

FCC Test Report

Report No.: RF181127C08-2

FCC ID: W23-WMU62XX

Test Model: WMU6202, WMU6206

Series Model: WMU6203, WMU6204, WMU6205, WMU6207

Received Date: Nov. 27, 2018

Test Date: Jan. 14, 2019 ~ Jan. 18, 2019

Issued Date: Jan. 28, 2019

Applicant: jjPlus Corporation

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(R.O.C.)

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

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Taiwan, R.O.C

**FCC Registration /
Designation Number:** 427177 / TW0011



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Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	9
3.2.1 Test Mode Applicability and Tested Channel Detail	10
3.3 Duty Cycle of Test Signal	12
3.4 Description of Support Units	13
3.4.1 Configuration of System under Test	13
3.5 General Description of Applied Standards	14
4 Test Types and Results	15
4.1 Radiated Emission and Bandedge Measurement	15
4.1.1 Limits of Radiated Emission and Bandedge Measurement	15
4.1.2 Test Instruments	16
4.1.3 Test Procedures	17
4.1.4 Deviation from Test Standard	18
4.1.5 Test Set Up	18
4.1.6 EUT Operating Conditions	19
4.1.7 Test Results	20
4.2 Conducted Emission Measurement	48
4.2.1 Limits of Conducted Emission Measurement	48
4.2.2 Test Instruments	48
4.2.3 Test Procedures	49
4.2.4 Deviation from Test Standard	49
4.2.5 Test Setup	49
4.2.6 EUT Operating Conditions	49
4.2.7 Test Results	50
4.3 6 dB Bandwidth Measurement	54
4.3.1 Limits of 6 dB Bandwidth Measurement	54
4.3.2 Test Setup	54
4.3.3 Test Instruments	54
4.3.4 Test Procedure	54
4.3.5 Deviation from Test Standard	54
4.3.6 EUT Operating Conditions	54
4.3.7 Test Results	55
4.4 Occupied Bandwidth Measurement	57
4.4.1 Test Setup	57
4.4.2 Test Instruments	57
4.4.3 Test Procedure	57
4.4.4 Deviation from Test Standard	57
4.4.5 EUT Operating Conditions	57
4.4.6 Test Results	58
4.5 Conducted Output Power Measurement	60
4.5.1 Limits of Conducted Output Power Measurement	60
4.5.2 Test Setup	60
4.5.3 Test Instruments	60
4.5.4 Test Procedures	60
4.5.5 Deviation from Test Standard	60
4.5.6 EUT Operating Conditions	60
4.5.7 Test Results	61

4.6	Power Spectral Density Measurement	62
4.6.1	Limits of Power Spectral Density Measurement.....	62
4.6.2	Test Setup.....	62
4.6.3	Test Instruments	62
4.6.4	Test Procedure	62
4.6.5	Deviation from Test Standard	62
4.6.6	EUT Operating Condition	62
4.6.7	Test Results	63
4.7	Conducted Out of Band Emission Measurement	65
4.7.1	Limits of Conducted Out of Band Emission Measurement.....	65
4.7.2	Test Setup.....	65
4.7.3	Test Instruments	65
4.7.4	Test Procedure	65
4.7.5	Deviation from Test Standard	65
4.7.6	EUT Operating Condition	65
4.7.7	Test Results	66
5	Pictures of Test Arrangements.....	73
	Appendix – Information of the Testing Laboratories	74

Release Control Record

Issue No.	Description	Date Issued
RF181127C08-2	Original Release	Jan. 28, 2019

1 Certificate of Conformity

Product: 11ac 2T2R WIFI & BT Module

Brand: jjPlus

Test Model: WMU6202, WMU6206

Series Model: WMU6203, WMU6204, WMU6205, WMU6207

Sample Status: wifi module

Applicant: jjPlus Corporation

Test Date: Jan. 14, 2019 ~ Jan. 18, 2019

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 RF characteristics under the conditions specified in this report.

Prepared by :



Date: Jan. 28, 2019

Gina Liu / Specialist

Approved by :



Date: Jan. 28, 2019

Dylan Chiou / 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 -9.47 dB at 0.16178 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.36 dB at 4874 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.
---	Occupied Bandwidth Measurement	Pass	Reference only
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	No antenna connector is used. (for WMU6206) Antenna connector is U.FLx2 not a standard connector.(for WMU6202)

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	11ac 2T2R WIFI & BT Module
Brand	jjPlus
Test Model	WMU6202, WMU6206
Series Model	WMU6203, WMU6204, WMU6205, WMU6207
Status of EUT	wifi module
Power Supply Rating	3.3 Vdc (host equipment)
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 300.0 Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	483.770 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

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

Modulation Mode	Tx Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

- All models and antennas are listed as below.

Test Mode	Model	RF Chip	RF Design	Interface	Antenna type	Antenna connector
v	WMU6202	RTL8822BU	The Same	mPCIe	Dipole	U.FLx2
	WMU6203			M.2		MHF4
	WMU6204			USB Type-A		U.FLx2
	WMU6205			4Pin Wafer		U.FLx2
v	WMU6206			USB Type-A	PCB Antenna x2	none (like solder)
	WMU6207			4Pin Wafer		none (like solder)

*The difference Models are pre-tested, because the connector and interface are difference with difference Model, and selected the worst Model for testing.

*Model WMU6202, WMU6203, WMU6204 and WMU6205 the difference doesn't affect the test result, only WMU6202 was chosen for the final test.

*Model WMU6206 and WMU6207 the difference doesn't affect the test result, only WMU6206 was chosen for the final test.

3. The antennas information is listed as below.

Antenna Type	Brand	Model	Antenna Gain (dBi)		
			BT	2.4G	5G
Dipole	LYNwave	AOA160-221020-000000	3.0	3.0	2.0
	LYNwave	AOA160-221034-000000	3.0	3.0	3.0
	LYNwave	AOA160-221050-000000	5.0	5.0	5.0
PCB	N/A	N/A	3.6	3.6	5.3
	N/A	N/A	3.6	3.6	4.7

4. The above EUT information is declared by manufacturer and for more detailed features description, please refers 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	√	√	√	√	WMU6202
B	√	√	√	-	WMU6206

Where **RE \geq 1G**: Radiated Emission above 1 GHz

RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

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**.

NOTE: "-" means no effect.

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)
A, B	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

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)	3 to 9	9	OFDM	BPSK	13.5
B	802.11b	1 to 11	11	DSSS	DBPSK	1.0

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)	3 to 9	9	OFDM	BPSK	13.5
B	802.11b	1 to 11	11	DSSS	DBPSK	1.0

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
	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
	802.11n (HT20)	1 to 11	1, 11	OFDM	BPSK	6.5
	802.11n (HT40)	3 to 9	3, 9	OFDM	BPSK	13.5

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
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE \geq 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang
APCM	25 deg. C, 65 % RH	3.3 Vdc	Gavin Wu

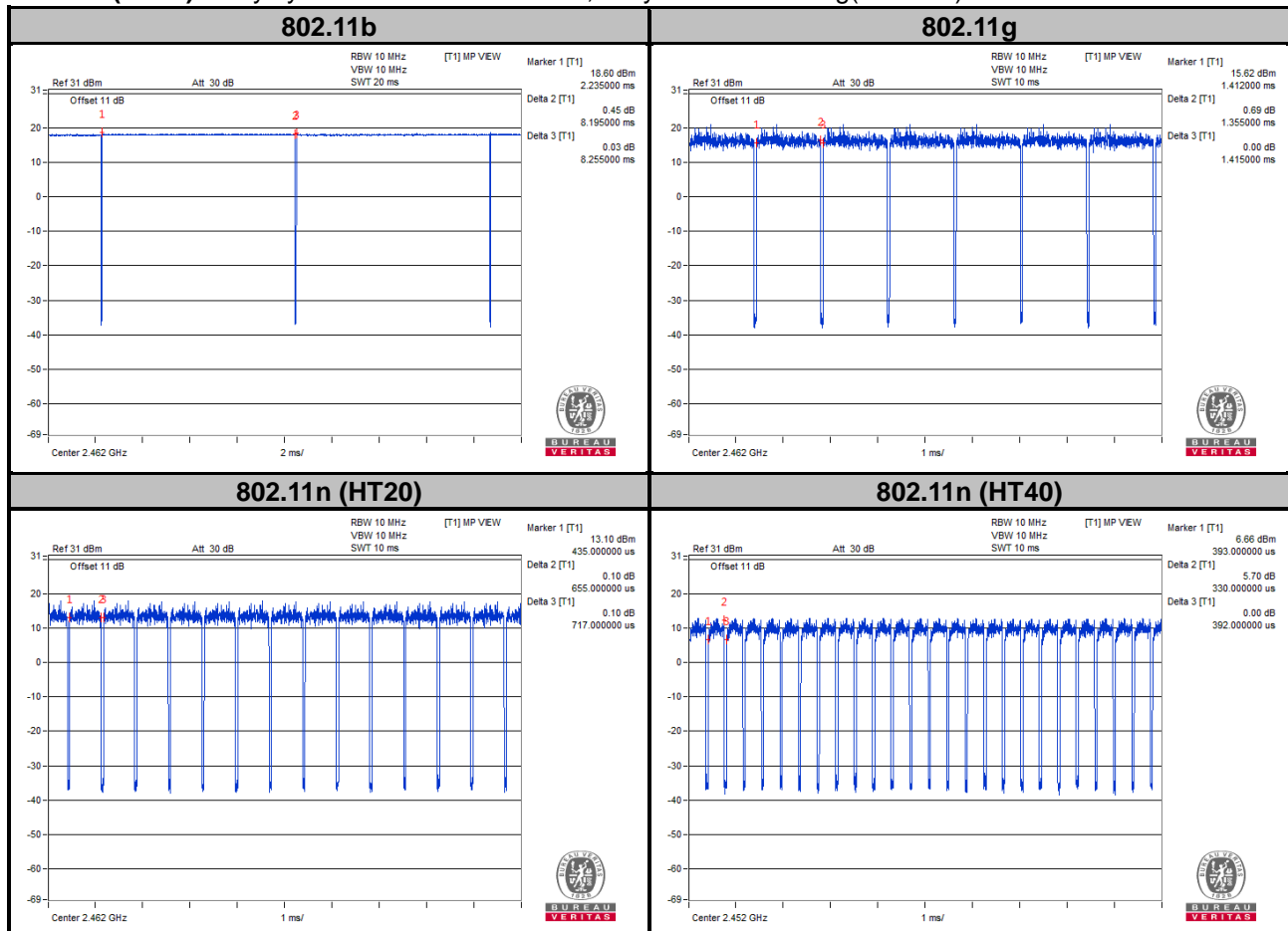
3.3 Duty Cycle of Test Signal

802.11b: Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11g: Duty cycle = $1.355/1.415 = 0.958$, Duty factor = $10 \cdot \log(1/0.958) = 0.19$

802.11n (HT20): Duty cycle = $0.655/0.717 = 0.914$, Duty factor = $10 \cdot \log(1/0.914) = 0.39$

802.11n (HT40): Duty cycle = $0.33/0.392 = 0.842$, Duty factor = $10 \cdot \log(1/0.842) = 0.75$



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
1.	Notebook	DELL	E6420	D3T96R1	N/A

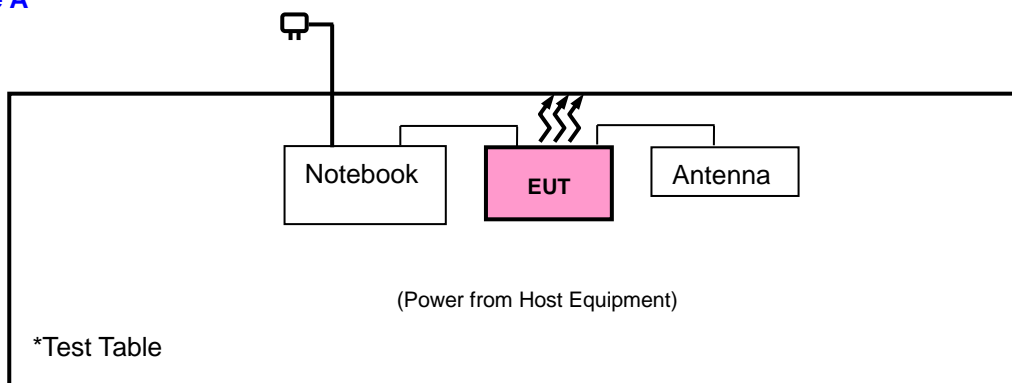
No.	Signal Cable Description of The Above Support Units
1.	N/A

Note:

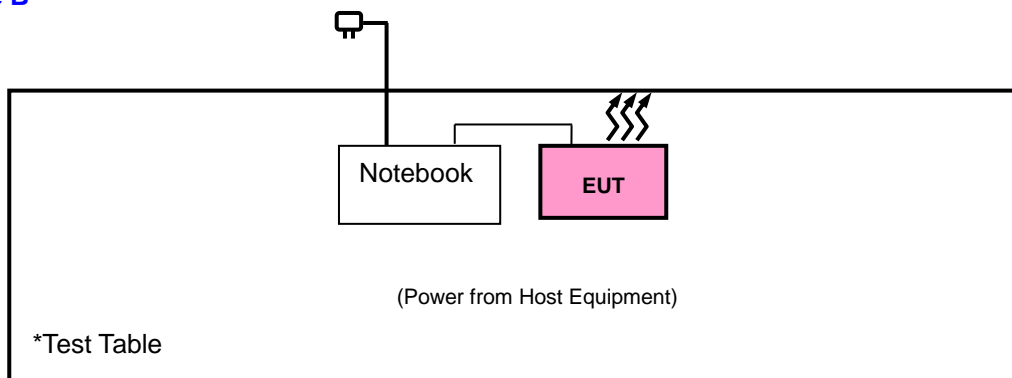
1. All power cords of the above support units are non-shielded (1.8m).

3.4.1 Configuration of System under Test

Mode A



Mode B



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)

KDB 558074 D01 15.247 Meas Guidance v05

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

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

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 Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSV40	100980	Apr. 17, 2018	Apr. 16, 2019
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 27, 2018	Nov. 26, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Woken	00801A1GGAM02Y	NA	May 17, 2018	May 16, 2019
Loop Antenna	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
Preamplifier EMCI	EMC 184045	980116	Oct. 12, 2018	Oct. 11, 2019
Power Meter Anritsu	ML2495A	1012010	Sep. 05, 2018	Sep. 04, 2019
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2018	Sep. 03, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	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 HsinTien Chamber 1.

3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.

