



**Spectrum Research  
& Testing Lab., Inc.**

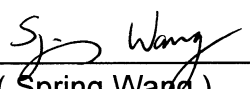
No. 101-10, Ling 8,  
Shan-Tong Li, Chung-Li  
City, Taoyuan, Taiwan,  
R.O.C.

## TEST REPORT

Reference No.:A02081407  
Report No.:FCCA02081407-01  
Page:1 of 19  
Issued Date:Nov. 01, 2002

Product Name: Remote controller (TX)  
Model Number: Tx174FP  
Applicant: IOWA Export-Import Trading Co.  
512 Tuttle Street, Des Moines, Iowa 50309-4168, U.S.A.  
Date of Receipt: Aug. 14, 2002  
Finished date of Test: Nov. 01, 2002  
Applicable Standards: 47 CFR Part 15, Subpart C

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Checked By :  , Date: Nov. 01, 2002  
( Spring Wang )

Approved By :  , Date: Nov. 01, 2002  
( Harris W. Lai, Director )



Lab Code: 200099-0



## Table of Contents

|                                                |    |
|------------------------------------------------|----|
| 1. DOCUMENT POLICY AND TEST STATEMENT .....    | 3  |
| 1.1 DOCUMENT POLICY .....                      | 3  |
| 1.2 TEST STATEMENT .....                       | 3  |
| 2. DESCRIPTION OF EUT AND TEST MODE.....       | 4  |
| 2.1 GENERAL DESCRIPTION OF EUT .....           | 4  |
| 2.2 DESCRIPTION OF EUT INTERNAL DEVICE .....   | 4  |
| 2.3 DESCRIPTION OF TEST MODE .....             | 4  |
| 2.4 DESCRIPTION OF SUPPORT UNIT.....           | 5  |
| 3. DESCRIPTION OF APPLIED STANDARDS .....      | 5  |
| 4. CONDUCTED EMISSION TEST .....               | 5  |
| 5. RADIATED EMISSION TEST .....                | 6  |
| 5.1 RADIATED EMISSION LIMIT .....              | 6  |
| 5.2 TEST EQUIPMENT .....                       | 7  |
| 5.3 TEST SET-UP .....                          | 8  |
| 5.4 TEST PROCEDURE.....                        | 8  |
| 5.5 EUT OPERATING CONDITION.....               | 8  |
| 5.6 RADIATED EMISSION TEST RESULT .....        | 9  |
| 6. BAND EDGE TEST .....                        | 10 |
| 6.1 BAND EDGE LIMIT .....                      | 10 |
| 6.2 TEST EQUIPMENT .....                       | 10 |
| 6.3 TEST SET-UP .....                          | 11 |
| 6.4 TEST PROCEDURE.....                        | 11 |
| 6.5 EUT OPERATING CONDITION.....               | 11 |
| 6.6 BAND EDGE TEST RESULT.....                 | 11 |
| 7. FREQUENCY BANDWIDTH.....                    | 13 |
| 7.1 FREQUENCY BANDWIDTH LIMIT .....            | 13 |
| 7.2 TEST EQUIPMENT .....                       | 13 |
| 7.3 TEST SET-UP .....                          | 13 |
| 7.4 TEST PROCEDURE.....                        | 14 |
| 7.5 EUT OPERATING CONDITION.....               | 14 |
| 7.6 FREQUENCY BANDWIDTH TEST RESULT .....      | 14 |
| 8. RELEASE OR OPERATING TIME .....             | 16 |
| 8.1 RELEASE TIME OR OPERATING LIMIT .....      | 16 |
| 8.2 TEST EQUIPMENT .....                       | 16 |
| 8.3 TEST SET-UP .....                          | 16 |
| 8.4 TEST PROCEDURE.....                        | 16 |
| 8.5 EUT OPERATING CONDITION.....               | 17 |
| 8.6 RELEASE OR OPERATING TIME TEST RESULT..... | 17 |
| 9. PHOTOS OF TESTING .....                     | 18 |
| 10. TERMS OF ABRIVATION .....                  | 19 |

|                                                                                                                                                                                                                          |                      |                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------|
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------|

## 1. DOCUMENT POLICY AND TEST STATEMENT

### 1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the applicant to claim that the product is endorsed by NVLAP.
- The NVLAP logo applies only to the applicable standards specified in this report.

