FCC TEST REPORT (15.407)

REPORT NO.:	RF120406C19C-1
MODEL NO.:	WDAM2120
FCC ID:	JVPTX
RECEIVED:	Dec. 26, 2012
TESTED:	Jan. 21 ~ Apr. 16, 2013
ISSUED:	Apr. 24, 2013

APPLICANT:	BenQ Corporation
ADDRESS:	16 Jihu Road, Neihu, Taipei 114, Taiwan

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
RF120406C19C-1	Original release	Apr. 24, 2013

1. CERTIFICATION

PRODUCT:	Wireless Transmitter
MODEL:	WDAM2120
BRAND:	BenQ
APPLICANT:	BenQ Corporation
TESTED:	Jan. 21 ~ Apr. 16, 2013
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart E (Section 15.407)**
	ANSI C63.10-2009

The above equipment (Model: WDAM2120) 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:** Apr. 24, 2013
Polly Chien / Specialist

APPROVED BY : _____ , **DATE:** Apr. 24, 2013
Ken Liu / Senior Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -6.15dB at 0.41560MHz.
15.407(b/1/2/3)(b)(6)	Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.4dB at 1038.00MHz &1046.00MHz.
15.407(a/1/2)	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)	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	No antenna connector is used.

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	150kHz~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	Wireless Transmitter
MODEL NO.	WDAM2120
POWER SUPPLY	5Vdc (Host equipment or adapter)
MODULATION TECHNOLOGY	Downlink: OFDM Uplink: OOK
TRANSFER RATE	Downlink: 1Mbps Uplink: 100Kbps
OPERATING FREQUENCY	5180.0 ~ 5240.0MHz
NUMBER OF CHANNEL	4 for channel bandwidth (20MHz) 2 for channel bandwidth (40MHz)
OUTPUT POWER	4.093mW
ANTENNA TYPE	PCB antenna with 2dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	1m shielded USB cable with 1 core
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	NA

NOTE:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and one receiver.

MODULATION MODE	TX FUNCTION
Channel bandwidth (20MHz)	2TX
Channel bandwidth (40MHz)	2TX

2. The EUT was powered by the following adapter:

BRAND:	Asian Power Devices Inc.
MODEL:	WA-10K05R
INPUT:	100~240Vac, 50-60Hz, 0.3A
OUTPUT:	5Vdc, 2A

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

3.2 DESCRIPTION OF TEST MODES

4 channels are provided for channel bandwidth (20MHz):

FREQUENCY	FREQUENCY
5180MHz	5220MHz
5200MHz	5240MHz

2 channels are provided for channel bandwidth (40MHz):

FREQUENCY	FREQUENCY
5190MHz	5230MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: "-"means no effect.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

☒ Following frequency (frequencies) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE FREQUENCY	TESTED FREQUENCY	MODULATION TECHNOLOGY	DATA RATE (Kbps)
A	channel bandwidth (20MHz)	5180 to 5240	5180, 5200, 5240	OOK	100
A	channel bandwidth (40MHz)	5190 to 5230	5190, 5230	OOK	100

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 frequency (frequencies) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE FREQUENCY	TESTED FREQUENCY	MODULATION TECHNOLOGY	DATA RATE (Kbps)
A, B	channel bandwidth (40MHz)	5190 to 5230	5190	OOK	100

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 frequency (frequencies) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE FREQUENCY	TESTED FREQUENCY	MODULATION TECHNOLOGY	DATA RATE (Kbps)
A, B	channel bandwidth (40MHz)	5190 to 5230	5190	OOK	100

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 frequency (frequencies) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE FREQUENCY	TESTED FREQUENCY	MODULATION TECHNOLOGY	DATA RATE (Kbps)
A	channel bandwidth (20MHz)	5180 to 5240	5180, 5200, 5240	OOK	100
A	channel bandwidth (40MHz)	5190 to 5230	5190, 5230	OOK	100

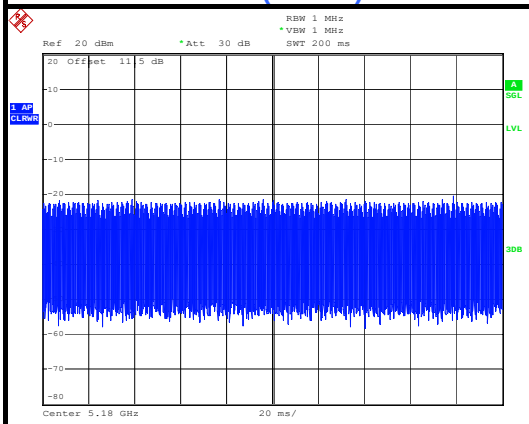
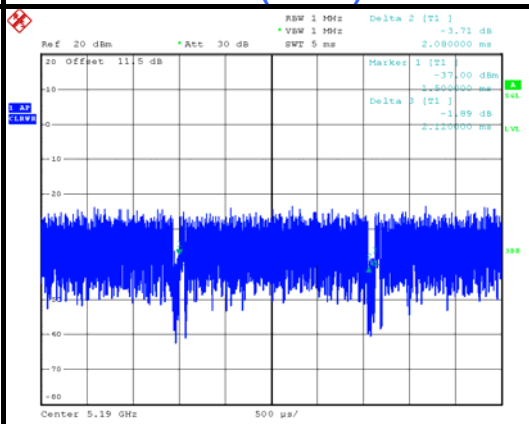
TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	25deg. C, 72%RH	120Vac, 60Hz	Cedric Wu
RE<1G	24deg. C, 69%RH	120Vac, 60Hz	Alan Wu Ted Chang
PLC	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
APCM	24deg. C, 64%RH	120Vac, 60Hz	Frank Liu

3.3 DUTY CYCLE OF TEST SIGNAL

Channel bandwidth (20MHz): Duty cycle of test signal is > 98 %, duty factor is not required.

