



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:

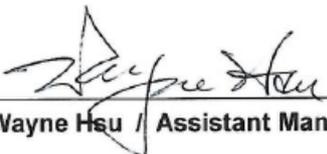

Wayne Hsu / Assistant Manager



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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				

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 _{TX})	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

No. 3 Type Specifications			
1 Communication Method	Semi-duplex		
2 Transmitter	(1) Rated Output	Refer test report clause 1.1.2 antenna power	
	(2) Freq. Range of Radio Wave	Refer test report clause 1.1.1 frequency band and 1.1.2 channel	
	(3) Oscillation	Synthesizer with Crystal Oscillation (40MHz) (Zero IF)	
	(4) Modulation	OFDM: D1D (16QAM,64QAM), G1D (BPSK, QPSK) Max. Signal Transmission Rate: 11a = 54 Mbps 11n BW _{ch} 20MHz = 130Mbps (MCS8; N _{ss} =2) BW _{ch} 40MHz = 270Mbps (MCS8; N _{ss} =2)	
3 Manufacturer (Brand) Information	Manufacturer (Brand)	Model Type or Name	Serial Number
	SparkLAN	WUBR-508N	n/a
4 Antenna	Type, Structure, Gain refer antenna report and test report clause 0.		
5 Classification and Model Name of Auxiliary Equipment	Protection Against Interference Automatic Transmission/reception of ID code (Radio equipment law article 9-4, item 9 is carrier sensing.		
6 Other Type Specifications Items	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.		
7 Attached Drawing	Radio Equipment System Diagram, Schematic Diagram, Layout		
8 Reference Information	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	Test Date
RF Conducted	TH06-HY	Shiming	24.6°C / 62%	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		± 0.63 dB	± 1.5 dB
RF power radiated		± 2.59 dB	± 6 dB
Spurious emissions, conducted	30 – 1000 MHz	± 0.51 dB	± 3 dB
	1 – 18 GHz	± 0.67 dB	± 3 dB
	18 – 26 GHz	± 0.83 dB	± 3 dB
Spurious emissions, radiated	30 – 1000 MHz	± 2.28 dB	± 6 dB
	1 – 18 GHz	± 2.59 dB	± 6 dB
	18 – 26 GHz	± 2.87 dB	± 6 dB
Temperature		± 0.8 °C	± 1 °C
Humidity		± 3 %	± 5 %
Time		± 1.42 %	± 10 %

2 Test Configuration of EUT

2.1 The Worse Case Modulation Configuration

Worst Modulation Used for Conformance Testing			
Modulation Mode	Transmit Chains (N _{TX})	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

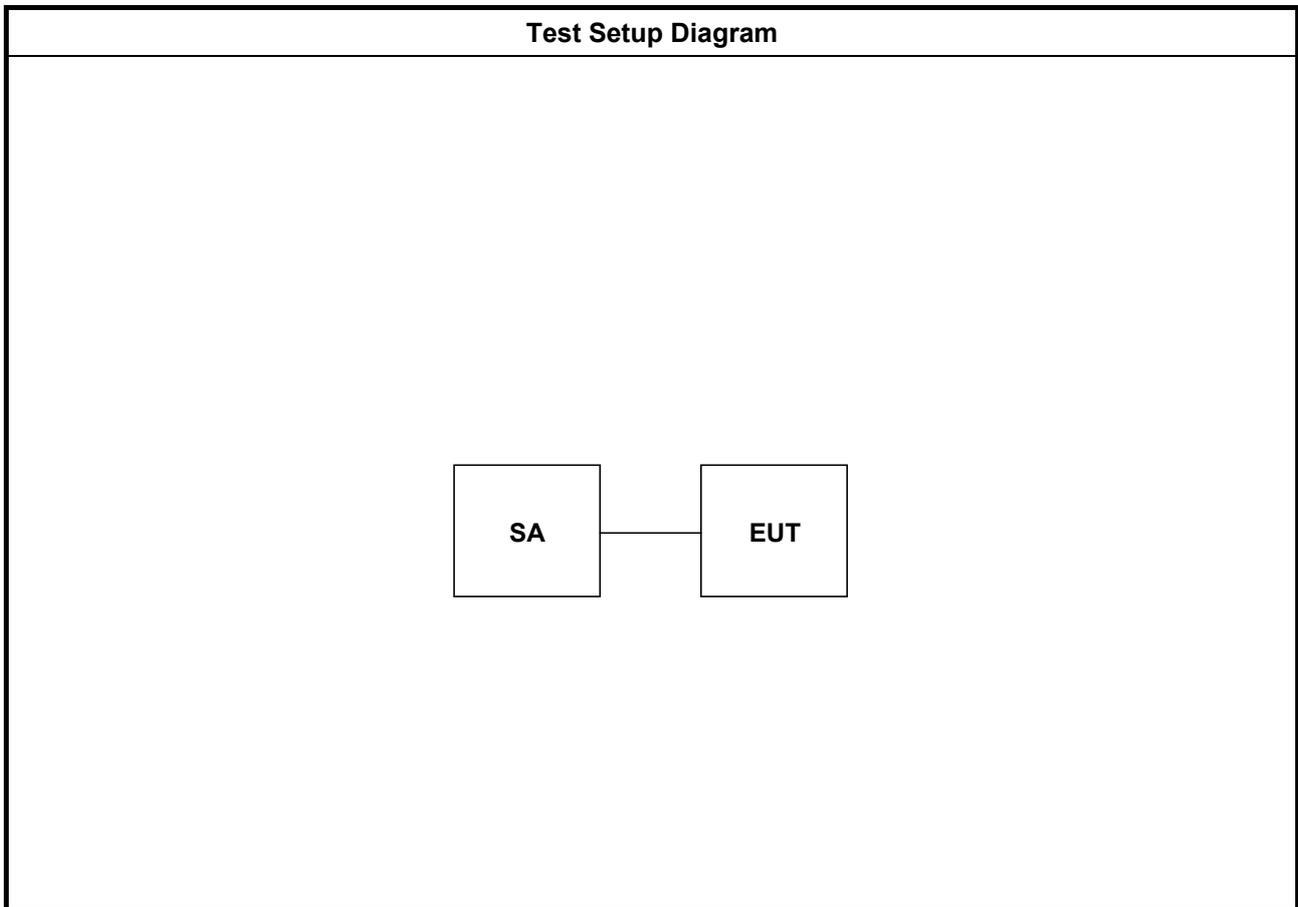
The Worst Case Power Setting Parameter						
Test Software Version	RT5x7xQA V1.0.5.9					
Modulation Mode	N _{TX}	Test Frequency (MHz)				
		NCB: 20MHz			NCB: 40MHz	
		5180	5200	5240	5190	5230
11a,6-54Mbps	1	25	25	27	-	-
HT20, M8-15	2	25 / 24	25 / 24	2A / 26	-	-
HT40, M8-15	2	-	-	-	26 / 24	28 / 25

2.3 The Worst Case Measurement Configuration

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

Tests Item	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,
Test Condition	Conducted measurement at transmit chains.
Modulation Mode	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

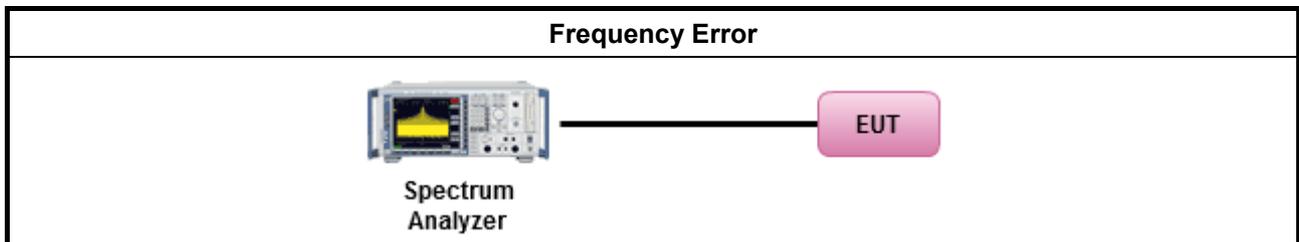
3.1.2 Measuring Instruments

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 _{ch} 20MHz) [W52/W53] - ≤ 18MHz (OFDM, DSSS, Other); (BW _{ch} 20MHz) [W56] - ≤ 19.7MHz (OFDM, DSSS, Other); (BW _{ch} 40MHz) - ≤ 38MHz (OFDM); (BW _{ch} 80MHz) - ≤ 78MHz (OFDM); (BW _{ch} 160MHz - contiguous) - ≤ 158MHz (OFDM) (BW _{ch} 80+80MHz - non-contiguous) - ≤ 78MHz (OFDM)

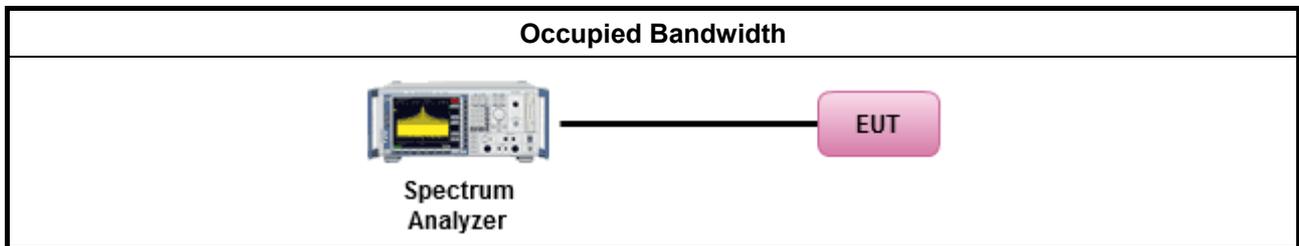
3.2.2 Measuring Instruments

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 _{ch} 20MHz) - ≤10; (BW _{ch} 40MHz) - ≤5; (BW _{ch} 80MHz) - ≤2.5; (BW _{ch} 160MHz) - ≤1.25;

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

EIRP Limit (mW/MHz)
(BW _{ch} 20MHz) - ≤10 ; (BW _{ch} 40MHz) - ≤5 ; (BW _{ch} 80MHz) - ≤2.5 ; (BW _{ch} 160MHz) - ≤1.25

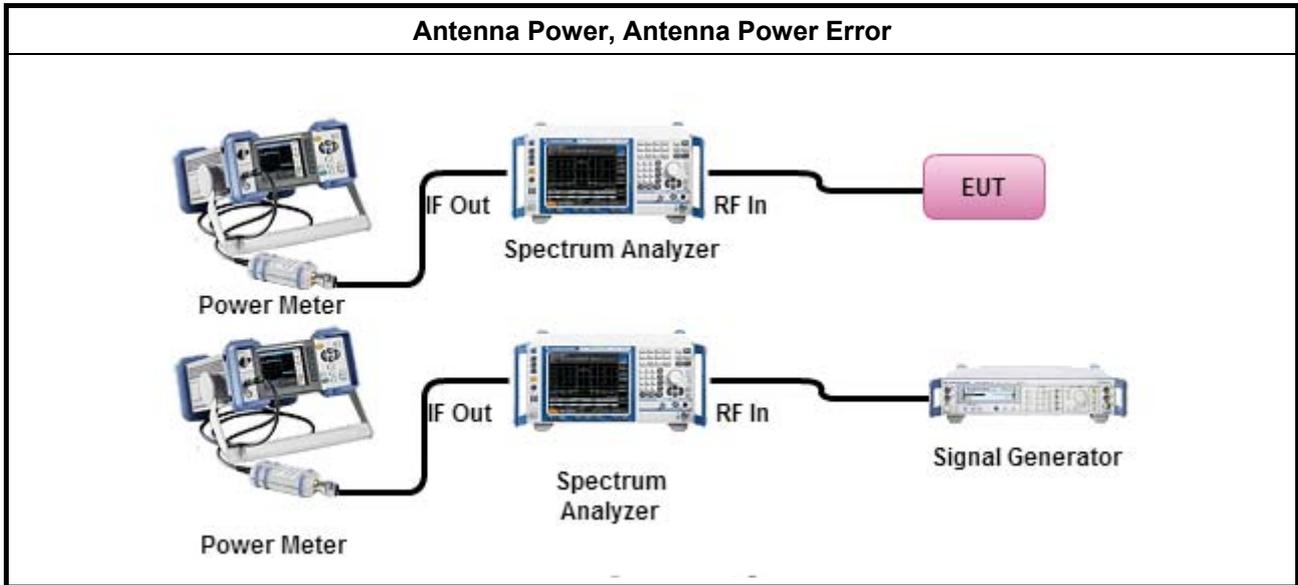
3.3.2 Measuring Instruments

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 _{ch} 20MHz & CP/OBW≤18MHz) - fc±20MHz ≥25dB; fc±40MHz ≥40dB
(BW _{ch} 20MHz & CP/OBW≤19MHz) - fc±20MHz ≥25dB; fc±40MHz ≥40dB
(BW _{ch} 40MHz & CP/OBW≤38MHz) - fc±40MHz ≥25dB; fc±80MHz ≥40dB
(BW _{ch} 80MHz & CP/OBW≤78MHz) - fc±80MHz ≥25dB
(BW _{ch} 80+80MHz & CP/OBW≤78MHz) - fc±80MHz ≥25dB
(BW _{ch} 160MHz & CP/OBW≤158MHz) - N/A

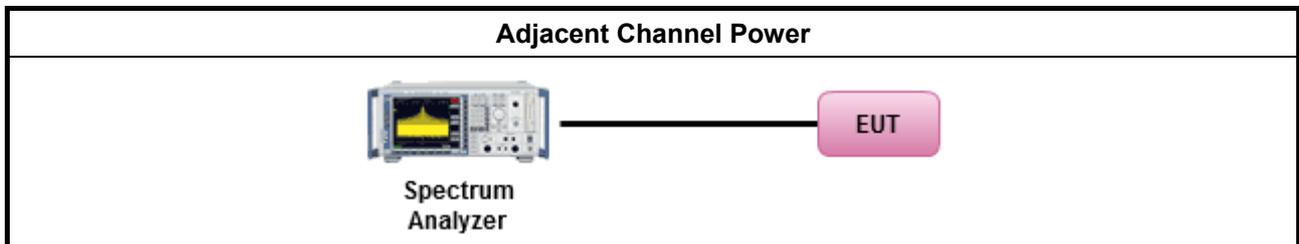
3.4.2 Measuring Instruments

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 _{ch} 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 _{ch} 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 _{ch} 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

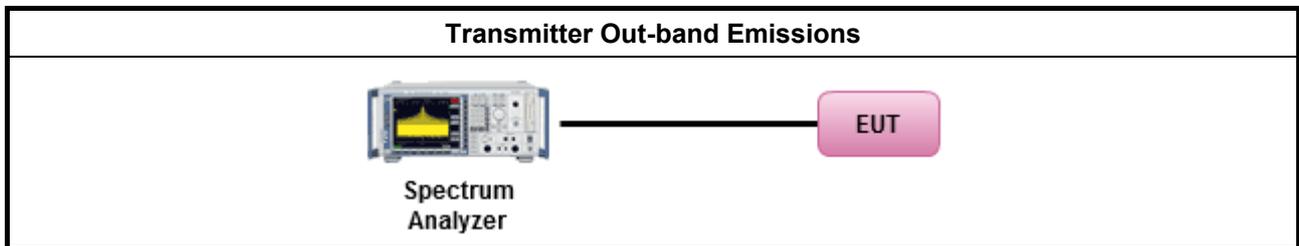
3.5.2 Measuring Instruments

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 _{ch} 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 _{ch} 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 _{ch} 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

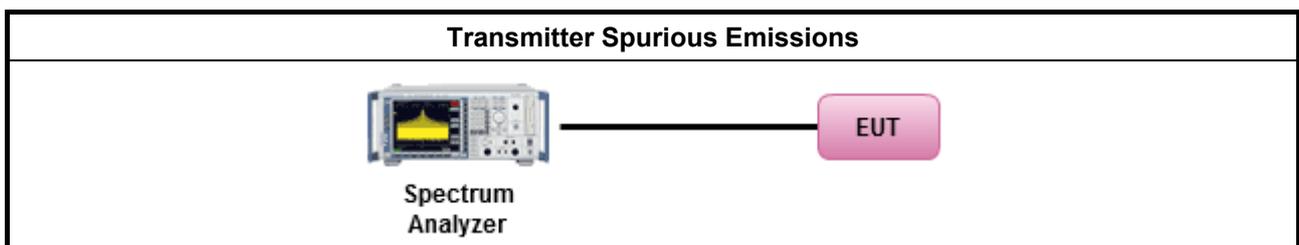
3.6.2 Measuring Instruments

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

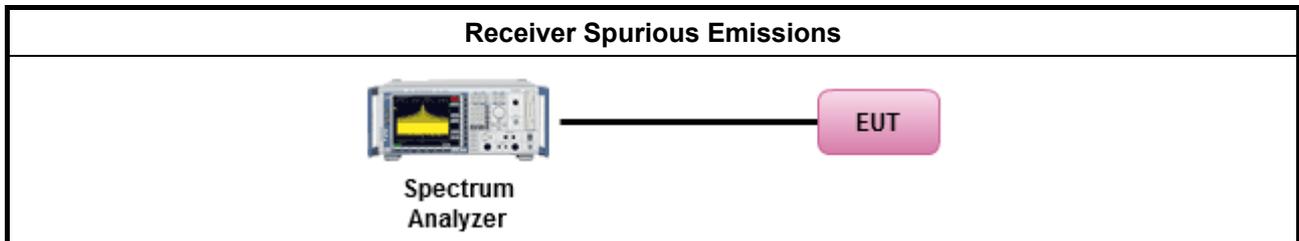
3.7.2 Measuring Instruments

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

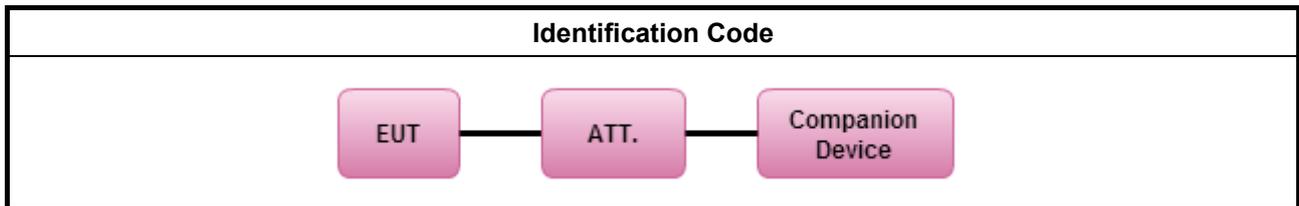
3.8.2 Measuring Instruments

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)

