FCC TEST REPORT (WLAN)

REPORT NO.:	RF970909H06
MODEL NO.:	SPA525G
RECEIVED:	Sep. 09, 2008
TESTED:	Oct. 03 to 14, 2008
ISSUED:	Oct. 15, 2008

APPLICANT:	Cisco Systems Inc
ADDRESS:	170 W Tasman Dr, San Jose, CA95134, USA

ISSUED BY:	Advance Data Technology Corporation
LAB LOCATION:	No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien, Taiwan, R.O.C.

Table of Contents

1 CERTIFICATION

PRODUCT :	5-Line IP Phone
BRAND NAME :	cisco
MODEL NO. :	SPA525G
TESTED :	Oct. 03 to 14, 2008
APPLICANT :	Cisco Systems Inc
TEST SAMPLE :	R&D SAMPLE
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.247) ANSI C63.4-2003

The above equipment (Model: SPA525G) 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 : Sunny Wen , **DATE:** *Oct. 15, 2008*
(Sunny Wen, Specialist)

TECHNICAL ACCEPTANCE : , **DATE:** *Oct. 15, 2008*
Responsible for RF
(Hank Chung, Deputy Manager)

APPROVED BY : , **DATE:** *Oct. 15, 2008*
(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**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -21.67 dB at 0.404 MHz
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)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -2.95 dB at 2483.50 MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(d)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit

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:

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

Measurement	**Value**
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.83 dB
Radiated emissions (1GHz -18GHz)	2.28 dB
Radiated emissions (18GHz -40GHz)	2.51 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	5-Line IP Phone
MODEL NO.	SPA525G
FCC ID	LDKSBSPA525G01
POWER SUPPLY	DC 5V from power adapter or PoE
MODULATION TYPE	For WLAN : CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	For Bluetooth : GPSK, DQPSK, 8DPSK
RADIO TECHNOLOGY	For WLAN : DSSS, OFDM
	For Bluetooth : FHSS
TRANSFER RATE	For WLAN : 802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps
	For Bluetooth : 3/2/1 Mbits/s
FREQUENCY RANGE	For WLAN : 2412MHz ~ 2462MHz
	For Bluetooth :2402MHz ~ 2480MHz
NUMBER OF CHANNEL	For WLAN : 13
	For Bluetooth :79
OUTPUT POWER (For WLAN)	802.11b: 98.855mW 802.11g: 190.108mW
OUTPUT POWER (For Bluetooth)	GPSK: 2.028 mW 8DPSK: 1.197 mW
ANTENNA TYPE	For WLAN : PIFA antenna with cable (Antenna Gain : 2.7dBi)
	For Bluetooth : PIFA antenna with cable (Antenna Gain : 3.5dBi)
DATA CABLE	NA
I/O PORT	USB Port x 1, Earphone Port x 1, RJ11 Port x 1, PC Port (RJ45) x 1, WAN Port (RJ45) x 1, RJ9 Port x 1
ASSOCIATED DEVICES	Stand

NOTE:

1. The EUT must be supplied with a power adapter as following:

Brand:	Linksys
Model:	PSM11R-050
Input:	AC 100~240V, 0.3A, 50~60Hz
Output:	DC 5V, 2A, 1.8m / unshielded

2. The EUT was pre-tested in chamber under the following modes:

Pre-test Mode	Description
Mode A	Tower-set (Wall-mounted)
Mode B	**With stand**

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the modes were recorded in this report.

3. The EUT complies with IEEE 802.11g standards, and backwards compatible with IEEE 802.11b products.

4. There are Bluetooth technology and WLAN technology used for the EUT. <the Bluetooth test data please refer "RF970909H06 for Bluetooth">

5. 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: thirteen 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		

EUT is capable of operating on channel 1-13, however, the channel 12 and 13 can't be operated in US band. Because this device is a WiFi client device and US master devices doesn't support channel 12 or 13 operation. Beside, non-US channels have been disabled by firmware in ad-hoc mode.

3.3 TEST MODE APPLICABLITY AND TESTED CHANNEL DETAIL:

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

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)
802.11g	1 to 11	11	OFDM	BPSK	6

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	11	DSSS	DBPSK	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	DBPSK	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	DBPSK	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	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6

3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 5-Line IP Phone. 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

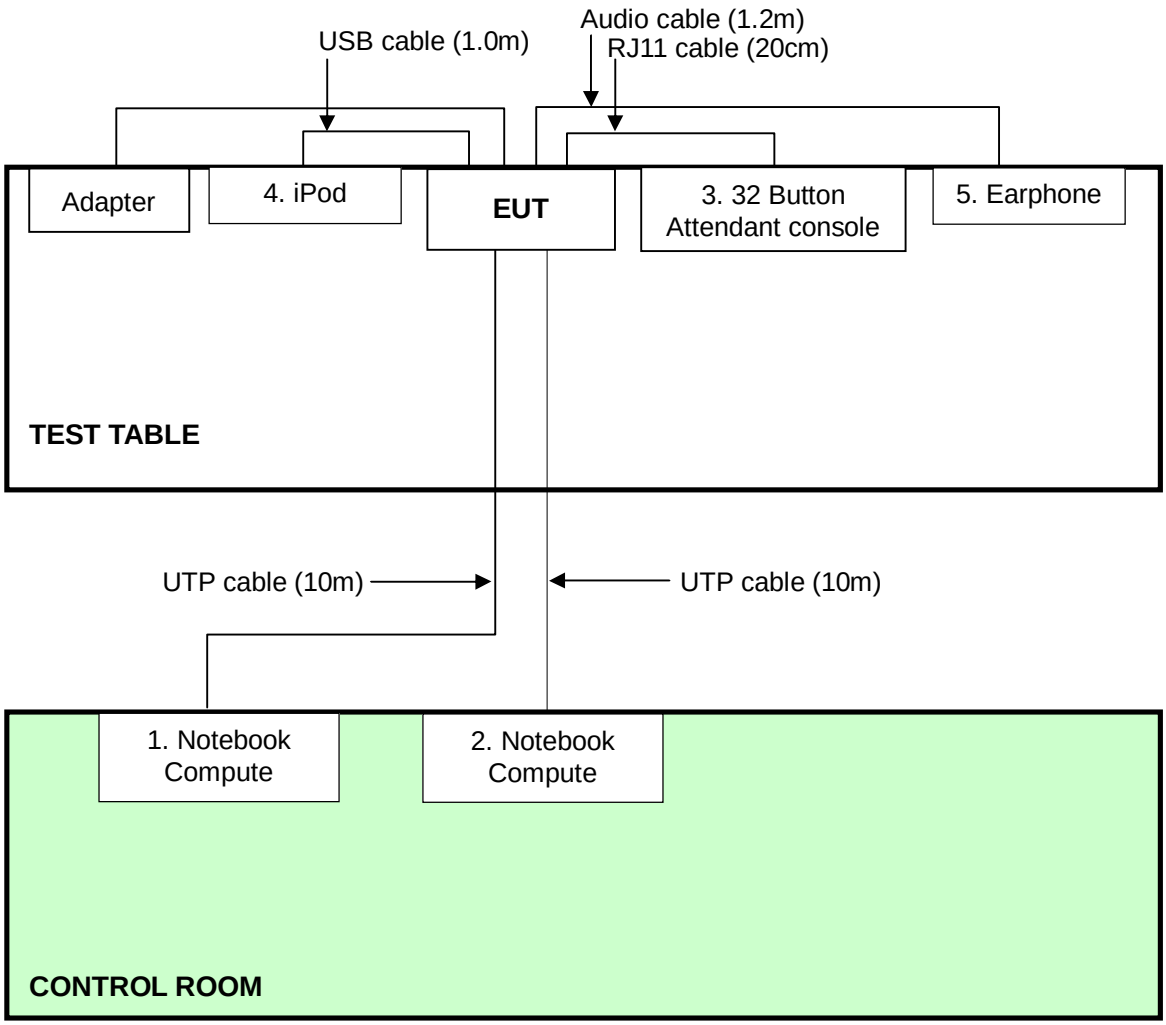
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook Computer	DELL	PP05L	CN-04Y212-48643-38E-0145	DoC
2	Notebook Computer	DELL	PP21L	CN-0GD366-70166-5B3-09ZX	QDS-BRCM1016
3	32 Button Attendant console	Linksys	SPA932	NA	NA
4	iPod	Apple	A1199	6U6426MTVQS	DoC
5	Earphone	PHILIPS	SBC HL145	8710895759472	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	NA
4	1 m shielded cable, terminated with USB connector, w/o core.
5	1.2 m wrapped shielded wire, terminated with 3.5mm phone plug via drain wire, w/o core.

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

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. All emanations from a class 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 11, 2008	Mar. 10, 2009
Line-Impedance Stabilization Network (for EUT)	KNW-407	8-1395-12	May 07, 2008	May 06, 2009
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 13, 2008	June 12, 2009
RF Cable (JYEBAO)	5DFB	COACAB-001	July 24, 2008	July 23, 2009
50 ohms Terminator	50	3	Nov. 16, 2007	Nov. 15, 2008
Software	ADT_Cond_V7.3.2	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 ADT Shielded Room No. A.
3. The VCCI Con A Registration No. is C-817.

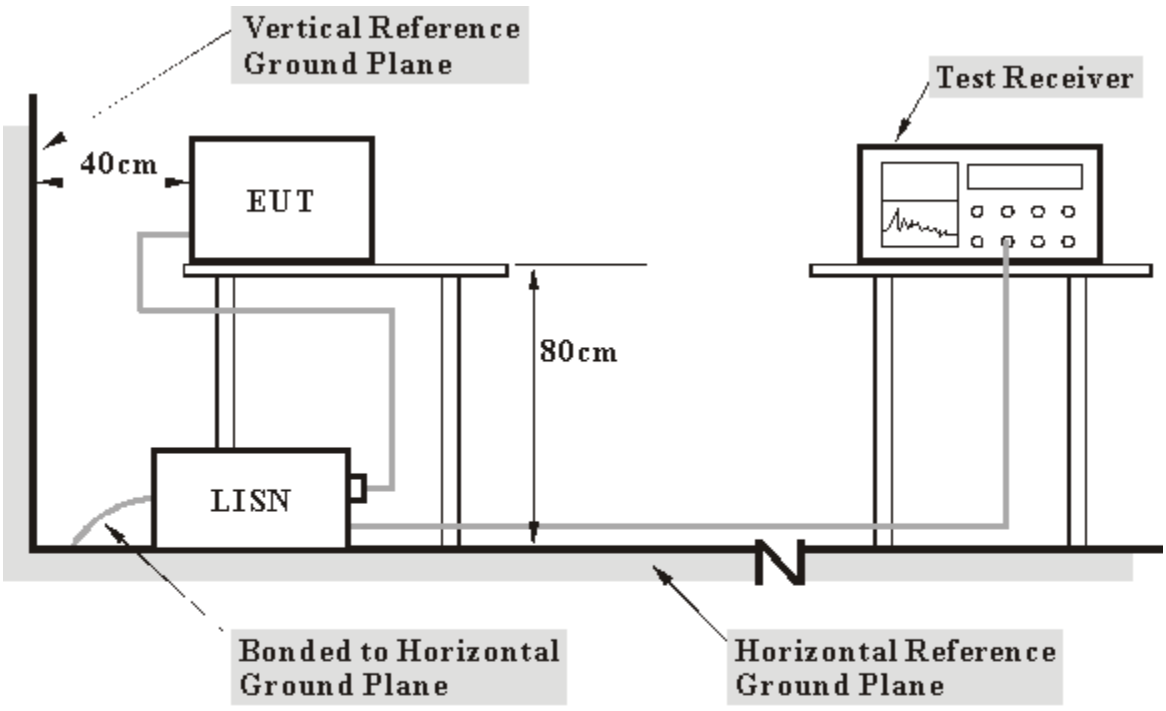
4.1.3 TEST PROCEDURES

a. The EUT/HOST was placed 0.4 meters from the conducting wall of the shielded room with EUT/HOST 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/HOST were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 TEST SETUP



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

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 testing table.

b. Prepared other computer systems (support units 1~2) to act as communication partners and placed them outside of testing area.

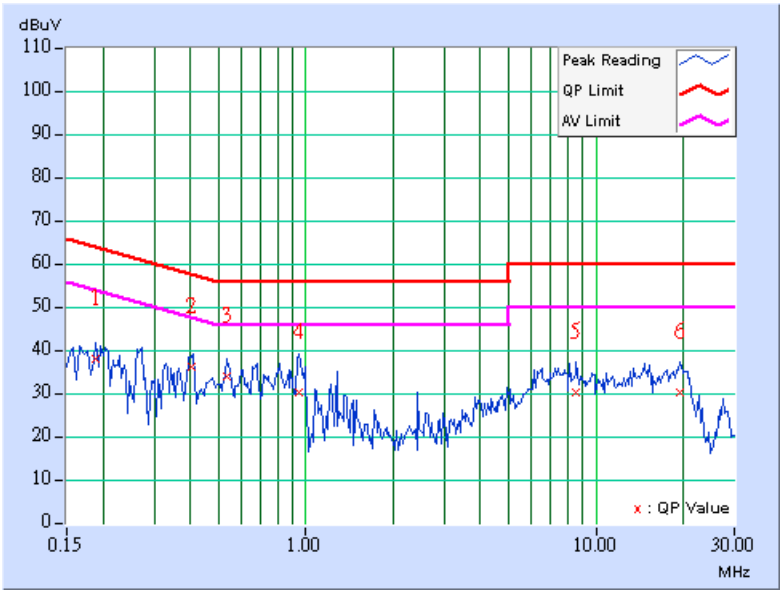
c. The communication partners run test program “Marvell” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.6 TEST RESULTS

INPUT POWER	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
PHASE	Line (L)	**TRANSFER RATE**	6Mbps
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 959hPa	**TESTED BY**	Rex Huang

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.52	37.47	-	37.99	-	64.08	54.08	-26.08	-
2	**0.404**	**0.40**	**35.71**	**-**	**36.11**	**-**	**57.78**	**47.78**	**-21.67**	**-**
3	0.533	0.42	33.29	-	33.71	-	56.00	46.00	-22.29	-
4	0.951	0.46	29.73	-	30.19	-	56.00	46.00	-25.81	-
5	8.547	0.59	29.45	-	30.04	-	60.00	50.00	-29.96	-
6	19.461	0.74	29.71	-	30.45	-	60.00	50.00	-29.55	-

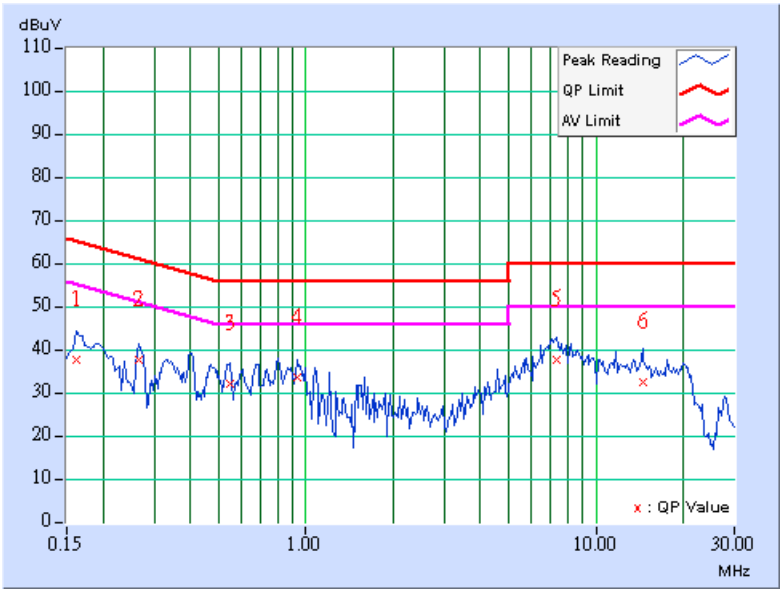
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



