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FCC TEST REPORT (15.247)

REPORT NO.: RF120913C10
MODEL NO.: WBR4200AGN (Refer to 3.1 for more details)
FCC ID: U2M-WBR4200AGN
RECEIVED: Sep. 13, 2012
TESTED: Aug. 22 ~ Oct. 04, 2012
ISSUED: Oct. 11, 2012

APPLICANT: Senao Networks, Inc.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120913C10	Original release	Oct. 11, 2012



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1. CERTIFICATION

PRODUCT: 802.11 abgn Router
MODEL NO.: WBR4200AGN (Refer to 3.1 for more details)
BRAND: Senao Networks
APPLICANT: Senao Networks, Inc.
TESTED: Aug. 22 ~ Oct. 04, 2012
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (model: WBR4200AGN) 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 : Jemma Yang , DATE : Oct. 11, 2012
Jemma Yang / Specialist

APPROVED BY : Ken Liu , DATE : Oct. 11, 2012
Ken Liu / 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 -4.81dB at 0.34141MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2483.50MHz, 2390.00MHz, 4874.00MHz, 11490.00MHz, 11570.00MHz.
15.247(d)	Band Edge Measurement	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	Antenna connector is IPEX not a standard connector.

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	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 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	802.11 abgn Router
MODEL NO.	WBR4200AGN (Refer to Note for more details)
POWER SUPPLY	12Vdc (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 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5825MHz
NUMBER OF CHANNEL	2.4GHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) 5.0GHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	276.43mW for 2412 ~ 2462MHz 146.12mW for 5745 ~ 5825MHz
ANTENNA TYPE	PIFA antenna with 2dBi gain
ANTENNA CONNECTOR	N/A
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

1. The following models are provided to the EUT.

Brand Name	Model No.	Description
Senao Networks	WBR4200AGN	The models are electrically identical, different models no. are for marketing purpose.
Power Cloud	CR5000	

2. The frequency bands used in this EUT are listed as follows:

Frequency Band (MHz)	2412~2462	5180~5240	5745~5825
802.11b	√		
802.11g	√		
802.11a		√	√
802.11n (20MHz)	√	√	√
802.11n (40MHz)	√	√	√



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

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	2TX
802.11a	2TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

- 4. The EUT consumes power from the following adapter.

ADAPTER	
BRAND:	DVE
MODEL:	DSA-15P-12 US 120150
INPUT:	100-240Vac, 50/60Hz, 0.5A
OUTPUT:	12Vdc, 1.25A
POWER LINE:	1.5m non-shielded cable w/o core

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

3.2 DESCRIPTION OF TEST MODES

FOR 2.4GHz:

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		

FOR 5.0GHz (5745 ~ 5825MHz):

5 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz



3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

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	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

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)
-	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2



BANDEDGE MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	3 to 9	3, 9	OFDM	BPSK	15.0

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Antony Lee,
			Chris Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
PLC	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
APCM	24deg. C, 64%RH	120Vac, 60Hz	Brad Wu



FOR 5.0GHz (5745 ~ 5825MHz):

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

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)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

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)
-	802.11a	149 to 165	149	OFDM	BPSK	6.0

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149	OFDM	BPSK	6.0



BANDEDGE MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

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)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Antony Lee,
			Chris Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
PLC	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
APCM	25deg. C, 67%RH	120Vac, 60Hz	Long Chen
	25deg. C, 67%RH	120Vac, 60Hz	Jack Li



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3.3 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.

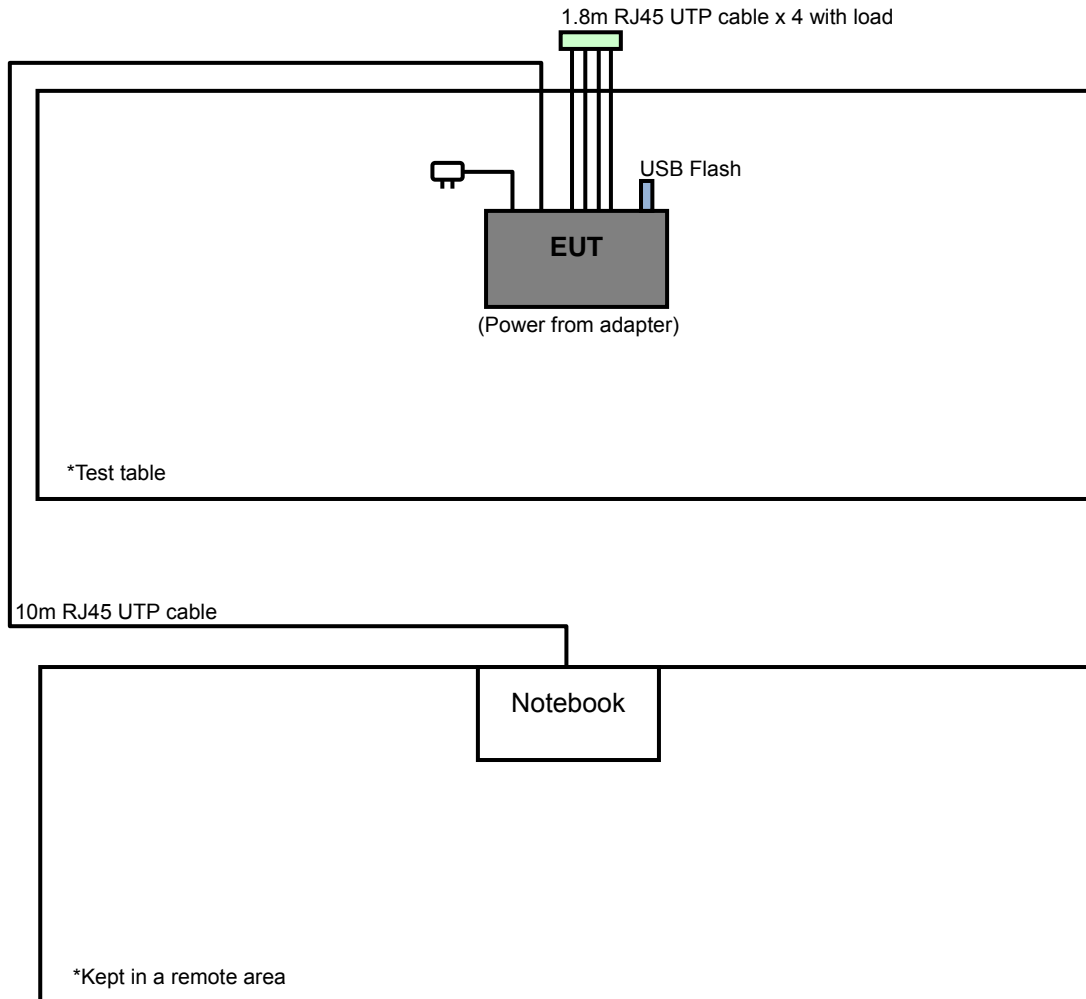
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	USB Flash	Transcend	V85	569992-8210	FCC DOC APPROVED
2	Notebook	DELL	E5420	33MLMQ1	

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	10m non-shielded RJ45 cable.

NOTE:

1. All power cords of the above support units are non shielded (1.8m).
2. Item 2 acted as communication partner to transfer data.

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST





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3.4 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 v01

ANSI C63.10-2009

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND)

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.



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4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	Aug. 06, 2012	Aug. 05, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Feb. 03, 2012	Feb. 02, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 06, 2012	Apr. 05, 2013
HORN Antenna SCHWARZBECK	9120D	209	Sep. 03, 2012	Sep. 02, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Preamplifier Agilent	8447D	2944A10633	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8449B	3008A01964	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/ 4	Aug. 28, 2012	Aug. 27, 2013
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100	TT93021703	NA	NA
Turn Table Controller ADT.	SC100	SC93021703	NA	NA
High Speed Peak Power Meter	ML2495A	0842014	Apr. 28, 2012	Apr. 27, 2013
Power Sensor	MA2411B	0738404	Apr. 28, 2012	Apr. 27, 2013

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 3.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 988962.
 5. The IC Site Registration No. is IC7450F-3.



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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. The antenna is a broadband antenna, and its height 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.

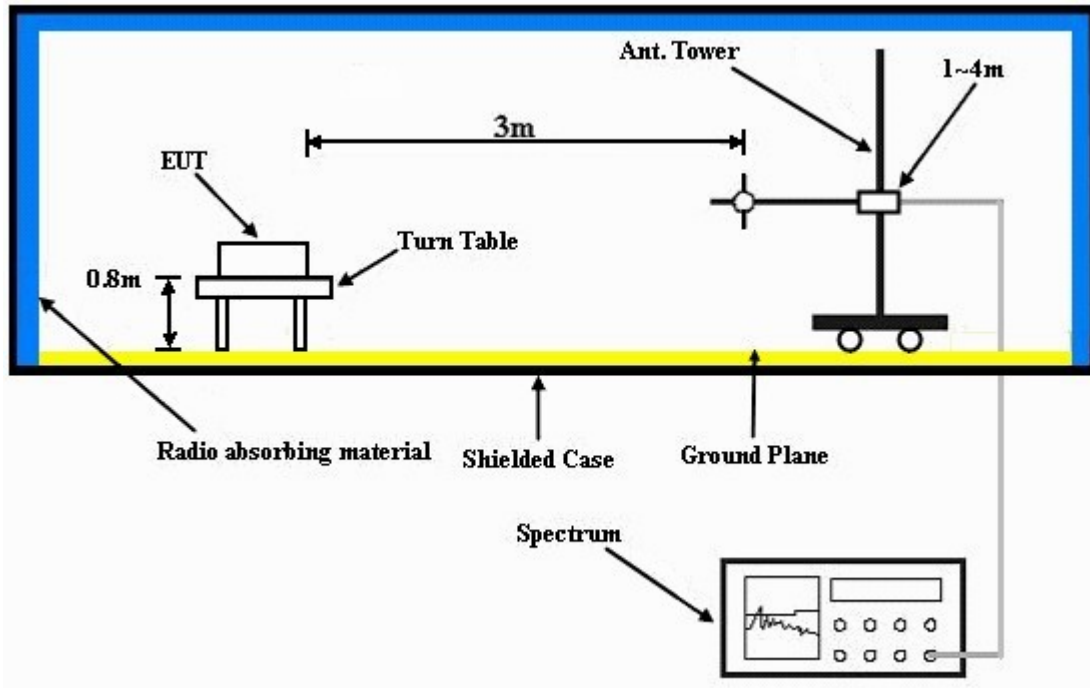
NOTE:

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 100kHz and video bandwidth is 300kHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz 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



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

4.1.6 EUT OPERATING CONDITIONS

- Placed the EUT on the testing table.
- Prepared notebook to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and run a test program to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".



