

FCC TEST REPORT  
for  
Wintop Electronics Co., Ltd.

2.4GHz Wireless Optical Mouse  
Model No.: WM-660, WM-690, WM-697, WM-698, WM-700

Prepared for : Wintop Electronics Co., Ltd.  
Address : Huaguan Industrial Park, Xinhe Road, Shangmugu, Pinghu  
Town, Longgang District, Shenzhen City, China

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Report Number : 201203762F  
Date of Test : Mar. 14~23, 2012  
Date of Report : Mar. 26, 2012

## TABLE OF CONTENT

Description	Page
Test Report	
<b>1. GENERAL INFORMATION .....</b>	<b>4</b>
1.1. Description of Device (EUT).....	4
1.2. Description of Test Facility .....	5
1.3. Measurement Uncertainty.....	5
<b>2. MEASURING DEVICE AND TEST EQUIPMENT.....</b>	<b>6</b>
<b>3. TEST PROCEDURE .....</b>	<b>7</b>
<b>4. RADIATION INTERFERENCE.....</b>	<b>8</b>
4.1. Requirements (15.249, 15.209): .....	8
4.2 Test Procedure .....	8
4.3 Test Results.....	8
<b>5. OCCUPIED BANDWIDTH.....</b>	<b>11</b>
5.1. Requirements (15.249): .....	11
5.2. Test Procedure .....	11
5.3. Test Configuration:.....	11
5.4. Test Results.....	11
<b>6. PHOTOGRAPH.....</b>	<b>14</b>
6.1. Photo of Radiation Emission Test .....	14
 APPENDIX I (External Photos) (1 Page)	
APPENDIX II (Internal Photos) (2 Pages)	

## TEST REPORT

Applicant : Wintop Electronics Co., Ltd.  
 Manufacturer : Shenzhen Wintop Electronics Co., Ltd.  
 EUT : 2.4GHz Wireless Optical Mouse  
 Model No. : WM-660, WM-690, WM-697, WM-698, WM-700  
 Serial No. : N/A  
 Rating : DC 3V  
 Trade Mark : N.A.

## Measurement Procedure Used:

FCC Part15 Subpart C, Paragraph 15.207, 15.249 & 15.209

The device described above is tested by Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Anbotek Compliance Laboratory Limited

Date of Test : Mar. 14~23, 2012

*Andy chen*

Prepared by :

(Engineer / Andy Chen)

*Jerry Du*

Reviewer :

(Project Manager / Jerry Du)

*Henry. yang .*

Approved & Authorized Signer :

(Manager / Henry Yang)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

EUT : 2.4GHz Wireless Optical Mouse

Model Number : WM-660, WM-690, WM-697, WM-698, WM-700  
(Note: The above samples are same except the model number & shape of appliances, so we prepare “WM-660” for FCC test only.)

Test Power Supply : DC 3V

Frequency : 2447~2448MHz

Antenna gain : 0dBi

Antenna type : PCB Antenna

Applicant : Wintop Electronics Co., Ltd.  
Address : Huaguan Industrial Park, Xinhe Road, Shangmugu, Pinghu Town, Longgang District, Shenzhen City, China

Manufacturer : Shenzhen Wintop Electronics Co., Ltd.  
Address : Huaguan Industrial Park, Xinhe Road, Shangmugu, Pinghu Town, Longgang District, Shenzhen City, China

Date of receiver : Mar. 14, 2012  
Date of Test : Mar. 14~23, 2012

## 1.2. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### **CNAS - LAB Code: L3503**

Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

### **FCC-Registration No.: 752021**

Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, August 20, 2010.

### **IC-Registration No.: 8058A-1**

Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, August 30, 2010.

### **Test Location**

All Emissions tests were performed at  
Anbotek Compliance Laboratory Limited. at 1/F, 1 /Building, SEC Industrial Park,  
No. 4 Qianhai Road, Nanshan District, Shenzhen, 518054, China

## 1.3. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.3dB

Conduction Uncertainty : Uc = 3.4dB

## 2. MEASURING DEVICE AND TEST EQUIPMENT

The following test equipments were used during test:

<b>Equipment</b>	<b>Manufacturer</b>	<b>Model #</b>	<b>Serial #</b>	<b>Data of Cal.</b>	<b>Due Data</b>
EMI Test Receiver	Rohde & Schwarz	ESCI	100119	Mar.03, 2011	Mar.02, 2012
EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	Sep.22, 2011	Sep.21, 2012
EMI Test Software	SHURPLE	ESK1	N/A	N/A	N/A
Spectrum Analyzer	Agilent	E7405A	MY45114970	Jun.21, 2011	Jun.20, 2012
Signal Generator	Rohde & Schwarz	SMR27	100124	Jul.06, 2011	Jul.05, 2012
Signal Generator	Rohde & Schwarz	SML03	102319	Aug.01, 2011	Aug.01, 2012
AC Power Source	Sepecial power system	YF650	N/A	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS21	100218	Apr.30, 2011	Apr.29, 2012
Power Meter	Rohde & Schwarz	NRVD	101287	Jul.19, 2011	Jul.18, 2012
Coaxial Cable	N/A	N/A	N/A	May.31, 2011	May.30, 2012
Coaxial Cable	N/A	N/A	N/A	May.31, 2011	May.30, 2012
Coaxial Cable	N/A	N/A	N/A	May.31, 2011	May.30, 2012
Universal radio Communication tester	Rohde & Schwarz	CMU200	101724	Sep.08, 2011	Sep.07, 2012
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
BiConilog Antenna	ETS-LINDGREN	3142C	00042670	Mar.03, 2011	Mar.02, 2012
BiConilog Antenna	ETS-LINDGREN	3142C	00042673	Mar.03, 2011	Mar.02, 2012
Loop Antenna	ETS-LINGREN	6502	00071730	Mar.03, 2011	Mar.02, 2012
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00035926	Dec.30, 2011	Dec.29, 2012
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00041545	Dec.30, 2011	Dec.29, 2012
Pre-amplifier	CD	PAM0203	804203	Jun.21, 2011	Jun.20, 2012
RF Switch	CD	RSU-M3	706543	Jun.21, 2011	Jun.20, 2012
Thermo-/Hygrometer	N/A	TH01	N/A	May.03, 2011	May.02, 2012
Shielding Room	Zhong Yu Electronic	N/A	N/A	N/A	N/A
3m Anechoic Chamber	Zhong Yu Electronic	N/A	N/A	Apr.28, 2011	Apr.27, 2012

### 3. Test Procedure

**GENERAL:** This report shall NOT be reproduced except in full without the written approval of Anbotek Compliance Laboratory Limited. The EUT was transmitting a test signal during the testing.

**RADIATION INTERFERENCE:** The test procedure used was ANSI STANDARD C63.4-2003 using a spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the EUT was 74.3oF with a humidity of 69%.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

**Example:**

Freq (MHz) METER READING + ACF = FS  
33 20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

**ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES:** The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

## 4. Radiation Interference

### 4.1. Requirements (15.249, 15.209):

FIELD STRENGTH of Fundamental: 902-928 MHZ 2.4-2.4835 GHz 94 dB $\mu$ V/m @3m	FIELD STRENGTH of Harmonics  54 dB $\mu$ V/m @3m	S15.209 30 - 88 MHz 88 - 216 MHz 216 - 960 MHz ABOVE 960 MHz	40 dBuV/m @3M 43.5 46 54dBuV/m
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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 15.209, whichever is the lesser attenuation.

### 4.2 Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz. The EUT is tested in 9\*6\*6 Chamber.

The test results are listed in Section 4.3.

### 4.3 Test Results

PASS.

Please refer the following pages.



FCC ID: ZUKWM660

**Data:**

Horizontal (2447MHz)								
Frequency	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dB $\mu$ V/m	dB $\mu$ V/m	Limit	
	dB	dB/m	dB	dB $\mu$ V			dB	
324.88	1.65	13.41	41.45	67.44	41.05	46.00	-4.95	QP
336.52	1.67	14.10	41.47	65.96	40.26	46.00	-5.74	QP
2447.01	2.21	31.25	35.90	85.55	83.11	94.0	-10.89	Peak
4894.12	2.65	35.10	34.73	33.30	36.32	54.0	-17.68	Peak
7341.25	3.10	36.20	35.17	30.46	34.59	54.0	-19.41	Peak
9764.00	---	---	---	---	---	---	---	---
12205.00	---	---	---	---	---	---	---	---
14646.00	---	---	---	---	---	---	---	---
17087.00	---	---	---	---	---	---	---	---
19528.00	---	---	---	---	---	---	---	---
21969.00	---	---	---	---	---	---	---	---
24410.00	---	---	---	---	---	---	---	---

