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FCC TEST REPORT

REPORT NO.: RF110308E11

MODEL NO.: C-U0008

FCC ID: JNZCU0008

RECEIVED: Mar. 08, 2011

TESTED: Mar. 11 to 15, 2011

ISSUED: Mar. 21, 2011

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

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Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING
CHANGES TO THE EUT BY THE LAB 32



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Mar. 21, 2011



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1 CERTIFICATION

PRODUCT : 2.4GHz Transceiver
BRAND NAME : Logitech
MODEL NO. : C-U0008
TEST SAMPLE : ENGINEERING SAMPLE
APPLICANT : LOGITECH FAR EAST LTD.
TESTED : Mar. 11 to 15, 2011
STANDARDS : FCC Part 15, Subpart C (Section 15.249)
ANSI C63.4-2003
ANSI C63.10-2009

The above equipment (Model: C-U0008) 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 : Carol Liao, **DATE:** Mar. 21, 2011
(Carol Liao, Specialist)

APPROVED BY : May Chen, **DATE:** Mar. 21, 2011
(May Chen, Deputy 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	Minimum passing margin is -8.59dB at 0.216MHz
15.249	Radiated Emission Test	PASS	Minimum passing margin is -5.9dB at 2474.0MHz
15.249	Conducted - Out Band Measurement	PASS	Meet the requirement of limit

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

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

Measurement	Value
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	2.45 dB
Radiated emissions (1GHz-18GHz)	3.76 dB
Radiated emissions (18GHz-40GHz)	2.19 dB



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	2.4GHz Transceiver
MODEL NO.	C-U0008
FCC ID	JNZCU0008
POWER SUPPLY	DC 5V from host equipment
MODULATION TYPE	GFSK
OPERATING FREQUENCY	2405MHz ~ 2474MHz
NUMBER OF CHANNEL	12
ANTENNA TYPE	PCB printed antenna, quarter-wave with -1.99dBi antenna gain
DATA CABLE	USB cable (shielded, 1.6m) for USB stand
I/O PORTS	NA
ASSOCIATED DEVICES	USB stand cable

NOTE:

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

Brand	Spec.
JEM	extension USB cable (shielded, 1.6m)
Hank	

2. For radiated test, the EUT was pre-tested in chamber under following test modes:

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

From the above modes, the worst case was found in **Mode C**. Therefore only the test data of the mode was recorded in this report individually.

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



3.2 DESCRIPTION OF TEST MODES

Twelve channels are provided to this EUT.

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

NOTE:

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

3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	OB	
-	√	√	√	√	With Hank USB stand cable

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz
RE ≥ 1G: Radiated Emission above 1GHz **OB:** CONDUCTED OUT-BAND EMISSION MEASUREMENT

POWER LINE CONDUCTED EMISSION TEST:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 12	12	GFSK

RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 12	12	GFSK



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RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 12	1, 8, 12	GFSK

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 12	1, 12	GFSK

3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (Section 15.249)

ANSI C63.4: 2003

ANSI C63.10: 2009

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.

3.5 DESCRIPTION OF SUPPORT UNITS

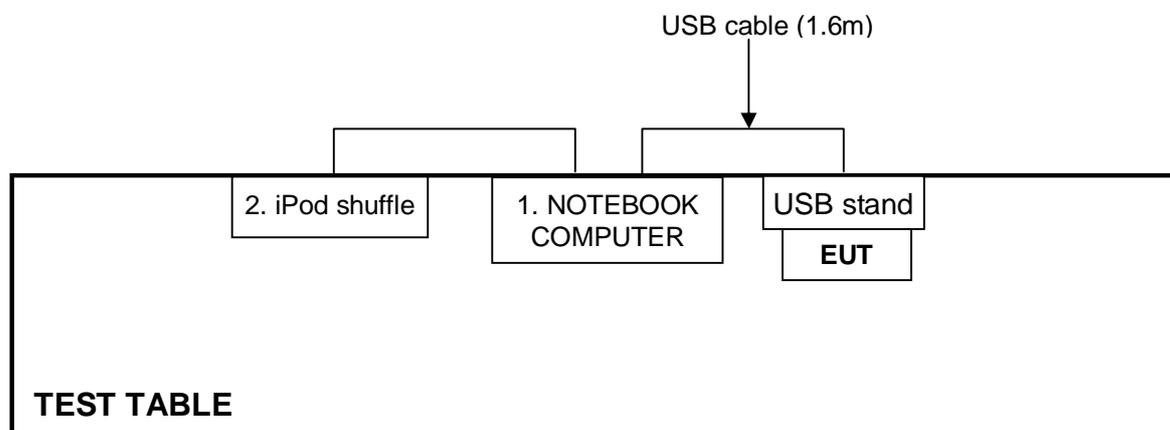
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC
2	iPod shuffle	Apple	MC749TA/A	CC4DMFKUDFDM	FCC DoC

No.	Signal cable description
1	USB cable, 1.6 m shielded.
2	USB cable, 0.1m

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

3.6 CONFIGURATION OF SYSTEM UNDER 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. 02, 2011	Mar. 01, 2012
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-523	Sep. 17, 2010	Sep. 16, 2011
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 11, 2010	June 10, 2011
RF Cable (JYEBAO)	5DFB	CONCAB-003	Aug. 06, 2010	Aug. 05, 2011
50 ohms Terminator	50	3	Nov. 03, 2010	Nov. 02, 2011
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