4.1.7 TEST RESULTS

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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	55.0 PK	74.0	-19.0	1.00 H	63	23.70	31.30
2	2390.00	44.4 AV	54.0	-9.6	1.00 H	63	13.10	31.30
3	*2412.00	100.1 PK			1.00 H	63	68.70	31.40
4	*2412.00	95.9 AV			1.00 H	63	64.50	31.40
5	4824.00	53.7 PK	74.0	-20.3	1.02 H	200	16.50	37.20
6	4824.00	49.4 AV	54.0	-4.6	1.02 H	200	12.20	37.20
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	2362.00	58.9 PK	74.0	-15.1	1.14 V	128	27.70	31.20
2	2362.00	47.7 AV	54.0	-6.3	1.14 V	128	16.50	31.20
3	2390.00	56.5 PK	74.0	-17.5	1.12 V	131	25.20	31.30
4	2390.00	45.8 AV	54.0	-8.2	1.12 V	131	14.50	31.30
5	*2412.00	104.0 PK			1.12 V	131	72.60	31.40
6	*2412.00	99.7 AV			1.12 V	131	68.30	31.40
7	#3216.00	46.7 PK	84.0	-37.3	1.00 V	74	13.40	33.30
8	#3216.00	37.6 AV	79.7	-42.1	1.00 V	74	4.30	33.30
9	4824.00	55.7 PK	74.0	-18.3	1.23 V	335	18.50	37.20
10	4824.00	52.6 AV	54.0	-1.4	1.23 V	335	15.40	37.20

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. “#“: The radiated frequency is out the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	103.3 PK			1.00 H	24	71.80	31.50
2	*2437.00	99.0 AV			1.00 H	24	67.50	31.50
3	4874.00	55.9 PK	74.0	-18.1	1.00 H	36	18.60	37.30
4	4874.00	51.7 AV	54.0	-2.3	1.00 H	36	14.40	37.30
5	7311.00	53.7 PK	74.0	-20.3	1.00 H	26	10.20	43.50
6	7311.00	40.4 AV	54.0	-13.6	1.00 H	26	-3.10	43.50
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	106.5 PK			1.10 V	131	75.00	31.50
2	*2437.00	102.0 AV			1.10 V	131	70.50	31.50
3	2489.00	59.3 PK	74.0	-14.7	1.08 V	135	27.60	31.70
4	2489.00	48.7 AV	54.0	-5.3	1.08 V	135	17.00	31.70
5	#3249.30	43.4 PK	86.5	-43.1	1.02 V	70	10.00	33.40
6	#3249.30	34.8 AV	82.0	-47.2	1.02 V	70	1.40	33.40
7	4874.00	55.5 PK	74.0	-18.5	1.21 V	338	18.20	37.30
8	4874.00	52.5 AV	54.0	-1.5	1.21 V	338	15.20	37.30
9	7311.00	50.8 PK	74.0	-23.2	1.14 V	242	7.30	43.50
10	7311.00	40.3 AV	54.0	-13.7	1.14 V	242	-3.20	43.50

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	100.6 PK			1.00 H	27	69.00	31.60
2	*2462.00	95.0 AV			1.00 H	27	63.40	31.60
3	2483.50	57.8 PK	74.0	-16.2	1.00 H	27	26.20	31.60
4	2483.50	50.4 AV	54.0	-3.6	1.00 H	27	18.80	31.60
5	4924.00	56.5 PK	74.0	-17.5	1.01 H	203	19.10	37.40
6	4924.00	52.9 AV	54.0	-1.1	1.01 H	203	15.50	37.40

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	106.6 PK			1.11 V	138	75.00	31.60
2	*2462.00	102.2 AV			1.11 V	138	70.60	31.60
3	2483.50	61.5 PK	74.0	-12.5	1.10 V	136	29.90	31.60
4	2483.50	53.0 AV	54.0	-1.0	1.10 V	136	21.40	31.60
5	#3282.60	43.3 PK	86.6	-43.3	1.00 V	72	9.80	33.50
6	#3282.60	34.4 AV	82.2	-47.8	1.00 V	72	0.90	33.50
7	4924.00	55.2 PK	74.0	-18.8	1.21 V	336	17.80	37.40
8	4924.00	52.4 AV	54.0	-1.6	1.21 V	336	15.00	37.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#": The radiated frequency is out the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	68.6 PK	74.0	-5.4	1.00 H	79	37.30	31.30
2	2390.00	49.8 AV	54.0	-4.2	1.00 H	79	18.50	31.30
3	*2412.00	102.8 PK			1.00 H	77	71.40	31.40
4	*2412.00	93.6 AV			1.00 H	77	62.20	31.40
5	4824.00	57.7 PK	74.0	-16.3	1.60 H	17	20.50	37.20
6	4824.00	44.1 AV	54.0	-9.9	1.60 H	17	6.90	37.20
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	71.4 PK	74.0	-2.6	1.16 V	308	40.10	31.30
2	2390.00	52.7 AV	54.0	-1.3	1.16 V	308	21.40	31.30
3	*2412.00	106.6 PK			1.19 V	182	75.20	31.40
4	*2412.00	96.6 AV			1.19 V	182	65.20	31.40
5	#3216.00	46.0 PK	86.6	-40.6	1.01 V	53	12.70	33.30
6	#3216.00	39.3 AV	76.6	-37.3	1.01 V	53	6.00	33.30
7	4824.00	58.1 PK	74.0	-15.9	1.21 V	329	20.90	37.20
8	4824.00	43.1 AV	54.0	-10.9	1.21 V	329	5.90	37.20

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	106.8 PK			1.00 H	25	75.30	31.50
2	*2437.00	96.9 AV			1.00 H	25	65.40	31.50
3	4874.00	62.3 PK	74.0	-11.7	1.47 H	16	25.00	37.30
4	4874.00	48.2 AV	54.0	-5.8	1.47 H	16	10.90	37.30
5	7311.00	64.5 PK	74.0	-9.5	1.26 H	108	21.00	43.50
6	7311.00	47.0 AV	54.0	-7.0	1.26 H	108	3.50	43.50

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	60.4 PK	74.0	-13.6	1.21 V	199	29.10	31.30
2	2390.00	49.2 AV	54.0	-4.8	1.21 V	199	17.90	31.30
3	*2437.00	111.5 PK			1.18 V	183	80.00	31.50
4	*2437.00	102.1 AV			1.18 V	183	70.60	31.50
5	2485.20	60.3 PK	74.0	-13.7	1.16 V	176	28.70	31.60
6	2485.20	48.5 AV	54.0	-5.5	1.16 V	176	16.90	31.60
7	#3249.30	46.4 PK	91.5	-45.1	1.00 V	51	13.00	33.40
8	#3249.30	38.5 AV	82.1	-43.6	1.00 V	51	5.10	33.40
9	4874.00	65.8 PK	74.0	-8.2	1.08 V	331	28.50	37.30
10	4874.00	52.4 AV	54.0	-1.6	1.08 V	331	15.10	37.30
11	7311.00	60.8 PK	74.0	-13.2	1.04 V	136	17.30	43.50
12	7311.00	47.2 AV	54.0	-6.8	1.04 V	136	3.70	43.50

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#": The radiated frequency is out the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	100.0 PK			1.00 H	312	68.40	31.60
2	*2462.00	91.1 AV			1.00 H	312	59.50	31.60
3	2483.50	63.3 PK	74.0	-10.7	1.00 H	321	31.70	31.60
4	2483.50	47.2 AV	54.0	-6.8	1.00 H	321	15.60	31.60
5	4924.00	47.8 PK	74.0	-26.2	1.00 H	33	10.40	37.40
6	4924.00	36.2 AV	54.0	-17.8	1.00 H	33	-1.20	37.40
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	105.8 PK			1.16 V	208	74.20	31.60
2	*2462.00	96.1 AV			1.16 V	208	64.50	31.60
3	2483.50	70.1 PK	74.0	-3.9	1.14 V	179	38.50	31.60
4	2483.50	52.3 AV	54.0	-1.7	1.14 V	179	20.70	31.60
5	#3282.60	46.0 PK	85.8	-39.8	1.05 V	42	12.50	33.50
6	#3282.60	35.8 AV	76.1	-40.3	1.05 V	42	2.30	33.50
7	4924.00	54.6 PK	74.0	-19.4	1.06 V	177	17.20	37.40
8	4924.00	40.5 AV	54.0	-13.5	1.06 V	177	3.10	37.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#": The radiated frequency is out the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	64.0 PK	74.0	-10.0	1.00 H	308	32.70	31.30
2	2390.00	49.0 AV	54.0	-5.0	1.00 H	308	17.70	31.30
3	*2412.00	101.9 PK			1.00 H	303	70.50	31.40
4	*2412.00	91.9 AV			1.00 H	303	60.50	31.40
5	4824.00	56.5 PK	74.0	-17.5	1.31 H	52	19.30	37.20
6	4824.00	42.0 AV	54.0	-12.0	1.31 H	52	4.80	37.20
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	66.0 PK	74.0	-8.0	1.00 V	191	34.70	31.30
2	2390.00	53.0 AV	54.0	-1.0	1.00 V	191	21.70	31.30
3	*2412.00	104.8 PK			1.00 V	193	73.40	31.40
4	*2412.00	93.0 AV			1.00 V	193	61.60	31.40
5	4824.00	63.3 PK	74.0	-10.7	1.00 V	322	26.10	37.20
6	4824.00	48.9 AV	54.0	-5.1	1.00 V	322	11.70	37.20

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).
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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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	105.9 PK			1.00 H	28	74.40	31.50
2	*2437.00	96.5 AV			1.00 H	28	65.00	31.50
3	4874.00	61.5 PK	74.0	-12.5	1.30 H	50	24.20	37.30
4	4874.00	48.1 AV	54.0	-5.9	1.30 H	50	10.80	37.30
5	7311.00	57.2 PK	74.0	-16.8	1.00 H	336	13.70	43.50
6	7311.00	44.8 AV	54.0	-9.2	1.00 H	336	1.30	43.50
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	111.4 PK			1.00 V	93	79.90	31.50
2	*2437.00	101.4 AV			1.00 V	93	69.90	31.50
3	4874.00	64.3 PK	74.0	-9.7	1.00 V	193	27.00	37.30
4	4874.00	53.0 AV	54.0	-1.0	1.00 V	193	15.70	37.30
5	7311.00	60.4 PK	74.0	-13.6	1.00 V	23	16.90	43.50
6	7311.00	47.2 AV	54.0	-6.8	1.00 V	23	3.70	43.50

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).
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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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	101.2 PK			1.00 H	24	69.60	31.60
2	*2462.00	90.9 AV			1.00 H	24	59.30	31.60
3	2483.50	63.4 PK	74.0	-10.6	1.00 H	25	31.80	31.60
4	2483.50	48.3 AV	54.0	-5.7	1.00 H	25	16.70	31.60
5	4924.00	48.3 PK	74.0	-25.7	1.02 H	36	10.90	37.40
6	4924.00	36.1 AV	54.0	-17.9	1.02 H	36	-1.30	37.40
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			1.00 V	105	73.90	31.60
2	*2462.00	95.1 AV			1.00 V	105	63.50	31.60
3	2483.50	70.5 PK	74.0	-3.5	1.00 V	105	38.90	31.60
4	2483.50	53.0 AV	54.0	-1.0	1.00 V	105	21.40	31.60
5	4924.00	51.6 PK	74.0	-22.4	1.00 V	123	14.20	37.40
6	4924.00	36.4 AV	54.0	-17.6	1.00 V	123	-1.00	37.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.