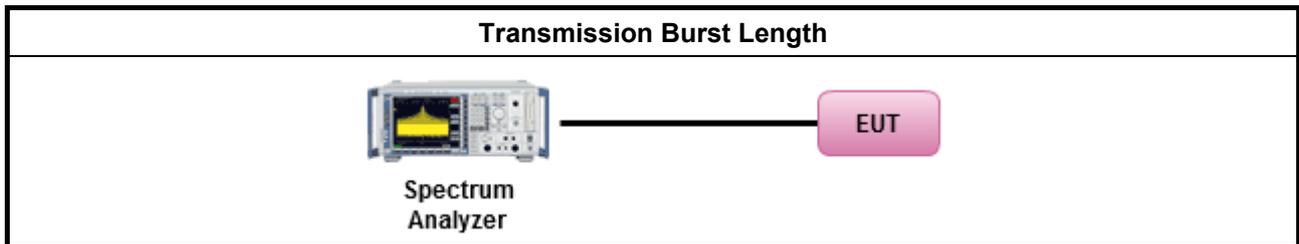
3.9.2 Measuring Instruments

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 $22.79+Gr-20*\log(f)$ [dBm])

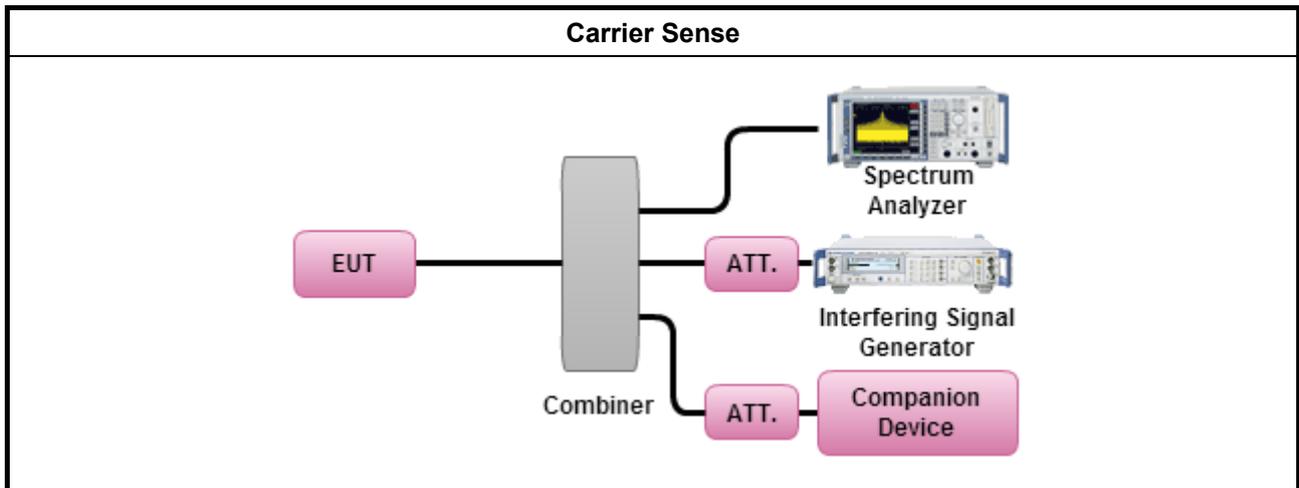
3.10.2 Measuring Instruments

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

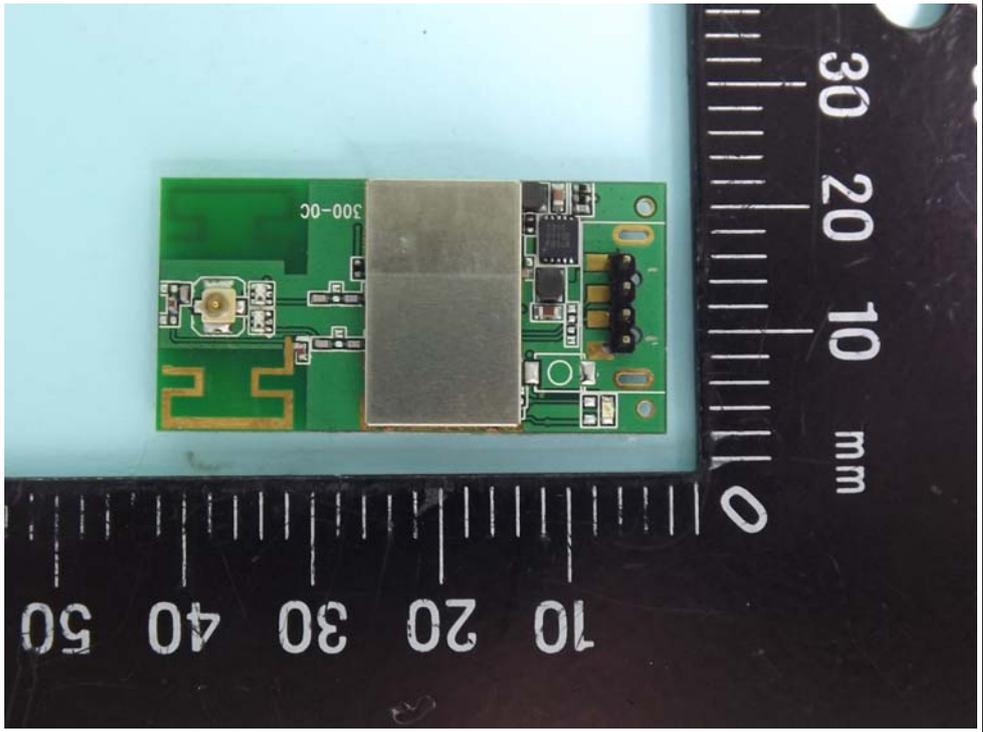
Photo	Item
Photo 1	

Photo 2

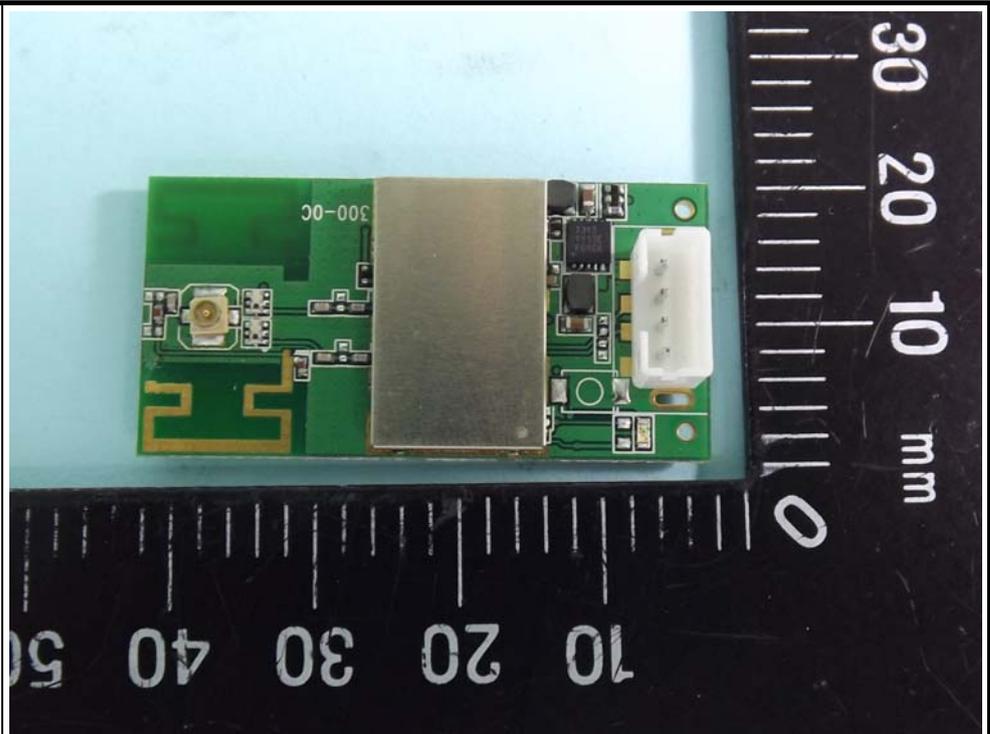
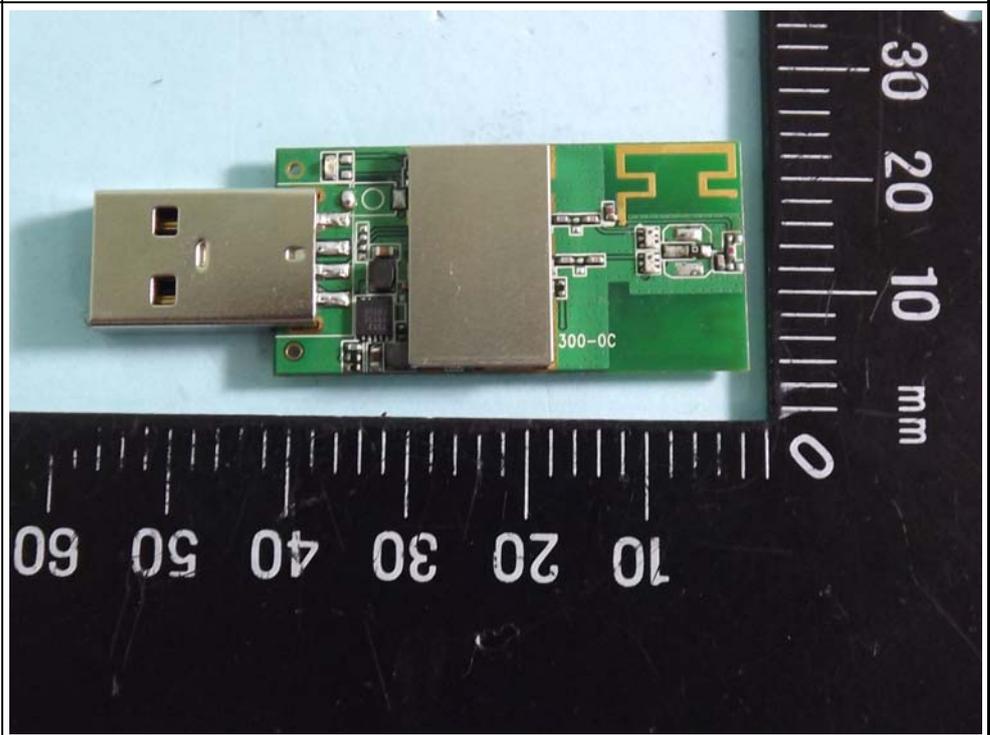


Photo 3





4 Test Equipment and Calibration Data

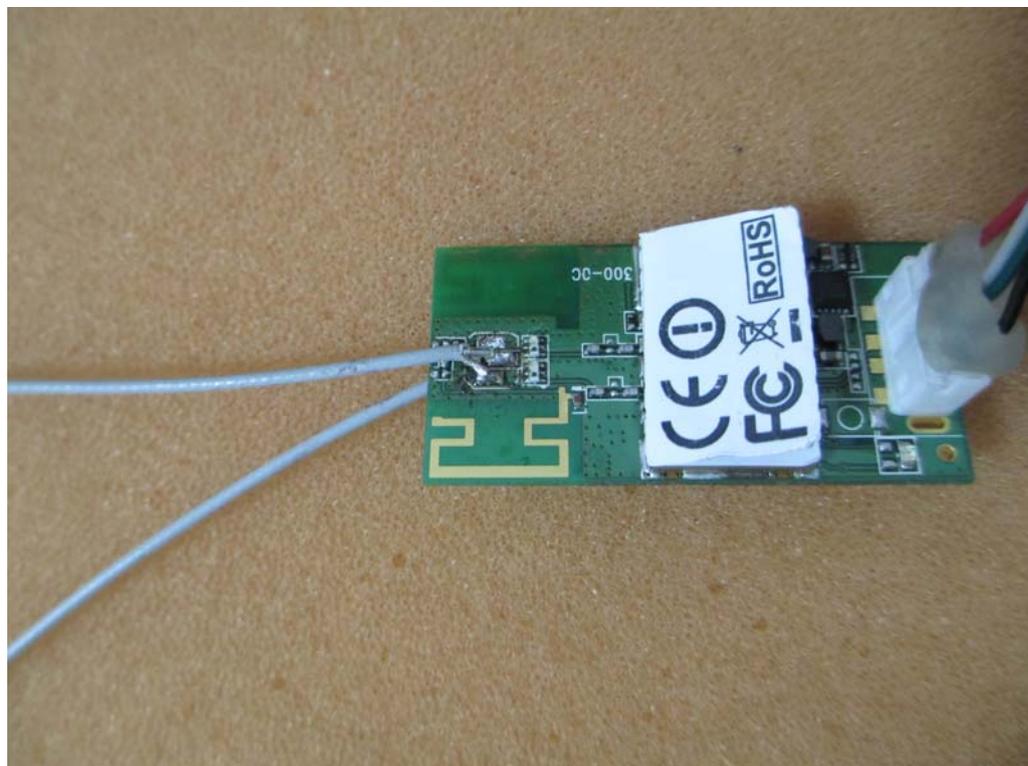
Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 40	100305	9KHz~40GHz	Mar. 20, 2013	Conducted
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 21, 2013	Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jun. 27, 2013	Conducted
Power Sensor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

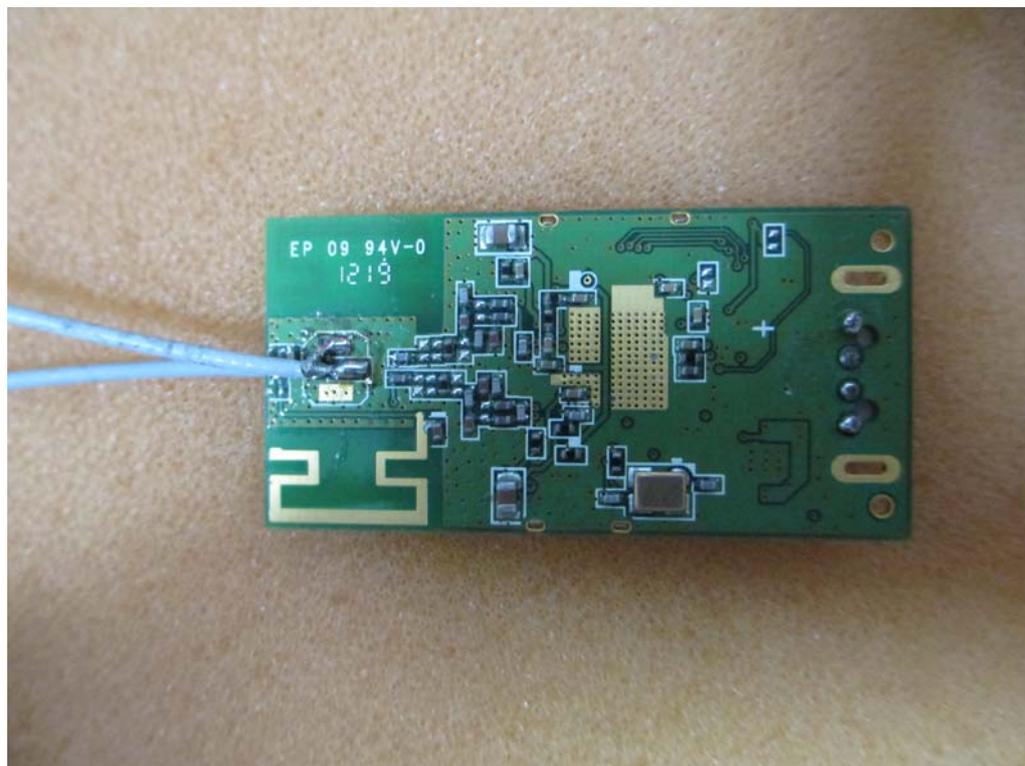
Note: Calibration Interval of instruments listed above is one year.

