



FCC TEST REPORT (15.247)

REPORT NO.: RF120712C20
MODEL NO.: WNDR4700
(refer to item 3.1 for more detail)
FCC ID: PY311400179
RECEIVED: Jul. 12, 2012
TESTED: Jul. 18 ~ Jul. 23, 2012
ISSUED: Jul. 26, 2012

APPLICANT: NETGEAR, 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
RF120712C20	Original release	Jul. 26, 2012



1. CERTIFICATION

PRODUCT: N900 Wireless Dual Band Gigabit Router
MODEL NO.: WNDR4700 (refer to item 3.1 for more detail)
BRAND: NETGEAR
APPLICANT: NETGEAR, INC.
TESTED: Jul. 18 ~ Jul. 23, 2012
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (Model: WNDR4700) 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 : Andrea Hsia , DATE : Jul. 26, 2012
Andrea Hsia / Specialist

APPROVED BY : Gary Chang , DATE : Jul. 26, 2012
Gary Chang / Technical 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 -10.00dB at 0.44688MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2375.00MHz.
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 UFL 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	3.19 dB
	200MHz ~1000MHz	3.21 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	N900 Wireless Dual Band Gigabit Router
MODEL NO.	WNDR4700 (refer to note as below)
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 450.0Mbps
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	600.7mW for 2412 ~ 2462MHz 486.5mW for 5745 ~ 5825MHz
ANTENNA TYPE	2.4GHz: Off board PCB dipole antenna with 2dBi gain 5.0GHz: Off board PCB dipole antenna with 3dBi gain
ANTENNA CONNECTOR	UFL
DATA CABLE	NA
I/O PORTS	RJ45, USB
ACCESSORY DEVICE	Adapter

NOTE:

1. The EUT incorporates a MIMO function. Physically, the EUT provides three completed transmitters and three receivers.

MODULATION MODE	TX FUNCTION
802.11b	3TX
802.11g	3TX
802.11a	3TX
802.11n (20MHz)	3TX
802.11n (40MHz)	3TX

2. The following models are provided to this EUT.

Brand Name	Model No.	Difference
NETGEAR	WNDR4700	Without HDD
NETGEAR	WNDR4720	With HDD

3. The following HDDs are provided to EUT.

Brand Name	Model No.	Spec.
WD	WD20EARX-00PASB0	2.0TB
Seagate	ST2000DM001	2000GB

*WD HDD was the worst for the final tests.

4. The EUT consumes power from the following adapters.

ADAPTER 1	
BRAND	NETGEAR
MODEL	AD8180LF
INPUT POWER	100-240Vac, 50/60Hz, 1.5A
OUTPUT POWER	12Vdc, 5.0A
POEWR LINE	1.5 m non-shielded cable without core

ADAPTER 2	
BRAND	NETGEAR
MODEL	NU60-H120500-11
INPUT POWER	100-240Vac, 50/60Hz, 1.4A
OUTPUT POWER	12.0Vdc, 5.0A
POEWR LINE	1.5 m non-shielded cable with 1 core

*Adapter 1 was the worst for the final tests.

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 \geq 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE \geq 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.

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	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.

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.

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	26deg. C, 69%RH	120Vac, 60Hz	Antony Lee
RE<1G	26deg. C, 69%RH	120Vac, 60Hz	Brad Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Anderson Hong
APCM	26deg. C, 69%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.

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 165	157	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 165	157	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.

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.

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 \geq 1G	26deg. C, 69%RH	120Vac, 60Hz	Alen Wu
RE $<$ 1G	26deg. C, 69%RH	120Vac, 60Hz	Brad Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Anderson Hong
APCM	26deg. C, 69%RH	120Vac, 60Hz	Brad Wu



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.

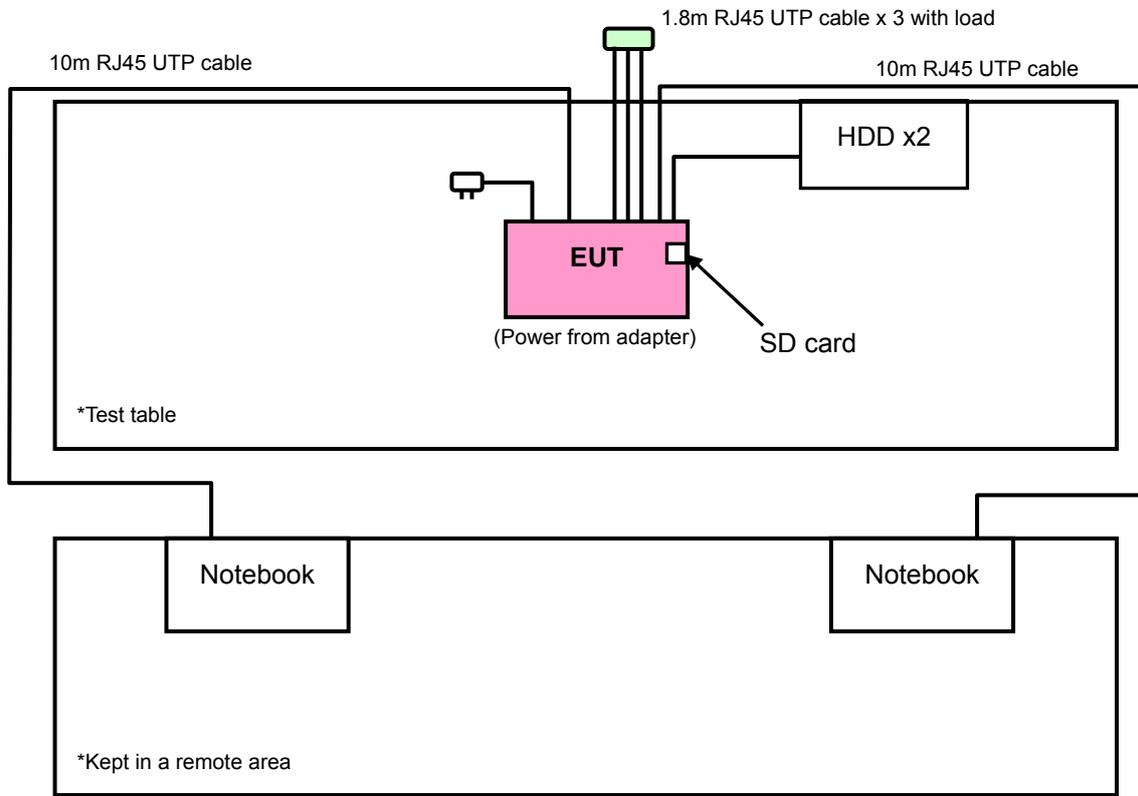
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	EXTERNAL HARD DISK	WD	WDBACY5000A BL-01	WX51C12T6215	NA
2	EXTERNAL HARD DISK	WD	WDBACY5000A BL-01	WX91EC1FPNR9	NA
3	NOTEBOOK	DELL	E5410	1HC2XM1	FCC DoC Approved
4	NOTEBOOK	DELL	E5410	6RP2YM1	FCC DoC Approved
5	SD CARD	Transcend	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	0.45m non-shielded USB cable without core
2	0.45m non-shielded USB cable without core
3	10m RJ45 UTP cable
4	10m RJ45 UTP cable
5	NA

NOTE:

1. All power cords of the above support units are non shielded (1.8m).
2. Items 3~4 acted as communication partners to transfer data.

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



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 30dB 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 30dB 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	ESI7	838496/016	Jan. 03, 2012	Jan. 02, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Sep. 05, 2011	Sep. 04, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 06, 2012	Apr. 05, 2013
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 05, 2012	Jan. 04, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8447D	2944A10738	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Nov. 03, 2011	Nov. 02, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Nov. 03, 2011	Nov. 02, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Nov. 03, 2011	Nov. 02, 2012
Software ADT	ADT_Radiated_ V7.6.15.9.2	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 ADT	TT100.	TT93021704	NA	NA
Turn Table Controller ADT	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 29, 2011	Oct. 28, 2012
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 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. 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.

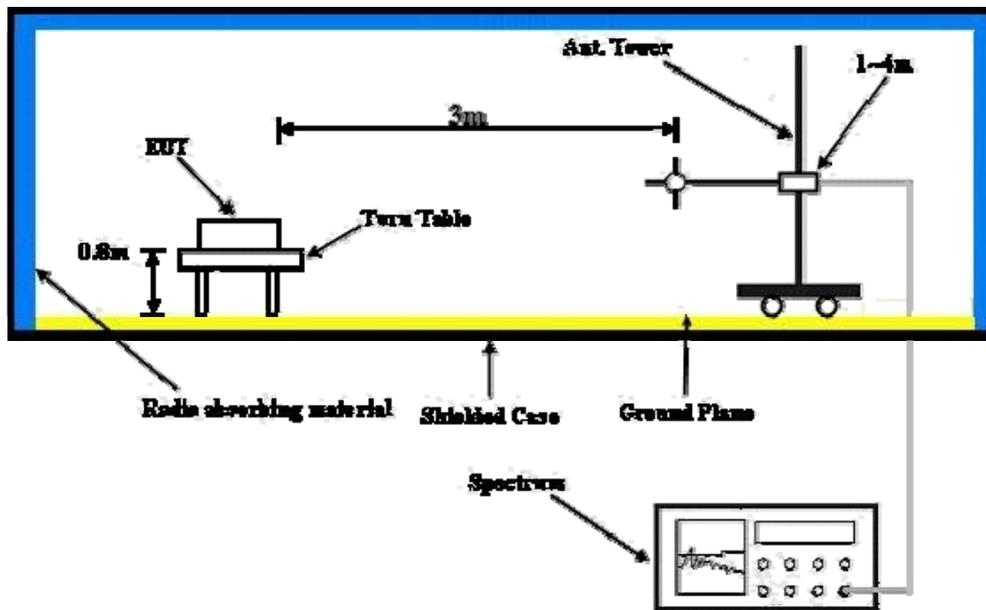
NOTE:

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 two notebooks to act as communication partners and placed them outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".



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4.1.7 TEST RESULTS

ABOVE 1GHz DATA :

802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	62.6 PK	74.0	-11.4	1.47 H	324	30.60	32.00
2	2390.00	50.1 AV	54.0	-3.9	1.47 H	324	18.10	32.00
3	#2400.00	67.0 PK	82.8	-15.8	1.47 H	324	35.00	32.00
4	#2400.00	59.5 AV	78.9	-19.4	1.47 H	324	27.50	32.00
5	*2412.00	112.8 PK			1.47 H	324	80.80	32.00
6	*2412.00	108.9 AV			1.47 H	324	76.90	32.00
7	4824.00	52.0 PK	74.0	-22.0	1.28 H	46	13.60	38.40
8	4824.00	47.0 AV	54.0	-7.0	1.28 H	46	8.60	38.40

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	2390.00	58.2 PK	74.0	-15.8	1.00 V	11	26.20	32.00
2	2390.00	47.1 AV	54.0	-6.9	1.00 V	11	15.10	32.00
3	#2400.00	62.8 PK	82.2	-19.4	1.00 V	11	30.80	32.00
4	#2400.00	58.8 AV	78.2	-19.4	1.00 V	11	26.80	32.00
5	*2412.00	112.2 PK			1.01 V	11	80.20	32.00
6	*2412.00	108.2 AV			1.01 V	11	76.20	32.00
7	4824.00	54.3 PK	74.0	-19.7	1.01 V	268	15.90	38.40
8	4824.00	51.3 AV	54.0	-2.7	1.01 V	268	12.90	38.40

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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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	2352.00	59.5 PK	74.0	-14.5	1.00 H	323	27.70	31.80
2	2352.00	52.1 AV	54.0	-1.9	1.00 H	323	20.30	31.80
3	*2437.00	112.8 PK			1.41 H	324	80.70	32.10
4	*2437.00	108.5 AV			1.41 H	324	76.40	32.10
5	4874.00	52.7 PK	74.0	-21.3	1.00 H	263	14.30	38.40
6	4874.00	48.3 AV	54.0	-5.7	1.00 H	263	9.90	38.40
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	2352.00	60.7 PK	74.0	-13.3	1.00 V	274	28.90	31.80
2	2352.00	50.4 AV	54.0	-3.6	1.00 V	274	18.60	31.80
3	*2437.00	111.8 PK			1.00 V	2	79.70	32.10
4	*2437.00	107.9 AV			1.00 V	2	75.80	32.10
5	4874.00	53.2 PK	74.0	-20.8	1.01 V	270	14.80	38.40
6	4874.00	51.0 AV	54.0	-3.0	1.01 V	270	12.60	38.40

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.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	2375.00	62.7 PK	74.0	-11.3	1.51 H	326	30.80	31.90
2	2375.00	53.0 AV	54.0	-1.0	1.51 H	326	21.10	31.90
3	*2462.00	112.8 PK			1.41 H	324	80.60	32.20
4	*2462.00	108.8 AV			1.41 H	324	76.60	32.20
5	2483.50	60.8 PK	74.0	-13.2	1.41 H	324	28.50	32.30
6	2483.50	49.2 AV	54.0	-4.8	1.41 H	324	16.90	32.30
7	4924.00	53.1 PK	74.0	-20.9	1.00 H	30	14.70	38.40
8	4924.00	48.8 AV	54.0	-5.2	1.00 H	30	10.40	38.40

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	2375.00	59.4 PK	74.0	-14.6	1.20 V	289	27.50	31.90
2	2375.00	51.4 AV	54.0	-2.6	1.20 V	289	19.50	31.90
3	*2462.00	114.0 PK			1.17 V	273	81.80	32.20
4	*2462.00	110.2 AV			1.17 V	273	78.00	32.20
5	2483.50	59.9 PK	74.0	-14.1	1.17 V	273	27.60	32.30
6	2483.50	48.1 AV	54.0	-5.9	1.17 V	273	15.80	32.30
7	4924.00	54.2 PK	74.0	-19.8	1.00 V	276	15.80	38.40
8	4924.00	50.2 AV	54.0	-3.8	1.00 V	276	11.80	38.40

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.



