FCC TEST REPORT

REPORT NO.:	RF980507H11
MODEL NO.:	M-R0007
RECEIVED:	May 12, 2009
TESTED:	May 15 to June 02, 2009
ISSUED:	June 04, 2009

APPLICANT:	LOGITECH FAR EAST LTD.
ADDRESS:	#2 Creation Rd. 4, Science-Based Ind. Park Hsinchu Taiwan, R.O.C.

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
TEST LOCATION:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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1 CERTIFICATION

PRODUCT :	2.4GHz Cordless Mouse
BRAND NAME :	Logitech
MODEL NO. :	M-R0007
TESTED :	May 15 to June 02, 2009
TEST SAMPLE :	MASS-PRODUCTION
APPLICANT :	LOGITECH FAR EAST LTD.
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.249), ANSI C63.4-2003

The above equipment (Model: M-R0007) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, 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:** June 04, 2009
(Sunny Wen, Specialist)

TECHNICAL ACCEPTANCE : Responsible for RF
(Hank Chung, Deputy Manager) , **DATE:** June 04, 2009

APPROVED BY : , **DATE:** June 04, 2009
(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 Paragraph	**Test Type**	**Result**	**Remark**
15.207	Conducted Emission Test	PASS	Minimum passing margin is -9.16dB at 0.166MHz
15.249	Radiated Emission Test	PASS	Minimum passing margin is -4.16dB at 2399.90MHz
15.249	Conducted - Out Band Measurement	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 16-4-2:

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

Measurement	Value
Conducted emissions	2.44 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.49 dB
Radiated emissions (18GHz -40GHz)	2.70 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	2.4GHz Cordless Mouse
MODEL NO.	M-R0007
FCC ID	JNZMR0007
POWER SUPPLY	DC 1.2V from batteries, DC 5V from host equipment or DC 5.15V from power adapter
MODULATION TYPE	GFSK
CARRIER FREQUENCY OF EACH CHANNEL	2405MHz ~ 2474MHz
NUMBER OF CHANNEL	12
ANTENNA TYPE	PCB printed quarter wave antenna with 0.5dBi antenna gain
DATA CABLE	JEM recharge USB cable (shielded 1.86m) Sinbon recharge USB cable (shielded 1.86m)
I/O PORTS	USB port x 1
ASSOCIATED DEVICES	adapter

NOTE:

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

To Logitech's Brand :	Logitech
To Logitech's Model No. :	NA
Brand :	PI
Model No. :	AD6310C
Input power :	AC 100-240V, 50/60Hz, 0.13A
Output power :	DC 5.15V, 1A

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

Pre-test Mode	Description	Power source
Mode A	Stand alone	Batteries
Mode B	Sinbon recharge USB cable + batteries	Host equipment
Mode C	JEM recharge USB cable + batteries	Host equipment
Mode D	Sinbon recharge USB cable	Host equipment
Mode E	**Sinbon recharge USB cable**	**Adapter**

The worst case was found in **Mode E**. Therefore only the test data of the modes were recorded in this report individually.

3. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Twelve channels are provided in this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	2405	4	2417	7	2441	10	2465
2	2408	5	2432	8	2444	11	2471
3	2414	6	2435	9	2462	12	2474

NOTE:

1. Below 1 GHz, the channel 1, 8, and 12 were pre-tested in chamber. The channel 1, worst case one, was chosen for final test.
2. Above 1 GHz, the channel 1, 8, and 12 were tested individually.

☒ For conducted emissions, the EUT was tested as the following test modes:

Test Mode	Description	Power source
Mode 1	Sinbon recharge USB cable + batteries	Host equipment
Mode 2	Sinbon recharge USB cable + batteries	Adapter
Mode 3	Sinbon recharge USB cable	Adapter

☒ For radiated emissions, the EUT was tested as the following test mode:

Test Mode	Description	Power source
Mode 1	Sinbon recharge USB cable	Adapter

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 2.4GHz Cordless Mouse. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C (Section 15.249)
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 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.

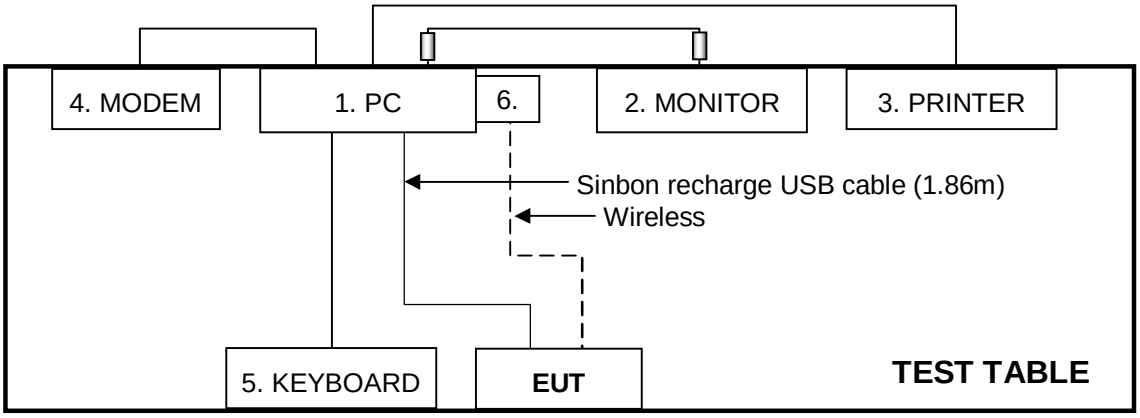
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	PERSONAL COMPUTER	DELL	DCSM	194QL1S	DoC
2	MONITOR	ADI	CM100	026058T10200636 A	DoC
3	PRINTER	EPSON	LQ-300+	DCGY017082	DoC
4	MODEM	ACEEX	1414	0206026772	IFAXDM1414
5	KEYBOARD	LENOVO	KU-0225	0040792	DoC
6	2.4GHz Transceiver	Logitech	C-U0003	NA	NA

No.	Signal cable description
1	NA
2	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, with two cores.
3	1.9 m braid shielded wire, terminated with DB25 and centronics connector via metallic frame, w/o core
4	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
5	2.5 m foil shielded wire, USB Connector, w/o core
6	NA

