



## Test Report

Product Name : Car Alarm Transmitter

Model No. : TC-4182

FCC ID : JKD4182

Applicant : Huge Technology Co., LTD.

Address : 6F-8., No. 20, Lane 609, Chung-Hsin Rd.,  
Sec.5, San-Chung City, Taipei, Taiwan.

Date of Receipt : Sep. 09, 2003

Date of Test : Sep. 17, 2003

Report No. : 039L509FI

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. 17, 2003

Report No. : 039L509FI



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200347-0

Product Name : Car Alarm Transmitter

Applicant : Huge Technology Co., LTD.

Address : 6F-8., No. 20, Lane 609, Chung-Hsin Rd., Sec.5, San-Chung City,  
Taipei, Taiwan.

Manufacturer : Huge Technology Co., LTD.  
Ningbo Poly Technology Co., Ltd.

Model No. : TC-4182

FCC ID. : JKD4182

Rated Voltage : DC 12V

Trade Name : TOPE

Measurement Standard : FCC Part 15 Subpart C Paragraph 15.231

Measurement Procedure : ANSI C63.4:1992

Test Result : Complied

The Test Results relate only to the samples tested.

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

Documented By :   
( Anita Chou )

Tested By :   
( Tom Hsieh )

Approved By :   
( Gene Chang )

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| Attachment 2: EUT Detailed Photographs                         |           |

## 1. GENERAL INFORMATION

### 1.1. EUT Description

|                     |                         |
|---------------------|-------------------------|
| Product Name        | : Car Alarm Transmitter |
| Trade Name          | : TOPE                  |
| FCC ID.             | : JKD4182               |
| Model No.           | : TC-4182               |
| Type of Modulation  | : GFSK                  |
| Antenna type        | : Printed               |
| Operating Frequency | : 303.5~330 MHz         |
| Reset Cable         | : Non-Shielded, 1.0m    |
| 4 Pin Cable         | : Non-Shielded, 1.0m    |
| SIREN Cable         | : Non-Shielded, 0.3m    |
| 6 Pin Cable         | : Non-Shielded, 1.8m    |
| FUSE 6Pin Cable     | : Non-Shielded, 0.8m    |
| TRUNK Opener Cable  | : Non-Shielded, 0.3m    |
| Led Cable           | : Non-Shielded, 1.0m    |
| Blue Cable          | : Non-Shielded, 1.3m    |
| 8 Pin Cable         | : Non-Shielded, 1.5m    |
| Transmitter         | : *2                    |
| Receiver            | : *1                    |
| Fuse                | : *1                    |
| Led                 | : *1                    |
| Shock Sensor        | : *1                    |
| Siren               | : *1                    |
| Trunk Opener        | : *1                    |
| Reset Switch        | : *1                    |

#### Note:

1. This device is a Car Alarm Transmitter, a 303.5~330MHz transmitting function.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.231.
3. This device is a composite device in accordance with part 15 regulations. The function for the receiver was measured and made a test report that the report number is 039L509F, certified under Declaration of Conformity.
4. QuietTek had verified the construction and function in typical operation, Then shown in this test report.

## 1.2. Operation Description

The EUT is a 303.5~330MHz transmitter. The radio remote control signal can be transferred to 309.8~310.3MHz radio frequency in GFSK modulation. The transmission antenna is printed on the EUT.

The radio remote control signal can be control the car alarm system.

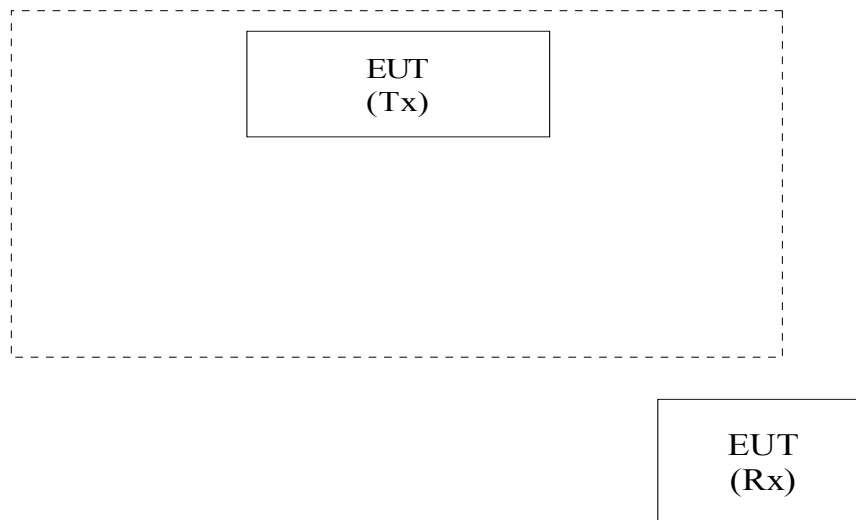
### 1.3. Tested System Details

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. | Power Cord |
|-----|---------|--------------|-----------|------------|------------|
| (1) | Battery | TRANE        | 12B50PE   | N/A        | N/A        |

| Signal Cable Type | Signal cable Description |
|-------------------|--------------------------|
| A. DC Power Cable | Non-shielded, 1.8m       |
| B. DC Power Cable | Non-shielded, 1.8m       |

### 1.4. Configuration of Tested System



### 1.5. EUT Exercise Software

- 1.5.1 Setup the EUT and simulators as shown on 1.4.
- 1.5.2 Turn on the power of all equipment.
- 1.5.3 The EUT will transmission the signal form transmitter.
- 1.5.4 Repeat the above procedure 1.5.2 to 1.5.3

## 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



June 30, 2002 Accreditation on NVLAP  
NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation

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## 2. Conducted Emission

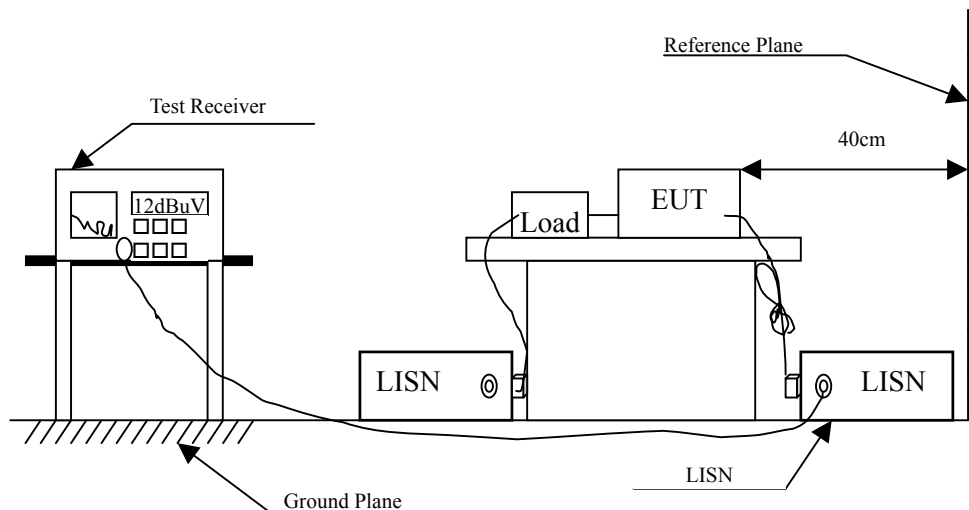
### 2.1. Test Equipment

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 30/838251/0001  | May, 2003  |             |
| 2    | L.I.S.N.           | R & S        | ESH3-Z5/836679/0023  | May, 2003  | EUT         |
| 3    | L.I.S.N.           | R & S        | ENV 4200/833209/0023 | May, 2003  | Peripherals |
| 4    | Pulse Limiter      | R & S        | ESH3-Z2              | May, 2003  |             |
| 5    | No.4 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 C63.4:1992 on conducted measurement.

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

## 2.5. Test Result of Conducted Emission

Product : Car Alarm Transmitter  
Test Item : Conducted Emission

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

### 3. Radiated Emission

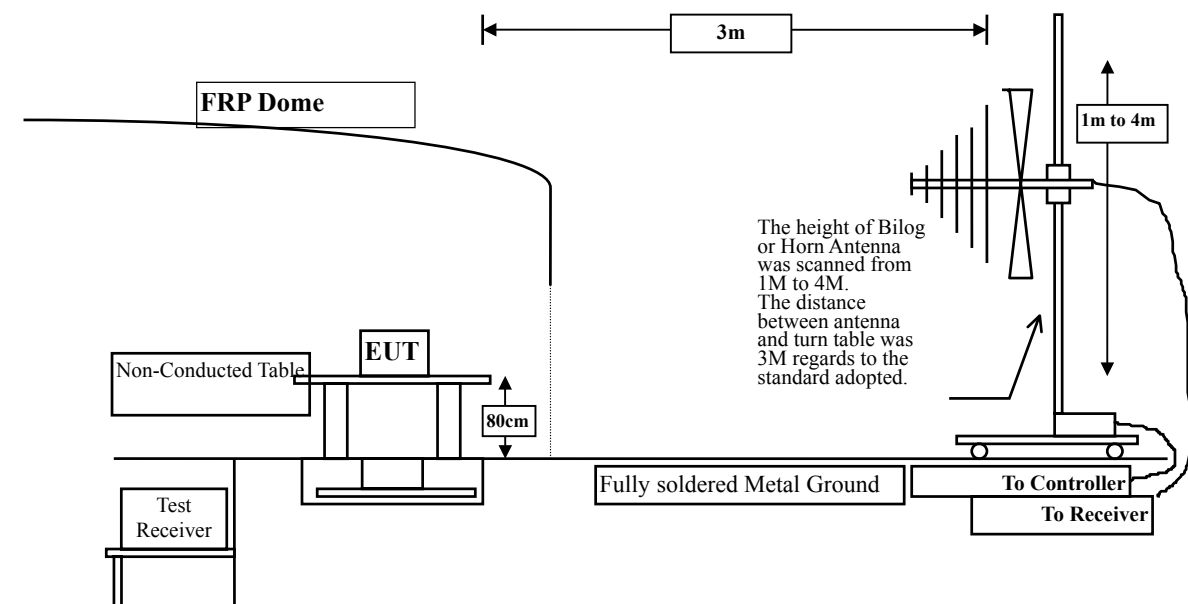
#### 3.1. Test Equipment

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, 2003 |
|                                              | Spectrum Analyzer | Advantest    | R3162/ 00803480        | May, 2003  |
|                                              | Pre-Amplifier     | Advantest    | BB525C/ 3307A01812     | May, 2003  |
|                                              | Bilog Antenna     | SCHAFFNER    | CBL6112B / 2697        | Nov., 2002 |
| <input type="checkbox"/> Site # 2            | Test Receiver     | R & S        | ESCS 30 / 836858 / 022 | Nov., 2002 |
|                                              | Spectrum Analyzer | Advantest    | R3162 / 100803466      | May, 2003  |
|                                              | Pre-Amplifier     | Advantest    | BB525C/3307A01814      | May, 2003  |
|                                              | Bilog Antenna     | SCHAFFNER    | CBL6112B / 2705        | Oct., 2002 |
|                                              | Horn Antenna      | ETS          | 3115 / 0005-6160       | July, 2003 |
|                                              | Pre-Amplifier     | QTK          | QTK-AMP-01/ 0001       | July, 2003 |
| <input checked="" type="checkbox"/> Site # 3 | Test Receiver     | R & S        | ESI 26 / 838786 / 004  | May, 2003  |
|                                              | Spectrum Analyzer | Advantest    | R3162 / 100803480      | May, 2003  |
|                                              | Pre-Amplifier     | QTK          | QTK-AMP-03 / 0003      | May, 2003  |
|                                              | Bilog Antenna     | SCHAFFNER    | CBL6112B / 2697        | May, 2003  |
|                                              | Horn Antenna      | ETS          | 3115 / 0005-6160       | July, 2003 |
|                                              | Pre-Amplifier     | QTK          | QTK-AMP-01 / 0001      | July, 2003 |

