FCC TEST REPORT

REPORT NO. : RF980303L05
MODEL NO. : P01L-P01L001
RECEIVED : Mar. 04, 2009
TESTED : Mar. 13 ~ Mar. 18, 2009
ISSUED : Mar. 27, 2009

APPLICANT : Dell Computer Corporation

ADDRESS : One Dell Way, Round Rock, TX 78682, United States

ISSUED BY : Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

LAB ADDRESS : No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, 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.

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1. CERTIFICATION

PRODUCT:	Personal Computer
MODEL NO.:	P01L-P01L001
BRAND:	DELL
APPLICANT:	Dell Computer Corporation
TESTED:	Mar. 13 ~ Mar. 18, 2009
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.209)**
	ANSI C63.4-2003

The above equipment (model: P01L-P01L001) have 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 : Peggy Chen **, DATE :** Mar. 27, 2009
Peggy Chen / Specialist

TECHNICAL ACCEPTANCE : Long Chen **, DATE :** Mar. 27, 2009
Responsible for RF
Long Chen / Senior Engineer

APPROVED BY : Gary Chang **, DATE :** Mar. 27, 2009
Gary Chang / Assistant Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD PARAGRAPH	**TEST TYPE**	**RESULT**	**REMARK**
15.207	Conducted Emission Test	PASS	Meet the requirement of limit. Minimum passing margin is -11.17dB at 0.599MHz.
15.209	Radiated Emission Test	PASS	Meet the requirement of limit. Minimum passing margin is -3.84dB at 54.24MHz.

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 emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 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	Personal Computer
MODEL NO.	P01L-P01L001
FCC ID	E2K-P01L001
POWER SUPPLY	19.5Vdc from adapter
MODULATION TYPE	TX: ASK RX: ASK, BPSK
FREQUENCY RANGE	13.56MHz
NUMBER OF CHANNEL	1
ANTENNA TYPE	Refer to Note 2
DATA CABLE	NA
I/O PORT	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

1. The EUT is powered by the following adapter.

BRAND	LITE-ON
MODEL	LA45NS0-00
INPUT	100~240Vac, 50/60Hz, 1.5A
OUTPUT	19.5Vdc, 2.31A
POWER LINE	AC 1.0m non-shielded cable without core DC 1.8m shielded cable with one core

2. There are 3 antenna brands for the EUT.

No.	Antenna Brand	Antenna P/N	Type	Connector
1	Yeago	6036B0047901	PCB	NA
2	Tyco	6036B0047901	PCB	NA
3	SmartAnt	6036B0047901	PCB	NA

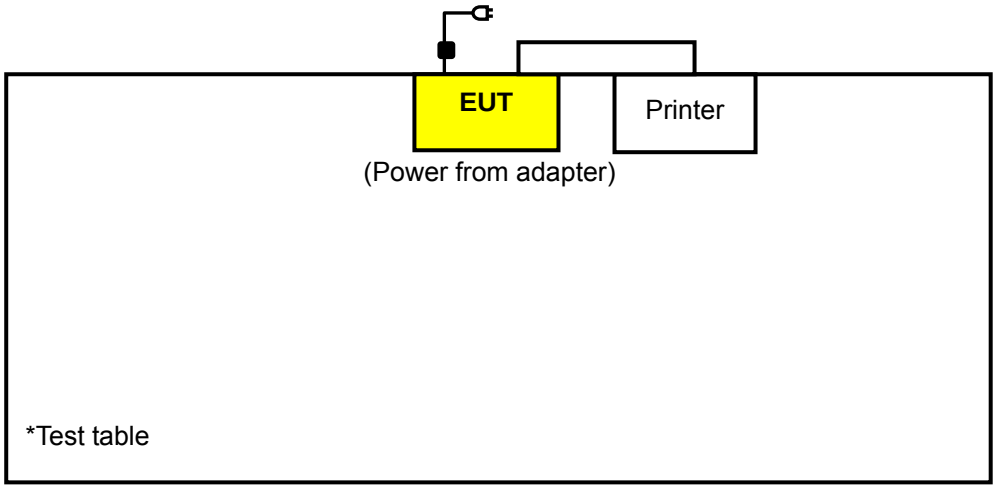
3. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

The EUT only have 1 channel.

