



A D T

FCC TEST REPORT

REPORT NO.: RF981222H02

MODEL NO.: C-U0007

RECEIVED: Dec. 22, 2009

TESTED: Dec. 24 to 28, 2009

ISSUED: Dec. 30, 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

This test report consists of 29 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced, except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.





Table of Contents

1	CERTIFICATION	3
2	SUMMARY OF TEST RESULTS	4
2.1	MEASUREMENT UNCERTAINTY	4
3	GENERAL INFORMATION	5
3.1	GENERAL DESCRIPTION OF EUT	5
3.2	DESCRIPTION OF TEST MODES	6
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	6
3.4	DESCRIPTION OF SUPPORT UNITS	7
3.5	CONFIGURATION OF SYSTEM UNDER TEST	8
4	TEST PROCEDURES AND RESULTS	9
4.1	CONDUCTED EMISSION MEASUREMENT	9
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	9
4.1.2	TEST INSTRUMENTS	9
4.1.3	TEST PROCEDURES	10
4.1.4	TEST SETUP	10
4.1.5	EUT OPERATING CONDITIONS	11
4.1.6	TEST RESULTS	12
4.2	RADIATED EMISSION MEASUREMENT	14
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	14
4.2.2	TEST INSTRUMENTS	15
4.2.3	TEST PROCEDURES	16
4.2.4	DEVIATION FROM TEST STANDARD	16
4.2.5	TEST SETUP	17
4.2.6	EUT OPERATING CONDITIONS	17
4.2.7	TEST RESULTS	18
4.3	CONDUCTED - OUT BAND MEASUREMENT	25
4.3.1	LIMITS OF CONDUCTED - OUT BAND MEASUREMENT	25
4.3.2	TEST INSTRUMENTS	25
4.3.3	TEST PROCEDURE	25
4.3.4	DEVIATION FROM TEST STANDARD	25
4.3.5	EUT OPERATING CONDITION	25
4.3.6	TEST RESULTS	26
5	INFORMATION ON THE TESTING LABORATORIES	28
6	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	29



A D T

1 CERTIFICATION

PRODUCT : 2.4GHz Transceiver
BRAND NAME : Logitech
MODEL NO. : C-U0007
TESTED : Dec. 24 to 28, 2009
TEST SAMPLE : ENGINEERING SAMPLE
APPLICANT : LOGITECH FAR EAST LTD.
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.249),
ANSI C63.4-2003

The above equipment (Model: C-U0007) 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:** Dec 30, 2009
(Sunny Wen, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung, **DATE:** Dec 30, 2009
(Hank Chung, Deputy Manager)

APPROVED BY : May Chen, **DATE:** Dec 30, 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 -10.71dB at 16.535MHz
15.249	Radiated Emission Test	PASS	Minimum passing margin is -4.6dB at 2400.00MHz
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 Emission	2.45 dB
Radiated emissions (30MHz-1GHz)	4.00 dB
Radiated emissions (1GHz-18GHz)	2.44 dB
Radiated emissions (18GHz-40GHz)	2.668 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	2.4GHz Transceiver
MODEL NO.	C-U0007
FCC ID	JNZCU0007
POWER SUPPLY	DC 5V from host equipment
MODULATION TYPE	GFSK
CARRIER FREQUENCY OF EACH CHANNEL	2405MHz ~ 2474MHz
NUMBER OF CHANNEL	24
ANTENNA TYPE	PCB trace antenna with 3.24dBi antenna gain
DATA CABLE	USB cable (shielded, 1.58m) for USB stand
I/O PORTS	NA
ASSOCIATED DEVICES	USB stand

NOTE:

1. The EUT could be supplied with USB stand, there are two different brand names could be chosen as following table:

Brand	Spec.
JEM	extension USB cable (shielded, 1.58m)
Hank	

2. The EUT was pre-tested in chamber under following test modes:

Pre-test Mode	Description
Mode A	Without USB stand
Mode B	With JEM USB stand - extension USB cable
Mode C	With Hank USB stand - extension USB cable

From the above modes, the worst case was found in **Mode B**. 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 feature descriptions, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Twenty-four channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	2405	7	2423	13	2441	19	2459
2	2408	8	2426	14	2444	20	2462
3	2411	9	2429	15	2447	21	2465
4	2414	10	2432	16	2450	22	2468
5	2417	11	2435	17	2453	23	2471
6	2420	12	2438	18	2456	24	2474

NOTE:

1. Below 1 GHz, the channel 1, 14, and 24 were pre-tested in chamber. The channel 1, worst case one, was chosen for final test.
2. Above 1 GHz, the channel 1, 14, and 24 were tested individually.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 2.4GHz Transceiver. 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.

Conducted test					
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	PERSONAL COMPUTER	DELL	DC01L	8P7WV1S	FCC DoC
2	MONITOR	DELL	E228WFPc	CN-OX765G-64180-88P-09ZM	FCC DoC
3	PRINTER	CANON	K10202	FASF84644	FCC DoC
4	MODEM	ACEEX	1414	0206026775	IFAXDM1414
5	KEYBOARD	DELL	SK-8115	MY-0J4635-71619-67V-0114	FCC DoC
6	2.4GHz Cordless Mouse	Logitech	M-R0009	NA	FCC DoC

Radiated test					
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP21L	CN-0GD366-70166-5B3-09ZX	QDS-BRCM1016
2	MODEM	ACEEX	1414	0206026776	IFAXDM1414

