FCC TEST REPORT (15.407)

IC TEST REPORT (RSS-210 Issue 8 (2010-12))

REPORT NO.:	RF140304C25-1
MODEL NO.:	FCM-AP214Bxxxxxx (Refer to item 3.1 for more details)
FCC ID:	TVE-122203
IC:	7280B-122203
RECEIVED:	Mar. 04, 2014
TESTED:	Mar. 18 ~ Jun. 12, 2014
ISSUED:	Jun. 19, 2014

APPLICANT:	Fortinet Inc.
ADDRESS:	899 Kifer Road Sunnyvale, CA 94086, USA

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

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140304C25-1	Original release	Jun. 19, 2014

1. CERTIFICATION

PRODUCT:	Secured Wireless Access Point w/ IP Camera
MODEL:	FCM-AP214Bxxxxxx (Refer to item 3.1 for more details)
BRAND:	Fortinet
APPLICANT:	Fortinet Inc.
TESTED:	Mar. 18 ~ Jun. 12, 2014
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart E (Section 15.407)**
	Canada RSS-210 Issue 8 (2010-12)
	Canada RSS-Gen Issue 3 (2010-12)
	ANSI C63.10-2009

The above equipment (model: FORTIAPCAM-214B) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Celine Chou **, DATE :** Jun. 19, 2014

Celine Chou / Specialist

APPROVED BY : Ken Liu **, DATE :** Jun. 19, 2014

Ken Liu / Senior Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407); RSS-210; RSS-Gen				
STANDARD SECTION		TEST TYPE	RESULT	REMARK
FCC Part 15E	Canada Standard			
15.407(b)(6)	RSS-Gen 7.2.4	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -6.26dB at 0.38047MHz.
-	RSS-Gen 4.6	Occupied Bandwidth Measurement	PASS	Meet the requirement of limit.
15.407(b/1/2/3) (b)(6)	RSS-210 Annex 9.2	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.3dB at 901.14MHz.
15.407(a/1/2)	RSS-210 Annex 9.2	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	-	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2)	RSS-210 Annex 9.2	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	-	Frequency Stability	PASS	Meet the requirement of limit.
15.203	-	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Secured Wireless Access Point w/ IP Camera
MODEL NO.	FCM-AP214Bxxxxxx (Refer to note for more details)
POWER SUPPLY	12Vdc (Adapter) 48Vdc (POE)
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	5180 ~ 5240MHz
NUMBER OF CHANNEL	4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	46.842mW
ANTENNA TYPE	Refer to note
ANTENNA CONNECTOR	Refer to note
DATA CABLE	0.35m non-shielded audio in cable without core 0.35m non-shielded AV out cable without core
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

1. The following models are provided to this EUT.

BRAND	MODEL	DESCRIPTION
Fortinet	FCM-AP214Bxxxxxx	where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only
	FAPCM-214Bxxxxxx	
	FORTICAM-AP214Bxxxxxx	
	FCMAP-214xxxxxx	
	FORTIAP-CAM214Bxxxxxx	
	FAP-CM214Bxxxxxx	
	FORTIAPCAM-214Bxxxxxx	
	FCM-AP214Bxxxxxx	

* The model FORTIAPCAM-214B was chosen for final test.

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

MODULATION MODE	TX FUNCTION
802.11b	2TX
802.11g	2TX
802.11a	2TX
802.11n (20MHz) (MCS 0-15)	2TX
802.11n (40MHz) (MCS 0-15)	2TX

3. There are 2 antennas for the EUT.

No.	Type	Gain(dBi)		Connector
		2.4GHz	5GHz	
1	PIFA	3.7	5.3	IPEX
2	PIFA	3.6	4.8	IPEX

4. The EUT consumes power from the following adapters.

ADAPTER 1	
BRAND	Powertron Electronics Corp.
MODEL	PA1015-2HC120125
INPUT POWER	100-240Vac, 50-60Hz, 0.4A
OUTPUT POWER	12Vdc, 1.25A, 15W Max
POWER LINE	1.5m cable without core attached on adapter

ADAPTER 2	
BRAND	Powertron Electronics Corp.
MODEL	PA1015-2I
P/N	PA1015-120IB125
INPUT POWER	100-240Vac, 50-60Hz, 0.4A
OUTPUT POWER	12Vdc, 1.25A, 15W Max
POWER LINE	1.5m cable without core attached on adapter

5. Both of the 2.4GHz and 5GHz cannot transmit simultaneously.
6. 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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190MHz	46	5230MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Powered by adapter 1
B	-	√	√	-	Powered by adapter 2
C	-	√	√	-	Powered by POE

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

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	15.0

RADIATED EMISSION TEST (BELOW 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A & B & C	802.11n (40MHz)	38 to 46	46	OFDM	BPSK	15.0

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A & B & C	802.11n (40MHz)	38 to 46	46	OFDM	BPSK	15.0

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	21deg. C, 69%RH	120Vac, 60Hz	Brad Tung
RE<1G	21deg. C, 69%RH 23deg. C, 69%RH	120Vac, 60Hz 48Vdc	Brad Tung Jones Chang
PLC	25deg. C, 65%RH 24deg. C, 64%RH	120Vac, 60Hz 48Vdc	Ted Chang Match Tsui
APCM	23deg. C, 60%RH	120Vac, 60Hz	Jun Wu

3.3 DUTY CYCLE OF TEST SIGNAL

MODULATION TYPE: BPSK

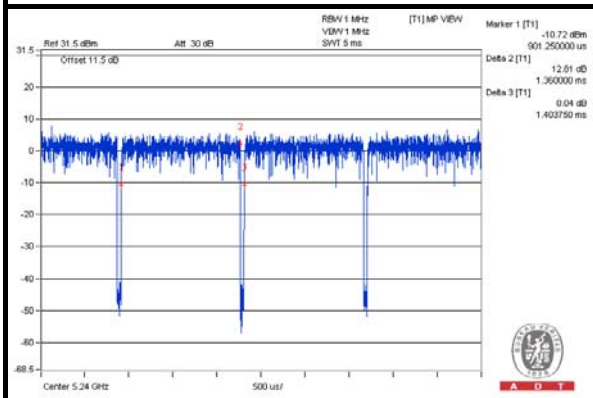
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 1.360/1.404 = 0.969, Duty factor = 10 * log(1/0.969) = 0.14

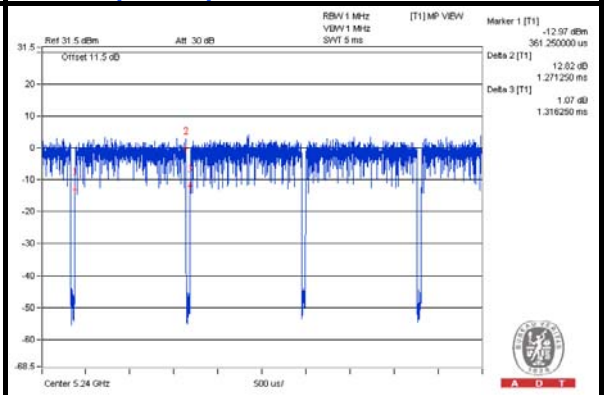
802.11n (20MHz): Duty cycle = 1.271/1.317 = 0.965, Duty factor = 10 * log(1/0.965) = 0.15

802.11n (40MHz): Duty cycle = 0.625/0.664 = 0.941, Duty factor = 10 * log(1/0.941) = 0.26

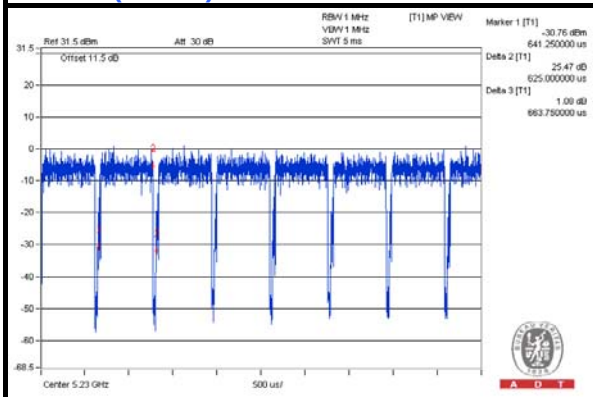
802.11a



802.11n (20MHz)



802.11n (40MHz)