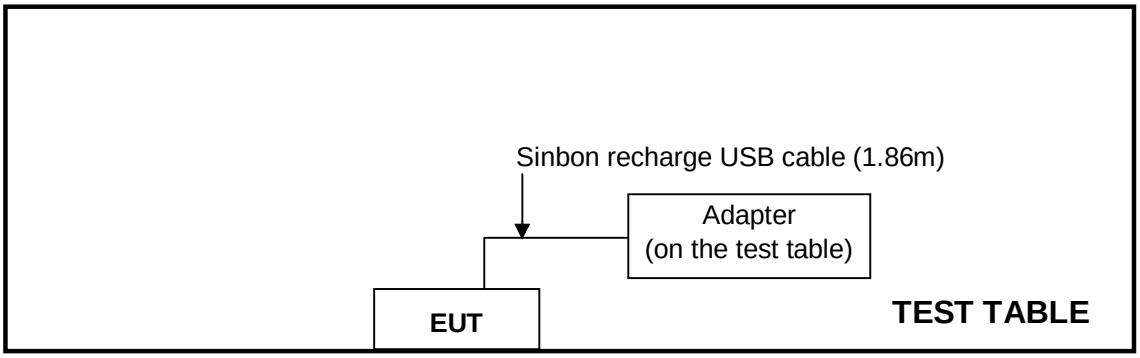
Note: The power cords of the above support units were unshielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST

For Conducted test mode 1:



For other test modes :



4 TEST PROCEDURES 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
Test Receiver	ESCS 30	100375	Mar. 23, 2009	Mar. 22, 2010
Line-Impedance Stabilization Network (for EUT)	ENV-216	100071	Nov. 26, 2008	Nov. 25, 2009
Line-Impedance Stabilization Network (for Peripheral)	ESH3-Z5	848773/004	Nov. 05, 2008	Nov. 04, 2009
RF Cable (JYEBAO)	5DFB	COBCAB-001	Aug. 15, 2008	Aug. 14, 2009
50 ohms Terminator	50	3	Nov. 05, 2008	Nov. 04, 2009
Software	BV ADT_Cond_V7.3.7	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 Shielded Room No. B.
3 The VCCI Con B Registration No. is C-2193.

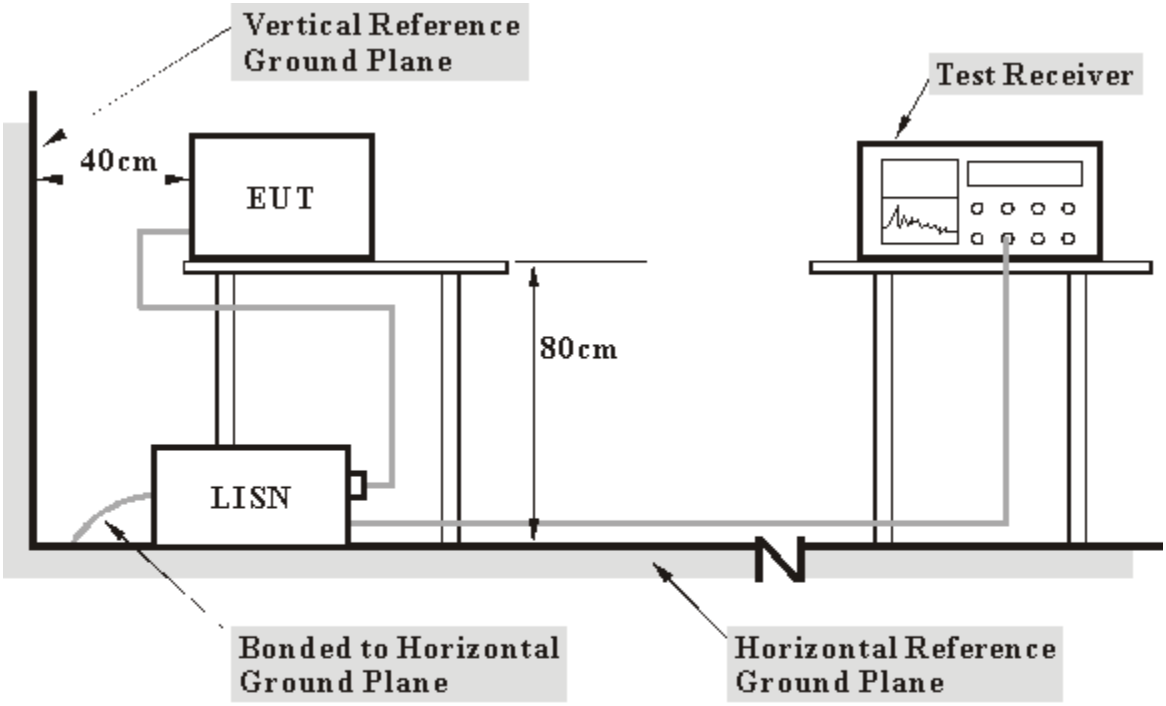
4.1.3 TEST PROCEDURES

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

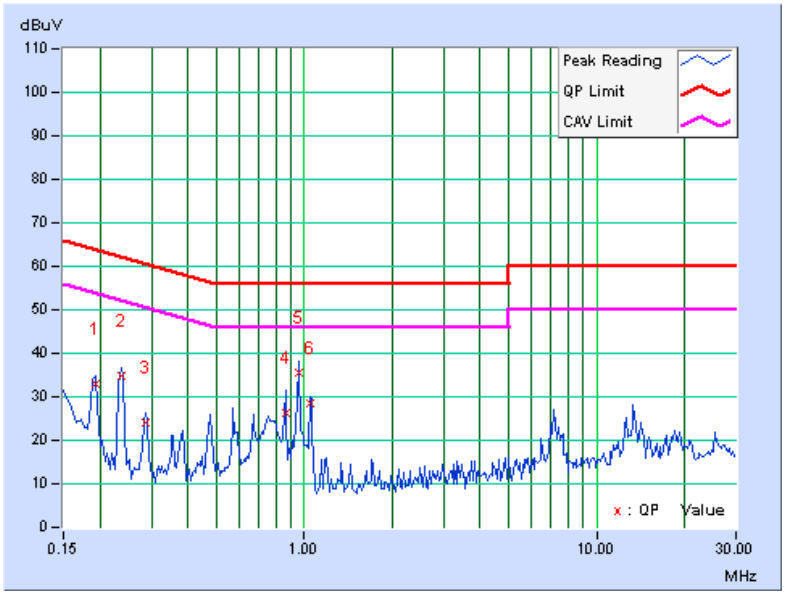
Set the EUT under transmission / receiver condition continuously at specific channel frequency.

