

FCC Test Report

Report No.: RF161013C32

FCC ID: TVE-2507T021

Test Model: FortiAP S221E, FortiAP S223E (refer to section 3.1 for more details)

Series Model: FortiAP S221Exxxxxx, FAP-S221Exxxxxx, FORTIAP-S221Exxxxxx, FortiAP S223Exxxxxx, FAP-S223Exxxxxx, FORTIAP-S223Exxxxxx (where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only) (refer to section 3.1 for more details)

Received Date: Oct. 13, 2016

Test Date: Nov. 03, 2016 ~ Mar. 16, 2017

Issued Date: Apr. 06, 2017

Applicant: Fortinet Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan, R.O.C.



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Release Control Record

Issue No.	Description	Date Issued
RF161013C32	Original Release	Apr. 06, 2017

1 Certificate of Conformity

Product: Secured Wireless Access Point

Brand: Fortinet Inc.

Test Model: FortiAP S221E, FortiAP S223E (refer to section 3.1 for more details)

Series Model: FortiAP S221Exxxxxx, FAP-S221Exxxxxx, FORTIAP-S221Exxxxxx, FortiAP S223Exxxxxx, FAP-S223Exxxxxx, FORTIAP-S223Exxxxxx (where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only) (refer to section 3.1 for more details)

Sample Status: Engineering Sample

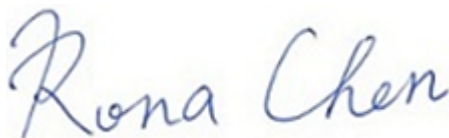
Applicant: Fortinet Inc.

Test Date: Nov. 03, 2016 ~ Mar. 16, 2017

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :



Date:

Apr. 06, 2017

Rona Chen / Specialist

Approved by :



Date:

Apr. 06, 2017

David Huang / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -9.55 dB at 0.36256 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.02 dB at 2389.47 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector for FortiAP S221E is IPEX. Antenna connector for FortiAP S223E is RP SMA plug.

2.1 Measurement Uncertainty

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

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Secured Wireless Access Point
Brand	Fortinet Inc.
Test Model	FortiAP S221E, FortiAP S223E
Series Model	FortiAP S221Exxxxxx, FAP-S221Exxxxxx, FORTIAP-S221Exxxxxx, FortiAP S223Exxxxxx, FAP-S223Exxxxxx, FORTIAP-S223Exxxxxx (where “x” can be used as “A-Z”, or “0-9”, or “-”, or blank for software changes or marketing purposes only)
Model Difference	Refer to Note for more details
Status of EUT	Engineering Sample
Power Supply Rating	12.0 Vdc (Adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to MCS15
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	CDD Mode: 216.77 mW Beamforming Mode: 74.645 mW
Antenna Type	Refer to Note as below
Antenna Connector	Refer to Note as below
Accessory Device	Refer to Note as below
Data Cable Supplied	N/A

Note:

1. All models are listed as below. Model: FAP-S221E and FAP-S223E were chosen for the final test.

Brand	Model	Difference
Fortinet Inc.	FortiAP S221Exxxxxx (Main test model: FortiAP S221E)	With Internal Antenna
	FAP-S221Exxxxxx	
	FORTIAP-S221Exxxxxx	
	FortiAP S223Exxxxxx (Main test model: FortiAP S223E)	With External Antenna
	FAP-S223Exxxxxx	
	FORTIAP-S223Exxxxxx	

2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	TX Function	Beamforming
802.11b	2TX	Not Support
802.11g	2TX	Not Support
802.11n (HT20)	2TX	Support
802.11n (HT40)	2TX	Support

* For 2.4GHz band, CDD mode is the worst case for final tests except out put power after pretesting CDD mode and beamforming mode.

3. The EUT uses following antennas.

For Model: FortiAP S221E (Internal antenna)

Antenna Type	PIFA	Antenna Connector	IPEX
Gain (dBi)	Frequency (MHz)		
	2400-2500	5150-5850	
Internal Ant. 1	4.36	-	
Internal Ant. 2	4.95	-	
Internal Ant. 3	-	5.64	
Internal Ant. 4	-	5.83	

Antenna Type	PIFA	Antenna Connector	IPEX
Gain (dBi)	Frequency (MHz)		
	2400-2500		
BT Ant.	3.67		

For Model: FortiAP S223E (External antenna)

Antenna Type	Dipole		Antenna Connector		RP SMA plug	
Gain (dBi)	Frequency (MHz)					
	2400	2450	2500	5150	5550	5850
External Ant.	4.06	4.26	4.58	5.27	5.35	5.04

Antenna Type	PIFA	Antenna Connector	IPEX
Gain (dBi)	Frequency (MHz)		
	2400-2500		
BT Ant.	3.67		

* The highest antenna gain was chosen for antenna port conducted measurement test only.

4. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	Asian Power Devices Inc.	WA-30J12R	I/P: 100-240 Vac, 50-60 Hz, 0.9 A O/P: 12 Vdc, 2.5 A

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

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

7 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE \geq 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Model: FortiAP S221E
B	√	√	√	-	Model: FortiAP S223E

Where **RE \geq 1G**: Radiated Emission above 1 GHz
PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1 GHz
APCM: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane FortiAP S221E for and X-plane for FortiAP S223E.

Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
CDD Mode						
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
Beamforming Mode						
A	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11n (HT40)	1 to 11	9	OFDM	BPSK	MCS0
B			3			

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11n (HT40)	1 to 11	9	OFDM	BPSK	MCS0
B			3			

Bandedge Measurement:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
A	802.11n (HT20)	1 to 11	1, 11	OFDM	BPSK	MCS0
A	802.11n (HT40)	3 to 9	3, 9	OFDM	BPSK	MCS0

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE \geq 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Toby Tian
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Frank FL Liu

3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

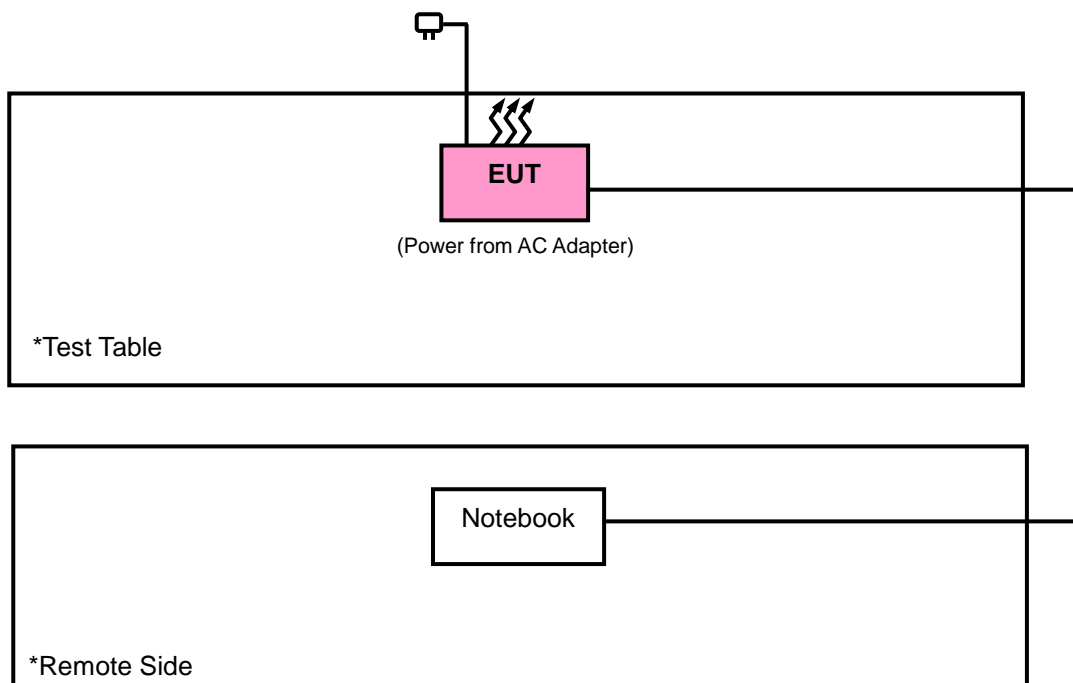
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
1.	Notebook	DELL	Inspiron 14R	8LRKKW1	N/A	--
2.	Adapter	Asian Power Devices Inc.	WA-30J12R	N/A	N/A	Option of EUT I/P: 100-240 Vac, 50-60 Hz, 0.9 A Max. O/P: 12 Vdc, 2.5 A 1.8m power cable without core attached on adapter
3.	POE	EnGenius	EPA5006GAT	N/A	N/A	Option of EUT I/P: 100-240 Vac, 50-60 Hz, 0.8 A O/P: 54 Vdc, 0.6 A 10.5m power cable without core

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items 1 acted as communication partners to transfer data.
3. After pre-scanning Adapter mode and POE mode, Adapter mode was the worse case, and only this worse case was tested for the final test.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r05

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC).
The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2016	Jan. 20, 2017
			Feb. 17, 2017	Feb. 16, 2018
Spectrum Analyzer Agilent	N9010A	MY52220314	Nov. 16, 2016	Nov. 15, 2017
			Dec. 16, 2016	Dec. 15, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
			Dec. 13, 2016	Dec. 12, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
			Dec. 26, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 04, 2016	Jan. 03, 2017
			Dec. 12, 2016	Dec. 13, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
			Dec. 14, 2016	Dec. 13, 2017
Fixed Attenuator Mini-Circuits	BW-N10W5+	NA	Jul. 08, 2016	Jul. 07, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier EMCI	EMC 012645	980115	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 184045	980116	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 330H	980112	Oct. 21, 2016	Oct. 20, 2017
Power Meter Anritsu	ML2495A	1232002	Sep. 08, 2016	Sep. 07, 2017
Power Sensor Anritsu	MA2411B	1207325	Sep. 08, 2016	Sep. 07, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 21, 2016	Oct. 20, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 21, 2016	Oct. 20, 2017
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 21, 2016	Oct. 20, 2017
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 10.

3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.

4. The FCC Site Registration No. is 690701.

5. The IC Site Registration No. is IC7450F-10.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

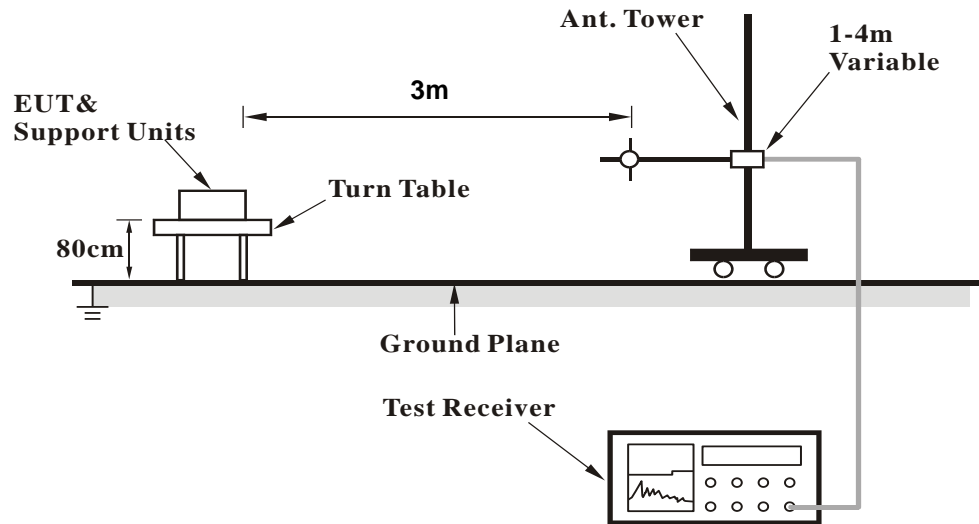
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 KHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for RMS Average (Duty cycle < 98 %) for Peak detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

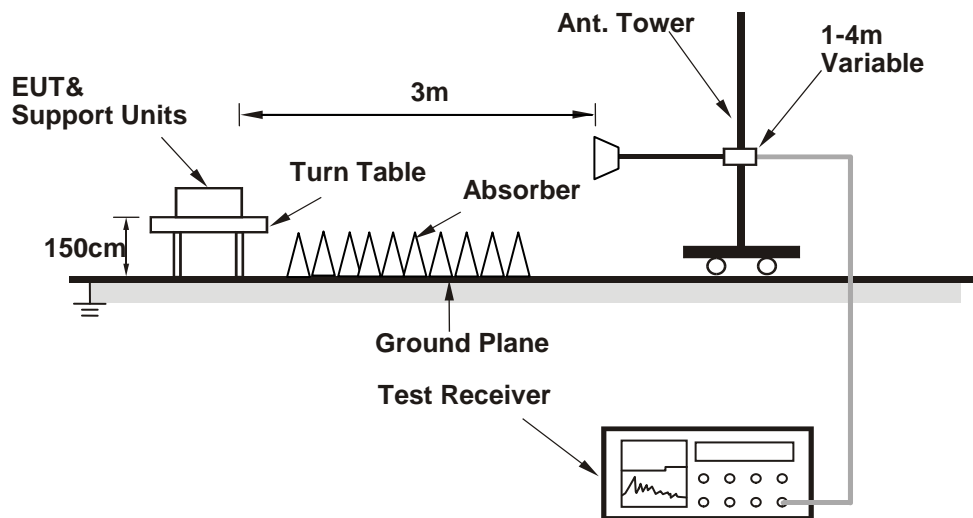
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data :

