

The FCC logo, consisting of the letters 'F' and 'C' in a stylized, bold, black font, with a circle around the 'C'.

# Test Report

Product Name : 27MHz Mouse

Model No. : N331, N332

FCC ID. : O62N331

Applicant : Darfon Electronics Corp.

Address : 6, Feng-Shu Tsuen, Gueishan, Taoyuan 333,  
Taiwan, R.O.C.

Date of Receipt : Sep 12, 2005

Issued Date : Sep 26, 2005

Report No. : 059L082FI

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

# Test Report Certification

Test Date : Sep 26, 2005

Report No.: 059L082FI



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200533-0

Product Name : 27MHz Mouse

Applicant : Darfon Electronics Corp.

Address : 6, Feng-Shu Tsuen, Gueishan, Taoyuan 333, Taiwan, R.O.C.

Manufacturer : Darfon Electronics Corp.

Model No. : N331, N332

FCC ID. : O62N331

Rated Voltage : DC 3V(Power by Battery)

Trade Name : BenQ, TDE Systems

Measurement Standard : FCC CFR Title 47 Part 15 Subpart C: 2003

Measurement Procedure : ANSI C63.4: 2003

Test Result : Complied

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuietTek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Documented By :



( Genie Chang )

Tested By :



( Tim Sung )

Approved By :



( Gene Chang )



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## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name : 27MHz Mouse  
 Trade Name : BenQ, TDE Systems  
 FCC ID. : O62N331  
 Model No. : N331, N332  
 EUT Voltage : DC 3V(Power by Battery)  
 Frequency Range : 27MHz for Mouse  
 Type of Modulation : FSK  
 Type of antenna : Loop antenna  
 Channel Number : 1  
 Channel Control : Manual

Frequency of Each Channel:

| Channel | Frequency      |
|---------|----------------|
| 1       | 27 MHz (Mouse) |

Note:

- The EUT is a 27MHz Mouse intends to use in household and office PC system or related application.
- The different of the each model is shown as below:
 

| Model Number | Trade Name  | Description   |
|--------------|-------------|---------------|
| N331         | BenQ        | Electrify     |
| N332         | TDE Systems | Not Electrify |
- These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC CFR Title 47 Part 15 Subpart C:2003 Paragraph 15.227.

| Pre-Test Mode   |                                                                |
|-----------------|----------------------------------------------------------------|
| EMI             | Mode 1: Normal Operation-N331<br>Mode 2: Normal Operation-N332 |
| Final Test Mode |                                                                |
| EMI             | Mode 1: Normal Operation-N331                                  |

## 1.2. Operation Description

The EUT is a 27MHz Mouse intends to use in household and office PC system.

The device adapts FSK modulation. The loop antenna provides diversity function to improve the transmitting function.

The super generation type receiver was used. An external excitation was used when the test of receiver was performed.

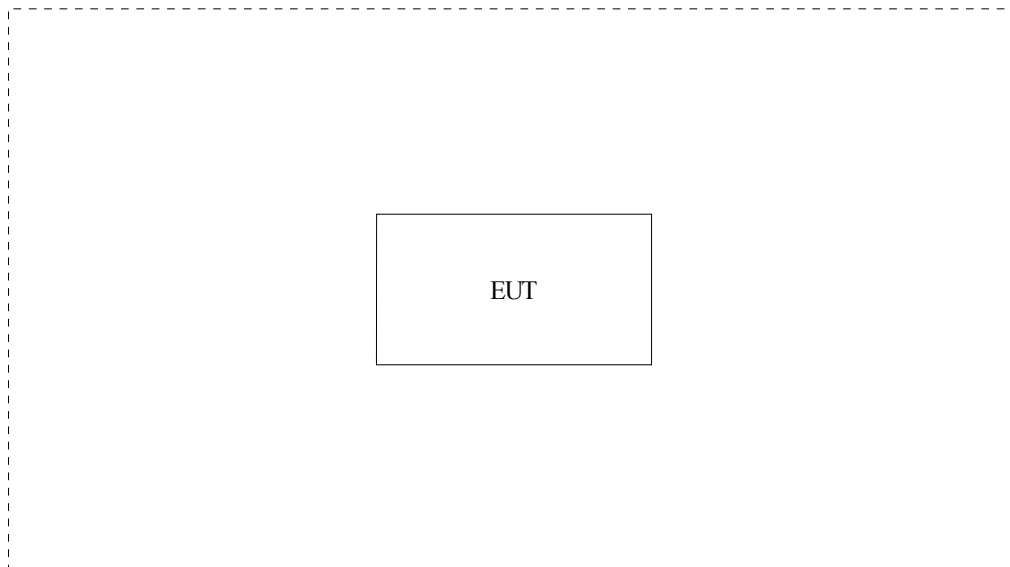
## 1.3. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product | Manufacturer | Model No. | Serial No. | FCC ID | Power Cord |
|---------|--------------|-----------|------------|--------|------------|
| (1) N/A | N/A          | N/A       | N/A        | N/A    | N/A        |

| Signal Cable Type | Signal cable Description |
|-------------------|--------------------------|
| A. N/A            | N/A                      |

## 1.4. Configuration of Test System



## 1.5. EUT Exercise Software

- (1) Setup the test system as shown on 1.4.
- (2) Enable RF signal and confirm the EUT is active.
- (3) Adjust output capacity of EUT to the specification.

