

6.0 Out of Band Emissions at Antenna Terminals

FCC §2.1051

The power of emissions must be attenuated below the power of the unmodulated carrier (P) on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth - at least $43 + 10 \log P$ dB.

6.1 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show the out-of-band emissions if any up to 10th harmonic.

6.2 Test Equipment

HP 8566B Spectrum Analyzer, 100 Hz - 22 GHz
HP 7470A Plotter

6.3 Test Results

Refer to the attached plots.

Plot Number	Description
6.1.1	Low Channel , 1 MHz –1 GHz
6.1.2	Low Channel, 1 GHz – 2.5 GHz
6.1.3	Low Channel, 2.5 GHz – 10 GHz
6.2.1	Middle Channel, 1 MHz –1 GHz
6.2.2	Middle Channel, 1 GHz – 2.5 GHz
6.2.3	Middle Channel, 2.5 GHz – 10 GHz
6.3.1	High Channel, 1 MHz –1 GHz
6.3.2	High Channel, 1 GHz – 2.5 GHz
6.3.3	High Channel, 2.5 GHz – 10 GHz

Results	Passed
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1365 Adams Ct. Menlo Park, CA 94025

Communication Network Interface, Inc., Model No. CNI-803D
FCC ID: N79CNI-803D

Date of Test: December 2-3, 2000

ITS Intertek Testing Services

Radiated Emissions Test Data

Company:	CNI	Model #:	CNI-803D	Reg:	FCC 2.993
EUT:		S/N or FCC #:		Test Cell:	3 meters
Project #:	J20033456	Test Date:	December 2, 2000	TP:	2.00 Watt
Test Mode:	Tx @ 808 MHz	Engineer:	Xi Ming Y.	Min. Attn:	49.01 dBc

Antenna Used	Pre-Amp Used	Cable Used	Transducer Used
Number: 7 14 12	0 8 13	21 0 0	0
Model: EM1PA-25 EMGO-3116 EMCO-3104	None CDF P1000 ACO/400	Cm-MH None None	None

Frequency MHz	Reading dB(μV)	Detector P/A/Q	Ant. Amp # #	Ant. Pol HV	Ant. Factor dB(E-1m)	Pre-Amp dB	Insert Loss dB	Net dB(μV/m)	ERP mW	Attn. dB	Margin dB
806.00	105.1	Peak	7 0	V	21.8	0.0	2.0	128.9	1.42E+03	0.0	N/A
1612.00	49.0	Peak	14 0	V	26.6	0.0	2.1	77.7	1.08E-02	51.2	-5.2
2418.00	59.9	Peak	14 8	V	30.1	28.5	2.3	63.8	4.39E-04	65.1	-19.1
3224.00	50.7	Peak	14 8	V	31.3	27.9	2.5	56.6	8.38E-05	72.3	-26.3
4030.00	54.2	Peak	14 8	H	34.5	27.9	2.9	63.7	4.29E-04	65.2	-19.2
4836.00	39.5	Peak	14 8	H	35.4	28.1	3.2	50.0	1.83E-05	78.9	-32.9
5642.00	31.0	Peak	14 8	V	36.1	28.3	3.7	42.5	3.25E-06	86.4	-40.4
6448.00	36.7	Peak	14 8	V	36.8	28.0	3.9	49.4	1.59E-05	79.5	-33.5
7254.00	36.0	Peak	14 8	V	38.0	28.0	4.3	50.3	1.98E-05	78.6	-32.6
8060.00	34.0	Peak	14 8	V	37.9	27.2	4.6	49.5	1.63E-05	79.4	-33.4

- Notes:
- a) O.C.F.: Other Correction Factor
 - b) Insert. Loss = Cable A + Cable B + Cable C + Transducer.
 - c) Net = Reading + Antenna Factor - Pre-Amp + Insert. Loss.
 - d) Attn. = Field Strength (Fundamental) - Field Strength (Harmonics).
 - e) Negative signs (-) in Margin column signify levels below the limits.