### 1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- The new battery power source 12 Vdc, was used during the test.

|                                                                                                                                                                                                                          |                      |                                                                                                   |
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------|

## 2. DESCRIPTION OF EUT AND TEST MODE

### 2.1 GENERAL DESCRIPTION OF EUT

|                                 |                                |
|---------------------------------|--------------------------------|
| <b>PRODUCT</b>                  | Remote controller (TX)         |
| <b>MODEL NO.</b>                | Tx174FP                        |
| <b>POWER SUPPLY</b>             | 12Vdc(Battery)                 |
| <b>CABLE</b>                    | N/A                            |
| <b>I/O PORT/INTERFACE</b>       | N/A                            |
| <b>FREQUENCY BAND</b>           | 303.875MHz                     |
| <b>CARRIER FREQUENCY</b>        | 303.875MHz                     |
| <b>NUMBER OF CHANNEL</b>        | 1                              |
| <b>CHANNEL SPACING</b>          | N/A                            |
| <b>RF OUTPUT POWER</b>          | -25 dBm (eirp)                 |
| <b>I.F. &amp; L.O.</b>          | L.O 303.875MHz                 |
| <b>MODULATION TYPE</b>          | ASK                            |
| <b>BIT RATE OF TRANSMISSION</b> | 4 kbps                         |
| <b>ANTENNA TYPE</b>             | Loop Antenna integrated on PCB |

**NOTE:** The EUT is the transmitter part of a remote controller which includes a receiver part. For more detailed information, please refer to the specifications or User's manual provided by manufacturer.

### 2.2 DESCRIPTION OF EUT INTERNAL DEVICE

| DEVICE | BRAND / MAKER | MODEL # | FCC ID/DOC | REMARK |
|--------|---------------|---------|------------|--------|
| N/A    |               |         |            |        |
|        |               |         |            |        |
|        |               |         |            |        |

### 2.3 DESCRIPTION OF TEST MODE

The EUT was operated in continually transmitting mode.

|                                                                                                                                                                                                                          |                      |                                                                                                   |
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------|

## 2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4 and CISPR 22. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

| NO | DEVICE | BRAND | MODEL # | FCC ID/DOC | CABLE |
|----|--------|-------|---------|------------|-------|
|    | N/A    |       |         |            |       |
|    |        |       |         |            |       |
|    |        |       |         |            |       |
|    |        |       |         |            |       |

**NOTE:** For the actual test configuration, please refer to the photos of testing.

## 3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of wireless product and according to the specifications provided by the applicant, must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C

All tests have been performed and recorded as per the above standards.

## 4. CONDUCTED EMISSION TEST

The test item was not performed, because the EUT uses 12Vdc battery as power source.

## 5. RADIATED EMISSION TEST

### 5.1 RADIATED EMISSION LIMIT

FCC part15C 15.209 limits of radiated emission measurement for frequency below 1000 MHz

| FREQUENCY (MHz) | DISTANCE (m) | FIELS STRENGTH (dBμV/m) |
|-----------------|--------------|-------------------------|
| 30 - 88         | 3            | 40.0                    |
| 88 - 216        | 3            | 43.5                    |
| 216 - 960       | 3            | 46.0                    |
| ABOVE 960       | 3            | 54.0                    |

FCC part15C 15.231(b) limit of fundamental and spurious emissions measurement.

| FREQUENCY (MHz) | Field Strength of Fundamental (microvolts/meter) | Field Strength of Spurious Emissions (microvolts/meter) |
|-----------------|--------------------------------------------------|---------------------------------------------------------|
| 40.66-40.70     | 2250                                             | 225                                                     |
| 70-130          | 1250                                             | 125                                                     |
| 130-174         | 1250 to 3750 (NOTE 5)                            | 125 to 375 (NOTE 7)                                     |
| 174-260         | 3750                                             | 375 (NOTE 7)                                            |
| 260-470         | 3750 to 12500 (NOTE 6)                           | 375 to 1250                                             |
| Above 470       | 12500                                            | 1250                                                    |

#### NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).
3. In the emission tables above, the tighter limit applies at the band edges.
4. Distance refers to the distance between measuring nstrument, antenna, and the closest point of any part of the device or system.
5. Limit =  $20\log(56.81818(F) - 6136.3636)$  ; F : Fundamental Frequency (MHz)
6. Limit =  $20\log(41.667 \times F - 7083.3333)$  ; F : Fundamental Frequency (MHz)
7. Limit = The Limit of Fundamental Frequency – 20dB
8. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

|                                                                                                                                                                                                                          |                      |                                                                                                   |
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------|

## 5.2 TEST EQUIPMENT

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

| EQUIPMENT/<br>FACILITIES | SPECIFICATIONS                  | MANUFACTURER       | MODEL#/<br>SERIAL#    | DUE DATE OF CAL. &<br>CAL. CENTER |
|--------------------------|---------------------------------|--------------------|-----------------------|-----------------------------------|
| EMI TEST<br>RECEIVER     | 9 kHz TO<br>2750 MHz            | ROHDE &<br>SCHWARZ | ESCS30/<br>836858/008 | DEC. 2002<br>R&S                  |
| BI-LOG<br>ANTENNA        | 25 MHz TO<br>2 GHz              | EMCO               | 3142/<br>9701-1124    | APR. 2003<br>ETC                  |
| PRE-AMPLIFIER            | 1GHz-26.5GHz<br>Gain:30dB(typ.) | HP                 | 8449B/<br>3008A01019  | NOV. 2002<br>ETC                  |
| SPECTRUM                 | 9KHz TO 26.5GHz                 | HP                 | 8953E/<br>3710A03220  | MAY 2003<br>ETC                   |
| HORN ANTENNA             | 1GHz TO 18GHz                   | EMCO               | 3115/<br>9012-3619    | JAN. 2003<br>ETC                  |
| OATS                     | 3 – 10 M<br>MEASUREMENT         | SRT                | SRT-1                 | MAY 2003<br>SRT                   |

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.
2. The Open Area Test Site (SRT-1) is registered by FCC with No. 90957 and VCCI with No. R-1081.
3. The Open Area Test Site (SRT-2) is registered by FCC with No. 98458 and VCCI with No. R-1168.



## 5.6 RADIATED EMISSION TEST RESULT

|                    |              |                    |           |
|--------------------|--------------|--------------------|-----------|
| Temperature:       | 30°C         | Humidity:          | 52%RH     |
| Ferquency Range:   | 30MHz - 2GHz | Measured Distance: | 3m        |
| Receiver Detector: | Q.P.         | Tested by:         | James Lee |

Antenna Polarization : Horizontal

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB) | Reading Data (dBμV) | Emission Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | AZ(°) | EL(m) |
|-----------------|-----------------|---------------------|---------------------|-------------------------|----------------|-------------|-------|-------|
| 303.870         | 1.64            | 14.92               | 54.8                | 71.3                    | 74.9           | -3.6        | 250.0 | 1.0   |
| 607.616         | 2.37            | 20.77               | 24.7                | 47.8                    | 54.9           | -6.2        | 25.0  | 1.2   |
| 911.393         | 2.91            | 23.71               | 19.4                | 46.0                    | 54.9           | -8.0        | 190.0 | 1.2   |
| 1215.480        | *               | *                   | *                   | *                       | *              | *           | *     | *     |
| 1519.350        | *               | *                   | *                   | *                       | *              | *           | *     | *     |

Antenna Polarization : Vertical

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB) | Reading Data (dBμV) | Emission Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | AZ(°) | EL(m) |
|-----------------|-----------------|---------------------|---------------------|-------------------------|----------------|-------------|-------|-------|
| 303.860         | 1.64            | 14.92               | 31.5                | 48.1                    | 74.9           | -26.8       | 21.0  | 1.2   |
| 607.616         | 2.37            | 20.77               | 14.9                | 38.1                    | 54.9           | -15.9       | 300.0 | 1.3   |
| 911.393         | 2.91            | 23.71               | 12.8                | 39.4                    | 54.9           | -14.6       | 280.0 | 1.0   |
| 1215.480        | *               | *                   | *                   | *                       | *              | *           | *     | *     |
| 1519.350        | *               | *                   | *                   | *                       | *              | *           | *     | *     |