A D T

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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	69.7 PK	74.0	-4.3	1.24 H	25	38.40	31.30
2	2390.00	51.9 AV	54.0	-2.1	1.24 H	25	20.60	31.30
3	*2422.00	97.9 PK			1.21 H	100	66.50	31.40
4	*2422.00	87.8 AV			1.21 H	100	56.40	31.40
5	4844.00	50.2 PK	74.0	-23.8	1.30 H	12	12.90	37.30
6	4844.00	36.4 AV	54.0	-17.6	1.30 H	12	-0.90	37.30
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	71.2 PK	74.0	-2.8	1.19 V	195	39.90	31.30
2	2390.00	52.8 AV	54.0	-1.2	1.19 V	195	21.50	31.30
3	*2422.00	99.2 PK			1.18 V	193	67.80	31.40
4	*2422.00	90.7 AV			1.18 V	193	59.30	31.40
5	#3229.30	46.0 PK	79.2	-33.2	1.00 V	56	12.60	33.40
6	#3229.30	38.4 AV	70.7	-32.3	1.00 V	56	5.00	33.40
7	4844.00	46.9 PK	74.0	-27.1	1.23 V	348	9.60	37.30
8	4844.00	34.8 AV	54.0	-19.2	1.23 V	348	-2.50	37.30

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	61.0 PK	74.0	-13.0	1.00 H	312	29.70	31.30
2	2390.00	49.9 AV	54.0	-4.1	1.00 H	312	18.60	31.30
3	*2437.00	98.8 PK			1.00 H	309	67.40	31.40
4	*2437.00	88.5 AV			1.00 H	309	57.10	31.40
5	4874.00	47.0 PK	74.0	-27.0	1.20 H	36	9.70	37.30
6	4874.00	35.3 AV	54.0	-18.7	1.20 H	36	-2.00	37.30

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	67.7 PK	74.0	-6.3	1.20 V	194	36.40	31.30
2	2390.00	52.6 AV	54.0	-1.4	1.20 V	194	21.30	31.30
3	*2437.00	101.2 PK			1.19 V	195	69.70	31.50
4	*2437.00	92.3 AV			1.19 V	195	60.80	31.50
5	4874.00	51.7 PK	74.0	-22.3	1.06 V	329	14.40	37.30
6	4874.00	38.5 AV	54.0	-15.5	1.06 V	329	1.20	37.30
7	7311.00	52.6 PK	74.0	-21.4	1.00 V	18	9.10	43.50
8	7311.00	39.5 AV	54.0	-14.5	1.00 V	18	-4.00	43.50

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).
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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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	25deg. C, 65%RH	TESTED BY	Antony Lee

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	95.7 PK			1.02 H	309	64.20	31.50
2	*2452.00	85.8 AV			1.02 H	309	54.30	31.50
3	2483.50	64.8 PK	74.0	-9.2	1.00 H	305	33.20	31.60
4	2483.50	48.4 AV	54.0	-5.6	1.00 H	305	16.80	31.60
5	4904.00	47.1 PK	74.0	-26.9	1.21 H	66	9.70	37.40
6	4904.00	34.9 AV	54.0	-19.1	1.21 H	66	-2.50	37.40
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	99.5 PK			1.13 V	151	68.00	31.50
2	*2452.00	90.5 AV			1.13 V	151	59.00	31.50
3	2483.50	70.1 PK	74.0	-3.9	1.14 V	193	38.50	31.60
4	2483.50	52.8 AV	54.0	-1.2	1.14 V	193	21.20	31.60
5	#3269.30	45.2 PK	79.5	-34.3	1.00 V	56	11.80	33.40
6	#3269.30	36.7 AV	70.5	-33.8	1.00 V	56	3.30	33.40
7	4904.00	48.7 PK	74.0	-25.3	1.19 V	336	11.30	37.40
8	4904.00	35.3 AV	54.0	-18.7	1.19 V	336	-2.10	37.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Chris Lin

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	125.17	39.3 QP	43.5	-4.2	1.50 H	7	27.00	12.30
2	249.60	35.0 QP	46.0	-11.0	1.00 H	99	22.00	13.00
3	399.31	39.9 QP	46.0	-6.1	1.00 H	120	22.40	17.50
4	500.42	34.5 QP	46.0	-11.5	1.99 H	328	14.50	20.00
5	624.85	39.4 QP	46.0	-6.6	1.24 H	309	17.10	22.30
6	947.60	39.0 QP	46.0	-7.0	1.50 H	97	11.70	27.30

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	55.18	35.1 QP	40.0	-4.9	1.00 V	16	21.40	13.70
2	117.39	38.9 QP	43.5	-4.6	1.00 V	222	27.40	11.50
3	399.31	39.5 QP	46.0	-6.5	1.00 V	138	22.00	17.50
4	500.42	36.0 QP	46.0	-10.0	1.00 V	16	16.00	20.00
5	624.85	34.6 QP	46.0	-11.4	1.50 V	345	12.30	22.30
6	875.67	35.4 QP	46.0	-10.6	1.24 V	200	8.90	26.50

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



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4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	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	100289	Nov. 19, 2011	Nov. 18, 2012
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 29, 2011	Dec. 28, 2012
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 30, 2011	Dec. 29, 2012
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 06, 2012	Jul. 05, 2013
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

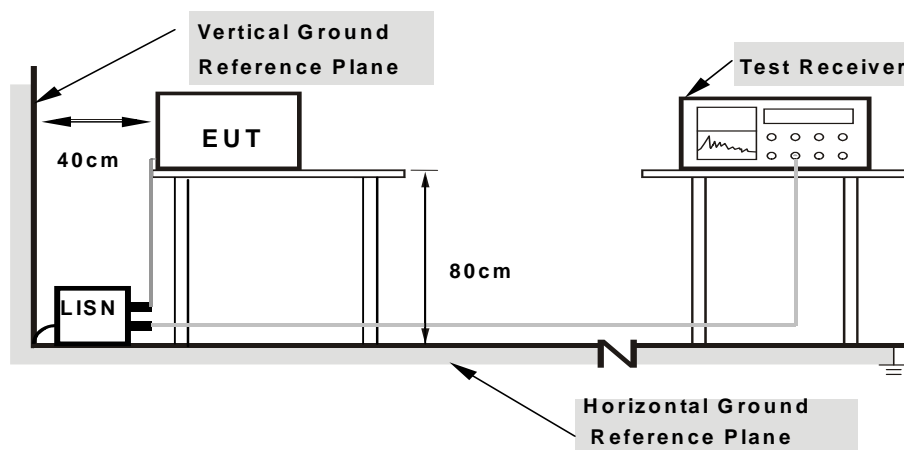
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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: 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 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.

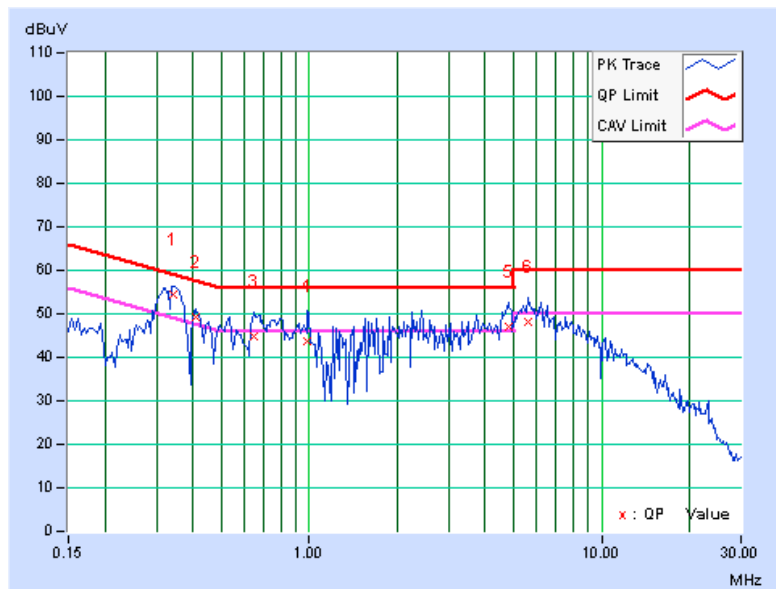
4.2.7 TEST RESULTS

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	0.34141	0.16	54.19	45.86	54.35	46.02	59.17	49.17	-4.81	-3.14
2	0.40781	0.17	49.01	38.11	49.18	38.28	57.69	47.69	-8.51	-9.41
3	0.65000	0.18	44.57	30.18	44.75	30.36	56.00	46.00	-11.25	-15.64
4	0.98594	0.19	43.69	29.01	43.88	29.20	56.00	46.00	-12.12	-16.80
5	4.79688	0.35	46.83	36.01	47.18	36.36	56.00	46.00	-8.82	-9.64
6	5.59766	0.36	47.72	37.33	48.08	37.69	60.00	50.00	-11.92	-12.31

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



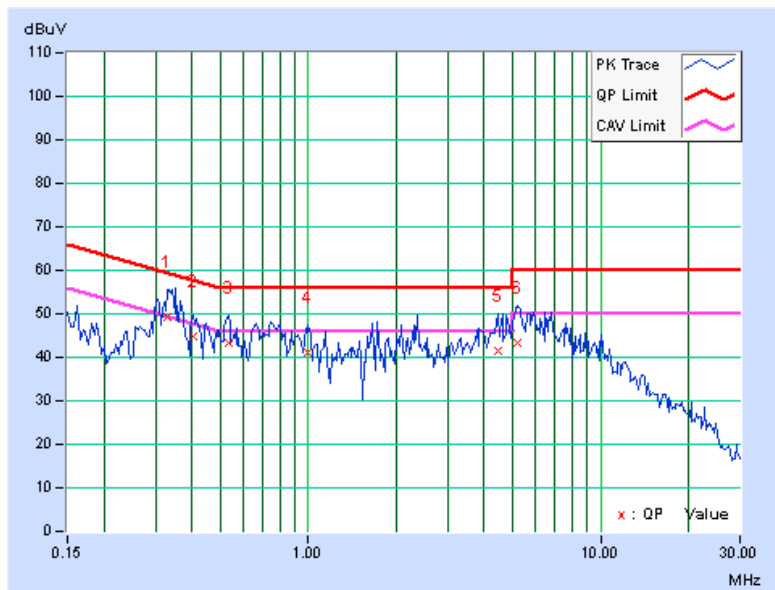


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PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.32969	0.15	49.28	35.53	49.43	35.68	59.46	49.46	-10.03	-13.78
2	0.40391	0.16	44.50	31.13	44.66	31.29	57.77	47.77	-13.11	-16.48
3	0.53281	0.17	43.00	30.74	43.17	30.91	56.00	46.00	-12.83	-15.09
4	1.00021	0.19	40.76	26.49	40.95	26.68	56.00	46.00	-15.05	-19.32
5	4.43750	0.36	41.05	29.46	41.41	29.82	56.00	46.00	-14.59	-16.18
6	5.21875	0.38	42.82	32.30	43.20	32.68	60.00	50.00	-16.80	-17.32

