FCC Test Report

Report No.:	RF160225C02
FCC ID:	MSQP00A
Test Model:	P00A
Received Date:	Feb. 25, 2016
Test Date:	Mar. 05, 2016 ~ Mar. 12, 2016
Issued Date:	Mar. 21, 2016
Applicant:	ASUSTek COMPUTER INC.
Address:	4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Test Location	No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C

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Release Control Record

Issue No.	Description	Date Issued
RF160225C02	Original Release	Mar. 21, 2016

1 Certificate of Conformity

Product:	ASUS Tablet
Brand:	ASUS
Test Model:	P00A
Sample Status:	Production Unit
Applicant:	ASUSTek COMPUTER INC.
Test Date:	Mar. 05, 2016 ~ Mar. 12, 2016
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013

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

Prepared by : Rona Chen , **Date:** Mar. 21, 2016

Rona Chen / Specialist

Approved by : Stanley Wu , **Date:** Mar. 21, 2016

Stanley Wu / Assistant Manager

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 -9.13 dB at 0.18617 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -3.92 dB at 2484 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:
The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	**Frequency**	**Expended Uncertainty (k=2) (±)**
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 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	ASUS Tablet
Brand	ASUS
Test Model	P00A
Status of EUT	Production Unit
Power Supply Rating	3.8Vdc (Battery) 5.2Vdc (Adapter) 5.0Vdc (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 (HT20): up to MCS7
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20)
Output Power	179.89 mW
Antenna Type	PIFA antenna with 3.23 dBi gain
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. The EUT provides 1 completed transmitter and 1 receiver.

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

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	ASUS	PA-1050-39	I/P: 100-240Vac, 50/60Hz, 0.25A O/P: 5.2Vdc, 1A
Adapter 2	ASUS	AS0102	I/P: 100-240Vac, 50/60Hz, 0.13A O/P: 5.2Vdc, 1A
Adapter 3	ASUS	AD2061320	I/P: 100-240Vac, 50/60Hz, 0.13A O/P: 5.2Vdc, 1A
Battery	SIMPLO	C11P1505	3.8Vdc, 15.2Wh
USB Cable 1	DAEC	AA781000	0.9m shielded cable w/o core
USB Cable 2	LUXSHARE-ICT	L65U2009-CS-B	0.9m shielded cable w/o core
USB Cable 3	FOXCONN	CUBB04M-AS0D0-EF	0.9m shielded cable w/o core
LCD Panel	AUO	B080EAB02	8 inch
CPU	MEDIATEK	MT8163	393 Pin , 1.3GHz
Main Board	ASUS	Z380M MB	--
BT/WLAN Module	MEDIATEK	MT6625L	--

Product	Brand	Model	Description
Camera 1 (Front)	SUNWIN	SW08572E221B-VB	2M
Camera 2 (Back)	SUNWIN	SWCN5725602A-VB	5M
Camera 3 (Front)	Chicony	CIFF21920003870LH	2M
Camera 4 (Back)	Chicony	CJAF52720003870LH	5M
eMMC 1	HYNIX	FLASH HYNIX H26M52208FPR	16G
eMMC 2	HYNIX	FLASH HYNIX H26M41204HPR	8G
eMMC 3	SAMSUNG	FLASH SAMSUNG KLMAG1JENB-B041	16G
eMMC 4	SAMSUNG	FLASH SAMSUNG KLM8G1GEND-B031	8G
DDR 1	MICRON	MT41K512M8DA-107:P	2G
DDR 2	NANYA	NT5CC256M8IN-DI	1G
DDR 3	SAMSUNG	K4B4G0846E-BYK0	2G

3. The EUT contains two SKU listed as below.

Part	Brand	Model	Specification	SKU	
				1	2
Battery	SIMPLO	C11P1505	3.8Vdc, 15.2Wh	V	V
LCD Panel	AUO	B080EAB02	8 inch	V	V
CPU	MEDIATEK	MT8163	393 Pin , 1.3GHz	V	V
Main Board	ASUS	Z380M MB	--	V	V
BT/WLAN Module	MEDIATEK	MT6625L	--	V	V
eMMC	HYNIX	FLASH HYNIX H26M52208FPR	16G	V	
	HYNIX	FLASH HYNIX H26M41204HPR	8G		V
DDR	MICRON	MT41K512M8DA-107:P	2G	V	
	NANYA	NT5CC256M8IN-DI	1G		V
Camera (Front)	SUNWIN	SW08572E221B-VB	2M	V	
	Chicony	CIFF21920003870LH	2M		V
Camera (Back)	SUNWIN	SWCN5725602A-VB	5M	V	
	Chicony	CJAF52720003870LH	5M		V

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

3.2 Description of Test Modes

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥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**.

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)
-	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	MCS0

Radiated Emission Test (Below 1 GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11n (HT20)	1 to 11	11	OFDM	BPSK	MCS0

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)
-	802.11n (HT20)	1 to 11	11	OFDM	BPSK	MCS0

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)
-	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	MCS0

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	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	MCS0

Test Condition:

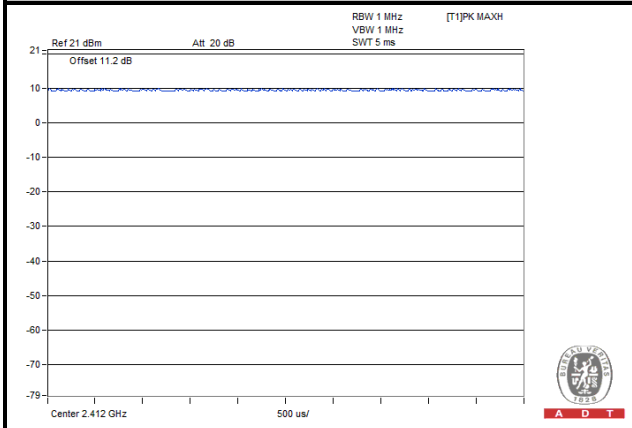
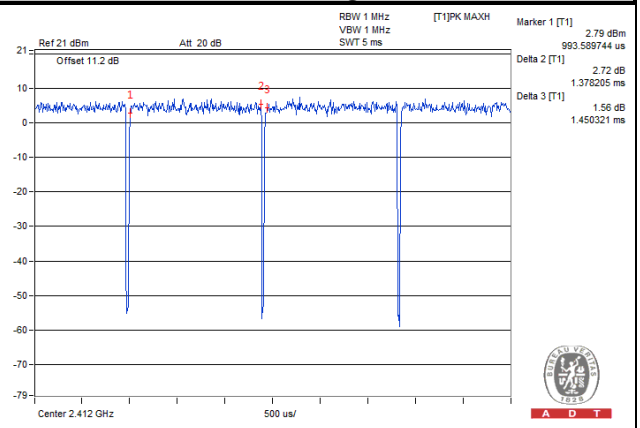
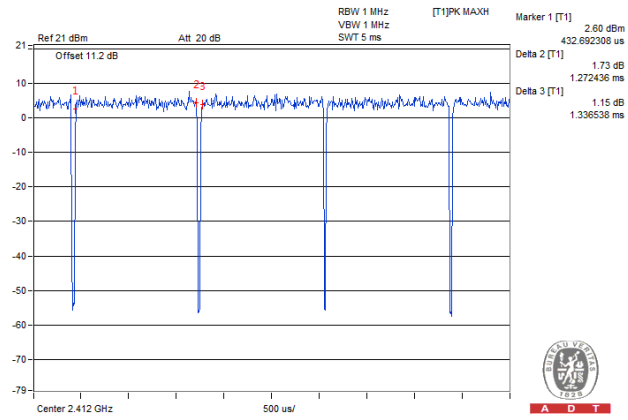
Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Taylor Liu
APCM	25 deg. C, 65 % RH	3.8 Vdc	Wayne Lin

3.3 Duty Cycle of Test Signal

802.11b: Duty cycle of test signal is 100%, duty factor is not required.

802.11g: Duty cycle = 1.378/1.450 = 0.950, Duty factor = 10 * log(1/0.950) = 0.22

802.11n (HT20): Duty cycle = 1.272/1.337 = 0.952, Duty factor = 10 * log(1/0.952) = 0.21

802.11b	802.11g
	
802.11n (HT20)	
	

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.

