MRT Technology (Suzhou) Co., Ltd
Phone: +86-512-66308358
Fax: +86-512-66308368
Web: www.mrt-cert.com

Report No.: 1608RSU02005
Report Version: V01
Issue Date: 09-16-2016

MEASUREMENT REPORT

EN 300 328 V1.9.1 WLAN 802.11b/g/n

Applicant:	Compex Systems Pte Ltd.
Address:	No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651
Product:	WIRELESS-ABGN 2X2 NETWORK MINIPCIE ADAPTER
Model No.:	WLE200NX, WLE200NX-I
Brand Name:	COMPEX
Standards:	ETSI EN 300 328 V1.9.1 (2015-02)
Result:	Complies
Test Date:	July 05 ~ Sep 16, 2016

Reviewed By : Robin Wu
(Robin Wu)

Approved By : Marlin Chen
(Marlin Chen)

Revision History

Report No.	Version	Description	Issue Date	Note
1608RSU02005	Rev. 01	Initial report	09-16-2016	Valid

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1. General Information

1.1. Applicant

Compex Systems Pte Ltd.

No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

1.2. Manufacturer

Compex Systems Pte Ltd.

No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

1.3. Testing Facility

Test Site

MRT Technology (Suzhou) Co., Ltd

Test Site Location

D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**

1.4. Feature of Equipment under Test

Product Name:	WIRELESS-ABGN 2X2 NETWORK MINIPCIE ADAPTER
Model No.:	WLE200NX, WLE200NX-I
Brand Name:	COMPEX
Wi-Fi Specification:	802.11a/b/g/n
Frequency Range:	For 802.11b/g/n-HT20: 2412 ~ 2472 MHz For 802.11n-HT40: 2422 ~ 2462 MHz

1.5. Product Specification Subjective to this Report

Frequency Range:	802.11b/g/n-HT20: 2412 ~ 2472MHz 802.11n-HT40: 2422 ~ 2462MHz
Channel Number:	802.11b/g/n-HT20: 13 802.11n-HT40: 9
Type of Modulation:	802.11b: DSSS 802.11g/n: OFDM
Data Rate:	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps

Note: For other features of this EUT, test reports will be issued separately.

1.6. Operation Frequency / Channel List

802.11b/g/n-HT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	12	2467 MHz
13	2472 MHz	--	--	--	--

802.11n-HT40

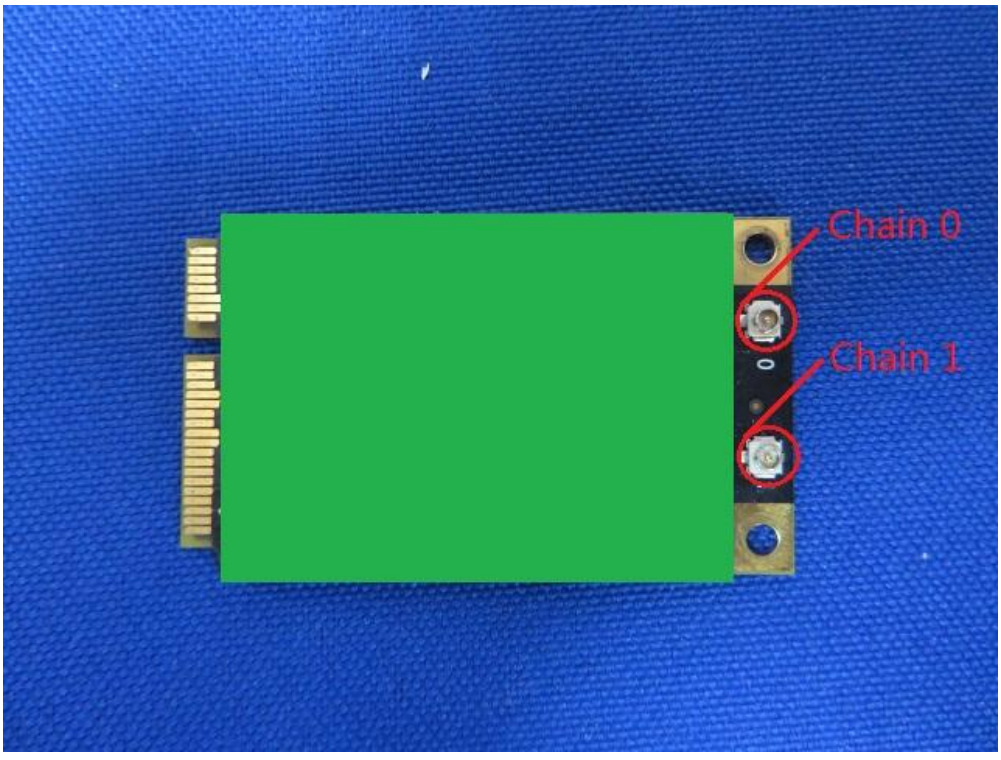
Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	10	2457 MHz	11	2462 MHz

1.7. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	Max Peak Antenna Gain (dBi)
Dipole Antenna	2412 ~ 2472	2

1.8. Description of Antenna RF Port

Antenna RF Port		
--	2.4GHz RF Port	
Software Control Port	Chain 0	Chain 1



1.9. Application Form for Testing

Modulation Type			
☐	FHSS	☒	other forms of modulation
Adaptivity 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		
The Worst Case Operational Mode for Each of The Following Tests			
☒	RF Output Power: 19.78dBm		
☒	Power Spectral Density: 9.76dBm/MHz		
☐	Duty cycle, Tx-Sequence, Tx-gap		
☐	Accumulated Transmit time, Frequency Occupation & Hopping Sequence		
☐	Medium Utilisation:		
☐	Hopping Frequency Separation:		
☒	Adaptivity & Receiver Blocking: 19.04ms, 154.5us		
☒	Occupied Nominal Channel Bandwidth: 36.32MHz		
☒	Transmitter unwanted emissions in the OOB domain: -10.69dBm/MHz		
☒	Transmitter unwanted emissions in the spurious domain: -32.4dBm		
☒	Receiver spurious emissions: -60.6dBm		
Antenna Category			
☒	Integral antenna (antenna permanently attached)		
	☐ Temporary RF connector provided		
	☒ No temporary RF connector provided		

Device Type			
☒	Stand-alone equipment		
☐	Combined (or host) equipment		
☐	Test Jig		
Operating Conditions			
☒	AC Mains State AC Voltage:100 - 240V	☐	DC State DC Voltage:
Type of DC Source	☐ Internal power supply		
	☒ External power supply or AC/DC adapter		
	☐ Battery		
☒	Temperature Range: 0 ~ 35°C		
Geo-location capability supported by the equipment			
☐	Yes ☐The geographical location determined by the equipment is not accessible to the user.		
☒	No		

1.10. Standards Applicable for Testing

The EUT complies with the requirements of ETSI EN 300 328 V1.9.1.

2. Test Configuration of Equipment under Test

2.1. Description of Test Mode

Test Mode
Mode 1: Transmit by 802.11b
Mode 2: Transmit by 802.11g
Mode 3: Transmit by 802.11n-HT20
Mode 4: Transmit by 802.11n-HT40
Mode 5: Receive by 802.11b
Mode 6: Receive by 802.11g
Mode 7: Receive by 802.11n-HT20
Mode 8: Receive by 802.11n-HT40

2.2. Description of Test Software

The test utility software used during testing was “ART”, and the version was “v09 b27”.

3. Test Summary

Clause (EN 300328)	Test Parameter	Result (Pass/Fail)	Remark
Transmitter Parameter			
4.3.2.2	RF Output Power	Pass	---
4.3.2.3	Power Spectral Density	Pass	---
4.3.2.7	Occupied Channel Bandwidth	Pass	---
4.3.2.8	Transmitter Unwanted Emissions in the out-of-band Domain	Pass	---
4.3.2.9	Transmitter Spurious Emissions	Pass	---
Receiver Parameters			
4.3.2.10	Receiver Spurious Emissions	Pass	---
Adaptive Test Item			
4.3.2.6	Adaptivity	Pass	---
4.3.2.11	Receiver Blocking	Pass	
Non-Adaptive Test Item			
4.3.2.4	Duty cycle, Tx-Sequence, Tx-gap	N/A	Only applicable for non-adaptive equipment with output power >10dBm
4.3.2.5	Medium Utilisation (MU) factor	N/A	
Geo-location Mechanism			
4.3.2.12	Geo-location Capability	N/A	---
Note 1: The EUT can operate in a adaptive mode with EIRP greater than 10dBm, and can't operate in a non-adaptive mode which was declared by the supplier. Note 2: For radiated spurious emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions (X axis), and the test setup showed in test setup photo.			

4. RF Output Power

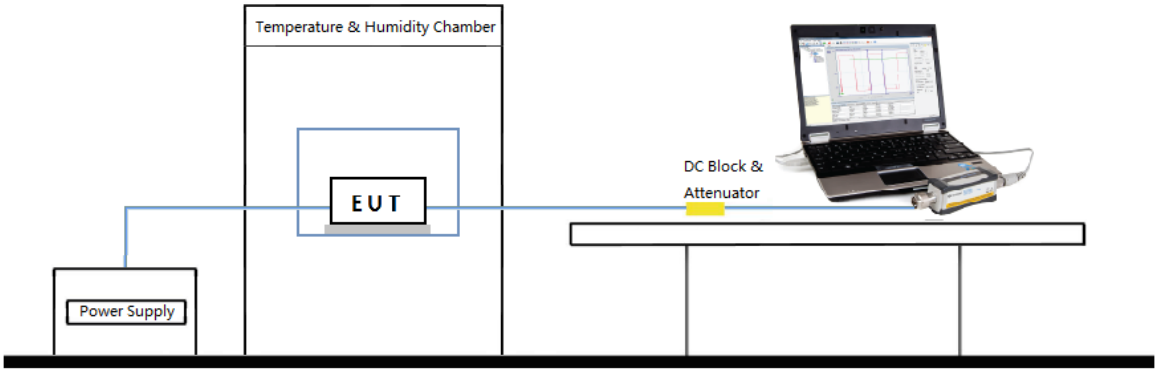
4.1. Limit

The maximum RF output power for adaptive equipment using wide band modulations other than FHSS shall be equal to or less than 20dBm.

Test Conditions	Limit
Normal and Extreme Temperature Conditions	20dBm (E.I.R.P)

4.2. Test Setup

For Conducted Measurement



4.3. Test Procedure

Refer to ETSI EN 300 328 V1.9.1 (2015-02) Clause 5.3.2.2.1.

4.4. Test Result

Product	WIRELESS-ABGN 2X2 NETWORK MINIPCIE ADAPTER	Temperature	0 ~ 35°C
Test Engineer	Milo Li	Relative Humidity	46 ~ 58%
Test Site	TR3	Test Date	2016/07/07

Normal Conditions - 1Tx (Temperature 25°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)	EIRP Power (dBm)	Limit (dBm)	Result
Chain 0						
11b	01	2412	17.11	19.11	20	Pass
11b	07	2442	17.07	19.07	20	Pass
11b	13	2472	16.95	18.95	20	Pass
11g	01	2412	11.22	13.22	20	Pass
11g	07	2442	17.17	19.17	20	Pass
11g	13	2472	9.10	11.10	20	Pass
11n-HT20	01	2412	10.12	12.12	20	Pass
11n-HT20	07	2442	17.04	19.04	20	Pass
11n-HT20	13	2472	7.49	9.49	20	Pass
11n-HT40	03	2422	12.71	14.71	20	Pass
11n-HT40	07	2442	16.98	18.98	20	Pass
11n-HT40	11	2462	10.48	12.48	20	Pass
Chain 1						
11b	01	2412	17.07	19.07	20	Pass
11b	07	2442	17.15	19.15	20	Pass
11b	13	2472	17.08	19.08	20	Pass
11g	01	2412	11.04	13.04	20	Pass
11g	07	2442	16.96	18.96	20	Pass
11g	13	2472	9.20	11.20	20	Pass
11n-HT20	01	2412	9.80	11.80	20	Pass
11n-HT20	07	2442	17.26	19.26	20	Pass
11n-HT20	13	2472	7.35	9.35	20	Pass
11n-HT40	03	2422	12.66	14.66	20	Pass
11n-HT40	07	2442	17.25	19.25	20	Pass
11n-HT40	11	2462	10.68	12.68	20	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi).

Normal Conditions - 2Tx (Temperature 25°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		EIRP Power (dBm)	Limit (dBm)	Result
			Chain 0	Chain 1			
11n-HT20	01	2412	9.16	9.62	14.41	20	Pass
11n-HT20	07	2442	13.95	14.29	19.13	20	Pass
11n-HT20	13	2472	7.25	8.17	12.74	20	Pass
11n-HT40	03	2422	12.22	12.44	17.34	20	Pass
11n-HT40	07	2442	14.50	14.98	19.76	20	Pass
11n-HT40	11	2462	10.96	11.91	16.47	20	Pass

Note: EIRP Power (dBm) = $10*\log(10^{\text{Chain 0 RF Output Power}/10} + 10^{\text{Chain 1 RF Output Power}/10})$ + Antenna Gain (dBi).

Extreme Conditions - 1Tx (Temperature 0°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)	EIRP Power (dBm)	Limit (dBm)	Result
Chain 0						
11b	01	2412	17.15	19.15	20	Pass
11b	07	2442	17.11	19.11	20	Pass
11b	13	2472	16.99	18.99	20	Pass
11g	01	2412	11.26	13.26	20	Pass
11g	07	2442	17.19	19.19	20	Pass
11g	13	2472	9.13	11.13	20	Pass
11n-HT20	01	2412	10.14	12.14	20	Pass
11n-HT20	07	2442	17.09	19.09	20	Pass
11n-HT20	13	2472	7.51	9.51	20	Pass
11n-HT40	03	2422	12.75	14.75	20	Pass
11n-HT40	07	2442	17.00	19.00	20	Pass
11n-HT40	11	2462	10.50	12.50	20	Pass
Chain 1						
11b	01	2412	17.11	19.11	20	Pass
11b	07	2442	17.19	19.19	20	Pass
11b	13	2472	17.13	19.13	20	Pass
11g	01	2412	11.07	13.07	20	Pass
11g	07	2442	17.00	19.00	20	Pass
11g	13	2472	9.24	11.24	20	Pass
11n-HT20	01	2412	9.83	11.83	20	Pass
11n-HT20	07	2442	17.28	19.28	20	Pass
11n-HT20	13	2472	7.38	9.38	20	Pass
11n-HT40	03	2422	12.68	14.68	20	Pass
11n-HT40	07	2442	17.28	19.28	20	Pass
11n-HT40	11	2462	10.70	12.70	20	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi).

Extreme Conditions - 2Tx (Temperature 0°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		EIRP Power (dBm)	Limit (dBm)	Result
			Chain 0	Chain 1			
11n-HT20	01	2412	9.18	9.64	14.43	20	Pass
11n-HT20	07	2442	14.00	14.34	19.18	20	Pass
11n-HT20	13	2472	7.28	8.20	12.77	20	Pass
11n-HT40	03	2422	12.26	12.46	17.37	20	Pass
11n-HT40	07	2442	14.53	15.00	19.78	20	Pass
11n-HT40	11	2462	11.01	11.96	16.52	20	Pass

Note: EIRP Power (dBm) = $10*\log(10^{\text{Chain 0 RF Output Power}/10} + 10^{\text{Chain 1 RF Output Power}/10})$ + Antenna Gain (dBi).

Extreme Conditions - 1Tx (Temperature 35°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)	EIRP Power (dBm)	Limit (dBm)	Result
Chain 0						
11b	01	2412	17.08	19.08	20	Pass
11b	07	2442	17.02	19.02	20	Pass
11b	13	2472	16.91	18.91	20	Pass
11g	01	2412	11.16	13.16	20	Pass
11g	07	2442	17.12	19.12	20	Pass
11g	13	2472	9.04	11.04	20	Pass
11n-HT20	01	2412	10.07	12.07	20	Pass
11n-HT20	07	2442	17.00	19.00	20	Pass
11n-HT20	13	2472	7.46	9.46	20	Pass
11n-HT40	03	2422	12.66	14.66	20	Pass
11n-HT40	07	2442	16.93	18.93	20	Pass
11n-HT40	11	2462	10.45	12.45	20	Pass
Chain 1						
11b	01	2412	17.02	19.02	20	Pass
11b	07	2442	17.12	19.12	20	Pass
11b	13	2472	17.05	19.05	20	Pass
11g	01	2412	11.01	13.01	20	Pass
11g	07	2442	16.90	18.90	20	Pass
11g	13	2472	9.16	11.16	20	Pass
11n-HT20	01	2412	9.75	11.75	20	Pass
11n-HT20	07	2442	17.22	19.22	20	Pass
11n-HT20	13	2472	7.32	9.32	20	Pass
11n-HT40	03	2422	12.62	14.62	20	Pass
11n-HT40	07	2442	17.20	19.20	20	Pass
11n-HT40	11	2462	10.63	12.63	20	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi).

