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FCC TEST REPORT (15.247)

REPORT NO.: RF130319C23

MODEL NO.: SBG6782-ACHU DIAGNOSTIC
(Refer to item 3.1 for more details)

FCC ID: W5HSBG6782ACH

RECEIVED: Mar. 25, 2013

TESTED: Apr. 01 ~ Apr. 12, 2013

ISSUED: May 09, 2013

APPLICANT: GENERAL INSTRUMENT OF TAIWAN, LTD.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130319C23	Original release	May 09, 2013



1. CERTIFICATION

PRODUCT: Wireless Gateway
MODEL NO.: SBG6782-ACHU DIAGNOSTIC
(Refer to item 3.1 for more details)
BRAND: Motorola
APPLICANT: GENERAL INSTRUMENT OF TAIWAN, LTD.
TESTED: Apr. 01 ~ Apr. 12, 2013
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (model: SBG6782-ACHU DIAGNOSTIC) 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 : Celine Chou , **DATE :** May 09, 2013
Celine Chou / Specialist

APPROVED BY : Ken Liu , **DATE :** May 09, 2013
Ken Liu / Senior Manager



2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -13.60dB at 0.30770MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2483.50, 2390.00, 5725.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is UFL, IPEX and Murata 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	Wireless Gateway
MODEL NO.	SBG6782-ACHU DIAGNOSTIC (Refer to note for more details)
POWER SUPPLY	100-240Vac
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 256QAM, 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 802.11ac: up to 1300Mbps
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) 1 for 802.11ac (80MHz)
OUTPUT POWER	307.987mW for 2412 ~ 2462MHz 715.898mW for 5745 ~ 5825MHz
ANTENNA TYPE	Refer to note
ANTENNA CONNECTOR	Refer to note
DATA CABLE	1.5m non-shielded Diagnostic cable w/o core (for SBG6782-ACHU DIAGNOSTIC only) 1.8m non-shielded RJ45 cable w/o core
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	1.5m non-shielded power cable w/o core

NOTE:

- All models are listed as below.

Brand	Model	Remark
Motorola	SBG6782-ACHU DIAGNOSTIC	with Diagnostic & USB port
	SBG6782-ACH	without Diagnostic & USB port

*After pre-testing, the model: SBG6782-ACHU DIAGNOSTIC was the worst case for the final test and presented in the test report.

2. The following antenna is provided to the EUT.

Antenna type	Band	Antenna Connector	Antenna gain (dBi)
Printed (Ant. 0)	2.4GHz	UFL	4.4
	5GHz	Murata	3.5
Printed (Ant. 1)	2.4GHz	IPEX	4.4
	5GHz	IPEX	3.5
Printed (Ant. 2)	2.4GHz	IPEX	4.4
	5GHz	UFL	3.5

*After pre-testing, ant. 0 was the worst case for 802.11a, ant. 2 was the worst case for 802.11b/g.

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

MODULATION MODE		TX FUNCTION
802.11b		1TX
802.11g		1TX
802.11a		1TX
802.11n (20MHz)	CDD Mode	3TX
	STBC Mode	
802.11n (40MHz)	CDD Mode	3TX
	STBC Mode	
802.11ac (80MHz)	CDD Mode	3TX
	STBC Mode	

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

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY
155	5775MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

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

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

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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

RADIATED EMISSION TEST (BELOW 1GHz):

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

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

POWER LINE CONDUCTED EMISSION TEST:

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

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



BANDEDGE MEASUREMENT:

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

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

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	25deg. C, 65%RH	120Vac, 60Hz	Brad Tung
RE $<$ 1G	25deg. C, 68%RH	120Vac, 60Hz	Brad Tung
PLC	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Chen



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FOR 5.0GHz (5745 ~ 5825MHz):

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

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

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	87.8

RADIATED EMISSION TEST (BELOW 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	149 to 165	157	OFDM	BPSK	7.2

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	149 to 165	157	OFDM	BPSK	7.2



BANDEDGE MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	87.8

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	87.8

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Brad Tung
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Brad Tung
PLC	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Chen



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3.3 DESCRIPTION OF SUPPORT UNITS

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

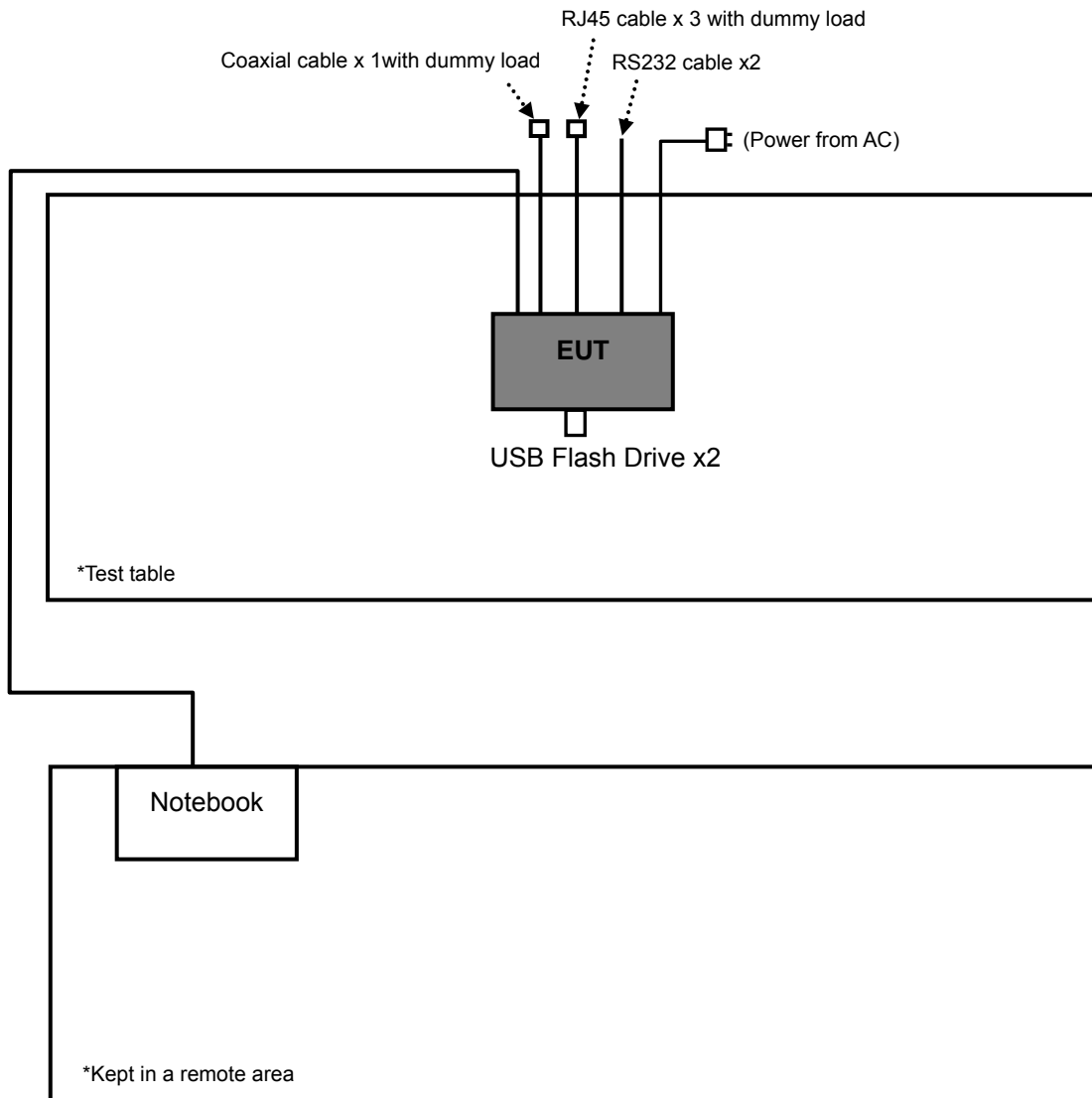
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	D531	CN-0XM006-48643-8 1U-2973	QDS-BRCM1020
2	USB FLASH DRIVE	Transcend	V85	569992-8210	FCC Doc Approved
3	USB FLASH DRIVE	Transcend	V85	569992-8209	FCC Doc Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m RJ45 UTP cable
2	NA
3	NA

NOTE:

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

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST





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3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance 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.



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4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	Aug. 06, 2012	Aug. 05, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jan. 31, 2013	Jan. 30, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Mar. 20, 2013	Mar. 19, 2014
HORN Antenna SCHWARZBECK	9120D	209	Sep. 03, 2012	Sep. 02, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Preamplifier Agilent	8447D	2944A10633	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8449B	3008A01964	Oct. 25, 2012	Oct. 24, 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 BV 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 BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV 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.

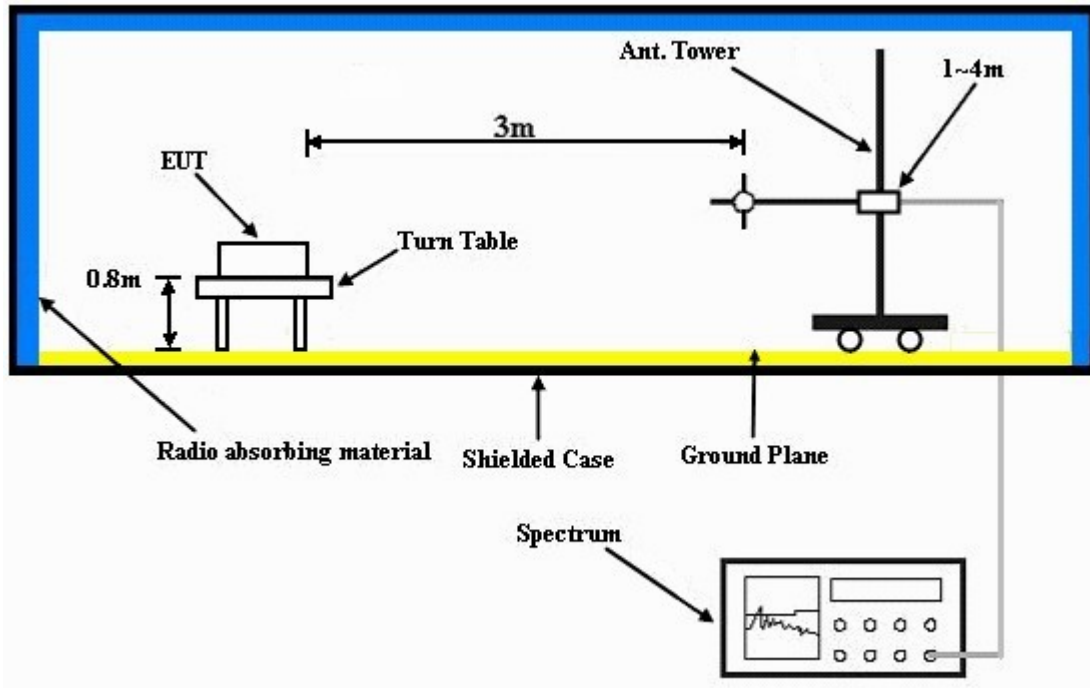
NOTE:

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

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partners sent data to EUT by command "PING".
- The necessary accessories enabled the system in full functions.



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4.1.7 TEST RESULTS

ABOVE 1GHz DATA :

802.11b

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

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	2332.00	63.0 PK	74.0	-11.0	1.38 H	254	31.70	31.30
2	2332.00	52.5 AV	54.0	-1.5	1.38 H	254	21.20	31.30
3	2390.00	63.0 PK	74.0	-11.0	1.32 H	262	31.50	31.50
4	2390.00	52.5 AV	54.0	-1.5	1.32 H	262	21.00	31.50
5	*2412.00	116.9 PK			1.32 H	262	85.40	31.50
6	*2412.00	112.2 AV			1.32 H	262	80.70	31.50
7	2492.00	63.0 PK	74.0	-11.0	1.22 H	266	31.20	31.80
8	2492.00	52.8 AV	54.0	-1.2	1.22 H	266	21.00	31.80
9	4824.00	47.3 PK	74.0	-26.7	1.45 H	111	10.10	37.20
10	4824.00	38.6 AV	54.0	-15.4	1.45 H	111	1.40	37.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.4 PK	74.0	-13.6	1.00 V	227	28.90	31.50
2	2390.00	46.7 AV	54.0	-7.3	1.00 V	227	15.20	31.50
3	*2412.00	107.2 PK			1.00 V	227	75.70	31.50
4	*2412.00	102.5 AV			1.00 V	227	71.00	31.50
5	4824.00	46.6 PK	74.0	-27.4	1.21 V	105	9.40	37.20
6	4824.00	37.6 AV	54.0	-16.4	1.21 V	105	0.40	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

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	2240.00	64.2 PK	74.0	-9.8	1.18 H	285	33.30	30.90
2	2240.00	52.5 AV	54.0	-1.5	1.18 H	285	21.60	30.90
3	2357.00	62.6 PK	74.0	-11.4	1.19 H	89	31.20	31.40
4	2357.00	52.0 AV	54.0	-2.0	1.19 H	89	20.60	31.40
5	*2437.00	113.6 PK			1.19 H	89	82.00	31.60
6	*2437.00	109.4 AV			1.19 H	89	77.80	31.60
7	4874.00	49.2 PK	74.0	-24.8	1.08 H	33	11.90	37.30
8	4874.00	43.9 AV	54.0	-10.1	1.08 H	33	6.60	37.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	106.6 PK			1.65 V	222	75.00	31.60
2	*2437.00	102.1 AV			1.65 V	222	70.50	31.60
3	4874.00	47.3 PK	74.0	-26.7	1.00 V	247	10.00	37.30
4	4874.00	37.7 AV	54.0	-16.3	1.00 V	247	0.40	37.30

REMARKS:

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

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	2239.00	65.4 PK	74.0	-8.6	1.19 H	285	34.50	30.90
2	2239.00	52.8 AV	54.0	-1.2	1.19 H	285	21.90	30.90
3	*2462.00	115.0 PK			1.25 H	90	83.30	31.70
4	*2462.00	111.3 AV			1.25 H	90	79.60	31.70
5	2483.50	62.3 PK	74.0	-11.7	1.30 H	90	30.50	31.80
6	2483.50	52.0 AV	54.0	-2.0	1.30 H	90	20.20	31.80
7	4924.00	51.6 PK	74.0	-22.4	1.27 H	39	14.20	37.40
8	4924.00	46.6 AV	54.0	-7.4	1.27 H	39	9.20	37.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.7 PK			1.43 V	225	75.00	31.70
2	*2462.00	102.1 AV			1.43 V	225	70.40	31.70
3	2483.50	55.5 PK	74.0	-18.5	1.50 V	228	23.70	31.80
4	2483.50	46.8 AV	54.0	-7.2	1.50 V	228	15.00	31.80
5	4924.00	50.4 PK	74.0	-23.6	1.00 V	275	13.00	37.40
6	4924.00	42.7 AV	54.0	-11.3	1.00 V	275	5.30	37.40

REMARKS:

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.3 PK	74.0	-9.7	1.34 H	258	32.80	31.50
2	2390.00	52.7 AV	54.0	-1.3	1.34 H	258	21.20	31.50
3	*2412.00	109.1 PK			1.35 H	260	77.60	31.50
4	*2412.00	98.5 AV			1.35 H	260	67.00	31.50
5	4824.00	48.6 PK	74.0	-25.4	1.35 H	47	11.40	37.20
6	4824.00	35.5 AV	54.0	-18.5	1.35 H	47	-1.70	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	2390.00	56.9 PK	74.0	-17.1	1.20 V	229	25.40	31.50
2	2390.00	46.3 AV	54.0	-7.7	1.20 V	229	14.80	31.50
3	*2412.00	97.9 PK			1.20 V	229	66.40	31.50
4	*2412.00	87.3 AV			1.20 V	229	55.80	31.50
5	4824.00	45.9 PK	74.0	-28.1	1.02 V	247	8.70	37.20
6	4824.00	35.8 AV	54.0	-18.2	1.02 V	247	-1.40	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