(2448MHz)								
Frequency	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dB $\mu$ V/m	dB $\mu$ V/m	Limit	
	dB	dB/m	dB	dB $\mu$ V			dB	
312.27	1.6	13.30	41.40	68.18	41.68	46.00	-4.32	QP
348.16	1.7	14.34	41.50	64.87	39.41	46.00	-6.59	QP
2448.00	2.23	31.32	36.00	85.66	83.21	94.0	-10.79	Peak
4896.10	2.67	35.06	34.80	33.30	36.23	54.0	-17.77	Peak
7434.94	3.11	36.20	35.20	30.53	34.64	54.0	-19.36	Peak
9920.00	---	---	---	---	---	---	---	---
12400.00	---	---	---	---	---	---	---	---
14880.00	---	---	---	---	---	---	---	---
17360.00	---	---	---	---	---	---	---	---
19840.00	---	---	---	---	---	---	---	---
22320.00	---	---	---	---	---	---	---	---
24800.00	---	---	---	---	---	---	---	---

Vertical

FCC ID: ZUKWM660

(2447MHz)								
Frequency	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dB $\mu$ V/m	dB $\mu$ V/m	Limit	
	dB	dB/m	dB	dB $\mu$ V			dB	
312.27	1.61	13.30	41.40	66.62	40.13	46.00	-5.87	QP
324.88	1.65	13.41	41.45	64.00	37.61	46.00	-8.39	QP
2447.01	2.21	31.25	35.90	84.87	82.43	94.0	-11.57	Peak
4894.12	2.65	35.10	34.72	33.51	36.54	54.0	-17.46	Peak
7341.25	3.10	36.20	35.17	30.79	34.92	54.0	-19.08	Peak
9764.00	---	---	---	---	---	---	---	---
12205.00	---	---	---	---	---	---	---	---
14646.00	---	---	---	---	---	---	---	---
17087.00	---	---	---	---	---	---	---	---
19528.00	---	---	---	---	---	---	---	---
21969.00	---	---	---	---	---	---	---	---
24410.00	---	---	---	---	---	---	---	---

(2448MHz)								
Frequency	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dB $\mu$ V/m	dB $\mu$ V/m	Limit	
	dB	dB/m	dB	dB $\mu$ V			dB	
324.88	1.65	13.41	41.45	62.30	35.91	46.00	-10.09	QP
336.52	1.67	14.10	41.47	64.89	39.19	46.00	-6.81	QP
2448.00	2.23	31.32	36.00	84.20	81.75	94.0	-12.25	Peak
4896.10	2.67	35.06	34.80	33.05	35.98	54.0	-18.02	Peak
7344.94	3.11	36.20	35.20	32.84	36.95	54.0	-17.05	Peak
9920.00	---	---	---	---	---	---	---	---
12400.00	---	---	---	---	---	---	---	---
14880.00	---	---	---	---	---	---	---	---
17360.00	---	---	---	---	---	---	---	---
19840.00	---	---	---	---	---	---	---	---
22320.00	---	---	---	---	---	---	---	---
24800.00	---	---	---	---	---	---	---	---

**NOTE: “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.**

## 5. Occupied Bandwidth

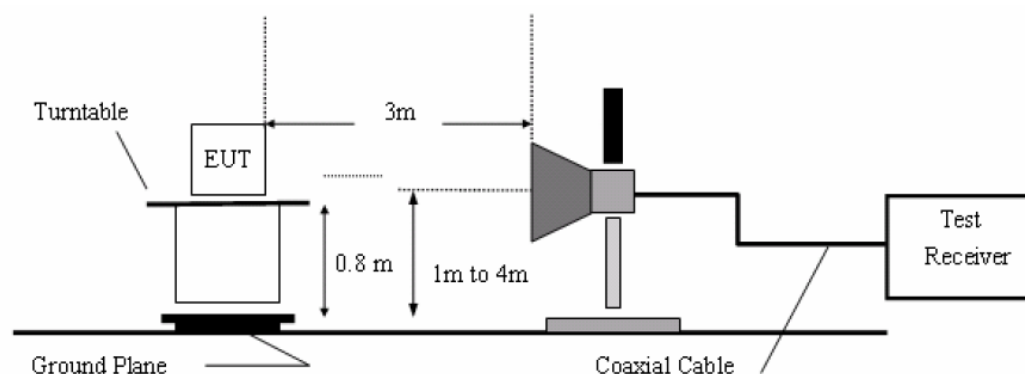
### 5.1. Requirements (15.249):

The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

### 5.2. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on an antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

