



World Standardization Certification & Testing CO., LTD
World Standardization Safety and EMC Testing Centre

FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Wireless Optical Mouse

Model: RF-02, TXD03, TXD04, TXD06, TXD21

TXD42, TXD48, TXD49, TXD53, TXD66

Trade Name: N/A

Prepared for

Shenzhen Wude Electronics Co., Ltd.

4/F, F1 Building, Huafeng Industrial Park, Gushu, Xixiang,

Bao'an District, Shenzhen

Prepared by

WORLD STANDARDIZATION CERTIFICATION & TESTING CO., LTD.

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Report Number: WSCT09030052E-RF

FCC-ID: W8WRF-02-A



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1. TEST RESULT CERTIFICATION

Applicant: Shenzhen Wude Electronics Co., Ltd.
4/F,F1 Building,Huafeng Industrial Park,Gushu,Xixiang,
Bao'an District,Shenzhen

Equipment Under Test: Wireless Optical Mouse

Trade Name: N/A

Model: RF-02,TXD03,TXD04,TXD06,TXD21,TXD42,TXD48,TXD49,
TXD53,TXD66

Date of Test: March 12~23, 2009

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC Part 15 Subpart C	No non-compliance noted

We hereby certify that:

The above equipment was tested by World Standardization Certification& Testing CO., LTD.
The test data, data evaluation, test procedures, and equipment configurations shown in this report
were made in accordance with the procedures given in ANSI C63.4:2003 and the energy emitted
by the sample tested as described in this report is in compliance with the requirements of FCC
Rules Part 15.227.

The test results of this report relate only to the tested sample identified in this report.

Tested By: Cheney Chen
(Cheney Chen)

Date: 2009-03-23

Check By: Joe Lin
(Joe Lin)

Date: 2009-03-23

Approved By: Sula Huang
(Sula Huang)

Date: 2009-03-23

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2. EUT DESCRIPTION

Product	Wireless Optical Mouse
Trade Name	N/A
Model Number	RF-02, TXD03, TXD04, TXD06, TXD21, TXD42, TXD48, TXD49, TXD53, TXD66
Model Difference	The model names are different for the marketing purpose, except that they are entirely same.
Power Supply	TX: Powered by AAA batteries $\times 2$ (Rating: $2 \times 1.5\text{Vdc}$) RX: Powered by the notebook
Frequency Range	27.045MHz
Modulation Technique	FSK
Antenna Specification	Integral Antenna (PCB ANT)

NOTE: This submittal(s) (test report) comply with Section 15.227 of the FCC Part 15, Subpart C Rules.



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 :2003 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.227.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4.:2003 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4.

FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

DESCRIPTION OF TEST MODES

The EUT has been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.



4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

FACILITIES

All measurement facilities used to collect the measurement data are located at

1-2/F, Dachong Science&Technology Building, No.28 of Tonggu Road, Nanshan District, ShenZhen.PRC.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4: 2003 and CISPR Publication 22.

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

LABORATORY ACCREDITATIONS AND LISTING

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC (The certificate registration number is 276008)
Japan	TIMCO (The certificate registration number is Q2001)
Canada	VCCI (The certificate registration number is C-2912, R-2662)
	INDUSTRY CANADA
	(The certificated registration number is 46405-7700)
Germany	TUV
	(The certificate registration number is UA50138086-0001, UA50138086-0002)
China	CNAS (The certificated registration number is L3732)

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.wsct.org.cn>



6. SETUP OF EQUIPMENT UNDER TEST

SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

SUPPORT EQUIPMENT

Device Type	Brand	Model	FCC ID	Series No.	Data Cable	Power Cord
Notebook	TOSHIBA	Satellite L200	N/A	N/A	N/A	Unshielded 1.8.m

Notes:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

7. FCC PART 15.227 REQUIREMENTS

RADIATED EMISSIONS

LIMIT

The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

1. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Note: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength (μ V/m at 3-meter)	Field Strength (dB μ V/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

3. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (Hz)	Field Strength (μ V/m at meter)	Measurement Distance (meter)
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

*** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

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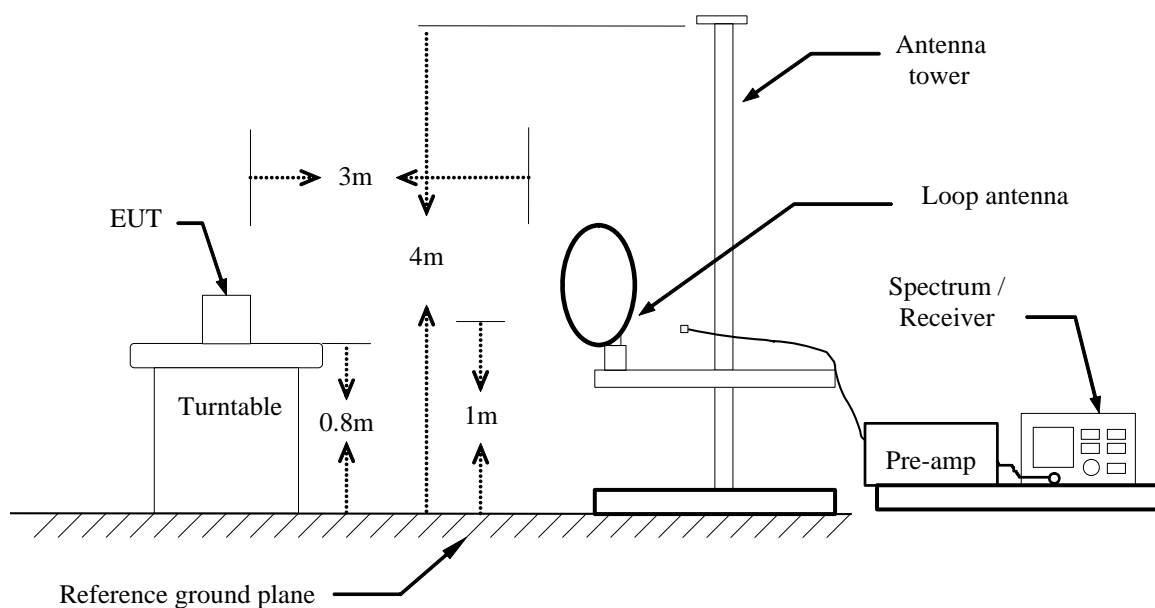
MEASUREMENT EQUIPMENT USED

966 CHAMBER				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/16/2010
EMI Test Receiver	R&S	ESCI	100005	06/23/2009
Pre Amplifier	HP	HP8447E	2945A02715	06/15/2009
Pre Amplifier	Agilent	8449B	N/A	06/04/2009
Bilog Antenna	SUNOL Sciences	JB3	A021907	06/10/2009
Horn Antenna	TRC	N/A	N/A	06/10/2009
Loop Antenna	ARA	PLA-1030/B	1029	06/09/2009
Turn Table	CCS	2081-1.21	N/A	N.C.R
Antenna Tower	CT	N/A	N/A	N.C.R
Controller	CCS	N/A	N/A	N.C.R
RF Comm. Test set	HP	8920B	US36142090	N.C.R
Site NSA	C&C	N/A	N/A	06/09/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

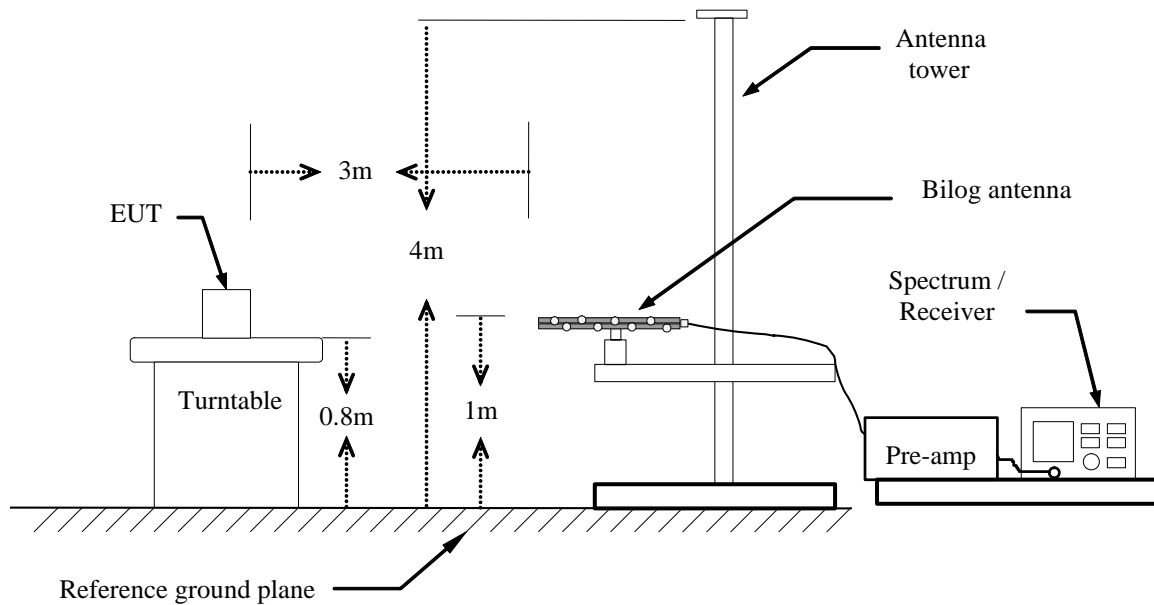
Test Configuration

Below 30MHz



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Below 1 GHz**TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.



TEST RESULTS

Below 1 GHz

Operation Mode: Transmitter(TX) **Test Date:** March 16, 2009
Temperature: 26°C **Tested by:** Cheney
Humidity: 60 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP/AVG)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
27.045	V	Peak	47.40	2.7	50.10	80.00	-29.9
54.071	V	QP	48.18	-12.09	36.09	40.00	-3.91
81.211	V	QP	48.70	-11.40	37.30	43.50	-2.70
135.031	V	Peak	41.14	-5.48	35.66	43.50	-7.84
162.041	V	Peak	39.33	-5.92	34.01	43.50	-9.49
189.074	V	Peak	40.26	-6.97	33.29	43.50	-10.21
324.456	V	Peak	40.84	-2.00	38.84	46.00	-7.16
27.045	H	Peak	44.50	2.7	47.20	80.00	-32.80
54.071	H	Peak	43.38	-13.21	30.17	40.00	-9.83
80.927	H	Peak	40.46	-12.38	28.08	40.00	-11.92
108.266	H	Peak	38.66	-6.16	32.50	43.50	-11.00
135.031	H	Peak	36.79	-6.05	30.74	43.50	-12.76
189.074	H	Peak	35.98	-7.32	28.66	43.50	-14.84
324.456	H	Peak	33.88	-2.52	31.36	46.00	-14.64

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " 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.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.

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POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

MEASUREMENT EQUIPMENT USED

Conducted Emission Test Site Shielding Room 743				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI	100005	06/23/2009
LISN	AFJ	LS16	16010222119	04/02/2009
LISN	Meestec	AN3016	04/10040	04/02/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

Not applicable (Since the EUT is Battery-powered only)

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20DB BANDWIDTH

LIMIT

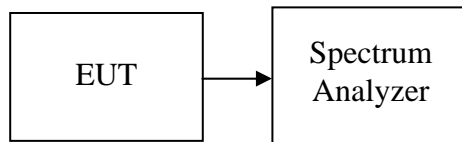
N/A

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI	100005	06/23/2009
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/16/2010

***Remark:** Each piece of equipment is scheduled for calibration once a year.*

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=10kHz, VBW = RBW, Span = 200KHz, Sweep = auto.
4. Mark the peak frequency and 20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

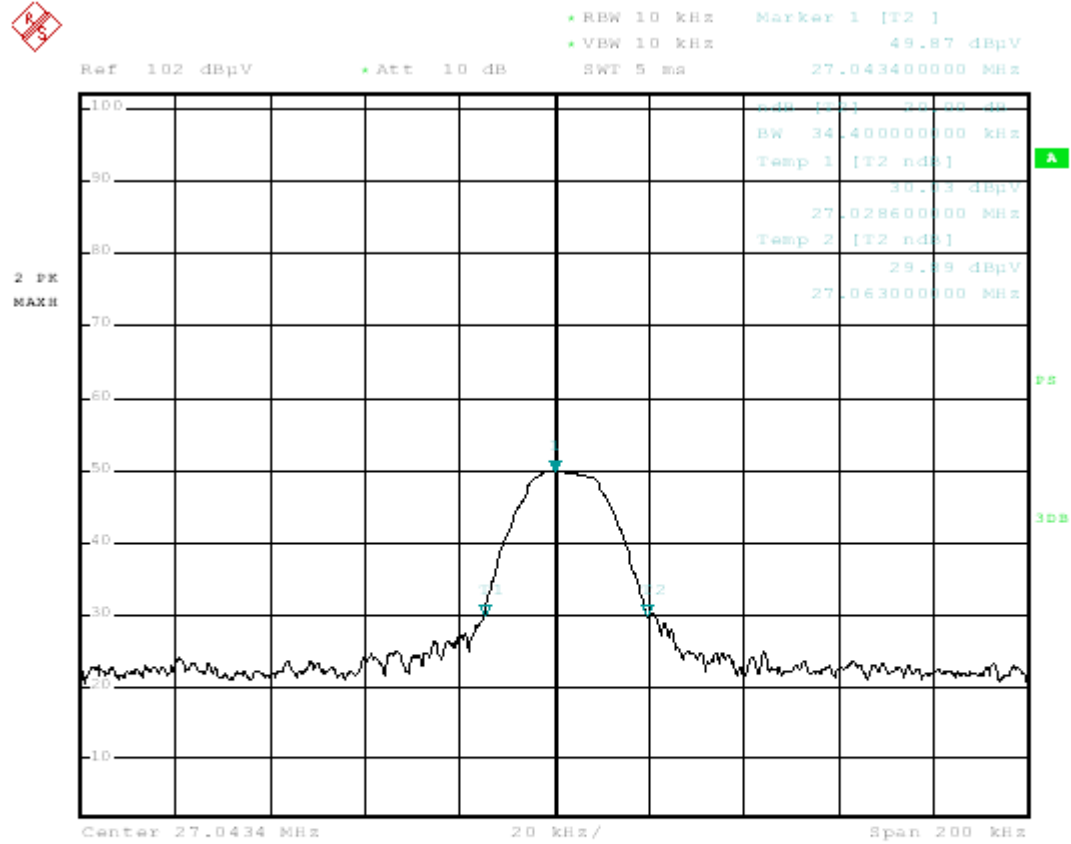
TEST RESULTS

No non-compliance noted

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Test Plot



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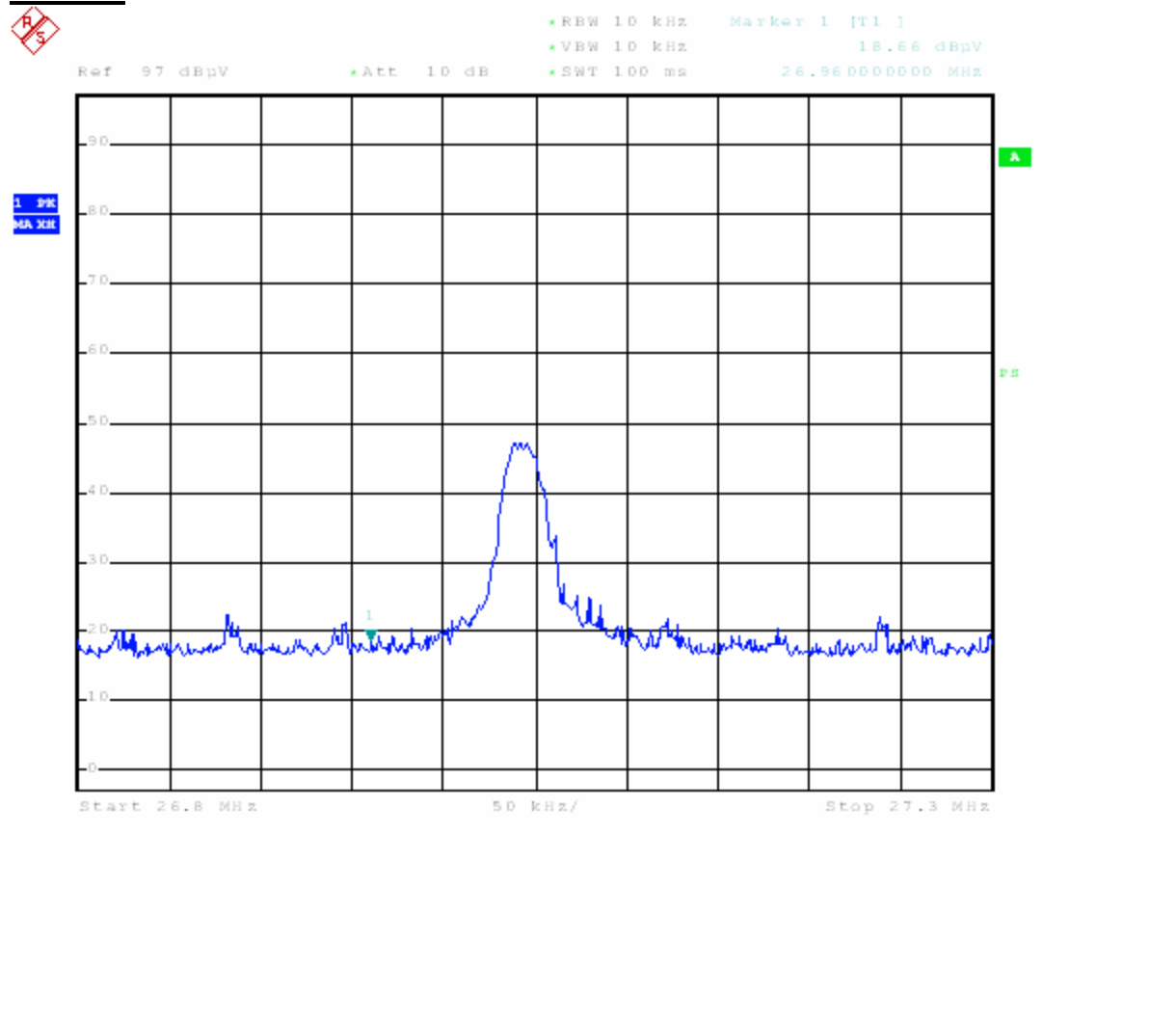
OUT OF BAND EMISSION

The result has been complied with the 15.227(b), see the following plot:

Frequency	Emission	Limit
MHz	dB μ V/m	dB μ V/m
26.96	18.66	40
27.28	19.33	40

Test Result: Pass

Test Plot



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