FCC TEST REPORT (15.247)

REPORT NO.:	RF121019C06
MODEL NO.:	MBR1400v2
FCC ID:	UXX-MBR1400V2
RECEIVED:	Oct. 19, 2012
TESTED:	Oct. 23 ~ Nov. 16, 2012
ISSUED:	Nov. 21, 2012

APPLICANT:	CradlePoint, Inc.
ADDRESS:	805W Franklin Street, Boise ID 83702, USA

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF121019C06	Original release	Nov. 21, 2012

1. CERTIFICATION

PRODUCT:	Dual band Router
MODEL NO.:	MBR1400v2
BRAND:	CradlePoint, Inc.
APPLICANT:	CradlePoint, Inc.
TESTED:	Oct. 23 ~ Nov. 16, 2012
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)**
	ANSI C63.10-2009

The above equipment (model: MBR1400v2) 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 : Pettie Chen / Senior Specialist , **DATE :** Nov. 21, 2012

APPROVED BY : Ken Liu / Manager , **DATE :** Nov. 21, 2012

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 -7.95dB at 0.18519MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2483.50MHz.
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 RSMA 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	Dual band Router
MODEL NO.	MBR1400v2
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	515.987mW for 2412 ~ 2462MHz 77.217mW for 5745 ~ 5825MHz
ANTENNA TYPE	Refer to NOTE
ANTENNA CONNECTOR	Refer to NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

1. The EUT provides three completed transmitters and three receivers.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (20MHz)	3TX
802.11n (40MHz)	3TX

2. The following antennas were provided to the EUT.

Antenna item	Type	Connector	Brand	Model	Gain
1	Dipole	R-SMA	Joymax	IWX-1511RSXX-711	5dBi
2	Dipole		Joymax	KWX-3621RSXX-711	5dBi

3. The EUT consumes power from the following adapter.

ADAPTER 1	
BRAND:	Leader
MODEL:	MU18-D120150-A1
INPUT:	100-240Vac, 50/60Hz, 0.6A
OUTPUT:	12Vdc, 1.5A
POWER LINE:	1.5m non-shielded cable without core

ADAPTER 2	
BRAND:	TENPAO
MODEL:	S018EM1200150
INPUT:	100-240Vac, 50/60Hz, 500mA
OUTPUT:	12Vdc, 1500mA
POWER LINE:	1.8m non-shielded cable without core

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

3.2 DESCRIPTION OF TEST MODES

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	
A	√	√	√	√	Power from adapter 1
B	-	√	-	-	Power from adapter 2

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

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	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)
A, B	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)
A	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)
A	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
A	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)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	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	24deg. C, 67%RH	120Vac, 60Hz	Chris Lin
RE<1G	24deg. C, 67%RH	120Vac, 60Hz	Martin Lee
PLC	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
APCM	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui

FOR 5.0GHz (5745 ~ 5825MHz):

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter 1
B	-	√	-	-	Power from adapter 2

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

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	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)
A, B	802.11n (20MHz)	149 to 165	149	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)
A	802.11n (20MHz)	149 to 165	149	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)
A	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
A	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)
A	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

TEST CONDITION:

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

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.

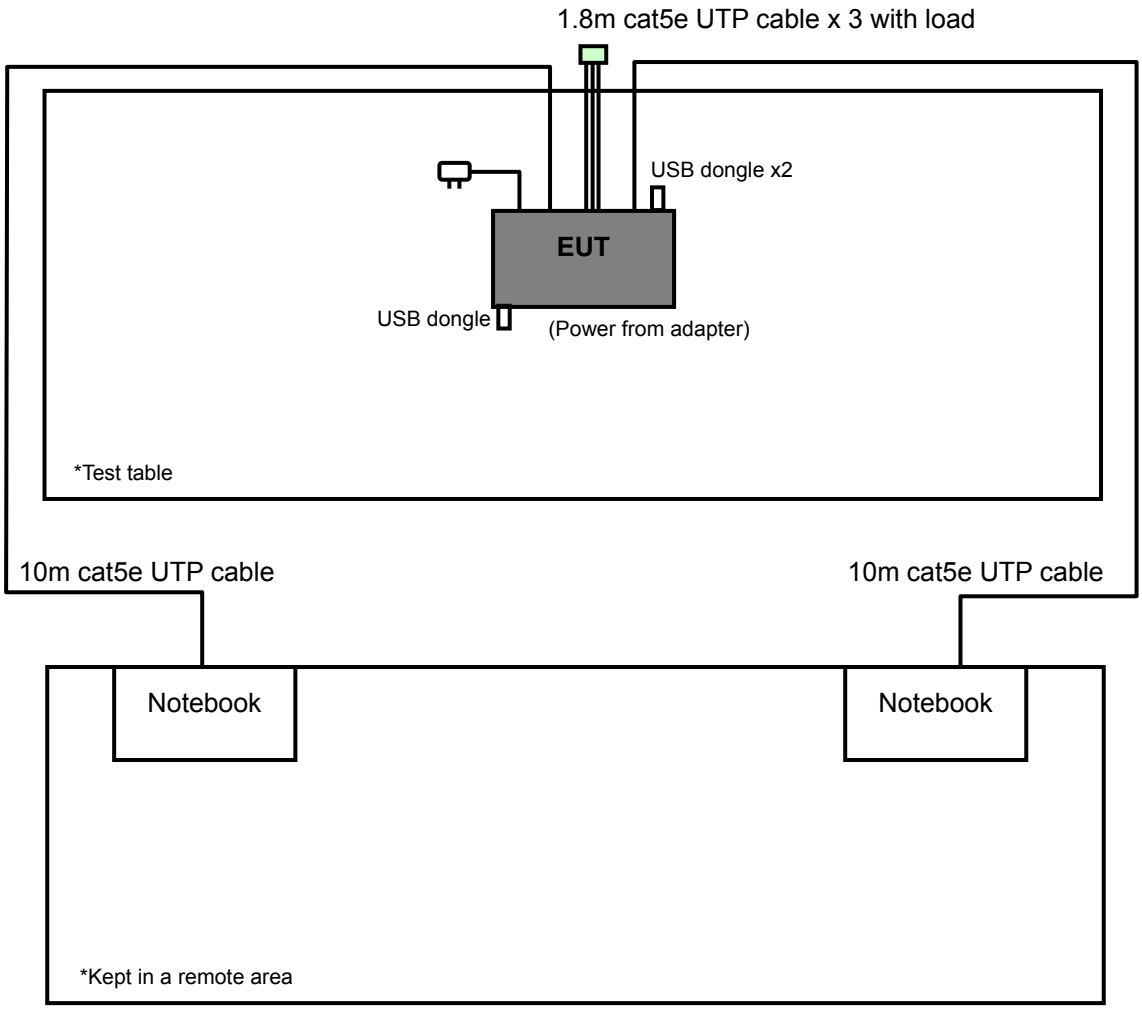
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	USB Dongle	Transcend	V85	538455 4481	NA
2	USB Dongle	Transcend	V85	569992-8271	NA
3	USB Dongle	Transcend	V85	569992-8208	NA
4	Load	NA	NA	NA	NA
5	Notebook	DELL	D531	CN-0XM006-48643-81U-2610	QDS-BRCM1020
6	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	NA
4	1.8m Cat5e UTP cable x 3 with load connected to EUT
5	10m Cat5e UTP cable
6	10m Cat5e UTP cable

NOTE:

1. All power cords of the above support units are non shielded (1.8m).
2. Item 5, 6 acted as communication partner 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 v02
662911 D01 Multiple Transmitter Output v01 r02
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.

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
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8447D	2944A10639	Oct. 23, 2012	Oct. 22, 2013
Preamplifier Agilent	8449B	3008A01976	Jun. 27, 2012	Jun. 26, 2013
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
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 25, 2012	Oct. 24, 2013
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 3.
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 988962.
6. The IC Site Registration No. is IC 7450F-3.

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.

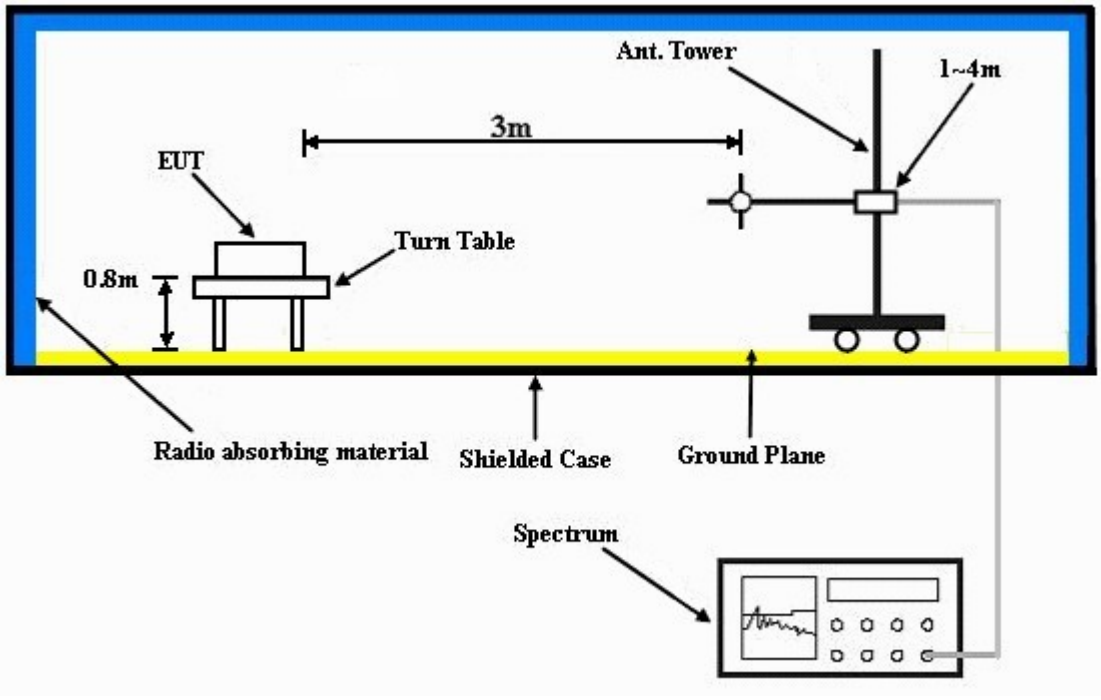
NOTE:

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

a. Placed the EUT on the testing table.
b. Prepared two notebooks to act as communication partner and placed them outside of testing area.
c. The communication partners 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.
d. The communication partners sent data to EUT by command "PING".
e. The necessary accessories enable the system in full functions.

4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE 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	24deg. C, 67%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	2390.00	54.4 PK	74.0	-19.6	1.12 H	285	23.60	30.80
2	2390.00	43.8 AV	54.0	-10.2	1.12 H	285	13.00	30.80
3	*2412.00	95.4 PK			1.06 H	360	64.50	30.90
4	*2412.00	91.6 AV			1.06 H	360	60.70	30.90
5	4824.00	44.5 PK	74.0	-29.5	1.13 H	347	7.50	37.00
6	4824.00	31.8 AV	54.0	-22.2	1.13 H	347	-5.20	37.00
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	2386.00	58.4 PK	74.0	-15.6	1.15 V	347	27.60	30.80
2	2386.00	49.4 AV	54.0	-4.6	1.15 V	347	18.60	30.80
3	2390.00	57.4 PK	74.0	-16.6	1.15 V	347	26.60	30.80
4	2390.00	46.6 AV	54.0	-7.4	1.15 V	347	15.80	30.80
5	*2412.00	107.9 PK			1.16 V	351	77.00	30.90
6	*2412.00	104.2 AV			1.16 V	351	73.30	30.90
7	4824.00	45.8 PK	74.0	-28.2	1.11 V	345	8.80	37.00
8	4824.00	35.1 AV	54.0	-18.9	1.11 V	345	-1.90	37.00

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.

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	24deg. C, 67%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	*2437.00	96.0 PK			1.02 H	360	65.00	31.00
2	*2437.00	92.1 AV			1.02 H	360	61.10	31.00
3	4874.00	44.7 PK	74.0	-29.3	1.10 H	68	7.60	37.10
4	4874.00	32.3 AV	54.0	-21.7	1.10 H	68	-4.80	37.10
5	7311.00	50.6 PK	74.0	-23.4	1.10 H	147	7.00	43.60
6	7311.00	38.2 AV	54.0	-15.8	1.10 H	147	-5.40	43.60
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	*2437.00	108.9 PK			1.14 V	348	77.90	31.00
2	*2437.00	105.3 AV			1.14 V	348	74.30	31.00
3	4874.00	44.8 PK	74.0	-29.2	1.10 V	169	7.70	37.10
4	4874.00	32.6 AV	54.0	-21.4	1.10 V	169	-4.50	37.10
5	7311.00	50.5 PK	74.0	-23.5	1.00 V	85	6.90	43.60
6	7311.00	38.0 AV	54.0	-16.0	1.00 V	85	-5.60	43.60

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.

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	24deg. C, 67%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	*2462.00	96.2 PK			1.05 H	360	65.10	31.10
2	*2462.00	92.6 AV			1.05 H	360	61.50	31.10
3	2483.50	54.8 PK	74.0	-19.2	1.05 H	360	23.60	31.20
4	2483.50	44.0 AV	54.0	-10.0	1.05 H	360	12.80	31.20
5	2487.00	55.2 PK	74.0	-18.8	1.05 H	360	24.00	31.20
6	2487.00	45.0 AV	54.0	-9.0	1.05 H	360	13.80	31.20
7	4924.00	45.5 PK	74.0	-28.5	1.10 H	74	8.30	37.20
8	4924.00	32.7 AV	54.0	-21.3	1.10 H	74	-4.50	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	*2462.00	106.9 PK			1.01 V	103	75.80	31.10
2	*2462.00	103.2 AV			1.01 V	103	72.10	31.10
3	2483.50	56.3 PK	74.0	-17.7	1.01 V	103	25.10	31.20
4	2483.50	46.9 AV	54.0	-7.1	1.01 V	103	15.70	31.20
5	2487.00	58.6 PK	74.0	-15.4	1.01 V	103	27.40	31.20
6	2487.00	49.2 AV	54.0	-4.8	1.01 V	103	18.00	31.20
7	4924.00	46.5 PK	74.0	-27.5	1.00 V	85	9.30	37.20
8	4924.00	34.0 AV	54.0	-20.0	1.00 V	85	-3.20	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.

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	24deg. C, 67%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	2390.00	54.7 PK	74.0	-19.3	1.07 H	4	23.90	30.80
2	2390.00	43.2 AV	54.0	-10.8	1.07 H	4	12.40	30.80
3	*2412.00	95.9 PK			1.07 H	4	65.00	30.90
4	*2412.00	85.1 AV			1.07 H	4	54.20	30.90
5	4824.00	45.2 PK	74.0	-28.8	1.17 H	63	8.20	37.00
6	4824.00	33.3 AV	54.0	-20.7	1.17 H	63	-3.70	37.00
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	2390.00	60.1 PK	74.0	-13.9	1.14 V	346	29.30	30.80
2	2390.00	47.5 AV	54.0	-6.5	1.14 V	346	16.70	30.80
3	*2412.00	107.7 PK			1.14 V	336	76.80	30.90
4	*2412.00	97.0 AV			1.14 V	336	66.10	30.90
5	4824.00	45.4 PK	74.0	-28.6	1.10 V	64	8.40	37.00
6	4824.00	33.7 AV	54.0	-20.3	1.10 V	64	-3.30	37.00

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.

