

FCC TEST REPORT

REPORT NO.: RF140403C06

MODEL NO.: F7C043fc

FCC ID: K7SF7C043

RECEIVED: Apr. 03, 2014

TESTED: Jun. 18 ~ Sep. 17, 2014

ISSUED: Sep. 22, 2014

APPLICANT: Belkin International, Inc.

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90094 USA

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

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TABLE OF CONTENTS

RELEASE CONTROL RECORD	4
1. CERTIFICATION.....	5
2. SUMMARY OF TEST RESULTS	6
2.1 MEASUREMENT UNCERTAINTY	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.....	12
3.4 DESCRIPTION OF SUPPORT UNITS	13
3.4.1 CONFIGURATION OF SYSTEM UNDER TEST	14
3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	14
4. TEST TYPES AND RESULTS	15
4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT	15
4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT.....	15
4.1.2 TEST INSTRUMENTS.....	16
4.1.3 TEST PROCEDURES	17
4.1.4 DEVIATION FROM TEST STANDARD	17
4.1.5 TEST SETUP.....	18
4.1.6 EUT OPERATING CONDITIONS	19
4.1.7 TEST RESULTS	20
4.2 CONDUCTED EMISSION MEASUREMENT	34
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	34
4.2.2 TEST INSTRUMENTS.....	34
4.2.3 TEST PROCEDURES	35
4.2.4 DEVIATION FROM TEST STANDARD	35
4.2.5 TEST SETUP.....	35
4.2.6 EUT OPERATING CONDITIONS	35
4.2.7 TEST RESULTS	36
4.3 6dB BANDWIDTH MEASUREMENT	38
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT.....	38
4.3.2 TEST SETUP.....	38
4.3.3 TEST INSTRUMENTS.....	38
4.3.4 TEST PROCEDURE.....	38
4.3.5 DEVIATION FROM TEST STANDARD	38
4.3.6 EUT OPERATING CONDITIONS	38
4.3.7 TEST RESULTS	39
4.4 CONDUCTED OUTPUT POWER	41
4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT	41



A D T

4.4.2	TEST SETUP	41
4.4.3	TEST INSTRUMENTS.....	41
4.4.4	TEST PROCEDURES	41
4.4.5	DEVIATION FROM TEST STANDARD	41
4.4.6	EUT OPERATING CONDITIONS	41
4.4.7	TEST RESULTS	42
4.5	POWER SPECTRAL DENSITY MEASUREMENT.....	44
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	44
4.5.2	TEST SETUP.....	44
4.5.3	TEST INSTRUMENTS.....	44
4.5.4	TEST PROCEDURE.....	44
4.5.5	DEVIATION FROM TEST STANDARD	44
4.5.6	EUT OPERATING CONDITION	45
4.5.7	TEST RESULTS	46
4.6	CONDUCTED OUT OF BAND EMISSION MEASUREMENT	48
4.6.1	LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT.....	48
4.6.2	TEST SETUP.....	48
4.6.3	TEST INSTRUMENTS.....	48
4.6.4	TEST PROCEDURE.....	49
4.6.5	DEVIATION FROM TEST STANDARD	49
4.6.6	EUT OPERATING CONDITION	49
4.6.7	TEST RESULTS	49
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION	54
6.	INFORMATION ON THE TESTING LABORATORIES	55
7.	APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	56



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140403C06	Original release.	Sep. 22, 2014

1. CERTIFICATION

PRODUCT: Wemo Maker
MODEL NO.: F7C043fc
BRAND: Belkin
APPLICANT: Belkin International, Inc.
TESTED: Jun. 18 ~ Sep. 17, 2014
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10-2009

The above equipment (model: F7C043fc) 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 : Polly Chien , **DATE :** Sep. 22, 2014
Polly Chien / Specialist

APPROVED BY : Ken Liu , **DATE :** Sep. 22, 2014
Ken Liu / Senior Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -18.77dB at 0.76719MHz.
15.205 & 209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.3dB at 600.38MHz.
15.247(d)	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	UNCERTAINTY
Conducted emissions	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Wemo Maker
MODEL NO.	F7C043fc
POWER SUPPLY	5Vdc (adapter)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 150Mbps
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
OUTPUT POWER	293.765mW
ANTENNA TYPE	Printed antenna with 2.13dBi gain
ANTENNA CONNECTOR	N/A
DATA CABLE	1.2m USB cable with 1 core
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

- The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX

- The EUT consumes power from the following adapter.

ADAPTER	
BRAND:	belkin
MODEL:	F8J052
INPUT:	100-240Vac, 50-60Hz, 0.5A
OUTPUT:	5Vdc, 2.1A

- The above EUT information is declared by manufacturer and for more detailed feature 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 (20MHz):

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 (40MHz):

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 $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Sample 02
B	-	√	-	-	Sample 01

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
2. "-" means no effect.

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)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	802.11n (40MHz)	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)
A, B	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	6.5

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	6.5

BANDEDGE MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	6.5
A	802.11n (40MHz)	3 to 9	3, 9	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5



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TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	29deg. C, 64%RH	120Vac, 60Hz	Alan Wu
RE<1G	28deg. C, 64%RH	120Vac, 60Hz	Alan Wu
PLC	24deg. C, 64%RH	120Vac, 60Hz	Match Tsai
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jun Wu

3.3 DUTY CYCLE OF TEST SIGNAL

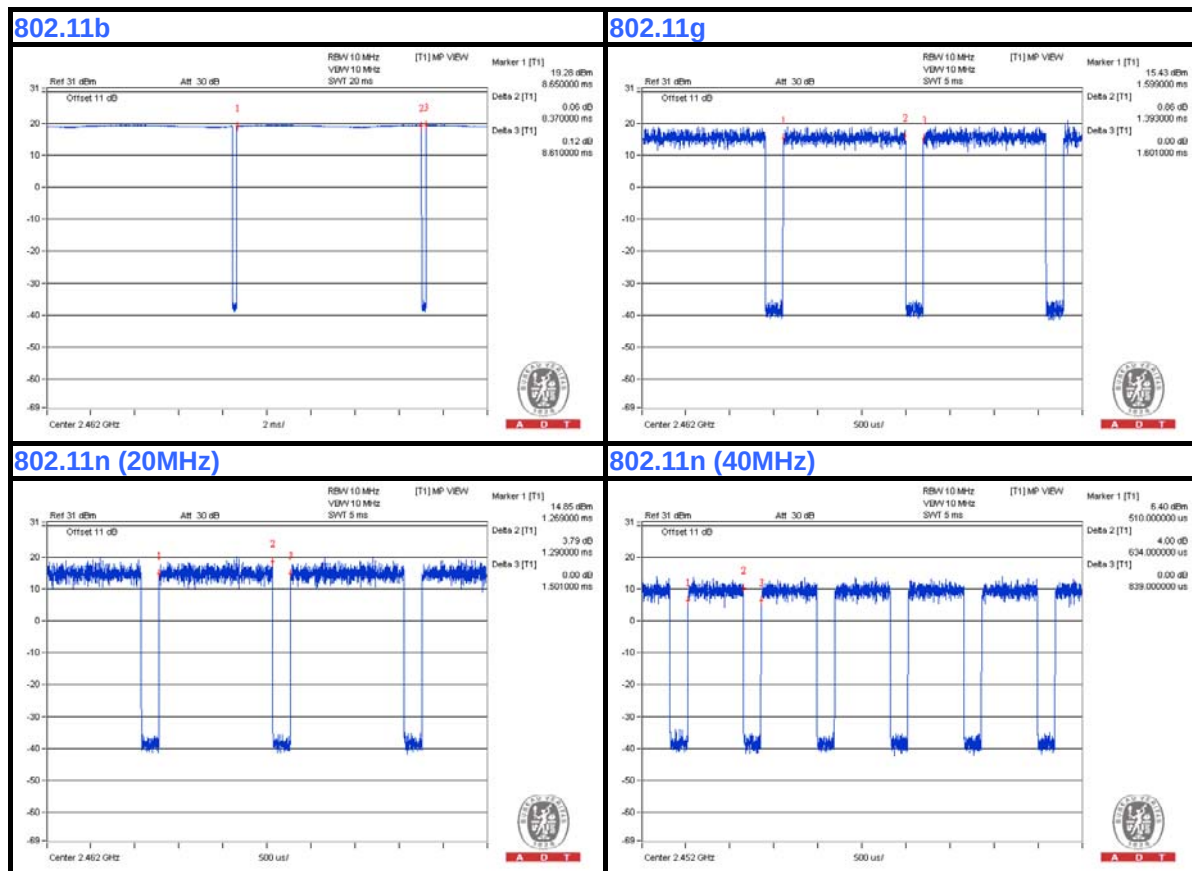
Duty cycle of test signal is < 98%

802.11b: Duty cycle = $8.370/8.610 = 0.972$, Duty factor = $10 * \log(1/0.972) = 0.12$

802.11g: Duty cycle = $1.393/1.601 = 0.870$, Duty factor = $10 * \log(1/0.870) = 0.60$