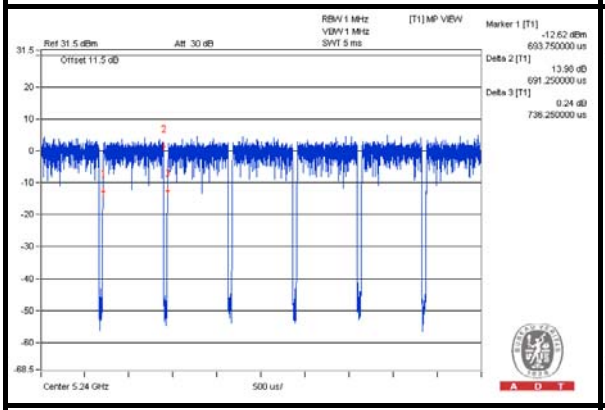
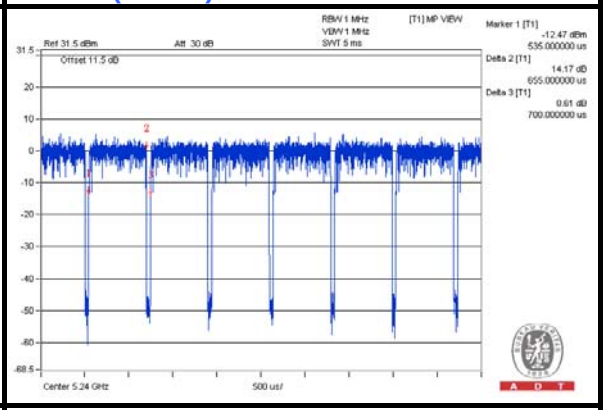
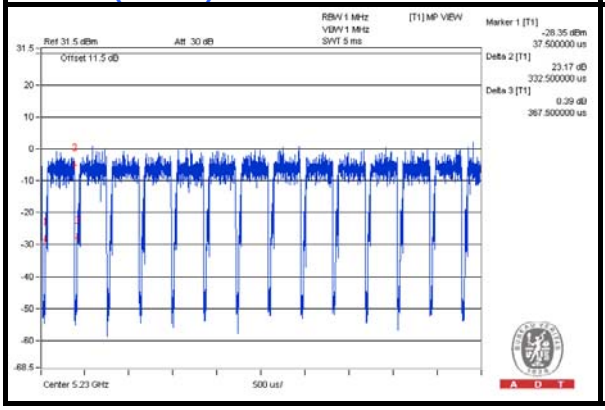
MODULATION TYPE: QPSK

Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 0.691/0.736 = 0.939, Duty factor = 10 * log(1/0.939) = 0.27

802.11n (20MHz): Duty cycle = 0.655/0.700 = 0.936, Duty factor = 10 * log(1/0.936) = 0.29

802.11n (40MHz): Duty cycle = 0.333/0.368 = 0.905, Duty factor = 10 * log(1/0.905) = 0.43

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

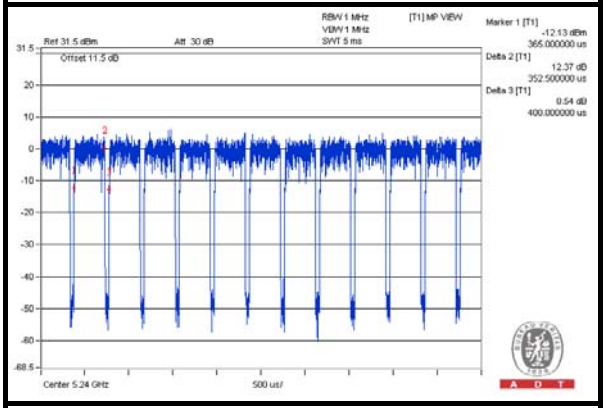
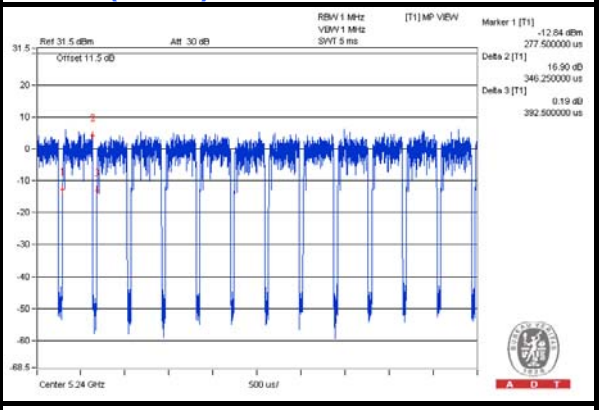
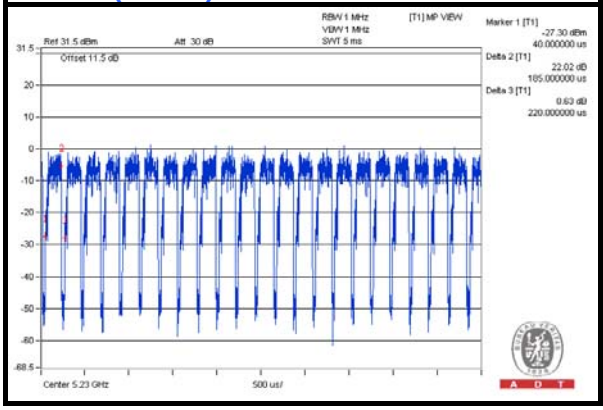
MODULATION TYPE: 16QAM

Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 0.352/0.400 = 0.880, Duty factor = 10 * log(1/0.880) = 0.56

802.11n (20MHz): Duty cycle = 0.346/0.392 = 0.883, Duty factor = 10 * log(1/0.883) = 0.54

802.11n (40MHz): Duty cycle = 0.185/0.220 = 0.841, Duty factor = 10 * log(1/0.841) = 0.75

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

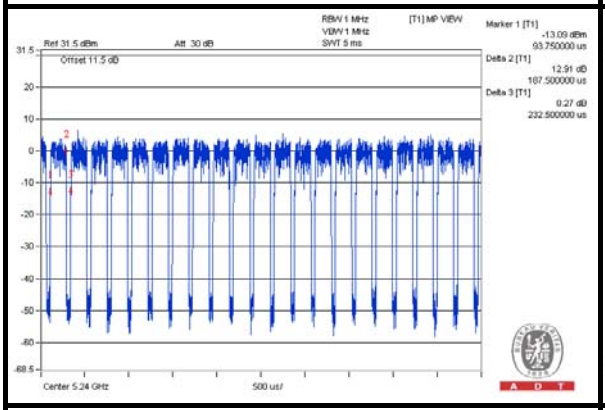
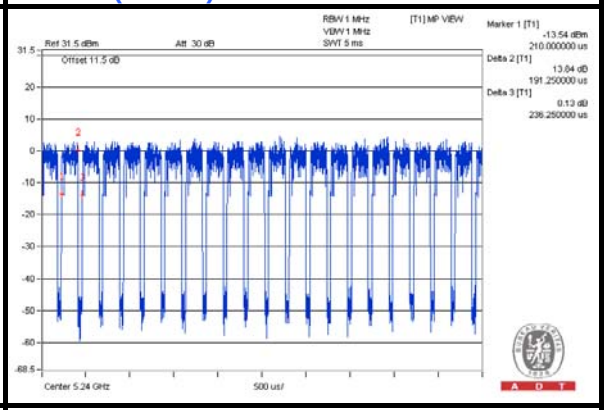
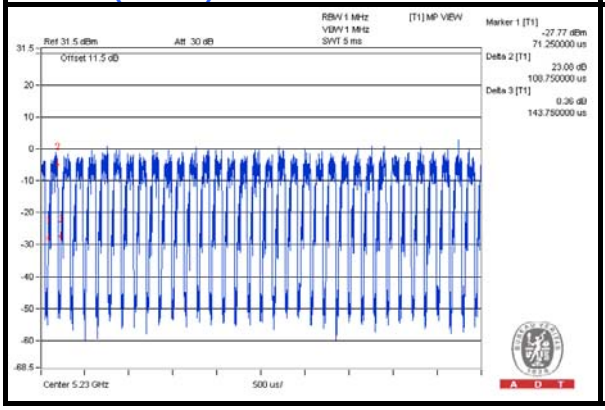
MODULATION TYPE: 64QAM

Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 0.188/0.233 = 0.807, Duty factor = 10 * log(1/0.807) = 0.93

802.11n (20MHz): Duty cycle = 0.191/0.236 = 0.809, Duty factor = 10 * log(1/0.809) = 0.92

802.11n (40MHz): Duty cycle = 0.109/0.144 = 0.757, Duty factor = 10 * log(1/0.757) = 1.21

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

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.

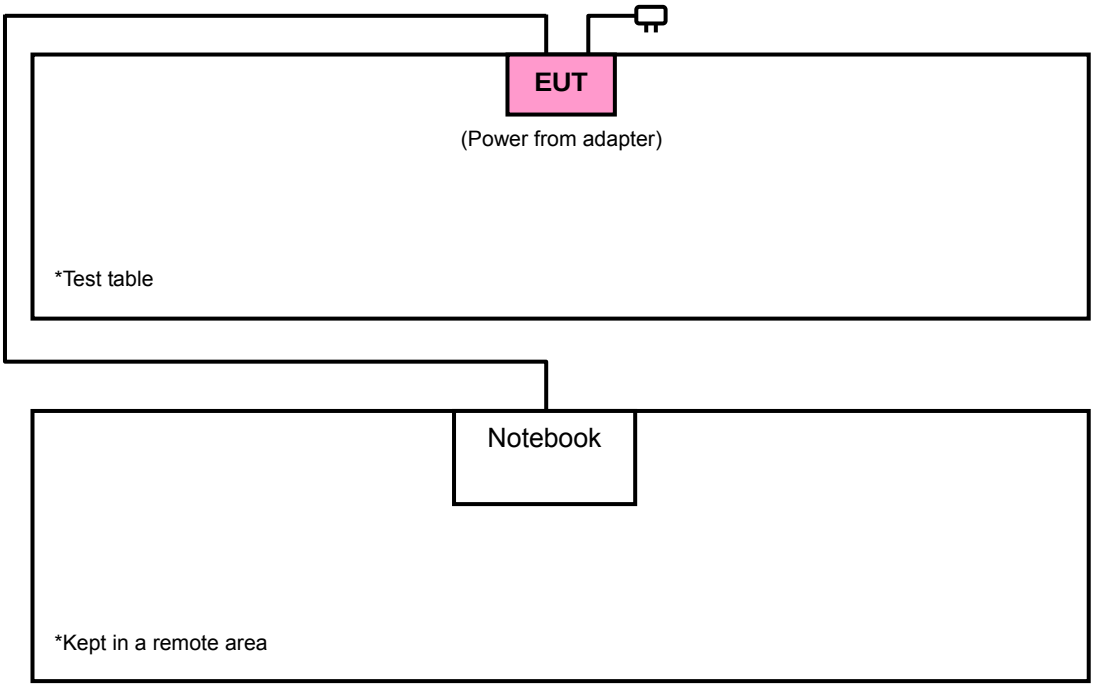
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	D531	CN-0XM006-48643-81U-2786	QDS-BRCM1020
2	POE	Powertron Electronics Corp.	PA1040-480IB080	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m RJ45 UTP cable for mode A and B, 1.8m RJ45 UTP cable for mode C
2	10m RJ45 UTP cable

