FCC TEST REPORT

REPORT NO. : RF951013A09B
MODEL NO. : 5189URF
RECEIVED : Oct. 13, 2006
TESTED : Oct. 19 ~ Nov. 02, 2006
ISSUED : Nov. 06, 2006

APPLICANT : BEHAVIOR TECH COMPUTER CORP.
ADDRESS : 20F-B, No. 98, Sec. 1, Sintai 5th Rd., Sijhih City, Taipei County 22102, Taiwan (R.O.C.)

ISSUED BY : Advance Data Technology Corporation
LAB ADDRESS : No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang 244, Taipei Hsien, Taiwan, R.O.C.
TEST LOCATION : No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

ACCREDITED
No. 2177-01

0528

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1. CERTIFICATION

PRODUCT :	Wireless Receiver
BRAND NAME :	HP
MODEL NO. :	5189URF
APPLICANT :	BEHAVIOR TECH COMPUTER CORP.
TESTED :	Oct. 19 ~ Nov. 02, 2006
TEST SAMPLE :	ENGINEERING SAMPLE
STANDARDS :	FCC Part 15, Subpart C (Section 15.249) ANSI C63.4-2003

The above equipment have 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	: Jessie Wang	, **DATE:**	Nov. 06, 2006
TECHNICAL ACCEPTANCE Responsible for RF	: Long Chen	, **DATE:**	Nov. 06, 2006
APPROVED BY	: Gary Chang / Supervisor	, **DATE:**	Nov. 06, 2006

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.249)			
STANDARD PARAGRAPH	**TEST TYPE**	**RESULT**	**REMARK**
15.207	Conducted Emission Test	PASS	Minimum passing margin is -11.51dB at 0.173MHz
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Minimum passing margin is -4.94dB at 1601.00MHz

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:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.62 dB
	200MHz ~1000MHz	3.64 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Wireless Receiver
MODEL NO.	5189URF
FCC ID	E5XRX5189URF
POWER SUPPLY	5Vdc from host equipment
MODULATION TYPE	GFSK
RADIO TECHNOLOGY	DSSS
FREQUENCY RANGE	2400 ~ 2483.5 MHz
NUMBER OF CHANNEL	78
ANTENNA TYPE	Printed Antenna with 4 dBi gain
DATA CABLE	NA
I/O PORT	NA

NOTE:

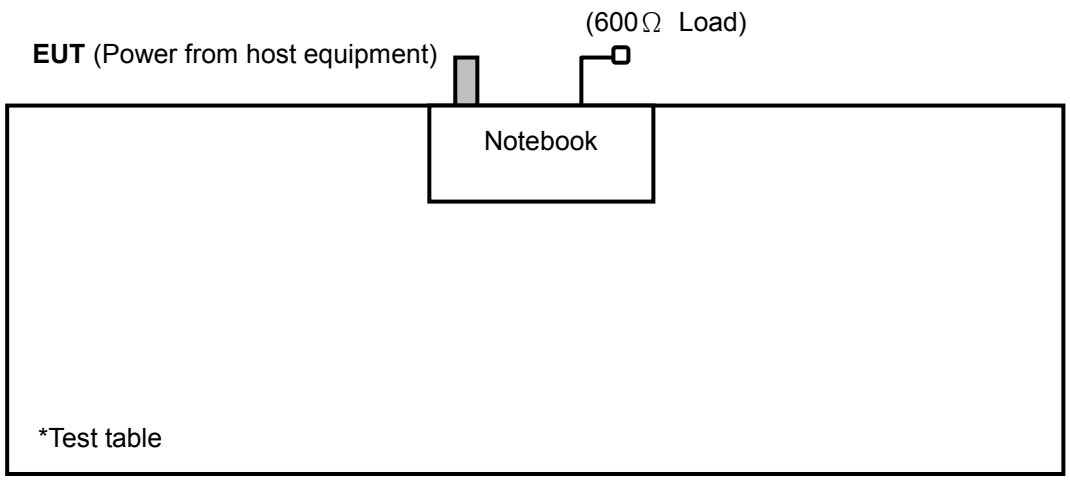
1. The EUT is a Wireless Receiver.
2. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

78 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2431	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460		
19	2421	39	2441	59	2461		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	-

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 and antenna ports (if EUT with antenna diversity architecture).

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
0 to 77	0, 39, 77	DSSS	GFSK

RADIATED EMISSION TEST (BELOW 1 GHz):

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
0 to 77	77	DSSS	GFSK

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
0 to 77	0, 39, 77	DSSS	GFSK

BANDEDGE MEASUREMENT:

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
0 to 77	0, 77	DSSS	GFSK

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (Section 15.249)
ANSI C63.4-2003

All test items 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 FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MOEDL NO.	SERIAL NO.	FCC ID
1	HP compaq nx6125	HP	nx6215	s/n:CND5390CMP	NA
2	600Ω LOAD	NA	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.5m shielded cable without core

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

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	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE:
1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Sep. 25, 2007
RF signal cable Woken	5D-FB	Cable-HYCO3-01	Jan. 06, 2007
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 09, 2007
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jan. 22, 2007
Software ADT	ADT_Cond_V3	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 HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

