

VERIFICATION OF COMPLIANCE

Equipment : 802.11abgn, USB module
Model No. : WUBR-508N
Applicant : SparkLAN Communications, Inc.
8F., No. 257, Sec. 2, Tiding Blvd., Neihs District,
Taipei City 11493, Taiwan

**I HEREBY****DECLARE THAT :**

The following technical requirements and test specifications are relevant to the presumption of conformity under the **R&TTE Directive 1999/5/EC (until 12 June 2016)** and **Directive 2014/53/EU (from 13 June 2016)**.

The equipment was **Passed** the test performed according to **ETSI EN 300 328 V1.9.1 (2015-02)**

The test was carried out on **Apr. 25, 2016** at **SPORTON INTERNATIONAL INC. LAB.**


Kevin Liang
Assistant Manager

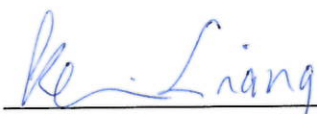
CE Test Report

Equipment : 802.11abgn, USB module
Brand Name : SparkLAN
Model No. : WUBR-508N
Standard : EN 300 328 V1.9.1 (2015-02)
Operating Band : 2400 MHz – 2483.5 MHz
Applicant : SparkLAN Communications, Inc.
Manufacturer : 8F., No. 257, Sec. 2, Tiding Blvd., Neihu District, Taipei
City 11493, Taiwan

The product sample received on Apr. 12, 2016 and completely tested on Apr. 25, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in EN 300 328 V1.9.1 (2015-02) and shown compliance with the applicable technical standards. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation: Directive 1999/5/EC (until 12 June 2016) and Directive 2014/53/EU (from 13 June 2016).

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:



Kevin Liang / Assistant Manager



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Summary of Test Result

Harmonized Standard Requirements and Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
3.1	4.3.2.2	RF Output Power	EIRP [dBm]: 19.92	20 dBm	Complied
3.2	4.3.2.3	Power Density	EIRP PSD [dBm/MHz] 8.64	10 dBm/MHz	Complied
-	4.3.2.4	Duty cycle, Tx-Sequence, Tx-gap	Adaptive w/o test	EN 300 328 Clause 4.3.2.4.3	N/A
-	4.3.2.5	Medium Utilisation	Adaptive w/o test	MU > 10%	N/A
3.3	4.3.2.7	Occupied Channel Bandwidth	OCB fall in band Bandwidth [MHz] F _L :2403.064 F _H :2480.936	Fall in band	Complied
3.4	4.3.2.8	Transmitter unwanted emissions in the OOB domain	2484.0 MHz -27.38 dBm (Margin 17.38 dB)	EN 300 328 Figure 3	Complied
3.5	4.3.2.9	Transmitter unwanted emissions in the spurious domain	[e.r.p.]: 55.22 MHz -63.63 dBm (Margin 9.63 dB)	EN 300 328 Table 4	Complied
4.1	4.3.2.10	Receiver spurious emissions	[e.r.p.]: 140.58 MHz -64.41 dBm (Margin 7.41 dB)	EN 300 328 Table 5	Complied
5.1	4.3.2.6 4.3.2.11	Adaptivity Receiver Blocking	COT: 12.483 ms Idle: 0.041 ms	IEEE 802.11 IEEE 802.11n	Complied



Revision History

[illegible]

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number	Transmit Chains (N _{TX})	EIRP - Output Power (dBm)
2400-2483.5	b	2412-2472	1-13 [13]	1	18.95
2400-2483.5	g	2412-2472	1-13 [13]	1	19.12
2400-2483.5	n (HT20)	2412-2472	1-13 [13]	2	19.01
2400-2483.5	n (HT40)	2422-2462	3-11 [9]	2	19.10

Note 1: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
 Note 2: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

1.1.2 Antenna Information

Antenna Category	
☐	Integral antenna (antenna permanently attached)
☐	Temporary RF connector provided
☐	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.
☒	External antenna (dedicated antennas)
☐	Single power level with corresponding antenna(s).
☒	Multiple power level and corresponding antenna(s).

Antenna General Information			
No.	Ant. Cat.	Ant. Type	Gain (dBi)
1-2	External	Dipole	3.00

Remark:

- IEEE802.11b/g only include 1Tx and EUT was pre-tested Antenna Port 1 and Antenna Port 2 for single chain, the worst case was Antenna Port 2. Therefore only test data (Port 2) was recorded in report.
- IEEE802.11n only include 2Tx.

1.1.3 Type of EUT

Identify EUT	
Software / Firmware Version :	N/A
Presentation of Equipment	☒ Production ; ☐ Pre-Production ; ☐ Prototype
Type of EUT	
☒	Stand-alone
☐	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
☐	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
☐	Other:

1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
☐ Operated normally mode for worst duty cycle	
☒ Operated test mode for worst duty cycle	
Test Signal Duty Cycle (x)	Power Duty Factor [dB] – (10 log 1/x)
☒ 100.00% - IEEE 802.11b	0.00
☒ 100.00% - IEEE 802.11g	0.00
☒ 100.00% - IEEE 802.11n (HT20)	0.00
☒ 100.00% - IEEE 802.11n (HT40)	0.00

1.1.5 Medium Access Protocol

Medium Access Protocol	
Medium Access Protocol:	☒ IEEE Std. 802.11-2007
	☒ IEEE Std. 802.11n-2009
	☐ IEEE Std. 802.15.4-2006
	☐ IEEE Std. 802.15.1-2005
	☐ Other:
A medium access protocol has been implemented by the equipment. With mechanism designed to facilitate spectrum sharing with other devices in a wireless network. The equipment implements an adequate spectrum sharing mechanism and users will be equal access wireless network.	

1.1.6 EUT Operational Condition

Supply Voltage	☐ AC mains	☒ DC	
Type of DC Source	☐ Internal DC supply	☒ From system	☐ External DC adapter
Test Voltage	☒ Vnom (5 V)	☒ Vmax (5.25 V)	☒ Vmin (4.75 V)
Test Climatic	☒ Tnom (20°C)	☒ Tmax (50°C)	☒ Tmin (0°C)

1.1.7 Adaptive Equipment

Adaptive Equipment	
☐	non-Adaptive Equipment:
	The maximum RF Output Power (e.i.r.p.): ... dBm
	The maximum (corresponding) Duty Cycle: ... %
☒	Adaptive Equipment without the possibility to switch to a non-adaptive mode:
☒	The equipment has implemented an LBT based DAA mechanism:
	☐ The equipment is Frame Based equipment
	☒ The equipment is Load Based equipment
	☐ The equipment can switch dynamically between Frame Based and Load Based equipment
☐	The equipment has implemented an non-LBT based DAA mechanism
☐	The equipment can operate in more than one adaptive mode
☐	Adaptive Equipment which can also operate in a non-adaptive mode

1.2 Support Equipment

Support Equipment - RF Conducted			
No.	Equipment	Brand Name	Model Name
1	Notebook	DELL	E5540
2	Adapter	DELL	LA65NM130

Support Equipment - Radiated Emission			
No.	Equipment	Brand Name	Model Name
1	Notebook	DELL	E5520
2	Adapter	DELL	HA65NM130

Support Equipment – Adaptivity			
No.	Equipment	Brand Name	Model Name
1	AP (Master)	EDIMAX	CG300
2	NoteBook	DELL	Latitude E5550
3	Adapter	DELL	FA90PSO-00
	NoteBook	DELL	Latitude E5540
	Adapter	DELL	DA65NM111-00

1.3 Testing Applied Standards

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

- ♦ EN 300 328 V1.9.1 (2015-02)

1.4 Testing Location Information

Testing Location			
☒	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.	
		TEL : 886-3-327-3456 FAX : 886-3-327-0973	
Test Condition		Test Site No.	Test Engineer
RF Conducted		TH01-HY	Ian
Radiated Emission		05CH01-HY	Monday
Adaptivity Site		DFS01-HY	Sam
			25.4°C / 60.3%

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		±0.6%	±5 %
RF output power, conducted		±0.1 dB	±1.5 dB
Power density, conducted		±0.6 dB	±3 dB
Unwanted emissions, conducted	30 – 1000 MHz	±0.56 dB	±3 dB
	1 – 12.75 GHz	±0.5 dB	±3 dB
All emissions, radiated	30 – 1000 MHz	±2.3 dB	±6 dB
	1 – 12.75 GHz	±2.6 dB	±6 dB
Temperature		±0.8 °C	±1 °C
Humidity		±5 %	±5 %
DC and low frequency voltages		±0.9%	±3 %
Time		±1.4 %	±5%
Duty Cycle		±0.6%	±5 %

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
11b	1	1-11 Mbps	1 Mbps
11g	1	6-54 Mbps	6 Mbps
HT20	2	MCS 8-15	MCS 8
HT40	2	MCS 8-15	MCS 8

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration	
IEEE Std. 802.11	Test Channel Frequencies (MHz)
b, g, n (HT20) n (HT40)	2412-(F1), 2442-(F2), 2472-(F3) 2422-(F4), 2437-(F5), 2462-(F6)

2.3 The Worse Case Power Setting Parameter

The Worst Case Power Setting Parameter (2400-2483.5MHz band)							
Test Software/Version	RT5x7x QA_V1.0.5.9						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz		
		2412	2442	2472	2422	2442	2462
11b	1	09	0A	0B	-	-	-
11g	1	0F	0F	11	-	-	-
HT20	2	12,0B	11,0B	11,0C	-	-	-
HT40	2	-	-	-	12,0B	11,0C	12,0C

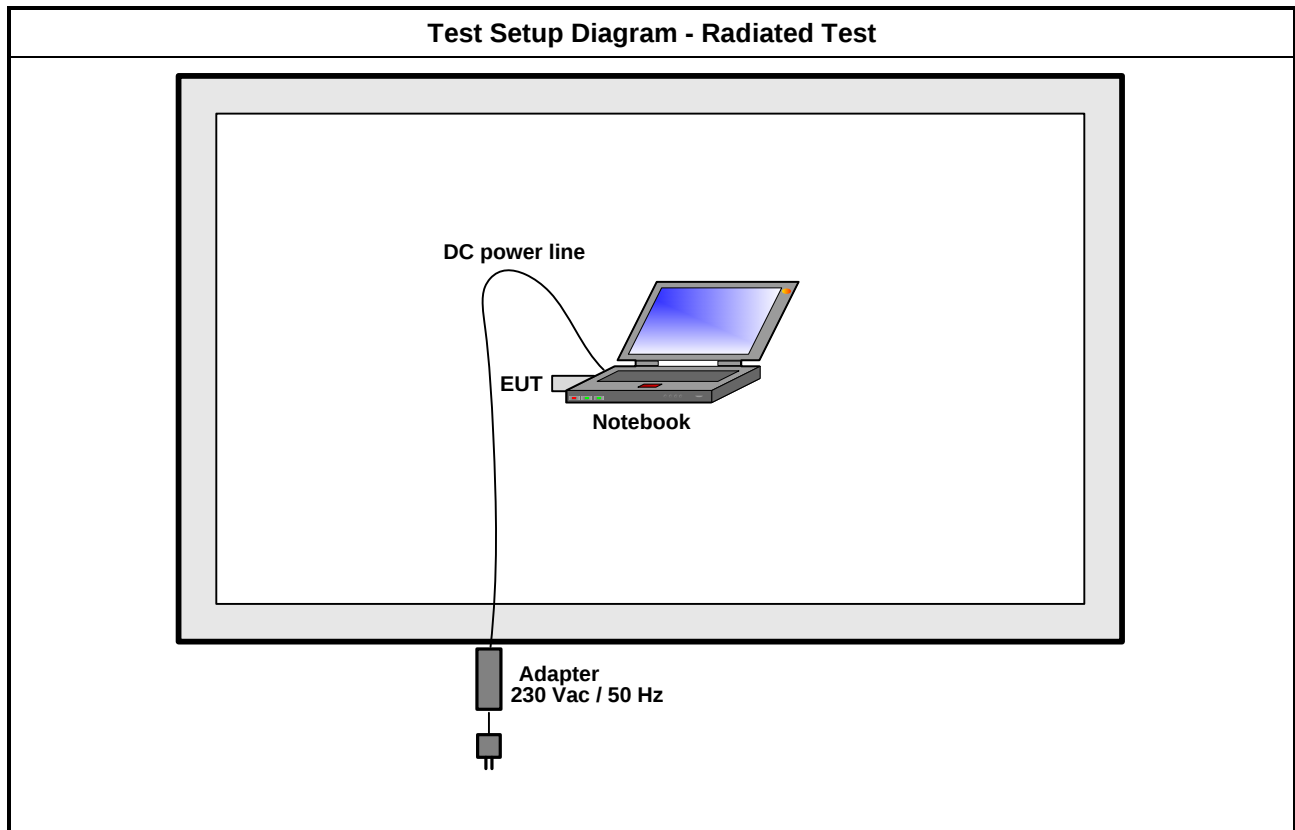
2.4 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	RF Output Power, Power Density, Occupied Channel Bandwidth Transmitter unwanted emissions in the OOB domain
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11b, 11g, HT20, HT40

The Worst Case Mode for Following Conformance Tests			
Tests Item	Transmitter Unwanted Emissions in The Spurious Domain, Receiver Spurious Emissions		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
User Position	☐ EUT will be placed in fixed position.		
	☒ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes.		
	☐ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes.		
Operating Mode	Operating Mode Description		
1	Transmit / Receive		
Modulation Mode	11b, 11g, HT20, HT40		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			
Worst Planes of EUT	V		

The Worst Case Mode for Following Conformance Tests	
Tests Item	Adaptivity & Receiver Blocking
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11b, 11g, HT20, HT40

2.5 Test Setup Diagram



3 Transmitter Test Result

3.1 RF Output Power

3.1.1 RF Output Power Limit

RF Output Power Limit	
Type of Equipment Using Wide Band Modulations Other than FHSS:	
☒	mean equivalent isotropic radiated power (e.i.r.p.) ≤ 20 dBm

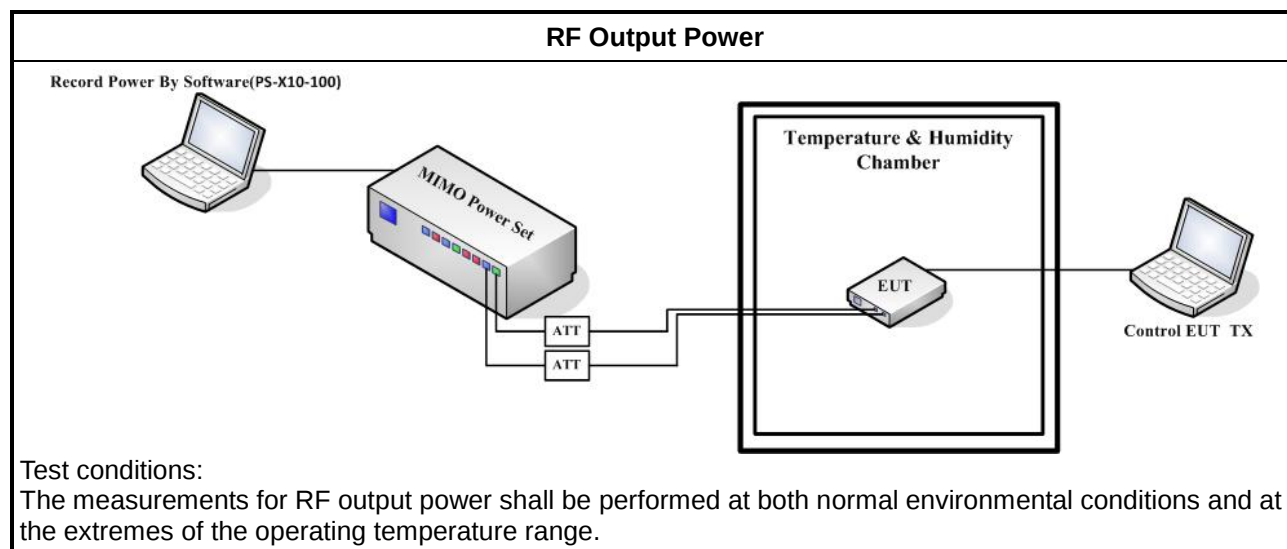
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method	
☒	The measurements shall be performed at both normal environmental conditions and at the extremes of the operating temperature range.
☒	Refer as EN 300 328, clause 5.3.2.2.1.2 for conducted measurement.
Step 1: Use a fast power sensor suitable for 2,4 GHz and capable of 1 MS/s. Use the following settings: - Sample speed 1 MS/s or faster. - The samples must represent the power of the signal. - Measurement duration: For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) are captured. NOTE 1: For adaptive equipment, to increase the measurement accuracy, a higher number of bursts may be used.	
Step 2: For conducted measurements on devices with multiple transmit chains: - Connect one power sensor to each transmit port for a synchronous measurement on all transmit ports. - Trigger the power sensors so that they start sampling at the same time. Make sure the time difference between the samples of all sensors is less than half the time between two samples. - For each instant in time, sum the power of the individual samples of all ports and store them. Use these stored samples in all following steps.	
Step 3: Find the start and stop times of each burst in the stored measurement samples. NOTE 2: The start and stop times are defined as the points where the power is at least 20 dB the RMS burst power calculated in step 4.	
Step 4: Between the start and stop times of each individual burst calculate the RMS power over the burst. Save these Pburst values, as well as the start and stop times for each burst.	
Step 5: The highest of all Pburst values (value "A" in dBm) will be used for maximum e.i.r.p. calculations.	
Step 6: Add the (stated) antenna assembly gain "G" in dBi of the individual antenna. If applicable, add the additional beamforming gain "Y" in dB. If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used. The RF Output Power (P) shall be calculated using the formula below: $P = A + G + Y$ This value, which shall comply with the limit given in clauses 4.3.1.2.3 or clauses 4.3.2.2.3, shall be recorded in the test report.	
☐	Refer as EN 300 328, clause 5.3.2.2.2 for radiated measurement.

3.1.4 Test Setup



3.1.5 Maximum Antenna Gain

Maximum Antenna Gain Result					
Transmit Chains No.		1	2	-	-
Maximum Gain (dBi)-G		3.00	3.00	-	-
Modulation Mode	G+Y (dBi)	N _{TX}	N _{SS} (Min.)	STBC	Beamforming Gain (dB)-Y
11b	3.00	1	1	-	-
11g	3.00	1	1	-	-
HT20	3.00	2	2	-	-
HT40	3.00	2	2	-	-

3.1.6 Test Result of RF Output Power

Test Date: Sep. 22, 2014		RF Output Power Result				
Max. Gain (dBi)		3.00		RF Output Power (dBm)		
Condition	Modulation Mode	N _T x	Freq. (MHz)	Port 1 (dBm)	EIRP Power (dBm)	EIRP Limit (dBm)
TnomVnom	11b	1	2412	14.97	17.97	20
TminVmax	11b	1	2412	15.87	18.87	20
TminVmin	11b	1	2412	15.90	18.90	20
TmaxVmax	11b	1	2412	12.94	15.94	20
TmaxVmin	11b	1	2412	12.94	15.94	20
TnomVnom	11b	1	2442	15.04	18.04	20
TminVmax	11b	1	2442	15.95	18.95	20
TminVmin	11b	1	2442	15.91	18.91	20
TmaxVmax	11b	1	2442	12.87	15.87	20
TmaxVmin	11b	1	2442	12.87	15.87	20
TnomVnom	11b	1	2472	14.70	17.70	20
TminVmax	11b	1	2472	15.71	18.71	20
TminVmin	11b	1	2472	15.72	18.72	20
TmaxVmax	11b	1	2472	12.50	15.50	20
TmaxVmin	11b	1	2472	12.51	15.51	20
Result				Complied		

Test Date: Sep. 22, 2014			RF Output Power Result			
Max. Gain (dBi)			3.00	RF Output Power (dBm)		
Condition	Modulation Mode	N _T x	Freq. (MHz)	Port 1 (dBm)	EIRP Power (dBm)	EIRP Limit (dBm)
TnomVnom	11g	1	2412	14.59	17.59	20
TminVmax	11g	1	2412	15.95	18.95	20
TminVmin	11g	1	2412	15.91	18.91	20
TmaxVmax	11g	1	2412	12.44	15.44	20
TmaxVmin	11g	1	2412	12.45	15.45	20
TnomVnom	11g	1	2442	14.60	17.60	20
TminVmax	11g	1	2442	15.86	18.86	20
TminVmin	11g	1	2442	15.83	18.83	20
TmaxVmax	11g	1	2442	12.37	15.37	20
TmaxVmin	11g	1	2442	12.34	15.34	20
TnomVnom	11g	1	2472	14.90	17.90	20
TminVmax	11g	1	2472	16.12	19.12	20
TminVmin	11g	1	2472	16.07	19.07	20
TmaxVmax	11g	1	2472	12.63	15.63	20
TmaxVmin	11g	1	2472	12.60	15.60	20
Result				Complied		

Test Date: Sep. 22, 2014		RF Output Power Result						
Max. Gain (dBi)		3.00		RF Output Power (dBm)				
Condition	Modulation Mode	N _T x	Freq. (MHz)	Port 1 (dBm)	Port 2 (dBm)	Sum (dBm)	EIRP Power (dBm)	EIRP Limit (dBm)
TnomVnom	HT20	2	2412	11.83	11.21	14.54	17.54	20
TminVmax	HT20	2	2412	12.94	12.56	15.76	18.76	20
TminVmin	HT20	2	2412	12.91	12.50	15.72	18.72	20
TmaxVmax	HT20	2	2412	9.92	8.97	12.48	15.48	20
TmaxVmin	HT20	2	2412	9.85	8.89	12.41	15.41	20
TnomVnom	HT20	2	2442	11.76	11.18	14.49	17.49	20
TminVmax	HT20	2	2442	13.02	12.66	15.85	18.85	20
TminVmin	HT20	2	2442	12.97	12.62	15.81	18.81	20
TmaxVmax	HT20	2	2442	9.48	8.55	12.05	15.05	20
TmaxVmin	HT20	2	2442	9.52	8.58	12.09	15.09	20
TnomVnom	HT20	2	2472	11.82	11.61	14.73	17.73	20
TminVmax	HT20	2	2472	13.00	12.99	16.01	19.01	20
TminVmin	HT20	2	2472	12.97	12.92	15.96	18.96	20
TmaxVmax	HT20	2	2472	9.50	9.07	12.30	15.30	20
TmaxVmin	HT20	2	2472	9.48	8.98	12.25	15.25	20
Result				Complied				

Test Date: Sep. 22, 2014		RF Output Power Result						
Max. Gain (dBi)		3.00		RF Output Power (dBm)				
Condition	Modulation Mode	N _T x	Freq. (MHz)	Port 1 (dBm)	Port 2 (dBm)	Sum (dBm)	EIRP Power (dBm)	EIRP Limit (dBm)
TnomVnom	HT40	2	2422	11.83	11.03	14.46	17.46	20
TminVmax	HT40	2	2422	13.08	12.57	15.84	18.84	20
TminVmin	HT40	2	2422	13.06	12.60	15.85	18.85	20
TmaxVmax	HT40	2	2422	9.69	8.58	12.18	15.18	20
TmaxVmin	HT40	2	2422	9.64	8.50	12.12	15.12	20
TnomVnom	HT40	2	2437	11.97	11.55	14.78	17.78	20
TminVmax	HT40	2	2437	13.30	12.71	16.03	19.03	20
TminVmin	HT40	2	2437	13.28	12.67	16.00	19.00	20
TmaxVmax	HT40	2	2437	9.38	9.49	12.45	15.45	20
TmaxVmin	HT40	2	2437	9.47	9.53	12.51	15.51	20
TnomVnom	HT40	2	2462	11.89	11.44	14.68	17.68	20
TminVmax	HT40	2	2462	12.94	13.17	16.07	19.07	20
TminVmin	HT40	2	2462	12.98	13.19	16.10	19.10	20
TmaxVmax	HT40	2	2462	9.69	8.98	12.36	15.36	20
TmaxVmin	HT40	2	2462	9.69	9.00	12.37	15.37	20
Result				Complied				