Channel bandwidth (40MHz): Duty cycle = 2.080/2.120 = 0.981> 98 %, duty factor is not required.

Channel bandwidth (20MHz)	Channel bandwidth (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.

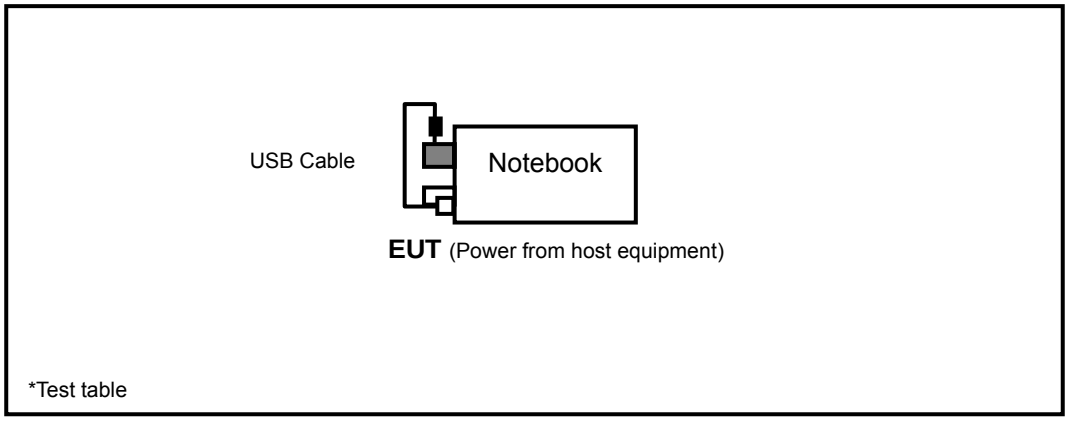
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	D531	CN-0XM006-48643-81U-2610	QDS-BRCM1020

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

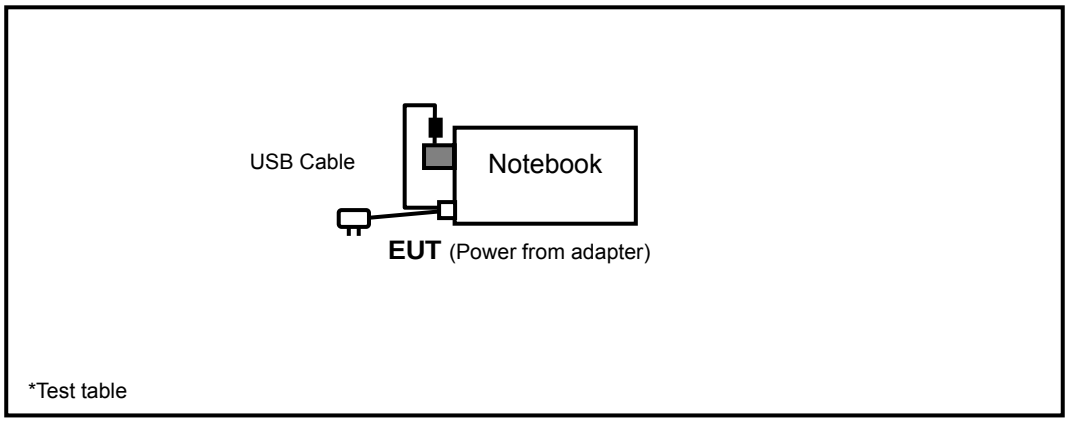
NOTE: All power cords of the above support units are non shielded (1.8m).

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST

Test Mode A



Test Mode B



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 v01 r02
ANSI C63.10-2009

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

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

4. TEST TYPES AND RESULTS

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

Tested date: Jan. 21 ~ Feb. 07, 2013

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Aug. 21, 2012	Aug. 20, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Oct. 25, 2012	Oct. 24, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 06, 2012	Apr. 05, 2013
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Dec. 22, 2012	Dec. 21, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8447D	2944A10738	Oct. 23, 2012	Oct. 22, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 28, 2012	Aug. 27, 2013
Software ADT	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT	TT100.	TT93021704	NA	NA
Turn Table Controller ADT	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 25, 2012	Oct. 24, 2013
High Speed Peak Power Meter	ML2495A	1232003	Aug. 10, 2012	Aug. 09, 2013
Power Sensor	MA2411B	1207333	Aug. 15, 2012	Aug. 14, 2013

NOTE:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 4.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 460141.
6. The IC Site Registration No. is IC7450F-4.

Tested date: Apr. 16, 2013

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Aug. 21, 2012	Aug. 20, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Oct. 25, 2012	Oct. 24, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Dec. 22, 2012	Dec. 21, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8447D	2944A10738	Oct. 23, 2012	Oct. 22, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 28, 2012	Aug. 27, 2013
Software BV ADT	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	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. 25, 2012	Oct. 24, 2013
High Speed Peak Power Meter	ML2495A	1232003	Aug. 10, 2012	Aug. 09, 2013
Power Sensor	MA2411B	1207333	Aug. 15, 2012	Aug. 14, 2013

NOTE:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 4.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 460141.
6. The IC Site Registration No. is IC7450F-4.

4.1.4 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.

