MEASUREMENT REPORT

EN 300 328 V2.1.1 WLAN 802.11b/g/n

Applicant:	Compex Systems Pte Ltd
Address:	No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651
Product:	Wireless Access Point
Model No.:	WPJ428HV
Serial Model:	WPJ428LV, WPJ418LV, WPJ418HV, MMS428LV, MMS428HV, MMS418LV, MMS418HV
Brand Name:	COMPEX
Standards:	EN 300 328 V2.1.1 (2016-11)
Result:	Complies
Test Date:	April 20 ~ June 22, 2017

Reviewed By : Jame Yuan
(Jame Yuan)

Approved By : Marlin Chen
(Marlin Chen)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

Revision History

Report No.	Version	Description	Issue Date	Note
1704RSU00211	Rev. 01	Initial report	06-30-2017	Valid

CONTENTS

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 Access Point
Model No.:	WPJ428HV
Serial Model:	WPJ428LV, WPJ418LV, WPJ418HV, MMS428LV, MMS428HV, MMS418LV, MMS418HV
Brand Name:	COMPEX
Wi-Fi Specification:	802.11a/b/g/n/ac
Components	
POE Adapter	Model No.: PoE35-54A INPUT: 100-240V ~ 50/60Hz 1.0A Max OUTPUT: 54Vdc, 0.65A
Adapter	Model No.: GRT-240100 INPUT: 100-240V ~ 50/60Hz 0.8A Max OUTPUT: 24V, 1.0A

1.5. Product Specification Subjective

Frequency Range:	For 802.11b/g/n-HT20: 2412 ~ 2472 MHz For 802.11n-HT40: 2422 ~ 2462 MHz
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 report 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

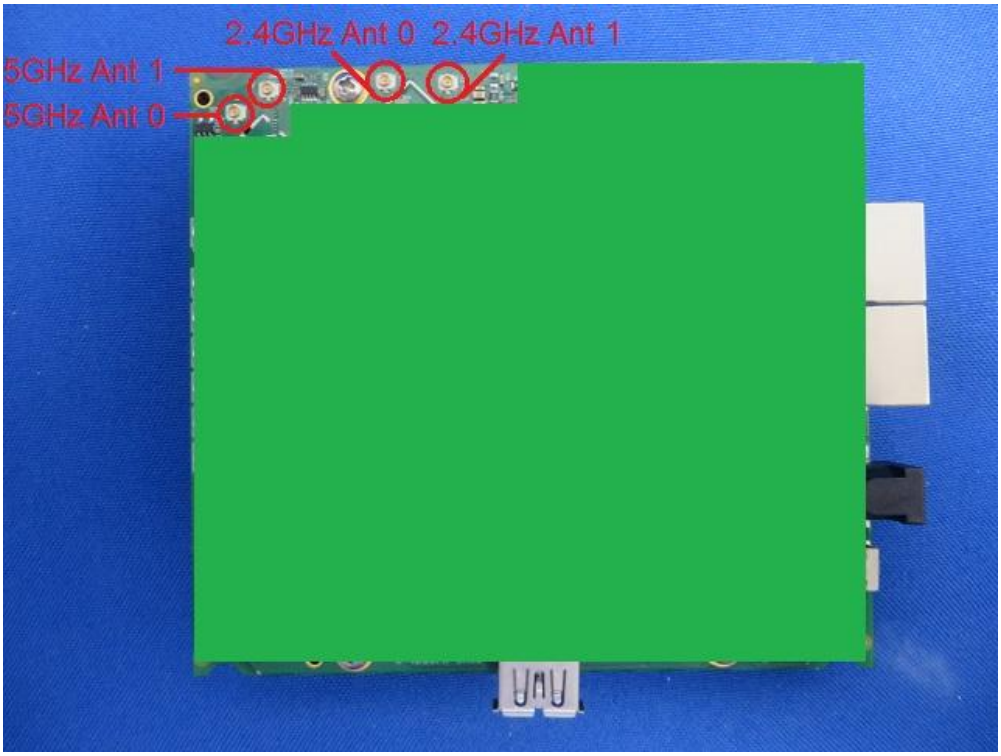
Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	10	2457 MHz	11	2462 MHz

1.7. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	TX Paths	Max Antenna Gain (dBi)	
			Ant 0	Ant 1
Panel Antenna	2412 ~ 2472	1	7	--
		2	7	7
Dipole Antenna	5150 ~ 5350	1	10	--
		2	10	10
Panel Antenna	5470 ~ 5850	1	17	--
		2	17	17

1.8. Description of Antenna RF Port

Antenna RF Port				
--	2.4GHz RF Port		5GHz RF Port	
Software Control Port for 1Tx	Ant 0	--	Ant 0	--
Software Control Port for 2Tx	Ant 0	Ant 1	Ant 0	Ant 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: 19.84dBm
☒	Power Spectral Density: 9.73dBm/MHz
☐	Duty cycle, Tx-Sequence, Tx-gap
☐	Accumulated Transmit time, Frequency Occupation & Hopping Sequence
☐	Medium Utilisation:
☐	Hopping Frequency Separation:
☒	Adaptivity: 1.928ms, 130.0us
☒	Occupied Nominal Channel Bandwidth: 36.11MHz
☒	Transmitter unwanted emissions in the OOB domain: -33.84dBm/MHz
☒	Transmitter unwanted emissions in the spurious domain: -36.20dBm
☒	Receiver spurious emissions: -52.40dBm
☒	Receiver Blocking: 0.6%

Antenna Category	
☒	Directional antenna (antenna permanently attached)
	☒ Permanently RF connector provided (Specific Antenna Connectors)
	☐ No temporary RF connector provided

Device Type			
☐	Stand-alone equipment		
☒	Combined (or host) equipment		
☐	Plug-in radio device		
☐	Test Jig		
Operating Conditions			
☒	AC Mains State AC Voltage:100 - 240V	☐	DC State DC Voltage: DC 48V
Type of DC Source	☐ Internal power supply		
	☐ External power supply or AC/DC adapter		
	☐ Battery		
☒	Temperature Range: -20 ~ 55°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 V2.1.1.

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 Data Rate

Pre-Test RF Output Power at various data rates for Ant 0

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate (Mbps)	RF Output Power (dBm)
11b	20	7	2442	1	9.35
				5.5	9.24
				11	9.07
11g	20	7	2442	6	12.46
				24	12.21
				54	12.02
11n	20	7	2442	6.5	12.73
				39.0	12.49
				65.0	12.18
11n	40	7	2442	13.5	12.74
				81.0	12.56
				135.0	12.30

Note: All modes of operation and data rates were investigated, so all RF test requirements shall be executed at low data rates.

2.3. Description of Test Software

The test utility software used during testing was “QRCT”.

Power Parameter Value for $1T_X$ _ Ant 0

Test Mode	Test Frequency (MHz)	Power Parameter Value Ant 0	Test Mode	Test Frequency (MHz)	Power Parameter Value Ant 0
802.11b	2412	9.0	802.11g	2412	12.0
	2442	9.0		2442	12.0
	2472	9.0		2472	12.0
802.11n-HT20	2412	11.5	802.11n-HT40	2422	11.5
	2442	12.0		2442	11.5
	2472	12.0		2462	11.5

Power Parameter Value for $2T_X$ _ Ant 0 + 1

Test Mode	Test Frequency (MHz)	Power Parameter Value Ant 0 + 1	Test Mode	Test Frequency (MHz)	Power Parameter Value Ant 0 + 1
802.11n-HT20	2412	8.5	802.11n-HT40	2422	8.5
	2442	9.0		2442	8.5
	2472	9.0		2462	8.5

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	---
4.3.2.11	Receiver Blocking	Pass	
Adaptive Test Item			
4.3.2.6	Adaptivity	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 an 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 Occupied Channel Bandwidth and Transmitter unwanted emissions in the OOB domain test, only the worst port was performed in the report.			

4. RF Output Power

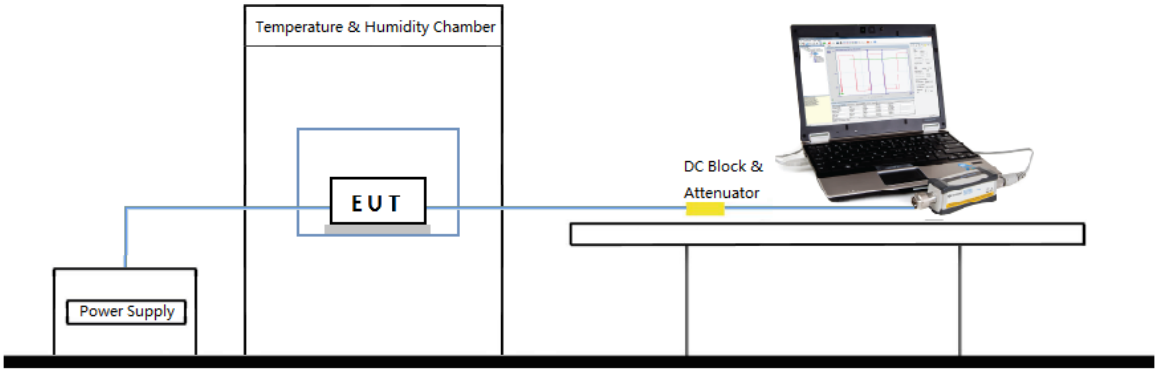
4.1. Limit

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 V2.1.1 (2016-11) Clause 5.4.2.2.1.

4.4. Test Result

Product	Wireless Access Point	Temperature	-20 ~ 55°C
Test Engineer	Lewis Huang	Relative Humidity	45 ~ 56%
Test Site	TR3	Test Date	2017/06/02

Normal Conditions (Temperature 25°C)

1Tx _ Ant 0

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)	E.I.R.P (dBm)	Limit (dBm)	Result
11b	01	2412	9.43	16.43	20	Pass
11b	07	2442	9.35	16.35	20	Pass
11b	13	2472	9.38	16.38	20	Pass
11g	01	2412	12.84	19.84	20	Pass
11g	07	2442	12.46	19.46	20	Pass
11g	13	2472	12.44	19.44	20	Pass
11n-HT20	01	2412	12.36	19.36	20	Pass
11n-HT20	07	2442	12.73	19.73	20	Pass
11n-HT20	13	2472	12.76	19.76	20	Pass
11n-HT40	03	2422	12.46	19.46	20	Pass
11n-HT40	07	2442	12.74	19.74	20	Pass
11n-HT40	11	2462	12.52	19.52	20	Pass

Note 1: E.I.R.P (dBm) = RF Output Power (dBm) + Antenna Gain (dBi).

Note 2: The measurement duration shall be long enough to ensure a minimum number of 10 bursts are captured. And during the test, 12 bursts were captured.

Note 3: During the output power testing, we measured each port separately and each port's worst-case level is based on the same phase.

2Tx _ Ant 0 + 1

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		EIRP (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	01	2412	9.42	9.44	19.44	20	Pass
11n-HT20	07	2442	9.78	9.45	19.63	20	Pass
11n-HT20	13	2472	9.76	9.56	19.67	20	Pass
11n-HT40	03	2422	9.61	9.64	19.64	20	Pass
11n-HT40	07	2442	9.45	9.52	19.50	20	Pass
11n-HT40	11	2462	9.67	9.55	19.62	20	Pass

Note 1: E.I.R.P (dBm) = $10*\log\{10^{\text{Ant 0 RF Output Power }/10}+10^{\text{Ant 1 RF Output Power }/10}\}$ (dBm) + Antenna Gain (dBi).

Note 2: The measurement duration shall be long enough to ensure a minimum number of 10 bursts are captured. And during the test, 12 bursts were captured.

Note 3: During the output power testing, we measured each port separately and each port's worst-case level is based on the same phase.

Extreme Conditions (Temperature -20°C)

1Tx _ Ant 0

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)	E.I.R.P (dBm)	Limit (dBm)	Result
11b	01	2412	9.68	16.68	20	Pass
11b	07	2442	9.48	16.48	20	Pass
11b	13	2472	9.53	16.53	20	Pass
11g	01	2412	12.68	19.68	20	Pass
11g	07	2442	12.71	19.71	20	Pass
11g	13	2472	12.58	19.58	20	Pass
11n-HT20	01	2412	12.57	19.57	20	Pass
11n-HT20	07	2442	12.77	19.77	20	Pass
11n-HT20	13	2472	12.82	19.82	20	Pass
11n-HT40	03	2422	12.65	19.65	20	Pass
11n-HT40	07	2442	12.71	19.71	20	Pass
11n-HT40	11	2462	12.68	19.68	20	Pass

Note 1: E.I.R.P (dBm) = RF Output Power (dBm) + Antenna Gain (dBi).

Note 2: The measurement duration shall be long enough to ensure a minimum number of 10 bursts are captured. And during the test, 12 bursts were captured.

Note 3: During the output power testing, we measured each port separately and each port's worst-case level is based on the same phase.

2Tx _ Ant 0 + 1

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		EIRP (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	01	2412	9.49	9.53	19.52	20	Pass
11n-HT20	07	2442	10.01	9.61	19.82	20	Pass
11n-HT20	13	2472	9.96	9.47	19.73	20	Pass
11n-HT40	03	2422	9.53	9.54	19.55	20	Pass
11n-HT40	07	2442	9.61	9.47	19.55	20	Pass
11n-HT40	11	2462	9.54	9.44	19.50	20	Pass

Note 1: E.I.R.P (dBm) = $10*\log\{10^{\text{Ant 0 RF Output Power }/10}+10^{\text{Ant 1 RF Output Power }/10}\}$ (dBm) + Antenna Gain (dBi).

Note 2: The measurement duration shall be long enough to ensure a minimum number of 10 bursts are captured. And during the test, 12 bursts were captured.

Note 3: During the output power testing, we measured each port separately and each port's worst-case level is based on the same phase.

Extreme Conditions (Temperature 55°C)

1Tx _ Ant 0

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)	E.I.R.P (dBm)	Limit (dBm)	Result
11b	01	2412	9.47	16.47	20	Pass
11b	07	2442	9.37	16.37	20	Pass
11b	13	2472	9.45	16.45	20	Pass
11g	01	2412	12.71	19.71	20	Pass
11g	07	2442	12.67	19.67	20	Pass
11g	13	2472	12.74	19.74	20	Pass
11n-HT20	01	2412	12.23	19.23	20	Pass
11n-HT20	07	2442	12.66	19.66	20	Pass
11n-HT20	13	2472	12.78	19.78	20	Pass
11n-HT40	03	2422	12.37	19.37	20	Pass
11n-HT40	07	2442	12.36	19.36	20	Pass
11n-HT40	11	2462	12.33	19.33	20	Pass

Note 1: E.I.R.P (dBm) = RF Output Power (dBm) + Antenna Gain (dBi).

Note 2: The measurement duration shall be long enough to ensure a minimum number of 10 bursts are captured. And during the test, 12 bursts were captured.

Note 3: During the output power testing, we measured each port separately and each port's worst-case level is based on the same phase.

2Tx _ Ant 0 + 1

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		EIRP (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	01	2412	9.54	9.33	19.45	20	Pass
11n-HT20	07	2442	9.65	9.54	19.61	20	Pass
11n-HT20	13	2472	9.76	9.34	19.57	20	Pass
11n-HT40	03	2422	9.62	9.43	19.54	20	Pass
11n-HT40	07	2442	9.53	9.56	19.56	20	Pass
11n-HT40	11	2462	9.44	9.34	19.40	20	Pass

Note 1: E.I.R.P (dBm) = $10*\log\{10^{\text{Ant 0 RF Output Power }/10}+10^{\text{Ant 1 RF Output Power }/10}\}$ (dBm) + Antenna Gain (dBi).

Note 2: The measurement duration shall be long enough to ensure a minimum number of 10 bursts are captured. And during the test, 12 bursts were captured.