CHANNEL	FREQUENCY (MHz)
1	13.56

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE≥1G	RE<1G	PLC	
A	√	√	√	Antenna 1
B	√	√	√	Antenna 2
C	√	√	√	Antenna 3

Where **PLC:** Power Line Conducted Emission **RE<1G:** Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz

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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
A, B, C	1	1	ASK

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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
A, B, C	1	1	ASK

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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
A, B, C	1	1	ASK

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 15.209)

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	MODEL NO.	SERIAL NO.	FCC ID
1	PRINTER	HP	HP LASERJET 1300	CNCM065403	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.8m braid shielded wire, DB25 connector, w/o core.

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

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Field strength limits are at the distance of 3 meters, 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jun. 30, 2008	Jun. 29, 2009
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 02, 2008	May 01, 2009
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jun. 24, 2008	Jun. 23, 2009
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 25, 2008	Dec. 24, 2009
Preamplifier Agilent	8447D	2944A10633	Nov. 03, 2008	Nov. 02, 2009
Preamplifier Agilent	8449B	3008A01964	Oct. 23, 2008	Oct. 22, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 20, 2008	May 19, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 20, 2008	May 19, 2009
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA	NA
Loop Antenna (Note 2)	HFH2-Z2	100070	Jan. 14, 2008	Jan. 13, 2010

NOTE: 1. The calibration interval of the above test instruments except loop antenna is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

3. The test was performed in HwaYa Chamber 3.

4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

5. The FCC Site Registration No. is 988962.

6. The IC Site Registration No. is IC 7450F-3.

4.1.3 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.

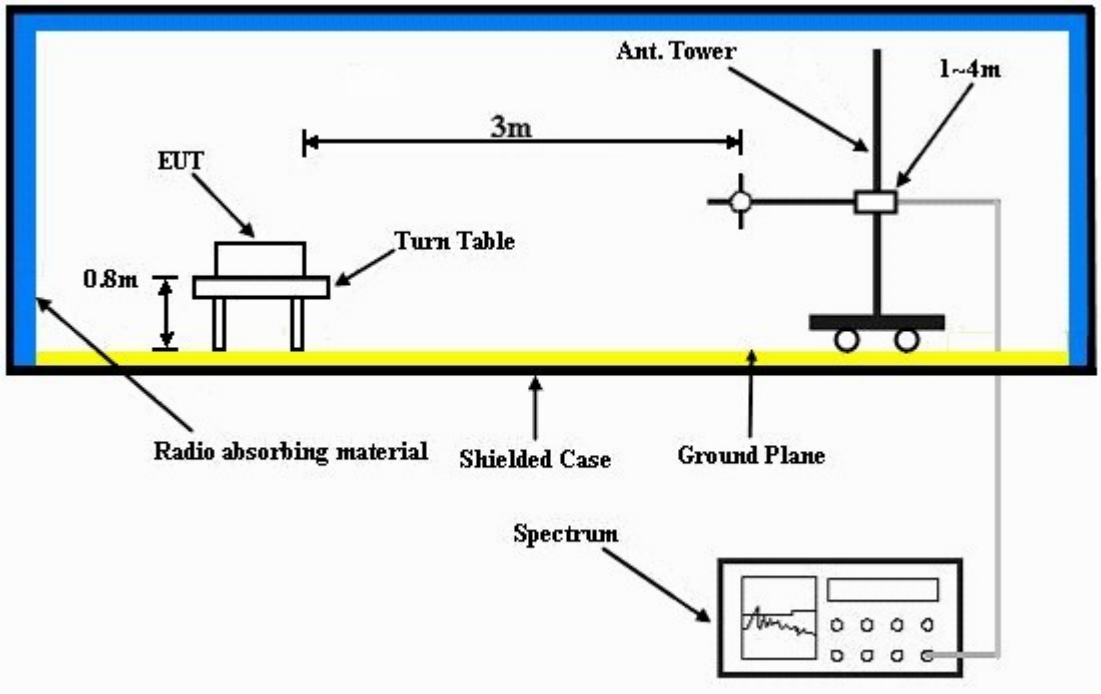
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

