FCC Dynamic Frequency Selection Test Report

for

SHENZHEN ZOWEE TECHNOLOGY CO.,LTD

Tablet PC

Model No.: PT301, S1219T, PC'TAB100X-X("X"=0~9)

FCC ID: 2AAP6M1042M

Prepared for :SHENZHEN ZOWEE TECHNOLOGY CO.,LTD
Science &Technology Industrial Park of Privately Owned Enterprises, Pingshan, Xili, Nanshan District, Shenzhen

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block,
Shenzhen Science & Industrial Park,
Nantou, Shenzhen, Guangdong, China

Tel: (0755) 26639496

Report Number : ACS-F15234
Date of Test : Aug.01, 2015
Date of Report ; Aug.12, 2015

TABLE OF CONTENTS

Description Page

TEST REPORT VERIFICATION....3
1.SUMMARY OF MEASUREMENTS AND RESULTS....4
2.GENERAL INFORMATION....5
2.1.Description of Device (EUT)....5
2.2.Support Equipment....6
2.3.Test Channel....6
2.4.Description of Test Facility....7
2.5.Measurement Uncertainty....7
3.TEST EQUIPMENT....8
4.WORKING MODES AND REQUIREMENT TEST ITEM....9
4.1.Applicability of DFS Requirements Prior To Use A Channel....9
4.2.Applicability of DFS Requirements During Normal Operation....9
5.DFS DETECTION THRESHOLOS AND RADAR TEST WAVEFORMS....10
5.1.Interference Threshold Value, Master or Client Incorporating In-Service Monitoring....10
5.2.Radar Test Waveform Minimum Step....10
5.3.Short Pulse Radar Test Waveforms....10
5.4.Long Pulse Radar Test Waveforms....11
5.5.Frequency Hopping Pulse Radar Test Waveforms....13
5.6.Conducted Calibration Setup....15
5.7.Radar Waveform Calibration Procedure....15
5.8.Calibration Deviation....15
5.9.Radar Waveform Calibration Result....16
6.TEST SETUP AND TEST RESULT....17
6.1.Test Setup....17
6.2.Channel Move Time, Channel Closing Transmission Time Measurement....19
7.HOTOGRAPHS OF MEASUREMENT....25
8.PHOTOGRAPH OF EUT....26

TEST REPORT VERIFICATION

Applicant	:	SHENZHEN ZOWEE TECHNOLOGY CO.,LTD
Manufacturer	:	SHENZHEN ZOWEE TECHNOLOGY CO.,LTD
FCC ID	:	2AAP6M1042M
EUT Description	:	Tablet PC
(A) Model	:	PT301, S1219T, PC'TAB100X-X("X"=0~9)
(B) Power Supply	:	DC 5V
(C) Test Voltage	:	DC 5V From Adapter Input AC 120V/60Hz

Measurement Standards Used:

FCC RULES AND REGULATIONS PART 15 Subpart E, Oct. 2014

(FCC CFR 47 Part 15E, §15.407)

The device described above was tested by Audix Technology (Shenzhen) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart E limits.

The measurement results are contained in this test report and Audix Technology (Shenzhen) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the requirements of FCC Part 15E standards.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shenzhen) Co., Ltd.

Date of Test : Aug.01, 2015 Report of date: Aug.12, 2015

Prepared by : Cindy Zhu
Cindy Zhu / Assistant

Reviewed by :
Sunny Lu / Assistant Manager

AUDIX® 信華科技（深圳）有限公司
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report

Approved & Authorized Signer : Signature: David Jin
David Jin / Manager

1. SUMMARY OF MEASUREMENTS AND RESULTS

The EUT has been tested according to the applicable standards as referenced below.

Description of Test Item	Results
Channel Availability Check Time	N/A
Channel Move Time	PASS
Non-Occupancy Period	N/A
Channel Closing Transmission Time	PASS
U-NII Detection Bandwidth	N/A
N/A is an abbreviation for Not Applicable, sine the product is client without radar detection function	

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Product Name	: Tablet PC
Model Number	: PT301, S1219T, PC'TAB100X-X("X"=0~9) (Only model name and brand name difference.)
Test Model	: PT301
FCC ID	: 2AAP6M1042M
Radio	: IEEE802.11 a/b/g/n; Bluetooth V3.0+EDR; Bluetooth V4.0
Operation Frequency	: **IEEE 802.11a**: 5180MHz—5240MHz; 5260MHz—5320MHz; 5500MHz—5700MHz; 5745MHz—5825MHz **IEEE 802.11b**: 2412MHz—2472MHz **IEEE 802.11g**: 2412MHz—2472MHz **IEEE802.11n HT20**: 2412MHz—2472MHz; 5180MHz—5240MHz;5260MHz—5320MHz; 5500MHz—5700MHz; 5745MHz—5825MHz **Bluetooth** : 2402-2480MHz
Modulation Technology	: IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11a/g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM(64QAM, 16QAM,QPSK,BPSK) Bluetooth V3.0+EDR: GFSK, π/4DQPSK,8-DPSK Bluetooth V4.0: GFSK
Antenna Assembly Gain	: **FPC Antenna,** Bluetooth Peak Gain: 2.64dBi 2.4GHz Peak Gain: 2.64dBi 5180-5240MHz Band: 1.99dBi; 5260-5320MHz Band: 1.18dBi 5500-5700MHz Band: 2.04dBi; 5745-5825MHz Band: 1.84dBi
Applicant	: SHENZHEN ZOWEE TECHNOLOGY CO.,LTD Science &Technology Industrial Park of Privately Owned Enterprises, Pingshan, Xili, Nanshan District, Shenzhen
Manufacturer	: SHENZHEN ZOWEE TECHNOLOGY CO.,LTD Science &Technology Industrial Park of Privately Owned Enterprises, Pingshan, Xili, Nanshan District, Shenzhen

Power Adapter : Manufacturer: Ktec, Model No.: KSA29B0500200D5

OTG Cable : Shielded, Detachable, 10cm

USB Cable : Shielded, Detachable, 70cm(with one core)

Date of Test : Aug.01, 2015

Date of Receipt : Jul.14, 2015

2.2. Support Equipment

Item	Manufacturer	Model	Remark
AP Server	CISCO	AIR-AP1262N-A-K9	FCC ID: LDK102073 IC:2461B-102073
AP Server	D-Link	DIR-815A1	NCC ID: CCAI10LP092AT0 FCC ID: KA2IR815A1 IC: 4216A-IR815A1
AP Server	NEC	PA-WR8750N-HP	

2.3. Test Channel

Frequency Band	Channel No.	Frequency
5260-5320MHz (UNII Band II)	**20MHz**	
	60	5300MHz
5500-5700MHz (UNII Band III)	**20MHz**	
	104	5520MHz

2.4. Description of Test Facility

Site Description

Name of Firm	:	Audix Technology (Shenzhen) Co., Ltd. No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park,Nantou, Shenzhen, Guangdong, China
3m Anechoic Chamber	:	Certificated by FCC, USA Registration Number: 90454 Valid Date: Dec.30, 2017
3m & 10m Anechoic Chamber	:	Certificated by FCC, USA Registration Number: 794232 Valid Date: Jul.12, 2017
EMC Lab.	:	Certificated by DAkkS, Germany Registration No: D-PL-12151-01-00 Valid Date: Dec.15, 2016 Accredited by NVLAP, USA NVLAP Code: 200372-0 Valid Date: Mar.31, 2016

2.5. Measurement Uncertainty

Test Item	Uncertainty
DFS Measurement	±0.5ms
Threshold	±0.33dB

3. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Vector Signal Generation	R&S	SMU200A	105064	Oct.29,14	1 Year
2	Spectrum Analyzer	R&S	FSV7	102493	Oct.29,14	1 Year
3	Atteuator (10dB)	Marvelous	MVE2213-10	NO.1	NCR	NCR
4	Atteuator (30 dB)	Marvelous	MVE2213-30	NO.1	NCR	NCR
5	Atteuator (10dB)	Marvelous	MVE2213-10	NO.2	NCR	NCR
6	Atteuator (30 dB)	Marvelous	MVE2213-30	NO.2	NCR	NCR
7	Power Splitter	Marvelous	MVE8576	NO.1	NCR	NCR
8	Power Splitter	Marvelous	MVE8576	NO.2	NCR	NCR

4. WORKING MODES AND REQUIREMENT TEST ITEM

4.1. Applicability of DFS Requirements Prior To Use A Channel

Requirement	Operational Mode		
	Master	Client without radar detection	Client with radar detection
Non-Occupancy Period	✓	Not required	✓
DFS Detection Threshold	✓	Not required	✓
Channel Availability Check Time	✓	Not required	Not required
Uniform Spreading	✓	Not required	Not required
U-NII Detection Bandwidth	✓	Not required	✓

4.2. Applicability of DFS Requirements During Normal Operation

Requirement	Operational Mode		
	Master	Client without radar detection	Client with radar detection
DFS Detection Threshold	✓	Not required	✓
Channel Closing Transmission Time	✓	✓	✓
Channel Move Time	✓	✓	✓
U-NII Detection Bandwidth	✓	Not required	✓

5. DFS DETECTION THRESHOLOS AND RADAR TEST WAVEFORMS

5.1. Interference Threshold Value, Master or Client Incorporating In-Service Monitoring

Maximum Transmit Power	Value (See Notes 1 and 2)
≥ 200 milliwatt	-64dBm
< 200 milliwatt	-62dBm
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.	

The radar Detection Threshold, lowest antenna gain is the parameter of interference radar DFS detection threshold.

5.2. Radar Test Waveform Minimum Step

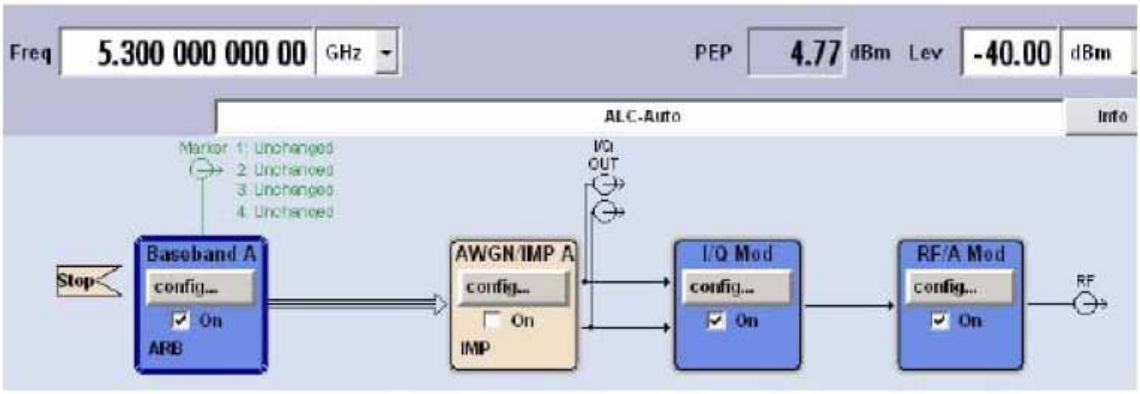
Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

5.3. Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulse	Minimum Percentage of Successful Detection	Minimum number of Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

A minimum of 30 unique waveforms are required for each of the short pulse radar type 2 through 4. For short pulse radar type 1, the same waveform is used a minimum of 30 times. If more than 30 waveforms are used for short pulse radar types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

FCC Radar Types (1~4) System Diagram



Used R&S SMU200A (Vector SG with two ARB)
B11: Base-band Generator with ARB (16M samples) and Digital Modulation
B13: Base-band Main Module
B106: frequency range (100 kHz to 6 GHz)
For selecting the waveform parameters from within the bounds of the signal type, system was random selection using uniform distribution.

