FCC Test Report

Report No.:	RF150402D08
FCC ID:	YLI-HSNHI2
Test Model:	NHI-85X
Received Date:	Apr. 2, 2015
Test Date:	May 4 ~ 7, 2015
Issued Date:	May 11, 2015
Applicant:	H.S. CRAFT MANUFACTURING CO.
Address:	9F, NO. 35, GUANG FU N. ROAD, TAIPEI, 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.)

Testing Laboratory
2021

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 8
3.2.1 Test Mode Applicability and Tested Channel Detail 9
3.3 Duty Cycle of Test Signal 11
3.4 Description of Support Units 12
3.4.1 Configuration of System under Test 12
3.5 General Description of Applied Standards 13

4 Test Types and Results 14

4.1 Radiated Emission and Bandedge Measurement 14
4.1.1 Limits of Radiated Emission and Bandedge Measurement 14
4.1.2 Test Instruments 15
4.1.3 Test Procedures 16
4.1.4 Deviation from Test Standard 16
4.1.5 Test Set Up 17
4.1.6 EUT Operating Conditions 17
4.1.7 Test Results 18
4.2 Conducted Emission Measurement 31
4.2.1 Limits of Conducted Emission Measurement 31
4.2.2 Test Instruments 31
4.2.3 Test Procedures 32
4.2.4 Deviation from Test Standard 32
4.2.5 Test Setup 32
4.2.6 EUT Operating Conditions 32
4.2.7 Test Results 33
4.3 6dB Bandwidth Measurement 35
4.3.1 Limits of 6dB Bandwidth Measurement 35
4.3.2 Test Setup 35
4.3.3 Test Instruments 35
4.3.4 Test Procedure 35
4.3.5 Deviation fromTest Standard 35
4.3.6 EUT Operating Conditions 35
4.3.7 Test Result 36
4.4 Conducted Output Power Measurement 38
4.4.1 Limits of Conducted Output Power Measurement 38
4.4.2 Test Setup 38
4.4.3 Test Instruments 38
4.4.4 Test Procedures 38
4.4.5 Deviation from Test Standard 38
4.4.6 EUT Operating Conditions 38
4.4.7 Test Results 39
4.5 Power Spectral Density Measurement 41
4.5.1 Limits of Power Spectral Density Measurement 41
4.5.2 Test Setup 41
4.5.3 Test Instruments 41
4.5.4 Test Procedure 41

4.5.5 Deviation from Test Standard 41
4.5.6 EUT Operating Condition 41
4.5.7 Test Results 42
4.6 Conducted Out of Band Emission Measurement 44
4.6.1 Limits of Conducted Out of Band Emission Measurement 44
4.6.2 Test Setup 44
4.6.3 Test Instruments 44
4.6.4 Test Procedure 44
4.6.5 Deviation from Test Standard 44
4.6.6 EUT Operating Condition 44
4.6.7 Test Results 44
5 Pictures of Test Arrangements 49
Appendix – Information on the Testing Laboratories 50

Release Control Record

Issue No.	Description	Date Issued
RF150402D08	Original release.	May 11, 2015

1 Certificate of Conformity

Product:	iTwinkle Wifi Module
Brand:	GE
Test Model:	NHI-85X
Sample Status:	Mass-Production
Applicant:	H.S. CRAFT MANUFACTURING CO.
Test Date:	May 4 ~ 7, 2015
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2009

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 : Annie Chang , **Date:** May 11, 2015

Annie Chang / Supervisor

Approved by : Rex. Lai , **Date:** May 11, 2015

Rex Lai / Assistant Manage

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 -7.15dB at 0.38438MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.1dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB 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 as specified in CISPR 16-4-2:

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.43 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	4.00 dB
Radiated Emissions above 1 GHz	1GHz ~ 40GHz	3.36 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	iTwinkle Wifi Module
Brand	GE
Test Model	NHI-85X
Status of EUT	Mass-Production
Power Supply Rating	5Vdc
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b:11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 115Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
Output Power	73.114mW
Antenna Type	PCB antenna with -10.24dBi gain
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

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

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

7 channels are provided for 802.11n (HT40):

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

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 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

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 1GHz):

☒ 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
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
-	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 1GHz):

☒ 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)
-	802.11g	1 to 11	11	OFDM	BPSK	6

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)
-	802.11g	1 to 11	11	OFDM	BPSK	6

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
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
-	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:

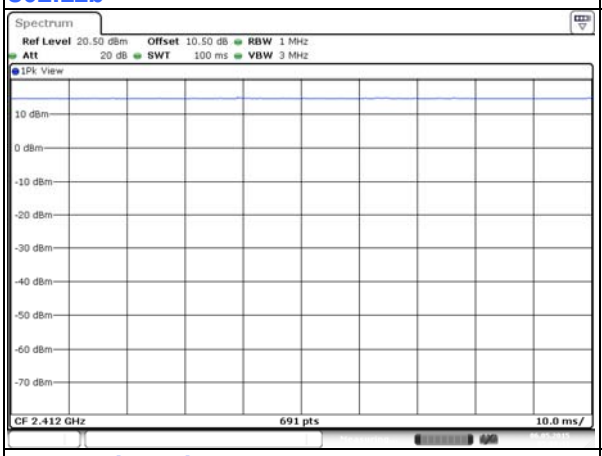
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	22deg. C, 76%RH	120Vac, 60Hz	Aaron You
RE<1G	22deg. C, 76%RH	120Vac, 60Hz	Aaron You
PLC	26deg. C, 70%RH	120Vac, 60Hz	Aaron You
APCM	25deg. C, 60%RH	120Vac, 60Hz	Saxon Lee

3.3 Duty Cycle of Test Signal

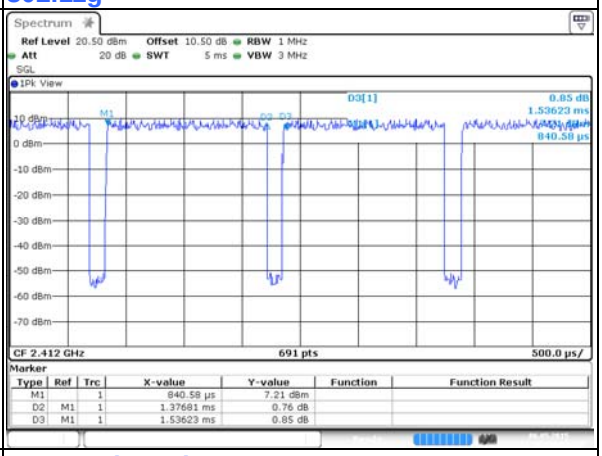
If duty cycle of test signal is ≥ 98 %, duty factor is not required.

802.11b: Duty cycle of test signal is 100 %, duty factor is not required.
802.11g: Duty cycle = 1.376/1.536 = 0.896, Duty factor = 10 * log(1/0.896) = 0.48
802.11n (HT20): Duty cycle = 1.289/1.463 = 0.881, Duty factor = 10 * log(1/0.881) = 0.55
802.11n (HT40): Duty cycle = 0.605/0.791 = 0.765, Duty factor = 10 * log(1/0.765) = 1.16

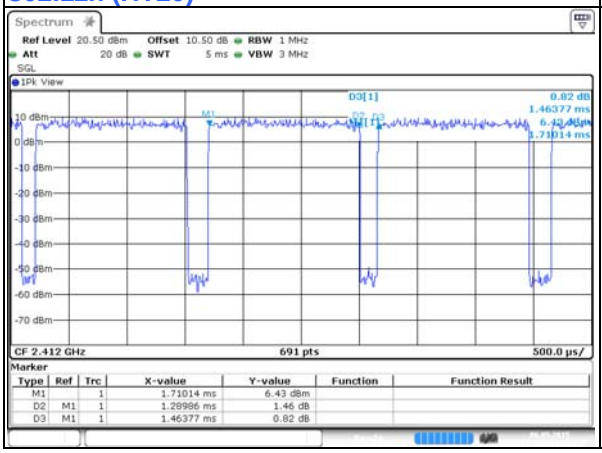
802.11b



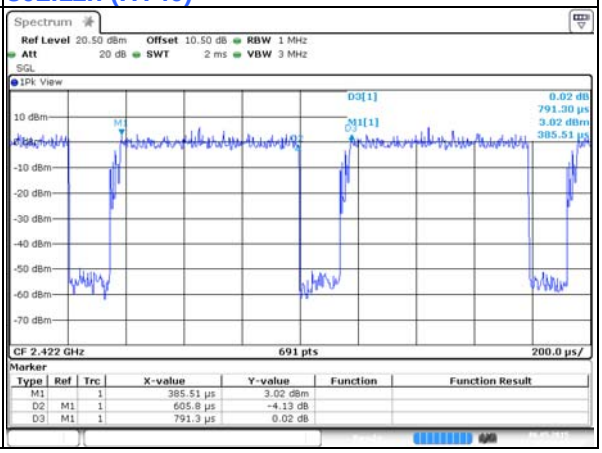
802.11g



802.11n (HT20)



802.11n (HT40)



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.