Extreme Conditions - 2Tx (Temperature 35°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		EIRP Power (dBm)	Limit (dBm)	Result
			Chain 0	Chain 1			
11n-HT20	01	2412	9.13	9.58	14.37	20	Pass
11n-HT20	07	2442	13.90	14.24	19.08	20	Pass
11n-HT20	13	2472	7.21	8.13	12.70	20	Pass
11n-HT40	03	2422	12.18	12.39	17.30	20	Pass
11n-HT40	07	2442	14.46	14.94	19.72	20	Pass
11n-HT40	11	2462	10.91	11.86	16.42	20	Pass

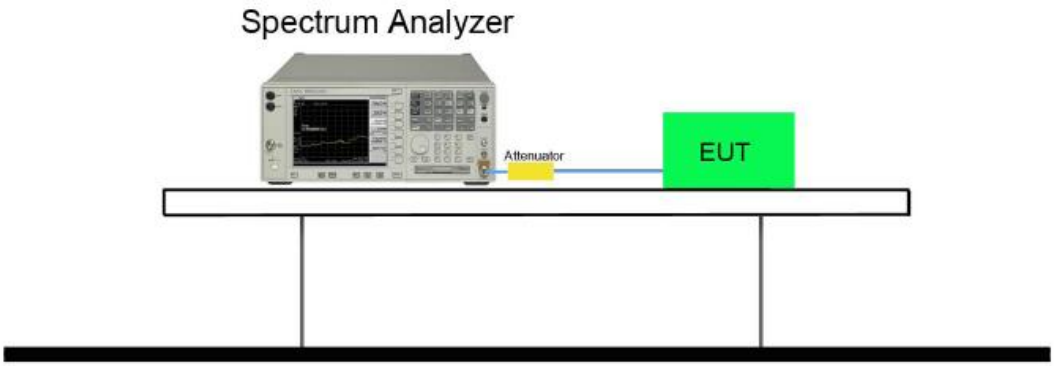
Note: EIRP Power (dBm) = $10*\log(10^{\text{Chain 0 RF Output Power}/10} + 10^{\text{Chain 1 RF Output Power}/10})$ + Antenna Gain (dBi).

5. Power Spectral Density

5.1. Limit

The maximum Power Spectral Density is limited to 10dBm per MHz for equipment using wide band modulations other than FHSS.

5.2. Test Setup



5.3. Test Procedure

Refer to ETSI EN 300 328 V1.9.1 (2015-02) Clause 5.3.3.2.1.

5.4. Test Result

Product	WIRELESS-ABGN 2X2 NETWORK MINIPCIE ADAPTER	Temperature	25°C
Test Engineer	Milo Li	Relative Humidity	52%
Test Site	TR3	Test Date	2016/07/07

Mode	Channel	Freq. (MHz)	EIRP Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
Chain 0					
11b	01	2412	9.76	10	Pass
11b	07	2442	9.48	10	Pass
11b	13	2472	9.56	10	Pass
11g	01	2412	2.25	10	Pass
11g	07	2442	7.83	10	Pass
11g	13	2472	0.33	10	Pass
11n-HT20	01	2412	0.64	10	Pass
11n-HT20	07	2442	7.72	10	Pass
11n-HT20	13	2472	-1.93	10	Pass
11n-HT40	03	2422	0.50	10	Pass
11n-HT40	07	2442	5.29	10	Pass
11n-HT40	11	2462	-1.50	10	Pass
Chain 1					
11b	01	2412	9.61	10	Pass
11b	07	2442	9.31	10	Pass
11b	13	2472	9.70	10	Pass
11g	01	2412	2.20	10	Pass
11g	07	2442	8.17	10	Pass
11g	13	2472	0.22	10	Pass
11n-HT20	01	2412	0.87	10	Pass
11n-HT20	07	2442	7.69	10	Pass
11n-HT20	13	2472	-1.83	10	Pass
11n-HT40	03	2422	0.84	10	Pass
11n-HT40	07	2442	4.80	10	Pass
11n-HT40	11	2462	-1.78	10	Pass

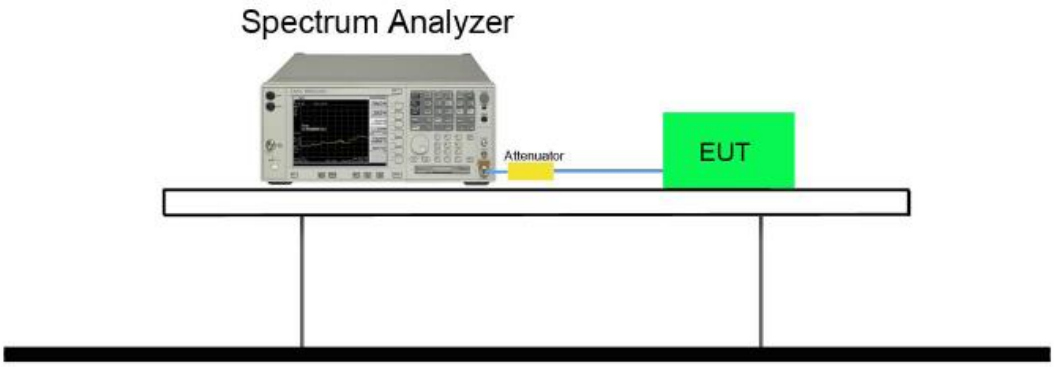
Mode	Channel	Freq. (MHz)	EIRP Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
Chain 0 + 1					
11n-HT20	01	2412	3.62	10	Pass
11n-HT20	07	2442	7.68	10	Pass
11n-HT20	13	2472	1.35	10	Pass
11n-HT40	03	2422	3.25	10	Pass
11n-HT40	07	2442	5.41	10	Pass
11n-HT40	11	2462	2.21	10	Pass

6. Duty Cycle, Tx-sequence, Tx-gap

6.1. Limit

The Duty Cycle shall be equal to or less than the maximum value declared by the supplier.
The Tx-sequence time shall be equal to or less than 10 ms. The minimum Tx-gap time following a Tx-sequence shall be equal to the duration of that proceeding Tx-sequence with a minimum of 3.5 ms.

6.2. Test Setup



6.3. Test Procedure

Refer to ETSI EN 300 328 V1.9.1 (2015-02) Clause 5.3.2.2.1.3.

6.4. Test Result

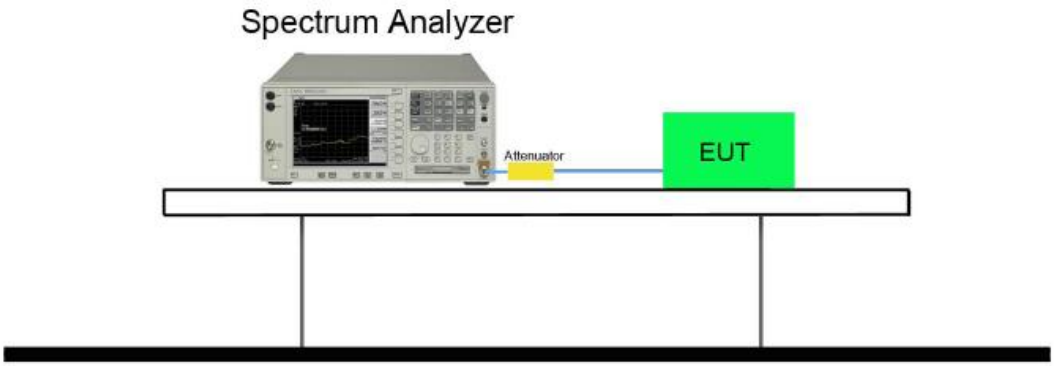
These requirements apply to non-adaptive equipment or to adaptive equipment when operating in a non-adaptive mode. So the item is not applicable.

7. Medium Utilisation (MU) Factor

7.1. Limit

The maximum Medium Utilisation factor shall be 10 % for non-adaptive equipment using wide band modulations other than FHSS.

7.2. Test Setup



7.3. Test Procedure

Refer to ETSI EN 300 328 V1.9.1 (2015-02) Clause 5.3.2.2.1.4.

7.4. Test Result

This requirement does not apply to adaptive equipment unless operating in a non-adaptive mode. So the item is not applicable.

8. Adaptivity and Receiver Blocking

8.1. Limit

LBT based Detect and Avoid (Load Based Equipment may implement an LBT based spectrum sharing mechanism as described in IEEE 802.11-2012 clauses 9, 10, 16, 17, 19 and 20 or in IEEE 802.15.4-2011, clauses 4, 5 and 8.)

Adaptivity Limit

The CCA observation time shall be not less than 18 us.

The Channel Occupancy Time shall be less than 13 ms.

The minimum idle period shall be not less than 18 us.

When adding the interference signal, the EUT shall stop transmissions on the current operating channel.

Short Control Signalling Transmissions Limit

Short Control Signalling Transmissions shall have a maximum ratio of 10% within an observation period of 50ms.

Receiver Blocking Limit

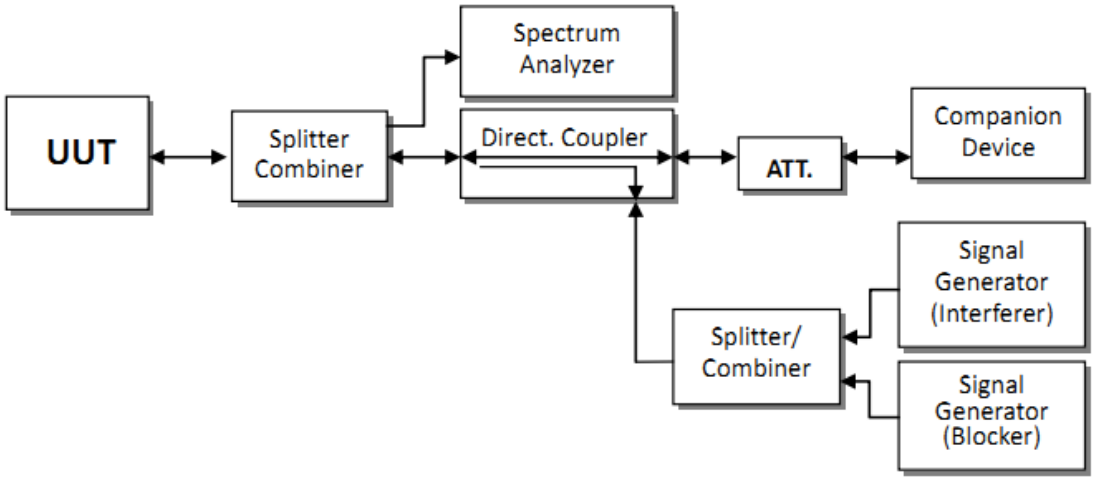
Adaptive equipment shall comply with the requirements in the presence of a blocking signal with characteristics as below.

Receiver Blocking parameters				
Equipment Type (LBT / non-LBT)	Wanted signal mean power from companion device	Blocking signal frequency [MHz]	Blocking signal 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	-30dBm			
NOTE 1: The highest blocking frequency shall be used for testing operating channels within the range 2400 MHz to 2442 MHz, while the lowest blocking frequency shall be used for testing operating channels within the range 2442 MHz to 2483.5 MHz. NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz.				

With the interfering signal present, adding the blocking signal, the EUT didn't resume any normal transmissions. When removal the interference and blocking signal, the EUT was allowed to start transmissions again on this channel.

8.2. Test Setup

For conducted measurements

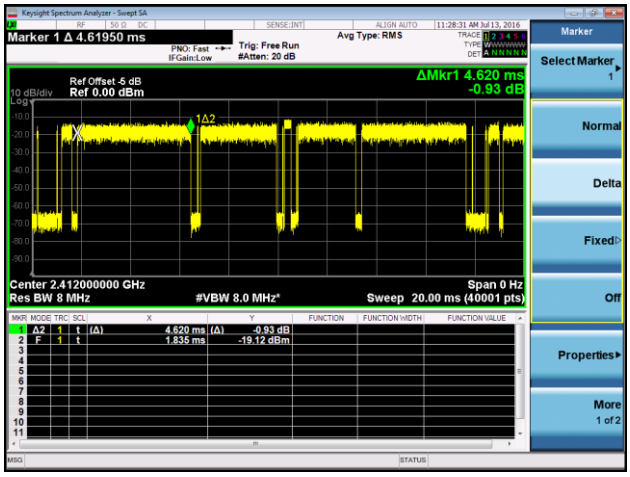
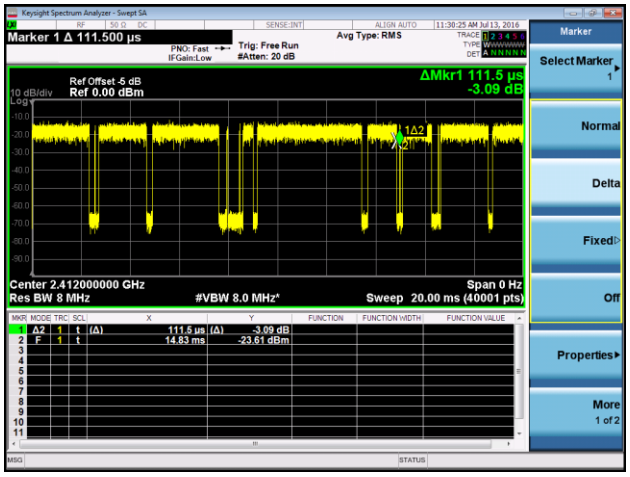
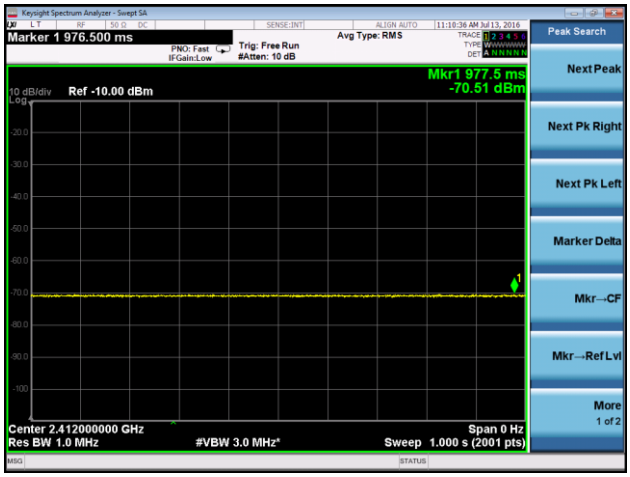
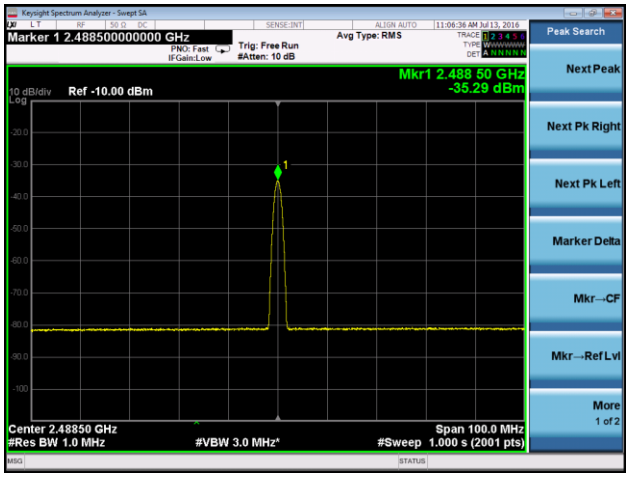


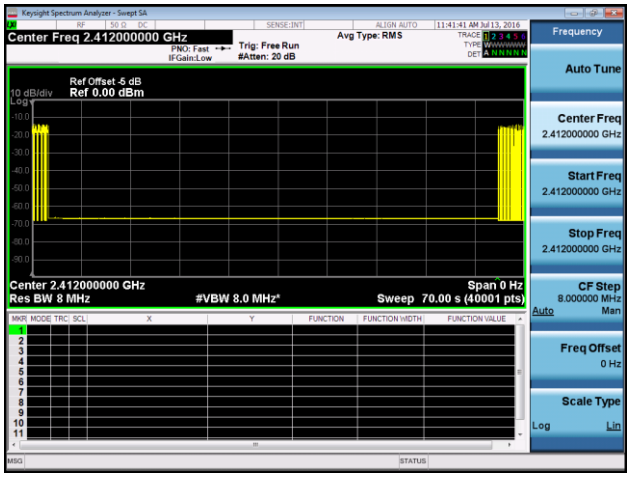
8.3. Test Procedure

Refer to ETSI EN 300 328 V1.9.1 (2015-02) Clause 5.3.7.2.1.

