ACCREDITED
Certificate # 5200.01

FCC Part 15, Subpart E

Test Report

FCC ID:	2A6XZ-LAGOFRAME01
Applicant:	Lago Digital, Inc.
Address:	530 7th Ave Suite 1001 NY, NY 10018
Manufacturer:	Lago Digital, Inc.
Address:	530 7th Ave Suite 1001 NY, NY 10018
Product:	33 inch Frame
Brand(s):	N/A
Test Model(s):	LAGO Frame Genesis
Series Model(s):	N/A
Test Date:	Apr. 24, 2022 ~ May 31, 2022
Issued Date:	Jun. 02, 2022
Issued By:	Hwa-Hsing (Dongguan) Testing Co., Ltd.
Address:	No.101, Bld. N1, Yuyuan 2Rd, Yuyuan Industrial Park, HuangJiang Town, Dongguan, China
Test Firm Registration No.:	915896
Designation No.:	CN1255
Standards:	FCC Part 15, Subpart E, Section 15.407, FCC 14-30; FCC public notices 06-96 KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02

The above equipment has been tested by **Hwa-Hsing (Dongguan) Testing Co., Ltd.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Tank Tan — *Tank Tan*

Reviewed by : Scott He — *Scott He*

Approved by : — *Harry Li*

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Release Control Record

Issue No.	Description	Date Issued
220214EL03-RF-US-05	Original Release	Jun. 02, 2022

1. Summary of Test Results

FCC Part 15, Subpart E, Section 15.407 FCC 14-30; FCC public notices 06-96 KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02			
Clause	Test Parameter	Remarks	Verdict
15.407	DFS Detection Threshold	Not 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	Applicable	Pass
15.407	Uniform Spreading	Not Applicable	N/A
15.407	U-NII Detection Bandwidth	Not Applicable	N/A
15.407	Non-associated test	Applicable	Pass
15.407	Non-Co-Channel test	Applicable	Pass

UUT Note: Client without radar detection

2. General Information

2.1 General Description of EUT

Product(s)	33 inch Frame
Test Model(s)	LAGO Frame Genesis
Sample No.	HS220509-01-03; HS220509-01-06
Series Model(s)	N/A
Status of EUT	Engineering Prototype
Power Supply Rating	100-240V~,1.2A,50~60Hz, 120W
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps 802.11ac: up to 867Mbps
Operating Frequency	5180~5240MHz, 5260~5320MHz 5500~5700MHz, 5745~5825MHz
Number of Channel	See the section 2.2
Maximum Output Power	19.45dBm for 5150 ~ 5250MHz (Maximum AVG Power) 18.97dBm for 5250 ~ 5350MHz (Maximum AVG Power) 19.18dBm for 5470 ~ 5725MHz (Maximum AVG Power) 18.99dBm for 5725 ~ 5850MHz (Maximum AVG Power)
Antenna Type	Dipole Antenna
Max. Antenna Gain	3.0dBi for 5150 ~ 5250MHz (Peak) 3.0dBi for 5250 ~ 5350MHz (Peak) 3.0dBi for 5470 ~ 5725MHz (Peak) 3.0dBi for 5725 ~ 5850MHz (Peak)
Antenna Connector	I-PEX
Accessory Device	N/A
Data Cable Supplied	AC Line: 190cm

Note:

1. Please refer to the EUT photo document (220214EL03-01&-02) for detailed product photo.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.
3. The EUT incorporates MIMO function, provides 2 completed Transmit and 2 Receive Chain.

Support mode	Transmit and receive mode	Transmit and receive chain
802.11a	MIMO	2TX/2RX
802.11n HT20	MIMO	2TX/2RX
802.11n HT40	MIMO	2TX/2RX
802.11ac VHT20	MIMO	2TX/2RX
802.11ac VHT40	MIMO	2TX/2RX
802.11ac VHT80	MIMO	2TX/2RX

2.2 Description of Test Channels

For 5150 ~ 5350MHz

8 channels are provided for 802.11a, 802.11ac 20MHz, 802.11n (20MHz):

Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz
44	5220 MHz	48	5240 MHz
52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz

4 channels are provided for 802.11ac 40MHz, 802.11n (40MHz):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz
54	5270 MHz	62	5310 MHz

2 channels are provided for 802.11ac (80MHz):

