



# FCC TEST REPORT

**REPORT NO.:** RF960503H02A

**MODEL NO.:** RSGu3502

**RECEIVED:** Aug. 09, 2007

**TESTED:** Aug. 28 to Sep. 04, 2007

**ISSUED:** Sep. 04, 2007

**APPLICANT:** Motorola Inc.

**ADDRESS:** 101 Toumament Drive, Horsham, PA 19044

**ISSUED BY:** Advance Data Technology Corporation

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## 1 CERTIFICATION

**PRODUCT :** Residential Seamless Mobility Gateway  
**BRAND NAME :** Motorola  
**MODEL NO. :** RSGu3502  
**TESTED:** Aug. 28 to Sep. 04, 2007  
**APPLICANT :** Motorola Inc.  
**TEST ITEM:** ENGINEERING SAMPLE  
**STANDARDS :** 47 CFR Part 15, Subpart C (Section 15.247)  
ANSI C63.4-2003

The above equipment (Model: RSGu3502) 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 :** Carol Liao , **DATE:** Sep. 04, 2007  
( Carol Liao, Specialist )

**TECHNICAL ACCEPTANCE :** Hank Chung , **DATE:** Sep. 04, 2007  
Responsible for RF ( Hank Chung, Deputy Manager )

**APPROVED BY :** May Chen , **DATE:** Sep. 04, 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 -1.70 dB at 1687.60 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>	Residential Seamless Mobility Gateway
<b>MODEL NO.</b>	RSGu3502
<b>H/W REVISION</b>	Rev. A
<b>FCC ID</b>	ACQRSGU3502
<b>POWER SUPPLY</b>	DC 12V from power adapter
<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: 120.226mW 802.11g: 331.131mW
<b>ANTENNA TYPE</b>	Please see note 1
<b>DATA CABLE</b>	NA
<b>I/O PORT</b>	LAN Port*4, WAN Port*1, RJ-11 PORT*2
<b>ASSOCIATED DEVICES</b>	NA

#### NOTE:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF960503H02 design is as the following:

u Dipole antenna has been changed.

Original Antenna:			
No.	Gain (dBi)	Antenna Type	Connector
1	1.5	Dipole	Right-Angle Reverse Polarity SMA
2	2	Chip (only Rx function)	NA
New Antenna:			
No.	Gain (dBi)	Antenna Type	Connector
1	4.48	Dipole	Right-Angle Reverse Polarity SMA
2	2	Chip (only Rx function)	NA
I Above antenna must be equipped with one antenna cable. (Cable length: 20cm, Cable loss: 0.74dB).			



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	
-	x	√	√	√	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

The Antenna Port Conducted test configuration was included the antenna cable (loss: 0.74dB)



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

The EUT is a Residential Seamless Mobility Gateway. 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.



### 3.5 DESCRIPTION OF SUPPORT UNITS

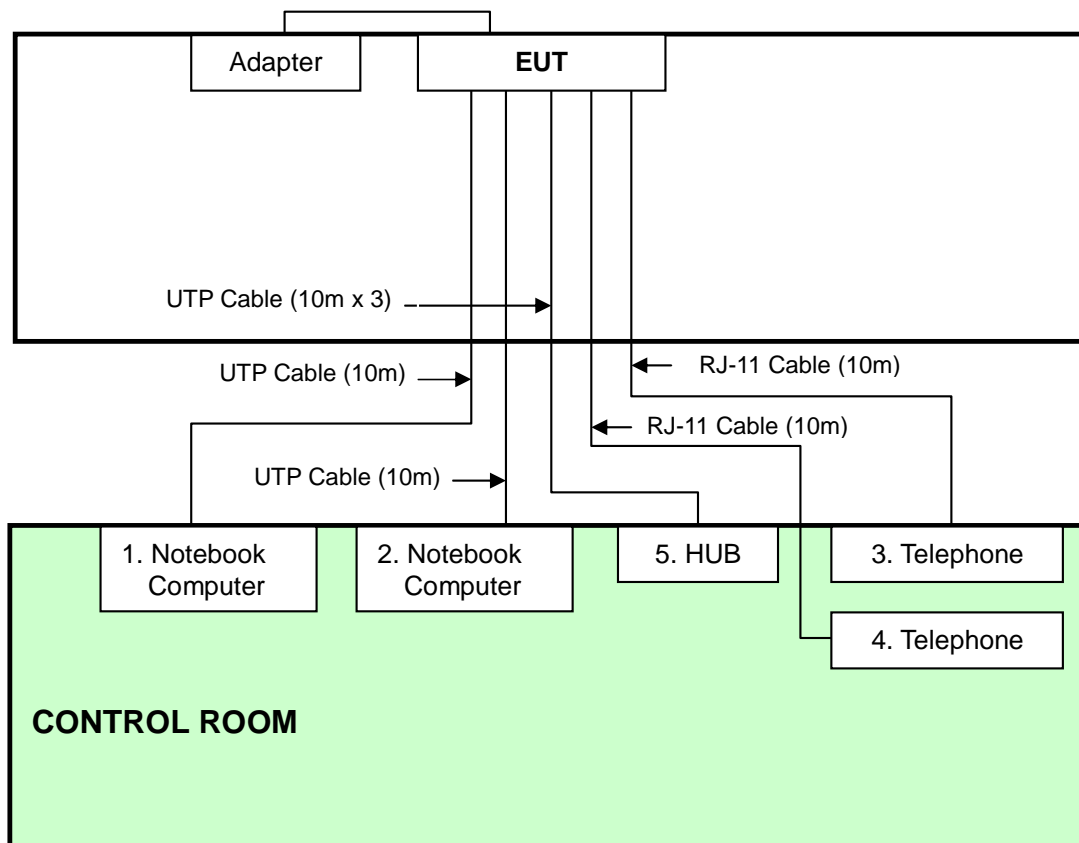
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	6976685584	DoC
2	NOTEBOOK COMPUTER	DELL	PP19L	CN-OHC416-70166-5CA-0448	PIW632500516610
3	TELEPHONE	Fujisu	K-9035	1380001742	NA
4	TELEPHONE	Fujisu	K-9035	1380001524	NA
5	HUB	AVSYS	110H8	01-20E-000002	DoC

No.	Signal cable description
1	NA
2	NA
3	10.0 m nonshielded telephone wire, terminated with RJ11 connector, w/o core.
4	10.0 m nonshielded telephone wire, terminated with RJ11 connector, w/o core.
5	NA

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

### 3.6 CONFIGURATION OF SYSTEM UNDER TEST



**NOTE:** 1. Support units 1-5 were kept in the control room during the 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 15, 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 26, 2008
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 25, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
RF Switches (ARNITSU)	CS-201	1565157	Aug. 13, 2008
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14. 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Aug. 13, 2008
Software	ADT_Radiated_V 7.6.15.7	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

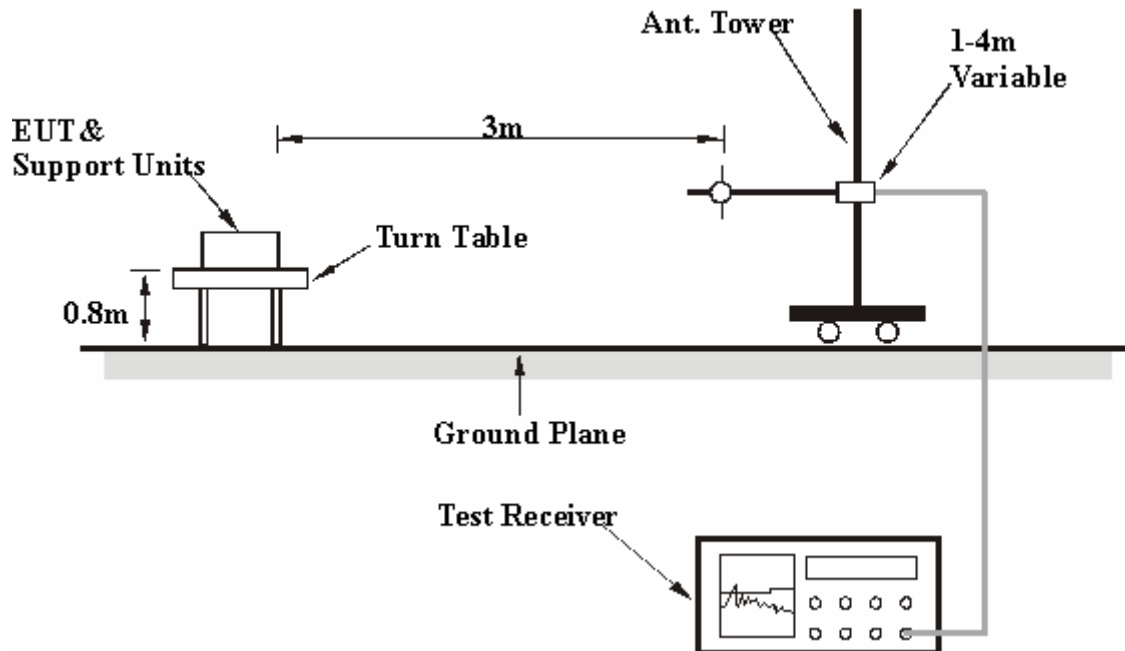
#### 4.1.3 TEST PROCEDURES

- 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. Placed the EUT on the testing table.
- b. Prepared other computer systems (support unit 1 and 2) to act as communication partners and placed them outside of testing area.
- c. The communication partners run test program” Radio Scope V\_03\_07” to enable EUT under transmission/receiving condition continuously at specific channel frequency via UTP cables and wireless.
- d. Support unit 3 and support unit 4 communicated to each other via EUT.



