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FCC TEST REPORT

REPORT NO.: RF981207H04

MODEL NO.: C-U0004

RECEIVED: Dec. 07, 2009

TESTED: Dec. 08 to 10, 2009

ISSUED: Dec. 15, 2009

APPLICANT: LOGITECH FAR EAST LTD.

ADDRESS: #2 Creation Rd. 4, Science-Based Ind. Park
Hsinchu Taiwan, R.O.C.

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

TEST LOCATION: No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung
Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307,
Taiwan

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1 CERTIFICATION

PRODUCT : 2.4GHz Transceiver
BRAND NAME : Logitech
MODEL NO. : C-U0004
TESTED : Dec. 08 to 10, 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-U0004) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY :  , **DATE:** Dec. 15, 2009
(Claire Kuan, Specialist)

TECHNICAL ACCEPTANCE :  , **DATE:** Dec. 15, 2009
(Hank Chung, Deputy Manager)

APPROVED BY :  , **DATE:** Dec. 15, 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 -12.69dB at 0.216MHz
15.249	Radiated Emission Test	PASS	Minimum passing margin is -4.8dB at 625.00MHz
15.249	Band Edge 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)	3.83 dB
Radiated emissions (1GHz -18GHz)	2.44 dB
Radiated emissions (18GHz -40GHz)	2.67 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	2.4GHz Transceiver
MODEL NO.	C-U0004
FCC ID	JNZCU0004
POWER SUPPLY	DC 5V from host equipment
MODULATION TYPE	GFSK
CARRIER FREQUENCY OF EACH CHANNEL	2405MHz ~ 2474MHz
NUMBER OF CHANNEL	24
ANTENNA TYPE	Please see note 1
DATA CABLE	USB cable(1.58m, Shielded)
I/O PORTS	NA
ASSOCIATED DEVICES	USB stand (With one USB cable, 1.58m, Shielded)

NOTE:

- There are three antennas provided to this EUT, please refer to the following table:

No.	Brand	Model No.	Gain (dBi)	Antenna Type	Connector
1	Yageo	CAN4311881042453K	0.81	SMD ceramic chip	NA
2	Panasonic	EBMGH8A245FM	-1	SMD ceramic chip	NA
3	ACX	AT8010-E2R9HAA_	2.5	SMD ceramic chip	NA

Antenna: AT8010-E2R9HAA_ was chosen for final test.

- The EUT must be supplied with one USB stand and following two different brands could be chosen to the USB stand. And the different USB cables were pre-tested under following test modes:

Test Mode	Description
Mode A	JEM recharge USB cable
Mode B	Hank recharge USB cable

From the above modes, the worst emission level was found in **Mode B**. Therefore only the test data of the modes were recorded in this report individually.

3. The EUT was pre-tested in chamber under the following modes:

Test Mode	Description
Mode A	With USB stand
Mode B	Without USB stand

From the above modes, the worst emission level was found in **Mode A**. Therefore only the test data of the modes were recorded in this report.

4. 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

Twenty-four channels are provided in 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.



3.4 DESCRIPTION OF SUPPORT UNITS

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

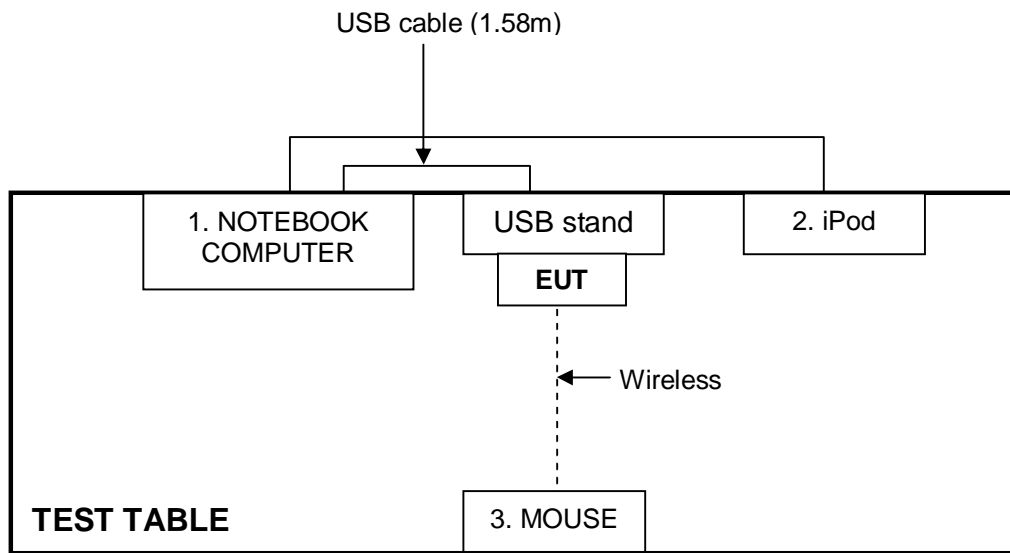
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	D531	CN-0XM006-48643-86L-4472	QDS-BRCM1019
2	iPod	Apple	A1137	5K7170JBUPR	FCC DoC
3	MOUSE	Logitech	M-RBY125	NA	JNZMRBY125
4	MODEM	ACEEX	1414	0206026772	IFAXDM1414