Channel	Frequency	Channel	Frequency
42	5210MHz	58	5290MHz

For 5470 ~ 5725MHz

11 channels are provided for 802.11a, 802.11a c 20MHz, 802.11n (20MHz):

Channel	Frequency	Channel	Frequency
100	5500 MHz	104	5520 MHz
108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz
124	5620 MHz	128	5640 MHz
132	5660 MHz	136	5680 MHz
140	5700 MHz	--	--

4 channels are provided for 802.11a c 40MHz, 802.11n (40MHz):

Channel	Frequency	Channel	Frequency
102	5510 MHz	110	5550 MHz
118	5590 MHz	134	5670 MHz

2 channels are provided for 802.11ac (80MHz):

Channel	Frequency	Channel	Frequency
106	5530MHz	122	5610MHz

For 5725 ~ 5850MHz

5 channels are provided for 802.11a, 802.11a c 20MHz, 802.11n (20MHz):

Channel	Frequency	Channel	Frequency
149	5745MHz	153	5765MHz
157	5785MHz	161	5805MHz
165	5825MHz	--	--

2 channels are provided for 802.11a c 40MHz, 802.11n (40MHz):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz):

Channel	Frequency	Channel	Frequency
155	5775MHz	--	--

3. Description of DFS Test

3.1 Test limits and radar signal parameters

- DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (See Note 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.	

- 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	100% of the UNII 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.	

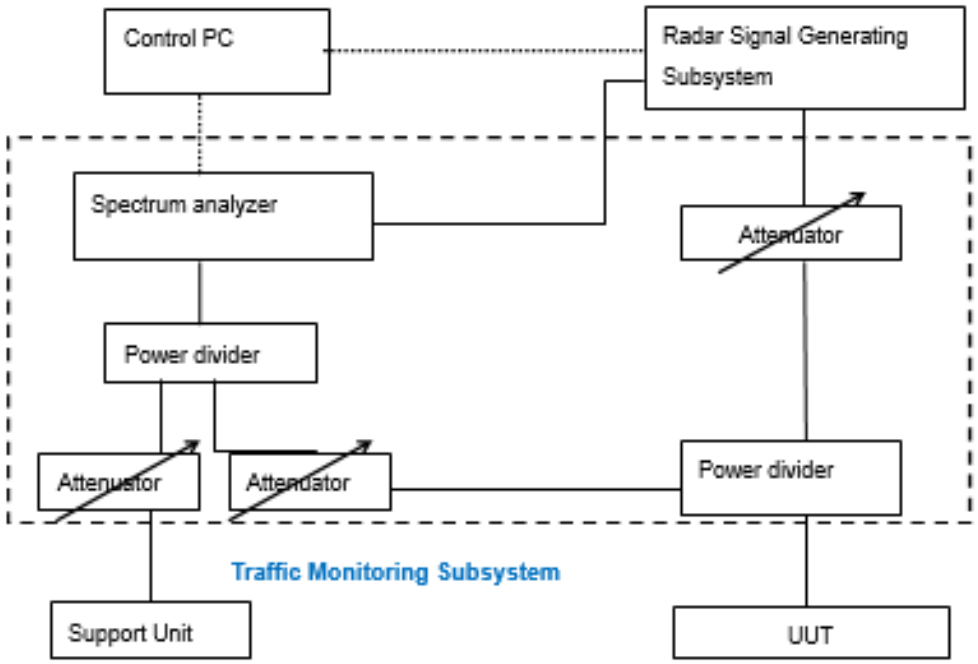
- Channel Loading

System testing will be performed with channel-loading using means appropriate to the data types that are used by the unlicensed device. The following requirements apply:

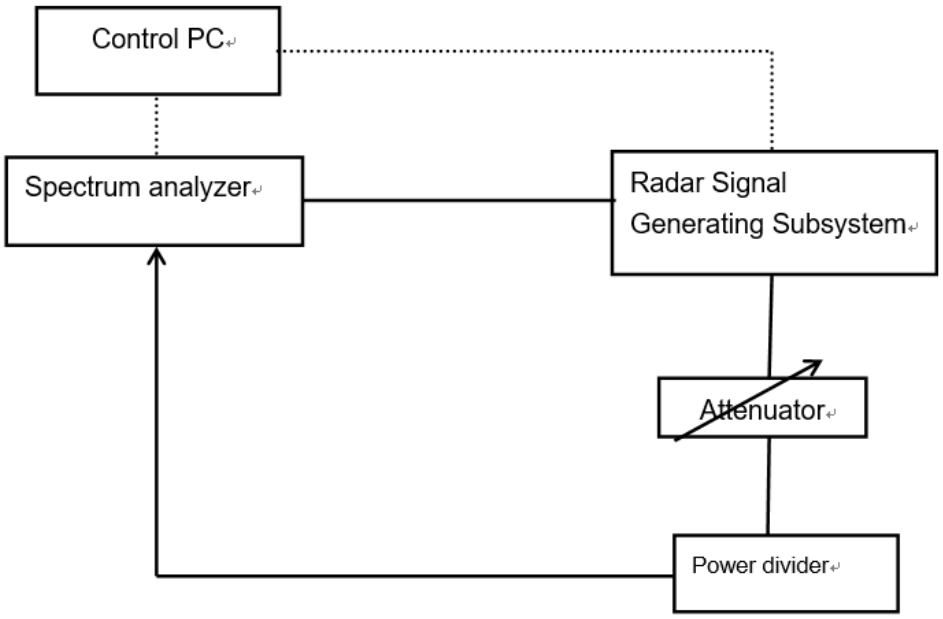
a)	The data file must be of a type that is typical for the device (i.e., MPEG-2, MPEG-4, WAV, MP3, MP4, AVI, etc.) and must generally be transmitting in a streaming mode.	N/A
b)	Software to ping the client is permitted to simulate data transfer but must have random ping intervals.	N/A
c)	Timing plots are required with calculations demonstrating a minimum channel loading of approximately 17% or greater.	Apply
d)	Unicast or Multicast protocols are preferable but other protocols may be used. The appropriate protocol used must be described in the test procedures.	N/A

3.2 DFS measurement system

A complete DFS Measurement System consists of Radar signal generate system to generating the radar waveforms in Table 10, 11 and 12. The traffic monitoring system is specified to the type of unit under test (UUT).
Conducted setup configuration of DFS Measurement System



3.3 Calibration of DFS detection threshold level



3.4 Parameters of DFS test signals

- 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 ---------- Test B: 15 unique PRI values randomly selected within the range of 518-3066 μs, with a minimum increment of 1 μs, excluding PRI values selected in Test A	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	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
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

- 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

- 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

3.5 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Next Date of Calibration
Spectrum Keysight	N9020A	MY51240612	2018/10/29	2022/09/12
Spectrum Analyzer Rohde&Schwarz	FSV-40N	101783	2018/12/11	2022/09/12
Power Meter 10Hz~18GHz Tonscend	JS0806-2	188060126	2018-11-10	2022/09/12
Signal generator Keysight	N5182A	GB40051020	2018/10/29	2022/09/12
Signal generator Keysight	N5182A	MY47420944	2018/10/29	2022/09/12
Test Software Tonscend	JS0806-2	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12/24months and the calibrations are traceable to CEPREI/CHINA.