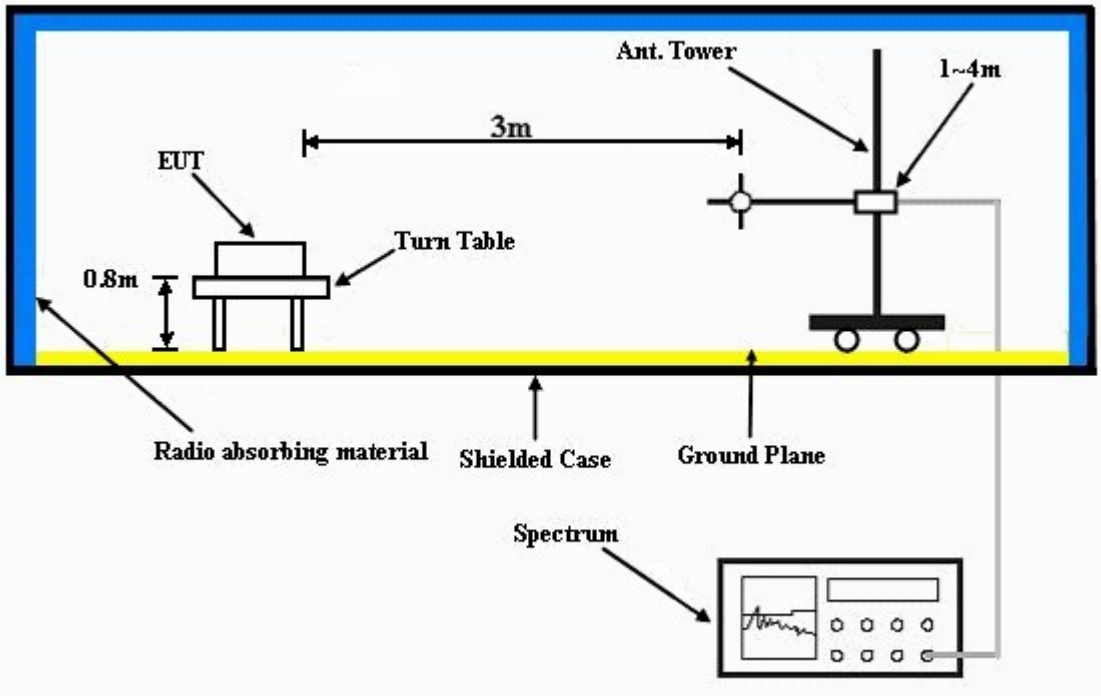
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) 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 1kHz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

4.1.6 TEST SETUP



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

4.1.7 EUT OPERATING CONDITION

a. Plugged the EUT to notebook and connected with notebook via USB cable.
b. Set the EUT under transmitting condition continuously at specific channel frequency.

4.1.8 TEST RESULTS

ABOVE 1GHz DATA

Channel Bandwidth (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
FREQUENCY	5180	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 72%RH	TESTED BY	Cedric 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	5150.00	55.7 PK	74.0	-18.3	1.07 H	33	16.30	39.40
2	5150.00	43.2 AV	54.0	-10.8	1.07 H	33	3.80	39.40
3	*5180.00	91.4 PK			1.06 H	31	52.00	39.40
4	*5180.00	77.4 AV			1.06 H	31	38.00	39.40
5	#10360.00	61.9 PK	74.0	-12.1	1.00 H	9	11.00	50.90
6	#10360.00	48.5 AV	54.0	-5.5	1.00 H	9	-2.40	50.90
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	5150.00	56.0 PK	74.0	-18.0	1.30 V	294	16.60	39.40
2	5150.00	43.8 AV	54.0	-10.2	1.30 V	294	4.40	39.40
3	*5180.00	92.1 PK			1.33 V	293	52.70	39.40
4	*5180.00	77.9 AV			1.33 V	293	38.50	39.40
5	#10360.00	59.7 PK	74.0	-14.3	1.70 V	16	8.80	50.90
6	#10360.00	51.9 AV	54.0	-2.1	1.70 V	16	1.00	50.90

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.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
FREQUENCY	5200	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 72%RH	TESTED BY	Cedric 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	*5200.00	91.9 PK			1.10 H	29	52.50	39.40
2	*5200.00	77.5 AV			1.10 H	29	38.10	39.40
3	#10400.00	59.8 PK	74.0	-14.2	1.54 H	22	8.90	50.90
4	#10400.00	49.3 AV	54.0	-4.7	1.54 H	22	-1.60	50.90
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	*5200.00	93.1 PK			1.32 V	288	53.70	39.40
2	*5200.00	78.3 AV			1.32 V	288	38.90	39.40
3	#10400.00	59.9 PK	74.0	-14.1	1.77 V	17	9.00	50.90
4	#10400.00	51.5 AV	54.0	-2.5	1.77 V	17	0.60	50.90

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.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
FREQUENCY	5240	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 72%RH	TESTED BY	Cedric 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	*5240.00	92.9 PK			1.05 H	30	53.40	39.50
2	*5240.00	77.5 AV			1.05 H	30	38.00	39.50
3	5350.00	56.1 PK	74.0	-17.9	1.05 H	30	16.50	39.60
4	5350.00	43.4 AV	54.0	-10.6	1.05 H	30	3.80	39.60
5	#10480.00	59.5 PK	74.0	-14.5	1.10 H	21	8.30	51.20
6	#10480.00	48.4 AV	54.0	-5.6	1.10 H	21	-2.80	51.20
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	*5240.00	94.8 PK			1.33 V	290	55.30	39.50
2	*5240.00	80.0 AV			1.33 V	290	40.50	39.50
3	5350.00	56.2 PK	74.0	-17.8	1.30 V	290	16.60	39.60
4	5350.00	44.0 AV	54.0	-10.0	1.30 V	290	4.40	39.60
5	#10480.00	60.9 PK	74.0	-13.1	1.92 V	17	9.70	51.20
6	#10480.00	51.7 AV	54.0	-2.3	1.92 V	17	0.50	51.20