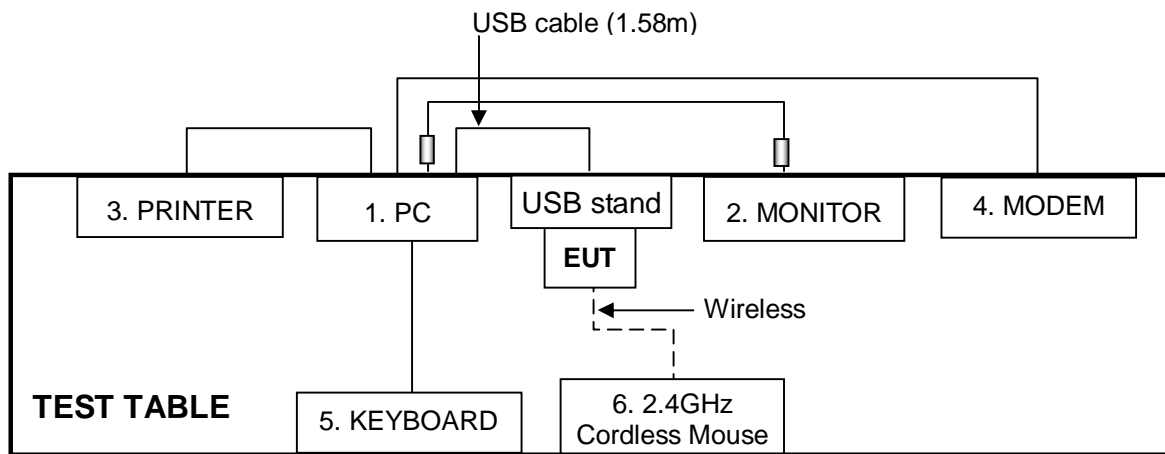
Conducted test	
No.	Signal cable description
1	1.58 m shielded, USB cable.
2	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, with two cores.
3	1.8 m braid shielded wire, terminated with DB25 and centronics connector via metallic frame, w/o core
4	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
5	1.9 m foil shielded wire, USB connector, w/o core.
6	NA

Radiated test	
No.	Signal cable description
1	1.58 m shielded, USB cable.
2	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

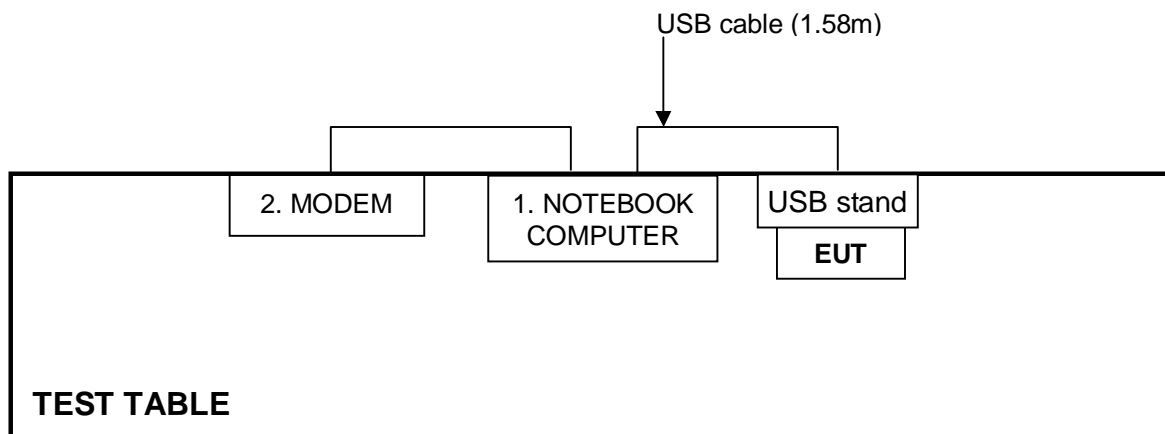
Note: 1. All power cords of the above support units are unshielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST

For Conducted test:



For Radiated test:





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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 05, 2009	Mar. 04, 2010
Line-Impedance Stabilization Network (for EUT)	KNW-407	8-1395-12	May 04, 2009	May 03, 2010
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 08, 2009	June 07, 2010
RF Cable (JYEBAO)	5DFB	COACAB-001	Dec 14, 2009	Dec 13, 2010
50 ohms Terminator	50	3	Oct. 28, 2009	Oct. 27, 2010
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

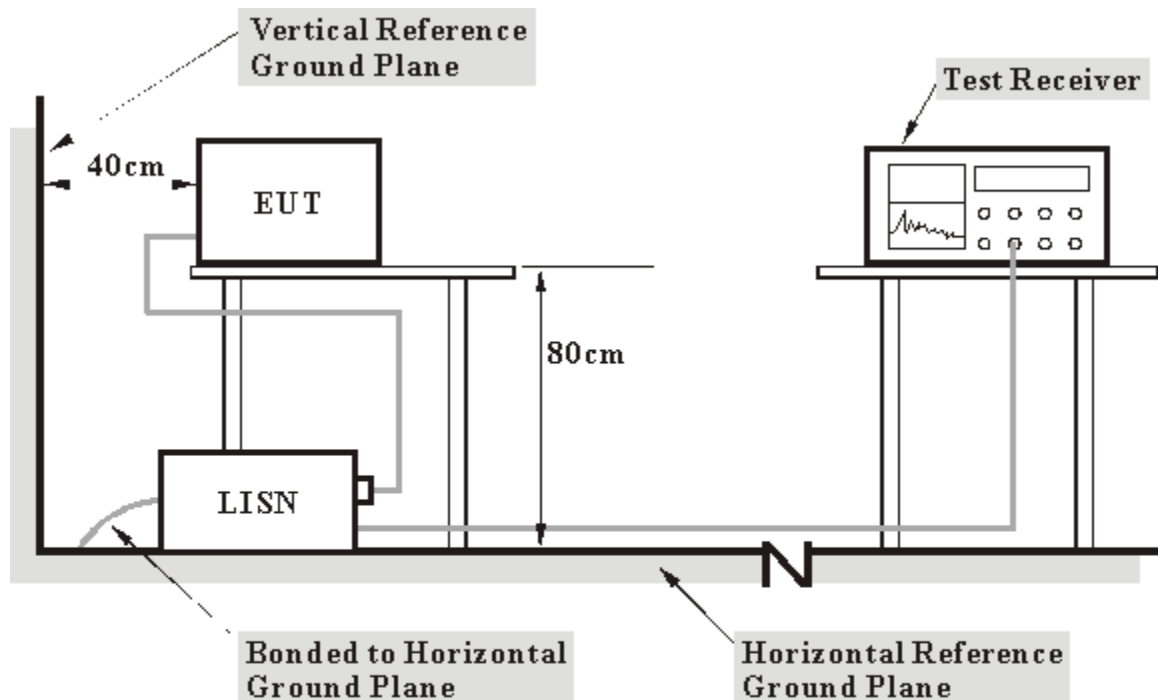
Note:

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. A.
3. The VCCI Con A Registration No. is C-817.