3.2 Power Density

3.2.1 Power Density Limit

Power Density Limit
Type of Equipment Using Wide Band Modulations Other than FHSS:
☒ mean equivalent isotropic radiated power (e.i.r.p.) density ≤ 10 dBm/MHz

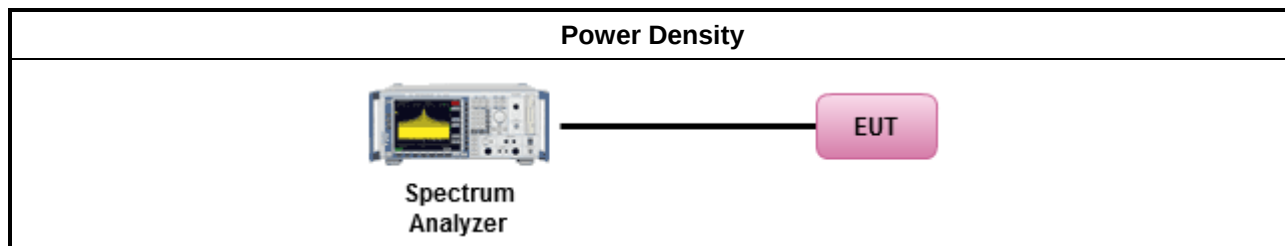
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method
☒ Refer as EN 300 328, clause 5.3.3.2.1 for conducted measurement.
Step 1: Connect the UUT to the spectrum analyzer and use the following settings: - Start & Stop Frequency: 2400 MHz ~ 2483.5MHz - Resolution BW: 10 kHz - Video BW: 30 kHz - Sweep Points: > 8 350 - Detector Mode: RMS - Trace Mode: Max Hold - Sweep time: Auto - Note: For non-continuous signals, wait for the trace to be completed. Save the (trace) data set to a file. Step 2: For conducted measurements on smart antenna systems using either operating mode 2 or 3 (see clause 5.1.3.2), repeat the measurement for each of the transmit ports. For each frequency point, add up the amplitude (power) values for the different transmit chains and use this as the new data set. Step 3: Add up the values for amplitude (power) for all the samples in the file. Step 4: Normalize the individual values for amplitude so that the sum is equal to the RF Output Power (e.i.r.p.) measured in clause 5.3.2. Step 5: Starting from the first sample in the file (lowest frequency), add up the power of the following samples representing a 1 MHz segment and record the results for power and position (i.e. sample #1 to #100). This is the Power Density (e.i.r.p.) for the first 1 MHz segment which shall be recorded. Step 6: Shift the start point of the samples added up in step 3 by 1 sample and repeat the procedure in step 3 (i.e. sample #2 to #101). Step 7: Repeat step 4 until the end of the data set and record the radiated power density values for each of the 1 MHz segments. From all the recorded results, the highest value is the maximum Power Density for the UUT. This value, which shall comply with the limit given in clause 4.3.2.2.2, shall be recorded in the test report.
☐ Refer as EN 300 328, clause 5.3.3.2.2 for radiated measurement.

3.2.4 Test Setup



3.2.5 Test Result of Power Density

Test Date: Oct. 01, 2015			Maximum e.i.r.p. Spectral Density Result			
Modulation Mode	N _T x	Freq. (MHz)	PD (dBm/MHz)	Max. Gain (dBi)	EIRP PD (dBm/MHz)	EIRP Limit (dBm/MHz)
11b	1	2412	5.35	3.00	8.35	10
11b	1	2442	5.64	3.00	8.64	10
11b	1	2472	5.24	3.00	8.24	10
11g	1	2412	3.13	3.00	6.13	10
11g	1	2442	3.47	3.00	6.47	10
11g	1	2472	3.73	3.00	6.73	10
HT20	2	2412	2.86	3.00	5.86	10
HT20	2	2442	2.88	3.00	5.88	10
HT20	2	2472	3.05	3.00	6.05	10
HT40	2	2422	-0.21	3.00	2.79	10
HT40	2	2442	0.12	3.00	3.12	10
HT40	2	2462	-0.11	3.00	2.89	10
Result			Complied			

3.3 Occupied Channel Bandwidth

3.3.1 Occupied Channel Bandwidth Limit

Occupied Channel Bandwidth Limit	
Type of Frequency Hopping Equipment:	
☐	Occupied Channel Bandwidth for each hopping frequency fall completely within 2.4 GHz – 2.4835 GHz.
☐	For non-adaptive equipment with e.i.r.p greater than 10 dBm, Occupied Channel Bandwidth $\leq$ 5 MHz.
Type of Equipment Using Wide Band Modulations Other than FHSS:	
☒	Occupied Channel Bandwidth fall completely within 2.4 GHz – 2.4835 GHz.
☐	For non-adaptive equipment with e.i.r.p greater than 10 dBm, Occupied Channel Bandwidth $\leq$ 20 MHz.

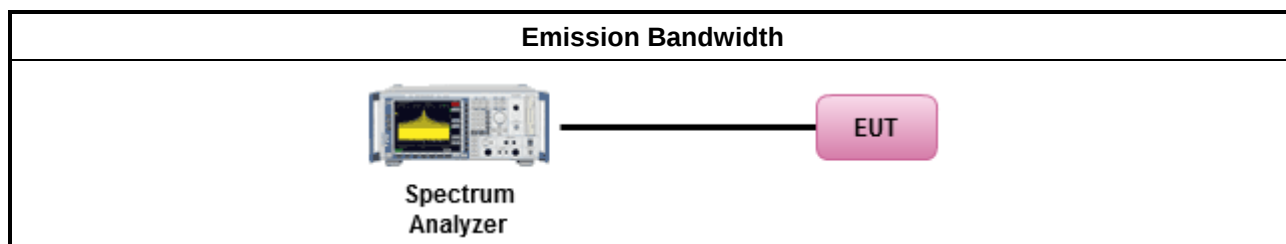
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
☒	Refer as EN 300 328, clause 5.3.8.2.1 for conducted measurement.
☐	The EUT supports single transmit chain and measurements performed on this transmit chain 2.
☒	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☒	Refer as EN 300 328, clause 5.3.8.2.1 for conducted measurements on smart antenna systems (equipment with multiple transmit chains) measurements need only to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.
☐	Refer as EN 300 328, clause 5.3.8.2.2 clause 5.3.8.2.2 for radiated measurement.

3.3.4 Test Setup

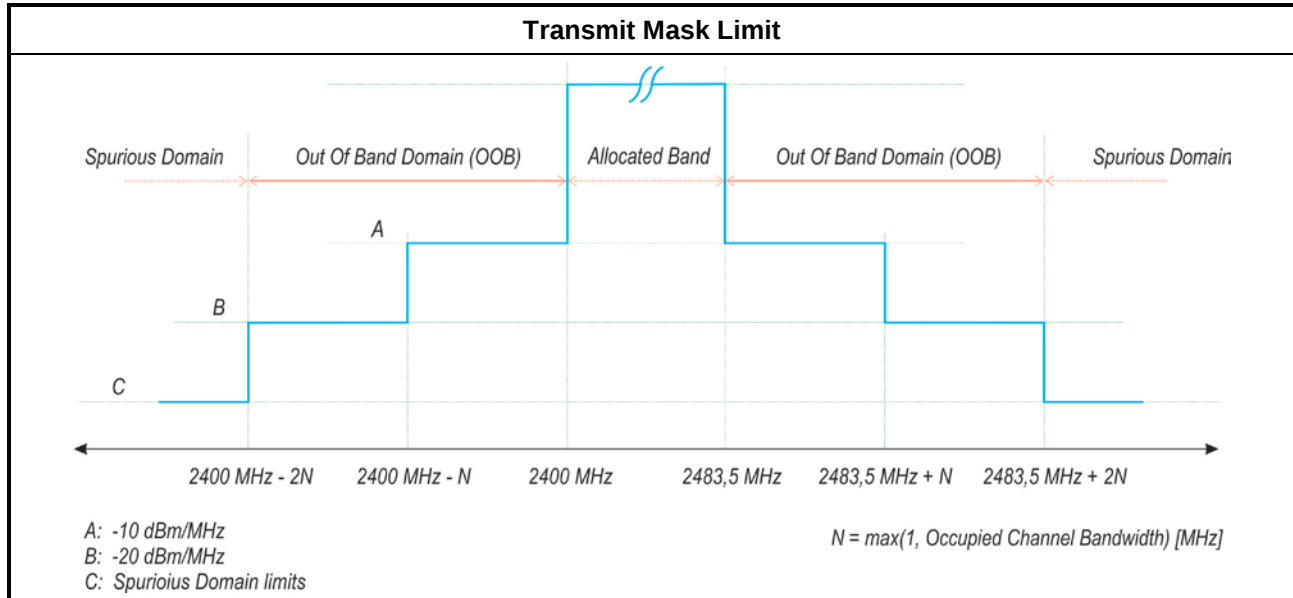


3.3.5 Test Result of Occupied Channel Bandwidth

Test Date: Sep. 22, 2014		Occupied Channel Bandwidth Result			
Modulation Mode	Frequency (MHz)	99% Bandwidth (MHz)	F _L at 99% BW (MHz)	F _H at 99% BW (MHz)	6dB Bandwidth (MHz)
11b	2412	14.65	2404.68400	2419.33600	10.84
11b	2472	14.67	2464.64400	2479.31600	10.84
11g	2412	16.91	2403.56400	2420.47600	16.88
11g	2472	16.91	2463.54400	2480.45600	16.88
HT20	2412	17.89	2403.06400	2420.95600	17.82
HT20	2472	17.89	2463.04400	2480.93600	17.82
HT40	2422	36.10	2403.96900	2440.07100	36.56
HT40	2462	36.10	2443.92900	2480.03100	36.52
Limit		N/A	2400	2483.5	N/A
Result		Complied			

3.4 Transmitter Unwanted Emissions in the Out-of-band Domain

3.4.1 Transmitter Unwanted Emissions in the Out-of-band Domain Limit



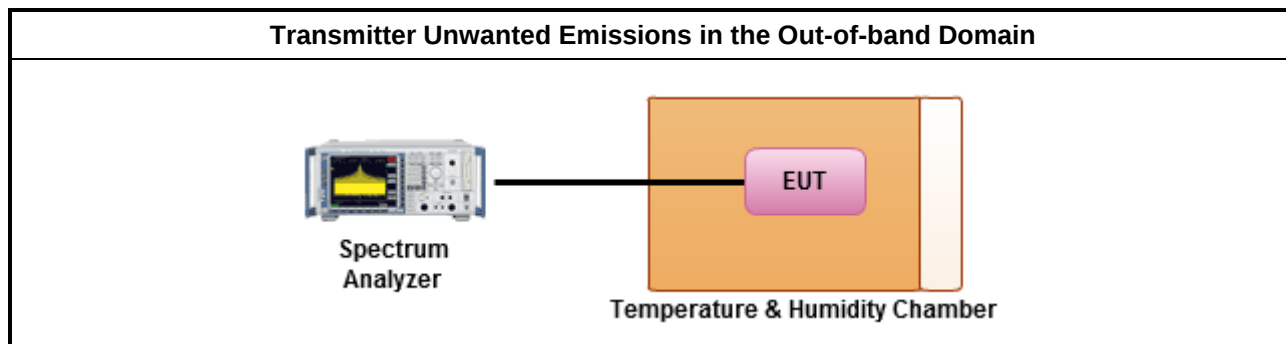
3.4.2 Measuring Instruments

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

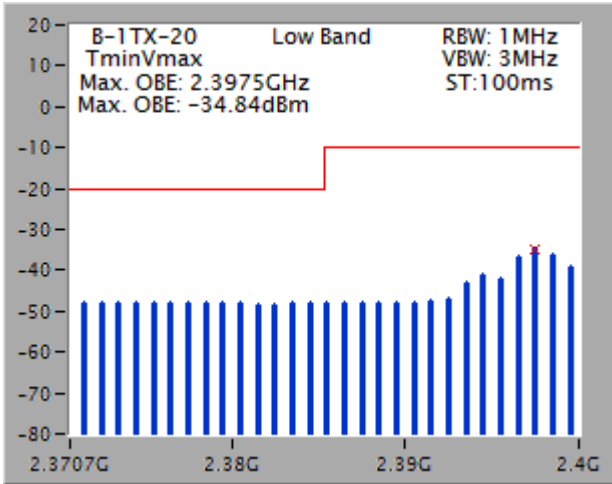
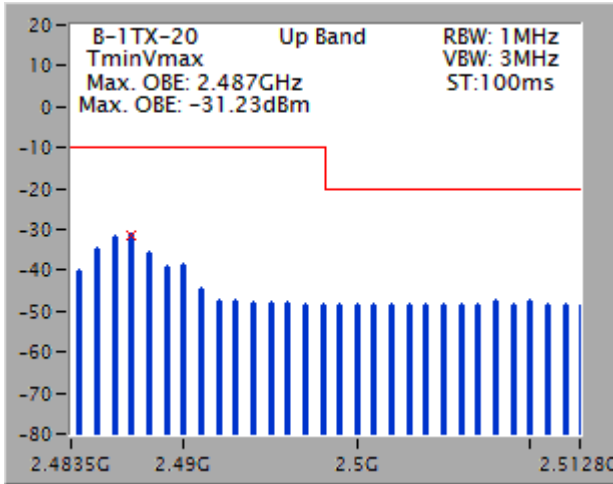
3.4.3 Test Procedures

Test Method	
☒	The measurements shall be performed at both normal environmental conditions and at the extremes of the operating temperature range.
☒	Refer as EN 300 328, clause 5.3.9.2.1 for conducted measurement.
☐	The EUT supports single transmit chain and measurements performed on this transmit chain 2.
☒	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☒	The EUT supports multiple transmit chains using options given below:
☒	Option 1: the results for each of the transmit chains for the corresponding 1 MHz segments shall be added and compared with the transmit mask limit.
☐	Option 2: the results for each of the transmit chains shall be individually compared with the transmit mask limit. After that these limits have been reduced with $10 \times \log_{10} (A_{ch})$. (Number of active transmit chains).
☐	Refer as EN 300 328, clause 5.3.9.2.2 for radiated measurement.

3.4.4 Test Setup

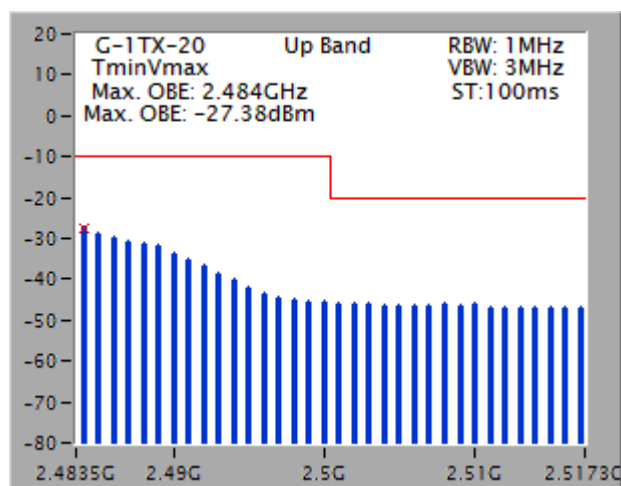
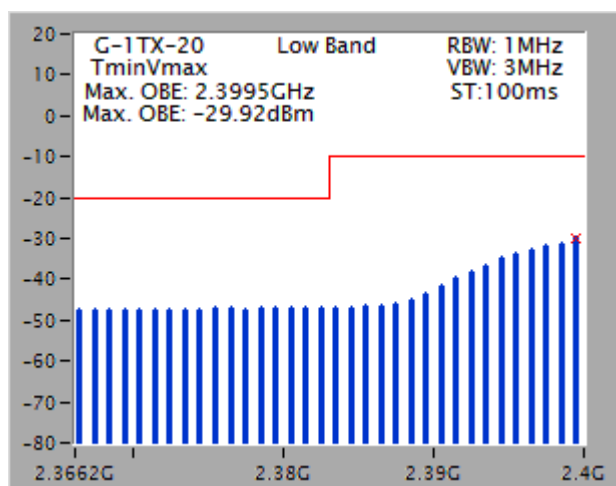


3.4.5 Test Result of Transmitter Unwanted Emissions in the Out-of-band Domain

Transmitter Unwanted Emissions in the Out-of-band Domain Result						
Test Date: Sep. 22, 2014		OOB Emissions (dBm/MHz)				
Condition	Modulation Mode	N _T x	Freq. (MHz)	OOB Freq. (MHz)	OOB Emissions	Limit
TnomVnom	11b	1	2412	2397.5	-36.99	-10
TminVmax	11b	1	2412	2397.5	-34.84	-10
TminVmin	11b	1	2412	2397.5	-34.85	-10
TmaxVmax	11b	1	2412	2397.5	-41.91	-10
TmaxVmin	11b	1	2412	2397.5	-41.90	-10
TnomVnom	11b	1	2472	2487.0	-33.37	-10
TminVmax	11b	1	2472	2487.0	-31.23	-10
TminVmin	11b	1	2472	2487.0	-31.24	-10
TmaxVmax	11b	1	2472	2487.0	-38.15	-10
TmaxVmin	11b	1	2472	2487.0	-38.14	-10
Low Band			Up Band			
 B-1TX-20 Low Band RBW: 1MHz TminVmax VBW: 3MHz Max. OBE: 2.3975GHz ST:100ms Max. OBE: -34.84dBm			 B-1TX-20 Up Band RBW: 1MHz TminVmax VBW: 3MHz Max. OBE: 2.487GHz ST:100ms Max. OBE: -31.23dBm			
Result			Complied			

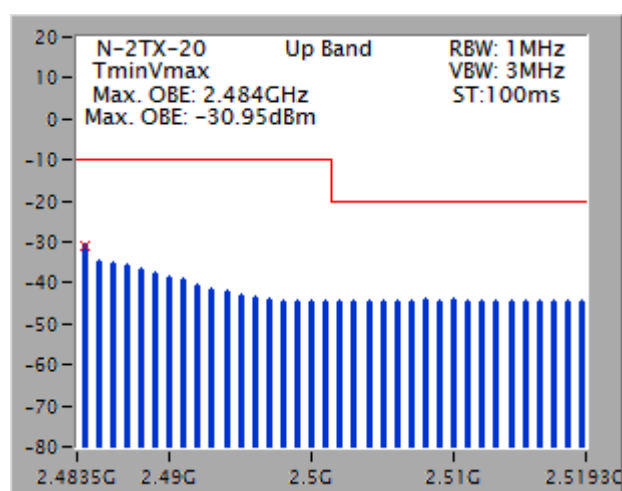
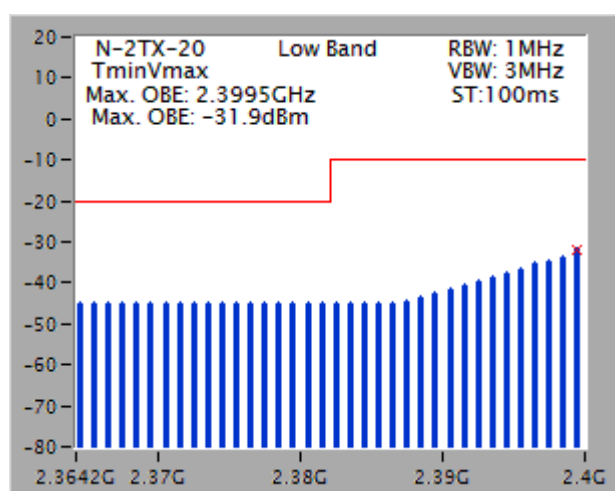
Transmitter Unwanted Emissions in the Out-of-band Domain Result
Test Date: Sep. 22, 2014
OOB Emissions (dBm/MHz)

Condition	Modulation Mode	N _T x	Freq. (MHz)	OOB Freq. (MHz)	OOB Emissions	Limit
TnomVnom	11g	1	2412	2399.5	-32.69	-10
TminVmax	11g	1	2412	2399.5	-29.92	-10
TminVmin	11g	1	2412	2399.5	-29.96	-10
TmaxVmax	11g	1	2412	2399.5	-36.25	-10
TmaxVmin	11g	1	2412	2399.5	-36.28	-10
TnomVnom	11g	1	2472	2484.0	-30.29	-10
TminVmax	11g	1	2472	2484.0	-27.38	-10
TminVmin	11g	1	2472	2484.0	-27.38	-10
TmaxVmax	11g	1	2472	2484.0	-35.34	-10
TmaxVmin	11g	1	2472	2484.0	-35.42	-10

Low Band
Up Band

Result
Complied

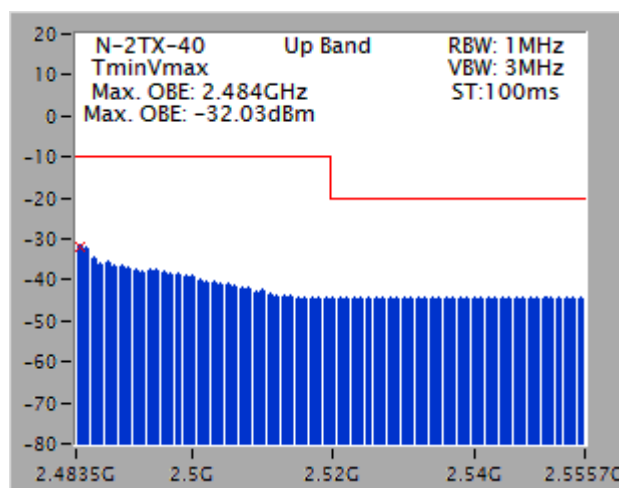
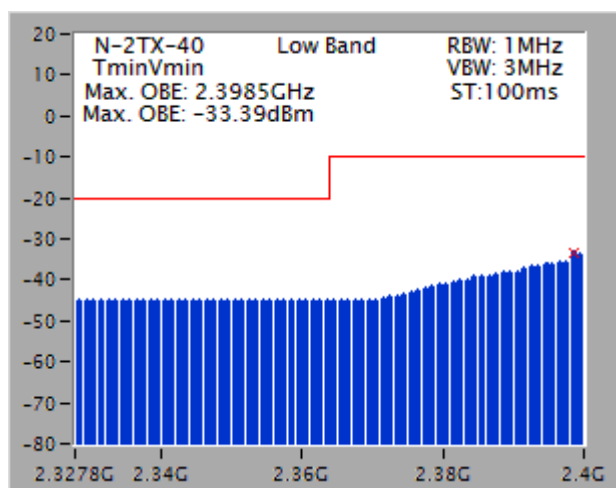
Transmitter Unwanted Emissions in the Out-of-band Domain Result
Test Date: Sep. 22, 2014
OOB Emissions (dBm/MHz)

