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# FCC TEST REPORT (15.247)

**REPORT NO.:** RF990701C17

**MODEL NO.:** VEN401-XX

(The "X" of Model Name could be 0~9, A~Z or blank)

**FCC ID:** MXF-AP990624M

**RECEIVED:** July 01, 2010

**TESTED:** July 01 to Nov. 24, 2010

**ISSUED:** Jan. 04, 2011

**APPLICANT:** Gemtek Technology Co., Ltd.

**ADDRESS:** No.15-1, Zhonghua Rd, Hsinchu Industrial Park , Hsinchu County, Taiwan,R.O.C.303

**ISSUED BY:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

**LAB ADDRESS:** No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

**TEST LOCATION (1):** No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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# 1. CERTIFICATION

**PRODUCT:** Wireless Video Access Point  
**BRAND NAME:** CISCO  
**MODEL NO.:** VEN401-XX  
(The "X" of Model Name could be 0~9, A~Z or blank)  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**TESTED:** July 01 to Nov. 24, 2010  
**APPLICANT:** Gemtek Technology Co., Ltd.  
**STANDARDS:** FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.4-2003

The above equipment (Model: VEN401-AT) 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** : Midoli Peng , **DATE:** Jan. 04, 2011  
( Midoli Peng, Specialist )

**TECHNICAL ACCEPTANCE** : Hank Chung , **DATE:** Jan. 04, 2011  
( Hank Chung, Deputy Manager )

**APPROVED BY** : May Chen , **DATE:** Jan. 04, 2011  
(May Chen, Deputy Manager )

### Revision Note:

Revision No.	Revised Date	Comment
Rev.1.0	Jan. 04, 2011	1. Added one adapter<Model: 12GWU12> and modified all related test items. 2. Changed power level and modified all related test items.



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## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 802.11a, 5725~5850MHz Band

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
Standard Section	Test Type and Limit	Result	Remark
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -11.97dB at 0.150MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -0.8dB at 11650.0MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Conducted Out-Band Emission Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

### NOTE:

1. The EUT was operating in 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.725~5.850GHz. For the 5.15~5.25GHz RF parameters was recorded in another test report.



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## 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:

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

<b>Measurement</b>	<b>Value</b>
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.76 dB
Radiated emissions (1GHz -18GHz)	2.19 dB
Radiated emissions (18GHz -40GHz)	2.55 dB



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Wireless Video Access Point
<b>MODEL NO.</b>	VEN401-XX (The "X" of Model Name could be 0~9, A~Z or blank)
<b>FCC ID</b>	MXF-AP990624M
<b>POWER SUPPLY</b>	DC 12V from power adapter
<b>MODULATION TYPE</b>	64QAM, 16QAM, QPSK, BPSK
<b>MODULATION TECHNOLOGY</b>	OFDM
<b>TRANSFER RATE</b>	802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: Up to 300 Mbps
<b>OPERATING FREQUENCY</b>	For 15.407 802.11a: 5.18 ~ 5.24GHz For 15.247 802.11a: 5.745 ~ 5.825GHz
<b>NUMBER OF CHANNEL</b>	<b>For 15.407</b> 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) <b>For 15.247</b> 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
<b>MAXIMUM OUTPUT POWER</b>	<b>For 15.407</b> 802.11a: 45.7mW 802.11n (20MHz): 47.0mW 802.11n (40MHz): 42.1mW <b>For 15.247</b> 802.11a: 398.1mW 802.11n (20MHz): 737.0mW 802.11n (40MHz): 734.6mW
<b>ANTENNA TYPE</b>	Please refer note 2
<b>ANTENNA CONNECTOR</b>	Please refer note 2
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Ethernet port x 1
<b>ASSOCIATED DEVICES</b>	Adapter x 1



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**NOTE:**

1. The EUT has below model names which are identical to each other in all aspects except for the following table :

Model No.	Description
VEN401-XX (X could be "0-9", "A-Z", "blank")	for different marketing

From the above models, model: **VEN401-AT** was selected as model for the test and its data was recorded in this report.

2. There is one set of antenna provided to this EUT, please refer to the following table:

Chain	Antenna Gain		Antenna Type	Connector
	For 5GHz(5.15~5.25) Gain (dBi)	For 5GHz(5.725~5.85) Gain (dBi)		
0	Peak Gain Top Front Antenna 3.4	Peak Gain Top Front Antenna 4.3	PIFA	NA
1	Peak Gain Top Middle Antenna 3.9(Rx only)	Peak Gain Top Middle Antenna 4.5(Rx only)	PIFA	NA
2	Peak Gain Top Rear Antenna 3.7	Peak Gain Top Rear Antenna 4.2	PIFA	NA

3. The EUT must be supplied with a power adapter and following three different models could be chosen:

<b>Adapter 1</b>	
<b>Brand:</b>	OEM
<b>Model No.:</b>	ADS18B-W 120100
<b>Input power :</b>	100-240V 0.5A 50-60Hz
<b>Output power :</b>	12V 1A DC output cable (Unshielded, 1.8m)
<b>Description:</b>	Two types: 1. DC output cable without power switch (※) 2. DC output cable with power switch (※)
<b>Adapter 2</b>	
<b>Brand:</b>	OEM
<b>Model No.:</b>	ADS0128-W 120100
<b>Input power :</b>	100-240V 0.5A 50-60Hz
<b>Output power :</b>	12V 1A DC output cable (Unshielded, 1.8m)
<b>Description:</b>	One type: 1. DC output cable without power switch (※)
<b>Adapter 3</b>	
<b>Brand:</b>	ENG
<b>Model No.:</b>	12GWU12
<b>Input power :</b>	100-120V 0.3A 50-60Hz
<b>Output power :</b>	12V 1A DC output cable (Unshielded, 1.9m)
<b>Description:</b>	Two types: 1. DC output cable without power switch (※) 2. DC output cable with power switch (※)

※**For Radiated test:** The EUT was pre-tested with above adapters, the worse case was found in the **adapter 1 without power switch**. Therefore only the test data of the adapter was recorded in this report.

4. The EUT incorporates a MIMO function with 802.11n.
5. The EUT is 2 \* 3 spatial MIMO (2Tx & 3Rx) without beam forming function. The 11a legacy mode is limited to single transmitter only.
6. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.



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### 3.2 DESCRIPTION OF TEST MODES

#### Operated in 5725 ~ 5850MHz band:

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

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

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

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	
1	√	√	√	√	Adapter 1 < DC output cable without power switch>
2	√	-	-	-	Adapter 1 < DC output cable with power switch>
3	√	-	-	-	Adapter 2 < DC output cable without power switch>
4	√	-	-	-	Adapter 3 < DC output cable without power switch>
5	√	-	-	-	Adapter 3 < DC output cable with power switch>

Where **PLC**: Power Line Conducted Emission

**RE < 1G**: Radiated Emission below 1GHz

**RE ≥ 1G**: Radiated Emission above 1GHz

**APCM**: Antenna Port Conducted Measurement

#### **POWER LINE CONDUCTED EMISSION TEST:**

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	EUT CONFIGURE MODE
802.11n (20MHz)	149 to 165	149	OFDM	BPSK	6.5	1~5

#### **RADIATED EMISSION TEST (BELOW 1 GHz):**

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	EUT CONFIGURE MODE
802.11n (20MHz)	149 to 165	149	OFDM	BPSK	6.5	1



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**RADIATED EMISSION TEST (ABOVE 1 GHz):**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	EUT CONFIGURE MODE
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6	1
802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	6.5	1
802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	13.5	1

**CONDUCTED OUT-BAND EMISSION MEASUREMENT:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	EUT CONFIGURE MODE
802.11a	149 to 165	149, 165	OFDM	BPSK	6	1
802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	6.5	1
802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	13.5	1

※ After verification, conducted out band emission as show worst chain in report by investigations.

**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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	EUT CONFIGURE MODE
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6	1
802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	6.5	1
802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	13.5	1

※ After verification, bandwidth as show worst chain in report by investigations.



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**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE <sup>3</sup> 1G	27deg. C, 72%RH, 1011 hPa	120Vac, 60Hz	Eric Lee
RE<1G	24deg. C, 68%RH, 1011 hPa	120Vac, 60Hz	Eric Lee
PLC	26deg. C, 76%RH, 1011 hPa	120Vac, 60Hz	Timmy Hu / Andy Ho
APCM	24deg. C, 68%RH, 1011 hPa	120Vac, 60Hz	Eric Lee



### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

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

**FCC Part 15, Subpart C. (15.247)**

**ANSI C63.4-2003**

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

**NOTE:** The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

### 3.4 DESCRIPTION OF SUPPORT UNITS

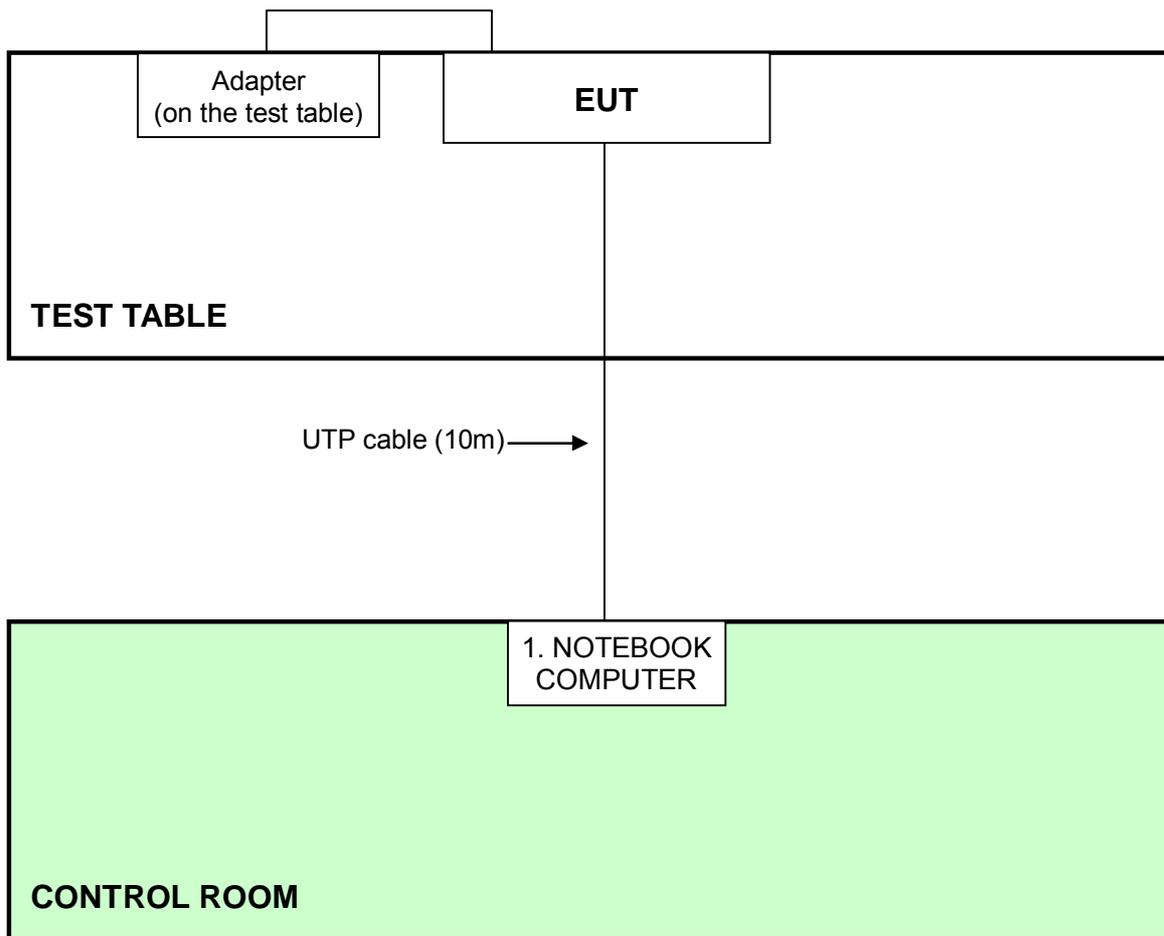
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

For conducted test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP27L	7YLB32S	FCC DoC
For radiated test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable(10m)

**NOTE:** 1. All power cords of the above support units are non shielded (1.8m).

### 3.5 CONFIGURATION OF SYSTEM UNDER TEST



## 4. TEST TYPES AND RESULTS (802.11a, 5725~5850MHz Band)

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ 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 0.50 MHz.
  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.

#### 4.1.2 TEST INSTRUMENTS

For test mode 1~3:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 09, 2010	Mar. 08, 2011
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-522	Sep. 23, 2009	Sep. 22, 2010
Line-Impedance Stabilization Network (for Peripheral)	ESH3-Z5	848773/004	Oct. 26, 2009	Oct. 25, 2010
RF Cable (JYEBAO)	5DFB	COBCAB-001	Nov. 24, 2009	Nov. 23, 2010
50 ohms Terminator	50	3	Oct. 28, 2009	Oct. 27, 2010
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.



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**For test mode 4~5:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 09, 2010	Mar. 08, 2011
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-522	Sep. 08, 2010	Sep. 07, 2011
Line-Impedance Stabilization Network (for Peripheral)	ESH3-Z5	848773/004	Nov. 03, 2010	Nov. 02, 2011
RF Cable (JYEBAO)	5DFB	COCCAB-002	Aug. 30, 2010	Aug. 29, 2011
50 ohms Terminator	50	3	Nov. 03, 2010	Nov. 02, 2011
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.

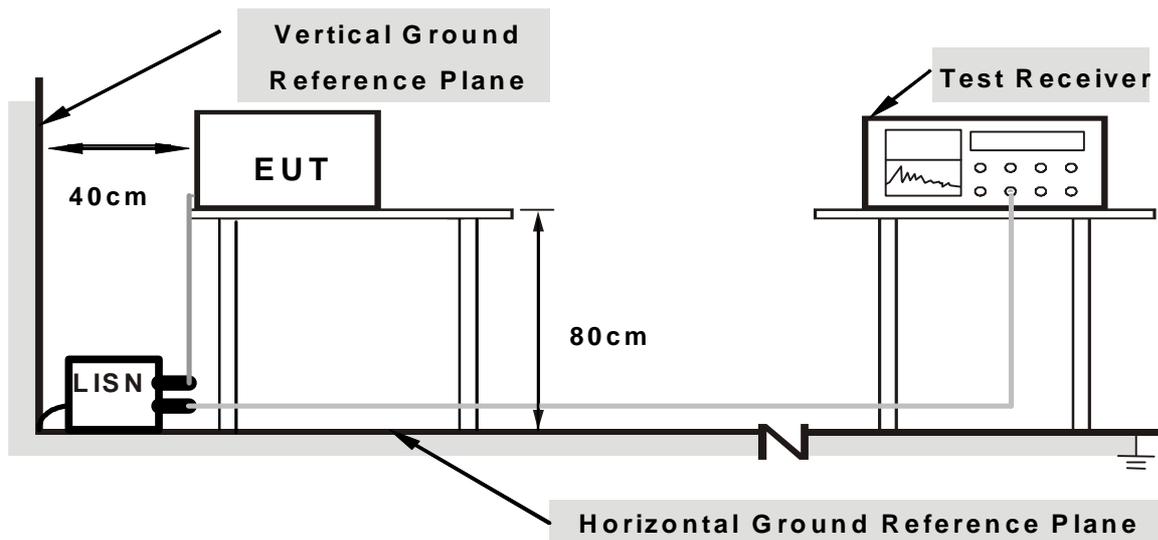
#### 4.1.3 TEST PROCEDURES

- 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) were not recorded.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 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 related item – Photographs of the Test Configuration.

#### 4.1.6 EUT OPERATING CONDITIONS

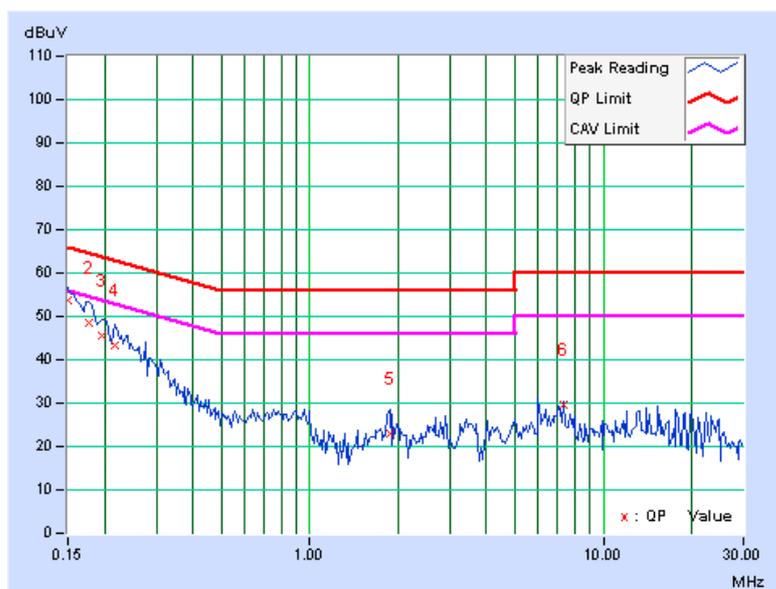
1. Placed the EUT on testing table.
2. Prepared other computer system (support unit 1) to act as communication partners and placed them outside of testing area.
3. The communication partners ran test program “telnet 192.168.1.1 & BRCM command” to enable EUT under transmission/receiving condition continuously at specific channel frequency via one UTP cable.

### 4.1.7 TEST RESULTS (MODE 1)

<b>PHASE</b>	Line (L)	<b>6dB BANDWIDTH</b>	9 kHz
--------------	----------	----------------------	-------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.05	53.72	-	53.77	-	66.00	56.00	-12.23	-
2	0.177	0.05	48.51	-	48.56	-	64.61	54.61	-16.05	-
3	0.197	0.05	45.42	-	45.47	-	63.74	53.74	-18.27	-
4	0.216	0.05	43.30	-	43.35	-	62.96	52.96	-19.60	-
5	1.879	0.13	22.91	-	23.04	-	56.00	46.00	-32.96	-
6	7.348	0.28	29.30	-	29.58	-	60.00	50.00	-30.42	-

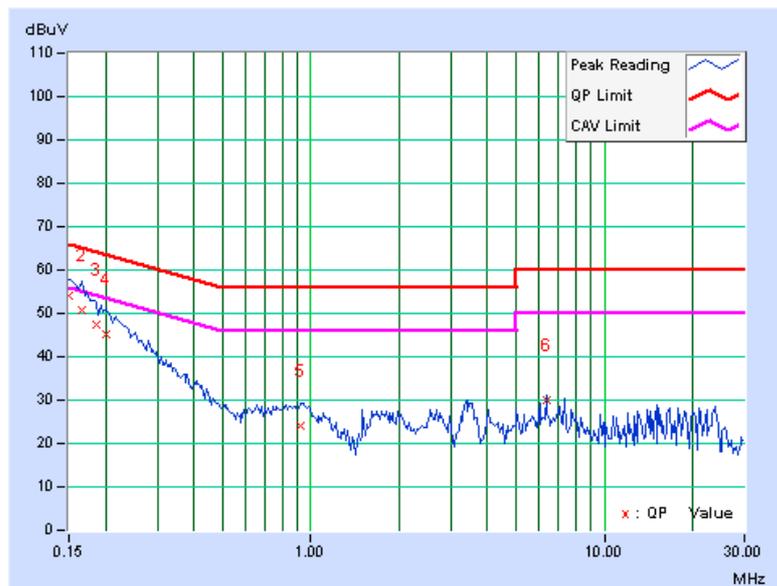
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>PHASE</b>	Neutral (N)	<b>6dB BANDWIDTH</b>	9 kHz
--------------	-------------	----------------------	-------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.06	53.97	-	54.03	-	66.00	56.00	-11.97	-
2	0.166	0.06	50.52	-	50.58	-	65.18	55.18	-14.59	-
3	0.185	0.06	47.19	-	47.25	-	64.25	54.25	-17.00	-
4	0.201	0.06	45.31	-	45.37	-	63.58	53.58	-18.21	-
5	0.927	0.10	24.01	-	24.11	-	56.00	46.00	-31.89	-
6	6.348	0.26	29.64	-	29.90	-	60.00	50.00	-30.10	-

