



Measurement of RF Interference from a Cascade  
Networks Model Cyclone Transciever (UNII) Band  
using the Maxrad Model MFB51510  
Omni-directional Antenna, a MTI Model MT-485002  
Flat Panel Antenna and a RadioWaves Model SEC-  
5V-120-14 120 Antenna

---

For : Cascade Networks, Inc.  
Longview WA

P.O. No. :  
Date Received: January 19<sup>th</sup>. 2004  
Date Tested : January 19<sup>th</sup> through January 24, 2004  
Test Personnel: Richard E. King  
Specification : FCC "Code of Federal Regulations" Title 47  
Part 15.407, Subpart E

Test Report By :  
Richard E. King  
EMC Engineer

Witnessed by :  
Brian Magnuson  
Cascade Networks, Inc.

Approved By : Raymond J. Klouda  
Registered Professional Engineer of  
Illinois - 44894



TABLE OF CONTENTS

<u>PARAGRAPH</u>	<u>DESCRIPTION OF CONTENTS</u>	<u>PAGE NO.</u>
1.0 INTRODUCTION .....		4
1.1 Description of Test Item .....		4
1.2 Purpose .....		4
1.3 Deviations, Additions and Exclusions .....		4
1.4 Applicable Documents .....		4
1.5 Subcontractor Identification .....		4
1.6 Laboratory Conditions .....		4
2.0 TEST ITEM SETUP AND OPERATION .....		5
2.1 Power Input .....		5
2.2 Grounding .....		5
2.3 Peripheral Equipment .....		5
2.4 Interconnect Cables .....		5
2.5 Operational Mode .....		5
3.0 TEST EQUIPMENT .....		5
3.1 Test Equipment List .....		5
3.2 Calibration Traceability .....		5
4.0 REQUIREMENTS, PROCEDURES AND RESULTS .....		5
4.1 Powerline Conducted Emissions .....		5
4.1.1 Requirements .....		5
4.3 Radiated Measurements .....		5
4.3.1 Requirements .....		5
4.3.2 Procedures .....		6
4.3.2.2 Final Radiated Measurements .....		6
4.3.3 Results .....		6
5.0 CONCLUSIONS .....		6
6.0 CERTIFICATION .....		6
7.0 ENDORSEMENT DISCLAIMER .....		7
TABLE I - EQUIPMENT LIST .....		8

## Measurement of RF Emissions from a Cascade Networks Cyclone Transceiver

### **1.0 INTRODUCTION:**

**1.1 Description of Test Item** - This document presents the results of tests performed to determine if the Cascade Networks Cyclone Transceiver (UNII Band) meets the FCC requirements when using a Maxrad Model MFB51510 Omni-directional Antenna, a MTI Model MT-485002 Flat Panel Antenna and a RadioWaves Model SEC-5V-120-14 120 Antenna.

The test item is a Motorola Canopy transceiver modified by Cascade Networks and designed to transmit in the 5.250MHz to 5.350MHz band. The tests were performed for Cascade Networks Inc, of Longview, Washington.

**1.2 Purpose** - The test series was performed to determine if the test item meets the requirements of the radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart E, Sections for Intentional Radiators. Testing was performed in accordance with ANSI C63.4-2001.

**1.3 Deviations, Additions and Exclusions** - There were no deviations, additions to, or exclusions from the test specification during this test series.

**1.4 Applicable Documents** - The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart E, dated 1 October 2002
- ANSI C63.4-2001, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"

**1.5 Subcontractor Identification** - This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP Lab Code: 100278-0.

**1.6 Laboratory Conditions** The temperature at the time of the test was 22°C and the relative humidity was 11%.

## **2.0 TEST ITEM SETUP AND OPERATION:**

The test item is a Cascade Networks Cyclone Transciever with external antennas. A block diagram of the test item setup is shown as Figure 1.

**2.1 Power Input** - The test item was powered with 24VDC from a Motorola model SADB-1129 transformer.

**2.2 Grounding** - Since the test item was powered with two wires, it was ungrounded during the tests.

**2.3 Peripheral Equipment** - The test item was submitted with a Panasonic ToughBook laptop that was used to power and communicate with the test item via one 45 foot long CAT 5 ethernet cable.