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	2240.00	63.8 PK	74.0	-10.2	1.44 H	289	32.90	30.90
2	2240.00	52.8 AV	54.0	-1.2	1.44 H	289	21.90	30.90
3	*2437.00	115.1 PK			1.30 H	275	83.50	31.60
4	*2437.00	103.4 AV			1.30 H	275	71.80	31.60
5	4874.00	50.4 PK	74.0	-23.6	1.39 H	52	13.10	37.30
6	4874.00	38.9 AV	54.0	-15.1	1.39 H	52	1.60	37.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2240.00	52.8 PK	74.0	-21.2	1.18 V	234	21.90	30.90
2	2240.00	40.1 AV	54.0	-13.9	1.18 V	234	9.20	30.90
3	*2437.00	103.1 PK			1.15 V	231	71.50	31.60
4	*2437.00	92.7 AV			1.15 V	231	61.10	31.60
5	4874.00	45.4 PK	74.0	-28.6	1.08 V	254	8.10	37.30
6	4874.00	34.7 AV	54.0	-19.3	1.08 V	254	-2.60	37.30

REMARKS:

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

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	111.2 PK			1.29 H	257	79.50	31.70
2	*2462.00	99.5 AV			1.29 H	257	67.80	31.70
3	2483.50	64.2 PK	74.0	-9.8	1.29 H	259	32.40	31.80
4	2483.50	53.0 AV	54.0	-1.0	1.29 H	259	21.20	31.80
5	4924.00	49.2 PK	74.0	-24.8	1.34 H	41	11.80	37.40
6	4924.00	35.8 AV	54.0	-18.2	1.34 H	41	-1.60	37.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	100.2 PK			1.12 V	224	68.50	31.70
2	*2462.00	90.1 AV			1.12 V	224	58.40	31.70
3	2483.50	56.4 PK	74.0	-17.6	1.12 V	224	24.60	31.80
4	2483.50	45.8 AV	54.0	-8.2	1.12 V	224	14.00	31.80
5	4924.00	45.8 PK	74.0	-28.2	1.09 V	252	8.40	37.40
6	4924.00	35.4 AV	54.0	-18.6	1.09 V	252	-2.00	37.40

REMARKS:

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



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802.11n (20MHz)

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

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	66.3 PK	74.0	-7.7	1.07 H	278	34.80	31.50
2	2390.00	52.8 AV	54.0	-1.2	1.07 H	278	21.30	31.50
3	*2412.00	110.0 PK			1.31 H	240	78.50	31.50
4	*2412.00	99.4 AV			1.31 H	240	67.90	31.50
5	4824.00	48.6 PK	74.0	-25.4	1.41 H	169	11.40	37.20
6	4824.00	35.8 AV	54.0	-18.2	1.41 H	169	-1.40	37.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.9 PK	74.0	-9.1	1.17 V	338	33.40	31.50
2	2390.00	51.7 AV	54.0	-2.3	1.17 V	338	20.20	31.50
3	*2412.00	108.5 PK			1.17 V	338	77.00	31.50
4	*2412.00	98.1 AV			1.17 V	338	66.60	31.50
5	4824.00	45.9 PK	74.0	-28.1	1.22 V	157	8.70	37.20
6	4824.00	36.2 AV	54.0	-17.8	1.22 V	157	-1.00	37.20

REMARKS:

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

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	2240.00	63.5 PK	74.0	-10.5	1.16 H	283	32.60	30.90
2	2240.00	52.6 AV	54.0	-1.4	1.16 H	283	21.70	30.90
3	*2437.00	117.6 PK			1.08 H	276	86.00	31.60
4	*2437.00	105.2 AV			1.08 H	276	73.60	31.60
5	4874.00	54.7 PK	74.0	-19.3	1.21 H	135	17.40	37.30
6	4874.00	39.9 AV	54.0	-14.1	1.21 H	135	2.60	37.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2240.00	64.8 PK	74.0	-9.2	1.28 V	312	33.90	30.90
2	2240.00	50.8 AV	54.0	-3.2	1.28 V	312	19.90	30.90
3	*2437.00	115.6 PK			1.21 V	341	84.00	31.60
4	*2437.00	103.4 AV			1.21 V	341	71.80	31.60
5	4874.00	46.1 PK	74.0	-27.9	1.08 V	116	8.80	37.30
6	4874.00	35.6 AV	54.0	-18.4	1.08 V	116	-1.70	37.30

REMARKS:

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

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	109.6 PK			1.26 H	288	77.90	31.70
2	*2462.00	97.3 AV			1.26 H	288	65.60	31.70
3	2483.50	64.6 PK	74.0	-9.4	1.26 H	280	32.80	31.80
4	2483.50	52.5 AV	54.0	-1.5	1.26 H	280	20.70	31.80
5	4924.00	48.5 PK	74.0	-25.5	1.28 H	152	11.10	37.40
6	4924.00	36.2 AV	54.0	-17.8	1.28 H	152	-1.20	37.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.8 PK			1.12 V	329	76.10	31.70
2	*2462.00	96.1 AV			1.12 V	329	64.40	31.70
3	2483.50	64.2 PK	74.0	-9.8	1.17 V	324	32.40	31.80
4	2483.50	50.8 AV	54.0	-3.2	1.17 V	324	19.00	31.80
5	4924.00	45.4 PK	74.0	-28.6	1.27 V	165	8.00	37.40
6	4924.00	36.1 AV	54.0	-17.9	1.27 V	165	-1.30	37.40

REMARKS:

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



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

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	70.3 PK	74.0	-3.7	1.13 H	280	39.50	30.80
2	2390.00	53.0 AV	54.0	-1.0	1.13 H	280	22.20	30.80
3	*2422.00	105.9 PK			1.13 H	345	75.00	30.90
4	*2422.00	93.8 AV			1.13 H	345	62.90	30.90
5	4844.00	47.4 PK	74.0	-26.6	1.06 H	258	10.40	37.00
6	4844.00	34.4 AV	54.0	-19.6	1.06 H	258	-2.60	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	69.5 PK	74.0	-4.5	1.14 V	330	38.70	30.80
2	2390.00	53.0 AV	54.0	-1.0	1.14 V	330	22.20	30.80
3	*2422.00	105.9 PK			1.14 V	330	75.00	30.90
4	*2422.00	94.9 AV			1.14 V	330	64.00	30.90
5	4844.00	47.5 PK	74.0	-26.5	1.06 V	236	10.50	37.00
6	4844.00	34.7 AV	54.0	-19.3	1.06 V	236	-2.30	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.4 PK	74.0	-8.6	1.14 H	325	34.60	30.80
2	2390.00	52.9 AV	54.0	-1.1	1.14 H	325	22.10	30.80
3	*2437.00	108.9 PK			1.14 H	325	77.90	31.00
4	*2437.00	97.0 AV			1.14 H	325	66.00	31.00
5	4874.00	46.6 PK	74.0	-27.4	1.08 H	268	9.50	37.10
6	4874.00	34.8 AV	54.0	-19.2	1.08 H	268	-2.30	37.10
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	65.4 PK	74.0	-8.6	1.15 V	323	34.60	30.80
2	2390.00	53.0 AV	54.0	-1.0	1.15 V	323	22.20	30.80
3	*2437.00	108.8 PK			1.15 V	323	77.80	31.00
4	*2437.00	96.9 AV			1.15 V	323	65.90	31.00
5	4874.00	46.5 PK	74.0	-27.5	1.12 V	246	9.40	37.10
6	4874.00	34.8 AV	54.0	-19.2	1.12 V	246	-2.30	37.10

REMARKS:

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

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	108.7 PK			1.14 H	310	77.60	31.10
2	*2452.00	95.9 AV			1.14 H	310	64.80	31.10
3	2483.50	67.8 PK	74.0	-6.2	1.14 H	320	36.60	31.20
4	2483.50	53.0 AV	54.0	-1.0	1.14 H	320	21.80	31.20
5	4904.00	46.9 PK	74.0	-27.1	1.14 H	75	9.70	37.20
6	4904.00	34.5 AV	54.0	-19.5	1.14 H	75	-2.70	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	*2452.00	108.2 PK			1.13 V	314	77.10	31.10
2	*2452.00	95.4 AV			1.13 V	314	64.30	31.10
3	2483.50	67.5 PK	74.0	-6.5	1.17 V	326	36.30	31.20
4	2483.50	53.0 AV	54.0	-1.0	1.17 V	326	21.80	31.20
5	4904.00	47.0 PK	74.0	-27.0	1.10 V	100	9.80	37.20
6	4904.00	34.8 AV	54.0	-19.2	1.10 V	100	-2.40	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.



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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Brad Tung

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	167.94	32.3 QP	43.5	-11.2	1.50 H	80	18.80	13.50
2	214.61	35.7 QP	43.5	-7.8	1.50 H	249	24.00	11.70
3	249.60	41.7 QP	46.0	-4.3	1.25 H	262	28.50	13.20
4	269.05	43.3 QP	46.0	-2.7	1.00 H	220	29.40	13.90
5	632.63	35.8 QP	46.0	-10.2	1.00 H	101	12.90	22.90
6	799.84	35.9 QP	46.0	-10.1	1.25 H	162	10.30	25.60

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	31.84	35.5 QP	40.0	-4.5	1.25 V	143	23.10	12.40
2	97.95	33.9 QP	43.5	-9.6	1.00 V	44	24.90	9.00
3	269.05	37.4 QP	46.0	-8.6	1.00 V	185	23.50	13.90
4	500.42	32.9 QP	46.0	-13.1	1.25 V	244	12.80	20.10
5	797.89	38.0 QP	46.0	-8.0	1.00 V	112	12.50	25.50
6	904.83	36.7 QP	46.0	-9.3	1.50 V	92	9.70	27.00

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.



4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

- NOTE:** 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 09, 2012	Nov. 08, 2013
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 21, 2012	Dec. 20, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 06, 2012	Jul. 05, 2013
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

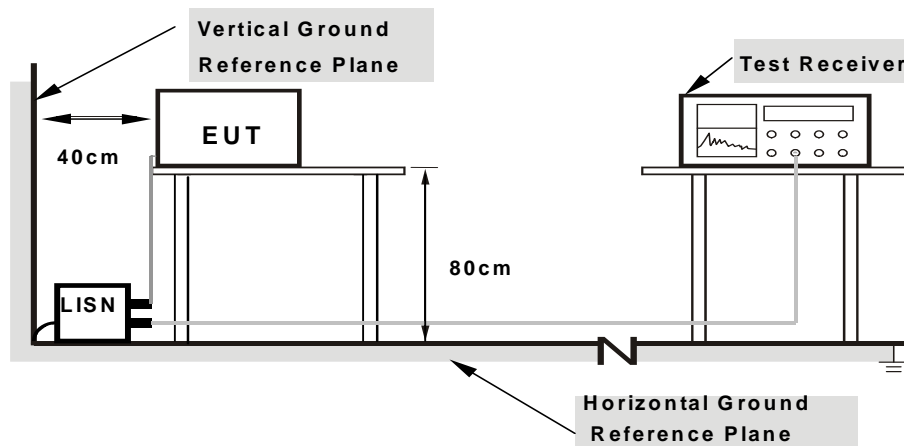
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

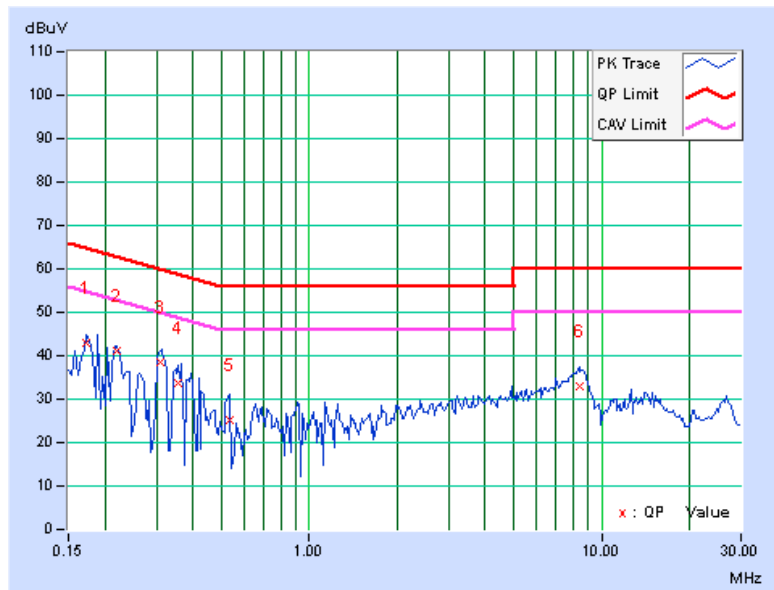
4.2.7 TEST RESULTS

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

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	0.12	42.70	39.47	42.82	39.59	64.79	54.79	-21.97	-15.20
2	0.22031	0.12	41.05	38.05	41.17	38.17	62.81	52.81	-21.63	-14.63
3	0.30770	0.14	38.39	36.30	38.53	36.44	60.03	50.03	-21.51	-13.60
4	0.35467	0.14	33.58	29.09	33.72	29.23	58.85	48.85	-25.13	-19.62
5	0.53163	0.16	24.96	20.12	25.12	20.28	56.00	46.00	-30.88	-25.72
6	8.40234	0.57	32.48	26.53	33.05	27.10	60.00	50.00	-26.95	-22.90

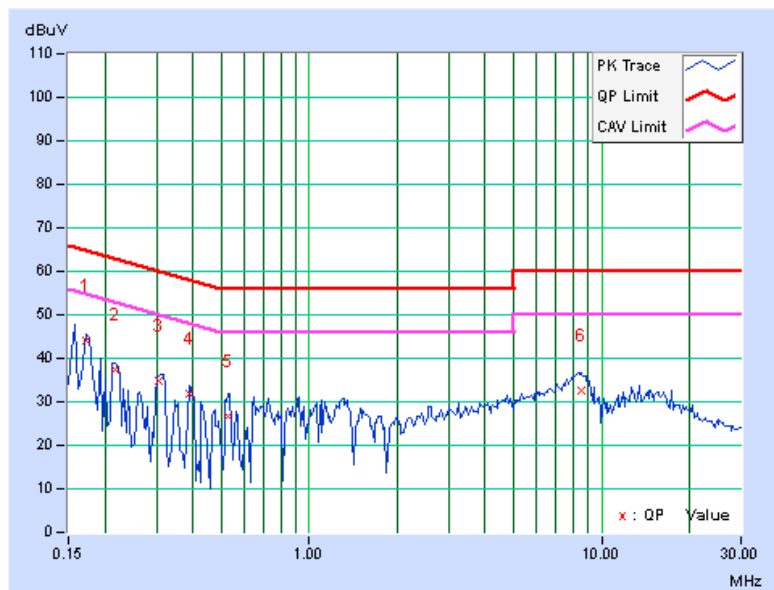
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. The emission levels of other frequencies were very low against the limit.
 3. Margin value = Emission level - Limit value
 4. Correction factor = Insertion loss + Cable loss
 5. Emission Level = Correction Factor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



PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	0.17	43.72	39.44	43.89	39.61	64.79	54.79	-20.90	-15.18
2	0.21641	0.17	37.25	33.44	37.42	33.61	62.96	52.96	-25.53	-19.34
3	0.30643	0.19	34.71	34.17	34.90	34.36	60.07	50.07	-25.17	-15.71
4	0.38828	0.21	31.69	28.08	31.90	28.29	58.10	48.10	-26.20	-19.81
5	0.52891	0.22	26.56	22.47	26.78	22.69	56.00	46.00	-29.22	-23.31
6	8.58203	0.54	32.19	26.42	32.73	26.96	60.00	50.00	-27.27	-23.04

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

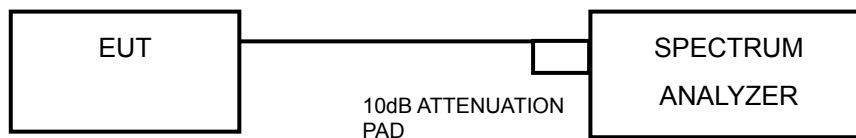


4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURE

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

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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



4.3.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.10	0.5	PASS
6	2437	8.12	0.5	PASS
11	2462	8.15	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.47	0.5	PASS
6	2437	15.48	0.5	PASS
11	2462	16.49	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	17.68	17.69	17.69	0.5	PASS
6	2437	17.17	17.63	17.00	0.5	PASS
11	2462	17.68	17.63	17.38	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	36.44	36.52	35.88	0.5	PASS
6	2437	35.90	35.91	35.88	0.5	PASS
9	2452	36.48	35.92	35.19	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)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

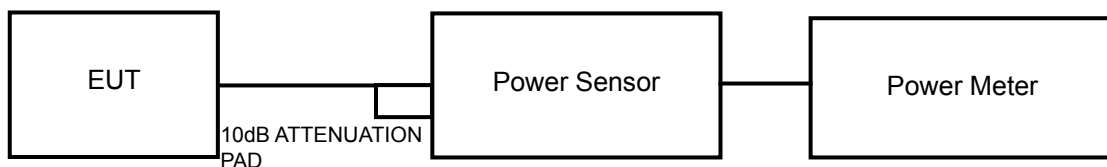
Array Gain = 0 dB (i.e., no array gain) for NANT \leq 4;

Array Gain = 0 dB (i.e., no array gain) for channel widths \geq 40 MHz for any NANT;

Array Gain = $5 \log(\text{NANT}/\text{NSS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with NANT \geq 5.