INPUT POWER	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
PHASE	Neutral (N)	**TRANSFER RATE**	6Mbps
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 959hPa	**TESTED BY**	Rex Huang

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.33	37.25	-	37.58	-	65.38	55.38	-27.79	-
2	0.267	0.22	37.37	-	37.59	-	61.20	51.20	-23.61	-
3	0.548	0.18	31.63	-	31.81	-	56.00	46.00	-24.19	-
4	0.931	0.22	33.08	-	33.30	-	56.00	46.00	-22.70	-
5	7.363	0.36	37.44	-	37.80	-	60.00	50.00	-22.20	-
6	14.465	0.47	32.26	-	32.73	-	60.00	50.00	-27.27	-

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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 22, 2008	July 21, 2009
HP Pre_Amplifier	8449B	3008A01922	Sep. 25, 2008	Sep. 24, 2009
ROHDE & SCHWARZ Test Receiver	ESCS 30	841977/002	Nov. 13, 2007	Nov. 12, 2008
SCHAFFNER(CHASE) Broadband Antenna	CBL6112B	2798	April 30, 2008	April 29, 2009
Schwarzbeck Horn_Antenna	BBHA9120-D1	D123	Sep. 30, 2008	Sep. 29, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 28, 2008	Jan. 27, 2009
RF Switches	MP59B	6100175593	Aug. 11, 2008	Aug. 10, 2009
RF Cable	8DFB	STBCAB-30M-1GHz	Sep. 02, 2008	Sep. 01, 2009
Software	ADT_Radiated_V7.6.15.8	NA	NA	NA
CHANCE MOST Antenna Tower	AT-100	CM-A007	NA	NA
CHANCE MOST Turn Table	TC-008	CM-T007	NA	NA
CORCOM AC Filter	MRI2030	024/019	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, 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. B.
4. The VCCI Site Registration No. is R-847.
5. The FCC Site Registration No. is 92753.
6. The CANADA Site Registration No. is IC 3789C-2.

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 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.

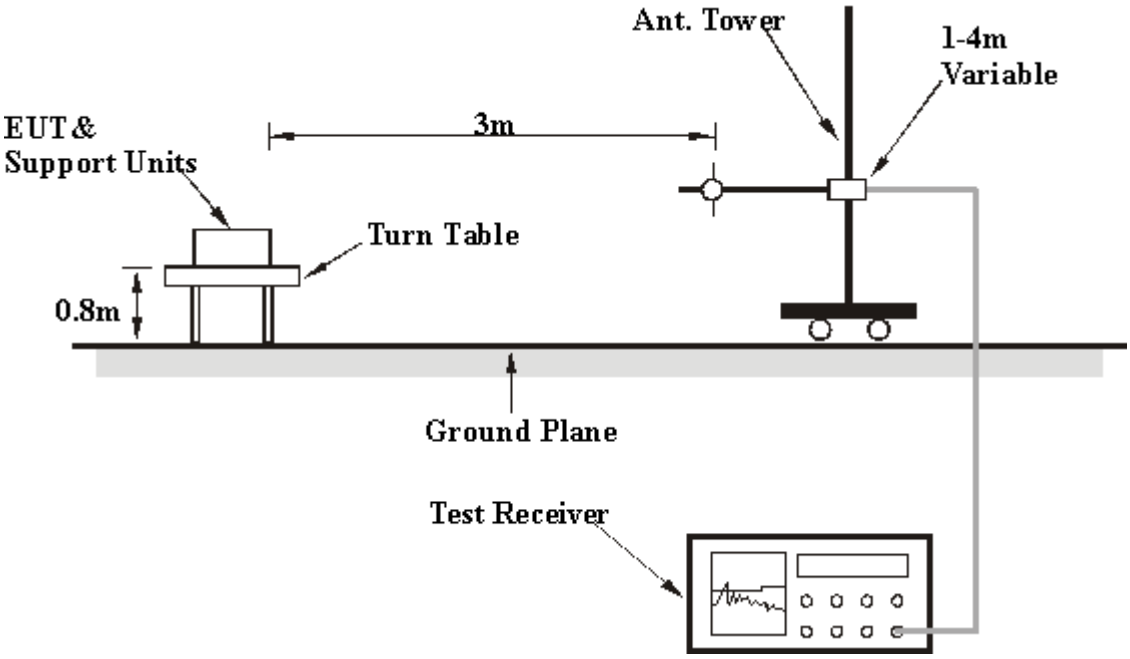
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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 Quasi-peak detection 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.

4.2.4 TEST SETUP



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

4.2.5 EUT OPERATING CONDITIONS

Same as 4.1.5

4.2.6 TEST RESULTS

BELOW 1GHz WORST-CASE DATA：802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	27deg. C, 70%RH 959hPa	TESTED BY	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	71.12	32.15 QP	40.00	-7.85	2.87 H	152	19.31	12.84
2	111.58	27.49 QP	43.50	-16.01	1.52 H	266	15.08	12.41
3	200.00	28.13 QP	43.50	-15.37	1.29 H	241	15.15	12.98
4	250.00	28.21 QP	46.00	-17.79	1.00 H	241	12.79	15.42
5	300.00	34.17 QP	46.00	-11.83	1.00 H	315	17.15	17.02
6	375.00	38.47 QP	46.00	-7.53	1.02 H	15	18.37	20.10
7	500.00	38.12 QP	46.00	-7.88	1.55 H	23	15.46	22.66
8	725.00	36.51 QP	46.00	-9.49	1.19 H	264	8.76	27.75
9	800.00	36.42 QP	46.00	-9.58	1.00 H	54	6.48	29.94
10	825.00	35.11 QP	46.00	-10.89	1.00 H	321	4.92	30.19
11	875.00	34.42 QP	46.00	-11.58	1.00 H	241	3.70	30.72
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	67.45	36.12 QP	40.00	-3.88	1.00 V	312	22.81	13.31
2	120.00	35.46 QP	43.50	-8.04	1.00 V	354	21.63	13.83
3	125.00	31.46 QP	43.50	-12.04	1.00 V	26	17.34	14.12
4	137.51	35.01 QP	43.50	-8.49	1.00 V	246	20.17	14.84
5	200.00	32.15 QP	43.50	-11.35	1.00 V	188	19.17	12.98
6	250.00	34.15 QP	46.00	-11.85	1.00 V	144	18.73	15.42
7	375.00	36.75 QP	46.00	-9.25	1.00 V	22	16.65	20.10
8	500.00	33.52 QP	46.00	-12.48	1.00 V	132	10.86	22.66
9	700.00	31.15 QP	46.00	-14.85	1.53 V	300	4.11	27.04
10	825.00	35.23 QP	46.00	-10.77	1.22 V	5	5.04	30.19
11	875.00	37.11 QP	46.00	-8.89	1.00 V	85	6.39	30.72
12	975.00	41.00 QP	54.00	-13.00	1.00 V	132	8.76	32.24

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.

802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH 959hPa	TESTED BY	Rex 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	58.57 PK	74.00	-15.43	1.27 H	355	28.54	30.03
2	2390.00	45.63 AV	54.00	-8.37	1.27 H	355	15.60	30.03
3	*2412.00	108.50 PK			1.27 H	355	78.38	30.12
4	*2412.00	103.80 AV			1.27 H	355	73.68	30.12
5	4824.00	50.70 PK	74.00	-23.30	1.06 H	177	15.22	35.48
6	4824.00	45.70 AV	54.00	-8.30	1.06 H	177	10.22	35.48
7	#7236.00	51.70 PK	88.50	-36.80	1.00 H	167	10.63	41.07
8	#7236.00	37.90 AV	83.80	-45.90	1.00 H	167	-3.17	41.07
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	58.47 PK	74.00	-15.53	1.04 V	342	28.44	30.03
2	2390.00	46.96 AV	54.00	-7.04	1.04 V	342	16.93	30.03
3	*2412.00	108.50 PK			1.02 V	342	78.38	30.12
4	*2412.00	103.90 AV			1.02 V	342	73.78	30.12
5	4824.00	51.80 PK	74.00	-22.20	1.08 V	321	16.32	35.48
6	4824.00	47.80 AV	54.00	-6.20	1.08 V	321	12.32	35.48
7	#7236.00	51.40 PK	88.50	-37.10	1.20 V	257	10.33	41.07
8	#7236.00	37.70 AV	83.90	-46.20	1.20 V	257	-3.37	41.07

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH 959hPa	TESTED BY	Rex 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	107.40 PK			1.29 H	352	77.19	30.21
2	*2437.00	102.20 AV			1.29 H	352	71.99	30.21
3	4874.00	51.70 PK	74.00	-22.30	1.08 H	177	16.08	35.62
4	4874.00	47.60 AV	54.00	-6.40	1.08 H	177	11.98	35.62
5	7311.00	52.00 PK	74.00	-22.00	1.00 H	161	10.73	41.27
6	7311.00	38.00 AV	54.00	-16.00	1.00 H	161	-3.27	41.27
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	106.30 PK			1.01 V	341	76.09	30.21
2	*2437.00	101.80 AV			1.01 V	341	71.59	30.21
3	4874.00	51.20 PK	74.00	-22.80	1.09 V	322	15.58	35.62
4	4874.00	47.10 AV	54.00	-6.90	1.09 V	322	11.48	35.62
5	7311.00	51.50 PK	74.00	-22.50	1.24 V	314	10.23	41.27
6	7311.00	37.90 AV	54.00	-16.10	1.24 V	314	-3.37	41.27

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH 959hPa	TESTED BY	Rex 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	107.50 PK			1.23 H	352	77.19	30.31
2	*2462.00	102.40 AV			1.23 H	352	72.09	30.31
3	2483.50	58.05 PK	74.00	-15.95	1.23 H	352	27.65	30.40
4	2483.50	45.47 AV	54.00	-8.53	1.23 H	352	15.07	30.40
5	4924.00	52.80 PK	74.00	-21.20	1.02 H	178	17.05	35.75
6	4924.00	48.60 AV	54.00	-5.40	1.02 H	178	12.85	35.75
7	7386.00	52.30 PK	74.00	-21.70	1.00 H	164	10.86	41.44
8	7386.00	38.40 AV	54.00	-15.60	1.00 H	164	-3.04	41.44
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	108.40 PK			1.03 V	340	78.09	30.31
2	*2462.00	103.90 AV			1.03 V	340	73.59	30.31
3	2483.50	59.07 PK	74.00	-14.93	1.00 V	341	28.67	30.40
4	2483.50	46.65 AV	54.00	-7.35	1.00 V	341	16.25	30.40
5	4924.00	52.90 PK	74.00	-21.10	1.04 V	321	17.15	35.75
6	4924.00	49.00 AV	54.00	-5.00	1.04 V	321	13.25	35.75
7	7386.00	51.70 PK	74.00	-22.30	1.23 V	284	10.26	41.44
8	7386.00	38.10 AV	54.00	-15.90	1.23 V	284	-3.34	41.44

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

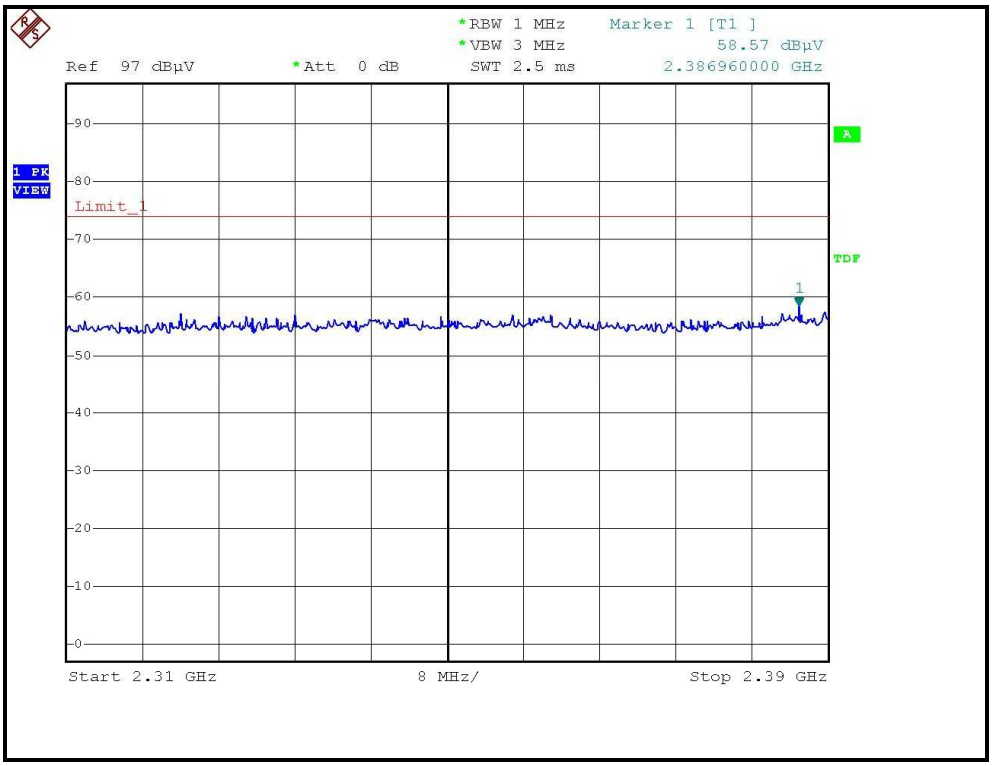
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

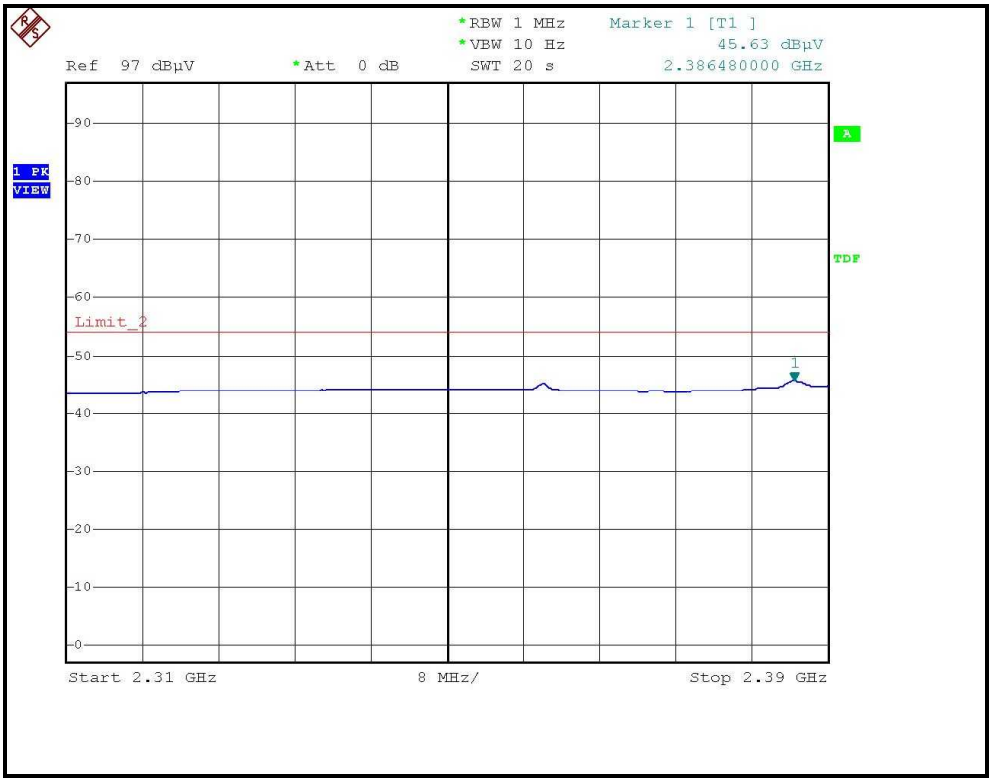
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