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802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	59.2 PK	74.0	-14.8	1.47 H	326	27.20	32.00
2	2390.00	48.0 AV	54.0	-6.0	1.47 H	326	16.00	32.00
3	#2400.00	76.0 PK	79.0	-3.0	1.47 H	326	44.00	32.00
4	#2400.00	64.8 AV	67.9	-3.1	1.47 H	326	32.80	32.00
5	*2412.00	109.0 PK			1.47 H	326	77.00	32.00
6	*2412.00	97.9 AV			1.47 H	326	65.90	32.00
7	4824.00	46.5 PK	74.0	-27.5	1.00 H	105	8.10	38.40
8	4824.00	32.7 AV	54.0	-21.3	1.00 H	105	-5.70	38.40

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	2390.00	58.2 PK	74.0	-15.8	1.00 V	270	26.20	32.00
2	2390.00	47.2 AV	54.0	-6.8	1.00 V	270	15.20	32.00
3	#2400.00	75.6 PK	79.5	-3.9	1.00 V	270	43.60	32.00
4	#2400.00	64.0 AV	67.9	-3.9	1.00 V	270	32.00	32.00
5	*2412.00	109.5 PK			1.00 V	270	77.50	32.00
6	*2412.00	97.9 AV			1.00 V	270	65.90	32.00
7	4824.00	46.0 PK	74.0	-28.0	1.00 V	15	7.60	38.40
8	4824.00	32.9 AV	54.0	-21.1	1.00 V	15	-5.50	38.40

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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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	60.0 PK	74.0	-14.0	1.41 H	325	28.00	32.00
2	2390.00	49.2 AV	54.0	-4.8	1.41 H	325	17.20	32.00
3	*2437.00	115.1 PK			1.41 H	325	83.00	32.10
4	*2437.00	102.8 AV			1.41 H	325	70.70	32.10
5	4874.00	46.1 PK	74.0	-27.9	1.00 H	215	7.70	38.40
6	4874.00	34.4 AV	54.0	-19.6	1.00 H	215	-4.00	38.40
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	*2437.00	115.9 PK			1.00 V	2	83.80	32.10
2	*2437.00	102.7 AV			1.00 V	2	70.60	32.10
3	2483.50	59.9 PK	74.0	-14.1	1.00 V	5	27.60	32.30
4	2483.50	49.2 AV	54.0	-4.8	1.00 V	5	16.90	32.30
5	4874.00	45.5 PK	74.0	-28.5	1.00 V	158	7.10	38.40
6	4874.00	33.2 AV	54.0	-20.8	1.00 V	158	-5.20	38.40

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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	110.1 PK			1.39 H	322	77.90	32.20
2	*2462.00	98.9 AV			1.39 H	322	66.70	32.20
3	2483.50	66.3 PK	74.0	-7.7	1.39 H	323	34.00	32.30
4	2483.50	48.5 AV	54.0	-5.5	1.39 H	323	16.20	32.30
5	4924.00	45.5 PK	74.0	-28.5	1.00 H	148	7.10	38.40
6	4924.00	32.2 AV	54.0	-21.8	1.00 H	148	-6.20	38.40
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	2379.00	61.6 PK	74.0	-12.4	1.00 V	56	29.70	31.90
2	2379.00	49.2 AV	54.0	-4.8	1.00 V	56	17.30	31.90
3	*2462.00	111.1 PK			1.00 V	277	78.90	32.20
4	*2462.00	99.7 AV			1.00 V	277	67.50	32.20
5	2483.50	61.3 PK	74.0	-12.7	1.00 V	277	29.00	32.30
6	2483.50	49.9 AV	54.0	-4.1	1.00 V	277	17.60	32.30
7	4924.00	45.6 PK	74.0	-28.4	1.00 V	53	7.20	38.40
8	4924.00	34.0 AV	54.0	-20.0	1.00 V	53	-4.40	38.40

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.



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802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	59.7 PK	74.0	-14.3	1.47 H	325	27.70	32.00
2	2390.00	48.8 AV	54.0	-5.2	1.47 H	325	16.80	32.00
3	#2400.00	76.1 PK	79.2	-3.1	1.47 H	325	44.10	32.00
4	#2400.00	64.5 AV	67.6	-3.1	1.47 H	325	32.50	32.00
5	*2412.00	109.2 PK			1.47 H	325	77.20	32.00
6	*2412.00	97.6 AV			1.47 H	325	65.60	32.00
7	4824.00	45.1 PK	74.0	-28.9	1.00 H	159	6.70	38.40
8	4824.00	32.3 AV	54.0	-21.7	1.00 H	159	-6.10	38.40
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	2390.00	59.0 PK	74.0	-15.0	1.00 V	20	27.00	32.00
2	2390.00	46.5 AV	54.0	-7.5	1.00 V	20	14.50	32.00
3	#2400.00	76.5 PK	79.5	-3.0	1.00 V	20	44.50	32.00
4	#2400.00	64.3 AV	67.3	-3.0	1.00 V	20	32.30	32.00
5	*2412.00	109.5 PK			1.00 V	20	77.50	32.00
6	*2412.00	97.3 AV			1.00 V	20	65.30	32.00
7	4824.00	45.4 PK	74.0	-28.6	1.00 V	21	7.00	38.40
8	4824.00	32.8 AV	54.0	-21.2	1.00 V	21	-5.60	38.40

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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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	59.6 PK	74.0	-14.4	1.45 H	322	27.60	32.00
2	2390.00	49.8 AV	54.0	-4.2	1.45 H	322	17.80	32.00
3	*2437.00	115.7 PK			1.45 H	322	83.60	32.10
4	*2437.00	103.0 AV			1.45 H	322	70.90	32.10
5	4874.00	47.3 PK	74.0	-26.7	1.00 H	226	8.90	38.40
6	4874.00	34.5 AV	54.0	-19.5	1.00 H	226	-3.90	38.40
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	*2437.00	115.1 PK			1.02 V	5	83.00	32.10
2	*2437.00	102.3 AV			1.02 V	5	70.20	32.10
3	2483.50	60.3 PK	74.0	-13.7	1.02 V	5	28.00	32.30
4	2483.50	49.7 AV	54.0	-4.3	1.02 V	5	17.40	32.30
5	4874.00	46.3 PK	74.0	-27.7	1.00 V	159	7.90	38.40
6	4874.00	33.5 AV	54.0	-20.5	1.00 V	159	-4.90	38.40

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	110.5 PK			1.43 H	322	78.30	32.20
2	*2462.00	98.4 AV			1.43 H	322	66.20	32.20
3	2483.50	63.0 PK	74.0	-11.0	1.43 H	323	30.70	32.30
4	2483.50	49.7 AV	54.0	-4.3	1.43 H	323	17.40	32.30
5	4924.00	46.2 PK	74.0	-27.8	1.00 H	157	7.80	38.40
6	4924.00	33.4 AV	54.0	-20.6	1.00 H	157	-5.00	38.40
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	111.1 PK			1.00 V	4	78.90	32.20
2	*2462.00	98.2 AV			1.00 V	4	66.00	32.20
3	2483.50	62.9 PK	74.0	-11.1	1.00 V	4	30.60	32.30
4	2483.50	49.3 AV	54.0	-4.7	1.00 V	4	17.00	32.30
5	4924.00	46.3 PK	74.0	-27.7	1.00 V	55	7.90	38.40
6	4924.00	35.2 AV	54.0	-18.8	1.00 V	55	-3.20	38.40

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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	65.9 PK	74.0	-8.1	1.43 H	324	33.90	32.00
2	2390.00	50.1 AV	54.0	-3.9	1.43 H	324	18.10	32.00
3	#2400.00	68.1 PK	73.1	-5.0	1.43 H	324	36.10	32.00
4	#2400.00	56.1 AV	61.1	-5.0	1.43 H	324	24.10	32.00
5	*2422.00	103.1 PK			1.43 H	324	71.00	32.10
6	*2422.00	91.1 AV			1.43 H	324	59.00	32.10
7	4844.00	45.7 PK	74.0	-28.3	1.00 H	253	7.30	38.40
8	4844.00	32.4 AV	54.0	-21.6	1.00 H	253	-6.00	38.40

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	2390.00	67.3 PK	74.0	-6.7	1.02 V	279	35.30	32.00
2	2390.00	51.9 AV	54.0	-2.1	1.02 V	279	19.90	32.00
3	#2400.00	67.2 PK	73.2	-6.0	1.00 V	279	35.20	32.00
4	#2400.00	55.0 AV	61.0	-6.0	1.00 V	279	23.00	32.00
5	*2422.00	103.2 PK			1.00 V	279	71.10	32.10
6	*2422.00	91.0 AV			1.00 V	279	58.90	32.10
7	4844.00	45.8 PK	74.0	-28.2	1.00 V	231	7.40	38.40
8	4844.00	32.5 AV	54.0	-21.5	1.00 V	231	-5.90	38.40

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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	58.9 PK	74.0	-15.1	1.43 H	322	26.90	32.00
2	2390.00	48.1 AV	54.0	-5.9	1.43 H	322	16.10	32.00
3	*2437.00	106.0 PK			1.43 H	322	73.90	32.10
4	*2437.00	93.3 AV			1.43 H	322	61.20	32.10
5	4874.00	47.3 PK	74.0	-26.7	1.00 H	12	8.90	38.40
6	4874.00	33.8 AV	54.0	-20.2	1.00 H	12	-4.60	38.40
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	2390.00	57.2 PK	74.0	-16.8	1.01 V	2	25.20	32.00
2	2390.00	46.5 AV	54.0	-7.5	1.01 V	2	14.50	32.00
3	*2437.00	106.2 PK			1.01 V	2	74.10	32.10
4	*2437.00	93.3 AV			1.01 V	2	61.20	32.10
5	4874.00	46.2 PK	74.0	-27.8	1.00 V	241	7.80	38.40
6	4874.00	33.5 AV	54.0	-20.5	1.00 V	241	-4.90	38.40

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	102.3 PK			1.40 H	324	70.10	32.20
2	*2452.00	90.8 AV			1.40 H	324	58.60	32.20
3	2483.50	64.7 PK	74.0	-9.3	1.40 H	324	32.40	32.30
4	2483.50	49.1 AV	54.0	-4.9	1.40 H	324	16.80	32.30
5	4904.00	45.9 PK	74.0	-28.1	1.00 H	123	7.40	38.50
6	4904.00	33.6 AV	54.0	-20.4	1.00 H	123	-4.90	38.50
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	*2452.00	103.5 PK			1.01 V	3	71.30	32.20
2	*2452.00	89.7 AV			1.01 V	3	57.50	32.20
3	2483.50	65.8 PK	74.0	-8.2	1.00 V	2	33.50	32.30
4	2483.50	50.6 AV	54.0	-3.4	1.00 V	2	18.30	32.30
5	4904.00	45.9 PK	74.0	-28.1	1.00 V	235	7.40	38.50
6	4904.00	33.4 AV	54.0	-20.6	1.00 V	235	-5.10	38.50

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.



