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# FCC TEST REPORT

**REPORT NO.:** RF990520C13B

**MODEL NO.:** BSMD02

**FCC ID:** ZJ5BSMOW07R

**RECEIVED:** May 12, 2011

**TESTED:** May 20 ~ 23, 2011

**ISSUED:** May 27, 2011

**APPLICANT:** Buffalo Kokuyo Supply Inc.

**ADDRESS:** AKAMONDORI Bldg., 30-20, Ohsu 3-chome,  
Naka-ku, Nagoya. Aichi, 460-8315, Japan

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

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

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## Table of Contents

RELEASE CONTROL RECORD.....	3
1. CERTIFICATION .....	4
2. SUMMARY OF TEST RESULTS.....	5
2.1 MEASUREMENT UNCERTAINTY.....	5
3. GENERAL INFORMATION .....	6
3.1 GENERAL DESCRIPTION OF EUT .....	6
3.2 DESCRIPTION OF TEST MODES.....	7
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST .....	7
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL: .....	8
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	10
3.4 DESCRIPTION OF SUPPORT UNITS .....	10
4. TEST TYPES AND RESULTS.....	11
4.1 CONDUCTED EMISSION MEASUREMENT .....	11
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	11
4.1.2 TEST INSTRUMENTS .....	11
4.1.3 TEST PROCEDURES .....	12
4.1.4 DEVIATION FROM TEST STANDARD .....	12
4.1.5 TEST SETUP .....	12
4.1.6 EUT OPERATING CONDITIONS .....	13
4.1.7 TEST RESULTS .....	14
4.2 RADIATED EMISSION MEASUREMENT .....	16
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	16
4.2.2 TEST INSTRUMENTS .....	17
4.2.3 TEST PROCEDURES .....	18
4.2.4 DEVIATION FROM TEST STANDARD .....	18
4.2.5 TEST SETUP .....	19
4.2.6 EUT OPERATING CONDITIONS .....	19
4.2.7 TEST RESULTS .....	20
4.3 BAND EDGES MEASUREMENT .....	25
4.3.1 LIMITS OF BAND EDGES 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 .....	25
5. PHOTOGRAPHS OF THE TEST CONFIGURATION.....	28
6. INFORMATION ON THE TESTING LABORATORIES .....	29
7. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....	30



## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF990520C13B	Original release	May 27, 2011

## 1. CERTIFICATION

**PRODUCT:** 2.4GHz Wireless receiver  
**BRAND NAME:** iBuffalo  
**MODEL NO.:** BSMD02  
**APPLICANT:** Buffalo Kokuyo Supply Inc.  
**TESTED:** May 20 ~ 23, 2011  
**TEST ITEM:** ENGINEERING SAMPLE  
**STANDARDS:** FCC Part 15, Subpart C (Section 15.249)  
ANSI C63.4-2003  
ANSI C63.10-2009

The above equipment 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 :** Jessica Cheng , **DATE:** May 27, 2011  
( Jessica Cheng / Specialist )

**APPROVED BY :** Ken Liu , **DATE:** May 27, 2011  
( Ken Liu / Manager )

## 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 SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	Conducted Emission Test	PASS	Minimum passing margin is -16.25dB at 0.185MHz
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 12.209	PASS	Minimum passing margin is -9.1dB at 168.80MHz

### 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	Frequency	Uncertainty
Conducted emissions	150kHz ~ 30MHz	2.41 dB
Radiated emissions	30MHz ~ 1GHz	3.87 dB
	Above 1GHz	2.89 dB

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	2.4GHz Wireless receiver
<b>MODEL NO.</b>	BSMD02
<b>FCC ID</b>	ZJ5BSMOW07R
<b>POWER SUPPLY</b>	5Vdc from host equipment
<b>MODULATION TYPE</b>	GFSK
<b>OPERATING FREQUENCY</b>	2405MHz ~ 2476MHz
<b>NUMBER OF CHANNEL</b>	64
<b>ANTENNA TYPE</b>	Copper trace antenna with -2.33dBi gain
<b>ANTENNA CONNECTOR</b>	N/A
<b>DATA CABLE</b>	N/A
<b>I/O PORTS</b>	USB port
<b>ASSOCIATED DEVICES</b>	N/A

#### NOTE:

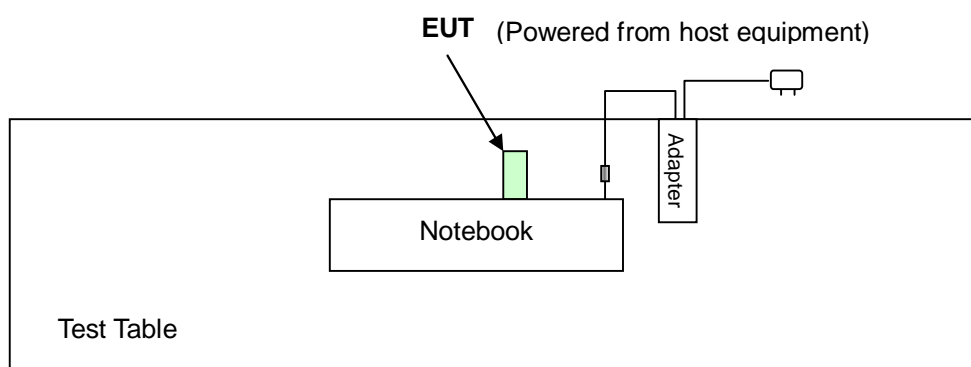
1. The EUT is a transceiver.
2. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