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

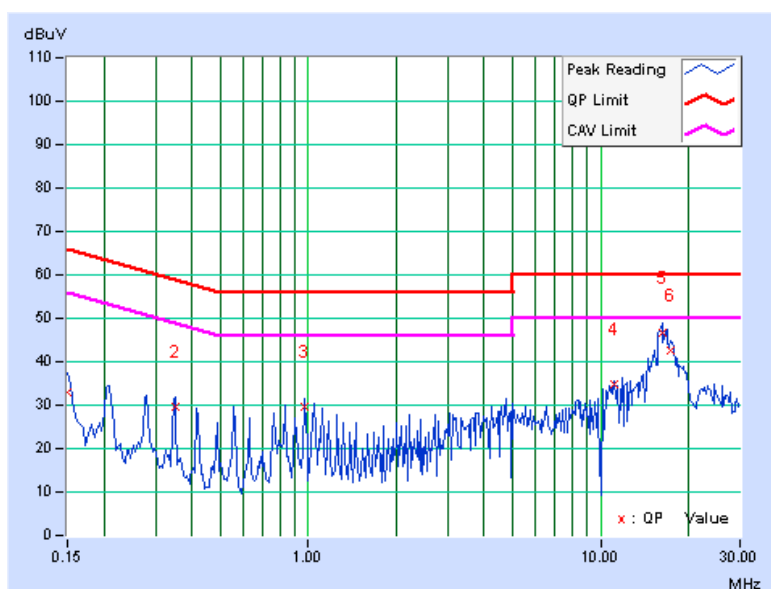
- a. The EUT link to support unit 1 (PC) and which placed on a testing table.
- b. The support unit 1 (PC) ran a test program to enable EUT under transmission condition continuously at specific channel frequency.

4.1.6 TEST RESULTS

INPUT POWER (SYSTEM)	120Vac, 60 Hz	6DB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	26 deg. C, 60%RH, 1024 hPa	PHASE	Line (L)
TESTED BY	Leo Peng		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.29	32.77	-	33.06	-	66.00	56.00	-32.94	-
2	0.349	0.13	29.47	-	29.60	-	58.98	48.98	-29.38	-
3	0.973	0.09	29.55	-	29.64	-	56.00	46.00	-26.36	-
4	11.191	0.35	34.46	-	34.81	-	60.00	50.00	-25.19	-
5	16.266	0.49	46.27	-	46.76	-	60.00	50.00	-13.24	-
6	17.445	0.52	41.96	-	42.48	-	60.00	50.00	-17.52	-

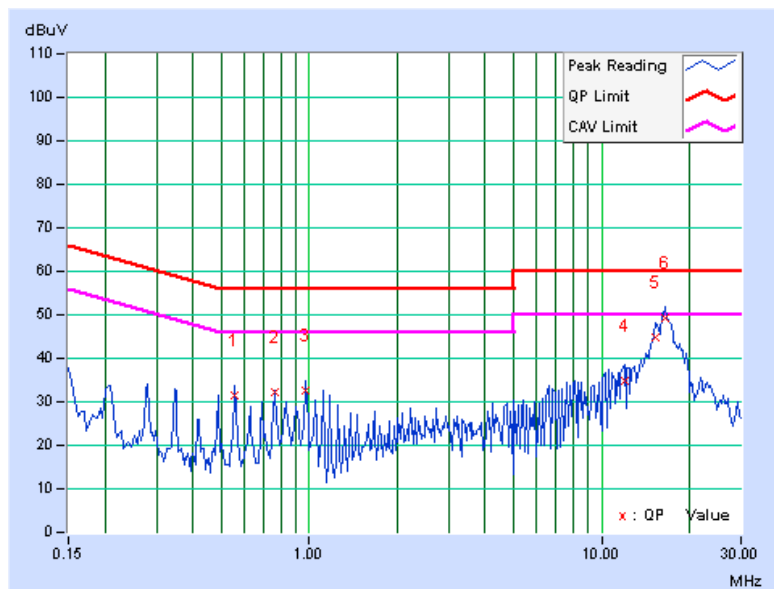
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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	26 deg. C, 60%RH, 1024 hPa	PHASE	Neutral (N)
TESTED BY	Eric Lee		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.556	0.12	31.54	-	31.66	-	56.00	46.00	-24.34	-
2	0.763	0.11	32.23	-	32.34	-	56.00	46.00	-23.66	-
3	0.974	0.11	32.63	-	32.74	-	56.00	46.00	-23.26	-
4	11.949	0.41	34.43	-	34.84	-	60.00	50.00	-25.16	-
5	15.355	0.50	44.45	-	44.95	-	60.00	50.00	-15.05	-
6	16.535	0.53	48.76	-	49.29	-	60.00	50.00	-10.71	-

- 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
ADVANTEST Spectrum Analyzer	U3751	160200410	July. 17, 2009	July. 16, 2010
ADVANTEST Spectrum Analyzer	U3772	160100280	Sep. 21, 2009	Sep. 20, 2010
HP Pre_Amplifier	8449B	3008A01922	Sep. 25, 2009	Sep. 24, 2010
ROHDE & SCHWARZ Test Receiver	ESVS 30	841977/002	Oct. 28, 2009	Oct. 27, 2010
SCHAFFNER(CHASE) Broadband Antenna	CBL6112B	2798	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120-D1	D123	Sep. 21, 2009	Sep. 20, 2010
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 23, 2009	Jan. 22, 2010
RF Switches	MP59B	6100175593	Sep. 01, 2009	Aug. 31, 2010
RF Cable	8DFB	STBCAB-001	Sep. 01, 2009	Aug. 31, 2010
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA
CORCOM AC Filter	MRI2030	024/019	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: U3772) are used only for the measurement of emission frequency above 1GHz if tested.

