FCC DoC TEST REPORT

REPORT NO.:	FD991217C06A
MODEL NO.:	PL-X31M (Refer to 3.1 for more details)
FCC ID:	MSQ-PLX31M
RECEIVED:	Dec. 17, 2010
TESTED:	Dec. 18 ~ Dec. 23, 2010
ISSUED:	Feb. 08, 2011

APPLICANT:	ASUSTeK COMPUTER INC.
ADDRESS:	15, Li-Te Rd., Peitou, Taipei 112, Taiwan
ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

Testing Laboratory 2021

LAB CODE: 200837-0

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Feb. 08, 2011

1 CERTIFICATION

PRODUCT: HomePLUG AV Ethernet adapter
BRAND: ASUS
MODEL NO.: PL-X31M (Refer to 3.1 for more details)
APPLICANT: ASUSTeK COMPUTER INC.
TESTED: Dec. 18 ~ Dec. 23, 2010
TEST SAMED: ENGINEERING SAMPLE
STANDARD: **FCC Part 15, Subpart B, Class B** (Carrier Current Systems & Digital Systems)
ICES-003: 2004, Class B
ANSI C63.4: 2003

The above equipment (Model: PL-X31M) 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 : _____ **, DATE :** Feb. 08, 2011
Suntee Liu / Specialist

APPROVED BY : _____ **, DATE :** Feb. 08, 2011
David Liu / Senior Engineer

NOTE: The test results for FCC compliance, indicating that these results are deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003.

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

FCC Part 15, Subpart B, Class B			
Standard Section	**Test Type**	**Result**	**Remarks**
FCC 15.107(a) ICES-003, 5.3	Conducted Emissions (Current Carrier Off)	PASS	Meets Class B Limit. Minimum passing margin is -17.48 dB at 0.150 MHz.
FCC 15.107(c)(2)	Conducted Emission (Current Carrier On)	PASS	Meets Class B Limit. Minimum passing margin is -18.90 dB at 0.713 MHz.
FCC 15.109(a) ICES-003, 5.5	Radiated Emission (Current Carrier Off, Device Operating Frequency: 9 kHz to 30 MHz) – *see Note 1*	PASS	Meets Class B Limit. Minimum passing margin is -3.02 dB at 875.01 MHz.
FCC 15.209	Radiated Emission (Current Carrier On, Device Operating Frequency: 9 kHz to 30 MHz) – *see Note 2*	PASS	Meets Class B Limit. Minimum passing margin is -8.09 dB at 875.10 MHz.

NOTE: 1. The report shows compliance with “Digital” emissions and also shows compliance with “Carrier Current” emissions from the EUT.

2. In-situ testing is required for testing of the carrier current system functions of the EUT.

3. The EUT is not under the definition of section 15.3(t) "Power line carrier systems", the section 15.113 is not applicable in the case.

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:

Measurement	Frequency	Uncertainty
Conducted emission	150kHz ~ 30MHz	2.44 dB
Radiated emission	30MHz ~ 1GHz	3.43 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

PRODUCT	HomePLUG AV Ethernet adapter
MODEL NO.	PL-X31M (Refer to Note for more details)
FCC ID	MSQ-PLX31M
POWER SUPPLY	100-240 Vac
DATA CABLE	NA
ACCESSORY DEVICE	NA

NOTE:

1. This is a duplicate report of FD991217C06. The only difference compared with original report is changing applicant, brand, product name, model designation & housing.
2. All models are electrically identical, different model names are for marketing purpose.

Brand	Model
ASUS	PL-X31M
	PL-X32M

3. The highest operating frequency is 150 MHz.
4. 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

The EUT has been pre-tested under communication rate 10 Mbps & 100 Mbps, and 100 Mbps was the worst case for final test.

The EUT ran a test program - during radiated and conducted testing - which was designed to exercise the various system components in a manner similar to typical use.

3.3 DESCRIPTION OF APPLIED STANDARD

The EUT is operating 9 kHz ~ 30 MHz, which uses house wiring to transmit ethernet data between computers, according to the specifications of the manufacturer, it must comply with the requirements of the following standards.

ICES-003: 2004, Class B

FCC Part 15, Subpart B, Class B Section 15.107(a), 15.107(c)(2), 15.109(a) and 15.209 with measurement guidelines based on:

ANSI C63.4: 2003

FCC 04-245 Appendix C item 1 & 3

All tests have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

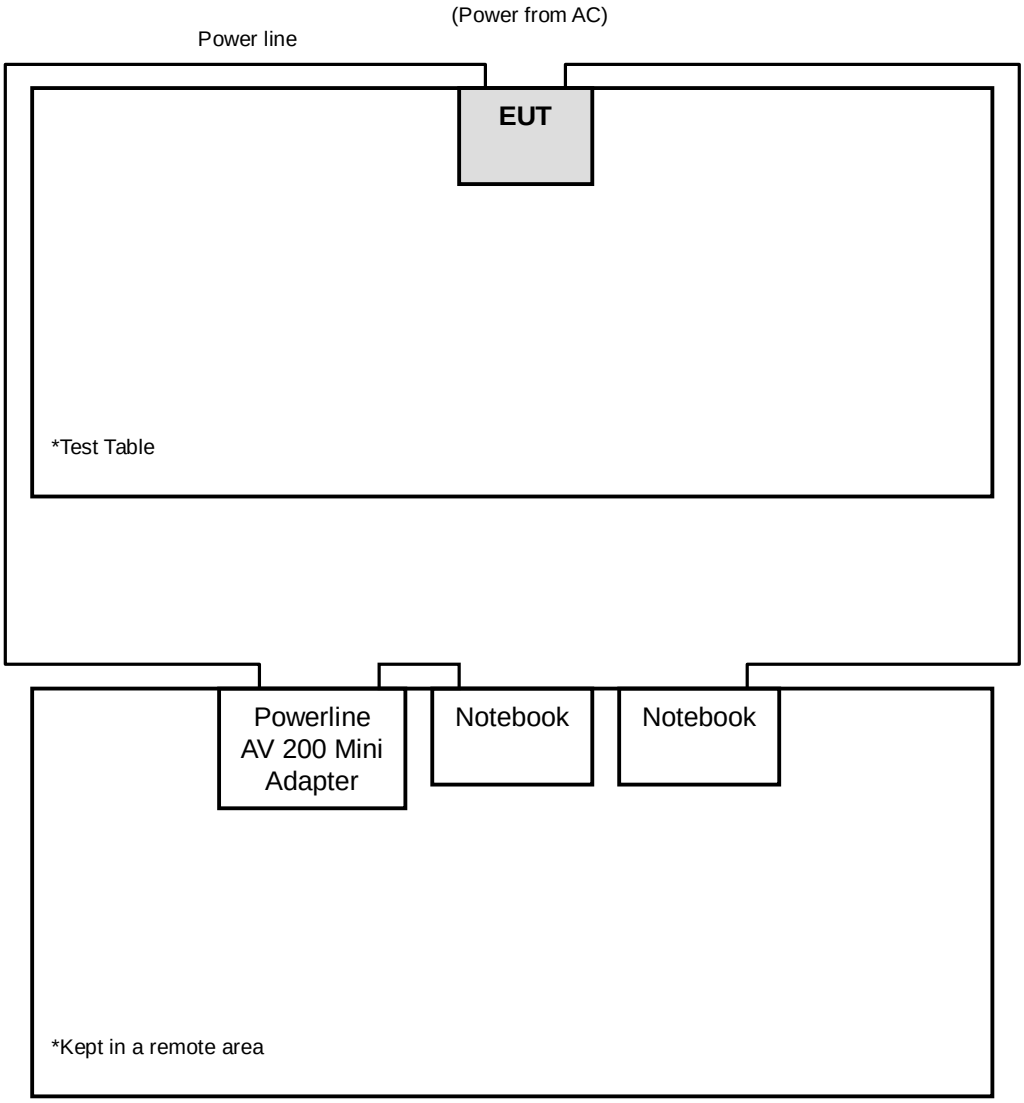
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	PP05L	FPBCB1S	E2K24CLNS
2	NOTEBOOK	DELL	D600	CN-0D2125-48643-4CC-5381	QDS-BRCM1005-D
3	HOMEPLUG AV ETHERNET ADAPTER	NETGEAR	PL-X31M	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10 m RJ45 UTP cable
2	3 m RJ45 UTP cable
3	NA

NOTE:
1. All power cords of the above support units are non-shielded (1.8 m).
2. Items 1-3 acted as communication partners to transfer data.
3. Item 3 was provided by the client.