4. The IC Site Registration No. is IC7450I-1.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 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:

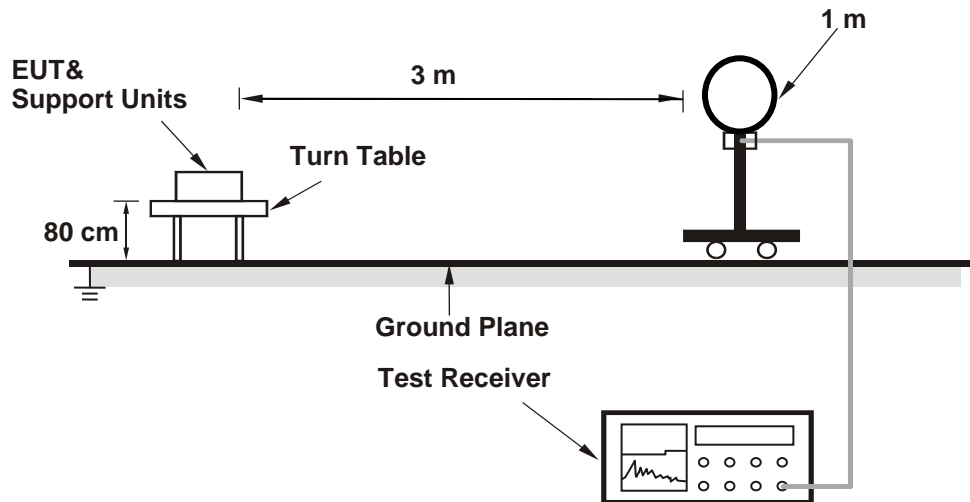
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
(11b: RBW = 1 MHz, VBW = 300 Hz ; 11g: RBW = 1 MHz, VBW = 1 kHz ;
11n (HT20): RBW = 1 MHz, VBW = 3 kHz ; 11n (HT40): RBW = 1 MHz, VBW = 10 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

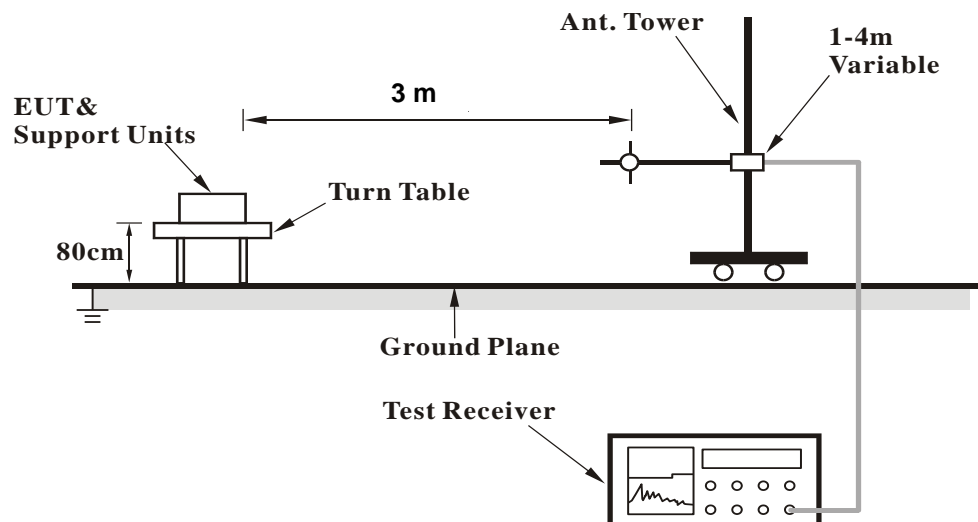
No deviation.

4.1.5 Test Set Up

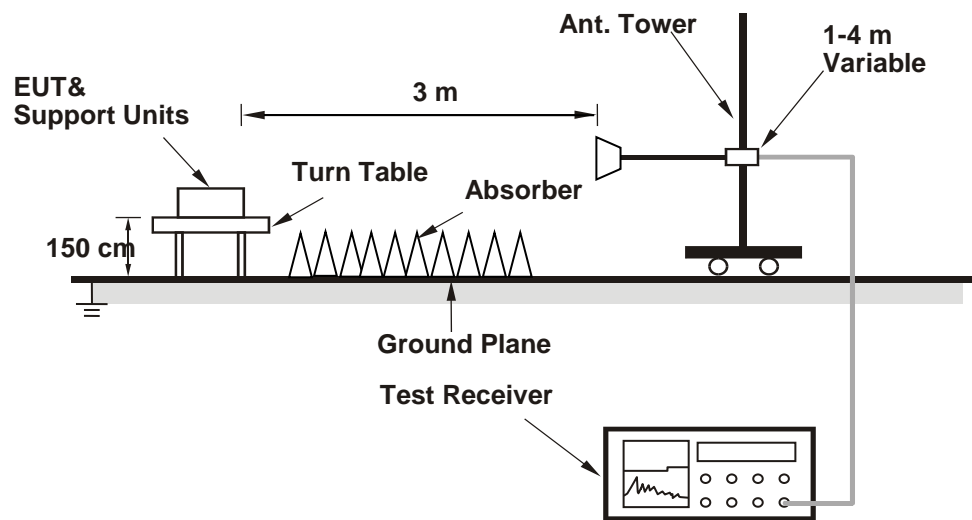
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission 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	Charles Hsiao

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	40.58	34.14	54	-13.42	31.8	5.4	30.76	273	56	Average
2388.84	51.73	45.29	74	-22.27	31.8	5.4	30.76	273	56	Peak
2412	94.1	87.59			31.81	5.43	30.73	273	56	Average
2412	96.95	90.44			31.81	5.43	30.73	273	56	Peak
4824	42.12	29.67	54	-11.88	33.97	8.26	29.78	105	187	Average
4824	49.05	36.6	74	-24.95	33.97	8.26	29.78	105	187	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
2386.5	43.77	37.33	54	-10.23	31.8	5.4	30.76	150	83	Average
2386.5	53.24	46.8	74	-20.76	31.8	5.4	30.76	150	83	Peak
2412	104.6	98.09			31.81	5.43	30.73	150	83	Average
2412	107.77	101.26			31.81	5.43	30.73	150	83	Peak
4824	42.2	29.75	54	-11.8	33.97	8.26	29.78	134	226	Average
4824	49.79	37.34	74	-24.21	33.97	8.26	29.78	134	226	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2376.69	40.53	34.14	54	-13.47	31.78	5.37	30.76	200	260	Average
2376.69	52.09	45.7	74	-21.91	31.78	5.37	30.76	200	260	Peak
2437	93.57	86.95			31.85	5.46	30.69	200	260	Average
2437	96.31	89.69			31.85	5.46	30.69	200	260	Peak
2499.2	41.02	34.17	54	-12.98	31.9	5.53	30.58	200	260	Average
2499.2	52.46	45.61	74	-21.54	31.9	5.53	30.58	200	260	Peak
4874	42.47	29.98	54	-11.53	33.98	8.27	29.76	103	248	Average
4874	50.47	37.98	74	-23.53	33.98	8.27	29.76	103	248	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
2359.77	42.2	35.87	54	-11.8	31.76	5.37	30.8	150	83	Average
2359.77	53.86	47.53	74	-20.14	31.76	5.37	30.8	150	83	Peak
2437	104.46	97.84			31.85	5.46	30.69	150	83	Average
2437	107.8	101.18			31.85	5.46	30.69	150	83	Peak
2486.16	41.73	34.94	54	-12.27	31.88	5.53	30.62	150	83	Average
2486.16	53	46.21	74	-21	31.88	5.53	30.62	150	83	Peak
4874	42.52	30.03	54	-11.48	33.98	8.27	29.76	159	265	Average
4874	49.23	36.74	74	-24.77	33.98	8.27	29.76	159	265	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	93.35	86.63			31.87	5.5	30.65	200	260	Average
2462	96.18	89.46			31.87	5.5	30.65	200	260	Peak
2495.76	41.08	34.23	54	-12.92	31.9	5.53	30.58	200	260	Average
2495.76	52.04	45.19	74	-21.96	31.9	5.53	30.58	200	260	Peak
4924	42.41	29.87	54	-11.59	33.99	8.28	29.73	165	296	Average
4924	49.39	36.85	74	-24.61	33.99	8.28	29.73	165	296	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	104.52	97.8			31.87	5.5	30.65	107	219	Average
2462	107.03	100.31			31.87	5.5	30.65	107	219	Peak
2486.76	42.38	35.59	54	-11.62	31.88	5.53	30.62	107	219	Average
2486.76	53.85	47.06	74	-20.15	31.88	5.53	30.62	107	219	Peak
4924	42.19	29.65	54	-11.81	33.99	8.28	29.73	105	222	Average
4924	50.05	37.51	74	-23.95	33.99	8.28	29.73	105	222	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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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	Charles Hsiao

