



# FCC TEST REPORT

**REPORT NO.:** RF960427H06A

**MODEL NO.:** 164-R9570

**RECEIVED:** June 05, 2007

**TESTED:** July 02 to 04, 2007

**ISSUED:** July 09, 2007

**APPLICANT:** Teradyne Diagnostic Solutions Ltd

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**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung Tsuen,  
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## 1 CERTIFICATION

**PRODUCT :** Wireless Card for VCM and VMM  
**BRAND NAME :** TERADYNE  
**MODEL NO. :** 164-R9570  
**TESTED:** July 02 to 04, 2007  
**APPLICANT :** Teradyne Diagnostic Solutions Ltd  
**TEST ITEM:** ENGINEERING SAMPLE  
**STANDARDS :** 47 CFR Part 15, Subpart C (Section 15.247)  
ANSI C63.4-2003

The above equipment (Model: 164-R9570) has been tested by **Advance Data Technology Corporation**, 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 :** Claire Kuan , **DATE:** July 09, 2007  
( Claire Kuan, Specialist )

**TECHNICAL ACCEPTANCE :** Hank Chung , **DATE:** July 09, 2007  
Responsible for RF ( Hank Chung, Deputy Manager )

**APPROVED BY :** May Chen , **DATE:** July 09, 2007  
( May Chen, Deputy Manager )

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -3.10 dB at 2387.00 MHz
15.247(c)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit

**NOTE:**

1. This report is prepared for FCC class II permissive change. Only radiated emission, Maximum Peak Output Power and Band Edge Measurement were presented in this test report.

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Wireless Card for VCM and VMM
<b>MODEL NO.</b>	164-R9570
<b>FCC ID</b>	VBD-35540121
<b>POWER SUPPLY</b>	DC 5V from host equipment
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>RADIO TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps
<b>FREQUENCY RANGE</b>	2412MHz ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11
<b>CHANNEL SPACING</b>	5MHz
<b>OUTPUT POWER</b>	802.11b: 60.814mW 802.11g: 41.305mW
<b>ANTENNA TYPE</b>	Ceramic Antenna without connector, Gain: 2dBi
<b>DATA CABLE</b>	NA
<b>INTERFACE</b>	PCMCIA
<b>ASSOCIATED DEVICES</b>	NA

#### NOTE:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF960427H06 design is as the following:
  - u Change to the PCB tracking and IC(U4&U15).
  - u Add two CAP.
2. The EUT, operates in the 2.4GHz frequency range, lets you connect IEEE 802.11g or IEEE 802.11b devices to the network. With its high-speed data transmissions of up to 54Mbps.
3. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz band:

For 802.11b/g normal mode: Eleven channels are provided to this EUT.

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

### 3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	5	√	√	√	NA

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

#### 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)
802.11b	1 to 11	1	DSSS	CCK	1

#### 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)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6

#### Bandedge Measurement:

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 11	DSSS	CCK	1
802.11g	1 to 11	1, 11	OFDM	BPSK	6





**Antenna Port Conducted Measurement:**

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6



### **3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a Wireless Card for VCM and VMM. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**47 CFR Part 15, Subpart C. (15.247)**  
**ANSI C63.4 : 2003**

All tests 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 47 CFR Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



### 3.5 DESCRIPTION OF SUPPORT UNITS

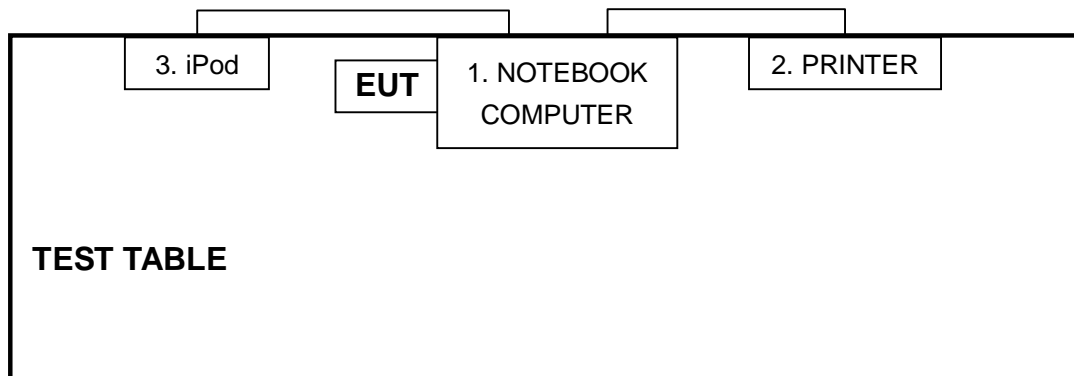
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	ASUS	A2400H	49NG038481	DoC
2	PRINTER	EPSON	LQ-300+	DCGY017082	DoC
3	iPod	Apple	A1059	4W50577SPS9	DoC

No.	Signal cable description
1	NA
2	1.8 m foil shielded wire, terminated with USB connector via drain wire, with core.
3	1.0 m foil shielded wire, terminated with USB connector via drain wire, with core.

Note: 1. All power cords of the above support units are unshielded (1.8m).

### 3.6 CONFIGURATION OF SYSTEM UNDER TEST



## 4 TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 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.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 03, 2008
HP Pre_Amplifier	8449B	3008A01922	Sep. 18, 2007
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 20, 2007
CHASE Broadband Antenna	VULB 9168	138	July 17, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 05, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
R&S Loop Antenna	HFH2-Z2	881058/15	Nov. 29, 2007
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14. 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	July 15, 2007
Software	ADT_Radiated_V 5.14	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

- Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Biconical and Periodic Antenna) and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 4824A-3.
7. The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Radiated emissions (30MHz-1GHz)	2.98 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~40GHz)	1.88 dB

8. Loop antenna was used for all emissions below 30 MHz.

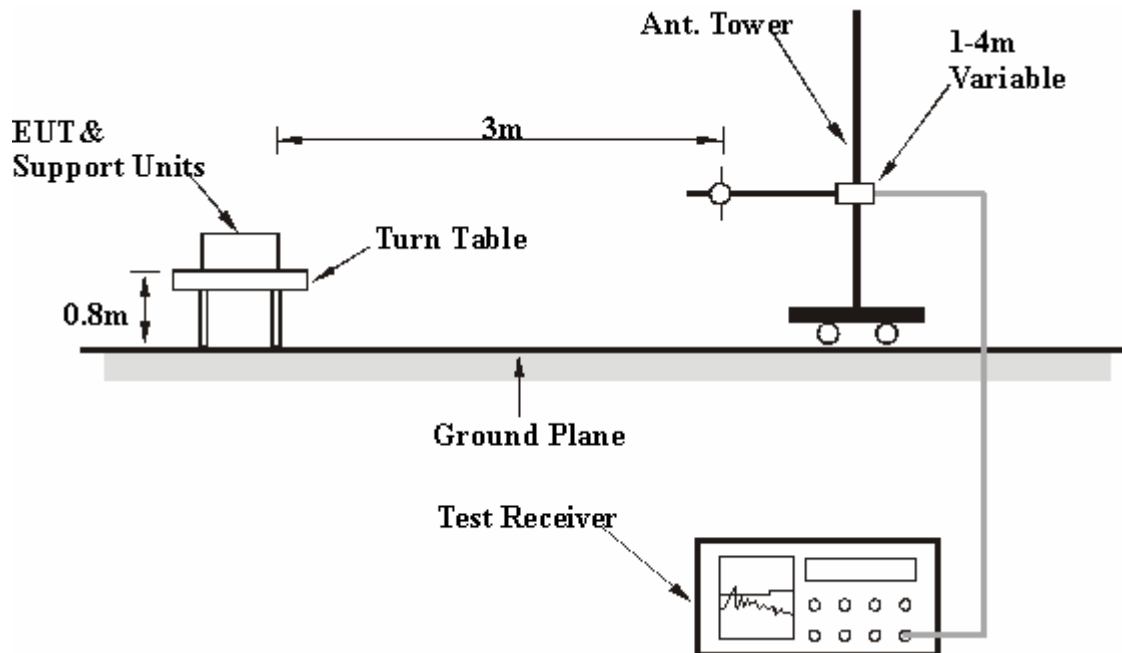
#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. 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 10 dB 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 10 dB 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 is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection 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.

#### 4.1.4 TEST SETUP



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

#### 4.1.5 EUT OPERATING CONDITIONS

- a. Connect the EUT with the support unit 1 (Notebook computer) and placed it on the testing table.
- b. The support unit 1 (Notebook computer) ran a test program “Marvell RF tool” to enable EUT under transmission condition continuously at specific channel frequency.
- c. The support unit 1 (Notebook computer) sends “H” messages to printer, then printer prints them on paper.