Appendix A. Test Photos

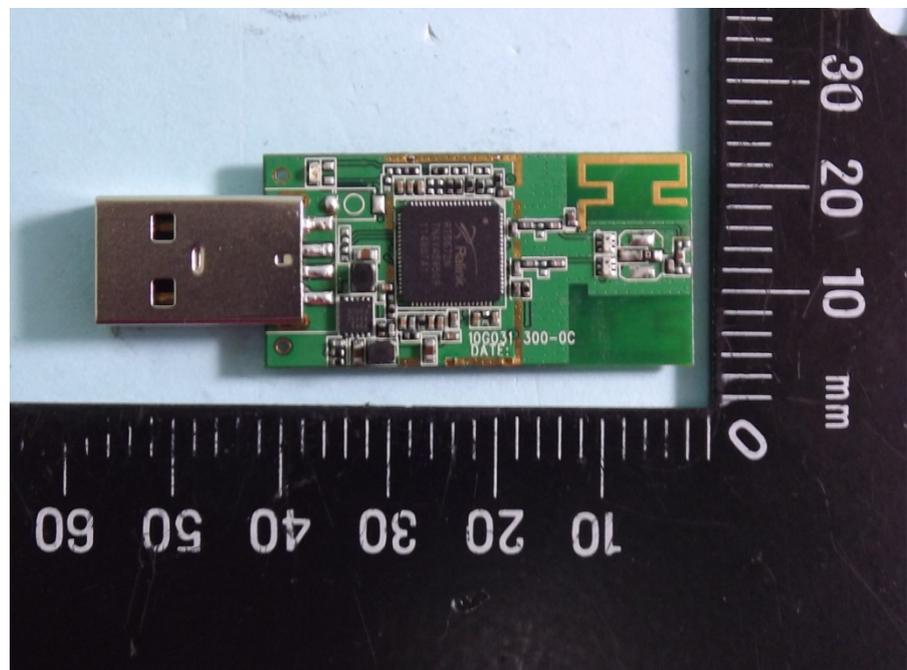
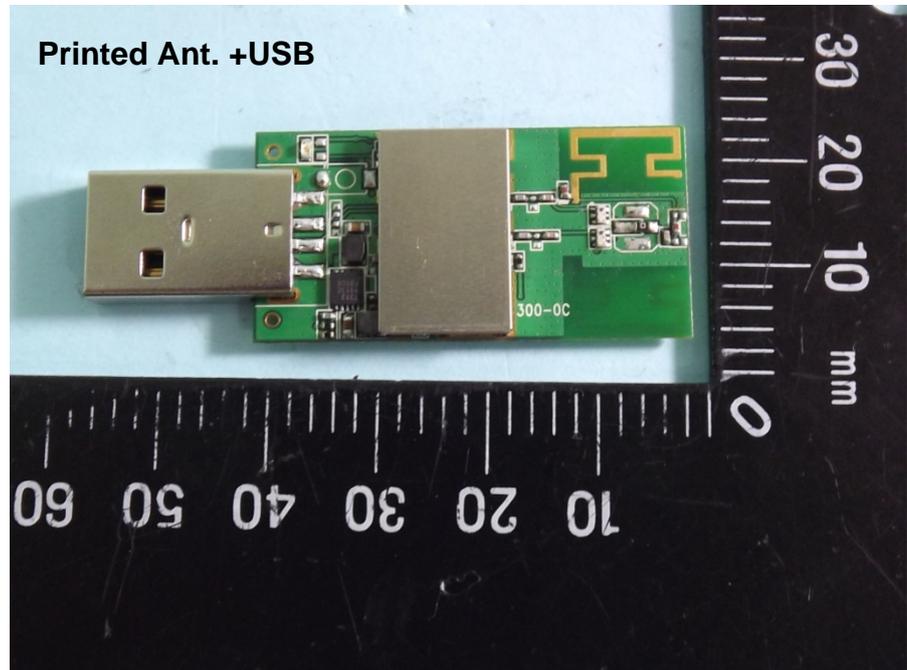


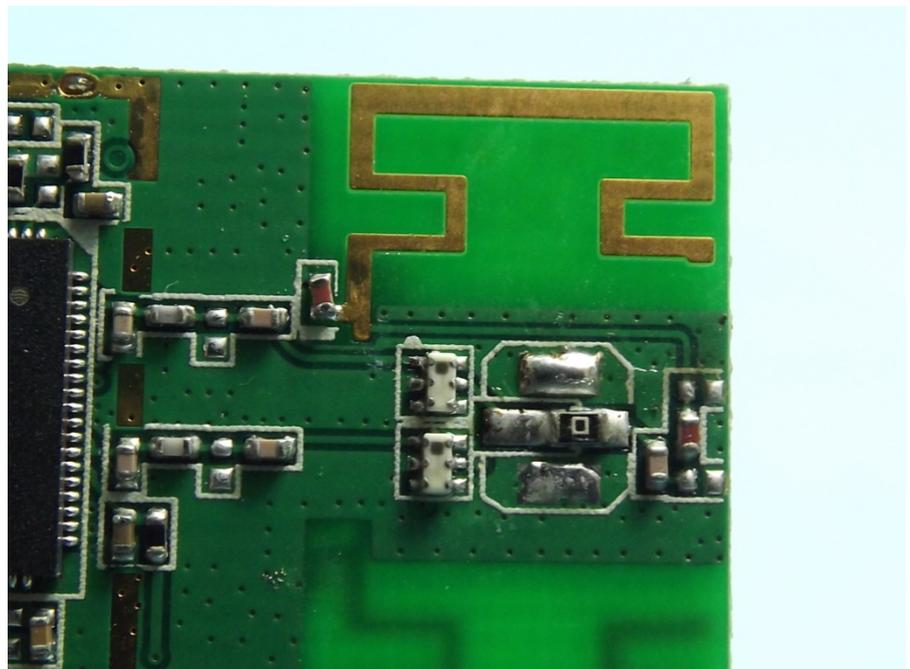


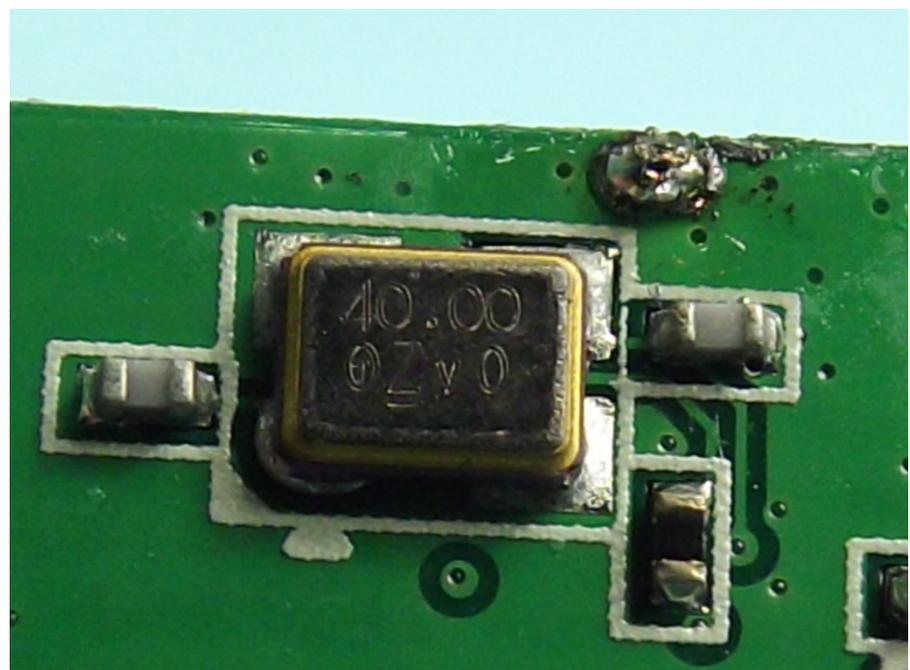
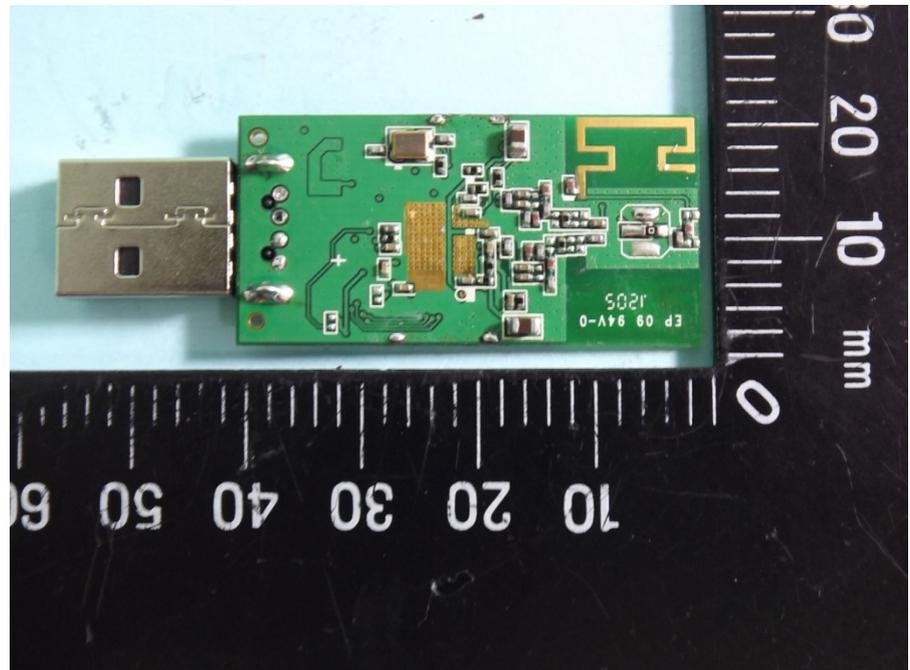


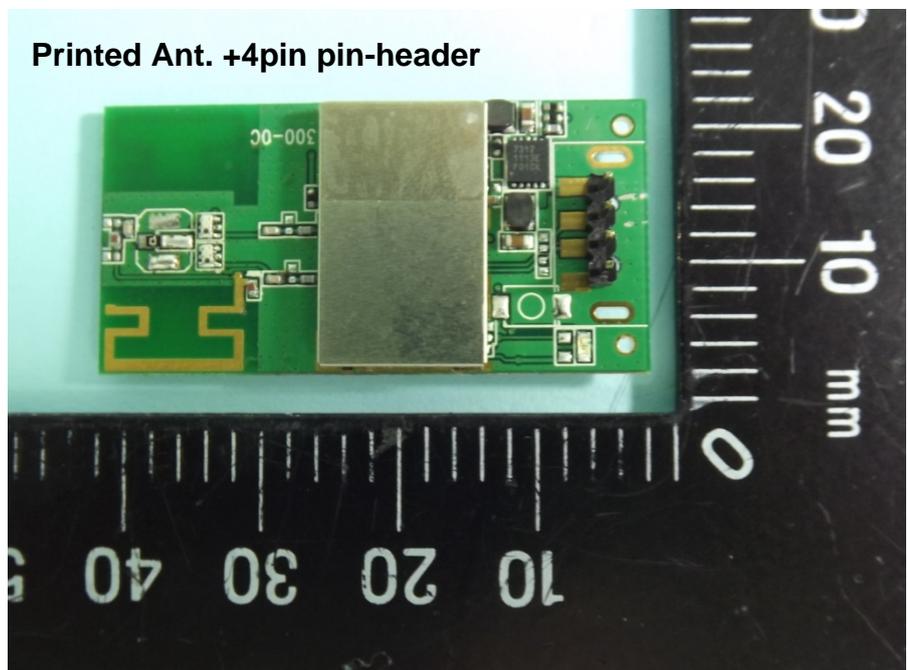
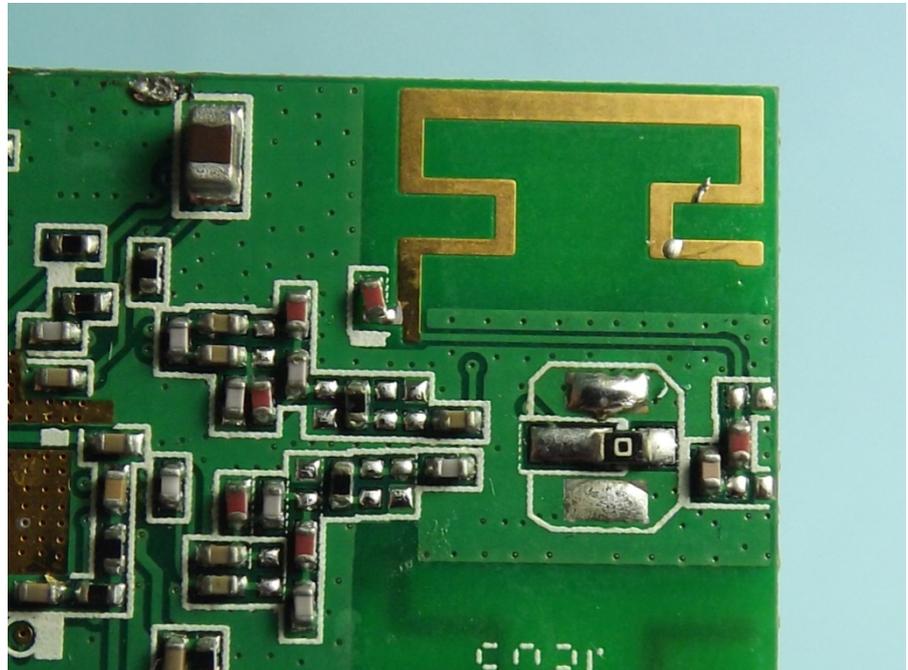


APPENDIX B Photographs of EUT



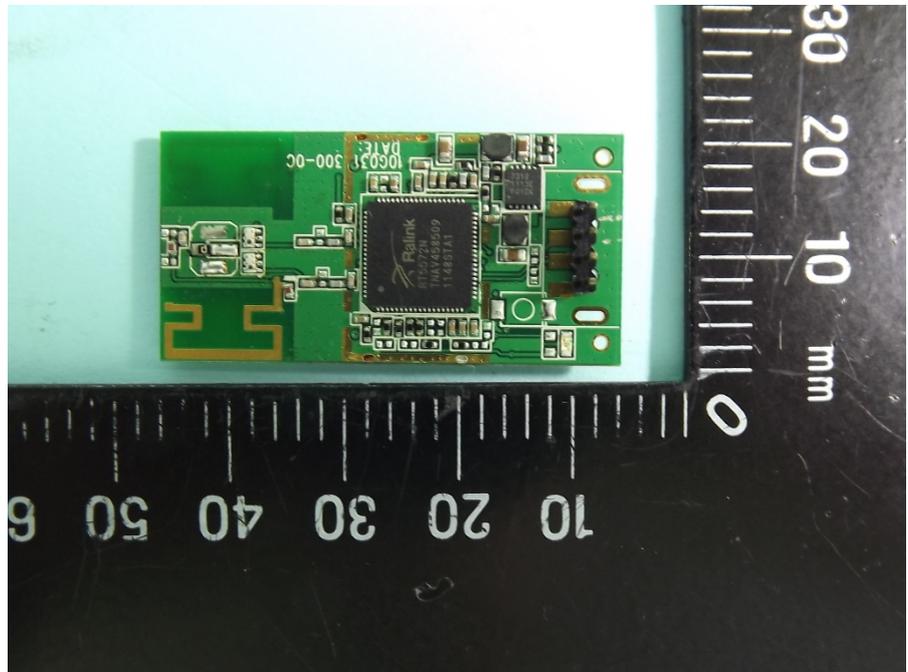






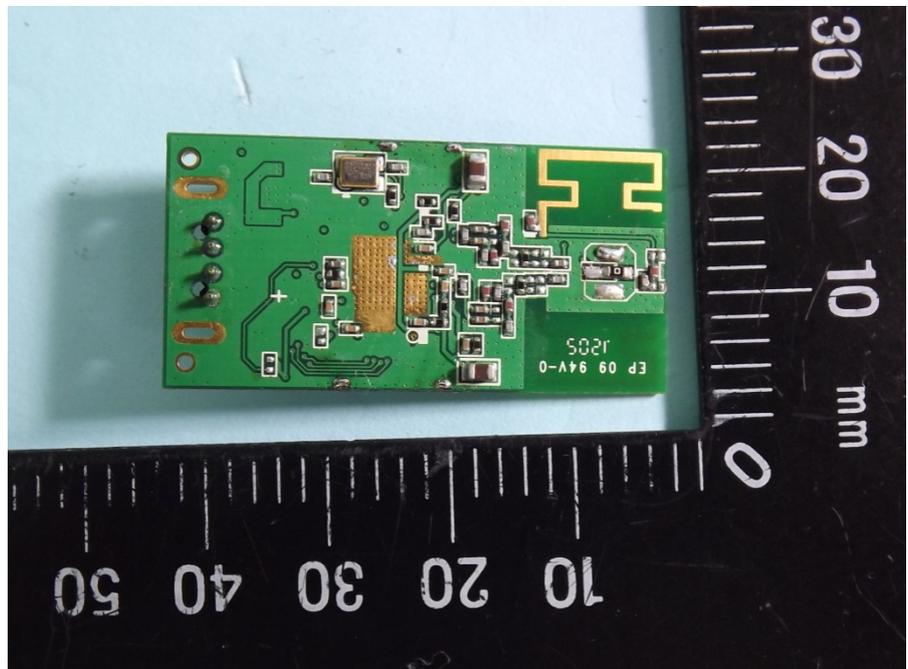
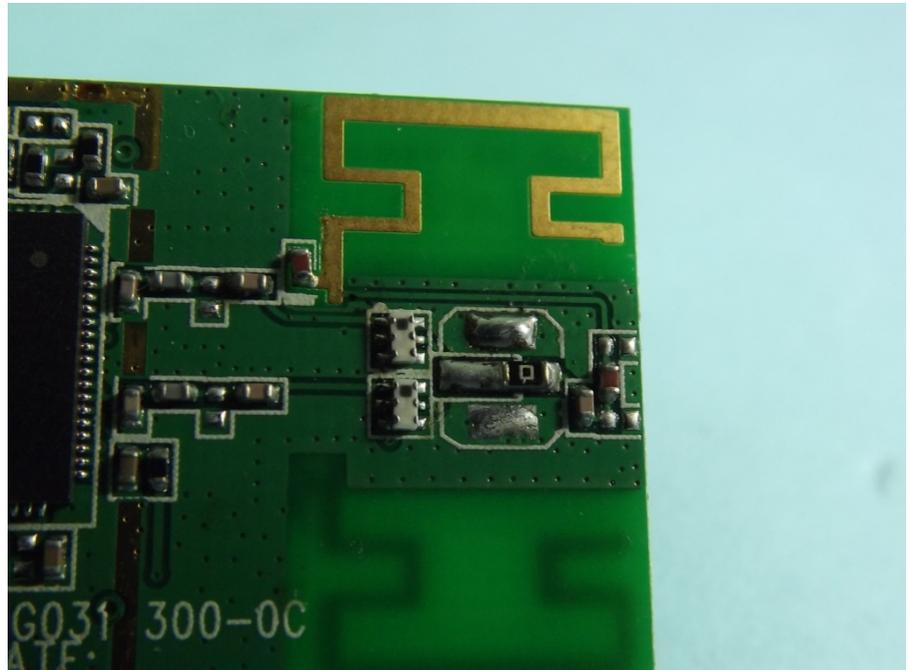