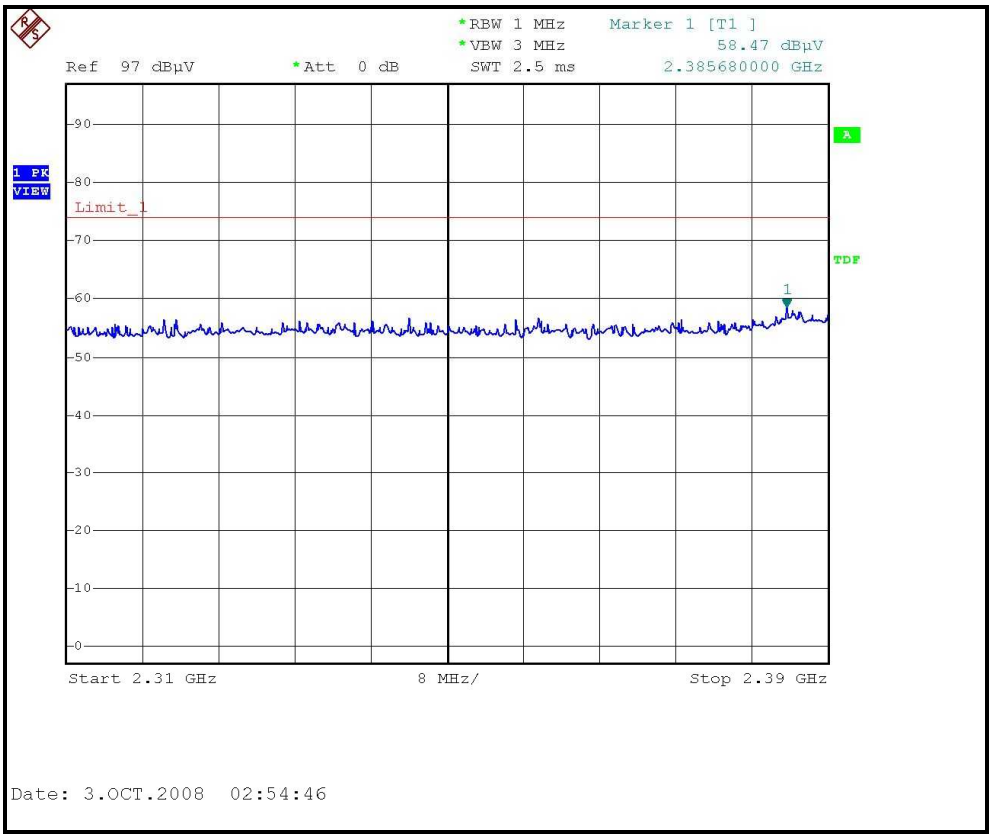
5. " * ": Fundamental frequency.

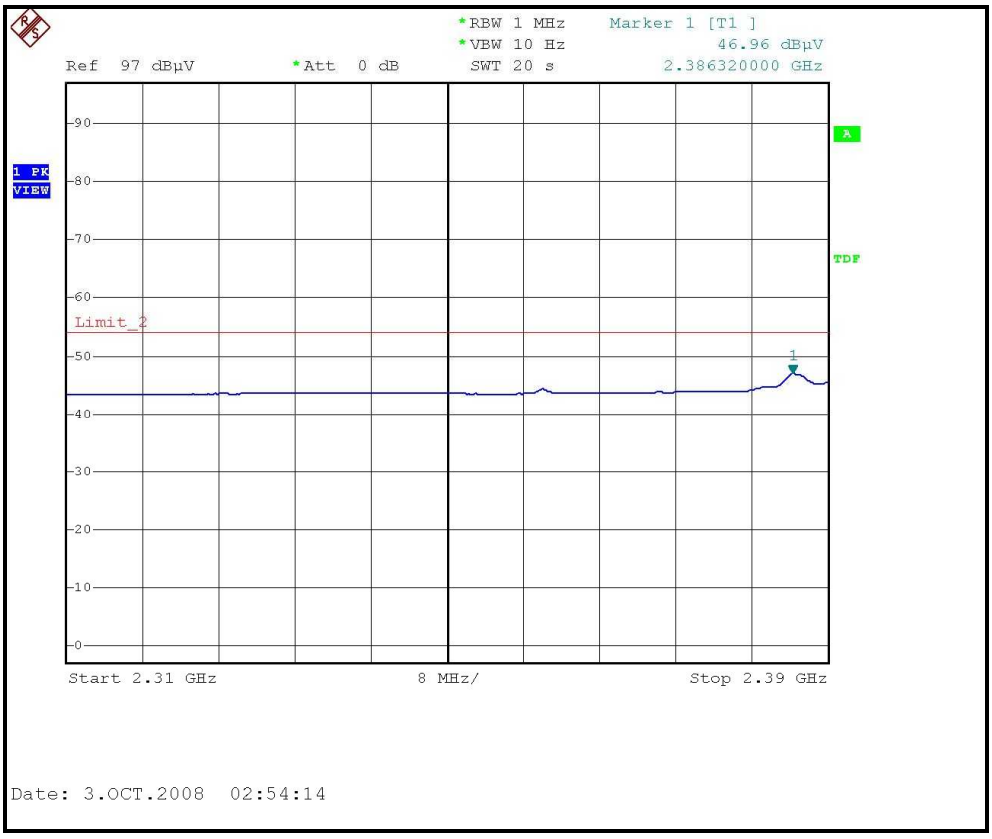
RESTRICTED BANDEDGE (802.11b MODE, CH1, HORIZONTAL)



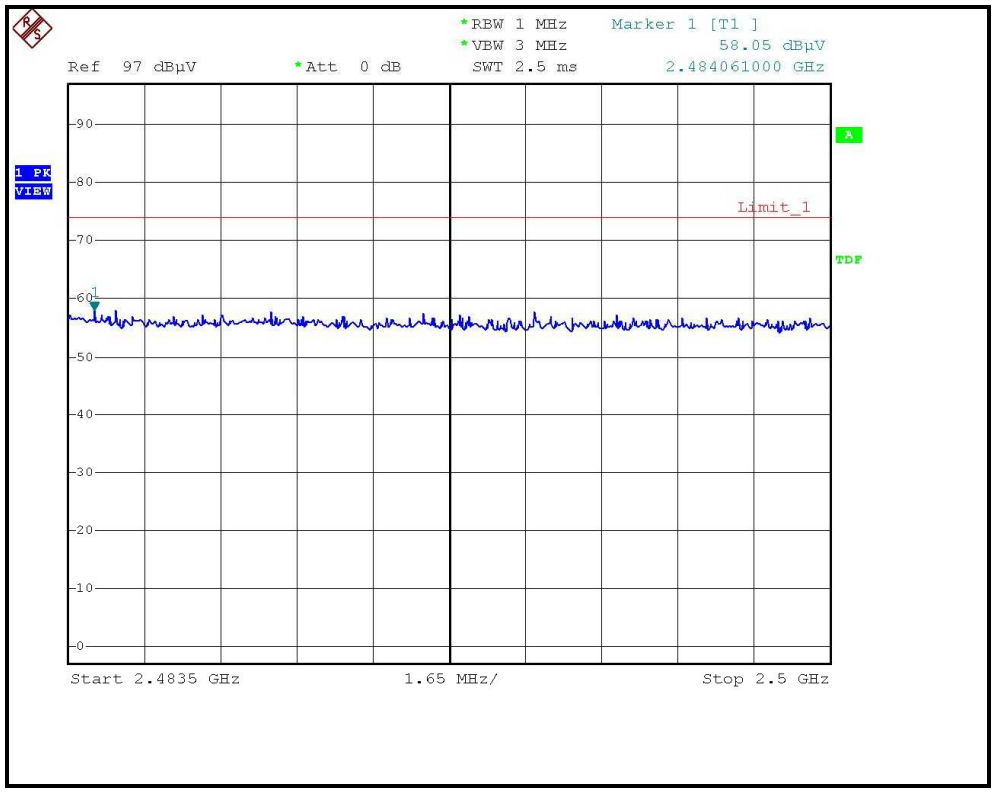


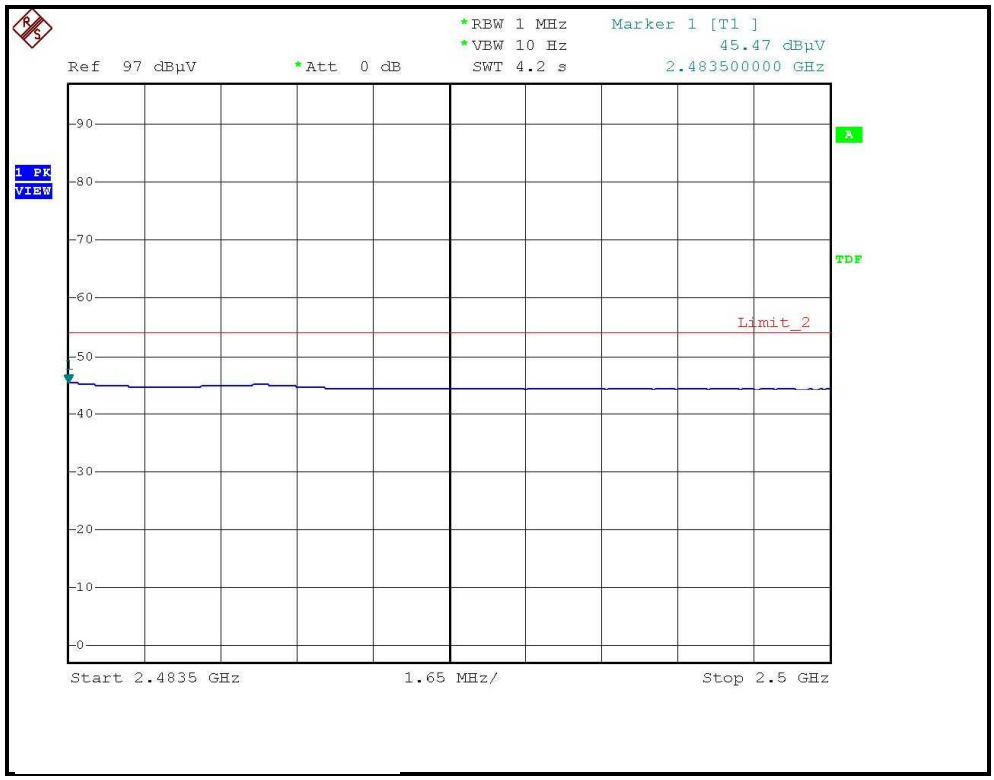
RESTRICTED BANDEDGE (802.11b MODE, CH1, VERTICAL)



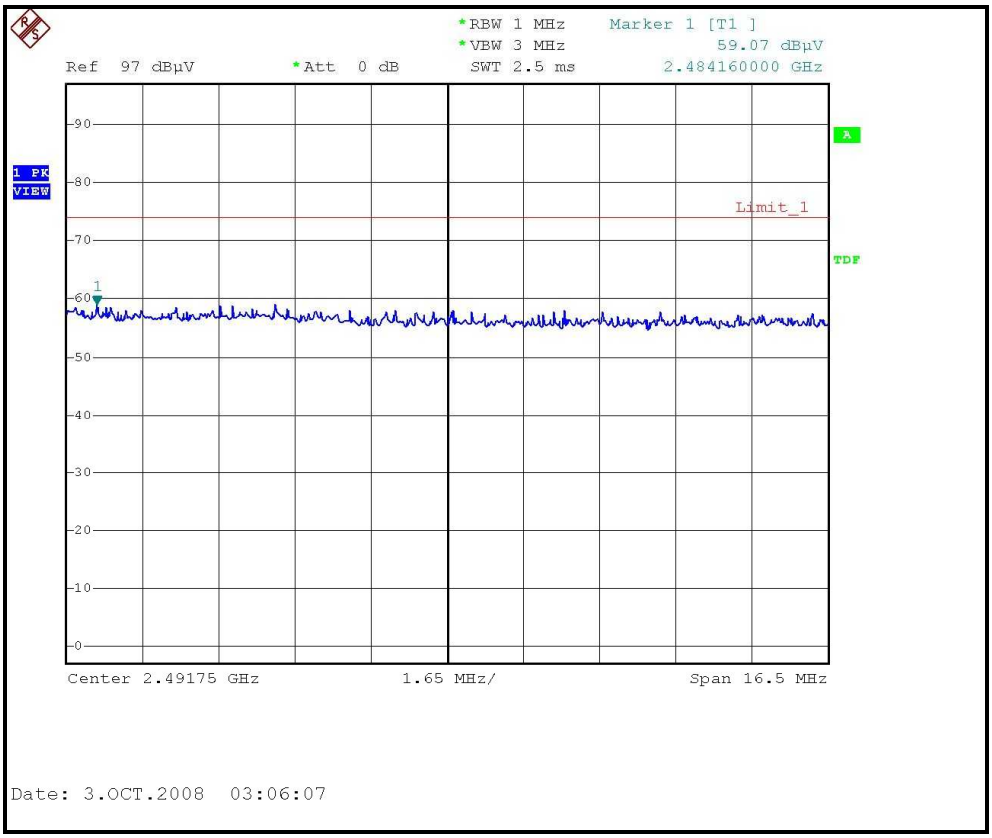


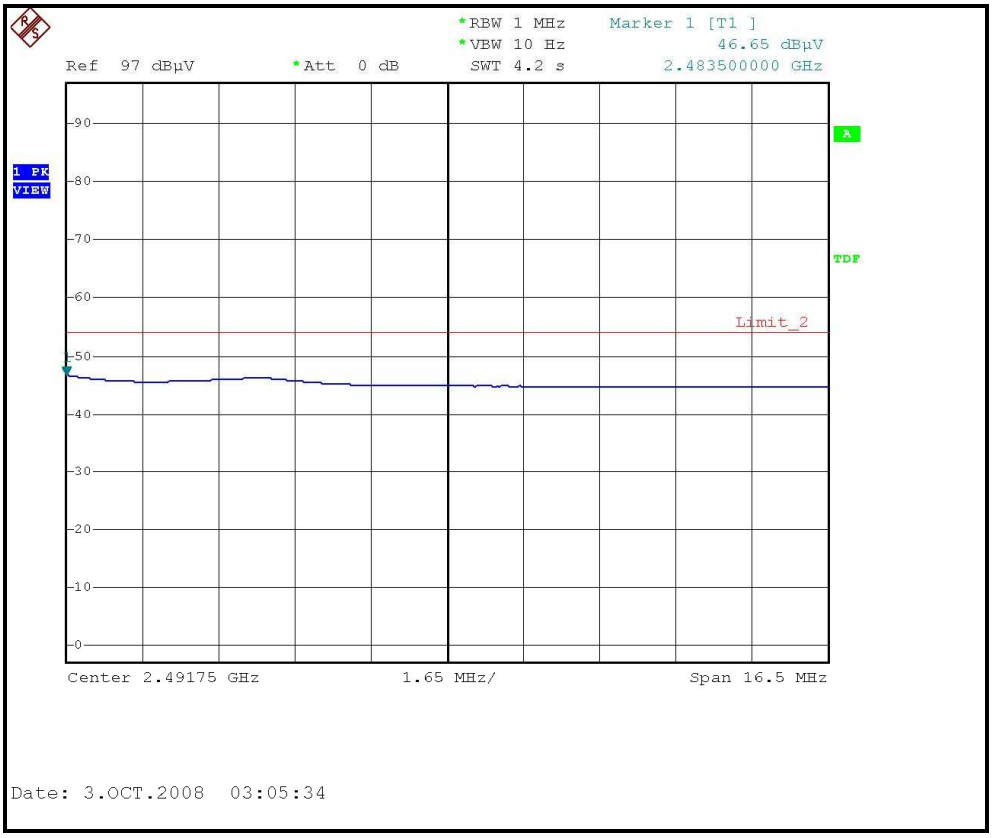
RESTRICTED BANDEDGE (802.11b MODE, CH11, HORIZONTAL)