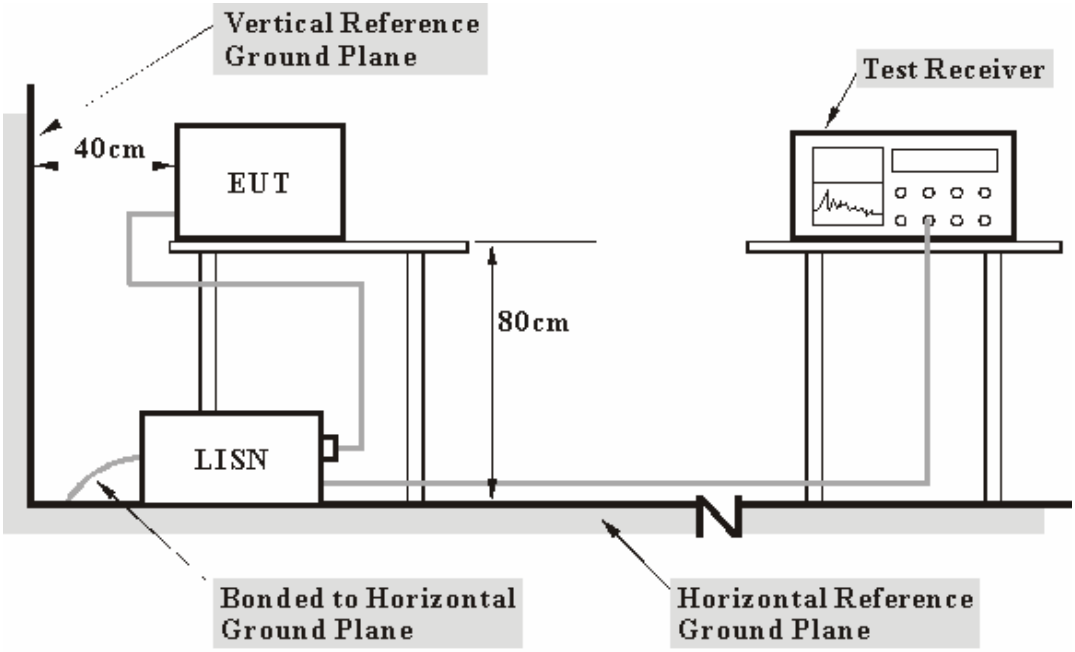
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 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.

4.1.6 EUT OPERATING CONDITIONS

a. Plugged the EUT to a notebook system and placed on a testing table.
b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
c. The notebook system sent "H" messages to its screen.
d. Steps b ~ c were repeated.

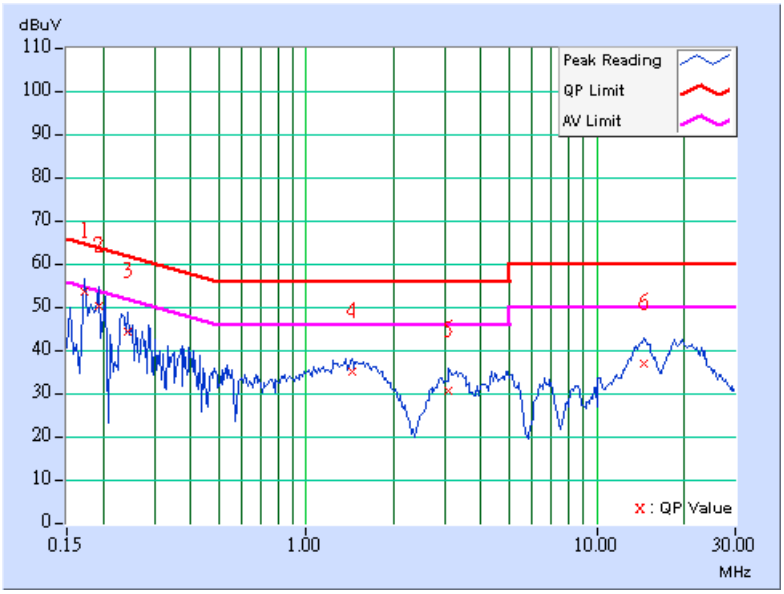
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	PHASE	Line 1
CHANNEL	Channel 0	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.173	0.10	52.98	-	53.08	-	64.79	54.79	-11.71	-
2	0.193	0.10	49.72	-	49.82	-	63.91	53.91	-14.09	-
3	0.244	0.10	43.70	-	43.80	-	61.97	51.97	-18.17	-
4	1.441	0.14	34.68	-	34.82	-	56.00	46.00	-21.18	-
5	3.098	0.29	30.25	-	30.54	-	56.00	46.00	-25.46	-
6	14.531	0.60	36.46	-	37.06	-	60.00	50.00	-22.94	-

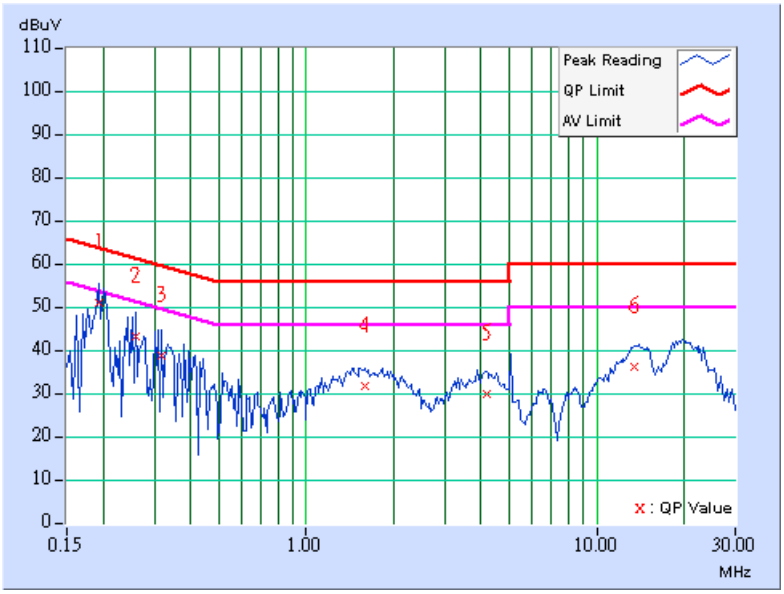
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	PHASE	Line 2
CHANNEL	Channel 0	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	50.57	-	50.67	-	63.91	53.91	-13.24	-
2	0.259	0.10	42.74	-	42.84	-	61.45	51.45	-18.61	-
3	0.318	0.10	38.43	-	38.53	-	59.76	49.76	-21.23	-
4	1.598	0.20	31.21	-	31.41	-	56.00	46.00	-24.59	-
5	4.168	0.37	29.24	-	29.61	-	56.00	46.00	-26.39	-
6	13.391	0.58	35.56	-	36.14	-	60.00	50.00	-23.86	-