A D T

BELOW 1GHz WORST-CASE DATA : 802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 69%RH	TESTED BY	Brad 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	125.17	29.0 QP	43.5	-14.5	1.99 H	101	16.40	12.60
2	282.66	33.1 QP	46.0	-12.9	1.24 H	12	18.10	15.00
3	358.48	35.8 QP	46.0	-10.2	1.00 H	7	18.50	17.30
4	624.85	35.9 QP	46.0	-10.1	1.24 H	189	12.20	23.70
5	751.23	36.9 QP	46.0	-9.1	1.00 H	7	11.10	25.80
6	887.33	35.0 QP	46.0	-11.0	1.49 H	5	6.60	28.40
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	62.95	35.7 QP	40.0	-4.3	1.00 V	26	22.50	13.20
2	296.27	33.4 QP	46.0	-12.6	1.24 V	207	17.80	15.60
3	389.59	33.6 QP	46.0	-12.4	1.24 V	70	15.50	18.10
4	624.85	34.0 QP	46.0	-12.0	1.74 V	317	10.30	23.70
5	764.84	33.0 QP	46.0	-13.0	1.24 V	204	6.80	26.20
6	875.67	34.8 QP	46.0	-11.2	1.24 V	14	6.60	28.20

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.

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	100291	Nov. 23, 2011	Nov. 22, 2012
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 29, 2011	Dec. 28, 2012
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2012	Jul. 01, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 07, 2012	Feb. 06, 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 1.
 3. The VCCI Site Registration No. is C-2040.

4.2.3 TEST PROCEDURES

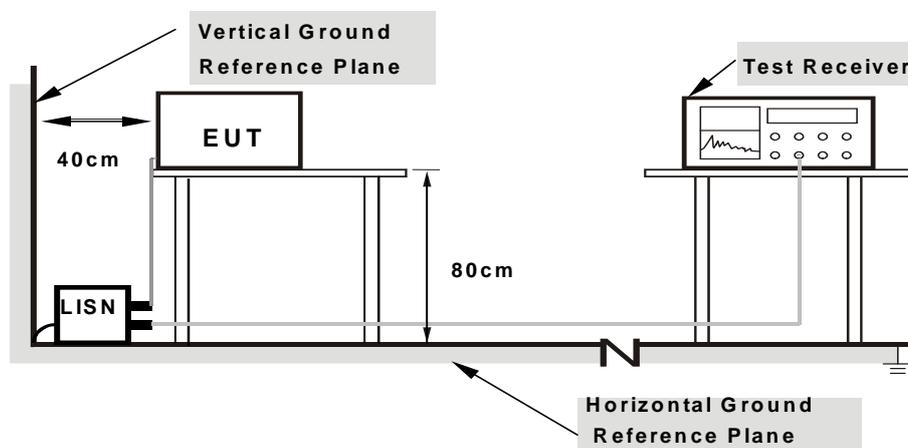
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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



A D T

4.2.7 TEST RESULTS

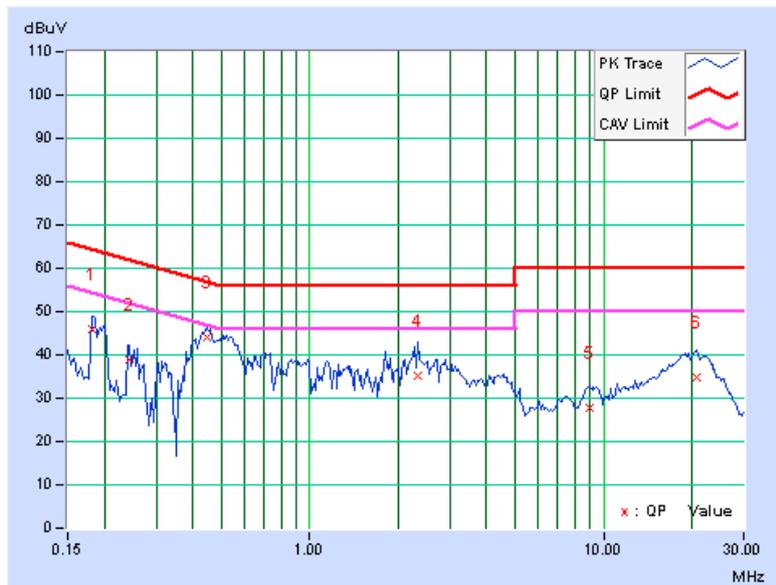
CONDUCTED WORST-CASE DATA : 802.11g

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	0.12	45.63	28.06	45.75	28.18	64.43	54.43	-18.67	-26.24
2	0.24375	0.13	38.63	23.20	38.76	23.33	61.97	51.97	-23.21	-28.64
3	0.44688	0.13	43.86	31.87	43.99	32.00	56.93	46.93	-12.94	-14.93
4	2.34766	0.24	35.10	20.84	35.34	21.08	56.00	46.00	-20.66	-24.92
5	8.98438	0.59	27.16	19.08	27.75	19.67	60.00	50.00	-32.25	-30.33
6	20.74219	1.20	33.79	29.04	34.99	30.24	60.00	50.00	-25.01	-19.76

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.

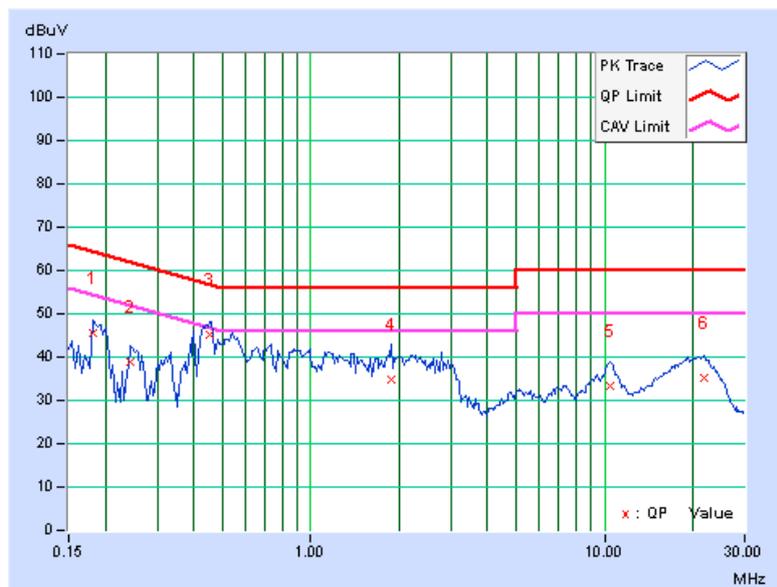


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	0.13	45.51	29.76	45.64	29.89	64.43	54.43	-18.78	-24.53
2	0.24375	0.14	38.59	25.40	38.73	25.54	61.97	51.97	-23.24	-26.43
3	0.45078	0.16	45.20	36.29	45.36	36.45	56.86	46.86	-11.51	-10.42
4	1.88672	0.23	34.76	20.58	34.99	20.81	56.00	46.00	-21.01	-25.19
5	10.42578	0.61	32.85	24.85	33.46	25.46	60.00	50.00	-26.54	-24.54
6	21.74609	1.03	33.99	29.05	35.02	30.08	60.00	50.00	-24.98	-19.92

REMARKS:

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

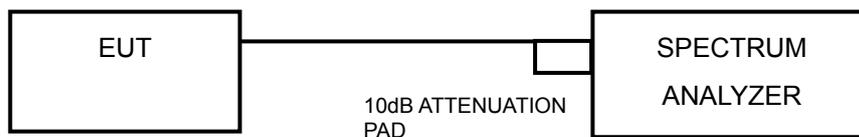


4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURE

- a. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 DEVIATION 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	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	10.29	10.21	10.28	0.5	PASS
6	2437	10.26	10.25	10.29	0.5	PASS
11	2462	10.27	10.27	10.28	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	16.55	16.59	16.53	0.5	PASS
6	2437	16.53	16.49	16.59	0.5	PASS
11	2462	16.55	16.65	16.62	0.5	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.73	17.77	17.73	0.5	PASS
6	2437	17.66	17.79	17.79	0.5	PASS
11	2462	17.75	17.85	17.81	0.5	PASS

802.11n (40MHz)

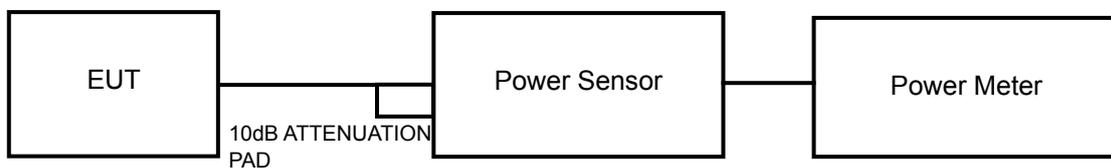
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	37.04	36.69	36.55	0.5	PASS
6	2437	37.33	36.38	36.94	0.5	PASS
9	2452	36.88	36.56	37.09	0.5	PASS

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

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

CHAN.	CHAN. FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	22.83	22.80	22.30	552.2	27.4	29.2	PASS
6	2437	22.51	23.19	22.5	564.5	27.5	29.2	PASS
11	2462	23.22	23.37	22.36	599.4	27.8	29.2	PASS

NOTE: Directional gain = 2dBi + 10log(3) = 6.8dBi > 6dBi , so the limit shall be reduced to 30-(6.8-6) = 29.2dBm.

802.11g

CHAN.	CHAN. FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	17.29	18.27	16.93	170.0	22.31	29.2	PASS
6	2437	22.84	23.04	23.16	600.7	27.79	29.2	PASS
11	2462	18.05	17.73	17.00	173.2	22.39	29.2	PASS

NOTE: Directional gain = 2dBi + 10log(3) = 6.8dBi > 6dBi , so the limit shall be reduced to 30-(6.8-6) = 29.2dBm.

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	18.02	18.48	17.10	185.1	22.68	29.2	PASS
6	2437	22.90	22.94	23.10	595.9	27.75	29.2	PASS
11	2462	18.10	17.64	16.95	172.2	22.36	29.2	PASS

NOTE: Directional gain = 2dBi + 10log(3) = 6.8dBi > 6dBi , so the limit shall be reduced to 30-(6.8-6) = 29.2dBm.

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
3	2422	15.18	15.92	14.52	100.4	20.02	29.2	PASS
6	2437	18.08	18.94	17.60	200.2	23.01	29.2	PASS
9	2452	14.60	14.22	12.64	73.6	18.67	29.2	PASS

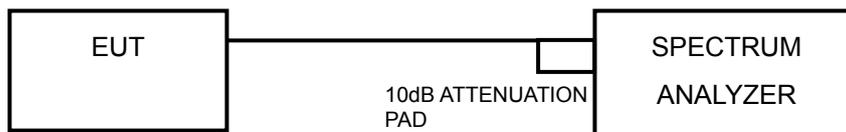
NOTE: Directional gain = 2dBi + 10log(3) = 6.8dBi > 6dBi , so the limit shall be reduced to 30-(6.8-6) = 29.2dBm.

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

- a. Set the RBW = 100 kHz, VBW =300 kHz, Detector = average.
- b. Sweep time = 26s, Trace mode = max hold, allow trace to fully stabilize.
- c. Use the average marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- d. 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

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	5.07	-10.16	4.77	-5.39	7.2	PASS
	6	2437	4.88	-10.35	4.77	-5.58	7.2	PASS
	11	2462	5.45	-9.78	4.77	-5.01	7.2	PASS
1	1	2412	4.63	-10.60	4.77	-5.83	7.2	PASS
	6	2437	4.98	-10.25	4.77	-5.48	7.2	PASS
	11	2462	5.43	-9.80	4.77	-5.03	7.2	PASS
2	1	2412	4.32	-10.91	4.77	-6.14	7.2	PASS
	6	2437	4.35	-10.88	4.77	-6.11	7.2	PASS
	11	2462	4.23	-11.00	4.77	-6.23	7.2	PASS

NOTE: Directional gain = 2dBi + 10log(3) = 6.8dBi > 6dBi , so the limit shall be reduced to 8-(6.8-6) = 7.2dBm.