RESTRICTED BANDEDGE (802.11b MODE, CH11, VERTICAL)





802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH 959hPa	TESTED BY	Rex 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	68.47 PK	74.00	-5.53	1.30 H	357	38.44	30.03
2	2390.00	49.34 AV	54.00	-4.66	1.30 H	357	19.31	30.03
3	*2412.00	108.00 PK			1.26 H	356	77.88	30.12
4	*2412.00	97.30 AV			1.26 H	356	67.18	30.12
5	4824.00	47.10 PK	74.00	-26.90	1.06 H	174	11.62	35.48
6	4824.00	32.90 AV	54.00	-21.10	1.06 H	174	-2.58	35.48
7	#7236.00	51.80 PK	88.00	-36.20	1.00 H	165	10.73	41.07
8	#7236.00	37.80 AV	77.30	-39.50	1.00 H	165	-3.27	41.07
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	65.77 PK	74.00	-8.23	1.04 V	342	35.74	30.03
2	2390.00	48.43 AV	54.00	-5.57	1.04 V	342	18.40	30.03
3	*2412.00	107.40 PK			1.03 V	343	77.28	30.12
4	*2412.00	96.70 AV			1.03 V	343	66.58	30.12
5	4824.00	47.50 PK	74.00	-26.50	1.06 V	326	12.02	35.48
6	4824.00	33.70 AV	54.00	-20.30	1.06 V	326	-1.78	35.48
7	#7236.00	51.10 PK	87.40	-36.30	1.20 V	258	10.03	41.07
8	#7236.00	37.50 AV	76.70	-39.20	1.20 V	258	-3.57	41.07

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH 959hPa	TESTED BY	Rex 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	106.69 PK			1.28 H	351	76.48	30.21
2	*2437.00	95.60 AV			1.28 H	351	65.39	30.21
3	4874.00	48.80 PK	74.00	-25.20	1.08 H	174	13.18	35.62
4	4874.00	34.20 AV	54.00	-19.80	1.08 H	174	-1.42	35.62
5	7311.00	52.20 PK	74.00	-21.80	1.00 H	162	10.93	41.27
6	7311.00	38.10 AV	54.00	-15.90	1.00 H	162	-3.17	41.27
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	106.40 PK			1.06 V	341	76.19	30.21
2	*2437.00	96.00 AV			1.06 V	341	65.79	30.21
3	4874.00	47.70 PK	74.00	-26.30	1.08 V	330	12.08	35.62
4	4874.00	34.10 AV	54.00	-19.90	1.08 V	330	-1.52	35.62
5	7311.00	51.20 PK	74.00	-22.80	1.21 V	295	9.93	41.27
6	7311.00	37.60 AV	54.00	-16.40	1.21 V	295	-3.67	41.27

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH 959hPa	TESTED BY	Rex 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	106.80 PK			1.24 H	353	76.49	30.31
2	*2462.00	96.20 AV			1.24 H	353	65.89	30.31
3	2483.50	66.10 PK	74.00	-7.90	1.23 H	354	35.70	30.40
4	2483.50	49.45 AV	54.00	-4.55	1.23 H	354	19.05	30.40
5	4924.00	48.20 PK	74.00	-25.80	1.03 H	179	12.45	35.75
6	4924.00	34.60 AV	54.00	-19.40	1.03 H	179	-1.15	35.75
7	7386.00	52.10 PK	74.00	-21.90	1.00 H	165	10.66	41.44
8	7386.00	38.20 AV	54.00	-15.80	1.00 H	165	-3.24	41.44
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	107.20 PK			1.03 V	341	76.89	30.31
2	*2462.00	97.20 AV			1.03 V	341	66.89	30.31
3	2483.50	68.84 PK	74.00	-5.16	1.00 V	341	38.44	30.40
4	**2483.50**	**51.05 AV**	**54.00**	**-2.95**	**1.00 V**	**341**	**20.65**	**30.40**
5	4924.00	48.60 PK	74.00	-25.40	1.04 V	329	12.85	35.75
6	4924.00	35.20 AV	54.00	-18.80	1.04 V	329	-0.55	35.75
7	7386.00	51.40 PK	74.00	-22.60	1.25 V	276	9.96	41.44
8	7386.00	37.00 AV	54.00	-17.00	1.25 V	276	-4.44	41.44

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

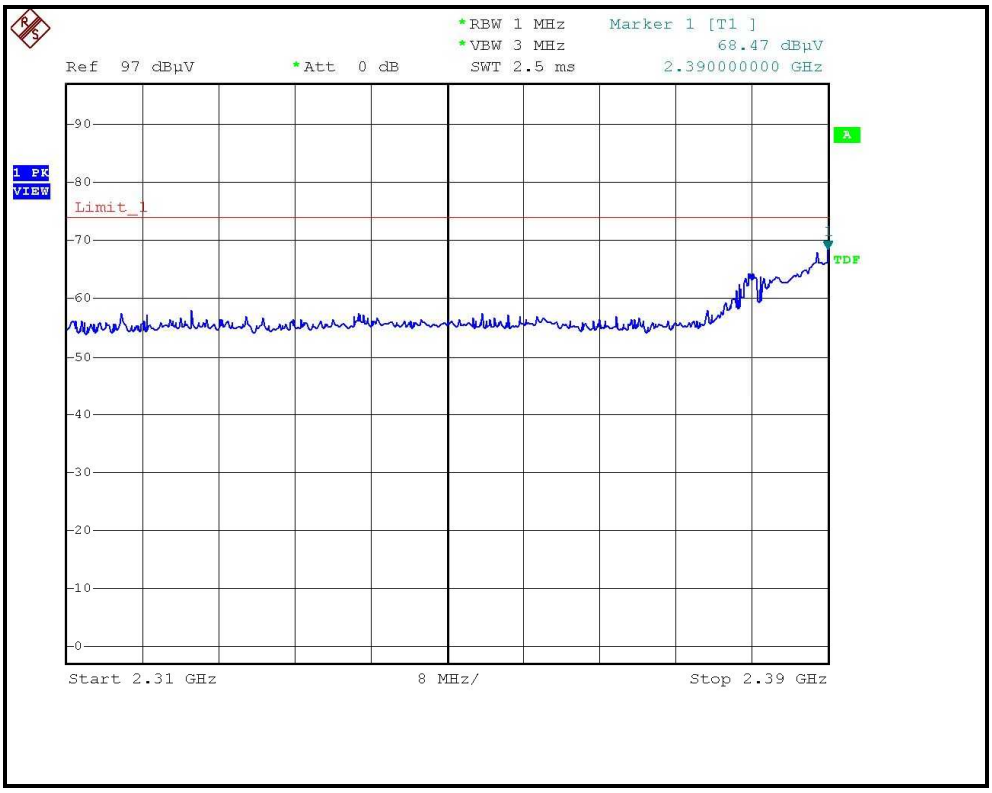
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

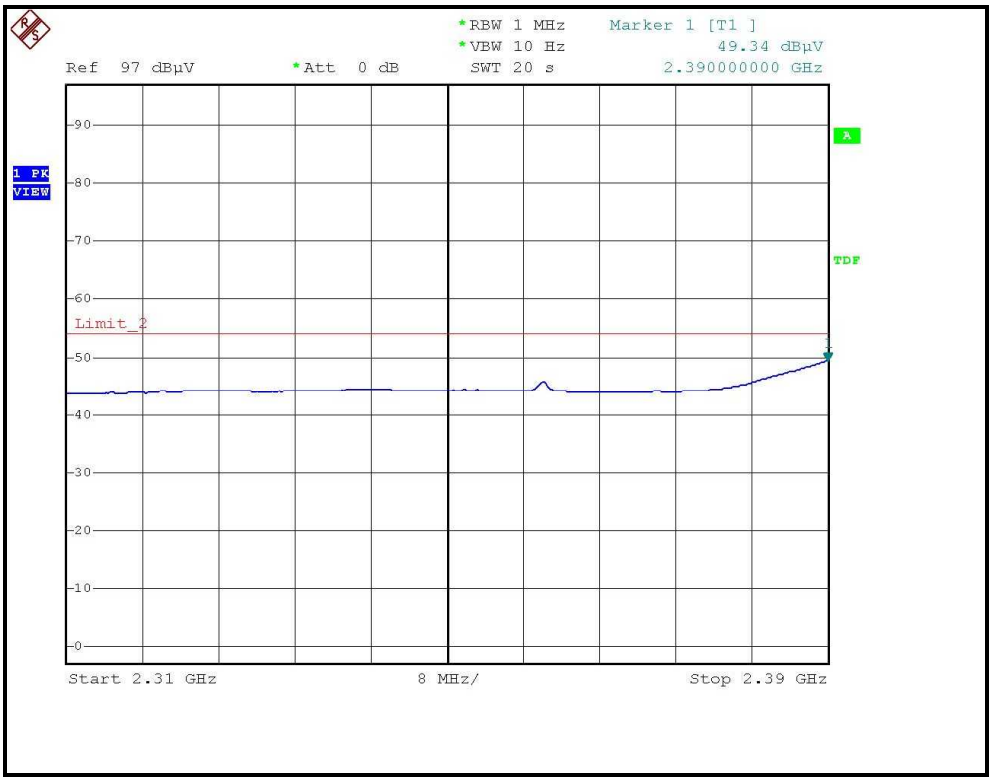
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

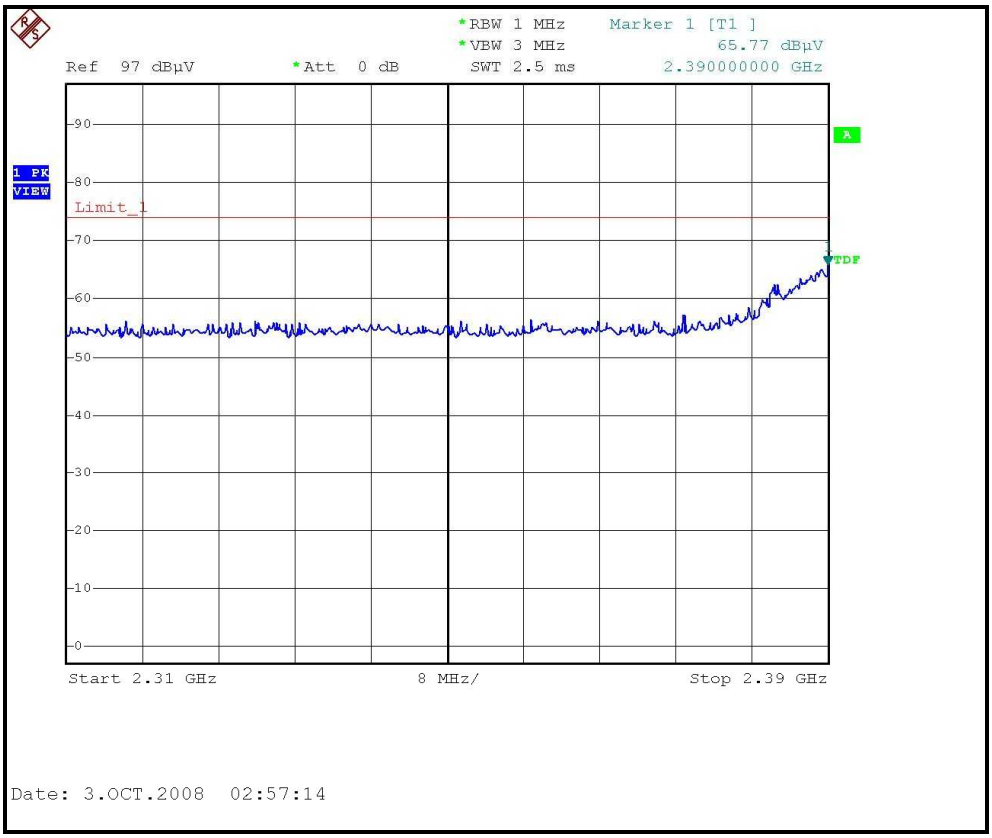
5. " * ": Fundamental frequency.

