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# FCC TEST REPORT

**REPORT NO.:** RF121120E23

**MODEL NO.:** C-U0012

**FCC ID:** JNZCU0012

**RECEIVED:** Nov. 20, 2012

**TESTED:** Nov. 23 to 29, 2012

**ISSUED:** Dec. 05, 2012

**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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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF121120E23	Original release	Dec. 05, 2012



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## 1 CERTIFICATION

**PRODUCT :** 2.4GHz USB Transceiver

**BRAND NAME :** Logitech

**MODEL NO. :** C-U0012

**TEST SAMPLE :** ENGINEERING SAMPLE

**APPLICANT :** LOGITECH FAR EAST LTD.

**TESTED :** Nov. 23 to 29, 2012

**STANDARDS :** FCC Part 15, Subpart C (Section 15.249)

ANSI C63.10-2009

The above equipment (Model: C-U0012) 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 :** Phoenix Huang, **DATE:** Dec. 05, 2012  
(Phoenix Huang, Specialist)

**APPROVED BY :** May Chen, **DATE:** Dec. 05, 2012  
(May Chen, Deputy Manager)



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## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.249)			
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK
15.207	Conducted Emission Test	PASS	Meet the requirement of limit. Minimum passing margin is -13.45dB at 0.21641MHz
15.209	Radiated Emission Test		
15.249	Band Edge Measurement		
15.249 (d)	Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -16.6dB at 2400.00MHz

### 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	2.98 dB
Radiated emissions (30MHz-1GHz)	5.59 dB
Radiated emissions (1GHz -6GHz)	3.84 dB
Radiated emissions (6GHz -18GHz)	4.09 dB
Radiated emissions (18GHz -40GHz)	4.24 dB



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### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	2.4GHz USB Transceiver
<b>MODEL NO.</b>	C-U0012
<b>POWER SUPPLY</b>	DC 5V from host equipment
<b>MODULATION TYPE</b>	GFSK
<b>CARRIER FREQUENCY OF EACH CHANNEL</b>	2405MHz ~ 2474MHz
<b>NUMBER OF CHANNEL</b>	12
<b>ANTENNA TYPE</b>	Metallic wire antenna, quarter-wave antenna (Gain: -3.99dBi)
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ASSOCIATED DEVICES</b>	NA

#### NOTE:

1. The EUT operates in the 2.4GHz frequency spectrum and complies with GFSK techniques.
2. 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.



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### 3.2 DESCRIPTION OF TEST MODES

Twelve channels are provided in this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	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

### 3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	PLC	RE<1G	RE <sup>&gt;</sup> 1G	
-	√	√	√	-

Where

PLC: Power Line Conducted Emission

RE&lt;1G: Radiated Emission below 1GHz

RE<sup>></sup>1G: Radiated Emission above 1GHz

#### POWER LINE CONDUCTED EMISSION TEST:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture) and packet type.
- 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

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER(SYSTEM)	TESTED BY
PLC	24deg. C, 65%RH	120Vac, 60Hz	Timmy Hu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
RE <sup>3</sup> 1G	24deg. C, 61%RH	120Vac, 60Hz	Nelson Teng



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### 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 C63.10-2009

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.



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### 3.5 DESCRIPTION OF SUPPORT UNITS

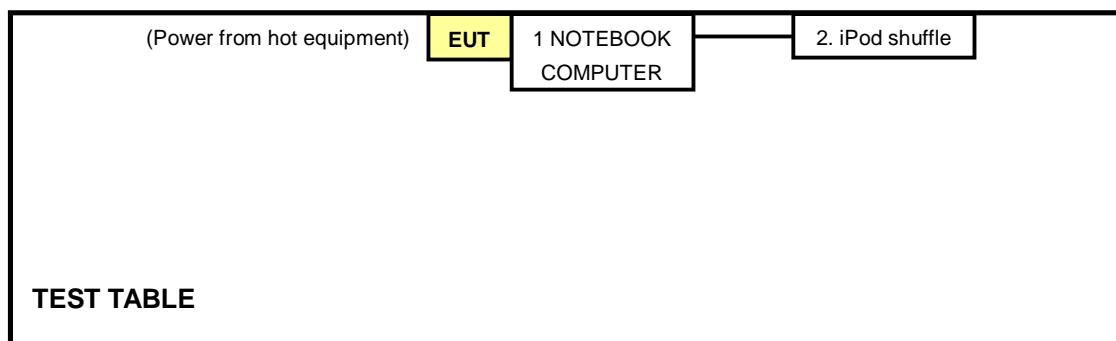
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	USB cable, 0.1m

