



FCC TEST REPORT (15.407)

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MODEL NO.: SBG6580-G228
FCC ID: W5HSBG6580-G228
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APPLICANT: GENERAL INSTRUMENT OF TAIWAN, LTD.

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(H.K.) Ltd., Taoyuan Branch

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120522C16-1	Original release	Jul. 02, 2012
RF120522C16-1 R1	Revised the model name and FCC ID.	Jul. 24, 2012

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 -6.16dB at 0.42734MHz.
15.407(b/1/2/3)(b)(6)	Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2333.00MHz.
15.407(a/1/2)	Peak 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	Antenna connector is UFL 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	2.44dB
Radiated emissions	30MHz ~ 200MHz	3.34dB
	200MHz ~1000MHz	3.35dB
	1GHz ~ 18GHz	2.26dB
	18GHz ~ 40GHz	1.94dB

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	DOCSIS 3.0 Wi-Fi Gateway
MODEL NO.	SBG6580-G228
POWER SUPPLY	12Vdc (Adapter)
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	5180.0 ~ 5240.0MHz
NUMBER OF CHANNEL	4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	28.0mW
ANTENNA TYPE	Printed antenna with 2.05dBi gain (Antenna 1) Printed antenna with 2.65dBi gain (Antenna 2)
ANTENNA CONNECTOR	UFL
DATA CABLE	1.8m non-shielded RJ45 cable without core
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

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

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

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

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

3. The EUT consumes power from the following adapter.

BRAND:	Asian Power Devices Inc.
MODEL:	WA-18X12FU
INPUT:	100-240Vac, 50-60Hz, 0.5A Max.
OUTPUT:	12Vdc, 1.5A
POWER LINE:	1.8m non-shielded cable without core

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

3.2 DESCRIPTION OF TEST MODES

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	
-	√	√	√	√	-

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

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	36 to 48	40	OFDM	BPSK	6.0

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Haru Yang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Sun Lin
PLC	22deg. C, 63%RH	120Vac, 60Hz	Ben Huang
APCM	26deg. C, 65%RH	120Vac, 60Hz	Haru Yang

3.3 DUTY CYCLE OF TEST SIGNAL

802.11a:

Duty cycle = $2.100/2.110 = 0.995$

Duty cycle of test signal is 99.5% > 98 %, duty factor is not required.

802.11n (20MHz):

Duty cycle = $0.996/1.014 = 0.982$

Duty cycle of test signal is 98.2% > 98 %, duty factor is not required.

802.11n (40MHz):

Duty cycle = $501/516 = 0.971$, Duty factor = $10 * \log(1/0.971) = 0.13$



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.

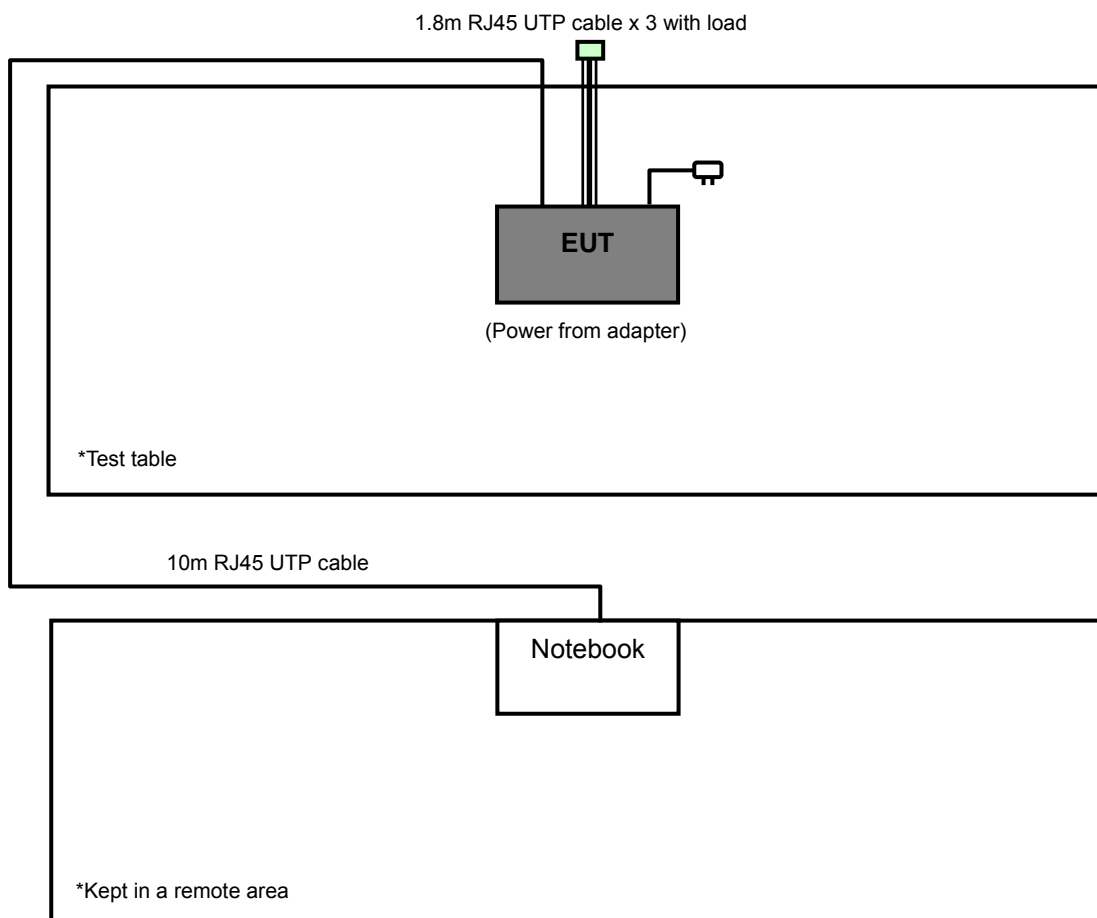
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	HP	Compaq 69109	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	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 communication partner to transfer data.
3. Item 1 is provided by the manufacturer.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST





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 v01r01

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

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:

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

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	Aug. 02, 2011	Aug. 01, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Jul. 21, 2011	Jul. 20, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 06, 2012	Apr. 05, 2013
HORN Antenna SCHWARZBECK	9120D	209	Aug. 25, 2011	Aug. 24, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 20, 2011	Jul. 19, 2012
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8447D	2944A10633	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8449B	3008A01964	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 30, 2011	Aug. 29, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/ 4	Aug. 30, 2011	Aug. 29, 2012
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100	TT93021703	NA	NA
Turn Table Controller ADT.	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 29, 2011	Oct. 28, 2012
SUHNER RF cable	SF102	Cable-CH6	Aug. 19, 2011	Aug. 18, 2012
High Speed Peak Power Meter	ML2495A	0842014	Apr. 28, 2012	Apr. 27, 2013
Power Sensor	MA2411B	0738404	Apr. 28, 2012	Apr. 27, 2013

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. The test was performed in HwaYa Chamber 3.
 4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 5. The FCC Site Registration No. is 988962.
 6. The IC Site Registration No. is IC 7450F-3.

4.1.4 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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 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.

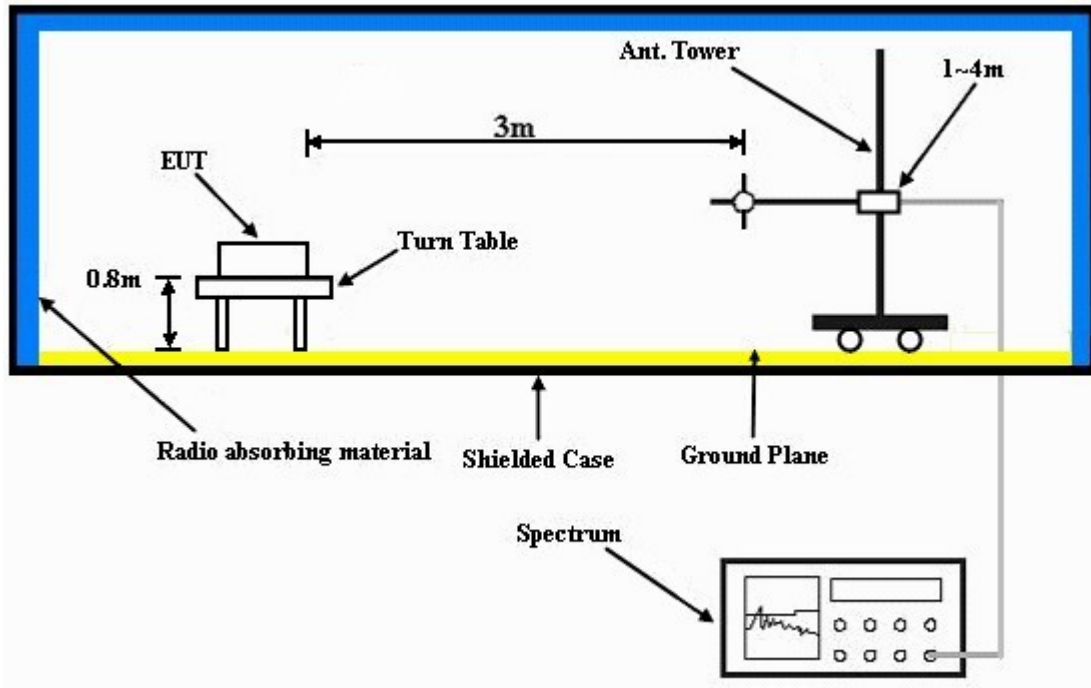
NOTE:

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. Placed the EUT on the testing table.
- b. Prepared the notebook 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.

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, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	2333.00	59.7 PK	74.0	-14.3	1.36 H	51	28.60	31.10
2	2333.00	52.9 AV	54.0	-1.1	1.36 H	51	21.80	31.10
3	5000.00	56.9 PK	74.0	-17.1	1.01 H	156	19.30	37.60
4	5000.00	45.8 AV	54.0	-8.2	1.01 H	156	8.20	37.60
5	5150.00	56.4 PK	74.0	-17.6	1.08 H	141	18.60	37.80
6	5150.00	44.2 AV	54.0	-9.8	1.08 H	141	6.40	37.80
7	*5180.00	102.7 PK			1.08 H	141	64.80	37.90
8	*5180.00	90.9 AV			1.08 H	141	53.00	37.90
9	#10360.00	58.5 PK	68.3	-9.8	1.00 H	212	9.40	49.10

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	2333.00	57.4 PK	74.0	-16.6	1.00 V	127	26.30	31.10
2	2333.00	49.6 AV	54.0	-4.4	1.00 V	127	18.50	31.10
3	5000.00	57.0 PK	74.0	-17.0	1.12 V	317	19.40	37.60
4	5000.00	47.6 AV	54.0	-6.4	1.12 V	317	10.00	37.60
5	5150.00	65.9 PK	74.0	-8.1	1.16 V	9	28.10	37.80
6	5150.00	39.7 AV	54.0	-14.3	1.16 V	9	1.90	37.80
7	*5180.00	110.3 PK			1.01 V	8	72.40	37.90
8	*5180.00	97.7 AV			1.01 V	8	59.80	37.90
9	#10360.00	58.1 PK	68.3	-10.2	1.12 V	283	9.00	49.10

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.