## 3.2 DESCRIPTION OF TEST MODES

64 channels are provided to this EUT:

Frequency Group 1				Frequency Group 2			
CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
1	2407	17	2442	33	2405	49	2443
2	2408	18	2447	34	2406	50	2444
3	2412	19	2451	35	2419	51	2446
4	2414	20	2452	36	2410	52	2448
5	2417	21	2457	37	2411	53	2449
6	2420	22	2458	38	2413	54	2453
7	2421	23	2459	39	2415	55	2455
8	2422	24	2460	40	2416	56	2456
9	2427	25	2461	41	2418	57	2462
10	2428	26	2465	42	2419	58	2463
11	2431	27	2468	43	2423	59	2464
12	2435	28	2469	44	2425	60	2466
13	2436	29	2472	45	2429	61	2467
14	2437	30	2473	46	2430	62	2470
15	2438	31	2475	47	2432	63	2471
16	2439	32	2476	48	2434	64	2474

### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	BM	
-	√	√	√	√	-

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

RE<1G RE: Radiated Emission below 1GHz  
BM: Bandedge Measurement

#### POWER LINE CONDUCTED EMISSION TEST:

- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 64	33	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 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 64	33	GFSK

#### RADIATED EMISSION TEST (ABOVE 1 GHz):

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 64	33, 16, 32	GFSK

#### BANDEDGE MEASUREMENT:

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 64	33, 32	GFSK





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**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	25deg. C, 85% RH, 1007hPa	120Vac, 60Hz	Chad Lee
RE<1G	24deg. C, 82% RH, 1009hPa	120Vac, 60Hz	Chad Lee
RE <sup>3</sup> 1G	24deg. C, 82% RH, 1009hPa	120Vac, 60Hz	Chad Lee
BM	24deg. C, 82% RH, 1009hPa	120Vac, 60Hz	Chad Lee

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

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

**ANSI C63.4-2003**

**ANSI C63.10-2009**

**NOTE:** The product has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

All test items 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	PP05L	24729091408	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

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

## 4. TEST TYPES 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 A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100276	Dec. 31, 2010	Dec. 30, 2011
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100219	Nov. 24, 2010	Nov. 23, 2011
LISN With Adapter (for EUT)	AD10	C10Ada-001	Nov. 24, 2010	Nov. 23, 2011
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100218	Nov. 24, 2010	Nov. 23, 2011
Software	ADT_Cond_V7.3.7	NA	NA	NA
Software	ADT_ISN_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	Feb. 22, 2011	Feb. 21, 2012
SUHNTER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Feb. 26, 2011	Feb. 25, 2012

- 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. 10.
  3. The VCCI Site Registration No. C-1852.

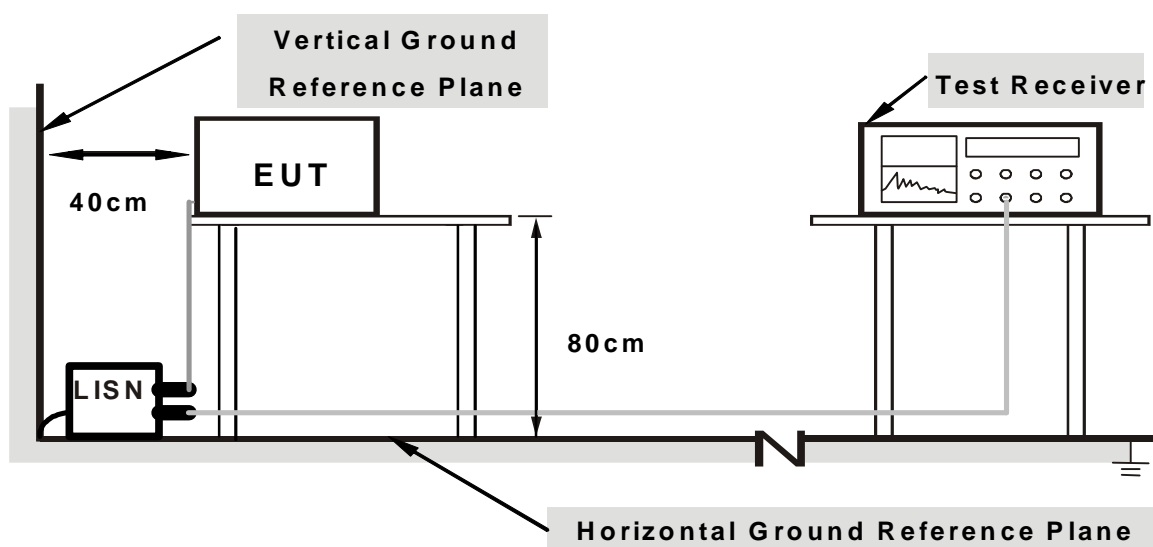
### 4.1.3 TEST PROCEDURES

- 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.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under limit - 20dB was not recorded.

### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

### 4.1.5 TEST SETUP



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

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

#### **4.1.6 EUT OPERATING CONDITIONS**

- a. Connected the EUT to a notebook placed on a testing table.
- b. The notebook ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.