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	24deg. C, 67%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	*2437.00	95.4 PK			1.00 H	6	64.40	31.00
2	*2437.00	84.6 AV			1.00 H	6	53.60	31.00
3	4874.00	45.3 PK	74.0	-28.7	1.10 H	96	8.20	37.10
4	4874.00	32.2 AV	54.0	-21.8	1.10 H	96	-4.90	37.10
5	7311.00	51.2 PK	74.0	-22.8	1.00 H	47	7.60	43.60
6	7311.00	38.1 AV	54.0	-15.9	1.00 H	47	-5.50	43.60
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	*2437.00	108.7 PK			1.16 V	350	77.70	31.00
2	*2437.00	98.1 AV			1.16 V	350	67.10	31.00
3	4874.00	44.8 PK	74.0	-29.2	1.10 V	63	7.70	37.10
4	4874.00	32.1 AV	54.0	-21.9	1.10 V	63	-5.00	37.10
5	7311.00	50.7 PK	74.0	-23.3	1.10 V	247	7.10	43.60
6	7311.00	39.1 AV	54.0	-14.9	1.10 V	247	-4.50	43.60

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.

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	24deg. C, 67%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	*2462.00	96.4 PK			1.01 H	360	65.30	31.10
2	*2462.00	86.4 AV			1.01 H	360	55.30	31.10
3	2483.50	55.7 PK	74.0	-18.3	1.10 H	74	24.50	31.20
4	2483.50	45.1 AV	54.0	-8.9	1.10 H	74	13.90	31.20
5	4924.00	46.5 PK	74.0	-27.5	1.12 H	28	9.30	37.20
6	4924.00	34.0 AV	54.0	-20.0	1.12 H	28	-3.20	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	*2462.00	106.8 PK			1.04 V	105	75.70	31.10
2	*2462.00	96.4 AV			1.04 V	105	65.30	31.10
3	2483.50	60.6 PK	74.0	-13.4	1.00 V	112	29.40	31.20
4	2483.50	47.4 AV	54.0	-6.6	1.00 V	112	16.20	31.20
5	4924.00	44.5 PK	74.0	-29.5	1.00 V	46	7.30	37.20
6	4924.00	32.8 AV	54.0	-21.2	1.00 V	46	-4.40	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.

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	24deg. C, 67%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	2390.00	57.4 PK	74.0	-16.6	1.00 H	191	26.60	30.80
2	2390.00	45.5 AV	54.0	-8.5	1.00 H	191	14.70	30.80
3	*2412.00	99.1 PK			1.06 H	188	68.20	30.90
4	*2412.00	89.8 AV			1.06 H	188	58.90	30.90
5	4824.00	45.6 PK	74.0	-28.4	1.10 H	73	8.60	37.00
6	4824.00	32.3 AV	54.0	-21.7	1.10 H	73	-4.70	37.00
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	2390.00	67.4 PK	74.0	-6.6	1.14 V	345	36.60	30.80
2	2390.00	52.4 AV	54.0	-1.6	1.14 V	345	21.60	30.80
3	*2412.00	112.4 PK			1.14 V	345	81.50	30.90
4	*2412.00	103.0 AV			1.14 V	345	72.10	30.90
5	4824.00	44.5 PK	74.0	-29.5	1.10 V	52	7.50	37.00
6	4824.00	32.0 AV	54.0	-22.0	1.10 V	52	-5.00	37.00

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.

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	24deg. C, 67%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	*2437.00	103.0 PK			1.06 H	178	72.00	31.00
2	*2437.00	93.2 AV			1.06 H	178	62.20	31.00
3	4874.00	44.9 PK	74.0	-29.1	1.10 H	41	7.80	37.10
4	4874.00	32.1 AV	54.0	-21.9	1.10 H	41	-5.00	37.10
5	7311.00	50.7 PK	74.0	-23.3	1.10 H	69	7.10	43.60
6	7311.00	38.0 AV	54.0	-16.0	1.10 H	69	-5.60	43.60
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	*2437.00	113.9 PK			1.15 V	352	82.90	31.00
2	*2437.00	104.0 AV			1.15 V	352	73.00	31.00
3	4874.00	45.3 PK	74.0	-28.7	1.17 V	52	8.20	37.10
4	4874.00	32.1 AV	54.0	-21.9	1.17 V	52	-5.00	37.10
5	7311.00	50.6 PK	74.0	-23.4	1.10 V	96	7.00	43.60
6	7311.00	38.1 AV	54.0	-15.9	1.10 V	96	-5.50	43.60

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.

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	24deg. C, 67%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	*2462.00	103.0 PK			1.00 H	180	71.90	31.10
2	*2462.00	92.6 AV			1.00 H	180	61.50	31.10
3	2483.50	56.4 PK	74.0	-17.6	1.00 H	180	25.20	31.20
4	2483.50	45.1 AV	54.0	-8.9	1.00 H	180	13.90	31.20
5	4924.00	45.2 PK	74.0	-28.8	1.10 H	41	8.00	37.20
6	4924.00	33.5 AV	54.0	-20.5	1.10 H	41	-3.70	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	*2462.00	113.2 PK			1.10 V	170	82.10	31.10
2	*2462.00	104.1 AV			1.10 V	170	73.00	31.10
3	2483.50	69.9 PK	74.0	-4.1	1.10 V	170	38.70	31.20
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.10 V**	**170**	**21.80**	**31.20**
5	4924.00	44.7 PK	74.0	-29.3	1.10 V	63	7.50	37.20
6	4924.00	32.3 AV	54.0	-21.7	1.10 V	63	-4.90	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.

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	24deg. C, 67%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	2390.00	54.8 PK	74.0	-19.2	1.00 H	193	24.00	30.80
2	2390.00	44.5 AV	54.0	-9.5	1.00 H	193	13.70	30.80
3	*2422.00	95.8 PK			1.00 H	193	64.90	30.90
4	*2422.00	85.0 AV			1.00 H	193	54.10	30.90
5	4844.00	45.3 PK	74.0	-28.7	1.10 H	52	8.30	37.00
6	4844.00	32.3 AV	54.0	-21.7	1.10 H	52	-4.70	37.00
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	2390.00	67.8 PK	74.0	-6.2	1.00 V	340	37.00	30.80
2	2390.00	52.9 AV	54.0	-1.1	1.00 V	340	22.10	30.80
3	*2422.00	108.5 PK			1.13 V	169	77.60	30.90
4	*2422.00	98.4 AV			1.13 V	169	67.50	30.90
5	4844.00	45.3 PK	74.0	-28.7	1.10 V	63	8.30	37.00
6	4844.00	32.8 AV	54.0	-21.2	1.10 V	63	-4.20	37.00

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.

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	24deg. C, 67%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	*2437.00	99.0 PK			1.00 H	196	68.00	31.00
2	*2437.00	89.1 AV			1.00 H	196	58.10	31.00
3	4874.00	44.3 PK	74.0	-29.7	1.10 H	52	7.20	37.10
4	4874.00	33.2 AV	54.0	-20.8	1.10 H	52	-3.90	37.10
5	7311.00	51.1 PK	74.0	-22.9	1.00 H	324	7.50	43.60
6	7311.00	37.5 AV	54.0	-16.5	1.00 H	324	-6.10	43.60
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	2333.00	60.8 PK	74.0	-13.2	1.00 V	174	30.20	30.60
2	2333.00	50.8 AV	54.0	-3.2	1.00 V	174	20.20	30.60
3	*2437.00	110.7 PK			1.00 V	174	79.70	31.00
4	*2437.00	102.5 AV			1.00 V	174	71.50	31.00
5	4874.00	45.1 PK	74.0	-28.9	1.14 V	52	8.00	37.10
6	4874.00	32.0 AV	54.0	-22.0	1.14 V	52	-5.10	37.10
7	7311.00	50.2 PK	74.0	-23.8	1.10 V	85	6.60	43.60
8	7311.00	38.0 AV	54.0	-16.0	1.10 V	85	-5.60	43.60

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.

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	24deg. C, 67%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	*2452.00	93.4 PK			1.01 H	180	62.30	31.10
2	*2452.00	84.3 AV			1.01 H	180	53.20	31.10
3	2483.50	56.3 PK	74.0	-17.7	1.01 H	180	25.10	31.20
4	2483.50	45.1 AV	54.0	-8.9	1.01 H	180	13.90	31.20
5	4904.00	45.4 PK	74.0	-28.6	1.09 H	41	8.20	37.20
6	4904.00	31.1 AV	54.0	-22.9	1.09 H	41	-6.10	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	*2452.00	105.2 PK			1.10 V	177	74.10	31.10
2	*2452.00	95.8 AV			1.10 V	177	64.70	31.10
3	2483.50	67.1 PK	74.0	-6.9	1.10 V	177	35.90	31.20
4	2483.50	52.5 AV	54.0	-1.5	1.10 V	177	21.30	31.20
5	4904.00	45.4 PK	74.0	-28.6	1.10 V	52	8.20	37.20
6	4904.00	33.3 AV	54.0	-20.7	1.10 V	52	-3.90	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.

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 67%RH	TESTED BY	Martin Lee
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	125.17	34.6 QP	43.5	-8.9	1.36 H	251	22.30	12.30
2	249.60	29.9 QP	46.0	-16.1	1.24 H	254	16.90	13.00
3	374.04	33.1 QP	46.0	-12.9	1.14 H	112	16.20	16.90
4	500.42	39.2 QP	46.0	-6.8	1.20 H	193	19.20	20.00
5	624.85	31.4 QP	46.0	-14.6	1.85 H	126	9.10	22.30
6	961.21	45.6 QP	54.0	-8.4	1.96 H	123	18.20	27.40
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	51.29	36.8 QP	40.0	-3.2	1.25 V	0	22.80	14.00
2	72.67	36.8 QP	40.0	-3.2	1.35 V	148	25.10	11.70
3	125.17	34.9 QP	43.5	-8.6	1.00 V	248	22.60	12.30
4	500.42	39.3 QP	46.0	-6.7	1.44 V	157	19.30	20.00
5	624.85	32.5 QP	46.0	-13.5	1.69 V	176	10.20	22.30
6	961.21	42.1 QP	54.0	-11.9	1.87 V	143	14.70	27.40

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 67%RH	TESTED BY	Martin Lee
TEST MODE	B		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	146.56	33.4 QP	43.5	-10.1	1.45 H	64	19.40	14.00
2	249.60	29.3 QP	46.0	-16.7	1.25 H	116	16.30	13.00
3	374.04	31.9 QP	46.0	-14.1	1.58 H	190	15.00	16.90
4	500.42	39.5 QP	46.0	-6.5	2.14 H	183	19.50	20.00
5	624.85	32.4 QP	46.0	-13.6	1.36 H	127	10.10	22.30
6	961.21	38.3 QP	54.0	-15.7	1.74 H	209	10.90	27.40
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	146.56	33.4 QP	43.5	-10.1	1.24 V	73	19.40	14.00
2	374.04	31.9 QP	46.0	-14.1	1.63 V	191	15.00	16.90
3	500.42	39.3 QP	46.0	-6.7	1.44 V	198	19.30	20.00
4	624.85	32.3 QP	46.0	-13.7	1.69 V	123	10.00	22.30
5	751.23	29.7 QP	46.0	-16.3	1.88 V	303	5.30	24.40
6	961.21	38.0 QP	54.0	-16.0	1.74 V	215	10.60	27.40

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.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

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

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

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	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.

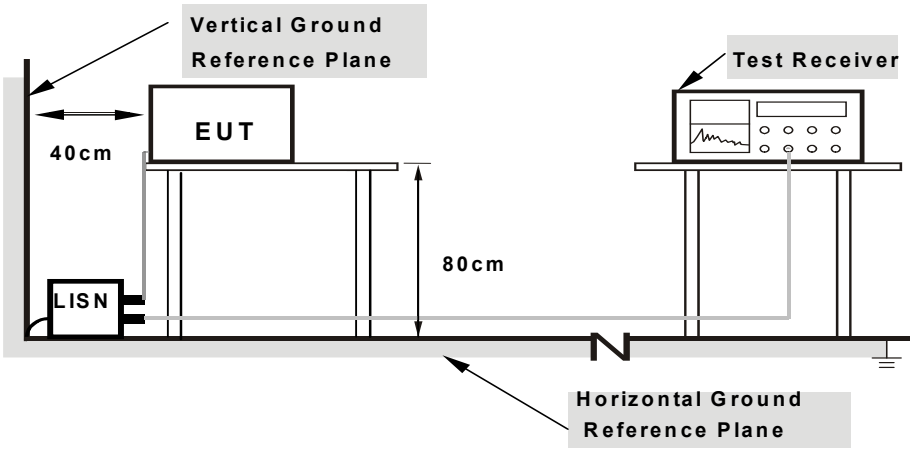
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

4.2.7 TEST RESULTS

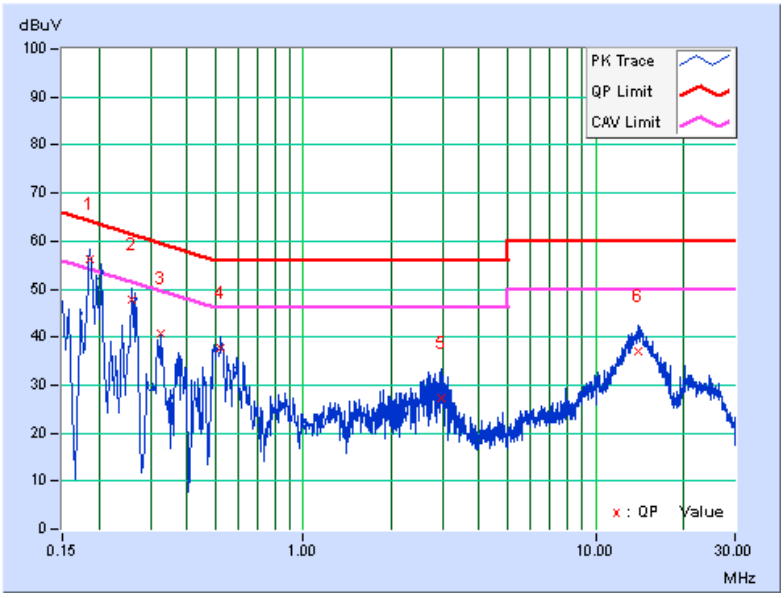
CONDUCTED WORST-CASE DATA：802.11n(20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.18519**	**0.20**	**56.10**	**41.61**	**56.30**	**41.81**	**64.25**	**54.25**	**-7.95**	**-12.44**
2	0.25948	0.21	47.44	33.74	47.65	33.95	61.45	51.45	-13.80	-17.50
3	0.32595	0.19	40.41	25.50	40.60	25.69	59.55	49.55	-18.96	-23.87
4	0.52130	0.17	37.54	26.44	37.71	26.61	56.00	46.00	-18.29	-19.39
5	2.97302	0.29	26.94	16.52	27.23	16.81	56.00	46.00	-28.77	-29.19
6	13.97576	0.69	36.18	29.90	36.87	30.59	60.00	50.00	-23.13	-19.41

REMARKS:

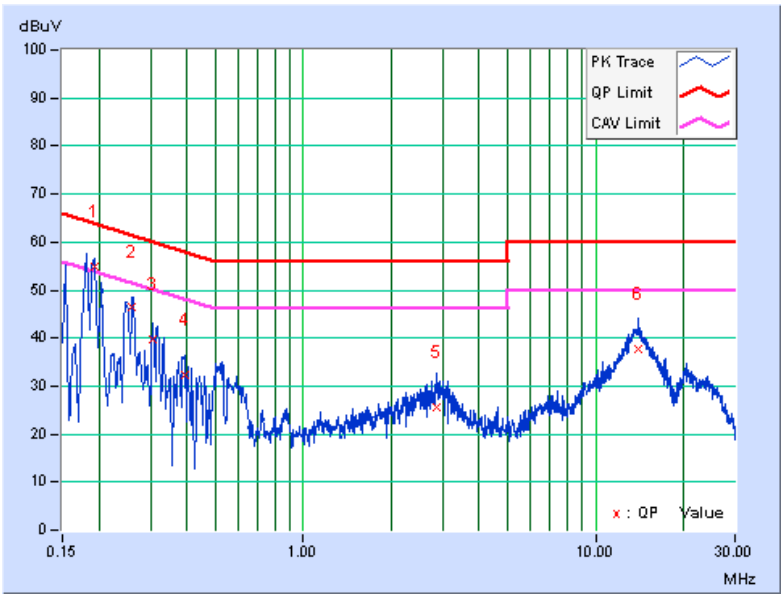
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



PHASE	Line 2	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19255	0.30	54.52	41.16	54.82	41.46	63.93	53.93	-9.11	-12.47
2	0.26001	0.29	46.21	31.15	46.50	31.44	61.43	51.43	-14.93	-19.99
3	0.30615	0.28	39.54	21.09	39.82	21.37	60.07	50.07	-20.26	-28.71
4	0.39219	0.25	32.06	16.74	32.31	16.99	58.02	48.02	-25.70	-31.02
5	2.85968	0.39	25.25	14.46	25.64	14.85	56.00	46.00	-30.36	-31.15
6	14.01486	0.79	36.96	30.54	37.75	31.33	60.00	50.00	-22.25	-18.67

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.