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

### 3.6 CONFIGURATION OF SYSTEM UNDER TEST





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## 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 $\mu$ 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. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 12, 2012	Mar.11, 2013
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 08,2012	June 07,2013
RF Cable (JYEBAO)	5DFB	COCCAB-001	Aug. 28, 2012	Aug. 27, 2013
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
Software ADT	BV ADT_Cond_V7.3.7.3	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. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Nov. 27, 2012

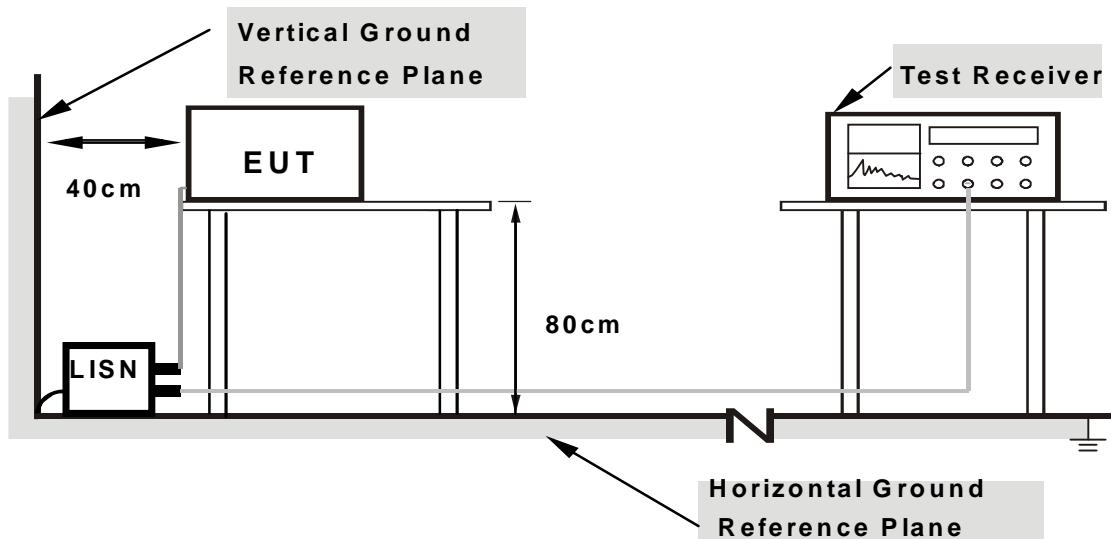
#### 4.1.3 TEST PROCEDURES

- 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:**

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

#### 4.1.4 TEST SETUP



**Note: 1. Support units were connected to second LISN.**

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



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#### 4.1.5 EUT OPERATING CONDITIONS

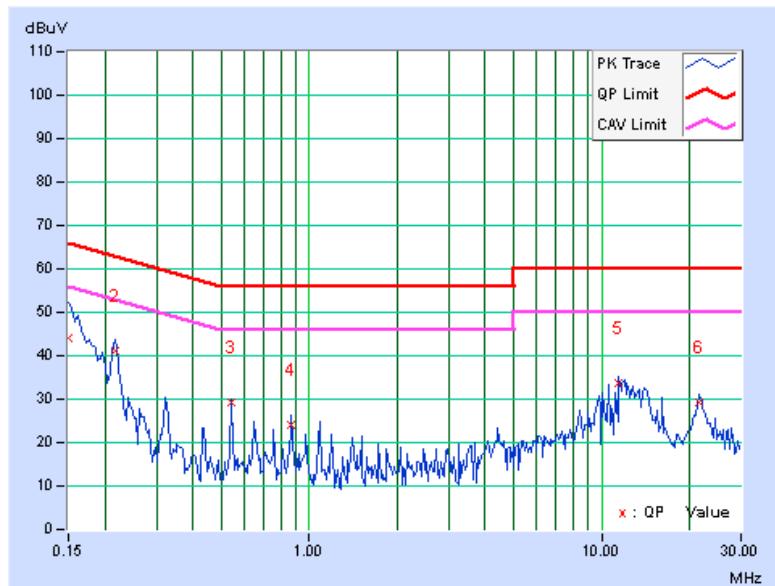
1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed in test table.
2. The support unit 1 (Notebook Computer) runs test program “RF Sample(Num Lock)” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