For power measurements on all other devices: Array Gain = $10 \log(\text{NANT}/\text{NSS})$ dB.

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.4.4 TEST PROCEDURES

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



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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)	Average Power (mW)	Average Power (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	153.109	21.85	30	PASS
6	2437	150.314	21.77	30	PASS
11	2462	141.579	21.51	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	Average Power (mW)	Average Power (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	26.792	14.28	30	PASS
6	2437	150.661	21.78	30	PASS
11	2462	36.141	15.58	30	PASS

802.11n (20MHz)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Average Power (mW)	Total Average Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	12.47	11.18	12.89	50.236	17.01	30	PASS
6	2437	20.12	20.01	20.21	307.987	24.89	30	PASS
11	2462	13.25	11.71	13.57	58.711	17.69	30	PASS

802.11n (40MHz)

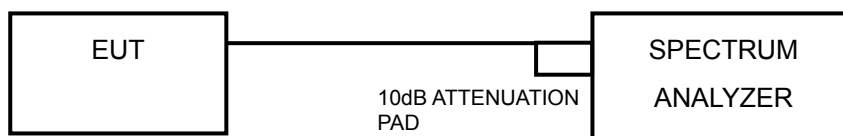
Chan.	Freq. (MHz)	Average Power (dBm)			Total Average Power (mW)	Total Average Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
3	2422	13.55	12.12	11.75	53.901	17.32	30	PASS
6	2437	16.14	14.96	16.24	114.521	20.59	30	PASS
9	2452	15.98	14.22	15.73	103.463	20.15	30	PASS

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

- Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



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4.5.7 TEST RESULTS

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-3.33	8	PASS
6	2437	-2.71	8	PASS
11	2462	-3.18	8	PASS

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-14.08	8	PASS
6	2437	-7.19	8	PASS
11	2462	-12.72	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	-14.99	4.77	-10.22	4.83	PASS
	6	2437	-7.90	4.77	-3.13	4.83	PASS
	11	2462	-13.54	4.77	-8.77	4.83	PASS
1	1	2412	-16.89	4.77	-12.12	4.83	PASS
	6	2437	-7.25	4.77	-2.48	4.83	PASS
	11	2462	-15.30	4.77	-10.53	4.83	PASS
2	1	2412	-15.12	4.77	-10.35	4.83	PASS
	6	2437	-7.03	4.77	-2.26	4.83	PASS
	11	2462	-14.08	4.77	-9.31	4.83	PASS

NOTE: Directional gain = 4.4dBi + 10log(3) = 9.17dBi > 6dBi , so the power density limit shall be reduced to 8-(9.17-6) = 4.83dBm.



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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	-18.62	4.77	-13.85	4.83	PASS
	6	2437	-15.69	4.77	-10.92	4.83	PASS
	9	2452	-15.82	4.77	-11.05	4.83	PASS
1	3	2422	-16.34	4.77	-11.57	4.83	PASS
	6	2437	-13.55	4.77	-8.78	4.83	PASS
	9	2452	-14.45	4.77	-9.68	4.83	PASS
2	3	2422	-17.08	4.77	-12.31	4.83	PASS
	6	2437	-13.71	4.77	-8.94	4.83	PASS
	9	2452	-13.95	4.77	-9.18	4.83	PASS

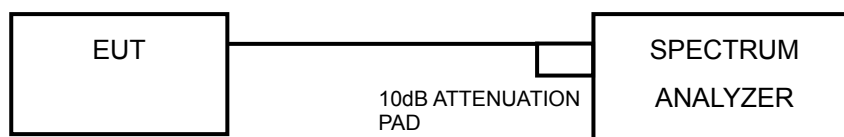
NOTE: Directional gain = $4.4\text{dBi} + 10\log(3) = 9.17\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(9.17-6) = 4.83\text{dBm}$.

4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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



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MEASUREMENT PROCEDURE OOB

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

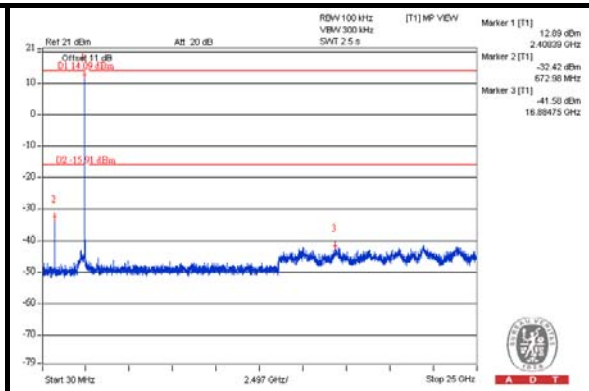
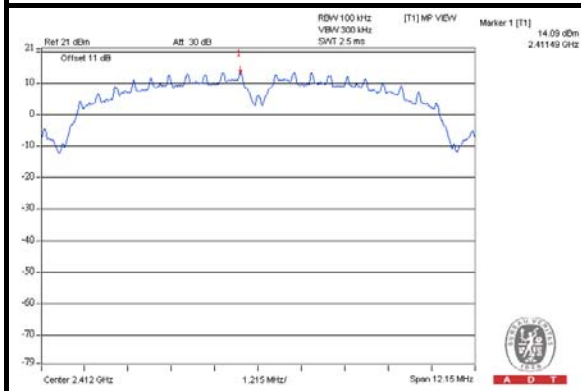
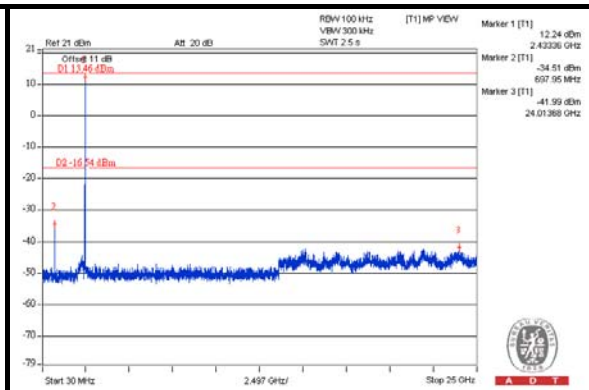
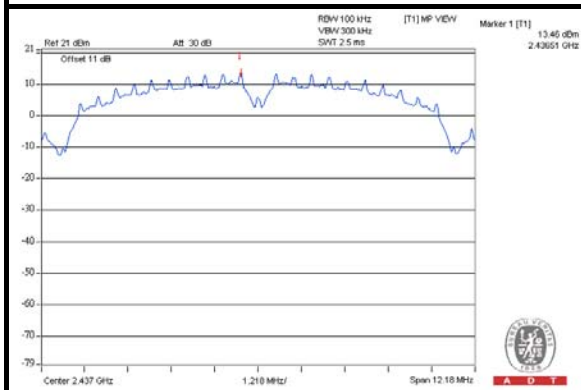
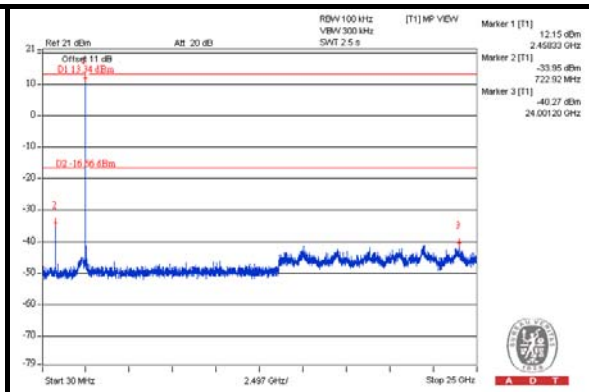
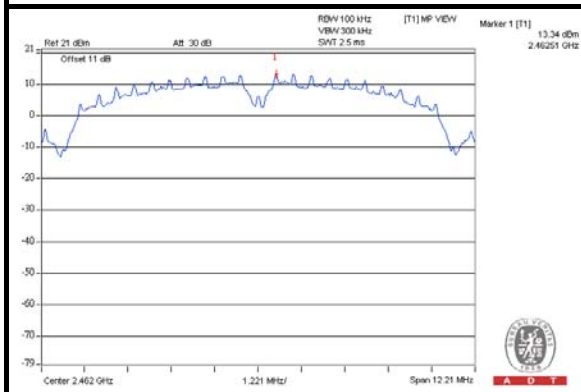
4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

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

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

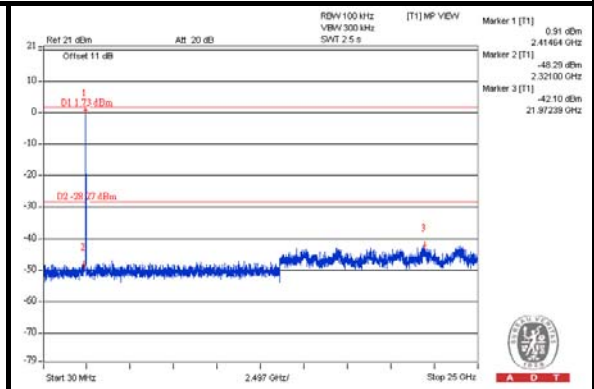
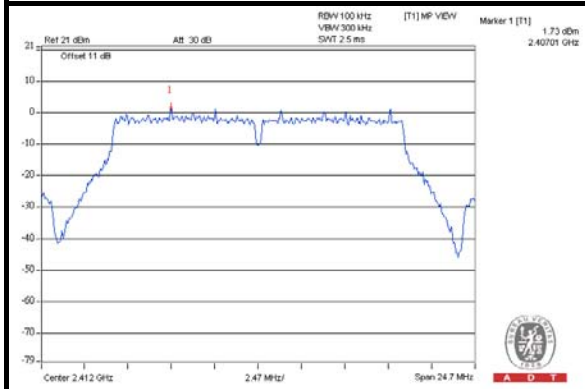
802.11b**CH 1****CH 6****CH 11**



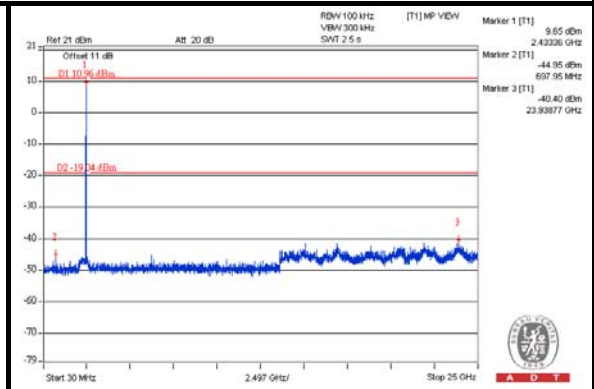
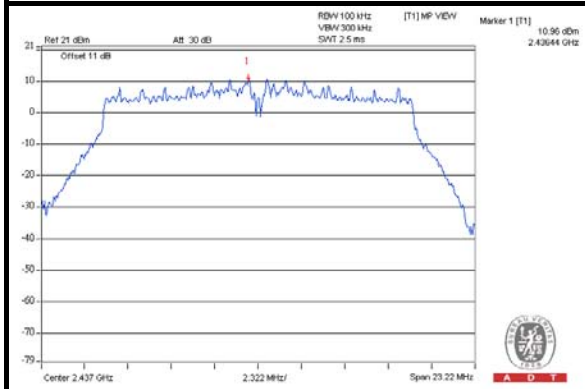
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802.11g

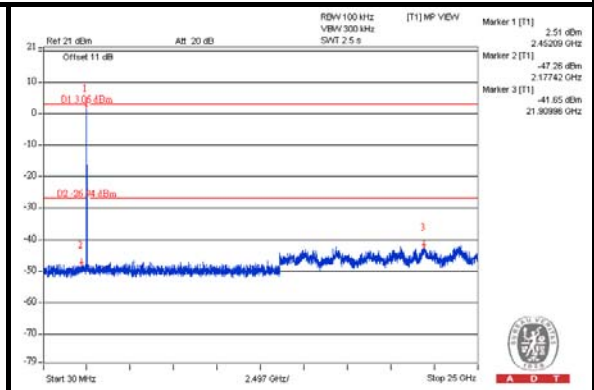
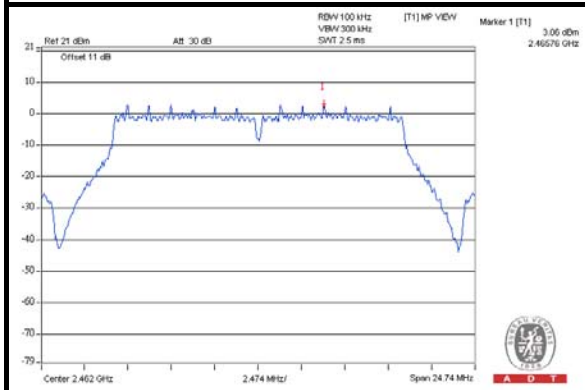
CH 1