## 1.6. Test Facility

Ambient conditions in the laboratory:

| Items                      | Required (IEC 68-1) | Actual   |
|----------------------------|---------------------|----------|
| Temperature (°C)           | 15-35               | 20-35    |
| Humidity (%RH)             | 25-75               | 50-65    |
| Barometric pressure (mbar) | 860-1060            | 950-1000 |

Site Description: June 22, 2001 File on  
Federal Communications Commission  
FCC Engineering Laboratory  
7435 Oakland Mills Road  
Columbia, MD 21046  
Reference 31040/SIT1300F2



July 03, 2001 Accreditation on NVLAP  
NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,  
Lin-Kou Shiang, Taipei,  
Taiwan, R.O.C.  
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789  
E-Mail : [service@quietek.com](mailto:service@quietek.com)



## 2. Conducted Emission

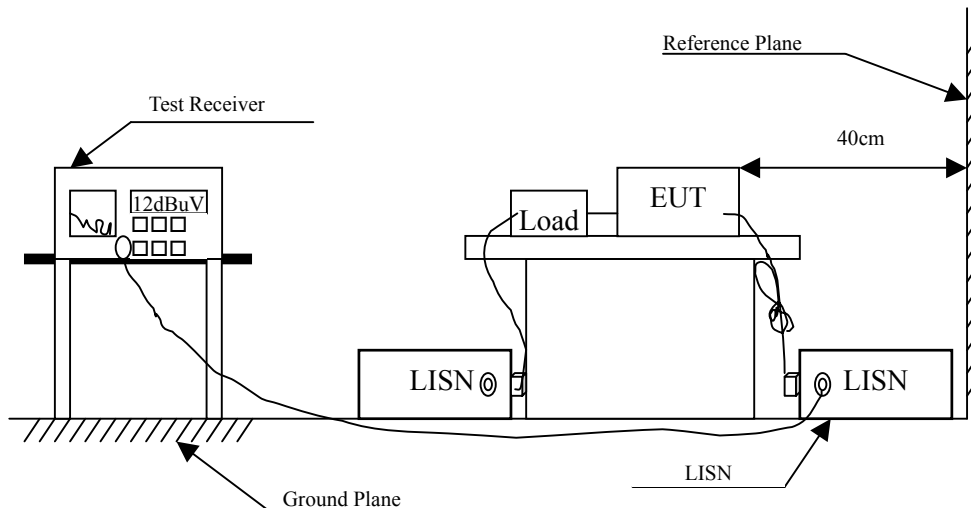
### 2.1. Test Equipment

The following test equipment are used during the conducted emission test:

| Item | Instrument         | Manufacturer | Type No./Serial No   | Last Cal. | Remark      |
|------|--------------------|--------------|----------------------|-----------|-------------|
| 1    | Test Receiver      | R & S        | ESCS 30/838251/001   | May, 2005 |             |
| 2    | L.I.S.N.           | R & S        | ESH3-Z5/836679/0023  | May, 2005 | EUT         |
| 3    | L.I.S.N.           | R & S        | ENV 4200/833209/0023 | May, 2005 | Peripherals |
| 4    | Pulse Limiter      | R & S        | ESH3-Z2              | May, 2005 |             |
| 6    | No.1 Shielded Room |              |                      | N/A       |             |

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

### 2.2. Test Setup



### 2.3. Limits

| FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit |        |       |
|-----------------------------------------------------|--------|-------|
| Frequency<br>MHz                                    | Limits |       |
|                                                     | QP     | AV    |
| 0.15 - 0.50                                         | 66-56  | 56-46 |
| 0.50-5.0                                            | 56     | 46    |
| 5.0 - 30                                            | 60     | 50    |

Remarks : In the above table, the tighter limit applies at the band edges.

## 2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2001 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

## 2.5. Uncertainty

The measurement uncertainty is defined as  $\pm 2.02$  dB



## **2.6. Test Data of Conducted Emission**

Owing to the DC operation of EUT, this test item is not performed.

### 3. Radiated Emission

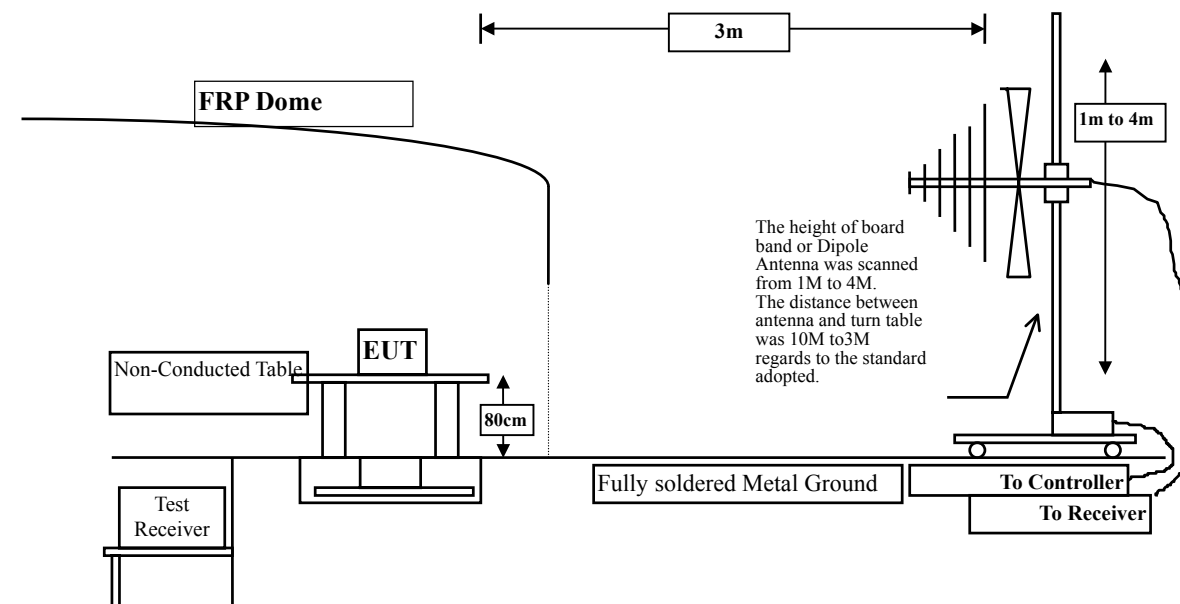
#### 3.1. Test Equipment

The following test equipment are used during the radiated emission test:

| Test Site                                    | Equipment         | Manufacturer | Model No./Serial No.   | Last Cal.   |
|----------------------------------------------|-------------------|--------------|------------------------|-------------|
| <input type="checkbox"/> Site # 1            | Test Receiver     | R & S        | ESVS 10 / 834468/003   | July, 2005  |
|                                              | Spectrum Analyzer | Advantest    | R3162/ 00803480        | May, 2005   |
|                                              | Pre-Amplifier     | Advantest    | BB525C/ 3307A01812     | May, 2005   |
|                                              | Bilog Antenna     | SCHAFFNER    | CBL6112B / 2697        | Nov., 2004  |
| <input type="checkbox"/> Site # 2            | Test Receiver     | R & S        | ESCS 30 / 836858 / 022 | Nov., 2004  |
|                                              | Spectrum Analyzer | Advantest    | R3162 / 100803466      | May, 2005   |
|                                              | Pre-Amplifier     | Advantest    | BB525C/3307A01814      | May, 2005   |
|                                              | Bilog Antenna     | SCHAFFNER    | CBL6112B / 2705        | Oct., 2004  |
| <input checked="" type="checkbox"/> Site # 3 | Test Receiver     | R & S        | ESI 26 / 838786 / 004  | May, 2005   |
|                                              | Spectrum Analyzer | Advantest    | R3162 / 100803480      | May, 2005   |
|                                              | Pre-Amplifier     | QTK          | QTK-AMP-03 / 0003      | May, 2005   |
|                                              | Horn Antenna      | ETS          | 3115 / 0005-6160       | July, 2004  |
|                                              | Pre-Amplifier     | QTK          | QTK-AMP-01 / 0001      | July, 2004  |
|                                              | Broadband Antenna | Schwarzbeck  | VULB9166/1085          | April, 2005 |

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.  
2. Mark "X" test instruments are used to measure the final test results.

#### 3.2. Test Setup



### 3.3. Limits

➤ FCC Part 15 Subpart C Paragraph 15.227 Limit

| FCC Part 15 Subpart C Paragraph 15.227 Limits |                               |        |
|-----------------------------------------------|-------------------------------|--------|
| Fundamental Frequency<br>MHz                  | Field strength of fundamental |        |
|                                               | uV/m                          | dBuV/m |
| 26.96-27.28                                   | 10000                         | 80.0   |

Remarks :

1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

➤ Frequencies in restricted band are complied to limits on Paragraph 15.209.

| FCC Part 15 Subpart C Paragraph 15.209 Limits |          |           |
|-----------------------------------------------|----------|-----------|
| Frequency<br>MHz                              | uV/m @3m | dBuV/m@3m |
| 30-88                                         | 100      | 40        |
| 88-216                                        | 150      | 43.5      |
| 216-960                                       | 200      | 46        |
| Above 960                                     | 500      | 54        |

- Remarks :
1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
  2. In the Above Table, the tighter limit applies at the band edges.
  3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

### 3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 3 meters.

The frequency range from 30MHz to 10th harmonics is checked.

### 3.5. Uncertainty

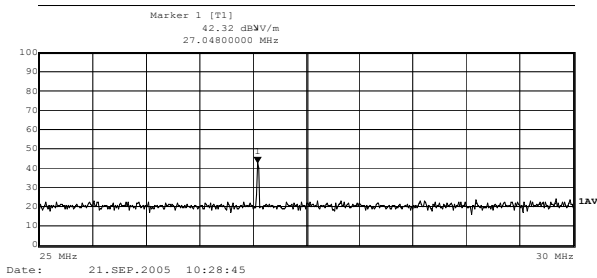
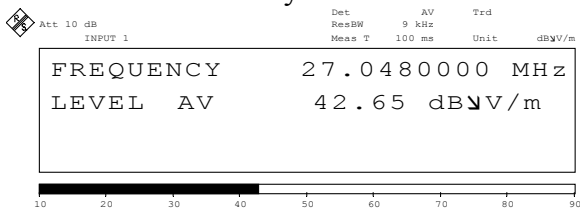
The measurement uncertainty is defined as  $\pm 3.8$  dB

### 3.6. Test Data of Radiated Emission

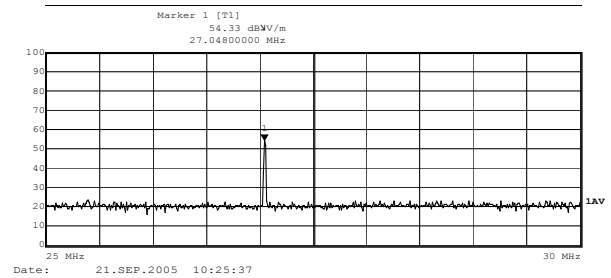
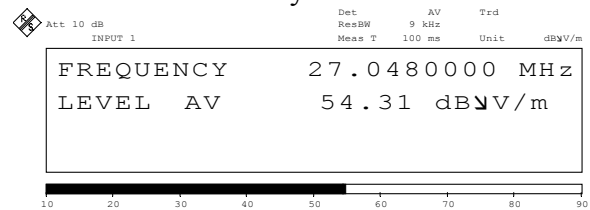
Product : 27MHz Mouse  
 Test Item : Fundamental Radiated Emission  
 Test Site : No.3 OATS  
 Test Voltage : DC 3V(Power by Battery)  
 Test Mode : Mode 1: Normal Operation-N331

| Polarity | Frequency (MHz) | Measurement | Limit    | Result |
|----------|-----------------|-------------|----------|--------|
| X        | 27.048          | 42.65dBuV/m | 80dBuV/m | Pass   |
| Y        | 27.048          | 54.31dBuV/m | 80dBuV/m | Pass   |
| Z        | 27.048          | 54.61dBuV/m | 80dBuV/m | Pass   |

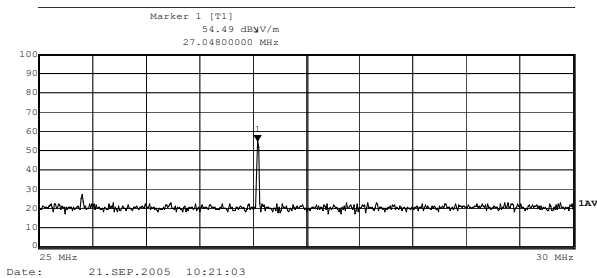
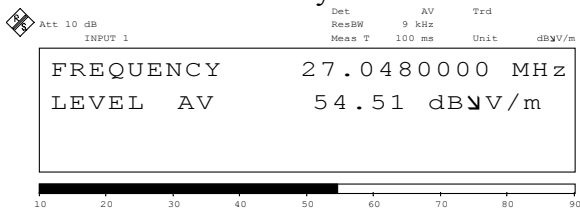
#### Polarity X