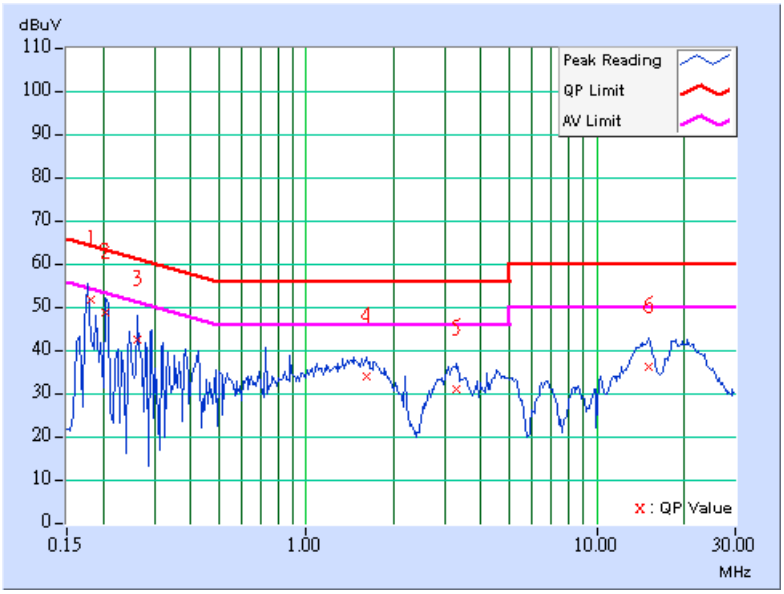
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	PHASE	Line 1
CHANNEL	Channel 39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	51.22	-	51.32	-	64.43	54.43	-13.11	-
2	0.205	0.10	48.18	-	48.28	-	63.42	53.42	-15.14	-
3	0.263	0.10	42.14	-	42.24	-	61.33	51.33	-19.09	-
4	1.605	0.16	33.58	-	33.74	-	56.00	46.00	-22.26	-
5	3.285	0.31	30.55	-	30.86	-	56.00	46.00	-25.14	-
6	15.148	0.63	35.79	-	36.42	-	60.00	50.00	-23.58	-

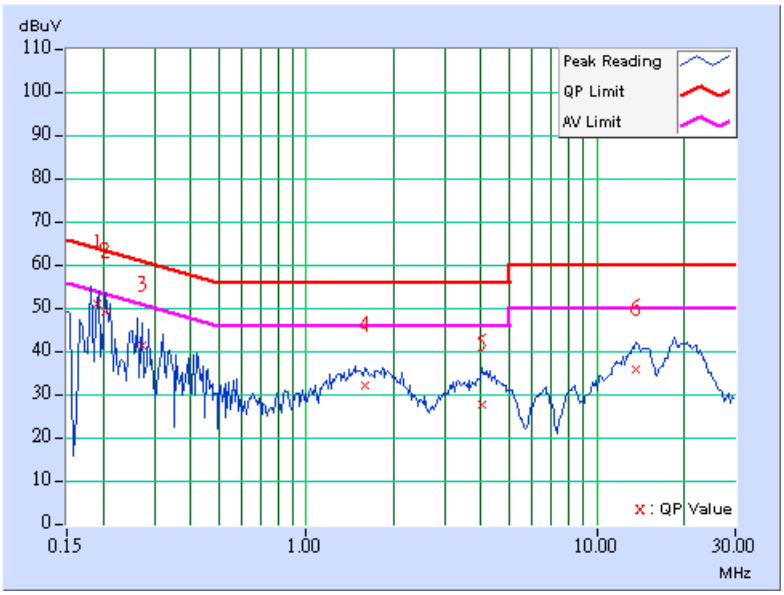
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	PHASE	Line 2
CHANNEL	Channel 39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.192	0.10	50.55	-	50.65	-	63.97	53.97	-13.32	-
2	0.205	0.10	48.74	-	48.84	-	63.42	53.42	-14.58	-
3	0.271	0.10	40.86	-	40.96	-	61.08	51.08	-20.12	-
4	1.598	0.20	31.75	-	31.95	-	56.00	46.00	-24.05	-
5	4.043	0.37	27.23	-	27.60	-	56.00	46.00	-28.40	-
6	13.594	0.58	35.35	-	35.93	-	60.00	50.00	-24.07	-

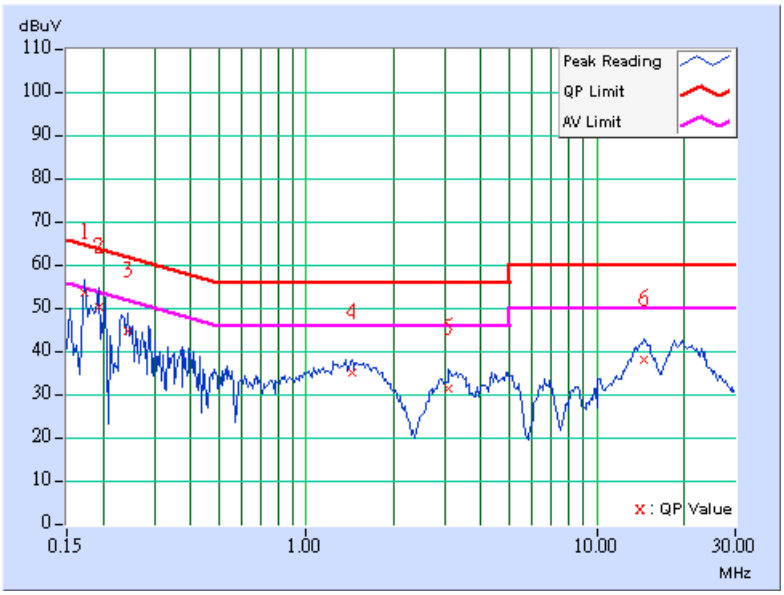
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	PHASE	Line 1
CHANNEL	Channel 77	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.173**	**0.10**	**53.21**	**-**	**53.31**	**-**	**64.82**	**54.82**	**-11.51**	**-**
2	0.194	0.10	49.72	-	49.82	-	63.88	53.88	-14.06	-
3	0.244	0.10	44.25	-	44.35	-	61.97	51.97	-17.62	-
4	1.445	0.14	34.68	-	34.82	-	56.00	46.00	-21.18	-
5	3.100	0.29	30.85	-	31.14	-	56.00	46.00	-24.86	-
6	14.532	0.60	37.58	-	38.18	-	60.00	50.00	-21.82	-