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT (CURRENT CARRIER OFF)

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT (CURRENT CARRIER OFF)

FCC Part 15 Subpart B (Section 15.107(a)) & ICES-003 (Clause 5.3) for Class B device operating above 30 MHz of unintentional radiators.

Frequency (MHz)	Conducted Emissions Limit	
	Quasi-peak (dBµV)	Average (dBµV)
0.15-0.5	66-56	56-46
0.50-5.0	56	46
5.0-30.0	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 INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 30, 2010	Nov. 29, 2011
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 30, 2009	Dec. 29, 2010
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jun. 28, 2010	Jun. 27, 2011
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jul. 12, 2010	Jul. 11, 2011
Software ADT	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 HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.1.3 TEST PROCEDURE

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.

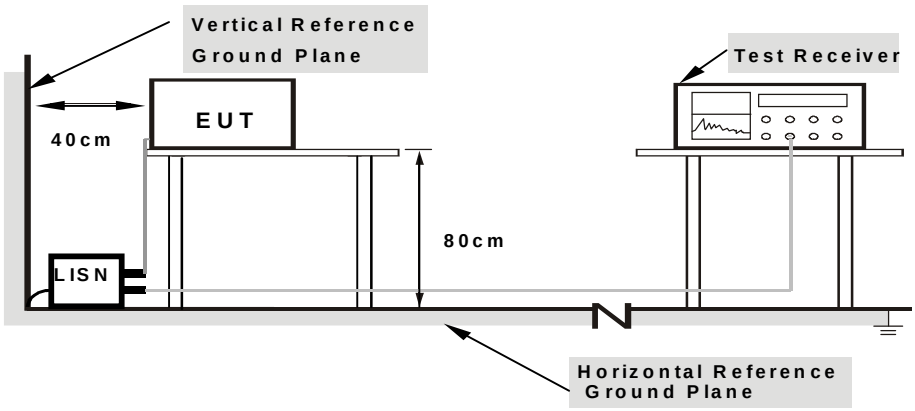
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

4.1.6 EUT OPERATING CONDITIONS

a. Conducted emission test with carrier current turned “Off”.

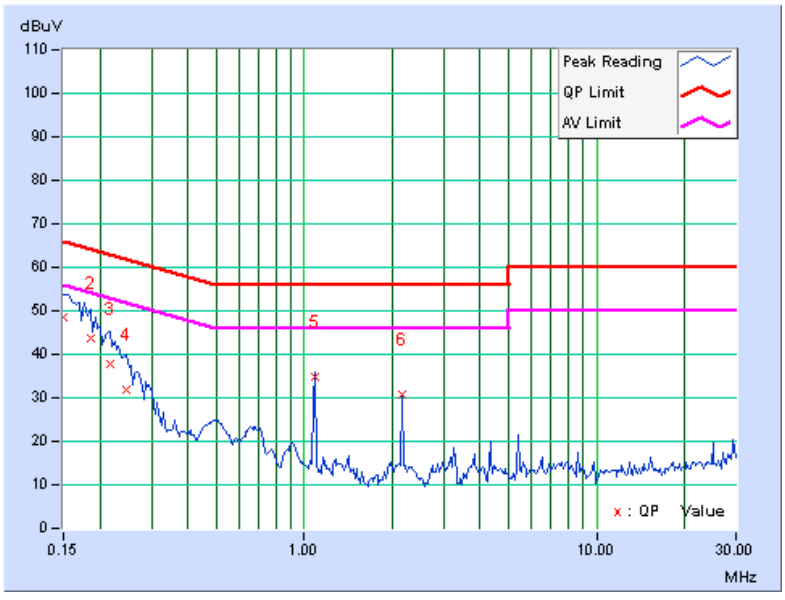
b. The notebooks ping the EUT continuously.

4.1.7 TEST RESULTS

INPUT POWER	120 Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 65% RH, 987 hPa	**PHASE**	Line 1
TESTED BY	Daniel Lin		

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	0.150	0.12	48.36	-	48.48	-	66.00	56.00	-17.52	-
2	0.185	0.11	43.41	-	43.52	-	64.25	54.25	-20.73	-
3	0.216	0.11	37.75	-	37.86	-	62.96	52.96	-25.09	-
4	0.248	0.11	31.73	-	31.84	-	61.84	51.84	-29.99	-
5	1.082	0.19	34.66	-	34.85	-	56.00	46.00	-21.15	-
6	2.168	0.26	30.59	-	30.85	-	56.00	46.00	-25.15	-

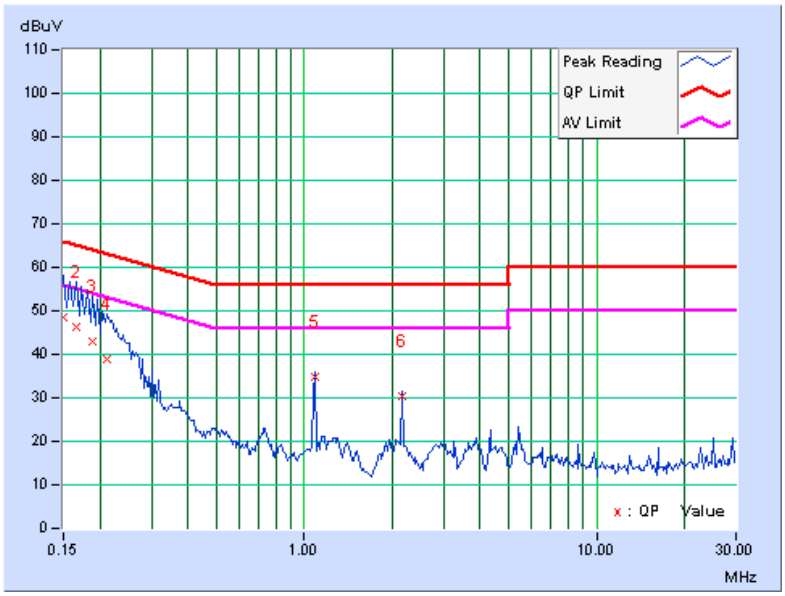
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



INPUT POWER	120 Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 65% RH, 987 hPa	**PHASE**	Line 2
TESTED BY	Daniel Lin		

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	**0.150**	**0.10**	**48.42**	**-**	**48.52**	**-**	**66.00**	**56.00**	**-17.48**	**-**
2	0.166	0.10	46.25	-	46.35	-	65.18	55.18	-18.83	-
3	0.189	0.10	42.71	-	42.81	-	64.08	54.08	-21.27	-
4	0.213	0.10	38.93	-	39.03	-	63.11	53.11	-24.08	-
5	1.082	0.18	34.82	-	35.00	-	56.00	46.00	-21.00	-
6	2.168	0.25	30.11	-	30.36	-	56.00	46.00	-25.64	-

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



4.2 CONDUCTED EMISSION MEASUREMENT (CURRENT CARRIER ON)

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT (CURRENT CARRIER ON)

FCC Part 15 Subpart B (Section 15. 107(c)(2)) for device operating below 30 MHz of unintentional carrier current radiators.

