

FCC TEST REPORT (15.247)

REPORT NO.: RF111207C05A

MODEL NO.: EIR900

FCC ID: A8JEIR900

RECEIVED: Nov. 03, 2011

TESTED: Nov. 03 ~ Dec. 08, 2011

ISSUED: Jun. 18, 2012

APPLICANT: EnGenius Technologies

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TABLE OF CONTENTS

RELEASE CONTROL RECORD	5
1. CERTIFICATION	6
2. SUMMARY OF TEST RESULTS	7
2.1 MEASUREMENT UNCERTAINTY	7
3. GENERAL INFORMATION	8
3.1 GENERAL DESCRIPTION OF EUT	8
3.2 DESCRIPTION OF TEST MODES	10
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST	11
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	12
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS	16
3.4 DESCRIPTION OF SUPPORT UNITS	16
4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND)	17
4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT	17
4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT	17
4.1.2 TEST INSTRUMENTS	18
4.1.3 TEST PROCEDURES	19
4.1.4 DEVIATION FROM TEST STANDARD	19
4.1.5 TEST SETUP	20
4.1.6 EUT OPERATING CONDITIONS	20
4.1.7 TEST RESULTS	21
4.2 CONDUCTED EMISSION MEASUREMENT	34
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	34
4.2.2 TEST INSTRUMENTS	34
4.2.3 TEST PROCEDURES	35
4.2.4 DEVIATION FROM TEST STANDARD	35
4.2.5 TEST SETUP	36
4.2.6 EUT OPERATING CONDITIONS	36
4.2.7 TEST RESULTS	37
4.3 6dB BANDWIDTH MEASUREMENT	39
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT	39
4.3.2 TEST SETUP	39
4.3.3 TEST INSTRUMENTS	39
4.3.4 TEST PROCEDURE	39
4.3.5 DEVIATION FROM TEST STANDARD	39
4.3.6 EUT OPERATING CONDITIONS	39
4.3.7 TEST RESULTS	40
4.4 CONDUCTED OUTPUT POWER	41
4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT	41
4.4.2 TEST SETUP	41
4.4.3 TEST INSTRUMENTS	41
4.4.4 TEST PROCEDURES	41
4.4.5 DEVIATION FROM TEST STANDARD	41
4.4.6 EUT OPERATING CONDITIONS	41
4.4.7 TEST RESULTS	42
4.5 POWER SPECTRAL DENSITY MEASUREMENT	43
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	43
4.5.2 TEST SETUP	43
4.5.3 TEST INSTRUMENTS	43
4.5.4 TEST PROCEDURE	43



4.5.5	DEVIATION FROM TEST STANDARD	43
4.5.6	EUT OPERATING CONDITION	43
4.5.7	TEST RESULTS	44
4.6	CONDUCTED EMISSION MEASUREMENT	46
4.6.1	LIMITS OF BAND EDGES MEASUREMENT	46
4.6.2	TEST SETUP	46
4.6.3	TEST INSTRUMENTS	46
4.6.4	TEST PROCEDURE	46
4.6.5	DEVIATION FROM TEST STANDARD	47
4.6.6	EUT OPERATING CONDITION	47
4.6.7	TEST RESULTS	47
4.6.8	TEST RESULTS	48
5.	TEST TYPES AND RESULTS (FOR 5.0GHz BAND)	52
5.1	RADIATED EMISSION MEASUREMENT	52
5.1.1	LIMITS OF RADIATED EMISSION MEASUREMENT	52
5.1.2	TEST INSTRUMENTS	53
5.1.3	TEST PROCEDURES	54
5.1.4	DEVIATION FROM TEST STANDARD	54
5.1.5	TEST SETUP	55
5.1.6	EUT OPERATING CONDITIONS	55
5.1.7	TEST RESULTS	56
5.2	CONDUCTED EMISSION MEASUREMENT	71
5.2.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	71
5.2.2	TEST INSTRUMENTS	71
5.2.3	TEST PROCEDURES	72
5.2.4	DEVIATION FROM TEST STANDARD	72
5.2.5	TEST SETUP	73
5.2.6	EUT OPERATING CONDITIONS	73
5.2.7	TEST RESULTS	74
5.3	6dB BANDWIDTH MEASUREMENT	76
5.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	76
5.3.2	TEST SETUP	76
5.3.3	TEST INSTRUMENTS	76
5.3.4	TEST PROCEDURE	76
5.3.5	DEVIATION FROM TEST STANDARD	76
5.3.6	EUT OPERATING CONDITIONS	76
5.3.7	TEST RESULTS	77
5.4	CONDUCTED OUTPUT POWER	78
5.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT	78
5.4.2	TEST SETUP	78
5.4.3	INSTRUMENTS	78
5.4.4	TEST PROCEDURES	78
5.4.5	DEVIATION FROM TEST STANDARD	78
5.4.6	EUT OPERATING CONDITIONS	78
5.4.7	TEST RESULTS	79
5.5	POWER SPECTRAL DENSITY MEASUREMENT	80
5.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	80
5.5.2	TEST SETUP	80
5.5.3	TEST INSTRUMENTS	80
5.5.4	TEST PROCEDURE	80
5.5.5	DEVIATION FROM TEST STANDARD	80
5.5.6	EUT OPERATING CONDITION	80
5.5.7	TEST RESULTS	81



A D T

5.6	CONDUCTED EMISSION MEASUREMENT	83
5.6.1	LIMITS OF BAND EDGES MEASUREMENT	83
5.6.2	TEST SETUP	83
5.6.3	TEST INSTRUMENTS	83
5.6.4	TEST PROCEDURE	83
5.6.5	DEVIATION FROM TEST STANDARD	84
5.6.6	EUT OPERATING CONDITION	84
5.6.7	TEST RESULTS	84
6.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	88
7.	INFORMATION ON THE TESTING LABORATORIES	89
8.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	90



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF111207C05A	Original release	Jun. 18, 2012



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1. CERTIFICATION

PRODUCT: Dual Band 3T3R Router

MODEL: EIR900

BRAND: EnGenius

APPLICANT: EnGenius Technologies

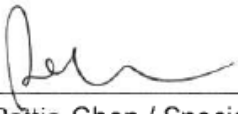
TESTED: Nov. 03 ~ Dec. 08, 2011

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10-2009

The above equipment (Model: EIR900) 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 :  , **DATE :** Jun. 18, 2012
Pettie Chen / Specialist

APPROVED BY :  , **DATE :** Jun. 18, 2012
Gary Chang / Technical Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.89dB at 0.150MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.5dB at 4920.00MHz.
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 I-PEX not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Dual Band 3T3R Router
MODEL NO.	EIR900
POWER SUPPLY	12Vdc (Adapter)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps
OPERATING FREQUENCY	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5825MHz
NUMBER OF CHANNEL	2.4GHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) 5.0GHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	636.5mW for 2412 ~ 2462MHz 566.8mW for 5745 ~ 5825MHz
ANTENNA TYPE	2.4GHz: PCB Dipole antenna with 3.1dBi gain 5.0GHz: PCB Dipole antenna with 2.0dBi gain
ANTENNA CONNECTOR	I-PEX
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

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

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

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

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

3. The EUT was powered by the following adapter:

BRAND:	Powertron
MODEL:	PA1045-120HUB
INPUT:	100-240Vac, 50-60Hz, 1.0A
OUTPUT:	12Vdc, 3.3A
POWER LINE:	1.5m non-shielded cable without core

4. Due Tx have been evaluated and product continue compliance with the relevant rules.
5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

FOR 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		

FOR 5.0GHz (5745 ~ 5825MHz):

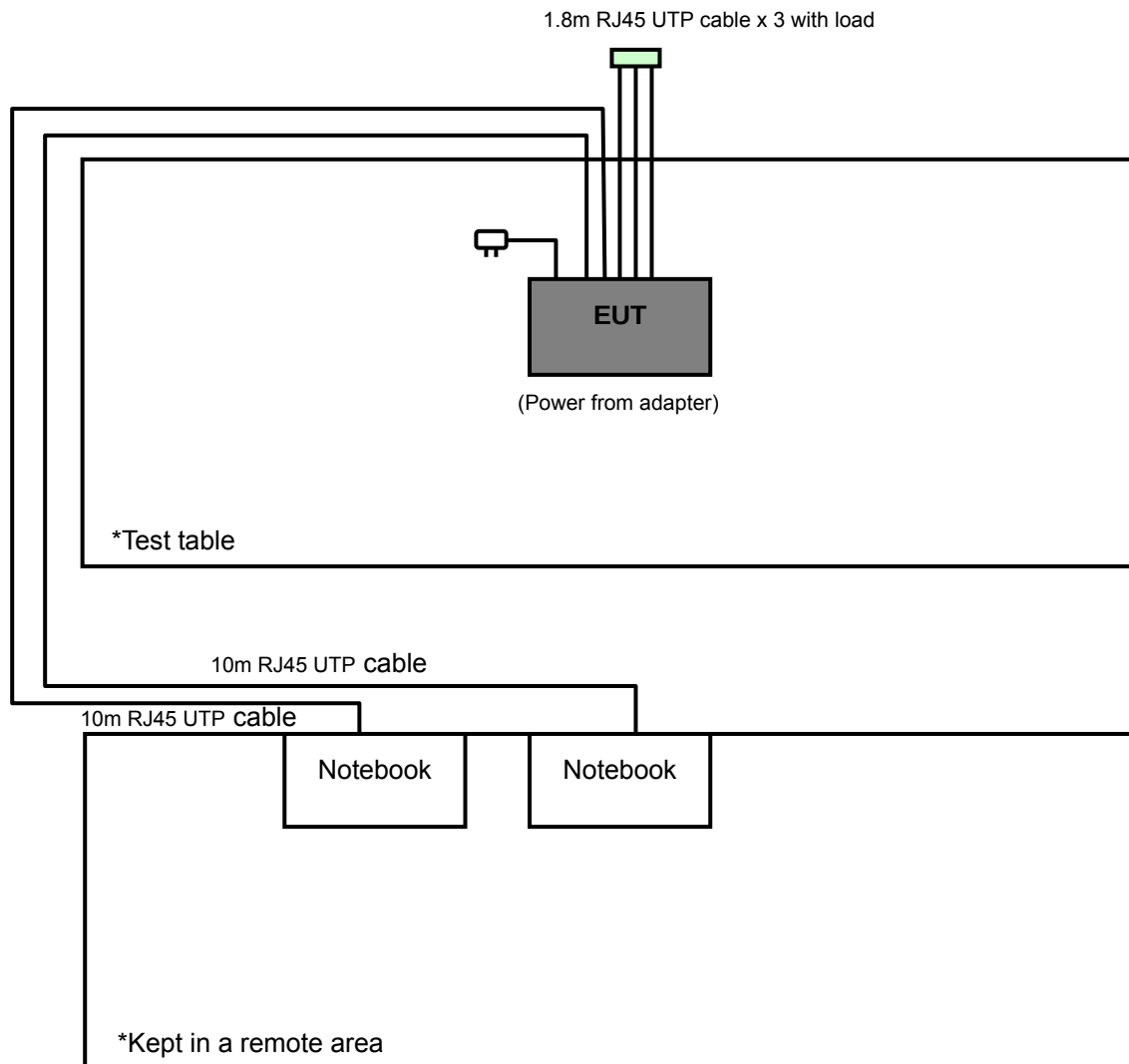
5 channels are provided for 802.11a, 802.11n (20MHz):

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

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

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0

RADIATED EMISSION TEST (BELOW 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (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.

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.

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)	1 to 7	1, 7	OFDM	BPSK	15.0

ANTENNA PORT CONDUCTED MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 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)	1 to 7	1, 4, 7	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	David Huang
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Anderson Hong
APCM	25deg. C, 65%RH	120Vac, 60Hz	David Huang

FOR 5.745 ~ 5.825GHz:

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

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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

RADIATED EMISSION TEST (BELOW 1GHz):

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

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

POWER LINE CONDUCTED EMISSION TEST:

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

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

BANDEDGE MEASUREMENT:

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

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

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	David Huang
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Anderson Hong
APCM	25deg. C, 65%RH	120Vac, 60Hz	David Huang



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v01

ANSI C63.10-2009

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	D531	CN-0XM006-48643-8 1U-2973	QDS-BRCM1020
2	NOTEBOOK	DELL	Latitude E5520	NA	FCC DoC Approved

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

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

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, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). 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. As shown in 15.35(b), 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. 02, 2011	Aug. 01, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP 40	100041	Jul. 21, 2011	Jul. 20, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 13, 2011	Apr. 12, 2012
HORN Antenna SCHWARZBECK	9120D	209	Aug. 25, 2011	Aug. 24, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8447D	2944A10633	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8449B	3008A01964	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295014/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	Aug. 19, 2011	Aug. 18, 2012
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA	NA
High Speed Peak Power Meter	ML2495A	0842014	Apr. 26, 2011	Apr. 25, 2012
Power Sensor	MA2411B	0738404	Apr. 26, 2011	Apr. 25, 2012