4.1.6 TEST RESULTS (MODE 1)

INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6DB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 960 hPa	**PHASE**	Line (L)
TESTED BY	Eric Lee		

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	0.193	0.22	32.81	-	33.03	-	63.91	53.91	-30.88	-
2	0.236	0.26	34.43	-	34.69	-	62.24	52.24	-27.54	-
3	0.287	0.32	23.87	-	24.19	-	60.62	50.62	-36.42	-
4	0.861	0.33	25.88	-	26.21	-	56.00	46.00	-29.79	-
5	0.955	0.30	35.40	-	35.70	-	56.00	46.00	-20.30	-
6	1.051	0.30	28.15	-	28.45	-	56.00	46.00	-27.55	-

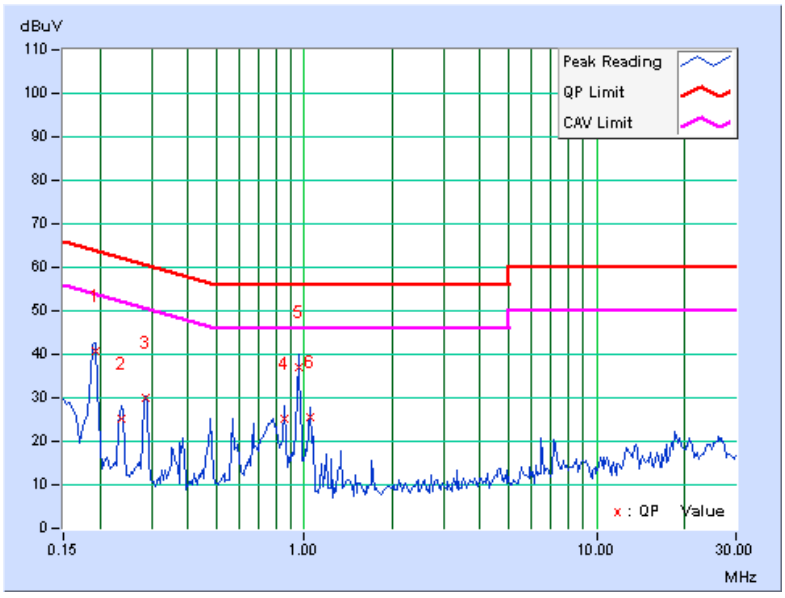
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 960 hPa	**PHASE**	Neutral (N)
TESTED BY	Eric Lee		

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	0.193	0.15	40.45	-	40.60	-	63.91	53.91	-23.31	-
2	0.236	0.19	25.17	-	25.36	-	62.24	52.24	-36.87	-
3	0.287	0.26	29.58	-	29.84	-	60.62	50.62	-30.78	-
4	0.860	0.25	25.06	-	25.31	-	56.00	46.00	-30.69	-
5	0.956	0.21	36.96	-	37.17	-	56.00	46.00	-18.83	-
6	1.047	0.21	25.21	-	25.42	-	56.00	46.00	-30.58	-

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.

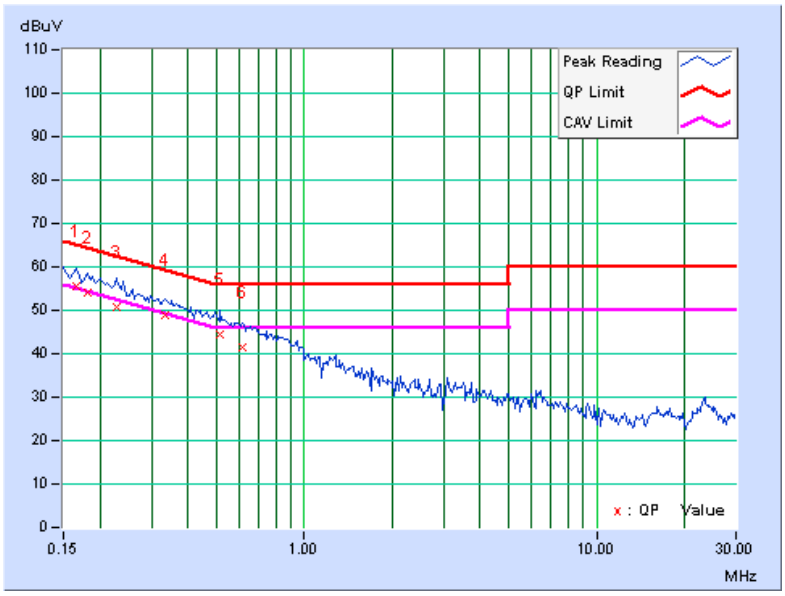


4.1.7 TEST RESULTS (MODE 2)

INPUT POWER	120Vac, 60 Hz	**6DB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 960 hPa	**PHASE**	Line (L)
TESTED BY	Eric Lee		

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	**0.166**	**0.20**	**55.42**	**45.82**	**55.62**	**46.02**	**65.18**	**55.18**	**-9.56**	**-9.16**
2	0.181	0.21	53.97	-	54.18	-	64.43	54.43	-10.25	-
3	0.228	0.25	50.63	-	50.88	-	62.52	52.52	-11.63	-
4	0.334	0.38	48.49	-	48.87	-	59.36	49.36	-10.49	-
5	0.517	0.43	44.11	-	44.54	-	56.00	46.00	-11.46	-
6	0.611	0.40	41.05	-	41.45	-	56.00	46.00	-14.55	-