5.4. Long Pulse Radar Test Waveforms

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

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms. Each waveform is defined as following:

(1) The transmission period for the Long Pulse Radar test signal is 12 seconds.

(2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst_Count.

(3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.

(4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the some pulse width. Pulses in different Bursts may have different pulse widths.

(5) Each pulse has a linear FM chirp between 5 and 20MHz, with the chirp width being randomly chosen. Each pulse within a Burst will have the same chirp width. Pulses in different Burst may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300MHz and a 20MHz chirped signal, the chirp starts at 5290MHz and ends at 5310MHz.

(6) If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the time between the first and second pulses is chosen independently of the time between the second and third pulses.

(7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst_Count. Each interval is of length (12000000/Burst_Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12000000/Burst_Count)-(Total Burst length)+(One Random PRI interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

A representative example of a Long Pulse radar test waveform:

(1) The total test signal length is 12 seconds.

(2) 8 Bursts are randomly generated for the Burst_Count.

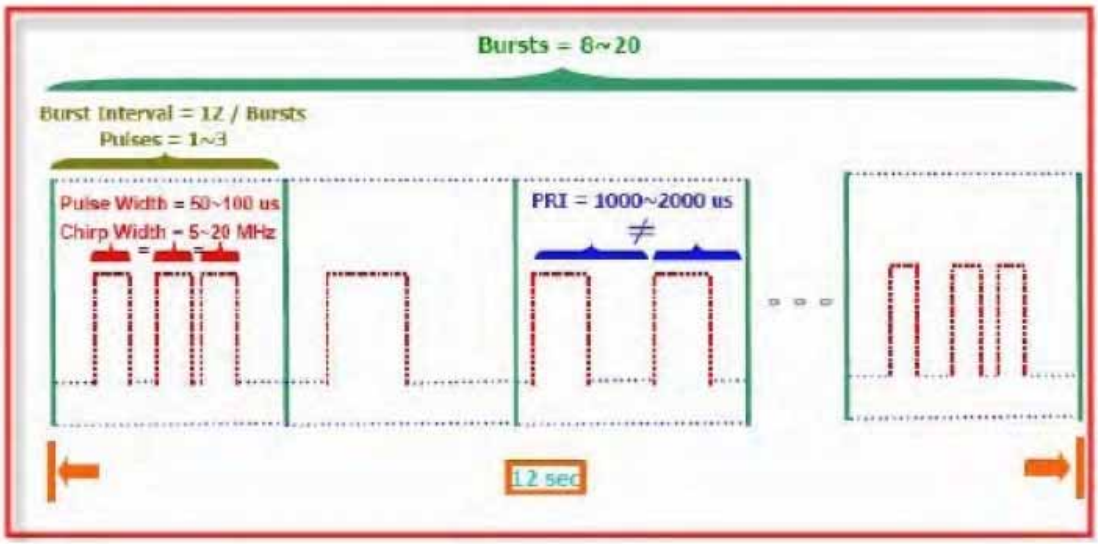
(3) Burst 1 has 2 randomly generated pulses.

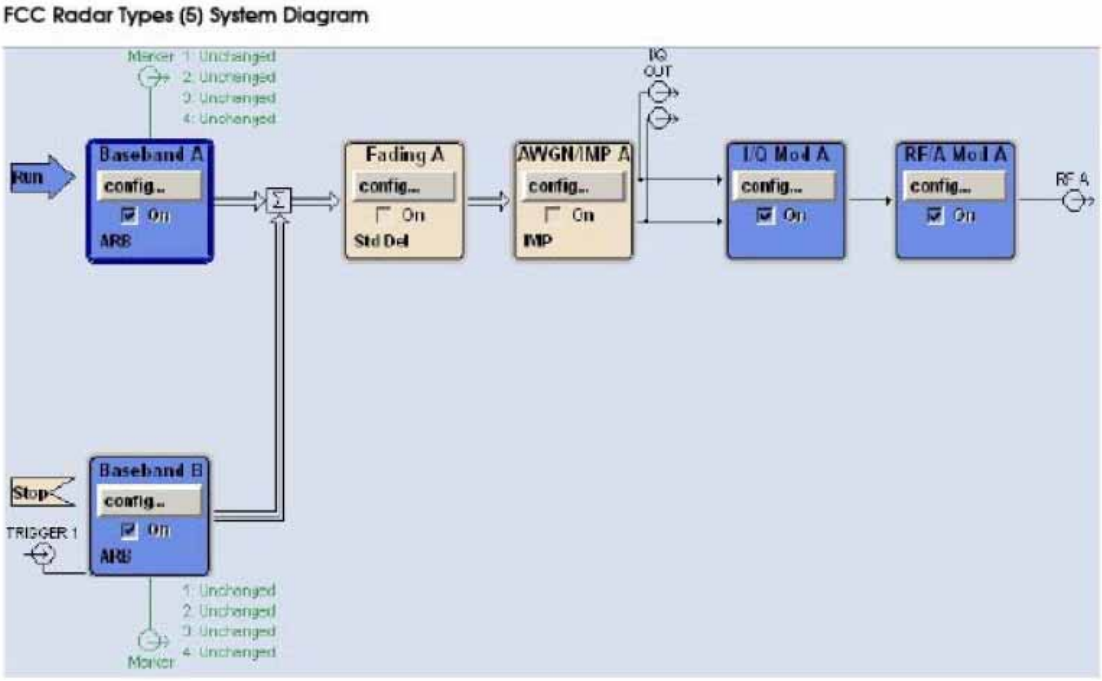
(4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.

(5) The PRI is randomly selected to be at 1213 microseconds.

(6) Bursts 2 through 8 are generated using steps 3-5.

(7) Each Burst is contained in even intervals of 1500000 microseconds. The starting location for Pulse 1. Burst 1 is randomly generated (1 to 1500000 minus the total Burst 1 length + 1 random PRI interval) at the 325001 microsecond step. Bursts 2 through 8 randomly fall in successive 1500000 microsecond intervals (i.e. Burst 2 falls in the 1500001-3000000 microsecond range).





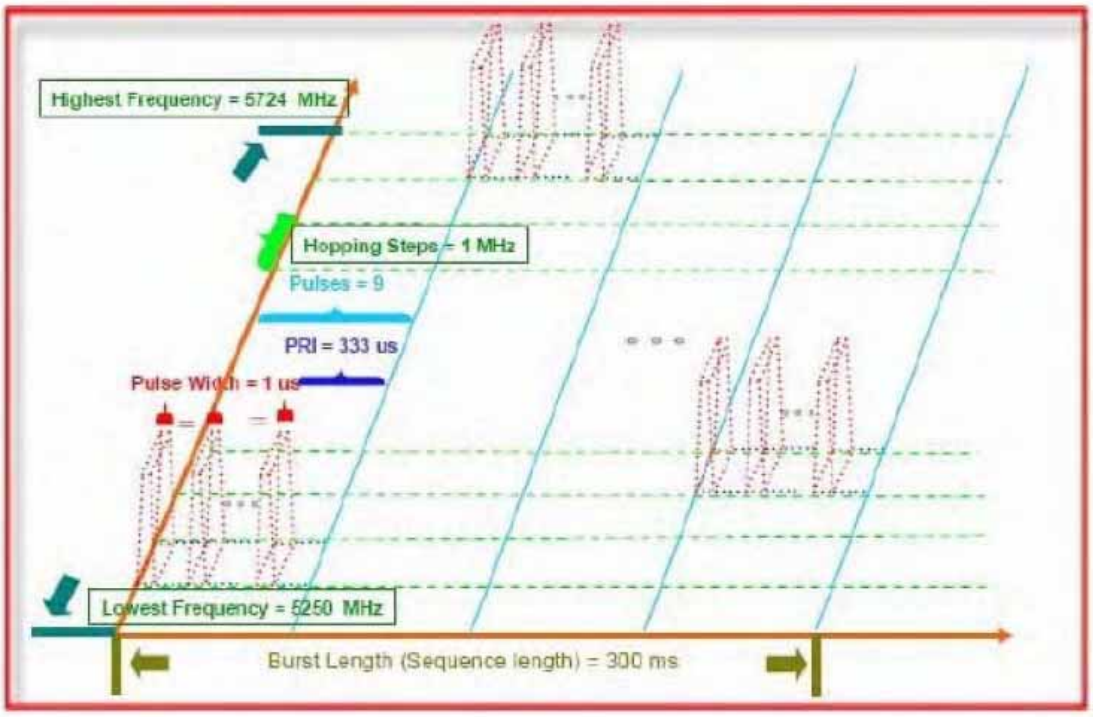
Used R&S SMU200A (Vector SG with two ARB)
Path A/Path B Two B11: Base-band Generator with ARB (16M samples) and Digital Modulation
B13: Base-band Main Module
B106: frequency range (100 kHz to 6 GHz)
For selecting the waveform parameters from within the bounds of the signal type, system was random selection using uniform distribution.

5.5. Frequency Hopping Pulse Radar Test Waveforms

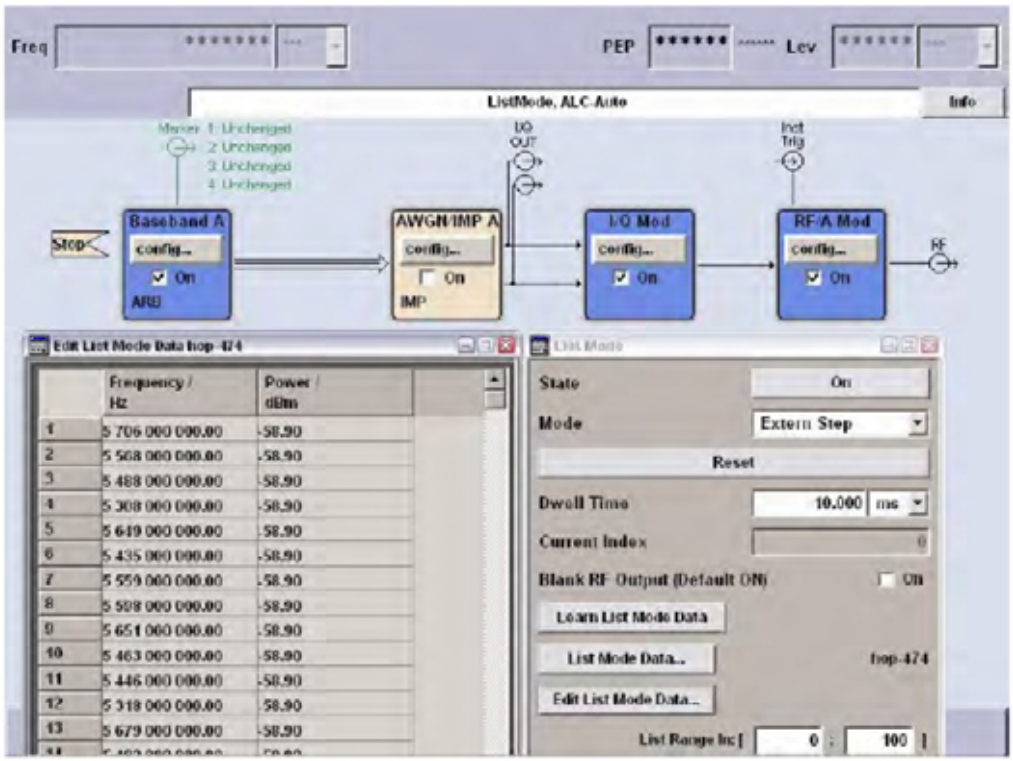
Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses Per Hop	Hopping Rate (kHz)	Hopping Sequence Length (ms)	Minimum Percentage of Successful Detection	Minimum of Trials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same Burst parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies form 5250-5274MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of random frequency, the frequencies remaining within the group are always treated as equally likely.