Condition	Modulation Mode	N _T x	Freq. (MHz)	OOB Freq. (MHz)	OOB Emissions	Limit
TnomVnom	HT20	2	2412	2399.5	-33.92	-10
TminVmax	HT20	2	2412	2399.5	-31.90	-10
TminVmin	HT20	2	2412	2399.5	-31.90	-10
TmaxVmax	HT20	2	2412	2399.5	-37.14	-10
TmaxVmin	HT20	2	2412	2399.5	-37.26	-10
TnomVnom	HT20	2	2472	2484.0	-32.72	-10
TminVmax	HT20	2	2472	2484.0	-30.95	-10
TminVmin	HT20	2	2472	2484.0	-30.95	-10
TmaxVmax	HT20	2	2472	2484.0	-35.83	-10
TmaxVmin	HT20	2	2472	2484.0	-35.89	-10

Low Band
Up Band

Result
Complied

Transmitter Unwanted Emissions in the Out-of-band Domain Result
Test Date: Sep. 22, 2014
OOB Emissions (dBm/MHz)

Condition	Modulation Mode	N _T x	Freq. (MHz)	OOB Freq. (MHz)	OOB Emissions	Limit
TnomVnom	HT40	2	2422	2398.5	-35.52	-10
TminVmax	HT40	2	2422	2398.5	-33.42	-10
TminVmin	HT40	2	2422	2398.5	-33.39	-10
TmaxVmax	HT40	2	2422	2398.5	-38.21	-10
TmaxVmin	HT40	2	2422	2398.5	-38.26	-10
TnomVnom	HT40	2	2462	2484.0	-34.08	-10
TminVmax	HT40	2	2462	2484.0	-32.03	-10
TminVmin	HT40	2	2462	2484.0	-32.03	-10
TmaxVmax	HT40	2	2462	2484.0	-36.84	-10
TmaxVmin	HT40	2	2462	2484.0	-36.90	-10

Low Band
Up Band

Result
Complied

3.5 Transmitter Unwanted Emissions in the Spurious Domain

3.5.1 Transmitter Unwanted Emissions in the Spurious Domain Limit

Frequency Range	Maximum Power e.r.p. (≤ 1 GHz) ; e.r.p. (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz
Note 1: spurious domain $\leq (2400 \text{ MHz} - 2N)$ and spurious domain $\geq (2483.5 \text{ MHz} + 2N)$; N = MAX (1, Occupied Channel Bandwidth) MHz		

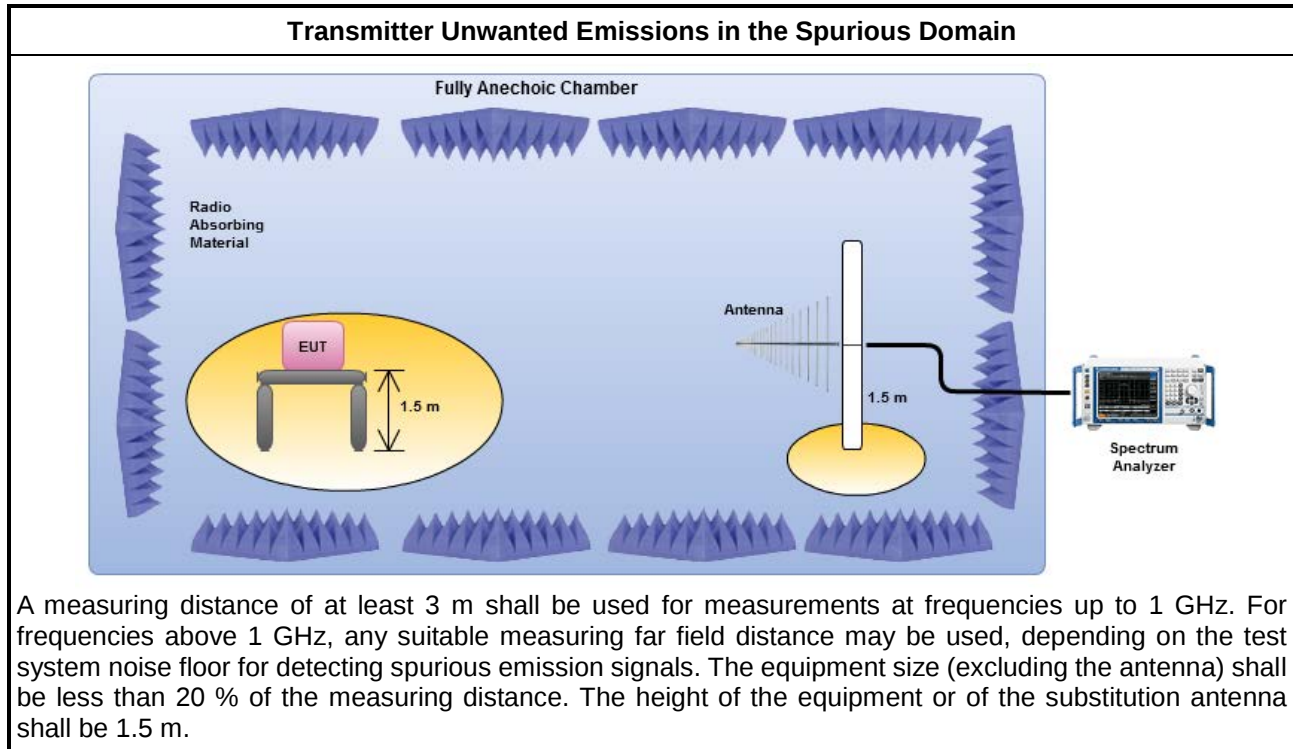
3.5.2 Measuring Instruments

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

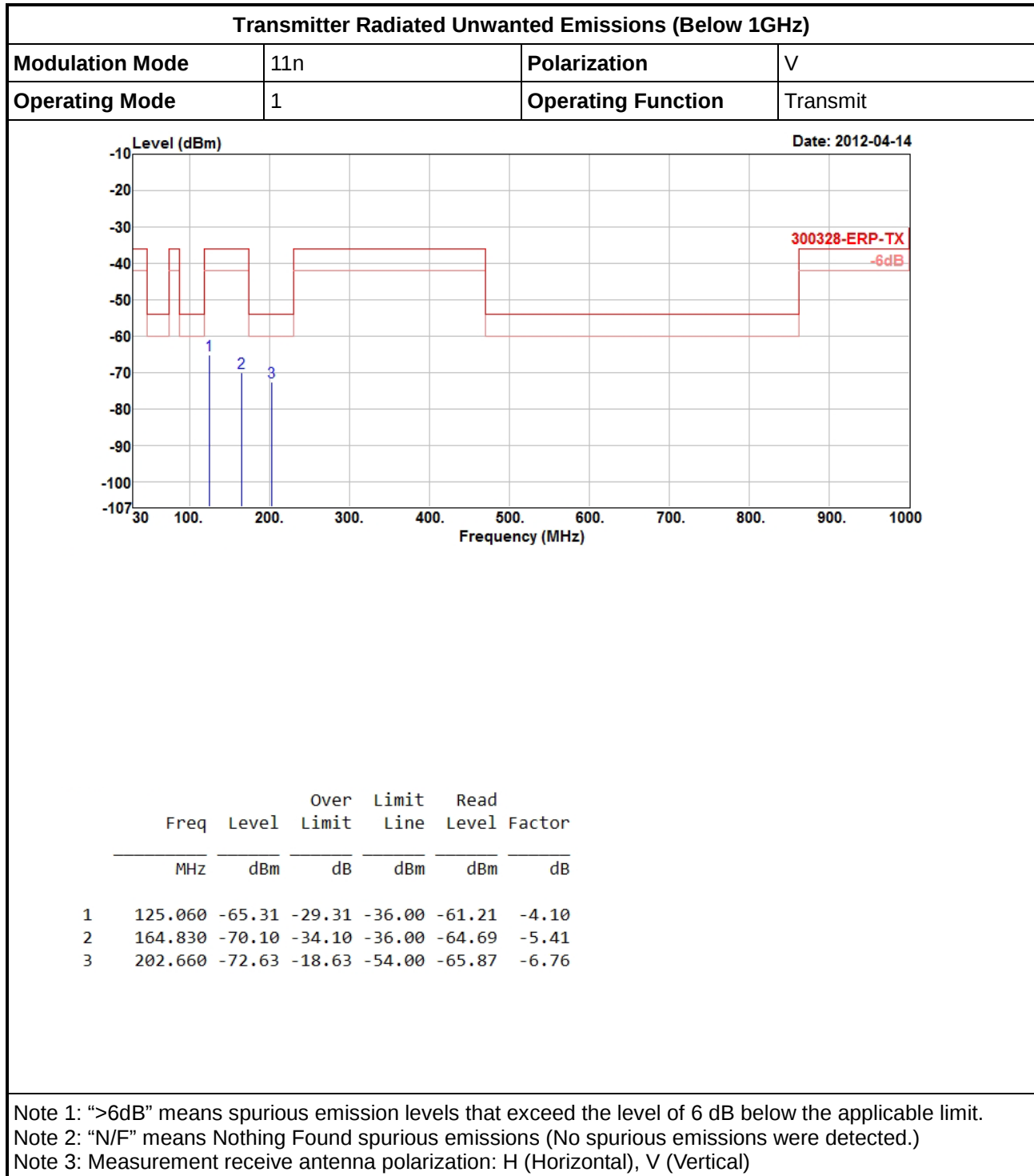
3.5.3 Test Procedures

Test Method	
☐	Refer as EN 300 328, clause 5.3.10.2.1 for conducted measurement. Conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation).
☐	The EUT supports single transmit chain and measurements performed on this transmit chain.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☐	The EUT supports multiple transmit chains using options given below:
☐	Option 1: The trace data for each transmit chain has to be individually recorded and each transmit chain trace data shall be added and compared with the transmitter spurious emissions limit.
☐	Option 2: the results for each of the transmit chains shall be individually compared with the transmitter spurious emissions limit. After that these limits have been reduced with $10 \times \log_{10}(A_{ch})$. (Number of active transmit chains).
☐	Equipment with single transmit chain. All measurement had be performed on this transmit chain.
☒	Refer as EN 300 328, clause 5.3.10.2.2 for radiated measurement.

3.5.4 Test Setup

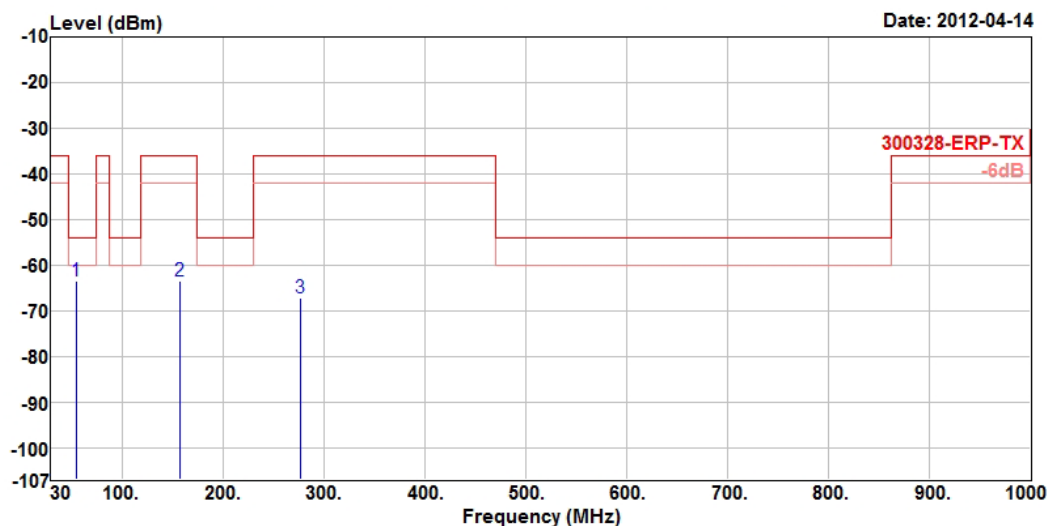


3.5.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)



Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation Mode	11n	Polarization	H
Operating Mode	1	Operating Function	Transmit



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB

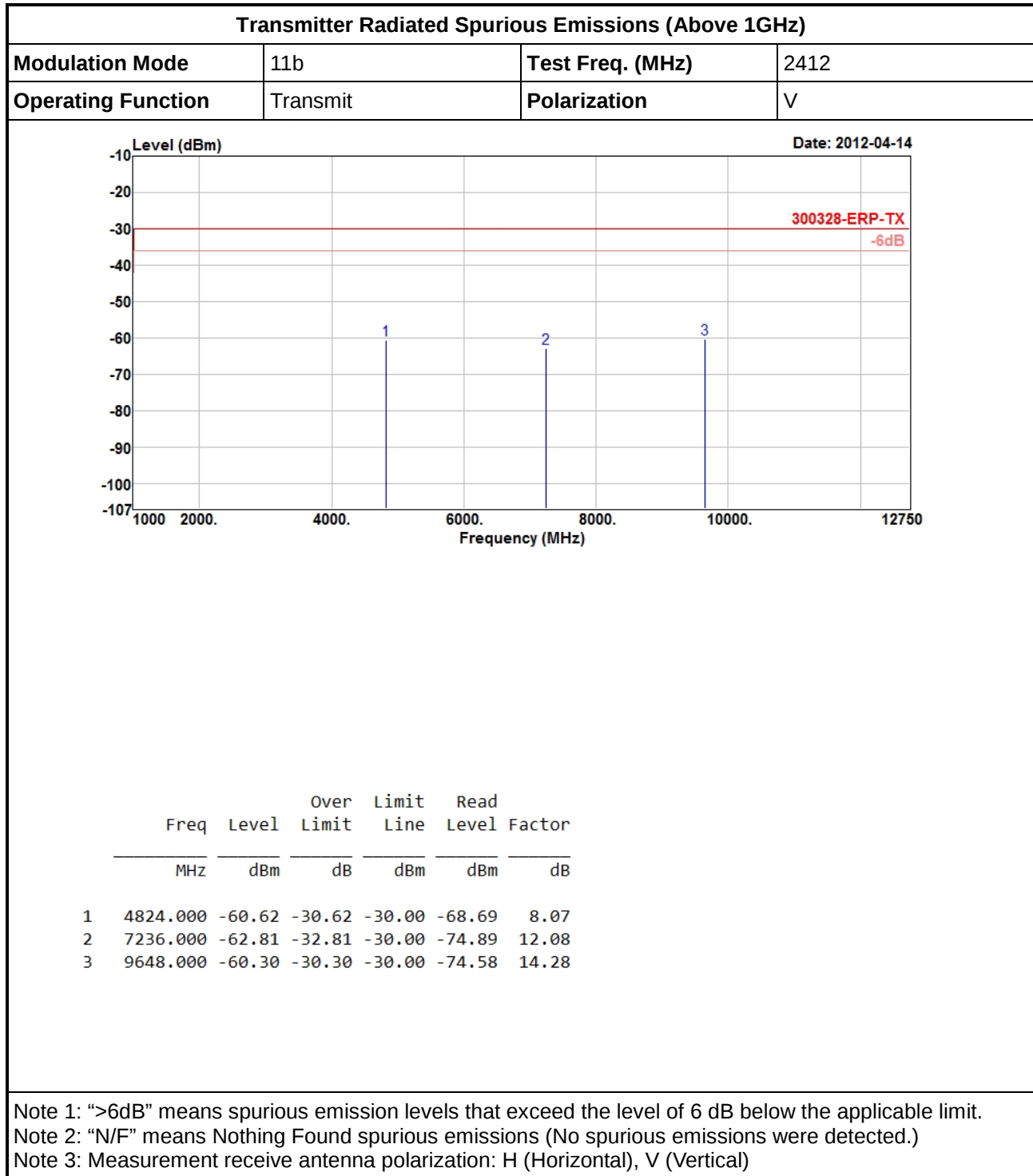
1	55.220	-63.63	-9.63	-54.00	-60.56	-3.07
2	157.070	-63.43	-27.43	-36.00	-58.98	-4.45
3	277.350	-67.10	-31.10	-36.00	-63.67	-3.43

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

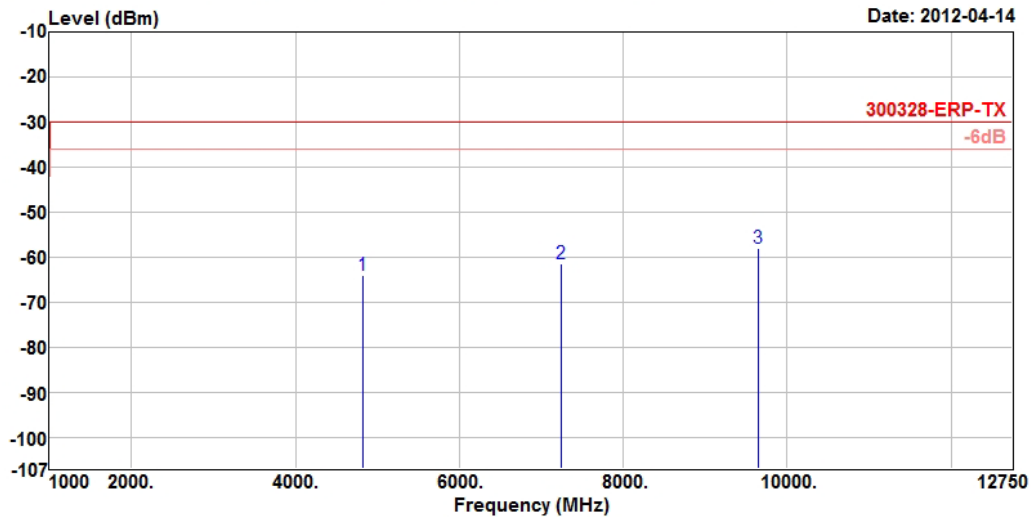
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz)



Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2412
Operating Function	Transmit	Polarization	H

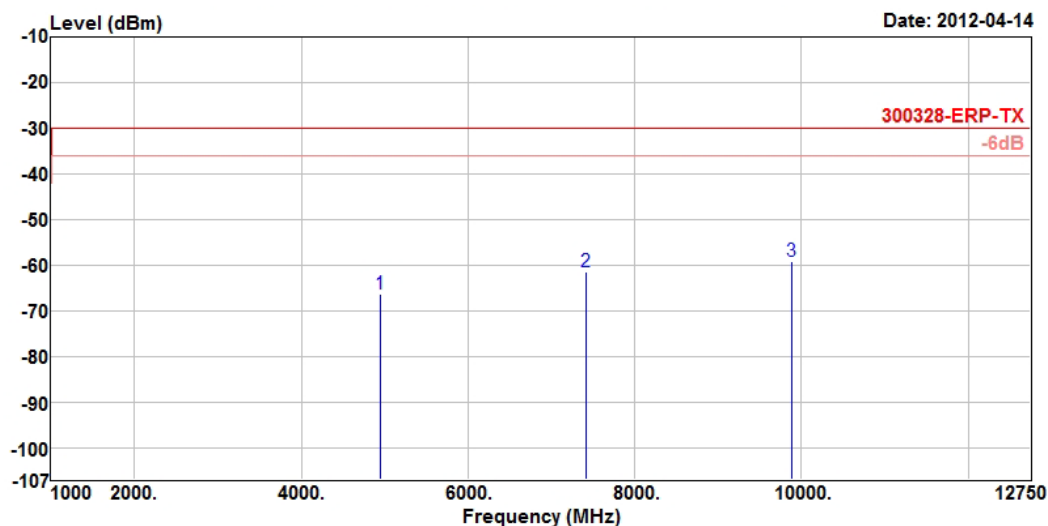


	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
		dB		dBm	dBm	dB
1	4824.000	-64.18	-34.18	-30.00	-73.04	8.86
2	7236.000	-61.41	-31.41	-30.00	-74.97	13.56
3	9648.000	-58.07	-28.07	-30.00	-74.08	16.01

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2472
Operating Function	Transmit	Polarization	V

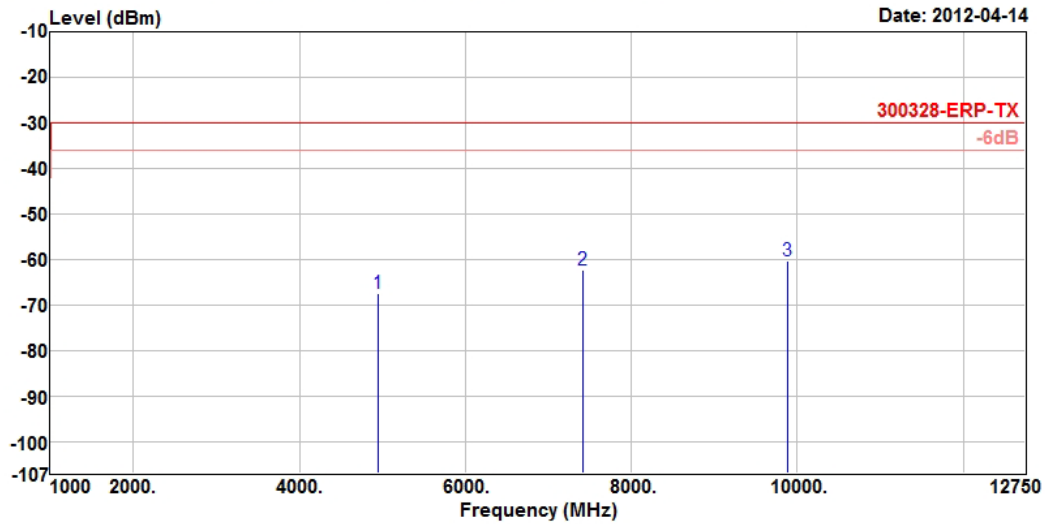


	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4944.000	-66.48	-36.48	-30.00	-75.95	9.47
2	7416.000	-61.45	-31.45	-30.00	-75.19	13.74
3	9888.000	-59.08	-29.08	-30.00	-74.09	15.01

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2472
Operating Function	Transmit	Polarization	H



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4944.000	-67.49	-37.49	-30.00	-76.09	8.60
2	7416.000	-62.39	-32.39	-30.00	-74.90	12.51
3	9888.000	-60.42	-30.42	-30.00	-74.12	13.70

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

4 Receiver Test Result

4.1 Receiver Spurious Emissions

4.1.1 Receiver Spurious Emissions Limit

Frequency Range	Maximum Power e.r.p. (≤ 1 GHz) ; e.r.p. (> 1 GHz)	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