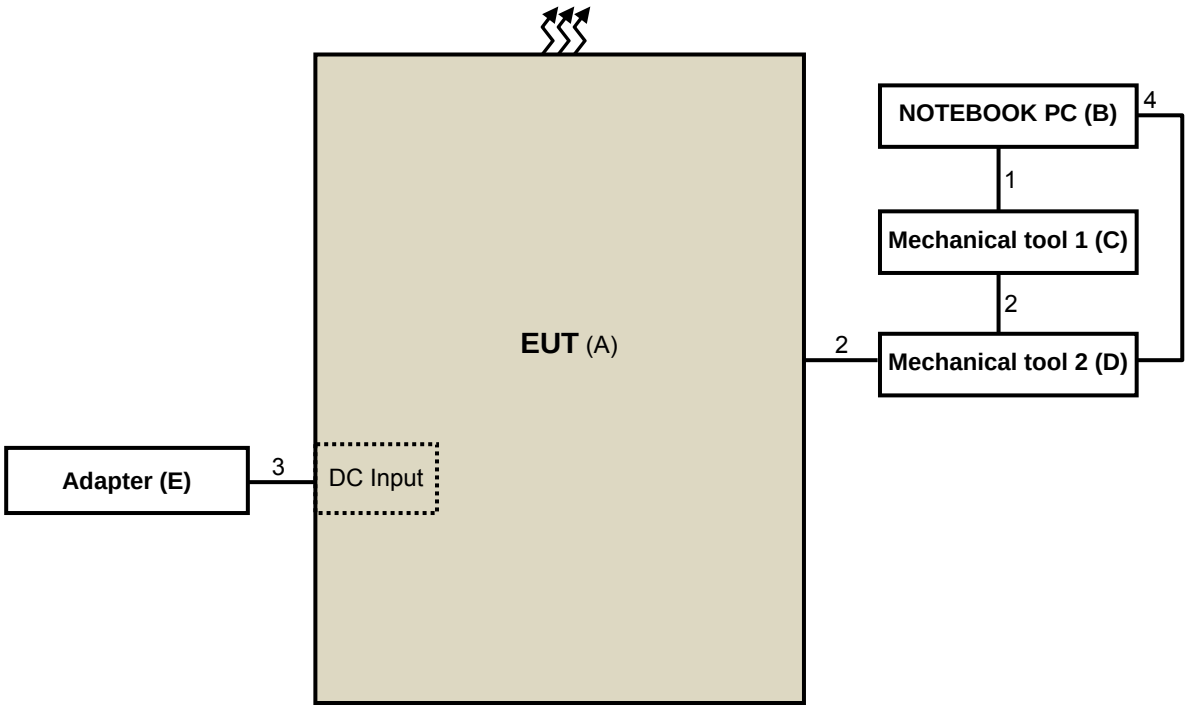
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	EUT	GE	NHI-85X	-	-	-
B.	Notebook PC	DELL	E5410	BW33YM1	FCC DoC Approved	Provided by Lab
C.	Mechanical tool 1	N/A	N/A	N/A	N/A	Supplied by client
D.	Mechanical tool 2	N/A	N/A	N/A	N/A	Supplied by client
E.	Adapter	TDC	SA3A-050-3000	N/A	N/A	Supplied by client

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	0.3	Y	0	Provided by Lab
2.	Data cable	2	0.2	Y	0	Supplied by client
3.	DC cable	1	0.2	N	0	Supplied by client
4.	LAN cable	1	1.5	N	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s).

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 v03r02
ANSI C63.10-2009

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 20dB 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 1000MHz, 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 20dB under any condition of modulation.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2015	Feb. 25, 2016
HP Preamplifier	8449B	3008A01201	Feb. 26, 2015	Feb. 25, 2016
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2015	Feb. 28, 2016
Agilent Spectrum	E4446A	MY51100050	Oct. 24, 2014	Oct. 23, 2015
Agilent TEST RECEIVER	N9038A	MY51210129	Jan. 20, 2015	Jan. 19, 2016
Schwarzbeck Antenna	VULB 9168	139	Feb. 04, 2015	Feb. 03, 2016
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2013	May 28, 2015
Schwarzbeck Horn Antenna	BBHA-9170	212	Feb. 09, 2015	Feb. 08, 2016
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Feb. 10, 2015	Feb. 09, 2016
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V7.6.15.9.4	NA	NA	NA
SUHNER RF cable	SF104	CABLE-CH6	Aug. 15, 2014	Aug. 14, 2015
SUHNER RF cable	SF102	Cable-CH8-3.6m	Aug. 15, 2014	Aug. 14, 2015
EMCO Horn Antenna	3115	00028257	Feb. 05, 2015	Feb. 04, 2016
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 29, 2014	Sep. 28, 2015
Anritsu Power Sensor	MA2411B	0738404	Apr. 21, 2015	Apr. 20, 2016
Anritsu Power Meter	ML2495A	0842014	Apr. 21, 2015	Apr. 20, 2016

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters 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 detect 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:

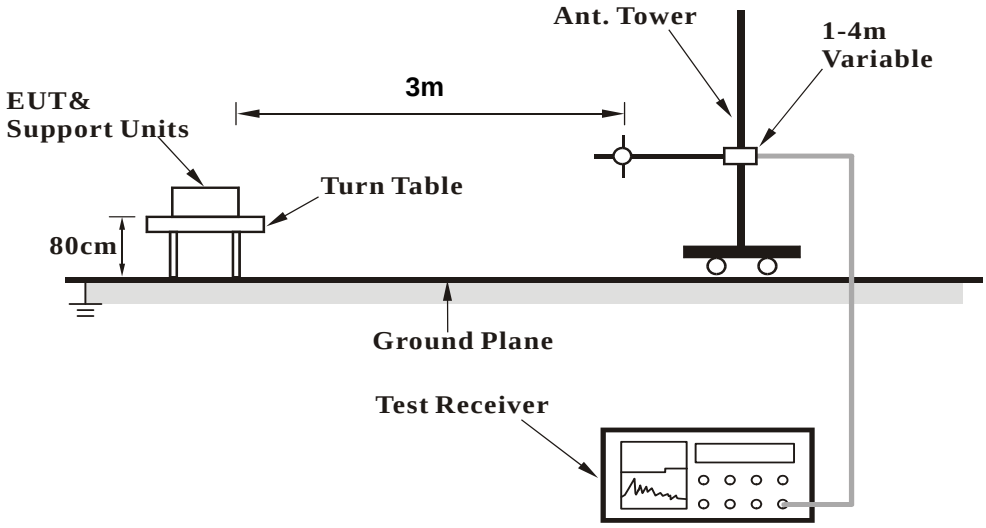
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

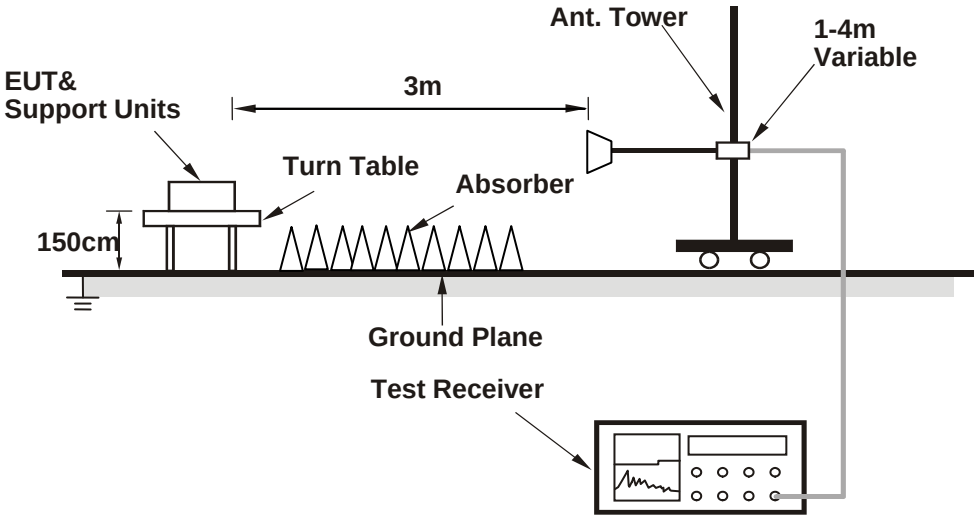
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

a. Plugged the EUT into notebook via two Mechanical tools and placed them on the testing table.
b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
c. The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz Data：

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.5 PK	74.0	-18.5	1.02 H	308	59.80	-4.34
2	2390.00	45.0 AV	54.0	-9.0	1.02 H	308	49.33	-4.34
3	*2412.00	96.6 PK			1.02 H	308	100.77	-4.21
4	*2412.00	93.4 AV			1.02 H	308	97.64	-4.21
5	4824.00	52.2 PK	74.0	-21.8	1.44 H	52	49.28	2.95
6	4824.00	44.7 AV	54.0	-9.3	1.44 H	52	41.77	2.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.2 PK	74.0	-14.9	2.43 V	100	63.49	-4.34
2	2390.00	51.7 AV	54.0	-2.3	2.43 V	100	56.01	-4.34
3	*2412.00	102.2 PK			2.43 V	100	106.38	-4.21
4	*2412.00	99.6 AV			2.43 V	100	103.80	-4.21
5	4824.00	50.2 PK	74.0	-23.8	1.10 V	208	47.26	2.95
6	4824.00	42.1 AV	54.0	-11.9	1.10 V	208	39.15	2.95

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	98.4 PK			1.01 H	305	102.53	-4.09
2	*2437.00	95.9 AV			1.01 H	305	99.95	-4.09
3	2483.50	57.2 PK	74.0	-16.8	1.01 H	305	61.03	-3.85
4	2483.50	49.1 AV	54.0	-5.0	1.01 H	305	52.90	-3.85
5	4874.00	51.0 PK	74.0	-23.0	1.39 H	25	47.93	3.06
6	4874.00	42.3 AV	54.0	-11.7	1.39 H	25	39.22	3.06
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.8 PK			2.63 V	100	107.88	-4.09
2	*2437.00	100.6 AV			2.63 V	100	104.70	-4.09
3	2483.50	59.7 PK	74.0	-14.3	2.63 V	100	63.53	-3.85
4	**2483.50**	**52.9 AV**	**54.0**	**-1.1**	**2.63 V**	**100**	**56.79**	**-3.85**
5	4874.00	50.0 PK	74.0	-24.1	1.00 V	227	46.89	3.06
6	4874.00	41.9 AV	54.0	-12.2	1.00 V	227	38.79	3.06

