Report No.	C3115443
FCC ID	IOWRMO254UP
Specifications	FCC Part 15, Class B
Test Method	ANSI C63.4 1992
Application	■Original □Class II Changes
Applicant	Chic Technology Corp.
Applicant address	16F, No. 150, Chien-I Road, 235 Chung Ho City, Taipei Hsien, Taiwan, R.O.C.
Product name	M-RAQ103A
Items tested	Wireless Optical Mouse
Model No.	831201-0000
Sample No.	C31442
EUT Condition	■Engineering sample □Pre-production □Final production
Frequency Range	26.96MHz to 27.28MHz
Results	**Passed** (As detailed within this report)
Date	04/12/2004 (month / day / year)(Sample received) 04/13/2004 (month / day / year)(Tested)
Prepared by	Jason Yeh — Project Engineer
Authorized by	Jacob Lin — V. General Manager (Jacob Lin)
Issue date	April 13, 2004 (month / day / year)
Modified by TRC	None
Tested by	Training Research Co., Ltd. **(Accredited by NVLAP)**
Office at	1F, No. 255, Nan Yang Street, Hsichih, Taipei Hsien 221, Taiwan
Open site at	No. 15, Lane 530, Pa-Lian RD., Sec. 1, Hsichih City, Taipei Hsien, Taiwan, R.O.C.

Conditions of issue :

- ***This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.***
- ***The test data in this test report are following the procedures in accordance with the terms of accreditation.***
- ***This test report and measurements made by TRC are traceable to the NIST only Conducted and Radiated Method (TRC is accredited by NVLAP, code No.: 200174-0).***
- ***This report must not be used by the client to claim product endorsement by NVLAP or USA Government.***
- ***The device has been tested is fully complied with the requirements the Directive FCC Part 15.***

Contents

Chapter 1 Introduction

Description of EUT 3
Configuration of Test Setup 4
List of Support Equipment 4

Chapter 2 Conducted Emission Test

Test Condition and Setup 5

Chapter 3 Peak Power Measurement (Frequency Band: 26.96 ~ 27.28)

Test Setup 6
Test Procedure 6

Chapter 4 Radiated Emission Test

Test Condition and Setup 7
Radiated Test Placement 8

Appendix A:

Peak Power and Radiated test result 9

Appendix B:

Band Edge of Measurement 11

Chapter 1 Introduction

Description of EUT:

EUT	**:**	Wireless Optical Mouse
Model No.	**:**	831201-0000
Product name	**:**	M-RAQ103A
Frequency Range	**:**	26.96 – 27.28 MHz
Power Type	**:**	Transmitter: Powered by two 1.5VDC AA batteries

*This EUT only has one channel (with 256 IDs): 27.100 MHz

Test method:

Pretest was found that the emission of operating mode is worse than standby mode. So, The final test is made at the operating mode.

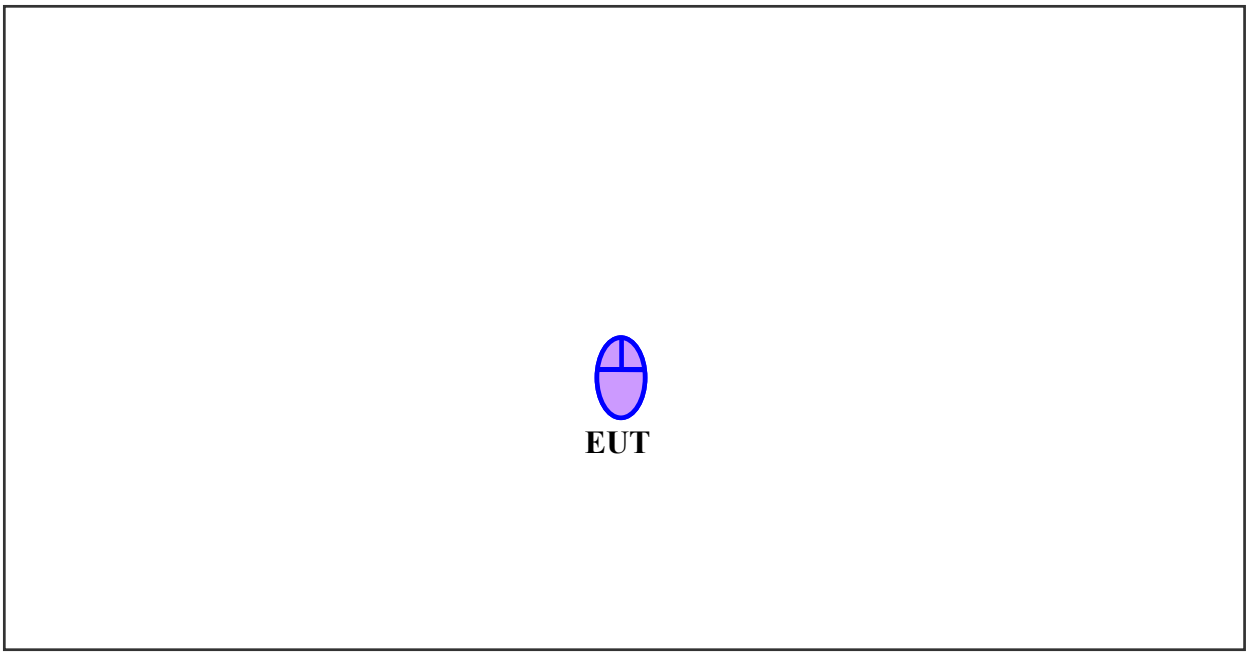
During the measurement, the EUT was at operating mode. The radiation pretest was found out this mode was the worst case and we only recorded this data in this report.