#### 4.1.6 TEST RESULTS

##### Below 1GHz Worst-Case Data

<b>MODULATION TYPE</b>	CCK	<b>CHANNEL</b>	Channel 1
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 65%RH, 956hPa	<b>TRANSFER RATE</b>	1Mbps
<b>TESTED BY</b>	Phoenix Huang	<b>DETECTOR FUNCTION</b>	Quasi-Peak, 120kHz

##### 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	60.09	23.33 QP	40.00	-16.67	1.35 H	16	9.64	13.69
2	200.13	32.59 QP	43.50	-10.91	1.12 H	21	20.98	11.61
3	332.60	40.21 QP	46.00	-5.79	1.12 H	1	23.02	17.19
4	401.04	35.77 QP	46.00	-10.23	1.11 H	21	16.72	19.05
5	501.12	33.90 QP	46.00	-12.10	1.65 H	258	12.11	21.79
6	672.09	36.02 QP	46.00	-9.98	1.38 H	112	10.65	25.37
7	720.10	35.45 QP	46.00	-10.55	1.11 H	352	9.03	26.42
8	802.34	39.41 QP	46.00	-6.59	1.15 H	355	11.81	27.60
9	960.12	38.45 QP	54.00	-15.55	1.00 H	75	8.56	29.89

##### 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	50.39	30.00 QP	40.00	-10.00	1.00 V	298	14.94	15.06
2	72.69	33.73 QP	40.00	-6.27	1.00 V	177	21.81	11.92
3	200.63	34.43 QP	43.50	-9.07	1.00 V	12	22.80	11.63
4	467.92	39.17 QP	46.00	-6.83	1.19 V	349	18.23	20.94
5	501.12	37.49 QP	46.00	-8.51	1.14 V	262	15.70	21.79
6	534.86	41.31 QP	46.00	-4.69	1.01 V	298	18.52	22.79
7	672.09	38.90 QP	46.00	-7.10	1.00 V	244	13.53	25.37
8	768.10	38.46 QP	46.00	-7.54	1.61 V	273	11.03	27.43
9	800.18	34.68 QP	46.00	-11.32	1.51 V	1	7.12	27.56
10	959.99	35.30 QP	46.00	-10.70	1.13 V	356	5.41	29.89

- 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.

#### 4.1.7 TEST RESULTS –DSSS

##### 802.11b DSSS modulation

<b>MODE</b>	Channel 1	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	22 deg. C, 67%RH, 956hPa	<b>TESTED BY</b>	Phoenix Huang

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	2387.00	60.33 PK	74.00	-13.67	1.37 H	272	28.41	31.92
2	<b>2387.00</b>	<b>50.90 AV</b>	<b>54.00</b>	<b>-3.10</b>	<b>1.37 H</b>	<b>272</b>	<b>18.98</b>	<b>31.92</b>
3	*2412.00	106.00 PK			1.39 H	273	73.98	32.02
4	*2412.00	100.60 AV			1.39 H	273	68.58	32.02
5	4824.00	50.00 PK	74.00	-24.00	1.66 H	217	14.03	35.97
6	4824.00	44.50 AV	54.00	-9.50	1.66 H	217	8.53	35.97
7	7236.00	54.17 PK	74.00	-19.83	1.56 H	247	11.93	42.24
8	7236.00	40.07 AV	54.00	-13.93	1.56 H	247	-2.17	42.24

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	2386.60	60.40 PK	74.00	-13.60	1.24 V	108	28.48	31.92
2	2386.60	50.40 AV	54.00	-3.60	1.24 V	108	18.48	31.92
3	*2412.00	104.20 PK			1.22 V	106	72.18	32.02
4	*2412.00	98.60 AV			1.22 V	106	66.58	32.02
5	4824.00	52.30 PK	74.00	-21.70	1.33 V	80	16.33	35.97
6	4824.00	47.60 AV	54.00	-6.40	1.33 V	80	11.63	35.97
7	7236.00	54.60 PK	74.00	-19.40	1.25 V	329	12.36	42.24
8	7236.00	41.23 AV	54.00	-12.77	1.25 V	329	-1.01	42.24

- 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. The limit value is defined as per 15.247
  6. “ \* “ : Fundamental frequency

<b>MODE</b>	Channel 6	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	22 deg. C, 67%RH, 956hPa	<b>TESTED BY</b>	Phoenix Huang

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	*2437.00	106.20 PK			1.40 H	258	74.09	32.11
2	*2437.00	100.90 AV			1.40 H	258	68.79	32.11
3	4874.00	50.00 PK	74.00	-24.00	1.67 H	205	13.92	36.08
4	4874.00	42.60 AV	54.00	-11.40	1.67 H	205	6.52	36.08
5	7311.00	54.61 PK	74.00	-19.39	1.50 H	237	12.09	42.52
6	7311.00	40.56 AV	54.00	-13.44	1.50 H	237	-1.96	42.52

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	*2437.00	103.70 PK			1.20 V	107	71.59	32.11
2	*2437.00	98.10 AV			1.20 V	107	65.99	32.11
3	4874.00	52.40 PK	74.00	-21.60	1.41 V	291	16.32	36.08
4	4874.00	47.70 AV	54.00	-6.30	1.41 V	291	11.62	36.08
5	7311.00	54.87 PK	74.00	-19.13	1.27 V	335	12.35	42.52
6	7311.00	41.43 AV	54.00	-12.57	1.27 V	335	-1.09	42.52

- 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. The limit value is defined as per 15.247
  6. “ \* “ : Fundamental frequency



<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	22 deg. C, 67%RH, 956hPa	<b>TESTED BY</b>	Phoenix Huang

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	104.00 PK			1.39 H	67	71.79	32.21
2	*2462.00	98.00 AV			1.39 H	67	65.79	32.21
3	2483.50	56.90 PK	74.00	-17.10	1.36 H	56	24.61	32.29
4	2483.50	45.20 AV	54.00	-8.80	1.36 H	56	12.91	32.29
5	4924.00	49.10 PK	74.00	-24.90	1.94 H	223	12.91	36.19
6	4924.00	43.10 AV	54.00	-10.90	1.94 H	223	6.91	36.19
7	7386.00	54.30 PK	74.00	-19.70	1.64 H	17	11.50	42.80
8	7386.00	42.10 AV	54.00	-11.90	1.64 H	17	-0.70	42.80