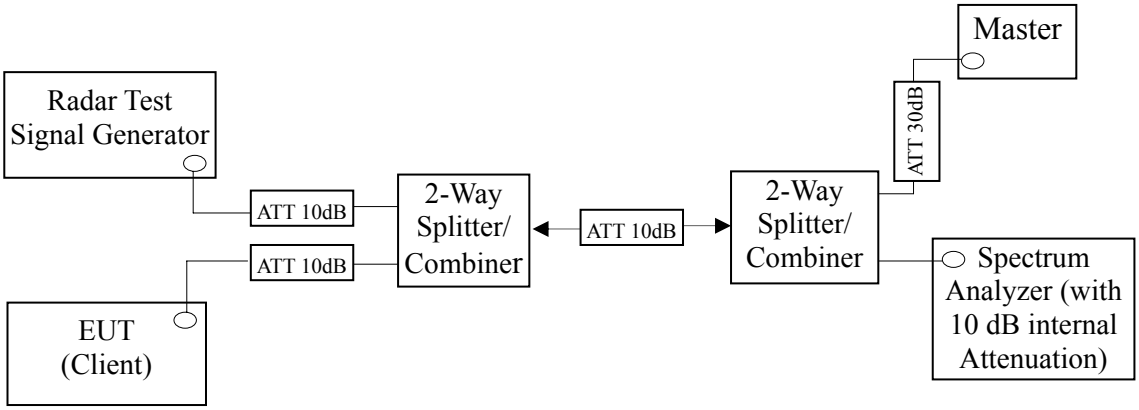


FCC Radar Types (6) System Diagram



Used R&S SMU200A (Vector SG with two ARB)
B11: Base-band Generator with ARB (16M samples) and Digital Modulation
B13: Base-band Main Module
B106: frequency range (100 kHz to 6 GHz)
For selecting the waveform parameters from within the bounds of the signal type, system was random selection using uniform distribution.

5.6. Conducted Calibration Setup



5.7. Radar Waveform Calibration Procedure

The measured frequency is 5300MHz & 5520MHz. The radar signal was the same as transmitted channels, and injected into the antenna port of AP (master) or Client Device with Radar Detection, measured the channel closing transmission time and channel move time. The calibrated conducted detection threshold level is set to -62dBm. The tested level is lower than required level hence it provides margin to the limit.

5.8. Calibration Deviation

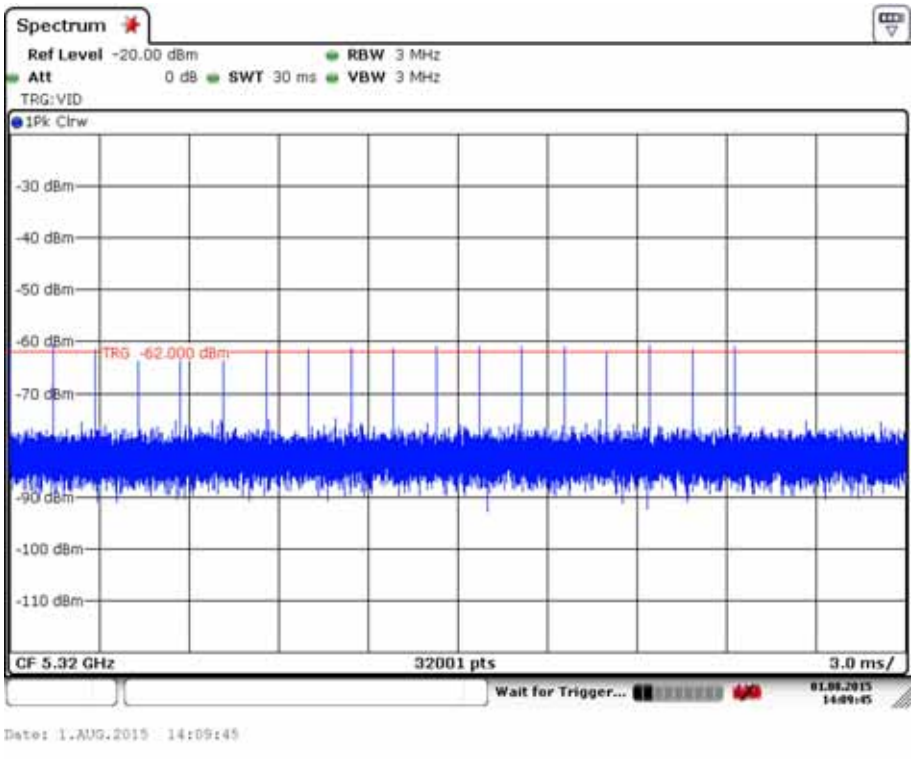
There is no deviation with the original standard.

5.9. Radar Waveform Calibration Result

DFS detection threshold level and the burst of pulses on the Channel frequency

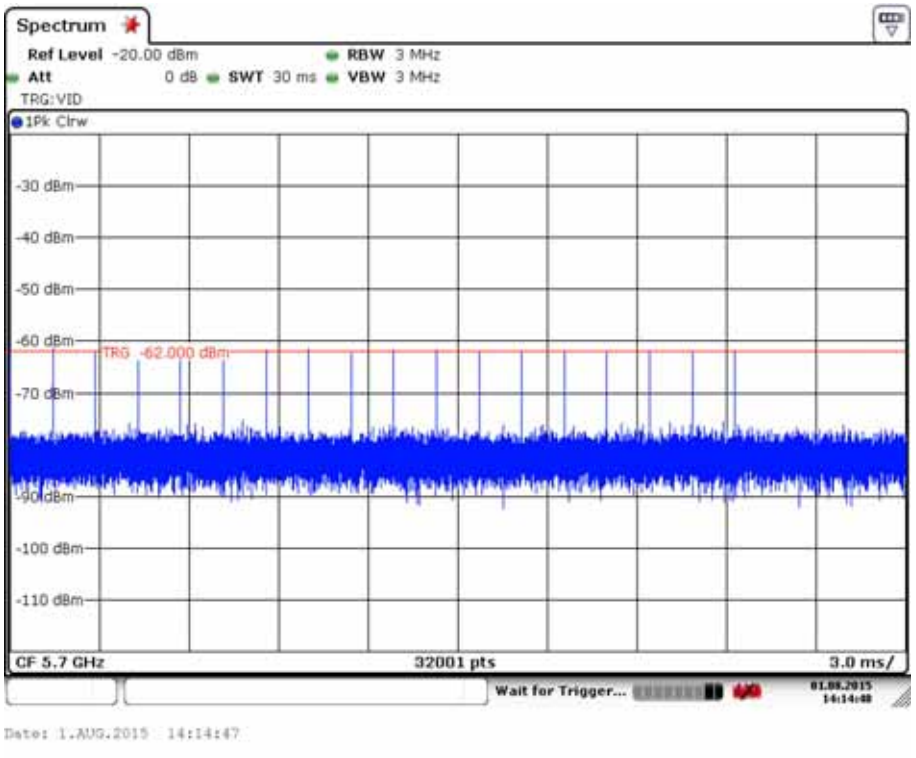
Band II

20MHz



Band III

20MHz

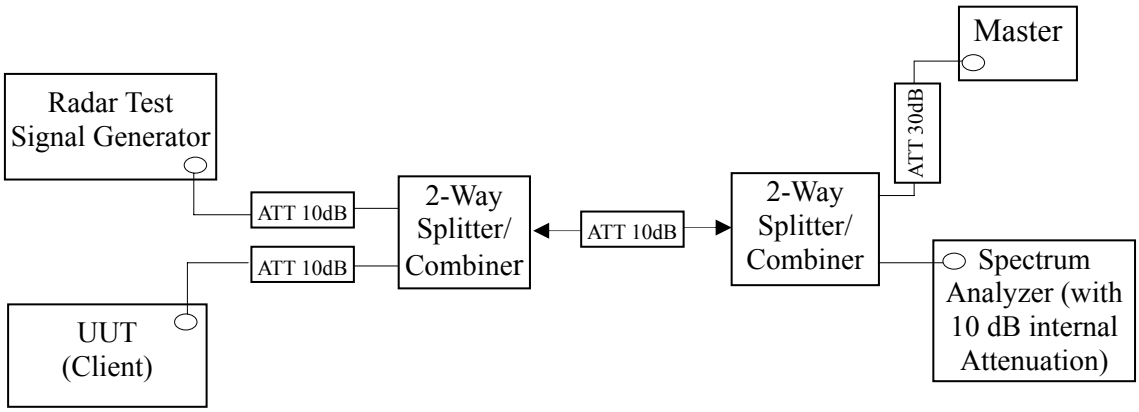


6. TEST SETUP AND TEST RESULT

6.1. Test Setup

6.1.1. Test Setup Diagram

Following is the test setup for generated the radar waveforms and used to monitor UNII device.



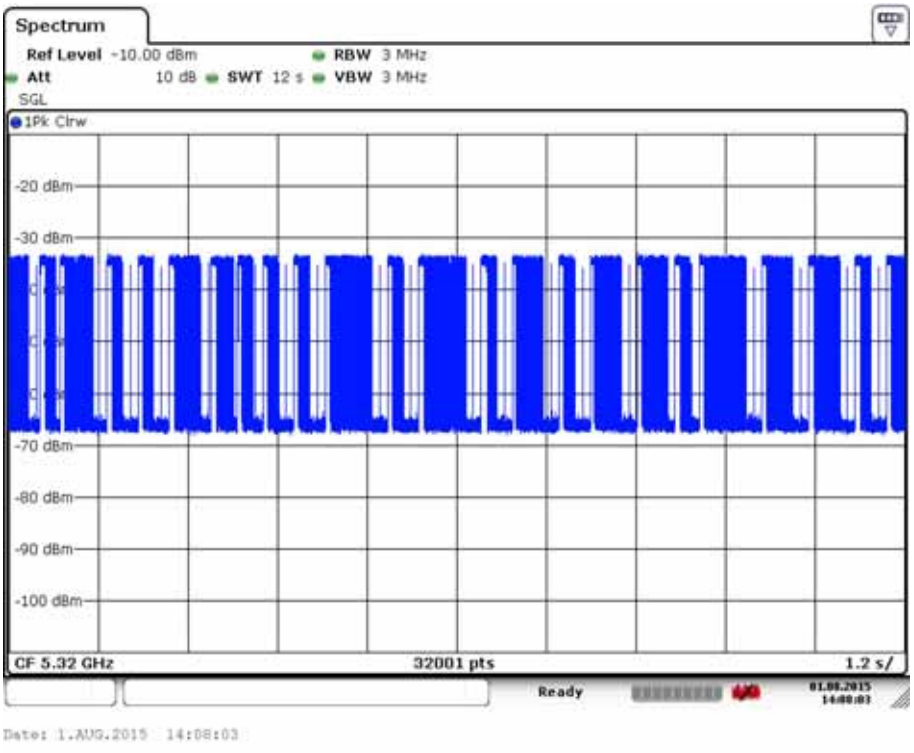
6.1.2. Test Setup Operation

System testing was performed with the designated test file that streams full motion video from the Access Point to Client in full motion video mode using the media player with the V2.61 Codec package. This file is used by IP and Frame based systems for loading the test channel during the in-service compliance testing of the U-NII device.
The waveform parameters from within the bounds of the signal type are selected randomly using uniform distribution.
A spectrum analyzer is used as a monitor to verify that the EUT has vacated the Channel within the (Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the detection and Channel move. It is also used to monitor EUT transmissions during the Channel Availability Check Time.