Mode A

802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2386.14	60.14	66.65	74	-13.86	26.91	4.08	37.5	194	296	Peak
2386.77	52.51	59.02	54	-1.49	26.91	4.08	37.5	194	296	Average
2412	109.02	115.49			26.96	4.09	37.52	194	296	Average
2412	112.11	118.58			26.96	4.09	37.52	194	296	Peak
4824	36.59	51.89	54	-17.41	30.99	6.79	53.08	100	351	Average
4824	45.82	61.12	74	-28.18	30.99	6.79	53.08	100	351	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2381.46	57.02	63.58	74	-16.98	26.86	4.08	37.5	203	30	Peak
2387.04	41.61	48.12	54	-12.39	26.91	4.08	37.5	203	30	Average
2412	101.17	107.64			26.96	4.09	37.52	203	30	Average
2412	104.79	111.26			26.96	4.09	37.52	203	30	Peak
4824	35.85	51.15	54	-18.15	30.99	6.79	53.08	100	168	Average
4824	43.91	59.21	74	-30.09	30.99	6.79	53.08	100	168	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2337.09	57.31	63.97	74	-16.69	26.77	4.04	37.47	234	343	Peak
2389.29	45.31	51.82	54	-8.69	26.91	4.08	37.5	234	343	Average
2437	111.49	117.77			27.06	4.12	37.46	234	343	Average
2437	114.63	120.91			27.06	4.12	37.46	234	343	Peak
2484.48	58.7	64.72	74	-15.3	27.15	4.15	37.32	234	343	Peak
2485.48	52.17	58.19	54	-1.83	27.15	4.15	37.32	234	343	Average
4874	45.18	60.32	54	-8.82	31.06	6.85	53.05	100	195	Average
4874	48.25	63.39	74	-25.75	31.06	6.85	53.05	100	195	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.57	59.33	65.84	74	-14.67	26.91	4.08	37.5	189	28	Peak
2389.29	50.1	56.61	54	-3.9	26.91	4.08	37.5	189	28	Average
2437	104.59	110.87			27.06	4.12	37.46	189	28	Average
2437	107.9	114.18			27.06	4.12	37.46	189	28	Peak
2485.44	46.12	52.14	54	-7.88	27.15	4.15	37.32	189	28	Average
2485.64	58.63	64.65	74	-15.37	27.15	4.15	37.32	189	28	Peak
4874	41.95	57.09	54	-12.05	31.06	6.85	53.05	100	241	Average
4874	46.27	61.41	74	-27.73	31.06	6.85	53.05	100	241	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	108.15	114.31			27.1	4.13	37.39	190	312	Average
2462	111.34	117.5			27.1	4.13	37.39	190	312	Peak
2487.6	60.41	66.37	74	-13.59	27.2	4.16	37.32	190	312	Peak
2489.04	51.01	56.97	54	-2.99	27.2	4.16	37.32	190	312	Average
4924	36.32	51.35	54	-17.68	31.12	6.88	53.03	100	156	Average
4924	45.36	60.39	74	-28.64	31.12	6.88	53.03	100	156	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	101.19	107.35			27.1	4.13	37.39	200	29	Average
2462	104.08	110.24			27.1	4.13	37.39	200	29	Peak
2487	58.17	64.19	74	-15.83	27.15	4.15	37.32	200	29	Peak
2487.32	44.6	50.61	54	-9.4	27.15	4.16	37.32	200	29	Average
4924	35.58	50.61	54	-18.42	31.12	6.88	53.03	100	161	Average
4924	44.54	59.57	74	-29.46	31.12	6.88	53.03	100	161	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.74	66.11	72.62	74	-7.89	26.91	4.08	37.5	194	313	Peak
2389.83	52.55	59.08	54	-1.45	26.91	4.08	37.52	194	313	Average
2412	100.94	107.41			26.96	4.09	37.52	194	313	Average
2412	108.26	114.73			26.96	4.09	37.52	194	313	Peak
4824	35.34	50.64	54	-18.66	30.99	6.79	53.08	100	155	Average
4824	45.06	60.36	74	-28.94	30.99	6.79	53.08	100	155	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2341.77	56.98	63.66	74	-17.02	26.77	4.04	37.49	187	29	Peak
2389.92	40.23	46.76	54	-13.77	26.91	4.08	37.52	187	29	Average
2412	91.5	97.97			26.96	4.09	37.52	187	29	Average
2412	99.27	105.74			26.96	4.09	37.52	187	29	Peak
4824	34.37	49.67	54	-19.63	30.99	6.79	53.08	100	117	Average
4824	44.18	59.48	74	-29.82	30.99	6.79	53.08	100	117	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.74	52.22	58.73	54	-1.78	26.91	4.08	37.5	194	313	Average
2389.74	64.96	71.47	74	-9.04	26.91	4.08	37.5	194	313	Peak
2437	110.25	116.53			27.06	4.12	37.46	194	313	Average
2437	117.41	123.69			27.06	4.12	37.46	194	313	Peak
2484.2	47.13	53.15	54	-6.87	27.15	4.15	37.32	194	312	Average
2484.88	62.25	68.27	74	-11.75	27.15	4.15	37.32	194	312	Peak
4874	35.06	50.2	54	-18.94	31.06	6.85	53.05	100	219	Average
4874	44.45	59.59	74	-29.55	31.06	6.85	53.05	100	219	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2385.96	57.16	63.67	74	-16.84	26.91	4.08	37.5	187	26	Peak
2386.86	41.33	47.84	54	-12.67	26.91	4.08	37.5	187	26	Average
2437	101.17	107.45			27.06	4.12	37.46	187	26	Average
2437	109.06	115.34			27.06	4.12	37.46	187	26	Peak
2483.84	42.74	48.76	54	-11.26	27.15	4.15	37.32	187	26	Average
2486.6	58.95	64.97	74	-15.05	27.15	4.15	37.32	187	26	Peak
4874	34.23	49.37	54	-19.77	31.06	6.85	53.05	100	110	Average
4874	43.42	58.56	74	-30.58	31.06	6.85	53.05	100	110	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	102.83	108.99			27.1	4.13	37.39	191	313	Average
2462	110.4	116.56			27.1	4.13	37.39	191	313	Peak
2484.12	64.93	70.95	74	-9.07	27.15	4.15	37.32	191	313	Peak
2484.52	52.61	58.63	54	-1.39	27.15	4.15	37.32	191	313	Average
4924	35.5	50.53	54	-18.5	31.12	6.88	53.03	100	184	Average
4924	44.09	59.12	74	-29.91	31.12	6.88	53.03	100	184	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	93.85	100.01			27.1	4.13	37.39	201	10	Average
2462	102.19	108.35			27.1	4.13	37.39	201	10	Peak
2483.52	44.43	50.45	54	-9.57	27.15	4.15	37.32	201	10	Average
2483.52	59.06	65.08	74	-14.94	27.15	4.15	37.32	201	10	Peak
4924	34.57	49.6	54	-19.43	31.12	6.88	53.03	100	105	Average
4924	43.76	58.79	74	-30.24	31.12	6.88	53.03	100	105	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.03	67.27	73.78	74	-6.73	26.91	4.08	37.5	142	39	Peak
2388.21	52.52	59.03	54	-1.48	26.91	4.08	37.5	142	39	Average
2412	102.9	109.37			26.96	4.09	37.52	142	39	Average
2412	110.28	116.75			26.96	4.09	37.52	142	39	Peak
4824	35.32	50.62	54	-18.68	30.99	6.79	53.08	100	103	Average
4824	45.31	60.61	74	-28.69	30.99	6.79	53.08	100	103	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2387.31	60.11	66.62	74	-13.89	26.91	4.08	37.5	100	29	Peak
2387.58	45.03	51.54	54	-8.97	26.91	4.08	37.5	100	29	Average
2412	96.44	102.91			26.96	4.09	37.52	100	29	Average
2412	103.93	110.4			26.96	4.09	37.52	100	29	Peak
4824	34.68	49.98	54	-19.32	30.99	6.79	53.08	100	247	Average
4824	44.13	59.43	74	-29.87	30.99	6.79	53.08	100	247	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.83	51.67	58.2	54	-2.33	26.91	4.08	37.52	232	310	Average
2389.83	66.95	73.48	74	-7.05	26.91	4.08	37.52	232	310	Peak
2437	109.27	115.55			27.06	4.12	37.46	232	310	Average
2437	116.92	123.2			27.06	4.12	37.46	232	310	Peak
2485.44	46.88	52.9	54	-7.12	27.15	4.15	37.32	232	310	Average
2487.36	63.17	69.18	74	-10.83	27.15	4.16	37.32	232	310	Peak
4874	34.94	50.08	54	-19.06	31.06	6.85	53.05	102	186	Average
4874	44.98	60.12	74	-29.02	31.06	6.85	53.05	102	186	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.29	58.81	65.32	74	-15.19	26.91	4.08	37.5	185	26	Peak
2389.92	41.33	47.86	54	-12.67	26.91	4.08	37.52	185	26	Average
2437	100.58	106.86			27.06	4.12	37.46	185	26	Average
2437	108.02	114.3			27.06	4.12	37.46	185	26	Peak
2483.6	44.04	50.06	54	-9.96	27.15	4.15	37.32	185	26	Average
2484.64	60.68	66.7	74	-13.32	27.15	4.15	37.32	185	26	Peak
4874	34.36	49.5	54	-19.64	31.06	6.85	53.05	100	354	Average
4874	43.83	58.97	74	-30.17	31.06	6.85	53.05	100	354	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	104.16	110.32			27.1	4.13	37.39	138	38	Average
2462	111.69	117.85			27.1	4.13	37.39	138	38	Peak
2486.84	52.37	58.39	54	-1.63	27.15	4.15	37.32	138	38	Average
2489.36	66.48	72.44	74	-7.52	27.2	4.16	37.32	138	38	Peak
4924	35.44	50.47	54	-18.56	31.12	6.88	53.03	100	195	Average
4924	44.25	59.28	74	-29.75	31.12	6.88	53.03	100	195	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	96.13	102.29			27.1	4.13	37.39	110	34	Average
2462	103.39	109.55			27.1	4.13	37.39	110	34	Peak
2487.92	59.97	65.93	74	-14.03	27.2	4.16	37.32	110	34	Peak
2489.8	44.94	50.9	54	-9.06	27.2	4.16	37.32	110	34	Average
4924	34.49	49.52	54	-19.51	31.12	6.88	53.03	100	138	Average
4924	43.52	58.55	74	-30.48	31.12	6.88	53.03	100	138	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.84	63.35	69.86	74	-10.65	26.91	4.08	37.5	156	39	Peak
2389.92	52.52	59.05	54	-1.48	26.91	4.08	37.52	156	39	Average
2422	95.75	102.09			27.01	4.11	37.46	156	39	Average
2422	102.9	109.24			27.01	4.11	37.46	156	39	Peak
2490.52	58.09	64.05	74	-15.91	27.2	4.16	37.32	156	39	Peak
2499.92	38.62	44.51	54	-15.38	27.2	4.16	37.25	156	39	Average
4844	35.44	50.67	54	-18.56	31.01	6.82	53.06	102	147	Average
4844	44.37	59.6	74	-29.63	31.01	6.82	53.06	102	147	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.11	57.2	63.71	74	-16.8	26.91	4.08	37.5	100	24	Peak
2389.92	47.44	53.97	54	-6.56	26.91	4.08	37.52	100	24	Average
2422	89.99	96.33			27.01	4.11	37.46	100	24	Average
2422	97.54	103.88			27.01	4.11	37.46	100	24	Peak
2492.6	57.6	63.49	74	-16.4	27.2	4.16	37.25	100	24	Peak
2500	37.24	43.13	54	-16.76	27.2	4.16	37.25	100	24	Average
4844	35.12	50.35	54	-18.88	31.01	6.82	53.06	100	108	Average
4844	44.08	59.31	74	-29.92	31.01	6.82	53.06	100	108	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2422 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.02	52.65	59.16	54	-1.35	26.91	4.08	37.5	155	38	Average
2389.29	64.83	71.34	74	-9.17	26.91	4.08	37.5	155	38	Peak
2437	98.87	105.15			27.06	4.12	37.46	155	38	Average
2437	106.49	112.77			27.06	4.12	37.46	155	38	Peak
2483.6	47.06	53.08	54	-6.94	27.15	4.15	37.32	155	38	Average
2483.64	61.15	67.17	74	-12.85	27.15	4.15	37.32	155	38	Peak
4874	35.17	50.31	54	-18.83	31.06	6.85	53.05	101	105	Average
4874	45.36	60.5	74	-28.64	31.06	6.85	53.05	101	105	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.39	60.76	67.27	74	-13.24	26.91	4.08	37.5	100	24	Peak
2389.47	48.87	55.38	54	-5.13	26.91	4.08	37.5	100	24	Average
2437	94.76	101.04			27.06	4.12	37.46	100	24	Average
2437	102.27	108.55			27.06	4.12	37.46	100	24	Peak
2483.92	39.46	45.48	54	-14.54	27.15	4.15	37.32	100	24	Average
2487.68	57.39	63.35	74	-16.61	27.2	4.16	37.32	100	24	Peak
4874	34.77	49.91	54	-19.23	31.06	6.85	53.05	100	162	Average
4874	44.5	59.64	74	-29.5	31.06	6.85	53.05	100	162	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2382.18	51.52	58.08	74	-22.48	26.86	4.08	37.5	233	314	Peak
2388.21	41.86	48.37	54	-12.14	26.91	4.08	37.5	233	314	Average
2452	96.39	102.59			27.06	4.13	37.39	233	314	Average
2452	103.88	110.08			27.06	4.13	37.39	233	314	Peak
2484.32	52.91	74.74	54	-1.09	27.15	4.63	53.61	233	314	Average
2484.56	63.47	69.49	74	-10.53	27.15	4.15	37.32	233	314	Peak
4904	35.15	50.2	54	-18.85	31.1	6.88	53.03	104	122	Average
4904	45.2	60.25	74	-28.8	31.1	6.88	53.03	104	122	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2352.12	37.32	43.95	54	-16.68	26.81	4.05	37.49	201	337	Average
2382.36	48.16	54.72	74	-25.84	26.86	4.08	37.5	201	337	Peak
2452	90.83	97.03			27.06	4.13	37.39	201	337	Average
2452	98.56	104.76			27.06	4.13	37.39	201	337	Peak
2484.64	45.33	51.35	54	-8.67	27.15	4.15	37.32	201	337	Average
2487.68	59.18	65.14	74	-14.82	27.2	4.16	37.32	201	337	Peak
4904	35.06	50.11	54	-18.94	31.1	6.88	53.03	103	166	Average
4904	44.38	59.43	74	-29.62	31.1	6.88	53.03	103	166	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2452 MHz: Fundamental frequency.