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

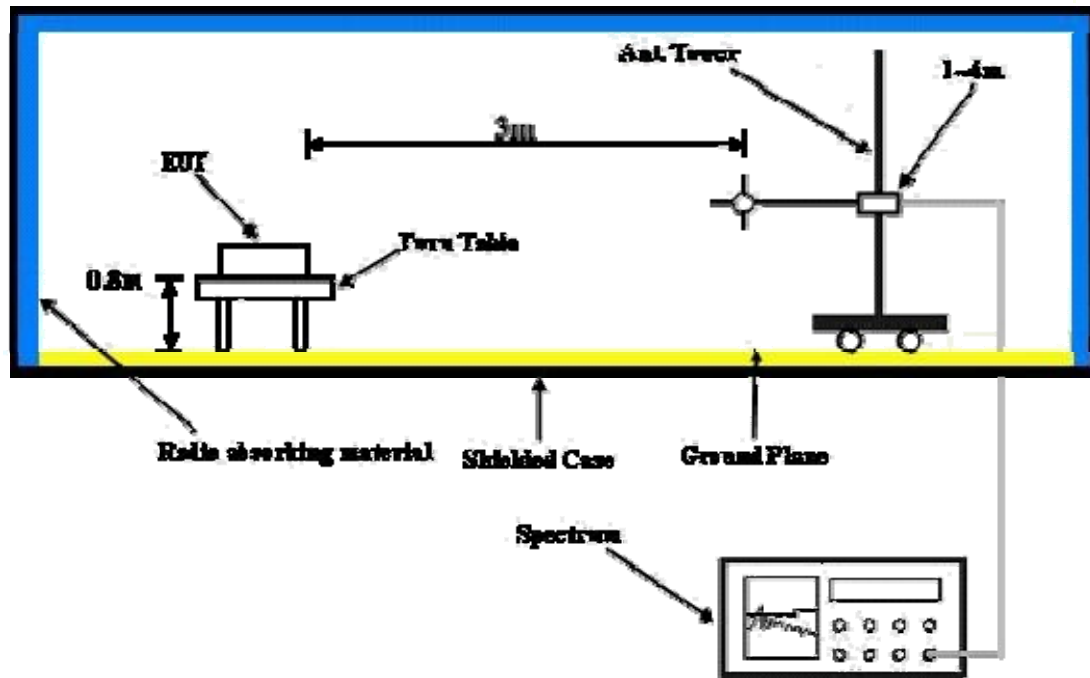
NOTE:

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



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4.1.7 TEST RESULTS

ABOVE 1GHz DATA : 802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.3 PK	74.0	-17.7	1.00 H	67	25.20	31.10
2	2390.00	43.6 AV	54.0	-10.4	1.00 H	67	12.50	31.10
3	*2412.00	110.9 PK			1.34 H	84	79.70	31.20
4	*2412.00	106.2 AV			1.34 H	84	75.00	31.20
5	2498.00	56.7 PK	74.0	-17.3	1.00 H	47	25.20	31.50
6	2498.00	48.4 AV	54.0	-5.6	1.00 H	47	16.90	31.50
7	4824.00	52.8 PK	74.0	-21.2	1.00 H	304	15.90	36.90
8	4824.00	48.9 AV	54.0	-5.1	1.00 H	304	12.00	36.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.3 PK	74.0	-12.7	1.00 V	125	30.20	31.10
2	2390.00	45.6 AV	54.0	-8.4	1.00 V	125	14.50	31.10
3	*2412.00	113.7 PK			1.00 V	124	82.50	31.20
4	*2412.00	109.0 AV			1.00 V	124	77.80	31.20
5	2498.00	62.6 PK	74.0	-11.4	1.00 V	125	31.10	31.50
6	2498.00	52.8 AV	54.0	-1.2	1.00 V	125	21.30	31.50
7	4824.00	51.9 PK	74.0	-22.1	1.60 V	12	15.00	36.90
8	4824.00	46.4 AV	54.0	-7.6	1.60 V	12	9.50	36.90

- 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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

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	2351.50	59.1 PK	74.0	-14.9	1.00 H	79	28.10	31.00
2	2351.50	46.8 AV	54.0	-7.2	1.00 H	79	15.80	31.00
3	*2437.00	110.2 PK			1.00 H	79	78.90	31.30
4	*2437.00	106.4 AV			1.00 H	79	75.10	31.30
5	4874.00	51.6 PK	74.0	-22.4	1.11 H	53	14.60	37.00
6	4874.00	46.3 AV	54.0	-7.7	1.11 H	53	9.30	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	2351.50	63.1 PK	74.0	-10.9	1.04 V	93	32.10	31.00
2	2351.50	53.0 AV	54.0	-1.0	1.04 V	93	22.00	31.00
3	*2437.00	113.2 PK			1.27 V	141	81.90	31.30
4	*2437.00	108.5 AV			1.27 V	141	77.20	31.30
5	4874.00	50.1 PK	74.0	-23.9	1.55 V	0	13.10	37.00
6	4874.00	43.2 AV	54.0	-10.8	1.55 V	0	6.20	37.00

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



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

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	2371.50	58.0 PK	74.0	-16.0	1.52 H	97	27.00	31.00
2	2371.50	47.8 AV	54.0	-6.2	1.52 H	97	16.80	31.00
3	*2462.00	103.9 PK			1.00 H	127	72.50	31.40
4	*2462.00	99.9 AV			1.00 H	127	68.50	31.40
5	2483.50	53.0 PK	74.0	-21.0	1.00 H	137	21.60	31.40
6	2483.50	46.2 AV	54.0	-7.8	1.00 H	137	14.80	31.40
7	4924.00	44.6 PK	74.0	-29.4	1.00 H	258	7.50	37.10
8	4924.00	42.0 AV	54.0	-12.0	1.00 H	258	4.90	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	2371.50	62.4 PK	74.0	-11.6	1.52 V	97	31.40	31.00
2	2371.50	52.5 AV	54.0	-1.5	1.52 V	97	21.50	31.00
3	*2462.00	106.9 PK			1.00 V	127	75.50	31.40
4	*2462.00	102.9 AV			1.00 V	127	71.50	31.40
5	2483.50	57.2 PK	74.0	-16.8	1.00 V	137	25.80	31.40
6	2483.50	49.6 AV	54.0	-4.4	1.00 V	137	18.20	31.40
7	4924.00	48.6 PK	74.0	-25.4	1.00 V	258	11.50	37.10
8	4924.00	45.0 AV	54.0	-9.0	1.00 V	258	7.90	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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802.11g

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

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	63.1 PK	74.0	-10.9	1.32 H	83	32.00	31.10
2	2390.00	49.8 AV	54.0	-4.2	1.32 H	83	18.70	31.10
3	*2412.00	115.3 PK			1.31 H	82	84.10	31.20
4	*2412.00	103.6 AV			1.31 H	82	72.40	31.20
5	2500.00	56.8 PK	74.0	-17.2	1.00 H	131	25.30	31.50
6	2500.00	46.2 AV	54.0	-7.8	1.00 H	131	14.70	31.50
7	4824.00	50.1 PK	74.0	-23.9	1.00 H	160	13.20	36.90
8	4824.00	35.1 AV	54.0	-18.9	1.00 H	160	-1.80	36.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.3 PK	74.0	-1.7	1.00 V	94	41.20	31.10
2	2390.00	52.7 AV	54.0	-1.3	1.00 V	94	21.60	31.10
3	*2412.00	115.0 PK			1.02 V	125	83.80	31.20
4	*2412.00	104.2 AV			1.02 V	125	73.00	31.20
5	2500.00	63.1 PK	74.0	-10.9	1.00 V	124	31.60	31.50
6	2500.00	50.7 AV	54.0	-3.3	1.00 V	124	19.20	31.50
7	4824.00	51.6 PK	74.0	-22.4	1.40 V	0	14.70	36.90
8	4824.00	36.2 AV	54.0	-17.8	1.40 V	0	-0.70	36.90

- 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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

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	2353.00	56.6 PK	74.0	-17.4	1.34 H	80	25.60	31.00
2	2353.00	45.5 AV	54.0	-8.5	1.34 H	80	14.50	31.00
3	*2437.00	114.5 PK			1.29 H	83	83.20	31.30
4	*2437.00	104.0 AV			1.29 H	83	72.70	31.30
5	4874.00	44.2 PK	74.0	-29.8	1.34 H	80	7.20	37.00
6	4874.00	32.9 AV	54.0	-21.1	1.34 H	80	-4.10	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	2353.00	64.2 PK	74.0	-9.8	1.04 V	79	33.20	31.00
2	2353.00	52.8 AV	54.0	-1.2	1.04 V	79	21.80	31.00
3	*2437.00	114.6 PK			1.00 V	125	83.30	31.30
4	*2437.00	104.3 AV			1.00 V	125	73.00	31.30
5	4874.00	45.5 PK	74.0	-28.5	1.10 V	224	8.50	37.00
6	4874.00	33.8 AV	54.0	-20.2	1.10 V	224	-3.20	37.00

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.1 PK			1.27 H	84	78.70	31.40
2	*2462.00	99.2 AV			1.27 H	84	67.80	31.40
3	2483.50	61.7 PK	74.0	-12.3	1.26 H	83	30.30	31.40
4	2483.50	50.3 AV	54.0	-3.7	1.26 H	83	18.90	31.40
5	4924.00	44.7 PK	74.0	-29.3	1.08 H	120	7.60	37.10
6	4924.00	32.3 AV	54.0	-21.7	1.08 H	120	-4.80	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	2376.00	64.3 PK	74.0	-9.7	1.26 V	93	33.30	31.00
2	2376.00	52.3 AV	54.0	-1.7	1.26 V	93	21.30	31.00
3	*2462.00	112.5 PK			1.00 V	126	81.10	31.40
4	*2462.00	101.6 AV			1.00 V	126	70.20	31.40
5	2483.50	63.7 PK	74.0	-10.3	1.00 V	99	32.30	31.40
6	2483.50	47.6 AV	54.0	-6.4	1.00 V	99	16.20	31.40
7	4924.00	45.4 PK	74.0	-28.6	1.00 V	85	8.30	37.10
8	4924.00	32.9 AV	54.0	-21.1	1.00 V	85	-4.20	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.



A D T

802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.5 PK	74.0	-5.5	1.31 H	82	37.40	31.10
2	2390.00	53.3 AV	54.0	-0.7	1.31 H	82	22.20	31.10
3	*2412.00	114.0 PK			1.34 H	82	82.80	31.20
4	*2412.00	102.2 AV			1.34 H	82	71.00	31.20
5	2500.00	61.0 PK	74.0	-13.0	1.28 H	81	29.50	31.50
6	2500.00	48.1 AV	54.0	-5.9	1.28 H	81	16.60	31.50
7	4824.00	53.7 PK	74.0	-20.3	1.00 H	260	16.80	36.90
8	4824.00	37.8 AV	54.0	-16.2	1.00 H	260	0.90	36.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.5 PK	74.0	-4.5	1.04 V	159	38.40	31.10
2	2390.00	52.9 AV	54.0	-1.1	1.04 V	159	21.80	31.10
3	*2412.00	114.9 PK			1.02 V	126	83.70	31.20
4	*2412.00	103.8 AV			1.02 V	126	72.60	31.20
5	2500.00	63.2 PK	74.0	-10.8	1.00 V	127	31.70	31.50
6	2500.00	49.2 AV	54.0	-4.8	1.00 V	127	17.70	31.50
7	4824.00	51.5 PK	74.0	-22.5	1.28 V	360	14.60	36.90
8	4824.00	35.1 AV	54.0	-18.9	1.28 V	360	-1.80	36.90

- 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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

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	2355.00	59.7 PK	74.0	-14.3	1.37 H	85	28.70	31.00
2	2355.00	47.4 AV	54.0	-6.6	1.37 H	85	16.40	31.00
3	*2437.00	115.3 PK			1.30 H	158	84.00	31.30
4	*2437.00	104.2 AV			1.30 H	158	72.90	31.30
5	4874.00	46.2 PK	74.0	-27.8	1.00 H	260	9.20	37.00
6	4874.00	32.2 AV	54.0	-21.8	1.00 H	260	-4.80	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	2355.00	64.9 PK	74.0	-9.1	1.03 V	96	33.90	31.00
2	2355.00	52.6 AV	54.0	-1.4	1.03 V	96	21.60	31.00
3	*2437.00	114.7 PK			1.00 V	126	83.40	31.30
4	*2437.00	103.8 AV			1.00 V	126	72.50	31.30
5	4874.00	47.3 PK	74.0	-26.7	1.00 V	329	10.30	37.00
6	4874.00	33.7 AV	54.0	-20.3	1.00 V	329	-3.30	37.00

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



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

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	2378.00	59.4 PK	74.0	-14.6	1.25 H	75	28.40	31.00
2	2378.00	47.3 AV	54.0	-6.7	1.25 H	75	16.30	31.00
3	*2462.00	109.5 PK			1.24 H	82	78.10	31.40
4	*2462.00	98.2 AV			1.24 H	82	66.80	31.40
5	2483.50	62.7 PK	74.0	-11.3	1.27 H	81	31.30	31.40
6	2483.50	49.9 AV	54.0	-4.1	1.27 H	81	18.50	31.40
7	4924.00	43.2 PK	74.0	-30.8	1.00 H	230	6.10	37.10
8	4924.00	31.8 AV	54.0	-22.2	1.00 H	230	-5.30	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	2378.00	64.9 PK	74.0	-9.1	1.28 V	94	33.90	31.00
2	2378.00	52.4 AV	54.0	-1.6	1.28 V	94	21.40	31.00
3	*2462.00	110.9 PK			1.00 V	127	79.50	31.40
4	*2462.00	99.9 AV			1.00 V	127	68.50	31.40
5	2483.50	63.7 PK	74.0	-10.3	1.00 V	85	32.30	31.40
6	2483.50	49.1 AV	54.0	-4.9	1.00 V	85	17.70	31.40
7	4924.00	44.6 PK	74.0	-29.4	1.00 V	360	7.50	37.10
8	4924.00	33.0 AV	54.0	-21.0	1.00 V	360	-4.10	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.