3. The test was performed in Open Site No. B.

4. The VCCI Site Registration No. is R-847.

5. The FCC Site Registration No. is 92753.

6. The CANADA Site Registration No. is IC 7450G-2.

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.

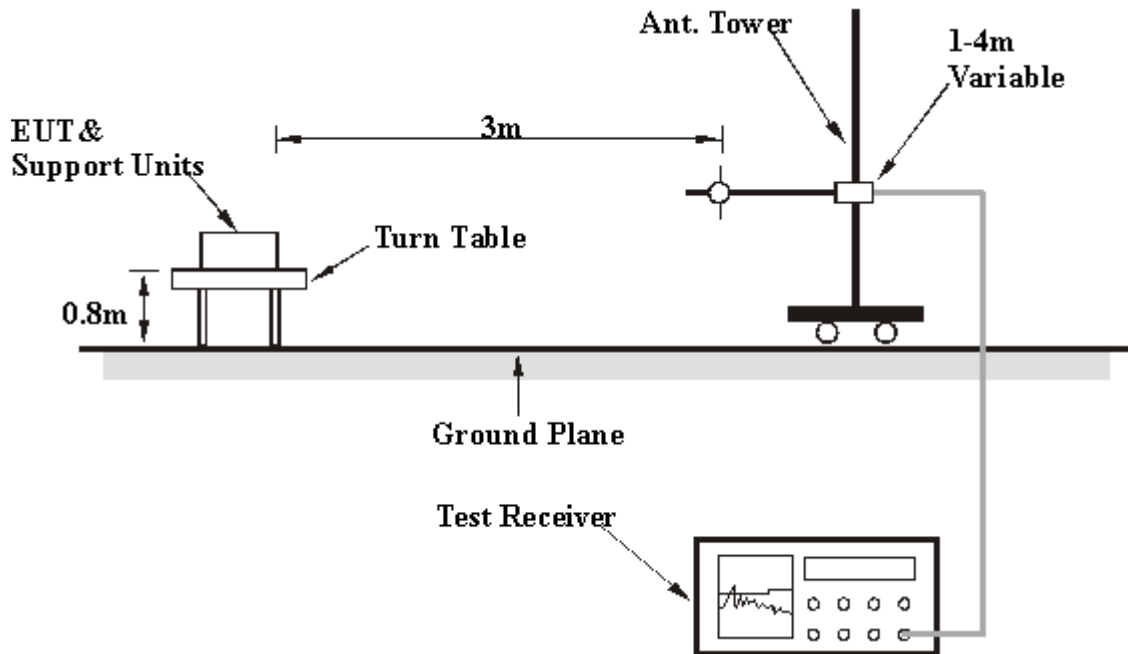
NOTE:

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

- a. The EUT link to support unit 1 (Notebook Computer) and which placed on a testing table.
- b. The support unit 1 (Notebook Computer) ran a test program “Button Function.txt” to enable EUT under transmission 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 (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH 1024 hPa	TESTED BY	Eagle Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	120.00	29.3 QP	43.5	-14.2	2.20 H	284	16.68	12.60
2	144.00	30.3 QP	43.5	-13.2	2.25 H	28	17.92	12.35
3	216.97	29.3 QP	46.0	-16.7	2.34 H	40	17.27	12.05
4	360.02	33.5 QP	46.0	-12.5	1.50 H	355	16.50	16.98
5	480.04	30.9 QP	46.0	-15.1	2.13 H	359	10.98	19.94
6	600.01	32.3 QP	46.0	-13.7	1.00 H	124	10.56	21.72
7	960.00	33.1 QP	46.0	-13.0	1.00 H	233	7.72	25.33
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	120.00	29.6 QP	43.5	-13.9	1.00 V	340	16.98	12.60
2	216.58	29.1 QP	46.0	-16.9	1.00 V	57	17.04	12.03
3	312.01	31.1 QP	46.0	-14.9	1.00 V	341	15.46	15.68
4	360.98	35.5 QP	46.0	-10.5	1.00 V	342	18.47	17.01
5	600.00	32.2 QP	46.0	-13.8	1.59 V	55	10.44	21.72
6	912.03	32.0 QP	46.0	-14.0	1.59 V	152	7.04	24.96
7	960.04	37.8 QP	54.0	-16.2	1.49 V	130	12.45	25.33

- 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 (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	14deg. C, 66%RH 1024 hPa	TESTED BY	Frank Liu

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	2400.00	69.4 PK	74.0	-4.6	1.00 H	188	39.33	30.07
2	2400.00	30.4 AV	54.0	-23.6	1.00 H	188	0.32	30.07
3	*2405.00	101.4 PK	114.0	-12.6	1.00 H	211	71.31	30.09
4	*2405.00	62.4 AV	94.0	-31.6	1.00 H	211	32.30	30.09
5	4810.00	55.2 PK	74.0	-18.8	1.53 H	134	19.75	35.45
6	4810.00	16.2 AV	54.0	-37.8	1.53 H	134	-19.26	35.45
7	7215.00	47.1 PK	74.0	-26.9	1.19 H	125	6.05	41.01
8	7215.00	8.1 AV	54.0	-46.0	1.19 H	125	-32.96	41.01

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	2400.00	68.4 PK	74.0	-5.6	1.03 V	188	38.30	30.07
2	2400.00	29.4 AV	54.0	-24.6	1.03 V	188	-0.71	30.07
3	*2405.00	102.5 PK	114.0	-11.5	1.04 V	184	72.41	30.09
4	*2405.00	63.5 AV	94.0	-30.5	1.04 V	184	33.40	30.09
5	4810.00	55.7 PK	74.0	-18.3	1.00 V	215	20.25	35.45
6	4810.00	16.7 AV	54.0	-37.3	1.00 V	215	-18.76	35.45
7	7215.00	47.2 PK	74.0	-26.8	1.00 V	226	6.19	41.01
8	7215.00	8.2 AV	54.0	-45.8	1.00 V	226	-32.82	41.01

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “ : Fundamental frequency
 6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (0.08753 \text{ ms} / 7.812 \text{ ms}) = -39.0 \text{ dB}$
 Please see page 22 for plotted duty.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 14	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	14deg. C, 66%RH 1024 hPa	TESTED BY	Frank Liu