- 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 15.231 Limit

| FCC Part 15 Subpart C Paragraph 15.231 Limits |                               |             |                                      |             |
|-----------------------------------------------|-------------------------------|-------------|--------------------------------------|-------------|
| Fundamental Frequency<br><br>MHz              | Field strength of fundamental |             | Field Strength of spurious emissions |             |
|                                               | uV/m                          | dBuV/m      | uV/m                                 | dBuV/m      |
| 40.66-40.70                                   | 2250                          | 67.0        | 225                                  | 47.0        |
| 70-130                                        | 1250                          | 61.9        | 125                                  | 41.9        |
| 130-174                                       | 1250-3750 <sup>1</sup>        | 61.9 – 71.5 | 125-375 <sup>1</sup>                 | 41.9 – 51.5 |
| 174-260                                       | 3750                          | 71.5        | 375                                  | 51.5        |
| 260-470                                       | 3750-12500 <sup>1</sup>       | 71.5 – 81.9 | 375-1250 <sup>1</sup>                | 51.5 – 61.9 |
| above 470                                     | 12500                         | 82.0        | 1250                                 | 62.0        |

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.

#### ➤ Frequencies in restricted band are complied to limits on Paragraph15.209.

| FCC Part 15 Subpart C Paragraph 15.209 Limits |          |           |
|-----------------------------------------------|----------|-----------|
| Frequency (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 C63.4:1992 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30) is 120 kHz and above 1GHz is 1MHz.

### 3.5. Test Result of Radiated Emission

Product : Car Alarm Transmitter  
Test Item : Fundamental Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Normal Operation

| Freq.                 | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|-----------------------|-------|--------|--------|---------|----------|--------|--------|
| MHz                   | Loss  | Factor |        | Level   |          |        |        |
|                       | dB    | dB/m   | dB     | dBuV    | dBuV/m   | dB     | dBuV/m |
| <b>Horizontal</b>     |       |        |        |         |          |        |        |
| <b>Peak Detector:</b> |       |        |        |         |          |        |        |
| 309.800               | 2.31  | 12.15  | 0.00   | 43.66   | 58.12    | 23.18  | 75.306 |
| 310.000               | 2.31  | 12.08  | 0.00   | 41.83   | 56.22    | 25.08  | 75.318 |
| 310.200               | 2.31  | 12.08  | 0.00   | 46.73   | 61.12    | 20.18  | 75.331 |
| 310.300               | 2.31  | 12.08  | 0.00   | 42.49   | 56.88    | 24.42  | 75.337 |

Peak=58.12dBuV/m; Duty Cycle=20Log(0.809)

Average=Peak+Duty Cycle=56.282dBuV/m

Average Limit=41.6667\*(309.8MHz)-7083.3333=5825.01uV/m=75.306dBuV/m

Peak Limit=75.306+20dB=95.306dBuV/m

Peak=56.22dBuV/m; Duty Cycle=20Log(0.786)

Average=Peak+Duty Cycle=54.129dBuV/m

Average Limit=41.6667\*(310.0MHz)-7083.3333=5833.344uV/m=75.318dBuV/m

Peak Limit=75.318+20dB=95.318dBuV/m

Peak=61.12dBuV/m; Duty Cycle=20Log(0.801)

Average=Peak+Duty Cycle=59.193dBuV/m

Average Limit=41.6667\*(310.20MHz)-7083.3333=5841.677uV/m=75.331dBuV/m

Peak Limit=75.331+20dB=95.331dBuV/m

Peak=56.88dBuV/m; Duty Cycle=20Log(0.798)

Average=Peak+Duty Cycle=54.919dBuV/m

Average Limit=41.6667\*(310.30MHz)-7083.3333=5845.844uV/m=75.337dBuV/m

Peak Limit=75.337+20dB=95.337dBuV/m

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss.

Product : Car Alarm Transmitter  
 Test Item : Fundamental Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation

| Freq. | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz   | Loss  | Factor | dB     | Level   |          |        |        |
|       | dB    | dB/m   |        | dBuV    | dBuV/m   | dB     | dBuV/m |

### Vertical

#### Peak Detector:

|         |      |       |      |       |       |       |        |
|---------|------|-------|------|-------|-------|-------|--------|
| 309.870 | 2.31 | 12.20 | 0.00 | 42.77 | 57.28 | 24.02 | 75.310 |
| 310.000 | 2.31 | 12.20 | 0.00 | 36.85 | 51.36 | 29.94 | 75.318 |
| 310.200 | 2.31 | 12.20 | 0.00 | 45.59 | 60.10 | 21.20 | 75.331 |
| 310.300 | 2.31 | 12.20 | 0.00 | 45.39 | 59.90 | 21.40 | 75.337 |

Peak=57.28dBuV/m; Duty Cycle=20Log(0.809)

Average=Peak+Duty Cycle=55.442dBuV/m

Average Limit=41.6667\*(309.870MHz)-7083.3333=5827.927uV/m=75.310dBuV/m

Peak Limit=75.310+20dB=95.310dBuV/m

Peak=51.36dBuV/m; Duty Cycle=20Log(0.786)

Average=Peak+Duty Cycle=49.269dBuV/m

Average Limit=41.6667\*(310.00MHz)-7083.3333=5833.344uV/m=75.318dBuV/m

Peak Limit=75.318+20dB=95.318dBuV/m

Peak=60.10dBuV/m; Duty Cycle=20Log(0.801)

Average=Peak+Duty Cycle=58.173dBuV/m

Average Limit=41.6667\*(310.20MHz)-7083.3333=5841.677uV/m=75.331dBuV/m

Peak Limit=75.331+20dB=95.331dBuV/m

Peak=59.90dBuV/m; Duty Cycle=20Log(0.798)

Average=Peak+Duty Cycle=57.939dBuV/m

Average Limit=41.6667\*(310.30MHz)-7083.3333=5845.844uV/m=75.337dBuV/m

Peak Limit=75.337+20dB=95.337dBuV/m

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss.

Product : Car Alarm Transmitter  
Test Item : Harmonic Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Normal Operation (Botten1)

| Freq. | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz   | Loss  | Factor |        | Level   |          |        |        |
|       | dB    | dB/m   | dB     | dBuV    | dBuV/m   | dB     | dBuV/m |

### Horizontal

#### Peak Detector:

|          |      |       |      |       |       |       |       |
|----------|------|-------|------|-------|-------|-------|-------|
| 1240.040 | 2.81 | 24.87 | 0.00 | 13.71 | 41.39 | 32.61 | 74.00 |
| 1549.390 | 3.14 | 25.74 | 0.00 | 13.74 | 42.63 | 31.37 | 74.00 |
| 1858.300 | 3.40 | 27.30 | 0.00 | 13.66 | 44.36 | 29.64 | 74.00 |
| 2167.210 | 3.76 | 28.21 | 0.00 | 14.44 | 46.41 | 27.59 | 74.00 |
| 2476.120 | 4.11 | 28.76 | 0.00 | 14.95 | 47.82 | 26.18 | 74.00 |
| 2785.030 | 4.28 | 29.78 | 0.00 | 16.07 | 50.14 | 23.86 | 74.00 |
| 3091.536 | 4.65 | 30.74 | 0.00 | 15.97 | 51.36 | 22.64 | 74.00 |

#### Average Detector:

--

### Vertical

#### Peak Detector:

|          |      |       |      |       |       |       |       |
|----------|------|-------|------|-------|-------|-------|-------|
| 1238.070 | 2.81 | 24.87 | 0.00 | 16.53 | 44.21 | 29.79 | 74.00 |
| 1546.980 | 3.14 | 25.74 | 0.00 | 17.51 | 46.39 | 27.61 | 74.00 |
| 1855.890 | 3.40 | 27.21 | 0.00 | 16.54 | 47.15 | 26.85 | 74.00 |
| 2164.800 | 3.76 | 28.21 | 0.00 | 16.43 | 48.39 | 25.61 | 74.00 |
| 2473.710 | 4.10 | 28.76 | 0.00 | 16.39 | 49.25 | 24.75 | 74.00 |
| 2782.260 | 4.28 | 29.78 | 0.00 | 16.32 | 50.39 | 23.61 | 74.00 |
| 3091.530 | 4.65 | 30.74 | 0.00 | 15.87 | 51.26 | 22.74 | 74.00 |

#### Average Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.



Product : Car Alarm Transmitter  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton2)

| Freq. | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz   | Loss  | Factor | dB     | Level   | dBuV/m   | dB     | dBuV/m |
|       | dB    | dB/m   |        | dBuV    |          |        |        |

### Horizontal

#### Peak Detector:

|          |      |       |      |       |       |       |       |
|----------|------|-------|------|-------|-------|-------|-------|
| 1238.200 | 2.81 | 24.87 | 0.00 | 15.92 | 43.60 | 30.40 | 74.00 |
| 1547.090 | 3.14 | 25.74 | 0.00 | 16.72 | 45.60 | 28.40 | 74.00 |
| 1856.030 | 3.40 | 27.21 | 0.00 | 18.97 | 49.58 | 24.42 | 74.00 |
| 2164.910 | 3.76 | 28.21 | 0.00 | 18.24 | 50.20 | 23.80 | 74.00 |
| 2473.820 | 4.10 | 28.76 | 0.00 | 18.28 | 51.14 | 22.86 | 74.00 |
| 2782.730 | 4.28 | 29.78 | 0.00 | 18.29 | 52.36 | 21.64 | 74.00 |
| 3091.640 | 4.65 | 30.74 | 0.00 | 17.22 | 52.61 | 21.39 | 74.00 |

#### Average Detector:

--

### Vertical

#### Peak Detector:

|          |      |       |      |       |       |       |       |
|----------|------|-------|------|-------|-------|-------|-------|
| 1238.190 | 2.81 | 24.87 | 0.00 | 18.53 | 46.21 | 27.79 | 74.00 |
| 1547.090 | 3.14 | 25.74 | 0.00 | 20.43 | 49.31 | 24.69 | 74.00 |
| 1856.000 | 3.40 | 27.21 | 0.00 | 19.15 | 49.76 | 24.24 | 74.00 |
| 2164.910 | 3.76 | 28.21 | 0.00 | 18.91 | 50.87 | 23.13 | 74.00 |
| 2473.820 | 4.10 | 28.76 | 0.00 | 18.28 | 51.14 | 22.86 | 74.00 |
| 2782.730 | 4.28 | 29.78 | 0.00 | 18.18 | 52.25 | 21.75 | 74.00 |
| 3091.650 | 4.65 | 30.74 | 0.00 | 17.51 | 52.90 | 21.10 | 74.00 |

