



**VERIFICATION TEST REPORT
FOR THE
LINK-IT TAG (TRANSMITTER) AND READER (RECEIVER),
L-TG501 AND L-RX100
FCC PART 15 SUBPART B SECTIONS 15.107, 15.109 & 15.111
AND
FCC PART 15 SUBPART C SECTION 15.231
COMPLIANCE**

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PREPARED FOR:

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ADMINISTRATIVE INFORMATION

DATE OF TEST:

November 27 - December 5, 2000

PURPOSE OF TEST:

To demonstrate the compliance of the Link-it Tag (Transmitter) and Reader (Receiver), L-TG501 and L-RX100, with the requirements for FCC Part 15 Subpart B Sections 15.107, 15.109 & 15.111 and FCC Part 15 Subpart C Section 15.231 devices.

MANUFACTURER:

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TEST LOCATION:

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TEST PERSONNEL:

Randal Clark

TEST METHOD:

ANSI C63.4 1992

FREQUENCY RANGE TESTED:

450 kHz - 4.33 GHz

EQUIPMENT UNDER TEST:

Link-it Tag (Transmitter)

Manuf: Omnigo
Model: L-TG501
Serial: 4278612-5010
FCC ID: O6XL-TG501 (pending)

Link-it Reader (Receiver)

Manuf: Microtronix
Model: L-RX100
Serial: 402354
FCC ID: DoC

SUMMARY OF RESULTS

The Automated Identification Technologies Link-it Tag (Transmitter) and Reader (Receiver), L-TG501 and L-RX100, was tested in accordance with ANSI C63.4 1992 for compliance with FCC Part 15 Subpart B Sections 15.107, 15.109 & 15.111 and FCC Part 15 Subpart C Section 15.231.

As received, the above equipment was found to be fully compliant with the limits of FCC Part 15 Subpart B Sections 15.107, 15.109 & 15.111 and FCC Part 15 Subpart C Section 15.231. The results in this report apply only to the items tested, as identified herein.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The model L-TG501 is a low power RF ASK transmitter at 433.92 MHz for use in active tagging technology. It operates on a battery and has no I/O cables. The model L-RX100 is a receiver which can operate on battery or DC power provided through a DC power supply. It reads data from the Link-it Tag and outputs the tag in RS232 format to a PC.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ± 4 dB measurement uncertainty.

EUT OPERATING FREQUENCY

The EUT was operating at 433.92 MHz.

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C. The relative humidity was between 20% and 75%.

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Power Supply

Manuf: HP
Model: 6205C
Serial: 2228A01775
FCC ID: N/A

Computer

Manuf: IBM
Model: Think Pad 600
Serial: 78-LD521
FCC ID: 4U6JPN-32476-FT-E

Active Tag

Manuf: Automated Identification Technologies
Model: L-TG501
Serial: 4278612-9
FCC ID: O6XL-TG501 (pending)

REPORT OF MEASUREMENTS

The following tables report the highest worst case levels recorded during the tests performed on the Link-it Tag (Transmitter) and Reader (Receiver), L-TG501 and L-RX100. All readings taken are peak readings unless otherwise noted by a “Q” or “A”. The data sheets from which these tables were compiled are contained in Appendix B.

| Table 1: Fundamental Radiated Emission Levels - Transmitter | | | | | | | | | |
|--|--------------------------------|--------------------|-----------|-------------|-------------|--------------------------------------|-------------------------------|--------------|-------|
| FREQUENCY MHz | METER READING dB μ V | CORRECTION FACTORS | | | | CORRECTED READING dB μ V/m | SPEC LIMIT dB μ V/m | MARGIN dB | NOTES |
| | | Log dB | Amp dB | Cable dB | 15.35 dB | | | | |
| 433.850 | 90.9 | 16.8 | -25.6 | 4.4 | -20.0 | 66.5 | 72.6 | -6.1 | H-1 |
| 433.850 | 80.3 | 16.8 | -25.6 | 4.4 | -20.0 | 55.9 | 72.6 | -16.7 | V-1 |
| 433.860 | 76.3 | 16.8 | -25.6 | 4.4 | -20.0 | 51.9 | 72.6 | -20.7 | V-2 |
| 433.870 | 88.9 | 16.8 | -25.6 | 4.4 | -20.0 | 64.5 | 72.6 | -8.1 | H-2 |

Test Method:

ANSI C63.4 1992

NOTES: H = Horizontal Polarization

Spec Limit :

FCC Part 15.231(e)

V = Vertical Polarization

Test Distance:

3 Meters

1 - Card flat on table

2 - Card on edge

COMMENTS: EUT is an active tag transmitting on 433.92MHz. EUT is battery powered and battery is non-removable. EUT has an integral antenna. Duty cycle correction factor (20dB) used in accordance with FCC Part 15.35.

Table 2: Highest Radiated Emission Levels - 30-1000 MHz - Transmitter

| FREQUENCY MHz | METER READING dB μ V | CORRECTION FACTORS | | | | CORRECTED READING dB μ V/m | SPEC LIMIT dB μ V/m | MARGIN dB | NOTES |
|------------------|--------------------------------|--------------------|-----------|-------------|-------------|--------------------------------------|-------------------------------|--------------|-------|
| | | Log dB | Amp dB | Cable dB | 15.35 dB | | | | |
| 867.630 | 57.7 | 23.0 | -25.9 | 6.5 | -20.0 | 41.3 | 54.0 | -12.7 | H |
| 867.703 | 56.4 | 23.0 | -25.9 | 6.5 | -20.0 | 40.0 | 54.0 | -14.0 | V |

Test Method:

ANSI C63.4 1992

NOTES: H = Horizontal Polarization

Spec Limit :

FCC Part 15.231(e)

V = Vertical Polarization

Test Distance:

3 Meters

COMMENTS: EUT is an active tag transmitting on 433.92MHz. EUT is battery powered and battery is non-removable. EUT has an integral antenna. Duty cycle correction factor (20dB) used in accordance with 15.35.

Table 3: Six Highest Radiated Emission Levels - 1-4.33 GHz - Transmitter

| FREQUENCY MHz | METER READING dB μ V | CORRECTION FACTORS | | | | CORRECTED READING dB μ V/m | SPEC LIMIT dB μ V/m | MARGIN dB | NOTES |
|------------------|--------------------------------|--------------------|-----------|-------------|-------------|--------------------------------------|-------------------------------|--------------|-------|
| | | Ant dB | Amp dB | Cable dB | 15.35 dB | | | | |
| 1301.498 | 62.9 | 24.8 | -35.8 | 5.4 | -20.0 | 37.3 | 54.0 | -16.7 | H |
| 1735.130 | 54.0 | 26.0 | -35.5 | 6.2 | -20.0 | 30.7 | 54.0 | -23.3 | V |
| 2169.217 | 50.2 | 27.7 | -35.0 | 10.6 | -20.0 | 33.5 | 54.0 | -20.5 | H |
| 3036.886 | 35.6 | 33.1 | -35.5 | 16.2 | -20.0 | 29.4 | 54.0 | -24.6 | V |
| 3470.737 | 34.7 | 34.8 | -35.9 | 15.8 | -20.0 | 29.4 | 54.0 | -24.6 | V |
| 3904.499 | 34.7 | 38.1 | -36.1 | 14.1 | -20.0 | 30.8 | 54.0 | -23.2 | V |

Test Method:

ANSI C63.4 1992

NOTES: H = Horizontal Polarization

Spec Limit :

FCC Part 15.231(e)

V = Vertical Polarization

Test Distance:

3 Meters

COMMENTS: EUT is an active tag transmitting on 433.92MHz. EUT is battery powered and battery is non-removable. EUT has an integral antenna. Duty cycle correction factor (20dB) used in accordance with FCC Part 15.35.

Table 4: Six Highest Antenna Conducted Emission Levels - Receiver

| FREQUENCY MHz | METER READING dB μ V | CORRECTION FACTORS | | | | CORRECTED READING dB μ V/m | SPEC LIMIT dB μ V/m | MARGIN dB | NOTES |
|------------------|--------------------------------|--------------------|-----------|-------------|------------|--------------------------------------|-------------------------------|--------------|-------|
| | | Ant dB | Amp dB | Cable dB | Dist dB | | | | |
| 48.080 | 28.1 | 0.0 | | | | 28.1 | 50.0 | -21.9 | N |
| 218.095 | 26.9 | 0.0 | | | | 26.9 | 50.0 | -23.1 | N |
| 232.123 | 28.7 | 0.0 | | | | 28.7 | 50.0 | -21.3 | N |
| 240.105 | 28.2 | 0.0 | | | | 28.2 | 50.0 | -21.8 | N |
| 846.516 | 33.5 | 0.0 | | | | 33.5 | 50.0 | -16.5 | N |
| 1692.913 | 28.6 | 0.0 | | | | 28.6 | 50.0 | -21.4 | N |

Test Method:

ANSI C63.4 1992

NOTES: N = No Polarization

Spec Limit :

FCC Part 15.111

Test Distance:

No Distance

COMMENTS: EUT is an active tag receiver with a detachable antenna powered by a separate DC power supply.

Table 5: Six Highest Radiated Emission Levels - 30-1000MHZ - Receiver

| FREQUENCY MHz | METER READING dB μ V | CORRECTION FACTORS | | | | CORRECTED READING dB μ V/m | SPEC LIMIT dB μ V/m | MARGIN dB | NOTES |
|------------------|--------------------------------|--------------------|-----------|-------------|------------|--------------------------------------|-------------------------------|--------------|-------|
| | | Ant dB | Amp dB | Cable dB | Dist dB | | | | |
| 54.024 | 43.1 | 10.2 | -24.9 | 1.4 | | 29.8 | 40.0 | -10.2 | V |
| 74.099 | 46.6 | 7.8 | -25.0 | 1.6 | | 31.0 | 40.0 | -9.0 | H |
| 318.763 | 37.8 | 20.4 | -24.9 | 3.8 | | 37.1 | 46.0 | -8.9 | V |
| 338.690 | 40.7 | 19.3 | -25.0 | 3.9 | | 38.9 | 46.0 | -7.1 | V |
| 378.620 | 41.3 | 17.4 | -25.3 | 4.0 | | 37.4 | 46.0 | -8.6 | V |
| 890.318 | 34.1 | 23.4 | -25.7 | 6.7 | | 38.5 | 46.0 | -7.5 | HQ |

Test Method: ANSI C63.4 1992
 Spec Limit : FCC Part 15.109
 Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
 V = Vertical Polarization
 N = No Polarization
 D = Dipole Reading
 Q = Quasi Peak Reading
 A = Average Reading

COMMENTS: EUT is an active tag receiver with a detachable antenna powered by a separate DC power supply.