**2.4 Interconnect Cables** - The test item was connected to the laptop via a 45 foot long CAT 5 ethernet cable.

**2.5 Operational Mode** - For all tests the test item was placed on a 80cm high non-conductive stand. The test item and all peripheral equipment were energized.

For all tests, the test item was controlled and powered by the laptop computer. Through the computer the test item was set to transmit continuously in a continuous wave mode. The tests were performed with the test item transmitting at 5250MHz, 5300MHz and 5350MHz.

## **3.0 TEST EQUIPMENT:**

**3.1 Test Equipment List** - A list of the test equipment used can be found on Table I. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

**3.2 Calibration Traceability** Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

## **4.0 REQUIREMENTS, PROCEDURES AND RESULTS:**

### **4.1 Powerline Conducted Emissions**

**4.1.1 Requirements** – Since conducted emissions test data was obtained by Cascade Networks no conducted emission measurements were taken.

### **4.2 Radiated Measurements**

**4.2.1 Requirements** - Per section 15.407(b)(2), For transmitters operating in the 5.25 - 5.35GHz range band: all emissions outside of the 5.15-5.25GHz band shall not exceed an EIRP of -27dm/MHz. Devices operating in the 5.25-5.35GHz band that generate emissions in the 5.15-5.25GHz band must meet all applicable technical requirements for operation in the 5.15-5.25GHz (including

indoor use) or alternatively meet an out-of-band emissions EIRP limit of -27dBm/MHz in the 5.15-5.25GHz band.

**4.2.2 Procedures** - Radiated measurements were manually performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads. The frequency ranges for the harmonics were investigated using an average detector function.

To ensure that maximum emission levels were measured, the following steps were taken:

- 1) Measurements were made using an average detector and a standard gain horn antenna.
- 2) To ensure that maximum or worst case, emission levels were measured, the following steps were taken:
  - (a) The test item was rotated so that all of its sides were exposed to the receiving antenna.
  - (b) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
  - (c) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.

Photographs of the test item setup with the Omni antenna are presented as Figures 2.

**4.2.3 Results** - The radiated emission levels, with the test item transmitting at 5250.0, 5300.0 and 5350.0MHz, are presented on data pages 13 through 21. As can be seen by the data the test item with the three separate antennas did meet the emissions limits of 15.407(b)(2).

## **5.0 CONCLUSIONS:**

It was determined that the Cascade Networks Cyclone Transciever tested with a Maxrad Model MFB51510 Omni-directional Antenna, a MTI Model MT-485002 Flat Panel Antenna and a RadioWaves Model SEC-5V-120-14 120 Antenna, did fully meet the selected emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15.407, Subpart E. for Intentional Radiators, when tested per ANSI C63.4-2001.

## **6.0 CERTIFICATION:**

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specifications.

The data presented in this test report pertains to the test item at the test date as operated by Cascade



Networks, Inc. personnel. Any electrical or mechanical modification made to the test item subsequent to the specified test date will serve to invalidate the data and void this certification.