802.11n (20MHz): Duty cycle = $1.290/1.501 = 0.859$, Duty factor = $10 * \log(1/0.859) = 0.66$

802.11n (40MHz): Duty cycle = $0.634/0.839 = 0.756$, Duty factor = $10 * \log(1/0.756) = 1.21$





3.4 DESCRIPTION OF SUPPORT UNITS

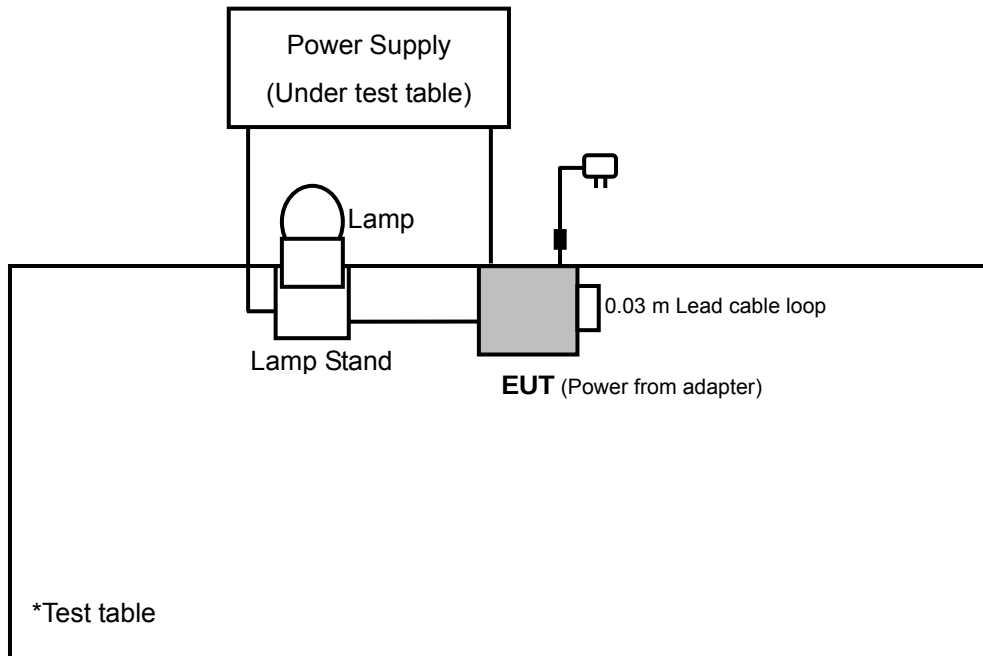
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Power Supply	TOPWARD	6306A	727263	NA
2	Lamp Stand	NA	NA	NA	NA
3	Lamp	NA	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	NA

NOTE: 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 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.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100187	Jan. 02, 2014	Jan. 01, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Dec. 18, 2013	Dec. 17, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 26, 2014	Feb. 25, 2015
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 05, 2014	Jan. 04, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 17, 2014	Feb. 16, 2015
Loop Antenna	HFH2-Z2	100070	Mar. 06, 2014	Mar. 05, 2016
Preamplifier Agilent	8449B	3008A01961	Oct. 28, 2013	Oct. 27, 2014
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 26, 2013	Aug. 25, 2014
			Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 26, 2013	Aug. 25, 2014
			Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 26, 2013	Aug. 25, 2014
			Aug. 09, 2014	Aug. 08, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	NA	NA
High Speed Power Meter	ML2495A	0824011	Jul. 29, 2013	Jul. 28, 2014
			Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 29, 2013	Jul. 28, 2014
			Jul. 26, 2014	Jul. 25, 2015

- 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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 4.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 460141.
6. The IC Site Registration No. is IC7450F-4.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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. Height of receiving 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

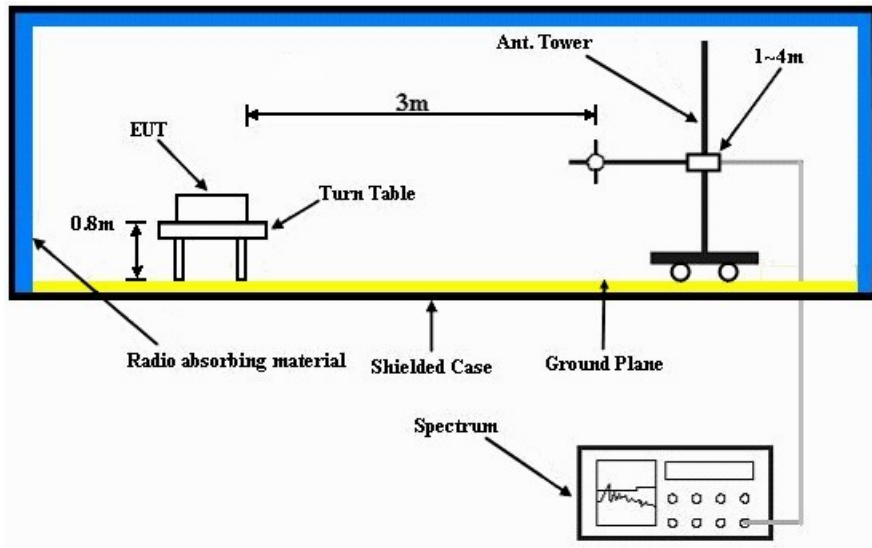
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

4.1.4 DEVIATION FROM TEST STANDARD

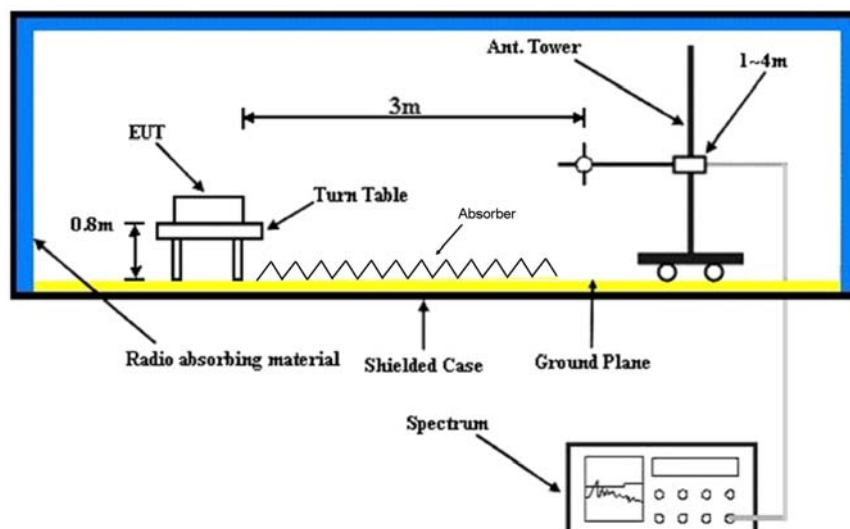
No deviation.

4.1.5 TEST SETUP

Frequency range 30MHz~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. The EUT's relay connected to a power source via a Lamp to check in action.
- b. During the test, the Sensor port "GPIO and Ground" are in loop (Lead cable).
- c. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The necessary accessories enable the system in full functions.

4.1.7 TEST RESULTS

ABOVE 1GHz DATA :

802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	2386.00	57.5 PK	74.0	-16.5	1.01 H	329	25.50	32.00
2	2386.00	47.5 AV	54.0	-6.5	1.01 H	329	15.50	32.00
3	*2412.00	99.8 PK			1.03 H	329	67.80	32.00
4	*2412.00	95.9 AV			1.03 H	329	63.90	32.00
5	4824.00	51.8 PK	74.0	-22.2	1.00 H	148	46.60	5.20
6	4824.00	45.6 AV	54.0	-8.4	1.00 H	148	40.40	5.20
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	2386.00	59.9 PK	74.0	-14.1	1.17 V	31	27.90	32.00
2	2386.00	51.1 AV	54.0	-2.9	1.17 V	31	19.10	32.00
3	*2412.00	110.5 PK			1.17 V	35	78.50	32.00
4	*2412.00	106.7 AV			1.17 V	35	74.70	32.00
5	4824.00	51.5 PK	74.0	-22.5	1.03 V	165	46.30	5.20
6	4824.00	47.4 AV	54.0	-6.6	1.03 V	165	42.20	5.20

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
5. “ * “: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	99.1 PK			1.05 H	328	67.00	32.10
2	*2437.00	95.1 AV			1.05 H	328	63.00	32.10
3	4874.00	50.7 PK	74.0	-23.3	1.00 H	140	45.40	5.30
4	4874.00	44.3 AV	54.0	-9.7	1.00 H	140	39.00	5.30
5	7311.00	55.0 PK	74.0	-19.0	1.28 H	109	43.70	11.30
6	7311.00	47.7 AV	54.0	-6.3	1.28 H	109	36.40	11.30
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	109.2 PK			1.12 V	46	77.10	32.10
2	*2437.00	105.4 AV			1.12 V	46	73.30	32.10
3	4874.00	52.7 PK	74.0	-21.3	1.03 V	166	47.40	5.30
4	4874.00	47.9 AV	54.0	-6.1	1.03 V	166	42.60	5.30
5	7311.00	55.3 PK	74.0	-18.7	1.11 V	329	44.00	11.30
6	7311.00	47.6 AV	54.0	-6.4	1.11 V	329	36.30	11.30