Table 6: Radiated Emission Levels - 1-4.33 GHz - Receiver

| FREQUENCY MHz | METER READING dB μ V | CORRECTION FACTORS | | | | CORRECTED READING dB μ V/m | SPEC LIMIT dB μ V/m | MARGIN dB | NOTES |
|------------------|--------------------------------|--------------------|-----------|-------------|------------|--------------------------------------|-------------------------------|--------------|-------|
| | | Ant dB | Amp dB | Cable dB | Dist dB | | | | |
| 1085.663 | 45.2 | 24.0 | -35.9 | 4.9 | | 38.2 | 54.0 | -15.8 | V |
| 1951.350 | 46.7 | 26.4 | -35.3 | 6.5 | | 44.3 | 54.0 | -9.7 | V |
| 1955.290 | 46.1 | 26.4 | -35.3 | 6.6 | | 43.8 | 54.0 | -10.2 | H |
| 1955.354 | 47.5 | 26.4 | -35.3 | 6.6 | | 45.2 | 54.0 | -8.8 | V |
| 1963.190 | 47.0 | 26.4 | -35.3 | 6.6 | | 44.7 | 54.0 | -9.3 | H |

Test Method: ANSI C63.4 1992
 Spec Limit: FCC Part 15.109
 Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
 V = Vertical Polarization
 N = No Polarization
 D = Dipole Reading
 Q = Quasi Peak Reading
 A = Average Reading

COMMENTS: EUT is an active tag receiver with a detachable antenna powered by a separate DC power supply.

Table 7: Six Highest Conducted Emission Levels - Receiver

| FREQUENCY MHz | METER READING dB μ V | CORRECTION FACTORS | | | CORRECTED READING dB μ V | SPEC LIMIT dB μ V | MARGIN dB | NOTES |
|------------------|--------------------------------|--------------------|-------------|----|------------------------------------|-----------------------------|--------------|-------|
| | | Lisn dB | Cable dB | dB | | | | |
| 7.130400 | 34.3 | 0.2 | 3.3 | | 37.8 | 48.0 | -10.2 | W |
| 8.400935 | 34.7 | 0.2 | 3.2 | | 38.1 | 48.0 | -9.9 | B |
| 8.646845 | 34.3 | 0.2 | 4.2 | | 38.7 | 48.0 | -9.3 | B |
| 8.810784 | 34.6 | 0.2 | 4.8 | | 39.6 | 48.0 | -8.4 | B |
| 8.988386 | 33.5 | 0.2 | 5.5 | | 39.2 | 48.0 | -8.8 | B |
| 9.097679 | 34.5 | 0.2 | 5.1 | | 39.8 | 48.0 | -8.2 | B |

Test Method: ANSI C63.4 1992
 Spec Limit : FCC Part 15.107

NOTES: Q = Quasi Peak Reading
 A = Average Reading
 B = Black Lead
 W = White Lead

COMMENTS: EUT is an active tag receiver with a detachable antenna powered by a separate DC power supply. Support computer powered through support LISN.

TABLE A
LIST OF TEST EQUIPMENT

Industry Canada File No. IC 3082-D

1. Spectrum Analyzer, Hewlett Packard, Model No. 8566B, CKC 1, S/N 2403A08241 (Display Unit), S/N 2209A01404 (rf Unit). Calibration date: November 3, 2000. Calibration due date: November 3, 2001.
2. Preamp (1-26.5GHz), Hewlett Packard, Model No. 8449B, S/N 3008A00301. Calibration date: October 13, 2000. Calibration due date: October 13, 2001.
3. Preamp, Hewlett Packard, Model No. 8447D, S/N 1937A02604. Calibration Date: April 3, 2000. Calibration Due: April 3, 2001.
4. Quasi-Peak Adapter, Hewlett Packard, Model No. 85650A, S/N 2043A00272. Calibration Date: November 10, 2000. Calibration Due: November 10, 2001.
5. Quasi-Peak Adapter, Hewlett Packard, Model No. 85650A, S/N 2811A01267. Calibration Date: November 3, 2000. Calibration Due: November 3, 2001.
6. Biconical Antenna, A & H Systems, Model No. SAS-200/542, S/N 156. Calibration Date: May 8, 2000. Calibration Due: May 8, 2001.
7. Log Periodic Antenna, A & H Systems, Model No. SAS-200/512, S/N 154. Calibration Date: May 8, 2000. Calibration Due: May 8, 2001.
8. Horn Antenna, EMC Test, Model 9602-4660, S/N 2113. Calibration Date: November 10, 2000. Calibration Due: November 10, 2001.
9. Cable #4 50', Andrew, FSJ1-50A, Calibration Date: May 10, 2000. Calibration Due: May 10, 2001.
10. Cable #2 (2'), Andrew, FSJ1-50A, Calibration Date: May 10, 2000. Calibration Due: May 10, 2001.
11. Cable # 7 25', Andrew, FSJ1-50A, Calibration Date: May 10, 2000. Calibration Due: May 10, 2001.
12. LISN's set, Solar, Model 8028-50-TS-24-BNC, S/N 814493, 474. Calibration Date: June 5, 2000. Calibration Due: June 5, 2001.
13. Mariposa Site B (Barn). Calibration date: August 11, 2000. Calibration due date: August 11, 2001.

EUT SETUP

The equipment under test (EUT) and the peripheral(s) listed were set up in a manner that represented their normal use. Any special conditions required for the EUT to operate normally are identified in the comments that accompany Tables 1-7 for radiated and conducted emissions characteristics. Additionally, a complete description of all the receiver ports and I/O cables is included on the information sheets contained in Appendix A.

During radiated emissions testing, the EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters. This configuration is typical for radiated emissions testing of handheld and wallmount devices.

I/O cables were connected to the receiver EUT and peripherals in the manner required for normal operation of the system. Excess cabling was bundled in the center in a serpentine fashion using 30-40 centimeter lengths.

During conducted emissions testing, the EUT was located on a test bench measuring approximately 80 cm high, 1 meter deep, and 2 meters in length. One wall of the room where the EUT bench is located is conductive, and there is conductive strip 40 cm in width on the top surface of the test bench where the LISN's are located. The EUT was mounted on the wooden portion of the test bench 40 cm away from the conductive wall, and 80 cm from the conductive portion of the test bench surface.

The metal plane used for conducted emissions was grounded to the earth through the green wire safety ground. Power to the EUT was provided from a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 1 meter away from the EUT during the conducted test. Conducted emissions tests required the use of the LISN's listed in Table A.

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A were used to collect both the radiated and conducted emissions data for the Link-it Tag (Transmitter) and Reader (Receiver), L-TG501 and L-RX100. For radiated measurements below 300 MHz, the biconical antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. For testing above 1000 MHz, the horn antenna was used. All antennas were located at a distance of 3 meters from the edge of the EUT. Conducted emissions tests required the use of the FCC type LISN's.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB μ V, and a vertical scale of 10 dB per division.

TABLE B : ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

| TEST | BEGINNING FREQUENCY | ENDING FREQUENCY | BANDWIDTH SETTING |
|---------------------|---------------------|------------------|-------------------|
| CONDUCTED EMISSIONS | 450 kHz | 30 MHz | 9 kHz |
| RADIATED EMISSIONS | 30 MHz | 1000 MHz | 120 kHz |
| RADIATED EMISSIONS | 1000 MHz | 4.3 GHz | 1 MHz |

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in Tables 1-7 indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the Link-it Tag (Transmitter) and Reader (Receiver), L-TG501 and L-RX100.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

When the frequencies exceed 1 GHz, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

TEST METHODS

The radiated and conducted emissions data of the Link-it Tag (Transmitter) and Reader (Receiver), L-TG501 and L-RX100, was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the "Sample Calculations". The corrected data was then compared to the FCC Part 15 Subpart B Sections 15.107, 15.109 & 15.111 and FCC Part 15 Subpart C Section 15.231emissions limits to determine compliance.

Preliminary and final measurements were taken in order to better ensure that all emissions from the EUT were found and maximized.

Radiated Emissions Testing

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode with the I/O cables and line cords facing the antenna. The frequency range of 30 MHz - 88 MHz was then scanned with the biconical antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks which were at or near the limit were recorded. The frequency range of 100 - 300 MHz was scanned with the biconical antenna in the same manner, and the peaks recorded. Lastly, a scan of the FM band from 88 - 110 MHz was made, using a reduced resolution bandwidth and a reduced frequency span. The biconical antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 - 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 - 1000 MHz was again scanned. For frequencies above 1000 MHz the horn antenna was used. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

For the final radiated scan, the equipment was again positioned with the back of the unit facing the antenna. A thorough scan of all frequencies was manually made using a small frequency span, rotating the turntable as needed. Comparison with the previously recorded measurements was then made.

Using the peak readings from both scans as a guide, the test engineer then maximized the readings with respect to the table rotation, antenna height and configuration of the peripherals and cables. Maximizing of the receiver cables was achieved by monitoring the spectrum analyzer on a closed circuit television monitor while the EUT cables were being moved and rearranged on the EUT table for maximum emissions. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

Conducted Emissions Testing

For conducted emissions testing, a 30 to 50 second sweep time was used for automated measurements in the frequency bands of 450 kHz to 1.705 MHz, 1.705 MHz to 3 MHz, and 3 MHz to 30 MHz. All readings within 20 dB of the limit were recorded. At frequencies where the recorded emissions were close to the limit, further investigation was performed manually at a slower sweep rate.

FCC Part 15.231(c) - Occupied Bandwidth Measurements

In accordance with Part 15.231(c), the bandwidth was kept within the required .25% of the fundamental frequency.

FCC Part 15.111 – Antenna Conducted Measurements

For measuring the signal strength on the RF output port of the EUT, the spectrum analyzer was connected directly to the RF output port via a cable. The sweep time of the analyzer was adjusted so that the spectrum analyzer readings were always in a calibrated range. All readings within 20 dB of the limit were recorded.