### NOTE :

1. Measurement uncertainty is less than +/- 4dB.
2. "\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.
- 5.The emission level is lower than equipment 's noise.

|                                                                                                                                                                                                                          |                      |                                                                                                    |
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------|

## 6. BAND EDGE TEST

### 6.1 BAND EDGE LIMIT

FCC part15C 15.231(b) limit of fundamental and spurious emissions measurement.

| FREQUENCY (MHz) | Field Strength of Fundamental (microvolts/meter) | Field Strength of Spurious Emissions (microvolts/meter) |
|-----------------|--------------------------------------------------|---------------------------------------------------------|
| 40.66-40.70     | 2250                                             | 225                                                     |
| 70-130          | 1250                                             | 125                                                     |
| 130-174         | 1250 to 3750 (NOTE 4)                            | 125 to 375 (NOTE 6)                                     |
| 174-260         | 3750                                             | 375                                                     |
| 260-470         | 3750 to 12500 (NOTE 5)                           | 375 to 1250 (NOTE 6)                                    |
| Above 470       | 12500                                            | 1250                                                    |

#### NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level ( $\mu\text{V/m}$ ) =  $20 \log$  Emission level ( $\mu\text{V/m}$ ).
3. In the emission tables above, the tighter limit applies at the band edges.
4. Limit =  $20 \log(56.81818(F) - 6136.3636)$  ; F : Fundamental Frequency (MHz)
5. Limit =  $20 \log(41.667 \times F - 7083.3333)$  ; F : Fundamental Frequency (MHz)
6. Limit = The Limit of Fundamental Frequency – 20dB
7. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

### 6.2 TEST EQUIPMENT

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

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER    | MODEL#/ SERIAL#     | DUE DATE OF CAL. & CAL. CENTER |
|-----------------------|----------------|-----------------|---------------------|--------------------------------|
| SPECTRUM              | 9 kHz TO 7GHz  | ROHDE & SCHWARZ | FSP7/<br>839511/010 | MAR. 2003<br>ETC               |

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 6.3 TEST SET-UP

The EUT was connected to Receiver(or spectrum) by 50Ω coaxial cable.



### 6.4 TEST PROCEDURE

Please refer to FCC Part15C 15.231.

### 6.5 EUT OPERATING CONDITION

Same as section 2.3 of this report.

### 6.6 BAND EDGE TEST RESULT

|                    |              |            |                  |
|--------------------|--------------|------------|------------------|
| Temperature:       | <u>25 °C</u> | Humidity:  | <u>60%RH</u>     |
| Receiver Detector: | <u>PK.</u>   | Tested by: | <u>James Lee</u> |

| Frequency<br>(MHz) | RF LEVEL<br>120kHz Bw<br>(dBμV) | Limit<br>(dBμV) | Margin<br>(dB) |
|--------------------|---------------------------------|-----------------|----------------|
| 312.574            | 17.93                           | 56.74           | -38.81         |
|                    |                                 |                 |                |
|                    |                                 |                 |                |