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	95.8 PK			1.04 H	309	63.50	32.30
2	*2462.00	92.0 AV			1.04 H	309	59.70	32.30
3	2483.50	57.4 PK	74.0	-16.6	1.09 H	301	25.00	32.40
4	2483.50	44.2 AV	54.0	-9.8	1.09 H	301	11.80	32.40
5	4924.00	48.1 PK	74.0	-25.9	1.46 H	117	42.70	5.40
6	4924.00	43.1 AV	54.0	-10.9	1.46 H	117	37.70	5.40
7	7386.00	54.4 PK	74.0	-19.6	1.44 H	121	43.00	11.40
8	7386.00	47.9 AV	54.0	-6.1	1.44 H	121	36.50	11.40
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	106.9 PK			1.08 V	54	74.60	32.30
2	*2462.00	103.1 AV			1.08 V	54	70.80	32.30
3	2483.50	60.2 PK	74.0	-13.8	1.02 V	57	27.80	32.40
4	2483.50	52.4 AV	54.0	-1.6	1.02 V	57	20.00	32.40
5	4924.00	50.2 PK	74.0	-23.8	1.05 V	169	44.80	5.40
6	4924.00	45.6 AV	54.0	-8.4	1.05 V	169	40.20	5.40
7	7386.00	54.3 PK	74.0	-19.7	1.17 V	332	42.90	11.40
8	7386.00	47.5 AV	54.0	-6.5	1.17 V	332	36.10	11.40

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.



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802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	58.1 PK	74.0	-15.9	1.00 H	329	26.10	32.00
2	2390.00	45.7 AV	54.0	-8.3	1.00 H	329	13.70	32.00
3	*2412.00	97.8 PK			1.04 H	329	65.80	32.00
4	*2412.00	88.3 AV			1.04 H	329	56.30	32.00
5	4824.00	48.2 PK	74.0	-25.8	1.00 H	149	43.00	5.20
6	4824.00	35.1 AV	54.0	-18.9	1.00 H	149	29.90	5.20
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	70.9 PK	74.0	-3.1	1.15 V	31	38.90	32.00
2	2390.00	52.4 AV	54.0	-1.6	1.15 V	31	20.40	32.00
3	*2412.00	109.4 PK			1.17 V	33	77.40	32.00
4	*2412.00	99.8 AV			1.17 V	33	67.80	32.00
5	4824.00	48.5 PK	74.0	-25.5	1.02 V	162	43.30	5.20
6	4824.00	36.3 AV	54.0	-17.7	1.02 V	162	31.10	5.20

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
5. “ * “: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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			1.04 H	328	66.50	32.10
2	*2437.00	88.9 AV			1.04 H	328	56.80	32.10
3	2489.00	57.0 PK	74.0	-17.0	1.02 H	320	24.60	32.40
4	2489.00	44.5 AV	54.0	-9.5	1.02 H	320	12.10	32.40
5	4874.00	48.0 PK	74.0	-26.0	1.00 H	148	42.70	5.30
6	4874.00	34.8 AV	54.0	-19.2	1.00 H	148	29.50	5.30
7	7311.00	64.0 PK	74.0	-10.0	1.47 H	125	52.70	11.30
8	7311.00	47.5 AV	54.0	-6.5	1.47 H	125	36.20	11.30
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	108.6 PK			1.16 V	34	76.50	32.10
2	*2437.00	98.8 AV			1.16 V	34	66.70	32.10
3	2489.00	67.0 PK	74.0	-7.0	1.16 V	36	34.60	32.40
4	2489.00	52.5 AV	54.0	-1.5	1.16 V	36	20.10	32.40
5	4874.00	49.3 PK	74.0	-24.7	1.05 V	165	44.00	5.30
6	4874.00	36.4 AV	54.0	-17.6	1.05 V	165	31.10	5.30
7	7311.00	62.6 PK	74.0	-11.4	1.32 V	327	51.30	11.30
8	7311.00	47.7 AV	54.0	-6.3	1.32 V	327	36.40	11.30

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	92.4 PK			1.00 H	333	60.10	32.30
2	*2462.00	83.2 AV			1.00 H	333	50.90	32.30
3	2483.50	57.6 PK	74.0	-16.4	1.00 H	331	25.20	32.40
4	2483.50	43.6 AV	54.0	-10.4	1.00 H	331	11.20	32.40
5	4924.00	46.1 PK	74.0	-27.9	1.00 H	145	40.70	5.40
6	4924.00	33.3 AV	54.0	-20.7	1.00 H	145	27.90	5.40
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	105.5 PK			1.10 V	53	73.20	32.30
2	*2462.00	95.6 AV			1.10 V	53	63.30	32.30
3	2483.50	71.5 PK	74.0	-2.5	1.12 V	32	39.10	32.40
4	2483.50	52.8 AV	54.0	-1.2	1.12 V	32	20.40	32.40
5	4924.00	46.5 PK	74.0	-27.5	1.00 V	160	41.10	5.40
6	4924.00	33.9 AV	54.0	-20.1	1.00 V	160	28.50	5.40

REMARKS:

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

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	62.7 PK	74.0	-11.3	1.07 H	331	30.70	32.00
2	2390.00	44.5 AV	54.0	-9.5	1.07 H	331	12.50	32.00
3	*2412.00	97.2 PK			1.05 H	332	65.20	32.00
4	*2412.00	86.7 AV			1.05 H	332	54.70	32.00
5	4824.00	47.4 PK	74.0	-26.6	1.00 H	148	42.20	5.20
6	4824.00	34.8 AV	54.0	-19.2	1.00 H	148	29.60	5.20
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	70.1 PK	74.0	-3.9	1.16 V	35	38.10	32.00
2	2390.00	52.6 AV	54.0	-1.4	1.16 V	35	20.60	32.00
3	*2412.00	108.4 PK			1.17 V	39	76.40	32.00
4	*2412.00	97.9 AV			1.17 V	39	65.90	32.00
5	4824.00	47.7 PK	74.0	-26.3	1.01 V	161	42.50	5.20
6	4824.00	36.0 AV	54.0	-18.0	1.01 V	161	30.80	5.20

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	99.1 PK			1.05 H	330	67.00	32.10
2	*2437.00	88.6 AV			1.05 H	330	56.50	32.10
3	2489.00	57.5 PK	74.0	-16.5	1.07 H	325	25.10	32.40
4	2489.00	44.8 AV	54.0	-9.2	1.07 H	325	12.40	32.40
5	4874.00	48.1 PK	74.0	-25.9	1.00 H	143	42.80	5.30
6	4874.00	35.2 AV	54.0	-18.8	1.00 H	143	29.90	5.30
7	7311.00	63.0 PK	74.0	-11.0	1.47 H	126	51.70	11.30
8	7311.00	47.5 AV	54.0	-6.5	1.47 H	126	36.20	11.30
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	109.5 PK			1.39 V	43	77.40	32.10
2	*2437.00	99.3 AV			1.39 V	43	67.20	32.10
3	2489.00	67.5 PK	74.0	-6.5	1.30 V	40	35.10	32.40
4	2489.00	52.1 AV	54.0	-1.9	1.30 V	40	19.70	32.40
5	4874.00	48.3 PK	74.0	-25.7	1.00 V	160	43.00	5.30
6	4874.00	36.6 AV	54.0	-17.4	1.00 V	160	31.30	5.30
7	7311.00	62.0 PK	74.0	-12.0	1.33 V	329	50.70	11.30
8	7311.00	47.2 AV	54.0	-6.8	1.33 V	329	35.90	11.30

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	92.1 PK			1.00 H	333	59.80	32.30
2	*2462.00	82.3 AV			1.00 H	333	50.00	32.30
3	2483.50	61.7 PK	74.0	-12.3	1.00 H	330	29.30	32.40
4	2483.50	43.8 AV	54.0	-10.2	1.00 H	330	11.40	32.40
5	4924.00	46.7 PK	74.0	-27.3	1.00 H	140	41.30	5.40
6	4924.00	34.6 AV	54.0	-19.4	1.00 H	140	29.20	5.40
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	105.6 PK			1.08 V	53	73.30	32.30
2	*2462.00	95.1 AV			1.08 V	53	62.80	32.30
3	2483.50	72.9 PK	74.0	-1.1	1.01 V	54	40.50	32.40
4	2483.50	51.1 AV	54.0	-2.9	1.01 V	54	18.70	32.40
5	4924.00	47.0 PK	74.0	-27.0	1.03 V	165	41.60	5.40
6	4924.00	35.1 AV	54.0	-18.9	1.03 V	165	29.70	5.40