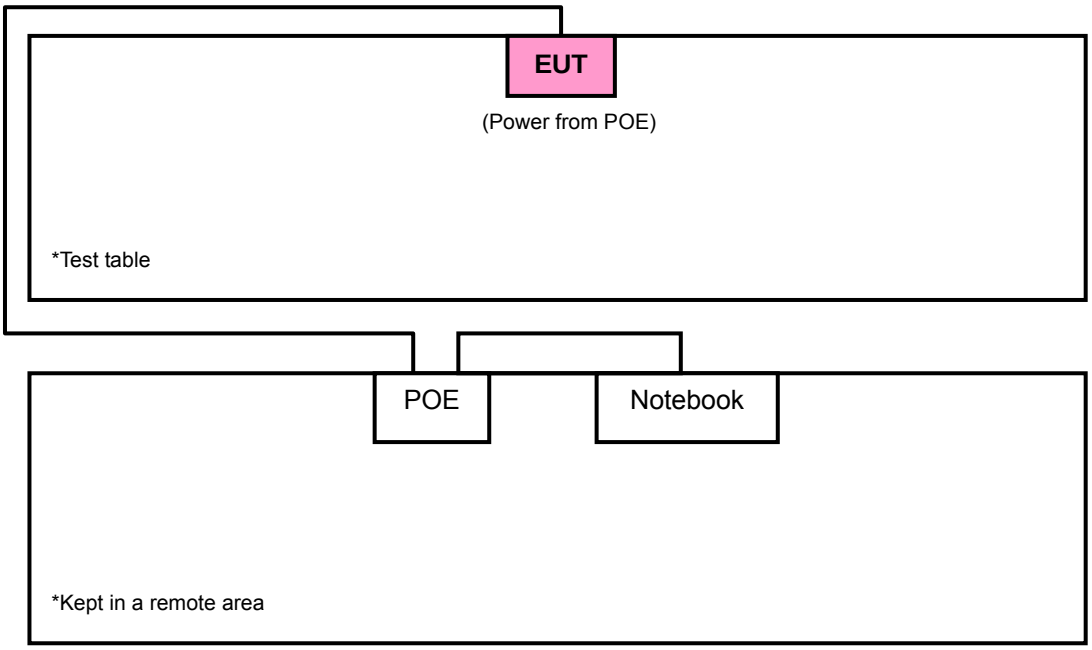
NOTE:
1. All power cords of the above support units are non-shielded (1.8 m).
2. Item 1 acted as a communication partner to transfer data.
3. Item 2 for mode C tested only.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST

TEST MODE A, B



TEST MODE C



3.5 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 E (15.407)
789033 D01 General UNII Test Procedures v01r03
662911 D01 Multiple Transmitter Output v02r01
Canada RSS-210 Issue 8 (2010-12)
Canada RSS-Gen Issue 3 (2010-12)
ANSI C63.10-2009

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

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

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
√	FIELD STRENGTH AT 3m (dBμV/m)	
	PK	AV
	74	54
	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m)
	PK	PK
	-27	68.3

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts).

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Sep. 09, 2013	Sep. 08, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Dec. 18, 2013	Dec. 17, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 26, 2014	Feb. 25, 2015
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 05, 2014	Jan. 04, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 28, 2013	Oct. 27, 2014
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 26, 2013	Aug. 25, 2014
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2013	Oct. 17, 2014
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 10, 2013	Jun. 09, 2014

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 4.

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 460141.

5. The IC Site Registration No. is IC7450F-4.

4.1.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. 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 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

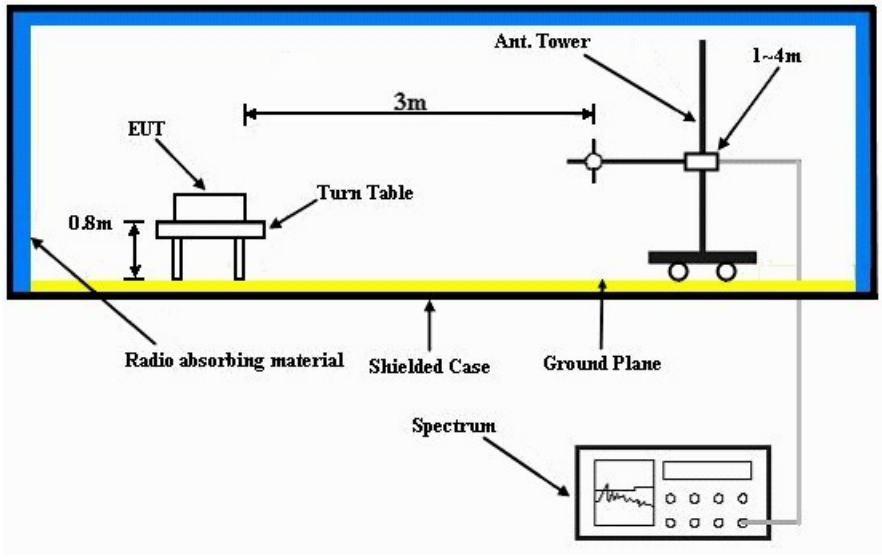
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

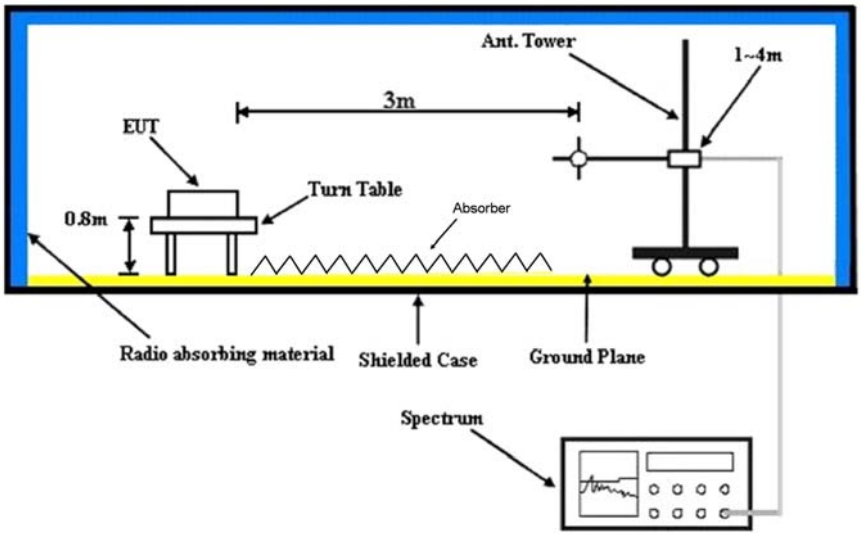
No deviation.

4.1.6 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



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

4.1.7 EUT OPERATING CONDITION

a. Placed the EUT on the testing table.
b. Prepared notebooks to act as communication partner and placed it outside of testing area.
c. 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.
d. The communication partner sent data to EUT by command "PING".

4.1.8 TEST RESULTS

ABOVE 1GHz DATA：

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.00	58.4 PK	74.0	-15.6	1.55 H	34	53.00	5.40
2	#5150.00	44.4 AV	54.0	-9.6	1.55 H	34	39.00	5.40
3	*5180.00	107.0 PK			1.55 H	34	67.70	39.30
4	*5180.00	95.0 AV			1.55 H	34	55.70	39.30
5	#10360.00	58.2 PK	74.0	-15.8	1.06 H	75	42.00	16.20
6	#10360.00	46.2 AV	54.0	-7.8	1.06 H	75	30.00	16.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.00	58.8 PK	74.0	-15.2	1.42 V	8	53.40	5.40
2	#5150.00	44.8 AV	54.0	-9.2	1.42 V	8	39.40	5.40
3	*5180.00	107.4 PK			1.42 V	8	68.10	39.30
4	*5180.00	95.4 AV			1.42 V	8	56.10	39.30
5	#10360.00	58.3 PK	74.0	-15.7	1.30 V	239	42.10	16.20
6	#10360.00	46.3 AV	54.0	-7.7	1.30 V	239	30.10	16.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	106.8 PK			1.49 H	50	67.50	39.30
2	*5200.00	94.6 AV			1.49 H	50	55.30	39.30
3	#10400.00	58.2 PK	74.0	-15.8	1.08 H	140	41.80	16.40
4	#10400.00	46.6 AV	54.0	-7.4	1.08 H	140	30.20	16.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	107.0 PK			1.66 V	4	67.70	39.30
2	*5200.00	94.9 AV			1.66 V	4	55.60	39.30
3	#10400.00	58.3 PK	74.0	-15.7	1.15 V	16	41.90	16.40
4	#10400.00	46.8 AV	54.0	-7.2	1.15 V	16	30.40	16.40