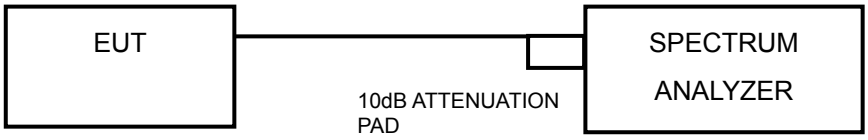


4.3 6dB BANDWIDTH MEASUREMENT

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

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

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	12.72	0.5	PASS
6	2437	12.73	0.5	PASS
11	2462	13.11	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.54	0.5	PASS
6	2437	16.49	0.5	PASS
11	2462	16.53	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	17.51	17.51	17.50	0.5	PASS
6	2437	17.46	17.45	17.35	0.5	PASS
11	2462	17.44	17.51	17.58	0.5	PASS

802.11n (40MHz)

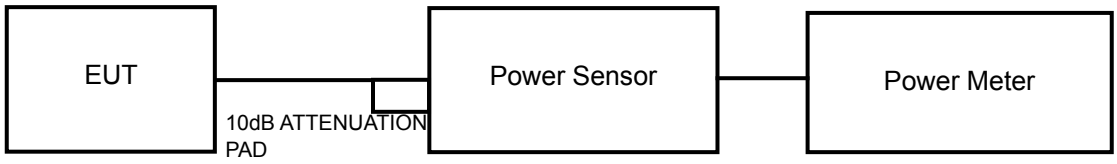
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	36.11	36.16	36.13	0.5	PASS
6	2437	36.24	36.15	36.27	0.5	PASS
9	2452	36.23	36.30	36.23	0.5	PASS

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	102.565	20.11	30	PASS
6	2437	115.080	20.61	30	PASS
11	2462	108.143	20.34	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	179.473	22.54	30	PASS
6	2437	174.181	22.41	30	PASS
11	2462	184.927	22.67	30	PASS

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	20.18	20.14	19.84	303.891	24.83	30	PASS
6	2437	22.18	22.48	22.40	515.987	27.13	30	PASS
11	2462	22.81	22.41	21.41	503.523	27.02	30	PASS

802.11n (40MHz)

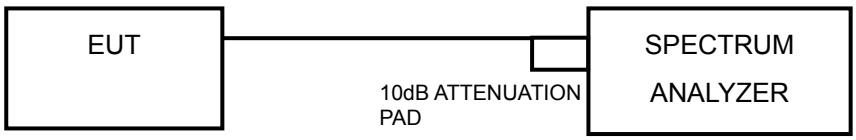
CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
3	2422	19.84	20.18	14.84	231.094	23.64	30	PASS
6	2437	22.14	22.32	21.98	482.051	26.92	30	PASS
9	2452	19.84	19.81	14.21	218.465	23.39	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 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 = 3 kHz, VBW =10 kHz, Detector = peak.

b. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.

c. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

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/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	4.08	8	PASS
6	2437	4.74	8	PASS
11	2462	4.45	8	PASS

802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.66	8	PASS
6	2437	-11.58	8	PASS
11	2462	-11.37	8	PASS

802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-16.01	4.77	-11.24	4.2	PASS
	6	2437	-13.85	4.77	-9.08	4.2	PASS
	11	2462	-13.37	4.77	-8.60	4.2	PASS
1	1	2412	-14.04	4.77	-9.27	4.2	PASS
	6	2437	-11.73	4.77	-6.96	4.2	PASS
	11	2462	-11.96	4.77	-7.19	4.2	PASS
2	1	2412	-17.29	4.77	-12.52	4.2	PASS
	6	2437	-14.82	4.77	-10.05	4.2	PASS
	11	2462	-15.94	4.77	-11.17	4.2	PASS

NOTE: Directional gain = 5dBi + 10log(3) = 9.8dBi > 6dBi , so the power density limit shall be reduced to 8-(9.8-6) = 4.2dBm.

802.11n (40MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-19.11	4.77	-14.34	4.2	PASS
	6	2437	-16.59	4.77	-11.82	4.2	PASS
	9	2452	-19.01	4.77	-14.24	4.2	PASS
1	3	2422	-19.23	4.77	-14.46	4.2	PASS
	6	2437	-16.95	4.77	-12.18	4.2	PASS
	9	2452	-19.44	4.77	-14.67	4.2	PASS
2	3	2422	-24.91	4.77	-20.14	4.2	PASS
	6	2437	-17.67	4.77	-12.90	4.2	PASS
	9	2452	-25.32	4.77	-20.55	4.2	PASS

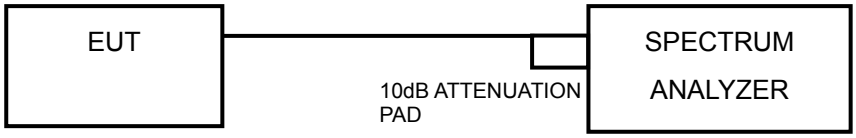
NOTE: Directional gain = 5dBi + 10log(3) = 9.8dBi > 6dBi , so the power density limit shall be reduced to 8-(9.8-6) = 4.2dBm.

4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. 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

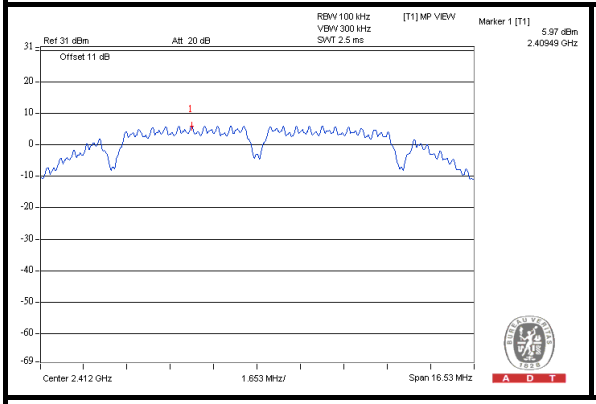
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit. Only worst data of each operating mode is presented.

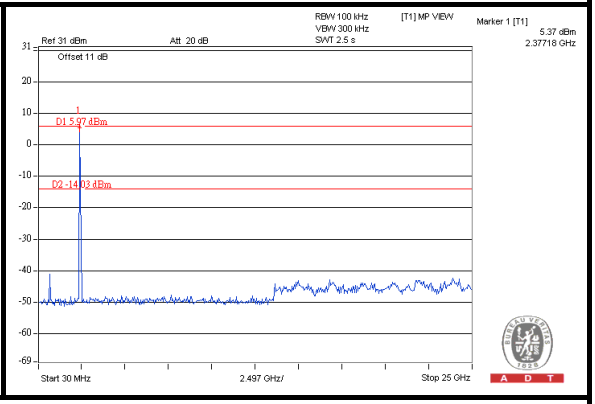
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

4.6.8 TEST RESULTS

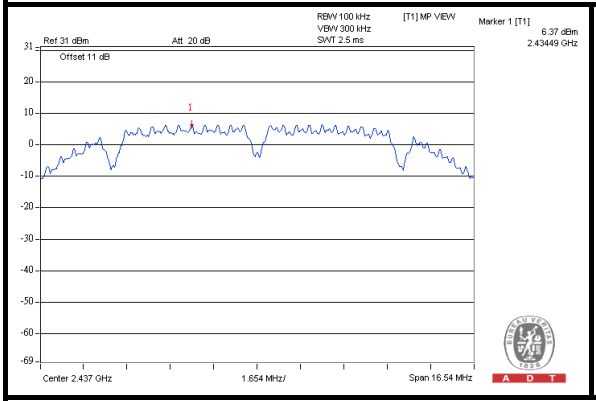
802.11b

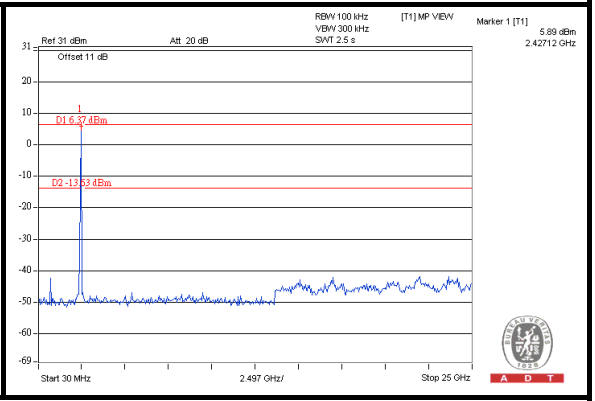
CH 1



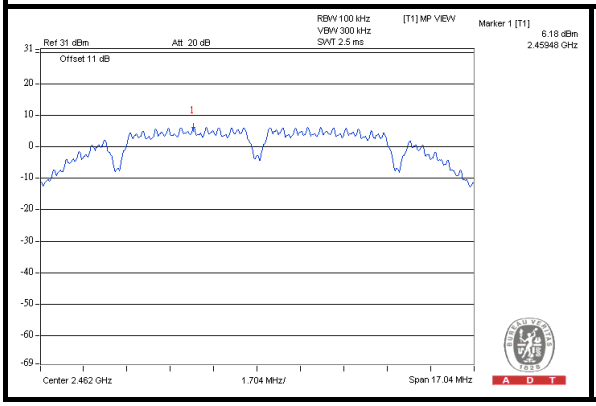


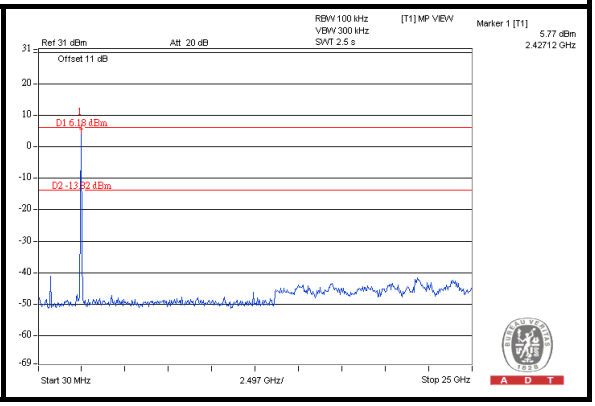
CH 6





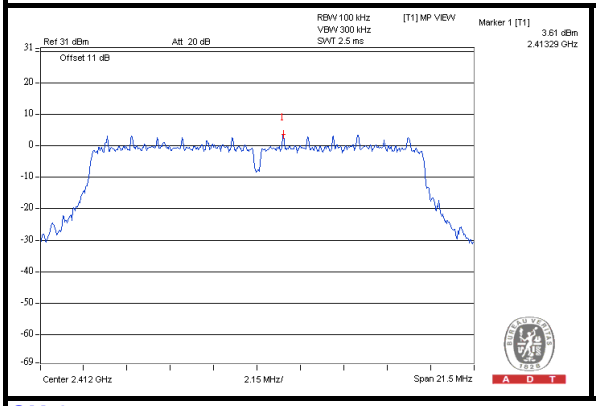
CH 11

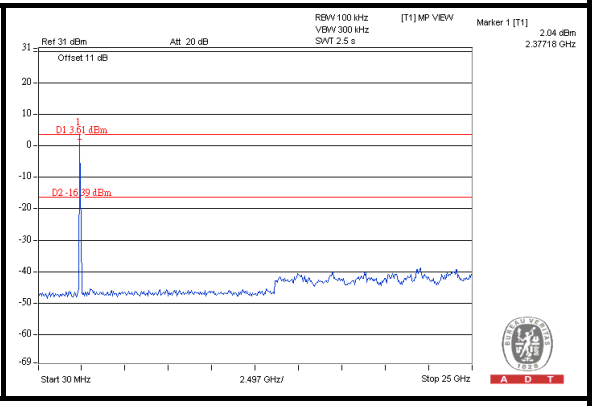




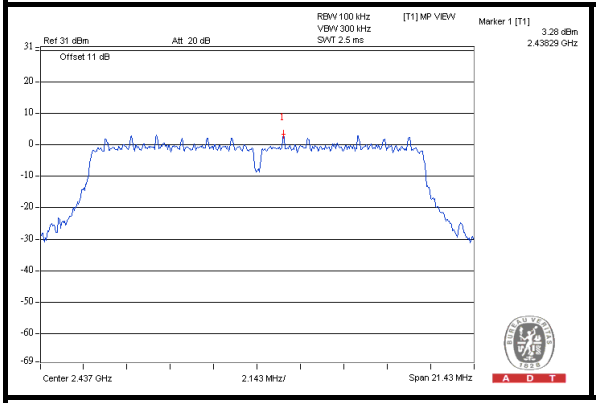
802.11g

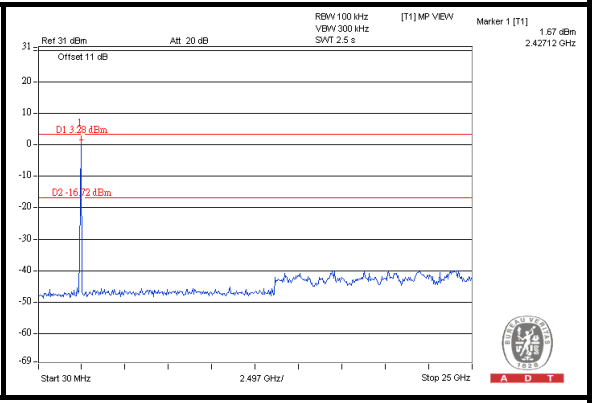
CH 1



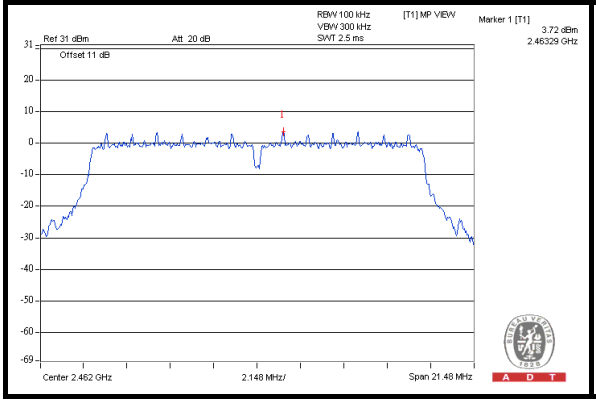


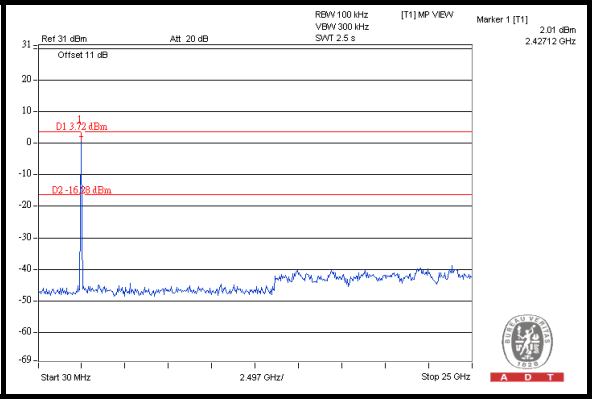
CH 6





CH 11





802.11n (20MHz)