## 4.1.6 TEST RESULTS

PHASE		Line (L)		DETECTOR FUNCTION		Quasi-Peak (QP) / Average (AV)				
No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)	(dB)
1	0.15000	0.11	43.95	24.03	44.06	24.14	66.00	56.00	-21.94	-31.86
2	0.21641	0.12	40.86	33.32	40.98	33.44	62.96	52.96	-21.97	-19.51
3	0.54063	0.17	29.25	28.41	29.42	28.58	56.00	46.00	-26.58	-17.42
4	0.86484	0.18	24.01	23.64	24.19	23.82	56.00	46.00	-31.81	-22.18
5	11.41488	0.61	33.02	31.55	33.63	32.16	60.00	50.00	-26.37	-17.84
6	21.44922	0.95	28.44	26.55	29.39	27.50	60.00	50.00	-30.61	-22.50

## REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

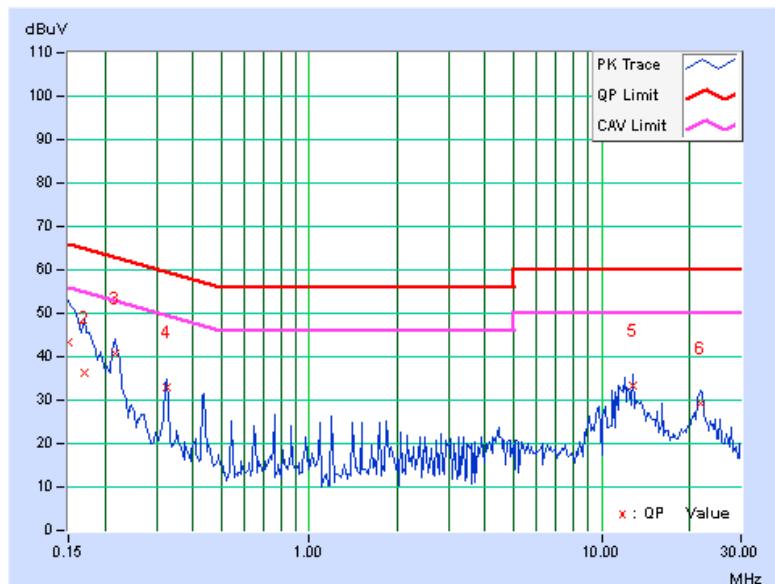


PHASE		Neutral (N)				DETECTOR FUNCTION		Quasi-Peak (QP) / Average (AV)	
-------	--	-------------	--	--	--	-------------------	--	--------------------------------	--

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	0.15000	0.09	43.18	23.21	43.27	23.30	66.00	56.00	-22.73	-32.70
2	0.16953	0.09	36.39	24.63	36.48	24.72	64.98	54.98	-28.50	-30.26
<b>3</b>	<b>0.21641</b>	<b>0.10</b>	<b>40.61</b>	<b>39.40</b>	<b>40.71</b>	<b>39.50</b>	<b>62.96</b>	<b>52.96</b>	<b>-22.24</b>	<b>-13.45</b>
4	0.32578	0.13	32.74	31.81	32.87	31.94	59.56	49.56	-26.69	-17.62
5	12.77344	0.48	33.00	28.79	33.48	29.27	60.00	50.00	-26.52	-20.73
6	21.77734	0.64	28.73	26.33	29.37	26.97	60.00	50.00	-30.63	-23.03

**REMARKS:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.





## 4.2 RADIATED EMISSION AND BAND EDGE MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION AND BAND EDGE MEASUREMENT

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

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 as below table, whichever is the lesser attenuation

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

#### NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB<sub>uV</sub>/m) = 20 log Emission level (uV/m).
3. 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.