While testing, the EUT was made to transmit continuously and adjusted at a position, which transmitted the maximum emission.

The test placement as the photographs showed is the worst case emission placed. (If the emission is close to the ambient, the resolution BW and view resolution will be reduced and the data will be recorded by detection of maximum hold peak mode.)

The testing configuration of test setup is showing in the next page.

Configuration of Test Setup



EUT:

Put three AA size, 1.5V battery into the battery cell of EUT, powers the subject device. The EUT does not be connected with any product.

List of Support Equipment

Conducted (Radiated) test:

N/A

Chapter 2 Conducted Emission Test

Test Condition and Setup:

All the equipment is placed and setup according to the standard.
The EUT is assembled on a wooden table that is 80 cm high, is placed 40 cm from the back-wall that is a vertical conducting plane. One LISN is for EUT, the other LISN is for support equipment. They are all placed on the conductive ground. The EUT's LISN connect a line switch box for selecting L1 or L2, then connect to a preamplifier and Spectrum.

The spectrum measured from 150KHz to 30MHz. Conducted emission levels are detected at max. peak mode. But if the max. peak mode failed or over average limit, it will be measured by QP and average detection mode using the Receiver.

While testing, there is the worst-emission plot printed at peak detection mode, and there are more than 6 highest emissions relative to limit recorded. The plot is kept as the original data, not included in test report.

List of test Instrument :

				Calibration Date	
Instrument Name	**Model No.**	**Brand**	**Serial No.**	**Last time**	**Next time**
Spectrum analyzer	8591EM	H P	3710A01203	05/21/03	05/20/04
LISN (EUT)	3825/2	EMCO	9411-2284	07/21/03	07/20/04
LISN (Support E.)	3825/2	EMCO	9210-2007	09/03/03	09/02/04
Preamplifier	CB-001	TRC	98-02	05/29/03	05/28/04
Line switch box	CB-01	TRC	98-04	05/29/03	05/28/04
1dB Attenuator	CAT-1	mini-circuits	- - - - - - - - -	05/29/03	05/28/04
FTB-1-6 Attenuator	15542	mini-circuits	9620 03	05/29/03	05/28/04
20dB Attenuator	CAT-20	mini-circuits	9620 13	05/29/03	05/28/04
Coaxial Cable	BNC3200B-0058	Jyebao	CL-05	05/29/03	05/28/04
Coaxial Cable	BNC31VB-0316	Jyebao	IF-01ca0069-036	05/29/03	05/28/04
50ohm terminator	370BNM	NARDA	PWR5W	07/21/03	07/20/04
50ohm terminator	370BNM	NARDA	PWR5W	07/21/03	07/20/04
50ohm terminator	370BNM	NARDA	PWR5W	09/03/03	09/02/04
50ohm terminator	370BNM	NARDA	PWR5W	09/03/03	09/02/04

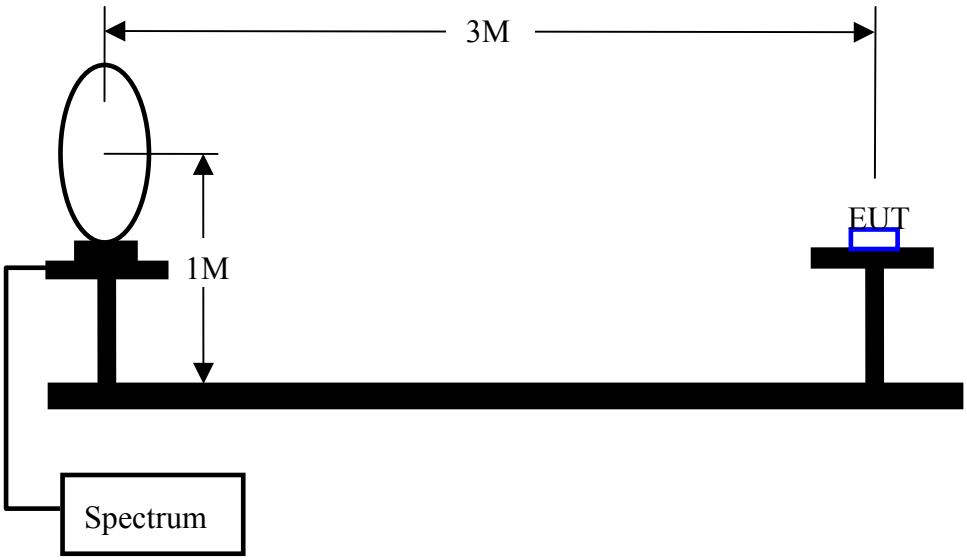
The level of confidence of 95% , the uncertainty of measurement of conducted emission is +3.1/-4.84 dB .

Test Result: Pass

Chapter 3 Peak Power Measurement (Frequency Band: 26.96 ~ 27.28)

Test Setup:

1. Test Setup:



2. Test Procedure:

a. The EUT was setup in the anechoic chamber as shown above.
b. The loop antenna was located upon its plane vertical, 3-meter distance from the EUT. The center of the loop is 1-meter above the ground plane.
c. In order to find the maximum radiation, the EUT was rotated 360°. The measuring antenna was rotated about its axis at each azimuth about the EUT.