**7.0 ENDORSEMENT DISCLAIMER:**

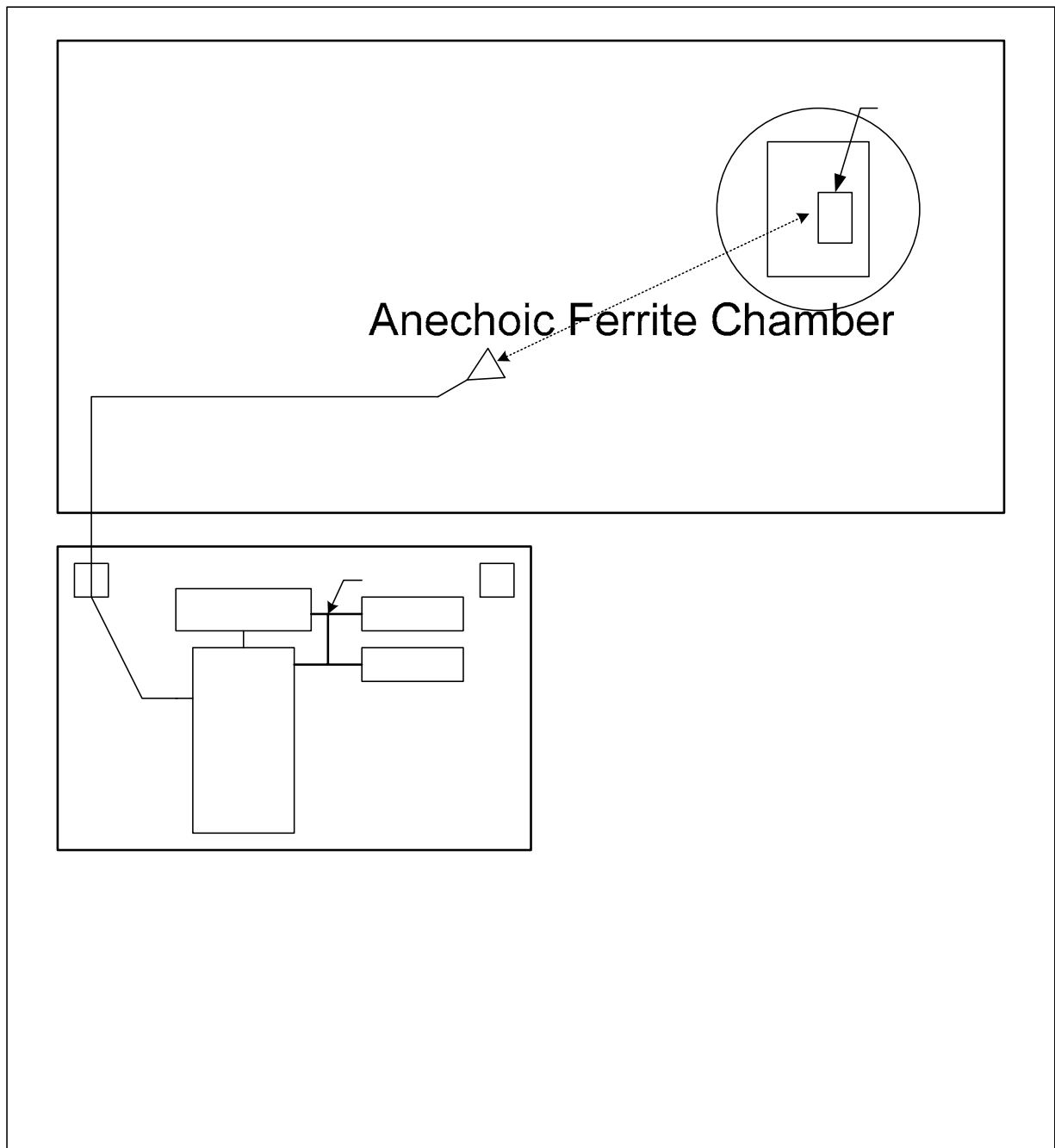
This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.