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

4.1.7 TEST RESULTS

RADIATED WORST-CASE DATA:

EUT TEST CONDITION		MEASUREMENT DETAIL	
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1002hPa	**TESTED BY**	Antony Lee
TEST MODE	**A**		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA OPEN AT 3m								
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	13.56	49.85 QP	69.54	-19.69	1.00	31	31.41	18.44
2	21.29	32.85 QP	69.54	-36.69	1.00	261	14.05	18.80
3	27.12	41.68 QP	69.54	-27.86	1.00	188	22.58	19.10

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.
5. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:

13.56MHz	=	30uV/m	30m
	=	29.54dBuV/m	30m
	=	$29.54+20\log(30/3)^2$	3m
	=	69.54dBuV/m	

EUT TEST CONDITION		MEASUREMENT DETAIL	
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1002hPa	**TESTED BY**	Antony Lee
TEST MODE	**A**		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA CLOSE AT 3m								
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	13.56	49.63 QP	69.54	-19.91	1.00	244	31.19	18.44
2	21.29	31.85 QP	69.54	-37.69	1.00	269	13.05	18.80
3	27.12	47.07 QP	69.54	-22.47	1.00	237	27.97	19.10

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.
5. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:

13.56MHz = 30uV/m 30m
= 29.54dBuV/m 30m
= $29.54+20\log(30/3)^2$ 3m
= 69.54dBuV/m

EUT TEST CONDITION		MEASUREMENT DETAIL	
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1002hPa	**TESTED BY**	Antony Lee
TEST MODE	**B**		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA OPEN AT 3m								
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	13.56	48.78 QP	69.54	-20.76	1.00	25	30.34	18.44
2	21.04	39.75 QP	69.54	-29.79	1.00	166	20.95	18.80
3	27.12	33.34 QP	69.54	-36.20	1.00	220	14.24	19.10

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.
5. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:

13.56MHz = 30uV/m 30m
= 29.54dBuV/m 30m
= $29.54+20\log(30/3)^2$ 3m
= 69.54dBuV/m

EUT TEST CONDITION		MEASUREMENT DETAIL	
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1002hPa	**TESTED BY**	Antony Lee
TEST MODE	**B**		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA CLOSE AT 3m								
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	13.56	48.22 QP	69.54	-21.32	1.00	25	29.78	18.44
2	21.04	38.41 QP	69.54	-31.13	1.00	49	19.61	18.80
3	27.12	34.56 QP	69.54	-34.98	1.00	138	15.46	19.10

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.
5. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:

13.56MHz = 30uV/m 30m
= 29.54dBuV/m 30m
= $29.54+20\log(30/3)^2$ 3m
= 69.54dBuV/m

EUT TEST CONDITION		MEASUREMENT DETAIL	
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1002hPa	TESTED BY	Antony Lee
TEST MODE	C		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA OPEN AT 3m								
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	13.56	47.80 QP	69.54	-21.74	1.00	26	29.36	18.44
2	21.04	32.63 QP	69.54	-36.91	1.00	210	13.83	18.80
3	27.12	39.56 QP	69.54	-29.98	1.00	153	20.46	19.10

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.
5. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:

13.56MHz = 30uV/m 30m
= 29.54dBuV/m 30m
= $29.54+20\log(30/3)^2$ 3m
= 69.54dBuV/m