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	40.69	34.25	54	-13.31	31.8	5.4	30.76	200	260	Average
2389.29	51.37	44.93	74	-22.63	31.8	5.4	30.76	200	260	Peak
2412	89.49	82.98			31.81	5.43	30.73	200	260	Average
2412	96.55	90.04			31.81	5.43	30.73	200	260	Peak
4824	43	30.55	54	-11	33.97	8.26	29.78	154	4	Average
4824	48.89	36.44	74	-25.11	33.97	8.26	29.78	154	4	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	46.05	39.58	54	-7.95	31.8	5.4	30.73	150	83	Average
2389.83	58.46	51.99	74	-15.54	31.8	5.4	30.73	150	83	Peak
2412	100.27	93.76			31.81	5.43	30.73	150	83	Average
2412	107.83	101.32			31.81	5.43	30.73	150	83	Peak
4824	42.73	30.28	54	-11.27	33.97	8.26	29.78	135	246	Average
4824	49.85	37.4	74	-24.15	33.97	8.26	29.78	135	246	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2382.09	40.5	34.08	54	-13.5	31.78	5.4	30.76	200	260	Average
2382.09	51.58	45.16	74	-22.42	31.78	5.4	30.76	200	260	Peak
2437	89.52	82.9			31.85	5.46	30.69	200	260	Average
2437	96.18	89.56			31.85	5.46	30.69	200	260	Peak
2492.36	41.11	34.26	54	-12.89	31.9	5.53	30.58	200	260	Average
2492.36	51.98	45.13	74	-22.02	31.9	5.53	30.58	200	260	Peak
4874	42.74	30.25	54	-11.26	33.98	8.27	29.76	132	285	Average
4874	49.74	37.25	74	-24.26	33.98	8.27	29.76	132	285	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
2383.98	41.89	35.47	54	-12.11	31.78	5.4	30.76	107	219	Average
2383.98	53.36	46.94	74	-20.64	31.78	5.4	30.76	107	219	Peak
2437	100.58	93.96			31.85	5.46	30.69	107	219	Average
2437	107.94	101.32			31.85	5.46	30.69	107	219	Peak
2486.64	41.74	34.95	54	-12.26	31.88	5.53	30.62	107	219	Average
2486.64	52.8	46.01	74	-21.2	31.88	5.53	30.62	107	219	Peak
4874	42.62	30.13	54	-11.38	33.98	8.27	29.76	195	326	Average
4874	49.24	36.75	74	-24.76	33.98	8.27	29.76	195	326	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	89.59	82.87			31.87	5.5	30.65	200	260	Average
2462	96.23	89.51			31.87	5.5	30.65	200	260	Peak
2485.6	41.18	34.39	54	-12.82	31.88	5.53	30.62	200	260	Average
2485.6	53.06	46.27	74	-20.94	31.88	5.53	30.62	200	260	Peak
4924	42.78	30.24	54	-11.22	33.99	8.28	29.73	121	111	Average
4924	49.88	37.34	74	-24.12	33.99	8.28	29.73	121	111	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	100.04	93.32			31.87	5.5	30.65	107	219	Average
2462	107.65	100.93			31.87	5.5	30.65	107	219	Peak
2483.52	43.21	36.45	54	-10.79	31.88	5.5	30.62	107	219	Average
2483.52	55.19	48.43	74	-18.81	31.88	5.5	30.62	107	219	Peak
4924	42.9	30.36	54	-11.1	33.99	8.28	29.73	121	216	Average
4924	49.87	37.33	74	-24.13	33.99	8.28	29.73	121	216	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2387.94	40.52	34.08	54	-13.48	31.8	5.4	30.76	232	187	Average
2387.94	51.88	45.44	74	-22.12	31.8	5.4	30.76	232	187	Peak
2412	89.59	83.08			31.81	5.43	30.73	232	187	Average
2412	96.22	89.71			31.81	5.43	30.73	232	187	Peak
4824	42.86	30.41	54	-11.14	33.97	8.26	29.78	172	321	Average
4824	50.86	38.41	74	-23.14	33.97	8.26	29.78	172	321	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	43.31	36.84	54	-10.69	31.8	5.4	30.73	100	99	Average
2389.83	54.27	47.8	74	-19.73	31.8	5.4	30.73	100	99	Peak
2412	100.37	93.86			31.81	5.43	30.73	100	99	Average
2412	107.19	100.68			31.81	5.43	30.73	100	99	Peak
4824	42.98	30.53	54	-11.02	33.97	8.26	29.78	133	154	Average
4824	49.57	37.12	74	-24.43	33.97	8.26	29.78	133	154	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2387.04	40.61	34.17	54	-13.39	31.8	5.4	30.76	232	187	Average
2387.04	52.34	45.9	74	-21.66	31.8	5.4	30.76	232	187	Peak
2437	89.95	83.33			31.85	5.46	30.69	232	187	Average
2437	96.21	89.59			31.85	5.46	30.69	232	187	Peak
2498.68	41.03	34.18	54	-12.97	31.9	5.53	30.58	232	187	Average
2498.68	52	45.15	74	-22	31.9	5.53	30.58	232	187	Peak
4874	43.34	30.85	54	-10.66	33.98	8.27	29.76	125	177	Average
4874	50.22	37.73	74	-23.78	33.98	8.27	29.76	125	177	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
2351.4	41.8	35.53	54	-12.2	31.74	5.33	30.8	100	99	Average
2351.4	53.01	46.74	74	-20.99	31.74	5.33	30.8	100	99	Peak
2437	100.37	93.75			31.85	5.46	30.69	100	99	Average
2437	107.17	100.55			31.85	5.46	30.69	100	99	Peak
2486.48	41.68	34.89	54	-12.32	31.88	5.53	30.62	100	99	Average
2486.48	53.07	46.28	74	-20.93	31.88	5.53	30.62	100	99	Peak
4874	42.77	30.28	54	-11.23	33.98	8.27	29.76	162	327	Average
4874	49.82	37.33	74	-24.18	33.98	8.27	29.76	162	327	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	89.55	82.83			31.87	5.5	30.65	232	187	Average
2462	96.44	89.72			31.87	5.5	30.65	232	187	Peak
2483.8	41.1	34.34	54	-12.9	31.88	5.5	30.62	232	187	Average
2483.8	53.08	46.32	74	-20.92	31.88	5.5	30.62	232	187	Peak
4924	42.81	30.27	54	-11.19	33.99	8.28	29.73	185	187	Average
4924	50.16	37.62	74	-23.84	33.99	8.28	29.73	185	187	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	100.36	93.64			31.87	5.5	30.65	100	99	Average
2462	107.39	100.67			31.87	5.5	30.65	100	99	Peak
2483.56	45.15	38.39	54	-8.85	31.88	5.5	30.62	100	99	Average
2483.56	59.49	52.73	74	-14.51	31.88	5.5	30.62	100	99	Peak
4924	43.07	30.53	54	-10.93	33.99	8.28	29.73	134	226	Average
4924	49.9	37.36	74	-24.1	33.99	8.28	29.73	134	226	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2387.4	41.38	34.94	54	-12.62	31.8	5.4	30.76	100	187	Average
2387.49	52.86	46.42	74	-21.14	31.8	5.4	30.76	100	187	Peak
2422	85.25	78.68			31.83	5.43	30.69	100	187	Average
2422	92.61	86.04			31.83	5.43	30.69	100	187	Peak
2489.72	41.5	34.69	54	-12.5	31.9	5.53	30.62	100	187	Average
2489.72	51.8	44.99	74	-22.2	31.9	5.53	30.62	100	187	Peak
4844	43.87	31.41	54	-10.13	33.97	8.26	29.77	135	285	Average
4844	50.11	37.65	74	-23.89	33.97	8.26	29.77	135	285	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	44.11	37.67	54	-9.89	31.8	5.4	30.76	100	99	Average
2389.2	60.08	53.64	74	-13.92	31.8	5.4	30.76	100	99	Peak
2422	96.89	90.32			31.83	5.43	30.69	100	99	Average
2422	103.44	96.87			31.83	5.43	30.69	100	99	Peak
2495.24	42.54	35.69	54	-11.46	31.9	5.53	30.58	100	99	Average
2495.24	53.32	46.47	74	-20.68	31.9	5.53	30.58	100	99	Peak
4844	43.48	31.02	54	-10.52	33.97	8.26	29.77	109	86	Average
4844	49.81	37.35	74	-24.19	33.97	8.26	29.77	109	86	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2422 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2375.88	41.09	34.7	54	-12.91	31.78	5.37	30.76	100	187	Average
2375.88	52.4	46.01	74	-21.6	31.78	5.37	30.76	100	187	Peak
2437	85.74	79.12			31.85	5.46	30.69	100	187	Average
2437	92.55	85.93			31.85	5.46	30.69	100	187	Peak
2486.44	41.56	34.77	54	-12.44	31.88	5.53	30.62	100	187	Average
2486.44	53.31	46.52	74	-20.69	31.88	5.53	30.62	100	187	Peak
4874	43.6	31.11	54	-10.4	33.98	8.27	29.76	154	4	Average
4874	49.86	37.37	74	-24.14	33.98	8.27	29.76	154	4	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
2387.04	42.77	36.33	54	-11.23	31.8	5.4	30.76	100	99	Average
2387.04	53.29	46.85	74	-20.71	31.8	5.4	30.76	100	99	Peak
2437	96.76	90.14			31.85	5.46	30.69	100	99	Average
2437	103.96	97.34			31.85	5.46	30.69	100	99	Peak
2484	44.07	37.31	54	-9.93	31.88	5.5	30.62	100	99	Average
2484	58.2	51.44	74	-15.8	31.88	5.5	30.62	100	99	Peak
4874	43.52	31.03	54	-10.48	33.98	8.27	29.76	185	320	Average
4874	49.7	37.21	74	-24.3	33.98	8.27	29.76	185	320	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2387.13	41	34.56	54	-13	31.8	5.4	30.76	100	187	Average
2387.13	52.88	46.44	74	-21.12	31.8	5.4	30.76	100	187	Peak
2452	85.47	78.81			31.85	5.46	30.65	100	187	Average
2452	92.66	86			31.85	5.46	30.65	100	187	Peak
2484.52	41.98	35.19	54	-12.02	31.88	5.53	30.62	100	187	Average
2484.52	52.43	45.64	74	-21.57	31.88	5.53	30.62	100	187	Peak
4904	42.72	30.2	54	-11.28	33.98	8.28	29.74	150	165	Average
4904	50.55	38.03	74	-23.45	33.98	8.28	29.74	150	165	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	42.28	35.84	54	-11.72	31.8	5.4	30.76	100	99	Average
2388.66	52.82	46.38	74	-21.18	31.8	5.4	30.76	100	99	Peak
2452	96.57	89.91			31.85	5.46	30.65	100	99	Average
2452	103.71	97.05			31.85	5.46	30.65	100	99	Peak
2483.52	48.19	41.43	54	-5.81	31.88	5.5	30.62	100	123	Average
2483.52	61.99	55.23	74	-12.01	31.88	5.5	30.62	100	123	Peak
4904	43.94	31.42	54	-10.06	33.98	8.28	29.74	132	58	Average
4904	50.35	37.83	74	-23.65	33.98	8.28	29.74	132	58	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2452 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	45.08	38.64	54	-8.92	31.8	5.4	30.76	171	220	Average
2386.14	53.36	46.92	74	-20.64	31.8	5.4	30.76	171	220	Peak
2412	98.55	92.04			31.81	5.43	30.73	171	220	Average
2412	101.72	95.21			31.81	5.43	30.73	171	220	Peak
4824	49	36.55	54	-5	33.97	8.26	29.78	100	124	Average
4824	51.79	39.34	74	-22.21	33.97	8.26	29.78	100	124	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
2386.23	43.15	36.71	54	-10.85	31.8	5.4	30.76	100	348	Average
2386.23	53.16	46.72	74	-20.84	31.8	5.4	30.76	100	348	Peak
2412	92.56	86.05			31.81	5.43	30.73	100	348	Average
2412	95.7	89.19			31.81	5.43	30.73	100	348	Peak
4824	44.69	32.24	54	-9.31	33.97	8.26	29.78	100	298	Average
4824	49.31	36.86	74	-24.69	33.97	8.26	29.78	100	298	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2368.95	41.06	34.67	54	-12.94	31.78	5.37	30.76	171	220	Average
2368.95	52.57	46.18	74	-21.43	31.78	5.37	30.76	171	220	Peak
2437	98.56	91.94			31.85	5.46	30.69	171	220	Average
2437	101.34	94.72			31.85	5.46	30.69	171	220	Peak
2492.76	41.13	34.28	54	-12.87	31.9	5.53	30.58	171	220	Average
2492.76	52.53	45.68	74	-21.47	31.9	5.53	30.58	171	220	Peak
4874	52.64	40.15	54	-1.36	33.98	8.27	29.76	101	125	Average
4874	55.27	42.78	74	-18.73	33.98	8.27	29.76	101	125	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
2389.74	40.6	34.16	54	-13.4	31.8	5.4	30.76	100	348	Average
2389.74	52.58	46.14	74	-21.42	31.8	5.4	30.76	100	348	Peak
2437	92.5	85.88			31.85	5.46	30.69	100	348	Average
2437	95.78	89.16			31.85	5.46	30.69	100	348	Peak
2494	40.98	34.13	54	-13.02	31.9	5.53	30.58	100	348	Average
2494	52.12	45.27	74	-21.88	31.9	5.53	30.58	100	348	Peak
4874	45.74	33.25	54	-8.26	33.98	8.27	29.76	100	298	Average
4874	50.35	37.86	74	-23.65	33.98	8.27	29.76	100	298	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	98.25	91.53			31.87	5.5	30.65	191	220	Average
2462	101.62	94.9			31.87	5.5	30.65	191	220	Peak
2487.8	42.75	35.94	54	-11.25	31.9	5.53	30.62	191	220	Average
2487.8	53.02	46.21	74	-20.98	31.9	5.53	30.62	191	220	Peak
4924	52.45	39.91	54	-1.55	33.99	8.28	29.73	100	124	Average
4924	56.7	44.16	74	-17.3	33.99	8.28	29.73	100	124	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	92.33	85.61			31.87	5.5	30.65	100	348	Average
2462	95.43	88.71			31.87	5.5	30.65	100	348	Peak
2487.84	42.15	35.34	54	-11.85	31.9	5.53	30.62	100	348	Average
2487.84	52.3	45.49	74	-21.7	31.9	5.53	30.62	100	348	Peak
4924	47.59	35.05	54	-6.41	33.99	8.28	29.73	100	298	Average
4924	51.18	38.64	74	-22.82	33.99	8.28	29.73	100	298	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	48.79	42.32	54	-5.21	31.8	5.4	30.73	191	220	Average
2389.83	61.41	54.94	74	-12.59	31.8	5.4	30.73	191	220	Peak
2412	93.66	87.15			31.81	5.43	30.73	191	220	Average
2412	100.59	94.08			31.81	5.43	30.73	191	220	Peak
4824	40.32	27.87	54	-13.68	33.97	8.26	29.78	100	124	Average
4824	51.49	39.04	74	-22.51	33.97	8.26	29.78	100	124	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	45.17	38.7	54	-8.83	31.8	5.4	30.73	100	348	Average
2389.92	57.55	51.08	74	-16.45	31.8	5.4	30.73	100	348	Peak
2412	87.74	81.23			31.81	5.43	30.73	100	348	Average
2412	94.56	88.05			31.81	5.43	30.73	100	348	Peak
4824	39.35	26.9	54	-14.65	33.97	8.26	29.78	100	298	Average
4824	48.99	36.54	74	-25.01	33.97	8.26	29.78	100	298	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	40.94	34.47	54	-13.06	31.8	5.4	30.73	171	220	Average
2389.92	53.23	46.76	74	-20.77	31.8	5.4	30.73	171	220	Peak
2437	93.95	87.33			31.85	5.46	30.69	171	220	Average
2437	100.54	93.92			31.85	5.46	30.69	171	220	Peak
2490.12	41.14	34.33	54	-12.86	31.9	5.53	30.62	171	220	Average
2490.12	52.19	45.38	74	-21.81	31.9	5.53	30.62	171	220	Peak
4874	43.49	31	54	-10.51	33.98	8.27	29.76	100	124	Average
4874	50.52	38.03	74	-23.48	33.98	8.27	29.76	100	124	Peak
7311	47.59	33.24	54	-6.41	35.54	9.95	31.14	100	211	Average
7311	58.44	44.09	74	-15.56	35.54	9.95	31.14	100	211	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
2389.47	40.59	34.15	54	-13.41	31.8	5.4	30.76	100	348	Average
2389.74	52.32	45.88	74	-21.68	31.8	5.4	30.76	100	348	Peak
2437	87.65	81.03			31.85	5.46	30.69	100	348	Average
2437	94.2	87.58			31.85	5.46	30.69	100	348	Peak
2490.84	41.03	34.22	54	-12.97	31.9	5.53	30.62	100	348	Average
2490.84	51.89	45.08	74	-22.11	31.9	5.53	30.62	100	348	Peak
4874	39.75	27.26	54	-14.25	33.98	8.27	29.76	100	298	Average
4874	48.8	36.31	74	-25.2	33.98	8.27	29.76	100	298	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	93.66	86.94			31.87	5.5	30.65	191	220	Average
2462	100.77	94.05			31.87	5.5	30.65	191	220	Peak
2483.52	45.12	38.36	54	-8.88	31.88	5.5	30.62	191	220	Average
2483.52	59.05	52.29	74	-14.95	31.88	5.5	30.62	191	220	Peak
4924	43.65	31.11	54	-10.35	33.99	8.28	29.73	100	124	Average
4924	54.6	42.06	74	-19.4	33.99	8.28	29.73	100	124	Peak
7386	48.42	34.17	54	-5.58	35.52	9.95	31.22	100	211	Average
7386	60.35	46.1	74	-13.65	35.52	9.95	31.22	100	211	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	87.59	80.87			31.87	5.5	30.65	100	348	Average
2462	94.56	87.84			31.87	5.5	30.65	100	348	Peak
2483.52	45.3	38.54	54	-8.7	31.88	5.5	30.62	100	348	Average
2483.52	60.22	53.46	74	-13.78	31.88	5.5	30.62	100	348	Peak
4924	40.25	27.71	54	-13.75	33.99	8.28	29.73	100	298	Average
4924	50.1	37.56	74	-23.9	33.99	8.28	29.73	100	298	Peak
7386	47.39	33.14	54	-6.61	35.52	9.95	31.22	100	300	Average
7386	59.93	45.68	74	-14.07	35.52	9.95	31.22	100	300	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	45.95	39.48	54	-8.05	31.8	5.4	30.73	100	31	Average
2389.92	57.42	50.95	74	-16.58	31.8	5.4	30.73	100	31	Peak
2412	94.77	88.26			31.81	5.43	30.73	100	101	Average
2412	101.13	94.62			31.81	5.43	30.73	100	101	Peak
4824	40.2	27.75	54	-13.8	33.97	8.26	29.78	131	111	Average
4824	50.34	37.89	74	-23.66	33.97	8.26	29.78	131	111	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	45.45	38.98	54	-8.55	31.8	5.4	30.73	246	298	Average
2389.92	57.11	50.64	74	-16.89	31.8	5.4	30.73	246	298	Peak
2412	92.65	86.14			31.81	5.43	30.73	246	298	Average
2412	99.13	92.62			31.81	5.43	30.73	246	298	Peak
4824	40.55	28.1	54	-13.45	33.97	8.26	29.78	105	222	Average
4824	50.27	37.82	74	-23.73	33.97	8.26	29.78	105	222	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2379.39	40.72	34.33	54	-13.28	31.78	5.37	30.76	100	101	Average
2379.39	51.84	45.45	74	-22.16	31.78	5.37	30.76	100	101	Peak
2437	95.66	89.04			31.85	5.46	30.69	100	101	Average
2437	102.01	95.39			31.85	5.46	30.69	100	101	Peak
2488.4	41.03	34.22	54	-12.97	31.9	5.53	30.62	100	101	Average
2488.4	52.02	45.21	74	-21.98	31.9	5.53	30.62	100	101	Peak
4874	40.2	27.71	54	-13.8	33.98	8.27	29.76	131	1	Average
4874	49.76	37.27	74	-24.24	33.98	8.27	29.76	131	1	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
2384.43	40.7	34.28	54	-13.3	31.78	5.4	30.76	246	298	Average
2384.43	53.05	46.63	74	-20.95	31.78	5.4	30.76	246	298	Peak
2437	93.77	87.15			31.85	5.46	30.69	246	298	Average
2437	100.37	93.75			31.85	5.46	30.69	246	298	Peak
2490.64	41.13	34.32	54	-12.87	31.9	5.53	30.62	246	298	Average
2490.64	52.43	45.62	74	-21.57	31.9	5.53	30.62	246	298	Peak
4874	39.55	27.06	54	-14.45	33.98	8.27	29.76	157	77	Average
4874	49.85	37.36	74	-24.15	33.98	8.27	29.76	157	77	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	94.66	87.94			31.87	5.5	30.65	100	101	Average
2462	101.01	94.29			31.87	5.5	30.65	100	101	Peak
2483.6	48.24	41.48	54	-5.76	31.88	5.5	30.62	100	21	Average
2483.6	61.54	54.78	74	-12.46	31.88	5.5	30.62	100	21	Peak
4924	40.33	27.79	54	-13.67	33.99	8.28	29.73	195	333	Average
4924	50.69	38.15	74	-23.31	33.99	8.28	29.73	195	333	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	92.55	85.83			31.87	5.5	30.65	107	310	Average
2462	99.39	92.67			31.87	5.5	30.65	107	310	Peak
2483.52	42.83	36.07	54	-11.17	31.88	5.5	30.62	107	310	Average
2483.52	56.36	49.6	74	-17.64	31.88	5.5	30.62	107	310	Peak
4924	40.2	27.66	54	-13.8	33.99	8.28	29.73	135	200	Average
4924	50.01	37.47	74	-23.99	33.99	8.28	29.73	135	200	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	50.69	44.25	54	-3.31	31.8	5.4	30.76	109	248	Average
2389.74	61.21	54.77	74	-12.79	31.8	5.4	30.76	109	248	Peak
2422	89.65	83.08			31.83	5.43	30.69	100	101	Average
2422	96.77	90.2			31.83	5.43	30.69	100	101	Peak
2492.4	41.69	34.84	54	-12.31	31.9	5.53	30.58	100	101	Average
2492.4	52.5	45.65	74	-21.5	31.9	5.53	30.58	100	101	Peak
4844	39.64	27.18	54	-14.36	33.97	8.26	29.77	125	2	Average
4844	49.91	37.45	74	-24.09	33.97	8.26	29.77	125	2	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
2389.74	44.9	38.46	54	-9.1	31.8	5.4	30.76	107	310	Average
2389.74	56.24	49.8	74	-17.76	31.8	5.4	30.76	107	310	Peak
2422	89.8	83.23			31.83	5.43	30.69	107	310	Average
2422	96.64	90.07			31.83	5.43	30.69	107	310	Peak
2495.84	41.49	34.64	54	-12.51	31.9	5.53	30.58	107	310	Average
2495.84	52.19	45.34	74	-21.81	31.9	5.53	30.58	107	310	Peak
4844	40.29	27.83	54	-13.71	33.97	8.26	29.77	120	222	Average
4844	50.27	37.81	74	-23.73	33.97	8.26	29.77	120	222	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2422 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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	43.92	37.45	54	-10.08	31.8	5.4	30.73	100	101	Average
2389.92	54.5	48.03	74	-19.5	31.8	5.4	30.73	100	101	Peak
2437	91.88	85.26			31.85	5.46	30.69	100	101	Average
2437	98.66	92.04			31.85	5.46	30.69	100	101	Peak
2483.68	43.13	36.37	54	-10.87	31.88	5.5	30.62	100	101	Average
2483.68	55.19	48.43	74	-18.81	31.88	5.5	30.62	100	101	Peak
4874	40.25	27.76	54	-13.75	33.98	8.27	29.76	124	4	Average
4874	49.8	37.31	74	-24.2	33.98	8.27	29.76	124	4	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
2389.02	41.99	35.55	54	-12.01	31.8	5.4	30.76	107	310	Average
2389.02	52.01	45.57	74	-21.99	31.8	5.4	30.76	107	310	Peak
2437	89.56	82.94			31.85	5.46	30.69	107	310	Average
2437	96.09	89.47			31.85	5.46	30.69	107	310	Peak
2483.6	42.68	35.92	54	-11.32	31.88	5.5	30.62	107	310	Average
2483.6	55.81	49.05	74	-18.19	31.88	5.5	30.62	107	310	Peak
4874	39.88	27.39	54	-14.12	33.98	8.27	29.76	100	100	Average
4874	49.65	37.16	74	-24.35	33.98	8.27	29.76	100	100	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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	Charles Hsiao