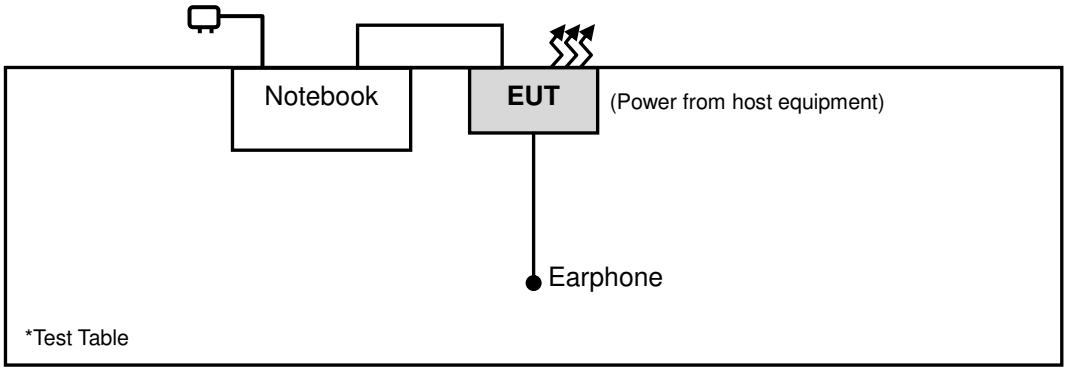
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Earphone	N/A	N/A	N/A	N/A
2.	Notebook	DELL	Inspiron 14R	8LRKKW1	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A
2.	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



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
558074 D01 DTS Meas Guidance v03r04
ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	May 19, 2015	May 18, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna Schwarzbeck	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna ETS-Lindgren	3117	00143293	Jan. 04, 2016	Jan. 03, 2017
Bluetooth Tester	CBT	100980	Apr. 27, 2015	Apr. 26, 2017
Loop Antenna	EM-6879	269	Jul. 31, 2015	Jul. 30, 2016
Agilent Communications Tester-Wireless	8960 Series 10	MY53201073	Jul. 03, 2015	Jul. 02, 2017
Preamplifier Agilent	310N	187226	Jun. 29, 2015	Jun. 28, 2016
Preamplifier Agilent	83017A	MY39501357	Jun. 29, 2015	Jun. 28, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 27, 2015	Jun. 26, 2016
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 27, 2015	Jun. 26, 2016
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 FCC Site Registration No. is 149147.
5. The IC Site Registration No. is IC7450I-1.

4.1.3 Test Procedures

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

Note:

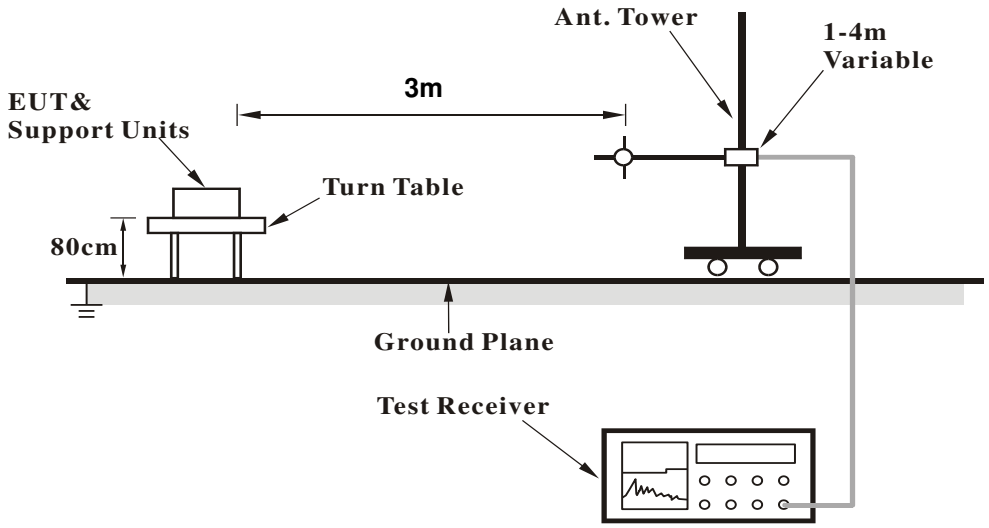
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for RMS Average (Duty cycle < 98 %) for Average detection (AV) at frequency above 1 GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

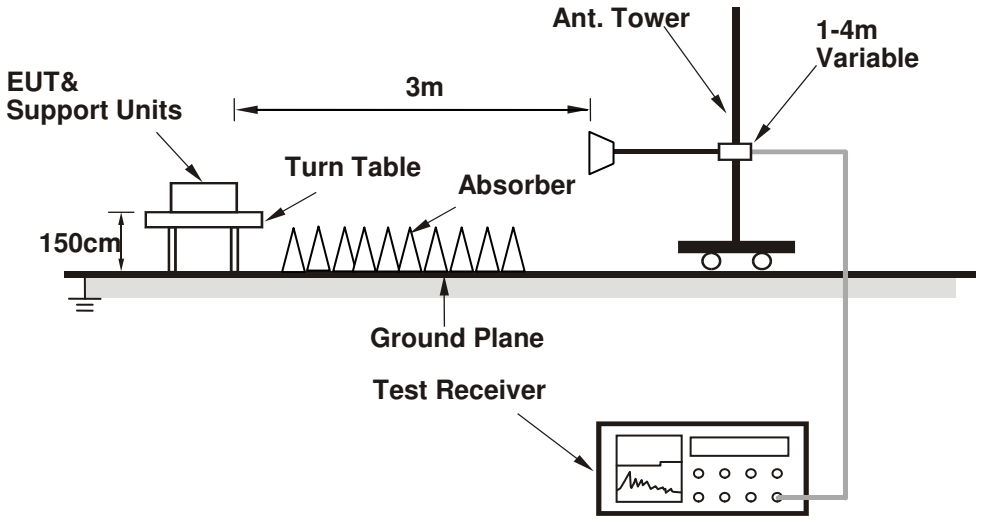
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1 GHz Data：

For SKU 1

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**
2384	41.18	39.49	54	-12.82	31.78	5.4	35.49	102	156	Average
2384	55.41	53.72	74	-18.59	31.78	5.4	35.49	102	156	Peak
2412	104.95	103.18			31.81	5.43	35.47	102	156	Average
2412	107.82	106.05			31.81	5.43	35.47	102	156	Peak
2486	40.41	38.42	54	-13.59	31.88	5.53	35.42	102	156	Average
2486	55.21	53.22	74	-18.79	31.88	5.53	35.42	102	156	Peak
4824	44.05	35.92	54	-9.95	33.97	8.26	34.1	100	204	Average
4824	51.27	43.14	74	-22.73	33.97	8.26	34.1	100	204	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**
2310	40.46	38.98	54	-13.54	31.71	5.3	35.53	309	12	Average
2310	54.92	53.44	74	-19.08	31.71	5.3	35.53	309	12	Peak
2412	103.4	101.63			31.81	5.43	35.47	309	12	Average
2412	106.48	104.71			31.81	5.43	35.47	309	12	Peak
2484	40.25	38.29	54	-13.75	31.88	5.5	35.42	309	12	Average
2484	55.65	53.69	74	-18.35	31.88	5.5	35.42	309	12	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	**Frequency Range**	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	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**
2328	39.72	38.21	54	-14.28	31.73	5.3	35.52	102	156	Average
2328	55.55	54.04	74	-18.45	31.73	5.3	35.52	102	156	Peak
2437	104.44	102.59			31.85	5.46	35.46	102	156	Average
2437	107.25	105.4			31.85	5.46	35.46	102	156	Peak
2492	40.12	38.1	54	-13.88	31.9	5.53	35.41	102	156	Average
2492	55.68	53.66	74	-18.32	31.9	5.53	35.41	102	156	Peak
4874	41.34	33.15	54	-12.66	33.98	8.27	34.06	102	357	Average
4874	49.61	41.42	74	-24.39	33.98	8.27	34.06	102	357	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**
2350	39.82	38.25	54	-14.18	31.74	5.33	35.5	298	12	Average
2350	55.2	53.63	74	-18.8	31.74	5.33	35.5	298	12	Peak
2437	103.36	101.51			31.85	5.46	35.46	298	12	Average
2437	106.2	104.35			31.85	5.46	35.46	298	12	Peak
2490	40.22	38.21	54	-13.78	31.9	5.53	35.42	298	12	Average
2490	54.92	52.91	74	-19.08	31.9	5.53	35.42	298	12	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	**Frequency Range**	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	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**
2312	39.75	38.27	54	-14.25	31.71	5.3	35.53	102	156	Average
2312	55.04	53.56	74	-18.96	31.71	5.3	35.53	102	156	Peak
2462	102.1	100.17			31.87	5.5	35.44	102	156	Average
2462	105.74	103.81			31.87	5.5	35.44	102	156	Peak
2484	40.88	38.92	54	-13.12	31.88	5.5	35.42	102	156	Average
2484	55.43	53.47	74	-18.57	31.88	5.5	35.42	102	156	Peak
4924	46.44	38.19	54	-7.56	33.99	8.28	34.02	203	164	Average
4924	52.87	44.62	74	-21.13	33.99	8.28	34.02	203	164	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**
2338	39.72	38.17	54	-14.28	31.74	5.33	35.52	295	12	Average
2338	55.24	53.69	74	-18.76	31.74	5.33	35.52	295	12	Peak
2462	101.41	99.48			31.87	5.5	35.44	295	12	Average
2462	104.73	102.8			31.87	5.5	35.44	295	12	Peak
2486	40.35	38.36	54	-13.65	31.88	5.53	35.42	295	12	Average
2486	54.95	52.96	74	-19.05	31.88	5.53	35.42	295	12	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.