A D T

802.11n (40MHz)

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

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	70.0 PK	74.0	-4.0	1.30 H	80	38.90	31.10
2	2390.00	50.3 AV	54.0	-3.7	1.30 H	80	19.20	31.10
3	*2422.00	105.4 PK			1.30 H	82	74.20	31.20
4	*2422.00	95.0 AV			1.30 H	82	63.80	31.20
5	4844.00	44.3 PK	74.0	-29.7	1.00 H	180	7.40	36.90
6	4844.00	31.2 AV	54.0	-22.8	1.00 H	180	-5.70	36.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.2 PK	74.0	-0.8	1.27 V	97	42.10	31.10
2	2390.00	52.9 AV	54.0	-1.1	1.27 V	97	21.80	31.10
3	*2422.00	106.4 PK			1.00 V	92	75.20	31.20
4	*2422.00	95.8 AV			1.00 V	92	64.60	31.20
5	4844.00	45.7 PK	74.0	-28.3	1.00 V	75	8.80	36.90
6	4844.00	32.5 AV	54.0	-21.5	1.00 V	75	-4.40	36.90

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

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	66.9 PK	74.0	-7.1	1.31 H	82	35.80	31.10
2	2390.00	51.1 AV	54.0	-2.9	1.31 H	82	20.00	31.10
3	*2437.00	110.9 PK			1.28 H	82	79.60	31.30
4	*2437.00	100.3 AV			1.28 H	82	69.00	31.30
5	2483.50	63.4 PK	74.0	-10.6	1.27 H	83	32.00	31.40
6	2483.50	50.9 AV	54.0	-3.1	1.27 H	83	19.50	31.40
7	4874.00	44.1 PK	74.0	-29.9	1.00 H	136	7.10	37.00
8	4874.00	31.9 AV	54.0	-22.1	1.00 H	136	-5.10	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	72.1 PK	74.0	-1.9	1.28 V	94	41.00	31.10
2	2390.00	52.8 AV	54.0	-1.2	1.28 V	94	21.70	31.10
3	*2437.00	113.7 PK			1.00 V	111	82.40	31.30
4	*2437.00	103.0 AV			1.00 V	111	71.70	31.30
5	2483.50	69.4 PK	74.0	-4.6	1.00 V	126	38.00	31.40
6	2483.50	52.7 AV	54.0	-1.3	1.00 V	126	21.30	31.40
7	4874.00	45.3 PK	74.0	-28.7	1.00 V	258	8.30	37.00
8	4874.00	33.2 AV	54.0	-20.8	1.00 V	258	-3.80	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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

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	2381.00	57.7 PK	74.0	-16.3	1.35 H	81	26.60	31.10
2	2381.00	48.2 AV	54.0	-5.8	1.35 H	81	17.10	31.10
3	*2452.00	106.7 PK			1.22 H	68	75.40	31.30
4	*2452.00	95.6 AV			1.22 H	68	64.30	31.30
5	2483.50	67.9 PK	74.0	-6.1	1.24 H	67	36.50	31.40
6	2483.50	52.8 AV	54.0	-1.2	1.24 H	67	21.40	31.40
7	4904.00	44.8 PK	74.0	-29.2	1.00 H	234	7.80	37.00
8	4904.00	31.3 AV	54.0	-22.7	1.00 H	234	-5.70	37.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2381.00	63.7 PK	74.0	-10.3	1.28 V	95	32.60	31.10
2	2381.00	50.7 AV	54.0	-3.3	1.28 V	95	19.60	31.10
3	*2452.00	109.1 PK			1.00 V	126	77.80	31.30
4	*2452.00	98.5 AV			1.00 V	126	67.20	31.30
5	2483.50	72.8 PK	74.0	-1.2	1.00 V	90	41.40	31.40
6	2483.50	53.2 AV	54.0	-0.8	1.00 V	90	21.80	31.40
7	4904.00	45.3 PK	74.0	-28.7	1.00 V	74	8.30	37.00
8	4904.00	32.5 AV	54.0	-21.5	1.00 V	74	-4.50	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.



A D T

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	103.78	30.4 QP	43.5	-13.1	3.00 H	256	19.70	10.70
2	125.17	31.0 QP	43.5	-12.5	3.00 H	67	18.10	12.90
3	166.00	32.0 QP	43.5	-11.5	1.50 H	244	18.00	14.00
4	249.60	36.1 QP	46.0	-9.9	1.00 H	82	23.10	13.00
5	335.15	37.1 QP	46.0	-8.9	1.00 H	103	21.20	15.90
6	399.31	33.2 QP	46.0	-12.8	1.00 H	229	15.60	17.60
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	53.23	36.1 QP	40.0	-3.9	1.25 V	10	22.10	14.00
2	107.67	34.8 QP	43.5	-8.7	1.25 V	67	23.70	11.10
3	125.17	31.5 QP	43.5	-12.0	1.25 V	319	18.60	12.90
4	337.10	33.1 QP	46.0	-12.9	1.25 V	136	17.10	16.00
5	389.59	35.7 QP	46.0	-10.3	1.50 V	88	18.30	17.40
6	498.47	31.7 QP	46.0	-14.3	1.00 V	268	11.20	20.50

- 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.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 23, 2011	Nov. 22, 2012
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 30, 2010	Dec. 29, 2011
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 06, 2011	Jan. 05, 2012
LISN ROHDE & SCHWARZ	ESH3-Z5	835239/001	Feb. 22, 2011	Feb. 21, 2012
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 30, 2011	Jun. 29, 2012
LISN ROHDE & SCHWARZ	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Software ADT	ADT_Conc_ V7.3.7	NA	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

4.2.3 TEST PROCEDURES

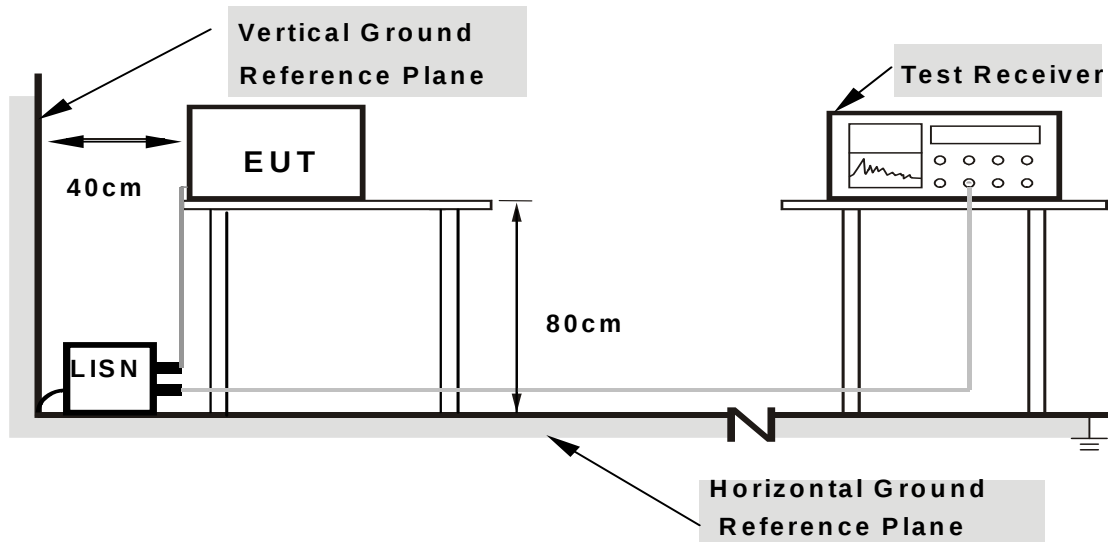
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

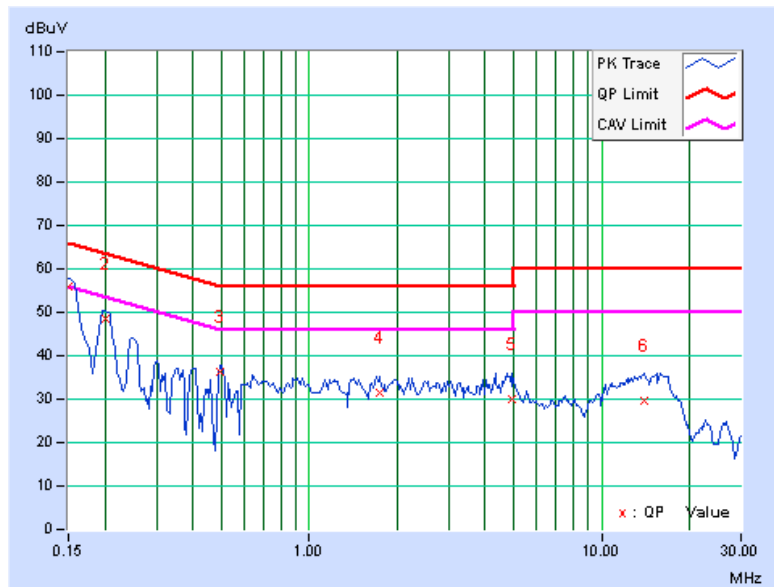
4.2.7 TEST RESULTS

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

PHASE	Line 1	6dB BANDWIDTH	9kHz
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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	0.150	0.11	55.99	45.80	56.11	45.91	66.00	56.00	-9.89	-10.09
2	0.201	0.12	48.47	39.90	48.59	40.02	63.58	53.58	-14.99	-13.56
3	0.494	0.13	36.22	30.13	36.35	30.26	56.10	46.10	-19.76	-15.85
4	1.738	0.18	31.29	24.17	31.47	24.35	56.00	46.00	-24.53	-21.65
5	4.957	0.37	29.70	21.56	30.07	21.93	56.00	46.00	-25.93	-24.07
6	13.930	0.83	28.97	22.99	29.80	23.82	60.00	50.00	-30.20	-26.18

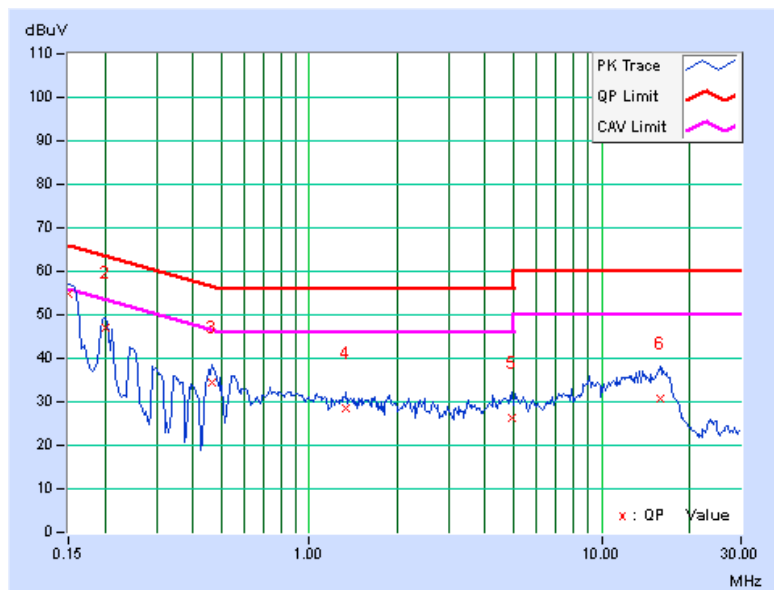
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq.	Corr. Factor	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	0.150	0.12	54.72	43.89	54.84	44.01	66.00	56.00	-11.16	-11.99
2	0.201	0.13	46.99	37.26	47.12	37.39	63.58	53.58	-16.46	-16.19
3	0.463	0.14	34.17	20.50	34.31	20.64	56.65	46.65	-22.33	-26.00
4	1.340	0.19	28.38	20.92	28.57	21.11	56.00	46.00	-27.43	-24.89
5	4.934	0.37	25.99	19.86	26.36	20.23	56.00	46.00	-29.64	-25.77
6	15.879	0.78	30.13	22.48	30.91	23.26	60.00	50.00	-29.09	-26.74

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

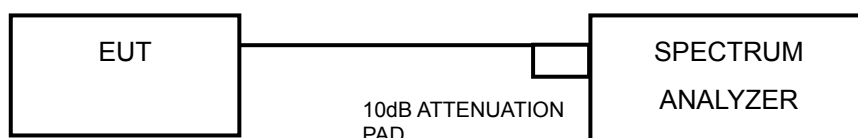


4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURE

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

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	9.77	9.62	9.72	0.5	PASS
6	2437	9.60	10.26	9.64	0.5	PASS
11	2462	10.23	10.29	10.33	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	16.47	16.50	16.58	0.5	PASS
6	2437	16.49	16.56	16.46	0.5	PASS
11	2462	16.47	16.60	16.51	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	17.69	17.80	17.81	0.5	PASS
6	2437	17.71	17.67	17.75	0.5	PASS
11	2462	17.65	17.88	17.75	0.5	PASS

802.11n (40MHz)

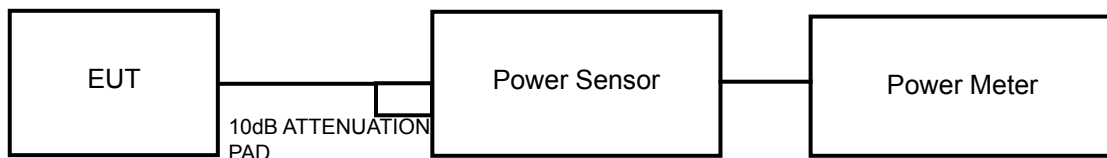
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2422	36.95	36.30	36.45	0.5	PASS
4	2437	36.90	36.54	36.47	0.5	PASS
7	2452	36.57	37.21	36.81	0.5	PASS

4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.4.4 TEST PROCEDURES

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

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.4.7 TEST RESULTS

802.11b

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	18.8	17.9	17.8	197.8	23.0	28.2	PASS
6	2437	17.3	17.3	17.2	159.9	22.0	28.2	PASS
11	2462	12.3	13.1	12.4	54.8	17.4	28.2	PASS