CH 6



CH 11



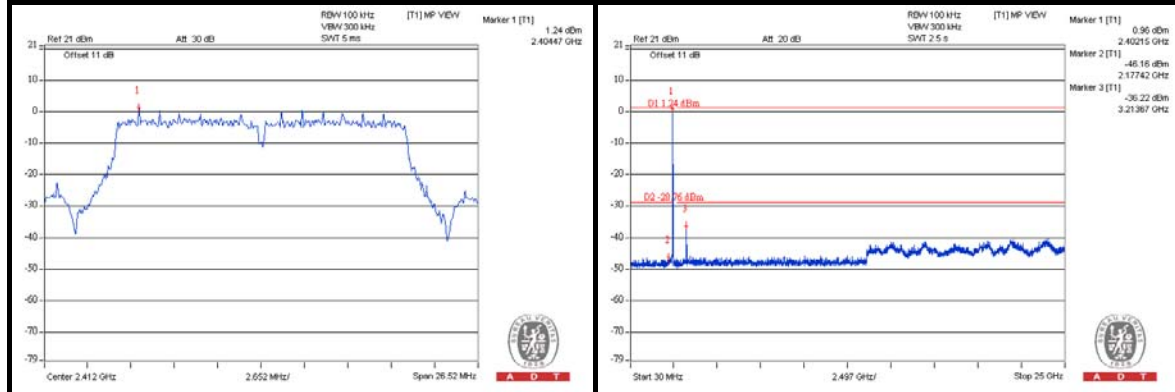


A D T

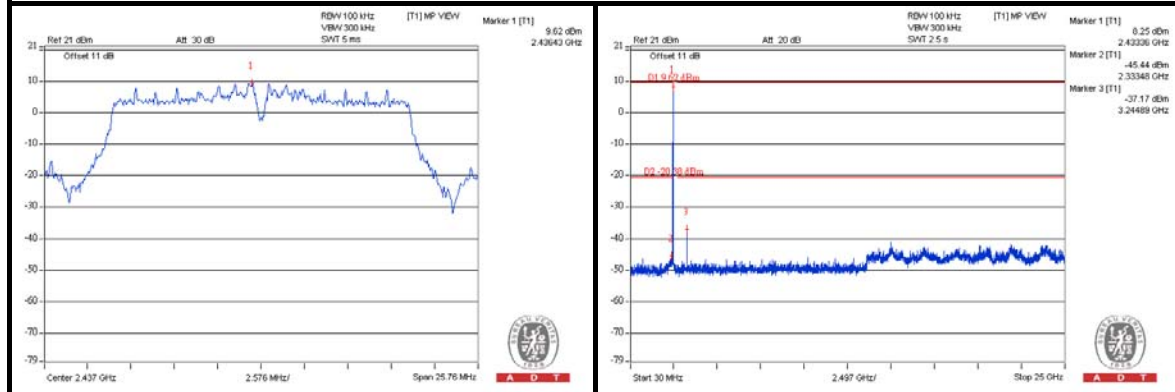
802.11n (20MHz)

CHAIN 0

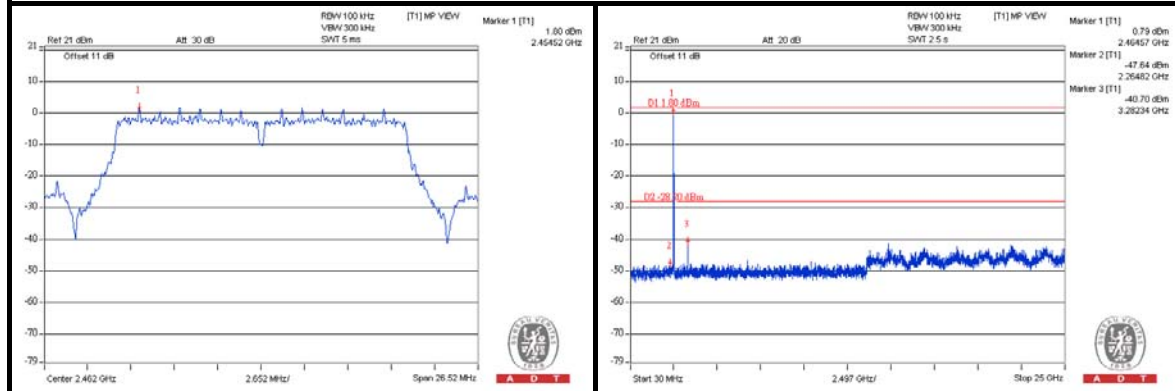
CH 1



CH 6



CH 11

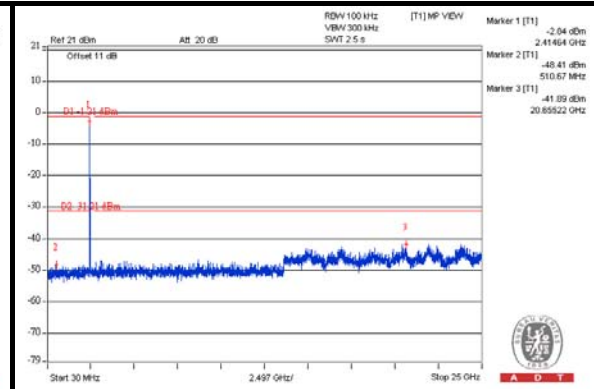
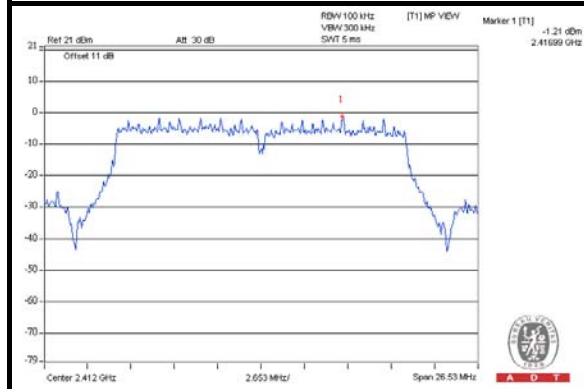




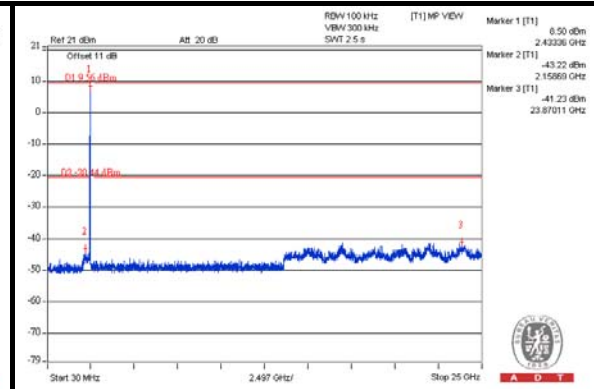
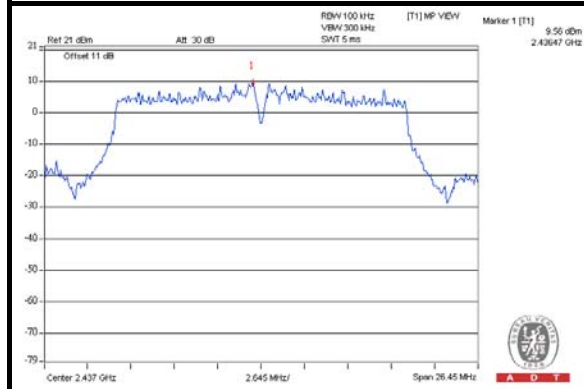
A D T

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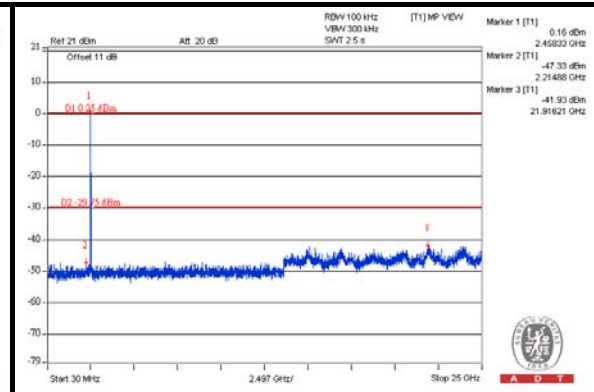
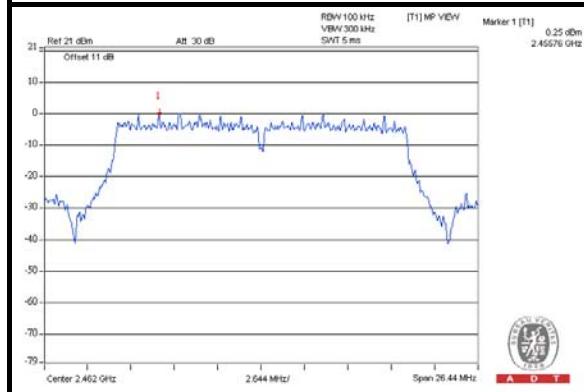
CH 1



CH 6



CH 11

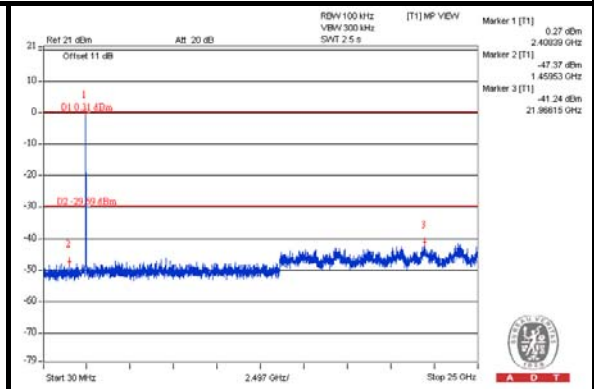
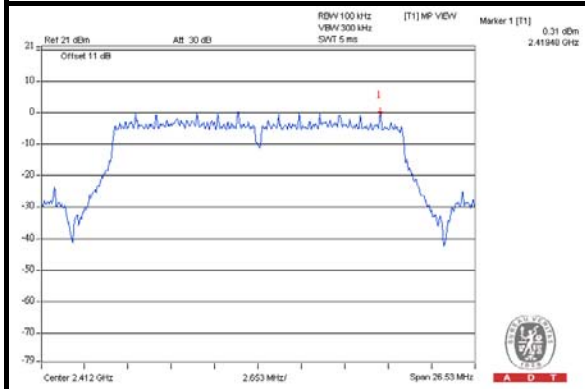




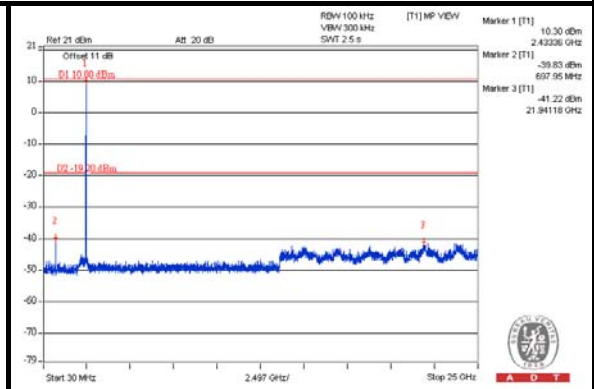
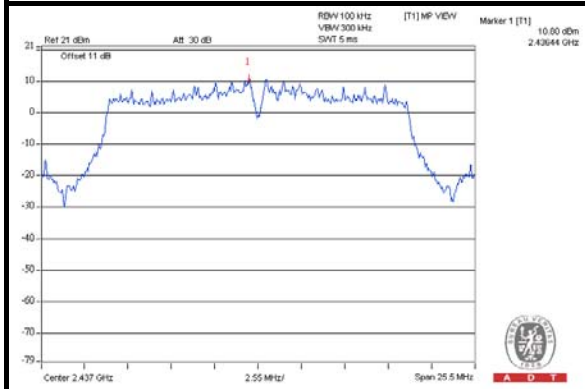
A D T

CHAIN 2

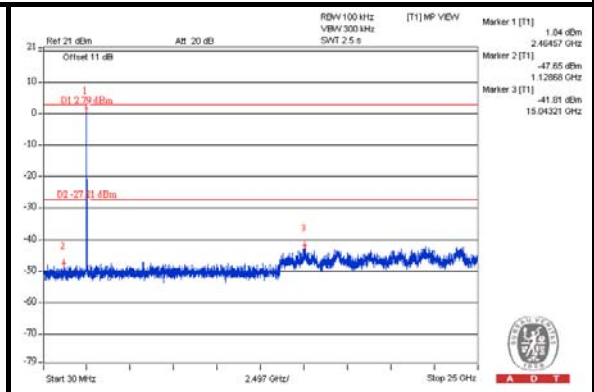
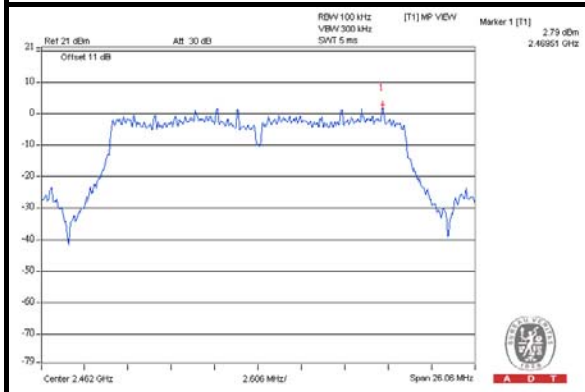
CH 1



CH 6



CH 11



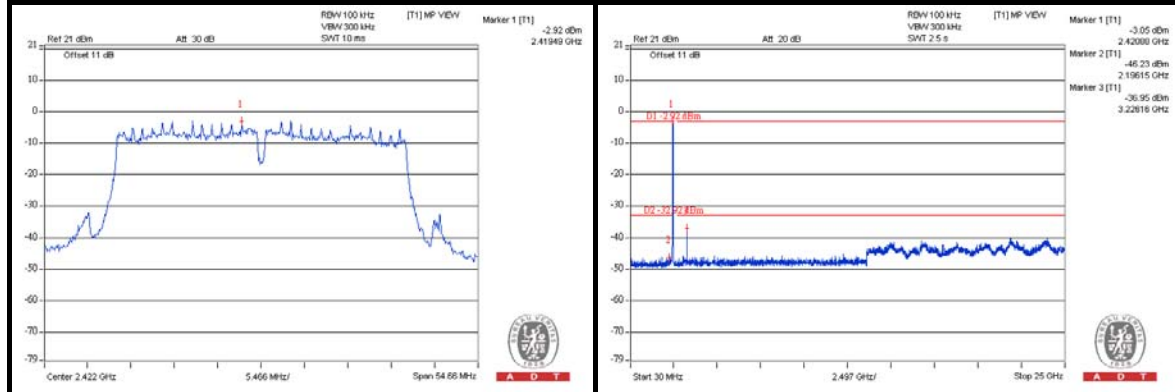


A D T

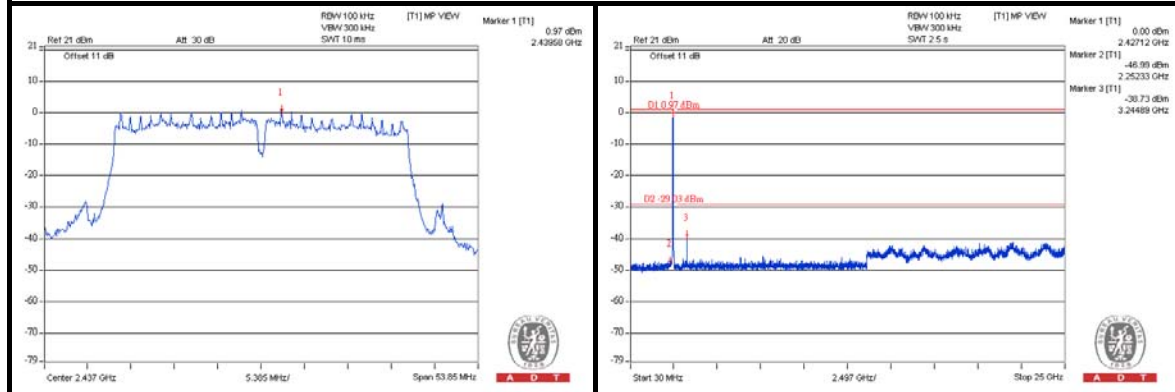
802.11n (40MHz)