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	98.8 PK			1.18 H	307	102.79	-3.95
2	*2462.00	95.2 AV			1.18 H	307	99.19	-3.95
3	2483.50	57.0 PK	74.0	-17.0	1.18 H	307	60.89	-3.85
4	2483.50	46.7 AV	54.0	-7.3	1.18 H	307	50.58	-3.85
5	4924.00	52.3 PK	74.0	-21.7	1.52 H	47	49.10	3.21
6	4924.00	44.4 AV	54.0	-9.6	1.52 H	47	41.23	3.21
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.5 PK			2.11 V	104	108.40	-3.95
2	*2462.00	101.8 AV			2.11 V	104	105.75	-3.95
3	2483.50	61.2 PK	74.0	-12.8	2.11 V	104	65.04	-3.85
4	2483.50	52.7 AV	54.0	-1.3	2.11 V	104	56.58	-3.85
5	4924.00	50.4 PK	74.0	-23.6	1.00 V	265	47.22	3.21
6	4924.00	42.8 AV	54.0	-11.2	1.00 V	265	39.58	3.21

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.7 PK	74.0	-13.3	1.19 H	304	65.08	-4.34
2	2390.00	42.8 AV	54.0	-11.2	1.19 H	304	47.17	-4.34
3	*2412.00	96.2 PK			1.19 H	304	100.45	-4.21
4	*2412.00	93.0 AV			1.19 H	304	97.16	-4.21
5	4824.00	47.2 PK	74.0	-26.8	1.41 H	29	44.21	2.95
6	4824.00	39.5 AV	54.0	-14.5	1.41 H	29	36.58	2.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.3 PK	74.0	-6.7	2.39 V	97	71.64	-4.34
2	2390.00	47.9 AV	54.0	-6.1	2.39 V	97	52.28	-4.34
3	*2412.00	100.4 PK			2.39 V	97	104.61	-4.21
4	*2412.00	96.8 AV			2.39 V	97	101.01	-4.21
5	4824.00	45.0 PK	74.0	-29.0	1.03 V	251	42.01	2.95
6	4824.00	37.1 AV	54.0	-16.9	1.03 V	251	34.12	2.95

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	98.9 PK			1.18 H	303	103.02	-4.09
2	*2437.00	96.0 AV			1.18 H	303	100.09	-4.09
3	4874.00	47.1 PK	74.0	-26.9	1.12 H	34	44.08	3.06
4	4874.00	39.2 AV	54.0	-14.8	1.12 H	34	36.17	3.06
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.9 PK			2.20 V	102	107.96	-4.09
2	*2437.00	100.3 AV			2.20 V	102	104.35	-4.09
3	4874.00	45.3 PK	74.0	-28.7	1.00 V	247	42.20	3.06
4	4874.00	37.3 AV	54.0	-16.7	1.00 V	247	34.25	3.06

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	98.3 PK			1.16 H	305	102.20	-3.95
2	*2462.00	95.3 AV			1.16 H	305	99.21	-3.95
3	2483.50	67.2 PK	74.0	-6.8	1.16 H	305	71.02	-3.85
4	2483.50	48.9 AV	54.0	-5.1	1.16 H	305	52.77	-3.85
5	4924.00	47.2 PK	74.0	-26.8	1.38 H	32	43.97	3.21
6	4924.00	38.8 AV	54.0	-15.2	1.38 H	32	35.55	3.21
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.7 PK			1.67 V	104	107.66	-3.95
2	*2462.00	100.7 AV			1.67 V	104	104.63	-3.95
3	2483.50	71.0 PK	74.0	-3.0	1.67 V	104	74.86	-3.85
4	2483.50	52.2 AV	54.0	-1.8	1.67 V	104	56.07	-3.85
5	4924.00	45.5 PK	74.0	-28.5	1.01 V	150	42.26	3.21
6	4924.00	37.2 AV	54.0	-16.8	1.01 V	150	34.01	3.21

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11n (20MHz)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.3 PK	74.0	-9.7	1.17 H	303	68.64	-4.34
2	2390.00	44.7 AV	54.0	-9.4	1.17 H	303	48.99	-4.34
3	*2412.00	96.1 PK			1.17 H	303	100.27	-4.21
4	*2412.00	92.9 AV			1.17 H	303	97.13	-4.21
5	4824.00	47.1 PK	74.0	-26.9	1.52 H	33	44.17	2.95
6	4824.00	39.0 AV	54.0	-15.0	1.52 H	33	36.08	2.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.1 PK	74.0	-1.9	2.31 V	101	76.42	-4.34
2	2390.00	51.5 AV	54.0	-2.5	2.31 V	101	55.82	-4.34
3	*2412.00	101.8 PK			2.31 V	101	106.04	-4.21
4	*2412.00	98.8 AV			2.31 V	101	103.04	-4.21
5	4824.00	45.5 PK	74.0	-28.5	1.00 V	149	42.58	2.95
6	4824.00	37.2 AV	54.0	-16.8	1.00 V	149	34.22	2.95

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	98.6 PK			1.18 H	307	102.65	-4.09
2	*2437.00	95.8 AV			1.18 H	307	99.87	-4.09
3	4924.00	47.3 PK	74.0	-26.7	1.55 H	40	44.10	3.21
4	4924.00	39.3 AV	54.0	-14.7	1.55 H	40	36.05	3.21
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.8 PK			1.44 V	105	107.87	-4.09
2	*2437.00	100.8 AV			1.44 V	105	104.86	-4.09
3	4874.00	45.0 PK	74.0	-29.1	1.38 V	27	41.89	3.06
4	4874.00	36.1 AV	54.0	-17.9	1.38 V	27	33.02	3.06

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	95.2 PK			1.00 H	308	99.10	-3.95
2	*2462.00	92.4 AV			1.00 H	308	96.33	-3.95
3	2483.50	65.6 PK	74.0	-8.4	1.00 H	308	69.45	-3.85
4	2483.50	42.6 AV	54.0	-11.4	1.00 H	308	46.46	-3.85
5	4924.00	45.4 PK	74.0	-28.6	1.25 H	30	42.19	3.21
6	4924.00	37.5 AV	54.0	-16.5	1.25 H	30	34.28	3.21
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	100.9 PK			1.58 V	106	104.84	-3.95
2	*2462.00	97.8 AV			1.58 V	106	101.77	-3.95
3	2483.50	72.5 PK	74.0	-1.5	1.58 V	106	76.35	-3.85
4	2483.50	46.4 AV	54.0	-7.6	1.58 V	106	50.26	-3.85
5	4924.00	45.0 PK	74.0	-29.0	1.45 V	224	41.79	3.21
6	4924.00	37.2 AV	54.0	-16.8	1.45 V	224	33.98	3.21

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11n (40MHz)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.0 PK	74.0	-11.1	1.17 H	305	67.29	-4.34
2	2390.00	46.6 AV	54.0	-7.4	1.17 H	305	50.90	-4.34
3	*2422.00	93.0 PK			1.17 H	305	97.20	-4.16
4	*2422.00	90.2 AV			1.17 H	305	94.40	-4.16
5	4844.00	46.8 PK	74.0	-27.2	1.39 H	36	43.77	2.99
6	4844.00	38.6 AV	54.0	-15.4	1.39 H	36	35.59	2.99
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	71.9 PK	74.0	-2.1	1.90 V	102	76.21	-4.34
2	2390.00	52.2 AV	54.0	-1.8	1.90 V	102	56.54	-4.34
3	*2422.00	99.5 PK			1.90 V	102	103.65	-4.16
4	*2422.00	96.4 AV			1.90 V	102	100.56	-4.16
5	4844.00	46.0 PK	74.0	-28.0	1.00 V	223	43.01	2.99
6	4844.00	38.3 AV	54.0	-15.7	1.00 V	223	35.28	2.99

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	96.4 PK			1.15 H	307	100.46	-4.09
2	*2437.00	93.0 AV			1.15 H	307	97.11	-4.09
3	2483.50	58.0 PK	74.0	-16.0	1.15 H	307	61.87	-3.85
4	2483.50	48.5 AV	54.0	-5.5	1.15 H	307	52.33	-3.85
5	4874.00	46.8 PK	74.0	-27.2	1.44 H	39	43.76	3.06
6	4874.00	38.1 AV	54.0	-15.9	1.44 H	39	35.07	3.06
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.7 PK			2.33 V	104	105.75	-4.09
2	*2437.00	98.4 AV			2.33 V	104	102.47	-4.09
3	2483.50	68.7 PK	74.0	-5.3	2.33 V	104	72.58	-3.85
4	**2483.50**	**52.9 AV**	**54.0**	**-1.1**	**2.33 V**	**104**	**56.77**	**-3.85**
5	4874.00	45.7 PK	74.0	-28.3	1.01 V	243	42.60	3.06
6	4874.00	37.9 AV	54.0	-16.1	1.01 V	243	34.85	3.06

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	94.5 PK			1.16 H	304	98.49	-4.01
2	*2452.00	91.7 AV			1.16 H	304	95.69	-4.01
3	2483.50	68.4 PK	74.0	-5.6	1.16 H	304	72.21	-3.85
4	2483.50	50.4 AV	54.0	-3.6	1.16 H	304	54.26	-3.85
5	4904.00	47.2 PK	74.0	-26.8	1.37 H	54	44.09	3.14
6	4904.00	39.4 AV	54.0	-14.6	1.37 H	54	36.30	3.14
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	99.9 PK			2.17 V	102	103.89	-4.01
2	*2452.00	96.9 AV			2.17 V	102	100.89	-4.01
3	2483.50	72.7 PK	74.0	-1.3	2.17 V	102	76.53	-3.85
4	2483.50	52.6 AV	54.0	-1.4	2.17 V	102	56.48	-3.85
5	4904.00	45.5 PK	74.0	-28.5	1.05 V	262	42.34	3.14
6	4904.00	37.3 AV	54.0	-16.7	1.05 V	262	34.15	3.14