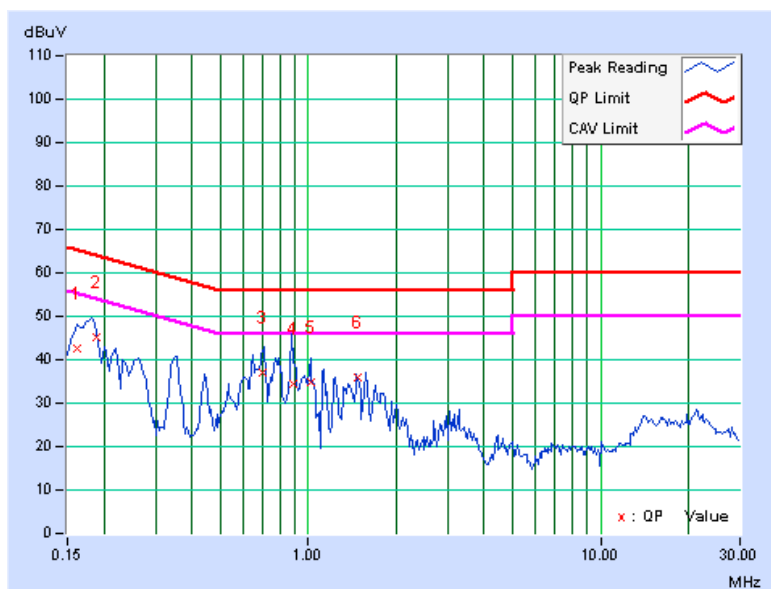
## 4.1.7 TEST RESULTS

### CONDUCTED WORST CASE DATA

PHASE	Line 1	6dB BANDWIDTH	9 kHz
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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	0.162	0.17	42.43	-	42.60	-	65.38	55.38	-22.78	-
2	0.188	0.17	44.92	-	45.09	-	64.14	54.14	-19.05	-
3	0.702	0.26	36.86	-	37.12	-	56.00	46.00	-18.88	-
4	0.886	0.26	34.03	-	34.29	-	56.00	46.00	-21.71	-
5	1.018	0.27	34.52	-	34.79	-	56.00	46.00	-21.21	-
6	1.474	0.30	35.58	-	35.88	-	56.00	46.00	-20.12	-

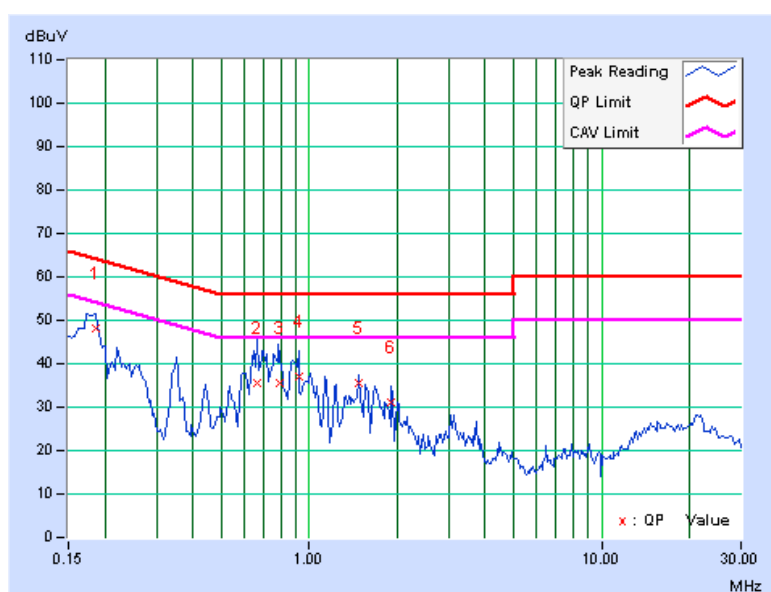
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



PHASE	Line 2	6dB BANDWIDTH	9 kHz
-------	--------	---------------	-------

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	0.185	0.18	47.82	-	48.00	-	64.25	54.25	-16.25	-
2	0.667	0.26	35.26	-	35.52	-	56.00	46.00	-20.48	-
3	0.791	0.27	35.14	-	35.41	-	56.00	46.00	-20.59	-
4	0.922	0.28	36.80	-	37.08	-	56.00	46.00	-18.92	-
5	1.483	0.30	35.34	-	35.64	-	56.00	46.00	-20.36	-
6	1.916	0.33	30.89	-	31.22	-	56.00	46.00	-24.78	-

- 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

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209, 15.249 as following:

15.209 Limit		
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
15.249 Limit		
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

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
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.





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## 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Mar. 04, 2011	Mar. 03, 2012
HP Preamplifier	8449B	3008A01924	Mar. 04, 2011	Mar. 03, 2012
HP Preamplifier	8449B	3008A01292	Mar. 04, 2011	Mar. 03, 2012
ROHDE & SCHWARZ TEST RECEIVER	ESU26	100005	Jun. 10, 2010	Jun. 09, 2011
Schwarzbeck Antenna	VULB 9168	137	Apr. 12, 2011	Apr. 11, 2012
Schwarzbeck Antenna	VHBA 9123	480	May 06, 2011	May 05, 2012
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V 7.6.15.9.2	NA	NA	NA
SUHNER RF cable	SF102	CABLE-CH6	Aug. 20, 2010	Aug. 19, 2011
EMCO Horn Antenna	3115	6714	Oct. 26, 2010	Oct. 25, 2011
EMCO Horn Antenna	3115	9312-4192	Apr. 22, 2011	Apr. 21, 2012
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

### 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 meter semi- anechoic 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. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak method or average method as specified and then reported in data sheet.