#### 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>	28deg. C, 67%RH, 956hPa	<b>TRANSFER RATE</b>	1Mbps
<b>TESTED BY</b>	Rex 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	125.00	28.99 QP	43.50	-14.51	2.04 H	153	16.21	12.78
2	249.99	36.50 QP	46.00	-9.50	1.62 H	139	22.15	14.35
3	312.50	39.97 QP	46.00	-6.03	1.32 H	206	23.58	16.39
4	350.01	39.84 QP	46.00	-6.16	1.04 H	68	22.28	17.56
5	375.00	38.71 QP	46.00	-7.29	1.00 H	47	20.29	18.42
6	437.52	38.91 QP	46.00	-7.09	1.00 H	197	18.72	20.19
7	500.02	40.73 QP	46.00	-5.27	1.32 H	10	18.69	22.04
8	625.01	40.35 QP	46.00	-5.65	1.59 H	106	16.52	23.83
9	750.03	39.28 QP	46.00	-6.72	1.18 H	204	12.58	26.70
10	875.03	42.62 QP	46.00	-3.38	1.00 H	328	14.61	28.01

##### 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	125.00	38.07 QP	43.50	-5.43	1.00 V	277	25.29	12.78
2	249.99	35.15 QP	46.00	-10.85	1.00 V	275	20.80	14.35
3	312.50	36.80 QP	46.00	-9.20	1.00 V	208	20.41	16.39
4	350.01	38.05 QP	46.00	-7.95	1.00 V	176	20.49	17.56
5	375.00	40.87 QP	46.00	-5.13	1.00 V	201	22.45	18.42
6	437.51	38.29 QP	46.00	-7.71	1.00 V	202	18.10	20.19
7	500.00	40.23 QP	46.00	-5.77	1.00 V	337	18.19	22.04
8	625.01	40.41 QP	46.00	-5.59	1.74 V	145	16.58	23.83
9	750.02	35.76 QP	46.00	-10.24	1.17 V	230	9.06	26.70
10	874.98	35.99 QP	46.00	-10.01	1.34 V	224	7.99	28.00

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

### 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, 68%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	1687.60	45.90 PK	74.00	-28.10	1.00 H	273	17.68	28.22
2	1687.60	42.70 AV	54.00	-11.30	1.00 H	273	14.48	28.22
3	2390.00	56.10 PK	74.00	-17.90	1.47 H	100	25.78	30.32
4	2390.00	43.60 AV	54.00	-10.40	1.47 H	100	13.28	30.32
5	*2412.00	100.10 PK			1.40 H	102	69.69	30.41
6	*2412.00	94.50 AV			1.40 H	102	64.09	30.41
7	4824.00	46.20 PK	74.00	-27.80	1.46 H	285	10.41	35.79
8	4824.00	35.50 AV	54.00	-18.50	1.46 H	285	-0.29	35.79
9	7236.00	52.20 PK	74.00	-21.80	1.37 H	321	10.60	41.60
10	7236.00	38.70 AV	54.00	-15.30	1.37 H	321	-2.90	41.60

#### 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	1687.60	53.40 PK	74.00	-20.60	1.00 V	288	25.18	28.22
2	1687.60	52.20 AV	54.00	-1.80	1.00 V	288	23.98	28.22
3	2390.00	62.70 PK	74.00	-11.30	1.43 V	93	32.38	30.32
4	2390.00	49.50 AV	54.00	-4.50	1.43 V	93	19.18	30.32
5	*2412.00	113.80 PK			1.41 V	109	83.39	30.41
6	*2412.00	108.60 AV			1.41 V	109	78.19	30.41
7	4824.00	51.20 PK	74.00	-22.80	1.22 V	267	15.41	35.79
8	4824.00	46.90 AV	54.00	-7.10	1.22 V	267	11.11	35.79
9	7236.00	52.70 PK	74.00	-21.30	1.21 V	128	11.10	41.60
10	7236.00	39.50 AV	54.00	-14.50	1.21 V	128	-2.10	41.60

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  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, 68%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	1687.60	46.30 PK	74.00	-27.70	1.02 H	265	18.08	28.22
2	1687.60	43.10 AV	54.00	-10.90	1.02 H	265	14.88	28.22
3	*2437.00	99.40 PK			1.50 H	245	68.88	30.52
4	*2437.00	94.00 AV			1.50 H	245	63.48	30.52
5	4874.00	45.70 PK	74.00	-28.30	1.27 H	207	9.78	35.92
6	4874.00	35.30 AV	54.00	-18.70	1.27 H	207	-0.62	35.92
7	7311.00	52.50 PK	74.00	-21.50	1.36 H	201	10.69	41.81
8	7311.00	38.60 AV	54.00	-15.40	1.36 H	201	-3.21	41.81

<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	1687.60	53.80 PK	74.00	-20.20	1.01 V	278	25.58	28.22
<b>2</b>	<b>1687.60</b>	<b>52.30 AV</b>	<b>54.00</b>	<b>-1.70</b>	<b>1.01 V</b>	<b>278</b>	<b>24.08</b>	<b>28.22</b>
3	*2437.00	112.40 PK			1.40 V	92	81.88	30.52
4	*2437.00	107.80 AV			1.40 V	92	77.28	30.52
5	4874.00	58.70 PK	74.00	-15.30	1.22 V	22	22.78	35.92
6	4874.00	44.40 AV	54.00	-9.60	1.22 V	22	8.48	35.92
7	7311.00	53.10 PK	74.00	-20.90	1.23 V	197	11.29	41.81
8	7311.00	39.30 AV	54.00	-14.70	1.23 V	197	-2.51	41.81

- 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, 68%RH, 956hPa	<b>TESTED BY</b>	Phoenix Huang

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

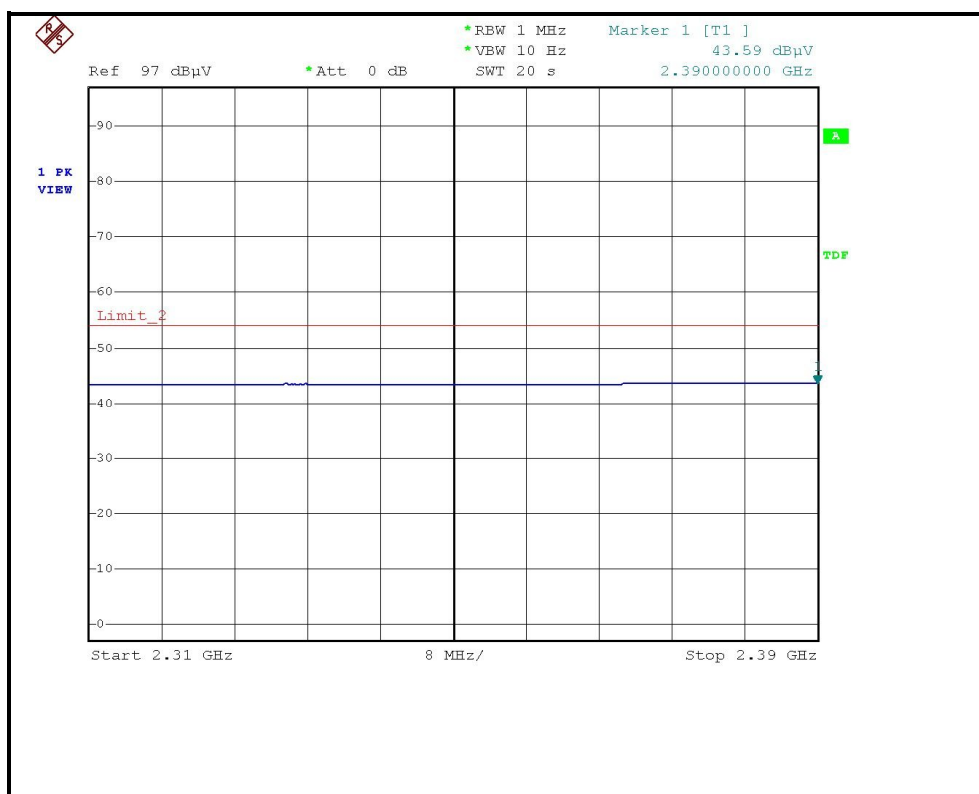
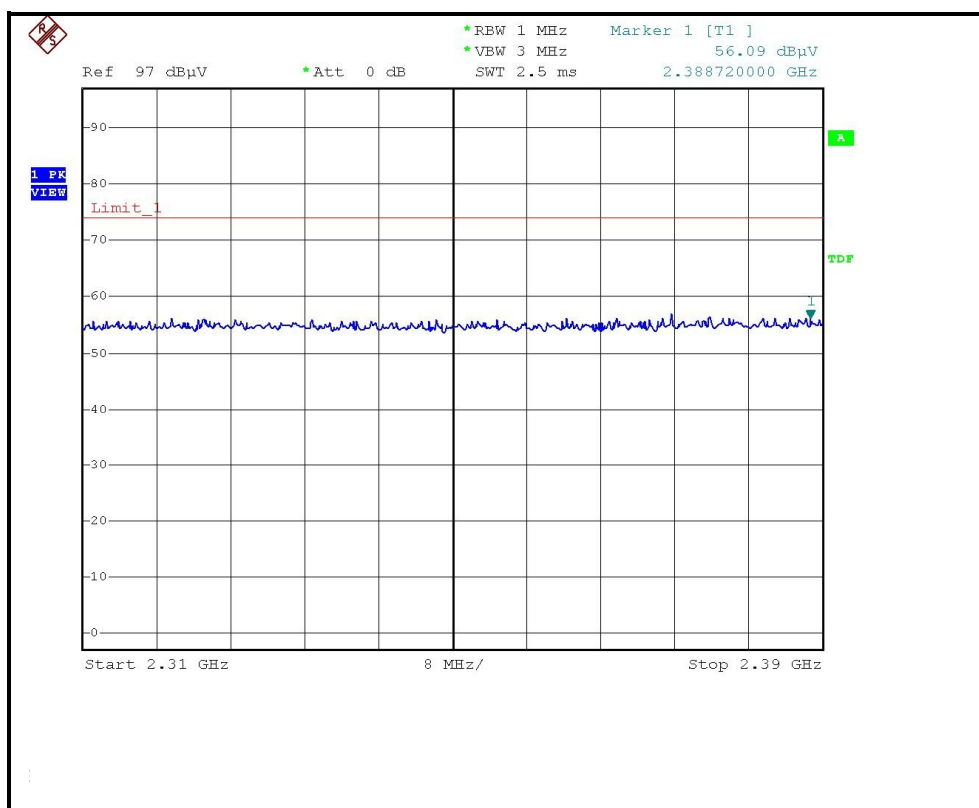
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1687.60	46.00 PK	74.00	-28.00	1.03 H	261	17.78	28.22
2	1687.60	42.90 AV	54.00	-11.10	1.03 H	261	14.68	28.22
3	*2462.00	99.70 PK			1.02 H	159	69.07	30.63
4	*2462.00	94.30 AV			1.02 H	159	63.67	30.63
5	2483.50	56.20 PK	74.00	-17.80	1.00 H	160	25.48	30.72
6	2483.50	44.30 AV	54.00	-9.70	1.00 H	160	13.58	30.72
7	4924.00	46.00 PK	74.00	-28.00	1.28 H	211	9.94	36.06
8	4924.00	35.30 AV	54.00	-18.70	1.28 H	211	-0.76	36.06
9	7386.00	52.00 PK	74.00	-22.00	1.41 H	256	9.99	42.01
10	7386.00	38.50 AV	54.00	-15.50	1.41 H	256	-3.51	42.01

