



FCC TEST REPORT

REPORT NO.: RF960204H02

MODEL NO.: W441A, W441B, LCS-WR5-2314

RECEIVED: Feb. 05, 2007

TESTED: Feb. 07 to March 03, 2007

ISSUED: March 15, 2007

APPLICANT: NETRONIX , INC.

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1 CERTIFICATION

PRODUCT : 802.11g Wireless VPN Router
BRAND NAME : NETRONIX, Longshine
MODEL NO. : W441A, W441B, LCS-WR5-2314
TESTED: Feb. 07 to March 03, 2007
APPLICANT : NETRONIX , INC.
TEST ITEM: ENGINEERING SAMPLE
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.247)
ANSI C63.4-2003

The above equipment (Model: W441A) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Claire Kuan **DATE:** March 15, 2007
(Claire Kuan)

TECHNICAL ACCEPTANCE : Moris Lin **DATE:** March 15, 2007
Responsible for RF (Moris Lin)

APPROVED BY : Hank Chung **DATE:** March 15, 2007
(Hank Chung, 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 -1.66 dB at 0.411 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(c)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -1.1 dB at 4824.00 MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	802.11g Wireless VPN Router
MODEL NO.	W441A, W441B, LCS-WR5-2314
FCC ID	NOI-W441A
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
RADIO TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps (Turbo mode: up to 72Mbps)
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
CHANNEL SPACING	5MHz
OUTPUT POWER	802.11b: 60.256mW 802.11g: 104.713mW
ANTENNA TYPE	Dipole Antenna (Antenna gain : 3.0dBi)
DATA CABLE	NA
I/O PORT	LAN Port x 4; WAN Port x 1

NOTE:

- The EUT has three model names and two brand names, which are identical to each other in all aspects except for the followings:

Brand Name	Model Name
NETRONIX	W441A
	W441B
Longshine	LCS-WR5-2314

From the above models, model: **W441A** was selected as representative model for the test and its data was recorded in this report.

2. The EUT could be supplied with the following power adapters:

Brand:	DVE		
Model No.:	DSA-12W-10		
Input power :	100-240V	0.3A	50-60Hz
Output power :	DC 12 V 1 A (Cable:1.8m/unshielded/without core)		

3. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 54Mbps.
4. The EUT complies with IEEE 802.11g standards, and backwards compatible with IEEE 802.11b products.
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: 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	
-	√	√	√	√	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)
802.11b	1 to 11	11	DSSS	CCK	1

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	CCK	1

Radiated Emission Test (Above 1 GHz):

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

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

Bandedge Measurement:

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

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

Antenna Port Conducted Measurement:

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

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



3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 802.11g Wireless VPN Router. 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.

Conducted test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	Latitude C600	TW-09c748-12800-165-3171	FCC DoC
2	NuStreams	xtramus	NuStreams-600	05NS06C00004	NA
3	HUB	AVSYS	110H8	01-20E-000002	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	NA

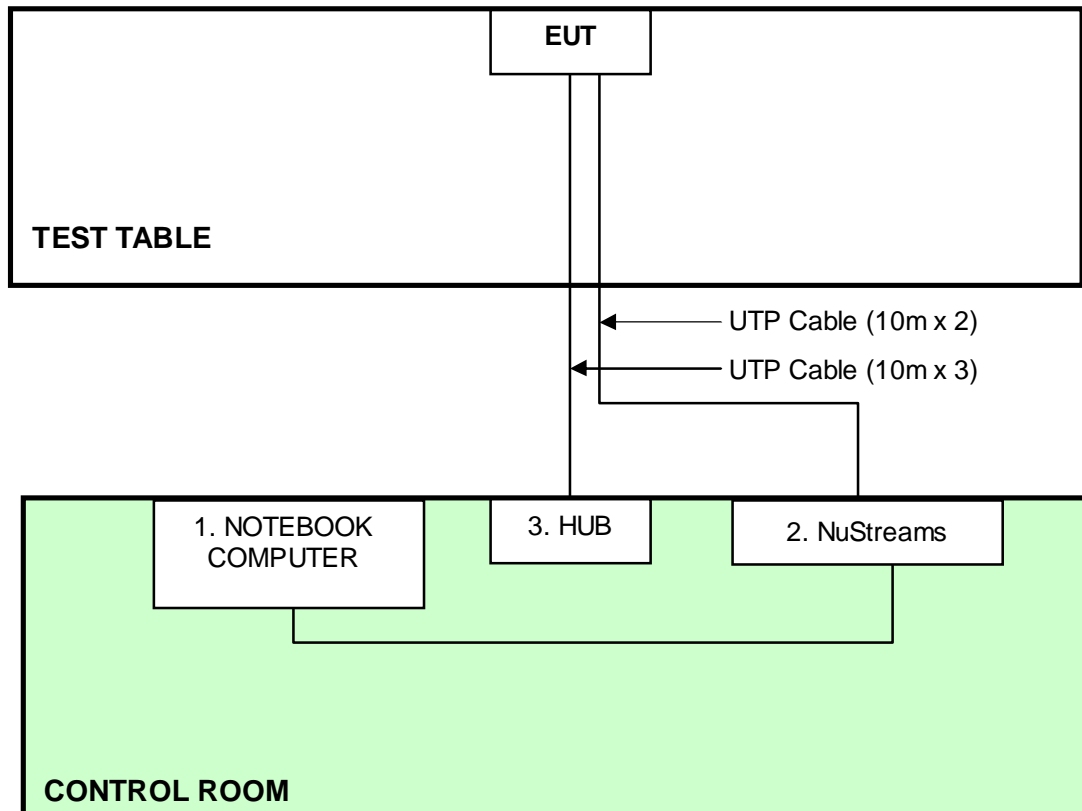
Other test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	Compaq	N800C	470048-515	DoC
2	NOTEBOOK COMPUTER	Dell	PP01L	TW-09c748-12800-165-3171	DoC
3	HUB	AVSYS	110H8	01-20E-000002	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	NA