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

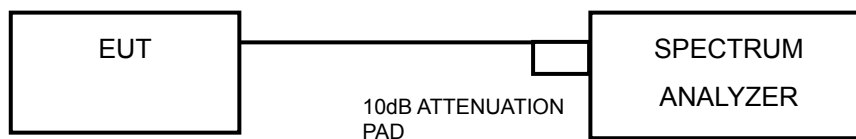


4.3 6dB BANDWIDTH MEASUREMENT

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) = approximately 1% of the emission bandwidth
- 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	10.29	0.5	PASS
6	2437	10.30	0.5	PASS
11	2462	10.30	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.49	16.47	0.5	PASS
6	2437	16.56	16.60	0.5	PASS
11	2462	16.50	16.52	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.76	17.76	0.5	PASS
6	2437	17.87	17.80	0.5	PASS
11	2462	17.75	17.74	0.5	PASS



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802.11n (40MHz)

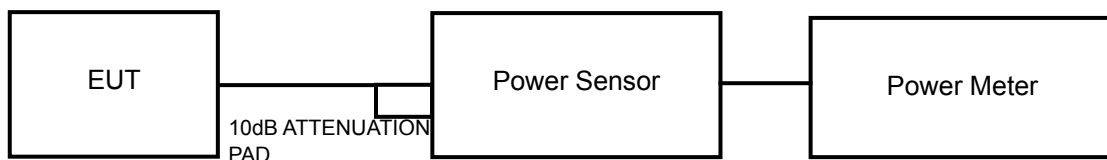
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	36.88	36.93	0.5	PASS
6	2437	37.36	36.81	0.5	PASS
9	2452	36.85	37.07	0.5	PASS

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

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	55.72	17.46	30	PASS
6	2437	63.68	18.04	30	PASS
11	2462	39.90	16.01	30	PASS

802.11g

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	18.02	17.68	122.00	20.86	30	PASS
6	2437	21.22	21.40	270.47	24.32	30	PASS
11	2462	15.97	16.34	82.59	19.17	30	PASS

NOTE: Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, therefore the limit no need to reduced.

802.11n (20MHz)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	16.94	18.54	120.88	20.82	30	PASS
6	2437	21.34	21.47	276.43	24.42	30	PASS
11	2462	15.94	16.91	88.36	19.46	30	PASS

NOTE: Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, therefore the limit no need to reduced.

802.11n (40MHz)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	14.73	13.36	51.39	17.11	30	PASS
6	2437	17.62	17.57	114.96	20.61	30	PASS
9	2452	15.41	16.12	75.68	18.79	30	PASS

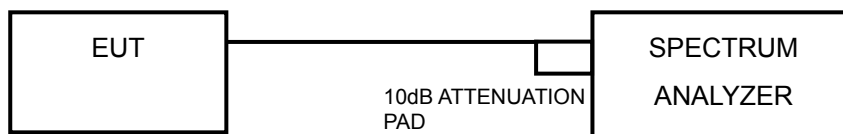
NOTE: Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, therefore the limit no need to reduced.

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

- Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3 \text{ kHz}/100\text{kHz})$

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/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	5.95	-9.28	8	PASS
6	2437	6.44	-8.79	8	PASS
11	2462	4.30	-10.93	8	PASS

802.11g

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-0.89	-16.12	3.01	-13.11	8	PASS
	6	2437	2.44	-12.79	3.01	-9.78	8	PASS
	11	2462	-3.00	-18.23	3.01	-15.22	8	PASS
1	1	2412	-1.24	-16.47	3.01	-13.46	8	PASS
	6	2437	2.68	-12.55	3.01	-9.54	8	PASS
	11	2462	-2.41	-17.64	3.01	-14.63	8	PASS

NOTE: Directional gain = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, therefore the limit no need to reduced.

802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-2.51	-17.74	3.01	-14.73	8	PASS
	6	2437	2.07	-13.16	3.01	-10.15	8	PASS
	11	2462	-3.67	-18.90	3.01	-15.89	8	PASS
1	1	2412	-0.24	-15.47	3.01	-12.46	8	PASS
	6	2437	2.87	-12.36	3.01	-9.35	8	PASS
	11	2462	-1.84	-17.07	3.01	-14.06	8	PASS

NOTE: Directional gain = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, therefore the limit no need to reduced.



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802.11n (40MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-7.82	-23.05	3.01	-20.04	8	PASS
	6	2437	-4.83	-20.06	3.01	-17.05	8	PASS
	9	2452	-6.64	-21.87	3.01	-18.86	8	PASS
1	3	2422	-9.36	-24.59	3.01	-21.58	8	PASS
	6	2437	-4.95	-20.18	3.01	-17.17	8	PASS
	9	2452	-6.65	-21.88	3.01	-18.87	8	PASS

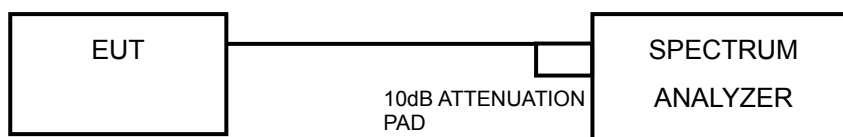
NOTE: Directional gain = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, therefore the limit no need to reduced.

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.



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MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW \geq 300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

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

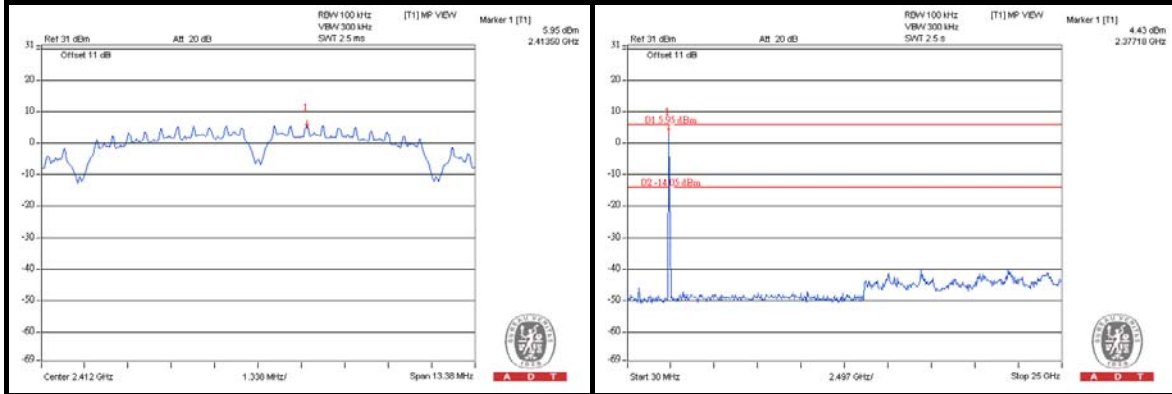
The conducted emission test is performed on each TX port of operating mode without summing or adding $10\log(N)$ since the limit is relative emission limit. Only worst data of each operating mode is presented.

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.