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#### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
Pre-Selector Agilent	N9039A	MY46520310	Sep. 03, 2012	Sep. 02, 2013
Signal Generator Agilent	N5181A	MY49060347	July 24, 2012	July 23, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02465	Feb. 27, 2012	Feb. 26, 2013
SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
Horn Antenna SCHWARZBECK	BBHA 9120	9120D-783	Sep. 20, 2012	Sep. 19, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 27, 2011	Dec. 26, 2012
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	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.
6. Tested Date: Nov. 26 to 29, 2012



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#### 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.

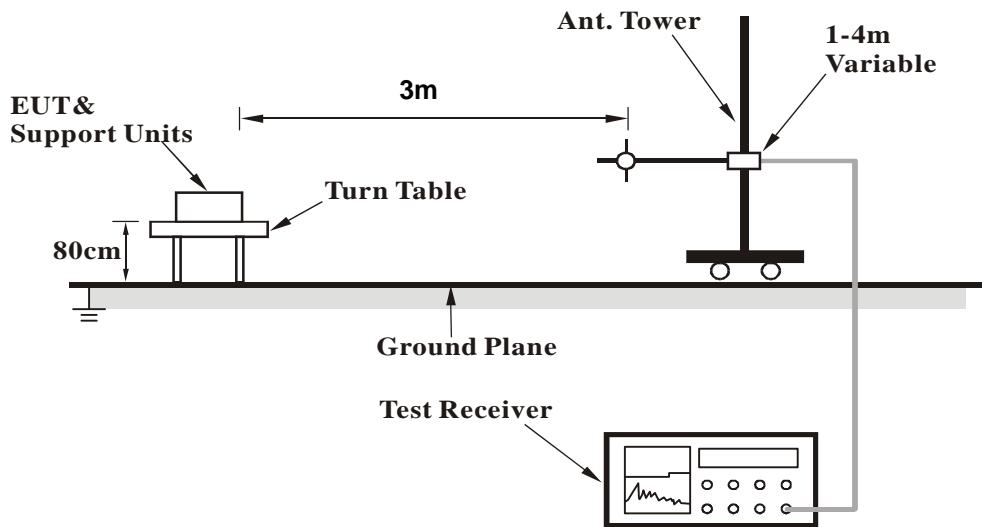
#### NOTE:

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 of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. 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



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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6



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#### 4.2.7 TEST RESULTS

##### BELOW 1GHz WORST-CASE DATA

###### GFSK

CHANNEL	TX Channel 12	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	257.73	19.3 QP	46.0	-26.7	1.50 H	175	5.65	13.61
2	315.04	18.9 QP	46.0	-27.1	1.50 H	0	3.21	15.68
3	396.04	23.5 QP	46.0	-22.5	1.50 H	237	5.81	17.66
4	480.01	24.7 QP	46.0	-21.3	2.00 H	290	5.07	19.61
5	531.05	21.8 QP	46.0	-24.3	1.50 H	0	0.99	20.76
6	798.68	25.9 QP	46.0	-20.1	1.00 H	243	0.29	25.65

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	296.57	22.1 QP	46.0	-23.9	1.25 V	239	6.89	15.17
2	396.64	24.9 QP	46.0	-21.1	1.00 V	139	7.26	17.68
3	431.45	22.2 QP	46.0	-23.8	1.75 V	237	3.71	18.47
4	480.01	21.7 QP	46.0	-24.3	2.00 V	234	2.11	19.61
5	579.13	21.2 QP	46.0	-24.8	1.50 V	360	-0.63	21.80
6	957.01	29.3 QP	46.0	-16.7	2.00 V	69	1.17	28.10

