REPORT No.: SZ17050109W05

FCC RF TEST REPORT

APPLICANT	:	AOC
PRODUCT NAME	:	Tablet PC
MODEL NAME	:	A110, A110-E
TRADE NAME	:	N/A
BRAND NAME	:	AOC
FCC ID	:	2AEB5-A110
STANDARD(S)	:	47 CFR Part 15 Subpart E
ISSUE DATE	:	2017-06-27

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

MORLAB GROUP
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Tel: 86-755-36698555 Http://www.morlab.com
Fax: 86-755-36698525 E-mail: service@morlab.cn

DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	2017-06-27	First edition

TEST REPORT DECLARATION

Applicant	AOC
Applicant Address	14F-5, No. 258, Liancheng Rd., Zhonghe Dist., New Taipei City, Taiwan
Manufacturer	AOC
Manufacturer Address	14F-5, No. 258, Liancheng Rd., Zhonghe Dist., New Taipei City, Taiwan
Product Name	Tablet PC
Model Name	A110, A110-E
Brand Name	AOC
HW Version	EM-T8811A
SW Version	A110-E
Test Standards	47 CFR Part 15 Subpart E
Test Date	2017-05-25 to 2017-06-15
Test Result	PASS

Tested by : Li Jingzong

Li Jingzong (Test Engineer)

Approved by : Qiu Xiaojun

Qiu Xiaojun (Supervisor)

1. GENERAL INFORMATION

1.1 EUT Description

Product Name.....:	Tablet PC
Serial No. .....:	(n.a, marked #1 by test site)
Hardware Version.....:	EM_T8811A_V6.0 MO
Software Version.....:	Android 6.0
Applicant.....:	AOC 14F-5, No. 258, Liancheng Rd., Zhonghe Dist., New Taipei City, Taiwan
Manufacturer .....:	AOC 14F-5, No. 258, Liancheng Rd., Zhonghe Dist., New Taipei City, Taiwan
Frequency Range.....:	802.11b/g/n: 2.400GHz - 2.4835GHz 802.11a/n: 5.150GHz- 5.250GHz 5.25 GHz -5.35 GHz 5.47 GHz -5.725 GHz 5.725GHz- 5.850GHz
Channel Number .....:	Refer Note(2)
Modulation Type.....:	DSSS, OFDM
Antenna Type.....:	PIFA Antenna
Antenna Gain.....:	2 dBi

Note 1: The U-NII band DFS result is applicable to this report, another test cases is documented in a separate report.

Note 2 : The following tables are the channel number and frequency of the EUT, the black bold channels were selected for test.

20MHz Bandwidth:

Frequency Range	5150~5250MHz				5250~5350MHz			
Channel Number	**36**	40	**44**	**48**	**52**	56	**60**	**64**
Frequency (MHz)	**5180**	5200	**5220**	**5240**	**5260**	5280	**5300**	**5320**

Frequency Range	5470~5725MHz										
Channel Number	**100**	105	108	112	116	**120**	124	128	132	136	**140**
Frequency (MHz)	**5500**	5520	5540	5560	5580	**5600**	5620	5640	5660	5680	**5700**

Frequency Range	5725~5850MHz				
Channel Number	**149**	153	**157**	161	**165**
Frequency (MHz)	**5745**	5765	**5785**	5805	**5825**

40MHz Bandwidth:

Frequency Range	5150~5250 MHz		5250~5350 MHz	
Channel Number	**38**	**46**	**54**	**62**
Frequency (MHz)	**5190**	**5230**	**5270**	**5310**

Frequency Range	5470~5725MHz					
Channel Number	**102**	110	118	**126**	**134**	142
Frequency (MHz)	**5510**	5550	5590	**5630**	**5670**	5710

Frequency Range	5725~5850 MHz	
Channel Number	**151**	**159**
Frequency (MHz)	**5755**	**5795**

Note 3: During test, the duty cycle of the EUT was setting to 100%.

Note 4: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 5: The antenna connector of EUT is designed with permanent attachment and no consideration of replacement.

1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart E (UNII band) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (5-1-14 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	15.407(h)	TPC and DFS	**PASS** (Note)
Note: A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.			

These RF tests were performed according to the method of measurements prescribed in KDB905462 D02 v02 (04/08/2016).