CHAIN 0

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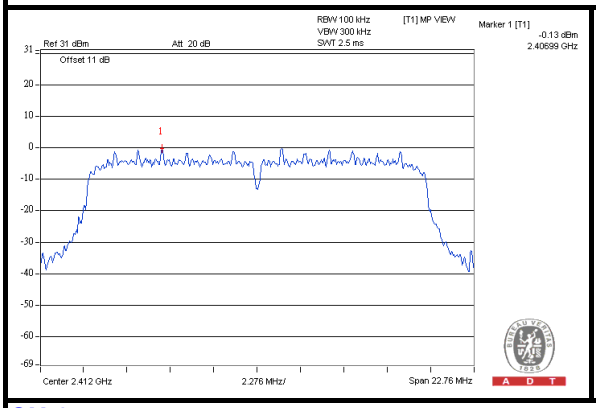
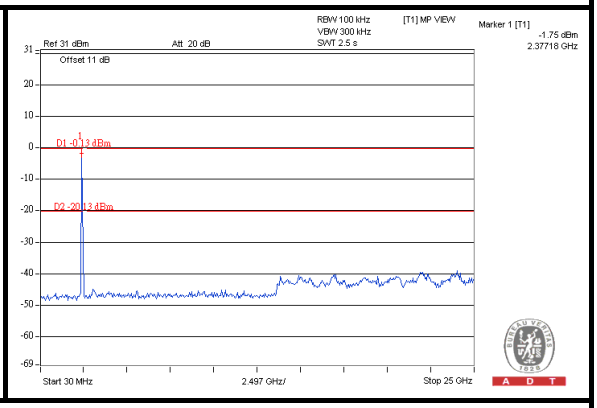
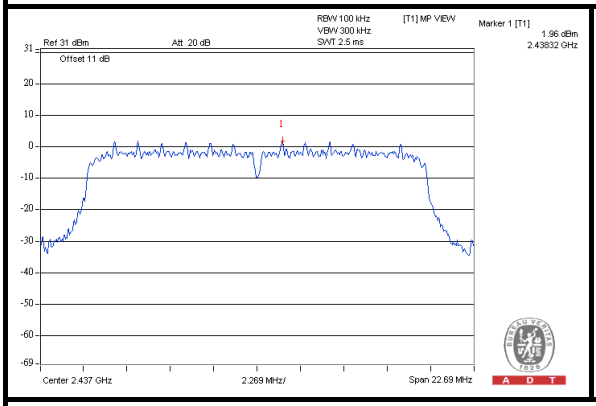
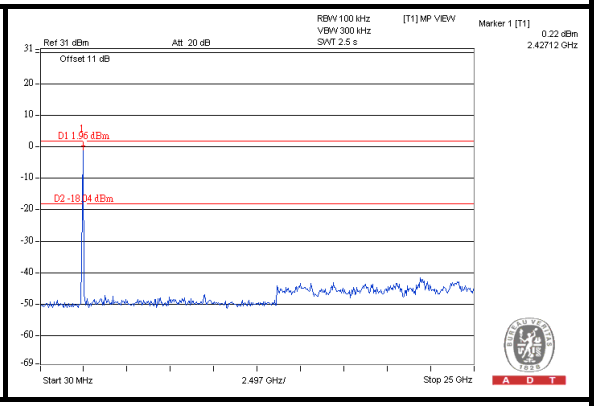


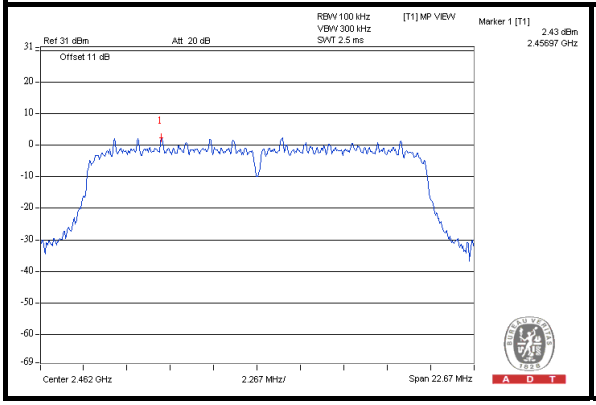


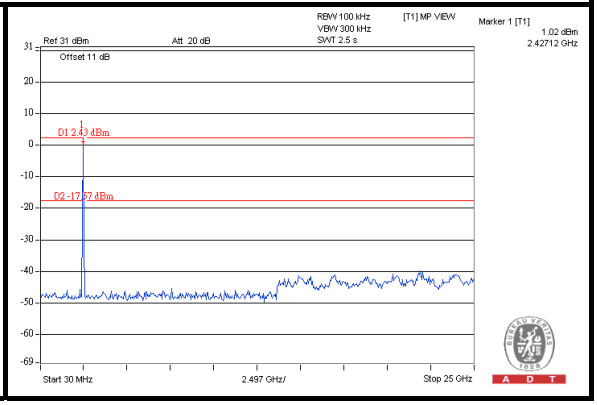
CH 6





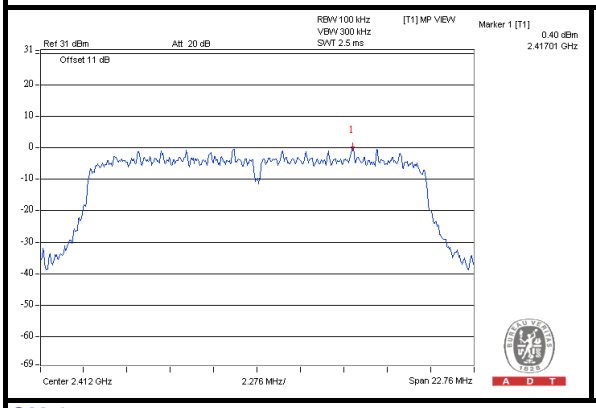
CH 11

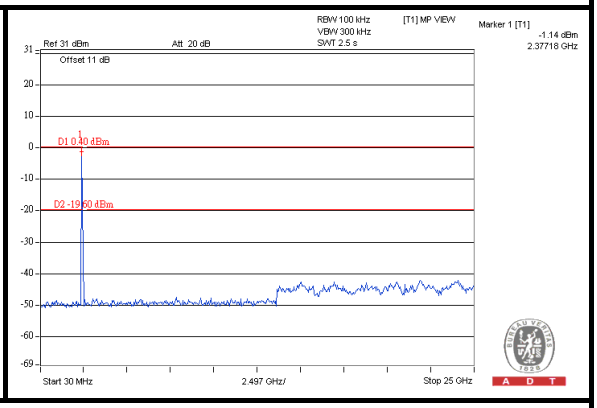




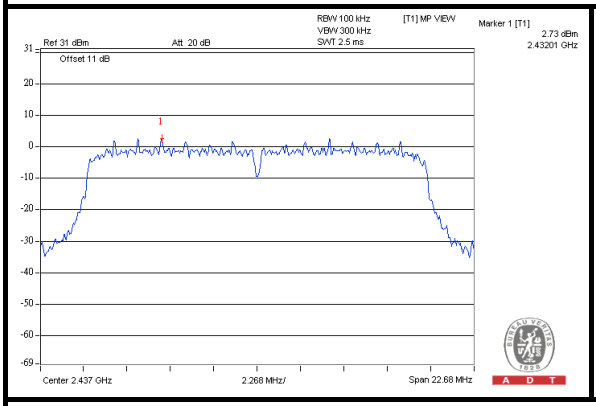
CHAIN 1

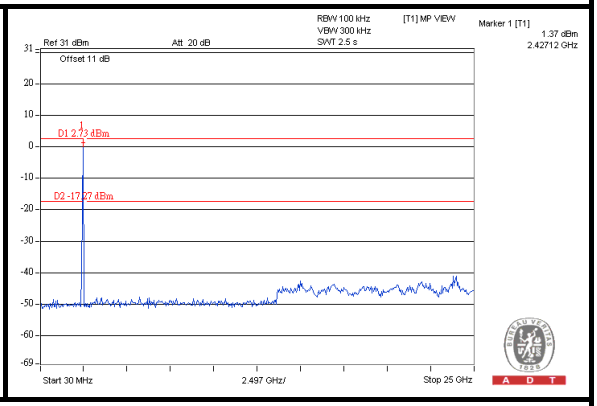
CH 1





CH 6





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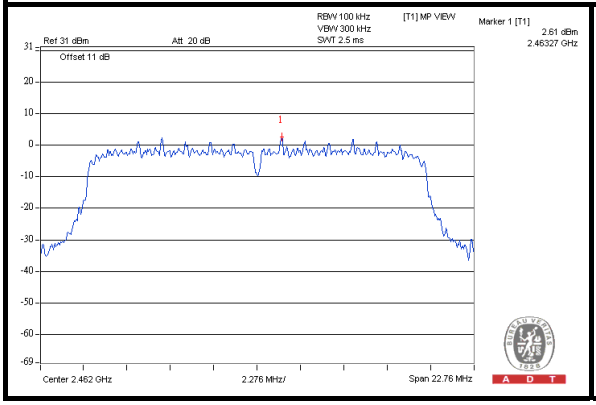
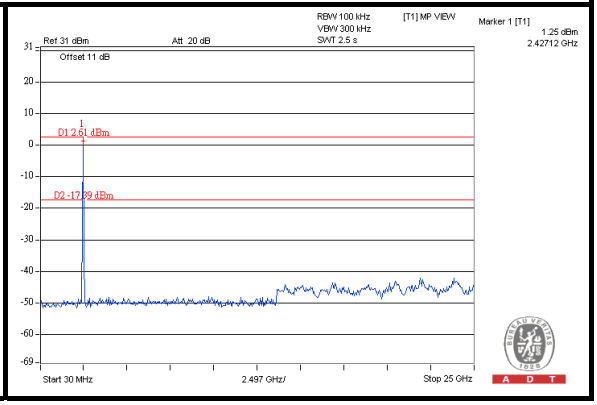
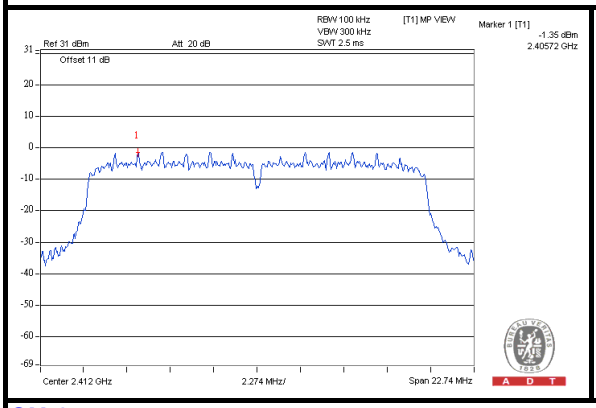
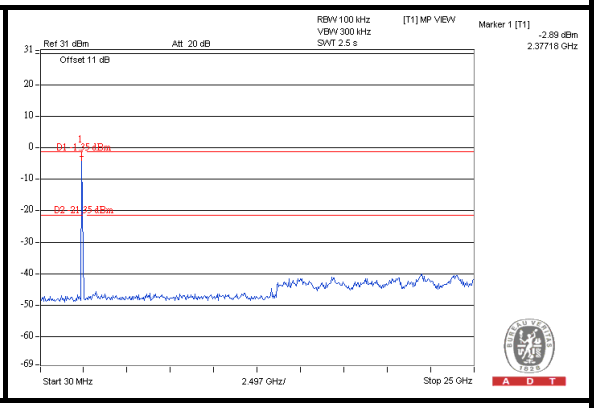




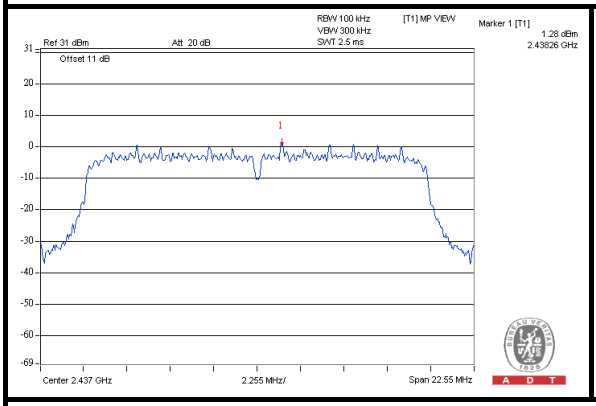
CHAIN 2

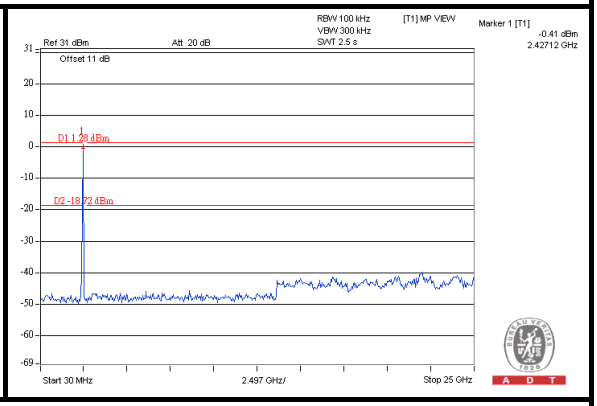
CH 1



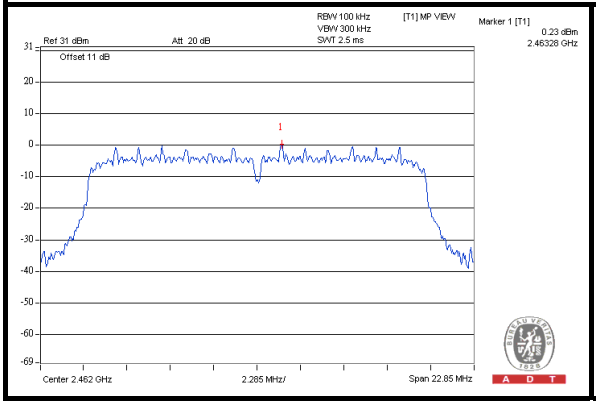


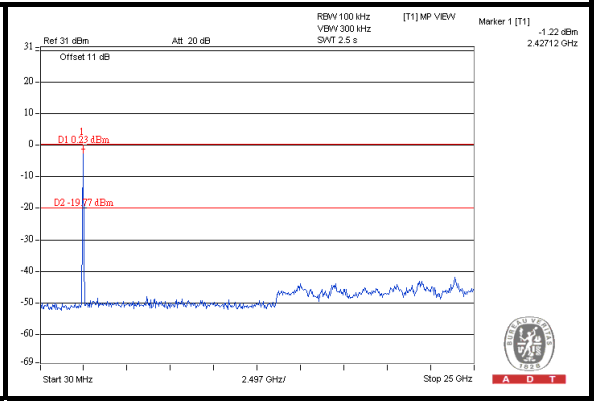
CH 6





CH 11

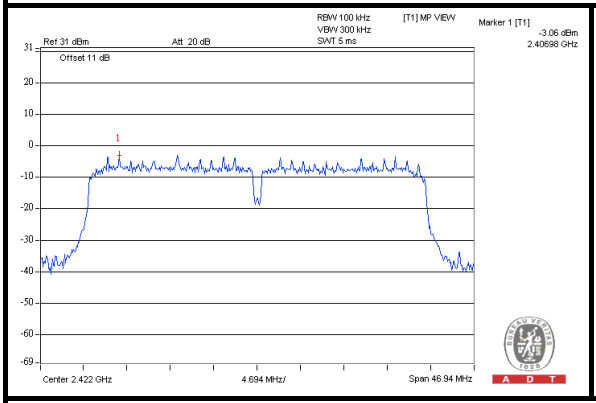


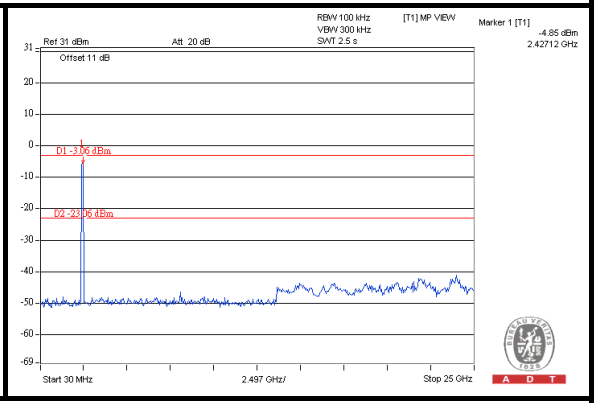


802.11n (40MHz)