Frequency (MHz)	Conducted Emissions Limit	
	Quasi-peak (μV)	Quasi-peak (dBμV)
0.535-1.705	1000	60

4.2.2 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 30, 2010	Nov. 29, 2011
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 30, 2009	Dec. 29, 2010
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jun. 28, 2010	Jun. 27, 2011
LISN ROHDE & SCHWARZ	ESH3-Z5	835239/001	Feb., 10, 2010	Feb. 09, 2011
Software ADT	ADT_Cond_V7.3.7	NA	NA	NA
ISN	FCC-TLISN-T8-02	20593	Jun. 26, 2010	Jun. 25, 2011
Impedance-stabilization-network	ISN PLC-25-30	23338	Aug. 25, 2010	Aug. 24, 2011
RF Current Probe	F-33-4	45	Feb. 02, 2010	Feb. 01, 2011

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 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 TEST PROCEDURE

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.

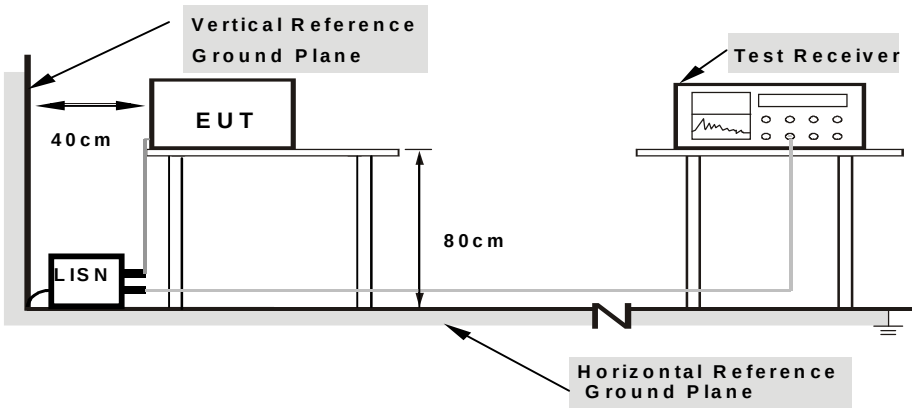
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 535 kHz to 1705 kHz was searched. Emission levels under (Limit - 20dB) were not recorded.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

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

4.2.6 EUT OPERATING CONDITIONS

a. Conducted emission test with carrier current turned “On”.

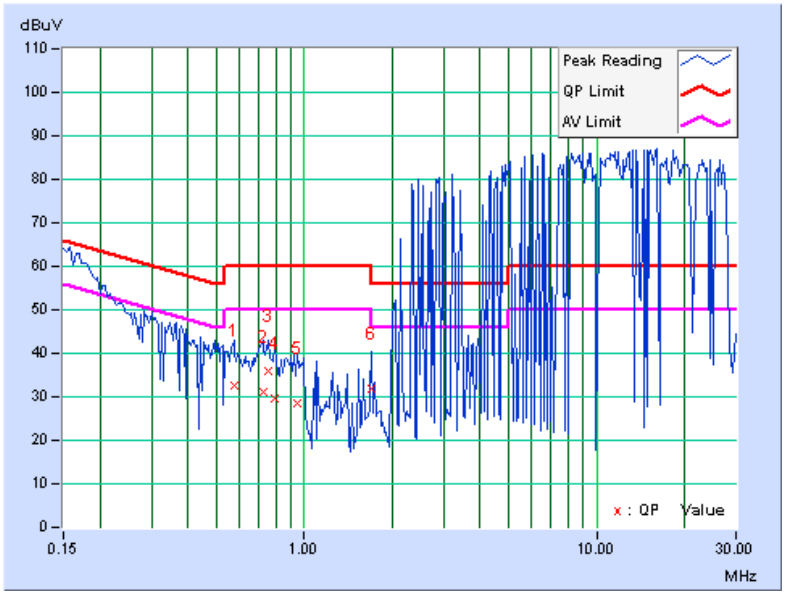
b. The notebooks communicated data to each other by command "PING" via EUT.

4.2.7 TEST RESULTS

INPUT POWER	120 Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 65% RH, 987 hPa	**PHASE**	Line 1
TESTED BY	Daniel Lin		

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	0.576	0.14	32.27	-	32.41	-	60.00	50.00	-27.59	-
2	0.724	0.16	30.87	-	31.03	-	60.00	50.00	-28.97	-
3	0.752	0.16	35.82	-	35.98	-	60.00	50.00	-24.02	-
4	0.795	0.16	29.46	-	29.62	-	60.00	50.00	-30.38	-
5	0.947	0.18	28.21	-	28.39	-	60.00	50.00	-31.61	-
6	1.699	0.23	31.76	-	31.99	-	60.00	50.00	-28.01	-

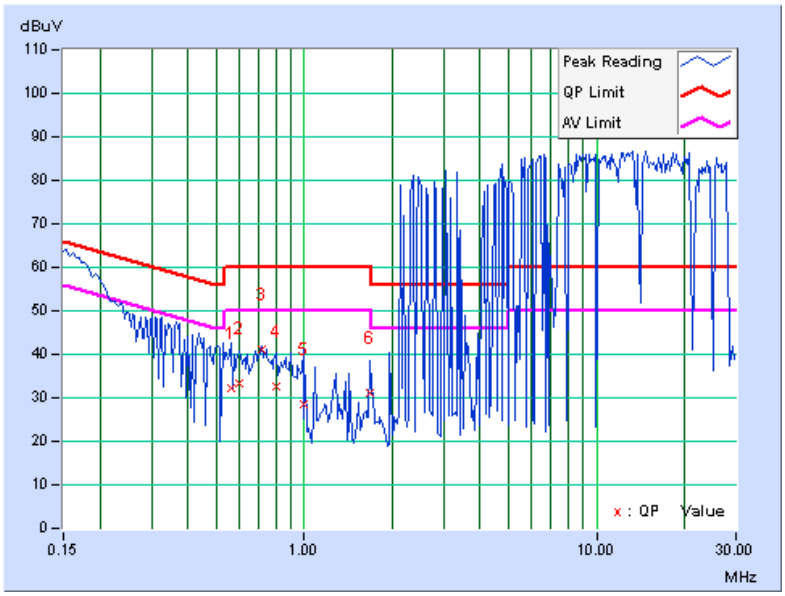
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



INPUT POWER	120 Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 65% RH, 987 hPa	**PHASE**	Line 2
TESTED BY	Daniel Lin		

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	0.560	0.13	31.97	-	32.10	-	60.00	50.00	-27.90	-
2	0.599	0.14	33.28	-	33.42	-	60.00	50.00	-26.58	-
3	**0.713**	**0.15**	**40.95**	**-**	**41.10**	**-**	**60.00**	**50.00**	**-18.90**	**-**
4	0.798	0.15	32.42	-	32.57	-	60.00	50.00	-27.43	-
5	0.990	0.17	28.17	-	28.34	-	60.00	50.00	-31.66	-
6	1.676	0.22	30.90	-	31.12	-	60.00	50.00	-28.88	-

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



4.3 RADIATED EMISSION MEASUREMENT (CURRENT CARRIER OFF)

4.3.1 LIMITS OF RADIATED EMISSION MEASUREMENT (CURRENT CARRIER OFF)

According to FCC Part 15 Subpart B (Section 15.109) & ICES-003 (Clause 5.5) for class B device operating 9 kHz ~ 30 MHz of unintentional carrier current radiators. (current carrier off)

Frequency (MHz)	Field Strength (Microvolts/Meter)	Measurement Distance (meter)
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. 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.

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

4.3.2 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100188	Dec. 15, 2010	Dec. 14, 2011
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-157	Apr. 29, 2010	Apr. 28, 2011
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-405	Feb. 03, 2010	Feb. 02, 2011
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 29, 2010	Jan. 28, 2011
Preamplifier Agilent	8447D	2944A10629	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8449B	3008A01959	Nov. 03, 2010	Nov. 02, 2011
RF signal cable HUBER+SUHNER	SUCOFLEX 104	23636/6	Aug. 21, 2010	Aug. 20, 2011
RF signal cable HUBER+SUHNER	SUCOFLEX 104	283402/4	Aug. 21, 2010	Aug. 20, 2011
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower ADT.	AT100	AT93021702	NA	NA
Turn Table ADT.	TT100.	TT93021702	NA	NA
Controller ADT.	SC100.	SC93021702	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 Chamber 2.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 686814.
5. The IC Site Registration No. is IC 7450F-2.
6. The VCCI Site Registration No. is G-18.