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

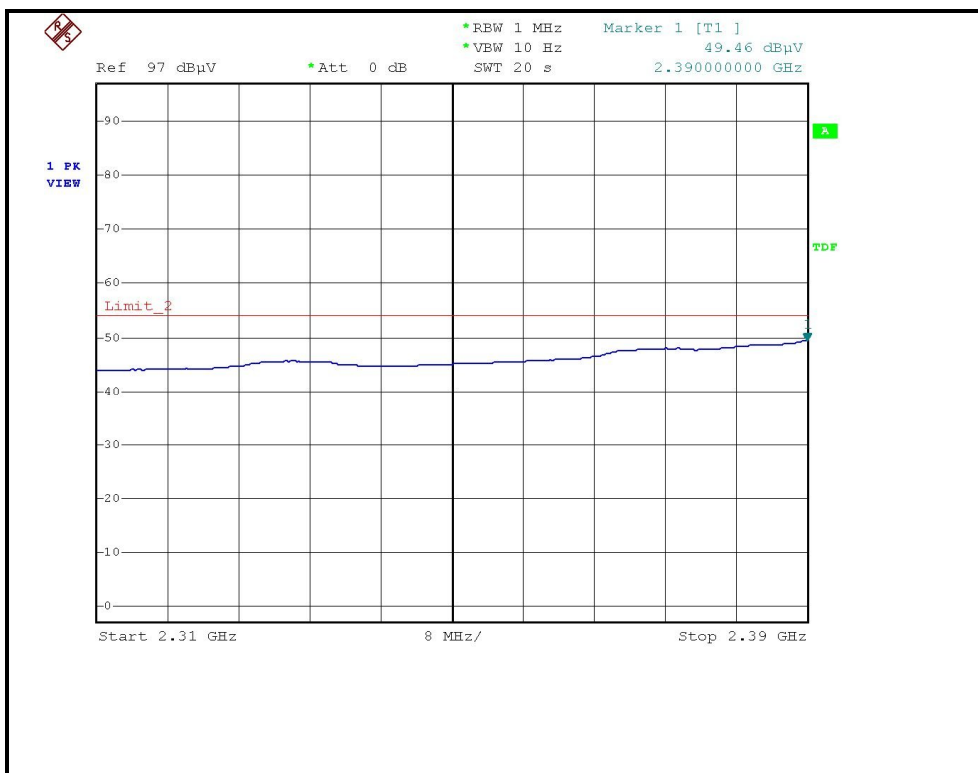
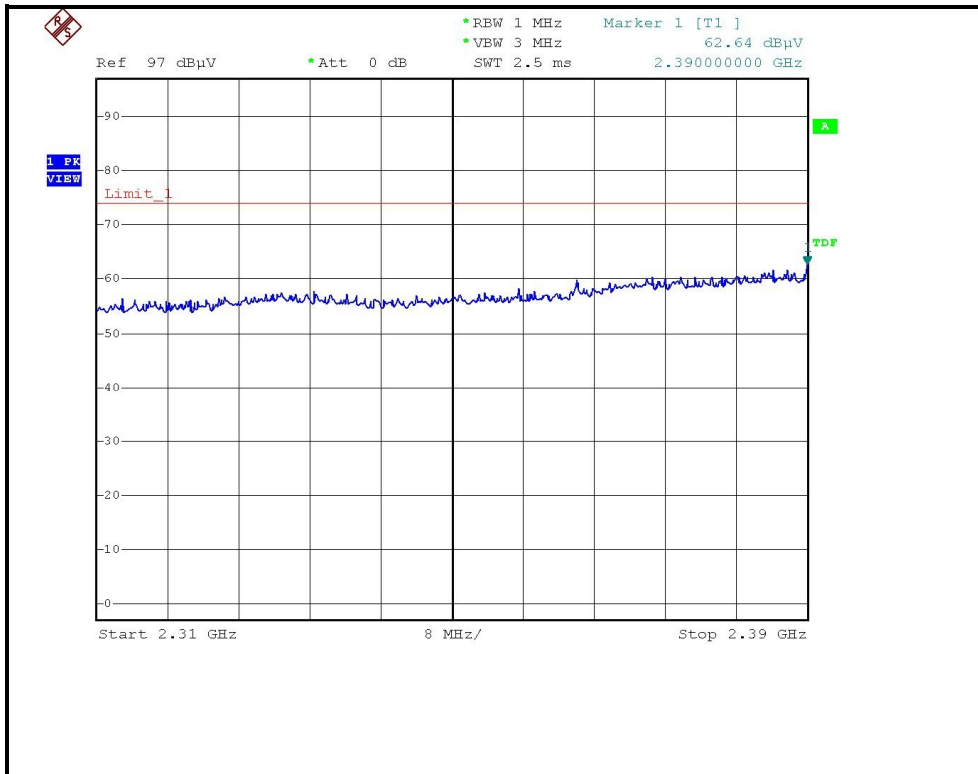
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1687.60	53.70 PK	74.00	-20.30	1.00 V	271	25.48	28.22
2	1687.60	52.10 AV	54.00	-1.90	1.00 V	271	23.88	28.22
3	*2462.00	113.00 PK			1.41 V	108	82.37	30.63
4	*2462.00	108.40 AV			1.41 V	108	77.77	30.63
5	2483.50	62.00 PK	74.00	-12.00	1.39 V	93	31.28	30.72
6	2483.50	49.20 AV	54.00	-4.80	1.39 V	93	18.48	30.72
7	4924.00	48.00 PK	74.00	-26.00	1.32 V	287	11.94	36.06
8	4924.00	43.00 AV	54.00	-11.00	1.32 V	287	6.94	36.06
9	7386.00	52.30 PK	74.00	-21.70	1.45 V	162	10.29	42.01
10	7386.00	39.00 AV	54.00	-15.00	1.45 V	162	-3.01	42.01

- 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

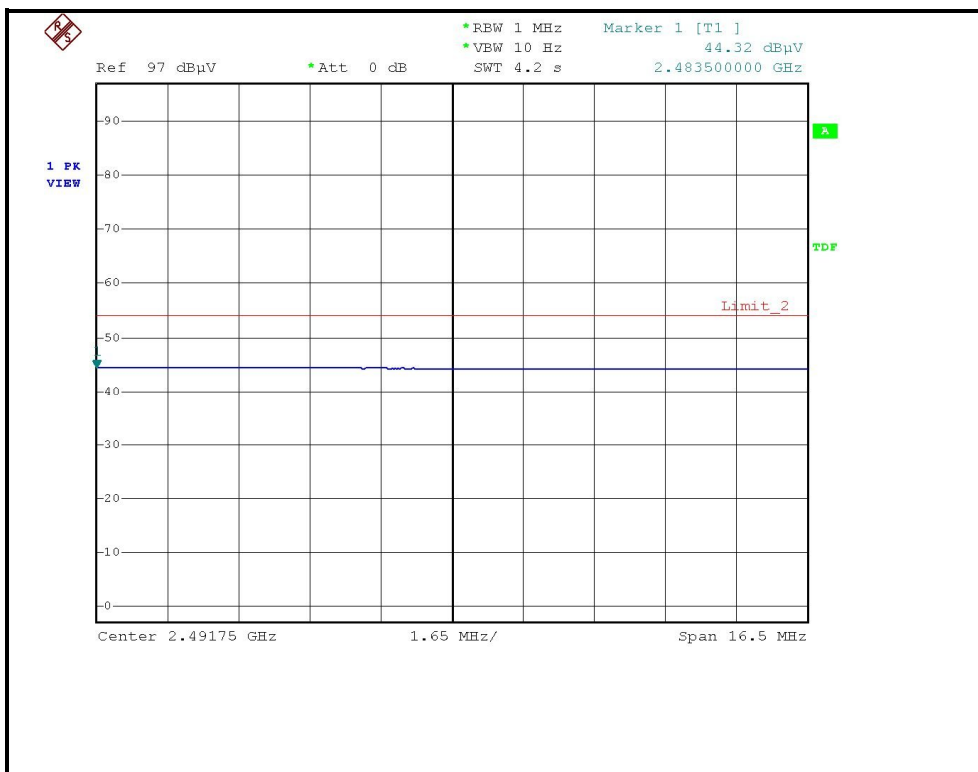
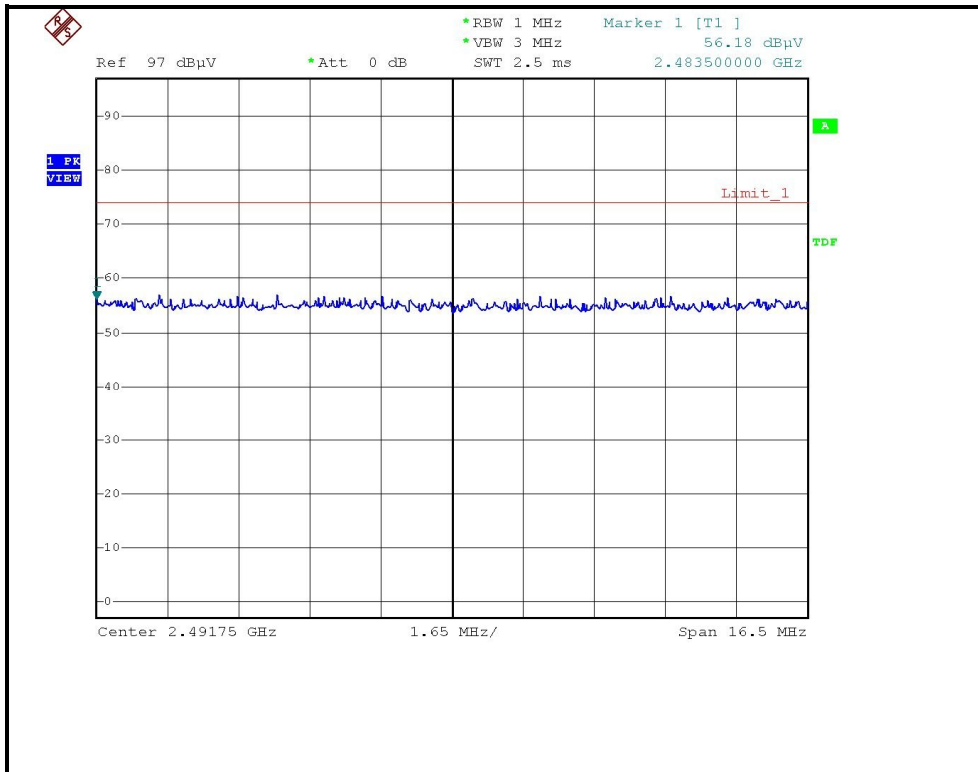
### RESTRICTED BANDEDGE (802.11b MODE,CH1, HORIZONTAL )