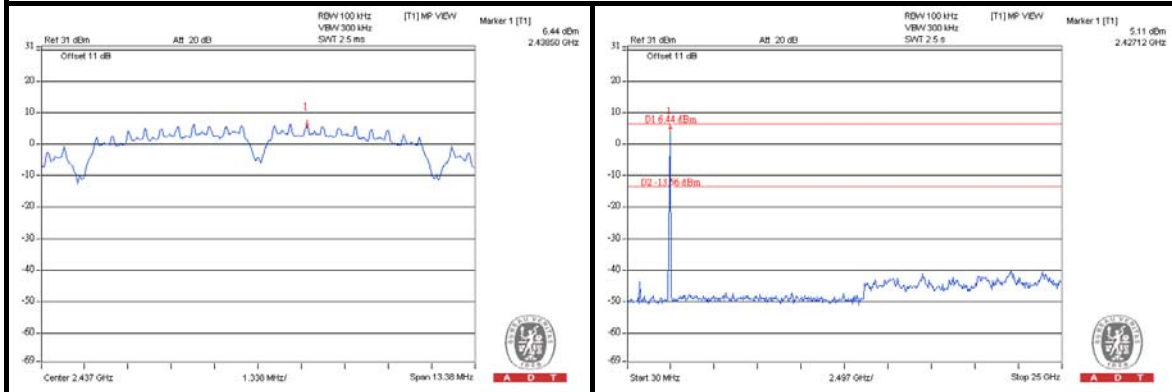
4.6.8 TEST RESULTS

802.11b

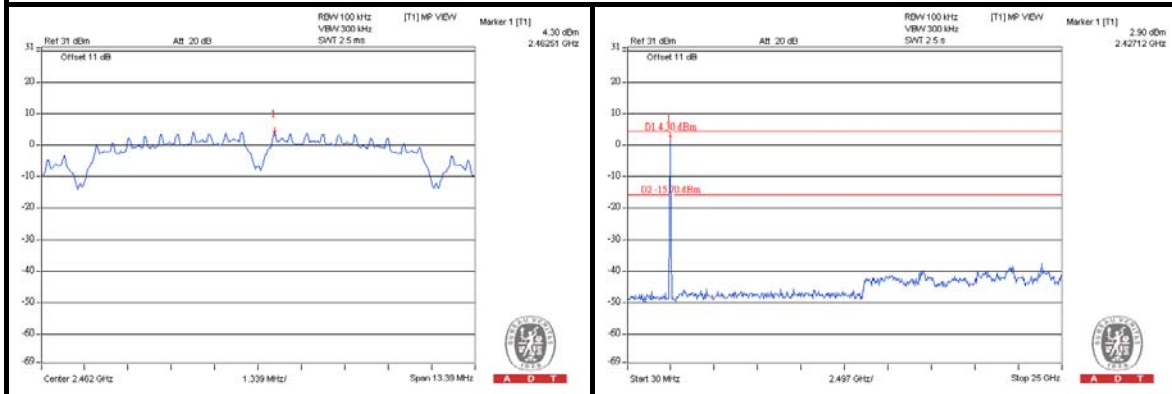
CH 1



CH 6

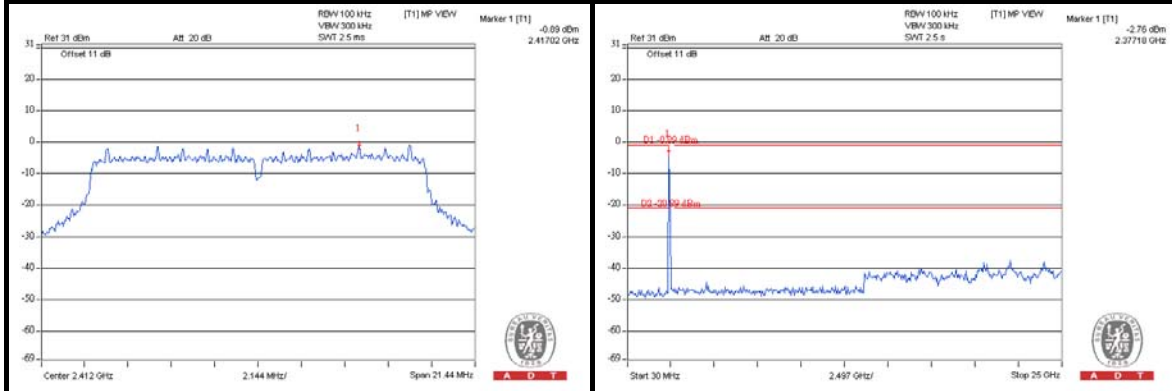


CH 11

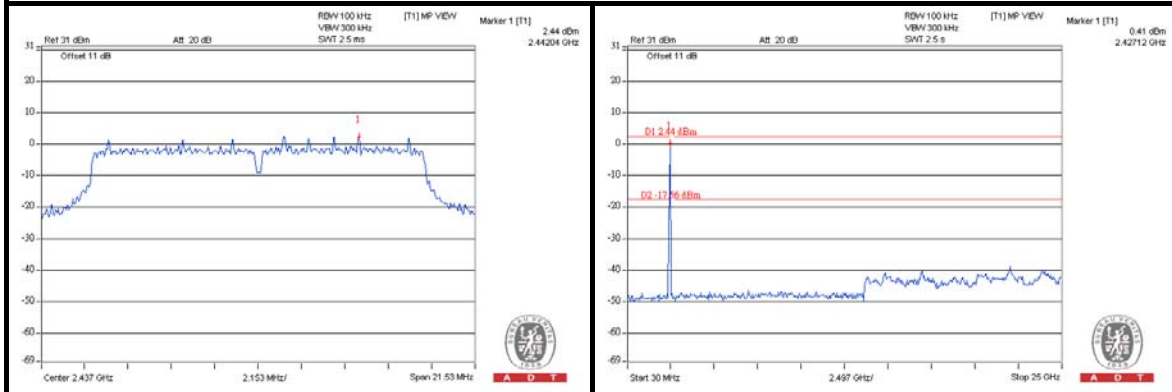


802.11g

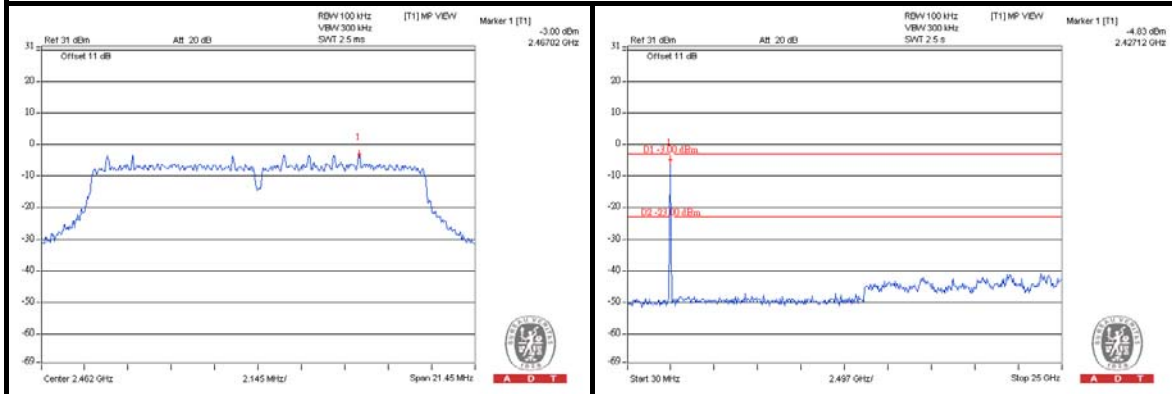
CH 1



CH 6

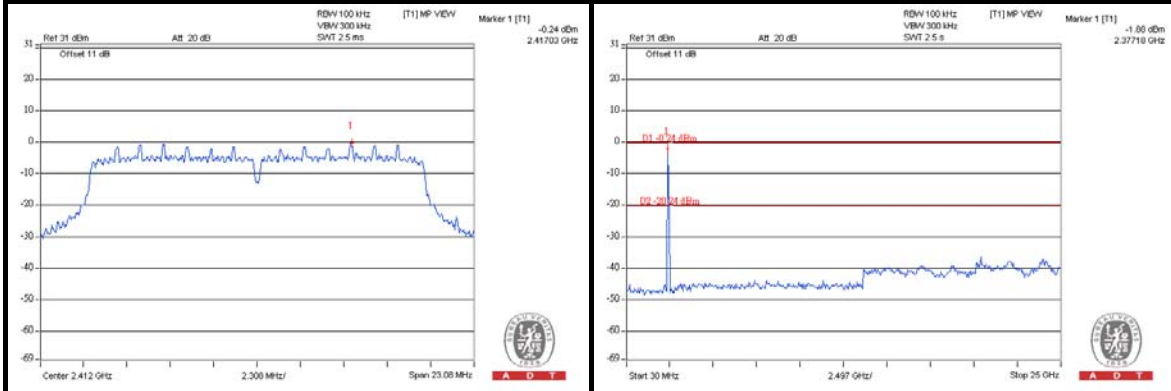


CH 11

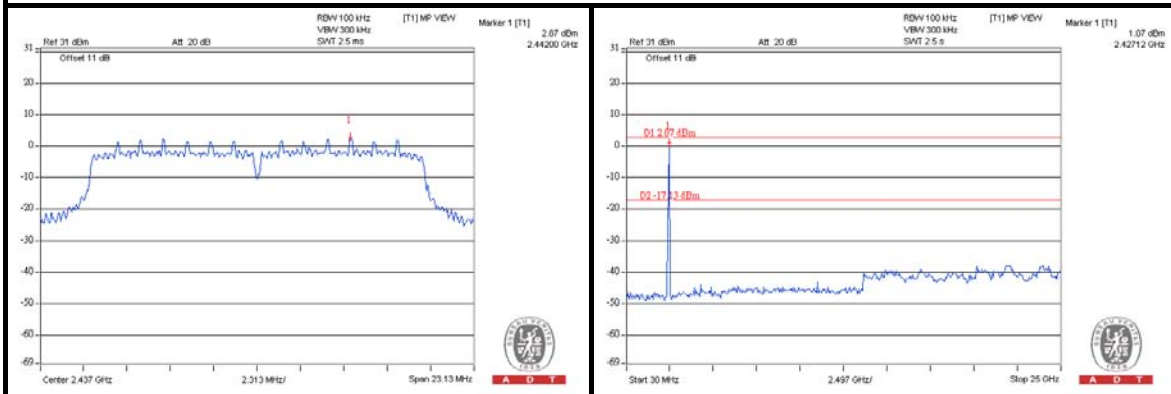


802.11n (20MHz)

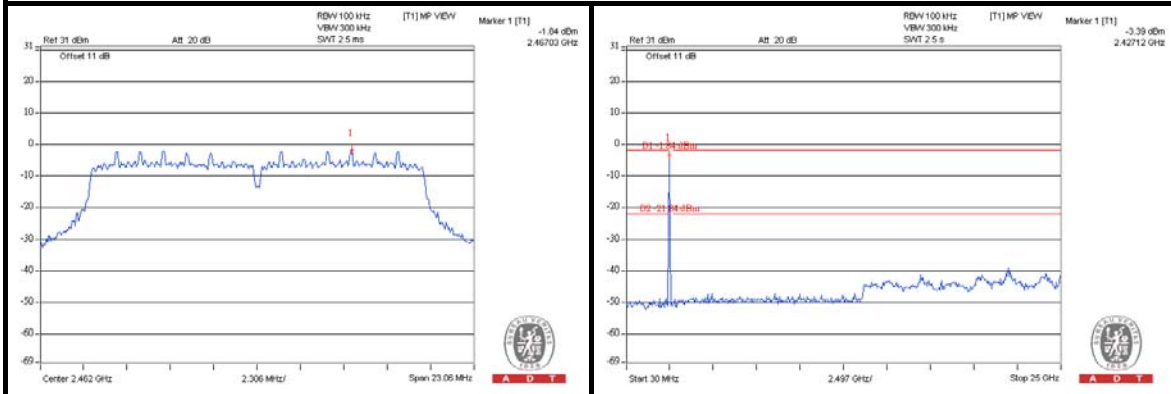
CH 1

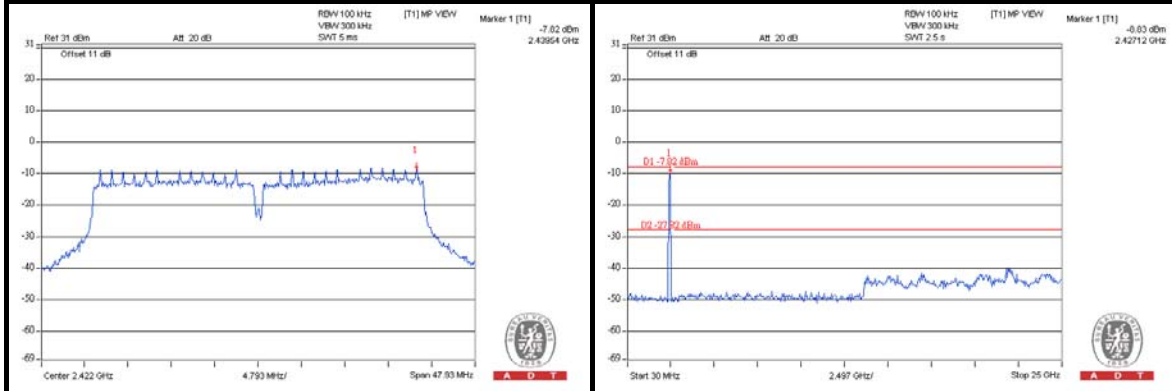
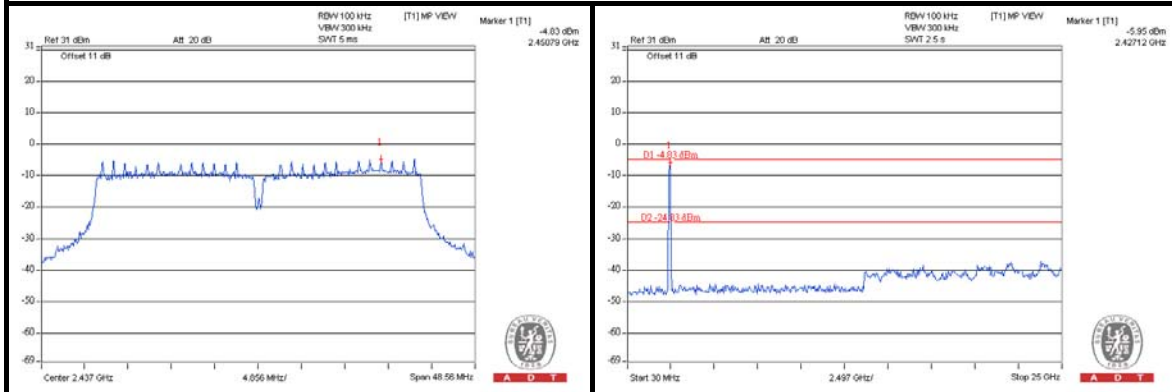
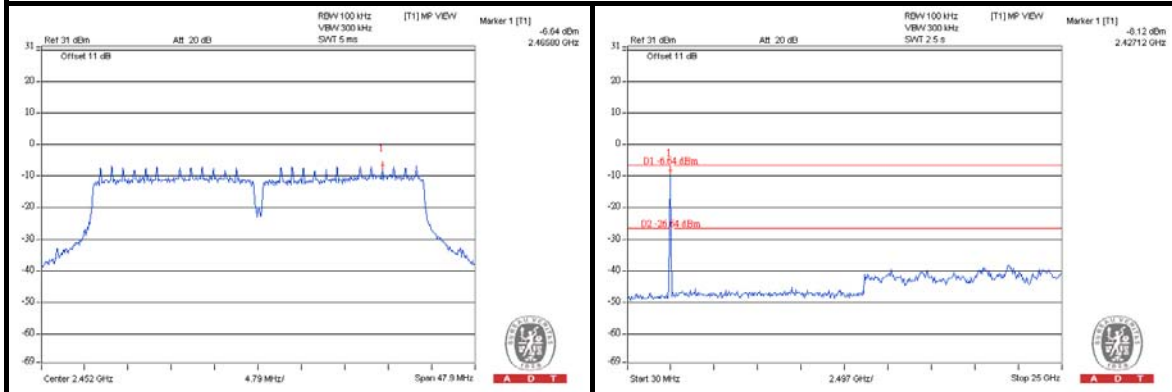