Directional gain = $3.1\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $30 - (7.8 - 6) = 28.2\text{dBm}$

802.11g

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	23.4	23.1	23.2	631.9	28.0	28.2	PASS
6	2437	23.7	22.3	23.6	633.3	28.0	28.2	PASS
11	2462	19.6	19.7	20.1	286.9	24.6	28.2	PASS

Directional gain = $3.1\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $30 - (7.8 - 6) = 28.2\text{dBm}$

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	23.7	22.1	23.7	631.0	28.0	28.2	PASS
6	2437	23.3	23.2	23.3	636.5	28.0	28.2	PASS
11	2462	19.5	19.6	20.1	282.7	24.5	28.2	PASS

Directional gain = $3.1\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $30 - (7.8 - 6) = 28.2\text{dBm}$

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2422	19.9	19.5	19.4	273.9	24.4	28.2	PASS
4	2437	23.3	23.0	23.4	632.1	28.0	28.2	PASS
7	2452	21.5	21.2	21.3	408.0	26.1	28.2	PASS

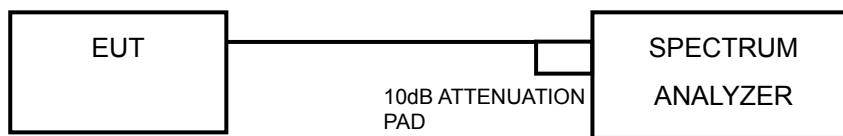
Directional gain = $3.1\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $30 - (7.8 - 6) = 28.2\text{dBm}$

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

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

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	7.21	-8.02	4.77	-3.25	6.2	PASS
	6	2437	5.87	-9.36	4.77	-4.59	6.2	PASS
	11	2462	0.88	-14.35	4.77	-9.58	6.2	PASS
1	1	2412	6.37	-8.86	4.77	-4.09	6.2	PASS
	6	2437	4.80	-10.43	4.77	-5.66	6.2	PASS
	11	2462	0.05	-15.18	4.77	-10.41	6.2	PASS
2	1	2412	5.87	-9.36	4.77	-4.59	6.2	PASS
	6	2437	5.39	-9.84	4.77	-5.07	6.2	PASS
	11	2462	0.63	-14.6	4.77	-9.83	6.2	PASS

Directional gain = $3.1\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $8 - (7.8 - 6) = 6.2\text{dBm}$

802.11g

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	0.62	-14.61	4.77	-9.84	6.2	PASS
	6	2437	0.95	-14.28	4.77	-9.51	6.2	PASS
	11	2462	-3.08	-18.31	4.77	-13.54	6.2	PASS
1	1	2412	0.89	-14.34	4.77	-9.57	6.2	PASS
	6	2437	0.30	-14.93	4.77	-10.16	6.2	PASS
	11	2462	-2.31	-17.54	4.77	-12.77	6.2	PASS
2	1	2412	3.01	-12.22	4.77	-7.45	6.2	PASS
	6	2437	3.58	-11.65	4.77	-6.88	6.2	PASS
	11	2462	-0.18	-15.41	4.77	-10.64	6.2	PASS

Directional gain = $3.1\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $8 - (7.8 - 6) = 6.2\text{dBm}$

802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	2.10	-13.13	4.77	-8.36	6.2	PASS
	6	2437	1.63	-13.60	4.77	-8.83	6.2	PASS
	11	2462	-2.13	-17.36	4.77	-12.59	6.2	PASS
1	1	2412	1.11	-14.12	4.77	-9.35	6.2	PASS
	6	2437	2.06	-13.17	4.77	-8.40	6.2	PASS
	11	2462	-1.45	-16.68	4.77	-11.91	6.2	PASS
2	1	2412	1.60	-13.63	4.77	-8.86	6.2	PASS
	6	2437	1.21	-14.02	4.77	-9.25	6.2	PASS
	11	2462	-1.86	-17.09	4.77	-12.32	6.2	PASS

Directional gain = $3.1\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $8 - (7.8 - 6) = 6.2\text{dBm}$

802.11n (40MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2422	-6.30	-21.53	4.77	-16.76	6.2	PASS
	4	2437	-2.68	-17.91	4.77	-13.14	6.2	PASS
	7	2452	-4.59	-19.82	4.77	-15.05	6.2	PASS
1	1	2422	-6.20	-21.43	4.77	-16.66	6.2	PASS
	4	2437	-2.54	-17.77	4.77	-13.00	6.2	PASS
	7	2452	-4.49	-19.72	4.77	-14.95	6.2	PASS
2	1	2422	-5.74	-20.97	4.77	-16.20	6.2	PASS
	4	2437	-1.69	-16.92	4.77	-12.15	6.2	PASS
	7	2452	-3.80	-19.03	4.77	-14.26	6.2	PASS

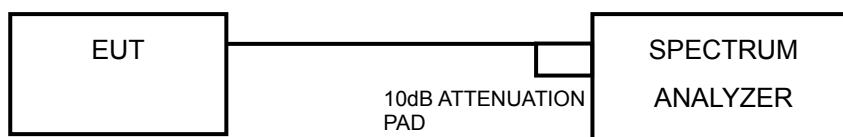
Directional gain = $3.1\text{dBi} + 10\log(3) = 7.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $8 - (7.8 - 6) = 6.2\text{dBm}$

4.6 CONDUCTED EMISSION MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

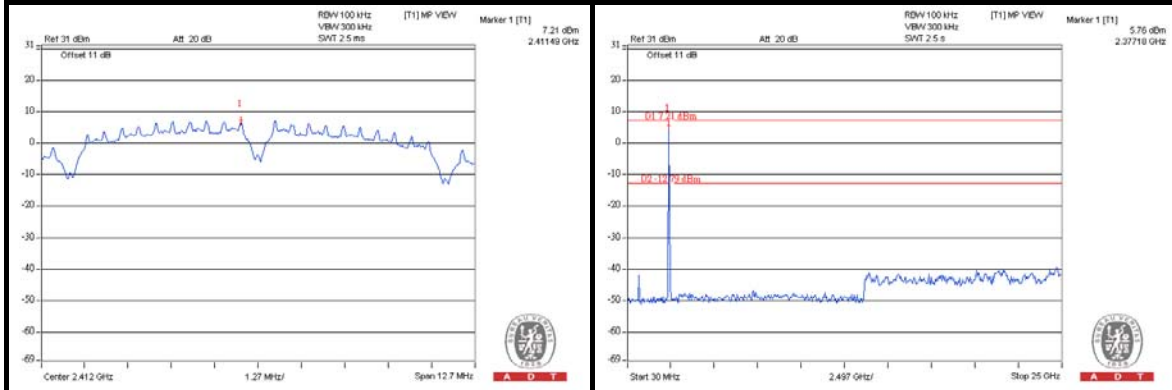
The conducted emission test is performed on each TX port of operating mode without summing or adding $10\log(N)$ since the limit is relative emission limit. Only worst data of each operating mode is presented.