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)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	56.2 PK	74.0	-17.8	1.09 H	320	24.20	32.00
2	2390.00	43.6 AV	54.0	-10.4	1.09 H	320	11.60	32.00
3	*2422.00	91.9 PK			1.04 H	328	59.80	32.10
4	*2422.00	80.7 AV			1.04 H	328	48.60	32.10
5	4844.00	46.9 PK	74.0	-27.1	1.00 H	149	41.60	5.30
6	4844.00	34.1 AV	54.0	-19.9	1.00 H	149	28.80	5.30
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	66.6 PK	74.0	-7.4	1.13 V	54	34.60	32.00
2	2390.00	52.5 AV	54.0	-1.5	1.13 V	54	20.50	32.00
3	*2422.00	102.8 PK			1.11 V	50	70.70	32.10
4	*2422.00	91.6 AV			1.11 V	50	59.50	32.10
5	4844.00	47.1 PK	74.0	-26.9	1.01 V	167	41.80	5.30
6	4844.00	35.4 AV	54.0	-18.6	1.01 V	167	30.10	5.30

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	91.9 PK			1.05 H	329	59.80	32.10
2	*2437.00	81.2 AV			1.05 H	329	49.10	32.10
3	2483.50	59.6 PK	74.0	-14.4	1.08 H	326	27.20	32.40
4	2483.50	44.9 AV	54.0	-9.1	1.08 H	326	12.50	32.40
5	4874.00	47.5 PK	74.0	-26.5	1.00 H	142	42.20	5.30
6	4874.00	34.3 AV	54.0	-19.7	1.00 H	142	29.00	5.30
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	102.7 PK			1.78 V	34	70.60	32.10
2	*2437.00	92.3 AV			1.78 V	34	60.20	32.10
3	2483.50	69.2 PK	74.0	-4.8	1.74 V	36	36.80	32.40
4	2483.50	52.4 AV	54.0	-1.6	1.74 V	36	20.00	32.40
5	4874.00	47.8 PK	74.0	-26.2	1.00 V	162	42.50	5.30
6	4874.00	35.8 AV	54.0	-18.2	1.00 V	162	30.50	5.30

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH	TESTED BY	Alan Wu

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	88.3 PK			1.00 H	4	56.00	32.30
2	*2452.00	77.7 AV			1.00 H	4	45.40	32.30
3	2483.50	59.0 PK	74.0	-15.0	1.00 H	353	26.60	32.40
4	2483.50	43.9 AV	54.0	-10.1	1.00 H	353	11.50	32.40
5	4904.00	46.2 PK	74.0	-27.8	1.00 H	146	40.80	5.40
6	4904.00	33.2 AV	54.0	-20.8	1.00 H	146	27.80	5.40
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	101.7 PK			1.09 V	55	69.40	32.30
2	*2452.00	90.4 AV			1.09 V	55	58.10	32.30
3	2483.50	69.6 PK	74.0	-4.4	1.01 V	57	37.20	32.40
4	2483.50	52.4 AV	54.0	-1.6	1.01 V	57	20.00	32.40
5	4904.00	46.6 PK	74.0	-27.4	1.06 V	168	41.20	5.40
6	4904.00	34.7 AV	54.0	-19.3	1.06 V	168	29.30	5.40

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.



A D T

BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 64%RH	TESTED BY	Alan Wu
TEST MODE	A		

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	179.31	34.3 QP	43.5	-9.2	1.99 H	6	49.30	-15.00
2	299.62	31.8 QP	46.0	-14.2	1.00 H	222	44.30	-12.50
3	417.98	32.2 QP	46.0	-13.8	1.00 H	145	42.70	-10.50
4	480.07	32.7 QP	46.0	-13.3	1.99 H	159	41.90	-9.20
5	540.23	34.2 QP	46.0	-11.8	1.49 H	12	42.50	-8.30
6	600.38	42.7 QP	46.0	-3.3	1.25 H	190	49.40	-6.70
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	31.84	34.2 QP	40.0	-5.8	1.49 V	314	49.70	-15.50
2	111.40	33.0 QP	43.5	-10.5	1.00 V	56	50.00	-17.00
3	179.31	30.1 QP	43.5	-13.4	1.00 V	210	45.10	-15.00
4	299.62	30.1 QP	46.0	-15.9	1.49 V	222	42.60	-12.50
5	480.07	34.4 QP	46.0	-11.6	1.00 V	162	43.60	-9.20
6	600.38	36.2 QP	46.0	-9.8	1.24 V	359	42.90	-6.70

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 64%RH	TESTED BY	Alan Wu
TEST MODE	B		

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	194.83	39.9 QP	43.5	-3.6	1.25 H	333	56.40	-16.50
2	359.77	34.2 QP	46.0	-11.8	1.00 H	147	45.70	-11.50
3	480.07	33.9 QP	46.0	-12.1	2.00 H	34	43.10	-9.20
4	538.28	35.3 QP	46.0	-10.7	2.00 H	120	43.70	-8.40
5	600.38	39.4 QP	46.0	-6.6	1.25 H	180	46.10	-6.70
6	720.68	30.7 QP	46.0	-15.3	1.00 H	195	35.50	-4.80
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	35.72	34.5 QP	40.0	-5.5	1.24 V	209	49.70	-15.20
2	119.16	33.9 QP	43.5	-9.6	1.00 V	156	50.00	-16.10
3	189.01	31.6 QP	43.5	-11.9	1.24 V	229	47.70	-16.10
4	295.73	32.0 QP	46.0	-14.0	1.49 V	232	44.60	-12.60
5	480.07	34.0 QP	46.0	-12.0	1.00 V	74	43.20	-9.20
6	600.38	39.5 QP	46.0	-6.5	1.00 V	9	46.20	-6.70

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 OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	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.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Apr. 24, 2014	Apr. 23, 2015
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 23, 2013	Dec. 22, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 10, 2014	Jul. 09, 2015
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 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

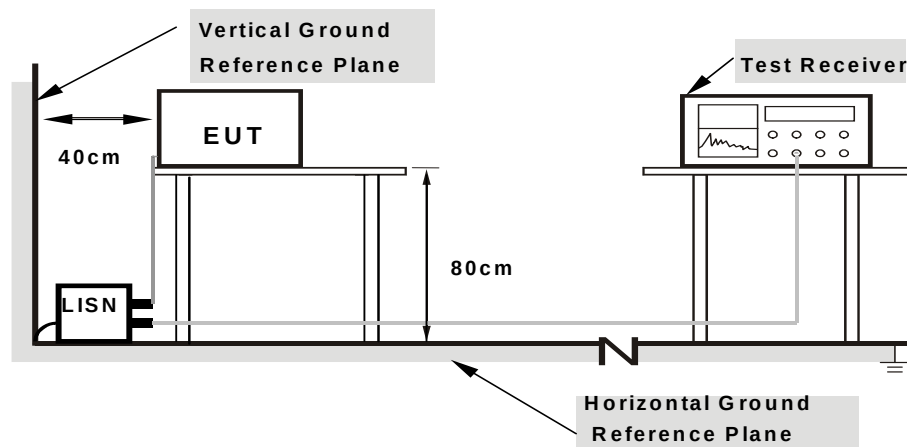
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) 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.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

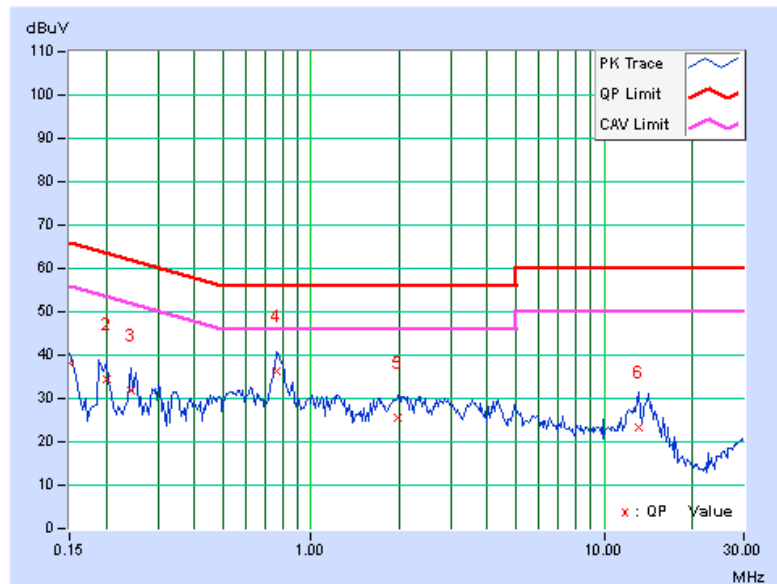
CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.26	38.07	26.73	38.33	26.99	66.00	56.00	-27.67	-29.01
2	0.20078	0.28	34.17	24.07	34.45	24.35	63.58	53.58	-29.13	-29.23
3	0.24375	0.28	31.58	22.34	31.86	22.62	61.97	51.97	-30.10	-29.34
4	0.76719	0.32	35.80	26.91	36.12	27.23	56.00	46.00	-19.88	-18.77
5	1.98828	0.36	25.26	16.56	25.62	16.92	56.00	46.00	-30.38	-29.08
6	13.11328	0.52	22.83	15.01	23.35	15.53	60.00	50.00	-36.65	-34.47