#### Average Detector:

--

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Car Alarm Transmitter  
Test Item : Harmonic Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Normal Operation (Botton3)

| Freq. | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz   | Loss  | Factor |        | Level   |          |        |        |
|       | dB    | dB/m   | dB     | dBuV    | dBuV/m   | dB     | dBuV/m |

### Horizontal

#### Peak Detector:

|          |      |       |      |       |       |       |       |
|----------|------|-------|------|-------|-------|-------|-------|
| 1238.180 | 2.81 | 24.87 | 0.00 | 15.61 | 43.29 | 30.71 | 74.00 |
| 1547.090 | 3.14 | 25.74 | 0.00 | 16.75 | 45.63 | 28.37 | 74.00 |
| 1856.000 | 3.40 | 27.21 | 0.00 | 16.01 | 46.62 | 27.38 | 74.00 |
| 2164.914 | 3.76 | 28.21 | 0.00 | 15.84 | 47.80 | 26.20 | 74.00 |
| 2473.820 | 4.10 | 28.76 | 0.00 | 15.79 | 48.65 | 25.35 | 74.00 |
| 2782.734 | 4.28 | 29.78 | 0.00 | 15.51 | 49.58 | 24.42 | 74.00 |
| 3091.640 | 4.65 | 30.74 | 0.00 | 15.87 | 51.26 | 22.74 | 74.00 |

#### Average Detector:

--

### Vertical

#### Peak Detector:

|          |      |       |      |       |       |       |       |
|----------|------|-------|------|-------|-------|-------|-------|
| 1238.184 | 2.81 | 24.87 | 0.00 | 18.61 | 46.29 | 27.71 | 74.00 |
| 1547.090 | 3.14 | 25.74 | 0.00 | 18.26 | 47.14 | 26.86 | 74.00 |
| 1856.000 | 3.40 | 27.21 | 0.00 | 18.03 | 48.64 | 25.36 | 74.00 |
| 2164.910 | 3.76 | 28.21 | 0.00 | 17.15 | 49.11 | 24.89 | 74.00 |
| 2473.360 | 4.10 | 28.76 | 0.00 | 17.28 | 50.14 | 23.86 | 74.00 |
| 2782.760 | 4.28 | 29.78 | 0.00 | 17.57 | 51.64 | 22.36 | 74.00 |
| 3091.640 | 4.65 | 30.74 | 0.00 | 16.80 | 52.19 | 21.81 | 74.00 |

#### Average Detector:

--

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Car Alarm Transmitter  
Test Item : Harmonic Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Normal Operation (Botton4)

| Freq. | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz   | Loss  | Factor |        | Level   |          |        |        |
|       | dB    | dB/m   | dB     | dBuV    | dBuV/m   | dB     | dBuV/m |

### Horizontal

#### Peak Detector:

|          |      |       |      |       |       |       |       |
|----------|------|-------|------|-------|-------|-------|-------|
| 1238.120 | 2.81 | 24.87 | 0.00 | 15.60 | 43.28 | 30.72 | 74.00 |
| 1547.600 | 3.14 | 25.74 | 0.00 | 19.48 | 48.36 | 25.64 | 74.00 |
| 1856.000 | 3.40 | 27.21 | 0.00 | 19.40 | 50.01 | 23.99 | 74.00 |
| 2164.910 | 3.76 | 28.21 | 0.00 | 18.15 | 50.11 | 23.89 | 74.00 |
| 2473.820 | 4.10 | 28.76 | 0.00 | 18.14 | 51.00 | 23.00 | 74.00 |
| 2782.734 | 4.28 | 29.78 | 0.00 | 18.11 | 52.18 | 21.82 | 74.00 |
| 3091.640 | 4.65 | 30.74 | 0.00 | 17.30 | 52.69 | 21.31 | 74.00 |

#### Average Detector:

--

### Vertical

#### Peak Detector:

|          |      |       |      |       |       |       |       |
|----------|------|-------|------|-------|-------|-------|-------|
| 1238.180 | 2.81 | 24.87 | 0.00 | 19.88 | 47.56 | 26.44 | 74.00 |
| 1547.090 | 3.14 | 25.74 | 0.00 | 19.75 | 48.63 | 25.37 | 74.00 |
| 1856.000 | 3.40 | 27.21 | 0.00 | 19.13 | 49.74 | 24.26 | 74.00 |
| 2164.920 | 3.76 | 28.21 | 0.00 | 18.90 | 50.86 | 23.14 | 74.00 |
| 2473.820 | 4.10 | 28.76 | 0.00 | 18.34 | 51.20 | 22.80 | 74.00 |
| 2782.700 | 4.28 | 29.78 | 0.00 | 17.67 | 51.74 | 22.26 | 74.00 |
| 3091.600 | 4.65 | 30.74 | 0.00 | 16.95 | 52.34 | 21.66 | 74.00 |

#### Average Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Car Alarm Transmitter  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton1)

| Freq.              | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|--------------------|-------|--------|--------|---------|----------|--------|--------|
| MHz                | Loss  | Factor |        | Level   |          |        |        |
|                    | dB    | dB/m   | dB     | dBuV    | dBuV/m   | dB     | dBuV/m |
| <b>Horizontal:</b> |       |        |        |         |          |        |        |
| 620.132            | 3.91  | 18.67  | 0.00   | 5.57    | 28.14    | 17.86  | 46.00  |
| * 931.262          | 5.51  | 20.13  | 0.00   | 9.18    | 34.82    | 11.18  | 46.00  |
| <b>Vertical:</b>   |       |        |        |         |          |        |        |
| 620.940            | 3.91  | 19.08  | 0.00   | 7.20    | 30.19    | 15.81  | 46.00  |
| * 931.260          | 5.51  | 21.43  | 0.00   | 7.22    | 34.16    | 11.84  | 46.00  |

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 – PreAMP.

Product : Car Alarm Transmitter  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton2)

| Freq. | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz   | Loss  | Factor |        | Level   |          |        |        |
|       | dB    | dB/m   | dB     | dBuV    | dBuV/m   | dB     | dBuV/m |

#### Horizontal

##### Peak Detector:

|           |      |       |      |      |       |       |       |
|-----------|------|-------|------|------|-------|-------|-------|
| 620.132   | 3.91 | 18.67 | 0.00 | 9.00 | 31.57 | 14.43 | 46.00 |
| * 931.840 | 5.52 | 20.03 | 0.00 | 9.05 | 34.59 | 11.41 | 46.00 |

#### Vertical

##### Peak Detector:

|           |      |       |      |       |       |       |       |
|-----------|------|-------|------|-------|-------|-------|-------|
| * 622.933 | 3.92 | 18.89 | 0.00 | 12.29 | 35.10 | 10.90 | 46.00 |
| 931.850   | 5.52 | 21.33 | 0.00 | 5.85  | 32.69 | 13.31 | 46.00 |

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Car Alarm Transmitter  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton3)

| Freq. | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz   | Loss  | Factor |        | Level   |          |        |        |
|       | dB    | dB/m   | dB     | dBuV    | dBuV/m   | dB     | dBuV/m |

#### Horizontal

##### Peak Detector:

|           |      |       |      |      |       |       |       |
|-----------|------|-------|------|------|-------|-------|-------|
| 620.133   | 3.91 | 18.67 | 0.00 | 7.23 | 29.80 | 16.20 | 46.00 |
| * 929.053 | 5.50 | 20.22 | 0.00 | 4.93 | 30.65 | 15.35 | 46.00 |

#### Vertical

##### Peak Detector:

|           |      |       |      |      |       |       |       |
|-----------|------|-------|------|------|-------|-------|-------|
| 620.134   | 3.91 | 19.27 | 0.00 | 7.09 | 30.26 | 15.74 | 46.00 |
| * 929.030 | 5.50 | 21.42 | 0.00 | 8.22 | 35.14 | 10.86 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Car Alarm Transmitter  
Test Item : Harmonic Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Normal Operation (Botton4)

| Freq. | Cable | Probe  | PreAMP | Reading | Emission | Margin | Limit  |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz   | Loss  | Factor | dB     | Level   | dBuV/m   | dB     | dBuV/m |
|       | dB    | dB/m   |        | dBuV    |          |        |        |

#### Horizontal

##### Peak Detector:

|   |         |      |       |      |       |       |       |       |
|---|---------|------|-------|------|-------|-------|-------|-------|
| * | 618.720 | 3.90 | 18.77 | 0.00 | 12.15 | 34.82 | 11.18 | 46.00 |
|   | 927.639 | 5.49 | 20.31 | 0.00 | 7.96  | 33.77 | 12.23 | 46.00 |

#### Vertical

##### Peak Detector:

|   |         |      |       |      |       |       |       |       |
|---|---------|------|-------|------|-------|-------|-------|-------|
|   | 620.135 | 3.91 | 19.27 | 0.00 | 10.08 | 33.25 | 12.75 | 46.00 |
| * | 931.846 | 5.52 | 21.33 | 0.00 | 7.45  | 34.29 | 11.71 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

## 4. Occupied Bandwidth

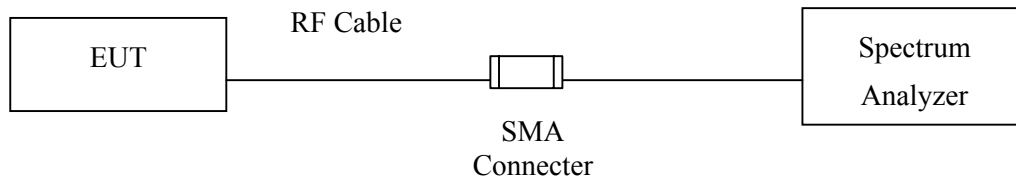
### 4.1. Test Equipment

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

|   | Equipment         | Manufacturer | Model No./Serial No. | Last Cal. |
|---|-------------------|--------------|----------------------|-----------|
| X | Spectrum Analyzer | Advantest    | R3272 / 72421194     | May, 2003 |

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.

