 4	15.8	439.0	14	6146.0
Download	9	Type 4	11.5	223.0	12	2676.0
Download	10	Type 4	17.4	208.0	15	3120.0
Download	11	Type 4	19.0	463.0	16	7408.0
Download	12	Type 4	16.0	441.0	14	6174.0
Download	13	Type 4	13.8	323.0	13	4199.0
Download	14	Type 4	18.9	297.0	16	4752.0
Download	15	Type 4	15.5	412.0	14	5768.0
Download	16	Type 4	19.9	324.0	16	5184.0
Download	17	Type 4	14.1	271.0	13	3523.0
Download	18	Type 4	15.2	349.0	14	4886.0
Download	19	Type 4	13.8	409.0	13	5317.0
Download	20	Type 4	17.1	373.0	15	5595.0
Download	21	Type 4	13.8	254.0	13	3302.0
Download	22	Type 4	19.8	274.0	16	4384.0
Download	23	Type 4	15.3	278.0	14	3892.0
Download	24	Type 4	14.5	317.0	13	4121.0

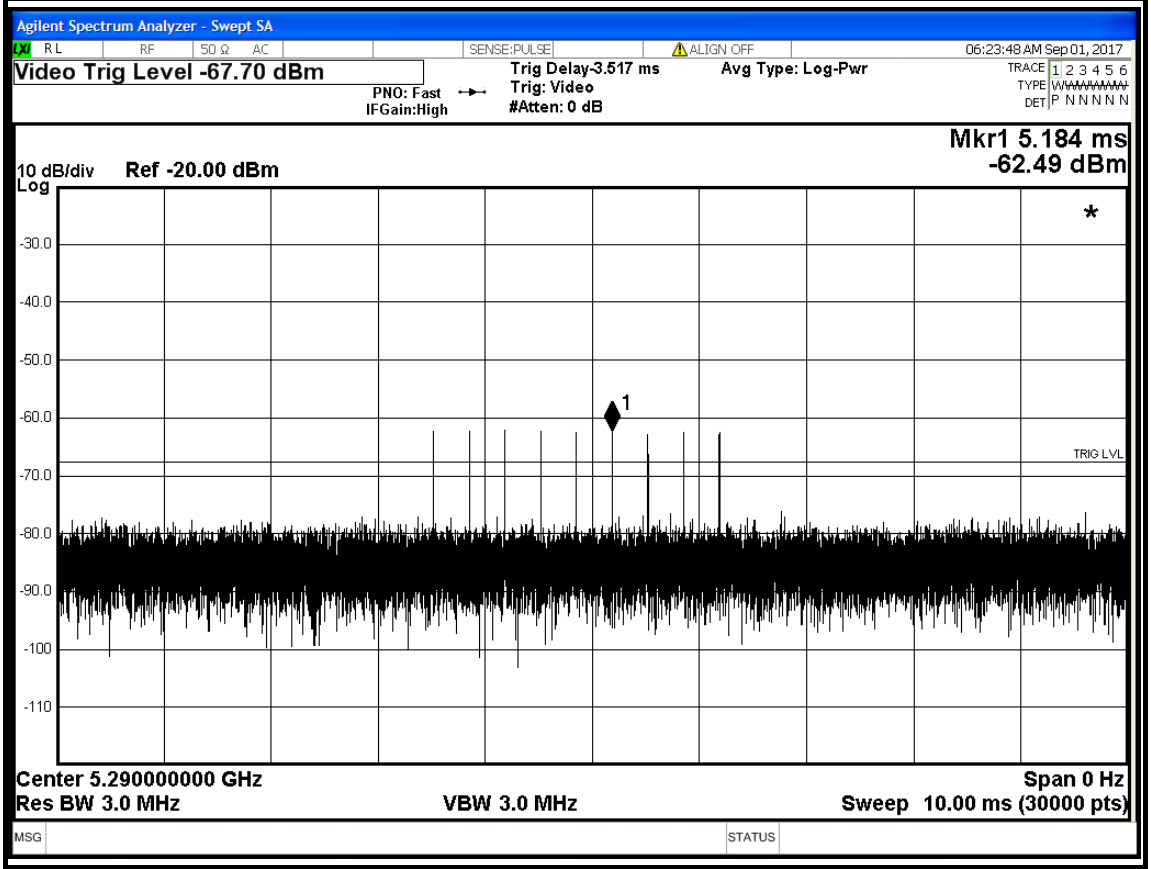
Sample of Long Pulse Radar Type 5

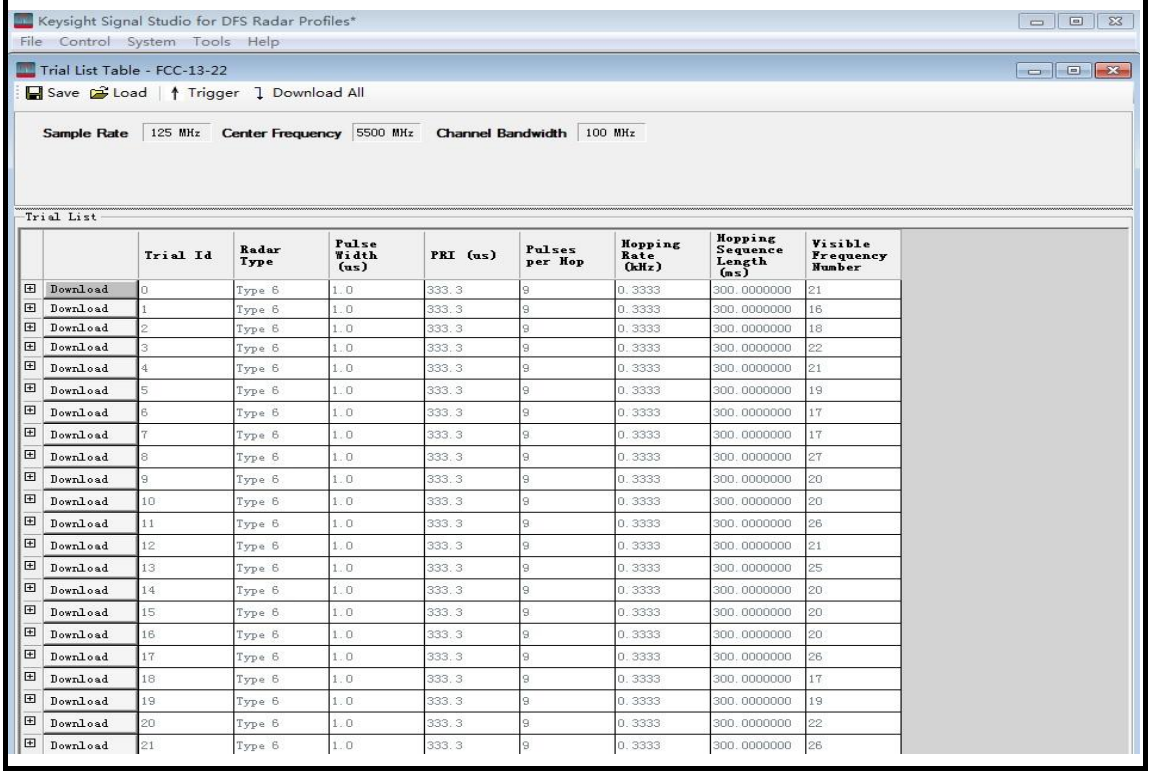




	Trial Id	Radar Type	Number of Bursts	Burst Period (s)	Waveform Length (s)	Center Frequency (GHz)
Download	0	Type 5	15	0.8000000	12.0000000	5.500000000
Download	1	Type 5	8	1.5000000	12.0000000	5.500000000
Download	2	Type 5	11	1.0909091	12.0000000	5.500000000
Download	3	Type 5	20	0.6000000	12.0000000	5.500000000
Download	4	Type 5	17	0.7058824	12.0000000	5.500000000
Download	5	Type 5	14	0.8571429	12.0000000	5.500000000
Download	6	Type 5	15	0.8000000	12.0000000	5.500000000
Download	7	Type 5	12	1.0000000	12.0000000	5.500000000
Download	8	Type 5	14	0.8571429	12.0000000	5.500000000
Download	9	Type 5	8	1.5000000	12.0000000	5.500000000
Download	10	Type 5	17	0.7058824	12.0000000	5.503900000
Download	11	Type 5	19	0.6315789	12.0000000	5.505100000
Download	12	Type 5	15	0.8000000	12.0000000	5.502700000
Download	13	Type 5	12	1.0000000	12.0000000	5.501500000
Download	14	Type 5	19	0.6315789	12.0000000	5.504700000
Download	15	Type 5	14	0.8571429	12.0000000	5.502300000
Download	16	Type 5	20	0.6000000	12.0000000	5.505500000
Download	17	Type 5	12	1.0000000	12.0000000	5.501500000
Download	18	Type 5	14	0.8571429	12.0000000	5.502300000
Download	19	Type 5	12	1.0000000	12.0000000	5.501500000
Download	20	Type 5	16	0.7500000	12.0000000	5.496500000
Download	21	Type 5	12	1.0000000	12.0000000	5.498900000
Download	22	Type 5	20	0.6000000	12.0000000	5.494500000
Download	23	Type 5	14	0.8571429	12.0000000	5.497700000
Download	24	Type 5	13	0.9230769	12.0000000	5.498100000