1.3 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR PART 15E REQUIREMENTS

2.1 Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS)

2.1.1 Requirement

According to FCC section 15.407(h), (1) Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

(2) Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26 dB emission bandwidth in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems. Operators shall only use equipment with a DFS mechanism that is turned on when operating in these bands. The device must sense for radar signals at 100 percent of its emission bandwidth. The minimum DFS detection threshold for devices with a maximum e.i.r.p. of 200 mW to 1 W is −64 dBm. For devices that operate with less than 200 mW e.i.r.p. and a power spectral density of less than 10 dBm in a 1 MHz band, the minimum detection threshold is −62 dBm. The detection threshold is the received power averaged over 1 microsecond referenced to a 0 dBi antenna. For the initial channel setting, the manufacturers shall be permitted to provide for either random channel selection or manual channel selection.

A U-NII network will employ a DFS function to detect signals from radar systems and to avoid co-channel operation with these systems. This applies to the 5250-5350 MHz and/or 5470-5725 MHz bands.1

Within the context of the operation of the DFS function, a U-NII device will operate in either Master Mode or Client Mode. U-NII devices operating in Client Mode can only operate in a network controlled by a U-NII device operating in Master Mode.2

Tables 1 and 2 shown below summarize the information contained in sections 5.1.1 and 5.1.2.

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
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master	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.		

The operational behavior and individual DFS requirements that are associated with these modes are as follows:

2.1.1.1 Master Devices

a) The Master Device will use DFS in order to detect Radar Waveforms with received signal strength above the DFS Detection Threshold in the 5250 − 5350 MHz and 5470 − 5725 MHz bands. DFS is not required in the 5150 − 5250 MHz or 5725 − 5825 MHz bands.

b) Before initiating a network on a Channel, the Master Device will perform a Channel Availability Check for a specified time duration (Channel Availability Check Time) to ensure that there is no radar system operating on the Channel, using DFS described under subsection a) above.

c) The Master Device initiates a U-NII network by transmitting control signals that will enable other U-NII devices to Associate with the Master Device.

d) During normal operation, the Master Device will monitor the Channel (In-Service Monitoring) to ensure that there is no radar system operating on the Channel, using DFS described under a).

e) If the Master Device has detected a Radar Waveform during In-Service Monitoring as described under d), the Operating Channel of the U-NII network is no longer an Available Channel. The Master Device will instruct all associated Client Device(s) to stop transmitting on this Channel within the Channel Move Time. The transmissions during the Channel Move Time will be limited to

the Channel Closing Transmission Time.

f) Once the Master Device has detected a Radar Waveform it will not utilize the Channel for the duration of the Non-Occupancy Period. 3

g) If the Master Device delegates the In-Service Monitoring to a Client Device, then the combination will be tested to the requirements described under d) through f) above.

2.1.1.2 Client Devices

a) A Client Device will not transmit before having received appropriate control signals from a Master Device.

b) A Client Device will stop all its transmissions whenever instructed by a Master Device to which it is associated and will meet the Channel Move Time and Channel Closing Transmission Time requirements. The Client Device will not resume any transmissions until it has again received control signals from a Master Device.

c) If a Client Device is performing In-Service Monitoring and detects a Radar Waveform above the DFS Detection Threshold, it will inform the Master Device. This is equivalent to the Master Device detecting the Radar Waveform and d) through f) of section 5.1.1 apply.

d) Irrespective of Client Device or Master Device detection the Channel Move Time and Channel Closing Transmission Time requirements remain the same.

e) The client test frequency must be monitored to ensure no transmission of any type has occurred for 30 minutes. Note: If the client moves with the master, the device is considered compliant if nothing appears in the client non-occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear.

2.1.1.3 DFS Detection Thresholds

Table 3 below provides the DFS Detection Thresholds for Master Devices as well as Client Devices incorporating In-Service Monitoring.

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.	

2.1.1.4 Response Requirements

Table 4 provides the response requirements for Master and Client Devices incorporating DFS.

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.