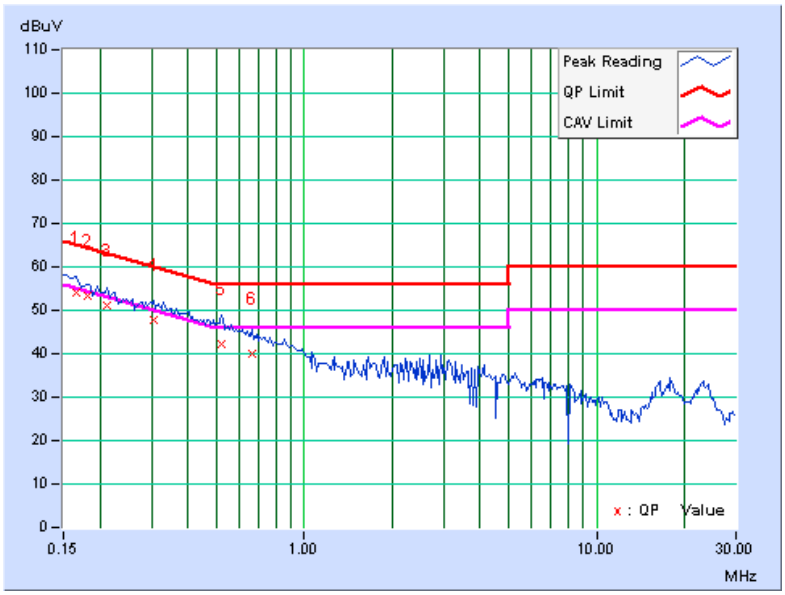
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission 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
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 960 hPa	**PHASE**	Neutral (N)
TESTED BY	Eric Lee		

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	0.166	0.13	54.11	-	54.24	-	65.18	55.18	-10.94	-
2	0.181	0.14	53.13	-	53.27	-	64.43	54.43	-11.16	-
3	0.213	0.17	50.83	-	51.00	-	63.11	53.11	-12.11	-
4	0.306	0.28	47.40	-	47.68	-	60.07	50.07	-12.39	-
5	0.521	0.36	41.92	-	42.28	-	56.00	46.00	-13.72	-
6	0.666	0.31	39.73	-	40.04	-	56.00	46.00	-15.96	-

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.

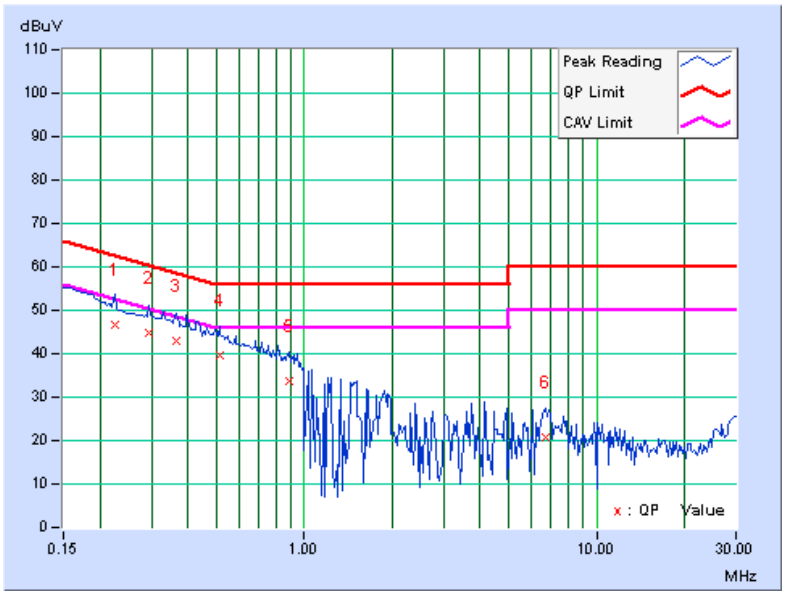


4.1.8 TEST RESULTS (MODE 3)

INPUT POWER	120Vac, 60 Hz	**6DB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 960 hPa	**PHASE**	Line (L)
TESTED BY	Eric Lee		

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	0.224	0.25	46.42	-	46.67	-	62.66	52.66	-15.99	-
2	0.295	0.33	44.40	-	44.73	-	60.40	50.40	-15.66	-
3	0.365	0.42	42.59	-	43.01	-	58.62	48.62	-15.61	-
4	0.513	0.43	39.35	-	39.78	-	56.00	46.00	-16.22	-
5	0.888	0.32	33.35	-	33.67	-	56.00	46.00	-22.33	-
6	6.660	0.64	20.20	-	20.84	-	60.00	50.00	-39.16	-

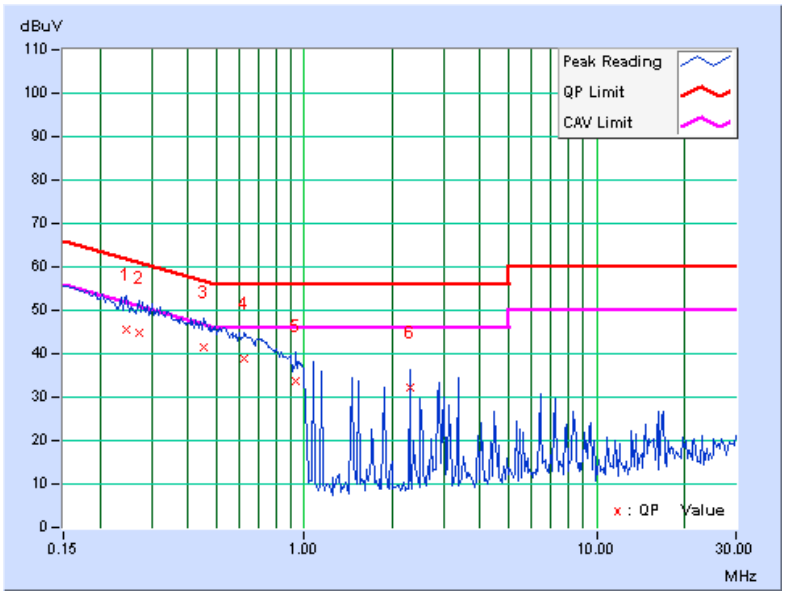
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission 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
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 960 hPa	**PHASE**	Neutral (N)
TESTED BY	Eric Lee		