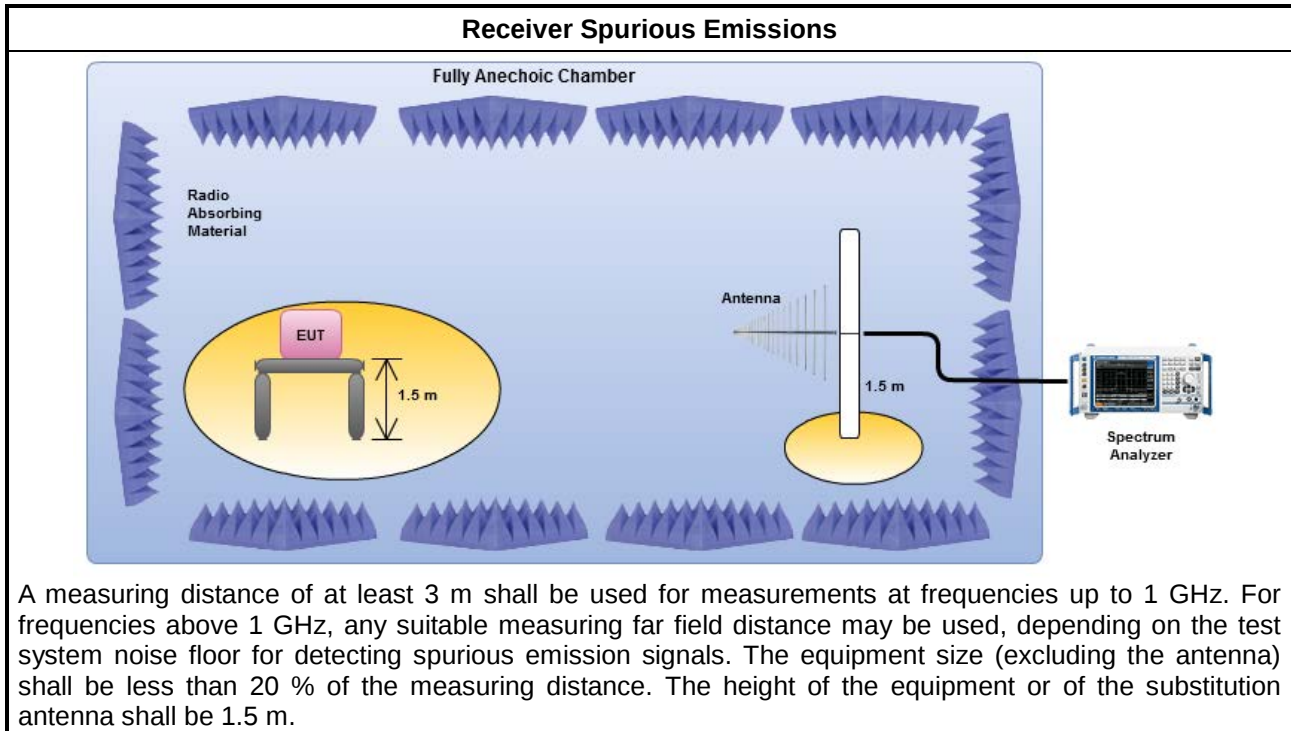
4.1.2 Measuring Instruments

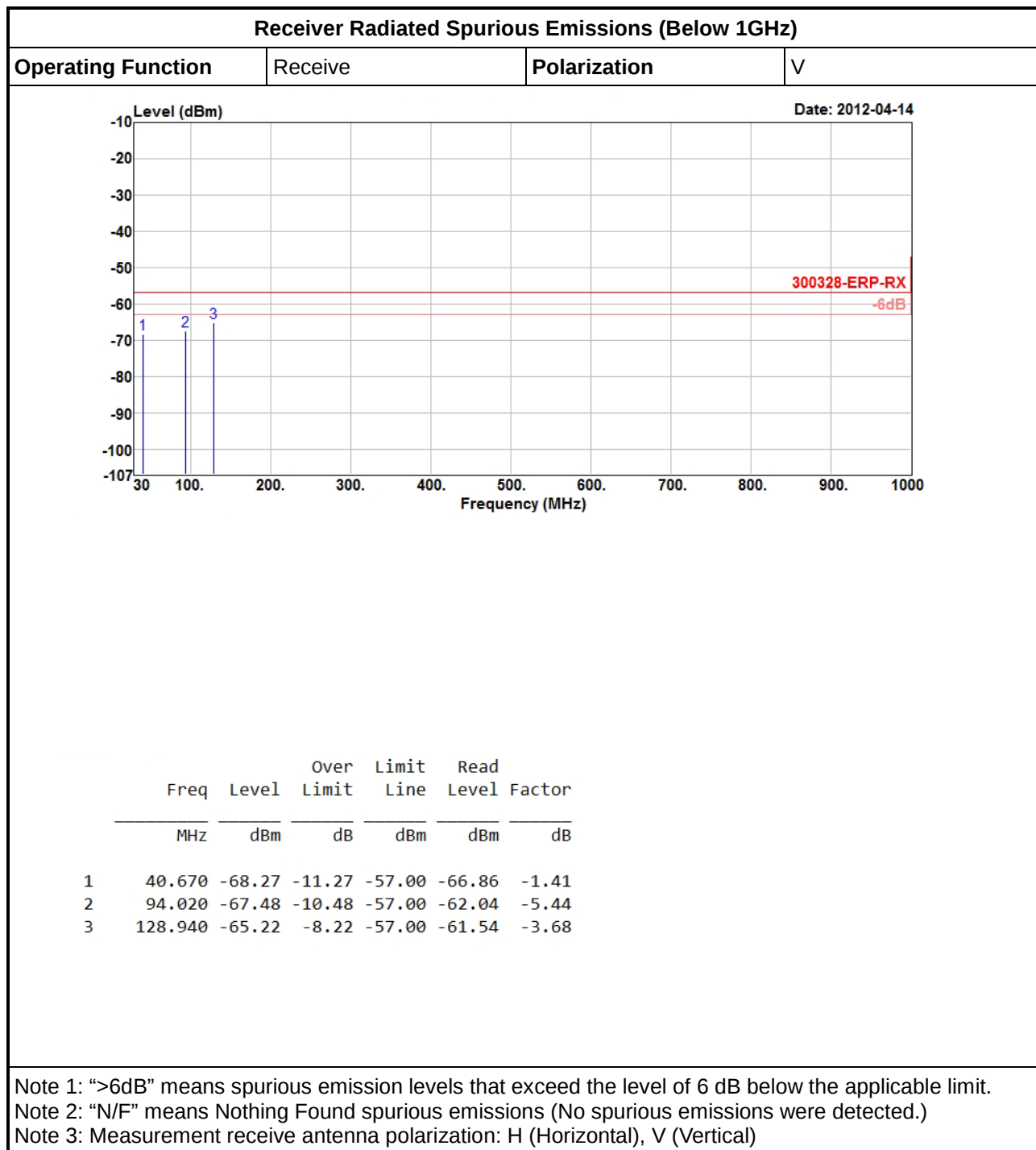
Refer a test equipment and calibration data table in this test report.

4.1.3 Test Procedures

Test Method	
☐	Refer as EN 300 328, clause 5.3.11.2.1 for conducted measurement. Conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation).
☐	The EUT supports single receive chain and measurements performed on this receive chain.
☐	The EUT supports diversity receiving and the results on receive chain port 1 is the worst case.
☐	The EUT supports multiple receive chains using options given below:
☐	Option 1: The trace data for each receive chain has to be individually recorded and each receive chain trace data shall be added and compared with the receiver spurious emissions limit.
☐	Option 2: the results for each of the receive chains shall be individually compared with the receiver spurious emissions limit. After that these limits have been reduced with $10 \times \log_{10}(A_{ch})$. (Number of active receive chains).
☒	Refer as EN 300 328, clause 5.3.11.2.2 for radiated measurement.

4.1.4 Test Setup



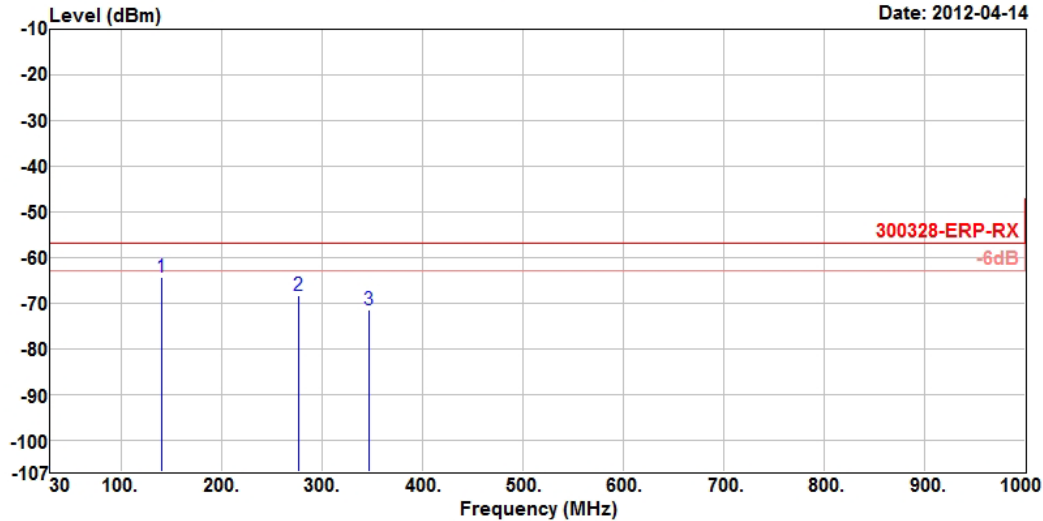
4.1.5 Receiver Radiated Spurious Emissions (Below 1GHz)


Receiver Radiated Spurious Emissions (Below 1GHz)
Operating Function

Receive

Polarization

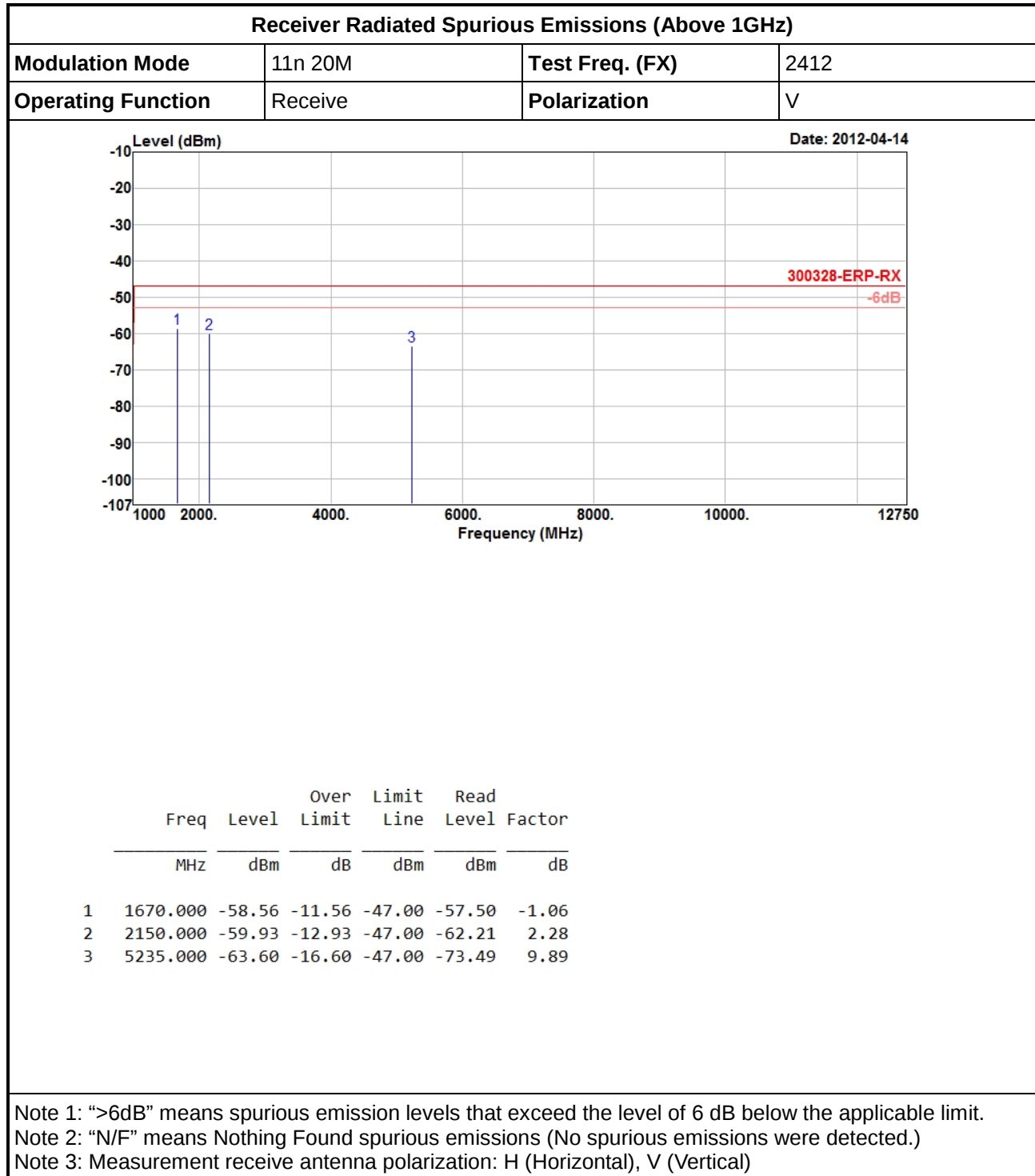
H



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB

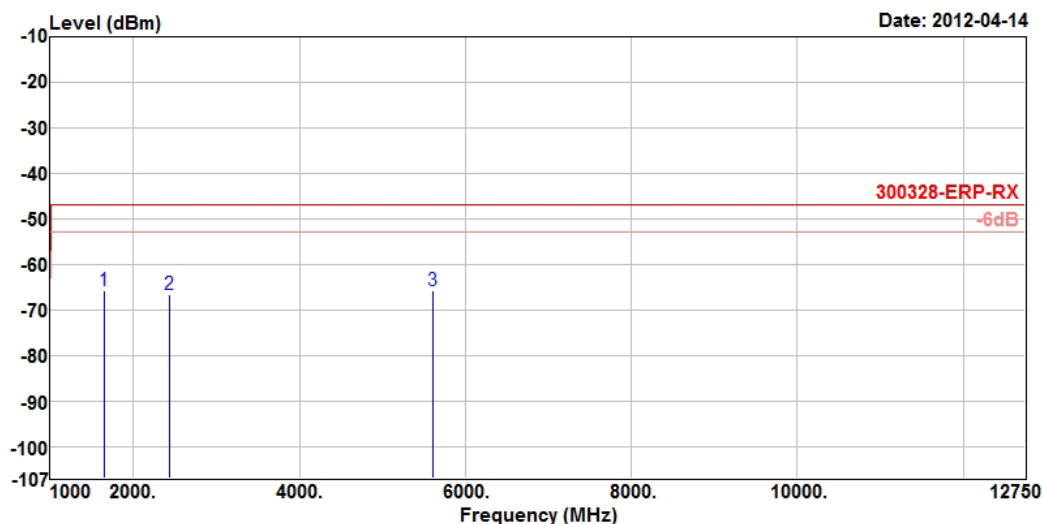
1	140.580	-64.41	-7.41	-57.00	-61.10	-3.31
2	277.350	-68.32	-11.32	-57.00	-64.89	-3.43
3	347.190	-71.52	-14.52	-57.00	-69.38	-2.14

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

4.1.6 Receiver Radiated Spurious Emissions (Above 1GHz)


Receiver Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11n 20M	Test Freq. (FX)	2412
Operating Function	Receive	Polarization	V

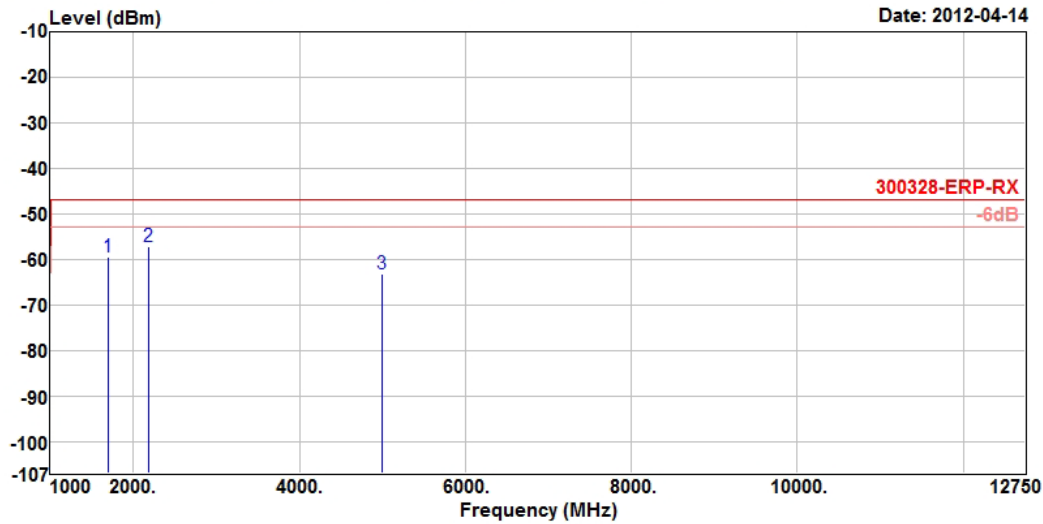


	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1650.000	-65.88	-18.88	-47.00	-64.73	-1.15
2	2430.000	-66.51	-19.51	-47.00	-68.94	2.43
3	5610.000	-65.75	-18.75	-47.00	-74.77	9.02

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Receiver Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11n 20M	Test Freq. (FX)	2472
Operating Function	Receive	Polarization	V



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1695.000	-59.63	-12.63	-47.00	-58.83	-0.80
2	2190.000	-57.15	-10.15	-47.00	-59.43	2.28
3	4990.000	-63.10	-16.10	-47.00	-72.69	9.59

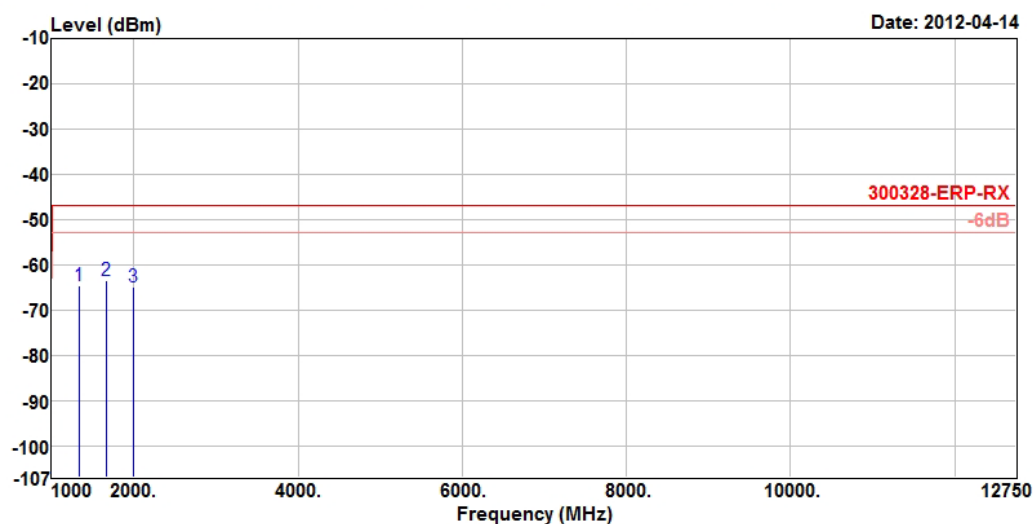
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Receiver Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11n 20M	Test Freq. (FX)	2472
Operating Function	Receive	Polarization	H



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1330.000	-64.78	-17.78	-47.00	-61.44	-3.34
2	1670.000	-63.50	-16.50	-47.00	-62.61	-0.89
3	1990.000	-65.00	-18.00	-47.00	-67.52	2.52

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

5 Adaptivity Test Result

5.1 Adaptivity and Receiver Blocking

5.1.1 Adaptivity and Receiver Blocking Limit

Adaptivity and Receiver Blocking Limit	
Type of Equipment Using Wide Band Modulations Other than FHSS:	
☒	Only for adaptive systems and RF Output Power > 10 dBm
☐	Non-LBT based Detect and Avoid: ♦ minimum remain unavailable = 1sec; ♦ minimum Idle Period time = 100us; ♦ maximum Channel Occupancy Time (COT) = 40ms ♦ i.e. COT [40ms] + Idle Period [2ms - 5% of COT]; N x [COT+Idle]; ♦ detection threshold level = -70 dBm/MHz + 20 - Pout e.i.r.p. (Pout in dBm);
☐	LBT based Detect and Avoid (Frame Based Equipment): ♦ minimum Clear Channel Assessment (CCA) time = 18 us; ♦ CCA declared by the supplier ♦ COT = 1 ms to 10 ms ♦ Idle Period = 5% of COT ♦ e.g. CCA [120us] + COT [10ms] + Idle Period [0.5ms - 5% of COT]; ♦ detection threshold level = -70 dBm/MHz + 20 - Pout e.i.r.p. (Pout in dBm);
☒	LBT based Detect and Avoid (Load Based Equipment with spectrum sharing mechanism IEEE Std.): ♦ LBT based spectrum sharing mechanism may implement IEEE 802.11™-2012 [i.3] clause 9, clause 10, clause 16, clause 17, clause 19 and clause 20, or in IEEE 802.15.4™-2011 [i.4], clause 4, clause 5 and clause 8 providing they comply with the conformance requirements referred to in clause 4.3.2.6.3.4.
☒	LBT based Detect and Avoid (Load Based Equipment): ♦ minimum Clear Channel Assessment (CCA) time = 18 us; ♦ COT ≤ 13ms; ♦ detection threshold level = -70 dBm/MHz + 20 - Pout e.i.r.p. (Pout in dBm);
☒	Short Control Signalling Transmissions: ♦ Short Control Signalling Transmissions shall have a maximum duty cycle of 10 % within an observation period of 50 ms.

Receiver Blocking Parameters				
Equipment Type	Wanted Signal Mean Power from Companion Device	Blocking Signal Frequency (MHz)	Blocking Signal Mean power (dBm)	Type of Interfering Signal
LBT	sufficient to maintain the link (see note 2)	2395 or 2488,5 (see note 1)	-35	CW
Non-LBT	-30 dBm			
Note 1: The highest blocking frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest blocking frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.3.7.1.				
Note 2: A typical value which can be used in most cases is -50 dBm/MHz.				

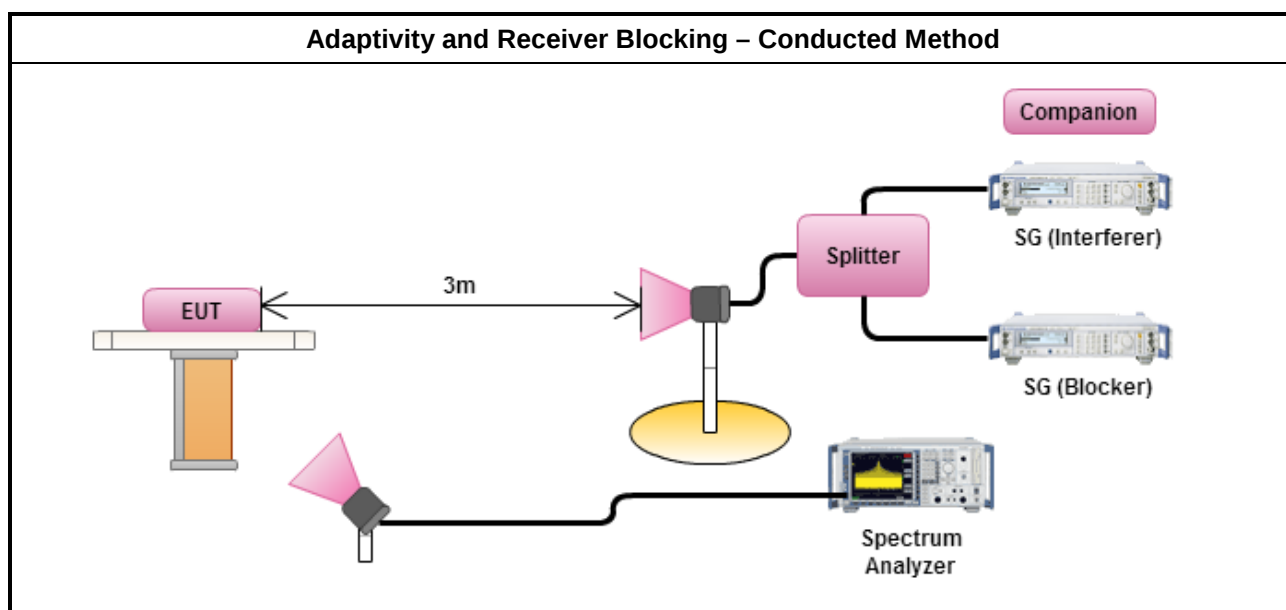
5.1.2 Measuring Instruments

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

5.1.3 Test Procedures

Test Method	
☒	Configure the EUT for normal transmissions with a sufficiently high payload to allow demonstration the adaptive mechanism.
☐	Refer as EN 300 328, clause 5.3.7.2.1 for conducted measurement.
☐	The EUT supports single receive chain and measurements performed on this receive chain.
☐	For conducted measurements on devices with multiple transmit chains and receive chains. The power splitter/combiner shall be used to combine all the transmit/receive chains (antenna outputs) into a single test point. The insertion loss of the power splitter/combiner shall be taken into account.
☒	Refer as EN 300 328, clause 5.3.7.2.2 for radiated measurement.