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

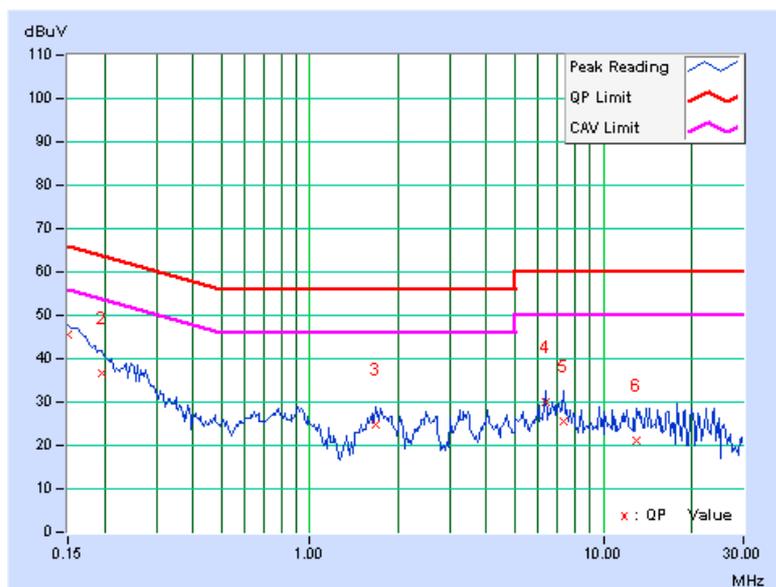


### 4.1.8 TEST RESULTS (MODE 2)

<b>PHASE</b>	Line (L)	<b>6dB BANDWIDTH</b>	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.05	45.60	-	45.65	-	66.00	56.00	-20.35	-
2	0.197	0.05	36.74	-	36.79	-	63.74	53.74	-26.95	-
3	1.680	0.12	24.70	-	24.82	-	56.00	46.00	-31.18	-
4	6.355	0.25	29.73	-	29.98	-	60.00	50.00	-30.02	-
5	7.363	0.28	25.20	-	25.48	-	60.00	50.00	-34.52	-
6	13.051	0.40	20.54	-	20.94	-	60.00	50.00	-39.06	-

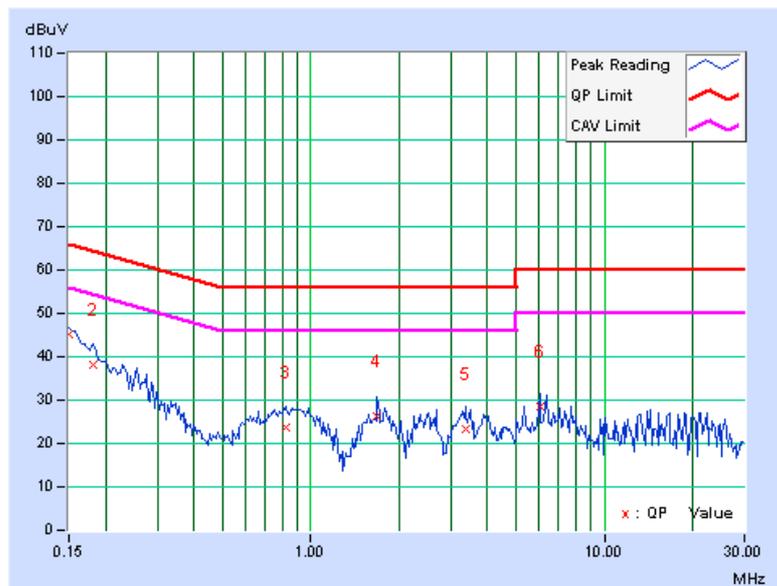
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>PHASE</b>	Neutral (N)	<b>6dB BANDWIDTH</b>	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.06	45.13	-	45.19	-	66.00	56.00	-20.81	-
2	0.181	0.06	38.09	-	38.15	-	64.43	54.43	-26.28	-
3	0.822	0.09	23.77	-	23.86	-	56.00	46.00	-32.14	-
4	1.672	0.13	26.09	-	26.22	-	56.00	46.00	-29.78	-
5	3.367	0.18	23.09	-	23.27	-	56.00	46.00	-32.73	-
6	6.016	0.25	28.29	-	28.54	-	60.00	50.00	-31.46	-

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

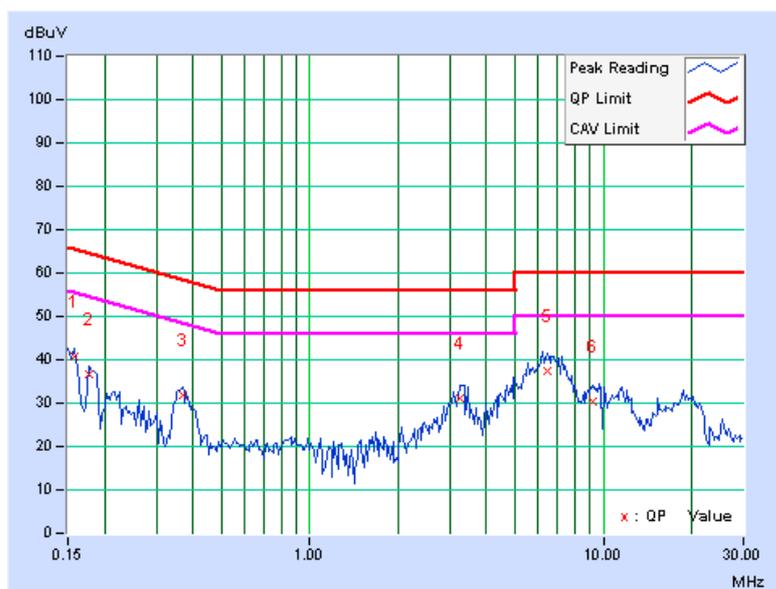


### 4.1.9 TEST RESULTS (MODE 3)

<b>PHASE</b>	Line (L)	<b>6dB BANDWIDTH</b>	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.05	40.62	-	40.67	-	65.58	55.58	-24.90	-
2	0.177	0.05	36.47	-	36.52	-	64.61	54.61	-28.09	-
3	0.369	0.06	31.90	-	31.96	-	58.53	48.53	-26.57	-
4	3.242	0.17	30.85	-	31.02	-	56.00	46.00	-24.98	-
5	6.426	0.25	36.98	-	37.23	-	60.00	50.00	-22.77	-
6	9.211	0.33	29.97	-	30.30	-	60.00	50.00	-29.70	-

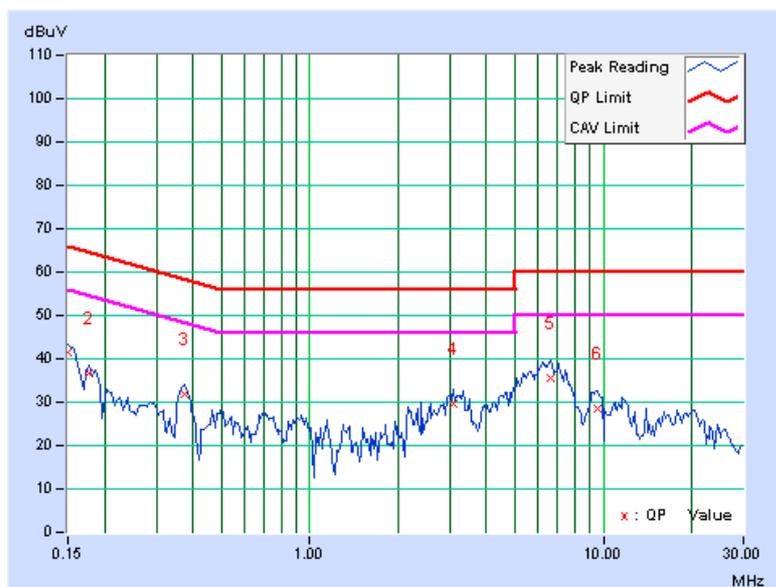
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.06	41.48	-	41.54	-	66.00	56.00	-24.46	-
2	0.177	0.06	36.49	-	36.55	-	64.61	54.61	-28.06	-
3	0.373	0.07	31.64	-	31.71	-	58.44	48.44	-26.73	-
4	3.090	0.17	29.43	-	29.60	-	56.00	46.00	-26.40	-
5	6.578	0.27	35.30	-	35.57	-	60.00	50.00	-24.43	-
6	9.516	0.35	28.33	-	28.68	-	60.00	50.00	-31.32	-