No.	Signal cable description
1	NA
2	1 m shielded cable, terminated with USB connector, w/o core.
3	NA
4	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

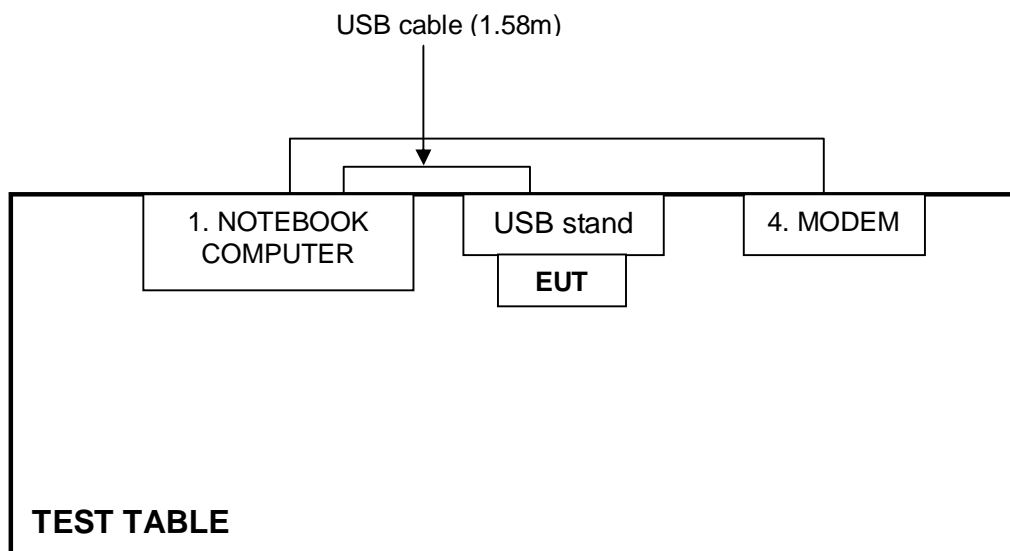
Note: 1. All power cords of the above support units are unshielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST

For conducted test:



For other test items:





4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	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
Test Receiver	ESCS 30	100375	Mar. 23, 2009	Mar. 22, 2010
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100071	Nov. 25, 2009	Nov. 24, 2010
Line-Impedance Stabilization Network (for EUT)	ESH3-Z5	848773/004	Nov. 04, 2009	Nov. 03, 2010
RF Cable (JYEBAO)	5DFB	COBCAB-001	Aug. 14, 2009	Aug. 13, 2010
50 ohms Terminator	50	3	Nov. 04, 2009	Nov. 03, 2010
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

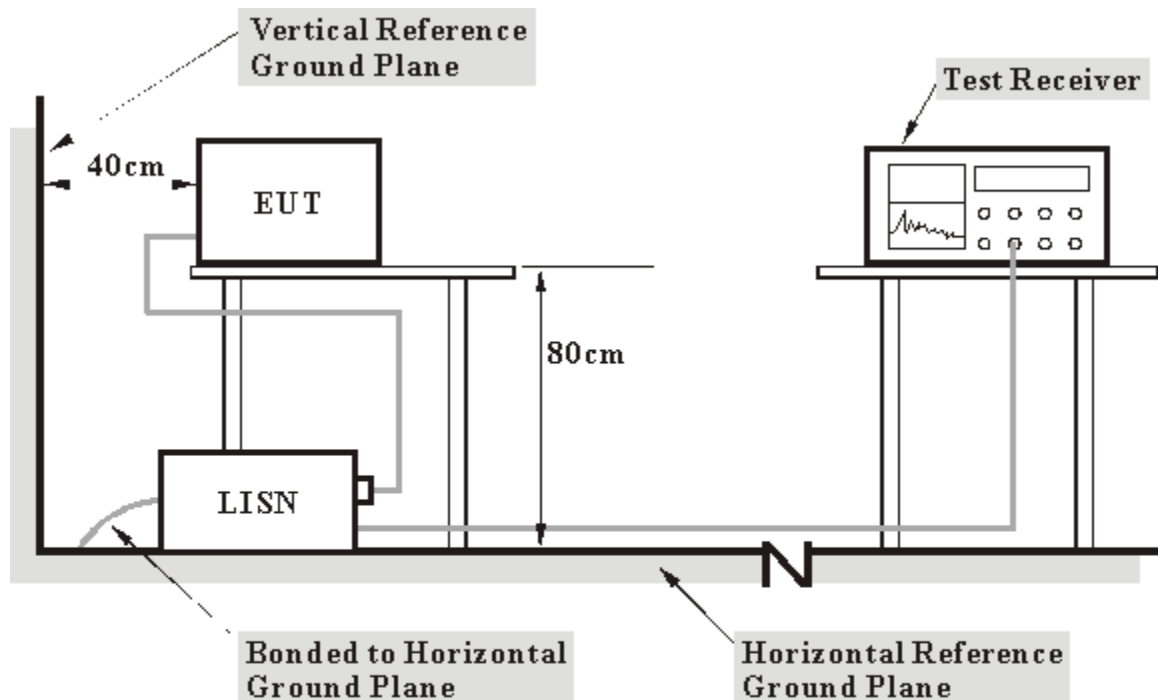
Note:

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. B.
3. The VCCI Con B Registration No. is C-2193.