802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	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**
2390	46.71	44.98	54	-7.29	31.8	5.4	35.47	102	156	Average
2390	61.51	59.78	74	-12.49	31.8	5.4	35.47	102	156	Peak
2412	97.59	95.82			31.81	5.43	35.47	102	156	Average
2412	105.87	104.1			31.81	5.43	35.47	102	156	Peak
2496	40.19	38.17	54	-13.81	31.9	5.53	35.41	102	156	Average
2496	55.79	53.77	74	-18.21	31.9	5.53	35.41	102	156	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2386	42	40.29	54	-12	31.8	5.4	35.49	309	12	Average
2386	56.66	54.95	74	-17.34	31.8	5.4	35.49	309	12	Peak
2412	96.26	94.49			31.81	5.43	35.47	309	12	Average
2412	104.58	102.81			31.81	5.43	35.47	309	12	Peak
2488	40.09	38.08	54	-13.91	31.9	5.53	35.42	309	12	Average
2488	55.72	53.71	74	-18.28	31.9	5.53	35.42	309	12	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	**Frequency Range**	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	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	39.54	37.83	54	-14.46	31.8	5.4	35.49	102	156	Average
2388	55.86	54.15	74	-18.14	31.8	5.4	35.49	102	156	Peak
2437	97.52	95.67			31.85	5.46	35.46	102	156	Average
2437	105.76	103.91			31.85	5.46	35.46	102	156	Peak
2484	39.94	37.98	54	-14.06	31.88	5.5	35.42	102	156	Average
2484	55.45	53.49	74	-18.55	31.88	5.5	35.42	102	156	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2320	39.33	37.82	54	-14.67	31.73	5.3	35.52	298	12	Average
2320	55.62	54.11	74	-18.38	31.73	5.3	35.52	298	12	Peak
2437	96.31	94.46			31.85	5.46	35.46	298	12	Average
2437	104.55	102.7			31.85	5.46	35.46	298	12	Peak
2494	39.73	37.71	54	-14.27	31.9	5.53	35.41	298	12	Average
2494	55.31	53.29	74	-18.69	31.9	5.53	35.41	298	12	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	**Frequency Range**	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	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**
2390	39.8	38.07	54	-14.2	31.8	5.4	35.47	101	156	Average
2390	54.3	52.57	74	-19.7	31.8	5.4	35.47	101	156	Peak
2462	97.44	95.51			31.87	5.5	35.44	101	156	Average
2462	105.12	103.19			31.87	5.5	35.44	101	156	Peak
2484	47.28	45.32	54	-6.72	31.88	5.5	35.42	101	156	Average
2484	65.89	63.93	74	-8.11	31.88	5.5	35.42	101	156	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2360	39.68	38.05	54	-14.32	31.76	5.37	35.5	295	12	Average
2360	54.96	53.33	74	-19.04	31.76	5.37	35.5	295	12	Peak
2462	96.81	94.88			31.87	5.5	35.44	295	12	Average
2462	104.59	102.66			31.87	5.5	35.44	295	12	Peak
2484	44.7	42.74	54	-9.3	31.88	5.5	35.42	295	12	Average
2484	65.58	63.62	74	-8.42	31.88	5.5	35.42	295	12	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	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**
2390	48.39	46.66	54	-5.61	31.8	5.4	35.47	102	156	Average
2390	67.33	65.6	74	-6.67	31.8	5.4	35.47	102	156	Peak
2412	97.25	95.48			31.81	5.43	35.47	102	156	Average
2412	105.9	104.13			31.81	5.43	35.47	102	156	Peak
2484	40.15	38.19	54	-13.85	31.88	5.5	35.42	102	156	Average
2484	56.84	54.88	74	-17.16	31.88	5.5	35.42	102	156	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2390	42.98	41.25	54	-11.02	31.8	5.4	35.47	309	12	Average
2390	57.62	55.89	74	-16.38	31.8	5.4	35.47	309	12	Peak
2412	96.23	94.46			31.81	5.43	35.47	309	12	Average
2412	104.71	102.94			31.81	5.43	35.47	309	12	Peak
2496	40.21	38.19	54	-13.79	31.9	5.53	35.41	309	12	Average
2496	56.7	54.68	74	-17.3	31.9	5.53	35.41	309	12	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	**Frequency Range**	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	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	39.44	37.73	54	-14.56	31.8	5.4	35.49	102	156	Average
2388	55.77	54.06	74	-18.23	31.8	5.4	35.49	102	156	Peak
2437	97.37	95.52			31.85	5.46	35.46	102	156	Average
2437	105.53	103.68			31.85	5.46	35.46	102	156	Peak
2488	39.67	37.66	54	-14.33	31.9	5.53	35.42	102	156	Average
2488	56.27	54.26	74	-17.73	31.9	5.53	35.42	102	156	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2390	39.56	37.83	54	-14.44	31.8	5.4	35.47	298	12	Average
2390	55.26	53.53	74	-18.74	31.8	5.4	35.47	298	12	Peak
2437	96.19	94.34			31.85	5.46	35.46	298	12	Average
2437	104.66	102.81			31.85	5.46	35.46	298	12	Peak
2496	39.79	37.77	54	-14.21	31.9	5.53	35.41	298	12	Average
2496	55.83	53.81	74	-18.17	31.9	5.53	35.41	298	12	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	**Frequency Range**	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	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**
2384	39.54	37.85	54	-14.46	31.78	5.4	35.49	101	156	Average
2384	55.29	53.6	74	-18.71	31.78	5.4	35.49	101	156	Peak
2462	97.72	95.79			31.87	5.5	35.44	101	156	Average
2462	105.08	103.15			31.87	5.5	35.44	101	156	Peak
2484	47.98	46.02	54	-6.02	31.88	5.5	35.42	101	156	Average
2484	**70.08**	**68.12**	**74**	**-3.92**	**31.88**	**5.5**	**35.42**	**101**	**156**	**Peak**
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2378	39.29	37.63	54	-14.71	31.78	5.37	35.49	298	12	Average
2378	56.13	54.47	74	-17.87	31.78	5.37	35.49	298	12	Peak
2462	96.67	94.74			31.87	5.5	35.44	298	12	Average
2462	104.47	102.54			31.87	5.5	35.44	298	12	Peak
2484	45.25	43.29	54	-8.75	31.88	5.5	35.42	298	12	Average
2484	65.22	63.26	74	-8.78	31.88	5.5	35.42	298	12	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.

For SKU 2

802.11n (HT20)

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**
2390	40.57	38.84	54	-13.43	31.8	5.4	35.47	112	139	Average
2390	55.49	53.76	74	-18.51	31.8	5.4	35.47	112	139	Peak
2462	97.11	95.18			31.87	5.5	35.44	112	139	Average
2462	105.04	103.11			31.87	5.5	35.44	112	139	Peak
2484	48.48	46.52	54	-5.52	31.88	5.5	35.42	112	139	Average
2484	68.4	66.44	74	-5.6	31.88	5.5	35.42	112	139	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**
2390	40.86	39.13	54	-13.14	31.8	5.4	35.47	149	166	Average
2390	55.47	53.74	74	-18.53	31.8	5.4	35.47	149	166	Peak
2462	97.1	95.17			31.87	5.5	35.44	149	166	Average
2462	105.67	103.74			31.87	5.5	35.44	149	166	Peak
2484	48.18	46.22	54	-5.82	31.88	5.5	35.42	149	166	Average
2484	66.75	64.79	74	-7.25	31.88	5.5	35.42	149	166	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.