802.11g

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-2.99	-18.22	4.77	-13.45	7.2	PASS
	6	2437	2.51	-12.72	4.77	-7.95	7.2	PASS
	11	2462	-2.06	-17.29	4.77	-12.52	7.2	PASS
1	1	2412	-2.11	-17.34	4.77	-12.57	7.2	PASS
	6	2437	2.88	-12.35	4.77	-7.58	7.2	PASS
	11	2462	-2.76	-17.99	4.77	-13.22	7.2	PASS
2	1	2412	-3.78	-19.01	4.77	-14.24	7.2	PASS
	6	2437	2.28	-12.95	4.77	-8.18	7.2	PASS
	11	2462	-3.84	-19.07	4.77	-14.30	7.2	PASS

NOTE: Directional gain = 2dBi + 10log(3) = 6.8dBi > 6dBi , so the limit shall be reduced to 8-(6.8-6) = 7.2dBm.

802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-2.55	-17.78	4.77	-13.01	7.2	PASS
	6	2437	2.31	-12.92	4.77	-8.15	7.2	PASS
	11	2462	-2.34	-17.57	4.77	-12.80	7.2	PASS
1	1	2412	-2.34	-17.57	4.77	-12.80	7.2	PASS
	6	2437	2.01	-13.22	4.77	-8.45	7.2	PASS
	11	2462	-2.96	-18.19	4.77	-13.42	7.2	PASS
2	1	2412	-3.97	-19.20	4.77	-14.43	7.2	PASS
	6	2437	2.08	-13.15	4.77	-8.38	7.2	PASS
	11	2462	-3.96	-19.19	4.77	-14.42	7.2	PASS

NOTE: Directional gain = $2\text{dBi} + 10\log(3) = 6.8\text{dBi} > 6\text{dBi}$, so the limit shall be reduced to $8-(6.8-6) = 7.2\text{dBm}$.

802.11n (40MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2422	-8.30	-23.53	4.77	-18.76	7.2	PASS
	4	2437	-5.46	-20.69	4.77	-15.92	7.2	PASS
	7	2452	-8.90	-24.13	4.77	-19.36	7.2	PASS
1	1	2422	-7.58	-22.81	4.77	-18.04	7.2	PASS
	4	2437	-4.60	-19.83	4.77	-15.06	7.2	PASS
	7	2452	-9.23	-24.46	4.77	-19.69	7.2	PASS
2	1	2422	-9.19	-24.42	4.77	-19.65	7.2	PASS
	4	2437	-6.23	-21.46	4.77	-16.69	7.2	PASS
	7	2452	-11.04	-26.27	4.77	-21.50	7.2	PASS

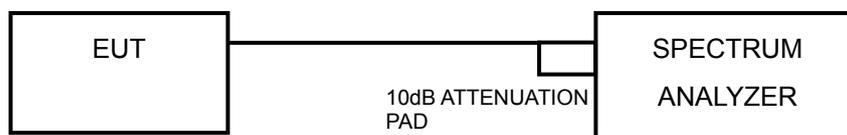
NOTE: Directional gain = $2\text{dBi} + 10\log(3) = 6.8\text{dBi} > 6\text{dBi}$, so the limit shall be reduced to $8-(6.8-6) = 7.2\text{dBm}$.

4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below -30dB 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 = rms.
4. Sweep time = 26 second.
5. Perform the measurement over a single sweep.
6. 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. Set span to encompass the spectrum to be examined.
4. Detector = rms.
5. Sweep time = 26 second.
6. Perform the measurement over a single sweep.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

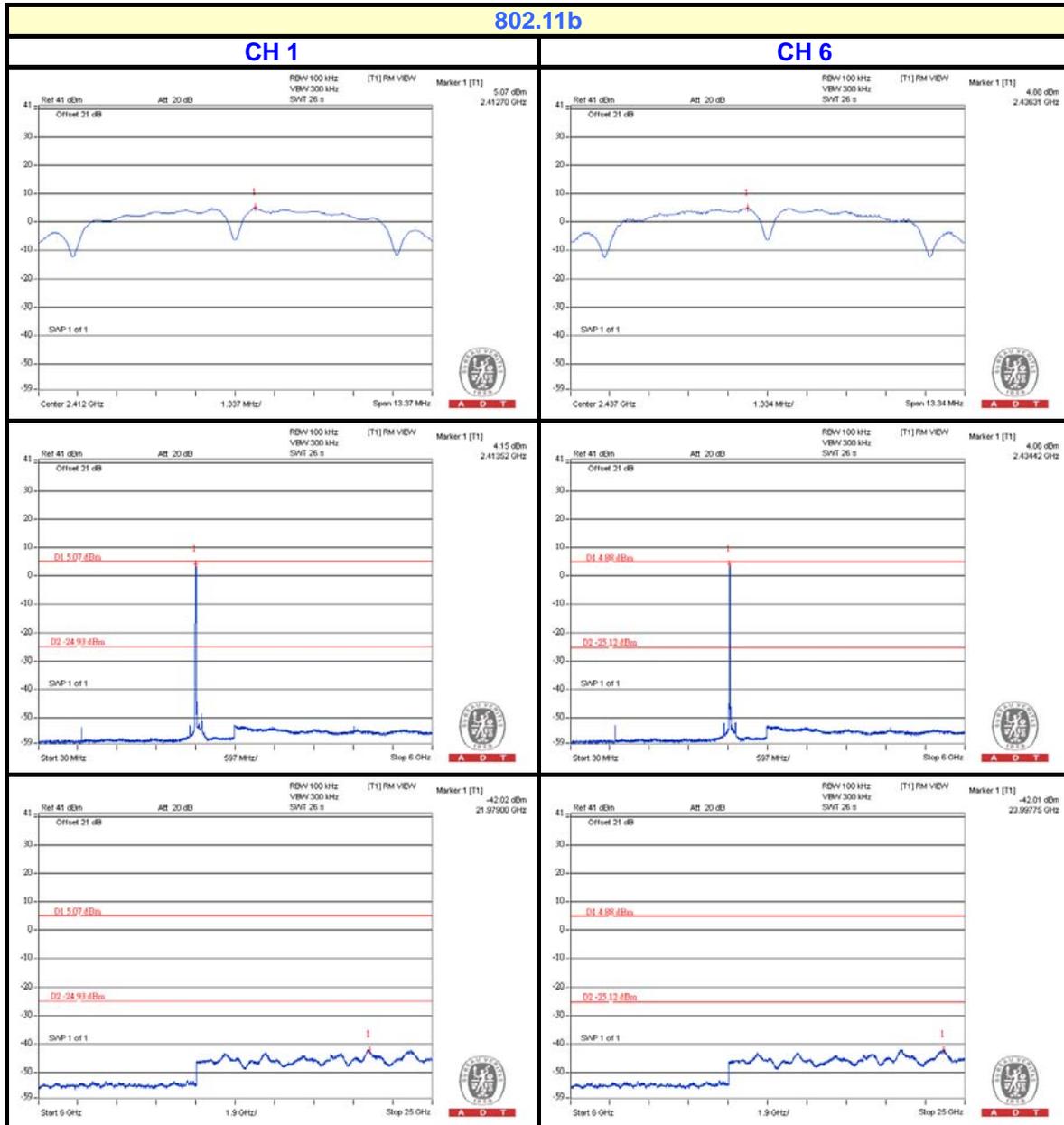
Same as Item 4.3.6

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.

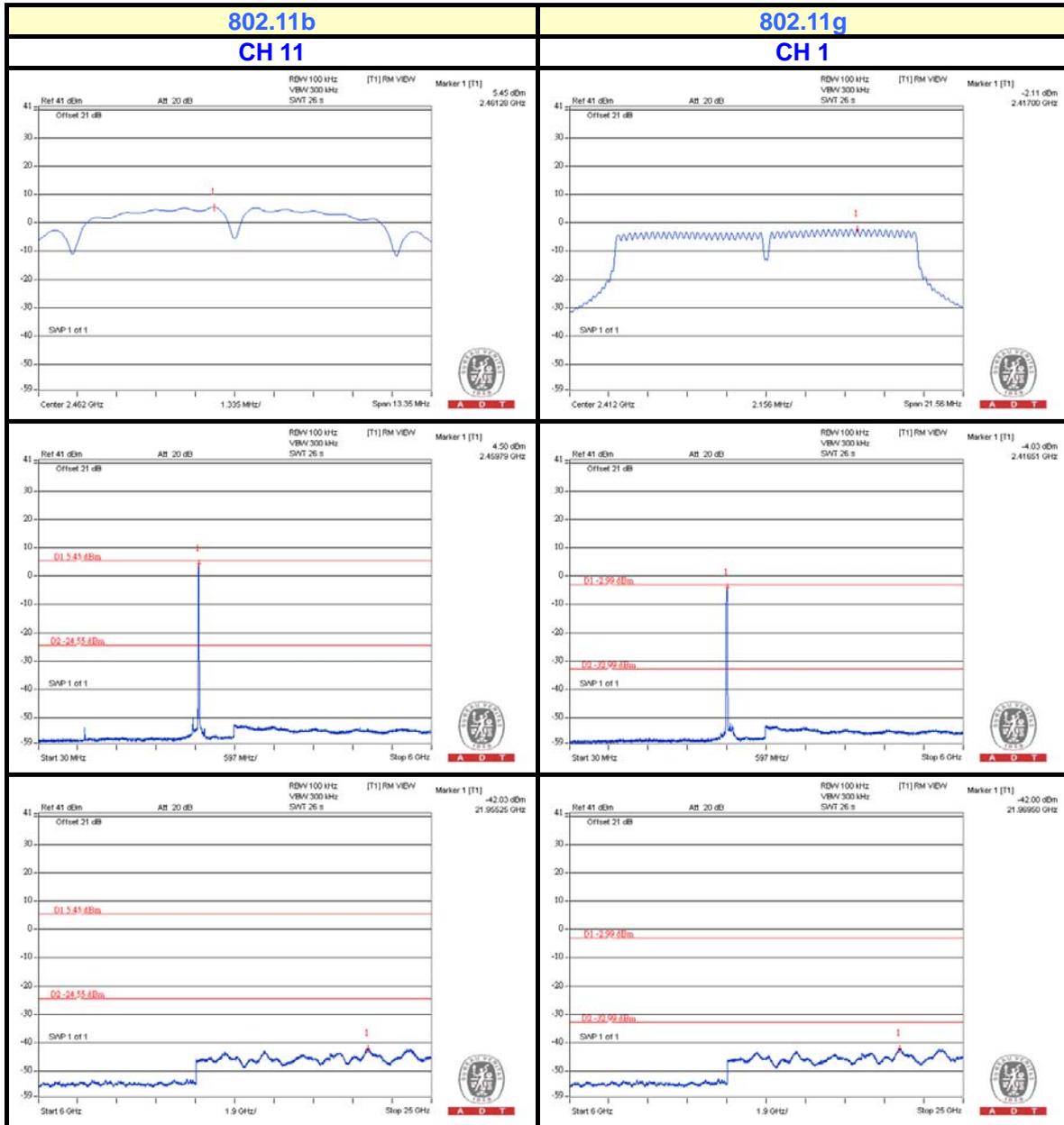
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

