ETSI EN 300 328 V2.1.1 (2016-11)

TEST REPORT

For

SHENZHEN TENDA TECHNOLOGY CO.,LTD.

6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China.
518052

Model: AC10

Report Type:	**Product Type:**
Original Report	AC1200 MU-MIMO Dual Band Gigabit WiFi Router

Report Number: RDG171102009-22A

Report Date: 2017-11-22

Reviewed By: Robin Zheng
RF Engineer

Robin Zheng

Test Laboratory:

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COMPLIANCE TESTING AND VERIFICATION SERVICES
BACL

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		AC1200 MU-MIMO Dual Band Gigabit WiFi Router
EUT Model:		AC10
Multiple Models:		N/A
Rated Input Voltage:		DC 12V from adapter
Nominal Adapter Information	**Model:**	BN036-A12012E
	Input:	100-240V~50/60Hz 0.4A
	Output:	12V,1.0A
External Dimension:		Length (27.3cm)*Width (16.2cm)*High (5.9cm) Length (27.3cm)*Width (16.2cm)*High (22.3cm) with Antenna
Serial Number:		171102009
EUT Received Date:		2017.11.03

Objective

This report is prepared on behalf of *SHENZHEN TENDA TECHNOLOGY CO.,LTD.* in accordance with ETSI EN 300 328 V2.1.1 (2016-11), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of Directive 2014/53/EU.

The objective is to determine the compliance of EUT with ETSI EN 300 328 V2.1.1 (2016-11).

Test Methodology

All measurements contained in this report were conducted with ETSI EN 300 328 V2.1.1 (2016-11).

Measurement Uncertainty

Parameter	Flab	Maximum allow uncertainty
Occupied Channel Bandwidth	±5 %	±5 %
RF output power, conducted	±0.61dB	±1,5 dB
Power Spectral Density, conducted	±3 dB	±3 dB
Unwanted Emissions, conducted	±2.47dB	±3 dB
All emissions, radiated	±3.62dB	±6 dB
Temperature	±1℃	±3℃
Supply voltages	±0.4%	±3 %
Time	1%	±5 %

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L5662). And accredited to ISO/IEC 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Dongguan) was registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode, which was provided by manufacturer.

For 2.4GHz WLAN, 13 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442	/	/

802.11b, 802.11g and 802.11n-HT20 modes were tested with Channel 1, 7 and 13.

802.11n-HT40 mode was tested with Channel 3,7 and 11.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power and PSD across all data rates bandwidths, and modulations.

Equipment Modifications

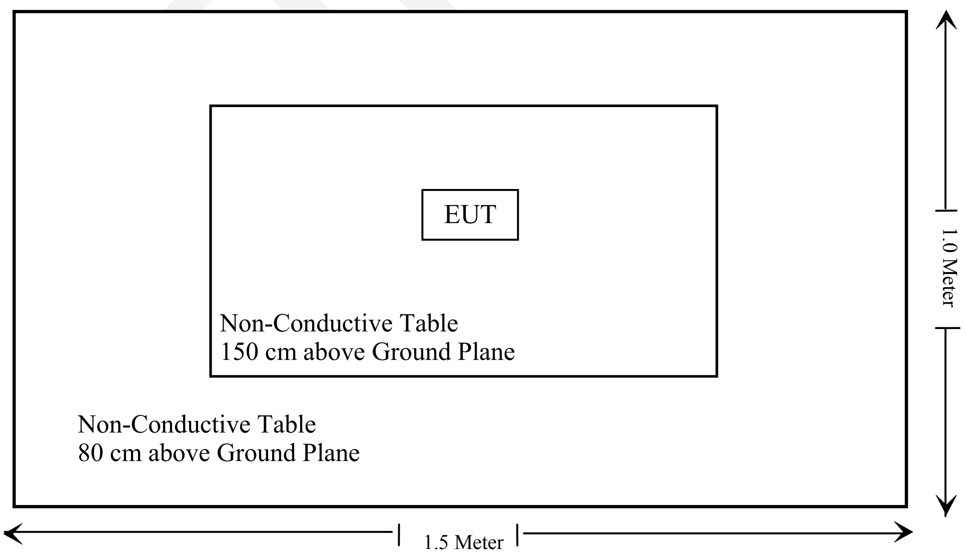
No modification was made to the EUT tested.

EUT Exercise Software

The software ' MP_TEST.exe 'was used for testing, which was provided by manufacturer and the test configured as following table:

Antenna 0/Antenna 1				
Test Mode	Test Software Version	MP_TEST.exe		
802.11b	Test Frequency	2412MHz	2442MHz	2472MHz
	Data Rate	CCK 1M	CCK 1M	CCK 1M
	Power Level Setting	18/15	21/17	22/19
802.11g	Test Frequency	2412MHz	2442MHz	2472MHz
	Data Rate	OFDM 6M	OFDM 6M	OFDM 6M
	Power Level Setting	23/19	26/21	28/24
802.11n ht20	Test Frequency	2412MHz	2442MHz	2472MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	19/14	21/18	24/20
802.11n ht40	Test Frequency	2422MHz	2442MHz	2462MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	19/16	21/18	24/19

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

ETSI EN 300 328 V2.1.1 (2016-11)	Description of Test	Test Result
§ 4.3.2.2	RF output power	Compliance
§ 4.3.2.3	Power Spectral Density	Compliance
§ 4.3.2.4	Duty Cycle, Tx-sequence, Tx-gap	Not Applicable
§ 4.3.2.5	Medium Utilisation (MU) factor	Not Applicable
§ 4.3.2.6	Adaptivity	Compliance
§ 4.3.2.7	Occupied Channel Bandwidth	Compliance
§ 4.3.2.8	Transmitter unwanted emissions in the out-of-band domain	Compliance
§ 4.3.2.9	Transmitter unwanted emissions in the spurious domain	Compliance
§ 4.3.2.10	Receiver spurious emissions	Compliance
§ 4.3.2.11	Receiver Blocking	Compliance
§ 4.3.2.12	Geo-location capability	Not Applicable*

Note:

The supplier declared that the equipment is adaptive equipment.
Not Applicable –These requirements only apply for non-adaptive equipment.
Not Applicable*– The equipment without geo-location capability.

ETSI EN 300 328 V2.1.1 (2016-11) §4.3.2.2 – RF OUTPUT POWER

Applicable Standard

This requirement applies to all types of equipment using wide band modulations other than FHSS.

The RF output power is defined as the mean equivalent isotropic radiated power (e.i.r.p.) of the equipment during a transmission burst.

For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm.

The maximum RF output power for non-adaptive equipment shall be declared by the supplier and shall not exceed 20 dBm. See clause 5.4.1 m). For non-adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be equal to or less than the value declared by the supplier.

This limit shall apply for any combination of power level and intended antenna assembly.

Test Procedure

The test procedure shall be as follows:

Step 1:

- Use a fast power sensor suitable for 2,4 GHz and capable of minimum 1 MS/s.
- Use the following settings:
  - Sample speed 1 MS/s or faster.
  - The samples shall represent the RMS power of the signal.
  - Measurement duration: For non-adaptive equipment: equal to the observation period defined in clause 4.3.1.3.2 or clause 4.3.2.4.2. For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) are captured.

  For adaptive equipment, to increase the measurement accuracy, a higher number of bursts may be used.

Step 2:

- For conducted measurements on devices with one transmit chain:

  - Connect the power sensor to the transmit port, sample the transmit signal and store the raw data. Use these stored samples in all following steps.

- For conducted measurements on devices with multiple transmit chains:

  - Connect one power sensor to each transmit port for a synchronous measurement on all transmit ports.
  - Trigger the power sensors so that they start sampling at the same time. Make sure the time difference between the samples of all sensors is less than 500 ns.
  - For each individual sampling point (time domain), sum the coincident power samples of all ports and store them. Use these summed samples in all following steps.

Step 3:

- Find the start and stop times of each burst in the stored measurement samples.
  The start and stop times are defined as the points where the power is at least 30 dB below the highest value of the stored samples in step 2.

In case of insufficient dynamic range, the value of 30 dB may need to be reduced appropriately.

Step 4:

• Between the start and stop times of each individual burst calculate the RMS power over the burst using the formula below. The start and stop points shall be included.Save these Pburst values, as well as the start and stop times for each burst.

$$P_{burst} = \frac{1}{k}\sum_{n=1}^{k} P_{sample}(n)$$

with 'k' being the total number of samples and 'n' the actual sample number

Step 5:

• The highest of all P_{burst} values (value "A" in dBm) will be used for maximum e.i.r.p. calculations.

Step 6:

• Add the (stated) antenna assembly gain "G" in dBi of the individual antenna.
• If applicable, add the additional beamforming gain "Y" in dB.
• If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used.
• The RF Output Power (P) shall be calculated using the formula below:

P = A + G + Y

• This value, which shall comply with the limit given in clause 4.3.1.2.3 or clause 4.3.2.2.3, shall be recorded in the test report.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	USB Wideband Power Sensor	U2022XA	MY54170006	2016-12-21	2017-12-21
Keysight	Power Analysis Manager	V3.1.1	/	/	/
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2018-09-09

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.4 °C
Relative Humidity:	55 %
ATM Pressure:	100.9 kPa

The testing was performed by Swim Lv on 2017-11-10.

Test Mode: Transmitting

Test Result: Compliance. Please refer to following tables.

802.11b Mode

Test Condition			AV Output Power (dBm)		Antenna Gain	EIRP (dBm)		Limit
Frequency (MHz)	Temperature	Voltage						
	℃	Vdc	Antenna 0	Antenna 1	dBi	Antenna 0	Antenna 1	dBm
2412	25	12	13.34	13.44	5	18.34	18.44	20
	0	12	13.42	13.53	5	18.42	18.53	
	40	12	13.25	13.38	5	18.25	18.38	
2442	25	12	13.51	13.58	5	18.51	18.58	
	0	12	13.59	13.68	5	18.59	18.68	
	40	12	13.46	13.41	5	18.46	18.41	
2472	25	12	13.56	13.40	5	18.56	18.40	
	0	12	13.64	13.48	5	18.64	18.48	
	40	12	13.52	13.36	5	18.52	18.36	

802.11g Mode

Test Condition			AV Output Power (dBm)		Antenna Gain	EIRP (dBm)		Limit
Frequency (MHz)	Temperature	Voltage						
	℃	Vdc	Antenna 0	Antenna 1	dBi	Antenna 0	Antenna 1	dBm
2412	25	12	14.87	14.68	5	19.87	19.68	20
	0	12	14.93	14.77	5	19.93	19.77	
	40	12	14.81	14.62	5	19.81	19.62	
2442	25	12	14.98	14.56	5	19.98	19.56	
	0	12	14.90	14.65	5	19.90	19.65	
	40	12	14.87	14.53	5	19.87	19.53	
2472	25	12	14.89	14.64	5	19.89	19.64	
	0	12	14.91	14.73	5	19.91	19.73	
	40	12	14.78	14.58	5	19.78	19.58	

802.11n-HT20 Mode

Test Condition			AV Output Power (dBm)	Antenna Gain	EIRP	Limit
Frequency (MHz)	Temperature	Voltage				
	℃	Vdc	Total	dBi	(dBm)	dBm
2412	25	12	14.88	5	19.88	20
	0	12	14.74	5	19.74	
	40	12	14.95	5	19.95	
2442	25	12	14.79	5	19.79	
	0	12	14.83	5	19.83	
	40	12	14.70	5	19.70	
2472	25	12	14.86	5	19.86	
	0	12	14.93	5	19.93	
	40	12	14.83	5	19.83	

802.11n-HT40 Mode

Test Condition			AV Output Power (dBm)	Antenna Gain	EIRP	Limit
Frequency (MHz)	Temperature	Voltage				
	℃	Vdc	Total	dBi	(dBm)	dBm
2422	25	12	14.49	5	19.49	20
	0	12	14.56	5	19.56	
	40	12	14.32	5	19.32	
2442	25	12	14.78	5	19.78	
	0	12	14.87	5	19.87	
	40	12	14.66	5	19.66	
2462	25	12	14.77	5	19.77	
	0	12	14.81	5	19.81	
	40	12	14.61	5	19.61	

ETSI EN 300 328 V2.1.1 (2016-11)§4.3.2.3 - POWER SPECTRAL DENSITY

Applicable Standard

According to ETSI EN 300 328 V2.1.1 (2016-11) §4.3.2.3.2, this requirement applies to all types of equipment using wide band modulations other than FHSS.

The Power Spectral Density is the mean equivalent isotropically radiated power (e.i.r.p.) spectral density in a 1 MHz bandwidth during a transmission burst.

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

Test Procedure

The transmitter shall be connected to a spectrum analyser and the Power Spectral Density as defined in clause 4.3.2.3 shall be measured and recorded.

The test procedure shall be as follows:

Step 1:

Connect the UUT to the spectrum analyser and use the following settings:

- Start Frequency: 2 400 MHz
- Stop Frequency: 2 483.5 MHz
- Resolution BW: 10 kHz
- Video BW: 30 kHz
- Sweep Points: > 8 350; for spectrum analysers not supporting this number of sweep points, the frequency band may be segmented

NOTE: For spectrum analysers not supporting this number of sweep points, the frequency band may be segmented.

- Detector: RMS
- Trace Mode: Max Hold
- Sweep time: For non-continuous transmissions: 2 × Channel Occupancy Time × number of sweep points

  For continuous transmissions: 10 s; the sweep time may be increased further until a value where the sweep time has no impact on the RMS value of the signal.

For non-continuous signals, wait for the trace to stabilize. Save the data (trace data) set to a file.

Step 2:

For conducted measurements on smart antenna systems using either operating mode 2 or operating mode 3 (see clause 5.3.2.2), repeat the measurement for each of the transmit ports. For each sampling point (frequency domain), add up the coincident power values (in mW) for the different transmit chains and use this as the new data set.

Step 3:

Add up the values for power for all the samples in the file using the formula below.

$$P_{Sum} = \frac{1}{k}\sum_{n=1}^{k} P_{sample}(n)$$

with 'k' being the total number of samples and 'n' the actual sample number

Step 4:

Normalize the individual values for power (in dBm) so that the sum is equal to the RF Output Power (e.i.r.p.) measured in clause 5.3.2 and save the corrected data. The following formulas can be used:

$$C_{Corr} = P_{Sum} - P_{e.i.r.p}$$

$$P_{Samplecorr}(n) = P_{Sample}(n) - C_{Corr}$$

with 'n' being the actual sample number

Step 5:

Starting from the first sample $P_{Samplecorr}(n)$ (lowest frequency), add up the power (in mW) of the following samples representing a 1 MHz segment and record the results for power and position (i.e. sample #1 to sample #100). This is the Power Spectral Density (e.i.r.p.) for the first 1 MHz segment which shall be recorded.

Step 6:

Shift the start point of the samples added up in step 5 by one sample and repeat the procedure in step 5 (i.e. sample #2 to sample #101).

Step 7:

Repeat step 6 until the end of the data set and record the Power Spectral Density values for each of the 1 MHz segments.

From all the recorded results, the highest value is the maximum Power Spectral Density for the UUT. This value, which shall comply with the limit given in clause 4.3.2.3.3, shall be recorded in the test report.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESPI	100120	2016/12/8	2017/12/8
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/
BACL	RF Conducted Test	/	/	/	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.4 °C
Relative Humidity:	55 %
ATM Pressure:	100.9 kPa

The testing was performed by Swim Lv on 2017-11-10.

Test Result: Compliance. Please refer to following table and plots.

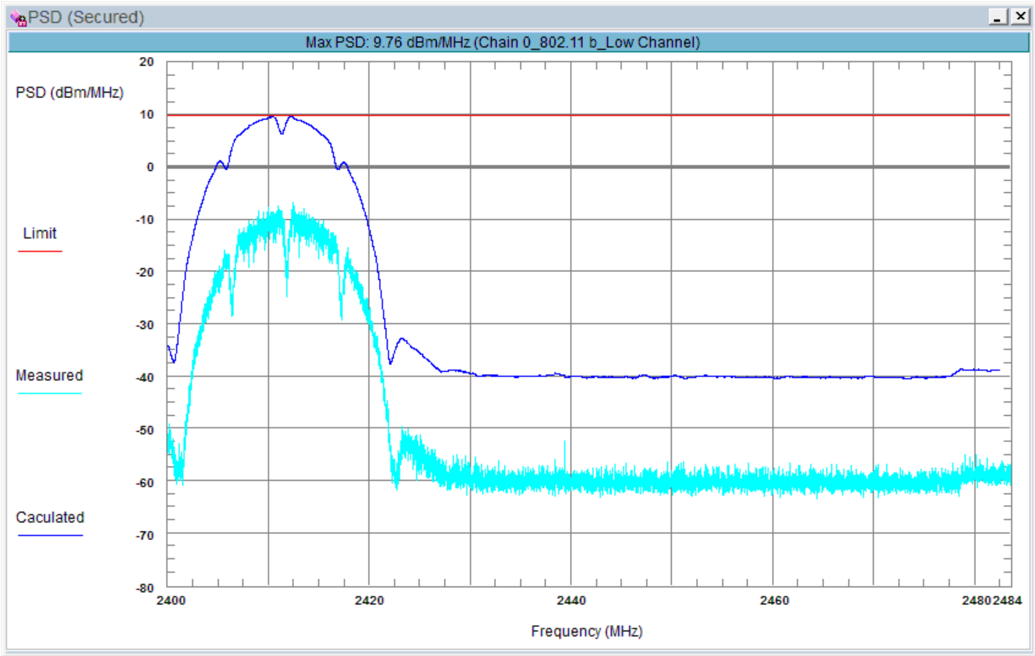
Test Mode: Transmitting

Note: The antenna gain was caculated in the test result.

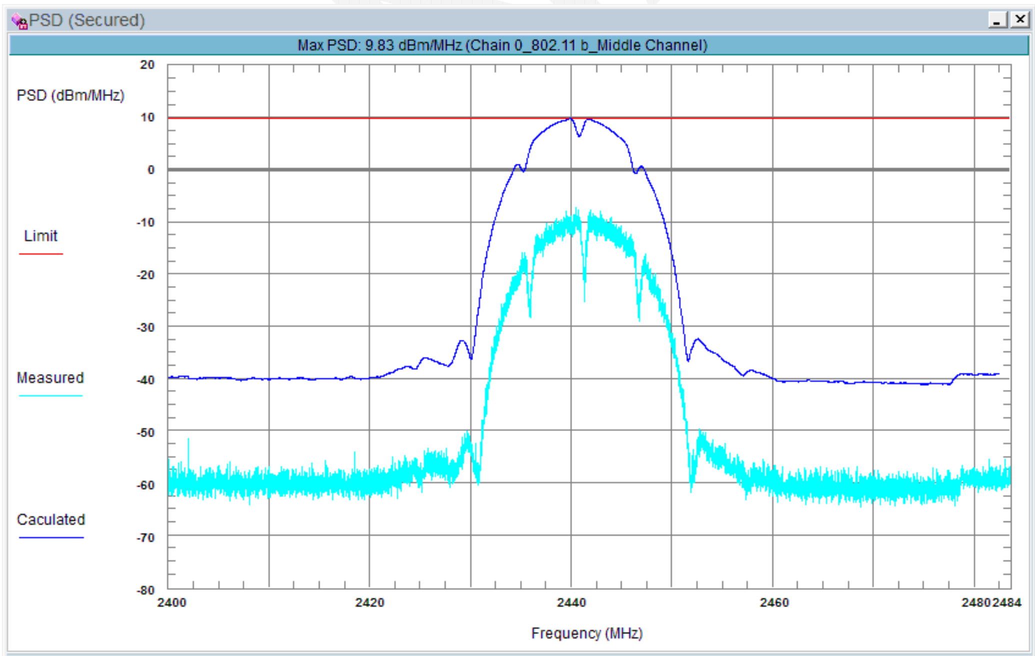
Test mode	Channel Frequency	Power Density (dBm/MHz)		Limit (dBm/MHz)
		Antenna 0	Antenna1	
802.11b	2412	9.76	9.82	10
	2442	9.83	9.97	
	2472	9.92	9.86	
802.11g	2412	9.01	8.61	
	2442	9.19	8.56	
	2472	9.15	8.75	

Test mode	Channel Frequency	Power Density (dBm/MHz)	Limit (dBm/MHz)
802.11n20	2412	8.74	10
	2442	8.78	
	2472	8.94	
802.11n40	2422	5.08	
	2442	5.31	
	2462	5.25	