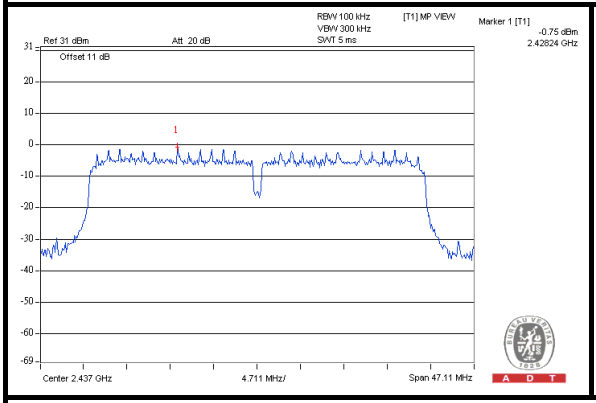
CHAIN 0

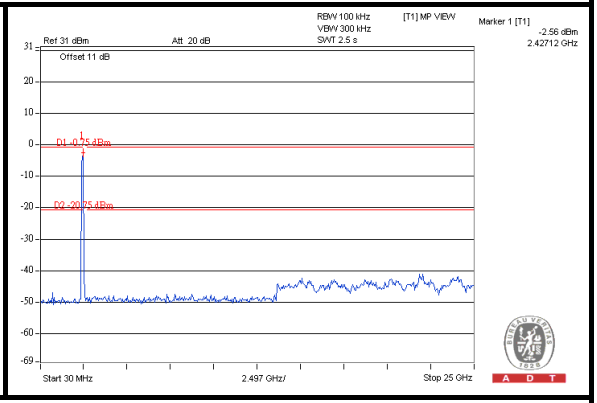
CH 3



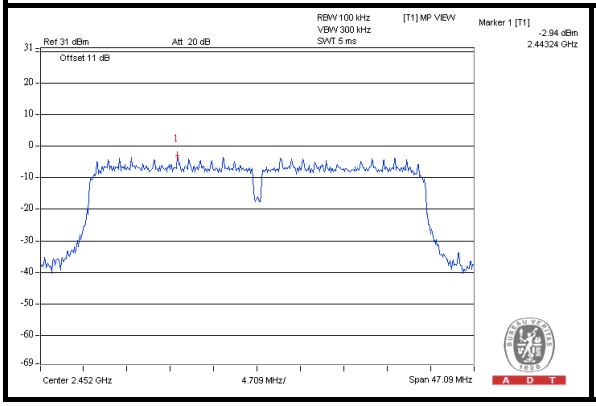


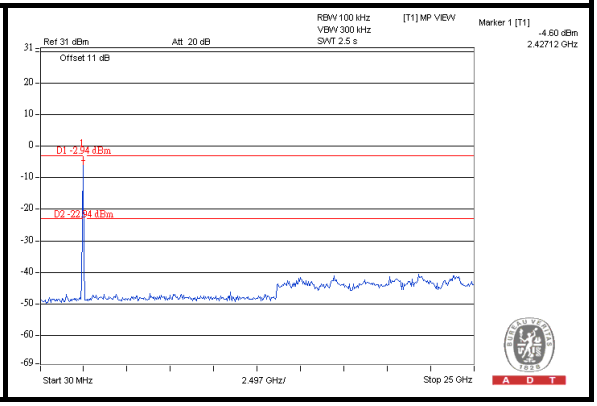
CH 6





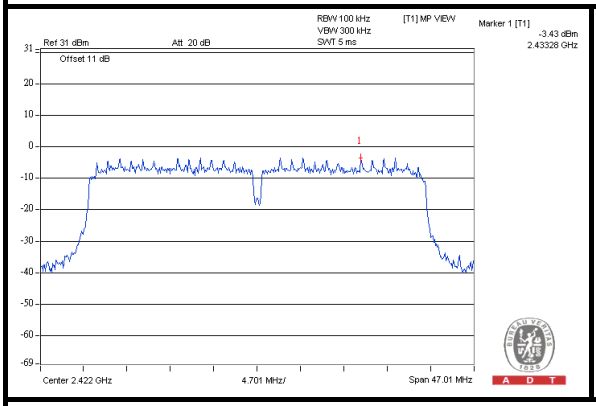
CH 9

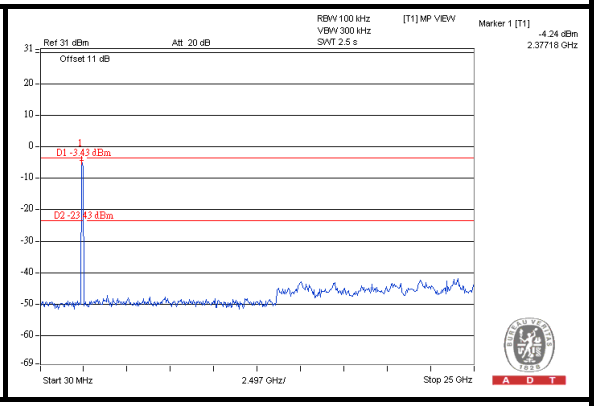




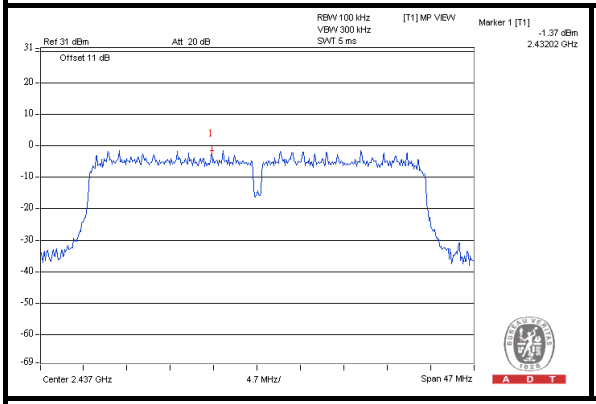
CHAIN 1

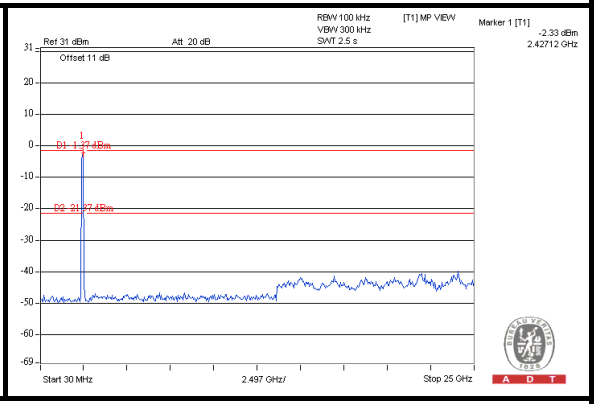
CH 3



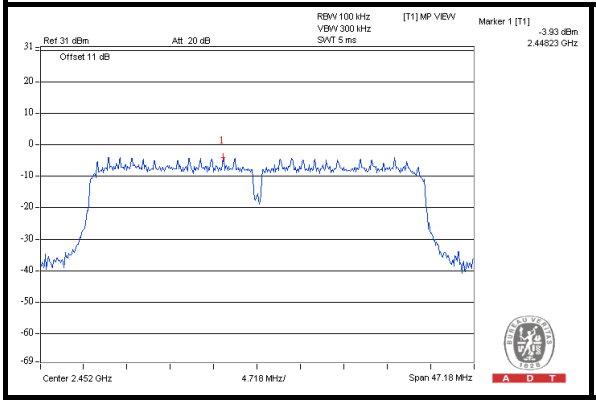


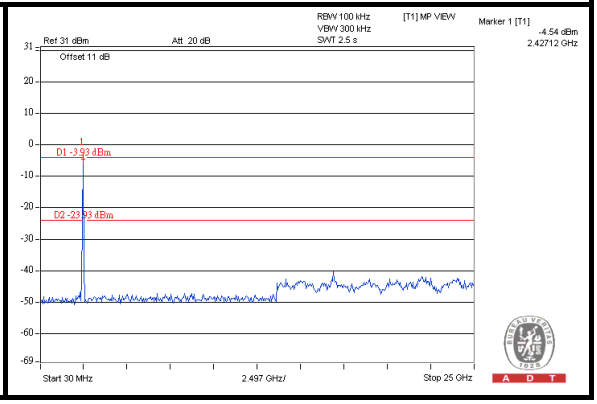
CH 6





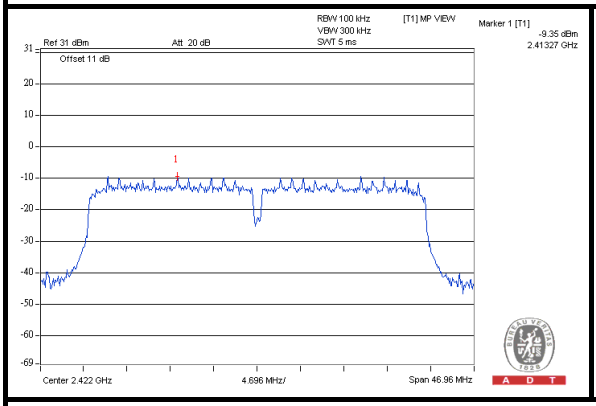
CH 9

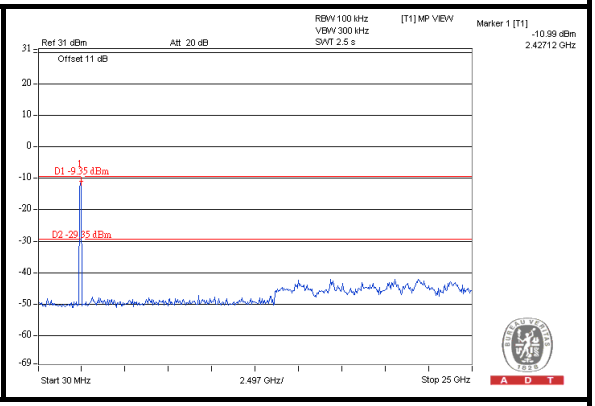




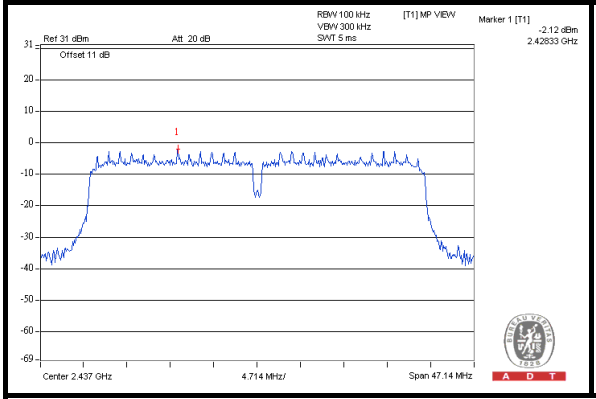
CHAIN 2

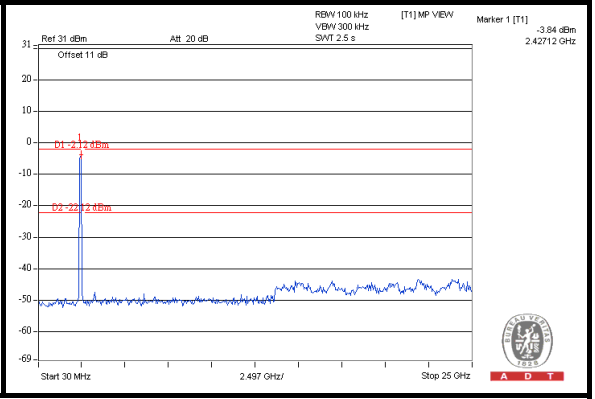
CH 3



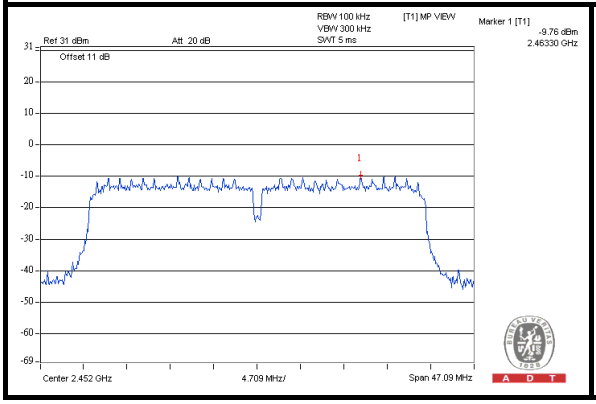


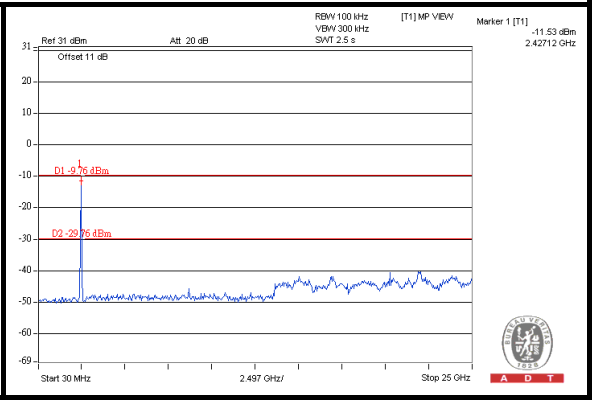
CH 6





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.

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 item 4.1.6.

5.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE 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	24deg. C, 67%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	3830.00	48.1 PK	74.0	-25.9	1.38 H	13	13.90	34.20
2	3830.00	38.8 AV	54.0	-15.2	1.38 H	13	4.60	34.20
3	#5725.00	54.5 PK	73.9	-19.4	1.15 H	197	15.80	38.70
4	#5725.00	39.9 AV	64.1	-24.2	1.15 H	197	1.20	38.70
5	*5745.00	93.9 PK			1.08 H	200	55.20	38.70
6	*5745.00	84.1 AV			1.08 H	200	45.40	38.70
7	11490.00	61.2 PK	74.0	-12.8	1.03 H	222	11.70	49.50
8	11490.00	47.8 AV	54.0	-6.2	1.03 H	222	-1.70	49.50
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	3830.00	50.5 PK	74.0	-23.5	1.19 V	317	16.30	34.20
2	3830.00	45.0 AV	54.0	-9.0	1.19 V	317	10.80	34.20
3	#5725.00	63.9 PK	83.9	-20.0	1.19 V	75	25.20	38.70
4	#5725.00	47.0 AV	72.4	-25.4	1.19 V	75	8.30	38.70
5	*5745.00	103.9 PK			1.04 V	73	65.20	38.70
6	*5745.00	92.4 AV			1.04 V	73	53.70	38.70
7	11490.00	60.8 PK	74.0	-13.2	1.00 V	214	11.30	49.50
8	11490.00	47.1 AV	54.0	-6.9	1.00 V	214	-2.40	49.50

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.