Mode B

802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2387.49	44.75	51.26	54	-9.25	26.91	4.08	37.5	110	178	Average
2387.49	57.75	64.26	74	-16.25	26.91	4.08	37.5	110	178	Peak
2412	107.01	113.48			26.96	4.09	37.52	110	178	Average
2412	110.1	116.57			26.96	4.09	37.52	110	178	Peak
4824	34.71	50.01	54	-19.29	30.99	6.79	53.08	122	258	Average
4824	45.21	60.51	74	-28.79	30.99	6.79	53.08	122	258	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2387.31	52.92	59.43	54	-1.08	26.91	4.08	37.5	151	353	Average
2387.85	61.07	67.58	74	-12.93	26.91	4.08	37.5	151	353	Peak
2412	112.05	118.52			26.96	4.09	37.52	151	353	Average
2412	115.32	121.79			26.96	4.09	37.52	151	353	Peak
4824	33.92	49.22	54	-20.08	30.99	6.79	53.08	165	65	Average
4824	44.67	59.97	74	-29.33	30.99	6.79	53.08	165	65	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2373.27	56.67	63.24	74	-17.33	26.86	4.07	37.5	108	183	Peak
2389.92	37.14	43.67	54	-16.86	26.91	4.08	37.52	108	183	Average
2437	107.38	113.66			27.06	4.12	37.46	108	183	Average
2437	110.51	116.79			27.06	4.12	37.46	108	183	Peak
2483.72	38.06	44.08	54	-15.94	27.15	4.15	37.32	108	183	Average
2494.76	57.6	63.49	74	-16.4	27.2	4.16	37.25	108	183	Peak
4874	35.16	50.3	54	-18.84	31.06	6.85	53.05	126	255	Average
4874	43.93	59.07	74	-30.07	31.06	6.85	53.05	126	255	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.66	57.39	63.9	74	-16.61	26.91	4.08	37.5	165	340	Peak
2389.56	45.27	51.78	54	-8.73	26.91	4.08	37.5	165	340	Average
2437	111.03	117.31			27.06	4.12	37.46	165	340	Average
2437	114.36	120.64			27.06	4.12	37.46	165	340	Peak
2484.84	44.17	50.19	54	-9.83	27.15	4.15	37.32	165	340	Average
2488.2	58.36	64.32	74	-15.64	27.2	4.16	37.32	165	340	Peak
4874	33.94	49.08	54	-20.06	31.06	6.85	53.05	162	66	Average
4874	43.81	58.95	74	-30.19	31.06	6.85	53.05	162	66	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	106.09	112.25			27.1	4.13	37.39	107	165	Average
2462	109.42	115.58			27.1	4.13	37.39	107	165	Peak
2487.12	45.63	51.65	54	-8.37	27.15	4.15	37.32	107	165	Average
2487.96	58.98	64.94	74	-15.02	27.2	4.16	37.32	107	165	Peak
4924	35.15	50.18	54	-18.85	31.12	6.88	53.03	135	268	Average
4924	45.09	60.12	74	-28.91	31.12	6.88	53.03	135	268	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	112.27	118.43			27.1	4.13	37.39	150	334	Average
2462	115.51	121.67			27.1	4.13	37.39	150	334	Peak
2487.72	60.7	66.66	74	-13.3	27.2	4.16	37.32	150	334	Peak
2488.52	52.12	58.08	54	-1.88	27.2	4.16	37.32	150	334	Average
4924	35.18	50.21	54	-18.82	31.12	6.88	53.03	161	63	Average
4924	44.5	59.53	74	-29.5	31.12	6.88	53.03	161	63	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.11	43.21	49.72	54	-10.79	26.91	4.08	37.5	110	175	Average
2389.47	57.89	64.4	74	-16.11	26.91	4.08	37.5	110	175	Peak
2412	93.63	100.1			26.96	4.09	37.52	110	175	Average
2412	101.86	108.33			26.96	4.09	37.52	110	175	Peak
4824	34.73	50.03	54	-19.27	30.99	6.79	53.08	127	262	Average
4824	45.06	60.36	74	-28.94	30.99	6.79	53.08	127	262	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.92	52.48	59.01	54	-1.52	26.91	4.08	37.52	148	337	Average
2389.92	64.73	71.26	74	-9.27	26.91	4.08	37.52	148	337	Peak
2412	100.16	106.63			26.96	4.09	37.52	148	337	Average
2412	108.21	114.68			26.96	4.09	37.52	148	337	Peak
4824	34.21	49.51	54	-19.79	30.99	6.79	53.08	159	79	Average
4824	44.06	59.36	74	-29.94	30.99	6.79	53.08	159	79	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.57	42.37	48.88	54	-11.63	26.91	4.08	37.5	124	58	Average
2389.47	57.5	64.01	74	-16.5	26.91	4.08	37.5	124	58	Peak
2437	102.21	108.49			27.06	4.12	37.46	124	58	Average
2437	110.01	116.29			27.06	4.12	37.46	124	58	Peak
2483.52	45.55	51.57	54	-8.45	27.15	4.15	37.32	124	58	Average
2484.12	61	67.02	74	-13	27.15	4.15	37.32	124	58	Peak
4874	34.63	49.77	54	-19.37	31.06	6.85	53.05	100	166	Average
4874	44.04	59.18	74	-29.96	31.06	6.85	53.05	100	166	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.75	51.89	58.4	54	-2.11	26.91	4.08	37.5	200	30	Average
2389.02	65.53	72.04	74	-8.47	26.91	4.08	37.5	200	30	Peak
2437	110.55	116.83			27.06	4.12	37.46	200	30	Average
2437	118.47	124.75			27.06	4.12	37.46	200	30	Peak
2483.52	52.77	58.79	54	-1.23	27.15	4.15	37.32	200	30	Average
2484	66.36	72.38	74	-7.64	27.15	4.15	37.32	200	30	Peak
4874	35.16	50.3	54	-18.84	31.06	6.85	53.05	100	124	Average
4874	44.8	59.94	74	-29.2	31.06	6.85	53.05	100	124	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	95.6	101.76			27.1	4.13	37.39	107	197	Average
2462	103.33	109.49			27.1	4.13	37.39	107	197	Peak
2484.36	47.1	53.12	54	-6.9	27.15	4.15	37.32	107	197	Average
2484.88	60.63	66.65	74	-13.37	27.15	4.15	37.32	107	197	Peak
4924	34.97	50	54	-19.03	31.12	6.88	53.03	115	264	Average
4924	45.06	60.09	74	-28.94	31.12	6.88	53.03	115	264	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	100.78	106.94			27.1	4.13	37.39	142	332	Average
2462	108.94	115.1			27.1	4.13	37.39	142	332	Peak
2483.64	52.37	58.39	54	-1.63	27.15	4.15	37.32	142	332	Average
2483.96	64.91	70.93	74	-9.09	27.15	4.15	37.32	142	332	Peak
4924	34.67	49.7	54	-19.33	31.12	6.88	53.03	167	78	Average
4924	44.53	59.56	74	-29.47	31.12	6.88	53.03	167	78	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.74	61.61	68.12	74	-12.39	26.91	4.08	37.5	110	194	Peak
2389.92	46.6	53.13	54	-7.4	26.91	4.08	37.52	110	194	Average
2412	93.3	99.77			26.96	4.09	37.52	110	194	Average
2412	101.25	107.72			26.96	4.09	37.52	110	194	Peak
4824	34.89	50.19	54	-19.11	30.99	6.79	53.08	132	250	Average
4824	45.74	61.04	74	-28.26	30.99	6.79	53.08	132	250	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.83	66.9	73.43	74	-7.1	26.91	4.08	37.52	146	338	Peak
2389.92	52.42	58.95	54	-1.58	26.91	4.08	37.52	146	338	Average
2412	99.55	106.02			26.96	4.09	37.52	146	338	Average
2412	107.4	113.87			26.96	4.09	37.52	146	338	Peak
4824	34.19	49.49	54	-19.81	30.99	6.79	53.08	157	61	Average
4824	43.94	59.24	74	-30.06	30.99	6.79	53.08	157	61	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.92	39.35	45.88	54	-14.65	26.91	4.08	37.52	125	44	Average
2389.92	57.58	64.11	74	-16.42	26.91	4.08	37.52	125	44	Peak
2437	100.95	107.23			27.06	4.12	37.46	125	44	Average
2437	109.41	115.69			27.06	4.12	37.46	125	44	Peak
2483.52	40.35	46.37	54	-13.65	27.15	4.15	37.32	125	44	Average
2484	58.63	64.65	74	-15.37	27.15	4.15	37.32	125	44	Peak
4874	34.42	49.56	54	-19.58	31.06	6.85	53.05	100	328	Average
4874	43.65	58.79	74	-30.35	31.06	6.85	53.05	100	328	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.2	68.5	75.01	74	-5.5	26.91	4.08	37.5	128	241	Peak
2389.92	52.24	58.77	54	-1.76	26.91	4.08	37.52	128	241	Average
2437	109.34	115.62			27.06	4.12	37.46	128	241	Average
2437	116.95	123.23			27.06	4.12	37.46	128	241	Peak
2485.56	65.15	71.17	74	-8.85	27.15	4.15	37.32	128	241	Peak
2486.04	47.93	53.95	54	-6.07	27.15	4.15	37.32	128	241	Average
4874	35.19	50.33	54	-18.81	31.06	6.85	53.05	100	188	Average
4874	44.2	59.34	74	-29.8	31.06	6.85	53.05	100	188	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	98.21	104.37			27.1	4.13	37.39	108	192	Average
2462	105.99	112.15			27.1	4.13	37.39	108	192	Peak
2483.52	49.68	55.7	54	-4.32	27.15	4.15	37.32	108	192	Average
2483.52	64.06	70.08	74	-9.94	27.15	4.15	37.32	108	192	Peak
4924	35.15	50.18	54	-18.85	31.12	6.88	53.03	123	267	Average
4924	44.08	59.11	74	-29.92	31.12	6.88	53.03	123	267	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	102.53	108.69			27.1	4.13	37.39	151	319	Average
2462	110.6	116.76			27.1	4.13	37.39	151	319	Peak
2483.68	67.22	73.24	74	-6.78	27.15	4.15	37.32	151	337	Peak
2486.32	52.08	58.1	54	-1.92	27.15	4.15	37.32	151	337	Average
4924	34.88	49.91	54	-19.12	31.12	6.88	53.03	163	70	Average
4924	45.6	60.63	74	-28.4	31.12	6.88	53.03	163	70	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2367.24	57.27	63.89	74	-16.73	26.81	4.07	37.5	108	190	Peak
2385.87	41	47.51	54	-13	26.91	4.08	37.5	108	190	Average
2422	87.27	93.61			27.01	4.11	37.46	108	190	Average
2422	95.32	101.66			27.01	4.11	37.46	108	190	Peak
2485.52	58.06	64.08	74	-15.94	27.15	4.15	37.32	108	190	Peak
2496.08	38.14	44.03	54	-15.86	27.2	4.16	37.25	108	190	Average
4844	34.5	49.73	54	-19.5	31.01	6.82	53.06	129	249	Average
4844	44.3	59.53	74	-29.7	31.01	6.82	53.06	129	249	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.84	64.95	71.46	74	-9.05	26.91	4.08	37.5	162	194	Peak
2389.47	52.98	59.49	54	-1.02	26.91	4.08	37.5	162	194	Average
2422	93.79	100.13			27.01	4.11	37.46	162	194	Average
2422	101.16	107.5			27.01	4.11	37.46	162	194	Peak
2485.28	57.72	63.74	74	-16.28	27.15	4.15	37.32	162	194	Peak
2499.84	40.26	46.15	54	-13.74	27.2	4.16	37.25	162	194	Average
4844	33.7	48.93	54	-20.3	31.01	6.82	53.06	134	77	Average
4844	43.74	58.97	74	-30.26	31.01	6.82	53.06	134	77	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2422 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.29	44.36	50.87	54	-9.64	26.91	4.08	37.5	106	198	Average
2389.56	58.66	65.17	74	-15.34	26.91	4.08	37.5	106	198	Peak
2437	93.02	99.3			27.06	4.12	37.46	106	198	Average
2437	100.97	107.25			27.06	4.12	37.46	106	198	Peak
2483.72	59.13	65.15	74	-14.87	27.15	4.15	37.32	106	198	Peak
2483.92	43.69	49.71	54	-10.31	27.15	4.15	37.32	106	198	Average
4874	34.33	49.47	54	-19.67	31.06	6.85	53.05	100	180	Average
4874	44.24	59.38	74	-29.76	31.06	6.85	53.05	100	180	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.84	65.27	71.78	74	-8.73	26.91	4.08	37.5	100	241	Peak
2389.92	52.84	59.37	54	-1.16	26.91	4.08	37.52	100	241	Average
2437	99.64	105.92			27.06	4.12	37.46	100	241	Average
2437	106.93	113.21			27.06	4.12	37.46	100	241	Peak
2486.04	45.16	51.18	54	-8.84	27.15	4.15	37.32	100	241	Average
2486.48	59.16	65.18	74	-14.84	27.15	4.15	37.32	100	241	Peak
4874	35.58	50.72	54	-18.42	31.06	6.85	53.05	100	262	Average
4874	44.89	60.03	74	-29.11	31.06	6.85	53.05	100	262	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2385.33	57.07	63.63	74	-16.93	26.86	4.08	37.5	109	191	Peak
2388.66	38.67	45.18	54	-15.33	26.91	4.08	37.5	109	191	Average
2452	91.71	97.91			27.06	4.13	37.39	109	191	Average
2452	99.45	105.65			27.06	4.13	37.39	109	191	Peak
2484.44	51.22	57.24	54	-2.78	27.15	4.15	37.32	109	191	Average
2487.56	62.77	68.73	74	-11.23	27.2	4.16	37.32	109	191	Peak
4904	34.77	49.82	54	-19.23	31.1	6.88	53.03	131	244	Average
4904	44.28	59.33	74	-29.72	31.1	6.88	53.03	131	244	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2378.58	57.71	64.28	74	-16.29	26.86	4.07	37.5	166	194	Peak
2382.27	41.67	48.23	54	-12.33	26.86	4.08	37.5	166	194	Average
2452	97.69	103.89			27.06	4.13	37.39	166	194	Average
2452	104.6	110.8			27.06	4.13	37.39	166	194	Peak
2483.52	52.31	58.33	54	-1.69	27.15	4.15	37.32	166	194	Average
2488.8	65.7	71.66	74	-8.3	27.2	4.16	37.32	166	194	Peak
4904	33.69	48.74	54	-20.31	31.1	6.88	53.03	151	71	Average
4904	43.71	58.76	74	-30.29	31.1	6.88	53.03	151	71	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2452 MHz: Fundamental frequency.

9 kHz ~ 30 MHz DATA:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz WORST-CASE DATA:

Mode A

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
39.7	18.46	35.27	40	-21.54	13.54	0.64	30.99	103	111	Peak
57.16	23.09	41.42	40	-16.91	12.25	0.77	31.35	103	75	Peak
68.8	21.26	41.29	40	-18.74	10.89	0.85	31.77	120	208	Peak
129.91	27.39	46.45	43.5	-16.11	11.68	1.14	31.88	122	107	Peak
256.01	23.4	42.13	46	-22.6	11.65	1.51	31.89	134	68	Peak
403.45	30.95	45.7	46	-15.05	15.41	1.92	32.08	115	49	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
39.7	29.05	45.86	40	-10.95	13.54	0.64	30.99	124	151	Peak
55.22	30.32	48.45	40	-9.68	12.45	0.75	31.33	126	349	Peak
68.8	30.14	50.17	40	-9.86	10.89	0.85	31.77	123	283	Peak
129.91	27.43	46.49	43.5	-16.07	11.68	1.14	31.88	136	113	Peak
270.56	22.36	40.74	46	-23.64	12.08	1.55	32.01	104	50	Peak
406.36	28.97	43.63	46	-17.03	15.46	1.92	32.04	115	235	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value

Mode B

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
79.47	32.24	54.52	40	-7.76	8.37	0.89	31.54	120	311	Peak
144.46	35.48	53.44	43.5	-8.02	12.51	1.16	31.63	140	180	Peak
221.09	36.78	56.86	46	-9.22	10.26	1.38	31.72	104	277	Peak
357.86	40.96	56.78	46	-5.04	14.33	1.79	31.94	118	172	Peak
672.14	37.05	45.99	46	-8.95	20.48	2.4	31.82	123	26	Peak
905.91	35.55	41.28	46	-10.45	23.54	2.76	32.03	134	126	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
42.61	38.91	55.75	40	-1.09	13.58	0.66	31.08	100	238	QP
58.13	36.71	55.13	40	-3.29	12.15	0.78	31.35	100	1	QP
80.44	32.83	55.32	40	-7.17	8.13	0.89	31.51	100	10	QP
357.86	40.24	56.06	46	-5.76	14.33	1.79	31.94	126	185	Peak
672.14	38.37	47.31	46	-7.63	20.48	2.4	31.82	116	136	Peak
905.91	36.63	42.36	46	-9.37	23.54	2.76	32.03	118	236	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 21, 2016	Nov. 20, 2017
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 22, 2016	Dec. 21, 2017
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 28, 2016	Jul. 27, 2017
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

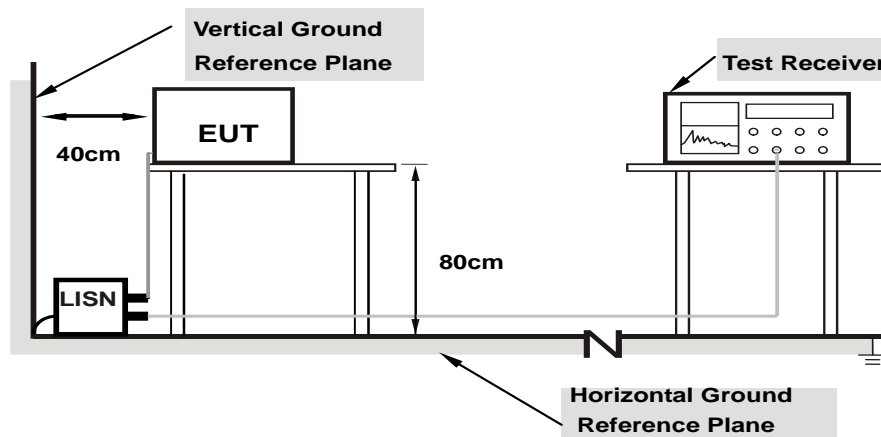
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.2.7 Test Results