EUT TEST CONDITION		MEASUREMENT DETAIL	
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1002hPa	**TESTED BY**	Antony Lee
TEST MODE	**C**		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA CLOSE AT 3m								
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	13.56	47.56 QP	69.54	-21.98	1.00	238	29.12	18.44
2	21.04	32.54 QP	69.54	-37.00	1.00	25	13.74	18.80
3	27.12	45.07 QP	69.54	-24.47	1.00	239	25.97	19.10

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.
5. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:

13.56MHz = 30uV/m 30m
= 29.54dBuV/m 30m
= $29.54+20\log(30/3)^2$ 3m
= 69.54dBuV/m

BELOW 1GHz WORST-CASE DATA：

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1000hPa	TESTED BY	Antony Lee
TEST MODE	A		

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	53.23	30.64 QP	40.00	-9.36	2.25 H	265	17.55	13.09
2	152.39	27.42 QP	43.50	-16.08	2.25 H	262	13.32	14.10
3	245.72	32.66 QP	46.00	-13.34	1.25 H	226	19.11	13.54
4	305.99	37.83 QP	46.00	-8.17	1.00 H	97	23.83	13.99
5	506.25	31.96 QP	46.00	-14.04	2.00 H	4	11.40	20.56
6	881.50	36.60 QP	46.00	-9.40	1.50 H	289	9.05	27.54
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	**54.24**	**36.16 QP**	**40.00**	**-3.84**	**1.23 V**	**49**	**23.11**	**13.06**
2	302.10	36.16 QP	46.00	-9.84	1.75 V	355	22.34	13.82
3	496.53	34.51 QP	46.00	-11.49	1.25 V	289	14.16	20.35
4	665.68	34.70 QP	46.00	-11.30	1.50 V	196	10.51	24.18
5	745.40	35.92 QP	46.00	-10.08	1.50 V	10	10.47	25.45
6	799.84	34.21 QP	46.00	-11.79	2.00 V	220	8.19	26.02

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1000hPa	TESTED BY	Antony Lee
TEST MODE	B		

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	53.23	28.17 QP	40.00	-11.83	2.00 H	343	14.57	13.59
2	189.33	34.71 QP	43.50	-8.79	1.50 H	154	23.26	11.45
3	745.40	34.04 QP	46.00	-11.96	1.00 H	145	10.20	23.83
4	772.62	38.74 QP	46.00	-7.26	1.00 H	154	14.17	24.57
5	799.84	35.05 QP	46.00	-10.95	1.75 H	298	9.74	25.32
6	935.94	37.47 QP	46.00	-8.53	1.50 H	301	11.08	26.38
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	30.00	35.73 QP	40.00	-4.27	1.00 V	355	23.45	12.28
2	189.33	31.58 QP	43.50	-11.92	1.00 V	301	20.13	11.45
3	251.55	34.17 QP	46.00	-11.83	2.00 V	16	21.32	12.86
4	745.40	34.09 QP	46.00	-11.91	1.50 V	58	10.25	23.83
5	772.62	38.52 QP	46.00	-7.48	1.25 V	76	13.95	24.57
6	799.84	33.43 QP	46.00	-12.57	1.75 V	289	8.11	25.32
7	990.38	41.32 QP	54.00	-12.68	1.00 V	115	14.65	26.68

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1000hPa	TESTED BY	Antony Lee
TEST MODE	C		

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	243.77	32.95 QP	46.00	-13.05	1.25 H	226	19.54	13.41
2	284.60	33.94 QP	46.00	-12.06	1.00 H	91	20.19	13.75
3	311.82	36.32 QP	46.00	-9.68	1.50 H	91	22.07	14.25
4	704.57	33.38 QP	46.00	-12.62	1.25 H	205	8.30	25.08
5	731.79	35.16 QP	46.00	-10.84	1.00 H	208	9.83	25.33
6	759.01	35.92 QP	46.00	-10.08	1.00 H	292	10.32	25.59
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	31.84	35.42 QP	40.00	-4.58	1.00 V	328	22.34	13.08
2	298.21	34.70 QP	46.00	-11.30	1.75 V	343	20.97	13.73
3	342.93	33.81 QP	46.00	-12.19	1.50 V	166	18.18	15.63
4	502.36	31.89 QP	46.00	-14.11	1.00 V	139	11.42	20.48
5	706.51	34.13 QP	46.00	-11.87	1.50 V	13	9.04	25.10
6	759.01	35.74 QP	46.00	-10.26	1.25 V	40	10.14	25.59