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

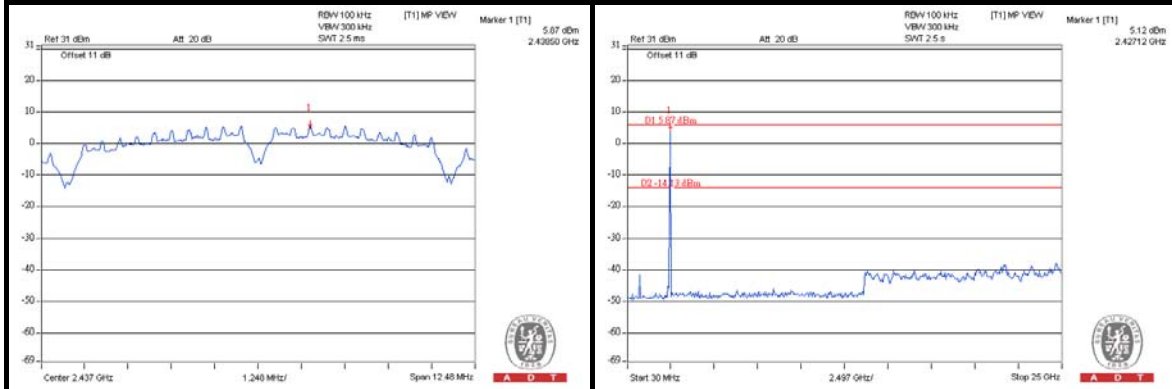
4.6.8 TEST RESULTS

802.11b

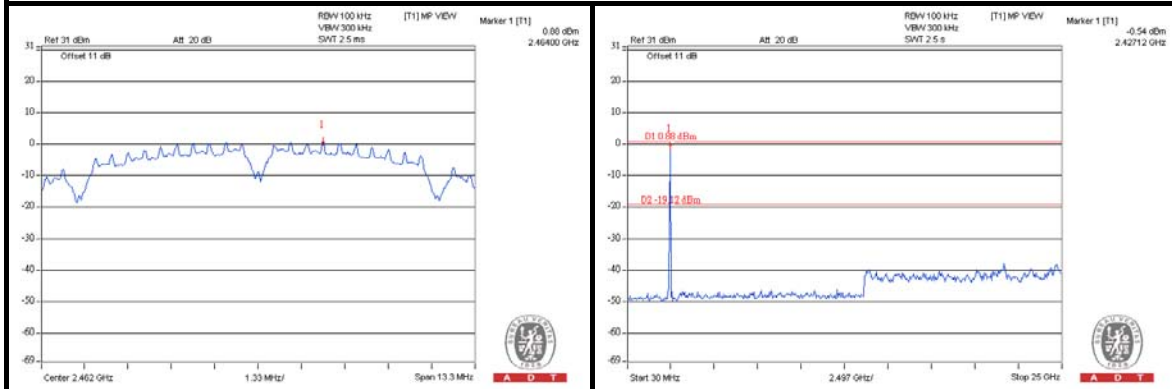
CH 1



CH 6

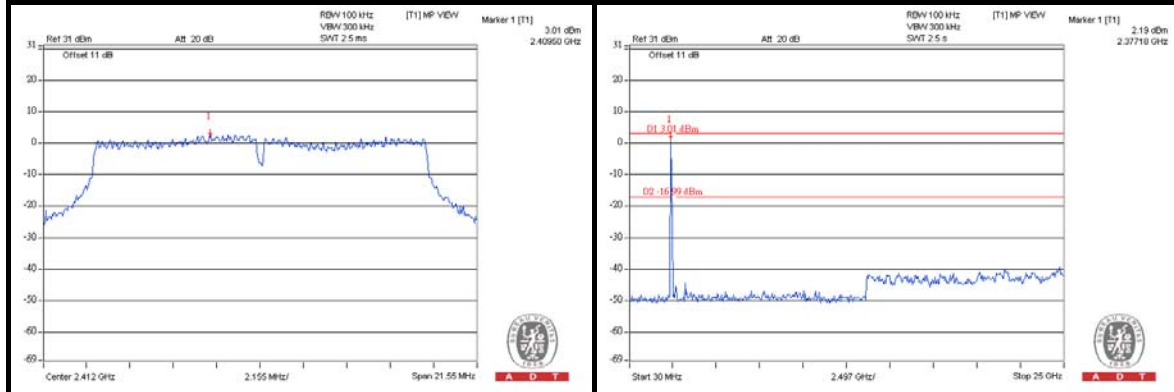


CH 11

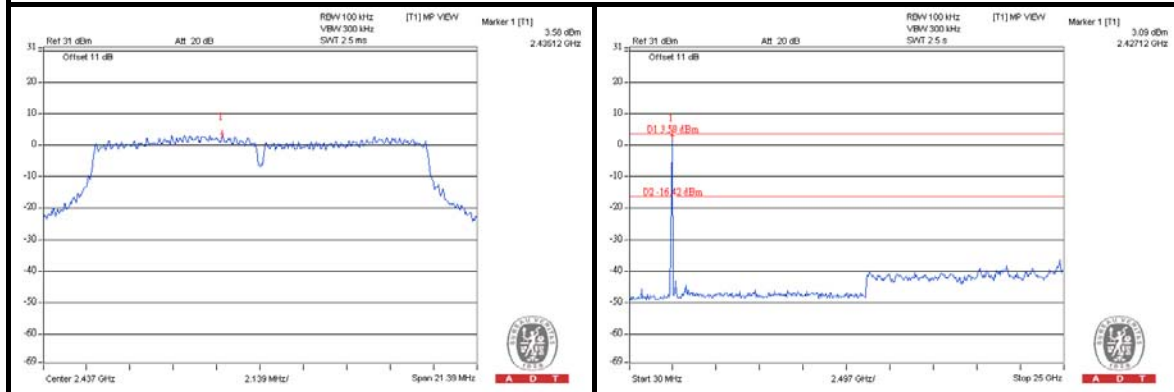


802.11g

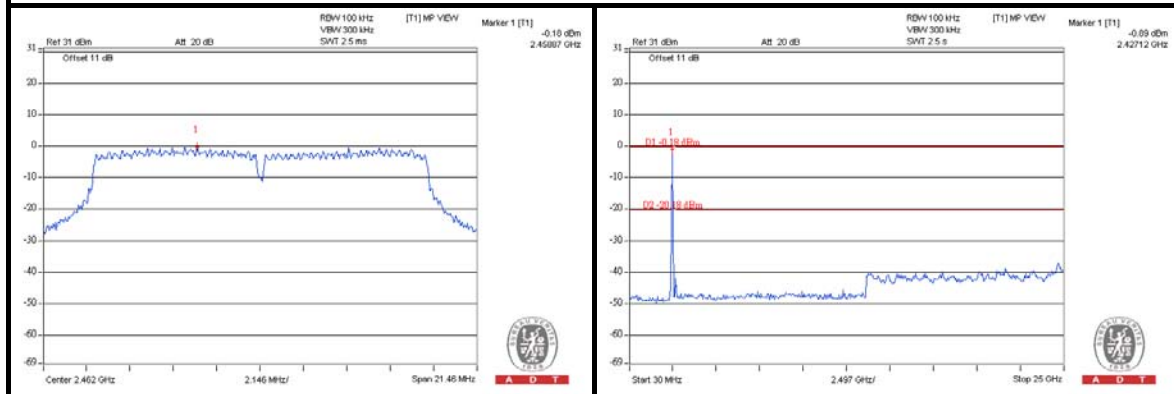
CH 1



CH 6



CH 11

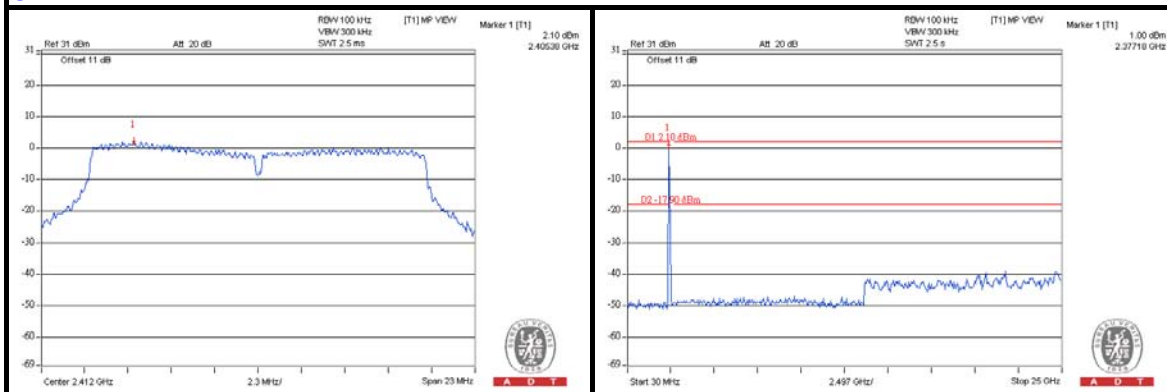




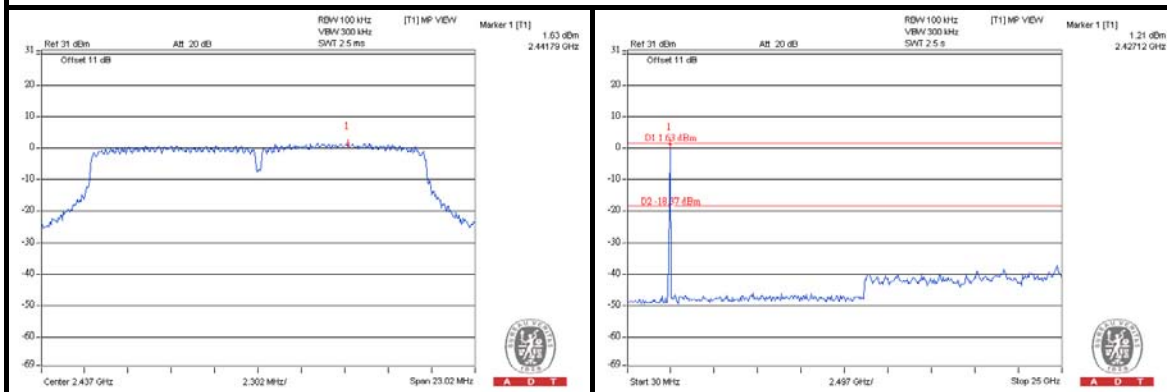
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802.11n (20MHz)

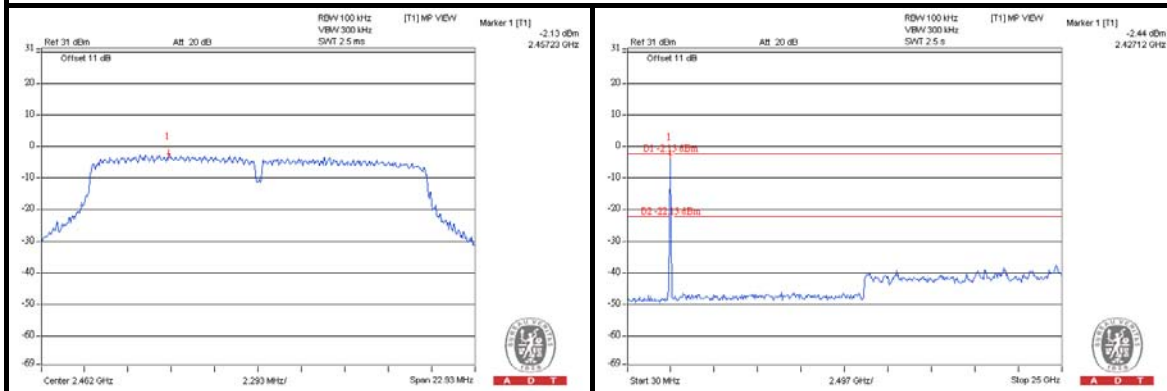
CH 1



CH 6

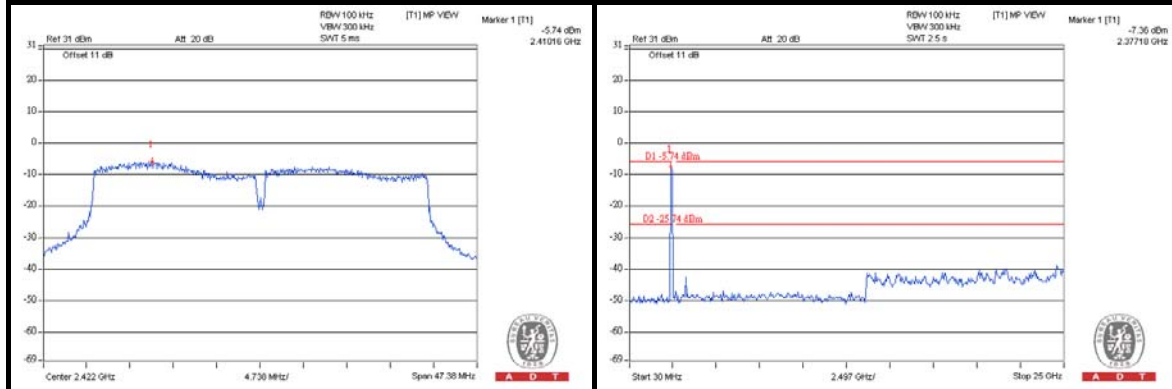


CH 11

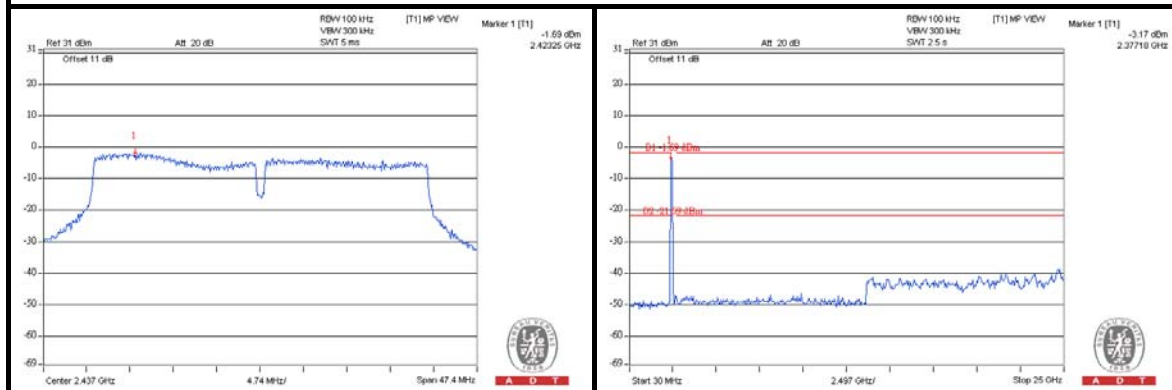


802.11n (40MHz)

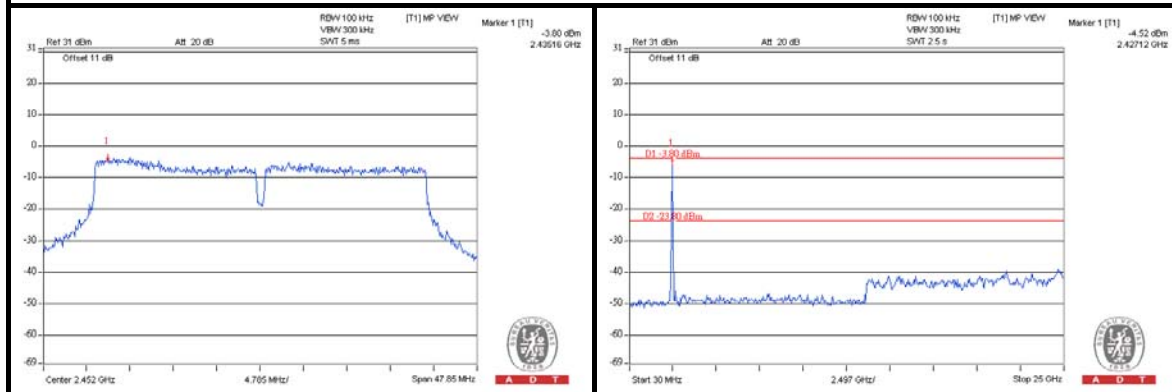
CH 1



CH 4



CH 7



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, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). 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. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	Aug. 02, 2011	Aug. 01, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP 40	100041	Jul. 21, 2011	Jul. 20, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 13, 2011	Apr. 12, 2012
HORN Antenna SCHWARZBECK	9120D	209	Aug. 25, 2011	Aug. 24, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8447D	2944A10633	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8449B	3008A01964	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295014/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	Aug. 19, 2011	Aug. 18, 2012
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA	NA
High Speed Peak Power Meter	ML2495A	0842014	Apr. 26, 2011	Apr. 25, 2012
Power Sensor	MA2411B	0738404	Apr. 26, 2011	Apr. 25, 2012
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 29, 2011	Oct. 28, 2012

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 3.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 988962.
 5. The IC Site Registration No. is IC 7450F-3.

5.1.3 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.

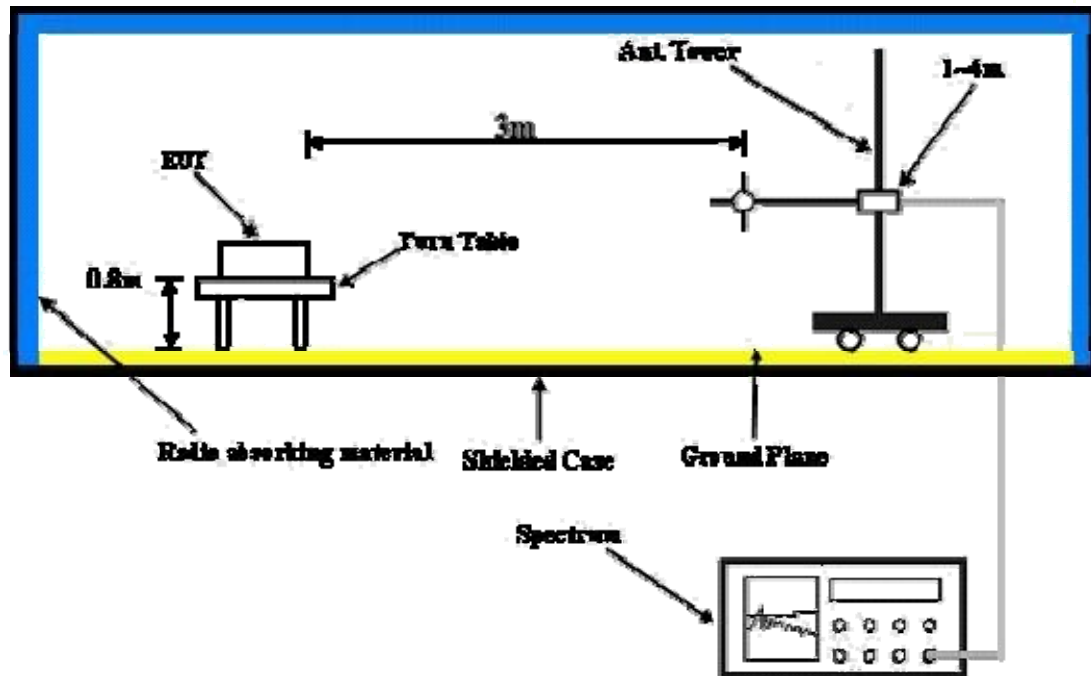
NOTE:

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.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP



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

5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

5.1.7 TEST RESULTS

ABOVE 1GHz DATA : 802.11a

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

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	4920.00	59.0 PK	74.0	-15.0	1.00 H	79	22.00	37.00
2	4920.00	53.4 AV	54.0	-0.6	1.00 H	79	16.40	37.00
3	5040.00	58.1 PK	74.0	-15.9	1.00 H	80	20.80	37.30
4	5040.00	52.1 AV	54.0	-1.9	1.00 H	80	14.80	37.30
5	#5725.00	72.5 PK	91.1	-18.6	1.02 H	269	34.10	38.40
6	#5725.00	53.9 AV	79.7	-25.8	1.02 H	269	15.50	38.40
7	*5745.00	111.1 PK			1.01 H	269	72.70	38.40
8	*5745.00	99.7 AV			1.01 H	269	61.30	38.40
9	11490.00	57.5 PK	74.0	-16.5	1.00 H	49	8.50	49.00
10	11490.00	45.3 AV	54.0	-8.7	1.00 H	49	-3.70	49.00

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. The limit value is defined as per 15.247.
 7. “#”:The radiated frequency is out the restricted band.