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
2389.38	41.55	35.11	54	-12.45	31.8	5.4	30.76	100	101	Average
2389.38	52.47	46.03	74	-21.53	31.8	5.4	30.76	100	101	Peak
2452	90.55	83.89			31.85	5.46	30.65	100	101	Average
2452	97.2	90.54			31.85	5.46	30.65	100	101	Peak
2483.64	51.38	44.62	54	-2.62	31.88	5.5	30.62	100	24	Average
2483.64	61.81	55.05	74	-12.19	31.88	5.5	30.62	100	24	Peak
4904	39.8	27.28	54	-14.2	33.98	8.28	29.74	174	4	Average
4904	49.78	37.26	74	-24.22	33.98	8.28	29.74	174	4	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
2382.9	40.89	34.47	54	-13.11	31.78	5.4	30.76	107	310	Average
2382.9	52.03	45.61	74	-21.97	31.78	5.4	30.76	107	310	Peak
2452	88.57	81.91			31.85	5.46	30.65	107	310	Average
2452	95.44	88.78			31.85	5.46	30.65	107	310	Peak
2483.56	45.44	38.68	54	-8.56	31.88	5.5	30.62	107	310	Average
2483.56	55.8	49.04	74	-18.2	31.88	5.5	30.62	107	310	Peak
4904	40.5	27.98	54	-13.5	33.98	8.28	29.74	133	326	Average
4904	50.45	37.93	74	-23.55	33.98	8.28	29.74	133	326	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2452 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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.

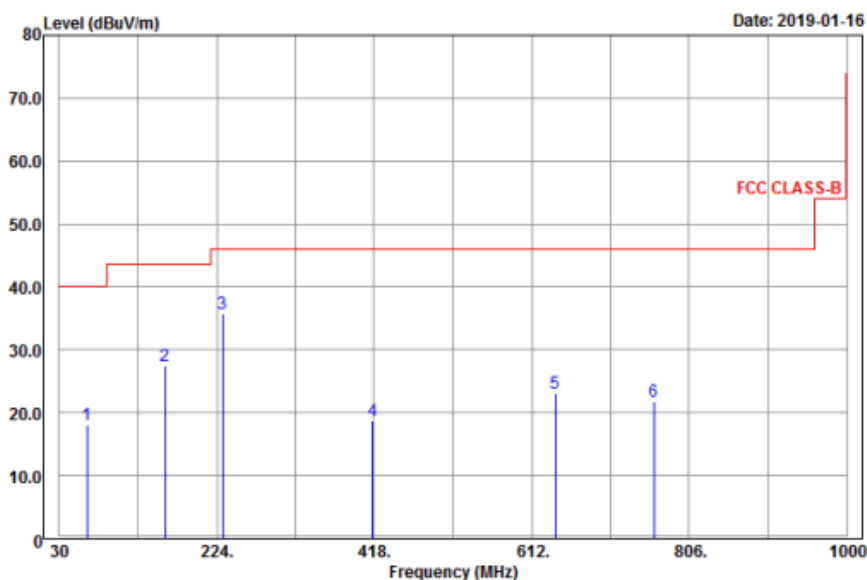
30 MHz ~ 1 GHz Worst-Case Data:

Mode A

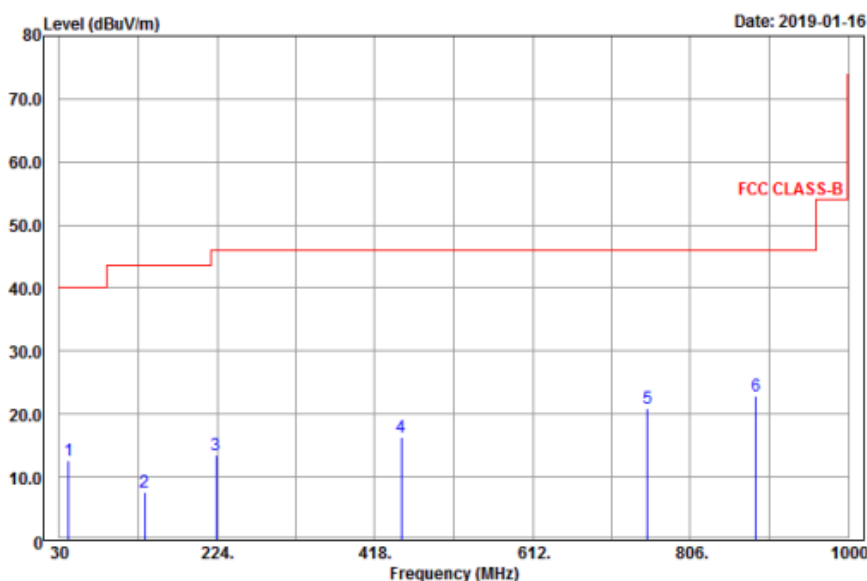
802.11n (HT40)

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	Karl Lee

Horizontal



Vertical



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
64.56	18.11	37.34	40	-21.89	12.09	0.9	32.22	135	201	Peak
160.41	27.46	49.46	43.5	-16.04	8.75	1.52	32.27	195	333	Peak
231.42	35.68	54.18	46	-10.32	11.82	1.85	32.17	167	151	Peak
416.2	18.68	33.29	46	-27.32	15.18	2.41	32.2	167	243	Peak
640.9	23.08	33.94	46	-22.92	18.31	2.99	32.16	133	24	Peak
762.7	21.89	30.85	46	-24.11	19.94	3.22	32.12	198	256	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
41.34	12.65	30.35	40	-27.35	13.78	0.74	32.22	189	221	Peak
135.3	7.66	29.88	43.5	-35.84	8.65	1.38	32.25	175	161	Peak
222.51	13.57	32.71	46	-32.43	11.42	1.65	32.21	103	239	Peak
450.5	16.38	30.45	46	-29.62	15.58	2.49	32.14	145	265	Peak
753.6	20.9	29.97	46	-25.1	19.85	3.22	32.14	160	357	Peak
886.6	22.8	29.51	46	-23.2	21.37	3.49	31.57	152	216	Peak

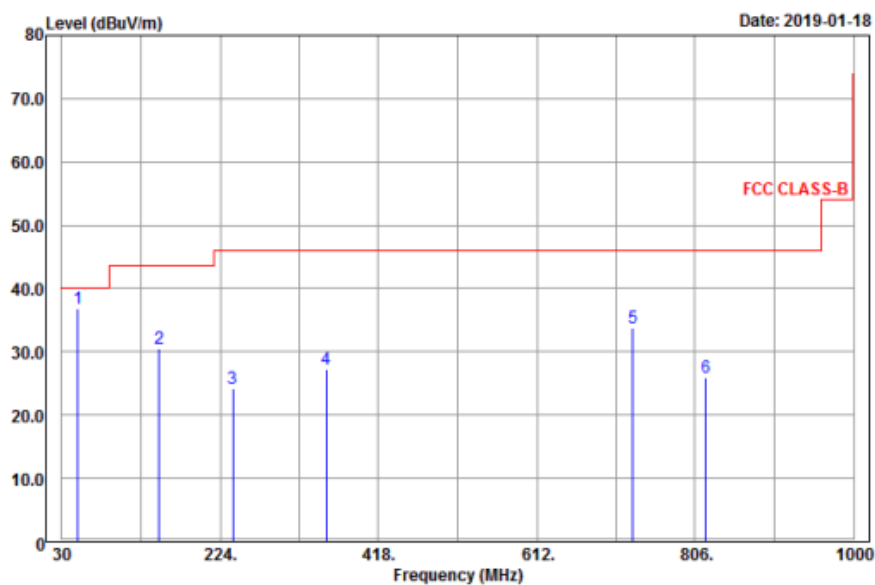
Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value.
- The emission levels of other frequencies were very low against the limit.

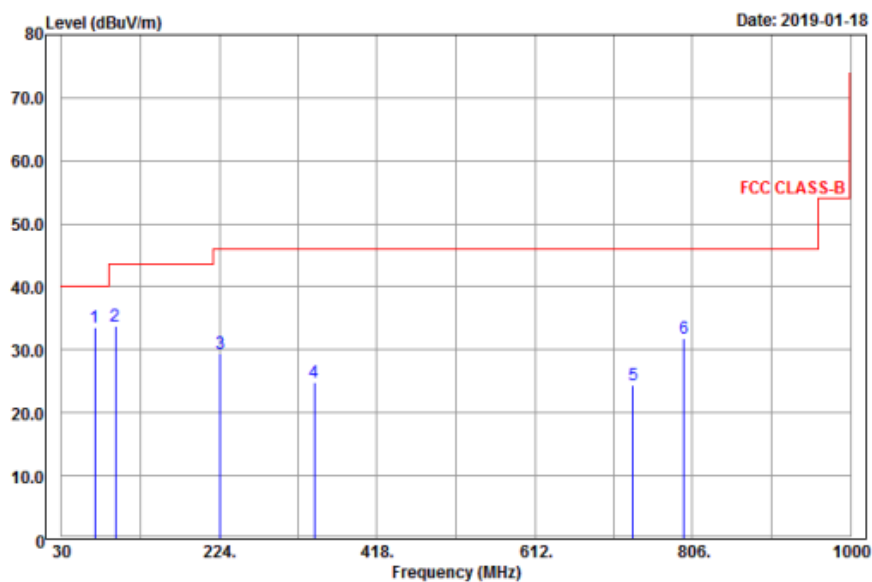
Mode B
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 11	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	Karl Lee

Horizontal



Vertical



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
49.98	36.85	53.63	40	-3.15	14.54	0.9	32.22	105	104	Peak
149.61	30.54	52.89	43.5	-12.96	8.4	1.52	32.27	161	249	Peak
239.52	24.22	42.43	46	-21.78	12.08	1.85	32.14	120	185	Peak
353.9	27.29	42.91	46	-18.71	14.27	2.19	32.08	127	148	Peak
729.8	33.77	43.12	46	-12.23	19.61	3.16	32.12	105	16	Peak
819.4	25.94	33.93	46	-20.06	20.64	3.32	31.95	119	346	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
71.31	33.67	55.31	40	-6.33	9.47	1.11	32.22	134	119	Peak
95.88	33.85	52.86	43.5	-9.65	11.75	1.28	32.04	124	4	Peak
225.48	29.38	48.13	46	-16.62	11.59	1.85	32.19	113	196	Peak
340.6	24.86	40.67	46	-21.14	14.08	2.19	32.08	140	18	Peak
733.3	24.46	33.79	46	-21.54	19.64	3.16	32.13	124	116	Peak
795.6	31.76	40.28	46	-14.24	20.28	3.27	32.07	124	205	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value.
- The emission levels of other frequencies were very low against the limit.

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	Dec. 10, 2018	Dec. 09, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	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

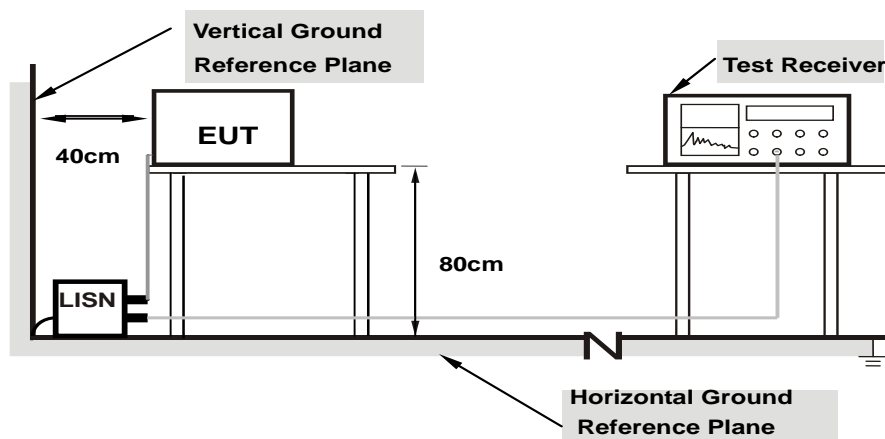
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance 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: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.