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

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	2333.00	59.6 PK	74.0	-14.4	1.34 H	62	28.50	31.10
2	2333.00	52.8 AV	54.0	-1.2	1.34 H	62	21.70	31.10
3	5000.00	56.7 PK	74.0	-17.3	1.01 H	160	19.10	37.60
4	5000.00	47.0 AV	54.0	-7.0	1.01 H	160	9.40	37.60
5	5150.00	55.4 PK	74.0	-18.6	1.09 H	141	17.60	37.80
6	5150.00	42.9 AV	54.0	-11.1	1.09 H	141	5.10	37.80
7	*5200.00	103.7 PK			1.09 H	141	65.80	37.90
8	*5200.00	90.8 AV			1.09 H	141	52.90	37.90
9	#10400.00	58.2 PK	68.3	-10.1	1.00 H	208	9.10	49.10
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	2333.00	58.2 PK	74.0	-15.8	1.00 V	129	27.10	31.10
2	2333.00	49.3 AV	54.0	-4.7	1.00 V	129	18.20	31.10
3	5000.00	57.2 PK	74.0	-16.8	1.12 V	316	19.60	37.60
4	5000.00	47.4 AV	54.0	-6.6	1.12 V	316	9.80	37.60
5	5150.00	58.5 PK	74.0	-15.5	1.02 V	7	20.70	37.80
6	5150.00	44.1 AV	54.0	-9.9	1.02 V	7	6.30	37.80
7	*5200.00	109.1 PK			1.02 V	7	71.20	37.90
8	*5200.00	97.1 AV			1.02 V	7	59.20	37.90
9	#10400.00	57.7 PK	68.3	-10.6	1.14 V	274	8.60	49.10

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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	2333.00	59.4 PK	74.0	-14.6	1.37 H	62	28.30	31.10
2	2333.00	52.9 AV	54.0	-1.1	1.37 H	62	21.80	31.10
3	5000.00	57.5 PK	74.0	-16.5	1.02 H	160	19.90	37.60
4	5000.00	47.2 AV	54.0	-6.8	1.02 H	160	9.60	37.60
5	*5240.00	102.4 PK			1.06 H	140	64.50	37.90
6	*5240.00	90.0 AV			1.06 H	140	52.10	37.90
7	5350.00	55.7 PK	74.0	-18.3	1.06 H	140	17.60	38.10
8	5350.00	42.3 AV	54.0	-11.7	1.06 H	140	4.20	38.10
9	#10480.00	59.0 PK	68.3	-9.3	1.00 H	224	9.50	49.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2333.00	57.4 PK	74.0	-16.6	1.00 V	128	26.30	31.10
2	2333.00	49.3 AV	54.0	-4.7	1.00 V	128	18.20	31.10
3	5000.00	56.9 PK	74.0	-17.1	1.06 V	263	19.30	37.60
4	5000.00	47.3 AV	54.0	-6.7	1.06 V	263	9.70	37.60
5	*5240.00	108.5 PK			1.01 V	9	70.60	37.90
6	*5240.00	96.8 AV			1.01 V	9	58.90	37.90
7	5350.00	55.7 PK	74.0	-18.3	1.01 V	9	17.60	38.10
8	5350.00	43.2 AV	54.0	-10.8	1.01 V	9	5.10	38.10
9	#10480.00	58.4 PK	68.3	-9.9	1.15 V	281	8.90	49.50

REMARKS:

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



A D T

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	2333.00	59.6 PK	74.0	-14.4	1.35 H	49	28.50	31.10
2	2333.00	53.0 AV	54.0	-1.0	1.35 H	49	21.90	31.10
3	5000.00	56.6 PK	74.0	-17.4	1.03 H	164	19.00	37.60
4	5000.00	48.0 AV	54.0	-6.0	1.03 H	164	10.40	37.60
5	5150.00	56.6 PK	74.0	-17.4	1.08 H	142	18.80	37.80
6	5150.00	44.8 AV	54.0	-9.2	1.08 H	142	7.00	37.80
7	*5180.00	104.5 PK			1.08 H	142	66.60	37.90
8	*5180.00	90.5 AV			1.08 H	142	52.60	37.90
9	#10360.00	58.6 PK	68.3	-9.7	1.07 H	211	9.50	49.10

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	2333.00	57.8 PK	74.0	-16.2	1.00 V	127	26.70	31.10
2	2333.00	49.5 AV	54.0	-4.5	1.00 V	127	18.40	31.10
3	5000.00	59.3 PK	74.0	-14.7	1.25 V	315	21.70	37.60
4	5000.00	48.9 AV	54.0	-5.1	1.25 V	315	11.30	37.60
5	5150.00	65.4 PK	74.0	-8.6	1.01 V	337	27.60	37.80
6	5150.00	49.3 AV	54.0	-4.7	1.01 V	337	11.50	37.80
7	*5180.00	110.6 PK			1.01 V	337	72.70	37.90
8	*5180.00	97.1 AV			1.01 V	337	59.20	37.90
9	#10360.00	58.3 PK	68.3	-10.0	1.13 V	276	9.20	49.10

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.