### 4.2. Test Setup



### 4.3. Limits

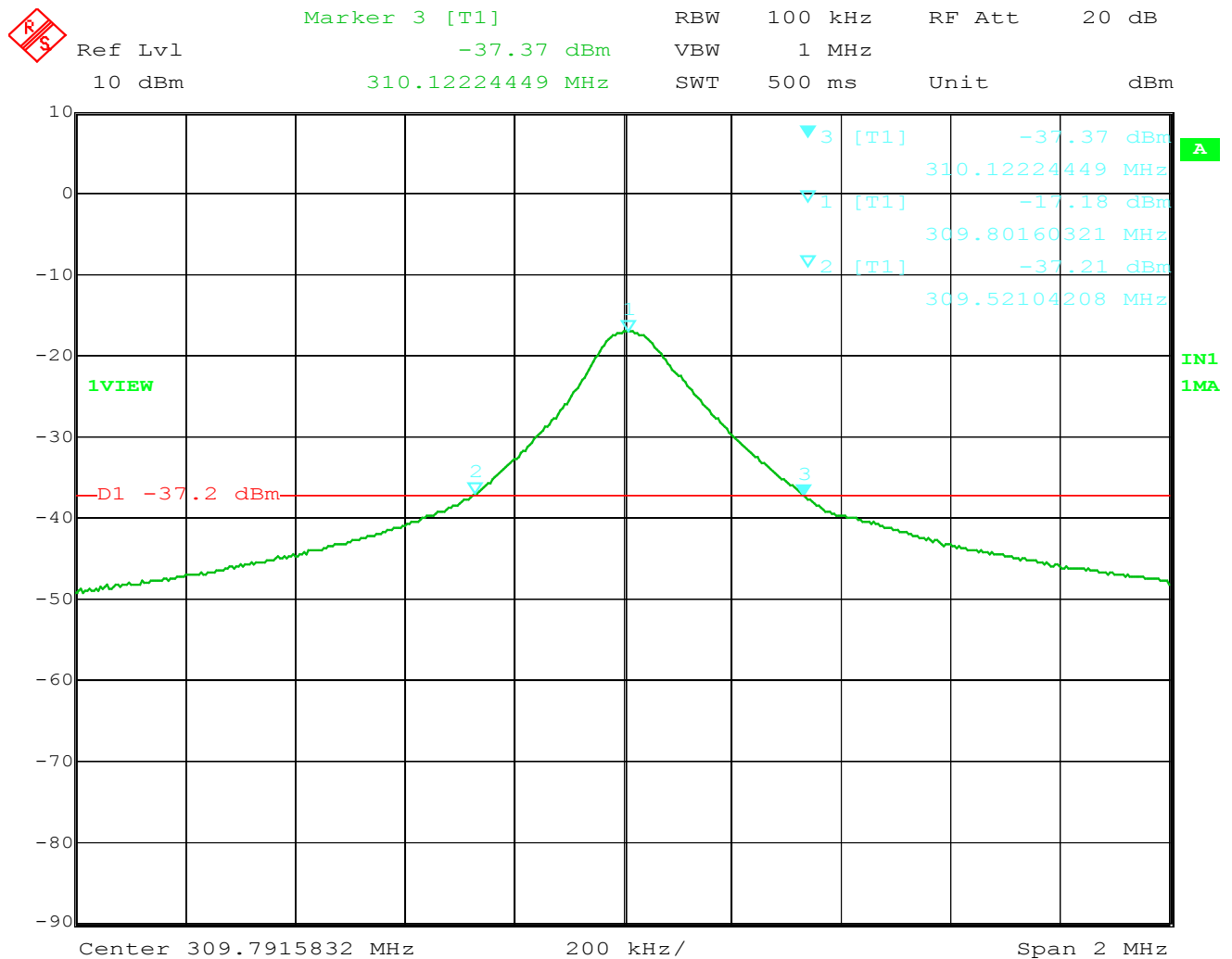
- (1) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz.
- (2) The bandwidth of the emission shall be no wider than 0.5% of the center frequency for devices operating above 900MHz.



#### 4.4. Test Result of Occupied Bandwidth

Product : Car Alarm Transmitter  
 Test Item : Occupied Bandwidth  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton1)

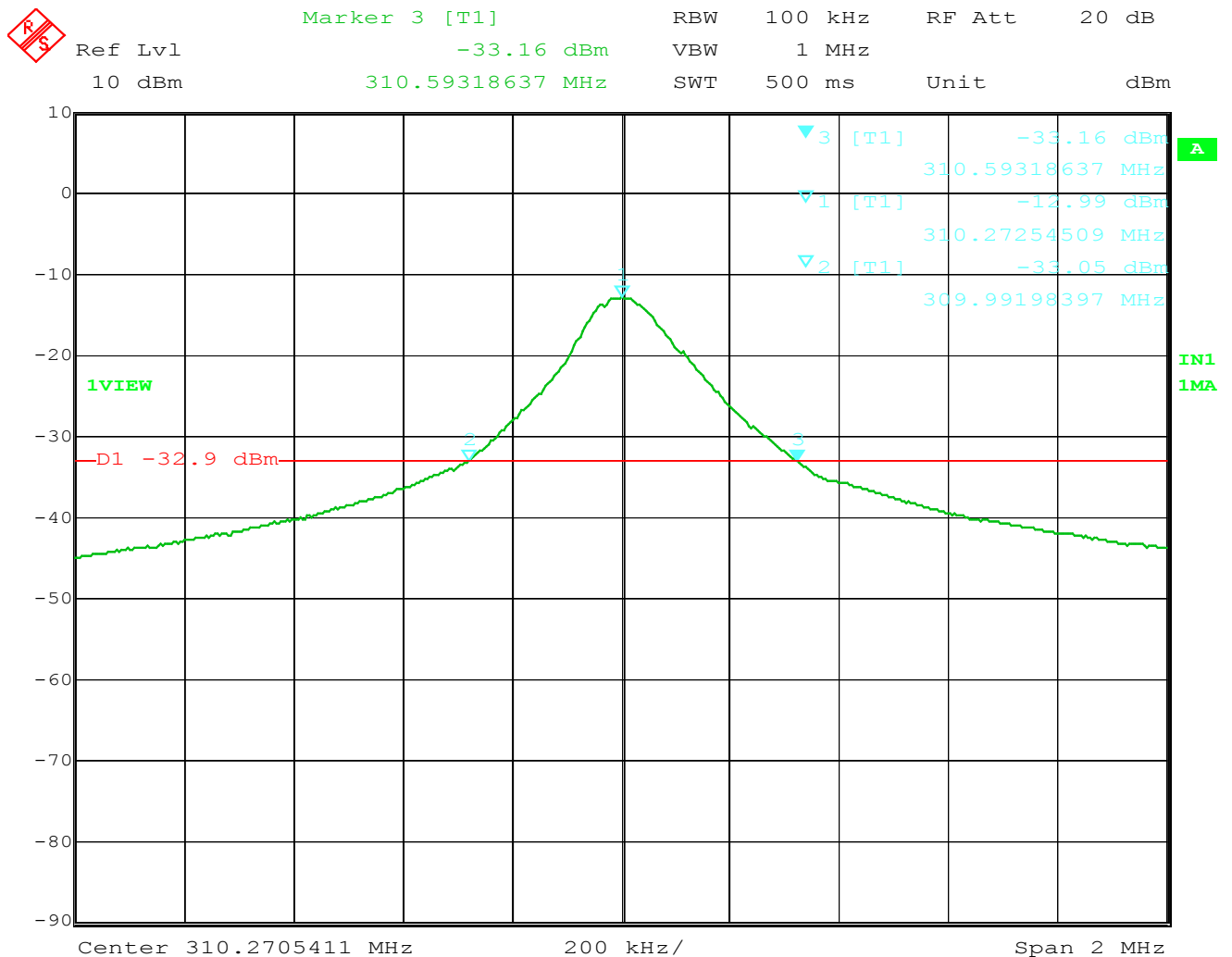
|                                                             |                          |     |
|-------------------------------------------------------------|--------------------------|-----|
| Center Frequency                                            | 309.801                  | MHz |
| Allowable Bandwidth ( 70-900 MHz:0.25%, Above 900MHz: 0.5%) | 775                      | kHz |
| Bandwidth at 20dB down (Max)                                | 602                      | kHz |
| Result                                                      | Complied with regulation |     |



Date: 8.OCT.1998 07:40:24

Product : Car Alarm Transmitter  
 Test Item : Occupied Bandwidth  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton2)

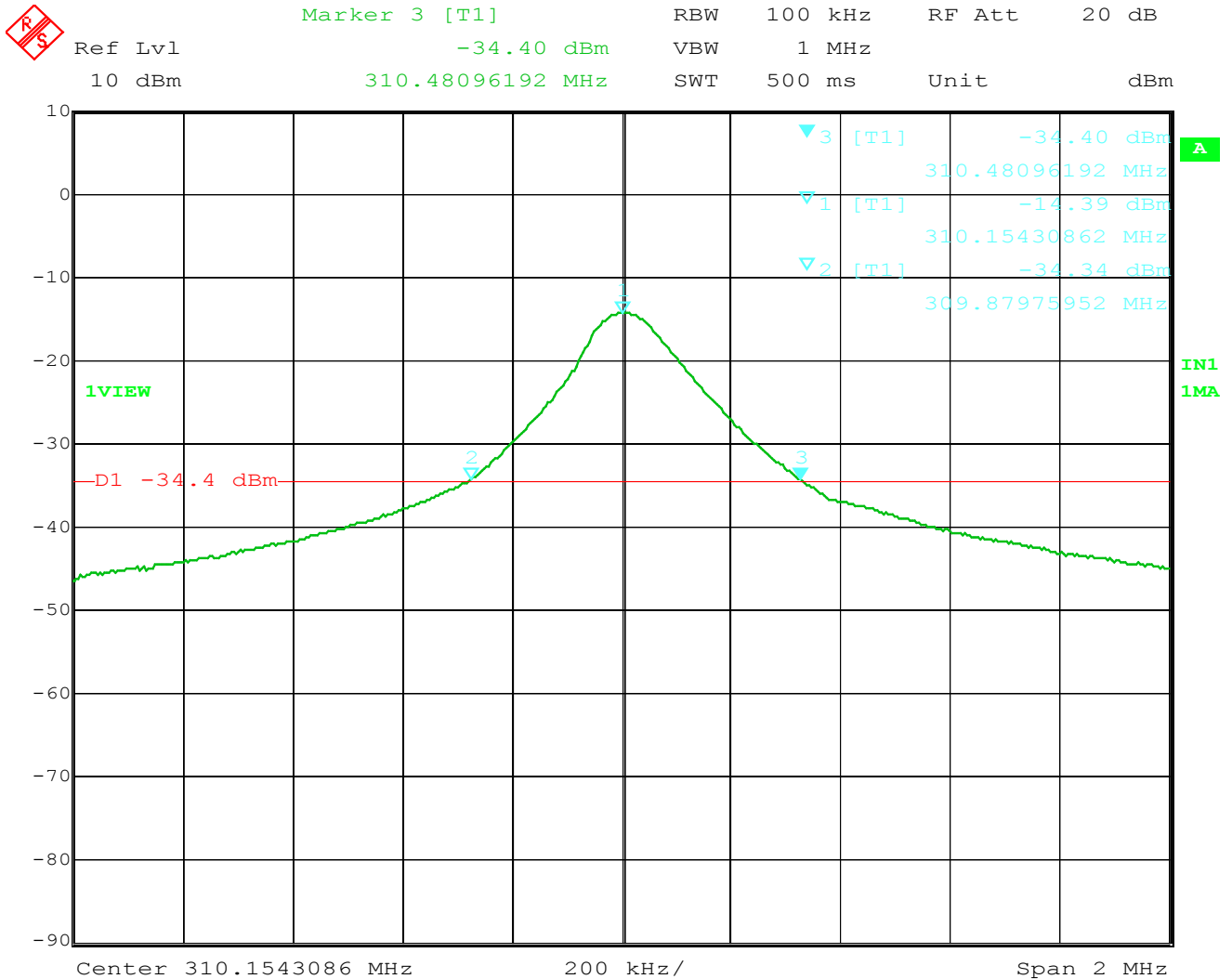
|                                                             |                          |     |
|-------------------------------------------------------------|--------------------------|-----|
| Center Frequency                                            | 310.272                  | MHz |
| Allowable Bandwidth ( 70-900 MHz:0.25%, Above 900MHz: 0.5%) | 776                      | kHz |
| Bandwidth at 20dB down (Max)                                | 601                      | kHz |
| Result                                                      | Complied with regulation |     |



Date: 8.OCT.1998 07:08:54

Product : Car Alarm Transmitter  
 Test Item : Occupied Bandwidth  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton3)