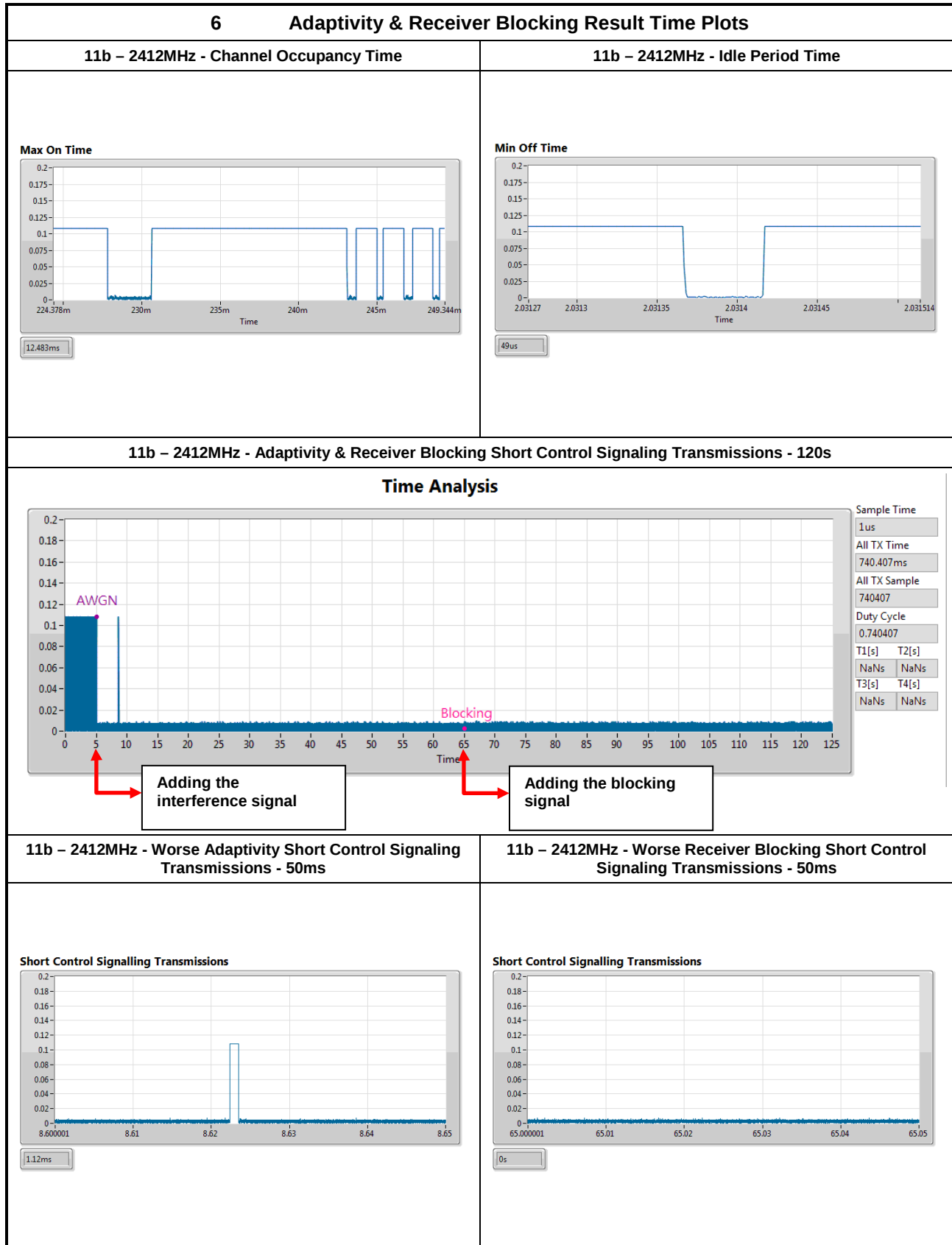
5.1.4 Test Setup



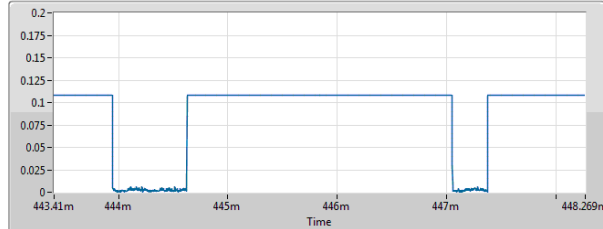
5.1.5 Test Result of Adaptivity and Receiver Blocking

Adaptivity & Receiver Blocking Result.							
Software/Firmware Version		5.1.19.0					
Detection Threshold Level (dBm)		-70					
Modulation Mode	Freq. (MHz)	Channel Occupancy Time (ms)	Idle Period Time (ms)	Short Control Signalling Transmissions (ms)			
				Adaptivity		Adaptivity & Receiver Blocking	
				Bin	Time (ms)	Bin	Time (ms)
11b	2412	12.483	0.049	1120	1.12	0	0
11b	2472	2.43	0.07	1313	1.313	0	0
11g	2412	0.708	0.061	283	0.283	0	0
11g	2472	1.051	0.041	48	0.048	0	0
HT20	2412	2.891	0.062	368	0.368	0	0
HT20	2472	2.89	0.052	389	0.389	0	0
HT40	2422	1.584	0.041	642	0.642	0	0
HT40	2462	1.568	0.041	1620	1.62	56	0.056
Limit		13ms	0.018ms	5 ms in 50 ms period		5 ms in 50 ms period	
Result		Complied					
Channel Occupancy Time and Idle Period Time follow as IEEE 802.11™-2012 and IEEE 802.15.4™-2011 specification without restrirction.							

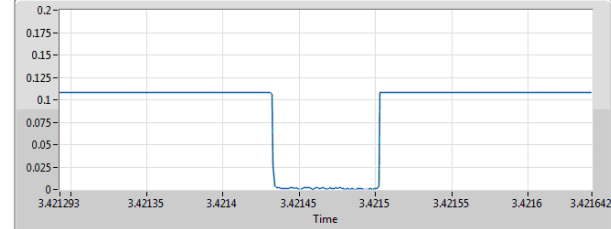
5.1.6 Test Result of Adaptivity Time Plots



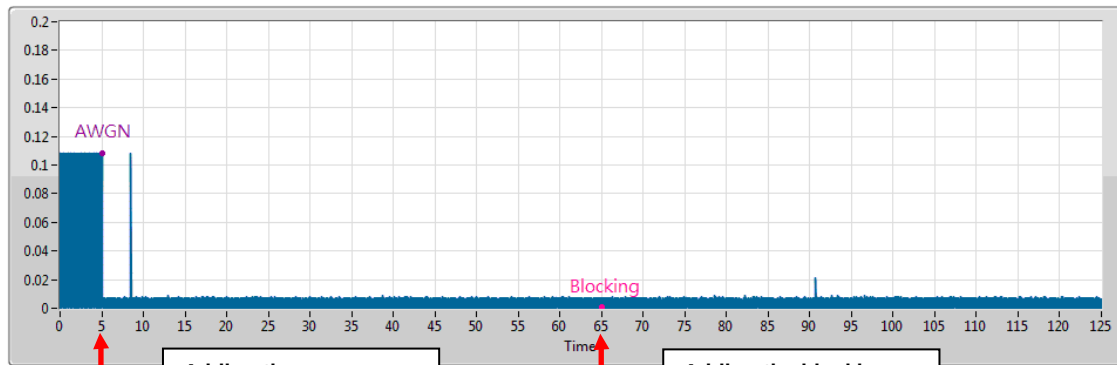
Note : In the plots of Short Control Signaling Transmissions, inject the interference signal to the EUT at the beginning..

Adaptivity & Receiver Blocking Result Time Plots
11b – 2472MHz - Channel Occupancy Time
Max On Time


2.43ms

11b – 2472MHz - Idle Period Time
Min Off Time


70us

11b – 2472MHz - Adaptivity & Receiver Blocking Short Control Signaling Transmissions - 120s
Time Analysis

Sample Time

1us

All TX Time

729.546ms

All TX Sample

729546

Duty Cycle

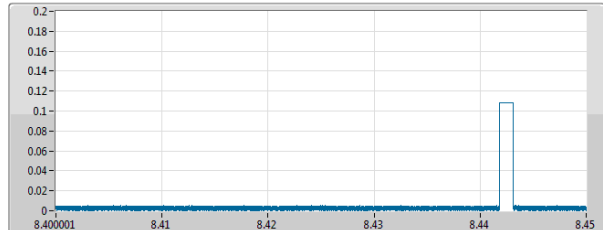
0.729546

T1[s] T2[s]

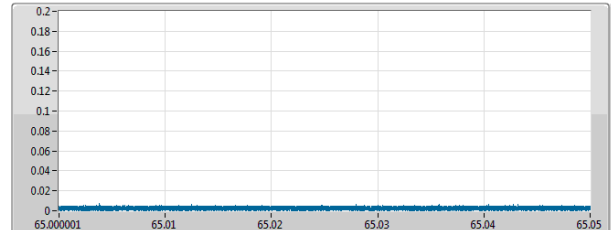
NaNs NaNs

T3[s] T4[s]

NaNs NaNs

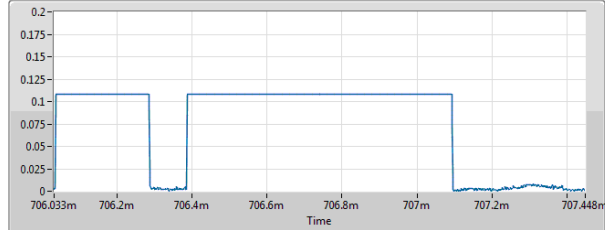
11b – 2472MHz - Worse Adaptivity Short Control Signaling Transmissions - 50ms
Short Control Signalling Transmissions


1.313ms

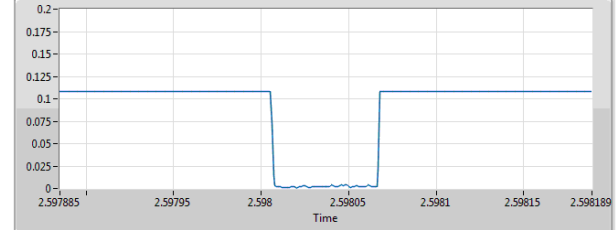
11b – 2472MHz - Worse Receiver Blocking Short Control Signaling Transmissions - 50ms
Short Control Signalling Transmissions


0s

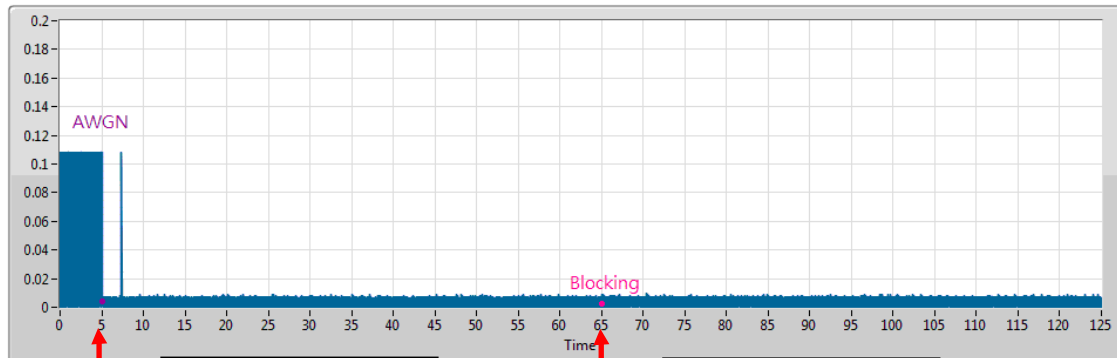
Note : In the plots of Short Control Signaling Transmissions, inject the interference signal to the EUT at the beginning..

Adaptivity & Receiver Blocking Result Time Plots
11g – 2412MHz - Channel Occupancy Time
Max On Time


708us

11g – 2412MHz - Idle Period Time
Min Off Time


61us

11g – 2412MHz - Adaptivity & Receiver Blocking Short Control Signaling Transmissions - 120s
Time Analysis

Sample Time

1us

All TX Time

621.736ms

All TX Sample

621736

Duty Cycle

0.621736

T1[s] T2[s]

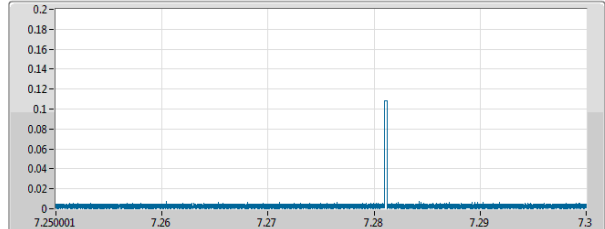
NaNs NaNs

T3[s] T4[s]

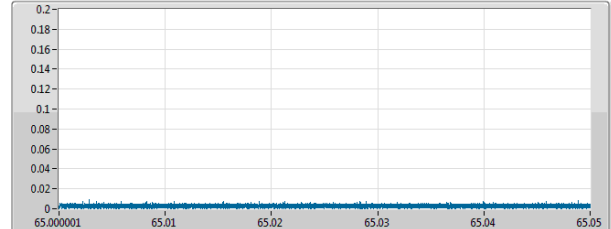
NaNs NaNs

Adding the
interference signal

Adding the blocking
signal

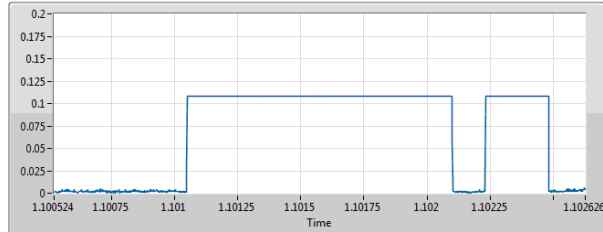
11g – 2412MHz - Worse Adaptivity Short Control Signaling Transmissions - 50ms
Short Control Signalling Transmissions


283us

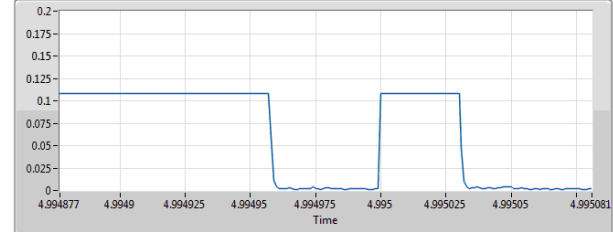
11g – 2412MHz - Worse Receiver Blocking Short Control Signaling Transmissions - 50ms
Short Control Signalling Transmissions


0s

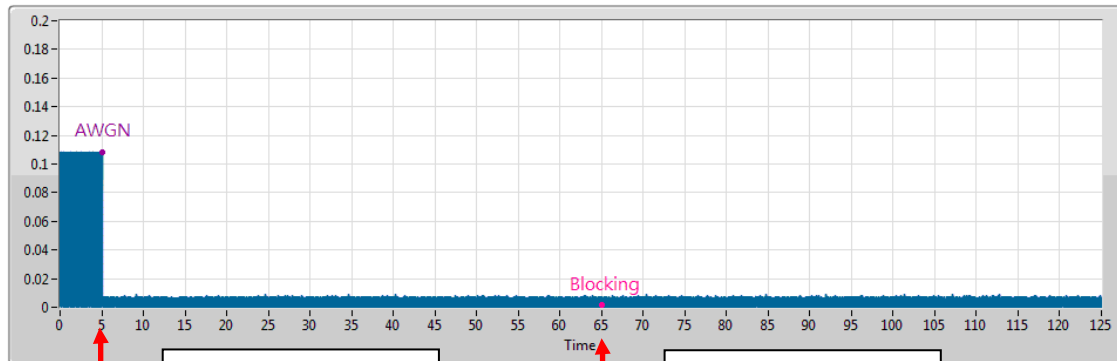
Note : In the plots of Short Control Signaling Transmissions, inject the interference signal to the EUT at the beginning..

Adaptivity & Receiver Blocking Result Time Plots
11g – 2472MHz - Channel Occupancy Time
Max On Time


1.051ms

11g – 2472MHz - Idle Period Time
Min Off Time


41us

11g – 2472MHz - Adaptivity & Receiver Blocking Short Control Signaling Transmissions - 120s
Time Analysis

Sample Time

1us

All TX Time

590.106ms

All TX Sample

590106

Duty Cycle

0.590106

T1[s] T2[s]

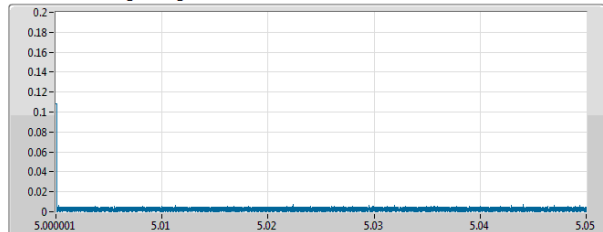
NaNs NaNs

T3[s] T4[s]

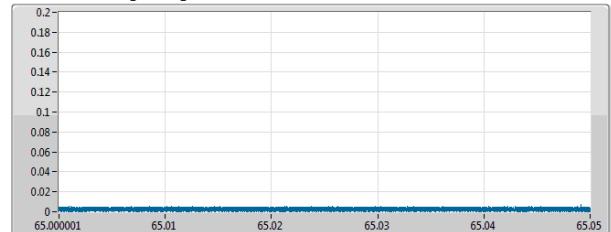
NaNs NaNs

Adding the
interference signal

Adding the blocking
signal

11g – 2472MHz - Worse Adaptivity Short Control Signaling Transmissions - 50ms
Short Control Signalling Transmissions


48us

11g – 2472MHz - Worse Receiver Blocking Short Control Signaling Transmissions - 50ms
Short Control Signalling Transmissions


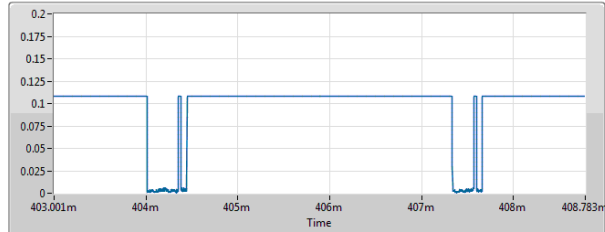
0s

Note : In the plots of Short Control Signaling Transmissions, inject the interference signal to the EUT at the beginning..

Adaptivity & Receiver Blocking Result Time Plots

HT20 – 2412MHz - Channel Occupancy Time

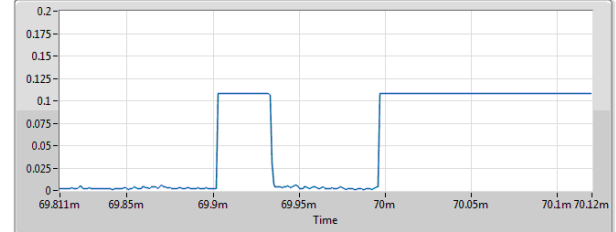
Max On Time



2.891ms

HT20 – 2412MHz - Idle Period Time

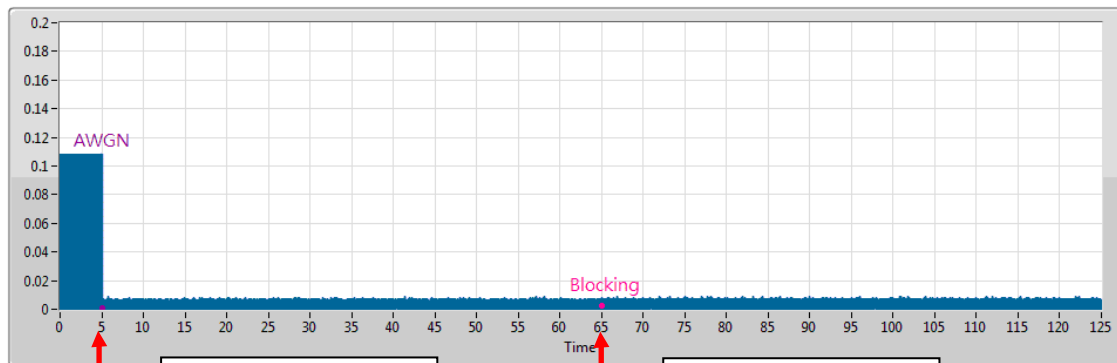
Min Off Time



62us

HT20 – 2412MHz - Adaptivity & Receiver Blocking Short Control Signaling Transmissions - 120s

Time Analysis



Sample Time

1us

All TX Time

874.223ms

All TX Sample

874223

Duty Cycle

0.874223

T1[s] T2[s]

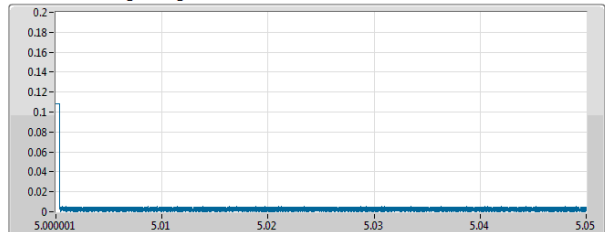
0s 5s

T3[s] T4[s]

NaNs NaNs

HT20 – 2412MHz - Worse Adaptivity Short Control Signaling Transmissions - 50ms

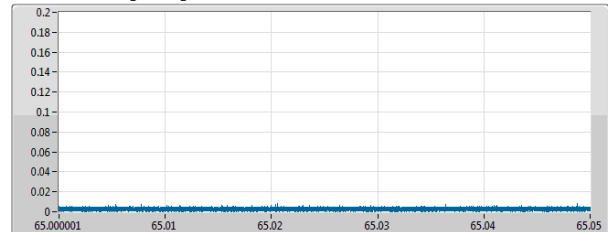
Short Control Signalling Transmissions



368us

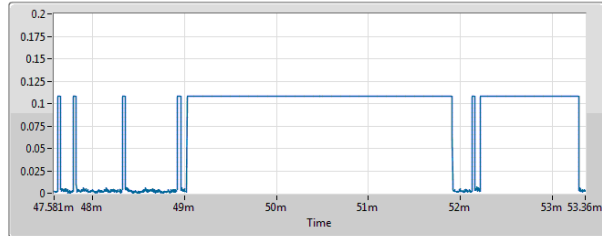
HT20 – 2412MHz - Worse Receiver Blocking Short Control Signaling Transmissions - 50ms

Short Control Signalling Transmissions

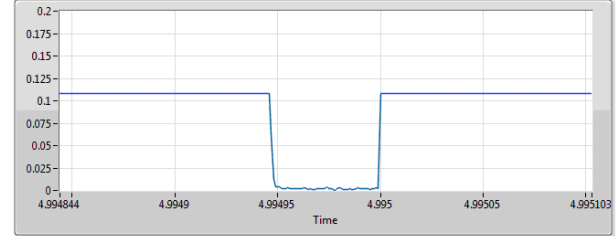


0s

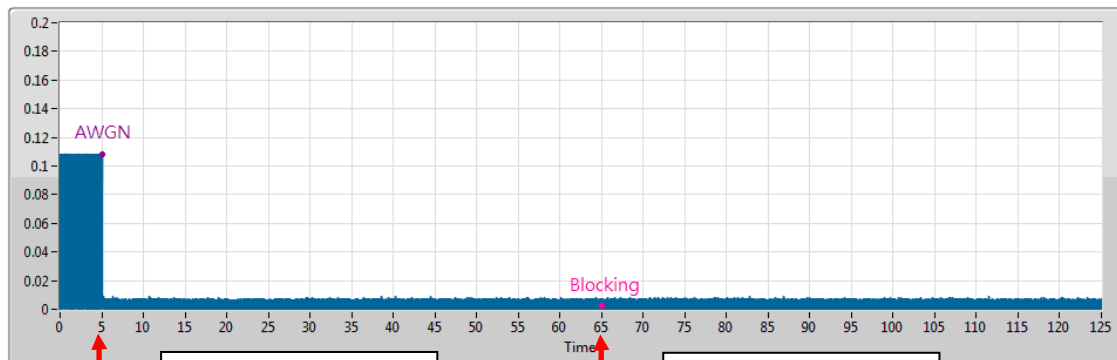
Note : In the plots of Short Control Signaling Transmissions, inject the interference signal to the EUT at the beginning..