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

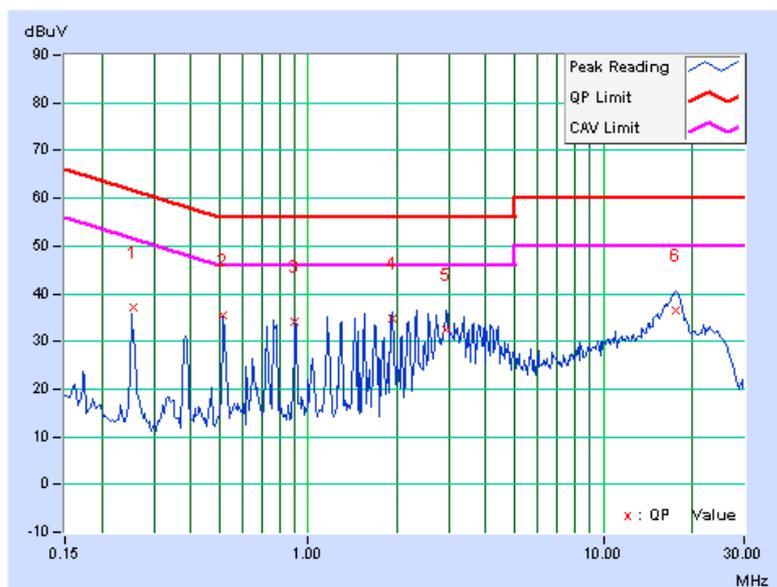


#### 4.1.10 TEST RESULTS (MODE 4)

PHASE	Line (L)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.257	0.13	36.94	-	37.07	-	61.52	51.52	-24.45	-
2	0.518	0.13	35.46	-	35.59	-	56.00	46.00	-20.41	-
3	0.905	0.14	33.93	-	34.07	-	56.00	46.00	-21.93	-
4	1.941	0.16	34.79	-	34.95	-	56.00	46.00	-21.05	-
5	2.938	0.18	32.21	-	32.39	-	56.00	46.00	-23.61	-
6	17.632	0.62	35.79	-	36.41	-	60.00	50.00	-23.59	-

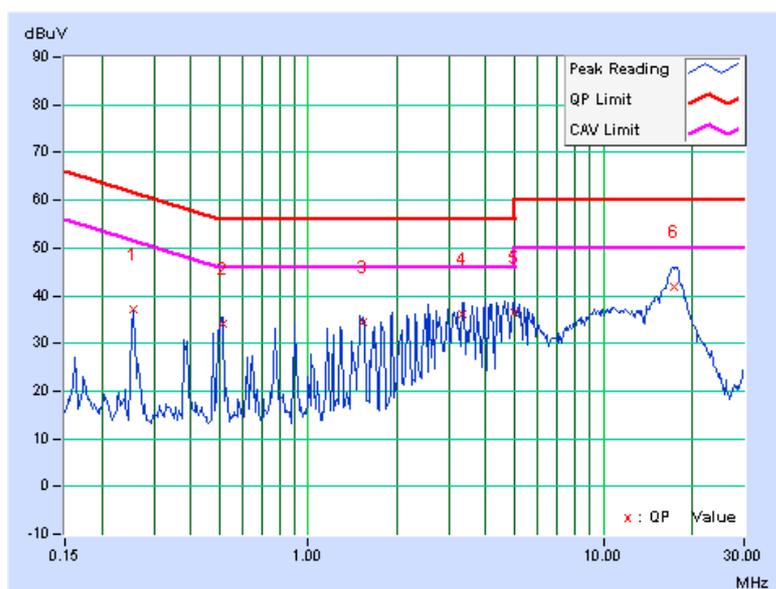
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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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	0.256	0.14	36.93	-	37.07	-	61.57
2	0.518	0.15	34.03	-	34.18	-	56.00	46.00	-21.82	-
3	1.538	0.18	34.40	-	34.58	-	56.00	46.00	-21.42	-
4	3.329	0.25	35.73	-	35.98	-	56.00	46.00	-20.02	-
5	5.002	0.37	36.07	-	36.44	-	60.00	50.00	-23.56	-
6	17.268	1.26	40.61	-	41.87	-	60.00	50.00	-18.13	-

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

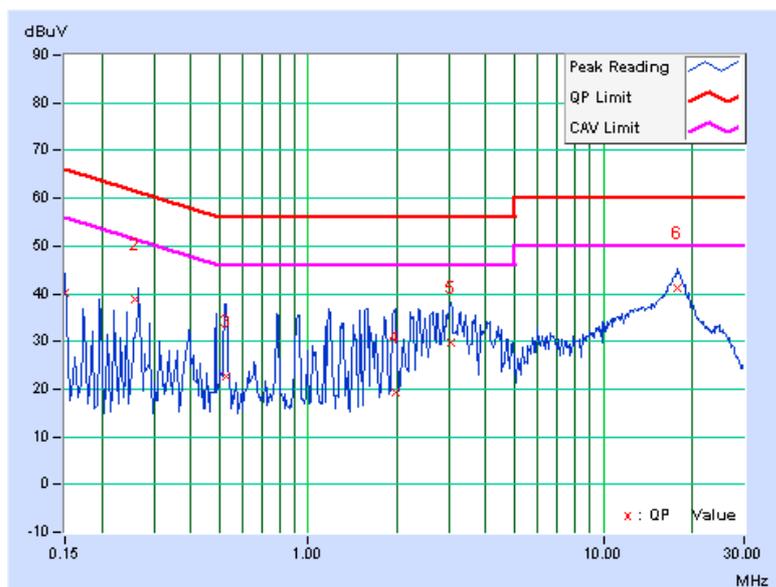


#### 4.1.11 TEST RESULTS (MODE 5)

PHASE	Line (L)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	40.18	-	40.28	-	66.00	56.00	-25.72	-
2	0.260	0.13	38.74	-	38.87	-	61.43	51.43	-22.56	-
3	0.525	0.13	22.57	-	22.70	-	56.00	46.00	-33.30	-
4	1.988	0.16	19.28	-	19.44	-	56.00	46.00	-36.56	-
5	3.043	0.18	29.61	-	29.79	-	56.00	46.00	-26.21	-
6	17.870	0.62	40.45	-	41.07	-	60.00	50.00	-18.93	-

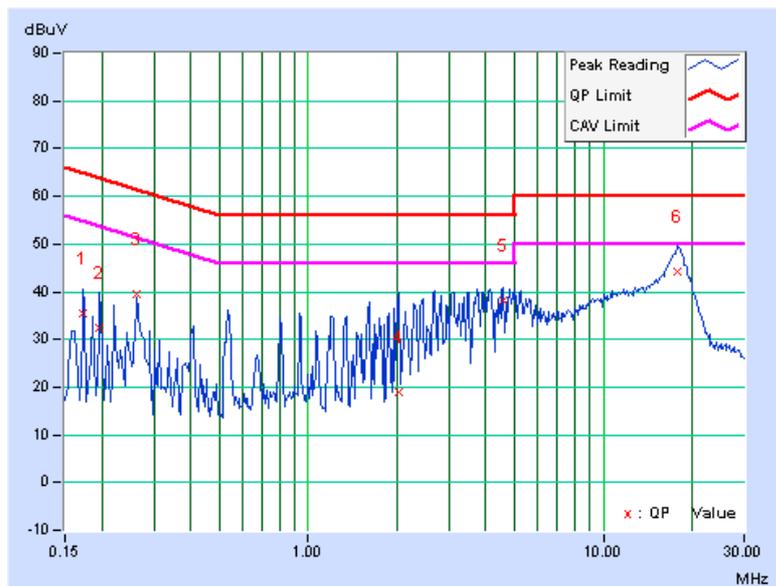
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.173	0.13	35.35	-	35.48	-	64.79	54.79	-29.32	-
2	0.197	0.14	32.46	-	32.60	-	63.74	53.74	-31.14	-
3	0.263	0.14	39.41	-	39.55	-	61.32	51.32	-21.77	-
4	2.023	0.19	18.75	-	18.94	-	56.00	46.00	-37.06	-
5	4.568	0.33	37.76	-	38.09	-	56.00	46.00	-17.91	-
6	17.796	1.29	43.00	-	44.29	-	60.00	50.00	-15.71	-

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



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



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## 4.2.2 TEST INSTRUMENTS

Test date: July 01 to 21, 2010

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250254	Aug. 03, 2009	Aug. 02, 2010
Agilent Pre-Selector	N9039A	MY46520310	Aug. 18, 2009	Aug. 17, 2010
Agilent Signal Generator	N5181A	MY49060347	July 30, 2009	July 29, 2010
LIG NEX1 Test Receiver	ER-265	L09068005	Aug. 31, 2009	Aug. 30, 2010
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 18, 2009	Nov. 17, 2010
Agilent Pre-Amplifier	8449B	3008A02465	Mar. 01, 2010	Feb. 28, 2011
Miteq Pre-Amplifier	AFS33-1800265 0-30-8P-44	881786	NA	NA
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Sep. 30, 2009	Sep. 29, 2010
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 16, 2009	Nov. 15, 2010
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Sep. 30, 2009	Sep. 29, 2010
RF CABLE	NA	RF104-205 RF104-207 RF104-208	Dec. 24, 2009	Dec. 23, 2010
RF Cable	NA	CHHCAB_001	NA	NA
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