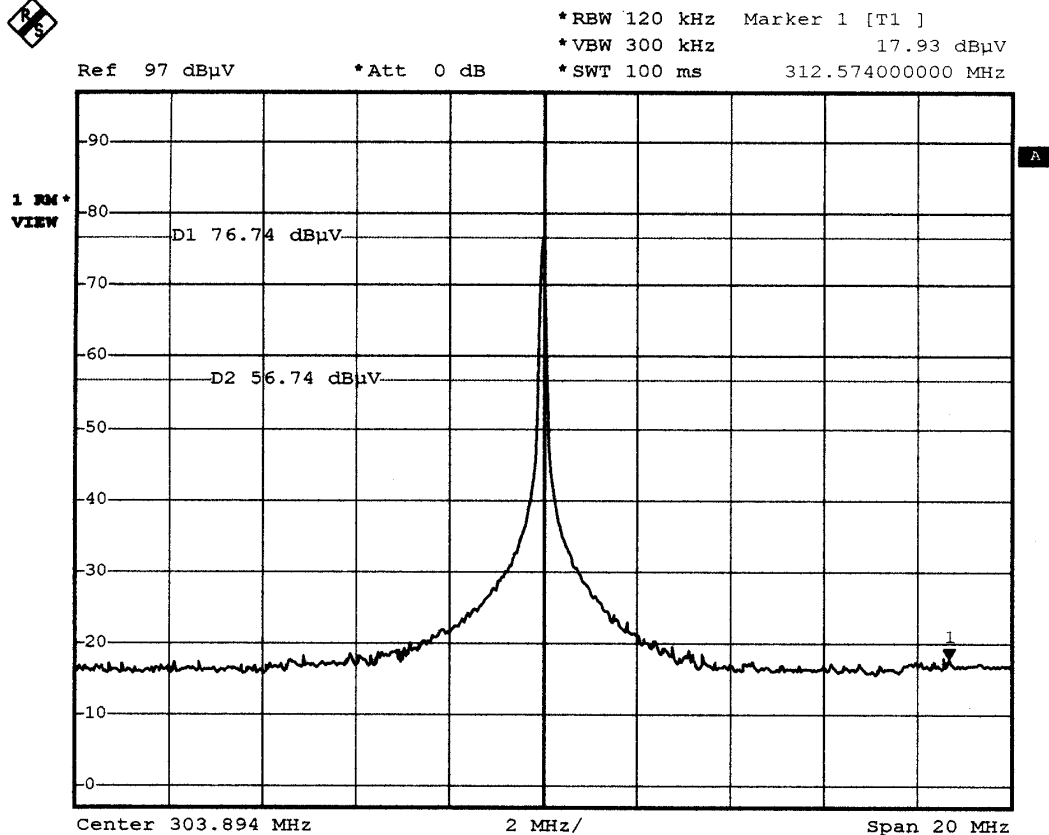


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# TEST REPORT

Reference No.:A02081407  
ReportNo.:FCCA02081407-01  
Page:12 of 19  
Issued Date:Nov. 01, 2002



Date: 20.AUG.2002 07:04:15

## 7. FREQUENCY BANDWIDTH

### 7.1 FREQUENCY BANDWIDTH LIMIT

| FREQUENCY (MHz) | BANDWIDTH LIMIT(kHz)        |
|-----------------|-----------------------------|
| Above 70-900    | 0.25%×Center Frequency(MHz) |
| Above 900       | 0.5% ×Center Frequency(MHz) |

**NOTE:**

1. Bandwidth is determined at the points 20dB down from the modulated carrier.

### 7.2 TEST EQUIPMENT

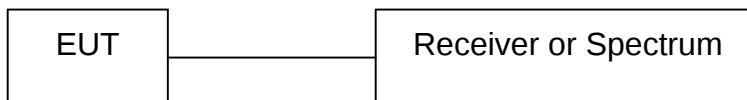
The following test equipment was used during the radiated emission test :

| EQUIPMENT/<br>FACILITIES | SPECIFICATIONS | MANUFACTURER       | MODEL#/<br>SERIAL#  | DUE DATE OF CAL. &<br>CAL. CENTER |
|--------------------------|----------------|--------------------|---------------------|-----------------------------------|
| SPECTRUM                 | 9 kHz TO 7GHz  | ROHDE &<br>SCHWARZ | FSP7/<br>839511/010 | MAR. 2003<br>ETC                  |

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 7.3 TEST SET-UP

The EUT was connected to Receiver(or spectrum) by 50Ω coaxial cable.



|                                                                                                                                                                                                                          |                      |                                                                                                    |
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------|

## 7.4 TEST PROCEDURE

Please refer to FCC Part15C 15.231.

## 7.5 EUT OPERATING CONDITION

Same as section 2.3 of this report.