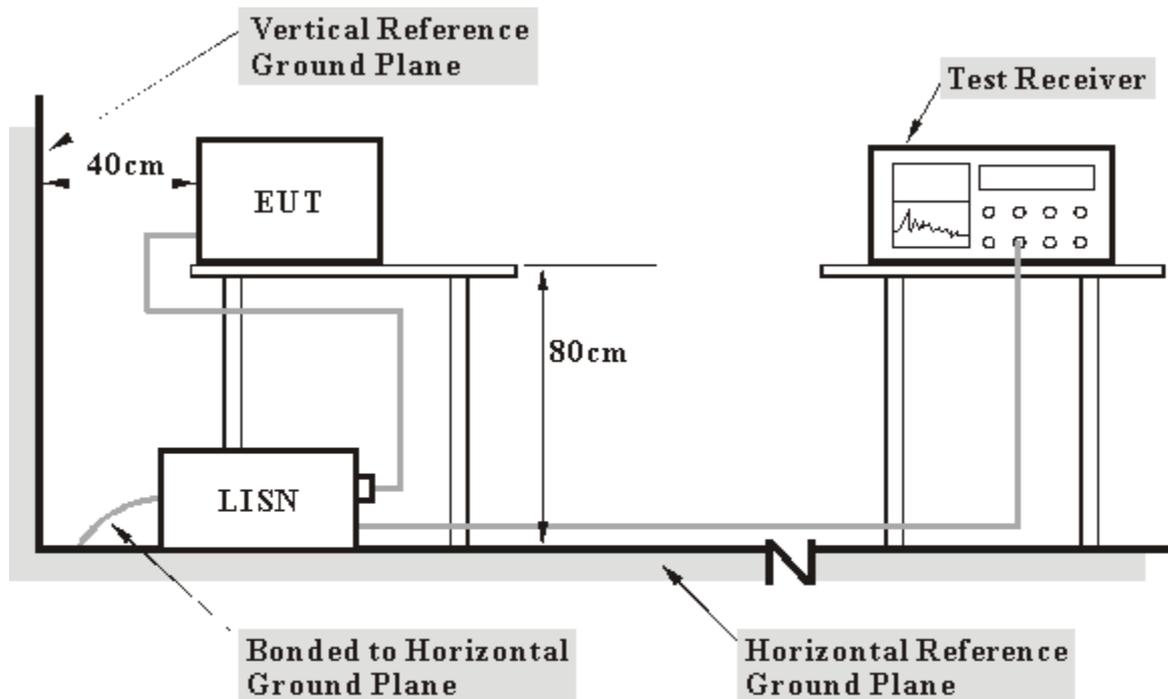
Note:

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.



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4.1.5 EUT OPERATING CONDITIONS

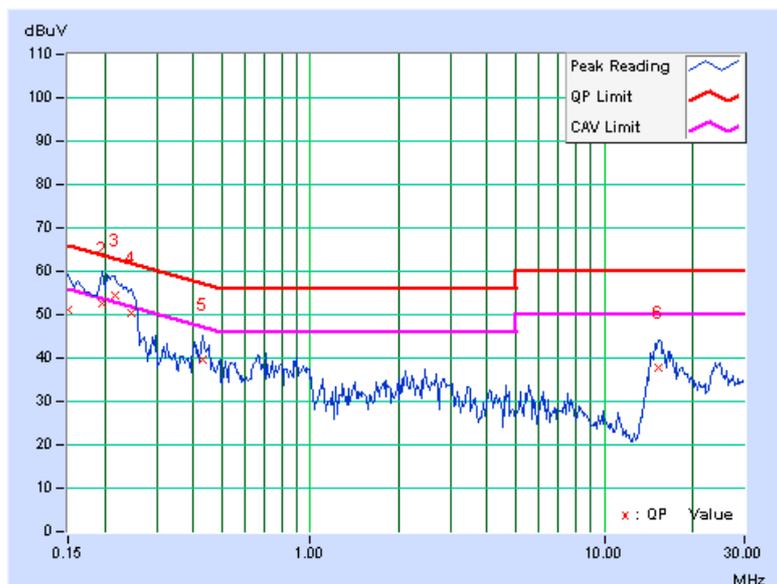
- a. The EUT linked to support unit 1 (Notebook Computer) and which was placed on a testing table.
- b. The support unit 1 (Notebook Computer) ran a test program “Button Function.txt” to enable EUT under transmission condition continuously at specific channel frequency.

4.1.6 TEST RESULTS

INPUT POWER (SYSTEM)	120Vac, 60 Hz	6DB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	21 deg. C, 50%RH, 1024 hPa	PHASE	Line (L)
TESTED BY	Wen Yu		

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	0.37	50.66	-	51.03	-	66.00	56.00	-14.97	-
2	0.197	0.36	52.10	-	52.46	-	63.74	53.74	-11.28	-
3	0.216	0.36	54.01	43.17	54.37	43.53	62.96	52.96	-8.59	-9.43
4	0.248	0.36	49.89	-	50.25	-	61.84	51.84	-11.59	-
5	0.431	0.36	39.45	-	39.81	-	57.23	47.23	-17.42	-
6	15.391	1.00	36.68	-	37.68	-	60.00	50.00	-22.32	-

- 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.