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	100.5 PK	114.0	-13.5	1.00 H	214	70.26	30.24
2	*2444.00	61.5 AV	94.0	-32.5	1.00 H	214	31.25	30.24
3	4888.00	53.8 PK	74.0	-20.2	1.50 H	129	18.14	35.66
4	4888.00	14.8 AV	54.0	-39.2	1.50 H	129	-20.87	35.66
5	7332.00	48.2 PK	74.0	-25.8	1.16 H	127	6.89	41.31
6	7332.00	9.2 AV	54.0	-44.8	1.16 H	127	-32.12	41.31

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	100.3 PK	114.0	-13.7	1.03 V	187	70.06	30.24
2	*2444.00	61.3 AV	94.0	-32.7	1.03 V	187	31.05	30.24
3	4888.00	53.6 PK	74.0	-20.4	1.00 V	211	17.94	35.66
4	4888.00	14.6 AV	54.0	-39.4	1.00 V	211	-21.07	35.66
5	7332.00	48.1 PK	74.0	-25.9	1.00 V	229	6.79	41.31
6	7332.00	9.1 AV	54.0	-44.9	1.00 V	229	-32.22	41.31

REMARKS:

- Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
- Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- The other emission levels were very low against the limit.
- Margin value = Emission level – Limit value.
- “ * “ : Fundamental frequency
- The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (0.08753 \text{ ms} / 7.812 \text{ ms}) = -39.0 \text{ dB}$
 Please see page 22 for plotted duty.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 24	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	14deg. C, 66%RH 1024 hPa	TESTED BY	Frank Liu

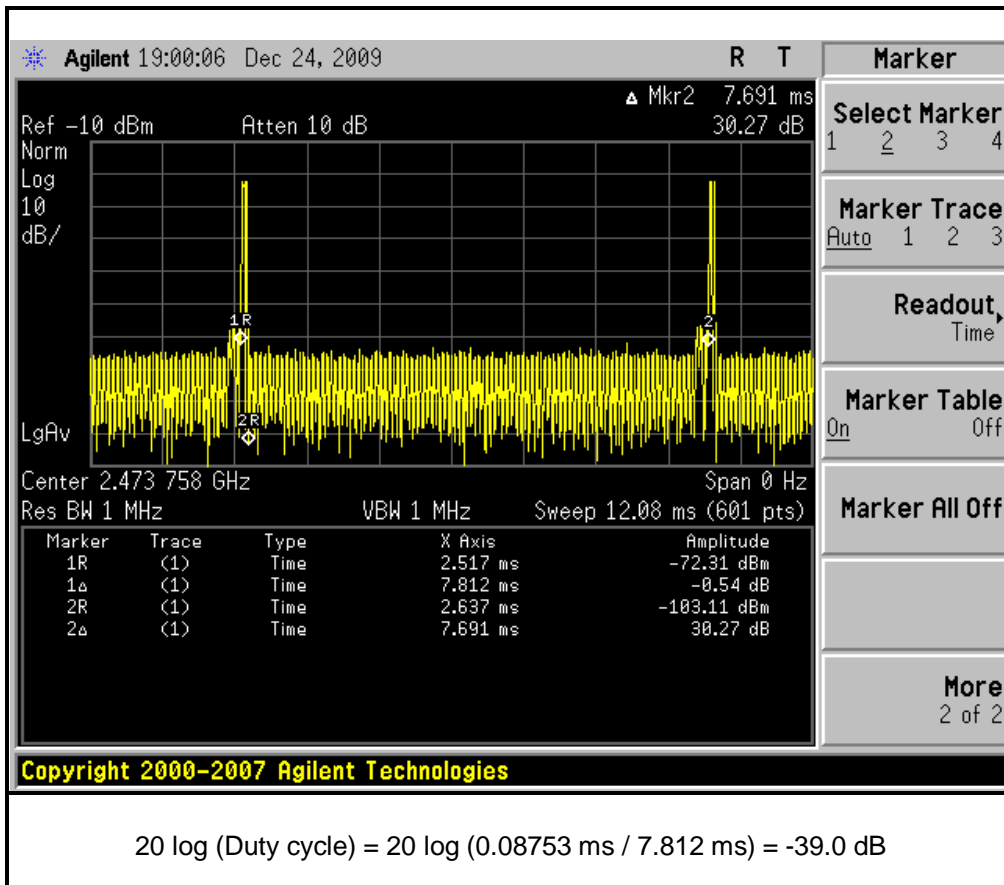
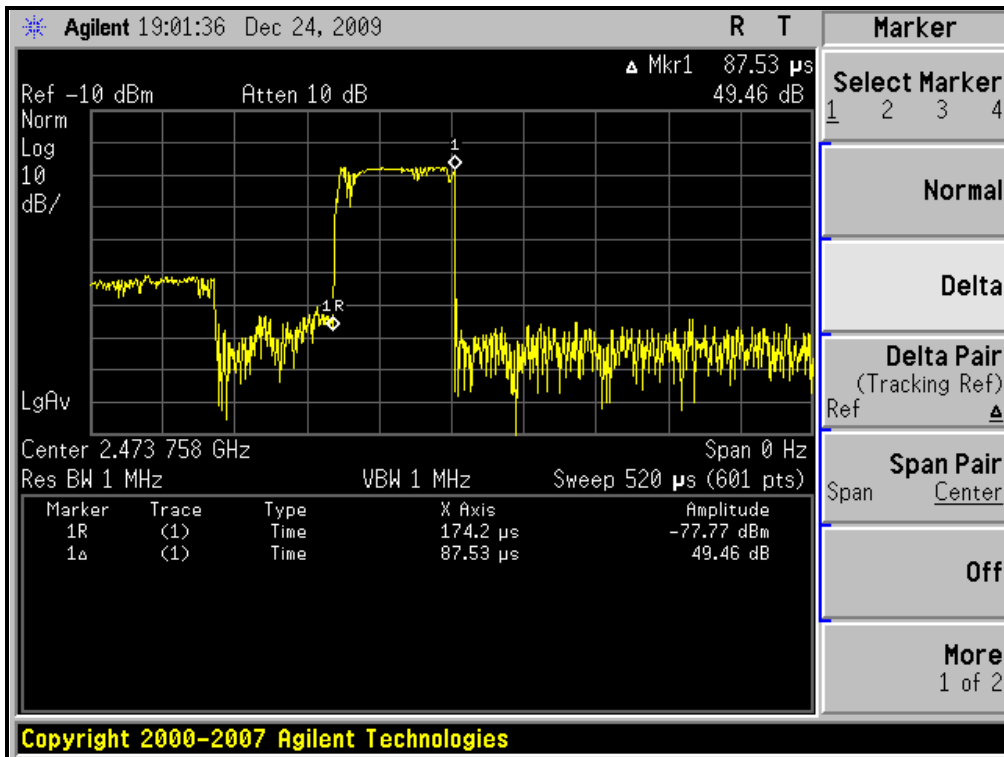
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