Radiated Emissions Test Data

Company:	CNI	Model #:	CNI-803D	Reg:	FCC 2.993
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1365 Adams Ct. Menlo Park, CA 94025

Communication Network Interface, Inc., Model No. CNI-803D
FCC ID: N79CNI-803D

Date of Test: December 2-3, 2000

ITS Intertek Testing Services

EUT:		S/N or FCC #:		Test Date:	3	Version:	
Project #:	J20033456	Test Date:	December 2, 2000	TP	2.00	Wait	
Test Mode:	Tx @ 813 MHz	Engineer:	Xi Ming Y.	Min. Attn:	45.01	dBc	

Antenna Used	Pre-Amp Used	Cable Used	Transducer Used
Numbers: 7 14 12 0 8 13 21 0 0 0			
Model: EM1/PA 20 EMCO 3115 EMCO 5104 None CNI-P1000 ACC/400 GM-M-1 None None None			

Frequency	Reading	Detector	Ant. Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	Net	ERP	Attn.	Margin
MHz	dB(μV)	F/A/Q	#	F	dB(1m)	dB	dB	dB(μV/m)	μW	dBc	dB
813.00	105.0	Peak	7	0	21.8	0.0	2.0	126.8	1.39E+03	0.0	N/A
1612.00	48.7	Peak	14	0	26.6	0.0	2.1	77.4	1.01E-02	49.1	-3.1
2439.00	61.0	Peak	14	8	30.1	26.5	2.3	64.9	5.65E-04	61.6	-15.6
3252.00	47.0	Peak	14	8	31.3	27.9	2.5	52.9	3.57E-05	73.6	-27.6
4065.00	53.0	Peak	14	8	34.5	27.9	2.9	62.5	3.25E-04	64.0	-18.0
4878.00	37.0	Peak	14	8	35.4	28.1	3.2	47.5	1.03E-05	79.0	-33.0
5691.00	31.0	Peak	14	8	36.1	28.3	3.7	42.5	3.25E-06	84.0	-38.0
6504.00	35.0	Peak	14	8	36.4	28.0	4.2	47.6	1.05E-05	78.9	-32.9
7317.00	36.0	Peak	14	8	38.0	28.0	4.3	50.3	1.96E-05	76.2	-30.2
8130.00	34.0	Peak	14	8	37.9	27.2	4.8	49.5	1.63E-05	77.0	-31.0

Notes:	a) O.C.F.: Other Correction Factor
	b) Insert. Loss = Cable A + Cable B + Cable C + Transducer.
	c) Net = Reading + Antenna Factor - Pre-Amp + Insert. Loss.
	d) Attn. = Field Strength (Fundamental) - Field Strength (Harmonics).
	e) Negative signs (-) in Margin column signify levels below the limits.

Communication Network Interface, Inc., Model No. CNI-803D
FCC ID: N79CNI-803D

Date of Test: December 2-3, 2000

ITS Intertek Testing Services

Radiated Emissions Test Data

Company:	CNI	Model #:	CNI-803D	Reg:	FCC 2.993
EUT:		S/N or FCC #:		Test Dist:	3 meters
Project #:	J20033456	Test Date:	December 2, 2000	TP:	2.00 V/m
Test Mode:	Tx @ 821 MHz	Engineer:	Xi Ming Y.	Min. Attn:	48.0 dB

Antenna Used	Pre-Amp Used	Cable Used	Transducer Used
Number: 7 14 12	0 8 13	21 0 0	0
Model: EM-LPA-25 EMCO-3135 EMCO-3104	None CB-P1000 AGCM00	Gm-Met1 None None	None

Frequency	Reading	Detector	Ant. #	Amp. #	Ant. Pol.	Ant. Factor	Pre-Amp	Insert Loss	Net	ERP	Attn.	Margin
MHz	dB(μV)	P/A/D	#	#	PA	dB(1m)	dB	dB	dB(μV/m)	mW	dBc	dB
821.00	105.2	Peak	7	0	V	21.9	0.0	2.0	129.1	1.49E+03	0.0	N/A
1642.00	47.8	Peak	14	0	V	26.6	0.0	2.1	76.5	8.17E-03	52.6	-6.6
2463.00	60.0	Peak	14	8	V	30.1	26.5	2.3	63.9	4.49E-04	65.2	-19.2
3284.00	41.0	Peak	14	8	V	31.3	27.9	2.5	46.9	8.96E-06	82.2	-36.2
4105.00	45.0	Peak	14	8	H	34.5	27.9	2.9	54.5	5.16E-05	74.6	-28.6
4926.00	32.0	Peak	14	8	H	35.4	28.1	3.2	42.5	3.25E-06	86.6	-40.6
5746.00	33.0	Peak	14	8	V	36.1	28.3	3.7	44.5	5.16E-06	84.6	-38.6
6568.00	34.5	Peak	14	8	V	36.4	28.0	4.2	47.1	9.38E-06	82.0	-36.0
7389.00	35.0	Peak	14	8	V	38.0	28.0	4.3	49.3	1.56E-05	79.8	-33.8
8210.00	34.0	Peak	14	8	V	37.9	27.2	4.8	49.5	1.63E-05	79.8	-33.6

Notes:

- a) O.C.F.: Other Correction Factor
- b) Insert Loss = Cable A + Cable B + Cable C + Transducer.
- c) Net = Reading + Antenna Factor - Pre-Amp + Insert Loss.
- d) Attn. = Field Strength (Fundamental) - Field Strength (Harmonics).
- e) Negative signs (-) in Margin column signify levels below the limits.