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

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

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

4. Margin value = Emission level – Limit value.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 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. 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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 19, 2008	Nov. 18, 2009
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 31, 2008	Dec. 30, 2009
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jun. 13, 2008	Jun. 12, 2009
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Dec. 04, 2008	Dec. 03, 2009
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.

4.2.3 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.

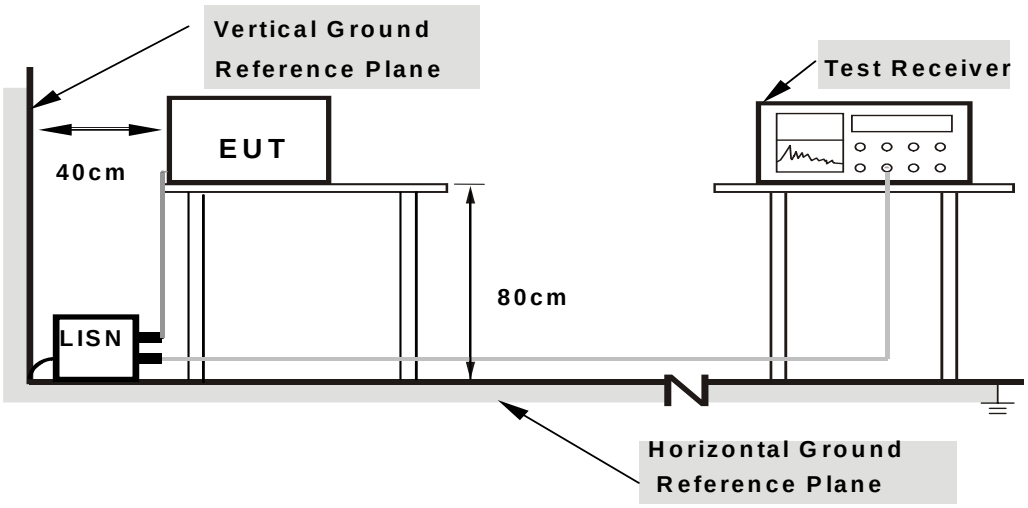
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

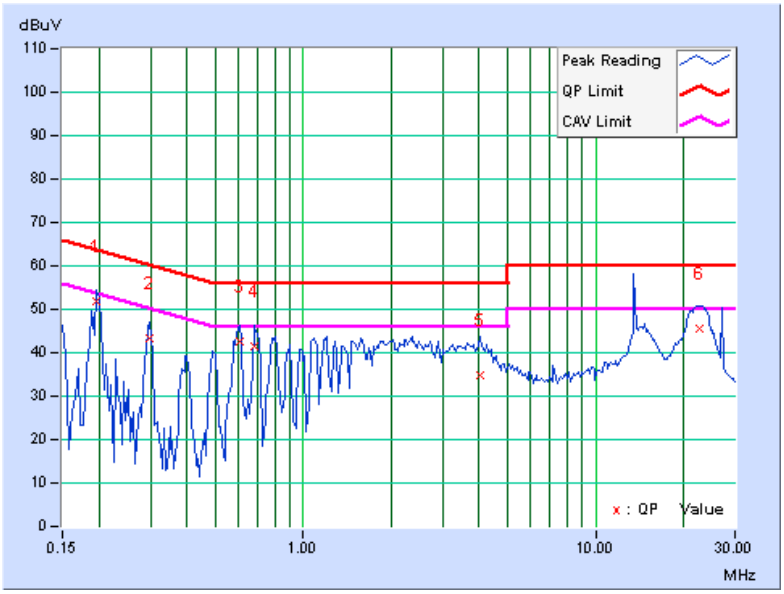
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA：