List of test Instrument :

				Calibration Date	
Instrument Name	**Model No.**	**Brand**	**Serial No.**	**Last time**	**Next time**
Receiver	SCR3102	SCHAFFNER	012	04/22/03	04/21/04
Control Box	TWR95-4	TRC	C9001-2	N/A	N/A
Antenna	6502	EMCO	9206-2777	06/10/03	06/09/04
Open test side				05/29/03	05/28/04
Pre-amplifier	TRC-CB-2	TRC	CB-002	05/29/03	05/28/04
Coaxial Cable (20meter)	RG-214/U	Jyebao	CL-002	05/29/03	05/28/04
Coaxial Cable (50cm)	BNC31VB-0316	Jyebao	CL-002	05/29/03	05/28/04
Coaxial Cable (20cm)	BNC31VB-0318	Jyebao	CL-007	05/29/03	05/28/04
Coaxial Cable (55cm)	BNC31VB-0316	Jyebao	CL-006	05/29/03	05/28/04
Coaxial Cable (55cm)	BNC31VB-0316	Jyebao	CL-005	05/29/03	05/28/04

The level of confidence of 95%, the uncertainty of measurement of radiated emission is +2.85/-2.77 dB.

Test Result : Appendix A

Chapter 4 Radiated Emission Test

Test Condition and Setup:

Pretest : Prior to the final test ,the EUT is placed in an anechoic chamber, and scan from 30MHz to 1GHz. The devices rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit. This is done to ensure the radiation exactly emits form the EUT.

Final test: Final radiation measurement was made on a **3 – meter** open-field test site. The EUT's maximum emission of radiation is placed on a nonconductive table, which is 0.8m height, the top surface is 1.0 x 1.5 meter. All placement is according to the standard.

The emissions was examined from 30 MHz to 1000 MHz measured by receiver.

The whole range Antenna is used to measure frequency from 30 MHz to 1 GHz. The final test is used the receiver.

Measure more than six top marked frequencies generated form pretest by computer step by step at each frequency. The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meters to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization.

Appropriated preamplifier, which is made by TRC is used for improving sensitivity and precautions is taken to avoid overloading. The spectrum analyzer's 6dB bandwidth is set to 120 KHz, and the EUT is measured at quasi-peak mode.

If the emission is close to the frequency band of ambient, the tester will recheck the data and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from shield room will be taken as the final data.

List of test Instrument :

				Calibration Date	
Instrument Name	**Model No.**	**Brand**	**Serial No.**	**Last time**	**Next time**
Receiver	SCR3102	SCHAFFNER	012	04/22/03	04/21/04
Control Box	TWR95-4	TRC	C9001-2	N/A	N/A
Antenna	CBL6141A	SCHAFFNER	4206	05/27/03	05/26/04
Open test side				05/29/03	05/28/04
Pre-amplifier	TRC-CB-2	TRC	CB-002	05/29/03	05/28/04
Coaxial Cable (20meter)	RG-214/U	Jyebao	CL-002	05/29/03	05/28/04
Coaxial Cable (50cm)	BNC31VB-0316	Jyebao	CL-002	05/29/03	05/28/04
Coaxial Cable (20cm)	BNC31VB-0318	Jyebao	CL-007	05/29/03	05/28/04
Coaxial Cable (55cm)	BNC31VB-0316	Jyebao	CL-006	05/29/03	05/28/04
Coaxial Cable (55cm)	BNC31VB-0316	Jyebao	CL-005	05/29/03	05/28/04

The level of confidence of 95%, the uncertainty of measurement of radiated emission is +2.85/-2.77 dB.

Test Result : Pass (Appendix A)

Radiated Test Placement: (Photographs)

Appendix A

Peak Power Test Result: (Horizontal)(Test mode: Channel 1)

Frequency	Reading Amplitude	Correction Factors	Corrected Amplitude	Limit	Margin
MHz	dBμV/m	dB	dBμV/m	dBμV/m	dB
27.0925	50.91	-8.30	42.61	80.00	-39.39

Radiated Emission Test Result: (Horizontal) (Test mode: Channel 1)

Test Conditions:

Testing site : Temperature : 27 ° C Humidity : 72 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
54.1851	27.09	1.19	0	-6.25	20.84	40.00	-19.16
81.2751	27.73	1.76	184	-9.89	17.84	40.00	-22.16
135.4577	29.02	1.01	273	-4.40	24.62	43.52	-18.90
325.0943	35.88	0.98	121	0.11	35.99	46.02	-10.03
352.1869	28.42	1.00	132	1.83	30.25	46.02	-15.77
***							

Note:

1. Margin = Amplitude – limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude – Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain)
   (For example : 30MHz correction factor = 15.5 + (–15.26) = 0.24 dB/m)

Peak Power Test Result: (Vertical) (Test mode: Channel 1)

Frequency	Reading Amplitude	Correction Factors	Corrected Amplitude	Limit	Margin
MHz	dBμV/m	dB/m	dBμV	dBμV/m	dB
27.0925	45.57	-8.30	37.27	80.00	-42.73

Radiated Emission Test Result: (Vertical) (Test mode: Channel 1)

Test Conditions:

Testing site : Temperature : 22 ° C Humidity : 72 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
54.1851	34.15	0.97	0	-6.25	27.90	40.00	-12.10
81.2751	36.68	1.06	0	-9.89	26.79	40.00	-13.21
108.3989	35.10	0.97	219	-6.34	28.76	43.52	-14.76
135.4577	34.40	3.99	0	-4.40	30.00	43.52	-13.52
189.6403	31.10	0.99	353	-4.62	26.48	43.52	-17.04
***							