Communication Network Interface, Inc., Model No. CNI-803D
FCC ID: N79CNI-803D

Date of Test: December 2-3, 2000

ITS Intertek Testing Services

Radiated Emissions Test Data

Company:	CNI	Model #:	CNI-803D	Standard:	FCC 47 CFR 15.209
EUT:		S/N #:		Limits:	3
Project #:	J2003345	Test Date:	December 3, 2000	Test Distance:	3 meters
	6				
Test Mode:	Tx mode	Engineer:	Xi-Ming Y.	Duty Relaxation:	0 dB

Antenna Used	Pre-Amp Used	Cable Used	Transducer Used
Number:	14 7 8 5 8 0 21 0 0 0		
Model:	EMCO EMKPA EMCO GDF P580 GDI P1000 None Gen MFL None None None		
	3115 25 3104		

Frequency	Reading	Detector	Ant.	Amp	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D.C.F.	Net	Limit @3m	Margin
MHz	dB(μV)	PA/AV	F	F	F/V	dB(1m)	dB	dB	dB	dB(μV/m)	dB(μV/m)	dB
133.30E+0	45.0	QP	8	5	V	12.8	19.1	0.8	0.0	39.5	43.5	-4.0
233.20E+0	45.0	Peak	7	5	V	11.3	19.6	1.0	0.0	37.7	46.0	-8.3
267.30E+0	45.0	QP	7	5	V	14.8	19.6	1.1	0.0	41.3	46.0	-4.7
300.00E+0	41.4	Peak	7	5	H	15.4	18.1	1.2	0.0	39.9	46.0	-6.1
356.30E+0	41.4	QP	7	5	H	16.5	17.9	1.3	0.0	41.3	46.0	-4.7
388.60E+0	40.0	Peak	7	5	H	17.7	17.9	1.3	0.0	41.1	46.0	-4.9
491.50E+0	38.0	Peak	7	5	H	18.0	17.0	1.5	0.0	40.5	46.0	-5.5
606.00E+0	26.0	Peak	7	5	H	22.5	14.3	2.0	0.0	36.2	46.0	-9.8
813.00E+0	24.8	Peak	7	5	H	22.6	14.3	2.0	0.0	35.1	46.0	-10.9
821.00E+0	24.1	Peak	7	5	H	22.5	14.3	2.0	0.0	34.3	46.0	-11.7
1612.00E+0	28.0	Ave.	14	8	H	26.2	29.5	2.1	0.0	26.8	54.0	-27.2
1626.00E+0	31.0	Ave.	14	8	H	26.2	29.5	2.1	0.0	29.8	54.0	-24.2
1642.00E+0	36.0	Ave.	14	8	H	26.2	29.5	2.1	0.0	34.8	54.0	-19.2
2418.00E+0	28.0	Ave.	14	8	H	28.8	28.5	2.3	0.0	30.6	54.0	-23.4
2439.00E+0	29.0	Ave.	14	8	H	28.8	28.5	2.3	0.0	31.6	54.0	-22.4
2463.00E+0	30.0	Ave.	14	8	H	28.8	28.5	2.3	0.0	32.6	54.0	-21.4

Notes:	a) D.C.F.: Distance Correction Factor
	b) Insert. Loss (dB) = Cable A + Cable B + Cable C.
	c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Transducer Loss - Duty Relaxation (transmitter only).
	d) Negative signs (-) in Margin column signify levels below the limits.
	e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

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Communication Network Interface, Inc., Model No. CNI-803D
FCC ID: N79CNI-803D

Date of Test: December 2-3, 2000

8.0 Line Conducted Emissions, FCC § 15.107

8.1 Test Procedure

8.2 Test Results

See attached test data.