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	ASK	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 1002hPa
TESTED BY	Sun Lin	TEST MODE	A

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.13	51.75	-	51.88	-	63.74	53.74	-11.86	-
2	0.298	0.13	43.36	-	43.49	-	60.29	50.29	-16.79	-
3	0.603	0.15	42.27	-	42.42	-	56.00	46.00	-13.58	-
4	0.677	0.16	41.43	-	41.59	-	56.00	46.00	-14.41	-
5	4.027	0.37	34.29	-	34.66	-	56.00	46.00	-21.34	-
6	22.664	1.19	44.22	-	45.41	-	60.00	50.00	-14.59	-

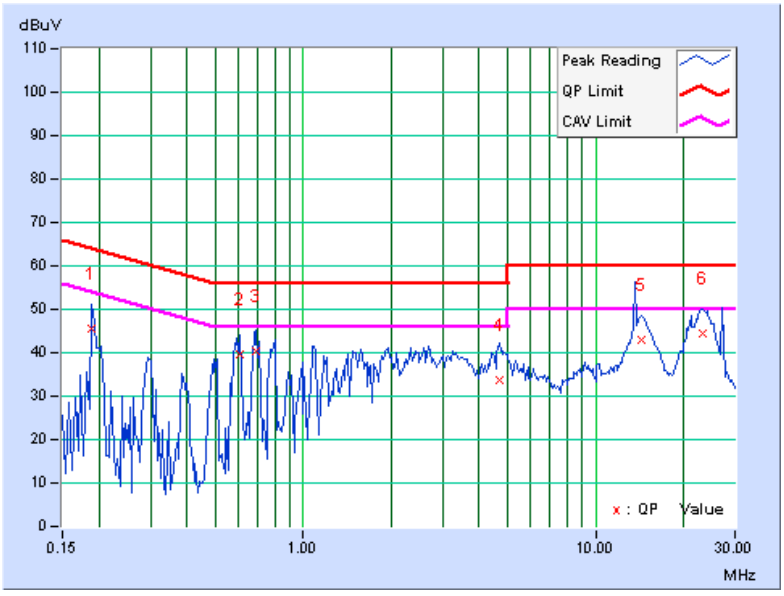
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	ASK	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 1002hPa
TESTED BY	Sun Lin	TEST MODE	A

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.15	45.32	-	45.47	-	64.08	54.08	-18.61	-
2	0.607	0.17	39.57	-	39.74	-	56.00	46.00	-16.26	-
3	0.685	0.18	40.34	-	40.52	-	56.00	46.00	-15.48	-
4	4.691	0.42	33.19	-	33.61	-	56.00	46.00	-22.39	-
5	14.313	0.80	41.99	-	42.79	-	60.00	50.00	-17.21	-
6	23.391	0.91	43.54	-	44.45	-	60.00	50.00	-15.55	-

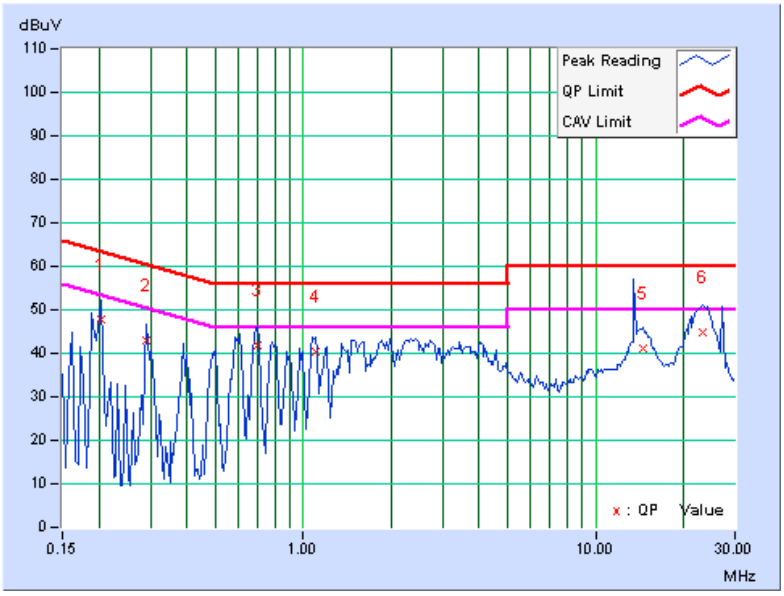
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	ASK	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 1002hPa
TESTED BY	Sun Lin	TEST MODE	B