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	24deg. C, 67%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	3856.00	51.5 PK	74.0	-22.5	1.02 H	44	17.20	34.30
2	3856.00	44.6 AV	54.0	-9.4	1.02 H	44	10.30	34.30
3	*5785.00	95.1 PK			1.07 H	198	56.30	38.80
4	*5785.00	85.1 AV			1.07 H	198	46.30	38.80
5	11570.00	60.3 PK	74.0	-13.7	1.02 H	33	10.90	49.40
6	11570.00	47.6 AV	54.0	-6.4	1.02 H	33	-1.80	49.40
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	3856.00	51.3 PK	74.0	-22.7	1.06 V	198	17.00	34.30
2	3856.00	47.2 AV	54.0	-6.8	1.06 V	198	12.90	34.30
3	*5785.00	103.1 PK			1.06 V	17	64.30	38.80
4	*5785.00	93.1 AV			1.06 V	17	54.30	38.80
5	11570.00	61.5 PK	74.0	-12.5	1.02 V	33	12.10	49.40
6	11570.00	47.8 AV	54.0	-6.2	1.02 V	33	-1.60	49.40

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

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	24deg. C, 67%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	3883.00	50.6 PK	74.0	-23.4	1.20 H	84	16.30	34.30
2	3883.00	41.6 AV	54.0	-12.4	1.20 H	84	7.30	34.30
3	*5825.00	95.5 PK			1.06 H	198	56.60	38.90
4	*5825.00	85.2 AV			1.06 H	198	46.30	38.90
5	#5850.00	48.5 PK	75.5	-27.0	1.06 H	198	9.60	38.90
6	#5850.00	37.0 AV	65.2	-28.2	1.06 H	198	-1.90	38.90
7	11650.00	60.0 PK	74.0	-14.0	1.32 H	44	10.70	49.30
8	11650.00	46.7 AV	54.0	-7.3	1.32 H	44	-2.60	49.30
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	3883.00	52.4 PK	74.0	-21.6	1.21 V	196	18.10	34.30
2	3883.00	49.7 AV	54.0	-4.3	1.21 V	196	15.40	34.30
3	*5825.00	102.2 PK			1.06 V	66	63.30	38.90
4	*5825.00	92.3 AV			1.06 V	66	53.40	38.90
5	#5850.00	49.3 PK	82.2	-32.9	1.06 V	66	10.40	38.90
6	#5850.00	37.4 AV	72.3	-34.9	1.06 V	66	-1.50	38.90
7	11650.00	61.6 PK	74.0	-12.4	1.11 V	215	12.30	49.30
8	11650.00	47.3 AV	54.0	-6.7	1.11 V	215	-2.00	49.30

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.

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	24deg. C, 67%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	#5725.00	56.2 PK	80.2	-24.0	1.08 H	198	17.50	38.70
2	#5725.00	45.8 AV	69.8	-24.0	1.08 H	198	7.10	38.70
3	*5745.00	100.2 PK			1.08 H	198	61.50	38.70
4	*5745.00	89.8 AV			1.08 H	198	51.10	38.70
5	11490.00	60.9 PK	74.0	-13.1	1.14 H	83	11.40	49.50
6	11490.00	47.8 AV	54.0	-6.2	1.14 H	83	-1.70	49.50
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	#5725.00	65.7 PK	89.7	-24.0	1.08 V	167	27.00	38.70
2	#5725.00	56.0 AV	80.0	-24.0	1.08 V	167	17.30	38.70
3	*5745.00	109.7 PK			1.19 V	213	71.00	38.70
4	*5745.00	100.0 AV			1.19 V	213	61.30	38.70
5	11490.00	61.0 PK	74.0	-13.0	1.10 V	77	11.50	49.50
6	11490.00	47.9 AV	54.0	-6.1	1.10 V	77	-1.60	49.50

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.

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	24deg. C, 67%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	*5785.00	99.1 PK			1.13 H	360	60.30	38.80
2	*5785.00	89.4 AV			1.13 H	360	50.60	38.80
3	11570.00	60.1 PK	74.0	-13.9	1.15 H	92	10.70	49.40
4	11570.00	47.0 AV	54.0	-7.0	1.15 H	92	-2.40	49.40
5	#17355.00	65.7 PK	79.1	-13.4	1.04 H	258	12.70	53.00
6	#17355.00	52.7 AV	69.4	-16.7	1.04 H	258	-0.30	53.00
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	109.1 PK			1.20 V	82	70.30	38.80
2	*5785.00	99.7 AV			1.20 V	82	60.90	38.80
3	11570.00	60.9 PK	74.0	-13.1	1.14 V	52	11.50	49.40
4	11570.00	47.0 AV	54.0	-7.0	1.14 V	52	-2.40	49.40
5	#17355.00	65.8 PK	89.1	-23.3	1.08 V	93	12.80	53.00
6	#17355.00	52.8 AV	79.7	-26.9	1.08 V	93	-0.20	53.00

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.

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	24deg. C, 67%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	*5825.00	98.3 PK			1.06 H	198	59.40	38.90
2	*5825.00	87.7 AV			1.06 H	198	48.80	38.90
3	#5850.00	48.3 PK	78.3	-30.0	1.10 H	188	9.40	38.90
4	#5850.00	47.7 AV	67.7	-20.0	1.10 H	188	8.80	38.90
5	11700.00	59.5 PK	74.0	-14.5	1.08 H	52	10.30	49.20
6	11700.00	46.7 AV	54.0	-7.3	1.08 H	52	-2.50	49.20
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	106.2 PK			1.18 V	85	67.30	38.90
2	*5825.00	96.8 AV			1.18 V	85	57.90	38.90
3	#5850.00	56.2 PK	86.2	-30.0	1.28 V	119	17.30	38.90
4	#5850.00	46.8 AV	76.8	-30.0	1.28 V	119	7.90	38.90
5	11700.00	60.0 PK	74.0	-14.0	1.15 V	96	10.80	49.20
6	11700.00	46.6 AV	54.0	-7.4	1.15 V	96	-2.60	49.20

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.

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	24deg. C, 67%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	#5725.00	59.4 PK	75.4	-16.0	1.07 H	225	20.70	38.70
2	#5725.00	49.5 AV	65.5	-16.0	1.07 H	225	10.80	38.70
3	*5755.00	95.4 PK			1.00 H	201	56.70	38.70
4	*5755.00	85.5 AV			1.00 H	201	46.80	38.70
5	11510.00	60.1 PK	74.0	-13.9	1.05 H	63	10.60	49.50
6	11510.00	47.9 AV	54.0	-6.1	1.05 H	63	-1.60	49.50
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	#5725.00	69.3 PK	85.3	-16.0	1.09 V	197	30.60	38.70
2	#5725.00	59.4 AV	75.4	-16.0	1.09 V	197	20.70	38.70
3	*5755.00	105.3 PK			1.10 V	210	66.60	38.70
4	*5755.00	95.4 AV			1.10 V	210	56.70	38.70
5	11510.00	60.1 PK	74.0	-13.9	1.15 V	187	10.60	49.50
6	11510.00	47.7 AV	54.0	-6.3	1.15 V	187	-1.80	49.50

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.

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	24deg. C, 67%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	*5795.00	93.2 PK			1.00 H	360	54.40	38.80
2	*5795.00	85.0 AV			1.00 H	360	46.20	38.80
3	#5850.00	48.2 PK	73.2	-25.0	1.14 H	28	9.30	38.90
4	#5850.00	40.0 AV	65.0	-25.0	1.14 H	28	1.10	38.90
5	11590.00	58.2 PK	74.0	-15.8	1.00 H	74	8.80	49.40
6	11590.00	47.7 AV	54.0	-6.3	1.00 H	74	-1.70	49.40
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	*5795.00	103.1 PK			1.00 V	201	64.30	38.80
2	*5795.00	93.7 AV			1.00 V	201	54.90	38.80
3	#5850.00	58.1 PK	83.1	-25.0	1.10 V	235	19.20	38.90
4	#5850.00	48.7 AV	73.7	-25.0	1.10 V	235	9.80	38.90
5	11590.00	59.2 PK	74.0	-14.8	1.10 V	42	9.80	49.40
6	11590.00	46.5 AV	54.0	-7.5	1.10 V	42	-2.90	49.40

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

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 67%RH	TESTED BY	Martin Lee
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	125.17	31.3 QP	43.5	-12.2	1.36 H	33	19.00	12.30
2	249.60	27.0 QP	46.0	-19.0	1.24 H	129	14.00	13.00
3	374.04	28.9 QP	46.0	-17.1	1.74 H	109	12.00	16.90
4	500.42	33.8 QP	46.0	-12.2	1.69 H	131	13.80	20.00
5	624.85	34.4 QP	46.0	-11.6	1.50 H	199	12.10	22.30
6	961.21	44.5 QP	54.0	-9.5	1.66 H	135	17.10	27.40
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	51.29	36.5 QP	40.0	-3.5	1.33 V	298	22.50	14.00
2	86.28	37.0 QP	40.0	-3.0	1.25 V	118	28.20	8.80
3	125.17	33.5 QP	43.5	-10.0	1.85 V	163	21.20	12.30
4	500.42	38.4 QP	46.0	-7.6	1.41 V	304	18.40	20.00
5	624.85	31.8 QP	46.0	-14.2	1.39 V	246	9.50	22.30
6	961.21	39.9 QP	54.0	-14.1	1.98 V	155	12.50	27.40

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 67%RH	TESTED BY	Martin Lee
TEST MODE	B		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	125.17	29.6 QP	43.5	-13.9	1.54 H	20	17.30	12.30
2	249.60	26.6 QP	46.0	-19.4	1.20 H	145	13.60	13.00
3	374.04	29.6 QP	46.0	-16.4	1.78 H	133	12.70	16.90
4	500.42	33.1 QP	46.0	-12.9	1.66 H	208	13.10	20.00
5	624.85	34.3 QP	46.0	-11.7	1.02 H	198	12.00	22.30
6	961.21	44.2 QP	54.0	-9.8	1.24 H	139	16.80	27.40
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	51.29	36.4 QP	40.0	-3.6	1.47 V	7	22.40	14.00
2	64.90	36.5 QP	40.0	-3.5	1.59 V	10	23.60	12.90
3	94.06	33.8 QP	43.5	-9.7	2.21 V	323	25.10	8.70
4	125.17	33.5 QP	43.5	-10.0	1.39 V	188	21.20	12.30
5	500.42	38.2 QP	46.0	-7.8	1.00 V	302	18.20	20.00
6	961.21	35.5 QP	54.0	-18.5	1.05 V	222	8.10	27.40

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.

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

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

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

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

5.2.2 T EST 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 item 4.1.6

5.2.7 TEST RESULTS

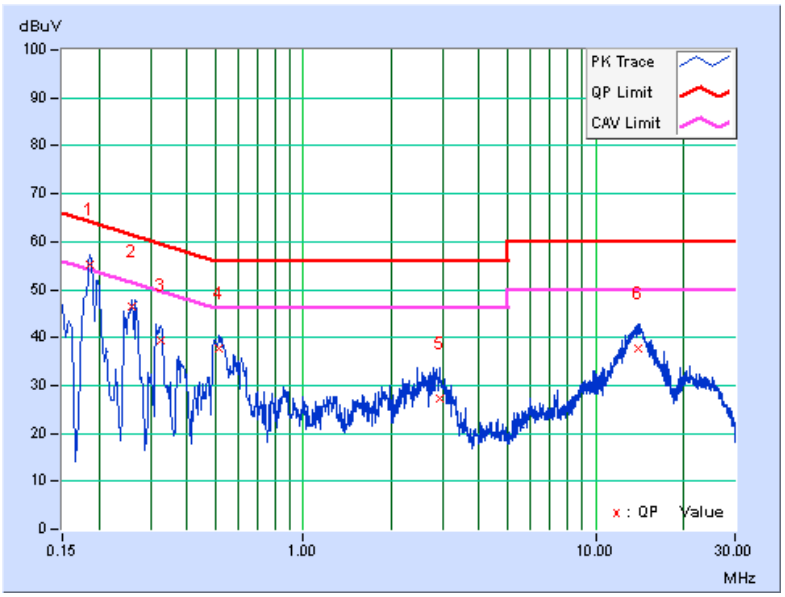
CONDUCTED WORST-CASE DATA：802.11n(20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18557	0.13	54.94	40.81	55.07	40.94	64.23	54.23	-9.17	-13.30
2	0.25932	0.13	46.28	33.16	46.41	33.29	61.45	51.45	-15.04	-18.16
3	0.32614	0.13	39.24	24.82	39.37	24.95	59.55	49.55	-20.18	-24.60
4	0.51363	0.14	37.48	26.52	37.62	26.66	56.00	46.00	-18.38	-19.34
5	2.94565	0.28	27.16	16.63	27.44	16.91	56.00	46.00	-28.56	-29.09
6	13.95230	0.85	36.94	30.42	37.79	31.27	60.00	50.00	-22.21	-18.73

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.

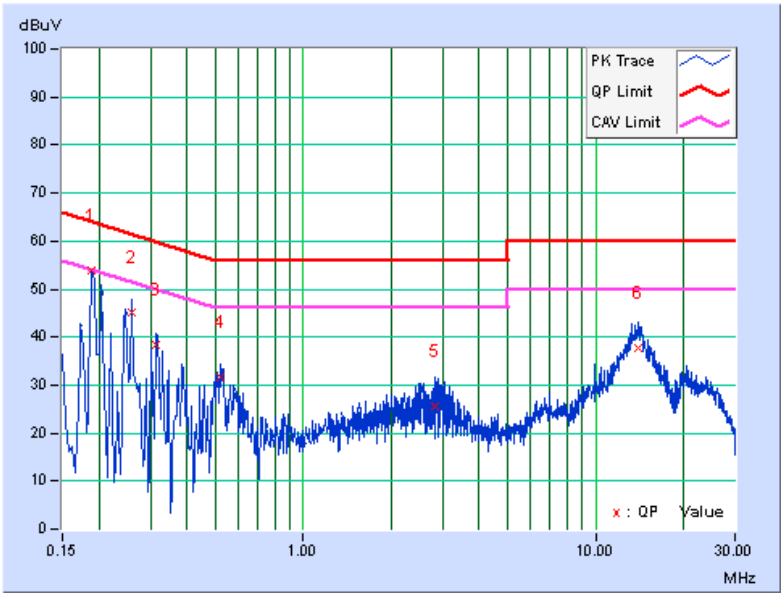


PHASE	Line 2	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18953	0.14	53.62	40.59	53.76	40.73	64.06	54.06	-10.30	-13.33
2	0.25948	0.14	45.09	30.53	45.23	30.67	61.45	51.45	-16.22	-20.78
3	0.31432	0.15	38.40	23.00	38.55	23.15	59.86	49.86	-21.31	-26.71
4	0.52145	0.16	31.59	17.69	31.75	17.85	56.00	46.00	-24.25	-28.15
5	2.84008	0.28	25.30	14.39	25.58	14.67	56.00	46.00	-30.42	-31.33
6	14.01486	0.74	36.83	30.41	37.57	31.15	60.00	50.00	-22.43	-18.85

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	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	15.81	0.5	PASS
157	5785	15.72	0.5	PASS
165	5825	15.87	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	16.30	16.56	16.07	0.5	PASS
157	5785	16.31	16.32	15.83	0.5	PASS
165	5825	16.62	16.62	16.61	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	35.28	35.24	32.23	0.5	PASS
159	5795	35.25	35.23	32.16	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

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	22.029	13.43	30	PASS
157	5785	20.137	13.04	30	PASS
165	5825	18.707	12.72	30	PASS

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	14.78	13.75	13.70	77.217	18.88	30	PASS
157	5785	13.71	12.19	12.27	56.920	17.55	30	PASS
165	5825	13.02	11.81	11.14	48.218	16.83	30	PASS

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	13.23	12.93	13.20	61.565	17.89	30	PASS
159	5795	12.16	11.36	11.83	45.362	16.57	30	PASS

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

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-17.82	8	PASS
157	5785	-18.00	8	PASS
165	5825	-18.23	8	PASS

802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-19.43	4.77	-14.66	4.2	PASS
	157	5785	-16.78	4.77	-12.01	4.2	PASS
	165	5825	-17.44	4.77	-12.67	4.2	PASS
1	149	5745	-18.95	4.77	-14.18	4.2	PASS
	157	5785	-17.07	4.77	-12.30	4.2	PASS
	165	5825	-17.72	4.77	-12.95	4.2	PASS
2	149	5745	-17.82	4.77	-13.05	4.2	PASS
	157	5785	-18.39	4.77	-13.62	4.2	PASS
	165	5825	-19.64	4.77	-14.87	4.2	PASS

NOTE: Directional gain = 5dBi + 10log(3) = 9.8dBi > 6dBi , so the power density limit shall be reduced to 8-(9.8-6) = 4.2dBm.