4.3.3 TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters 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.

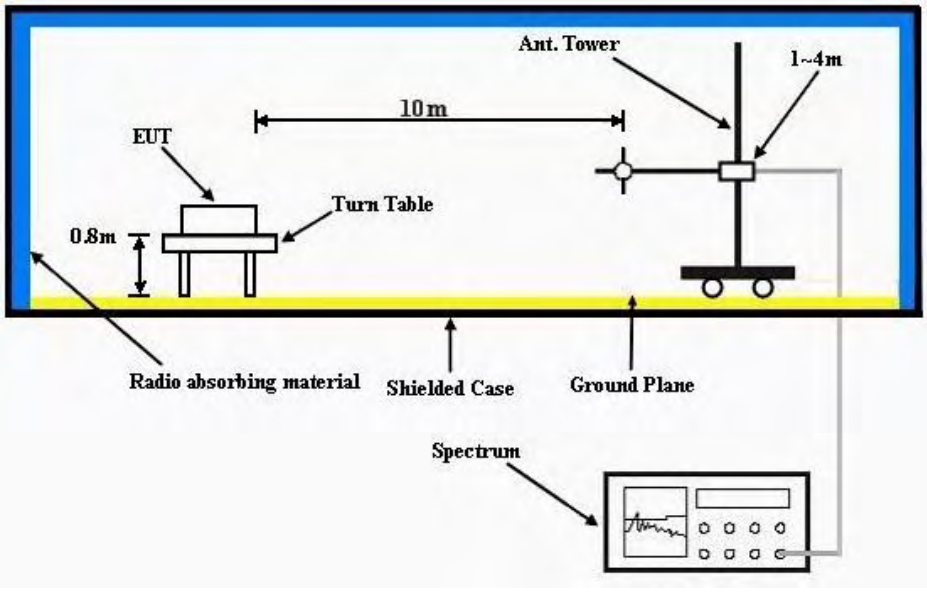
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for quasi-peak detection (QP) at frequency below 1 GHz.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



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

4.3.6 EUT OPERATING CONDITIONS

a. Radiated Emission test with carrier current turned “Off”.

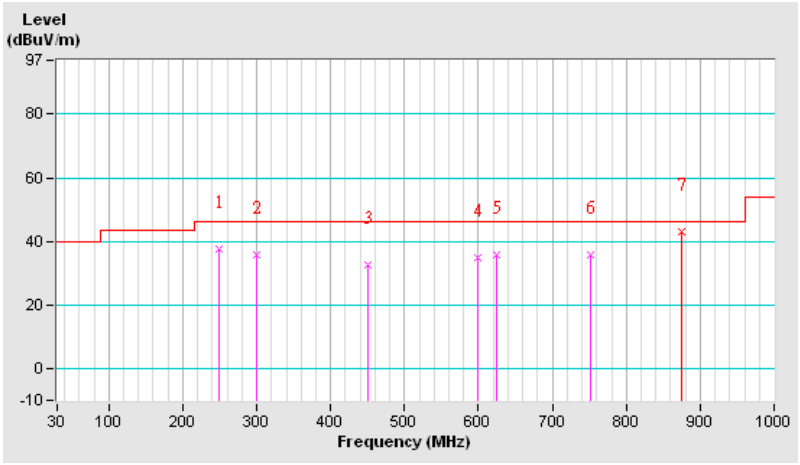
b. The notebooks communicated data to each other by command "PING" via EUT.

4.3.7 TEST RESULTS

INPUT POWER	120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 66% RH, 987 hPa	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak , 120 kHz
TESTED BY	Scott Yang		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL 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	249.66	37.77 QP	46.00	-8.23	1.50 H	274	24.59	13.18
2	300.20	35.72 QP	46.00	-10.28	1.00 H	277	20.83	14.89
3	449.88	32.65 QP	46.00	-13.35	1.50 H	31	13.82	18.83
4	599.56	34.79 QP	46.00	-11.21	1.50 H	115	12.36	22.43
5	624.83	35.69 QP	46.00	-10.31	1.50 H	271	12.87	22.82
6	751.18	35.66 QP	46.00	-10.34	2.00 H	169	10.76	24.90
7	**875.01**	**42.98 QP**	**46.00**	**-3.02**	**1.00 H**	**93**	**15.89**	**27.10**

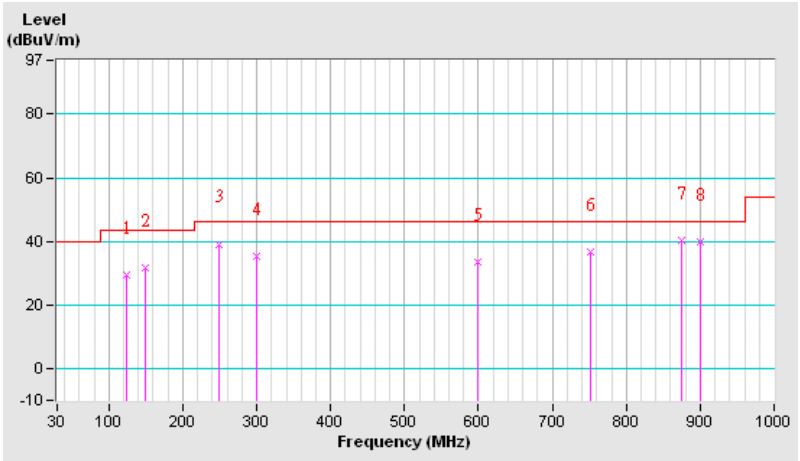
REMARKS: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



INPUT POWER	120 Vac, 60 Hz	**FREQUENCY RANGE**	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 66% RH, 987 hPa	**DETECTOR FUNCTION & BANDWIDTH**	Quasi-Peak , 120 kHz
TESTED BY	Scott Yang		

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	123.31	29.65 QP	43.50	-13.85	1.00 V	202	16.98	12.67
2	148.58	31.62 QP	43.50	-11.88	1.00 V	331	17.52	14.10
3	249.66	39.18 QP	46.00	-6.82	1.50 V	10	26.00	13.18
4	300.20	35.24 QP	46.00	-10.76	1.00 V	175	20.35	14.89
5	599.56	33.55 QP	46.00	-12.45	1.00 V	232	11.12	22.43
6	751.18	36.81 QP	46.00	-9.19	1.00 V	10	11.90	24.90
7	875.59	40.48 QP	46.00	-5.52	1.00 V	187	13.38	27.10
8	900.86	40.02 QP	46.00	-5.98	1.50 V	19	12.62	27.40

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.



4.4 RADIATED EMISSION MEASUREMENT (CURRENT CARRIER ON)

4.4.1 LIMITS OF RADIATED EMISSION MEASUREMENT (CURRENT CARRIER ON)

According to FCC Part 15 Subpart B (Section 15.209) for Class B device operating 9 kHz ~ 30 MHz of unintentional Carrier current radiators.