Adaptivity & Receiver Blocking Result Time Plots
HT20 – 2472MHz - Channel Occupancy Time
Max On Time


2.89ms

HT20 – 2472MHz - Idle Period Time
Min Off Time


52us

HT20 – 2472MHz - Adaptivity & Receiver Blocking Short Control Signaling Transmissions - 120s
Time Analysis

Sample Time

1us

All TX Time

862.97ms

All TX Sample

862970

Duty Cycle

0.86297

T1[s] T2[s]

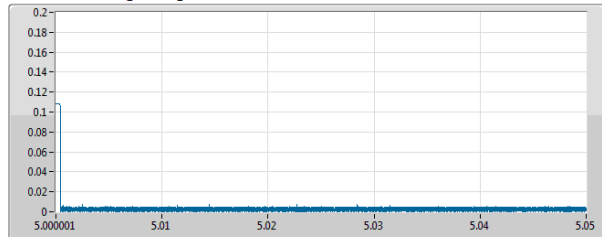
NaNs NaNs

T3[s] T4[s]

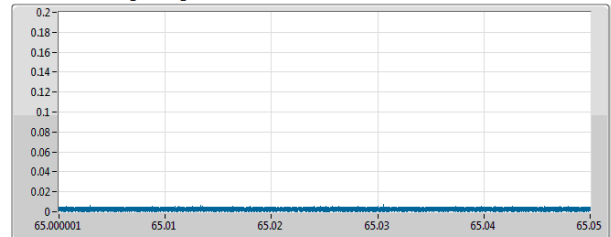
NaNs NaNs

Adding the
interference signal

Adding the blocking
signal

HT20 – 2472MHz - Worse Adaptivity Short Control Signaling Transmissions - 50ms
Short Control Signalling Transmissions


389us

HT20 – 2472MHz - Worse Receiver Blocking Short Control Signaling Transmissions - 50ms
Short Control Signalling Transmissions


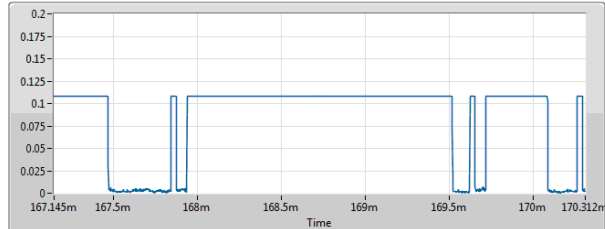
0s

Note : In the plots of Short Control Signaling Transmissions, inject the interference signal to the EUT at the beginning..

Adaptivity & Receiver Blocking Result Time Plots

HT40 – 2422MHz - Channel Occupancy Time

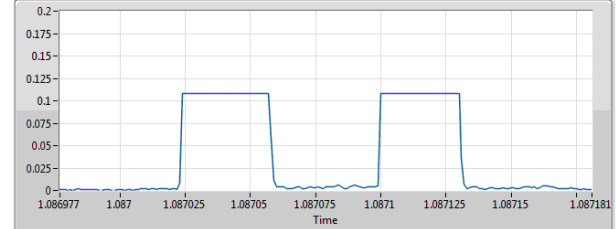
Max On Time



1.584ms

HT40 – 2422MHz - Idle Period Time

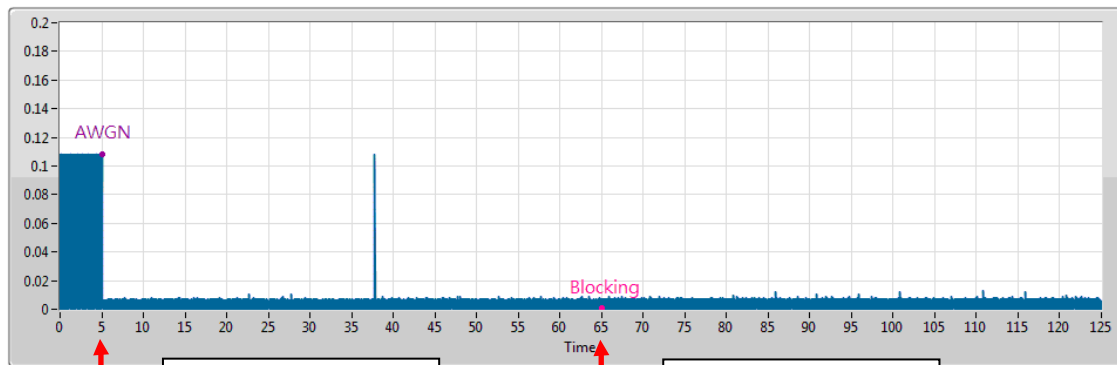
Min Off Time



41us

HT40 – 2422MHz - Adaptivity & Receiver Blocking Short Control Signaling Transmissions - 120s

Time Analysis



Sample Time

1us

All TX Time

769.855ms

All TX Sample

769855

Duty Cycle

0.769855

T1[s] T2[s]

NaNs NaNs

T3[s] T4[s]

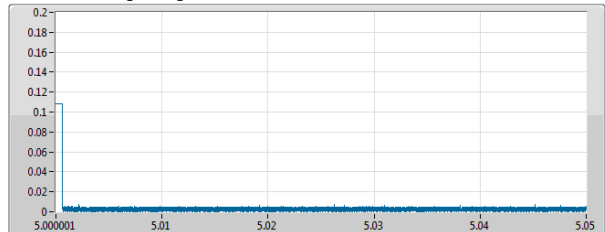
NaNs NaNs

Adding the
interference signal

Adding the blocking
signal

HT40 – 2422MHz - Worse Adaptivity Short Control Signaling Transmissions - 50ms

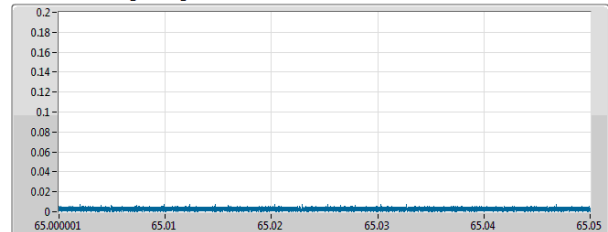
Short Control Signalling Transmissions



642us

HT40 – 2422MHz - Worse Receiver Blocking Short Control Signaling Transmissions - 50ms

Short Control Signalling Transmissions



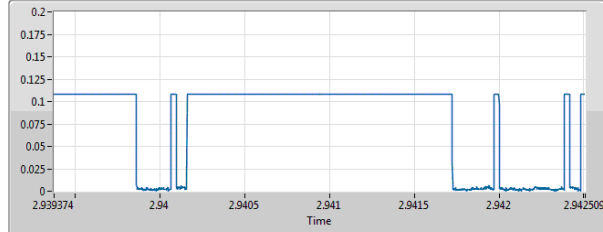
0s

Note : In the plots of Short Control Signaling Transmissions, inject the interference signal to the EUT at the beginning..

Adaptivity & Receiver Blocking Result Time Plots

HT40 – 2462MHz - Channel Occupancy Time

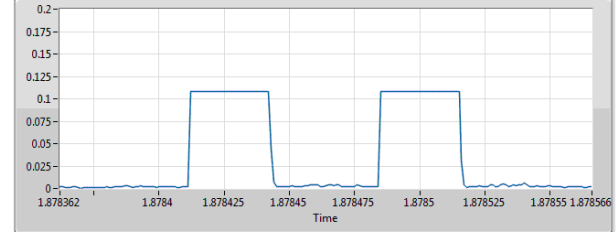
Max On Time



1.568ms

HT40 – 2462MHz - Idle Period Time

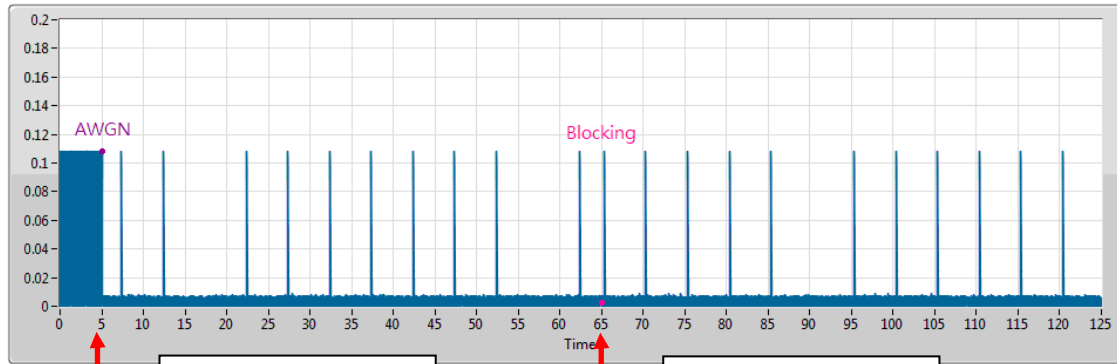
Min Off Time



41us

HT40 – 2462MHz - Adaptivity & Receiver Blocking Short Control Signaling Transmissions - 120s

Time Analysis



Sample Time

1us

All TX Time

768.503ms

All TX Sample

768503

Duty Cycle

0.768503

T1[s] T2[s]

NaNs NaNs

T3[s] T4[s]

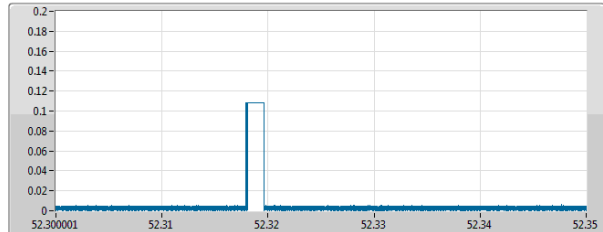
NaNs NaNs

Adding the
interference signal

Adding the blocking
signal

HT40 – 2462MHz - Worse Adaptivity Short Control Signaling Transmissions - 50ms

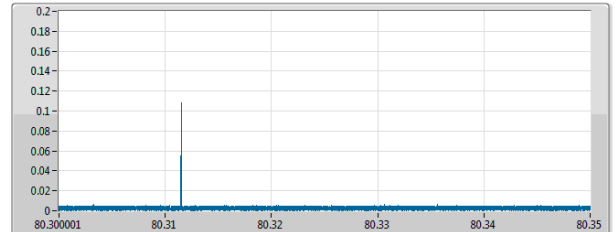
Short Control Signalling Transmissions



1.62ms

HT40 – 2462MHz - Worse Receiver Blocking Short Control Signaling Transmissions - 50ms

Short Control Signalling Transmissions



56us

Note : In the plots of Short Control Signaling Transmissions, inject the interference signal to the EUT at the beginning..

7 Test Equipment and Calibration Data

< RF Conducted >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	9kHz ~ 40GHz	Jan. 25, 2014	Jan. 24, 2015
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100℃	Nov. 20, 2013	Nov. 19, 2014
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 31, 2014	Jul. 30, 2015
Power Meter	Agilent	U2021XA	MY53480019	50MHz ~ 18GHz	Feb. 23, 2014	Feb. 22, 2015
Power Meter	Agilent	U2021XA	MY53510003	50MHz ~ 18GHz	Feb. 23, 2014	Feb. 22, 2015
RF Cable-0.2m	HUBER+SUHN ER	SUCOFLEX_103	10712/4 10709/4	30MHz ~ 26.5GHz	Dec. 02, 2013	Dec. 01, 2014

< Radiated Emission >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101514	10Hz ~ 40GHz	Jun. 13, 2014	Jun. 12, 2015
Amplifier	Agilent	8447D	2944A11146	10kHz ~ 1.3GHz	Jul. 15, 2014	Jul. 14, 2015
Amplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	Mar. 27, 2014	Mar. 26, 2015
Bilog Antenna	SCHAFFNER	CBL6111C	2737	25MHz ~ 2GHz	Oct. 19, 2013	Oct. 18, 2014
Horn Antenna	COM-POWER	AH-118	10091	1GHz ~ 18GHz	Jan. 28, 2014	Jan. 27, 2015
Horn Antenna	ETS	3115	6744	1GHz ~ 18GHz	May 05, 2014	May 04, 2015
RF Cable-R03m	Jye Bao	RG142	CB031	30MHz ~ 1GHz	Dec. 01, 2013	Nov. 30, 2014
RF Cable-10m	HUBER+SUHNE R	SUCOFLEX_104	SN 345675/4	1GHz ~ 26.5GHz	Dec. 01, 2013	Nov. 30, 2014
Turn Table	Chaintek Instruments	3000	MF780208275	0 ~ 360 degree	N/A	N/A
Antenna Mast	HD	100	HD1000203311	1 ~ 4 m	N/A	N/A

< Adaptivity Site >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
Spectrum Analyzer	Keysight	N9010A	MY55150165	9KHz~7GHz	Nov. 03, 2015	Nov. 02, 2016
Signal Generator	Keysight	N5182B	MY53051912	9KHz ~ 6GHz	Oct. 13, 2015	Oct. 12, 2016
Vector Signal Generator	Keysight	N5171B	MY53051240	9KHz ~ 6GHz	Nov. 02, 2015	Nov. 01, 2016
Amplifier	EMCI	EMC1150	980270	10KHz~1000MHz	Aug. 31, 2015	Aug. 30, 2016
USB Scope	NATIONAL INSTRUMENTS	USB-5133	F4D0D4	100MHz	Aug. 25, 2015	Aug. 24, 2016