TABLE I: TEST EQUIPMENT LIST

ELITE ELECTRONIC ENG. INC.								Page: 1
Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Cal Inv	Due Date
Equipment Type: ACCESSORIES, MISCELLANEOUS								
XPR0	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/	001	4.8-20GHZ	07/03/03	12	07/03/04
XZG0	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	3439A02724	---		N/A	
Equipment Type: AMPLIFIERS								
APH0	POWER AMPLIFIER	HEWLETT PACKARD	11975A	2304A00322	2-8GHZ		NOTE 1	
APK0	PRE-AMPLIFIER	HEWLETT PACKARD	8449B	3008A00662	1-26.5GHZ	02/04/04	12	02/04/05
Equipment Type: ANTENNAS								
NHA0	STANDARD GAIN HORN ANTENNA	NARDA	640	---	8.2-12.4GHZ		NOTE 1	
NHE0	STANDARD GAIN HORN ANTENNA	NARDA	639	---	12.4-18GHZ		NOTE 1	
NHG0	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ		NOTE 1	
NHH0	STANDARD GAIN HORN ANTENNA	NARDA	V637	---	26.5-40GHZ		NOTE 1	
NHH1	STANDARD GAIN HORN ANTENNA	NARDA	V637	---	26.5-40GHZ		NOTE 1	
NWG0	RIDGED WAVE GUIDE (DCC-MAT	AEL	H1479	104	1-12.4GHZ	11/26/03	12	11/26/04
NWI0	RIDGED WAVE GUIDE	AEL	H1498	153	2-18GHZ	09/05/03	12	09/05/04
Equipment Type: ATTENUATORS								
T2D0	20DB, 25W ATTENUATOR (DCC-	WEINSCHEL	46-20-43	AV5813	DC-18GHZ	01/22/04	12	01/22/05
T2D9	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BH5445	DC-18GHZ	12/29/03	12	12/29/04
T2DD	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BH5449	DC-18GHZ	12/03/03	12	12/03/04
TVC0	VARIABLE ATTENUATOR	HEWLETT PACKARD	R382A	1281	26.5-40GHZ	08/13/03	12	08/13/04
Equipment Type: CONTROLLERS								
CMA0	MULTI-DEVICE CONTROLLER	EMCO	2090	9701-1213	---		N/A	
Equipment Type: METERS								
MPA0	POWER METER	HEWLETT PACKARD	432A	1141A08696	0.01-40GHZ	07/01/03	12	07/01/04
MPAD	THERMISTOR MOUNT	HEWLETT PACKARD	R486A	3322	26.5-40GHZ	09/30/03	12	09/30/04
Equipment Type: RECEIVERS								
RAB0	SPECTRUM ANALYZER	HEWLETT PACKARD	85680A	1818A00258	100HZ-1.5GHZ	05/10/02	DAMAGED	
RAC1	SPECTRUM ANALYZER	HEWLETT PACKARD	85660B	3407A08369	100HZ-22GHZ	02/04/04	12	02/04/05
RACB	RF PRESELECTOR	HEWLETT PACKARD	85685A	3506A01491	20HZ-2GHZ	02/04/04	12	02/04/05
RAE1	SPECTRUM ANALYZER (DCC-CEM	HEWLETT PACKARD	85660A	2209A01336	100HZ-22GHZ	02/06/03	12	02/06/04
RAF3	QUASIPeAK ADAPTER	HEWLETT PACKARD	85650A	3303A01775	0.01-1000MHZ	02/04/04	12	02/04/05
RAI0	FREQUENCY MIXER	HEWLETT PACKARD	11970A	2332A00292	26-40GHZ	06/02/03	N/A	
Equipment Type: SIGNAL GENERATORS								
GBX1	SYNTHESIZED SWEEPER	HEWLETT PACKARD	83630A	3420A00857	10MHZ-26.5GHZ		NOTE 1	
GSB0	SWEEP OSCILLATOR	HEWLETT PACKARD	8350B	2309A02104	0.01-40GHZ	06/10/03	12	06/10/04
GSBC	TUNING HEAD	HEWLETT PACKARD	83572B	2429A00203	26.5-40GHZ	06/09/03	12	06/09/04

Cal. Interval: Listed in Months I/O: Initial Only N/A: Not Applicable  
Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.



Hpib cbl

Turn Table & Mast  
Controller

Computer

Page 9 of 12  
Printer



Figure 2



Test Setup For Measurement of radiated emissions MaxRad Model MFB51510 Omni-directional Antenna

Figure 3

No Picture Available

Figure 4



Test Setup For Measurement of radiated emissions RadioWaves Model SEC-5V-120-14 120 Antenna



MANUFACTURER : Cascade Networks  
MODEL : Cyclone Transceiver  
ANTENNA : MaxRad MFB51510 Omni  
S/N : None given  
SPECIFICATION : FCC-15C Radiated Emissions  
DATE : January 23, 2004  
NOTES : LOW Channel