SAMPLE CALCULATIONS

The basic spectrum analyzer reading was converted using correction factors as shown in the emissions readings in Tables 1-7. For radiated emissions in dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula:

$$\begin{aligned} & \text{Meter reading (dB}\mu\text{V)} \\ & + \text{Antenna Factor (dB)} \\ & + \text{Cable Loss (dB)} \\ & - \text{Distance Correction (dB)} \\ & - \text{Pre-amplifier Gain (dB)} \\ \\ & = \text{Corrected Reading(dB}\mu\text{V/m)} \end{aligned}$$

This reading was then compared to the applicable specification limit to determine compliance.

A typical data sheet will display the following in column format:

| # | Freq MHz | Rdng dB μ V | Cable | Amp | Bicon | Horn | Log | Dist | Corr dB μ V/m | Spec | Margin | Polar |
|-------|-------------|--------------------|-------|-----|-------|------|-----|------|----------------------|------|--------|-------|
| 15.35 | | | | | | | | | | | | |

means reading number

Freq MHz is the frequency in MHz of the obtained reading.

Rdng dB μ V is the reading obtained on the spectrum analyzer in dB μ V.

Amp is short for the preamplifier factor or gain in dB.

Bicon is the biconical antenna factor in dB.

Log is the log periodic antenna factor in dB.

Horn is the horn antenna factor in dB.

Cable is the cable loss in dB of the coaxial cable on the OATS.

Dist is the distance factor (in dB). It is used when testing at a different test distance than the one stated in the spec.

Corr dB μ V/m is the corrected reading which is now in dB μ V/m (field strength).

Spec is the specification limit (dB) stated in the regulations.

Margin is the closeness to the specified limit in dB; + is over and - is under the limit.

Polar is the Polarity of the antenna with respect to earth.

LISN is the line impedance stabilization network factor in dB.

15.35 is the distance correction called in FCC Part 15.35.

APPENDIX A
INFORMATION ABOUT THE EQUIPMENT UNDER TEST

| INFORMATION ABOUT THE EQUIPMENT UNDER TEST | |
|---|------------------------|
| Test Software/Firmware: | V1.2 |
| CRT was displaying: | |
| Power Supply Manufacturer: | Panasonic 3.1V Battery |
| Power Supply Part Number: | |
| AC Line Filter Manufacturer: | |
| AC Line Filter Part Number: | |
| The transmitter has no power cord. DC power is 12V. | |
| | |

| RECEIVER I/O PORTS | | RECEIVER CRYSTAL OSCILLATORS | |
|---------------------------|---|-------------------------------------|--------------|
| Type | # | Type | Freq. In MHz |
| TTL levels | 5 | Processor clock | 8 MHz |
| | | Receiver module | 13.568 MHz |

| PRINTED CIRCUIT BOARDS | | | | |
|-------------------------------|--------------|----------------|--------|----------|
| Function | Model & Rev | Clocks, MHz | Layers | Location |
| RF Transmitter | L-TG501 V1.0 | Internal 4 MHz | 2 | Center |
| Main Processor | RXTTL V1.2 | 1, 8 MHz | 2 | Center |
| Receiver Module | RF Mod1 V1.0 | 1, 13.568 MHz | 2 | Top |

| REQUIRED EUT CHANGES TO COMPLY: |
|--|
| None. |

RECEIVER CABLE INFORMATION

| | |
|--|---------------------------------|
| Cable #: 1 | Cable(s) of this type: 1 |
| Cable Type: C5F 4 Pair 24 AWG FTP IEC332-1 | Shield Type: Aluminum Foil |
| Construction: Screened Twisted Pair | Length In Meters: Max 1.8m |
| Connected To End (1): PC | Connected To End (2): Reader |
| Connector At End (1): DB9-Female | Connector At End (2): RJ45-Male |
| Shield Grounded At (1): Yes | Shield Grounded At (2): No |
| Part Number: | Number of Conductors: 8 |
| Notes and or description: For reader to output tag data in TTL levels on RS232 line to PC. | |

PHOTOGRAPH SHOWING RADIATED EMISSIONS - TRANSMITTER



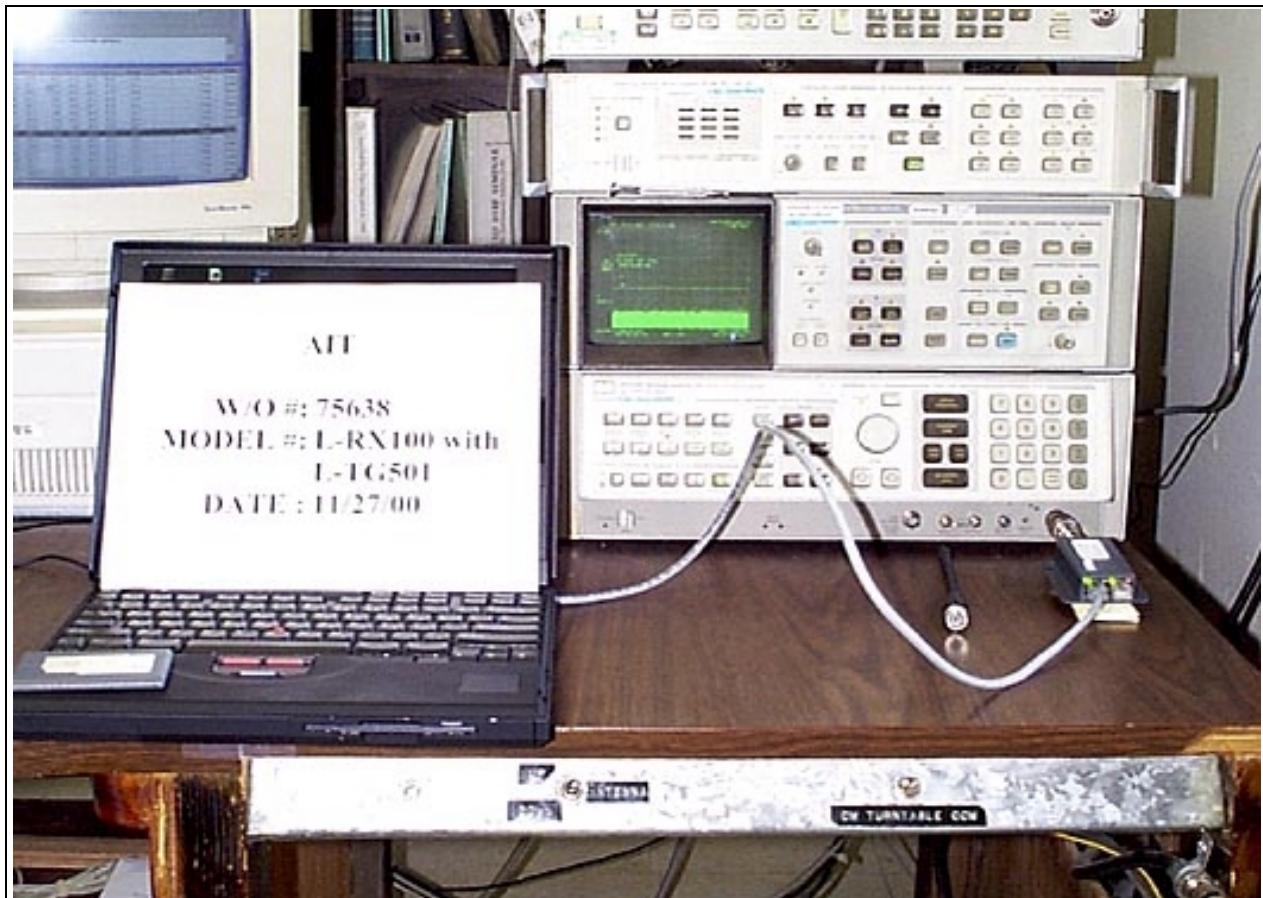
Radiated Emissions - Transmitter Flat

PHOTOGRAPH SHOWING RADIATED EMISSIONS - TRANSMITTER



Radiated Emissions - Transmitter on Edge

PHOTOGRAPH SHOWING ANTENNA CONDUCTED - RECEIVER



Antenna Conducted Emissions - Front View of Receiver

PHOTOGRAPH SHOWING RADIATED EMISSIONS



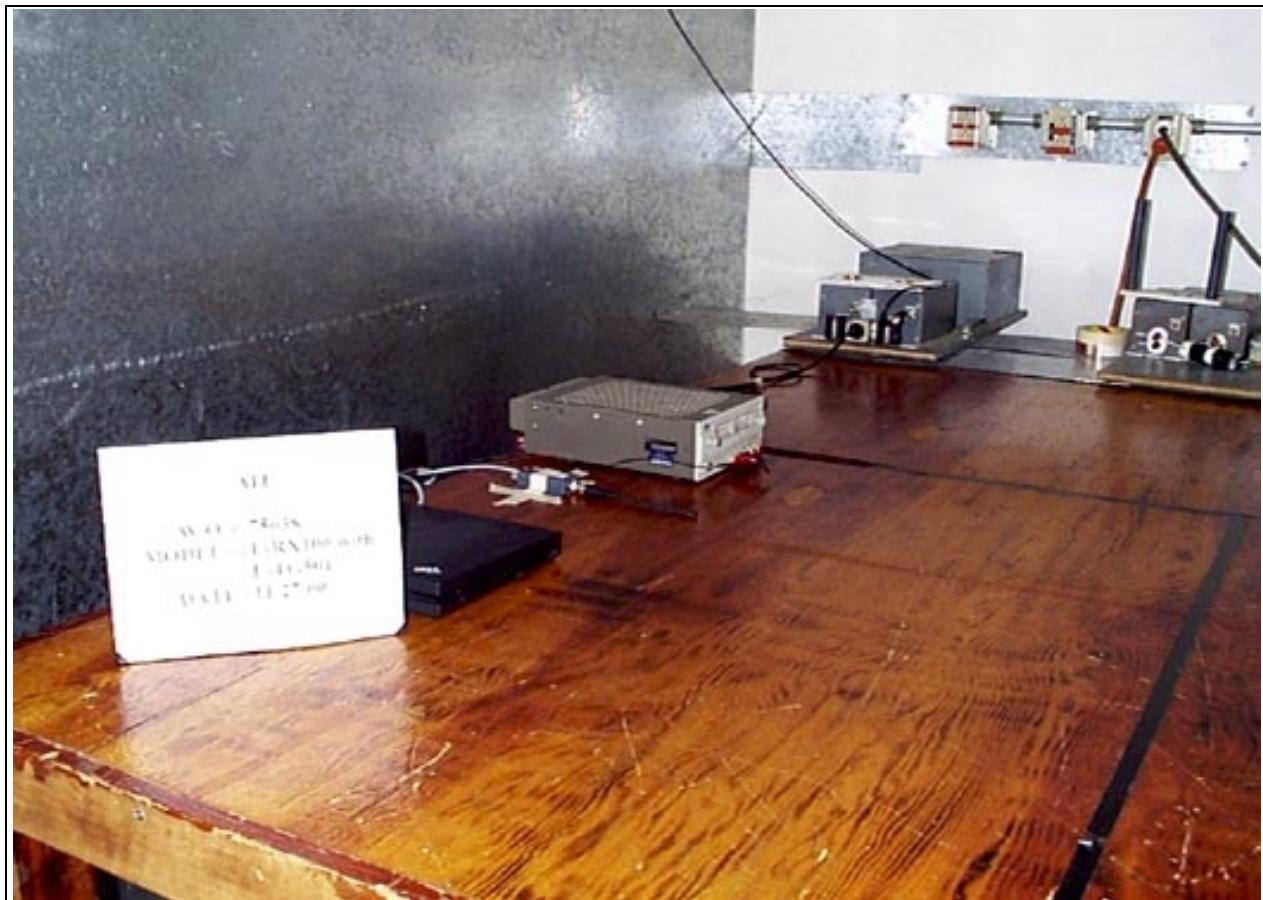
Radiated Emissions - Front View of Receiver