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	99.6 PK	114.0	-14.4	1.00 H	209	69.24	30.36
2	*2474.00	60.6 AV	94.0	-33.4	1.00 H	209	30.23	30.36
3	2483.50	62.5 PK	74.0	-11.6	1.00 H	203	32.05	30.40
4	2483.50	23.4 AV	54.0	-30.6	1.00 H	203	-6.96	30.40
5	4948.00	53.0 PK	74.0	-21.0	1.14 H	139	17.17	35.81
6	4948.00	14.0 AV	54.0	-40.0	1.14 H	139	-21.84	35.81
7	7422.00	48.4 PK	74.0	-25.6	1.13 H	124	6.86	41.54
8	7422.00	9.4 AV	54.0	-44.6	1.13 H	124	-32.15	41.54

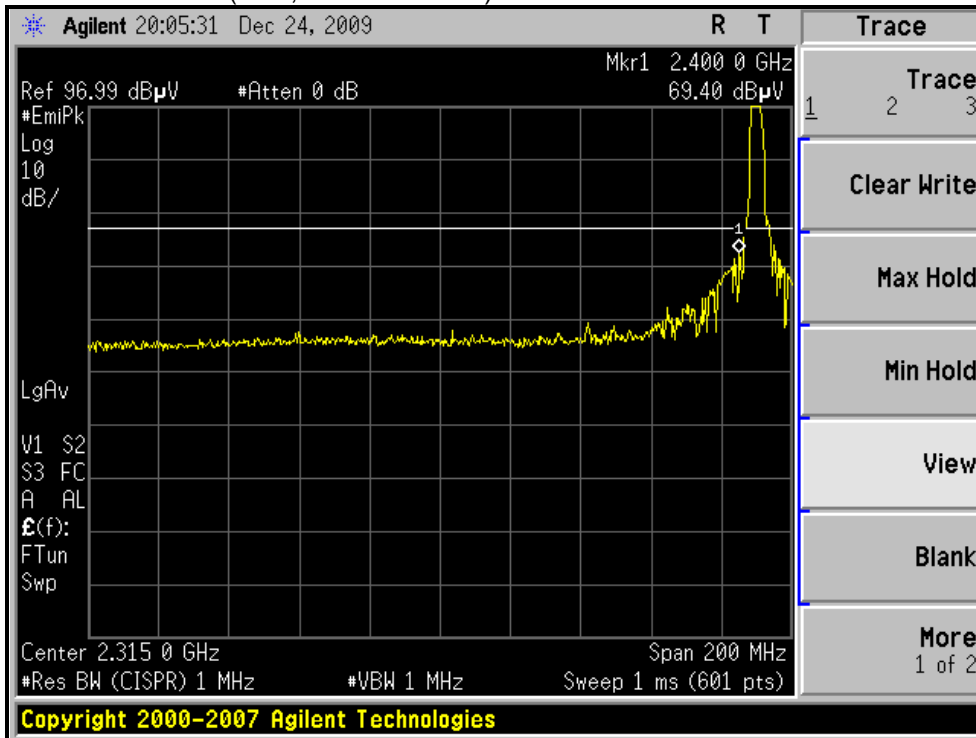
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

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	*2474.00	99.6 PK	114.0	-14.4	1.19 V	187	69.24	30.36
2	*2474.00	60.6 AV	94.0	-33.4	1.19 V	187	30.23	30.36
3	2483.50	61.1 PK	74.0	-12.9	1.19 V	184	30.69	30.40
4	2483.50	22.1 AV	54.0	-31.9	1.19 V	184	-8.32	30.40
5	4948.00	52.3 PK	74.0	-21.7	1.00 V	215	16.49	35.81
6	4948.00	13.3 AV	54.0	-40.7	1.00 V	215	-22.52	35.81
7	7422.00	48.1 PK	74.0	-25.9	1.00 V	231	6.56	41.54
8	7422.00	9.1 AV	54.0	-44.9	1.00 V	231	-32.45	41.54