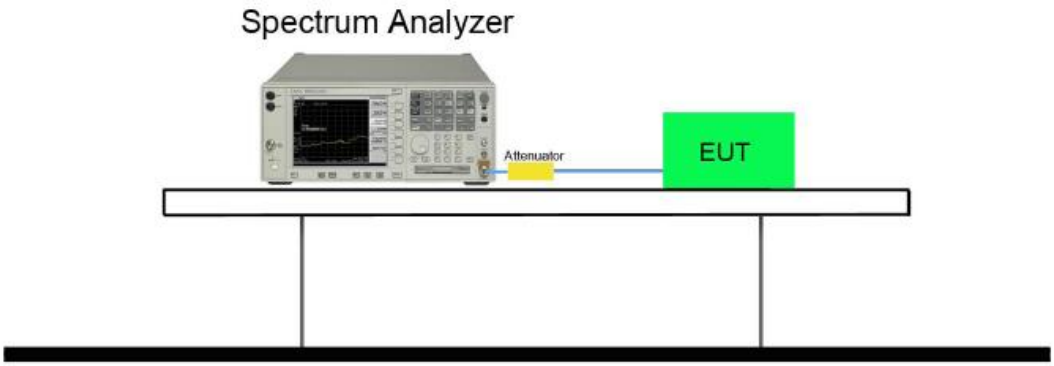
Note 3: During the output power testing, we measured each port separately and each port's worst-case level is based on the same phase.

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 V2.1.1 (2016-11) Clause 5.4.3.2.1 (Option 1).

5.4. Test Result

Product	Wireless Access Point	Temperature	23°C
Test Engineer	Lewis Huang	Relative Humidity	52%
Test Site	TR3	Test Date	2017/06/07

1Tx _ Ant 0

Mode	Ch. No.	Freq. (MHz)	Ant 0 PSD (dBm/MHz)	Limit (dBm/MHz)	Result
11b	01	2412	9.73	10	Pass
11b	07	2442	9.50	10	Pass
11b	13	2472	9.49	10	Pass
11g	01	2412	8.66	10	Pass
11g	07	2442	8.08	10	Pass
11g	13	2472	7.95	10	Pass
11n-HT20	01	2412	7.91	10	Pass
11n-HT20	07	2442	8.17	10	Pass
11n-HT20	13	2472	8.08	10	Pass
11n-HT40	03	2422	5.40	10	Pass
11n-HT40	07	2442	5.41	10	Pass
11n-HT40	11	2462	5.03	10	Pass

2Tx _ Ant 0 + 1

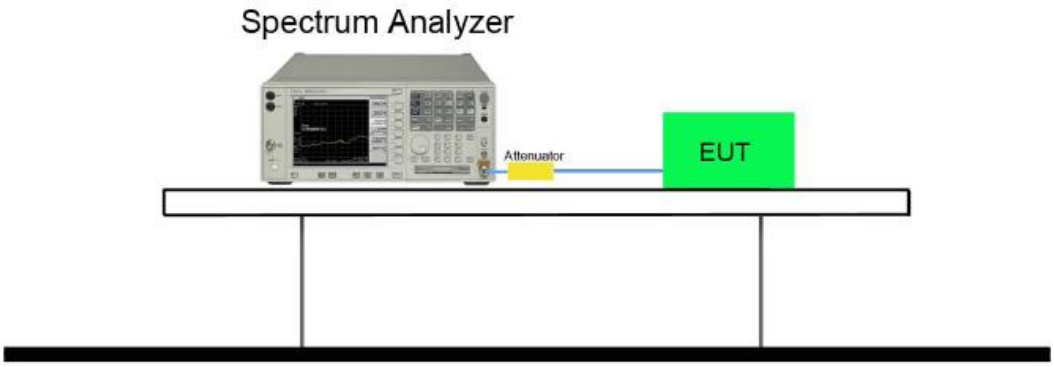
Mode	Ch. No.	Freq. (MHz)	Ant 0 + 1 PSD (dBm/MHz)	Limit (dBm/MHz)	Result
11n-HT20	01	2412	7.56	10	Pass
11n-HT20	07	2442	8.13	10	Pass
11n-HT20	13	2472	7.74	10	Pass
11n-HT40	03	2422	5.06	10	Pass
11n-HT40	07	2442	6.34	10	Pass
11n-HT40	11	2462	6.38	10	Pass

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 V2.1.1 (2016-11) Clause 5.4.2.2.1.3.

6.4. Test Result

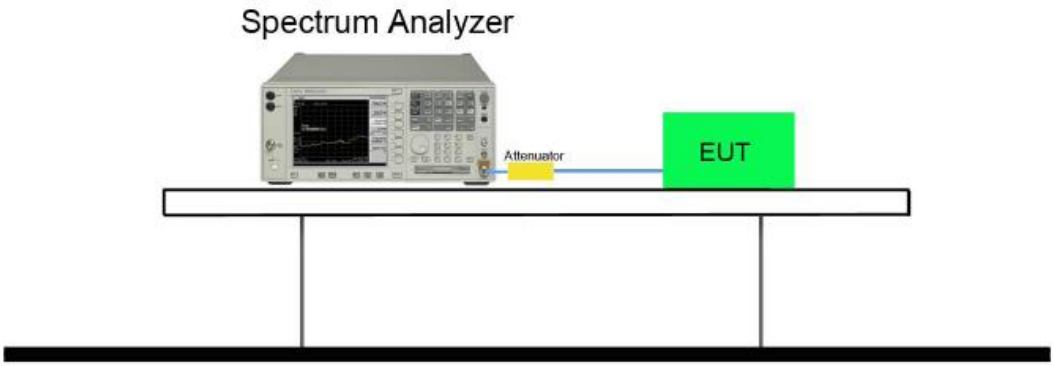
These requirements apply to non-adaptive equipment or to adaptive equipment when operating in a non-adaptive mode. So the item is not applicable.

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 V2.1.1 (2016-11) Clause 5.4.2.2.1.4.

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

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.

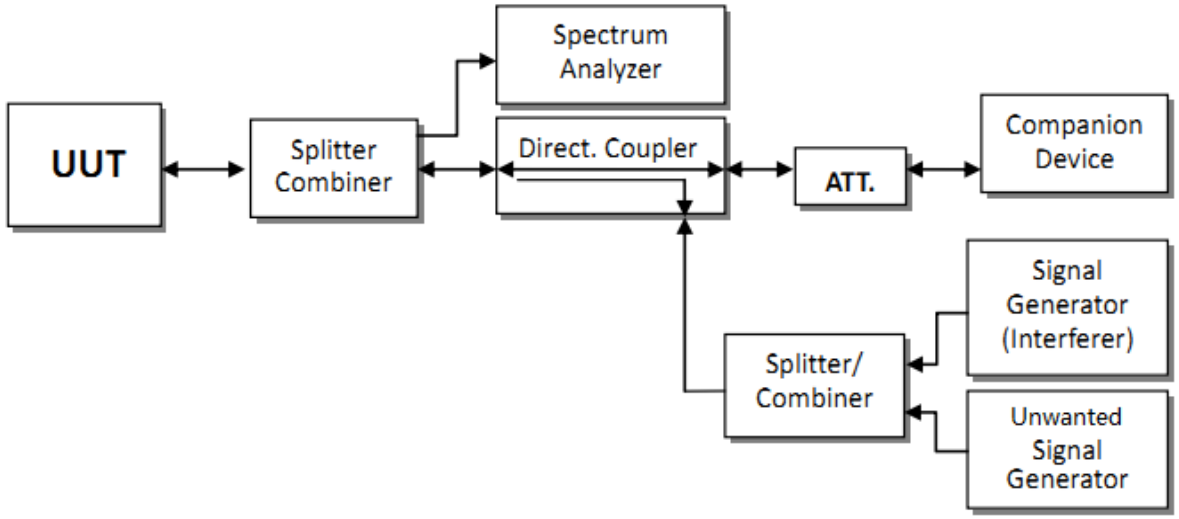
Adaptive equipment shall comply with the requirements in the presence of a unwanted Signal with characteristics as below.

Unwanted Signal parameters			
Wanted signal mean power from companion device	unwanted signal frequency [MHz]	Unwanted Signal power [dBm]	Type of interfering signal
-30dBm	2395 or 2488.5 (see note 1)	-35	CW
NOTE 1: The highest 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: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.			

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

8.2. Test Setup

For conducted measurements

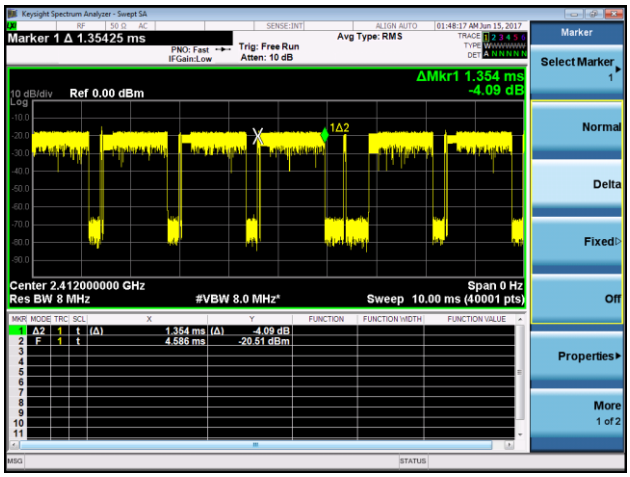
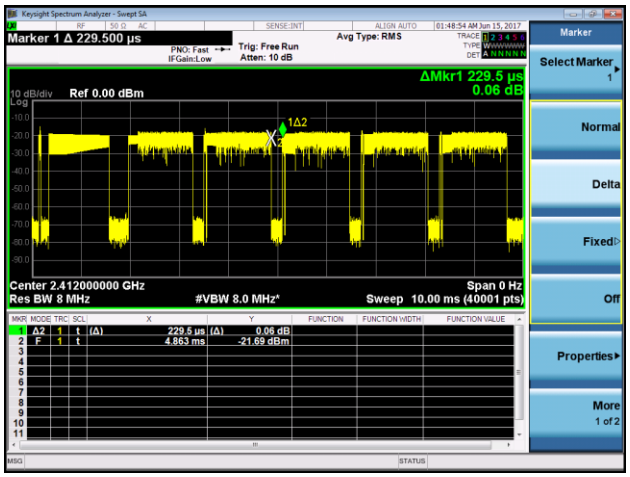
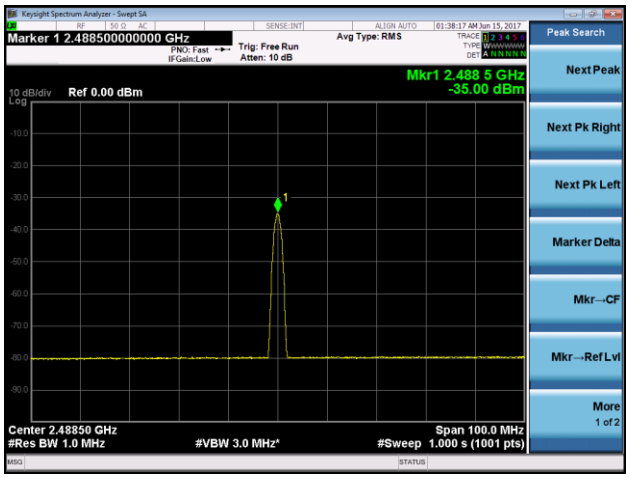


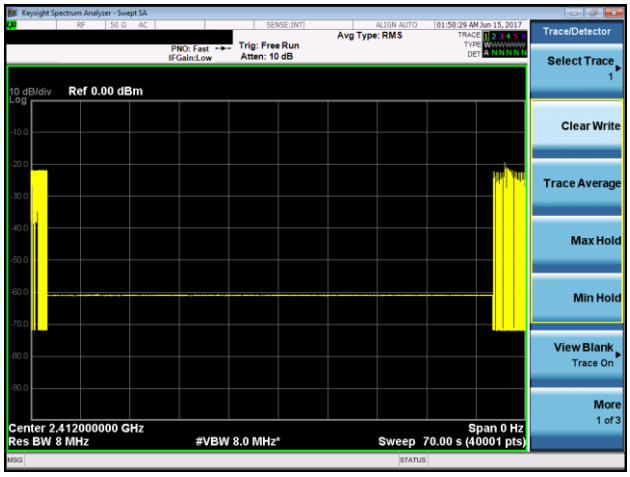
8.3. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.4.6.2.1.

8.4. Test Result

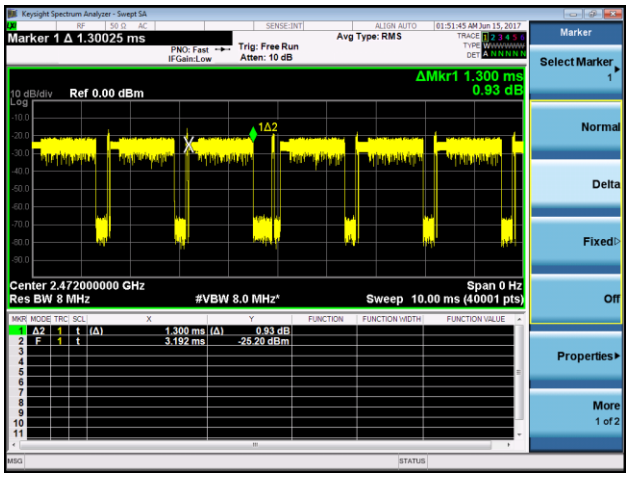
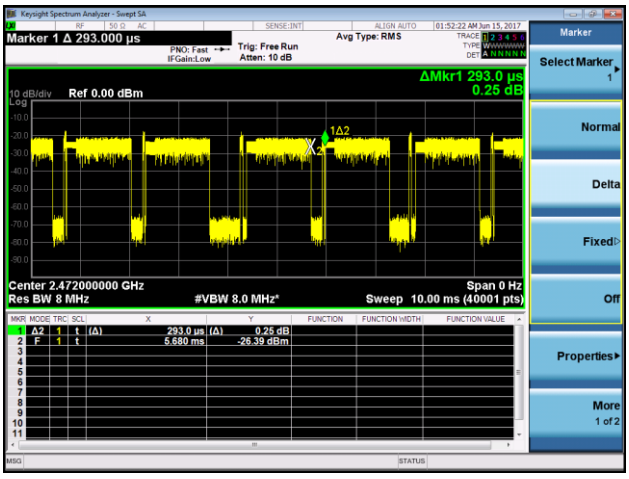
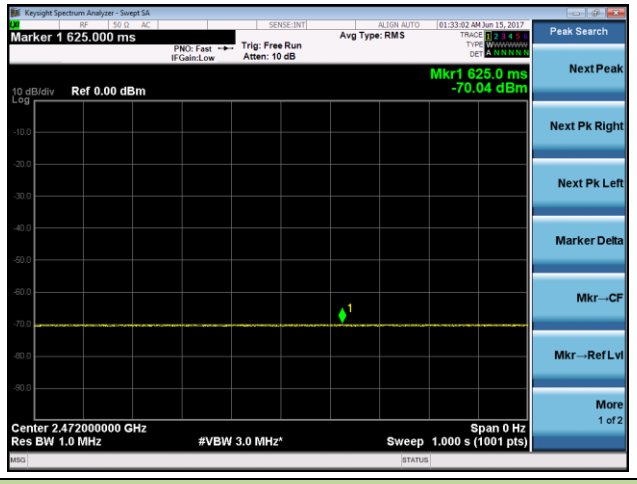
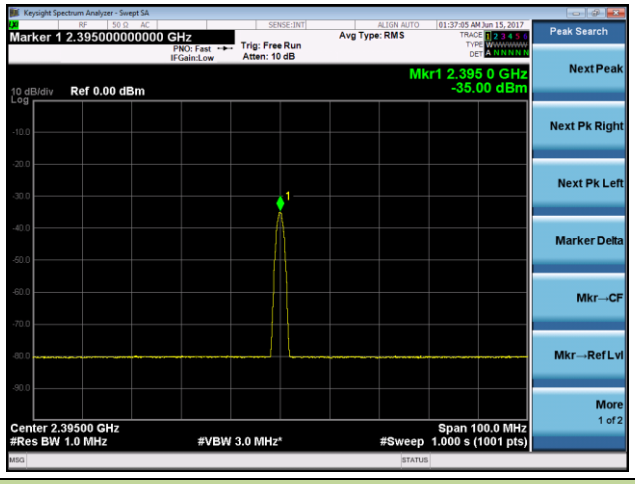
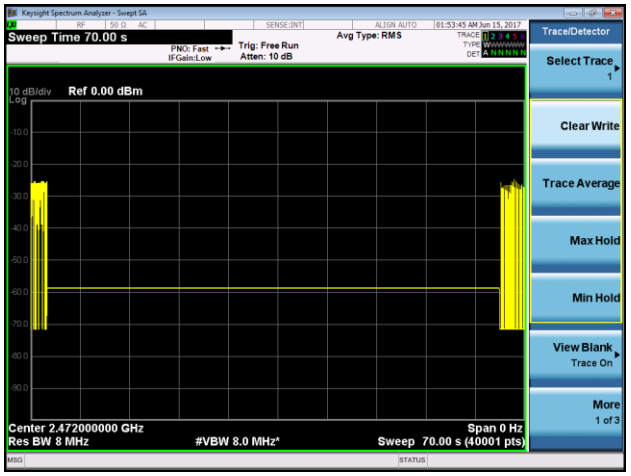
Product	Wireless Access Point	Temperature	20°C
Test Engineer	Andy Zhu	Relative Humidity	52%
Test Site	TR4	Test Date	2017/06/15

802.11b - 2412MHz	
Maximum Channel Occupancy Time = 1.354ms	**Minimum Idle Period = 229.5us**
	
Interference Signal Calibration	**Unwanted 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.	
	