4.6.8 TEST RESULTS



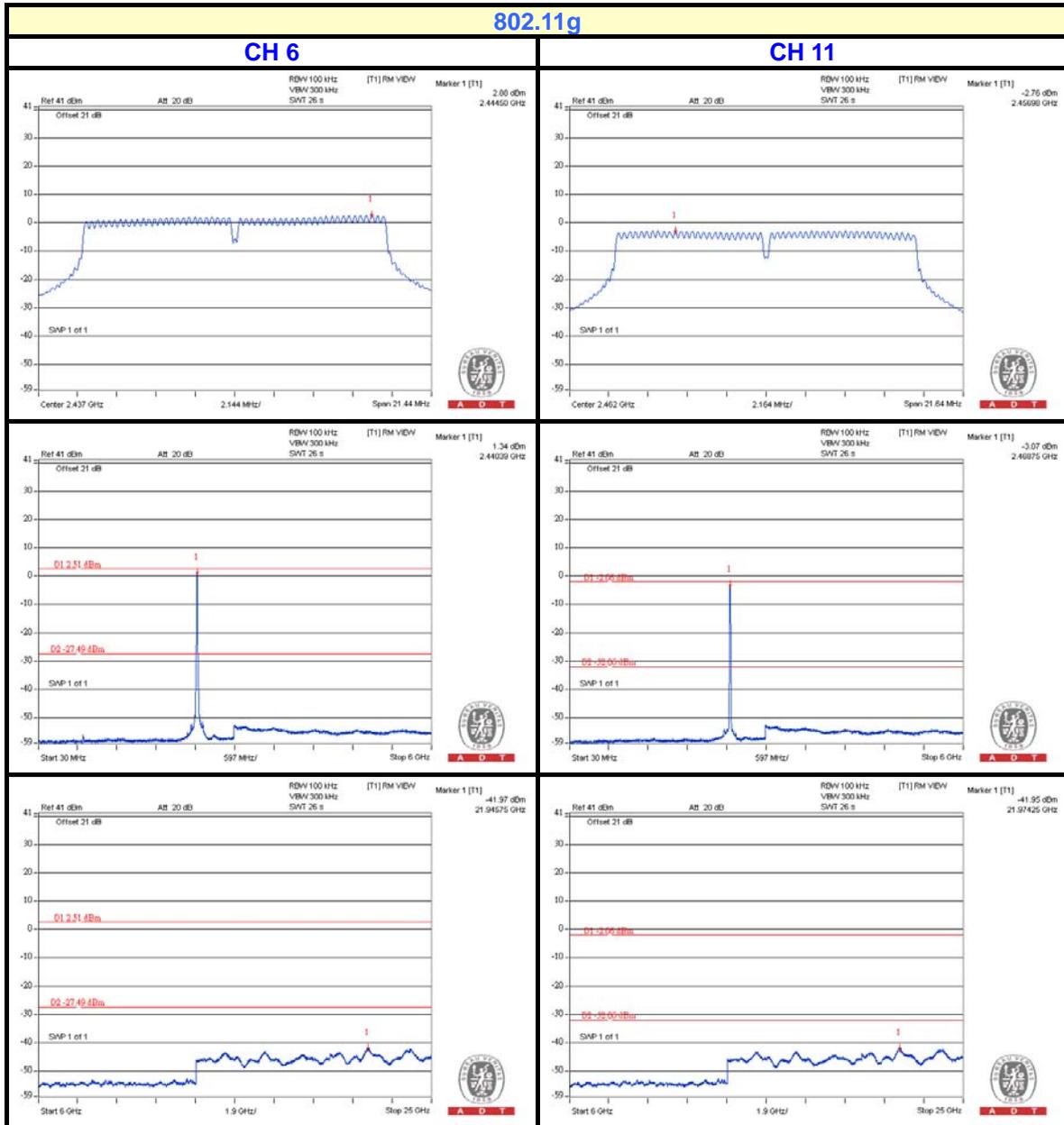


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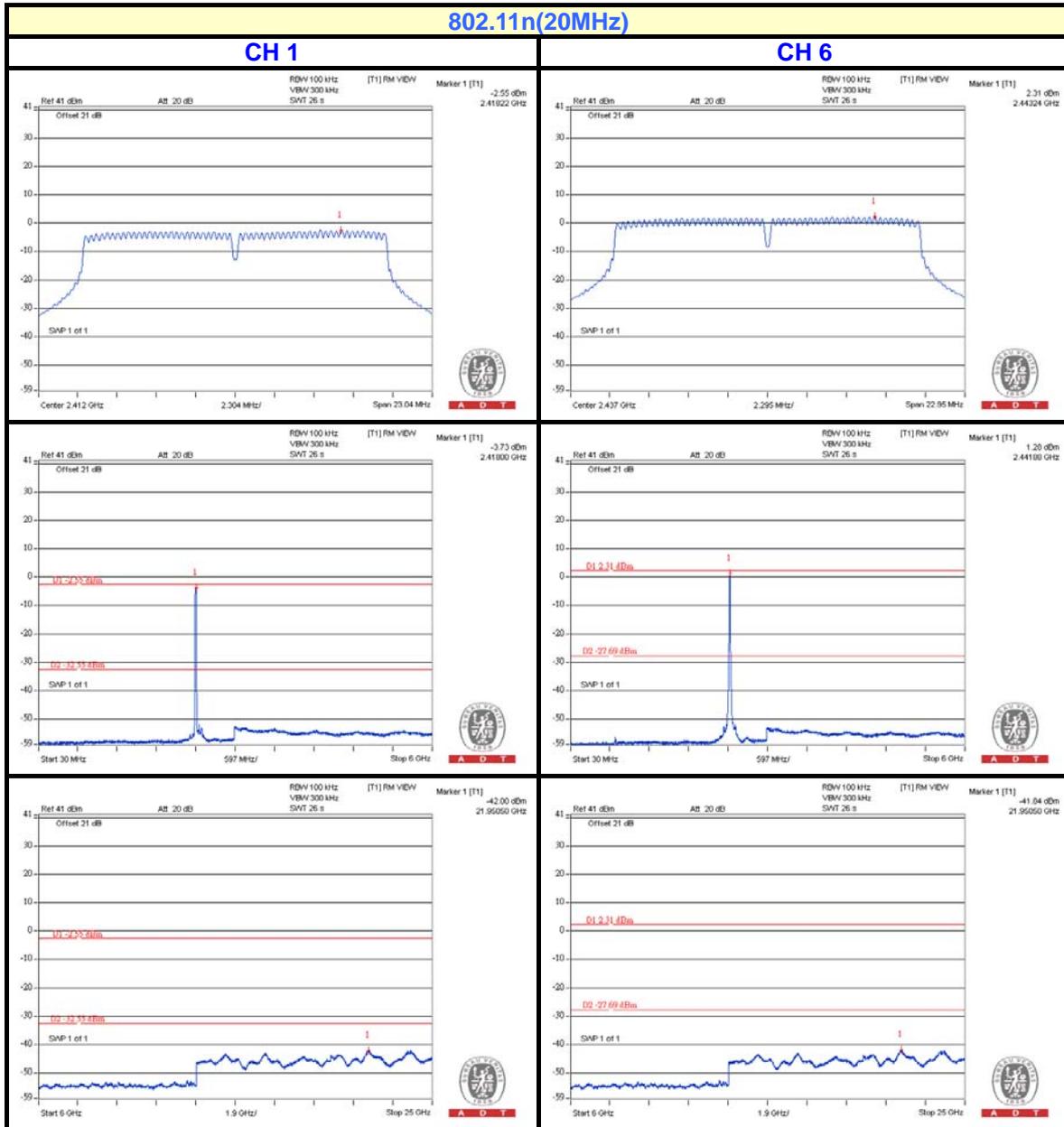
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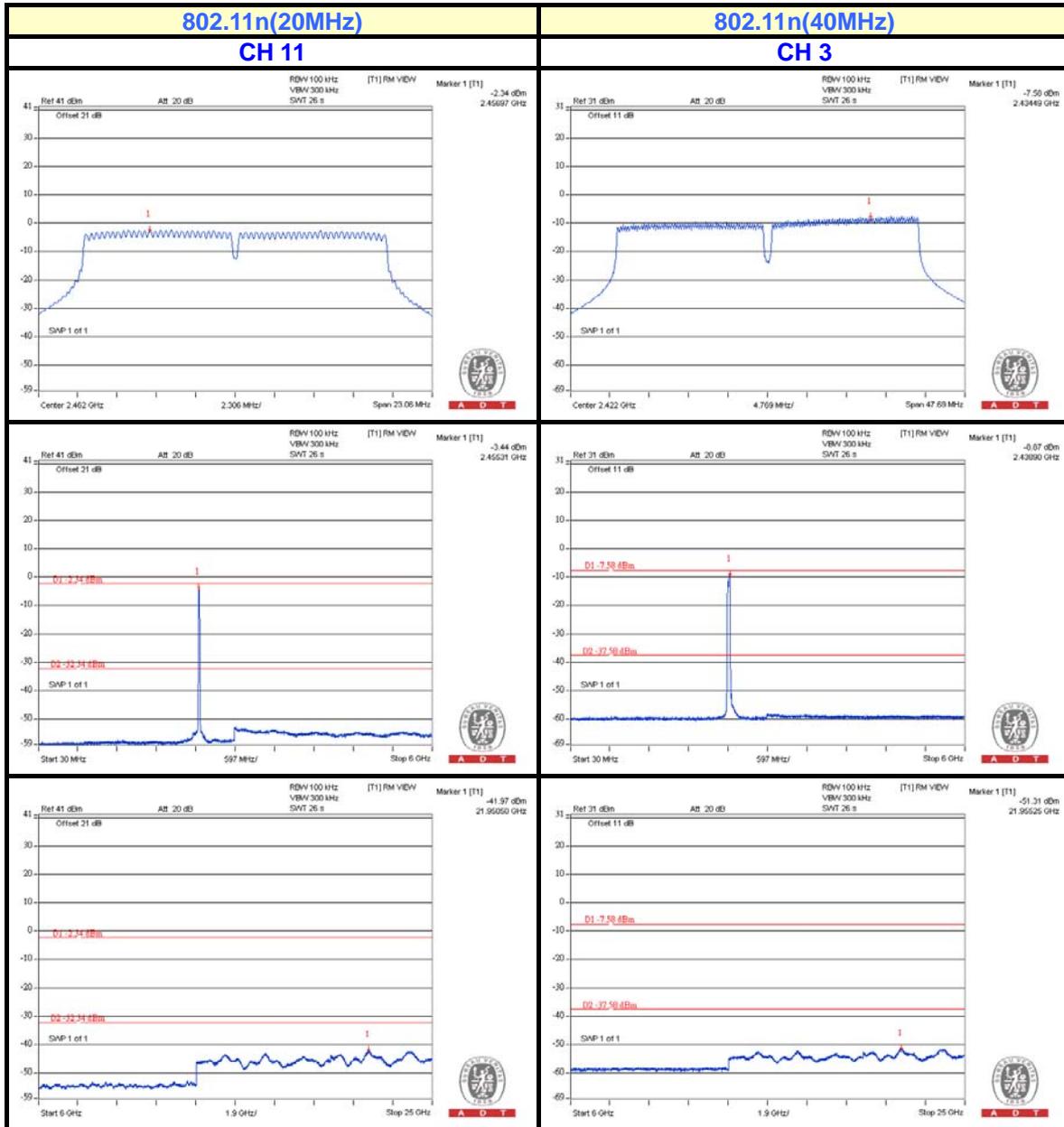




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802.11n(20MHz)

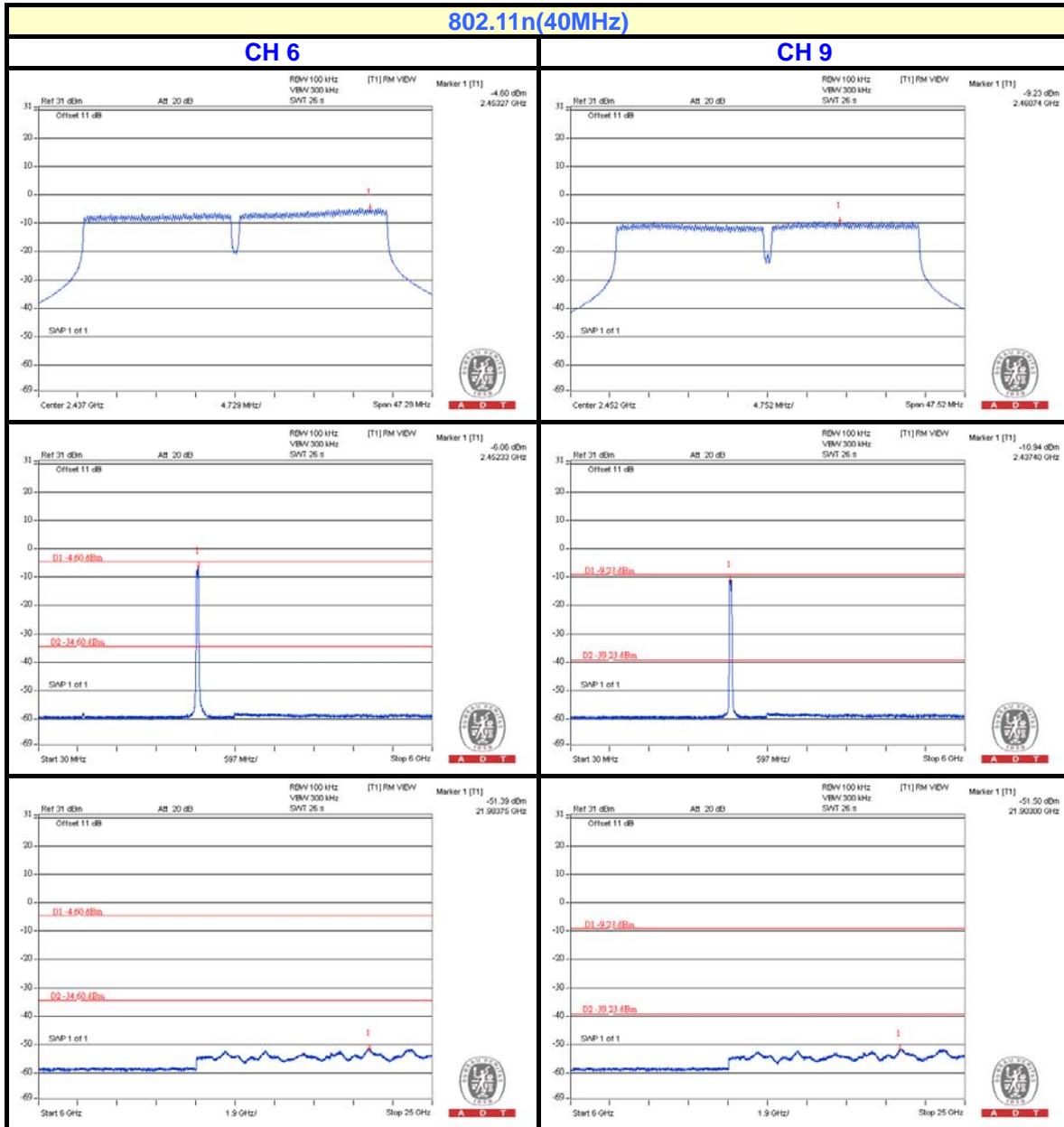






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802.11n(40MHz)



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 30dB 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 30dB under any condition of modulation.