PHOTOGRAPH SHOWING RADIATED EMISSIONS - RECEIVER



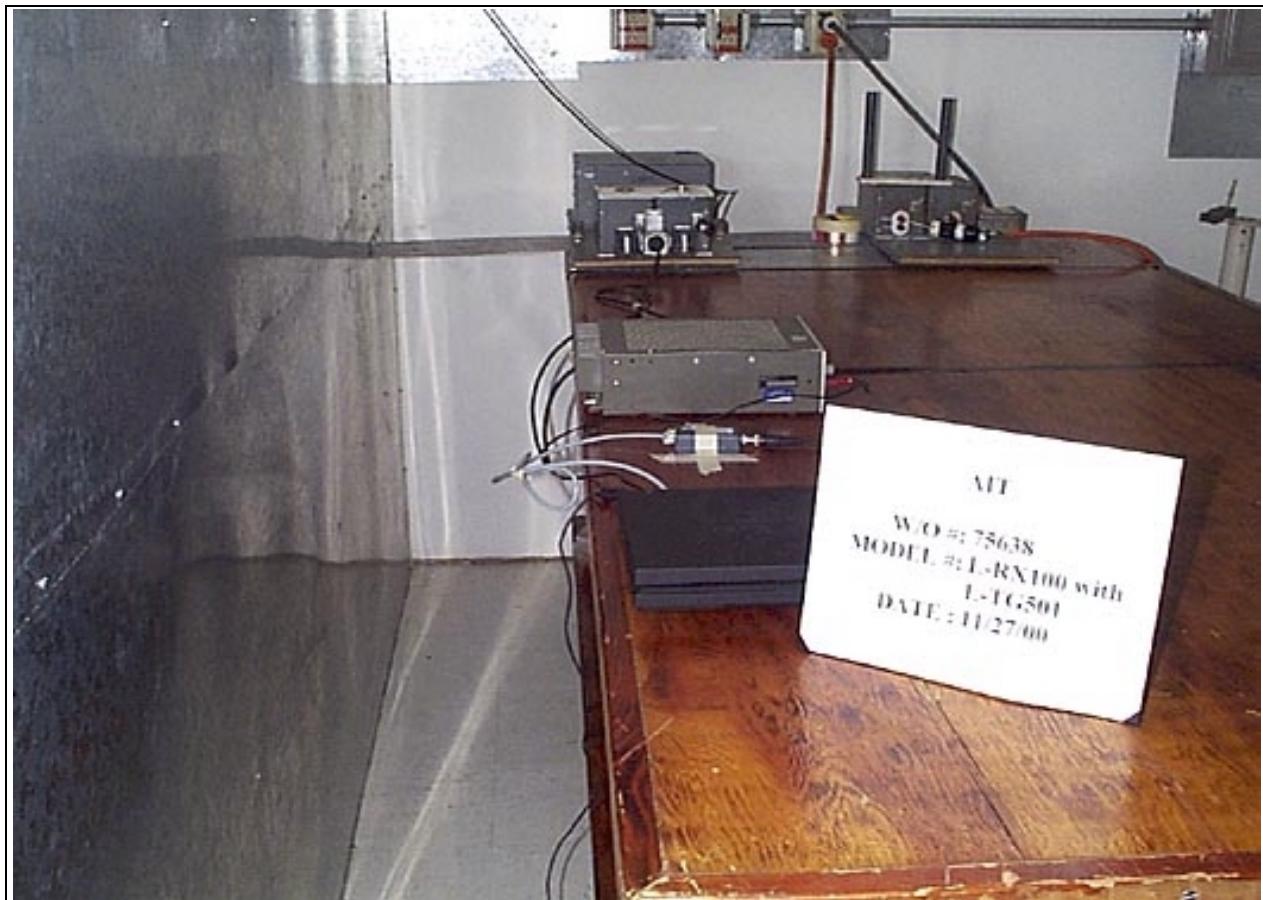
Radiated Emissions - Back View of Receiver

PHOTOGRAPH SHOWING CONDUCTED EMISSIONS - RECEIVER



Conducted Emissions - Front View of Receiver

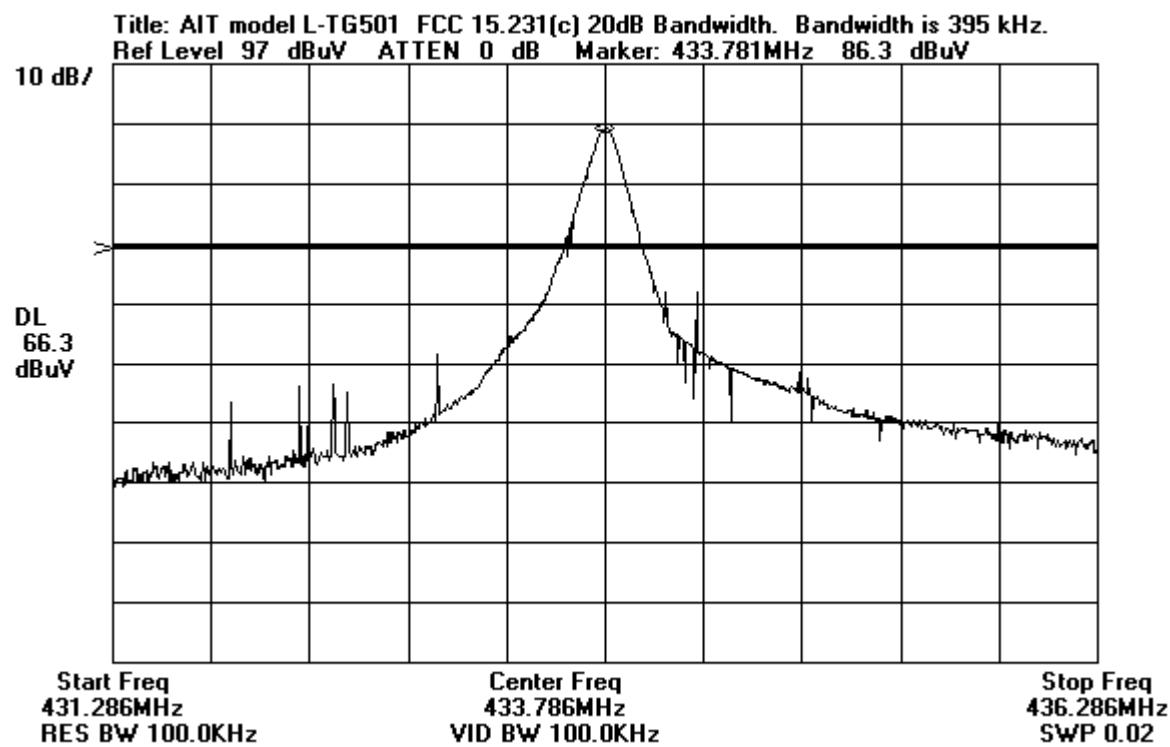
PHOTOGRAPH SHOWING CONDUCTED EMISSIONS - RECEIVER



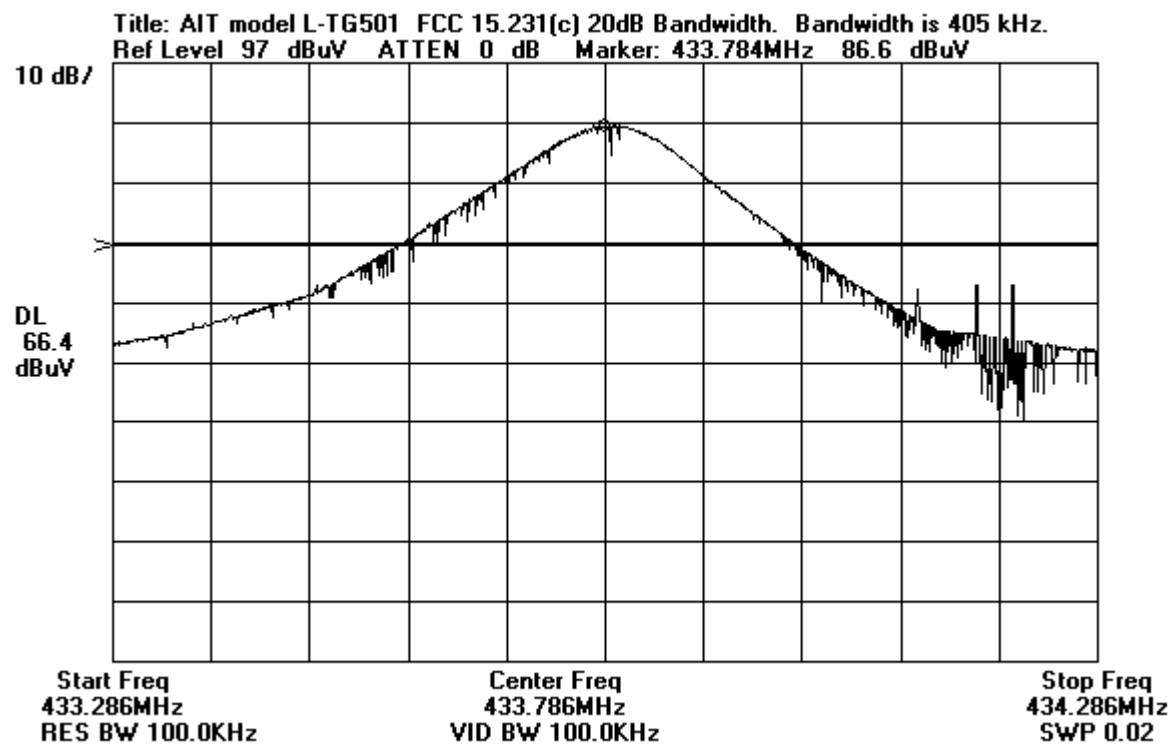
Conducted Emissions - Side View of Receiver