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

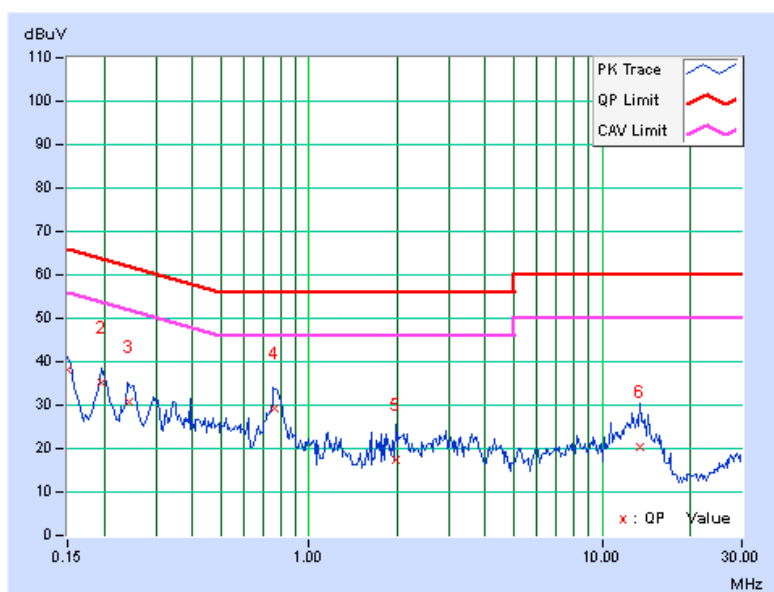


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.26	37.92	25.14	38.18	25.40	66.00	56.00	-27.82	-30.60
2	0.19687	0.28	35.07	22.67	35.35	22.95	63.74	53.74	-28.39	-30.79
3	0.24233	0.28	30.34	16.92	30.62	17.20	62.02	52.02	-31.39	-34.81
4	0.76564	0.32	28.76	19.47	29.08	19.79	56.00	46.00	-26.92	-26.21
5	1.96875	0.37	16.97	6.87	17.34	7.24	56.00	46.00	-38.66	-38.76
6	13.44922	0.55	19.76	9.43	20.31	9.98	60.00	50.00	-39.69	-40.02

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

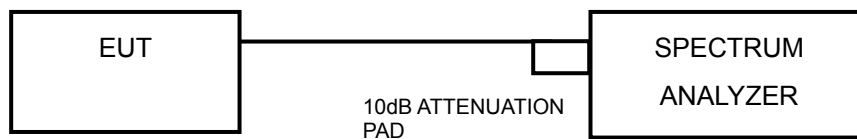


4.3 6dB BANDWIDTH MEASUREMENT

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

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

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	12.13	0.5	PASS
6	2437	12.14	0.5	PASS
11	2462	12.15	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.36	0.5	PASS
6	2437	16.36	0.5	PASS
11	2462	16.40	0.5	PASS

802.11n (20MHz)

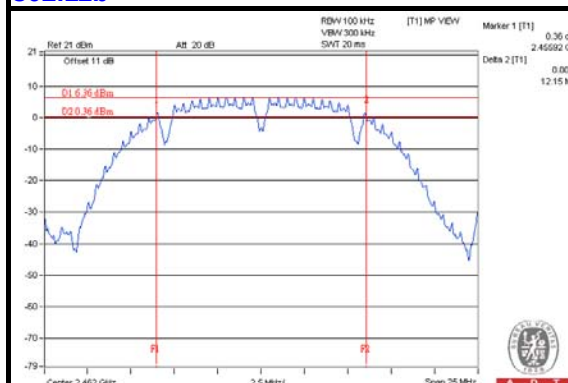
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.33	0.5	PASS
6	2437	17.12	0.5	PASS
11	2462	17.35	0.5	PASS

802.11n (40MHz)

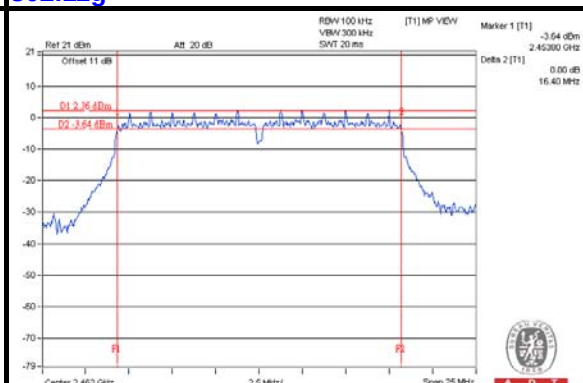
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.71	0.5	PASS
6	2437	35.74	0.5	PASS
9	2452	35.90	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

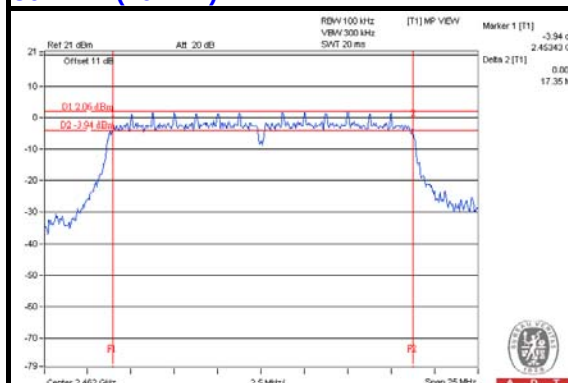
802.11b



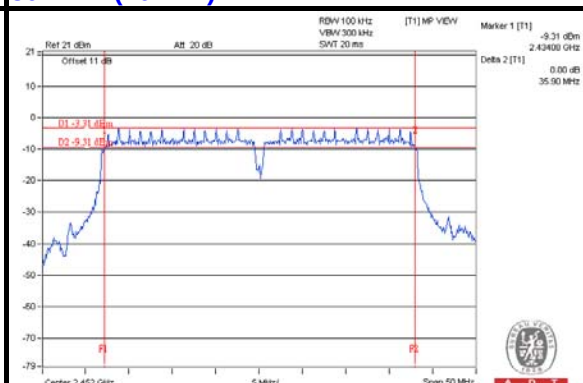
802.11g



802.11n (20MHz)



802.11n (40MHz)

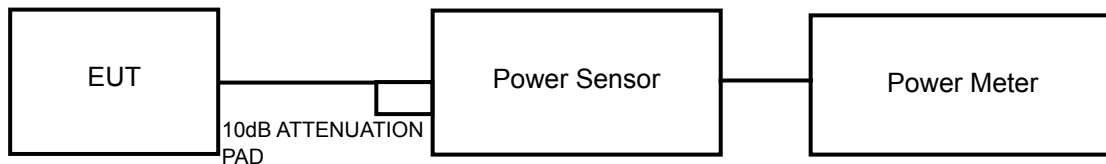


4.4 CONDUCTED OUTPUT POWER

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	248.313	23.95	30	PASS
6	2437	155.239	21.91	30	PASS
11	2462	95.060	19.78	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	271.644	24.34	30	PASS
6	2437	266.073	24.25	30	PASS
11	2462	142.561	21.54	30	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	251.768	24.01	30	PASS
6	2437	293.765	24.68	30	PASS
11	2462	144.212	21.59	30	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	172.187	22.36	30	PASS
6	2437	172.982	22.38	30	PASS
9	2452	104.713	20.20	30	PASS

FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	171.002	22.33
6	2437	94.189	19.74
11	2462	54.828	17.39

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	66.988	18.26
6	2437	69.183	18.40
11	2462	21.827	13.39

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	46.666	16.69
6	2437	68.865	18.38
11	2462	19.543	12.91

802.11n (40MHz)

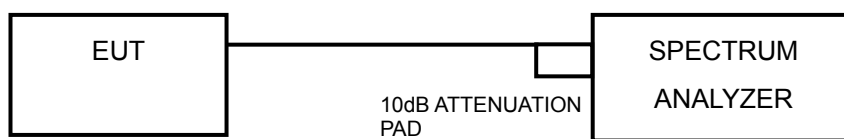
CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	23.335	13.68
6	2437	29.174	14.65
11	2462	13.740	11.38

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

4.5.5 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: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set the VBW $\geq 3 \times \text{RBW}$.
- 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.

4.5.6 DEVIATION FROM TEST STANDARD

No deviation.