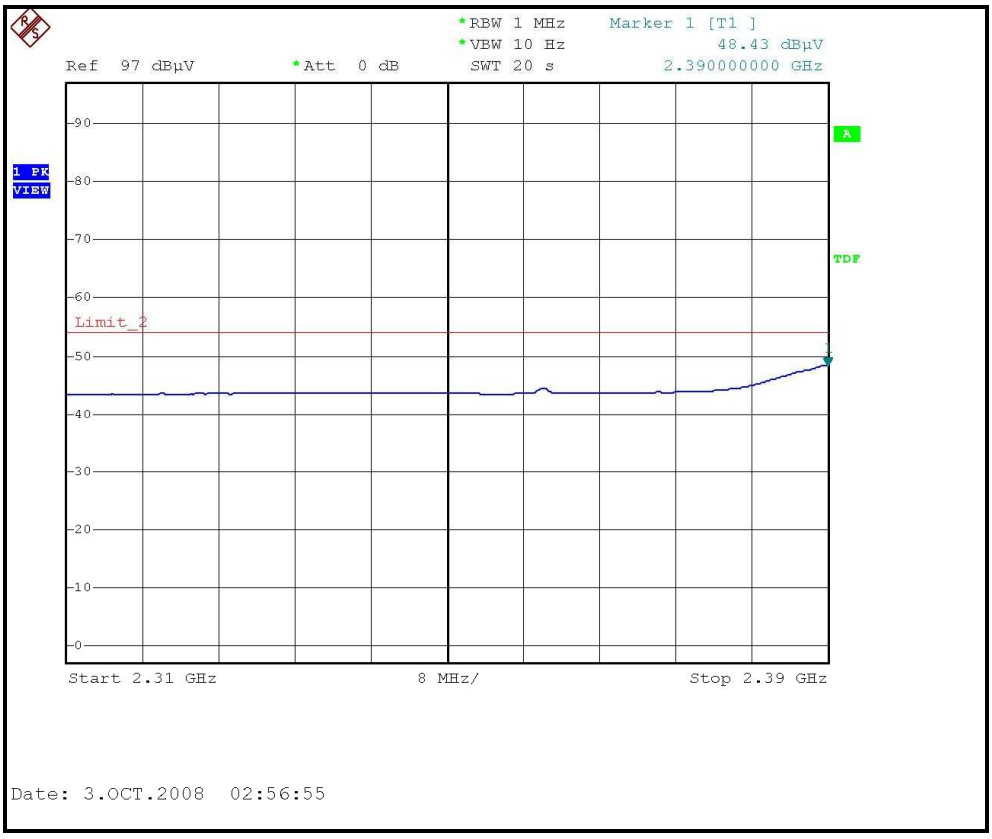
RESTRICTED BANDEDGE (802.11g MODE, CH1, HORIZONTAL)



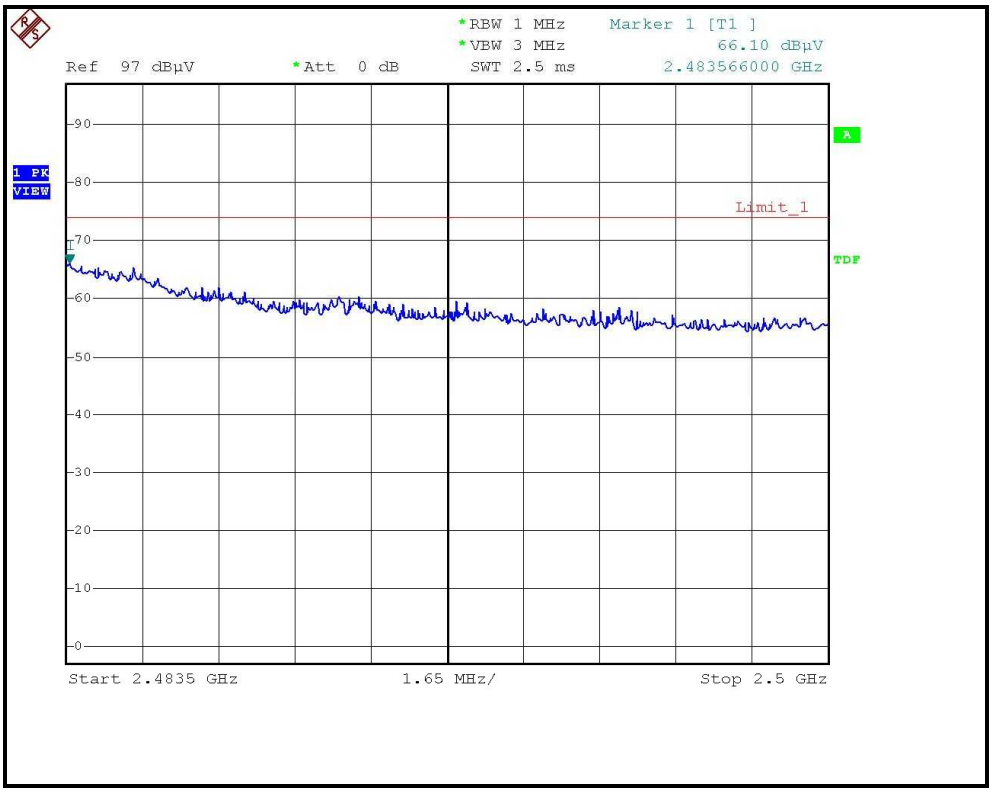


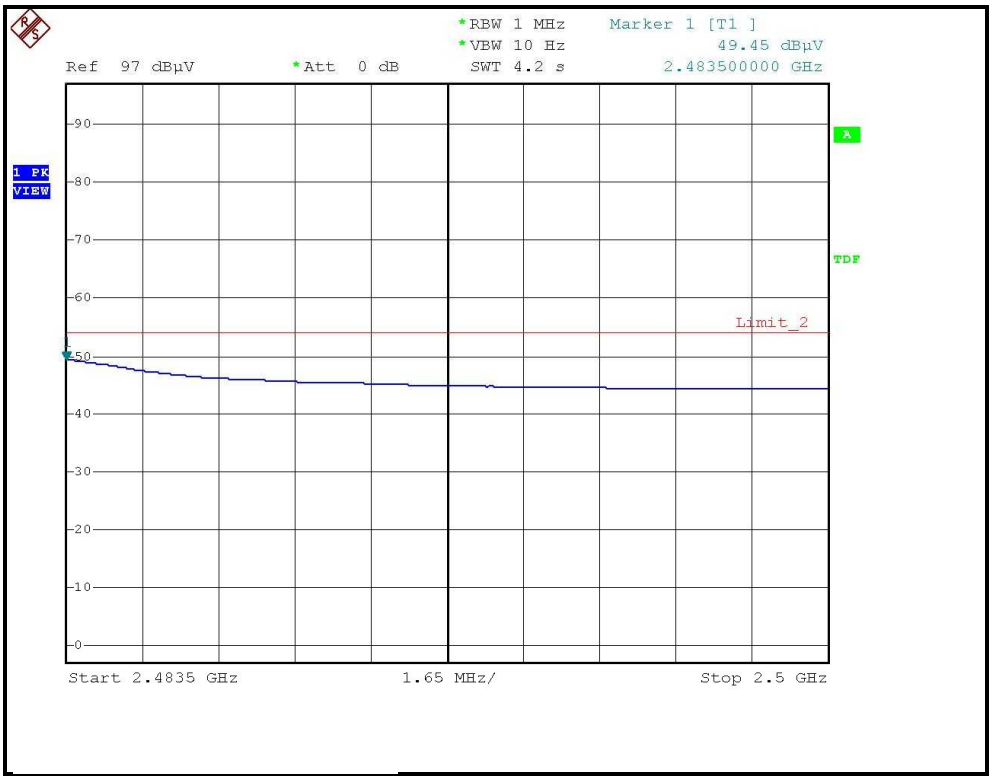
RESTRICTED BANDEDGE (802.11g MODE, CH1, VERTICAL)



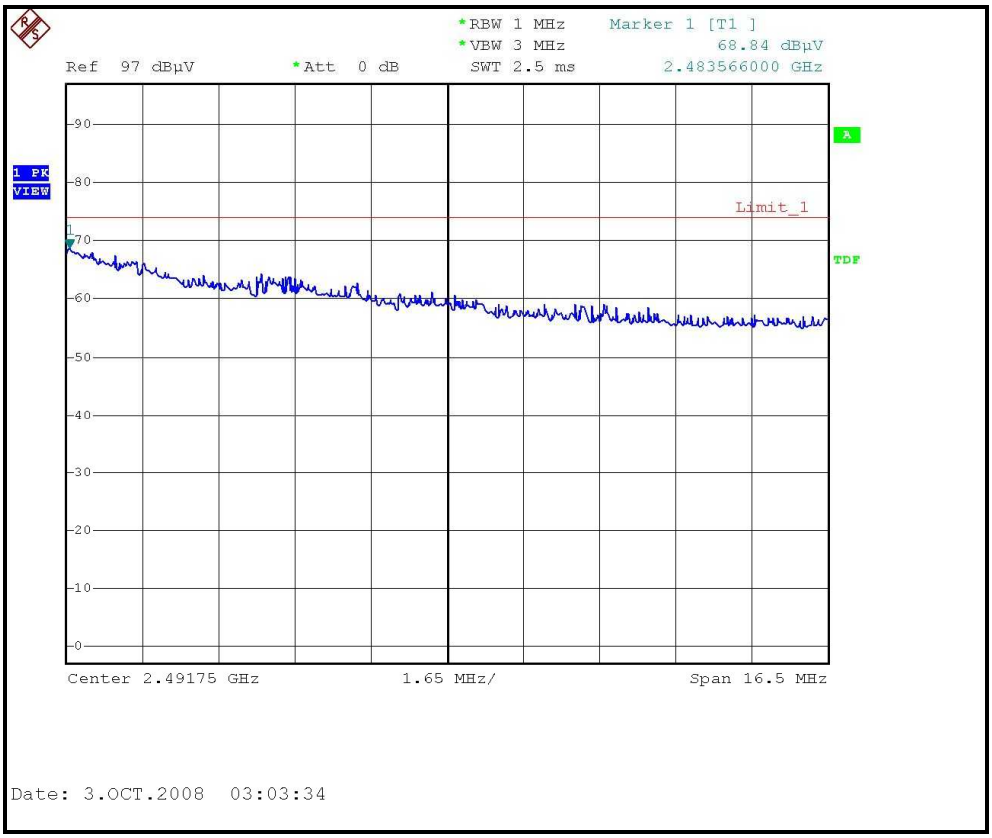


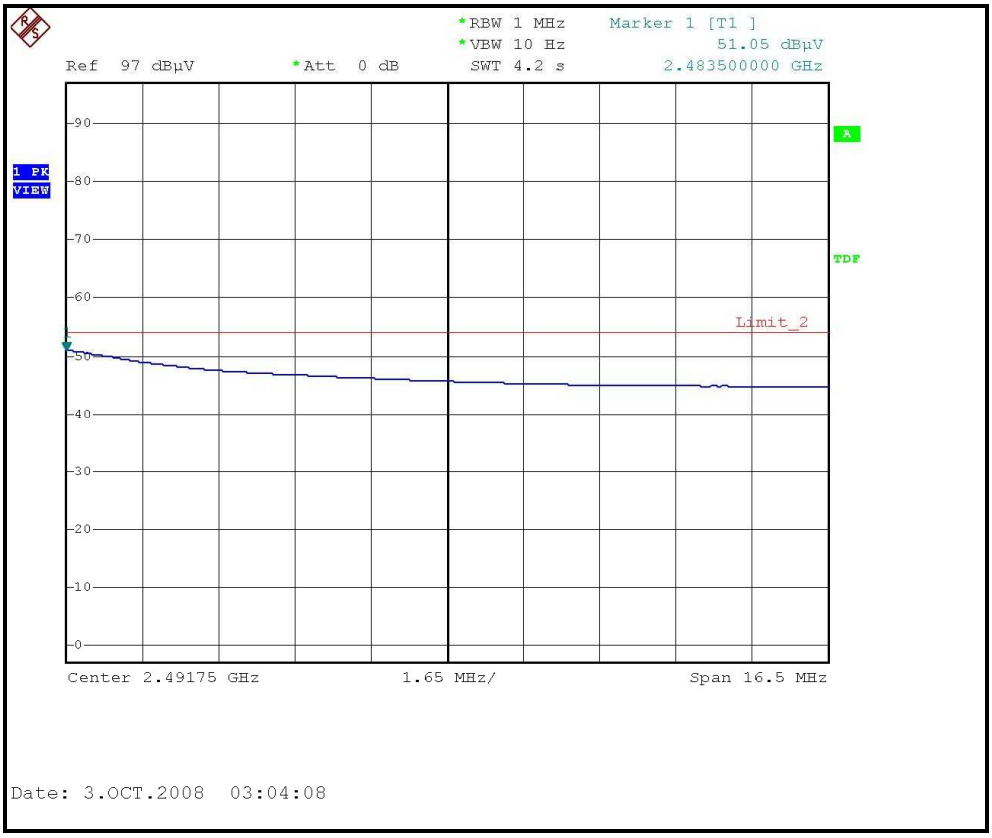
RESTRICTED BANDEDGE (802.11g MODE, CH11, HORIZONTAL)





RESTRICTED BANDEDGE (802.11g MODE, CH11, VERTICAL)





4.3 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, 2007	Dec. 17, 2008

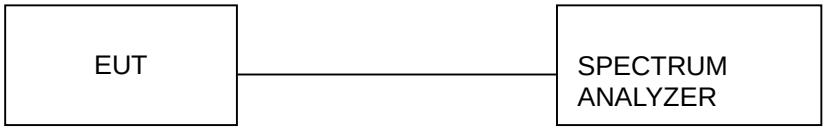
NOTE:

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

4.3.4 TEST SETUP



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

4.3.5 EUT OPERATING CONDITIONS

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

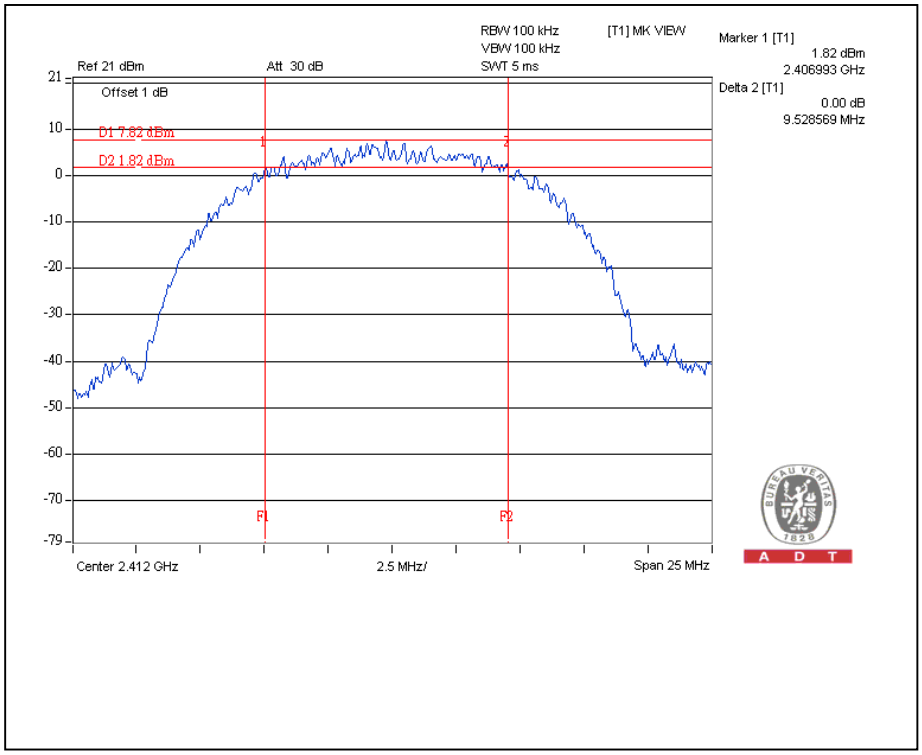
4.3.6 TEST RESULTS

802.11b DSSS modulation

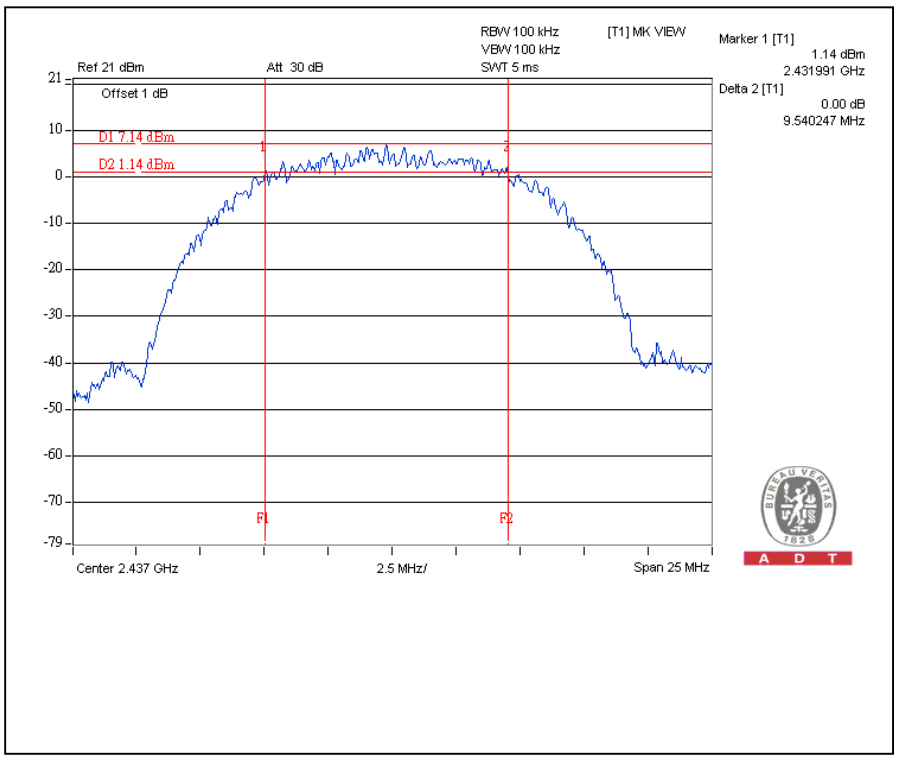
MODULATION TYPE	DBPSK	**TRANSFER RATE**	1Mbps
INPUT POWER	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 60%RH, 959hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	9.53	0.5	PASS
6	2437	9.54	0.5	PASS
11	2462	9.55	0.5	PASS