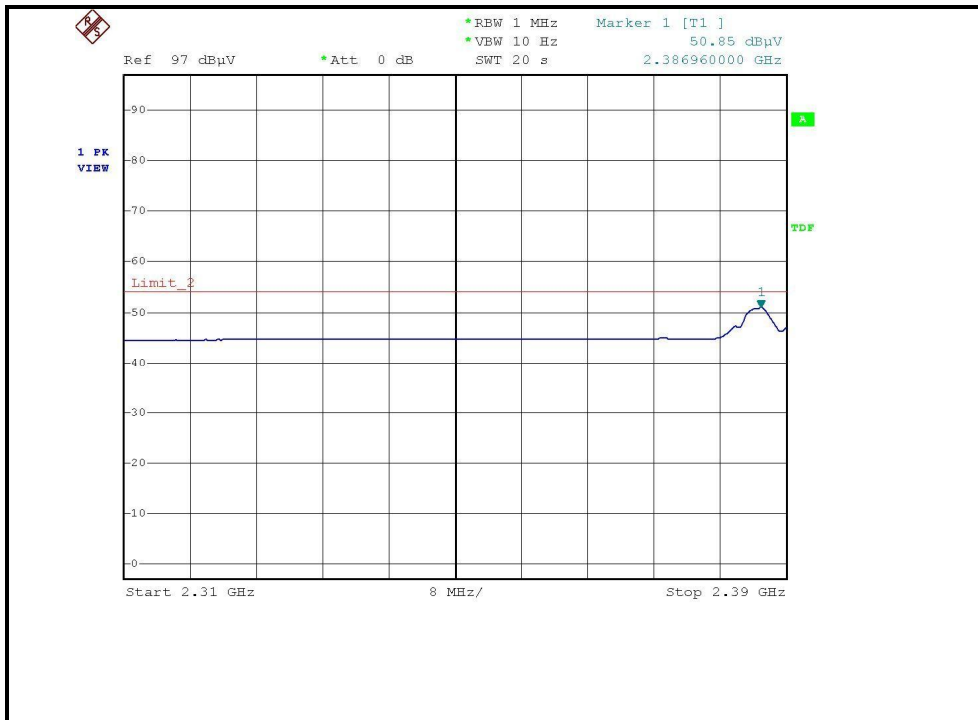
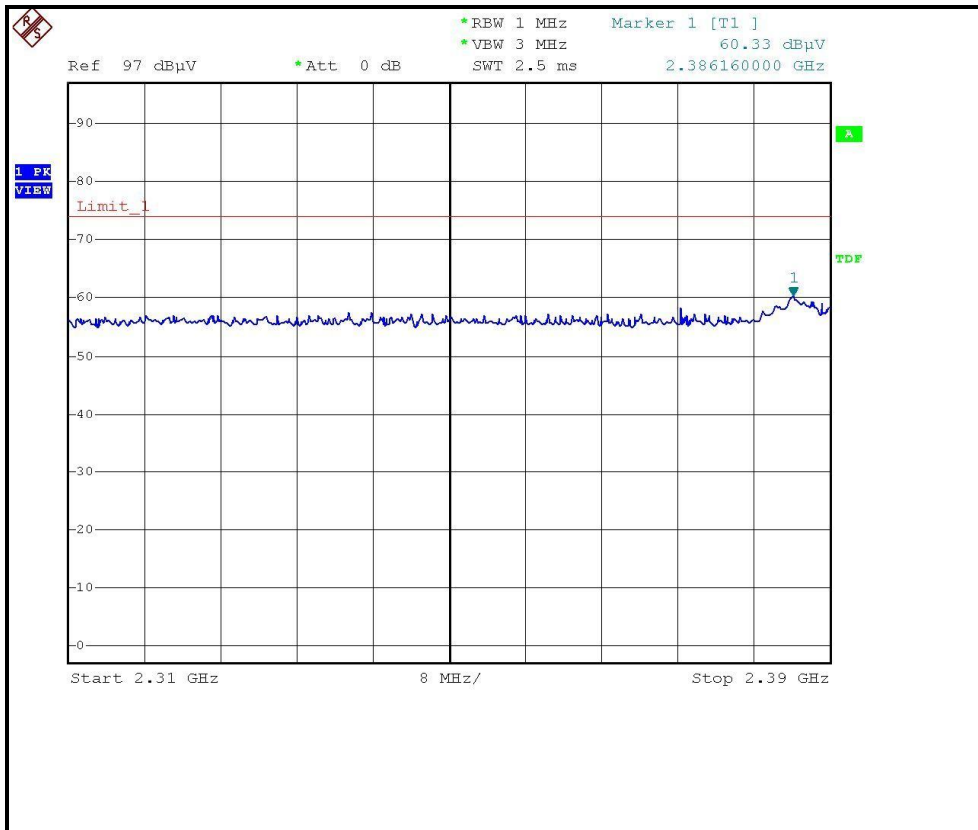
#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	101.80 PK			1.11 V	26	69.59	32.21
2	*2462.00	96.30 AV			1.11 V	26	64.09	32.21
3	2483.50	58.20 PK	74.00	-15.80	1.06 V	14	25.91	32.29
4	2483.50	45.93 AV	54.00	-8.07	1.06 V	14	13.64	32.29
5	4924.00	51.60 PK	74.00	-22.40	1.01 V	77	15.41	36.19
6	4924.00	45.20 AV	54.00	-8.80	1.01 V	77	9.01	36.19
7	7386.00	54.50 PK	74.00	-19.50	1.22 V	89	11.70	42.80
8	7386.00	41.80 AV	54.00	-12.20	1.22 V	89	-1.00	42.80

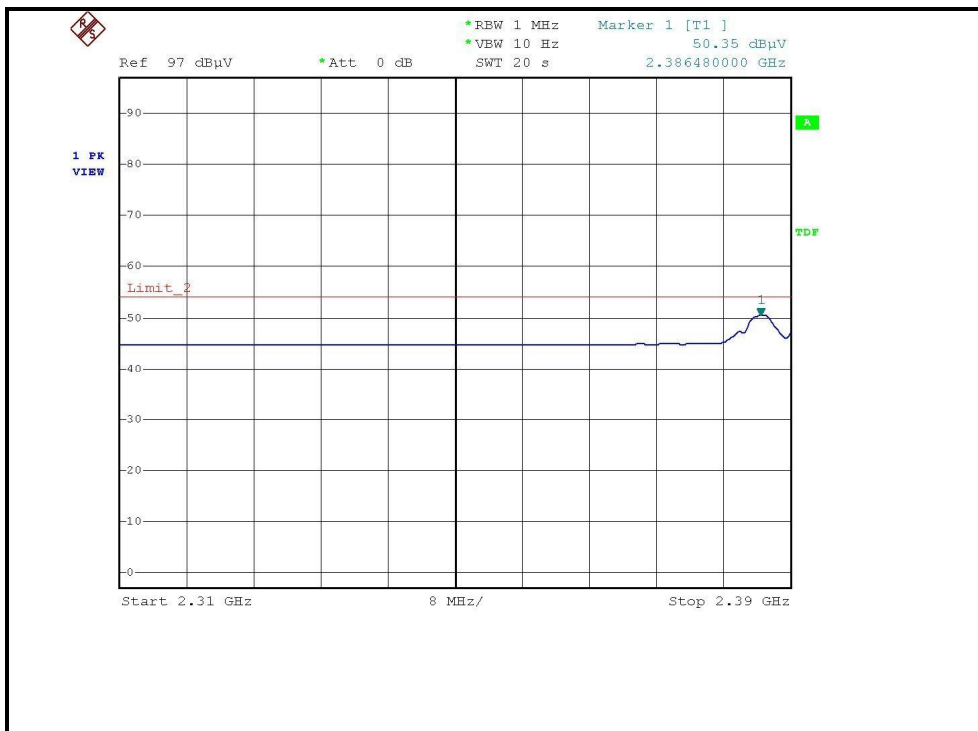
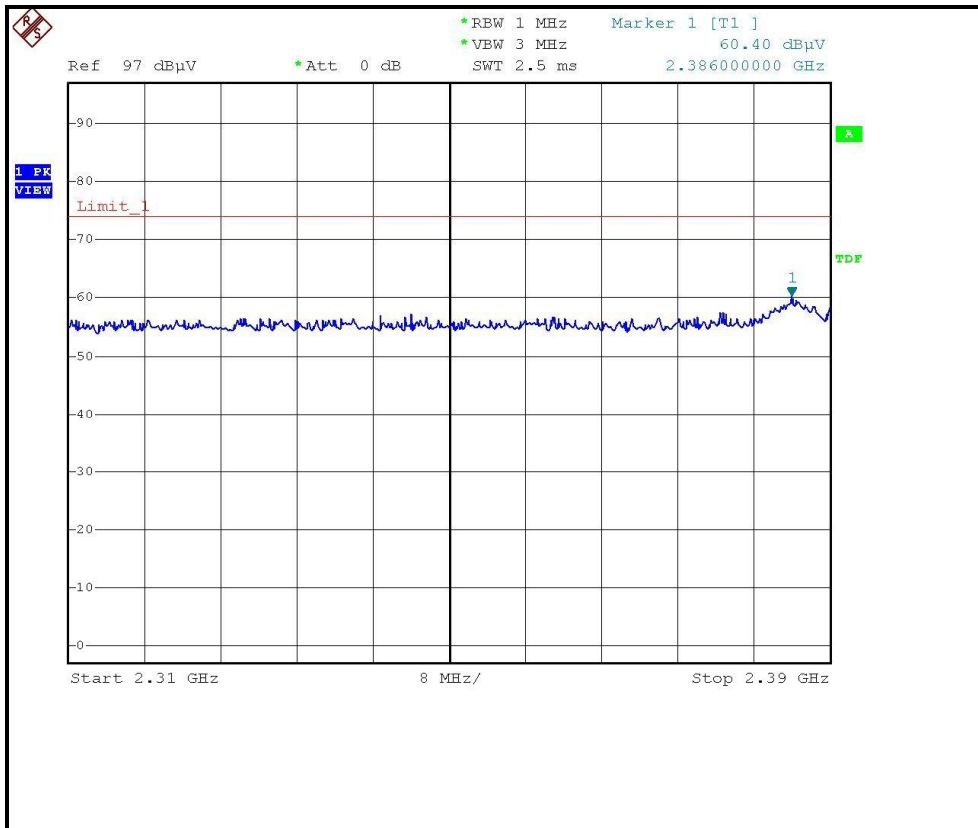
**REMARKS:**