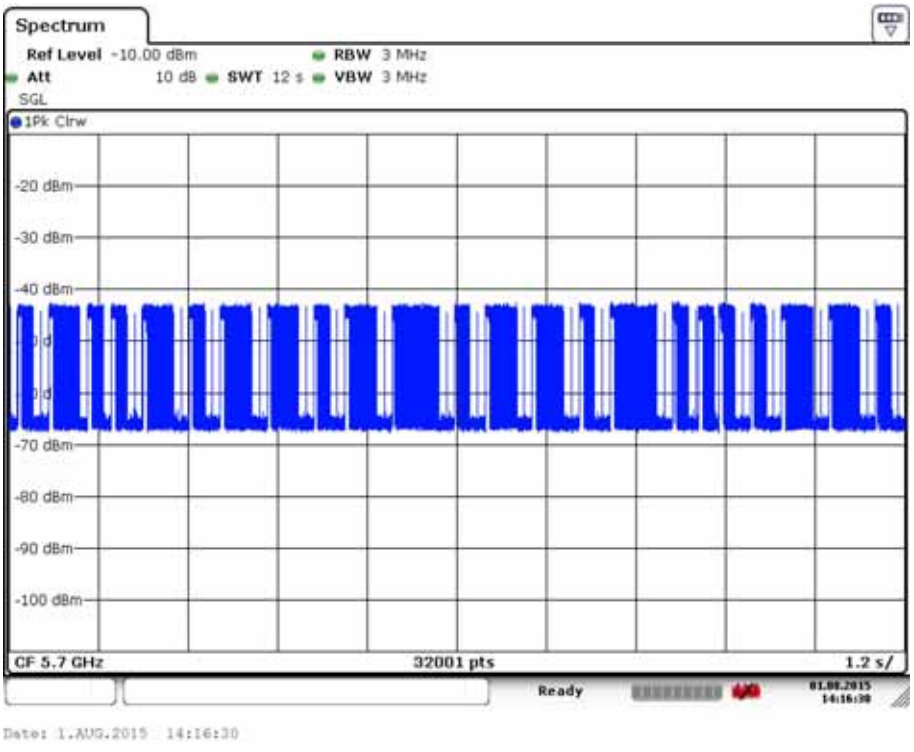
6.1.3. Test Setup for Data Traffic Plot

Test Date: Aug.01, 2015 Temperature: 21℃ Humidity:56%

Band II



Band III



6.2. Channel Move Time, Channel Closing Transmission Time Measurement

6.2.1. Limit

Parameter	Value
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.

Note 1: The instant that the Channel Move Time and the Channel Closing Transmission Time begins is as follows:

a. For the Short Pulse Radar Test Signals this instant is the end of the Burst.
b. For the Frequency Hopping radar Test Signal, this instant is the end of the last radar Burst generated.
c. 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.

6.2.2. Test Procedures

6.2.2.1. When a radar Burst with a level equal to the DFS Detection Threshold + 1dB is generated on the operating channel of the U-NII device. A U-NII device operating as a Client Device will associate with the Master of channel. Stream the MPEG test file from the Master Device to the Client Device on the selected channel for entire period of the test. At time to the radar waveform generator sends a Burst of pulses for each of the radar types at Detection Threshold + 1dB.

6.2.2.2. Observe the transmissions of the EUT at the end of the radar Burst on the Operating channel. Measure and record the transmissions from the EUT during the observation time [Channel Move Time]. One 10 Second plot bee reported for the short Pulse Radar type 1-4 and one for the Long Pulse Radar Type test in a 22 second plot. The plot for the Short Pulse Radar types start at the end of the radar burst. The Channel Move Time will be calculated based on the plot of the short Pulse Radar Type. The Long Pulse Radar Type plot show the device ceased transmissions within the 10 second window after detection has occurred. The plot for the Long Pulse Radar type should start at the beginning of the 12 second waveform.

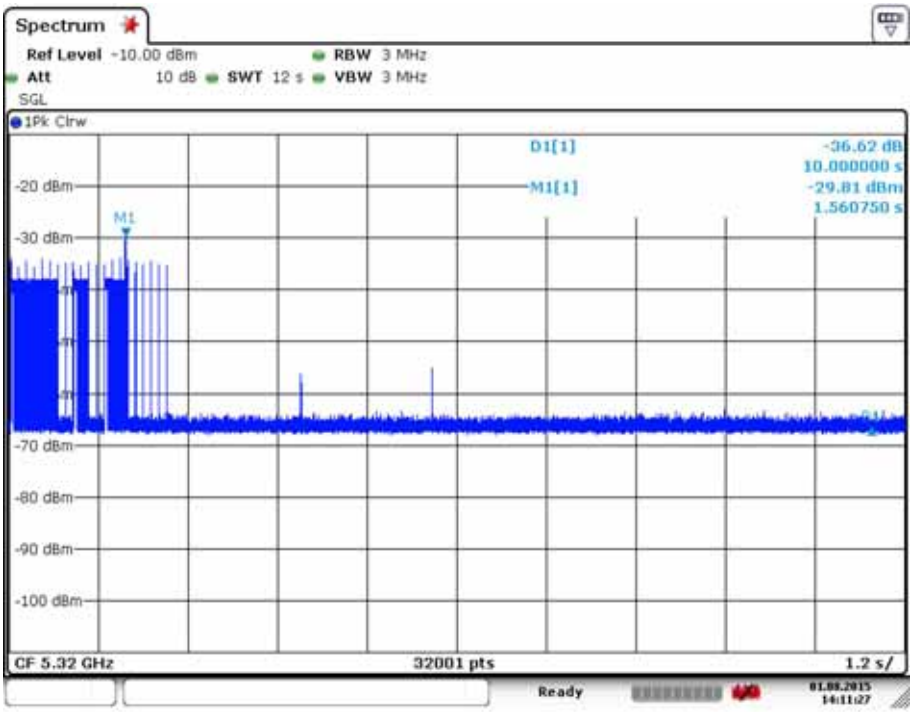
6.2.3. Test Result

Applicability of DFS Requirement During Normal Operation

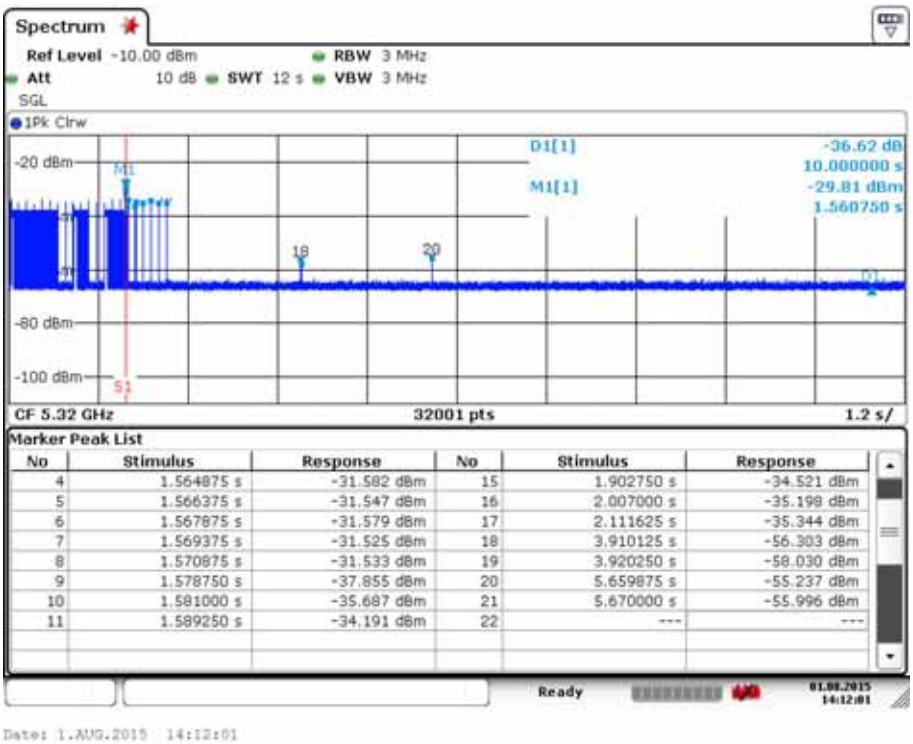
6.2.3.1. Channel Closing Transmission Time & Channel Move Time **(PASS)**

Test Mode: UNII Band II, 20MHz

Test Date: Aug.01, 2015 Temperature: 21℃ Humidity:56%



Channel move time ＜ 10 S



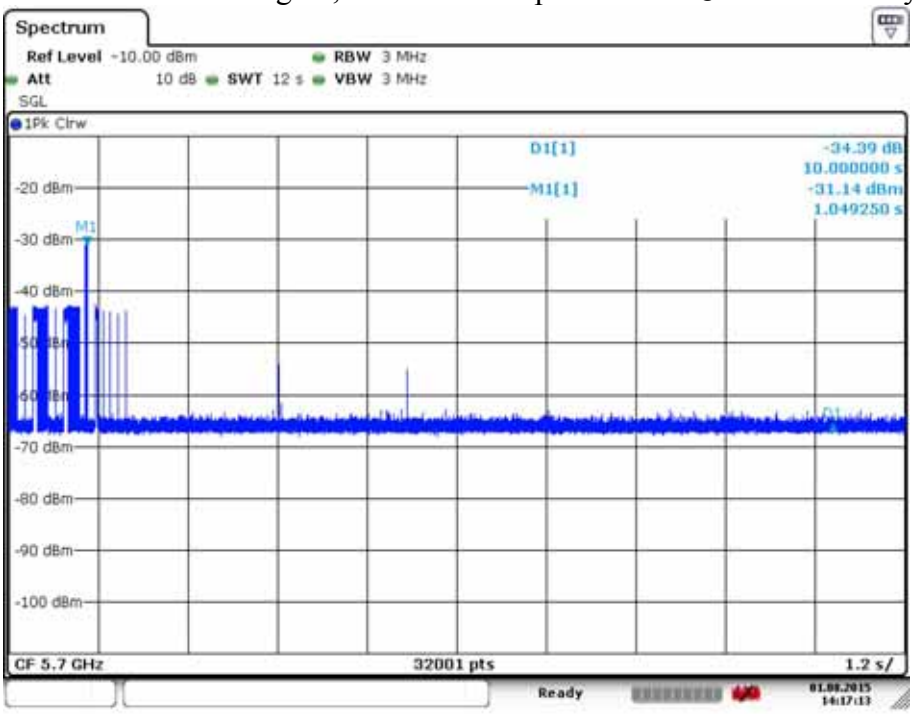
Test Channel: CH 60, Test Frequency: 5300MHz

Channel Closing Transmission Time Calculated	
Sweep Time(S) sec	12
Sweep points (P)	32001
Number of Sweep points in 10 sec (N)	18
Channel Closing Time (C)	6.75 ms

Channel closing time is calculated from C=N* dwell; where dwell is the occupancy time per sweep point calculated by the formula: dwell=S/P. N is the number of sweep points indicating transmission after S1; where S1 is the radar signal detected.