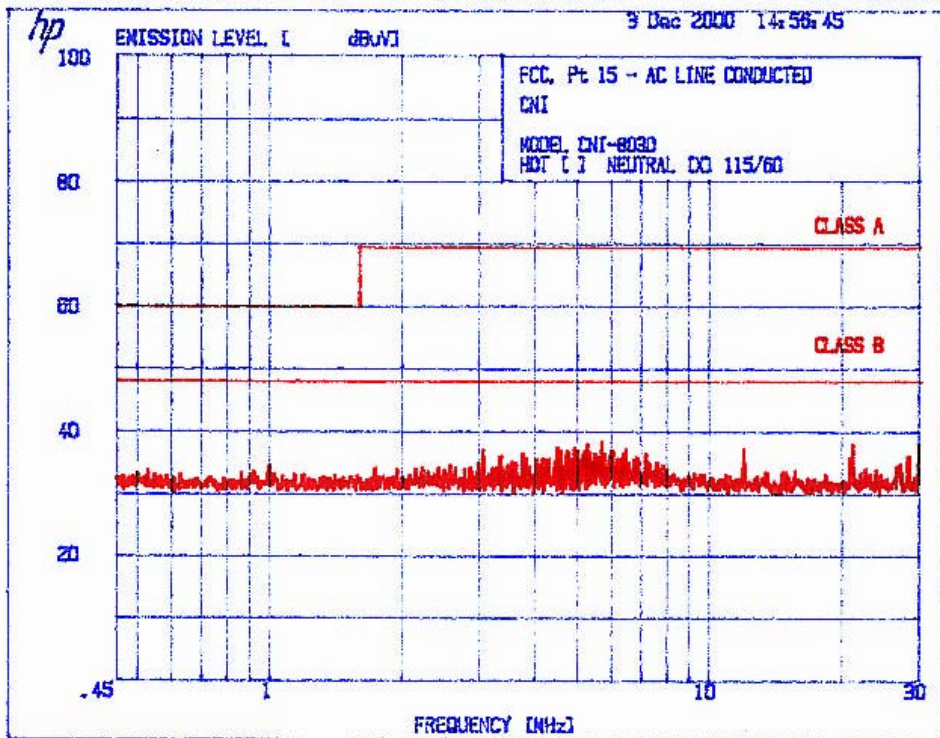
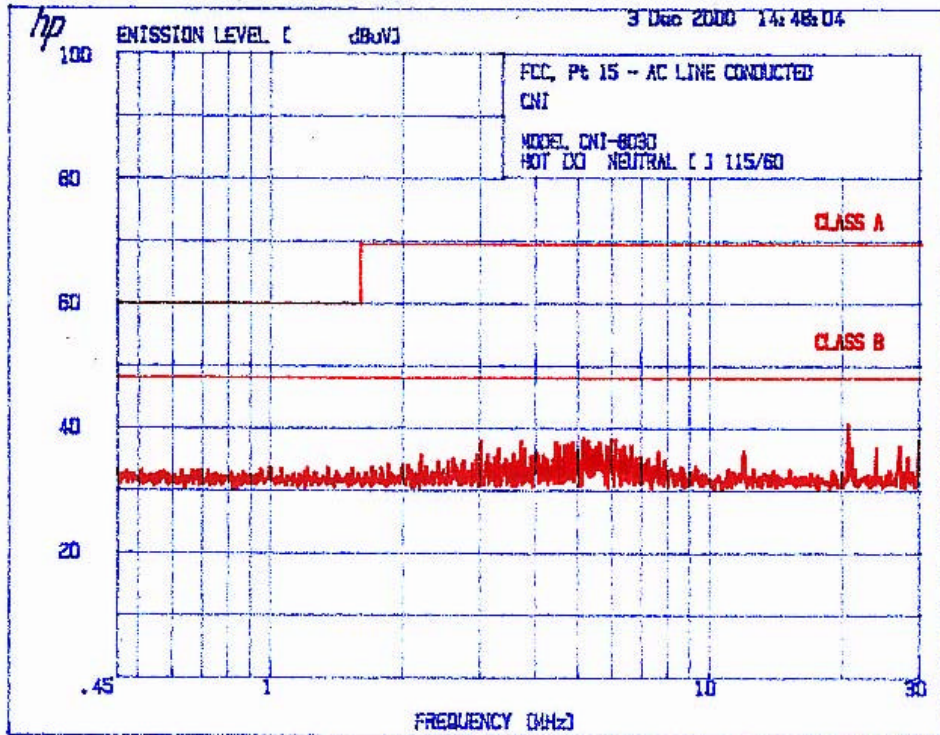
Results	Passed
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1365 Adams Ct. Menlo Park, CA 94025

Communication Network Interface, Inc., Model No. CNI-803D
FCC ID: N79CNI-803D

Date of Test: December 2-3, 2000



Communication Network Interface, Inc., Model No. CNI-803D
FCC ID: N79CNI-803D

Date of Test: December 2-3, 2000

9.0 Frequency Stability vs Temperature, FCC § 2.995(a)

9.1 Test Procedure

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feedthrough attenuators. The EUT was placed inside the temperature chamber. The DC leads, RF output cable, exited the chamber through an opening

After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

9.2 Test Equipment

Temperature Chamber, -50C to +100C
Hewlett Packard 5383A Frequency Counter
Tektronix 2784 Spectrum Analyzer
Goldstar DC Power Supply, GR303

9.3 Test Results

Refer to the test data below.

Frequency 813.00 MHz	
Temperature, C	Difference (Hz)
+60	895
+50	325
+40	-265
+30	-120
+20	-175
+10	290
0	450
-10	520
-20	530
-30	560

Results	Passed
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Communication Network Interface, Inc., Model No. CNI-803D
FCC ID: N79CNI-803D

Date of Test: December 2-3, 2000

10.0 Frequency Stability vs Voltage, FCC §2.995(d)(2)

10.1 Test Procedure

An external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115% of the DC nominal value and for 85% of the nominal value.

10.2 Test Equipment

Hewlett Packard 5383A Frequency Counter
Tektronix 2784 Spectrum Analyzer
Goldstar DC Power Supply, GR303

10.3 Test Results

Voltage, VDC		Difference (Hz)
85%	4.25	-175
100%	53.0	-177
115%	5.75	-179

Results	Passed
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11.0 Transient Frequency Behavior, FCC §90.214**11.1 Test Procedure**

Test was performed according the TIA/EIA/IS-102.CAAA, Section 2.2.18. The transmitter was continuously transmitting a modulated signal (FSK, 2400 bits/sec.). The generator was generating FM signal (1 kHz tone, 12.5 kHz deviation). Several plots were made on the FM demodulator output with the EUT turned ON and OFF.

11.2 Test Results

Results	Not Applicable
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12.0 RF Exposure**12.1 Maximum Permissible Exposure Limits, FCC 1.1310**

The following exposure limits apply to equipment use in Uncontrolled Environments:

Maximum Permissible Exposure for Uncontrolled Environments

Frequency Range (MHZ)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) E-field, H-field (mW/cm²)	Averaging Time (Minutes)
0.3 - 1.34	614	1.63	*100	30
1.34 - 30	824/f	2.19/f	*180/f ²	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	-	-	f/1500	30
1500 - 100,000	-	-	1.0	30

* = Plane-wave equivalent power density.

Dashes “-” are used to indicate that there is no limit under the guideline.

12.2 Test Procedure

The test was performed at 815 MHz. The antenna was placed on a 0.8m wooden table on open site. The antenna was connected to the EUT. EUT output power was measured at RF output connector. EUT has 0.47W ERP power output.

The sensor of the field strength meter was moved around the antenna to obtain the maximum reading of the field strength meter. The measurements were performed at the distance 0.1m to 1m from the antenna.

12.3 Field Strength Calculations

The field strength was measured directly from the meter. The power density (PD in W.m²) was calculated using the following formula:

$$Pd = E^2/120$$

Where E is Field Strength in V/m

12.4 Test Results

Module Used With Antenna #1			
Test Distance m	Maximum Field Strength Reading V/m	Calculated Power Density MW/cm ²	FCC Limit for Time- Averaging Interval of 30 min. mW/cm ²
0.1	55	0.8	0.54
0.2	26	0.18	0.54
0.3	18	0.086	0.54
0.5	10	0.027	0.54
1.0	5.5	0.008	0.54

As can be seen from the Table, Power Density at 0.2 m distance from the antenna is well below the limit.

Communication Network Interface, Inc., Model No. CNI-803D
FCC ID: N79CNI-803D

Date of Test: December 2-3, 2000

13.0 List of Test Equipment

Equipment	Manufacturer	Model	Serial #	Cal. Int.	Cal. Due	Used
Double-ridged Horn Antenna	EMCO	3115	9107-3712	12	6/25/01	X
Horn Antenna	EMCO	3160-9	N/A	#	#	X
Pre-amplifier	CDI	P1000	N/A	12	11/14/00	X
Pre-amplifier	Avantek	AFT18855	8723H705	12	11/14/00	X
Pre-amplifier	CTT	ACO/400	47526	12	11/14/00	X
Spectrum Analyzer w/8650 QP Adapter	Hewlett Packard	HP 8566B	2416A00317 2521A01021	6	2/03/01	X
Spectrum Analyzer	Tektronix	2784	B3020108	12	8/4/01	X
Field Strength Meter	Holaday	HI-3004EX				
Peak Power Meter	Hewlett Packard	8900D	3607U00673	12	7/31/01	X
Peak Power Sensor	Hewlett Packard	84811A	3318A05091	12	12/7/99	X
Power Meter	Hewlett Packard	EPM-441A	US37481023	12	5/17/01	X

Calibration is not required

14.0 Document History

Revision/Job Number	Date	Change
1.0 / J20033456	12/6/00	Original document