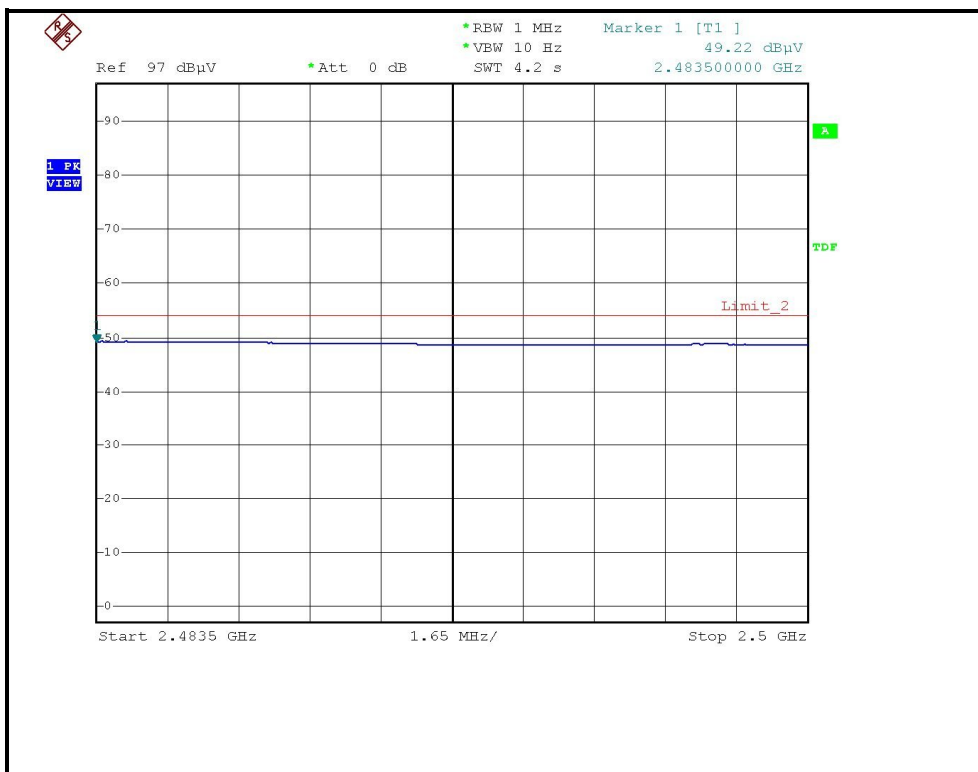
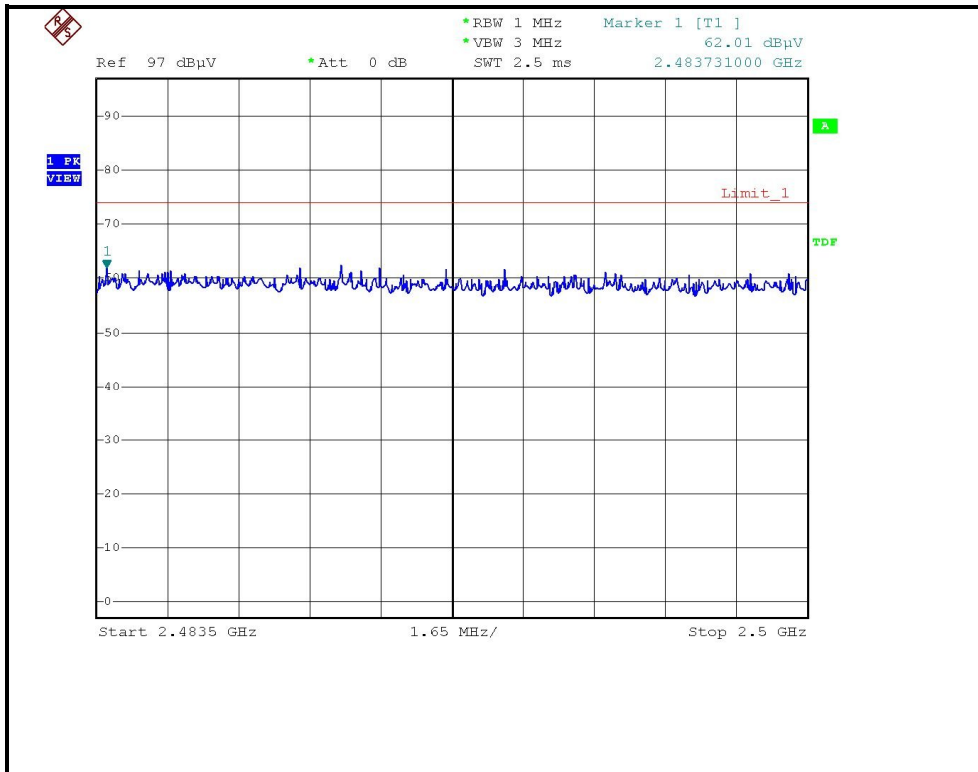
RESTRICTED BANDEDGE (802.11b MODE,CH1, VERTICAL )



RESTRICTED BANDEDGE (802.11b MODE,CH11, HORIZONTAL )



RESTRICTED BANDEDGE (802.11b MODE,CH11, VERTICAL )





### 802.11g 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, 68%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	1687.60	45.60 PK	74.00	-28.40	1.00 H	169	17.38	28.22
2	1687.60	42.60 AV	54.00	-11.40	1.00 H	169	14.38	28.22
3	2390.00	56.70 PK	74.00	-17.30	1.38 H	100	26.38	30.32
4	2390.00	44.00 AV	54.00	-10.00	1.38 H	100	13.68	30.32
5	*2412.00	101.12 PK			1.39 H	101	70.71	30.41
6	*2412.00	91.70 AV			1.39 H	101	61.29	30.41
7	4824.00	45.20 PK	74.00	-28.80	1.28 H	286	9.14	36.06
8	4824.00	34.00 AV	54.00	-20.00	1.28 H	286	-2.06	36.06
9	7236.00	53.00 PK	74.00	-21.00	1.27 H	185	11.40	41.60
10	7236.00	38.20 AV	54.00	-15.80	1.27 H	185	-3.40	41.60

#### 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	1687.60	53.20 PK	74.00	-20.80	1.00 V	287	24.98	28.22
2	1687.60	52.10 AV	54.00	-1.90	1.00 V	287	23.88	28.22
3	2390.00	67.70 PK	74.00	-6.30	1.42 V	108	37.38	30.32
4	2390.00	50.70 AV	54.00	-3.30	1.42 V	108	20.38	30.32
5	*2412.00	114.20 PK			1.40 V	93	83.79	30.41
6	*2412.00	105.50 AV			1.40 V	93	75.09	30.41
7	4824.00	49.20 PK	74.00	-24.80	1.32 V	18	13.14	36.06
8	4824.00	35.60 AV	54.00	-18.40	1.32 V	18	-0.46	36.06
9	7236.00	53.20 PK	74.00	-20.80	1.22 V	279	11.60	41.60
10	7236.00	39.00 AV	54.00	-15.00	1.22 V	279	-2.60	41.60

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  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, 68%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	1687.60	45.80 PK	74.00	-28.20	1.00 H	167	17.58	28.22
2	1687.60	42.70 AV	54.00	-11.30	1.00 H	167	14.48	28.22
3	*2437.00	106.20 PK			1.31 H	257	75.68	30.52
4	*2437.00	95.20 AV			1.31 H	257	64.68	30.52
5	4874.00	47.80 PK	74.00	-26.20	1.28 H	21	11.88	35.92
6	4874.00	35.00 AV	54.00	-19.00	1.28 H	21	-0.92	35.92
7	7311.00	53.50 PK	74.00	-20.50	1.16 H	167	11.69	41.81
8	7311.00	38.70 AV	54.00	-15.30	1.16 H	167	-3.11	41.81

#### 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	1687.60	53.00 PK	74.00	-21.00	1.00 V	288	24.78	28.22
2	1687.60	51.80 AV	54.00	-2.20	1.00 V	288	23.58	28.22
3	*2437.00	119.60 PK			1.38 V	82	89.08	30.52
4	*2437.00	108.60 AV			1.38 V	82	78.08	30.52
5	4874.00	57.90 PK	74.00	-16.10	1.22 V	267	21.98	35.92
6	4874.00	43.00 AV	54.00	-11.00	1.22 V	267	7.08	35.92
7	7311.00	53.70 PK	74.00	-20.30	1.23 V	285	11.89	41.81
8	7311.00	39.20 AV	54.00	-14.80	1.23 V	285	-2.61	41.81