9 kHz ~ 30 MHz DATA:

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

30 MHz ~ 1 GHz WORST-CASE DATA:

For SKU 1

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 11	**Frequency Range**	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK)
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**
90.75	18.6	40.28	43.5	-24.9	8.98	1.11	31.77	186	7	Peak
164.46	21.62	41.92	43.5	-21.88	10.44	1.52	32.26	103	152	Peak
188.76	17.91	38.15	43.5	-25.59	10.4	1.61	32.25	161	250	Peak
452.6	18.25	29.81	46	-27.75	18.09	2.49	32.14	182	181	Peak
554.1	21.24	30.41	46	-24.76	20.27	2.76	32.2	120	275	Peak
720	27.38	33.02	46	-18.62	23.31	3.16	32.11	167	339	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**
32.97	28.22	44.14	40	-11.78	15.59	0.74	32.25	117	218	Peak
55.38	26.57	50.66	40	-13.43	7.24	0.9	32.23	109	90	Peak
87.51	17.34	39.31	40	-22.66	8.78	1.11	31.86	170	136	Peak
525.4	21.36	30.11	46	-24.64	20.7	2.7	32.15	119	310	Peak
673.8	23.87	29.54	46	-22.13	23.4	3.05	32.12	167	338	Peak
790.7	25.77	30.34	46	-20.23	24.23	3.27	32.07	120	17	Peak

Remarks:

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

For SKU 2

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 11	**Frequency Range**	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK)
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**
90.48	19.61	41.27	43.5	-23.89	8.94	1.11	31.71	184	111	Peak
175.53	21.25	41.66	43.5	-22.25	10.22	1.61	32.24	175	53	Peak
192	18.39	38.58	43.5	-25.11	10.46	1.61	32.26	190	255	Peak
524	20.72	29.46	46	-25.28	20.7	2.7	32.14	180	318	Peak
680.1	23.72	29.47	46	-22.28	23.31	3.05	32.11	142	229	Peak
720	28.03	33.67	46	-17.97	23.31	3.16	32.11	165	110	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**
32.97	27.96	43.88	40	-12.04	15.59	0.74	32.25	127	196	Peak
48.36	27.41	50.42	40	-12.59	8.31	0.9	32.22	148	336	Peak
91.83	13.56	35.21	43.5	-29.94	9.06	1.11	31.82	159	5	Peak
479.9	19.31	29.95	46	-26.69	18.92	2.56	32.12	170	114	Peak
665.4	23.23	29.4	46	-22.77	22.97	2.99	32.13	166	354	Peak
839	24.58	29.4	46	-21.42	23.65	3.38	31.85	136	26	Peak

Remarks:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

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

4.2.2 Test Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

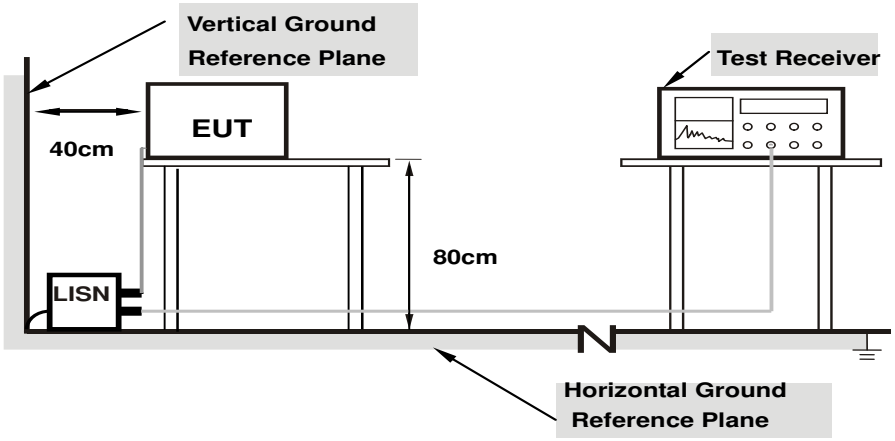
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

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

4.2.7 Test Results

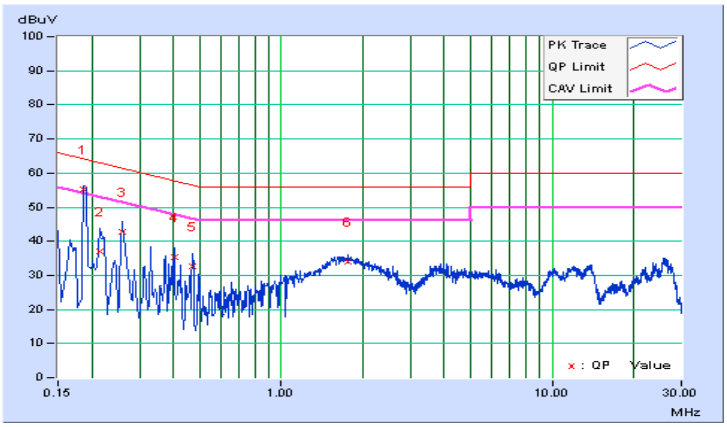
For SKU 1

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Toby Tian	Test Date	2016/3/12

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	**0.18617**	**10.09**	**44.98**	**26.85**	**55.07**	**36.94**	**64.21**	**54.21**	**-9.13**	**-17.26**
2	0.21400	10.12	26.75	13.66	36.87	23.78	63.05	53.05	-26.18	-29.27
3	0.25810	10.12	32.50	18.50	42.62	28.62	61.49	51.49	-18.87	-22.87
4	0.40200	10.13	25.23	11.67	35.36	21.80	57.81	47.81	-22.45	-26.01
5	0.47000	10.15	22.55	9.77	32.70	19.92	56.51	46.51	-23.82	-26.60
6	1.77000	10.27	23.81	13.05	34.08	23.32	56.00	46.00	-21.92	-22.68

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

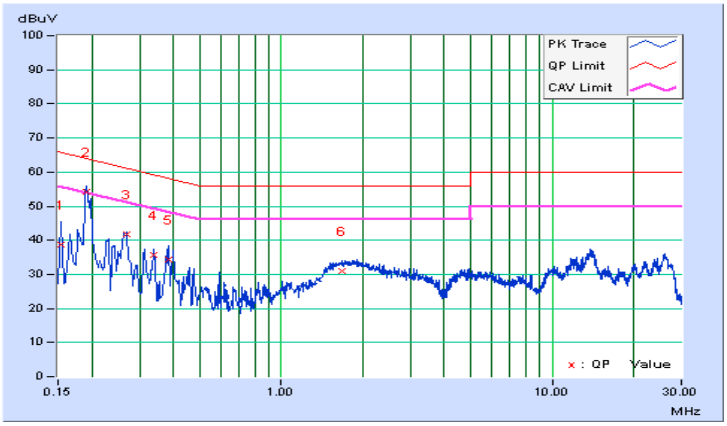


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Toby Tian	Test Date	2016/3/12

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	0.15400	10.01	28.56	12.63	38.57	22.64	65.78	55.78	-27.21	-33.14
2	0.19000	10.03	44.10	27.73	54.13	37.76	64.04	54.04	-9.90	-16.27
3	0.26992	10.08	31.70	18.58	41.78	28.66	61.12	51.12	-19.34	-22.46
4	0.33800	10.12	25.56	10.24	35.68	20.36	59.25	49.25	-23.58	-28.90
5	0.38200	10.14	24.31	9.76	34.45	19.90	58.24	48.24	-23.79	-28.34
6	1.67000	10.26	20.57	10.15	30.83	20.41	56.00	46.00	-25.17	-25.59

Remarks:

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



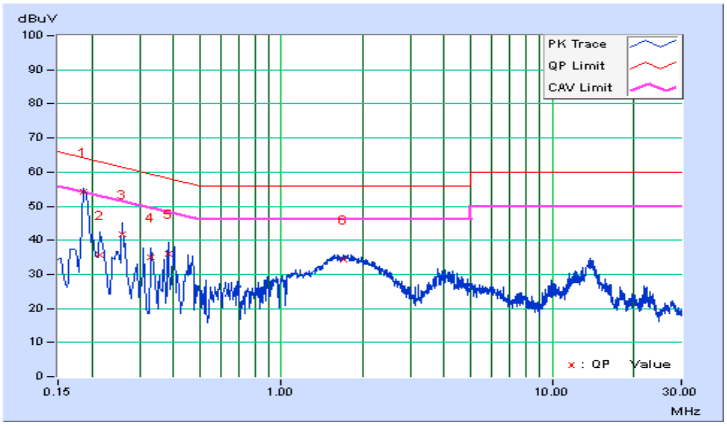
For SKU 2

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Toby Tian	Test Date	2016/3/12