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	0.248	0.21	45.48	-	45.69	-	61.84	51.84	-16.15	-
2	0.271	0.24	44.56	-	44.80	-	61.08	51.08	-16.29	-
3	0.455	0.38	40.93	-	41.31	-	56.79	46.79	-15.48	-
4	0.623	0.33	38.55	-	38.88	-	56.00	46.00	-17.12	-
5	0.935	0.22	33.30	-	33.52	-	56.00	46.00	-22.48	-
6	2.293	0.36	31.94	-	32.30	-	56.00	46.00	-23.70	-

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

According to 15.249 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)	
	Peak	Average
2400 ~ 2483.5	114	94
	Field Strength of Harmonics (dBuV/m)	
	74	54

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

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

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
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 09, 2008	Dec. 08, 2009
HP Pre_Amplifier	8449B	3008A01923	Nov. 10, 2008	Nov. 09, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 09, 2008	Sep. 08, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 09, 2008	Dec. 08, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
RF Switches	EMH-011	08009	Oct. 07, 2008	Oct. 06, 2009
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 15, 2008	Aug. 14, 2009
RF Cable	8DFB	STCCAB-30M-1GHz	Oct. 07, 2008	Oct. 06, 2009
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	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 horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 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 7450G-3.

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.

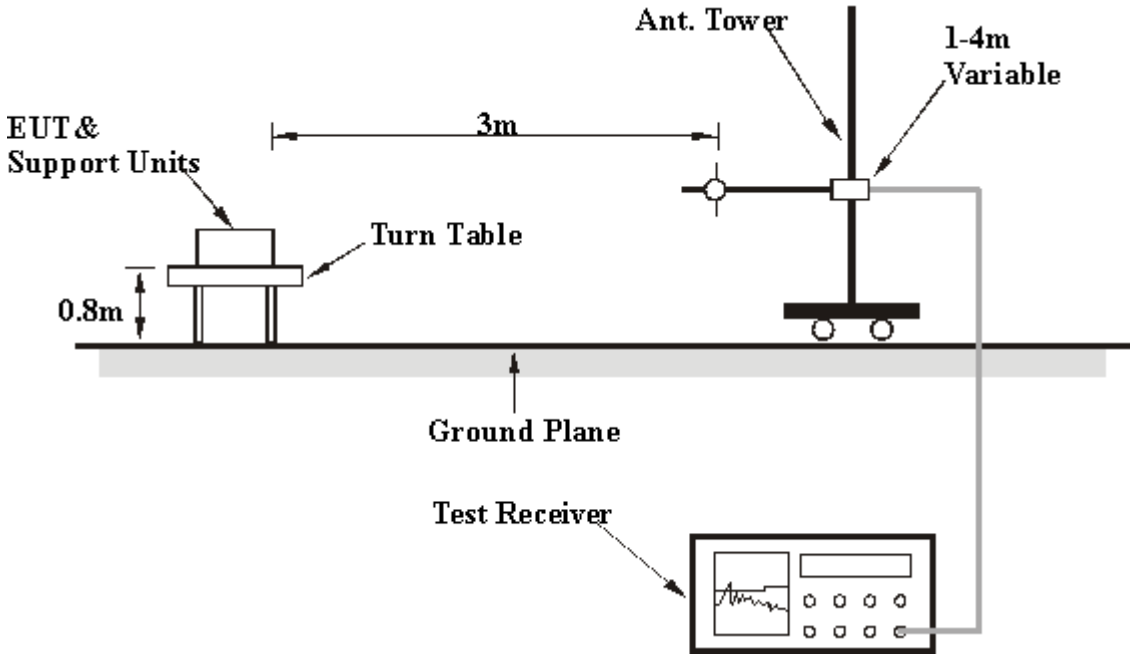
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) 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 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

Set the EUT under transmission / receiver condition continuously at specific channel frequency.

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	**FREQUENCY RANGE**	Below 1000MHz
INPUT POWER	120Vac, 60Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25.0deg. C, 63.0%RH 960hPa	**TESTED BY**	Wen Yu

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	57.21	20.73 QP	40.00	-19.27	1.62 H	22	6.39	14.34
2	333.00	34.93 QP	46.00	-11.07	1.18 H	59	16.56	18.37
3	399.86	35.70 QP	46.00	-10.30	2.13 H	230	14.57	21.13
4	480.08	30.06 QP	46.00	-15.94	1.65 H	163	7.70	22.36
5	500.03	28.20 QP	46.00	-17.80	1.63 H	225	5.54	22.66
6	912.14	32.36 QP	46.00	-13.64	1.00 H	307	1.16	31.20
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	57.21	27.53 QP	40.00	-12.47	1.00 V	262	13.19	14.34
2	133.49	27.21 QP	43.50	-16.29	1.00 V	141	12.60	14.61
3	333.00	28.06 QP	46.00	-17.94	1.19 V	296	9.69	18.37
4	400.03	33.81 QP	46.00	-12.19	1.15 V	328	12.67	21.14
5	499.77	27.92 QP	46.00	-18.08	1.02 V	291	5.26	22.66
6	665.71	33.74 QP	46.00	-12.26	1.59 V	289	7.48	26.26

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 DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 63.0%RH 960hPa	TESTED BY	Wen Yu

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	**2399.90**	**69.84 PK**	**74.00**	**-4.16**	**1.40 H**	**179**	**39.52**	**30.32**
2	2399.90	37.84 AV	54.00	-16.16	1.40 H	179	7.52	30.32
3	*2405.00	96.17 PK	114.00	-17.83	1.40 H	179	65.83	30.34
4	*2405.00	64.17 AV	94.00	-29.83	1.40 H	179	33.83	30.34
5	4810.00	51.14 PK	74.00	-22.86	1.61 H	233	14.39	36.75
6	4810.00	19.14 AV	54.00	-34.86	1.61 H	233	-17.61	36.75
7	7215.00	56.44 PK	74.00	-17.56	1.18 H	222	13.30	43.14
8	7215.00	24.44 AV	54.00	-29.56	1.18 H	222	-18.70	43.14
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	2399.70	67.48 PK	74.00	-6.52	1.00 V	226	37.16	30.32
2	2399.70	35.48 AV	54.00	-18.52	1.00 V	226	5.16	30.32
3	*2405.00	93.04 PK	114.00	-20.96	1.00 V	226	62.70	30.34
4	*2405.00	61.04 AV	94.00	-32.96	1.00 V	226	30.70	30.34
5	4810.00	51.50 PK	74.00	-22.50	1.30 V	0	14.75	36.75
6	4810.00	19.50 AV	54.00	-34.50	1.30 V	0	-17.25	36.75
7	7215.00	57.72 PK	74.00	-16.28	1.12 V	181	14.58	43.14
8	7215.00	25.72 AV	54.00	-28.28	1.12 V	181	-17.42	43.14