#### Polarity Y



#### Polarity Z



Product : 27MHz Mouse  
Test Item : General Radiated Emission  
Test Site : No.3 OATS  
Test Voltage : DC 3V(Power by Battery)  
Test Mode : Mode 1: Normal Operation-N331

| Frequency         | Correct | Reading | Measurement | Margin  | Limit  |
|-------------------|---------|---------|-------------|---------|--------|
| MHz               | Factor  | Level   | Level       |         |        |
|                   | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| <b>Horizontal</b> |         |         |             |         |        |
| 54.084            | 7.474   | 14.110  | 21.584      | -18.416 | 40.000 |
| *81.128           | 9.559   | 19.090  | 28.649      | -11.351 | 40.000 |
| 108.171           | 13.762  | 8.070   | 21.832      | -21.688 | 43.520 |
| 135.214           | 13.499  | 5.370   | 18.869      | -24.651 | 43.520 |
| 162.257           | 11.519  | 8.290   | 19.809      | -23.711 | 43.520 |
| 189.299           | 10.436  | 7.580   | 18.016      | -25.504 | 43.520 |
| 216.342           | 10.601  | 5.170   | 15.771      | -30.249 | 46.020 |
| 243.385           | 13.333  | 5.670   | 19.003      | -27.017 | 46.020 |
| 270.428           | 14.597  | 5.380   | 19.977      | -26.043 | 46.020 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ \* ” means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss.

Product : 27MHz Mouse  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Voltage : DC 3V(Power by Battery)  
 Test Mode : Mode 1: Normal Operation-N331

| Frequency       | Correct | Reading | Measurement | Margin  | Limit  |
|-----------------|---------|---------|-------------|---------|--------|
| MHz             | Factor  | Level   | Level       |         |        |
|                 | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| <b>Vertical</b> |         |         |             |         |        |
| 54.084          | 7.156   | 14.600  | 21.756      | -18.244 | 40.000 |
| *81.128         | 9.113   | 19.680  | 28.793      | -11.207 | 40.000 |
| 108.171         | 12.374  | 8.230   | 20.604      | -22.916 | 43.520 |
| 135.214         | 12.620  | 7.940   | 20.560      | -22.960 | 43.520 |
| 162.257         | 10.709  | 10.240  | 20.949      | -22.571 | 43.520 |
| 189.299         | 10.618  | 12.810  | 23.428      | -20.092 | 43.520 |
| 216.342         | 11.723  | 6.720   | 18.443      | -27.577 | 46.020 |
| 243.385         | 13.592  | 6.490   | 20.082      | -25.938 | 46.020 |
| 270.428         | 15.097  | 5.720   | 20.817      | -25.203 | 46.020 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ \* ” means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss.

## 4. Band Edge

### 4.1. Test Equipment

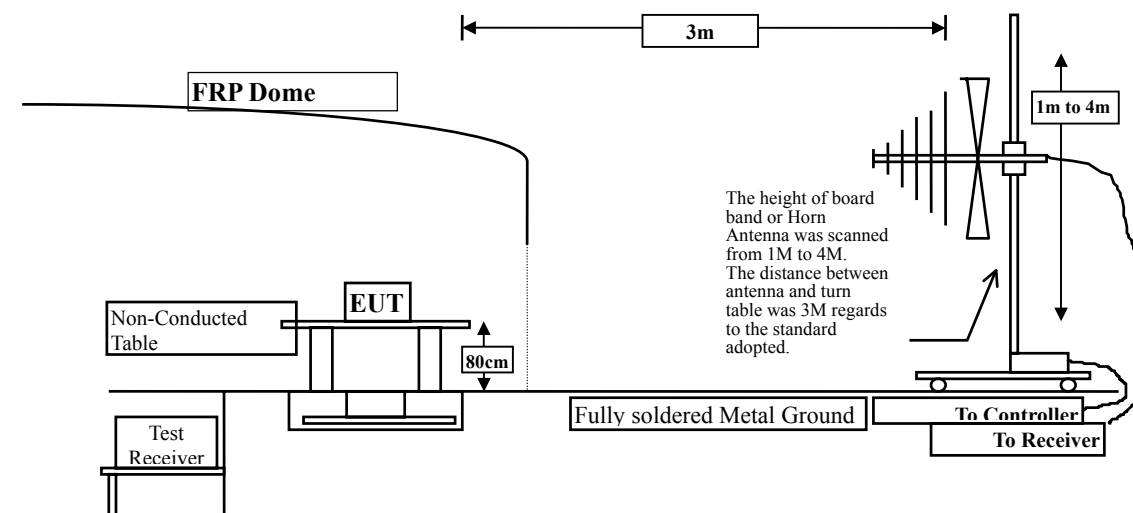
The following test equipment are used during the radiated emission test:

| Test Site                                    | Equipment         | Manufacturer | Model No./Serial No.   | Last Cal.   |
|----------------------------------------------|-------------------|--------------|------------------------|-------------|
| <input type="checkbox"/> Site # 1            | Test Receiver     | R & S        | ESVS 10 / 834468/003   | July, 2005  |
|                                              | Spectrum Analyzer | Advantest    | R3162/ 00803480        | May, 2005   |
|                                              | Pre-Amplifier     | Advantest    | BB525C/ 3307A01812     | May, 2005   |
|                                              | Bilog Antenna     | SCHAFFNER    | CBL6112B / 2697        | Nov., 2004  |
| <input type="checkbox"/> Site # 2            | Test Receiver     | R & S        | ESCS 30 / 836858 / 022 | Nov., 2004  |
|                                              | Spectrum Analyzer | Advantest    | R3162 / 100803466      | May, 2005   |
|                                              | Pre-Amplifier     | Advantest    | BB525C/3307A01814      | May, 2005   |
|                                              | Bilog Antenna     | SCHAFFNER    | CBL6112B / 2705        | Oct., 2004  |
| <input checked="" type="checkbox"/> Site # 3 | Test Receiver     | R & S        | ESI 26 / 838786 / 004  | May, 2005   |
|                                              | Spectrum Analyzer | HP           | E4407B / US39440758    | May, 2005   |
|                                              | Pre-Amplifier     | QTK          | QTK-AMP-03 / 0003      | May, 2005   |
|                                              | Broadband Antenna | Schwarzbeck  | VULB9166/1085          | April, 2005 |
|                                              | Horn Antenna      | ETS          | 3115 / 0005-6160       | July, 2005  |
|                                              | Pre-Amplifier     | QTK          | QTK-AMP-01 / 0001      | July, 2005  |

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.  
2. Mark "X" test instruments are used to measure the final test results.