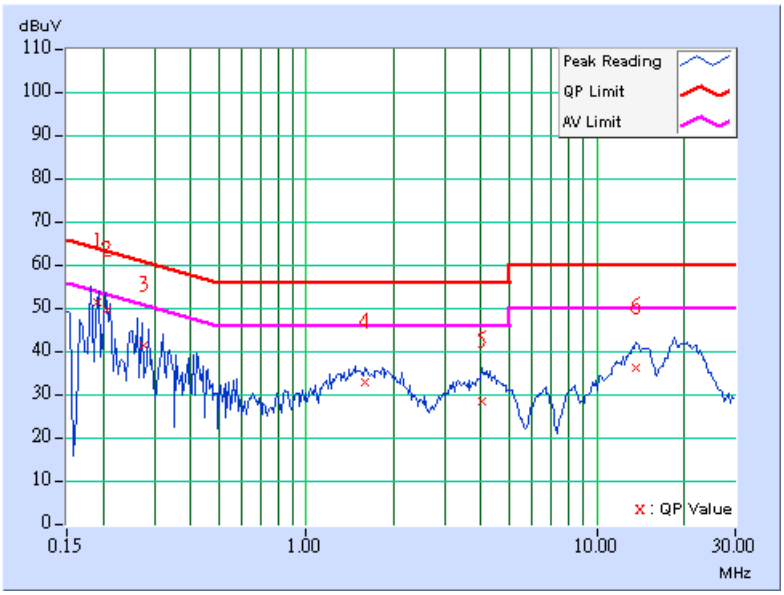
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	PHASE	Line 2
CHANNEL	Channel 77	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.190	0.10	50.96	-	51.06	-	64.03	54.03	-12.97	-
2	0.206	0.10	49.21	-	49.31	-	63.38	53.38	-14.07	-
3	0.277	0.10	40.86	-	40.96	-	60.92	50.92	-19.96	-
4	1.600	0.20	32.36	-	32.56	-	56.00	46.00	-23.44	-
5	4.044	0.37	27.85	-	28.22	-	56.00	46.00	-27.78	-
6	13.597	0.58	35.85	-	36.43	-	60.00	50.00	-23.57	-

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, 15.249 as following:

15.209 Limit

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

15.249 Limit

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 – 928 MHz	50	500
2400 – 2483.5 MHz	50	500
5725 -5875 MHz	50	500
24.0 – 24.25 GHz	250	2500

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
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 01, 2007
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 04, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 15, 2007
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 01, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 19, 2007
Preamplifier Agilent	8449B	3008A01960	Nov. 09, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219268/4	Dec. 20, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	230129/4	Dec. 20, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA
Turn Table ADT.	TT100.	TT93021704	NA
Turn Table Controller ADT.	SC100.	SC93021704	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 HwaYa Chamber 4.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The IC Site Registration No. is IC4924-4.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

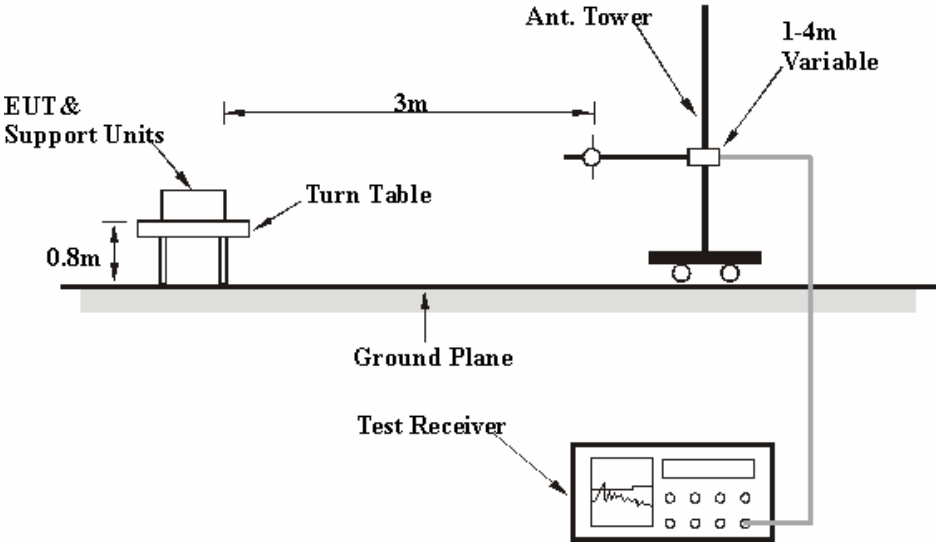
NOTE:

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 of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

RADIATED WORST-CASE DATA: BELOW 1GHz

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 77	**FREQUENCY RANGE**	Below 1000MHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Brad Wu		