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

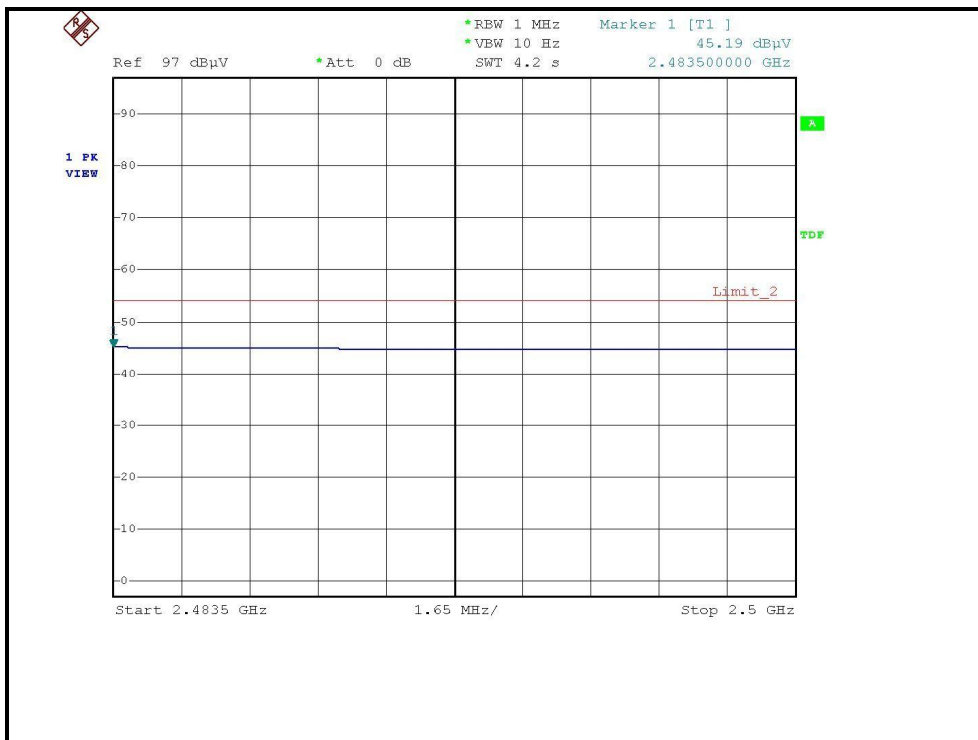
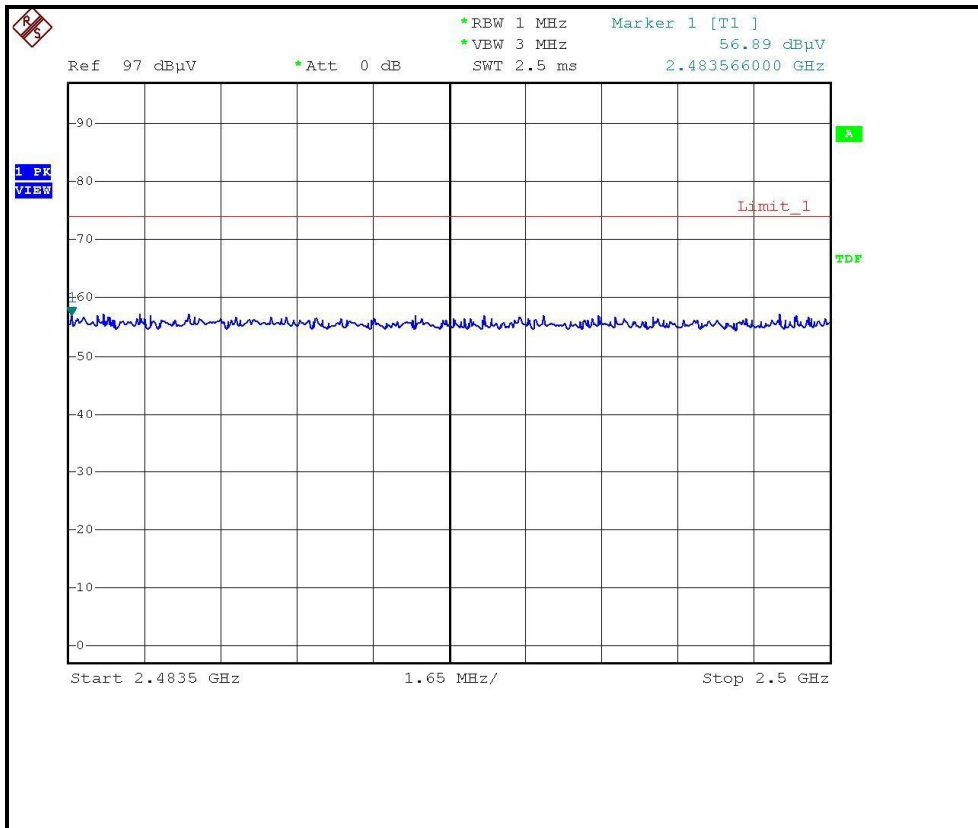
RESTRICTED BANDEDGE (802.11b MODE, CH1, HORIZONTAL )



RESTRICTED BANDEDGE (802.11b MODE, CH1, VERTICAL)



RESTRICTED BANDEDGE (802.11b MODE,CH11, HORIZONTAL )







#### 4.1.8 TEST RESULTS –OFDM 802.11g Normal OFDM modulation

<b>MODE</b>	Channel 1	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	22 deg. C, 67%RH, 956hPa	<b>TESTED BY</b>	Phoenix Huang

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	65.40 PK	74.00	-8.60	1.41 H	0	33.47	31.93
2	2390.00	49.36 AV	54.00	-4.64	1.41 H	0	17.43	31.93
3	*2412.00	102.31 PK			1.43 H	359	70.29	32.02
4	*2412.00	91.94 AV			1.43 H	359	59.92	32.02
5	4824.00	46.74 PK	74.00	-27.26	1.25 H	296	10.77	35.97
6	4824.00	32.97 AV	54.00	-21.03	1.25 H	296	-3.00	35.97
7	7236.00	54.24 PK	74.00	-19.76	1.66 H	105	12.00	42.24
8	7236.00	40.83 AV	54.00	-13.17	1.66 H	105	-1.41	42.24

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.35 PK	74.00	-10.65	1.21 V	245	31.42	31.93
2	2390.00	48.14 AV	54.00	-5.86	1.21 V	245	16.21	31.93
3	*2412.00	100.53 PK			1.22 V	197	68.51	32.02
4	*2412.00	90.35 AV			1.22 V	197	58.33	32.02
5	4824.00	47.38 PK	74.00	-26.62	1.35 V	168	11.41	35.97
6	4824.00	33.54 AV	54.00	-20.46	1.35 V	168	-2.43	35.97
7	7236.00	54.63 PK	74.00	-19.37	1.20 V	356	12.39	42.24
8	7236.00	41.19 AV	54.00	-12.81	1.20 V	356	-1.05	42.24

- 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. The limit value is defined as per 15.247
  6. " \* " : Fundamental frequency

<b>MODE</b>	Channel 6	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	22 deg. C, 67%RH, 956hPa	<b>TESTED BY</b>	Phoenix Huang

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	102.56 PK			1.42 H	0	70.45	32.11
2	*2437.00	91.99 AV			1.42 H	0	59.88	32.11
3	4874.00	46.69 PK	74.00	-27.31	1.29 H	291	10.61	36.08
4	4874.00	32.87 AV	54.00	-21.13	1.29 H	291	-3.21	36.08
5	7311.00	54.31 PK	74.00	-19.69	1.69 H	98	11.79	42.52
6	7311.00	40.96 AV	54.00	-13.04	1.69 H	98	-1.56	42.52

#### 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	*2437.00	99.07 PK			1.47 V	234	66.96	32.11
2	*2437.00	88.86 AV			1.47 V	234	56.75	32.11
3	4874.00	47.42 PK	74.00	-26.58	1.32 V	171	11.34	36.08
4	4874.00	33.57 AV	54.00	-20.43	1.32 V	171	-2.51	36.08
5	7311.00	54.92 PK	74.00	-19.08	1.17 V	345	12.40	42.52
6	7311.00	41.49 AV	54.00	-12.51	1.17 V	345	-1.03	42.52

- 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. The limit value is defined as per 15.247
  6. “ \* “ : Fundamental frequency

<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	22 deg. C, 67%RH, 956hPa	<b>TESTED BY</b>	Phoenix Huang