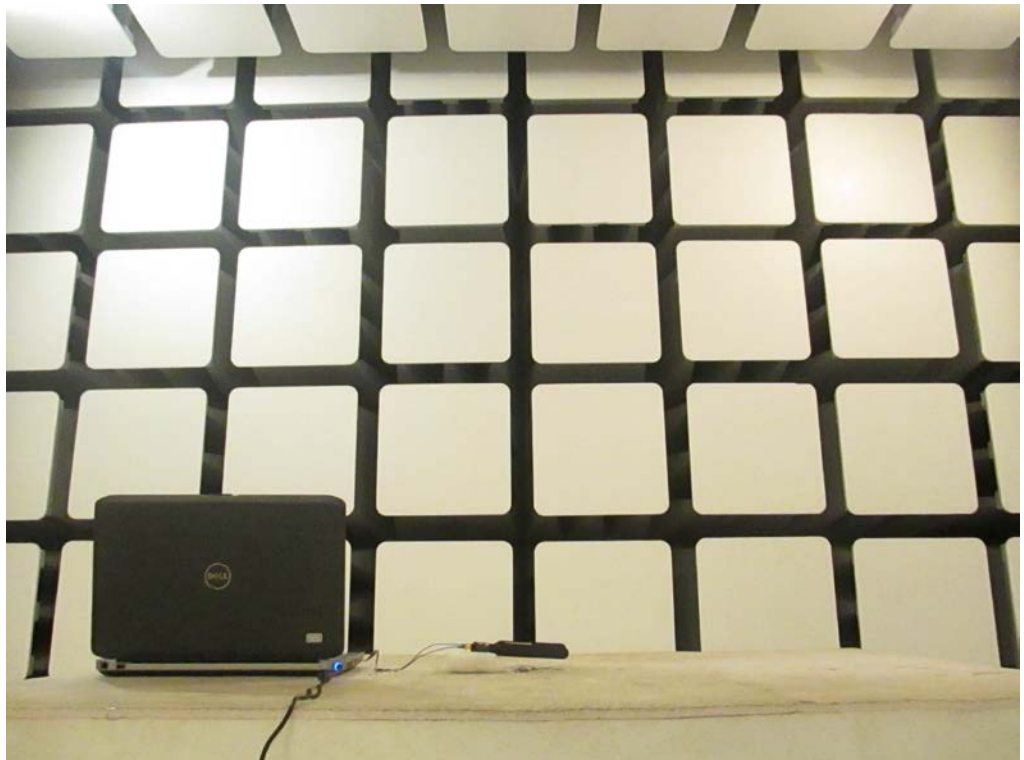
Appendix A. Test Photos

1. Photographs of Radiated Emissions Test Configuration

Front view



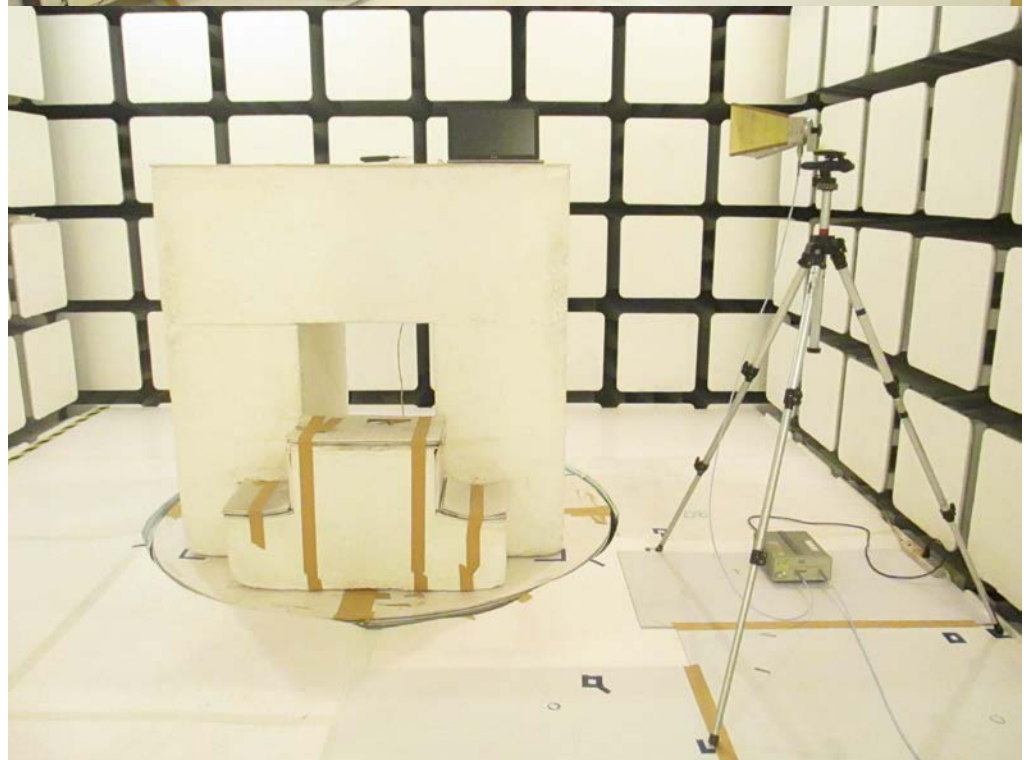
Rear view



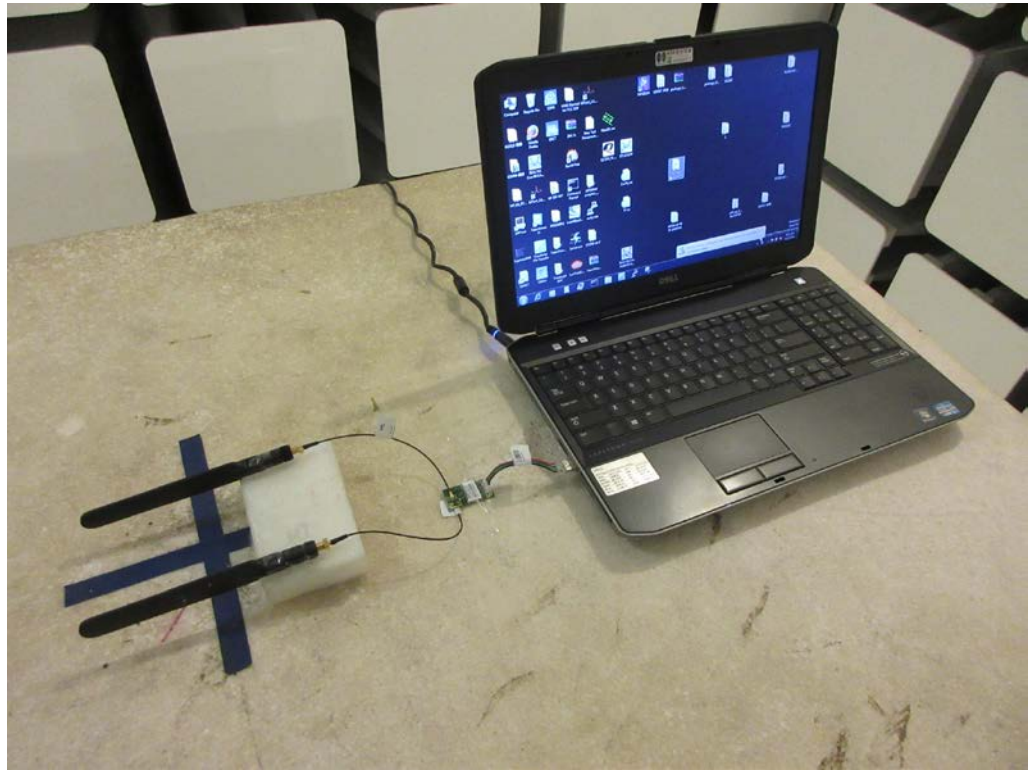
Below 1GHz



Above 1GHz



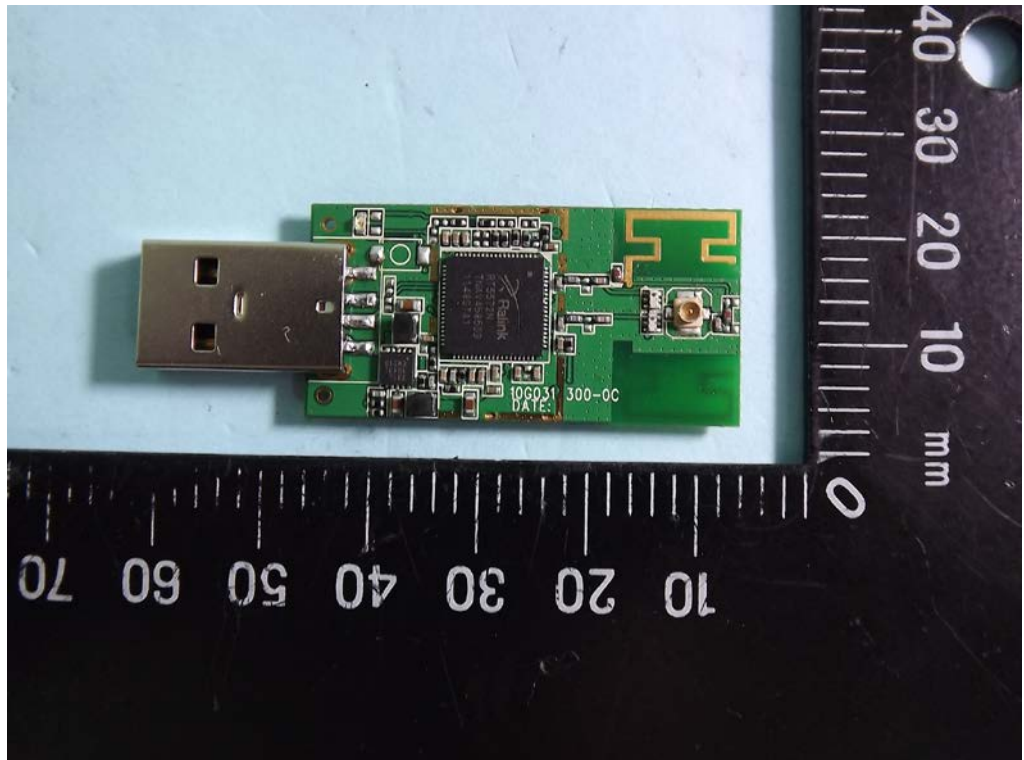
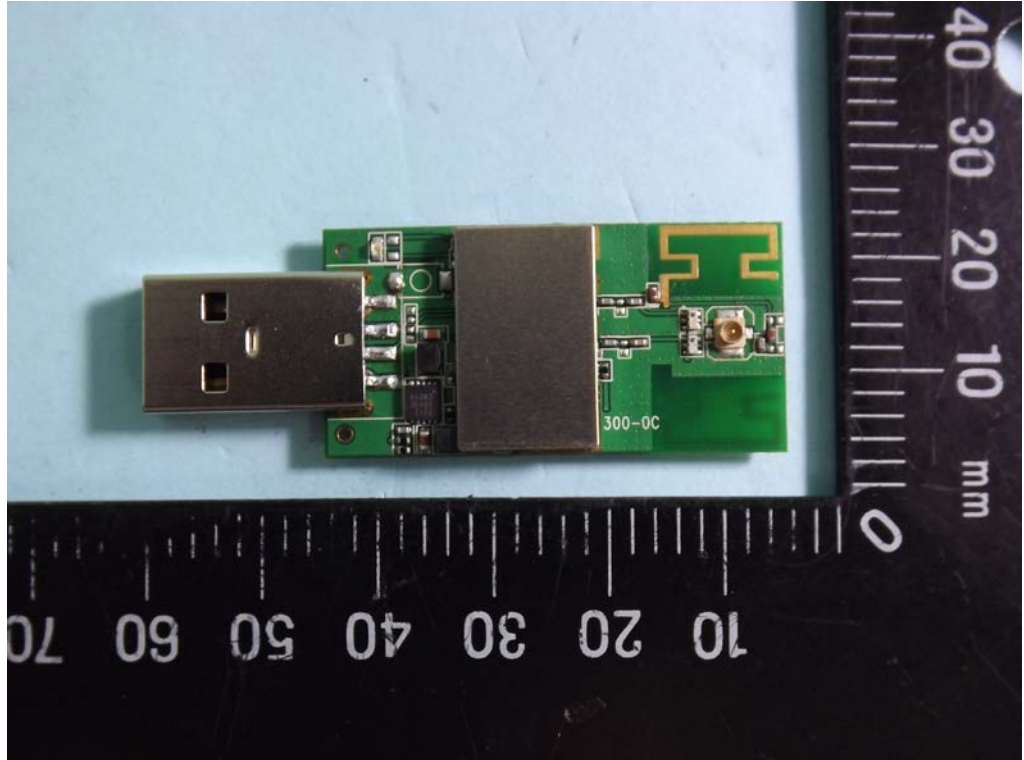
**EUT took a close
view**

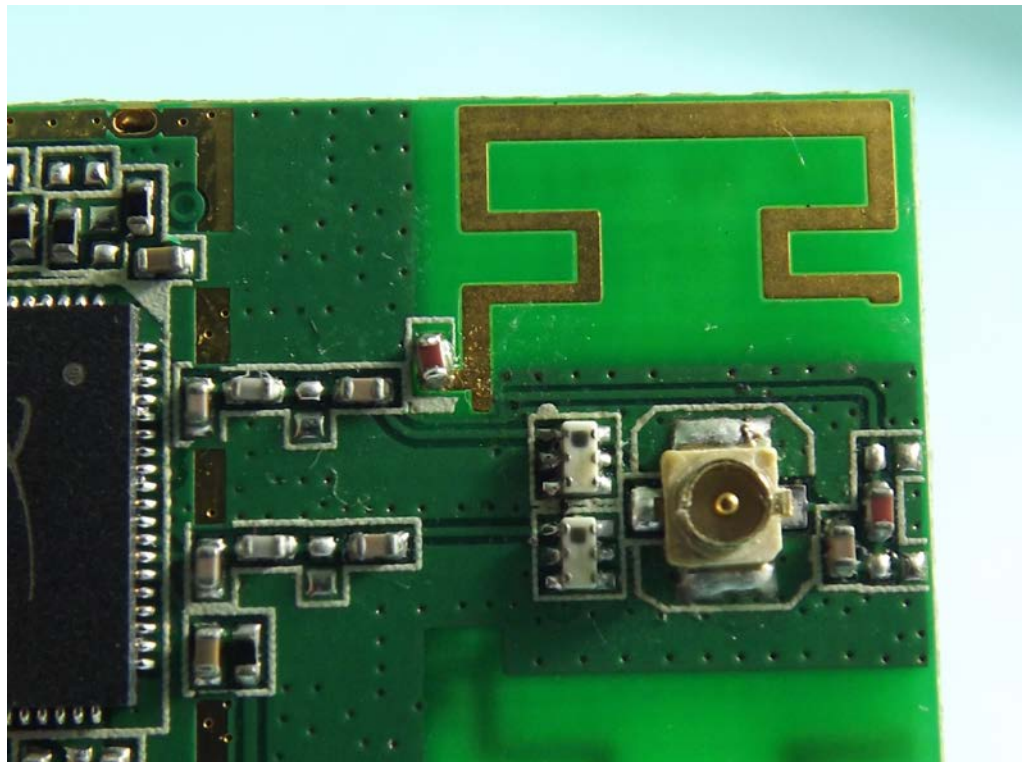


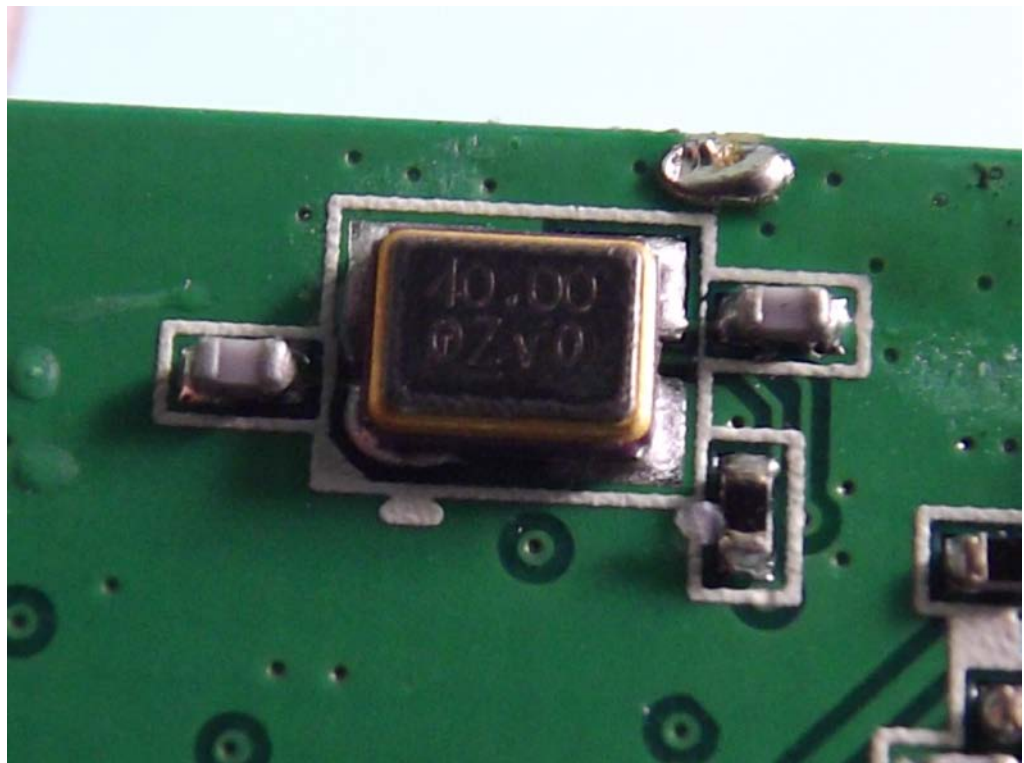
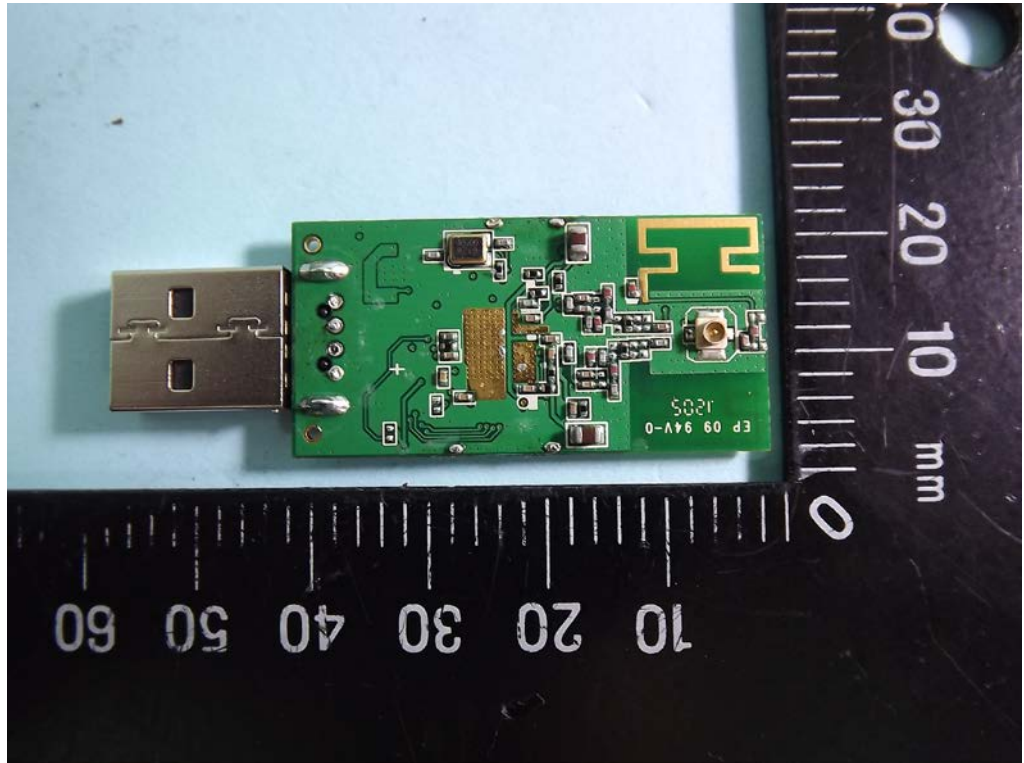
2. Photographs of Adaptivity Test Configuration

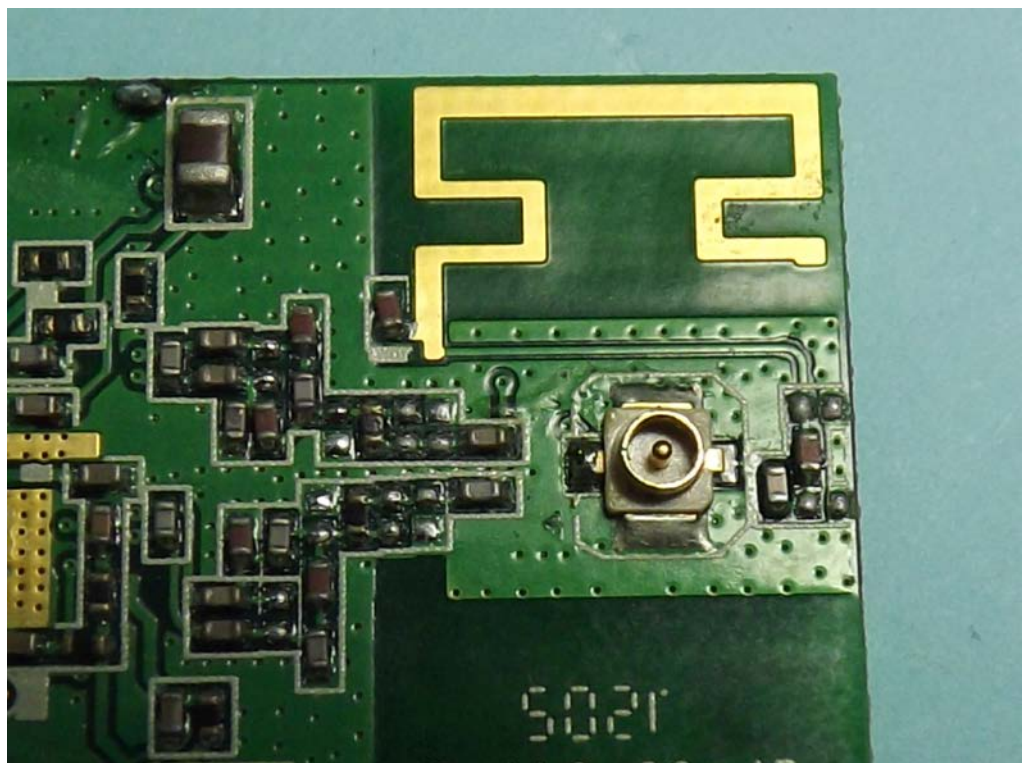
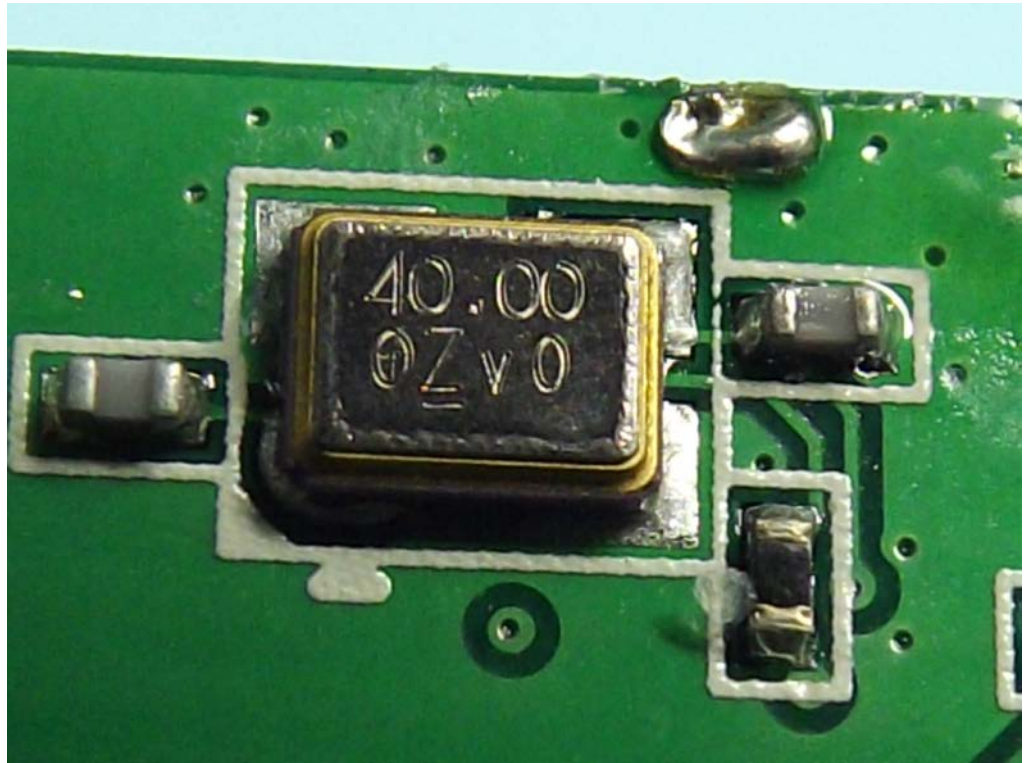


APPENDIX B. Photographs of EUT USB

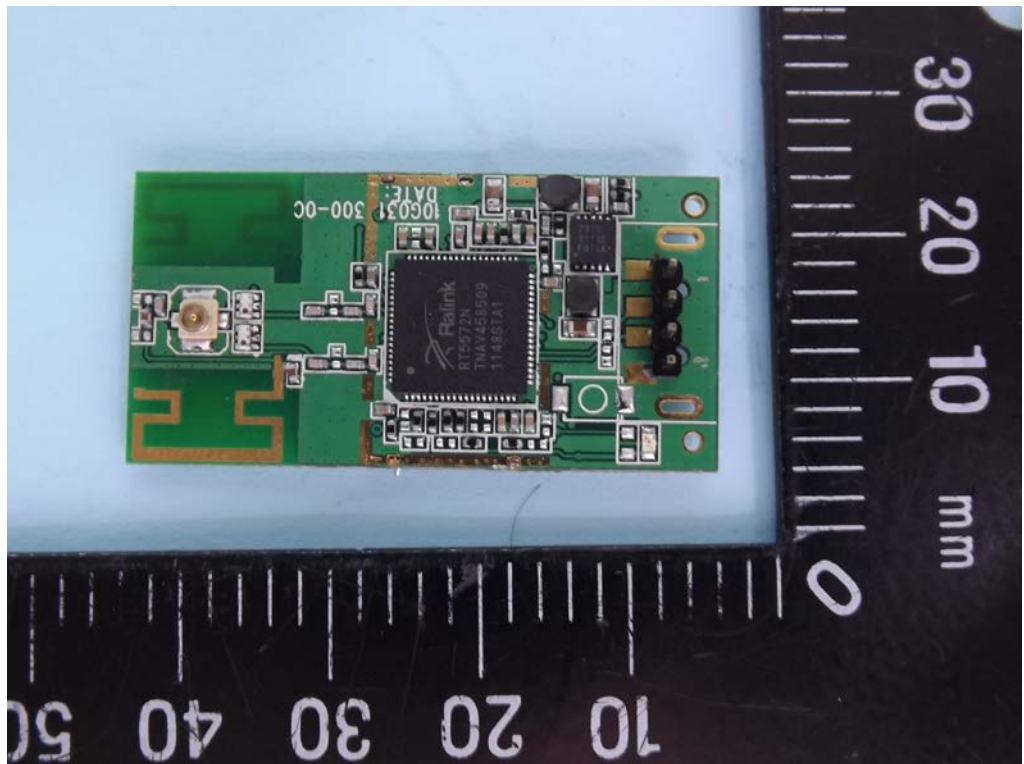
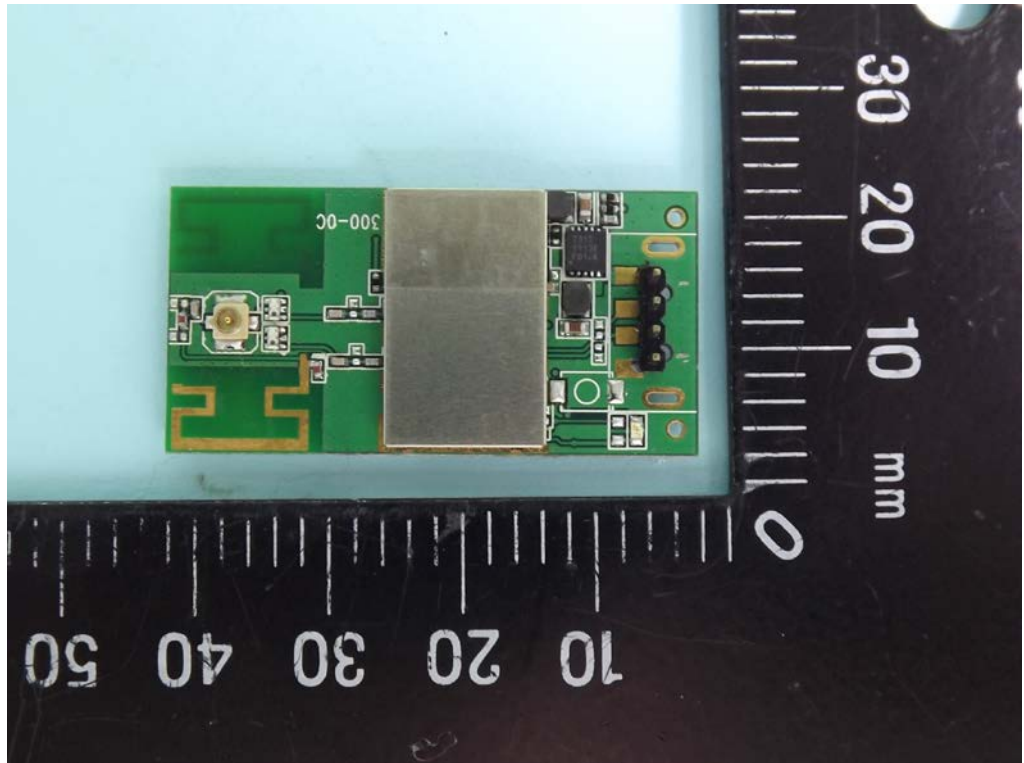