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	467.37	34.48 QP	46.00	-11.52	1.50 H	259	15.35	19.13
2	572.34	31.68 QP	46.00	-14.32	1.50 H	322	9.98	21.69
3	601.50	28.71 QP	46.00	-17.29	1.50 H	304	6.14	22.57
4	733.69	34.26 QP	46.00	-11.74	1.00 H	196	9.02	25.25
5	780.20	37.20 QP	46.00	-8.80	1.00 H	150	11.50	25.70
5	801.72	34.70 QP	46.00	-11.30	1.00 H	64	8.57	26.13
6	867.82	33.42 QP	46.00	-12.58	2.00 H	274	6.43	26.99

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	133.03	25.22 QP	43.50	-18.28	1.50 V	106	12.67	12.55
2	465.43	32.48 QP	46.00	-13.52	1.00 V	313	13.40	19.08
3	566.51	30.99 QP	46.00	-15.01	1.00 V	313	9.48	21.51
4	601.50	30.71 QP	46.00	-15.29	1.00 V	259	8.15	22.57
5	731.74	33.45 QP	46.00	-12.55	1.50 V	157	8.27	25.18
6	780.50	33.20 QP	46.00	-12.80	1.50 V	100	7.50	25.70
6	867.82	36.55 QP	46.00	-9.45	1.50 V	28	9.56	26.99

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.

ABOVE 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Brad Wu		

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	1601.00	56.48 PK	74.00	-17.52	1.00 H	45	26.82	29.66
1	**1601.00**	**49.06 AV**	**54.00**	**-4.94**	**1.00 H**	**45**	**19.40**	**29.66**
2	2352.00	55.22 PK	74.00	-18.78	1.41 H	54	23.26	31.96
2	2352.00	45.82 AV	54.00	-8.18	1.41 H	54	13.86	31.96
3	*2402.00	95.96 PK	114.00	-18.04	1.41 H	54	63.81	32.15
3	*2402.00	75.70 AV	94.00	-18.03	1.41 H	54	43.81	32.15
4	4804.00	55.32 PK	74.00	-18.68	1.00 H	219	16.75	38.57
4	4804.00	35.06 AV	54.00	-18.94	1.00 H	219	-3.25	38.57

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	1601.00	55.88 PK	74.00	-18.12	1.45 V	353	26.22	29.66
1	1601.00	48.60 AV	54.00	-5.40	1.45 V	353	18.94	29.66
2	2352.00	54.95 PK	74.00	-19.05	1.42 V	53	22.99	31.96
2	2352.00	45.50 AV	54.00	-8.50	1.42 V	53	13.54	31.96
3	*2402.00	95.60 PK	114.00	-18.40	1.42 V	53	63.45	32.15
3	*2402.00	75.34 AV	94.00	-18.66	1.42 V	53	43.45	32.15
4	4804.00	54.62 PK	74.00	-19.38	1.00 V	207	16.05	38.57
4	4804.00	34.36 AV	54.00	-19.64	1.00 V	207	-3.95	38.57

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 average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log\frac{1.00\ \text{ms}}{10.30\ \text{ms}} = -20.26\text{dB}$$

Please see page 27 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 65%RH, 991hPa
TESTED BY	Brad Wu		

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	1628.00	55.84 PK	74.00	-18.16	1.31 H	59	26.12	29.72
1	1628.00	48.61 AV	54.00	-5.39	1.31 H	59	18.89	29.72
2	*2441.00	95.69 PK	114.00	-18.31	1.36 H	48	63.40	32.29
2	*2441.00	75.43 AV	94.00	-18.57	1.36 H	48	43.40	32.29
3	4882.00	54.96 PK	74.00	-19.04	1.09 H	261	16.17	38.79
3	4882.00	34.70 AV	54.00	-19.30	1.09 H	261	-3.83	38.79

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	1628.00	55.81 PK	74.00	-18.19	1.35 V	234	26.09	29.72
1	1628.00	48.56 AV	54.00	-5.44	1.35 V	234	18.84	29.72
2	*2441.00	95.36 PK	114.00	-18.64	1.40 V	62	63.07	32.29
2	*2441.00	75.10 AV	94.00	-18.90	1.40 V	62	43.07	32.29
3	4882.00	54.69 PK	74.00	-19.31	1.15 V	274	15.90	38.79
3	4882.00	34.43 AV	54.00	-19.57	1.15 V	274	-4.10	38.79

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 average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log\frac{1.00\ \text{ms}}{10.30\ \text{ms}} = -20.26\text{dB}$$

Please see page 27 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 77	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 65%RH, 991hPa
TESTED BY	Brad Wu		