4.1.3 TEST PROCEDURES

- a. The EUT/HOST was placed 0.4 meters from the conducting wall of the shielded room with EUT/HOST being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT/HOST were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 TEST SETUP



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

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



4.1.5 EUT OPERATING CONDITIONS

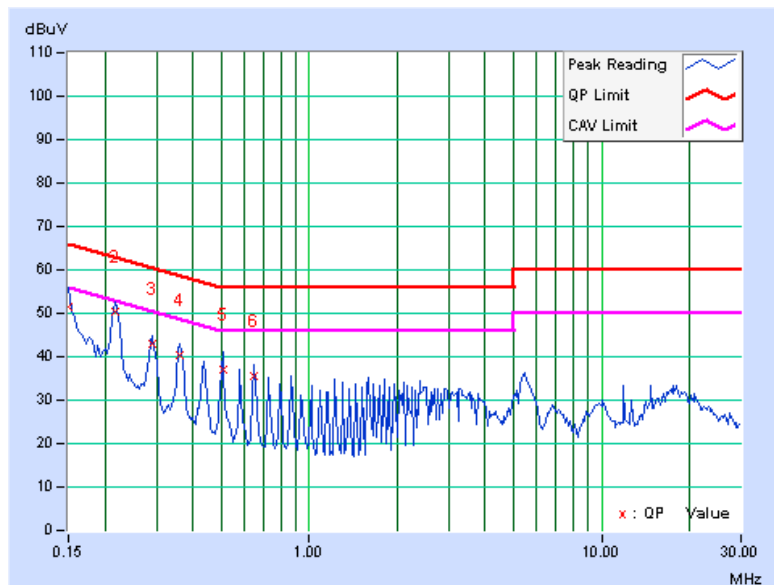
1. Turn on the power of all equipment.
2. Set the EUT under typical use condition.

4.1.6 TEST RESULTS

INPUT POWER (SYSTEM)	120Vac, 60 Hz	6DB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	26 deg. C, 56%RH, 1016 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	9.75	41.73	-	51.48	-	66.00	56.00	-14.52	-
2	0.216	9.76	40.51	-	50.27	-	62.96	52.96	-12.69	-
3	0.291	9.76	33.30	-	43.06	-	60.51	50.51	-17.45	-
4	0.361	9.76	30.77	-	40.53	-	58.71	48.71	-18.18	-
5	0.506	9.79	27.33	-	37.12	-	56.00	46.00	-18.88	-
6	0.649	9.82	25.61	-	35.43	-	56.00	46.00	-20.57	-

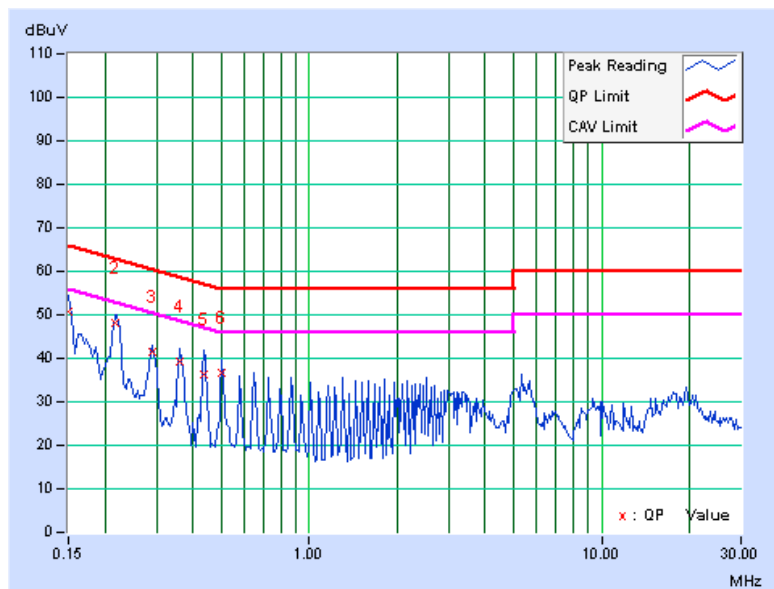
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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, 56%RH, 1016 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	9.74	40.86	-	50.60	-	66.00	56.00	-15.40	-
2	0.216	9.74	38.26	-	48.00	-	62.96	52.96	-14.95	-
3	0.291	9.74	31.67	-	41.41	-	60.51	50.51	-19.09	-
4	0.361	9.75	29.60	-	39.35	-	58.71	48.71	-19.36	-
5	0.435	9.76	26.58	-	36.34	-	57.15	47.15	-20.81	-
6	0.502	9.78	26.79	-	36.57	-	56.00	46.00	-19.43	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

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



Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 08, 2009	Dec. 07, 2010
Agilent PSA Spectrum Analyzer	E4446A	MY46180622	Apr. 24 , 2009	Apr. 23 , 2010
HP Pre_Amplifier	8449B	3008A01923	Nov. 09, 2009	Nov. 08, 2010
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Aug. 28, 2009	Aug. 28, 2010
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 08, 2009	Dec. 07, 2010
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
R&S Loop Antenna	HFH2-Z2	100070	Jan. 14, 2008	Jan. 13, 2010
RF Switches	EMH-011	08009	Sep. 26, 2009	Sep. 25, 2010
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 14, 2009	Aug. 13, 2010
RF Cable	8D	STCCAB-001	Sep. 26, 2009	Sep. 25, 2010
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 7450G-3.