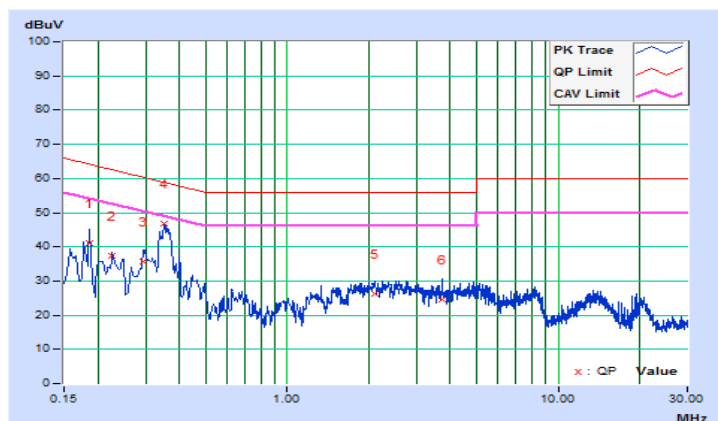
Mode A

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Toby Tian	Test Date	2016/12/25

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18600	10.13	31.06	15.22	41.19	25.35	64.21	54.21	-23.02	-28.86
2	0.22624	10.14	27.14	16.16	37.28	26.30	62.59	52.59	-25.31	-26.29
3	0.29599	10.15	25.60	17.99	35.75	28.14	60.35	50.35	-24.60	-22.21
4	0.35000	10.16	36.72	28.91	46.88	39.07	58.96	48.96	-12.08	-9.89
5	2.11000	10.26	16.12	10.50	26.38	20.76	56.00	46.00	-29.62	-25.24
6	3.73000	10.35	14.34	8.64	24.69	18.99	56.00	46.00	-31.31	-27.01

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

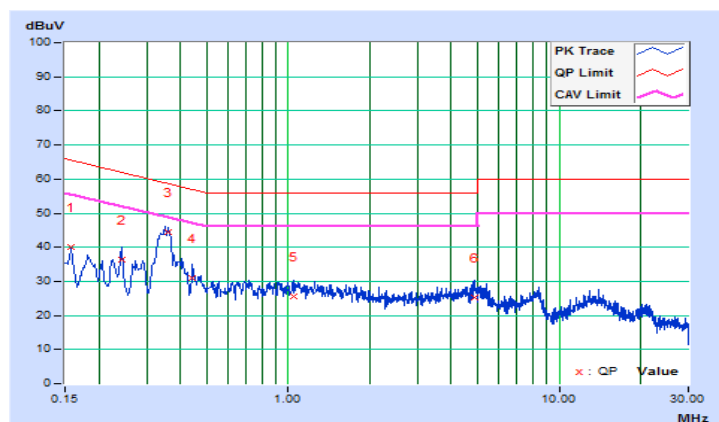


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Toby Tian	Test Date	2016/12/25

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	10.13	29.78	18.66	39.91	28.79	65.57	55.57	-25.66	-26.78
2	0.24200	10.16	26.19	18.90	36.35	29.06	62.03	52.03	-25.68	-22.97
3	0.36161	10.17	34.36	26.98	44.53	37.15	58.69	48.69	-14.16	-11.54
4	0.44200	10.18	20.72	14.16	30.90	24.34	57.02	47.02	-26.12	-22.68
5	1.04200	10.19	15.52	9.87	25.71	20.06	56.00	46.00	-30.29	-25.94
6	4.85800	10.44	14.81	8.67	25.25	19.11	56.00	46.00	-30.75	-26.89

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



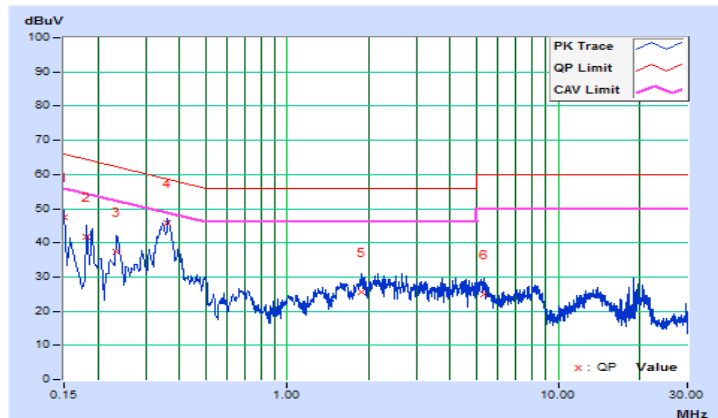
Mode B

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Toby Tian	Test Date	2016/12/25

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.11	37.20	22.48	47.31	32.59	66.00	56.00	-18.69	-23.41
2	0.18200	10.13	31.78	16.26	41.91	26.39	64.39	54.39	-22.48	-28.00
3	0.23400	10.15	27.06	16.44	37.21	26.59	62.31	52.31	-25.10	-25.72
4	0.36256	10.16	35.75	28.96	45.91	39.12	58.67	48.67	-12.76	-9.55
5	1.89000	10.24	15.34	10.55	25.58	20.79	56.00	46.00	-30.42	-25.21
6	5.31800	10.44	14.56	7.63	25.00	18.07	60.00	50.00	-35.00	-31.93

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

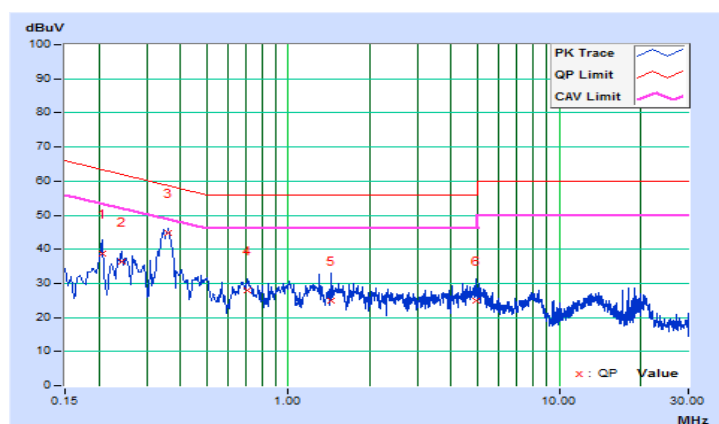


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Toby Tian	Test Date	2016/12/25

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20600	10.15	28.56	16.19	38.71	26.34	63.37	53.37	-24.66	-27.03
2	0.24200	10.16	26.31	18.75	36.47	28.91	62.03	52.03	-25.56	-23.12
3	0.36161	10.17	34.69	27.77	44.86	37.94	58.69	48.69	-13.83	-10.75
4	0.70982	10.19	17.75	13.13	27.94	23.32	56.00	46.00	-28.06	-22.68
5	1.44600	10.22	14.64	9.87	24.86	20.09	56.00	46.00	-31.14	-25.91
6	4.92600	10.45	14.44	7.96	24.89	18.41	56.00	46.00	-31.11	-27.59

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

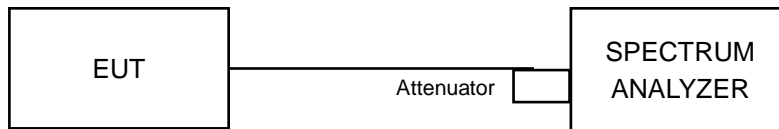


4.3 6 dB Bandwidth Measurement

4.3.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- Set resolution bandwidth (RBW) = 100 kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.11	8.11	0.5	Pass
6	2437	8.10	8.10	0.5	Pass
11	2462	8.10	8.10	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.37	16.38	0.5	Pass
6	2437	16.37	16.40	0.5	Pass
11	2462	16.38	16.40	0.5	Pass

802.11n (HT20)

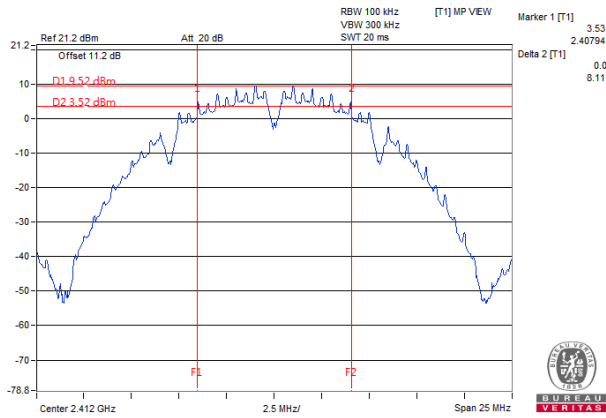
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.61	17.60	0.5	Pass
6	2437	17.62	17.62	0.5	Pass
11	2462	17.62	17.64	0.5	Pass

802.11n (HT40)

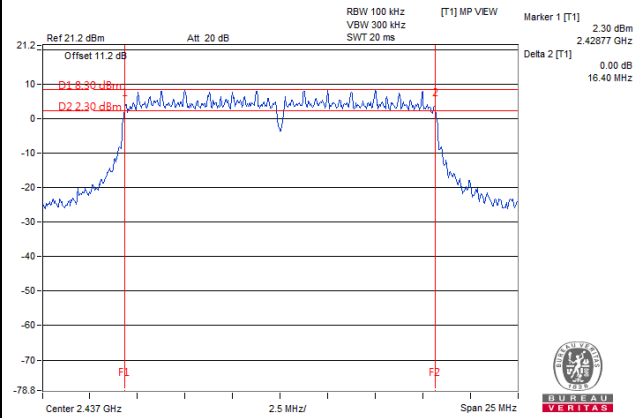
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.18	35.16	0.5	Pass
6	2437	35.24	35.21	0.5	Pass
9	2452	35.25	35.24	0.5	Pass

Spectrum Plot of Worst Value

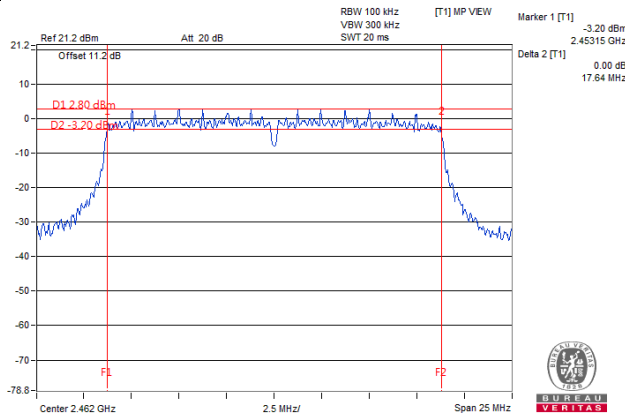
802.11b



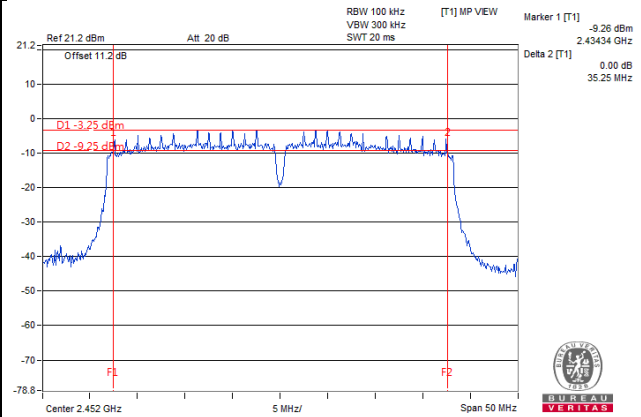
802.11g



802.11n (HT20)



802.11n (HT40)



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

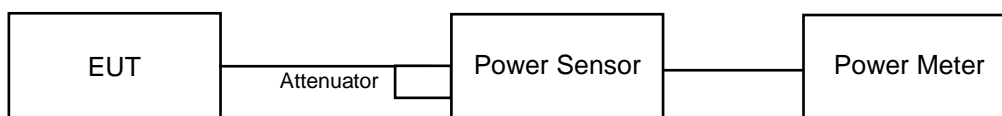
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less for 20 MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(NANT/NSS)$ dB.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.4.7 Test Results

CDD Mode

802.11b

Channel	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.24	17.78	112.980	20.53	30	Pass
6	2437	20.11	20.58	216.770	23.36	30	Pass
11	2462	17.16	17.59	109.396	20.39	30	Pass

802.11g

Channel	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	10.05	10.31	20.845	13.19	30	Pass
6	2437	19.08	19.32	166.341	22.21	30	Pass
11	2462	11.75	12.09	31.117	14.93	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	11.33	11.48	27.669	14.42	30	Pass
6	2437	18.65	18.81	149.279	21.74	30	Pass
11	2462	14.27	14.64	55.847	17.47	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	8.39	8.22	13.552	11.32	30	Pass
6	2437	12.89	13.01	39.446	15.96	30	Pass
9	2452	10.64	10.98	24.099	13.82	30	Pass

Beamforming Mode

802.11n (HT20)

Channel	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	8.32	8.47	13.836	11.41	30	Pass
6	2437	15.64	15.80	74.645	18.73	30	Pass
11	2462	11.26	11.63	27.925	14.46	30	Pass

802.11n (HT40)

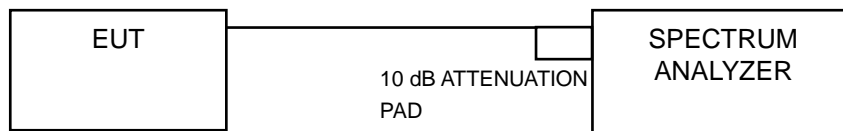
Channel	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	5.38	5.21	6.776	8.31	30	Pass
6	2437	9.88	10.00	19.724	12.95	30	Pass
9	2452	7.63	7.97	12.050	10.81	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results

802.11b

TX Chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-9.08	3.01	-6.07	6.04	Pass
	6	2437	-6.47	3.01	-3.46	6.04	Pass
	11	2462	-9.59	3.01	-6.58	6.04	Pass
1	1	2412	-8.56	3.01	-5.55	6.04	Pass
	6	2437	-6.09	3.01	-3.08	6.04	Pass
	11	2462	-9.07	3.01	-6.06	6.04	Pass

NOTE: Directional gain = 4.95 dBi + 10log(2) = 7.96 dBi > 6 dBi , so the power density limit shall be reduced to 8-(7.96-6) = 6.04 dBm.

802.11g

TX Chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-20.48	3.01	-17.27	6.04	Pass
	6	2437	-10.75	3.01	-7.54	6.04	Pass
	11	2462	-18.19	3.01	-14.98	6.04	Pass
1	1	2412	-20.04	3.01	-16.83	6.04	Pass
	6	2437	-10.62	3.01	-7.41	6.04	Pass
	11	2462	-17.94	3.01	-14.73	6.04	Pass

NOTE: Directional gain = 4.95 dBi + 10log(2) = 7.96 dBi > 6 dBi , so the power density limit shall be reduced to 8-(7.96-6) = 6.04 dBm.