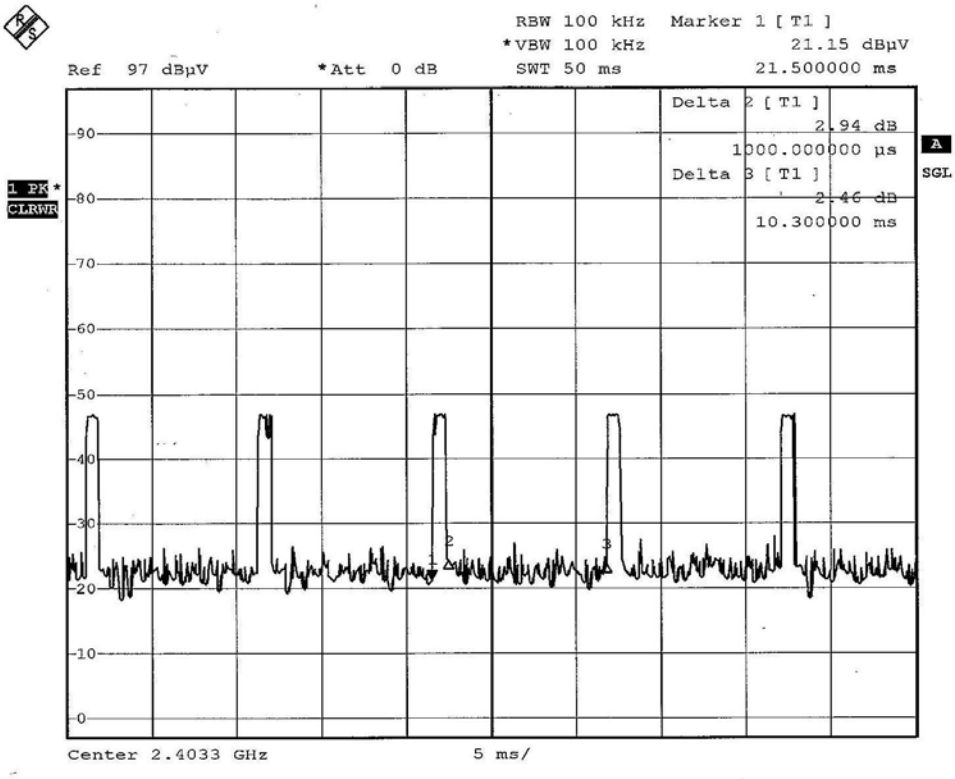
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1653.00	55.96 PK	74.00	-18.04	1.38 H	49	26.18	29.78
1	1653.00	48.72 AV	54.00	-5.28	1.38 H	49	18.94	29.78
2	*2479.00	95.58 PK	114.00	-18.42	1.37 H	46	63.16	32.42
2	*2479.00	75.32 AV	94.00	-18.68	1.37 H	46	43.16	32.42
3	2483.50	67.44 PK	74.00	-6.56	1.37 H	46	35.00	32.44
3	2483.50	48.63 AV	54.00	-5.37	1.37 H	46	16.19	32.44
4	4958.00	54.81 PK	74.00	-19.19	1.03 H	248	15.81	39.00
4	4958.00	34.55 AV	54.00	-19.45	1.03 H	248	-4.19	39.00

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	1653.00	55.74 PK	74.00	-18.26	1.40 V	229	25.96	29.78
1	1653.00	48.46 AV	54.00	-5.54	1.40 V	229	18.68	29.78
2	*2479.00	95.12 PK	114.00	-18.88	1.41 V	60	62.70	32.42
2	*2479.00	75.86 AV	94.00	-19.14	1.41 V	60	42.70	32.42
3	2483.50	67.12 PK	74.00	-6.88	1.41 V	60	34.68	32.44
3	2483.50	48.30 AV	54.00	-5.70	1.41 V	60	15.86	32.44
4	4958.00	54.51 PK	74.00	-19.49	1.03 V	244	15.51	39.00
4	4958.00	34.25AV	54.00	-19.75	1.03 V	244	-4.49	39.00

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.
5. " * " : Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log\frac{1.00\ \text{ms}}{10.30\ \text{ms}} = -20.26\text{dB}$$

Please see page 27 for plotted duty.



$$20\log(\text{Duty cycle}) = 20\log\frac{1.00\ \text{ms}}{10.30\ \text{ms}} = -20.26\text{dB}$$

4.3 BAND EDGES MEASUREMENT

4.3.1 LIMITS OF BAND EDGES MEASUREMENT

Below –50dB 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
SPECTRUM ANALYZER	FSP40	100040	Jun. 07, 2007

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

4.3.3 TEST PROCEDURE

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

4.3.4 DEVIATION FROM TEST STANDARD

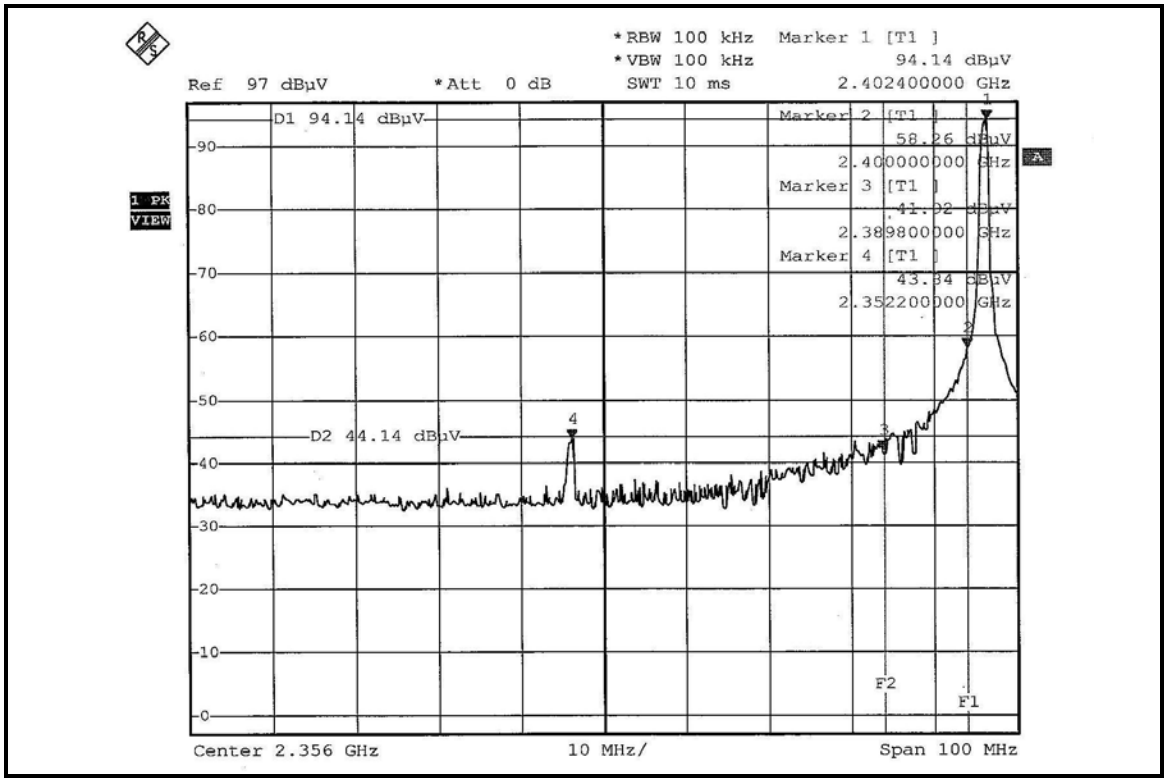
No deviation.

