

FCC TEST REPORT

REPORT NO.: FC110321N04

MODEL NO.: MS-148OR

RECEIVED: Mar. 21, 2011

TESTED: Mar.23~Mar.30, 2011

ISSUED: Apr. 1, 2011

APPLICANT: Shenzhen Fuyeda Industry Development Corp.,Ltd.

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ISSUED BY: NS Technology Co., Ltd.

LAB ADDRESS: Chenwu Industrial Zone, Houjie Town,

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1. CERTIFICATION

PRODUCT: Mouse

MODEL NO.: MS-148OR

BRAND: Newmen

APPLICANT: Shenzhen Fuyeda Industry Development Corp.,Ltd.

TESTED: Mar.24~Mar.30, 2011

TEST SAMPLE: ENGINEERING SAMPLE

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

ANSI C63.4-2003

The above equipment has been tested by **NS Technology Co., Ltd.**, 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.

REVIEWED BY : _______, **DATE**: _Apr. 1, 2011

Jade Yang / Supervisor

APPROVED BY : ______, DATE: Apr. 1, 2011

Chirs Du / 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 PARAGRAPH	TEST TYPE	RESULT	REMARK		
15.207	15.207 Conducted Emission Test		Power supply is 3.0Vdc from batteries.		
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 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -17.03dB at 32.42MHz.		

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:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz ~ 30MHz	2.56 dB
	30MHz ~ 200MHz	3.58 dB
Radiated emissions	200MHz ~1000MHz	3.58 dB
Nadiated emissions	1GHz ~ 18GHz	3.58 dB
	18GHz ~ 40GHz	3.58 dB

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



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Mouse
MODEL NO.	MS-148OR
FCC ID	V4P-MS148OR-3
POWER SUPPLY	3.0Vdc form batteries
MODULATION TYPE	FSK
OPERATING FREQUENCY	2403MHz ~ 2477MHz
NUMBER OF CHANNEL	16
ANTENNA TYPE	Printed antenna
DATA CABLE	NA
I/O PORT	NA
ACCESSORY DEVICES	NA

NOTE:

- 1. A set of the EUT include transmitter and receiver. This report covers transmitter only.
- 2. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



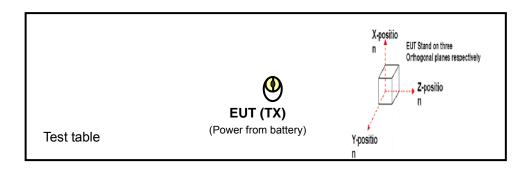
3.2 DESCRIPTION OF TEST MODES

16 channels are provided to this EUT.

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	2403.00	9	2442.00
2	2407.00	10	2447.00
3	2412.00	11	2452.00
4	2417.00	12	2457.00
5	2422.00	13	2462.00
6	2427.00	14	2467.00
7	2432.00	15	2472.00
8	2437.00	16	2477.00



3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



Note:

The EUT position(X. Y. Z) were checked and worse case was happened in Y position. So Y position was chose for find measurement.



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT APPLICABLE TO CONFIGURE			DESCRIPTION		
MODE	RE≥1G	RE<1G	PLC	ВМ	2 2001 1.0.1
-	V	V	NOTE	V	-

Where PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

BM: Bandedge Measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

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 16	1, 9, 16	FSK

RADIATED EMISSION TEST (BELOW 1 GHz):

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).

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 16	16	FSK

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 16	1, 16	FSK



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

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DONGLE	NEWMEN	MX-205	NA	V4P-MX205

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA



4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 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	5.249 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.



4.1.2 TEST INSTRUMENTS

BELOW 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer E7405A		MY45118807	May 30,10	May 30,11
EMI Test Receiver	ESVS10	841431/004	May 30,10	May 30,11
Bilog Antenna	CBL 6111D	25758	Nov.22,10	Nov.22,11
10m Semi-anechoic Chamber	21.4m*12.1m*8.8m	NSEMC006	May 2,10	May 2,11
RF Cable	IMRO-400	10m Cable 1#10m	May 2,10	May 2,11
RF Cable	IMRO-400	10m Cable 2#3m	May 2,10	May 2,11
Signal Amplifier	8447D	2944A11174	May 2,10	May 2,11

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.