8.4. Test Result

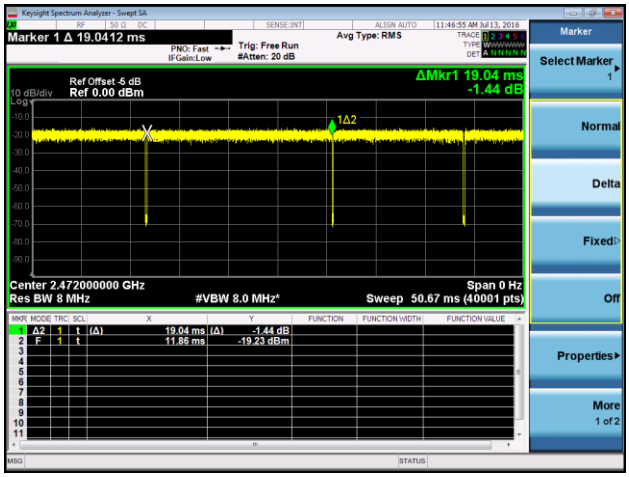
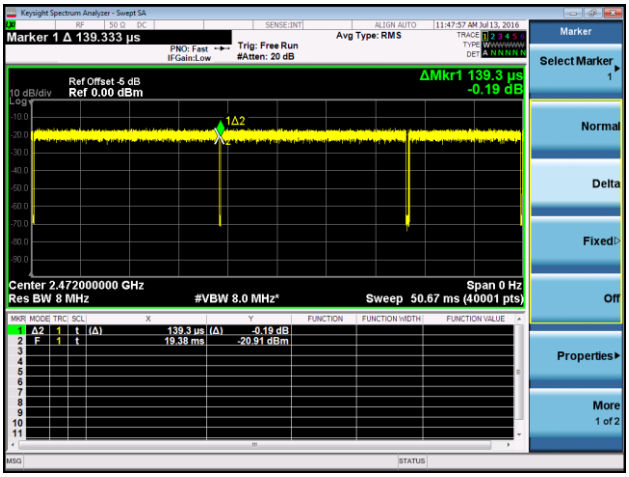
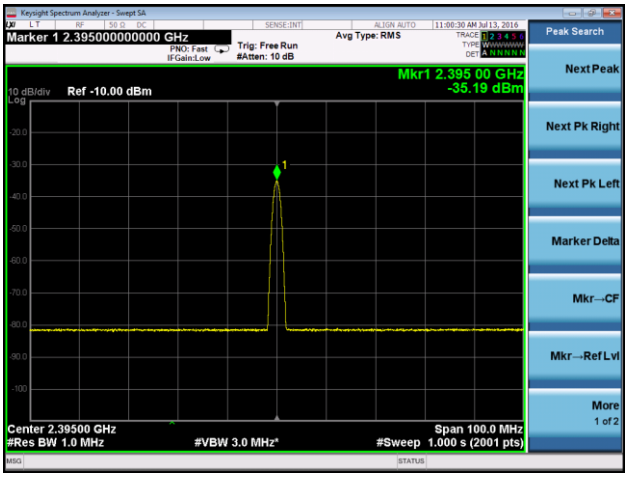
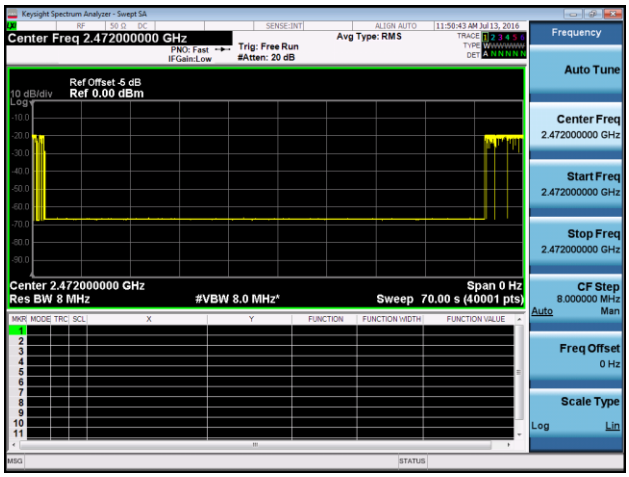
Product	WIRELESS-ABGN 2X2 NETWORK MINIPCIE ADAPTER	Temperature	24°C
Test Engineer	Andy Zhu	Relative Humidity	54%
Test Site	TR3	Test Date	2016/07/13

802.11b - 2412MHz	
Maximum Channel Occupancy Time=4.620ms	**Minimum Idle Period = 111.5us**
	
Interference Signal Calibration	**Blocking Signal Calibration**
	

Transmission stopped after interference added and the short control signaling less than 5ms. The UUT did not resume any normal transmissions when adding the blocking signal.	
	

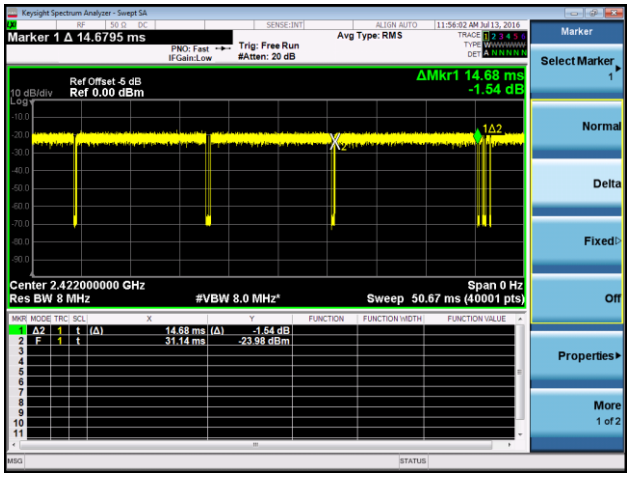
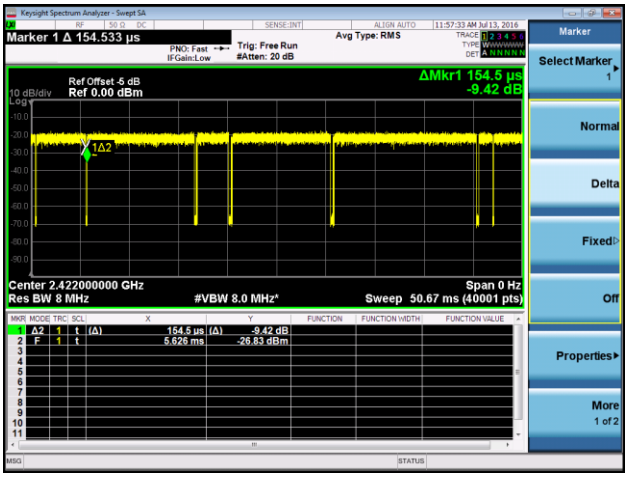
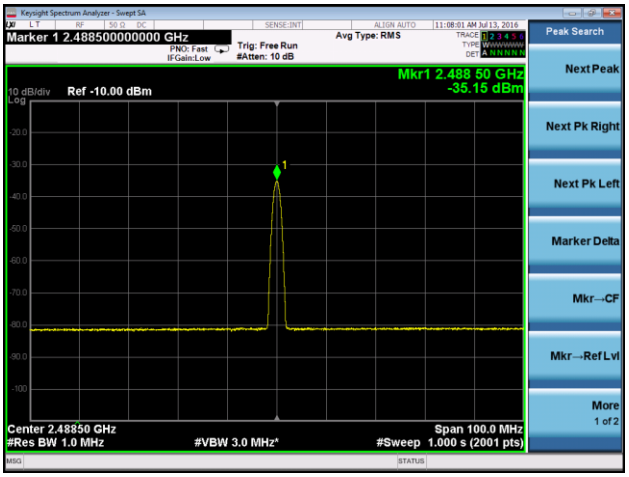
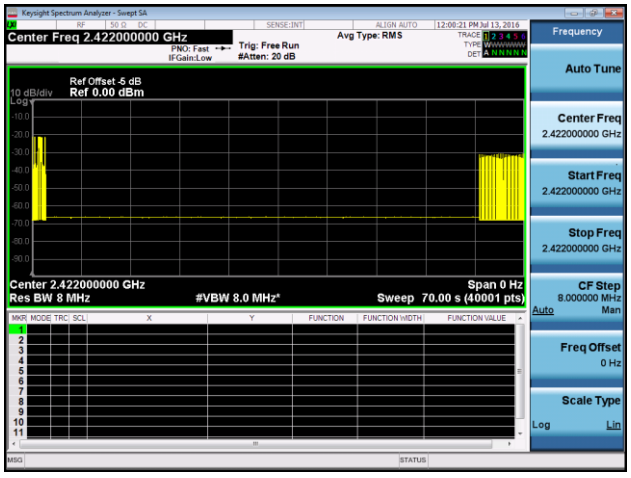
Note: Detection Level = -70 dBm/MHz + (20 dBm - the max conducted power (dBm))/MHz ≥ -70 dBm/MHz We used the worst-case detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11b - 2472MHz	
Maximum Channel Occupancy Time=19.04ms	**Minimum Idle Period =139.3us**
	
Interference Signal Calibration	**Blocking Signal Calibration**
	
Transmission stopped after interference added and the short control signaling less than 5ms. The UUT did not resume any normal transmissions when adding the blocking signal	
	

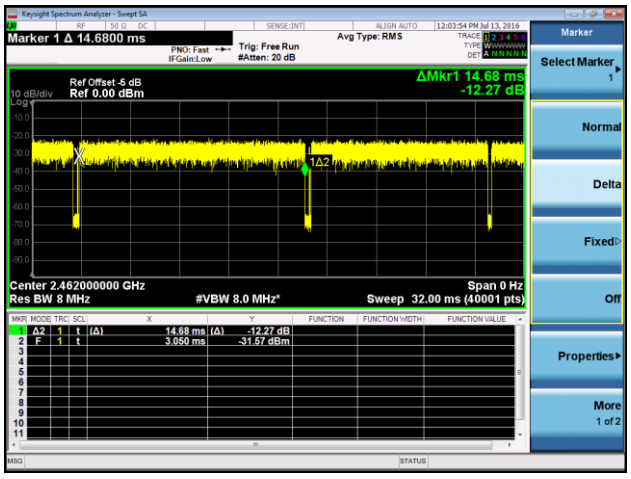
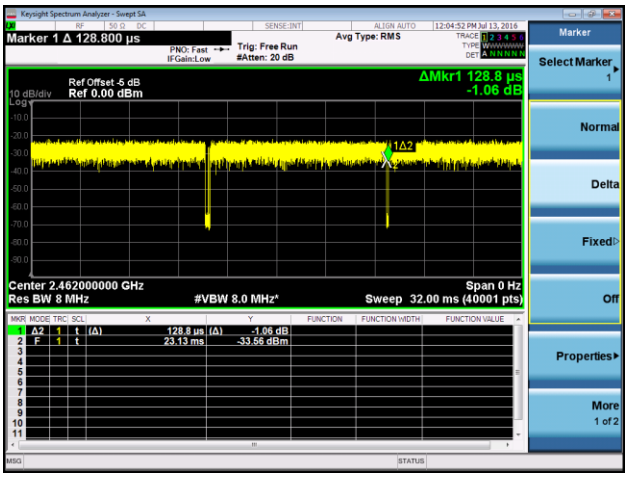
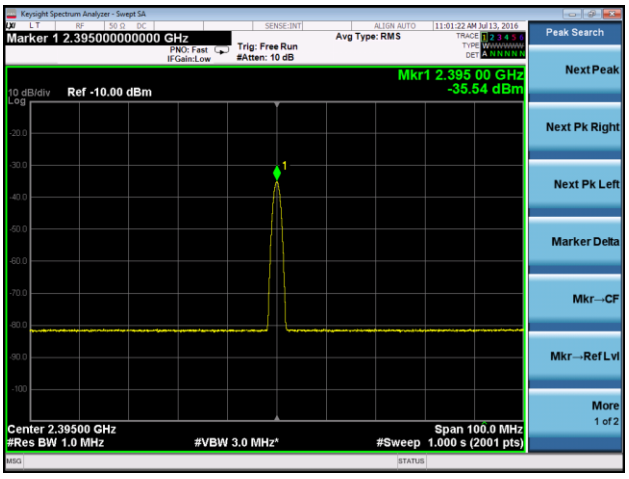
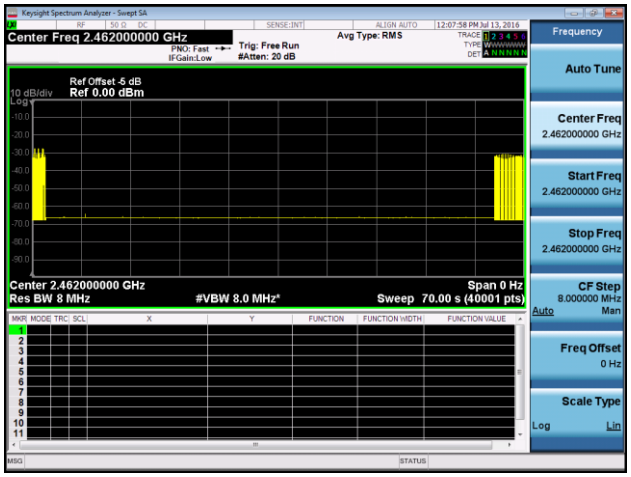
Note: Detection Level = -70 dBm/MHz + (20 dBm - the max conducted power (dBm))/MHz ≥ -70 dBm/MHz We used the worst-case detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11n-HT40 - 2422MHz	
Maximum Channel Occupancy Time=14.68ms	**Minimum Idle Period =154.5us**
	
Interference Signal Calibration	**Blocking Signal Calibration**
	
Transmission stopped after interference added and the short control signaling less than 5ms. The UUT did not resume any normal transmissions when adding the blocking signal	
	

Note: Detection Level = -70 dBm/MHz + (20 dBm - the max conducted power (dBm))/MHz ≥ -70 dBm/MHz We used the worst-case detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11n-HT40 - 2462MHz	
Maximum Channel Occupancy Time=14.68ms	**Minimum Idle Period =128.8us**
	
Interference Signal Calibration	**Blocking Signal Calibration**
	
Transmission stopped after interference added and the short control signaling less than 5ms. The UUT did not resume any normal transmissions when adding the blocking signal	
	

Note: Detection Level = -70 dBm/MHz + (20 dBm - the max conducted power (dBm))/MHz ≥ -70 dBm/MHz We used the worst-case detection level (-70dBm/MHz) to perform adaptivity testing.

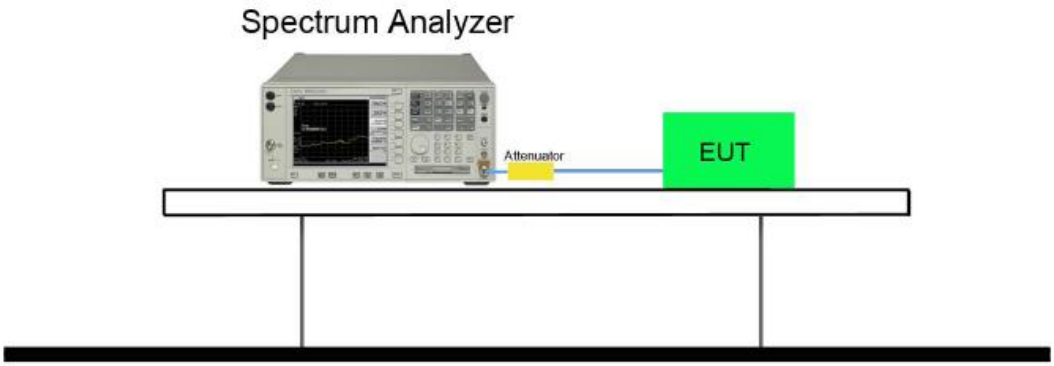
Test Result:	Pass

9. Occupied Channel Bandwidth

9.1. Limit

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within the band given in 2.4GHz to 2.4835GHz.

9.2. Test Setup



9.3. Test Procedure

Refer to ETSI EN 300 328 V1.9.1 (2015-02) Clause 5.3.8.2.1.

9.4. Test Result

Product	WIRELESS-ABGN 2X2 NETWORK MINIPCIE ADAPTER	Temperature	22°C
Test Engineer	Milo Li	Relative Humidity	52%
Test Site	TR3	Test Date	2016/07/07

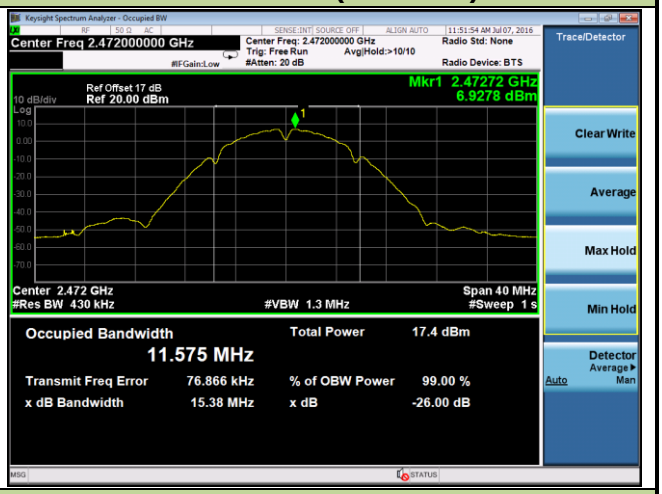
The spectrum analyzer setting: RBW ≈ 1 % of the span without going below 1 %, VBW ≥ 3RBW, Detector Mode = RMS.