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP MATCHED (dBm)	LIMIT (dBm)
10500.0	H	1MHz	29.2	-49.1	14.2	-0.9	-35.8	-27
10500.0	V	1MHz	30.0	-49.3	14.2	-0.9	-36.0	-27
15750.0	H	1MHz	29.8	-60.1	12.9	-1.2	-48.4	-27
15750.0	V	1MHz	29.9	-60.2	12.9	-1.2	-48.5	-27
21000.0	H	1MHz	30.1	-54.2	12.0	-1.0	-43.2	-27
21000.0	V	1MHz	30.2	-54.8	12.0	-1.0	-43.8	-27
26250.0	H	1MHz	31.4	-59.3	14.6	-1.0	-45.7	-27
26250.0	V	1MHz	31.3	-60.9	14.6	-1.0	-47.3	-27
31500.0	H	1MHz	25.9	-62.3	16.0	-1.0	-47.3	-27
31500.0	V	1MHz	25.7	-62.1	16.0	-1.0	-47.1	-27

CHECKED BY: Richard E. King  
Richard E. King



**MANUFACTURER** : Cascade Networks  
**MODEL** : Cyclone Transceiver  
**ANTENNA** : MaxRad MFB51510 Omni  
**S/N** : None given  
**SPECIFICATION** : FCC-15C Radiated Emissions  
**DATE** : January 23, 2004  
**NOTES** : MID Channel

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP MATCHED (dBm)	LIMIT (dBm)
10600.0	H	1MHz	28.8	-45.3	14.3	-0.9	-31.9	-27
10600.0	V	1MHz	29.6	-44.9	14.3	-0.9	-31.5	-27
15900.0	H	1MHz	26.9	-59.0	12.9	-1.2	-47.3	-27
15900.0	V	1MHz	27.2	-59.3	12.9	-1.2	-47.6	-27
21200.0	H	1MHz	30.4	-56.3	12.0	-1.0	-45.3	-27
21200.0	V	1MHz	30.5	-56.1	12.0	-1.0	-45.1	-27
26500.0	H	1MHz	30.2	-59.3	14.7	-1.0	-45.6	-27
26500.0	V	1MHz	30.2	-60.3	14.7	-1.0	-46.6	-27
31800.0	H	1MHz	26.0	-63.3	16.1	-1.0	-48.2	-27
31800.0	V	1MHz	25.9	-63.8	16.1	-1.0	-48.7	-27

CHECKED BY: Richard E. King  
Richard E. King



MANUFACTURER : Cascade Networks  
MODEL : Cyclone Transceiver  
ANTENNA : MaxRad MFB51510 Omni  
S/N : None given  
SPECIFICATION : FCC-15C Radiated Emissions  
DATE : January 23, 2004  
NOTES : HIGH Channel

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP MATCHED (dBm)	LIMIT (dBm)
10700.0	H	1MHz	28.8	-48.0	14.4	-0.9	-34.5	-27
10700.0	V	1MHz	28.9	-47.5	14.4	-0.9	-34.0	-27
16050.0	H	1MHz	29.6	-53.5	13.0	-1.2	-41.7	-27
16050.0	V	1MHz	29.5	-53.9	13.0	-1.2	-42.1	-27
21400.0	H	1MHz	29.7	-52.9	12.1	-1.0	-41.8	-27
21400.0	V	1MHz	29.9	-52.4	12.1	-1.0	-41.3	-27
26750.0	H	1MHz	31.2	-60.1	14.8	-1.0	-46.3	-27
26750.0	V	1MHz	31.4	-60.2	14.8	-1.0	-46.4	-27
32100.0	H	1MHz	26.8	-63.1	16.1	-1.0	-48.0	-27
32100.0	V	1MHz	26.5	-64.1	16.1	-1.0	-49.0	-27

CHECKED BY: Richard E. King  
Richard E. King



**MANUFACTURER** : Cascade Networks  
**MODEL** : Cyclone Transceiver  
**ANTENNA** : MTI MT-485002 Flat Panel  
**S/N** : None given  
**SPECIFICATION** : FCC-15C Radiated Emissions  
**DATE** : January 23, 2004  
**NOTES** : LOW Channel