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

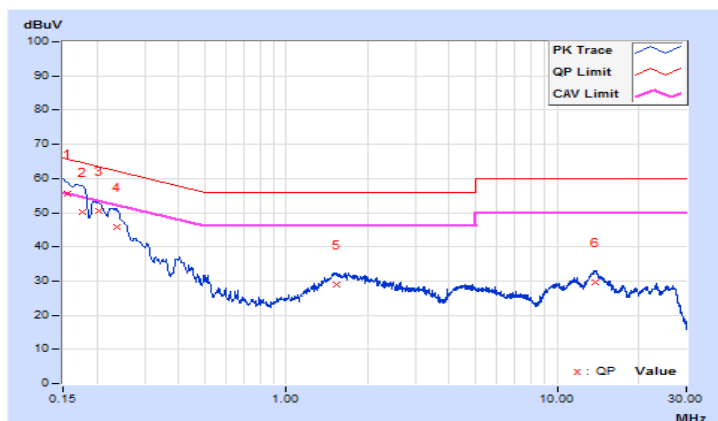
Mode A

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	Jisyong Wang	Test Date	2019/1/18

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	0.15675	10.05	45.52	26.89	55.57	36.94	65.63	55.63	-10.06	-18.69
2	0.17605	10.06	40.19	14.25	50.25	24.31	64.67	54.67	-14.42	-30.36
3	0.20400	10.06	40.45	24.88	50.51	34.94	63.45	53.45	-12.94	-18.51
4	0.23550	10.06	35.75	11.31	45.81	21.37	62.25	52.25	-16.44	-30.88
5	1.52700	10.08	18.78	5.47	28.86	15.55	56.00	46.00	-27.14	-30.45
6	13.80525	10.39	19.21	3.55	29.60	13.94	60.00	50.00	-30.40	-36.06

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

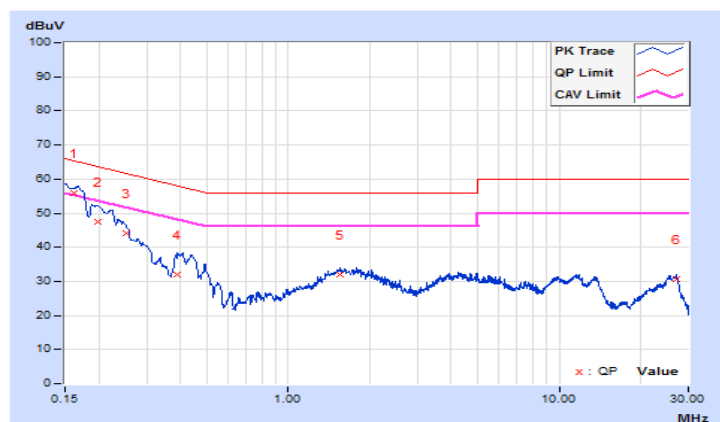


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Jisyong Wang	Test Date	2019/1/18

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	0.16178	10.06	45.84	27.09	55.90	37.15	65.37	55.37	-9.47	-18.22
2	0.19725	10.07	37.52	16.37	47.59	26.44	63.73	53.73	-16.14	-27.29
3	0.25125	10.07	33.98	22.51	44.05	32.58	61.72	51.72	-17.67	-19.14
4	0.39077	10.07	21.85	9.02	31.92	19.09	58.05	48.05	-26.13	-28.96
5	1.54500	10.09	21.92	8.29	32.01	18.38	56.00	46.00	-23.99	-27.62
6	27.00600	10.46	20.15	7.70	30.61	18.16	60.00	50.00	-29.39	-31.84

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



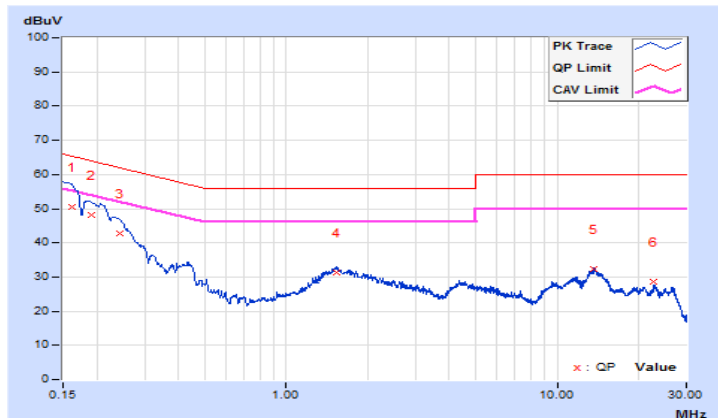
Mode B

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	Jisyong Wang	Test Date	2019/1/18

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	0.16125	10.05	40.61	14.71	50.66	24.76	65.40	55.40	-14.74	-30.64
2	0.19050	10.06	37.99	19.46	48.05	29.52	64.01	54.01	-15.96	-24.49
3	0.24225	10.06	32.79	16.27	42.85	26.33	62.02	52.02	-19.17	-25.69
4	1.53150	10.08	21.24	5.04	31.32	15.12	56.00	46.00	-24.68	-30.88
5	13.60725	10.38	21.94	5.04	32.32	15.42	60.00	50.00	-27.68	-34.58
6	22.67925	10.45	18.04	2.21	28.49	12.66	60.00	50.00	-31.51	-37.34

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

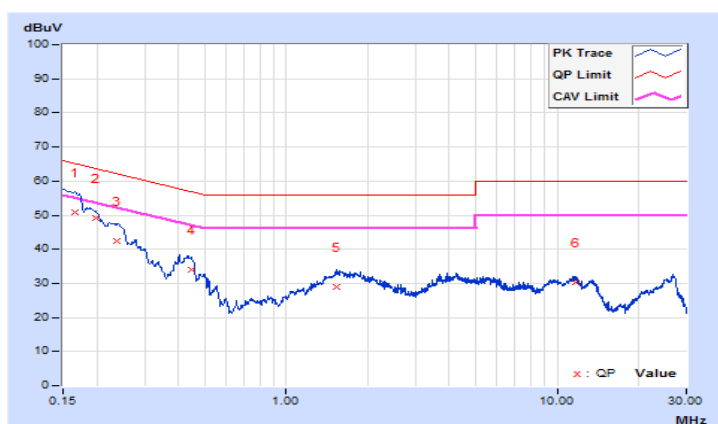


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Jisyong Wang	Test Date	2019/1/18

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	0.16524	10.06	40.90	15.14	50.96	25.20	65.20	55.20	-14.24	-30.00
2	0.19725	10.07	39.24	23.48	49.31	33.55	63.73	53.73	-14.42	-20.18
3	0.23550	10.07	32.32	15.41	42.39	25.48	62.25	52.25	-19.86	-26.77
4	0.44474	10.07	23.86	5.72	33.93	15.79	56.97	46.97	-23.04	-31.18
5	1.52925	10.09	18.73	4.21	28.82	14.30	56.00	46.00	-27.18	-31.70
6	11.69250	10.42	19.89	3.74	30.31	14.16	60.00	50.00	-29.69	-35.84

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

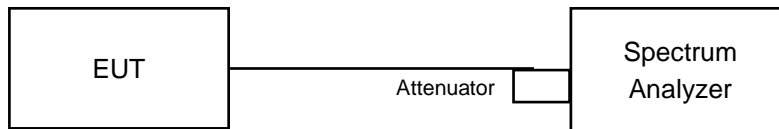


4.3 6 dB Bandwidth Measurement

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 Results

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.09	0.5	Pass
6	2437	9.57	0.5	Pass
11	2462	9.11	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.35	0.5	Pass
6	2437	16.36	0.5	Pass
11	2462	16.37	0.5	Pass

802.11n (HT20)

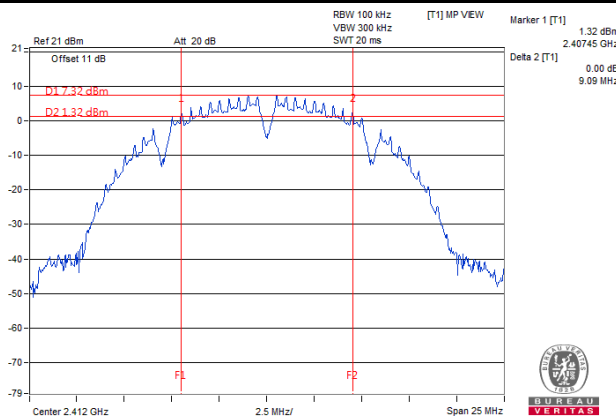
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.94	17.19	0.5	Pass
6	2437	16.96	17.01	0.5	Pass
11	2462	16.97	17.18	0.5	Pass

802.11n (HT40)

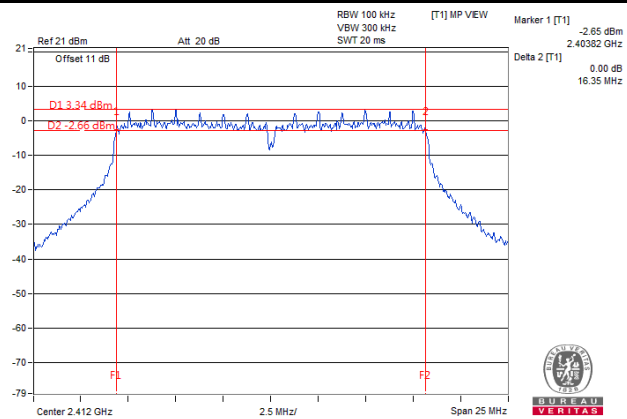
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	36.13	35.82	0.5	Pass
6	2437	36.16	35.87	0.5	Pass
9	2452	36.15	36.03	0.5	Pass

Spectrum Plot of Worst Value

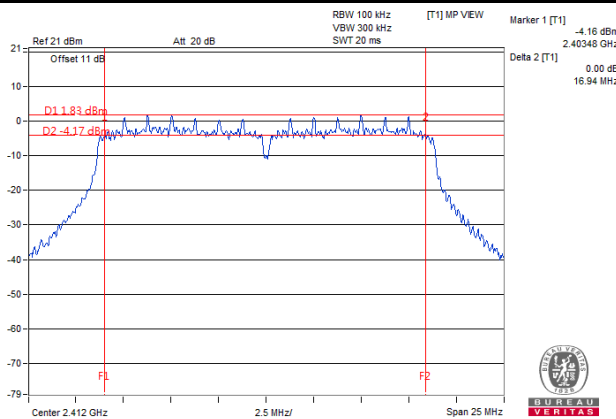
802.11b



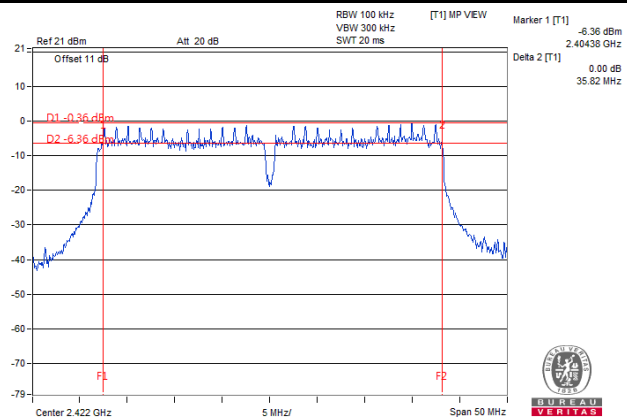
802.11g



802.11n (HT20)

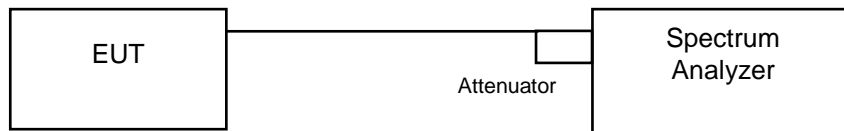


802.11n (HT40)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to PEAK. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.4 Deviation from Test Standard

No deviation.

4.4.5 EUT Operating Conditions

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

4.4.6 Test Results

802.11b

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	13.46	Pass
6	2437	13.56	Pass
11	2462	13.56	Pass

802.11g

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	16.74	Pass
6	2437	16.83	Pass
11	2462	16.83	Pass

802.11n (HT20)

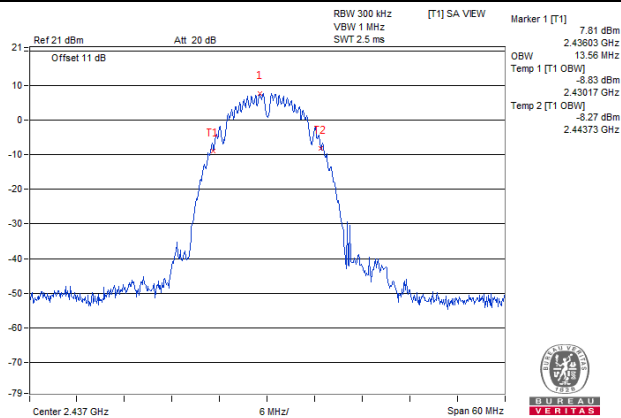
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	17.79	17.79	Pass
6	2437	17.79	17.70	Pass
11	2462	17.79	17.70	Pass

802.11n (HT40)

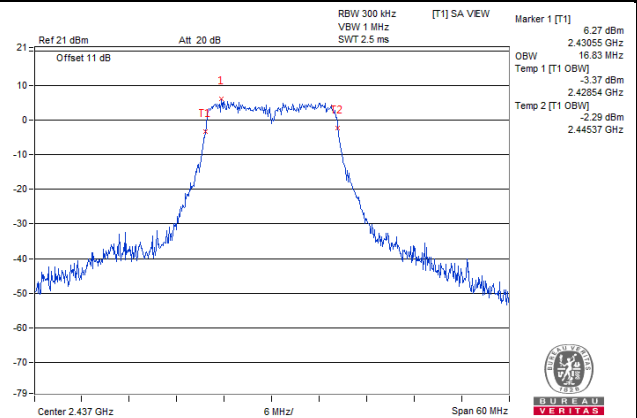
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
3	2422	37.21	36.83	Pass
6	2437	36.92	36.83	Pass
9	2452	37.12	36.83	Pass