Note:

1. Margin = Amplitude – limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude – Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain)

(For example : 30MHz correction factor = 15.5 + (–15.26) = 0.24 dB/m)

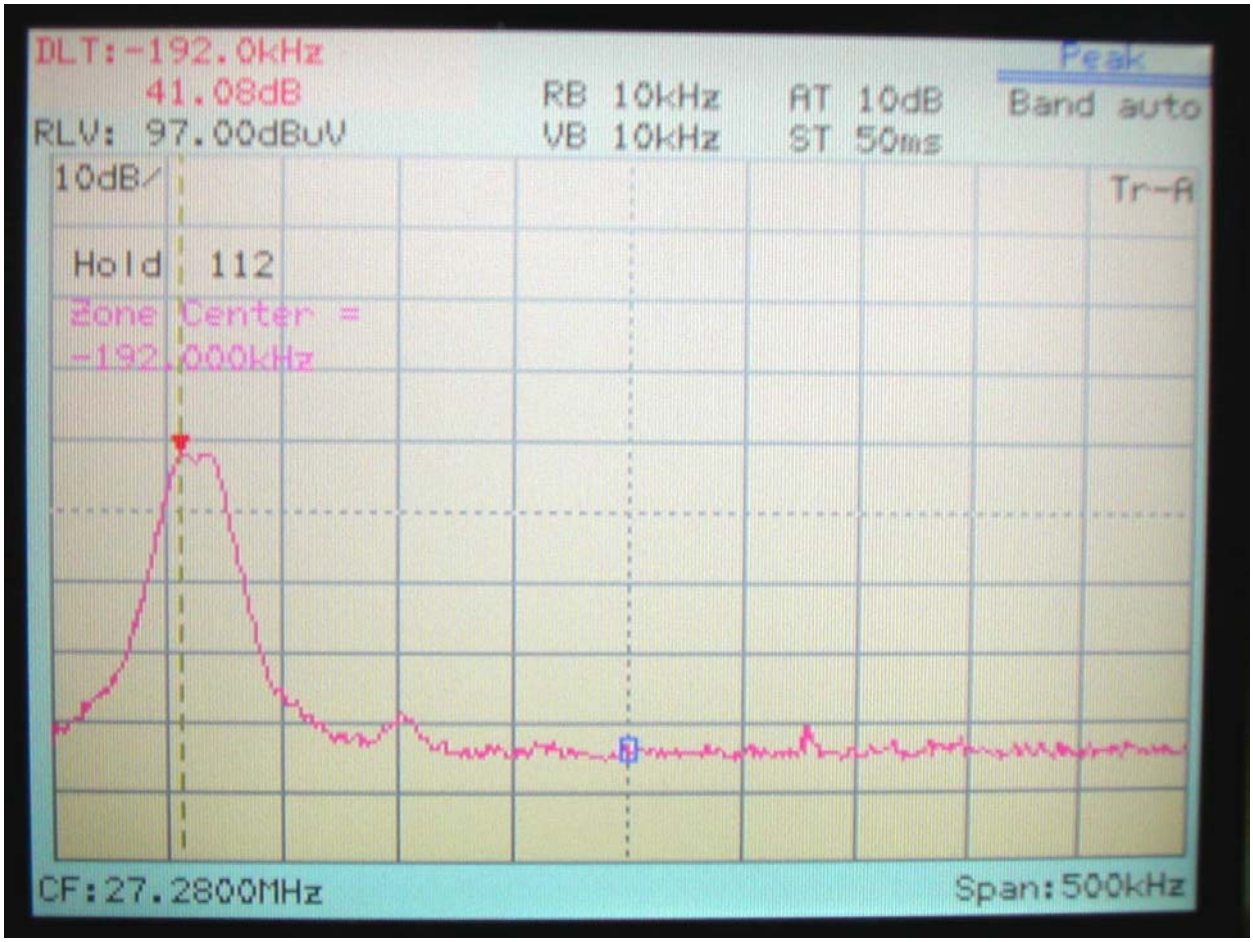
Appendix B

Band Edge of Measurement: (Frequency Band: 26.96 ~ 27.28)