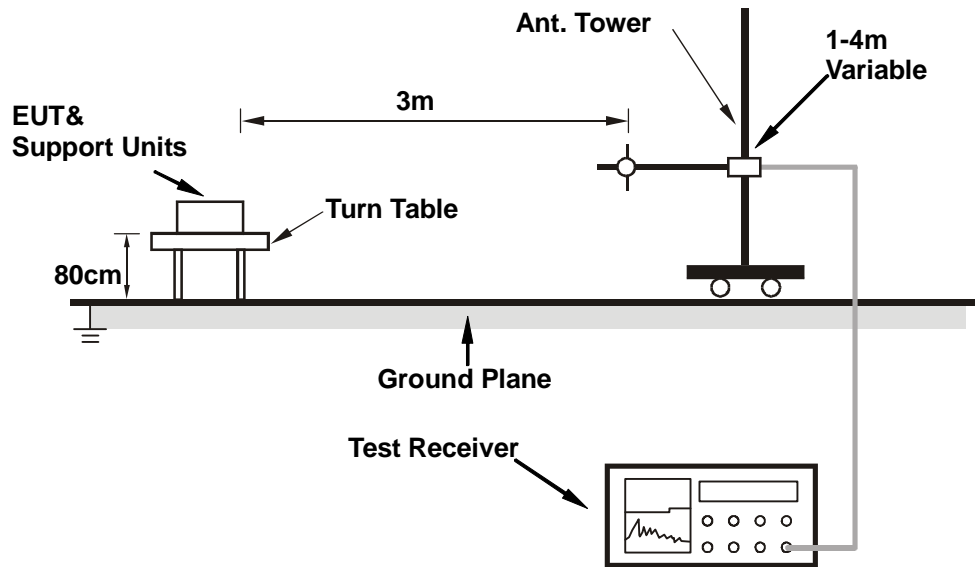
#### NOTE:

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 of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. 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

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



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## 4.2.7 TEST RESULTS

### ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 33	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 82%RH 1009 hPa	TESTED BY	Chad Lee

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	2390.00	53.0 PK	74.0	-21.0	1.22 H	200	20.50	32.47
2	2390.00	41.2 AV	54.0	-12.8	1.22 H	200	8.76	32.47
3	2400.00	50.4 PK	74.0	-23.7	1.22 H	200	17.84	32.51
4	2400.00	19.6 AV	54.0	-34.5	1.22 H	200	-12.96	32.51
5	*2405.00	84.9 PK	114.0	-29.2	1.22 H	200	52.32	32.53
6	*2405.00	54.1 AV	94.0	-40.0	1.22 H	200	21.52	32.53
7	4810.00	52.5 PK	74.0	-21.5	1.00 H	147	12.64	39.87
8	4810.00	21.7 AV	54.0	-32.3	1.00 H	147	-18.16	39.87
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	2390.00	51.2 PK	74.0	-22.8	1.00 V	25	18.74	32.47
2	2390.00	40.4 AV	54.0	-13.6	1.00 V	25	7.96	32.47
3	2400.00	46.4 PK	74.0	-27.6	1.00 V	25	13.93	32.51
4	2400.00	15.6 AV	54.0	-38.4	1.00 V	25	-16.87	32.51
5	*2405.00	80.9 PK	114.0	-33.1	1.00 V	25	48.41	32.53
6	*2405.00	50.1 AV	94.0	-43.9	1.00 V	25	17.61	32.53
7	4810.00	60.2 PK	74.0	-13.8	1.00 V	354	20.32	39.87
8	4810.00	29.4 AV	54.0	-24.6	1.00 V	354	-10.48	39.87

**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:  
 $20 \log (\text{Duty cycle}) = 20 \log (0.36 \text{ ms} * 8 / 100 \text{ ms}) = -30.8 \text{ dB}$   
 Please see page 23 for plotted duty.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 16	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 82%RH 1009 hPa	TESTED BY	Chad Lee

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	*2439.00	84.1 PK	114.0	-29.9	1.00 H	336	51.43	32.65
2	*2439.00	53.3 AV	94.0	-40.7	1.00 H	336	20.63	32.65
3	4878.00	54.6 PK	74.0	-19.5	1.00 H	34	14.45	40.10
4	4878.00	23.8 AV	54.0	-30.3	1.00 H	34	-16.35	40.10
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	*2439.00	82.0 PK	114.0	-32.0	1.00 V	189	49.35	32.65
2	*2439.00	51.2 AV	94.0	-42.8	1.00 V	189	18.55	32.65
3	4878.00	62.0 PK	74.0	-12.1	1.00 V	352	21.85	40.10
4	4878.00	31.2 AV	54.0	-22.9	1.00 V	352	-8.95	40.10

**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. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:  
 $20 \log (\text{Duty cycle}) = 20 \log (0.36 \text{ ms} * 8 / 100 \text{ ms}) = -30.8 \text{ dB}$   
Please see page 23 for plotted duty.