Spectrum Plot of Worst Value

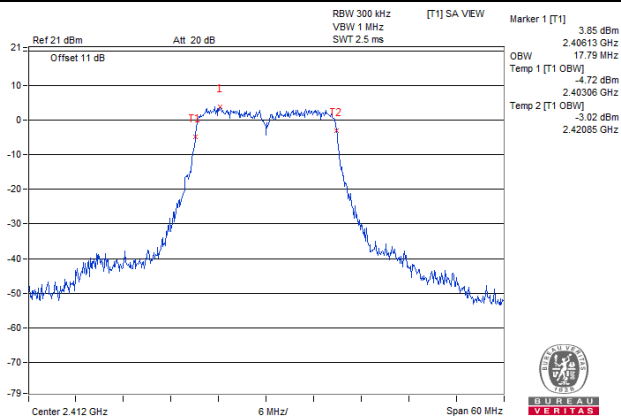
802.11b



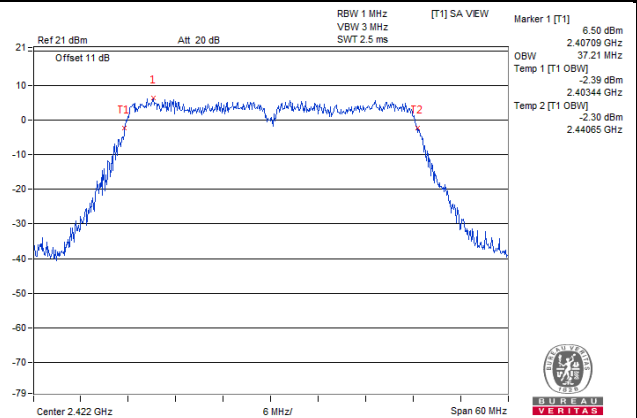
802.11g



802.11n (HT20)



802.11n (HT40)



4.5 Conducted Output Power Measurement

4.5.1 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,

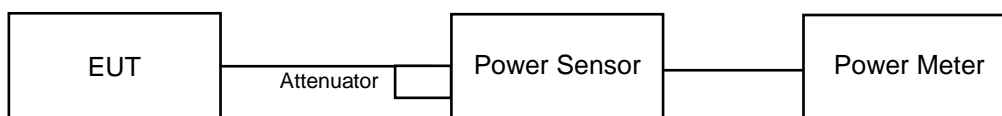
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

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.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test 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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	73.79	18.68	30	Pass
6	2437	73.114	18.64	30	Pass
11	2462	74.645	18.73	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	197.242	22.95	30	Pass
6	2437	212.814	23.28	30	Pass
11	2462	206.063	23.14	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.22	21.00	258.327	24.12	30	Pass
6	2437	22.03	21.87	313.403	24.96	30	Pass
11	2462	21.85	21.54	295.670	24.71	30	Pass

802.11n (HT40)

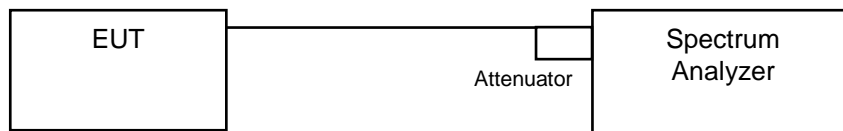
Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	23.54	23.36	442.714	26.46	30	Pass
6	2437	24.06	23.60	483.770	26.85	30	Pass
9	2452	22.75	22.40	362.145	25.59	30	Pass

4.6 Power Spectral Density Measurement

4.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm.

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

- 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.

4.6.5 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

802.11b

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-7.24	8	Pass
6	2437	-7.17	8	Pass
11	2462	-7.97	8	Pass

802.11g

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-11.40	8	Pass
6	2437	-11.38	8	Pass
11	2462	-11.67	8	Pass

802.11n (HT20)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-13.59	3.01	-10.58	5.99	Pass
	6	2437	-14.16	3.01	-11.15	5.99	Pass
	11	2462	-14.61	3.01	-11.60	5.99	Pass
1	1	2412	-13.15	3.01	-10.14	5.99	Pass
	6	2437	-12.92	3.01	-9.91	5.99	Pass
	11	2462	-13.51	3.01	-10.50	5.99	Pass

NOTE: Directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS}) = 8.01 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $8 - (8.01 - 6) = 5.99 \text{ dBm}$.

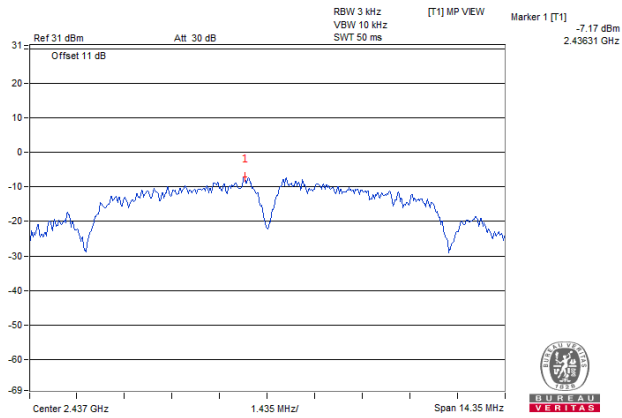
802.11n (HT40)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	3	2422	-17.80	3.01	-14.79	5.99	Pass
	6	2437	-17.67	3.01	-14.66	5.99	Pass
	9	2452	-18.88	3.01	-15.87	5.99	Pass
1	3	2422	-18.05	3.01	-15.04	5.99	Pass
	6	2437	-17.42	3.01	-14.41	5.99	Pass
	9	2452	-18.77	3.01	-15.76	5.99	Pass

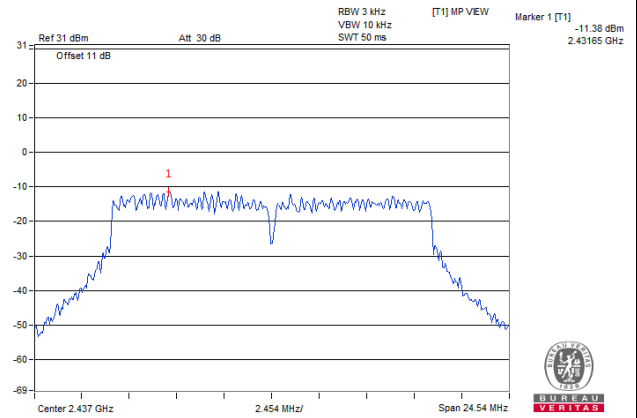
NOTE: Directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS}) = 8.01 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $8 - (8.01 - 6) = 5.99 \text{ dBm}$.

Spectrum Plot of Worst Value

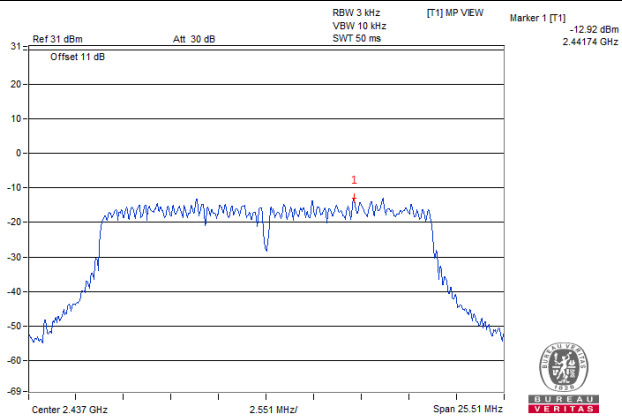
802.11b



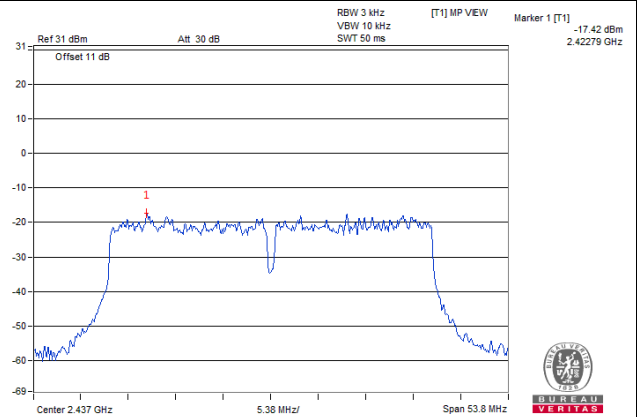
802.11g



802.11n (HT20)



802.11n (HT40)

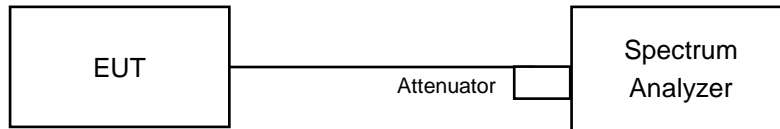


4.7 Conducted Out of Band Emission Measurement

4.7.1 Limits of Conducted Out of Band Emission Measurement

Below -20 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW \geq 300 kHz.
3. Detector = peak.
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. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

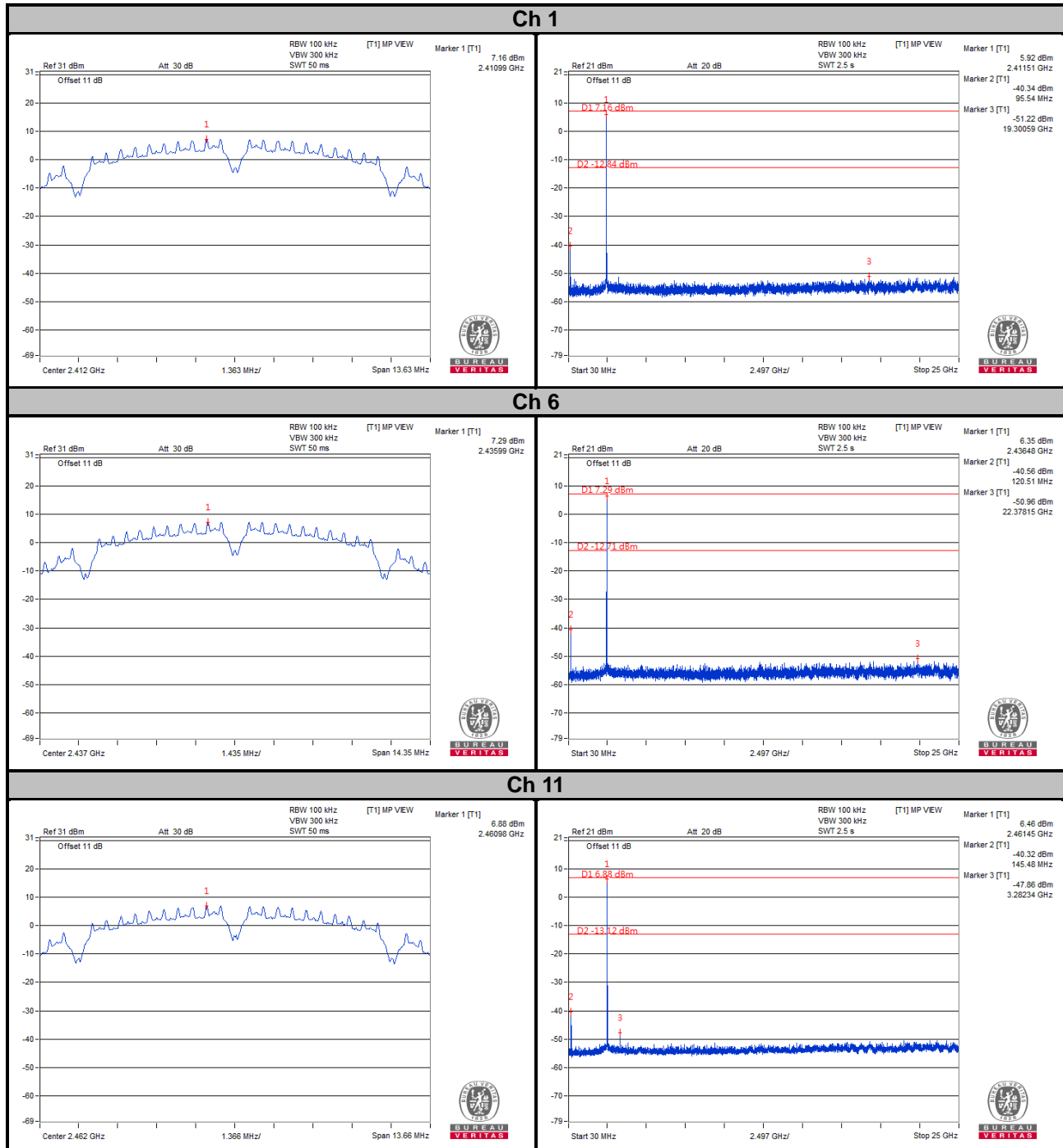
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

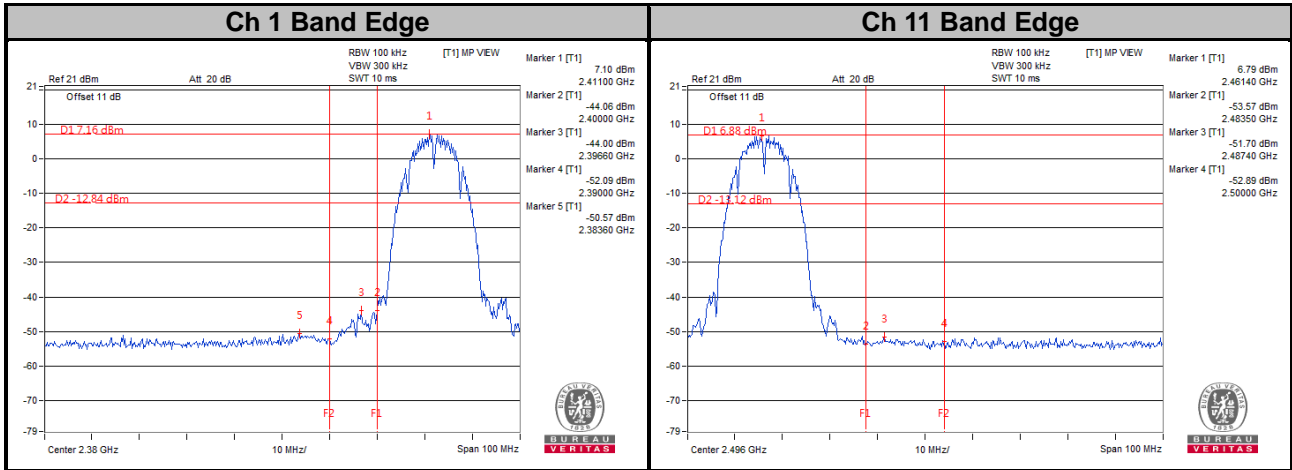
4.7.7 Test Results

The conducted emission test is performed on each TX port of operating mode without summing or adding $10\log(N)$ 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 20 dB offset below D1. It shows compliance with the requirement.