Frequency (MHz)	Radiated Emission Limit	
	Field Strength (Microvolts / Meter)	Measurement Distance (Meter)
0.009-0.490	2400 / F(kHz)	300
0.490-1.705	24000 / F(kHz)	30
1.705-30	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).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-10	400
10-30	500

4.4.2 TEST INSTRUMENT

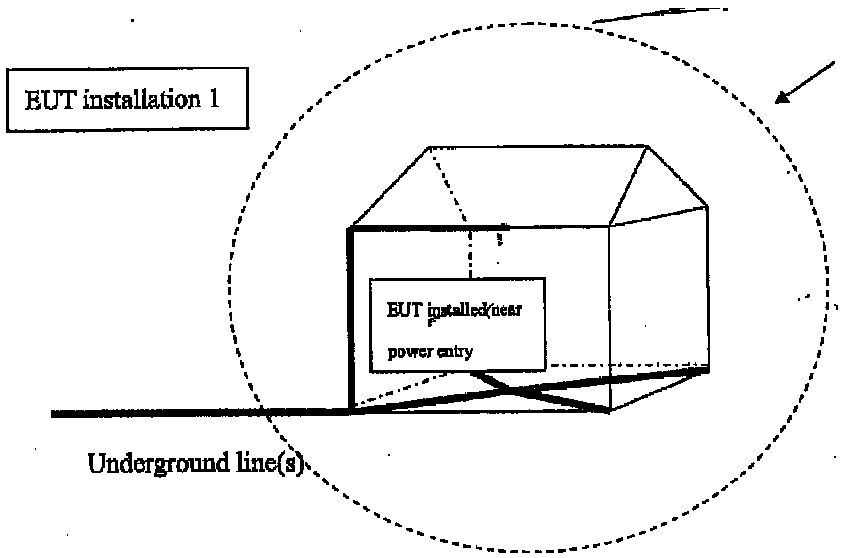
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Agilent	R3132	140701958	Jul. 19, 2010	Jul. 18, 2011
TEST RECEIVER ROHDE & SCHWARZ	ESCS30	100289	Nov. 23, 2010	Nov. 22, 2011
Pre-Amplifier Agilent	8447D	2944A10636	Dec. 10, 2010	Dec. 09, 2011
Bilog Antenna Schwarbeck	VULB9168	9168-155	Apr. 28, 2010	Apr. 27, 2011
LOOP ANTENNA ROHDE & SCHWARZ	HFH2-Z2	100070	Feb. 03, 2010	Feb. 02, 2011

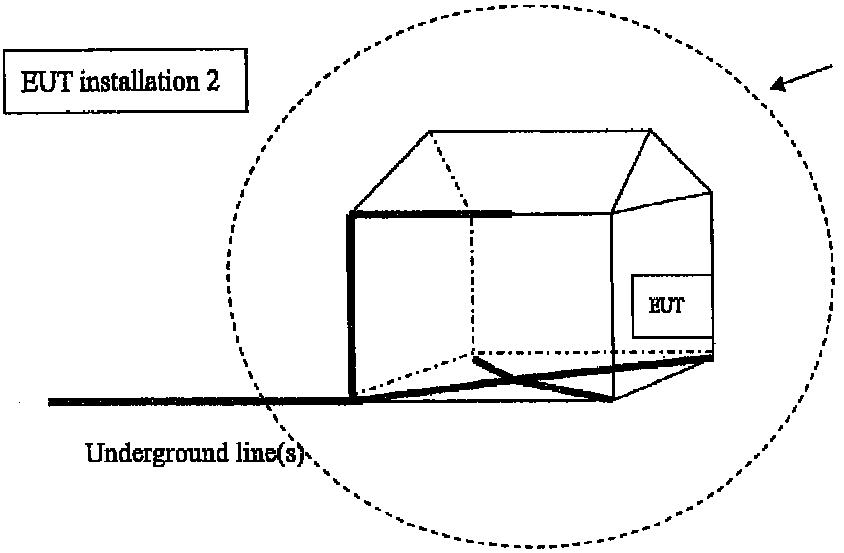
4.4.3 TEST PROCEDURE

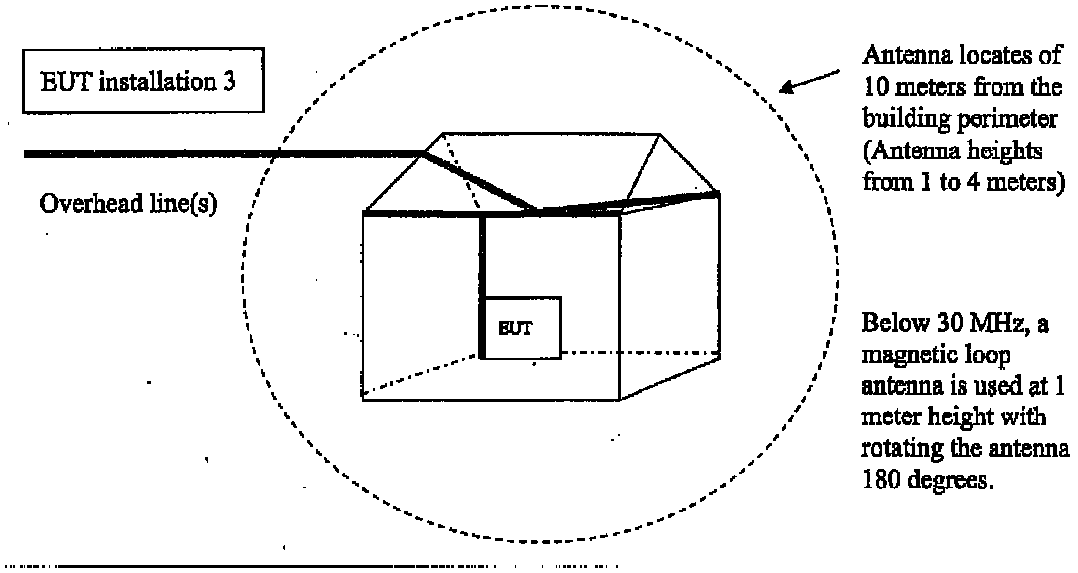
1) Testing shall be performed with the power settings of the Equipment Under Test (EUT) set at the maximum level.
2) Testing shall be performed using the maximum RF injection duty factor (burst rate). Test modes or test software may be used for uplink and downlink transmissions.
3) Measurements should be made at a test site where the ambient signal level is 6 dB below the applicable limit. (See ANSI C63.4-2003, section 5.1.2 for alternatives, if this test condition cannot be achieved.)
4) If the data communications burst rate is at least 20 burst per second, quasi-peak measurements shall be employed. If the data communications burst rate is 20 bursts per second or less, measurements shall be made using a peak detector.
5) For frequencies above 30 MHz, The signal shall be maximized for antenna heights from 1 to 4 meters, for both horizontal and vertical polarizations, in accordance to ANSI C63.4-2003 procedures.
6) For frequencies below 30 MHz, an active magnetic loop is used. The magnetic loop antenna was at 1 meter height with its plane oriented vertically and the emission maximized by rotating the antenna 180 degrees about its vertical axis.
7) The six highest radiated emissions relative to the limit and independent of antenna polarization were reported.

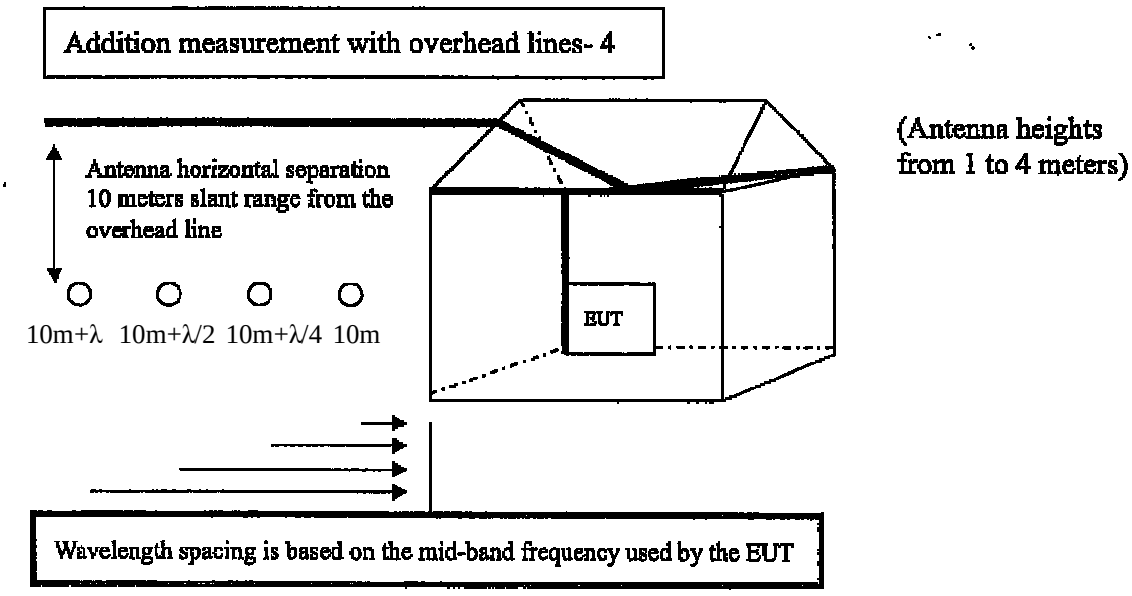
In-situ Radiated Emission Measurement environment.