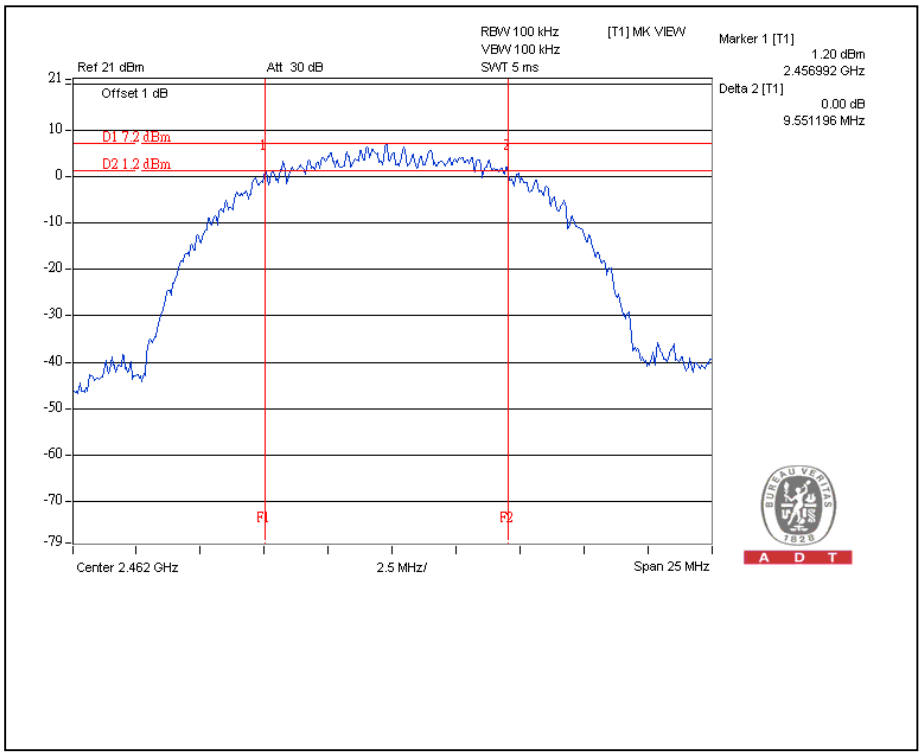
CH1


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
1.82 dBm
2.406993 GHz
Delta 2 [T1]
0.00 dB
9.528569 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 7.82 dBm
D2 1.82 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.412 GHz
2.5 MHz/
Span 25 MHz

CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
1.14 dBm
2.431991 GHz
Delta 2 [T1]
0.00 dB
9.540247 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 7.14 dBm
D2 1.14 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.437 GHz
2.5 MHz/
Span 25 MHz

CH11

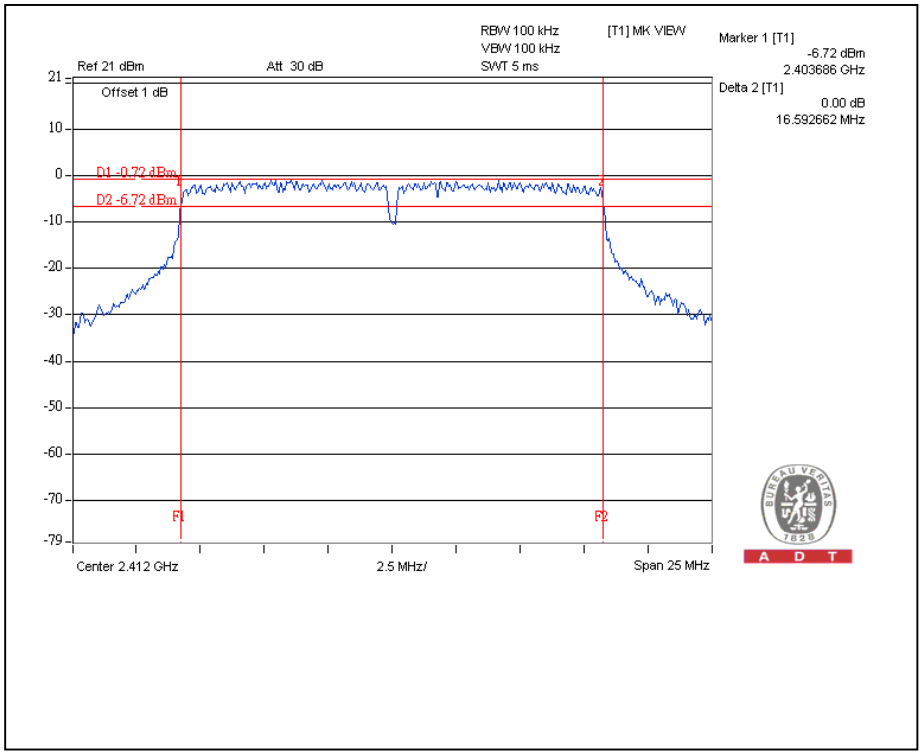

RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
1.20 dBm
2.456992 GHz
Delta 2 [T1]
0.00 dB
9.551196 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 7.2 dBm
D2 1.2 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.462 GHz
2.5 MHz/
Span 25 MHz

802.11g OFDM modulation

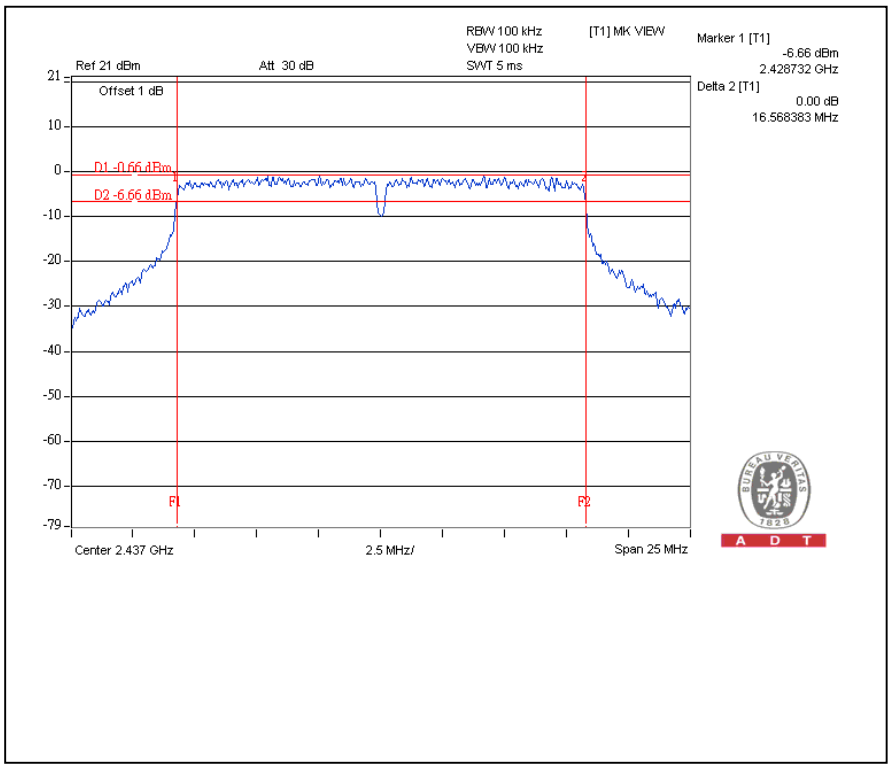
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 60%RH, 959hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.59	0.5	PASS
6	2437	16.57	0.5	PASS
11	2462	16.59	0.5	PASS

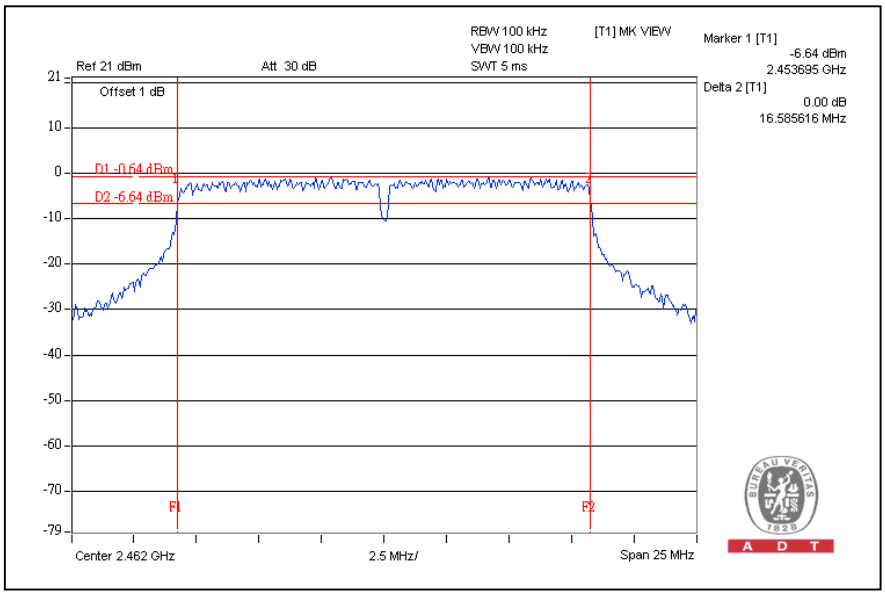
CH1


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-6.72 dBm
2.403686 GHz
Delta 2 [T1]
0.00 dB
16.592662 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -0.72 dBm
D2 -6.72 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.412 GHz
2.5 MHz/
Span 25 MHz

CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-6.66 dBm
2.428732 GHz
Delta 2 [T1]
0.00 dB
16.568383 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -0.66 dBm
D2 -6.66 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.437 GHz
2.5 MHz/
Span 25 MHz

CH11


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-6.64 dBm
2.453695 GHz
Delta 2 [T1]
0.00 dB
16.585616 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -0.64 dBm
D2 -6.64 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
R1
R2
Center 2.462 GHz
2.5 MHz/
Span 25 MHz

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 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 13, 2008	Aug. 12, 2009
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 26, 2007	Dec. 25, 2008
Anritsu Power Meter	ML2495A	0824006	NA	NA
Pulse Power Sensor	MA2411B	0738172	NA	NA

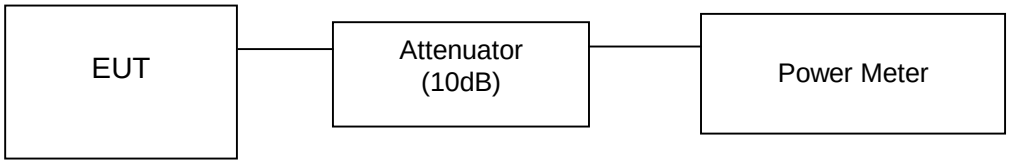
4.4.3 TEST PROCEDURES

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 4.3.5

4.4.7 TEST RESULTS

802.11b DSSS modulation

MODULATION TYPE	DBPSK	**TRANSFER RATE**	1Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 60%RH, 959hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	98.855	19.95	30	PASS
6	2437	94.842	19.77	30	PASS
11	2462	93.111	19.69	30	PASS

802.11g OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 959hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	188.799	22.76	30	PASS
6	2437	187.499	22.73	30	PASS
11	2462	190.108	22.79	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, 2007	Dec. 17, 2008

NOTE:

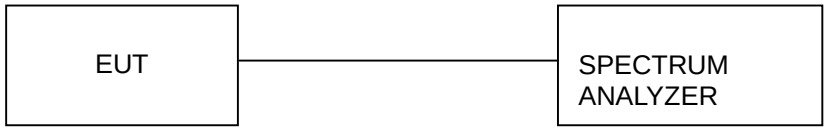
1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 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/3kHz. The power spectral density was measured and recorded.

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

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

Same as 4.3.5

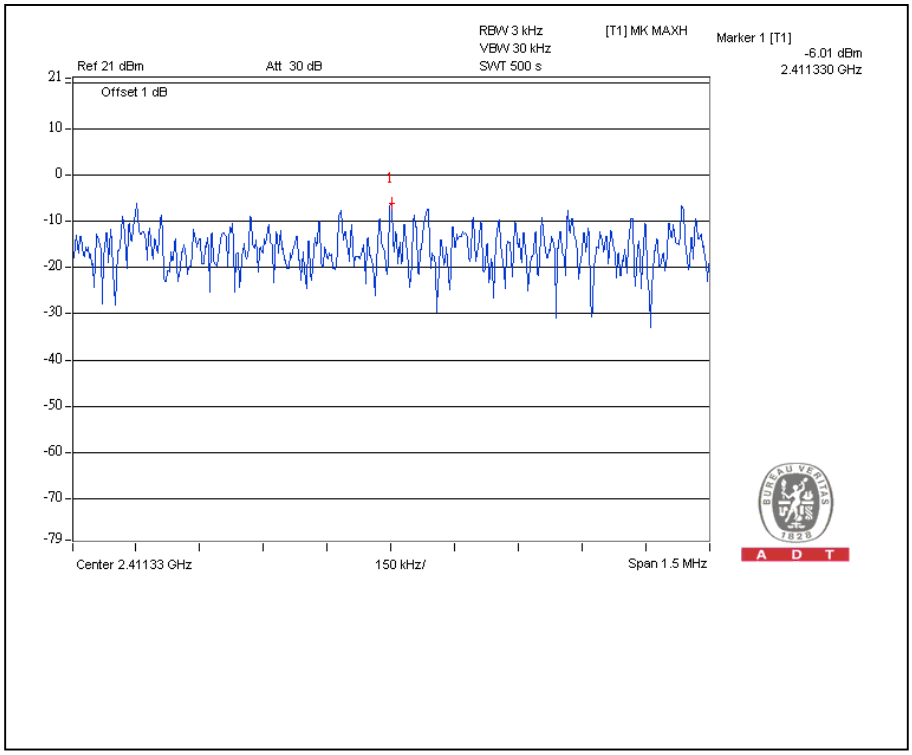
4.5.6 TEST RESULTS

802.11b DSSS modulation

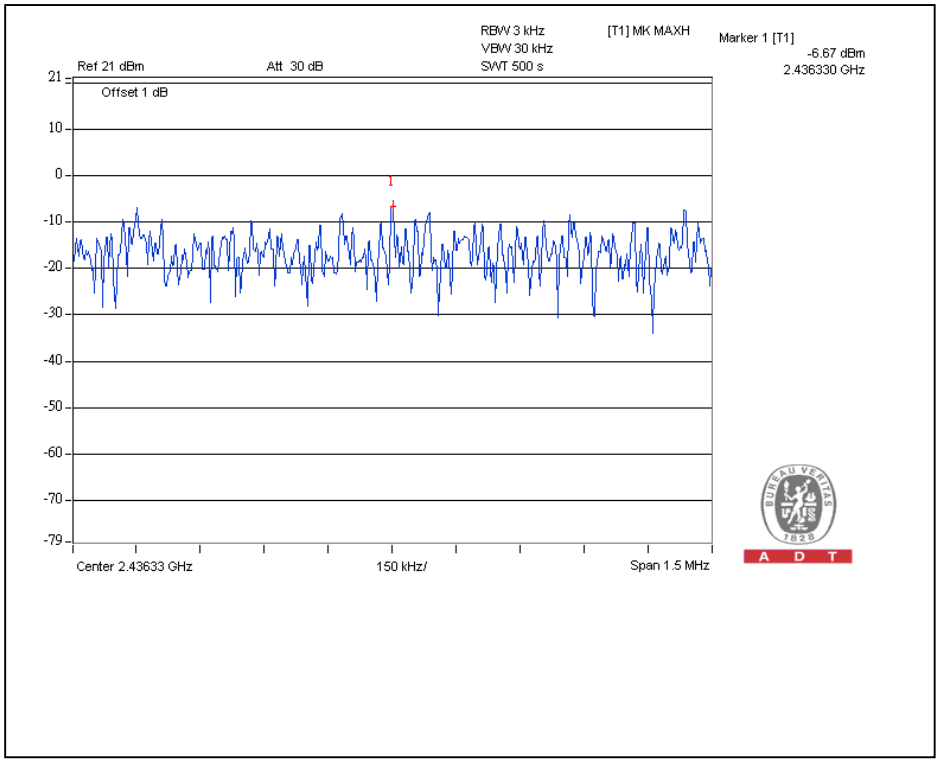
MODULATION TYPE	DBPSK	**TRANSFER RATE**	1Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 60%RH, 959hPa
TESTED BY	Rex Huang		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-6.01	8	PASS
6	2437	-6.67	8	PASS
11	2462	-6.71	8	PASS