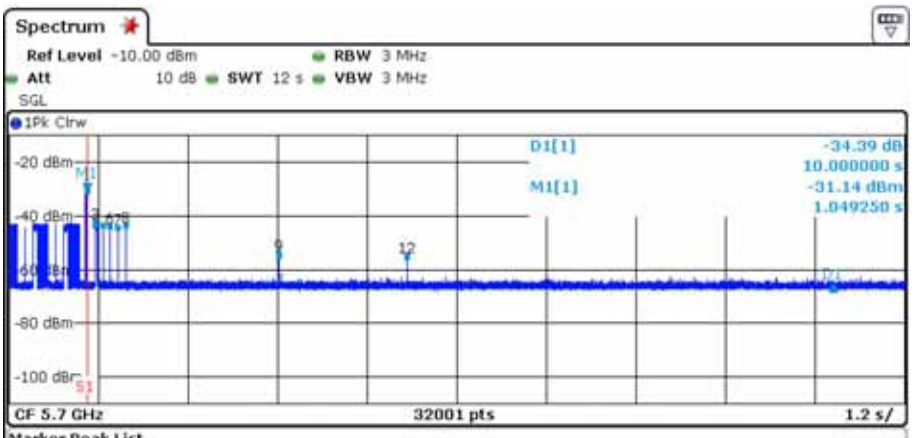
Test Mode: UNII Band III, 20MHz

Test Date: Aug.01, 2014 Temperature: 21℃ Humidity:56%



Date: 1.AUG.2015 14:17:12

Channel move time > 10 S



Marker Peak List

No	Stimulus	Response	No	Stimulus	Response
1	1.049250 s	-31.135 dBm	7	1.462125 s	-44.414 dBm
2	1.148625 s	-43.772 dBm	8	1.566375 s	-43.805 dBm
3	1.149750 s	-42.528 dBm	9	3.608625 s	-54.130 dBm
4	1.153875 s	-42.476 dBm	10	3.619125 s	-54.818 dBm
5	1.253250 s	-43.790 dBm	11	5.328000 s	-55.613 dBm
6	1.357500 s	-43.974 dBm	12	5.338500 s	-55.184 dBm

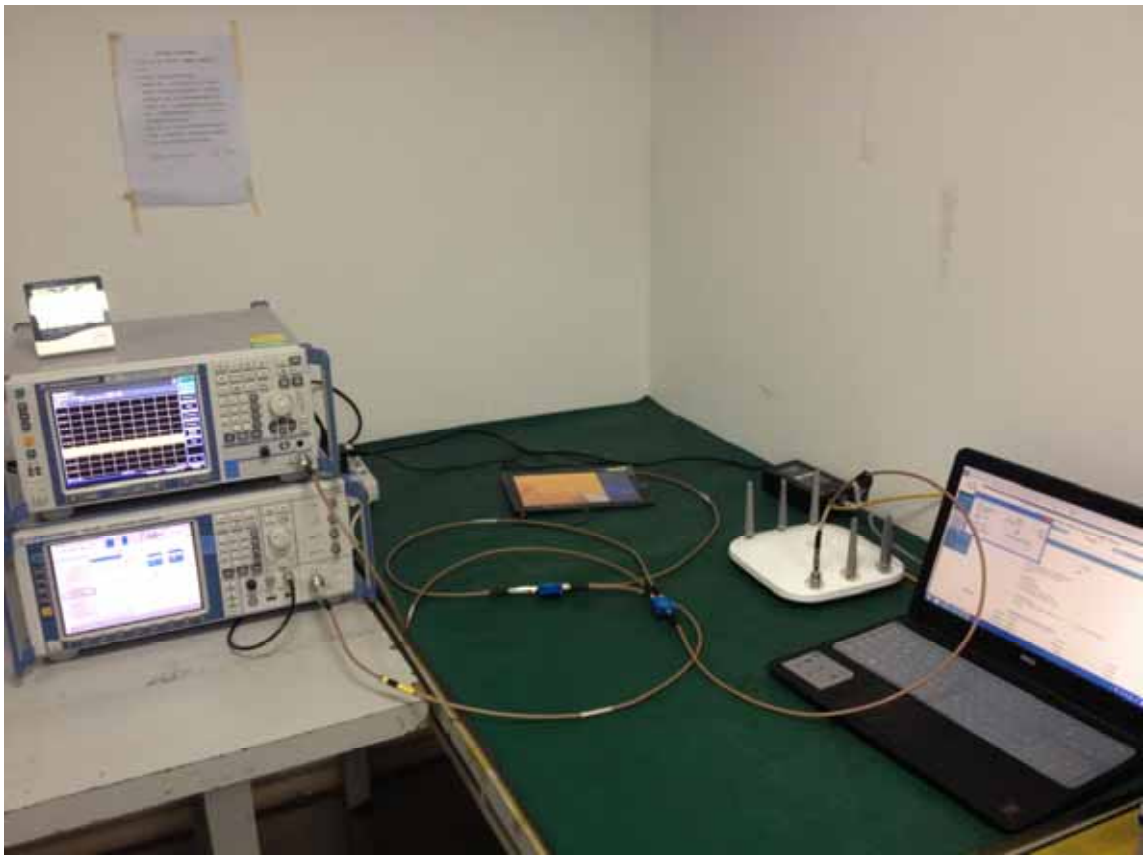
Date: 1.AUG.2015 14:17:31

Test Channel: CH 100, Test Frequency: 5500MHz

Channel Closing Transmission Time Calculated	
Sweep Time(S) sec	12
Sweep points (P)	32001
Number of Sweep points in 10 sec (N)	25
Channel Closing Time (C)	9.37 ms

Channel closing time is calculated from C=N* dwell; where dwell is the occupancy time per sweep point calculated by the formula: dwell=S/P. N is the number of sweep points indicating transmission after S1; where S1 is the radar signal detected.