MIC Test Report



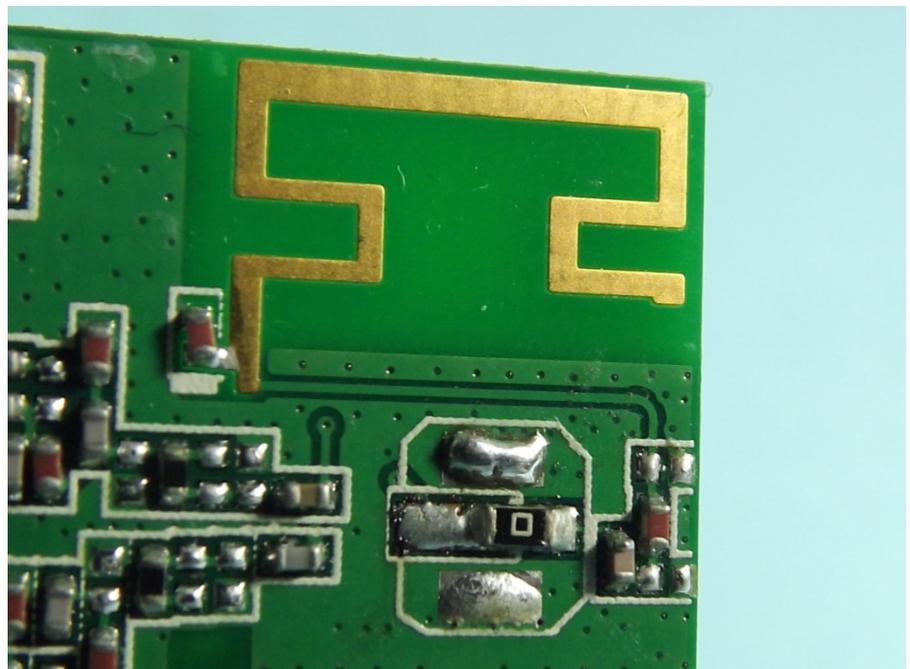
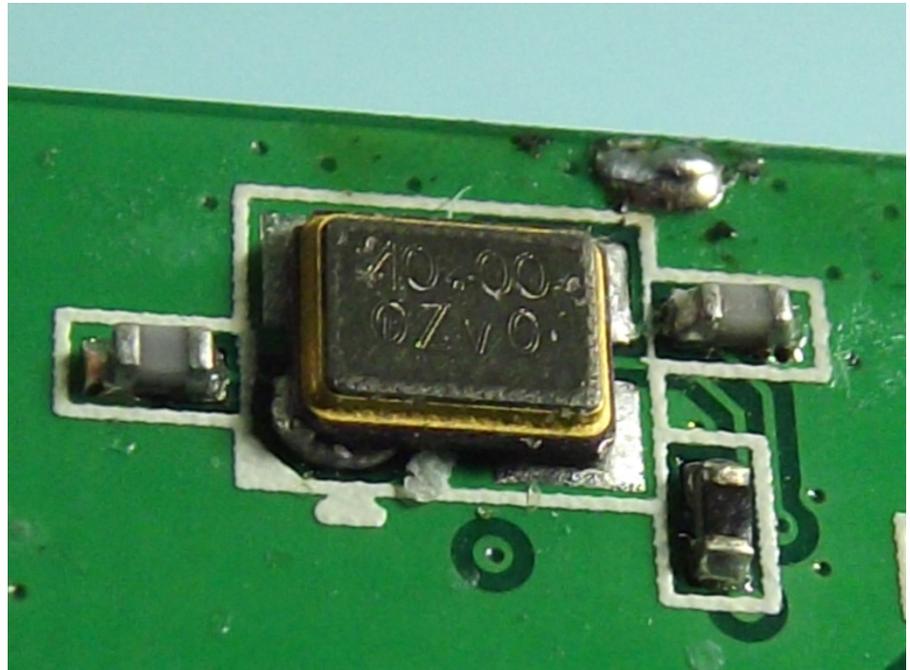


MIC Test Report

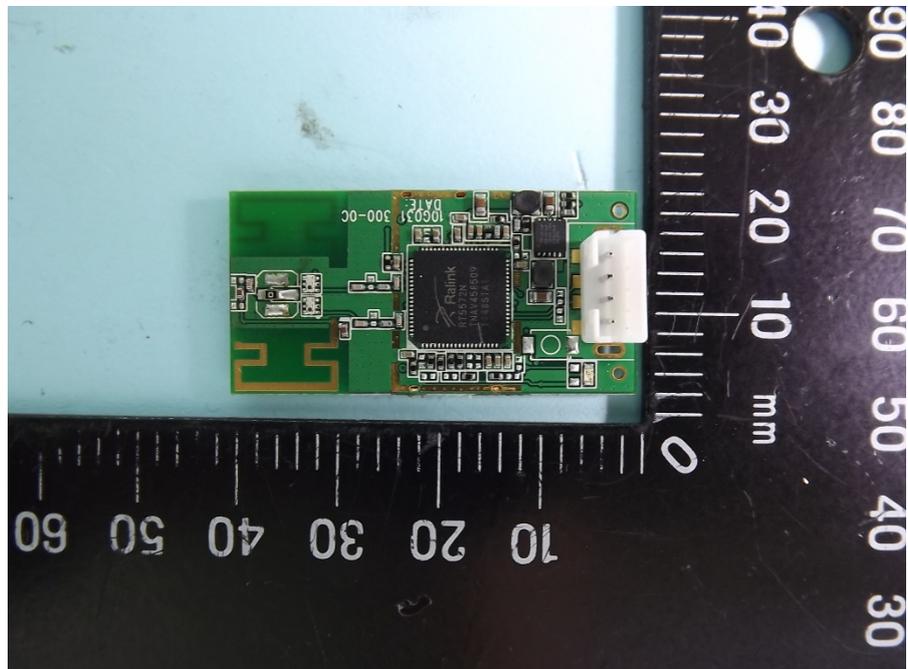
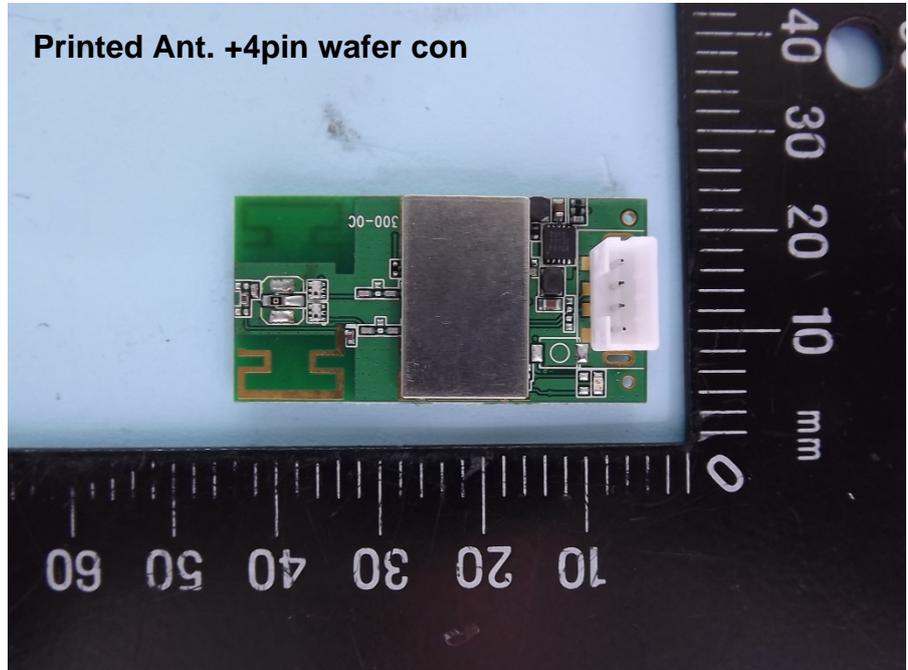




MIC Test Report

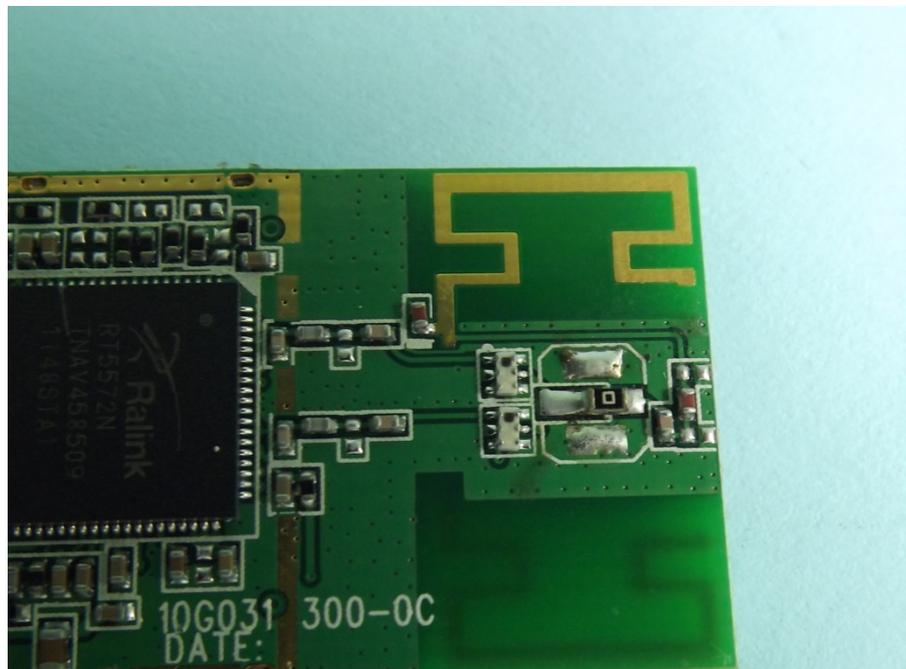


Printed Ant. +4pin wafer con



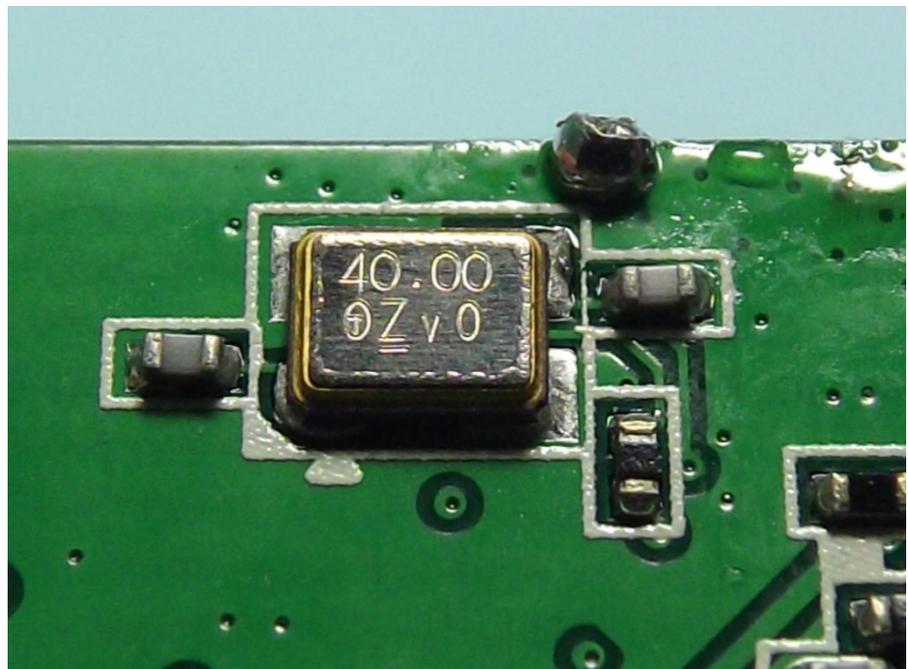
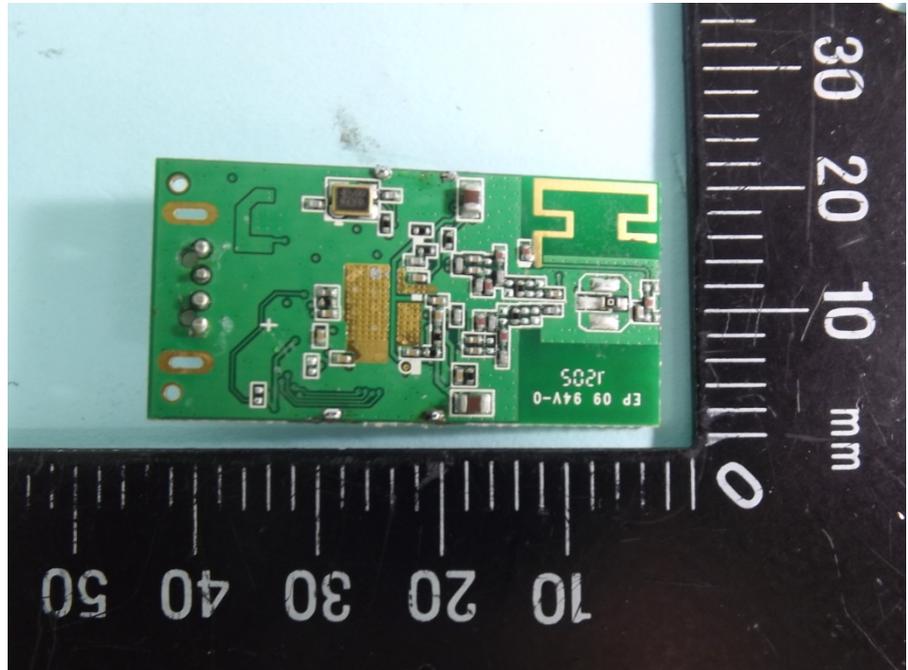