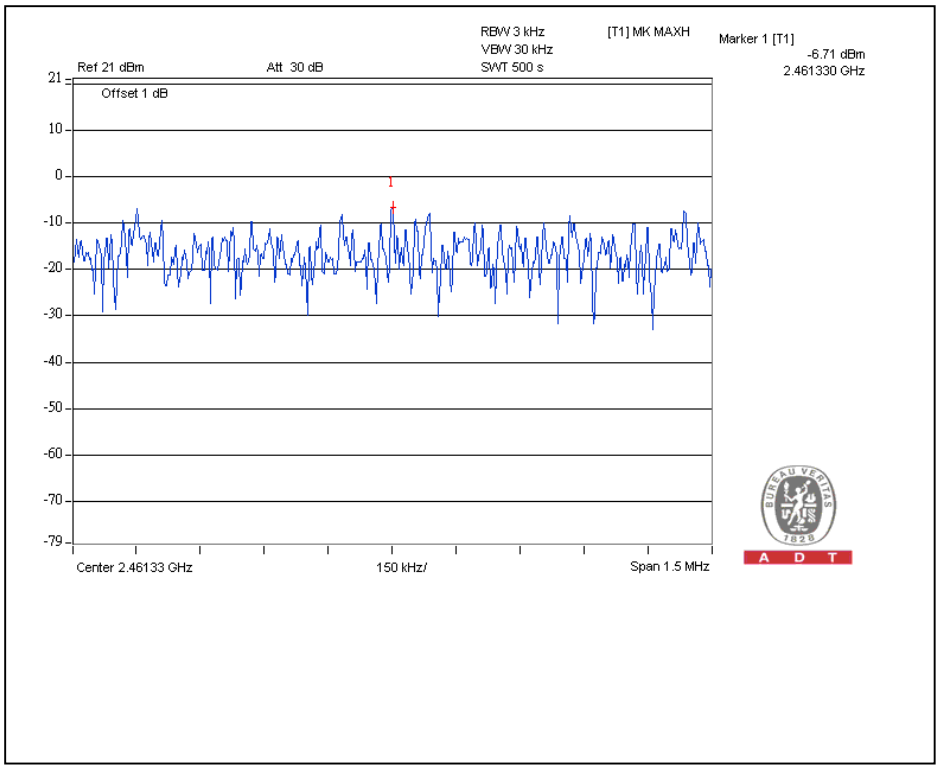
CH1


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-6.01 dBm
2.411330 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.41133 GHz
150 kHz/
Span 1.5 MHz

CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-6.67 dBm
2.436330 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.43633 GHz
150 kHz/
Span 1.5 MHz

CH11

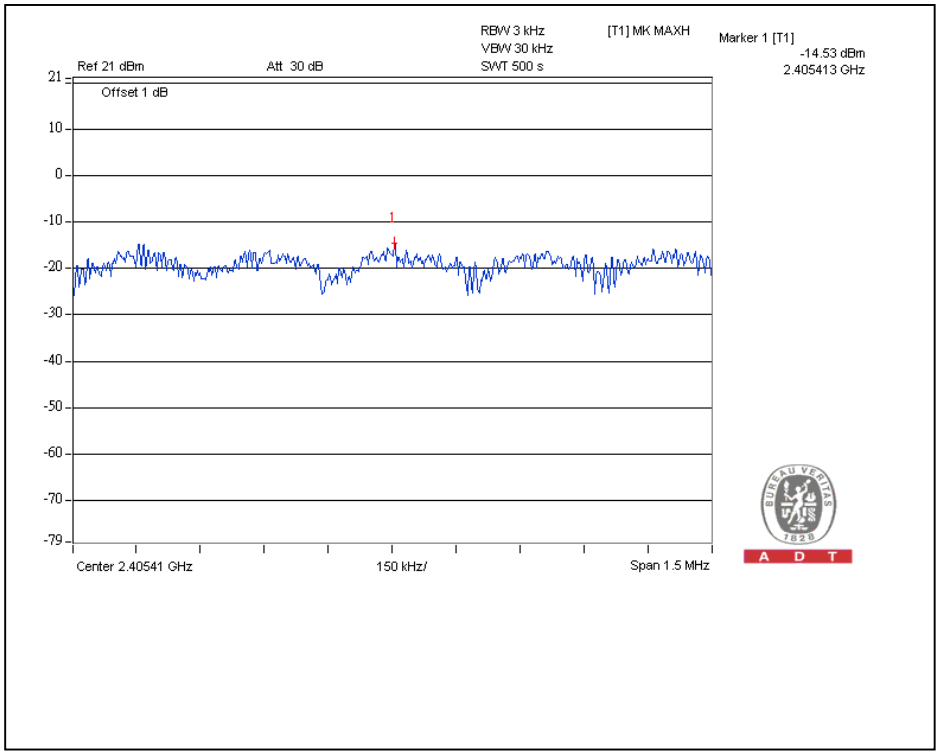

RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-6.71 dBm
2.461330 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.46133 GHz
150 kHz/
Span 1.5 MHz

802.11g OFDM modulation

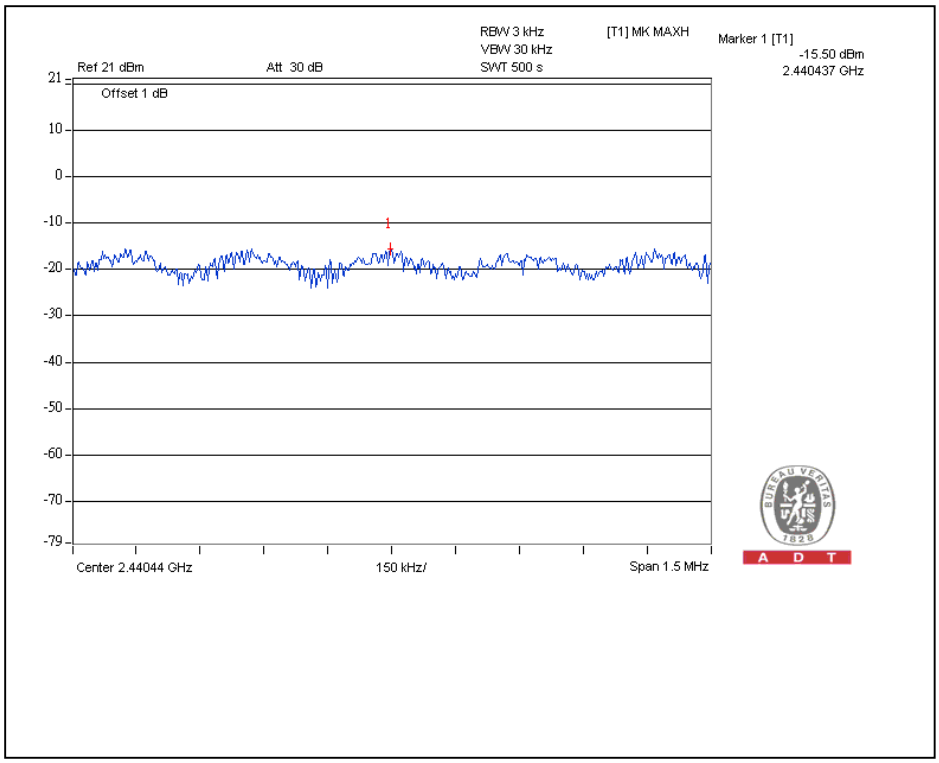
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 60%RH, 959hPa
TESTED BY	Rex Huang		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-14.53	8	PASS
6	2437	-15.50	8	PASS
11	2462	-14.65	8	PASS

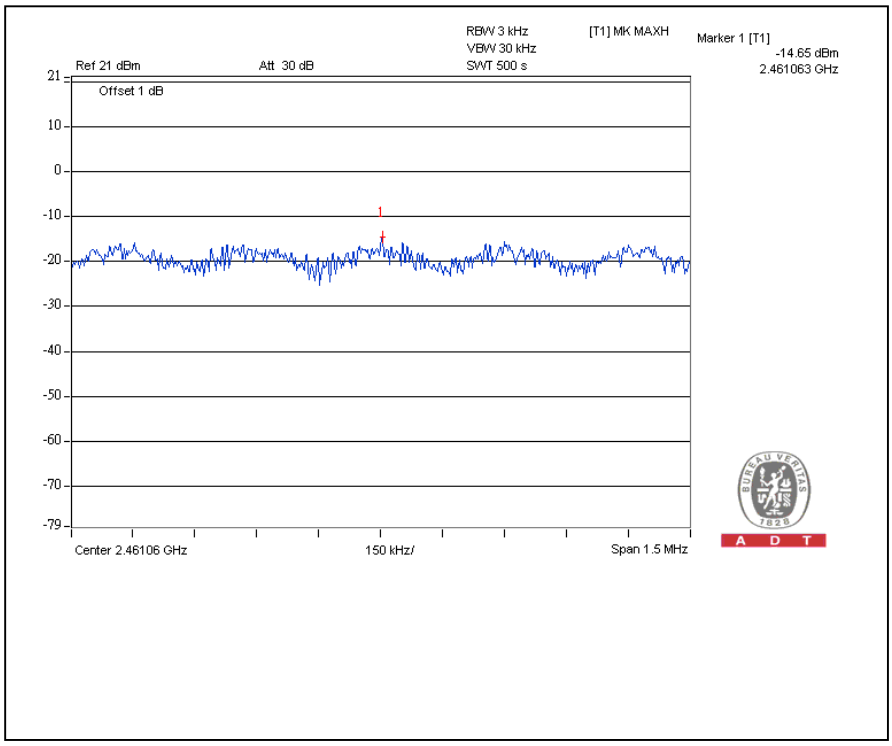
CH1


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-14.53 dBm
2.405413 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.40541 GHz
150 kHz/
Span 1.5 MHz

CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-15.50 dBm
2.440437 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.44044 GHz
150 kHz/
Span 1.5 MHz

CH11


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-14.65 dBm
2.461063 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.46106 GHz
150 kHz/
Span 1.5 MHz

4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below –20dB 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, 2007	Dec. 17, 2008

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.

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW of spectrum analyzer to 100kHz and VBW of spectrum analyzer to 300kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (RBW =100kHz ; VBW = 300kHz) are attached on the following pages.

4.6.4 EUT OPERATING CONDITION

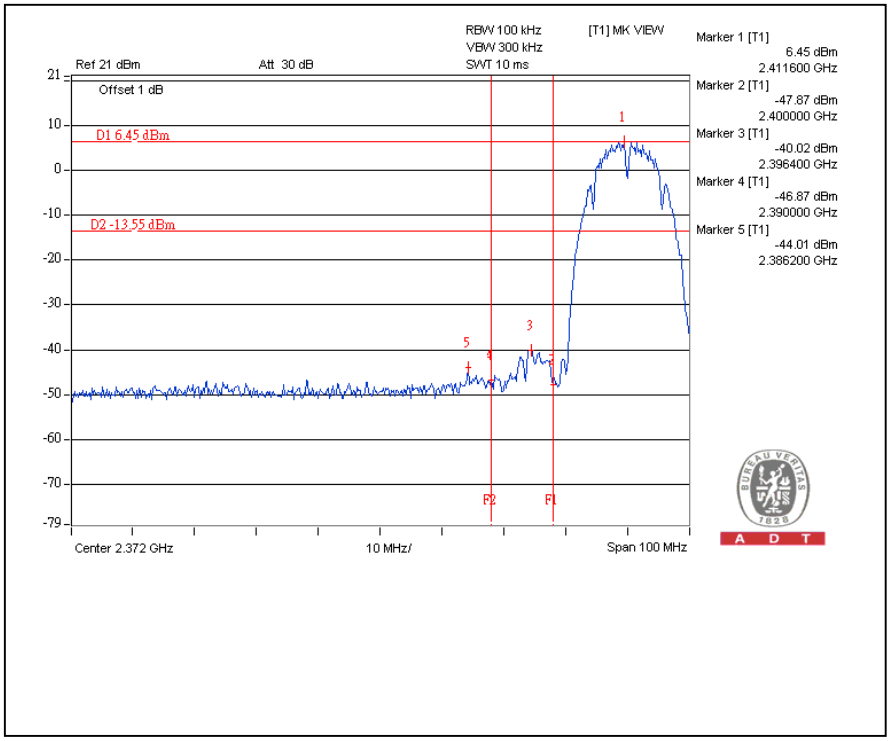
Same as Item 4.3.5

4.6.5 TEST RESULTS

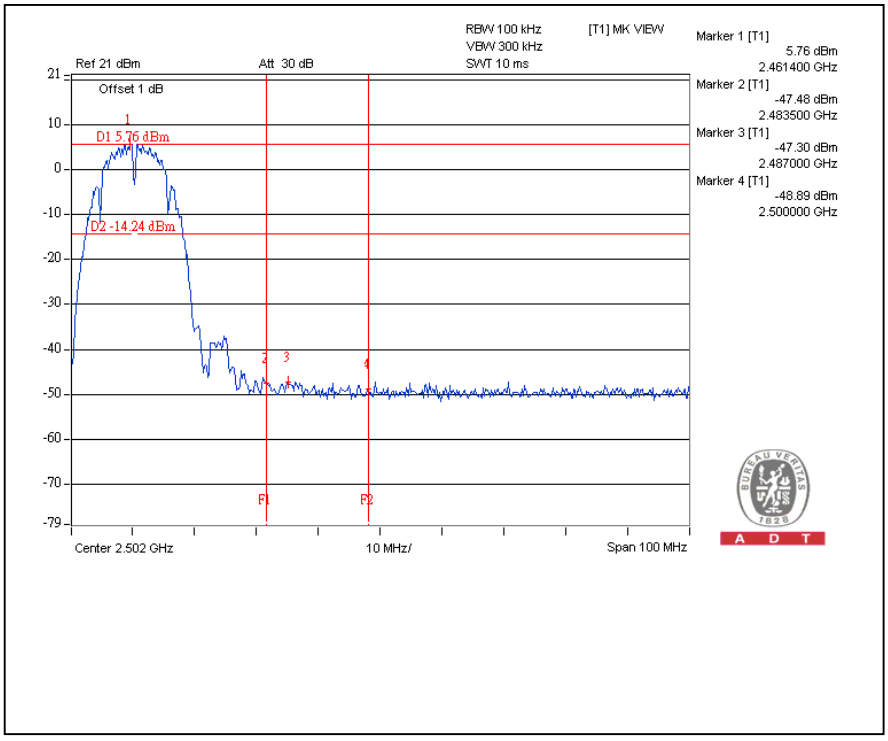
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b DSSS MODULATION:

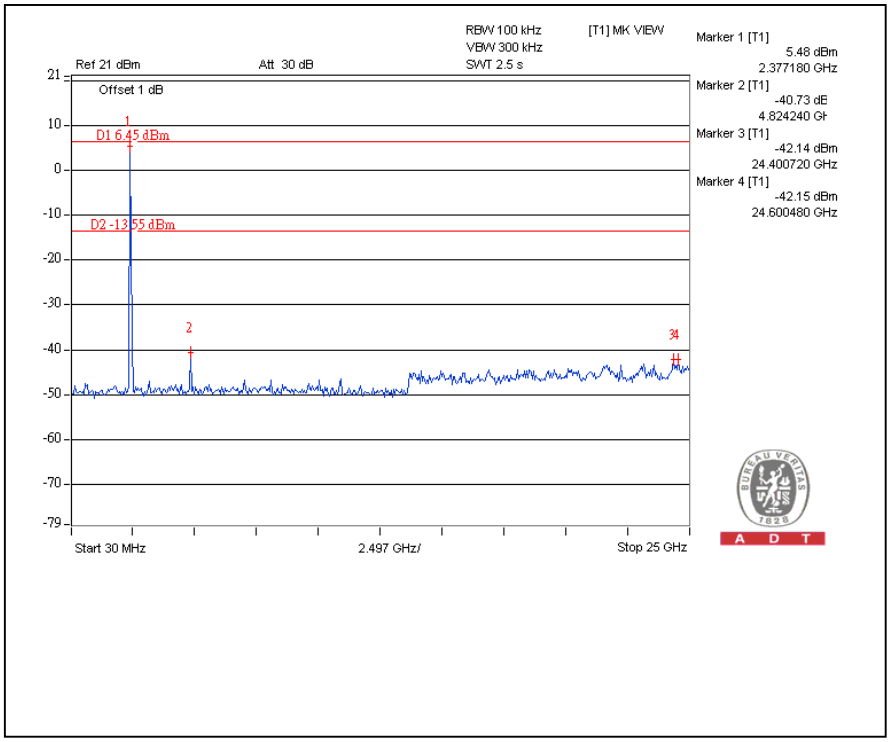
CH1



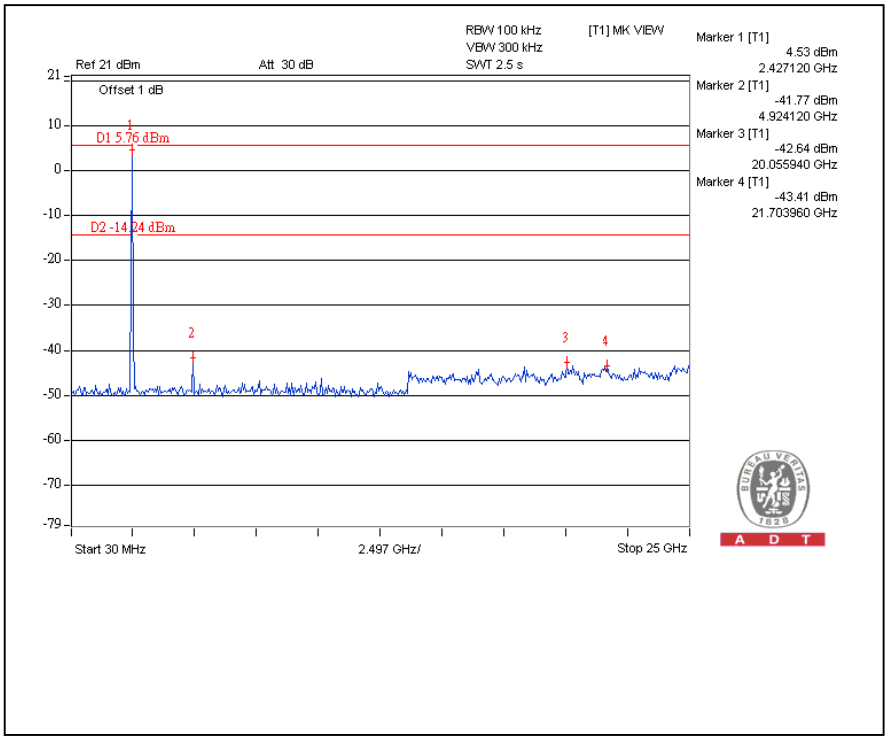
CH11



CH1

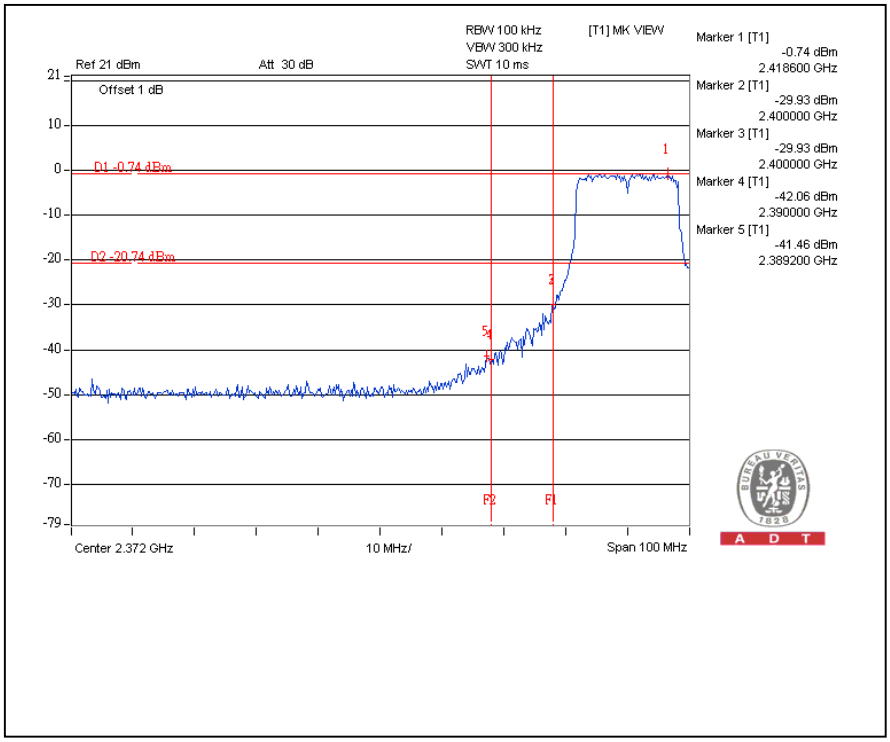

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 6.45 dBm
D2 -13.55 dBm
Marker 1 [T1]
5.48 dBm
2.377180 GHz
Marker 2 [T1]
-40.73 dE
4.824240 GH
Marker 3 [T1]
-42.14 dBm
24.400720 GHz
Marker 4 [T1]
-42.15 dBm
24.600480 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11

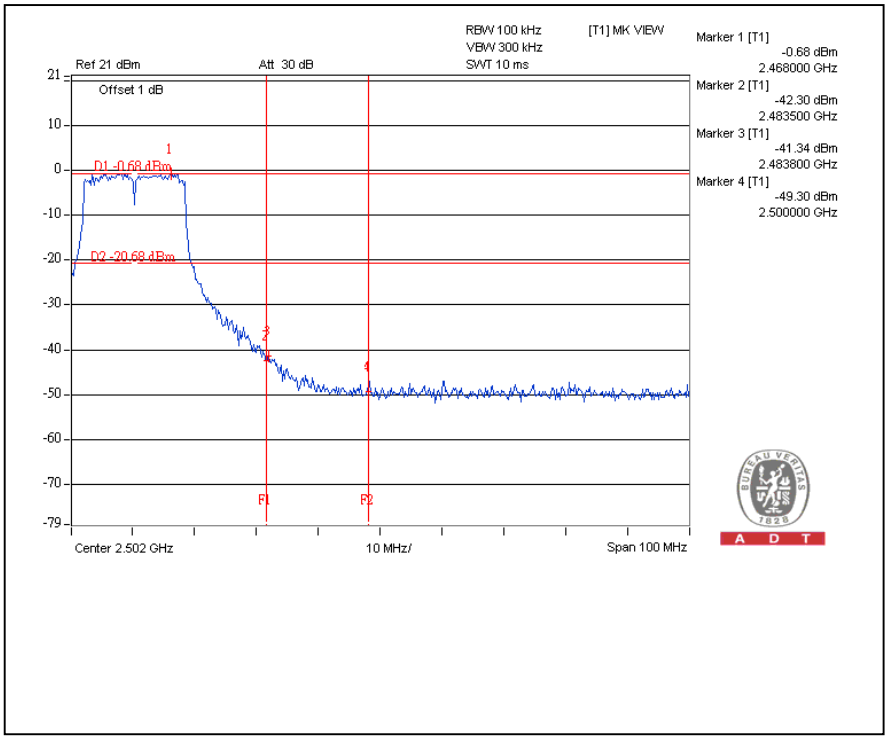

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 5.76 dBm
D2 -14.24 dBm
Marker 1 [T1]
4.53 dBm
2.427120 GHz
Marker 2 [T1]
-41.77 dBm
4.924120 GHz
Marker 3 [T1]
-42.64 dBm
20.055940 GHz
Marker 4 [T1]
-43.41 dBm
21.703960 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

802.11g OFDM MODULATION:

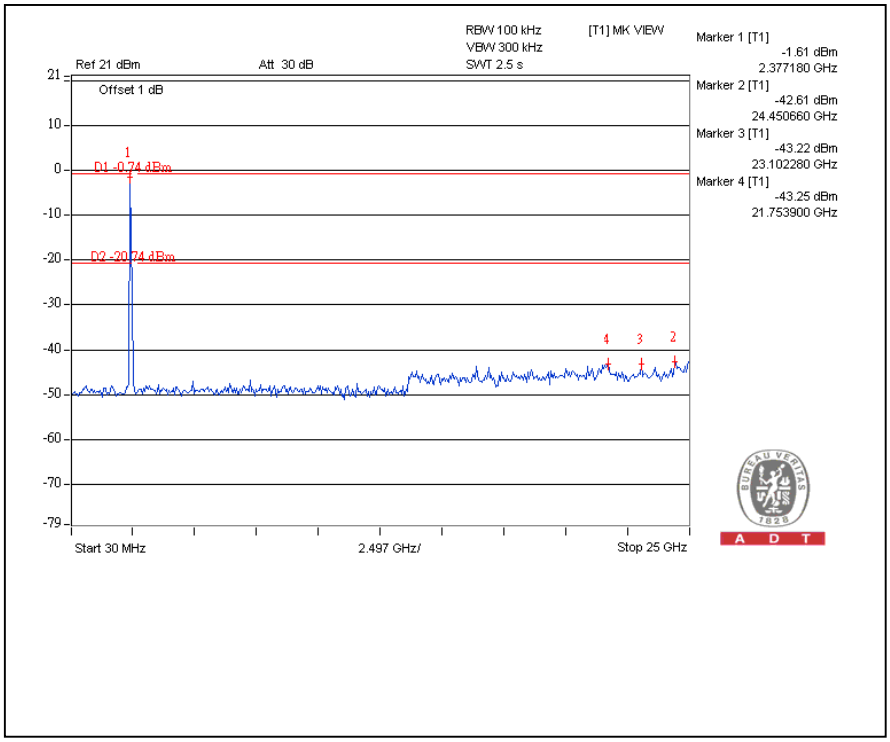
CH1



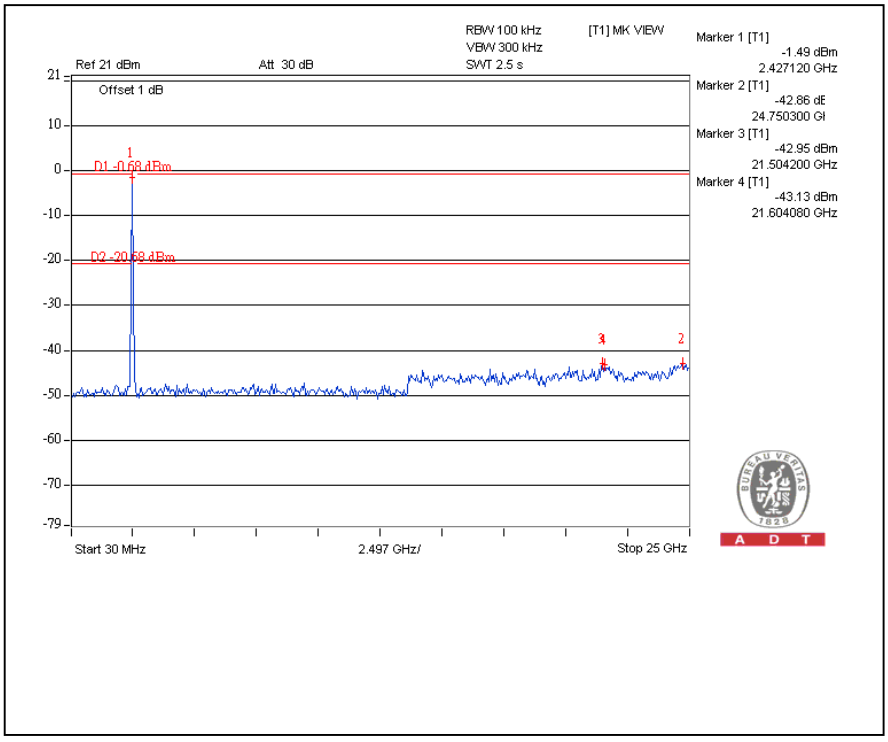
CH11



CH1


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -0.74 dBm
D2 -20.74 dBm
Marker 1 [T1]
-1.61 dBm
2.377180 GHz
Marker 2 [T1]
-42.61 dBm
24.450660 GHz
Marker 3 [T1]
-43.22 dBm
23.102280 GHz
Marker 4 [T1]
-43.25 dBm
21.753900 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -1.49 dBm
D2 -20.68 dBm
Marker 1 [T1]
-1.49 dBm
2.427120 GHz
Marker 2 [T1]
-42.86 dB
24.750300 GI
Marker 3 [T1]
-42.95 dBm
21.504200 GHz
Marker 4 [T1]
-43.13 dBm
21.604080 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

4.7 ANTENNA REQUIREMENT

4.7.1 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.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PIFA antenna with cable. The maximum Gain of the antenna is 2.7dBi.

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:

USA	FCC, UL
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	GOST-ASIA (MOU)
Russia	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.
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
Web Site: 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.

--- EMD ---