4.5.7 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.8 TEST RESULTS

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-4.45	8	PASS
6	2437	-6.92	8	PASS
11	2462	-8.69	8	PASS

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-8.28	8	PASS
6	2437	-8.27	8	PASS
11	2462	-13.51	8	PASS

802.11n (20MHz)

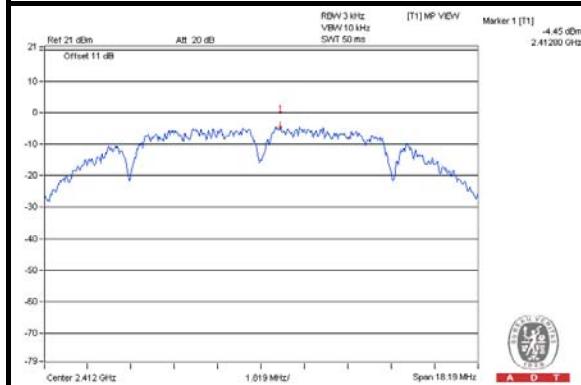
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-9.97	8	PASS
6	2437	-8.35	8	PASS
11	2462	-13.58	8	PASS

802.11n (40MHz)

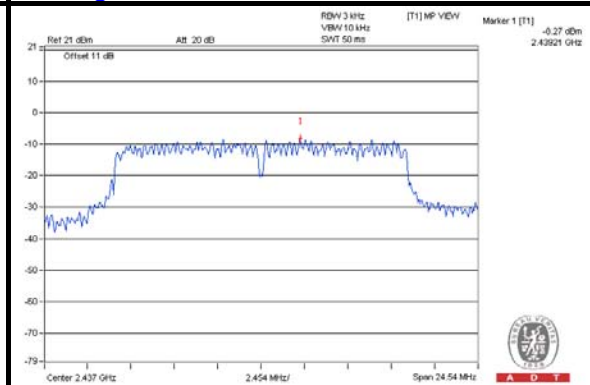
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-17.47	8	PASS
6	2437	-16.30	8	PASS
9	2452	-19.27	8	PASS

SPECTRUM PLOT OF WORST VALUE

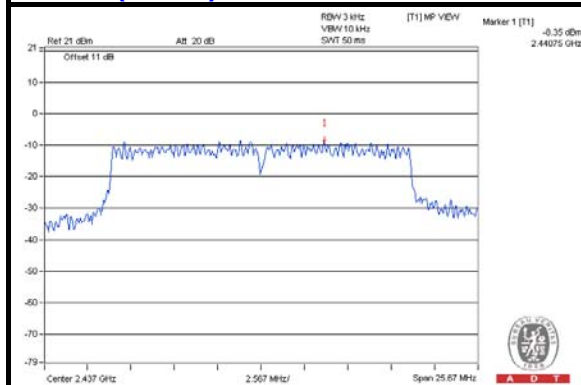
802.11b



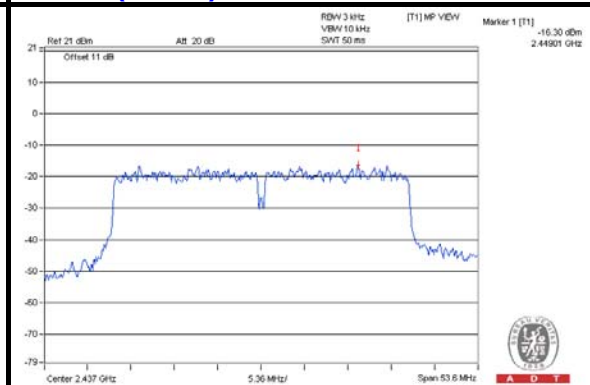
802.11g



802.11n (20MHz)



802.11n (40MHz)

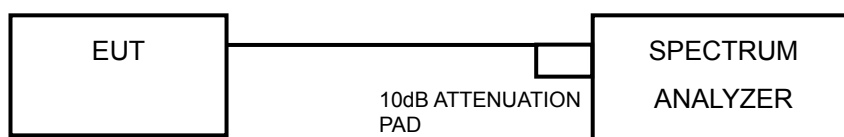


4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

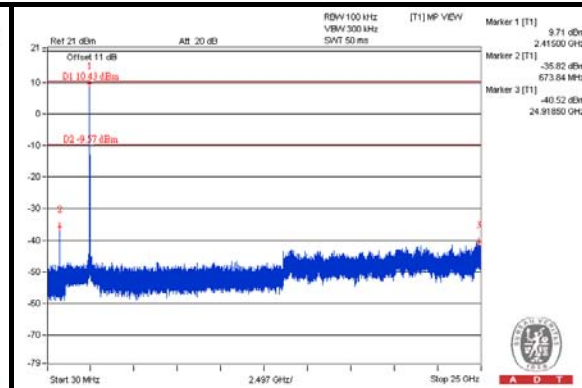
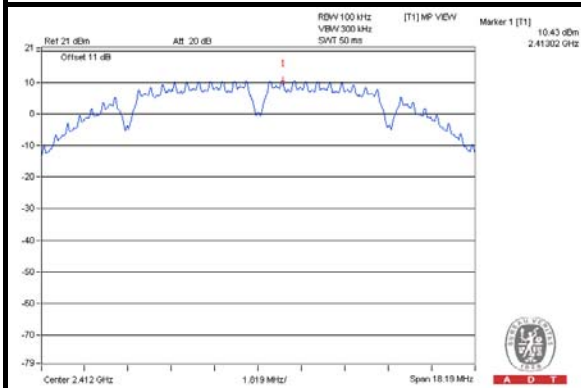
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



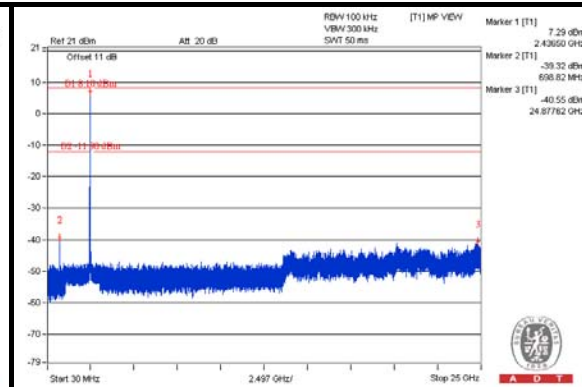
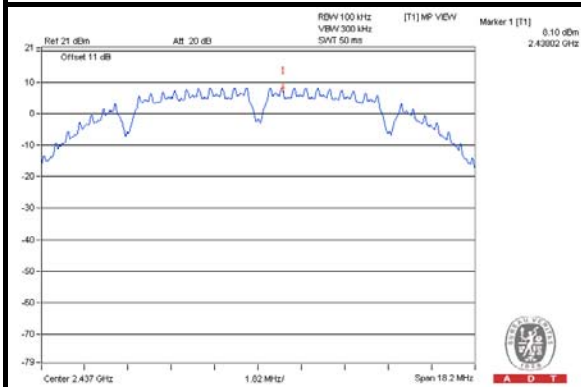
A D T

802.11b

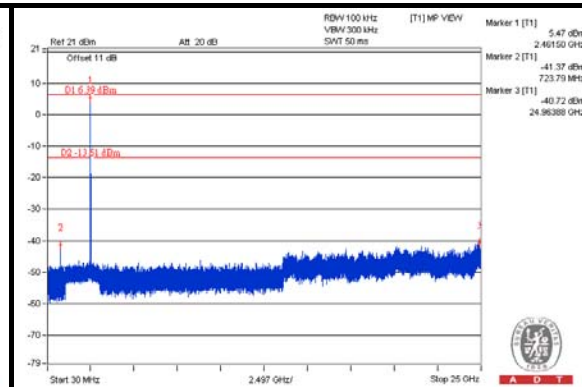
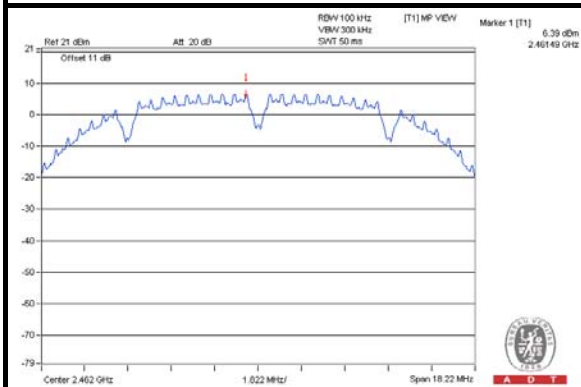
CH 1