Sample of Long Pulse Radar Type 6





	Trial Id	Radar Type	Pulse Width (us)	PRI (us)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (ms)	Visible Frequency Number
Download	0	Type 6	1.0	333.3	9	0.3333	300.0000000	21
Download	1	Type 6	1.0	333.3	9	0.3333	300.0000000	16
Download	2	Type 6	1.0	333.3	9	0.3333	300.0000000	18
Download	3	Type 6	1.0	333.3	9	0.3333	300.0000000	22
Download	4	Type 6	1.0	333.3	9	0.3333	300.0000000	21
Download	5	Type 6	1.0	333.3	9	0.3333	300.0000000	19
Download	6	Type 6	1.0	333.3	9	0.3333	300.0000000	17
Download	7	Type 6	1.0	333.3	9	0.3333	300.0000000	17
Download	8	Type 6	1.0	333.3	9	0.3333	300.0000000	27
Download	9	Type 6	1.0	333.3	9	0.3333	300.0000000	20
Download	10	Type 6	1.0	333.3	9	0.3333	300.0000000	20
Download	11	Type 6	1.0	333.3	9	0.3333	300.0000000	26
Download	12	Type 6	1.0	333.3	9	0.3333	300.0000000	21
Download	13	Type 6	1.0	333.3	9	0.3333	300.0000000	25
Download	14	Type 6	1.0	333.3	9	0.3333	300.0000000	20
Download	15	Type 6	1.0	333.3	9	0.3333	300.0000000	20
Download	16	Type 6	1.0	333.3	9	0.3333	300.0000000	20
Download	17	Type 6	1.0	333.3	9	0.3333	300.0000000	26
Download	18	Type 6	1.0	333.3	9	0.3333	300.0000000	17
Download	19	Type 6	1.0	333.3	9	0.3333	300.0000000	19
Download	20	Type 6	1.0	333.3	9	0.3333	300.0000000	22
Download	21	Type 6	1.0	333.3	9	0.3333	300.0000000	26

TEST CHANNEL AND METHOD

All tests were performed at a channel center frequency of 5300 MHz utilizing a conducted test method.

CHANNEL AVAILABILITY CHECK TIME

Test Procedure To Determine Initial Power-Up Cycle Time

A link was established on channel then the EUT was rebooted. The time from the cessation of traffic to the re-initialization of traffic was measured as the time required for the EUT to complete the total powerup cycle. The time to complete the initial power-up period is 60 seconds less than this total power-up time.

Test Procedure For Timing Of Radar Burst

With a link established on channel, the EUT was rebooted. A radar signal was triggered within 0 to 6 seconds after the initial power-up period, corresponding to the beginning of the CAC time, and transmissions on the channel were monitored on the spectrum analyzer.

The Non-Occupancy list was cleared. With a link established on channel, the EUT was rebooted. A radar signal was triggered within 54 to 60 seconds after the initial power-up period, corresponding to the end of the CAC time, and transmissions on the channel were monitored on the spectrum analyzer.

Channel Availability Check Time Results

No non-compliance noted.

Time required for EUT to complete the initial power-up cycle (sec)
33.31

If a radar signal is detected during the channel availability check then the PC controlling the EUT displays a message stating that radar was detected.

Timing of Radar Burst	Display on EUT / PC Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT Initiates Transmissions	Transmissions begin on channel after completion of the initial power-up cycle and the 60 second CAC
Within 0 to 6 second window	EUT indicates radar detected EUT does not display any radar parameter values	No transmissions on channel
Within 54 to 60 second window	EUT indicates radar detected EUT does not display any radar parameter values	No transmissions on channel

CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

General Reporting Notes

The reference marker is set at the end of last radar pulse.

Type 0 Radar Reporting Notes

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =

(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated

Begins no later than (Reference Marker + 200 msec)

and

Ends no earlier than (Reference Marker + 10 sec).

TEST RESULTS

LOW BAND RESULTS

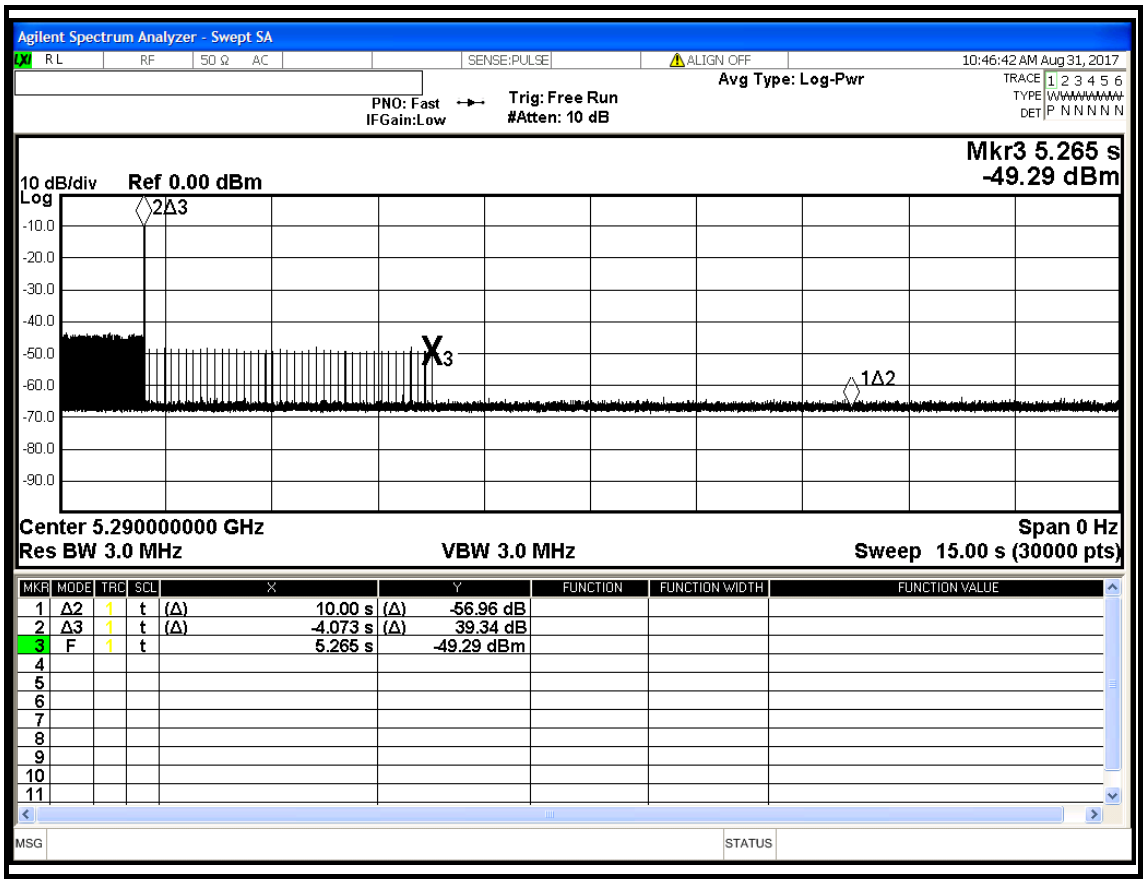
LOW BAND RESULTS

IEEE 802.11ac 80 MHz Mode

Type 0 Channel Move Time Results

No non-compliance noted.