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	106.4 PK			1.42 H	18	67.10	39.30
2	*5240.00	94.3 AV			1.42 H	18	55.00	39.30
3	#10480.00	58.7 PK	74.0	-15.3	1.09 H	34	41.40	17.30
4	#10480.00	47.7 AV	54.0	-6.3	1.09 H	34	30.40	17.30
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	*5240.00	106.8 PK			1.60 V	7	67.50	39.30
2	*5240.00	94.7 AV			1.60 V	7	55.40	39.30
3	#10480.00	59.0 PK	74.0	-15.0	1.12 V	20	41.70	17.30
4	#10480.00	47.7 AV	54.0	-6.3	1.12 V	20	30.40	17.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.00	64.1 PK	74.0	-9.9	1.35 H	80	58.70	5.40
2	#5150.00	45.4 AV	54.0	-8.6	1.35 H	80	40.00	5.40
3	*5180.00	106.1 PK			1.35 H	80	66.80	39.30
4	*5180.00	93.9 AV			1.35 H	80	54.60	39.30
5	#10360.00	57.4 PK	74.0	-16.6	1.08 H	243	41.20	16.20
6	#10360.00	46.6 AV	54.0	-7.4	1.08 H	243	30.40	16.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.00	65.4 PK	74.0	-8.6	1.05 V	5	60.00	5.40
2	#5150.00	46.1 AV	54.0	-7.9	1.05 V	5	40.70	5.40
3	*5180.00	106.4 PK			1.05 V	5	67.10	39.30
4	*5180.00	94.3 AV			1.05 V	5	55.00	39.30
5	#10360.00	57.6 PK	74.0	-16.4	1.22 V	45	41.40	16.20
6	#10360.00	46.6 AV	54.0	-7.4	1.22 V	45	30.40	16.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	105.9 PK			1.42 H	67	66.60	39.30
2	*5200.00	93.6 AV			1.42 H	67	54.30	39.30
3	#10400.00	57.5 PK	74.0	-16.5	1.14 H	208	41.10	16.40
4	#10400.00	46.6 AV	54.0	-7.4	1.14 H	208	30.20	16.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	106.2 PK			1.05 V	4	66.90	39.30
2	*5200.00	94.1 AV			1.05 V	4	54.80	39.30
3	#10400.00	57.7 PK	74.0	-16.3	1.18 V	50	41.30	16.40
4	#10400.00	46.9 AV	54.0	-7.1	1.18 V	50	30.50	16.40

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	105.7 PK			1.48 H	92	66.40	39.30
2	*5240.00	93.5 AV			1.48 H	92	54.20	39.30
3	#10480.00	58.5 PK	74.0	-15.5	1.12 H	265	41.20	17.30
4	#10480.00	47.9 AV	54.0	-6.1	1.12 H	265	30.60	17.30
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	*5240.00	105.9 PK			1.10 V	17	66.60	39.30
2	*5240.00	94.0 AV			1.10 V	17	54.70	39.30
3	#10480.00	58.8 PK	74.0	-15.2	1.06 V	35	41.50	17.30
4	#10480.00	47.9 AV	54.0	-6.1	1.06 V	35	30.60	17.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.00	69.2 PK	74.0	-4.8	1.38 H	95	63.80	5.40
2	#5150.00	49.0 AV	54.0	-5.0	1.38 H	95	43.60	5.40
3	*5190.00	103.4 PK			1.38 H	95	64.10	39.30
4	*5190.00	90.3 AV			1.38 H	95	51.00	39.30
5	#10380.00	58.1 PK	74.0	-15.9	1.10 H	253	41.70	16.40
6	#10380.00	46.6 AV	54.0	-7.4	1.10 H	253	30.20	16.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.00	69.5 PK	74.0	-4.5	1.29 V	11	64.10	5.40
2	#5150.00	50.0 AV	54.0	-4.0	1.29 V	11	44.60	5.40
3	*5190.00	104.0 PK			1.29 V	11	64.70	39.30
4	*5190.00	90.8 AV			1.29 V	11	51.50	39.30
5	#10380.00	58.2 PK	74.0	-15.8	1.12 V	14	41.80	16.40
6	#10380.00	46.6 AV	54.0	-7.4	1.12 V	14	30.20	16.40

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	103.3 PK			1.45 H	74	64.00	39.30
2	*5230.00	90.2 AV			1.45 H	74	50.90	39.30
3	#10460.00	58.6 PK	74.0	-15.4	1.03 H	303	41.60	17.00
4	#10460.00	47.0 AV	54.0	-7.0	1.03 H	303	30.00	17.00
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	*5230.00	104.0 PK			1.08 V	13	64.70	39.30
2	*5230.00	90.7 AV			1.08 V	13	51.40	39.30
3	#10460.00	58.8 PK	74.0	-15.2	1.10 V	22	41.80	17.00
4	#10460.00	47.2 AV	54.0	-6.8	1.10 V	22	30.20	17.00

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

BELOW 1GHz WORST-CASE DATA：802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	223.94	43.0 QP	46.0	-3.0	1.49 H	111	59.30	-16.30
2	513.06	39.1 QP	46.0	-6.9	1.49 H	230	47.70	-8.60
3	676.05	42.9 QP	46.0	-3.1	1.00 H	172	48.50	-5.60
4	730.38	40.6 QP	46.0	-5.4	1.25 H	233	45.00	-4.40
5	782.78	40.6 QP	46.0	-5.4	1.00 H	224	43.80	-3.20
6	900.00	42.5 QP	46.0	-3.5	1.49 H	216	43.90	-1.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	43.48	37.6 QP	40.0	-2.4	1.01 V	12	51.90	-14.30
2	107.52	34.8 QP	43.5	-8.7	1.50 V	10	52.20	-17.40
3	276.33	34.7 QP	46.0	-11.3	1.50 V	152	47.70	-13.00
4	625.60	35.9 QP	46.0	-10.1	1.01 V	227	42.00	-6.10
5	676.05	41.8 QP	46.0	-4.2	1.01 V	99	47.40	-5.60
6	**901.14**	**43.7 QP**	**46.0**	**-2.3**	**1.50 V**	**183**	**45.10**	**-1.40**

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) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Brad Tung
TEST MODE	B		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	161.85	40.1 QP	43.5	-3.4	1.25 H	104	53.90	-13.80
2	241.40	42.5 QP	46.0	-3.5	2.00 H	81	57.30	-14.80
3	276.33	36.0 QP	46.0	-10.0	1.00 H	272	49.10	-13.10
4	676.05	35.7 QP	46.0	-10.3	1.25 H	229	41.30	-5.60
5	730.38	38.1 QP	46.0	-7.9	1.50 H	222	42.50	-4.40
6	782.78	38.5 QP	46.0	-7.5	1.00 H	229	41.70	-3.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	43.48	36.2 QP	40.0	-3.8	1.25 V	33	50.50	-14.30
2	121.10	36.9 QP	43.5	-6.6	1.00 V	102	53.00	-16.10
3	161.85	40.2 QP	43.5	-3.3	1.50 V	13	54.00	-13.80
4	513.06	37.7 QP	46.0	-8.3	1.00 V	200	46.30	-8.60
5	567.39	38.5 QP	46.0	-7.5	2.00 V	251	46.30	-7.80
6	625.60	38.4 QP	46.0	-7.6	1.25 V	13	44.50	-6.10

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) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	48Vdc	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	TESTED BY	Jones Chang
TEST MODE	C		

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	57.12	31.6 QP	40.0	-8.4	1.99 H	3	46.20	-14.60
2	160.17	37.0 QP	43.5	-6.5	1.49 H	215	50.60	-13.60
3	224.33	36.8 QP	46.0	-9.2	1.00 H	274	53.10	-16.30
4	675.40	42.1 QP	46.0	-3.9	1.00 H	124	46.90	-4.80
5	729.84	38.4 QP	46.0	-7.6	1.00 H	129	42.20	-3.80
6	784.28	39.5 QP	46.0	-6.5	1.00 H	132	41.70	-2.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	80.45	30.4 QP	40.0	-9.6	1.00 V	221	49.00	-18.60
2	97.95	31.3 QP	43.5	-12.2	1.00 V	99	50.30	-19.00
3	224.33	37.4 QP	46.0	-8.6	2.00 V	215	53.70	-16.30
4	235.99	33.5 QP	46.0	-12.5	2.00 V	186	48.60	-15.10
5	675.40	41.7 QP	46.0	-4.3	1.50 V	154	46.50	-4.80
6	784.28	34.7 QP	46.0	-11.3	1.00 V	162	36.90	-2.20

REMARKS:

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

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

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 17, 2013	Nov. 16, 2014
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 23, 2013	Dec. 22, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 08, 2013	Jul. 07, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 2.