### 5.3. Test Configuration:



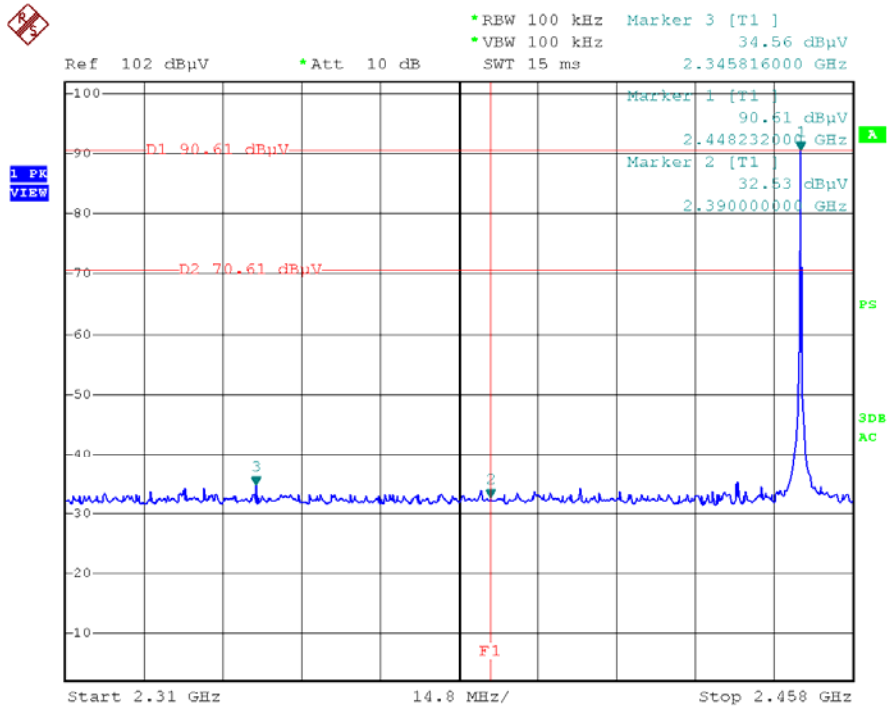
### 5.4. Test Results

Pass.

Please refer the following plot.

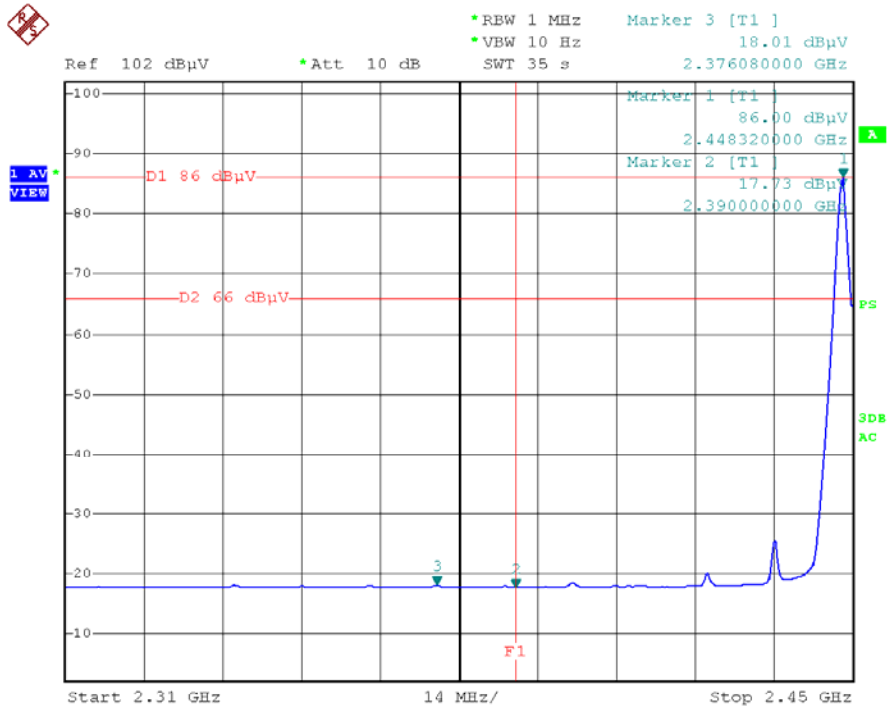
(Note: Marker 3 means the highest value in 2.31GHz~2.39GHz or 2.4835~2.5GHz)