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.

5.1.7 TEST RESULTS

ABOVE 1GHz DATA :

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	#5725.00	74.5 PK	87.4	-12.9	1.00 H	291	35.00	39.50
2	#5725.00	62.4 AV	75.3	-12.9	1.00 H	291	22.90	39.50
3	*5745.00	117.4 PK			1.00 H	299	77.80	39.60
4	*5745.00	105.3 AV			1.00 H	299	65.70	39.60
5	11490.00	59.5 PK	74.0	-14.5	1.00 H	248	7.80	51.70
6	11490.00	46.9 AV	54.0	-7.1	1.00 H	248	-4.80	51.70
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	#5725.00	77.6 PK	89.4	-11.8	1.00 V	277	38.10	39.50
2	#5725.00	65.7 AV	77.5	-11.8	1.00 V	277	26.20	39.50
3	*5745.00	119.4 PK			1.00 V	271	79.80	39.60
4	*5745.00	107.5 AV			1.00 V	271	67.90	39.60
5	11490.00	60.5 PK	74.0	-13.5	1.00 V	8	8.80	51.70
6	11490.00	47.2 AV	54.0	-6.8	1.00 V	8	-4.50	51.70

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).
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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	*5785.00	117.3 PK			1.00 H	13	77.60	39.70
2	*5785.00	105.2 AV			1.00 H	13	65.50	39.70
3	7713.00	52.9 PK	74.0	-21.1	1.00 H	19	7.70	45.20
4	7713.00	38.5 AV	54.0	-15.5	1.00 H	19	-6.70	45.20
5	11570.00	60.6 PK	74.0	-13.4	1.00 H	293	9.00	51.60
6	11570.00	47.7 AV	54.0	-6.3	1.00 H	293	-3.90	51.60
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	119.9 PK			1.00 V	270	80.20	39.70
2	*5785.00	107.7 AV			1.00 V	270	68.00	39.70
3	7713.00	53.6 PK	74.0	-20.4	1.00 V	16	8.40	45.20
4	7713.00	39.6 AV	54.0	-14.4	1.00 V	16	-5.60	45.20
5	11570.00	61.5 PK	74.0	-12.5	1.00 V	7	9.90	51.60
6	11570.00	48.9 AV	54.0	-5.1	1.00 V	7	-2.70	51.60

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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	*5825.00	117.2 PK			1.10 H	299	77.50	39.70
2	*5825.00	105.1 AV			1.10 H	299	65.40	39.70
3	#5850.00	72.7 PK	87.2	-14.5	1.03 H	296	32.90	39.80
4	#5850.00	60.6 AV	75.1	-14.5	1.03 H	296	20.80	39.80
5	11650.00	59.3 PK	74.0	-14.7	1.00 H	244	7.70	51.60
6	11650.00	46.8 AV	54.0	-7.2	1.00 H	244	-4.80	51.60
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	119.0 PK			1.00 V	274	79.30	39.70
2	*5825.00	106.9 AV			1.00 V	274	67.20	39.70
3	#5850.00	75.8 PK	89.0	-13.2	1.00 V	270	36.00	39.80
4	#5850.00	63.7 AV	76.9	-13.2	1.00 V	270	23.90	39.80
5	11650.00	60.3 PK	74.0	-13.7	1.00 V	10	8.70	51.60
6	11650.00	47.1 AV	54.0	-6.9	1.00 V	10	-4.50	51.60

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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	#5725.00	77.3 PK	87.7	-10.4	1.18 H	306	37.80	39.50
2	#5725.00	64.7 AV	75.1	-10.4	1.18 H	306	25.20	39.50
3	*5745.00	117.7 PK			1.11 H	301	78.10	39.60
4	*5745.00	105.1 AV			1.11 H	301	65.50	39.60
5	11490.00	60.0 PK	74.0	-14.0	1.00 H	275	8.30	51.70
6	11490.00	46.1 AV	54.0	-7.9	1.00 H	275	-5.60	51.70

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	#5725.00	81.4 PK	90.0	-8.6	1.48 V	4	41.90	39.50
2	#5725.00	69.1 AV	77.7	-8.6	1.48 V	4	29.60	39.50
3	*5745.00	120.0 PK			1.02 V	271	80.40	39.60
4	*5745.00	107.7 AV			1.02 V	271	68.10	39.60
5	11490.00	61.0 PK	74.0	-13.0	1.00 V	9	9.30	51.70
6	11490.00	47.4 AV	54.0	-6.6	1.00 V	9	-4.30	51.70

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).
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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	*5785.00	117.2 PK			1.00 H	299	77.50	39.70
2	*5785.00	104.7 AV			1.00 H	299	65.00	39.70
3	7713.00	51.6 PK	74.0	-22.4	1.00 H	295	6.40	45.20
4	7713.00	37.5 AV	54.0	-16.5	1.00 H	295	-7.70	45.20
5	11570.00	61.0 PK	74.0	-13.0	1.00 H	283	9.40	51.60
6	11570.00	47.9 AV	54.0	-6.1	1.00 H	283	-3.70	51.60
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	119.5 PK			1.00 V	273	79.80	39.70
2	*5785.00	107.3 AV			1.00 V	273	67.60	39.70
3	7713.00	52.4 PK	74.0	-21.6	1.00 V	10	7.20	45.20
4	7713.00	38.7 AV	54.0	-15.3	1.00 V	10	-6.50	45.20
5	11570.00	62.0 PK	74.0	-12.0	1.00 V	20	10.40	51.60
6	11570.00	48.1 AV	54.0	-5.9	1.00 V	20	-3.50	51.60

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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	*5825.00	116.7 PK			1.00 H	50	77.00	39.70
2	*5825.00	104.3 AV			1.00 H	50	64.60	39.70
3	#5850.00	75.4 PK	86.7	-11.3	1.00 H	52	35.60	39.80
4	#5850.00	63.0 AV	74.3	-11.3	1.00 H	52	23.20	39.80
5	11650.00	59.5 PK	74.0	-14.5	1.00 H	202	7.90	51.60
6	11650.00	46.9 AV	54.0	-7.1	1.00 H	202	-4.70	51.60
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	119.1 PK			1.00 V	268	79.40	39.70
2	*5825.00	107.3 AV			1.00 V	268	67.60	39.70
3	#5850.00	79.7 PK	89.1	-9.4	1.00 V	263	39.90	39.80
4	#5850.00	67.9 AV	77.3	-9.4	1.00 V	263	28.10	39.80
5	11650.00	60.5 PK	74.0	-13.5	1.00 V	13	8.90	51.60
6	11650.00	47.2 AV	54.0	-6.8	1.00 V	13	-4.40	51.60

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.



802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	#5725.00	76.8 PK	82.0	-5.2	1.00 H	57	37.30	39.50
2	#5725.00	65.6 AV	70.8	-5.2	1.00 H	57	26.10	39.50
3	*5755.00	112.0 PK			1.00 H	60	72.40	39.60
4	*5755.00	100.8 AV			1.00 H	60	61.20	39.60
5	11510.00	59.3 PK	74.0	-14.7	1.00 H	249	7.60	51.70
6	11510.00	46.8 AV	54.0	-7.2	1.00 H	249	-4.90	51.70

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	#5725.00	82.3 PK	86.2	-3.9	1.00 V	279	42.80	39.50
2	#5725.00	71.6 AV	75.5	-3.9	1.00 V	279	32.10	39.50
3	*5755.00	116.2 PK			1.00 V	270	76.60	39.60
4	*5755.00	105.5 AV			1.00 V	270	65.90	39.60
5	11510.00	60.3 PK	74.0	-13.7	1.00 V	19	8.60	51.70
6	11510.00	47.1 AV	54.0	-6.9	1.00 V	19	-4.60	51.70

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).
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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	*5795.00	112.2 PK			1.00 H	297	72.50	39.70
2	*5795.00	101.4 AV			1.00 H	297	61.70	39.70
3	#5850.00	64.3 PK	82.2	-17.9	1.00 H	291	24.50	39.80
4	#5850.00	53.5 AV	71.4	-17.9	1.00 H	291	13.70	39.80
5	11590.00	59.2 PK	74.0	-14.8	1.00 H	217	7.70	51.50
6	11590.00	46.1 AV	54.0	-7.9	1.00 H	217	-5.40	51.50
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	*5795.00	116.8 PK			1.00 V	271	77.10	39.70
2	*5795.00	105.3 AV			1.00 V	271	65.60	39.70
3	#5850.00	70.5 PK	86.8	-16.3	1.00 V	276	30.70	39.80
4	#5850.00	59.0 AV	75.3	-16.3	1.00 V	276	19.20	39.80
5	11590.00	60.2 PK	74.0	-13.8	1.00 V	11	8.70	51.50
6	11590.00	47.4 AV	54.0	-6.6	1.00 V	11	-4.10	51.50

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 limit value is defined as per 15.247.
7. "#":The radiated frequency is out the restricted band.



A D T

BELOW 1GHz WORST-CASE DATA : 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 69%RH	TESTED BY	Brad 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	61.01	27.6 QP	40.0	-12.4	1.25 H	221	14.10	13.50
2	290.43	33.6 QP	46.0	-12.4	1.00 H	180	18.30	15.30
3	424.59	33.1 QP	46.0	-12.9	1.75 H	3	14.00	19.10
4	500.42	34.1 QP	46.0	-11.9	1.75 H	184	13.00	21.10
5	624.85	37.1 QP	46.0	-8.9	1.25 H	185	13.40	23.70
6	755.12	34.1 QP	46.0	-11.9	1.00 H	256	8.20	25.90

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	62.95	36.2 QP	40.0	-3.8	1.00 V	13	23.00	13.20
2	284.60	33.2 QP	46.0	-12.8	1.49 V	205	18.10	15.10
3	389.59	33.2 QP	46.0	-12.8	1.24 V	351	15.10	18.10
4	624.85	34.7 QP	46.0	-11.3	1.49 V	151	11.00	23.70
5	751.23	34.4 QP	46.0	-11.6	1.24 V	223	8.60	25.80
6	875.67	35.2 QP	46.0	-10.8	1.24 V	0	7.00	28.20

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.