2. The test was performed in 966.

3.6 Description of support units

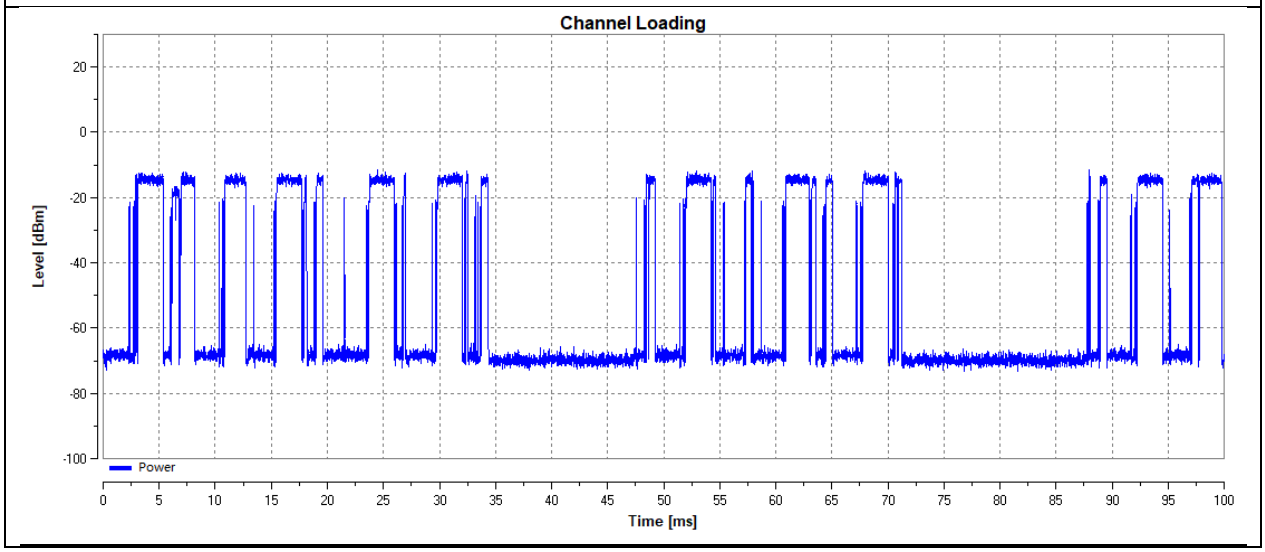
Product	Brand	Model name	FCC ID number	Maximum antenna Gain (dBi)	Max. Transmit Power
Wireless AP Router	ASUS	RT-AC1200	MSQ-RT1D00	1.0	<200mW