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	0.18617	10.09	44.12	26.23	54.21	36.32	64.21	54.21	-9.99	-17.88
2	0.21406	10.12	25.52	13.11	35.64	23.23	63.05	53.05	-27.41	-29.82
3	0.25800	10.12	31.65	18.06	41.77	28.18	61.50	51.50	-19.72	-23.31
4	0.33000	10.13	25.04	10.08	35.17	20.21	59.45	49.45	-24.28	-29.24
5	0.38200	10.13	26.01	11.65	36.14	21.78	58.24	48.24	-22.10	-26.46
6	1.70600	10.28	23.92	13.05	34.20	23.33	56.00	46.00	-21.80	-22.67

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

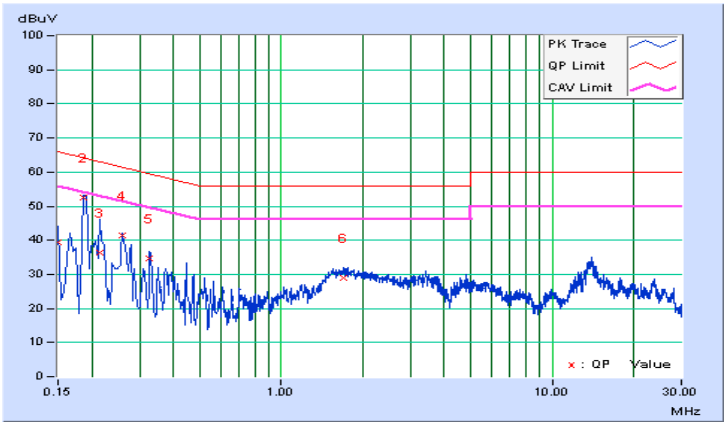


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Toby Tian	Test Date	2016/3/12

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	0.15000	10.00	29.30	12.68	39.30	22.68	66.00	56.00	-26.70	-33.32
2	0.18617	10.03	42.57	24.26	52.60	34.29	64.21	54.21	-11.61	-19.92
3	0.21406	10.05	26.35	13.49	36.40	23.54	63.05	53.05	-26.65	-29.51
4	0.25800	10.07	31.25	17.85	41.32	27.92	61.50	51.50	-20.17	-23.57
5	0.32630	10.11	24.59	9.66	34.70	19.77	59.54	49.54	-24.85	-29.78
6	1.69400	10.26	18.78	8.97	29.04	19.23	56.00	46.00	-26.96	-26.77

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

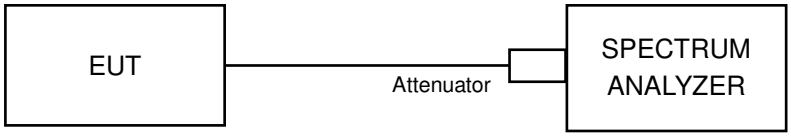


4.3 6 dB Bandwidth Measurement

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

a. Set resolution bandwidth (RBW) = 100 kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. 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 fromTest Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.58	0.5	Pass
6	2437	9.11	0.5	Pass
11	2462	9.11	0.5	Pass

802.11g

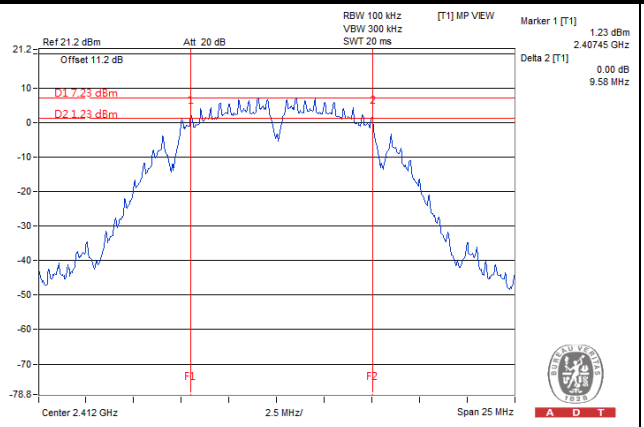
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.38	0.5	Pass
6	2437	16.40	0.5	Pass
11	2462	16.40	0.5	Pass

802.11n (HT20)

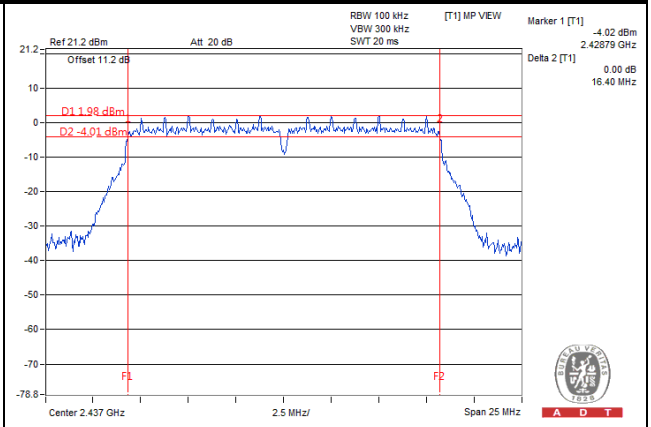
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.61	0.5	Pass
6	2437	17.63	0.5	Pass
11	2462	17.65	0.5	Pass

Spectrum Plot of Worst Value

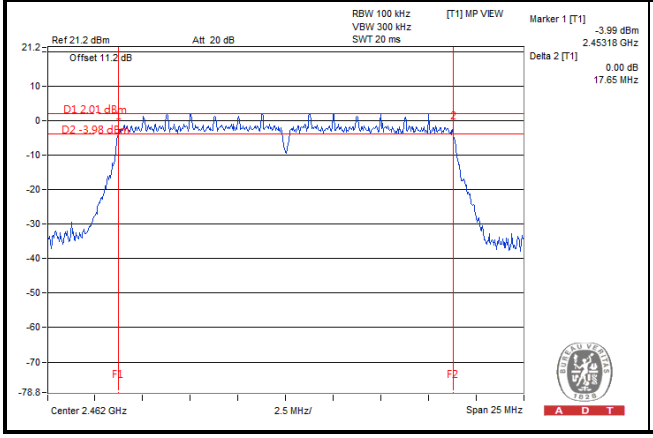
802.11b



802.11g



802.11n (HT20)

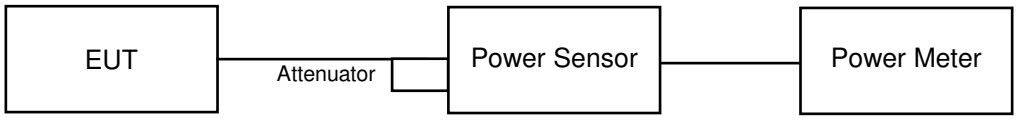


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

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

4.4.7 Test Results

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	**79.25**	**18.99**	30	Pass
6	2437	78.34	18.94	30	Pass
11	2462	68.39	18.35	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	137.09	21.37	30	Pass
6	2437	159.59	22.03	30	Pass
11	2462	**161.44**	**22.08**	30	Pass

802.11n (HT20)

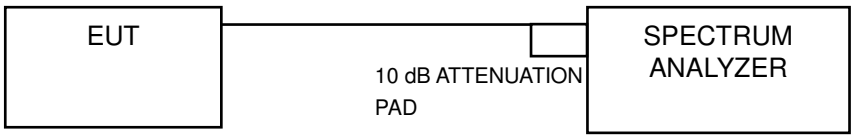
Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	174.18	22.41	30	Pass
6	2437	178.65	22.52	30	Pass
11	2462	**179.89**	**22.55**	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

a. Set analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set the VBW ≥ 3 × RBW.
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