Channel Move Time (s)	Limit (s)
4.073	10

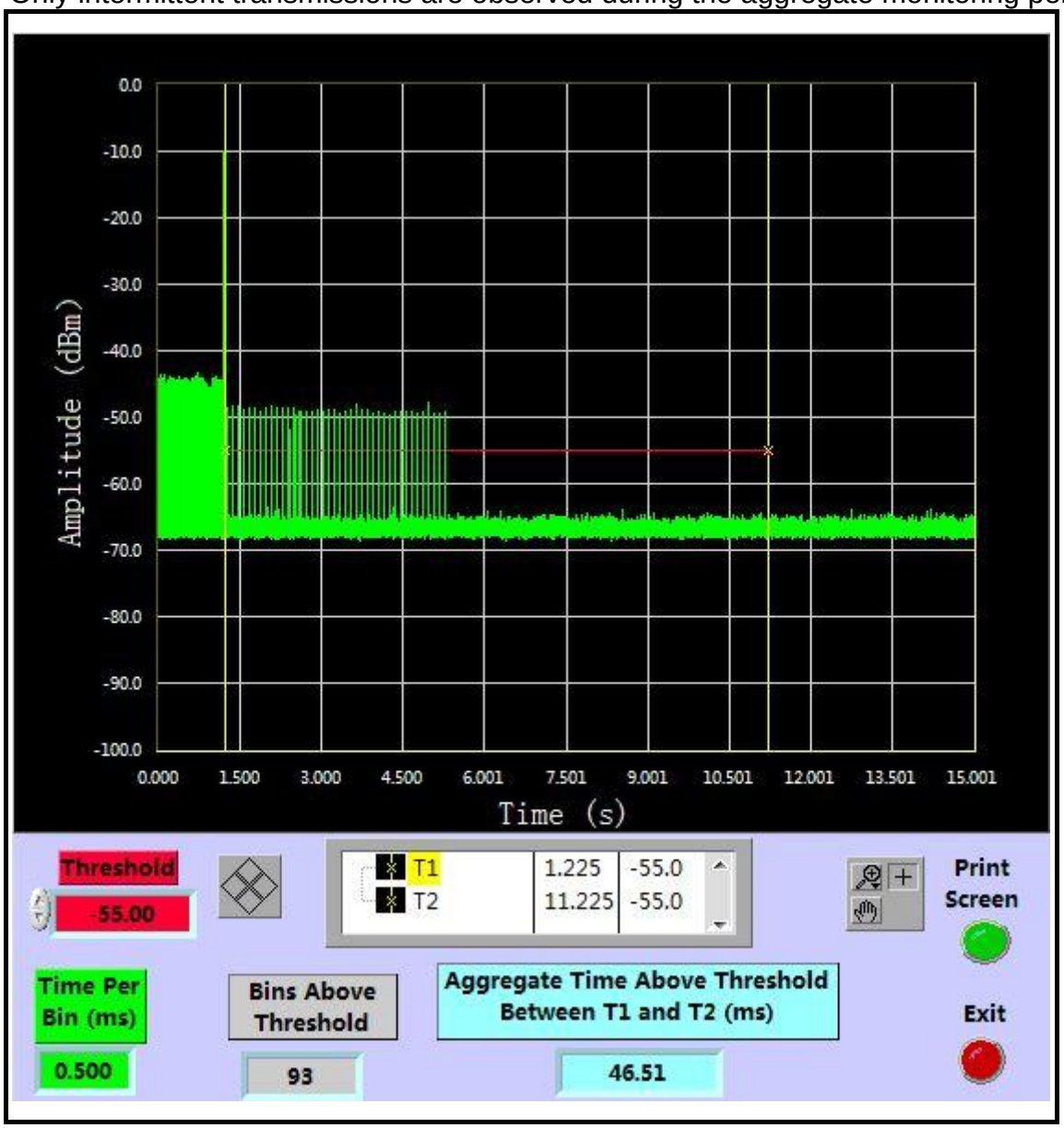


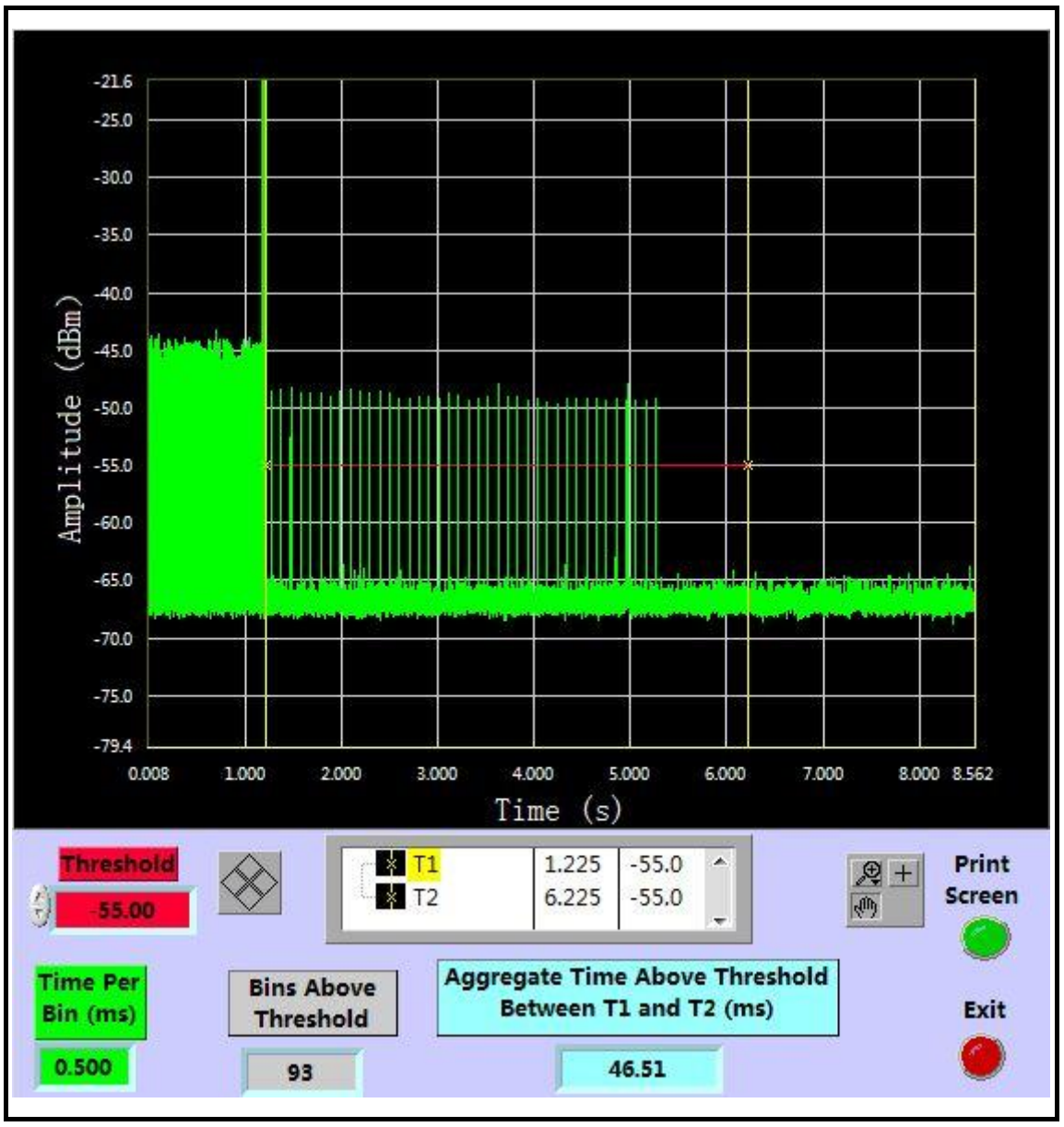
Type 1 Channel Closing Transmission Time sResults

No non-compliance noted.

Transmission After 200(ms)	Aggregate Transmission Time (ms)	Limit for Aggregate Transmission Time After 200 (ms)	Result
Yes	46.51	60	Pass

Only intermittent transmissions are observed during the aggregate monitoring period.