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

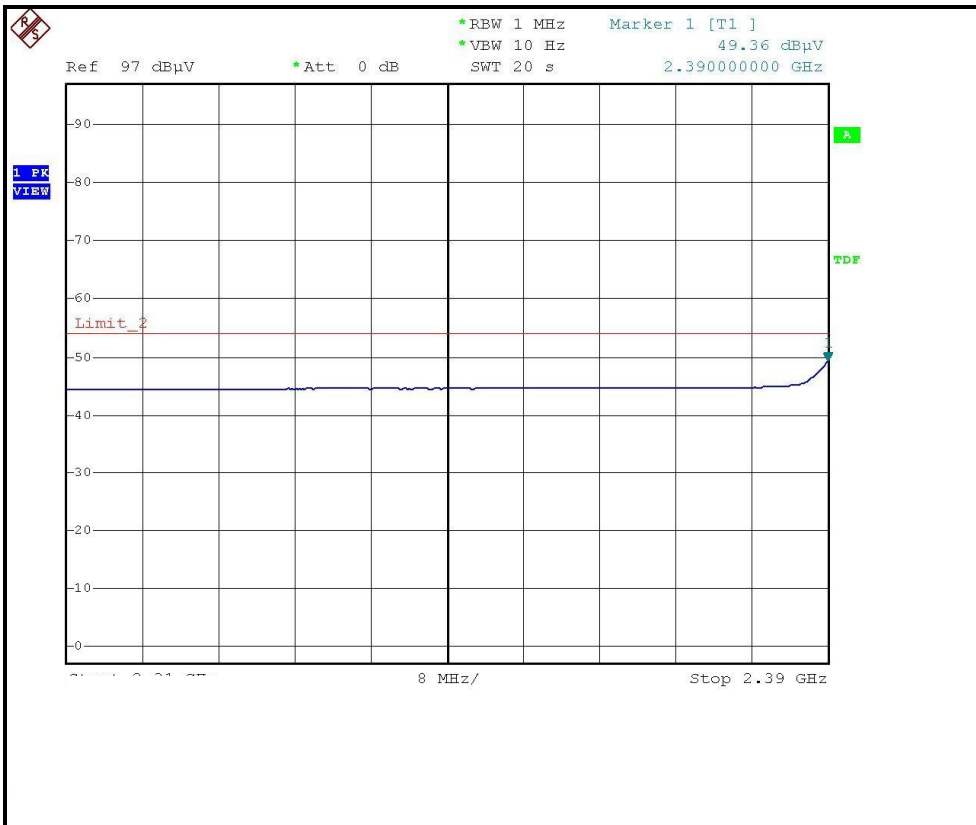
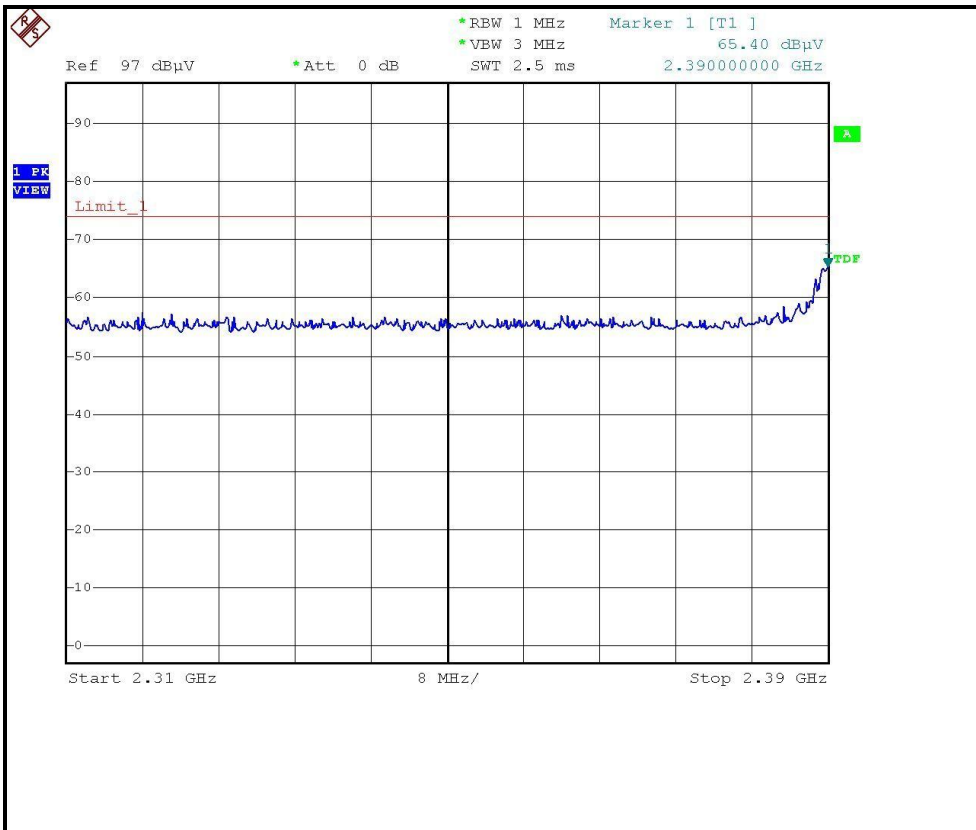
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	99.89 PK			1.44 H	350	67.68	32.21
2	*2462.00	89.52 AV			1.44 H	350	57.31	32.21
3	2483.50	65.87 PK	74.00	-8.13	1.13 H	356	33.58	32.29
4	2483.50	47.79 AV	54.00	-6.21	1.13 H	356	15.50	32.29
5	4924.00	46.81 PK	74.00	-27.19	1.26 H	280	10.62	36.19
6	4924.00	32.96 AV	54.00	-21.04	1.26 H	280	-3.23	36.19
7	7386.00	54.23 PK	74.00	-19.77	1.60 H	112	11.43	42.80
8	7386.00	40.72 AV	54.00	-13.28	1.60 H	112	-2.08	42.80

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

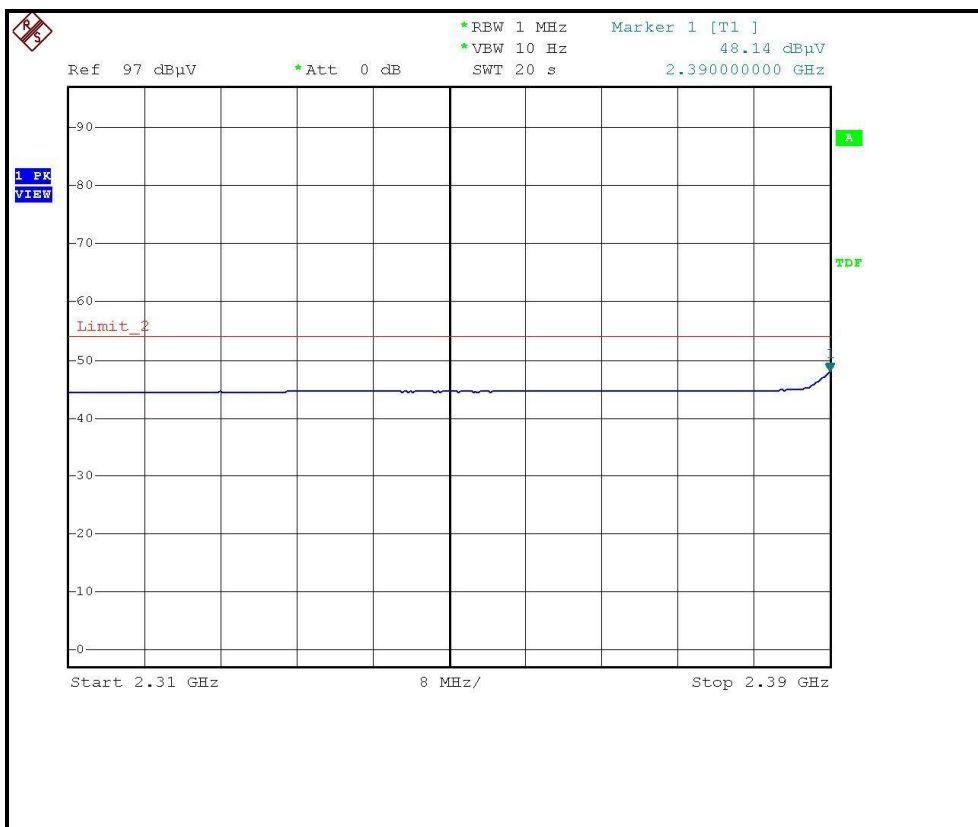
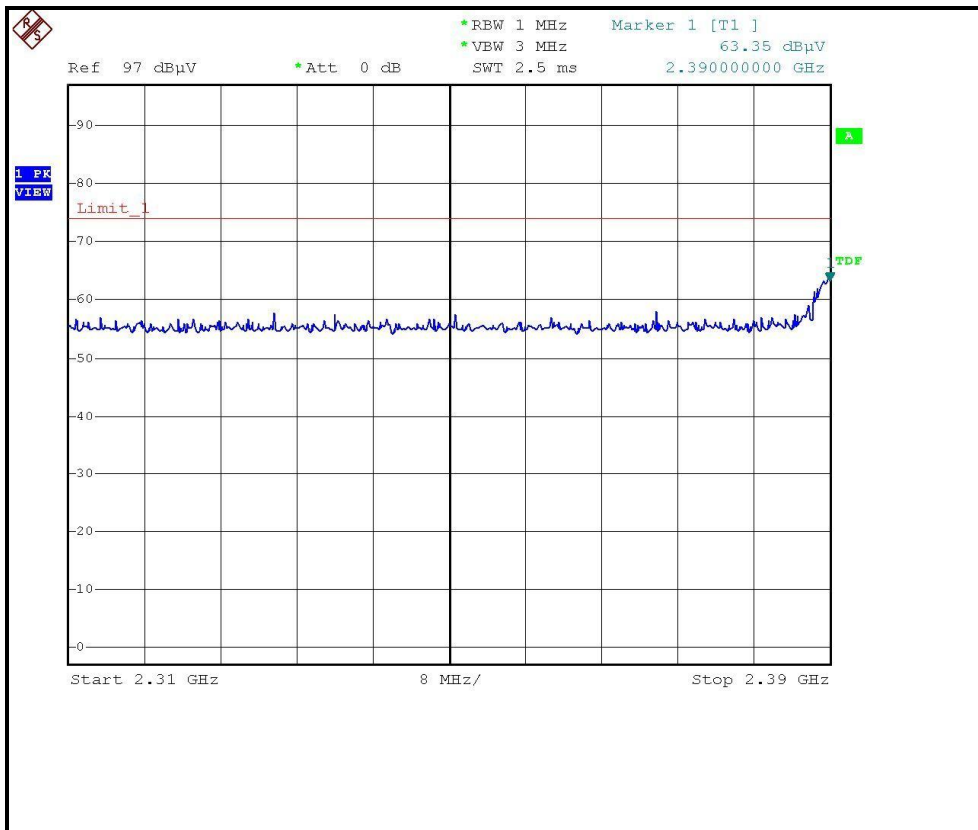
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	99.79 PK			1.14 V	106	67.58	32.21
2	*2462.00	89.39 AV			1.14 V	106	57.18	32.21
3	2483.50	67.24 PK	74.00	-6.76	1.09 V	102	34.95	32.29
4	2483.50	48.52 AV	54.00	-5.48	1.09 V	102	16.23	32.29
5	4924.00	47.56 PK	74.00	-26.44	1.38 V	159	11.37	36.19
6	4924.00	33.69 AV	54.00	-20.31	1.38 V	159	-2.50	36.19
7	7386.00	55.23 PK	74.00	-18.77	1.12 V	353	12.43	42.80
8	7386.00	41.73 AV	54.00	-12.27	1.12 V	353	-1.07	42.80