MIC Test Report



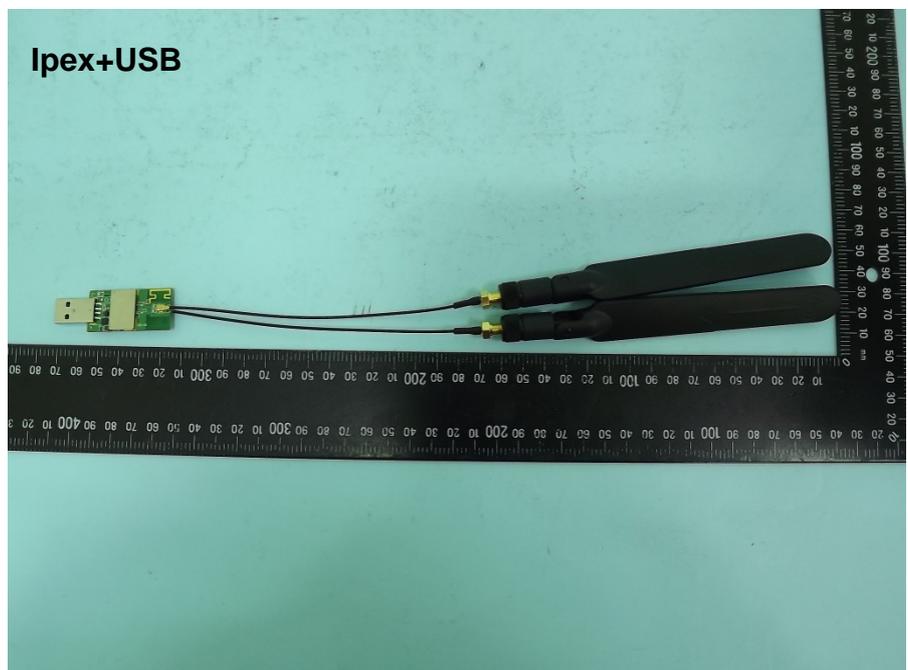
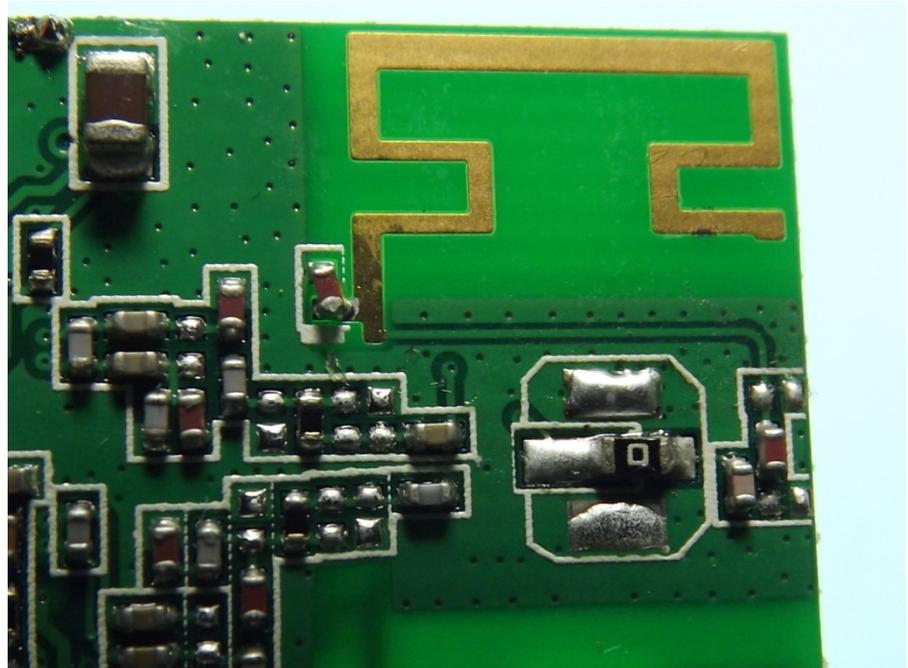


MIC Test Report



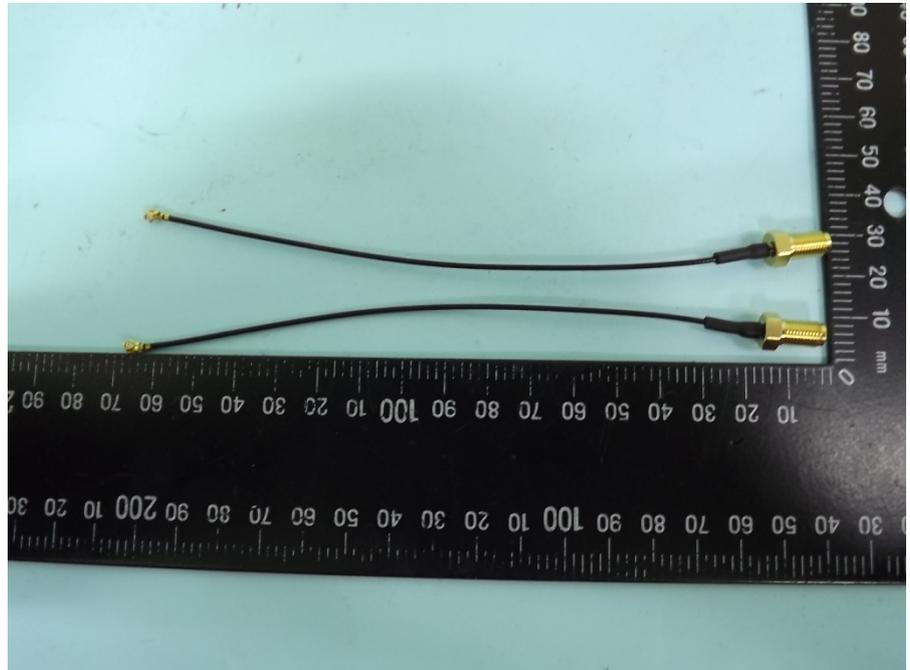


MIC Test Report



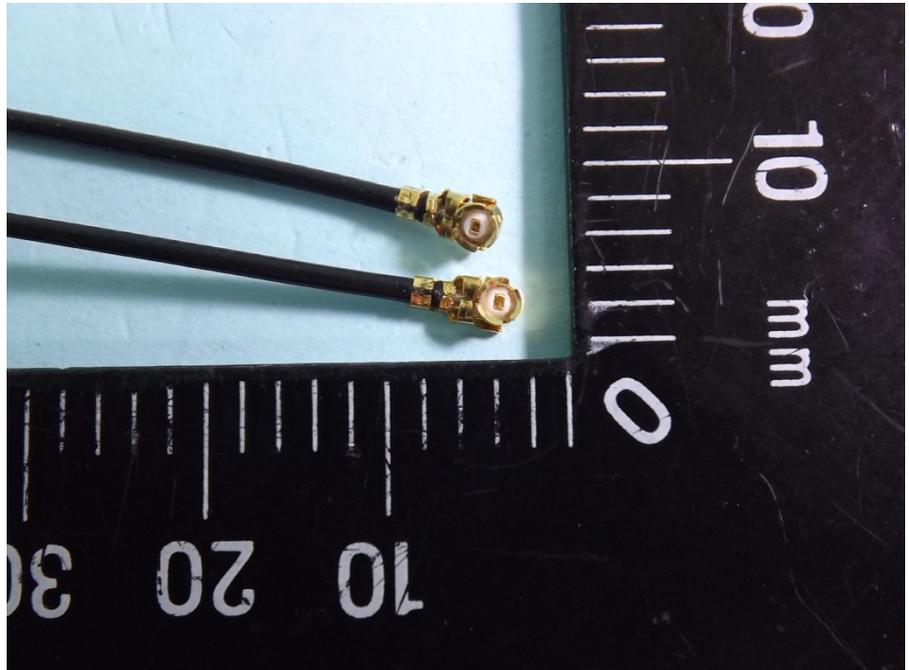


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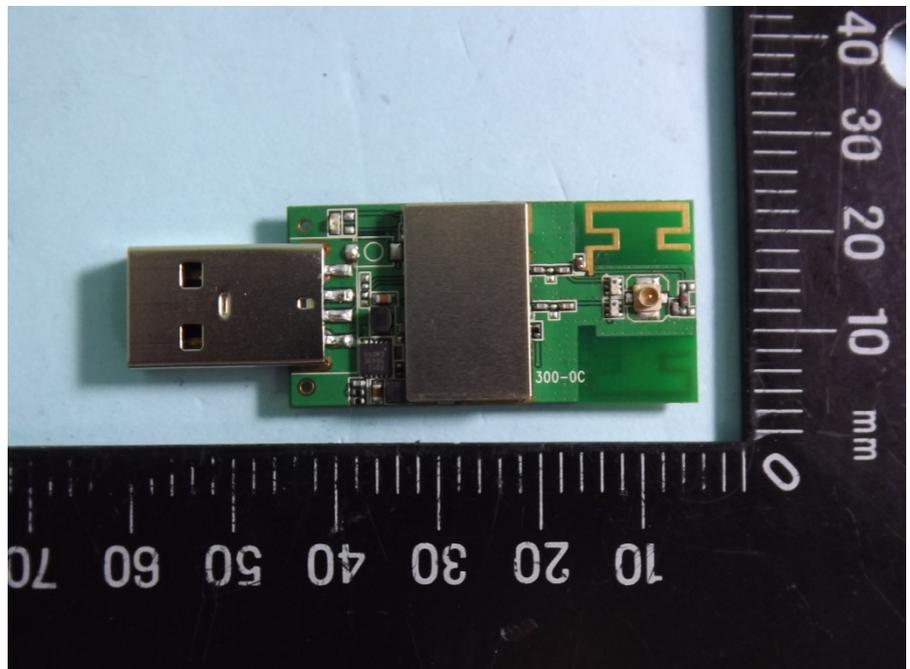


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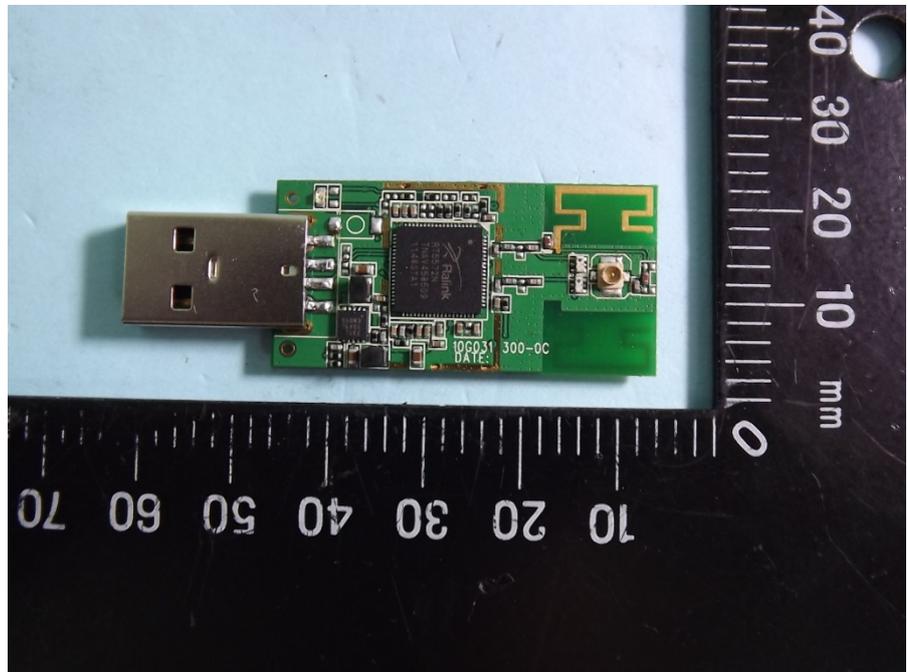


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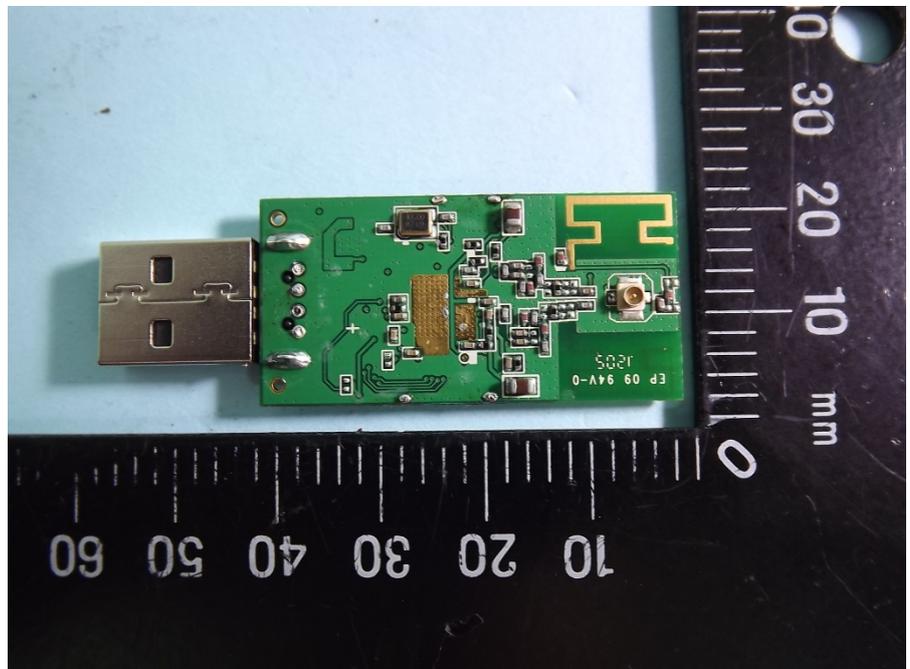
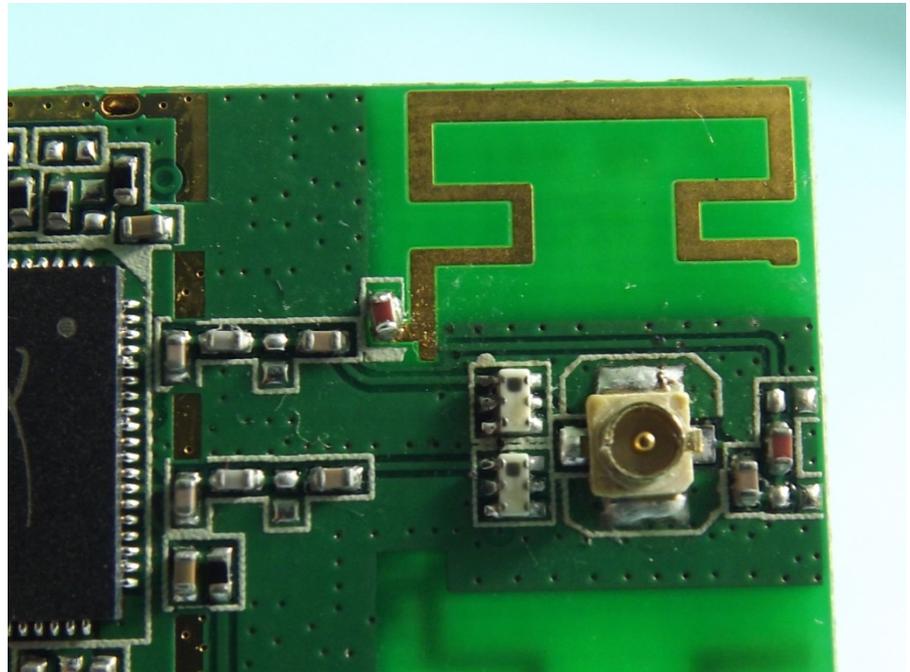


MIC Test Report



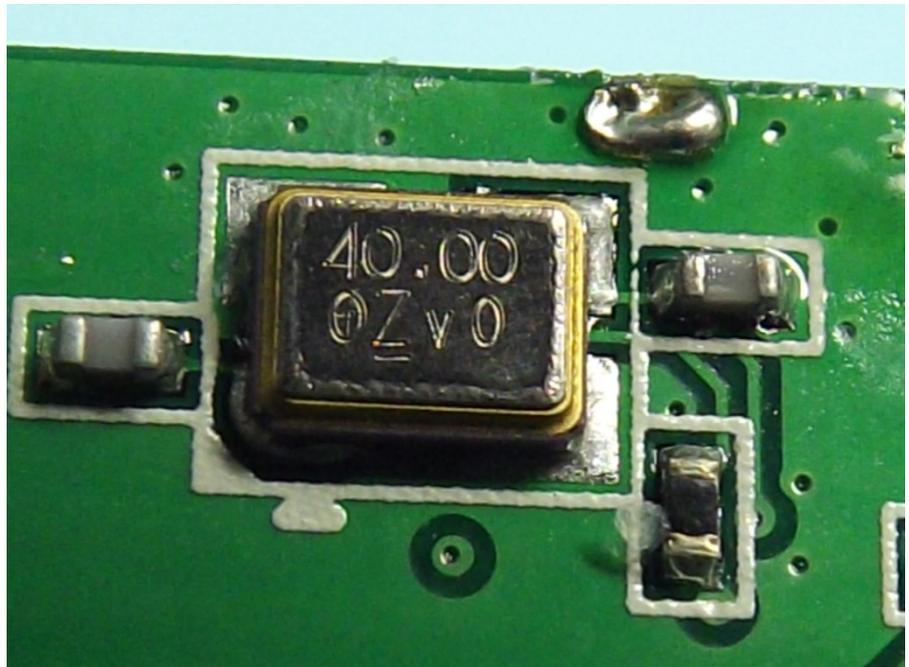
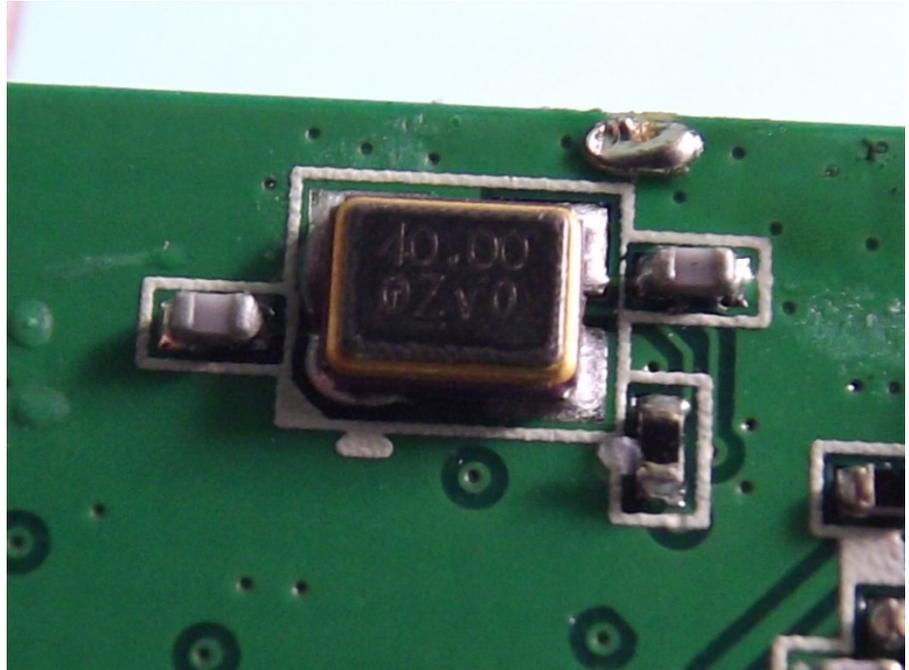