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

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	4920.00	53.0 PK	74.0	-21.0	1.00 V	297	16.00	37.00
2	4920.00	40.5 AV	54.0	-13.5	1.00 V	297	3.50	37.00
3	5040.00	52.2 PK	74.0	-21.8	1.00 V	318	14.90	37.30
4	5040.00	38.2 AV	54.0	-15.8	1.00 V	318	0.90	37.30
5	#5725.00	77.0 PK	91.6	-14.6	1.01 V	296	38.60	38.40
6	#5725.00	52.5 AV	80.6	-28.1	1.01 V	296	14.10	38.40
7	*5745.00	111.6 PK			1.01 V	296	73.20	38.40
8	*5745.00	100.6 AV			1.01 V	296	62.20	38.40
9	11490.00	59.3 PK	74.0	-14.7	1.00 V	333	10.30	49.00
10	11490.00	44.7 AV	54.0	-9.3	1.00 V	333	-4.30	49.00

- REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”:The radiated frequency is out the restricted band.



A D T

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

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	4920.00	59.0 PK	74.0	-15.0	1.02 H	85	22.00	37.00
2	4920.00	53.5 AV	54.0	-0.5	1.02 H	85	16.50	37.00
3	5040.00	58.1 PK	74.0	-15.9	1.00 H	78	20.80	37.30
4	5040.00	52.2 AV	54.0	-1.8	1.00 H	78	14.90	37.30
5	*5785.00	109.8 PK			1.02 H	270	71.30	38.50
6	*5785.00	98.2 AV			1.02 H	270	59.70	38.50
7	11570.00	57.3 PK	74.0	-16.7	1.00 H	8	8.50	48.80
8	11570.00	44.9 AV	54.0	-9.1	1.00 H	8	-3.90	48.80
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	4920.00	53.5 PK	74.0	-20.5	1.00 V	298	16.50	37.00
2	4920.00	41.6 AV	54.0	-12.4	1.00 V	298	4.60	37.00
3	5040.00	52.7 PK	74.0	-21.3	1.00 V	320	15.40	37.30
4	5040.00	38.7 AV	54.0	-15.3	1.00 V	320	1.40	37.30
5	*5785.00	111.8 PK			1.00 V	296	73.30	38.50
6	*5785.00	101.1 AV			1.00 V	296	62.60	38.50
7	11570.00	58.5 PK	74.0	-15.5	1.00 V	312	9.70	48.80
8	11570.00	46.4 AV	54.0	-7.6	1.00 V	312	-2.40	48.80

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ”: Fundamental frequency.
6. The limit value is defined as per 15.247.



A D T

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

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	4920.00	58.4 PK	74.0	-15.6	1.02 H	86	21.40	37.00
2	4920.00	53.5 AV	54.0	-0.5	1.02 H	86	16.50	37.00
3	5040.00	58.1 PK	74.0	-15.9	1.00 H	78	20.80	37.30
4	5040.00	52.1 AV	54.0	-1.9	1.00 H	78	14.80	37.30
5	*5825.00	109.6 PK			1.00 H	269	71.00	38.60
6	*5825.00	98.5 AV			1.00 H	269	59.90	38.60
7	#5850.00	68.2 PK	89.6	-21.4	1.00 H	26	29.60	38.60
8	#5850.00	46.7 AV	78.5	-31.8	1.00 H	26	8.10	38.60
9	11650.00	57.4 PK	74.0	-16.6	1.00 H	85	8.70	48.70
10	11650.00	44.6 AV	54.0	-9.4	1.00 H	85	-4.10	48.70

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ”: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”: The radiated frequency is out the restricted band.



A D T

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

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	4920.00	52.4 PK	74.0	-21.6	1.00 V	299	15.40	37.00
2	4920.00	40.5 AV	54.0	-13.5	1.00 V	299	3.50	37.00
3	5040.00	51.7 PK	74.0	-22.3	1.00 V	316	14.40	37.30
4	5040.00	38.1 AV	54.0	-15.9	1.00 V	316	0.80	37.30
5	*5825.00	110.6 PK			1.00 V	337	72.00	38.60
6	*5825.00	99.7 AV			1.00 V	337	61.10	38.60
7	#5850.00	66.1 PK	90.6	-24.5	1.00 V	299	27.50	38.60
8	#5850.00	43.9 AV	79.7	-35.8	1.00 V	299	5.30	38.60
9	11650.00	57.3 PK	74.0	-16.7	1.00 V	285	8.60	48.70
10	11650.00	44.3 AV	54.0	-9.7	1.00 V	285	-4.40	48.70

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. The limit value is defined as per 15.247.
 7. “#”:The radiated frequency is out the restricted band.



A D T

802.11n (20MHz)

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

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	4920.00	59.0 PK	74.0	-15.0	1.00 H	84	22.00	37.00
2	4920.00	53.5 AV	54.0	-0.5	1.00 H	84	16.50	37.00
3	5040.00	58.1 PK	74.0	-15.9	1.00 H	80	20.80	37.30
4	5040.00	52.1 AV	54.0	-1.9	1.00 H	80	14.80	37.30
5	#5725.00	71.5 PK	89.7	-18.2	1.02 H	269	33.10	38.40
6	#5725.00	53.1 AV	78.5	-25.4	1.02 H	269	14.70	38.40
7	*5745.00	109.7 PK			1.00 H	270	71.30	38.40
8	*5745.00	98.5 AV			1.00 H	270	60.10	38.40
9	11490.00	57.5 PK	74.0	-16.5	1.00 H	44	8.50	49.00
10	11490.00	44.7 AV	54.0	-9.3	1.00 H	44	-4.30	49.00

- REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”:The radiated frequency is out the restricted band.



A D T

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

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	4920.00	53.5 PK	74.0	-20.5	1.00 V	298	16.50	37.00
2	4920.00	41.9 AV	54.0	-12.1	1.00 V	298	4.90	37.00
3	5040.00	52.0 PK	74.0	-22.0	1.00 V	318	14.70	37.30
4	5040.00	37.7 AV	54.0	-16.3	1.00 V	318	0.40	37.30
5	#5725.00	80.0 PK	92.1	-12.1	1.00 V	47	41.60	38.40
6	#5725.00	54.0 AV	81.1	-27.1	1.00 V	47	15.60	38.40
7	*5745.00	112.1 PK			1.12 V	298	73.70	38.40
8	*5745.00	101.1 AV			1.12 V	298	62.70	38.40
9	11490.00	58.7 PK	74.0	-15.3	1.00 V	285	9.70	49.00
10	11490.00	44.7 AV	54.0	-9.3	1.00 V	285	-4.30	49.00

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. The limit value is defined as per 15.247.
 7. “#”:The radiated frequency is out the restricted band.

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

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	4920.00	59.0 PK	74.0	-15.0	1.02 H	85	22.00	37.00
2	4920.00	53.5 AV	54.0	-0.5	1.02 H	85	16.50	37.00
3	5040.00	58.1 PK	74.0	-15.9	1.00 H	77	20.80	37.30
4	5040.00	52.1 AV	54.0	-1.9	1.00 H	77	14.80	37.30
5	*5785.00	110.0 PK			1.03 H	271	71.50	38.50
6	*5785.00	98.6 AV			1.03 H	271	60.10	38.50
7	11570.00	57.3 PK	74.0	-16.7	1.00 H	65	8.50	48.80
8	11570.00	45.4 AV	54.0	-8.6	1.00 H	65	-3.40	48.80
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	4920.00	51.9 PK	74.0	-22.1	1.00 V	300	14.90	37.00
2	4920.00	39.9 AV	54.0	-14.1	1.00 V	300	2.90	37.00
3	5040.00	52.2 PK	74.0	-21.8	1.00 V	315	14.90	37.30
4	5040.00	37.7 AV	54.0	-16.3	1.00 V	315	0.40	37.30
5	*5785.00	113.1 PK			1.00 V	295	74.60	38.50
6	*5785.00	101.9 AV			1.00 V	295	63.40	38.50
7	11570.00	57.5 PK	74.0	-16.5	1.00 V	223	8.70	48.80
8	11570.00	45.4 AV	54.0	-8.6	1.00 V	223	-3.40	48.80

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ”: Fundamental frequency.
6. The limit value is defined as per 15.247.



A D T

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

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	4920.00	58.5 PK	74.0	-15.5	1.02 H	86	21.50	37.00
2	4920.00	53.5 AV	54.0	-0.5	1.02 H	86	16.50	37.00
3	5040.00	58.0 PK	74.0	-16.0	1.00 H	79	20.70	37.30
4	5040.00	52.1 AV	54.0	-1.9	1.00 H	79	14.80	37.30
5	*5825.00	110.2 PK			1.00 H	267	71.60	38.60
6	*5825.00	98.8 AV			1.00 H	267	60.20	38.60
7	#5850.00	67.3 PK	90.2	-22.9	1.00 H	89	28.70	38.60
8	#5850.00	46.1 AV	78.8	-32.7	1.00 H	89	7.50	38.60
9	11650.00	58.0 PK	74.0	-16.0	1.00 H	74	9.30	48.70
10	11650.00	44.6 AV	54.0	-9.4	1.00 H	74	-4.10	48.70

- REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ”: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”: The radiated frequency is out the restricted band.



A D T

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

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	4920.00	52.6 PK	74.0	-21.4	1.00 V	297	15.60	37.00
2	4920.00	40.4 AV	54.0	-13.6	1.00 V	297	3.40	37.00
3	5040.00	52.1 PK	74.0	-21.9	1.00 V	318	14.80	37.30
4	5040.00	37.7 AV	54.0	-16.3	1.00 V	318	0.40	37.30
5	*5825.00	111.8 PK			1.10 V	298	73.20	38.60
6	*5825.00	101.0 AV			1.10 V	298	62.40	38.60
7	#5850.00	67.0 PK	91.8	-24.8	1.28 V	251	28.40	38.60
8	#5850.00	45.3 AV	81.0	-35.7	1.28 V	251	6.70	38.60
9	11650.00	57.3 PK	74.0	-16.7	1.00 V	47	8.60	48.70
10	11650.00	44.7 AV	54.0	-9.3	1.00 V	47	-4.00	48.70

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”: The radiated frequency is out the restricted band.



A D T

802.11n (40MHz)

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

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	4920.00	58.5 PK	74.0	-15.5	1.00 H	86	21.50	37.00
2	4920.00	53.5 AV	54.0	-0.5	1.00 H	86	16.50	37.00
3	5040.00	58.0 PK	74.0	-16.0	1.00 H	80	20.70	37.30
4	5040.00	52.1 AV	54.0	-1.9	1.00 H	80	14.80	37.30
5	#5725.00	75.8 PK	88.3	-12.5	1.00 H	93	37.40	38.40
6	#5725.00	56.6 AV	76.8	-20.2	1.00 H	93	18.20	38.40
7	*5755.00	108.3 PK			1.00 H	270	69.80	38.50
8	*5755.00	96.8 AV			1.00 H	270	58.30	38.50
9	11510.00	57.7 PK	74.0	-16.3	1.00 H	74	8.70	49.00
10	11510.00	45.0 AV	54.0	-9.0	1.00 H	74	-4.00	49.00

- REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”: The radiated frequency is out the restricted band.



A D T

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

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	4920.00	53.0 PK	74.0	-21.0	1.00 V	297	16.00	37.00
2	4920.00	40.5 AV	54.0	-13.5	1.00 V	297	3.50	37.00
3	5040.00	52.0 PK	74.0	-22.0	1.00 V	315	14.70	37.30
4	5040.00	37.7 AV	54.0	-16.3	1.00 V	315	0.40	37.30
5	#5725.00	79.1 PK	88.2	-9.1	1.10 V	45	40.70	38.40
6	#5725.00	55.9 AV	77.3	-21.4	1.10 V	45	17.50	38.40
7	*5755.00	108.2 PK			1.00 V	304	69.70	38.50
8	*5755.00	97.3 AV			1.00 V	304	58.80	38.50
9	11510.00	58.6 PK	74.0	-15.4	1.00 V	41	9.60	49.00
10	11510.00	45.6 AV	54.0	-8.4	1.00 V	41	-3.40	49.00

- REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”:The radiated frequency is out the restricted band.



A D T

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

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	4920.00	59.0 PK	74.0	-15.0	1.02 H	86	22.00	37.00
2	4920.00	53.5 AV	54.0	-0.5	1.02 H	86	16.50	37.00
3	5040.00	58.1 PK	74.0	-15.9	1.00 H	80	20.80	37.30
4	5040.00	52.1 AV	54.0	-1.9	1.00 H	80	14.80	37.30
5	*5795.00	107.7 PK			1.00 H	92	69.20	38.50
6	*5795.00	96.4 AV			1.00 H	92	57.90	38.50
7	#5850.00	60.8 PK	87.7	-26.9	1.00 H	269	22.20	38.60
8	#5850.00	42.0 AV	76.4	-34.4	1.00 H	269	3.40	38.60
9	11590.00	57.5 PK	74.0	-16.5	1.00 H	174	8.70	48.80
10	11590.00	45.0 AV	54.0	-9.0	1.00 H	174	-3.80	48.80

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ”: Fundamental frequency.
 6. The limit value is defined as per 15.247.
 7. “#”: The radiated frequency is out the restricted band.