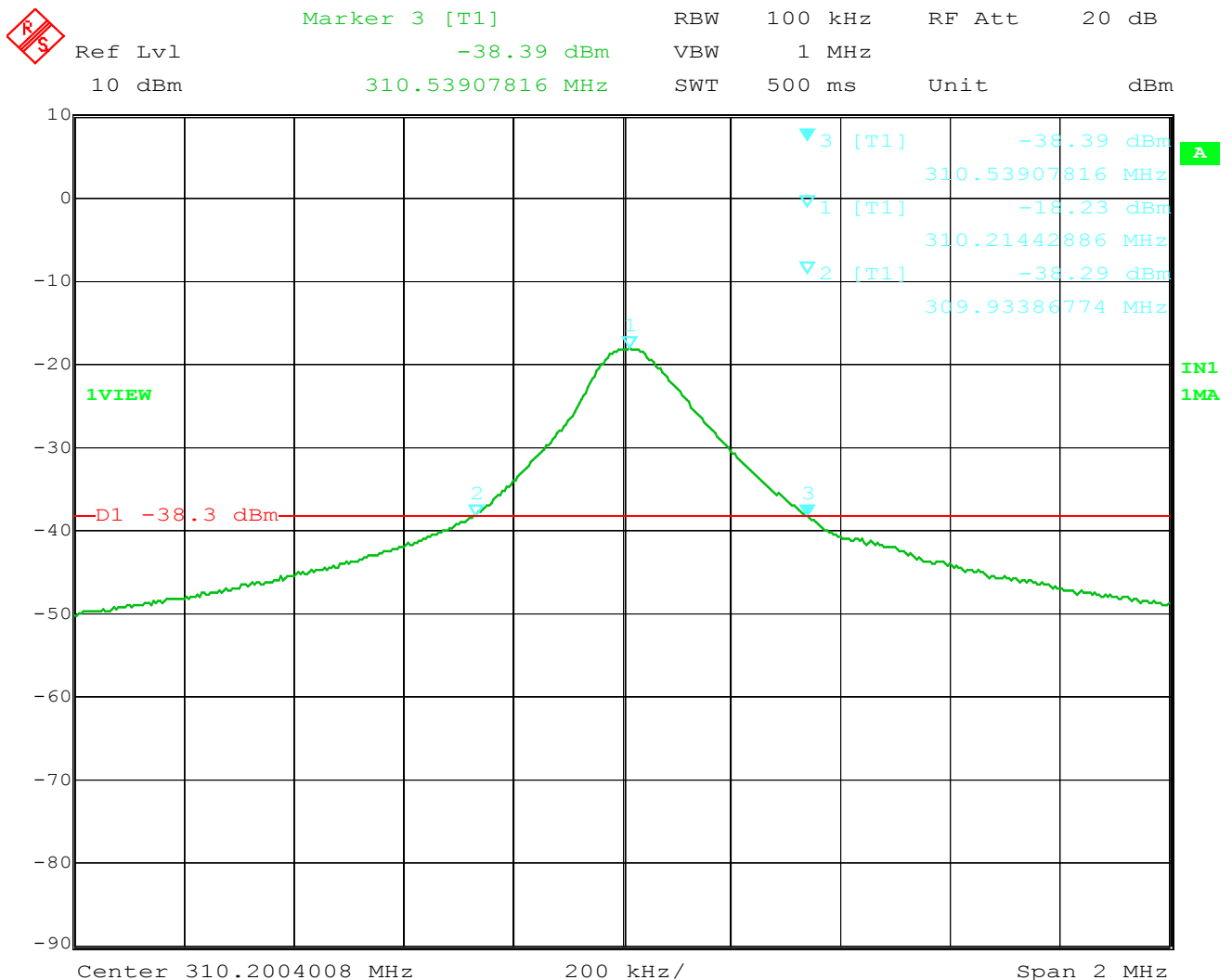
|                                                             |                          |     |
|-------------------------------------------------------------|--------------------------|-----|
| Center Frequency                                            | 310.154                  | MHz |
| Allowable Bandwidth ( 70-900 MHz:0.25%, Above 900MHz: 0.5%) | 776                      | kHz |
| Bandwidth at 20dB down (Max)                                | 601                      | kHz |
| Result                                                      | Complied with regulation |     |



Date: 8.OCT.1998 07:38:34

Product : Car Alarm Transmitter  
 Test Item : Occupied Bandwidth  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton4)

|                                                             |                          |     |
|-------------------------------------------------------------|--------------------------|-----|
| Center Frequency                                            | 310.214                  | MHz |
| Allowable Bandwidth ( 70-900 MHz:0.25%, Above 900MHz: 0.5%) | 776                      | kHz |
| Bandwidth at 20dB down (Max)                                | 606                      | kHz |
| Result                                                      | Complied with regulation |     |



Date: 8.OCT.1998 07:10:43

## 5. Duty Cycle

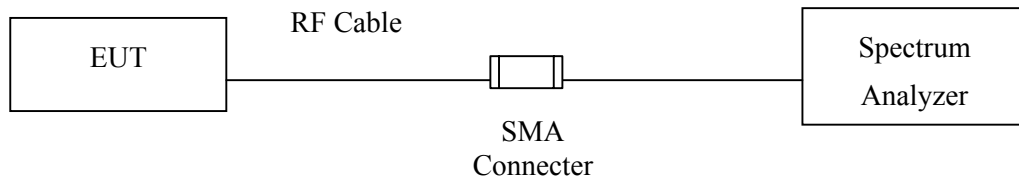
### 5.1. Test Equipment

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

|   | Equipment         | Manufacturer | Model No./Serial No. | Last Cal. |
|---|-------------------|--------------|----------------------|-----------|
| X | Spectrum Analyzer | Advantest    | R3272 / 72421194     | May, 2003 |

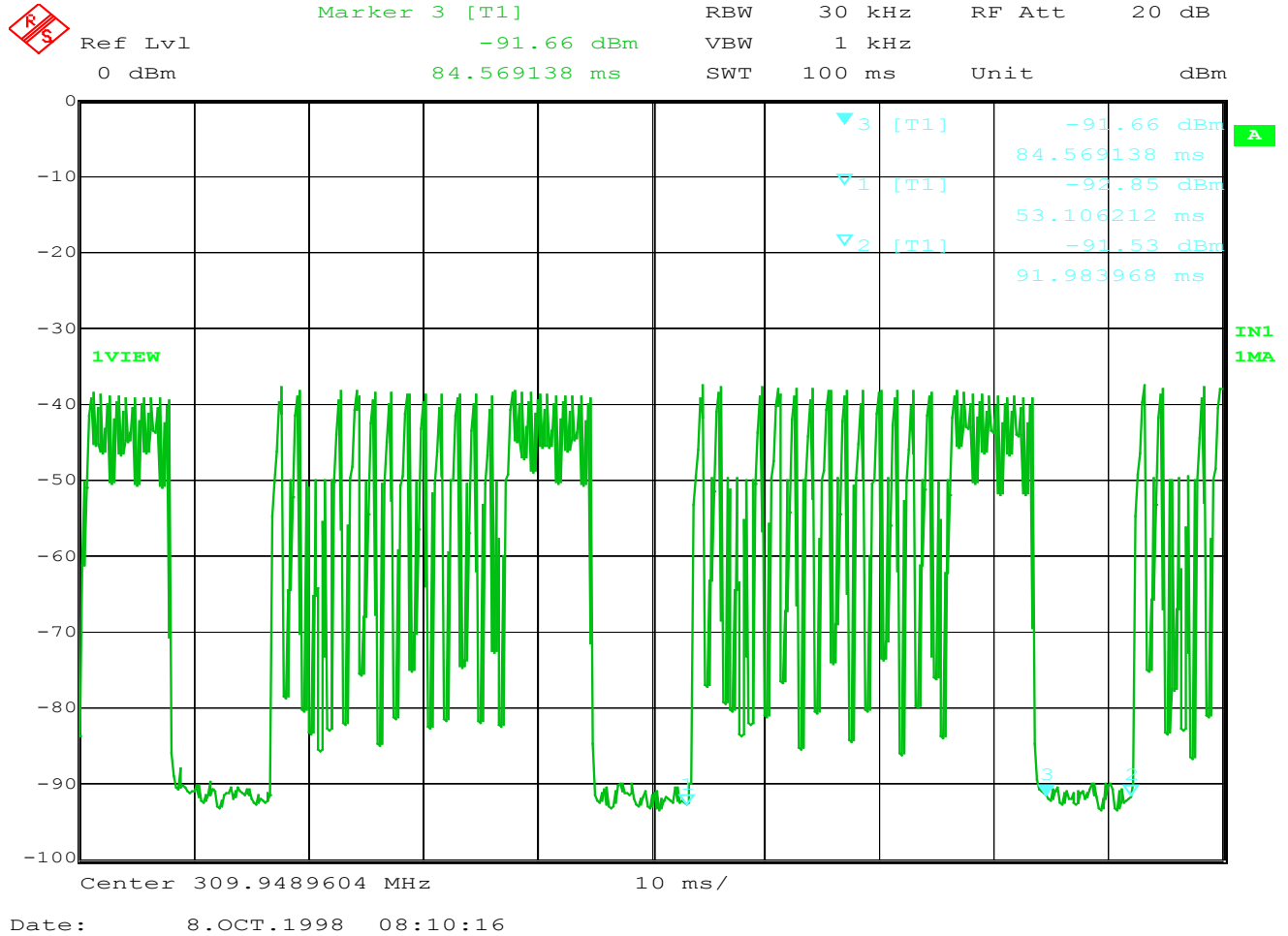
Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.  
2. Mark "X" test instruments are used to measure the final test results.

### 5.2. Test Setup



### 5.3. Test Result of Duty Cycle

Product : Car Alarm Transmitter  
 Test Item : Duty Cycle  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton1)