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

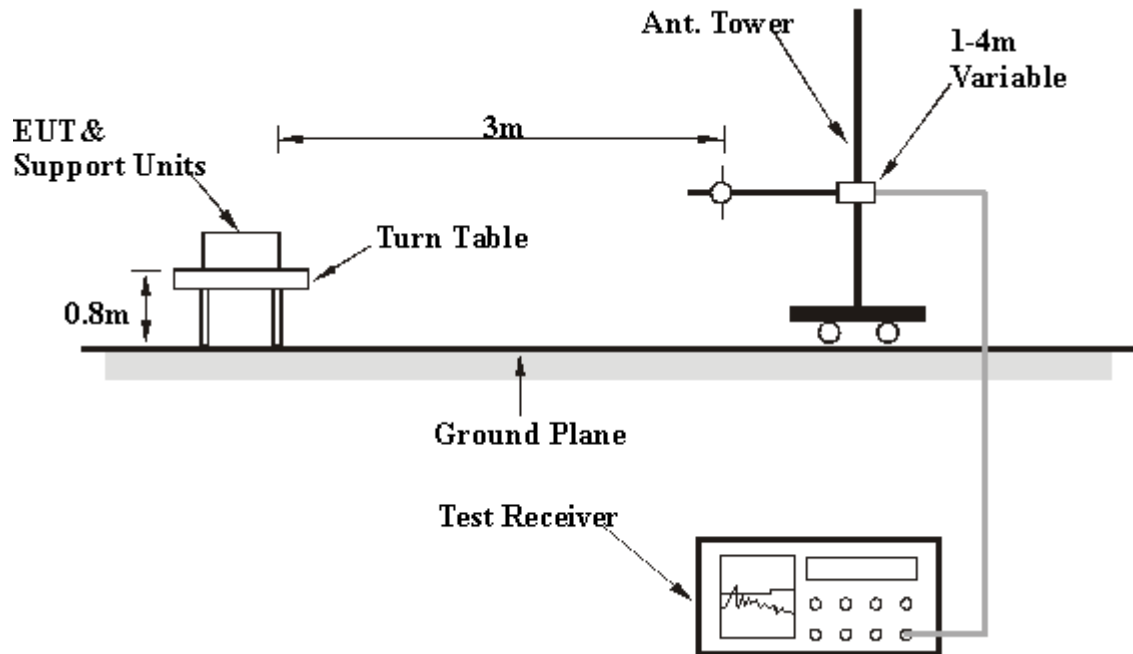
NOTE:

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

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



4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH 1016 hPa	TESTED BY	Phoenix 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	68.84	27.0 QP	40.00	-13.0	1.35 H	69	12.79	14.24
2	120.00	33.5 QP	43.50	-10.0	1.46 H	122	18.18	15.28
3	200.00	29.2 QP	43.50	-14.3	1.25 H	96	14.28	14.96
4	240.00	33.2 QP	46.00	-12.8	1.13 H	167	16.12	17.09
5	366.50	31.4 QP	46.00	-14.6	1.54 H	6	8.88	22.50
6	473.25	36.6 QP	46.00	-9.4	1.89 H	124	12.12	24.46
7	475.00	34.8 QP	46.00	-11.2	1.60 H	59	10.32	24.50
8	559.67	39.1 QP	46.00	-6.9	1.44 H	122	12.29	26.81
9	625.00	41.3 QP	46.00	-4.8	1.25 H	147	12.22	29.03
10	960.00	38.1 QP	46.00	-7.9	1.00 H	268	3.55	34.55
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	60.00	31.3 QP	40.00	-8.7	1.00 V	171	15.92	15.42
2	69.43	33.6 QP	40.00	-6.4	1.00 V	5	19.47	14.16
3	120.00	30.1 QP	43.50	-13.4	1.00 V	48	14.86	15.28
4	200.26	30.7 QP	43.50	-12.9	1.00 V	316	15.68	14.97
5	240.00	28.8 QP	46.00	-17.2	1.00 V	145	11.69	17.09
6	473.26	39.4 QP	46.00	-6.7	1.18 V	61	12.96	26.39
7	575.00	34.1 QP	46.00	-11.9	1.00 V	134	7.36	26.78
8	666.50	37.0 QP	46.00	-9.0	1.29 V	192	6.86	30.11
9	720.00	34.0 QP	46.00	-12.0	1.58 V	146	4.37	29.60
10	960.00	39.4 QP	46.00	-6.7	1.30 V	354	3.80	35.55