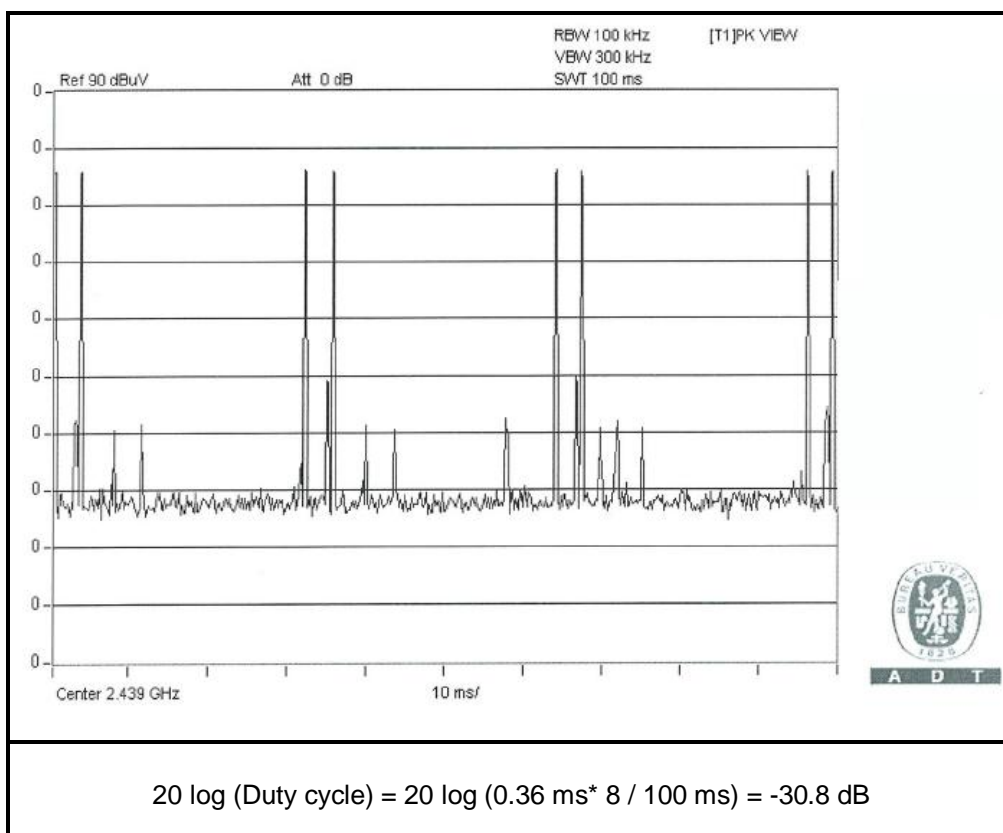
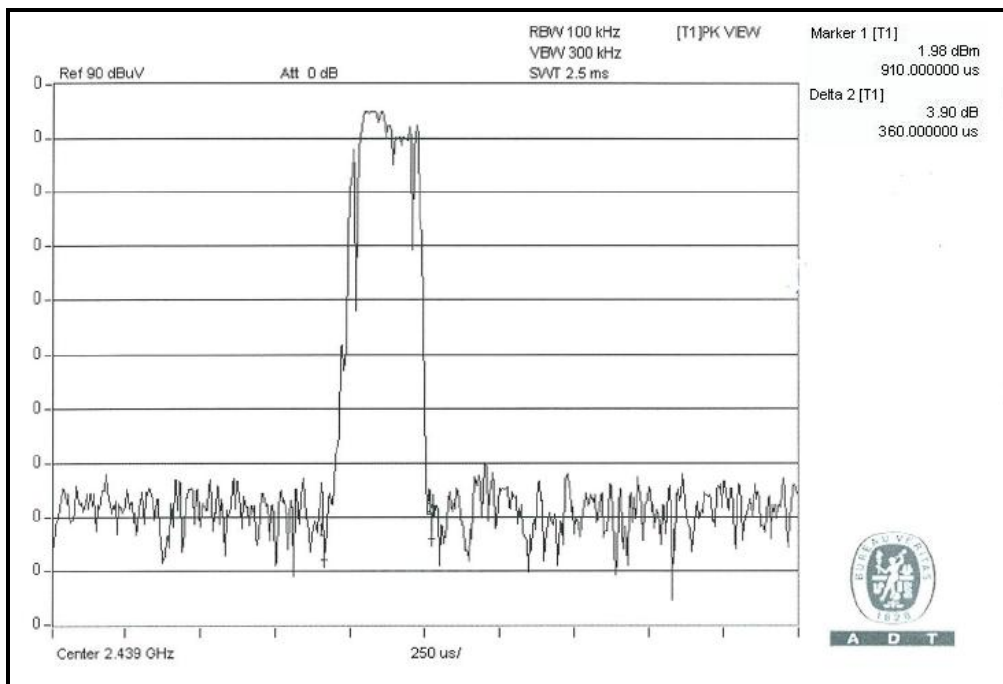


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 32	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 82%RH 1009 hPa	TESTED BY	Chad Lee