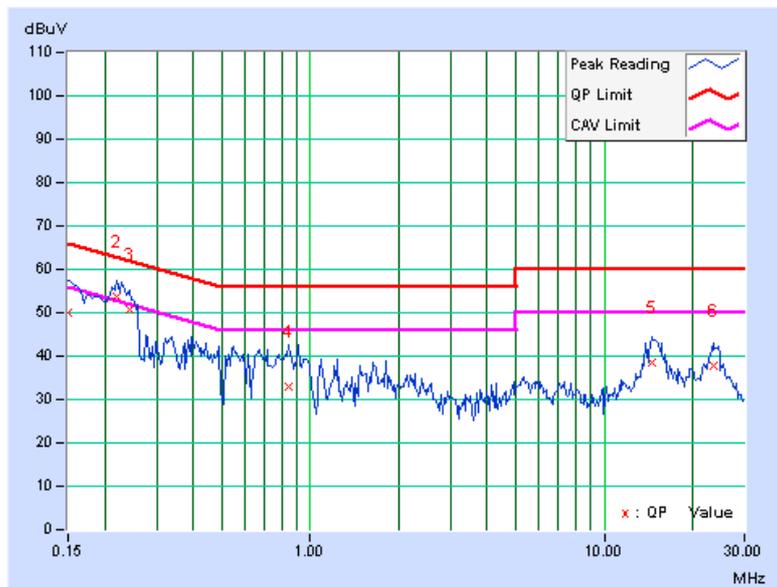


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INPUT POWER (SYSTEM)	120Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	21 deg. C, 50%RH, 1024 hPa	PHASE	Neutral (N)
TESTED BY	Wen Yu		

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	0.10	50.06	-	50.16	-	66.00	56.00	-15.84	-
2	0.220	0.10	53.67	43.54	53.77	43.64	62.81	52.81	-9.04	-9.17
3	0.244	0.10	50.71	-	50.81	-	61.97	51.97	-11.16	-
4	0.849	0.15	32.68	-	32.83	-	56.00	46.00	-23.17	-
5	14.477	0.89	37.81	-	38.70	-	60.00	50.00	-21.30	-
6	23.449	1.42	36.28	-	37.70	-	60.00	50.00	-22.30	-

- 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.
- Section 15.205 restricted bands of operation shall compliance with the limits in Section 15.209.



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250253	Aug. 23, 2010	Aug. 22, 2011
Agilent Pre-Selector	N9039A	MY46520310	Aug. 23, 2010	Aug. 22, 2011
Agilent Signal Generator	N5181A	MY49060347	July 30, 2010	July 29, 2011
LIG NEX1 Test Receiver	ER-265	L09068005	Oct. 25, 2010	Oct. 24, 2011
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 16, 2010	Nov. 15, 2011
Agilent Pre-Amplifier	8449B	3008A02465	Feb. 28, 2011	Feb. 27, 2012
Miteq Pre-Amplifier	AFS33-1800265 0-30-8P-44	881786	NA	NA
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Apr. 28, 2010	Apr. 27, 2011
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 22, 2010	Nov. 21, 2011
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 08, 2010	Oct. 07, 2011
RF CABLE	NA	RF104-205 RF104-207 RF104-202	Dec. 28, 2010	Dec. 27, 2011
RF Cable	NA	CHHCAB_001	NA	NA
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The test was performed in 966 Chamber No. H.
 4. The FCC Site Registration No. is 797305.
 5. The CANADA Site Registration No. is IC 7450H-3.

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. 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 height of antenna 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.
- f. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

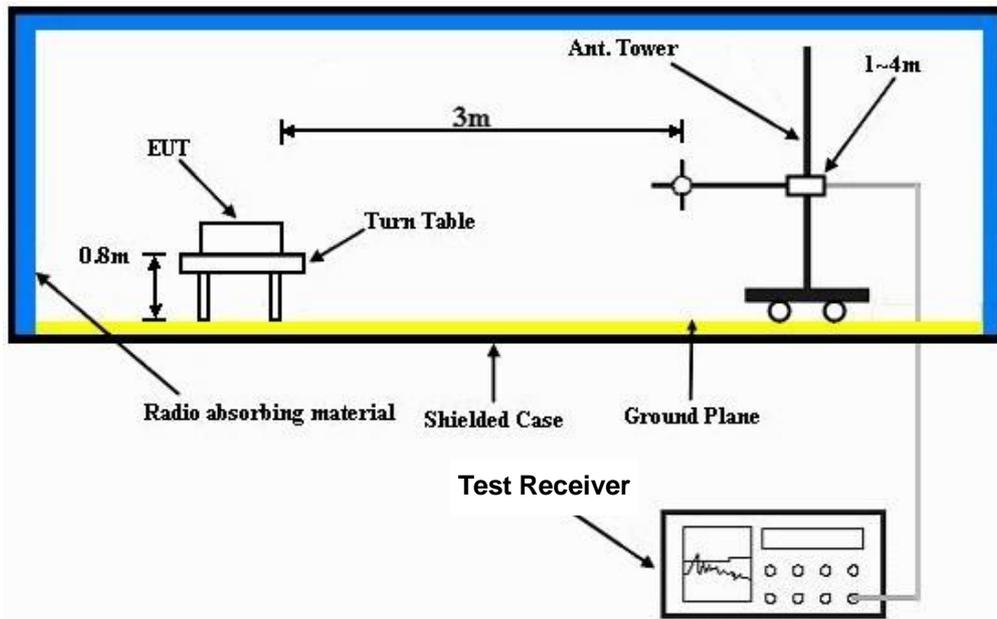
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for 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.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.5