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

Below 1GHz Data:

802.11g

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	86.07	33.2 QP	40.0	-6.8	4.00 H	54	52.37	-19.14
2	125.01	37.3 QP	43.5	-6.2	4.00 H	126	53.06	-15.72
3	148.15	36.7 QP	43.5	-6.8	4.00 H	76	50.43	-13.70
4	250.00	38.0 QP	46.0	-8.0	2.49 H	192	52.30	-14.29
5	625.00	37.7 QP	46.0	-8.3	1.63 H	218	43.66	-5.95
6	899.22	39.6 QP	46.0	-6.4	1.00 H	133	41.31	-1.72
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.68	32.3 QP	40.0	-7.7	1.33 V	1	47.87	-15.58
2	94.41	37.1 QP	43.5	-6.4	1.02 V	251	56.15	-19.02
3	125.01	37.3 QP	43.5	-6.2	1.00 V	239	53.01	-15.72
4	148.15	36.8 QP	43.5	-6.7	1.00 V	163	50.51	-13.70
5	250.04	35.4 QP	46.0	-10.6	2.44 V	196	49.65	-14.29
6	500.01	33.2 QP	46.0	-12.8	2.43 V	355	41.70	-8.49
7	625.08	33.7 QP	46.0	-12.3	2.27 V	275	39.68	-5.94
8	919.59	30.3 QP	46.0	-15.7	1.59 V	173	31.49	-1.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. 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 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100292	Dec. 18, 2014	Dec. 17, 2015
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 04, 2014	Dec. 03, 2015
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 04, 2014	Dec. 03, 2015
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Oct. 21, 2014	Oct. 20, 2015
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 08, 2014	May 07, 2015
Software	ADT_Cond_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C09.01	Feb. 24, 2015	Feb. 23, 2016
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 20, 2014	May 19, 2015
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 20, 2014	Nov. 19, 2015
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 20, 2014	Nov. 19, 2015

Notes: 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 Shielded Room No. 9.
3. The VCCI Site Registration No. C-1312.

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/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

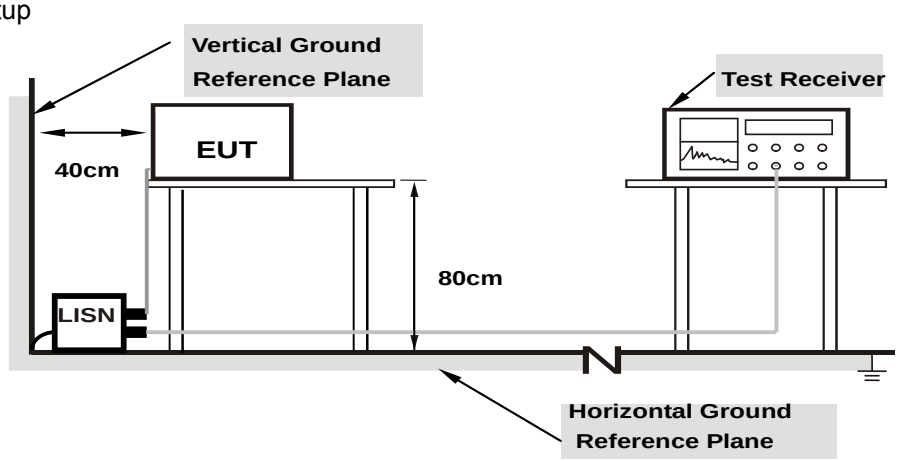
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

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

Same as 4.1.6.

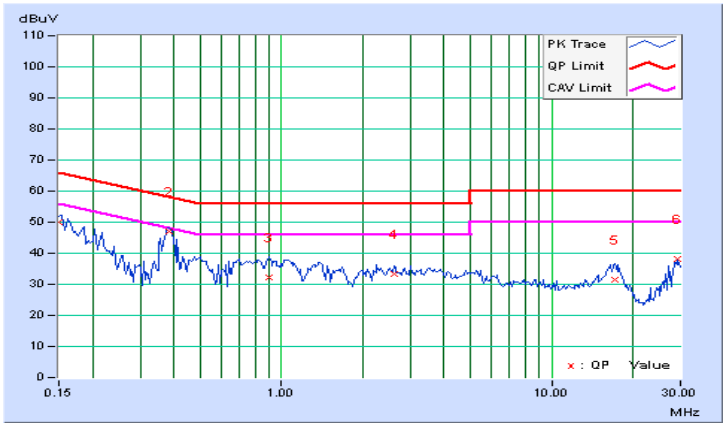
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.21	49.79	29.53	50.00	29.74	66.00	56.00	-16.00	-26.26
2	0.38438	0.27	46.61	40.03	46.88	40.30	58.18	48.18	-11.31	-7.89
3	0.89609	0.35	31.82	23.47	32.17	23.82	56.00	46.00	-23.83	-22.18
4	2.60938	0.49	32.74	26.01	33.23	26.50	56.00	46.00	-22.77	-19.50
5	17.14063	1.04	30.41	24.16	31.45	25.20	60.00	50.00	-28.55	-24.80
6	29.23438	1.13	37.04	34.17	38.17	35.30	60.00	50.00	-21.83	-14.70

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.

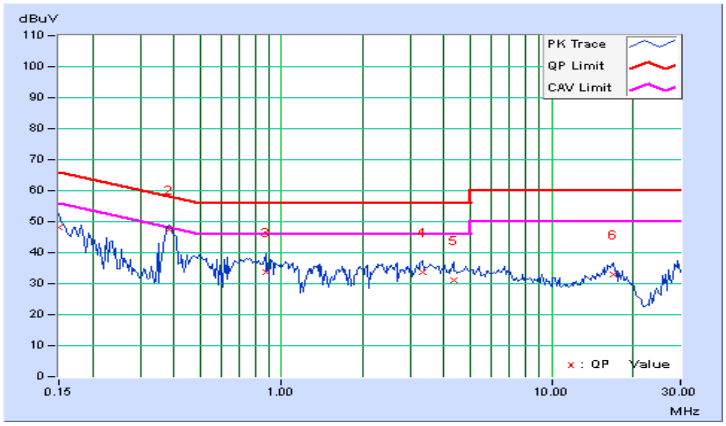


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.21	48.01	31.89	48.22	32.10	66.00	56.00	-17.78	-23.90
2	**0.38438**	**0.28**	**47.20**	**40.76**	**47.48**	**41.04**	**58.18**	**48.18**	**-10.71**	**-7.15**
3	0.87266	0.36	33.39	24.34	33.75	24.70	56.00	46.00	-22.25	-21.30
4	3.31250	0.54	33.14	24.66	33.68	25.20	56.00	46.00	-22.32	-20.80
5	4.32422	0.58	30.65	23.27	31.23	23.85	56.00	46.00	-24.77	-22.15
6	16.83984	0.89	32.10	26.61	32.99	27.50	60.00	50.00	-27.01	-22.50

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.

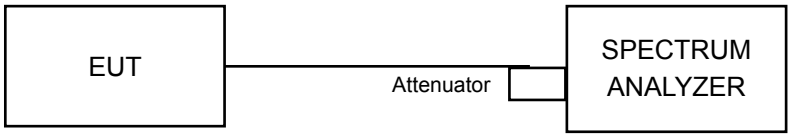


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB 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) = 100kHz
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)	6db Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.09	0.5	PASS
6	2437	10.10	0.5	PASS
11	2462	10.06	0.5	PASS

802.11g

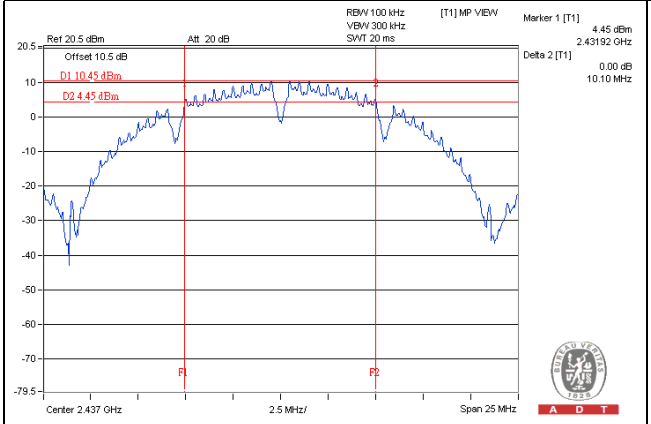
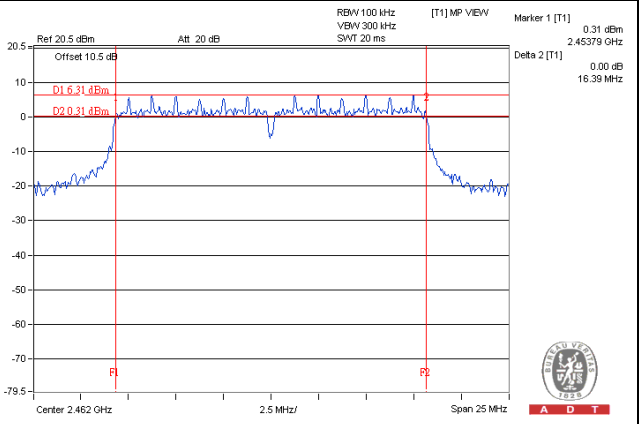
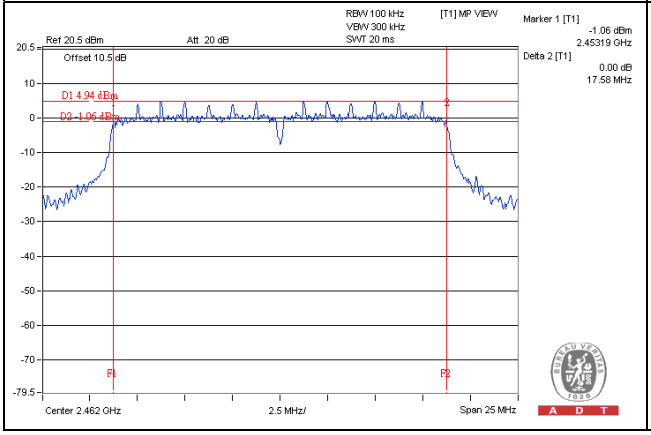
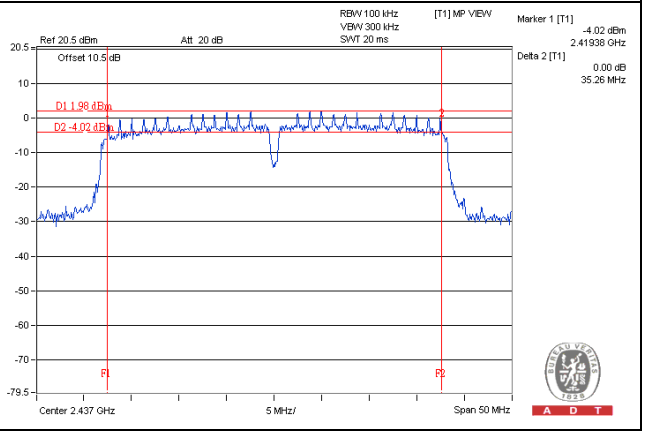
Channel	Frequency (MHz)	6db Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.37	0.5	PASS
6	2437	16.37	0.5	PASS
11	2462	16.39	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6db Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.37	0.5	Pass
6	2437	17.36	0.5	Pass
11	2462	17.58	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6db Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.25	0.5	Pass
6	2437	35.26	0.5	Pass
9	2452	35.26	0.5	Pass