802.11n (HT20)

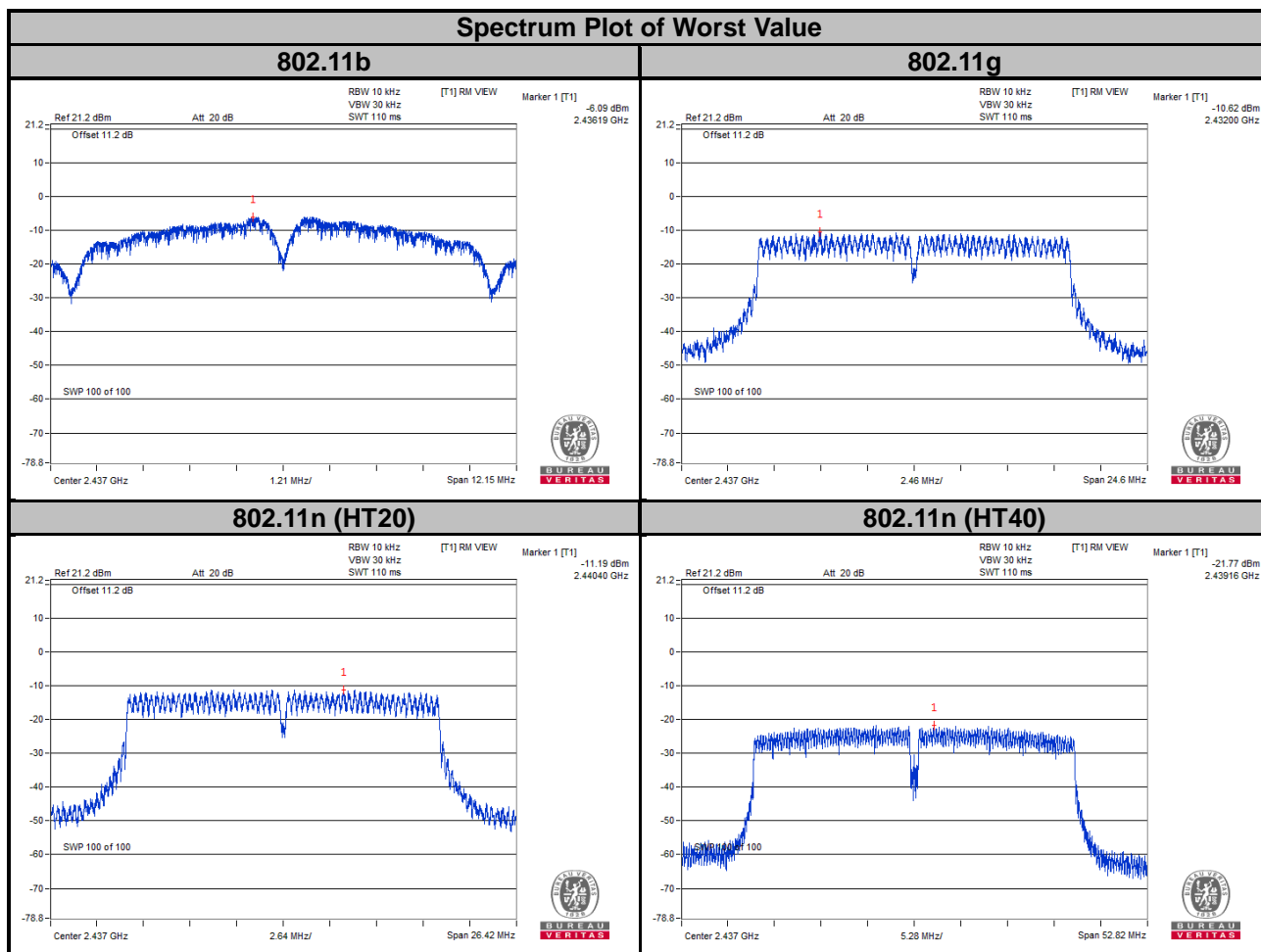
TX Chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-17.20	3.01	-14.10	6.04	Pass
	6	2437	-11.34	3.01	-8.24	6.04	Pass
	11	2462	-15.83	3.01	-12.73	6.04	Pass
1	1	2412	-16.88	3.01	-13.78	6.04	Pass
	6	2437	-11.19	3.01	-8.09	6.04	Pass
	11	2462	-15.27	3.01	-12.17	6.04	Pass

NOTE: Directional gain = 4.95 dBi + 10log(2) = 7.96 dBi > 6 dBi , so the power density limit shall be reduced to 8-(7.96-6) = 6.04 dBm.

802.11n (HT40)

TX Chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	3	2422	-26.20	3.01	-22.98	6.04	Pass
	6	2437	-22.22	3.01	-19.00	6.04	Pass
	9	2452	-22.30	3.01	-19.08	6.04	Pass
1	3	2422	-25.62	3.01	-22.40	6.04	Pass
	6	2437	-21.77	3.01	-18.55	6.04	Pass
	9	2452	-22.10	3.01	-18.88	6.04	Pass

NOTE: Directional gain = 4.95 dBi + 10log(2) = 7.96 dBi > 6 dBi , so the power density limit shall be reduced to 8-(7.96-6) = 6.04 dBm.

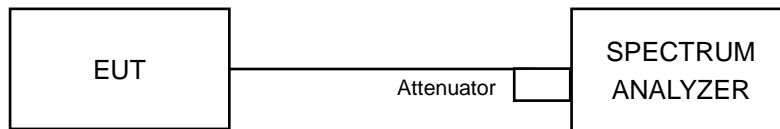


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 30 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW \geq 300 kHz.
3. Detector = average.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW \geq 300 kHz.
3. Ensure that the number of measurement points \geq span/RBW
4. According to measurement points to set differ measurement span.
5. Detector = average.
6. Trace Mode = max hold.
7. Sweep = auto couple.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

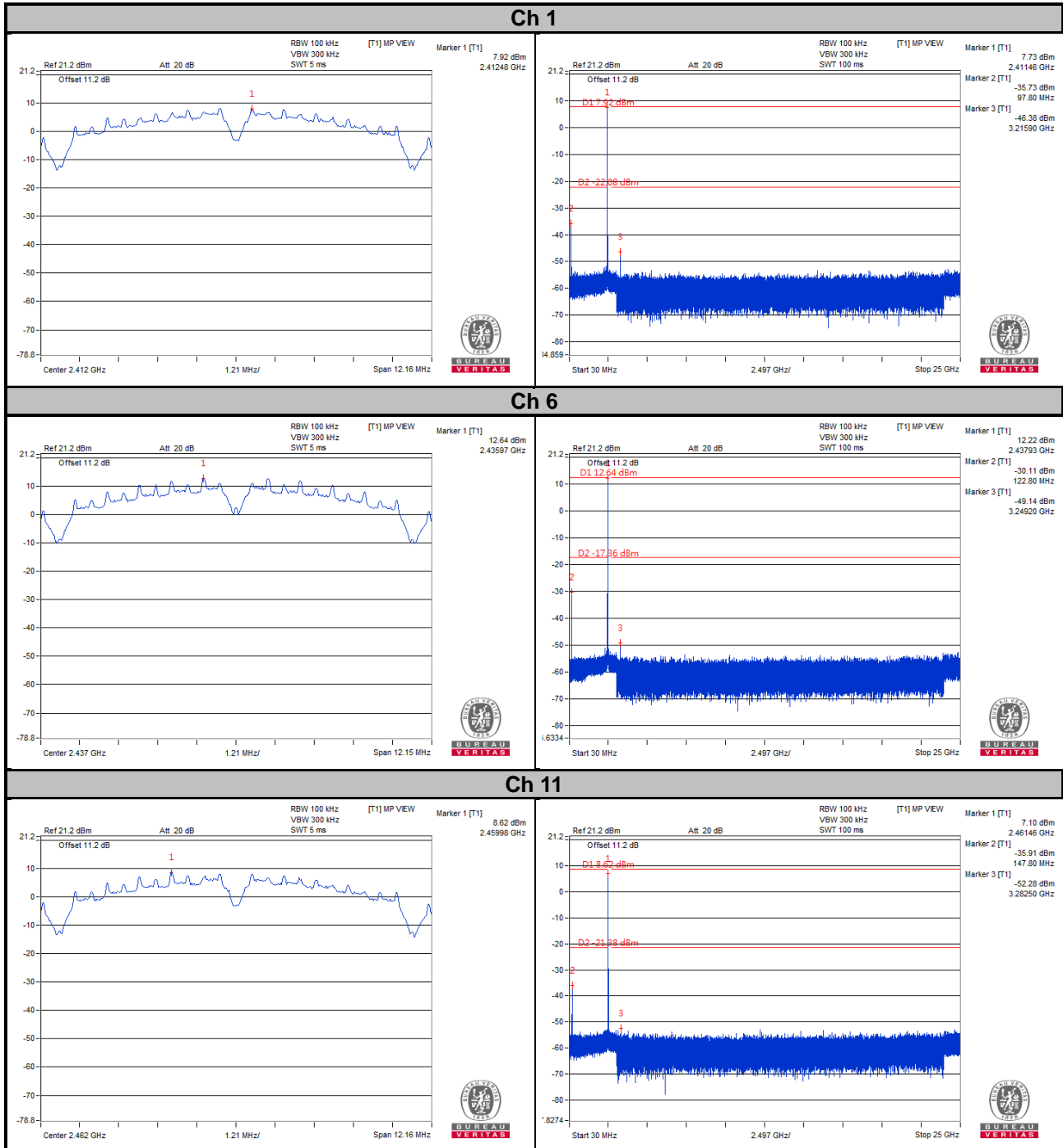
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

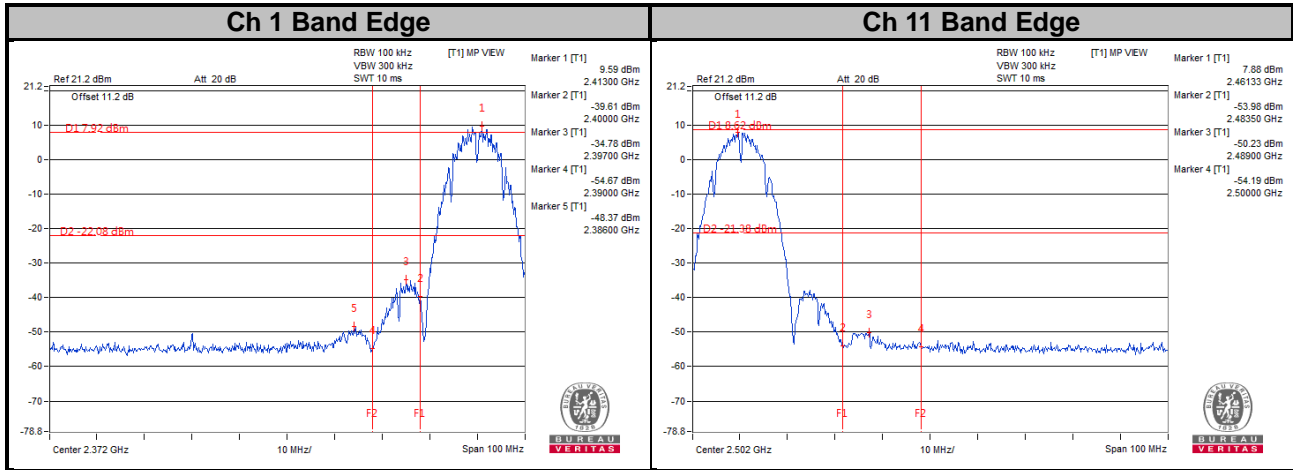
4.6.7 Test Results

The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 30 dB offset below D1. It shows compliance with the requirement.

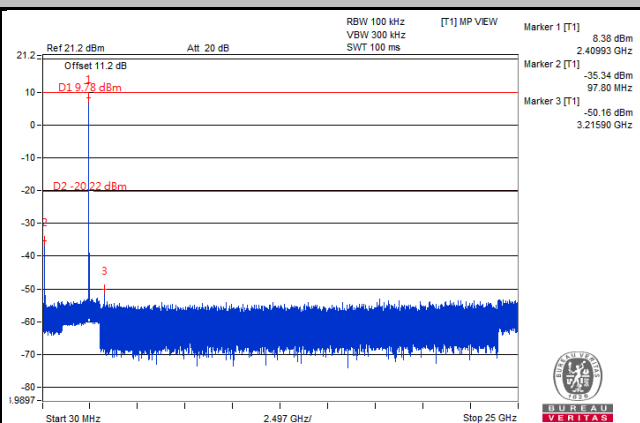
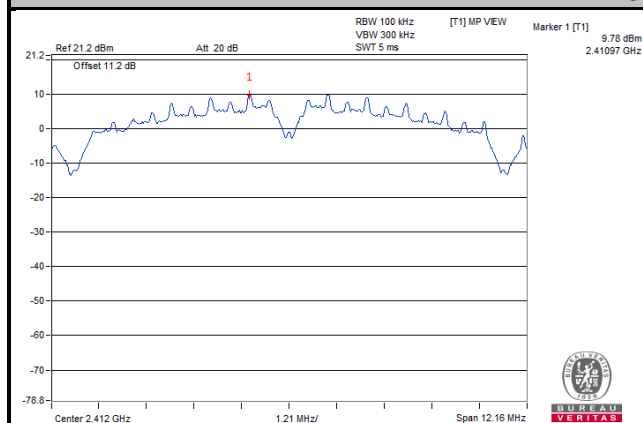
802.11b CHAIN 0



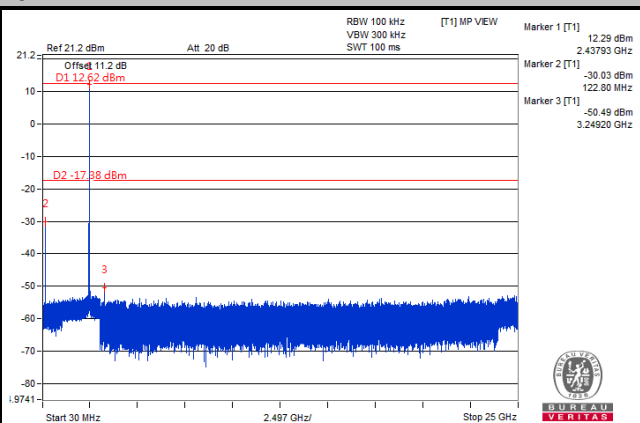
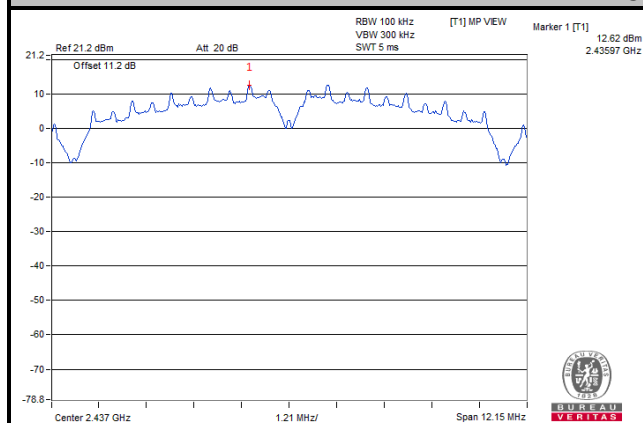