2.1.2 Test Description

Section 7.2 of KDB 905462 D02 V02

A. Test Setup:

B .1 Setup for Master with injection at the Master

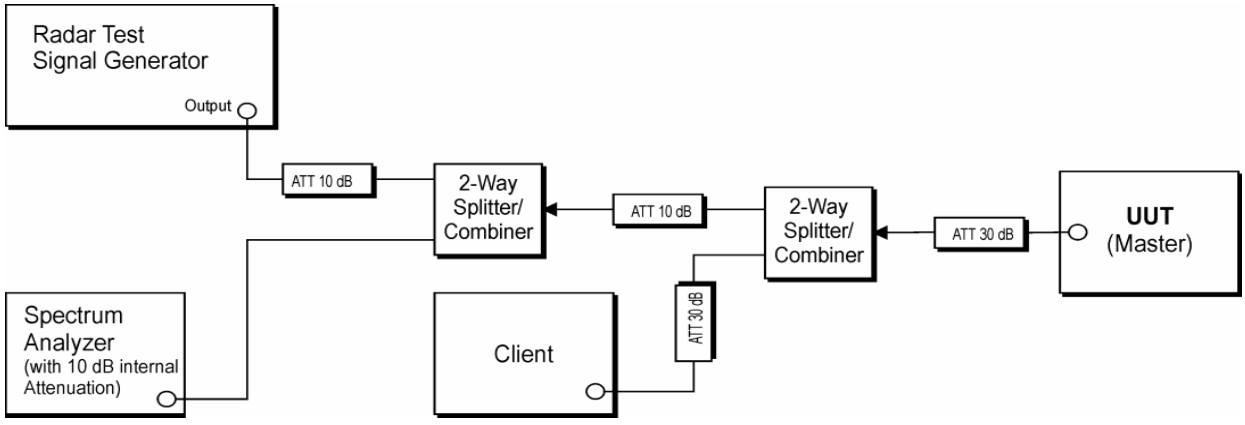


Figure 2: Example Conducted Setup where UUT is a Master and Radar Test Waveforms are injected into the Master

B.2 Setup for Client with injection at the Master

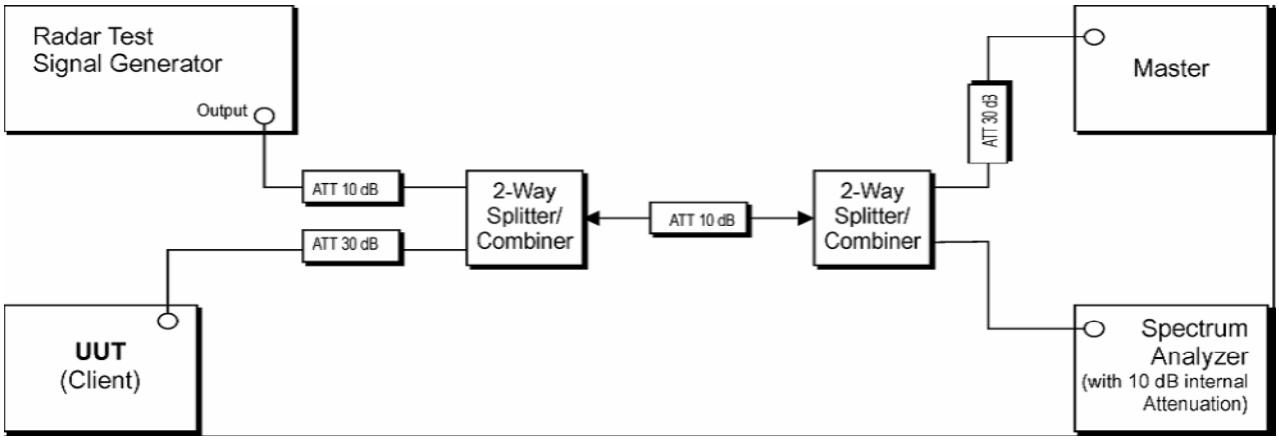


Figure 3: Example Conducted Setup where UUT is a Client and Radar Test Waveforms are injected into the Master