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

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	2333.00	59.4 PK	74.0	-14.6	1.33 H	47	28.30	31.10
2	2333.00	52.8 AV	54.0	-1.2	1.33 H	47	21.70	31.10
3	5000.00	57.2 PK	74.0	-16.8	1.03 H	161	19.60	37.60
4	5000.00	47.4 AV	54.0	-6.6	1.03 H	161	9.80	37.60
5	5150.00	55.3 PK	74.0	-18.7	1.08 H	141	17.50	37.80
6	5150.00	42.4 AV	54.0	-11.6	1.08 H	141	4.60	37.80
7	*5200.00	104.0 PK			1.08 H	141	66.10	37.90
8	*5200.00	90.2 AV			1.08 H	141	52.30	37.90
9	#10400.00	58.4 PK	68.3	-9.9	1.00 H	214	9.30	49.10
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	2333.00	58.3 PK	74.0	-15.7	1.00 V	128	27.20	31.10
2	2333.00	49.5 AV	54.0	-4.5	1.00 V	128	18.40	31.10
3	5000.00	57.8 PK	74.0	-16.2	1.12 V	308	20.20	37.60
4	5000.00	48.7 AV	54.0	-5.3	1.12 V	308	11.10	37.60
5	5150.00	57.8 PK	74.0	-16.2	1.12 V	334	20.00	37.80
6	5150.00	44.2 AV	54.0	-9.8	1.12 V	334	6.40	37.80
7	*5200.00	108.9 PK			1.12 V	334	71.00	37.90
8	*5200.00	96.3 AV			1.12 V	334	58.40	37.90
9	#10400.00	57.8 PK	68.3	-10.5	1.15 V	283	8.70	49.10

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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	2333.00	60.1 PK	74.0	-13.9	1.36 H	46	29.00	31.10
2	2333.00	53.0 AV	54.0	-1.0	1.36 H	46	21.90	31.10
3	5000.00	56.6 PK	74.0	-17.4	1.03 H	167	19.00	37.60
4	5000.00	47.0 AV	54.0	-7.0	1.03 H	167	9.40	37.60
5	*5240.00	104.5 PK			1.06 H	138	66.60	37.90
6	*5240.00	90.8 AV			1.06 H	138	52.90	37.90
7	5350.00	55.2 PK	74.0	-18.8	1.06 H	138	17.10	38.10
8	5350.00	41.5 AV	54.0	-12.5	1.06 H	138	3.40	38.10
9	#10480.00	58.9 PK	68.3	-9.4	1.00 H	230	9.40	49.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2333.00	58.0 PK	74.0	-16.0	1.00 V	128	26.90	31.10
2	2333.00	49.5 AV	54.0	-4.5	1.00 V	128	18.40	31.10
3	5000.00	59.4 PK	74.0	-14.6	1.06 V	263	21.80	37.60
4	5000.00	47.7 AV	54.0	-6.3	1.06 V	263	10.10	37.60
5	*5240.00	110.9 PK			1.00 V	339	73.00	37.90
6	*5240.00	97.1 AV			1.00 V	339	59.20	37.90
7	5350.00	56.2 PK	74.0	-17.8	1.00 V	339	18.10	38.10
8	5350.00	43.5 AV	54.0	-10.5	1.00 V	339	5.40	38.10
9	#10480.00	58.2 PK	68.3	-10.1	1.16 V	277	8.70	49.50

REMARKS:

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



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	2333.00	59.5 PK	74.0	-14.5	1.34 H	49	28.40	31.10
2	2333.00	53.0 AV	54.0	-1.0	1.34 H	49	21.90	31.10
3	5000.00	57.5 PK	74.0	-16.5	1.01 H	164	19.90	37.60
4	5000.00	47.8 AV	54.0	-6.2	1.01 H	164	10.20	37.60
5	5150.00	60.9 PK	74.0	-13.1	1.05 H	227	23.10	37.80
6	5150.00	47.0 AV	54.0	-7.0	1.05 H	227	9.20	37.80
7	*5190.00	99.0 PK			1.05 H	227	61.10	37.90
8	*5190.00	87.9 AV			1.05 H	227	50.00	37.90
9	#10380.00	59.0 PK	68.3	-9.3	1.09 H	225	9.90	49.10

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	2333.00	57.8 PK	74.0	-16.2	1.00 V	125	26.70	31.10
2	2333.00	49.7 AV	54.0	-4.3	1.00 V	125	18.60	31.10
3	5000.00	56.5 PK	74.0	-17.5	1.25 V	315	18.90	37.60
4	5000.00	48.1 AV	54.0	-5.9	1.25 V	315	10.50	37.60
5	5150.00	67.6 PK	74.0	-6.4	1.01 V	346	29.80	37.80
6	5150.00	52.7 AV	54.0	-1.3	1.01 V	346	14.90	37.80
7	*5190.00	103.1 PK			1.01 V	323	65.20	37.90
8	*5190.00	92.9 AV			1.01 V	323	55.00	37.90
9	#10380.00	58.5 PK	68.3	-9.8	1.14 V	281	9.40	49.10