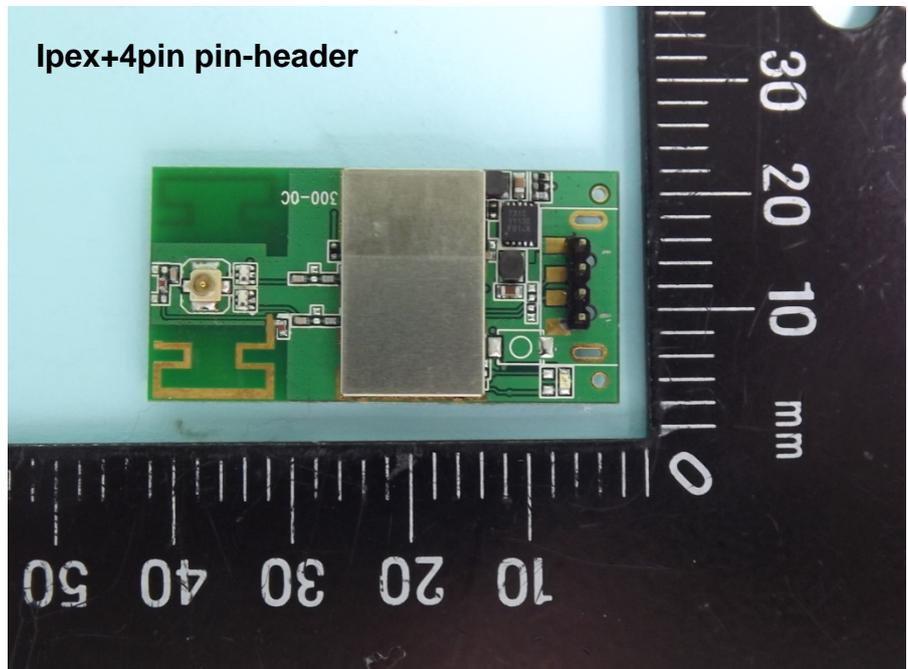
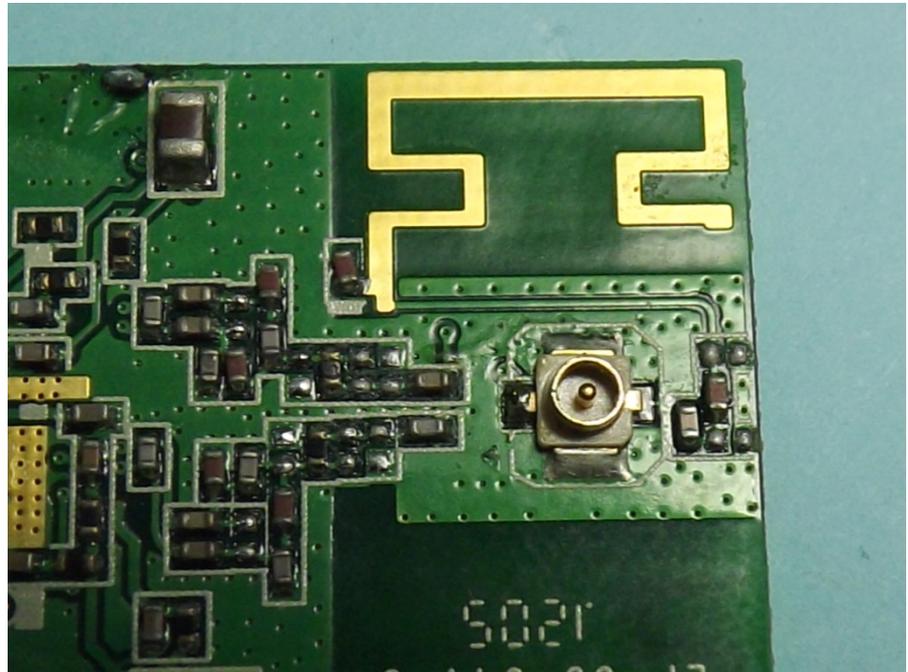
MIC Test Report





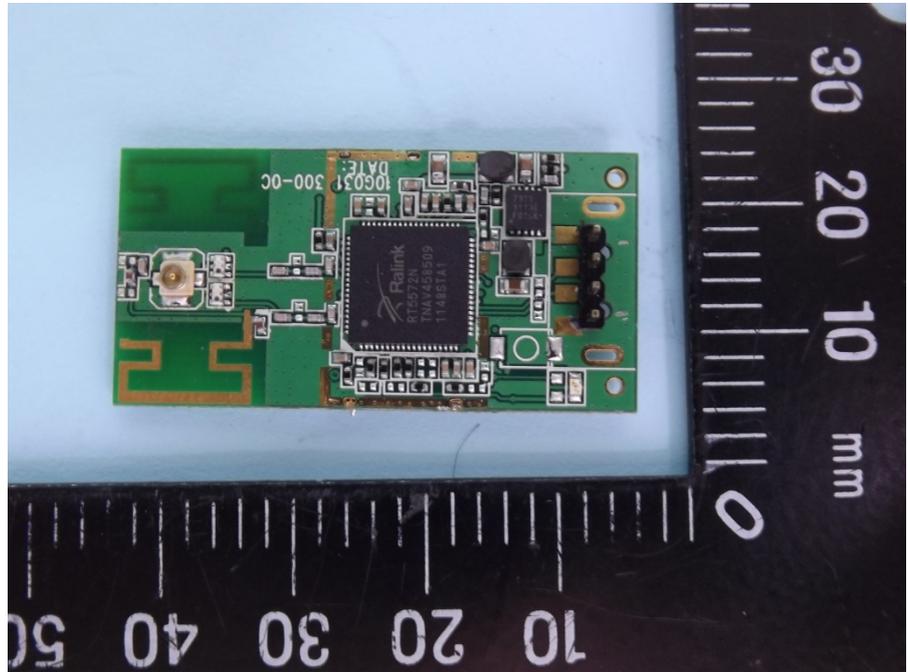
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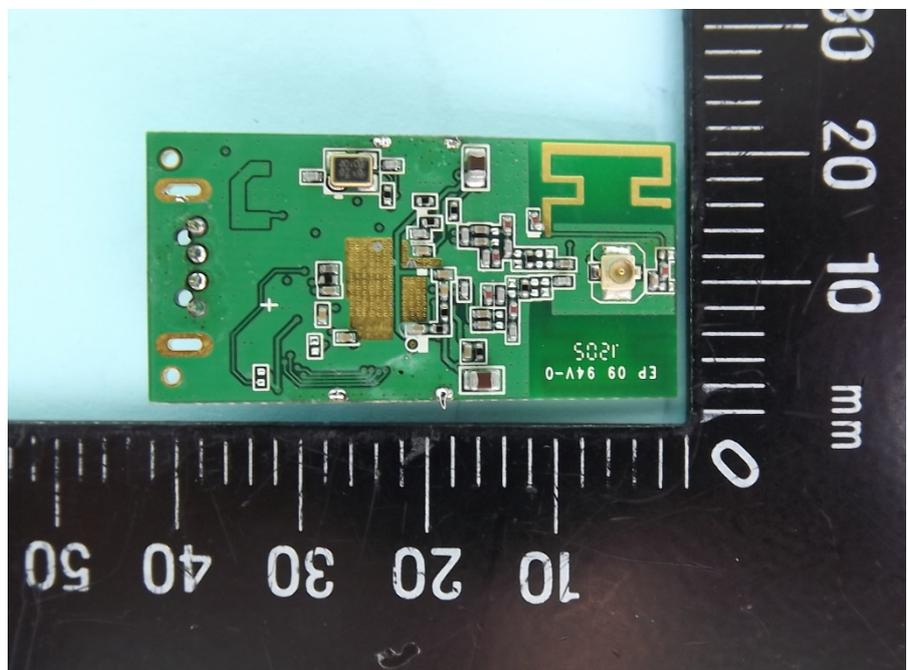
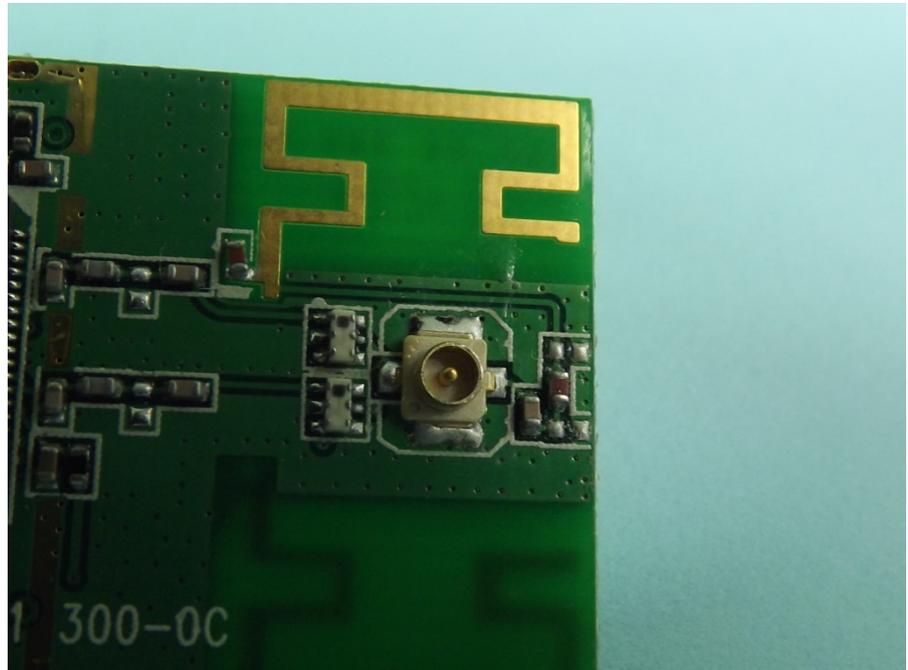


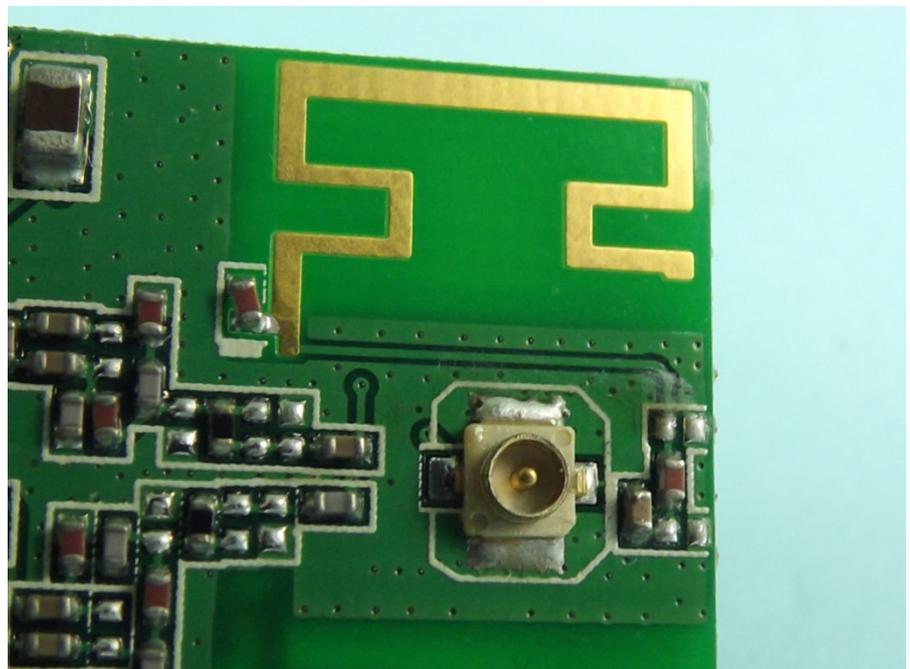
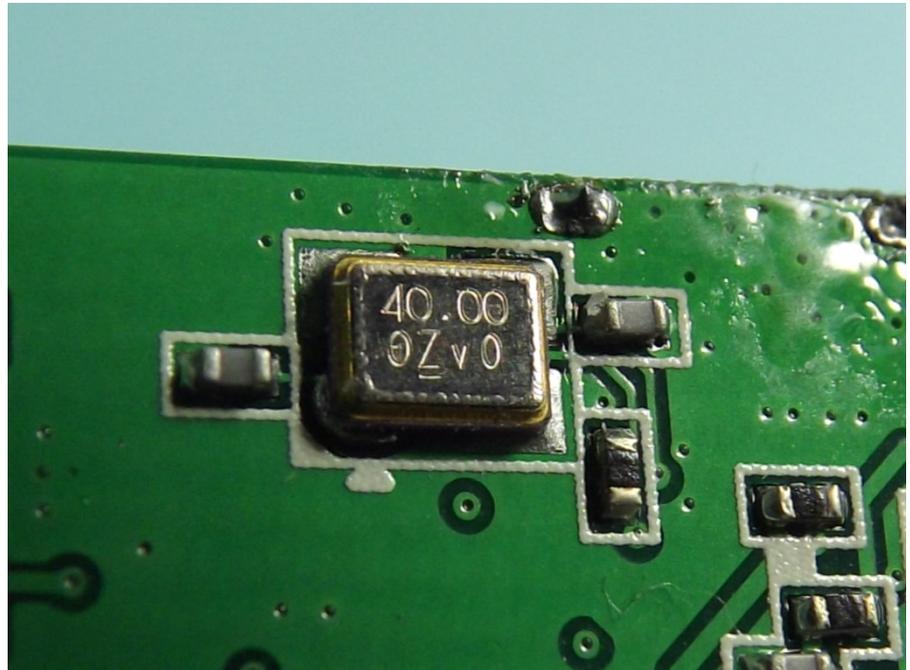
MIC Test Report

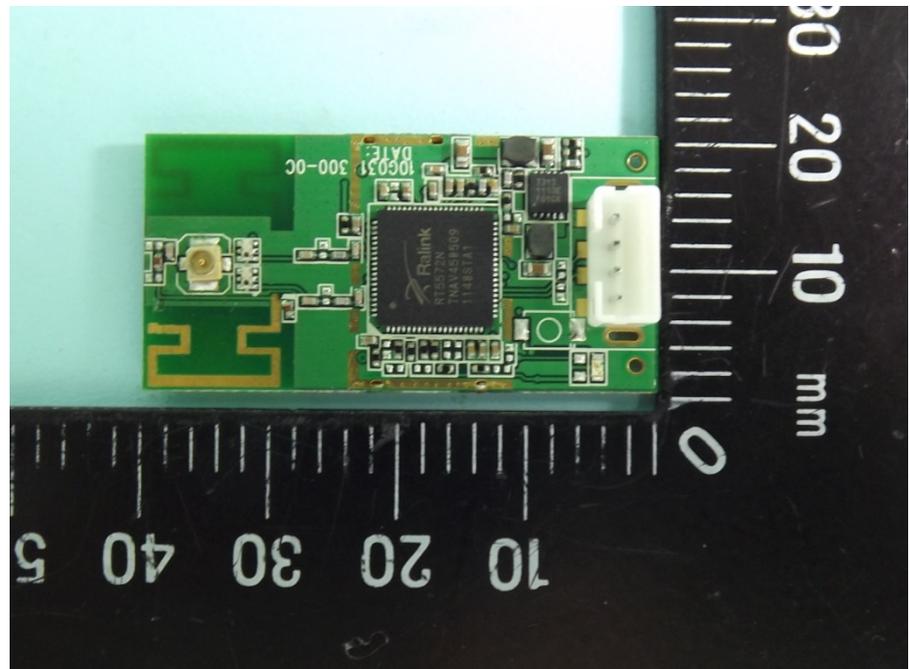
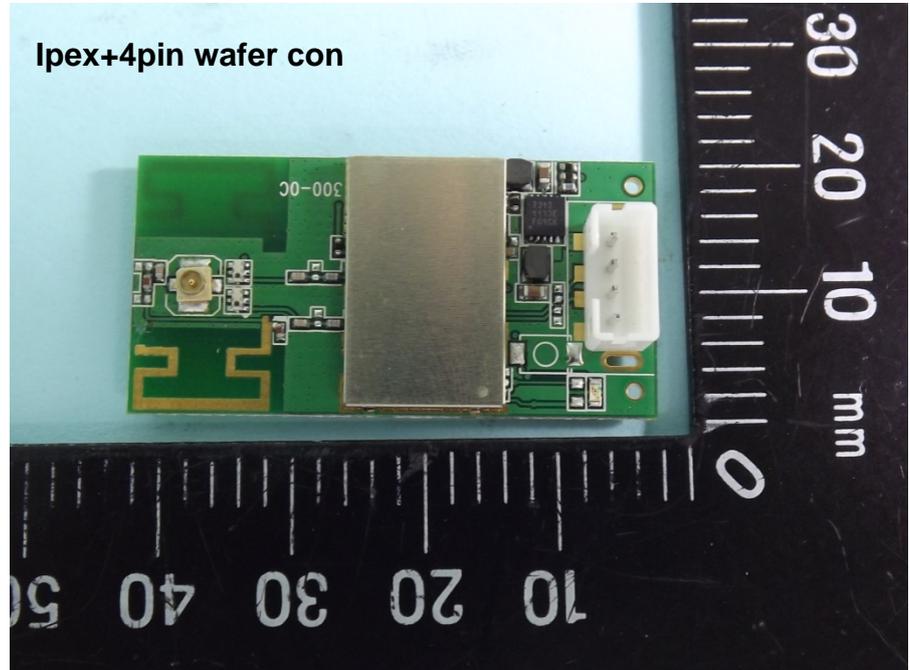