3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

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

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

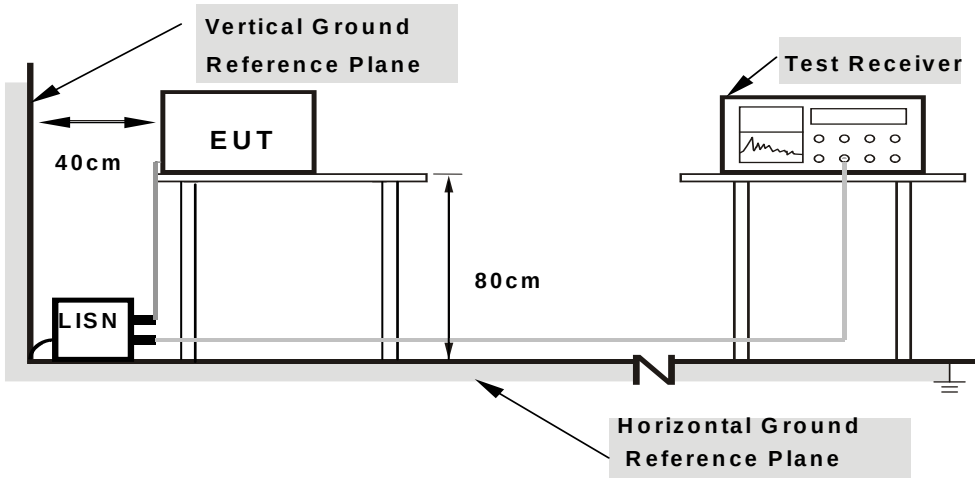
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

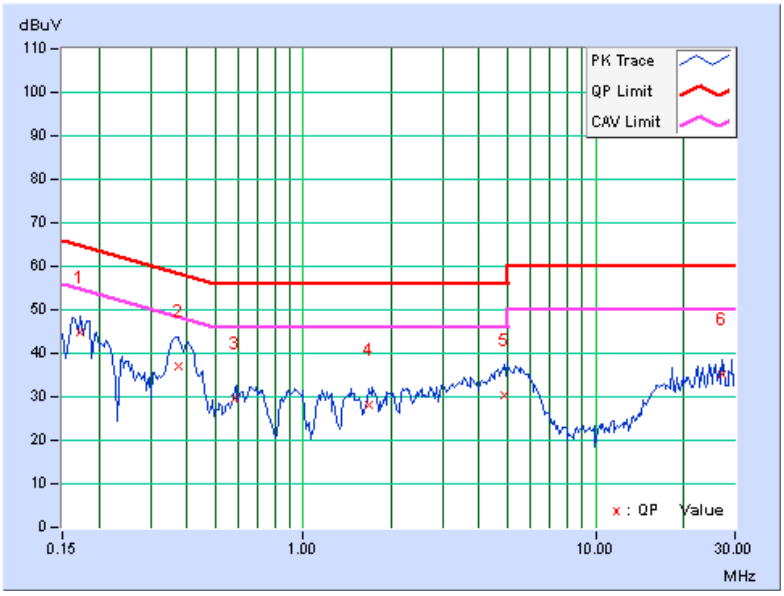
CONDUCTED WORST-CASE DATA：802.11n (40MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	0.23	44.51	36.97	44.74	37.20	64.79	54.79	-20.06	-17.60
2	0.37266	0.22	36.90	25.37	37.12	25.59	58.44	48.44	-21.32	-22.85
3	0.58359	0.24	29.29	19.71	29.53	19.95	56.00	46.00	-26.47	-26.05
4	1.67578	0.35	27.80	19.00	28.15	19.35	56.00	46.00	-27.85	-26.65
5	4.85547	0.45	29.92	21.28	30.37	21.73	56.00	46.00	-25.63	-24.27
6	27.15625	0.60	34.66	29.83	35.26	30.43	60.00	50.00	-24.74	-19.57

REMARKS:

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

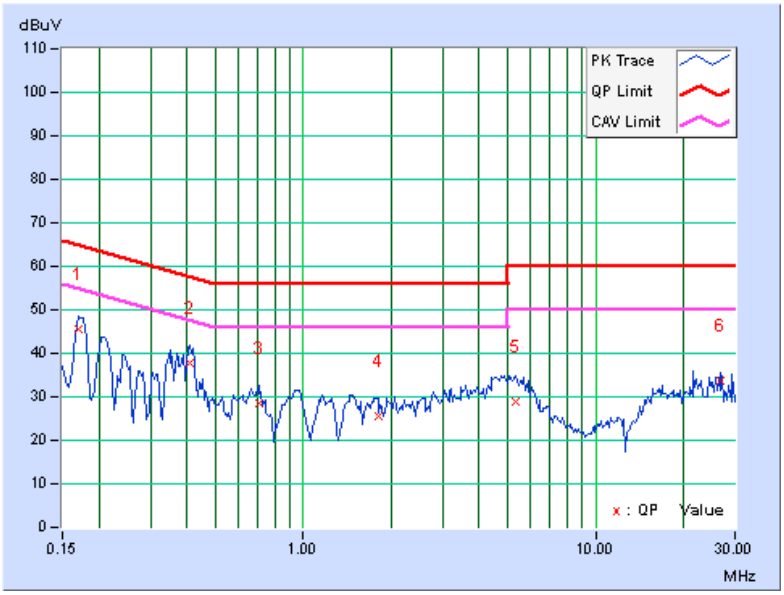


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.23	45.24	32.95	45.47	33.18	64.98	54.98	-19.51	-21.80
2	0.40781	0.30	37.59	29.14	37.89	29.44	57.69	47.69	-19.80	-18.25
3	0.70469	0.29	28.25	19.88	28.54	20.17	56.00	46.00	-27.46	-25.83
4	1.80469	0.37	25.15	15.67	25.52	16.04	56.00	46.00	-30.48	-29.96
5	5.33203	0.51	28.39	19.60	28.90	20.11	60.00	50.00	-31.10	-29.89
6	26.60938	0.70	32.90	27.69	33.60	28.39	60.00	50.00	-26.40	-21.61

REMARKS:

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

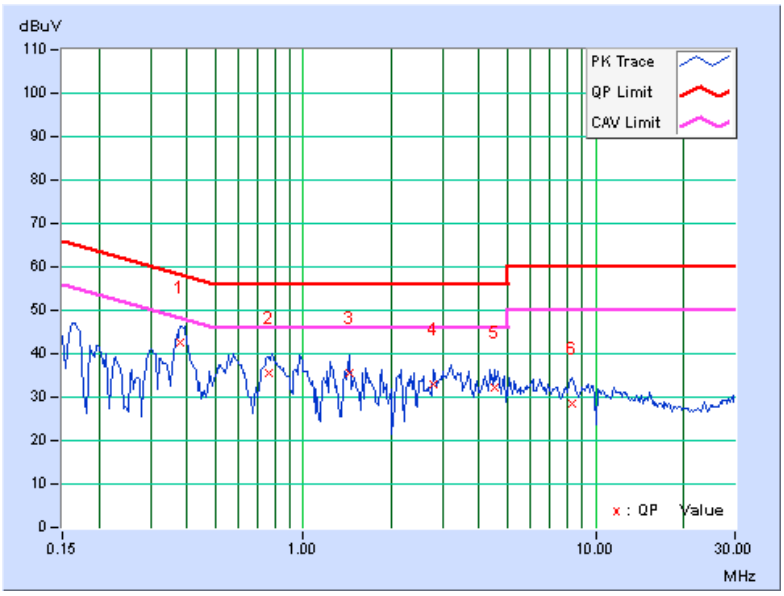


PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.38047	0.22	42.25	30.53	42.47	30.75	58.27	48.27	-15.80	-17.52
2	0.75938	0.27	35.25	25.79	35.52	26.06	56.00	46.00	-20.48	-19.94
3	1.44141	0.33	35.08	26.80	35.41	27.13	56.00	46.00	-20.59	-18.87
4	2.77344	0.40	32.53	24.23	32.93	24.63	56.00	46.00	-23.07	-21.37
5	4.50781	0.45	31.62	24.10	32.07	24.55	56.00	46.00	-23.93	-21.45
6	8.26172	0.49	28.11	21.55	28.60	22.04	60.00	50.00	-31.40	-27.96

REMARKS:

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

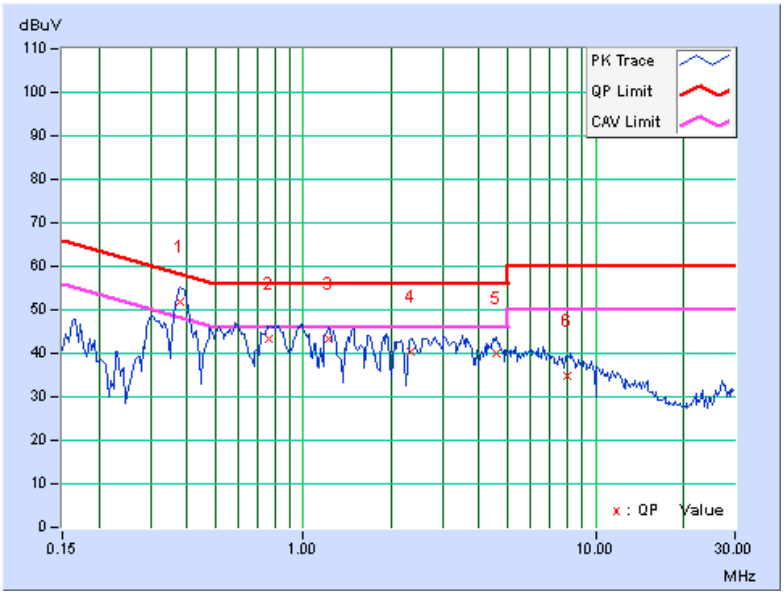


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.38047**	**0.29**	**51.72**	**40.24**	**52.01**	**40.53**	**58.27**	**48.27**	**-6.26**	**-7.74**
2	0.75938	0.29	43.03	35.60	43.32	35.89	56.00	46.00	-12.68	-10.11
3	1.21484	0.31	42.99	35.79	43.30	36.10	56.00	46.00	-12.70	-9.90
4	2.34766	0.41	39.80	33.35	40.21	33.76	56.00	46.00	-15.79	-12.24
5	4.56641	0.50	39.33	32.50	39.83	33.00	56.00	46.00	-16.17	-13.00
6	7.99609	0.55	34.42	27.31	34.97	27.86	60.00	50.00	-25.03	-22.14