- 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, 68%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	1687.60	45.80 PK	74.00	-28.20	1.00 H	170	17.58	28.22
2	1687.60	42.90 AV	54.00	-11.10	1.00 H	170	14.68	28.22
3	*2462.00	100.20 PK			1.41 H	279	69.57	30.63
4	*2462.00	91.00 AV			1.41 H	279	60.37	30.63
5	2483.50	56.33 PK	74.00	-17.67	1.41 H	277	25.61	30.72
6	2483.50	44.10 AV	54.00	-9.90	1.41 H	277	13.38	30.72
7	4924.00	45.70 PK	74.00	-28.30	1.29 H	277	9.64	36.06
8	4924.00	34.10 AV	54.00	-19.90	1.29 H	277	-1.96	36.06
9	7386.00	53.20 PK	74.00	-20.80	1.34 H	56	11.19	42.01
10	7386.00	38.50 AV	54.00	-15.50	1.34 H	56	-3.51	42.01

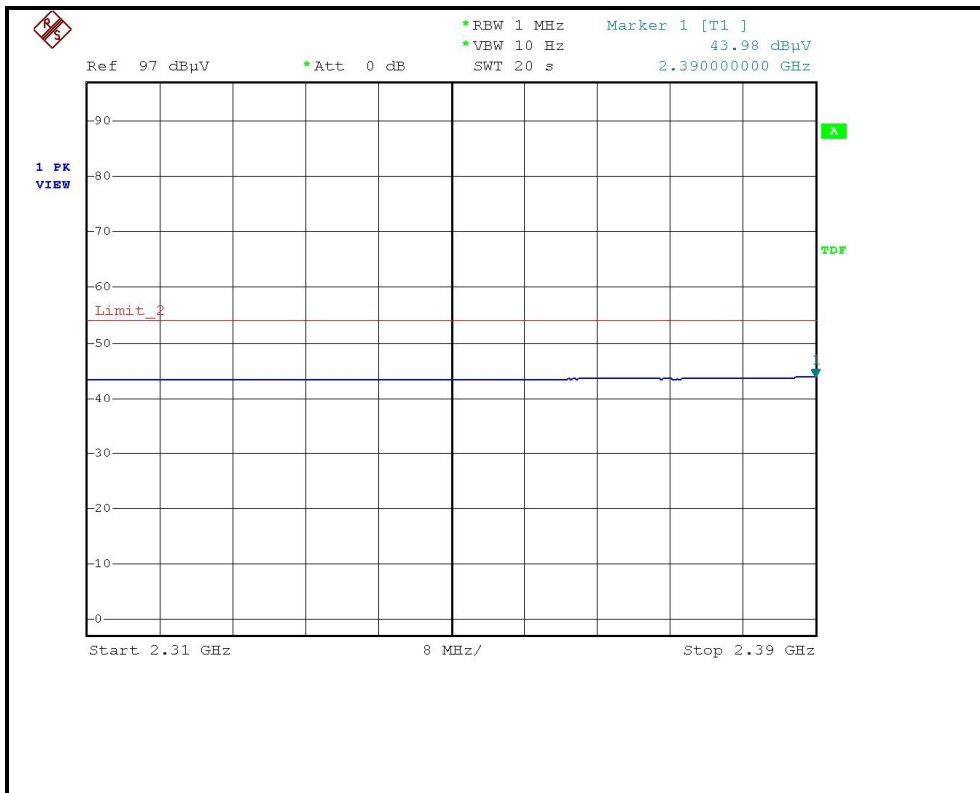
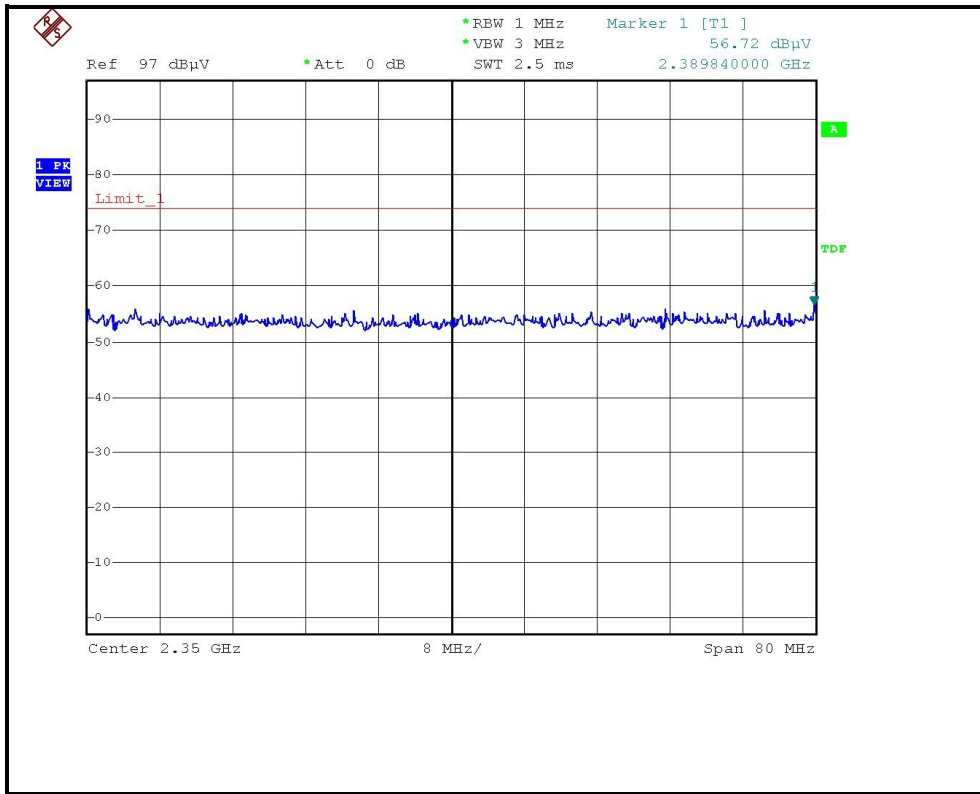
#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

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	1687.60	53.40 PK	74.00	-20.60	1.01 V	286	25.18	28.22
<b>2</b>	<b>1687.60</b>	<b>52.30 AV</b>	<b>54.00</b>	<b>-1.70</b>	<b>1.01 V</b>	<b>286</b>	<b>24.08</b>	<b>28.22</b>
3	*2462.00	115.50 PK			1.38 V	108	84.87	30.63
4	*2462.00	106.20 AV			1.38 V	108	75.57	30.63
5	2483.50	69.40 PK	74.00	-4.60	1.39 V	108	38.68	30.72
6	2483.50	50.10 AV	54.00	-3.90	1.39 V	108	19.38	30.72
7	4924.00	49.40 PK	74.00	-24.60	1.47 V	19	13.34	36.06
8	4924.00	35.80 AV	54.00	-18.20	1.47 V	19	-0.26	36.06
9	7386.00	53.40 PK	74.00	-20.60	1.33 V	236	11.39	42.01
10	7386.00	39.10 AV	54.00	-14.90	1.33 V	236	-2.91	42.01

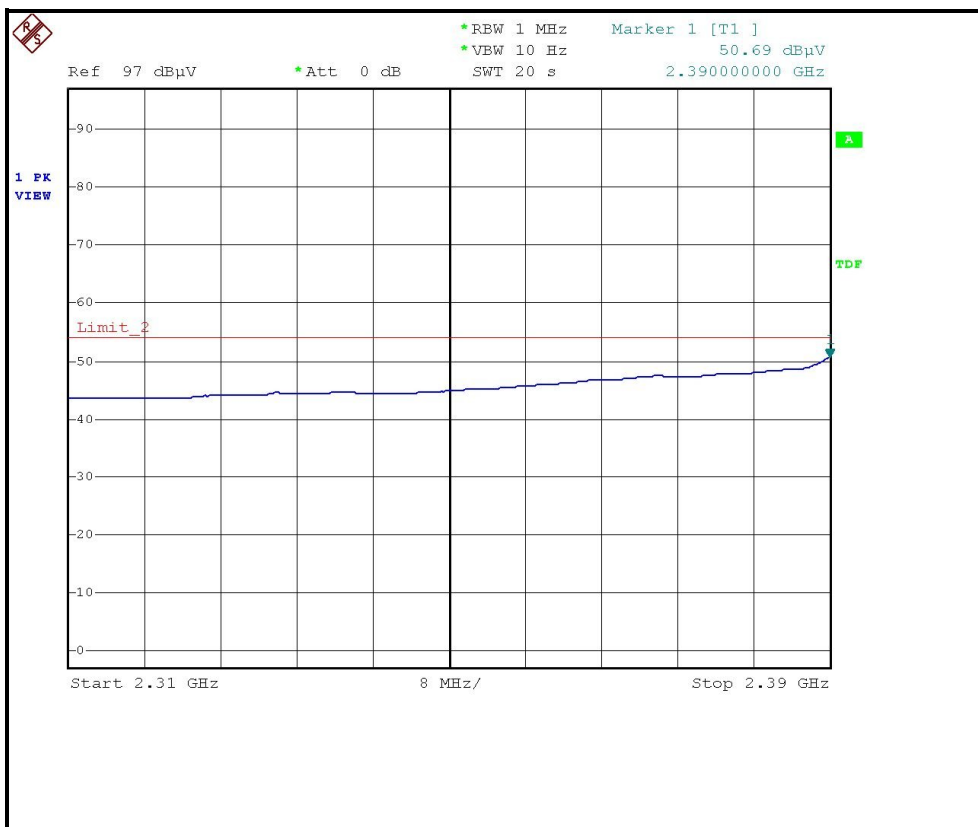
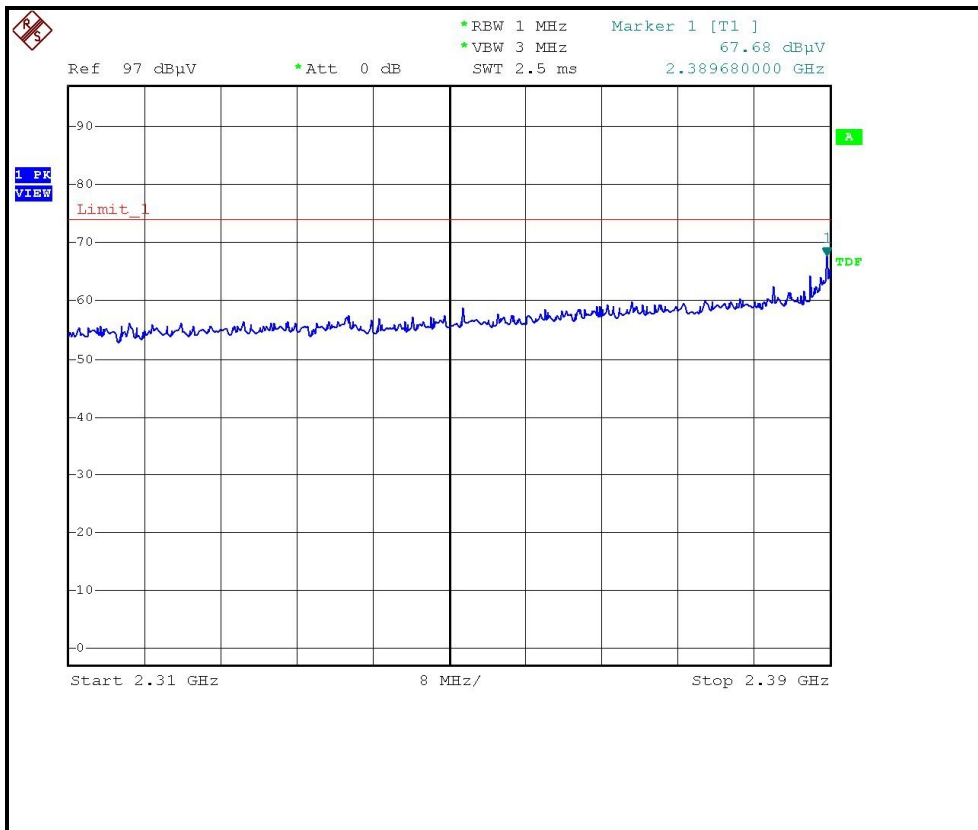
#### REMARKS:

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

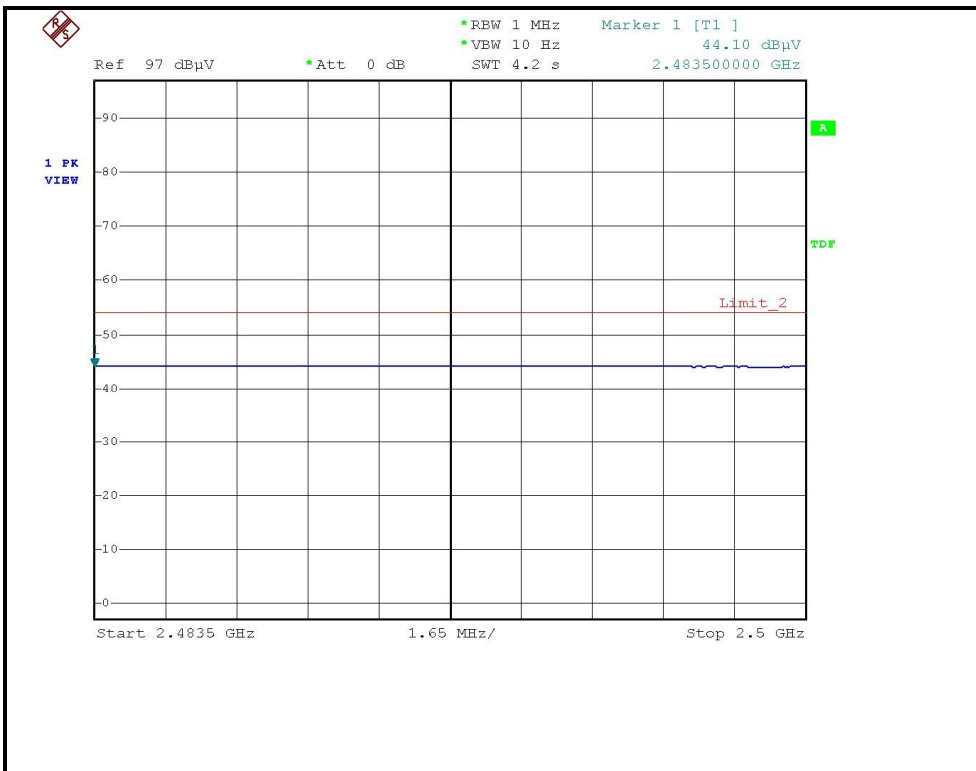
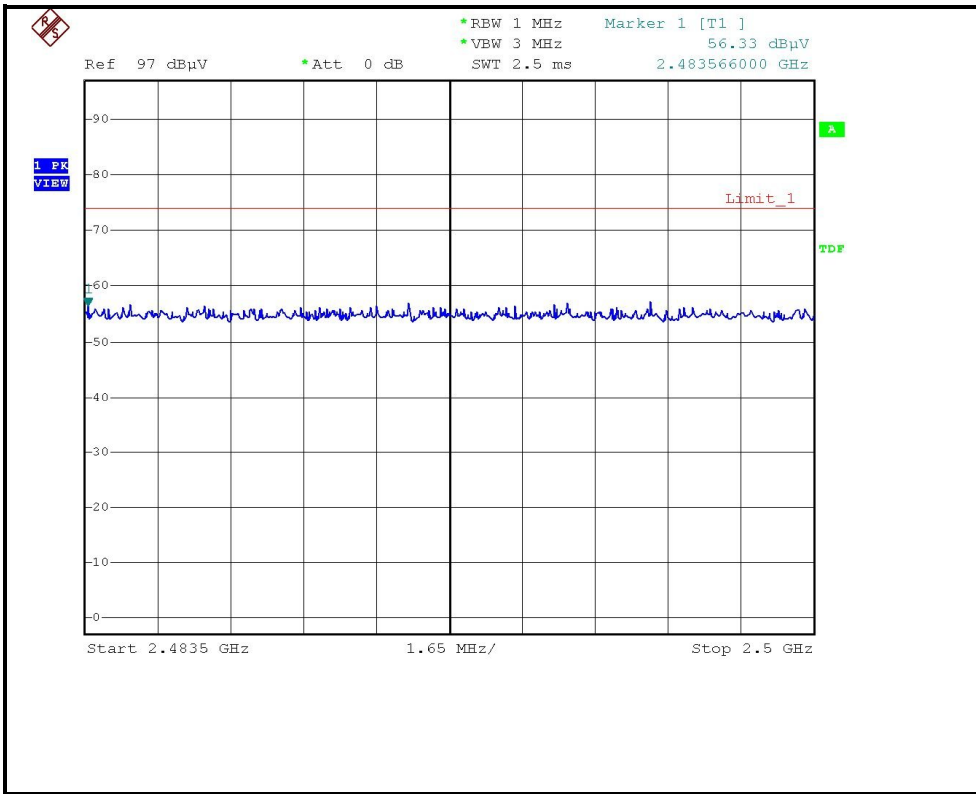
RESTRICTED BANDEDGE (802.11g MODE,CH1, HORIZONTAL )



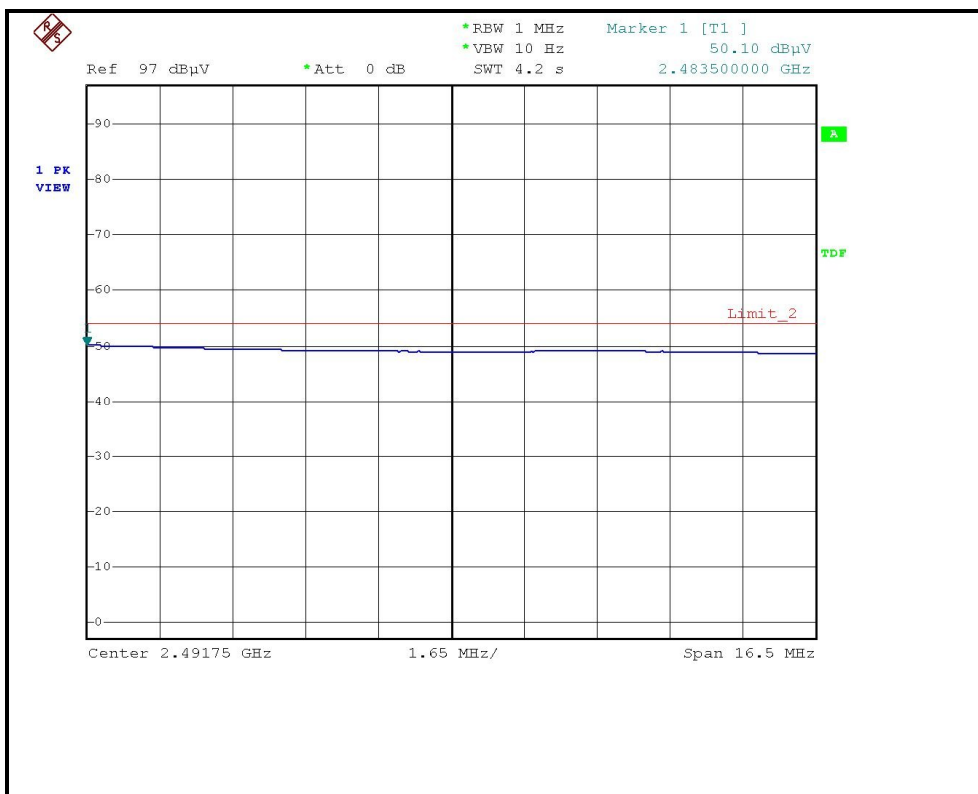
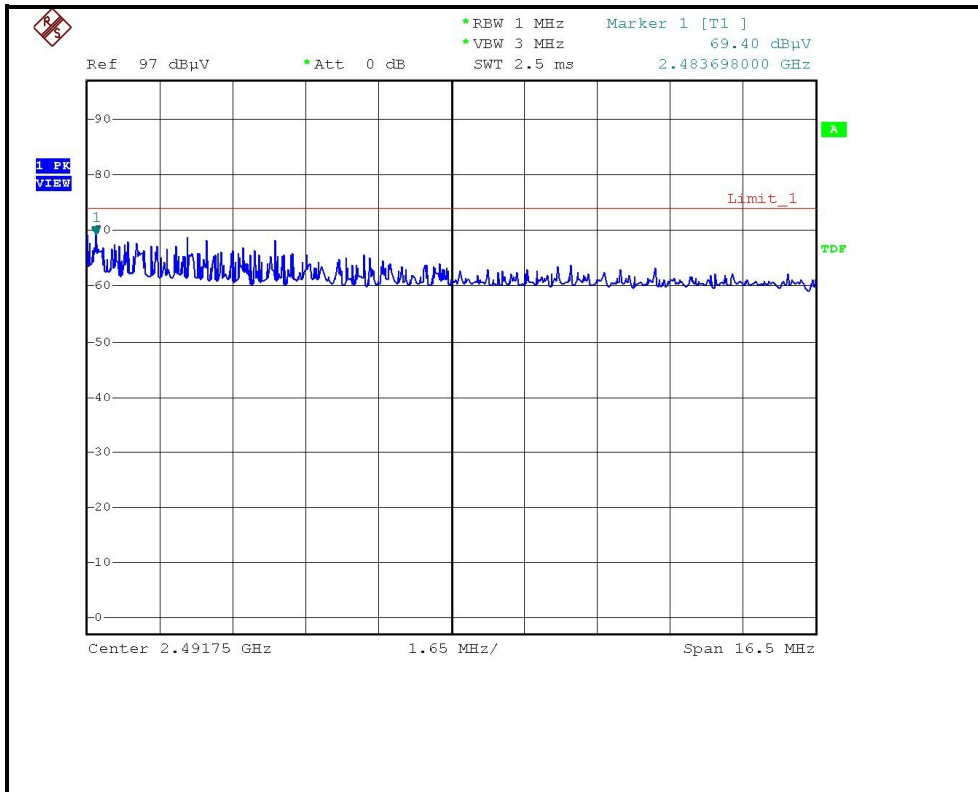
RESTRICTED BANDEDGE (802.11g MODE, CH1, VERTICAL )