802.11n (40MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-22.25	4.77	-17.48	4.2	PASS
	159	5795	-21.32	4.77	-16.55	4.2	PASS
1	151	5755	-22.71	4.77	-17.94	4.2	PASS
	159	5795	-20.79	4.77	-16.02	4.2	PASS
2	151	5755	-22.73	4.77	-17.96	4.2	PASS
	159	5795	-22.13	4.77	-17.36	4.2	PASS

NOTE: Directional gain = 5dBi + 10log(3) = 9.8dBi > 6dBi , so the power density limit shall be reduced to 8-(9.8-6) = 4.2dBm.

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

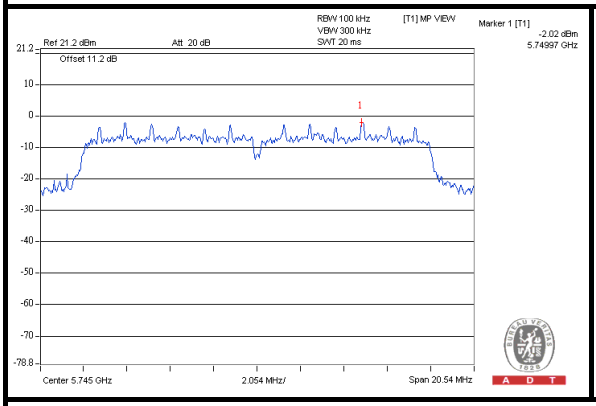
5.6.7 TEST RESULTS

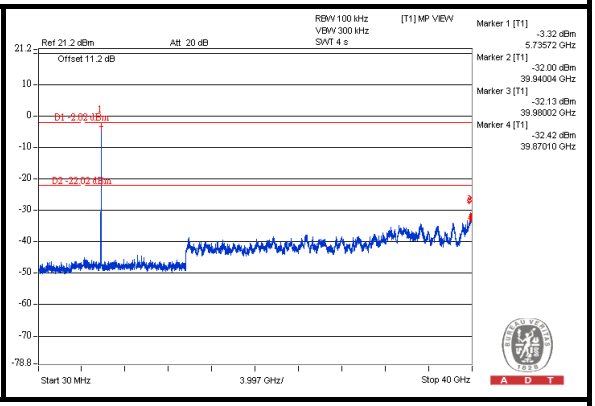
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit. Only worst data of each operating mode is presented.

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.

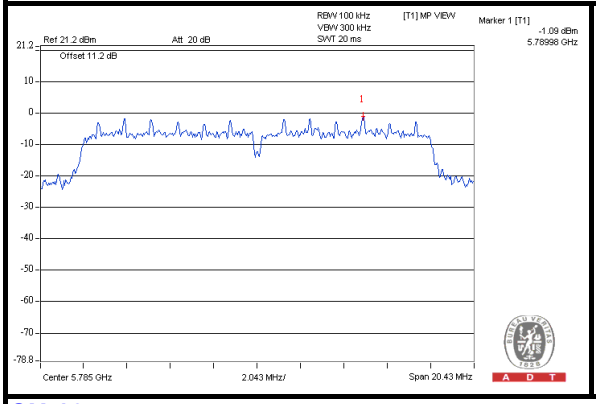
802.11a

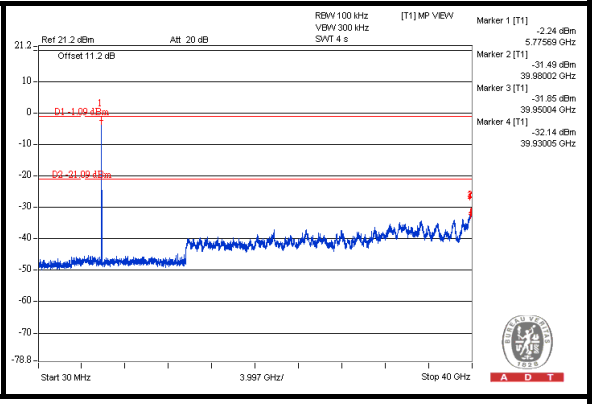
CH 149



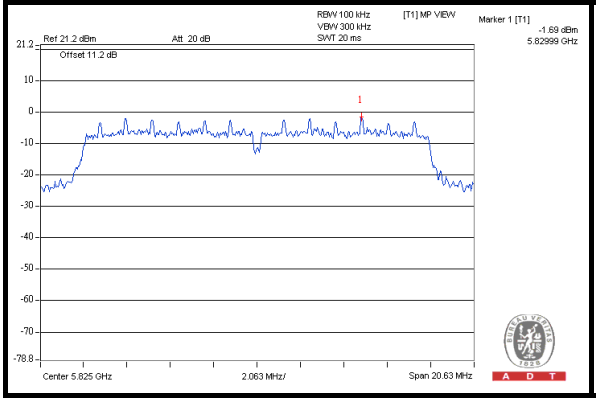


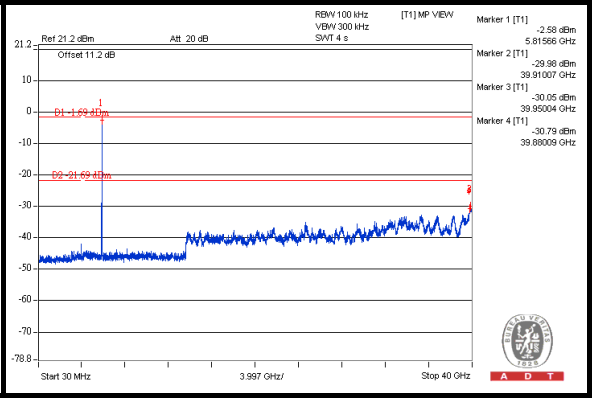
CH 157





CH 165

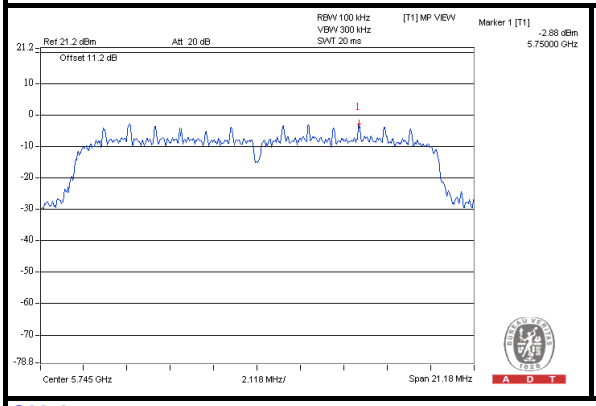


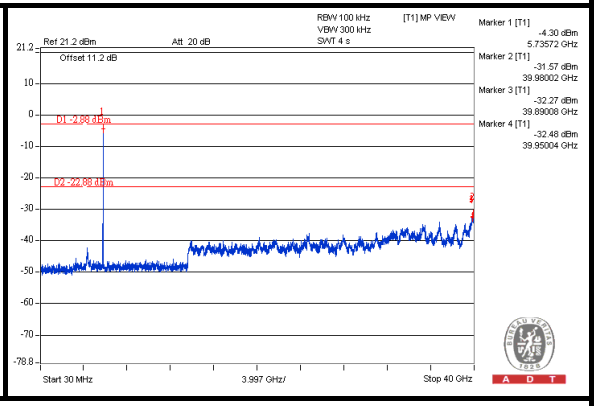


802.11n (20MHz)

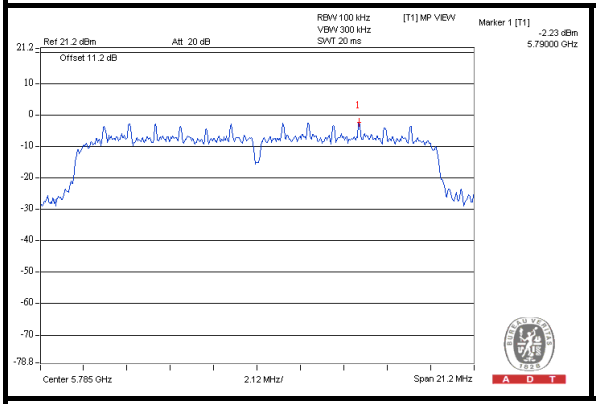
CHAIN 0

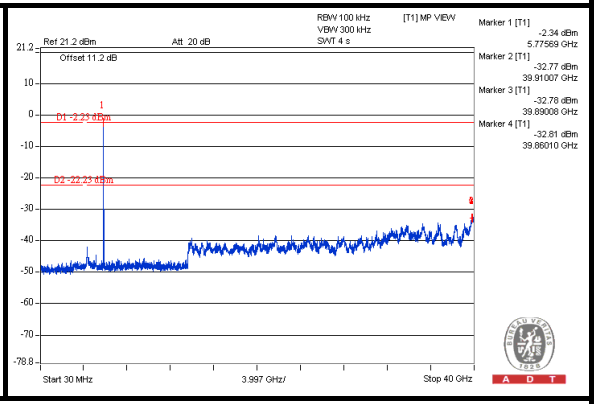
CH 149



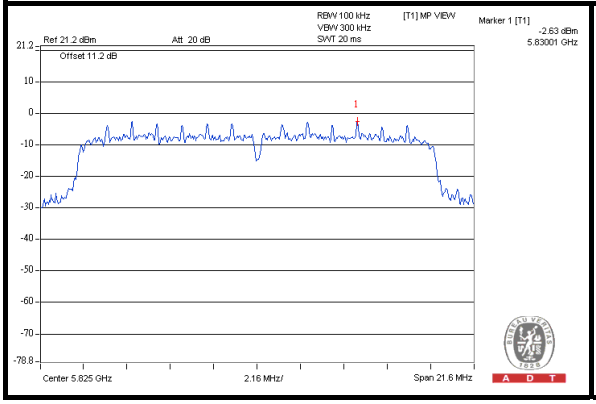


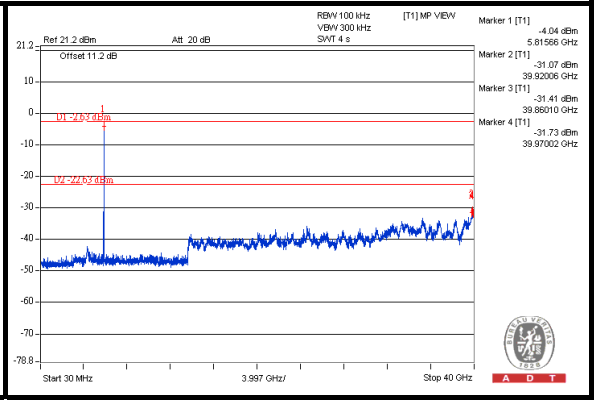
CH 157





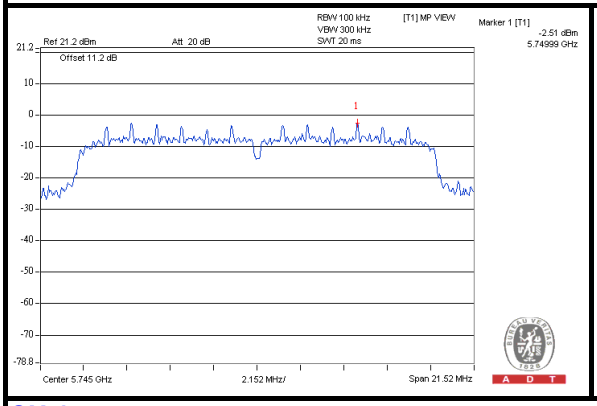
CH 165

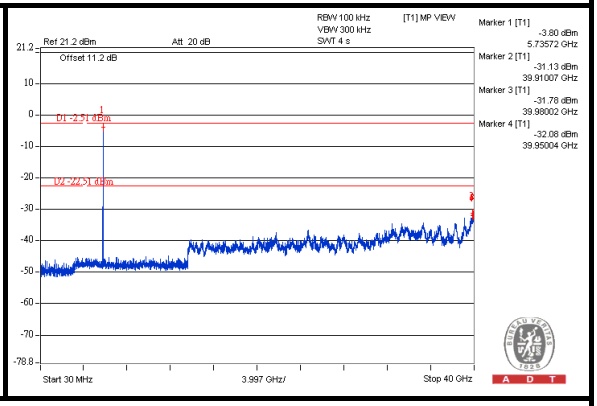




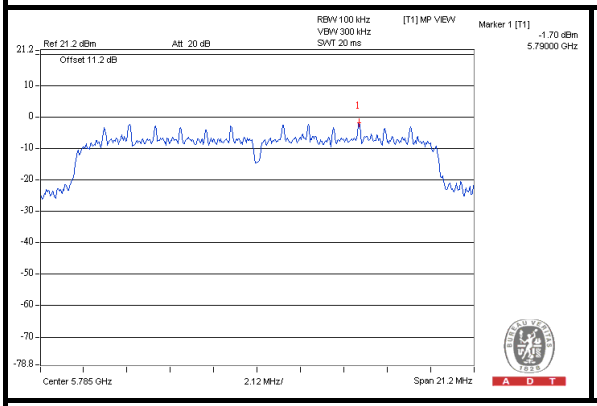
CHAIN 1

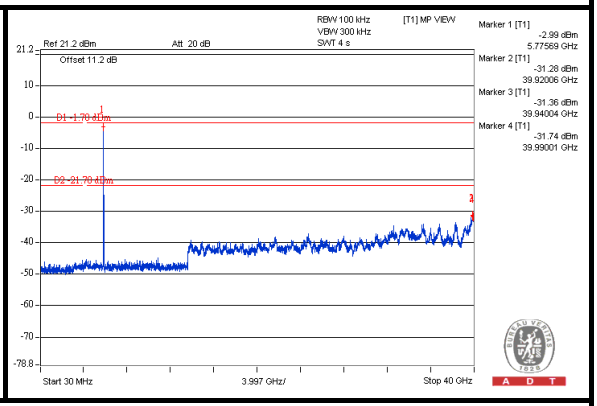
CH 149



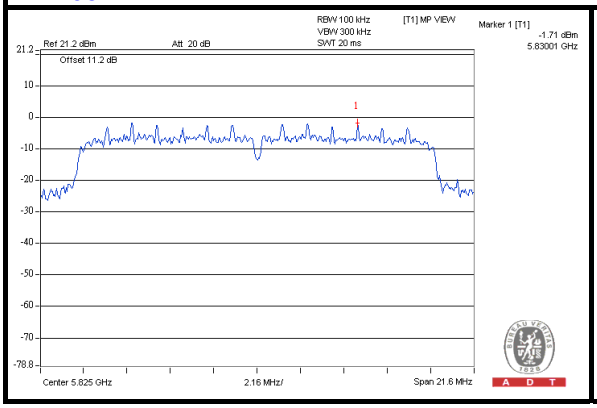


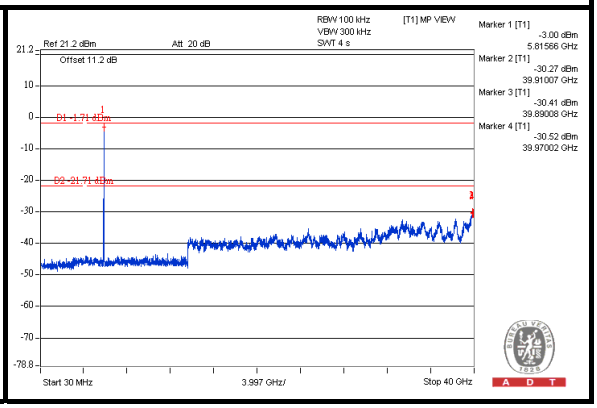
CH 157





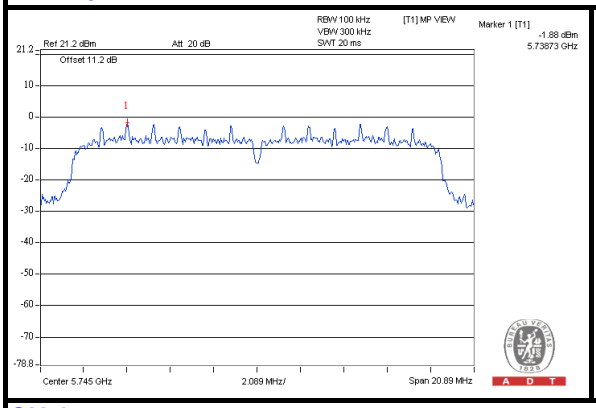
CH 165

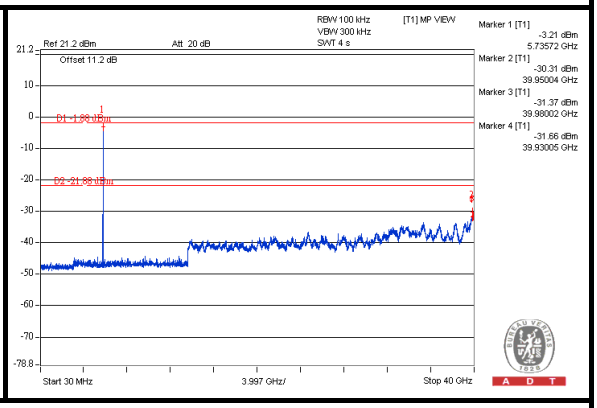




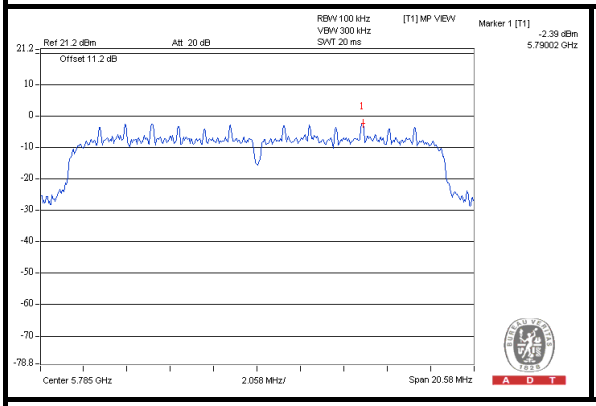
CHAIN 2

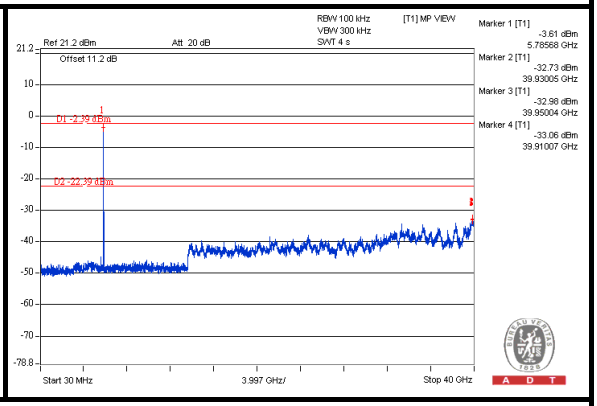
CH 149



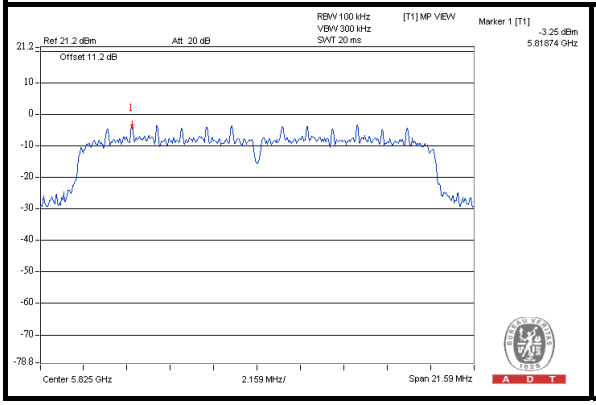


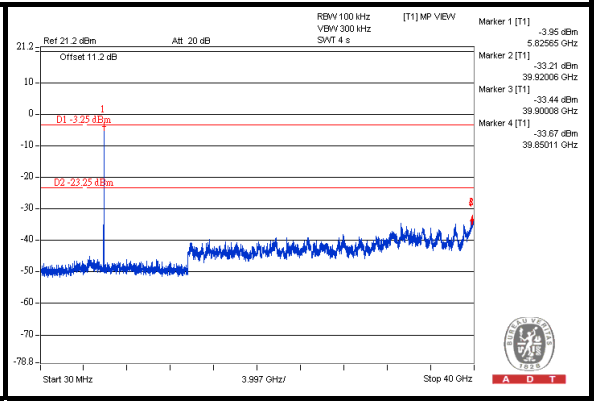
CH 157





CH 165

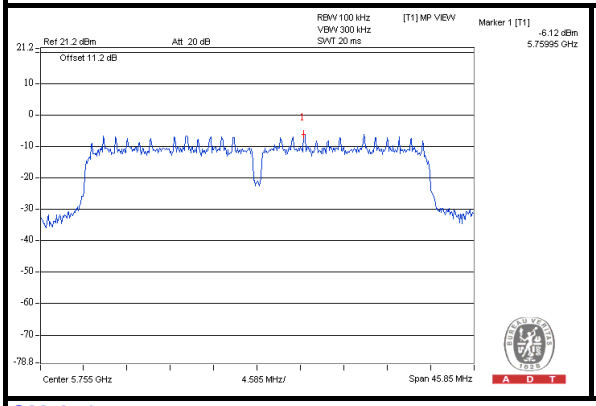


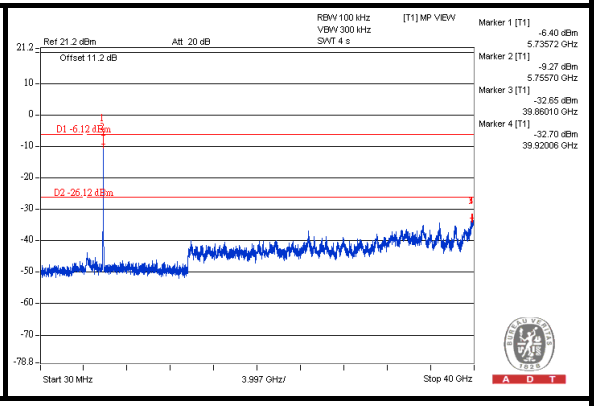


802.11n (40MHz)

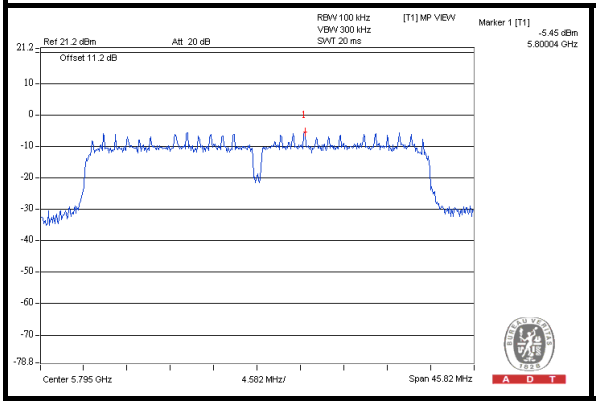
CHAIN 0

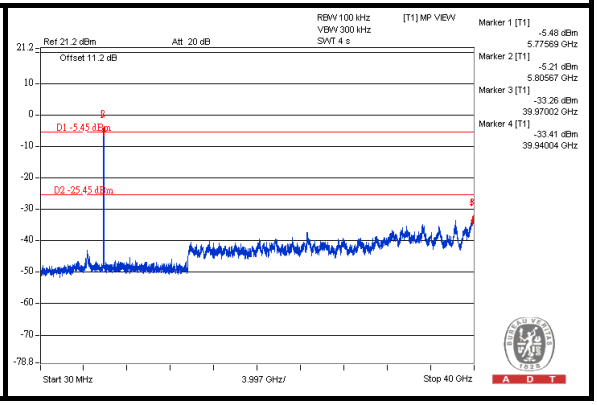
CH 151





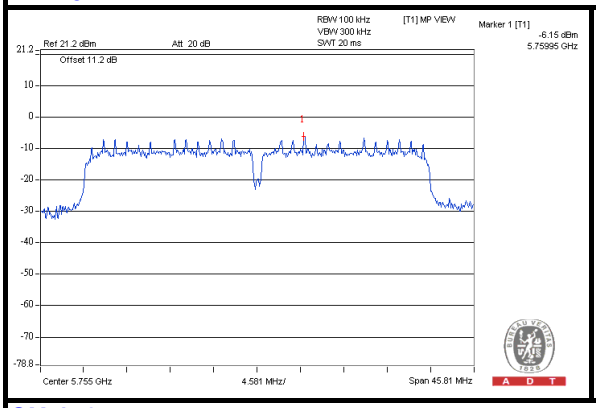
CH 159

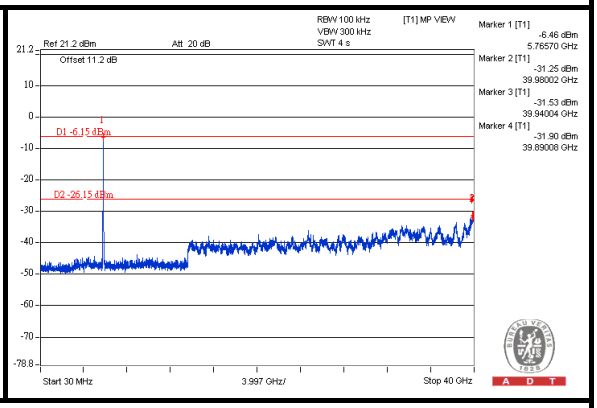




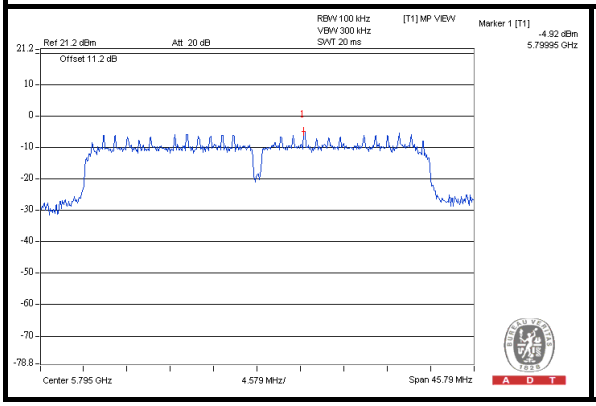
CHAIN 1

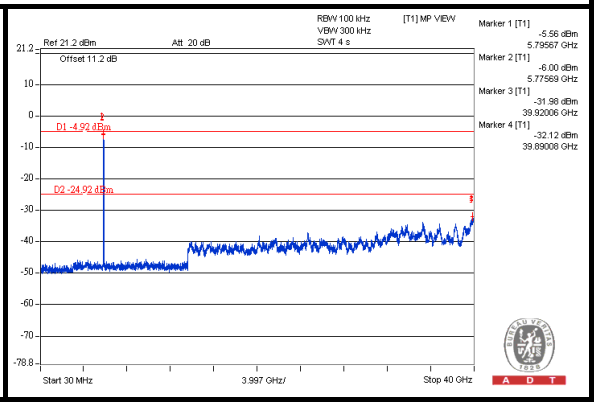
CH 151





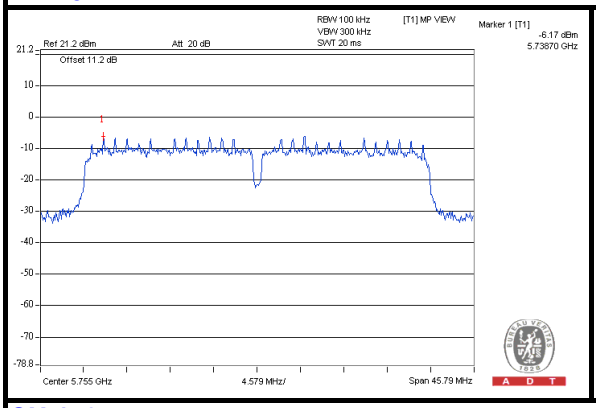
CH 159

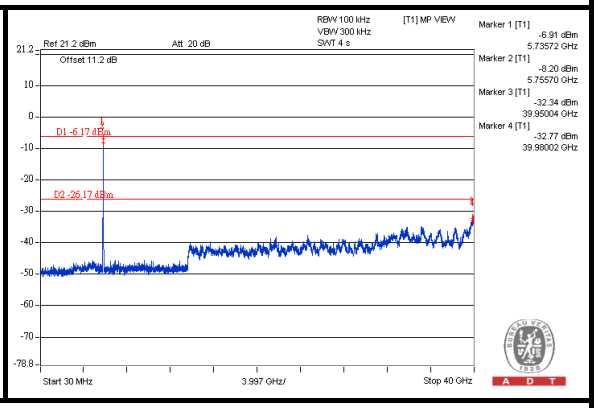




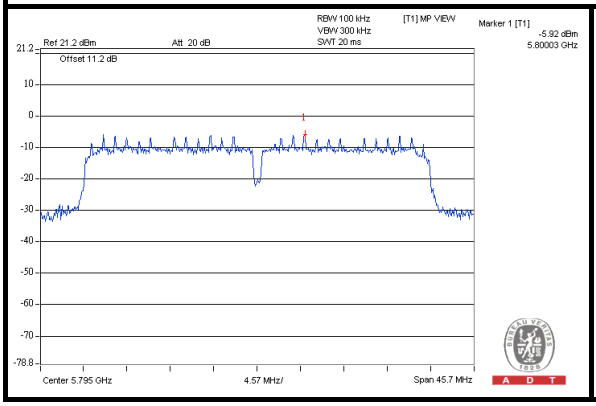
CHAIN 2

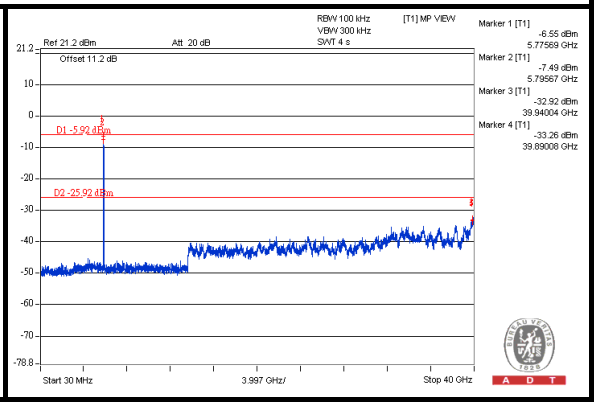
CH 151





CH 159





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

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---