### 4.2. Test Setup

#### RF Radiated Measurement:





#### **4.3. Limit**

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

#### **4.4. Test Procedure**

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement.

The bandwidth below 30MHz setting on the field strength meter is 10 kHz

#### 4.5. Test Result of Band Edge

Product : 27MHz Mouse  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Normal Operation-N331

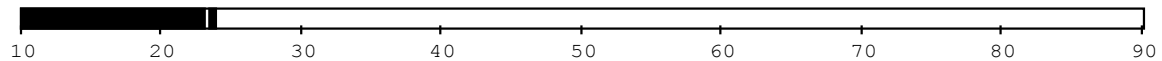
##### RF Radiated Measurement: (Average Detector)

| Frequency (MHz) | Reading Level (dBuV/m) | Limit (dBuV/m) | Result |
|-----------------|------------------------|----------------|--------|
| 25.652          | 25.632                 | 23.38          | Pass   |

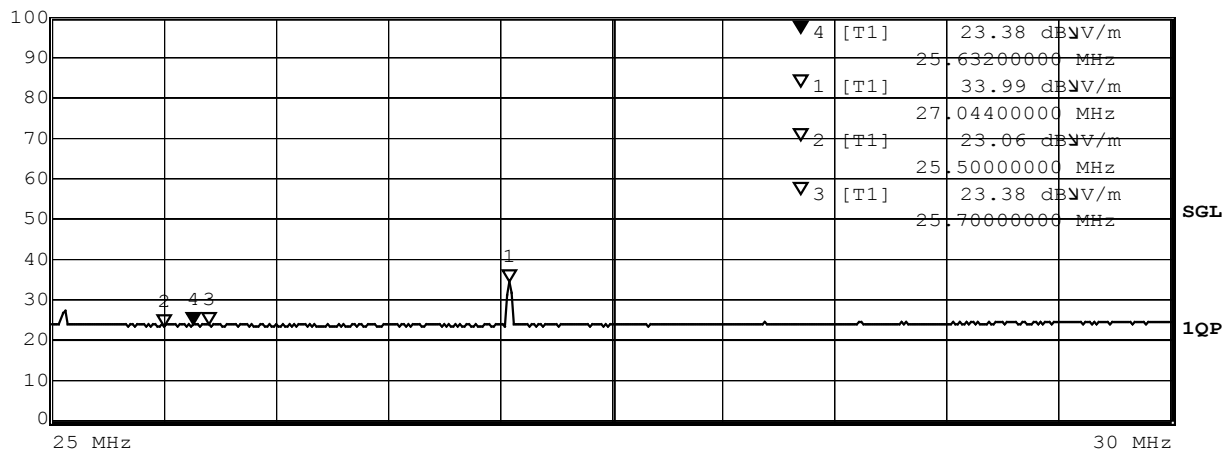


Att 10 dB INPUT 1 Det ResBW 9 kHz QP Trd Meas T 500 ms Unit dBuV/m

|           |            |        |
|-----------|------------|--------|
| FREQUENCY | 25.6320000 | MHz    |
| LEVEL QPK | 23.38      | dBuV/m |



Marker 4 [T1]  
 23.38 dBuV/m  
 25.63200000 MHz



Date: 28.SEP.2005 15:28:25

## 5. Occupied Bandwidth

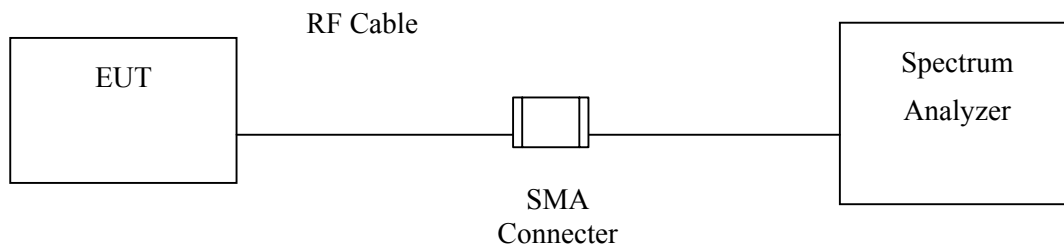
### 5.1. Test Equipment

The following test equipments are used during the radiated emission tests:

| Equipment           | Manufacturer | Model No./Serial No. | Last Cal. |
|---------------------|--------------|----------------------|-----------|
| X Spectrum Analyzer | HP           | E4407B / US39440758  | May, 2005 |

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.  
2. Mark "X" test instruments are used to measure the final test results.