CHAIN 1

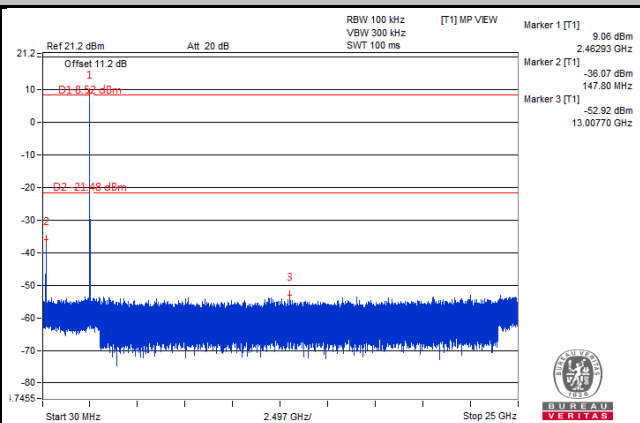
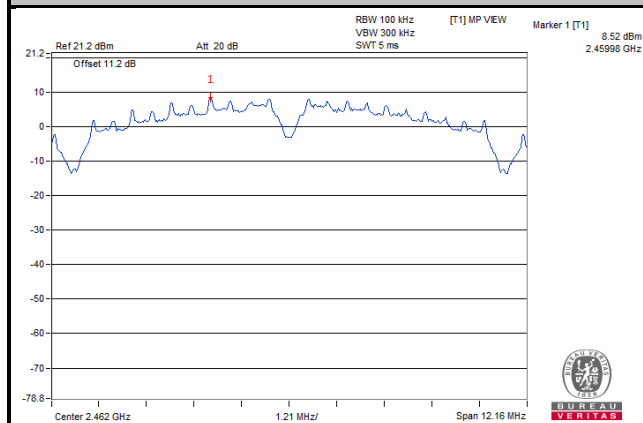
Ch 1

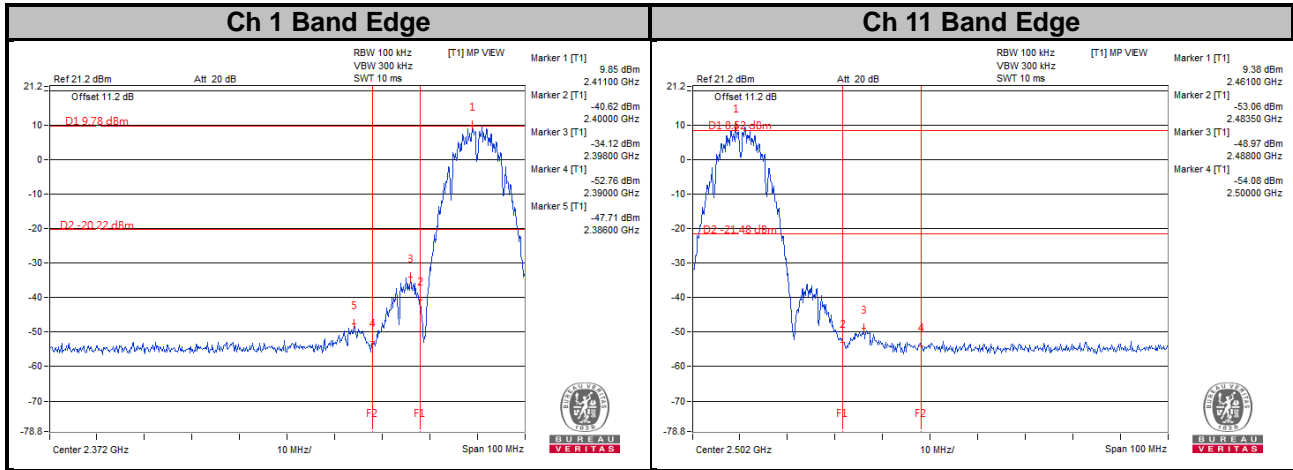


Ch 6



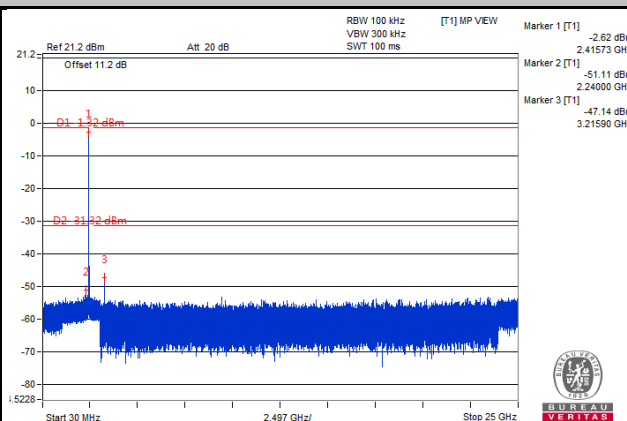
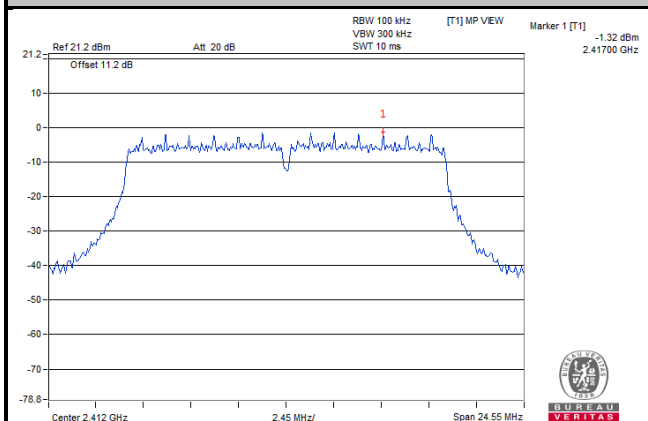
Ch 11



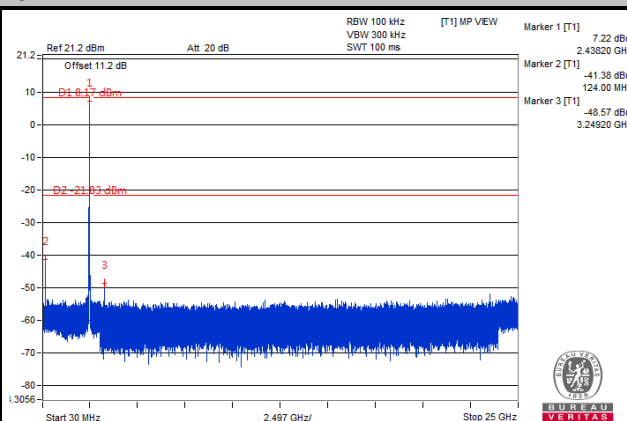
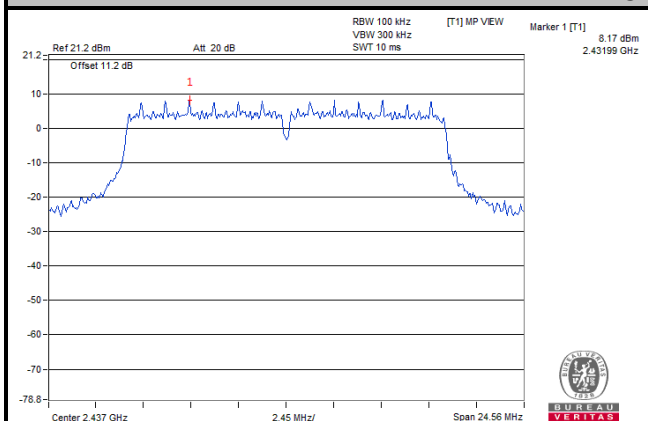


802.11g CHAIN 0

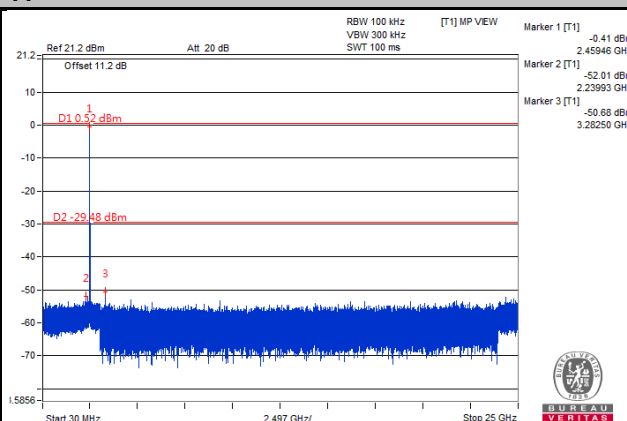
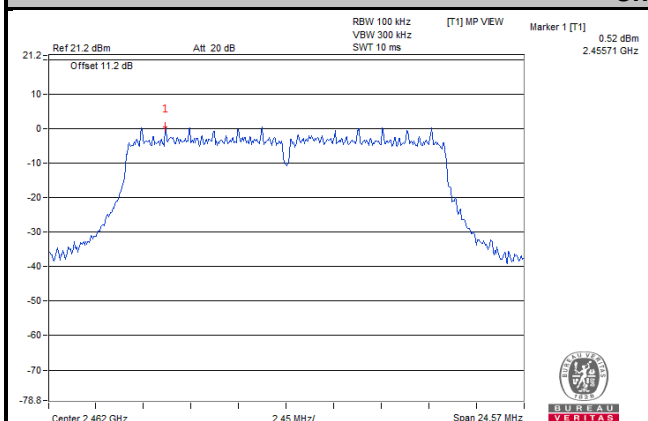
Ch 1

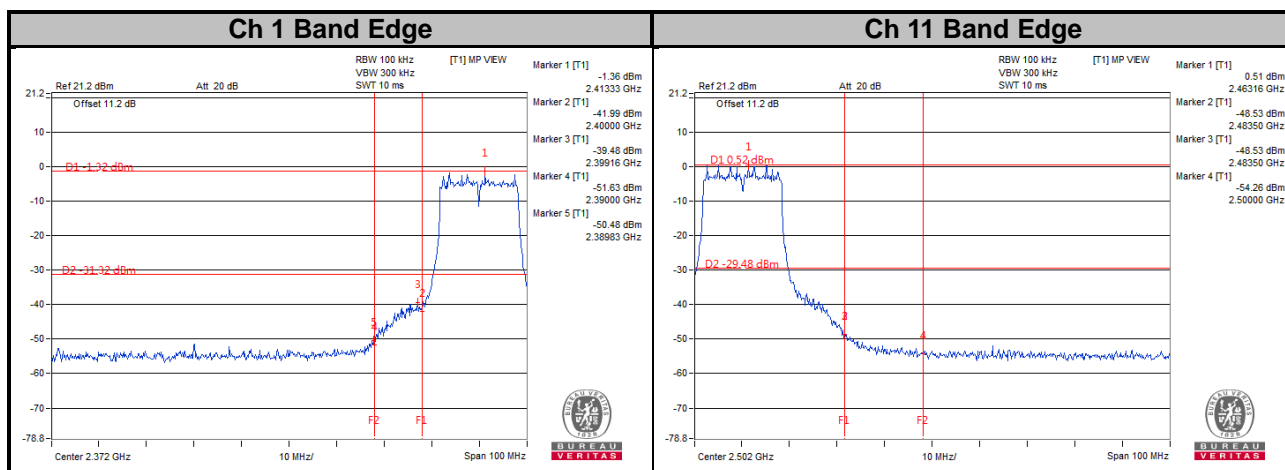


Ch 6



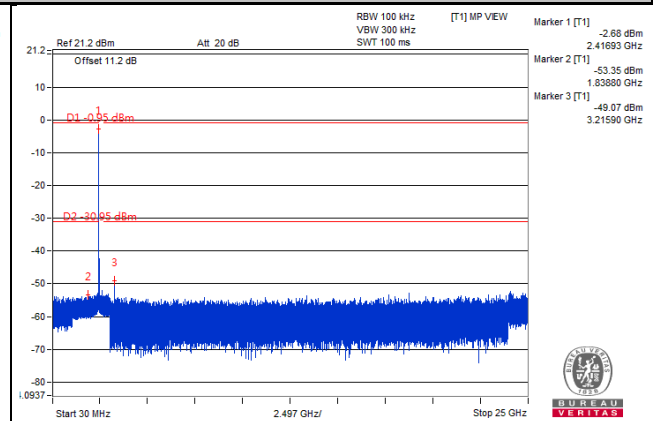
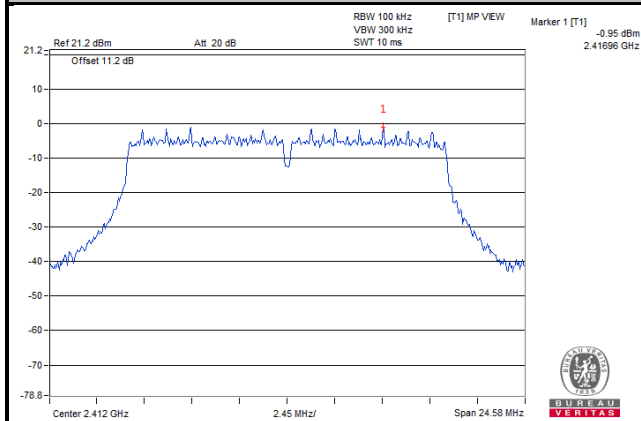
Ch 11



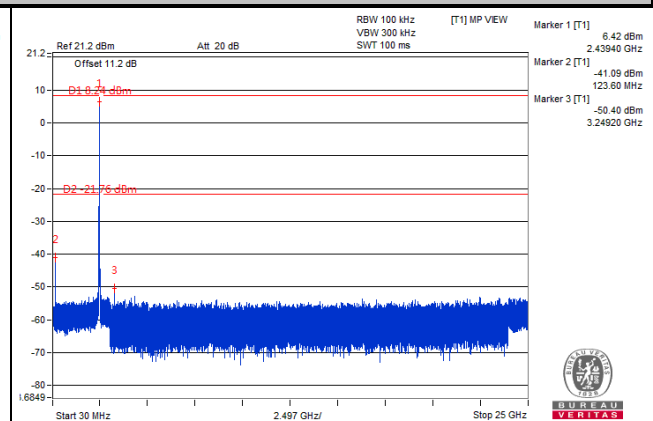
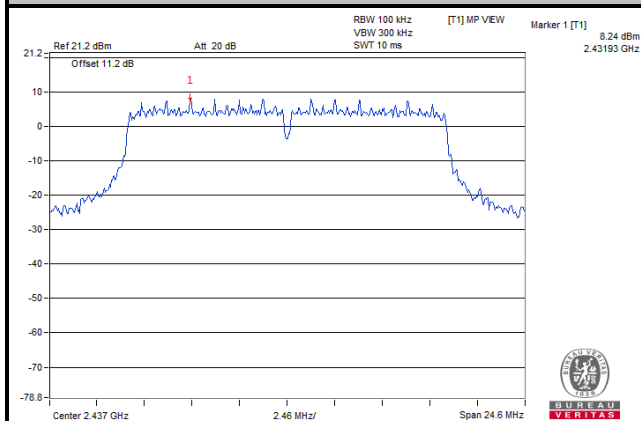


CHAIN 1

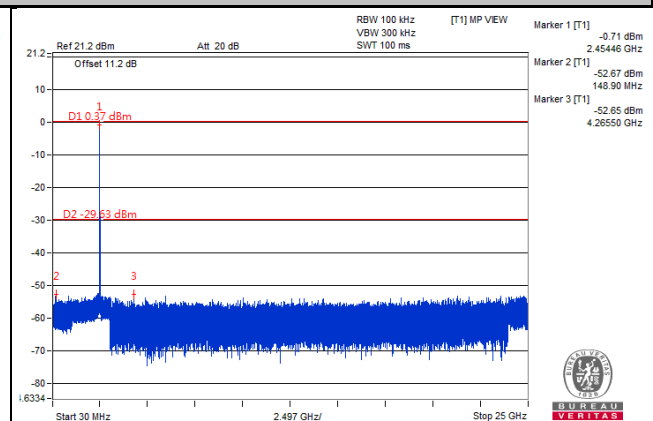
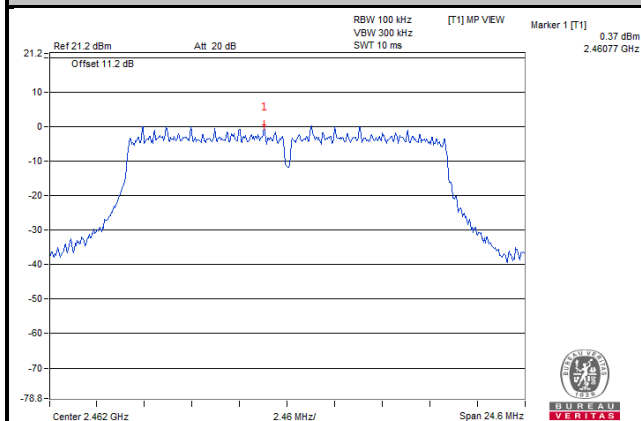
Ch 1