7. HOTOGRAPHS OF MEASUREMENT



8. PHOTOGRAPH OF EUT

Figure 1
General Appearance of the EUT

Figure 2
General Appearance of the EUT

Figure 3
General Appearance of the EUT

Figure 4
General Appearance of the EUT

Figure 5
General Appearance of the EUT

Figure 6
General Appearance of the EUT

Figure 7
General Appearance of the EUT

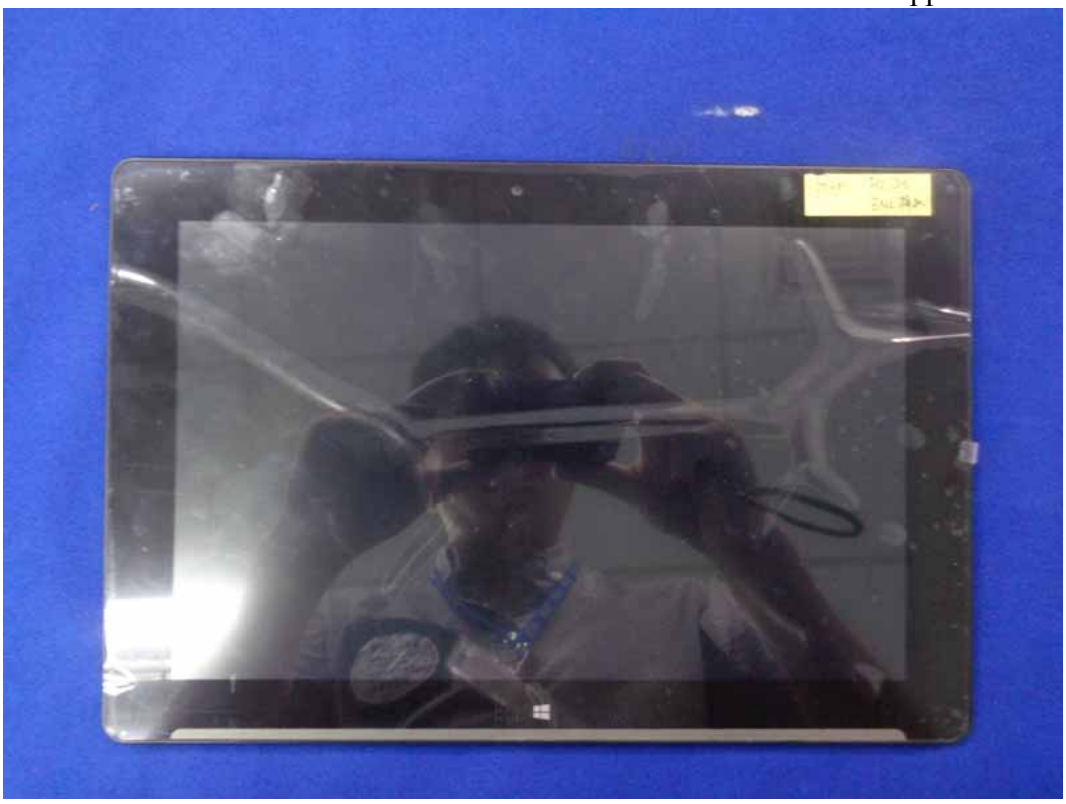


Figure 8
General Appearance of the EUT

Figure 9
General Appearance of the EUT

Figure 10
General Appearance of the EUT

Figure 11
General Appearance of the EUT

Figure 12
General Appearance of the EUT

Figure 13
General Appearance of the EUT