REMARKS:

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

Channel Bandwidth (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
FREQUENCY	5190	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 72%RH	TESTED BY	Cedric 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	5150.00	55.6 PK	74.0	-18.4	1.00 H	28	16.20	39.40
2	5150.00	42.8 AV	54.0	-11.2	1.00 H	28	3.40	39.40
3	*5190.00	87.7 PK			1.00 H	24	48.30	39.40
4	*5190.00	73.6 AV			1.00 H	24	34.20	39.40
5	#10380.00	59.1 PK	74.0	-14.9	1.41 H	26	8.20	50.90
6	#10380.00	49.3 AV	54.0	-4.7	1.41 H	26	-1.60	50.90
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	5150.00	55.8 PK	74.0	-18.2	1.20 V	290	16.40	39.40
2	5150.00	43.1 AV	54.0	-10.9	1.20 V	290	3.70	39.40
3	*5190.00	88.8 PK			1.19 V	288	49.40	39.40
4	*5190.00	74.5 AV			1.19 V	288	35.10	39.40
5	#10380.00	60.6 PK	74.0	-13.4	1.71 V	16	9.70	50.90
6	**#10380.00**	**52.6 AV**	**54.0**	**-1.4**	**1.71 V**	**16**	**1.70**	**50.90**

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.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
FREQUENCY	5230	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 72%RH	TESTED BY	Cedric 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	*5230.00	87.7 PK			1.00 H	29	48.20	39.50
2	*5230.00	72.9 AV			1.00 H	29	33.40	39.50
3	5350.00	57.0 PK	74.0	-17.0	1.00 H	35	17.40	39.60
4	5350.00	43.5 AV	54.0	-10.5	1.00 H	35	3.90	39.60
5	#10460.00	59.9 PK	74.0	-14.1	1.54 H	25	8.80	51.10
6	#10460.00	50.3 AV	54.0	-3.7	1.54 H	25	-0.80	51.10
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	*5230.00	88.9 PK			1.33 V	292	49.40	39.50
2	*5230.00	75.2 AV			1.33 V	292	35.70	39.50
3	5350.00	57.6 PK	74.0	-16.4	1.35 V	292	18.00	39.60
4	5350.00	44.0 AV	54.0	-10.0	1.35 V	292	4.40	39.60
5	#10460.00	60.3 PK	74.0	-13.7	1.75 V	16	9.20	51.10
6	**#10460.00**	**52.6 AV**	**54.0**	**-1.4**	**1.75 V**	**16**	**1.50**	**51.10**

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.
6. "#":The radiated frequency is out the restricted band.

BELOW 1GHz WORST-CASE DATA：Channel Bandwidth (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
FREQUENCY	5190	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 69%RH	TESTED BY	Alan Wu
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	99.75	30.7 QP	43.5	-12.8	1.99 H	105	21.50	9.20
2	165.73	34.2 QP	43.5	-9.3	1.49 H	82	20.70	13.50
3	231.70	33.0 QP	46.0	-13.0	1.24 H	87	21.00	12.00
4	319.02	32.6 QP	46.0	-13.4	1.24 H	7	17.50	15.10
5	480.07	36.7 QP	46.0	-9.3	1.74 H	49	17.70	19.00
6	600.38	31.9 QP	46.0	-14.1	1.24 H	80	10.40	21.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	41.54	32.1 QP	40.0	-7.9	1.00 V	118	18.60	13.50
2	165.73	37.5 QP	43.5	-6.0	1.00 V	60	24.00	13.50
3	319.02	27.6 QP	46.0	-18.4	2.00 V	118	12.50	15.10
4	480.07	30.9 QP	46.0	-15.1	1.75 V	158	11.90	19.00
5	641.13	32.0 QP	46.0	-14.0	1.00 V	5	9.90	22.10
6	800.24	28.9 QP	46.0	-17.1	1.49 V	151	4.30	24.60

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
FREQUENCY	5190	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 69%RH	TESTED BY	Ted Chang
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	49.30	27.60 QP	40.0	-12.4	2.00 H	8	13.90	13.70
2	113.34	33.90 QP	43.5	-9.6	2.00 H	8	22.70	11.20
3	227.82	39.30 QP	46.0	-6.7	1.49 H	81	27.60	11.70
4	431.56	32.20 QP	46.0	-13.8	1.00 H	141	14.50	17.70
5	664.41	33.70 QP	46.0	-12.3	1.24 H	37	11.10	22.60
6	840.99	34.90 QP	46.0	-11.1	1.00 H	69	9.60	25.30
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	51.24	28.60 QP	40.0	-11.4	1.00 V	338	15.10	13.50
2	95.87	31.20 QP	43.5	-12.3	1.00 V	231	21.70	9.50
3	229.76	37.70 QP	46.0	-8.3	1.25 V	25	25.90	11.80
4	421.86	31.60 QP	46.0	-14.4	1.25 V	7	14.20	17.40
5	666.35	31.90 QP	46.0	-14.1	1.99 V	14	9.30	22.60
6	840.99	33.00 QP	46.0	-13.0	1.49 V	205	7.70	25.30

REMARKS:

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

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

Tested date: Feb. 18, 2013

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

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

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

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

Tested date: Apr. 16, 2013

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 16, 2012	Nov. 15, 2013
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2012	Jul. 01, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 04, 2013	Feb. 03, 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 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.