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	*2476.00	82.5 PK	114.0	-31.5	1.00 H	211	49.75	32.78
2	*2476.00	51.7 AV	94.0	-42.3	1.00 H	211	18.95	32.78
3	2483.50	42.0 PK	74.0	-32.0	1.00 H	211	9.22	32.81
4	2483.50	11.2 AV	54.0	-42.8	1.00 H	211	-21.58	32.81
5	4952.00	54.9 PK	74.0	-19.1	1.00 H	16	14.62	40.32
6	4952.00	24.1 AV	54.0	-29.9	1.00 H	16	-16.18	40.32
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	*2476.00	80.8 PK	114.0	-33.2	1.00 V	187	48.04	32.78
2	*2476.00	50.0 AV	94.0	-44.0	1.00 V	187	17.24	32.78
3	2483.50	40.3 PK	74.0	-33.7	1.00 V	187	7.51	32.81
4	2483.50	9.5 AV	54.0	-44.5	1.00 V	187	-23.29	32.81
5	4952.00	60.5 PK	74.0	-13.5	1.00 V	166	20.14	40.32
6	4952.00	29.7 AV	54.0	-24.3	1.00 V	166	-10.66	40.32

**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:  
 $20 \log (\text{Duty cycle}) = 20 \log (0.36 \text{ ms} * 8 / 100 \text{ ms}) = -30.8 \text{ dB}$   
Please see page 23 for plotted duty.





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## BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 33	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 82%RH 1009 hPa	TESTED BY	Chad Lee

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	115.54	29.0 QP	43.5	-14.5	1.12 H	103	17.24	11.78
2	165.57	32.9 QP	43.5	-10.6	1.52 H	58	18.63	14.23
3	265.64	33.1 QP	46.0	-12.9	1.63 H	58	19.08	14.06
4	404.44	31.8 QP	46.0	-14.3	1.88 H	262	13.43	18.32
5	796.64	32.5 QP	46.0	-13.5	1.45 H	10	6.16	26.37
6	817.62	32.8 QP	46.0	-13.2	1.00 H	256	6.13	26.68
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	115.54	28.6 QP	43.5	-14.9	1.14 V	352	16.80	11.78
2	133.29	32.9 QP	43.5	-10.6	1.00 V	37	19.58	13.28
3	168.80	34.5 QP	43.5	-9.1	1.00 V	22	20.36	14.09
4	533.56	35.4 QP	46.0	-10.6	1.12 V	280	13.86	21.57
5	665.91	32.7 QP	46.0	-13.3	1.08 V	235	8.97	23.71
6	798.25	35.4 QP	46.0	-10.6	1.04 V	265	9.00	26.41

**REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).  
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
3. The other emission levels were very low against the limit.  
4. Margin value = Emission level – Limit value.



## 4.3 BAND EDGES MEASUREMENT

### 4.3.1 LIMITS OF BAND EDGES MEASUREMENT

Below –50dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP 40	100036	Apr. 06, 2011	Apr. 05, 2012

**NOTE:** 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 including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots are attached on the following pages.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.3.5 EUT OPERATING CONDITION