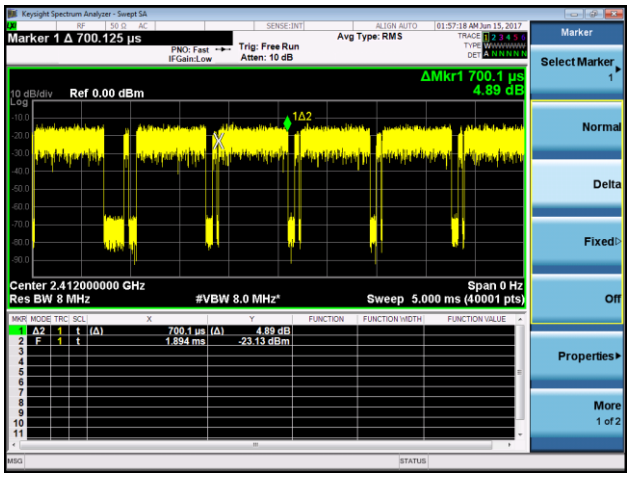
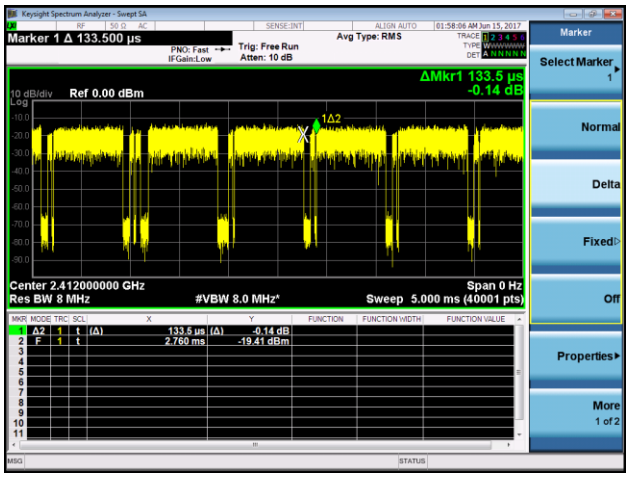
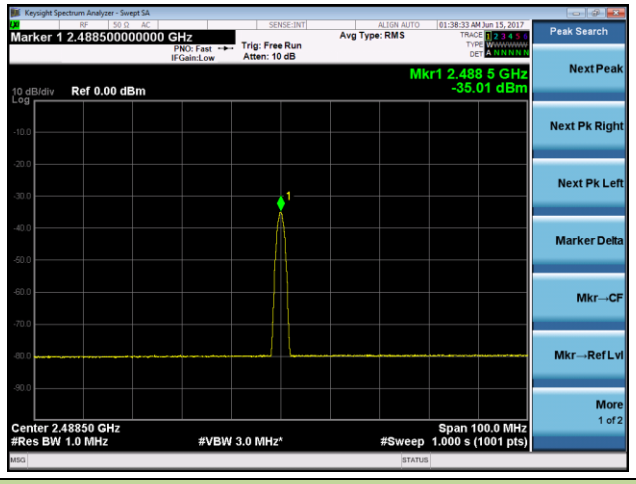
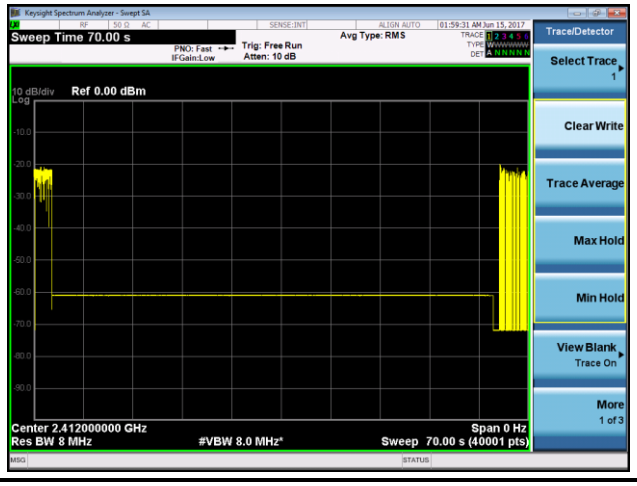
Note: Detection Level = -70 + 10 × log10 (100 mW / P_{out}) (P_{out} in mW e.i.r.p) dBm/MHz ≥ -70 dBm/MHz We used the detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11b - 2472MHz	
Maximum Channel Occupancy Time = 1.300ms	**Minimum Idle Period = 293.0us**
	
Interference Signal Calibration	**Unwanted 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	
	

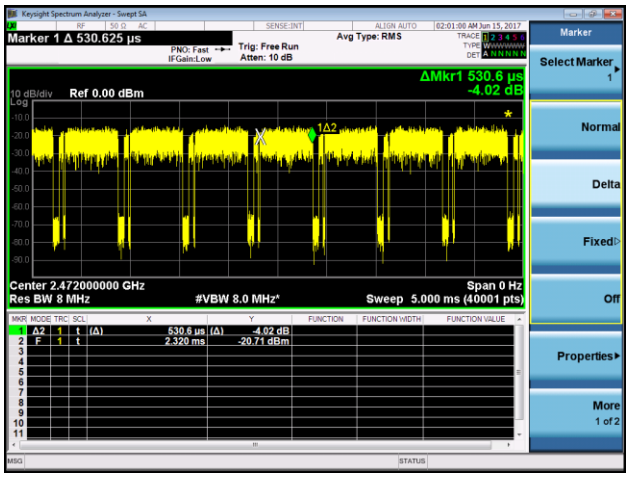
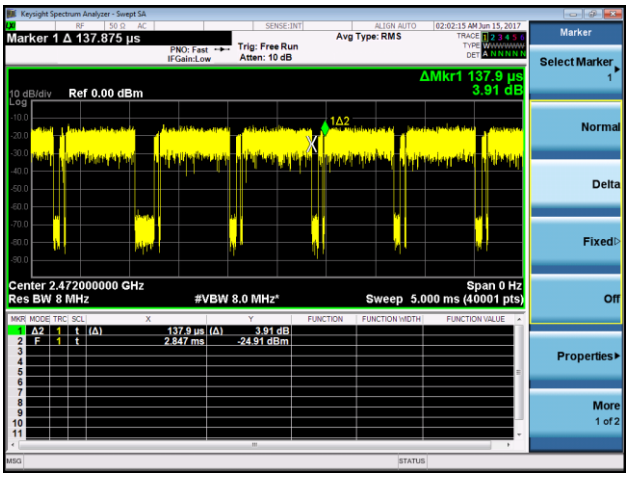
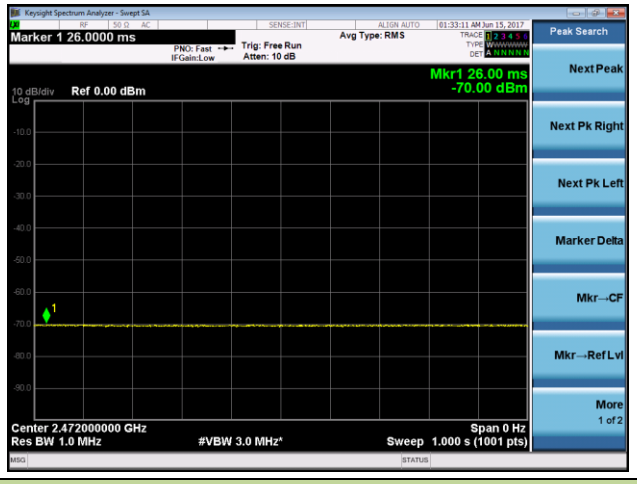
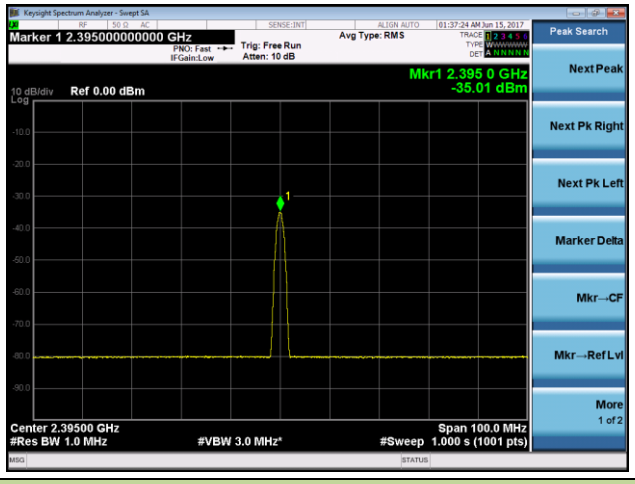
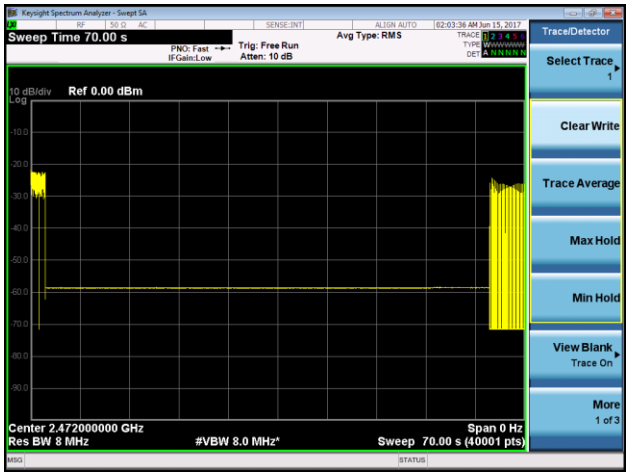
Note: Detection Level = -70 + 10 × log10 (100 mW / P_{out}) (P_{out} in mW e.i.r.p) dBm/MHz ≥ -70 dBm/MHz We used the detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11g - 2412MHz	
Maximum Channel Occupancy Time = 700.1us	**Minimum Idle Period = 133.5us**
	
Interference Signal Calibration	**Unwanted 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.	
	

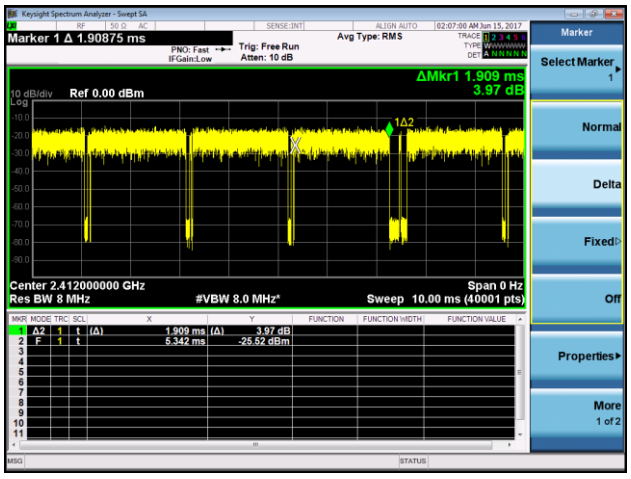
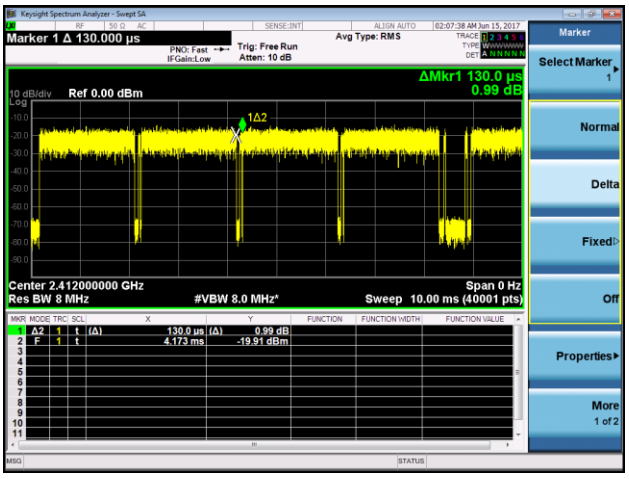
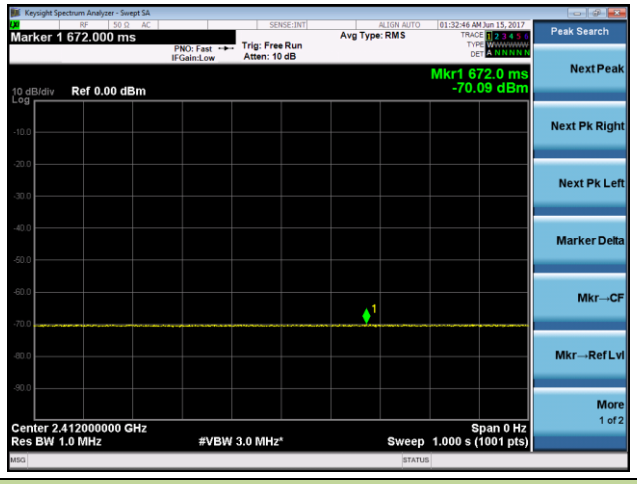
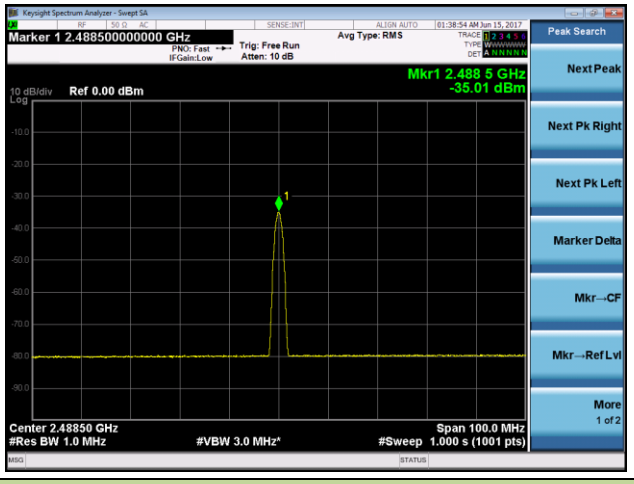
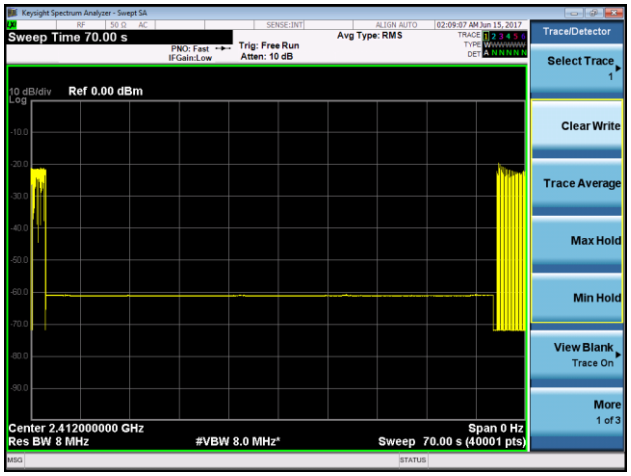
Note: Detection Level = -70 + 10 × log10 (100 mW / P_{out}) (P_{out} in mW e.i.r.p) dBm/MHz ≥ -70 dBm/MHz We used the detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11g - 2472MHz	
Maximum Channel Occupancy Time = 530.6us	**Minimum Idle Period = 137.9us**
	
Interference Signal Calibration	**Unwanted 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	
	

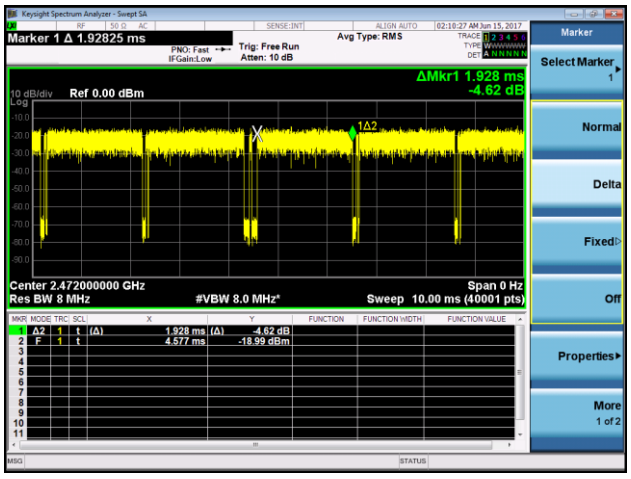
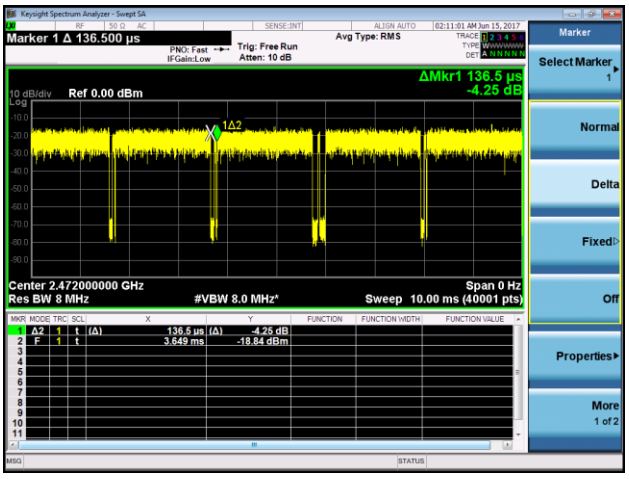
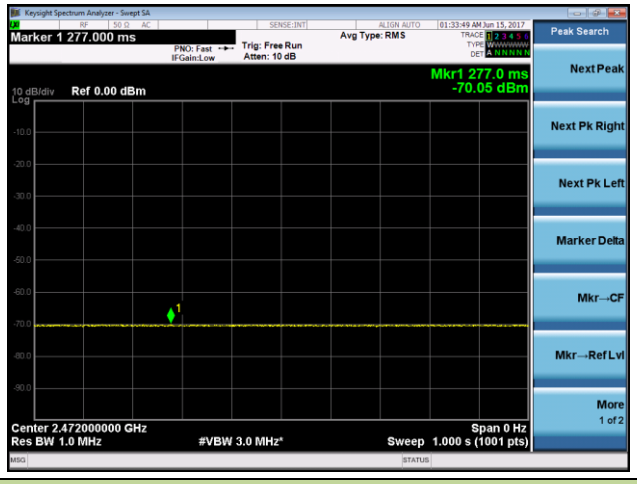
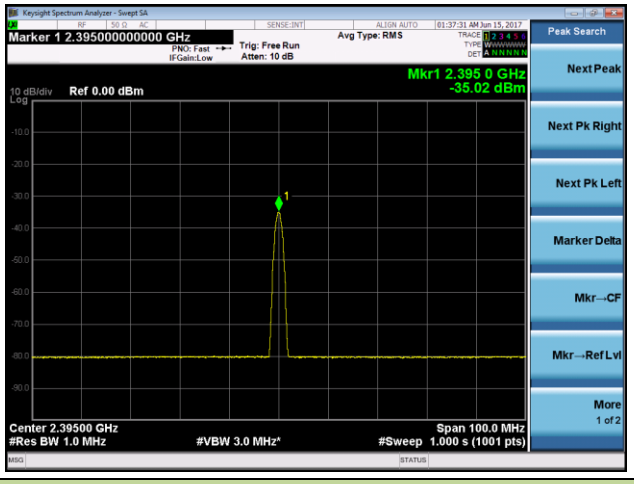
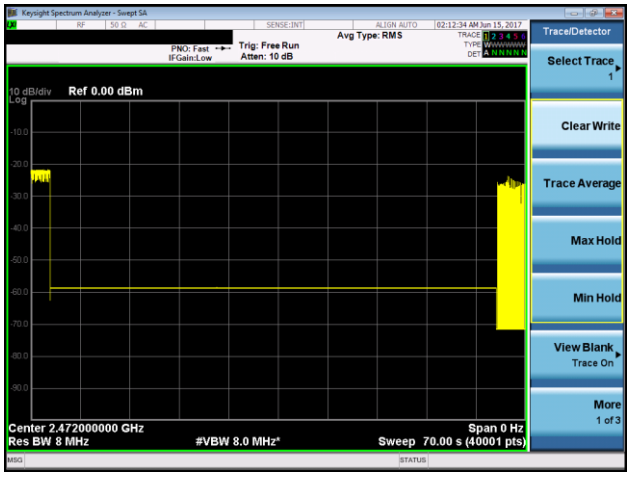
Note: Detection Level = -70 + 10 × log10 (100 mW / P_{out}) (P_{out} in mW e.i.r.p) dBm/MHz ≥ -70 dBm/MHz We used the detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11n-HT20 - 2412MHz	
Maximum Channel Occupancy Time = 1.909ms	**Minimum Idle Period = 130.0us**
	
Interference Signal Calibration	**Unwanted 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	
	

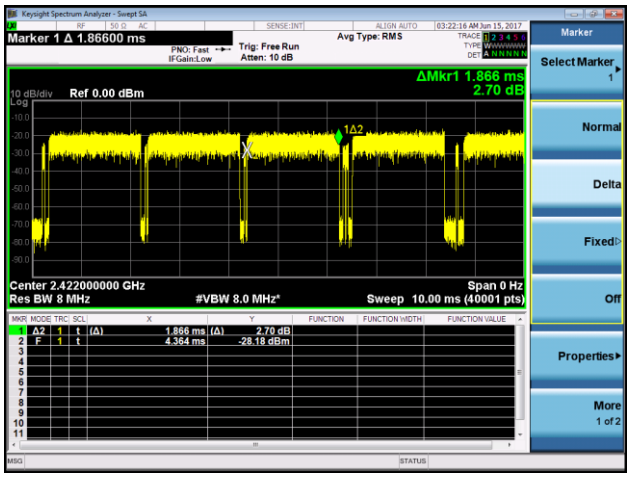
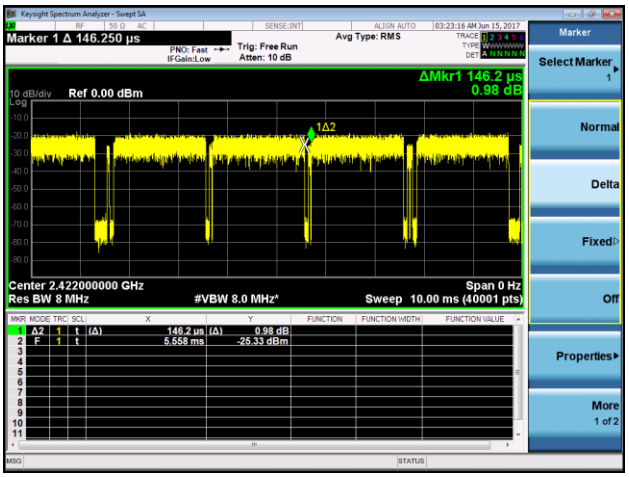
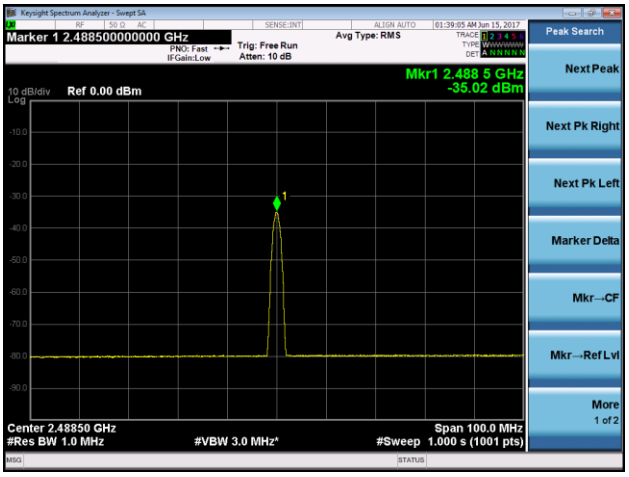
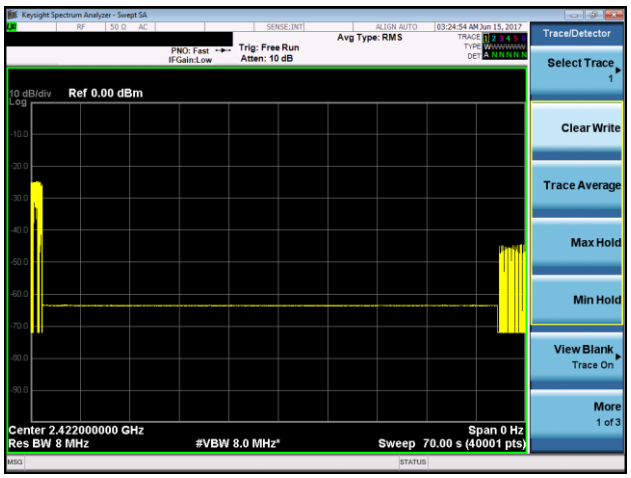
Note: Detection Level = -70 + 10 × log10 (100 mW / P_{out}) (P_{out} in mW e.i.r.p) dBm/MHz ≥ -70 dBm/MHz We used the detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11n-HT20 - 2472MHz	
Maximum Channel Occupancy Time = 1.928ms	**Minimum Idle Period = 136.5us**
	
Interference Signal Calibration	**Unwanted 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	
	

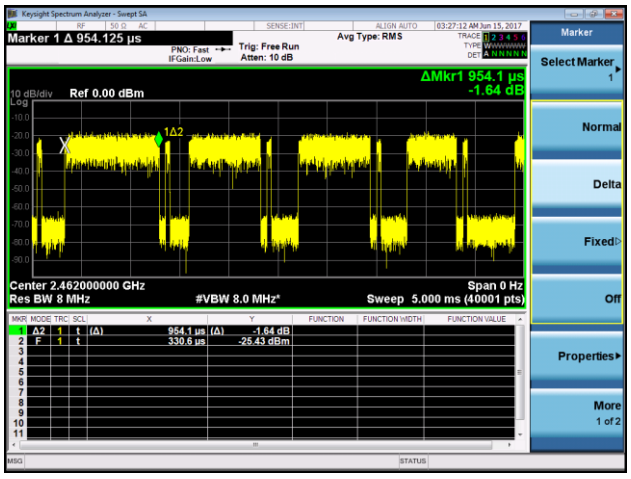
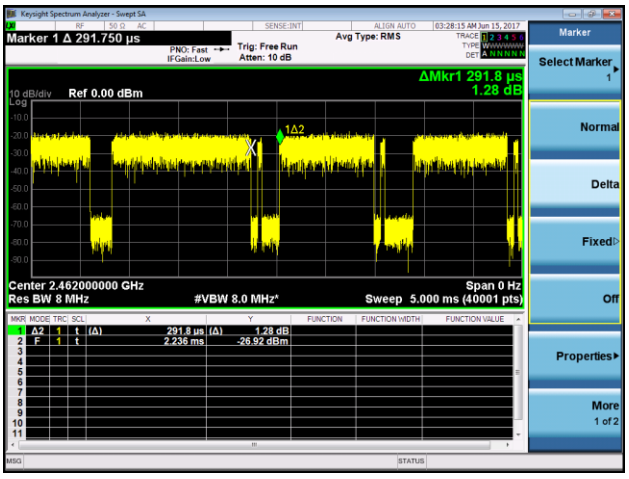
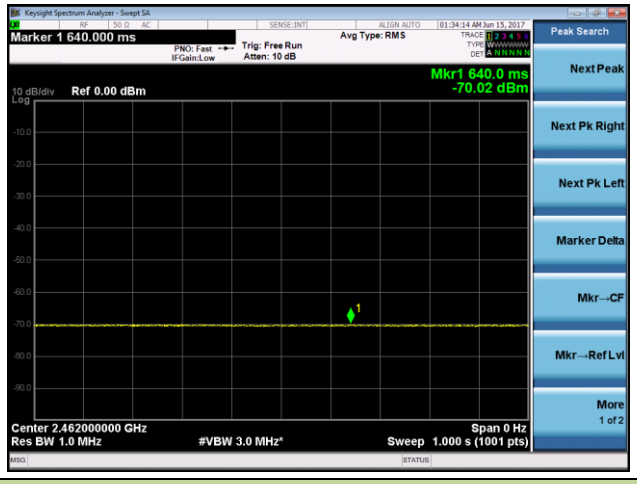
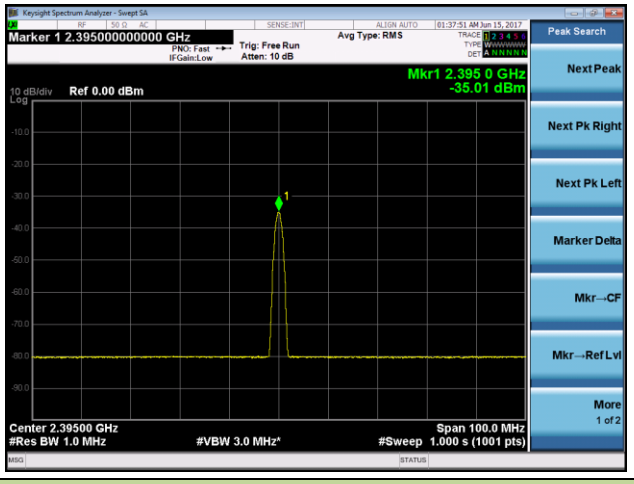
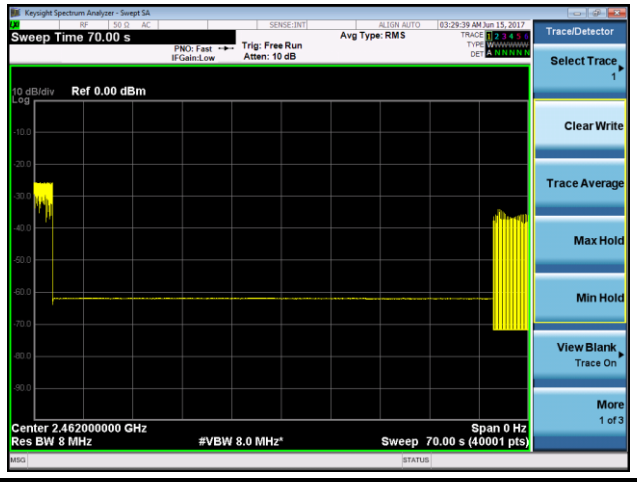
Note: Detection Level = -70 + 10 × log10 (100 mW / P_{out}) (P_{out} in mW e.i.r.p) dBm/MHz ≥ -70 dBm/MHz We used the detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11n-HT40 - 2422MHz	
Maximum Channel Occupancy Time = 1.866ms	**Minimum Idle Period = 146.2us**
	
Interference Signal Calibration	**Unwanted 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 + 10 × log10 (100 mW / P_{out}) (P_{out} in mW e.i.r.p) dBm/MHz ≥ -70 dBm/MHz We used the detection level (-70dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

802.11n-HT40 - 2462MHz	
Maximum Channel Occupancy Time = 954.1us	**Minimum Idle Period = 291.8us**
	
Interference Signal Calibration	**Unwanted 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 + 10 × log10 (100 mW / P_{out}) (P_{out} in mW e.i.r.p) dBm/MHz ≥ -70 dBm/MHz We used the detection level (-70dBm/MHz) to perform adaptivity testing.

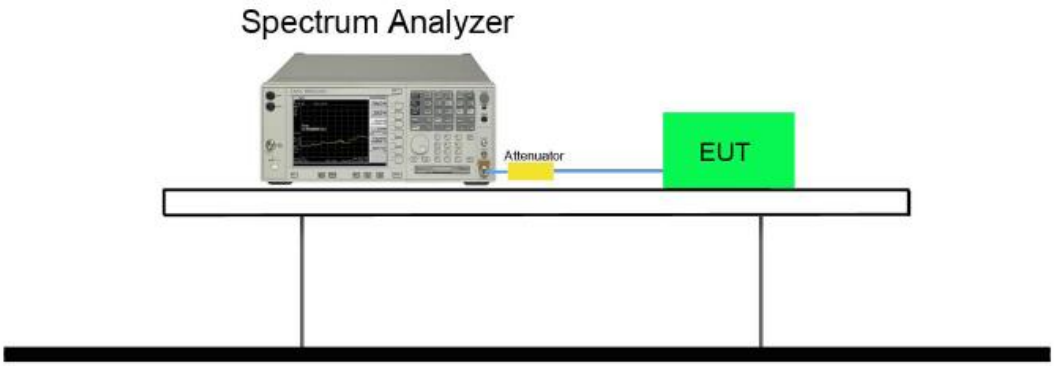
Test Result:	Pass

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 V2.1.1 (2016-11) Clause 5.4.7.2.1.

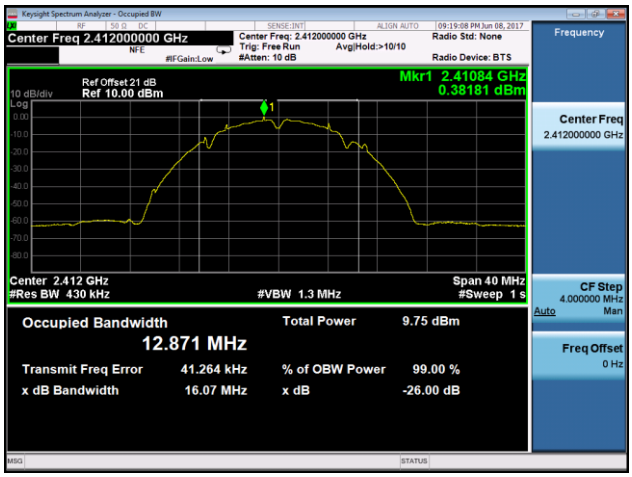
9.4. Test Result

Product	Wireless Access Point	Temperature	25°C
Test Engineer	Lewis Huang	Relative Humidity	54%
Test Site	TR3	Test Date	2017/06/08

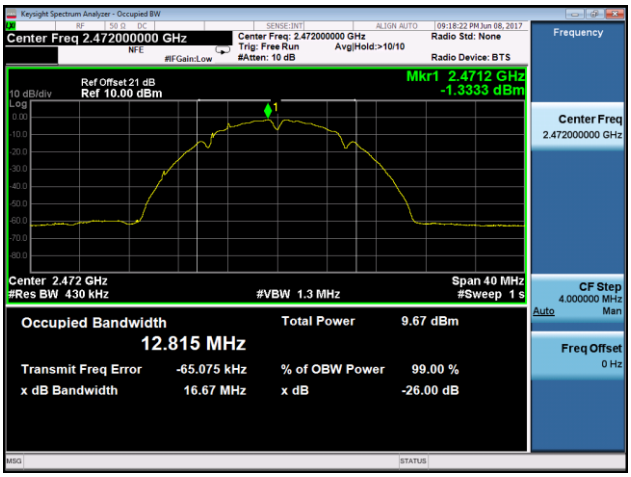
Test Mode	Channel No.	Frequency (MHz)	99% Bandwidth (MHz)	Frequency Range (MHz)	Result
Ant 0					
11b	01	2412	12.87	2405.57	Pass
11b	13	2472	12.82	2478.41	Pass
11g	01	2412	16.52	2403.74	Pass
11g	13	2472	16.53	2480.27	Pass
11n-HT20	01	2412	17.72	2403.14	Pass
11n-HT20	13	2472	17.73	2480.87	Pass
11n-HT40	03	2422	36.09	2403.96	Pass
11n-HT40	11	2462	36.11	2480.06	Pass
Ant 0 / Ant 0 + 1					
11n-HT20	01	2412	17.74	2403.13	Pass
11n-HT20	13	2472	17.73	2480.87	Pass
11n-HT40	03	2422	36.11	2403.95	Pass
11n-HT40	11	2462	36.06	2480.03	Pass

802.11b Occupied Channel Bandwidth - Ant 0

Channel 01 (2412MHz)

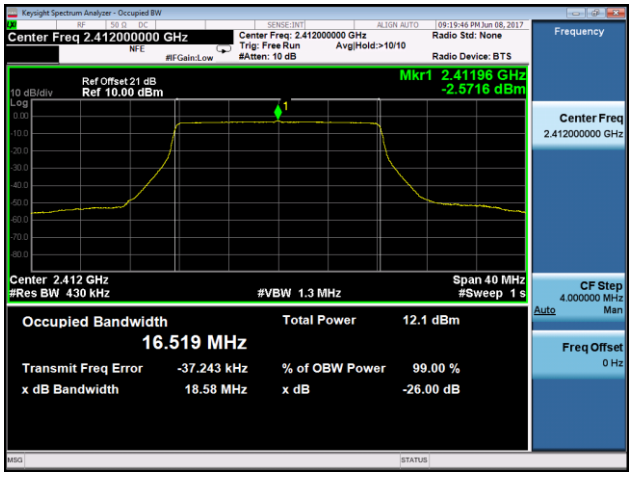


Channel 13 (2472MHz)

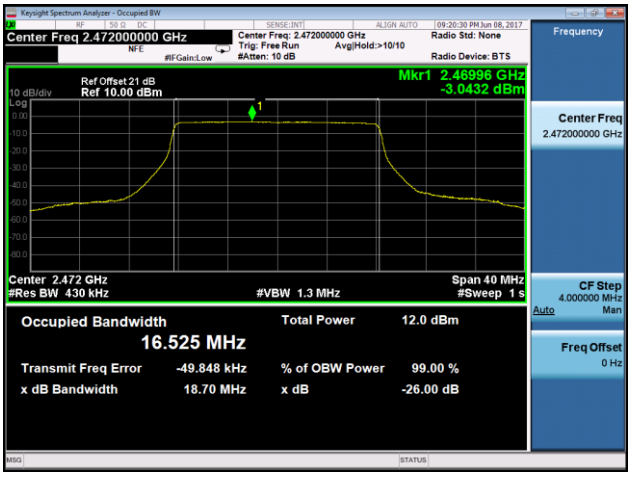


802.11g Occupied Channel Bandwidth - Ant 0

Channel 01 (2412MHz)

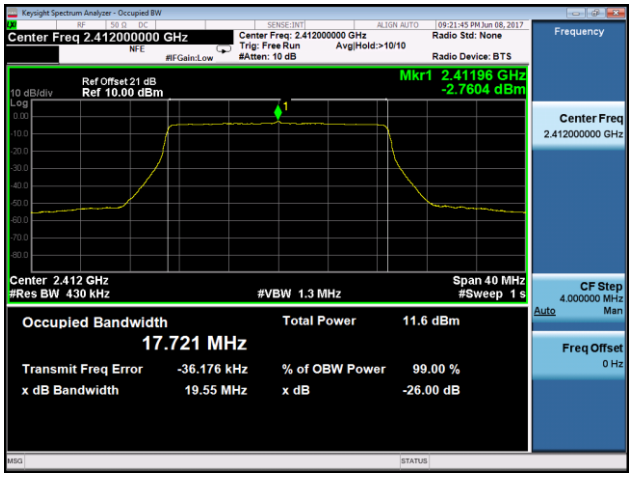


Channel 13 (2472MHz)

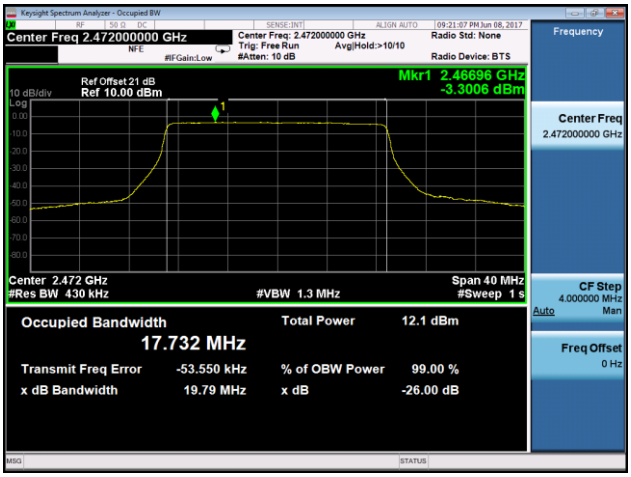


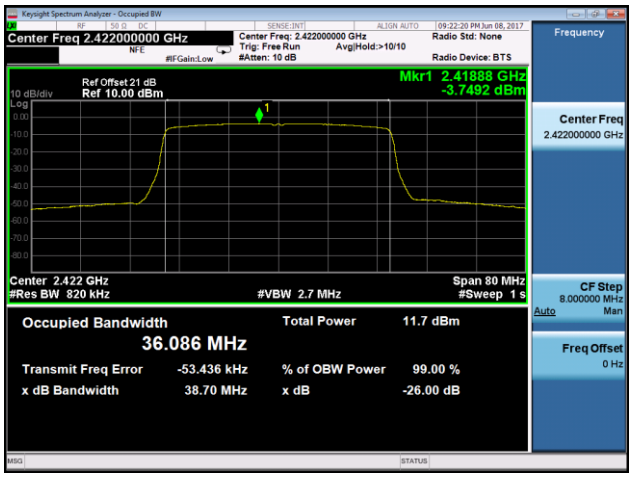
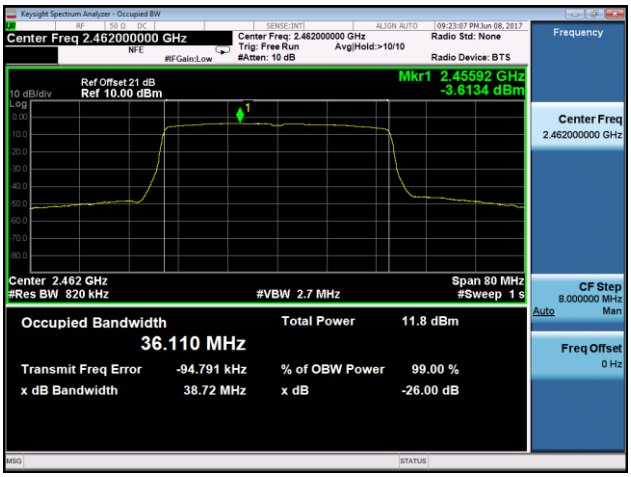
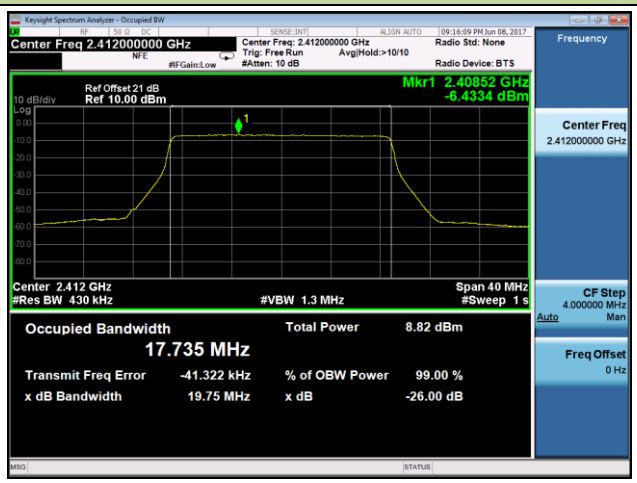
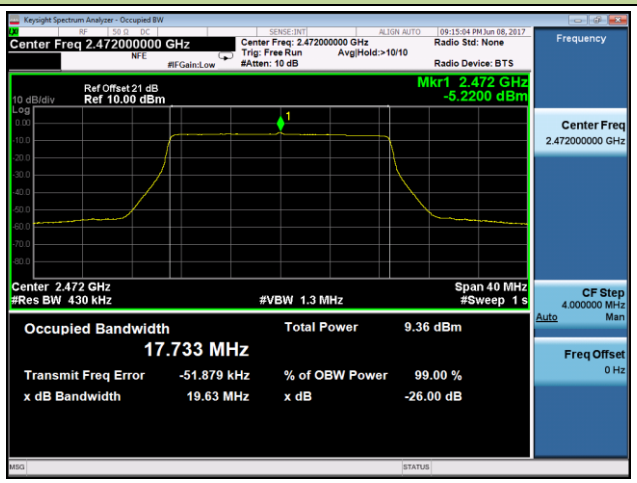
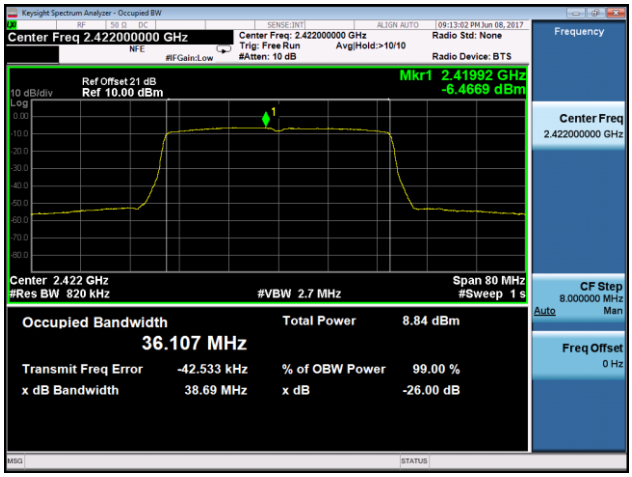
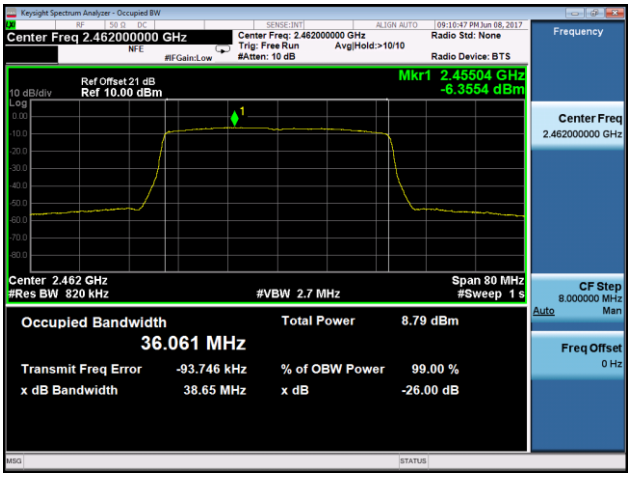
802.11n-HT20 Occupied Channel Bandwidth - Ant 0

Channel 01 (2412MHz)



Channel 13 (2472MHz)

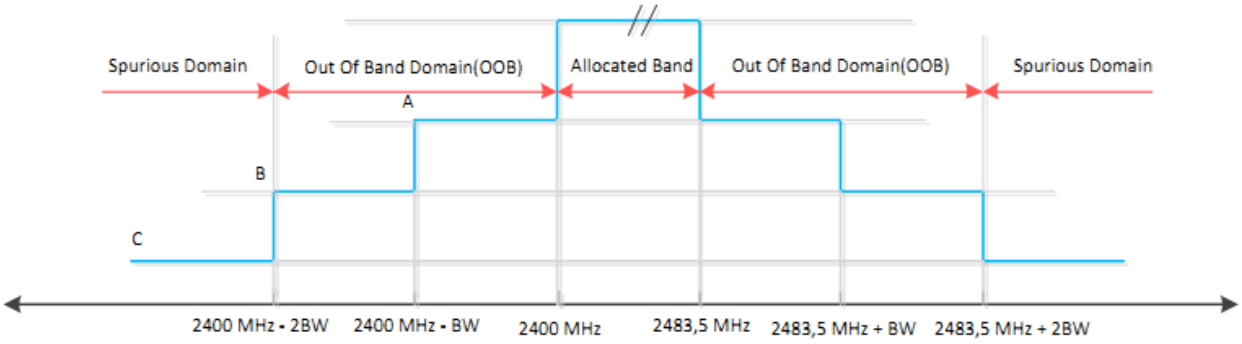


802.11n-HT40 Occupied Channel Bandwidth - Ant 0	
Channel 03 (2422MHz)	Channel 11 (2462MHz)
	
802.11n-HT20 Occupied Channel Bandwidth - Ant 0 / Ant 0 + 1	
Channel 01 (2412MHz)	Channel 13 (2472MHz)
	
802.11n-HT40 Occupied Channel Bandwidth - Ant 0 / Ant 0 + 1	
Channel 03 (2422MHz)	Channel 11 (2462MHz)
	

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 as below.



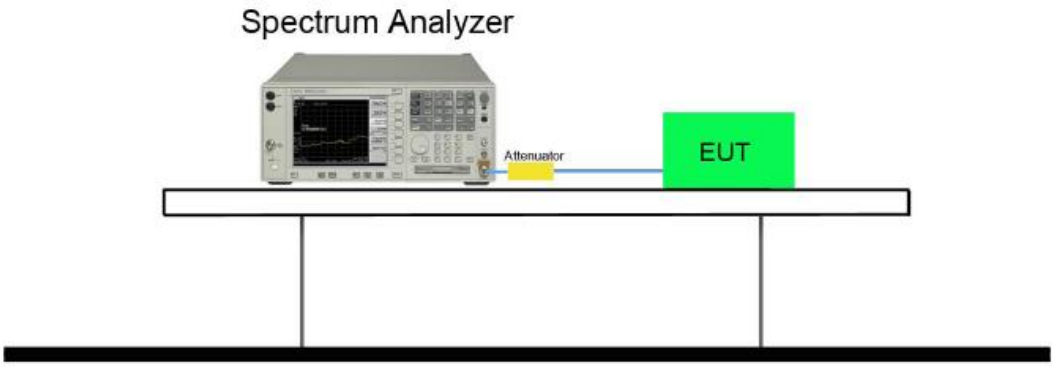
A: -10 dBm/MHz e.i.r.p.
B: -20 dBm/MHz e.i.r.p.
C: Spurious Domain limits

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 V2.1.1 (2016-11) Clause 5.4.8.2.1.

10.4. Test Result

Product	Wireless Access Point	Temperature	25°C
Test Engineer	Lewis Huang	Relative Humidity	54%
Test Site	TR3	Test Date	2017/06/08

1Tx _ Ant 0

Test Mode	Ch. No.	Freq. Range (MHz)	Worst Level (dBm/MHz)	Final Worst Level (dBm/MHz)	Limit (dBm/MHz)	Result
11b	01	2400-BW ~ 2400-2BW	-66.26	-59.26	-20	Pass
		2483.5+2BW ~ 2483.5+BW	-58.77	-51.77	-10	Pass
	13	2400-BW ~ 2400-2BW	-61.97	-54.97	-10	Pass
		2483.5+2BW ~ 2483.5+BW	-66.49	-59.49	-20	Pass
11g	01	2400-BW ~ 2400-2BW	-55.82	-48.82	-20	Pass
		2483.5+2BW ~ 2483.5+BW	-47.56	-40.56	-10	Pass
	13	2400-BW ~ 2400-2BW	-40.84	-33.84	-10	Pass
		2483.5+2BW ~ 2483.5+BW	-57.38	-50.38	-20	Pass
11n-HT20	01	2400-BW ~ 2400-2BW	-55.80	-48.80	-20	Pass
		2483.5+2BW ~ 2483.5+BW	-46.50	-39.50	-10	Pass
	13	2400-BW ~ 2400-2BW	-40.74	-33.74	-10	Pass
		2483.5+2BW ~ 2483.5+BW	-57.52	-50.52	-20	Pass
11n-HT40	03	2400-BW ~ 2400-2BW	-56.27	-49.27	-20	Pass
		2483.5+2BW ~ 2483.5+BW	-48.21	-41.21	-10	Pass
	11	2400-BW ~ 2400-2BW	-43.74	-36.74	-10	Pass
		2483.5+2BW ~ 2483.5+BW	-57.87	-50.87	-20	Pass

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

2Tx _ Ant 0 + 1

Test Mode	Ch. No.	Freq. Range (MHz)	Worst Level (dBm/MHz)		Total Worst Level (dBm/MHz)	Limit (dBm/MHz)	Result
			Ant 0	Ant 1			
11n-HT20	01	2400-BW ~ 2400-2BW	-58.42	-58.81	-48.60	-20	Pass
		2483.5+2BW ~ 2483.5+BW	-49.77	-49.43	-39.59	-10	Pass
	13	2400-BW ~ 2400-2BW	-46.59	-46.93	-36.75	-10	Pass
		2483.5+2BW ~ 2483.5+BW	-58.01	-58.16	-48.07	-20	Pass
11n-HT40	03	2400-BW ~ 2400-2BW	-57.45	-58.22	-47.81	-20	Pass
		2483.5+2BW ~ 2483.5+BW	-50.21	-50.54	-40.36	-10	Pass
	11	2400-BW ~ 2400-2BW	-52.55	-52.77	-42.65	-10	Pass
		2483.5+2BW ~ 2483.5+BW	-58.44	-58.13	-48.27	-20	Pass

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

11. Transmitter Unwanted Emissions in the Spurious Domain

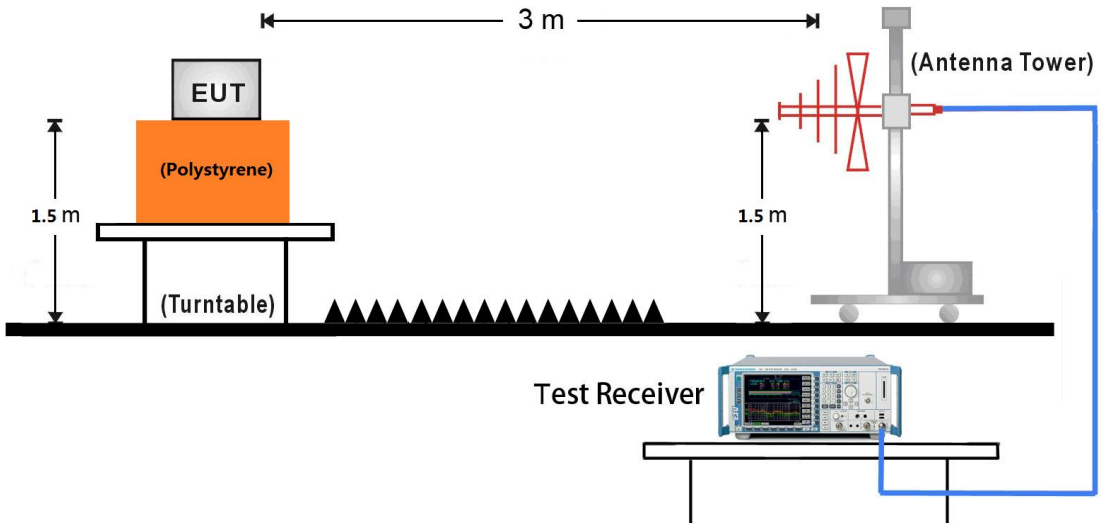
11.1. Limit

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

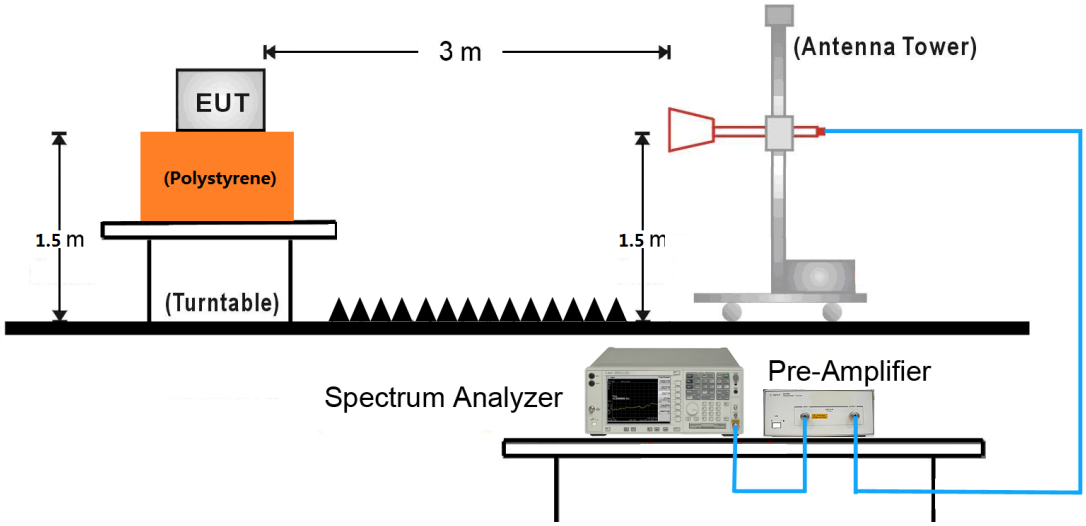
Note: These limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz.

11.2. Test Setup

30MHz ~ 1GHz Test Setup:



1GHz ~ 12.75GHz Test Setup:



11.3. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.4.9.2.2.

11.4. Test Result

Test Engineer	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11b - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	104.7	-89.2	15.2	-74.0	-54.0	-20.0	PK	Horizontal
	220.6	-94.0	26.1	-67.9	-54.0	-13.9	PK	Horizontal
	111.5	-97.6	29.3	-68.3	-54.0	-14.3	PK	Vertical
	740.0	-97.6	35.3	-62.3	-54.0	-8.3	PK	Vertical
	3214.9	-66.8	13.8	-53.0	-30.0	-23.0	PK	Horizontal
	7321.5	-70.6	24.5	-46.1	-30.0	-16.1	PK	Horizontal
	3214.9	-54.2	14.2	-40.0	-30.0	-10.0	PK	Vertical
	6252.3	-68.4	20.6	-47.8	-30.0	-17.8	PK	Vertical
13	104.7	-89.5	15.2	-74.3	-54.0	-20.3	PK	Horizontal
	220.1	-94.4	26.2	-68.2	-54.0	-14.2	PK	Horizontal
	111.5	-98.8	29.3	-69.5	-54.0	-15.5	PK	Vertical
	740.5	-97.8	35.3	-62.5	-54.0	-8.5	PK	Vertical
	4718.9	-70.3	17.9	-52.4	-30.0	-22.4	PK	Horizontal
	7309.8	-71.1	24.1	-47.0	-30.0	-17.0	PK	Horizontal
	3297.1	-60.6	14.1	-46.5	-30.0	-16.5	PK	Vertical
	6252.3	-68.9	20.6	-48.3	-30.0	-18.3	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11g - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	104.7	-89.9	15.2	-74.7	-54.0	-20.7	PK	Horizontal
	220.1	-94.1	26.2	-67.9	-54.0	-13.9	PK	Horizontal
	112.0	-98.9	29.2	-69.7	-54.0	-15.7	PK	Vertical
	743.9	-97.1	35.3	-61.8	-54.0	-7.8	PK	Vertical
	3214.9	-62.4	13.8	-48.6	-30.0	-18.6	PK	Horizontal
	8038.3	-71.2	25.9	-45.3	-30.0	-15.3	PK	Horizontal
	3216.0	-51.9	14.2	-37.7	-30.0	-7.7	RMS	Vertical
	9465.9	-70.6	29.2	-41.4	-30.0	-11.4	PK	Vertical
13	220.6	-93.4	26.1	-67.3	-54.0	-13.3	PK	Horizontal
	743.9	-97.4	35.4	-62.0	-54.0	-8.0	PK	Horizontal
	111.5	-98.4	29.3	-69.1	-54.0	-15.1	PK	Vertical
	744.4	-97.8	35.4	-62.4	-54.0	-8.4	PK	Vertical
	3297.1	-65.7	14.0	-51.7	-30.0	-21.7	PK	Horizontal
	7245.1	-71.7	23.9	-47.8	-30.0	-17.8	PK	Horizontal
	3297.1	-58.4	14.1	-44.3	-30.0	-14.3	PK	Vertical
	7268.6	-71.4	24.5	-46.9	-30.0	-16.9	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11n-HT20 - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	104.7	-89.5	15.2	-74.3	-54.0	-20.3	PK	Horizontal
	220.1	-93.9	26.2	-67.7	-54.0	-13.7	PK	Horizontal
	110.5	-97.3	29.2	-68.1	-54.0	-14.1	PK	Vertical
	742.5	-97.3	35.3	-62.0	-54.0	-8.0	PK	Vertical
	3214.9	-64.2	13.8	-50.4	-30.0	-20.4	PK	Horizontal
	7010.1	-70.6	23.4	-47.2	-30.0	-17.2	PK	Horizontal
	3214.5	-52.1	14.2	-37.9	-30.0	-7.9	PK	Vertical
	7215.8	-71.4	24.1	-47.3	-30.0	-17.3	PK	Vertical
13	220.1	-93.9	26.2	-67.7	-54.0	-13.7	PK	Horizontal
	743.9	-97.4	35.4	-62.0	-54.0	-8.0	PK	Horizontal
	111.0	-98.0	29.3	-68.7	-54.0	-14.7	PK	Vertical
	742.5	-97.1	35.3	-61.8	-54.0	-7.8	PK	Vertical
	3297.1	-66.5	14.0	-52.5	-30.0	-22.5	PK	Horizontal
	7239.3	-70.5	23.9	-46.6	-30.0	-16.6	PK	Horizontal
	3297.1	-58.6	14.1	-44.5	-30.0	-14.5	PK	Vertical
	6252.3	-69.5	20.6	-48.9	-30.0	-18.9	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11n-HT40 - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	220.1	-94.0	26.2	-67.8	-54.0	-13.8	PK	Horizontal
	739.6	-97.2	35.3	-61.9	-54.0	-7.9	PK	Horizontal
	110.5	-96.4	29.2	-67.2	-54.0	-13.2	PK	Vertical
	743.4	-97.2	35.3	-61.9	-54.0	-7.9	PK	Vertical
	3214.9	-63.2	13.8	-49.4	-30.0	-19.4	PK	Horizontal
	7168.8	-72.6	24.5	-48.1	-30.0	-18.1	PK	Horizontal
	3214.9	-51.5	14.2	-37.3	-30.0	-7.3	PK	Vertical
	8713.9	-70.9	27.2	-43.7	-30.0	-13.7	PK	Vertical
11	220.1	-94.6	26.2	-68.4	-54.0	-14.4	PK	Horizontal
	757.0	-98.7	36.1	-62.6	-54.0	-8.6	PK	Horizontal
	110.0	-98.4	29.1	-69.3	-54.0	-15.3	PK	Vertical
	741.0	-97.6	35.3	-62.3	-54.0	-8.3	PK	Vertical
	3285.4	-64.8	14.1	-50.7	-30.0	-20.7	PK	Horizontal
	9465.9	-70.9	29.2	-41.7	-30.0	-11.7	PK	Horizontal
	3285.4	-56.9	14.3	-42.6	-30.0	-12.6	PK	Vertical
	9648.0	-72.8	30.0	-42.8	-30.0	-12.8	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11n-HT20 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	220.1	-95.5	26.2	-69.3	-54.0	-15.3	PK	Horizontal
	736.2	-98.5	35.1	-63.4	-54.0	-9.4	PK	Horizontal
	110.5	-97.0	29.2	-67.8	-54.0	-13.8	PK	Vertical
	740.5	-98.4	35.3	-63.1	-54.0	-9.1	PK	Vertical
	3214.9	-61.6	13.8	-47.8	-30.0	-17.8	PK	Horizontal
	7533.0	-70.7	24.2	-46.5	-30.0	-16.5	PK	Horizontal
	3214.9	-50.4	14.2	-36.2	-30.0	-6.2	PK	Vertical
	9477.6	-72.1	29.2	-42.9	-30.0	-12.9	PK	Vertical
13	220.1	-96.0	26.2	-69.8	-54.0	-15.8	PK	Horizontal
	746.3	-98.1	35.5	-62.6	-54.0	-8.6	PK	Horizontal
	111.5	-98.4	29.3	-69.1	-54.0	-15.1	PK	Vertical
	740.5	-98.8	35.3	-63.5	-54.0	-9.5	PK	Vertical
	3297.1	-66.6	14.0	-52.6	-30.0	-22.6	PK	Horizontal
	9642.1	-72.4	29.7	-42.7	-30.0	-12.7	PK	Horizontal
	3297.1	-58.5	14.1	-44.4	-30.0	-14.4	PK	Vertical
	7268.6	-71.0	24.5	-46.5	-30.0	-16.5	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11n-HT40 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	220.1	-95.8	26.2	-69.6	-54.0	-15.6	PK	Horizontal
	745.4	-98.5	35.5	-63.0	-54.0	-9.0	PK	Horizontal
	111.5	-97.9	29.3	-68.6	-54.0	-14.6	PK	Vertical
	739.6	-97.9	35.3	-62.6	-54.0	-8.6	PK	Vertical
	3214.9	-62.4	13.8	-48.6	-30.0	-18.6	PK	Horizontal
	9418.9	-70.9	29.8	-41.1	-30.0	-11.1	PK	Horizontal
	3214.9	-50.5	14.2	-36.3	-30.0	-6.3	PK	Vertical
	9424.8	-72.5	29.4	-43.1	-30.0	-13.1	PK	Vertical
11	218.7	-94.9	25.9	-69.0	-54.0	-15.0	PK	Horizontal
	739.1	-98.6	35.3	-63.3	-54.0	-9.3	PK	Horizontal
	104.2	-95.6	26.2	-69.4	-54.0	-15.4	PK	Vertical
	742.0	-97.6	35.3	-62.3	-54.0	-8.3	PK	Vertical
	3285.4	-67.6	14.1	-53.5	-30.0	-23.5	PK	Horizontal
	9430.6	-72.3	29.5	-42.8	-30.0	-12.8	PK	Horizontal
	3285.4	-56.8	14.3	-42.5	-30.0	-12.5	PK	Vertical
	9454.1	-71.6	29.4	-42.2	-30.0	-12.2	PK	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

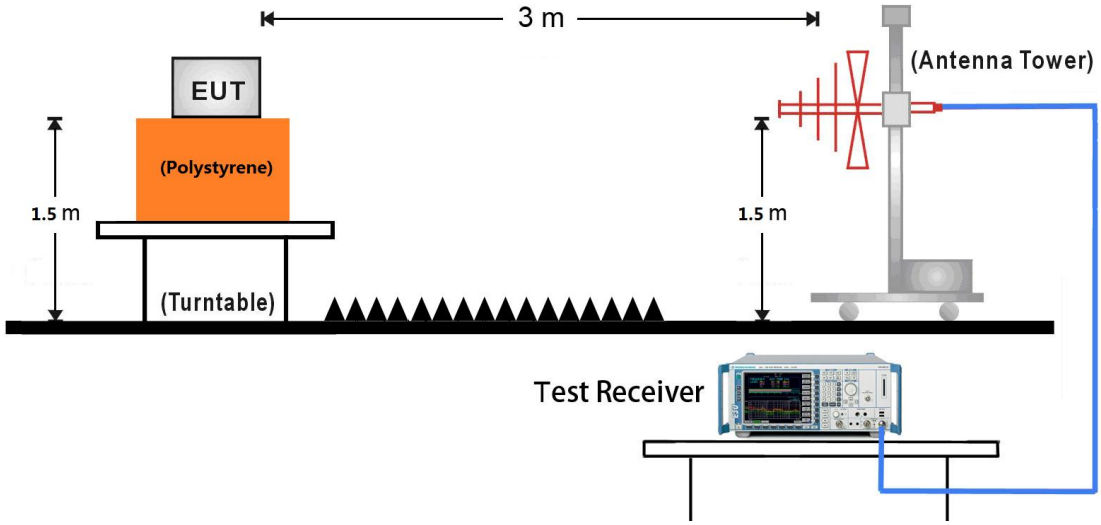
12.1. Limit

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

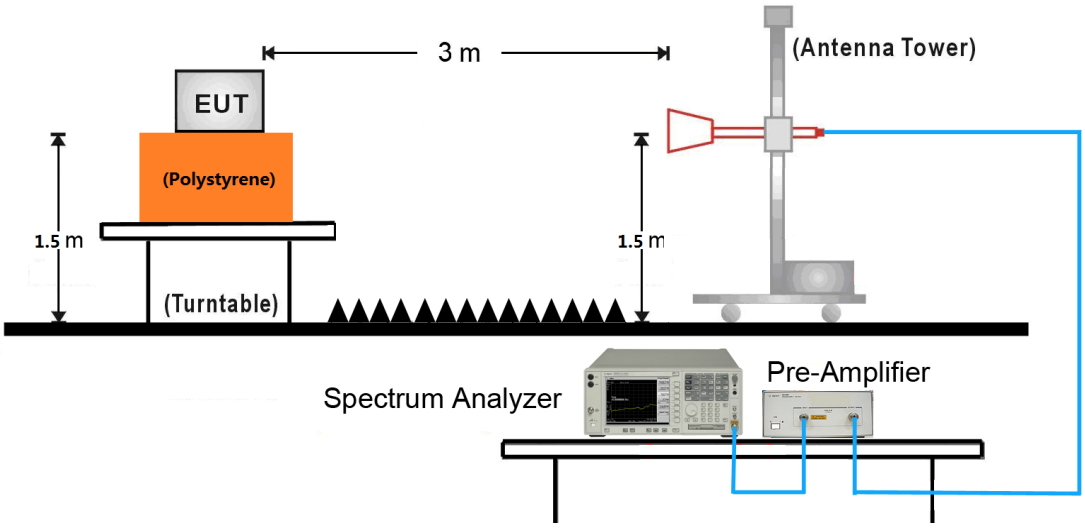
Note: These limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz.

12.2. Test Setup

30MHz ~ 1GHz Test Setup:



1GHz ~ 12.5GHz Test Setup:



12.3. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.4.10.2.2.

12.4. Test Result

Test Engineer	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11b - Ant 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	-98.4	30.1	-68.3	-57.0	-11.3	PK	Horizontal
	220.1	-94.2	26.2	-68.0	-57.0	-11.0	PK	Horizontal
	31.5	-86.3	17.8	-68.5	-57.0	-11.5	PK	Vertical
	104.7	-94.5	26.5	-68.0	-57.0	-11.0	PK	Vertical
	2274.9	-67.8	11.4	-56.4	-47.0	-9.4	PK	Horizontal
	4754.1	-70.3	17.9	-52.4	-47.0	-5.4	RMS	Horizontal
	2133.9	-66.6	10.5	-56.1	-47.0	-9.1	PK	Vertical
	3214.9	-70.0	14.2	-55.8	-47.0	-8.8	PK	Vertical
13	32.4	-96.5	29.2	-67.3	-57.0	-10.3	PK	Horizontal
	219.2	-97.0	26.0	-71.0	-57.0	-14.0	PK	Horizontal
	31.0	-86.6	18.1	-68.5	-57.0	-11.5	PK	Vertical
	104.7	-93.3	26.5	-66.8	-57.0	-9.8	PK	Vertical
	2216.1	-68.5	11.3	-57.2	-47.0	-10.2	PK	Horizontal
	3585.0	-71.4	15.5	-55.9	-47.0	-8.9	PK	Horizontal
	2280.8	-68.9	11.6	-57.3	-47.0	-10.3	PK	Vertical
	3978.6	-71.1	16.5	-54.6	-47.0	-7.6	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11g - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	35.3	-99.0	29.9	-69.1	-57.0	-12.1	PK	Horizontal
	220.1	-96.7	26.2	-70.5	-57.0	-13.5	PK	Horizontal
	31.0	-86.8	18.1	-68.7	-57.0	-11.7	PK	Vertical
	104.7	-92.6	26.5	-66.1	-57.0	-9.1	PK	Vertical
	2227.9	-69.2	11.6	-57.6	-47.0	-10.6	PK	Horizontal
	3684.9	-70.7	15.3	-55.4	-47.0	-8.4	PK	Horizontal
	2133.9	-65.6	10.5	-55.1	-47.0	-8.1	PK	Vertical
	3214.9	-69.6	14.2	-55.4	-47.0	-8.4	PK	Vertical
13	31.5	-94.8	29.5	-65.3	-57.0	-8.3	PK	Horizontal
	220.1	-94.4	26.2	-68.2	-57.0	-11.2	PK	Horizontal
	30.5	-86.4	18.2	-68.2	-57.0	-11.2	PK	Vertical
	110.5	-97.7	29.2	-68.5	-57.0	-11.5	PK	Vertical
	2145.6	-68.7	10.5	-58.2	-47.0	-11.2	PK	Horizontal
	3115.0	-69.6	13.6	-56.0	-47.0	-9.0	PK	Horizontal
	2133.9	-67.4	10.5	-56.9	-47.0	-9.9	PK	Vertical
	3267.8	-70.5	14.4	-56.1	-47.0	-9.1	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11n-HT20 - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	35.8	-95.5	29.8	-65.7	-57.0	-8.7	PK	Horizontal
	220.6	-96.1	26.1	-70.0	-57.0	-13.0	PK	Horizontal
	31.5	-86.3	17.8	-68.5	-57.0	-11.5	PK	Vertical
	104.7	-93.0	26.5	-66.5	-57.0	-9.5	PK	Vertical
	2245.5	-69.2	11.6	-57.6	-47.0	-10.6	PK	Horizontal
	3667.3	-69.5	15.2	-54.3	-47.0	-7.3	PK	Horizontal
	2263.1	-69.0	11.2	-57.8	-47.0	-10.8	PK	Vertical
	3667.3	-70.4	15.5	-54.9	-47.0	-7.9	PK	Vertical
13	33.9	-94.6	29.7	-64.9	-57.0	-7.9	PK	Horizontal
	220.1	-94.3	26.2	-68.1	-57.0	-11.1	PK	Horizontal
	31.5	-87.1	17.8	-69.3	-57.0	-12.3	PK	Vertical
	104.7	-96.1	26.5	-69.6	-57.0	-12.6	PK	Vertical
	2263.1	-68.6	11.5	-57.1	-47.0	-10.1	PK	Horizontal
	3690.8	-70.7	15.4	-55.3	-47.0	-8.3	PK	Horizontal
	2163.3	-69.6	11.3	-58.3	-47.0	-11.3	PK	Vertical
	3749.5	-71.6	16.0	-55.6	-47.0	-8.6	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11n-HT40 - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	35.8	-97.8	29.8	-68.0	-57.0	-11.0	PK	Horizontal
	572.7	-99.5	32.4	-67.1	-57.0	-10.1	PK	Horizontal
	80.0	-92.1	27.7	-64.4	-57.0	-7.4	PK	Vertical
	104.7	-91.4	26.5	-64.9	-57.0	-7.9	PK	Vertical
	2222.0	-68.5	11.5	-57.0	-47.0	-10.0	PK	Horizontal
	3667.3	-70.4	15.2	-55.2	-47.0	-8.2	PK	Horizontal
	3026.9	-70.6	13.6	-57.0	-47.0	-10.0	PK	Vertical
	4419.3	-71.5	17.2	-54.3	-47.0	-7.3	PK	Vertical
11	33.4	-97.6	29.5	-68.1	-57.0	-11.1	PK	Horizontal
	219.2	-96.8	26.0	-70.8	-57.0	-13.8	PK	Horizontal
	31.5	-86.3	17.8	-68.5	-57.0	-11.5	PK	Vertical
	111.5	-101.2	29.3	-71.9	-57.0	-14.9	PK	Vertical
	2245.5	-69.6	11.6	-58.0	-47.0	-11.0	PK	Horizontal
	3667.3	-69.8	15.2	-54.6	-47.0	-7.6	PK	Horizontal
	2169.1	-69.3	11.3	-58.0	-47.0	-11.0	PK	Vertical
	3197.3	-70.9	13.9	-57.0	-47.0	-10.0	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11n-HT20 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
01	31.0	-95.1	29.8	-65.3	-57.0	-8.3	PK	Horizontal
	220.6	-94.3	26.1	-68.2	-57.0	-11.2	PK	Horizontal
	31.0	-85.6	18.1	-67.5	-57.0	-10.5	PK	Vertical
	111.5	-98.7	29.3	-69.4	-57.0	-12.4	PK	Vertical
	2222.0	-68.6	11.5	-57.1	-47.0	-10.1	PK	Horizontal
	3226.6	-70.3	14.3	-56.0	-47.0	-9.0	PK	Horizontal
	2145.6	-69.3	10.9	-58.4	-47.0	-11.4	PK	Vertical
	3767.1	-71.5	15.9	-55.6	-47.0	-8.6	PK	Vertical
13	31.0	-95.0	29.8	-65.2	-57.0	-8.2	PK	Horizontal
	220.6	-94.4	26.1	-68.3	-57.0	-11.3	PK	Horizontal
	31.0	-86.3	18.1	-68.2	-57.0	-11.2	PK	Vertical
	110.5	-97.7	29.2	-68.5	-57.0	-11.5	PK	Vertical
	2210.3	-70.0	11.1	-58.9	-47.0	-11.9	PK	Horizontal
	3620.3	-71.6	15.3	-56.3	-47.0	-9.3	PK	Horizontal
	2151.5	-69.4	11.2	-58.2	-47.0	-11.2	PK	Vertical
	3244.3	-72.2	14.6	-57.6	-47.0	-10.6	PK	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	Jone Zhang	Temperature	25°C
Test Date	2017/06/09	Relative Humidity	54%
Test Mode	802.11n-HT40 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
03	30.5	-94.2	30.0	-64.2	-57.0	-7.2	PK	Horizontal
	220.6	-94.4	26.1	-68.3	-57.0	-11.3	PK	Horizontal
	31.0	-86.1	18.1	-68.0	-57.0	-11.0	PK	Vertical
	110.5	-98.4	29.2	-69.2	-57.0	-12.2	PK	Vertical
	2222.0	-69.2	11.5	-57.7	-47.0	-10.7	PK	Horizontal
	3179.6	-70.4	13.8	-56.6	-47.0	-9.6	PK	Horizontal
	2133.9	-66.9	10.5	-56.4	-47.0	-9.4	PK	Vertical
	3667.3	-70.9	15.5	-55.4	-47.0	-8.4	PK	Vertical
11	31.0	-94.5	29.8	-64.7	-57.0	-7.7	PK	Horizontal
	220.6	-94.3	26.1	-68.2	-57.0	-11.2	PK	Horizontal
	31.0	-86.0	18.1	-67.9	-57.0	-10.9	PK	Vertical
	111.5	-98.0	29.3	-68.7	-57.0	-11.7	PK	Vertical
	2744.9	-69.5	12.0	-57.5	-47.0	-10.5	PK	Horizontal
	3743.6	-70.7	15.6	-55.1	-47.0	-8.1	PK	Horizontal
	2392.4	-69.6	11.2	-58.4	-47.0	-11.4	PK	Vertical
	3173.8	-70.7	14.0	-56.7	-47.0	-9.7	PK	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. Receiver Blocking

13.1. Limit

The minimum performance criterion shall be a PER less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment.

13.2. Test Setup

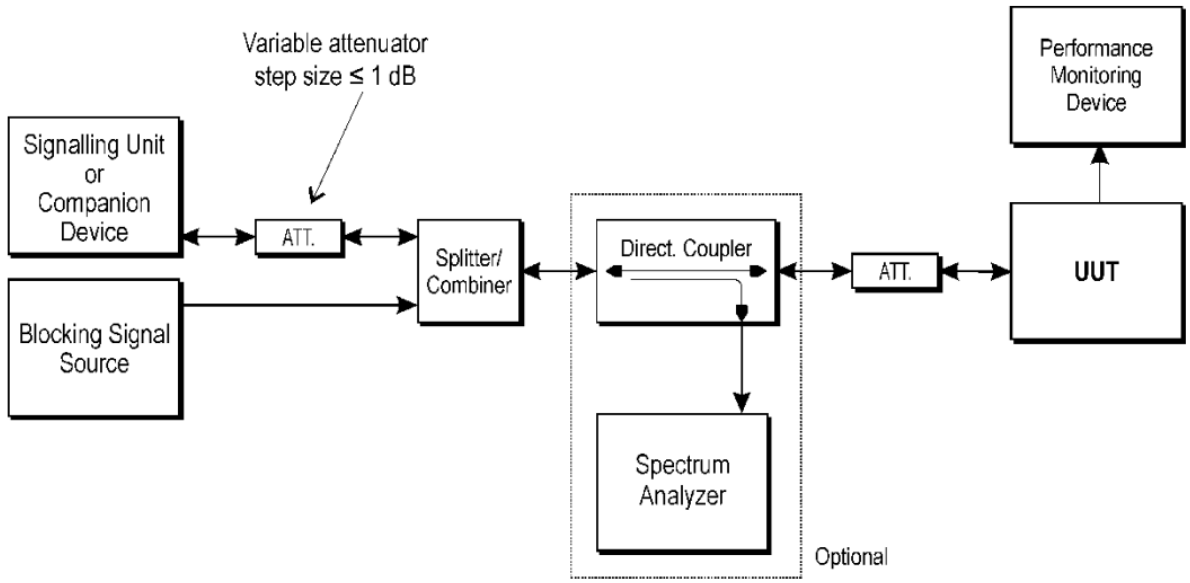


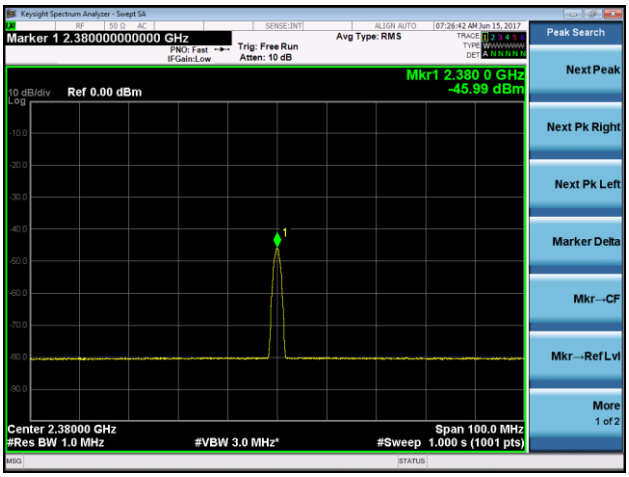
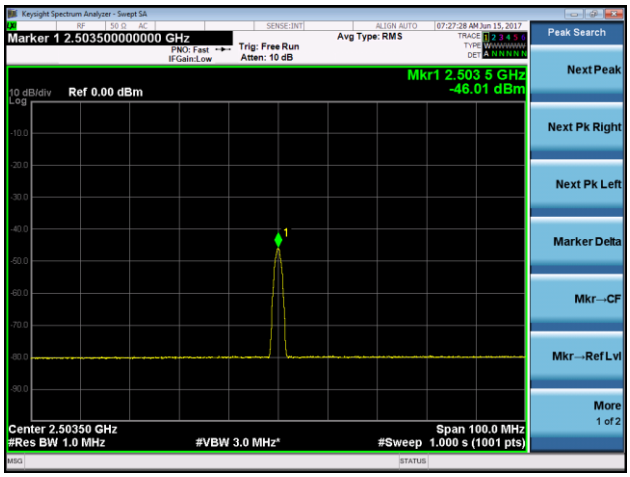
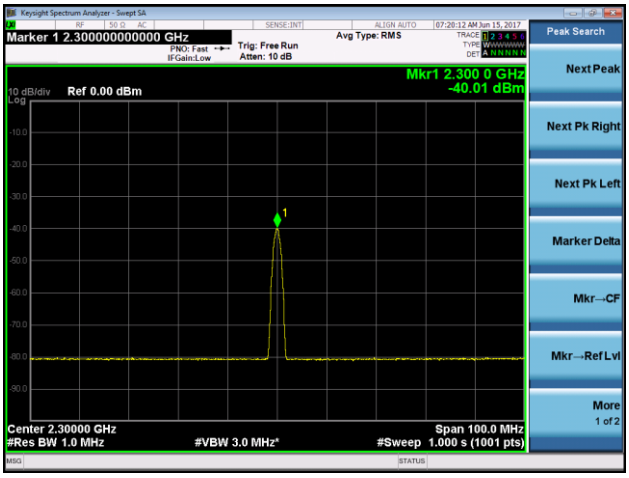
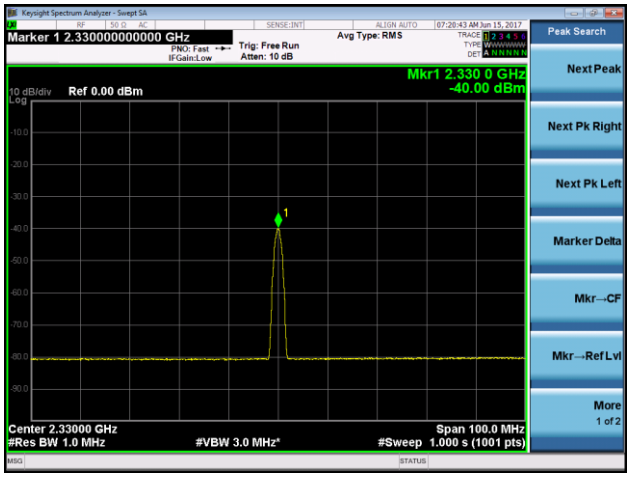
Figure 6: Test Set-up for receiver blocking

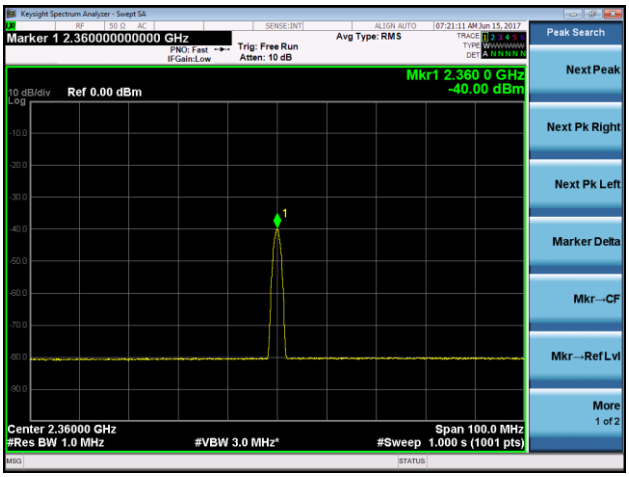
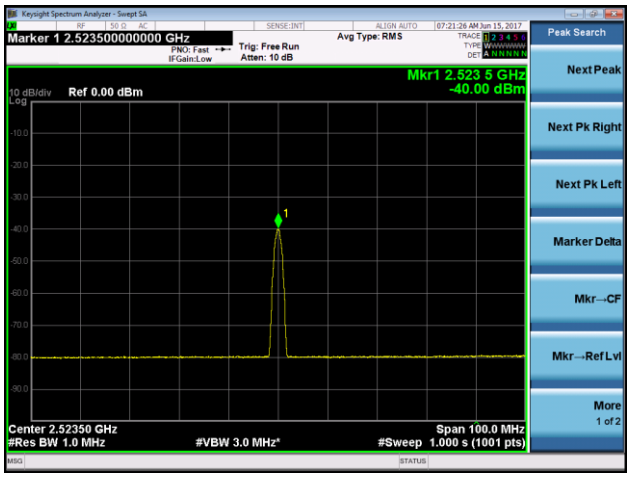
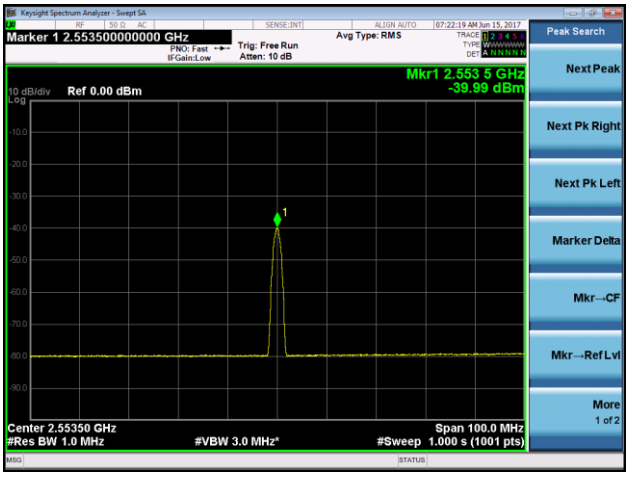
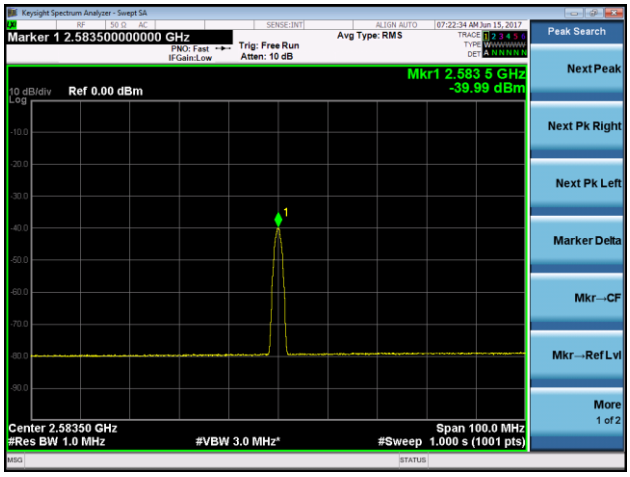
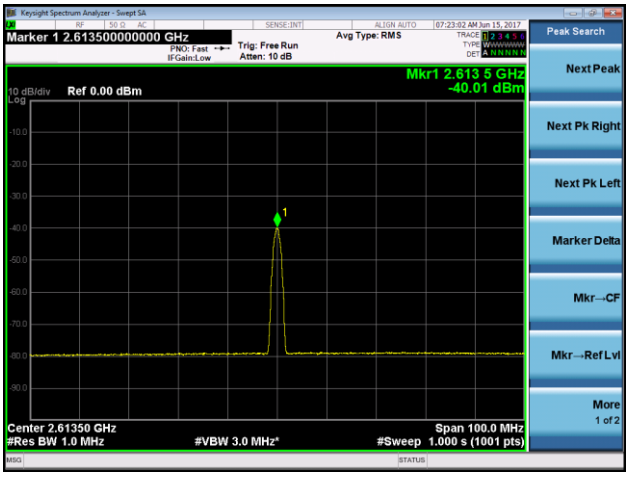
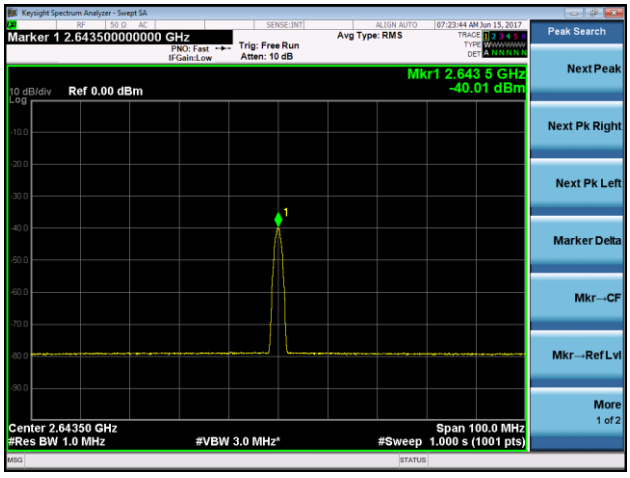
13.3. Test Procedure

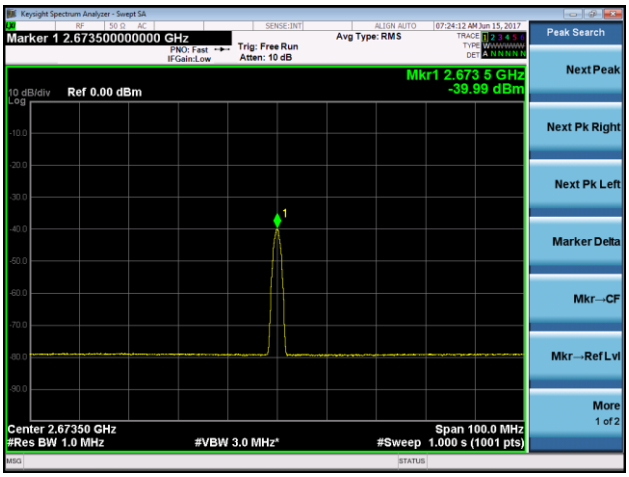
Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.4.11.2.1.

13.4. Test Result

Product	Wireless Access Point	Temperature	22°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	TR4	Test Date	2017/06/15

Blocking Signal Calibration Plots	
2380MHz	2503.5MHz
	
2300MHz	2330MHz
	

Blocking Signal Calibration Plots	
2360MHz	2523.5MHz
	
2553.5MHz	2583.5MHz
	
2613.5MHz	2643.5MHz
	

Blocking Signal Calibration Plots	
2673.5MHz	
	

Product	Wireless Access Point	Temperature	22°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	TR4	Test Date	2017/06/13
Test Mode	802.11b		

Channel	Wanted Signal Mean Power from Companion Device (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Type of Blocking Signal	PER Test Result	Limit (PER)	Test Result
01	P_{min} + 6 dB	2300.0	-40.0	CW	0.3	< 10%	Pass
		2330.0	-40.0		0.0		Pass
		2360.0	-40.0		0.3		Pass
		2380.0	-46.0		0.0		Pass
		2503.5	-46.0		0.1		Pass
		2523.5	-40.0		0.0		Pass
		2553.5	-40.0		0.2		Pass
		2583.5	-40.0		0.2		Pass
		2613.5	-40.0		0.0		Pass
		2643.5	-40.0		0.0		Pass
		2673.5	-40.0		0.1		Pass
Note 1: the P_{min} of channel 1 is -93dBm.							
13	P_{min} + 6 dB	2300.0	-40.0	CW	0.3	< 10%	Pass
		2330.0	-40.0		0.4		Pass
		2360.0	-40.0		0.0		Pass
		2380.0	-46.0		0.6		Pass
		2503.5	-46.0		0.0		Pass
		2523.5	-40.0		0.2		Pass
		2553.5	-40.0		0.0		Pass
		2583.5	-40.0		0.2		Pass
		2613.5	-40.0		0.1		Pass
		2643.5	-40.0		0.2		Pass
		2673.5	-40.0		0.3		Pass
Note 2: the P_{min} of channel 13 is -93dBm.							

Product	Wireless Access Point	Temperature	22°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	TR4	Test Date	2017/06/13
Test Mode	802.11g		

Channel	Wanted Signal Mean Power from Companion Device (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Type of Blocking Signal	PER Test Result	Limit (PER)	Test Result
01	P_{min} + 6 dB	2300.0	-40.0	CW	0.2	< 10%	Pass
		2330.0	-40.0		0.1		Pass
		2360.0	-40.0		0.3		Pass
		2380.0	-46.0		0.1		Pass
		2503.5	-46.0		0.0		Pass
		2523.5	-40.0		0.2		Pass
		2553.5	-40.0		0.2		Pass
		2583.5	-40.0		0.0		Pass
		2613.5	-40.0		0.3		Pass
		2643.5	-40.0		0.1		Pass
		2673.5	-40.0		0.1		Pass
Note 1: the P_{min} of channel 1 is -91dBm.							
13	P_{min} + 6 dB	2300.0	-40.0	CW	0.2	< 10%	Pass
		2330.0	-40.0		0.5		Pass
		2360.0	-40.0		0.0		Pass
		2380.0	-46.0		0.3		Pass
		2503.5	-46.0		0.0		Pass
		2523.5	-40.0		0.2		Pass
		2553.5	-40.0		0.1		Pass
		2583.5	-40.0		0.4		Pass
		2613.5	-40.0		0.1		Pass
		2643.5	-40.0		0.2		Pass
		2673.5	-40.0		0.2		Pass
Note 2: the P_{min} of channel 13 is -91dBm.							

14. 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 %

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	2017/12/06
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	MRTSUE06051	1 year	2017/12/06
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Power Spectral Density - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

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	2018/04/25
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Medium Utilisation (MU) Factor - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2017/12/06
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Adaptivity - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
Vector Signal Generator	Agilent	E4438C	MRTSUE06026	1 year	2017/12/06
Vector Signal Generator	Agilent	E4438C	MRTSUE06081	1 year	2017/12/06
Directional Coupler	Narda	4216-20	MRTSUE06065	1 year	2018/03/28
Power Splitter	Mini-Circuits	ZFRSC-123-S+	MRTSUE06122	N/A	N/A
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Receiver Blocking - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Vector Signal Generator	Agilent	E4438C	MRTSUE06026	1 year	2017/12/06
4 Ch. Simultaneous Sampling 14	Agilent	U2531A	MRTSUE06247	N/A	N/A
4 Ch. Simultaneous Sampling 14	Agilent	U2531A	MRTSUE06248	N/A	N/A
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06108	1 year	2017/11/10
Directional Coupler	Narda	4216-20	MRTSUE06065	1 year	2018/03/28
Power Splitter	Mini-Circuits	ZFRSC-123-S+	MRTSUE06122	N/A	N/A
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Occupied Channel Bandwidth - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

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	2018/04/25
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/06

Transmitter Spurious Emissions and Receiver Spurious Emissions - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2018/03/28
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2017/12/10
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2017/12/10
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2018/01/04
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06183	1 year	2017/12/20
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2018/05/10

Software	Version	Function
e3	V8.3.5	EMI Test Software

The End