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4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 12	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	17deg. C, 72%RH 1024 hPa	TESTED BY	Rex Huang

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	148.90	34.4 QP	43.5	-9.1	2.00 H	292	20.18	14.25
2	199.94	28.3 QP	43.5	-15.2	1.00 H	360	17.09	11.18
3	311.25	28.0 QP	46.0	-18.0	1.00 H	60	12.74	15.26
4	467.93	24.4 QP	46.0	-21.6	1.00 H	349	5.04	19.32
5	713.54	29.2 QP	46.0	-16.8	2.00 H	292	5.88	23.29
6	748.00	30.9 QP	46.0	-15.1	1.00 H	314	6.97	23.89
7	847.35	29.3 QP	46.0	-16.7	1.00 H	218	3.61	25.68
8	895.67	31.2 QP	46.0	-14.8	1.50 H	45	4.68	26.49
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	33.32	27.9 QP	40.0	-12.1	1.00 V	112	14.53	13.38
2	142.26	27.3 QP	43.5	-16.2	1.00 V	274	13.12	14.15
3	325.35	31.2 QP	46.0	-14.8	1.50 V	48	15.49	15.68
4	498.60	24.9 QP	46.0	-21.1	1.00 V	286	4.93	19.93
5	699.44	28.0 QP	46.0	-18.0	1.50 V	314	4.94	23.06
6	713.77	27.5 QP	46.0	-18.5	1.00 V	94	4.19	23.30
7	799.63	25.5 QP	46.0	-20.5	1.50 V	234	0.60	24.86
8	846.64	28.8 QP	46.0	-17.2	1.50 V	88	3.14	25.67
9	896.14	33.0 QP	46.0	-13.1	1.00 V	311	6.45	26.50

- 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.



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ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	21deg. C, 66%RH 1024 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2399.37	60.7 PK	74.0	-13.3	1.05 H	35	32.01	28.69
2	2399.37	27.9 AV	54.0	-26.1	1.05 H	35	-0.79	28.69
3	*2405.00	106.8 PK	114.0	-7.2	1.05 H	35	78.10	28.70
4	*2405.00	74.0 AV	94.0	-20.0	1.05 H	35	45.30	28.70
5	4810.00	57.7 PK	74.0	-16.3	1.23 H	247	27.20	30.50
6	4810.00	24.9 AV	54.0	-29.1	1.23 H	247	-5.60	30.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2399.62	60.2 PK	74.0	-13.8	1.00 V	25	28.96	31.24
2	2399.62	27.4 AV	54.0	-26.6	1.00 V	25	-3.84	31.24
3	*2405.00	105.5 PK	114.0	-8.5	1.00 V	25	74.25	31.25
4	*2405.00	72.7 AV	94.0	-21.3	1.00 V	25	41.45	31.25
5	4810.00	59.1 PK	74.0	-14.9	1.00 V	6	19.73	39.37
6	4810.00	26.3 AV	54.0	-27.7	1.00 V	6	-13.07	39.37

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “ : Fundamental frequency
 6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula: 20 log (Duty cycle) = 20 log (0.18 ms / 7.86 ms) = -32.8 dB
Please see page 25 for plotted duty.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 8	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	21deg. C, 66%RH 1024 hPa	TESTED BY	Rex Huang

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	107.4 PK	114.0	-6.6	1.02 H	36	78.67	28.73
2	*2444.00	74.6 AV	94.0	-19.4	1.02 H	36	45.87	28.73
3	4888.00	55.6 PK	74.0	-18.4	1.21 H	249	25.06	30.54
4	4888.00	22.8 AV	54.0	-31.2	1.21 H	249	-7.74	30.54
5	7332.00	58.7 PK	74.0	-15.3	1.09 H	293	26.68	32.02
6	7332.00	25.9 AV	54.0	-28.1	1.09 H	293	-6.12	32.02

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	105.6 PK	114.0	-8.4	1.00 V	22	74.25	31.35
2	*2444.00	72.8 AV	94.0	-21.2	1.00 V	22	41.45	31.35
3	4888.00	58.8 PK	74.0	-15.2	1.03 V	4	19.13	39.67
4	4888.00	26.0 AV	54.0	-28.0	1.03 V	4	-13.67	39.67
5	7332.00	59.1 PK	74.0	-14.9	1.00 V	14	14.97	44.13
6	7332.00	26.3 AV	54.0	-27.7	1.00 V	14	-17.83	44.13

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 (Duty cycle) = 20 log (0.18 ms / 7.86 ms) = -32.8 dB
Please see page 25 for plotted duty.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 12	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	21deg. C, 66%RH 1024 hPa	TESTED BY	Rex Huang