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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	2333.00	59.4 PK	74.0	-14.6	1.35 H	44	28.30	31.10
2	2333.00	53.0 AV	54.0	-1.0	1.35 H	44	21.90	31.10
3	5000.00	57.1 PK	74.0	-16.9	1.01 H	164	19.50	37.60
4	5000.00	47.8 AV	54.0	-6.2	1.01 H	164	10.20	37.60
5	*5230.00	99.3 PK			1.03 H	251	61.40	37.90
6	*5230.00	89.5 AV			1.03 H	251	51.60	37.90
7	5350.00	55.9 PK	74.0	-18.1	1.03 H	251	17.80	38.10
8	5350.00	42.9 AV	54.0	-11.1	1.03 H	251	4.80	38.10
9	#10460.00	59.1 PK	68.3	-9.2	1.10 H	241	9.70	49.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2333.00	58.2 PK	74.0	-15.8	1.00 V	126	27.10	31.10
2	2333.00	49.7 AV	54.0	-4.3	1.00 V	126	18.60	31.10
3	5000.00	56.5 PK	74.0	-17.5	1.25 V	314	18.90	37.60
4	5000.00	47.6 AV	54.0	-6.4	1.25 V	314	10.00	37.60
5	*5230.00	105.3 PK			1.00 V	330	67.40	37.90
6	*5230.00	94.0 AV			1.00 V	330	56.10	37.90
7	5350.00	55.7 PK	74.0	-18.3	1.00 V	330	17.60	38.10
8	5350.00	44.3 AV	54.0	-9.7	1.00 V	330	6.20	38.10
9	#10460.00	58.5 PK	68.3	-9.8	1.17 V	294	9.10	49.40

REMARKS:

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

BELOW 1GHz WORST-CASE DATA : 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	156.10	32.1 QP	43.5	-11.4	1.25 H	276	18.10	14.00
2	199.97	39.2 QP	43.5	-4.3	1.14 H	292	28.00	11.20
3	249.22	32.1 QP	46.0	-13.9	1.25 H	293	19.10	13.00
4	499.48	35.4 QP	46.0	-10.6	1.50 H	263	15.30	20.10
5	666.32	37.3 QP	46.0	-8.7	1.00 H	239	14.60	22.70
6	749.74	34.0 QP	46.0	-12.0	1.50 H	318	10.00	24.00
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	62.17	34.1 QP	40.0	-5.9	1.07 V	21	20.90	13.20
2	97.90	36.4 QP	43.5	-7.1	1.25 V	245	27.20	9.20
3	152.22	31.2 QP	43.5	-12.3	1.00 V	199	17.30	13.90
4	499.48	38.2 QP	46.0	-7.8	1.00 V	157	18.10	20.10
5	668.26	37.0 QP	46.0	-9.0	1.50 V	256	14.30	22.70
6	833.16	41.6 QP	46.0	-4.4	1.50 V	64	16.00	25.60

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.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 23, 2011	Nov. 22, 2012
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 29, 2011	Dec. 28, 2012
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 14, 2011	Jul. 13, 2012
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 07, 2012	Feb. 06, 2013
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

4.2.3 TEST PROCEDURES

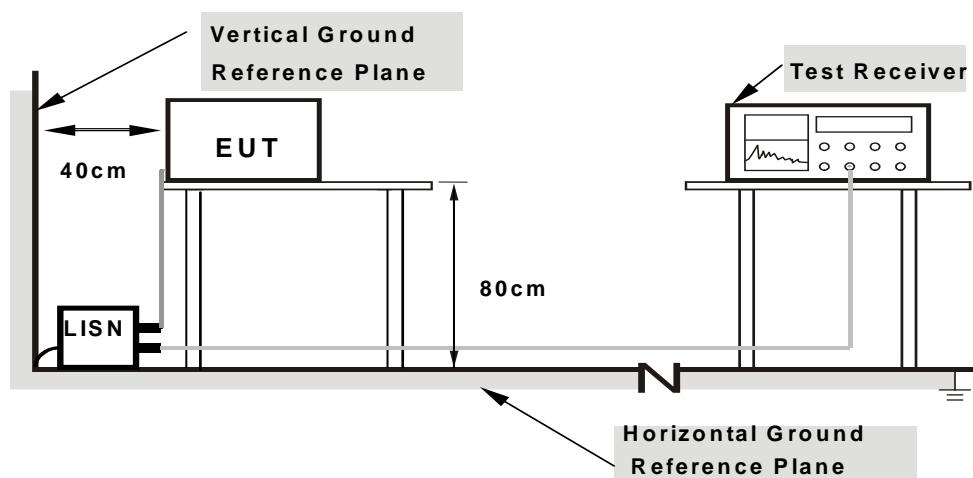
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