Test Mode	Channel No.	Frequency (MHz)	99% Bandwidth (MHz)	Frequency Range (MHz)	Result
Chain 010					
11b	01	2412	11.56	2406.22	Pass
11b	13	2472	11.58	2477.79	Pass
11g	01	2412	16.58	2403.71	Pass
11g	13	2472	16.56	2480.28	Pass
11n-HT20	01	2412	17.77	2403.12	Pass
11n-HT20	13	2472	17.76	2480.88	Pass
11n-HT40	03	2422	36.31	2403.85	Pass
11n-HT40	11	2462	36.31	2480.16	Pass
Chain 100					
11b	01	2412	11.68	2406.16	Pass
11b	13	2472	11.58	2477.79	Pass
11g	01	2412	16.58	2403.71	Pass
11g	13	2472	16.58	2480.29	Pass
11n-HT20	01	2412	17.77	2403.12	Pass
11n-HT20	13	2472	17.78	2480.89	Pass
11n-HT40	03	2422	36.32	2403.84	Pass
11n-HT40	11	2462	36.31	2480.16	Pass
Chain 0 / Chain 0 + 1					
11n-HT20	01	2412	17.77	2403.12	Pass
11n-HT20	13	2472	17.78	2480.89	Pass
11n-HT40	03	2422	36.31	2403.85	Pass
11n-HT40	11	2462	36.31	2480.16	Pass

802.11b Occupied Channel Bandwidth - Chain 0

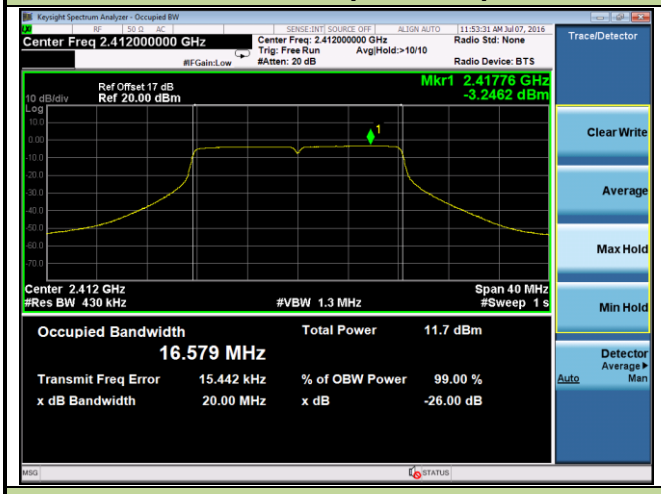
Channel 01 (2412MHz)

Channel 13 (2472MHz)

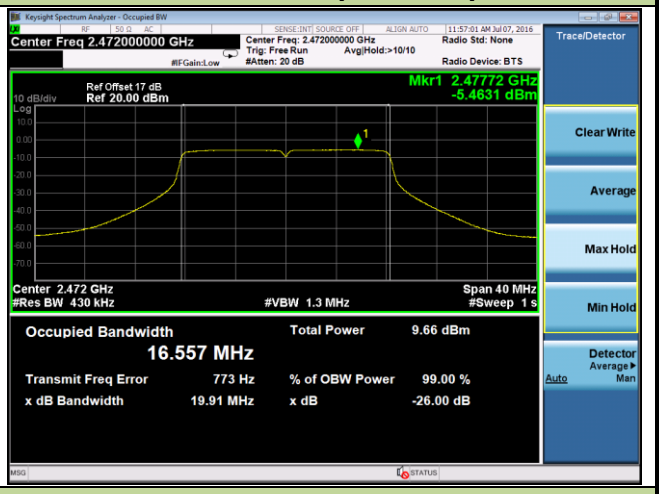


802.11g Occupied Channel Bandwidth - Chain 0

Channel 01 (2412MHz)

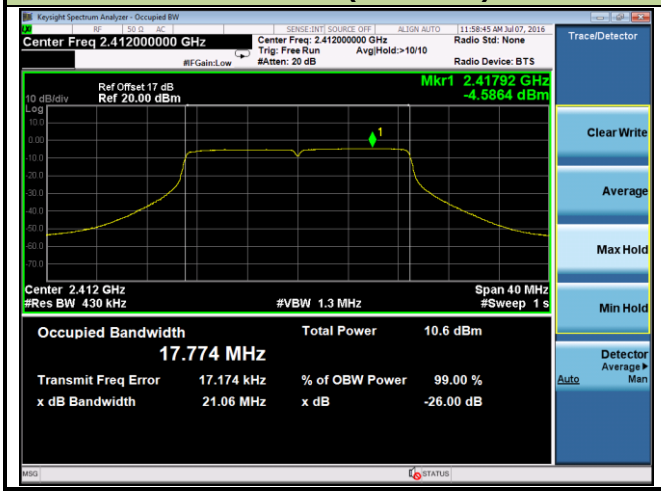


Channel 13 (2472MHz)

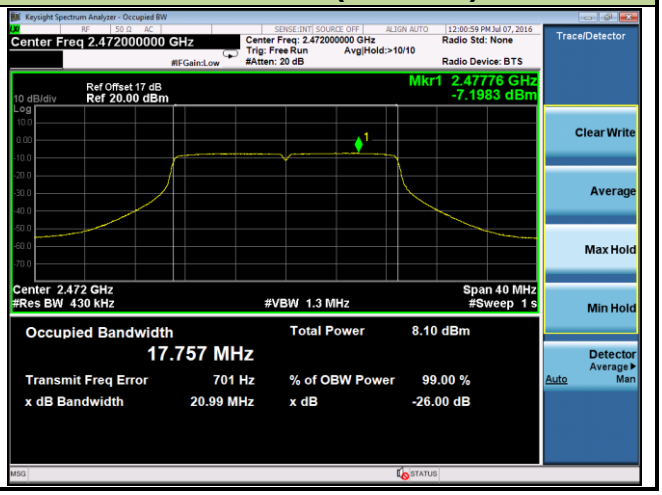


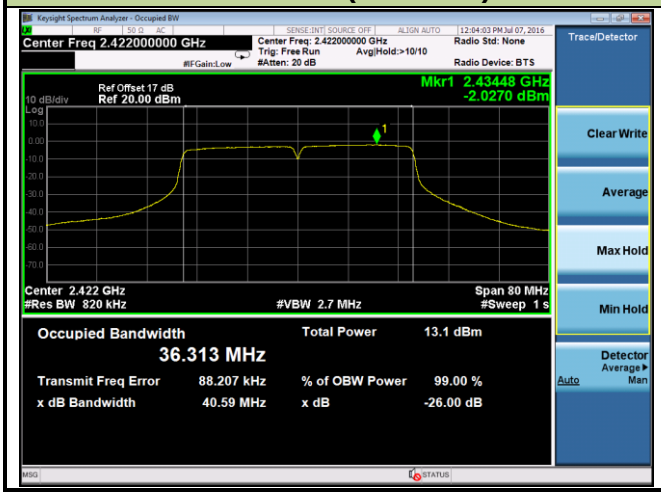
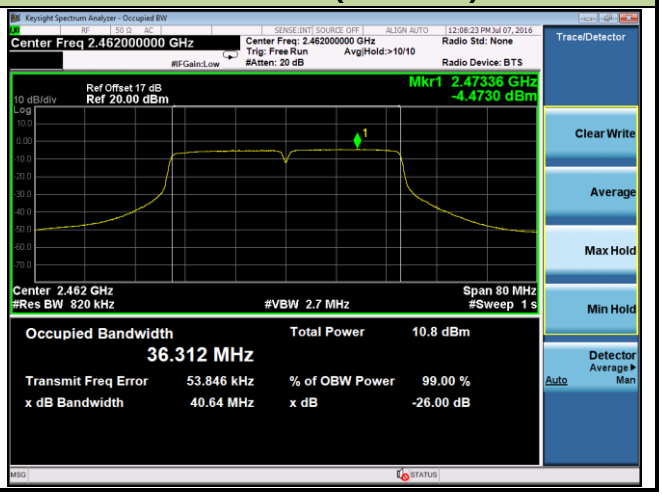
802.11n-HT20 Occupied Channel Bandwidth - Chain 0

Channel 01 (2412MHz)



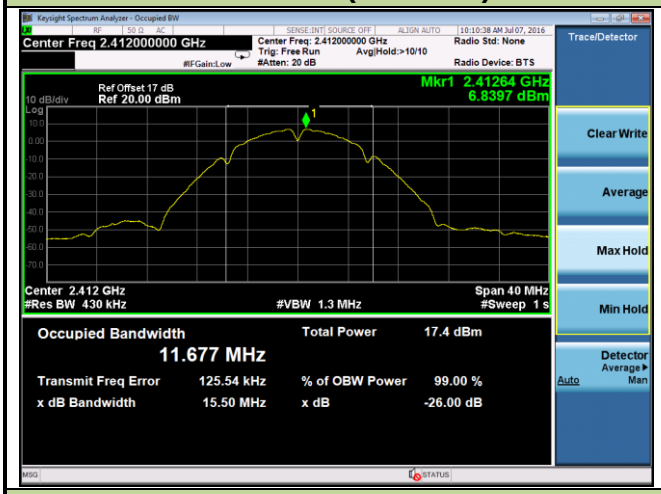
Channel 13 (2472MHz)



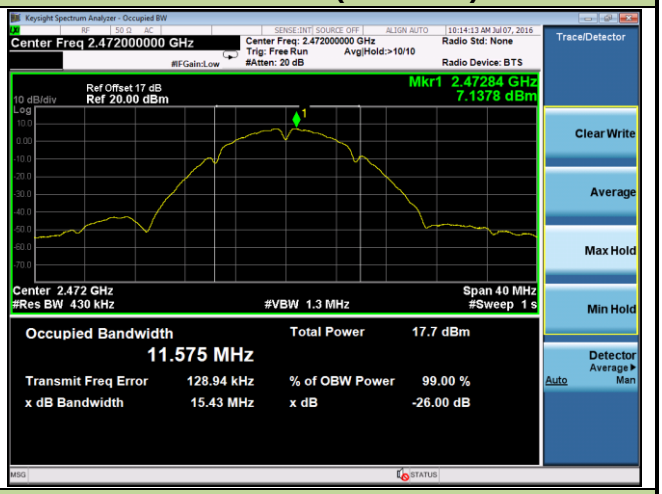
802.11n-HT40 Occupied Channel Bandwidth - Chain 0	
Channel 03 (2422MHz)	Channel 11 (2462MHz)
	

802.11b Occupied Channel Bandwidth - Chain 1

Channel 01 (2412MHz)

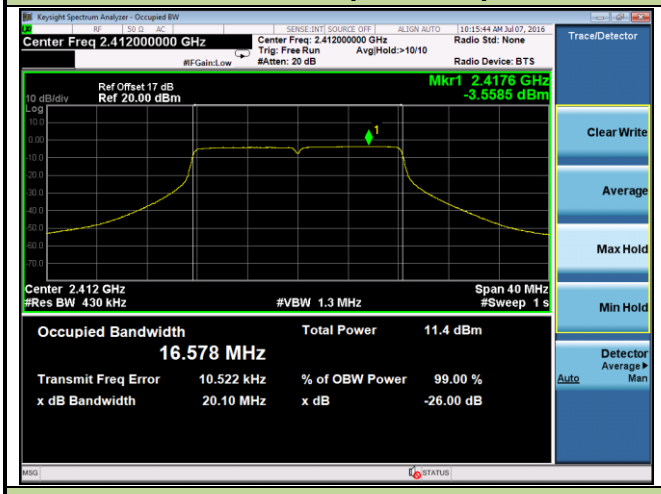


Channel 13 (2472MHz)

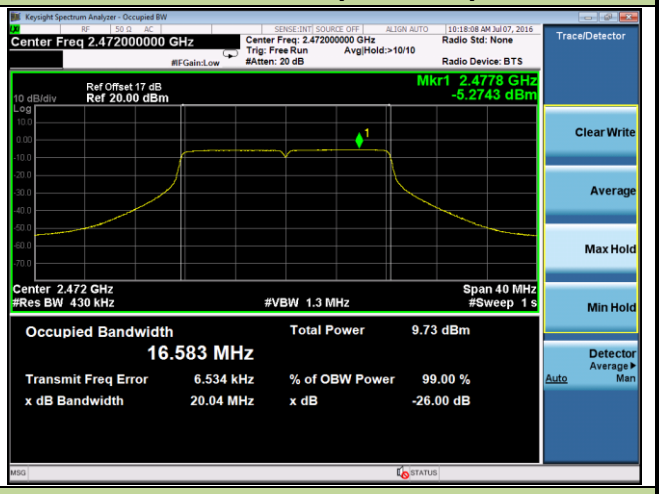


802.11g Occupied Channel Bandwidth - Chain 1

Channel 01 (2412MHz)

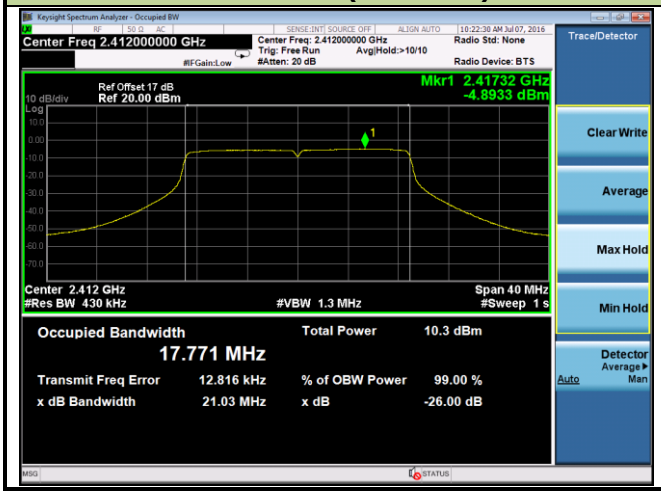


Channel 13 (2472MHz)

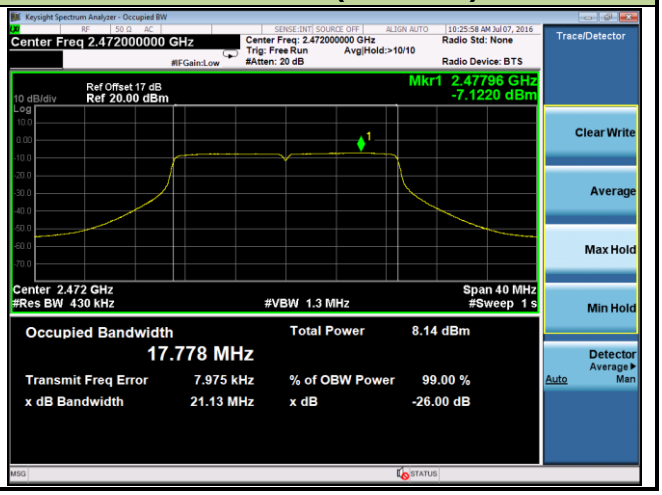


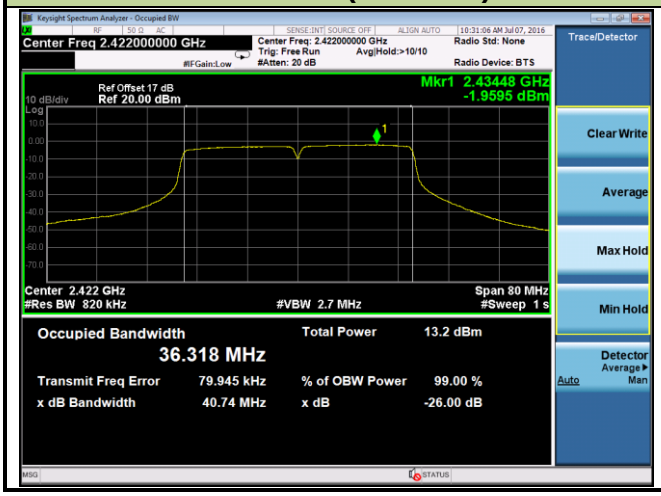
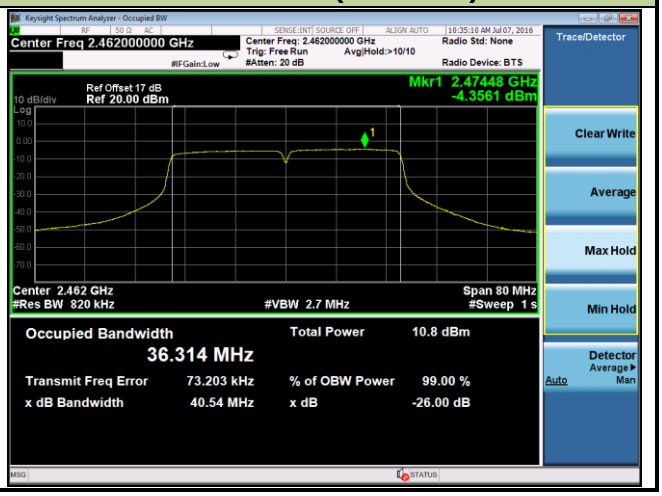
802.11n-HT20 Occupied Channel Bandwidth - Chain 1