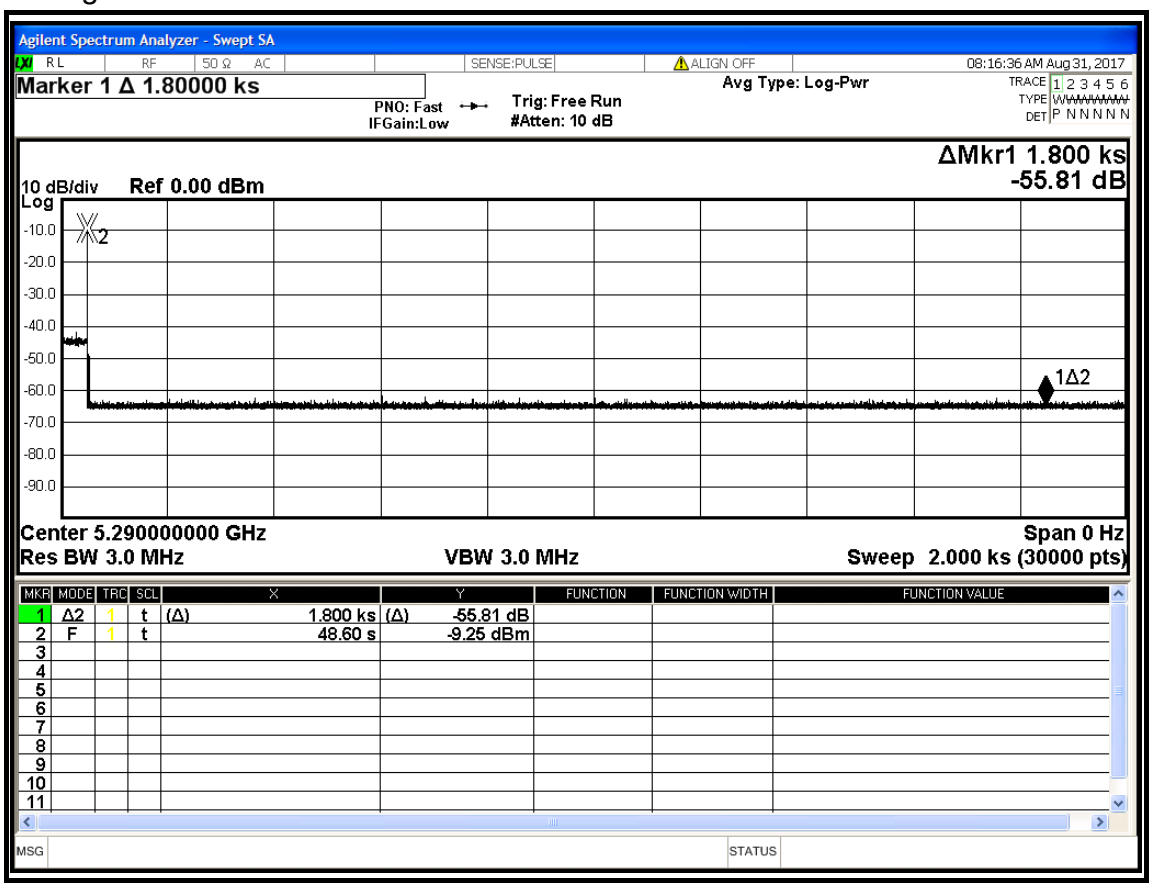




Non-Occupancy Period

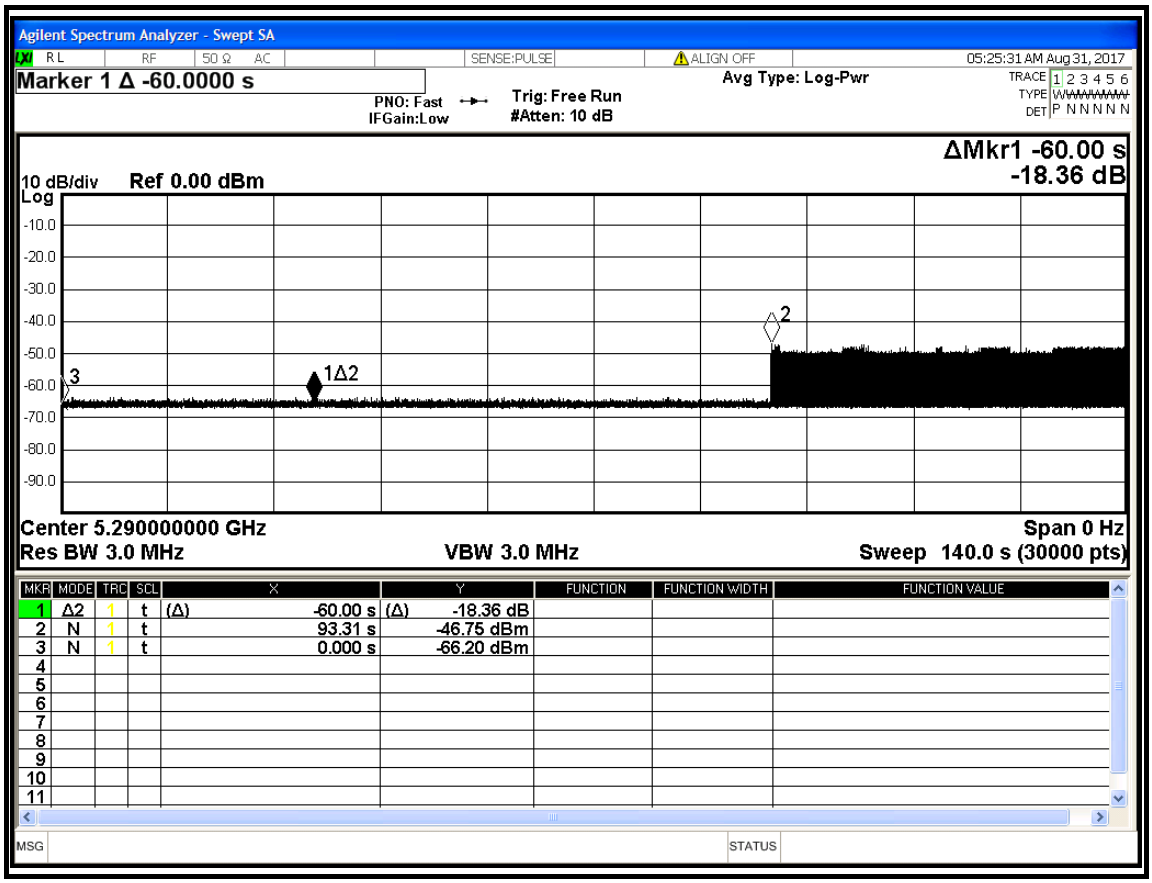
Type 1 Non-Occupancy Period Test Results

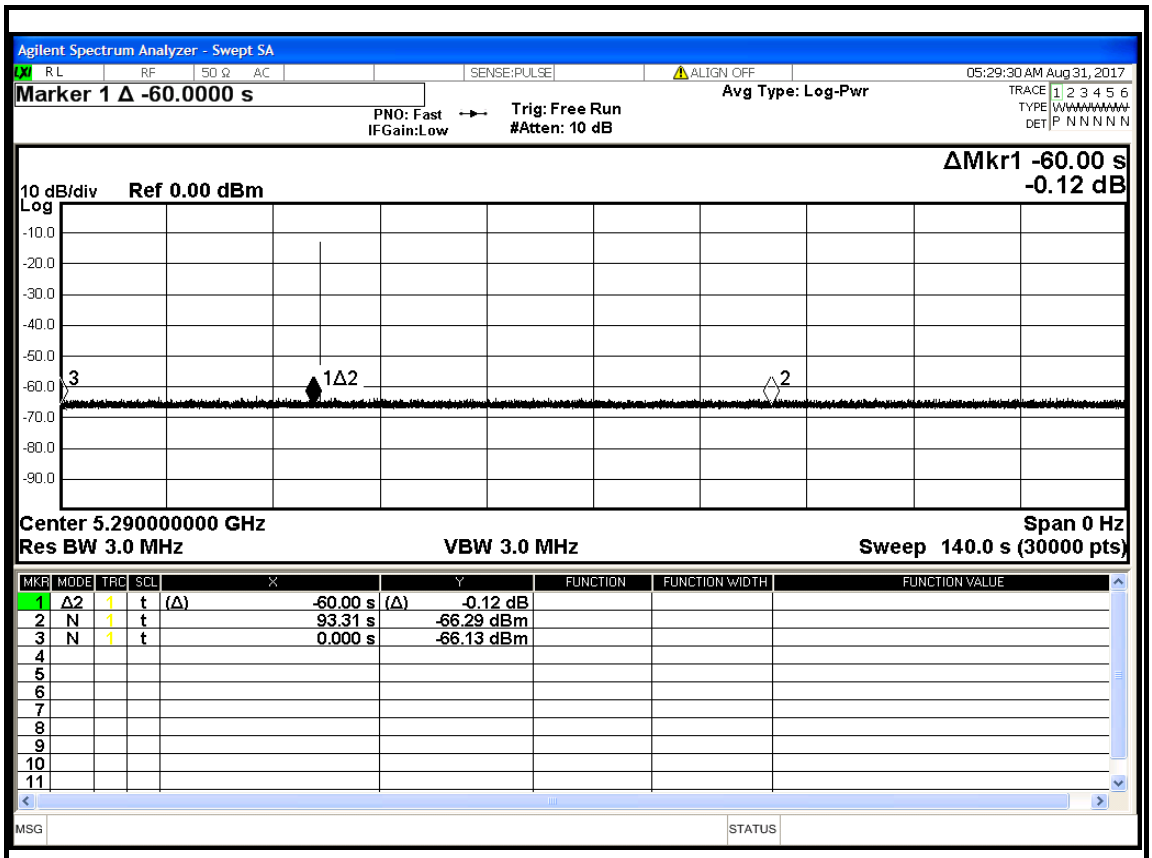
No non-compliance noted: No EUT transmissions were observed on the test channel during the 30 minute observation time.