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

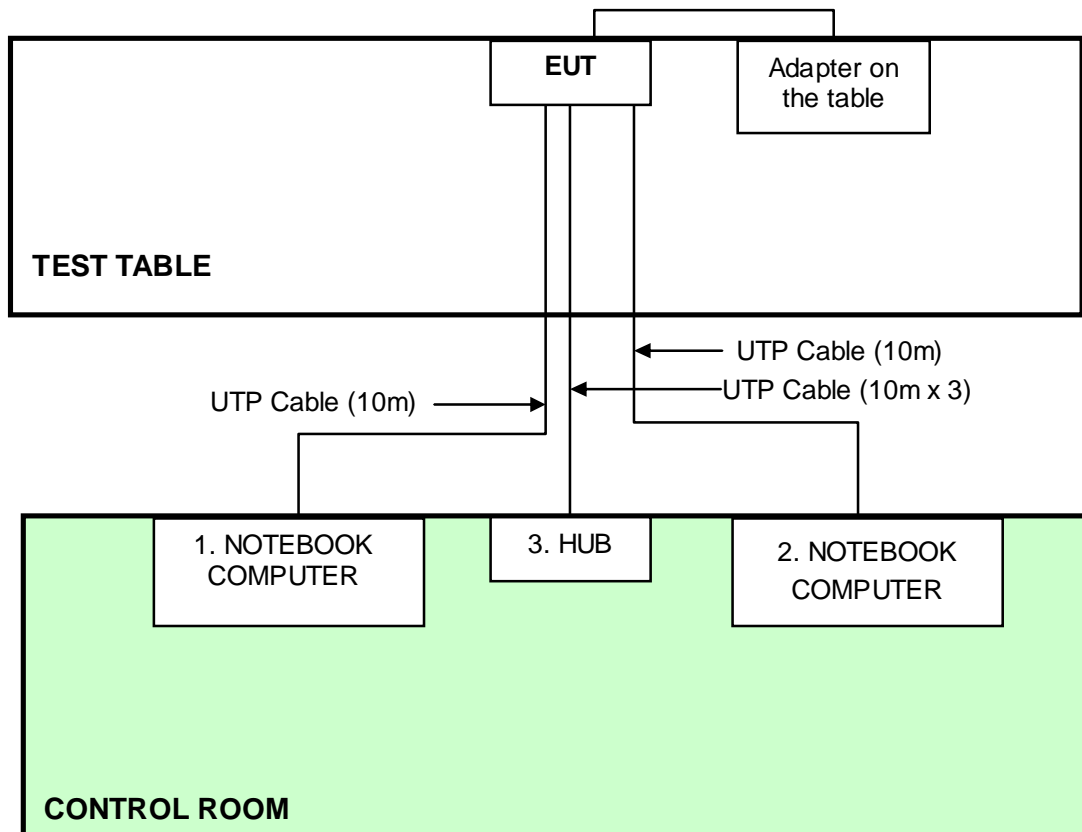
3.6 CONFIGURATION OF SYSTEM UNDER TEST

For conducted test items:



- NOTE:** 1. Support unit 1-3 were kept in the control room during the test.
2. Please refer to the photos of test configuration in Item 5 also.

For other test items:



NOTE: 1. Support unit 1-3 were kept in the control room during the test.
2. Please refer to the photos of test configuration in Item 5 also.



4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. 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

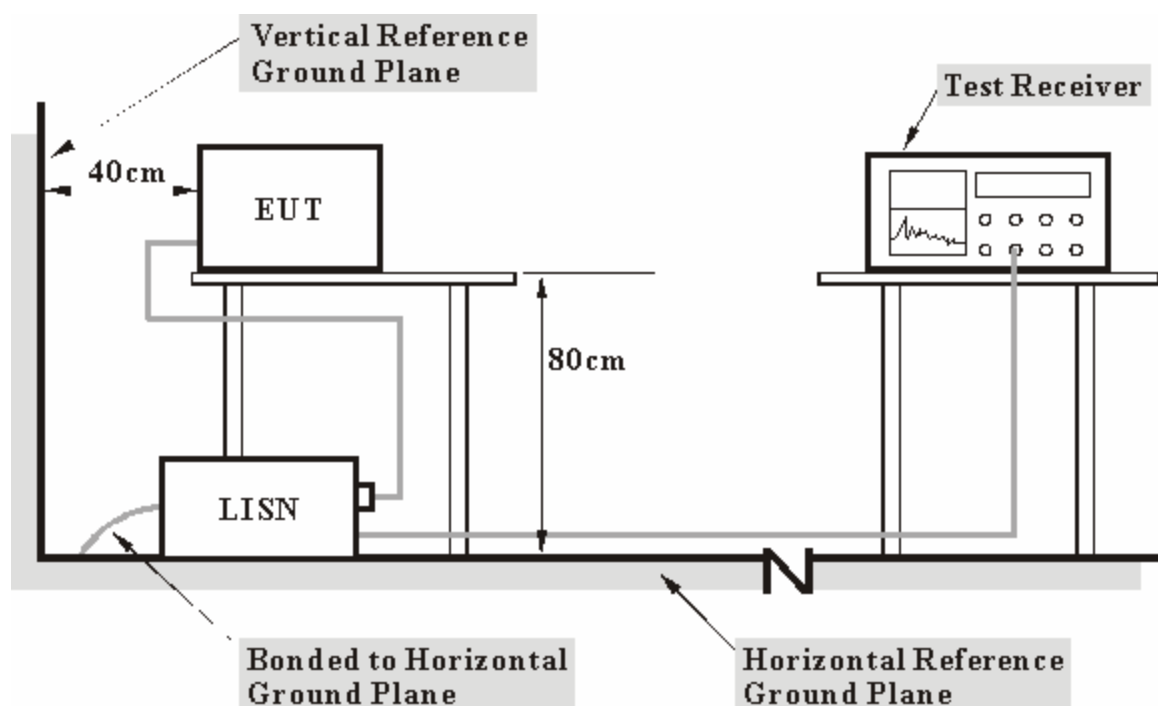
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver	ESCS 30	847124/029	Mar. 28, 2008
Line-Impedance Stabilization Network(for EUT)	ENV-216	100071	Nov. 26, 2007
Line-Impedance Stabilization Network(for Peripheral)	ESH3-Z5	848773/004	Oct. 26, 2007
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2007
Terminator	50	2	Oct. 30, 2007
Software	ADT_Cond_V7.3.2	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. B.
 3. The VCCI Con B Registration No. is C-2193.

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

For Conducted test:

- a. Placed the EUT on the testing table.
- b. Prepared other computer systems to act as communication partners and placed them outside of testing area.
- c. NOTEBOOK COMPUTER runs “Nu-Lite” program control the “NuStreams” transmitted messages and received messages from the EUT via UTP cables.

For Other test:

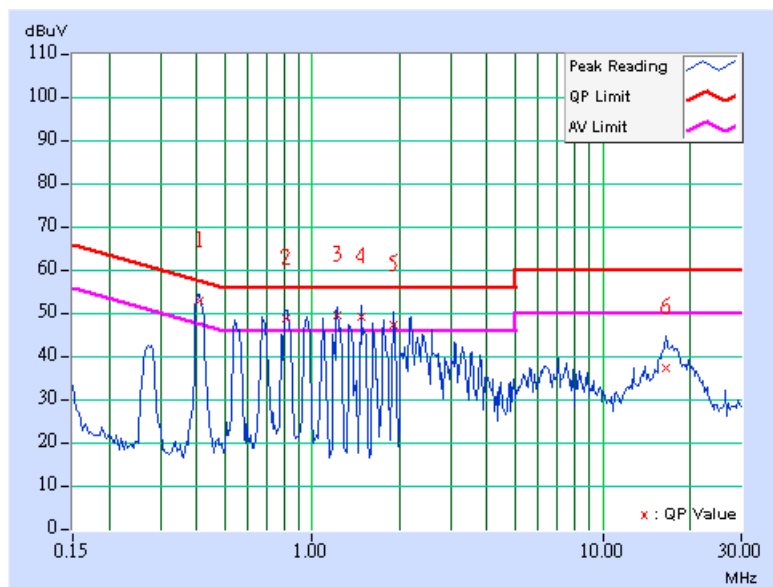
- a. Placed the EUT on the testing table.
- b. Prepared other computer systems to act as communication partners and placed them outside of testing area.
- c. The communication partner run test program “MP TEST.EXE” to enable EUT under transmission condition continuously at specific channel frequency.