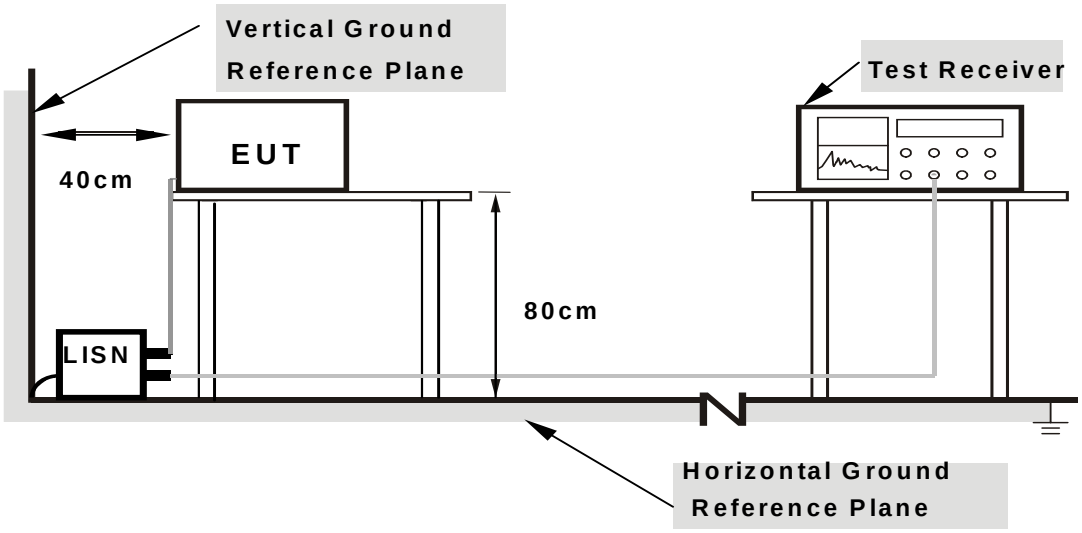
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

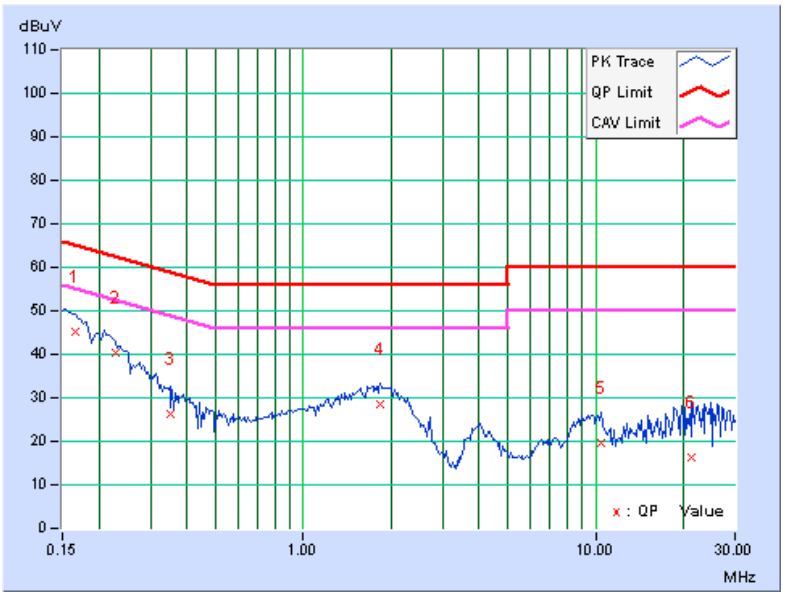
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA：Channel Bandwidth (40MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.12	45.01	27.15	45.13	27.27	65.18	55.18	-20.04	-27.90
2	0.22812	0.12	40.22	23.11	40.34	23.23	62.52	52.52	-22.17	-29.28
3	0.34922	0.14	26.16	10.25	26.30	10.39	58.98	48.98	-32.68	-38.59
4	1.83594	0.23	28.43	19.31	28.66	19.54	56.00	46.00	-27.34	-26.46
5	10.39844	0.67	18.97	13.64	19.64	14.31	60.00	50.00	-40.36	-35.69
6	21.34375	1.28	15.06	9.64	16.34	10.92	60.00	50.00	-43.66	-39.08

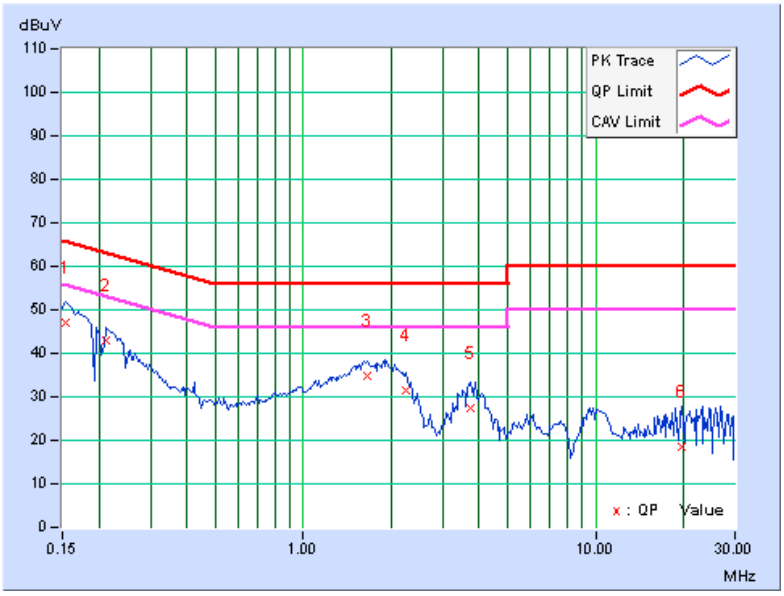
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.17	46.79	23.54	46.96	23.71	65.79	55.79	-18.82	-32.07
2	0.21250	0.17	42.85	22.87	43.02	23.04	63.11	53.11	-20.08	-30.06
3	1.65625	0.27	34.42	25.15	34.69	25.42	56.00	46.00	-21.31	-20.58
4	2.24609	0.29	31.34	23.20	31.63	23.49	56.00	46.00	-24.37	-22.51
5	3.71484	0.37	27.04	18.86	27.41	19.23	56.00	46.00	-28.59	-26.77
6	19.81250	0.92	17.60	10.40	18.52	11.32	60.00	50.00	-41.48	-38.68