Duty Cycle:  $91.98396 - 53.10621 = 38.87775\text{ms}$

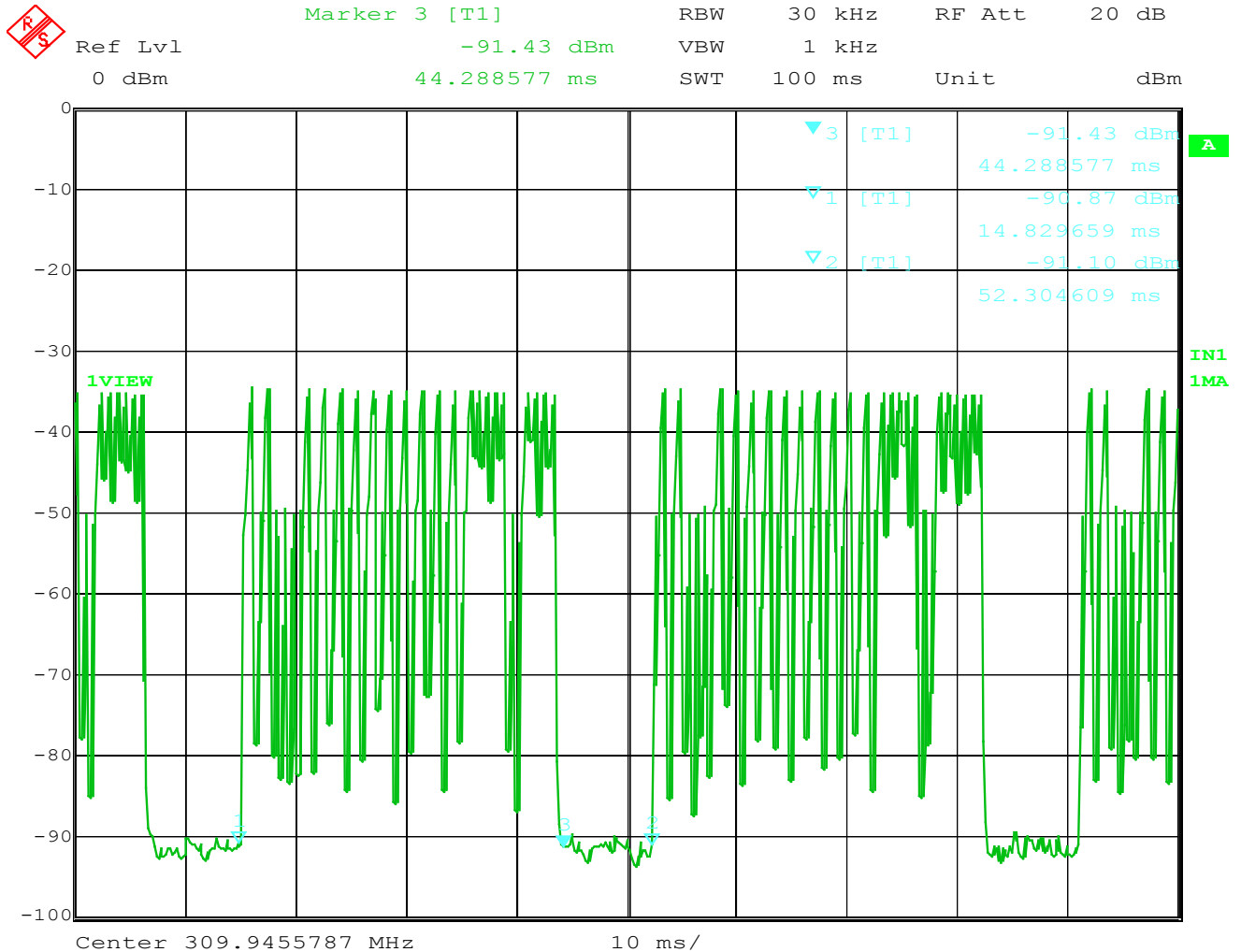
$84.569138 - 53.10621 = 31.462928\text{ms}$

$31.462928 / 38.87775 = 0.809278$

$20 \log 0.809278 = -1.838045\text{dB}$

Duty Cycle = -1.838045dB

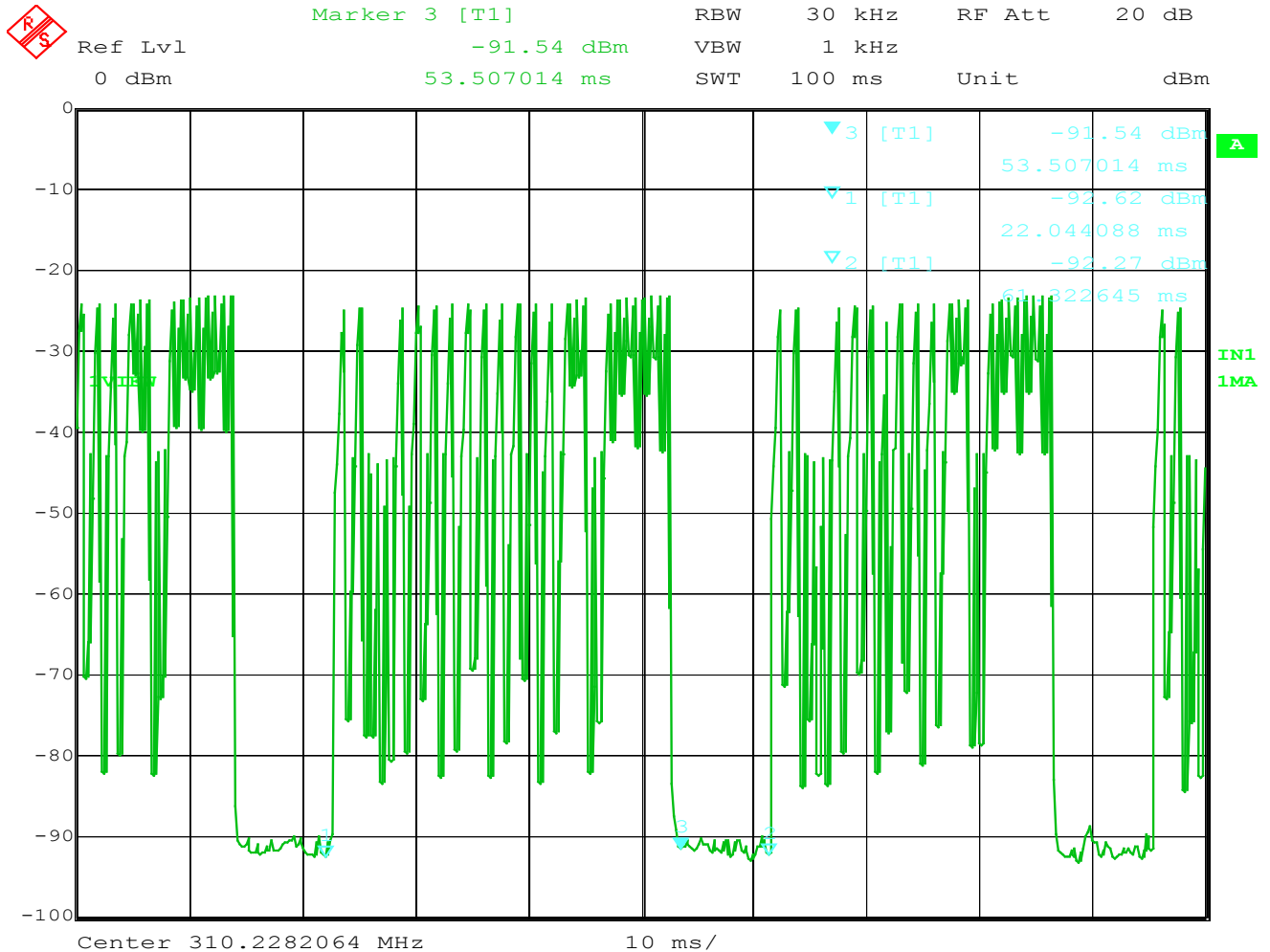
Product : Car Alarm Transmitter  
 Test Item : Duty Cycle  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton2)



Date: 8.OCT.1998 08:08:16

Duty Cycle:  $52.304609 - 14.829659 = 37.47495\text{ms}$   
 $44.288577 - 14.829659 = 29.458918\text{ms}$   
 $29.458918 / 37.47495 = 0.78609625$   
 $20 \log 0.78609 = -2.090554\text{dB}$   
 Duty Cycle= -2.090554dB

Product : Car Alarm Transmitter  
 Test Item : Duty Cycle  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton3)



Date: 8.OCT.1998 08:06:20

Duty Cycle:  $61.322645 - 22.044088 = 39.278\text{ms}$

$53.5070 - 22.044088 = 31.463\text{ms}$

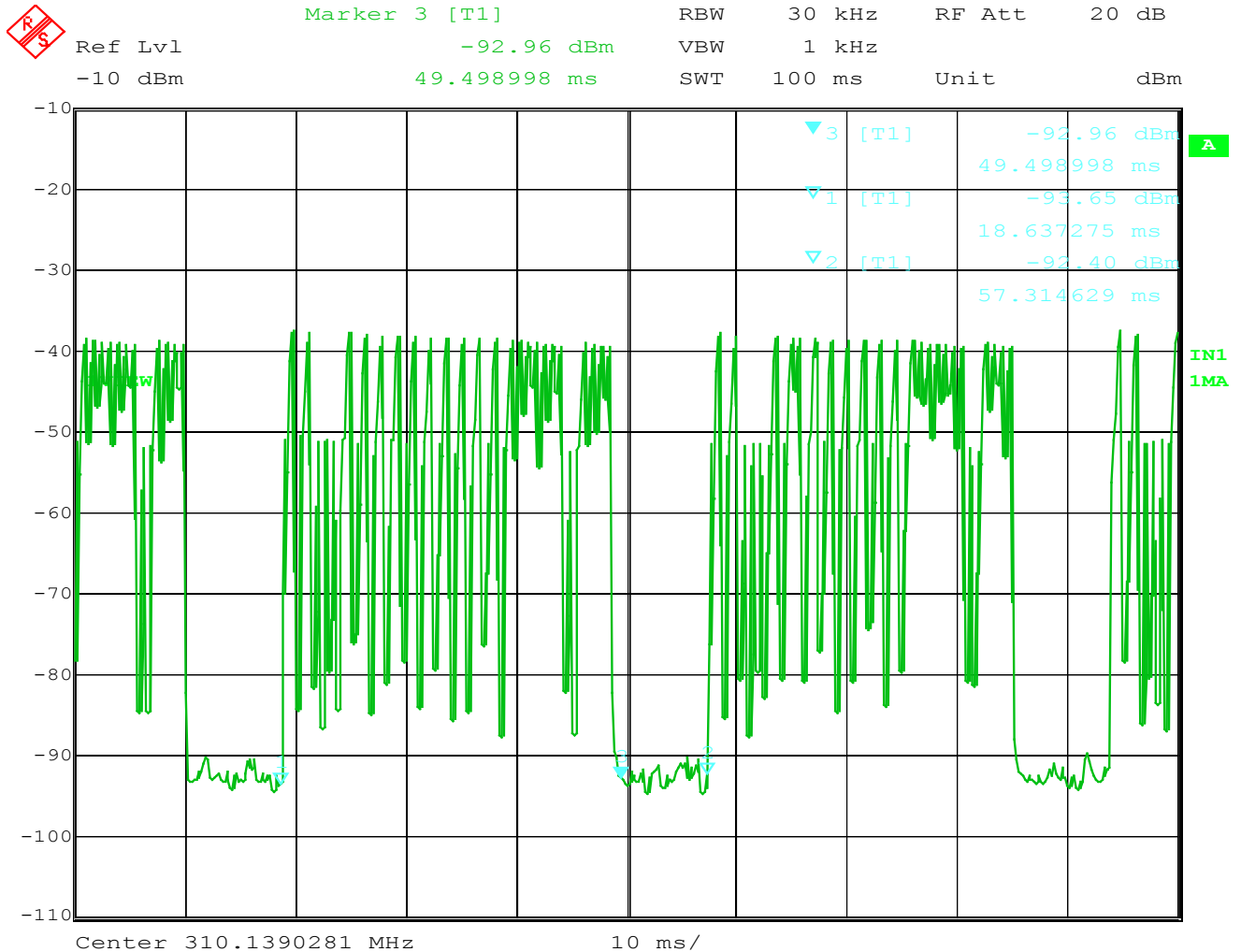
$31.463 / 39.278 = 0.80103$

$20 \log 0.80103 = -1.92698\text{dB}$

Duty Cycle= -1.92698dB



Product : Car Alarm Transmitter  
 Test Item : Duty Cycle  
 Test Site : No.3 OATS  
 Test Mode : Normal Operation (Botton4)