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

4. Test Result of DFS

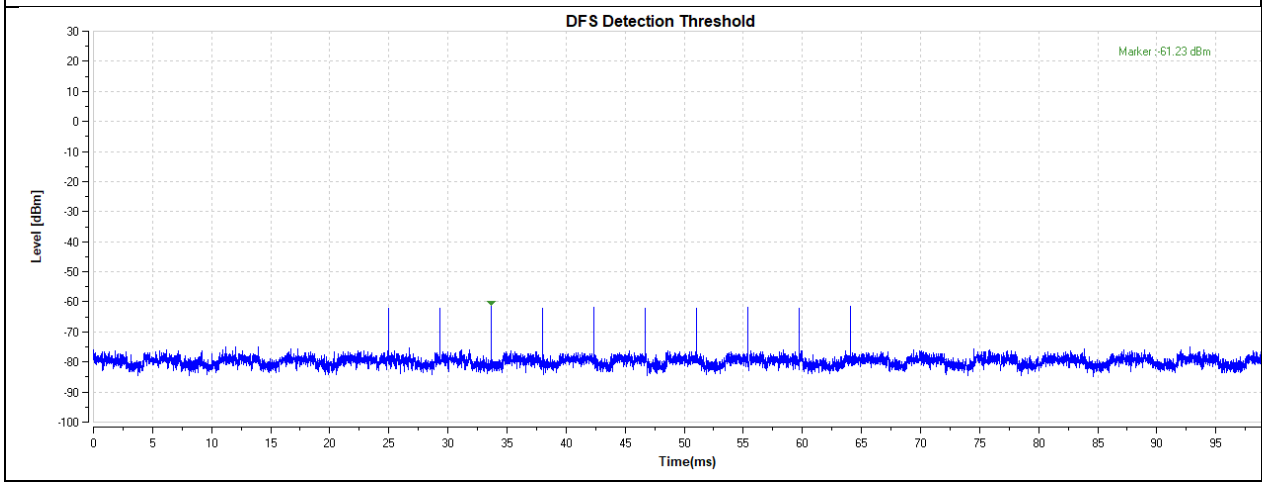
Channel Loading：

Duty cycle: 31.15%



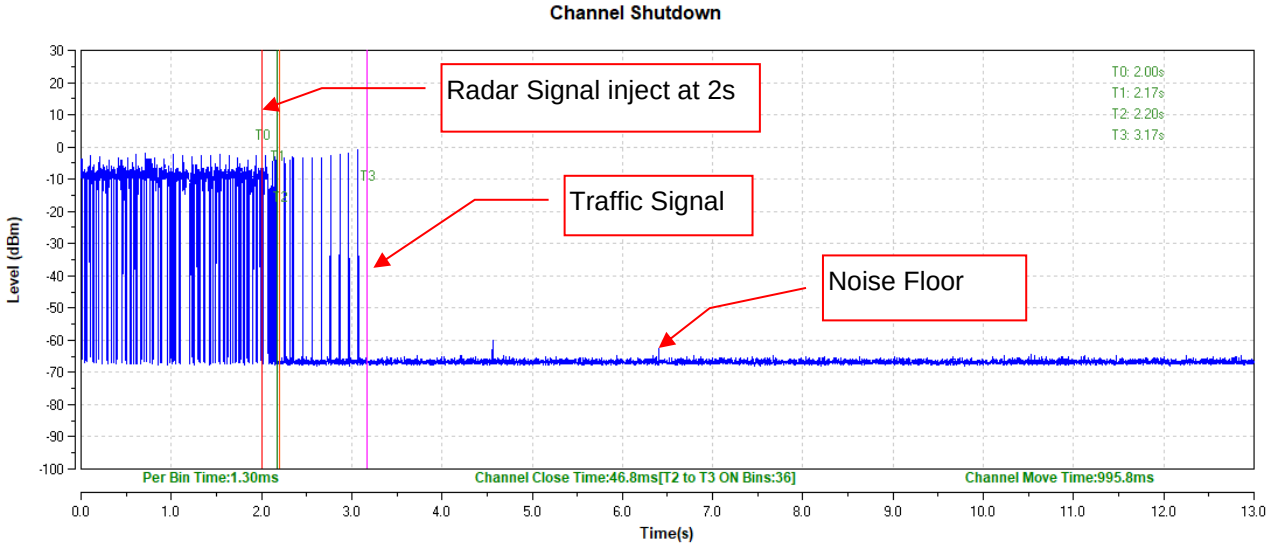
DFS detection threshold：

The Required detection threshold is -61.00dBm (= -62 +1.0)dBm.
The conducted radar burst level is set to -61.00dBm.