802.11b

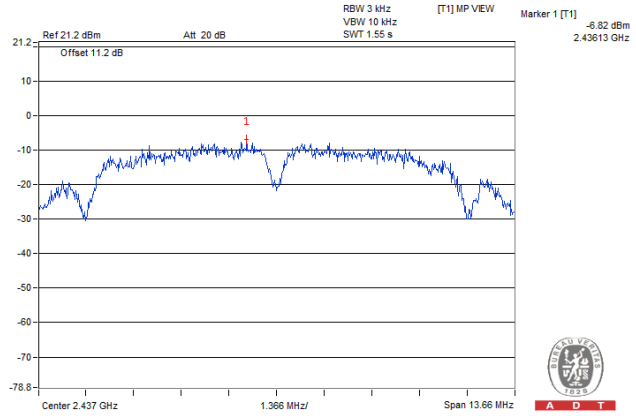
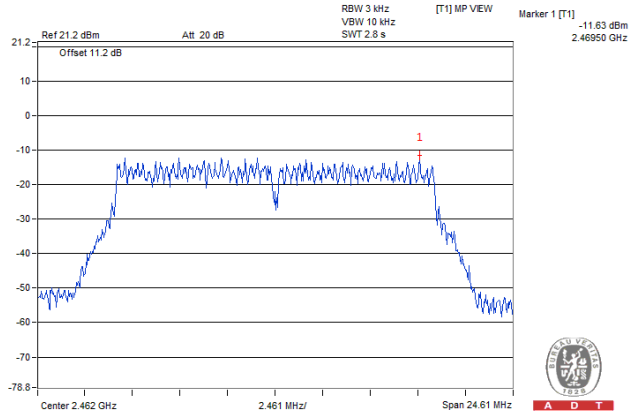
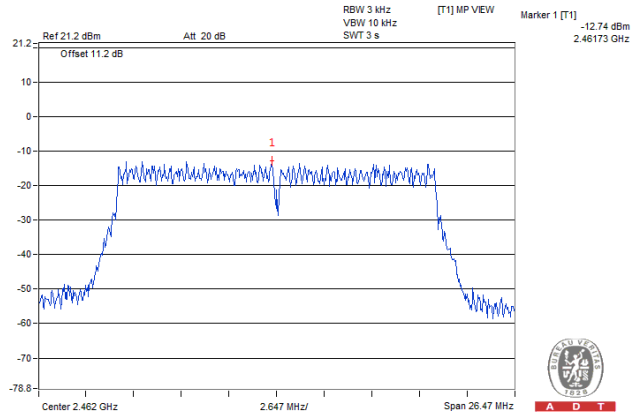
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-7.09	8	Pass
6	2437	-6.82	8	Pass
11	2462	-7.63	8	Pass

802.11g

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-12.45	8	Pass
6	2437	-12.30	8	Pass
11	2462	-11.63	8	Pass

802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-13.62	8	Pass
6	2437	-12.89	8	Pass
11	2462	-12.74	8	Pass

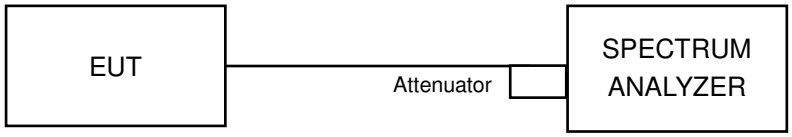
Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (HT20)	
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 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 OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 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.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

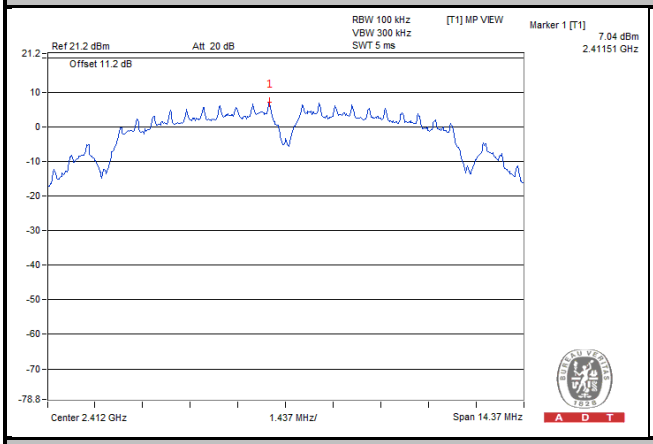
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

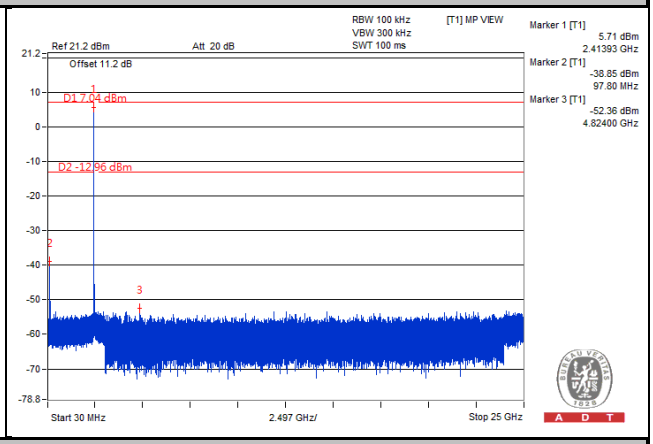
4.6.7 Test Results

The 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.