Date: 8.OCT.1998 08:03:02

Duty Cycle:  $57.314629 - 18.637275 = 38.677\text{ms}$   
 $49.498998 - 18.637275 = 30.86165\text{ms}$   
 $30.86165 / 38.677 = 0.797932$   
 $20 \log 0.797932 = -1.96067\text{dB}$   
 Duty Cycle= -1.96067dB

## **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



Front View of Radiated Test (Horn)



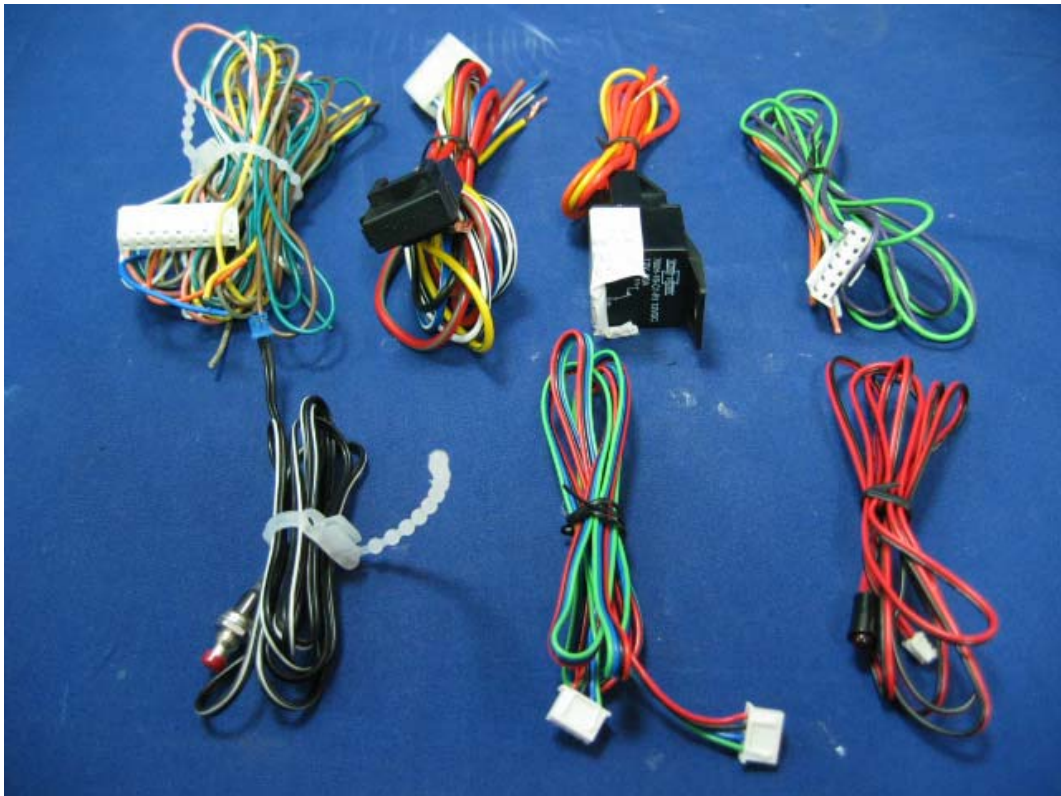
## Attachment 2 : EUT Detailed Photographs