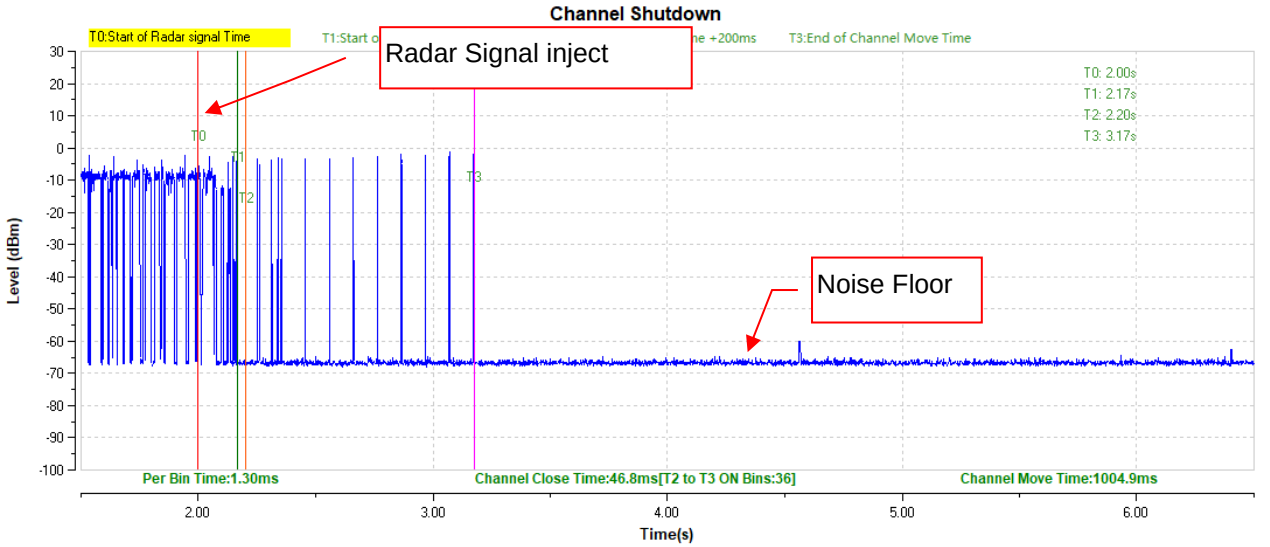


***Channel Closing Transmission and Channel Move Time(Worst case mode)*:**

11ac (80 MHz) 5290MHz



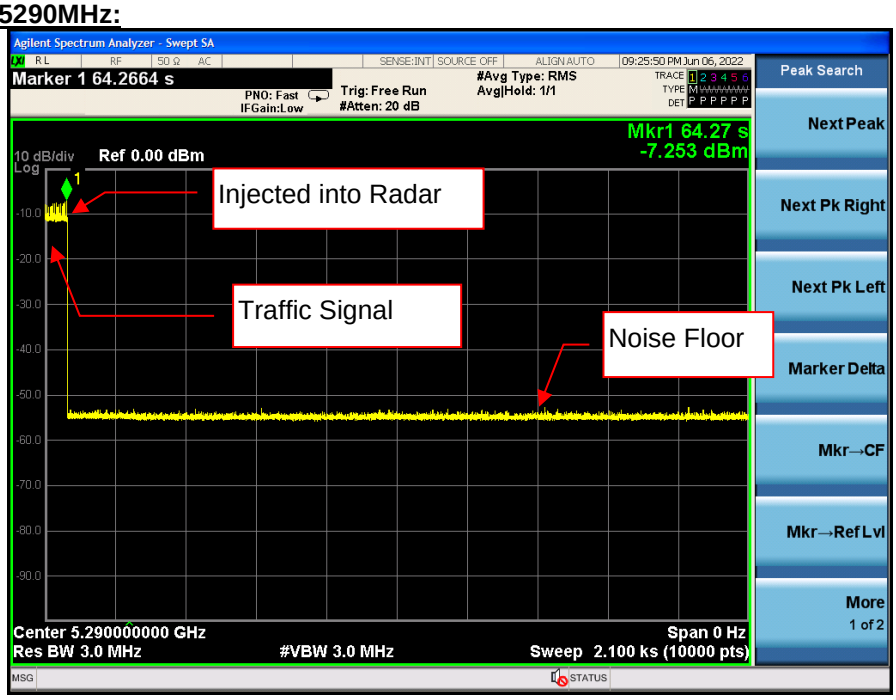
NOTE: T0 denotes the start of Channel Move Time upon the end of the last Radar burst at 2s.
T1 denotes the Normal Transmissions Complete.
T2 denotes the data transmission time of 200ms from T1.



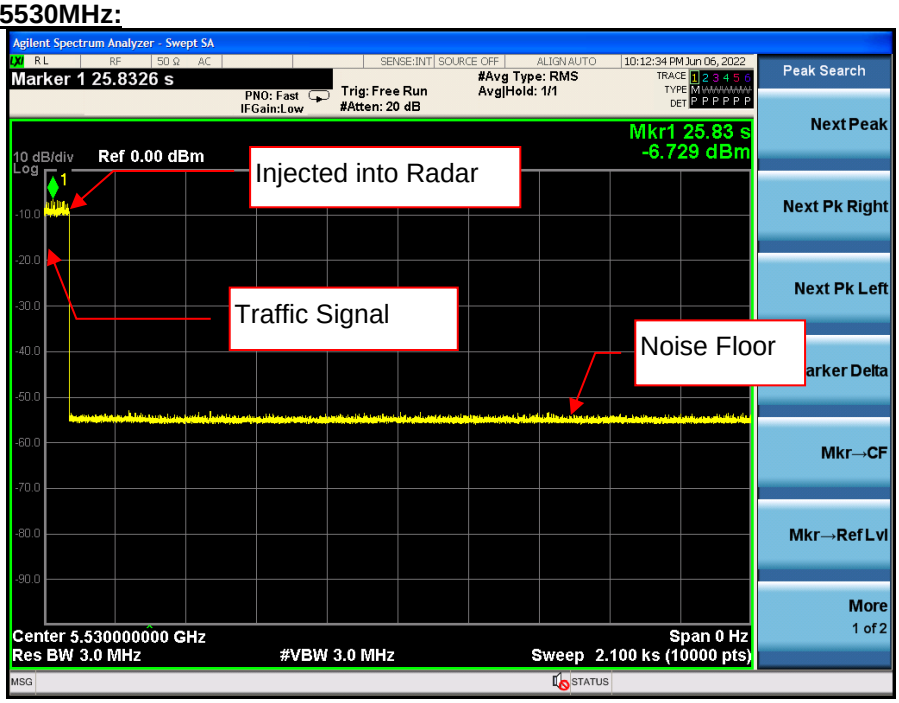
NOTE: An expanded plot for the device vacates the channel.