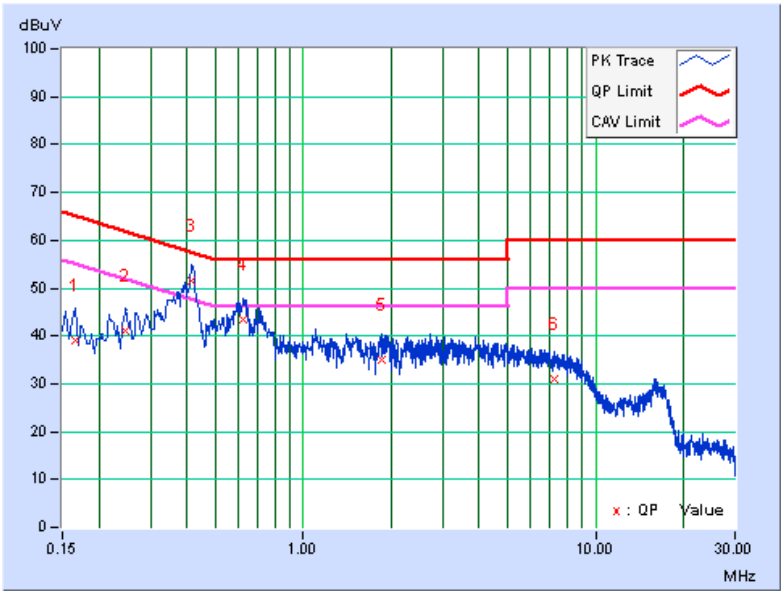
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16569	0.15	38.95	25.71	39.10	25.86	65.17	55.17	-26.08	-29.32
2	0.24775	0.16	41.04	30.74	41.20	30.90	61.83	51.83	-20.63	-20.93
3	**0.41560**	**0.20**	**51.18**	**40.46**	**51.38**	**40.66**	**57.54**	**47.54**	**-6.15**	**-6.87**
4	0.61920	0.21	43.31	31.69	43.52	31.90	56.00	46.00	-12.48	-14.10
5	1.86649	0.26	34.90	23.34	35.16	23.60	56.00	46.00	-20.84	-22.40
6	7.25447	0.55	30.26	18.99	30.81	19.54	60.00	50.00	-29.19	-30.46

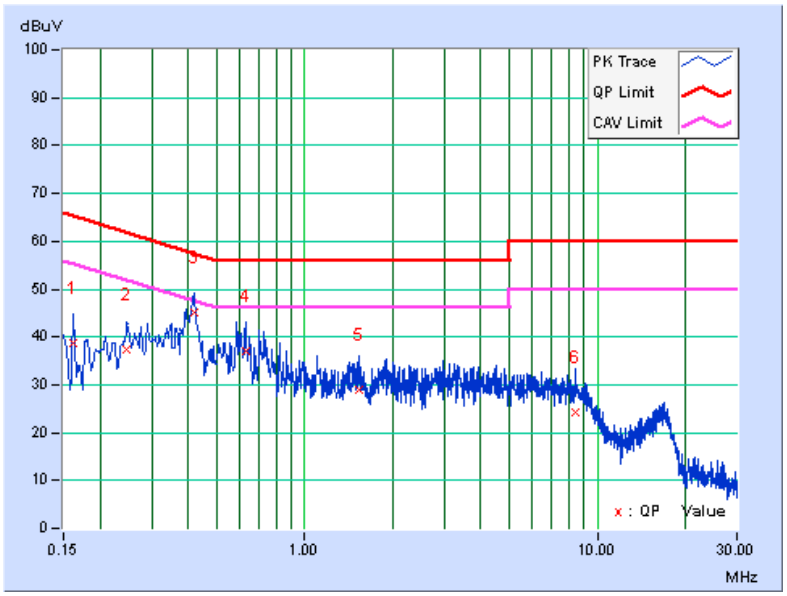
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16173	0.20	38.56	21.01	38.76	21.21	65.37	55.37	-26.62	-34.17
2	0.24775	0.21	37.08	24.86	37.29	25.07	61.83	51.83	-24.54	-26.76
3	0.41890	0.26	44.92	32.97	45.18	33.23	57.47	47.47	-12.29	-14.24
4	0.62689	0.26	36.94	23.18	37.20	23.44	56.00	46.00	-18.80	-22.56
5	1.53023	0.29	28.62	15.64	28.91	15.93	56.00	46.00	-27.09	-30.07
6	8.40401	0.57	23.67	13.17	24.24	13.74	60.00	50.00	-35.76	-36.26

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 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

4.3.1 LIMITS OF MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

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.

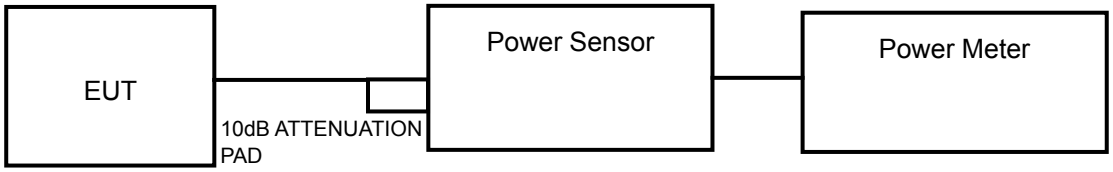
Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

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.

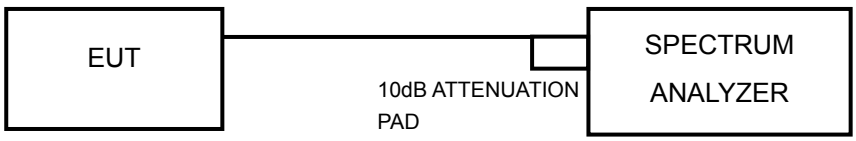
For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

4.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB 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 OCCUPIED 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%.

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:

Channel Bandwidth (20MHz)

CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
	CHAIN 0	CHAIN 1				
5180	2.80	3.34	4.063	6.09	17	PASS
5200	2.73	3.27	3.998	6.02	17	PASS
5240	2.69	3.29	3.991	6.01	17	PASS

Channel Bandwidth (40MHz)

CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
	CHAIN 0	CHAIN 1				
5190	2.80	3.40	**4.093**	6.12	17	PASS
5230	2.70	3.40	4.050	6.07	17	PASS

26dB BANDWIDTH:

Channel Bandwidth (20MHz)

CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
	CHAIN 0	CHAIN 1	
5180	18.61	18.45	PASS
5200	18.53	18.48	PASS
5240	18.46	18.44	PASS

Channel Bandwidth (40MHz)

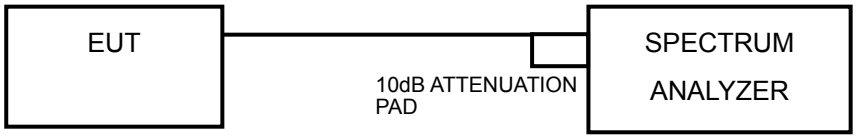
CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
	CHAIN 0	CHAIN 1	
5190	40.01	40.25	PASS
5230	40.15	40.23	PASS

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-1

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

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

Channel Bandwidth (20MHz)

CHANNEL FREQUENCY (MHZ)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
	CHAIN 0	CHAIN 1			
5180	-7.86	-6.23	-3.96	4	PASS
5200	-8.00	-6.96	-4.44	4	PASS
5240	-8.15	-6.15	-4.03	4	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 = 2dBi + 10log(2) = 5.01dBi < 6dBi , so the power density limit is not reduced.

Channel Bandwidth (40MHz)

CHANNEL FREQUENCY (MHZ)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
	CHAIN 0	CHAIN 1			
5190	-12.81	-12.35	-9.56	4	PASS
5230	-12.56	-11.81	-9.16	4	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.

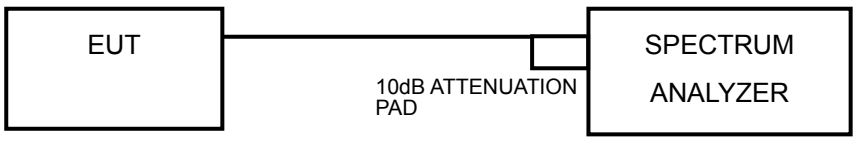
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi , so the power density limit is not reduced.

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.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

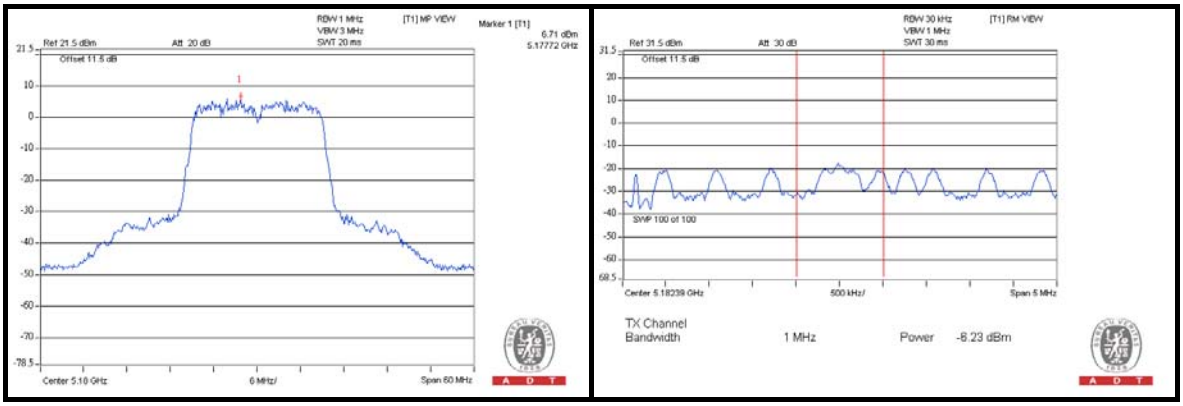
4.5.6 EUT OPERATING CONDITIONS

Same as 4.2.6

4.5.7 TEST RESULTS

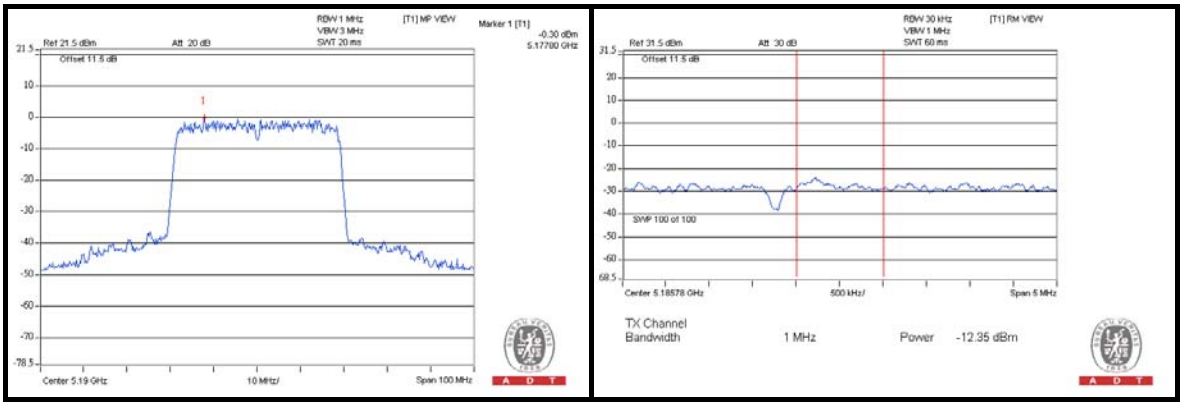
Channel Bandwidth (20MHz)

CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS/FAIL
	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
5180	4.51	6.71	-7.86	-6.23	12.37	12.94	13	PASS
5200	4.70	5.43	-8.00	-6.96	12.70	12.39	13	PASS
5240	4.20	5.11	-8.15	-6.15	12.35	11.26	13	PASS



Channel Bandwidth (40MHz)

CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS/FAIL
	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
5190	-1.08	-0.30	-12.81	-12.35	11.73	12.05	13	PASS
5230	-1.05	0.18	-12.56	-11.81	11.51	11.99	13	PASS

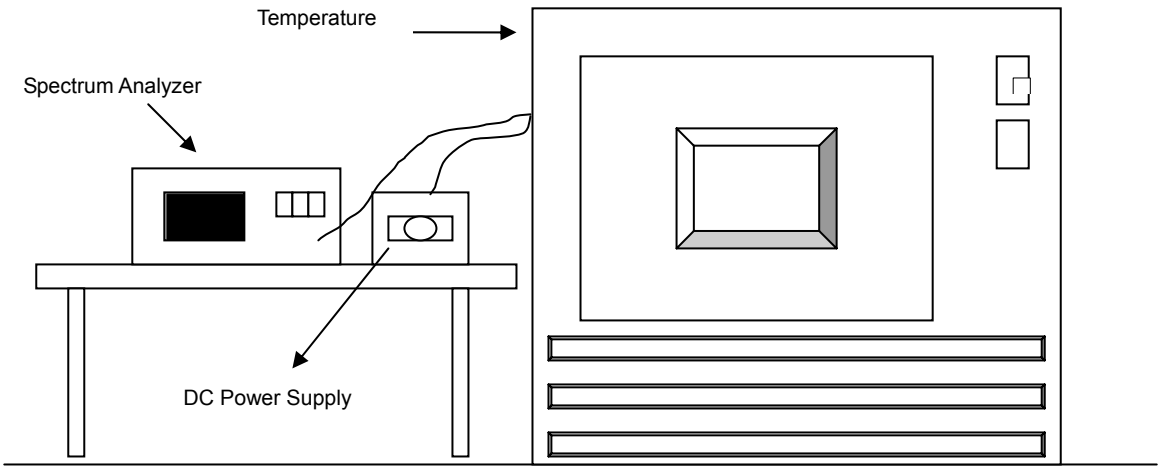


4.6 FREQUENCY STABILITY

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 DC 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: 5190MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	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 (%)
50	3.7	5189.9944	-0.0001	5189.9947	-0.0001	5189.9868	-0.0003	5189.9950	-0.0001
40	3.7	5190.0116	0.0002	5190.0131	0.0003	5190.0123	0.0002	5190.0111	0.0002
30	3.7	5189.9813	-0.0004	5189.9837	-0.0003	5189.9830	-0.0003	5189.9778	-0.0004
20	3.7	5190.0216	0.0004	5190.0235	0.0005	5190.0245	0.0005	5190.0183	0.0004
10	3.7	5189.9900	-0.0002	5189.9913	-0.0002	5189.9969	-0.0001	5189.9886	-0.0002
0	3.7	5189.9981	0.0000	5189.9918	-0.0002	5189.9924	-0.0001	5189.9895	-0.0002
-10	3.7	5190.0301	0.0006	5190.0302	0.0006	5190.0244	0.0005	5190.0234	0.0005
-20	3.7	5190.0192	0.0004	5190.0156	0.0003	5190.0252	0.0005	5190.0212	0.0004

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5910MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	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	4.255	5190.0210	0.0004	5190.0242	0.0005	5190.0252	0.0005	5190.0185	0.0004
	3.7	5190.0216	0.0004	5190.0235	0.0005	5190.0245	0.0005	5190.0183	0.0004
	3.145	5190.0200	0.0004	5190.0231	0.0004	5190.0259	0.0005	5190.0180	0.0003

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
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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 any modifications are made to the EUT by the lab during the test.

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