## Attachment 2 : EUT Detailed Photographs

### (1) EUT Photo



### (2) EUT Photo





(3) EUT Photo



(4) EUT Photo





(5) EUT Photo



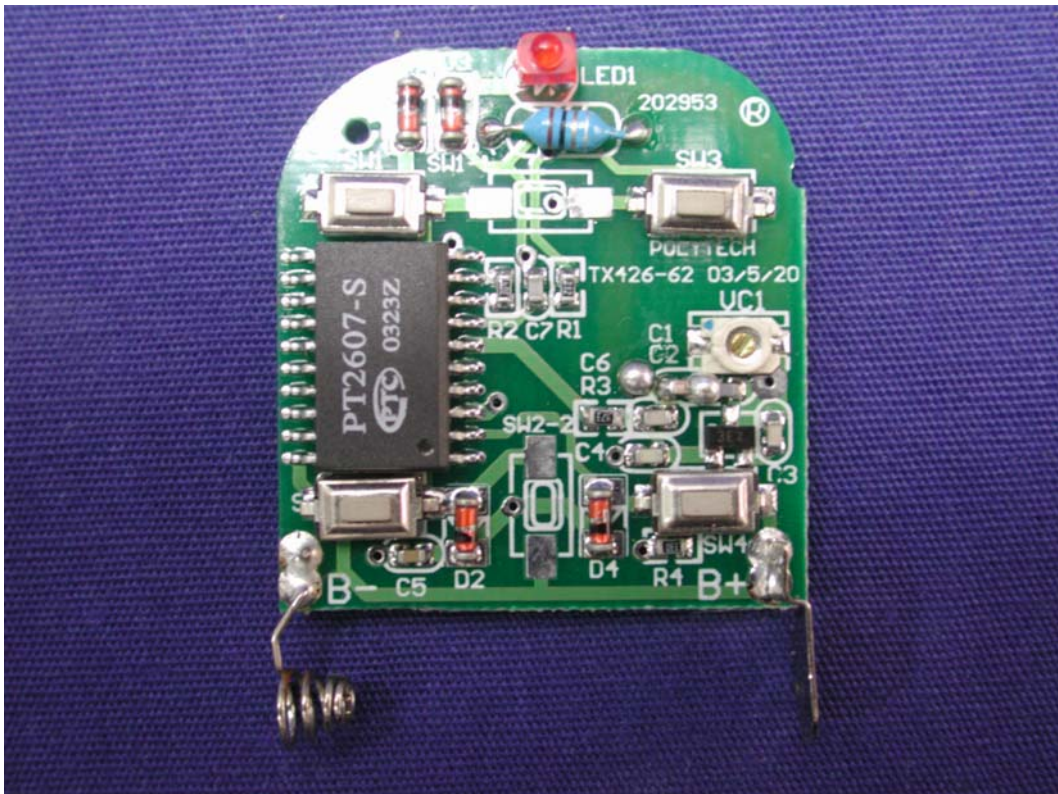
(6) EUT Photo



(7) EUT Photo

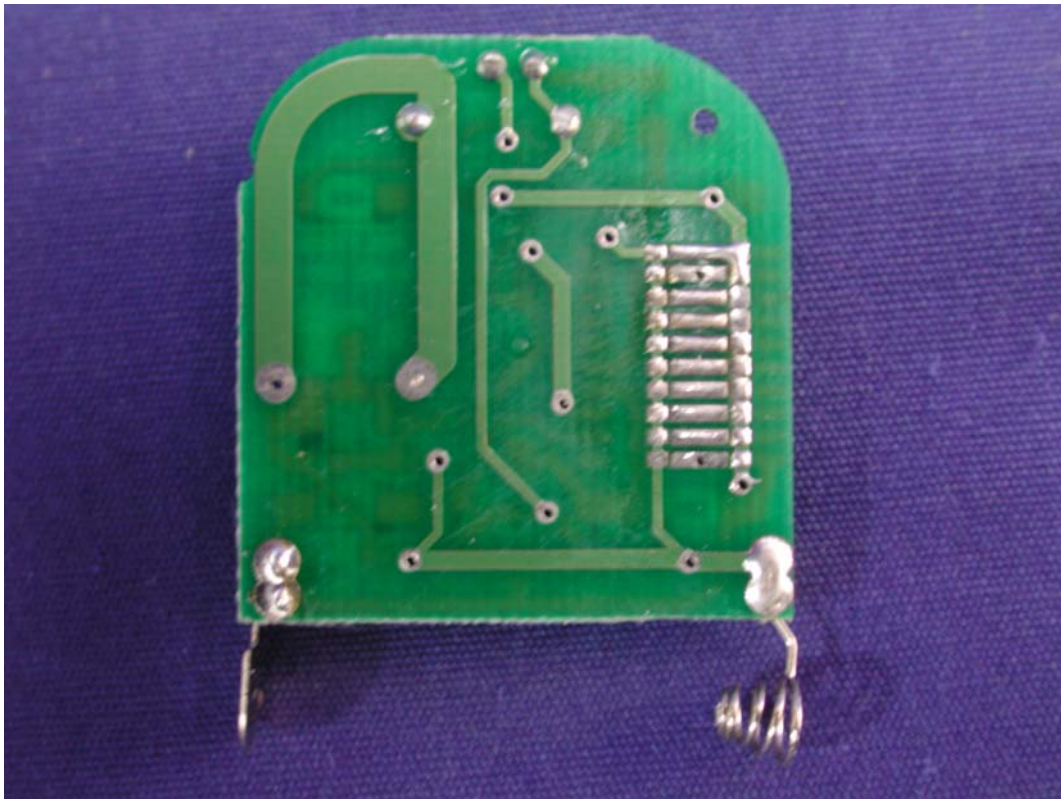


(8) EUT Photo





(9) EUT Photo



(10) EUT Photo



(11) EUT Photo

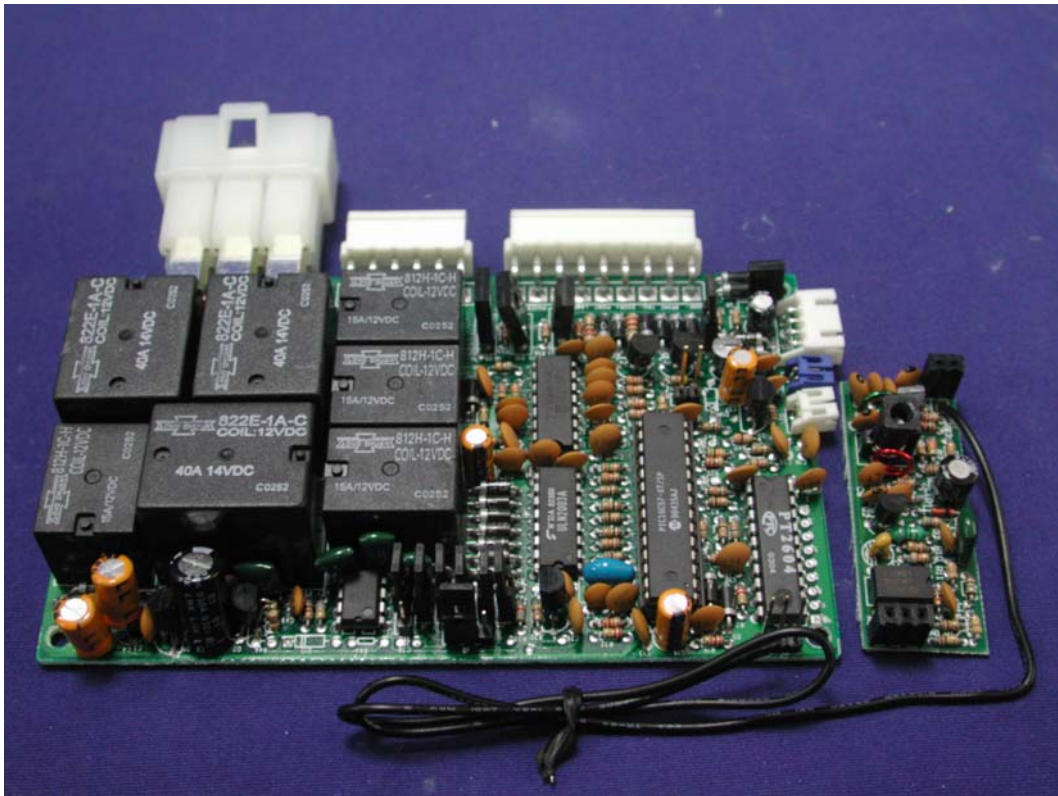


(12) EUT Photo

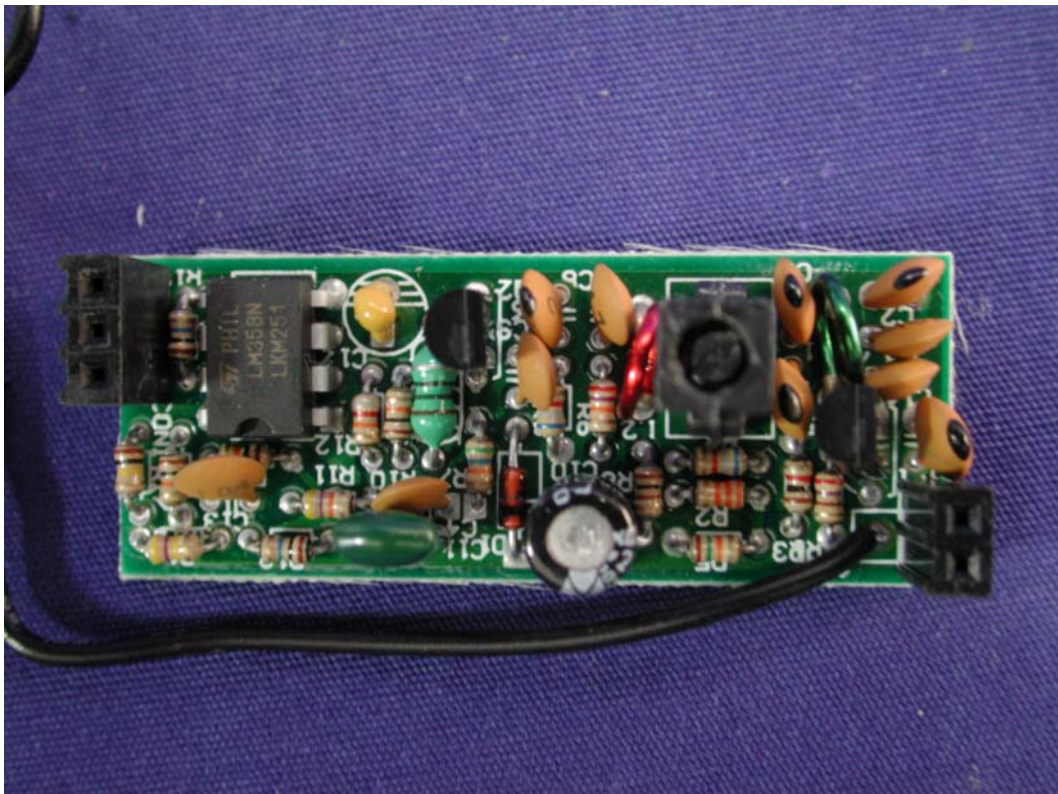




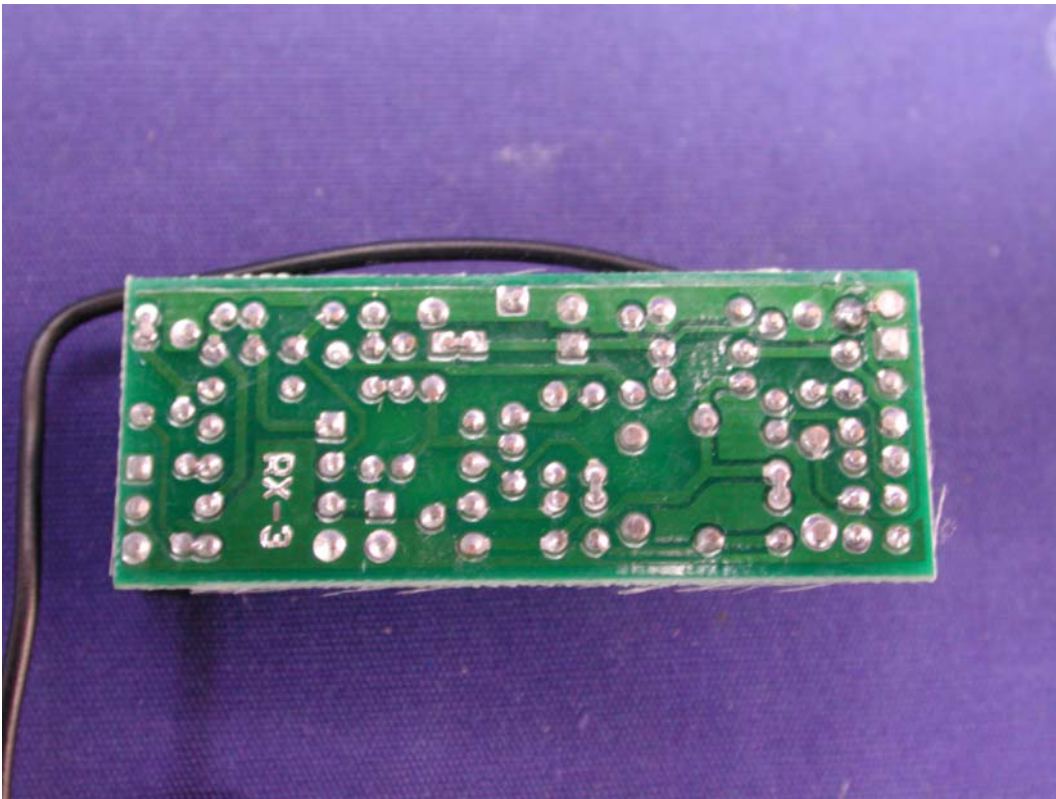
(13) EUT Photo



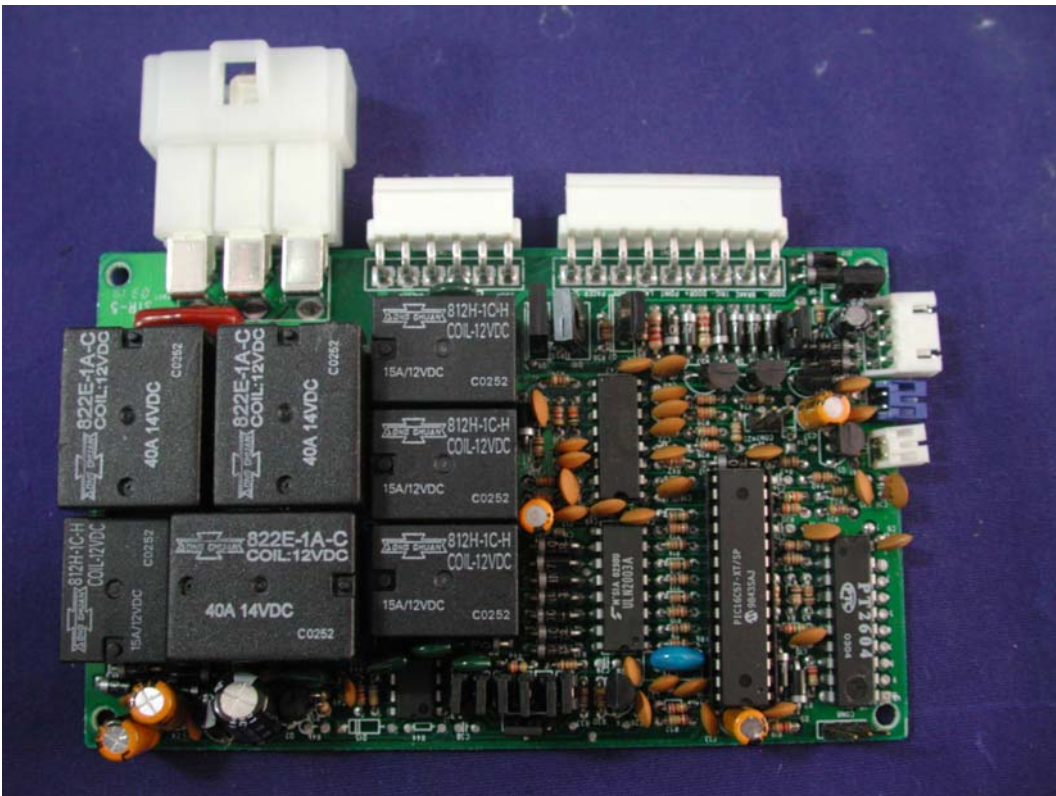
(14) EUT Photo



(15) EUT Photo

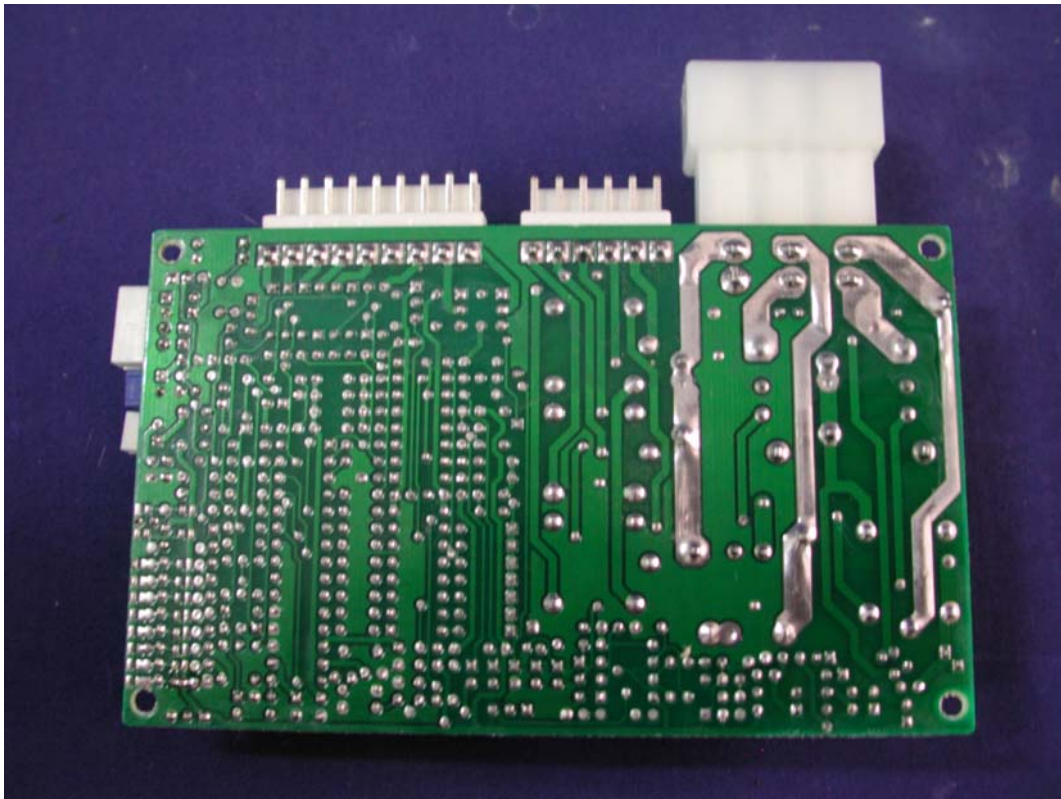


(16) EUT Photo





(17) EUT Photo



(18) EUT Photo