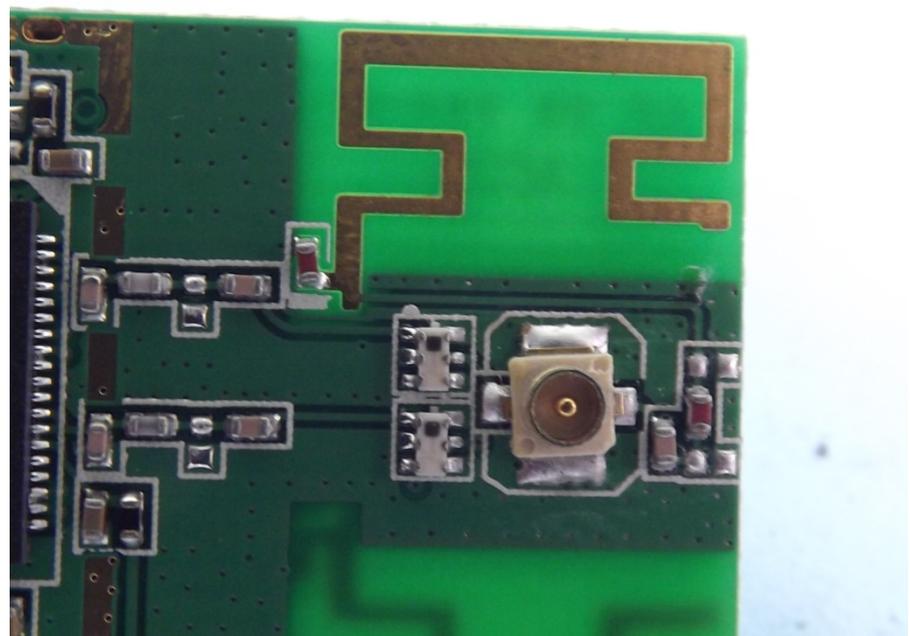


MIC Test Report



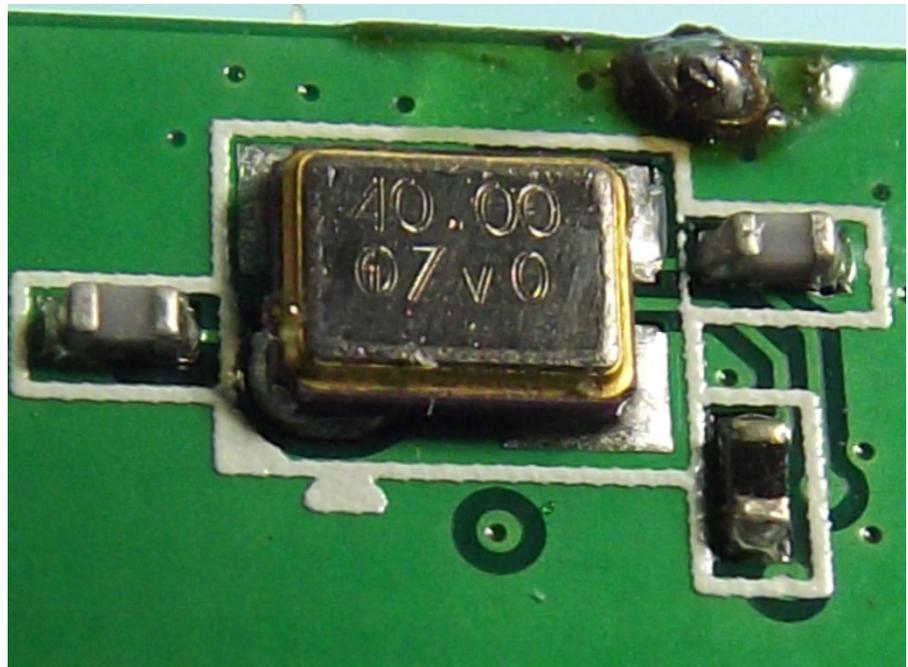
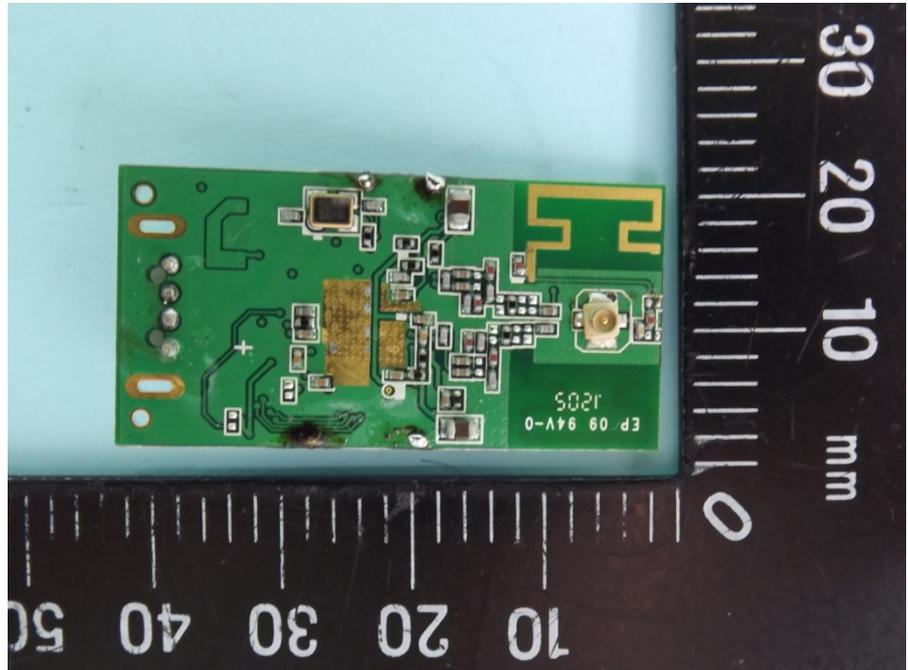






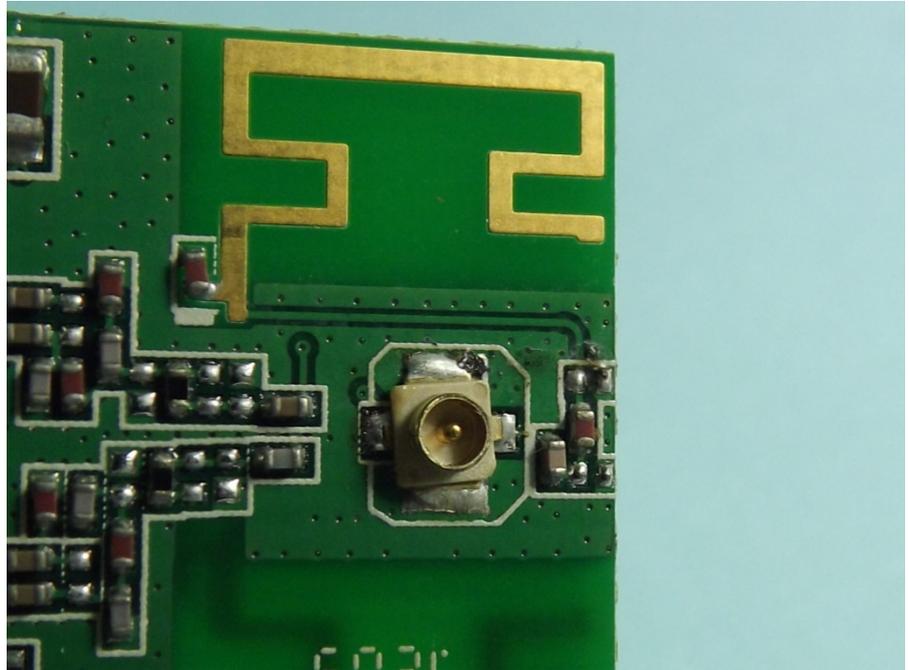


MIC Test Report





MIC Test Report



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

Sporton No.	JR373103
Test Date	2013/9/5
Test Location	SPORTON Lab.
Temp. / Humid.	24.6°C / 62%
Test Site	TH06-HY
Engineer	Shiming
Department	Radio Service Group

1. General Information

Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3	Antenna Port	DAC 0
	Type of Emission	G1D / D1D	Model	WUBR-508N
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM	Serial No.	12635W2002256
	Frequency	5180~5240MHz(20MHz Space 4 Channels)	Antenna Power	1.75 mW/MHz
				W52

2. Test Results

Test Voltage		V	Normal Voltage (5V)			Remarks		
Test Frequency		MHz	5180	5200	5240	Low/Mid/High of test frequency range		
Testing for Electrical Specification	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	μp	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 = 22.7r+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	-	-	-			
TPC function	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	
		Max value in the band	MHz	5135.00	5135.00	5043.11		
	W53	Raw dBm	-39.25	-44.26	-43.29	30MHz~5135MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)		
		dBm/MHz	-37.00	-42.01	-41.04			
	W52	Raw dBm	21955.54	21790.46	21955.54	5365MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)		
		dBm/MHz	-33.41	-33.95	-34.27			
	Out-Band Leakage Power (EIRP)	W52	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range
			Max value in the band	MHz	5137.17	5135.41	5137.09	
		W52	Raw dBm	-37.83	-41.96	-43.67	5135MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
			dBm/MHz	-28.94	-33.07	-34.78		
W52		Raw dBm	-32.19	-39.20	-43.46	5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)		
		dBm/MHz	-23.30	-30.31	-34.57			
W52		Raw dBm	-43.80	-42.77	-32.13	5250MHz~5251MHz Limit ≤ 1000 - 100 μW/MHz (0 - -10 dBm/MHz)		
		dBm/MHz	-34.91	-33.88	-32.24			
W52		Raw dBm	-44.58	-40.78	-30.09	5251MHz~5260MHz Limit ≤ 100 - 15.8 μW/MHz (-10 - -18 dBm/MHz)		
		dBm/MHz	-35.34	-31.89	-21.20			
W52	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	-31.89	-21.20				
W52	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				

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 ≤ 10 mW/MHz (10 dBm/MHz)	
Antenna Power (Conducted)	mW/MHz	1.7530	1.5732	1.7250				
Transmitter ON _{Time}	msec				1.0000			RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) _{Time}	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. 2nd 3rd
	* 1	MHz	-	-	-			
	* 2	MHz	-	-	-			
	* 1	MHz	21950.00	21950.00	3450.00			1st 1000MHz~26GHz: Maximum emission and all emissions beyond 1/10 of the limitation must be indicated. 2nd 3rd
	* 2	MHz	-	-	-			
	* 2	MHz	-	-	-			
Cable Loss	* 1	dB	0.78	0.78	0.78			1st 2nd 3rd
	* 1	dB	-	-	-			
	* 2	dB	-	-	-			
	* 2	dB	3.68	3.68	3.68			1st 2nd 3rd
	* 2	dB	-	-	-			
	* 2	dB	-	-	-			
Spectrum Raw	* 1	dBm	-77.95	-75.69	-78.62			1st 2nd 3rd
	* 1	dBm	-	-	-			
	* 2	dBm	-63.94	-63.97	-62.77			
	* 2	dBm	-	-	-			1st 2nd 3rd
	* 2	dBm	-	-	-			
	* 2	dBm	-	-	-			
Spurious Emission Intensity	* 1	dBm	-77.17	-74.91	-77.84			1st Limit ≤ 4 nW (-54 dBm) 2nd RBW : 100 kHz ; VBW : 100 kHz 3rd
	* 1	dBm	-	-	-			
	* 2	dBm	-60.26	-60.29	-59.09			
	* 2	dBm	-	-	-			1st Limit ≤ 20 nW (-47 dBm) 2nd RBW : 1 MHz ; VBW : 1 MHz 3rd
	* 2	dBm	-	-	-			
	* 2	dBm	-	-	-			
Spurious Emission Intensity	* 1	nW	0.0192	0.0323	0.0164			Total Emission Power 1st Limit ≤ 4 nW (-54 dBm) 2nd RBW : 100 kHz ; VBW : 100 kHz 3rd
	* 1	nW	-	-	-			
	* 1	nW	-	-	-			
	* 2	nW	0.9419	0.9354	1.2331			Total Emission Power 1st Limit ≤ 20 nW (-47 dBm) 2nd RBW : 1 MHz ; VBW : 1 MHz 3rd
	* 2	nW	-	-	-			
	* 2	nW	-	-	-			

* 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				
Mini. Antenna Gain	dBi	-1.25	-1.25	-1.25				
Carrier Level	dBm	-52.75	-52.78	-52.85			Pin = $22.79 + Gr - 20 * \log(\text{freq_MHz})$ [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°C / 62%
Test Site	TH06-HY
Engineer	Shiming
Department	Radio Service Group

1. General Information

Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3	Antenna Port	DAC 0
	Type of Emission	G1D / D1D	Model	WUBR-508N
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM	Serial No.	12635W2002256
	Frequency	5180~5240MHz(20MHz Space 4 Channels)	Antenna Power	0.86 mW/MHz
				W52

2. Test Results

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	μp	-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 = 22.7+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	-	-	-		
TPC function	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
		Max value in the band	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	0.04501	0.07638		
	W53	Max value in the band	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
Max value in the band			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	0.26363	0.32285	486.40721		
		μW/MHz	34.39	25.01	2.73	Margin to the technical requirement	
		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	0.24322	0.48306	1.51705		
		μW/MHz	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	0.24946	0.27290	5.90201		
	μW/MHz	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 ≤ 10 mW/MHz (10 dBm/MHz)	
Antenna Power (Conducted)	mW/MHz	0.8050	0.7830	0.8606				
Transmitter ON _{Time}	msec				1.0000			RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) _{Time}	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 emissions beyond 1/10 of the limitation must be indicated. 2nd 3rd	
	* 1	MHz	-	-	-				
	* 2	MHz	3438.00	22000.00	3450.00				
	Cable Loss	* 1	dB	0.78	0.78	0.78			1st 2nd 3rd
		* 1	dB	-	-	-			
		* 2	dB	3.68	3.68	3.68			
* 2		dB	-	-	3.68				
Spectrum Raw	* 1	dBm	-78.15	-76.60	-78.11			1st 2nd 3rd	
	* 1	dBm	-	-	-				
	* 2	dBm	-64.34	-64.55	-62.51				
	* 2	dBm	-	-	-63.19				
	* 2	dBm	-	-	-64.01				
	* 2	dBm	-	-	-				
Spurious Emission Intensity	* 1	dBm	-77.37	-75.82	-77.33			1st Limit ≤ 4 nW (-54 dBm) 2nd RBW : 100 kHz ; VBW : 100 kHz 3rd	
	* 1	dBm	-	-	-				
	* 2	dBm	-60.66	-60.87	-58.83				
	* 2	dBm	-	-	-59.51				
	* 2	dBm	-	-	-60.33				
	* 2	dBm	-	-	-				
Spurious Emission Intensity	* 1	nW	0.0183	0.0262	0.0185			Total Emission Power 1st Limit ≤ 4 nW (-54 dBm) 2nd RBW : 100 kHz ; VBW : 100 kHz 3rd	
	* 1	nW	-	-	-				
	* 2	nW	0.8590	0.8185	3.3554				
	* 2	nW	-	-	1.1194				
	* 2	nW	-	-	0.9268				
	* 2	nW	-	-	-				

* 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				
Mini. Antenna Gain	dBi	-1.25	-1.25	-1.25				
Carrier Level	dBm	-52.75	-52.78	-52.85			Pin = $22.79 + Gr - 20 * \log(\text{freq_MHz})$ [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 °C / 62%
Test Site	TH06-HY
Engineer	Shiming
Department	Radio Service Group

1. General Information

Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3	Antenna Port	DAC 1
	Type of Emission	G1D / D1D	Model	WUBR-508N
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM	Serial No.	12635W2002256
	Frequency	5180~5240MHz(20MHz Space 4 Channels)	Antenna Power	0.83 mW/MHz
				W52