- 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, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH 1016 hPa	TESTED BY	Phoenix 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	2400.00	64.6 PK	74.00	-9.4	1.00 H	172	34.30	30.32
2	2400.00	36.3 AV	54.00	-17.7	1.00 H	172	5.99	30.32
3	*2405.00	95.0 PK	114.00	-19.0	1.00 H	172	64.66	30.34
4	*2405.00	66.7 AV	94.00	-27.3	1.00 H	172	36.35	30.34
5	4810.00	47.0 PK	74.00	-27.0	1.71 H	248	10.25	36.75
6	4810.00	18.7 AV	54.00	-35.3	1.71 H	248	-18.06	36.75
7	7215.00	52.3 PK	74.00	-21.7	1.47 H	214	9.16	43.14
8	7215.00	24.0 AV	54.00	-30.0	1.47 H	214	-19.15	43.14
9	9620.00	54.2 PK	74.00	-19.8	1.94 H	6	8.27	45.93
10	9620.00	25.9 AV	54.00	-28.1	1.94 H	6	-20.04	45.93
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	67.5 PK	74.00	-6.6	1.03 V	216	37.13	30.32
2	2400.00	39.1 AV	54.00	-14.9	1.03 V	216	8.82	30.32
3	*2405.00	97.3 PK	114.00	-16.7	1.03 V	219	66.96	30.34
4	*2405.00	69.0 AV	94.00	-25.0	1.03 V	219	38.65	30.34
5	4810.00	48.3 PK	74.00	-25.7	1.44 V	166	11.55	36.75
6	4810.00	20.0 AV	54.00	-34.0	1.44 V	166	-16.76	36.75
7	7215.00	51.4 PK	74.00	-22.6	1.53 V	332	8.26	43.14
8	7215.00	23.1 AV	54.00	-30.9	1.53 V	332	-20.05	43.14
9	9620.00	55.3 PK	74.00	-18.7	1.68 V	153	9.41	45.93
10	9620.00	27.0 AV	54.00	-27.0	1.68 V	153	-18.90	45.93

- 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. Duty cycle = 3.84%
 7. Average value = peak reading + 20log(duty cycle).



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 14	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH 1016 hPa	TESTED BY	Phoenix 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	92.7 PK	114.00	-21.3	1.00 H	173	62.22	30.48
2	*2444.00	64.4 AV	94.00	-29.6	1.00 H	173	33.91	30.48
3	4888.00	45.0 PK	74.00	-29.0	1.50 H	195	8.04	36.96
4	4888.00	16.7 AV	54.00	-37.3	1.50 H	195	-20.27	36.96
5	7332.00	51.0 PK	74.00	-23.0	1.42 H	20	7.87	43.13
6	7332.00	22.7 AV	54.00	-31.3	1.42 H	20	-20.44	43.13
7	9776.00	55.2 PK	74.00	-18.8	1.62 H	20	9.10	46.10
8	9776.00	26.9 AV	54.00	-27.1	1.62 H	20	-19.21	46.10
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	96.6 PK	114.00	-17.4	1.00 V	149	66.12	30.48
2	*2444.00	68.3 AV	94.00	-25.7	1.00 V	149	37.81	30.48
3	4888.00	47.3 PK	74.00	-26.7	1.38 V	160	10.34	36.96
4	4888.00	19.0 AV	54.00	-35.0	1.38 V	160	-17.97	36.96
5	7332.00	51.5 PK	74.00	-22.5	1.33 V	155	8.37	43.13
6	7332.00	23.2 AV	54.00	-30.8	1.33 V	155	-19.94	43.13
7	9776.00	56.1 PK	74.00	-17.9	1.65 V	159	10.00	46.10
8	9776.00	27.8 AV	54.00	-26.2	1.65 V	159	-18.31	46.10

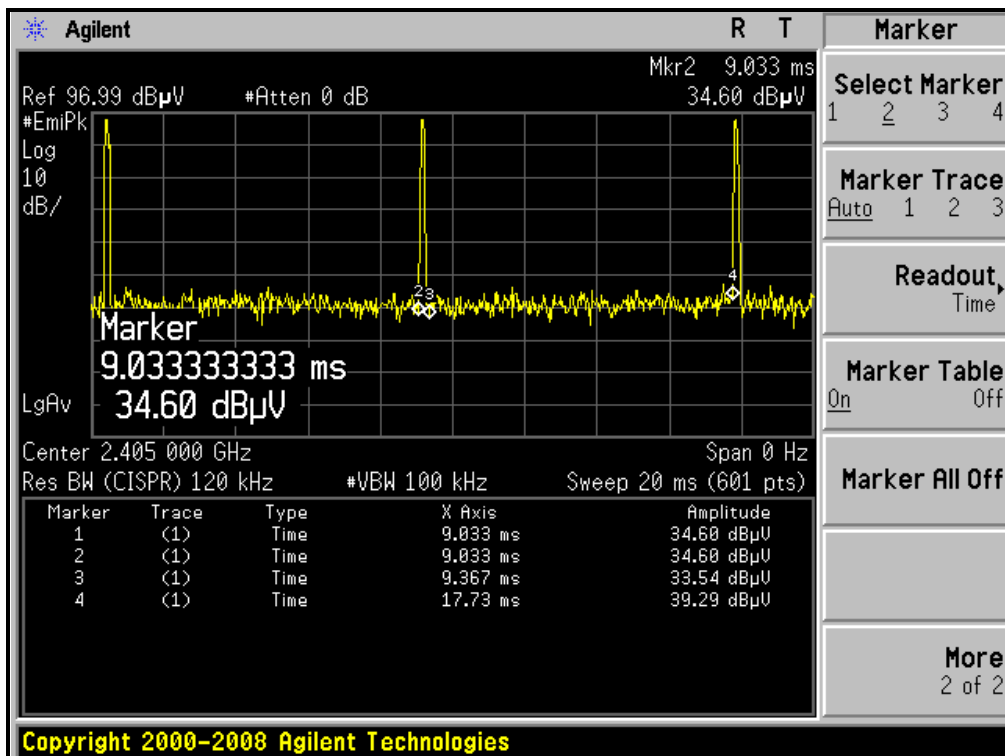
- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. Duty cycle = 3.84%
 7. Average value = peak reading + 20log(duty cycle).