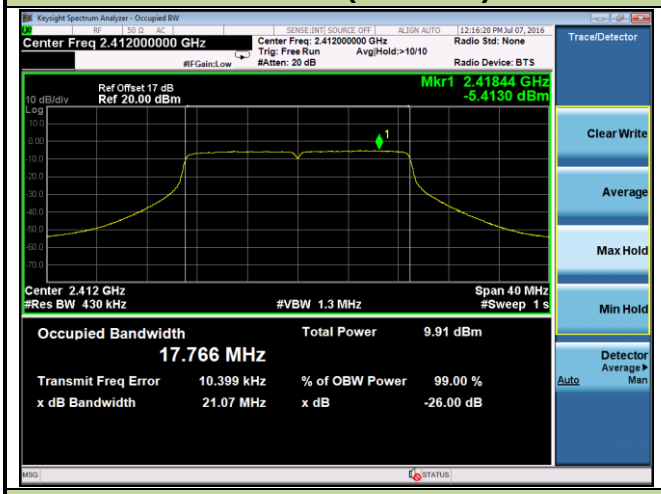
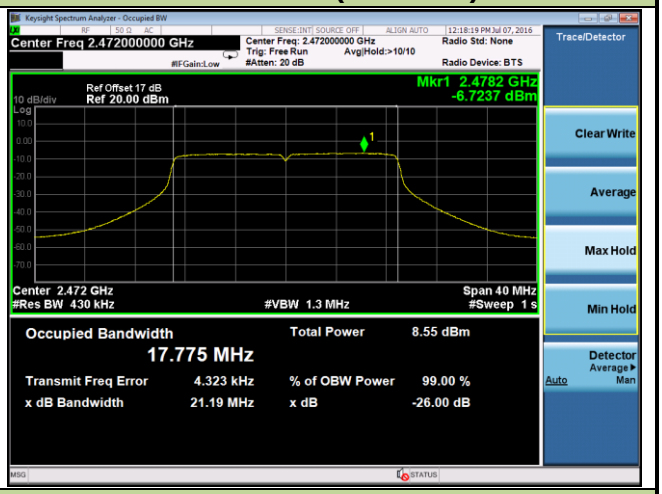
Channel 01 (2412MHz)

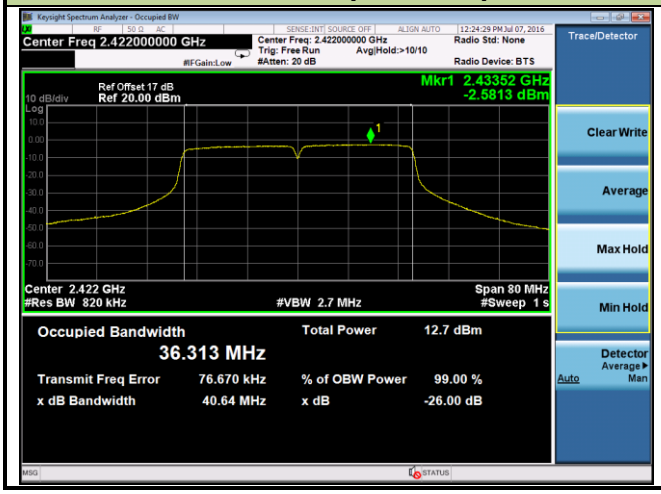
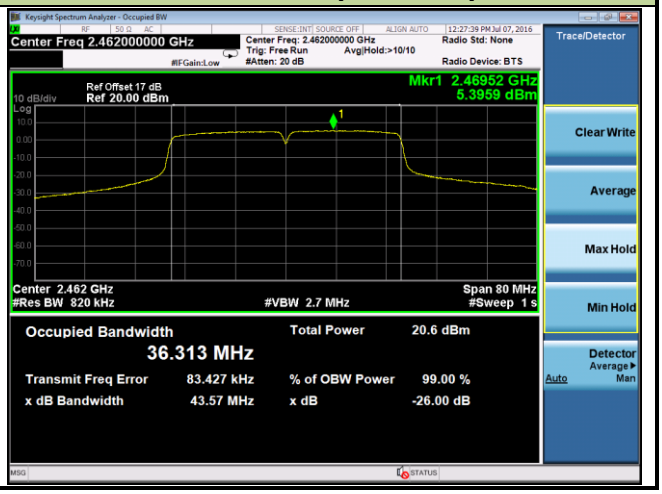


Channel 13 (2472MHz)



802.11n-HT40 Occupied Channel Bandwidth - Chain 1	
Channel 03 (2422MHz)	Channel 11 (2462MHz)
	

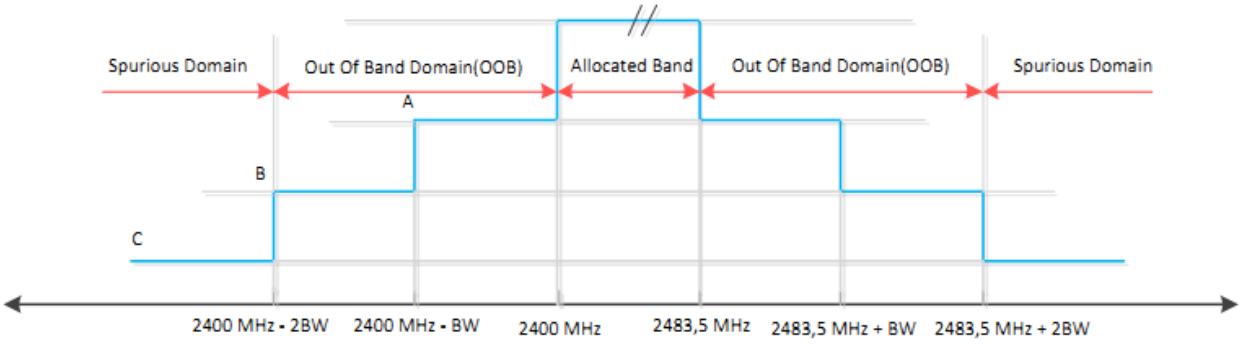
802.11n-HT20 Occupied Channel Bandwidth - Chain 0 / Chain 0 + 1	
Channel 01 (2412MHz)	Channel 13 (2472MHz)
	

802.11n-HT40 Occupied Channel Bandwidth - Chain 0 / Chain 0 + 1	
Channel 03 (2422MHz)	Channel 11 (2462MHz)
	

10. Transmitter unwanted emissions in the out-of-band domain

10.1. Limit

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in figure 3.



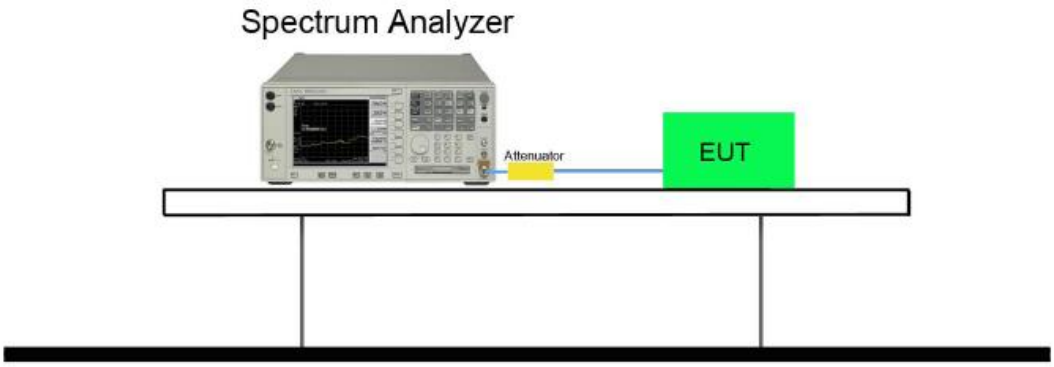
A: -10 dBm/MHz e.i.r.p.
B: -20 dBm/MHz e.i.r.p.
C: Spurious Domain limits

BW=occupied Channel Bandwidth in MHZ or 1MHz whichever is greater

Figure :Transmit Mask

10.2. Test Setup

For Conducted Measurement



10.3. Test Procedure

Refer to ETSI EN 300 328 V1.9.1 (2015-02) Clause 5.3.9.2.1.

10.4. Test Result

Product	WIRELESS-ABGN 2X2 NETWORK MINIPCIE ADAPTER	Temperature	24°C
Test Engineer	Mio Li	Relative Humidity	52%
Test Site	TR3	Test Date	2016/07/10

Test Mode	Ch. No.	Freq. Range (MHz)	Worst Level (dBm/MHz)	Total Worst Level (dBm/MHz)	Limit (dBm/MHz)	Result
Chain 0						
11b	01	2400-2BW ~ 2400-BW	-40.03	-38.03	-20	Pass
		2400-BW ~ 2400	-27.20	-25.20	-10	Pass
	13	2483.5 ~ 2483.5+BW	-28.83	-26.83	-10	Pass
		2483.5+BW ~ 2483.5+2BW	-40.50	-38.50	-20	Pass
11g	01	2400-2BW ~ 2400-BW	-42.61	-40.61	-20	Pass
		2400-BW ~ 2400	-13.19	-11.19	-10	Pass
	13	2483.5 ~ 2483.5+BW	-13.05	-11.05	-10	Pass
		2483.5+BW ~ 2483.5+2BW	-44.16	-42.16	-20	Pass
11n-HT20	01	2400-2BW ~ 2400-BW	-43.34	-41.34	-20	Pass
		2400-BW ~ 2400	-12.91	-10.91	-10	Pass
	13	2483.5 ~ 2483.5+BW	-12.69	-10.69	-10	Pass
		2483.5+BW ~ 2483.5+2BW	-44.51	-42.51	-20	Pass
11n-HT40	03	2400-2BW ~ 2400-BW	-39.46	-37.46	-20	Pass
		2400-BW ~ 2400	-12.97	-10.97	-10	Pass
	11	2483.5 ~ 2483.5+BW	-13.10	-11.10	-10	Pass
		2483.5+BW ~ 2483.5+2BW	-41.16	-39.16	-20	Pass

Note: Total Worst Level (dBm/MHz) = Worst Level (dBm/MHz) + Antenna Gain (dBi).

Test Mode	Ch. No.	Freq. Range (MHz)	Worst Level (dBm/MHz)	Total Worst Level (dBm/MHz)	Limit (dBm/ MHz)	Result
Chain 1						
11b	01	2400-2BW ~ 2400-BW	-42.03	-40.03	-20	Pass
		2400-BW ~ 2400	-27.93	-25.93	-10	Pass
	13	2483.5 ~ 2483.5+BW	-28.06	-26.06	-10	Pass
		2483.5+BW ~ 2483.5+2BW	-39.81	-37.81	-20	Pass
11g	01	2400-2BW ~ 2400-BW	-42.18	-40.18	-20	Pass
		2400-BW ~ 2400	-13.19	-11.19	-10	Pass
	13	2483.5 ~ 2483.5+BW	-12.84	-10.84	-10	Pass
		2483.5+BW ~ 2483.5+2BW	-44.32	-42.32	-20	Pass
11n-HT20	01	2400-2BW ~ 2400-BW	-46.26	-44.26	-20	Pass
		2400-BW ~ 2400	-13.51	-11.51	-10	Pass
	13	2483.5 ~ 2483.5+BW	-13.09	-11.09	-10	Pass
		2483.5+BW ~ 2483.5+2BW	-44.41	-42.41	-20	Pass
11n-HT40	03	2400-2BW ~ 2400-BW	-42.43	-40.43	-20	Pass
		2400-BW ~ 2400	-13.68	-11.68	-10	Pass
	11	2483.5 ~ 2483.5+BW	-13.38	-11.38	-10	Pass
		2483.5+BW ~ 2483.5+2BW	-42.76	-40.76	-20	Pass

Note: Total Worst Level (dBm/MHz) = Worst Level (dBm/MHz) + Antenna Gain (dBi).

Test Mode	Ch. No.	Freq. Range (MHz)	Worst Level Chain 0 (dBm/MHz)	Worst Level Chain 1 (dBm/MHz)	Total Worst Level (dBm/MHz)	Limit (dBm/MHz)	Result
Chain 0 + 1							
11n-HT20	01	2400-BW ~ 2400-2BW	-43.13	-46.52	-39.49	-20	Pass
		2483.5+2BW ~ 2483.5+BW	-16.25	-17.35	-11.75	-10	Pass
	13	2400-BW ~ 2400-2BW	-16.88	-16.22	-11.53	-10	Pass
		2483.5+2BW ~ 2483.5+BW	-44.31	-44.03	-39.16	-20	Pass
11n-HT40	03	2400-BW ~ 2400-2BW	-40.21	-44.35	-36.79	-20	Pass
		2483.5+2BW ~ 2483.5+BW	-16.4	-17.22	-11.78	-10	Pass
	11	2400-BW ~ 2400-2BW	-16.61	-16.93	-11.76	-10	Pass
		2483.5+2BW ~ 2483.5+BW	-41.22	-41.77	-36.48	-20	Pass

Note : Total Worst Level (dBm/MHz) = $10*\log(10^{\text{Chain 0 Worst Level }/10}+10^{\text{Chain 1 Worst Level }/10})$ + Antenna Gain (dBi).

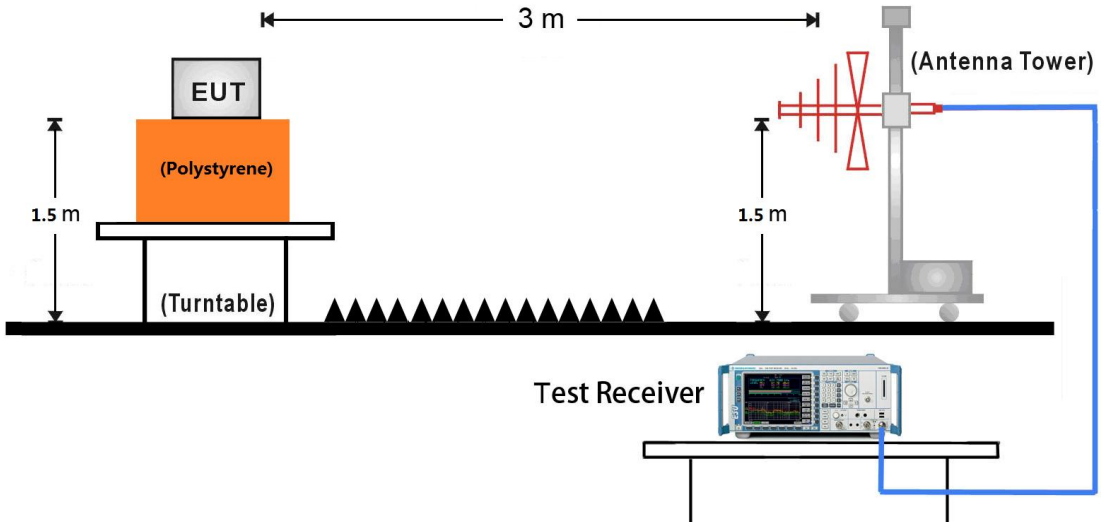
11. Transmitter Unwanted Emissions in the Spurious Domain

11.1. Limit

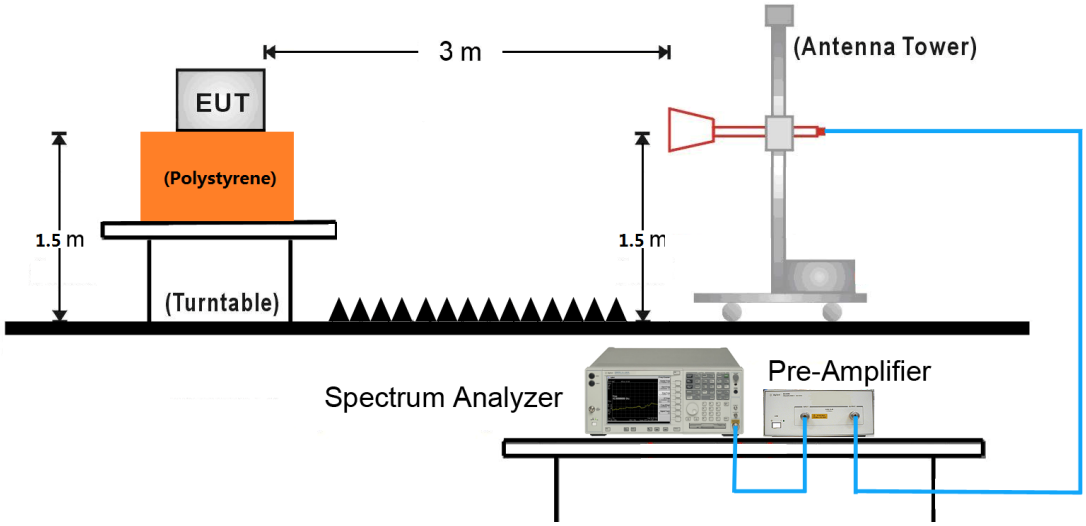
Transmitter Limits for Spurious Emissions		
Frequency Range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36dBm	100 kHz
47 MHz to 74 MHz	-54dBm	100 kHz
74 MHz to 87,5 MHz	-36dBm	100 kHz
87,5 MHz to 118 MHz	-54dBm	100 kHz
118 MHz to 174 MHz	-36dBm	100 kHz
174 MHz to 230 MHz	-54dBm	100 kHz
230 MHz to 470 MHz	-36dBm	100 kHz
470 MHz to 862 MHz	-54dBm	100 kHz
862 MHz to 1 GHz	-36dBm	100 kHz
1 GHz to 12,75 GHz	-30dBm	1 MHz

11.2. Test Setup

30MHz ~ 1GHz Test Setup:



1GHz ~ 12.75GHz Test Setup:



11.3. Test Procedure

Refer to ETSI EN 300 328 V1.9.1 (2015-02) Clause 5.3.10.2.2.

