

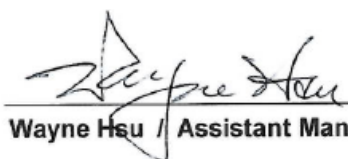
# MIC Test Report

**Equipment** : 802.11abgn USB Module  
**Brand Name** : SparkLAN  
**Model No.** : WUBR-508N  
**Standard** : MIC Certification Rule, Article 2 Paragraph 1 Item 19-3  
**Category** : XW (W52)  
**Measured Standard** : ARIB STD-T71  
**Frequency Range** : 5150 – 5250 MHz  
**Applicant** : SparkLAN Communications, Inc.  
**Manufacturer** : 8F., No.257, Sec. 2, Tiding Blvd., Neihu District,  
Taipei City 11493, Taiwan  
**Operate Mode** : Slave without radar detection

The product sample received on Aug. 01, 2013 and completely tested on Sep. 05, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in MIC Notice No.88 Appendix No.45 and shown compliance with the applicable MIC Ordinance Regulating Radio Equipment Article 49.20 and ARIB STD-71 technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

  
Wayne Hsu / Assistant Manager

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## Summary of Test Result

MIC Regulations Requirements				
Report Clause	Ref. Std. Article	Description	Measured	Result
1.1.6	ORE:49.20	Communication Method	half duplex operation	Complied
1.1.6	ORE:49.20	Modulation Method	OFDM	Complied
1.1.6	ORE:49.20	Signal Transmission Rate	refer to type specification	Complied
1.1.1	RLE:6	Frequency Band	refer to RF info.	Complied
3.1	ORE:5	Frequency Error	refer to test data within 20ppm	Complied
3.2	ORE:6	Occupied Bandwidth	refer to test data	Complied
3.3	ORE:49.20	Antenna Power, EIRP Power	refer to test data	Complied
3.3	ORE:14	Antenna Power Error	refer to test data	Complied
3.4	ORE:49.20	Adjacent Channel Power	refer to test data	Complied
3.5	ORE:49.20	Transmitter Out-band Emissions	refer to test data	Complied
3.6	ORE:7, Table 3	Transmitter Spurious Emissions	refer to test data	Complied
3.7	ORE:24	Receiver Spurious Emissions	refer to test data	Complied
3.8	TR:9	Identification Code	48 bits	Complied
3.9	ORE:49.20	Transmission Burst Length	<4ms	Complied
3.10	TR:9	Carrier Sense	refer to test data	Complied
3.11	ORE:49.20	EUT Construction Protection	Shielded Case	Complied
-	ORE:49.20	Transmit Power Control (TPC)	n/a or W53 > 3dB	NA
-	NT No.368,2011	DFS – Master Device	refer to test data	NA
RLE: Radio Law Enforcement Regulations ORE: Ordinance Regulating Radio Equipment TR: Terminal and Other Equipment Regulations NT: Notification of the Ministry of Internal Affairs and Communications				



**Report No. : JR373103XW**

## Revision History

[illegible]



# 1 General Description

## 1.1 Information

### 1.1.1 Frequency Band

Frequency Band	
<input checked="" type="checkbox"/>	(20MHz) - 5180, 5200, 5220, 5240 MHz
<input checked="" type="checkbox"/>	(40MHz) - 5190, 5230MHz
<input type="checkbox"/>	(80MHz) - 5210MHz

### 1.1.2 RF General Information

RF General Information for Category XW (W52)						
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N <sub>TX</sub> )	Antenna Power (mW/MHz)	EIRP (mW/MHz)
5150-5250	a	5180-5240	36-48 [4]	1	1.75	8.08690
5150-5250	n (HT20)	5180-5240	36-48 [4]	2	1.69	7.79625
5150-5250	n (HT40)	5190-5230	38-46 [2]	2	0.77	3.52951
Note 1: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.						

**1.1.3 Antenna Information**

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input checked="" type="checkbox"/>	Temporary RF connector provided
<input type="checkbox"/>	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
<input checked="" type="checkbox"/>	External antenna (dedicated antennas)

Antenna General Information					
No.	Ant. Cat.	Ant. Type	Brand	Model	Gain (dBi)
1	External	Dipole	Lct	FDE_ACBSMA-BGP	5
2	Integral	Printed	SparkLAN	WUBR-508N	6.64

**1.1.4 Type of EUT**

Identify EUT	
Presentation of Equipment	<input type="checkbox"/> Production ; <input checked="" type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.:
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.:
<input type="checkbox"/>	Other:

**1.1.5 EUT Operational Condition**

Supply Voltage	<input type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> System	<input type="checkbox"/> Battery

**1.1.6 Type Specifications**

<b>No. 3 Type Specifications</b>			
<b>1 Communication Method</b>	Semi-duplex		
<b>2 Transmitter</b>	<b>(1) Rated Output</b>	Refer test report clause 1.1.2 antenna power	
	<b>(2) Freq. Range of Radio Wave</b>	Refer test report clause 1.1.1 frequency band and 1.1.2 channel	
	<b>(3) Oscillation</b>	Synthesizer with Crystal Oscillation (40MHz) (Zero IF)	
	<b>(4) Modulation</b>	OFDM: D1D (16QAM,64QAM), G1D (BPSK, QPSK) Max. Signal Transmission Rate: 11a = 54 Mbps 11n BW <sub>ch</sub> 20MHz = 130Mbps (MCS8; N <sub>ss</sub> =2) BW <sub>ch</sub> 40MHz = 270Mbps (MCS8; N <sub>ss</sub> =2)	
<b>3 Manufacturer (Brand) Information</b>	<b>Manufacturer (Brand)</b>	<b>Model Type or Name</b>	<b>Serial Number</b>
	SparkLAN	WUBR-508N	n/a
<b>4 Antenna</b>	Type, Structure, Gain refer antenna report and test report clause 0.		
<b>5 Classification and Model Name of Auxiliary Equipment</b>	Protection Against Interference Automatic Transmission/reception of ID code (Radio equipment law article 9-4, item 9 is carrier sensing.		
<b>6 Other Type Specifications Items</b>	Other design specifications that are not mentioned under above item 1 to 5 all comply with the technical standard stipulated by the 3rd section of radio law.		
<b>7 Attached Drawing</b>	Radio Equipment System Diagram, Schematic Diagram, Layout		
<b>8 Reference Information</b>	Antenna Impedance : 50Ω		

## 1.2 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	Inspiron 6400	DoC

## 1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- MIC Ordinance Regulating Radio Equipment Article 49.20
- MIC Notice No.88 Appendix No.45

## 1.4 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.		
		TEL : 886-3-327-3456 FAX : 886-3-327-0973		
Test Condition		Test Site No.	Test Engineer	Test Environment
RF Conducted		TH06-HY	Shiming	24.6°C / 62%
Test Date				
Sep. 05, 2013				

## 1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty			
Test Item		Uncertainty	Limit
Radio frequency		$\pm 8.7 \times 10^{-7}$	$\pm 1 \times 10^{-5}$
RF output power, conducted		$\pm 0.63$ dB	$\pm 1.5$ dB
RF power radiated		$\pm 2.59$ dB	$\pm 6$ dB
Spurious emissions, conducted	30 – 1000 MHz	$\pm 0.51$ dB	$\pm 3$ dB
	1 – 18 GHz	$\pm 0.67$ dB	$\pm 3$ dB
	18 – 26 GHz	$\pm 0.83$ dB	$\pm 3$ dB
Spurious emissions, radiated	30 – 1000 MHz	$\pm 2.28$ dB	$\pm 6$ dB
	1 – 18 GHz	$\pm 2.59$ dB	$\pm 6$ dB
	18 – 26 GHz	$\pm 2.87$ dB	$\pm 6$ dB
Temperature		$\pm 0.8$ °C	$\pm 1$ °C
Humidity		$\pm 3$ %	$\pm 5$ %
Time		$\pm 1.42$ %	$\pm 10$ %

## 2 Test Configuration of EUT

### 2.1 The Worse Case Modulation Configuration

Worst Modulation Used for Conformance Testing			
Modulation Mode	Transmit Chains (N <sub>TX</sub> )	Data Rate / MCS	Worst Data Rate / MCS
11a,6-54Mbps	1	6-54Mbps	6Mbps
HT20, M8-15	2	M8-15	M8
HT40, M8-15	2	M8-15	M8

### 2.2 The Worse Case Power Setting Parameter

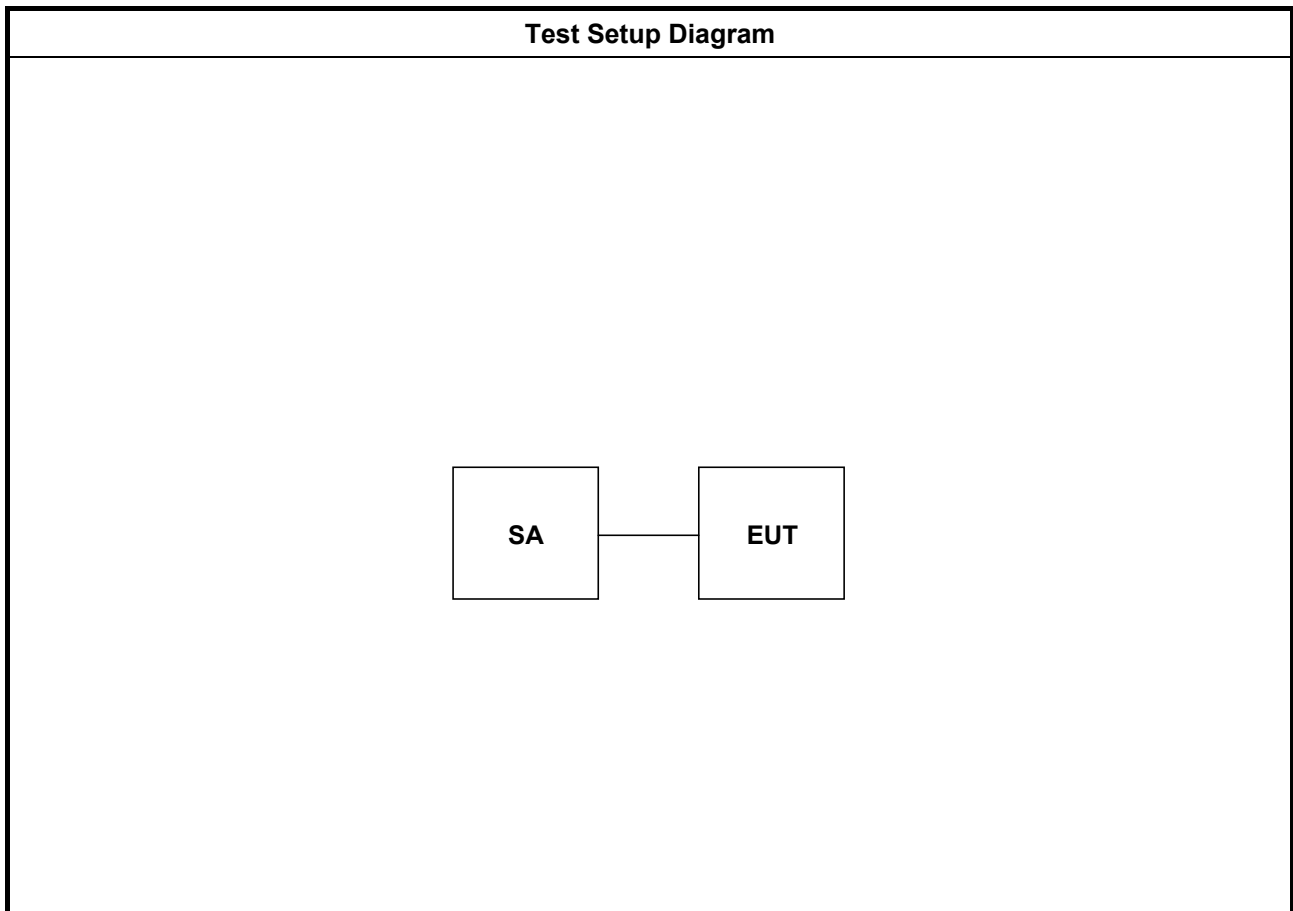
The Worst Case Power Setting Parameter						
Test Software Version	RT5x7xQA V1.0.5.9					
Modulation Mode	N <sub>TX</sub>	Test Frequency (MHz)				
		NCB: 20MHz			NCB: 40MHz	
		5180	5200	5240	5190	5230
11a,6-54Mbps	1	25	25	27	-	-
HT20, M8-15	2	25 / 24	25 / 24	2A / 26	-	-
HT40, M8-15	2	-	-	-	26 / 24	28 / 25

## 2.3 The Worst Case Measurement Configuration

<b>Tests Item</b>	Frequency Error
<b>Test Condition</b>	Conducted measurement at transmit chains.
<b>Modulation Mode</b>	Un-modulation

<b>Tests Item</b>	Occupied Bandwidth, Antenna Power, Antenna Power Error, EIRP Power, Adjacent Channel Power, Transmitter Out-band Emissions, Transmitter Spurious Emissions, Receiver Spurious Emissions, Transmission Burst Length, Identification Code, Carrier Sense,
<b>Test Condition</b>	Conducted measurement at transmit chains.
<b>Modulation Mode</b>	11a, HT20, HT40

## 2.4 Test Setup Diagram



### 3 Test Result

#### 3.1 Frequency Error

##### 3.1.1 Frequency Error Limit

Frequency Error Limit
$\leq \pm 20$ ppm

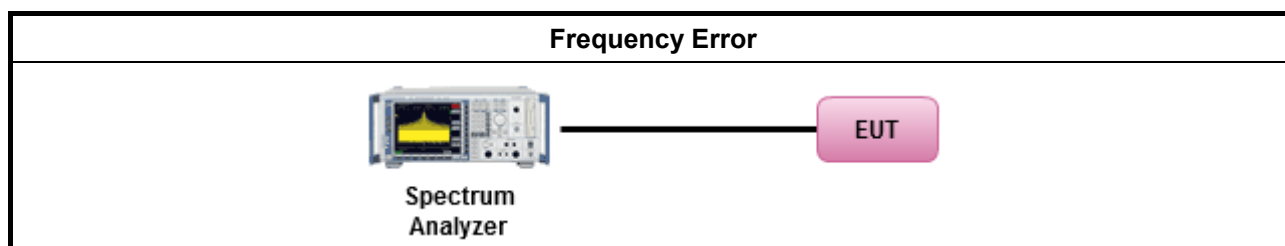
##### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

##### 3.1.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.43, clause 3.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.43, clause 3.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.43, clause 3.4
Presentation of Results	MIC Notice No.88 Appendix No.43, clause 3.5
Other Conditions	MIC Notice No.88 Appendix No.43, clause 3.6

##### 3.1.4 Test Setup



##### 3.1.5 Test Result of Frequency Error

Appendix	Mode	Item
C	Un-modulation	2



## 3.2 Occupied Bandwidth

### 3.2.1 Occupied Bandwidth Limit

Occupied Bandwidth Limit
(BW <sub>ch</sub> 20MHz) [W52/W53] - ≤ 18MHz (OFDM, DSSS, Other); (BW <sub>ch</sub> 20MHz) [W56] - ≤ 19.7MHz (OFDM, DSSS, Other); (BW <sub>ch</sub> 40MHz) - ≤ 38MHz (OFDM); (BW <sub>ch</sub> 80MHz) - ≤ 78MHz (OFDM); (BW <sub>ch</sub> 160MHz - contiguous) - ≤ 158MHz (OFDM) (BW <sub>ch</sub> 80+80MHz - non-contiguous) - ≤ 78MHz (OFDM)

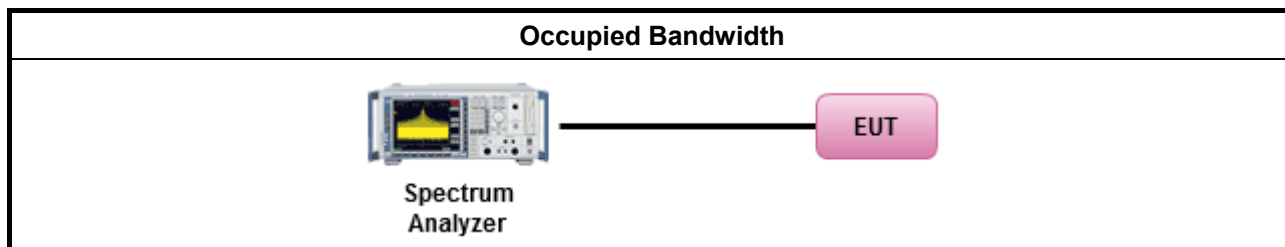
### 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.2.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.43, clause 4.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.43, clause 4.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.43, clause 4.4
Presentation of Results	MIC Notice No.88 Appendix No.43, clause 4.5
Other Conditions	MIC Notice No.88 Appendix No.43, clause 4.6

### 3.2.4 Test Setup



### 3.2.5 Test Result of Occupied Bandwidth

Appendix	Mode	Item
C	11a, HT20, HT40	2

### 3.3 Antenna Power, Antenna Power Error and EIRP Power

#### 3.3.1 Antenna Power, Antenna Power Error and EIRP Power Limit

Antenna Power Limit (mW/MHz)
(BW <sub>ch</sub> 20MHz) - ≤10; (BW <sub>ch</sub> 40MHz) - ≤5; (BW <sub>ch</sub> 80MHz) - ≤2.5; (BW <sub>ch</sub> 160MHz) - ≤1.25;

Antenna Power Error Limit (%)
+20% ~ -80%

EIRP Limit (mW/MHz)
(BW <sub>ch</sub> 20MHz) - ≤10 ; (BW <sub>ch</sub> 40MHz) - ≤5 ; (BW <sub>ch</sub> 80MHz) - ≤2.5 ; (BW <sub>ch</sub> 160MHz) - ≤1.25

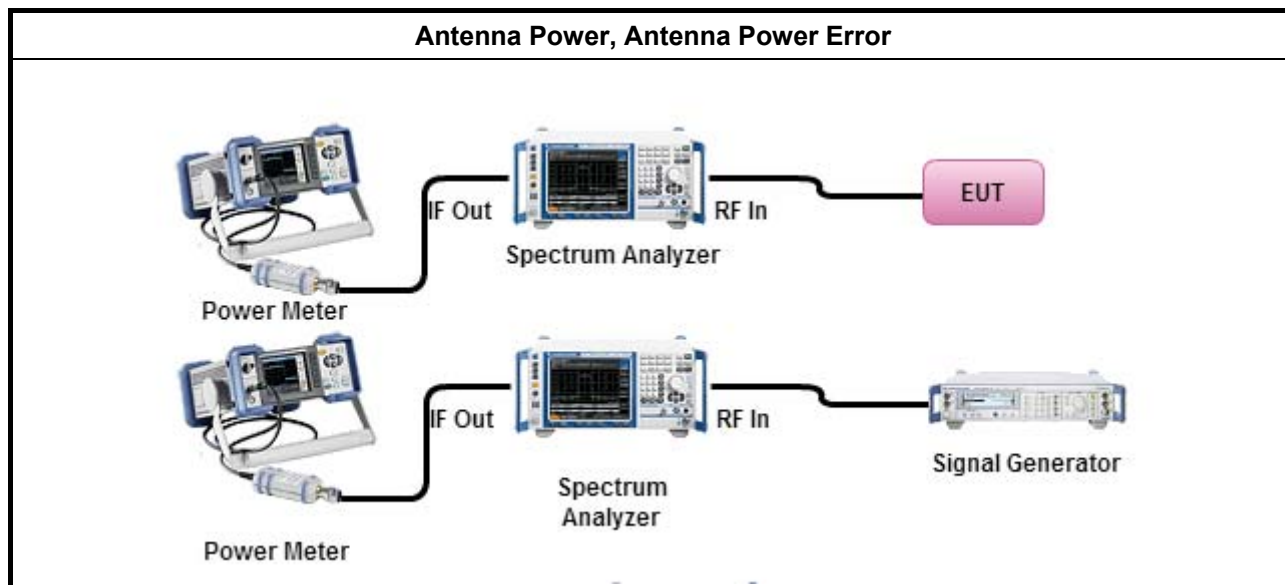
#### 3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.3.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.43, clause 6.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.43, clause 6.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.43, clause 6.4
Presentation of Results	MIC Notice No.88 Appendix No.43, clause 6.5
Other Conditions	MIC Notice No.88 Appendix No.43, clause 6.6

### 3.3.4 Test Setup



### 3.3.5 Test Result of Antenna Power, Antenna Power Error and EIRP Power

Appendix	Mode	Item
C	11a, HT20, HT40	2, 3

### 3.4 Adjacent Channel Power

#### 3.4.1 Adjacent Channel Power Limit

Adjacent Channel Power Limit
(BW <sub>ch</sub> 20MHz & CP/OBW≤18MHz) - fc±20MHz ≥25dB; fc±40MHz ≥40dB
(BW <sub>ch</sub> 20MHz & CP/OBW≤19MHz) - fc±20MHz ≥25dB; fc±40MHz ≥40dB
(BW <sub>ch</sub> 40MHz & CP/OBW≤38MHz) - fc±40MHz ≥25dB; fc±80MHz ≥40dB
(BW <sub>ch</sub> 80MHz & CP/OBW≤78MHz) - fc±80MHz ≥25dB
(BW <sub>ch</sub> 80+80MHz & CP/OBW≤78MHz) - fc±80MHz ≥25dB
(BW <sub>ch</sub> 160MHz & CP/OBW≤158MHz) - N/A

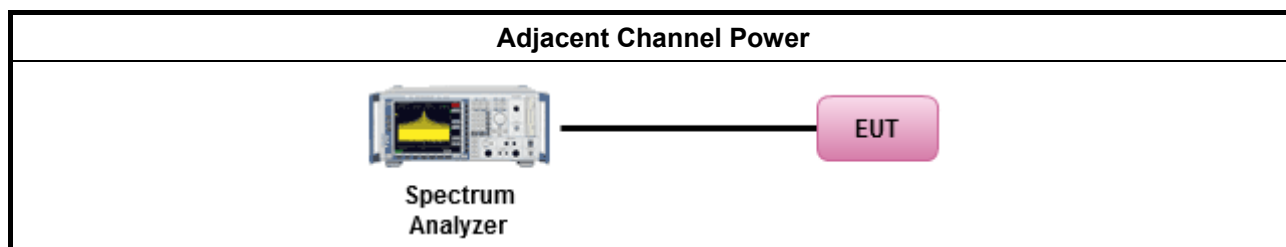
#### 3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.4.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 7.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 7.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 7.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 7.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 7.6

#### 3.4.4 Test Setup



#### 3.4.5 Test Result of Adjacent Channel Power

Appendix	Mode	Item
C	11a, HT20, HT40	2

### 3.5 Transmitter Out-band Emissions

#### 3.5.1 Transmitter Out-band Emissions Limit

W52 - BW <sub>ch</sub> 20MHz (OBW≤18MHz)					
Out Band Emissions		EIRP Limit			
Range (MHz)		mW/MHz		dBm/MHz	
5140	5142	0.0025	0.0025	-26	-26
5142	5150	0.015	0.015	-18	-18
5250	5251	1	0.1	0	-10
5251	5260	0.1	0.0158	-10	-18
5260	5266.7	0.0158	0.0025	-18	-26
5266.7	5360	0.0025	0.0025	-26	-26

W52 - BW <sub>ch</sub> 40MHz					
Out Band Emissions		EIRP Limit			
Range (MHz)		mW/MHz		dBm/MHz	
5100	5141.6	0.0025	0.0025	-26	-26
5141.6	5150	0.015	0.015	-18	-18
5250	5251	0.5	0.05	-3	-13
5251	5270	0.05	0.0079	-13	-21
5270	5278.4	0.0079	0.0025	-21	-26
5278.4	5400	0.0025	0.0025	-26	-26

W52 - BW <sub>ch</sub> 80MHz					
Out Band Emissions		EIRP Limit			
Range (MHz)		mW/MHz		dBm/MHz	
5020	5123.2	0.0025	0.0025	-26	-26
5123.2	5150	0.015	0.015	-18	-18
5250	5251	0.25	0.025	-6	-16
5251	5290	0.025	0.0040	-16	-24
5290	5296.7	0.0040	0.0025	-24	-26
5296.7	5480	0.0025	0.0025	-26	-26