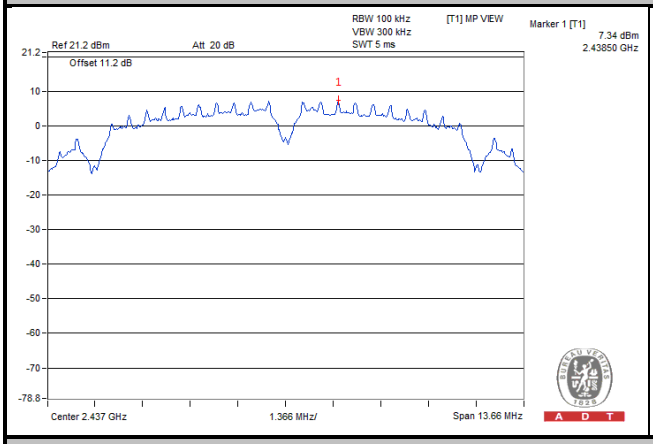
802.11b

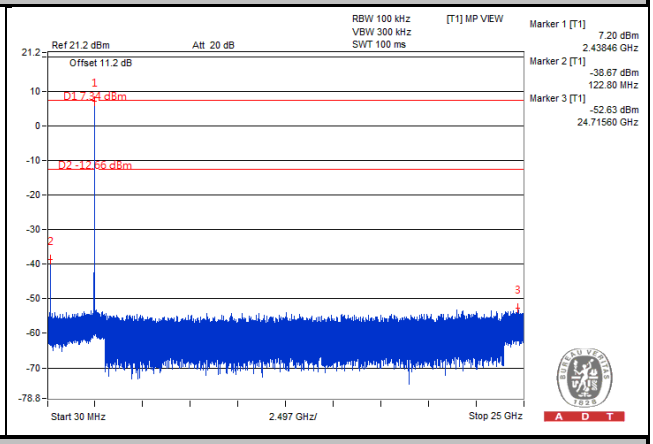
Ch 1



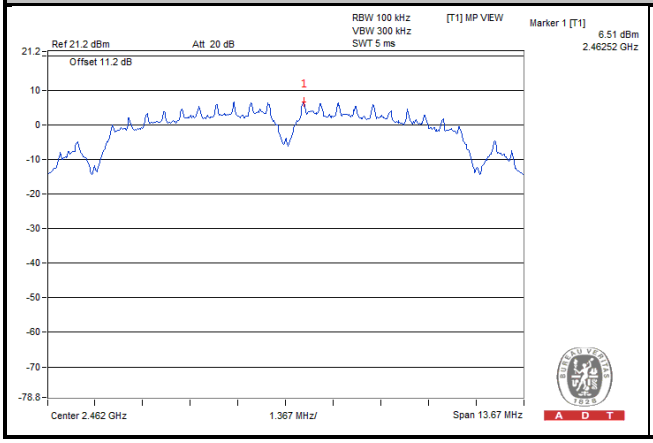


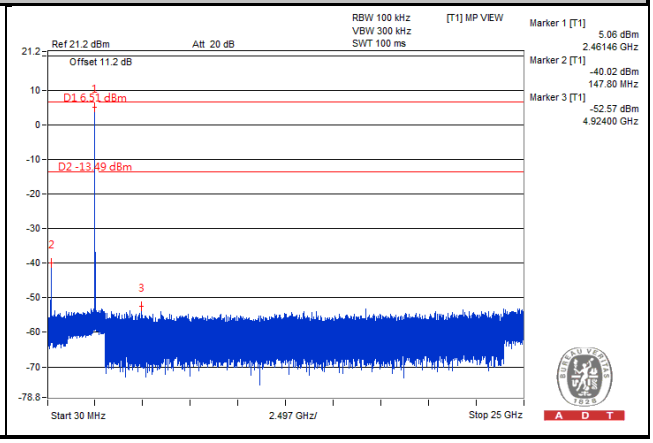
Ch 6

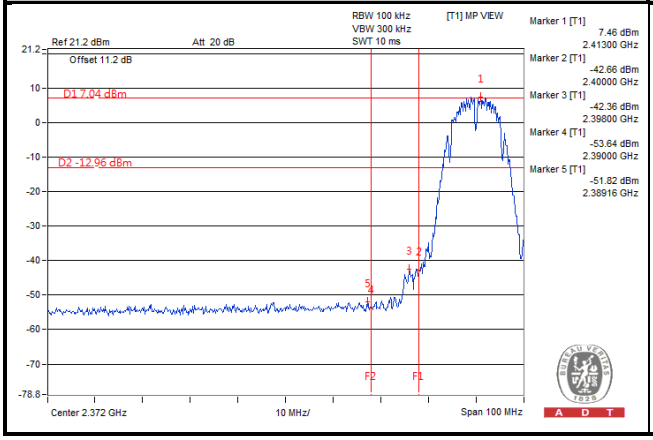
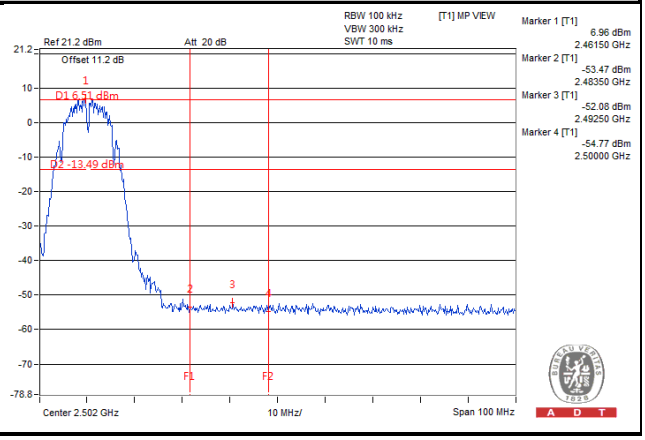




Ch 11

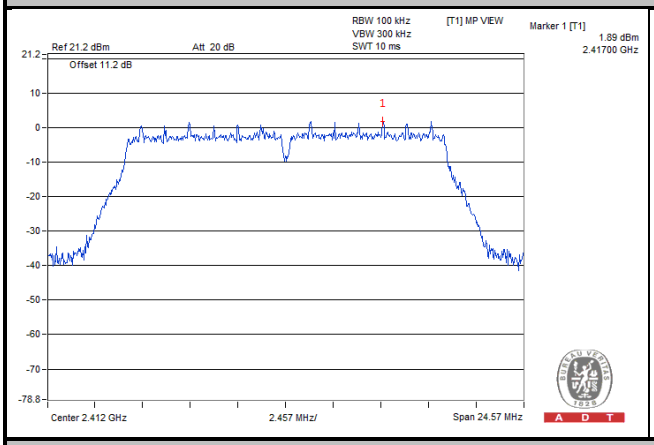


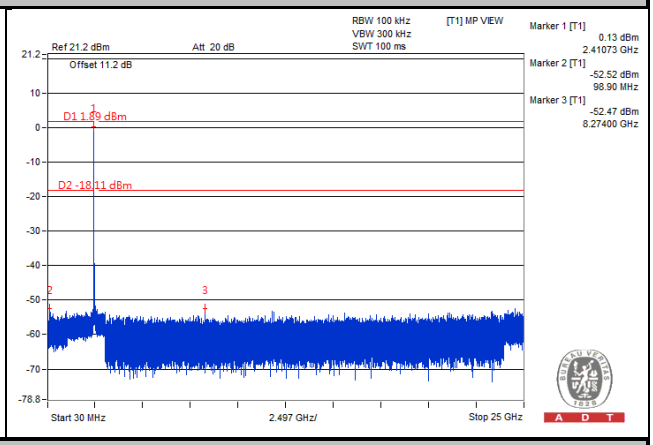


Ch 1 Band Edge	Ch 11 Band Edge
	

802.11g

Ch 1





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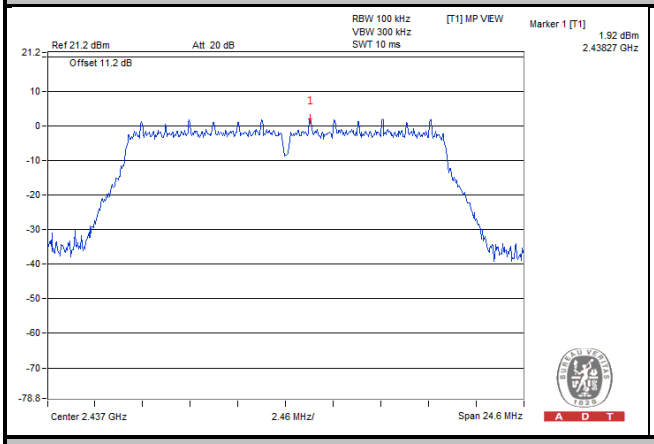
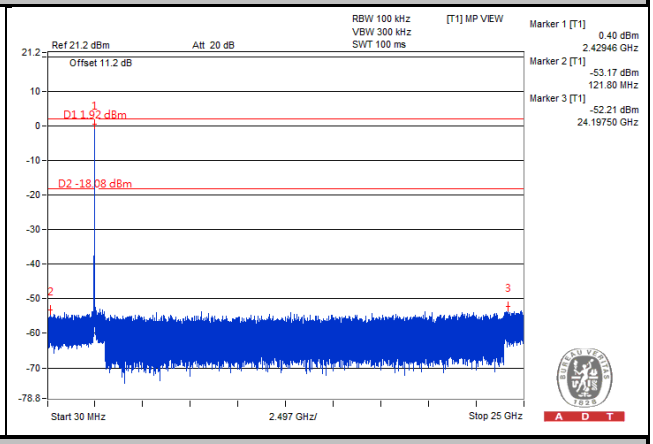
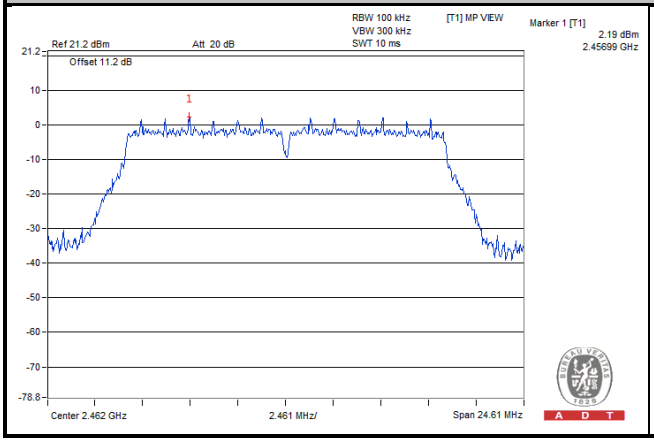
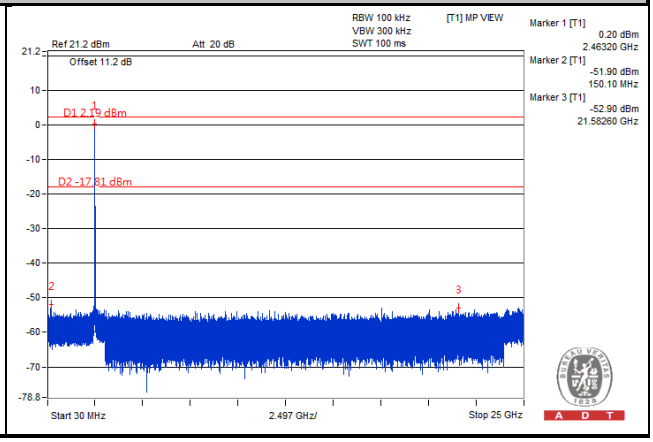
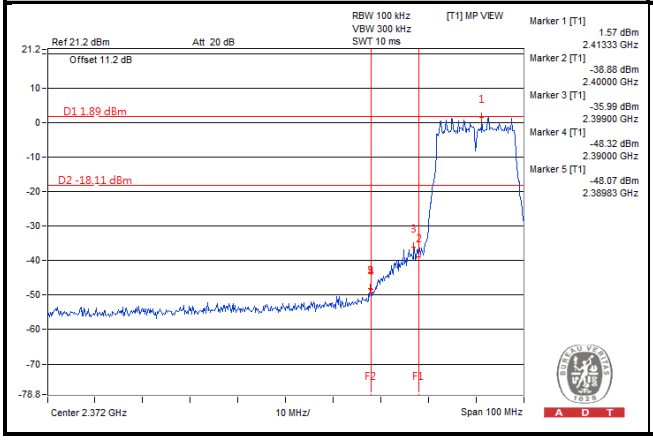
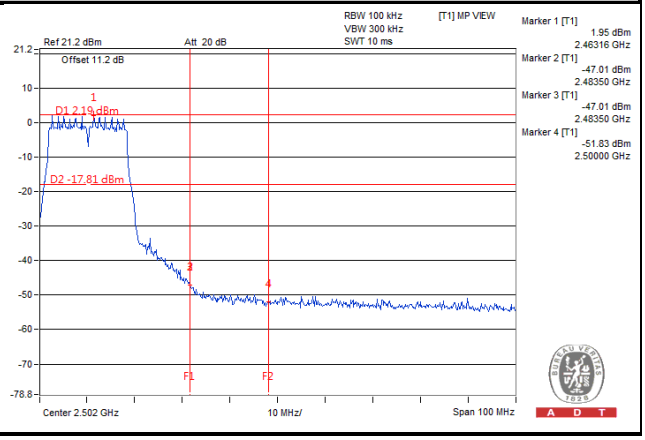