2. The test was performed in Chamber 10m.

ABOVE 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Horn Antenna	3117	00062558	Nov.01,10	Nov.01,11
Horn Antenna (AUX)	3117	00085519	Nov.01,10	Nov.01,11
Spectrum Analyzer	8593E	3448U00806	May 30,10	May 30,11
Signal Amplifier	PEC-38-30M18G -12-SFF	NSEMC001	Oct.16,10	Oct.16,11
RF Cable	M06/25-RG102	966 Cable 2#	May 2,10	May 2,11

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.

2. The test was performed in Chamber 10m.



4.1.3 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. 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 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 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 Quasi-peak detection 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. For Average measurement at frequency above 1GHz. The resolution bandwidth of the test receiver was 1MHz; due to the shortest pulse width T is 116us, according the video bandwidth should not smaller than 1/T,so the video bandwidth is 10Hz.
- 3. All modes of operation were investigated and the worst-case emissions are reported.

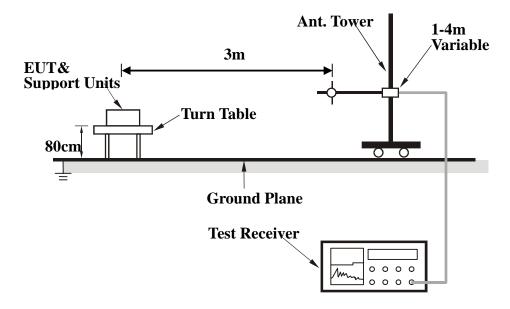
4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

12



4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

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



4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA

EUT TEST CONDITIO	N	MEASUREMENT DETAIL		
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz	
MODULATION TYPE	MODULATION TYPE FSK		Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS	25deg. C, 55%RH, 1008hPa	TESTED BY	Jade	

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)	
1	2403.00	96.74 PK	114.00	-17.26	218	62	62.36	34.38	
2	2403.00	73.49 AV	94.00	-20.51	218	62	39.11	34.38	
3	8310.00	51.72 PK	74.00	-22.28	400	85	3.47	48.25	
4	8310.00	43.99 AV	54.00	-10.01	400	85	-4.26	48.25	
5	12007.50	57.68 PK	74.00	-16.32	105	30	6.90	50.78	
6	12007.50	45.50 AV	54.00	-8.50	105	30	-5.28	50.78	

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)	
1	2403.00	97.82 PK	114.00	-16.15	100	100	63.44	34.38	
2	2403.00	74.57 AV	94.00	-19.43	100	100	40.19	34.38	
3	2955.00	49.22 PK	74.00	-24.78	105	214	13.57	35.65	
4	2955.00	39.47 AV	54.00	-14.53	105	214	3.82	35.65	
5	8097.50	52.05 PK	74.00	-21.95	110	120	4.08	47.97	
6	8097.50	42.71 AV	54.00	-11.29	110	120	-5.26	47.97	
7	12002.00	57.31 PK	74.00	-16.69	100	212	6.53	50.78	
8	12002.00	45.87 AV	54.00	-8.13	100	212	-4.91	50.78	

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. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

20log (Duty cycle) =
$$20log \frac{0.275 \text{ ms} * 25}{100 \text{ ms}} = -23.25 dB$$

Please see page 17 for plotted duty



EUT TEST CONDITIO	N	MEASUREMENT DETAIL		
CHANNEL	Channel 9		1 ~ 25GHz	
MODULATION TYPE	MODULATION TYPE FSK		Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS	25deg. C, 55%RH, 1008hPa	TESTED BY	Jade	

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)	
1	2442.00	96.53 PK	114.00	-17.47	325	42	62.15	34.38	
2	2442.00	73.28 AV	94.00	-20.72	325	42	38.90	34.38	
3	2955.00	49.82 PK	74.00	-24.18	221	273	14.17	35.65	
4	2955.00	38.73 AV	54.00	-15.27	221	273	3.08	35.65	
5	8140.00	51.50 PK	74.00	-22.50	400	341	3.48	48.02	
6	8140.00	42.15 AV	54.00	-11.85	400	341	-5.87	48.02	

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)	
1	2442.00	95.51 PK	114.00	-18.49	100	102	61.13	34.38	
2	2442.00	72.26 AV	94.00	-21.74	100	102	37.88	34.38	
3	2827.50	48.91 PK	74.00	-25.09	100	61	13.48	35.43	
4	2827.50	39.18 AV	54.00	-14.82	100	61	3.75	35.43	
5	8129.00	54.77 PK	74.00	-19.23	100	284	6.75	48.02	
6	8129.00	44.06 AV	54.00	-9.94	100	284	-3.96	48.02	