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	108.1 PK	114.0	-5.9	1.00 H	38	79.34	28.76
2	*2474.00	75.3 AV	94.0	-18.7	1.00 H	38	46.54	28.76
3	2483.50	56.1 PK	74.0	-17.9	1.00 H	38	27.33	28.77
4	2483.50	23.3 AV	54.0	-30.7	1.00 H	38	-5.47	28.77
5	4948.00	57.4 PK	74.0	-16.6	1.27 H	261	26.82	30.58
6	4948.00	24.6 AV	54.0	-29.4	1.27 H	261	-5.98	30.58
7	7422.00	59.6 PK	74.0	-14.4	1.06 H	275	27.54	32.06
8	7422.00	26.8 AV	54.0	-27.2	1.06 H	275	-5.26	32.06

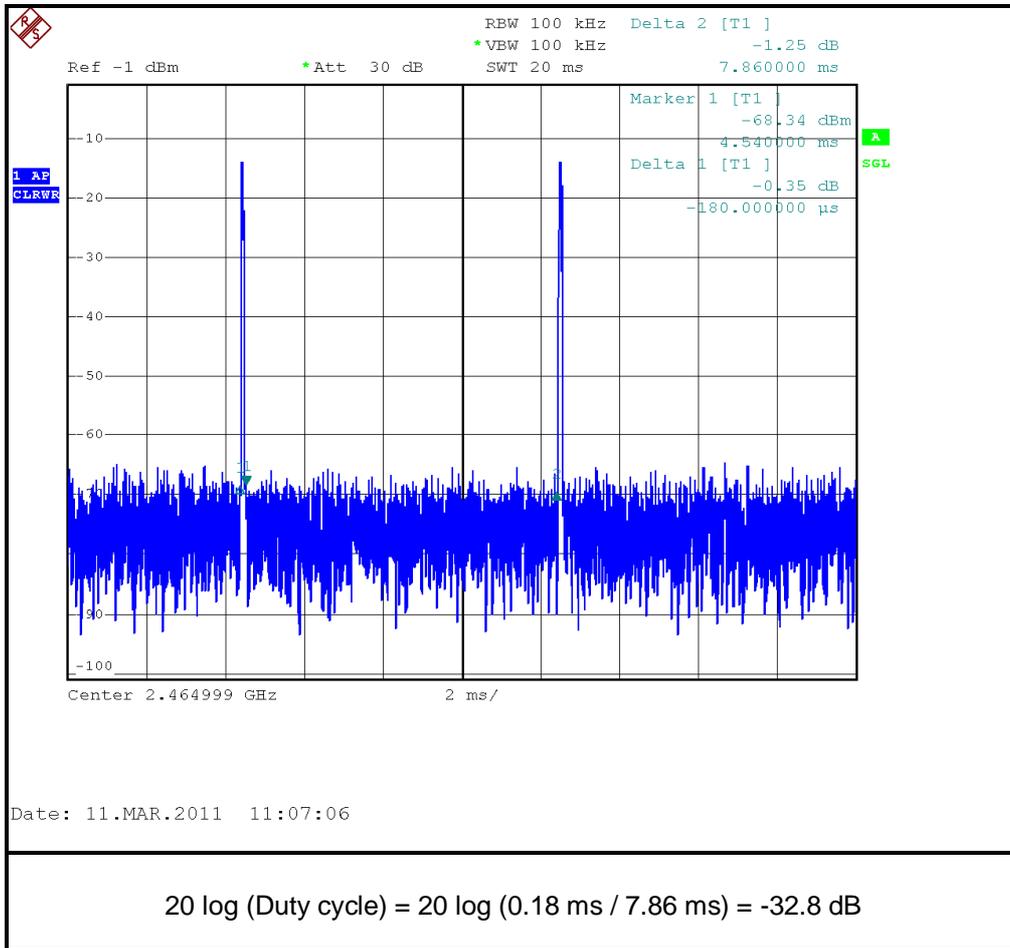
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

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	106.0 PK	114.0	-8.0	1.00 V	22	74.57	31.43
2	*2474.00	73.2 AV	94.0	-20.8	1.00 V	22	41.77	31.43
3	2483.50	54.9 PK	74.0	-19.1	1.00 V	22	23.44	31.46
4	2483.50	22.1 AV	54.0	-31.9	1.00 V	22	-9.36	31.46
5	4948.00	59.3 PK	74.0	-14.7	1.01 V	12	19.38	39.92
6	4948.00	26.5 AV	54.0	-27.5	1.01 V	12	-13.42	39.92
7	7422.00	60.4 PK	74.0	-13.6	1.00 V	26	16.18	44.22
8	7422.00	27.6 AV	54.0	-26.4	1.00 V	26	-16.62	44.22