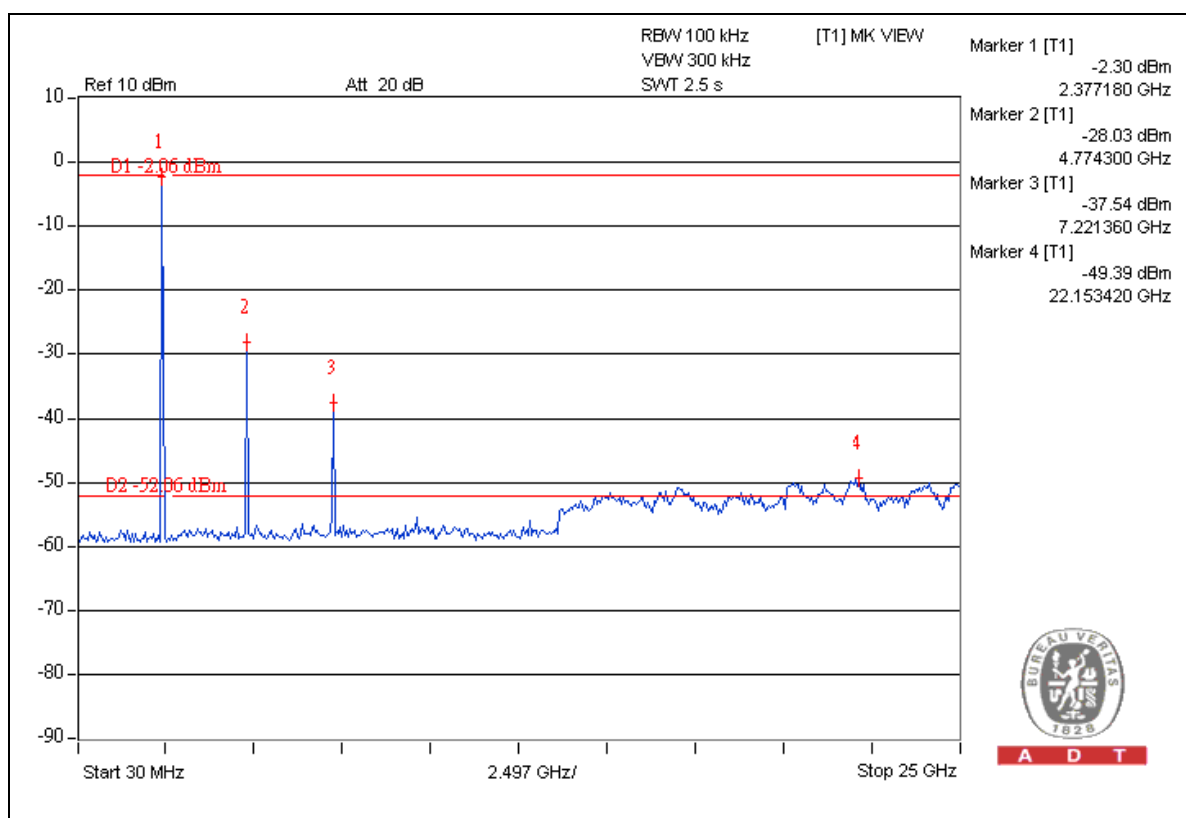
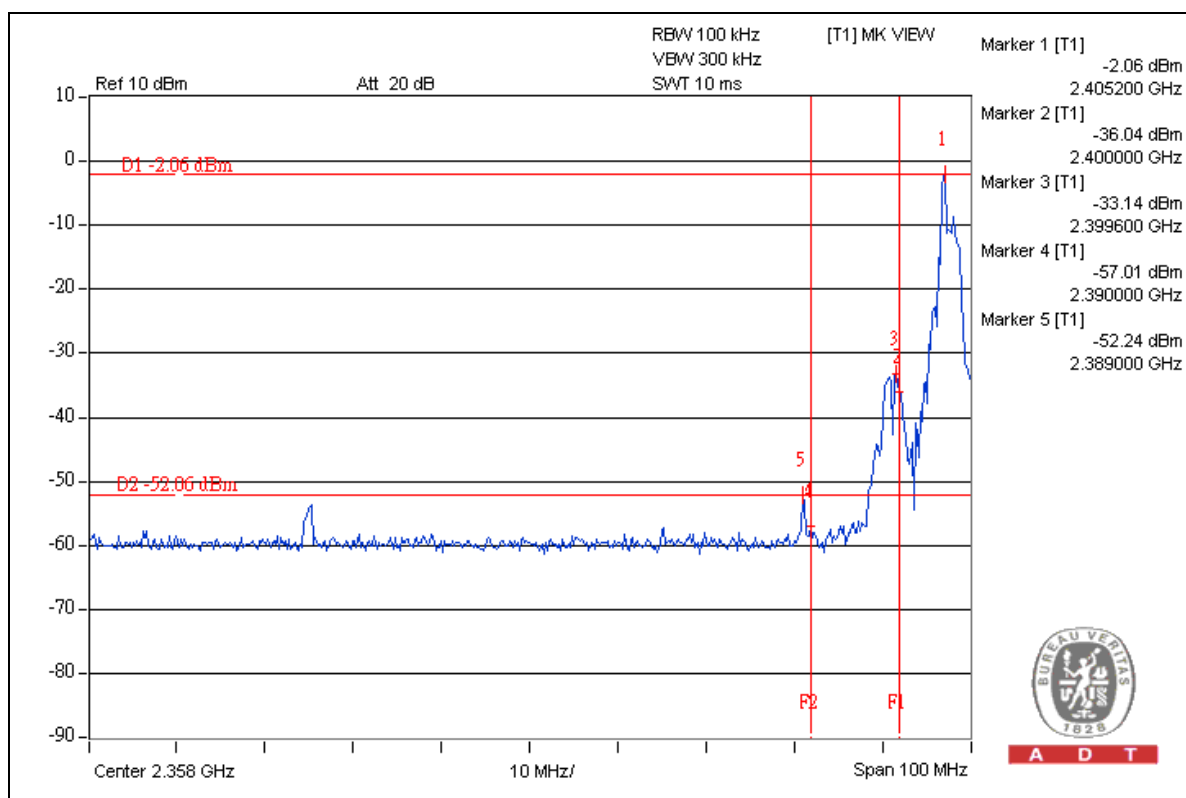
Same as Item 4.2.6

### 4.3.6 TEST RESULTS

The spectrum plots are attached on the following 4 images. D1 line indicates the highest level, and D2 line indicates the 50dB offset below D1. It shows compliance with the requirement in part 15.249(d).