###### 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.



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## ABOVE 1GHz DATA

## GFSK

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	56.9 PK	74.0	-17.1	1.03 H	204	24.88	32.02
2	2400.00	28.9 AV	54.0	-25.1	1.03 H	204	-3.12	32.02
3	*2405.00	91.5 PK	114.0	-22.5	1.03 H	204	59.47	32.03
4	*2405.00	63.5 AV	94.0	-30.5	1.03 H	204	31.47	32.03
5	4810.00	44.1 PK	74.0	-29.9	1.03 H	190	4.56	39.54
6	4810.00	16.1 AV	54.0	-37.9	1.03 H	190	-23.44	39.54
7	7215.00	54.2 PK	74.0	-19.8	1.20 H	193	6.59	47.61
8	7215.00	26.2 AV	54.0	-27.8	1.20 H	193	-21.41	47.61

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	57.4 PK	74.0	-16.6	1.00 V	87	25.38	32.02
2	2400.00	29.4 AV	54.0	-24.6	1.00 V	87	-2.62	32.02
3	*2405.00	89.1 PK	114.0	-24.9	1.00 V	87	57.07	32.03
4	*2405.00	61.1 AV	94.0	-32.9	1.00 V	87	29.07	32.03
5	4810.00	48.0 PK	74.0	-26.0	1.00 V	275	8.46	39.54
6	4810.00	20.0 AV	54.0	-34.0	1.00 V	275	-19.54	39.54
7	7215.00	53.1 PK	74.0	-20.9	1.04 V	224	5.49	47.61
8	7215.00	25.1 AV	54.0	-28.9	1.04 V	224	-22.51	47.61

## 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 + 20 log(Duty cycle) Where the duty factor is calculated from following formula:

$$20 \log (\text{Duty cycle}) = 20 \log (0.3216 \text{ ms} / 8.076 \text{ ms}) = -28.0 \text{ dB}$$

Please see page 24 for plotted duty.



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CHANNEL	TX Channel 8	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	94.1 PK	114.0	-19.9	1.04 H	207	61.97	32.13
2	*2444.00	66.1 AV	94.0	-27.9	1.04 H	207	33.97	32.13
3	4888.00	44.7 PK	74.0	-29.3	1.00 H	185	4.97	39.73
4	4888.00	16.7 AV	54.0	-37.3	1.00 H	185	-23.03	39.73
5	7332.00	53.9 PK	74.0	-20.1	1.21 H	198	6.33	47.57
6	7332.00	25.9 AV	54.0	-28.1	1.21 H	198	-21.67	47.57
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	92.1 PK	114.0	-21.9	1.00 V	85	59.97	32.13
2	*2444.00	64.1 AV	94.0	-29.9	1.00 V	85	31.97	32.13
3	4888.00	48.0 PK	74.0	-26.0	1.01 V	265	8.27	39.73
4	4888.00	20.0 AV	54.0	-34.0	1.01 V	265	-19.73	39.73
5	7332.00	53.5 PK	74.0	-20.5	1.02 V	217	5.93	47.57
6	7332.00	25.5 AV	54.0	-28.5	1.02 V	217	-22.07	47.57

**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 + 20 log(Duty cycle) Where the duty factor is calculated from following formula:  

$$20 \log (\text{Duty cycle}) = 20 \log (0.3216 \text{ ms} / 8.076 \text{ ms}) = -28.0 \text{ dB}$$
Please see page 24 for plotted duty.



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CHANNEL	TX Channel 12	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	96.3 PK	114.0	-17.7	1.02 H	206	64.09	32.21
2	*2474.00	68.3 AV	94.0	-25.7	1.02 H	206	36.09	32.21
3	2483.50	56.5 PK	74.0	-17.5	1.02 H	206	24.26	32.24
4	2483.50	28.5 AV	54.0	-25.5	1.02 H	206	-3.74	32.24
5	4948.00	45.3 PK	74.0	-28.7	1.02 H	189	5.39	39.91
6	4948.00	17.3 AV	54.0	-36.7	1.02 H	189	-22.61	39.91
7	7422.00	53.7 PK	74.0	-20.3	1.26 H	184	6.25	47.45
8	7422.00	25.7 AV	54.0	-28.3	1.26 H	184	-21.75	47.45
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	91.9 PK	114.0	-22.1	1.00 V	84	59.69	32.21
2	*2474.00	63.9 AV	94.0	-30.1	1.00 V	84	31.69	32.21
3	2483.50	57.2 PK	74.0	-16.8	1.00 V	84	24.96	32.24
4	2483.50	29.2 AV	54.0	-24.8	1.00 V	84	-3.04	32.24
5	4948.00	48.5 PK	74.0	-25.5	1.01 V	280	8.59	39.91
6	4948.00	20.5 AV	54.0	-33.5	1.01 V	280	-19.41	39.91
7	7422.00	54.0 PK	74.0	-20.0	1.01 V	205	6.55	47.45
8	7422.00	26.0 AV	54.0	-28.0	1.01 V	205	-21.45	47.45