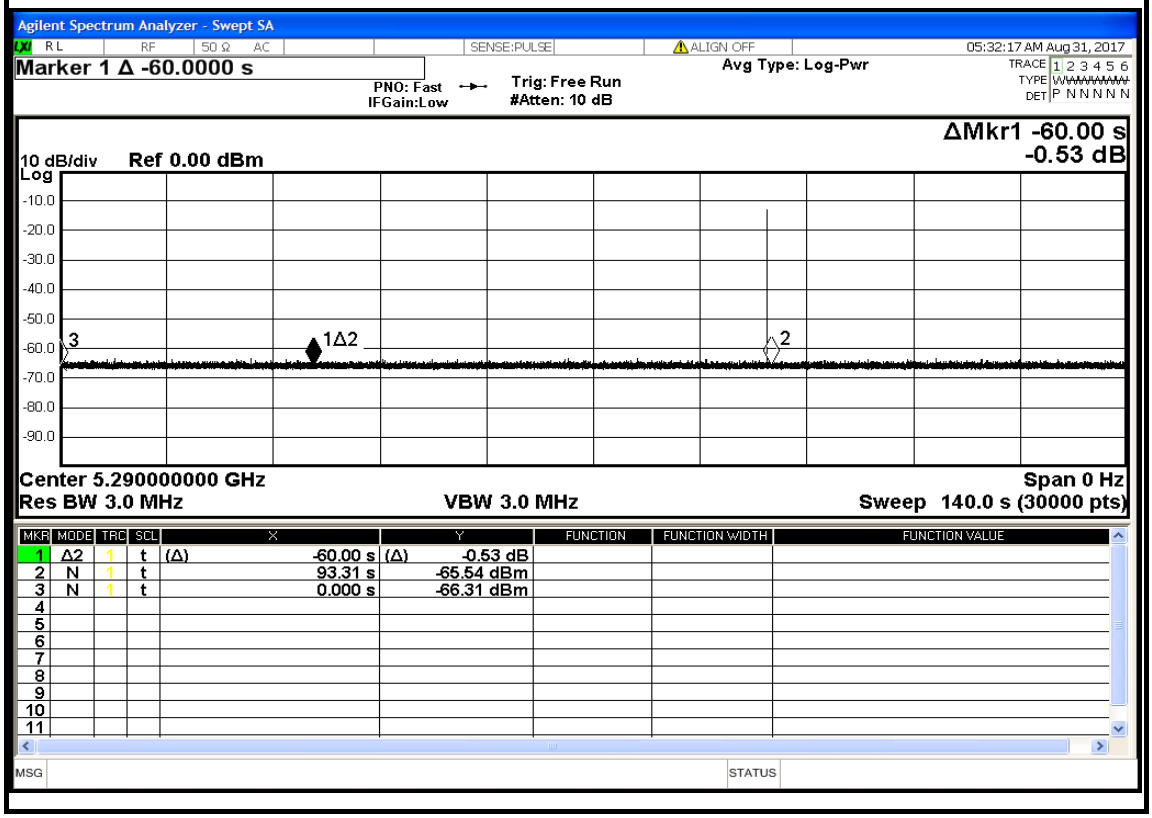


Initial Channel Availability Check Time (Master)

The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (=83.31-60=33.31 sec).







DETECTION BANDWIDTH

IEEE 802.11n 20 MHz Mode

Test Results

No non-compliance noted.

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (MHz)	Minimum Limit (%)
5291	5309	18	17.850	100.84	100

Number of Trials	Frequency (MHz)	Number Detected	Detection(%)
10	5291	10	100
10	5292	9	90
10	5293	10	100
10	5294	9	90
10	5295	10	100
10	5300	9	90
10	5305	10	100
10	5306	9	90
10	5307	10	100
10	5308	9	90
10	5309	10	100

IEEE 802.11n 40 MHz Mode

Test Results

No non-compliance noted.

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (MHz)	Minimum Limit (%)
5292	5328	36	36.400	98.90	100

Number of Trials	Frequency (MHz)	Number Detected	Detection(%)
10	5292	9	90
10	5293	9	90
10	5294	10	100
10	5295	9	90
10	5300	10	100
10	5305	9	90
10	5310	10	100
10	5315	9	90
10	5320	10	100
10	5325	9	90
10	5326	10	100
10	5327	9	90
10	5328	10	100

IEEE 802.11ac 80 MHz Mode

Test Results

No non-compliance noted.

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (MHz)	Minimum Limit (%)
5252	5328	76	75.804	100.26	100

Number of Trials	Frequency (MHz)	Number Detected	Detection(%)
10	5252	10	100
10	5253	9	90
10	5254	10	100
10	5255	9	90
10	5260	9	90
10	5265	10	100
10	5270	9	90
10	5275	10	100
10	5280	9	90
10	5285	9	90
10	5290	9	90
10	5295	10	100
10	5300	10	100
10	5305	9	90
10	5310	10	100
10	5315	9	90
10	5320	100	100
10	5325	10	100
10	5326	9	90
10	5327	10	100
10	5328	10	100

Statistical Performance Check

IEEE 802.11n 20 MHz Mode

Test Results

No non-compliance noted:

Summary of Detection Probability

Radar Type	Number of Trials	Detection (%)	Limit (%)	Pass / Fail
Type 0	30	93.33	60	Pass
Type 2	30	96.67	60	Pass
Type 3	30	96.67	60	Pass
Type 4	30	96.67	60	Pass
Aggregate of 1 to 4	30	95.84	80	Pass
Type 5	30	96.67	70	Pass
Type 6	30	96.67	80	Pass

Type 0 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	NO
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	NO
24	YES
25	YES
26	YES
27	YES
30	YES

Type 2 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	NO
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 3 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	NO
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 4 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	NO
24	YES
25	YES
26	YES
27	YES
30	YES

Type 5 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	NO
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 6 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	NO
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

IEEE 802.11n 40 MHz Mode

Test Results

No non-compliance noted:

Summary of Detection Probability

Radar Type	Number of Trials	Detection (%)	Limit (%)	Pass / Fail
Type 0	30	90.00	60	Pass
Type 2	30	96.67	60	Pass
Type 3	30	93.33	60	Pass
Type 4	30	93.33	60	Pass
Aggregate of 1 to 4	30	93.33	80	Pass
Type 5	30	93.33	70	Pass
Type 6	30	93.33	80	Pass

Type 0 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	NO
16	YES
17	YES
18	NO
19	YES
20	YES
21	YES
22	YES
23	NO
24	YES
25	YES
26	YES
27	YES
30	YES

Type 2 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	NO
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 3 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	NO
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	NO
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 4 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	NO
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	NO
24	YES
25	YES
26	YES
27	YES
30	YES

Type 5 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	NO
14	YES
15	YES
16	YES
17	YES
18	NO
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 6 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	NO
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	NO
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

IEEE 802.11ac 80 MHz Mode

Test Results

No non-compliance noted:

Summary of Detection Probability

Radar Type	Number of Trials	Detection (%)	Limit (%)	Pass / Fail
Type 0	30	93.33	60	Pass
Type 2	30	93.33	60	Pass
Type 3	30	96.67	60	Pass
Type 4	30	96.67	60	Pass
Aggregate of 1 to 4	30	95.00	80	Pass
Type 5	30	96.67	70	Pass
Type 6	30	96.67	80	Pass

Type 0 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	NO
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	NO
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 2 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	NO
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	NO
24	YES
25	YES
26	YES
27	YES
30	YES

Type 3 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	NO
30	YES

Type 4 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	NO
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 5 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	NO
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 6 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	NO
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

General Reporting Notes

The reference marker is set at the end of last radar pulse.

Type 0 Radar Reporting Notes

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =

(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated

Begins no later than (Reference Marker + 200 msec)

and

Ends no earlier than (Reference Marker + 10 sec).

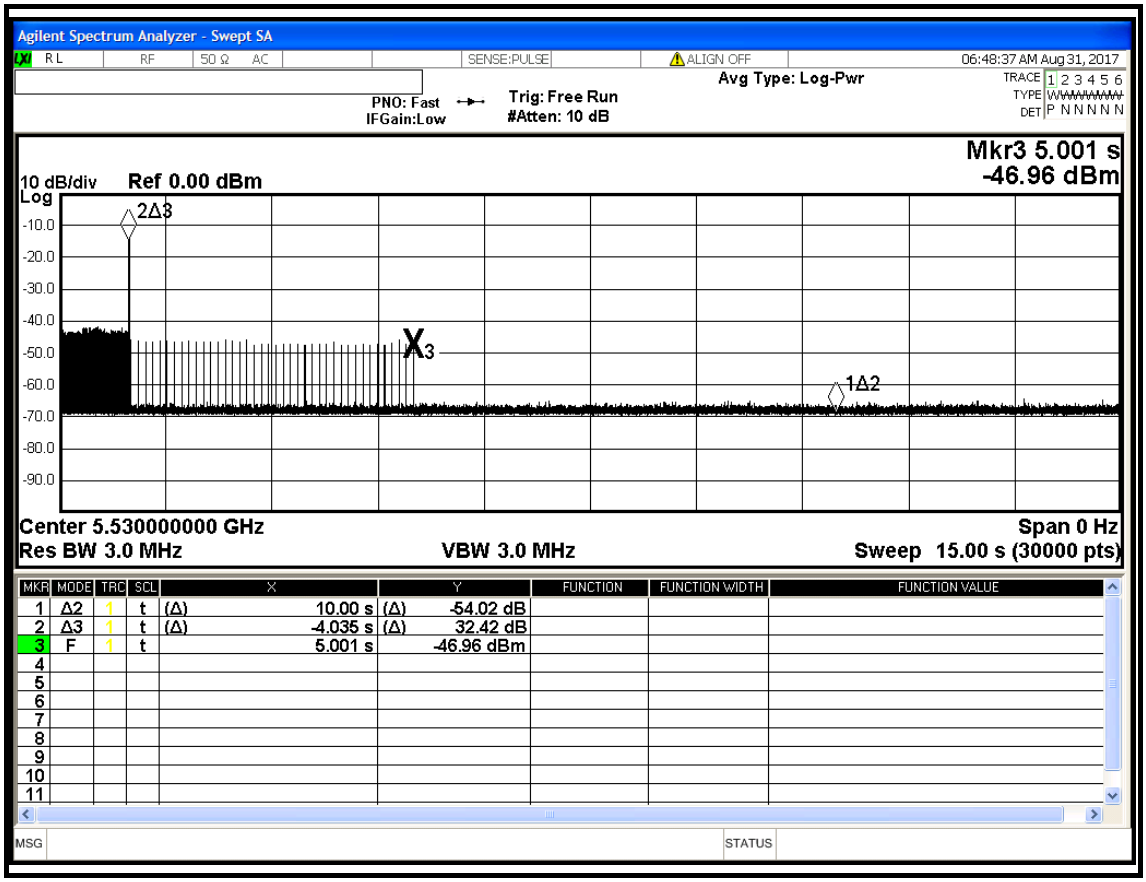
HIGH BAND RESULTS

IEEE 802.11ac 80 MHz Mode

Type 0 Channel Move Time Results

No non-compliance noted.