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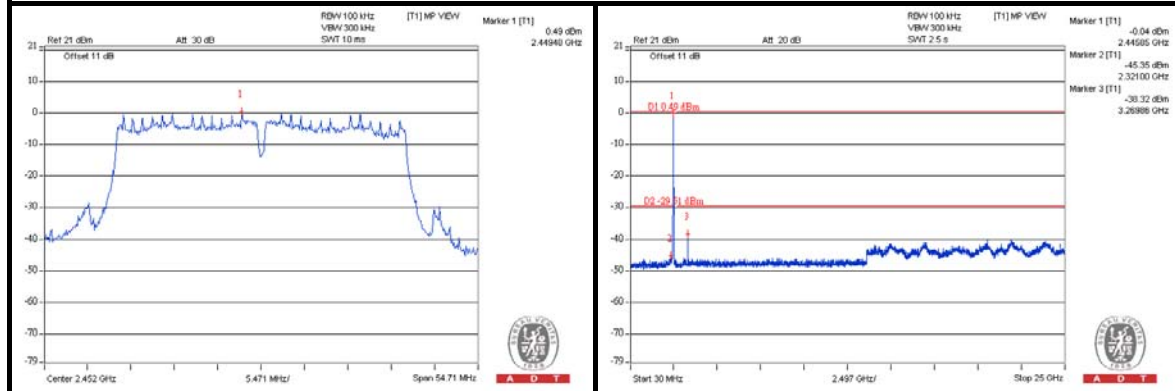
CH 3



CH 6

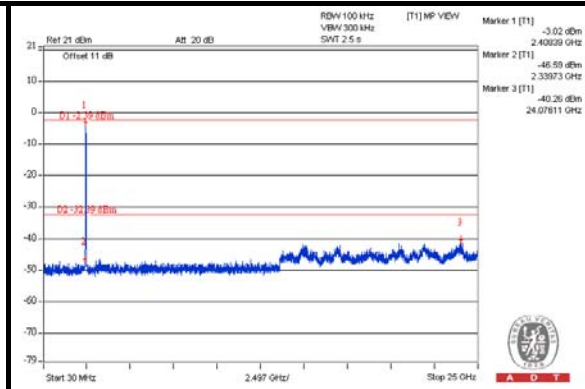
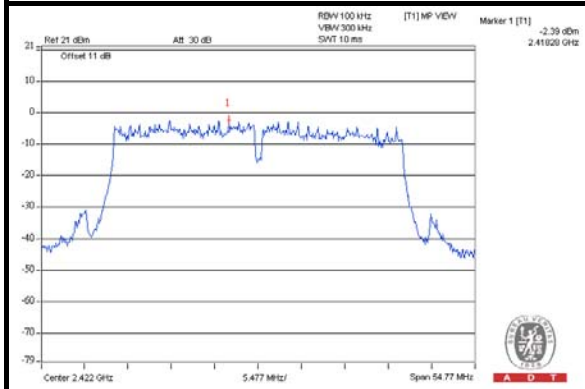


CH 9

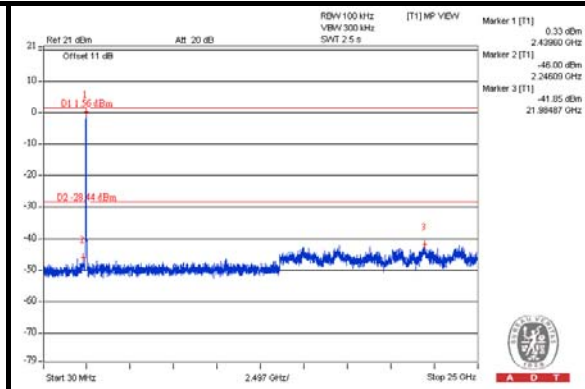
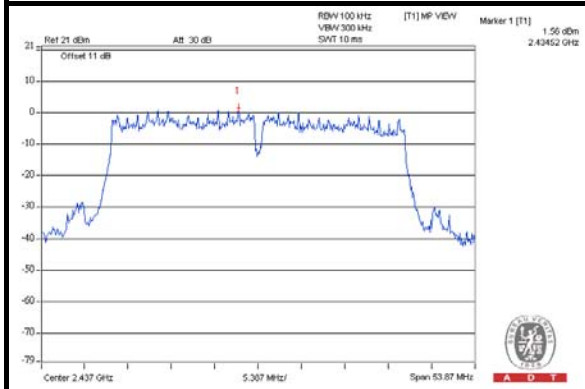


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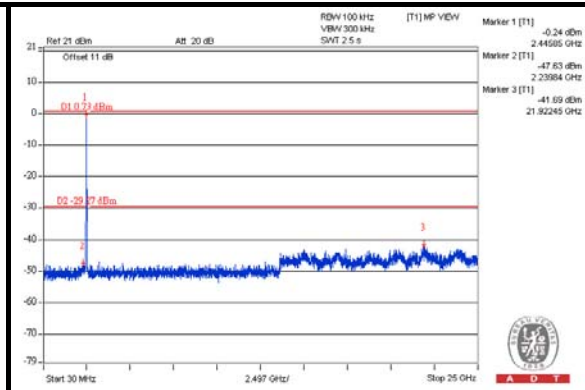
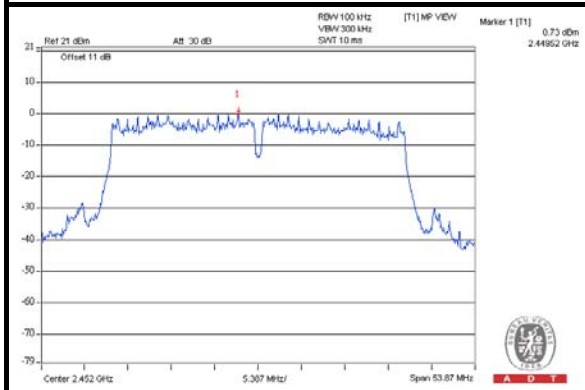
CH 3



CH 6



CH 9

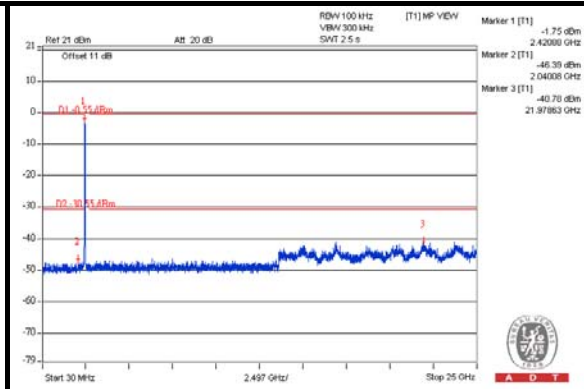
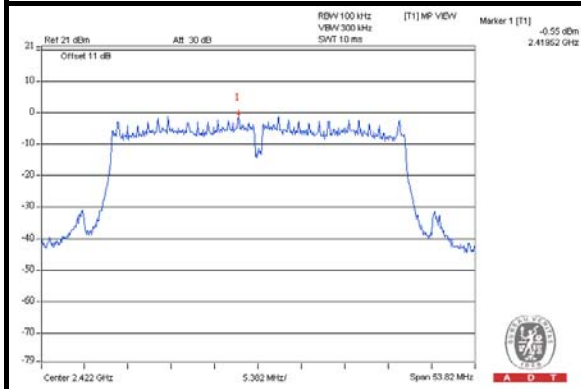




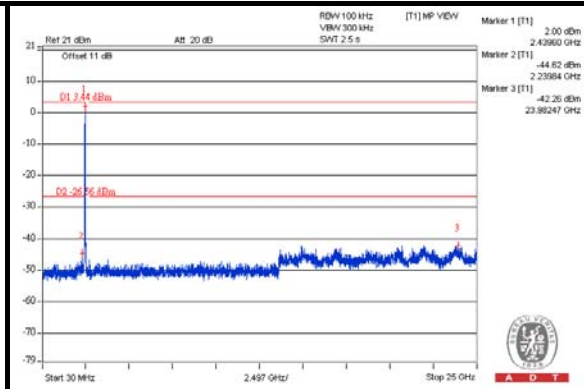
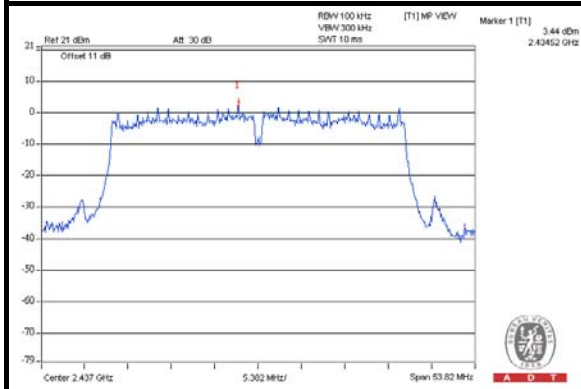
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CHAIN 2

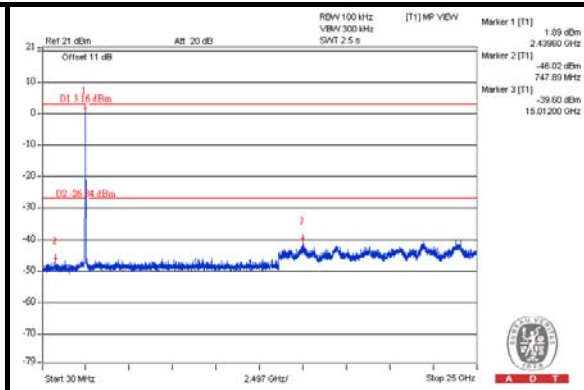
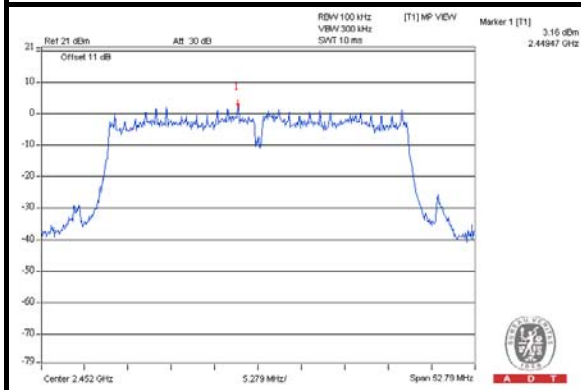
CH 3



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.



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5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

5.1.3 TEST PROCEDURES

Same as item 4.1.3.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP

Same as item 4.1.5.

5.1.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.



5.1.7 TEST RESULTS

ABOVE 1GHz DATA :

802.11a

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

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	85.5 PK	87.1	-1.6	1.24 H	111	46.80	38.70
2	#5725.00	74.9 AV	76.5	-1.6	1.24 H	111	36.20	38.70
3	*5745.00	117.1 PK			1.24 H	111	78.40	38.70
4	*5745.00	106.5 AV			1.24 H	111	67.80	38.70
5	11490.00	58.1 PK	74.0	-15.9	1.50 H	241	8.60	49.50
6	11490.00	44.6 AV	54.0	-9.4	1.50 H	241	-4.90	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	85.1 PK	86.7	-1.6	1.00 V	246	46.40	38.70
2	#5725.00	74.5 AV	76.1	-1.6	1.00 V	246	35.80	38.70
3	*5745.00	116.7 PK			1.00 V	246	78.00	38.70
4	*5745.00	106.1 AV			1.00 V	246	67.40	38.70
5	11490.00	58.2 PK	74.0	-15.8	1.32 V	169	8.70	49.50
6	11490.00	44.2 AV	54.0	-9.8	1.32 V	169	-5.30	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.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	117.2 PK			1.20 H	115	78.40	38.80
2	*5785.00	106.4 AV			1.20 H	115	67.60	38.80
3	11570.00	58.5 PK	74.0	-15.5	1.43 H	250	9.10	49.40
4	11570.00	44.2 AV	54.0	-9.8	1.43 H	250	-5.20	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	*5785.00	116.5 PK			1.00 V	253	77.70	38.80
2	*5785.00	106.3 AV			1.00 V	253	67.50	38.80
3	11570.00	58.3 PK	74.0	-15.7	1.27 V	175	8.90	49.40
4	11570.00	44.0 AV	54.0	-10.0	1.27 V	175	-5.40	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.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	117.1 PK			1.22 H	109	78.20	38.90
2	*5825.00	106.2 AV			1.22 H	109	67.30	38.90
3	#5850.00	85.3 PK	87.1	-1.8	1.22 H	109	46.40	38.90
4	#5850.00	74.4 AV	76.2	-1.8	1.22 H	109	35.50	38.90
5	11650.00	58.2 PK	74.0	-15.8	1.40 H	239	8.90	49.30
6	11650.00	44.4 AV	54.0	-9.6	1.40 H	239	-4.90	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	*5825.00	116.0 PK			1.00 V	260	77.10	38.90
2	*5825.00	105.1 AV			1.00 V	260	66.20	38.90
3	#5850.00	84.2 PK	86.0	-1.8	1.00 V	260	45.30	38.90
4	#5850.00	73.3 AV	75.1	-1.8	1.00 V	260	34.40	38.90
5	11650.00	58.1 PK	74.0	-15.9	1.24 V	180	8.80	49.30
6	11650.00	44.3 AV	54.0	-9.7	1.24 V	180	-5.00	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.



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802.11n (20MHz)

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

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	89.5 PK	91.0	-1.5	1.00 H	342	50.80	38.70
2	#5725.00	77.2 AV	78.7	-1.5	1.00 H	342	38.50	38.70
3	*5745.00	121.0 PK			1.00 H	342	82.30	38.70
4	*5745.00	108.7 AV			1.00 H	342	70.00	38.70
5	11490.00	59.7 PK	74.0	-14.3	1.21 H	72	10.20	49.50
6	11490.00	46.0 AV	54.0	-8.0	1.21 H	72	-3.50	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	88.2 PK	89.7	-1.5	1.00 V	256	49.50	38.70
2	#5725.00	76.2 AV	77.7	-1.5	1.00 V	256	37.50	38.70
3	*5745.00	119.7 PK			1.00 V	256	81.00	38.70
4	*5745.00	107.7 AV			1.00 V	256	69.00	38.70
5	11490.00	59.4 PK	74.0	-14.6	1.16 V	266	9.90	49.50
6	11490.00	45.7 AV	54.0	-8.3	1.16 V	266	-3.80	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.



A D T

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

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	122.8 PK			1.00 H	339	84.00	38.80
2	*5785.00	110.2 AV			1.00 H	339	71.40	38.80
3	11570.00	60.0 PK	74.0	-14.0	1.28 H	80	10.60	49.40
4	11570.00	46.2 AV	54.0	-7.8	1.28 H	80	-3.20	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	*5785.00	120.9 PK			1.00 V	260	82.10	38.80
2	*5785.00	108.5 AV			1.00 V	260	69.70	38.80
3	11570.00	59.9 PK	74.0	-14.1	1.23 V	270	10.50	49.40
4	11570.00	46.0 AV	54.0	-8.0	1.23 V	270	-3.40	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.



A D T

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

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	120.8 PK			1.00 H	328	81.90	38.90
2	*5825.00	108.2 AV			1.00 H	328	69.30	38.90
3	#5850.00	89.6 PK	90.8	-1.2	1.00 H	328	50.70	38.90
4	#5850.00	77.0 AV	78.2	-1.2	1.00 H	328	38.10	38.90
5	11650.00	59.5 PK	74.0	-14.5	1.24 H	73	10.20	49.30
6	11650.00	45.9 AV	54.0	-8.1	1.24 H	73	-3.40	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	*5825.00	119.7 PK			1.00 V	261	80.80	38.90
2	*5825.00	107.9 AV			1.00 V	261	69.00	38.90
3	#5850.00	88.5 PK	89.7	-1.2	1.00 V	261	49.60	38.90
4	#5850.00	76.7 AV	77.9	-1.2	1.00 V	261	37.80	38.90
5	11650.00	59.5 PK	74.0	-14.5	1.09 V	260	10.20	49.30
6	11650.00	45.9 AV	54.0	-8.1	1.09 V	260	-3.40	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.