RESTRICTED BANDEDGE (802.11g MODE,CH11, HORIZONTAL )



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:**

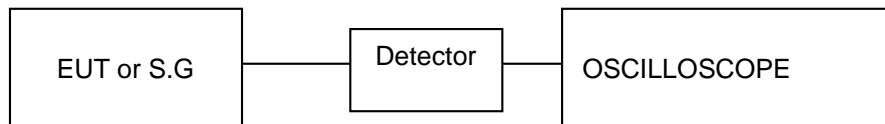
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.



#### 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

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



#### 4.2.6 TEST RESULTS

##### 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>	28deg. C, 62%RH, 956hPa
<b>TESTED BY</b>	Phoenix Huang		

<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	120.226	20.80	30	PASS
6	2437	69.183	18.40	30	PASS
11	2462	63.096	18.00	30	PASS



### 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>	28deg. C, 62%RH, 956hPa
<b>TESTED BY</b>	Phoenix Huang		

<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	95.499	19.80	30	PASS
6	2437	331.131	25.20	30	PASS
11	2462	100.000	20.00	30	PASS

### 4.3 BAND EDGES MEASUREMENT

#### 4.3.1 LIMITS OF BAND EDGES MEASUREMENT

Below  $-20\text{dB}$  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  $\pm 2.6\text{dB}$ , 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.

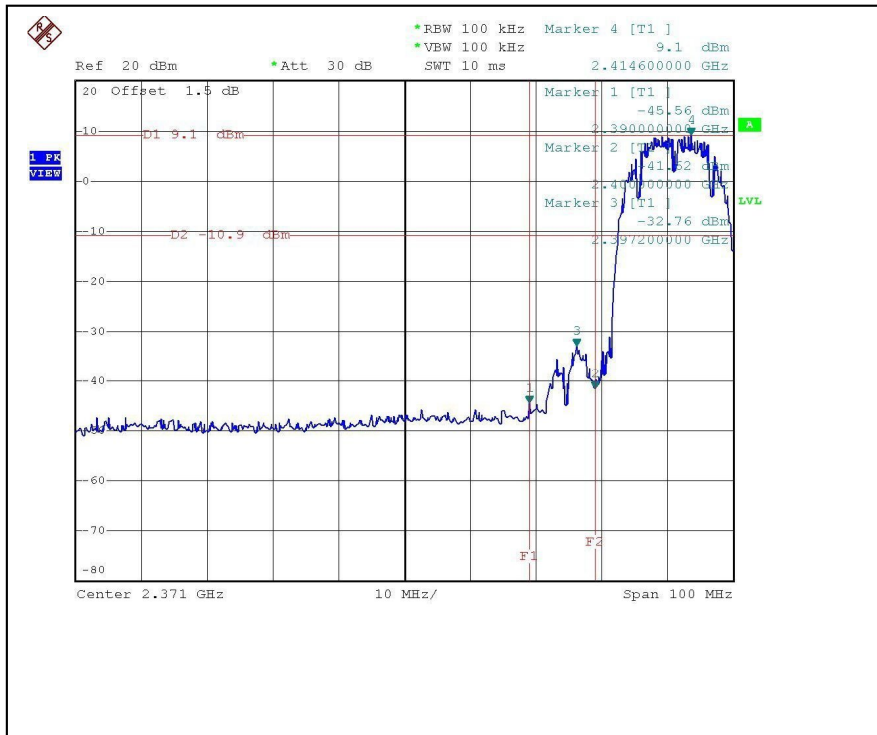
#### 4.3.4 EUT OPERATING CONDITION

Same as Item 4.2.5

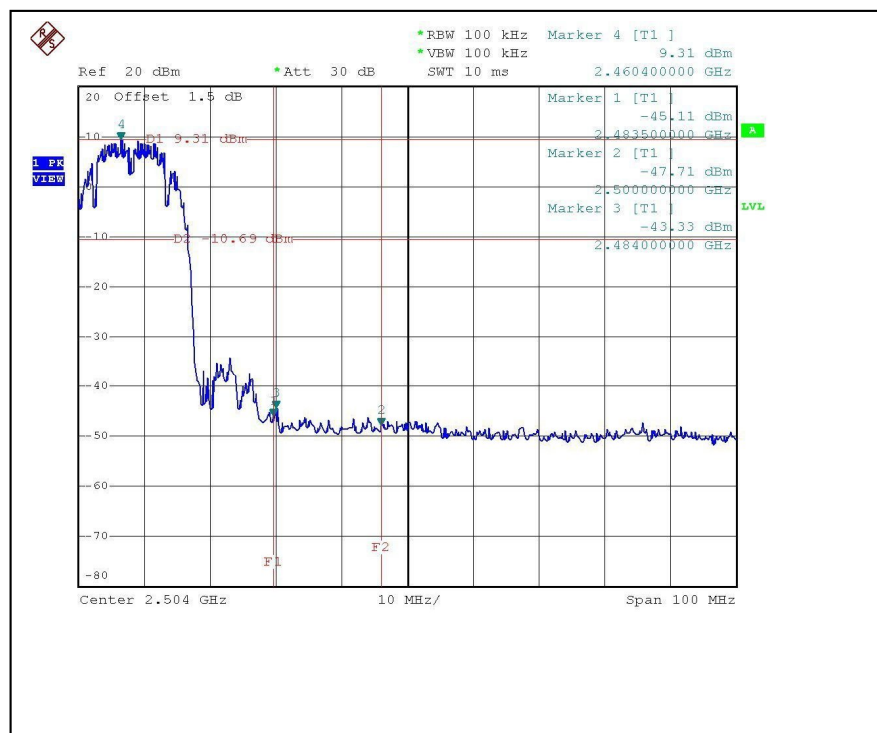
#### 4.3.5 TEST RESULTS

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).