Channel Move Time (s)	Limit (s)
4.035	10

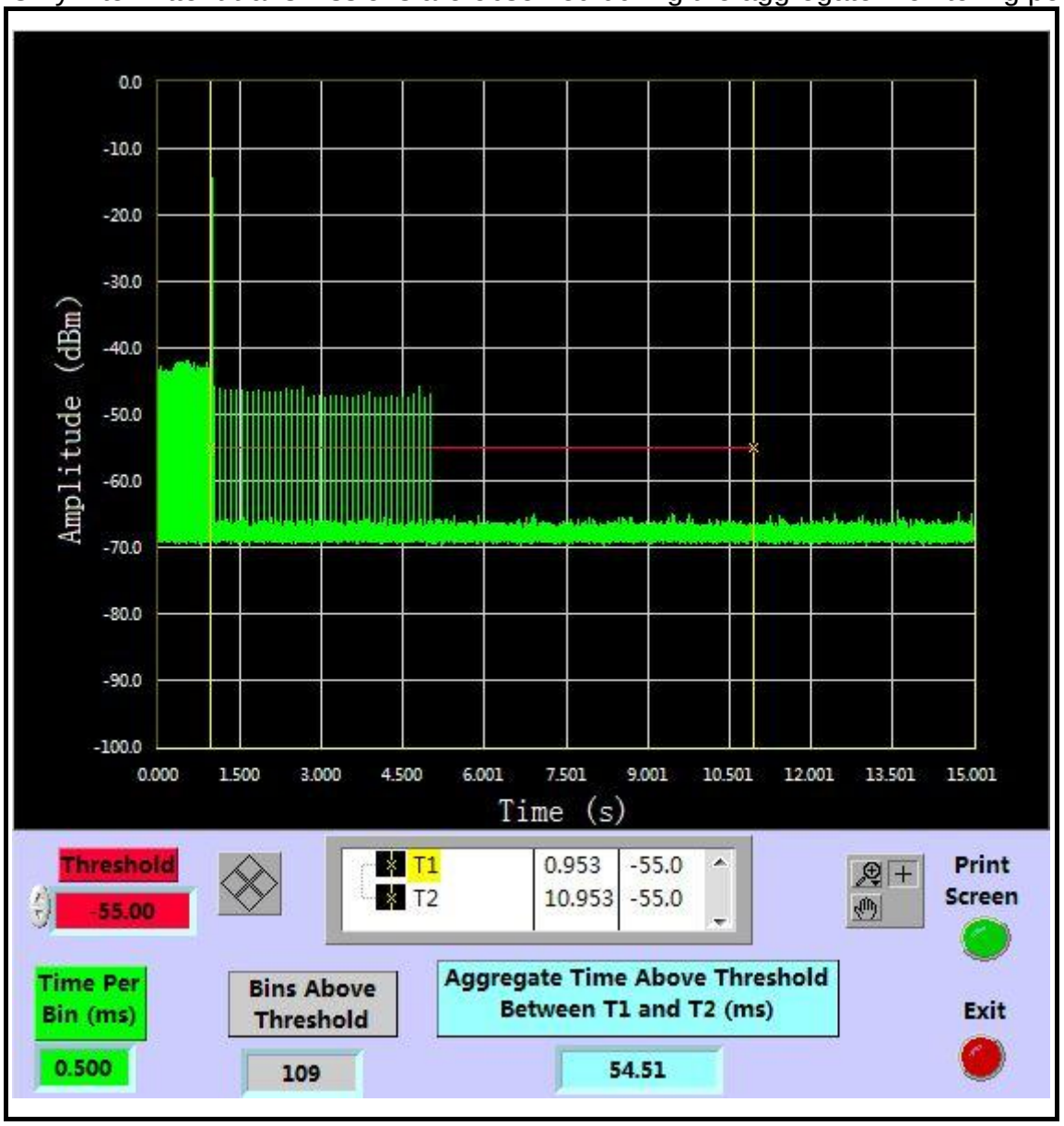


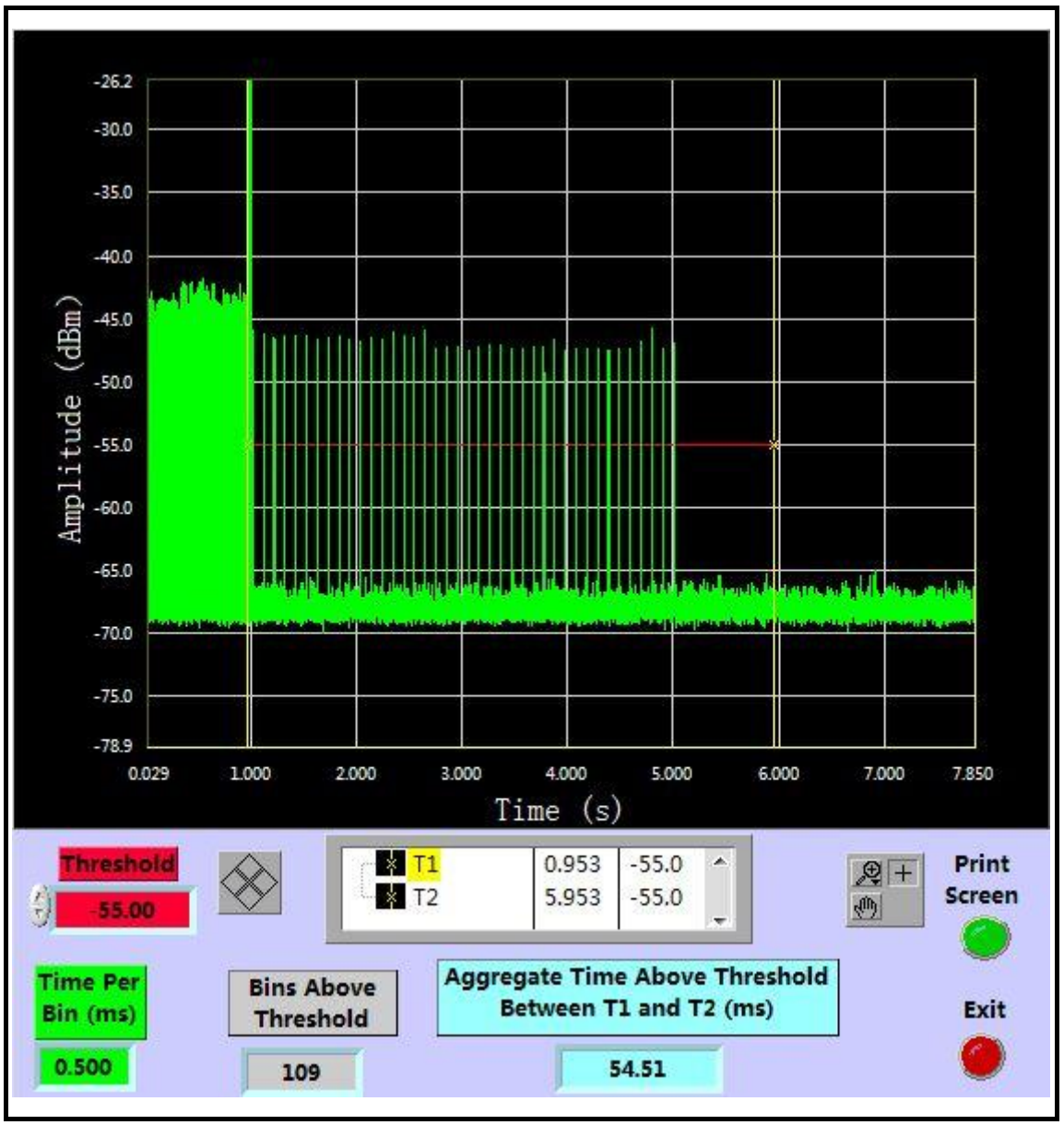
Type 1 Channel Closing Transmission Time Results

No non-compliance noted.

Transmission After 200(ms)	Aggregate Transmission Time (ms)	Limit for Aggregate Transmission Time After 200 (ms)	Result
Yes	54.51	60	Pass

Only intermittent transmissions are observed during the aggregate monitoring period.