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. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

20log (Duty cycle) =
$$20log \frac{0.275ms * 25}{100 ms}$$
 = -23.25B

Please see page 17 for plotted duty



EUT TEST CONDITIO	N	MEASUREMENT DETAIL		
CHANNEL Channel 16		FREQUENCY RANGE	1 ~ 25GHz	
MODULATION TYPE	MODULATION TYPE FSK		Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS			Jade	

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)	
1	2477.00	95.29 PK	114.00	-18.71	187	29	60.72	34.57	
2	2477.00	72.04 AV	94.00	-21.96	187	29	37.47	34.57	
3	2955.00	48.99 PK	74.00	-25.11	400	106	13.24	35.65	
4	2955.00	39.30 AV	54.00	-14.70	400	106	3.65	35.65	
5	12002.00	57.26 PK	74.00	-16.74	263	215	6.48	50.78	
6	12002.00	46.22 AV	54.00	-7.78	263	215	-4.56	50.78	

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)	
1	2477.00	95.76 PK	114.00	-18.24	105	105	61.19	34.57	
2	2477.00	72.51 AV	94.00	-21.49	105	105	37.94	34.57	
3	2950.00	48.92 PK	74.00	-25.08	200	52	13.27	35.65	
4	2950.00	40.22 AV	54.00	-13.78	200	52	4.57	35.65	
5	8140.00	54.87 PK	74.00	-19.13	100	270	6.85	48.02	
6	8140.00	42.05 AV	54.00	-11.95	100	270	-5.97	48.02	

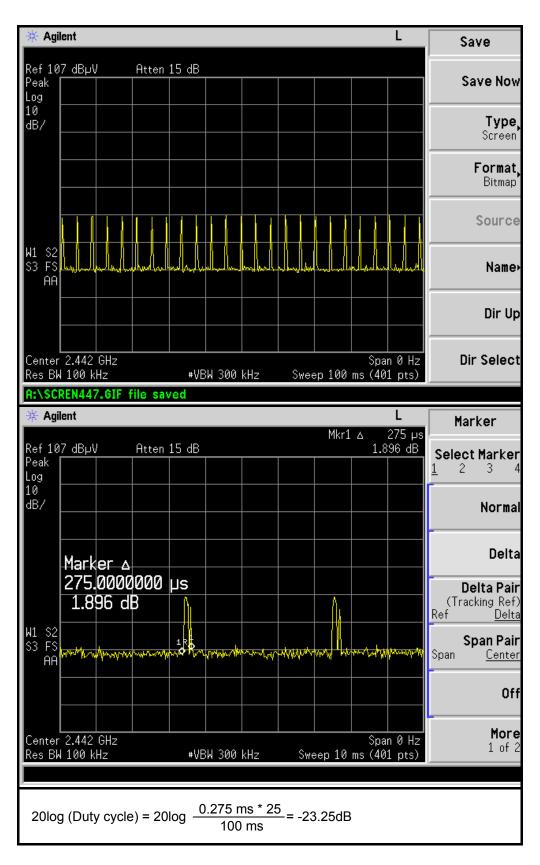
REMARKS:

- 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. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

20log (Duty cycle) =
$$20log \frac{0.275 \text{ ms} * 25}{100 \text{ ms}} = -23.25 dB$$

Please see page 17 for plotted duty







RADIATED WORST-CASE DATA: BELOW 1GHz

EUT TEST CONDITIO	N	MEASUREMENT DETAIL		
CHANNEL I Channel 16		FREQUENCY RANGE	Below 1000MHz	
MODULATION TYPE	MODULATION TYPE FSK		Quasi-Peak	
ENVIRONMENTAL CONDITIONS	25deg. C, 55%RH, 1008hPa	TESTED BY	Jade	

	ANT	ENNA POLAF	RITY & TE	ST DISTA	NCE: HO	RIZONTAL	_ AT 3 M	
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	32.42	22.97	40.00	-17.03	100	0	4.40	18.57
2	289.48	20.23	46.00	-25.77	100	323	4.99	15.24
3	299.18	18.84	46.00	-27.16	260	286	3.38	15.46
4	490.75	22.41	46.00	-23.59	400	263	1.77	20.64
5	636.25	25.54	46.00	-20.46	400	236	1.98	23.57
6	750.23	27.84	46.00	-18.16	400	205	1.69	26.15

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	32.42	19.55	40.00	-20.45	100	262	0.98	18.57
2	267.65	15.65	46.00	-30.35	100	173	0.55	15.10
3	432.55	21.08	46.00	-24.92	100	141	1.58	19.50
4	556.23	24.10	46.00	-21.90	100	112	1.81	22.29
5	609.58	25.46	46.00	-20.54	100	89	2.22	23.24
6	742.95	26.53	46.00	-19.47	100	33	0.60	25.93

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.