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

RESTRICTED BANDEDGE (802.11g MODE, CH1, HORIZONTAL )

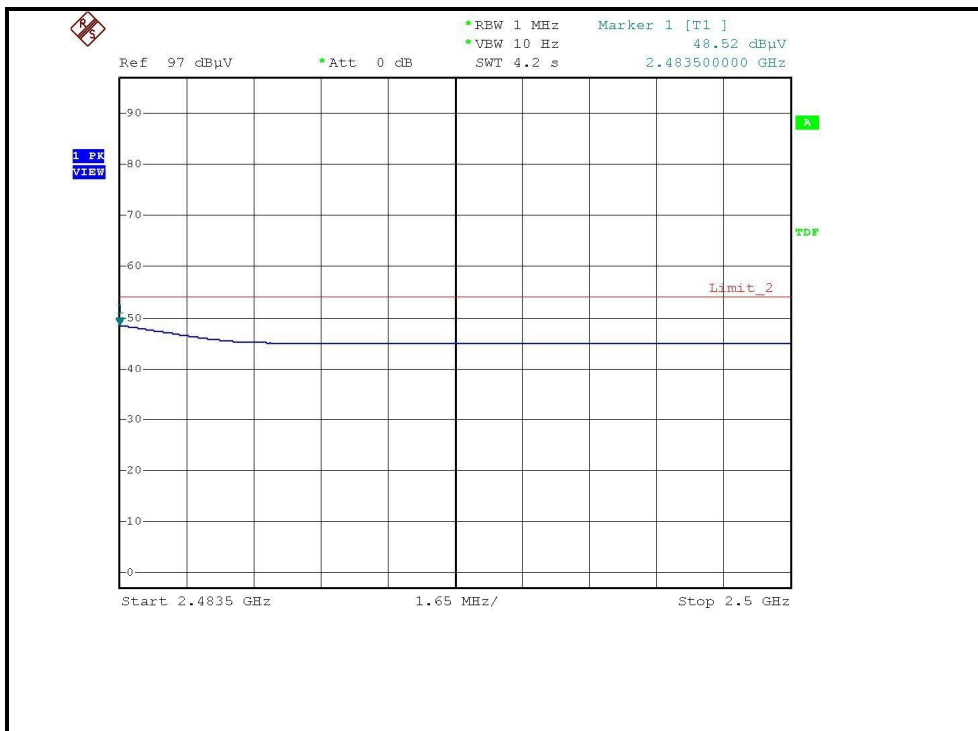
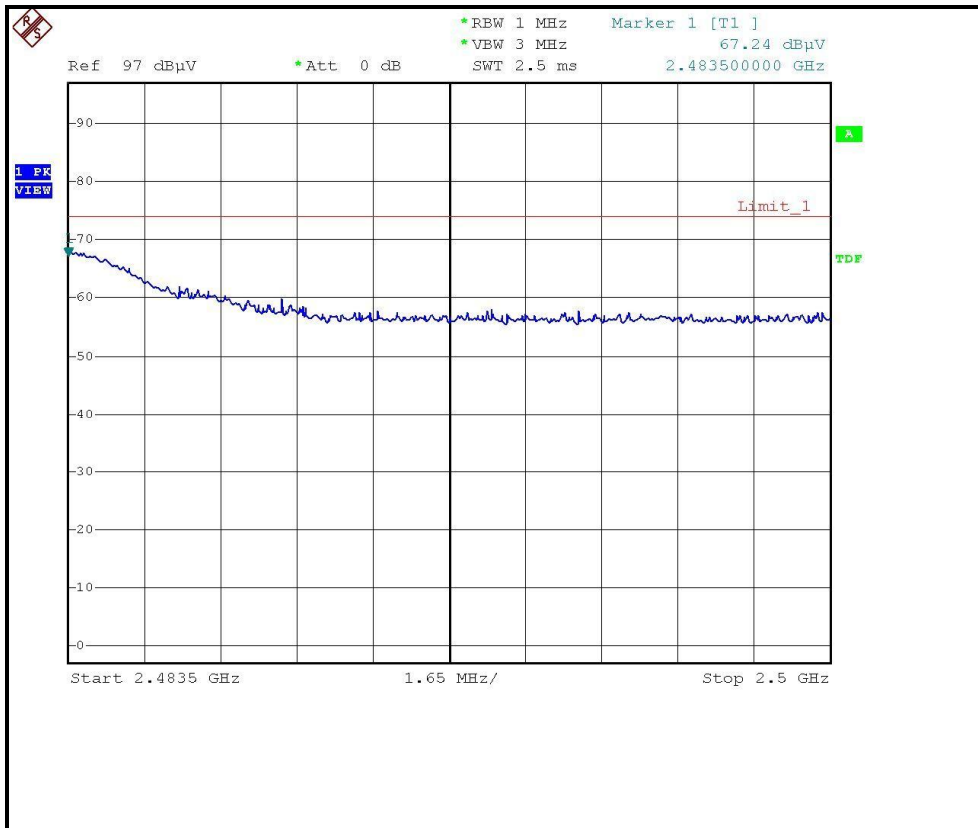


RESTRICTED BANDEDGE (802.11g MODE, CH1, VERTICAL )





RESTRICTED BANDEDGE (802.11g MODE,CH11, VERTICAL )





## 4.2 MAXIMUM PEAK OUTPUT POWER

### 4.2.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

### 4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2007
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2007
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	Jul. 04, 2008
NARDA DETECTOR	4503A	FSCM99899	NA

**NOTE:**

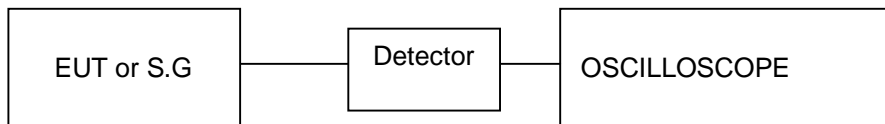
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.



#### 4.2.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the peak response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same peak reading on oscilloscope. Record the power level.

#### 4.2.4 TEST SETUP



#### 4.2.5 EUT OPERATING CONDITIONS

Same as Item 4.2.4



#### 4.2.6 TEST RESULTS – DSSS

##### 802.11b DSSS modulation

<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 64%RH, 956hPa
<b>TESTED BY</b>	Wen Yu		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (mW)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	59.704	17.76	30	PASS
6	2437	52.240	17.18	30	PASS
11	2462	60.814	17.84	30	PASS



#### 4.2.7 TEST RESULTS –OFDM

##### 802.11g OFDM modulation

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 64%RH, 956hPa
<b>TESTED BY</b>	Wen Yu		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (mW)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	32.211	15.08	30	PASS
6	2437	40.551	16.08	30	PASS
11	2462	41.305	16.16	30	PASS

### 4.3 BAND EDGES MEASUREMENT

#### 4.3.1 LIMITS OF BAND EDGES MEASUREMENT

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

#### 4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2007

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.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 via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (RBW = VBW = 100kHz) are attached on the following pages.