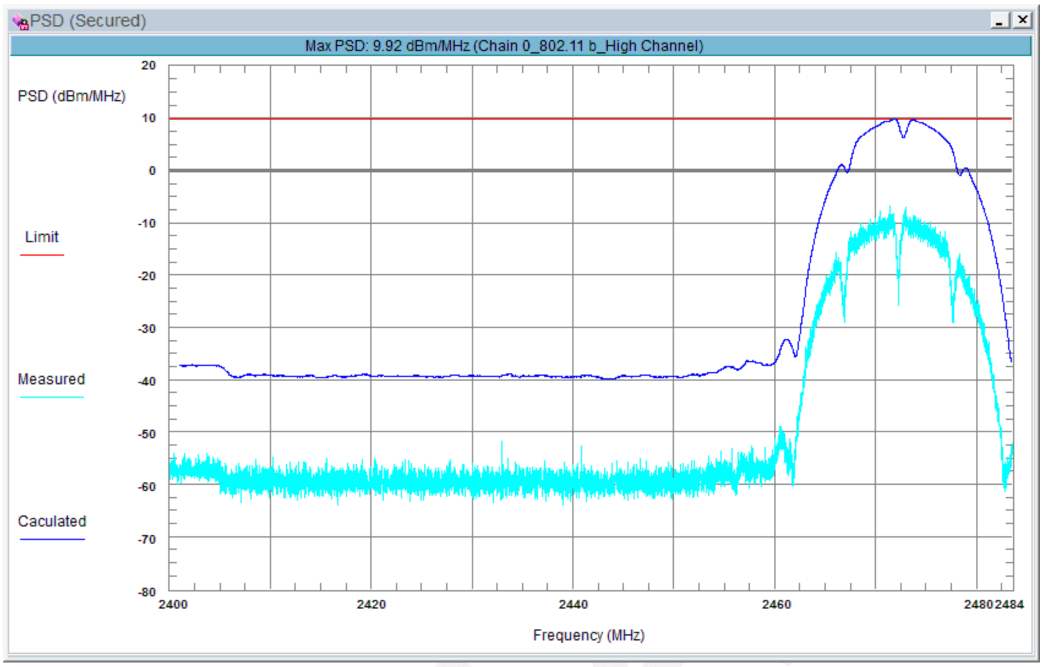
Antenna0, 802.11b-Low Channel



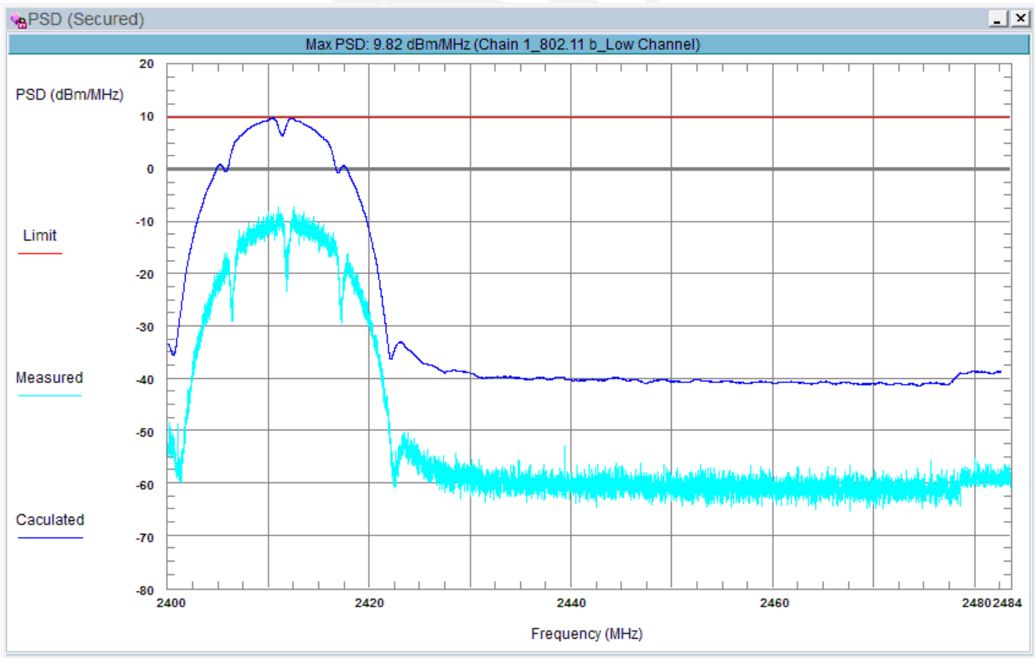
Antenna0, 802.11b-Middle Channel



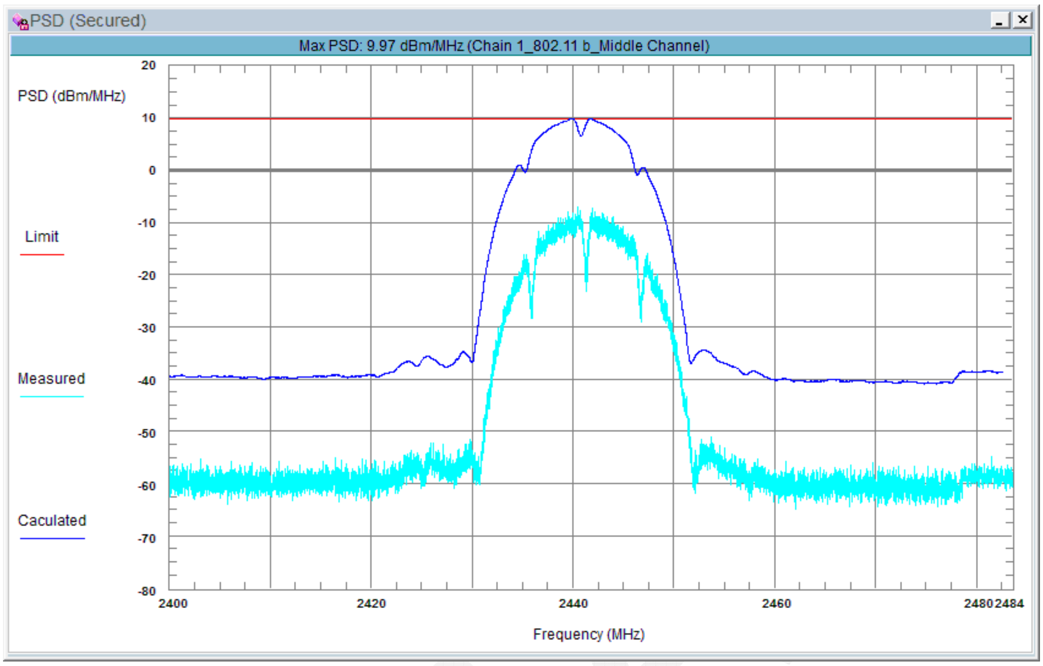
Antenna0, 802.11b-High Channel



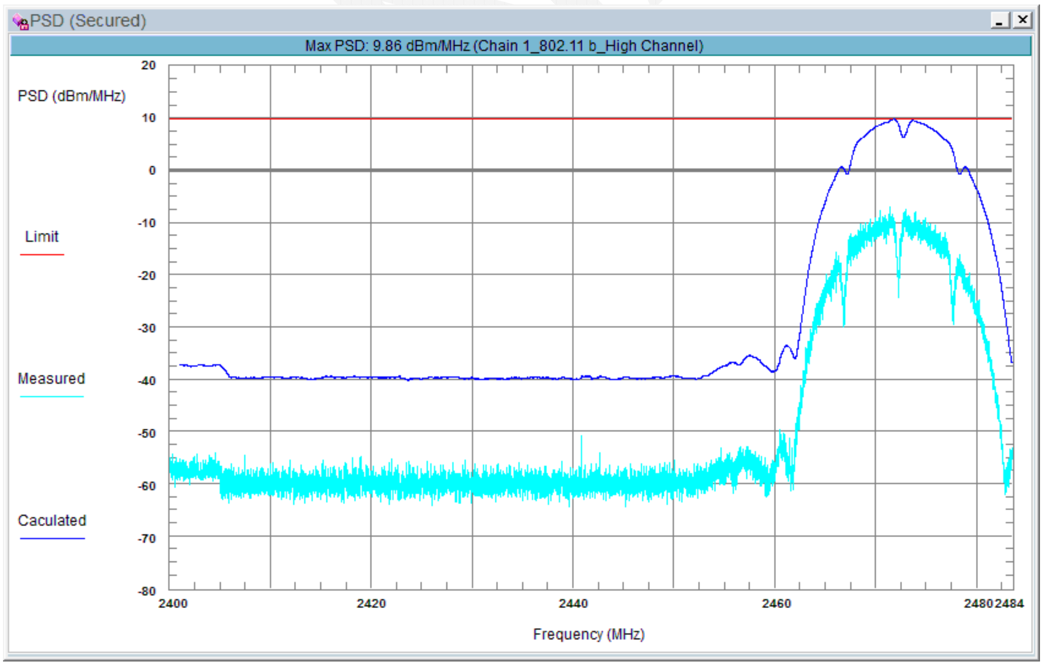
Antenna1, 802.11b-Low Channel



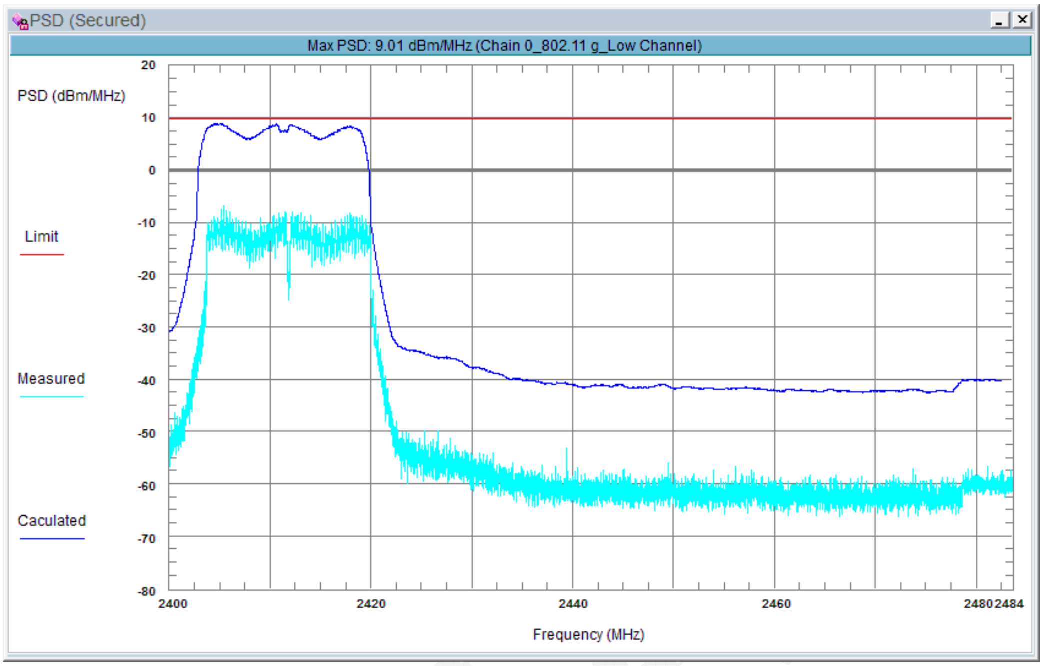
Antenna1, 802.11b-Middle Channel



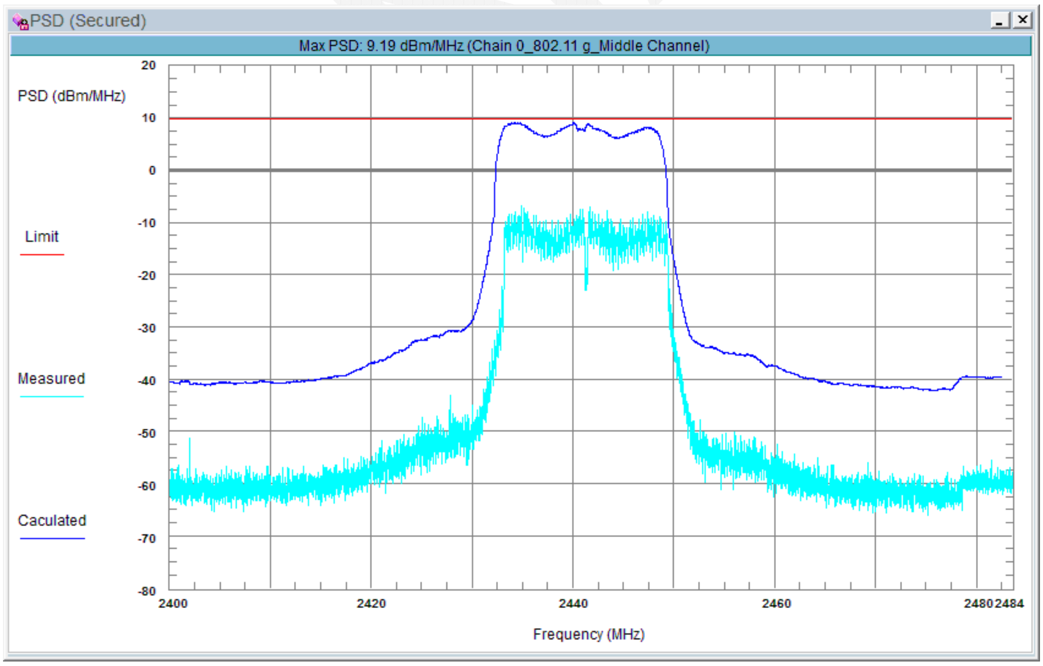
Antenna1, 802.11b-High Channel



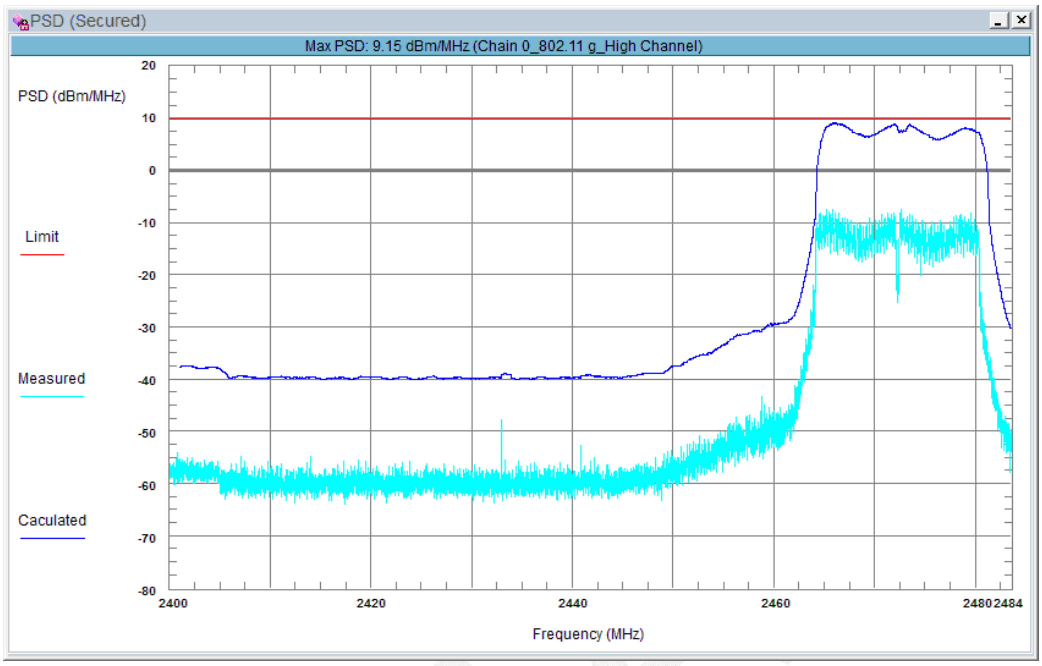
Antenna0, 802.11g-Low Channel



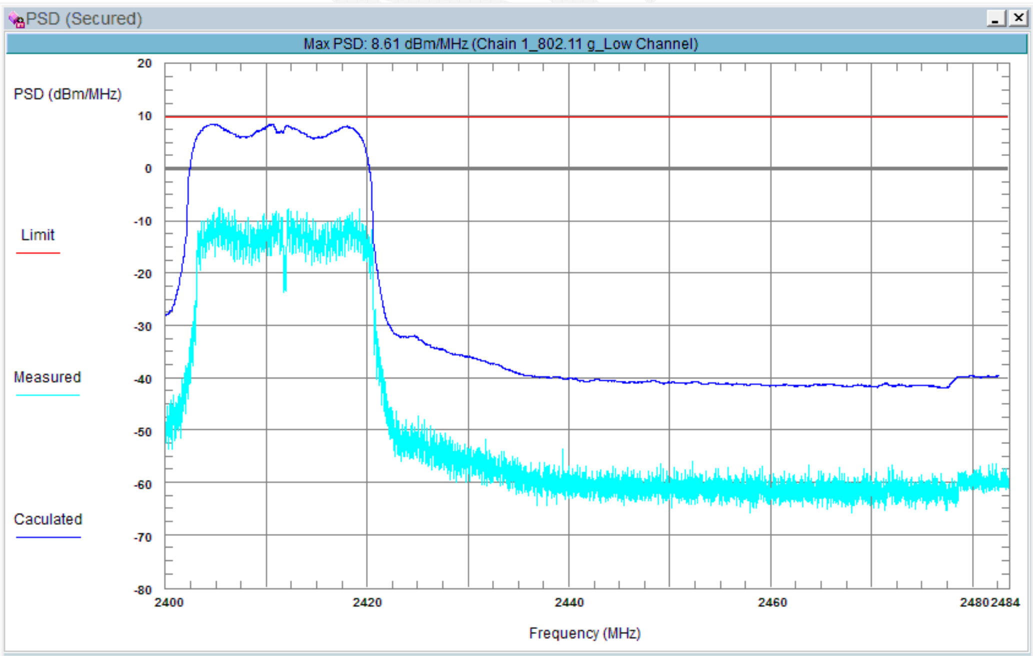
Antenna0, 802.11g-Middle Channel



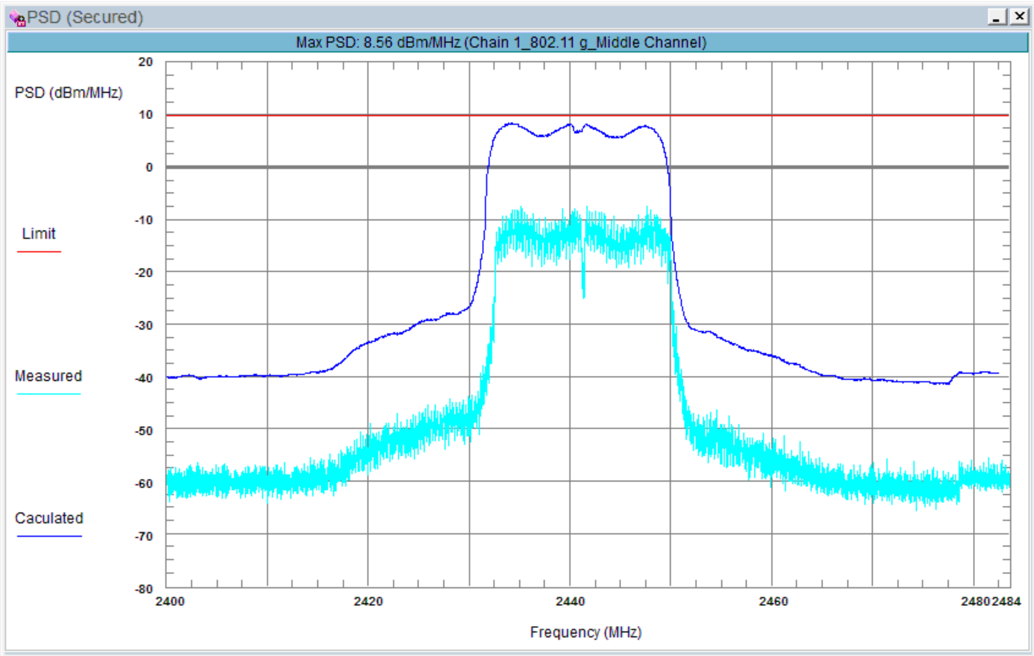
Antenna0, 802.11g-High Channel



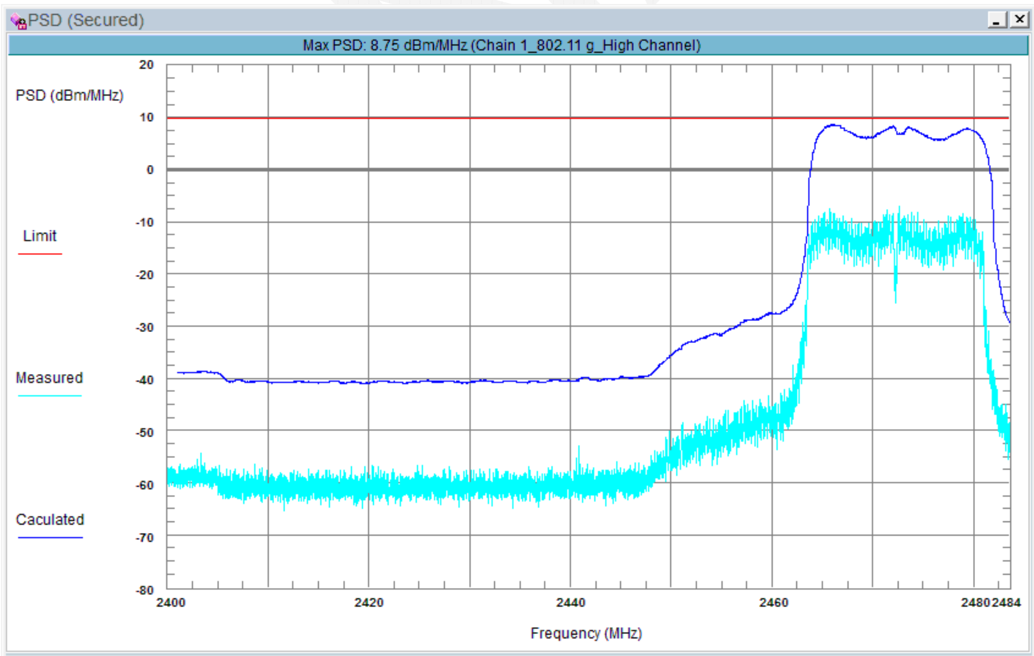
Antenna1, 802.11g-Low Channel



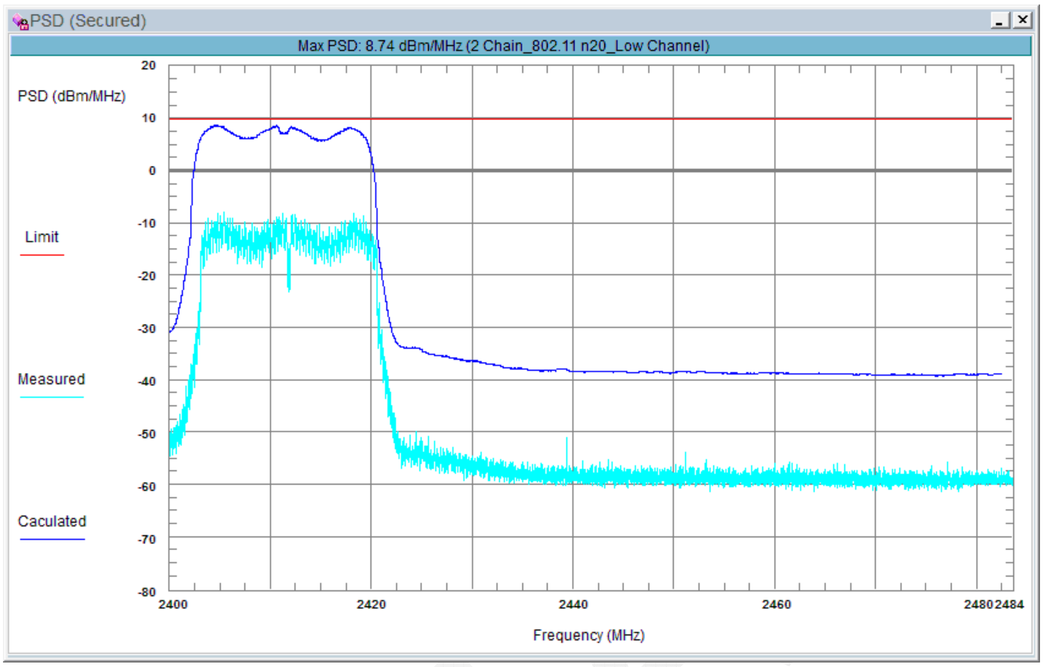
Antenna1, 802.11g-Middle Channel



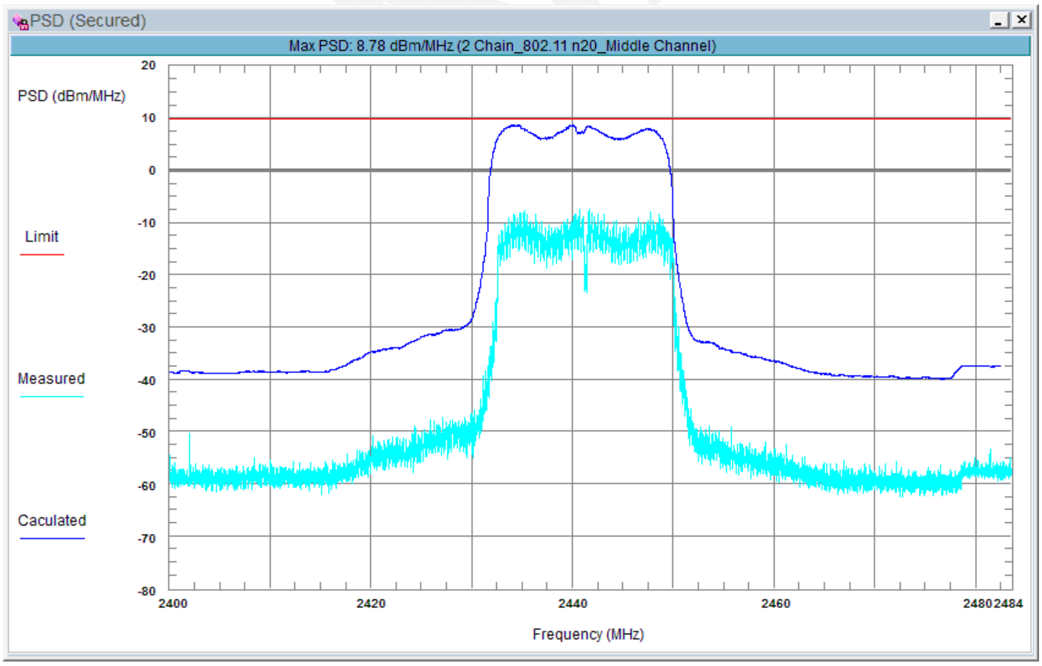
Antenna1, 802.11g-High Channel



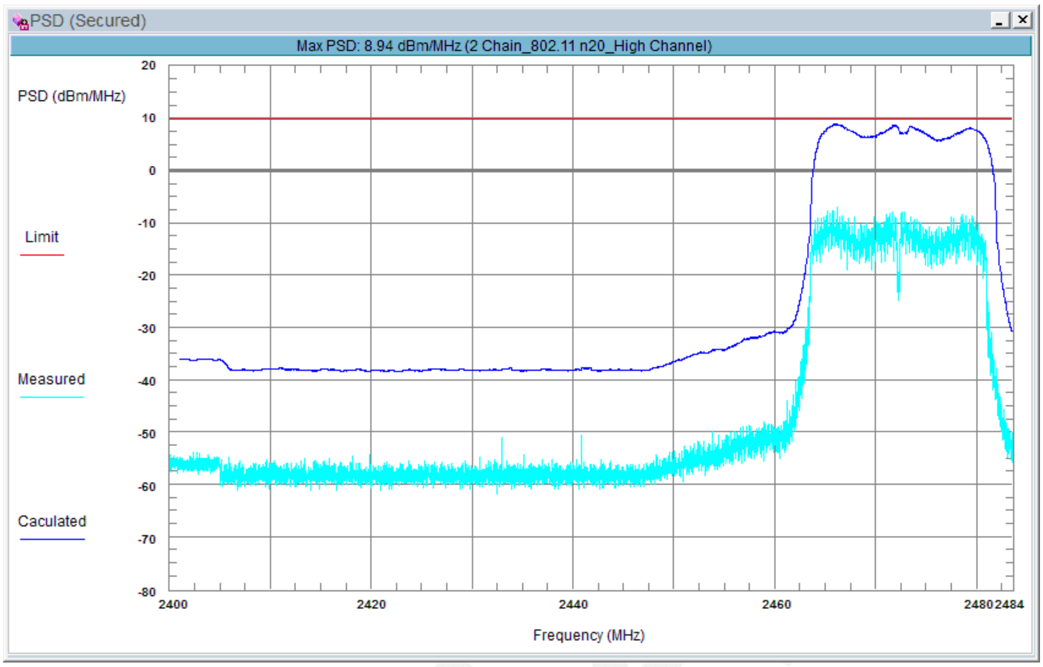
802.11n20-Low Channel



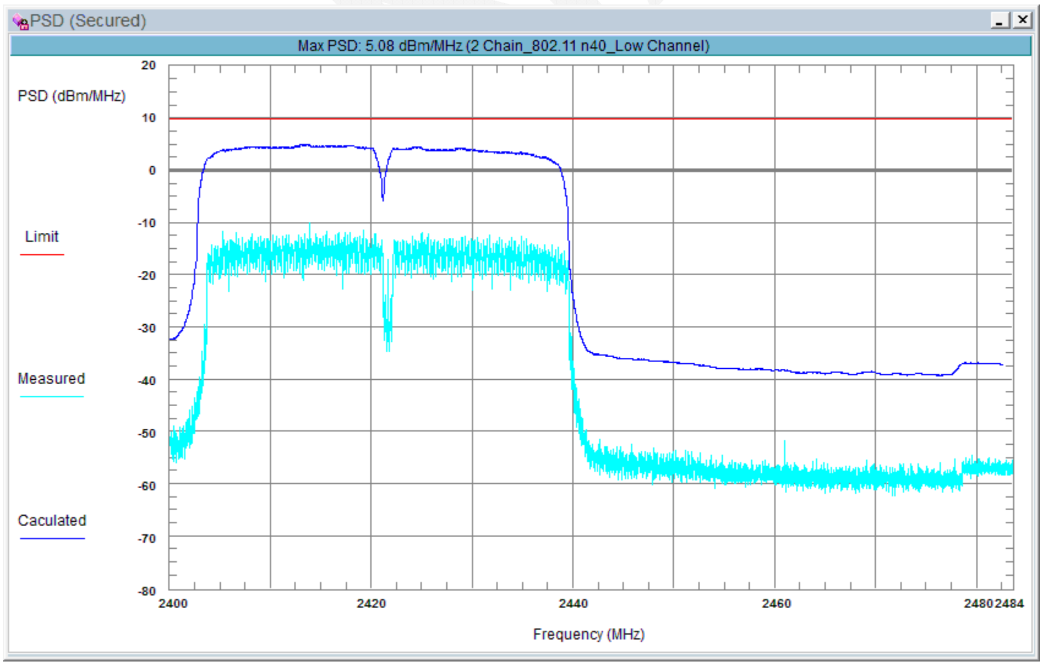
802.11n20-Middle Channel



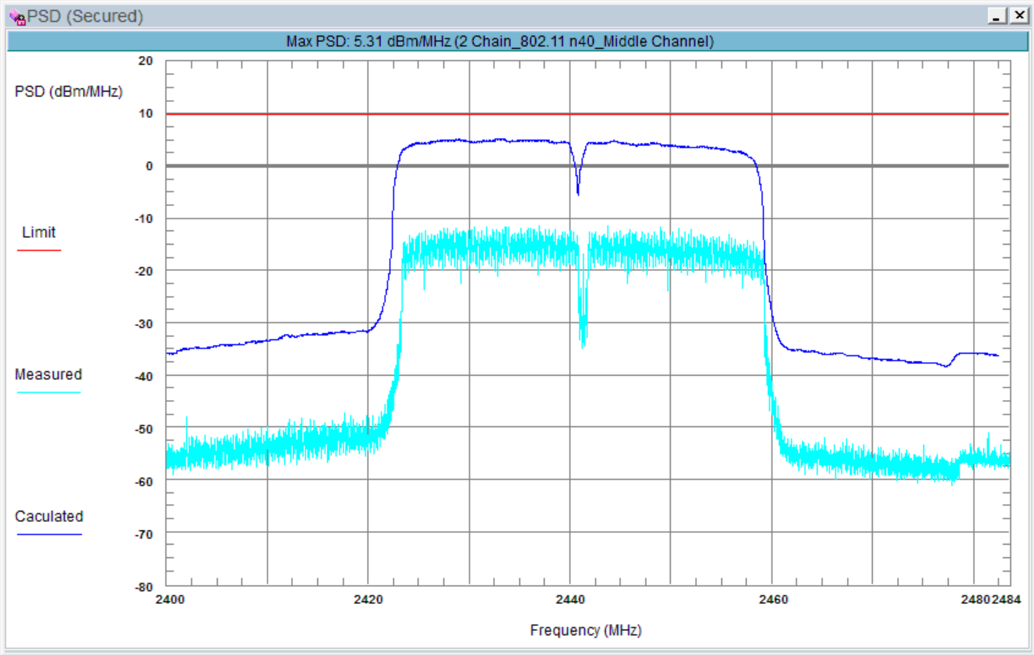
802.11n20-High Channel



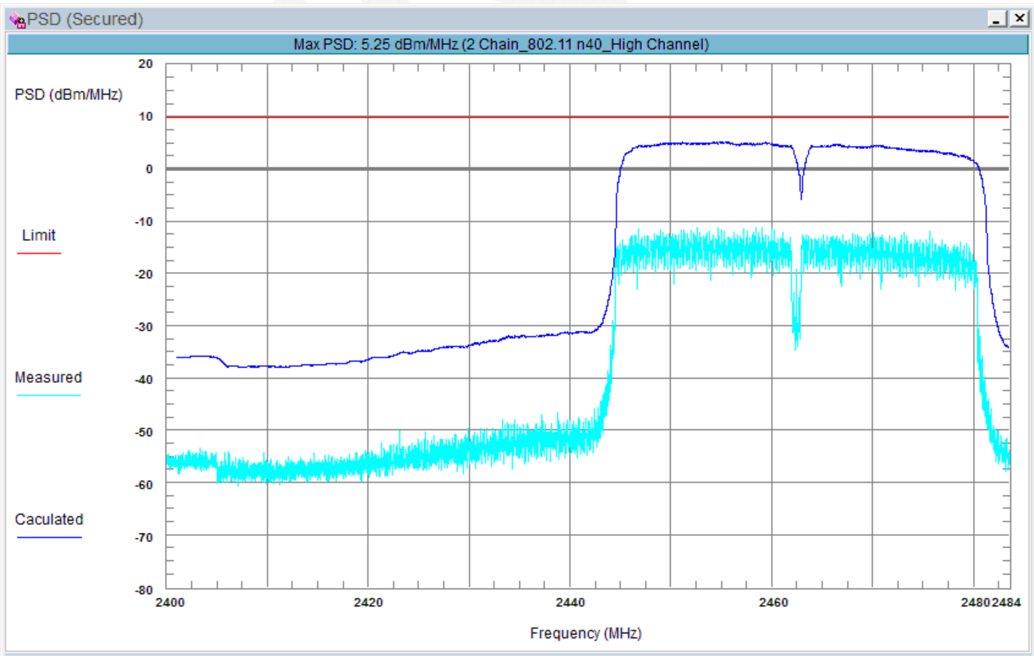
802.11n40-Low Channel



802.11n40-Middle Channel



802.11n40-High Channel



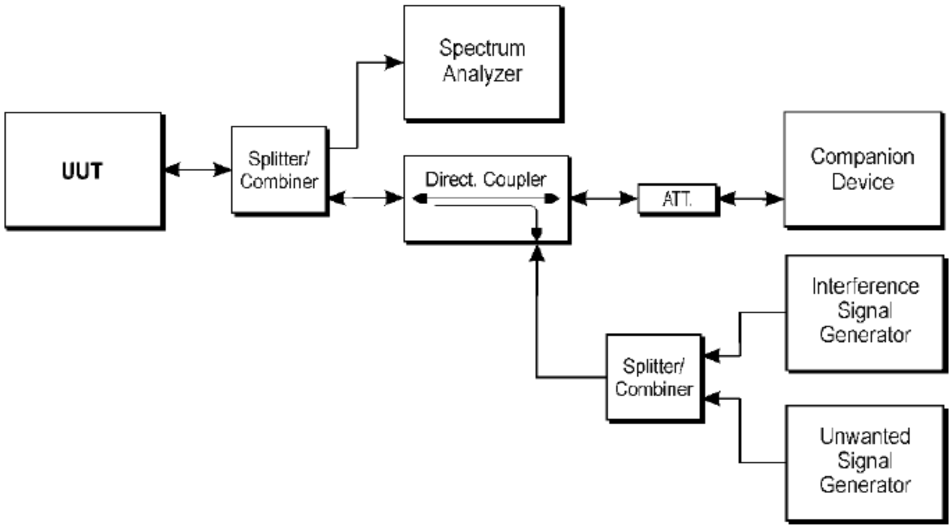
ETSI EN 300 328 V2.1.1 (2016-11) §4.3.2.6 - ADAPTIVITY

Applicable Standard

LBT based Detect and Avoid:

LBT based Detect and Avoid is a mechanism by which equipment using wide band modulations other than FHSS, avoids transmissions in a channel in the presence of other transmissions in that channel. This mechanism shall operate as intended in the presence of an unwanted signal on frequencies other than those of the operating band.

Test Setup Block diagram



Test Procedure

The measurement procedure refer to ETSI EN 300 328 V2.1.1 (2016-11) §5.4.6.2

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	101121	2017/3/2	2018/3/2
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/
/	ATKKPING	V1.9.9.10	/	/	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.4~27.5 °C
Relative Humidity:	55~64 %
ATM Pressure:	100.8~100.9 kPa

The testing was performed by Swim Lv from 2017-11-11 to 2017-11-13.

Test Mode: Connect to Laptop

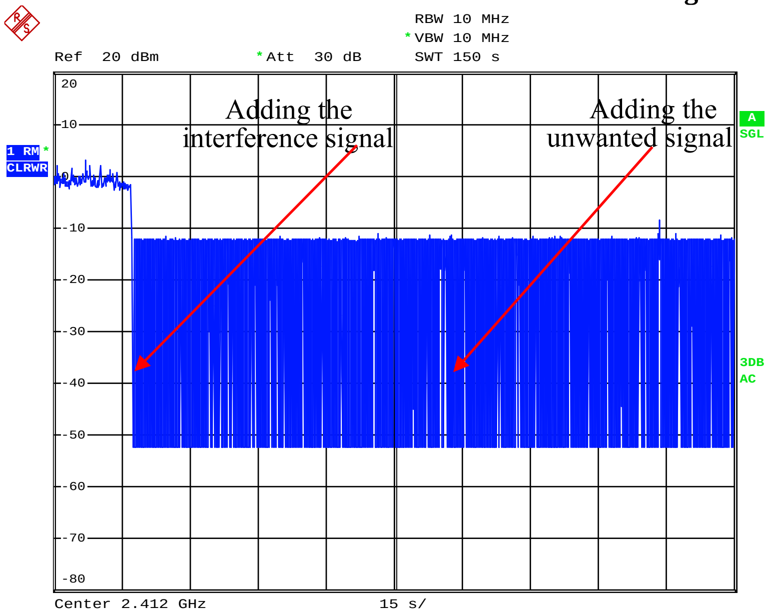
Test Result: Compliance, Please refer to the following table and plots:

Mode	Channel	Maximum Channel Occupancy Time (COT) (ms)		Clear Channel Assessment(CCA)(us)		Short Control Signalling Transmissions (SCST) (ms)	
		Measured	Limits	Measured	Limits	Measured	Limits
802.11b	L	3.910	<13	40.00	>18	1.9	5
	H	2.468		48.00		1.9	5
802.11g	L	2.484	<13	36.00	>18	1.9	5
	H	2.486		46.00		1.9	5
802.11 n20	L	2.904	<13	24.00	>18	2.3	5
	H	2.724		24.00		2.3	5
802.11 n40	L	2.890	<13	30.00	>18	2.3	5
	H	2.134		22.00		2.3	5

802.11b

Low Channel

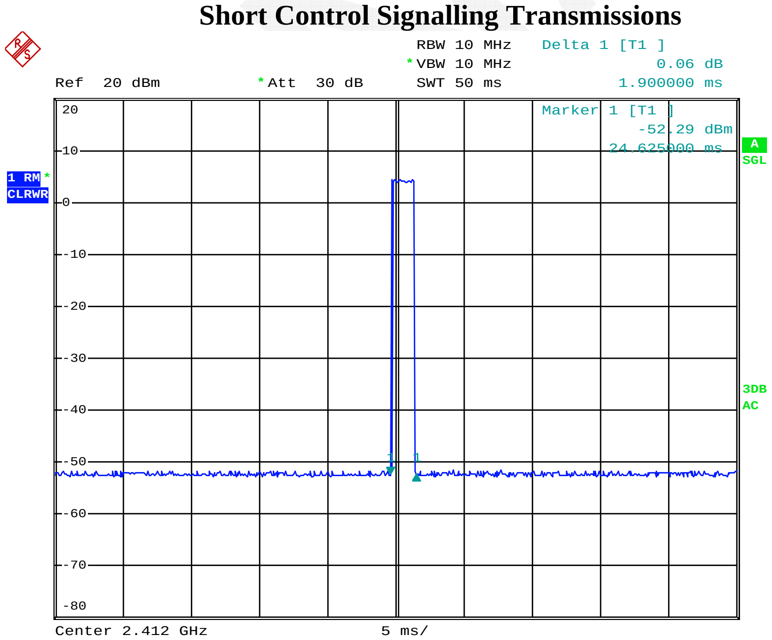
Reaction to the interference and unwanted signal