B.3 Setup for Client with injection at the Client

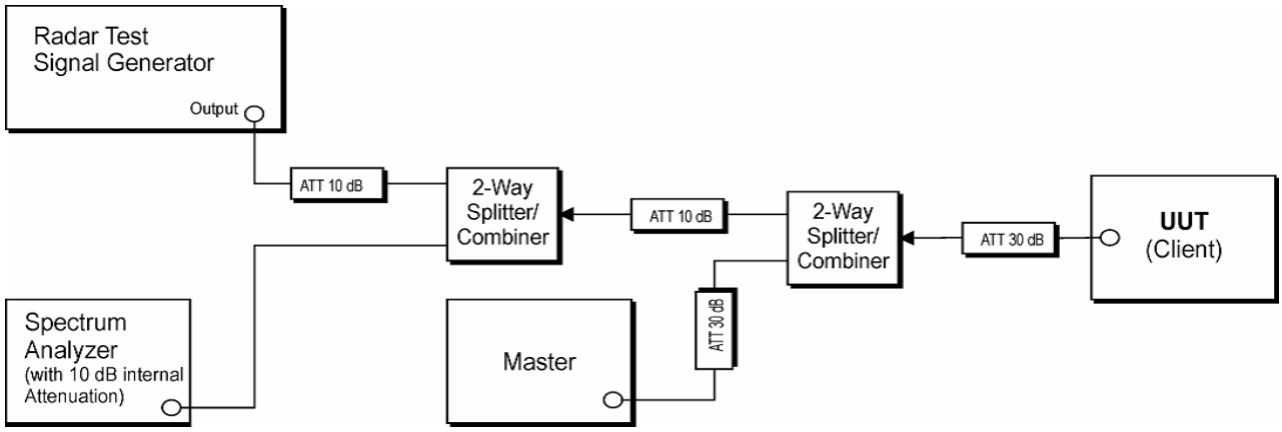
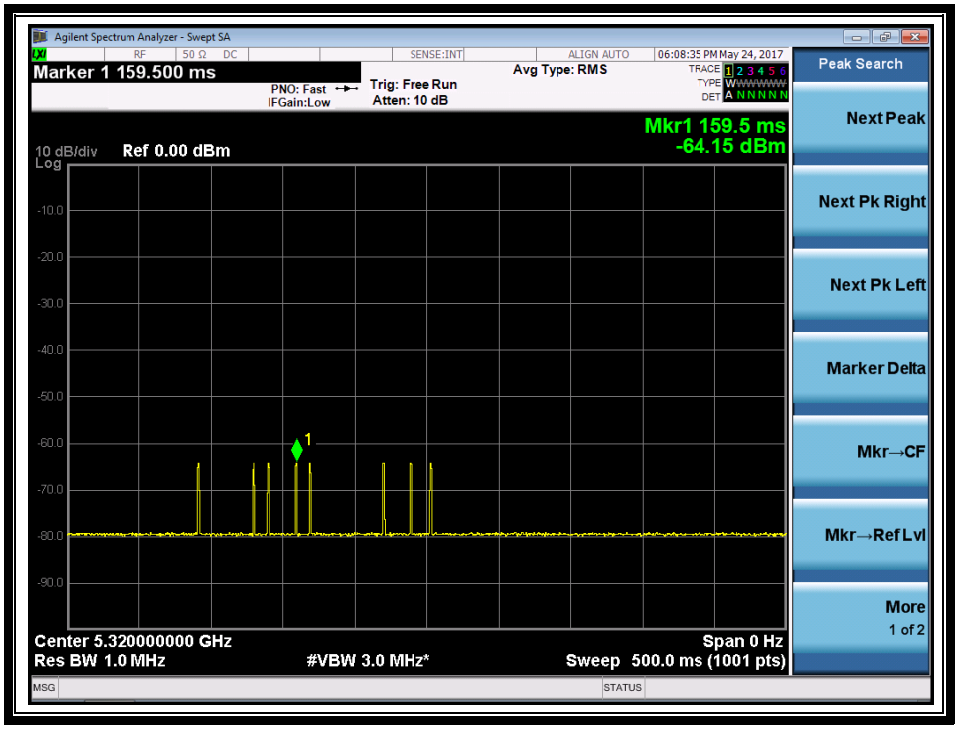


Figure 4: Example Conducted Setup where UUT is a Client and Radar Test Waveforms are injected into the Client