APPENDIX B
MEASUREMENT DATA SHEETS

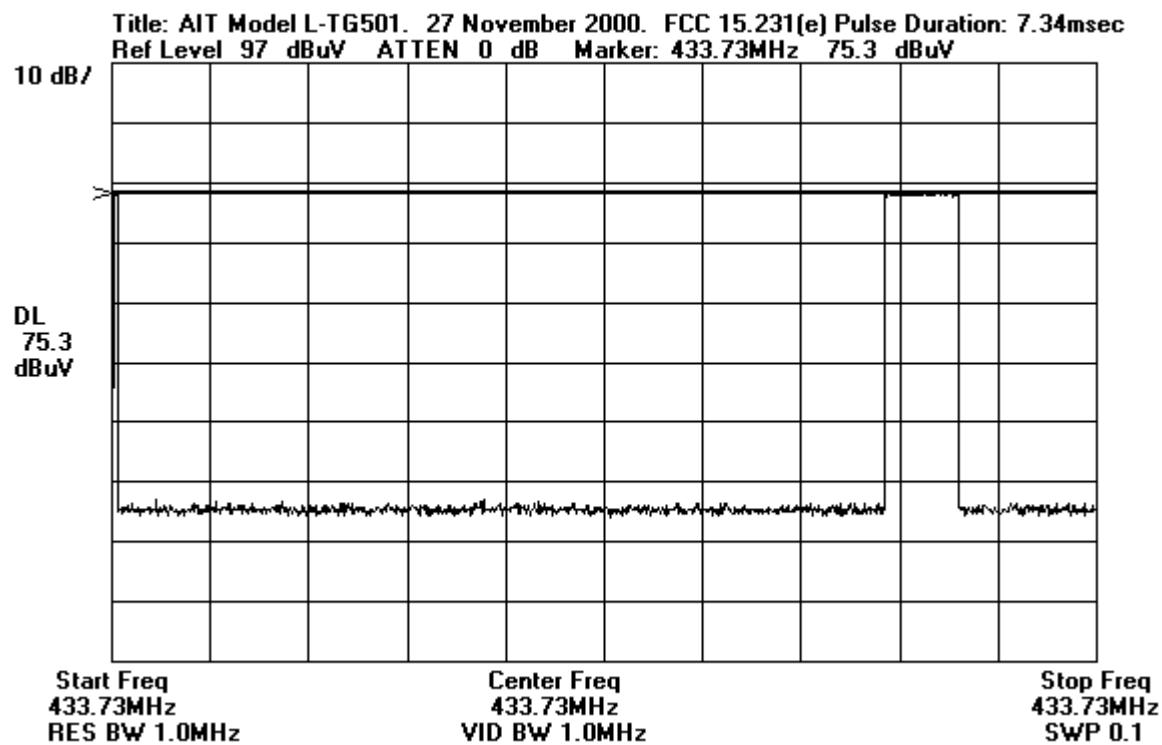
Occupied Bandwidth Plot



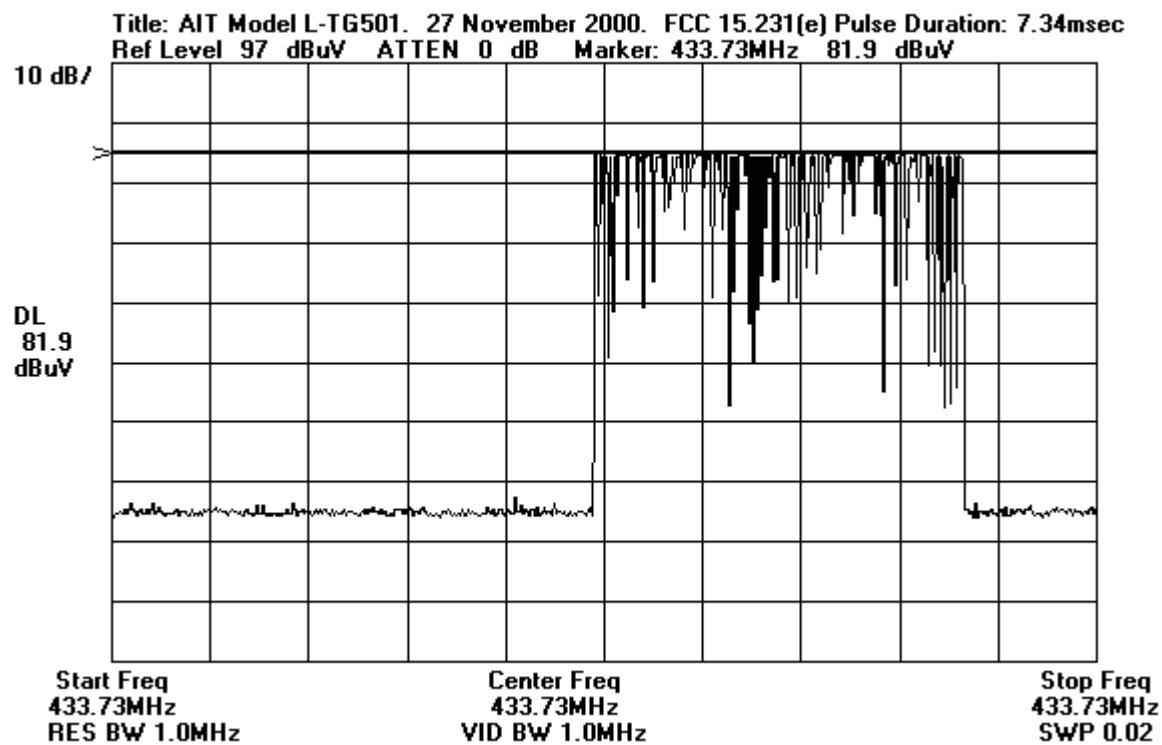
Occupied Bandwidth Plot



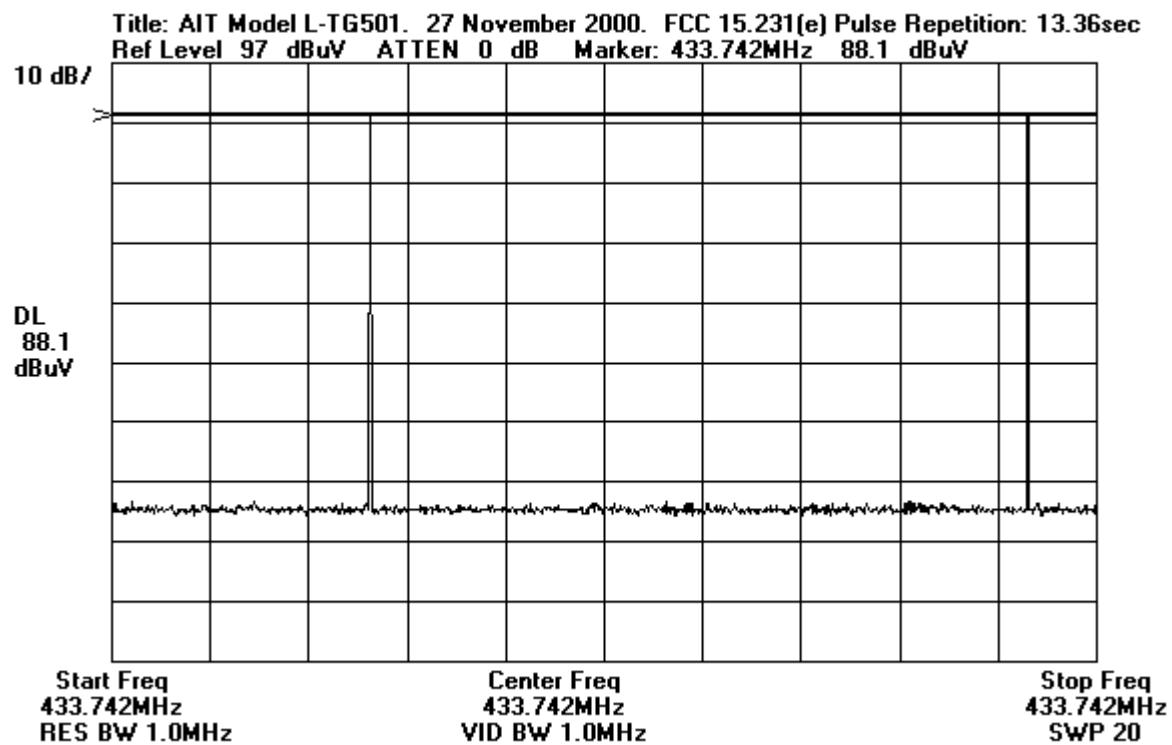
Pulse Duration Plot



Pulse Duration Plot



Pulse Repetition Plot



Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **AIT**
Specification: **FCC 15.231(e) Fundamental**
Work Order #: **75638** Date: 12/05/2000
Test Type: **Maximized Emissions** Time: 13:24:25
Equipment: **Active Tag** Sequence#: 10
Manufacturer: **AIT** Tested By: Randal Clark
Model: **L-TG501**
S/N: **4278612-9**

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|-------------|--------------|---------|-----------|
| Active Tag* | AIT | L-TG501 | 4278612-9 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|-----|
| | | | |

Test Conditions / Notes:

EUT is an active tag transmitting on 433.92MHz. EUT is battery powered and battery is non-removable. EUT has an integral antenna. Duty cycle correction factor (20dB) used in accordance with FCC Part 15.35.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

| # | Freq MHz | Rdng dB μ V | Amp 15.35 | Bicon dB | Log dB | Cable dB | Dist Table | Corr dB μ V/m | Spec dB μ V/m | Margin dB | Polar Ant |
|---|-------------|--------------------|----------------|-------------|-----------|-------------|---------------|----------------------|----------------------|--------------|-----------------------------|
| 1 | 433.850M | 90.9 | -25.6 -20.0 | +0.0 | +16.8 | +4.4 | +0.0 | 66.5 | 72.6 | -6.1 | Horiz Card flat on table |
| 2 | 433.870M | 88.9 | -25.6 -20.0 | +0.0 | +16.8 | +4.4 | +0.0 | 64.5 | 72.6 | -8.1 | Horiz Card on edge |
| 3 | 433.850M | 80.3 | -25.6 -20.0 | +0.0 | +16.8 | +4.4 | +0.0 | 55.9 | 72.6 | -16.7 | Vert Card flat on table |
| 4 | 433.860M | 76.3 | -25.6 -20.0 | +0.0 | +16.8 | +4.4 | +0.0 | 51.9 | 72.6 | -20.7 | Vert Card on edge |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **AIT**
Specification: **FCC 15.231(e) Spurious**
Work Order #: **75638** Date: 11/28/2000
Test Type: **Maximized Emissions** Time: 16:23:51
Equipment: **Active Tag** Sequence#: 3
Manufacturer: AIT Tested By: Randal Clark
Model: L-TG501
S/N: 4278612-9

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|-------------|--------------|---------|------------|
| Active Tag* | AIT | L-TG501 | 4278612-10 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|-----|
| | | | |

Test Conditions / Notes:

EUT is an active tag transmitting on 433.92MHz. EUT is battery powered and battery is non-removable. EUT has an integral antenna. Duty cycle correction factor (20dB) used in accordance with FCC Part 15.35.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

| # | Freq MHz | Rdng dB μ V | Amp 15.35 | Bicon dB | Log dB | Cable dB | Dist Table | Corr dB μ V/m | Spec dB μ V/m | Margin dB | Polar Ant |
|---|-------------|--------------------|----------------|-------------|-----------|-------------|---------------|----------------------|----------------------|--------------|--------------|
| 1 | 867.630M | 57.7 | -25.9 -20.0 | +0.0 | +23.0 | +6.5 | +0.0 | 41.3 | 54.0 | -12.7 | Horiz |
| 2 | 867.703M | 56.4 | -25.9 -20.0 | +0.0 | +23.0 | +6.5 | +0.0 | 40.0 | 54.0 | -14.0 | Vert |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **AIT**
 Specification: **FCC 15.231(e) Spurious**
 Work Order #: **75638** Date: 11/28/2000
 Test Type: **Maximized Emissions** Time: 16:08:07
 Equipment: **Active Tag** Sequence#: 4
 Manufacturer: **AIT** Tested By: Randal Clark
 Model: **L-TG501**
 S/N: **4278612-9**

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|-------------|--------------|---------|------------|
| Active Tag* | AIT | L-TG501 | 4278612-10 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|-----|
| | | | |

Test Conditions / Notes:

EUT is an active tag transmitting on 433.92MHz. EUT is battery powered and battery is non-removable. EUT has an integral antenna. Duty cycle correction factor (20dB) used in accordance with FCC Part 15.35.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

| # | Freq MHz | Rdng dB μ V | Amp Cable | Horn dB | Cable dB | Cable dB | Dist Table | Corr dB μ V/m | Spec dB μ V/m | Margin dB | Polar Ant |
|----|-------------|--------------------|---------------|----------------|-------------|-------------|---------------|----------------------|----------------------|--------------|--------------|
| 1 | 1301.498M | 62.9 | -35.8 +1.8 | +24.8 -20.0 | +0.2 | +3.4 | +0.0 | 37.3 | 54.0 | -16.7 | Horiz |
| 2 | 2169.217M | 50.2 | -35.0 +3.5 | +27.7 -20.0 | +1.4 | +5.7 | +0.0 | 33.5 | 54.0 | -20.5 | Horiz |
| 3 | 3904.499M | 34.7 | -36.1 +5.3 | +38.1 -20.0 | +1.7 | +7.1 | +0.0 | 30.8 | 54.0 | -23.2 | Vert |
| 4 | 1735.130M | 54.0 | -35.5 +2.1 | +26.0 -20.0 | +0.2 | +3.9 | +0.0 | 30.7 | 54.0 | -23.3 | Vert |
| 5 | 3470.737M | 34.7 | -35.9 +5.5 | +34.8 -20.0 | +3.1 | +7.2 | +0.0 | 29.4 | 54.0 | -24.6 | Vert |
| 6 | 3036.886M | 35.6 | -35.5 +5.7 | +33.1 -20.0 | +3.4 | +7.1 | +0.0 | 29.4 | 54.0 | -24.6 | Vert |
| 7 | 2169.036M | 45.8 | -35.0 +3.5 | +27.7 -20.0 | +1.4 | +5.7 | +0.0 | 29.1 | 54.0 | -24.9 | Vert |
| 8 | 1301.315M | 54.6 | -35.8 +1.8 | +24.8 -20.0 | +0.2 | +3.4 | +0.0 | 29.0 | 54.0 | -25.0 | Vert |
| 9 | 4338.373M | 31.8 | -35.4 +5.2 | +37.7 -20.0 | +1.7 | +7.2 | +0.0 | 28.2 | 54.0 | -25.8 | Horiz |
| 10 | 2602.951M | 34.9 | -34.6 +5.8 | +30.4 -20.0 | +3.6 | +8.0 | +0.0 | 28.1 | 54.0 | -25.9 | Vert |
| 11 | 3904.545M | 31.0 | -36.1 +5.3 | +38.1 -20.0 | +1.7 | +7.1 | +0.0 | 27.1 | 54.0 | -26.9 | Horiz |
| 12 | 4338.392M | 30.4 | -35.4 +5.2 | +37.7 -20.0 | +1.7 | +7.2 | +0.0 | 26.8 | 54.0 | -27.2 | Vert |
| 13 | 3036.864M | 31.4 | -35.5 +5.7 | +33.1 -20.0 | +3.4 | +7.1 | +0.0 | 25.2 | 54.0 | -28.8 | Horiz |
| 14 | 3470.670M | 28.9 | -35.9 +5.5 | +34.8 -20.0 | +3.1 | +7.2 | +0.0 | 23.6 | 54.0 | -30.4 | Horiz |

| | | | | | | | | | | | |
|----|-----------|------|---------------|----------------|------|------|------|------|------|-------|-------|
| 15 | 2602.953M | 29.9 | -34.6 +5.8 | +30.4 -20.0 | +3.6 | +8.0 | +0.0 | 23.1 | 54.0 | -30.9 | Horiz |
| 16 | 1735.170M | 44.6 | -35.5 +2.1 | +26.0 -20.0 | +0.2 | +3.9 | +0.0 | 21.3 | 54.0 | -32.7 | Horiz |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **AIT**
Specification: **FCC B 15.111**
Work Order #: **75638** Date: 12/01/2000
Test Type: **Maximized Emissions** Time: 12:28:16
Equipment: **Reader** Sequence#: 5
Manufacturer: AIT Tested By: Randal Clark
Model: L-RX100
S/N: 402354

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|--------|
| Reader* | AIT | L-RX100 | 402354 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|--------------|--------------|---------------|------------|
| Power Supply | HP | 6205C | 2228A01775 |
| Computer | IBM | Think Pad 600 | 78-LD521 |
| Active Tag | AIT | L-TG501 | 4278612-9 |

Test Conditions / Notes:

EUT is an active tag receiver with a detachable antenna powered by a separate DC power supply.

Measurement Data: Reading listed by margin. Test Distance: None

| # | Freq MHz | Rdng dB μ V | dB | dB | dB | Dist Table | Corr dB μ V/m | Spec dB μ V/m | Margin dB | Polar Ant |
|----|-----------|-----------------|----|----|----|------------|-------------------|-------------------|-----------|-----------|
| 1 | 846.516M | 33.5 | | | | +0.0 | 33.5 | 50.0 | -16.5 | None |
| 2 | 232.123M | 28.7 | | | | +0.0 | 28.7 | 50.0 | -21.3 | None |
| 3 | 1692.913M | 28.6 | | | | +0.0 | 28.6 | 50.0 | -21.4 | None |
| 4 | 240.105M | 28.2 | | | | +0.0 | 28.2 | 50.0 | -21.8 | None |
| 5 | 48.080M | 28.1 | | | | +0.0 | 28.1 | 50.0 | -21.9 | None |
| 6 | 218.095M | 26.9 | | | | +0.0 | 26.9 | 50.0 | -23.1 | None |
| 7 | 226.117M | 26.6 | | | | +0.0 | 26.6 | 50.0 | -23.4 | None |
| 8 | 220.120M | 26.5 | | | | +0.0 | 26.5 | 50.0 | -23.5 | None |
| 9 | 228.117M | 26.3 | | | | +0.0 | 26.3 | 50.0 | -23.7 | None |
| 10 | 260.093M | 26.2 | | | | +0.0 | 26.2 | 50.0 | -23.8 | None |
| 11 | 224.105M | 25.9 | | | | +0.0 | 25.9 | 50.0 | -24.1 | None |
| 12 | 182.108M | 25.8 | | | | +0.0 | 25.8 | 50.0 | -24.2 | None |
| 13 | 216.124M | 25.7 | | | | +0.0 | 25.7 | 50.0 | -24.3 | None |

| | | | | | | | |
|----|----------|------|------|------|------|-------|------|
| 14 | 74.103M | 25.7 | +0.0 | 25.7 | 50.0 | -24.3 | None |
| 15 | 204.111M | 25.5 | +0.0 | 25.5 | 50.0 | -24.5 | None |
| 16 | 196.081M | 25.5 | +0.0 | 25.5 | 50.0 | -24.5 | None |
| 17 | 54.070M | 25.5 | +0.0 | 25.5 | 50.0 | -24.5 | None |
| 18 | 56.110M | 25.3 | +0.0 | 25.3 | 50.0 | -24.7 | None |
| 19 | 212.103M | 25.2 | +0.0 | 25.2 | 50.0 | -24.8 | None |
| 20 | 64.031M | 25.1 | +0.0 | 25.1 | 50.0 | -24.9 | None |
| 21 | 120.062M | 25.1 | +0.0 | 25.1 | 50.0 | -24.9 | None |
| 22 | 234.121M | 25.0 | +0.0 | 25.0 | 50.0 | -25.0 | None |
| 23 | 236.109M | 24.9 | +0.0 | 24.9 | 50.0 | -25.1 | None |
| 24 | 96.101M | 24.9 | +0.0 | 24.9 | 50.0 | -25.1 | None |
| 25 | 94.106M | 24.7 | +0.0 | 24.7 | 50.0 | -25.3 | None |
| 26 | 230.149M | 24.6 | +0.0 | 24.6 | 50.0 | -25.4 | None |
| 27 | 91.147M | 24.5 | +0.0 | 24.5 | 50.0 | -25.5 | None |
| 28 | 192.086M | 24.3 | +0.0 | 24.3 | 50.0 | -25.7 | None |
| 29 | 198.112M | 24.1 | +0.0 | 24.1 | 50.0 | -25.9 | None |
| 30 | 190.106M | 24.0 | +0.0 | 24.0 | 50.0 | -26.0 | None |
| 31 | 86.060M | 24.0 | +0.0 | 24.0 | 50.0 | -26.0 | None |
| 32 | 188.081M | 23.6 | +0.0 | 23.6 | 50.0 | -26.4 | None |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **AIT**
 Specification: **FCC B RADIATED**
 Work Order #: **75638** Date: 12/01/2000
 Test Type: **Radiated Scan** Time: 17:26:04
 Equipment: **Reader** Sequence#: 8
 Manufacturer: AIT Tested By: Randal Clark
 Model: L-RX100
 S/N: 402354