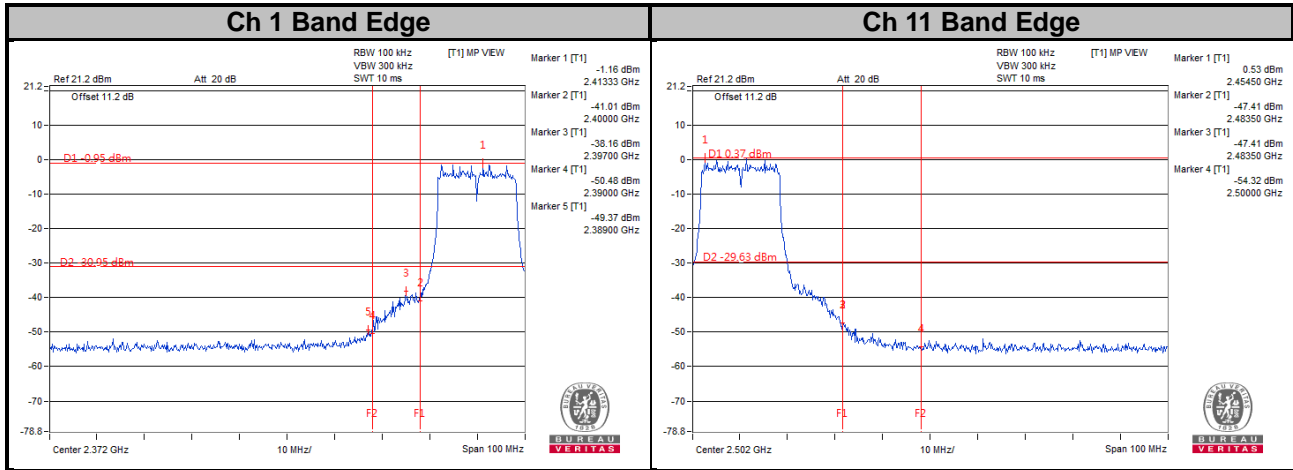


Ch 6

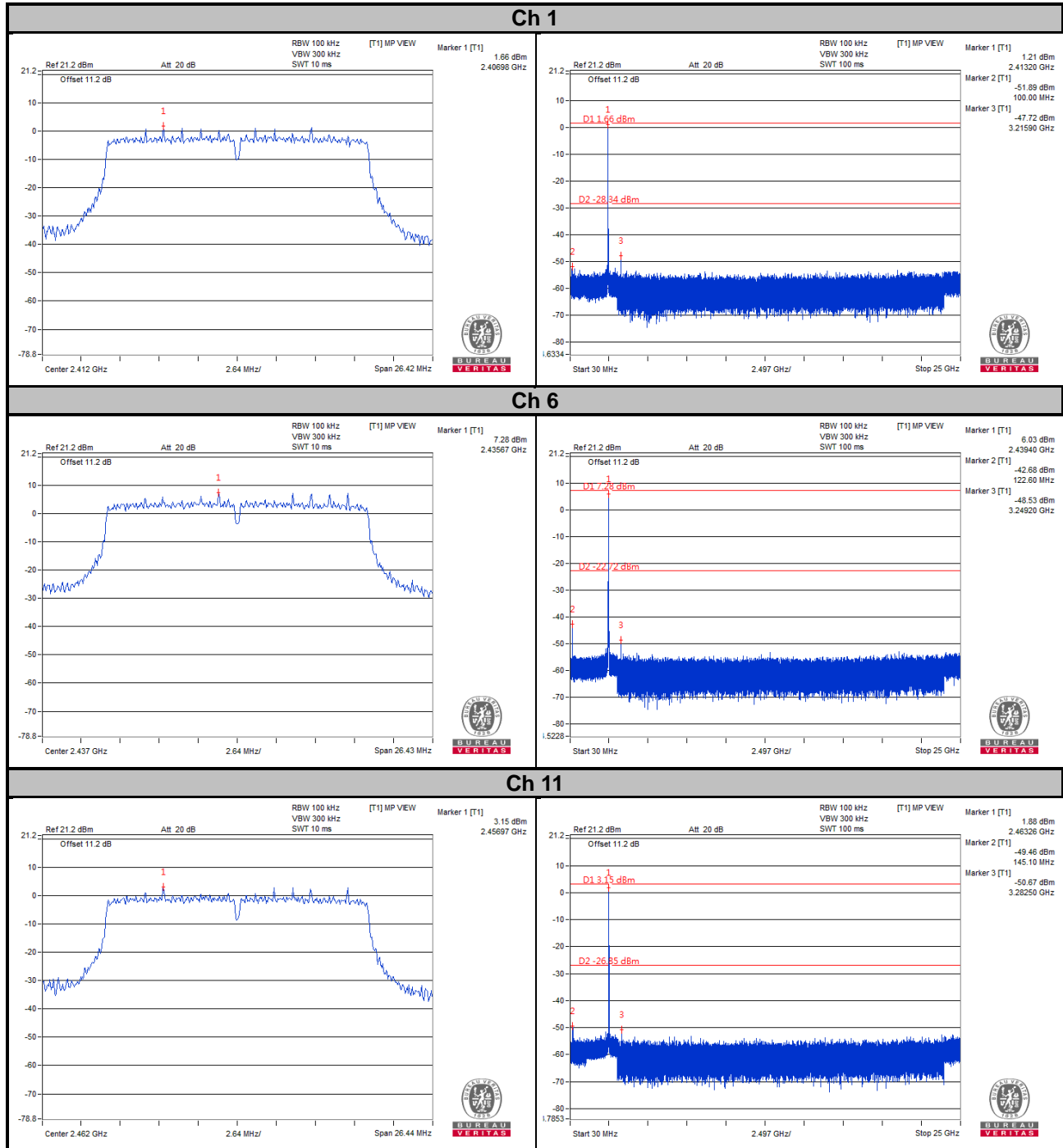


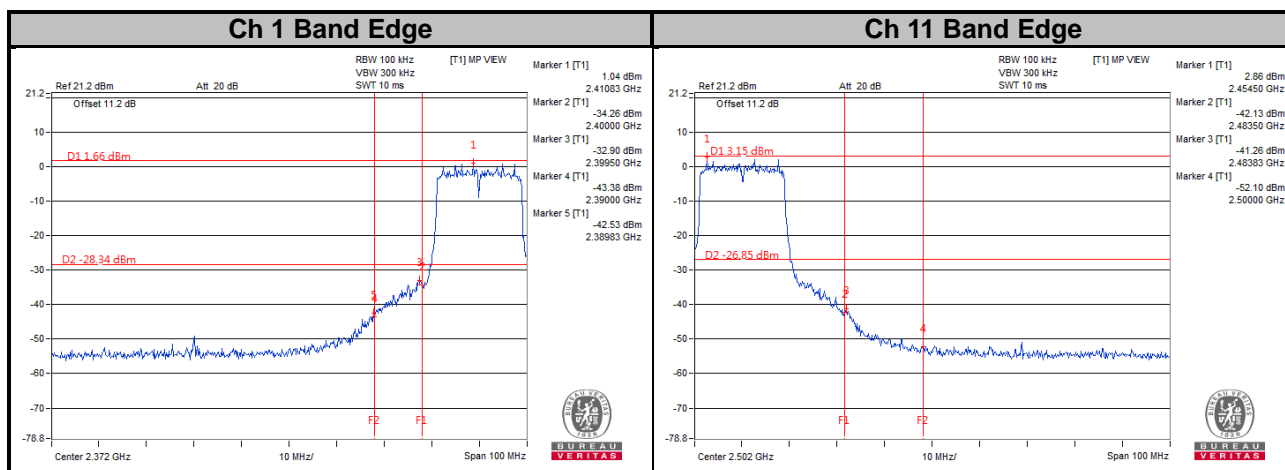
Ch 11





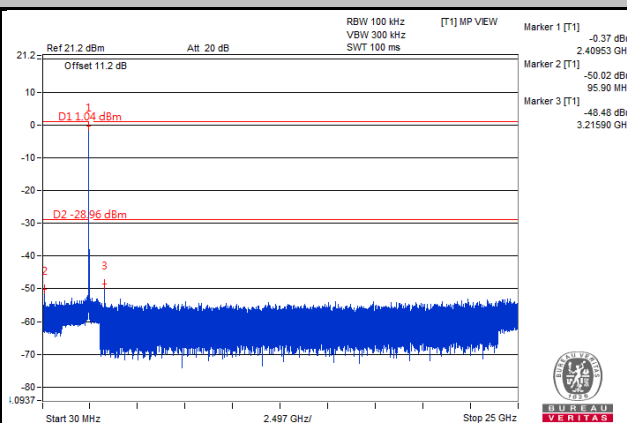
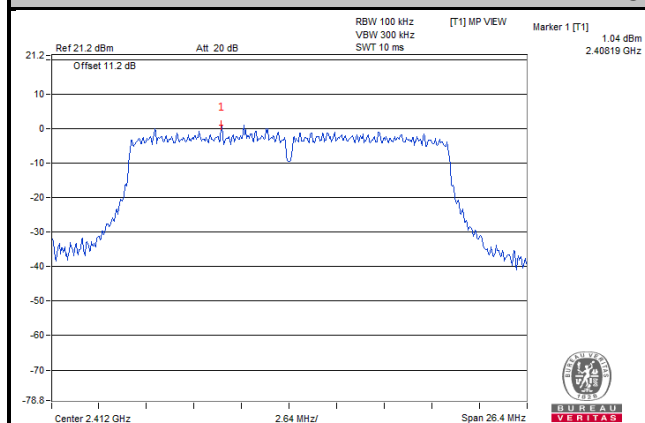
802.11n (HT20) CHAIN 0



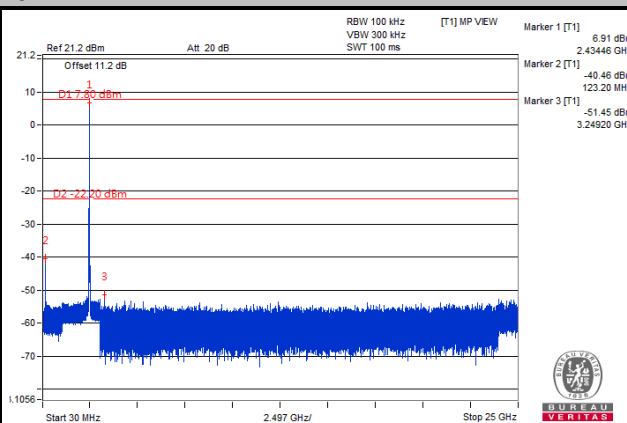
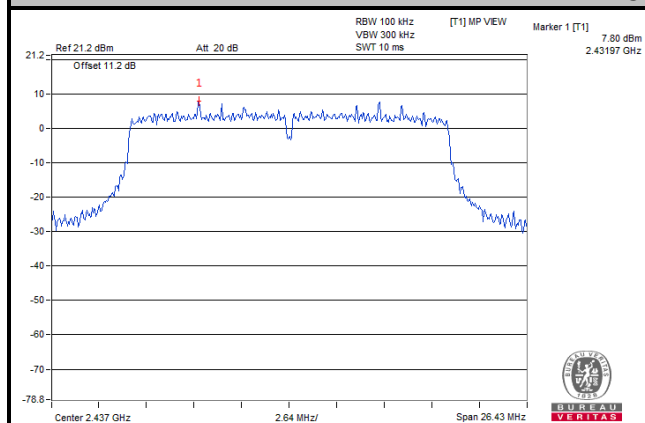


CHAIN 1

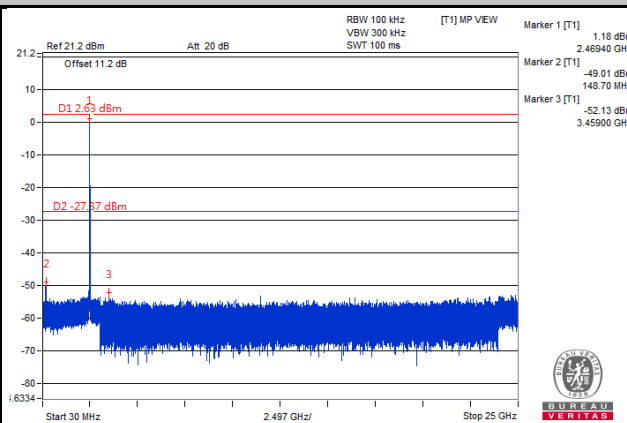
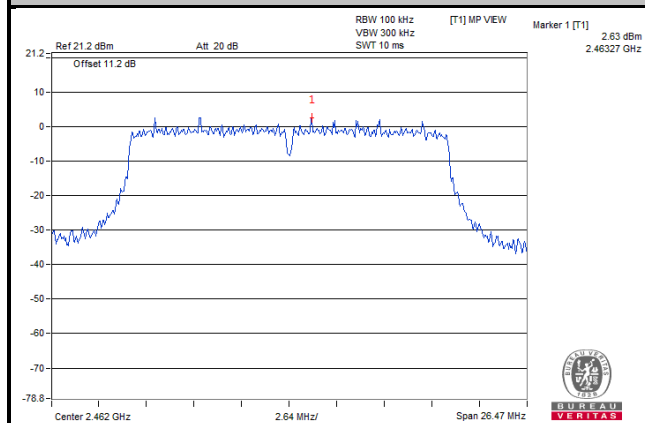
Ch 1