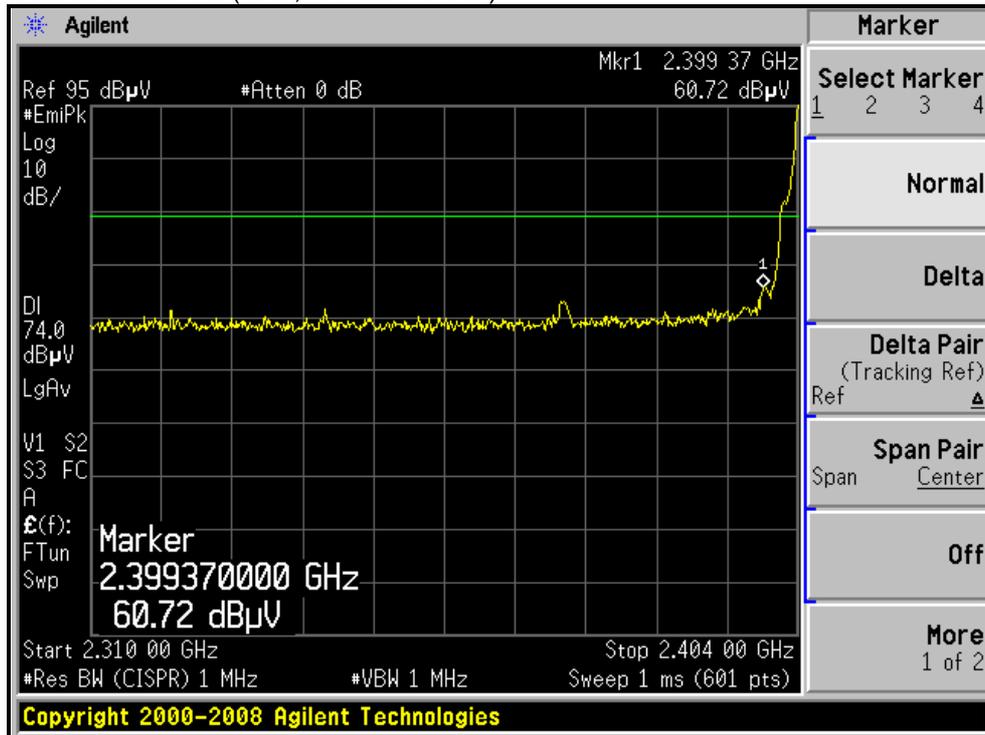
- REMARKS:**
- Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 - Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 - The other emission levels were very low against the limit.
 - Margin value = Emission level – Limit value.
 - “ * “ : Fundamental frequency
 - The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula: 20 log (Duty cycle) = 20 log (0.18 ms / 7.86 ms) = -32.8 dB
Please see page 25 for plotted duty.



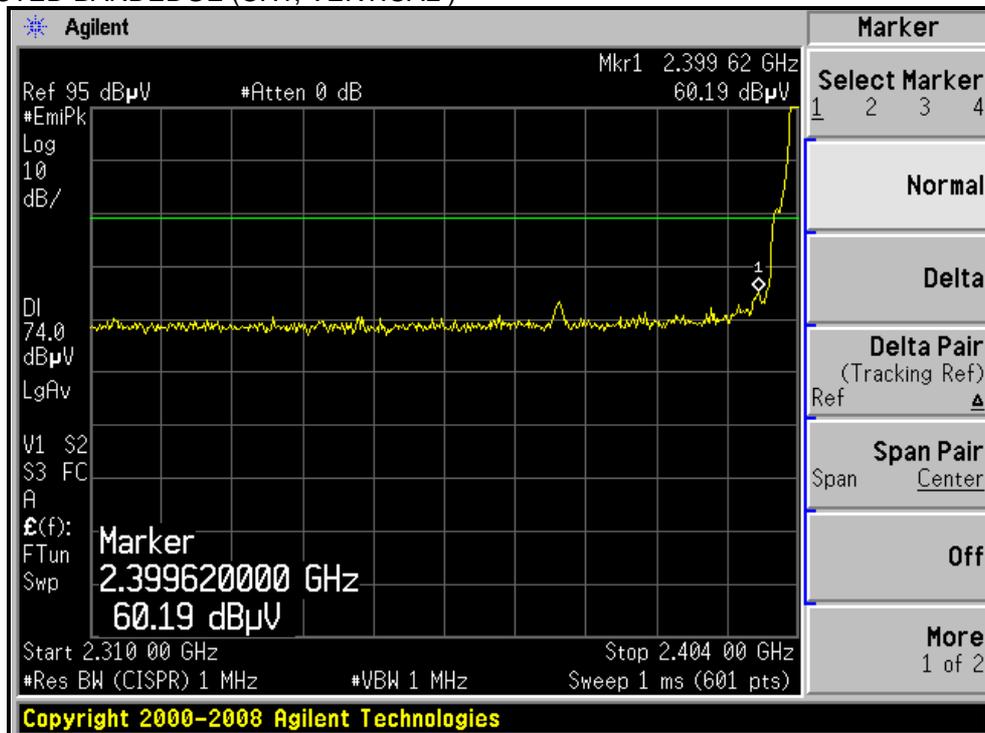
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RESTRICTED BANDEDGE (CH1, HORIZONTAL)

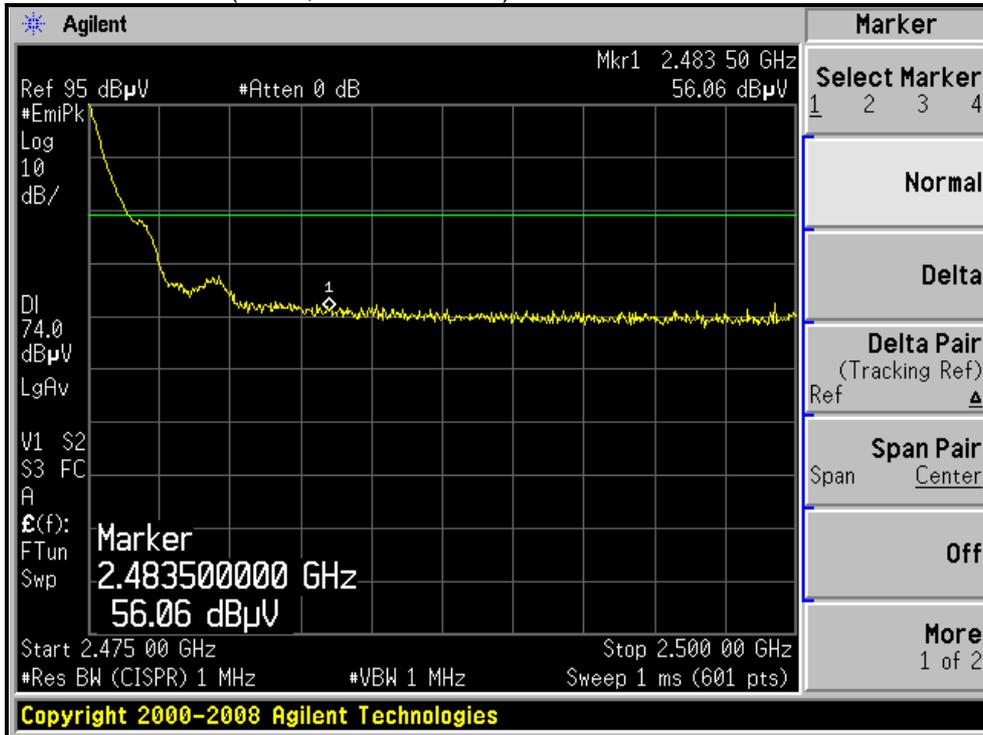


RESTRICTED BANDEDGE (CH1, VERTICAL)

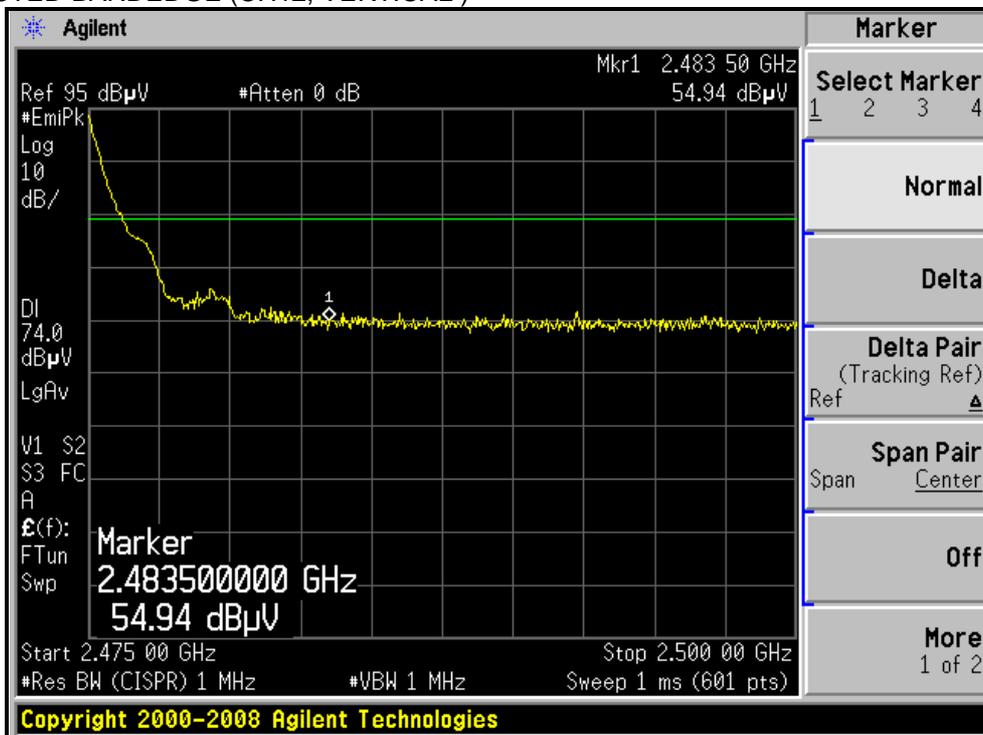


* The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle). And it meets the requirement of limit.

RESTRICTED BANDEDGE (CH12, HORIZONTAL)



RESTRICTED BANDEDGE (CH12, VERTICAL)



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



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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. 08, 2010	Dec. 07, 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.

4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span from band edge. The band edges was measured and recorded.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

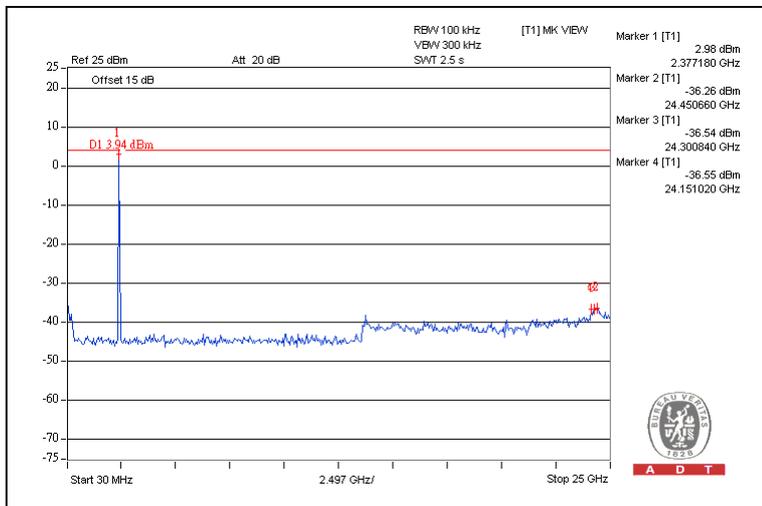
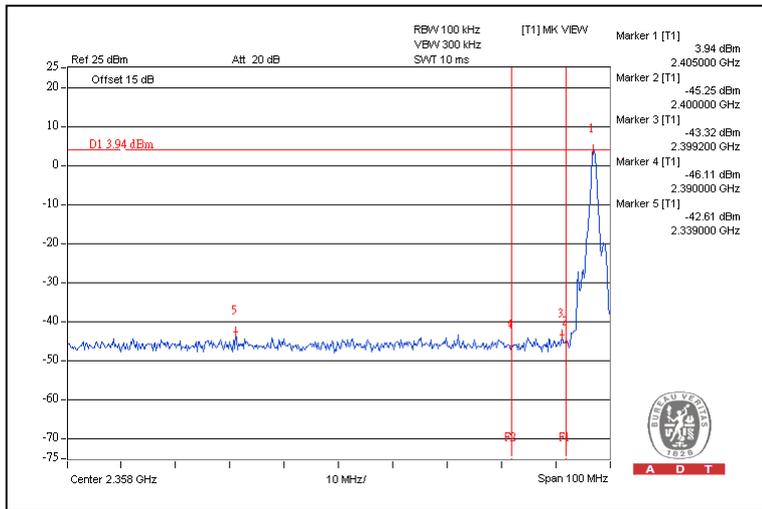
4.3.5 EUT OPERATING CONDITION

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 below pages for met the requirement of the general radiated emission limits in § 15.209.

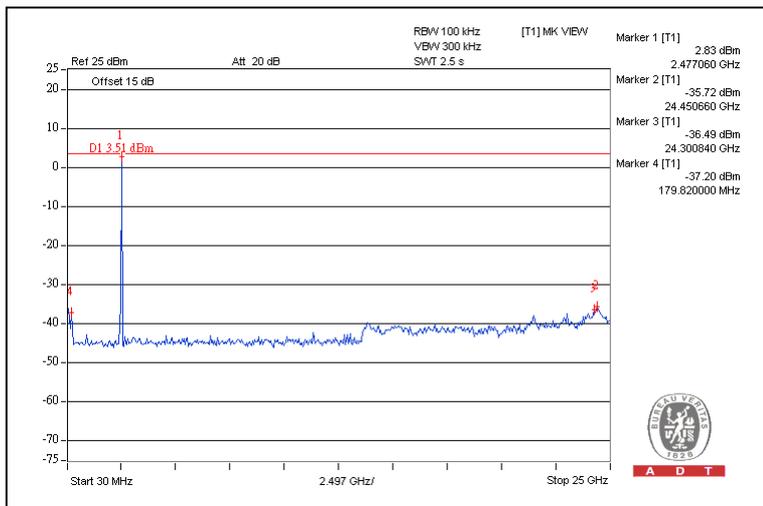
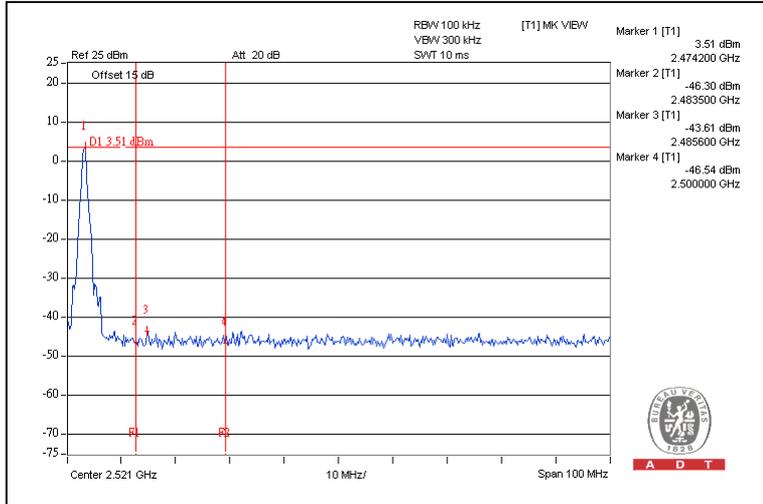
CH1





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CH12





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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.



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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.

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