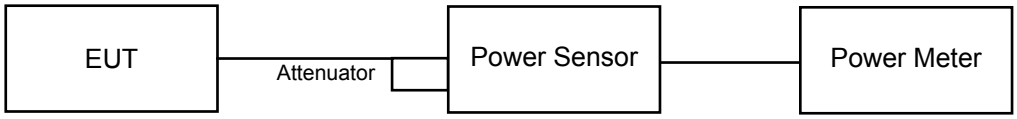
Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (HT20)	**802.11n (HT40)**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	63.533	18.03	30	Pass
6	2437	65.917	18.19	30	Pass
11	2462	64.269	18.08	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	66.988	18.26	30	Pass
6	2437	70.958	18.51	30	Pass
11	2462	**73.114**	18.64	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	68.391	18.35	30	Pass
6	2437	67.920	18.32	30	Pass
11	2462	67.298	18.28	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	64.565	18.10	30	Pass
6	2437	70.632	18.49	30	Pass
9	2452	68.549	18.36	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	46.559	16.68
6	2437	49.091	16.91
11	2462	42.954	16.33

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	21.232	13.27
6	2437	24.210	13.84
11	2462	25.645	14.09

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	20.606	13.14
6	2437	23.335	13.68
11	2462	21.380	13.30

802.11n (HT40)

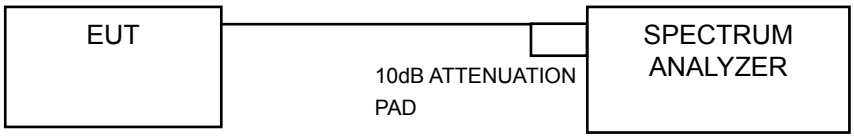
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	20.137	13.04
6	2437	21.478	13.32
9	2452	19.815	12.97

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

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

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	4.45	8	Pass
6	2437	4.82	8	Pass
11	2462	3.92	8	Pass

802.11g

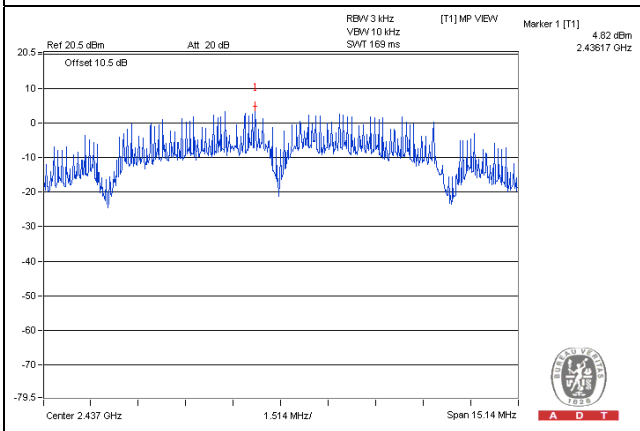
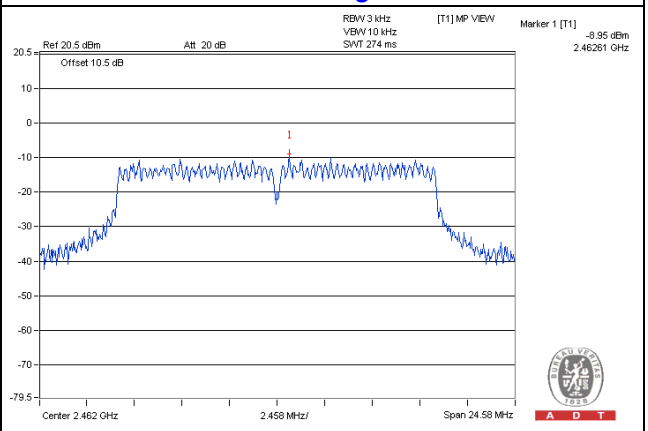
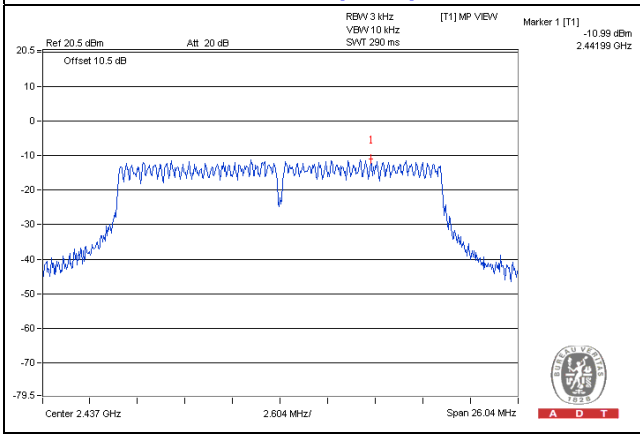
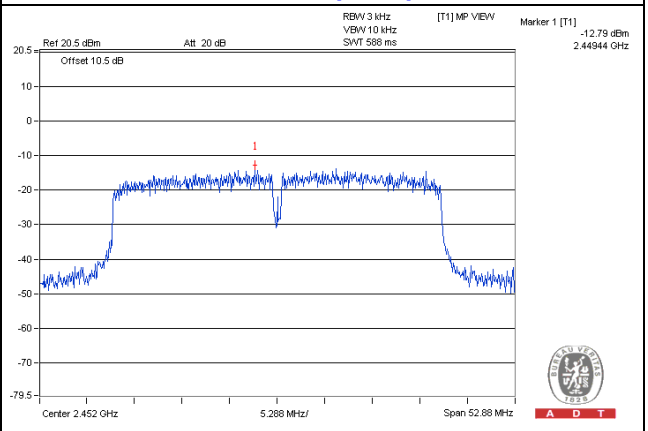
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-9.92	8	Pass
6	2437	-10.01	8	Pass
11	2462	-8.95	8	Pass

802.11n (HT20)

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-11.65	8	Pass
6	2437	-10.99	8	Pass
11	2462	-11.33	8	Pass

802.11n (HT40)

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	PASS /FAIL
3	2422	-13.71	8	PASS
6	2437	-13.15	8	PASS
9	2452	-12.79	8	PASS

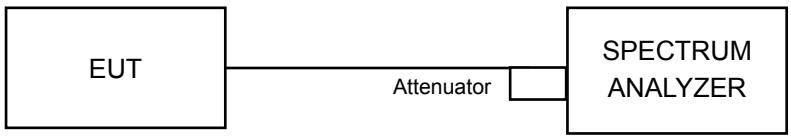
Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (HT20)	**802.11n (HT40)**
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB of the highest emission level of operating band (in 100kHz 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

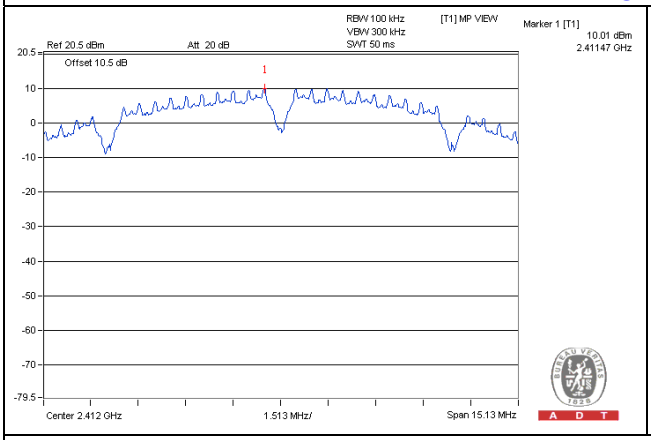
Same as Item 4.3.6

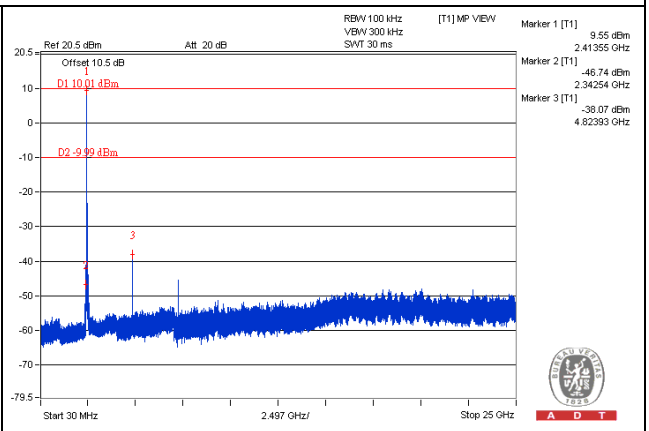
4.6.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