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 (Duty cycle) = 20 log (0.2 ms / 7.94 ms) = -31.98 dB

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 8	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 63.0%RH 960hPa	TESTED BY	Wen Yu

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	*2444.00	97.11 PK	114.00	-16.89	1.30 H	192	66.63	30.48
2	*2444.00	65.11 AV	94.00	-28.89	1.30 H	192	34.63	30.48
3	4888.00	51.47 PK	74.00	-22.53	1.58 H	232	14.51	36.96
4	4888.00	19.47 AV	54.00	-34.53	1.58 H	232	-17.49	36.96
5	7332.00	55.96 PK	74.00	-18.04	1.20 H	225	12.83	43.13
6	7332.00	23.96 AV	54.00	-30.04	1.20 H	225	-19.17	43.13
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	*2444.00	92.08 PK	114.00	-21.92	1.05 V	204	61.60	30.48
2	*2444.00	60.08 AV	94.00	-33.92	1.05 V	204	29.60	30.48
3	4888.00	51.75 PK	74.00	-22.25	1.40 V	352	14.79	36.96
4	4888.00	19.75 AV	54.00	-34.25	1.40 V	352	-17.21	36.96
5	7332.00	57.36 PK	74.00	-16.64	1.36 V	126	14.23	43.13
6	7332.00	25.36 AV	54.00	-28.64	1.36 V	126	-17.77	43.13

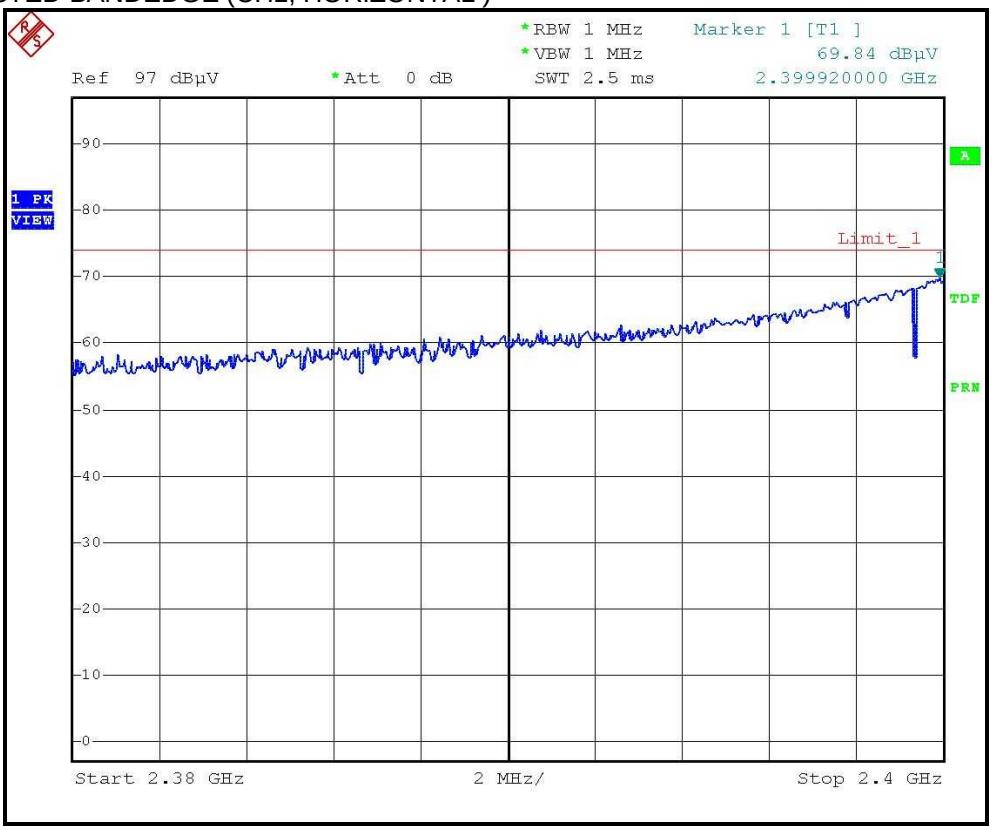
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
20 log (Duty cycle) = 20 log (0.2 ms / 7.94 ms) = -31.98 dB

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 12	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 63.0%RH 960hPa	TESTED BY	Wen Yu