4.1.6 TEST RESULTS

INPUT POWER (SYSTEM)	120Vac, 60 Hz		
PHASE	Line (L)	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 960hPa	TRANSFER RATE	1Mbps
TESTED BY	Rex Huang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.411	9.60	42.94	36.38	52.54	45.98	57.64	47.64	-5.10	-1.66
2	0.813	9.60	38.64	28.24	48.24	37.84	56.00	46.00	-7.76	-8.16
3	1.223	9.62	39.39	27.13	49.01	36.75	56.00	46.00	-6.99	-9.25
4	1.486	9.65	39.18	25.30	48.83	34.95	56.00	46.00	-7.17	-11.05
5	1.895	9.69	37.41	23.32	47.10	33.01	56.00	46.00	-8.90	-12.99
6	16.430	10.10	27.47	-	37.57	-	60.00	50.00	-22.43	-

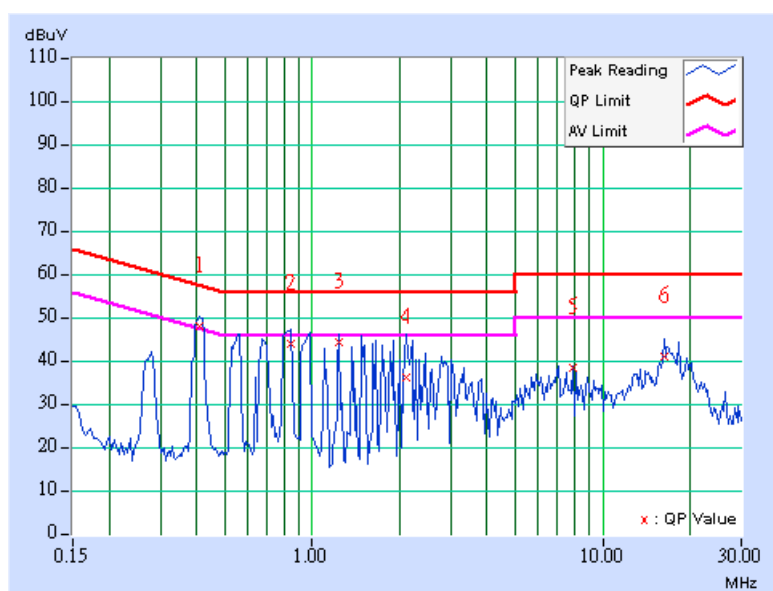
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



INPUT POWER (SYSTEM)	120Vac, 60 Hz		
PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 960hPa	TRANSFER RATE	1Mbps
TESTED BY	Rex Huang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.411	9.60	38.02	-	47.62	-	57.63	47.63	-10.01	-
2	0.841	9.60	33.98	-	43.58	-	56.00	46.00	-12.42	-
3	1.234	9.62	34.47	-	44.09	-	56.00	46.00	-11.91	-
4	2.109	9.70	26.09	-	35.79	-	56.00	46.00	-20.21	-
5	7.918	9.83	28.58	-	38.41	-	60.00	50.00	-21.59	-
6	16.230	10.02	31.01	-	41.03	-	60.00	50.00	-18.97	-

- 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 UNTIL
ROHDE & SCHWARZ Analyzer	FSP40	1093449540	Aug. 15, 2007
HP Pre_Amplifier	8449B	3008A01922	Sep. 18, 2007
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 20, 2007
CHASE Broadband Antenna	VULB 9168	138	Dec. 11, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 05, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
R&S Loop Antenna	HFH2-Z2	881058/15	Nov. 29, 2007
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14, 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Jul. 15, 2007
Software	ADT_Radiated_V 5.14	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

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

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

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

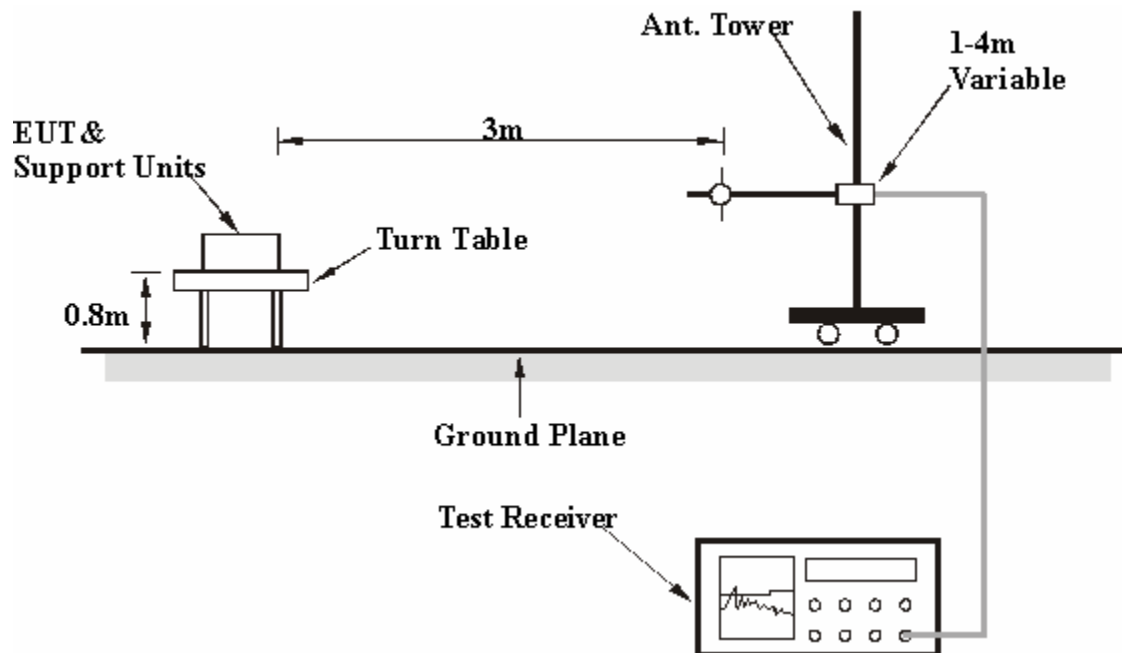
4.2.3 TEST PROCEDURES

- 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

MODULATION TYPE	DSSS	CHANNEL	Channel 11
INPUT POWER (SYSTEM)	120Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	19deg. C, 63%RH, 960hPa	TRANSFER RATE	1Mbps
TESTED BY	Tony Chen	DETECTOR FUNCTION	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	200.03	37.50 QP	43.50	-6.00	1.49 H	83	25.90	11.60
2	250.03	42.70 QP	46.00	-3.30	1.27 H	70	28.90	13.80
3	375.05	35.80 QP	46.00	-10.20	1.11 H	311	17.60	18.20
4	400.05	33.50 QP	46.00	-12.50	1.01 H	304	14.40	19.00
5	499.99	38.60 QP	46.00	-7.40	1.18 H	247	16.80	21.80
6	625.09	36.90 QP	46.00	-9.10	1.16 H	109	12.20	24.80
7	750.10	35.50 QP	46.00	-10.50	1.24 H	148	8.20	27.40
8	875.12	32.70 QP	46.00	-13.30	1.28 H	297	4.00	28.60

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	36.64	25.90 QP	40.00	-14.10	1.09 V	204	12.80	13.10
2	69.72	32.20 QP	40.00	-7.80	1.27 V	32	19.60	12.60
3	200.03	28.80 QP	43.50	-14.70	1.01 V	147	17.20	11.60
4	240.00	29.30 QP	46.00	-16.70	1.00 V	166	15.90	13.30
5	250.03	34.80 QP	46.00	-11.20	1.00 V	93	21.00	13.80
6	432.00	32.10 QP	46.00	-13.90	1.39 V	50	12.10	20.00
7	624.98	29.10 QP	46.00	-16.90	1.52 V	335	4.30	24.80
8	750.11	29.00 QP	46.00	-17.00	1.31 V	104	1.60	27.40
9	875.12	31.20 QP	46.00	-14.80	1.47 V	259	2.60	28.60

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

4.2.7 TEST RESULTS - DSSS

802.11b DSSS modulation

MODE	Channel 1	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 69%RH, 960hPa	TESTED BY	Tony Chen

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	2253.00	45.60 PK	74.00	-28.40	1.21 H	90	14.20	31.40
1	2253.00	38.40 AV	54.00	-15.60	1.21 H	90	7.00	31.40
2	2388.00	58.00 PK	74.00	-16.00	1.03 H	21	26.10	31.90
2	2388.00	44.60 AV	54.00	-9.40	1.03 H	21	12.70	31.90
3	*2412.00	97.00 PK			1.03 H	21	65.00	32.00
3	*2412.00	93.60 AV			1.03 H	21	61.60	32.00
4	4824.00	51.30 PK	74.00	-22.70	1.22 H	92	15.30	36.00
4	4824.00	47.80 AV	54.00	-6.20	1.22 H	92	11.80	36.00
5	7236.00	53.40 PK	74.00	-20.60	1.29 H	35	11.20	42.20
5	7236.00	43.70 AV	54.00	-10.30	1.29 H	35	1.50	42.20

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	2253.00	55.00 PK	74.00	-19.00	1.06 V	14	23.50	31.40
1	2253.00	50.30 AV	54.00	-3.70	1.06 V	14	18.90	31.40
2	2386.40	58.60 PK	74.00	-15.40	1.00 V	82	26.60	31.90
2	2386.40	47.00 AV	54.00	-7.00	1.00 V	82	15.10	31.90
3	*2412.00	111.10 PK			1.00 V	82	79.10	32.00
3	*2412.00	107.00 AV			1.00 V	82	75.00	32.00
4	4824.00	55.30 PK	74.00	-18.70	1.32 V	338	19.30	36.00
4	4824.00	52.70 AV	54.00	-1.30	1.32 V	338	16.70	36.00
5	7236.00	53.80 PK	74.00	-20.20	1.21 V	60	11.60	42.20
5	7236.00	43.90 AV	54.00	-10.10	1.21 V	60	1.70	42.20

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

MODE	Channel 6	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 69%RH, 960hPa	TESTED BY	Tony Chen

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	2278.00	46.10 PK	74.00	-27.90	1.30 H	132	14.60	31.50
1	2278.00	39.70 AV	54.00	-14.30	1.30 H	132	8.20	31.50
2	*2437.00	98.00 PK			1.58 H	314	65.80	32.10
2	*2437.00	93.30 AV			1.58 H	314	61.20	32.10
3	4874.00	51.70 PK	74.00	-22.30	1.50 H	88	15.60	36.10
3	4874.00	47.80 AV	54.00	-6.20	1.50 H	88	11.70	36.10
4	7311.00	53.70 PK	74.00	-20.30	1.35 H	87	11.10	42.50
4	7311.00	44.60 AV	54.00	-9.40	1.35 H	87	2.00	42.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 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	2278.00	55.40 PK	74.00	-18.60	1.00 V	10	23.90	31.50
1	2278.00	52.10 AV	54.00	-1.90	1.00 V	10	20.60	31.50
2	*2437.00	111.00 PK			1.00 V	86	78.90	32.10
2	*2437.00	107.70 AV			1.00 V	86	75.60	32.10
3	4874.00	55.00 PK	74.00	-19.00	1.30 V	336	18.90	36.10
3	4874.00	52.80 AV	54.00	-1.20	1.30 V	336	16.70	36.10
4	7311.00	54.50 PK	74.00	-19.50	1.22 V	154	12.00	42.50
4	7311.00	45.90 AV	54.00	-8.10	1.22 V	154	3.40	42.50

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

MODE	Channel 11	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 69%RH, 960hPa	TESTED BY	Tony Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

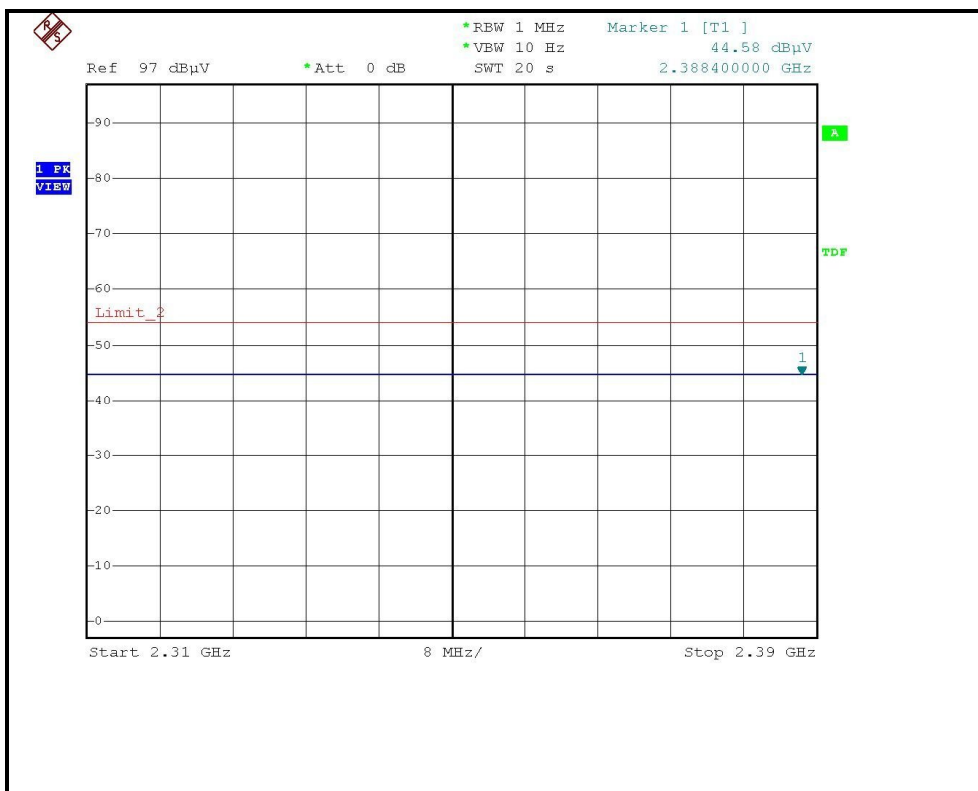
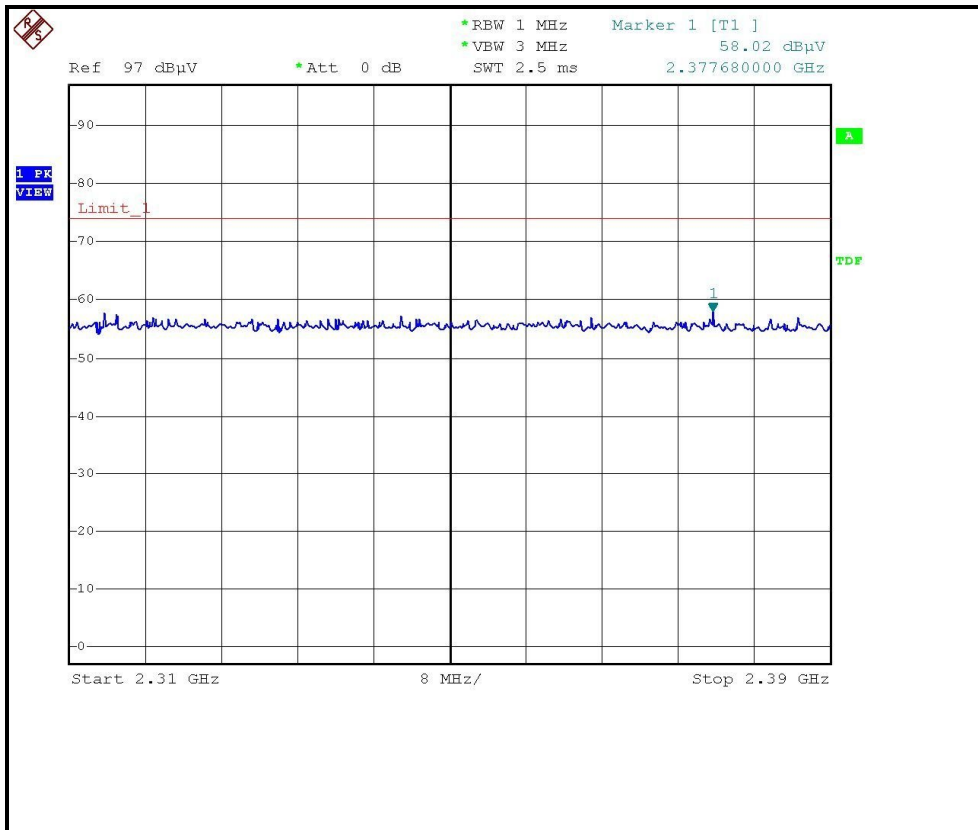
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2300.00	49.10 PK	74.00	-24.90	1.11 H	108	17.50	31.60
1	2300.00	42.70 AV	54.00	-11.30	1.11 H	108	11.10	31.60
2	*2462.00	97.70 PK			1.60 H	322	65.50	32.20
2	*2462.00	93.60 AV			1.60 H	322	61.40	32.20
3	2483.50	56.20 PK	74.00	-17.80	1.60 H	322	23.90	32.30
3	2483.50	44.80 AV	54.00	-9.20	1.60 H	322	12.50	32.30
4	4924.00	50.70 PK	74.00	-23.30	1.05 H	107	14.50	36.20
4	4924.00	46.40 AV	54.00	-7.60	1.05 H	107	10.20	36.20
5	7386.00	53.30 PK	74.00	-20.70	1.40 H	249	10.50	42.80
5	7386.00	43.70 AV	54.00	-10.30	1.40 H	249	0.90	42.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

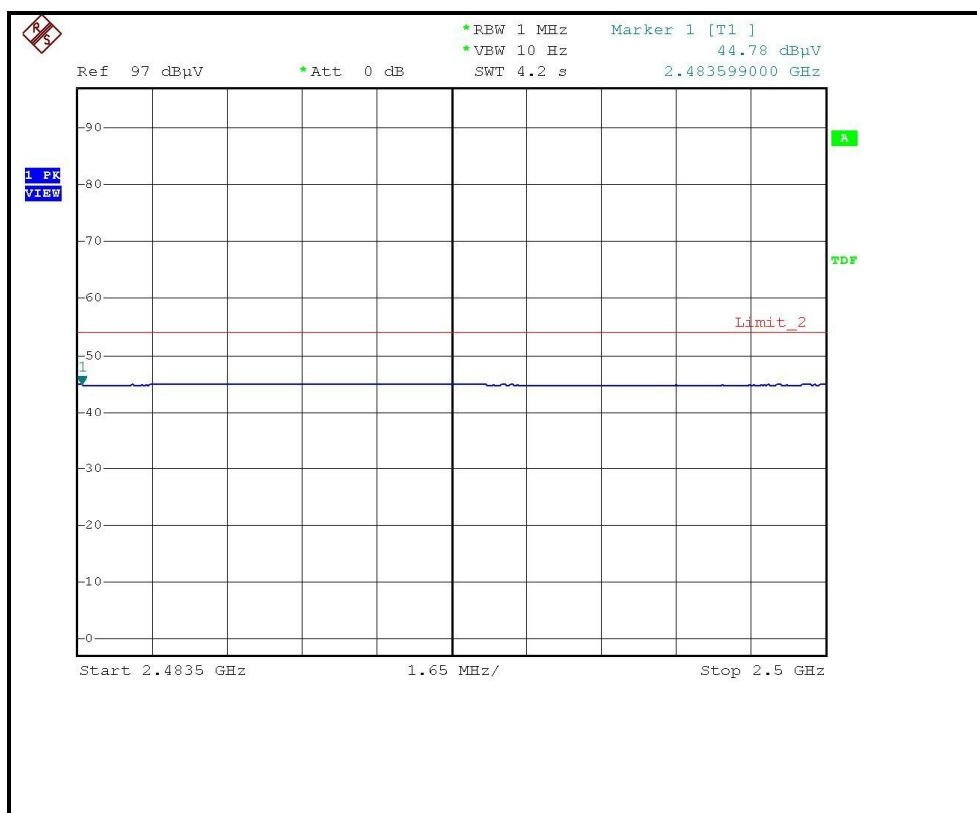
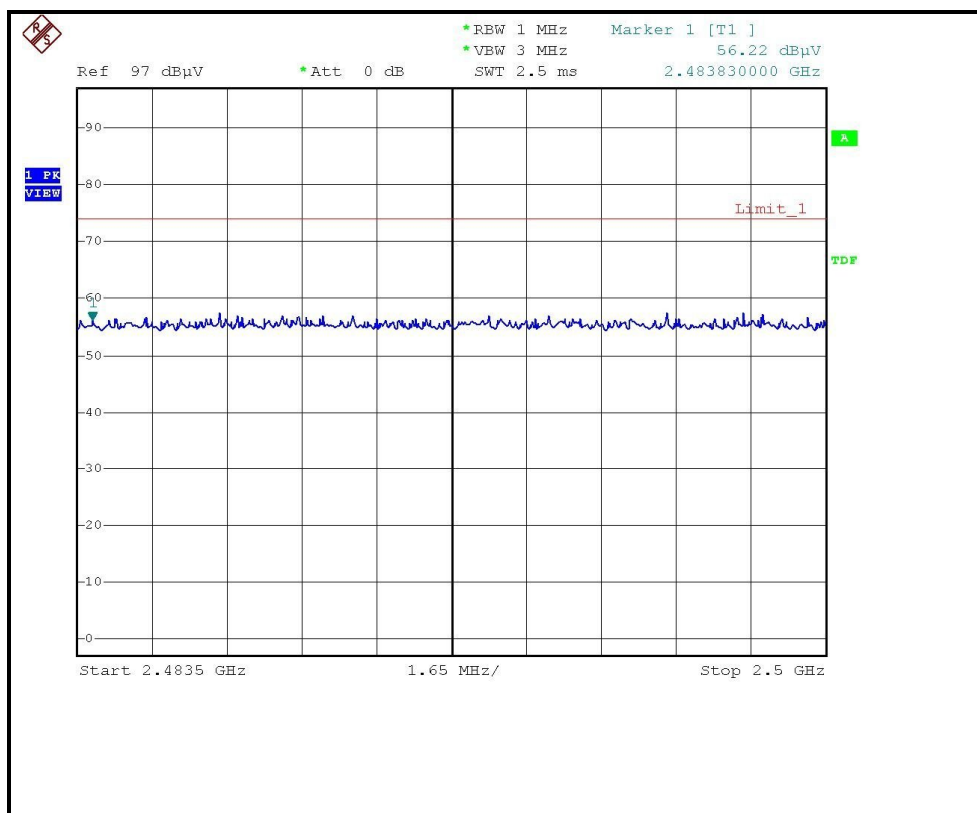
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2300.00	58.80 PK	74.00	-15.20	1.03 V	14	27.20	31.60
1	2300.00	52.80 AV	54.00	-1.20	1.03 V	14	21.20	31.60
2	*2462.00	111.30 PK			1.00 V	83	79.10	32.20
2	*2462.00	106.70 AV			1.00 V	83	74.50	32.20
3	2487.20	61.60 PK	74.00	-12.40	1.00 V	83	29.30	32.30
3	2487.20	50.10 AV	54.00	-3.90	1.00 V	83	17.80	32.30
4	4924.00	55.30 PK	74.00	-18.70	1.38 V	304	19.10	36.20
4	4924.00	52.90 AV	54.00	-1.10	1.38 V	304	16.70	36.20
5	7386.00	54.60 PK	74.00	-19.40	1.39 V	143	11.80	42.80
5	7386.00	44.80 AV	54.00	-9.20	1.39 V	143	2.00	42.80

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

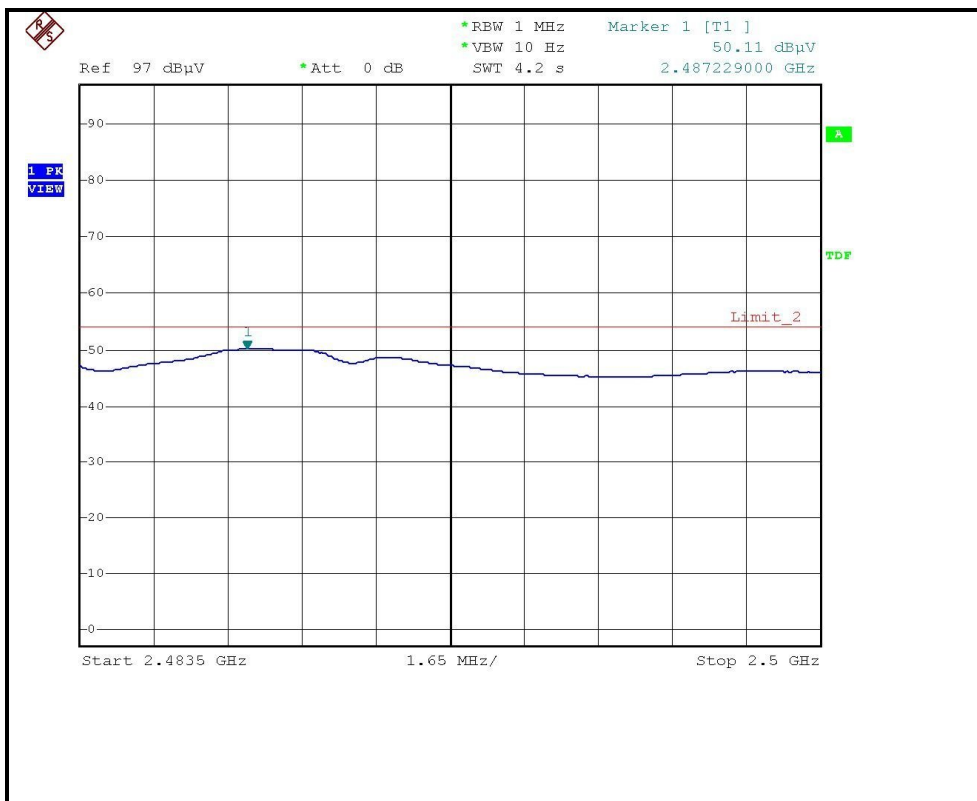
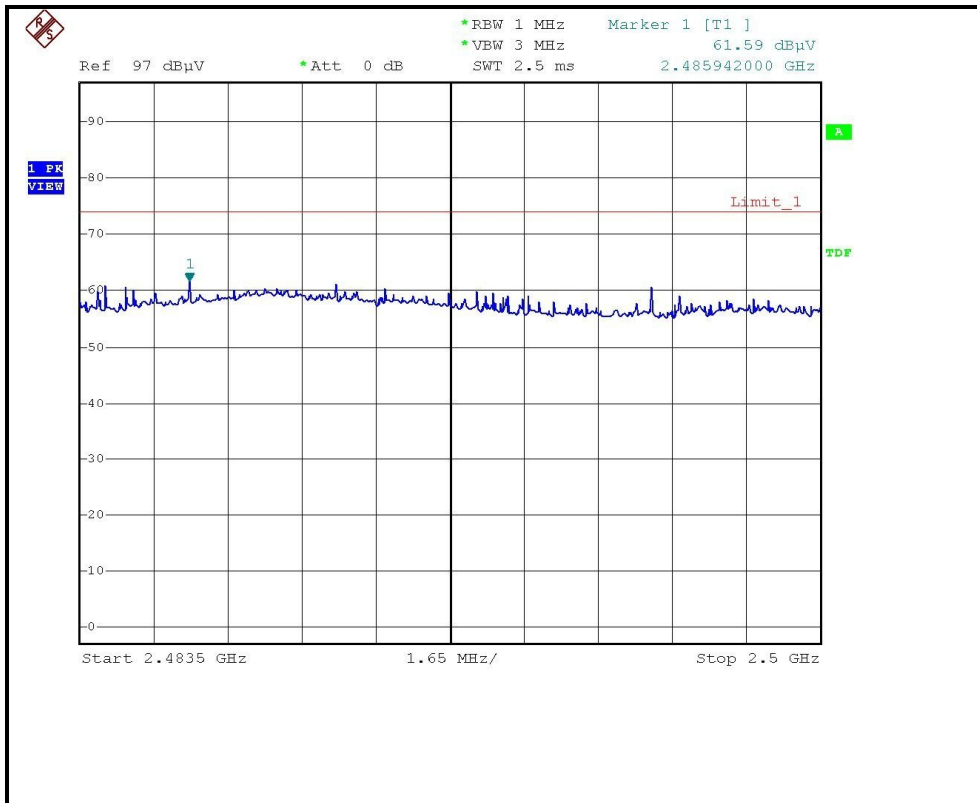
RESTRICTED BANDEDGE (802.11b MODE, CH1, HORIZONTAL)



RESTRICTED BANDEDGE (802.11b MODE, CH11, HORIZONTAL)



RESTRICTED BANDEDGE (802.11b MODE, CH11, VERTICAL)



4.2.8 TEST RESULTS - OFDM

802.11g Normal OFDM modulation

MODE	Channel 1	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 69%RH, 960hPa	TESTED BY	Tony Chen

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	2253.00	45.50 PK	74.00	-28.50	1.18 H	359	14.10	31.40
1	2253.00	34.20 AV	54.00	-19.80	1.18 H	359	2.80	31.40
2	2390.00	57.40 PK	74.00	-16.60	1.43 H	352	25.50	31.90
2	2390.00	44.70 AV	54.00	-9.30	1.43 H	352	12.70	31.90
3	*2412.00	100.30 PK			1.43 H	352	68.30	32.00
3	*2412.00	89.70 AV			1.43 H	352	57.70	32.00
4	4824.00	47.70 PK	74.00	-26.30	1.21 H	143	11.70	36.00
4	4824.00	34.60 AV	54.00	-19.40	1.21 H	143	-1.40	36.00
5	7236.00	50.60 PK	74.00	-23.40	1.11 H	321	8.30	42.20
5	7236.00	37.30 AV	54.00	-16.70	1.11 H	321	-4.90	42.20

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	2253.00	52.50 PK	74.00	-21.50	1.20 V	1	21.10	31.40
1	2253.00	42.10 AV	54.00	-11.90	1.20 V	1	10.70	31.40
2	2390.00	65.40 PK	74.00	-8.60	1.00 V	82	33.50	31.90
2	2390.00	49.30 AV	54.00	-4.70	1.00 V	82	17.40	31.90
3	*2412.00	111.10 PK			1.00 V	82	79.10	32.00
3	*2412.00	101.10 AV			1.00 V	82	69.10	32.00
4	4824.00	52.00 PK	74.00	-22.00	1.32 V	177	16.00	36.00
4	4824.00	40.80 AV	54.00	-13.20	1.32 V	177	4.90	36.00
5	7236.00	53.50 PK	74.00	-20.50	1.13 V	153	11.30	42.20
5	7236.00	39.70 AV	54.00	-14.30	1.13 V	153	-2.50	42.20

- 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

MODE	Channel 6	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 69%RH, 960hPa	TESTED BY	Tony Chen

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	2278.00	46.30 PK	74.00	-27.70	1.17 H	360	14.80	31.50
1	2278.00	35.20 AV	54.00	-18.80	1.17 H	360	3.70	31.50
2	*2437.00	100.30 PK			1.32 H	343	68.20	32.10
2	*2437.00	89.90 AV			1.32 H	343	57.80	32.10
3	4874.00	46.90 PK	74.00	-27.10	1.20 H	64	10.80	36.10
3	4874.00	34.50 AV	54.00	-19.50	1.20 H	64	-1.50	36.10
4	7311.00	52.10 PK	74.00	-21.90	1.24 H	154	9.60	42.50
4	7311.00	38.00 AV	54.00	-16.00	1.24 H	154	-4.50	42.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2278.00	53.20 PK	74.00	-20.80	1.40 V	121	21.70	31.50
1	2278.00	42.60 AV	54.00	-11.40	1.40 V	121	11.10	31.50
2	*2437.00	111.20 PK			1.00 V	83	79.10	32.10
2	*2437.00	100.90 AV			1.00 V	83	68.80	32.10
3	4874.00	52.70 PK	74.00	-21.30	1.31 V	145	16.60	36.10
3	4874.00	41.40 AV	54.00	-12.60	1.31 V	145	5.30	36.10
4	7311.00	54.00 PK	74.00	-20.00	1.05 V	241	11.50	42.50
4	7311.00	40.70 AV	54.00	-13.30	1.05 V	241	-1.80	42.50

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

MODE	Channel 11	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 69%RH, 960hPa	TESTED BY	Tony Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