11.4. Test Result

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11b - Chain 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	500.3	-97.6	28.9	-68.7	-54.0	-14.7	Peak	Horizontal
	796.6	-97.7	34.0	-63.7	-54.0	-9.7	Peak	Horizontal
	3215.3	-48.2	12.2	-36.0	-30.0	-6.0	RMS	Horizontal
	4824.9	-70.1	17.1	-53.0	-30.0	-23.0	Peak	Horizontal
	58.3	-81.0	22.0	-59.0	-54.0	-5.0	RMS	Vertical
	531.5	-94.6	29.9	-64.7	-54.0	-10.7	Peak	Vertical
	3214.7	-45.4	12.1	-33.3	-30.0	-3.3	RMS	Vertical
	4823.9	-70.7	17.1	-53.6	-30.0	-23.6	Peak	Vertical
13	59.6	-96.1	21.9	-74.2	-54.0	-20.2	Peak	Horizontal
	790.0	-102.2	34.3	-67.9	-54.0	-13.9	Peak	Horizontal
	3296.6	-54.6	12.3	-42.3	-30.0	-12.3	Peak	Horizontal
	4942.4	-71.0	16.7	-54.3	-30.0	-24.3	Peak	Horizontal
	59.2	-83.2	21.6	-61.6	-54.0	-7.6	Peak	Vertical
	530.8	-93.0	29.9	-63.1	-54.0	-9.1	Peak	Vertical
	3297.5	-53.1	12.0	-41.1	-30.0	-11.1	Peak	Vertical
	7391.7	-72.0	25.6	-46.4	-30.0	-16.4	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11g - Chain 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	500.1	-97.1	28.9	-68.2	-54.0	-14.2	Peak	Horizontal
	786.4	-100.1	34.5	-65.6	-54.0	-11.6	Peak	Horizontal
	3215.5	-46.0	12.2	-33.8	-30.0	-3.8	RMS	Horizontal
	4830.2	-67.2	17.0	-50.2	-30.0	-20.2	Peak	Horizontal
	59.1	-87.4	21.8	-65.6	-54.0	-11.6	Peak	Vertical
	531.1	-97.6	29.9	-67.7	-54.0	-13.7	Peak	Vertical
	3215.0	-46.0	12.1	-33.9	-30.0	-3.9	RMS	Vertical
	7233.7	-72.9	25.2	-47.7	-30.0	-17.7	Peak	Vertical
13	59.3	-90.8	21.9	-68.9	-54.0	-14.9	Peak	Horizontal
	793.3	-101.1	34.1	-67.0	-54.0	-13.0	Peak	Horizontal
	3297.2	-49.3	12.3	-37.0	-30.0	-7.0	Peak	Horizontal
	4941.5	-67.3	16.7	-50.6	-30.0	-20.6	Peak	Horizontal
	59.9	-86.8	21.6	-65.2	-54.0	-11.2	Peak	Vertical
	792.6	-95.3	34.5	-60.8	-54.0	-6.8	Peak	Vertical
	3296.9	-51.3	12.0	-39.3	-30.0	-9.3	Peak	Vertical
	4772.2	-73.2	17.2	-56.0	-30.0	-26.0	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT20 - Chain 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	58.8	-91.3	22.2	-69.1	-54.0	-15.1	Peak	Horizontal
	780.9	-100.4	34.6	-65.8	-54.0	-11.8	Peak	Horizontal
	3215.4	-49.6	12.2	-37.4	-30.0	-7.4	Peak	Horizontal
	7227.5	-68.3	25.5	-42.8	-30.0	-12.8	Peak	Horizontal
	94.2	-96.3	33.7	-62.6	-54.0	-8.6	Peak	Vertical
	797.3	-99.4	34.4	-65.0	-54.0	-11.0	Peak	Vertical
	3215.1	-45.2	12.1	-33.1	-30.0	-3.1	RMS	Vertical
	7245.6	-74.1	25.2	-48.9	-30.0	-18.9	Peak	Vertical
13	59.5	-91.0	21.9	-69.1	-54.0	-15.1	Peak	Horizontal
	790.8	-103.3	34.3	-69.0	-54.0	-15.0	Peak	Horizontal
	3297.2	-53.5	12.3	-41.2	-30.0	-11.2	Peak	Horizontal
	7427.1	-73.1	25.8	-47.3	-30.0	-17.3	Peak	Horizontal
	58.9	-82.2	21.8	-60.4	-54.0	-6.4	Peak	Vertical
	532.1	-97.0	29.9	-67.1	-54.0	-13.1	Peak	Vertical
	3297.7	-49.2	12.0	-37.2	-30.0	-7.2	Peak	Vertical
	4942.6	-68.4	16.4	-52.0	-30.0	-22.0	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT40 - Chain 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	58.2	-97.0	22.2	-74.8	-54.0	-20.8	Peak	Horizontal
	792.9	-101.0	34.2	-66.8	-54.0	-12.8	Peak	Horizontal
	3226.6	-49.6	12.4	-37.2	-30.0	-7.2	Peak	Horizontal
	4783.2	-69.9	17.3	-52.6	-30.0	-22.6	Peak	Horizontal
	59.2	-85.1	21.8	-63.3	-54.0	-9.3	Peak	Vertical
	790.8	-100.4	34.4	-66.0	-54.0	-12.0	Peak	Vertical
	3226.8	-42.9	12.5	-33.4	-30.0	-3.4	RMS	Vertical
	4777.4	-74.0	17.2	-56.8	-30.0	-26.8	Peak	Vertical
11	58.5	-95.5	22.2	-73.3	-54.0	-19.3	Peak	Horizontal
	795.0	-101.2	34.1	-67.1	-54.0	-13.1	Peak	Horizontal
	3285.7	-54.5	12.2	-42.3	-30.0	-12.3	Peak	Horizontal
	5312.4	-71.3	16.4	-54.9	-30.0	-24.9	Peak	Horizontal
	59.1	-86.3	21.8	-64.5	-54.0	-10.5	Peak	Vertical
	792.2	-93.7	34.4	-59.3	-54.0	-5.3	RMS	Vertical
	3285.5	-52.1	12.1	-40.0	-30.0	-10.0	Peak	Vertical
	4742.1	-70.7	17.1	-53.6	-30.0	-23.6	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11b - Chain 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	499.9	-93.6	28.9	-64.7	-54.0	-10.7	Peak	Horizontal
	796.7	-96.9	34.0	-62.9	-54.0	-8.9	Peak	Horizontal
	3215.6	-51.4	12.2	-39.2	-30.0	-9.2	Peak	Horizontal
	4825.1	-71.1	17.1	-54.0	-30.0	-24.0	Peak	Horizontal
	59.1	-85.8	22.0	-63.8	-54.0	-9.8	Peak	Vertical
	530.8	-94.9	29.9	-65.0	-54.0	-11.0	Peak	Vertical
	3215.1	-45.7	12.1	-33.6	-30.0	-3.6	RMS	Vertical
	4823.9	-71.4	17.1	-54.3	-30.0	-24.3	Peak	Vertical
13	59.4	-92.8	21.9	-70.9	-54.0	-16.9	Peak	Horizontal
	789.8	-103.0	34.3	-68.7	-54.0	-14.7	Peak	Horizontal
	3296.9	-56.0	12.3	-43.7	-30.0	-13.7	Peak	Horizontal
	4942.2	-68.8	16.7	-52.1	-30.0	-22.1	Peak	Horizontal
	59.8	-84.0	21.6	-62.4	-54.0	-8.4	Peak	Vertical
	531.1	-97.9	29.9	-68.0	-54.0	-14.0	Peak	Vertical
	3297.2	-53.7	12.0	-41.7	-30.0	-11.7	Peak	Vertical
	7392.4	-69.3	25.6	-43.7	-30.0	-13.7	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11g - Chain 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	499.6	-101.8	28.9	-72.9	-54.0	-18.9	Peak	Horizontal
	787.7	-100.6	34.5	-66.1	-54.0	-12.1	Peak	Horizontal
	3215.3	-50.8	12.2	-38.6	-30.0	-8.6	Peak	Horizontal
	4830.6	-67.1	17.0	-50.1	-30.0	-20.1	Peak	Horizontal
	58.9	-82.8	21.8	-61.0	-54.0	-7.0	Peak	Vertical
	530.6	-95.2	29.9	-65.3	-54.0	-11.3	Peak	Vertical
	3215.6	-44.5	12.1	-32.4	-30.0	-2.4	RMS	Vertical
	7233.4	-69.6	25.2	-44.4	-30.0	-14.4	Peak	Vertical
13	59.7	-93.7	21.9	-71.8	-54.0	-17.8	Peak	Horizontal
	794.1	-102.6	34.1	-68.5	-54.0	-14.5	Peak	Horizontal
	3296.7	-54.1	12.3	-41.8	-30.0	-11.8	Peak	Horizontal
	4942.5	-64.8	16.7	-48.1	-30.0	-18.1	Peak	Horizontal
	60.0	-85.8	21.6	-64.2	-54.0	-10.2	Peak	Vertical
	793.1	-96.8	34.5	-62.3	-54.0	-8.3	Peak	Vertical
	3296.8	-46.7	12.0	-34.7	-30.0	-4.7	RMS	Vertical
	4771.5	-69.8	17.2	-52.6	-30.0	-22.6	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT20 - Chain 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	59.5	-95.3	21.9	-73.4	-54.0	-19.4	Peak	Horizontal
	797.2	-102.6	34.0	-68.6	-54.0	-14.6	Peak	Horizontal
	3215.1	-64.6	12.2	-52.4	-30.0	-22.4	Peak	Horizontal
	4831.2	-67.8	17.0	-50.8	-30.0	-20.8	Peak	Horizontal
	59.3	-85.6	21.8	-63.8	-54.0	-9.8	Peak	Vertical
	532.1	-96.9	29.9	-67.0	-54.0	-13.0	Peak	Vertical
	4829.8	-68.6	16.9	-51.7	-30.0	-21.7	Peak	Vertical
	7151.7	-73.1	25.0	-48.1	-30.0	-18.1	Peak	Vertical
13	59.1	-93.1	21.6	-71.5	-54.0	-17.5	Peak	Horizontal
	791.7	-102.8	34.3	-68.5	-54.0	-14.5	Peak	Horizontal
	4953.9	-69.5	16.7	-52.8	-30.0	-22.8	Peak	Horizontal
	7209.6	-72.8	25.2	-47.6	-30.0	-17.6	Peak	Horizontal
	59.2	-82.7	21.8	-60.9	-54.0	-6.9	Peak	Vertical
	791.5	-99.2	34.5	-64.7	-54.0	-10.7	Peak	Vertical
	4777.5	-74.5	17.2	-57.3	-30.0	-27.3	Peak	Vertical
	7215.5	-76.1	25.2	-50.9	-30.0	-20.9	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT40 - Chain 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	59.4	-94.9	21.6	-73.3	-54.0	-19.3	Peak	Horizontal
	793.2	-100.8	34.2	-66.6	-54.0	-12.6	Peak	Horizontal
	4783.9	-68.6	17.3	-51.3	-30.0	-21.3	Peak	Horizontal
	7139.7	-75.3	25.2	-50.1	-30.0	-20.1	Peak	Horizontal
	59.5	-86.8	21.6	-65.2	-54.0	-11.2	Peak	Vertical
	786.3	-102.5	34.3	-68.2	-54.0	-14.2	Peak	Vertical
	4724.9	-72.4	17.0	-55.4	-30.0	-25.4	Peak	Vertical
	6757.4	-72.2	22.2	-50.0	-30.0	-20.0	Peak	Vertical
11	59.3	-92.5	21.6	-70.9	-54.0	-16.9	Peak	Horizontal
	791.4	-100.5	34.3	-66.2	-54.0	-12.2	Peak	Horizontal
	4782.9	-67.9	17.3	-50.6	-30.0	-20.6	Peak	Horizontal
	7491.7	-72.6	26.0	-46.6	-30.0	-16.6	Peak	Horizontal
	59.1	-82.2	22.0	-60.2	-54.0	-6.2	Peak	Vertical
	793.6	-101.6	34.5	-67.1	-54.0	-13.1	Peak	Vertical
	4747.9	-70.6	17.1	-53.5	-30.0	-23.5	Peak	Vertical
	7380.1	-71.1	25.8	-45.3	-30.0	-15.3	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT20 - Chain 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	59.4	-92.8	21.6	-71.2	-54.0	-17.2	Peak	Horizontal
	791.3	-97.9	34.3	-63.6	-54.0	-9.6	Peak	Horizontal
	3215.1	-48.2	12.2	-36.0	-30.0	-6.0	RMS	Horizontal
	4818.6	-66.1	17.0	-49.1	-30.0	-19.1	Peak	Horizontal
	58.9	-85.2	21.8	-63.4	-54.0	-9.4	Peak	Vertical
	530.8	-97.3	29.9	-67.4	-54.0	-13.4	Peak	Vertical
	3215.5	-50.3	12.1	-38.2	-30.0	-8.2	Peak	Vertical
	5077.4	-72.1	17.5	-54.6	-30.0	-24.6	Peak	Vertical
13	59.0	-91.7	21.6	-70.1	-54.0	-16.1	Peak	Horizontal
	795.6	-101.4	34.0	-67.4	-54.0	-13.4	Peak	Horizontal
	3296.8	-51.0	12.3	-38.7	-30.0	-8.7	Peak	Horizontal
	4948.1	-70.2	16.7	-53.5	-30.0	-23.5	Peak	Horizontal
	56.8	-84.7	22.2	-62.5	-54.0	-8.5	Peak	Vertical
	794.4	-96.8	34.4	-62.4	-54.0	-8.4	Peak	Vertical
	3297.5	-47.9	12.0	-35.9	-30.0	-5.9	RMS	Vertical
	7362.0	-74.6	25.7	-48.9	-30.0	-18.9	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT40 - Chain 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	59.0	-94.8	21.6	-73.2	-54.0	-19.2	Peak	Horizontal
	500.5	-94.5	28.9	-65.6	-54.0	-11.6	Peak	Horizontal
	3226.5	-50.0	12.4	-37.6	-30.0	-7.6	Peak	Horizontal
	4783.6	-73.5	17.3	-56.2	-30.0	-26.2	Peak	Horizontal
	58.7	-82.8	21.8	-61.0	-54.0	-7.0	Peak	Vertical
	531.6	-97.2	29.9	-67.3	-54.0	-13.3	Peak	Vertical
	3226.1	-49.6	12.5	-37.1	-30.0	-7.1	Peak	Vertical
	7533.0	-71.4	25.5	-45.9	-30.0	-15.9	Peak	Vertical
11	58.9	-94.6	21.9	-72.7	-54.0	-18.7	Peak	Horizontal
	731.9	-103.0	34.4	-68.6	-54.0	-14.6	Peak	Horizontal
	3285.3	-52.4	12.2	-40.2	-30.0	-10.2	Peak	Horizontal
	7392.6	-70.7	25.9	-44.8	-30.0	-14.8	Peak	Horizontal
	59.8	-86.2	21.8	-64.4	-54.0	-10.4	Peak	Vertical
	94.9	-93.8	33.7	-60.1	-54.0	-6.1	Peak	Vertical
	3286.1	-49.0	12.1	-36.9	-30.0	-6.9	Peak	Vertical
	5523.1	-69.3	17.6	-51.7	-30.0	-21.7	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