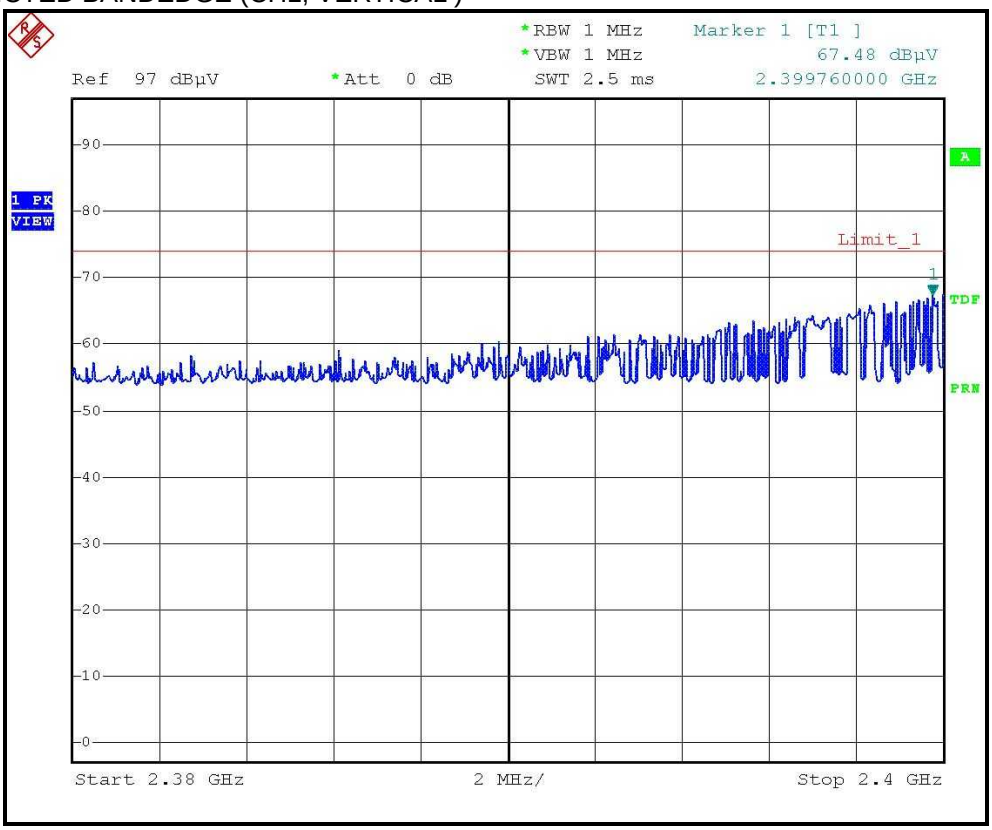
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2474.00	97.10 PK	114.00	-16.90	1.30 H	171	66.51	30.59
2	*2474.00	65.10 AV	94.00	-28.90	1.30 H	171	34.51	30.59
3	2483.60	63.94 PK	74.00	-10.06	1.30 H	171	33.31	30.63
4	2483.60	31.94 AV	54.00	-22.06	1.30 H	171	1.31	30.63
5	4948.00	51.50 PK	74.00	-22.50	1.49 H	230	14.38	37.12
6	4948.00	19.50 AV	54.00	-34.50	1.49 H	230	-17.62	37.12
7	7422.00	55.80 PK	74.00	-18.20	1.45 H	224	12.67	43.13
8	7422.00	23.80 AV	54.00	-30.20	1.45 H	224	-19.33	43.13
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	*2474.00	91.49 PK	114.00	-22.51	1.34 V	202	60.90	30.59
2	*2474.00	59.49 AV	94.00	-34.51	1.34 V	202	28.90	30.59
3	2483.60	59.33 PK	74.00	-14.67	1.34 V	202	28.70	30.63
4	2483.60	27.33 AV	54.00	-26.67	1.34 V	202	-3.30	30.63
5	4948.00	51.61 PK	74.00	-22.39	1.42 V	344	14.49	37.12
6	4948.00	19.61 AV	54.00	-34.39	1.42 V	344	-17.51	37.12
7	7422.00	57.28 PK	74.00	-16.72	1.38 V	123	14.15	43.13
8	7422.00	25.28 AV	54.00	-28.72	1.38 V	123	-17.85	43.13

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 (Duty cycle) = 20 log (0.2 ms / 7.94 ms) = -31.98 dB

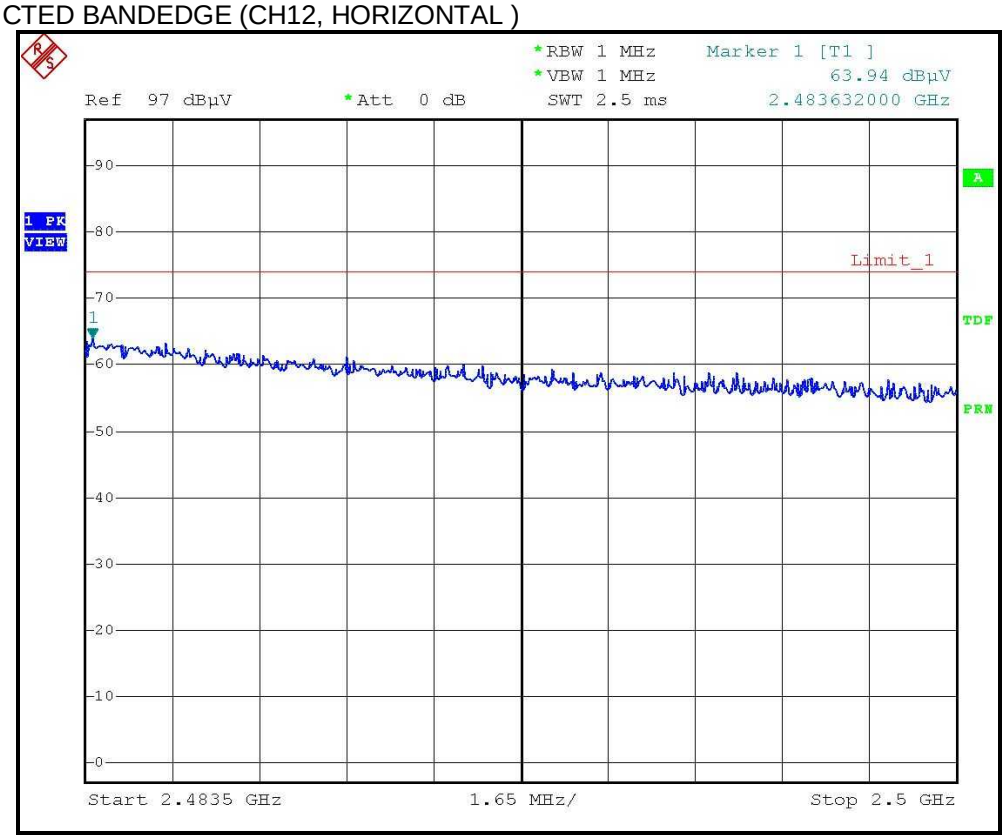
RESTRICTED BANDEDGE (CH1, HORIZONTAL)