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.13	47.69	-	47.82	-	63.42	53.42	-15.60	-
2	0.291	0.13	42.77	-	42.90	-	60.51	50.51	-17.60	-
3	0.701	0.16	41.78	-	41.94	-	56.00	46.00	-14.06	-
4	1.105	0.19	40.17	-	40.36	-	56.00	46.00	-15.64	-
5	14.539	0.88	40.40	-	41.28	-	60.00	50.00	-18.72	-
6	23.250	1.20	43.68	-	44.88	-	60.00	50.00	-15.12	-

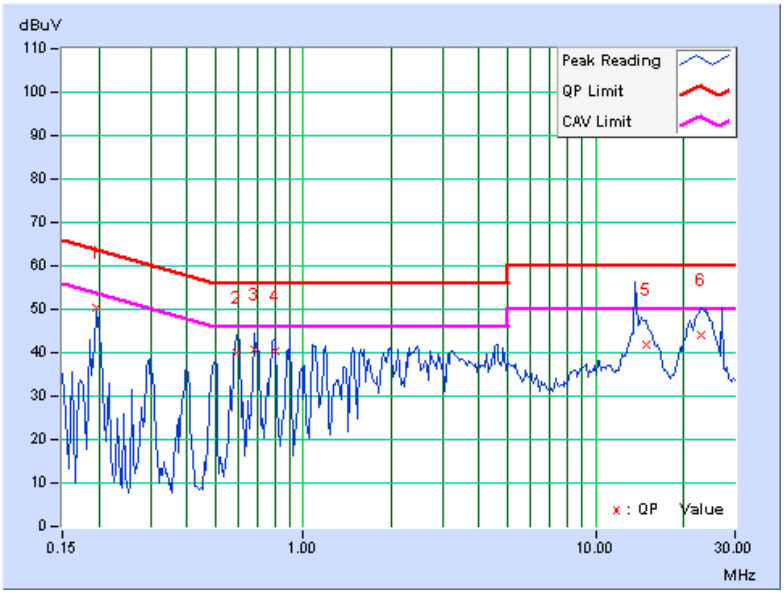
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	ASK	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 1002hPa
TESTED BY	Sun Lin	TEST MODE	B

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.15	50.24	-	50.39	-	63.74	53.74	-13.35	-
2	0.591	0.17	39.68	-	39.85	-	56.00	46.00	-16.15	-
3	0.677	0.18	40.65	-	40.83	-	56.00	46.00	-15.17	-
4	0.798	0.19	40.03	-	40.22	-	56.00	46.00	-15.78	-
5	14.898	0.82	41.18	-	42.00	-	60.00	50.00	-18.00	-
6	23.008	0.91	43.32	-	44.23	-	60.00	50.00	-15.77	-