CH 6



CH 11



802.11n (40MHz)**CH 3****CH 6****CH 9**



5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 LIMITS OF RADIATED EMISSION 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.



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5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

5.1.3 TEST PROCEDURES

Same as item 4.1.3.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP

Same as item 4.1.5.

5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6.



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5.1.7 TEST RESULTS

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	#5725.00	76.2 PK	87.3	-11.1	1.00 H	16	37.20	39.00
2	#5725.00	58.5 AV	76.9	-18.4	1.00 H	16	19.50	39.00
3	*5745.00	107.3 PK			1.00 H	12	68.30	39.00
4	*5745.00	96.9 AV			1.00 H	12	57.90	39.00
5	11490.00	61.0 PK	74.0	-13.0	1.00 H	230	10.70	50.30
6	11490.00	48.0 AV	54.0	-6.0	1.00 H	230	-2.30	50.30
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	5080.00	57.5 PK	74.0	-16.5	1.40 V	47	19.70	37.80
2	5080.00	46.7 AV	54.0	-7.3	1.40 V	47	8.90	37.80
3	5400.00	58.6 PK	74.0	-15.4	1.22 V	235	20.30	38.30
4	5400.00	46.5 AV	54.0	-7.5	1.22 V	235	8.20	38.30
5	#5725.00	74.3 PK	88.2	-13.9	1.03 V	342	35.30	39.00
6	#5725.00	62.4 AV	76.3	-13.9	1.03 V	342	23.40	39.00
7	*5745.00	108.2 PK			1.03 V	341	69.20	39.00
8	*5745.00	96.3 AV			1.03 V	341	57.30	39.00
9	11490.00	66.9 PK	74.0	-7.1	1.74 V	316	16.60	50.30
10	11490.00	53.0 AV	54.0	-1.0	1.74 V	316	2.70	50.30

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. "#":The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	*5785.00	107.7 PK			1.31 H	49	68.60	39.10
2	*5785.00	97.5 AV			1.31 H	49	58.40	39.10
3	11570.00	60.2 PK	74.0	-13.8	1.00 H	169	10.00	50.20
4	11570.00	47.9 AV	54.0	-6.1	1.00 H	169	-2.30	50.20
5	#17355.00	66.4 PK	87.7	-21.3	1.00 H	125	12.40	54.00
6	#17355.00	52.3 AV	77.5	-25.2	1.00 H	125	-1.70	54.00
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	*5785.00	108.3 PK			1.48 V	315	69.20	39.10
2	*5785.00	98.3 AV			1.48 V	315	59.20	39.10
3	11570.00	70.0 PK	74.0	-4.0	1.42 V	315	19.80	50.20
4	11570.00	53.0 AV	54.0	-1.0	1.42 V	315	2.80	50.20
5	#17355.00	66.8 PK	88.3	-21.5	1.00 V	64	12.80	54.00
6	#17355.00	51.8 AV	78.3	-26.5	1.00 V	64	-2.20	54.00

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#“: The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	*5825.00	104.9 PK			1.58 H	13	65.80	39.10
2	*5825.00	93.9 AV			1.58 H	13	54.80	39.10
3	#5850.00	49.4 PK	84.9	-35.5	1.00 H	19	10.20	39.20
4	#5850.00	37.6 AV	73.9	-36.3	1.00 H	19	-1.60	39.20
5	11650.00	59.8 PK	74.0	-14.2	1.00 H	33	9.60	50.20
6	11650.00	48.2 AV	54.0	-5.8	1.00 H	33	-2.00	50.20
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	*5825.00	105.9 PK			1.02 V	337	66.80	39.10
2	*5825.00	94.4 AV			1.02 V	337	55.30	39.10
3	#5850.00	65.3 PK	85.9	-20.6	1.02 V	337	26.10	39.20
4	#5850.00	53.8 AV	74.4	-20.6	1.02 V	337	14.60	39.20
5	11650.00	68.1 PK	74.0	-5.9	1.49 V	315	17.90	50.20
6	11650.00	52.6 AV	54.0	-1.4	1.49 V	315	2.40	50.20

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#“:The radiated frequency is out the restricted band.



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802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	#5725.00	76.5 PK	87.6	-11.1	1.00 H	16	37.50	39.00
2	#5725.00	58.2 AV	77.3	-19.1	1.00 H	16	19.20	39.00
3	*5745.00	107.6 PK			1.00 H	16	68.60	39.00
4	*5745.00	97.3 AV			1.00 H	16	58.30	39.00
5	11490.00	60.6 PK	74.0	-13.4	1.00 H	58	10.30	50.30
6	11490.00	48.9 AV	54.0	-5.1	1.00 H	58	-1.40	50.30

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	#5725.00	76.2 PK	89.1	-12.9	1.00 V	114	37.20	39.00
2	#5725.00	58.1 AV	78.7	-20.6	1.00 V	114	19.10	39.00
3	*5745.00	109.1 PK			1.00 V	114	70.10	39.00
4	*5745.00	98.7 AV			1.00 V	114	59.70	39.00
5	11490.00	64.0 PK	74.0	-10.0	1.00 V	258	13.70	50.30
6	11490.00	52.3 AV	54.0	-1.7	1.00 V	258	2.00	50.30

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. "#":The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	*5785.00	107.3 PK			1.61 H	14	68.20	39.10
2	*5785.00	96.7 AV			1.61 H	14	57.60	39.10
3	11570.00	60.7 PK	74.0	-13.3	1.00 H	64	10.50	50.20
4	11570.00	48.8 AV	54.0	-5.2	1.00 H	64	-1.40	50.20
5	#17355.00	67.0 PK	87.3	-20.3	1.00 H	258	13.00	54.00
6	#17355.00	51.7 AV	76.7	-25.0	1.00 H	258	-2.30	54.00
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	*5785.00	107.5 PK			1.12 V	309	68.40	39.10
2	*5785.00	96.9 AV			1.12 V	309	57.80	39.10
3	11570.00	65.3 PK	74.0	-8.7	1.00 V	64	15.10	50.20
4	11570.00	52.4 AV	54.0	-1.6	1.00 V	64	2.20	50.20
5	#17355.00	67.1 PK	87.5	-20.4	1.00 V	23	13.10	54.00
6	#17355.00	52.0 AV	76.9	-24.9	1.00 V	23	-2.00	54.00

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. "#":The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	*5825.00	104.9 PK			1.55 H	36	65.80	39.10
2	*5825.00	94.2 AV			1.55 H	36	55.10	39.10
3	#5850.00	50.2 PK	84.9	-34.7	1.55 H	36	11.00	39.20
4	#5850.00	38.3 AV	74.2	-35.9	1.55 H	36	-0.90	39.20
5	11650.00	60.5 PK	74.0	-13.5	1.00 H	15	10.30	50.20
6	11650.00	49.3 AV	54.0	-4.7	1.00 H	15	-0.90	50.20
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	*5825.00	106.1 PK			1.00 V	317	67.00	39.10
2	*5825.00	95.0 AV			1.00 V	317	55.90	39.10
3	#5850.00	66.4 PK	86.1	-19.7	1.00 V	317	27.20	39.20
4	#5850.00	54.3 AV	75.0	-20.7	1.00 V	317	15.10	39.20
5	11650.00	66.5 PK	74.0	-7.5	1.00 V	163	16.30	50.20
6	11650.00	52.2 AV	54.0	-1.8	1.00 V	163	2.00	50.20

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#“: The radiated frequency is out the restricted band.



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	#5725.00	72.7 PK	84.6	-11.9	1.02 H	15	33.70	39.00
2	#5725.00	53.9 AV	74.7	-20.8	1.02 H	15	14.90	39.00
3	*5755.00	104.6 PK			1.02 H	15	65.60	39.00
4	*5755.00	94.7 AV			1.02 H	15	55.70	39.00
5	11510.00	60.9 PK	74.0	-13.1	1.00 H	23	10.60	50.30
6	11510.00	49.0 AV	54.0	-5.0	1.00 H	23	-1.30	50.30

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	#5725.00	76.1 PK	86.4	-10.3	1.02 V	346	37.10	39.00
2	#5725.00	66.4 AV	76.7	-10.3	1.02 V	346	27.40	39.00
3	*5755.00	106.4 PK			1.03 V	343	67.40	39.00
4	*5755.00	96.7 AV			1.03 V	343	57.70	39.00
5	11510.00	64.9 PK	74.0	-9.1	1.50 V	317	14.60	50.30
6	11510.00	52.7 AV	54.0	-1.3	1.50 V	317	2.40	50.30

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”:The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	*5795.00	102.3 PK			1.21 H	36	63.20	39.10
2	*5795.00	92.5 AV			1.21 H	36	53.40	39.10
3	#5850.00	59.3 PK	82.3	-23.0	1.21 H	36	20.10	39.20
4	#5850.00	48.4 AV	72.5	-24.1	1.21 H	36	9.20	39.20
5	11590.00	61.2 PK	74.0	-12.8	1.00 H	67	11.00	50.20
6	11590.00	49.3 AV	54.0	-4.7	1.00 H	67	-0.90	50.20
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	*5795.00	104.8 PK			1.02 V	349	65.70	39.10
2	*5795.00	95.1 AV			1.02 V	349	56.00	39.10
3	#5850.00	57.4 PK	84.8	-27.4	1.02 V	349	18.20	39.20
4	#5850.00	47.7 AV	75.1	-27.4	1.02 V	349	8.50	39.20
5	11590.00	64.6 PK	74.0	-9.4	1.64 V	317	14.40	50.20
6	11590.00	52.7 AV	54.0	-1.3	1.64 V	317	2.50	50.20

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#“:The radiated frequency is out the restricted band.