3. The test was performed in 966 Chamber No. H.

4. The FCC Site Registration No. is 797305.

5. The CANADA Site Registration No. is IC 7450H-3.

#### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

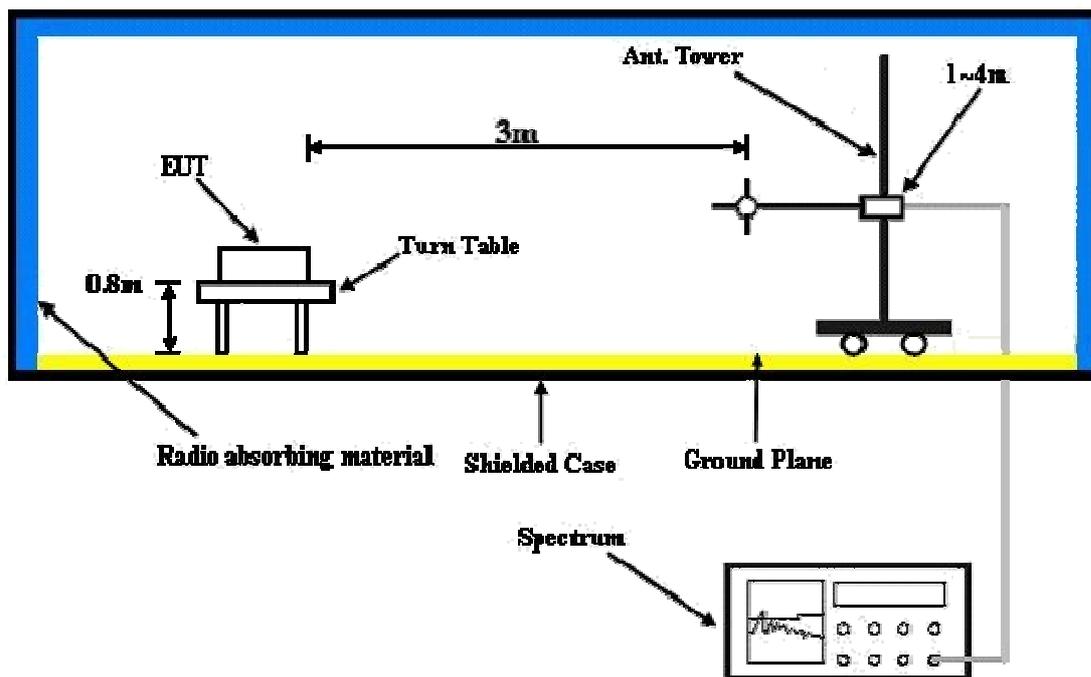
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.2.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

## 4.2.7 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 1011 hPa	TESTED BY	Eric Lee

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	146.81	30.2 QP	43.5	-13.3	1.75 H	203	15.98	14.26
2	196.45	32.4 QP	43.5	-11.1	2.00 H	189	20.94	11.48
3	300.12	35.2 QP	46.0	-10.8	2.00 H	352	20.33	14.91
4	380.15	34.2 QP	46.0	-11.8	1.00 H	1	16.91	17.33
5	532.20	26.6 QP	46.0	-19.4	1.00 H	113	5.68	20.90
6	560.01	27.5 QP	46.0	-18.5	1.87 H	52	5.94	21.58
7	625.10	27.0 QP	46.0	-19.0	2.25 H	32	4.19	22.77
8	640.10	28.9 QP	46.0	-17.1	1.00 H	45	6.00	22.90
9	709.27	32.7 QP	46.0	-13.3	1.00 H	328	9.15	23.56
10	874.99	30.2 QP	46.0	-15.8	1.25 H	199	3.91	26.29

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	36.21	36.5 QP	40.0	-3.5	1.75 V	42	22.57	13.93
2	47.51	32.6 QP	40.0	-7.4	1.50 V	187	17.97	14.63
3	62.62	32.5 QP	40.0	-7.5	1.75 V	137	19.57	12.93
4	73.24	34.7 QP	40.0	-5.3	2.00 V	236	23.11	11.58
5	110.32	32.5 QP	43.5	-11.0	1.25 V	85	21.12	11.42
6	197.50	30.6 QP	43.5	-12.9	1.25 V	98	19.20	11.40
7	340.11	28.4 QP	46.0	-17.6	2.00 V	136	12.29	16.12
8	710.10	35.4 QP	46.0	-10.6	1.00 V	52	11.84	23.58
9	875.00	31.0 QP	46.0	-15.0	2.50 V	254	4.71	26.29
10	904.08	34.1 QP	46.0	-11.9	1.25 V	360	7.41	26.69

- 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.



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ABOVE 1GHz DATA

802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 1011 hPa	TESTED BY	Eric Lee

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	*5745.00	116.5 PK			1.29 H	75	88.97	27.53
2	*5745.00	105.1 AV			1.29 H	75	77.57	27.53
3	11490.00	62.4 PK	74.0	-11.6	1.00 H	70	34.87	27.53
4	11490.00	49.9 AV	54.0	-4.1	1.00 H	70	22.37	27.53

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	*5745.00	119.7 PK			1.24 V	105	92.17	27.53
2	*5745.00	107.6 AV			1.24 V	105	80.07	27.53
3	11490.00	62.8 PK	74.0	-11.2	1.01 V	84	35.27	27.53
4	11490.00	50.6 AV	54.0	-3.4	1.01 V	84	23.07	27.53

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 1011 hPa	TESTED BY	Eric Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	117.0 PK			1.30 H	88	89.47	27.53
2	*5785.00	104.8 AV			1.30 H	88	77.27	27.53
3	11570.00	61.7 PK	74.0	-12.3	1.09 H	47	34.17	27.53
4	11570.00	49.7 AV	54.0	-4.3	1.09 H	47	22.17	27.53
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	120.5 PK			1.30 V	79	92.97	27.53
2	*5785.00	107.9 AV			1.30 V	79	80.37	27.53
3	11570.00	61.5 PK	74.0	-12.5	1.00 V	83	33.97	27.53
4	11570.00	50.8 AV	54.0	-3.2	1.00 V	83	23.27	27.53

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 1011 hPa	TESTED BY	Eric Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	118.4 PK			1.29 H	88	90.87	27.53
2	*5825.00	105.6 AV			1.29 H	88	78.07	27.53
3	11650.00	63.7 PK	74.0	-10.3	1.07 H	47	36.17	27.53
4	11650.00	51.1 AV	54.0	-2.9	1.07 H	47	23.57	27.53
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	121.2 PK			1.25 V	98	93.67	27.53
2	*5825.00	108.3 AV			1.25 V	98	80.77	27.53
3	11650.00	62.6 PK	74.0	-11.4	1.01 V	264	35.07	27.53
4	11650.00	41.4 AV	54.0	-12.6	1.01 V	264	13.87	27.53

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

### 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 1011 hPa	TESTED BY	Eric Lee

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	*5745.00	118.1 PK			1.19 H	100	90.57	27.53
2	*5745.00	106.3 AV			1.19 H	100	78.77	27.53
3	11490.00	71.2 PK	74.0	-2.8	1.05 H	66	43.67	27.53
4	11490.00	52.1 AV	54.0	-1.9	1.05 H	66	24.57	27.53
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	*5745.00	119.7 PK			1.25 V	95	92.17	27.53
2	*5745.00	107.7 AV			1.25 V	95	80.17	27.53
3	11490.00	72.5 PK	74.0	-1.5	1.04 V	89	44.97	27.53
4	11490.00	53.0 AV	54.0	-1.0	1.04 V	89	25.47	27.53

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 1011 hPa	TESTED BY	Eric Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	119.4 PK			1.18 H	80	91.87	27.53
2	*5785.00	107.1 AV			1.18 H	80	79.57	27.53
3	11570.00	71.1 PK	74.0	-2.9	1.03 H	70	43.57	27.53
4	11570.00	51.6 AV	54.0	-2.4	1.03 H	70	24.07	27.53
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	120.9 PK			1.30 V	100	93.37	27.53
2	*5785.00	108.2 AV			1.30 V	100	80.67	27.53
3	11570.00	71.5 PK	74.0	-2.5	1.08 V	49	43.97	27.53
4	11570.00	53.1 AV	54.0	-0.9	1.08 V	49	25.57	27.53

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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 1011 hPa	TESTED BY	Eric Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	119.1 PK			1.20 H	91	91.57	27.53
2	*5825.00	107.7 AV			1.20 H	91	80.17	27.53
3	11650.00	71.9 PK	74.0	-2.1	1.05 H	64	44.37	27.53
4	11650.00	51.6 AV	54.0	-2.4	1.05 H	64	24.07	27.53
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	120.0 PK			1.29 V	20	92.47	27.53
2	*5825.00	108.2 AV			1.29 V	20	80.67	27.53
3	11650.00	72.8 PK	74.0	-1.2	1.04 V	89	45.27	27.53
4	11650.00	53.2 AV	54.0	-0.8	1.04 V	89	25.67	27.53

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

### 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 1011 hPa	TESTED BY	Eric Lee

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	*5755.00	116.9 PK			1.29 H	89	89.37	27.53
2	*5755.00	102.7 AV			1.29 H	89	75.17	27.53
3	11510.00	63.8 PK	74.0	-10.2	1.01 H	88	36.27	27.53
4	11510.00	52.8 AV	54.0	-1.2	1.01 H	88	25.27	27.53
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	*5755.00	118.1 PK			1.25 V	80	90.57	27.53
2	*5755.00	104.2 AV			1.25 V	80	76.67	27.53
3	11510.00	70.6 PK	74.0	-3.4	1.02 V	55	43.07	27.53
4	11510.00	51.2 AV	54.0	-2.8	1.02 V	55	23.67	27.53

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 1011 hPa	TESTED BY	Eric Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	117.2 PK			1.20 H	76	89.67	27.53
2	*5795.00	103.0 AV			1.20 H	76	75.47	27.53
3	11590.00	64.2 PK	74.0	-9.8	1.10 H	50	36.67	27.53
4	11590.00	49.6 AV	54.0	-4.4	1.10 H	50	22.07	27.53
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	118.6 PK			1.21 V	97	91.07	27.53
2	*5795.00	104.9 AV			1.21 V	97	77.37	27.53
3	11590.00	71.9 PK	74.0	-2.1	1.03 V	44	44.37	27.53
4	11590.00	52.8 AV	54.0	-1.2	1.03 V	44	25.27	27.53

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



### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010

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

### 4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.3.5 TEST SETUP



### 4.3.6 EUT OPERATING CONDITIONS

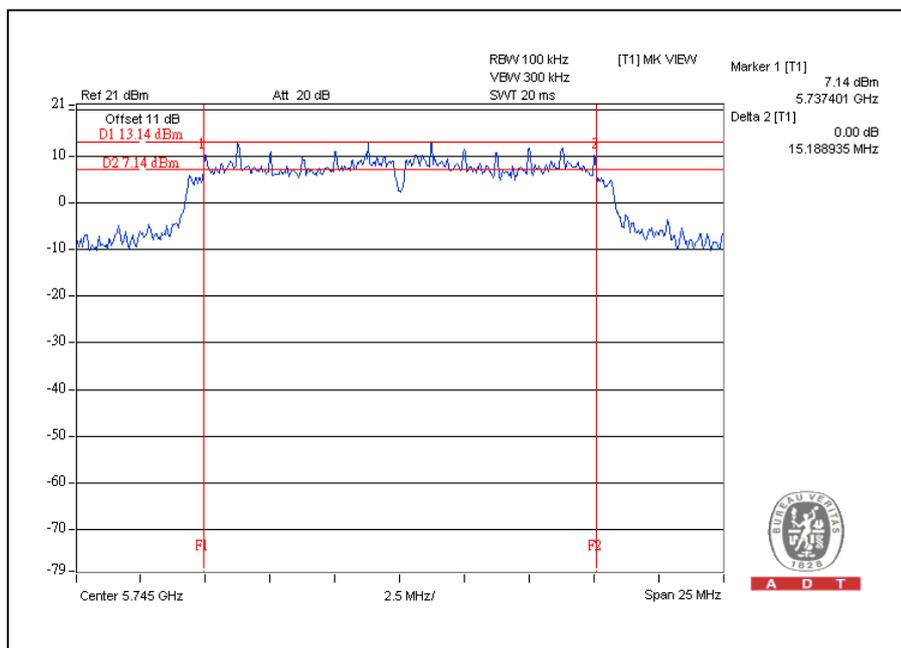
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



**802.11n (20MHz) OFDM MODULATION:**

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	15.18	0.5	PASS
157	5785	15.09	0.5	PASS
165	5825	15.14	0.5	PASS

**CH149**



**802.11n (40MHz) OFDM MODULATION:**

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
151	5755	33.93	0.5	PASS
159	5795	33.82	0.5	PASS

**CH151**



#### 4.4 MAXIMUM PEAK OUTPUT POWER

##### 4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

##### 4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Peak Power Meter	ML2495A	0824006	May 04, 2010	May 03, 2011
Power Sensor	MA2411B	0738172	May 04, 2010	May 03, 2011

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

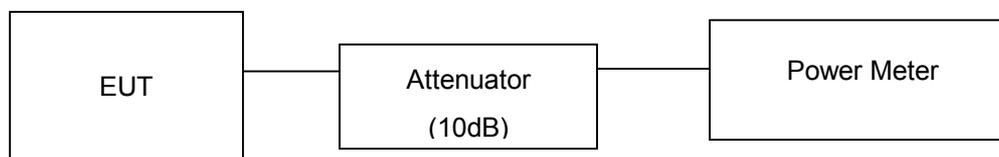
##### 4.4.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator; the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the power level.

##### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

##### 4.4.5 TEST SETUP



##### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



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#### 4.4.7 TEST RESULTS

##### 802.11a OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
149	5745	398.1	26.0	30	PASS
157	5785	389.0	25.9	30	PASS
165	5825	363.1	25.6	30	PASS

##### 802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(2)				
149	5745	26.0	25.3	737.0	28.7	30	PASS
157	5785	25.3	25.5	693.7	28.4	30	PASS
165	5825	25.0	25.5	671.0	28.3	30	PASS

##### 802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (DBM)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(2)				
151	5755	25.6	25.1	686.7	28.4	30	PASS
159	5795	25.7	25.6	734.6	28.7	30	PASS



## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010

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

#### 4.5.3 TEST PROCEDURE

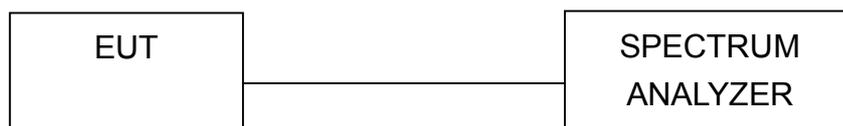
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3 kHz for a full response of the mixer in the spectrum analyzer.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITION

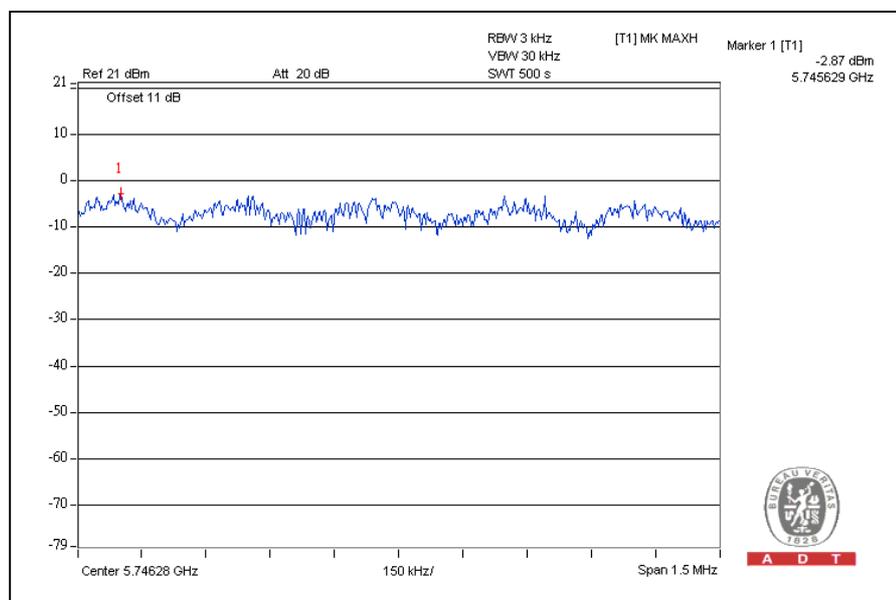
Same as Item 4.3.6

### 4.5.7 TEST RESULTS

#### 802.11a OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
149	5745	-2.9	8	PASS
157	5785	-3.4	8	PASS
161	5805	-3.6	8	PASS

For CH149



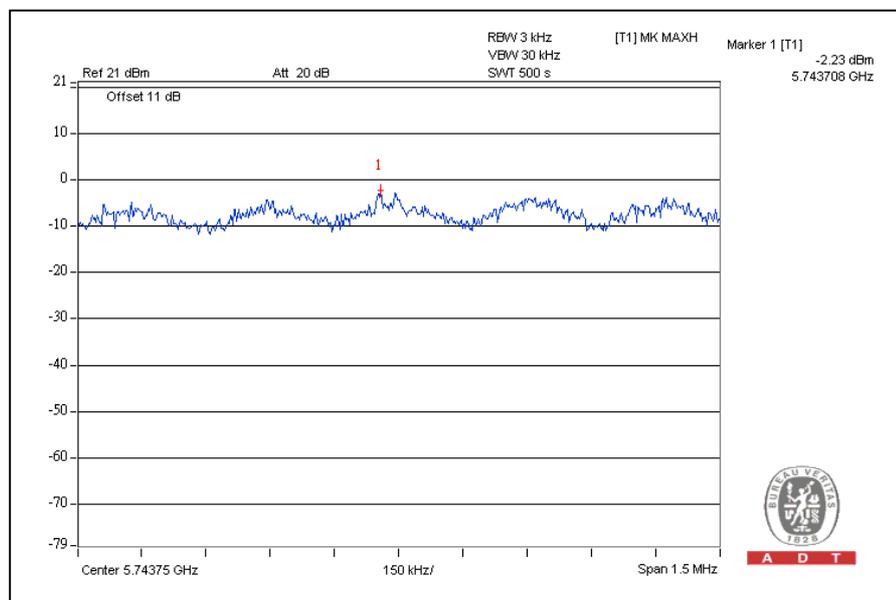


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### 802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(2)			
149	5745	-3.7	-2.2	0.1	8	PASS
157	5785	-2.8	-4.0	-0.3	8	PASS
161	5805	-4.3	-4.6	-1.4	8	PASS

For Chain(2): CH149



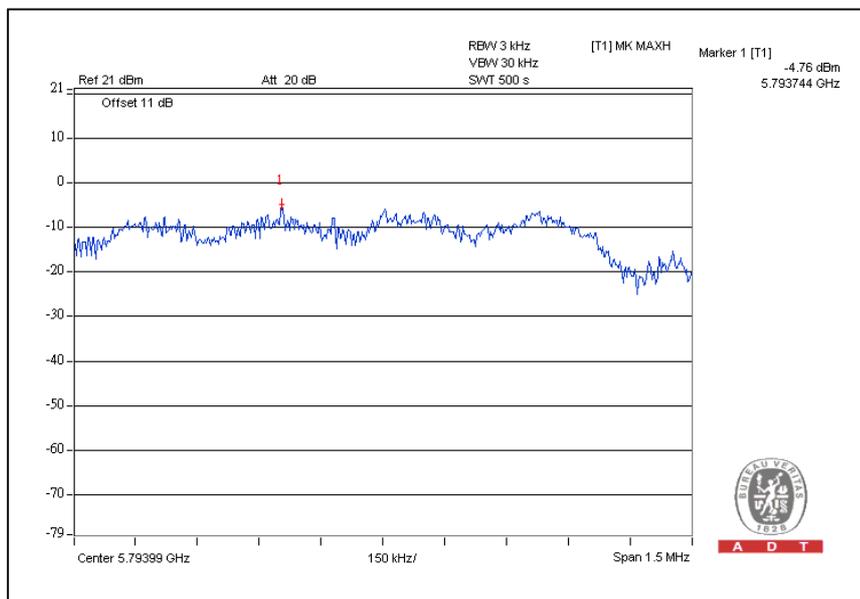


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### 802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(2)			
151	5755	-7.0	-7.3	-4.1	8	PASS
159	5795	-4.8	-7.1	-2.8	8	PASS

For Chain(0): CH159





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## 4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010

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

#### 4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set RBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 MHz or 200 MHz bandwidth from band edge. The band edges was measured and recorded.

#### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.6.6 TEST RESULTS

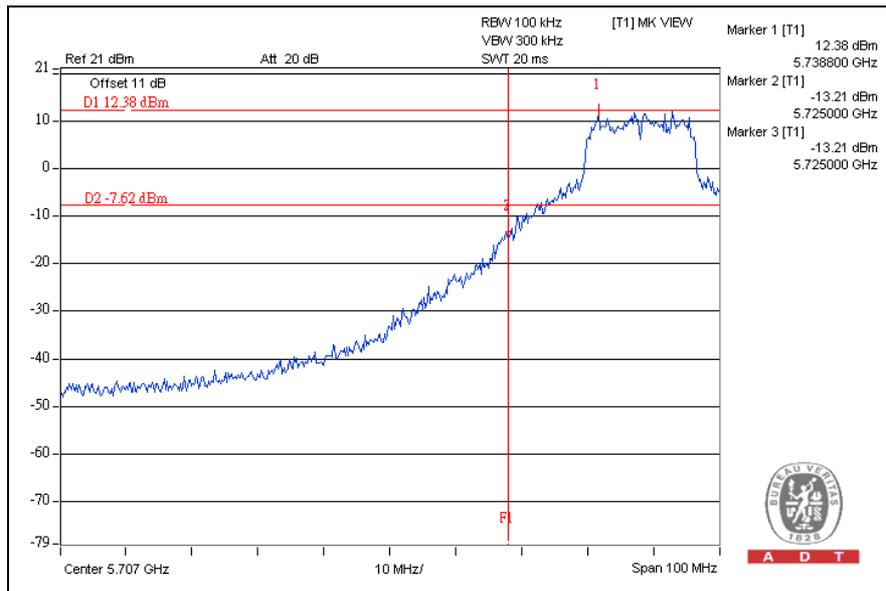
The spectrum plots are attached on the following pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).



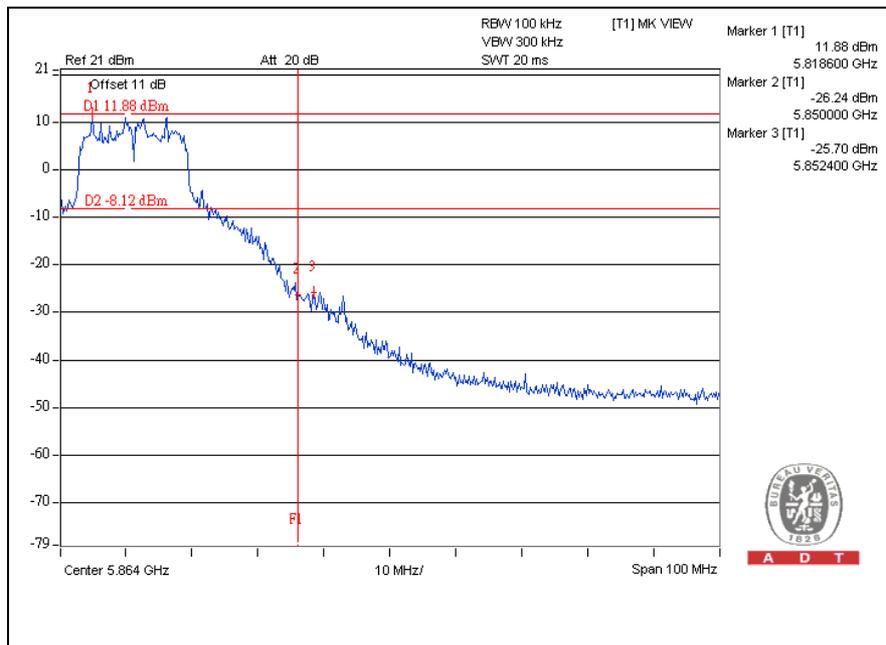
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## 802.11a OFDM MODULATION

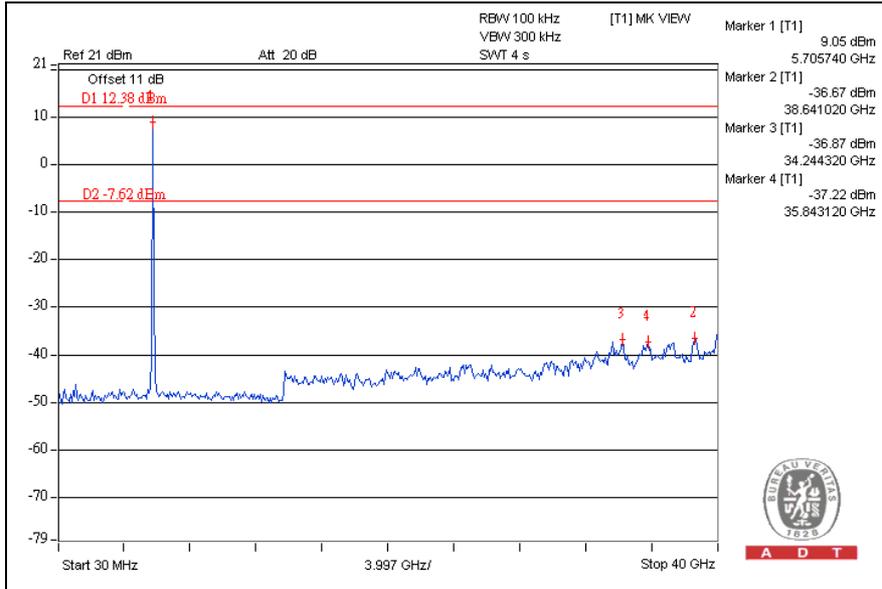
### CH149



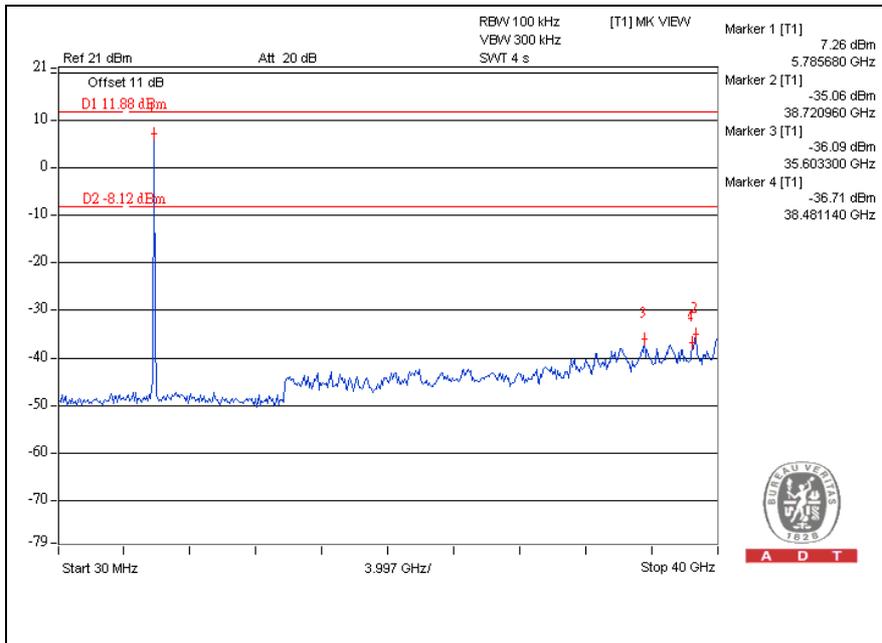
### CH165



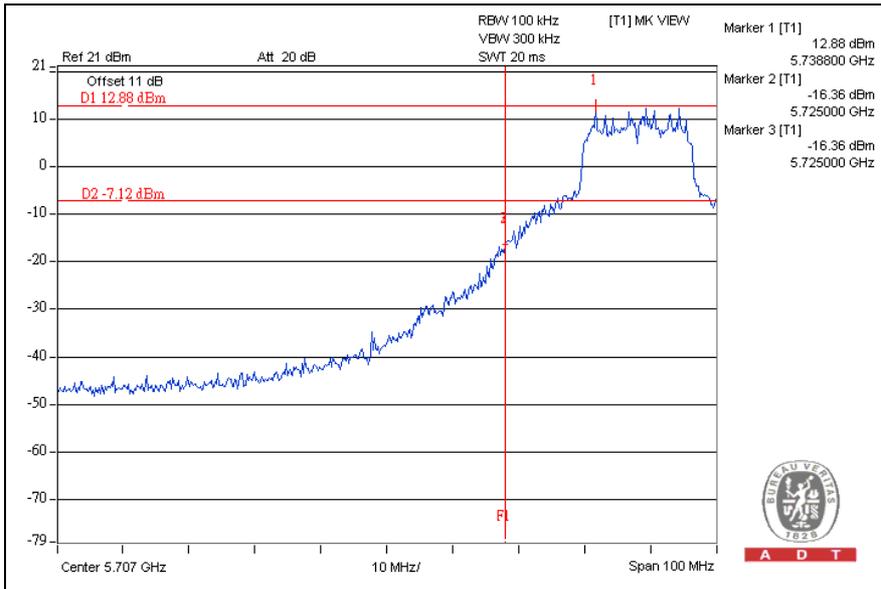
### CH149



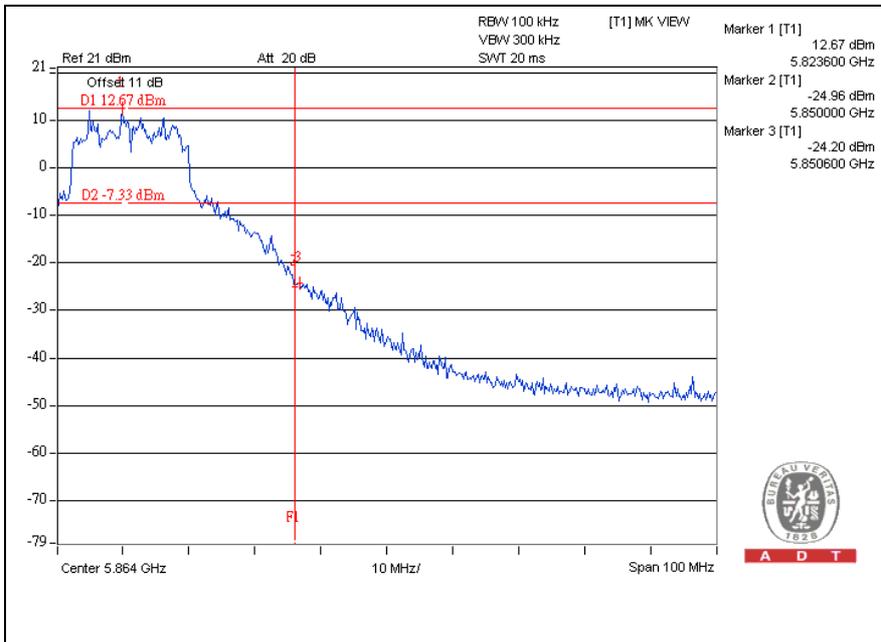
### CH165



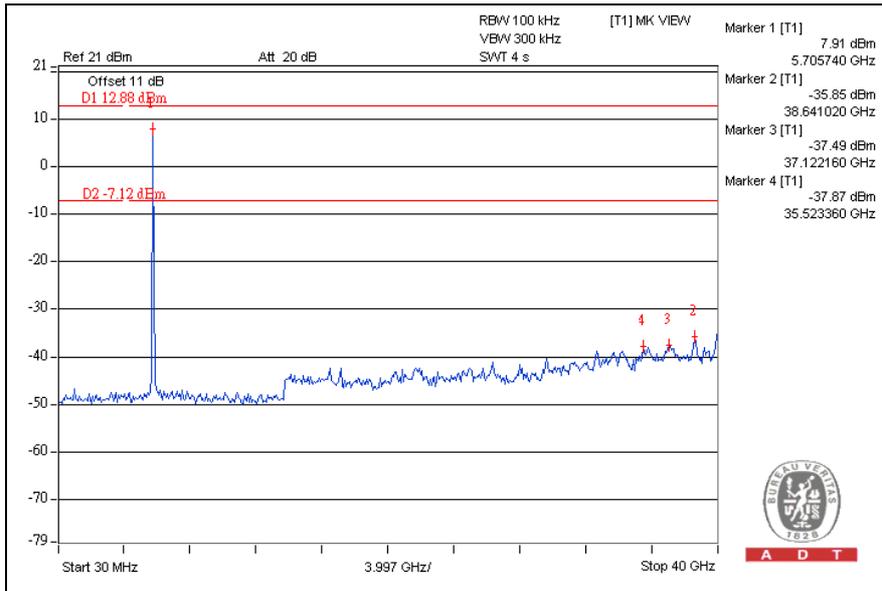
## 802.11n (20MHz) OFDM MODULATION: CH149



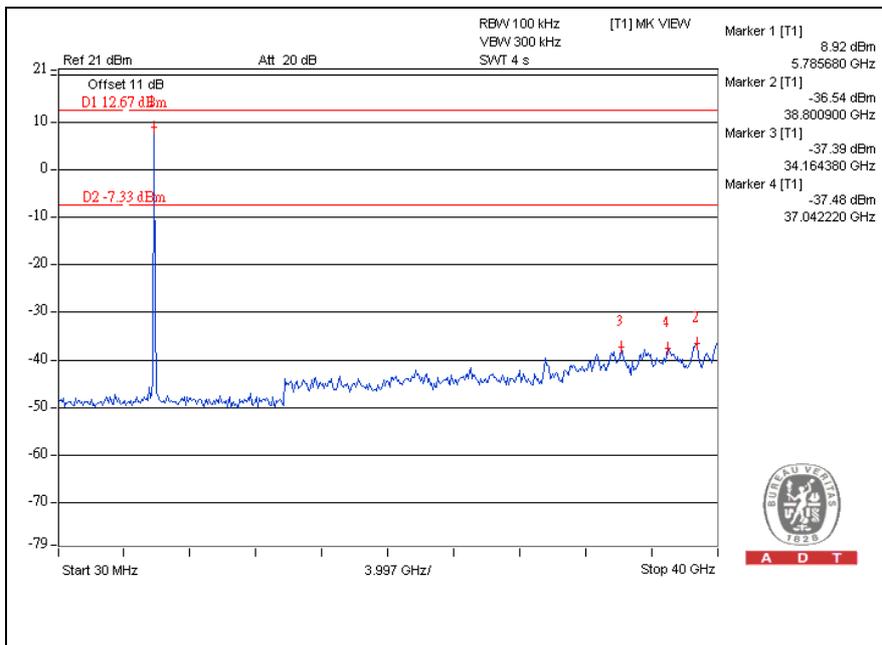
## CH165



### CH149



### CH165

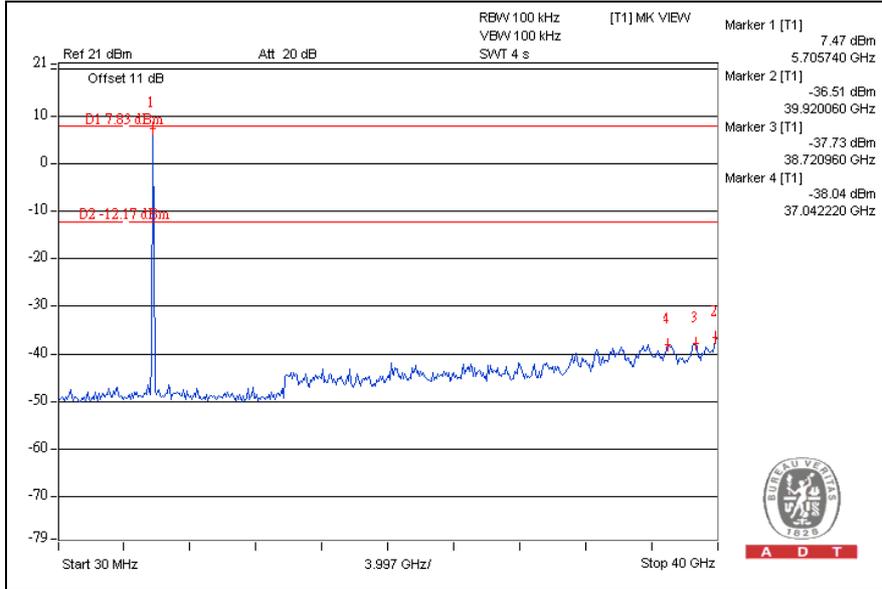




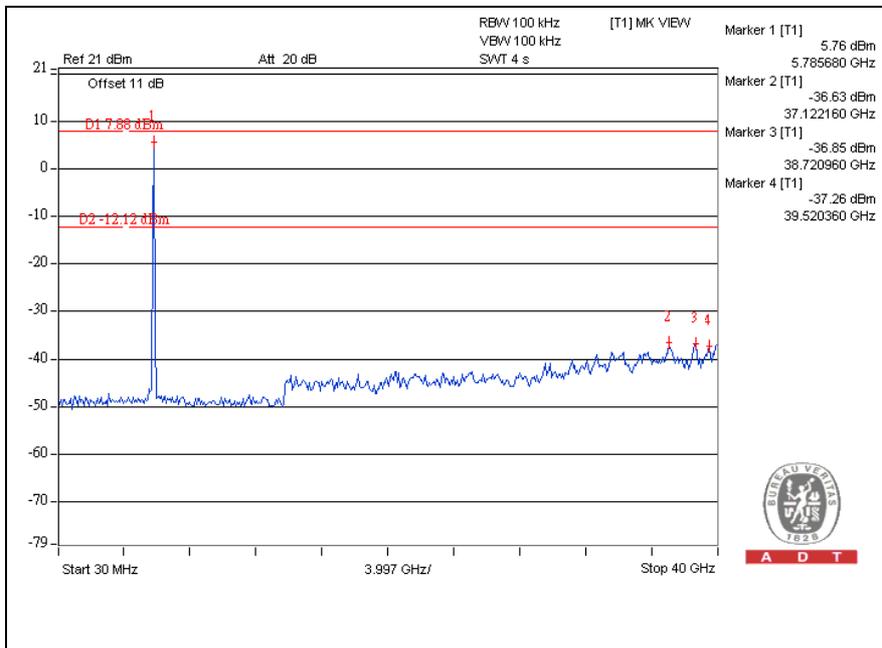


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### CH151



### CH159





## 5. 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.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: [www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml). If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab:**  
Tel: 886-2-26052180  
Fax: 886-2-26052943

**Hsin Chu EMC/RF Lab:**  
Tel: 886-3-5935343  
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Telecom Lab:**  
Tel: 886-3-3183232  
Fax: 886-3-3185050

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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



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## **6.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.

---END---