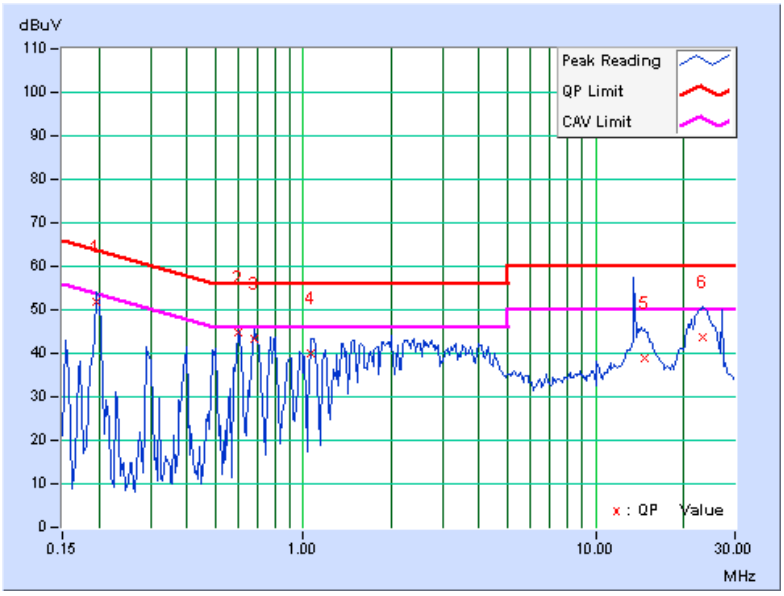
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	ASK	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 1002hPa
TESTED BY	Sun Lin	TEST MODE	C

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.13	51.63	-	51.76	-	63.74	53.74	-11.98	-
2	**0.599**	**0.15**	**44.68**	**-**	**44.83**	**-**	**56.00**	**46.00**	**-11.17**	**-**
3	0.677	0.16	43.05	-	43.21	-	56.00	46.00	-12.79	-
4	1.066	0.18	39.66	-	39.84	-	56.00	46.00	-16.16	-
5	14.672	0.89	38.06	-	38.95	-	60.00	50.00	-21.05	-
6	23.316	1.20	42.65	-	43.85	-	60.00	50.00	-16.15	-

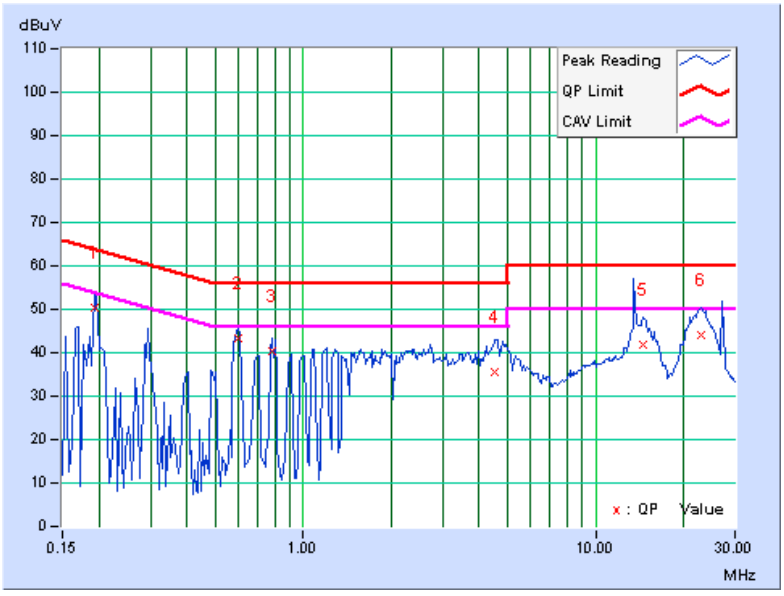
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	ASK	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 1002hPa
TESTED BY	Sun Lin	TEST MODE	C

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.15	50.04	-	50.19	-	63.91	53.91	-13.72	-
2	0.599	0.17	43.23	-	43.40	-	56.00	46.00	-12.60	-
3	0.779	0.19	40.01	-	40.20	-	56.00	46.00	-15.80	-
4	4.539	0.41	35.26	-	35.67	-	56.00	46.00	-20.33	-
5	14.543	0.81	40.89	-	41.70	-	60.00	50.00	-18.30	-
6	23.043	0.91	43.01	-	43.92	-	60.00	50.00	-16.08	-

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.



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

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 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
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

7. 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---