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BELOW 1GHz WORST-CASE DATA : 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Chris Lin

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	125.17	39.0 QP	43.5	-4.5	1.50 H	13	26.70	12.30
2	249.60	35.5 QP	46.0	-10.5	1.00 H	83	22.50	13.00
3	399.31	40.1 QP	46.0	-5.9	1.00 H	116	22.60	17.50
4	500.42	36.6 QP	46.0	-9.4	1.99 H	332	16.60	20.00
5	624.85	39.1 QP	46.0	-6.9	1.25 H	300	16.80	22.30
6	947.60	39.0 QP	46.0	-7.0	1.50 H	99	11.70	27.30

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	41.57	36.9 QP	40.0	-3.1	2.00 V	286	23.10	13.80
2	117.39	38.3 QP	43.5	-5.2	1.00 V	191	26.80	11.50
3	399.31	41.8 QP	46.0	-4.2	1.00 V	142	24.30	17.50
4	500.42	37.4 QP	46.0	-8.6	1.24 V	15	17.40	20.00
5	624.85	35.6 QP	46.0	-10.4	1.24 V	119	13.30	22.30
6	875.67	36.5 QP	46.0	-9.5	1.24 V	199	10.00	26.50

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	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.

5.2.2 TEST INSTRUMENTS

Same as item 4.2.2.

5.2.3 TEST PROCEDURES

Same as item 4.2.3.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

5.2.5 TEST SETUP

Same as item 4.2.5.

5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

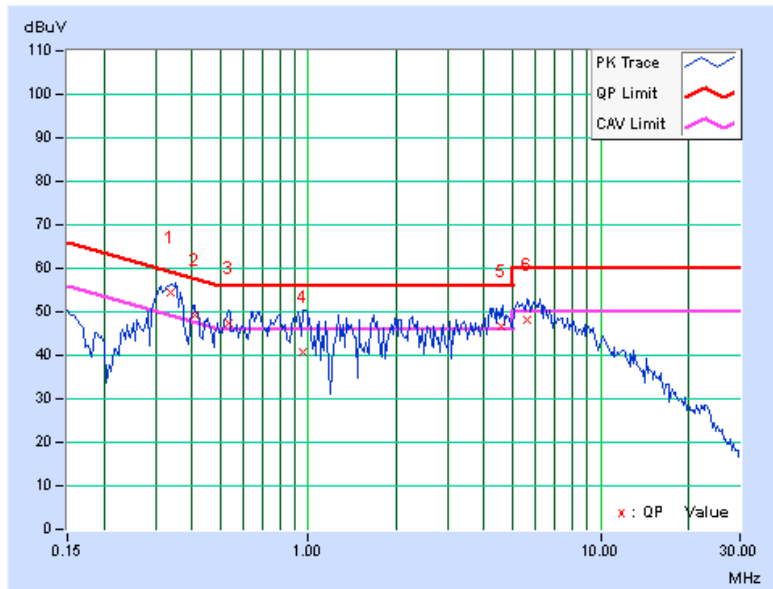
5.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11a

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.33750	0.16	54.25	45.69	54.41	45.85	59.26	49.26	-4.85	-3.41
2	0.40781	0.17	49.26	38.23	49.43	38.40	57.69	47.69	-8.26	-9.29
3	0.53281	0.17	47.14	35.66	47.31	35.83	56.00	46.00	-8.69	-10.17
4	0.95859	0.19	40.45	26.60	40.64	26.79	56.00	46.00	-15.36	-19.21
5	4.55469	0.35	46.47	35.32	46.82	35.67	56.00	46.00	-9.18	-10.33
6	5.63672	0.36	47.80	37.47	48.16	37.83	60.00	50.00	-11.84	-12.17

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



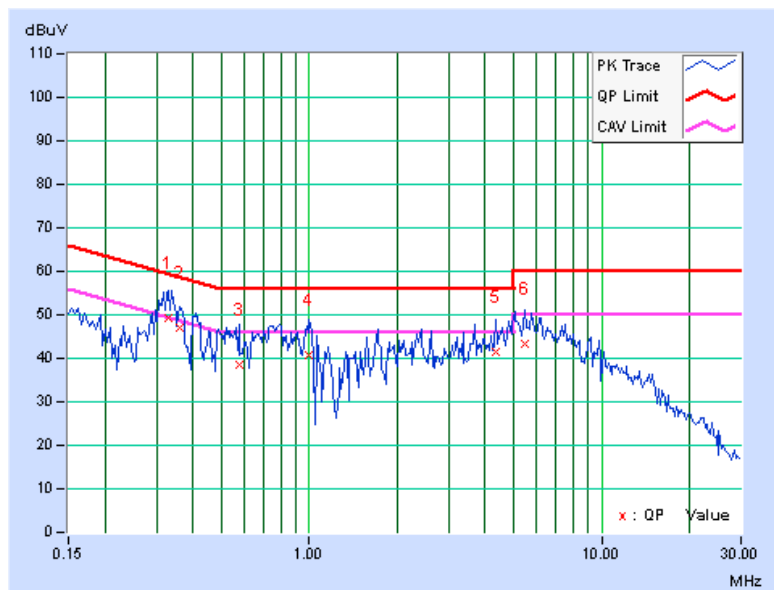


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PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.32969	0.15	49.07	34.99	49.22	35.14	59.46	49.46	-10.24	-14.32
2	0.36094	0.16	46.74	29.49	46.90	29.65	58.71	48.71	-11.81	-19.06
3	0.57578	0.17	38.25	23.10	38.42	23.27	56.00	46.00	-17.58	-22.73
4	0.99766	0.19	40.47	26.05	40.66	26.24	56.00	46.00	-15.34	-19.76
5	4.36719	0.36	40.96	29.68	41.32	30.04	56.00	46.00	-14.68	-15.96
6	5.46484	0.38	42.89	32.35	43.27	32.73	60.00	50.00	-16.73	-17.27

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.





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5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

5.3.2 TEST SETUP

Same as item 4.3.2.

5.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.3.4 TEST PROCEDURE

Same as item 4.3.4.

5.3.5 DEVIATION FROM TEST STANDARD

No deviation.

5.3.6 EUT OPERATING CONDITIONS

Same as item 4.3.6.



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5.3.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	16.45	16.54	0.5	PASS
157	5785	16.48	16.54	0.5	PASS
165	5825	16.46	16.56	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.67	17.77	0.5	PASS
157	5785	17.67	17.79	0.5	PASS
165	5825	17.58	17.76	0.5	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	36.56	36.36	0.5	PASS
159	5795	36.14	36.66	0.5	PASS



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5.4 CONDUCTED OUTPUT POWER

5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725 –5850 MHz bands: 1 Watt (30dBm)

5.4.2 TEST SETUP

Same as Item 4.4.2.

5.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.4.4 TEST PROCEDURES

Same as Item 4.4.4.

5.4.5 DEVIATION FROM TEST STANDARD

No deviation.

5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.



5.4.7 TEST RESULTS

802.11a

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	17.62	19.46	146.12	21.65	30	PASS
157	5785	17.19	17.81	112.75	20.52	30	PASS
165	5825	18.27	17.78	127.12	21.04	30	PASS

NOTE: Directional gain = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, therefore the limit no need to reduced.

802.11n (20MHz)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	18.41	17.84	130.16	21.14	30	PASS
157	5785	18.15	17.54	122.07	20.87	30	PASS
165	5825	17.04	16.71	97.46	19.89	30	PASS

NOTE: Directional gain = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, therefore the limit no need to reduced.

802.11n (40MHz)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
151	5755	18.19	19.03	145.90	21.64	30	PASS
159	5795	18.21	18.75	141.21	21.50	30	PASS

NOTE: Directional gain = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, therefore the limit no need to reduced.



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5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST SETUP

Same as item 4.5.2.

5.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.5.4 TEST PROCEDURE.

Same as item 4.5.4.

5.5.5 DEVIATION FROM TEST STANDARD

No deviation.

5.5.6 EUT OPERATING CONDITION

Same as item 4.3.6.



5.5.7 TEST RESULTS

802.11a

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-3.87	-19.10	3.01	-16.09	8	PASS
	157	5785	-4.29	-19.52	3.01	-16.51	8	PASS
	165	5825	-2.98	-18.21	3.01	-15.20	8	PASS
1	149	5745	-3.08	-18.31	3.01	-15.30	8	PASS
	157	5785	-4.59	-19.82	3.01	-16.81	8	PASS
	165	5825	-4.80	-20.03	3.01	-17.02	8	PASS

NOTE: Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, therefore the limit no need to reduced.

802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-3.08	-18.31	3.01	-15.30	8	PASS
	157	5785	-3.15	-18.38	3.01	-15.37	8	PASS
	165	5825	-4.23	-19.46	3.01	-16.45	8	PASS
1	149	5745	-5.60	-20.83	3.01	-17.82	8	PASS
	157	5785	-5.71	-20.94	3.01	-17.93	8	PASS
	165	5825	-6.61	-21.84	3.01	-18.83	8	PASS

NOTE: Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, therefore the limit no need to reduced.

802.11n (40MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-6.08	-21.31	3.01	-18.30	8	PASS
	159	5795	-6.10	-21.33	3.01	-18.32	8	PASS
1	151	5755	-4.64	-19.87	3.01	-16.86	8	PASS
	159	5795	-4.74	-19.97	3.01	-16.96	8	PASS

NOTE: Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, therefore the limit no need to reduced.



5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

5.6.2 TEST SETUP

Same as Item 4.6.2

5.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.6.4 TEST PROCEDURE

Same as Item 4.6.4

5.6.5 DEVIATION FROM TEST STANDARD

No deviation.