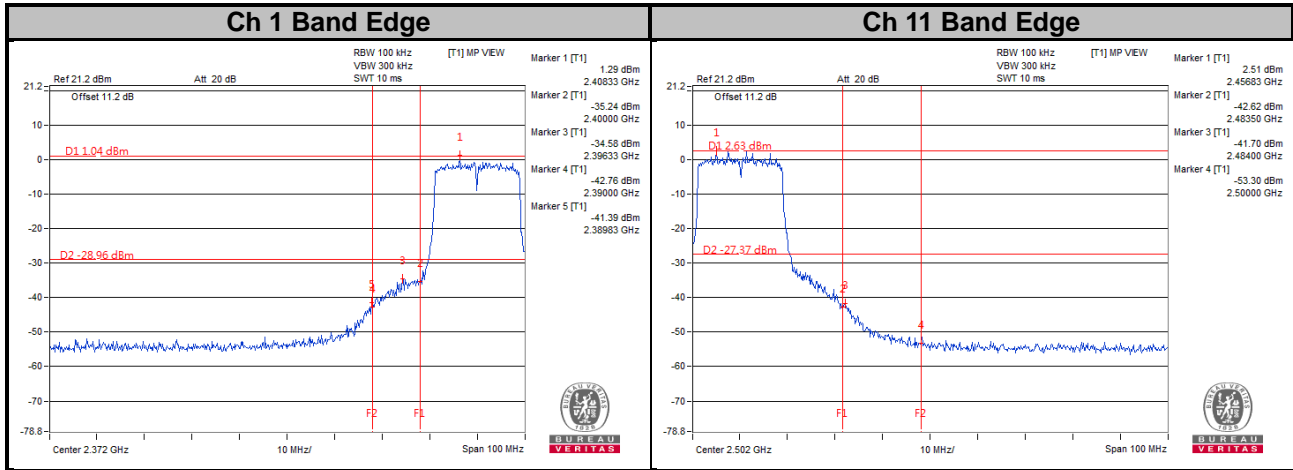


Ch 6



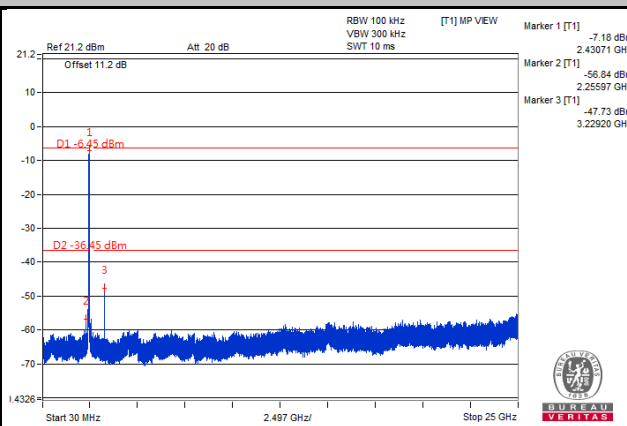
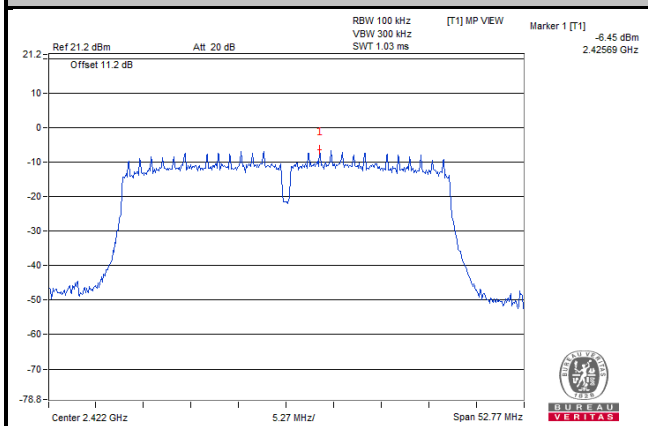
Ch 11



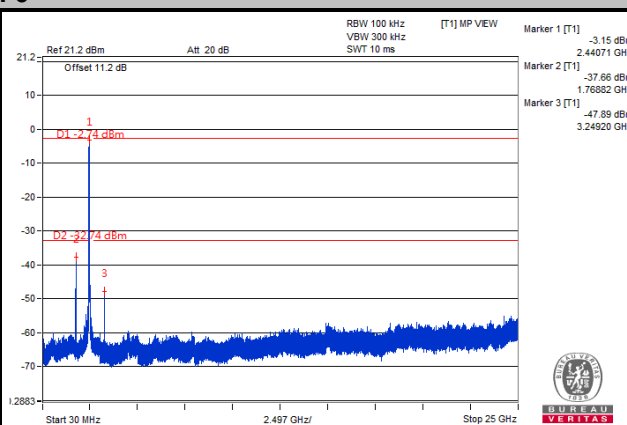
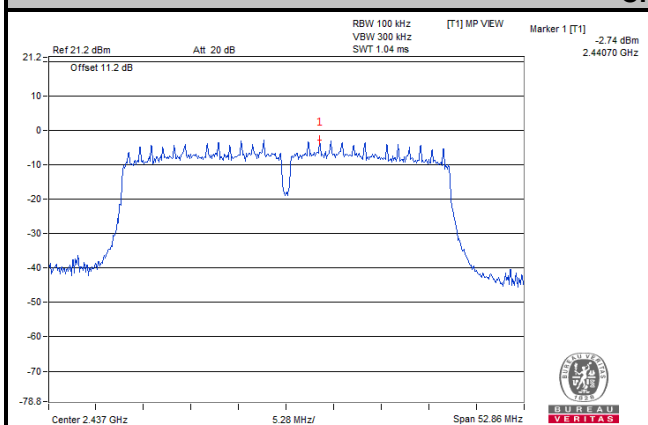


802.11n (HT40) CHAIN 0

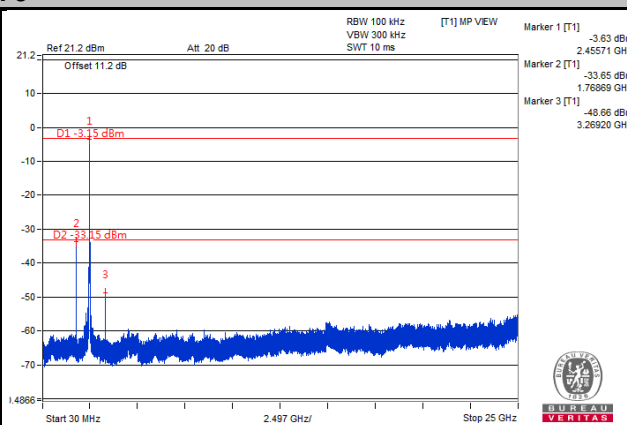
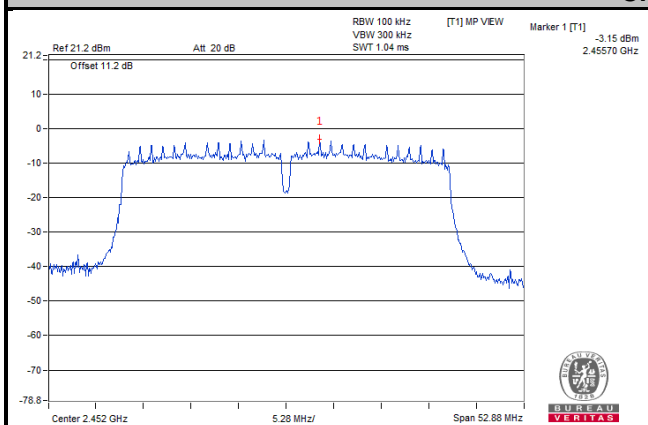
Ch 3

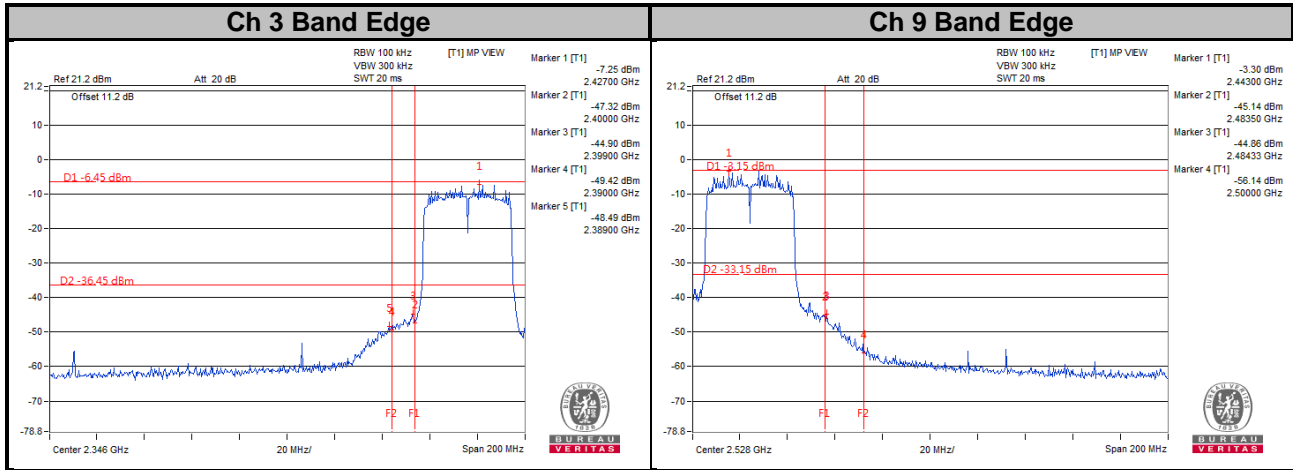


Ch 6



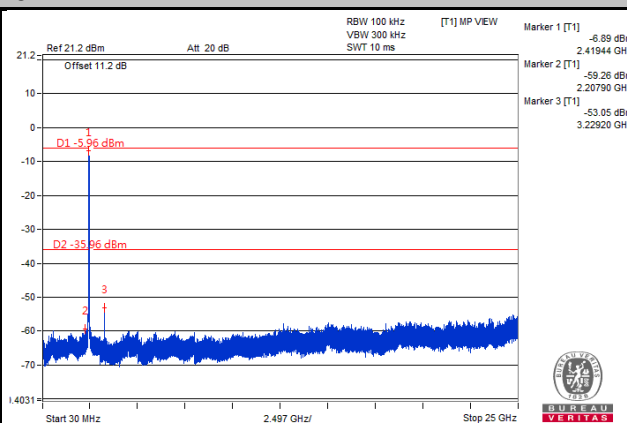
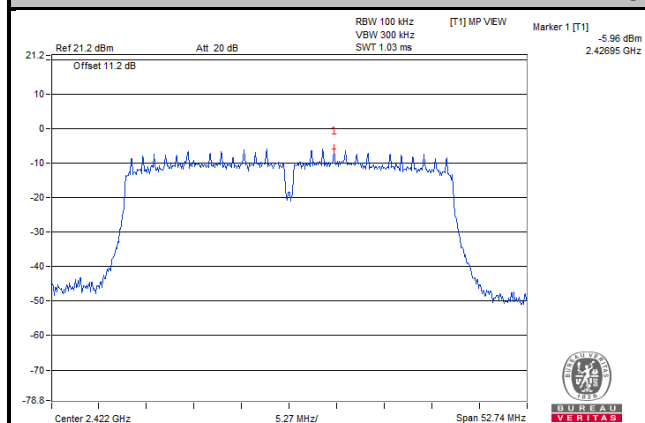
Ch 9



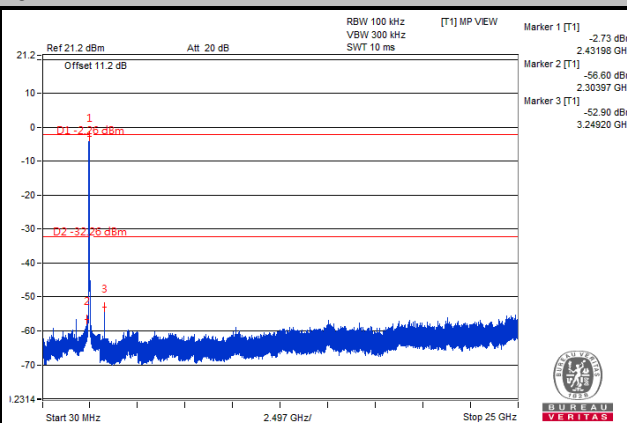
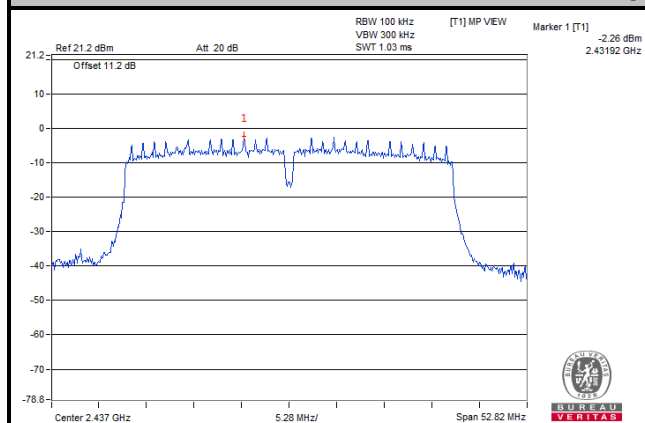


CHAIN 1

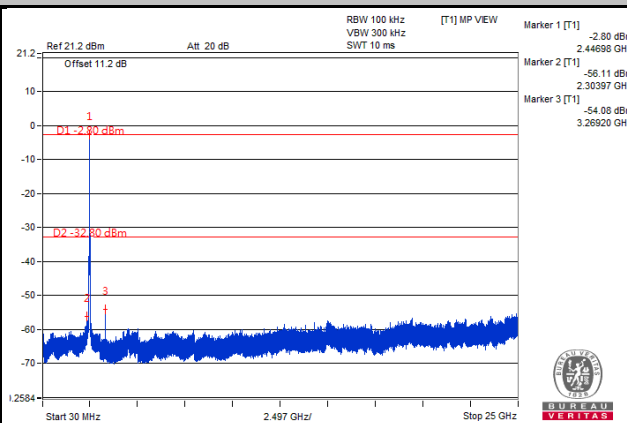
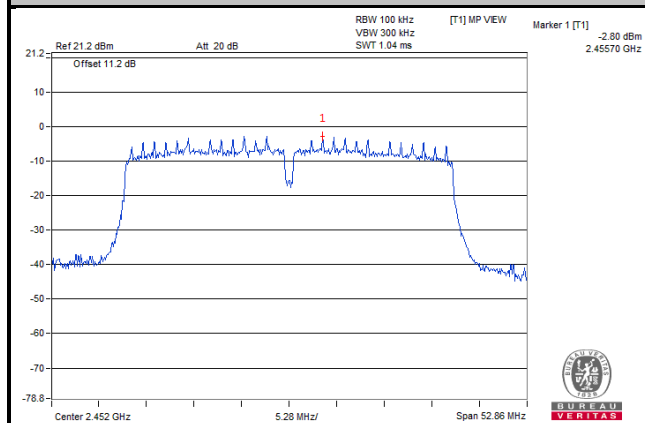
Ch 3

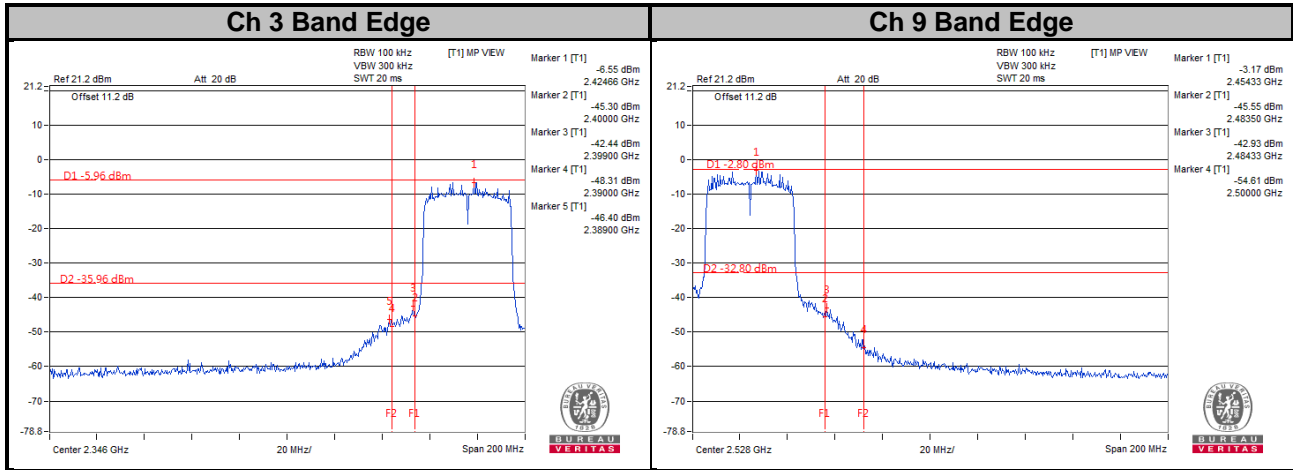


Ch 6



Ch 9





5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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