- The three installations shall include a combination of buildings with overhead-line(s) and underground line(s).
- The buildings shall not have aluminum or other metal siding, or shielding wiring (e.g.: wiring installed through conduit or BX electric cable).
- Measurement shall be made at a minimum of 16 radial angles surrounding the EUT (building perimeter).
- Measurement distance is 10 meters. If necessary, due to ambient emissions, measurement may be performed a distance of 3 meters using distance corrections in accordance with 15.31(f).


EUT installation 1
Antenna locatesions of 10 meters from the building perimeter (Antenna heights from 1 to 4 meters)
EUT installed(near power entry
Below 30 MHz, a magnetic loop antenna is used at 1 meter height with plane oriented Vertically with rotating the antenna 180 degrees.
Underground line(s)


EUT installation 2
Antenna locates of 10 meters from the building perimeter (Antenna heights from 1 to 4 meters)
EUT
Below 30 MHz, a magnetic loop antenna is used at 1 meter height with plane oriented Vertically with rotating the antenna 180 degrees.
Underground line(s)





4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP LOCATION

The measurements were performed at three installations that were representative of typical installations. For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

Installation 1	
Address	Room 852, Holland Village, Pu-Xin Pasture, Gaorong Village, Yangmei Township, Taoyuan County 326, Taiwan
General description	It is a three floors concerted building and room 852 is located at first floor.
Source of power lines	Underground lines

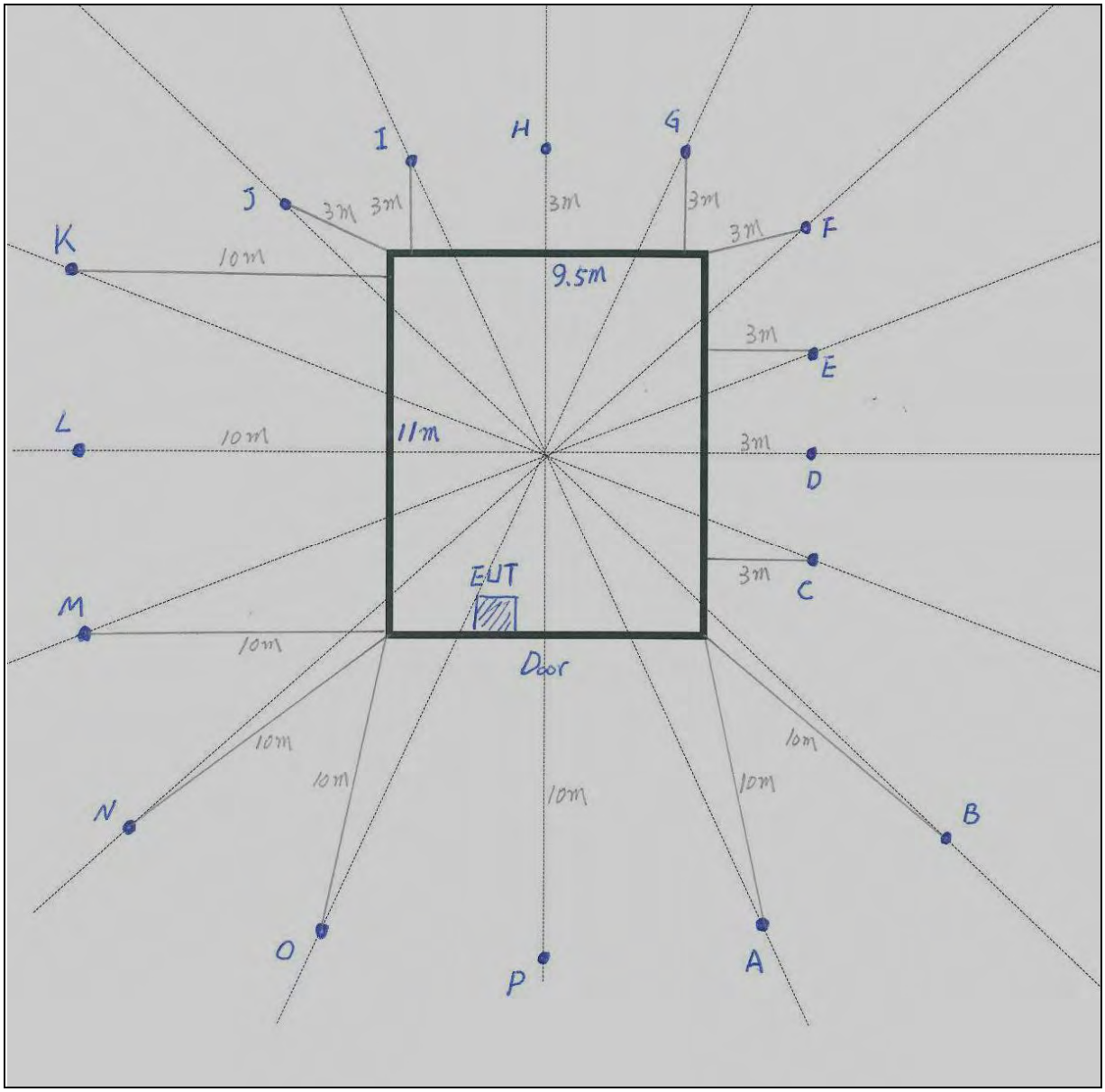
Installation 2	
Address	Room 862, Holland Village, Pu-Xin Pasture, Gaorong Village, Yangmei Township, Taoyuan County 326, Taiwan
General description	It is a two floors concerted building and room 802 is located at first floor.
Source of power lines	Underground lines

Installation 3	
Address	Playground in the seafront by the sea, Houlong, Dashan Village, Houlong Township, Miaoli County 356, Taiwan
General description	It is a two floors wood building.
Source of power lines	Overhead lines