A D T

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

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	4920.00	52.9 PK	74.0	-21.1	1.00 V	300	15.90	37.00
2	4920.00	40.9 AV	54.0	-13.1	1.00 V	300	3.90	37.00
3	5040.00	51.4 PK	74.0	-22.6	1.00 V	320	14.10	37.30
4	5040.00	39.0 AV	54.0	-15.0	1.00 V	320	1.70	37.30
5	*5795.00	108.6 PK			1.00 V	78	70.10	38.50
6	*5795.00	97.8 AV			1.00 V	78	59.30	38.50
7	#5850.00	61.3 PK	88.6	-27.3	1.00 V	249	22.70	38.60
8	#5850.00	41.9 AV	77.8	-35.9	1.00 V	249	3.30	38.60
9	11590.00	57.4 PK	74.0	-16.6	1.00 V	123	8.60	48.80
10	11590.00	44.8 AV	54.0	-9.2	1.00 V	123	-4.00	48.80

- REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”:The radiated frequency is out the restricted band.



A D T

BELOW 1GHz WORST-CASE DATA : 802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	125.17	31.5 QP	43.5	-12.0	3.00 H	70	18.60	12.90
2	166.00	31.4 QP	43.5	-12.1	1.50 H	265	17.40	14.00
3	249.60	36.3 QP	46.0	-9.7	1.00 H	76	23.30	13.00
4	337.10	36.9 QP	46.0	-9.1	1.00 H	121	20.90	16.00
5	389.59	34.7 QP	46.0	-11.3	1.00 H	229	17.30	17.40
6	624.85	30.7 QP	46.0	-15.3	1.00 H	262	7.40	23.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	55.18	35.8 QP	40.0	-4.2	1.50 V	10	22.00	13.80
2	107.67	34.3 QP	43.5	-9.2	1.00 V	55	23.20	11.10
3	125.17	32.0 QP	43.5	-11.5	1.00 V	19	19.10	12.90
4	166.00	31.1 QP	43.5	-12.4	1.00 V	67	17.10	14.00
5	337.10	32.9 QP	46.0	-13.1	1.00 V	130	16.90	16.00
6	389.59	35.8 QP	46.0	-10.2	1.50 V	79	18.40	17.40

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

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

5.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 23, 2011	Nov. 22, 2012
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 30, 2010	Dec. 29, 2011
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 06, 2011	Jan. 05, 2012
LISN ROHDE & SCHWARZ	ESH3-Z5	835239/001	Feb. 22, 2011	Feb. 21, 2012
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 30, 2011	Jun. 29, 2012
LISN ROHDE & SCHWARZ	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Software ADT	ADT_Conc_ V7.3.7	NA	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

5.2.3 TEST PROCEDURES

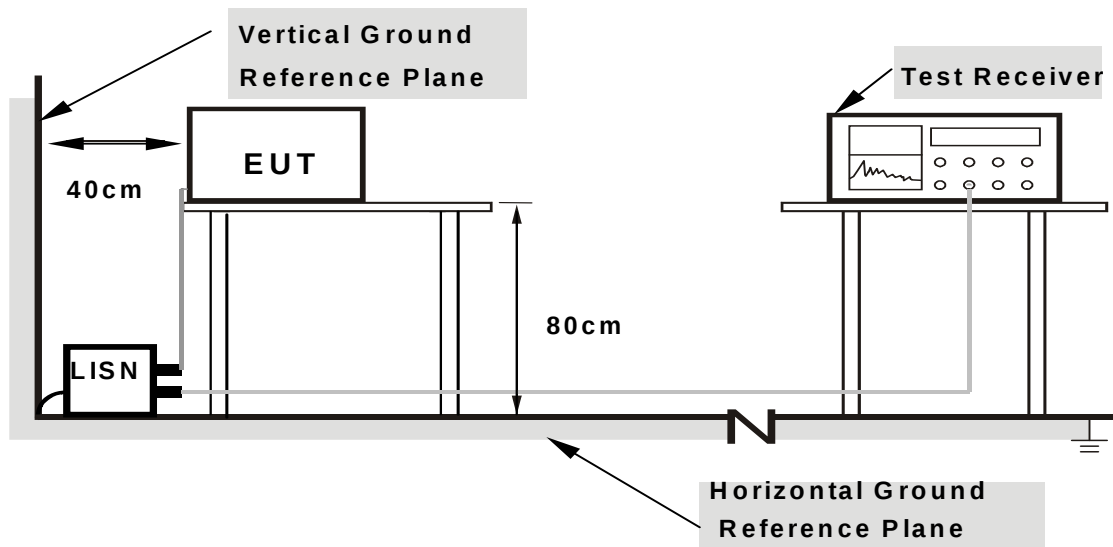
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

5.2.5 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).

5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

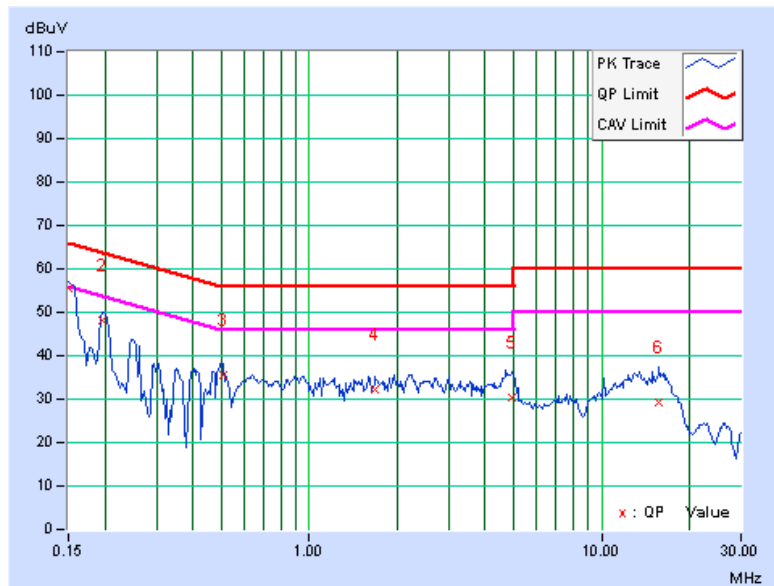
5.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11a

PHASE	Line 1	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

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	0.150	0.11	55.35	45.13	55.47	45.25	66.00	56.00	-10.53	-10.75
2	0.197	0.12	48.10	38.26	48.22	38.38	63.74	53.74	-15.52	-15.36
3	0.505	0.13	35.32	28.18	35.45	28.31	56.00	46.00	-20.55	-17.69
4	1.680	0.18	31.89	24.72	32.07	24.90	56.00	46.00	-23.93	-21.10
5	4.953	0.37	29.94	21.76	30.31	22.13	56.00	46.00	-25.69	-23.87
6	15.724	0.91	28.49	19.25	29.40	20.16	60.00	50.00	-30.60	-29.84

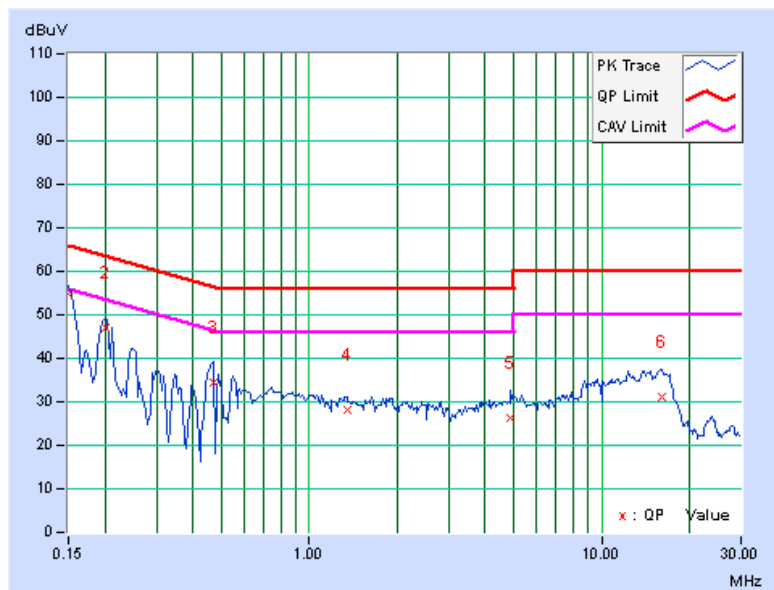
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

No	Freq.	Corr. Factor	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	0.150	0.12	54.68	43.77	54.80	43.89	66.00	56.00	-11.20	-12.11
2	0.201	0.13	46.93	37.18	47.06	37.31	63.58	53.58	-16.52	-16.27
3	0.470	0.14	34.20	14.99	34.34	15.13	56.51	46.51	-22.16	-31.37
4	1.348	0.19	28.10	20.56	28.29	20.75	56.00	46.00	-27.71	-25.25
5	4.902	0.36	25.92	20.07	26.28	20.43	56.00	46.00	-29.72	-25.57
6	16.121	0.79	30.33	22.52	31.12	23.31	60.00	50.00	-28.88	-26.69

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

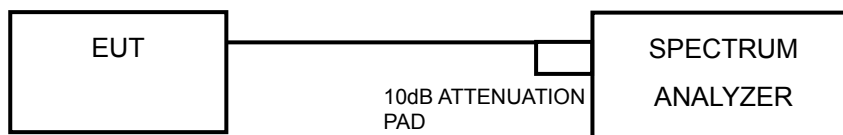


5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

5.3.2 TEST SETUP



5.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.3.4 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. 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

5.3.5 DEVIATION FROM TEST STANDARD

No deviation.

5.3.6 EUT OPERATING CONDITIONS

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

5.3.7 TEST RESULTS

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.33	16.65	16.68	0.5	PASS
157	5785	16.26	16.60	16.53	0.5	PASS
165	5825	16.36	16.62	16.61	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	17.43	17.77	17.85	0.5	PASS
157	5785	17.78	17.88	17.88	0.5	PASS
165	5825	17.88	17.76	17.89	0.5	PASS

802.11n (40MHz)

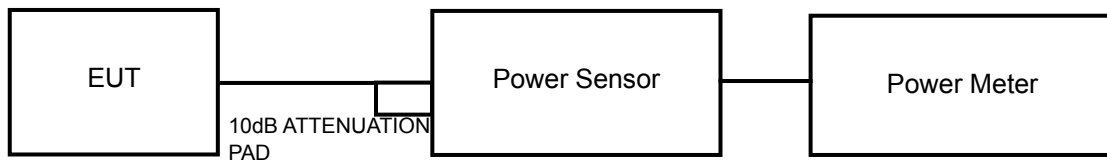
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	35.52	37.19	36.80	0.5	PASS
159	5795	35.29	37.24	37.12	0.5	PASS

5.4 CONDUCTED OUTPUT POWER

5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

5.4.2 TEST SETUP



5.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.4.4 TEST PROCEDURES

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

5.4.5 DEVIATION FROM TEST STANDARD

No deviation.

5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

5.4.7 TEST RESULTS

802.11a

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	22.9	23.5	21.7	566.8	27.5	29.2	PASS
157	5785	22.1	23.0	21.5	503.0	27.0	29.2	PASS
165	5825	22.2	23.1	21.2	502.0	27.0	29.2	PASS

Directional gain = $2\text{dBi} + 10\log(3) = 6.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $30 - (6.8 - 6) = 29.2\text{dBm}$

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	22.2	23.2	21.4	512.9	27.1	29.2	PASS
157	5785	22.0	23.3	21.6	516.8	27.1	29.2	PASS
165	5825	22.1	23.1	21.5	507.6	27.1	29.2	PASS

Directional gain = $2\text{dBi} + 10\log(3) = 6.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $30 - (6.8 - 6) = 29.2\text{dBm}$

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	21.8	23.1	22.1	517.7	27.1	29.2	PASS
159	5795	21.7	23.3	22.3	531.5	27.3	29.2	PASS

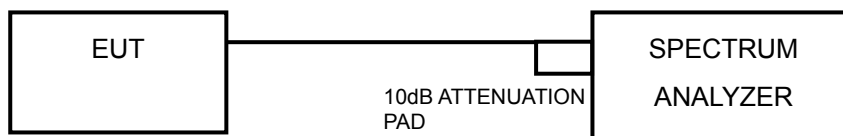
Directional gain = $2\text{dBi} + 10\log(3) = 6.8\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $30 - (6.8 - 6) = 29.2\text{dBm}$

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



5.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.5.4 TEST PROCEDURE.

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

5.5.5 DEVIATION FROM TEST STANDARD

No deviation.

5.5.6 EUT OPERATING CONDITION

Same as Item 5.3.6.