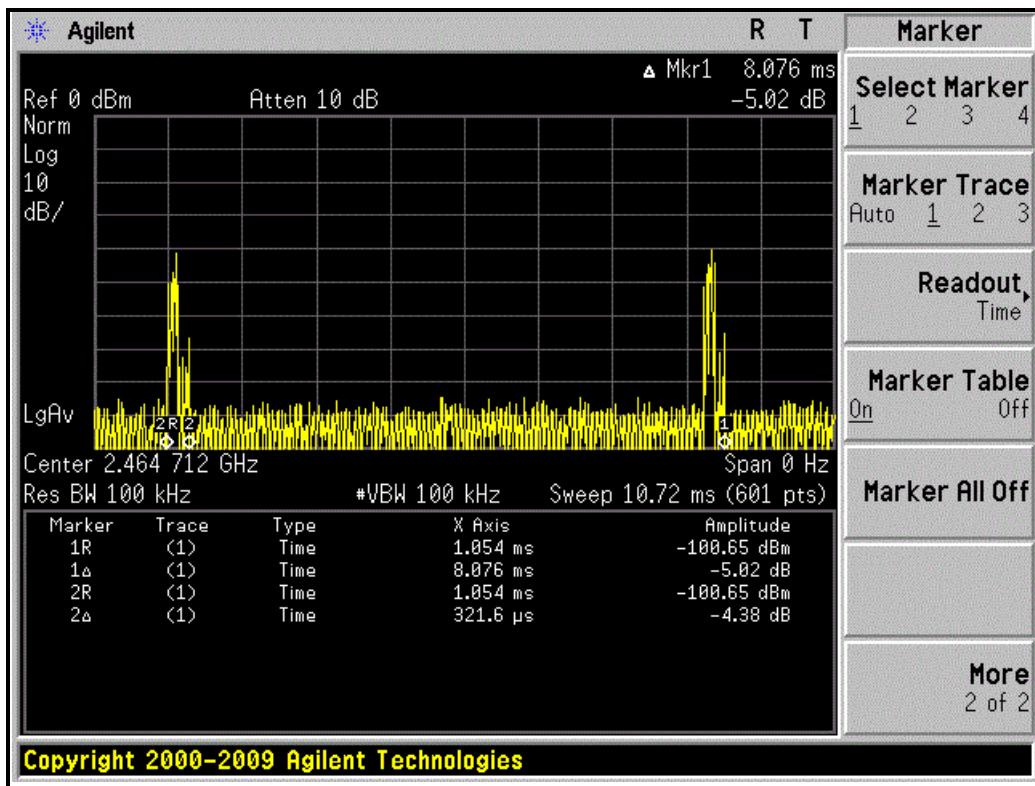
**REMARKS:**

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 + 20 log(Duty cycle) Where the duty factor is calculated from following formula:  

$$20 \log (\text{Duty cycle}) = 20 \log (0.3216 \text{ ms} / 8.076 \text{ ms}) = -28.0 \text{ dB}$$
Please see page 24 for plotted duty.



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20 log (Duty cycle) = 20 log (0.3216 ms / 8.076 ms) = -28.0 dB



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## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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## 6 INFORMATION ON THE TESTING LABORATORIES

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

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

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The address and road map of all our labs can be found in our web site also.



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## 5 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

--- END ---