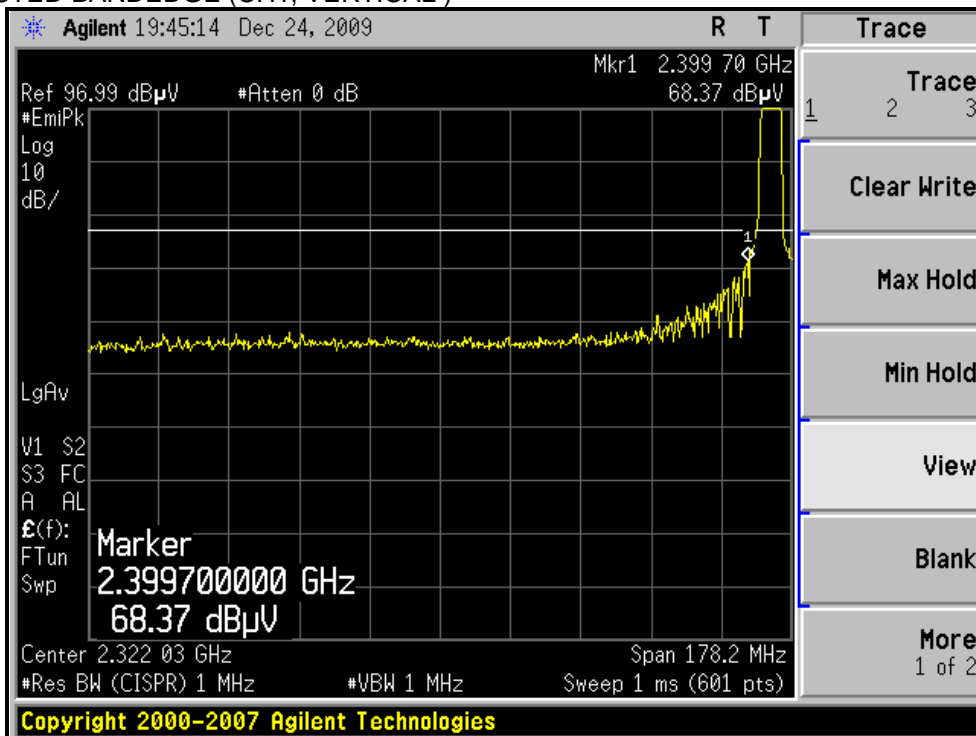
- REMARKS:**
- Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 - Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 - The other emission levels were very low against the limit.
 - Margin value = Emission level – Limit value.
 - “ * ” : Fundamental frequency
 - The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (0.08753 \text{ ms} / 7.812 \text{ ms}) = -39.0 \text{ dB}$
 Please see page 22 for plotted duty.



RESTRICTED BANDEDGE (CH1, HORIZONTAL)

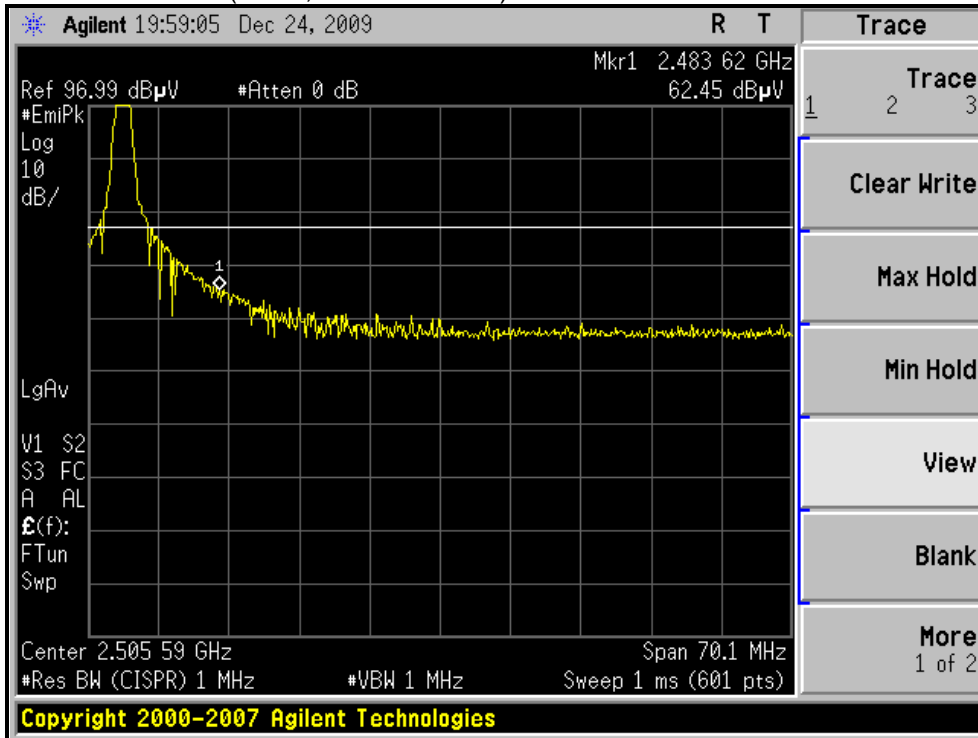


RESTRICTED BANDEDGE (CH1, VERTICAL)

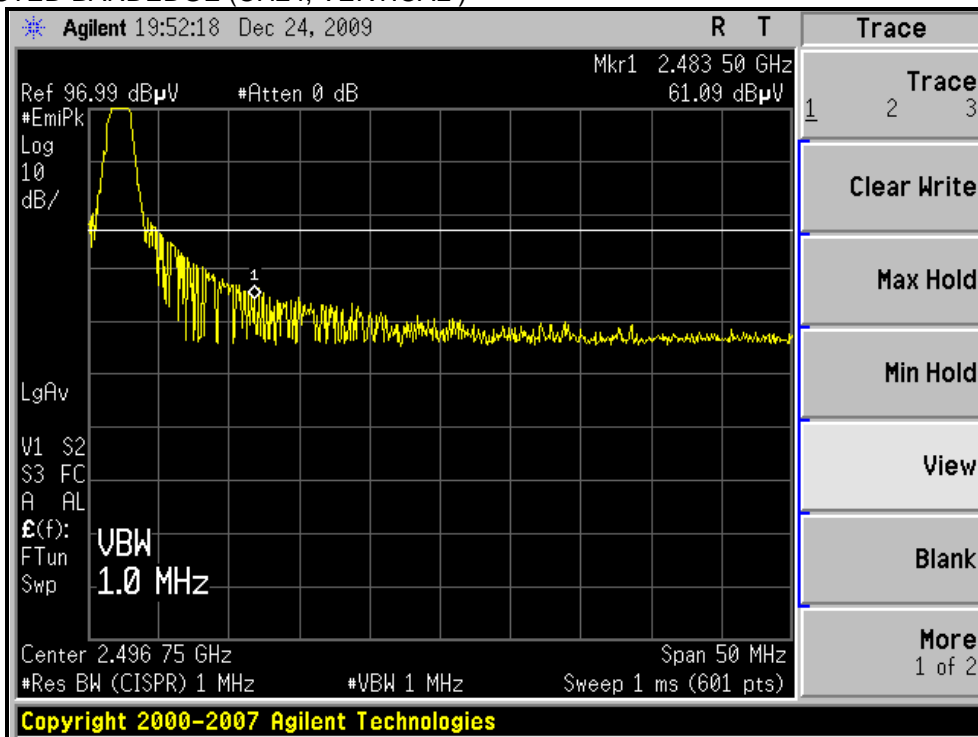


* The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle). And it meets the requirement of limit.