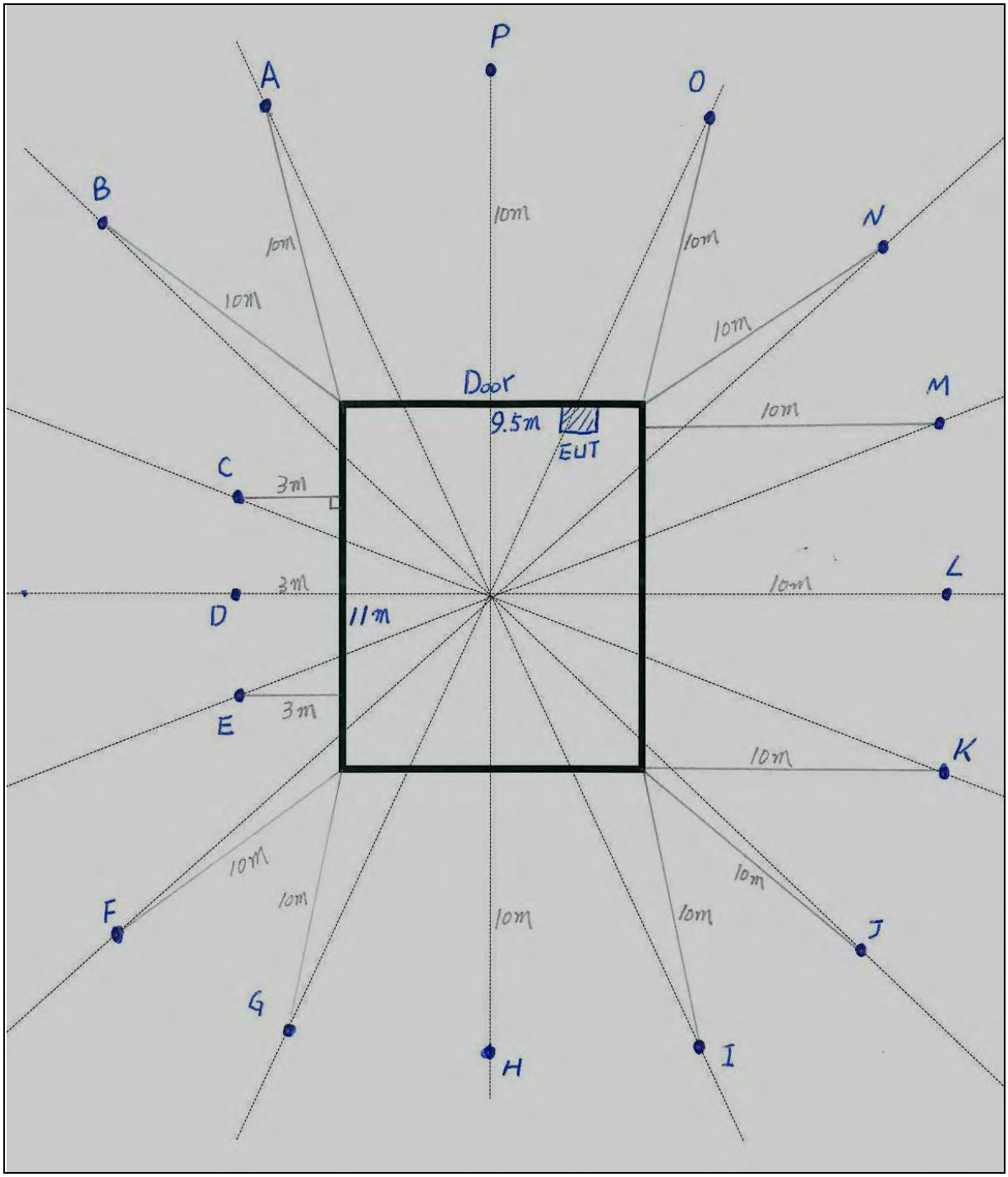
Addition measurement with overhead lines-4	
Address	Playground by the sea, Houlong, Dashan Village, Houlong Township, Miaoli County 356, Taiwan
General description	It is a two floors wood building.
Source of power lines	Overhead lines

4.4.6 TEST SETUP DIAGRAM

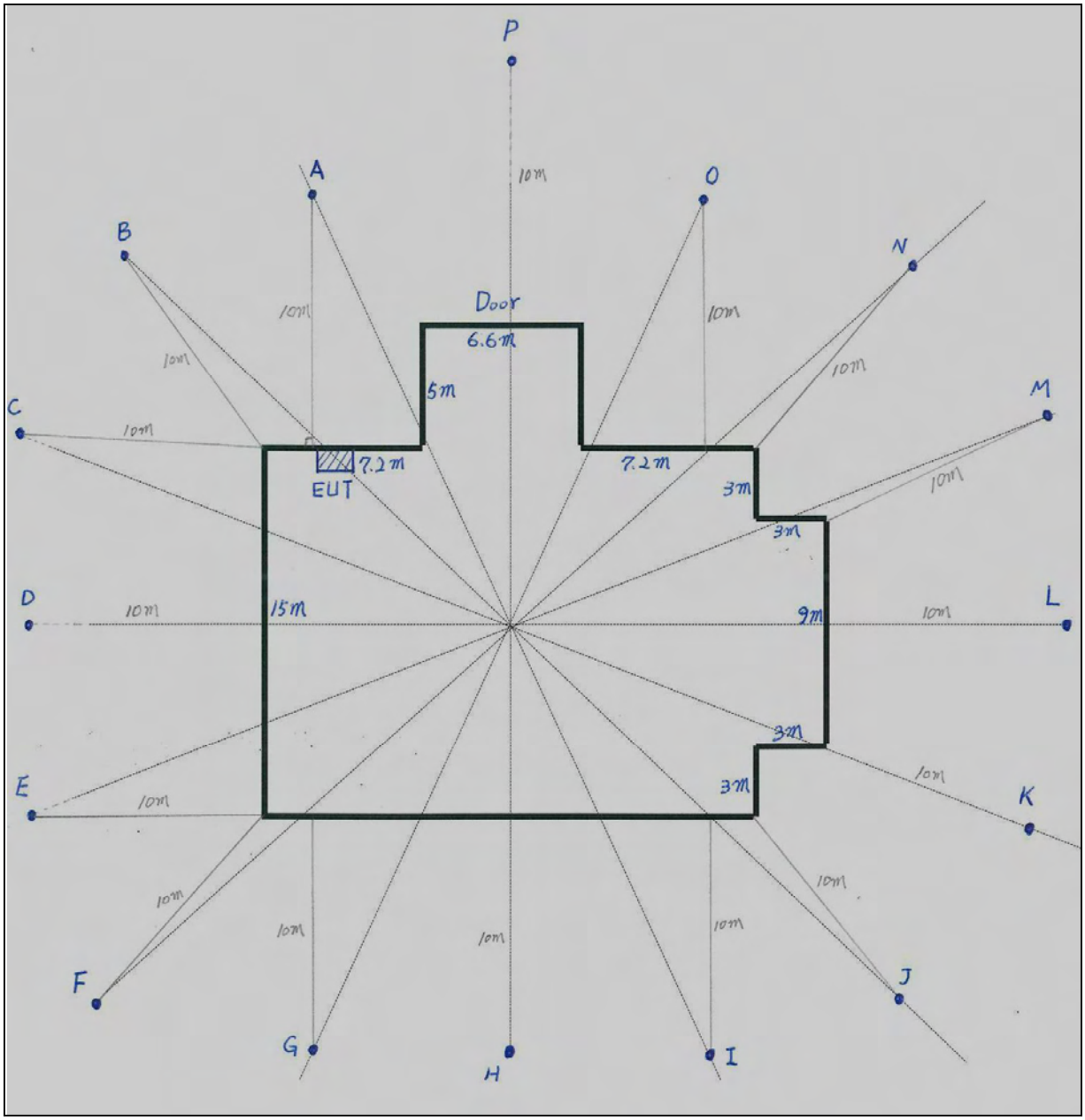
Installation 1



Installation 2



Installation 3



4.4.7 EUT OPERATING CONDITIONS

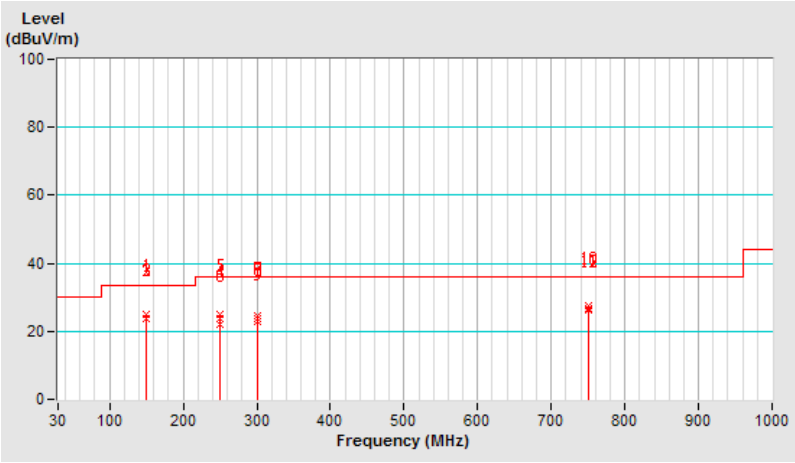
Radiated emission test with carrier current turned “On”.