Figure 14
General Appearance of the EUT

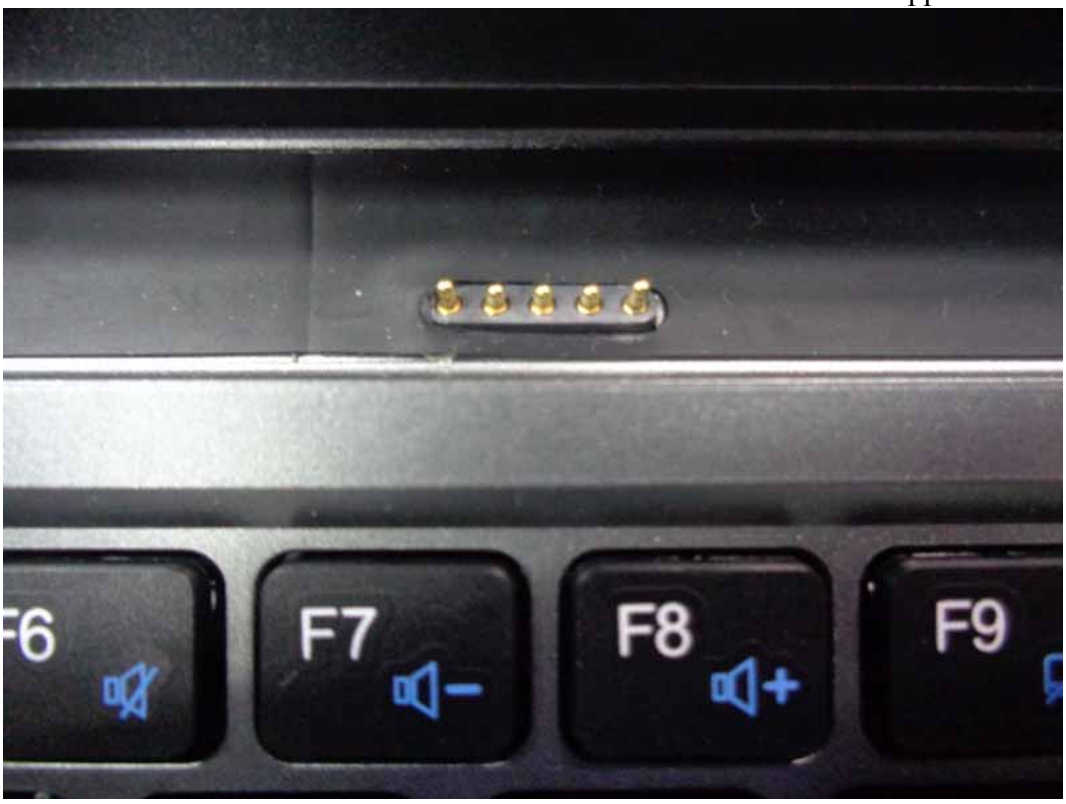


Figure 15
Inside of the EUT

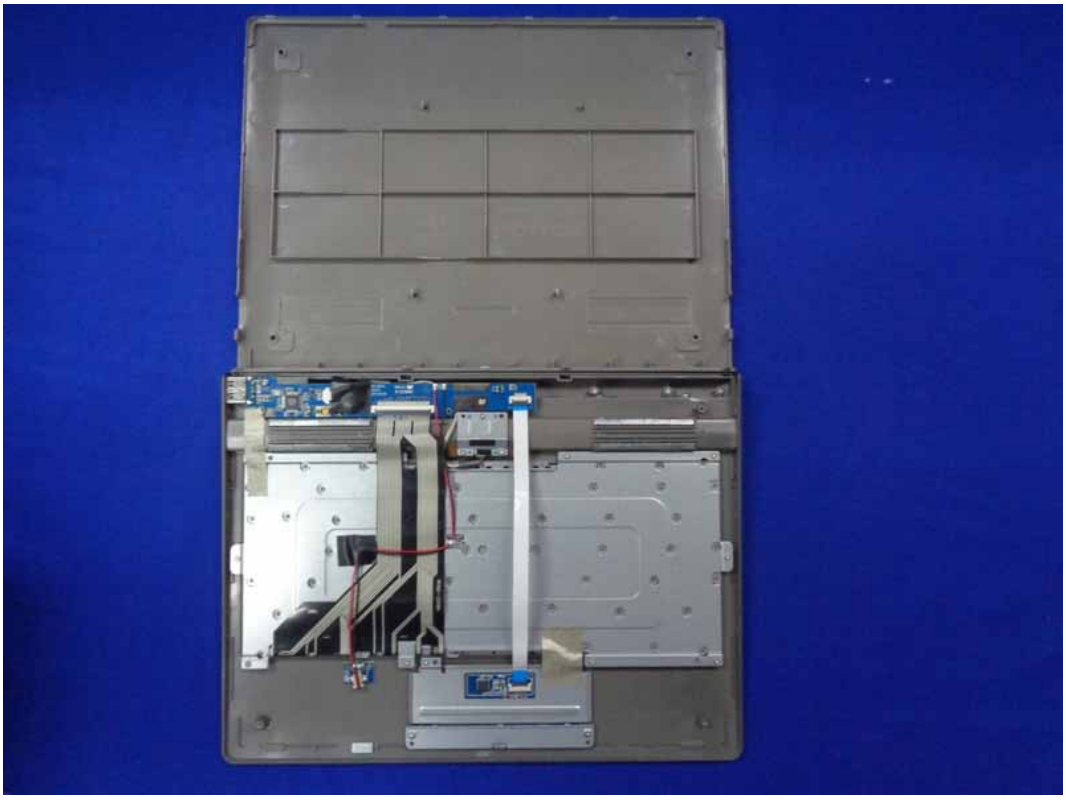


Figure 16
Inside of the EUT

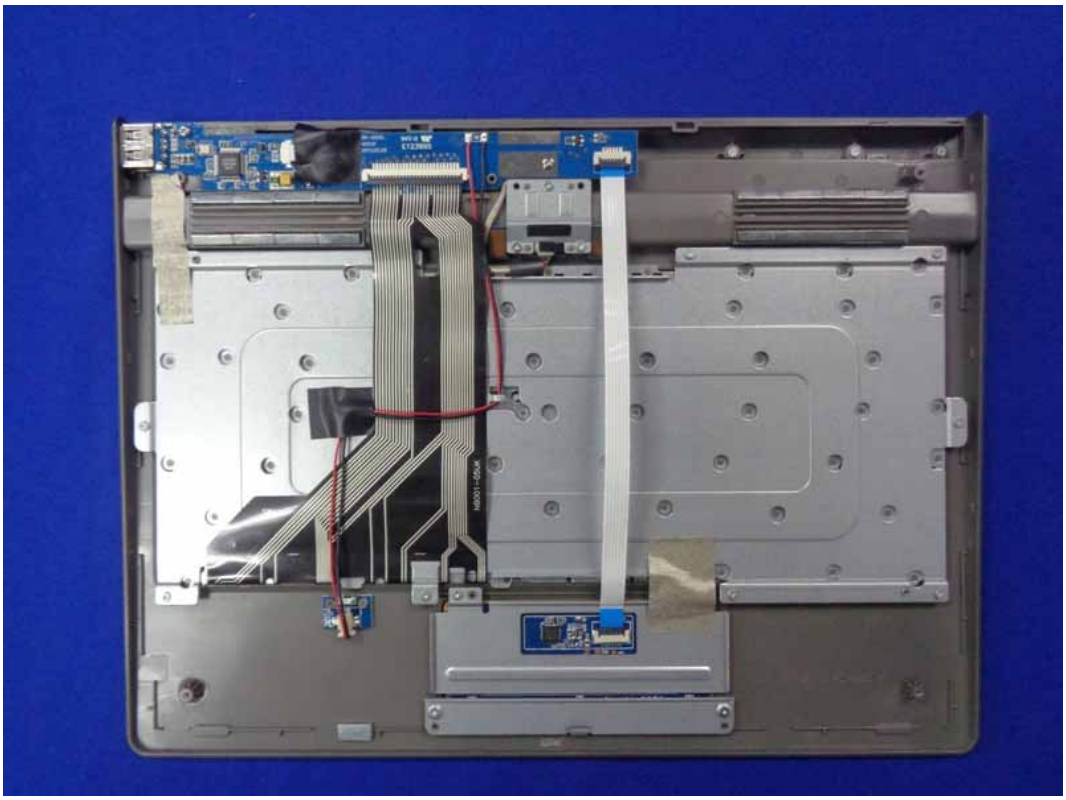


Figure 17
Inside of the EUT

Figure 18
Inside of the EUT

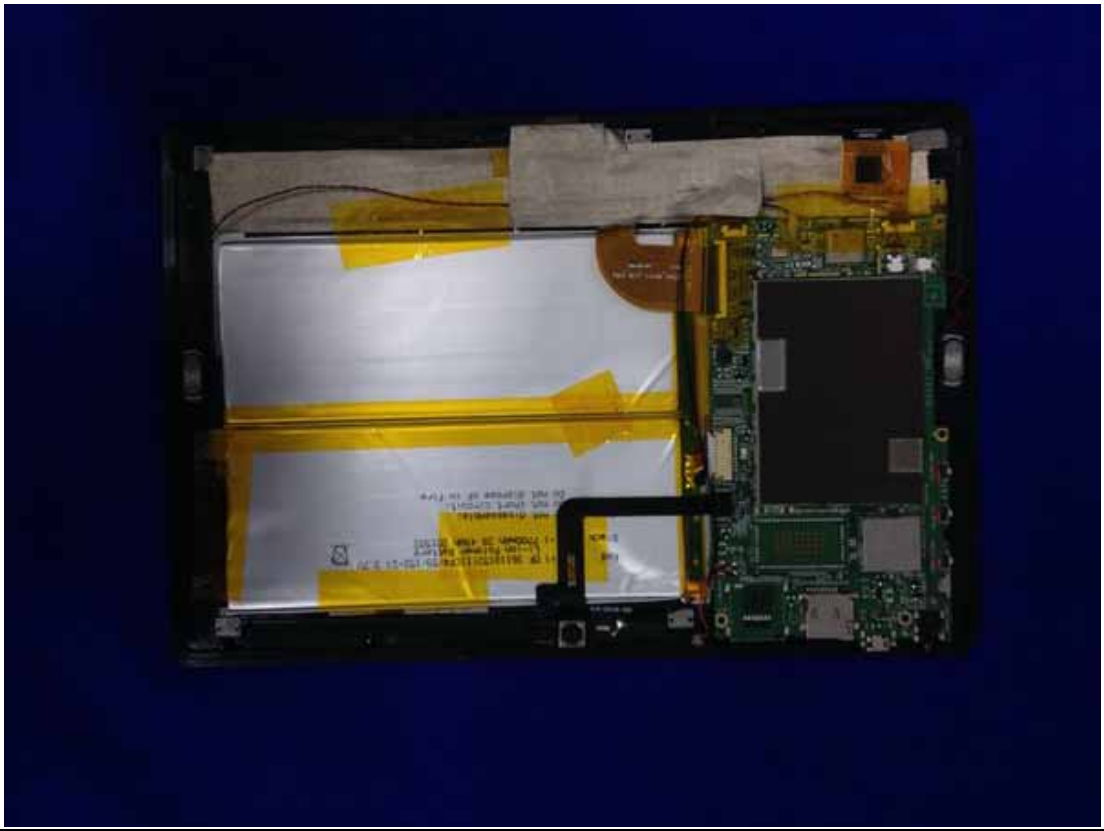


Figure 19
EUT of the Panel

Figure 20
EUT of the Panel

Figure 21
Panel of the Label

Figure 22
Component side of the PCB

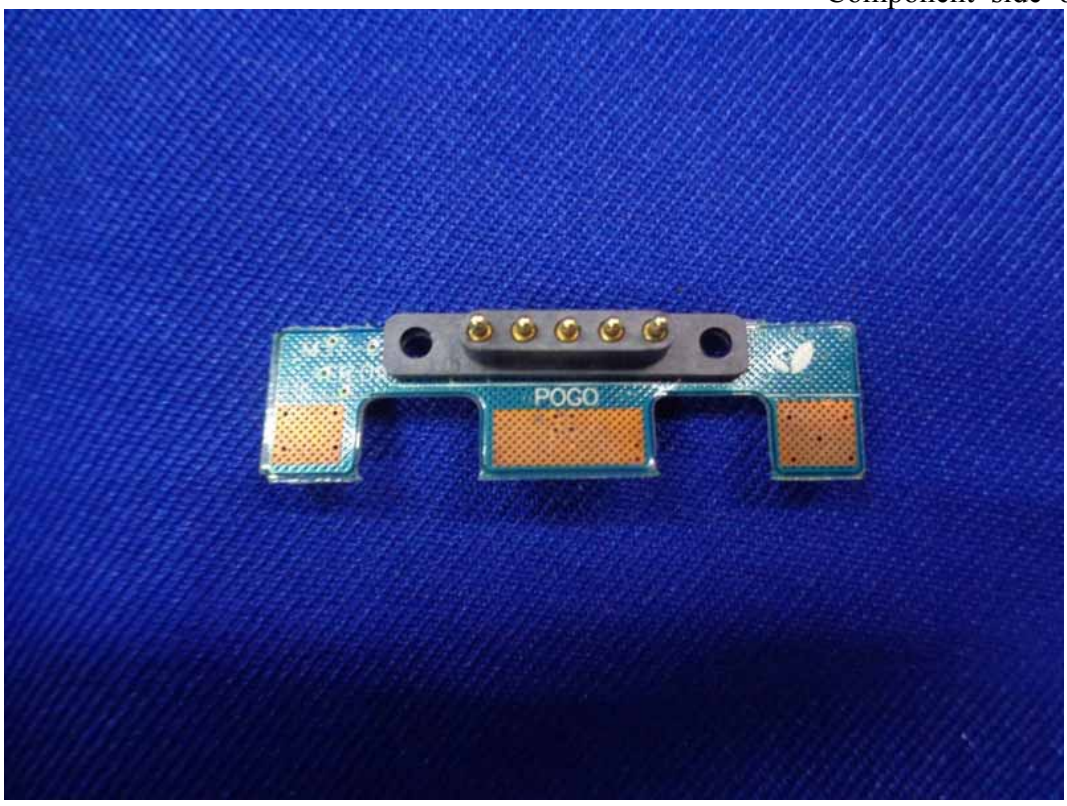


Figure 23
Component side of the PCB

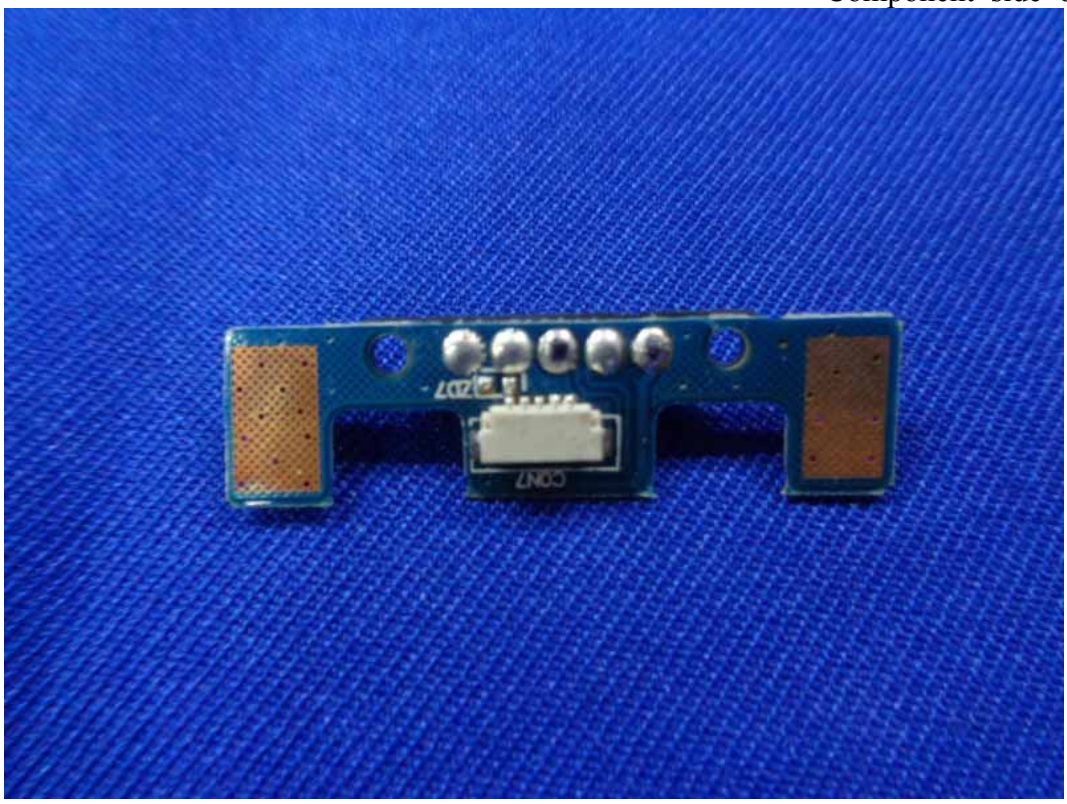


Figure 24
Component side of the PCB