REMARKS:

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

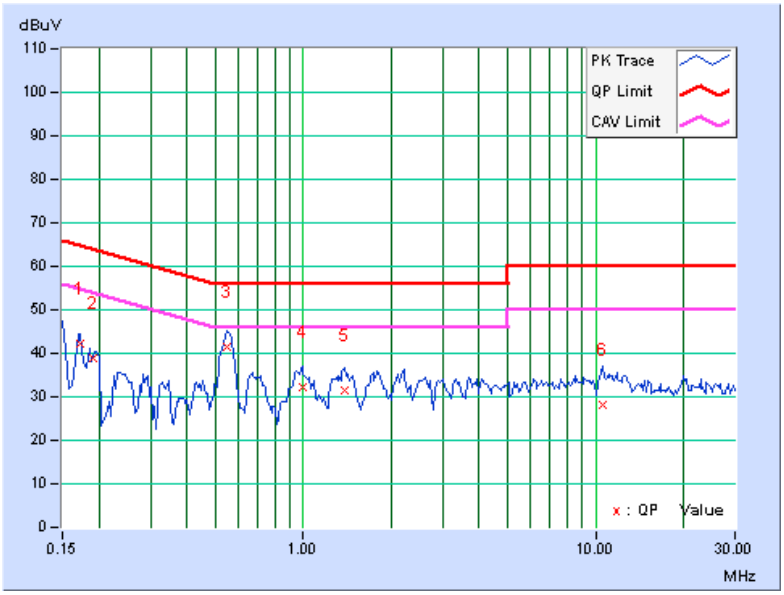


PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	C		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	0.27	41.96	30.36	42.23	30.63	64.79	54.79	-22.56	-24.16
2	0.19054	0.28	38.52	29.09	38.80	29.37	64.01	54.01	-25.22	-24.65
3	0.54844	0.31	41.29	28.71	41.60	29.02	56.00	46.00	-14.40	-16.98
4	0.99766	0.34	32.05	24.03	32.39	24.37	56.00	46.00	-23.61	-21.63
5	1.37891	0.35	31.26	23.27	31.61	23.62	56.00	46.00	-24.39	-22.38
6	10.64844	0.50	27.53	21.03	28.03	21.53	60.00	50.00	-31.97	-28.47

REMARKS:

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

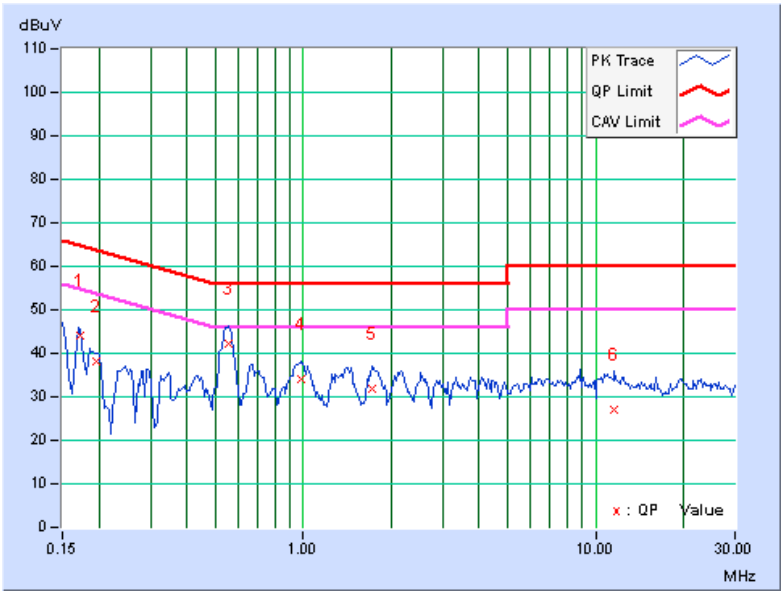


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	C		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17208	0.27	43.77	31.88	44.04	32.15	64.86	54.86	-20.82	-22.71
2	0.19687	0.28	37.74	26.96	38.02	27.24	63.74	53.74	-25.72	-26.50
3	0.55234	0.31	41.75	29.81	42.06	30.12	56.00	46.00	-13.94	-15.88
4	0.98203	0.34	33.87	26.94	34.21	27.28	56.00	46.00	-21.79	-18.72
5	1.71875	0.36	31.61	23.88	31.97	24.24	56.00	46.00	-24.03	-21.76
6	11.62500	0.53	26.51	20.59	27.04	21.12	60.00	50.00	-32.96	-28.88

REMARKS:

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



4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

FOR FCC PART 15, SUBPART E (SECTION 15.407)

FREQUENCY BAND	LIMIT
5.15 ~ 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB

NOTE: Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

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

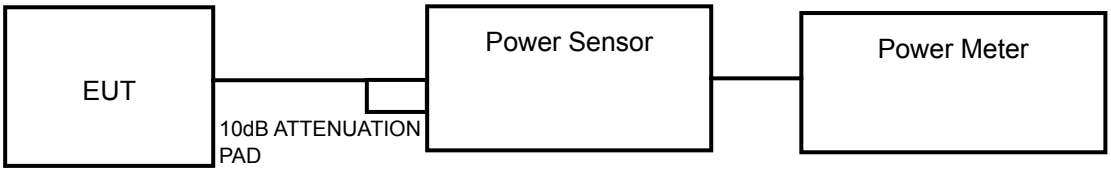
FOR RSS-210; RSS-Gen

FREQUENCY BAND	LIMIT
5.150 ~ 5.250GHz	e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$ B

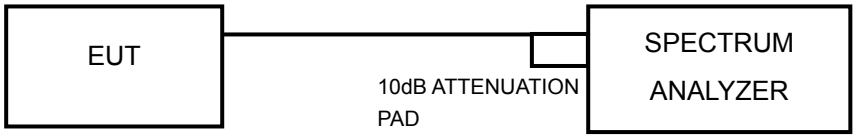
NOTE: Where B is the occupied emission bandwidth in MHz.

4.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB BANDWIDTH AND OCCUPIED BANDWIDTH



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

FOR AVERAGE POWER MEASUREMENT

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

FOR 26dB BANDWIDTH

1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

FOR OCCUPIED BANDWIDTH

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 300 kHz RBW and 1 MHz VBW. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given 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 specific channel frequencies individually.

4.3.7 TEST RESULTS

POWER OUTPUT:

802.11a

CHAN.	FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	12.93	12.78	38.601	15.87	17.00	PASS
40	5200	12.80	12.34	36.195	15.59	17.00	PASS
48	5240	12.91	13.36	41.220	16.15	17.00	PASS

NOTE:
CHAIN 0
1. 4dBm + 10log (22.09) = 17.44 > 17dBm
2. 4dBm + 10log (22.40) = 17.50 > 17dBm
3. 4dBm + 10log (22.54) = 17.53 > 17dBm

CHAIN 1
1. 4dBm + 10log (21.64) = 17.35 > 17dBm
2. 4dBm + 10log (21.56) = 17.34 > 17dBm
3. 4dBm + 10log (22.05) = 17.43 > 17dBm

802.11n (20MHz)

CHAN.	FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	12.92	12.82	38.731	15.88	17.00	PASS
40	5200	12.64	12.63	36.688	15.65	17.00	PASS
48	5240	12.62	13.21	39.222	15.94	17.00	PASS

NOTE:
CHAIN 0
1. 4dBm + 10log (22.86) = 17.59 > 17dBm
2. 4dBm + 10log (22.87) = 17.59 > 17dBm
3. 4dBm + 10log (23.39) = 17.69 > 17dBm

CHAIN 1
1. 4dBm + 10log (22.29) = 17.48 > 17dBm
2. 4dBm + 10log (23.55) = 17.72 > 17dBm
3. 4dBm + 10log (22.97) = 17.61 > 17dBm

802.11n (40MHz)

CHAN.	FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	13.72	13.64	46.671	16.69	17.00	PASS
46	5230	13.92	13.46	**46.842**	16.71	17.00	PASS

NOTE:

CHAIN 0

1. 4dBm + 10log (46.67) = 20.69 > 17dBm
2. 4dBm + 10log (47.35) = 20.75 > 17dBm

CHAIN 1

1. 4dBm + 10log (46.21) = 20.65 > 17dBm
2. 4dBm + 10log (55.96) = 21.48 > 17dBm

EIRP POWER (Following data is for Industry Canada certification only and not applicable to FCC certification):

802.11a

CHAN.	FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	EIRP POWER (dBm)	EIRP LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
36	5180	12.93	12.78	38.601	15.87	21.17	22.20	PASS
40	5200	12.80	12.34	36.195	15.59	20.89	22.20	PASS
48	5240	12.91	13.36	41.220	16.15	21.45	22.23	PASS

NOTE:

CHAIN 0

1. 10dBm + 10log (16.87) = 22.27 < 23dBm
2. 10dBm + 10log (16.87) = 22.27 < 23dBm
3. 10dBm + 10log (16.87) = 22.27 < 23dBm

CHAIN 1

1. 10dBm + 10log (16.61) = 22.20 < 23dBm
2. 10dBm + 10log (16.61) = 22.20 < 23dBm
3. 10dBm + 10log (16.70) = 22.23 < 23dBm

802.11n (20MHz)

CHAN.	FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	EIRP POWER (dBm)	EIRP LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
36	5180	12.92	12.82	38.731	15.88	21.18	22.49	PASS
40	5200	12.64	12.63	36.688	15.65	20.95	22.52	PASS
48	5240	12.62	13.21	39.222	15.94	21.24	22.52	PASS

NOTE:

CHAIN 0

1. 10dBm + 10log (17.76) = 22.49 < 23dBm
2. 10dBm + 10log (18.00) = 22.55 < 23dBm
3. 10dBm + 10log (17.88) = 22.52 < 23dBm

CHAIN 1

1. 10dBm + 10log (17.76) = 22.49 < 23dBm
2. 10dBm + 10log (17.88) = 22.52 < 23dBm
3. 10dBm + 10log (17.88) = 22.52 < 23dBm

802.11n (40MHz)

CHAN.	FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	EIRP POWER (dBm)	EIRP LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
38	5190	13.72	13.64	46.671	16.69	21.99	23.00	PASS
46	5230	13.92	13.46	46.842	16.71	22.01	23.00	PASS

NOTE:

CHAIN 0

1. 10dBm + 10log (37.20) = 25.71 > 23dBm
2. 10dBm + 10log (37.20) = 25.71 > 23dBm

CHAIN 1

1. 10dBm + 10log (37.20) = 25.71 > 23dBm
2. 10dBm + 10log (37.00) = 25.68 > 23dBm

26dB BANDWIDTH:

802.11a

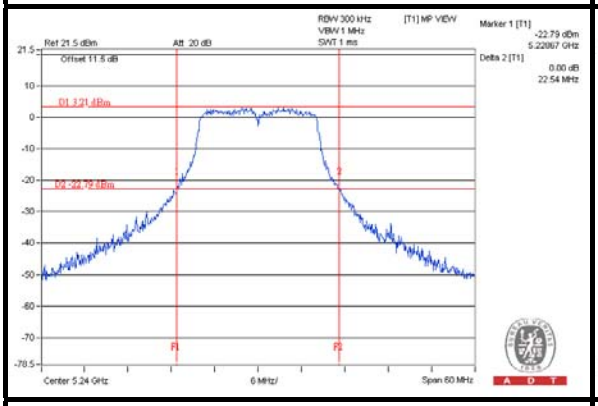
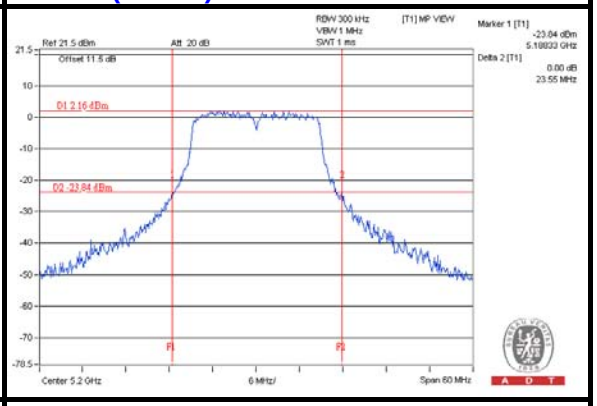
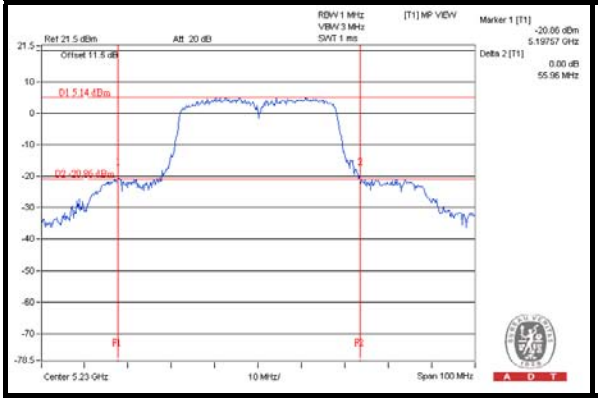
CHANNEL	FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	22.09	21.64	PASS
40	5200	22.40	21.56	PASS
48	5240	22.54	22.05	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	22.86	22.29	PASS
40	5200	22.87	23.55	PASS
48	5240	23.39	22.97	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	46.67	46.21	PASS
46	5230	47.35	55.96	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11a	**802.11n (20MHz)**
	
802.11n (40MHz)	
	

OCCUPIED BANDWIDTH:

802.11a

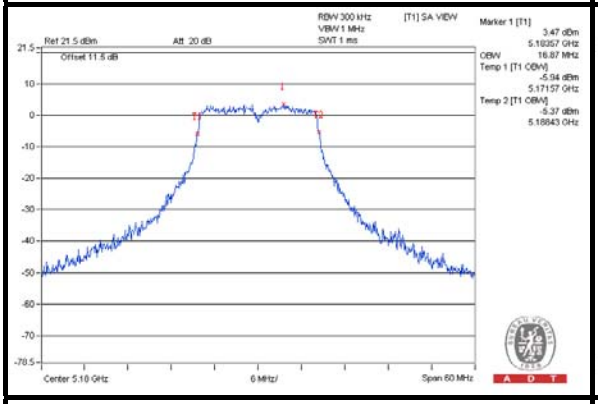
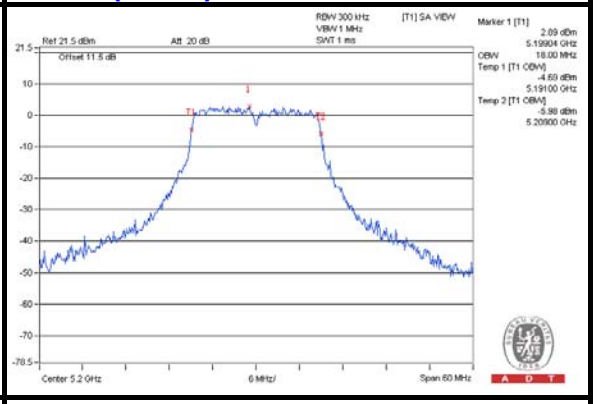
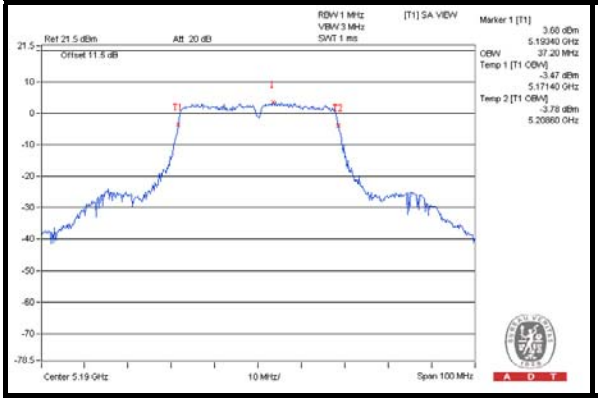
CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	16.87	16.61	PASS
40	5200	16.87	16.61	PASS
48	5240	16.87	16.70	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	17.76	17.76	PASS
40	5200	18.00	17.88	PASS
48	5240	17.88	17.88	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	37.20	37.20	PASS
46	5230	37.20	37.00	PASS

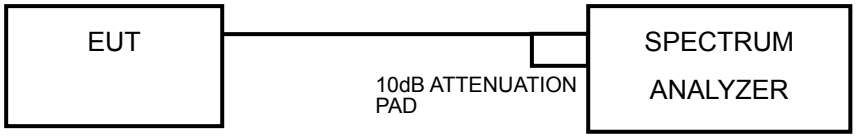
SPECTRUM PLOT OF WORST VALUE	
802.11a	**802.11n (20MHz)**
	
802.11n (40MHz)	
	

4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

FREQUENCY BAND	LIMIT
5.15 ~ 5.25GHz	4dBm

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.4.4 TEST PROCEDURES

Using method SA-2

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 30 KHz, Set VBW ≥ 1 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value and add 10 log (1/duty cycle)

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6.