Date: 11.NOV.2017 15:39:07

Low Channel

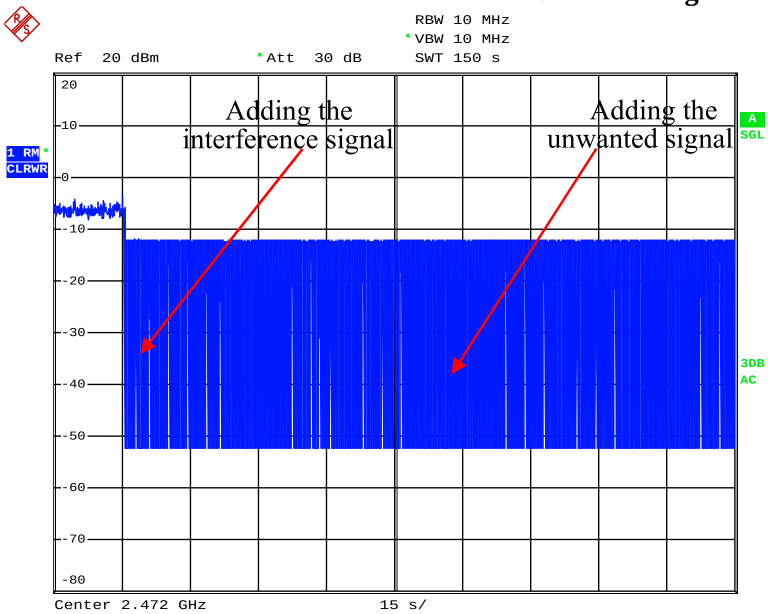
Short Control Signalling Transmissions



Date: 11.NOV.2017 15:39:46

High Channel

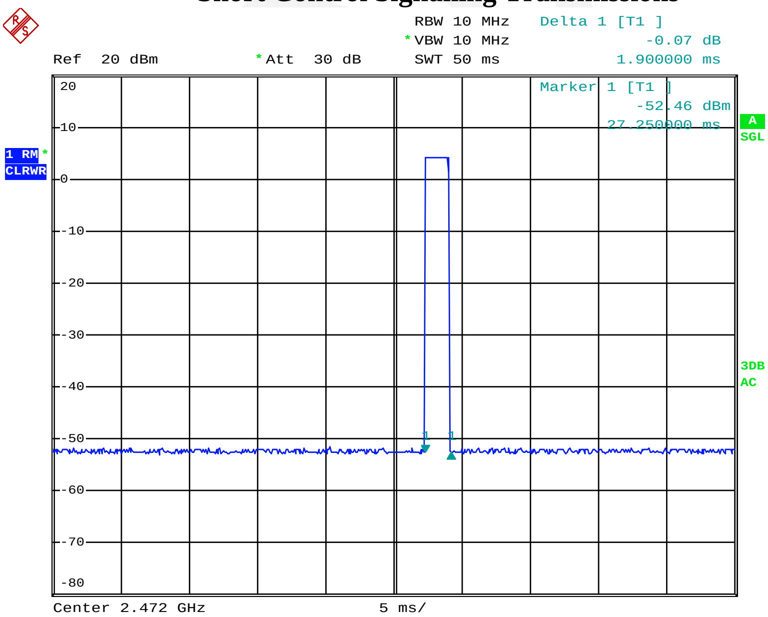
Reaction to the interference and unwanted signal



Date: 11.NOV.2017 15:50:06

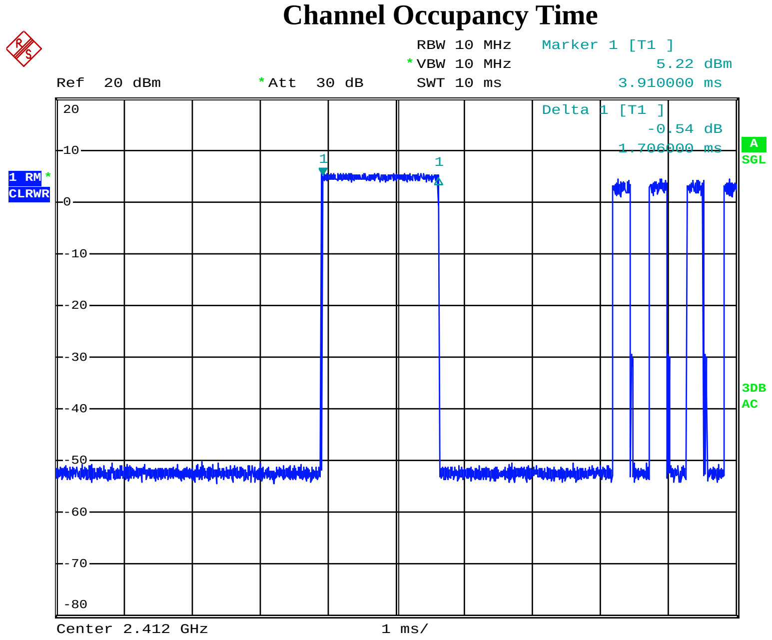
High Channel

Short Control Signalling Transmissions



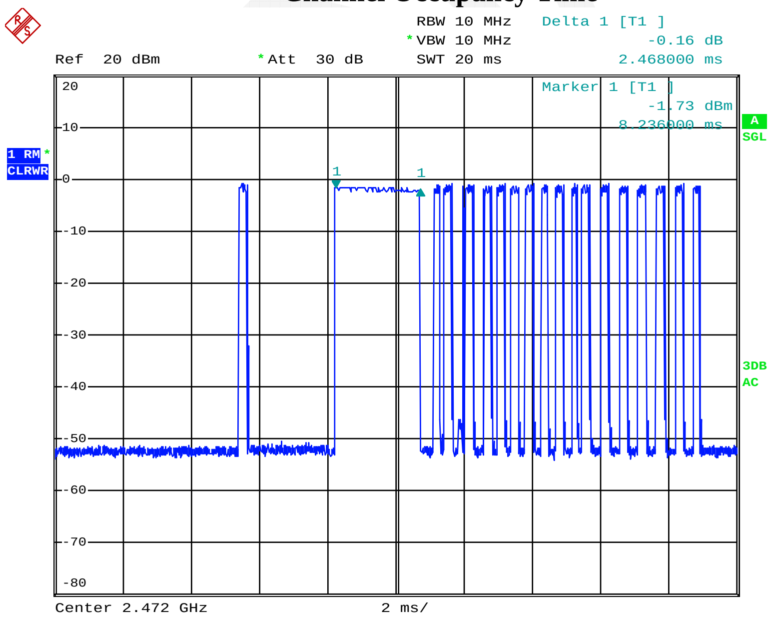
Date: 11.NOV.2017 15:50:40

Low Channel
Channel Occupancy Time



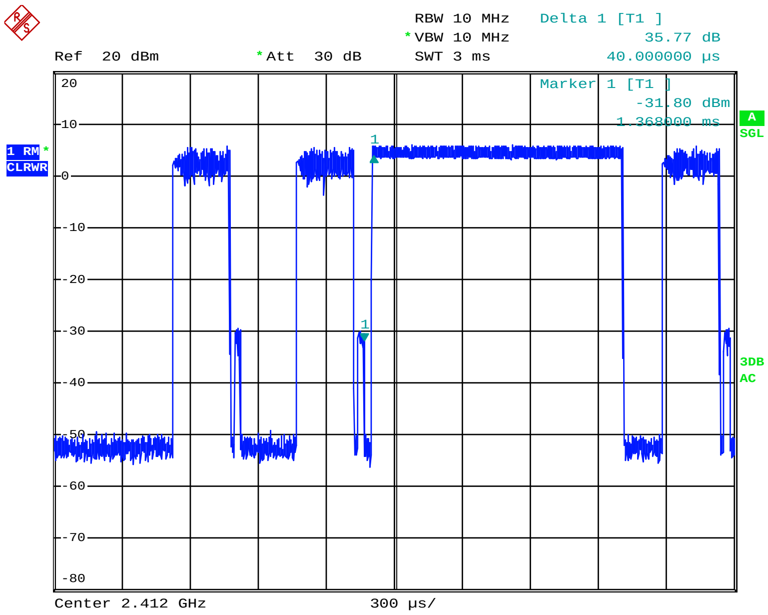
Date: 13.NOV.2017 08:54:22

High Channel
Channel Occupancy Time



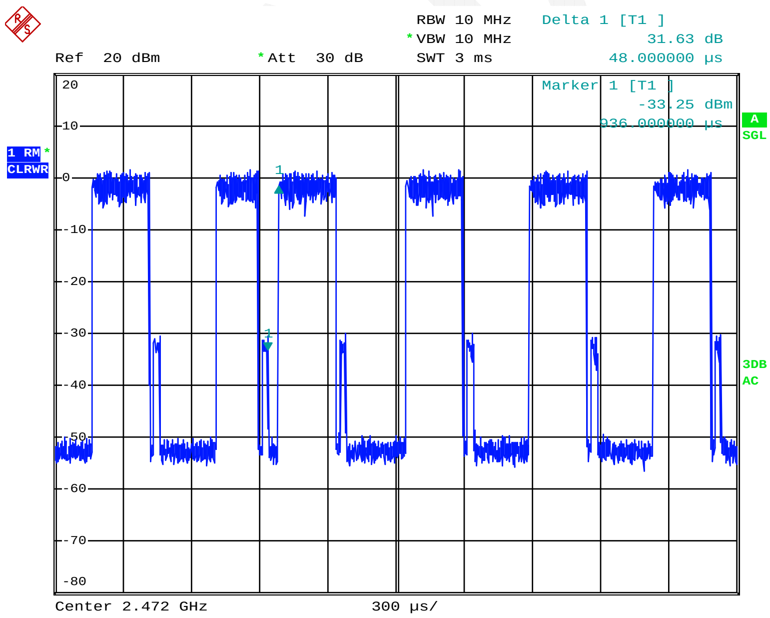
Date: 13.NOV.2017 09:20:19

Low Channel CCA



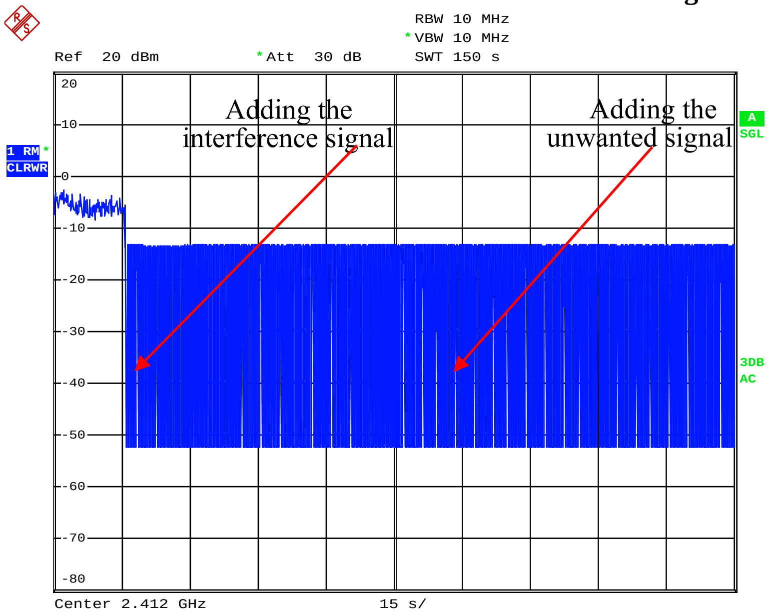
Date: 13.NOV.2017 08:45:16

High Channel CCA



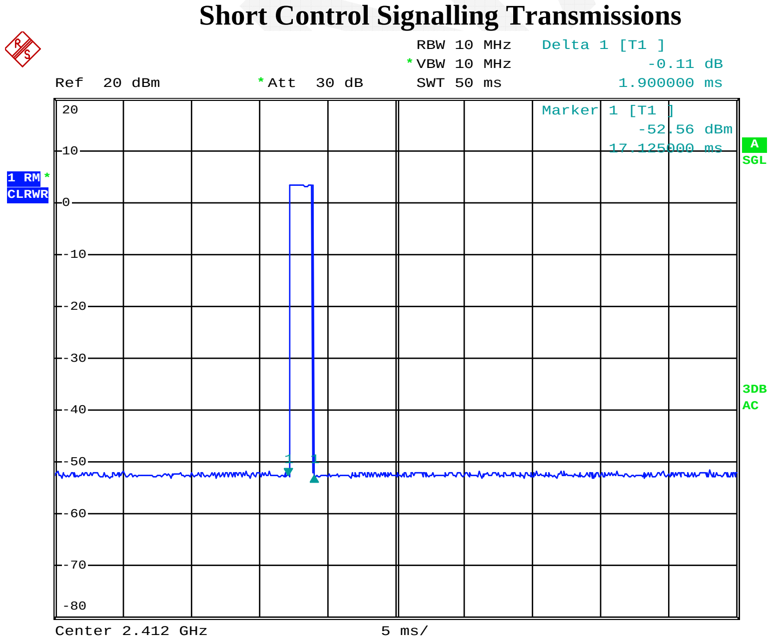
Date: 13.NOV.2017 09:06:32

802.11g
Low Channel
Reaction to the interference and unwanted signal



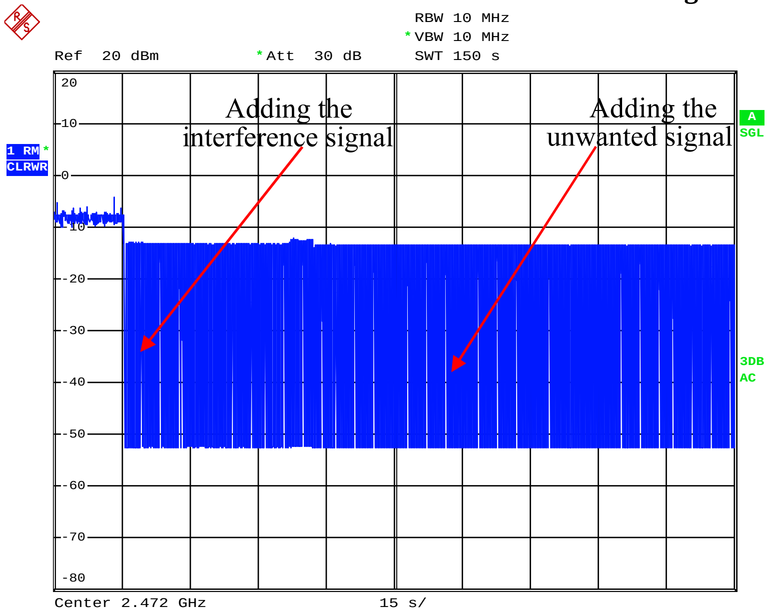
Date: 11.NOV.2017 16:23:16

Low Channel
Short Control Signalling Transmissions



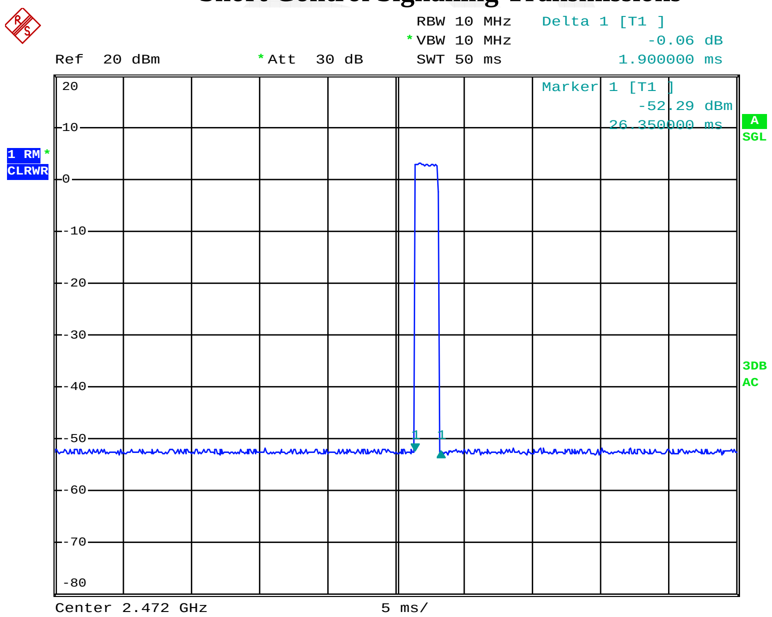
Date: 11.NOV.2017 16:23:51

High Channel
Reaction to the interference and unwanted signal



Date: 11.NOV.2017 16:27:46

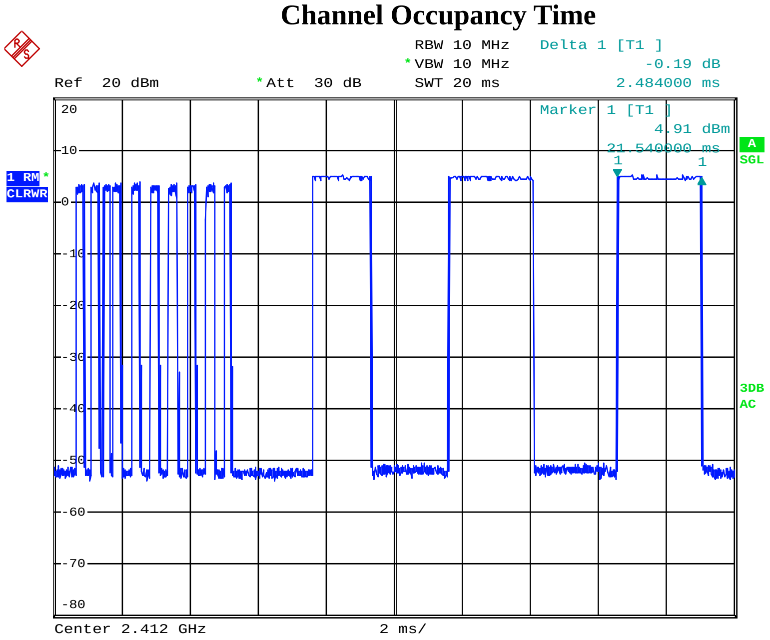
High Channel
Short Control Signalling Transmissions