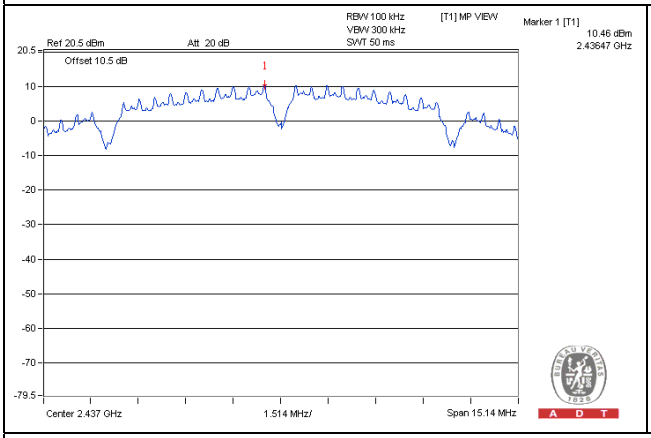
802.11b

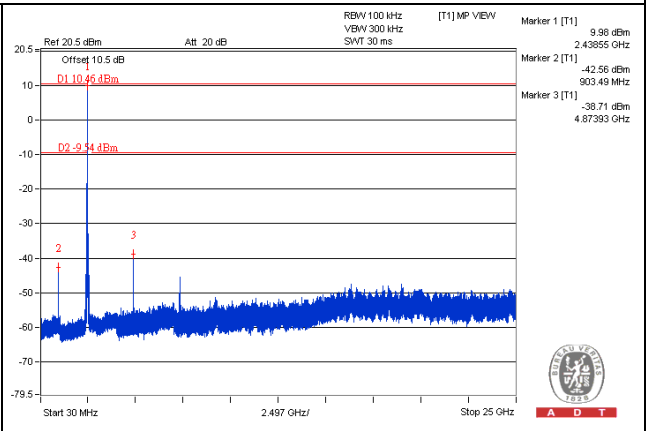
CH 1



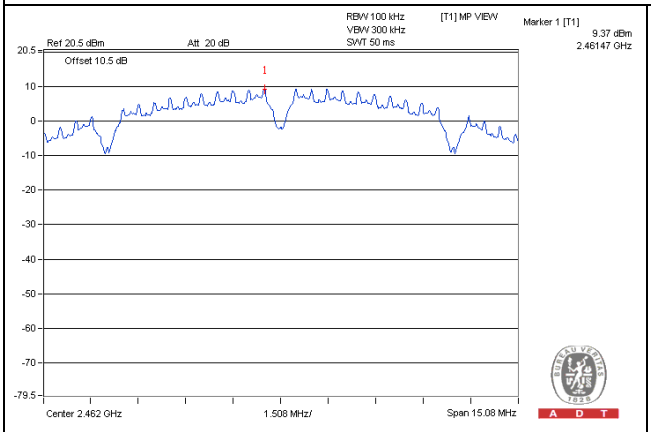


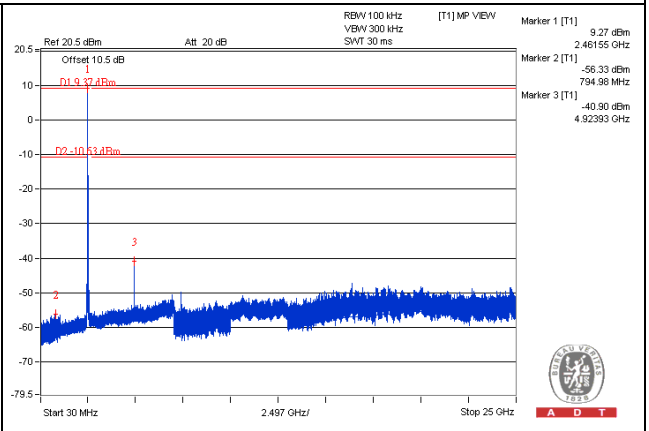
CH 6



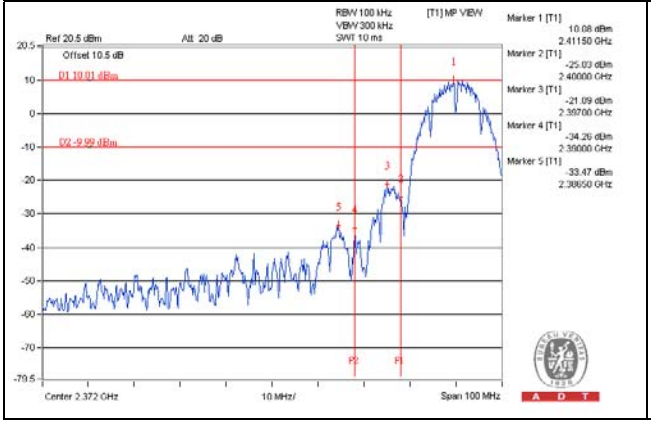


CH 11

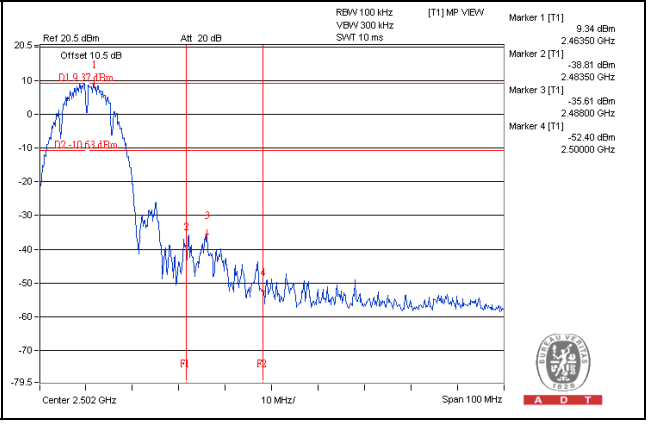




CH 1 Band edge

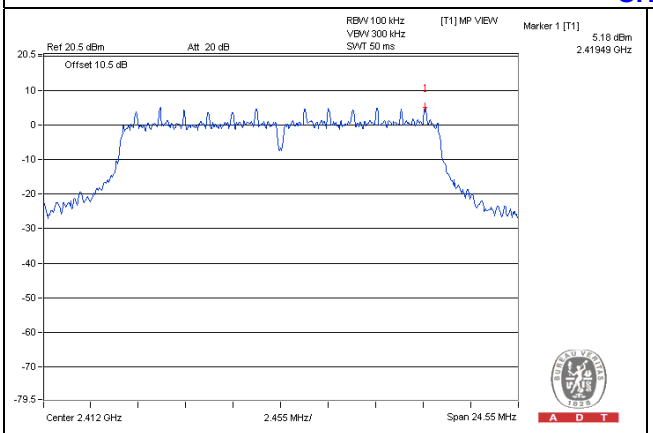


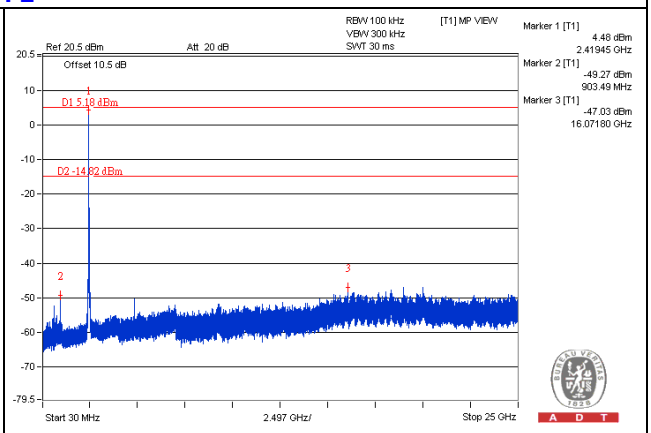
CH 11 Band edge



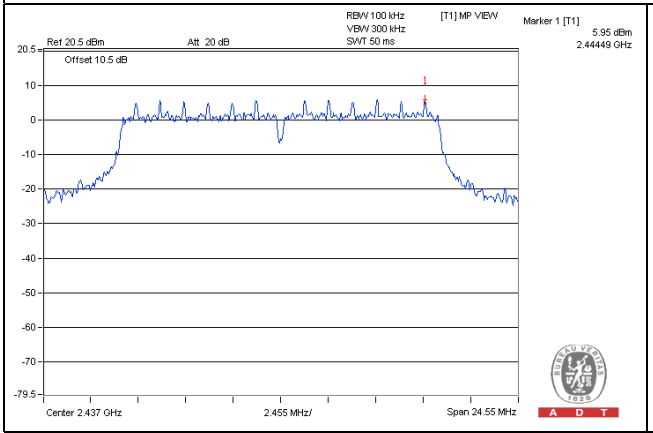