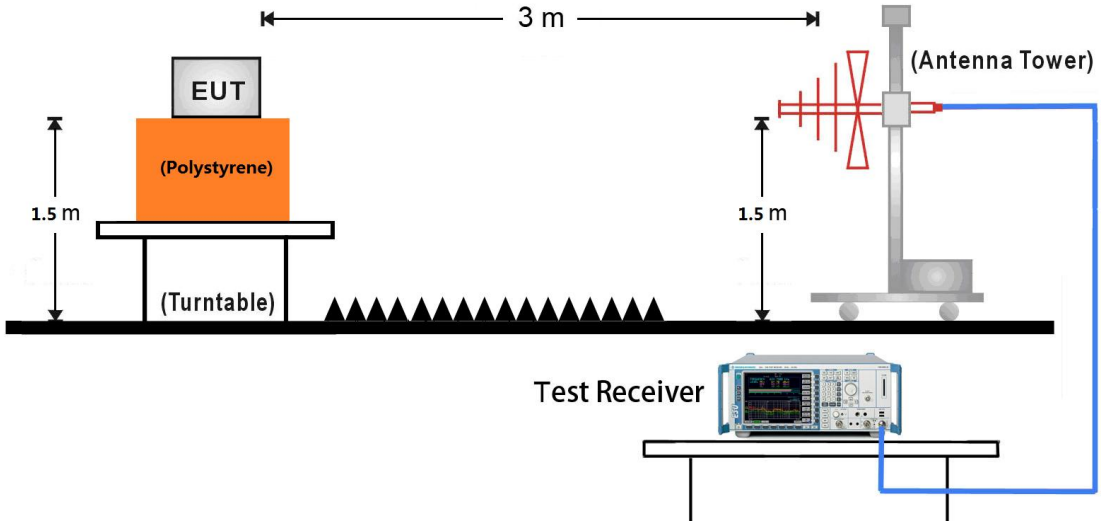
12. Receiver Spurious Emissions

12.1. Limit

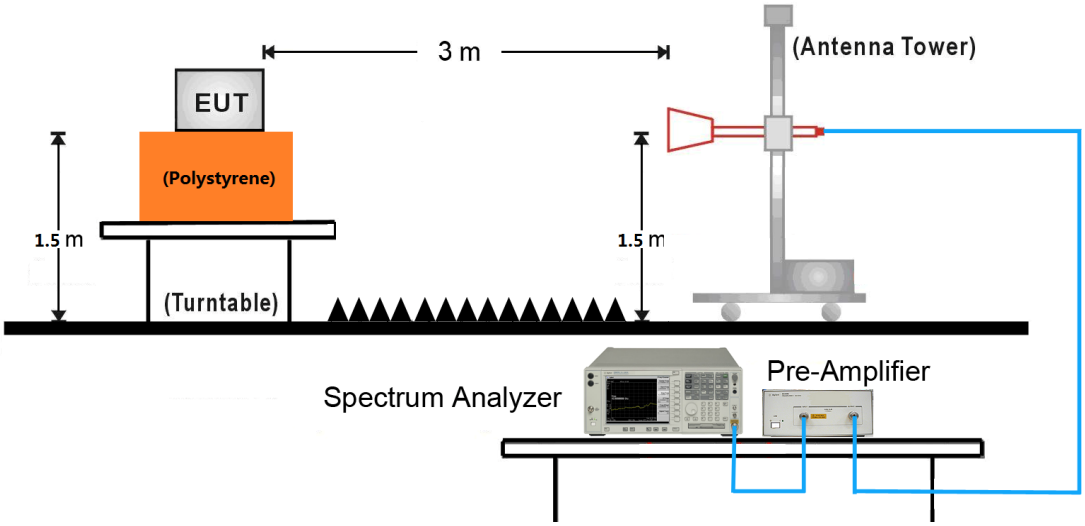
Spurious emissions limits for receivers		
Frequency Range	Maximum power	Measurement bandwidth
30 MHz to 1 GHz	-57dBm	100 kHz
1 GHz to 12.75 GHz	-47dBm	1 MHz

12.2. Test Setup

30MHz ~ 1GHz Test Setup:



1GHz ~ 12.5GHz Test Setup:



12.3. Test Procedure

Refer to ETSI EN 300 328 V1.9.1 (2015-02) Clause 5.3.11.2.2.

12.4. Test Result

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11b - Chain 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	531.2	-96.4	30.8	-65.6	-57.0	-8.6	Peak	Horizontal
	791.8	-102.4	34.3	-68.1	-57.0	-11.1	Peak	Horizontal
	1857.6	-64.9	8.4	-56.5	-47.0	-9.5	Peak	Horizontal
	4783.7	-70.1	17.3	-52.8	-47.0	-5.8	RMS	Horizontal
	60.1	-84.1	21.4	-62.7	-57.0	-5.7	RMS	Vertical
	94.8	-98.4	33.6	-64.8	-57.0	-7.8	Peak	Vertical
	3286.1	-69.2	12.1	-57.1	-47.0	-10.1	Peak	Vertical
	4748.4	-74.3	17.1	-57.2	-47.0	-10.2	Peak	Vertical
13	531.2	-104.3	30.7	-73.6	-57.0	-16.6	Peak	Horizontal
	791.2	-100.1	34.3	-65.8	-57.0	-8.8	Peak	Horizontal
	1270.0	-67.7	9.8	-57.9	-47.0	-10.9	Peak	Horizontal
	4718.6	-71.4	17.2	-54.2	-47.0	-7.2	Peak	Horizontal
	57.5	-84.8	22.2	-62.6	-57.0	-5.6	RMS	Vertical
	528.9	-91.4	30.0	-61.4	-57.0	-4.4	RMS	Vertical
	1452.7	-68.5	9.0	-59.5	-47.0	-12.5	Peak	Vertical
	3590.8	-70.9	13.9	-57.0	-47.0	-10.0	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11g - Chain 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	531.1	-101.5	30.7	-70.8	-57.0	-13.8	Peak	Horizontal
	793.0	-99.1	34.2	-64.9	-57.0	-7.9	Peak	Horizontal
	1341.0	-65.7	11.1	-54.6	-47.0	-7.6	Peak	Horizontal
	4718.7	-69.7	17.2	-52.5	-47.0	-5.5	RMS	Horizontal
	57.4	-82.8	22.2	-60.6	-57.0	-3.6	RMS	Vertical
	531.7	-93.1	29.9	-63.2	-57.0	-6.2	Peak	Vertical
	1393.2	-67.9	10.1	-57.8	-47.0	-10.8	Peak	Vertical
	2910.1	-67.6	10.7	-56.9	-47.0	-9.9	Peak	Vertical
13	36.9	-98.0	29.3	-68.7	-57.0	-11.7	Peak	Horizontal
	791.1	-100.3	34.3	-66.0	-57.0	-9.0	Peak	Horizontal
	1335.3	-70.5	10.6	-59.9	-47.0	-12.9	Peak	Horizontal
	3285.4	-68.1	12.2	-55.9	-47.0	-8.9	Peak	Horizontal
	57.5	-86.7	22.2	-64.5	-57.0	-7.5	Peak	Vertical
	530.3	-96.8	29.9	-66.9	-57.0	-9.9	Peak	Vertical
	1334.6	-69.1	10.0	-59.1	-47.0	-12.1	Peak	Vertical
	5000.6	-73.7	16.8	-56.9	-47.0	-9.9	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT20 - Chain 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	37.3	-98.5	29.3	-69.2	-57.0	-12.2	Peak	Horizontal
	799.8	-102.8	33.8	-69.0	-57.0	-12.0	Peak	Horizontal
	1340.6	-65.2	11.1	-54.1	-47.0	-7.1	Peak	Horizontal
	4730.4	-68.9	17.0	-51.9	-47.0	-4.9	RMS	Horizontal
	57.4	-87.8	22.2	-65.6	-57.0	-8.6	Peak	Vertical
	801.1	-98.3	34.3	-64.0	-57.0	-7.0	Peak	Vertical
	1399.5	-67.1	10.5	-56.6	-47.0	-9.6	Peak	Vertical
	4725.4	-70.1	17.0	-53.1	-47.0	-6.1	Peak	Vertical
13	34.1	-95.4	27.2	-68.2	-57.0	-11.2	Peak	Horizontal
	801.9	-98.5	33.8	-64.7	-57.0	-7.7	Peak	Horizontal
	1393.6	-69.7	10.4	-59.3	-47.0	-12.3	Peak	Horizontal
	3285.2	-66.9	12.2	-54.7	-47.0	-7.7	Peak	Horizontal
	95.9	-98.8	33.5	-65.3	-57.0	-8.3	Peak	Vertical
	530.8	-98.2	29.9	-68.3	-57.0	-11.3	Peak	Vertical
	1393.1	-66.7	10.1	-56.6	-47.0	-9.6	Peak	Vertical
	4741.8	-72.3	17.1	-55.2	-47.0	-8.2	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT40 - Chain 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	33.9	-96.1	27.2	-68.9	-57.0	-11.9	Peak	Horizontal
	776.4	-99.0	34.6	-64.4	-57.0	-7.4	Peak	Horizontal
	1399.3	-70.3	10.3	-60.0	-47.0	-13.0	Peak	Horizontal
	4671.8	-69.9	16.7	-53.2	-47.0	-6.2	Peak	Horizontal
	56.7	-87.0	22.2	-64.8	-57.0	-7.8	Peak	Vertical
	531.6	-96.5	29.9	-66.6	-57.0	-9.6	Peak	Vertical
	1388.3	-66.7	9.7	-57.0	-47.0	-10.0	Peak	Vertical
	4718.9	-70.2	17.1	-53.1	-47.0	-6.1	Peak	Vertical
11	34.7	-100.4	27.6	-72.8	-57.0	-15.8	Peak	Horizontal
	799.1	-101.0	33.8	-67.2	-57.0	-10.2	Peak	Horizontal
	1392.9	-64.3	10.4	-53.9	-47.0	-6.9	Peak	Horizontal
	4749.0	-74.6	17.2	-57.4	-47.0	-10.4	Peak	Horizontal
	94.5	-97.4	33.2	-64.2	-57.0	-7.2	Peak	Vertical
	531.3	-93.0	29.9	-63.1	-57.0	-6.1	Peak	Vertical
	1387.1	-67.0	9.7	-57.3	-47.0	-10.3	Peak	Vertical
	3285.7	-68.3	12.1	-56.2	-47.0	-9.2	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11b - Chain 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	531.5	-98.2	30.8	-67.4	-57.0	-10.4	Peak	Horizontal
	791.8	-97.3	34.3	-63.0	-57.0	-6.0	RMS	Horizontal
	1857.6	-66.6	8.4	-58.2	-47.0	-11.2	Peak	Horizontal
	4783.4	-71.5	17.3	-54.2	-47.0	-7.2	Peak	Horizontal
	60.8	-84.0	21.4	-62.6	-57.0	-5.6	RMS	Vertical
	95.6	-101.6	33.6	-68.0	-57.0	-11.0	Peak	Vertical
	3284.9	-68.1	12.1	-56.0	-47.0	-9.0	Peak	Vertical
	4748.3	-70.7	17.1	-53.6	-47.0	-6.6	Peak	Vertical
13	531.0	-103.3	30.7	-72.6	-57.0	-15.6	Peak	Horizontal
	790.5	-102.2	34.3	-67.9	-57.0	-10.9	Peak	Horizontal
	1270.0	-66.9	9.8	-57.1	-47.0	-10.1	Peak	Horizontal
	4719.1	-70.5	17.2	-53.3	-47.0	-6.3	Peak	Horizontal
	56.8	-87.5	22.2	-65.3	-57.0	-8.3	Peak	Vertical
	528.2	-94.2	30.0	-64.2	-57.0	-7.2	Peak	Vertical
	1452.4	-67.3	9.0	-58.3	-47.0	-11.3	Peak	Vertical
	3591.0	-66.3	13.9	-52.4	-47.0	-5.4	RMS	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11g - Chain 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	531.4	-101.2	30.7	-70.5	-57.0	-13.5	Peak	Horizontal
	791.8	-100.2	34.2	-66.0	-57.0	-9.0	Peak	Horizontal
	1340.7	-67.9	11.1	-56.8	-47.0	-9.8	Peak	Horizontal
	4718.8	-69.6	17.2	-52.4	-47.0	-5.4	RMS	Horizontal
	56.9	-87.8	22.2	-65.6	-57.0	-8.6	Peak	Vertical
	531.8	-95.0	29.9	-65.1	-57.0	-8.1	Peak	Vertical
	1394.2	-65.1	10.1	-55.0	-47.0	-8.0	Peak	Vertical
	2909.0	-65.2	10.7	-54.5	-47.0	-7.5	Peak	Vertical
13	37.4	-103.1	29.3	-73.8	-57.0	-16.8	Peak	Horizontal
	791.3	-103.9	34.3	-69.6	-57.0	-12.6	Peak	Horizontal
	1335.2	-69.2	10.6	-58.6	-47.0	-11.6	Peak	Horizontal
	3285.4	-69.6	12.2	-57.4	-47.0	-10.4	Peak	Horizontal
	57.9	-87.5	22.2	-65.3	-57.0	-8.3	Peak	Vertical
	530.9	-97.4	29.9	-67.5	-57.0	-10.5	Peak	Vertical
	1335.5	-66.7	10.0	-56.7	-47.0	-9.7	Peak	Vertical
	5000.3	-71.0	16.8	-54.2	-47.0	-7.2	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT20 - Chain 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	33.6	-100.1	27.2	-72.9	-57.0	-15.9	Peak	Horizontal
	801.6	-96.0	33.8	-62.2	-57.0	-5.2	RMS	Horizontal
	1269.6	-67.6	9.8	-57.8	-47.0	-10.8	Peak	Horizontal
	3285.5	-67.0	12.2	-54.8	-47.0	-7.8	Peak	Horizontal
	56.7	-84.6	21.9	-62.7	-57.0	-5.7	RMS	Vertical
	668.1	-94.1	32.2	-61.9	-57.0	-4.9	RMS	Vertical
	1388.0	-64.3	9.7	-54.6	-47.0	-7.6	Peak	Vertical
	4713.0	-74.9	17.3	-57.6	-47.0	-10.6	Peak	Vertical
13	32.5	-95.9	27.1	-68.8	-57.0	-11.8	Peak	Horizontal
	802.2	-96.0	33.8	-62.2	-57.0	-5.2	RMS	Horizontal
	1328.7	-64.0	9.9	-54.1	-47.0	-7.1	Peak	Horizontal
	5618.3	-73.7	17.9	-55.8	-47.0	-8.8	Peak	Horizontal
	57.4	-88.0	22.2	-65.8	-57.0	-8.8	Peak	Vertical
	668.3	-95.4	32.2	-63.2	-57.0	-6.2	Peak	Vertical
	1328.9	-66.3	9.5	-56.8	-47.0	-9.8	Peak	Vertical
	4778.1	-68.8	17.2	-51.6	-47.0	-4.6	RMS	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT40 - Chain 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	32.8	-99.3	27.0	-72.3	-57.0	-15.3	Peak	Horizontal
	794.0	-97.5	34.2	-63.3	-57.0	-6.3	Peak	Horizontal
	1341.4	-66.6	11.1	-55.5	-47.0	-8.5	Peak	Horizontal
	4677.4	-69.5	16.8	-52.7	-47.0	-5.7	RMS	Horizontal
	57.2	-82.9	22.2	-60.7	-57.0	-3.7	RMS	Vertical
	94.5	-97.0	33.6	-63.4	-57.0	-6.4	Peak	Vertical
	1334.8	-64.1	10.0	-54.1	-47.0	-7.1	Peak	Vertical
	4730.5	-70.1	17.1	-53.0	-47.0	-6.0	RMS	Vertical
11	34.0	-95.6	27.6	-68.0	-57.0	-11.0	Peak	Horizontal
	801.8	-96.0	33.8	-62.2	-57.0	-5.2	RMS	Horizontal
	1399.1	-68.8	10.3	-58.5	-47.0	-11.5	Peak	Horizontal
	4778.0	-69.0	17.3	-51.7	-47.0	-4.7	RMS	Horizontal
	94.8	-97.3	33.7	-63.6	-57.0	-6.6	Peak	Vertical
	668.4	-94.3	32.2	-62.1	-57.0	-5.1	RMS	Vertical
	1394.0	-70.6	10.1	-60.5	-47.0	-13.5	Peak	Vertical
	4595.8	-71.9	16.4	-55.5	-47.0	-8.5	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT20 - Chain 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	33.2	-97.2	27.2	-70.0	-57.0	-13.0	Peak	Horizontal
	800.5	-99.9	33.8	-66.1	-57.0	-9.1	Peak	Horizontal
	1393.5	-68.6	10.4	-58.2	-47.0	-11.2	Peak	Horizontal
	4730.4	-73.4	17.0	-56.4	-47.0	-9.4	Peak	Horizontal
	58.3	-87.4	22.2	-65.2	-57.0	-8.2	Peak	Vertical
	668.1	-95.9	32.2	-63.7	-57.0	-6.7	Peak	Vertical
	1417.4	-65.6	9.9	-55.7	-47.0	-8.7	Peak	Vertical
	3550.0	-67.9	13.6	-54.3	-47.0	-7.3	Peak	Vertical
13	500.6	-91.5	28.9	-62.6	-57.0	-5.6	RMS	Horizontal
	801.7	-101.2	33.8	-67.4	-57.0	-10.4	Peak	Horizontal
	1328.7	-63.5	9.9	-53.6	-47.0	-6.6	Peak	Horizontal
	4748.7	-74.0	17.2	-56.8	-47.0	-9.8	Peak	Horizontal
	56.6	-86.7	21.9	-64.8	-57.0	-7.8	Peak	Vertical
	790.4	-97.1	34.4	-62.7	-57.0	-5.7	RMS	Vertical
	1328.6	-63.6	9.5	-54.1	-47.0	-7.1	Peak	Vertical
	4718.6	-72.6	17.1	-55.5	-47.0	-8.5	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Engineer	Vince Yu	Temperature	23°C
Test Date	2016/07/12	Relative Humidity	54%
Test Mode	802.11n-HT40 - Chain 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	499.8	-99.9	28.9	-71.0	-57.0	-14.0	Peak	Horizontal
	799.8	-103.1	33.8	-69.3	-57.0	-12.3	Peak	Horizontal
	1387.1	-68.8	10.0	-58.8	-47.0	-11.8	Peak	Horizontal
	4731.2	-70.4	17.0	-53.4	-47.0	-6.4	Peak	Horizontal
	57.8	-87.5	22.2	-65.3	-57.0	-8.3	Peak	Vertical
	662.2	-95.1	32.1	-63.0	-57.0	-6.0	RMS	Vertical
	1387.7	-66.7	9.7	-57.0	-47.0	-10.0	Peak	Vertical
	4730.5	-73.7	17.1	-56.6	-47.0	-9.6	Peak	Vertical
11	37.7	-99.0	29.3	-69.7	-57.0	-12.7	Peak	Horizontal
	780.6	-102.2	34.6	-67.6	-57.0	-10.6	Peak	Horizontal
	1392.9	-68.2	10.4	-57.8	-47.0	-10.8	Peak	Horizontal
	4735.8	-71.0	17.0	-54.0	-47.0	-7.0	Peak	Horizontal
	58.2	-84.5	22.2	-62.3	-57.0	-5.3	RMS	Vertical
	791.6	-97.3	34.5	-62.8	-57.0	-5.8	RMS	Vertical
	1452.9	-68.4	9.0	-59.4	-47.0	-12.4	Peak	Vertical
	4748.7	-70.8	17.1	-53.7	-47.0	-6.7	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