5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

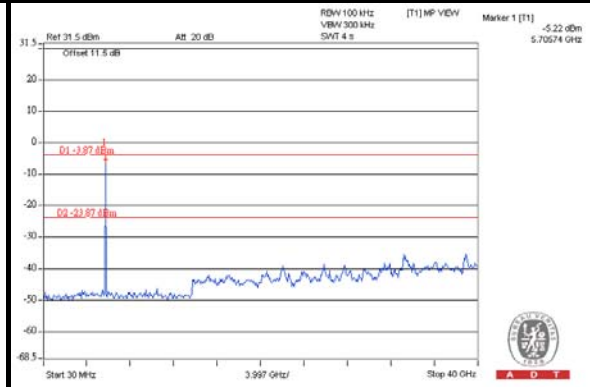
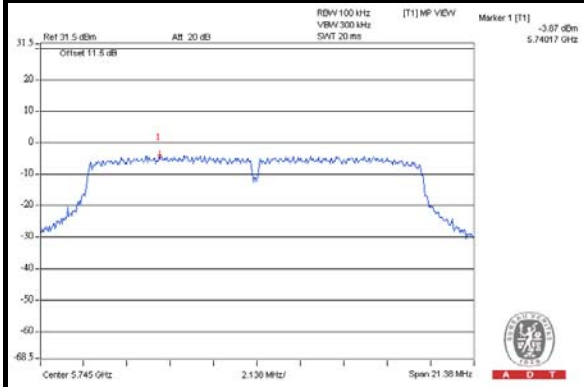
5.6.7 TEST RESULTS

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

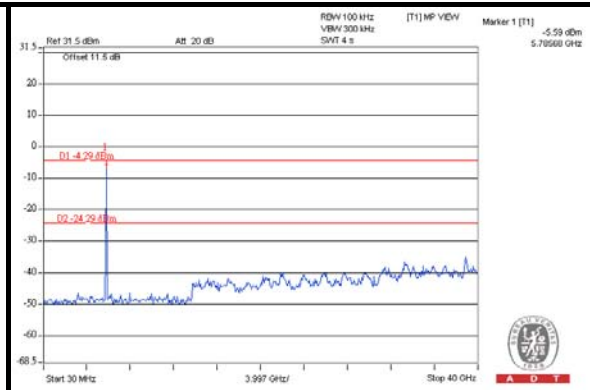
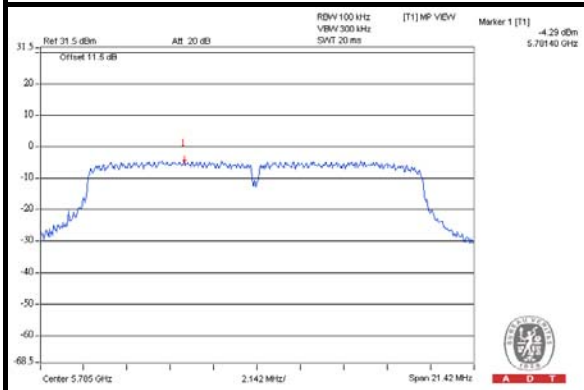
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11a

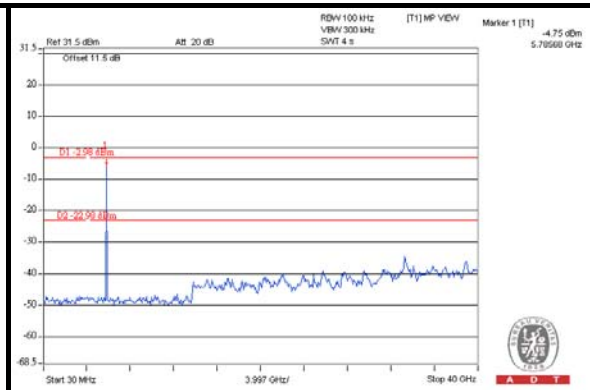
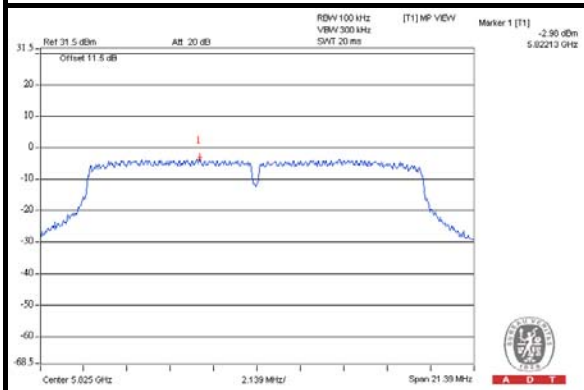
CH 149

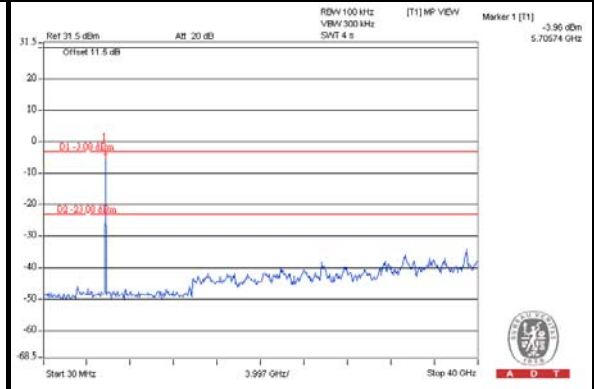
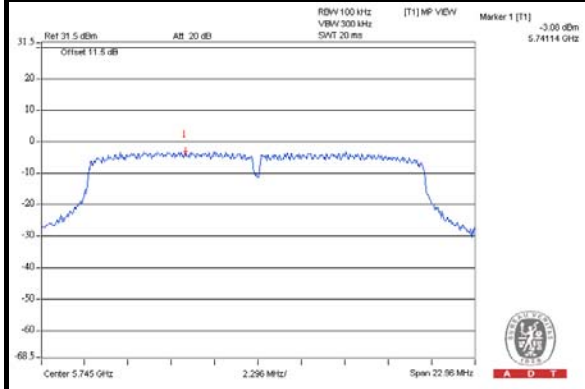
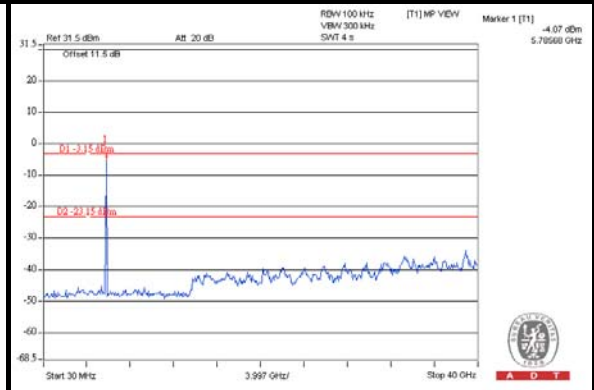
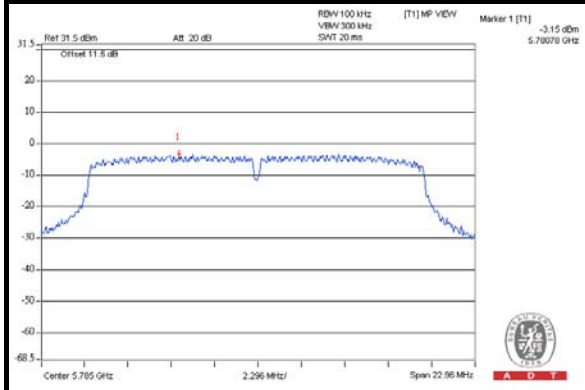
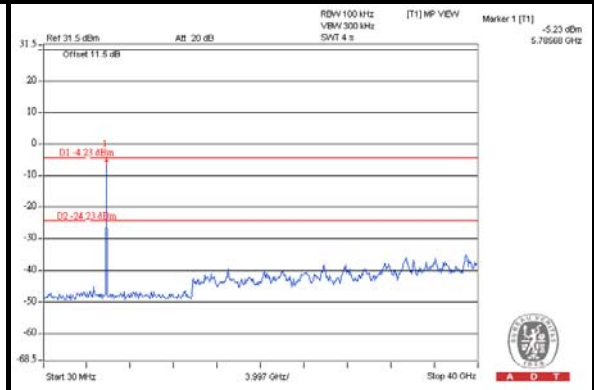
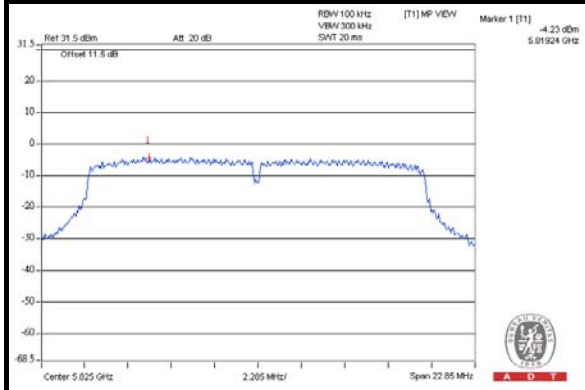


CH 157



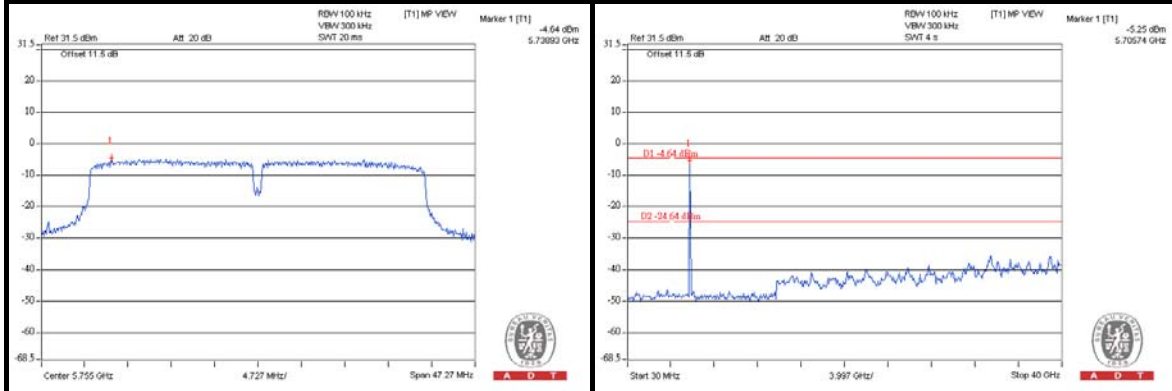
CH 165



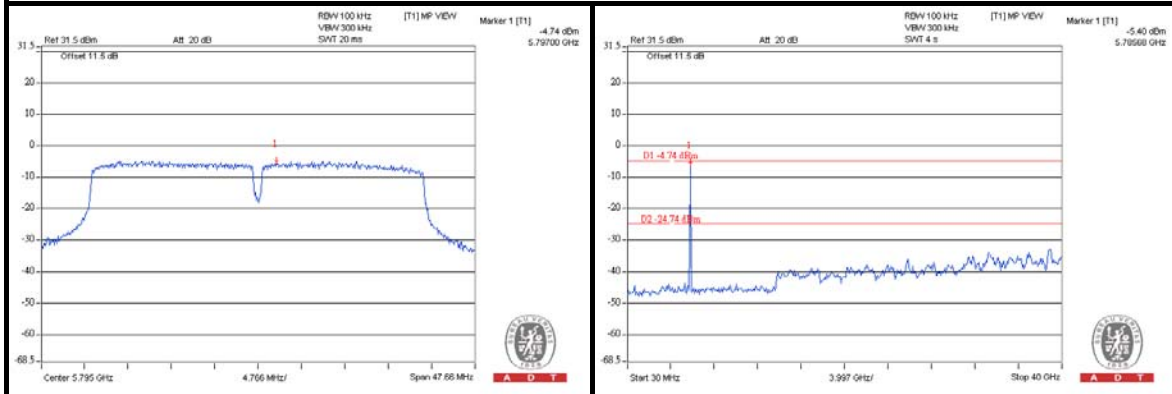
802.11n (20MHz)**CH 149****CH 157****CH 165**

802.11n (40MHz)

CH 151



CH 159





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6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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



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8. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---