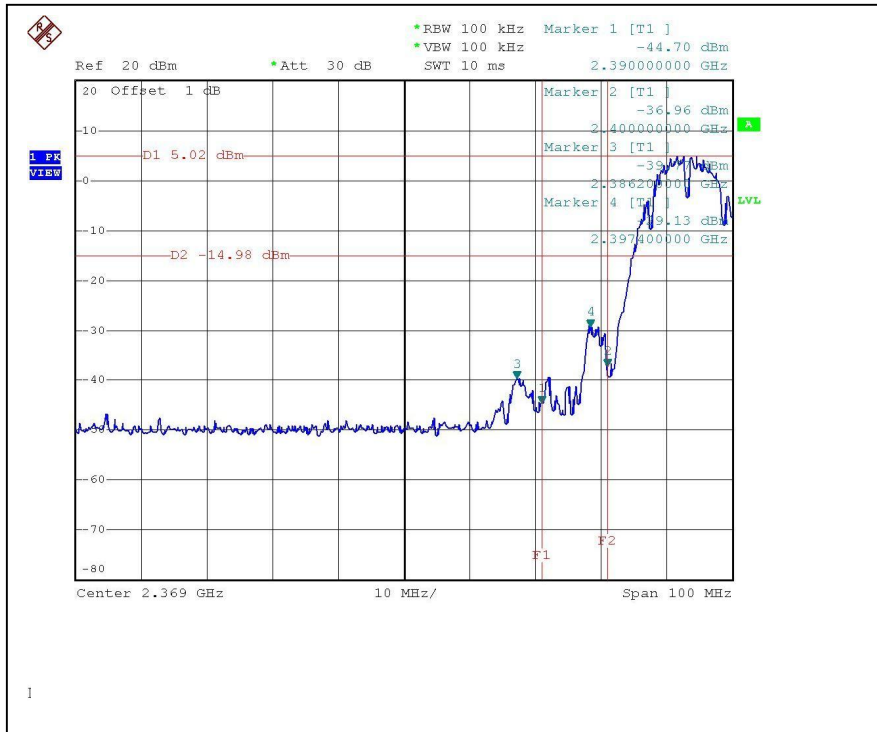
#### 4.3.4 EUT OPERATING CONDITION

Same as Item 4.2.4

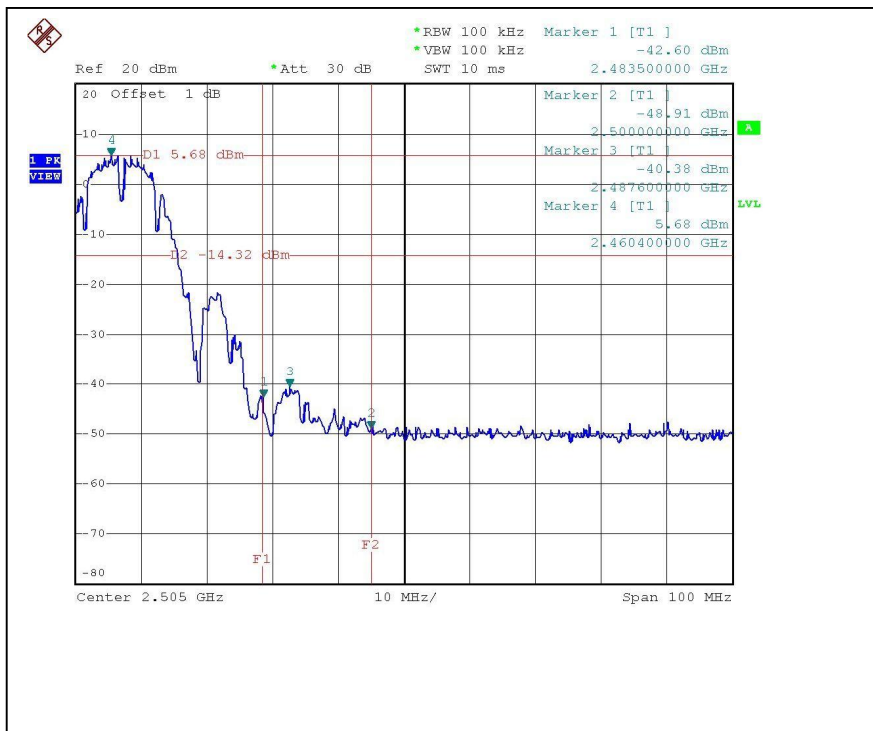
#### 4.3.5 TEST RESULTS

The spectrum plots are attached on the following 8 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