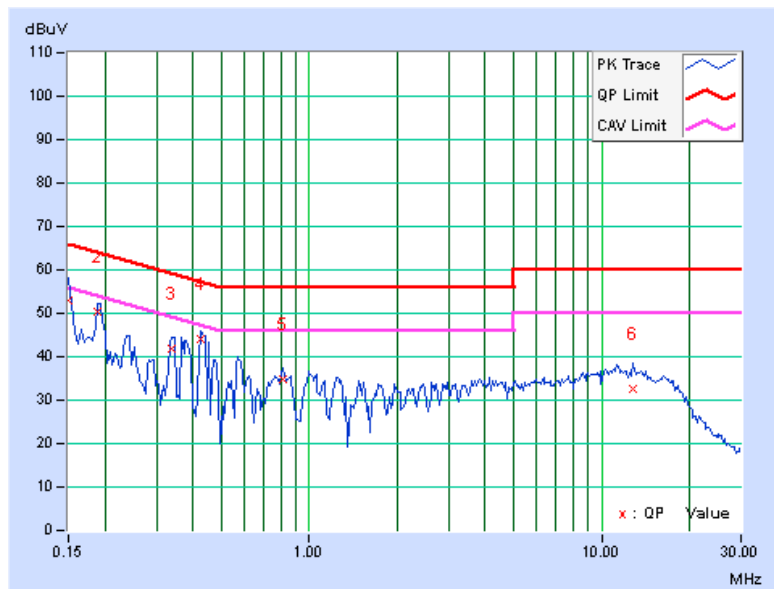
CONDUCTED WORST-CASE DATA : 802.11a

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.14	52.76	38.84	52.90	38.98	66.00	56.00	-13.10	-17.02
2	0.18906	0.21	50.28	42.11	50.49	42.32	64.08	54.08	-13.59	-11.76
3	0.33750	0.18	41.72	37.05	41.90	37.23	59.26	49.26	-17.36	-12.03
4	0.42734	0.16	44.06	40.98	44.22	41.14	57.30	47.30	-13.08	-6.16
5	0.81797	0.19	34.75	28.24	34.94	28.43	56.00	46.00	-21.06	-17.57
6	12.75000	0.66	31.85	26.83	32.51	27.49	60.00	50.00	-27.49	-22.51

REMARKS:

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





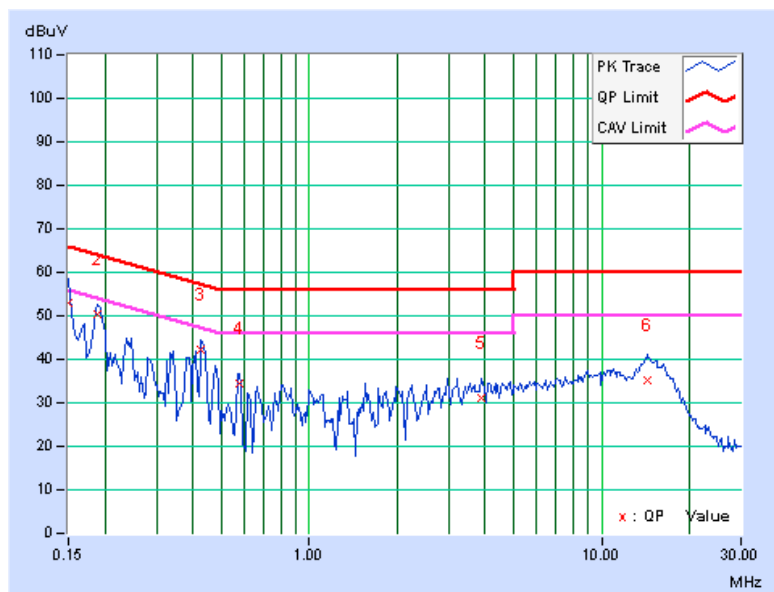
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PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.23	52.60	38.06	52.83	38.29	66.00	56.00	-13.17	-17.71
2	0.18906	0.29	50.20	39.86	50.49	40.15	64.08	54.08	-13.58	-13.92
3	0.42734	0.25	41.84	37.21	42.09	37.46	57.30	47.30	-15.21	-9.84
4	0.57969	0.26	34.18	28.98	34.44	29.24	56.00	46.00	-21.56	-16.76
5	3.86328	0.44	30.58	24.34	31.02	24.78	56.00	46.00	-24.98	-21.22
6	14.26953	0.80	34.55	29.52	35.35	30.32	60.00	50.00	-24.65	-19.68

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.



4.3 PEAK TRANSMIT POWER MEASUREMENT

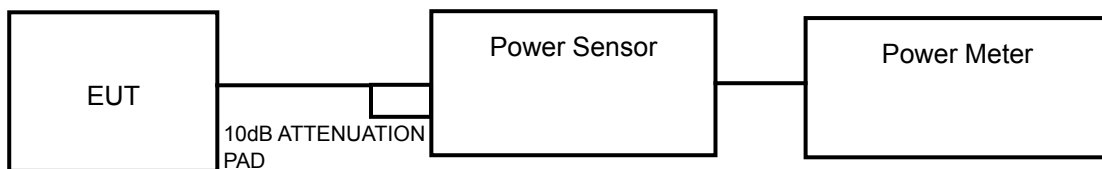
4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

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

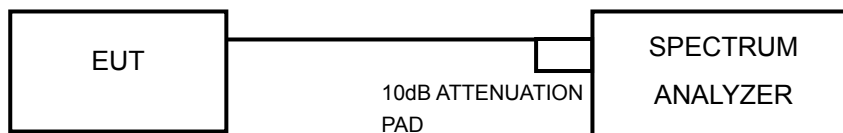
NOTE: Where B is the 26dB emission bandwidth in MHz.

4.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB 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%.

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

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	22.4	13.51	17	PASS
40	5200	28.0	14.47	17	PASS
48	5240	21.8	13.39	17	PASS

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	9.67	10.28	19.9	13.0	17	PASS
40	5200	9.71	10.31	20.1	13.0	17	PASS
48	5240	9.54	10.21	19.5	12.9	17	PASS

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	9.33	9.97	18.5	12.7	17	PASS
46	5230	10.31	10.84	22.9	13.6	17	PASS



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26dB BANDWIDTH: 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
36	5180	21.13	PASS
40	5200	26.07	PASS
48	5240	20.44	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	19.85	19.73	PASS
40	5200	21.48	19.72	PASS
48	5240	19.87	19.79	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	41.57	43.85	PASS
46	5230	43.98	44.54	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 for 802.11a / 802.11an 20MHz

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1 MHz, Set VBW \geq 3 MHz, Detector = RMS
- 3) Sweep time = auto, trigger set to "free run" .
- 4) Trace average at least 100 traces in power averaging mode.
- 5) Record the max value

Using method SA-2 alternative for 802.11an 40MHz

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1 MHz, Set VBW \geq 3 MHz, Detector = RMS
- 3) Sweep time = SWT 4s second.
- 4) Perform a single sweep.
- 5) Record the max value and add $10 \log (1/\text{duty cycle})$

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

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	3.04	4	PASS
40	5200	3.87	4	PASS
48	5240	3.10	4	PASS

NOTE: 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.