Lower channel

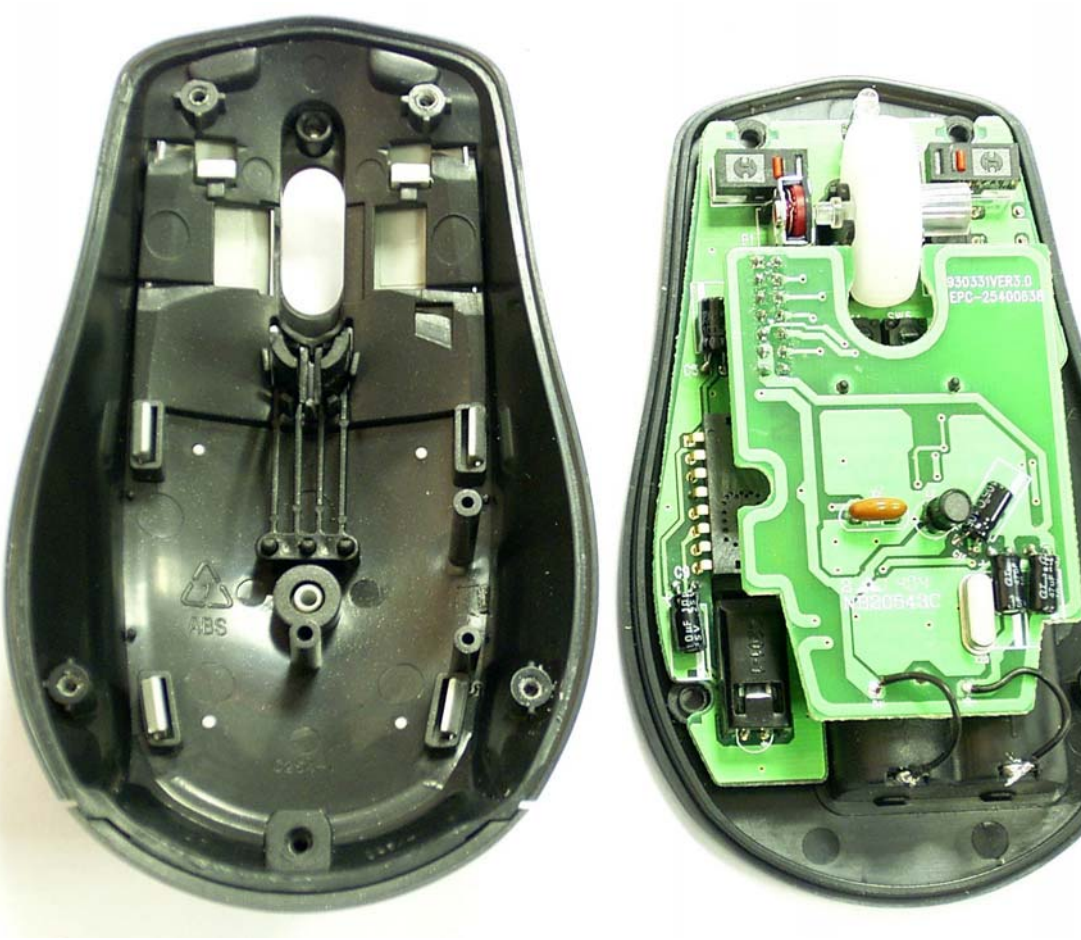
26.96MHz << Class B Limit.

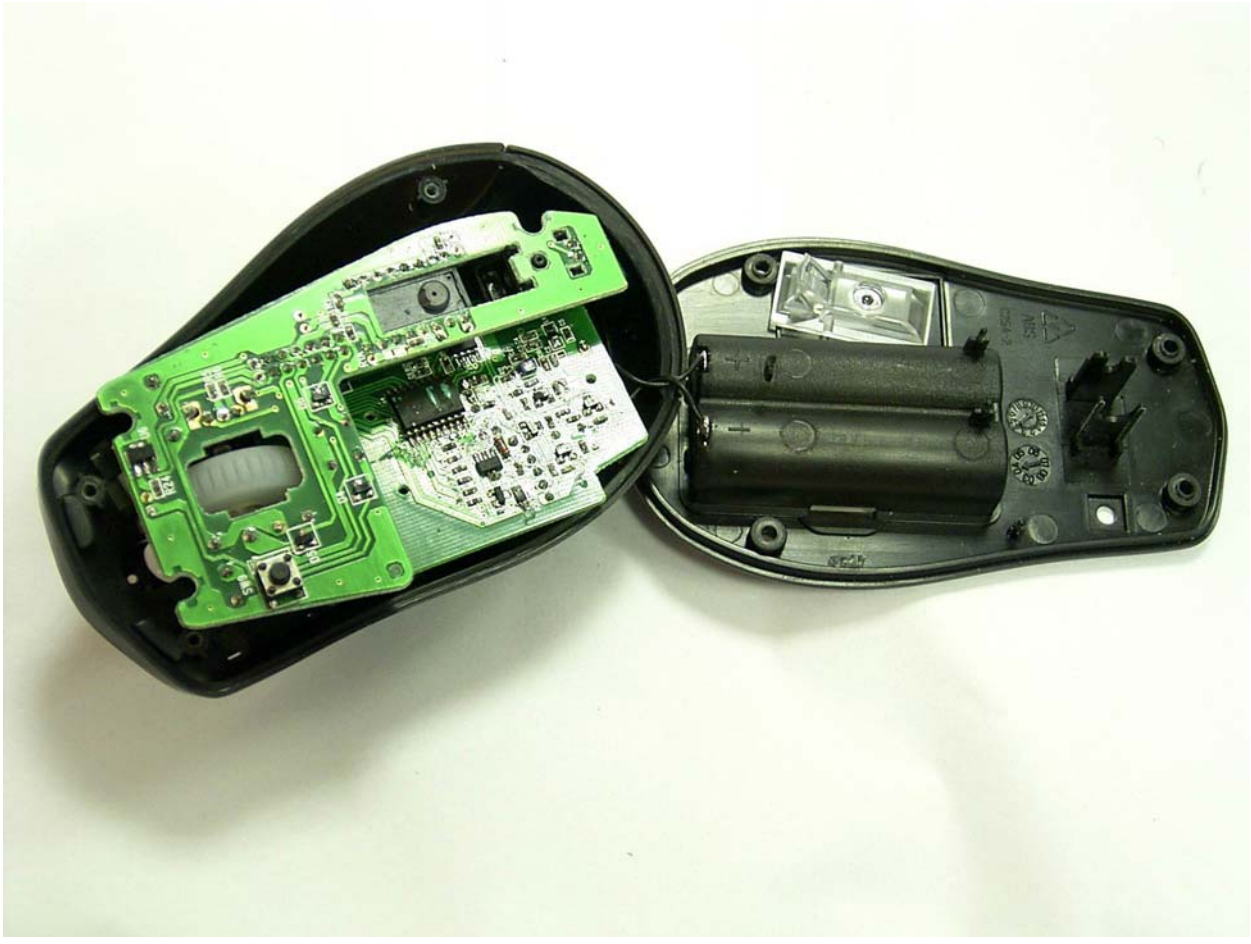
Upper channel:

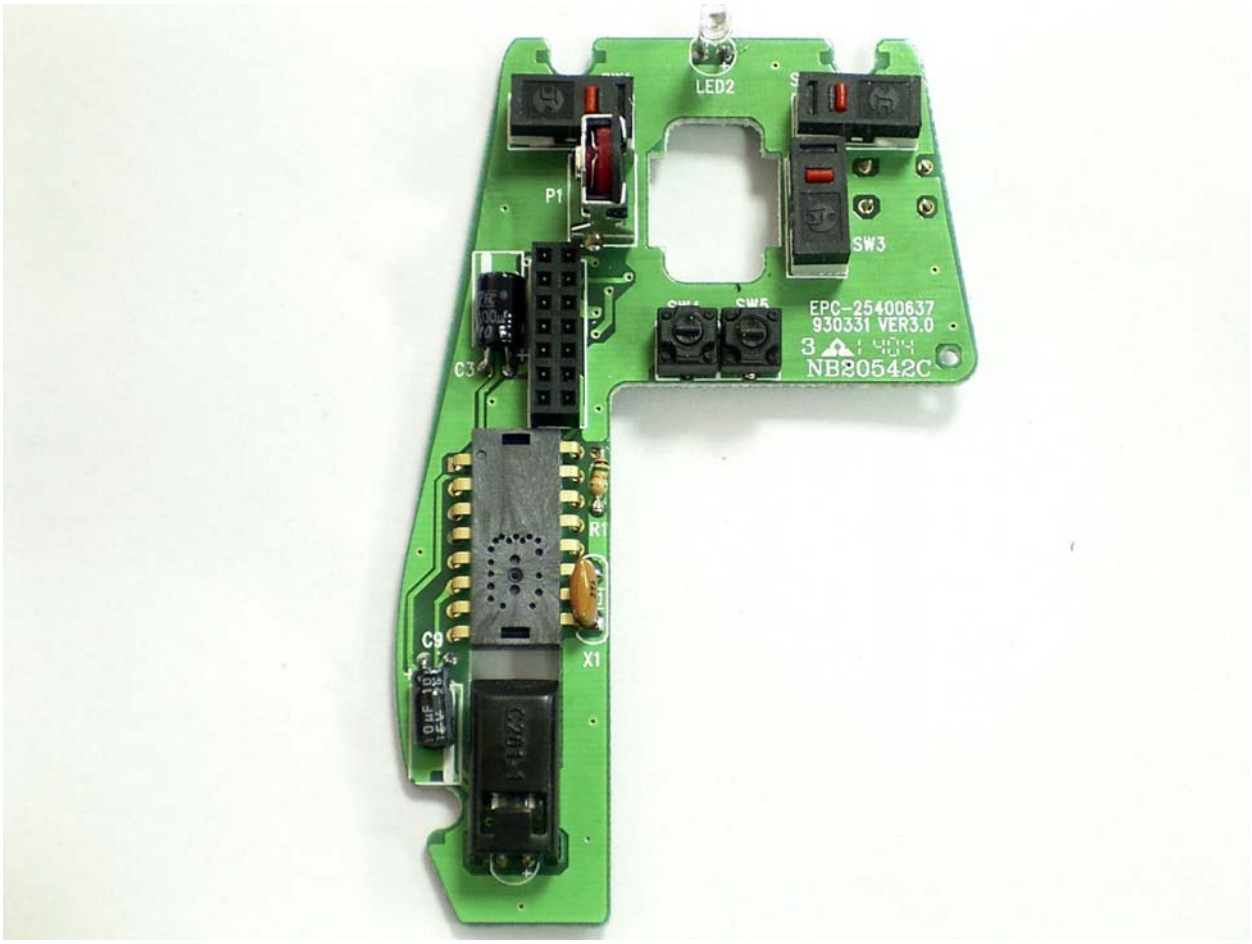


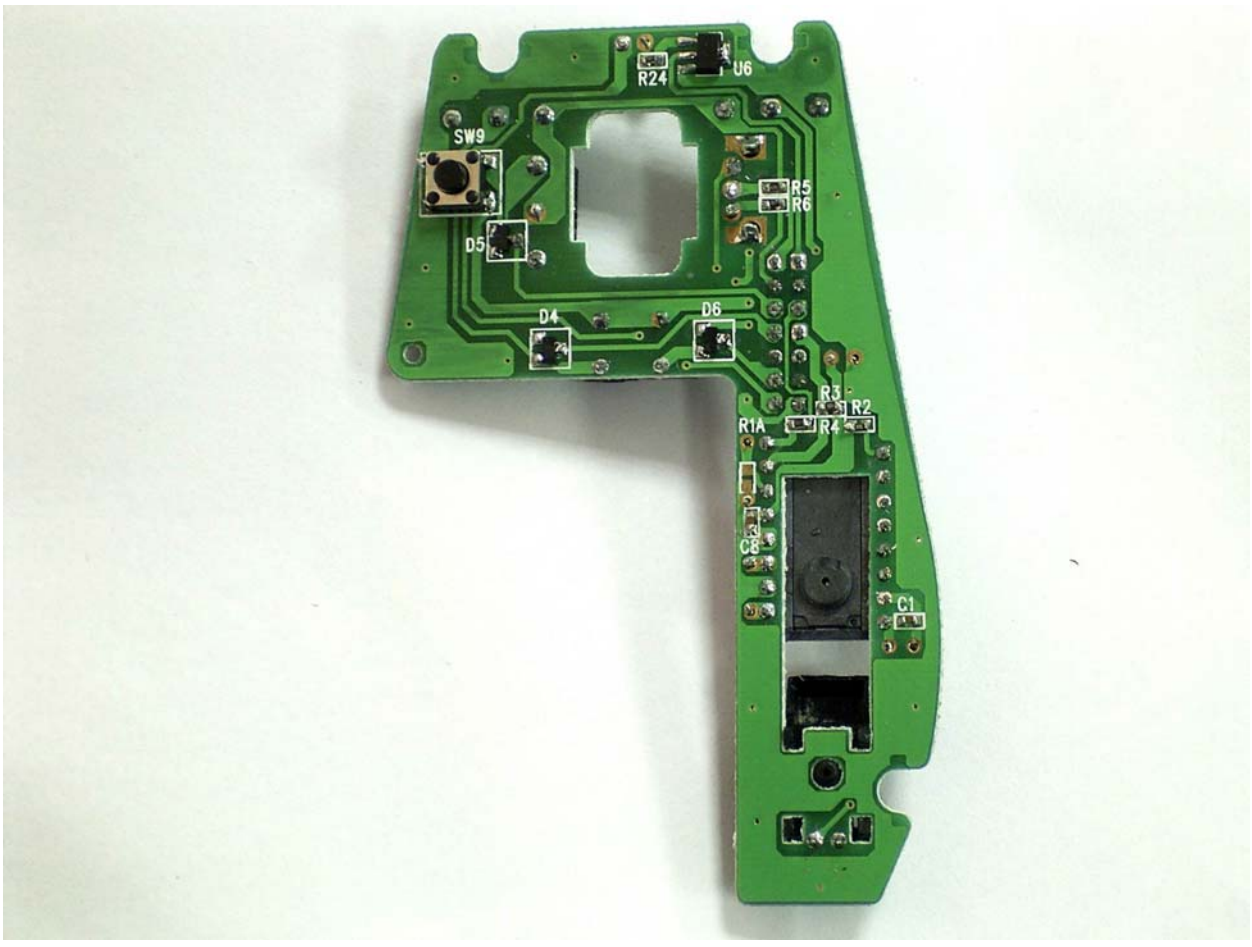
27.28 MHz << Class B Limit.