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP MATCHED (dBm)	LIMIT (dBm)
10500.0	H	1MHz	30.7	-48.9	14.2	0.9	-33.8	-27
10500.0	V	1MHz	29.8	-49.5	14.2	0.9	-34.4	-27
15750.0	H	1MHz	29.9	-60.3	12.9	1.2	-46.2	-27
15750.0	V	1MHz	29.7	-60.3	12.9	1.2	-46.2	-27
21000.0	H	1MHz	30.3	-57.8	12.0	1.0	-44.8	-27
21000.0	V	1MHz	30.4	-57.9	12.0	1.0	-44.9	-27
26250.0	H	1MHz	31.4	-59.3	14.6	1.0	-43.7	-27
26250.0	V	1MHz	31.5	-58.9	14.6	1.0	-43.3	-27
31500.0	H	1MHz	26.6	-62.2	16.0	1.0	-45.2	-27
31500.0	V	1MHz	25.2	-62.0	16.0	1.0	-45.0	-27

CHECKED BY: Richard E. King  
Richard E. King



**MANUFACTURER** : Cascade Networks  
**MODEL** : CycloneTransceiver  
**ANTENNA** : MTI MT-485002 Flat Panel  
**S/N** : None given  
**SPECIFICATION** : FCC-15C Radiated Emissions  
**DATE** : January 23, 2004  
**NOTES** : MID Channel

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP MATCHED (dBm)	LIMIT (dBm)
10600.0	H	1MHz	28.7	-46.9	14.3	0.9	-31.7	-27
10600.0	V	1MHz	28.8	-46.9	14.3	0.9	-31.7	-27
15900.0	H	1MHz	25.4	-58.7	12.9	1.2	-44.6	-27
15900.0	V	1MHz	26.9	-58.5	12.9	1.2	-44.4	-27
21200.0	H	1MHz	30.1	-59.6	12.0	1.0	-46.6	-27
21200.0	V	1MHz	30.1	-59.9	12.0	1.0	-46.9	-27
26500.0	H	1MHz	30.5	-60.0	14.7	1.0	-44.3	-27
26500.0	V	1MHz	30.1	-60.5	14.7	1.0	-44.8	-27
31800.0	H	1MHz	25.7	-62.1	16.1	1.0	-45.1	-27
31800.0	V	1MHz	25.3	-62.6	16.1	1.0	-45.6	-27

CHECKED BY: Richard E. King  
Richard E. King





**MANUFACTURER** : Cascade Networks  
**MODEL** : Cyclone Transceiver  
**ANTENNA** : MTI MT-485002 Flat Panel  
**S/N** : None given  
**SPECIFICATION** : FCC-15C Radiated Emissions  
**DATE** : January 23, 2004  
**NOTES** : HIGH Channel

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP MATCHED (dBm)	LIMIT (dBm)
10700.0	H	1MHz	30.8	-47.9	14.4	0.9	-32.6	-27
10700.0	V	1MHz	30.8	-47.9	14.4	0.9	-32.6	-27
16050.0	H	1MHz	29.6	-54.5	13.0	1.2	-40.3	-27
16050.0	V	1MHz	29.8	-54.8	13.0	1.2	-40.6	-27
21400.0	H	1MHz	29.5	-55.0	12.1	1.0	-41.9	-27
21400.0	V	1MHz	29.7	-55.2	12.1	1.0	-42.1	-27
26750.0	H	1MHz	31.3	-60.0	14.8	1.0	-44.2	-27
26750.0	V	1MHz	31.0	-60.0	14.8	1.0	-44.2	-27
32100.0	H	1MHz	26.4	-63.0	16.1	1.0	-45.9	-27
32100.0	V	1MHz	26.8	-62.9	16.1	1.0	-45.8	-27