## 7.6 FREQUENCY BANDWIDTH TEST RESULT

|                    |              |            |                  |
|--------------------|--------------|------------|------------------|
| Temperature:       | <u>25 °C</u> | Humidity:  | <u>60%RH</u>     |
| Receiver Detector: | <u>PK.</u>   | Tested by: | <u>James Lee</u> |
| Test Result:       | <u>Pass</u>  |            |                  |

| CHANNEL | FREQUENCY<br>(MHz) | <u>20</u> dB<br>DOWN<br>BANDWIDTH<br>(kHz) | MINIMUM<br>LIMIT<br>(kHz) | MAXMUM<br>LIMIT<br>(kHz) |
|---------|--------------------|--------------------------------------------|---------------------------|--------------------------|
| 1       | 303.868            | 226                                        | N/A                       | 759.67                   |
|         |                    |                                            |                           |                          |



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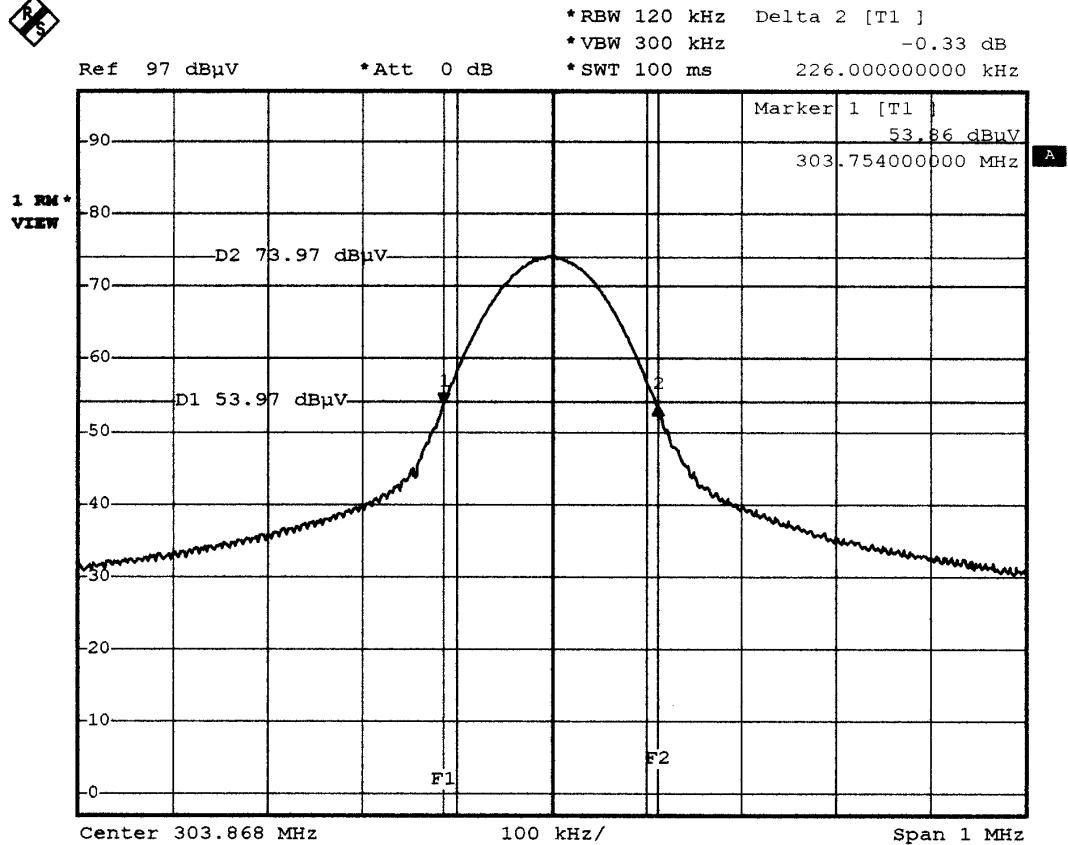
# TEST REPORT

Reference No.:A02081407

ReportNo.:FCCA02081407-01

Page:15 of 19

Issued Date:Nov. 01, 2002



Date: 20.AUG.2002 06:58:40

## 8. RELEASE OR OPERATING TIME

### 8.1 RELEASE TIME OR OPERATING LIMIT

1. A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
2. A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- 3). Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.
4. Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