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 24	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH 1016 hPa	TESTED BY	Phoenix Huang

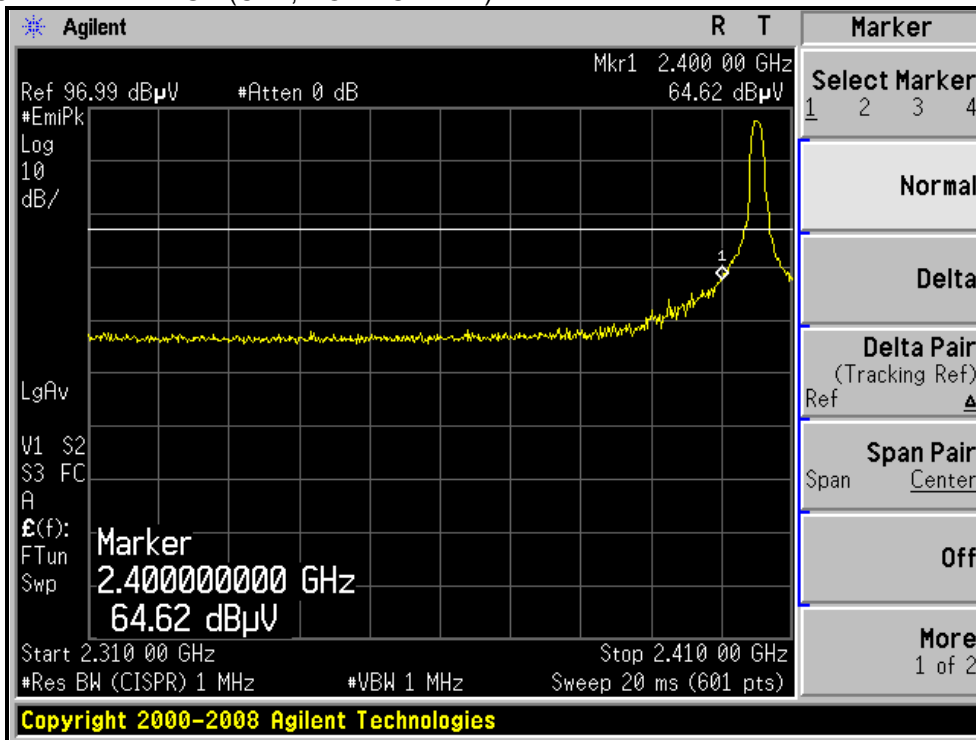
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2474.00	91.0 PK	114.00	-23.0	1.56 H	173	60.41	30.59
2	*2474.00	62.7 AV	94.00	-31.3	1.56 H	173	32.10	30.59
3	2483.50	56.4 PK	74.00	-17.6	1.56 H	173	25.77	30.63
4	2483.50	27.7 AV	54.00	-26.3	1.56 H	173	-2.94	30.63
5	4948.00	45.4 PK	74.00	-28.6	1.31 H	183	8.28	37.12
6	4948.00	17.1 AV	54.00	-36.9	1.31 H	183	-20.03	37.12
7	7422.00	52.9 PK	74.00	-21.1	1.18 H	5	9.77	43.13
8	7422.00	24.6 AV	54.00	-29.4	1.18 H	5	-18.54	43.13
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2474.00	94.5 PK	114.00	-19.5	1.00 V	150	63.91	30.59
2	*2474.00	66.2 AV	94.00	-27.8	1.00 V	150	35.60	30.59
3	2483.50	58.1 PK	74.00	-15.9	1.00 V	150	27.46	30.63
4	2483.50	29.8 AV	54.00	-24.2	1.00 V	150	-0.85	30.63
5	4948.00	45.5 PK	74.00	-28.5	1.18 V	159	8.38	37.12
6	4948.00	17.2 AV	54.00	-36.8	1.18 V	159	-19.93	37.12
7	7422.00	52.0 PK	74.00	-22.0	1.27 V	6	8.87	43.13
8	7422.00	23.7 AV	54.00	-30.3	1.27 V	6	-19.44	43.13

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. Duty cycle = 3.84%
 7. Average value = peak reading + 20log(duty cycle).