2.1.3 Test Result

2.1.3.1 Radar Test Waveforms are injected into the Master：



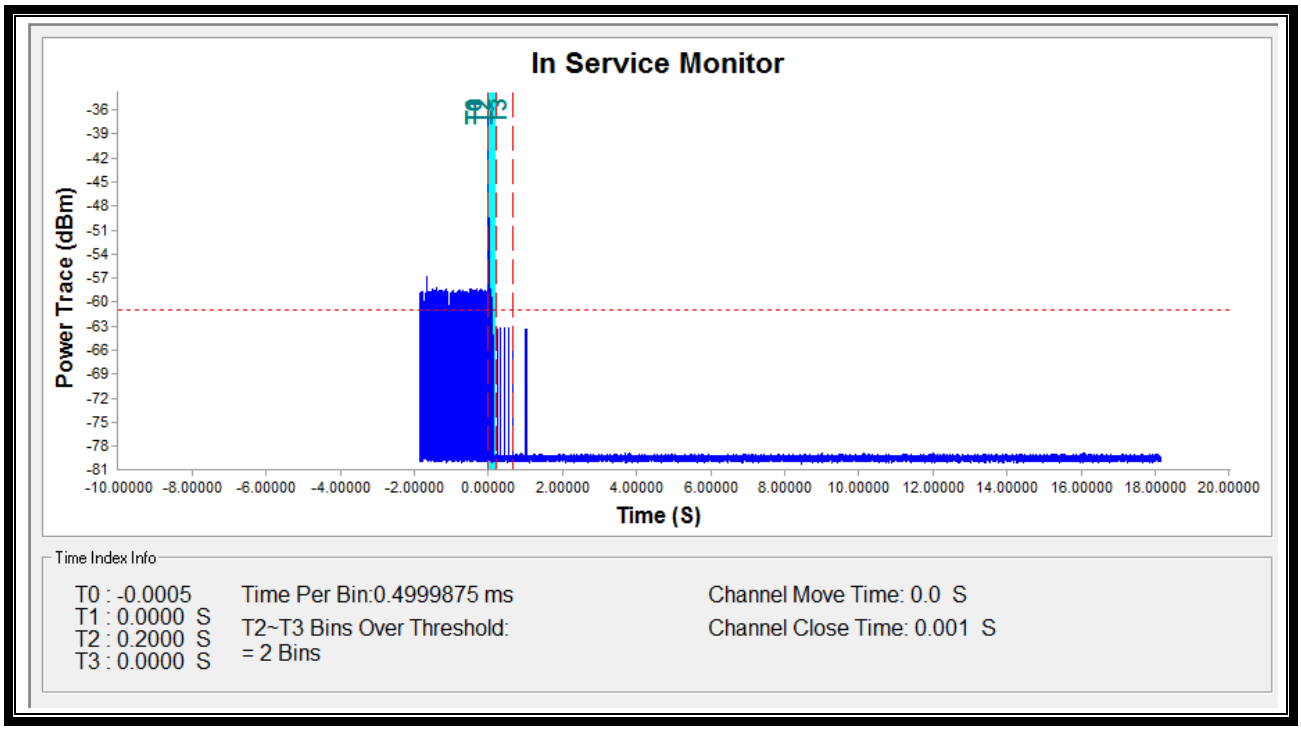
2.1.3.2 EUT is a Client Device Without Radar Detection :

Channel & Bandwidth	Requirement	Operational Mode	Test Result	Limit	Verdict
		Client Without Radar Detection			
20MHz	Channel Move Time	Yes	0.98s	＜10s	Pass
5320MHz	Channel Closing Transmission Time	Yes	0.001s	＜1s	Pass
40MHz	Channel Move Time	Yes	0.65s	＜10s	Pass
5590MHz	Channel Closing Transmission Time	Yes	0.003s	＜1s	Pass