4.2 BAND EDGES MEASUREMENT

4.2.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED
SPECTRUM ANALYZER	FSP 40	100041	Apr. 21, 2009

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.

4.2.3 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 1MHz and 3MHz 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.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

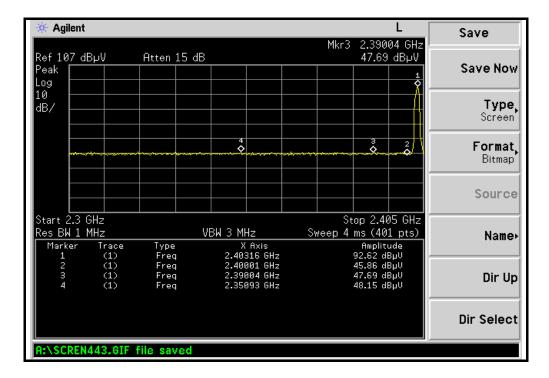
4.2.5 EUT OPERATING CONDITION

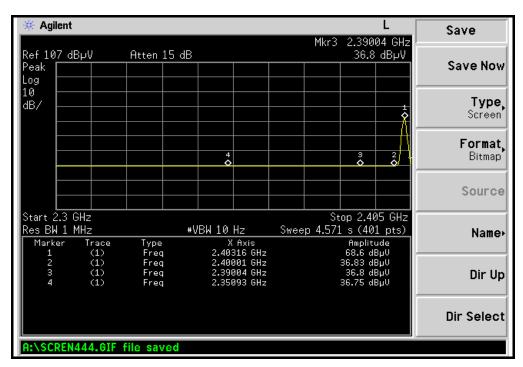
The software provided by client to enable the EUT under transmission condition continuously at lowest and highest channel frequencies individually.



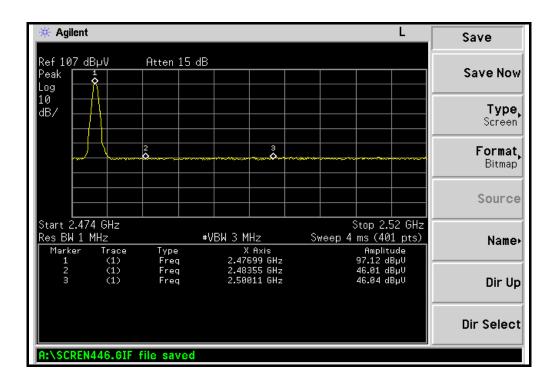
4.2.6 TEST RESULTS

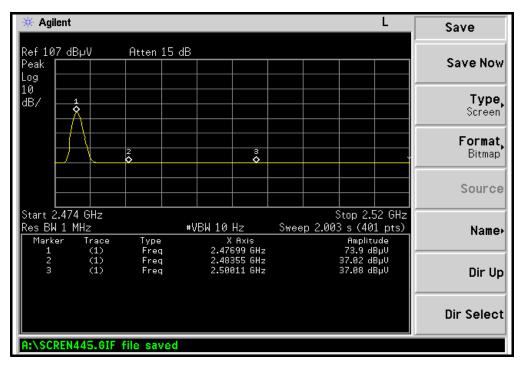
The spectrum plots are attached on the following 4 images. It shows compliance with the requirement in part 15.249 (d).













5. PHOTOGRAPHS OF THE TEST CONFIGURATION
Please refer to the attached file (Test Setup Photo).



6. INFORMATION ON THE TESTING LABORATORIES

We, NS Technology Co., Ltd., were founded in 2002 to provide our best service in EMC, Radio, 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 checked from our web site: http://www.nsco.cn. If you have any comments, please feel free to contact us at the following:

EMC Lab: Safety Lab:

Tel: 86-769-85935656-8008 Tel: 86-769-85935656-8018 Fax: 86-769-85991080 Fax: 86-769-85991080

Email: service@nsco.cn

Web Site: http://www.nsco.cn

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



ENGINEERING CHANGES TO THE EUT BY THE LAB
No any modifications are made to the EUT by the lab during the test.
END