Date: 11.NOV.2017 16:28:21

Low Channel

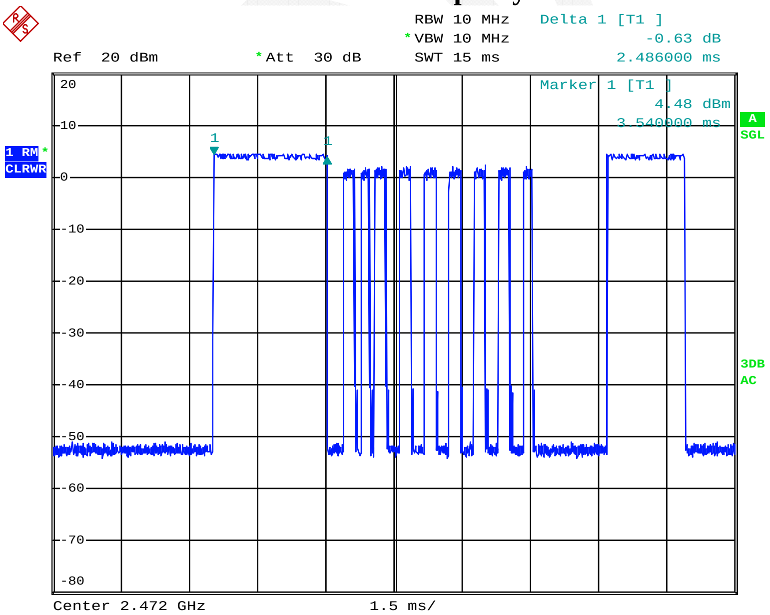
Channel Occupancy Time



Date: 13.NOV.2017 09:29:55

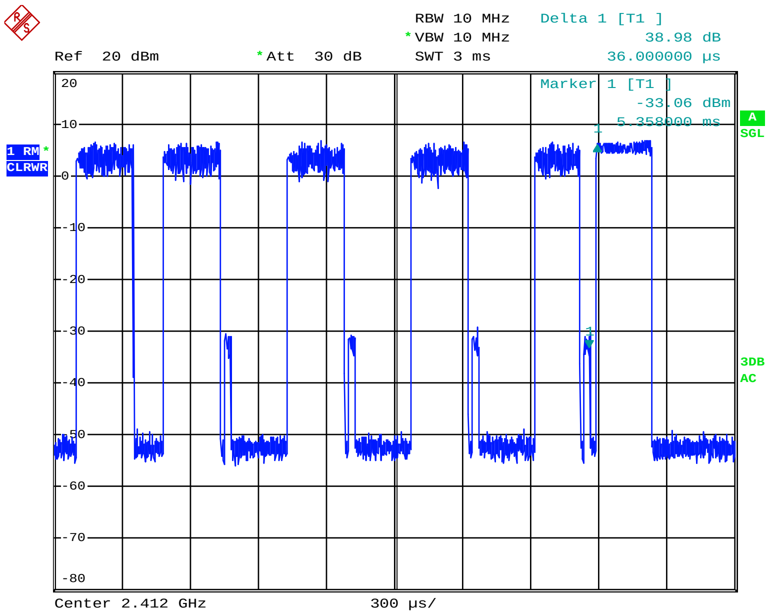
High Channel

Channel Occupancy Time



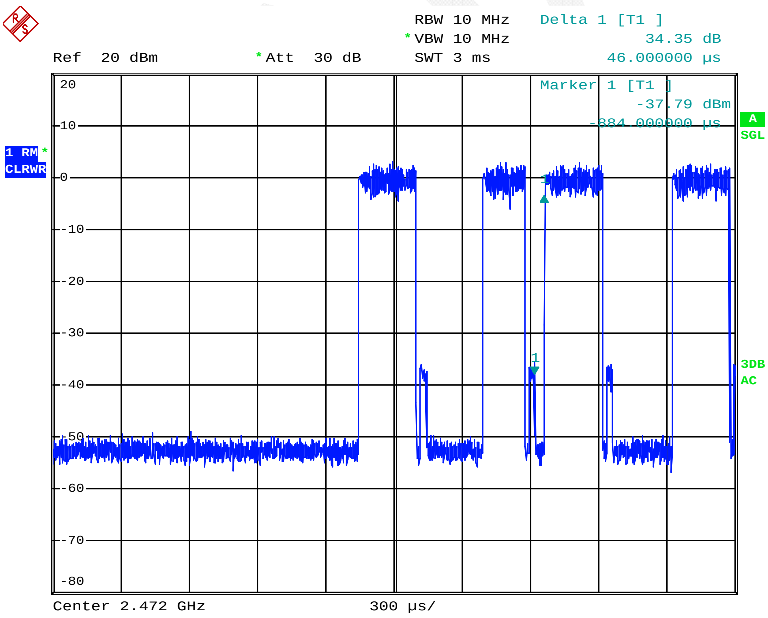
Date: 13.NOV.2017 09:53:32

Low Channel CCA



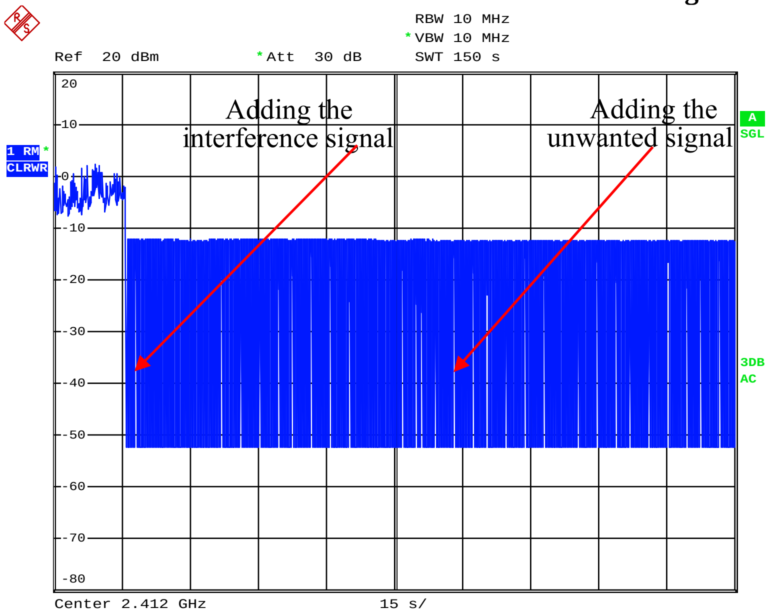
Date: 13.NOV.2017 09:25:26

High Channel CCA



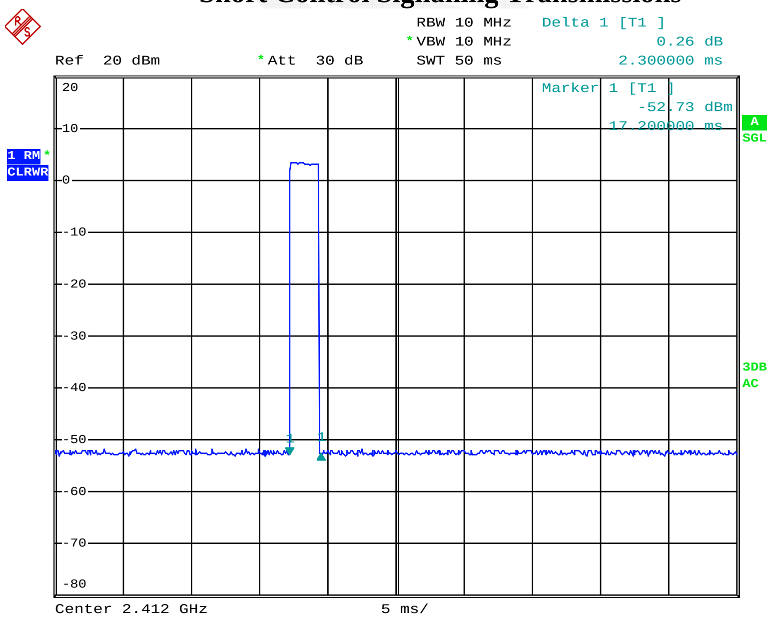
Date: 13.NOV.2017 09:47:06

802.11n ht20
Low Channel
Reaction to the interference and unwanted signal



Date: 11.NOV.2017 16:32:01

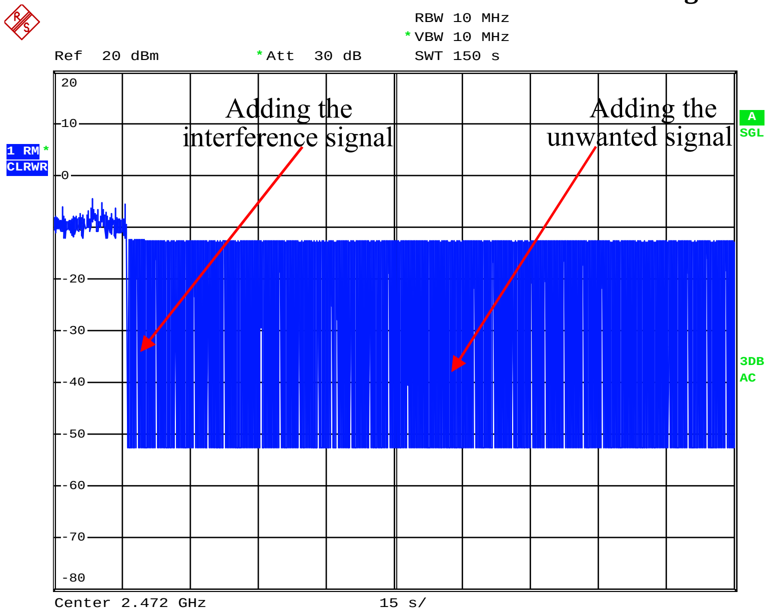
Low Channel
Short Control Signalling Transmissions



Date: 11.NOV.2017 16:32:26

High Channel

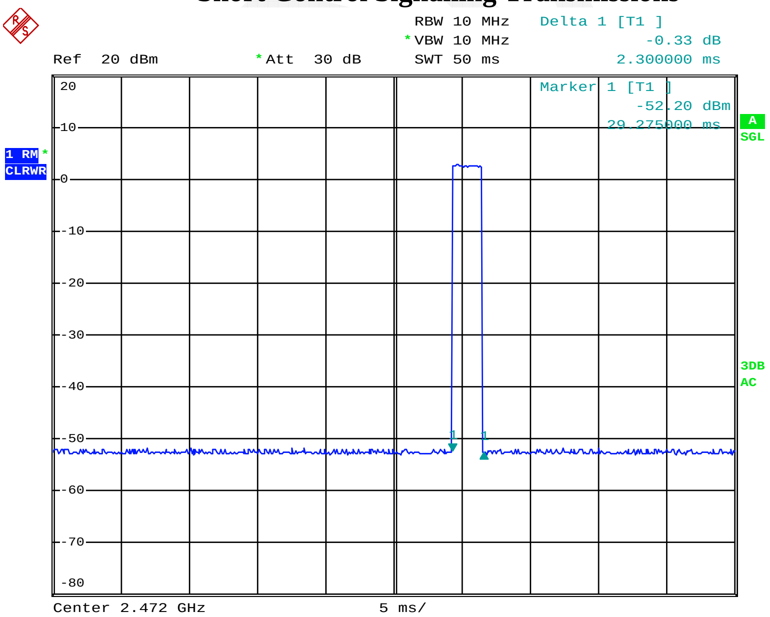
Reaction to the interference and unwanted signal



Date: 11.NOV.2017 16:36:57

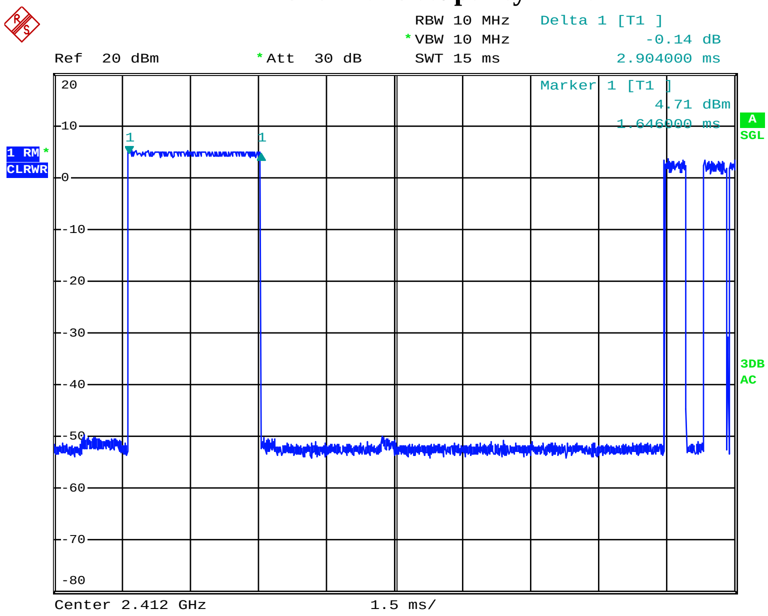
High Channel

Short Control Signalling Transmissions



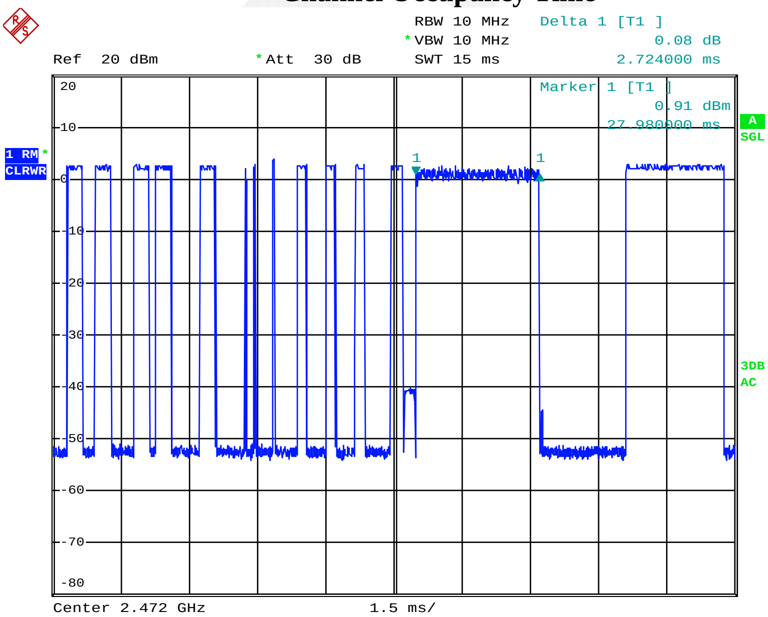
Date: 11.NOV.2017 16:37:37

Low Channel
Channel Occupancy Time



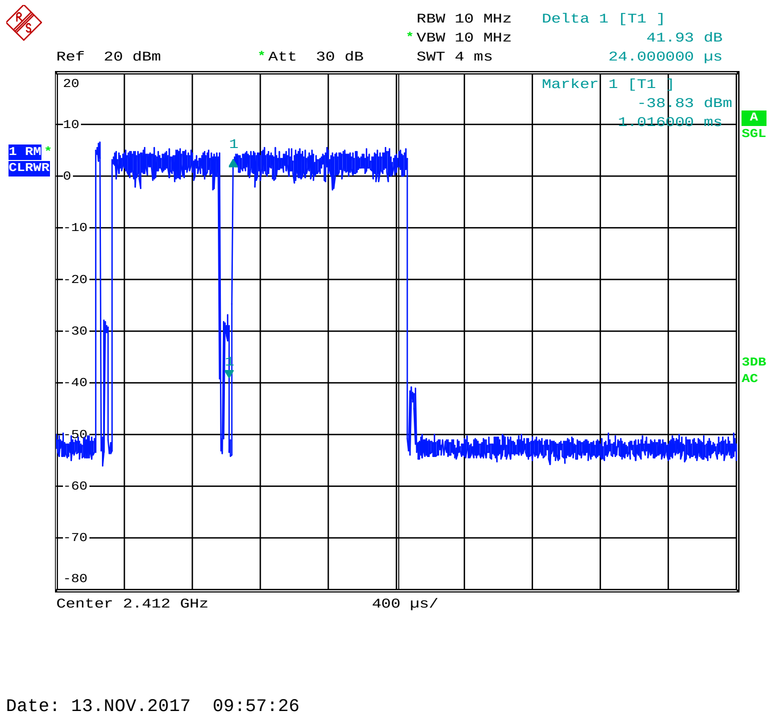
Date: 13.NOV.2017 09:58:55

High Channel
Channel Occupancy Time

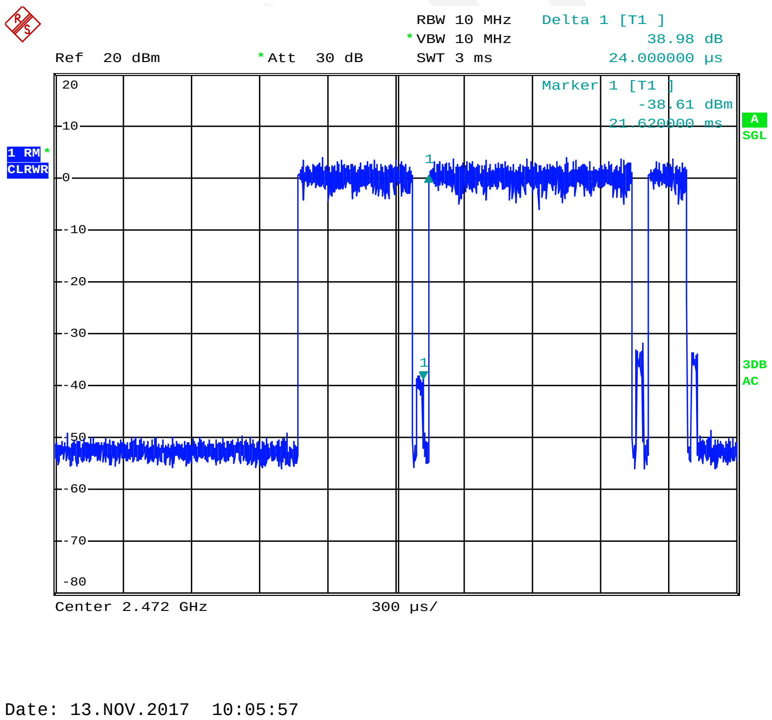


Date: 13.NOV.2017 10:08:22

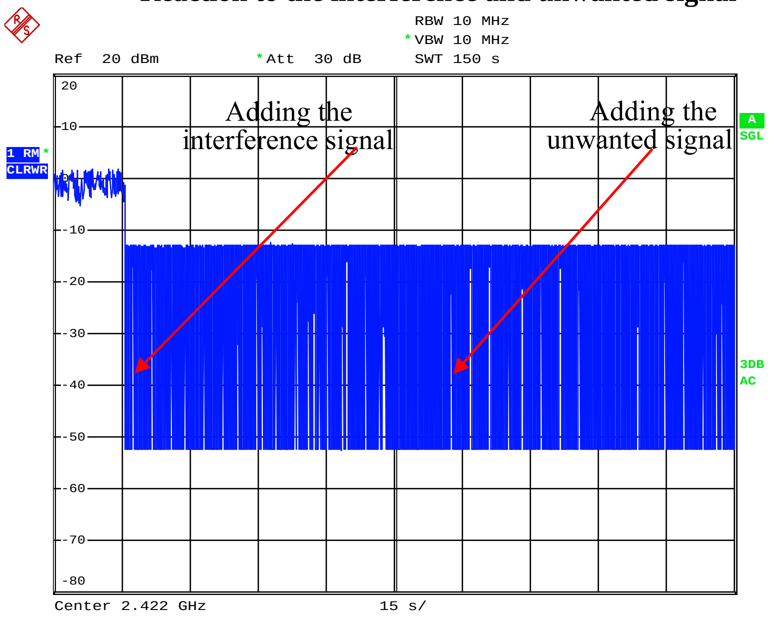
Low Channel CCA



High Channel CCA

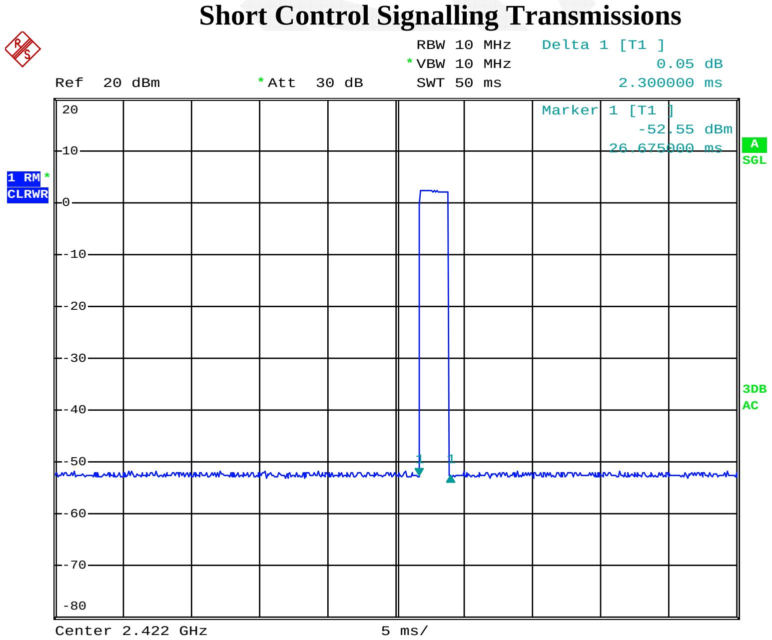


802.11n ht40
Low Channel
Reaction to the interference and unwanted signal



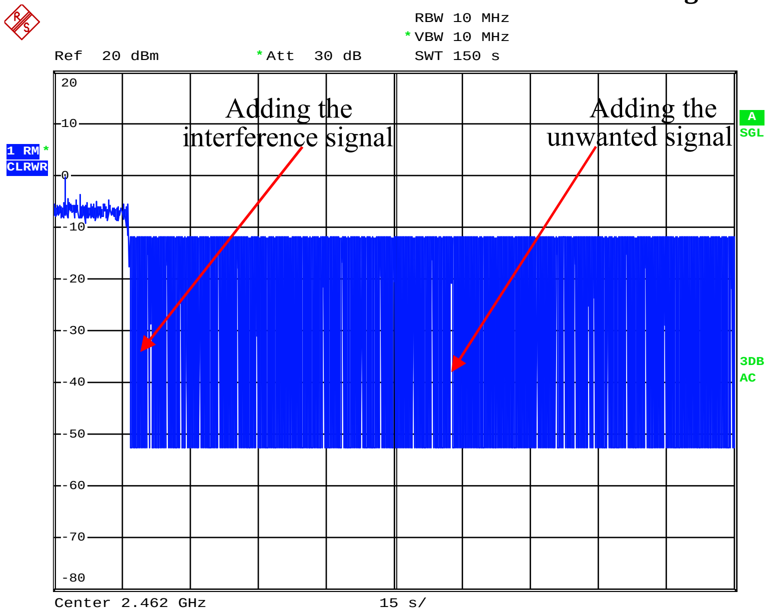
Date: 11.NOV.2017 16:44:53

Low Channel
Short Control Signalling Transmissions



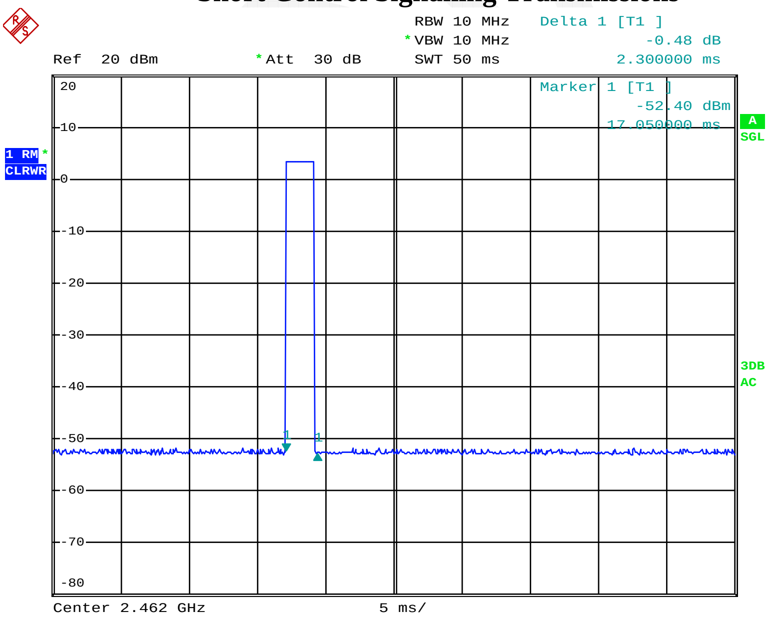
Date: 11.NOV.2017 16:45:18

High Channel
Reaction to the interference and unwanted signal



Date: 11.NOV.2017 16:50:34

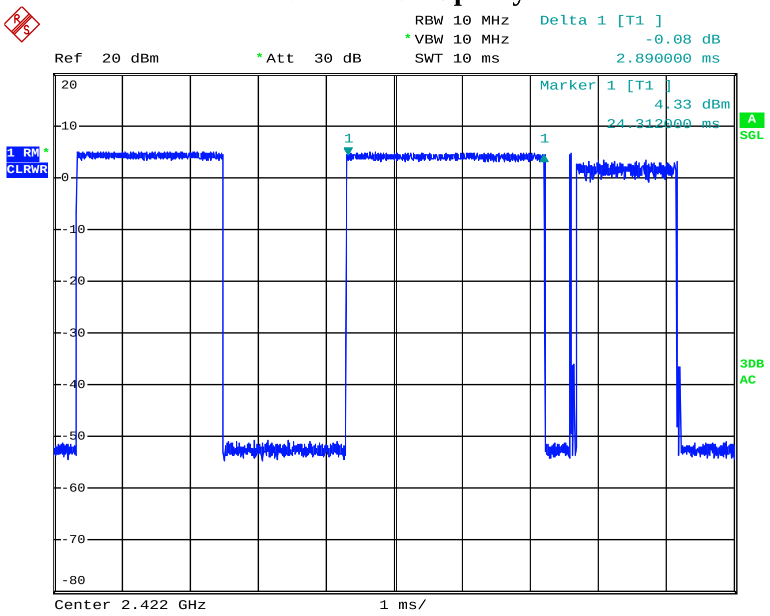
High Channel
Short Control Signalling Transmissions