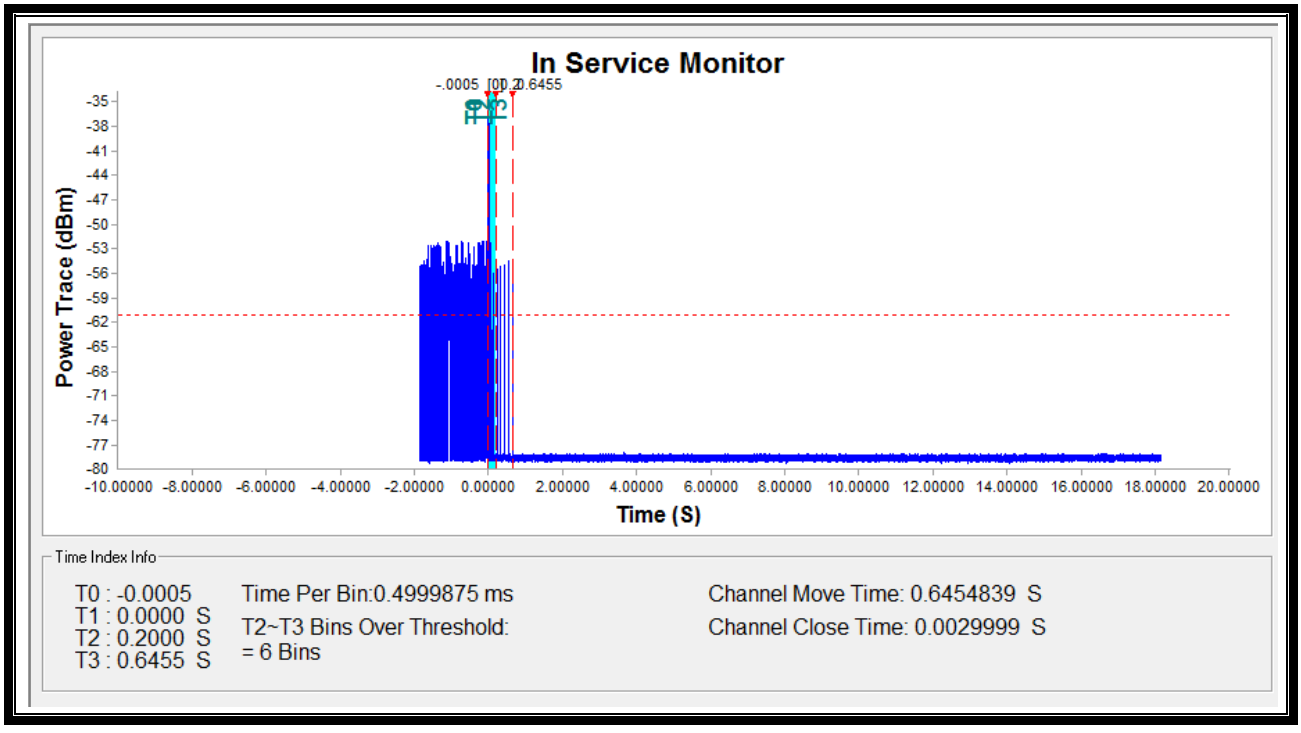
2.1.3.3 Test Plots

Note:T0 denotes the start time of the Radar single transmitted,T1 denotes the end time of the Radar single transmit end. T2 denotes the data transmission time of 200ms from T1. T3 denotes the end of the Channel Move Time, the time of T3 from T1 is less than 12s.

20MHz/5320MHz:



40MHz/5590MHz:



2.1.3.4 Test Photo for DFS

ANNEX A GENERAL INFORMATION

1.1 Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Responsible Test Lab Manager:	Mr. Su Feng
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

1.2 Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

1.3 Facilities and Accreditations

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10 2013 and CISPR Publication 22; the FCC registration number is 695796.

1.4 Maximum measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test items	Uncertainty
Peak Output Power	±2.22dB
Power spectral density (PSD)	±2.22dB
Bandwidth	±5%
Conducted Spurious Emission	±2.77 dB
Restricted Frequency Bands	±5%
Radiated Emission	±2.95dB
Conducted Emission	±2.44dB

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

1.5 Test Equipments Utilized

1.5.1 Conducted Test Equipments

Conducted Test Equipment						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal. Due**
1	Spectrum Analyzer	MY45101810	E4407B	Agilent	2017.05.23	2018.05.22
2	Power Splitter	NW521	1506A	Weinschel	2017.05.23	2018.05.22
3	Attenuator 1	(N/A.)	10dB	Resnet	2017.05.23	2018.05.22
4	Attenuator 2	(N/A.)	3dB	Resnet	2017.05.23	2018.05.22
5	EXA Signal Analzyer	MY53470836	N9010A	Agilent	2016.12.07	2017.12.06
6	RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
7	Coaxial cable	CB02	RF02	Morlab	N/A	N/A
8	SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

1.5.2 Conducted Emission Test Equipments

Conducted Emission Test Equipments						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal. Due**
1	Receiver	US44210471	E7405A	Agilent	2017.05.23	2018.05.22
2	LISN	812744	NSLK 8127	Schwarzbeck	2017.05.23	2018.05.22
3	Service Supplier	100448	CMU200	R&S	2017.05.23	2018.05.22
4	Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2017.05.23	2018.05.22
5	Coaxial cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A

1.5.3 Auxiliary Test Equipment

Auxiliary Test Equipment						
No.	**Equipment Name**	**Model No.**	**Brand Name**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Computer	T430i	Think Pad	Lenovo	N/A	N/A

***** END OF REPORT *****