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	-1.03	-0.35	2.322	4	PASS
40	5200	-1.03	-0.40	2.244	4	PASS
48	5240	-1.12	-0.37	2.178	4	PASS

NOTE: 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.

802.11n (40MHz)

CHAN.	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	-4.82	-5.19	-2.020	0.13	-1.890	4	PASS
46	5230	-3.61	-4.36	-0.956	0.13	-0.826	4	PASS

NOTE:

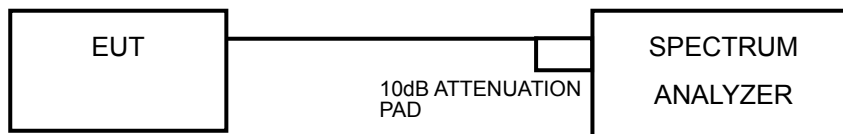
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Refer to section 3.3 for duty cycle spectrum plot.

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 \geq 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

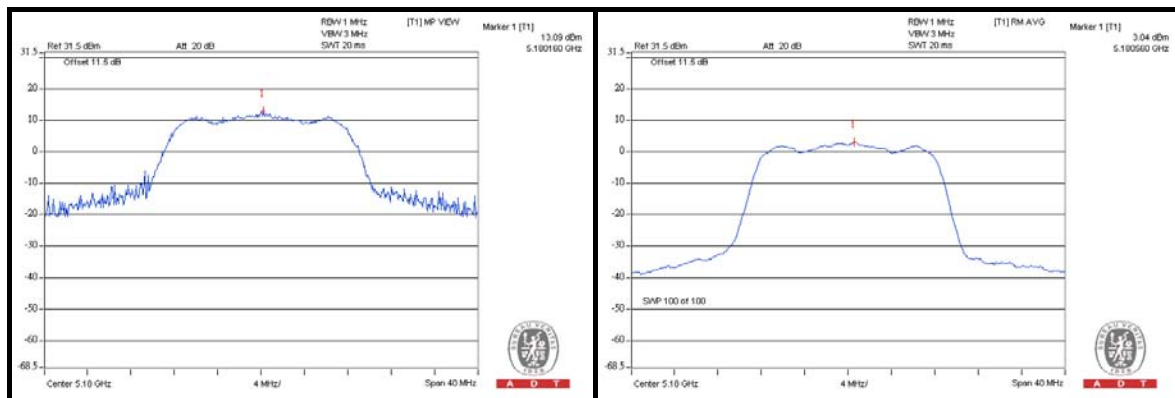


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4.5.7 TEST RESULTS

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS/FAIL
36	5180	13.09	3.04	10.05	13	PASS
44	5220	13.91	3.87	10.04	13	PASS
48	5240	12.94	3.10	9.84	13	PASS

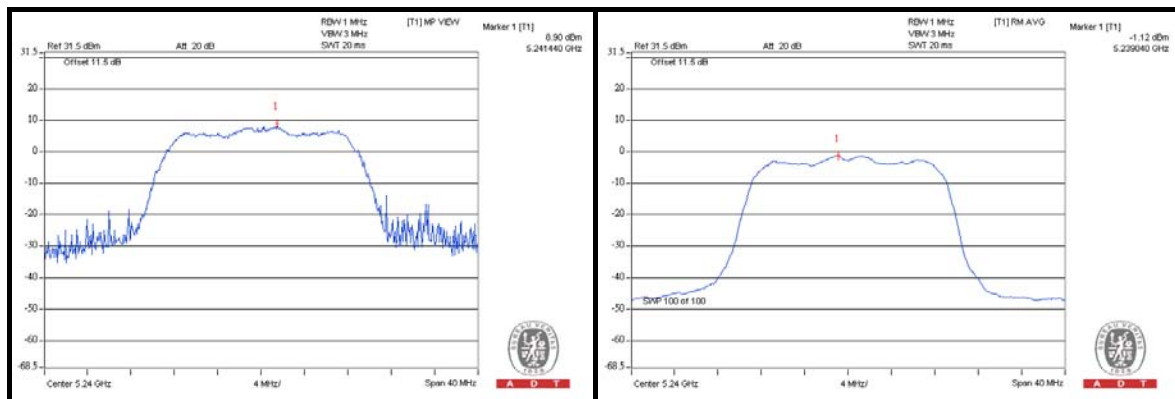




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802.11n (20MHz)