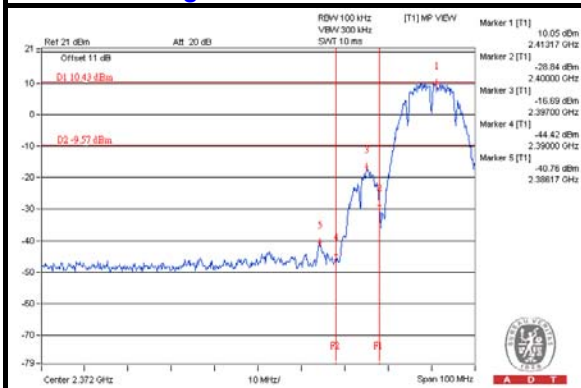
CH 6



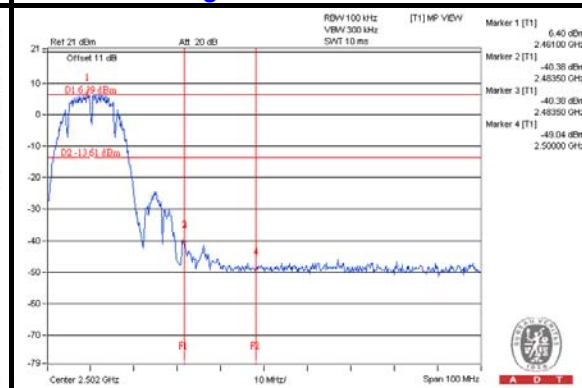
CH 11



CH 1 Band edge



CH 11 Band edge

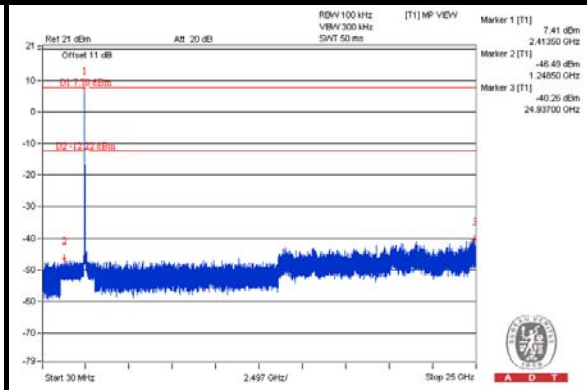
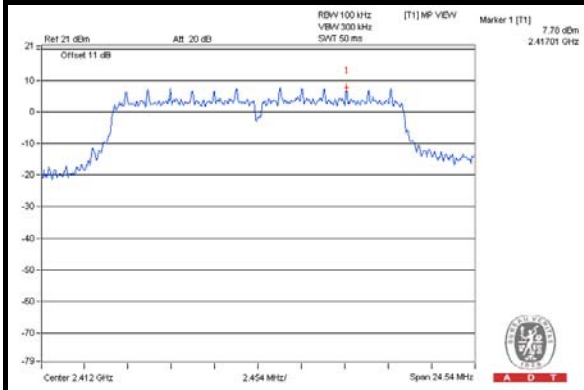




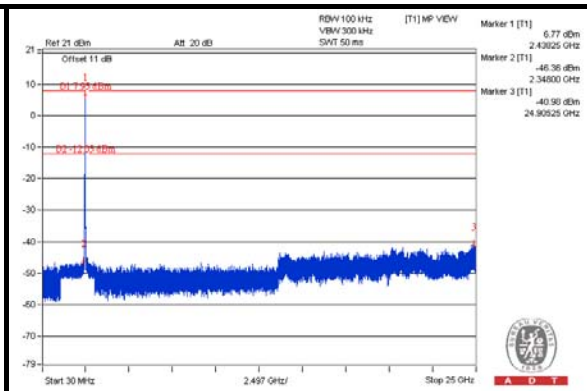
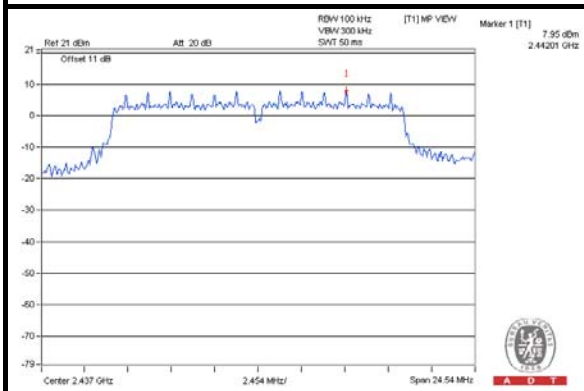
A D T

802.11g

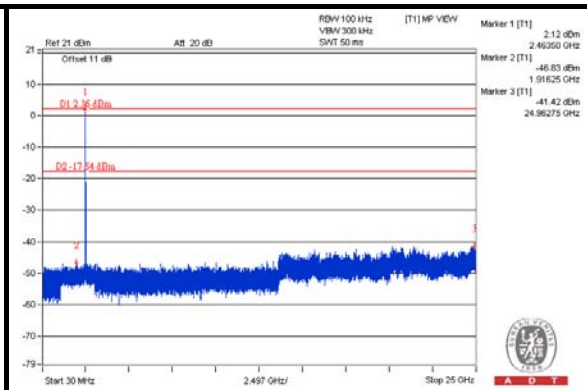
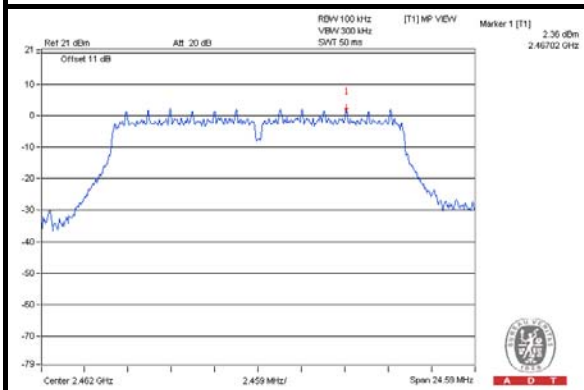
CH 1



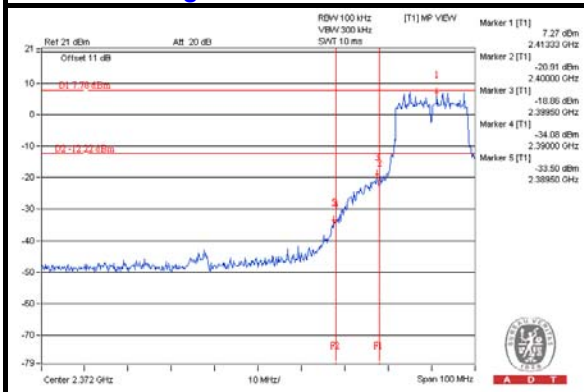
CH 6



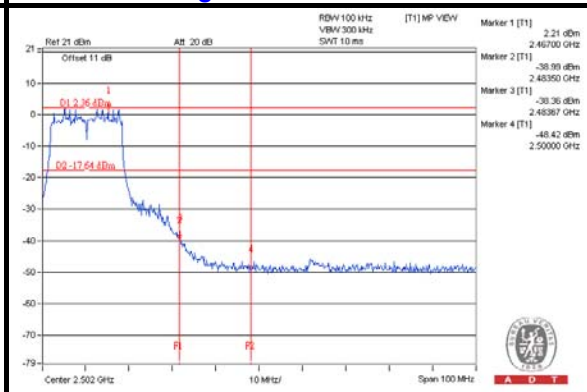
CH 11



CH 1 Band edge



CH 11 Band edge

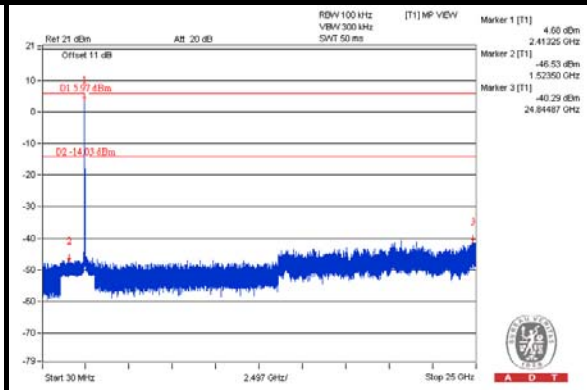
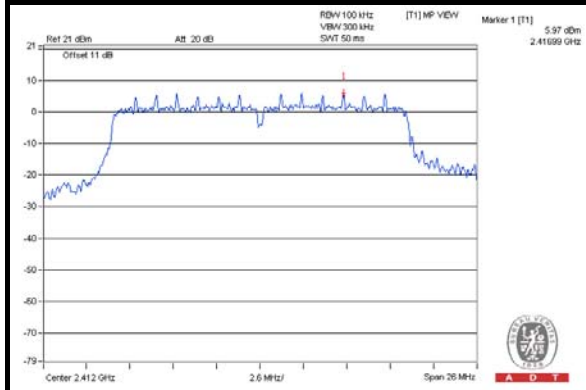




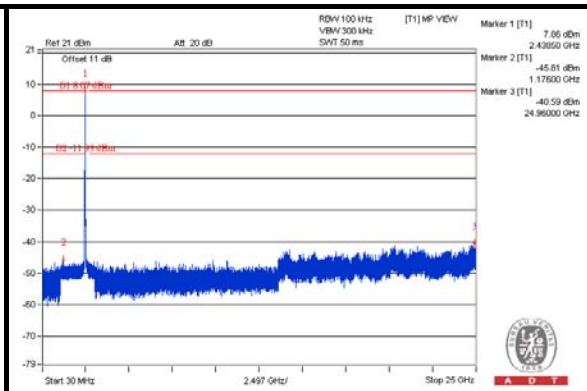
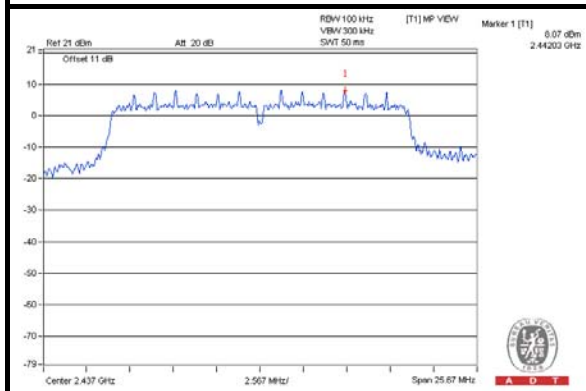
A D T

802.11n (20MHz)