Date: 11.NOV.2017 16:50:58

Low Channel

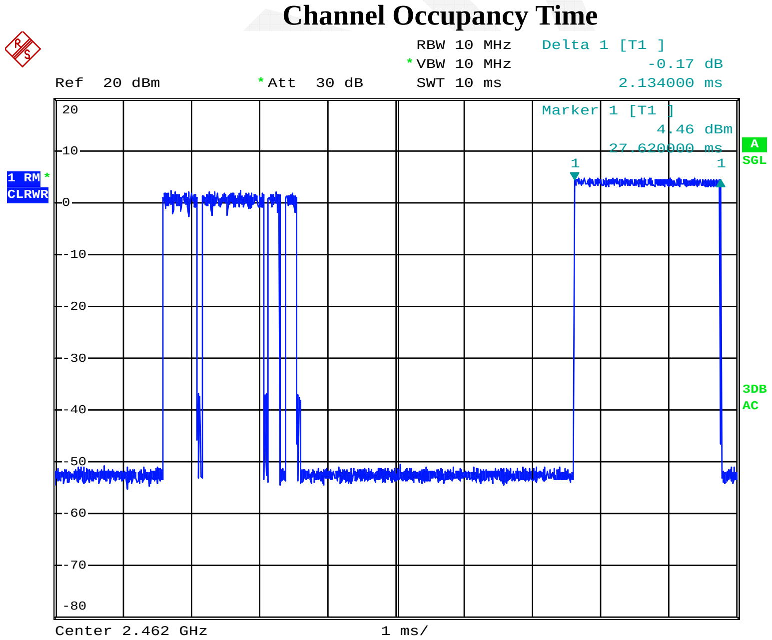
Channel Occupancy Time



Date: 13.NOV.2017 10:22:59

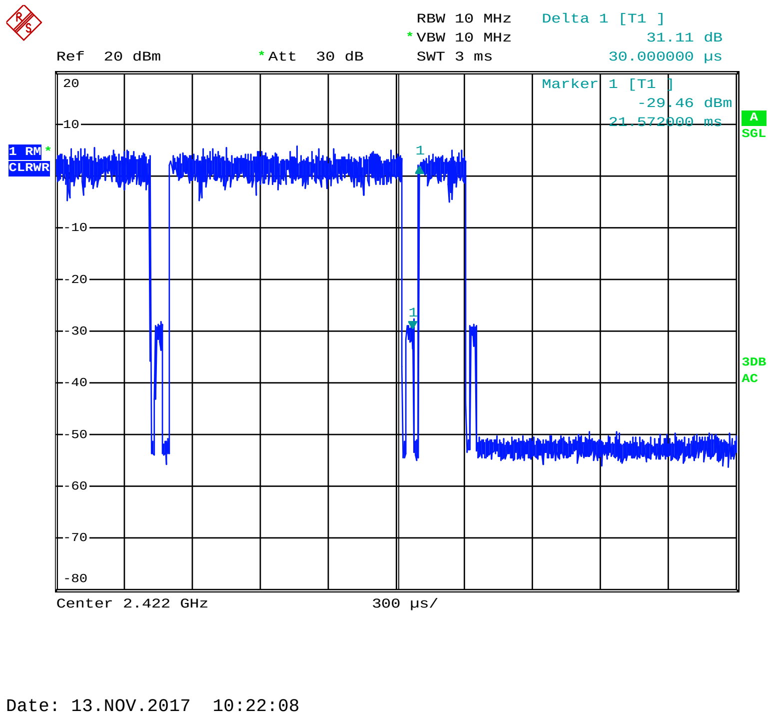
High Channel

Channel Occupancy Time

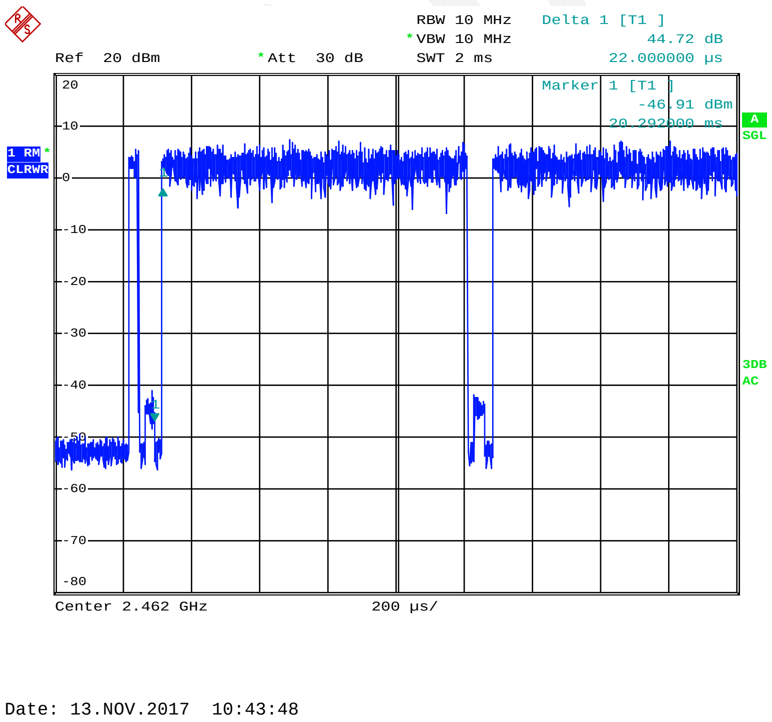


Date: 13.NOV.2017 10:48:11

Low Channel CCA



High Channel CCA



ETSI EN 300 328 V2.1.1 (2016-11) §4.3.2.7 – OCCUPIED CHANNEL BANDWIDTH

Applicable Standard

According to ETSI EN 300 328 V2.1.1 (2016-11)§4.3.2.7.2, the occupied channel bandwidth is the bandwidth that contains 99 % of the power of the signal.

Limit:

The Occupied Channel Bandwidth shall fall completely within the band given in clause 1.
In addition, for non-adaptive equipment using wide band modulations other than FHSS and with e.i.r.p greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

Test Procedure

The measurement procedure shall be as follows:

Step 1:

Connect the UUT to the spectrum analyser and use the following settings:

- Centre Frequency: The centre frequency of the channel under test
- Resolution BW: ~ 1 % of the span without going below 1 %
- Video BW: 3 × RBW
- Frequency Span: 2 × Nominal Channel Bandwidth
- Detector Mode: RMS
- Trace Mode: Max Hold
- Sweep time: 1 s

Step 2:

Wait for the trace to stabilize.
Find the peak value of the trace and place the analyser marker on this peak.

Step 3:

Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.

NOTE: Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	101121	2017/3/2	2018/3/2
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

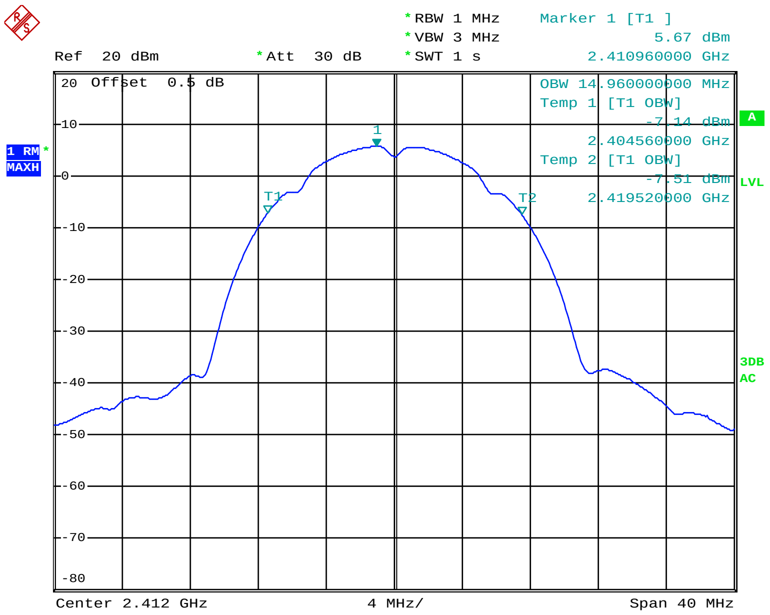
Temperature:	27.5 °C
Relative Humidity:	64 %
ATM Pressure:	100.9 kPa

The testing was performed by Swim Lv on 2017-11-11.

Test Mode: Transmitting (Test performed at antenna 0)

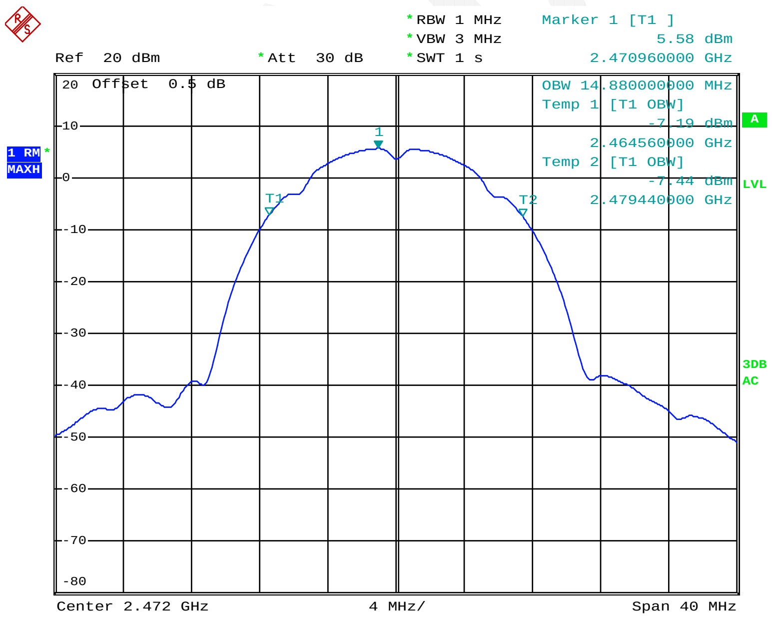
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
802.11b		
Low	2412	14.96
High	2472	14.88
802.11g		
Low	2412	17.28
High	2472	17.28
802.11n-HT20		
Low	2412	18.16
High	2472	18.16
802.11n-HT40		
Low	2422	36.32
High	2462	36.32

802.11b, Low Channel



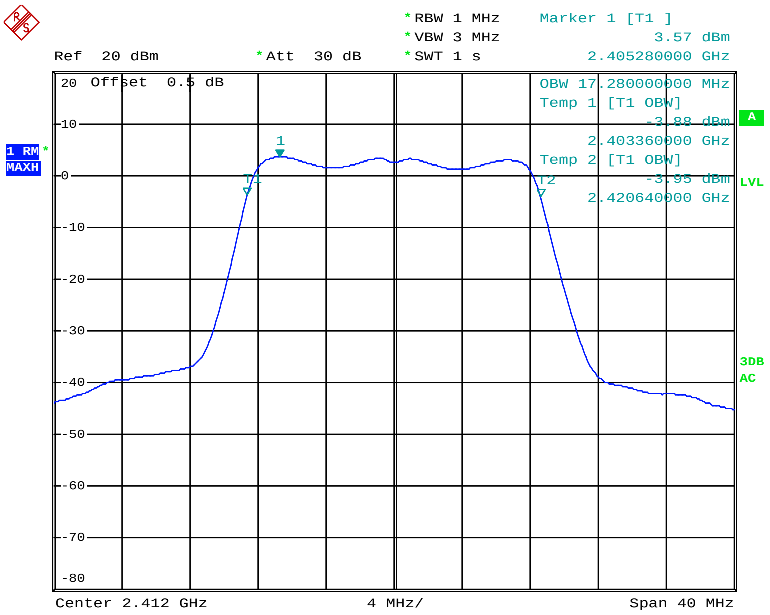
Date: 11.NOV.2017 14:45:43

802.11b, High Channel



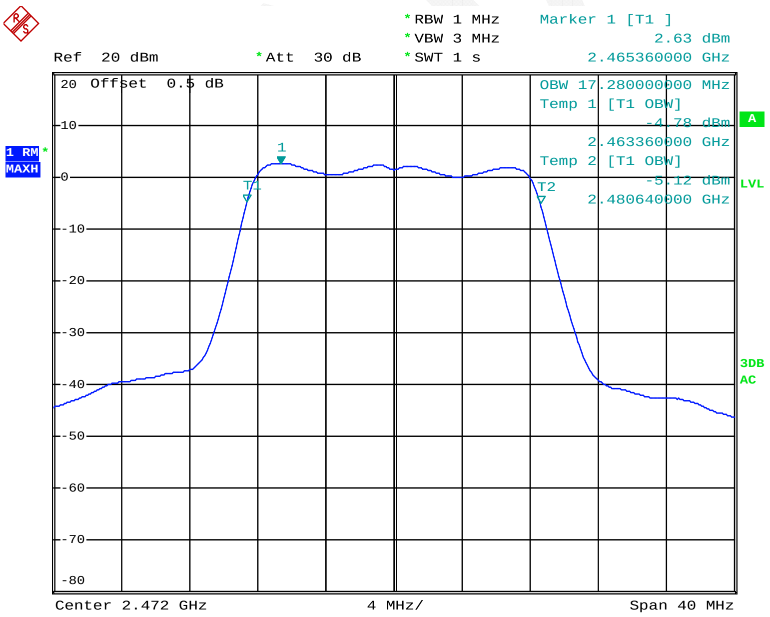
Date: 11.NOV.2017 14:46:06

802.11g, Low Channel



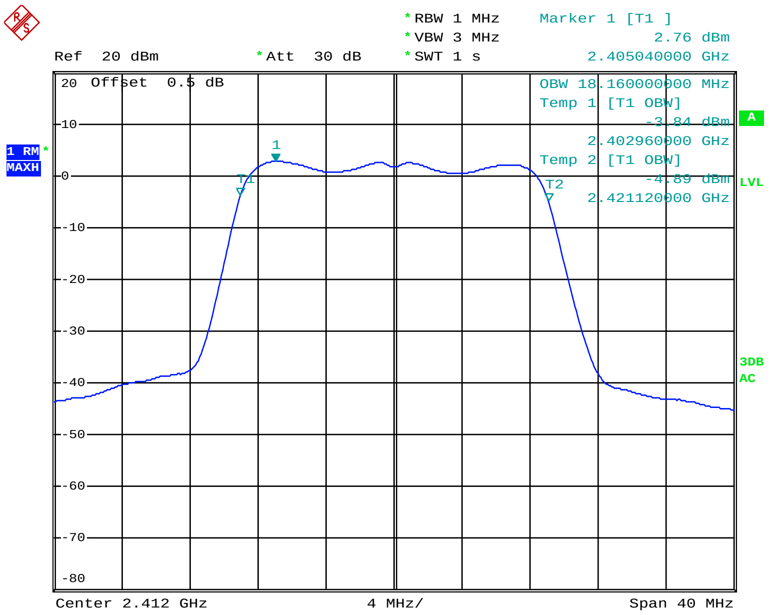
Date: 11.NOV.2017 14:46:50

802.11g, High Channel



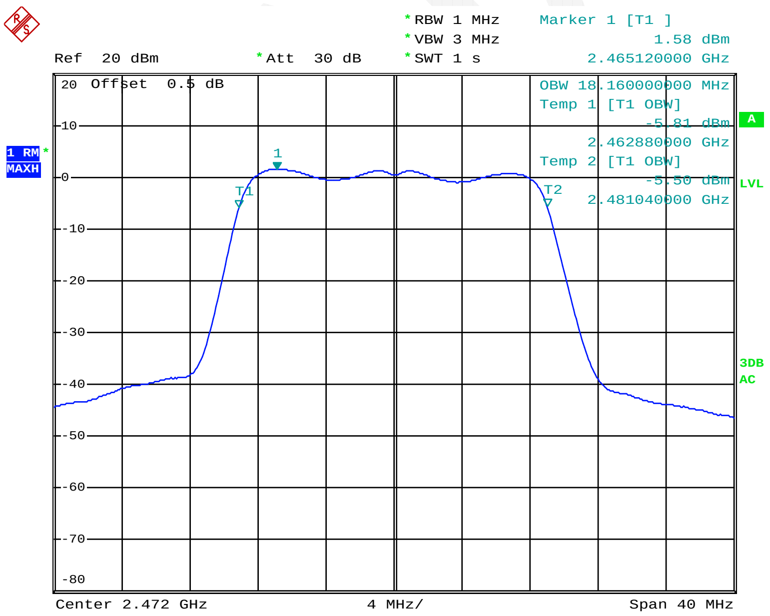
Date: 11.NOV.2017 14:47:56

802.11n20, Low Channel



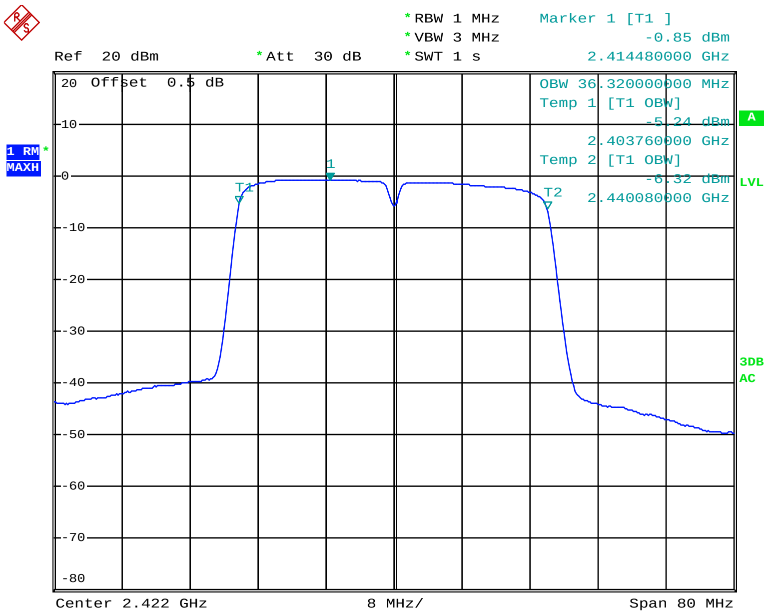
Date: 11.NOV.2017 14:48:38

802.11n20, High Channel



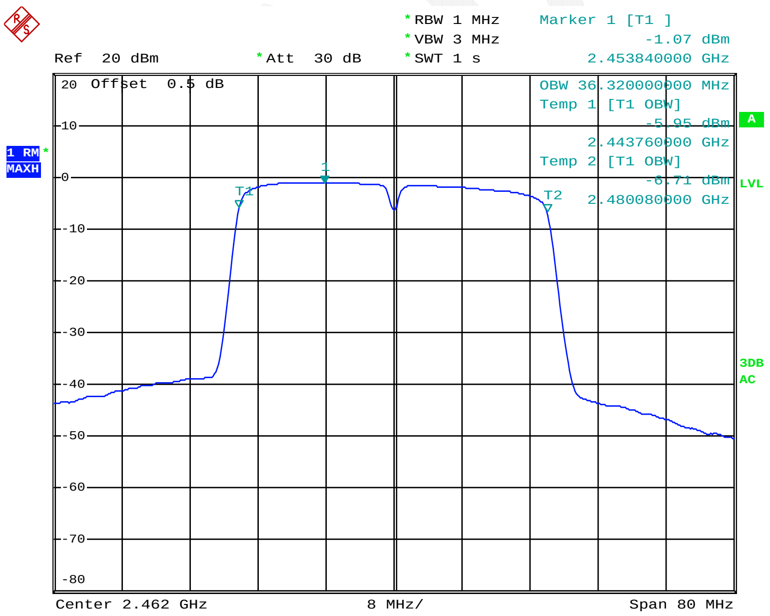
Date: 11.NOV.2017 14:49:31

802.11n40, Low Channel



Date: 11.NOV.2017 14:52:33

802.11n40, High Channel



Date: 11.NOV.2017 14:53:08

ETSI EN 300 328 V2.1.1 (2016-11) §4.3.2.8 – TRANSMITTER UNWANTED EMISSION IN THE OUT-OF-BAND DOMAIN

Applicable Standard

According to ETSI EN 300 328 V2.1.1 (2016-11) §4.3.2.8.2, Transmitter unwanted emissions in the out-of-band domain are emissions when the equipment is in Transmit mode, on frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions.

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.

NOTE: Within the 2 400 MHz to 2 483,5 MHz band, the Out-of-band emissions are fulfilled by compliance with the Occupied Channel Bandwidth requirement in clause 4.3.2.7.