FCC ID: ZUKWM660



Band Edges-L

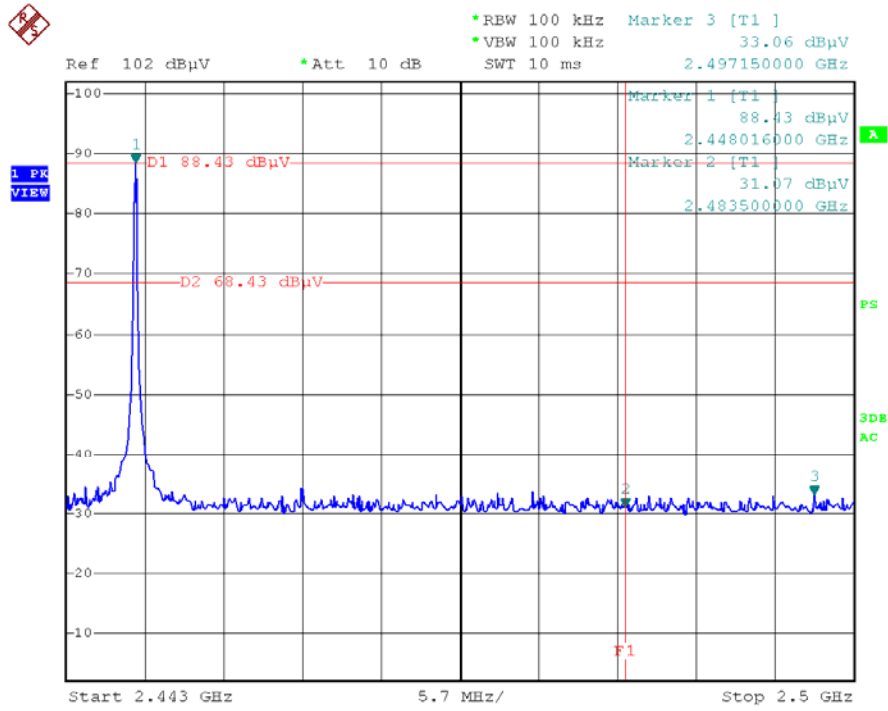
Date: 22.MAR.2012 17:46:47



Band Edges-L-AV

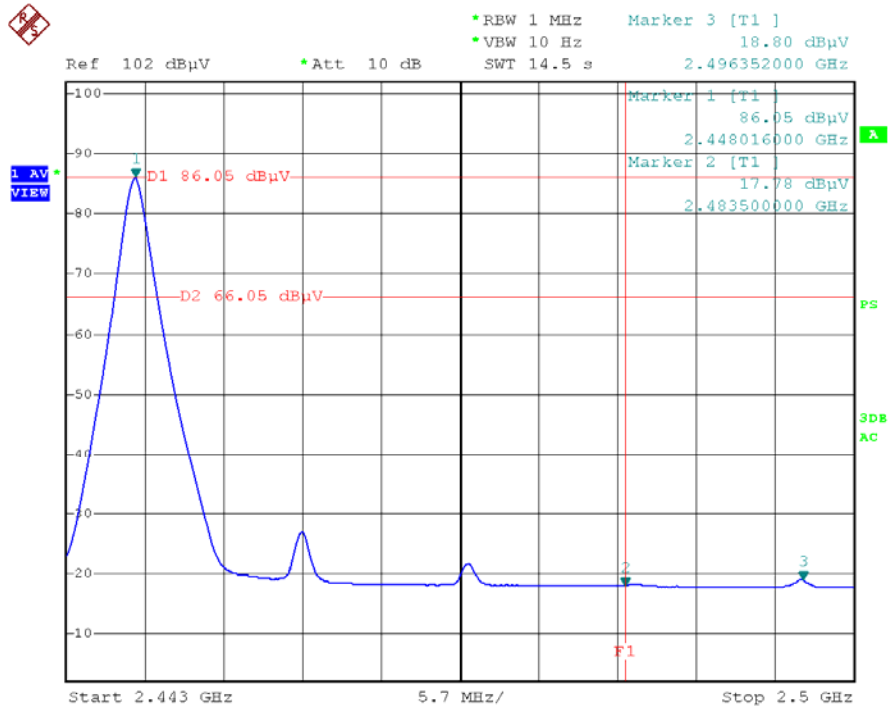
Date: 22.MAR.2012 17:52:50

FCC ID: ZUKWM660



Band Edges-H

Date: 22.MAR.2012 17:48:50



Band Edges-H-AV

Date: 22.MAR.2012 17:50:44