A D T

802.11n (40MHz)

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

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	83.7 PK	85.2	-1.5	1.12 H	221	45.00	38.70
2	#5725.00	72.7 AV	74.2	-1.5	1.12 H	221	34.00	38.70
3	*5755.00	115.2 PK			1.15 H	228	76.50	38.70
4	*5755.00	104.2 AV			1.15 H	228	65.50	38.70
5	11510.00	56.8 PK	74.0	-17.2	1.39 H	304	7.30	49.50
6	11510.00	46.7 AV	54.0	-7.3	1.39 H	304	-2.80	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	81.8 PK	83.2	-1.4	1.08 V	252	43.10	38.70
2	#5725.00	71.0 AV	72.4	-1.4	1.08 V	252	32.30	38.70
3	*5755.00	113.2 PK			1.09 V	249	74.50	38.70
4	*5755.00	102.4 AV			1.09 V	249	63.70	38.70
5	11510.00	57.2 PK	74.0	-16.8	1.09 V	34	7.70	49.50
6	11510.00	44.8 AV	54.0	-9.2	1.09 V	34	-4.70	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.



A D T

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

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	117.5 PK			1.12 H	235	78.70	38.80
2	*5795.00	106.8 AV			1.12 H	235	68.00	38.80
3	#5850.00	83.5 PK	87.5	-4.0	1.13 H	220	44.60	38.90
4	#5850.00	72.8 AV	76.8	-4.0	1.13 H	220	33.90	38.90
5	11590.00	56.8 PK	74.0	-17.2	1.48 H	304	7.40	49.40
6	11590.00	46.8 AV	54.0	-7.2	1.48 H	304	-2.60	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	115.9 PK			1.03 V	93	77.10	38.80
2	*5795.00	104.5 AV			1.03 V	93	65.70	38.80
3	#5850.00	83.1 PK	85.9	-2.8	1.04 V	98	44.20	38.90
4	#5850.00	71.7 AV	74.5	-2.8	1.04 V	98	32.80	38.90
5	11590.00	58.5 PK	74.0	-15.5	1.12 V	62	9.10	49.40
6	11590.00	45.2 AV	54.0	-8.8	1.12 V	62	-4.20	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.



A D T

802.11ac (80MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 155	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Tung

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	5133.00	55.6 PK	74.0	-18.4	1.16 H	247	17.90	37.70
2	5133.00	52.8 AV	54.0	-1.2	1.16 H	247	15.10	37.70
3	#5725.00	81.8 PK	83.8	-2.0	1.00 H	206	43.10	38.70
4	#5725.00	71.9 AV	73.9	-2.0	1.00 H	206	33.20	38.70
5	*5775.00	113.8 PK			1.00 H	206	75.00	38.80
6	*5775.00	103.9 AV			1.00 H	206	65.10	38.80
7	#5850.00	78.8 PK	83.8	-5.0	1.00 H	206	39.90	38.90
8	#5850.00	68.9 AV	73.9	-5.0	1.00 H	206	30.00	38.90
9	11550.00	58.7 PK	74.0	-15.3	1.20 H	128	9.20	49.50
10	11550.00	45.8 AV	54.0	-8.2	1.20 H	128	-3.70	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	5133.00	53.5 PK	74.0	-20.5	1.21 V	116	15.80	37.70
2	5133.00	49.4 AV	54.0	-4.6	1.21 V	116	11.70	37.70
3	#5725.00	82.3 PK	83.3	-1.0	1.38 V	262	43.60	38.70
4	#5725.00	71.8 AV	72.8	-1.0	1.38 V	262	33.10	38.70
5	*5775.00	113.3 PK			1.38 V	253	74.50	38.80
6	*5775.00	102.8 AV			1.38 V	253	64.00	38.80
7	#5850.00	81.3 PK	83.3	-2.0	1.38 V	262	42.40	38.90
8	#5850.00	70.8 AV	72.8	-2.0	1.38 V	262	31.90	38.90
9	11550.00	57.3 PK	74.0	-16.7	1.25 V	112	7.80	49.50
10	11550.00	45.0 AV	54.0	-9.0	1.25 V	112	-4.50	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.



A D T

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Brad Tung

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	195.16	35.0 QP	43.5	-8.5	1.50 H	104	23.50	11.50
2	214.61	34.9 QP	43.5	-8.6	2.00 H	99	23.20	11.70
3	249.60	40.3 QP	46.0	-5.7	1.00 H	66	27.10	13.20
4	269.05	41.0 QP	46.0	-5.0	1.00 H	209	27.10	13.90
5	374.04	32.0 QP	46.0	-14.0	2.00 H	121	15.10	16.90
6	624.85	38.3 QP	46.0	-7.7	1.00 H	295	15.50	22.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	31.84	34.4 QP	40.0	-5.6	1.00 V	127	22.00	12.40
2	99.89	38.8 QP	43.5	-4.7	1.25 V	204	29.60	9.20
3	222.38	30.4 QP	46.0	-15.6	1.00 V	100	18.40	12.00
4	269.05	38.1 QP	46.0	-7.9	2.00 V	182	24.20	13.90
5	432.37	33.0 QP	46.0	-13.0	2.00 V	250	14.60	18.40
6	599.58	35.6 QP	46.0	-10.4	1.00 V	347	13.10	22.50

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

5.2.2 TEST INSTRUMENTS

Same as item 4.2.2.

5.2.3 TEST PROCEDURES

Same as item 4.2.3.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

5.2.5 TEST SETUP

Same as item 4.2.5.

5.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

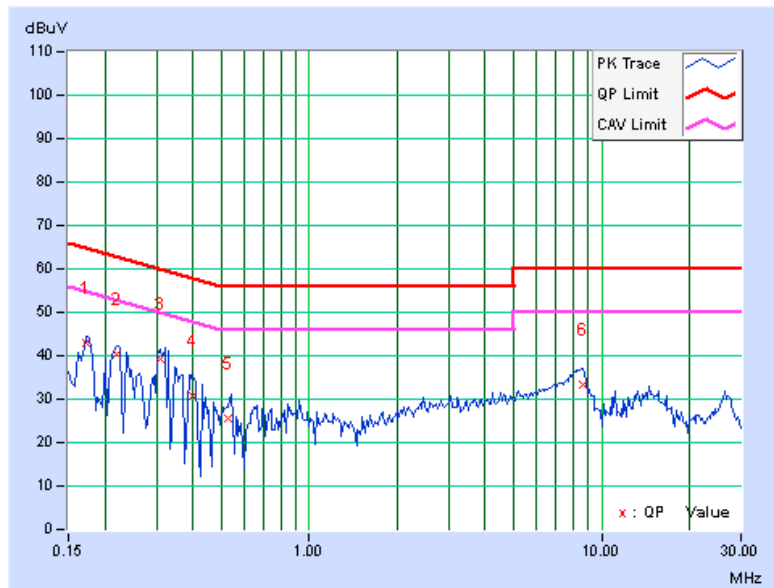
5.2.7 TEST RESULTS

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

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	0.12	42.87	39.82	42.99	39.94	64.79	54.79	-21.80	-14.85
2	0.22031	0.12	40.23	37.49	40.35	37.61	62.81	52.81	-22.45	-15.19
3	0.31016	0.14	39.08	35.70	39.22	35.84	59.97	49.97	-20.75	-14.13
4	0.40000	0.15	30.74	23.83	30.89	23.98	57.85	47.85	-26.96	-23.87
5	0.52794	0.16	25.39	21.72	25.55	21.88	56.00	46.00	-30.45	-24.12
6	8.63672	0.58	32.66	27.07	33.24	27.65	60.00	50.00	-26.76	-22.35

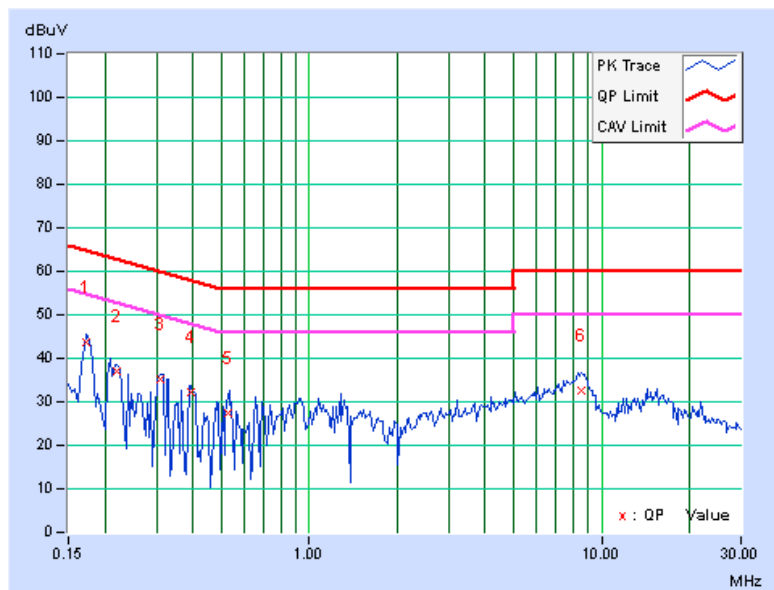
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. The emission levels of other frequencies were very low against the limit.
 3. Margin value = Emission level - Limit value
 4. Correction factor = Insertion loss + Cable loss
 5. Emission Level = Correction Factor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



PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	0.17	43.71	39.46	43.88	39.63	64.79	54.79	-20.91	-15.16
2	0.22031	0.17	36.74	33.44	36.91	33.61	62.81	52.81	-25.89	-19.19
3	0.30907	0.19	34.87	33.42	35.06	33.61	60.00	50.00	-24.93	-16.38
4	0.39219	0.21	32.05	31.71	32.26	31.92	58.02	48.02	-25.76	-16.10
5	0.52645	0.22	27.19	25.56	27.41	25.78	56.00	46.00	-28.59	-20.22
6	8.53906	0.54	31.93	25.61	32.47	26.15	60.00	50.00	-27.53	-23.85

- 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.





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5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

5.3.2 TEST SETUP

Same as item 4.3.2.

5.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.3.4 TEST PROCEDURE

Same as item 4.3.4.

5.3.5 DEVIATION FROM TEST STANDARD

No deviation.

5.3.6 EUT OPERATING CONDITIONS

Same as item 4.3.6.



5.3.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.43	0.5	PASS
157	5785	16.42	0.5	PASS
165	5825	16.40	0.5	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.34	16.42	17.68	0.5	PASS
157	5785	17.35	16.39	17.29	0.5	PASS
165	5825	17.61	16.38	17.62	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	36.44	36.41	36.44	0.5	PASS
159	5795	36.46	36.48	36.42	0.5	PASS

802.11ac (80MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
155	5775	75.78	75.83	76.18	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)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT \leq 4;

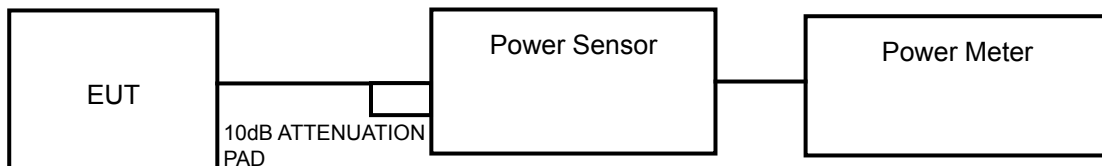
Array Gain = 0 dB (i.e., no array gain) for channel widths \geq 40 MHz for any NANT;

Array Gain = $5 \log(\text{NANT}/\text{NSS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with NANT \geq 5.

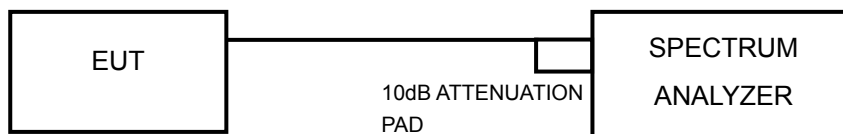
For power measurements on all other devices: Array Gain = $10 \log(\text{NANT}/\text{NSS})$ dB.

5.4.2 TEST SETUP

For 802.11a, 802.11n (20MHz), 802.11n (40MHz)



For 802.11ac (80MHz)



5.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.



5.4.4 TEST PROCEDURES

For 802.11a, 802.11n (20MHz), 802.11n (40MHz)

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

For 802.11ac (80MHz)

Method SA-1

- 1) Set the analyzer span to a minimum of 1.5 times the EBW.
- 2) Set the RBW = 1 MHz.
- 3) Set the VBW = 3 MHz.
- 4) Number of measurement points in the sweep. $2 \times (\text{span}/\text{RBW})$.
- 5) Sweep time = auto couple.
- 6) Detector = power averaging (RMS) or sample.
- 7) Employ trace averaging in power averaging (RMS) mode over a minimum of 100 traces.
- 8) Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges.

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)	Average Power (mW)	Average Power (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	282.488	24.51	30	PASS
157	5785	269.774	24.31	30	PASS
165	5825	267.301	24.27	30	PASS

802.11n (20MHz)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Average Power (mW)	Total Average Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
149	5745	23.66	23.75	23.80	709.294	28.51	30	PASS
157	5785	23.71	23.74	23.88	715.898	28.55	30	PASS
165	5825	23.74	23.70	23.83	712.561	28.53	30	PASS

802.11n (40MHz)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Average Power (mW)	Total Average Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
151	5755	21.14	20.01	22.28	399.292	26.01	30	PASS
159	5795	23.21	23.42	23.97	678.656	28.32	30	PASS

802.11ac (80MHz)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Average Power (mW)	Total Average Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
155	5775	17.11	16.58	17.43	152.238	21.83	30	PASS



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5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST SETUP

Same as item 4.5.2.

5.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.5.4 TEST PROCEDURE.

Same as item 4.5.4.

5.5.5 DEVIATION FROM TEST STANDARD

No deviation.

5.5.6 EUT OPERATING CONDITION

Same as item 4.3.6.



5.5.7 TEST RESULTS

802.11a

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-2.70	8	PASS
157	5785	-2.66	8	PASS
165	5825	-2.37	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	149	5745	-2.91	4.77	1.86	5.73	PASS
	157	5785	-0.74	4.77	4.03	5.73	PASS
	165	5825	-2.99	4.77	1.78	5.73	PASS
1	149	5745	-2.11	4.77	2.66	5.73	PASS
	157	5785	-1.23	4.77	3.54	5.73	PASS
	165	5825	-3.01	4.77	1.76	5.73	PASS
2	149	5745	0.05	4.77	4.82	5.73	PASS
	157	5785	-1.08	4.77	3.69	5.73	PASS
	165	5825	-2.74	4.77	2.03	5.73	PASS

NOTE: Directional gain = 3.5dBi + 10log(3) = 8.27dBi > 6dBi , so the power density limit shall be reduced to 8-(8.27-6) = 5.73dBm.

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	-8.13	4.77	-3.36	5.73	PASS
	159	5795	-5.74	4.77	-0.97	5.73	PASS
1	151	5755	-6.61	4.77	-1.84	5.73	PASS
	159	5795	-5.84	4.77	-1.07	5.73	PASS
2	151	5755	-7.62	4.77	-2.85	5.73	PASS
	159	5795	-4.80	4.77	-0.03	5.73	PASS

NOTE: Directional gain = 3.5dBi + 10log(3) = 8.27dBi > 6dBi , so the power density limit shall be reduced to 8-(8.27-6) = 5.73dBm.

802.11ac (80MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	155	5775	-13.67	4.77	-8.90	5.73	PASS
1	155	5775	-13.10	4.77	-8.33	5.73	PASS
2	155	5775	-12.62	4.77	-7.85	5.73	PASS

NOTE: Directional gain = 3.5dBi + 10log(3) = 8.27dBi > 6dBi , so the power density limit shall be reduced to 8-(8.27-6) = 5.73dBm.



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5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

5.6.2 TEST SETUP

Same as Item 4.6.2

5.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.6.4 TEST PROCEDURE

Same as Item 4.6.4

5.6.5 DEVIATION FROM TEST STANDARD

No deviation.