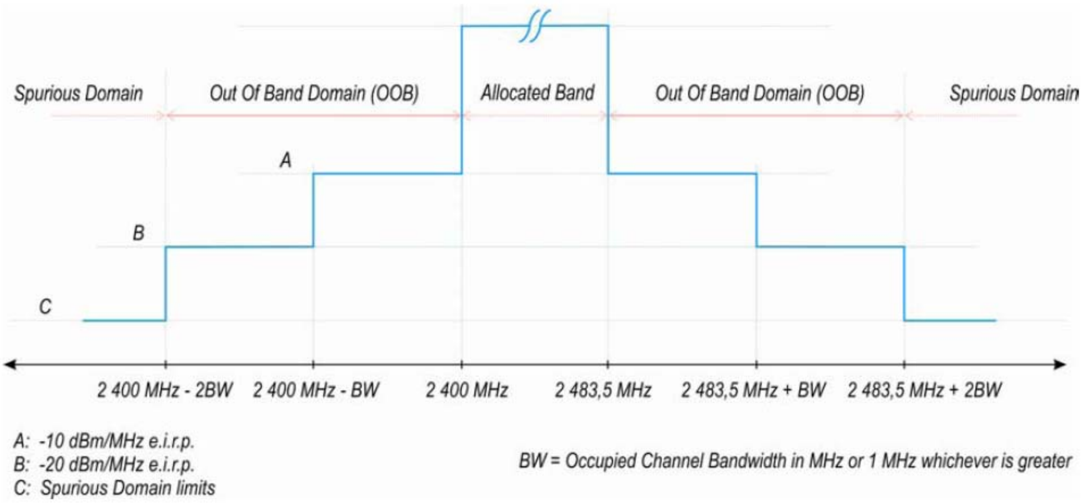


Figure 3: Transmit mask

Test Procedure

According to ETSI EN 300 328 V2.1.1 (2016-11) §5.4.8.2

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	101121	2017/3/2	2018/3/2
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.4 °C
Relative Humidity:	55 %
ATM Pressure:	100.9 kPa

The testing was performed by Swim Lv on 2017-11-10.

Test Mode: Transmitting

Test Result: Compliance.please refer to the following tables:

802.11b mode

Segment	Test Condition		Reading (dBm/MHz)		Antenna Gain	EIRP (dBm/MHz)		Limit
	Temperature	Voltage						
	℃	Vdc	Antenna 0	Antenna 1	dBi	Antenna 0	Antenna 1	dBm/MHz
2483.5 MHz ~2483.5 MHz + BW	25	12	-30.07	-31.58	5	-25.07	-26.58	-10
	0	12	-34.69	-34.69	5	-29.69	-29.69	
	40	12	-35.47	-34.47	5	-30.47	-29.47	
2483.5 MHz + BW~ 2483.5 MHz + 2BW	25	12	-34.28	-35.18	5	-29.28	-30.18	-20
	0	12	-31.69	-31.69	5	-26.69	-26.69	
	40	12	-35.47	-37.47	5	-30.47	-32.47	
2400MHz - BW ~2400 MHz	25	12	-31.92	-32.48	5	-26.92	-27.48	-10
	0	12	-33.69	-31.69	5	-28.69	-26.69	
	40	12	-35.47	-34.47	5	-30.47	-29.47	
2400 MHz - 2BW ~2400 MHz - BW	25	12	-35.15	-34.58	5	-30.15	-29.58	-20
	0	12	-31.69	-34.69	5	-26.69	-29.69	
	40	12	-36.47	-37.47	5	-31.47	-32.47	

802.11g mode

Segment	Test Condition		Reading (dBm/MHz)		Antenna Gain	EIRP (dBm/MHz)		Limit
	Temperature	Voltage						
	℃	Vdc	Antenna 0	Antenna 1	dBi	Antenna 0	Antenna 1	dBm/MHz
2483.5 MHz ~2483.5 MHz + BW	25	12	-31.16	-30.28	5	-26.16	-25.28	-10
	0	12	-30.56	-33.69	5	-25.56	-28.69	
	40	12	-32.49	-36.47	5	-27.49	-31.47	
2483.5 MHz + BW~ 2483.5 MHz + 2BW	25	12	-32.68	-34.67	5	-27.68	-29.67	-20
	0	12	-31.59	-33.68	5	-26.59	-28.68	
	40	12	-33.56	-32.79	5	-28.56	-27.79	
2400MHz - BW ~2400 MHz	25	12	-29.04	-31.59	5	-24.04	-26.59	-10
	0	12	-28.00	-37.65	5	-23.00	-32.65	
	40	12	-31.28	-33.97	5	-26.28	-28.97	
2400 MHz - 2BW ~2400 MHz - BW	25	12	-33.89	-32.80	5	-28.89	-27.80	-20
	0	12	-32.97	-34.85	5	-27.97	-29.85	
	40	12	-35.59	-36.41	5	-30.59	-31.41	

802.11n20 mode

Segment	Test Condition		Reading	Antenna Gain	EIRP	Limit
	Temperature	Voltage				
	℃	Vdc	(dBm/MHz)	dBi	(dBm/MHz)	dBm/MHz
2483.5 MHz ~2483.5 MHz + BW	25	12	-31.20	5	-26.20	-10
	0	12	-36.47	5	-31.47	
	40	12	-34.67	5	-29.67	
2483.5 MHz + BW~ 2483.5 MHz + 2BW	25	12	-32.80	5	-27.80	-20
	0	12	-37.47	5	-32.47	
	40	12	-34.67	5	-29.67	
2400MHz - BW~2400 MHz	25	12	-27.38	5	-22.38	-10
	0	12	-35.47	5	-30.47	
	40	12	-35.67	5	-30.67	
2400 MHz - 2BW ~2400 MHz - BW	25	12	-33.65	5	-28.65	-20
	0	12	-34.47	5	-29.47	
	40	12	-34.67	5	-29.67	

802.11n40 mode

Segment	Test Condition		Reading	Antenna Gain	EIRP	Limit
	Temperature	Voltage				
	℃	Vdc	(dBm/MHz)	dBi	(dBm/MHz)	dBm/MHz
2483.5 MHz ~2483.5 MHz + BW	25	12	-32.63	5	-27.63	-10
	0	12	-33.80	5	-28.80	
	40	12	-35.85	5	-30.85	
2483.5 MHz + BW~ 2483.5 MHz + 2BW	25	12	-33.65	5	-28.65	-20
	0	12	-31.80	5	-26.80	
	40	12	-34.85	5	-29.85	
2400MHz - BW ~2400 MHz	25	12	-28.94	5	-23.94	-10
	0	12	-30.80	5	-25.80	
	40	12	-35.85	5	-30.85	
2400 MHz - 2BW ~2400 MHz - BW	25	12	-30.89	5	-25.89	-20
	0	12	-31.80	5	-26.80	
	40	12	-32.85	5	-27.85	

ETSI EN 300 328 V2.1.1 (2016-11)§4.3.2.9 – TRANSMITTER UNWANTED EMISSION IN THE SPURIOUS DOMAIN

Applicable Standard

Transmitter unwanted emissions in the spurious domain are emissions outside the allocated band and outside the Out-of-band Domain as indicated in figure 3 when the equipment is in Transmit mode.

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in the following table.

Transmitter limits for spurious emissions

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

NOTE: In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted) and to the emissions radiated by the cabinet. In case of integral antenna equipment (without temporary antenna connectors), these limits apply to emissions radiated by the equipment.

Test Procedure

According to ETSI EN 300 328 V2.1.1 (2016-11) §5.4.9.2

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Signal Generator	E8247C	MY43321350	2017/9/23	2018/9/23
R&S	EMI Test Receiver	ESCI	100224	2017/9/1	2018/9/1
Sunol Sciences	Antenna	JB3	A060611-1	2017/11/10	2020/11/10
HP	Amplifier	8447D	2727A05902	2017/9/5	2018/9/5
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017/9/5	2018/9/5
N/A	Coaxial Cable	C-NJNJ-50	C-0075-01	2017/9/5	2018/9/5
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017/9/5	2018/9/5
Agilent	Spectrum Analyzer	E4440A	SG43360054	2016/12/8	2017/12/8
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016/1/5	2019/1/5
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017/9/5	2018/9/5
N/A	Coaxial Cable	C-SJSJ-50	C-0800-01	2017/9/5	2018/9/5
Farad	Test Software	EZ-EMC	V1.1.42	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24.3~25.8 °C
Relative Humidity:	28.5~38 %
ATM Pressure:	100.8~101.3 kPa

The testing was performed by Steven Zuo &Blake Yang from 2017-11-13 to 2017-11-15.

Test Mode: Transmitting

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted			Absolute Level (dBm)	EN 300 328	
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
802.11b, Low Channel								
4824.000	H	47.62	-60.1	14.2	1.6	-47.5	-30.0	17.5
4824.000	V	48.35	-59.2	14.2	1.6	-46.6	-30.0	16.6
7236.000	H	46.28	-55	13.0	1.6	-43.6	-30.0	13.6
7236.000	V	46.57	-54.8	13.0	1.6	-43.4	-30.0	13.4
5633.000	H	45.72	-60.3	14.0	1.3	-47.6	-30.0	17.6
5633.000	V	46.35	-59.5	14.0	1.3	-46.8	-30.0	16.8
224.000	H	44.60	-64.3	0.0	0.5	-64.8	-54.0	10.8
372.000	V	45.20	-63.5	0.0	0.6	-64.1	-36.0	28.1
802.11b, High Channel								
4944.000	H	47.65	-60	13.9	1.5	-47.6	-30.0	17.6
4944.000	V	48.28	-58.7	13.9	1.5	-46.3	-30.0	16.3
7416.000	H	46.42	-54.2	13.3	1.4	-42.3	-30.0	12.3
7416.000	V	46.68	-54.3	13.3	1.4	-42.4	-30.0	12.4
6482.000	H	45.64	-58.2	13.5	1.7	-46.4	-30.0	16.4
6482.000	V	46.36	-57.6	13.5	1.7	-45.8	-30.0	15.8
124.000	H	43.90	-60	0.0	0.3	-60.3	-36.0	24.3
428.000	V	45.30	-62.6	0.0	0.6	-63.2	-36.0	27.2
802.11g, Low Channel								
4824.000	H	47.53	-60.1	14.2	1.6	-47.5	-30.0	17.5
4824.000	V	48.15	-59.4	14.2	1.6	-46.8	-30.0	16.8
7236.000	H	46.42	-54.8	13.0	1.6	-43.4	-30.0	13.4
7236.000	V	46.68	-54.7	13.0	1.6	-43.3	-30.0	13.3
5463.000	H	45.66	-60.7	13.9	1.3	-48.1	-30.0	18.1
5463.000	V	46.33	-59.9	13.9	1.3	-47.3	-30.0	17.3
411.000	H	44.30	-60.4	0.0	0.6	-61.0	-36.0	25.0
325.000	V	45.20	-64.3	0.0	0.5	-64.8	-36.0	28.8
802.11g, High Channel								
4944.000	H	47.65	-60	13.9	1.5	-47.6	-30.0	17.6
4944.000	V	48.15	-58.8	13.9	1.5	-46.4	-30.0	16.4
7416.000	H	46.21	-54.4	13.3	1.4	-42.5	-30.0	12.5
7416.000	V	46.46	-54.5	13.3	1.4	-42.6	-30.0	12.6
6142.000	H	45.78	-59.3	13.7	1.5	-47.1	-30.0	17.1
6142.000	V	46.19	-59	13.7	1.5	-46.8	-30.0	16.8
273.000	H	44.60	-64.4	0.0	0.5	-64.9	-36.0	28.9
435.000	V	45.70	-62.2	0.0	0.6	-62.8	-36.0	26.8

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted			Absolute Level (dBm)	EN 300 328	
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
802.11n ht20, Low Channel								
4824.000	H	47.83	-59.8	14.2	1.6	-47.2	-30.0	17.2
4824.000	V	48.52	-59	14.2	1.6	-46.4	-30.0	16.4
7236.000	H	46.34	-54.9	13.0	1.6	-43.5	-30.0	13.5
7236.000	V	46.49	-54.9	13.0	1.6	-43.5	-30.0	13.5
5486.000	H	45.72	-60.8	13.9	1.3	-48.2	-30.0	18.2
5486.000	V	46.23	-60.2	13.9	1.3	-47.6	-30.0	17.6
425.000	H	43.20	-61.5	0.0	0.6	-62.1	-36.0	26.1
238.000	V	45.30	-66.8	0.0	0.5	-67.3	-36.0	31.3
802.11n ht20, High Channel								
4944.000	H	47.64	-60	13.9	1.5	-47.6	-30.0	17.6
4944.000	V	48.24	-58.7	13.9	1.5	-46.3	-30.0	16.3
7416.000	H	46.23	-54.4	13.3	1.4	-42.5	-30.0	12.5
7416.000	V	46.63	-54.4	13.3	1.4	-42.5	-30.0	12.5
6238.000	H	45.75	-59	13.6	1.5	-46.9	-30.0	16.9
6238.000	V	46.45	-58.4	13.6	1.5	-46.3	-30.0	16.3
258.000	H	44.10	-65	0.0	0.5	-65.5	-36.0	29.5
347.000	V	45.60	-63.5	0.0	0.6	-64.1	-36.0	28.1
802.11n ht40, Low Channel								
4844.000	H	47.54	-60.1	14.1	1.5	-47.5	-30.0	17.5
4844.000	V	48.24	-59	14.1	1.5	-46.4	-30.0	16.4
7266.000	H	46.18	-54.9	13.1	1.6	-43.4	-30.0	13.4
7266.000	V	46.58	-54.7	13.1	1.6	-43.2	-30.0	13.2
5784.000	H	45.55	-60.6	14.1	1.3	-47.8	-30.0	17.8
5784.000	V	46.38	-59.8	14.1	1.3	-47.0	-30.0	17.0
124.000	H	43.70	-60.2	0.0	0.3	-60.5	-36.0	24.5
372.000	V	45.60	-63.1	0.0	0.6	-63.7	-36.0	27.7
802.11n ht40, High Channel								
4924.000	H	47.44	-60.1	13.9	1.5	-47.7	-30.0	17.7
4924.000	V	48.48	-58.2	13.9	1.5	-45.8	-30.0	15.8
7386.000	H	46.48	-54.2	13.3	1.4	-42.3	-30.0	12.3
7386.000	V	46.59	-54.5	13.3	1.4	-42.6	-30.0	12.6
6138.000	H	45.61	-59.5	13.7	1.5	-47.3	-30.0	17.3
6138.000	V	46.26	-59	13.7	1.5	-46.8	-30.0	16.8
285.000	H	44.20	-64.6	0.0	0.5	-65.1	-36.0	29.1
428.000	V	45.70	-62.2	0.0	0.6	-62.8	-36.0	26.8

ETSI EN 300 328 V2.1.1 (2016-11)§4.3.2.10 – RECEIVER SPURIOUS EMISSIONS

Applicable Standard

According to ETSI EN 300 328 V2.1.1 (2016-11) §4.3.2.10, the receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

The spurious emissions of the receiver shall not exceed the values given in the following table

Frequency Range	Maximum power	Measurement Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

NOTE: In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted) and to the emissions radiated by the cabinet. In case of integral antenna equipment (without temporary antenna connectors), these limits apply to emissions radiated by the equipment.

Test Procedure

According to ETSI EN 300 328 V2.1.1 (2016-11) §5.4.10.2

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Signal Generator	E8247C	MY43321350	2017/9/23	2018/9/23
R&S	EMI Test Receiver	ESCI	100224	2017/9/1	2018/9/1
Sunol Sciences	Antenna	JB3	A060611-1	2017/11/10	2020/11/10
HP	Amplifier	8447D	2727A05902	2017/9/5	2018/9/5
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017/9/5	2018/9/5
N/A	Coaxial Cable	C-NJNJ-50	C-0075-01	2017/9/5	2018/9/5
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017/9/5	2018/9/5
Agilent	Spectrum Analyzer	E4440A	SG43360054	2016/12/8	2017/12/8
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016/1/5	2019/1/5
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017/9/5	2018/9/5
N/A	Coaxial Cable	C-SJSJ-50	C-0800-01	2017/9/5	2018/9/5
Farad	Test Software	EZ-EMC	V1.1.42	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24.3~25.8 °C
Relative Humidity:	28.5~38 %
ATM Pressure:	100.8~101.3 kPa

The testing was performed by Steven Zuo &Blake Yang from 2017-11-13 to 2017-11-15.

Test Mode: Receiving (Worst Case)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted			Absolute Level (dBm)	EN 300 328	
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
Low Channel								
1585.000	H	45.63	-69.2	10.1	0.8	-59.9	-47.0	12.9
1585.000	V	46.27	-69.1	10.1	0.8	-59.8	-47.0	12.8
631.000	H	35.20	-66.7	0.0	0.8	-67.5	-57.0	10.5
420.000	V	36.10	-71.9	0.0	0.6	-72.5	-57.0	15.5
High Channel								
1439.000	H	45.82	-68.2	9.2	1.3	-60.3	-47.0	13.3
1439.000	V	46.49	-67.9	9.2	1.3	-60.0	-47.0	13.0
501.000	H	34.50	-69.7	0.0	0.7	-70.4	-57.0	13.4
221.000	V	35.80	-75.6	0.0	0.5	-76.1	-57.0	19.1

ETSI EN 300 328 V2.1.1 (2016-11) §4.3.2.11 - RECEIVER BLOCKING

Applicable Standard

This requirement applies to all receiver categories as defined in clause 4.2.3.

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 (see clause 5.4.1.t)).

While maintaining the minimum performance criteria as defined in clause 4.3.2.11.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in table 14, table 15 or table 16.

Table 14: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
P_{min} + 6 dB	2 380 2 503,5	-53	CW
P_{min} + 6 dB	2 300 2 330 2 360	-47	CW
P_{min} + 6 dB	2 523,5 2 553,5 2 583,5 2 613,5 2 643,5 2 673,5	-47	CW
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.			

Table 15: Receiver Blocking parameters receiver category 2 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
P_{min} + 6 dB	2 380 2 503,5	-57	CW
P_{min} + 6 dB	2 300 2 583,5	-47	CW
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.			

Table 16: Receiver Blocking parameters receiver category 3 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
P_{min} + 12 dB	2 380 2 503,5	-57	CW
P_{min} + 12 dB	2 300 2 583,5	-47	CW

NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.
NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.

Test Setup Block diagram

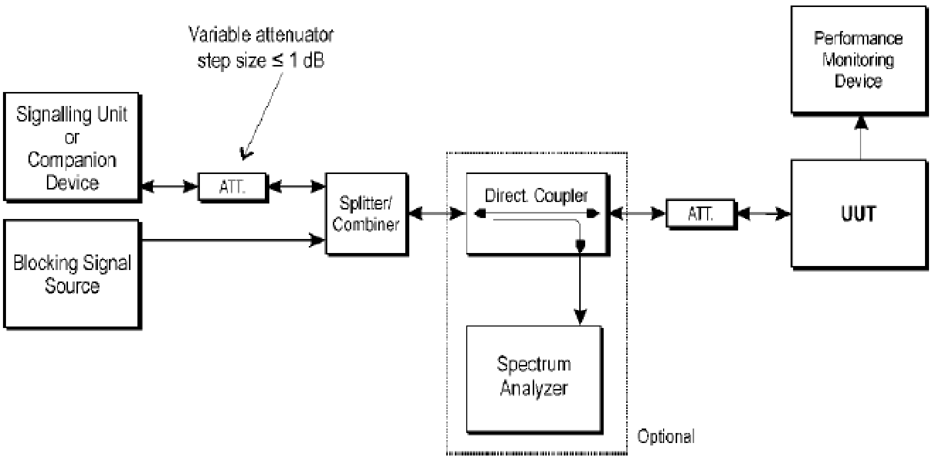


Figure 6: Test Set-up for receiver blocking

Test Procedure

The measurement procedure refer to ETSI EN 300 328 V2.1.1 (2016-11) §5.4.11.2.1

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESPI	100120	2016/12/8	2017/12/8
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/
Agilent	Step Attenuator	8498B	1510A05007	Each time	Each time
/	ATKKPING	V1.9.9.10	/	/	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.4 °C
Relative Humidity:	55 %
ATM Pressure:	100.9 kPa

The testing was performed by Rick Chen on 2017-11-10.

EUT operation mode: Receiving

Test Result: Compliance

The Maximum EIRP＞10dBm and the EUT is an adaptive device, so it belongs to the receiver category 1.

Channel Frequency (MHz)	Data Rate (Mbps)	Blocking Signal Frequency (MHz)	PER (%)	Limit (%)
802.11b mode 2412	1	2380	0.31	≤10
		2503.5	0.87	
		2300	0.89	
		2330	2.02	
		2360	1.31	
		2523.5	0.45	
		2553.5	0.74	
		2583.5	0.32	
		2613.5	0.65	
		2643.5	0.42	
		2673.5	1.24	
802.11b mode 2472	1	2380	0.98	
		2503.5	2.03	
		2300	1.74	
		2330	3.01	
		2360	0.45	
		2523.5	0.62	
		2553.5	2.31	
		2583.5	0.52	
		2613.5	3.45	
		2643.5	2.17	
		2673.5	3.16	

EXHIBIT A - E.2 INFORMATION AS REQUIRED BY EN 300 328 V2.1.1, CLAUSE 5.4.1

In accordance with EN 300 328, clause 5.4.1, the following information is provided by the supplier.

a) The type of modulation used by the equipment:

☐ FHSS
☒ other forms of modulation

b) In case of FHSS modulation:

In case of non-Adaptive Frequency Hopping equipment:
The number of Hopping Frequencies:_______.