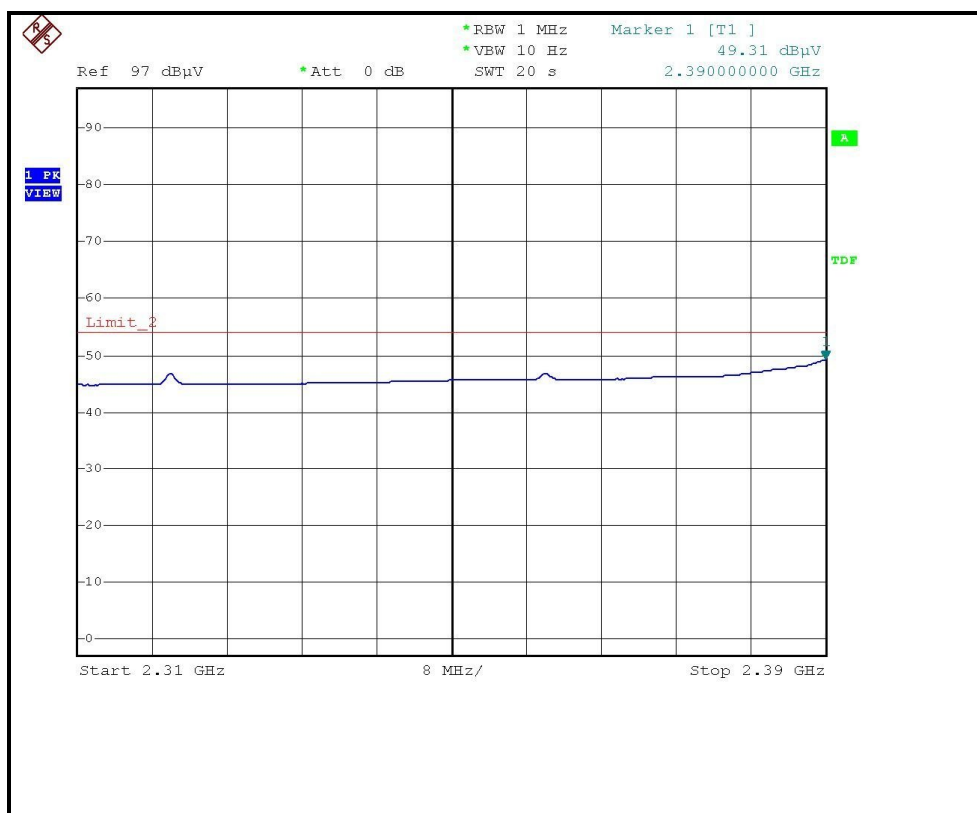
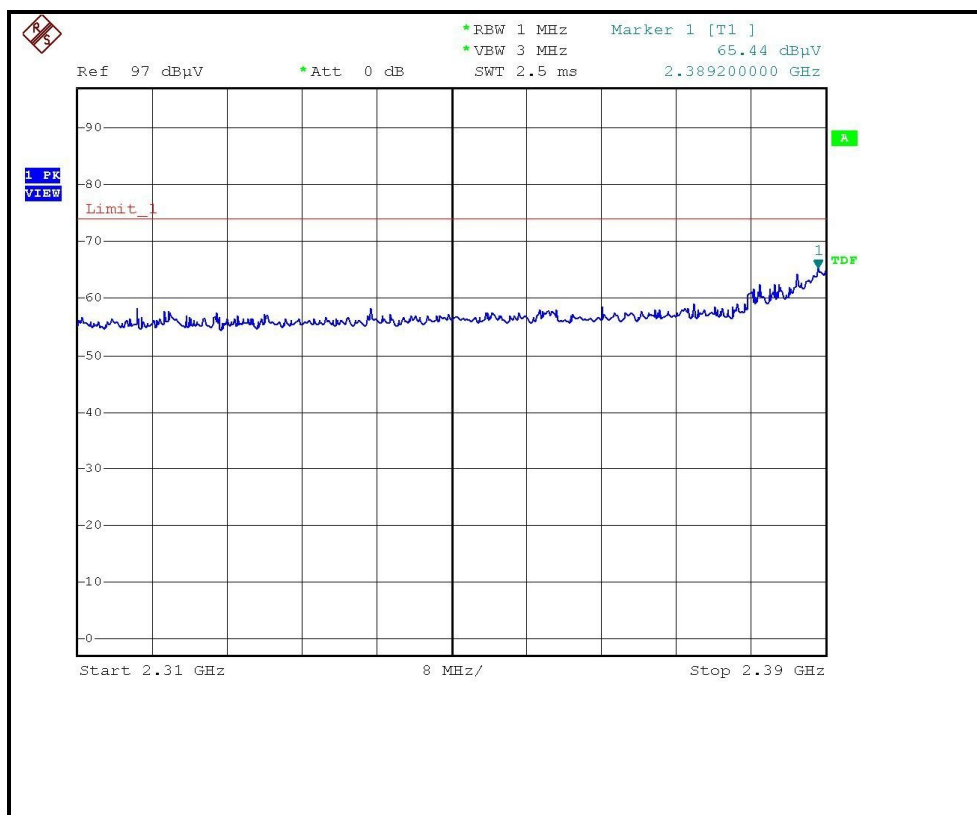
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2300.00	47.40 PK	74.00	-26.60	1.15 H	241	15.80	31.60
1	2300.00	36.60 AV	54.00	-17.40	1.15 H	241	5.00	31.60
2	*2462.00	100.00 PK			1.30 H	342	67.80	32.20
2	*2462.00	89.50 AV			1.30 H	342	57.30	32.20
3	2483.50	58.50 PK	74.00	-15.50	1.30 H	342	26.20	32.30
3	2483.50	45.10 AV	54.00	-8.90	1.30 H	342	12.90	32.30
4	4924.00	49.00 PK	74.00	-25.00	1.27 H	241	12.80	36.20
4	4924.00	35.10 AV	54.00	-18.90	1.27 H	241	-1.10	36.20
5	7386.00	51.80 PK	74.00	-22.20	1.03 H	241	9.00	42.80
5	7386.00	38.60 AV	54.00	-15.40	1.03 H	241	-4.20	42.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2300.00	55.30 PK	74.00	-18.70	1.24 V	134	23.70	31.60
1	2300.00	44.10 AV	54.00	-9.90	1.24 V	134	12.50	31.60
2	*2462.00	110.80 PK			1.00 V	21	78.60	32.20
2	*2462.00	101.10 AV			1.00 V	21	68.90	32.20
3	2483.50	67.20 PK	74.00	-6.80	1.01 V	84	34.90	32.30
3	2483.50	49.30 AV	54.00	-4.70	1.01 V	84	17.00	32.30
4	4924.00	53.00 PK	74.00	-21.00	1.23 V	314	16.80	36.20
4	4924.00	42.00 AV	54.00	-12.00	1.23 V	314	5.80	36.20
5	7386.00	55.00 PK	74.00	-19.00	1.12 V	143	12.20	42.80
5	7386.00	41.40 AV	54.00	-12.60	1.12 V	143	-1.40	42.80

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

RESTRICTED BANDEDGE (802.11g MODE, CH1, VERTICAL)



RESTRICTED BANDEDGE (802.11g MODE, CH11, VERTICAL)