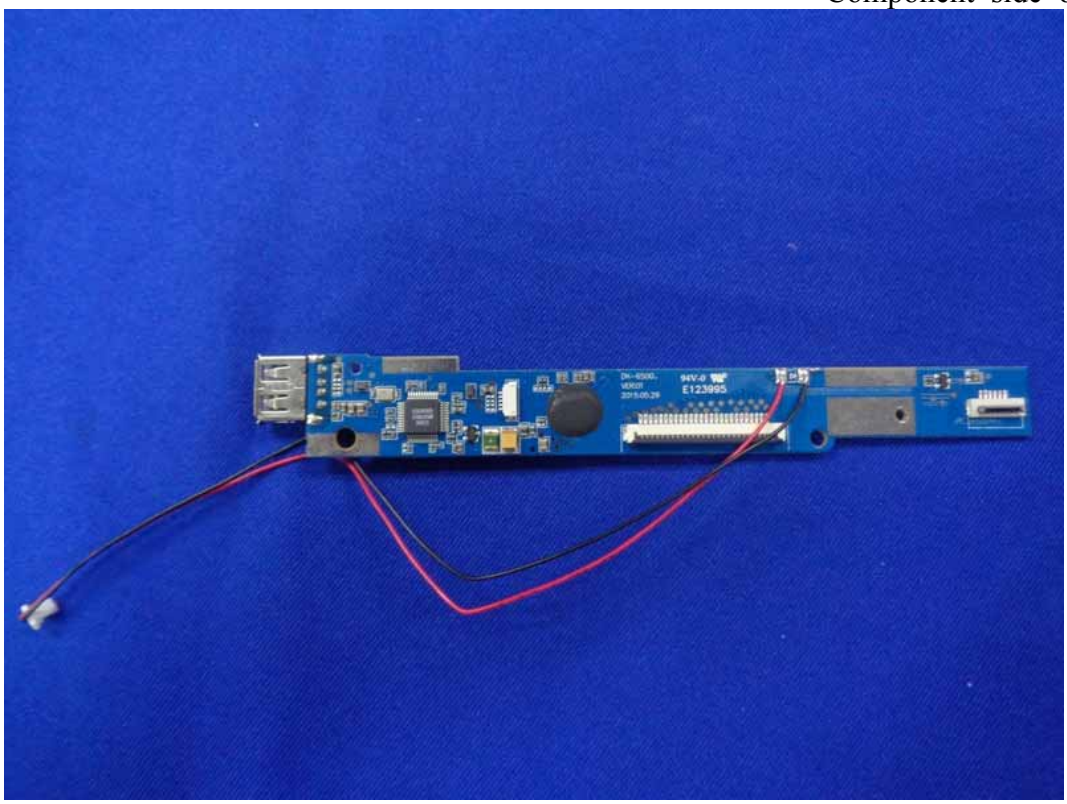


Figure 25
Component side of the PCB

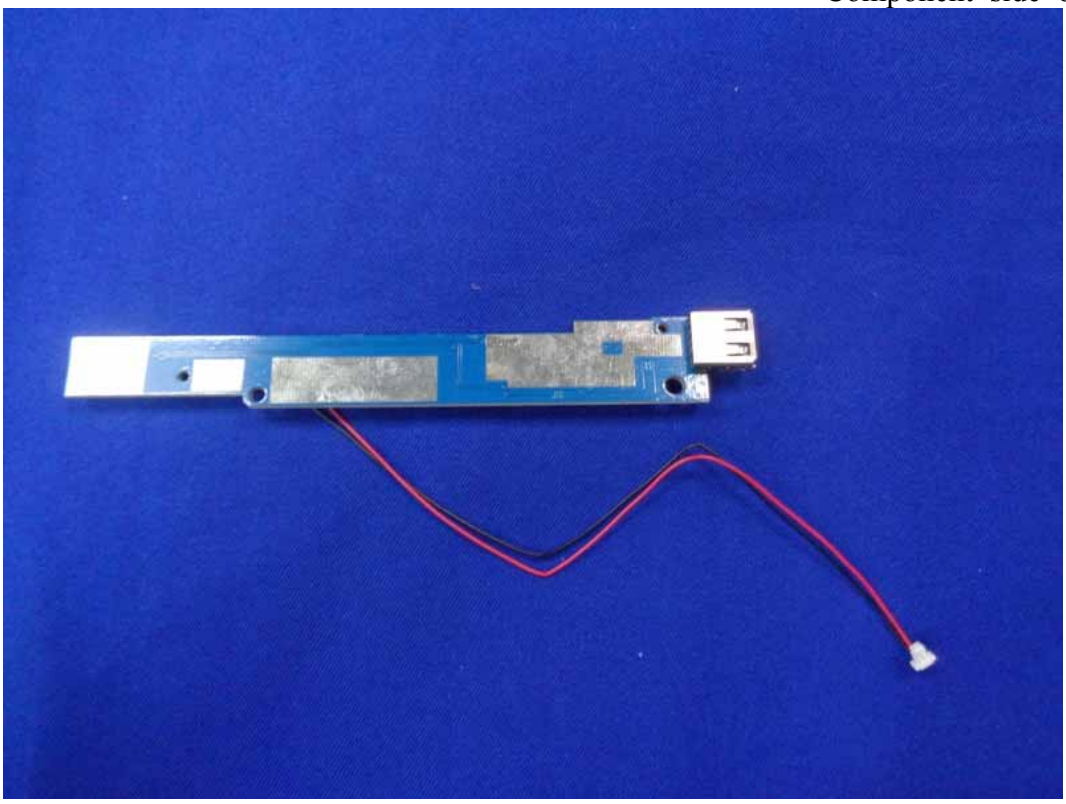


Figure 26
Component side of the PCB

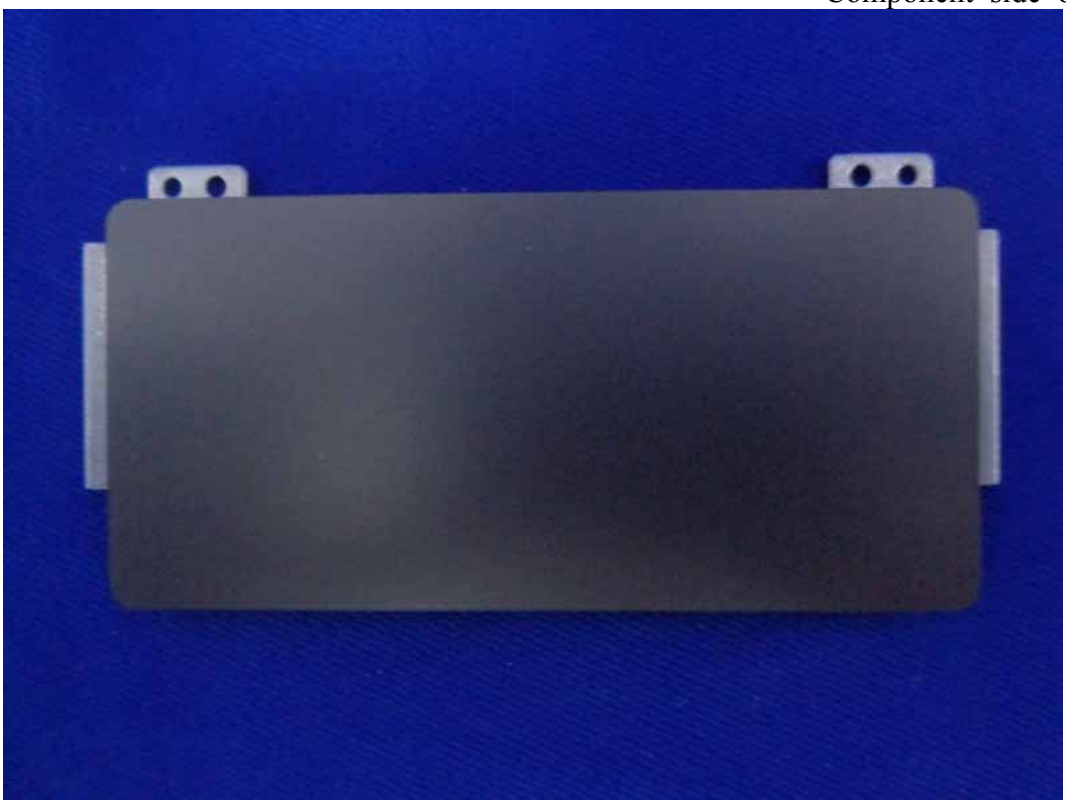


Figure 27
Component side of the PCB

Figure 28
Power Adapter #1

Figure 29
Battery

Figure 30
Battery

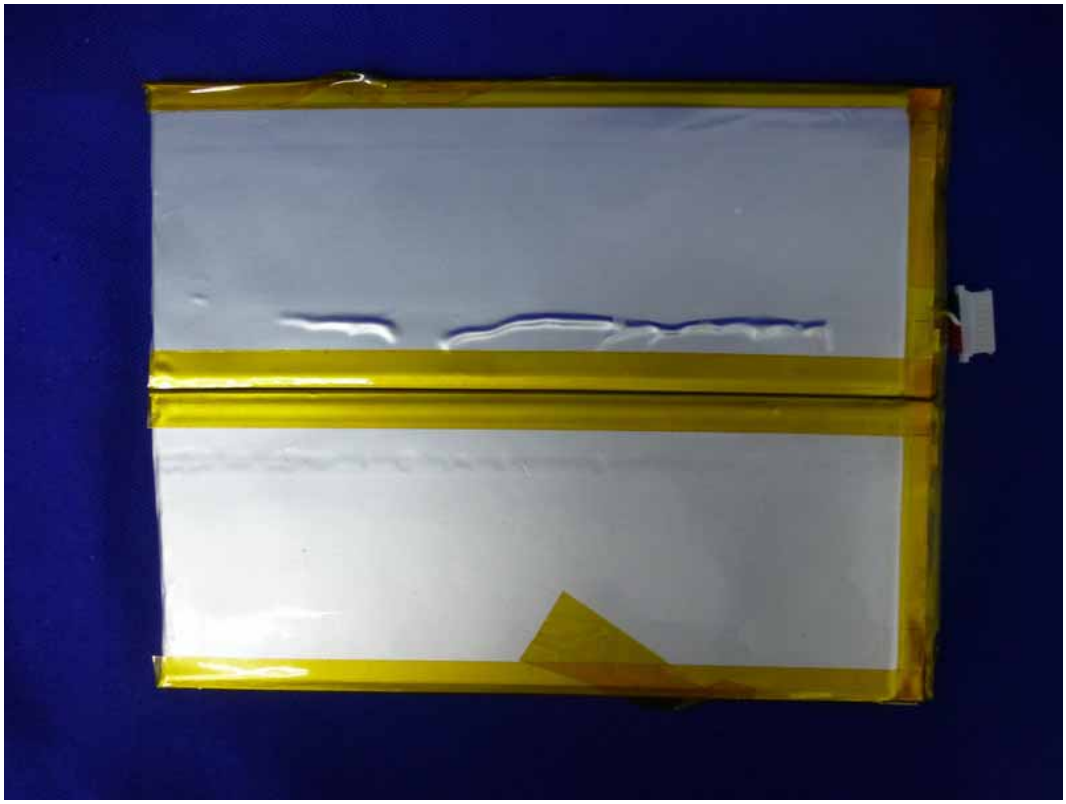


Figure 31
Battery

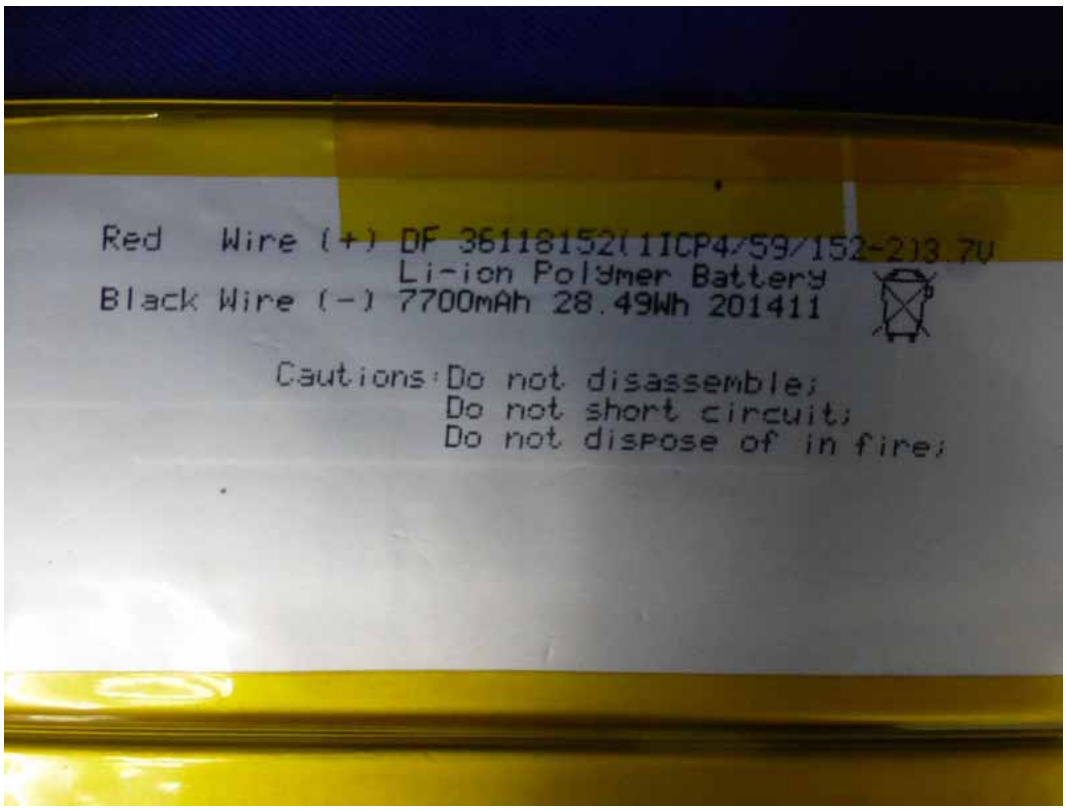


Figure 32
Speaker

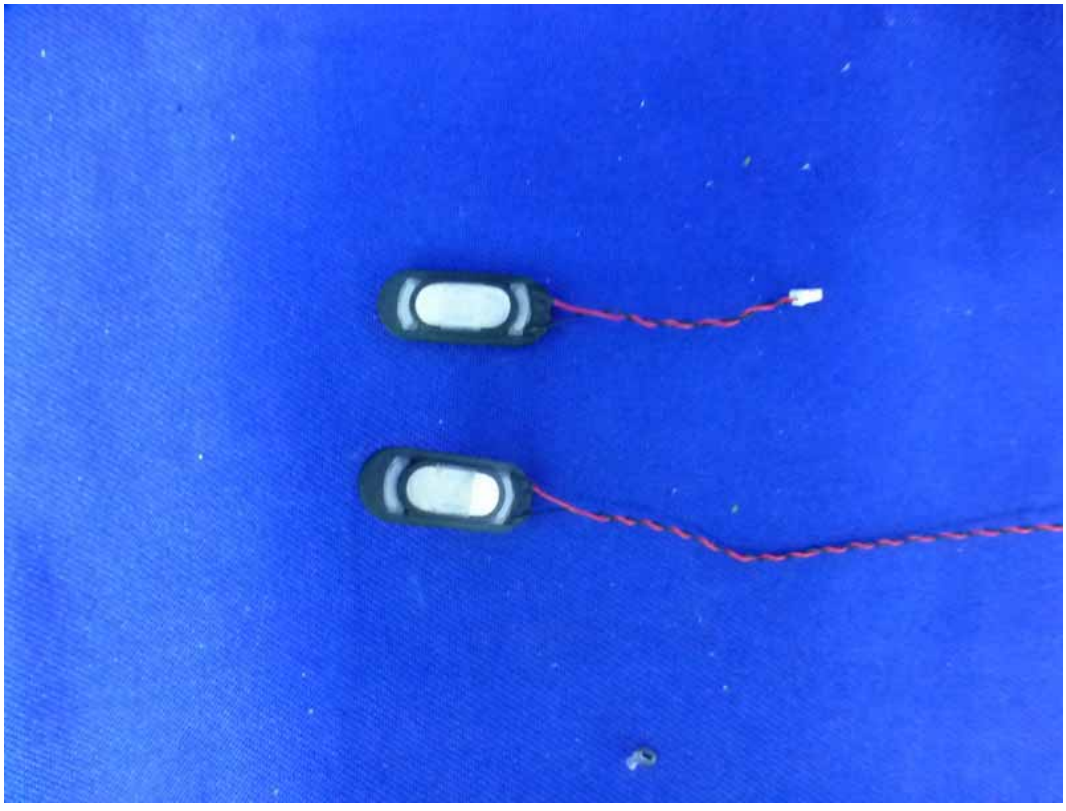


Figure 33
Power Adapter

Figure 34
Power Adapter

Figure 35
Power Adapter

Figure 36
OTG Cable

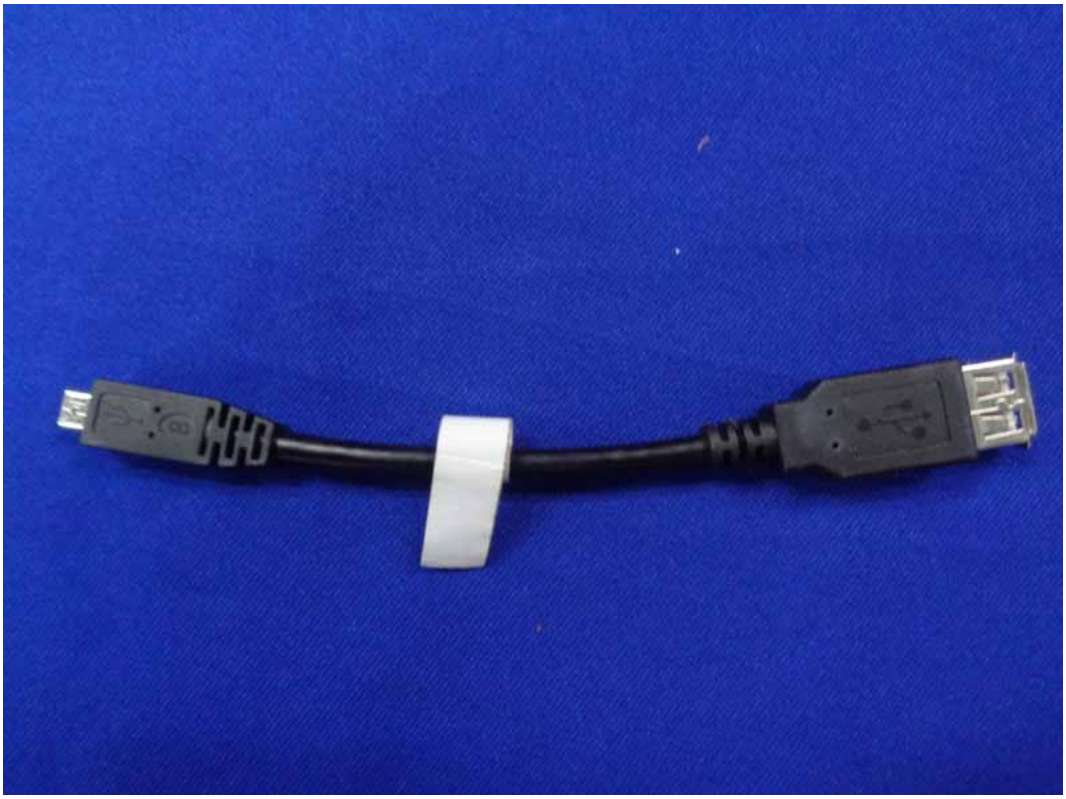


Figure 37
USB Cable