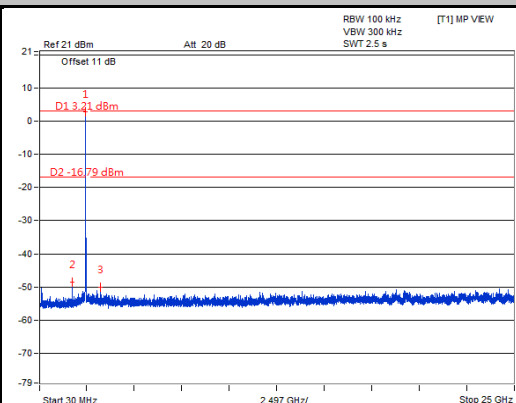
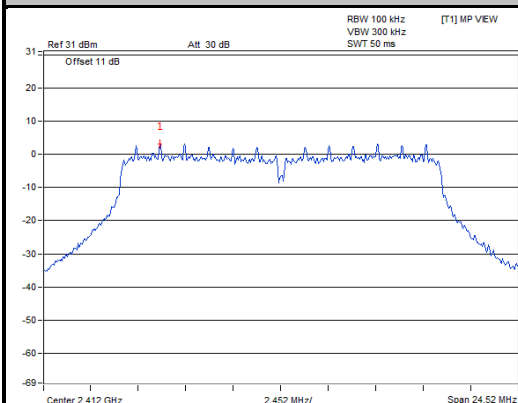
802.11b



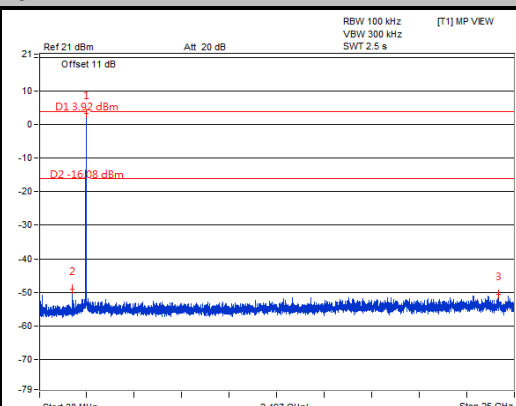
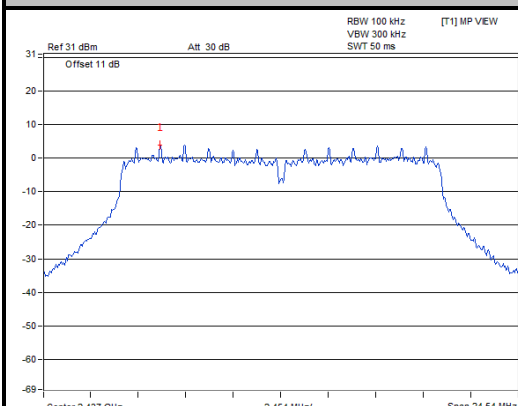


802.11g

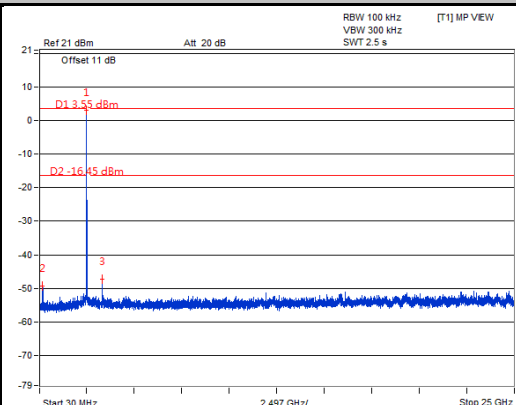
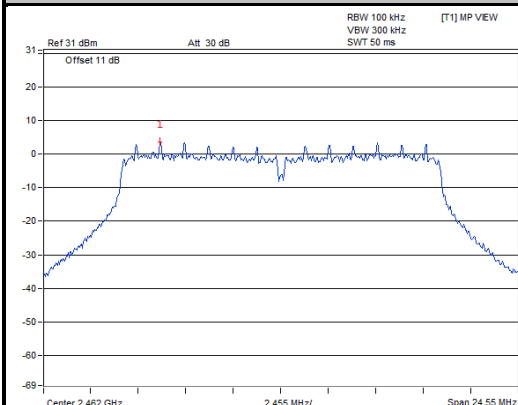
Ch 1



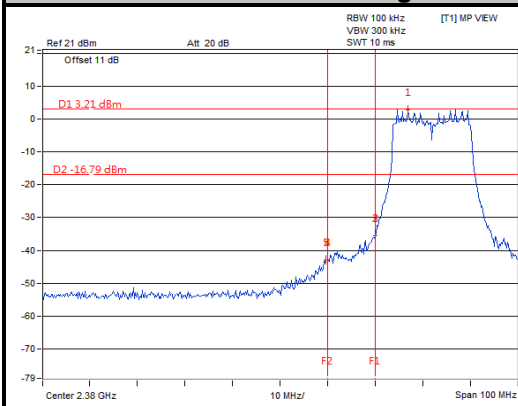
Ch 6



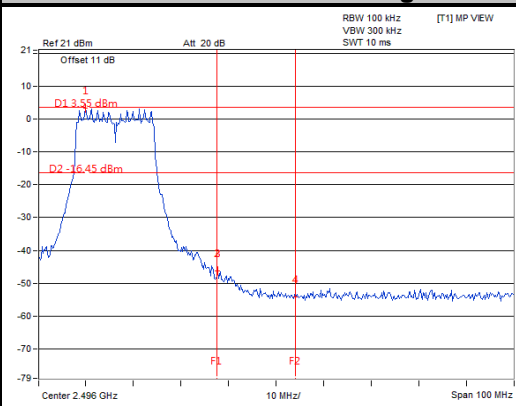
Ch 11



Ch 1 Band Edge

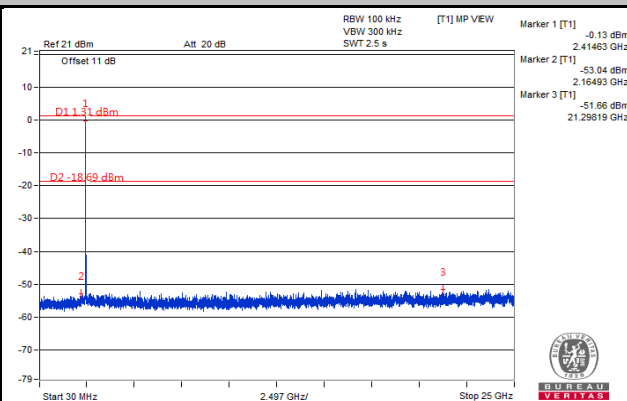
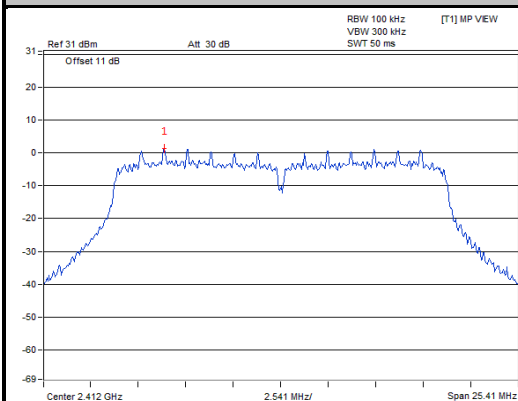


Ch 11 Band Edge

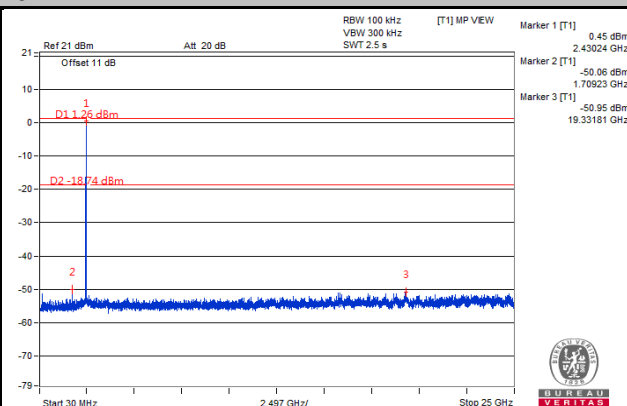
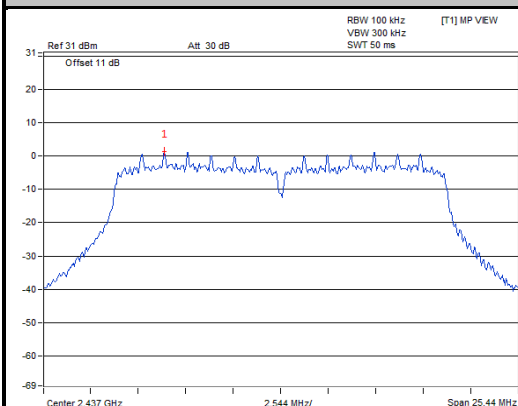


802.11n (HT20)_CHAIN 0

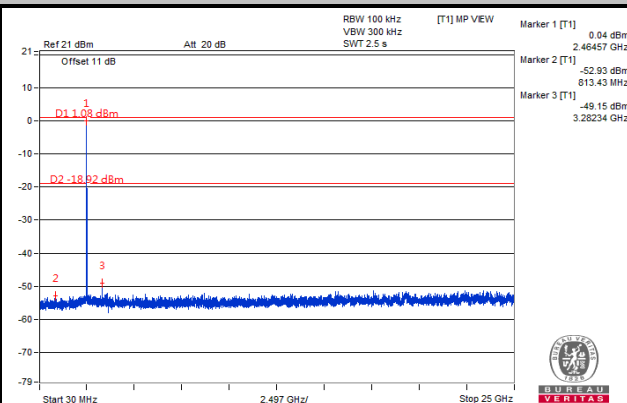
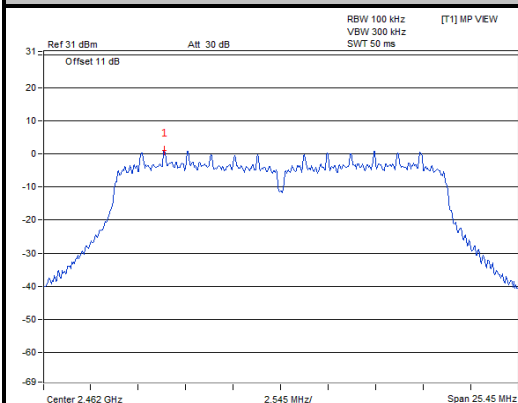
Ch 1



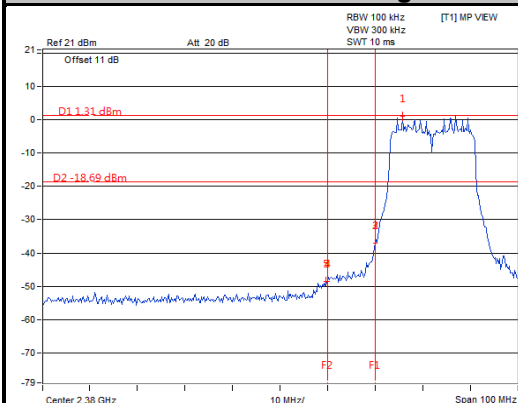
Ch 6



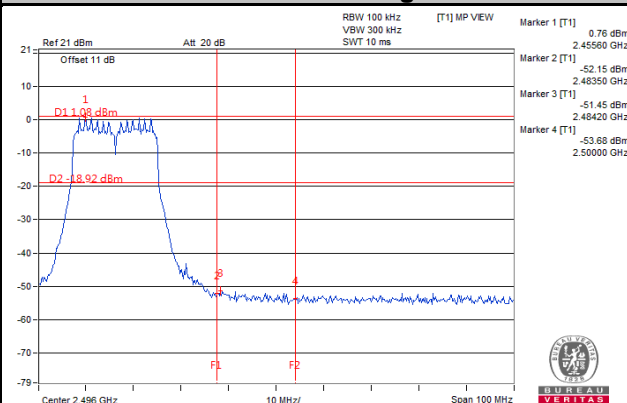
Ch 11



Ch 1 Band Edge

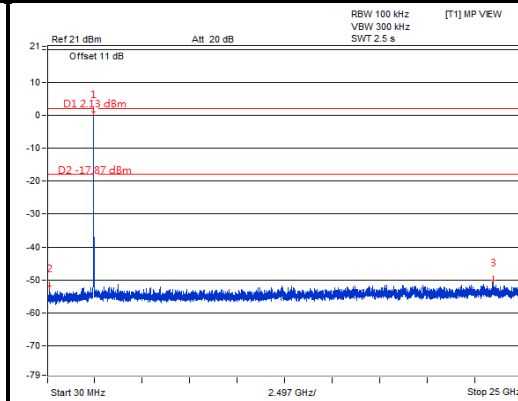
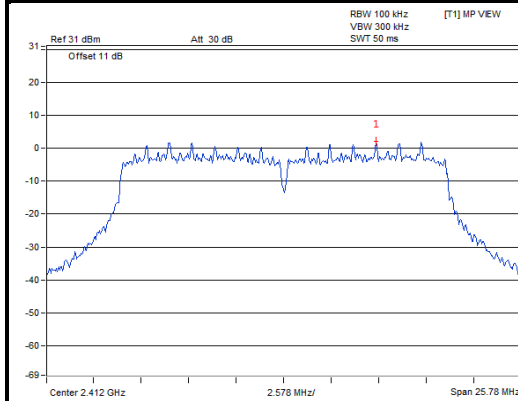


Ch 11 Band Edge

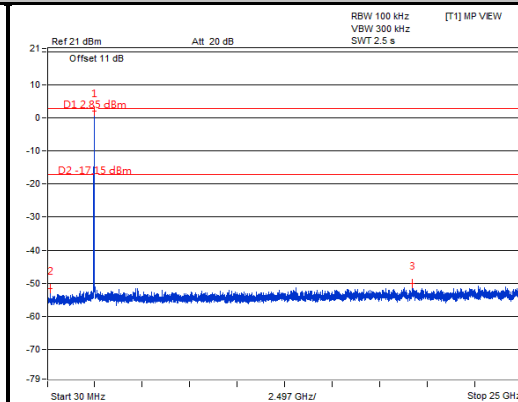
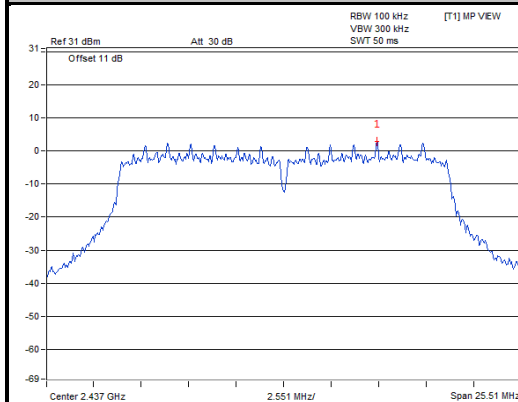