4.4.8 TEST RESULTS

INPUT POWER	120 Vac, 60 Hz	**FREQUENCY RANGE**	30-1000 MHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 65% RH, 987 hPa	**DETECTOR FUNCTION & BANDWIDTH**	Quasi-Peak , 120 kHz
TESTED BY	Whisky Chang		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL 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)	Installation	Point
1	150.00	25.02 QP	33.50	-8.48	2.74 H	0	10.70	14.32	3	A
2	150.10	23.92 QP	33.50	-9.58	2.85 H	0	9.60	14.32	1	O
3	150.20	23.81 QP	33.50	-9.69	2.34 H	0	9.49	14.32	2	K
4	250.00	23.59 QP	36.00	-12.41	2.14 H	0	10.18	13.41	3	B
5	250.10	25.11 QP	36.00	-10.89	2.95 H	0	11.70	13.41	1	N
6	250.20	22.20 QP	36.00	-13.80	2.35 H	0	8.79	13.41	2	L
7	300.00	24.41 QP	36.00	-11.59	1.75 H	0	9.38	15.03	3	F
8	300.10	23.74 QP	36.00	-12.26	2.04 H	0	8.71	15.03	1	M
9	300.20	22.73 QP	36.00	-13.27	1.95 H	0	7.69	15.04	2	L
10	750.00	27.37 QP	36.00	-8.63	3.02 H	0	1.79	25.58	3	C
11	750.10	26.50 QP	36.00	-9.50	2.86 H	0	0.92	25.58	1	L
12	750.20	26.43 QP	36.00	-9.57	2.54 H	0	0.85	25.58	2	P

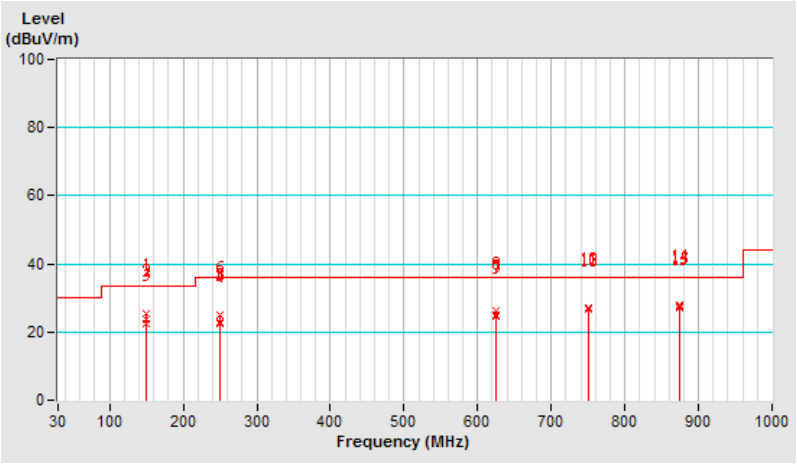
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. Refer to item 4.4.5 and 4.4.6 for installation information.
6. Only worst emission levels were recorded among the three installations.



INPUT POWER	120 Vac, 60 Hz	**FREQUENCY RANGE**	30-1000 MHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 65% RH, 987 hPa	**DETECTOR FUNCTION & BANDWIDTH**	Quasi-Peak , 120 kHz
TESTED BY	Whisky Chang		

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)	Installation	Point
1	150.00	25.31 QP	33.50	-8.19	1.25 V	0	11.00	14.32	3	A
2	150.10	23.61 QP	33.50	-9.89	1.57 V	0	9.29	14.32	1	P
3	150.20	22.34 QP	33.50	-11.16	1.45 V	0	8.02	14.32	2	K
4	250.00	22.32 QP	36.00	-13.68	1.39 V	0	8.91	13.41	3	H
5	250.10	22.70 QP	36.00	-13.30	1.78 V	0	9.29	13.41	1	O
6	250.20	24.79 QP	36.00	-11.21	1.56 V	0	11.38	13.41	2	L
7	625.00	25.09 QP	36.00	-10.91	1.82 V	0	1.92	23.17	.3	N
8	625.10	26.09 QP	36.00	-9.91	1.67 V	0	2.92	23.17	1	O
9	625.20	24.77 QP	36.00	-11.23	1.42 V	0	1.60	23.17	2	K
10	750.00	26.70 QP	36.00	-9.30	1.26 V	0	1.12	25.58	3	E
11	750.10	26.58 QP	36.00	-9.42	1.96 V	0	1.00	25.58	1	L
12	750.20	27.20 QP	36.00	-8.80	2.42 V	0	1.62	25.58	2	M
13	875.00	27.50 QP	36.00	-8.50	1.32 V	0	0.50	27.00	3	F
14	**875.10**	**27.91 QP**	**36.00**	**-8.09**	**1.75 V**	**0**	**0.91**	**27.00**	**1**	**P**
15	875.20	27.27 QP	36.00	-8.73	1.38 V	0	0.27	27.00	2	N

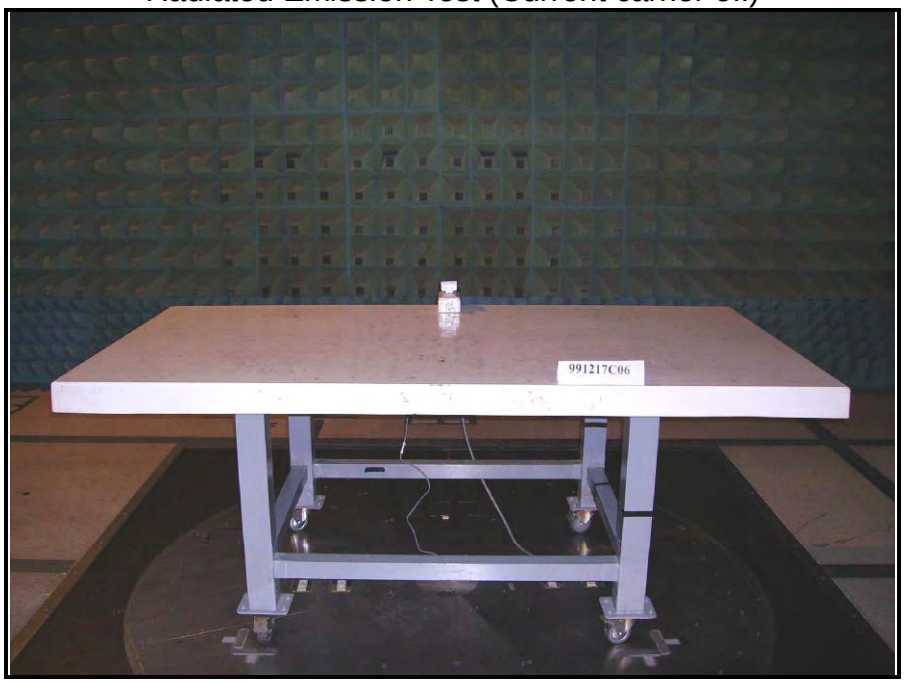
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. Refer to item 4.4.5 and 4.4.6 for installation information.
6. Only worst emission levels were recorded among the three installations.



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Conducted Emission Test

Radiated Emission Test (Current carrier off)



Radiated Emission Test (IN-SITU TEST) (Current carrier on)
(Installation 1)

Radiated Emission Test (IN-SITU TEST) (Current carrier on)
(Installation 2)

Radiated Emission Test (IN-SITU TEST) (Current carrier on)
(Installation 3)

Radiated Emission Test (IN-SITU TEST) (Current carrier on)
(Addition Measurement with Overhead Line-3)

6 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 according to ISO/IEC 17025.

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

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.

7 APPENDIX-A MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BYE THE LAB

No any modifications are made to the EUT by the lab during the test.

--- END ---