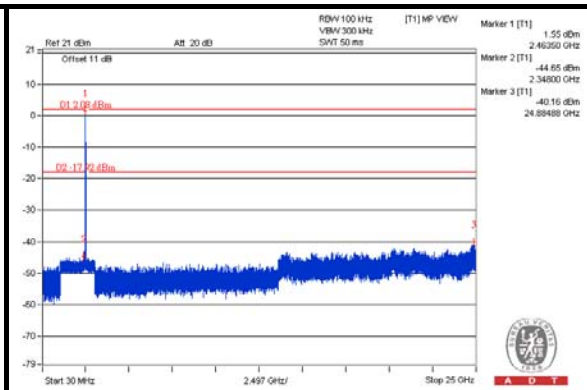
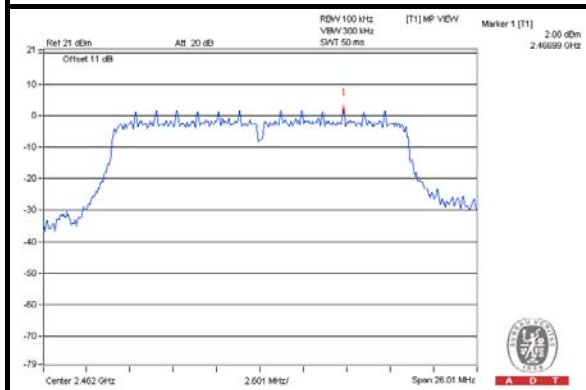
CH 1



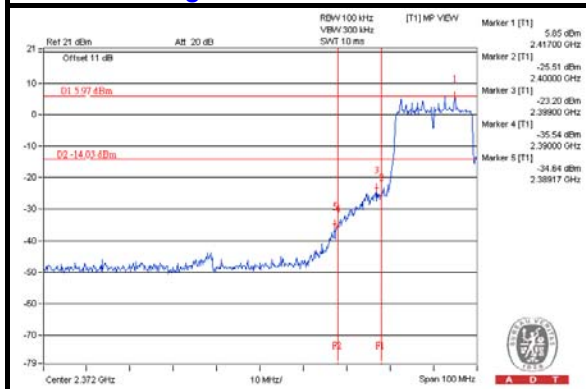
CH 6



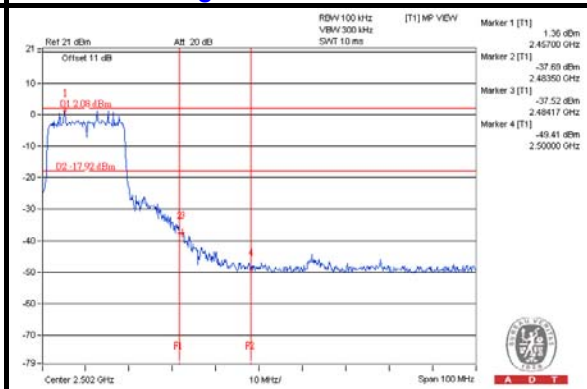
CH 11



CH 1 Band edge



CH 11 Band edge

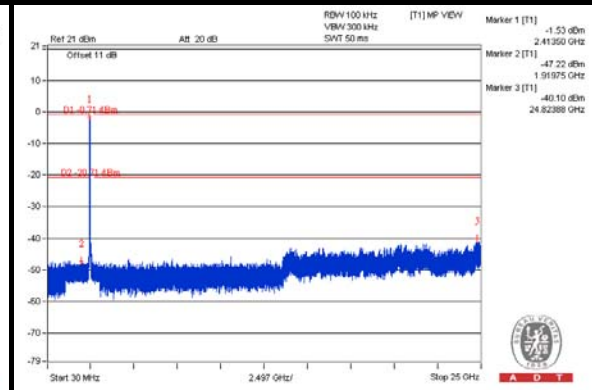
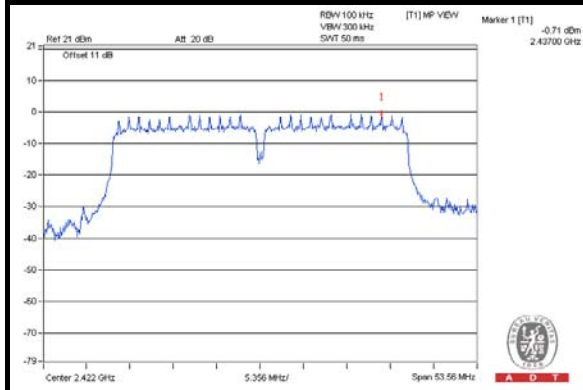




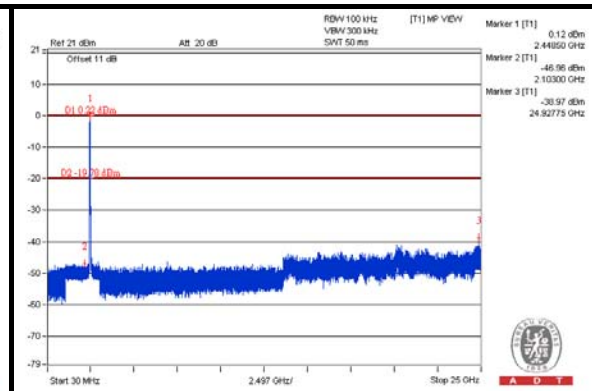
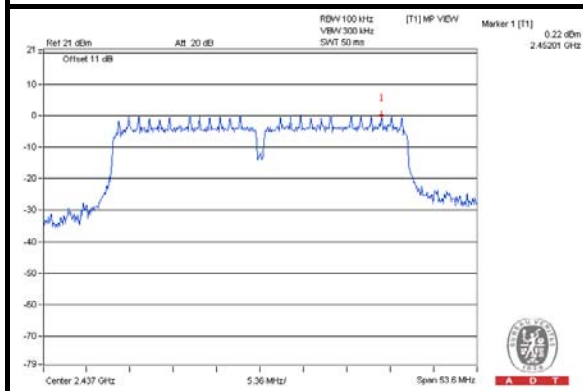
A D T

802.11n (40MHz)

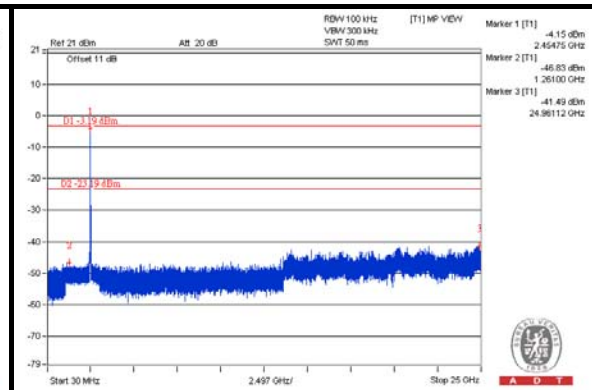
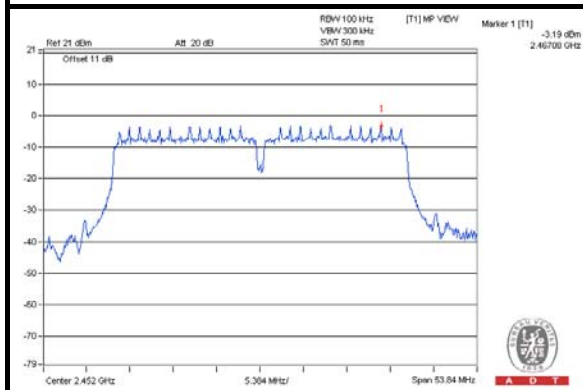
CH 3



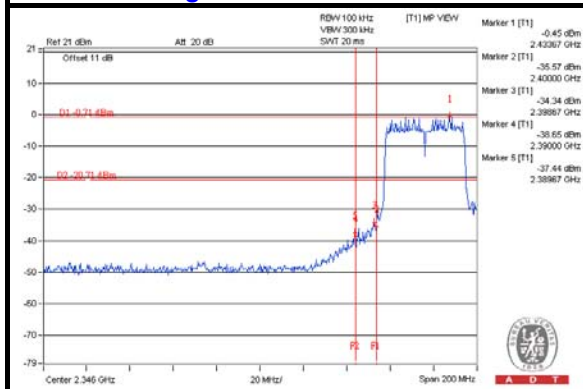
CH 6



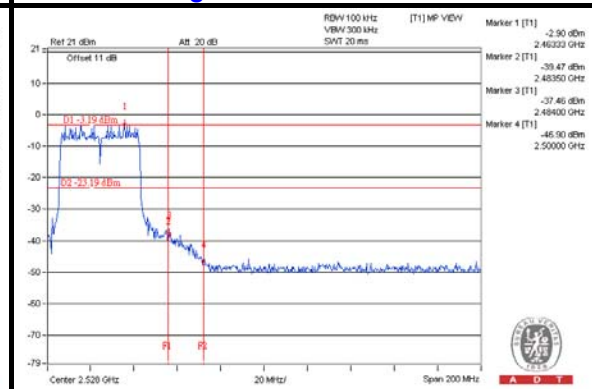
CH 9



CH 3 Band edge



CH 9 Band edge



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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6. 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: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab:

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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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7. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---