5.5.7 TEST RESULTS

802.11a

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	1.52	-13.71	4.77	-8.94	7.2	PASS
	157	5785	0.60	-14.63	4.77	-9.86	7.2	PASS
	165	5825	0.65	-14.58	4.77	-9.81	7.2	PASS
1	149	5745	1.52	-13.71	4.77	-8.94	7.2	PASS
	157	5785	0.88	-14.35	4.77	-9.58	7.2	PASS
	165	5825	0.87	-14.36	4.77	-9.59	7.2	PASS
2	149	5745	1.46	-13.77	4.77	-9.00	7.2	PASS
	157	5785	1.15	-14.08	4.77	-9.31	7.2	PASS
	165	5825	0.72	-14.51	4.77	-9.74	7.2	PASS

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

802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	0.31	-14.92	4.77	-10.15	7.2	PASS
	157	5785	0.20	-15.03	4.77	-10.26	7.2	PASS
	165	5825	0.01	-15.22	4.77	-10.45	7.2	PASS
1	149	5745	0.13	-15.10	4.77	-10.33	7.2	PASS
	157	5785	0.43	-14.80	4.77	-10.03	7.2	PASS
	165	5825	0.03	-15.20	4.77	-10.43	7.2	PASS
2	149	5745	-0.73	-15.96	4.77	-11.19	7.2	PASS
	157	5785	-0.62	-15.85	4.77	-11.08	7.2	PASS
	165	5825	-0.46	-15.69	4.77	-10.92	7.2	PASS

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

802.11n (40MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-2.79	-18.02	4.77	-13.25	7.2	PASS
	159	5795	-2.95	-18.18	4.77	-13.41	7.2	PASS
1	151	5755	-2.41	-17.64	4.77	-12.87	7.2	PASS
	159	5795	-2.35	-17.58	4.77	-12.81	7.2	PASS
2	151	5755	-3.27	-18.50	4.77	-13.73	7.2	PASS
	159	5795	-2.84	-18.07	4.77	-13.30	7.2	PASS

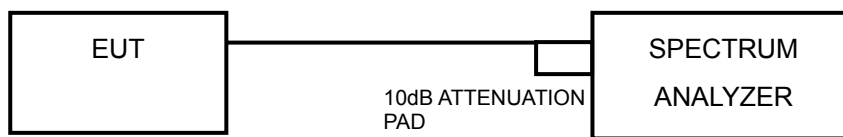
Directional gain = $2\text{dBi} + 10\log(3) = 6.8\text{dBi} > 6\text{dBi}$, so the power spectral density limit shall be reduced to $8 - (6.8 - 6) = 7.2\text{dBm}$

5.6 CONDUCTED EMISSION MEASUREMENT

5.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

5.6.2 TEST SETUP



5.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

5.6.5 DEVIATION FROM TEST STANDARD

No deviation.

5.6.6 EUT OPERATING CONDITION

Same as Item 5.3.6

5.6.7 TEST RESULTS

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

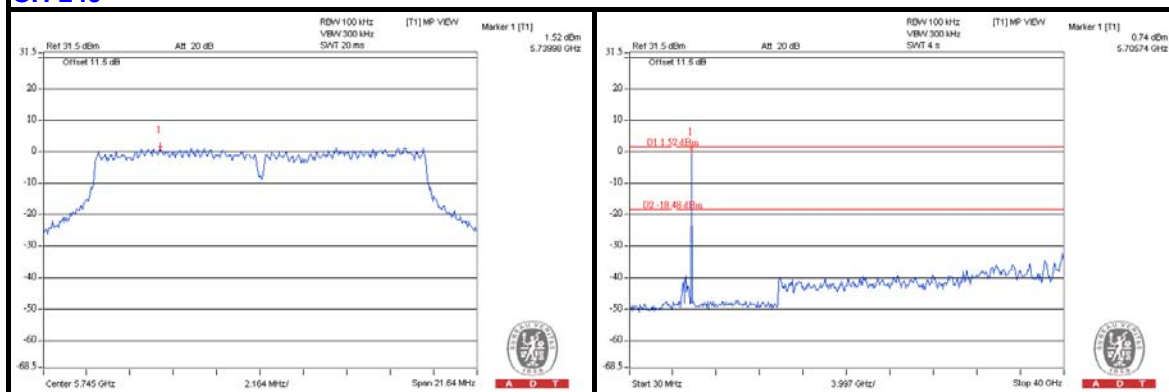
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).



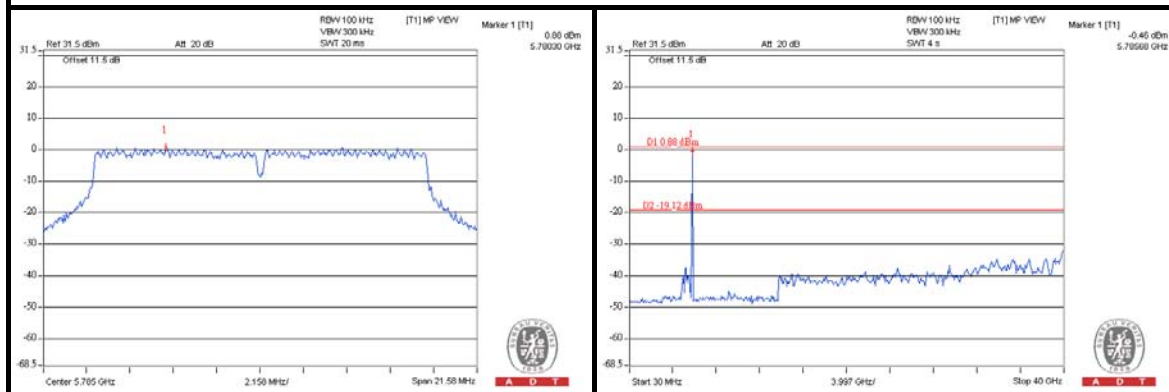
A D T

802.11a

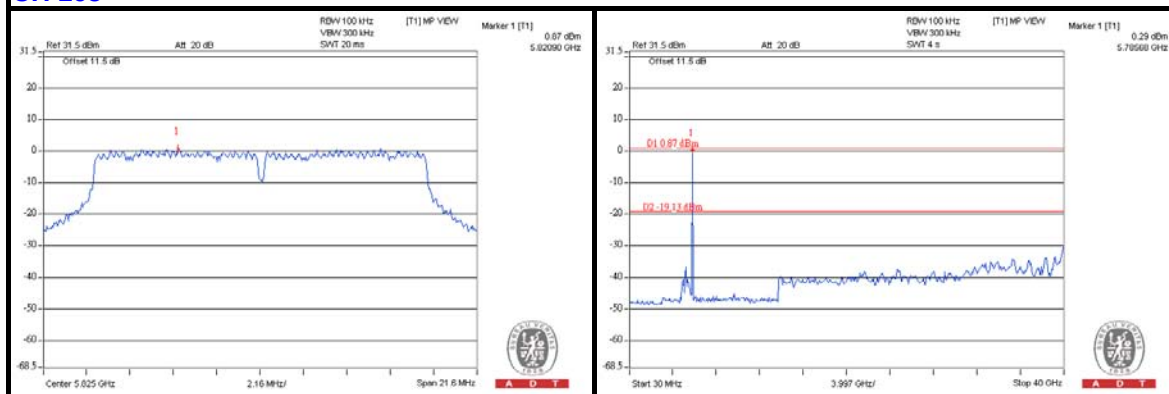
CH 149



CH 157

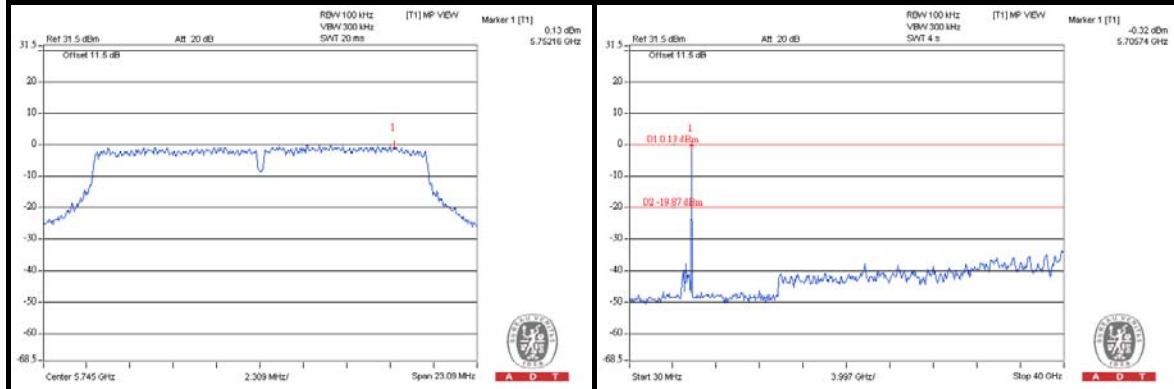


CH 165

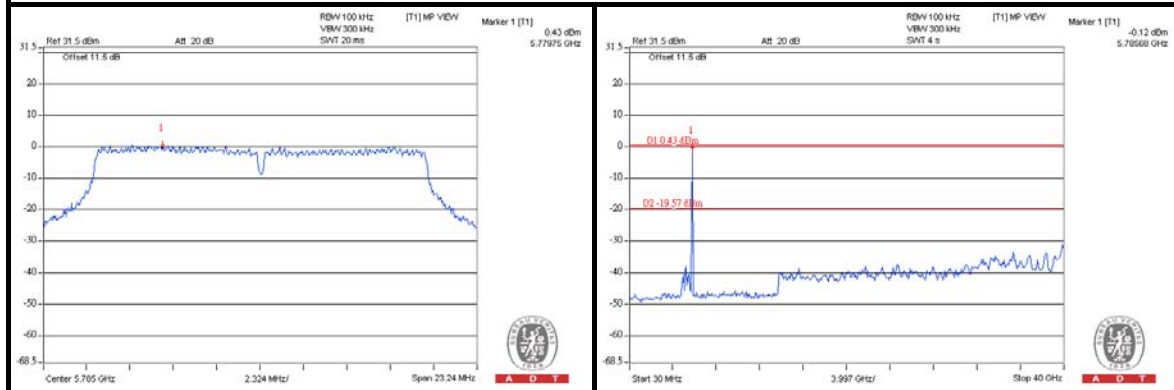


802.11n(20MHz)

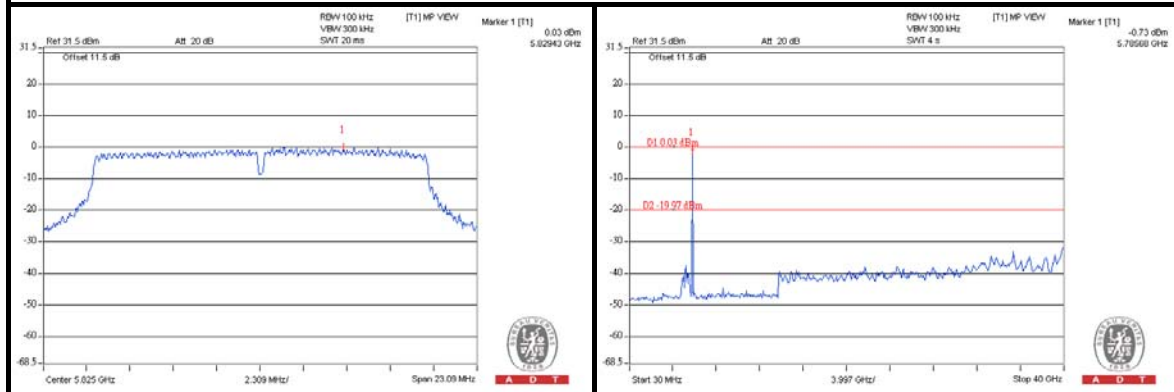
CH 149



CH 157

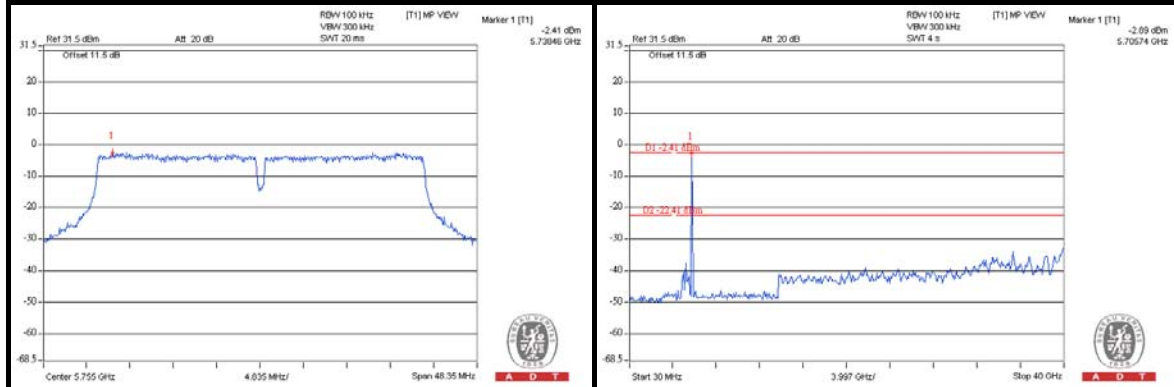


CH 165

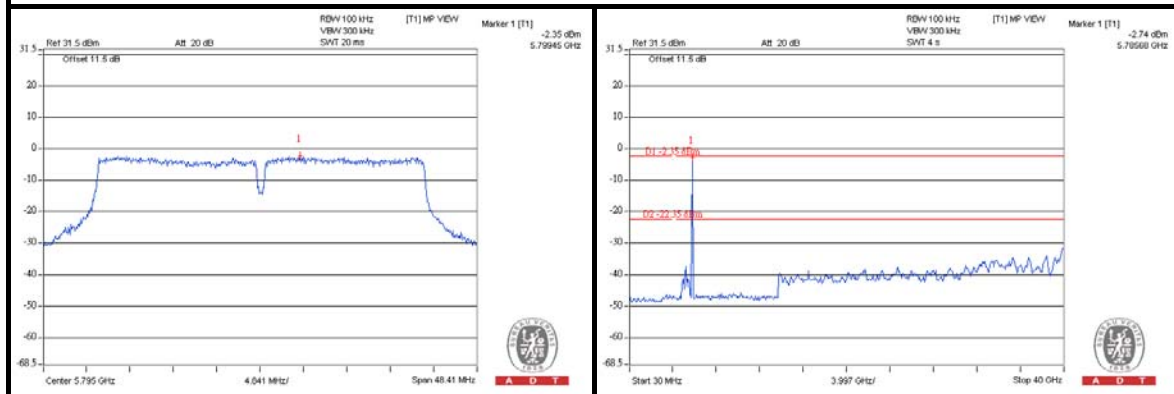


802.11n(40MHz)

CH 151



CH 159





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6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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7. INFORMATION ON THE TESTING LABORATORIES

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

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

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.adt.com.tw

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



A D T

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

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

---END---