5.2 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

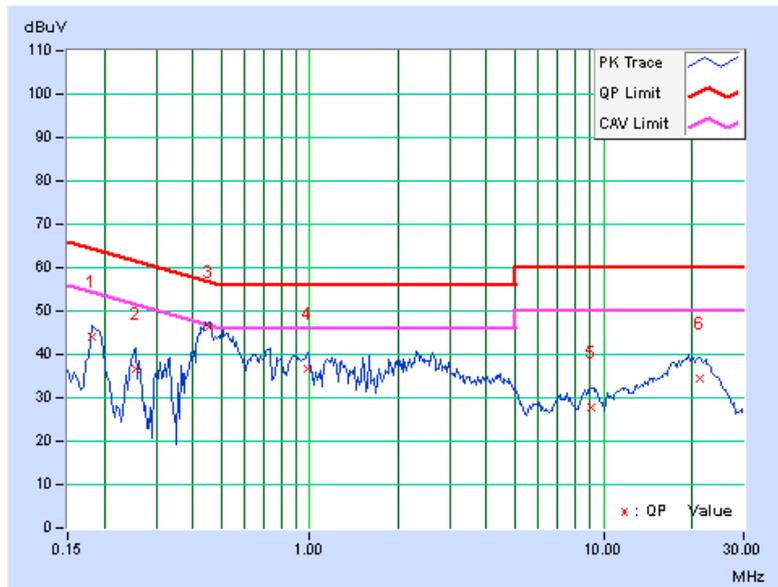
CONDUCTED WORST-CASE DATA : 802.11a

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	0.12	43.92	26.88	44.04	27.00	64.43	54.43	-20.38	-27.42
2	0.25547	0.13	36.47	23.51	36.60	23.64	61.58	51.58	-24.98	-27.94
3	0.45078	0.14	46.00	34.00	46.14	34.14	56.86	46.86	-10.73	-12.73
4	0.98203	0.19	36.34	20.21	36.53	20.40	56.00	46.00	-19.47	-25.60
5	9.11328	0.60	27.09	19.17	27.69	19.77	60.00	50.00	-32.31	-30.23
6	21.35156	1.23	33.30	28.36	34.53	29.59	60.00	50.00	-25.47	-20.41

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.

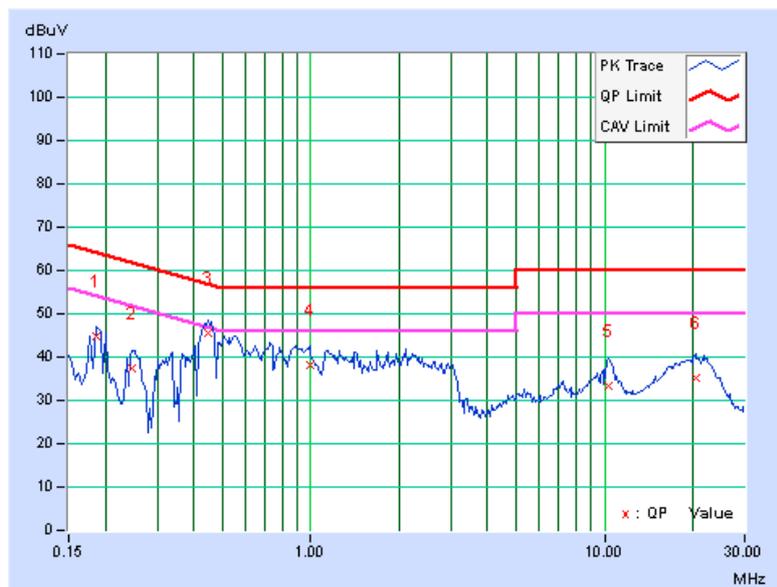


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.14	44.55	32.12	44.69	32.26	64.25	54.25	-19.57	-22.00
2	0.24766	0.14	37.23	26.72	37.37	26.86	61.84	51.84	-24.46	-24.97
3	0.44688	0.15	45.35	36.78	45.50	36.93	56.93	46.93	-11.43	-10.00
4	0.99375	0.21	37.86	21.72	38.07	21.93	56.00	46.00	-17.93	-24.07
5	10.29297	0.60	32.80	24.46	33.40	25.06	60.00	50.00	-26.60	-24.94
6	20.42969	0.99	34.33	29.37	35.32	30.36	60.00	50.00	-24.68	-19.64

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.



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.



5.3.7 TEST RESULTS

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.56	16.68	16.59	0.5	PASS
157	5785	16.59	16.67	16.61	0.5	PASS
165	5825	16.65	16.65	16.63	0.5	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.89	17.83	17.86	0.5	PASS
157	5785	17.76	17.93	17.88	0.5	PASS
165	5825	17.87	17.87	17.83	0.5	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	37.16	37.41	37.26	0.5	PASS
159	5795	37.09	37.18	37.10	0.5	PASS

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.	CHAN. FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	22.35	21.24	22.15	468.9	26.71	28.2	PASS
157	5785	22.04	21.84	22.40	486.5	26.87	28.2	PASS
165	5825	22.05	21.80	21.81	463.4	26.66	28.2	PASS

NOTE: Directional gain = 3dBi + 10log(3) = 7.8dBi > 6dBi , so the limit shall be reduced to 30-(7.8-6) = 28.2dBm.

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	22.24	21.40	22.03	465.1	26.68	28.2	PASS
157	5785	21.87	21.70	22.22	468.5	26.71	28.2	PASS
165	5825	21.90	21.73	21.84	456.6	26.60	28.2	PASS

NOTE: Directional gain = 3dBi + 10log(3) = 7.8dBi > 6dBi , so the limit shall be reduced to 30-(7.8-6) = 28.2dBm.

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	22.11	21.40	21.97	458.0	26.61	28.2	PASS
159	5795	21.68	21.76	22.05	457.5	26.60	28.2	PASS

NOTE: Directional gain = 3dBi + 10log(3) = 7.8dBi > 6dBi , so the limit shall be reduced to 30-(7.8-6) = 28.2dBm.

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=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	2.52	-12.71	4.77	-7.94	6.2	PASS
	157	5785	2.47	-12.76	4.77	-7.99	6.2	PASS
	165	5825	2.57	-12.66	4.77	-7.89	6.2	PASS
1	149	5745	2.01	-13.22	4.77	-8.45	6.2	PASS
	157	5785	2.41	-12.82	4.77	-8.05	6.2	PASS
	165	5825	2.34	-12.89	4.77	-8.12	6.2	PASS
2	149	5745	2.27	-12.96	4.77	-8.19	6.2	PASS
	157	5785	2.62	-12.61	4.77	-7.84	6.2	PASS
	165	5825	2.10	-13.13	4.77	-8.36	6.2	PASS

NOTE: Directional gain = $3\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the limit shall be reduced to $8-(7.8-6) = 6.2\text{dBm}$.

802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	1.88	-13.35	4.77	-8.58	6.2	PASS
	157	5785	2.02	-13.21	4.77	-8.44	6.2	PASS
	165	5825	1.52	-13.71	4.77	-8.94	6.2	PASS
1	149	5745	1.42	-13.81	4.77	-9.04	6.2	PASS
	157	5785	2.25	-12.98	4.77	-8.21	6.2	PASS
	165	5825	1.69	-13.54	4.77	-8.77	6.2	PASS
2	149	5745	2.01	-13.22	4.77	-8.45	6.2	PASS
	157	5785	2.51	-12.72	4.77	-7.95	6.2	PASS
	165	5825	2.01	-13.22	4.77	-8.45	6.2	PASS

NOTE: Directional gain = $3\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the limit shall be reduced to $8-(7.8-6) = 6.2\text{dBm}$.

802.11n (40MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-0.68	-15.91	4.77	-11.14	6.2	PASS
	159	5795	-0.90	-16.13	4.77	-11.36	6.2	PASS
1	151	5755	-1.36	-16.59	4.77	-11.82	6.2	PASS
	159	5795	-1.23	-16.46	4.77	-11.69	6.2	PASS
2	151	5755	-1.30	-16.53	4.77	-11.76	6.2	PASS
	159	5795	-1.11	-16.34	4.77	-11.57	6.2	PASS

NOTE: Directional gain = $3\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the limit shall be reduced to $8-(7.8-6) = 6.2\text{dBm}$.

5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below -30dB 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

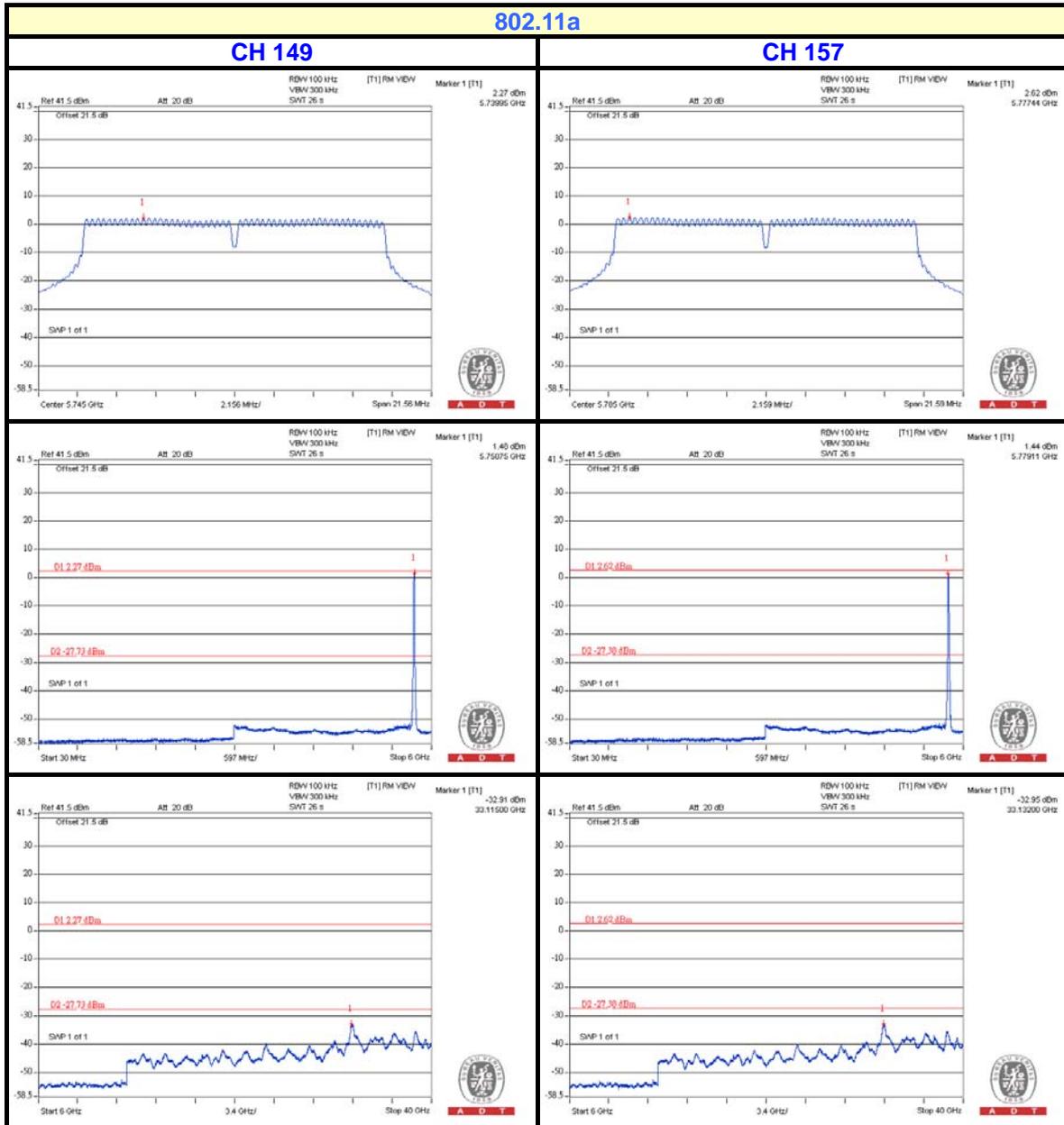
5.6.7 TEST RESULTS

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 30dB offset below D1. It shows compliance with the requirement.