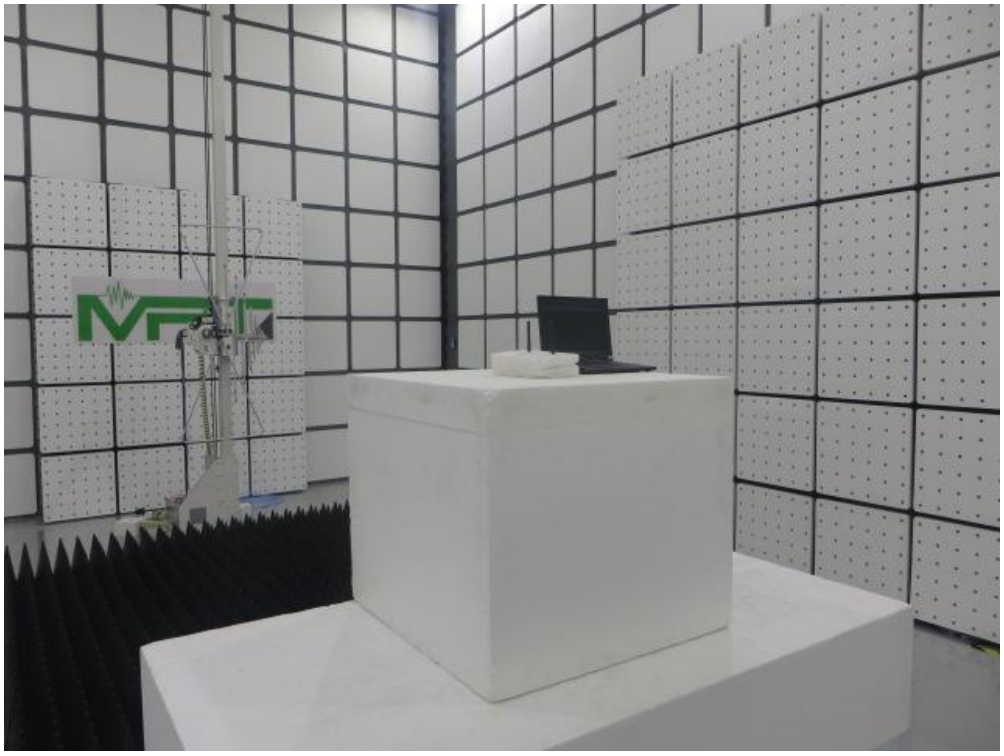
13. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

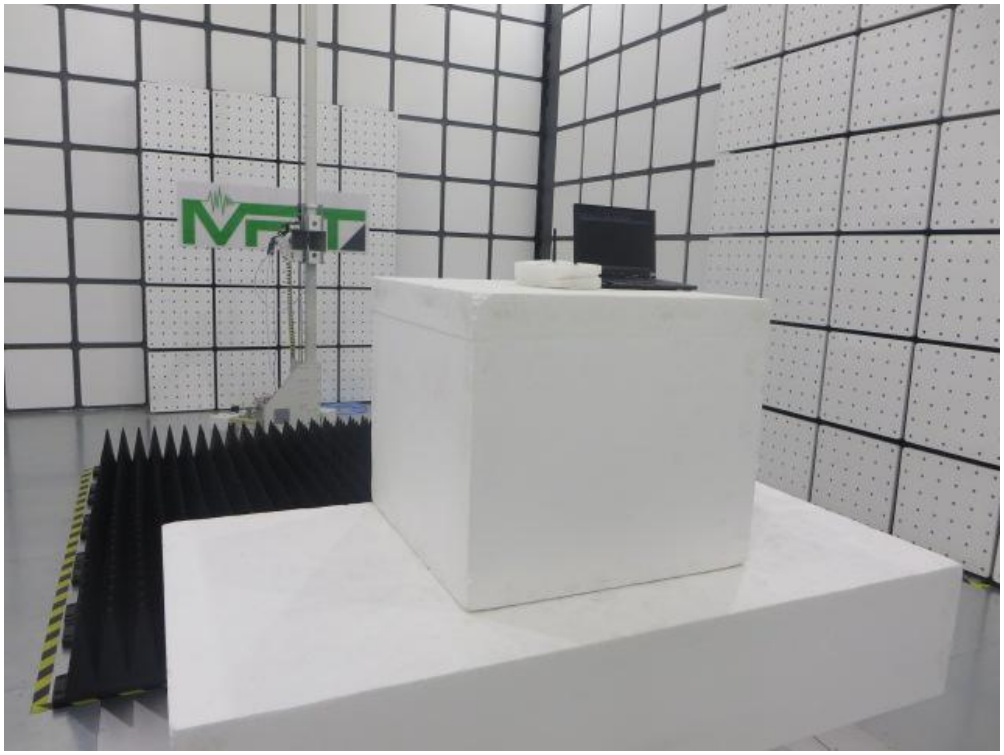
Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1,5 dB
Power Spectral Density, conducted	±3 dB
Unwanted Emissions, conducted	±3 dB
All emissions, radiated	±6 dB
Temperature	±3 °C
Supply voltages	±3 %
Time	±5 %

14. Test Photograph

Description: Radiated Spurious Emissions Test Setup for Below 1GHz



Description: Radiated Spurious Emissions Test Setup for Above 1GHz



15. List of Measuring Instrument

Equivalent Isotropic Radiated Power - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2016/12/08
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	MRTSUE06051	1 year	2016/12/08
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2016/12/20

Power Spectral Density - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2017/05/07
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2016/12/20

Duty Cycle, Tx-sequence, Tx-gap - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2017/05/07
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2016/12/20

Medium Utilisation (MU) Factor - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2017/05/07
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2016/12/08
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2016/12/20

Adaptivity and Blocking - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2017/05/07
Vector Signal Generator	Agilent	E4438C	MRTSUE06026	1 year	2016/12/08
Vector Signal Generator	Agilent	E4438C	MRTSUE06081	1 year	2016/12/08
Directional Coupler	Narda	4216-20	MRTSUE06065	1 year	2017/03/28
Power Splitter	Mini-Circuits	ZFRSC-123-S+	MRTSUE06122	N/A	N/A
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2016/12/20

Occupied Channel Bandwidth - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2017/05/07
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2016/12/20

Transmitter Unwanted Emissions in the out-of-band Domain - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2017/05/07
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	MRTSUE06051	1 year	2016/12/08
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2016/12/20

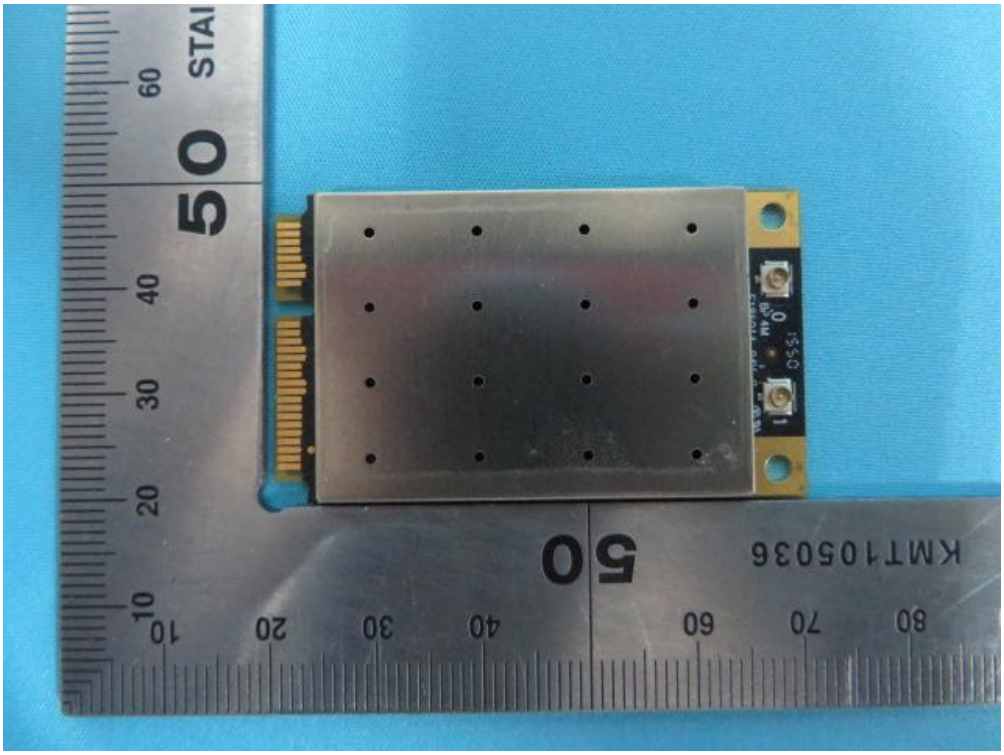
Transmitter Spurious Emissions and Receiver Spurious Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2017/05/10
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2017/05/07
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2017/03/28
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2016/12/11
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2016/11/07
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06181	1 year	2016/12/20

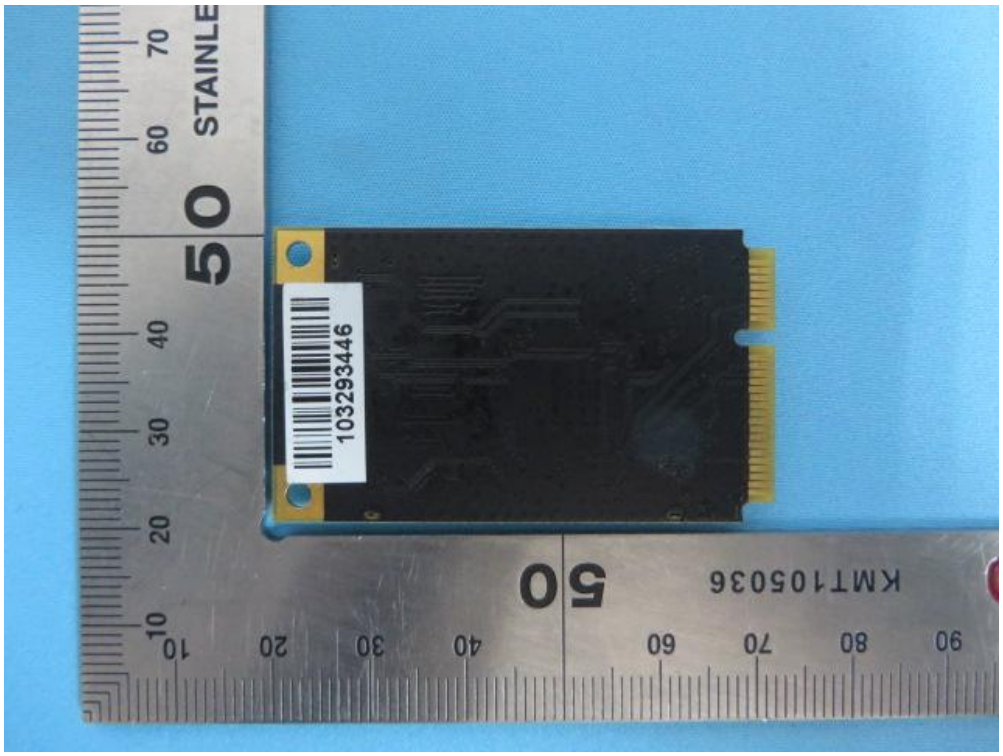
Software	Version	Function
e3	V8.3.5	EMI Test Software

16. Appendix - EUT Photograph

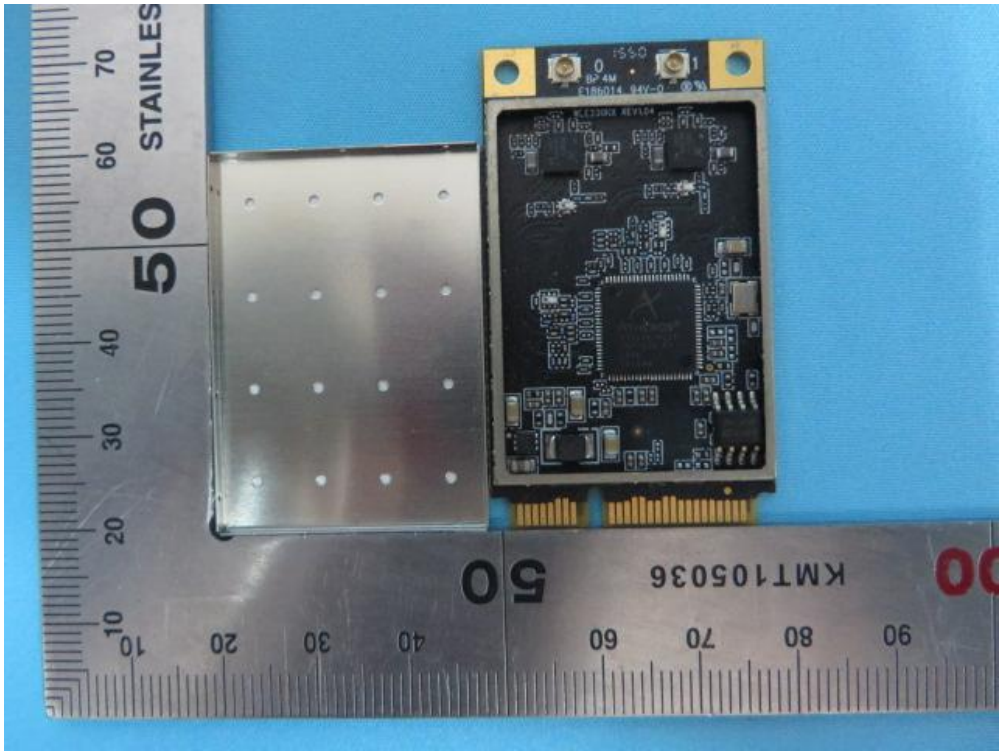
(1) EUT Photo



(2) EUT Photo



(3) EUT Photo



(4) EUT Photo

(5) EUT Photo

The End