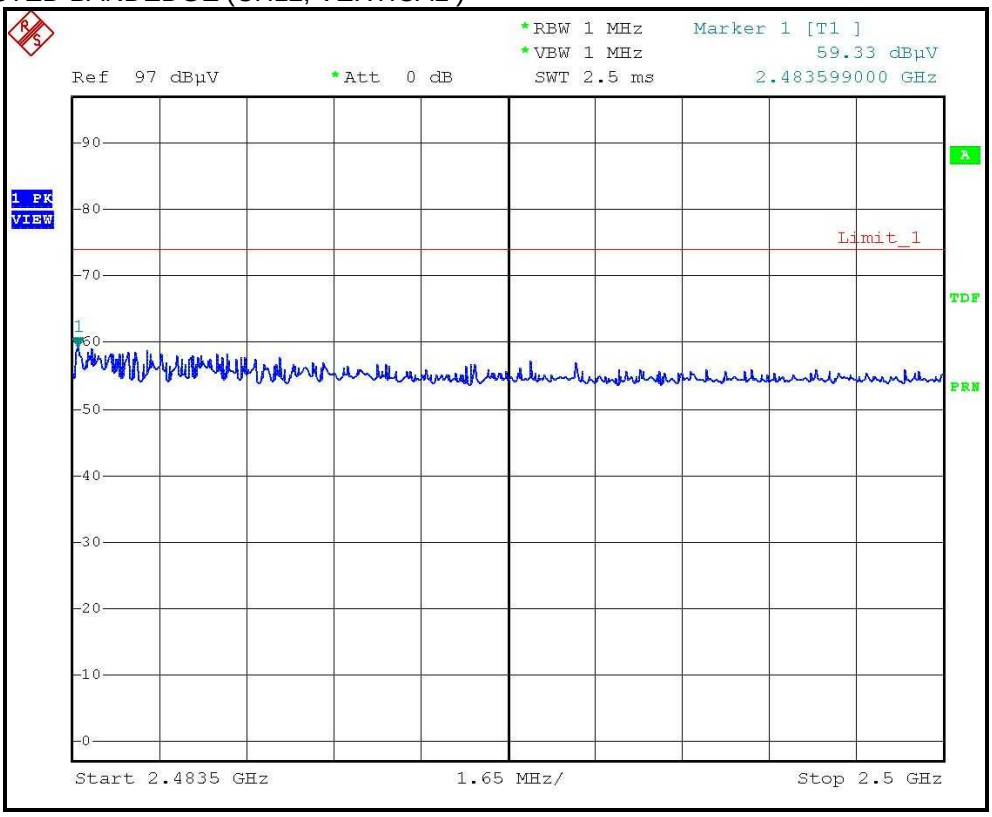
RESTRICTED BANDEDGE (CH1, VERTICAL)



RESTRICTED BANDEDGE (CH12, HORIZONTAL)



RESTRICTED BANDEDGE (CH12, VERTICAL)



4.3 CONDUCTED - OUT BAND MEASUREMENT

4.3.1 LIMITS OF CONDUCTED - OUT BAND MEASUREMENT

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2008	Aug. 08, 2009

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 with suitable frequency span including 300 MHz bandwidth from band edge. The band edges was measured and recorded.

4.3.4 DEVIATION FROM TEST STANDARD

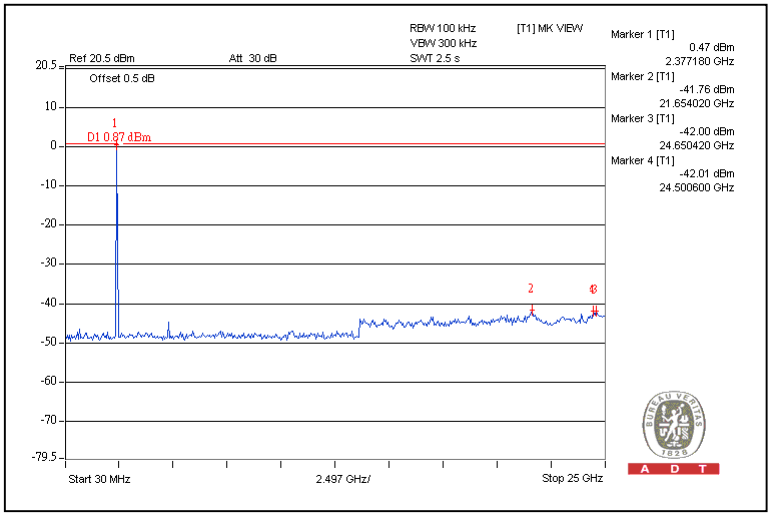
No deviation

4.3.5 EUT OPERATING CONDITION

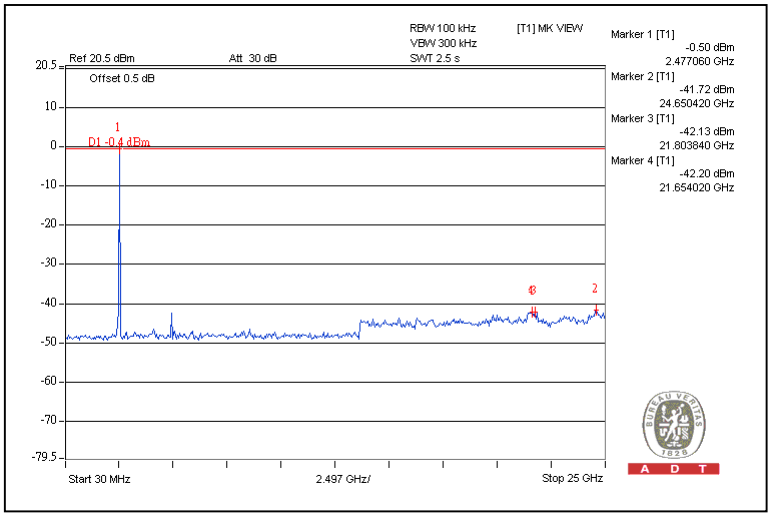
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.6 TEST RESULTS

Emissions radiated outside of the specified frequency bands, please refer pages form 23 to 25 for met the requirement of the general radiated emission limits in § 15.209.
CH1



CH12



5 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, 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, NVLAP
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: 886-2-26051924

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

Hwa Ya EMC/RF/Safety/Telecom Lab:
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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.

--- END ---