802.11g

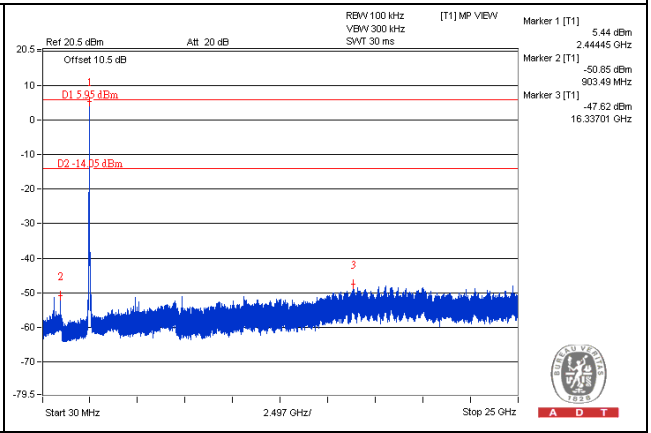
CH 1



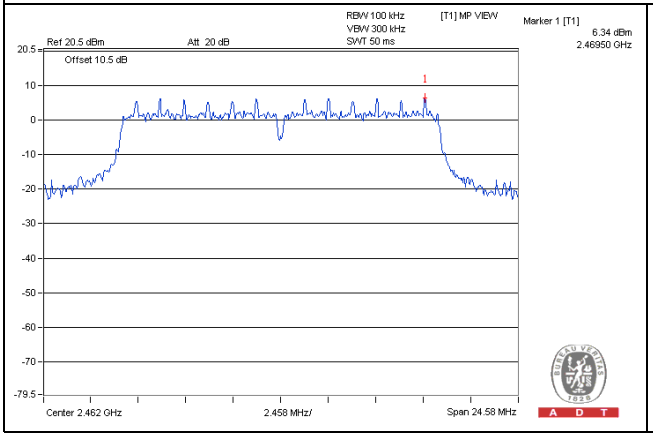


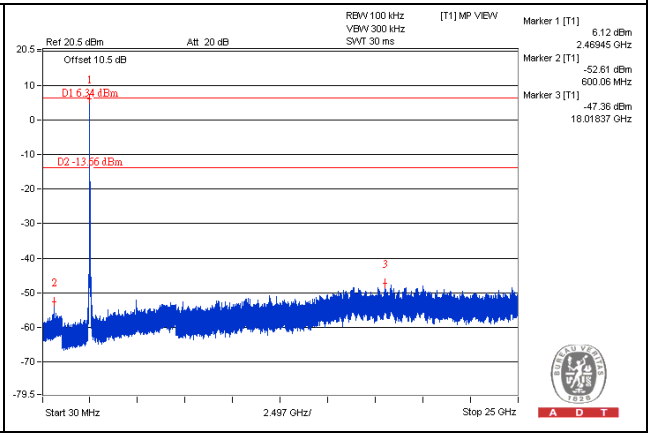
CH 6



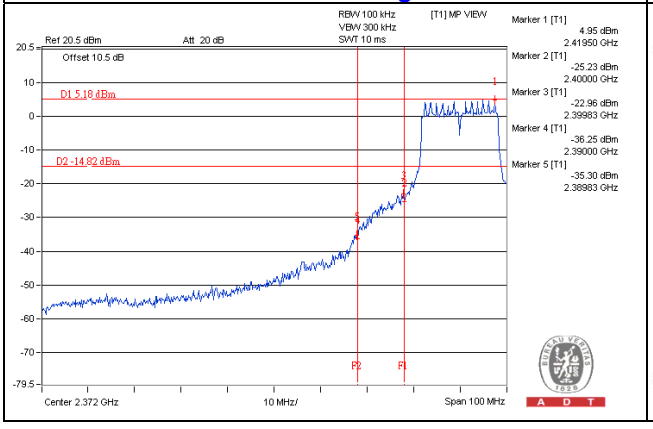


CH 11

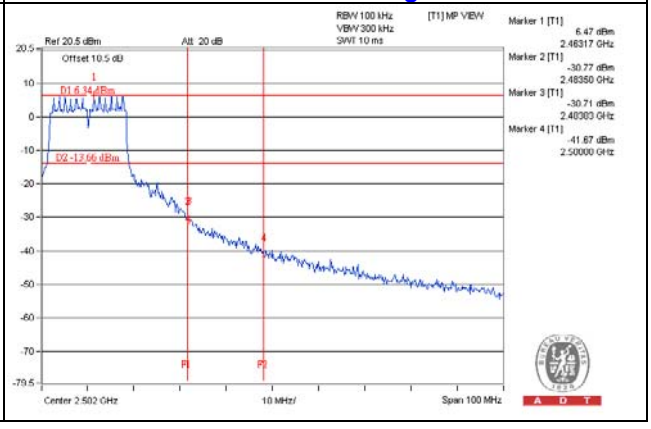




CH 1 Band edge

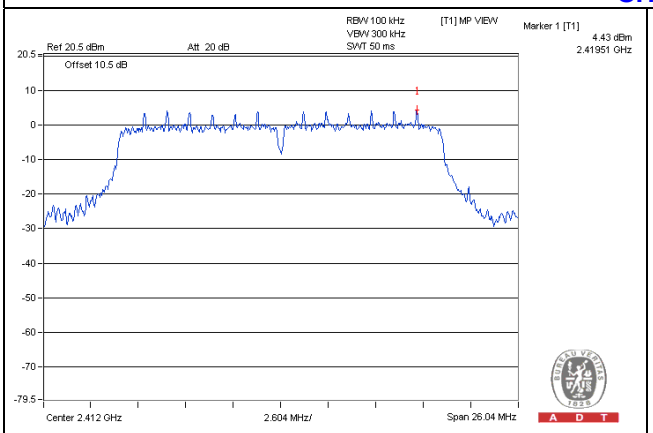


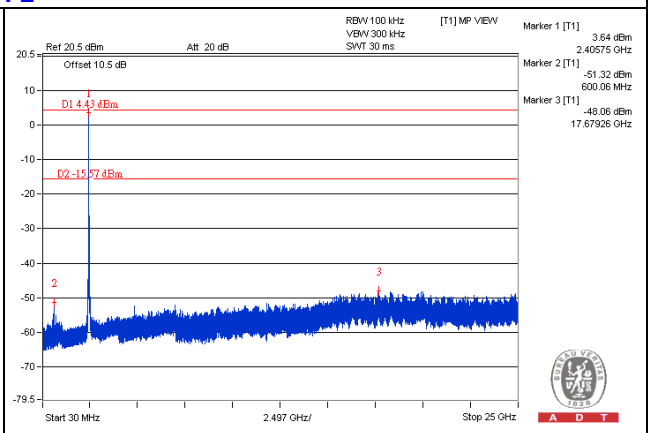
CH 11 Band edge



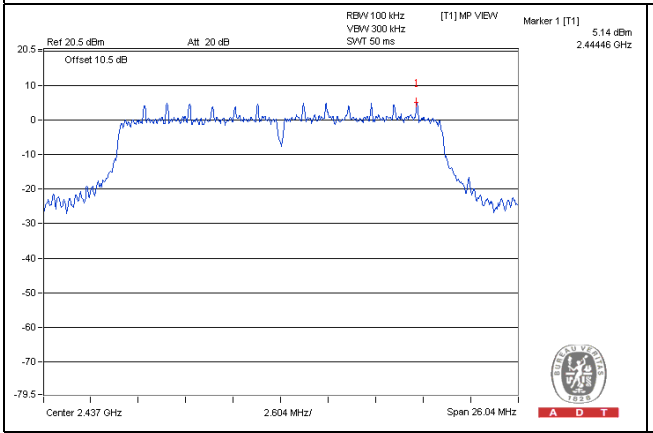
802.11n (HT20)