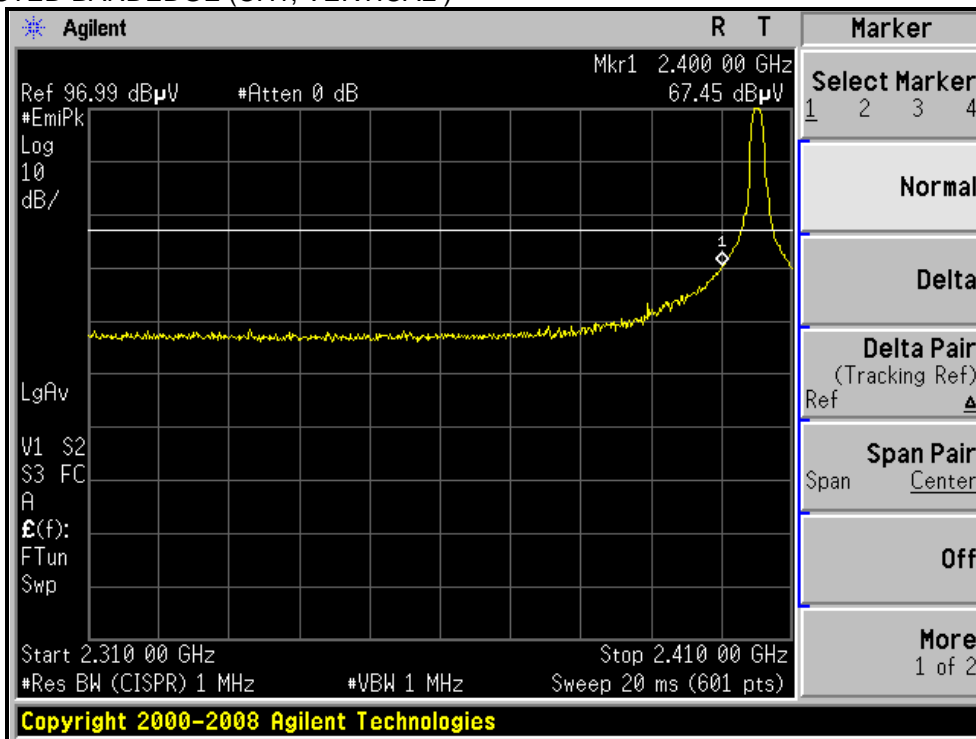


$$\text{Duty cycle} = (0.334 \text{ ms} / 8.697 \text{ ms}) \times 100 \% = 3.84 \%$$

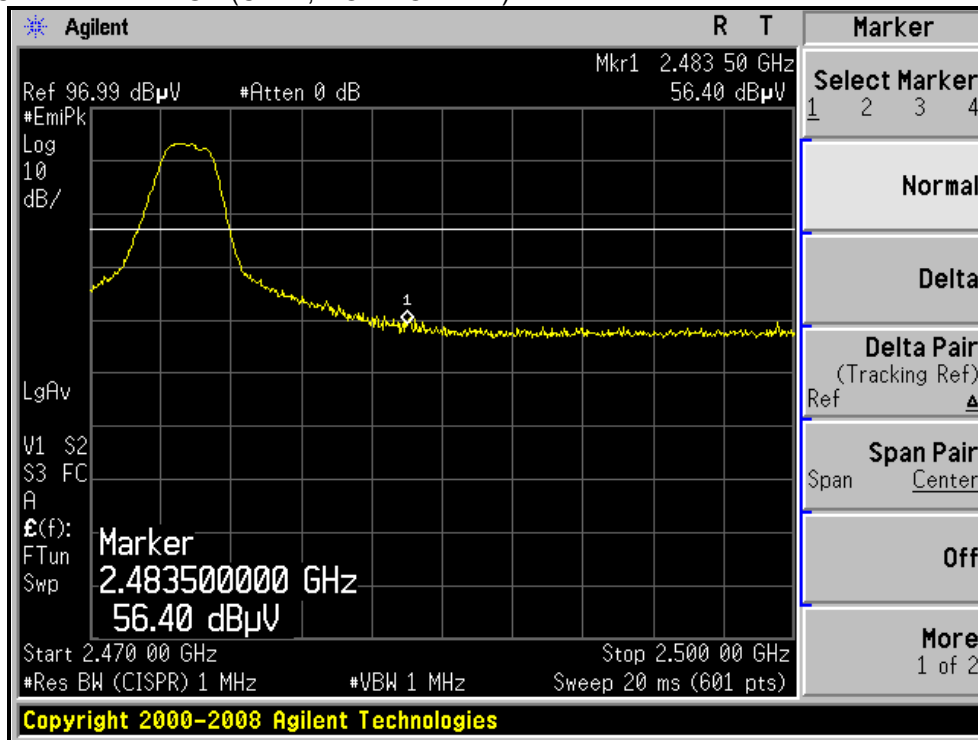
RESTRICTED BANDEDGE (CH1, HORIZONTAL)



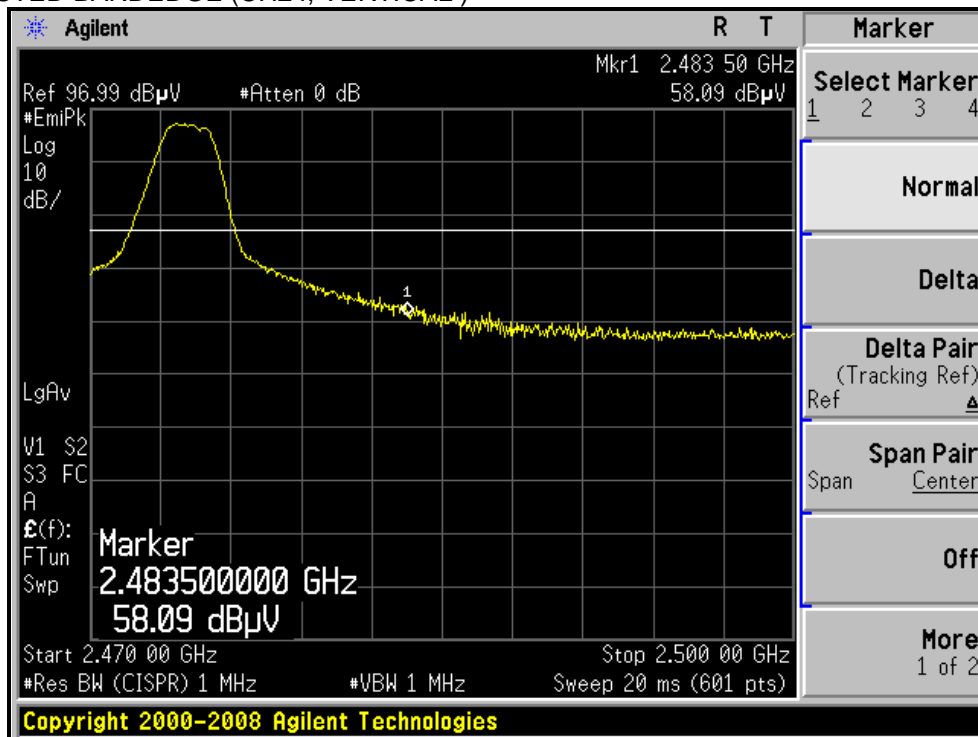
RESTRICTED BANDEDGE (CH1, VERTICAL)



RESTRICTED BANDEDGE (CH24, HORIZONTAL)



RESTRICTED BANDEDGE (CH24, VERTICAL)





4.3 CONDUCTED - OUT BAND MEASUREMENT

4.3.1 LIMITS OF CONDUCTED - OUT BAND MEASUREMENT

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

4.3.2 TEST INSTRUMENTS

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

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

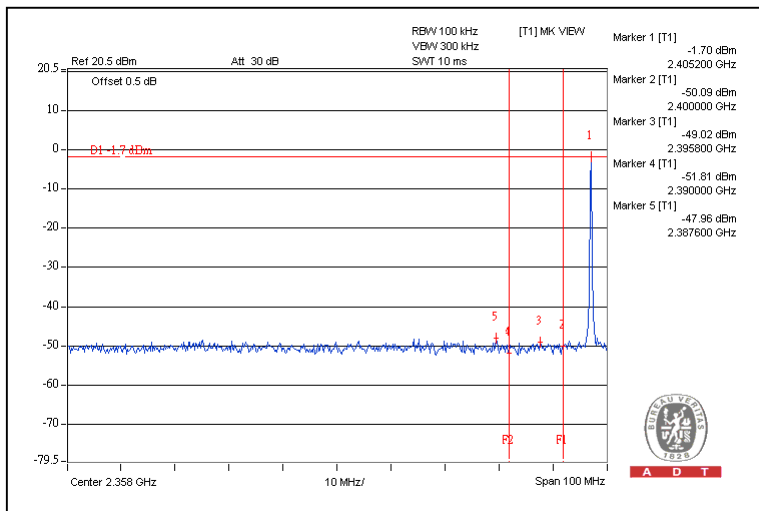
No deviation

4.3.5 EUT OPERATING CONDITION

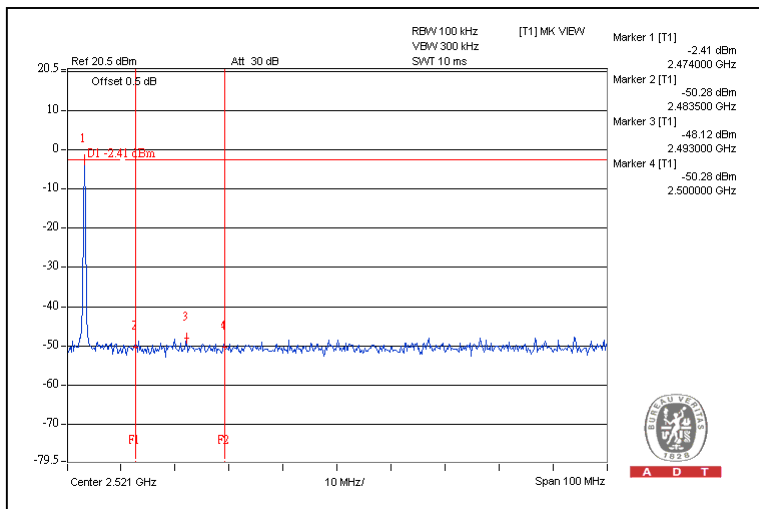
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.6 TEST RESULTS

Emissions radiated outside of the specified frequency bands, please refer pages from 18 to 21 for met the requirement of the general radiated emission limits in § 15.209.
CH1



CH24





5 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	GOST-ASIA (MOU)
Russia	CERTIS (MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:

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.



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 ---