CHECKED BY: Richard E. King  
Richard E. King



**MANUFACTURER** : Cascade Networks  
**MODEL** : Cyclone Transceiver  
**ANTENNA** : RadioWaves SEC-5V120  
**S/N** : None given  
**SPECIFICATION** : FCC-15C Radiated Emissions  
**DATE** : January 23, 2004  
**NOTES** : LOW Channel

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP MATCHED (dBm)	LIMIT (dBm)
10500.0	H	1MHz	30.8	-48.9	14.2	-0.9	-35.6	-27
10500.0	V	1MHz	30.5	-49.0	14.2	-0.9	-35.7	-27
15750.0	H	1MHz	29.7	-60.3	12.9	-1.2	-48.6	-27
15750.0	V	1MHz	29.4	-60.2	12.9	-1.2	-48.5	-27
21000.0	H	1MHz	30.2	-58.1	12.0	-1.0	-47.1	-27
21000.0	V	1MHz	30.7	-58.2	12.0	-1.0	-47.2	-27
26250.0	H	1MHz	31.3	-59.5	14.6	-1.0	-45.9	-27
26250.0	V	1MHz	31.4	-59.3	14.6	-1.0	-45.7	-27
31500.0	H	1MHz	26.1	-63.0	16.0	-1.0	-48.0	-27
31500.0	V	1MHz	26.0	-62.0	16.0	-1.0	-47.0	-27

CHECKED BY: Richard E. King  
Richard E. King



MANUFACTURER : Cascade Networks  
MODEL : Cyclone Transceiver  
ANTENNA : RadioWaves SEC-5V120  
S/N : None given  
SPECIFICATION : FCC-15C Radiated Emissions  
DATE : January 23, 2004  
NOTES : MID Channel

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP MATCHED (dBm)	LIMIT (dBm)
10600.0	H	1MHz	28.8	-47.7	14.3	-0.9	-34.3	-27
10600.0	V	1MHz	28.9	-47.6	14.3	-0.9	-34.2	-27
15900.0	H	1MHz	23.9	-59.7	12.9	-1.2	-48.0	-27
15900.0	V	1MHz	29.0	-58.9	12.9	-1.2	-47.2	-27
21200.0	H	1MHz	30.2	-53.9	12.0	-1.0	-42.8	-27
21200.0	V	1MHz	30.4	-53.7	12.0	-1.0	-42.6	-27
26500.0	H	1MHz	30.4	-59.1	14.7	-1.0	-45.4	-27
26500.0	V	1MHz	30.5	-59.4	14.7	-1.0	-45.7	-27
31800.0	H	1MHz	25.6	-62.3	16.1	-1.0	-47.2	-27
31800.0	V	1MHz	25.4	-62.2	16.1	-1.0	-47.1	-27

CHECKED BY: Richard E. King  
Richard E. King



**MANUFACTURER** : Cascade Networks  
**MODEL** : Cyclone Transceiver  
**ANTENNA** : RadioWaves SEC-5V120  
**S/N** : None given  
**SPECIFICATION** : FCC-15C Radiated Emissions  
**DATE** : January 23, 2004  
**NOTES** : HIGH Channel

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP MATCHED (dBm)	LIMIT (dBm)
10700.0	H	1MHz	28.9	-50.0	14.4	-0.9	-36.5	-27
10700.0	V	1MHz	28.8	-50.3	14.4	-0.9	-36.8	-27
16050.0	H	1MHz	30.0	-55.9	13.0	-1.2	-44.1	-27
16050.0	V	1MHz	30.7	-55.1	13.0	-1.2	-43.3	-27
21400.0	H	1MHz	29.4	-51.9	12.1	-1.0	-40.8	-27
21400.0	V	1MHz	29.6	-52.0	12.1	-1.0	-40.9	-27
26750.0	H	1MHz	31.4	-60.3	14.8	-1.0	-46.5	-27
26750.0	V	1MHz	31.6	-60.6	14.8	-1.0	-46.8	-27
32100.0	H	1MHz	23.1	-62.0	16.1	-1.0	-46.9	-27
32100.0	V	1MHz	23.5	-62.0	16.1	-1.0	-46.9	-27

CHECKED BY: Richard E. King  
Richard E. King