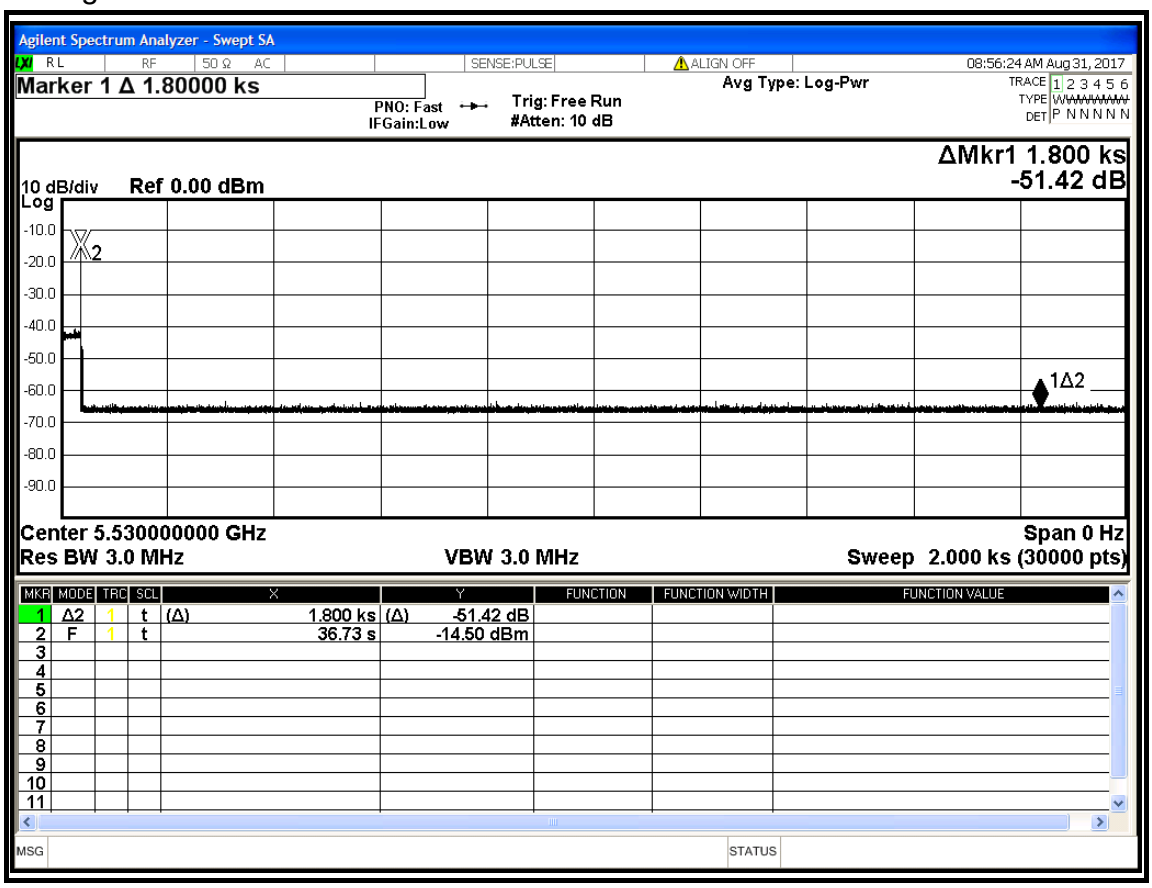




Non-Occupancy Period

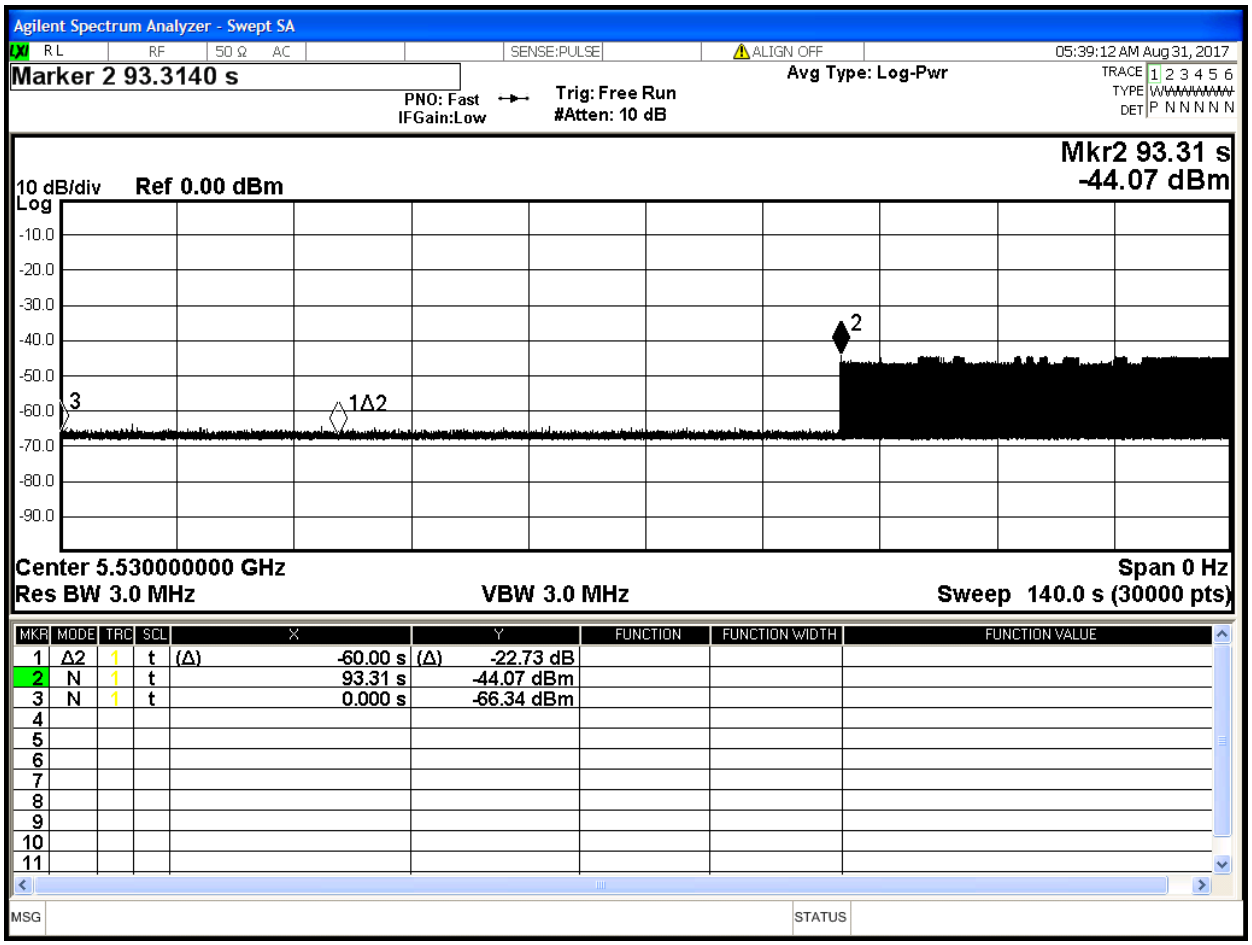
Type 1 Non-Occupancy Period Test Results

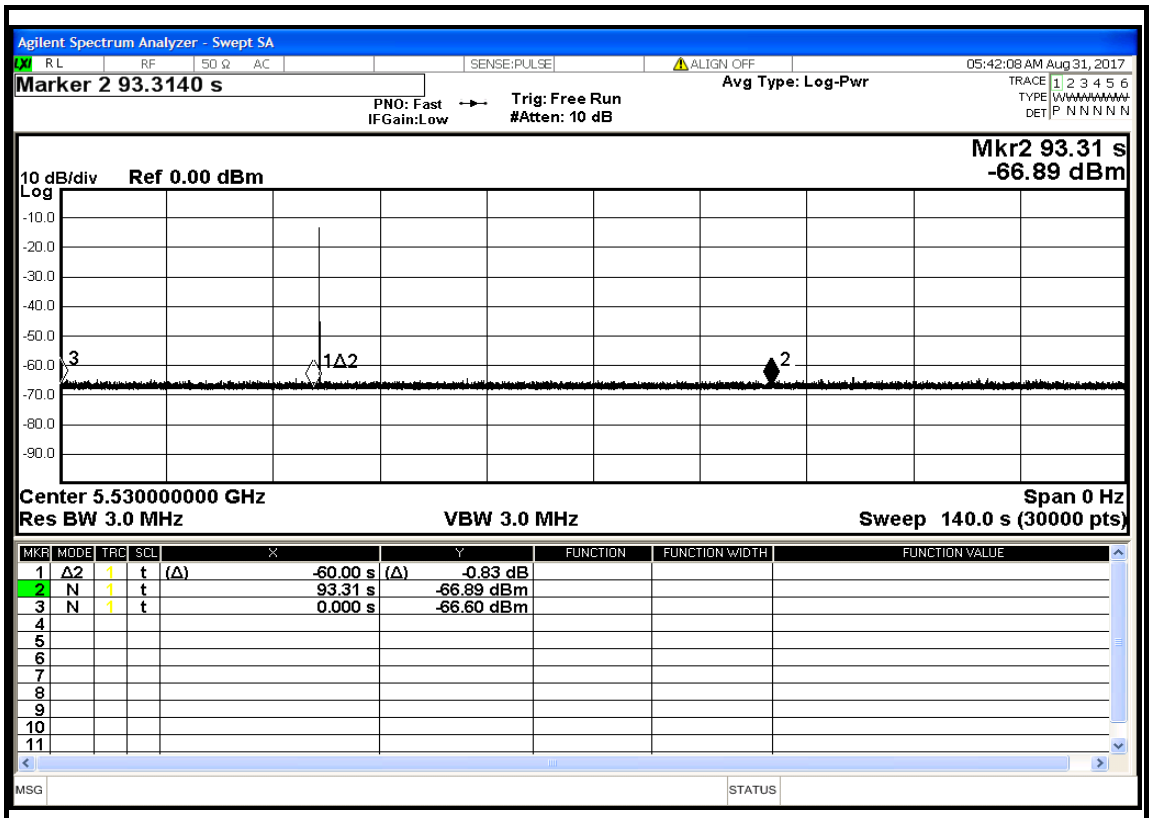
No non-compliance noted: No EUT transmissions were observed on the test channel during the 30 minute observation time.