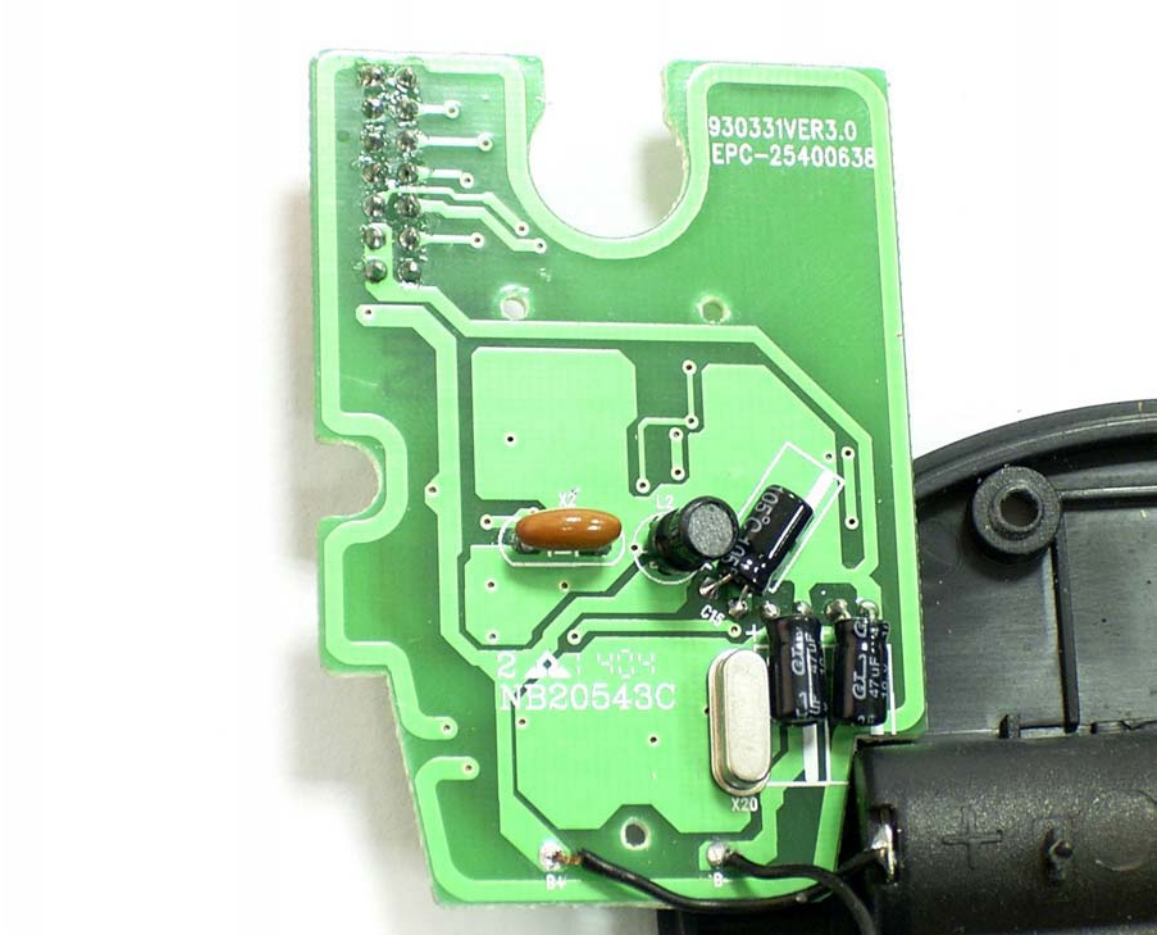

Labtec

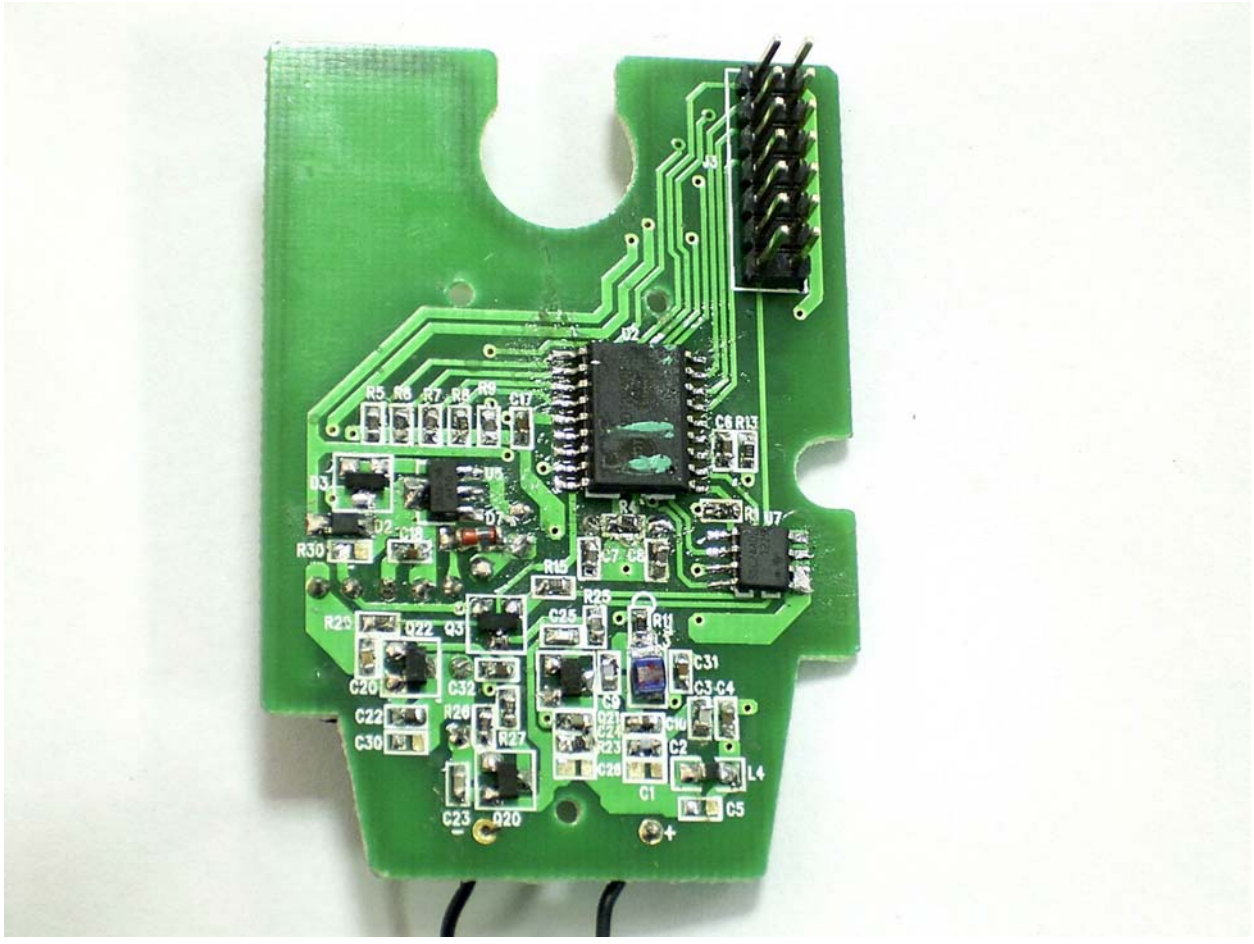

ABS
930331VER3.0
EPC-25400838




LED2
P1
SW3
EPC-25400637
930331 VER3.0
NB20542C
C3
R1
C9
X1


R24
U6
SW9
R5
R6
D5
D4
D6
R3
R2
R1A
R4
C8
C1


930331VER3.0
EPC-25400638
X2
L2
C15
NB20543C
X20
B+
B-


J3
U2
R5
R6
R7
R8
R9
C17
C6
R13
U3
U5
D2
D7
R4
R9
U7
R30
C7
C8
R15
R25
C25
R11
C31
C20
C32
C3
C4
C22
R26
C30
R27
C23
Q20
C28
C1
C2
L4
C5

LABEL Format:

LABEL Size: 34 x 37 mm

LABEL Position: