



Engineering and Testing for EMC and Safety Compliance

**APPLICATION FOR FCC CLASS B CERTIFICATION
WIDE BAND COMMUNICATIONS RECEIVER**

**MODEL: DJ-C7T
FCC ID: PH3DJ-C7T**

**Alinco Incorporated
Electronics Division
Shin-Dai Building 9F
2-6, 1-Chome, Dojimahama, Kita-ku
Osaka 530-0004 Japan**

April 22, 2004

| STANDARDS REFERENCED FOR THIS REPORT | |
|---|--|
| PART 2: 2003 | FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS |
| PART 15: 2003 | RADIO FREQUENCY DEVICES |
| ANSI C63.4-2001 | STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS |
| RSS-215; ISSUE 1 (PROVISIONAL): 1999 | ANALOGUE SCANNER RECEIVERS |

| FCC Rules Parts | Frequency Range (MHz) | Output Power (W) | Frequency Tolerance | Emission Designator |
|------------------------|-----------------------------------|-------------------------|----------------------------|----------------------------|
| 15.121 | 88.1-173.9875 and 380-511.9875 | N/A | N/A | N/A |

REPORT PREPARED BY:

Rhein Tech Laboratories, Inc.

**Test Engineer: Daniel Baltzell
Administrative Writer: Daniel Baltzell**

Document Number: 2004067

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TABLE OF CONTENTS

| | | |
|----------|---|-----------|
| 1 | GENERAL INFORMATION..... | 5 |
| 1.1 | MODIFICATIONS..... | 5 |
| 1.2 | RELATED SUBMITTAL(S)/GRANT(S)..... | 5 |
| 1.3 | TEST METHODOLOGY..... | 5 |
| 1.4 | TEST FACILITY..... | 5 |
| 2 | CONFORMANCE STATEMENT..... | 6 |
| 3 | SYSTEM TEST CONFIGURATION..... | 7 |
| 3.1 | JUSTIFICATION..... | 7 |
| 3.2 | EXERCISING THE EUT..... | 7 |
| 3.3 | TEST SYSTEM DETAILS..... | 7 |
| 3.4 | CONFIGURATION OF TESTED SYSTEM..... | 8 |
| 4 | RADIATED EMISSIONS..... | 9 |
| 4.1 | TEST METHODOLOGY FOR RADIATED EMISSIONS MEASUREMENTS..... | 9 |
| 4.2 | RADIATED EMISSION DATA..... | 10 |
| 5 | 38 DB REJECTION TEST..... | 13 |
| 5.1 | 38 DB REJECTION TEST DATA FOR BASE BAND (869.040-893.970 MHZ)..... | 14 |
| 5.2 | 38DB REJECTION TEST DATA FOR MOBILE BAND (824.040-848.970 MHZ)..... | 15 |
| 6 | CONCLUSION..... | 16 |

TABLE INDEX

| | | |
|------------|---|----|
| TABLE 3-1: | EQUIPMENT UNDER TEST (EUT)..... | 7 |
| TABLE 4-1: | RADIATED EMISSIONS: (INPUT FREQUENCY: 98.1 MHZ)..... | 10 |
| TABLE 4-2: | RADIATED EMISSIONS: (INPUT FREQUENCY: 125 MHZ)..... | 10 |
| TABLE 4-3: | RADIATED EMISSIONS: (INPUT FREQUENCY: 158 MHZ)..... | 10 |
| TABLE 4-4: | RADIATED EMISSIONS: (INPUT FREQUENCY: 400 MHZ)..... | 11 |
| TABLE 4-5: | RADIATED EMISSIONS: (INPUT FREQUENCY: 466 MHZ)..... | 11 |
| TABLE 4-6: | EQUIPMENT USED FOR TESTING..... | 12 |
| TABLE 5-1: | 38DB REJECTION {FREQUENCY INJECTED: 869.040 MHZ} (CELLULAR BAND)..... | 14 |
| TABLE 5-2: | 38DB REJECTION {FREQUENCY INJECTED: 881.500 MHZ} (CELLULAR BAND)..... | 14 |
| TABLE 5-3: | 38DB REJECTION {FREQUENCY INJECTED: 893.970 MHZ} (CELLULAR BAND)..... | 14 |
| TABLE 5-4: | 38DB REJECTION {FREQUENCY INJECTED: 824.040 MHZ} (MOBILE BAND)..... | 15 |
| TABLE 5-5: | 38DB REJECTION {FREQUENCY INJECTED: 836.500 MHZ} (MOBILE BAND)..... | 15 |
| TABLE 5-6: | 38DB REJECTION {FREQUENCY INJECTED: 848.970 MHZ} (MOBILE BAND)..... | 15 |
| TABLE 5-7: | EQUIPMENT USED FOR TESTING..... | 15 |

APPENDIX INDEX

| | | |
|-------------|--|----|
| APPENDIX A: | AGENCY AUTHORIZATION..... | 17 |
| APPENDIX B: | CONFIDENTIALITY REQUEST..... | 18 |
| APPENDIX C: | ATTESTATION ON CELLULAR BAND BLOCKING..... | 19 |
| APPENDIX D: | LABEL INFORMATION..... | 20 |
| APPENDIX E: | PRODUCT DESCRIPTION..... | 22 |
| APPENDIX F: | BLOCK DIAGRAM..... | 23 |
| APPENDIX G: | SCHEMATICS..... | 24 |
| APPENDIX H: | MANUAL..... | 25 |
| APPENDIX I: | TEST CONFIGURATION PHOTOGRAPHS..... | 26 |
| APPENDIX J: | EXTERNAL PHOTOGRAPHS..... | 28 |
| APPENDIX K: | INTERNAL PHOTOGRAPHS..... | 35 |

PHOTOGRAPH INDEX

| | | |
|----------------|--|----|
| PHOTOGRAPH 1: | LABEL LOCATION ON BACK OF EUT | 21 |
| PHOTOGRAPH 2: | RADIATED TEST CONFIGURATION (FRONT VIEW) | 26 |
| PHOTOGRAPH 3: | RADIATED TEST CONFIGURATION (REAR VIEW)..... | 27 |
| PHOTOGRAPH 4: | FRONT | 28 |
| PHOTOGRAPH 5: | BACK | 29 |
| PHOTOGRAPH 6: | BACK WITHOUT BATTERY | 30 |
| PHOTOGRAPH 7: | SIDE | 31 |
| PHOTOGRAPH 8: | SIDE | 32 |
| PHOTOGRAPH 9: | TOP | 33 |
| PHOTOGRAPH 10: | ANTENNA | 34 |
| PHOTOGRAPH 11: | INSIDE FRONT COVER | 35 |
| PHOTOGRAPH 12: | INSIDE BACK COVER | 36 |
| PHOTOGRAPH 13: | PCB ASSEMBY MOUNTED IN FRONT COVER | 37 |
| PHOTOGRAPH 14: | FRONT OF PCB ASSEMBLY | 38 |
| PHOTOGRAPH 15: | BACK OF PCB ASSEMBLY | 39 |
| PHOTOGRAPH 16: | FRONT OF RF PCB | 40 |
| PHOTOGRAPH 17: | BACK OF RF PCB WITH SHIELD | 41 |
| PHOTOGRAPH 18: | BACK OF RF PCB WITHOUT SHIELD | 42 |
| PHOTOGRAPH 19: | FRONT OF LCD ASSEMBLY | 43 |
| PHOTOGRAPH 20: | BACK OF LCD ASSEMBLY | 44 |
| PHOTOGRAPH 21: | TOP OF SPEAKER KEY PCB | 45 |
| PHOTOGRAPH 22: | BACK OF SPEAKER KEY PCB | 46 |
| PHOTOGRAPH 23: | TOP OF POWER AND OUTSIDE OF SWITCH PCB'S | 47 |
| PHOTOGRAPH 24: | BOTTOM OF POWER AND INSIDE OF SWITCH PCB'S | 48 |
| PHOTOGRAPH 25: | LEFT SWITCH SIDE OF PCB ASSEMBLY | 49 |
| PHOTOGRAPH 26: | RIGHT POWER CONNECTOR SIDE OF PCB ASSEMBLY | 50 |

1 GENERAL INFORMATION

The following application for FCC Type Certification of a Transceiver (Analog Scanner Receiver portion) is prepared on behalf of Alinco Incorporated; Electronics Division, in accordance with Part 2, and Part 15, Subparts A and B of the Federal Communications Commissions rules and regulations and Industry Canada RSS-215. The Equipment Under Test (EUT) was Model DJ-C7T, FCC ID: PH3DJ-C7T. The test results reported in this document relate only to the item that was tested.

All measurements contained in this Application were conducted in accordance with ANSI C63.4 Methods of Measurement of Radio Noise Emissions, 2001. The instrumentation utilized for the measurements conforms to the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Some accessories are used to increase sensitivity and prevent overloading of the measuring instrument. Calibration checks are performed regularly on the instruments, and all accessories including the high pass filter, preamplifier and cables.

All radiated emissions measurements were performed manually at Rhein Tech Laboratories. The radiated emissions measurements required by the rules were performed on the three-meter, open field; test range maintained by Rhein Tech Laboratories, 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. A complete description and site attenuation measurement data have been placed on file with the Federal Communications Commission. The power line conducted emissions measurements were performed in a shielded enclosure also located at the Herndon, Virginia facility. The FCC accepts Rhein Tech Laboratories, Inc. as a facility available to do measurement work for others on a contractual basis.

1.1 MODIFICATIONS

No modifications were made during testing.

1.2 RELATED SUBMITTAL(S)/GRANT(S)

This is an original certification submission.

1.3 TEST METHODOLOGY

Radiated testing was performed according to the procedures in ANSI C63.4 2001. Radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.4 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report, submitted to and approved by the Federal Communications Commission, to perform AC line conducted and radiated emissions testing (ANSI C63.4 2001).

2 CONFORMANCE STATEMENT

| STANDARDS REFERENCED FOR THIS REPORT | |
|---|--|
| PART 2: 2003 | FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS |
| PART 15: 2003 | RADIO FREQUENCY DEVICES |
| ANSI C63.4-2001 | STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS |
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| FCC Rules Parts | Frequency Range (MHz) | Output Power (W) | Frequency Tolerance | Emission Designator |
|-----------------|-----------------------------------|------------------|---------------------|---------------------|
| 15.121 | 88.1-173.9875 and 380-511.9875 | N/A | N/A | N/A |

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described above. No modifications were made to the equipment during testing in order to achieve compliance with these standards.


Furthermore, there was no deviation from, additions to, or exclusions from, the ANSI C63.4 test methodology.

Signature: 

Date: April 22, 2004

Typed/Printed Name: Desmond A. Fraser

Position: President
(NVLAP Signatory)

 Accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code 20061-0.

Note: This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

3 SYSTEM TEST CONFIGURATION

3.1 JUSTIFICATION

To complete the test configuration required by the FCC, the receiver was connected to an external antenna, which receives a signal from a signal generator output. With the antenna installed, the receiver indicator was used to determine optimal reception. The EUT's Intermediate Frequencies (IF), Local Oscillators (LO), crystal oscillators and harmonics of each were investigated. Conducted emission was measured from the AC port of the charger. All modes were investigated and tested including standby mode and scanning mode. The final radiated data was taken with the EUT locked to a set frequency.

3.2 EXERCISING THE EUT

The DJ-C7T is a receiver designed to function at the following frequency range: 88.1 MHz - 173.9875 MHz and 380 MHz – 511.9875 MHz. The following frequencies were tested: 98.1 MHz, 125 MHz, 155.000 MHz, 400 MHz, and 466 MHz. Each receiver frequency was measured independently. In order to activate the receiver circuitry; a signal was transmitted from a signal generator. This allowed the EUT to function in its typical state throughout the course of all testing. There were no deviations from the test standard(s) and/or methods.

3.3 TEST SYSTEM DETAILS

The test sample was received on April 15, 2004. The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system are:

TABLE 3-1: EQUIPMENT UNDER TEST (EUT)

| PART | MANUFACTURER | MODEL | SERIAL NUMBER | FCC ID | CABLE DESCRIPTION | RTL BAR CODE |
|----------------------------|--------------|---------|---------------|-----------|-------------------|--------------|
| Mobile Transceiver | Alinco, Inc. | DJ-C7T | M000402 | PH3DJ-C7T | N/A | 15856 |
| Mobile Transceiver | Alinco, Inc. | DJ-C7T | M000402 | PH3DJ-C7T | N/A | 15857 |
| 3.7V 600mAh Li-ion Battery | Alinco, Inc. | EBP-58N | N/A | N/A | N/A | 15858 |

3.4 CONFIGURATION OF TESTED SYSTEM

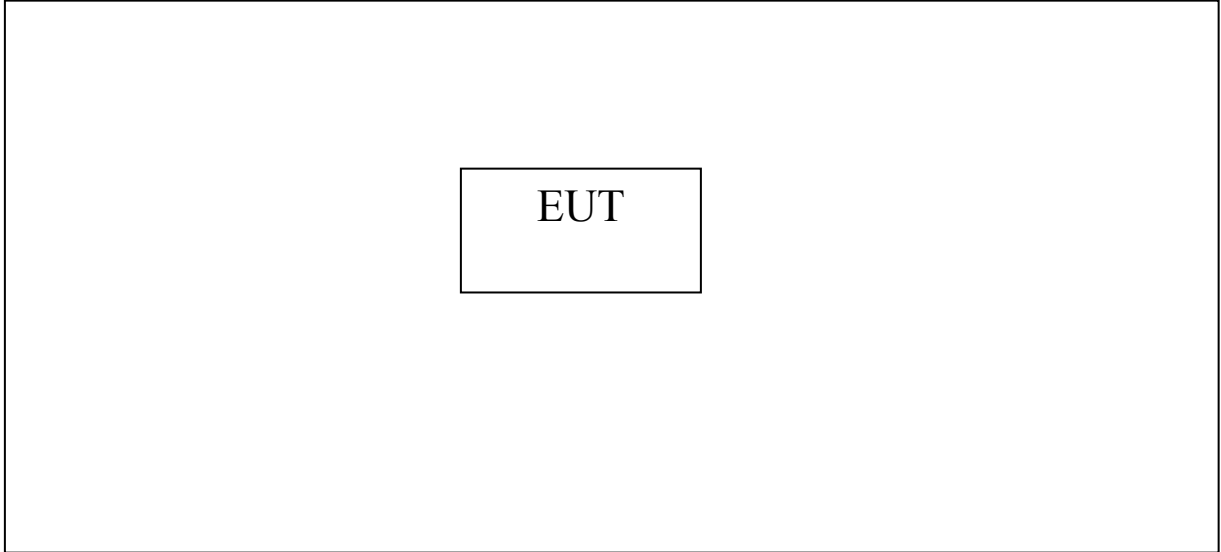


FIGURE 3-1: CONFIGURATION OF TESTED SYSTEM

|

4 RADIATED EMISSIONS

4.1 TEST METHODOLOGY FOR RADIATED EMISSIONS MEASUREMENTS

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one meter and three meter distances, in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to insure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three-meter, open-field test site. The EUT was placed on a nonconductive turntable approximately 0.8 meters above the ground plane. The spectrum was examined from 30 MHz to 1000 MHz using a spectrum analyzer, a quasi-peak adapter, and EMCO log periodic and biconical antenna. In order to gain sensitivity, a preamplifier was connected in series between the antenna and the input of the spectrum analyzer.

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters in order to determine the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarizations. The spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. No video filter less than 10 times the resolution bandwidth was used. The second harmonic of the highest LO was tested. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Note: Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech quality manual, section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as well as daily calibration methods, technician training, and emphasis to employees on avoiding error.

4.2 RADIATED EMISSION TEST DATA

TABLE 4-1: RADIATED EMISSIONS: (INPUT FREQUENCY: 98.1 MHZ)

| | | Temperature: 27°F | | | Humidity: 92% | | | | |
|--------------------------|---------------|------------------------|-------------------------|--------------------|-------------------------|-------------------------------|-------------------------|----------------|-------------|
| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Turntable Azimuth (deg) | Antenna Height (m) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 50.407 | Qp | V | 0 | 1.0 | 40.1 | -21.9 | 18.2 | 40.0 | -21.8 |
| 63.004 | Qp | V | 0 | 1.0 | 37.7 | -23.4 | 14.3 | 40.0 | -25.7 |
| 148.950 | Qp | V | 0 | 1.0 | 40.5 | -17.6 | 22.9 | 43.5 | -20.6 |
| 297.900 | Qp | V | 0 | 1.0 | 36.4 | -15.2 | 21.2 | 46.0 | -24.8 |
| 446.850 | Qp | V | 0 | 1.0 | 35.3 | -11.1 | 24.2 | 46.0 | -21.8 |

LO= 148.95 MHz, 1st IF = 21.7 MHz, 2nd IF = 450 kHz

TABLE 4-2: RADIATED EMISSIONS: (INPUT FREQUENCY: 125 MHZ)

| | | Temperature: 27°F | | | Humidity: 92% | | | | |
|--------------------------|---------------|------------------------|-------------------------|--------------------|-------------------------|-------------------------------|-------------------------|----------------|-------------|
| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Turntable Azimuth (deg) | Antenna Height (m) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 50.407 | Qp | V | 0 | 1.0 | 40.1 | -21.9 | 18.2 | 40.0 | -21.8 |
| 63.004 | Qp | V | 0 | 1.0 | 37.7 | -23.4 | 14.3 | 40.0 | -25.7 |
| 175.850 | Qp | V | 355 | 1.0 | 49.3 | -18.7 | 30.6 | 43.5 | -12.9 |
| 351.699 | Qp | V | 0 | 1.0 | 33.5 | -13.3 | 20.2 | 46.0 | -25.8 |
| 527.548 | Qp | V | 0 | 1.0 | 33.8 | -9.1 | 24.7 | 46.0 | -21.3 |

LO= 175.85 MHz, 1st IF = 21.7 MHz, 2nd IF = 450 kHz

TABLE 4-3: RADIATED EMISSIONS: (INPUT FREQUENCY: 158 MHZ)

| | | Temperature: 27°F | | | Humidity: 92% | | | | |
|--------------------------|---------------|------------------------|-------------------------|--------------------|-------------------------|-------------------------------|-------------------------|----------------|-------------|
| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Turntable Azimuth (deg) | Antenna Height (m) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 50.407 | Qp | V | 0 | 1.0 | 40.1 | -21.9 | 18.2 | 40.0 | -21.8 |
| 63.004 | Qp | V | 0 | 1.0 | 37.7 | -23.4 | 14.3 | 40.0 | -25.7 |
| 208.850 | Qp | H | 90 | 1.0 | 39.3 | -18.4 | 20.9 | 43.5 | -22.6 |
| 384.699 | Qp | V | 0 | 1.0 | 32.1 | -12.6 | 19.5 | 46.0 | -26.5 |
| 560.548 | Qp | V | 0 | 1.0 | 32.7 | -8.1 | 24.6 | 46.0 | -21.4 |

LO= 208.85 MHz, 1st IF = 21.7 MHz, 2nd IF = 450 kHz

TABLE 4-4: RADIATED EMISSIONS: (INPUT FREQUENCY: 400 MHZ)

| | | Temperature: 27°F | | | Humidity: 92% | | | | |
|--------------------------|---------------|------------------------|-------------------------|--------------------|-------------------------|-------------------------------|-------------------------|----------------|-------------|
| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Turntable Azimuth (deg) | Antenna Height (m) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 50.407 | Qp | V | 0 | 1.0 | 40.1 | -21.9 | 18.2 | 40.0 | -21.8 |
| 63.004 | Qp | V | 0 | 1.0 | 37.7 | -23.4 | 14.3 | 40.0 | -25.7 |
| 450.850 | Qp | V | 90 | 1.0 | 54.4 | -11.0 | 43.4 | 46.0 | -2.6 |
| 901.700 | Qp | V | 90 | 1.0 | 45.7 | -4.7 | 41.0 | 46.0 | -5.0 |
| 1352.550 | Av | V | 90 | 2.0 | 36.1 | 1.4 | 37.5 | 54.0 | -16.5 |

LO= 450.85 MHz, 1st IF = 21.7 MHz, 2nd IF = 450 kHz

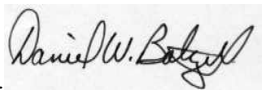
TABLE 4-5: RADIATED EMISSIONS: (INPUT FREQUENCY: 466 MHZ)

| | | Temperature: 27°F | | | Humidity: 92% | | | | |
|--------------------------|---------------|------------------------|-------------------------|--------------------|-------------------------|-------------------------------|-------------------------|----------------|-------------|
| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Turntable Azimuth (deg) | Antenna Height (m) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 50.407 | Qp | V | 0 | 1.0 | 40.1 | -21.9 | 18.2 | 40.0 | -21.8 |
| 63.004 | Qp | V | 0 | 1.0 | 37.7 | -23.4 | 14.3 | 40.0 | -25.7 |
| 516.850 | Qp | V | 0 | 1.0 | 33.6 | -9.4 | 24.2 | 46.0 | -21.8 |
| 1033.700 | Av | V | 0 | 1.0 | 33.0 | -3.4 | 29.6 | 54.0 | -24.4 |
| 1550.550 | Av | V | 0 | 1.0 | 32.5 | 3.6 | 36.1 | 54.0 | -17.9 |

LO= 516.85 MHz, 1st IF = 21.7 MHz, 2nd IF = 450 kHz

**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:



Signature: _____

Date: April 21, 2004 Typed Name: Daniel W. Baltzell

TABLE 4-6: EQUIPMENT USED FOR TESTING

* Note: The preamplifier's gain is included in the site correction factor.

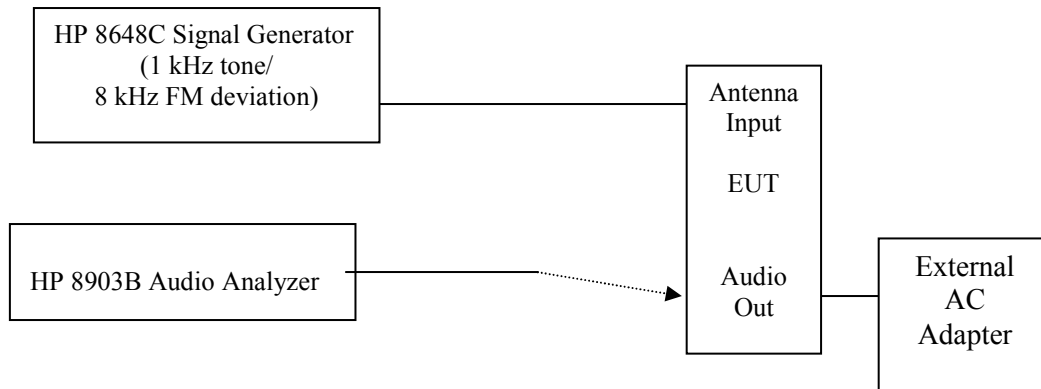
| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Date |
|-------------|--------------------------------------|----------|--|---------------|------------------|
| 900931 | Hewlett Packard | 8566B | Spectrum Analyzer (100 Hz - 22 GHz) | 3138A07771 | 5/12/04 |
| 900930 | Hewlett Packard | 85662A | Spectrum Analyzer Display Section | 3144A20839 | 5/12/04 |
| 900969 | Hewlett Packard | 85650A | Quasi-Peak Adapter | 2412A00414 | 5/12/04 |
| 901053 | Schaffner & Chase | CBL6112B | Bilog antenna (20 MHz - 2 GHz) | 2648 | 9/3/04 |
| *900905 | Rhein Tech Laboratories, Inc. | PR-1040 | Pre Amplifier 40dB (10 MHz - 2 GHz) | 1006 | 9/10/04 |
| 900917 | Hewlett Packard | 8648C | Signal Generator (100 KHz - 3200 MHz) | 3537A01741 | 5/2/04 |
| 900724 | Antenna Research Associates, Inc. | LPB-2520 | LOG Periodic /Biconal Antenna (25 - 1000 MHz) | 1037 | 4/13/05 |

5 38 DB REJECTION TEST

A signal generator was connected to the receiver under test, and the output of the receiver was connected to an audio analyzer.

An FM signal was applied to the receiver antenna input with a 1 kHz tone modulated at 8 kHz deviation, and adjusted with the audio analyzer to produce a 12 dB SINAD. This was done across the receiver bands to determine a reference level. The reference level used was that with the highest sensitivity in all of the bands.

The output of the signal generator was then adjusted to a level 40 dB above the reference level established and set to a low, medium, and high frequency in both the mobile and base cellular bands: mobile = 824.04 MHz - 848.97 MHz; base = 869.04 MHz - 893.97 MHz. The squelch of the receiver was then set to a minimum threshold level, and scanning began from the lowest to the highest channel. Whenever the receiver stopped and “un-squelched”, that frequency was noted as a response. After all the frequencies of responses were noted, the signal generator was set to measure the sensitivity at each of these response frequencies. This measurement was the reference sensitivity for the particular received frequency measured. The audio analyzer measurement was used to measure the 12 dB SINAD and that is the spurious value. The difference between the reference sensitivity and the spurious value is the rejection ratio and must be at least 38 dB.



Frequencies used on the signal generator were 824.04, 836.50, 848.97 MHz for the mobile and 869.04, 881.50, 893.97 MHz for the Base.

The DJ-C7T unit reference level used was -52.6 dBm from the signal generator. The DJ-C7T unit was scanned from 118 MHz – 173.995 MHz for all channels (based on manufacturer’s specifications.). Signals that were noted as responses were checked with the signal generator off. If they were still present, they were determined as ambient signals and removed from the response list. There was no signal available for the 38 dB rejection test requirements.