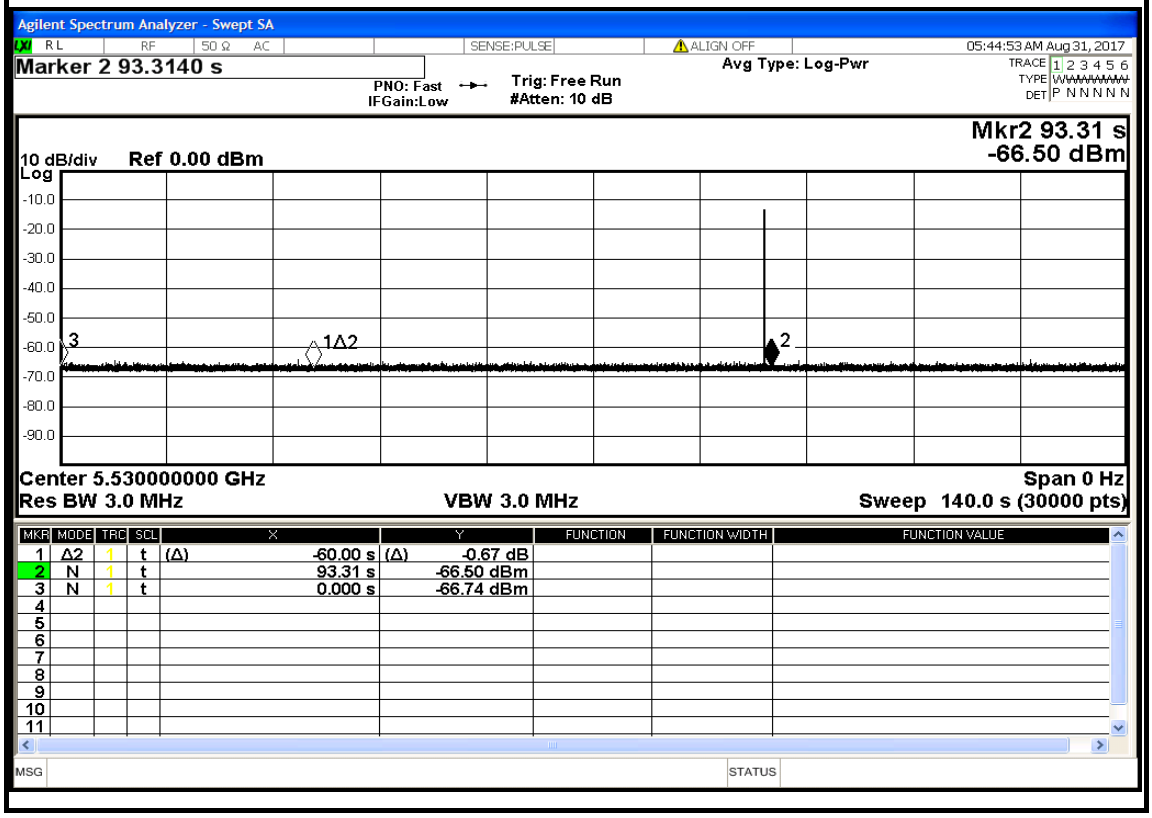


Initial Channel Availability Check Time (Master)

The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (=93.31-60=33.31 sec).







DETECTION BANDWIDTH

IEEE 802.11n 20 MHz Mode

Test Results

No non-compliance noted.

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (MHz)	Minimum Limit (%)
5491	5509	18	17.879	100.68	100

Number of Trials	Frequency (MHz)	Number Detected	Detection(%)
10	5491	10	100
10	5492	8	80
10	5493	10	100
10	5494	8	80
10	5495	10	100
10	5500	9	90
10	5505	10	100
10	5506	9	90
10	5507	8	80
10	5508	10	100
10	5509	10	100

IEEE 802.11n 40 MHz Mode

Test Results

No non-compliance noted.

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (MHz)	Minimum Limit (%)
5492	5528	36	36.408	98.88	100

Number of Trials	Frequency (MHz)	Number Detected	Detection(%)
10	5292	9	90
10	5293	10	100
10	5294	8	80
10	5295	10	100
10	5300	10	100
10	5305	9	90
10	5510	10	100
10	5515	8	80
10	5520	10	100
10	5525	9	90
10	5526	10	100
10	5527	8	80
10	5528	9	90

IEEE 802.11ac 80 MHz Mode

Test Results

No non-compliance noted.

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (MHz)	Minimum Limit (%)
5492	5568	76	75.804	100.26	100

Number of Trials	Frequency (MHz)	Number Detected	Detection(%)
10	5492	9	90
10	5493	10	100
10	5494	8	80
10	5495	10	100
10	5500	10	100
10	5505	9	90
10	5510	10	100
10	5515	9	80
10	5520	10	100
10	5525	8	80
10	5530	10	100
10	5535	9	90
10	5540	10	100
10	5545	9	90
10	5550	10	100
10	5555	10	100
10	5560	8	80
10	5565	10	100
10	5566	9	90
10	5567	8	80
10	5568	10	100

Statistical Performance Check

IEEE 802.11n 20 MHz Mode

Test Results

No non-compliance noted:

Summary of Detection Probability

Radar Type	Number of Trials	Detection (%)	Limit (%)	Pass / Fail
Type 0	30	96.67	60	Pass
Type 2	30	93.33	60	Pass
Type 3	30	93.33	60	Pass
Type 4	30	96.67	60	Pass
Aggregate of 1 to 4	30	95.00	80	Pass
Type 5	30	96.67	70	Pass
Type 6	30	96.67	80	Pass

Type 0 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	NO
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 2 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	NO
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	NO
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 3 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	NO
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	NO
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 4 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	NO
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 5 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	NO
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 6 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	NO
24	YES
25	YES
26	YES
27	YES
30	YES

IEEE 802.11n 40 MHz Mode

Test Results

No non-compliance noted:

Summary of Detection Probability

Radar Type	Number of Trials	Detection (%)	Limit (%)	Pass / Fail
Type 0	30	96.67	60	Pass
Type 2	30	96.67	60	Pass
Type 3	30	93.33	60	Pass
Type 4	30	96.67	60	Pass
Aggregate of 1 to 4	30	95.84	80	Pass
Type 5	30	93.33	70	Pass
Type 6	30	96.67	80	Pass

Type 0 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	NO
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 2 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	NO
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 3 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	NO
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	NO
26	YES
27	YES
30	YES

Type 4 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	NO
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 5 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	NO
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	NO
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 6 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	NO
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

IEEE 802.11ac 80 MHz Mode

Test Results

No non-compliance noted:

Summary of Detection Probability

Radar Type	Number of Trials	Detection (%)	Limit (%)	Pass / Fail
Type 0	30	96.67	60	Pass
Type 2	30	96.67	60	Pass
Type 3	30	96.67	60	Pass
Type 4	30	93.33	60	Pass
Aggregate of 1 to 4	30	95.84	80	Pass
Type 5	30	96.67	70	Pass
Type 6	30	96.67	80	Pass

Type 0 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	NO
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 2 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	NO
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 3 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	NO
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 4 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	NO
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	NO
25	YES
26	YES
27	YES
30	YES

Type 5 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	YES
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	NO
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

Type 6 Detection Probability

Trial No.	Successful Detection (Yes/No)
1	YES
2	YES
3	YES
4	NO
5	YES
6	YES
7	YES
8	YES
9	YES
10	YES
11	YES
12	YES
13	YES
14	YES
15	YES
16	YES
17	YES
18	YES
19	YES
20	YES
21	YES
22	YES
23	YES
24	YES
25	YES
26	YES
27	YES
30	YES

APPENDIX I PHOTOGRAPHS OF TEST SETUP