***Non- occupancy period*:**

11ac (80 MHz) 5290MHz:

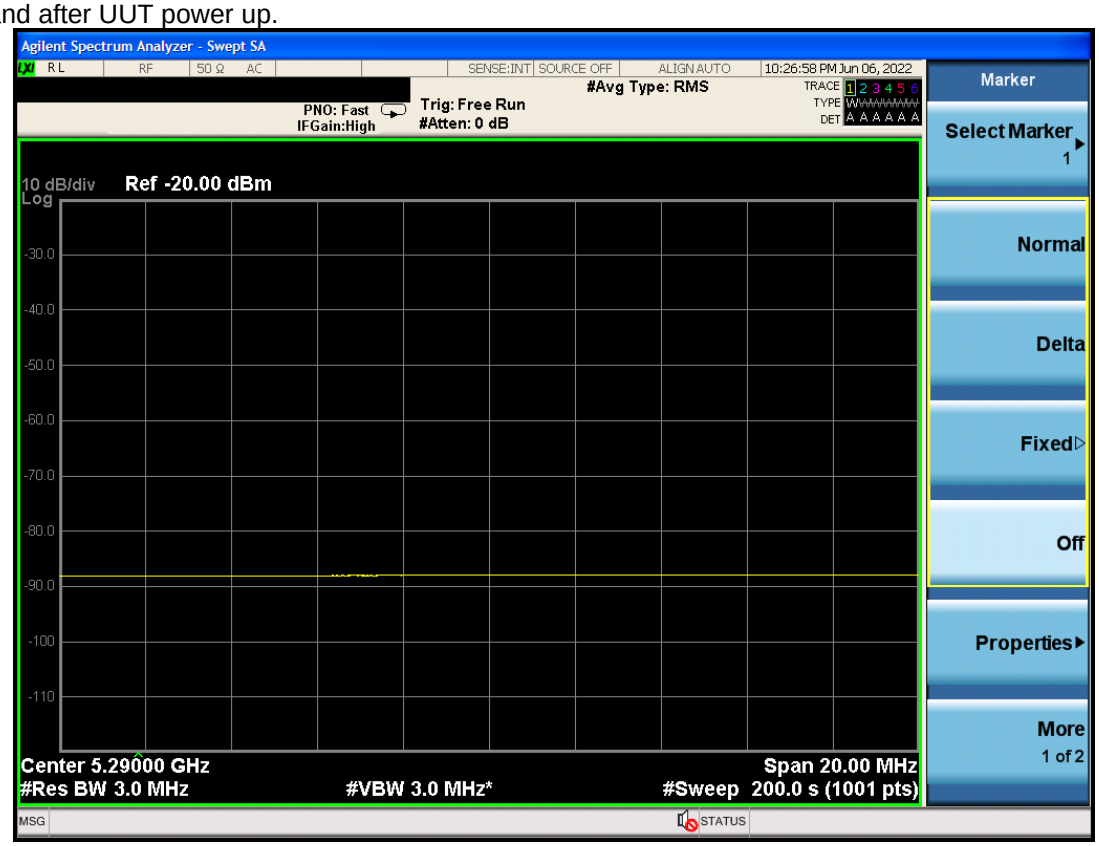


11ac (80 MHz) 5530MHz:



***Non-associated test*:**

After the master off, during the 30 minutes observation time, The UUT did not make any transmissions in the DFS band after UUT power up.



Non- co-channel test

The UUT was investigated after radar was detected the channel and made sure no co-channel operation with radars.

5. Photographs of the test configuration

Please refer to the attached file (Test Setup Photo).

Appendix – Information on The Testing Laboratories

We, Hwa-Hsing (Dongguan) Co., Ltd., A global provider of TESTING and CERTIFICATION services for consumer products, electronic products and wireless information technology products. Adhering to the core values “HONEST and TRUSTWORTHY, OBJECTIVE and IMPARTIALITY, RIGOROUS and AFFICIENT”, commitment to provide professional, perfect and efficient comprehensive ONE-STOP solution of TESTING and CERTIFICATION services for Manufacturers, Buyers, Traders, Brands, Retailers. Assist client to better manage risk, protect their brands, reduce costs and cut time to over 150 markets in global. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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