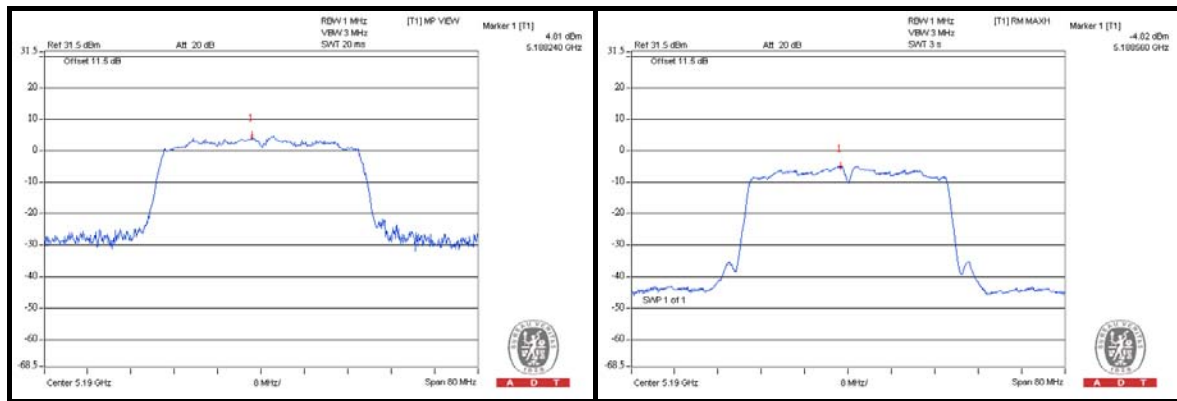
TX CHAIN	CHAN.	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS /FAIL
0	36	5180	8.86	-1.03	9.89	13	PASS
	40	5200	8.76	-1.03	9.79	13	PASS
	48	5240	8.90	-1.12	10.02	13	PASS
1	36	5180	8.98	-0.35	9.33	13	PASS
	40	5200	9.16	-0.40	9.56	13	PASS
	48	5240	9.08	-0.37	9.45	13	PASS



802.11n (40MHz)

TX CHAIN	CHAN.	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD WITHOUT DUTY FACTOR (dBm)	PPSD WITH DUTY FACTOR (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS /FAIL
0	38	5190	4.81	-4.82	-4.69	9.50	13	PASS
	46	5230	5.6	-3.61	-3.48	9.08	13	PASS
1	38	5190	4.16	-5.19	-5.06	9.22	13	PASS
	46	5230	5.15	-4.36	-4.23	9.38	13	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

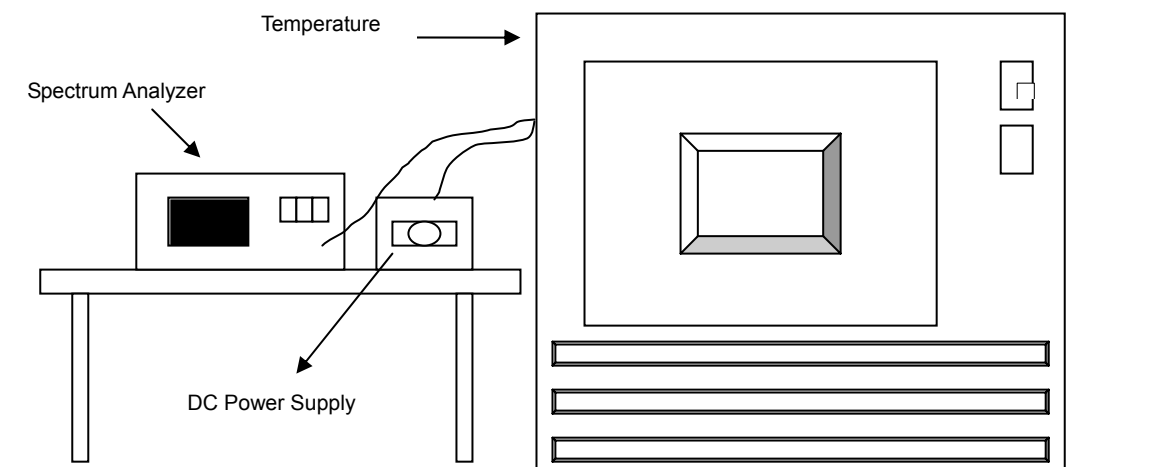


4.6 FREQUENCY STABILITY

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

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5200MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	110.0	5200.018707	3.598	5200.018259	3.511	5200.018174	3.495	5200.018192	3.498
40	110.0	5200.018220	3.504	5200.018705	3.597	5200.018638	3.584	5200.018142	3.489
30	110.0	5200.020498	3.942	5200.020309	3.906	5200.020017	3.849	5200.020448	3.932
20	110.0	5200.020847	4.009	5200.020949	4.029	5200.021264	4.089	5200.020795	3.999
10	110.0	5200.022698	4.365	5200.023090	4.440	5200.023082	4.439	5200.022803	4.385
0	110.0	5200.021186	4.074	5200.021427	4.121	5200.021405	4.116	5200.021411	4.118
-10	110.0	5200.019525	3.755	5200.020250	3.894	5200.019761	3.800	5200.019684	3.785
-20	110.0	5200.018901	3.635	5200.018705	3.597	5200.018693	3.595	5200.018722	3.600
-30	110.0	5200.017895	3.441	5200.018260	3.512	5200.018255	3.511	5200.018234	3.507

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5200MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	93.5	5200.020917	4.023	5200.020419	3.927	5200.020366	3.917	5200.020989	4.036
	110.0	5200.020847	4.009	5200.020949	4.029	5200.021264	4.089	5200.020795	3.999
	126.5	5200.022366	4.301	5200.023251	4.471	5200.022864	4.397	5200.022616	4.349

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
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Email: service.adt@tw.bureauveritas.com
Web Site: www.adt.com.tw

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

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---