Ch 11

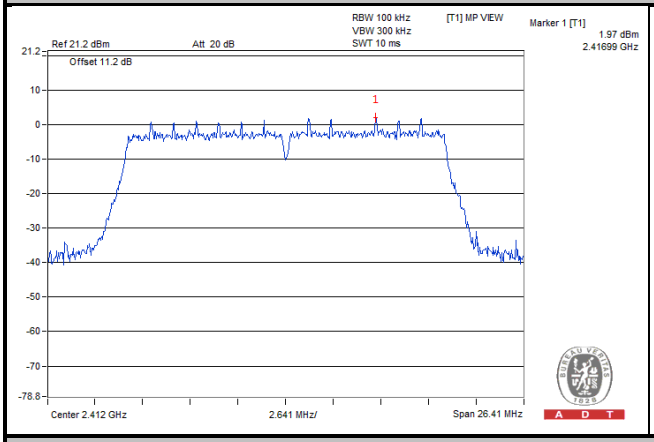


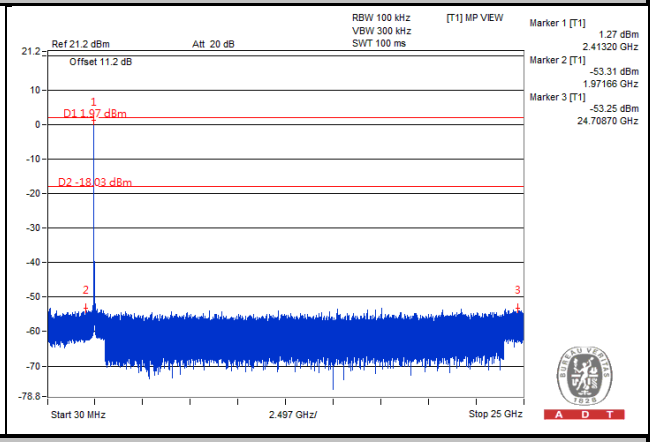


Ch 1 Band Edge	Ch 11 Band Edge
	

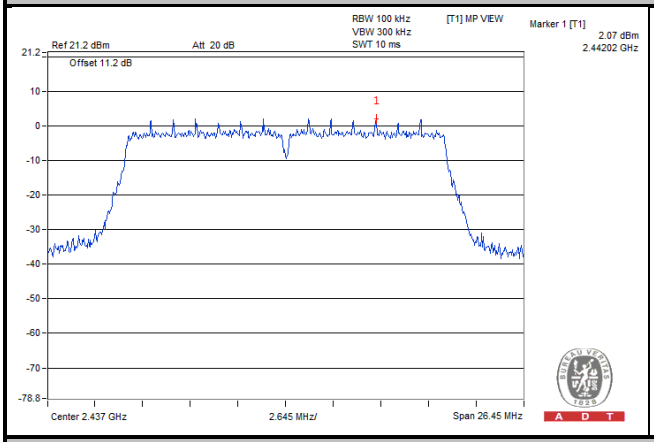
802.11n (HT20)

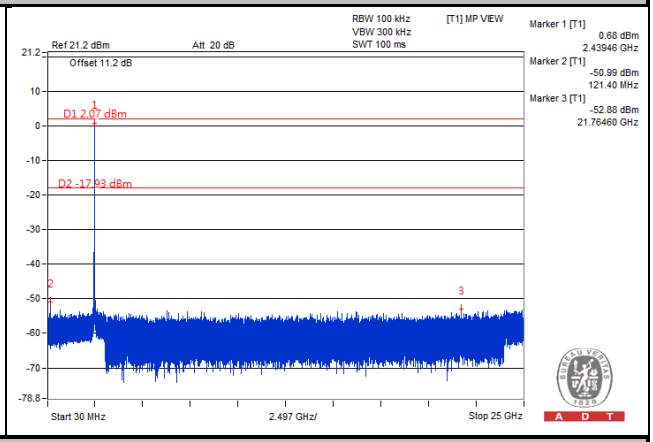
Ch 1



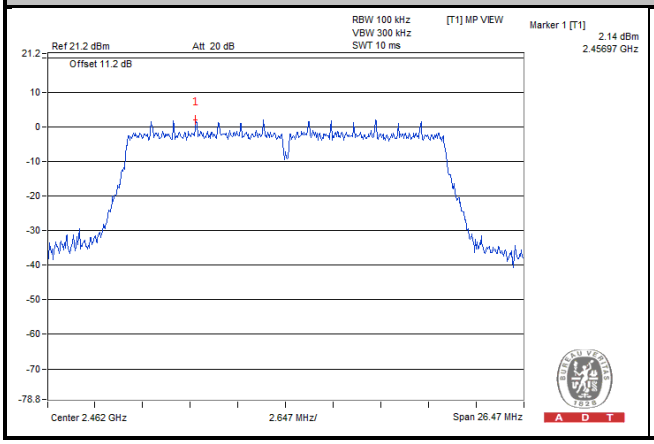


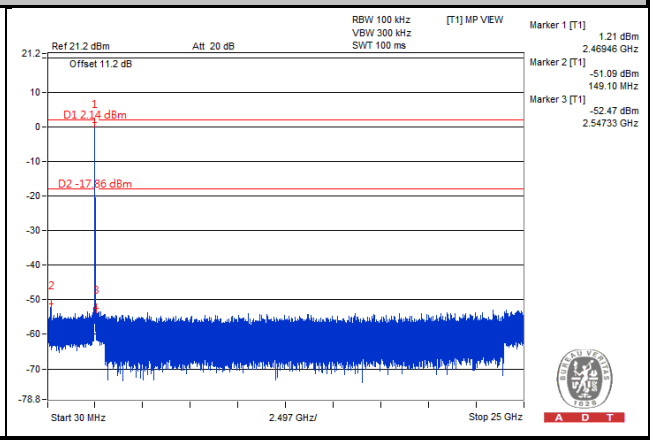
Ch 6

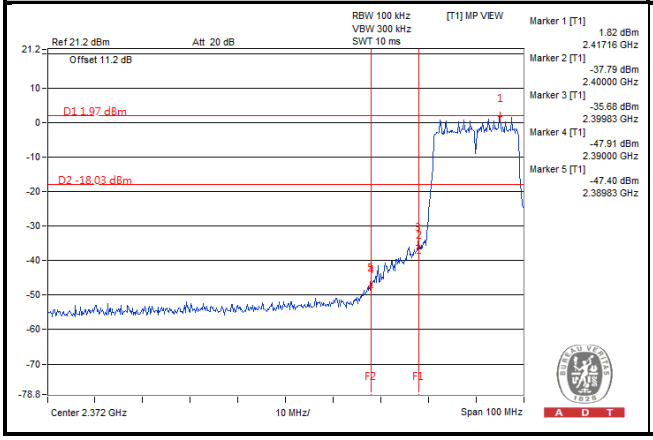
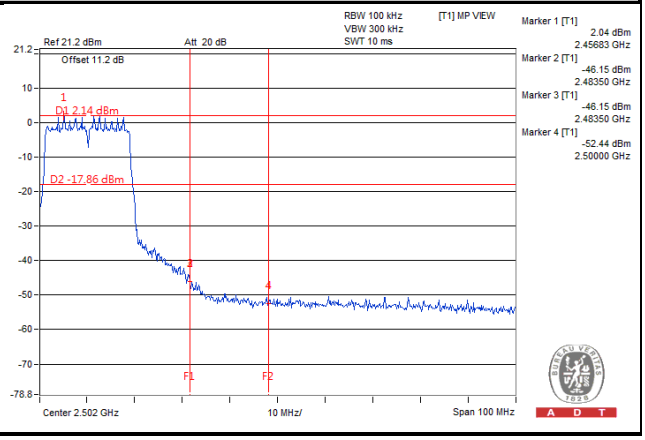




Ch 11





Ch 1 Band Edge	Ch 11 Band Edge
	

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
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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