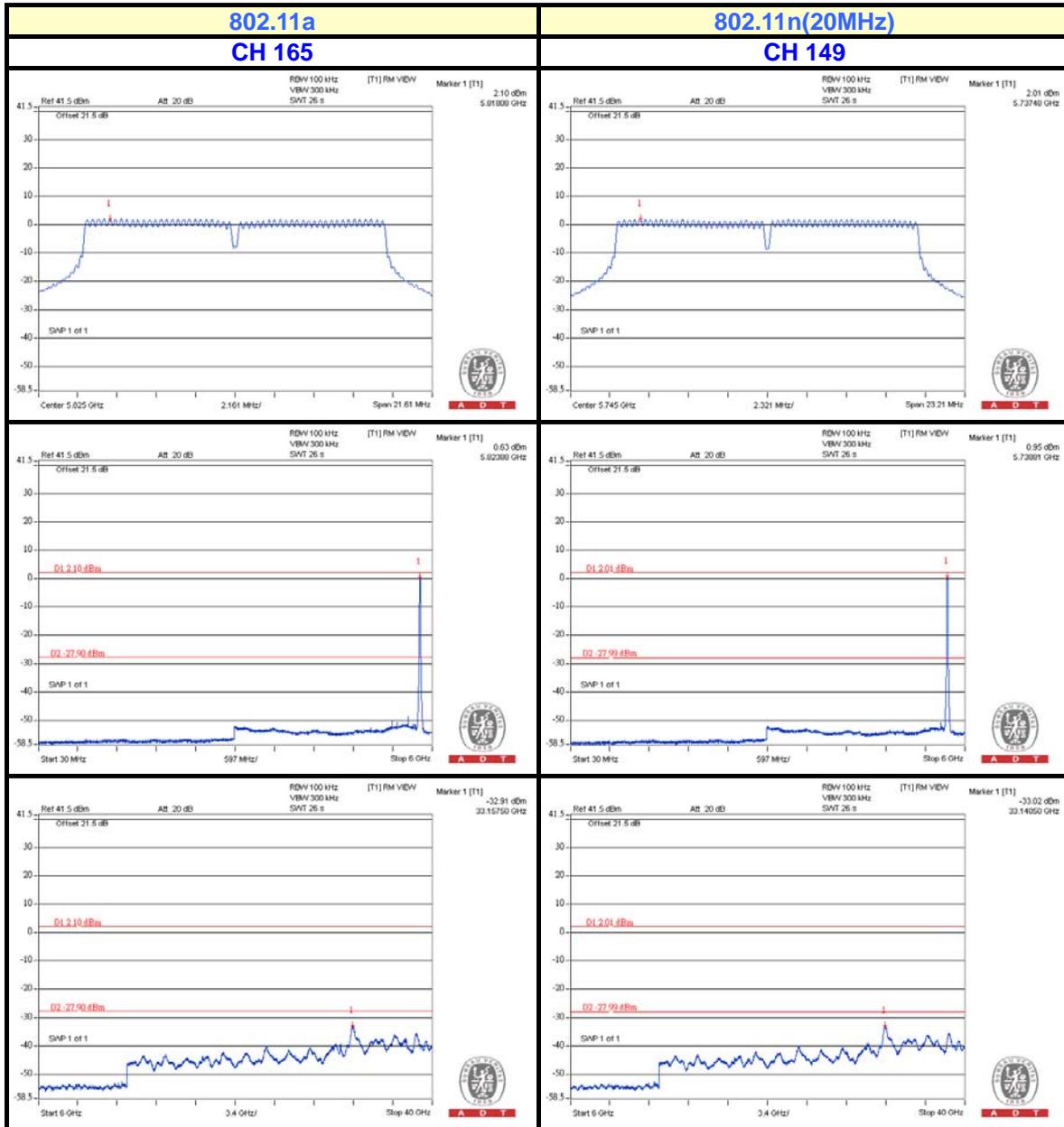


A D T





A D T



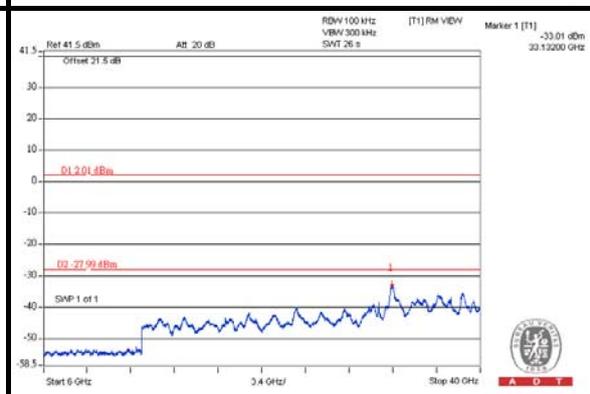
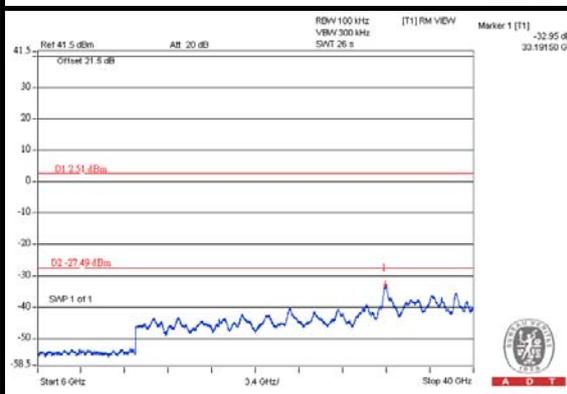
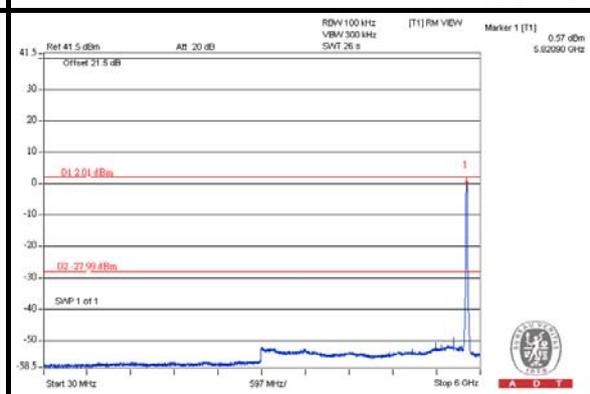
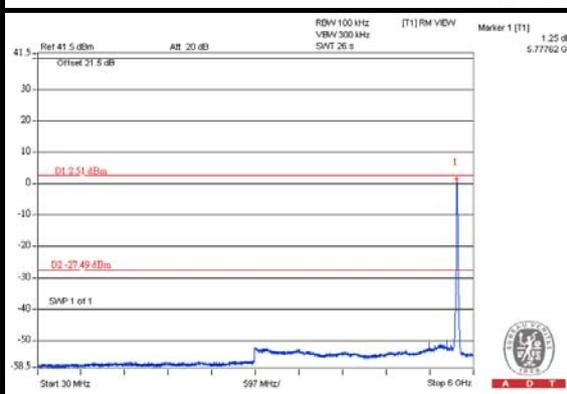
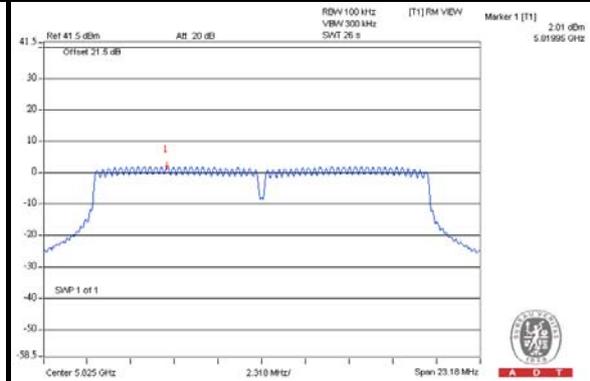
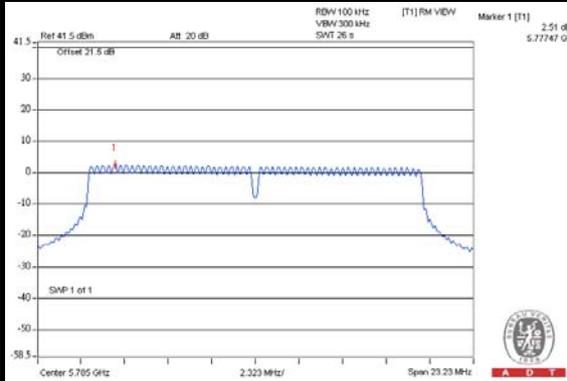


A D T

802.11n(20MHz)

CH 157

CH 165



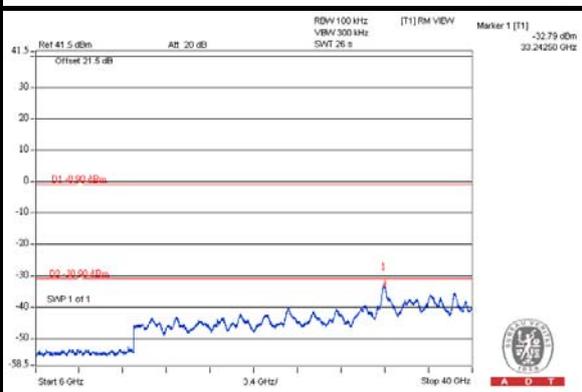
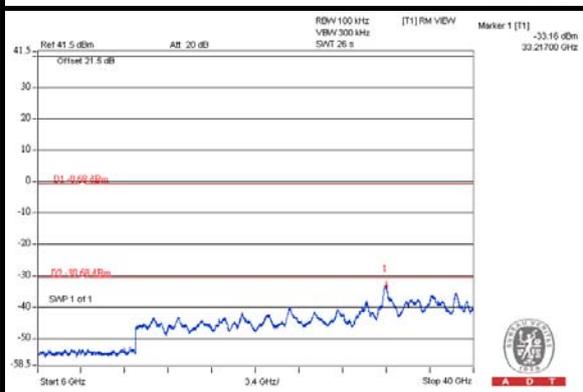
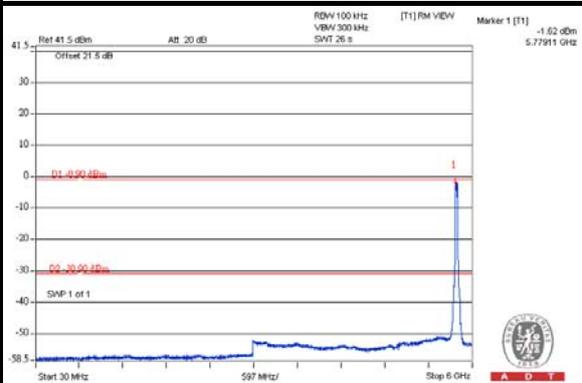
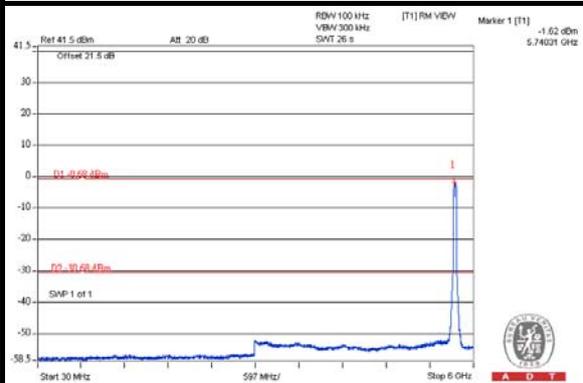
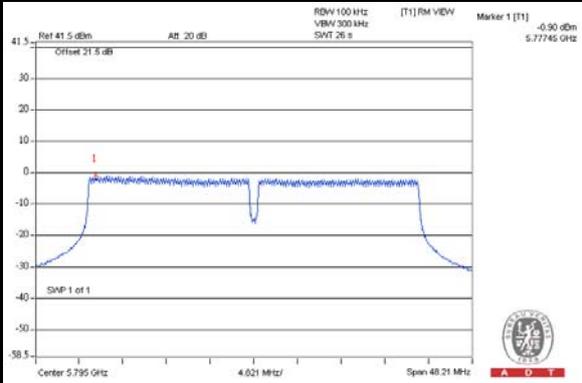
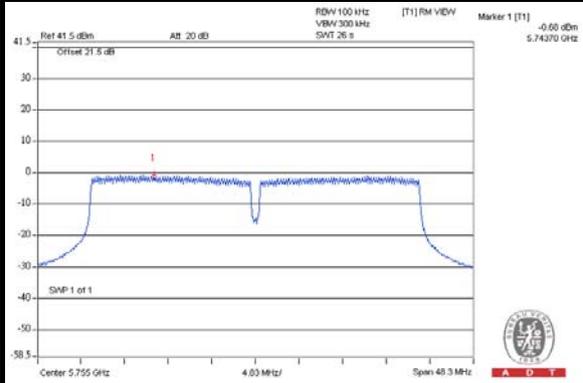


A D T

802.11n(40MHz)

CH 151

CH 159





A D T

6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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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Email: service.adt@tw.bureauveritas.com

Web Site: www.adt.com.tw

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



A D T

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---