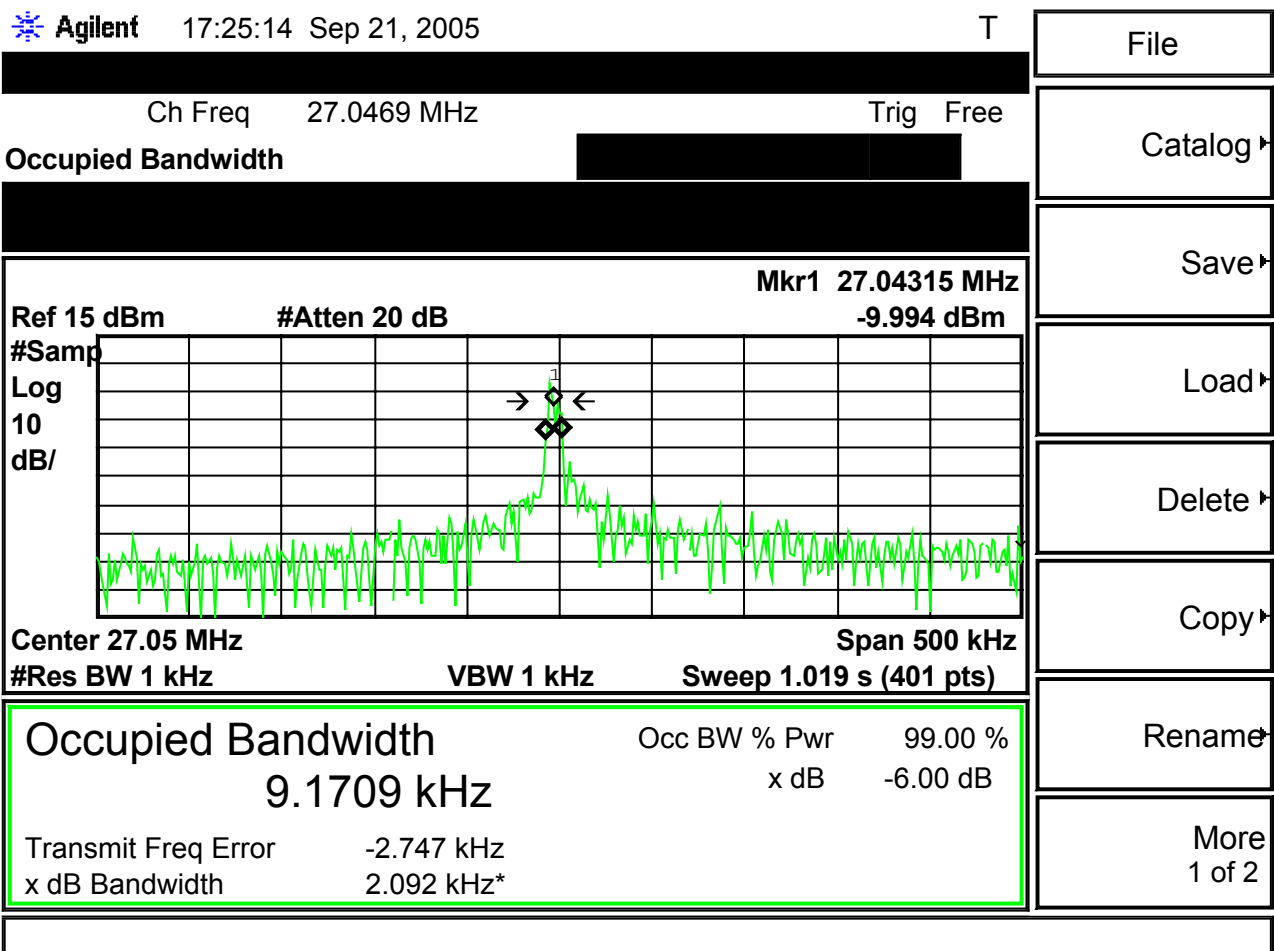
### 5.2. Test Setup



### 5.3. Test Result of Occupied Bandwidth

Product : 27MHz Mouse  
 Test Item : Occupied Bandwidth Data-N331  
 Test Site : No.3 Shielded Room  
 Test Mode : Channel 1

| Channel No. | Frequency (MHz) | Measurement Level (kHz) |
|-------------|-----------------|-------------------------|
| Ch01        | 27.04           | 9.1709                  |



## **6. EMI Reduction Method During Compliance Testing**

No modification was made during testing.

## Attachment 1: EUT Test Photographs

## Attachment 1: EUT Test Setup Photographs

Front View of Radiated Test



Back View of Radiated Test



## Attachment 2: EUT Detailed Photographs



**Attachment 2 : EUT Detailed Photographs**

(1) EUT Photo (N331)



(2) EUT Photo (N331)





(3) EUT Photo (N331)



(4) EUT Photo (N331)

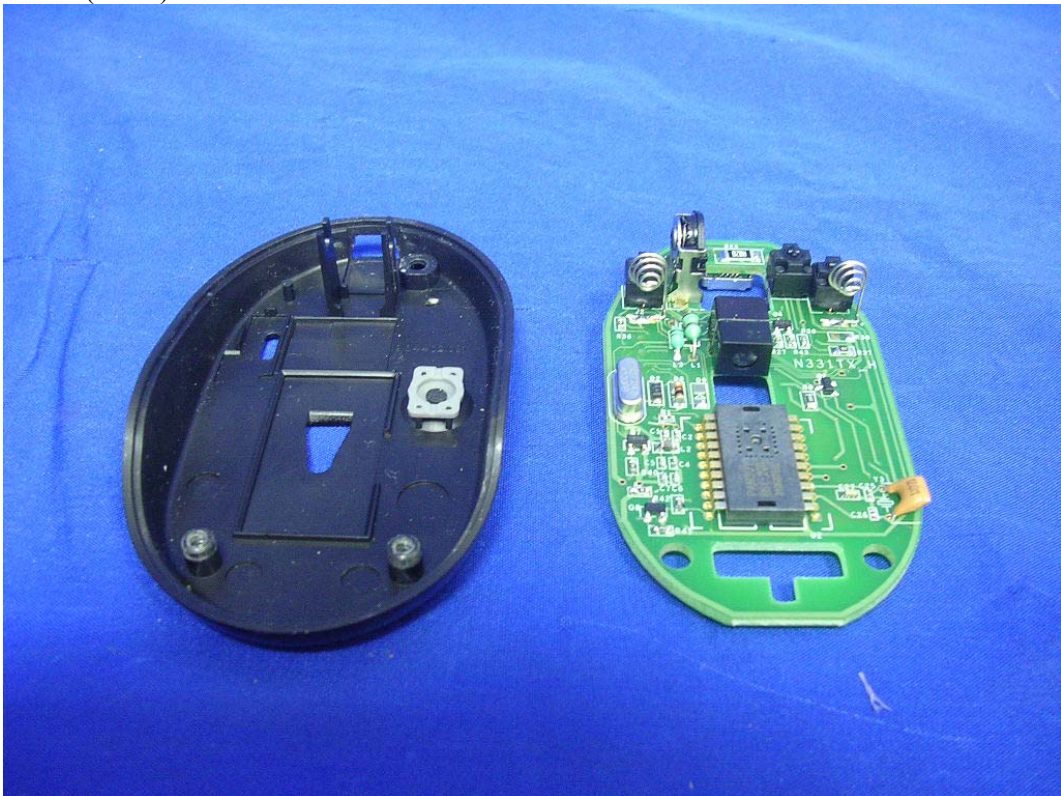




(5) EUT Photo (N331)