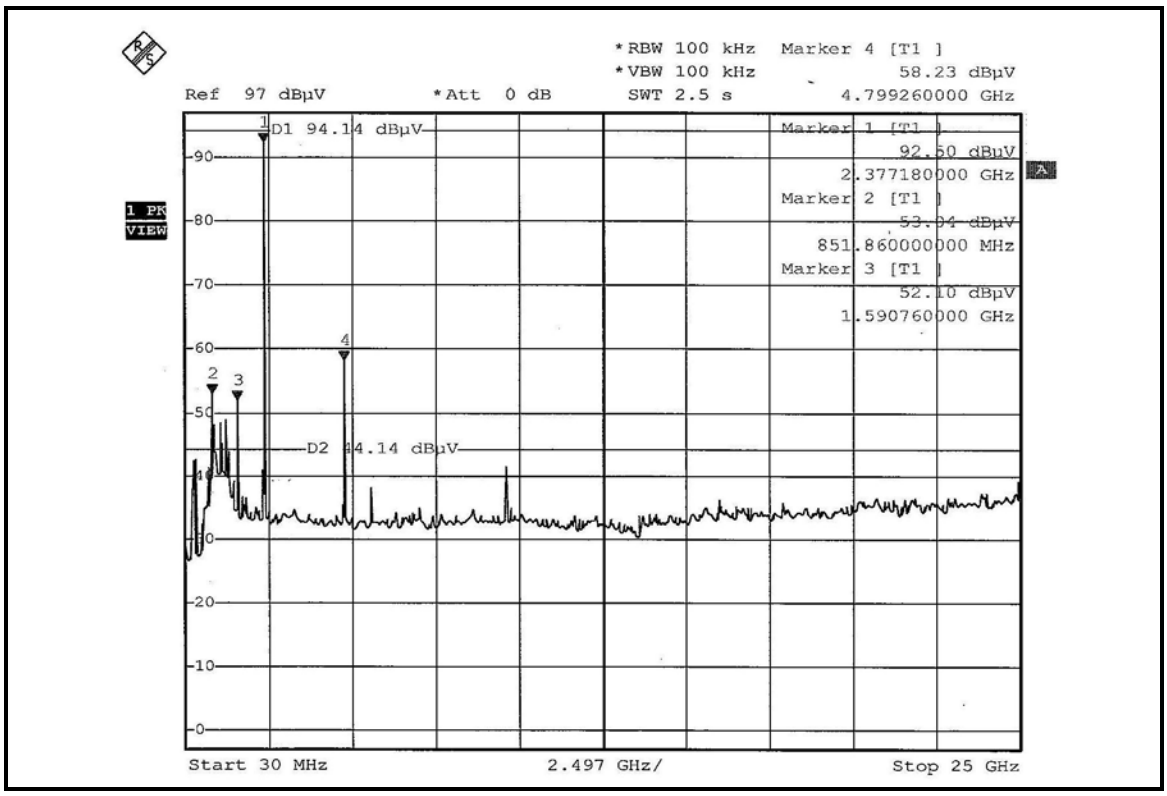
4.3.5 EUT OPERATING CONDITION

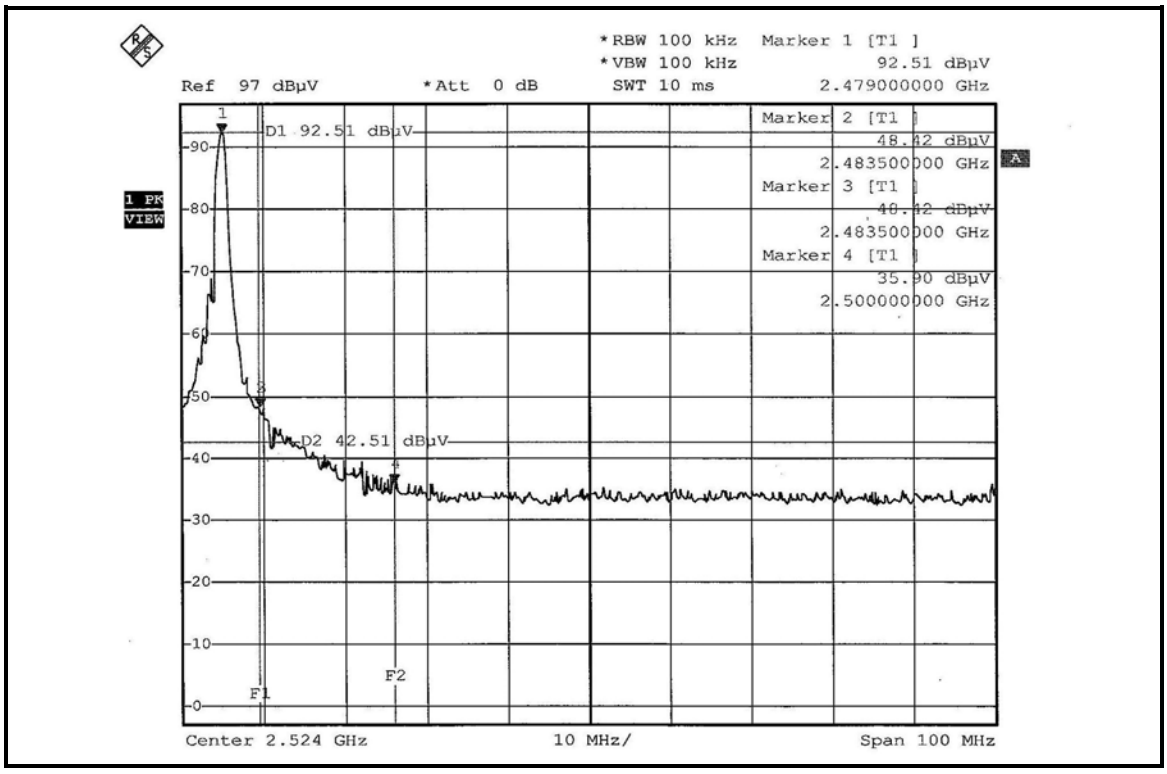
Same as Item 4.3.6.