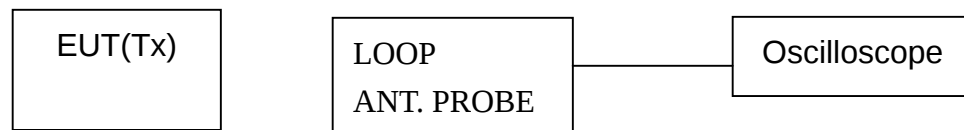
### 8.2 TEST EQUIPMENT

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

| EQUIPMENT/<br>FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/<br>SERIAL#    | DUE DATE OF CAL. &<br>CAL. CENTER |
|--------------------------|----------------|--------------|-----------------------|-----------------------------------|
| OSCILLOSCOPE             | 500MHz         | HP           | 54616B/<br>US39150351 | JUN 2003<br>ETC                   |

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 8.3 TEST SET-UP



### 8.4 TEST PROCEDURE

A specific loop antenna was connected to oscilloscope to detect the EUT's release time. The oscilloscope displayed the EUT's release time and take a picture of measurement.

8.5 EUT OPERATING CONDITION

The EUT is normal use function.

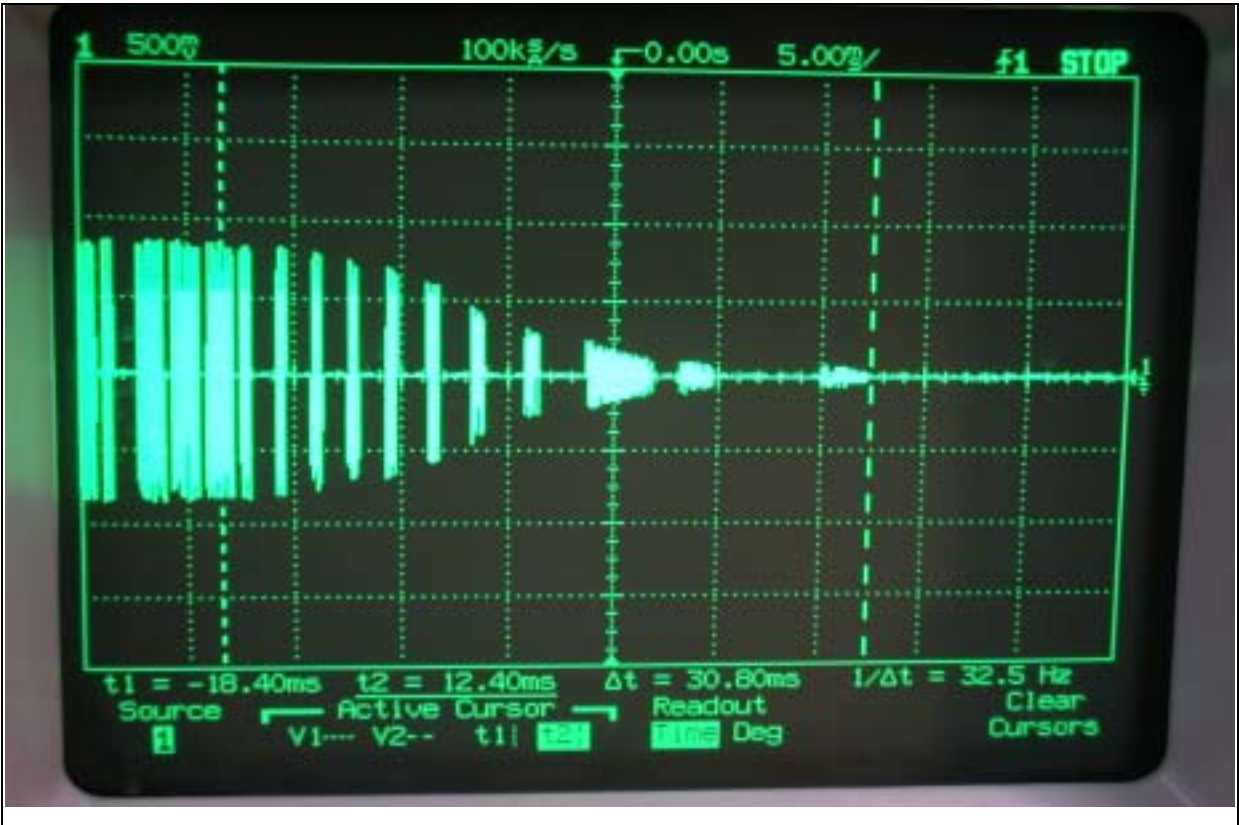
8.6 RELEASE OR OPERATING TIME TEST RESULT

|              |           |              |       |
|--------------|-----------|--------------|-------|
| Temperature: | 25 °C     | Humidity:    | 60%RH |
| Tested by:   | James Lee | Test Result: | Pass  |

| Start release time(ms) | Stop time(ms) | Total release time(ms) | Limit of release time<(s) |