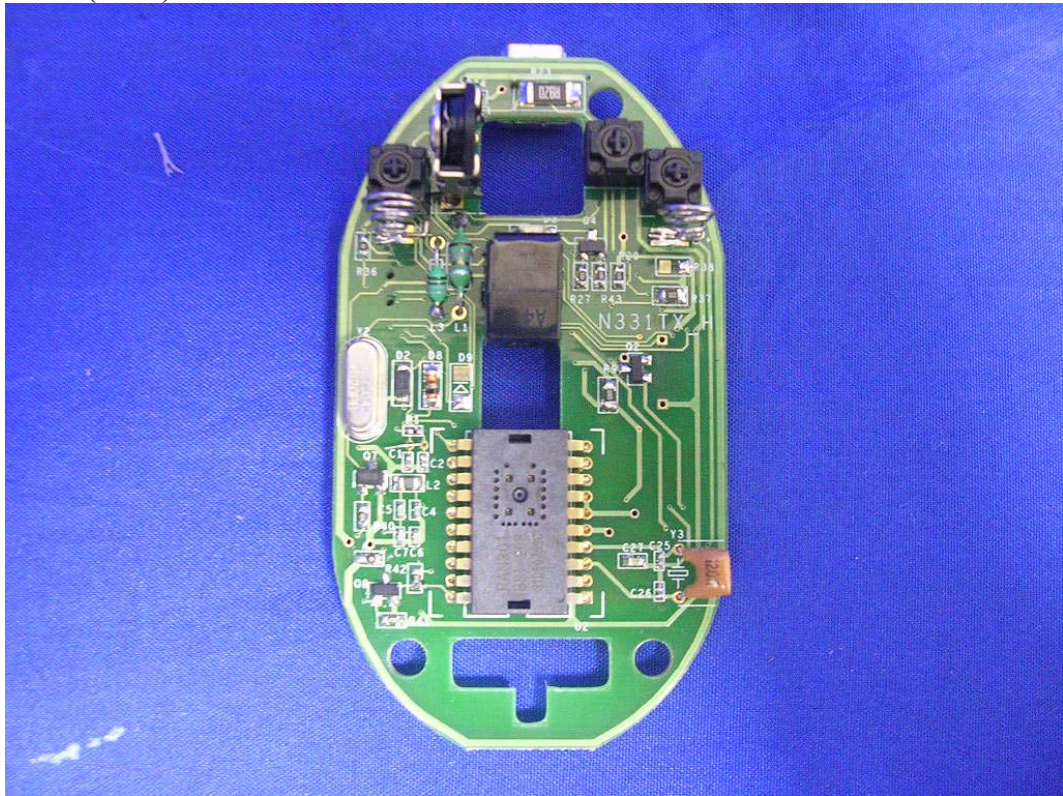


(6) EUT Photo (N331)

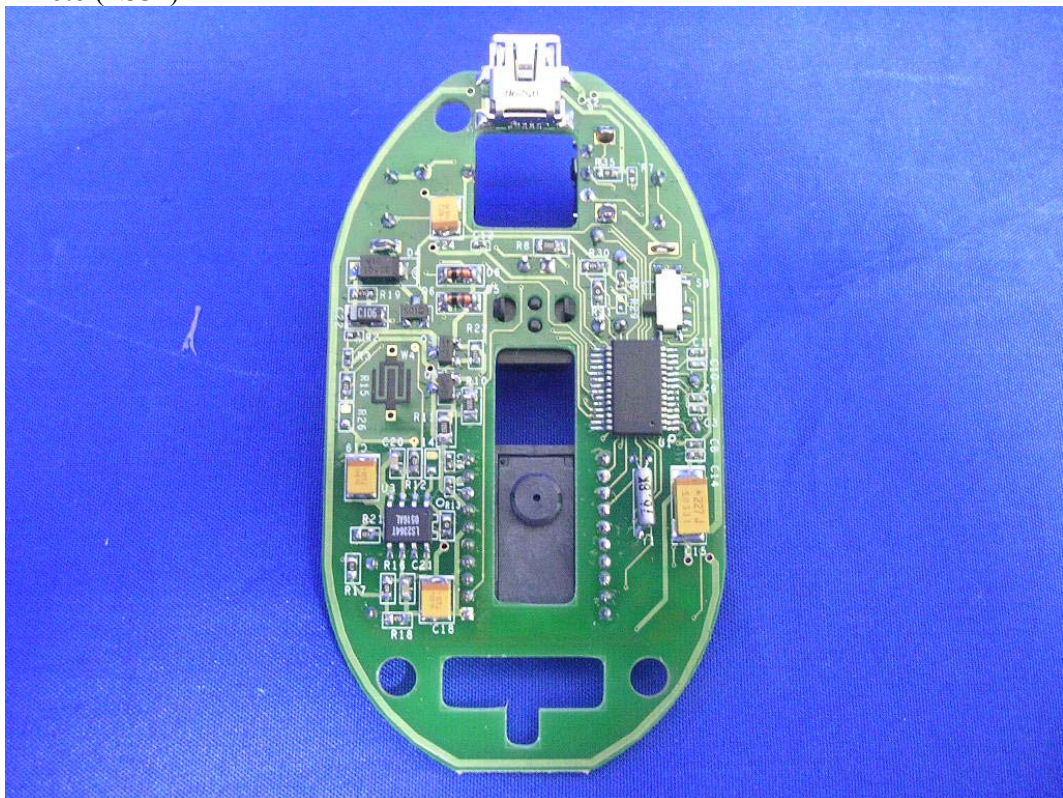




(7) EUT Photo (N331)



(8) EUT Photo (N331)





(9) EUT Photo (N331)



(10) EUT Photo (N331)