In case of Adaptive Frequency Hopping Equipment:
The maximum number of Hopping Frequencies:________;
The minimum number of Hopping Frequencies: ________;

The (average) Dwell Time:_______;

c) Adaptive / non-adaptive equipment:

☐ non-adaptive Equipment
☒ adaptive Equipment without the possibility to switch to a non-adaptive mode
☐ adaptive Equipment which can also operate in a non-adaptive mode

d) In case of adaptive equipment:

The Channel Occupancy Time implemented by the equipment: 3.91 ms

☐ The equipment has implemented an LBT based DAA mechanism

In case of equipment using modulation different from FHSS:

☐ 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 CCA time implemented by the equipment: 22 µs

☐ The equipment has implemented an non-LBT based DAA mechanism
☐ The equipment can operate in more than one adaptive mode

e) In case of non-adaptive Equipment:

The maximum RF Output Power (e.i.r.p.): _______dBm
The maximum (corresponding) Duty Cycle: ________ %

Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared):
____.

f) The worst case operational mode for each of the following tests:

RF Output Power: ___19.98dBm___;
Power Spectral Density___9.97dBm/MHz___;
Duty cycle, Tx-Sequence, Tx-gap ___N/A___;
Accumulated Transmit Time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment) ___N/A___;
Hopping Frequency Separation (only for FHSS equipment)___N/A___;
Medium Utilisation___N/A___;
Adaptivity ___Pass___;
Receiver Blocking___Pass___;
Norminal Occupied Channel Bandwidth___20 MHz&40 MHz___;
Transmitter unwanted emissions in the OOB domain___-22.38dBm/MHz___;
Transmitter unwanted emissions in the spurious domain___-64.8dBm___;
Receiver spurious emissions___-67.5dBm___;

g) The different transmit operating modes (tick all that apply):

☐ Operating mode 1: Single Antenna Equipment
☐ Equipment with only 1 antenna
☐ Equipment with 2 diversity antennas but only 1 antenna active at any moment in time
☐ Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)

☒ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming
☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2
Note: Add more lines if more channel bandwidths are supported.

☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming
☐ Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2
Note: Add more lines if more channel bandwidths are supported.

h) In case of Smart Antenna Systems:

The number of Receive chains: ___2___;
The number of Transmit chains:___2___;

☒ symmetrical power distribution
☐ asymmetrical power distribution

In case of beam forming, the maximum beam forming gain:___N/A___;

Note: Beam forming gain does not include the basic gain of a single antenna.

i) Operating Frequency Range(s) of the equipment:

Operating Frequency Range 1:___2412___ MHz to ___2472___MHz
Operating Frequency Range 2:___2422___MHz to ___2462___MHz

Note: Add more lines if more Frequency Ranges are supported.

j) Nominal Channel Bandwidth(s):

Nominal Channel Bandwidth 1:_____20____MHz
Nominal Channel Bandwidth 2:_____40____MHz

Note: Add more lines if more channel bandwidths are supported.

k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.):

☒ Stand-alone
☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)
☐ Plug-in radio device (Equipment intended for a variety of host systems)
☐ Other ______________________________;

l) The normal and the extreme operating conditions that apply to the equipment:

Normal operating conditions (if applicable):

Operating temperature range:___+25___ ° C
Other (please specify if applicable):________

Extreme operating conditions:

Operating temperature range: Minimum:___0___ ° C Maximum ___40___° C
Other (please specify if applicable): ________ Minimum: ________ Maximum ________

Details provided are for the: ☒ stand-alone equipment
☐ combined (or host) equipment
☐ test jig

m) The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:

Antenna Type:

☒ Integral Antenna (information to be provided in case of conducted measurements)

Antenna Gain:____5___ dBi

If applicable, additional beamforming gain (excluding basic antenna gain):________ dB

☐ Temporary RF connector provided
☐ No temporary RF connector provided

☐ Dedicated Antennas (equipment with antenna connector)
☐ Single power level with corresponding antenna(s)
☐ Multiple power settings and corresponding antenna(s)

Number of different Power Levels:________;
Power Level 1:_____ dBm
Power Level 2:_____dBm
Power Level 3:_____.dBm
Note 1: Add more lines in case the equipment has more power levels.
Note 2: These power levels are conducted power levels (at antenna connector).

For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable

Power Level 1:_____dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

Note 3: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 2:_____dBm

_Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

Note 4: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 2:_____dBm

_Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

Note 5: Add more rows in case more antenna assemblies are supported for this power level.

n) The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:

Details provided are for the: ☒stand-alone equipment
☐ combined (or host) equipment
☐ test jig

Supply Voltage ☒ AC mains State AC voltage 100-240 V
☒ DC State DC voltage 12 V

In case of DC, indicate the type of power source
☐ Internal Power Supply
☒ External Power Supply or AC/DC adapter
☐ Battery
☐ Other:______________________________.

o) Describe the test modes available which can facilitate testing:

The measurements shall be performed during continuously transmitting .

p) The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):

IEEE 802.11™ [i.3] .

q) If applicable, the statistical analysis referred to in clause 5.3.1 q)

(to be provided as separate attachment)

r) If applicable, the statistical analysis referred to in clause 5.3.1 r)

(to be provided as separate attachment)

s) Geo-location capability supported by the equipment:

☐ Yes

☐ The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user.

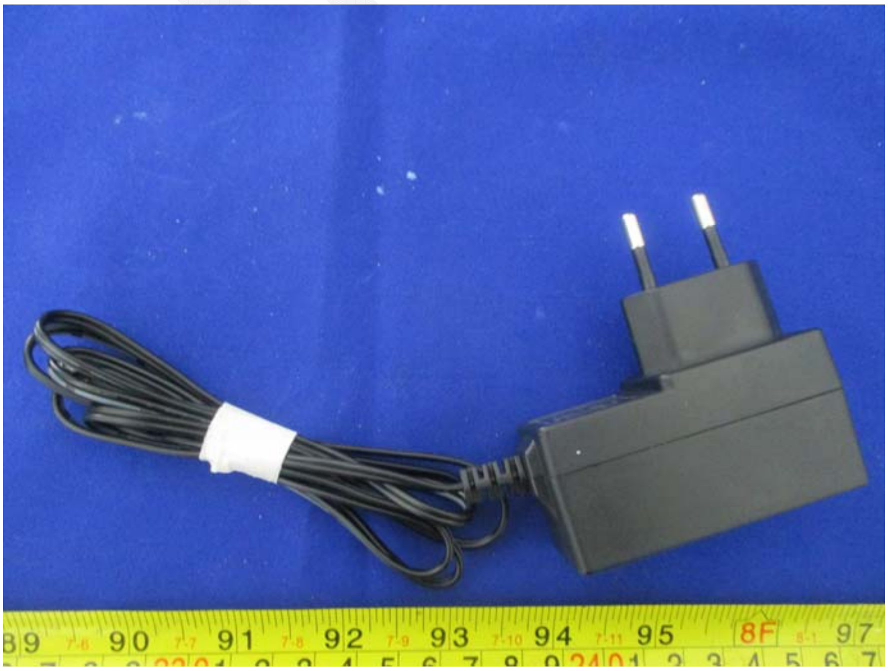
☒ No

t) Describe the minimum performance criteria that apply to the equipment (see clause 4.3.1.12.3 or clause 4.3.2.11.3): 3.45% .

EXHIBIT B - EUT PHOTOGRAPHS

EUT – All View

EUT – Adapter Top View



EUT – Adapter Bottom View

EUT – Adapter Label View

EUT – Top View

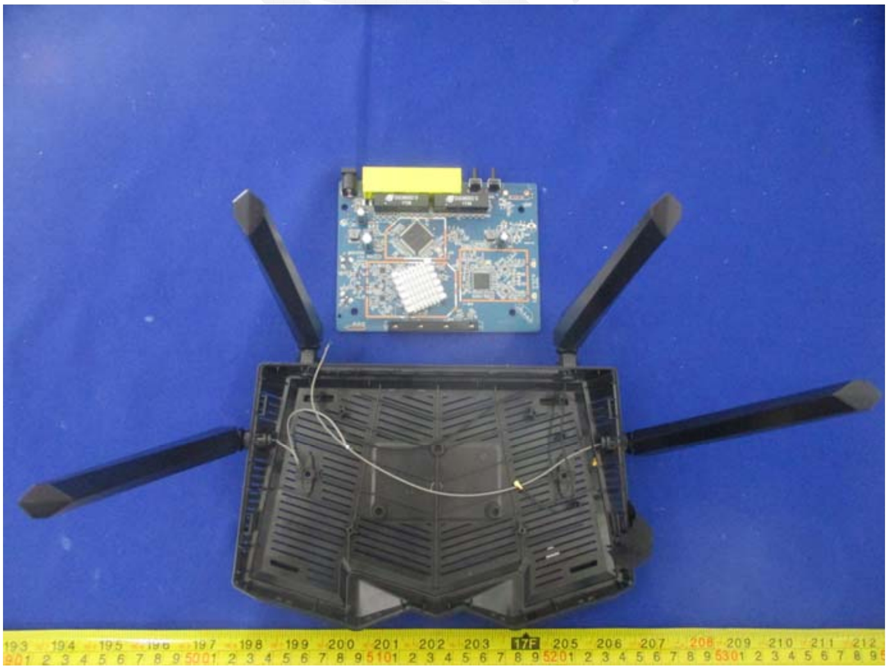
EUT – Bottom View

EUT – Port View

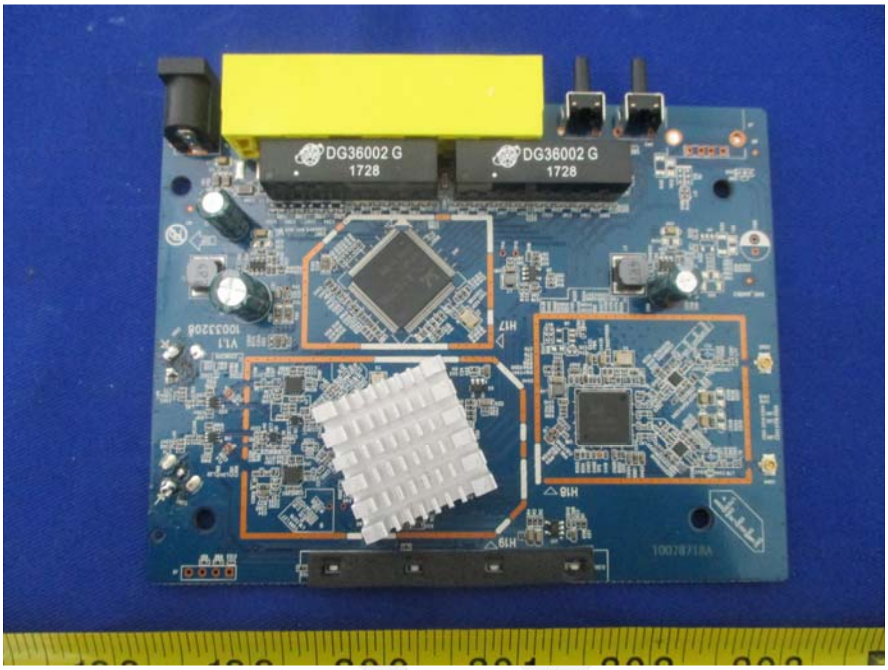
EUT – ANT View

EUT – Uncover View

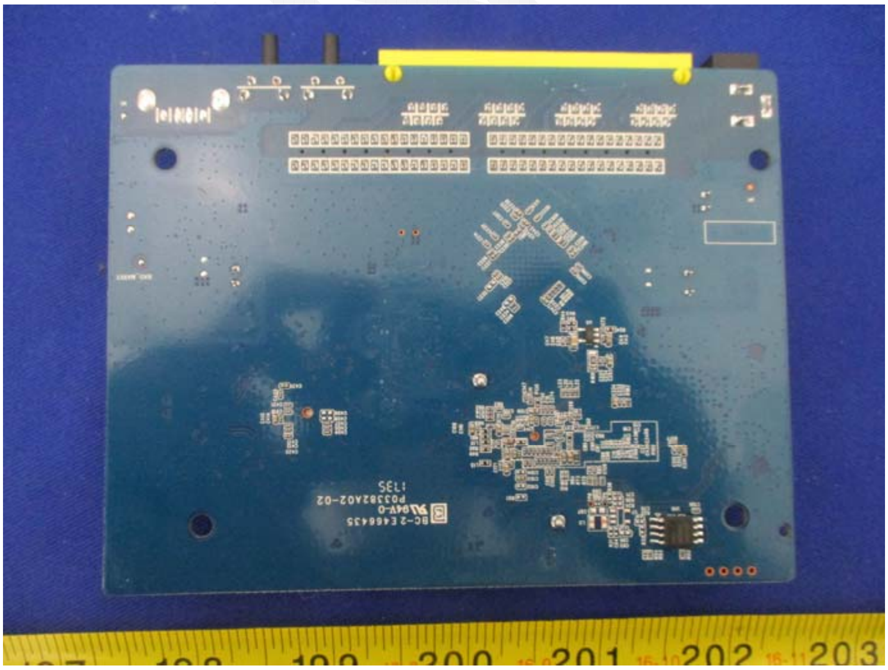
EUT – Uncover View



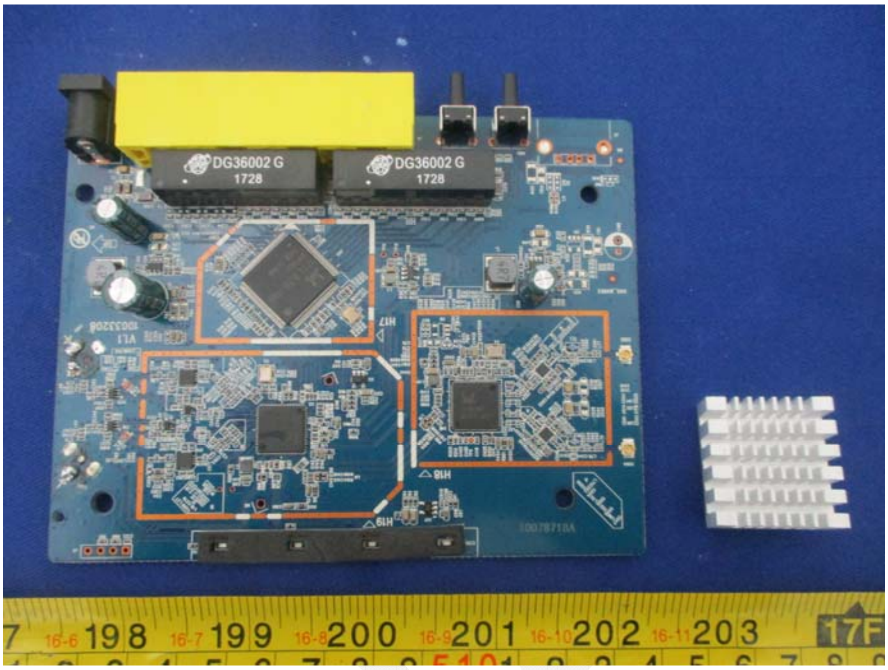
EUT – PCB Top View



EUT – PCB Bottom View

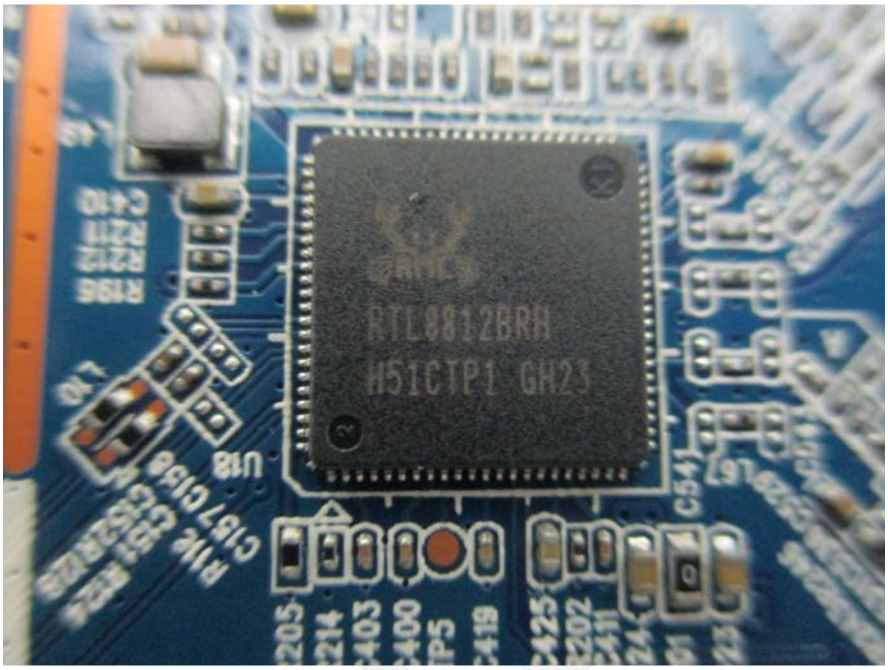


EUT – Uncover View



EUT – Main Chip View

EUT – 5G Chip View



EUT – 2.4G Chip View

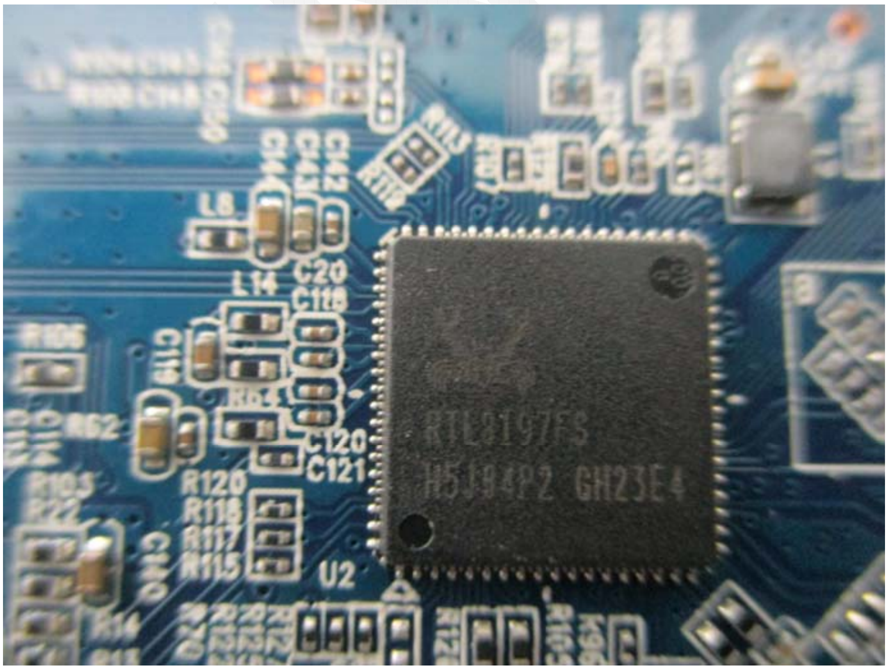
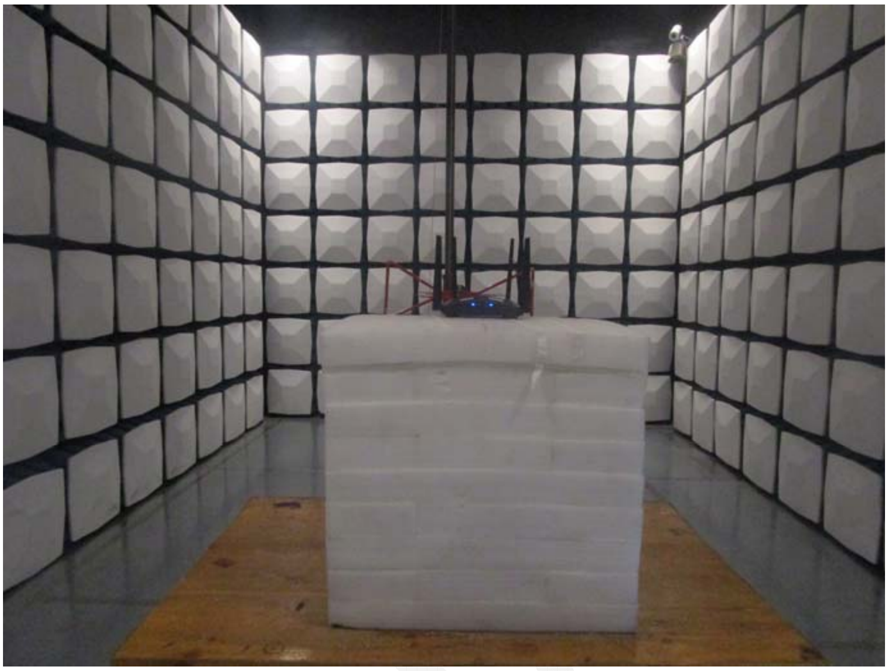


EXHIBIT C – TEST SETUP PHOTOGRAPHS

Radiated Emissions –Below 1GHz



Radiated Emissions –Above 1GHz

*******END OF REPORT*******