|------------------------|---------------|------------------------|---------------------------|
| -18.4                  | 12.4          | 30.8                   | 5                         |

NOTE:

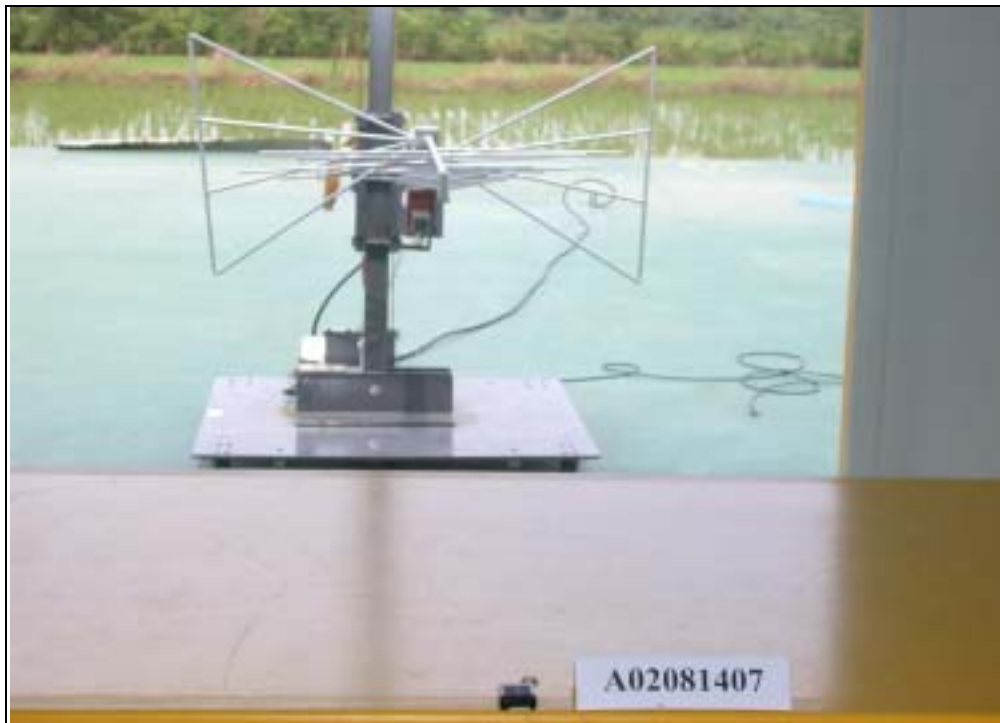
1. The EUT was manually operated.





## 9. PHOTOS OF TESTING

- Radiated test



## 10. TERMS OF ABRIVATION

|          |                                              |
|----------|----------------------------------------------|
| AV.      | Average detection                            |
| AZ(°)    | Turn table azimuth                           |
| Correct. | Correction                                   |
| EL(m)    | Antenna height (meter)                       |
| EUT      | Equipment Under Test                         |
| Horiz.   | Horizontal direction                         |
| LISN     | Line Impedance Stabilization Network         |
| NSA      | Normalized Site Attenuation                  |
| PK.      | Peak detection                               |
| Q.P.     | Quasi-peak detection                         |
| SRT Lab  | Spectrum Research & Testing Laboratory, Inc. |
| Vert.    | Vertical direction                           |