802.11n (HT20)_CHAIN 1

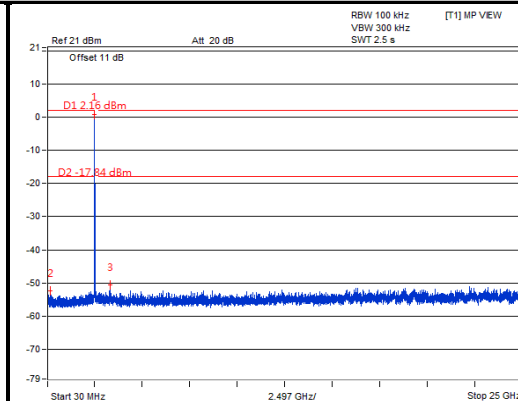
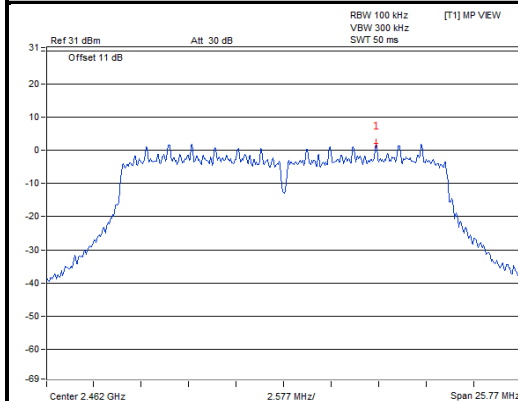
Ch 1



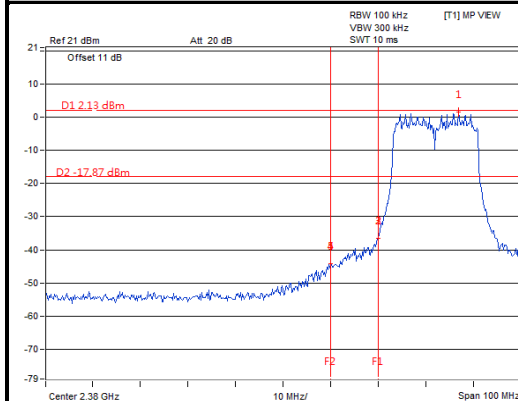
Ch 6



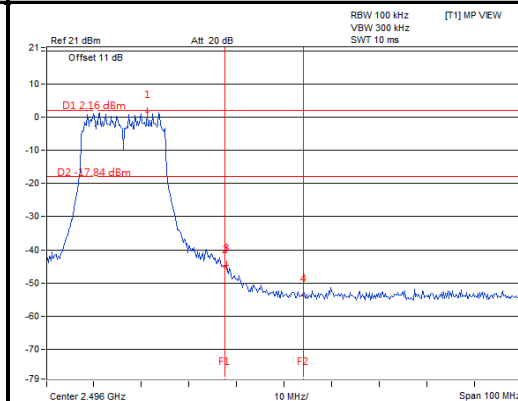
Ch 11



Ch 1 Band Edge

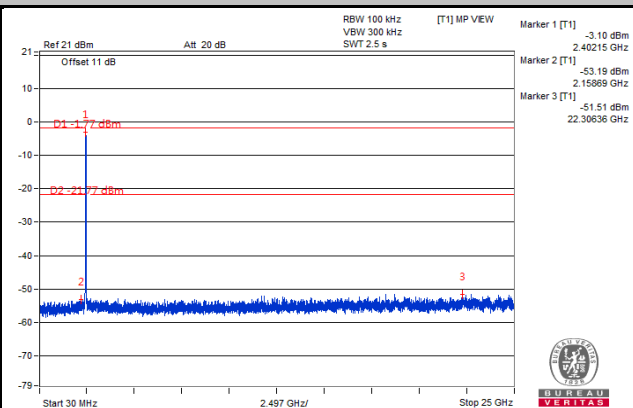
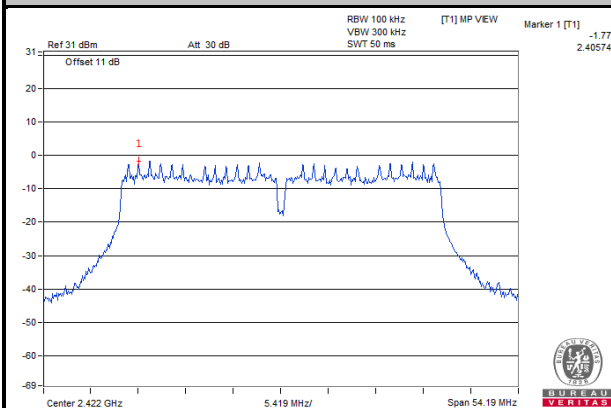


Ch 11 Band Edge

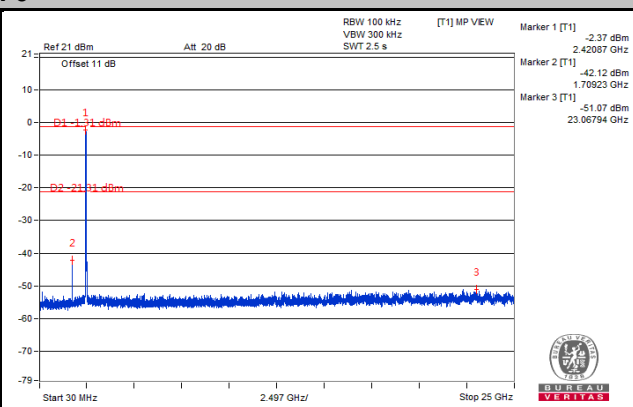
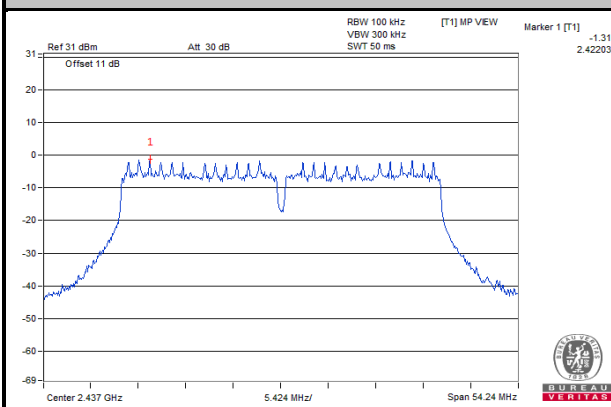


802.11n (HT40)_CHAIN 0

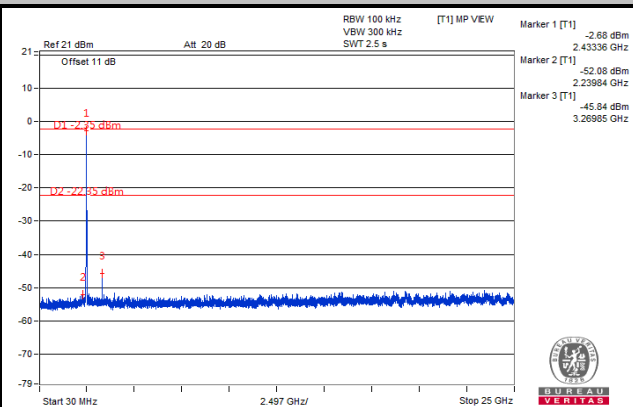
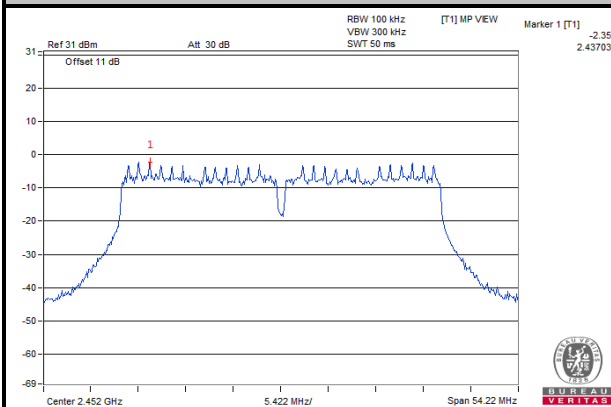
Ch 3



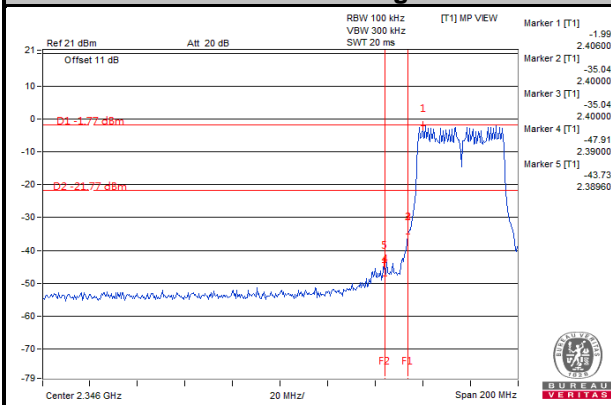
Ch 6



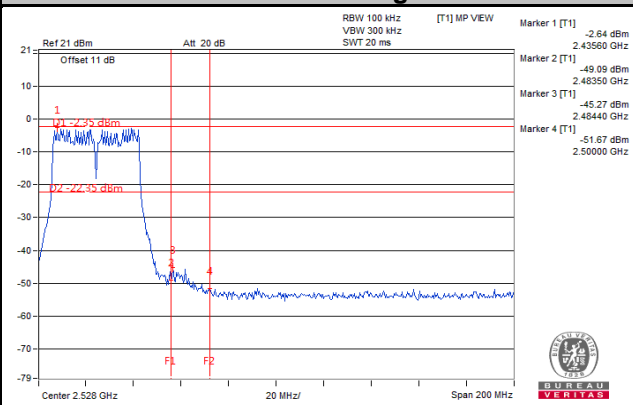
Ch 9



Ch 3 Band Edge

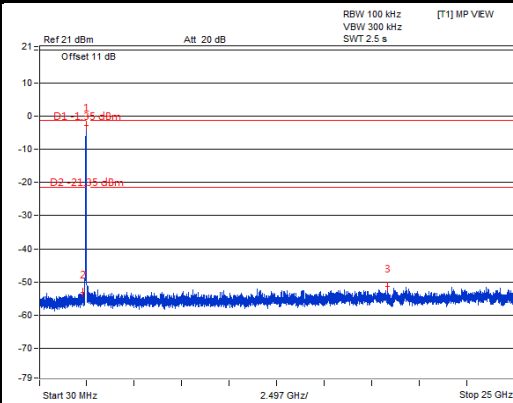
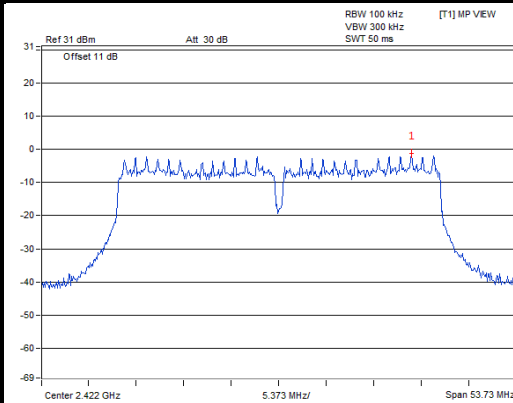


Ch 9 Band Edge

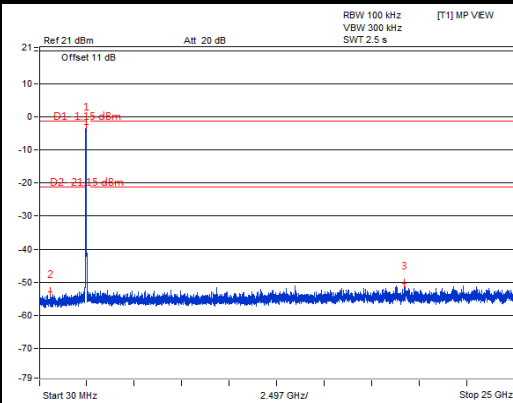
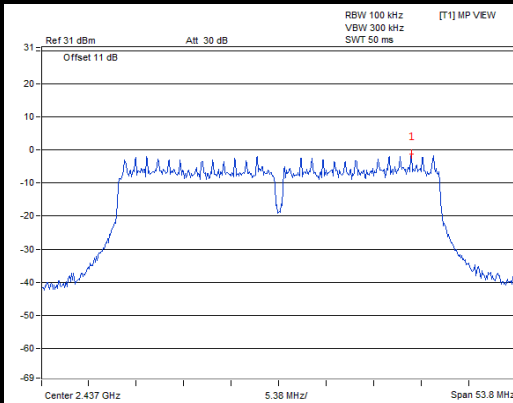


802.11n (HT40)CHAIN 1

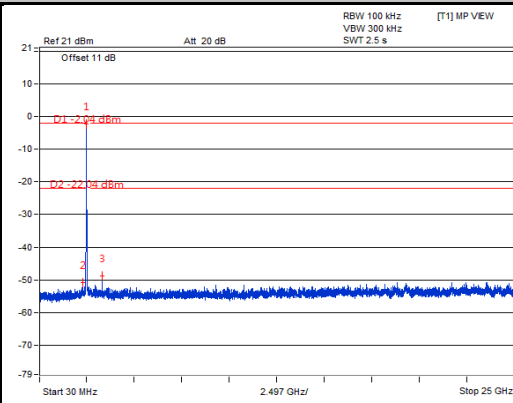
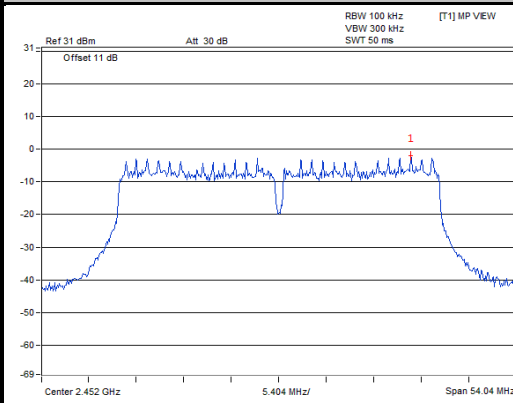
Ch 3



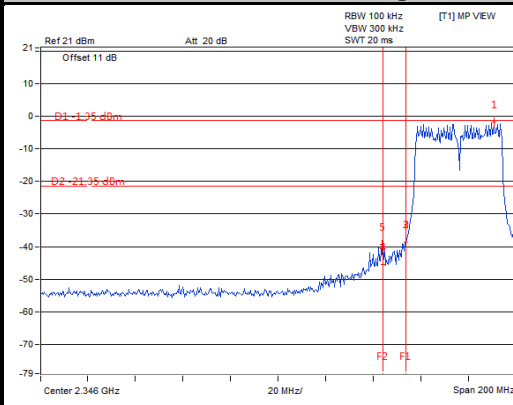
Ch 6



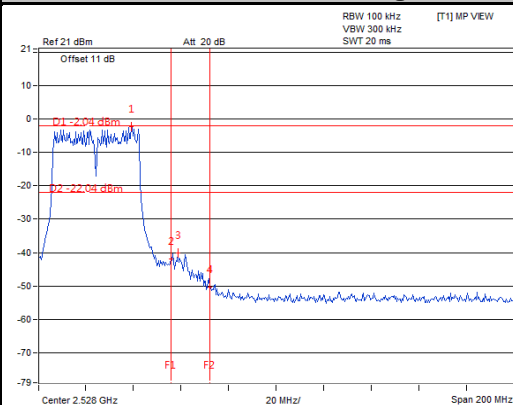
Ch 9



Ch 3 Band Edge



Ch 9 Band Edge



5 Pictures of Test Arrangements

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

Appendix – Information of 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 FCC recognized accredited test firms and accredited 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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