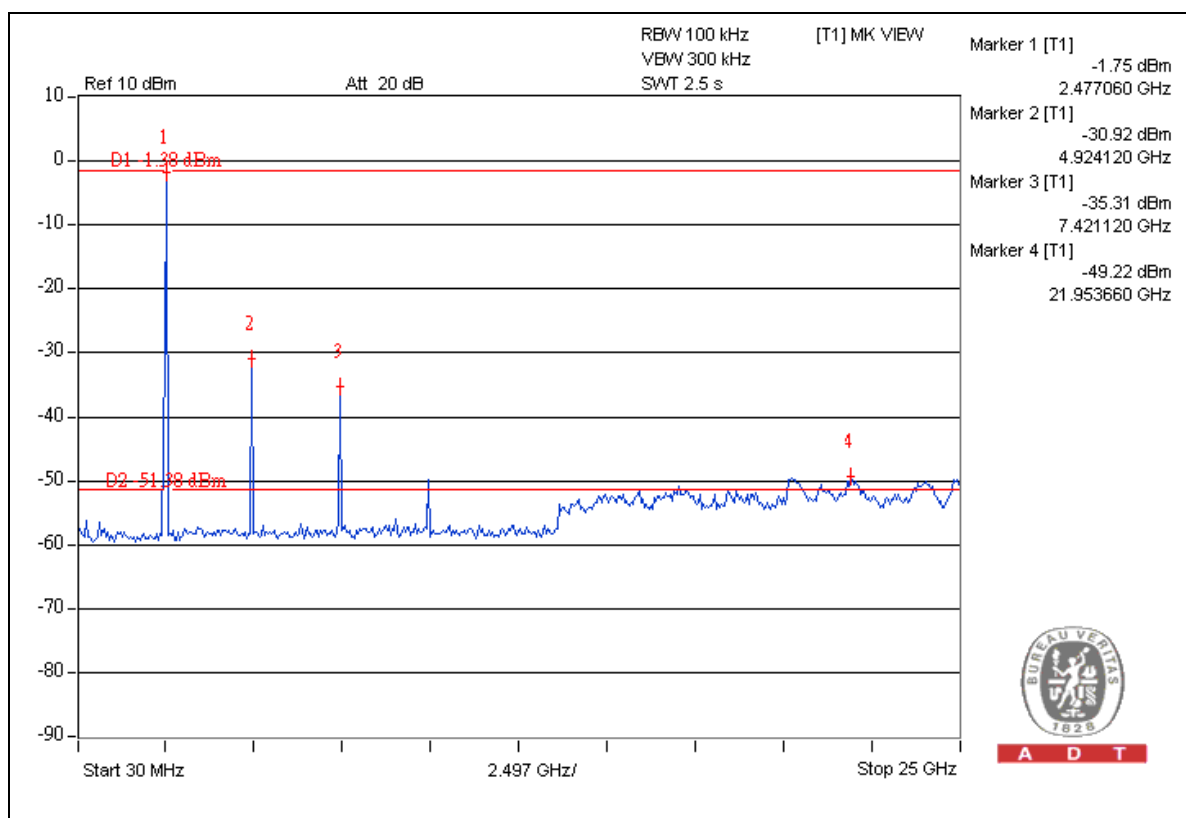
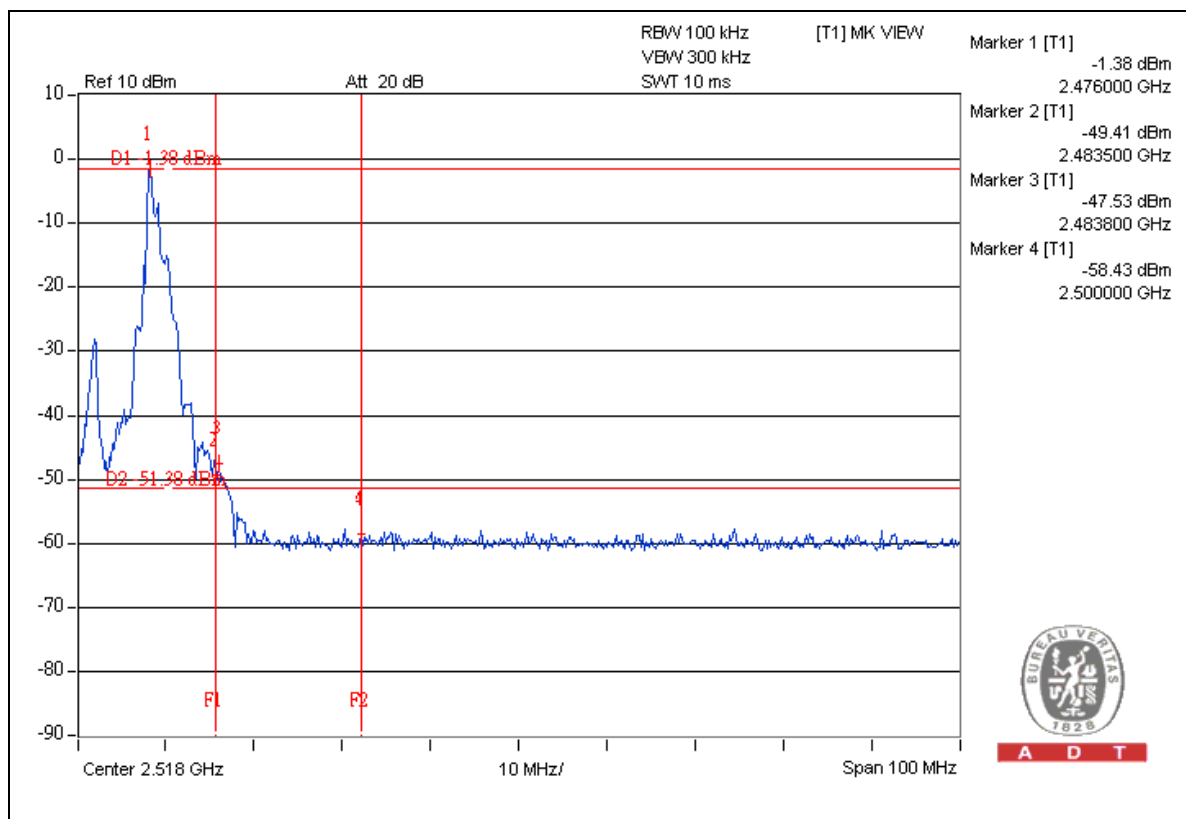


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## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

## 6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved 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](http://www.adt.com.tw/index.5/phtml).  
If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab:**  
Tel: 886-2-26052180  
Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab:**  
Tel: 886-3-5935343  
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Telecom Lab:**  
Tel: 886-3-3183232  
Fax: 886-3-3185050

**Web Site:** [www.adt.com.tw](http://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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## **7. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.

**---END---**