2. Test Results

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	μp	-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	
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					
Radio Interface	Test Frequency (W53)	MHz	-	-	-	Pin = Gr - 62 [dBm]Gr is max receiving antenna gain in dBi	
Prevention Function	DFS function	OK / NG	-	-	-		
Function	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
		Max value in the band	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	0.06208		
	W53	Test Frequency	MHz	5180	5200	5240	
		Max value in the band	MHz	5183.73	5196.81	5174.19	
		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)	W52	Test Frequency	MHz	5180	5200	5240	Low/Mid/High of test frequency range
		Max value in the band	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)	
		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		
		μW/MHz	0.24660	0.60814	1.93642	5251MHz~5260MHz Limit ≤ 100 - 15.8 μW/MHz (-10 - -18 dBm/MHz)	
		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		
		μW/MHz	0.23121	0.30200	9.01571	5260MHz~5266.7MHz Limit ≤ 15.8 - 2.5 μW/MHz (-18 - -26 dBm/MHz)	
	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			
	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)

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 = $10 \times 10\log_{10}(1/\text{Duty Cycle})$	
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	-2.06	-1.85	-0.81			Limit ≤ 10 mW/MHz (10 dBm/MHz)	
Antenna Power (Conducted)	mW/MHz	0.6220	0.6528	0.8294				
Transmitter ON _{Time}	msec				1.0000			RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) _{Time}	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. 2nd 3rd	
	* 1	MHz	-	-	-				
	* 2	MHz	3438.00	21900.00	21950.00				
	Cable Loss	* 1	dB	0.78	0.78	0.78			1st 1000MHz~26GHz: Maximum emission and all emissions beyond 1/10 of the limitation must be indicated. 2nd 3rd
		* 1	dB	-	-	-			
		* 2	dB	3.68	3.68	3.68			
Spectrum Raw		* 1	dBm	-78.87	-75.71	-78.51			1st 2nd 3rd
		* 1	dBm	-	-	-			
		* 2	dBm	-68.04	-64.86	-63.13			
	Spurious Emission Intensity	* 1	dBm	-	-	-			1st Limit ≤ 4 nW (-54 dBm) 2nd RBW : 100 kHz ; VBW : 100 kHz 3rd
		* 2	dBm	-64.36	-61.18	-59.45			
		* 2	dBm	-	-	-59.96			
Spurious Emission Intensity		* 1	nW	0.0155	0.0321	0.0169			1st Total Emission Power 2nd Limit ≤ 4 nW (-54 dBm) 3rd RBW : 100 kHz ; VBW : 100 kHz
		* 1	nW	-	-	-			
		* 2	nW	0.3664	0.7621	3.0754			
	Spurious Emission Intensity	* 1	nW	-	-	1.1350			1st Limit ≤ 20 nW (-47 dBm) 2nd RBW : 1 MHz ; VBW : 1 MHz 3rd
		* 2	nW	-	-	1.0093			
		* 2	nW	-	-	0.9311			

* 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				
Mini. Antenna Gain	dBi	6.64	6.64	6.64				
Carrier Level	dBm	-44.86	-44.89	-44.96			Pin = $22.79 + Gr - 20 * \log(\text{freq_MHz})$ [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°C / 62%
Test Site	TH06-HY
Engineer	Shiming
Department	Radio Service Group

1. General Information

Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3	Antenna Port	DAC 0+DAC 1
	Type of Emission	G1D / D1D	Model	WUBR-508N
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM	Serial No.	12635W2002256
	Frequency	5180~5240MHz(20MHz Space 4 Channels)	Antenna Power	1.69 mW/MHz
				W52

2. Test Results

Test Voltage		V	Normal Voltage (5V)								Remarks			
Test Frequency		MHz	5180	5200	5240						Low/Mid/High of test frequency range			
Testing for Electrical Specification	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	μp	-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 = 22.7V+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			
Testing for Electrical Specification	Unwanted Emission Intensity	W52	Test Frequency	MHz	5180	5200	5240						Low/Mid/High of test frequency range	
			Raw dBm	-	-	-								
		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									
		W53	Test Frequency	MHz	-	-	-							
			Raw dBm	-	-	-								
		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)	W52	Test Frequency	MHz	5180	5200	5240						Low/Mid/High of test frequency range
				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							
				Raw dBm	-	-	-							
				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							
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									
Raw dBm	-			-	-									
dBm/MHz	-33.10			-29.62	-24.62						5251MHz~5260MHz Limit ≤ 100 - 15.8 μW/MHz (-10 - -18 dBm/MHz)			
μW/MHz	0.48067			0.57489	14.91772									
Raw dBm	-	-	-											
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											
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 ≤ 10 mW/MHz (10 dBm/MHz)	
Antenna Power (Conducted)	mW/MHz	1.4270	1.4358	1.6900				
Transmitter ON _{Time}	msec				1.0000			RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) _{Time}	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 emissions beyond 1/10 of the limitation must be indicated.
	※ 1	MHz	-	-	-			2nd
	※ 1	MHz	-	-	-			3rd
	※ 2	MHz	-	-	-			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	-	-	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 ≤ 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 ≤ 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	-	-	-			1st Limit ≤ 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	-	-	2.1287			1st Limit ≤ 20 nW (-47 dBm)
※ 2	nW	-	-	1.8579			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				
Mini. Antenna Gain	dBi	6.64	6.64	6.64				
Carrier Level	dBm	-44.86	-44.89	-44.96			Pin = $22.79 + Gr - 20 \cdot \log(\text{freq_MHz})$ [dBm]	
Result	Good/Fail	Good	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°C / 62%	
				Test Site	TH06-HY	
				Engineer	Shiming	
				Department	Radio Service Group	
1. General Information		Class	Article 2 Paragraph 1 Item 19-3	Antenna Port	DAC 0	
Specified Radio Equipment		Type of Emission	GTD / D1D	Model	WUBR-508N	
		Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM	Serial No.	12635W2002256	
		Frequency	5190~5230MHz(40MHz Space 2 Channels)	Antenna Power	0.41	mW/MHz
					W52	

2. Test Results		Normal Voltage (5V)				Remarks		
Test Voltage		V						
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		For 40M Limit ≤ 5 mW/MHz - Antenna power & EIRP power		
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)		
Limitation of Collateral Emission of Receiver		< 1GHz	nW	0.0178	0.0170	Limit ≤ 4 nW (-54 dBm)		
		≥ 1GHz	nW	0.8790	0.9863	Limit ≤ 20 nW (-47 dBm)		
Transmission Burst Length		msec	2.3000	2.3000		Limit ≤ 4msec		
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						
Radio Interface Prevention Function		Test Frequency (W53)	MHz	-	-	Pin = Gr - 62 [dBm]Gr is max receiving 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		Raw dBm	-5089.86	-5008.74		30MHz~5100MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)		
		dBm/MHz	-42.69	-44.98				
		μW/MHz	-40.44	-42.73				
		dB	0.09036	0.05333				
		Raw dBm	-21838.80	-21838.80		5400MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)		
		dBm/MHz	-34.79	-35.13				
W53		Raw dBm	-31.11	-31.45				
		dBm/MHz	-31.11	-31.45				
		μW/MHz	0.77446	0.71614				
		Raw dBm	-42.61	-38.27		5250MHz~5251MHz Limit ≤ 500 - 50 μW/MHz (-3 - -13 dBm/MHz)		
		dBm/MHz	-42.61	-38.27				
		μW/MHz	0.42462	105.68175		Margin to the technical requirement		
Out-Band Leakage Power (EIRP)		Raw dBm	30.45	6.69		Margin to the technical requirement		
		dBm/MHz	30.45	6.69				
		μW/MHz	0.40458	2.17771		5251MHz~5270MHz Limit ≤ 50 - 7.924 μW/MHz (-13 - -21 dBm/MHz)		
		Raw dBm	-42.82	-36.51		Margin to the technical requirement		
		dBm/MHz	-42.82	-36.51				
		μW/MHz	0.20277	0.23014		5270MHz~5275.8MHz Limit ≤ 7.924 - 2.547 μW/MHz (-21 - -25.9 dBm/MHz)		
W52		Raw dBm	-45.82	-45.27		Margin to the technical requirement		
		dBm/MHz	-33.93	-36.38				
		μW/MHz	0.20277	0.23014				
		Raw dBm	14.58	15.29		Margin to the technical requirement		
		dBm/MHz	14.58	15.29				
		μW/MHz	0.22646	0.13836		5275.8MHz~5400MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)		

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 ≤ 5 mW/MHz (7 dBm/MHz)	
Antenna Power (Conducted)	mW/MHz	0.3774	0.4072					
Transmitter ON _{Time}	msec			1.0000			RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz	
Transmitter (ON→OFF) _{Time}	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 emissions beyond 1/10 of the limitation must be indicated.	
	※ 1 MHz	-	-				2nd	
	※ 1 MHz	-	-				3rd	
	※ 2 MHz	24800.00	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				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 ≤ 4 nW (-54 dBm)	
	※ 1 dBm	-	-				2nd RBW : 100 kHz ; VBW : 100 kHz	
	※ 1 dBm	-	-				3rd	
	※ 2 dBm	-60.56	-60.06				1st Limit ≤ 20 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	-	-				1st Limit ≤ 4 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	-	-				1st Limit ≤ 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	5190	5230					
Mini. 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					

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

Sporton No.	JR373103
Test Date	2013/9/5
Test Location	SPORTON Lab.
Temp. / Humid.	24.6 C / 62%
Test Site	TH06-HY
Engineer	Shiming
Department	Radio Service Group

1. General Information

Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3	Antenna Port	DAC 1
	Type of Emission	GTD / D1D	Model	WUBR-508N
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM	Serial No.	12635W2002256
	Frequency	5190~5230MHz(40MHz Space 2 Channels)	Antenna Power	0.37 mW/MHz
				W52

2. Test Results

Test Voltage		V	Normal Voltage (5V)				Remarks			
Testing for Electrical Specification	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	38.75	48.75			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						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	-	-			For W53-40M, EIRP ≤ 2.5mW/MHz, w/o TPC function			
Unwanted Emission Intensity	Test Frequency	MHz	5190	5230	-		Low/Mid/High of test frequency range			
	W52	Max value in the band	MHz	3203.82	4958.04					
		Raw dBm		-44.50	-45.37			30MHz~5100MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)		
	W53	Max value in the band	MHz	21880.00	21838.80					
		Raw dBm		34.95	34.69			5400MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)		
		Raw dBm		31.27	-31.01					
		μW/MHz		0.74645	0.79250					
Testing for Electrical Specification	Out-Band Leakage Power (EIRP)	Max value in the band	Test Frequency	MHz	5190	5230	-		Low/Mid/High of test frequency range	
			Raw dBm		5141.83	5126.80				
		W52	Max value in the band	Raw dBm		-47.38	-43.44			5100MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)
			dBm/MHz		-38.49	-34.55				
		Max value in the band	μW/MHz		0.14158	0.35075			5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)	
			Raw dBm		5148.74	5148.46				
		W52	Max value in the band	Raw dBm		-40.49	-44.52			5250MHz~5251MHz Limit ≤ 500 - 50 μW/MHz (-3 - -13 dBm/MHz)
			dBm/MHz		-31.60	-35.63				
		Max value in the band	μW/MHz		0.69183	0.27353			Margin to the technical requirement	
			Raw dBm		5250.09	5250.01				
		W52	Max value in the band	Raw dBm		-44.64	-36.24			5251MHz~5270MHz Limit ≤ 50 - 7.924 μW/MHz (-13 - -21 dBm/MHz)
			dBm/MHz		-37.19	-39.02				
		Max value in the band	μW/MHz		0.26607	1.84077			Margin to the technical requirement	
			Raw dBm		5272.38	5272.48				
		W52	Max value in the band	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				
		Max value in the band	μW/MHz		0.19099	0.12531			Margin to the technical requirement	
			Raw dBm		5329.21	5275.80				
		W52	Max value in the band	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 _{Time}	msec			1.0000				RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz
Transmitter (ON+OFF) _{Time}	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 emissions beyond 1/10 of the limitation must be indicated. 2nd 3rd
	※ 1	MHz	-	-				
	※ 1	MHz	21800.00	21800.00				
	※ 2	MHz	-	-				1st 1000MHz~26GHz: Maximum emission and all emissions beyond 1/10 of the limitation must be indicated. 2nd 3rd
	※ 2	MHz	-	-				
	※ 2	MHz	-	-				
Cable Loss	※ 1	dB	0.78	0.78				1st 2nd 3rd
	※ 1	dB	-	-				
	※ 1	dB	-	-				
	※ 2	dB	3.68	3.68				1st 2nd 3rd
	※ 2	dB	-	-				
	※ 2	dB	-	-				
Spectrum Raw	※ 1	dBm	-77.14	-77.96				1st 2nd 3rd
	※ 1	dBm	-	-				
	※ 1	dBm	-	-				
	※ 2	dBm	-64.36	-64.47				1st 2nd 3rd
	※ 2	dBm	-	-				
	※ 2	dBm	-	-				
Spurious Emission Intensity	※ 1	dBm	-76.36	-77.18				1st Limit $\leq 4 \text{ nW}$ (-54 dBm) 2nd RBW : 100 kHz ; VBW : 100 kHz 3rd
	※ 1	dBm	-	-				
	※ 1	dBm	-	-				
	※ 2	dBm	-60.68	-60.79				1st Limit $\leq 20 \text{ nW}$ (-47 dBm) 2nd RBW : 1 MHz ; VBW : 1 MHz 3rd
	※ 2	dBm	-	-				
	※ 2	dBm	-	-				
Spurious Emission Intensity	※ 1	nW	0.0231	0.0191				Total Emission Power Limit $\leq 4 \text{ nW}$ (-54 dBm) 2nd RBW : 100 kHz ; VBW : 100 kHz 3rd
	※ 1	nW	-	-				
	※ 1	nW	-	-				
	※ 2	nW	0.8551	0.8337				Total Emission Power Limit $\leq 20 \text{ nW}$ (-47 dBm) 2nd RBW : 1 MHz ; VBW : 1 MHz 3rd
	※ 2	nW	-	-				
	※ 2	nW	-	-				

※ 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					
Mini. 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 C / 62%
Test Site	TH06-HY
Engineer	Shiming
Department	Radio Service Group

1. General Information

Specified Radio Equipment	Class	Article 2 Paragraph 1 Item 19-3	Antenna Port	DAC 0+DAC 1
	Type of Emission	GTD / DTD	Model	WUBR-508N
	Modulation Type	OFDM: BPSK, QPSK, 16QAM, 64QAM	Serial No.	12635W2002256
	Frequency	5190~5230MHz(40MHz Space 2 Channels)	Antenna Power	0.77 mW/MHz
				W52

2. Test Results

Test Voltage		V	Normal Voltage (5V)			Remarks		
Testing for Electrical Specification	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	-			
	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)
		-80MHz	dB	-	-	-		Limit ≥ 25dB (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					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	-	-	-			
	TPC function	dB	-	-	-		For W53-40M, EIRP ≤ 2.5mW/MHz, w/o TPC function	
Unwanted Emission Intensity	Test Frequency	MHz	5190	5230	-		Low/Mid/High of test frequency range	
	W52	Raw dBm	-	-	-			
		dBm/MHz	-38.24	-39.91	-		30MHz~5100MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
	W53	Raw dBm	-	-	-			
		dBm/MHz	-28.18	-28.21	-		5400MHz~26000MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
	Out-Band Leakage Power (EIRP)	Max value in the band	Test Frequency	MHz	5190	5230	-	
Raw dBm			-	-	-			
dBm/MHz			-36.53	-30.43	-		5100MHz~5142MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	
μW/MHz			0.22212	0.90538	-			
Raw dBm			-29.85	-32.24	-		5142MHz~5150MHz Limit ≤ 15 μW/MHz (-18.24 dBm/MHz)	
dBm/MHz			-31.55	-7.07	-		5250MHz~5251MHz Limit ≤ 500 - 50 μW/MHz (-3 - -13 dBm/MHz)	
W52		Raw dBm	-	-	-			
		dBm/MHz	-31.74	-23.96	-		5251MHz~5270MHz Limit ≤ 50 - 7.924 μW/MHz (-13 - -21 dBm/MHz)	
		Raw dBm	-	-	-			
		dBm/MHz	-34.05	-34.49	-		5270MHz~5275.8MHz Limit ≤ 7.924 - 2.547 μW/MHz (-21 - -25.9 dBm/MHz)	
		Raw dBm	-	-	-			
		dBm/MHz	-33.51	-35.61	-		5275.8MHz~5400MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)	

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 ≤ 5 mW/MHz (7 dBm/MHz)	
Antenna Power (Conducted)	mW/MHz	0.7462	0.7651					
Transmitter ON _{Time}	msec					1.0000		
Transmitter (ON→OFF) _{Time}	msec					1.0000		
Transmitter Duty Cycle	%					100.00%		
RBW : 1 MHz ; VBW : 1 MHz ; SP : 0Hz								

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 emissions beyond 1/10 of the limitation must be indicated.	
	※ 1	MHz	-	-	-	-	2nd	
	※ 1	MHz	-	-	-	-	3rd	
	※ 2	MHz	-	-	-	-	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	-	-	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 ≤ 4 nW (-54 dBm)	
	※ 1	dBm	-	-	-	-	2nd RBW : 100 kHz ; VBW : 100 kHz	
	※ 1	dBm	-	-	-	-	3rd	
	※ 2	dBm	-57.61	-57.40	-	-	1st Limit ≤ 20 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 ≤ 4 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 ≤ 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	5190	5230					
Mini. 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