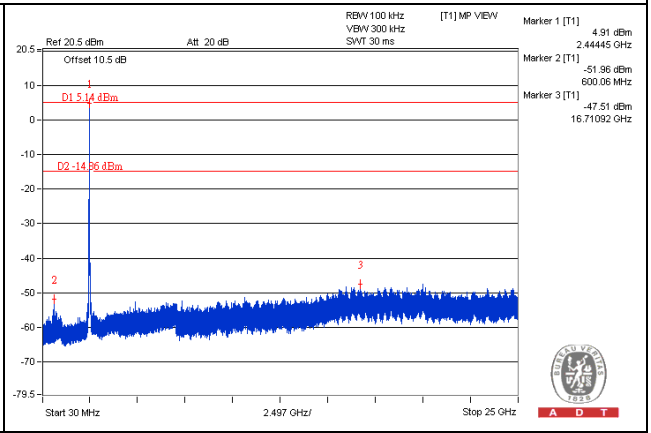
CH 1



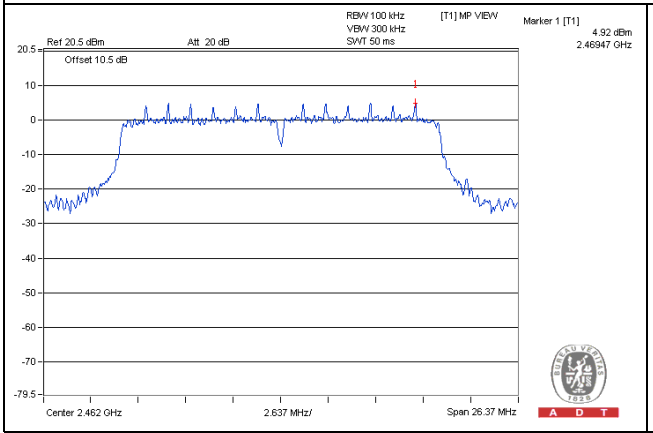


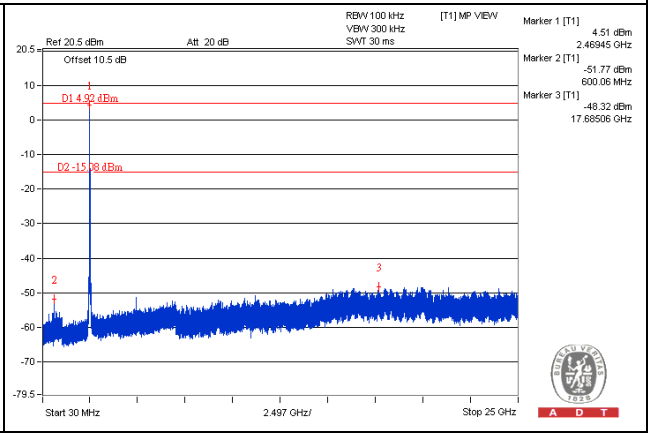
CH 6



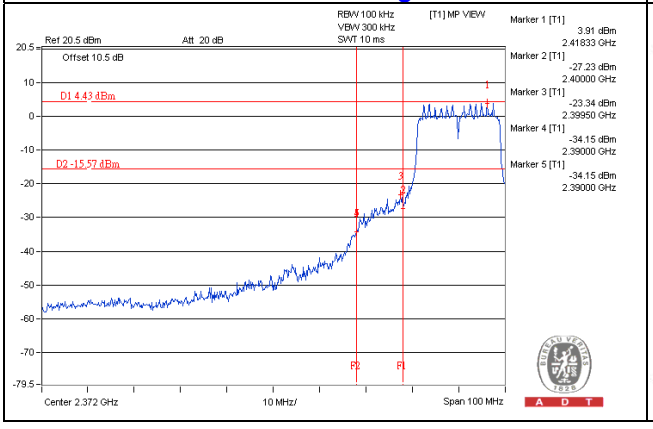


CH 11

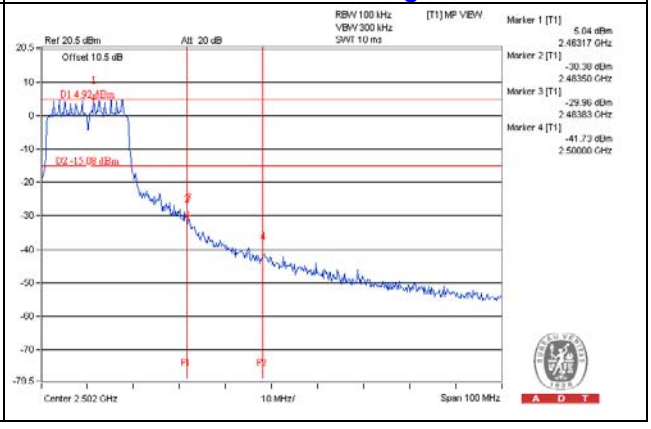




CH 1 Band edge

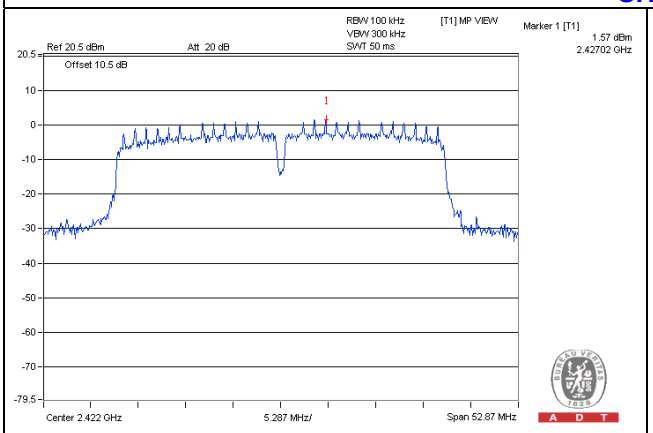


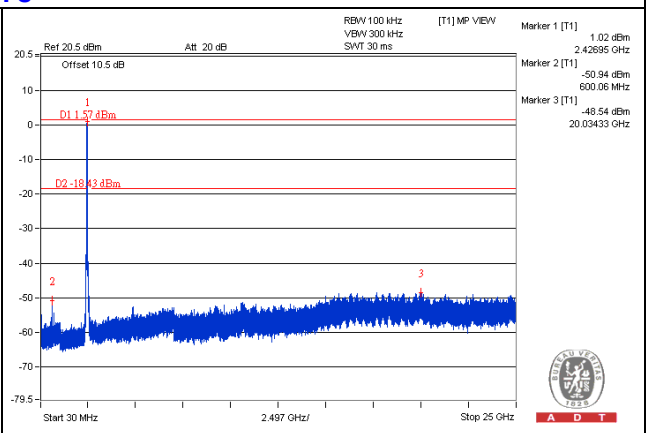
CH 11 Band edge



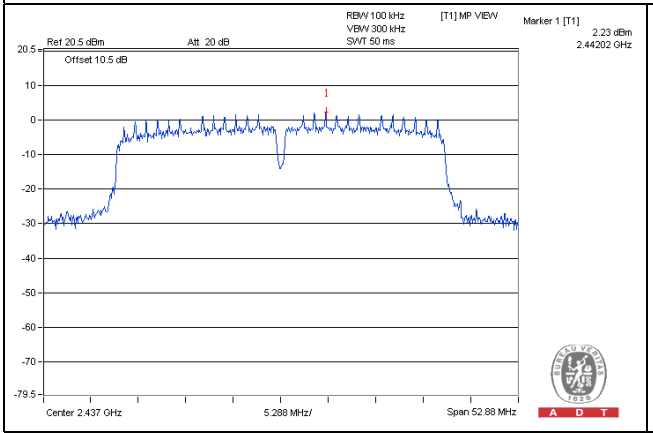
802.11n (HT40)

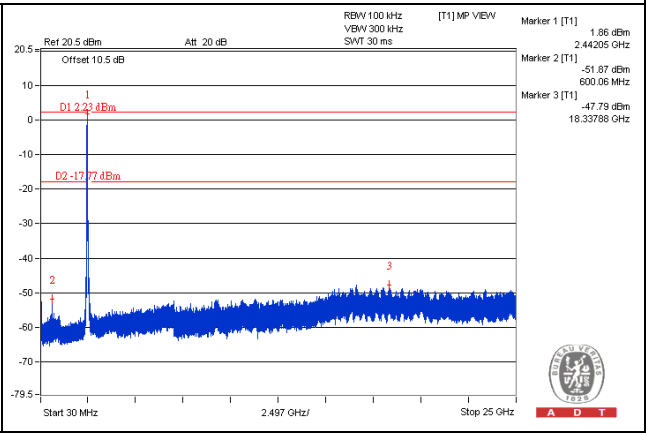
CH 3



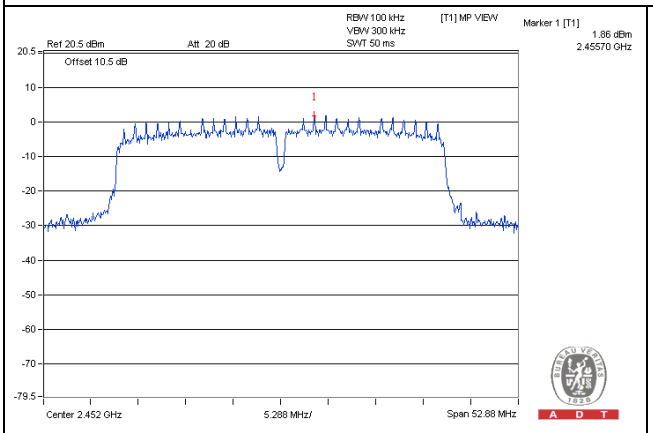


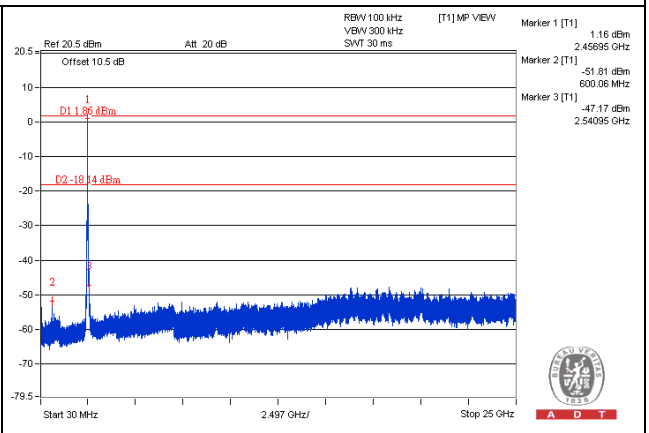
CH 6



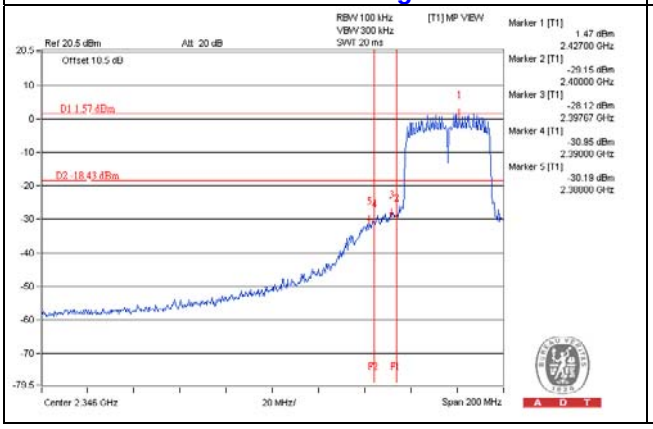


CH 9

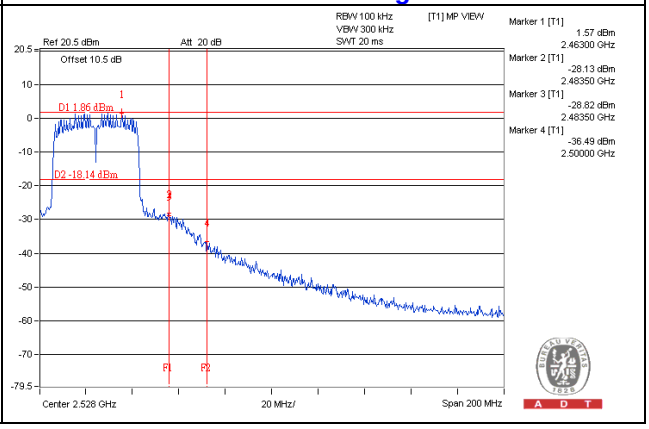




CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

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

Appendix – Information 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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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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