5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

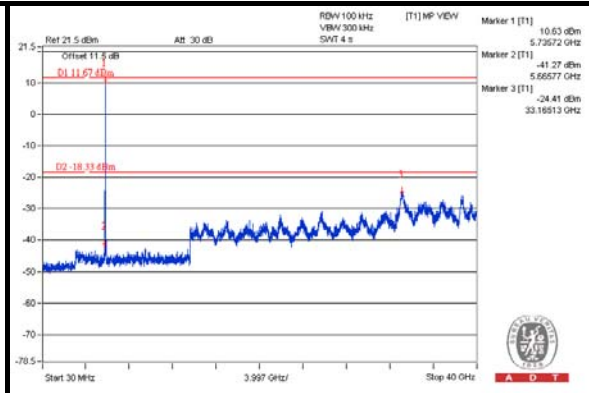
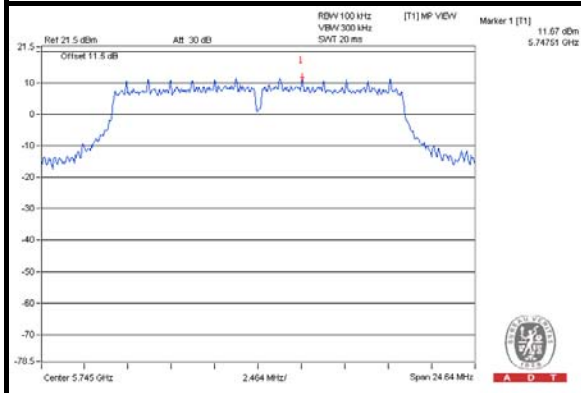
5.6.7 TEST RESULTS

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

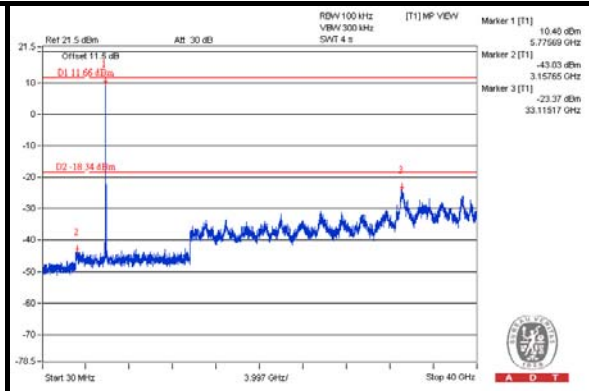
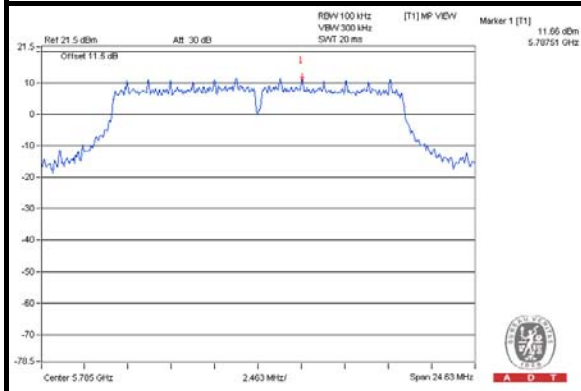
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11a

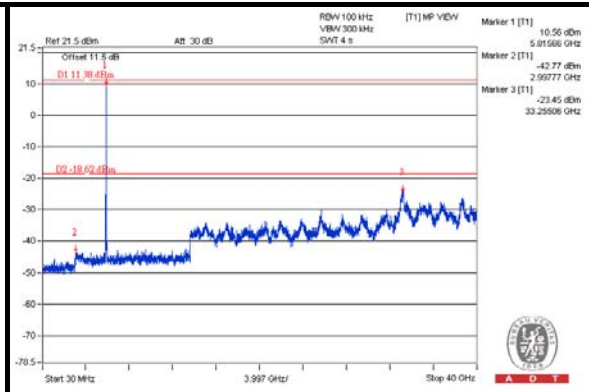
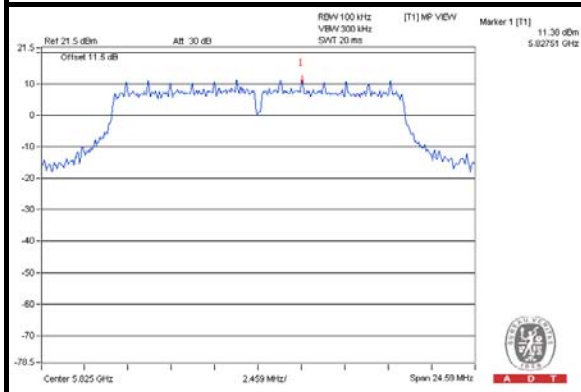
CH 149



CH 157



CH 165



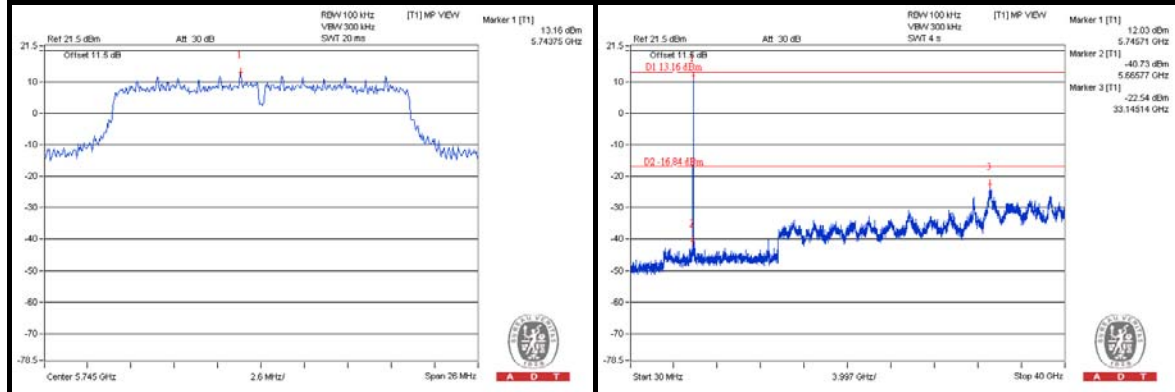


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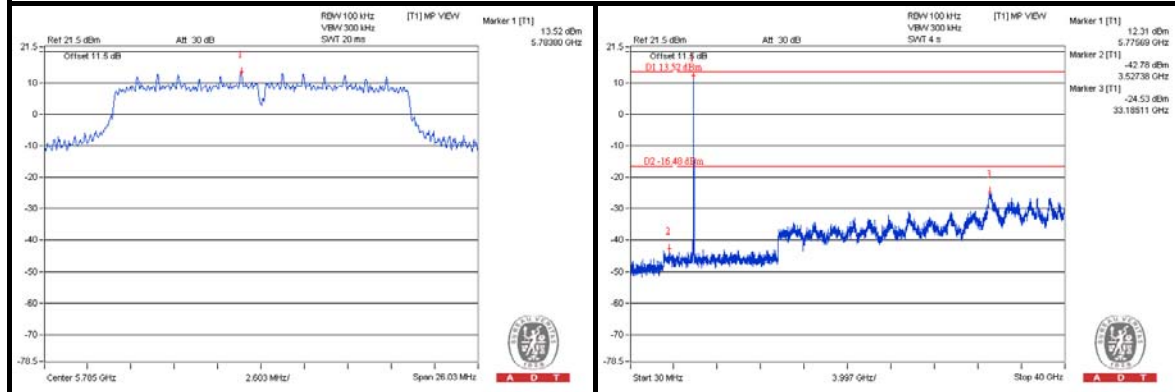
802.11n (20MHz)

CHAIN 0

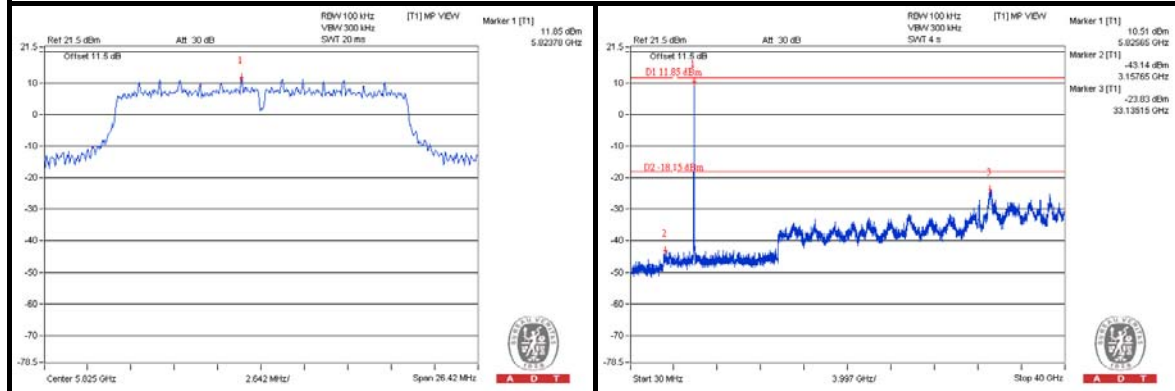
CH 149



CH 157

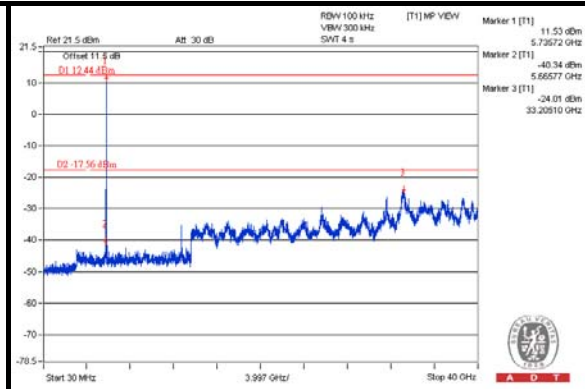
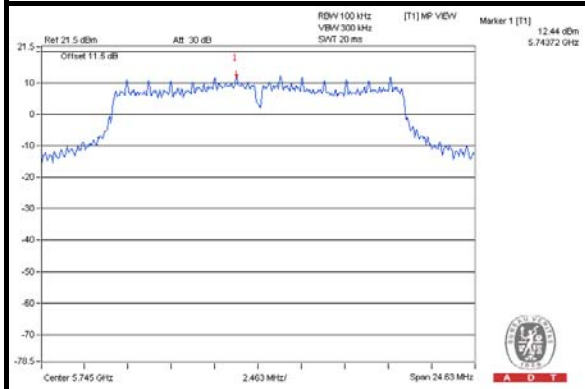


CH 165

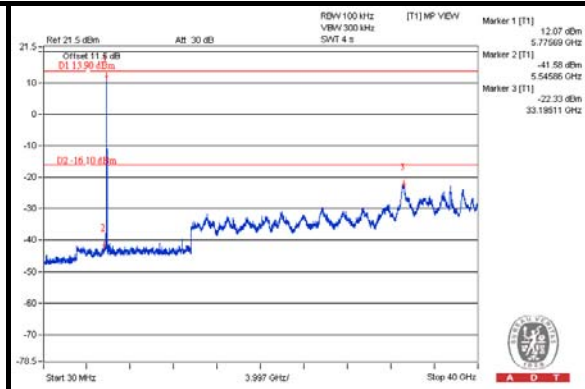
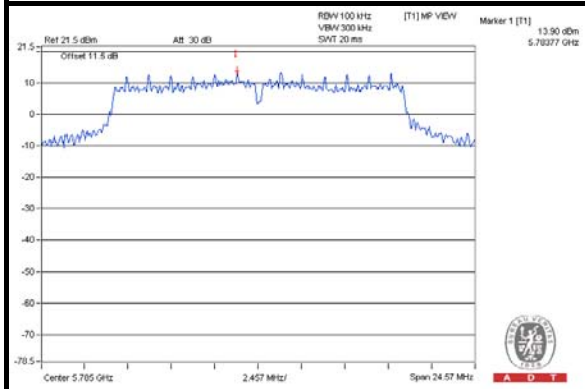


CHAIN 1

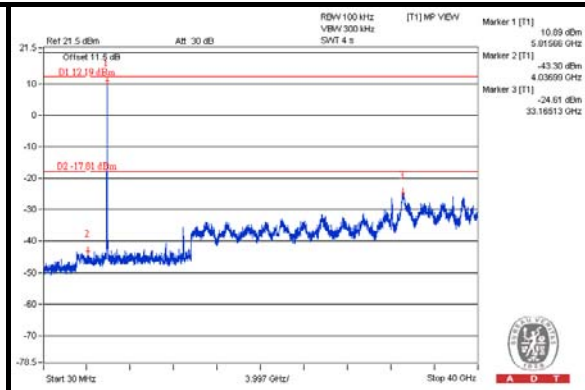
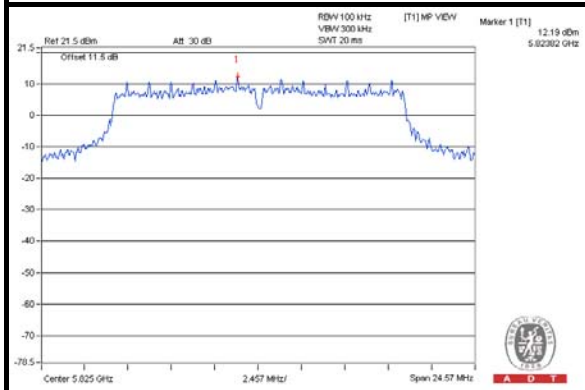
CH 149



CH 157

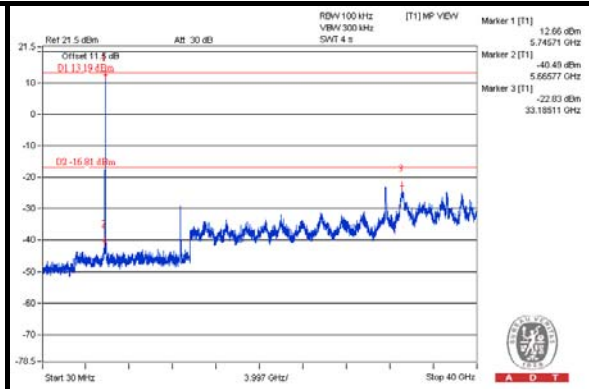
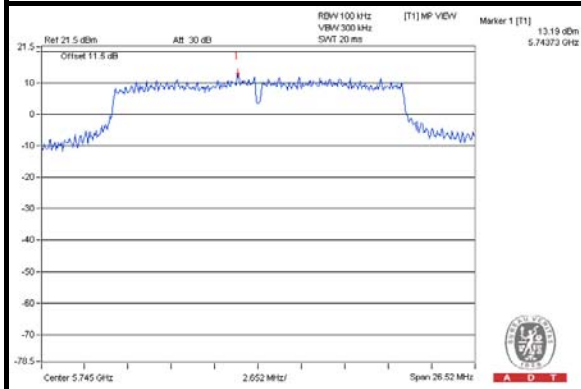


CH 165

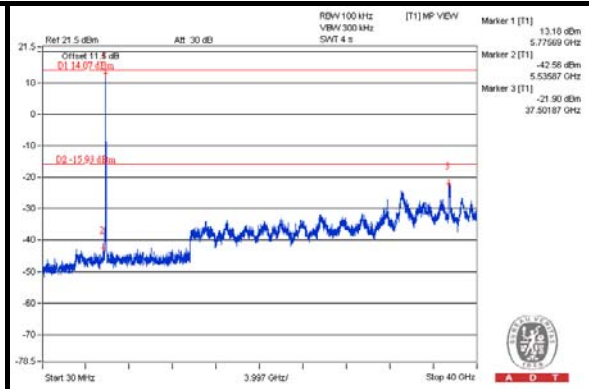
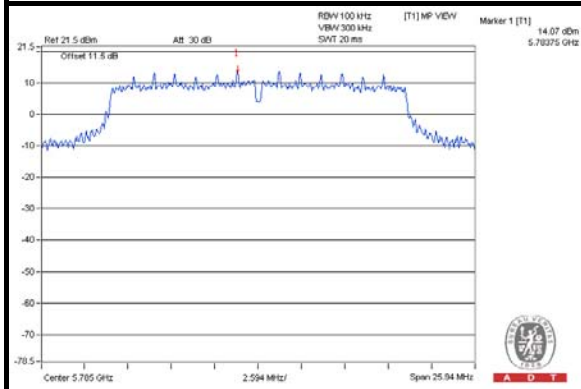