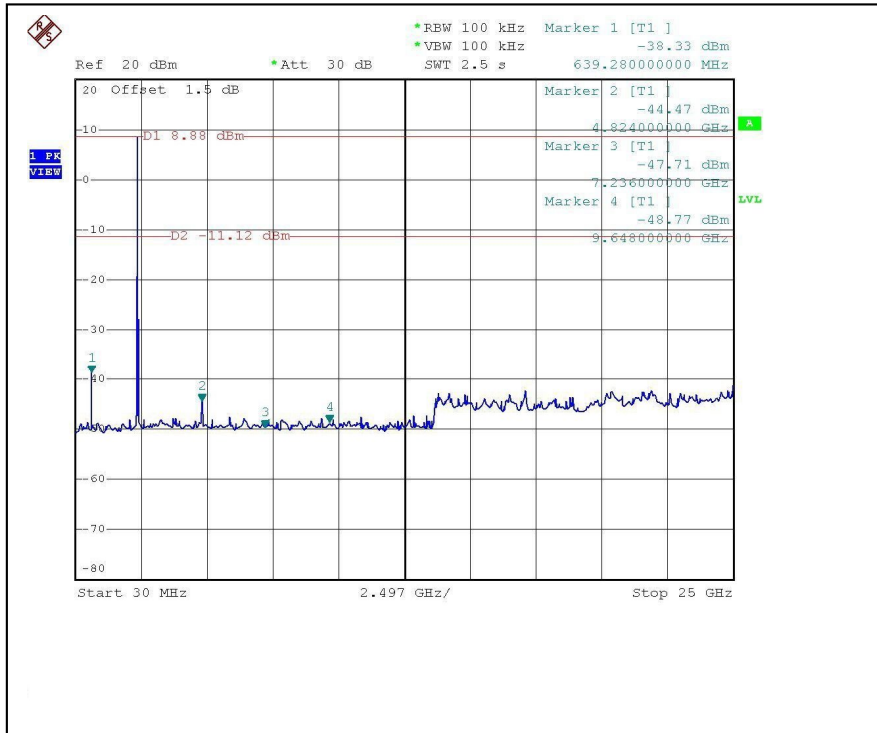
## 802.11b DSSS MODULATION: CH1



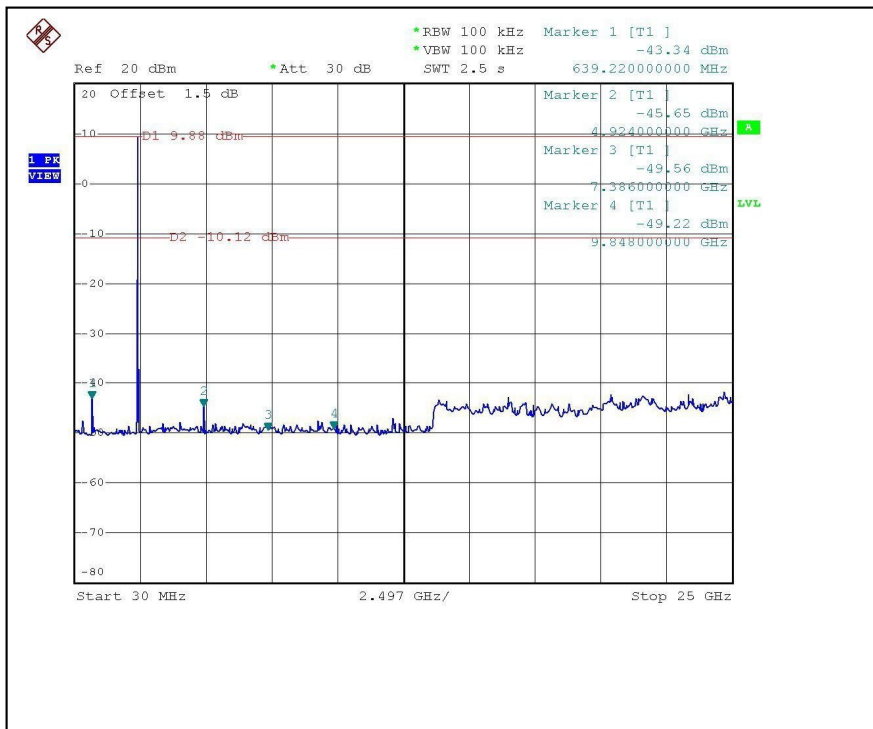
CH11



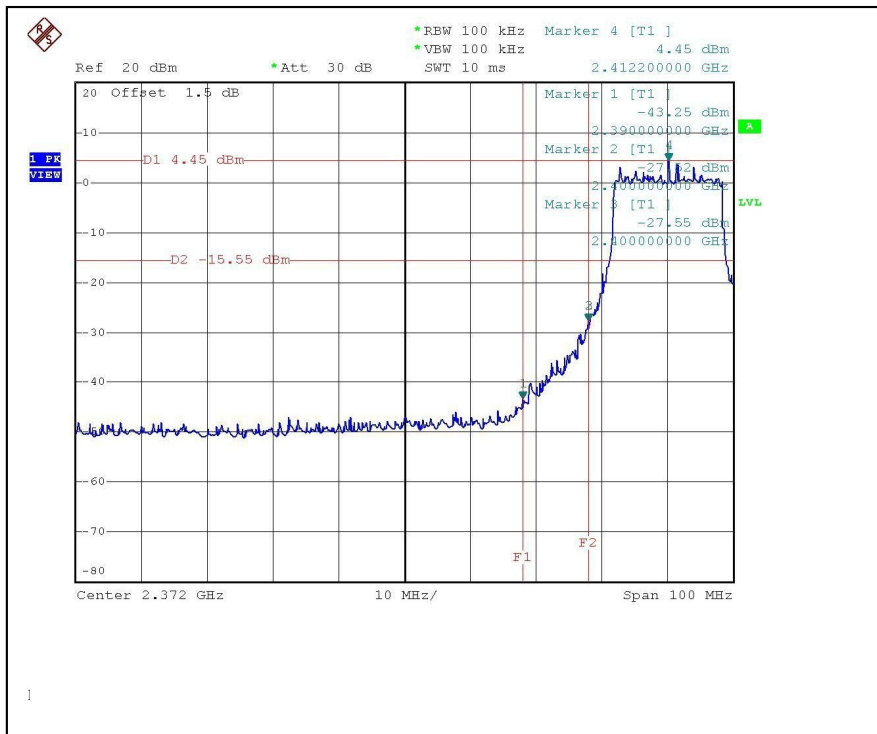
CH1



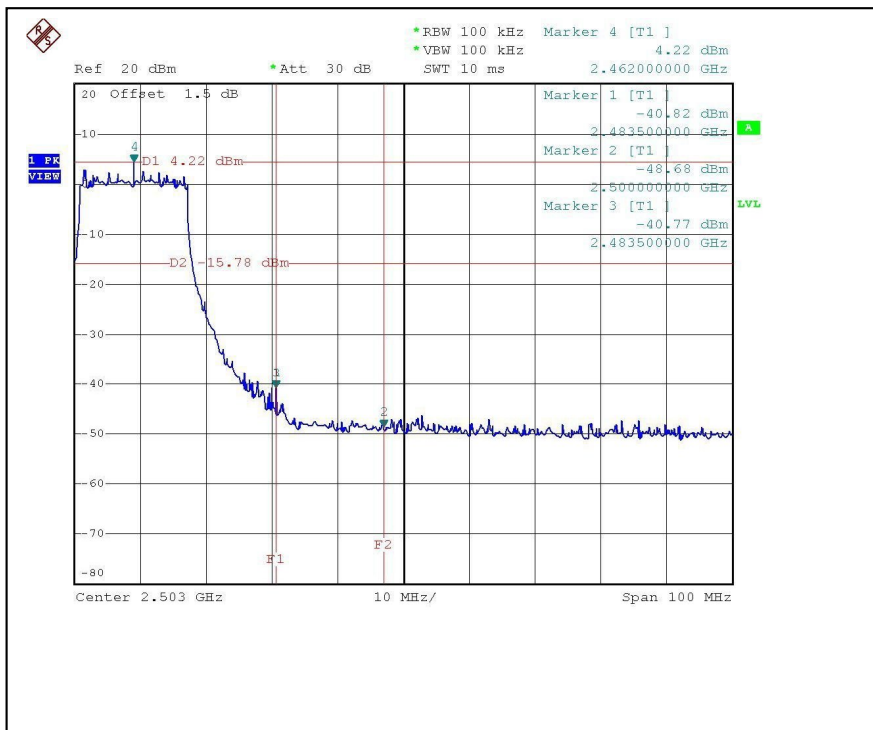
CH11



## 802.11g OFDM MODULATION: CH1

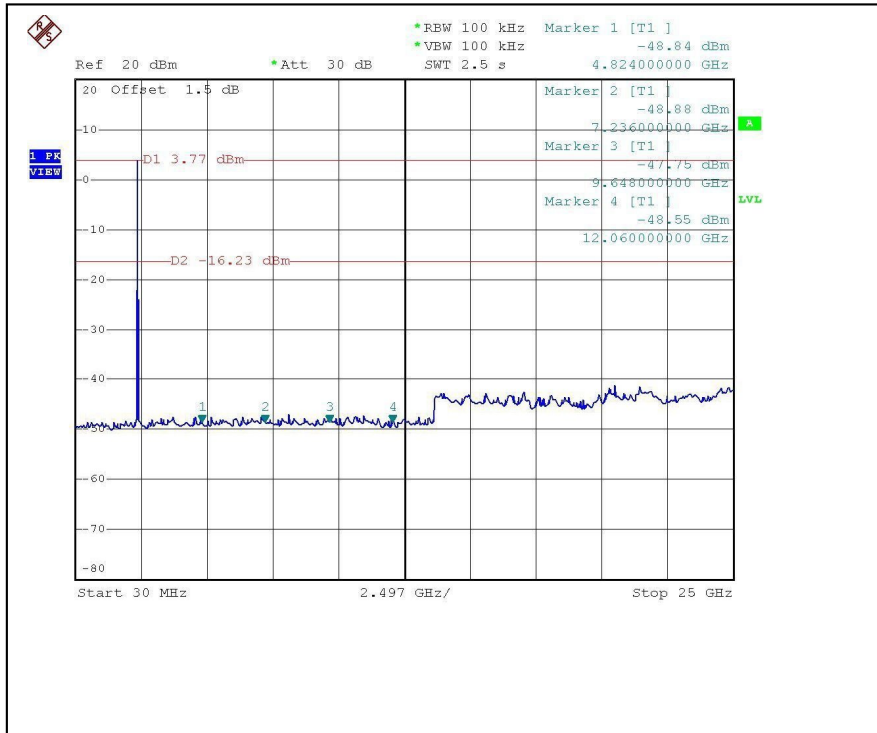


## CH11

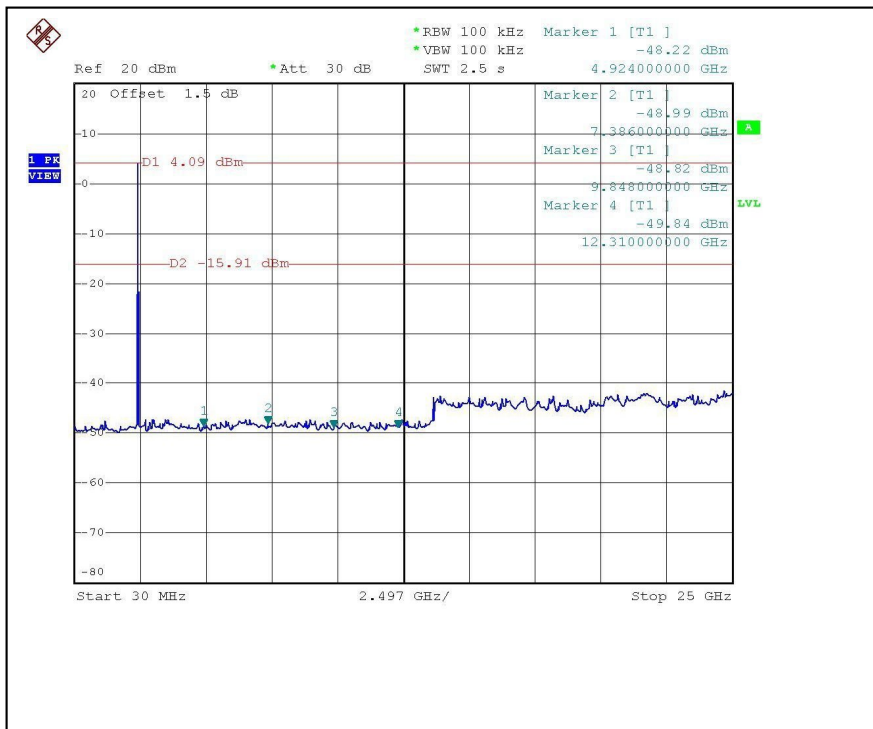




# CH1



# 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

There are two antennas provided to this EUT, please refer to the following table:

No.	Gain (dBi)	Antenna Type	Connector
1	3.74	Dipole	Right-Angle Reverse Polarity SMA
2	2	Chip (only Rx function)	NA



## 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).

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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.