4.4.7 TEST RESULTS

802.11a

CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
36	5180	-1.23	-1.77	1.52	0.14	1.66	1.94	PASS
40	5200	-1.47	-2.05	1.26	0.14	1.40	1.94	PASS
48	5240	-1.72	-1.36	1.47	0.14	1.61	1.94	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$]= 8.06, so the power density limit shall be reduced to 4-(8.06-6) = 1.94dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

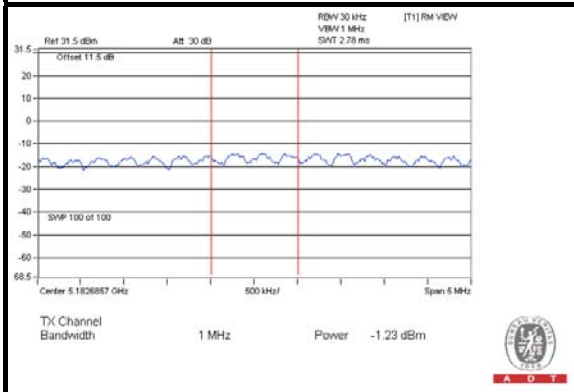
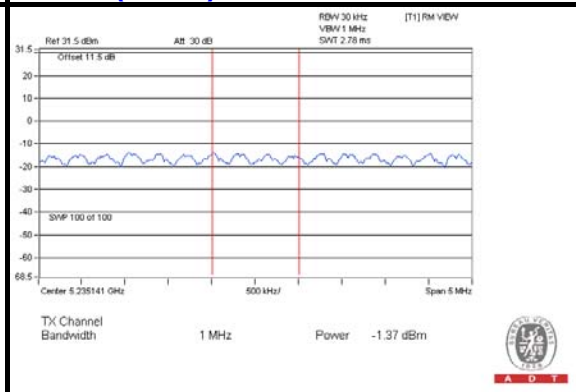
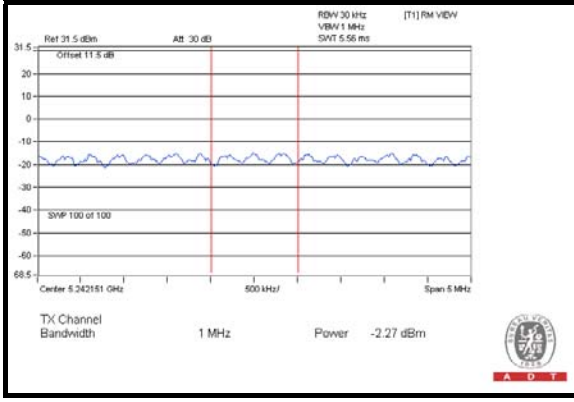
CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
36	5180	-1.42	-1.99	1.31	0.15	1.46	1.94	PASS
40	5200	-1.48	-2.18	1.19	0.15	1.34	1.94	PASS
48	5240	-1.83	-1.37	1.42	0.15	1.57	1.94	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$]= 8.06, so the power density limit shall be reduced to 4-(8.06-6) = 1.94dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
38	5190	-3.62	-4.00	-0.80	0.26	-0.54	1.94	PASS
46	5230	-3.17	-2.27	0.31	0.26	0.57	1.94	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$]= 8.06, so the power density limit shall be reduced to 4-(8.06-6) = 1.94dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

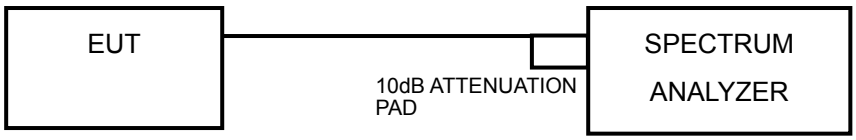
SPECTRUM PLOT OF WORST VALUE	
802.11a	**802.11n (20MHz)**
	
802.11n (40MHz)	
	

4.5 PEAK POWER EXCURSION MEASUREMENT

4.5.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Shall not exceed 13 dB

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.5.4 TEST PROCEDURE

1) Set RBW = 1 MHz, VBW ≥ 3 MHz, Detector = peak.
2) Trace mode = max-hold. Allow the sweeps to continue until the trace stabilizes.
3) Use the peak search function to find the peak of the spectrum.
4) Measure the PPSD.
5) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD. Find the worst channel and modulation mode as above test procedure, and follow KDB 789033 D01 General UNII Test Procedures v01r03 and repeat step 1 to 5 for final testing of each modulation mode on a single channel (all modulation types) in a single operating band to compliance with the peak excursion requirement.

4.5.5 DEVIATION FROM TEST STANDARD

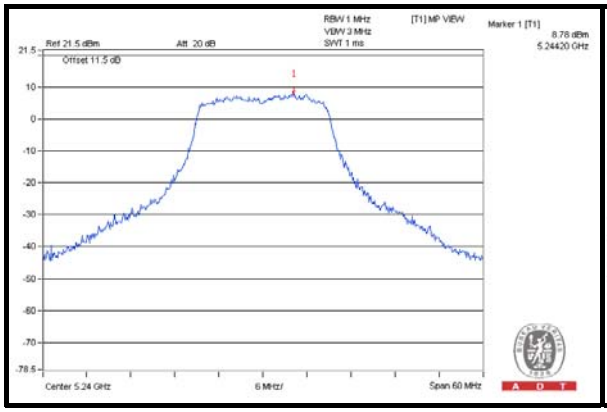
No deviation.

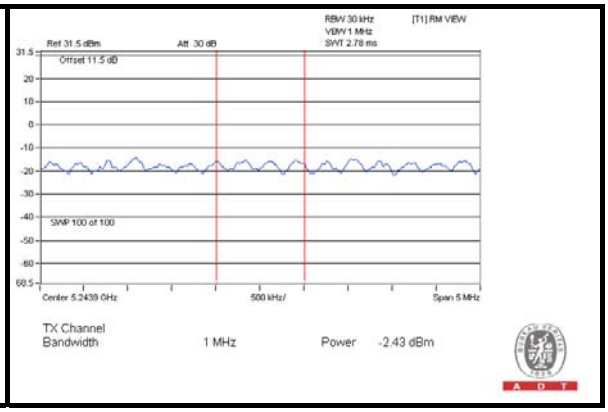
4.5.6 EUT OPERATING CONDITIONS

Same as 4.2.6

4.5.7 TEST RESULTS

MODULATION MODE	MODULATION TYPE	FREQ. (MHz)	PEAK VALUE (dBm)	PPSD WITHOUT DUTY FACTOR (dBm)	PPSD WITH DUTY FACTOR (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS /FAIL
802.11a	BPSK	5240	7.00	-1.72	-1.58	8.58	13	PASS
	QPSK		7.79	-1.35	-1.08	8.87	13	PASS
	16QAM		7.97	-2.30	-1.74	9.71	13	PASS
	64QAM		7.55	-3.42	-2.49	10.04	13	PASS
802.11n (20MHz)	BPSK	5240	6.61	-1.37	-1.22	7.83	13	PASS
	QPSK		7.84	-1.82	-1.53	9.37	13	PASS
	16QAM		8.78	-2.43	-1.89	10.67	13	PASS
	64QAM		7.97	-3.60	-2.68	10.65	13	PASS
802.11n (40MHz)	BPSK	5230	5.68	-2.27	-2.01	7.69	13	PASS
	QPSK		5.91	-3.07	-2.64	8.55	13	PASS
	16QAM		6.10	-3.59	-2.84	8.94	13	PASS
	64QAM		6.52	-4.49	-3.28	9.80	13	PASS



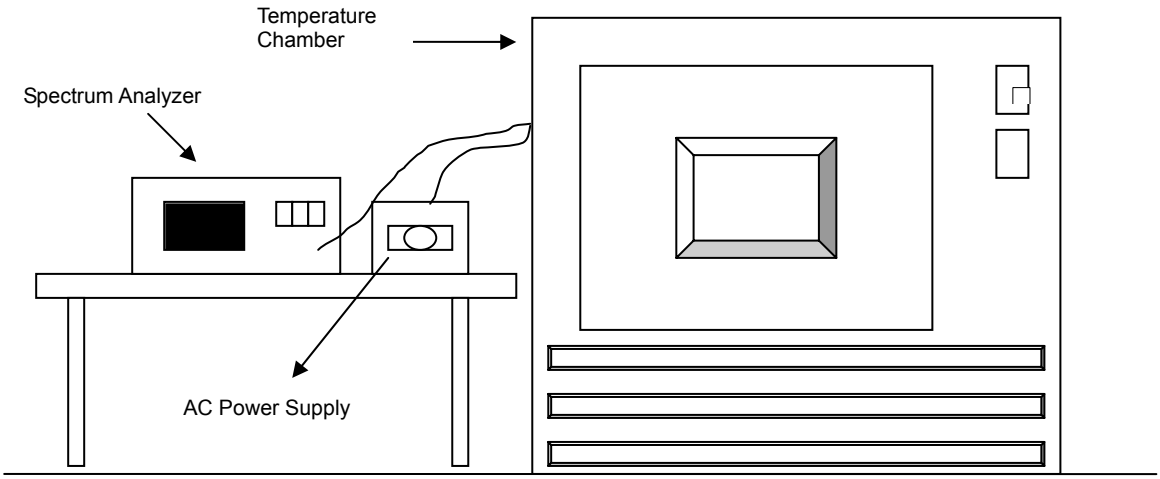


4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.6.4 TEST PROCEDURE

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 TEST RESULTS

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5200MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
40	120	5199.9886	-0.00022	5199.9899	-0.00019	5199.9892	-0.00021	5199.9906	-0.00018
30	120	5199.9811	-0.00036	5199.9828	-0.00033	5199.9831	-0.00032	5199.9813	-0.00036
20	120	5200.0248	0.00048	5200.0241	0.00046	5200.021	0.00040	5200.0258	0.00050
10	120	5199.9897	-0.00020	5199.986	-0.00027	5199.9877	-0.00024	5199.9871	-0.00025
0	120	5200.0136	0.00026	5200.0135	0.00026	5200.0144	0.00028	5200.013	0.00025

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5200MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5200.025	0.00048	5200.0238	0.00046	5200.0213	0.00041	5200.0254	0.00049
	120	5200.0248	0.00048	5200.0241	0.00046	5200.021	0.00040	5200.0258	0.00050
	102	5200.0239	0.00046	5200.0251	0.00048	5200.02	0.00038	5200.0268	0.00052

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. 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.bureauveritas-adt.com

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

7. 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---