(11) EUT Photo (N331)

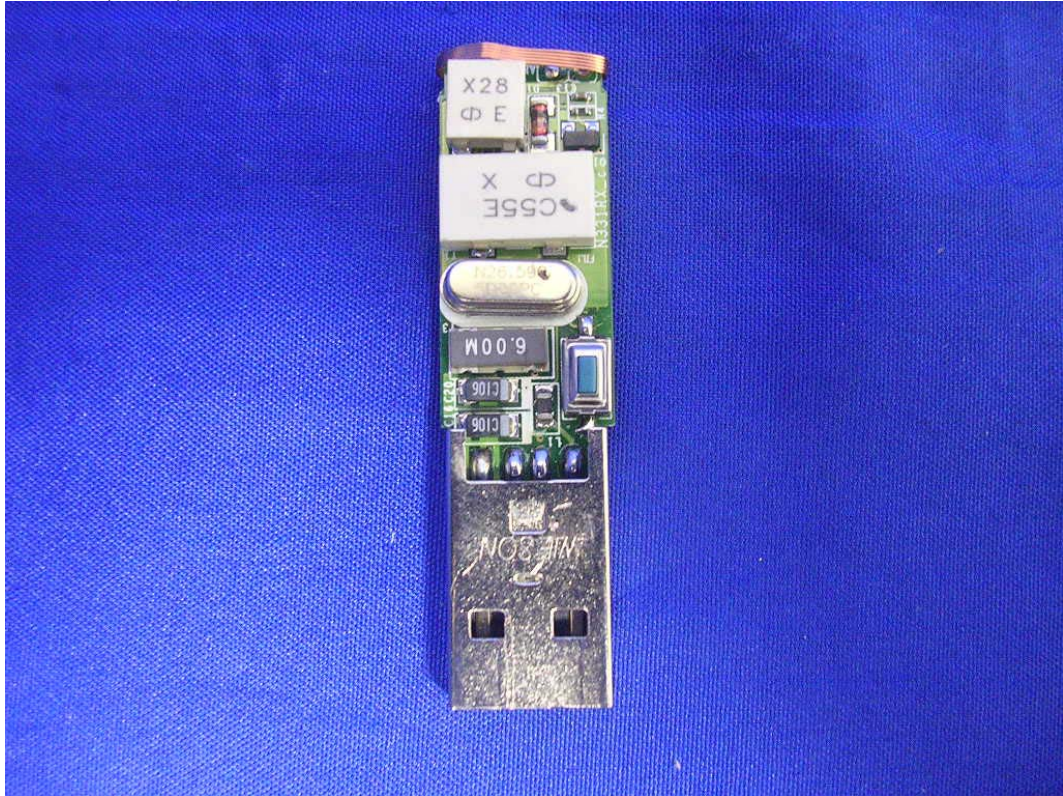


(12) EUT Photo (N331)

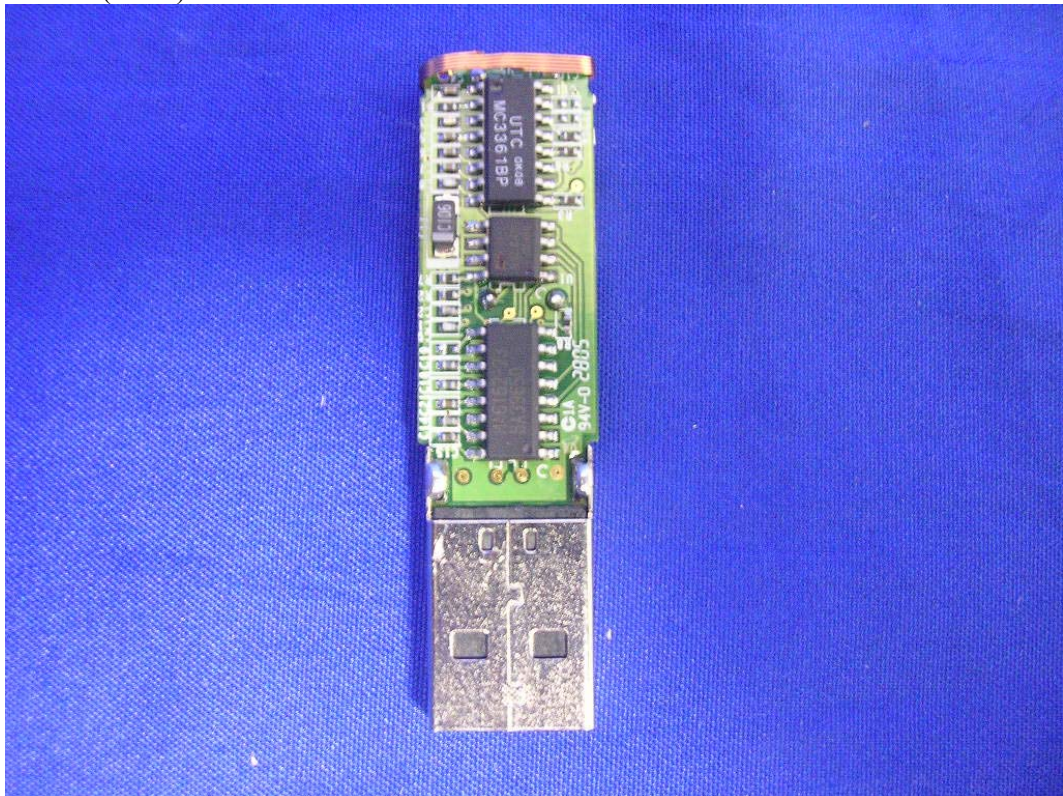




(13) EUT Photo (N331)



(14) EUT Photo (N331)





(15) EUT Photo (N331)



(16) EUT Photo (N331)





(17) EUT Photo (N331)



(18) EUT Photo (N332)



(19) EUT Photo (N332)



(20) EUT Photo (N332)





(21) EUT Photo (N332)



(22) EUT Photo (N332)



A green printed circuit board (PCB) for a mobile phone, showing various electronic components like resistors, capacitors, and integrated circuits. The board has a large central cutout and is surrounded by a blue border.



(25) EUT Photo (N332)