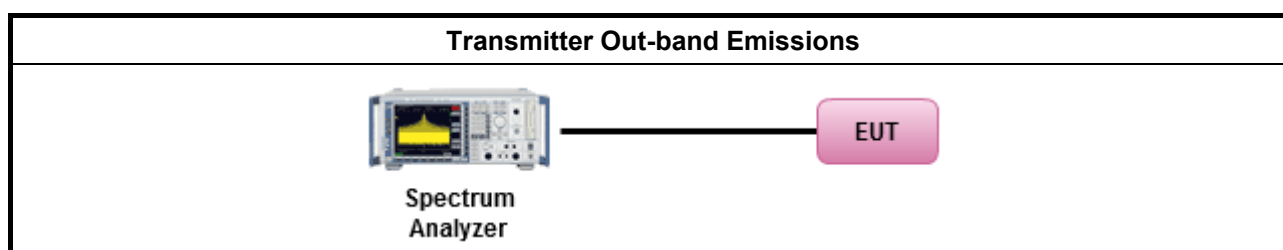
### 3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.5.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 7.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 7.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 7.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 7.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 7.6

### 3.5.4 Test Setup



### 3.5.5 Test Result of Transmitter Out-band Emissions

Appendix	Mode	Item
C	11a, HT20, HT40	2

### 3.6 Transmitter Spurious Emissions

#### 3.6.1 Transmitter Spurious Emissions Limit

W52 - BW <sub>ch</sub> 20MHz (OBW≤18MHz)						
Transmitter Spurious Emissions					Limit	
Range (MHz)		Bn (MHz)	2.5xBn	fc (MHz)	uW/MHz	dBm/MHz
30	5140	16	40	5180	2.5	-26
5360	26000	16	40	5320	2.5	-26
W52 - BW <sub>ch</sub> 40MHz						
Transmitter Spurious Emissions					EIRP Limit	
Range (MHz)		Bn (MHz)	2.5xBn	fc (MHz)	uW/MHz	dBm/MHz
30	5100	36	90	5190	2.5	-26
5400	26000	36	90	5310	2.5	-26
W52 - BW <sub>ch</sub> 80MHz						
Transmitter Spurious Emissions					Limit	
Range (MHz)		Bn (MHz)	2.5xBn	fc (MHz)	uW/MHz	dBm/MHz
30	5020	76	190	5210	2.5	-26
5480	26000	76	190	5290	2.5	-26

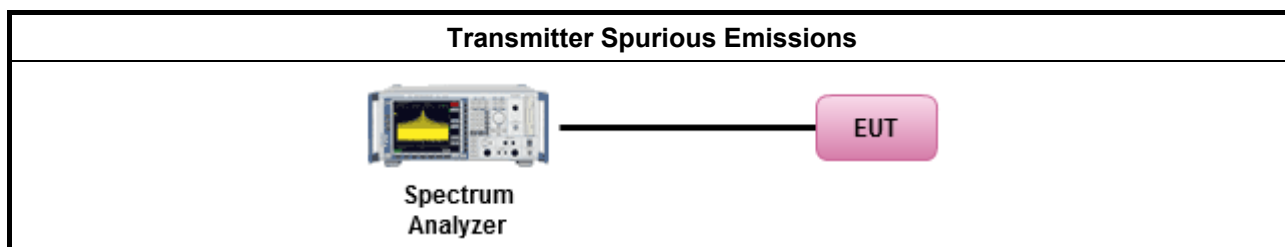
#### 3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.6.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.1, clause 1.3
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.1, clause 1.4
Measuring Operation Procedures	MIC Notice No.88 Appendix No.1, clause 1.5
Presentation of Results	MIC Notice No.88 Appendix No.1, clause 1.6

#### 3.6.4 Test Setup



**3.6.5 Test Result of Transmitter Spurious Emissions**

Appendix	Mode	Item
C	11a, HT20, HT40	2



### 3.7 Receiver Spurious Emissions

#### 3.7.1 Receiver Spurious Emissions Limit

RX Spurious Emission		Limit			
Range (MHz)		nW		dBm	
30	1000	4	4	-54	-54
1000	26000	20	20	-47	-47

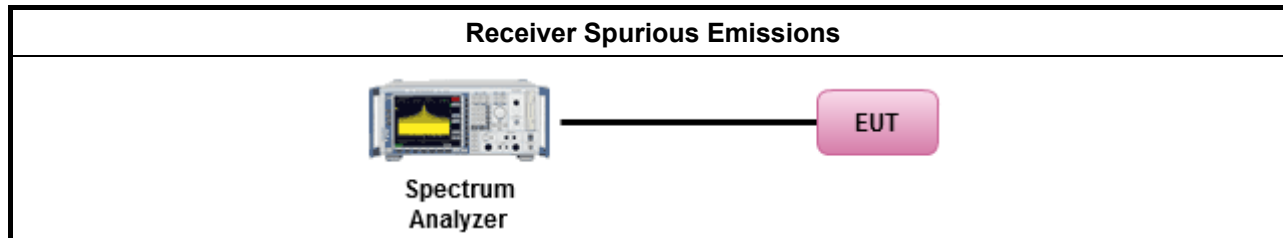
#### 3.7.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.7.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.43, clause 7.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.43, clause 7.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.43, clause 7.4
Presentation of Results	MIC Notice No.88 Appendix No.43, clause 7.5
Other Conditions	MIC Notice No.88 Appendix No.43, clause 7.6

#### 3.7.4 Test Setup



#### 3.7.5 Test Result of Receiver Spurious Emissions

Appendix	Mode	Item
C	11a, HT20, HT40	4

### 3.8 Identification Code

#### 3.8.1 Identification Code Limit

Identification Code Limit
≤ 19 bits

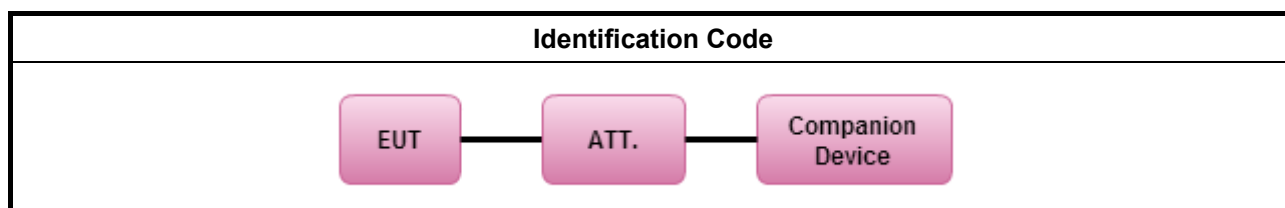
#### 3.8.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.8.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.43, clause 12.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.43, clause 12.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.43, clause 12.4
Presentation of Results	MIC Notice No.88 Appendix No.43, clause 12.5
Other Conditions	MIC Notice No.88 Appendix No.43, clause 12.6

#### 3.8.4 Test Setup



#### 3.8.5 Test Result of Identification Code

Appendix	Mode	Item
C	11a, HT20, HT40	2

### 3.9 Transmission Burst Length

#### 3.9.1 Transmission Burst Length Limit

Transmission Burst Length Limit
≤ 4msec. (OFDM)

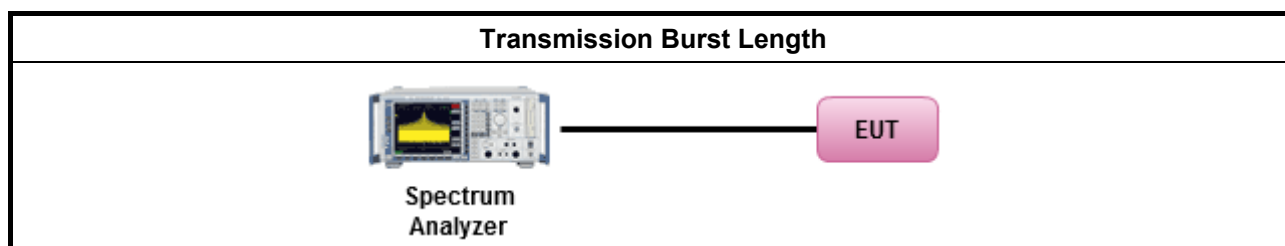
#### 3.9.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.9.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 10.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 10.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 10.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 10.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 10.6

#### 3.9.4 Test Setup



#### 3.9.5 Test Result of Transmission Burst Length

Appendix	Mode	Item
C	11a, HT20, HT40	2

### 3.10 Carrier Sense

#### 3.10.1 Carrier Sense Limit

Carrier Sense Limit
Stop transmission for interference signal level above 100mV/m (or level at $22.79 + Gr - 20 \cdot \log(f)$ [dBm])

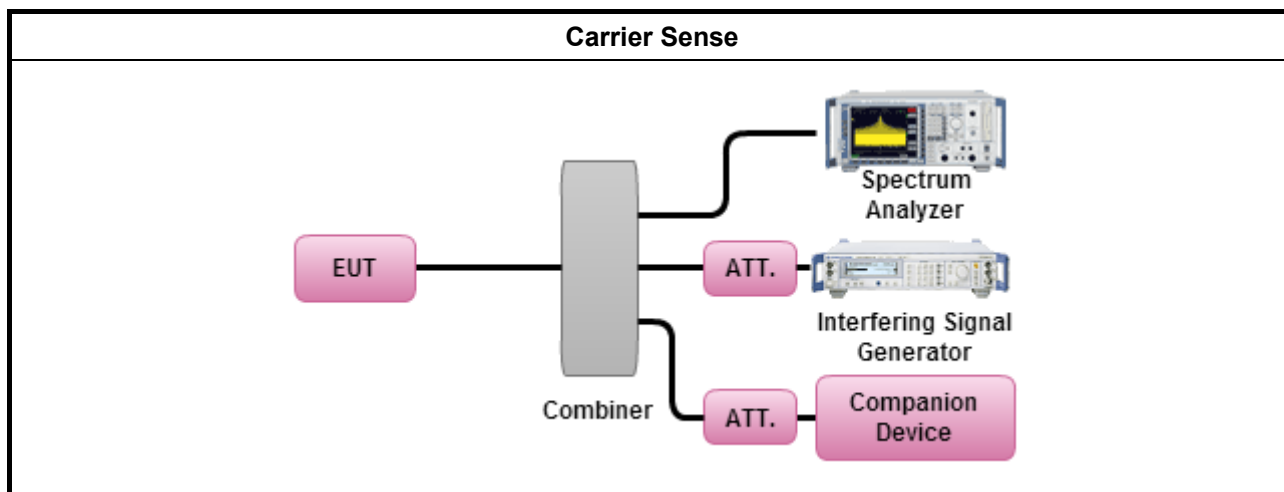
#### 3.10.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.10.3 Test Procedures

Test Method	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 12.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 12.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 12.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 12.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 12.6

#### 3.10.4 Test Setup



#### 3.10.5 Test Result of Carrier Sense

Appendix	Mode	Item
C	11a, HT20, HT40	2

### 3.11 EUT Construction Protection

#### 3.11.1 EUT Construction Protection Limit

EUT Construction Protection Limit	
The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.	

#### 3.11.2 EUT Construction Protection

Refer a test equipment and calibration data table in this test report.

EUT Construction Protection	
Protected Method	Description
Shielding Case	RF and Modulation components are covered with shielding case and this shielding case is soldered

#### 3.11.3 Reference Documents

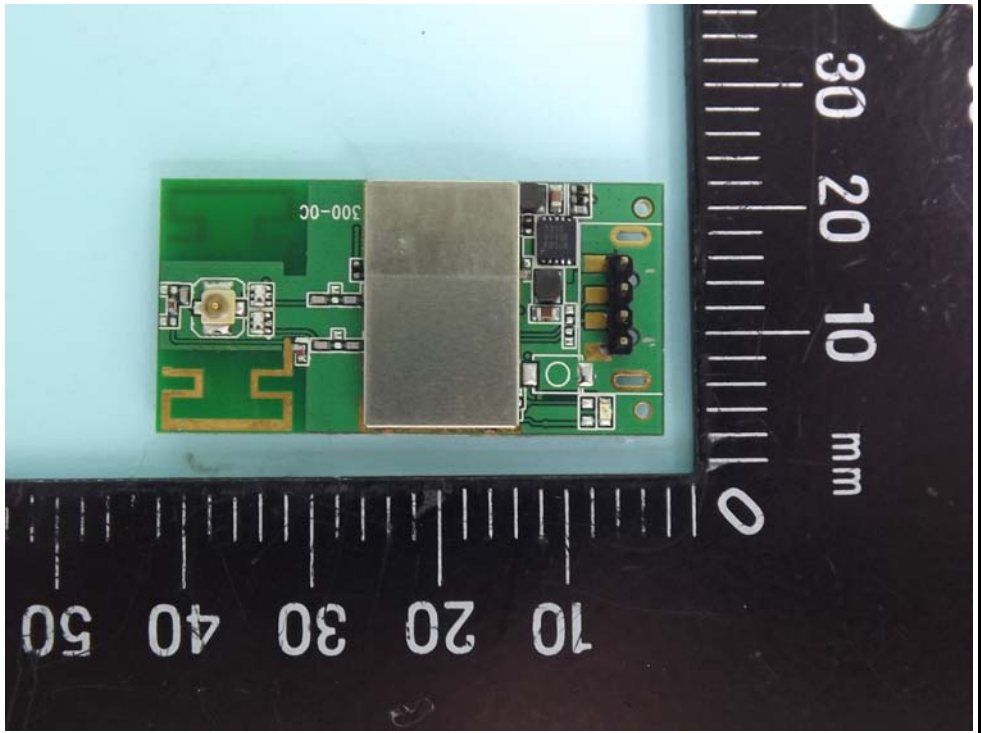
Photo	Item
Photo 1	

Photo 2

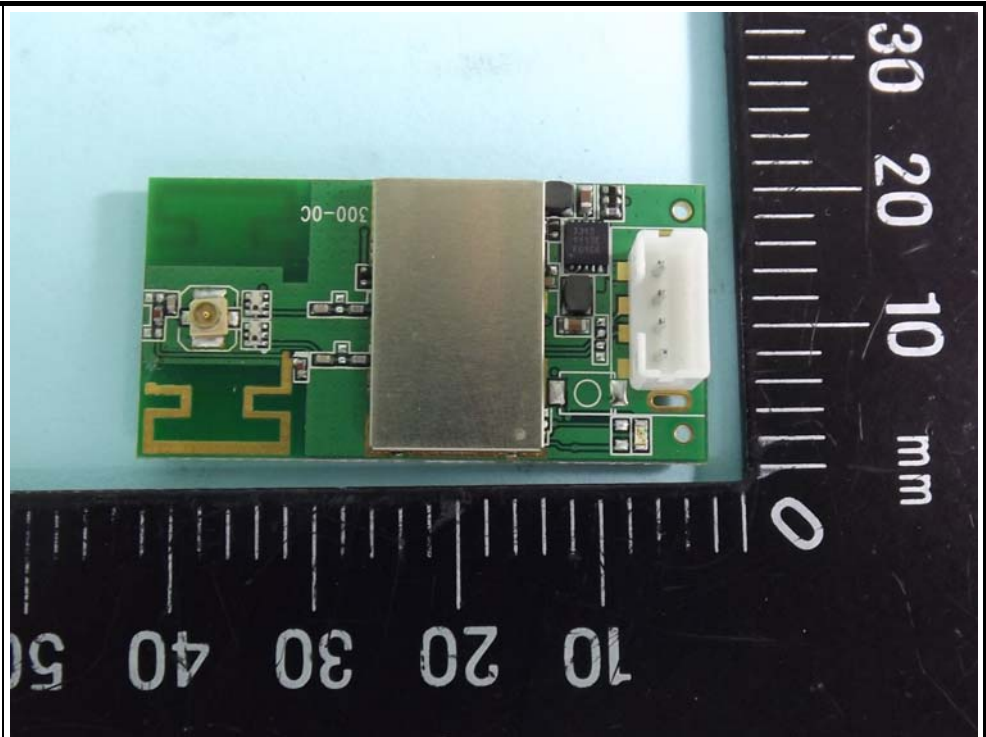
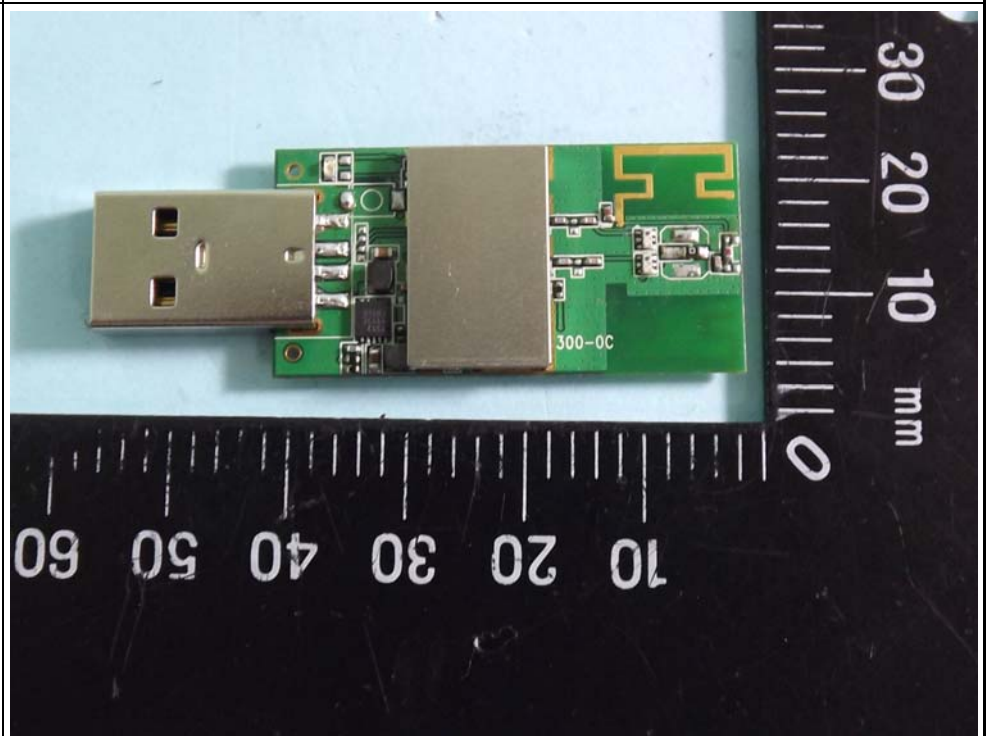


Photo 3



## 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 40	100305	9KHz~40GHz	Mar. 20, 2013	Conducted
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 21, 2013	Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jun. 27, 2013	Conducted
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	Feb. 02, 2013	Conducted
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	Feb. 02, 2013	Conducted

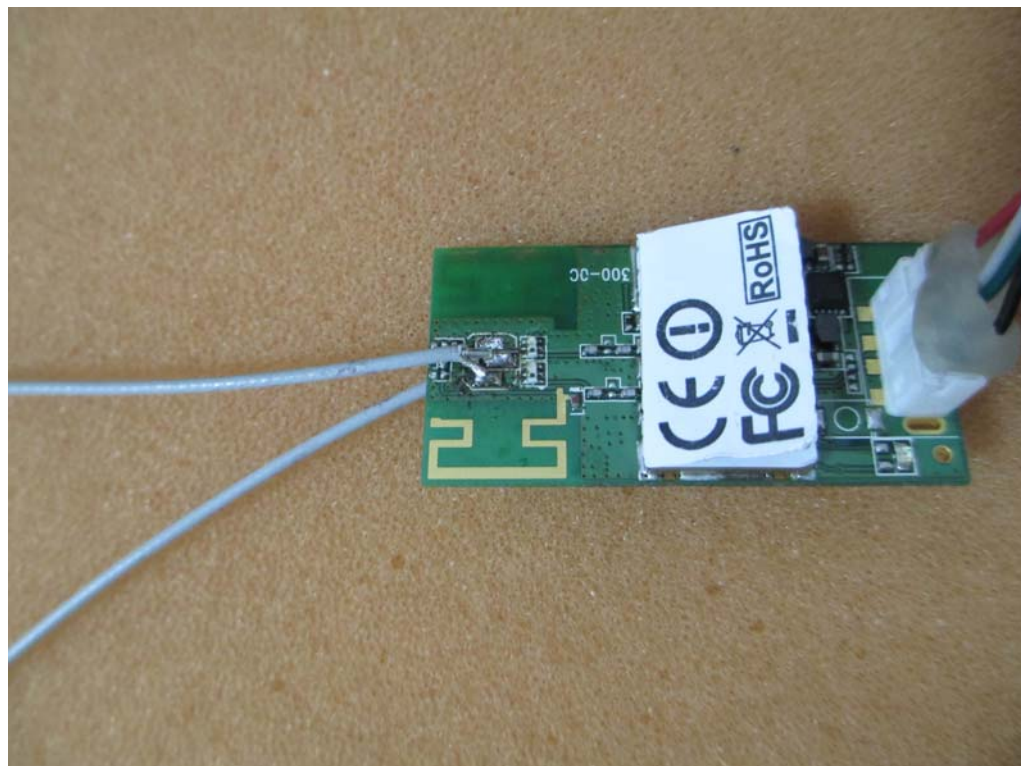
Note: Calibration Interval of instruments listed above is one year.

## **Appendix A. Test Photos**

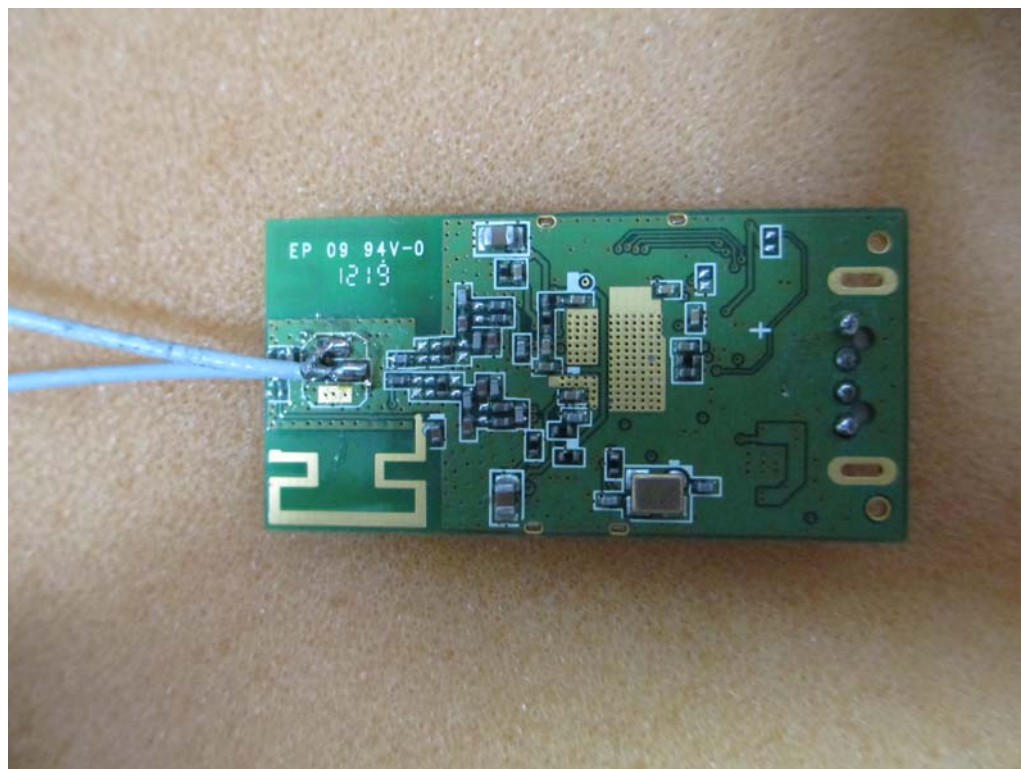




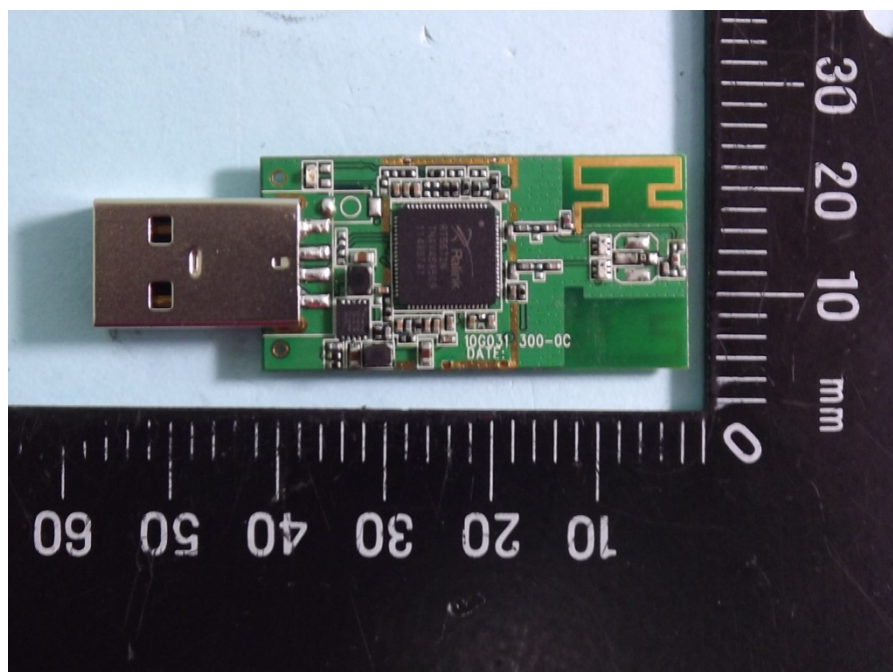
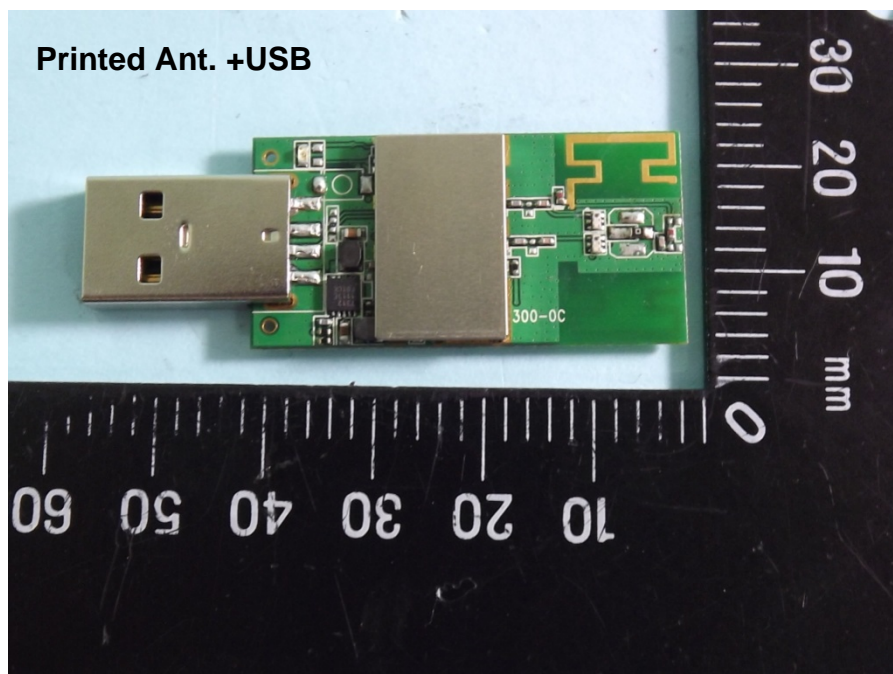


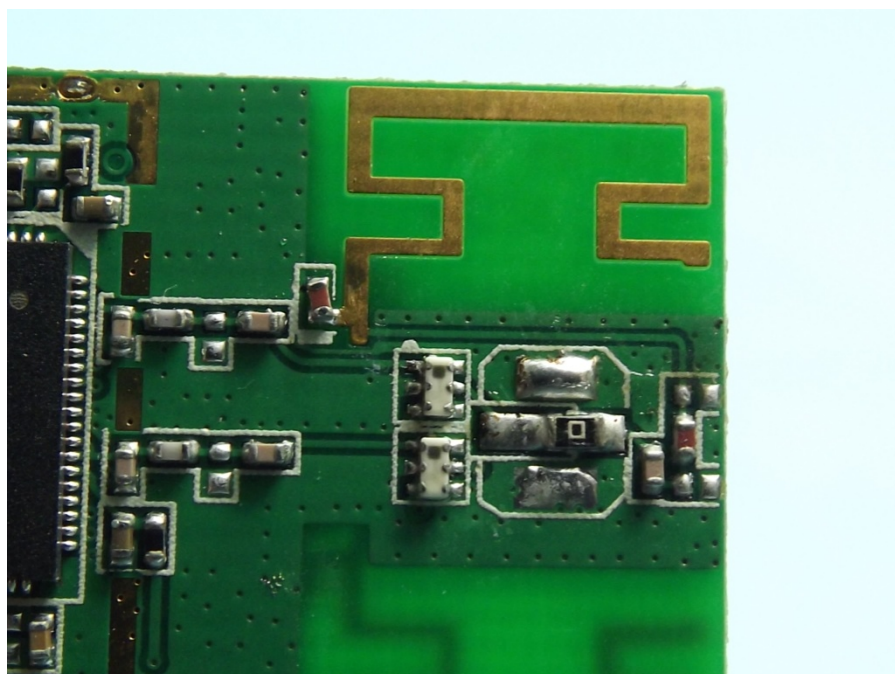




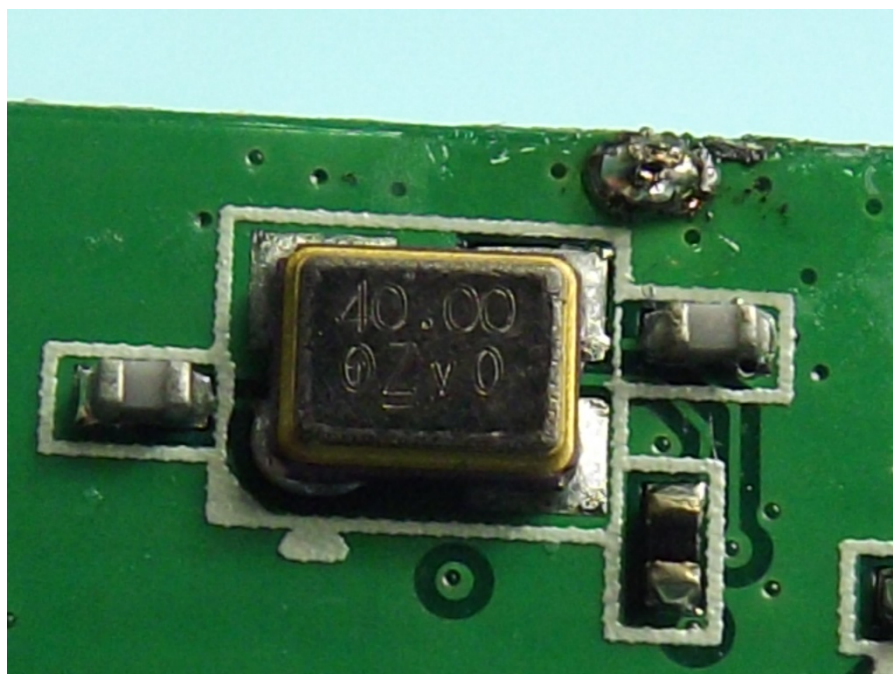
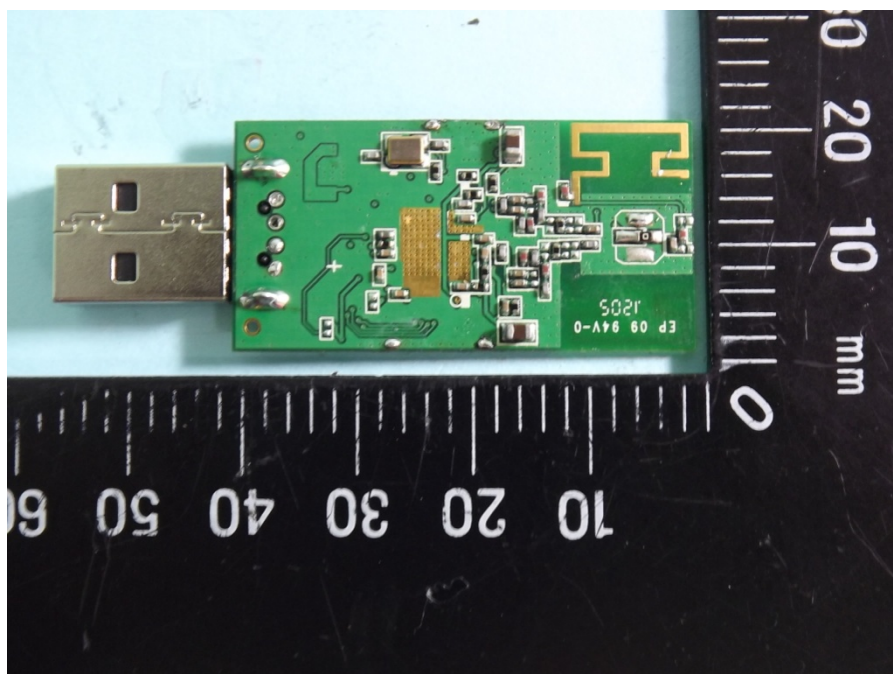


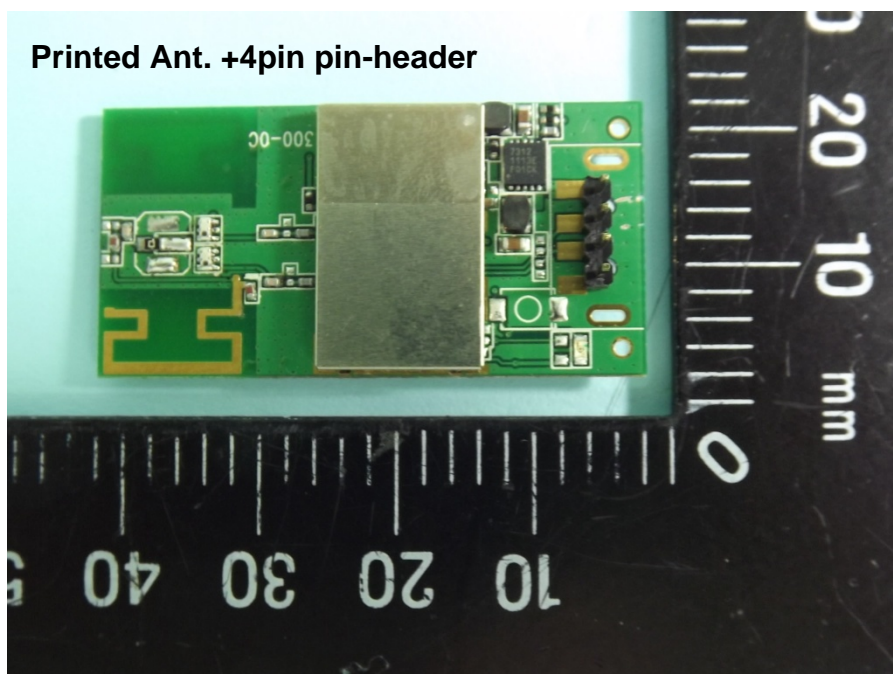
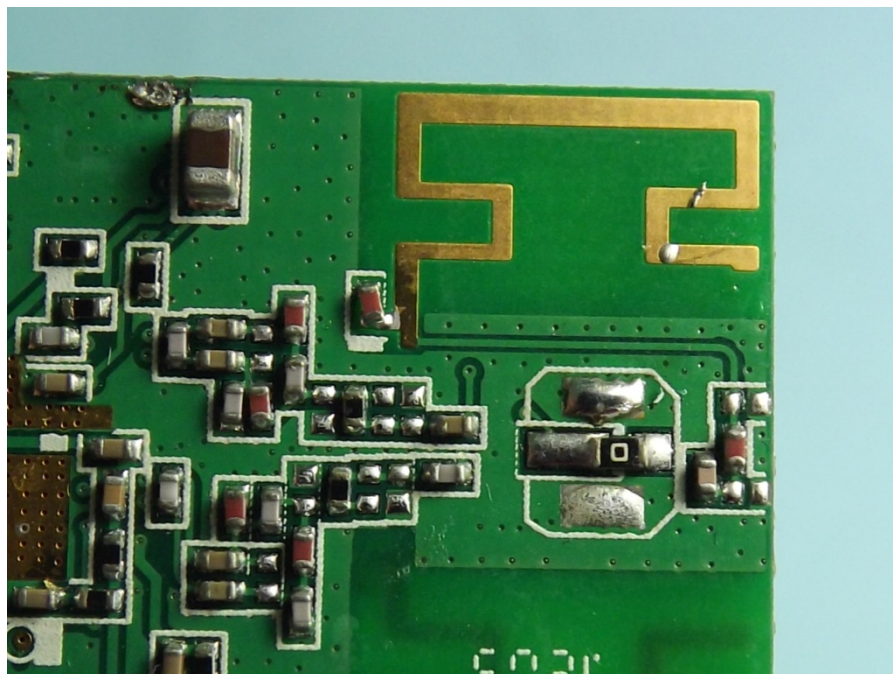
APPENDIX B Photographs of EUT



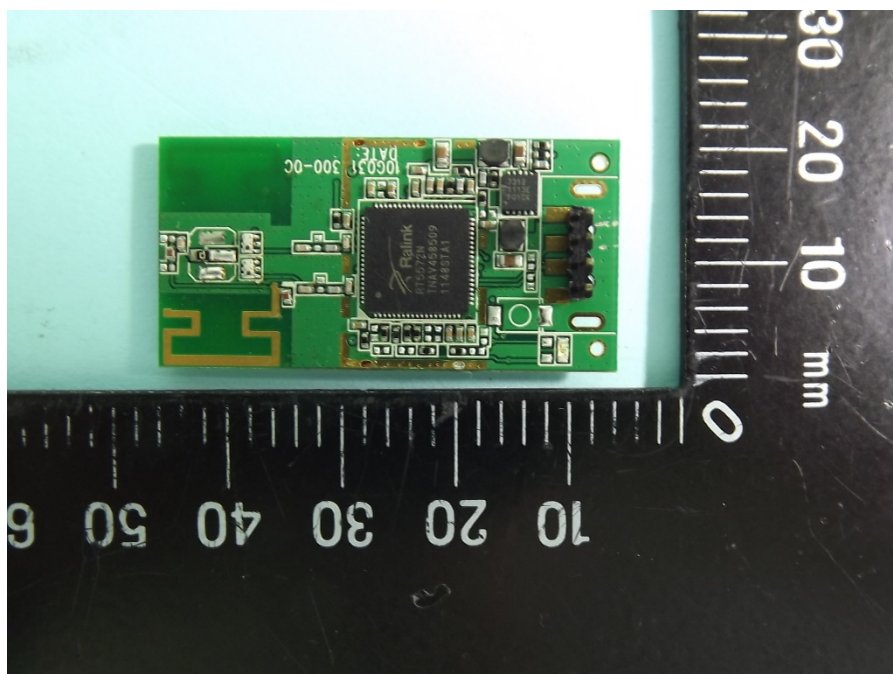


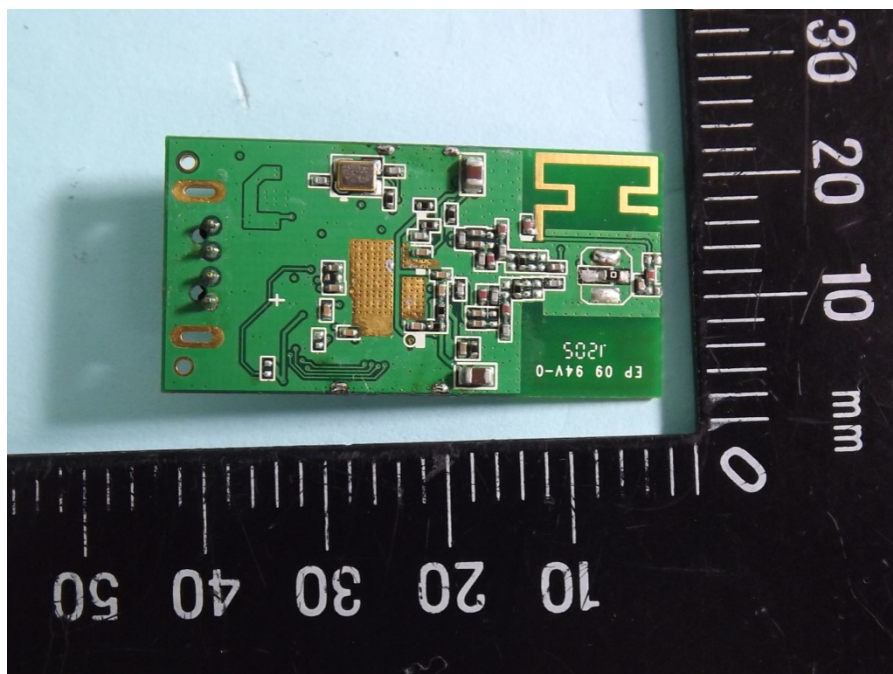
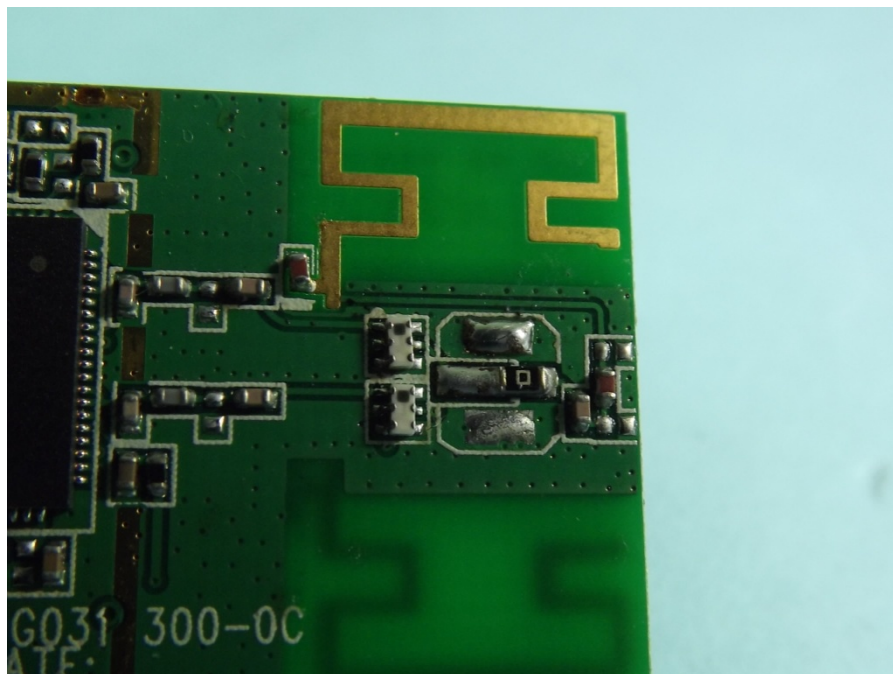




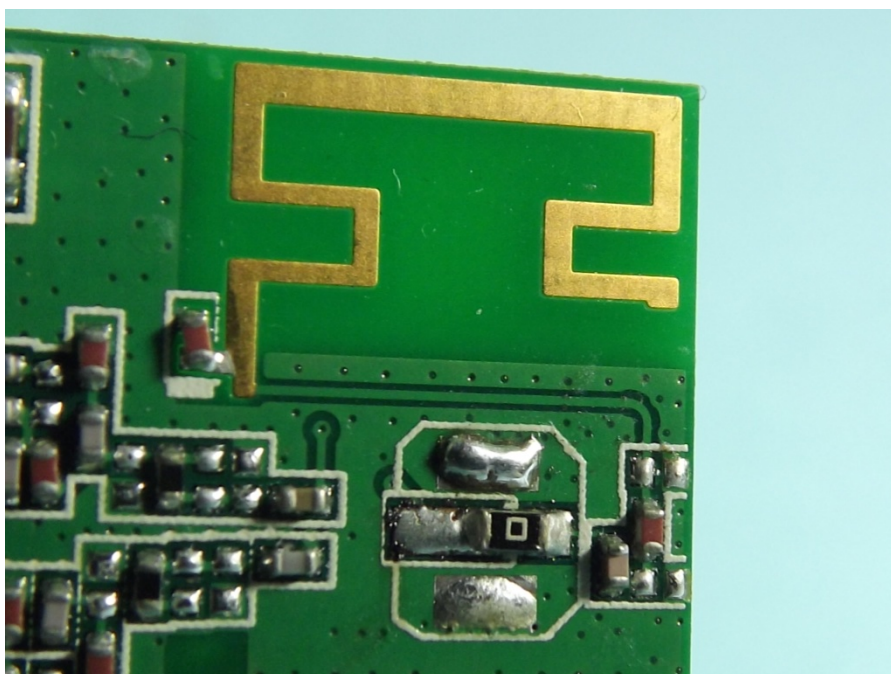
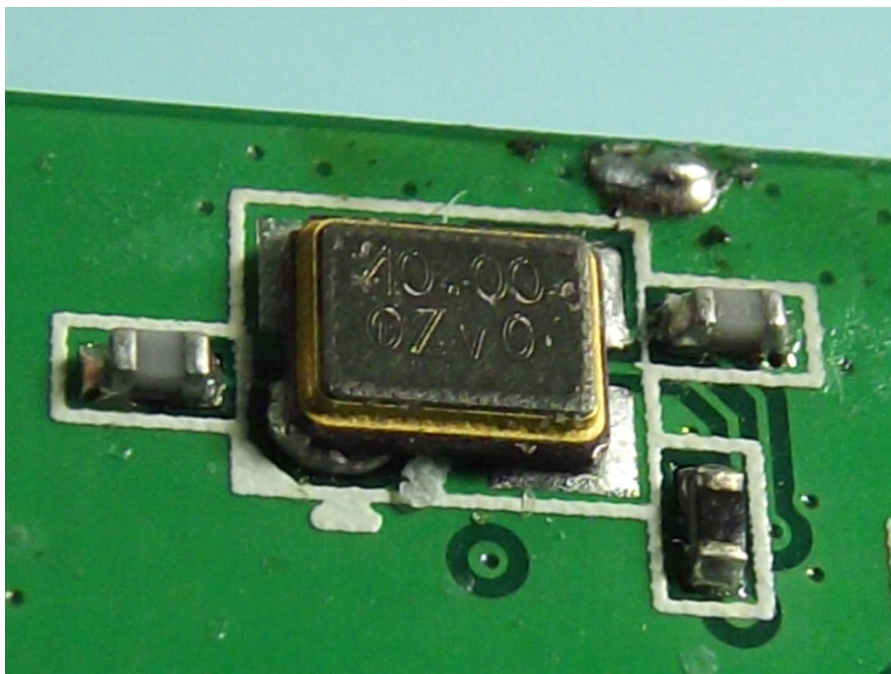




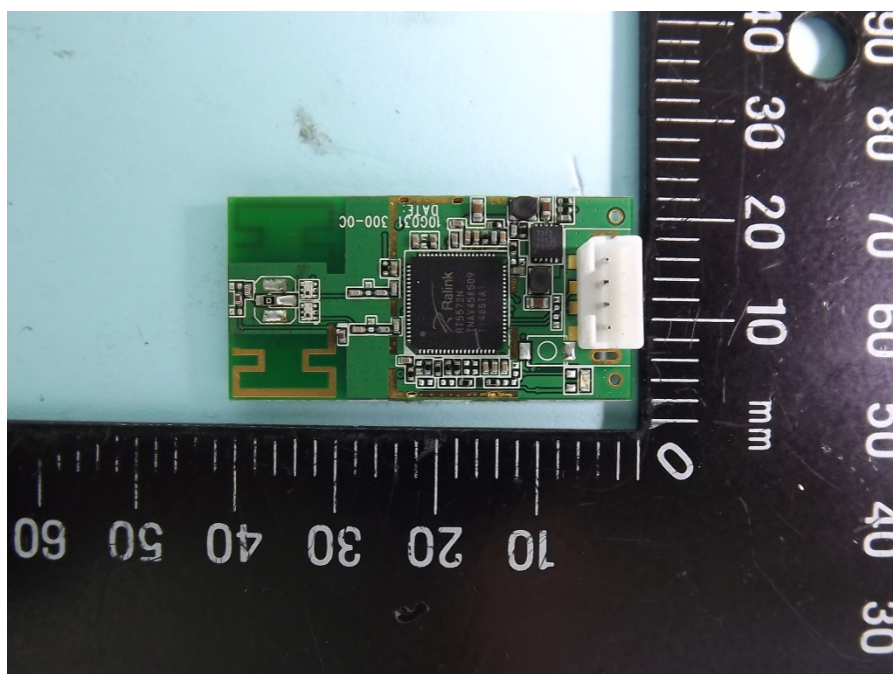
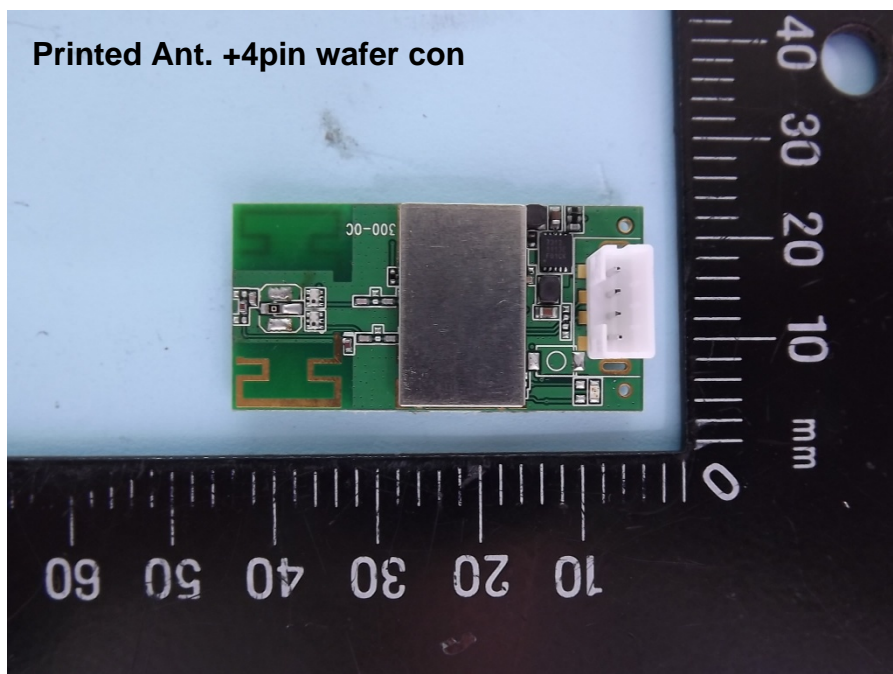


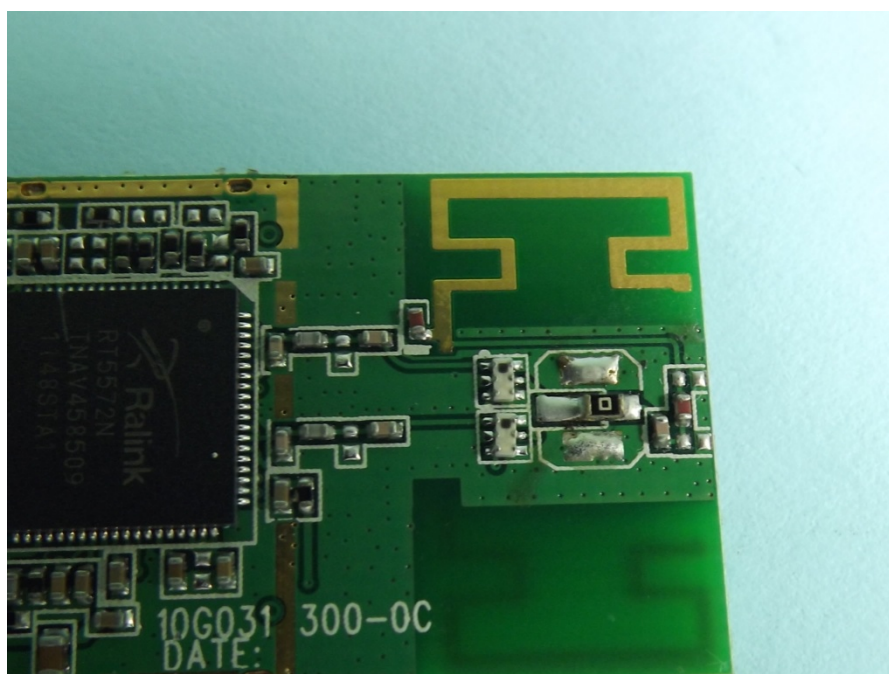




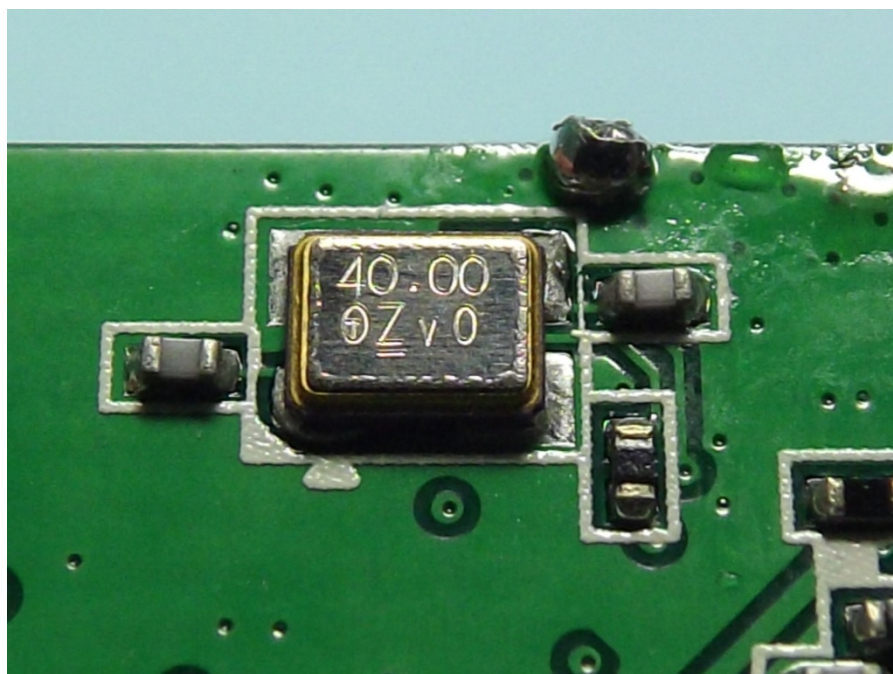
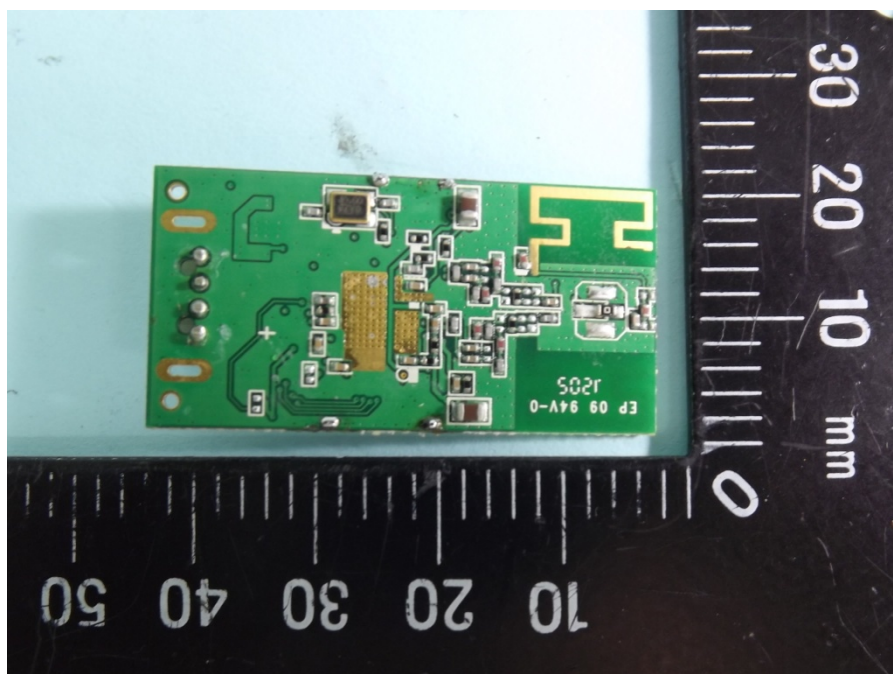


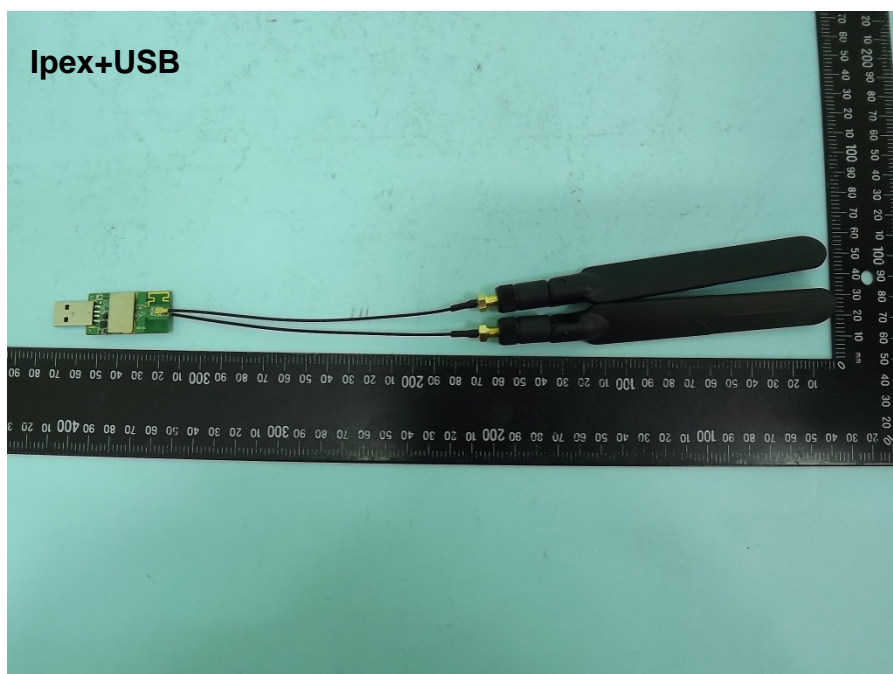
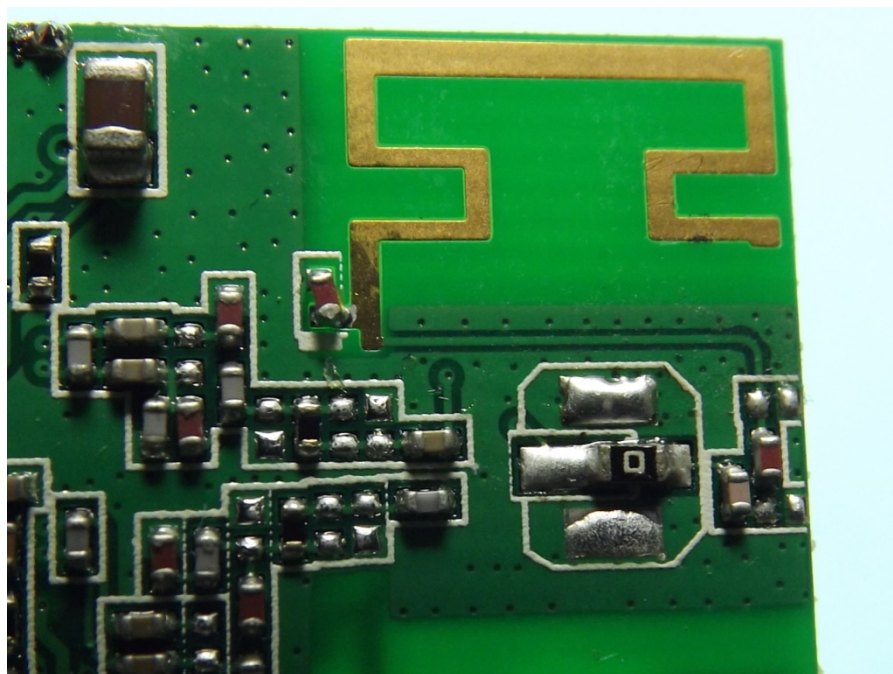
**Printed Ant. +4pin wafer con**







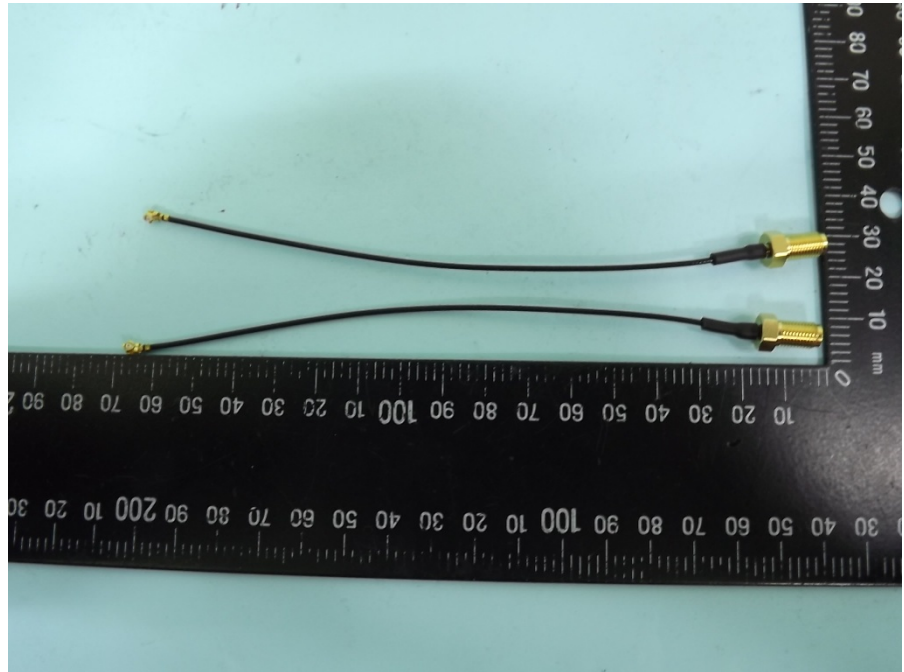




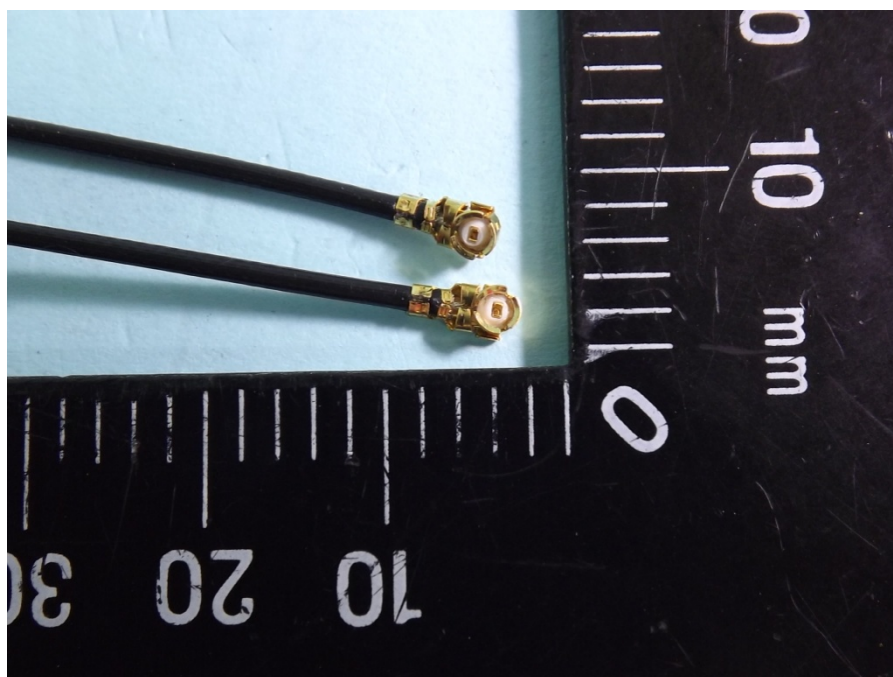


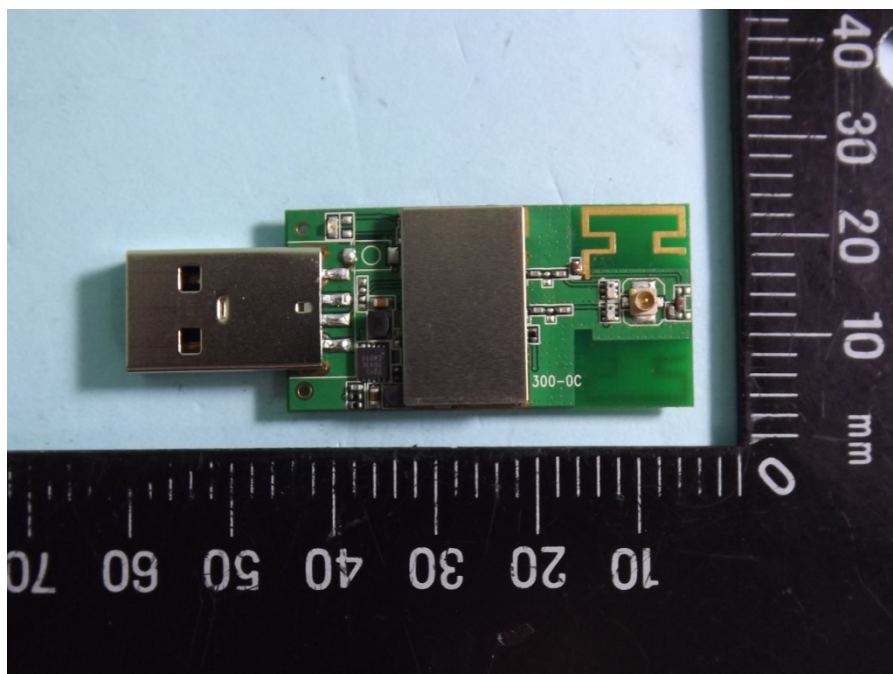
## MIC Test Report

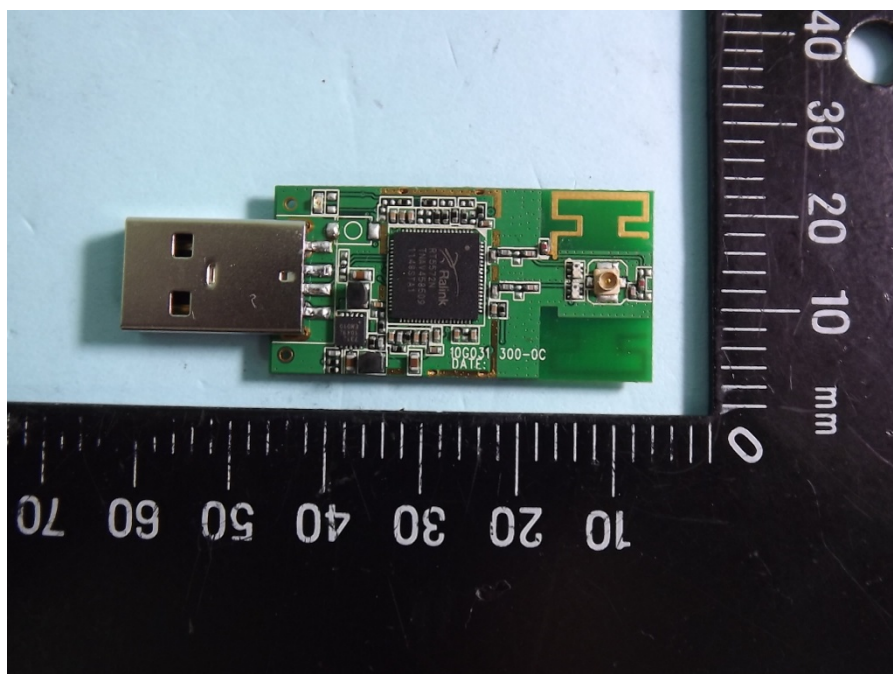
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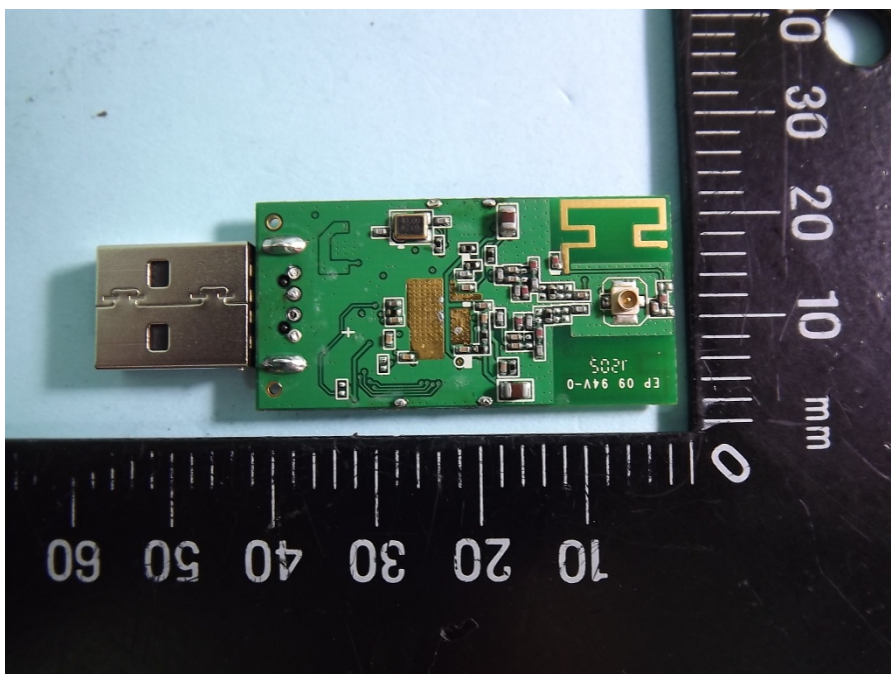
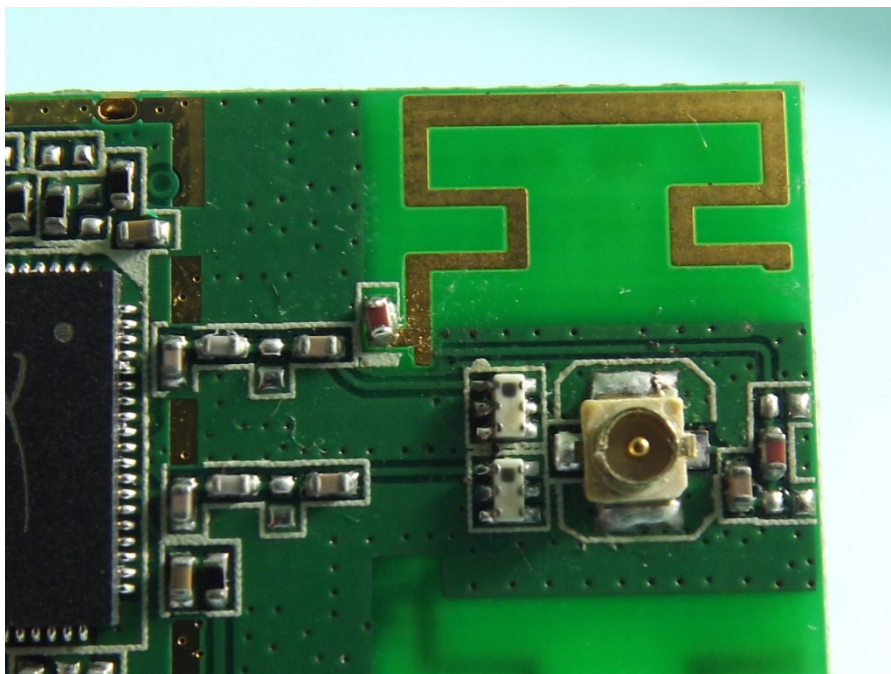


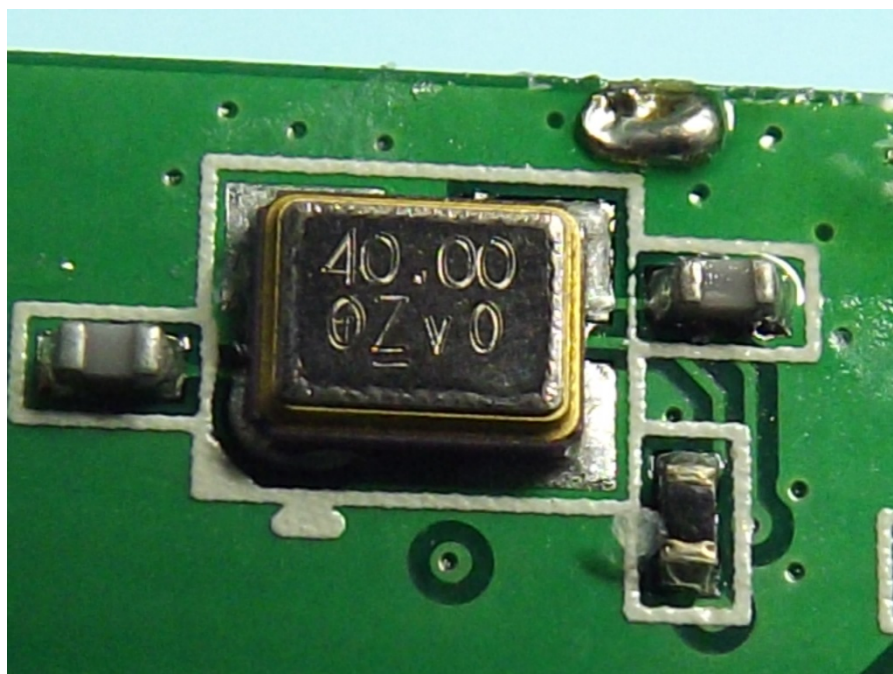
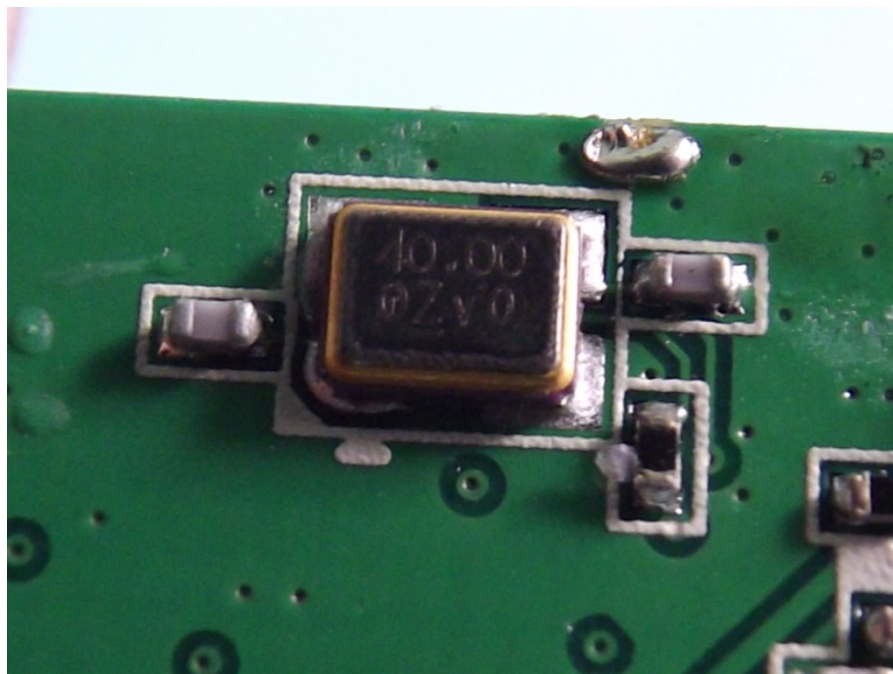




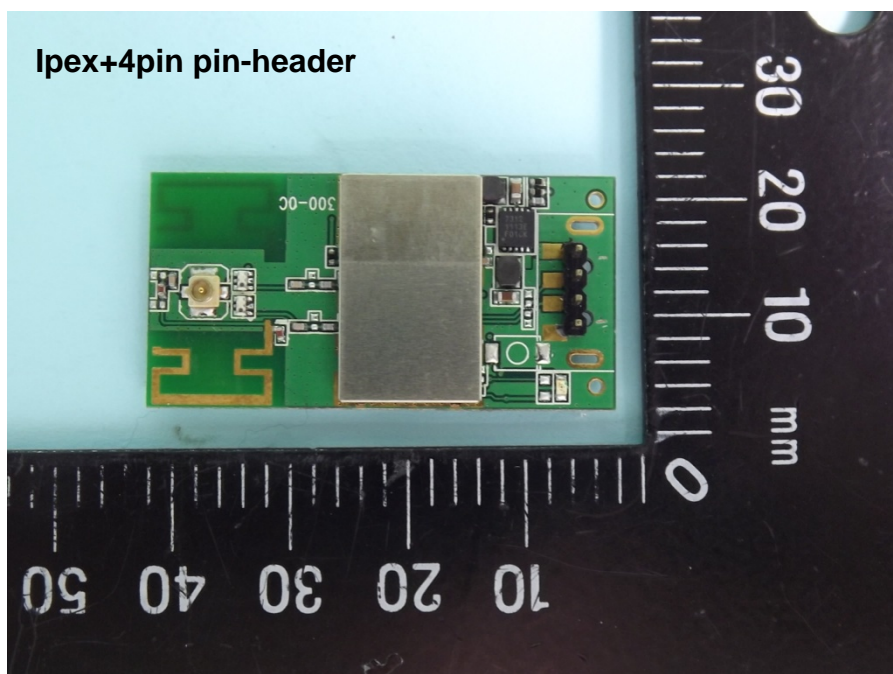
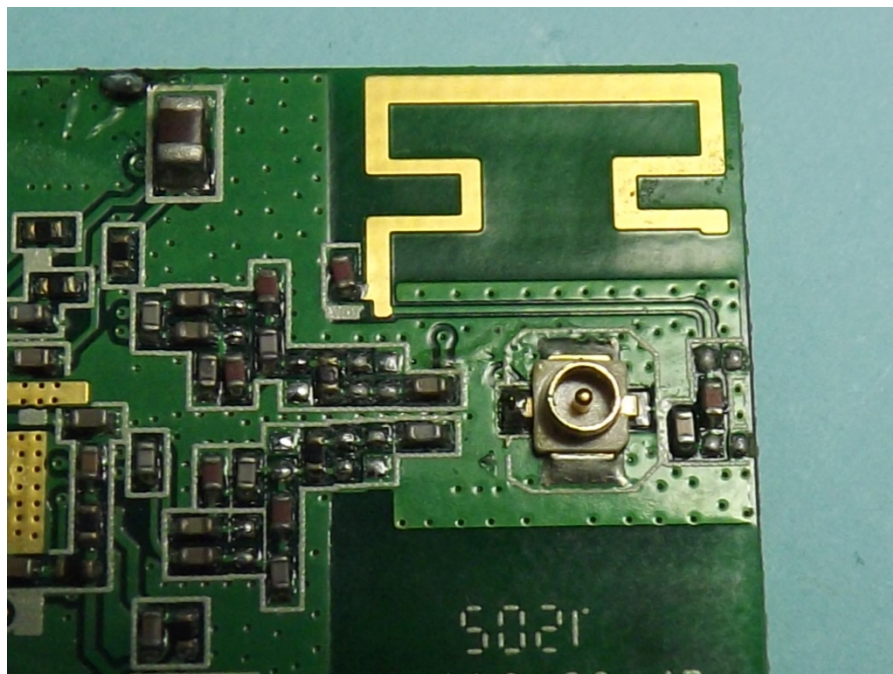


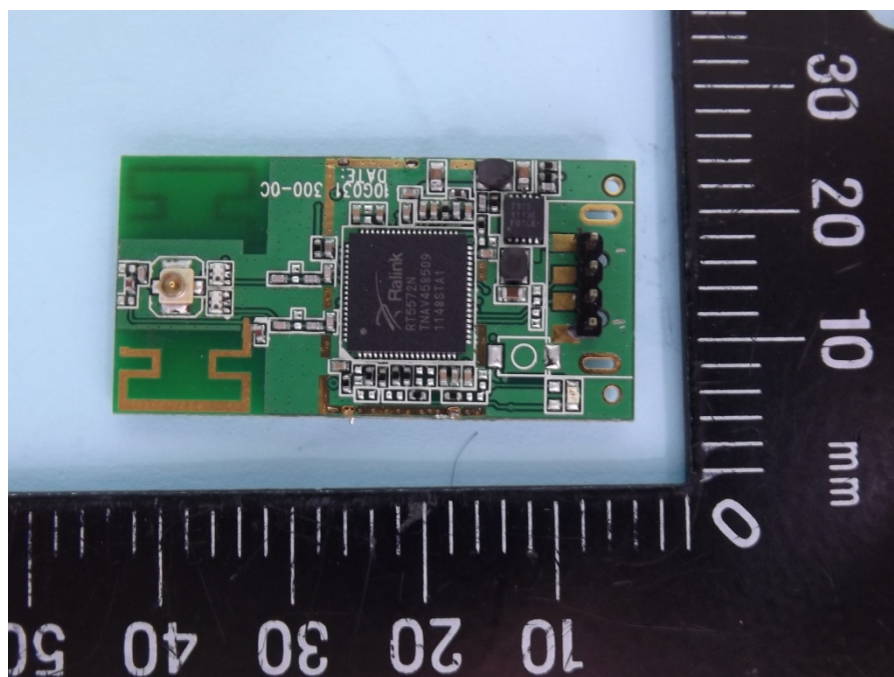




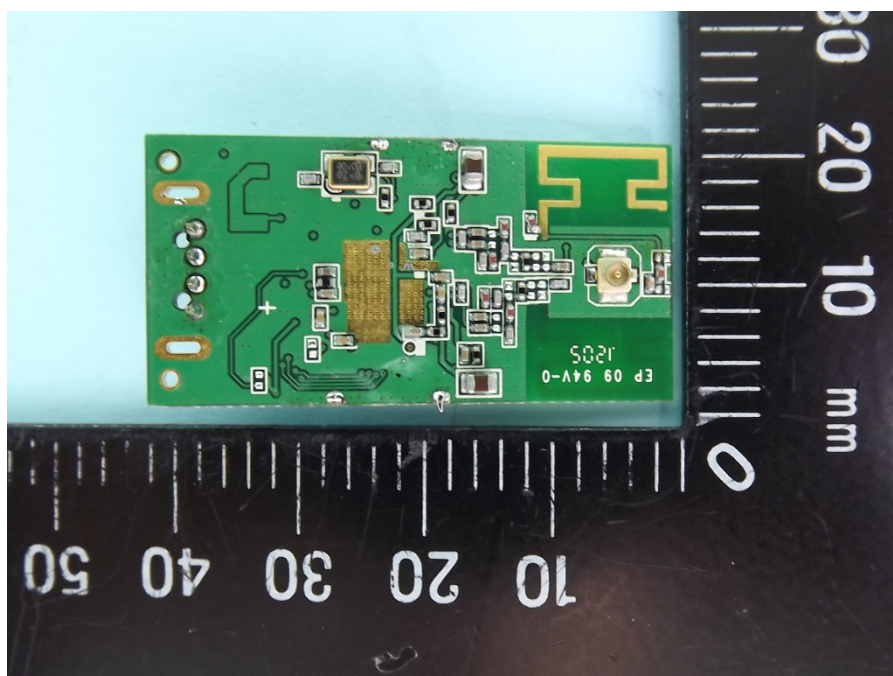
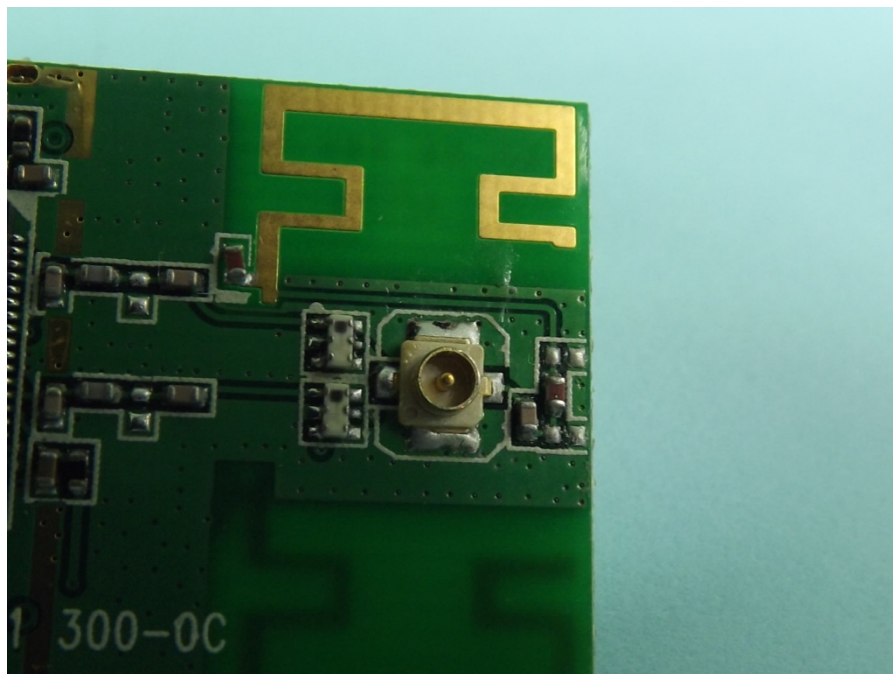




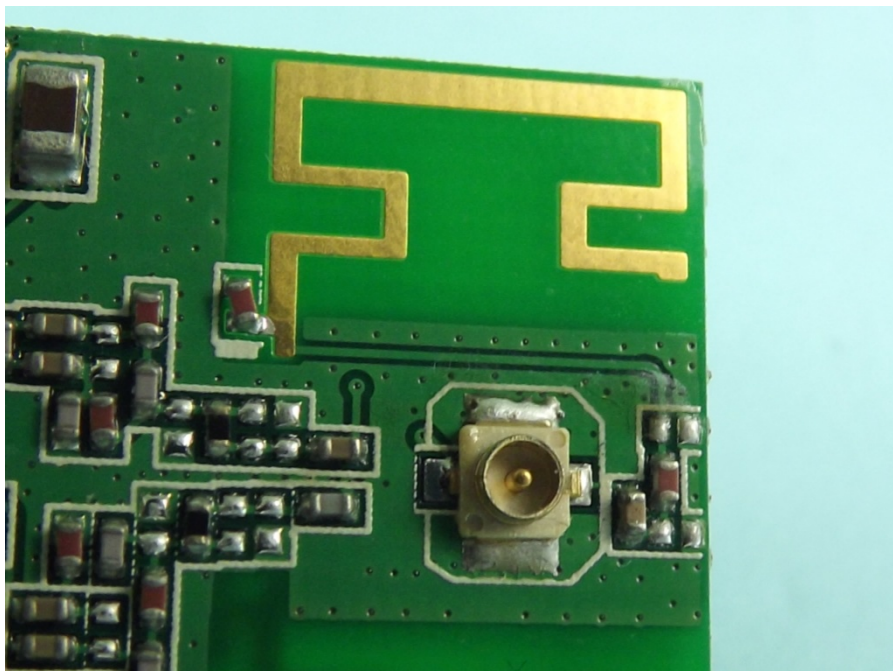
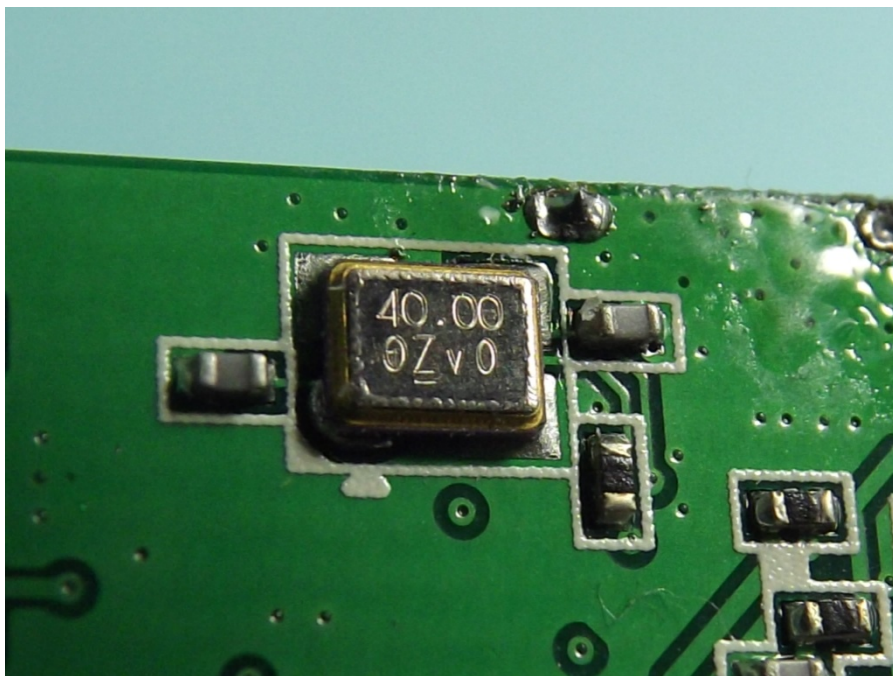




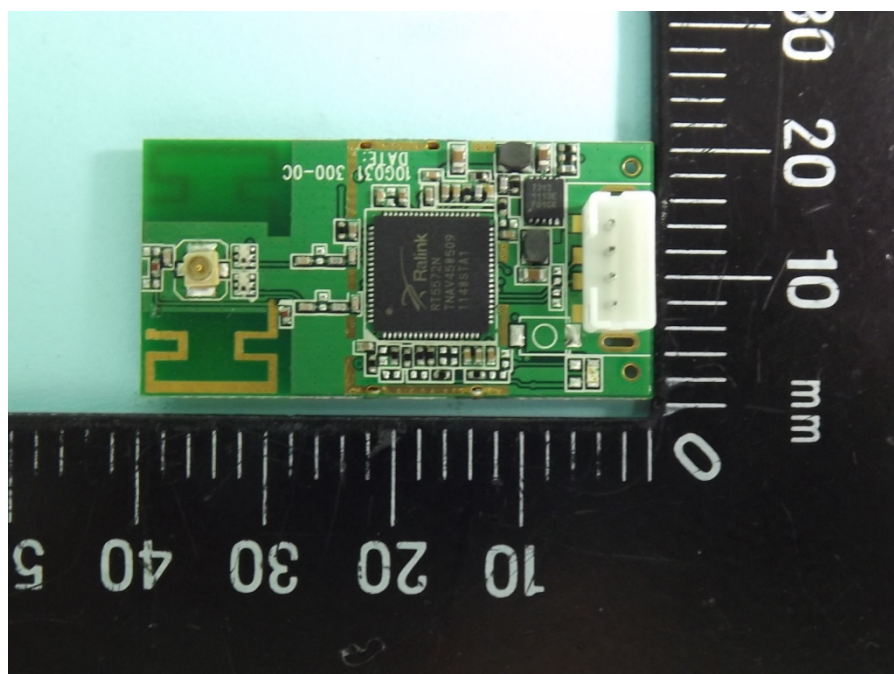
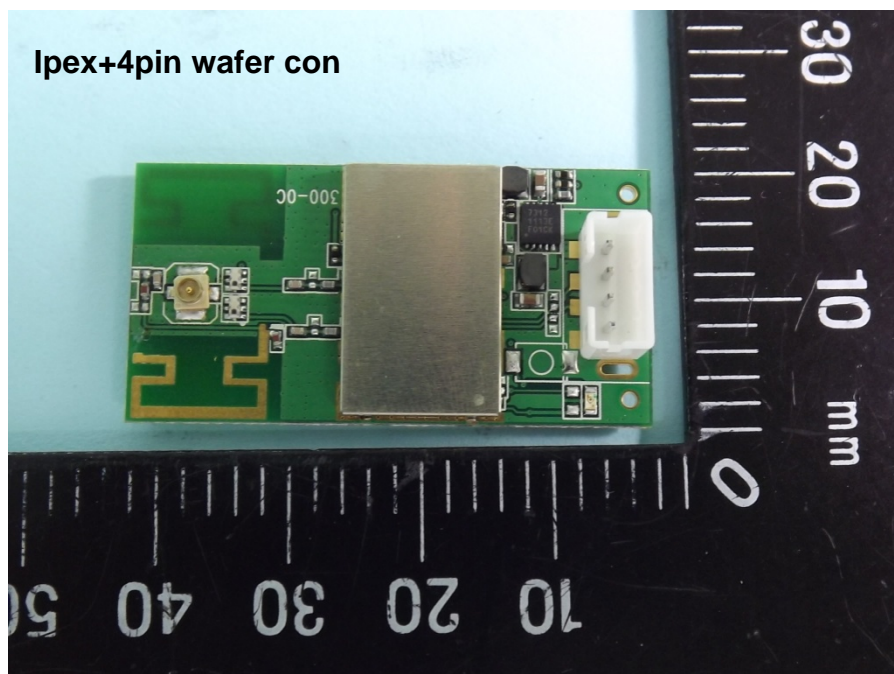




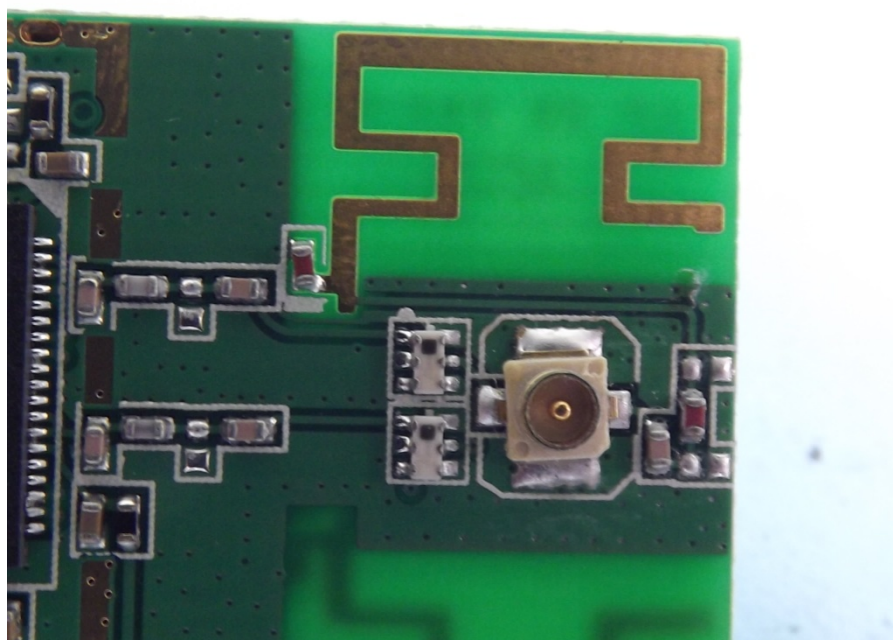


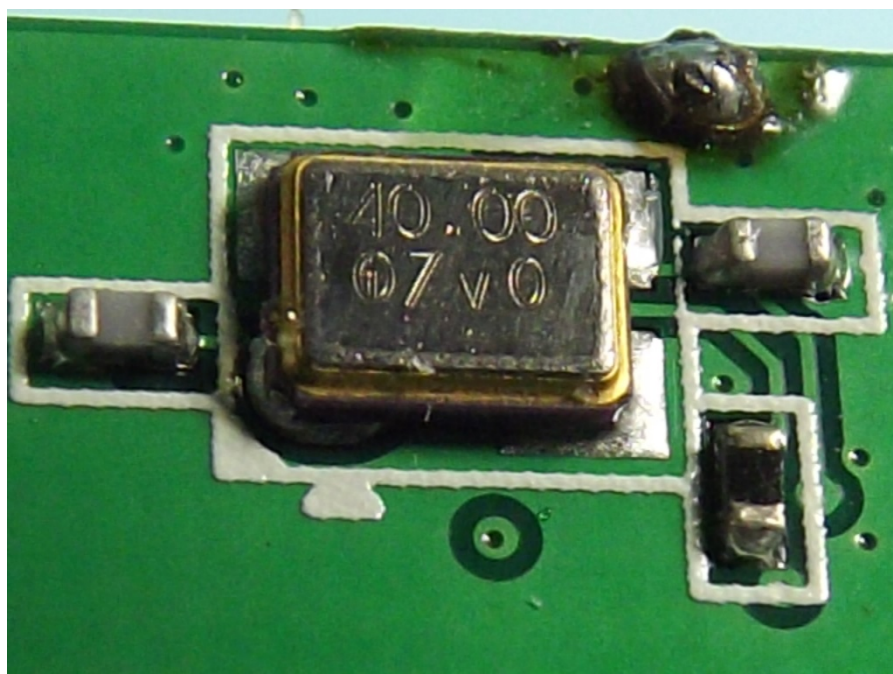
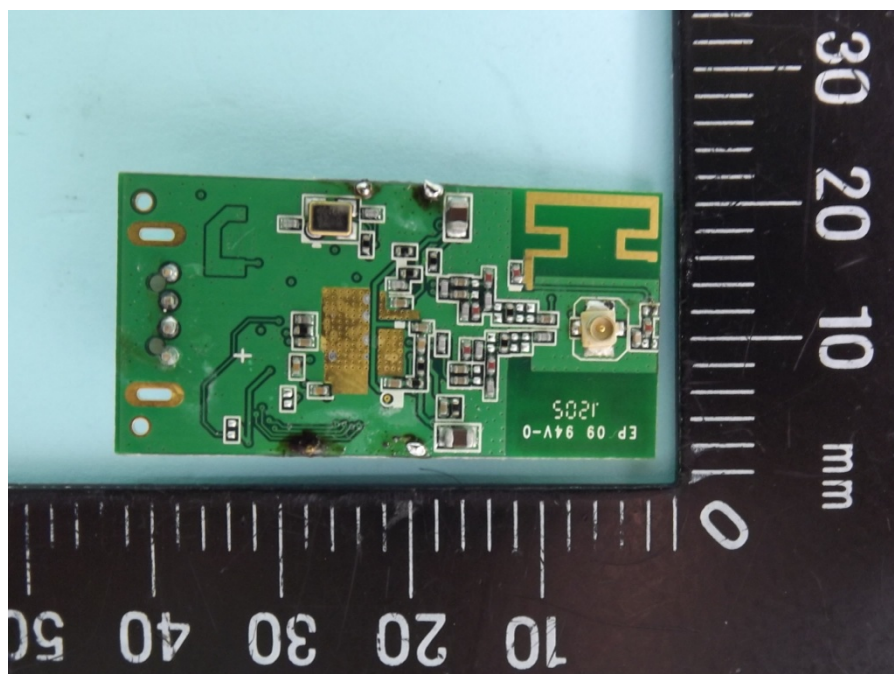


**lpex+4pin wafer con**





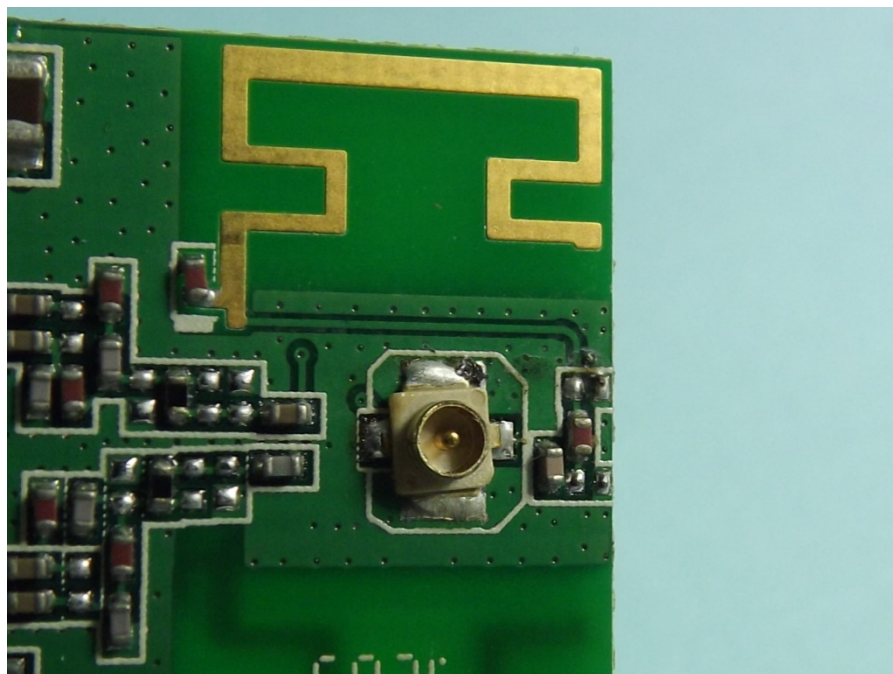






## *MIC Test Report*

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## Appendix C 19-3-11a-G1D(A-Mode)

				Sporton No.		JR373103				
				Test Date		2013/9/5				
				Test Location		SPORTON Lab.				
				Temp. / Humid.		24.6℃ / 62%				
				Test Site		TH06-HY				
				Engineer		Shiming				
				Department		Radio Service Group				
1. General Information				Antenna Port		DAC 0				
Specified Radio Equipment		Class	Article 2 Paragraph 1 Item 19-3		Model	WUBR-508N				
		Type of Emission	G1D / D1D		Serial No.	12635W2002256				
		Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM		Antenna Power	1.75	mW/MHz			
		Frequency	5180~5240MHz(20MHz Space 4 Channels)			W52				
2. Test Results										
Testing for Electrical Specification	Test Voltage		V		Normal Voltage (5V)		Remarks			
	Test Frequency		MHz		5180	5200	5240	Low/Mid/High of test frequency range		
	Measured Frequency		MHz		5179.9352	5199.9334	5239.9346			
	Frequency Error		ppm		12.51	12.81	12.48	Limit ≤ 20 ppm		
	Occupied Bandwidth		MHz		16.64	16.60	16.60	99% OBW Limit ≤ 19 MHz (RB/VB : 300kHz)		
	Spreading Bandwidth (DSSS only)		MHz		14.56	14.52	14.52	90% of total emission power		
	EIRP Power		mW/MHz		8.08690	7.25742	7.95760	Ant Gain : 6.64 [dBi]		
	Antenna Power (Conducted)		mW/MHz		1.75300	1.57319	1.72497	Limit ≤ 10 mW/MHz - Antenna power & EIRP power		
	Antenna Power Error		Δp		0.00300	-0.17681	-0.02503			
	Power Error Rate		%		0.17	-10.10	-1.43	Limit + 20% ~ - 80%		
	Adjacent Channel Leakage Power		-20MHz		dB	33.52	35.58	34.30	Limit ≥ 25dB (18MHz)	
			+20MHz		dB	33.18	35.68	34.95	Limit ≥ 25dB (18MHz)	
			-40MHz		dB	52.20	52.44	52.94	Limit ≥ 40dB (18MHz)	
			+40MHz		dB	53.97	53.38	57.17	Limit ≥ 40dB (18MHz)	
	Limitation of Collateral Emission of Receiver		< 1GHz		nW	0.0192	0.0323	0.0164	Limit ≤ 4 nW (-54 dBm)	
			≥ 1GHz		nW	0.9419	0.9354	1.2331	Limit ≤ 20 nW (-47 dBm)	
	Transmission Burst Length		msec		2.3000	2.3000	2.3000	Limit ≤ 4msec		
	Radio Interface Prevention Function		Carrier Sense (100mV/m)		OK / NG	OK	OK	OK	Pin = 22.79+Gr-20*log(freq_MHz) [dBm]	
			ID code		ID code	Good, MAC Address:00-0E-8E-40-89-82				
			Test Frequency (W53)		MHz	-				
			DFS function		OK / NG	-				
			Test Frequency (W53)		MHz	-	-	-	-	Pin = Gr - 62 [dBm]Gr is max receiving antenna gain in dBi
	TPC function		dB	-	-	-	-	If EIRP power density of EUT is less than 5mW/MHz, without TPC function		
Unwanted Emission Intensity	W52	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range			
		MHz	5135.00	5135.00	5043.11					
		Raw dBm	-39.25	-44.26	-43.29					
		dBm/MHz	-37.00	-42.01	-41.04	30MHz~5135MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)				
		μW/MHz	0.19953	0.06295	0.07870					
	W53	MHz	21955.54	21790.46	21955.54					
		Raw dBm	-33.41	-33.95	-34.27					
		dBm/MHz	-29.73	-30.27	-30.59	5365MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)				
		μW/MHz	1.06414	0.93972	0.87297					
		Out-Band Leakage Power (EIRP)	W52	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range	
MHz	5137.17			5135.41	5137.09					
Raw dBm	-37.83			-41.96	-43.67					
dBm/MHz	-28.94			-33.07	-34.78	5135MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)				
μW/MHz	1.27644			0.49317	0.33266					
MHz	5148.90			5146.94	5145.34					
Raw dBm	-32.19			-39.20	-43.46					
dBm/MHz	-23.30			-30.31	-34.57	5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)				
μW/MHz	4.67735			0.93111	0.34914					
MHz	5250.14			5251.00	5250.00					
Raw dBm	-43.80		-42.77	-42.13	5250MHz~5251MHz Limit ≤ 1000 ~ 100 μW/MHz (0 ~ -10 dBm/MHz)					
dBm/MHz	-34.91		-33.88	-31.24						
μW/MHz	0.32285		0.40926	474.24199						
dB	33.53		23.92	3.24	Margin to the technical requirement					
MHz	5259.30		5252.49	5251.04						
Raw dBm	-44.58		-40.78	-30.09	5251MHz~5260MHz Limit ≤ 100 ~ 15.8 μW/MHz (-10 ~ -18 dBm/MHz)					
dBm/MHz	-35.69		-31.89	-21.20						
μW/MHz	0.26977		0.64714	7.58578						
dB	18.31		20.58	11.17	Margin to the technical requirement					
MHz	5265.35		5265.95	5260.00						
Raw dBm	-44.23	-44.02	-39.91	5260MHz~5266.7MHz Limit ≤ 15.8 ~ 2.5 μW/MHz (-18 ~ -26 dBm/MHz)						
dBm/MHz	-35.34	-35.13	-31.02							
μW/MHz	0.29242	0.30690	0.79068							
dB	10.92	9.99	13.02	Margin to the technical requirement						
MHz	5271.62	5267.09	5267.49							
Raw dBm	-45.15	-44.04	-36.20	5266.7MHz~5365MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)						
dBm/MHz	-36.26	-35.15	-27.31							
μW/MHz	0.23659	0.30549	1.85780							



## Appendix C 19-3-11a-G1D-Power(A-Mode)

## 3. Antenna Power (Conducted Power)

Test Voltage	V	Normal Voltage ( 5V )									Remarks
Test Frequency	MHz	5180	5200	5240							
Power Meter Raw (IF of Spectrum)	dBm	-18.26	-18.73	-18.33							
Power Measurement System Loss	dB	21.19	21.19	21.19							Refer to Calibration Result
Transmitter Duty Cycle Factor	dB	0.00	0.00	0.00							Duty Factor = $10 \times 10\log_{10}(1/\text{Duty Cycle})$
Equivalent Noise Bandwidth	MHz	1.12	1.12	1.12							ENB = $\text{Total\_Sum}^2 / \text{Peak\_Level} * \text{Point\_Width}$
Equivalent Noise Bandwidth Factor	dB	0.49	0.49	0.49							ENB Factor = $10 \times 10\log_{10}(1/\text{ENB})$
Antenna Power (Conducted)	dBm/MHz	2.44	1.97	2.37							Limit $\leq 10$ mW/MHz (10 dBm/MHz)
Antenna Power (Conducted)	mW/MHz	1.7530	1.5732	1.7250							
Transmitter ON <sub>Time</sub>	msec	1.0000									RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) <sub>Time</sub>	msec	1.0000									
Transmitter Duty Cycle	%	100.00%									

## 4. Limitation of Collateral Emission of Receiver

Test Voltage	V	Normal Voltage ( 5V )									Remarks
Test Frequency	MHz	5180	5200	5240							
Spurious Emission Frequency	* 1 MHz	844.80	76.56	452.92							1st 30MHz~1000MHz: Maximum emission and all emissions beyond 1/10 of the limitation must be indicated.
	* 1 MHz	-	-	-							2nd
	* 1 MHz	-	-	-							3rd
	* 2 MHz	21950.00	21950.00	3450.00							1st 1000MHz~26GHz: Maximum emission and all emissions beyond 1/10 of the limitation must be indicated.
	* 2 MHz	-	-	-							2nd
	* 2 MHz	-	-	-							3rd
Cable Loss	* 1 dB	0.78	0.78	0.78							1st
	* 1 dB	-	-	-							2nd
	* 1 dB	-	-	-							3rd
	* 2 dB	3.68	3.68	3.68							1st
	* 2 dB	-	-	-							2nd
	* 2 dB	-	-	-							3rd
Spectrum Raw	* 1 dBm	-77.95	-75.69	-78.62							1st
	* 1 dBm	-	-	-							2nd
	* 1 dBm	-	-	-							3rd
	* 2 dBm	-63.94	-63.97	-62.77							1st
	* 2 dBm	-	-	-							2nd
	* 2 dBm	-	-	-							3rd
Spurious Emission Intensity	* 1 dBm	-77.17	-74.91	-77.84							1st Limit $\leq 4$ nW (-54 dBm)
	* 1 dBm	-	-	-							2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1 dBm	-	-	-							3rd
	* 2 dBm	-60.26	-60.29	-59.09							1st Limit $\leq 20$ nW (-47 dBm)
	* 2 dBm	-	-	-							2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2 dBm	-	-	-							3rd
Spurious Emission Intensity	* 1 nW	0.0192	0.0323	0.0164							Total Emission Power
	* 1 nW	-	-	-							1st Limit $\leq 4$ nW (-54 dBm)
	* 1 nW	-	-	-							2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1 nW	-	-	-							3rd
	* 2 nW	0.9419	0.9354	1.2331							Total Emission Power
	* 2 nW	-	-	-							1st Limit $\leq 20$ nW (-47 dBm)
	* 2 nW	-	-	-							2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2 nW	-	-	-							3rd

\* 1: Frequency Band 5 (30 MHz  $\leq f < 1000$  MHz) \* 2: Frequency Band 6 (1000 MHz  $\leq f < 26$  GHz)

## 5. Carrier Sense Capability

Test Voltage	V	Normal Voltage ( 5V )									Remarks
Test Frequency	MHz	5180	5200	5240							
Min. Antenna Gain	dBi	-1.25	-1.25	-1.25							
Carrier Level	dBm	-52.75	-52.78	-52.85							Pin = $22.79 + \text{Gr} - 20 * \log(\text{freq\_MHz})$ [dBm]
Result	Good/Fail	Good	Good	Good							

## Appendix C 19-3-11n-20M

				Sporton No.	JR373103		
				Test Date	2013/9/5		
				Test Location	SPORTON Lab.		
				Temp. / Humid.	24.6℃ / 62%		
				Test Site	TH06-HY		
				Engineer	Shiming		
				Department	Radio Service Group		
1. General Information				Antenna Port	DAC 0		
Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3		Model	WUBR-508N		
	Type of Emission	G1D / D1D		Serial No.	12635W2002256		
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM		Antenna Power	0.86 mW/MHz		
	Frequency	5180~5240MHz(20MHz Space 4 Channels)		W52			
2. Test Results							
Testing for Electrical Specification	Test Voltage	V	Normal Voltage ( 5V )			Remarks	
	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range	
	Measured Frequency	MHz	5180.0054	5200.0078	5240.0060		
	Frequency Error	ppm	-1.04	-1.50	-1.15	Limit ≤ 20 ppm	
	Occupied Bandwidth	MHz	17.52	17.48	17.52	99% OBW Limit ≤ 19 MHz (RB/VB : 300kHz)	
	Spreading Bandwidth (DSSS only)	MHz	15.08	15.12	15.08	90% of total emission power	
	EIRP Power	mW/MHz	3.71349	3.61228	3.96992	Ant Gain : 6.64 [dBi]	
	Antenna Power (Conducted)	mW/MHz	0.80497	0.78304	0.86056	Limit ≤ 10 mW/MHz - Antenna power & EIRP power	
	Antenna Power Error	Δp	-0.05503	-0.07696	0.00056		
	Power Error Rate	%	-6.40	-8.95	0.07	Limit + 20% ~ - 80%	
	Adjacent Channel Power	-20MHz	dB	37.10	36.54	35.83	Limit ≥ 25dB (18MHz)
		+20MHz	dB	38.51	37.36	37.39	Limit ≥ 25dB (18MHz)
		-40MHz	dB	51.78	52.33	52.04	Limit ≥ 40dB (18MHz)
		+40MHz	dB	52.40	53.00	52.84	Limit ≥ 40dB (18MHz)
	Limitation of Collateral Emission of Receiver	< 1GHz	nW	0.0183	0.0262	0.0185	Limit ≤ 4 nW (-54 dBm)
		≥ 1GHz	nW	0.8590	0.8185	3.3554	Limit ≤ 20 nW (-47 dBm)
	Transmission Burst Length	msec	2.3000	2.3000	2.3000	Limit ≤ 4msec	
	Radio Interface Prevention Function	Carrier Sense (100mV/m)	OK / NG	OK	OK	OK	Pin = 22.79+Gr-20*log(freq_MHz) [dBm]
		ID code	ID code	Good, MAC Address:00-0E-8E-40-89-82			
		Test Frequency (W53)	MHz	-	-	-	Pin = Gr - 62 [dBm]Gr is max receiving antenna gain in dBi
		DFS function	OK / NG	-	-	-	
		Test Frequency (W53)	MHz	-	-	-	If EIRP power density of EUT is less than 5mW/MHz, without TPC function
		TPC function	dB	-	-	-	
Unwanted Emission Intensity	W52	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range
		MHz	5135.00	5063.53	5012.48		
		Raw dBm	-42.54	-44.12	-43.42		
		dBm/MHz	-40.29	-41.87	-41.17	30MHz~5135MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
		μW/MHz	0.09354	0.06501	0.07638		
	W53	MHz	20634.90	21955.54	21831.73		
		Raw dBm	-33.43	-34.81	-33.99		
		dBm/MHz	-29.75	-31.13	-30.31	5365MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
		μW/MHz	1.05925	0.77090	0.93111		
Out-Band Leakage Power (EIRP)	W52	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range
		MHz	5141.69	5137.44	5140.80		
		Raw dBm	-43.51	-43.40	-43.37		
		dBm/MHz	-34.62	-34.51	-34.48	5135MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
		μW/MHz	0.34514	0.35400	0.35645		
		MHz	5148.35	5148.00	5142.66		
		Raw dBm	-40.12	-40.95	-43.41		
		dBm/MHz	-31.23	-32.06	-34.52	5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)	
		μW/MHz	0.75336	0.62230	0.35318		
		MHz	5250.14	5250.99	5250.04		
		Raw dBm	-44.68	-43.80	-42.02	5250MHz~5251MHz Limit ≤ 1000 ~ 100 μW/MHz (0 ~ -10 dBm/MHz)	
		dBm/MHz	-35.79	-34.91	-31.13		
		μW/MHz	0.26363	0.32285	486.40721		
		dB	34.39	25.01	2.73	Margin to the technical requirement	
	W52	MHz	5255.48	5252.48	5252.40		
		Raw dBm	-45.03	-42.05	-37.08	5251MHz~5260MHz Limit ≤ 100 ~ 15.8 μW/MHz (-10 ~ -18 dBm/MHz)	
		dBm/MHz	-36.14	-33.16	-28.19		
		μW/MHz	0.24322	0.48306	1.51705		
		dB	22.16	21.85	16.94	Margin to the technical requirement	
		MHz	5266.30	5265.20	5260.52		
		Raw dBm	-44.92	-44.53	-31.18	5260MHz~5266.7MHz Limit ≤ 15.8 ~ 2.5 μW/MHz (-18 ~ -26 dBm/MHz)	
		dBm/MHz	-36.03	-35.64	-22.29		
		μW/MHz	0.24946	0.27290	5.90201		
		dB	10.47	11.40	3.66	Margin to the technical requirement	
		MHz	5295.99	5268.27	5267.88		
		Raw dBm	-45.53	-45.03	-40.58	5266.7MHz~5365MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
		dBm/MHz	-36.64	-36.14	-31.69		
		μW/MHz	0.21677	0.24322	0.67764		



## Appendix C 19-3-11n-20M-Power

## 3. Antenna Power (Conducted Power)

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5180	5200	5240						
Power Meter Raw (IF of Spectrum)	dBm	-21.64	-21.76	-21.35						
Power Measurement System Loss	dB	21.19	21.19	21.19						Refer to Calibration Result
Transmitter Duty Cycle Factor	dB	0.00	0.00	0.00						Duty Factor = $10 \times 10\log_{10}(1/\text{Duty Cycle})$
Equivalent Noise Bandwidth	MHz	1.12	1.12	1.12						ENB = $\text{Total\_Sum}^2 / \text{Peak\_Level} * \text{Point\_Width}$
Equivalent Noise Bandwidth Factor	dB	0.49	0.49	0.49						ENB Factor = $10 \times 10\log_{10}(1/\text{ENB})$
Antenna Power (Conducted)	dBm/MHz	-0.94	-1.06	-0.65						Limit $\leq 10$ mW/MHz (10 dBm/MHz)
Antenna Power (Conducted)	mW/MHz	0.8050	0.7830	0.8606						
Transmitter ON <sub>Time</sub>	msec	1.0000								RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) <sub>Time</sub>	msec	1.0000								
Transmitter Duty Cycle	%	100.00%								

## 4. Limitation of Collateral Emission of Receiver

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5180	5200	5240						
Spurious Emission Frequency	* 1	MHz	119.24	74.62	738.10					1st 30MHz~1000MHz: Maximum emission and all
	* 1	MHz	-	-	-					2nd emissions beyond 1/10 of the limitation must
	* 1	MHz	-	-	-					3rd be indicated.
	* 2	MHz	3438.00	22000.00	3450.00					1st 1000MHz~26GHz: Maximum emission and all
	* 2	MHz	-	-	21950.00					2nd emissions beyond 1/10 of the limitation must
	* 2	MHz	-	-	21800.00					3rd be indicated.
	* 1	dB	0.78	0.78	0.78					1st
	* 1	dB	-	-	-					2nd
	* 1	dB	-	-	-					3rd
	* 2	dB	3.68	3.68	3.68					1st
Cable Loss	* 2	dB	-	-	3.68					2nd
	* 2	dB	-	-	3.68					3rd
Spectrum Raw	* 1	dBm	-78.15	-76.60	-78.11					1st
	* 1	dBm	-	-	-					2nd
	* 1	dBm	-	-	-					3rd
	* 2	dBm	-64.34	-64.55	-62.51					1st
	* 2	dBm	-	-	-63.19					2nd
	* 2	dBm	-	-	-64.01					3rd
Spurious Emission Intensity	* 1	dBm	-77.37	-75.82	-77.33					1st
	* 1	dBm	-	-	-					2nd Limit $\leq 4$ nW (-54 dBm)
	* 1	dBm	-	-	-					3rd RBW : 100 kHz ; VBW : 100 kHz
	* 2	dBm	-60.66	-60.87	-58.83					1st
	* 2	dBm	-	-	-59.51					2nd Limit $\leq 20$ nW (-47 dBm)
	* 2	dBm	-	-	-60.33					3rd RBW : 1 MHz ; VBW : 1 MHz
Spurious Emission Intensity	* 1	nW	0.0183	0.0262	0.0185					Total Emission Power
	* 1	nW	0.0183	0.0262	0.0185					1st
	* 1	nW	-	-	-					2nd Limit $\leq 4$ nW (-54 dBm)
	* 1	nW	-	-	-					3rd RBW : 100 kHz ; VBW : 100 kHz
	* 2	nW	0.8590	0.8185	3.3554					Total Emission Power
	* 2	nW	0.8590	0.8185	1.3092					1st
	* 2	nW	-	-	1.1194					2nd Limit $\leq 20$ nW (-47 dBm)
	* 2	nW	-	-	0.9268					3rd RBW : 1 MHz ; VBW : 1 MHz

\* 1: Frequency Band 5 (30 MHz  $\leq f < 1000$  MHz) \* 2: Frequency Band 6 (1000 MHz  $\leq f < 26$  GHz)

## 5. Carrier Sense Capability

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5180	5200	5240						
Min. Antenna Gain	dBi	-1.25	-1.25	-1.25						
Carrier Level	dBm	-52.75	-52.78	-52.85						Pin = $22.79 + \text{Gr} - 20 * \log(\text{freq\_MHz})$ [dBm]
Result	Good/Fail	Good	Good	Good						

## Appendix C 19-3-11n-20M

				Sporton No.	JR373103		
				Test Date	2013/9/5		
				Test Location	SPORTON Lab.		
				Temp. / Humid.	24.6℃ / 62%		
				Test Site	TH06-HY		
				Engineer	Shiming		
				Department	Radio Service Group		
				Antenna Port	DAC 1		
				Model	WUBR-508N		
				Serial No.	12635W2002256		
				Antenna Power	0.83 mW/MHz		
				Frequency	5180~5240MHz(20MHz Space 4 Channels) W52		
1. General Information							
Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3					
	Type of Emission	G1D / D1D					
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM					
	Frequency	5180~5240MHz(20MHz Space 4 Channels)					
2. Test Results							
Testing for Electrical Specification	Test Voltage	V	Normal Voltage ( 5V )			Remarks	
	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range	
	Measured Frequency	MHz	5180.0054	5200.0078	5240.0060		
	Frequency Error	ppm	-1.04	-1.50	-1.15	Limit ≤ 20 ppm	
	Occupied Bandwidth	MHz	17.52	17.56	17.52	99% OBW Limit ≤ 19 MHz (RB/VB : 300kHz)	
	Spreading Bandwidth (DSSS only)	MHz	15.20	15.24	15.16	90% of total emission power	
	EIRP Power	mW/MHz	2.86934	3.01149	3.82633	Ant Gain : 6.64 [dBi]	
	Antenna Power (Conducted)	mW/MHz	0.62199	0.65280	0.82943	Limit ≤ 10 mW/MHz · Antenna power & EIRP power	
	Antenna Power Error	Δp	-0.20801	-0.17720	-0.00057		
	Power Error Rate	%	-25.06	-21.35	-0.07	Limit + 20% ~ - 80%	
	Adjacent Channel Power	-20MHz	dB	37.55	38.18	37.21	Limit ≥ 25dB (18MHz)
		+20MHz	dB	37.61	37.44	36.85	Limit ≥ 25dB (18MHz)
		-40MHz	dB	51.84	52.40	52.36	Limit ≥ 40dB (18MHz)
		+40MHz	dB	52.64	53.00	52.87	Limit ≥ 40dB (18MHz)
	Limitation of Collateral Emission of Receiver	< 1GHz	nW	0.0155	0.0321	0.0169	Limit ≤ 4 nW (-54 dBm)
		≥ 1GHz	nW	0.3664	0.7621	3.0754	Limit ≤ 20 nW (-47 dBm)
	Transmission Burst Length	msec	2.3000	2.3000	2.3000	Limit ≤ 4msec	
	Radio Interface Prevention Function	Carrier Sense (100mV/m)	OK / NG	OK	OK	OK	Pin = 22.79+Gr-20*log(freq_MHz) [dBm]
		ID code	ID code	Good, MAC Address:00-0E-8E-40-89-82			
		Test Frequency (W53)	MHz	-	-	-	Pin = Gr - 62 [dBm]Gr is max receiving antenna gain in dBi
		DFS function	OK / NG	-	-	-	
		Test Frequency (W53)	MHz	-	-	-	If EIRP power density of EUT is less than 5mW/MHz, without TPC function
	Unwanted Emission Intensity	TPC function	dB	-	-	-	
Test Frequency		MHz	5180	5200	5240	Low/Mid/High of test frequency range	
Max value in the band		W52	MHz	5135.00	4981.85	4941.01	
		Raw dBm	-43.08	-44.19	-44.32		
		dBm/MHz	-40.83	-41.94	-42.07	30MHz~5135MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
		μW/MHz	0.08260	0.06397	0.06209		
Max value in the band		W53	MHz	21831.73	21996.81	21749.19	
		Raw dBm	-33.98	-33.99	-34.12		
		dBm/MHz	-30.30	-30.31	-30.44	5365MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
		μW/MHz	0.93325	0.93111	0.90365		
Out-Band Leakage Power (EIRP)	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range	
	Max value in the band	W52	MHz	5141.99	5135.24	5141.41	
		Raw dBm	-42.94	-43.68	-44.43		
		dBm/MHz	-34.05	-34.79	-35.54	5135MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
		μW/MHz	0.39355	0.33189	0.27925		
		MHz	5145.25	5148.11	5149.78		
		Raw dBm	-37.99	-40.63	-43.57		
		dBm/MHz	-29.10	-31.74	-34.68	5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)	
		μW/MHz	1.23027	0.66988	0.34041		
		MHz	5250.97	5250.95	5250.00		
		Raw dBm	-45.25	-42.49	-33.44	5250MHz~5251MHz Limit ≤ 1000 - 100 μW/MHz (0 - -10 dBm/MHz)	
	Max value in the band	W52	dBm/MHz	-36.36	-33.60	-27.13	
		μW/MHz	0.23121	0.43652	350.75187		
		dB	26.64	24.08	4.55	Margin to the technical requirement	
		MHz	5257.93	5251.90	5251.50		
		Raw dBm	-44.97	-41.05	-36.02		
		dBm/MHz	-36.08	-32.16	-27.13	5251MHz~5260MHz Limit ≤ 100 - 15.8 μW/MHz (-10 - -18 dBm/MHz)	
		μW/MHz	0.24660	0.60814	1.93642		
		dB	19.92	21.36	16.68	Margin to the technical requirement	
		MHz	5260.13	5264.48	5260.72		
		Raw dBm	-45.25	-44.09	-29.34		
	Max value in the band	W52	dBm/MHz	-36.36	-35.20	-20.45	
		μW/MHz	0.23121	0.30200	9.01571		
		dB	18.20	11.83	1.58	Margin to the technical requirement	
		MHz	5270.63	5268.08	5267.68		
		Raw dBm	-45.35	-44.38	-40.64		
		dBm/MHz	-36.46	-35.49	-31.75		
		μW/MHz	0.22594	0.28249	0.66834	5266.7MHz~5365MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	

## Appendix C 19-3-11n-20M-Power

## 3. Antenna Power (Conducted Power)

Antenna Power	Test Voltage	V	Normal Voltage ( 5V)									Remarks
	Test Frequency	MHz	5180	5200	5240							
	Power Meter Raw (IF of Spectrum)	dBm	-22.76	-22.55	-21.51							
	Power Measurement System Loss	dB	21.19	21.19	21.19							Refer to Calibration Result
	Transmitter Duty Cycle Factor	dB	0.00	0.00	0.00							Duty Factor = 10 × 10Log <sub>10</sub> (1/Duty Cycle)
	Equivalent Noise Bandwidth	MHz	1.12	1.12	1.12							ENB = Total_Sum^2 / Peak_Level * Point_Width
	Equivalent Noise Bandwidth Factor	dB	0.49	0.49	0.49							ENB Factor = 10 × 10Log <sub>10</sub> (1/ENB)
	Antenna Power (Conducted)	dBm/MHz	-2.06	-1.85	-0.81							Limit ≤ 10 mW/MHz (10 dBm/MHz)
	Antenna Power (Conducted)	mW/MHz	0.6220	0.6528	0.8294							
	Transmitter ON <sub>Time</sub>	msec	1.0000									RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) <sub>Time</sub>	msec	1.0000										
Transmitter Duty Cycle	%	100.00%										

## 4. Limitation of Collateral Emission of Receiver

Test Voltage	V	Normal Voltage ( 5V)									Remarks
Test Frequency	MHz	5180	5200	5240							
Spurious Emission Frequency	* 1	MHz	74.62	72.68	712.88						1st 30MHz~1000MHz: Maximum emission and all emissions beyond 1/10 of the limitation must be indicated.
	* 1	MHz	-	-	-						2nd
	* 1	MHz	-	-	-						3rd
	* 2	MHz	3438.00	21900.00	21950.00						1st 1000MHz~26GHz: Maximum emission and all emissions beyond 1/10 of the limitation must be indicated.
	* 2	MHz	-	-	21800.00						2nd
	* 2	MHz	-	-	21250.00						3rd
Cable Loss	* 1	dB	0.78	0.78	0.78						1st
	* 1	dB	-	-	-						2nd
	* 1	dB	-	-	-						3rd
	* 2	dB	3.68	3.68	3.68						1st
	* 2	dB	-	-	3.68						2nd
	* 2	dB	-	-	3.68						3rd
Spectrum Raw	* 1	dBm	-78.87	-75.71	-78.51						1st
	* 1	dBm	-	-	-						2nd
	* 1	dBm	-	-	-						3rd
	* 2	dBm	-68.04	-64.86	-63.13						1st
	* 2	dBm	-	-	-63.64						2nd
	* 2	dBm	-	-	-63.99						3rd
Spurious Emission Intensity	* 1	dBm	-78.09	-74.93	-77.73						1st Limit $\leq 4$ nW (-54 dBm)
	* 1	dBm	-	-	-						2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	dBm	-	-	-						3rd
	* 2	dBm	-64.36	-61.18	-59.45						1st Limit $\leq 20$ nW (-47 dBm)
	* 2	dBm	-	-	-59.96						2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	dBm	-	-	-60.31						3rd
Spurious Emission Intensity	* 1	nW	0.0155	0.0321	0.0169						Total Emission Power
	* 1	nW	0.0155	0.0321	0.0169						1st Limit $\leq 4$ nW (-54 dBm)
	* 1	nW	-	-	-						2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	nW	-	-	-						3rd
	* 2	nW	0.3664	0.7621	3.0754						Total Emission Power
	* 2	nW	0.3664	0.7621	1.1350						1st Limit $\leq 20$ nW (-47 dBm)
	* 2	nW	-	-	1.0093						2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	nW	-	-	0.9311						3rd

\* 1: Frequency Band 5 (30 MHz  $\leq f < 1000$  MHz) \* 2: Frequency Band 6 (1000 MHz  $\leq f < 26$  GHz)

## 5. Carrier Sense Capability

Test Voltage	V	Normal Voltage ( 5V)									Remarks
Test Frequency	MHz	5180	5200	5240							
Min. Antenna Gain	dBi	6.64	6.64	6.64							
Carrier Level	dBm	-44.86	-44.89	-44.96							Pin = $22.79 + \text{Gr} - 20 * \log(\text{freq\_MHz})$ [dBm]
Result	Good/Fail	Good	Good	Good							

## Appendix C 19-3-11n-20M

				Sporton No.	JR373103				
				Test Date	2013/9/5				
				Test Location	SPORTON Lab.				
				Temp. / Humid.	24.6℃ / 62%				
				Test Site	TH06-HY				
				Engineer	Shiming				
				Department	Radio Service Group				
1. General Information				Antenna Port	DAC 0+DAC 1				
Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3	Model	WUBR-508N					
	Type of Emission	G1D / D1D	Serial No.	12635W2002256					
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM	Antenna Power	1.69	mW/MHz				
	Frequency	5180~5240MHz(20MHz Space 4 Channels)			W52				
2. Test Results									
Testing for Electrical Specification	Test Voltage	V	Normal Voltage (5V)			Remarks			
	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range			
	Measured Frequency	MHz	-	-	-				
	Frequency Error	ppm	-	-	-	Limit ≤ 20 ppm			
	Occupied Bandwidth	MHz	-	-	-	99% OBW Limit ≤ 19 MHz (RB/VB : 300kHz)			
	Spreading Bandwidth (DSSS only)	MHz	-	-	-	90% of total emission power			
	EIRP Power	mW/MHz	6.58283	6.62378	7.79625	Ant Gain : 6.64 [dBi]			
	Antenna Power (Conducted)	mW/MHz	1.42696	1.43584	1.69000	Limit ≤ 10 mW/MHz - Antenna power & EIRP power			
	Antenna Power Error	2p	-0.26304	-0.25416	0.00000				
	Power Error Rate	%	-15.56	-15.04	0.00	Limit + 20% ~ - 80%			
	Adjacent Channel Power	-20MHz	dB	-	-	-	Limit ≥ 25dB (18MHz)		
		+20MHz	dB	-	-	-	Limit ≥ 25dB (18MHz)		
		-40MHz	dB	-	-	-	Limit ≥ 40dB (18MHz)		
		+40MHz	dB	-	-	-	Limit ≥ 40dB (18MHz)		
	Limitation of Collateral Emission of Receiver	< 1GHz	nW	0.0338	0.0583	0.0354	Limit ≤ 4 nW (-54 dBm)		
		≥ 1GHz	nW	1.2255	1.5805	6.4308	Limit ≤ 20 nW (-47 dBm)		
	Transmission Burst Length	msec	2.3000	2.3000	2.3000	Limit ≤ 4msec			
	Radio Interface Prevention Function	Carrier Sense (100mV/m)	OK / NG	OK	OK	OK	Pin = 22.79+Gr-20*log(freq_MHz) [dBm]		
		ID code	ID code	Good, MAC Address:00-0E-8E-40-89-82					
		Test Frequency (W53)	MHz	-	-	-	Pin = Gr - 62 [dBm]Gr is max receiving antenna gain in dBi		
		DFS function	OK / NG	-	-	-			
		Test Frequency (W53)	MHz	-	-	-	If EIRP power density of EUT is less than 5mW/MHz, without TPC function		
		TPC function	dB	-	-	-			
Unwanted Emission Intensity	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range			
	W52	MHz	-	-	-				
		Raw dBm	-	-	-				
	W53	dBm/MHz	-37.54	-38.89	-38.59	30MHz~5135MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)			
		μW/MHz	0.17614	0.12899	0.13847				
	Max value in the band	MHz	-	-	-				
		Raw dBm	-	-	-				
	Max value in the band	dBm/MHz	-27.01	-27.69	-27.36	5365MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)			
		μW/MHz	1.99251	1.70201	1.83476				
	Out-Band Leakage Power (EIRP)	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range		
Max value in the band		MHz	-	-	-				
		Raw dBm	-	-	-				
		dBm/MHz	-31.32	-31.64	-31.97	5135MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)			
		μW/MHz	0.73869	0.68589	0.63571				
		MHz	-	-	-				
		Raw dBm	-	-	-				
Max value in the band		dBm/MHz	-27.03	-28.89	-31.59	5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)			
		μW/MHz	1.98362	1.29218	0.69359				
		MHz	-	-	-				
		Raw dBm	-	-	-				
		dBm/MHz	-33.06	-31.20	-0.77	5250MHz~5251MHz Limit ≤ 1000 ~ 100 μW/MHz (0 ~ -10 dBm/MHz)			
		μW/MHz	0.49484	0.75937	837.15908				
Max value in the band		MHz	-	-	-				
		Raw dBm	-	-	-				
		dBm/MHz	-33.10	-29.62	-24.62	5251MHz~5260MHz Limit ≤ 100 ~ 15.8 μW/MHz (-10 ~ -18 dBm/MHz)			
		μW/MHz	0.48982	1.09119	3.45347				
		MHz	-	-	-				
		Raw dBm	-	-	-				
Max value in the band		dBm/MHz	-33.18	-32.40	-18.26	5260MHz~5266.7MHz Limit ≤ 15.8 ~ 2.5 μW/MHz (-18 ~ -26 dBm/MHz)			
		μW/MHz	0.48067	0.57489	14.91772				
		MHz	-	-	-				
		Raw dBm	-	-	-				
		dBm/MHz	-33.54	-32.79	-28.71	5266.7MHz~5365MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)			
	μW/MHz	0.44271	0.52571	1.34599					

## Appendix C 19-3-11n-20M-Power

## 3. Antenna Power (Conducted Power)

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5180	5200	5240						
Power Meter Raw (IF of Spectrum)	dBm	-19.15	-19.13	-18.42						
Power Measurement System Loss	dB	21.19	21.19	21.19						Refer to Calibration Result
Transmitter Duty Cycle Factor	dB	0.00	0.00	0.00						Duty Factor = $10 \times 10\log_{10}(1/\text{Duty Cycle})$
Equivalent Noise Bandwidth	MHz	1.12	1.12	1.12						ENB = $\text{Total\_Sum}^2 / \text{Peak\_Level} * \text{Point\_Width}$
Equivalent Noise Bandwidth Factor	dB	0.49	0.49	0.49						ENB Factor = $10 \times 10\log_{10}(1/\text{ENB})$
Antenna Power (Conducted)	dBm/MHz	1.54	1.57	2.28						Limit $\leq 10$ mW/MHz (10 dBm/MHz)
Antenna Power (Conducted)	mW/MHz	1.4270	1.4358	1.6900						
Transmitter ON <sub>Time</sub>	msec	1.0000								RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) <sub>Time</sub>	msec	1.0000								
Transmitter Duty Cycle	%	100.00%								

## 4. Limitation of Collateral Emission of Receiver

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5180	5200	5240						
Spurious Emission Frequency	* 1	MHz	-	-	-					1st 30MHz~1000MHz:: Maximum emission and all
	* 1	MHz	-	-	-					2nd emissions beyond 1/10 of the limitation must
	* 1	MHz	-	-	-					3rd be indicated.
	* 2	MHz	-	-	-					1st 1000MHz~26GHz:: Maximum emission and all
	* 2	MHz	-	-	-					2nd emissions beyond 1/10 of the limitation must
	* 2	MHz	-	-	-					3rd be indicated.
Cable Loss	* 1	dB	0.78	0.78	0.78					1st
	* 1	dB	-	-	-					2nd
	* 1	dB	-	-	-					3rd
	* 2	dB	3.68	3.68	3.68					1st
	* 2	dB	-	-	3.68					2nd
	* 2	dB	-	-	3.68					3rd
Spectrum Raw	* 1	dBm	-	-	-					1st
	* 1	dBm	-	-	-					2nd
	* 1	dBm	-	-	-					3rd
	* 2	dBm	-	-	-					1st
	* 2	dBm	-	-	-					2nd
	* 2	dBm	-	-	-					3rd
Spurious Emission Intensity	* 1	dBm	-74.70	-72.34	-74.52					1st Limit $\leq 4$ nW (-54 dBm)
	* 1	dBm	-	-	-					2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	dBm	-	-	-					3rd
	* 2	dBm	-59.12	-58.01	-56.12					1st Limit $\leq 20$ nW (-47 dBm)
	* 2	dBm	-	-	-56.72					2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	dBm	-	-	-57.31					3rd
Spurious Emission Intensity	* 1	nW	0.0338	0.0583	0.0354					Total Emission Power
	* 1	nW	0.0338	0.0583	0.0354					1st Limit $\leq 4$ nW (-54 dBm)
	* 1	nW	-	-	-					2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	nW	-	-	-					3rd
	* 2	nW	1.2255	1.5805	6.4308					Total Emission Power
	* 2	nW	1.2255	1.5805	2.4442					1st Limit $\leq 20$ nW (-47 dBm)
	* 2	nW	-	-	2.1287					2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	nW	-	-	1.8579					3rd

\* 1: Frequency Band 5 (30 MHz  $\leq f < 1000$  MHz) \* 2: Frequency Band 6 (1000 MHz  $\leq f < 26$  GHz)

## 5. Carrier Sense Capability

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5180	5200	5240						
Min. Antenna Gain	dBi	6.64	6.64	6.64						
Carrier Level	dBm	-44.86	-44.89	-44.96						Pin = $22.79 + \text{Gr} - 20 * \log(\text{freq\_MHz})$ [dBm]
Result	Good/Fail	Good	Good	Good						

## Appendix C 19-3-11n-D1D (40 mode)

1. General Information				Antenna Port	DAC 0	Sporton No.	JR373103
						Test Date	2013/9/5
						Test Location	SPORTON Lab.
						Temp. / Humid.	24.6℃ / 62%
Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3	Model	WUBR-508N		Test Site	TH06-HY
	Type of Emission	GTD / D1D	Serial No.	12635W2002256		Engineer	Shiming
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM	Antenna Power	0.41	mW/MHz	Department	Radio Service Group
				Frequency	5190~5230MHz(40MHz Space 2 Channels)		

## 2. Test Results

Test Voltage		V	Normal Voltage (5V)					Remarks		
Test Frequency		MHz	5190	5230	-	Low/Mid/High of test frequency range				
Measured Frequency		MHz	5189.9898	5229.9892						
Frequency Error		ppm	1.97	2.07	Limit ≤ 20 ppm					
Occupied Bandwidth		MHz	36.00	36.00	99% OBW Limit ≤ 38 MHz (RB/VB : 300kHz)					
Spreading Bandwidth (DSSS only)		MHz	32.08	32.08	90% of total emission power					
EIRP Power		mW/MHz	1.74093	1.87837	Ant Gain : 6.64 [dBi]					
Antenna Power (Conducted)		mW/MHz	0.37738	0.40718						
Antenna Power Error (Cond.)		Δp	-0.03262	-0.00282	For W53-40M, EIRP ≤ 2.5mW/MHz, w/o TPC function					
Power Error Rate (Cond.)		%	-7.96	-0.69	Limit + 20% ~ - 80%					
Adjacent Channel Leakage Power		-40MHz	dB	34.32	33.87	Limit ≥ 25dB (38MHz)				
		+40MHz	dB	35.80	35.64	Limit ≥ 25dB (38MHz)				
		-80MHz	dB	48.72	48.73	Limit ≥ 40dB (38MHz)				
		+80MHz	dB	49.86	50.28	Limit ≥ 40dB (38MHz)				
		< 1GHz	nW	0.0178	0.0170	Limit ≤ 4 nW (-54 dBm)				
Limitation of Collateral Emission of Receiver		≥ 1GHz	nW	0.8790	0.9863	Limit ≤ 20 nW (-47 dBm)				
Transmission Burst Length		msec	2.3000	2.3000	Limit ≤ 4msec					
Radio Interface Prevention Function	Carrier Sense (100m/m)	OK / NG	OK	OK	Pin = 22.79+Gr-20*log(freq_MHz) [dBm]					
	ID code	Good, MAC Address:00-0E-8E-40-89-82								
	Test Frequency (W53)	MHz								
	DFS function	OK / NG								
	Test Frequency (W53)	MHz	-	-	-	Pin = Gr - 62 [dBm]Gr is max receiving antenna gain in dBi				
TPC function		dB	For W53-40M, EIRP ≤ 2.5mW/MHz, w/o TPC function							
Test Frequency		MHz	5190	5230	-	Low/Mid/High of test frequency range				
Unwanted Emission Intensity	W52	Max value in the band	MHz	5089.86	5008.74					
		Raw dBm	-42.69	-44.98						
	W53	Max value in the band	MHz	-40.44	-42.73	30MHz~5100MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)				
		Raw dBm	-40.936	-42.73						
	W52	Max value in the band	MHz	21838.80	21838.80					
		Raw dBm	-34.79	-35.13	5400MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)					
	W53	Max value in the band	MHz	-31.11	-31.45					
		Raw dBm	-31.11	-31.45						
	W52	Max value in the band	MHz	0.77446	0.71614					
		Raw dBm	0.77446	0.71614						
Out-Band Leakage Power (EIRP)	W52	Test Frequency	MHz	5190	5230	-	Low/Mid/High of test frequency range			
		Max value in the band	MHz	5139.98	5127.47	-				
	W53	Max value in the band	MHz	5139.98	5127.47	-				
		Raw dBm	-49.83	-41.45	-	5100MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)				
	W52	Max value in the band	MHz	-40.94	-32.56	-				
		Raw dBm	-40.94	-32.56	-					
	W53	Max value in the band	MHz	0.08054	0.55463	-				
		Raw dBm	0.08054	0.55463	-					
	W52	Max value in the band	MHz	5149.97	5148.72	-				
		Raw dBm	-43.52	-43.79	-	5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)				
	W53	Max value in the band	MHz	-34.63	-34.90	-				
		Raw dBm	-34.63	-34.90	-					
	W52	Max value in the band	MHz	0.34435	0.32359	-				
		Raw dBm	0.34435	0.32359	-					
	W53	Max value in the band	MHz	5250.03	5250.01	-				
		Raw dBm	-42.61	-18.65	-	5250MHz~5251MHz Limit ≤ 500 ~ 50 μW/MHz (-3 ~ -13 dBm/MHz)				
	W52	Max value in the band	MHz	-42.61	-18.65	-				
		Raw dBm	-42.61	-18.65	-					
	W53	Max value in the band	MHz	5251.95	5251.00	-				
		Raw dBm	5251.95	5251.00	-					
	W52	Max value in the band	MHz	-42.82	-35.51	-	5251MHz~5270MHz Limit ≤ 50 ~ 7.924 μW/MHz (-13 ~ -21 dBm/MHz)			
		Raw dBm	-42.82	-35.51	-					
	W53	Max value in the band	MHz	105.68175	-	-				
		Raw dBm	105.68175	-	-					
	W52	Max value in the band	MHz	20.52	13.61	-	Margin to the technical requirement			
		Raw dBm	20.52	13.61	-					
	W53	Max value in the band	MHz	5271.58	5270.09	-				
		Raw dBm	5271.58	5270.09	-					
	W52	Max value in the band	MHz	-45.82	-45.27	-	5270MHz~5275.8MHz Limit ≤ 7.924 ~ 2.547 μW/MHz (-21 ~ -25.9 dBm/MHz)			
		Raw dBm	-45.82	-45.27	-					
	W53	Max value in the band	MHz	-36.93	-36.38	-				
		Raw dBm	-36.93	-36.38	-					
	W52	Max value in the band	MHz	0.20277	0.23014	-				
		Raw dBm	0.20277	0.23014	-					
	W53	Max value in the band	MHz	14.58	15.29	-	Margin to the technical requirement			
		Raw dBm	14.58	15.29	-					
	W52	Max value in the band	MHz	5293.19	5275.80	-				
		Raw dBm	5293.19	5275.80	-					
	W53	Max value in the band	MHz	-45.34	-47.48	-	5275.8MHz~5400MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)			
		Raw dBm	-45.34	-47.48	-					
	W52	Max value in the band	MHz	-36.45	-38.59	-				
		Raw dBm	-36.45	-38.59	-					
	W53	Max value in the band	MHz	0.22646	0.13836	-				
		Raw dBm	0.22646	0.13836	-					

## Appendix C 19-3-11n-D1D-Power (40MHz mode)

## 3. Antenna Power (Conducted Power)

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5190	5230							
Power Meter Raw (IF of Spectrum)	dBm	-24.93	-24.60							
Power Measurement System Loss	dB	21.19	21.19							Refer to Calibration Result
Transmitter Duty Cycle Factor	dB	0.00	0.00							Duty Factor = $10 \times 10\log_{10}(1/\text{Duty Cycle})$
Equivalent Noise Bandwidth	MHz	1.12	1.12							ENB = $\text{Total\_Sum}^2 / \text{Peak\_Level} * \text{Point\_Width}$
Equivalent Noise Bandwidth Factor	dB	0.49	0.49							ENB Factor = $10 \times 10\log_{10}(1/\text{ENB})$
Antenna Power (Conducted)	dBm/MHz	-4.23	-3.90							Limit $\leq 5 \text{ mW/MHz}$ (7 dBm/MHz)
Antenna Power (Conducted)	mW/MHz	0.3774	0.4072							
Transmitter ON <sub>Time</sub>	msec	1.0000								RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) <sub>Time</sub>	msec	1.0000								
Transmitter Duty Cycle	%	100.00%								

## 4. Limitation of Collateral Emission of Receiver

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5190	5230							
Spurious Emission Frequency	* 1	MHz	138.64	134.76						1st 30MHz~1000MHz:: Maximum emission and all
	* 1	MHz	-	-						2nd emissions beyond 1/10 of the limitation must
	* 1	MHz	-	-						3rd be indicated.
	* 2	MHz	24800.00	3450.00						1st 1000MHz~26GHz:: Maximum emission and all
	* 2	MHz	-	-						2nd emissions beyond 1/10 of the limitation must
	* 2	MHz	-	-						3rd be indicated.
Cable Loss	* 1	dB	0.78	0.78						1st
	* 1	dB	-	-						2nd
	* 1	dB	-	-						3rd
	* 2	dB	3.68	3.68						1st
	* 2	dB	-	-						2nd
	* 2	dB	-	-						3rd
Spectrum Raw	* 1	dBm	-78.28	-78.48						1st
	* 1	dBm	-	-						2nd
	* 1	dBm	-	-						3rd
	* 2	dBm	-64.24	-63.74						1st
	* 2	dBm	-	-						2nd
	* 2	dBm	-	-						3rd
Spurious Emission Intensity	* 1	dBm	-77.50	-77.70						1st Limit $\leq 4 \text{ nW}$ (-54 dBm)
	* 1	dBm	-	-						2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	dBm	-	-						3rd
	* 2	dBm	-60.56	-60.06						1st Limit $\leq 20 \text{ nW}$ (-47 dBm)
	* 2	dBm	-	-						2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	dBm	-	-						3rd
Spurious Emission Intensity	* 1	nW	0.0178	0.0170						Total Emission Power
	* 1	nW	0.0178	0.0170						1st Limit $\leq 4 \text{ nW}$ (-54 dBm)
	* 1	nW	-	-						2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	nW	-	-						3rd
	* 2	nW	0.8790	0.9863						Total Emission Power
	* 2	nW	0.8790	0.9863						1st Limit $\leq 20 \text{ nW}$ (-47 dBm)
	* 2	nW	-	-						2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	nW	-	-						3rd

\* 1: Frequency Band 5 (30 MHz  $\leq f < 1000$  MHz) \* 2: Frequency Band 6 (1000 MHz  $\leq f < 26$  GHz)

## 5. Carrier Sense Capability

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5190	5230							
Minl. Antenna Gain	dBi	-1.25	-1.25							
Carrier Level	dBm	-52.76	-52.83							Pin = $22.79 + \text{Gr} - 20 * \log(\text{freq\_MHz})$ [dBm]
Result	Good/Fail	Good	Good							



## Appendix C 19-3-11n-D1D (40 mode)

				Sporton No.	JR373103		
				Test Date	2013/9/5		
				Test Location	SPORTON Lab.		
				Temp. / Humid.	24.6℃ / 62%		
				Test Site	TH06-HY		
				Engineer	Shiming		
				Department	Radio Service Group		
1. General Information				Antenna Port	DAC 1		
				Model	WUBR-508N		
				Serial No.	12635W2002256		
				Antenna Power	0.37 mW/MHz		
Specified Radio Equipment				Frequency	5190~5230MHz(40MHz Space 2 Channels)		
				W52			
2. Test Results							
Testing for Electrical Specification	Test Voltage	V	Normal Voltage ( 5V )			Remarks	
	Test Frequency	MHz	5190	5230	-	Low/Mid/High of test frequency range	
	Measured Frequency	MHz	5189.9898	5229.9892			
	Frequency Error	ppm	1.97	2.07		Limit ≤ 20 ppm	
	Occupied Bandwidth	MHz	36.08	36.00		99% OBW Limit ≤ 38 MHz (RB/VB : 300kHz)	
	Spreading Bandwidth (DSSS only)	MHz	32.32	32.32		90% of total emission power	
	EIRP Power	mW/MHz	1.70130	1.65113		Ant Gain : 6.64 [dBi]	
	Antenna Power (Conducted)	mW/MHz	0.36879	0.35792		For 40M Limit ≤ 5 mW/MHz - Antenna power & EIRP power	
	Antenna Power Error (Cond.)	Δp	-0.00121	-0.01208		For W53-40M, EIRP ≤ 2.5mW/MHz, w/o TPC function	
	Power Error Rate (Cond.)	%	-0.33	-3.27		Limit + 20% - - 80%	
	Adjacent Channel Leakage Power	-40MHz	dB	34.95	35.37	Limit ≥ 25dB (38MHz)	
		+40MHz	dB	34.71	35.21	Limit ≥ 25dB (38MHz)	
		-80MHz	dB	48.75	48.75	Limit ≥ 40dB (38MHz)	
		+80MHz	dB	49.86	49.69	Limit ≥ 40dB (38MHz)	
	Limitation of Collateral Emission of Receiver	< 1GHz	nW	0.0231	0.0191	Limit ≤ 4 nW (-54 dBm)	
		≥ 1GHz	nW	0.8551	0.8337	Limit ≤ 20 nW (-47 dBm)	
Transmission Burst Length	msec	2.3000	2.3000		Limit ≤ 4msec		
Radio Interface Prevention Function	Carrier Sense (100m/m)	OK / NG	OK	OK	Pin = 22.79+Gr-20*log(freq_MHz) [dBm]		
	ID code	ID code	Good, MAC Address:00-0E-8E-40-89-82				
	Test Frequency (W53)	MHz	-	-		Pin = Gr - 62 [dBm]Gr is max receiveing antenna gain in dBi	
	DFS function	OK / NG	-	-			
	Test Frequency (W53)	MHz	-	-		For W53-40M, EIRP ≤ 2.5mW/MHz, w/o TPC function	
	TPC function	dB	-	-			
Unwanted Emission Intensity	Test Frequency	MHz	5190	5230	-	Low/Mid/High of test frequency range	
	W52 W53	MHz	3203.82	4958.04			
		Raw dBm	-44.50	-45.37			
		dBm/MHz	-42.25	-43.12		30MHz~5100MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
		μW/MHz	0.05957	0.04875			
	W53	MHz	21880.00	21838.80			
Raw dBm		-34.95	-34.69		5400MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)		
	dBm/MHz	-31.27	-31.01				
	μW/MHz	0.74645	0.79250				
Testing for Electrical Specification	Out-Band Leakage Power (EIRP)	Test Frequency	MHz	5190	5230	-	Low/Mid/High of test frequency range
		W52	MHz	5141.83	5126.80	-	
			Raw dBm	-47.38	-43.44	-	
			dBm/MHz	-38.49	-34.55	-	5100MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)
			μW/MHz	0.14158	0.35075	-	
			MHz	5148.74	5148.46	-	
			Raw dBm	-40.49	-44.52	-	
			dBm/MHz	-31.60	-35.63	-	5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)
			μW/MHz	0.69183	0.27353	-	
			MHz	5250.09	5250.01	-	
			Raw dBm	-44.50	-49.31	-	
			dBm/MHz	-35.61	-40.42	-	5250MHz~5251MHz Limit ≤ 500 ~ 50 μW/MHz (-3 ~ -13 dBm/MHz)
			μW/MHz	0.27479	90.78205	-	
		dB	31.70	7.35	-	Margin to the technical requirement	
		MHz	5255.64	5255.71	-		
		Raw dBm	-44.64	-36.24	-	5251MHz~5270MHz Limit ≤ 50 ~ 7.924 μW/MHz (-13 ~ -21 dBm/MHz)	
		dBm/MHz	-35.75	-27.35	-		
		μW/MHz	0.26607	1.84077	-		
		dB	20.79	12.36	-	Margin to the technical requirement	
		MHz	5272.38	5272.48	-		
		Raw dBm	-46.08	-47.91	-	5270MHz~5275.8MHz Limit ≤ 7.924 ~ 2.547 μW/MHz (-21 ~ -25.9 dBm/MHz)	
		dBm/MHz	-37.19	-39.02	-		
		μW/MHz	0.19099	0.12531	-		
		dB	14.16	15.90	-	Margin to the technical requirement	
		MHz	5329.21	5275.80	-		
		Raw dBm	-45.49	-47.55	-	5275.8MHz~5400MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
		dBm/MHz	-36.60	-38.66	-		
μW/MHz	0.21878	0.13614	-				

## Appendix C 19-3-11n-D1D-Power (40MHz mode)

## 3. Antenna Power (Conducted Power)

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5190	5230							
Power Meter Raw (IF of Spectrum)	dBm	-25.03	-25.16							
Power Measurement System Loss	dB	21.19	21.19							Refer to Calibration Result
Transmitter Duty Cycle Factor	dB	0.00	0.00							Duty Factor = $10 \times 10\log_{10}(1/\text{Duty Cycle})$
Equivalent Noise Bandwidth	MHz	1.12	1.12							ENB = $\text{Total\_Sum}^2 / \text{Peak\_Level} * \text{Point\_Width}$
Equivalent Noise Bandwidth Factor	dB	0.49	0.49							ENB Factor = $10 \times 10\log_{10}(1/\text{ENB})$
Antenna Power (Conducted)	dBm/MHz	-4.33	-4.46							Limit $\leq 5 \text{ mW/MHz}$ (7 dBm/MHz)
Antenna Power (Conducted)	mW/MHz	0.3688	0.3579							
Transmitter ON <sub>Time</sub>	msec	1.0000								RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) <sub>Time</sub>	msec	1.0000								
Transmitter Duty Cycle	%	100.00%								

## 4. Limitation of Collateral Emission of Receiver

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5190	5230	-						
Spurious Emission Frequency	* 1	MHz	961.20	672.14						1st 30MHz~1000MHz:: Maximum emission and all
	* 1	MHz	-	-						2nd emissions beyond 1/10 of the limitation must
	* 1	MHz	-	-						3rd be indicated.
	* 2	MHz	21800.00	21800.00						1st 1000MHz~26GHz:: Maximum emission and all
	* 2	MHz	-	-						2nd emissions beyond 1/10 of the limitation must
	* 2	MHz	-	-						3rd be indicated.
Cable Loss	* 1	dB	0.78	0.78						1st
	* 1	dB	-	-						2nd
	* 1	dB	-	-						3rd
	* 2	dB	3.68	3.68						1st
	* 2	dB	-	-						2nd
	* 2	dB	-	-						3rd
Spectrum Raw	* 1	dBm	-77.14	-77.96						1st
	* 1	dBm	-	-						2nd
	* 1	dBm	-	-						3rd
	* 2	dBm	-64.36	-64.47						1st
	* 2	dBm	-	-						2nd
	* 2	dBm	-	-						3rd
Spurious Emission Intensity	* 1	dBm	-76.36	-77.18						1st Limit $\leq 4 \text{ nW}$ (-54 dBm)
	* 1	dBm	-	-						2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	dBm	-	-						3rd
	* 2	dBm	-60.68	-60.79						1st Limit $\leq 20 \text{ nW}$ (-47 dBm)
	* 2	dBm	-	-						2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	dBm	-	-						3rd
Spurious Emission Intensity	* 1	nW	0.0231	0.0191						Total Emission Power
	* 1	nW	0.0231	0.0191						1st Limit $\leq 4 \text{ nW}$ (-54 dBm)
	* 1	nW	-	-						2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	nW	-	-						3rd
	* 2	nW	0.8551	0.8337						Total Emission Power
	* 2	nW	0.8551	0.8337						1st Limit $\leq 20 \text{ nW}$ (-47 dBm)
	* 2	nW	-	-						2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	nW	-	-						3rd

\* 1: Frequency Band 5 (30 MHz  $\leq f < 1000$  MHz) \* 2: Frequency Band 6 (1000 MHz  $\leq f < 26$  GHz)

## 5. Carrier Sense Capability

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5190	5230							
Minl. Antenna Gain	dBi	-1.25	-1.25							
Carrier Level	dBm	-52.76	-52.83							Pin = $22.79 + \text{Gr} - 20 * \log(\text{freq\_MHz})$ [dBm]
Result	Good/Fail	Good	Good							

## Appendix C 19-3-11n-D1D (40 mode)

					Sporton No.		JR373103								
					Test Date		2013/9/5								
					Test Location		SPORTON Lab.								
					Temp. / Humid.		24.6℃ / 62%								
					Test Site		TH06-HY								
					Engineer		Shiming								
					Department		Radio Service Group								
1. General Information															
			Antenna Port		DAC 0+DAC 1										
Specified Radio Equipment			Class		Article 2 Paragraph 1 Item 19-3		Model		WUBR-508N						
			Type of Emission		G1D / DID		Serial No.		12635W2002256						
			Modulation Type		OFDM: BPSK, QPSK, 16QAM, 64QAM		Antenna Power		0.77 mW/MHz						
			Frequency		5190~5230MHz(40MHz Space 2 Channels)		W52		Department						
2. Test Results															
Testing for Electrical Specification		Test Voltage		V		Normal Voltage (5V)				Remarks					
		Test Frequency		MHz		5190 5230 -				Low/Mid/High of test frequency range					
		Measured Frequency		MHz		- - -									
		Frequency Error		ppm		- - -				Limit ≤ 20 ppm					
		Occupied Bandwidth		MHz		- - -				99% OBW Limit ≤ 38 MHz (RB/VB : 300kHz)					
		Spreading Bandwidth (DSSS only)		MHz		- - -				90% of total emission power					
		EIRP Power		mW/MHz		3.44224 3.52951				Ant Gain : 6.64 [dBi]					
		Antenna Power (Conducted)		mW/MHz		0.74618 0.76509				For 40M Limit ≤ 5 mW/MHz - Antenna power & EIRP power					
		Antenna Power Error (Cond.)		Δp		-0.02382 -0.00491				For W53-40M, EIRP ≤ 2.5mW/MHz, w/o TPC function					
		Power Error Rate (Cond.)		%		-3.09 -0.64				Limit + 20% ~ - 80%					
		Adjacent Channel Leakage Power		-40MHz		dB		- -				Limit ≥ 25dB (38MHz)			
				+40MHz		dB		- -				Limit ≥ 25dB (38MHz)			
				-80MHz		dB		- -				Limit ≥ 40dB (38MHz)			
				+80MHz		dB		- -				Limit ≥ 40dB (38MHz)			
				Limitation of Collateral Emission of Receiver		≤ 1GHz		nW		0.0409 0.0361				Limit ≤ 4 nW (-54 dBm)	
				≥ 1GHz		nW		1.7341 1.8200						Limit ≤ 20 nW (-47 dBm)	
		Transmission Burst Length		msec		2.3000 2.3000						Limit ≤ 4msec			
Radio Interface Prevention Function		Carrier Sense (100m/m)		OK / NG		OK OK						Pin = 22.79+Gr-20*log(freq_MHz) [dBm]			
		ID code		ID code								Good, MAC Address:00-0E-8E-40-89-82			
		Test Frequency (W53)		MHz		-									
		DFS function		OK / NG		-								Pin = Gr - 62 [dBm]Gr is max receiving antenna gain in dBi	
		Test Frequency (W53)		MHz		-								For W53-40M, EIRP ≤ 2.5mW/MHz, w/o TPC function	
		TPC function		dB		-									
Unwanted Emission Intensity		Test Frequency		MHz		5190 5230 -						Low/Mid/High of test frequency range			
		W52		Max value in the band		MHz		-							
				Raw dBm		-									
				dBm/MHz		-38.24 -39.91						30MHz~5100MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)			
		W53		Max value in the band		MHz		-							
				Raw dBm		-									
dBm/MHz				-28.18 -28.21						5400MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)					
		μW/MHz		1.52091 1.50864											
Out-Band Leakage Power (EIRP)		Test Frequency		MHz		5190 5230 -						Low/Mid/High of test frequency range			
		W52		Max value in the band		MHz		-							
				Raw dBm		-									
				dBm/MHz		-36.53 -30.43						5100MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)			
				μW/MHz		0.22212 0.90538									
				Max value in the band		MHz		-							
				Raw dBm		-									
		W52		Max value in the band		dBm/MHz		-29.85 -32.24							
				μW/MHz		1.03618 0.59712						5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)			
				Max value in the band		MHz		-							
				Raw dBm		-									
				dBm/MHz		-31.55 -7.07						5250MHz~5251MHz Limit ≤ 500 ~ 50 μW/MHz (-3 ~ -13 dBm/MHz)			
				μW/MHz		0.69941 196.46380									
		W52		Max value in the band		MHz		-							
				Raw dBm		-									
				dBm/MHz		-31.74 -23.96						5251MHz~5270MHz Limit ≤ 50 ~ 7.924 μW/MHz (-13 ~ -21 dBm/MHz)			
				μW/MHz		0.67065 4.01848									
				Max value in the band		MHz		-							
				Raw dBm		-									
		W52		Max value in the band		dBm/MHz		-34.05 -34.49							
				μW/MHz		0.39375 0.35546						5270MHz~5275.8MHz Limit ≤ 7.924 ~ 2.547 μW/MHz (-21 ~ -25.9 dBm/MHz)			
				Max value in the band		MHz		-							
				Raw dBm		-									
				dBm/MHz		-33.51 -35.61						5275.8MHz~5400MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)			
μW/MHz				0.44524 0.27450											

## Appendix C 19-3-11n-D1D-Power (40MHz mode)

## 3. Antenna Power (Conducted Power)

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5190	5230							
Power Meter Raw (IF of Spectrum)	dBm	-21.97	-21.86							
Power Measurement System Loss	dB	21.19	21.19							Refer to Calibration Result
Transmitter Duty Cycle Factor	dB	0.00	0.00							Duty Factor = $10 \times 10\log_{10}(1/\text{Duty Cycle})$
Equivalent Noise Bandwidth	MHz	1.12	1.12							ENB = $\text{Total\_Sum}^2 / \text{Peak\_Level} * \text{Point\_Width}$
Equivalent Noise Bandwidth Factor	dB	0.49	0.49							ENB Factor = $10 \times 10\log_{10}(1/\text{ENB})$
Antenna Power (Conducted)	dBm/MHz	-1.27	-1.16							Limit $\leq 5 \text{ mW/MHz}$ (7 dBm/MHz)
Antenna Power (Conducted)	mW/MHz	0.7462	0.7651							
Transmitter ON <sub>Time</sub>	msec							1.0000		RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) <sub>Time</sub>	msec							1.0000		
Transmitter Duty Cycle	%							100.00%		

## 4. Limitation of Collateral Emission of Receiver

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5190	5230	-						
Spurious Emission Frequency	* 1	MHz	-	-	-					1st 30MHz~1000MHz:: Maximum emission and all
	* 1	MHz	-	-	-					2nd emissions beyond 1/10 of the limitation must
	* 1	MHz	-	-	-					3rd be indicated.
	* 2	MHz	-	-	-					1st 1000MHz~26GHz:: Maximum emission and all
	* 2	MHz	-	-	-					2nd emissions beyond 1/10 of the limitation must
	* 2	MHz	-	-	-					3rd be indicated.
Cable Loss	* 1	dB	0.78	0.78	-					1st
	* 1	dB	-	-	-					2nd
	* 1	dB	-	-	-					3rd
	* 2	dB	3.68	3.68	-					1st
	* 2	dB	-	-	-					2nd
	* 2	dB	-	-	-					3rd
Spectrum Raw	* 1	dBm	-	-	-					1st
	* 1	dBm	-	-	-					2nd
	* 1	dBm	-	-	-					3rd
	* 2	dBm	-	-	-					1st
	* 2	dBm	-	-	-					2nd
	* 2	dBm	-	-	-					3rd
Spurious Emission Intensity	* 1	dBm	-73.88	-74.42	-					1st Limit $\leq 4 \text{ nW}$ (-54 dBm)
	* 1	dBm	-	-	-					2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	dBm	-	-	-					3rd
	* 2	dBm	-57.61	-57.40	-					1st Limit $\leq 20 \text{ nW}$ (-47 dBm)
	* 2	dBm	-	-	-					2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	dBm	-	-	-					3rd
Spurious Emission Intensity	* 1	nW	0.0409	0.0361	-					Total Emission Power
	* 1	nW	-	-	-					1st Limit $\leq 4 \text{ nW}$ (-54 dBm)
	* 1	nW	-	-	-					2nd RBW : 100 kHz ; VBW : 100 kHz
	* 1	nW	-	-	-					3rd
	* 2	nW	1.7341	1.8200	-					Total Emission Power
	* 2	nW	-	-	-					1st Limit $\leq 20 \text{ nW}$ (-47 dBm)
	* 2	nW	-	-	-					2nd RBW : 1 MHz ; VBW : 1 MHz
	* 2	nW	-	-	-					3rd

\* 1: Frequency Band 5 (30 MHz  $\leq f < 1000$  MHz) \* 2: Frequency Band 6 (1000 MHz  $\leq f < 26$  GHz)

## 5. Carrier Sense Capability

Test Voltage	V	Normal Voltage ( 5V)								Remarks
Test Frequency	MHz	5190	5230							
Minl. Antenna Gain	dBi	-1.25	-1.25							
Carrier Level	dBm	-52.76	-52.83							Pin = $22.79 + Gr - 20 * \log(\text{freq\_MHz})$ [dBm]
Result	Good/Fail	Good	Good							

### Power Supply Voltage Fluctuation Test

Voltage Fluctuation Test	Normal Voltage	High Voltage	Low Voltage
Input DC Power	5	5.5	4.5
Output DC Power	3.26	3.27	3.25
Voltage Variation (%)	-	0.31%	-0.31%

Note: Voltage Variation (%) = (Output High or Low Voltage - Output Normal Voltage)/Output Normal Voltage X 100  
During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/- 1%. Exempt extremely high and low supply voltage condition tests, EUT only operated in normal voltage to test all regulations