RESTRICTED BANDEDGE (CH24, HORIZONTAL)



RESTRICTED BANDEDGE (CH24, VERTICAL)



* The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle). And it meets the requirement of limit.



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	100036	Dec. 18, 2009	Dec. 17, 2010

NOTE:

- 1. 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

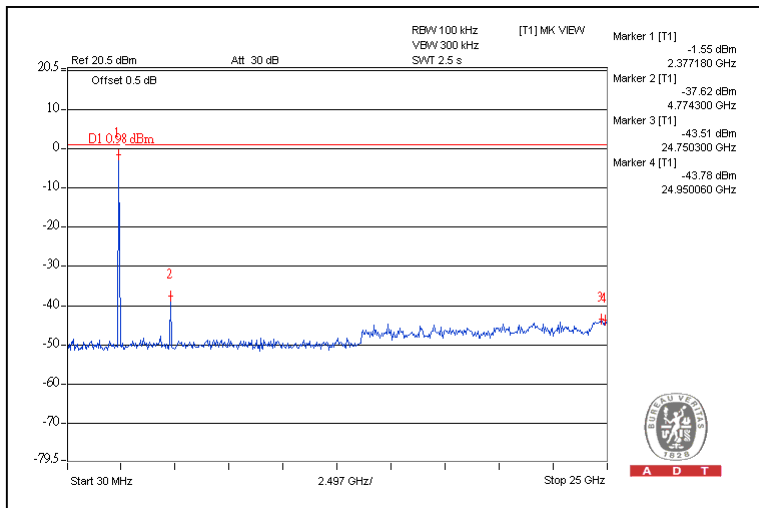
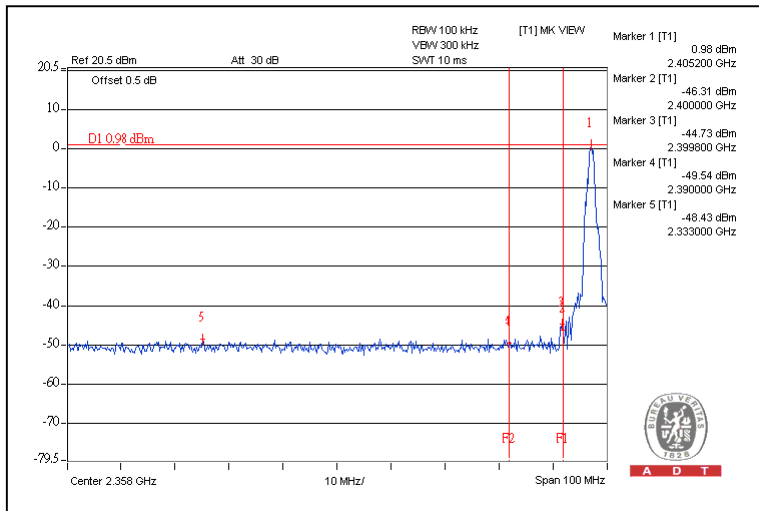
4.3.5 EUT OPERATING CONDITION

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

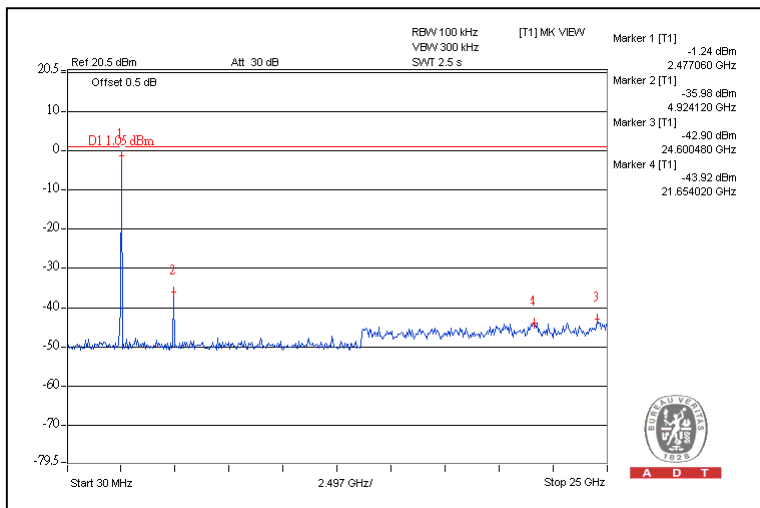
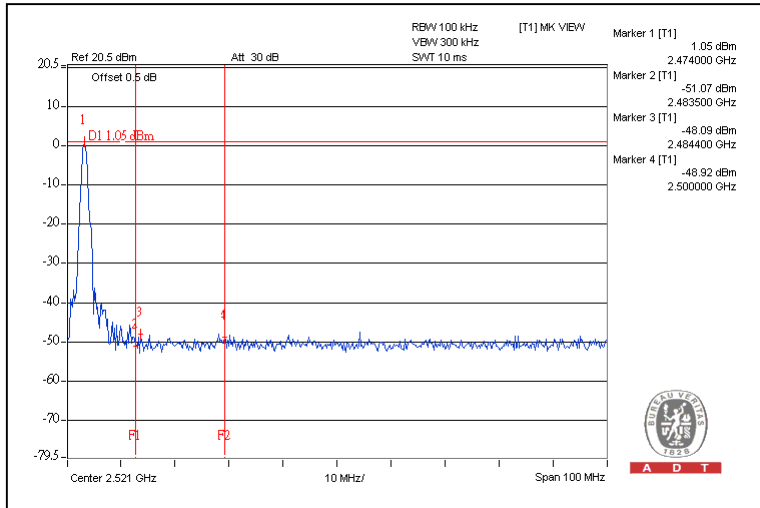
4.3.6 TEST RESULTS

Emissions radiated outside of the specified frequency bands, please refer pages from 19 to 21 for met the requirement of the general radiated emission limits in § 15.209.

CH1



CH24





A D T

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 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: 886-2-26052943

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.



A D T

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 ---