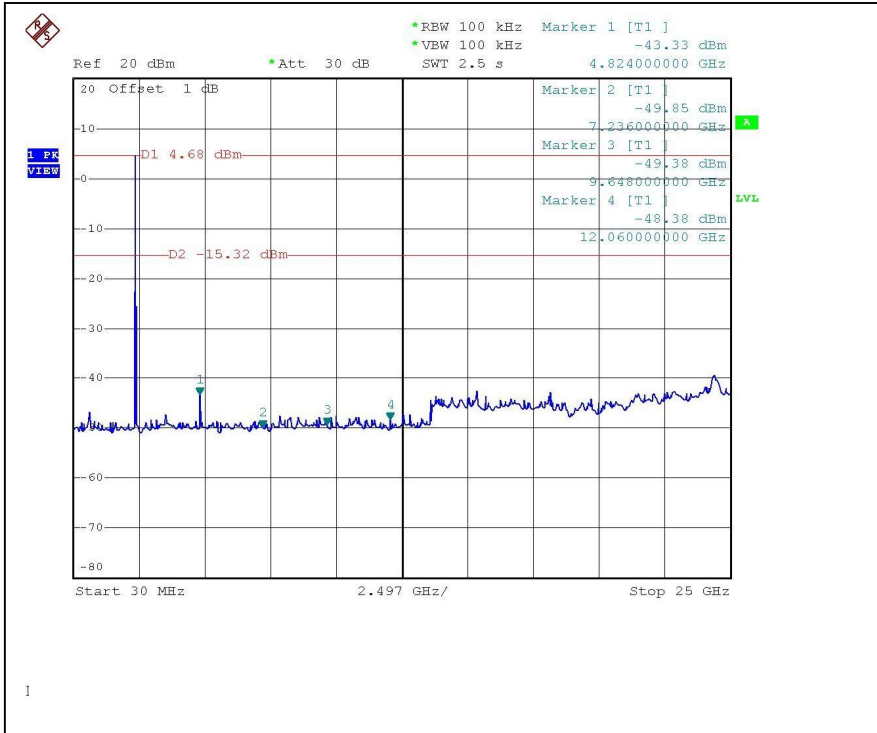
## 802.11b DSSS MODULATION: CH1



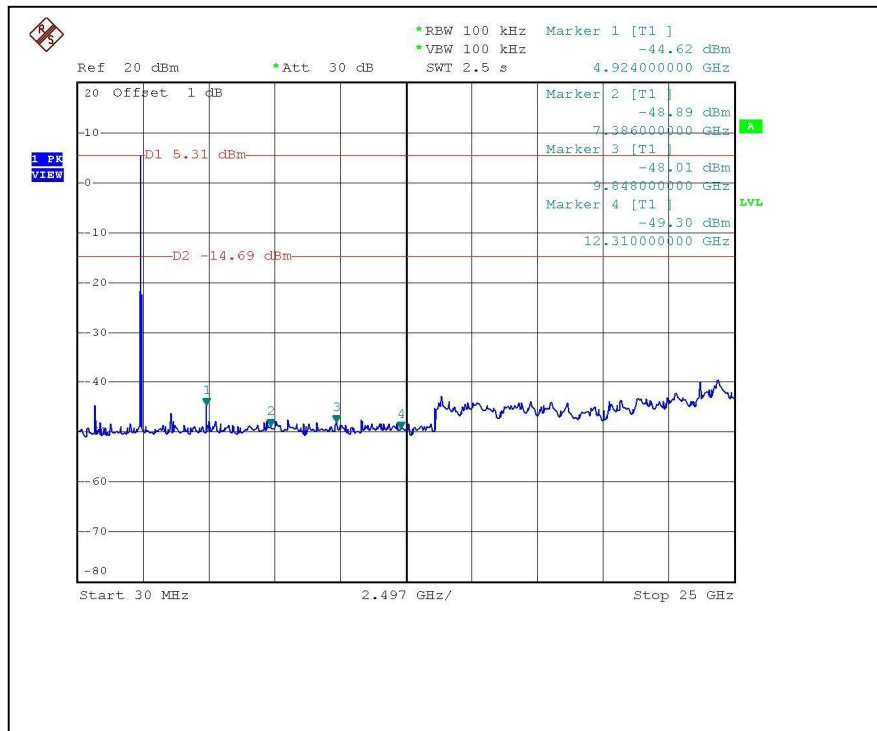
CH11



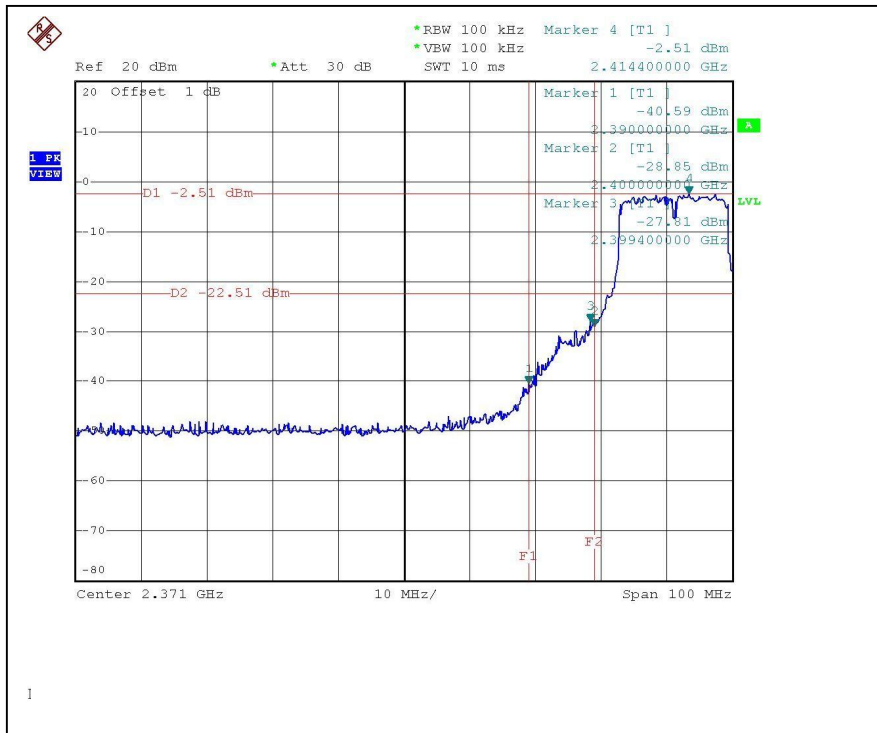
CH1



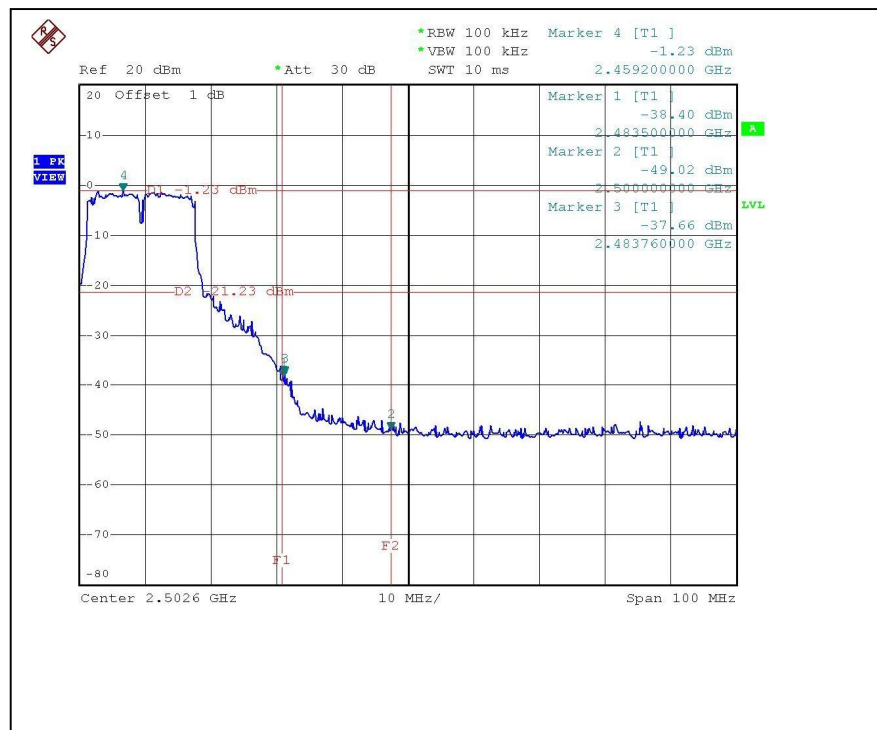
CH11



## 802.11g OFDM MODULATION: CH1

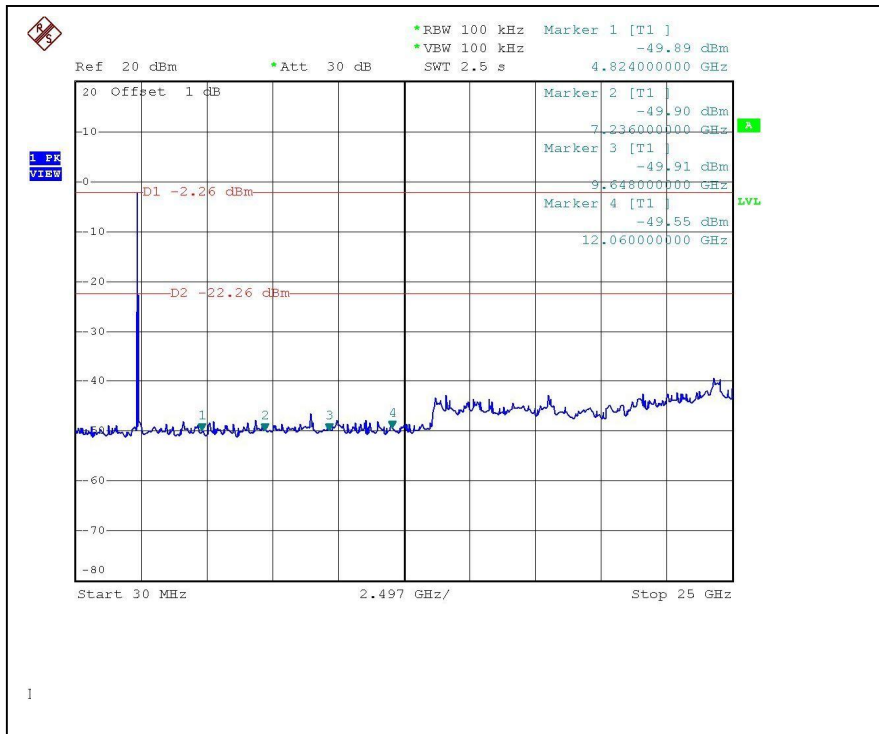


CH11

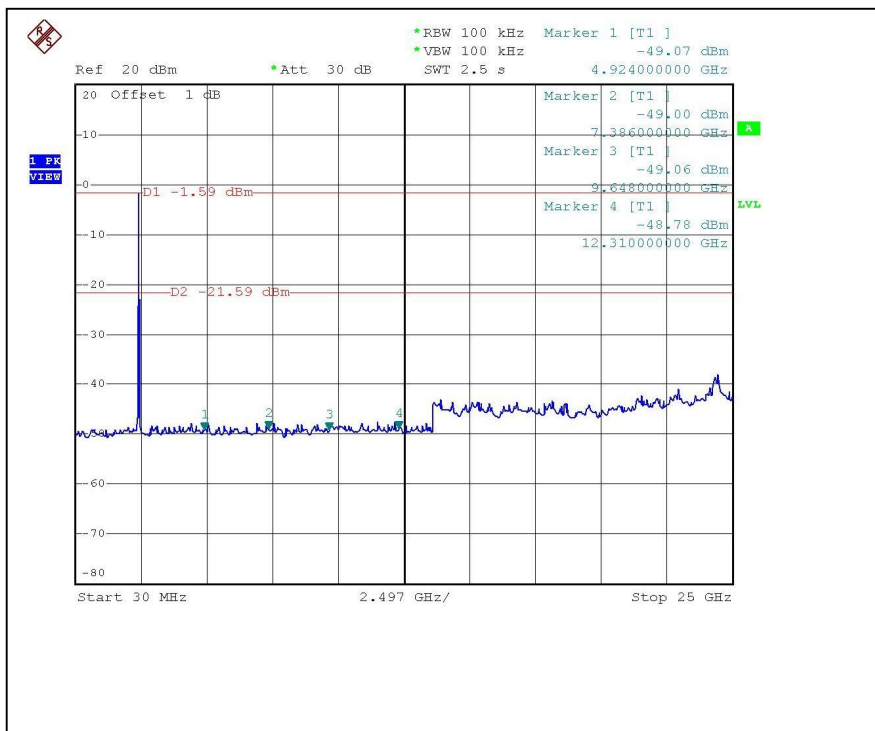




CH1



CH11



## 4.4 ANTENNA REQUIREMENT

### 4.4.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 4.4.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Ceramic antenna without connector. The maximum Gain of the antenna is 2dBi



## 5 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:

<b>USA</b>	FCC, UL, A2LA
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA, CSA
<b>R.O.C.</b>	TAF, BSMI, NCC
<b>Netherlands</b>	Telefication
<b>Singapore</b>	PSB, GOST-ASIA (MOU)
<b>Russia</b>	CERTIS (MOU)

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

**Email:** [service@adt.com.tw](mailto:service@adt.com.tw)

**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.

## **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.