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|--------|
| Reader* | AIT | L-RX100 | 402354 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|--------------|--------------|---------------|------------|
| Power Supply | HP | 6205C | 2228A01775 |
| Computer | IBM | Think Pad 600 | 78-LD521 |
| Active Tag | AIT | L-TG501 | 4278612-9 |

Test Conditions / Notes:

EUT is an active tag receiver with a detachable antenna powered by a separate DC power supply.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

| # | Freq MHz | Rdng dB μ V | Amp dB | Bicon dB | Log dB | Cable dB | Dist Table | Corr dB μ V/m | Spec dB μ V/m | Margin dB | Polar Ant |
|----|----------|-----------------|--------|----------|--------|----------|------------|-------------------|-------------------|-----------|-----------|
| 1 | 338.690M | 40.7 | -25.0 | +0.0 | +19.3 | +3.9 | +0.0 | 38.9 | 46.0 | -7.1 | Vert |
| 2 | 890.318M | 34.1 | -25.7 | +0.0 | +23.4 | +6.7 | +0.0 | 38.5 | 46.0 | -7.5 | Horiz |
| ^ | 890.303M | 38.3 | -25.7 | +0.0 | +23.4 | +6.7 | +0.0 | 42.7 | 46.0 | -3.3 | Horiz |
| 4 | 378.620M | 41.3 | -25.3 | +0.0 | +17.4 | +4.0 | +0.0 | 37.4 | 46.0 | -8.6 | Vert |
| 5 | 318.763M | 37.8 | -24.9 | +0.0 | +20.4 | +3.8 | +0.0 | 37.1 | 46.0 | -8.9 | Vert |
| 6 | 74.099M | 46.6 | -25.0 | +7.8 | +0.0 | +1.6 | +0.0 | 31.0 | 40.0 | -9.0 | Horiz |
| 7 | 56.003M | 43.1 | -24.9 | +10.1 | +0.0 | +1.5 | +0.0 | 29.8 | 40.0 | -10.2 | Vert |
| 8 | 54.024M | 43.1 | -24.9 | +10.2 | +0.0 | +1.4 | +0.0 | 29.8 | 40.0 | -10.2 | Vert |
| 9 | 358.670M | 38.4 | -25.1 | +0.0 | +18.3 | +3.9 | +0.0 | 35.5 | 46.0 | -10.5 | Vert |
| 10 | 58.014M | 42.3 | -24.9 | +10.1 | +0.0 | +1.5 | +0.0 | 29.0 | 40.0 | -11.0 | Vert |
| 11 | 331.417M | 36.3 | -24.9 | +0.0 | +19.7 | +3.8 | +0.0 | 34.9 | 46.0 | -11.1 | Horiz |
| 12 | 398.410M | 39.7 | -25.5 | +0.0 | +16.5 | +4.1 | +0.0 | 34.8 | 46.0 | -11.2 | Vert |
| 13 | 329.942M | 35.5 | -24.9 | +0.0 | +19.8 | +3.8 | +0.0 | 34.2 | 46.0 | -11.8 | Horiz |

| | | | | | | | | | | | |
|----|----------|------|-------|-------|-------|------|------|------|------|-------|-------|
| 14 | 330.277M | 35.1 | -24.9 | +0.0 | +19.8 | +3.8 | +0.0 | 33.8 | 46.0 | -12.2 | Horiz |
| 15 | 333.320M | 35.1 | -24.9 | +0.0 | +19.6 | +3.8 | +0.0 | 33.6 | 46.0 | -12.4 | Vert |
| 16 | 72.076M | 43.0 | -25.0 | +7.9 | +0.0 | +1.6 | +0.0 | 27.5 | 40.0 | -12.5 | Horiz |
| 17 | 416.890M | 37.4 | -25.5 | +0.0 | +16.6 | +4.3 | +0.0 | 32.8 | 46.0 | -13.2 | Vert |
| 18 | 56.096M | 40.0 | -24.9 | +10.1 | +0.0 | +1.5 | +0.0 | 26.7 | 40.0 | -13.3 | Horiz |
| 19 | 58.112M | 39.9 | -24.9 | +10.1 | +0.0 | +1.5 | +0.0 | 26.6 | 40.0 | -13.4 | Horiz |
| 20 | 54.072M | 39.6 | -24.9 | +10.2 | +0.0 | +1.4 | +0.0 | 26.3 | 40.0 | -13.7 | Horiz |
| 21 | 372.062M | 35.5 | -25.2 | +0.0 | +17.7 | +4.0 | +0.0 | 32.0 | 46.0 | -14.0 | Horiz |
| 22 | 438.110M | 35.8 | -25.6 | +0.0 | +16.8 | +4.5 | +0.0 | 31.5 | 46.0 | -14.5 | Vert |
| 23 | 144.018M | 37.9 | -24.9 | +13.7 | +0.0 | +2.3 | +0.0 | 29.0 | 43.5 | -14.5 | Vert |
| 24 | 398.483M | 36.3 | -25.5 | +0.0 | +16.5 | +4.1 | +0.0 | 31.4 | 46.0 | -14.6 | Horiz |
| 25 | 240.087M | 36.1 | -24.6 | +16.8 | +0.0 | +3.1 | +0.0 | 31.4 | 46.0 | -14.6 | Horiz |
| 26 | 74.002M | 40.9 | -25.0 | +7.8 | +0.0 | +1.6 | +0.0 | 25.3 | 40.0 | -14.7 | Vert |
| 27 | 336.123M | 32.4 | -24.9 | +0.0 | +19.5 | +3.8 | +0.0 | 30.8 | 46.0 | -15.2 | Horiz |
| 28 | 438.653M | 34.6 | -25.6 | +0.0 | +16.9 | +4.5 | +0.0 | 30.4 | 46.0 | -15.6 | Horiz |
| 29 | 48.072M | 37.1 | -24.9 | +10.7 | +0.0 | +1.3 | +0.0 | 24.2 | 40.0 | -15.8 | Horiz |
| 30 | 348.071M | 31.3 | -25.0 | +0.0 | +18.9 | +3.9 | +0.0 | 29.1 | 46.0 | -16.9 | Horiz |
| 31 | 170.057M | 33.4 | -24.8 | +15.2 | +0.0 | +2.5 | +0.0 | 26.3 | 43.5 | -17.2 | Horiz |
| 32 | 408.119M | 33.1 | -25.5 | +0.0 | +16.5 | +4.2 | +0.0 | 28.3 | 46.0 | -17.7 | Vert |
| 33 | 168.081M | 33.1 | -24.8 | +15.0 | +0.0 | +2.5 | +0.0 | 25.8 | 43.5 | -17.7 | Horiz |
| 34 | 150.095M | 34.8 | -24.9 | +13.2 | +0.0 | +2.3 | +0.0 | 25.4 | 43.5 | -18.1 | Horiz |
| 35 | 432.145M | 32.2 | -25.6 | +0.0 | +16.8 | +4.4 | +0.0 | 27.8 | 46.0 | -18.2 | Vert |
| 36 | 144.087M | 32.2 | -24.9 | +13.7 | +0.0 | +2.3 | +0.0 | 23.3 | 43.5 | -20.2 | Horiz |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **AIT**
Specification: **FCC B RADIATED**
Work Order #: **75638**
Test Type: **Radiated Scan**
Equipment: **Reader**
Manufacturer: AIT
Model: L-RX100
S/N: 402354

Date: 12/01/2000
Time: 17:49:11
Sequence#: 9
Tested By: Randal Clark

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|--------|
| Reader* | AIT | L-RX100 | 402354 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|--------------|--------------|---------------|------------|
| Power Supply | HP | 6205C | 2228A01775 |
| Computer | IBM | Think Pad 600 | 78-LD521 |
| Active Tag | AIT | L-TG501 | 4278612-9 |

Test Conditions / Notes:

EUT is an active tag receiver with a detachable antenna powered by a separate DC power supply.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

| # | Freq MHz | Rdng dB μ V | Amp Cable dB | Horn dB | Cable dB | Cable dB | Dist Table | Corr dB μ V/m | Spec dB μ V/m | Margin dB | Polar Ant |
|---|-------------|--------------------|--------------------|------------|-------------|-------------|---------------|----------------------|----------------------|--------------|--------------|
| 1 | 1955.354M | 47.5 | -35.3 +2.2 | +26.4 | +0.2 | +4.2 | +0.0 | 45.2 | 54.0 | -8.8 | Vert |
| 2 | 1963.190M | 47.0 | -35.3 +2.2 | +26.4 | +0.2 | +4.2 | +0.0 | 44.7 | 54.0 | -9.3 | Horiz |
| 3 | 1951.350M | 46.7 | -35.3 +2.2 | +26.4 | +0.2 | +4.1 | +0.0 | 44.3 | 54.0 | -9.7 | Vert |
| 4 | 1955.290M | 46.1 | -35.3 +2.2 | +26.4 | +0.2 | +4.2 | +0.0 | 43.8 | 54.0 | -10.2 | Horiz |
| 5 | 1085.663M | 45.2 | -35.9 +1.6 | +24.0 | +0.3 | +3.0 | +0.0 | 38.2 | 54.0 | -15.8 | Vert |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **AIT**
 Specification: **FCC B COND**
 Work Order #: **75638**
 Test Type: **Conducted Emissions**
 Equipment: **Reader**
 Manufacturer: AIT
 Model: L-RX100
 S/N: 402354