5.1 38 DB REJECTION TEST DATA FOR BASE BAND (869.040-893.970 MHZ)

TABLE 5-1: 38DB REJECTION {FREQUENCY INJECTED: 869.040 MHZ} (CELLULAR BAND)

| Frequency Injected: 869.040 MHz | | Temperature: 74°F; Humidity: 33% | | |
|---------------------------------|---------------------------------|----------------------------------|-----------|--------|
| Frequency Detected (MHz) | Level 12dB SINAD at 869.040 MHz | Level 12dB at frequency detected | Rejection | Margin |
| No Frequencies Detected | N/A | N/A | N/A | N/A |

TABLE 5-2: 38DB REJECTION {FREQUENCY INJECTED: 881.500 MHZ} (CELLULAR BAND)

| Frequency Injected: 881.500 MHz | | Temperature: 74°F; Humidity: 33% | | |
|---------------------------------|-------------------------------|----------------------------------|-----------|--------|
| Frequency Detected (MHz) | Level 12dB SINAD at 881.50MHz | Level 12dB at frequency detected | Rejection | Margin |
| No Frequencies Detected | N/A | N/A | N/A | N/A |

TABLE 5-3: 38DB REJECTION {FREQUENCY INJECTED: 893.970 MHZ} (CELLULAR BAND)

| Frequency Injected: 893.970 MHz | | Temperature: 74°F; Humidity: 33% | | |
|---------------------------------|--------------------------------|----------------------------------|-----------|--------|
| Frequency Detected (MHz) | Level 12dB SINAD at 893.970MHz | Level 12dB at frequency detected | Rejection | Margin |
| No Frequencies Detected | N/A | N/A | N/A | N/A |

5.2 38DB REJECTION TEST DATA FOR MOBILE BAND (824.040-848.970 MHz)

TABLE 5-4: 38DB REJECTION {FREQUENCY INJECTED: 824.040 MHz} (MOBILE BAND)

| Frequency Injected: 824.040 MHz | | Temperature: 74°F; Humidity: 33% | | |
|---------------------------------|--------------------------------|----------------------------------|-----------|--------|
| Frequency Detected (MHz) | Level 12dB SINAD at 824.040MHz | Level 12dB at frequency detected | Rejection | Margin |
| No Frequencies Detected | N/A | N/A | N/A | N/A |

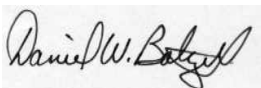
TABLE 5-5: 38DB REJECTION {FREQUENCY INJECTED: 836.500 MHz} (MOBILE BAND)

| Frequency Injected: 836.505 MHz | | Temperature: 74°F; Humidity: 33% | | |
|---------------------------------|--------------------------------|----------------------------------|-----------|--------|
| Frequency Detected (MHz) | Level 12dB SINAD at 836.500MHz | Level 12dB at frequency detected | Rejection | Margin |
| No Frequencies Detected | N/A | N/A | N/A | N/A |

TABLE 5-6: 38DB REJECTION {FREQUENCY INJECTED: 848.970 MHz} (MOBILE BAND)

| Frequency Injected: 848.970 MHz | | Temperature: 74°F; Humidity: 33% | | |
|---------------------------------|--------------------------------|----------------------------------|-----------|--------|
| Frequency Detected (MHz) | Level 12dB SINAD at 848.970MHz | Level 12dB at frequency detected | Rejection | Margin |
| No Frequencies Detected | N/A | N/A | N/A | N/A |

TEST PERSONNEL:

Signature: 

Date: April 22, 2004

Typed Name: Daniel Baltzell

TABLE 5-7: EQUIPMENT USED FOR TESTING

| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Date |
|-------------|-----------------|-------|--|---------------|------------------|
| 900917 | Hewlett Packard | 8648C | Signal Generator (100 kHz - 3200 MHz) | 3537A01741 | 5/2/2004 |
| 901067 | Hewlett Packard | 8903B | Audio Analyzer (20 Hz - 100 kHz) | 2303A00307 | 4/15/2005 |

6 CONCLUSION

The data in this measurement report shows that the Alinco Inc., Model DJ-C7T, FCC ID: PH3DJ-C7T, complies with all the requirements of Parts 2 and 15.121 of the FCC Rules and Industry Canada RSS-215, Issue 1.