CHAIN 2

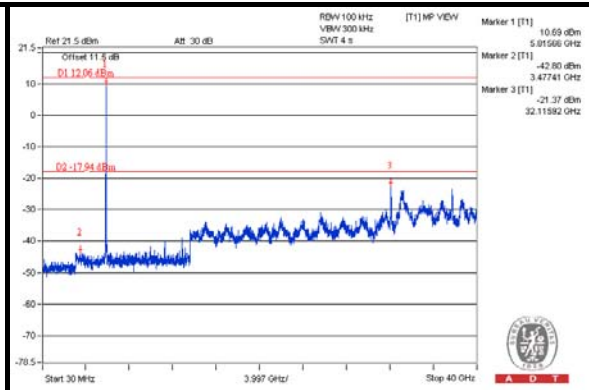
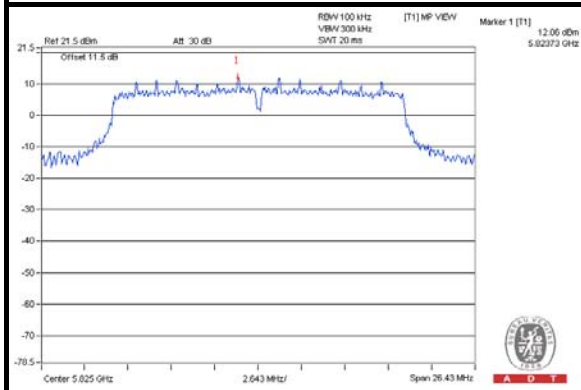
CH 149



CH 157



CH 165



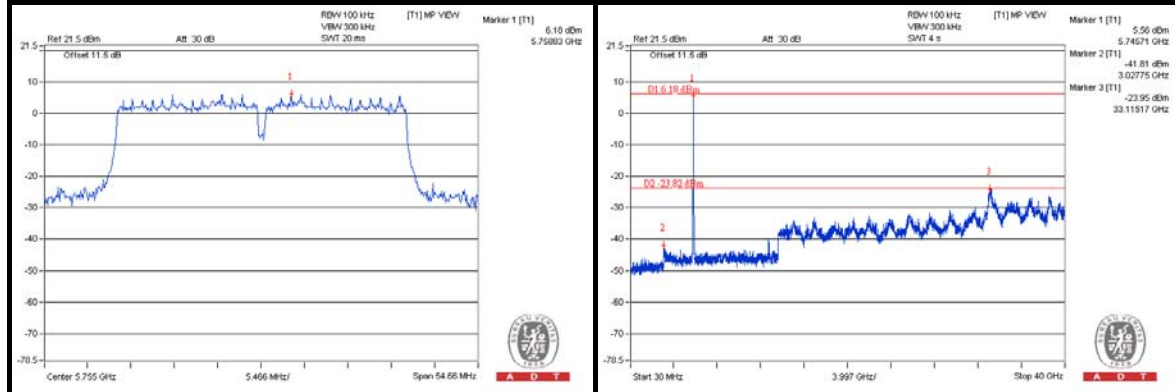


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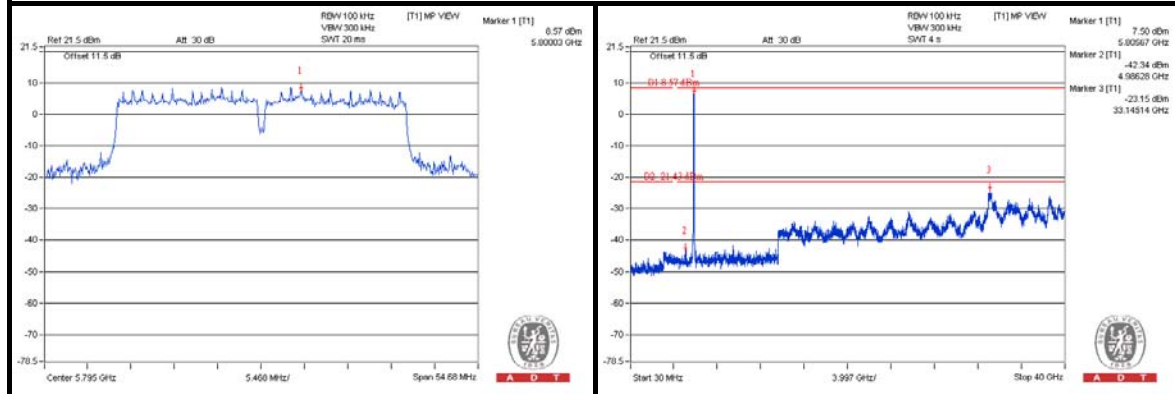
802.11n (40MHz)

CHAIN 0

CH 151



CH 159

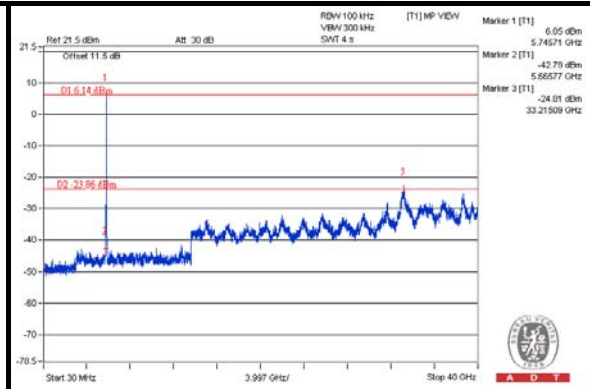
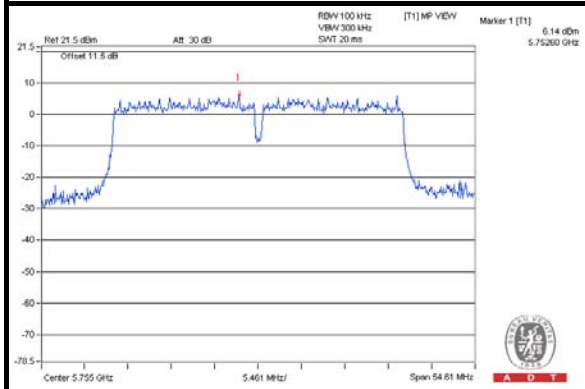




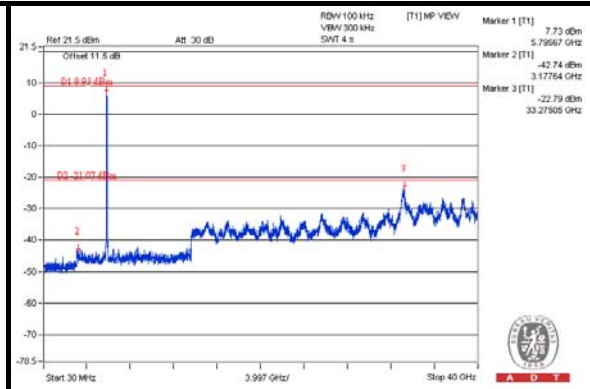
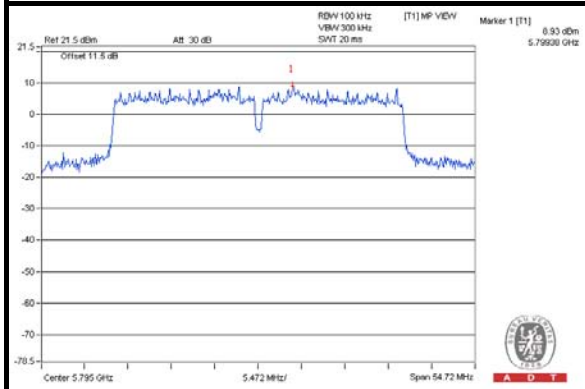
A D T

CHAIN 1

CH 151

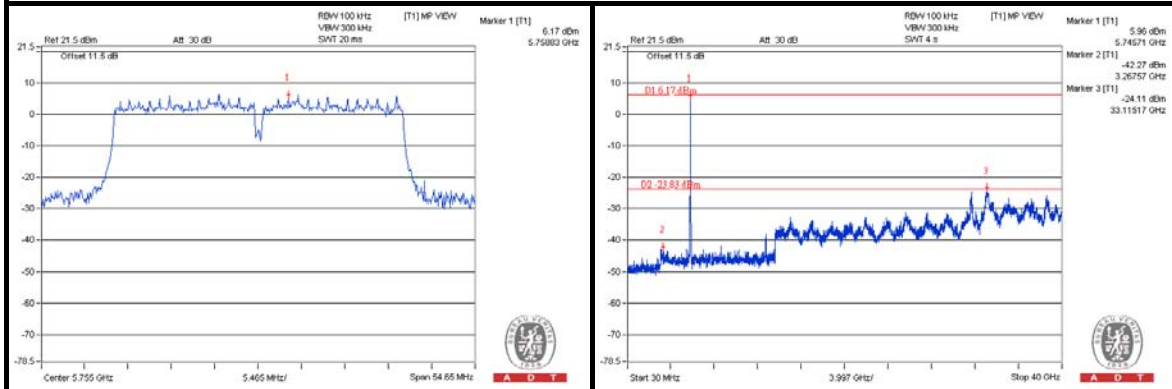


CH 159

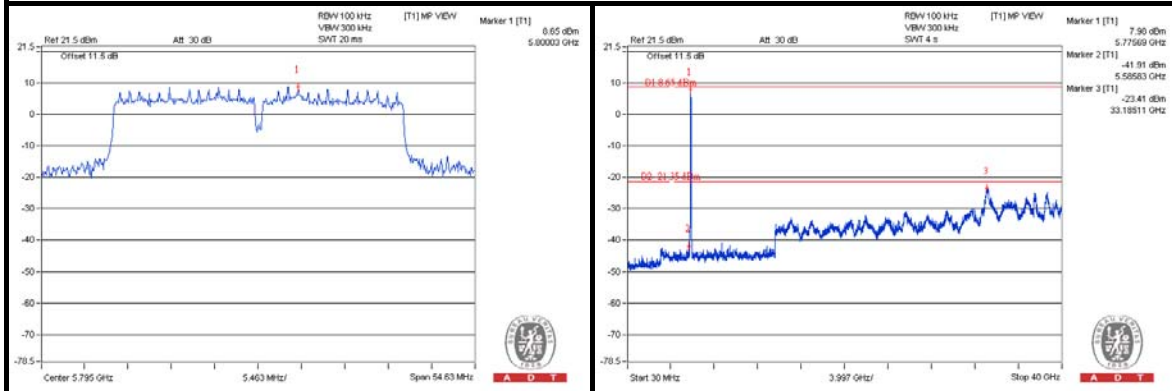


CHAIN 2

CH 151



CH 159



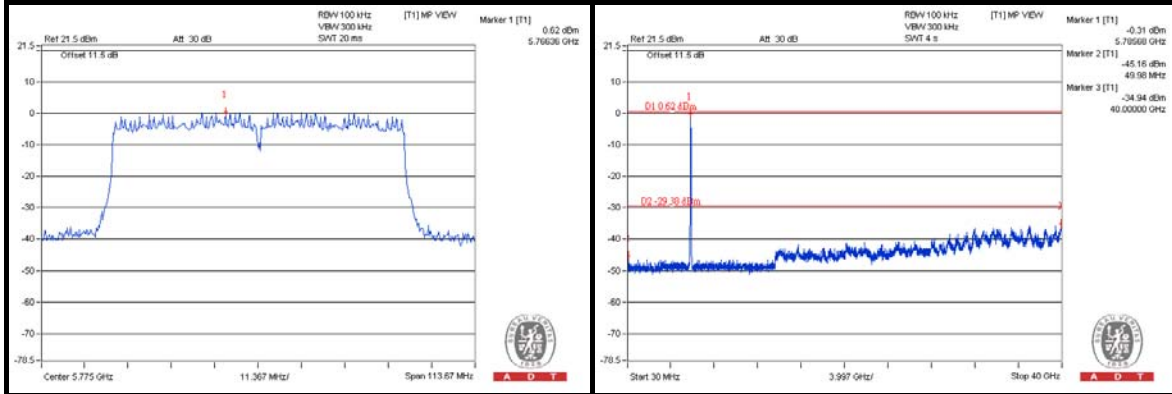


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802.11ac (80MHz)

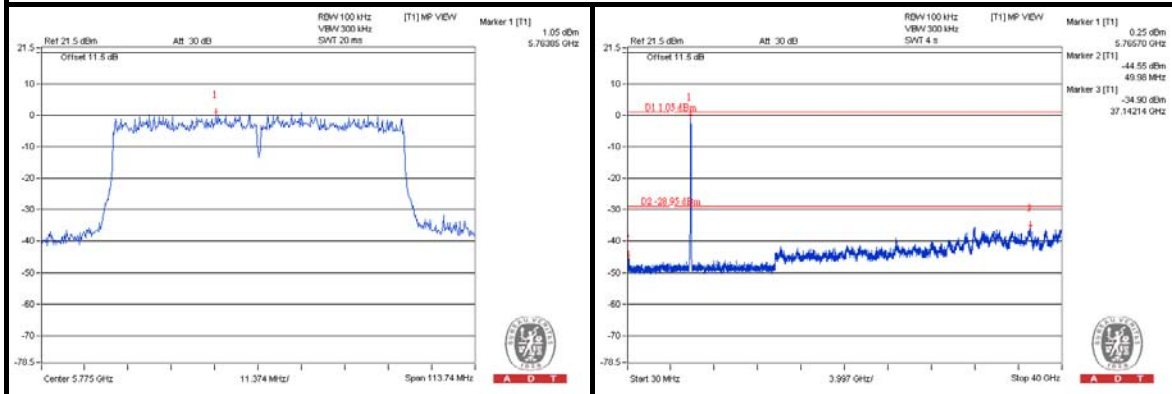
CHAIN 0

CH 155



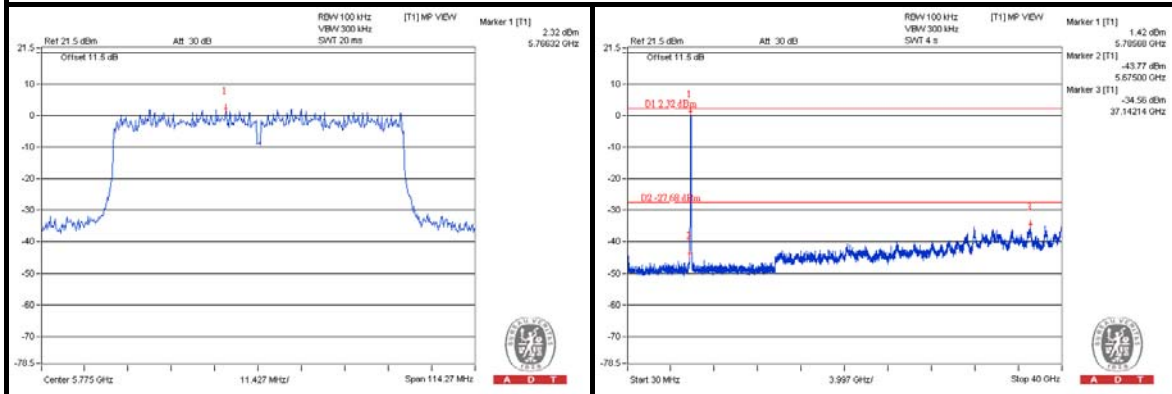
CHAIN 1

CH 155



CHAIN 2

CH 155





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6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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7. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26051924

Hsin Chu EMC/RF Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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



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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---