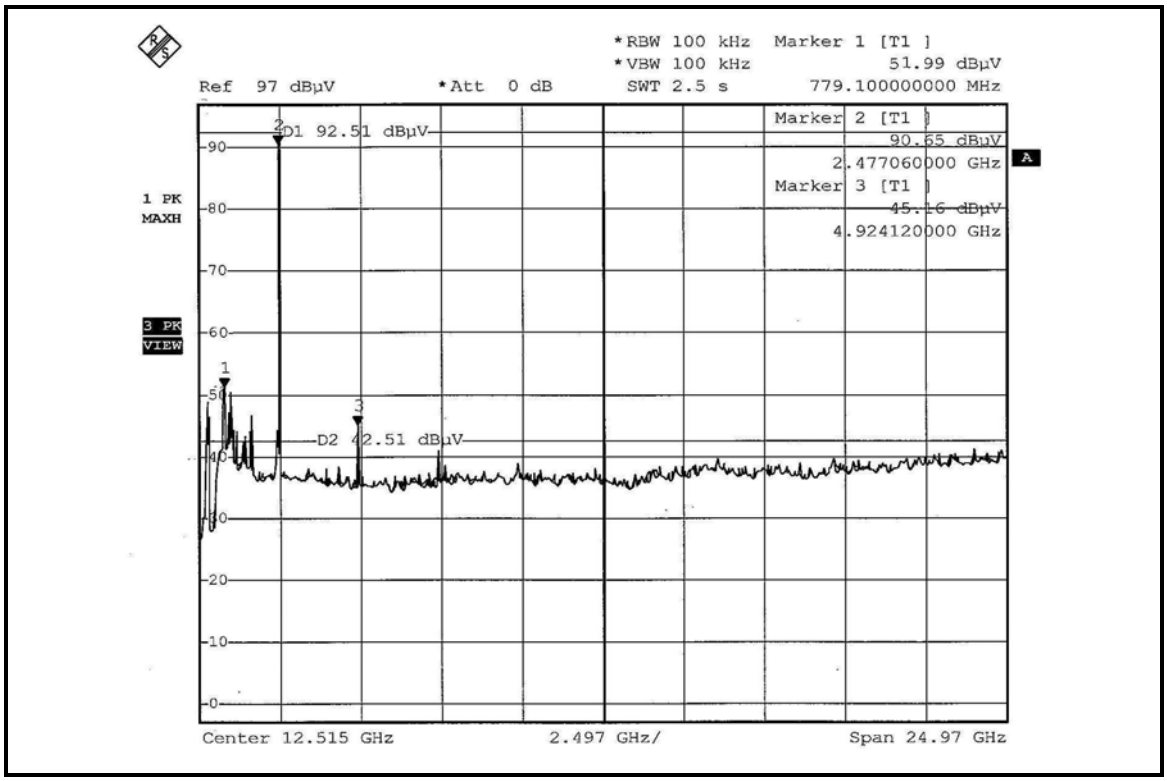
4.3.6 TEST RESULTS

The spectrum plots are attached on the following 4 images. D2 line indicates the highest level, and D1 line indicates the 50dB offset below D2. It shows compliance with the requirement in part 15.249 (d).


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
94.14 dBµV
2.402400000 GHz
Ref 97 dBµV
*Att 0 dB
D1 94.14 dBµV
D2 44.14 dBµV
Marker 2 [T1]
58.26 dBµV
2.400000000 GHz
Marker 3 [T1]
41.02 dBµV
2.389800000 GHz
Marker 4 [T1]
43.84 dBµV
2.352200000 GHz
1 PK VIEW
A
F2
F1
Center 2.356 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 4 [T1]
58.23 dBµV
4.799260000 GHz
Ref 97 dBµV
*Att 0 dB
D1 94.14 dBµV
D2 44.14 dBµV
Marker 1 [T1]
92.50 dBµV
2.377180000 GHz
Marker 2 [T1]
53.04 dBµV
851.860000000 MHz
Marker 3 [T1]
52.10 dBµV
1.590760000 GHz
1 PK VIEW
A
Start 30 MHz
2.497 GHz/
Stop 25 GHz


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
92.51 dBµV
2.479000000 GHz
Ref 97 dBµV
*Att 0 dB
Marker 2 [T1]
48.42 dBµV
2.483500000 GHz
Marker 3 [T1]
48.42 dBµV
2.483500000 GHz
Marker 4 [T1]
35.90 dBµV
2.500000000 GHz
1 PK
VIEW
D1 92.51 dBµV
D2 42.51 dBµV
F1
F2
Center 2.524 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
51.99 dBµV
779.100000000 MHz
Ref 97 dBµV
*Att 0 dB
Marker 2 [T1]
90.65 dBµV
2.477060000 GHz
Marker 3 [T1]
45.16 dBµV
4.924120000 GHz
1 PK
MAXH
3 PK
VIEW
D1 92.51 dBµV
D2 42.51 dBµV
Center 12.515 GHz
2.497 GHz/
Span 24.97 GHz

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, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, NCC
Netherlands	Telefication
Singapore	PSB , 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: 886-2-26051924

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

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

Web Site: www.adt.com.tw

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

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.