Date: 12/01/2000
 Time: 12:43:54
 Sequence#: 6
 Tested By: Randal Clark

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|--------|
| Reader* | AIT | L-RX100 | 402354 |

Support Devices:

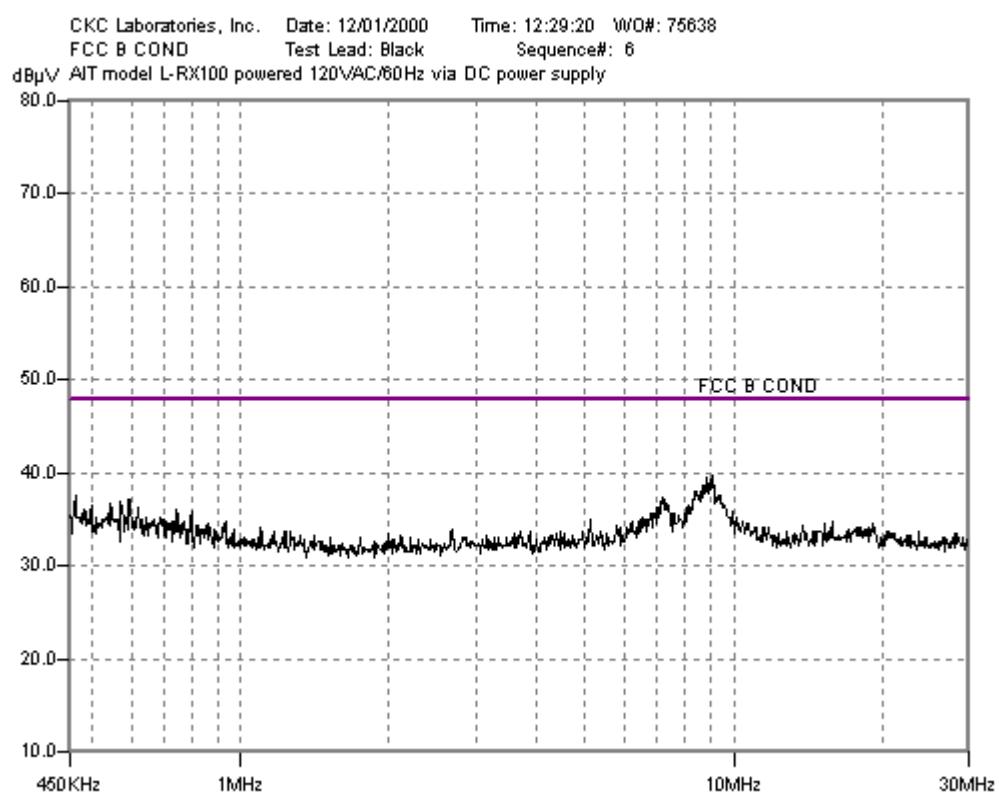
| Function | Manufacturer | Model # | S/N |
|--------------|--------------|---------------|------------|
| Power Supply | HP | 6205C | 2228A01775 |
| Computer | IBM | Think Pad 600 | 78-LD521 |
| Active Tag | AIT | L-TG501 | 4278612-9 |

Test Conditions / Notes:

EUT is an active tag receiver with a detachable antenna powered by a separate DC power supply. Support computer powered through support LISN.

| # | Freq MHz | Rdng dB μ V | LISN | | | Dist Table | Corr dB μ V | Spec dB μ V | Margin dB | Polar Ant |
|----|-------------|--------------------|------|------|----|---------------|--------------------|--------------------|--------------|--------------|
| | | | dB | dB | dB | | | | | |
| 1 | 9.098M | 34.5 | +0.2 | +5.1 | | +0.0 | 39.8 | 48.0 | -8.2 | Black |
| 2 | 8.811M | 34.6 | +0.2 | +4.8 | | +0.0 | 39.6 | 48.0 | -8.4 | Black |
| 3 | 8.988M | 33.5 | +0.2 | +5.5 | | +0.0 | 39.2 | 48.0 | -8.8 | Black |
| 4 | 8.906M | 33.5 | +0.2 | +5.2 | | +0.0 | 38.9 | 48.0 | -9.1 | Black |
| 5 | 8.742M | 34.0 | +0.2 | +4.5 | | +0.0 | 38.7 | 48.0 | -9.3 | Black |
| 6 | 8.647M | 34.3 | +0.2 | +4.2 | | +0.0 | 38.7 | 48.0 | -9.3 | Black |
| 7 | 8.551M | 34.1 | +0.2 | +3.8 | | +0.0 | 38.1 | 48.0 | -9.9 | Black |
| 8 | 8.401M | 34.7 | +0.2 | +3.2 | | +0.0 | 38.1 | 48.0 | -9.9 | Black |
| 9 | 8.333M | 34.9 | +0.2 | +2.9 | | +0.0 | 38.0 | 48.0 | -10.0 | Black |
| 10 | 9.391M | 33.4 | +0.2 | +3.9 | | +0.0 | 37.5 | 48.0 | -10.5 | Black |
| 11 | 463.386k | 36.9 | +0.1 | +0.5 | | +0.0 | 37.5 | 48.0 | -10.5 | Black |
| 12 | 7.171M | 36.4 | +0.2 | +0.8 | | +0.0 | 37.4 | 48.0 | -10.6 | Black |
| 13 | 594.738k | 36.7 | +0.1 | +0.4 | | +0.0 | 37.2 | 48.0 | -10.8 | Black |

| | | | | | | | | | |
|----|----------|------|------|------|------|------|------|-------|-------|
| 14 | 572.149k | 36.4 | +0.1 | +0.4 | +0.0 | 36.9 | 48.0 | -11.1 | Black |
| 15 | 458.366k | 36.3 | +0.1 | +0.5 | +0.0 | 36.9 | 48.0 | -11.1 | Black |
| 16 | 7.322M | 35.7 | +0.2 | +0.9 | +0.0 | 36.8 | 48.0 | -11.2 | Black |
| 17 | 542.030k | 36.2 | +0.1 | +0.5 | +0.0 | 36.8 | 48.0 | -11.2 | Black |
| 18 | 7.363M | 35.4 | +0.2 | +1.0 | +0.0 | 36.6 | 48.0 | -11.4 | Black |
| 19 | 8.100M | 34.3 | +0.2 | +2.0 | +0.0 | 36.5 | 48.0 | -11.5 | Black |
| 20 | 498.525k | 35.9 | +0.1 | +0.5 | +0.0 | 36.5 | 48.0 | -11.5 | Black |



Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **AIT**
 Specification: **FCC B COND**
 Work Order #: **75638**
 Date: 12/01/2000
 Test Type: **Conducted Emissions**
 Time: 13:01:03
 Equipment: **Reader**
 Sequence#: 7
 Manufacturer: AIT
 Tested By: Randal Clark
 Model: L-RX100
 S/N: 402354

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|--------|
| Reader* | AIT | L-RX100 | 402354 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|--------------|--------------|---------------|------------|
| Power Supply | HP | 6205C | 2228A01775 |
| Computer | IBM | Think Pad 600 | 78-LD521 |
| Active Tag | AIT | L-TG501 | 4278612-9 |

Test Conditions / Notes:

EUT is an active tag receiver with a detachable antenna powered by a separate DC power supply. Support computer powered through support LISN.

| # | Freq MHz | Rdng dB μ V | LISN | | Cable | | Dist Table | Corr dB μ V | Spec dB μ V | Margin dB | Polar Ant |
|----|-------------|--------------------|------|----|-------|----|---------------|--------------------|--------------------|--------------|--------------|
| | | | dB | dB | dB | dB | | | | | |
| 1 | 7.130M | 34.3 | +0.2 | | +3.3 | | +0.0 | 37.8 | 48.0 | -10.2 | White |
| 2 | 8.442M | 35.8 | +0.2 | | +1.7 | | +0.0 | 37.7 | 48.0 | -10.3 | White |
| 3 | 8.223M | 35.5 | +0.2 | | +2.0 | | +0.0 | 37.7 | 48.0 | -10.3 | White |
| 4 | 7.035M | 34.1 | +0.2 | | +3.4 | | +0.0 | 37.7 | 48.0 | -10.3 | White |
| 5 | 460.040k | 37.0 | +0.1 | | +0.6 | | +0.0 | 37.7 | 48.0 | -10.3 | White |
| 6 | 6.857M | 34.3 | +0.2 | | +3.1 | | +0.0 | 37.6 | 48.0 | -10.4 | White |
| 7 | 8.333M | 35.4 | +0.2 | | +1.9 | | +0.0 | 37.5 | 48.0 | -10.5 | White |
| 8 | 7.732M | 34.6 | +0.2 | | +2.7 | | +0.0 | 37.5 | 48.0 | -10.5 | White |
| 9 | 7.568M | 34.4 | +0.2 | | +2.8 | | +0.0 | 37.4 | 48.0 | -10.6 | White |
| 10 | 464.223k | 36.7 | +0.1 | | +0.6 | | +0.0 | 37.4 | 48.0 | -10.6 | White |
| 11 | 8.018M | 34.7 | +0.2 | | +2.4 | | +0.0 | 37.3 | 48.0 | -10.7 | White |
| 12 | 7.328M | 34.0 | +0.2 | | +3.1 | | +0.0 | 37.3 | 48.0 | -10.7 | White |
| 13 | 6.939M | 33.8 | +0.2 | | +3.3 | | +0.0 | 37.3 | 48.0 | -10.7 | White |

| | | | | | | | | | |
|----|----------|------|------|------|------|------|------|-------|-------|
| 14 | 515.258k | 36.4 | +0.1 | +0.6 | +0.0 | 37.1 | 48.0 | -10.9 | White |
| 15 | 453.347k | 36.4 | +0.1 | +0.6 | +0.0 | 37.1 | 48.0 | -10.9 | White |
| 16 | 7.643M | 34.0 | +0.2 | +2.7 | +0.0 | 36.9 | 48.0 | -11.1 | White |
| 17 | 8.742M | 35.3 | +0.2 | +1.3 | +0.0 | 36.8 | 48.0 | -11.2 | White |
| 18 | 604.778k | 35.8 | +0.1 | +0.6 | +0.0 | 36.5 | 48.0 | -11.5 | White |
| 19 | 496.852k | 35.7 | +0.1 | +0.6 | +0.0 | 36.4 | 48.0 | -11.6 | White |
| 20 | 475.936k | 35.6 | +0.1 | +0.6 | +0.0 | 36.3 | 48.0 | -11.7 | White |