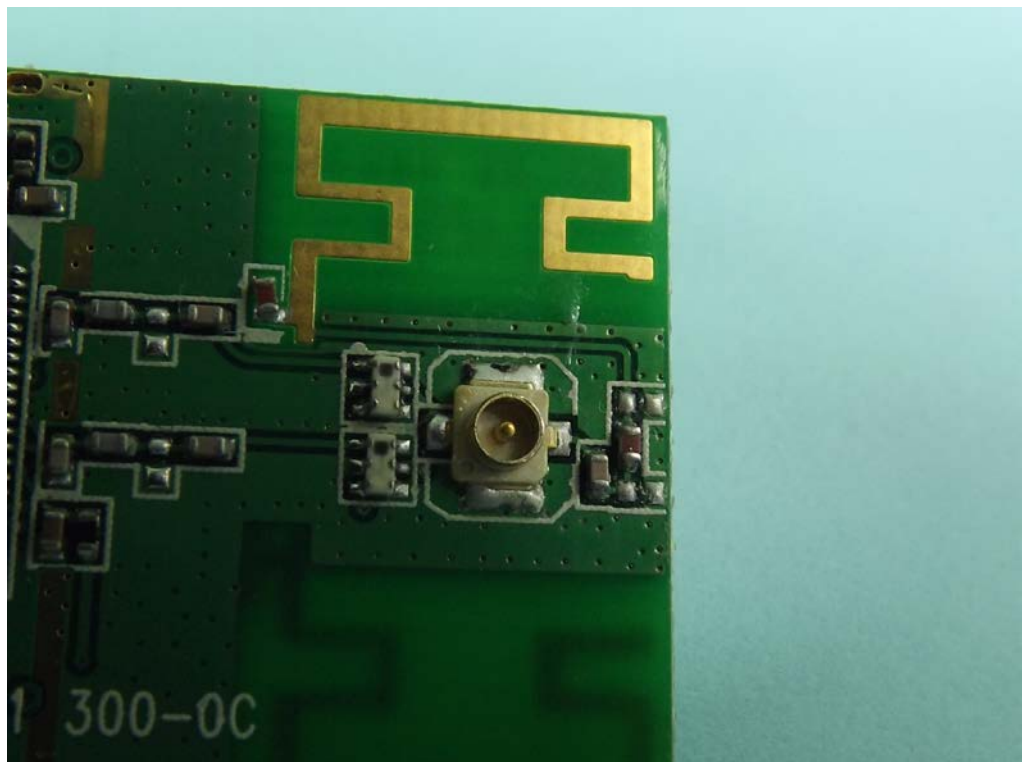


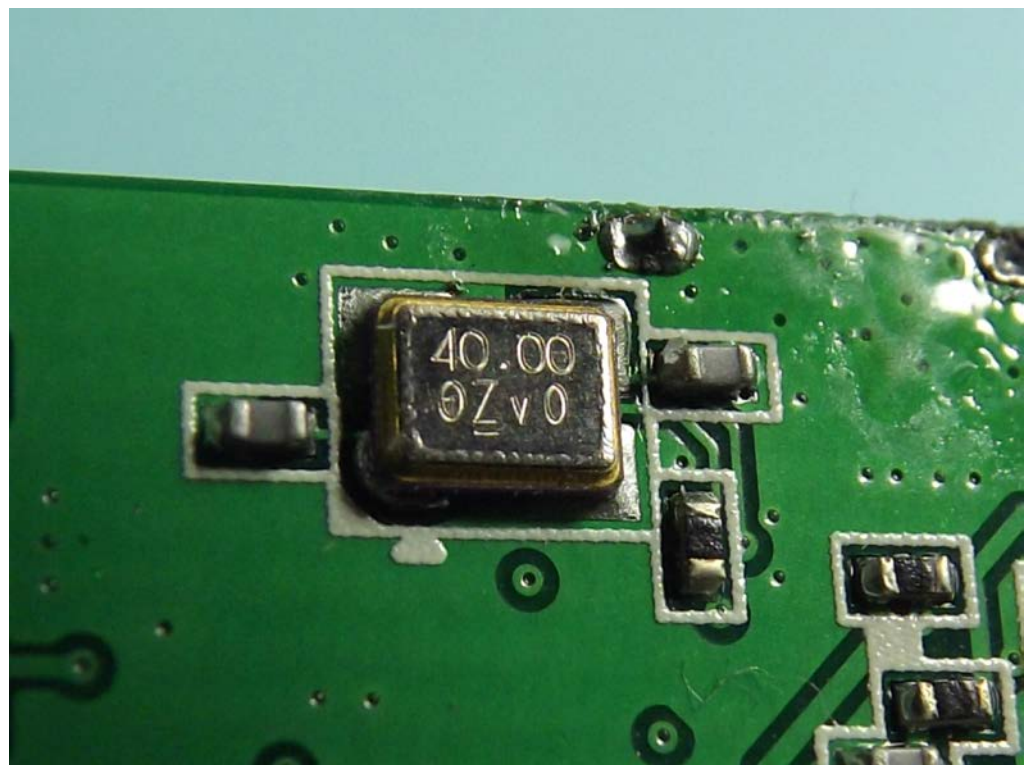
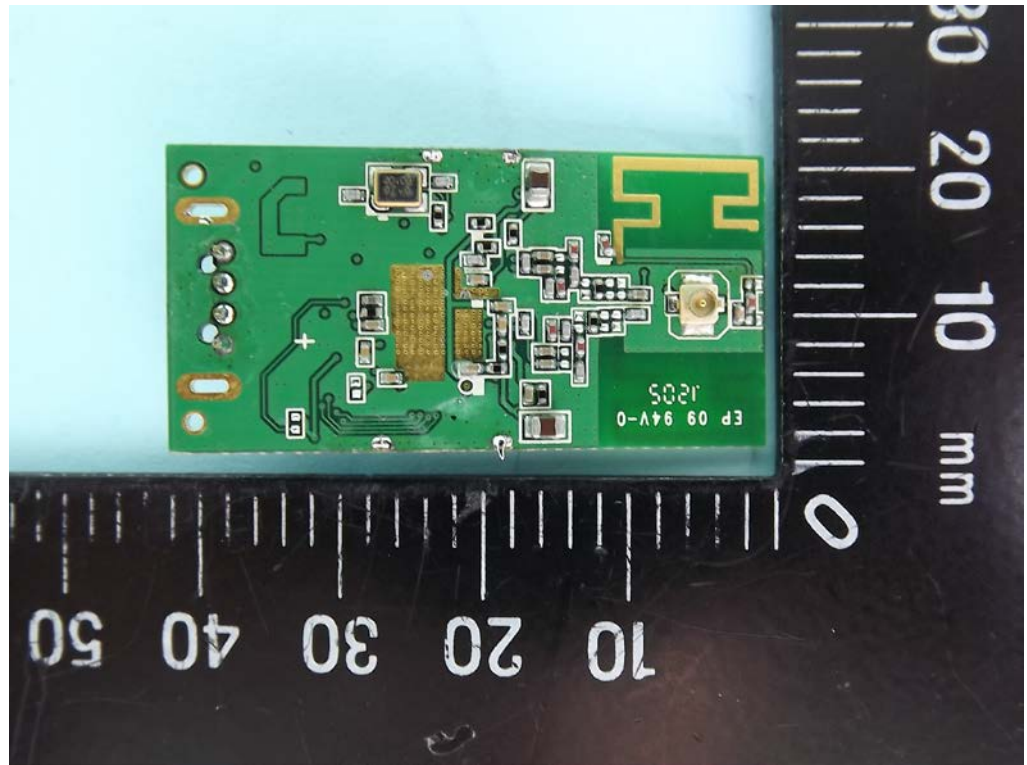


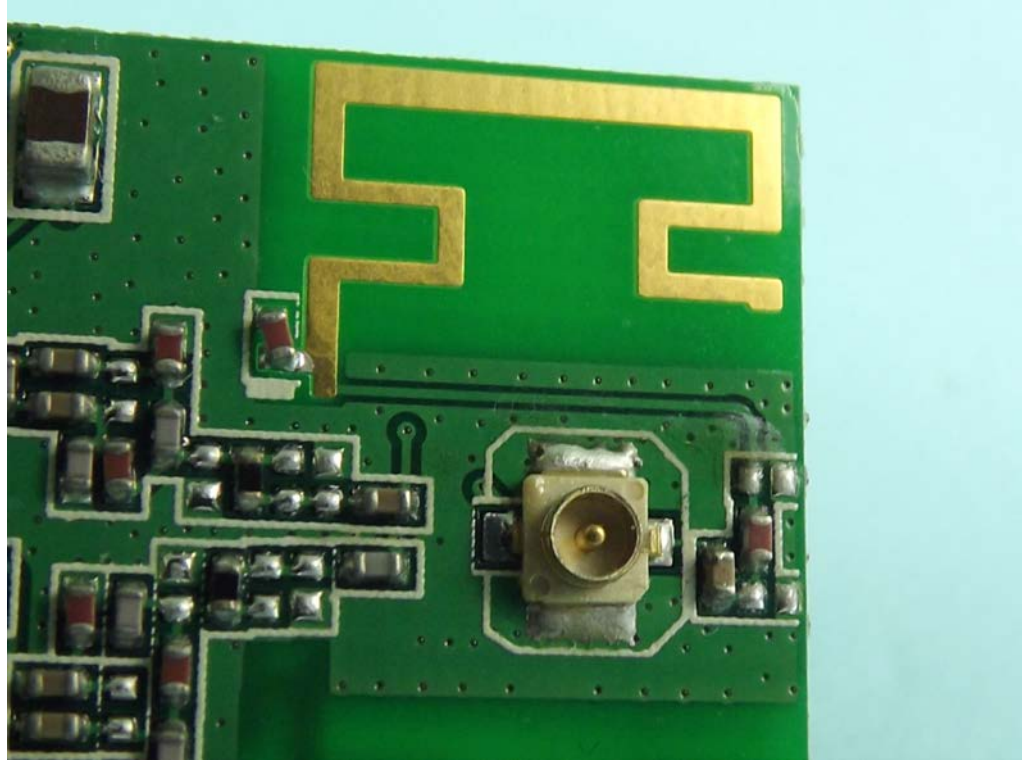


Ipex + 4pin pin-header

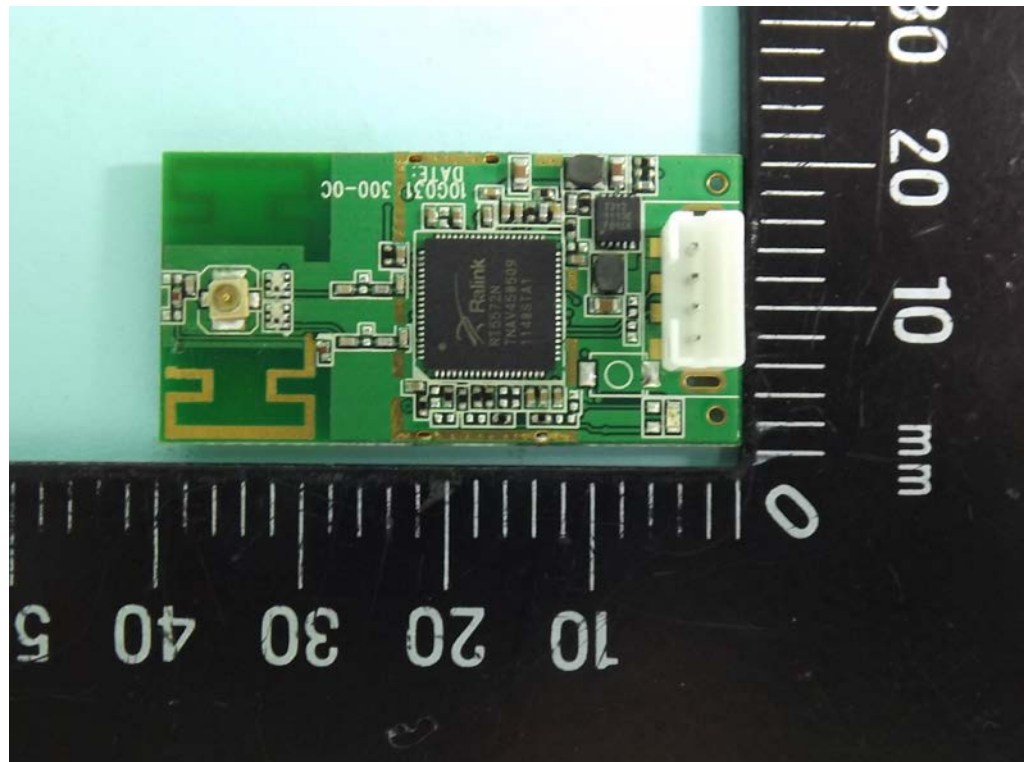
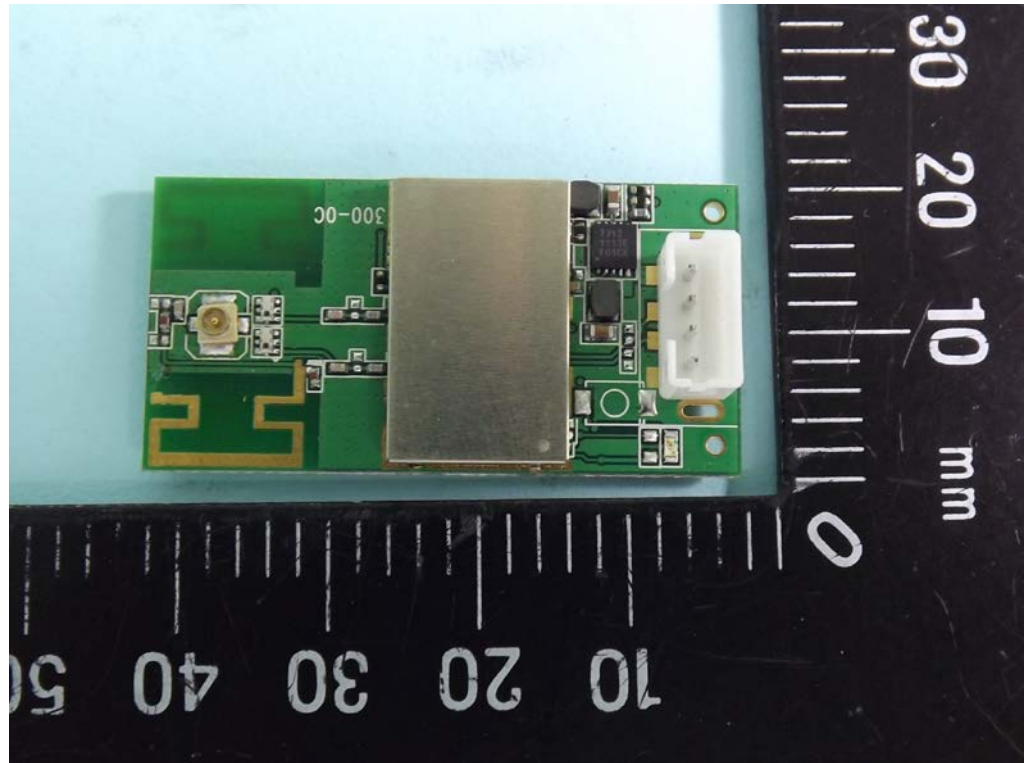


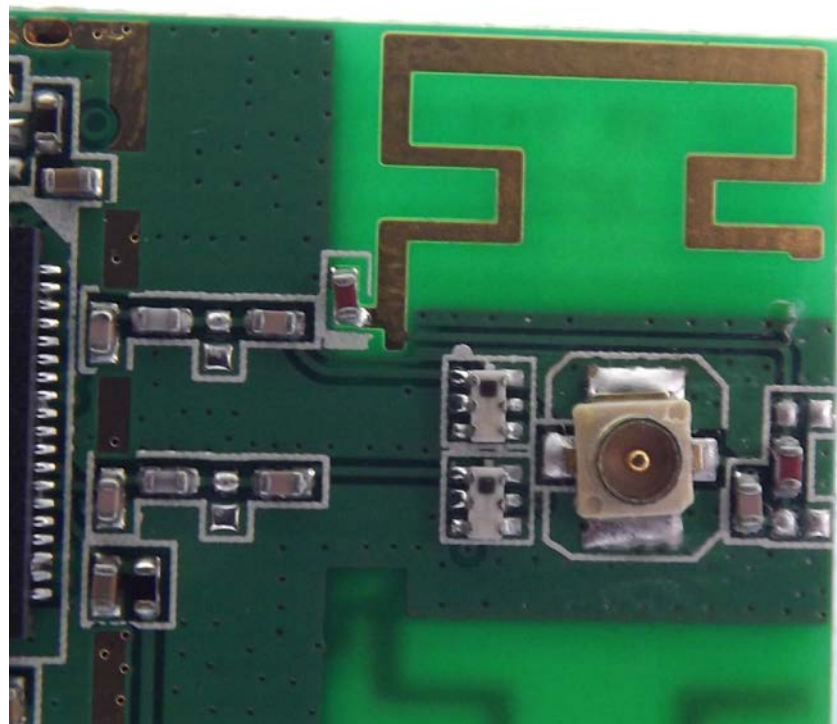


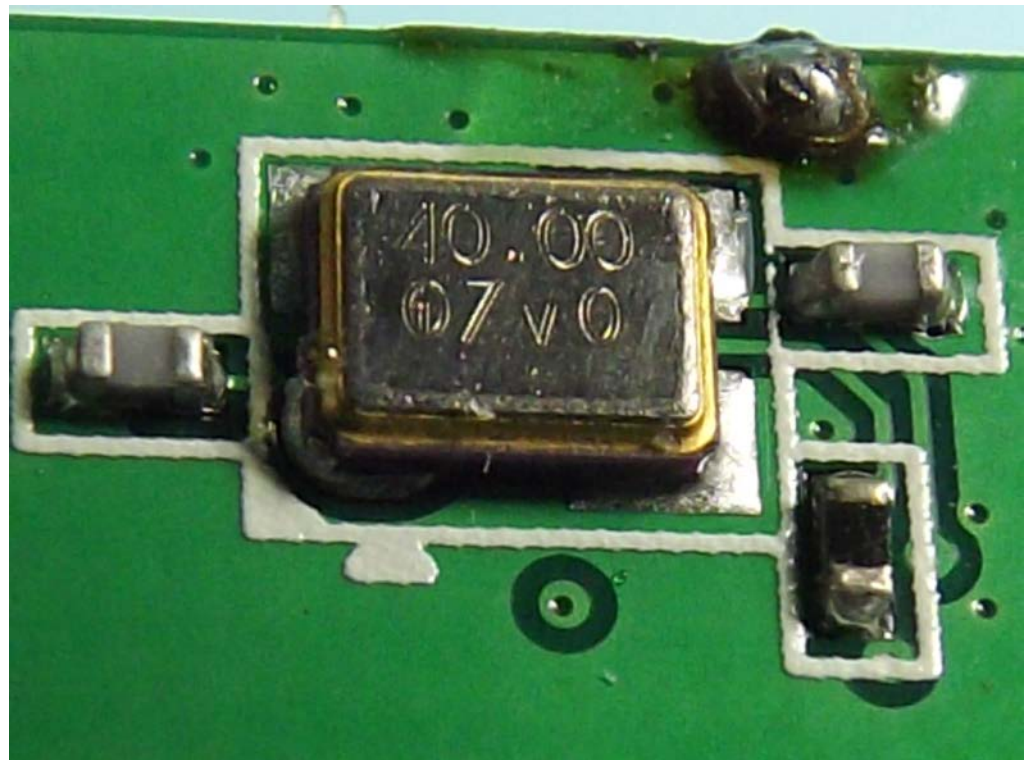
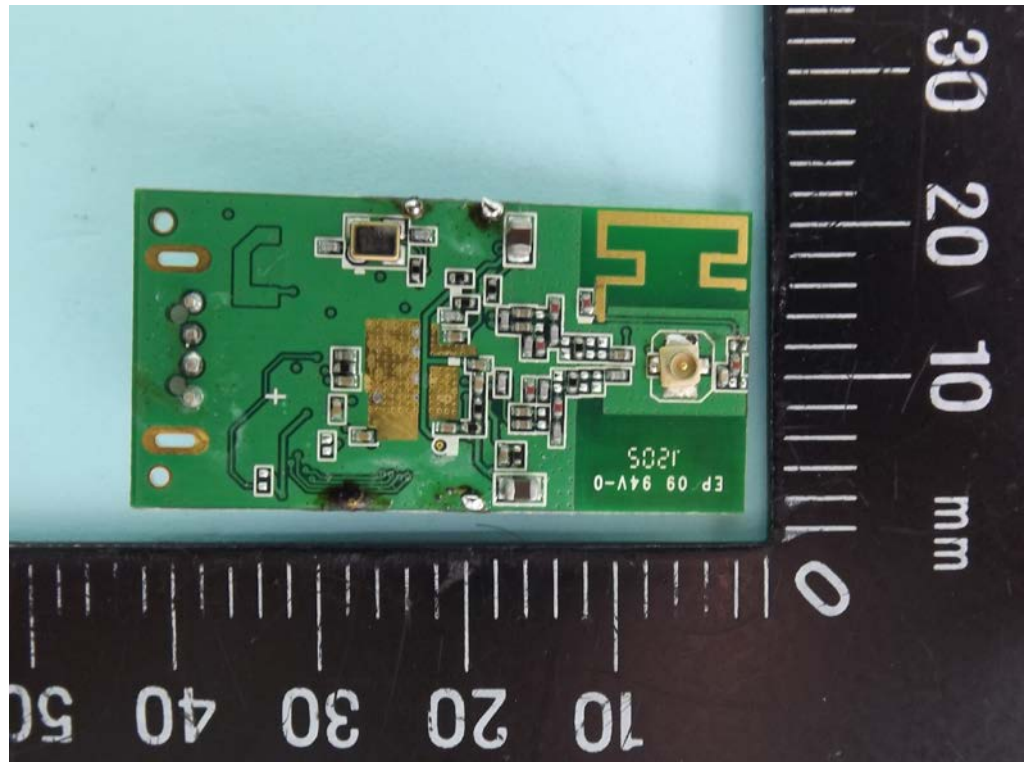


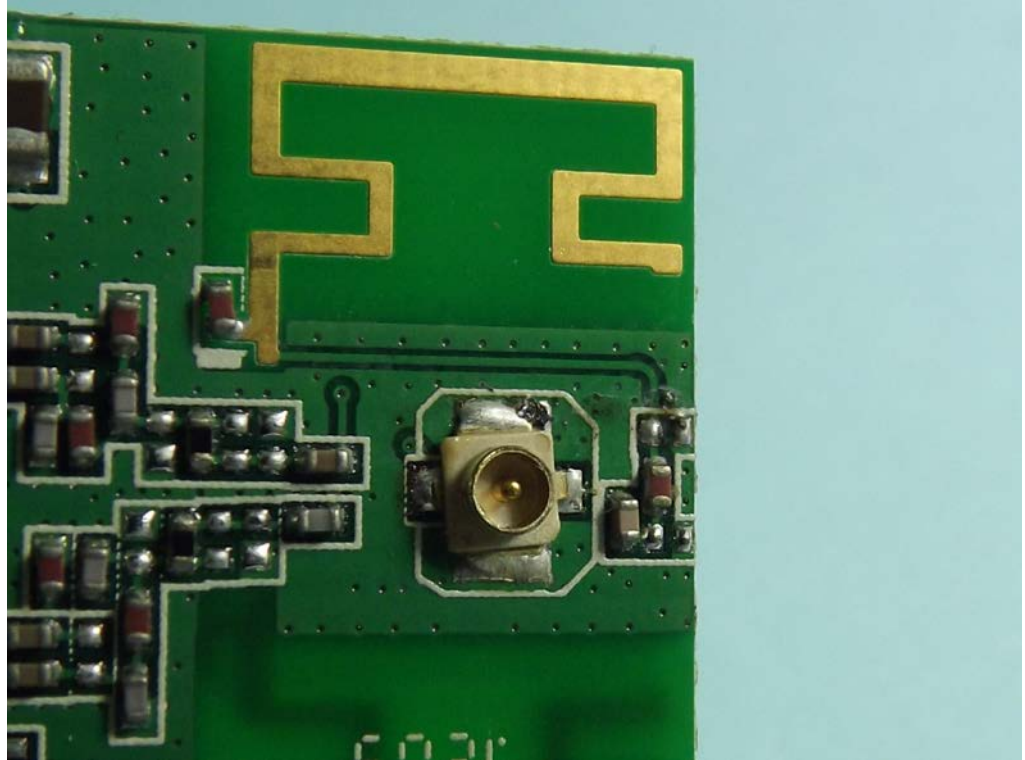


Ipex + 4pin wafer con









Dipole Ant.

