

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com



Test Report

Product Name: FM EXCITER - TRANSMITTER

FCC ID: RMYNT250FP03

Applicant:

**NiCOM USA, INC.
2626 SOUTHPORT WAY
SUITE B
NATIONAL CITY, CA 91950**

Date Receipt: DECEMBER 29, 2003

Date Tested: JANUARY 13, 2004

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

COVER SHEET

TIMCO ENGINEERING INC.

849 NW State Road 45
Newberry, Florida 32669
<http://www.timcoengr.com>
888.472.2424 F 352.472.2030 email: sid@timcoengr.com

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

TABLE OF CONTENTS LIST

TEST REPORT CONTAINING:

PAGE 1.....	GENERAL INFORMATION & TECHNICAL DESCRIPTION
PAGE 2.....	TECHNICAL DESCRIPTION & RF POWER OUTPUT
PAGE 3.....	MODULATION CHARACTERISTICS
	AUDIO FREQUENCY RESPONSE GRAPH
	AUDIO LOW PASS FILTER
PAGE 4.....	OCCUPIED BANDWIDTH
PAGE 5-7.....	OCCUPIED BANDWIDTH PLOTS
PAGE 8.....	SPURIOUS EMISSION AT ANTENNA TERMINALS
PAGE 9.....	METHOD OF MEASURING SPURIOUS EMISSIONS AT
	ANTENNA TERMINALS
PAGE 10-12.....	FIELD STRENGTH OF SPURIOUS EMISSIONS
PAGE 13.....	METHOD OF MEASURING RADIATED SPURIOUS EMISSIONS
PAGE 14.....	POWER LINE CONDUCTED INTERFERENCE
PAGE 15.....	POWER LINE CONDUCTED PLOTS
PAGE 16.....	FREQUENCY STABILITY
PAGE 17-18.....	EQUIPMENT LIST

EXHIBITS INCLUDING:

BLOCK DIAGRAM
SCHEMATICS
PARTS LIST
USERS MANUAL
LABEL SAMPLE
LABEL LOCATION
EXTERNAL PHOTOGRAPHS
INTERNAL PHOTOGRAPHS
TUNING PROCEDURE
OPERATIONAL DESCRIPTION
TEST SET UP PHOTOGRAPH

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TABLE OF CONTENTS

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

2.1033 NiCOM USA, INC. will manufacture the FCC ID: RMYNT250FP03 in quantity, for use under FCC RULES PART 73.801, LOW POWER FM BROADCAST STATIONS (LPFM).

2.1033(c)(4) TECHNICAL DESCRIPTION

Type of Emission: 75KF3E

$$B_n = 2M + 2DK$$

$$M = 15000$$

$$D = 22\text{KHz (Peak Deviation)}$$

$$K = 1$$

$$B_n = 2(15K) + 2(22K)(1) = 75K$$

ALLOWED AUTHORIZED BANDWIDTH = 200 kHz.

2.1033 (c)(5) Frequency Range: 88 - 108 MHz

2.1033 (c)(6) Power Range and Controls: The EUT can be adjusted from 2 Watt up to the maximum of the rated power.

2.1033 (c)(7) Maximum Output Power Rating: 250 Watts into 50 ohms resistive load.

2.1033 (c)(8) DC Voltages and Current into Final Amplifier:

FINAL AMPLIFIER ONLY

$$V_{ce} = 48.0 \text{ Volts}$$

$$I_{ce} = 8.0 \text{ A.}$$

2.1033 (c)(9) Tune-up procedure. The tune-up procedure is given in the Exhibits.

2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram and the block diagrams are included as part of the attached exhibits.

2.1033(c)(11) Photographs or drawings of the identification label & its location are included as part of the exhibits.

2.1033(c)(12) Photographs of both the externals & internals are included as part of the exhibits.

2.1033(c)(13) Digital Modulation is NOT used in this EUT.

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

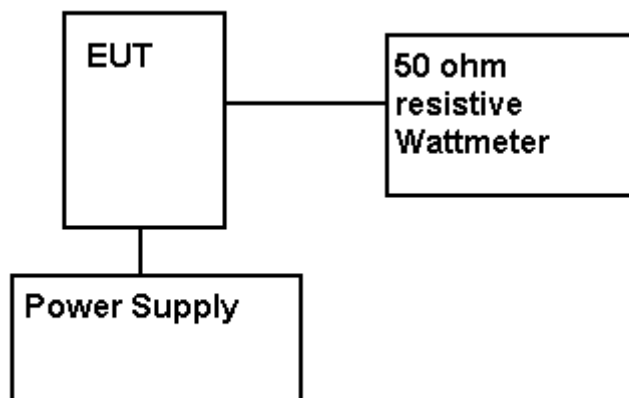
2.1033(c)(14) Data required by ¶ 2.1046 Through ¶ 2.1057 is submitted below.

2.1046 **RF power output.**

73.267 (b)(2)

RF power is measured by Direct Method power using TIA/EIA STANDARD 603.

OUTPUT POWER: 250 Watts



APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

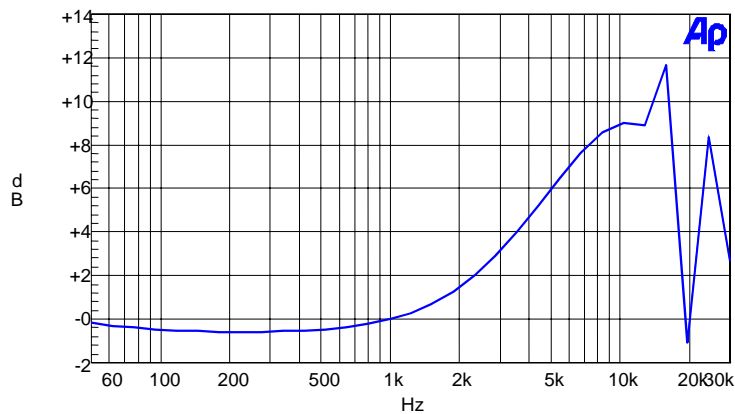
2.1047(a)(b)

Modulation characteristics:

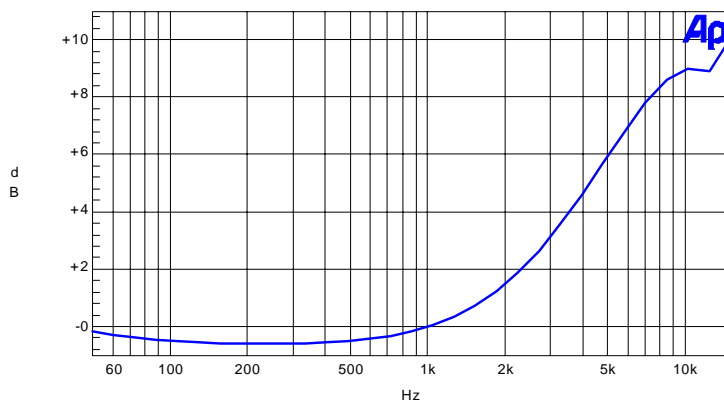
AUDIO FREQUENCY RESPONSE

The audio frequency response was measured in accordance with TIA/EIA Specification 603. The audio frequency response curve is shown below.

Audio Frequency Response



Audio Frequency Response



Color	Line Style	Thick	Data	Axis
Blue	Solid	2	AnIr.Level AINormalize	Left

MaxFreq.at1

2.1047(a)(b)

AUDIO LOW PASS FILTER

The audio low pass filter is NA for this EUT.

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

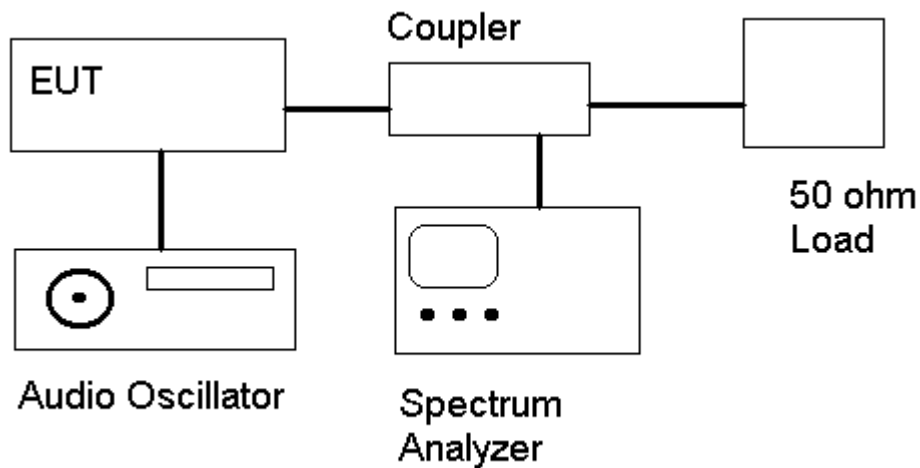
2.1049

73.317(b-d)

OCCUPIED BANDWIDTH:

Any emission appearing on the frequency removed from the carrier between 120kHz and 240kHz inclusive must be attenuated at least 25 dB below the level of the un-modulated carrier. Compliance with this requirement will be deemed to show occupied bandwidth to be 240kHz or less. Any emission appearing on the frequency removed from the carrier by more than 240 kHz and up to and including 600 kHz must be attenuated at least 35 dB below the level of the un-modulated carrier. Any emission appearing on the frequency removed from the carrier by more than 600 kHz must be attenuated at least $43 + 10 \log(P)$ dB below the level of the un-modulated carrier, or 80 dB, whichever is the lesser attenuation.

OCCUPIED BANDWIDTH MEASUREMENT



REQUIREMENT: PART 73: 200kHz EMISSION BANDWIDTH.

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

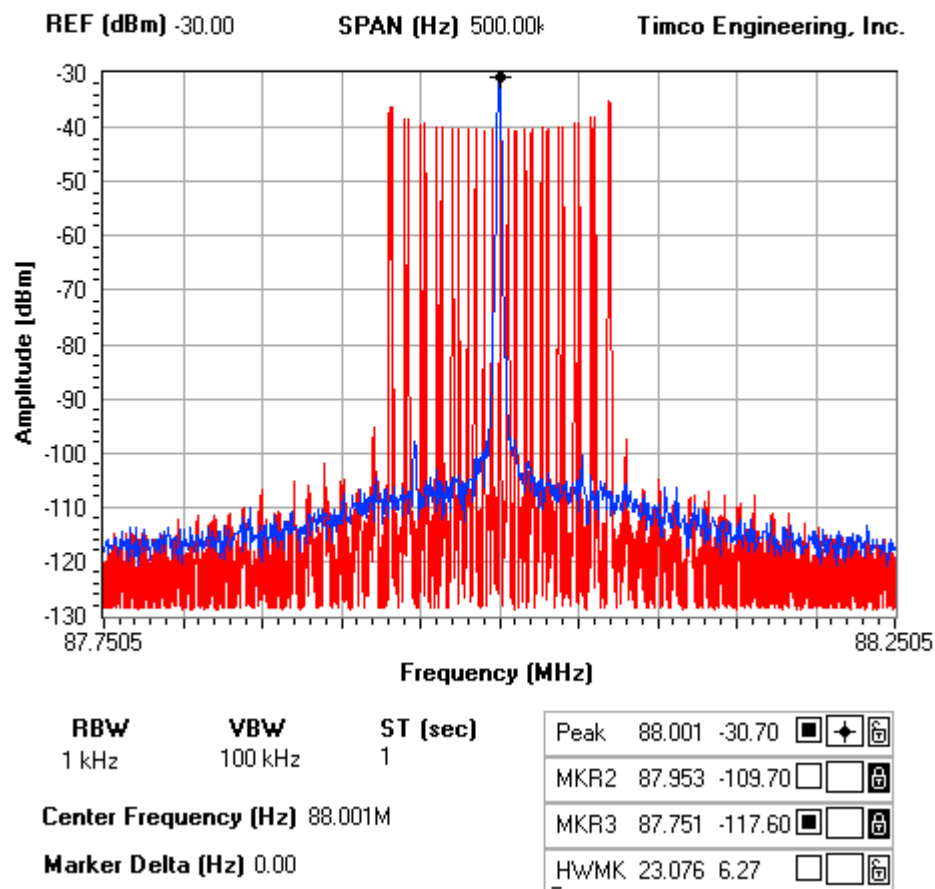
888.472.2424 F 352.472.2030 email: sid@timcoengr.com

2.1049

OCCUPIED BANDWIDTH PLOT (50 Hz)

NOTES:

NiCOM USA, INC. - FCC ID: RMYNT 30
OCCUPIED BANDWIDTH PLOT (50Hz)



APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

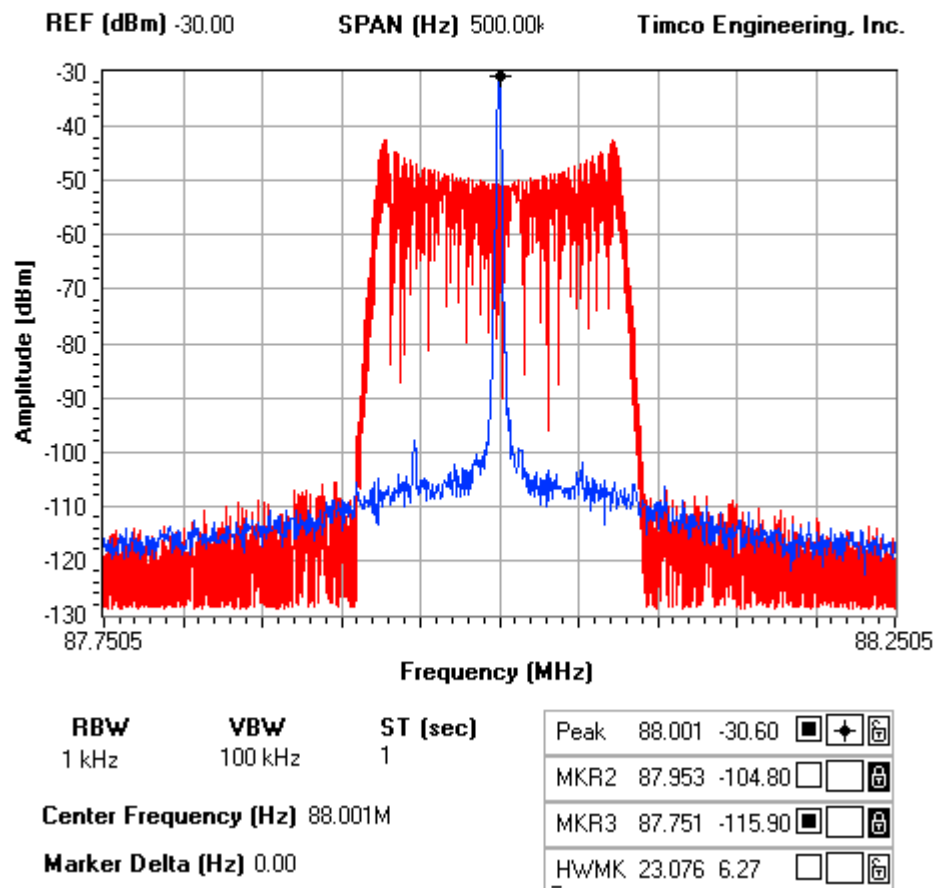
2.1049

OCCUPIED BANDWIDTH PLOT (1 kHz)

NOTES:

NiCOM USA, INC. - FCC ID: RMYNT 30

OCCUPIED BANDWIDTH PLOT (1KHz)



APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

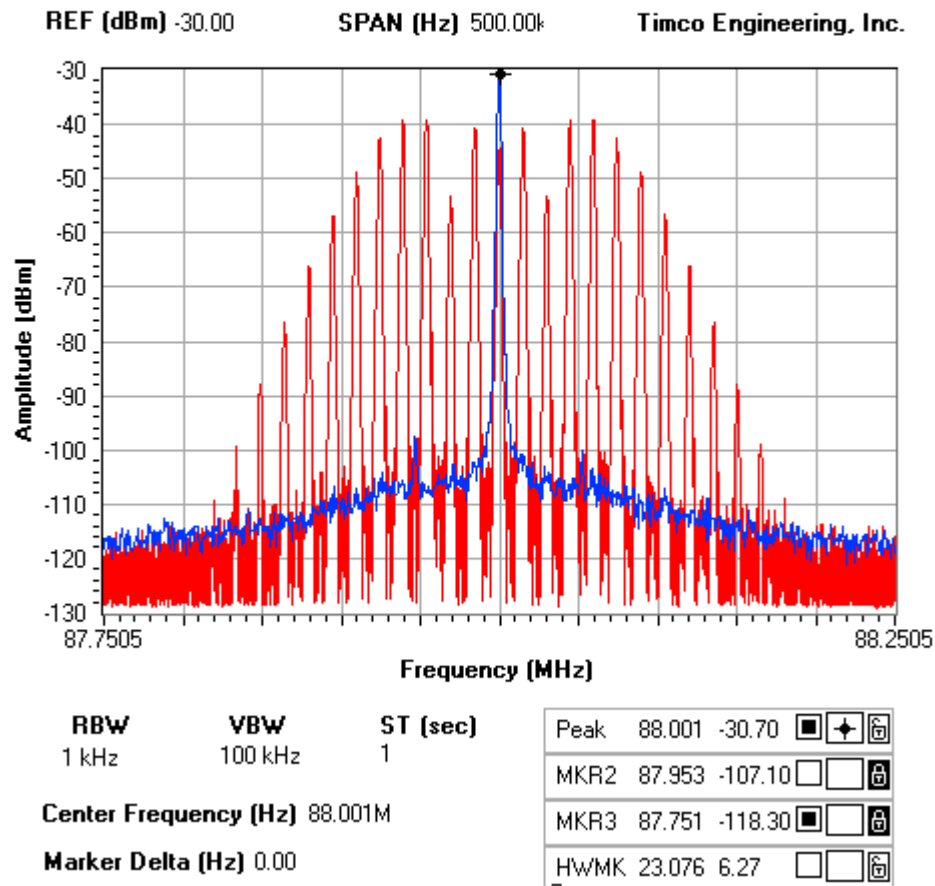
2.1049

OCCUPIED BANDWIDTH PLOT (15 kHz)

NOTES:

NiCOM USA, INC. - FCC ID: RMYNT 30

OCCUPIED BANDWIDTH PLOT (15KHz)



APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

2.1051

Spurious emissions at antenna terminals (conducted):

Data on the following page shows the level of conducted spurious responses. The carrier was modulated 100% using 2500Hz tone. The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard TIA/EIA-603.

REQUIREMENTS: Emissions must be $43 + 10\log(P_o)$ dB below the mean power output of the transmitter.

$$43 + 10\log(250) = 66.9 \text{ dB}$$

$$43 + 10\log(2) = 46 \text{ dB}$$

TF		dB below	TF		dB below
HIGH POWER	EF	carrier	LOW POWER	EF	carrier
88.1	88.1	0.0	88.1	88.1	0.0
	176.2	82.4		176.2	76.2
	264.3	71.7		264.3	72.6
	352.4	91.3		352.4	98.6
	440.5	77.1		440.5	77.6
	528.6	93.6		528.6	106.6
	616.7	91.1		616.7	107.2
	704.8	101.6		704.8	108.0
	792.9	102.0		792.9	108.6
	881.0	105.3		881.0	109.3

TF		dB below	TF		dB below
HIGH POWER	EF	carrier	LOW POWER	EF	carrier
100.1	100.1	0.0	100.1	100.1	0.0
	200.2	84.1		200.2	78.3
	300.3	86.4		300.3	84.3
	400.4	93.0		400.4	97.7
	500.5	75.4		500.5	89.1
	600.6	91.8		600.6	104.7
	700.7	95.4		700.7	107.4
	800.8	98.9		800.8	107.9
	900.9	99.4		900.9	107.8
	1001.0	100.4		1001.0	106.8

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45
Newberry, Florida 32669
<http://www.timcoengr.com>
888.472.2424 F 352.472.2030 email: sid@timcoengr.com

2.1051 Spurious emissions at antenna terminals (conducted)(cont):

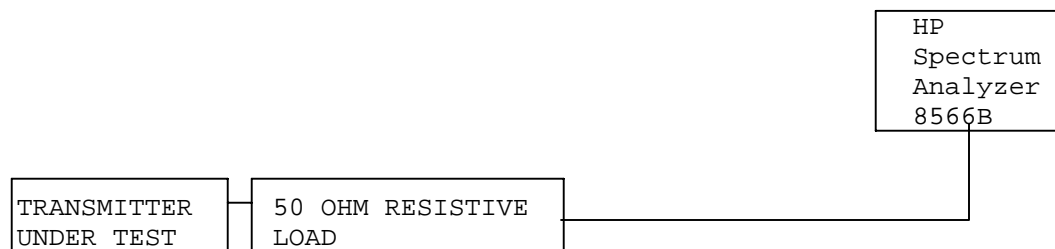
REQUIREMENTS: Emissions must be $43 + 10\log(P_o)$ dB below the mean power output of the transmitter.

$$43 + 10\log(250) = 66.9 \text{ dB}$$

$$43 + 10\log(2) = 46 \text{ dB}$$

TF		dB below	TF		dB below
LOW POWER	EF	carrier	HIGH POWER	EF	carrier
107.9	107.9	0.0	107.9	107.9	0.0
	215.8	79.2		215.8	74.0
	323.7	79.6		323.7	89.8
	431.6	100.2		431.6	92.8
	539.5	101.2		539.5	105.1
	647.4	92.7		647.4	106.5
	755.3	99.4		755.3	106.4
	863.2	106.8		863.2	106.8
	971.1	105.9		971.1	106.6
	1079.0	105.0		1079.0	108.0

2.1051 Method of Measuring Conducted Spurious Emissions



METHOD OF MEASUREMENT: The procedure used was TIA/EIA-603 STANDARD without any exceptions. An audio generator was connected to the UUT through a dummy microphone circuit and the output of the transmitter connected to a standard load and from the standard load through a pre-selector filter of the spectrum analyzer. The spectrum was scanned from 400 kHz to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer. The measurements were made using the shielded room located at TIMCO ENGINEERING INC. 849 N.W. State Road 45, Newberry, Florida 32669.

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

2.1053(a)(b) Field strength of spurious emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS (88 MHz)

REQUIREMENTS: Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least $43 + 10\log(P)$ dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

HIGH: $43 + 10\log(250) = 66.9$ dB

LOW: $43 + 10\log(2) = 46.0$ dB

TEST DATA (HIGH):

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
88.10	H	0.00
176.20	H	114.14
264.30	H	98.42
352.40	V	123.06
440.50	V	100.86
792.90	V	103.67

TEST DATA (LOW):

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
88.10	V	0.00
176.20	H	108.33
264.30	H	101.91
440.50	V	99.65

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

2.1053(a)(b) Field strength of spurious emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS (100.1 MHz)

REQUIREMENTS: Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least $43 + 10\log(P)$ dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

HIGH: $43 + 10\log(250) = 66.9$ dB

LOW: $43 + 10\log(2) = 46.0$ dB

TEST DATA (HIGH):

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
100.10	H	0.00
200.20	H	98.30
300.30	V	112.20
500.50	H	113.40
700.70	V	83.16
800.80	H	108.90
900.90	H	113.90

TEST DATA (LOW):

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
100.10	H	0.00
200.20	H	90.45

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

2.1053(a)(b) Field strength of spurious emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS (107.9 MHz)

REQUIREMENTS: Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least $43 + 10\log(P)$ dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

HIGH: $43 + 10\log(250) = 66.9$ dB

LOW: $43 + 10\log(2) = 46.0$ dB

TEST DATA (HIGH):

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
107.90	H	0.00
215.80	H	110.70
323.70	V	116.64
971.10	V	116.75

TEST DATA (LOW):

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
107.90	H	0.00
215.80	H	104.95

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

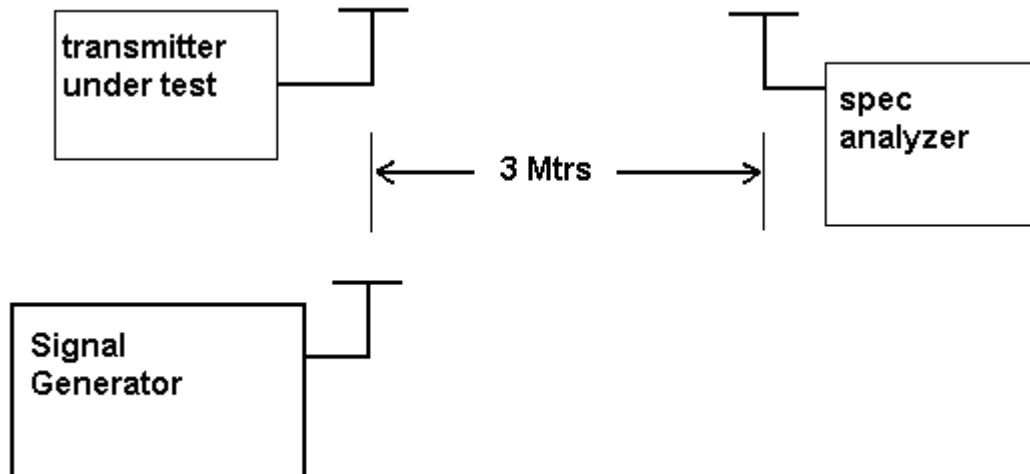
849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

2.1053(a)(b) Method of Measuring Radiated Spurious Emissions



METHOD OF MEASUREMENT: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA STANDARD 603 using the substitution method. Measurements were made at the open field test site of TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45, Newberry, FL 32669.

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45
Newberry, Florida 32669
<http://www.timcoengr.com>
888.472.2424 F 352.472.2030 email: sid@timcoengr.com

FCC ID: RMYNT250FP03

NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

REQUIREMENTS:	QUASI-PEAK	AVERAGE
.15 - 0.5 MHz	66-56 dBuV	56-46 dBuV
0.5 - 5.0	56	46
5.0 - 30.	60	50

TEST PROCEDURE: ANSI STANDARD C63.4-1992. The spectrum was scanned from .15 to 30 MHz.

TEST DATA:

THE FOLLOWING GRAPHS REPRESENT THE EMISSIONS TAKEN FOR THIS DEVICE.

TEST RESULTS: Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

PERFORMED BY: NAM NGUYEN

DATE: DECEMBER 18, 2003

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

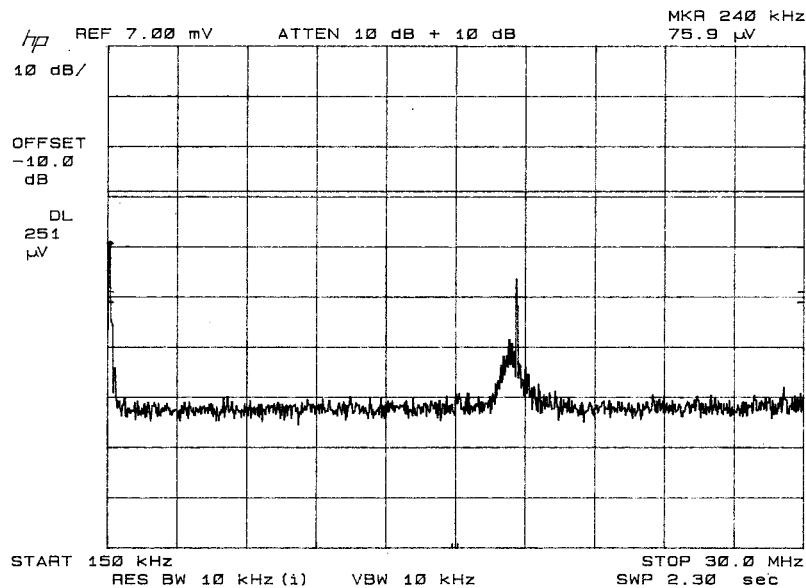
849 NW State Road 45

Newberry, Florida 32669

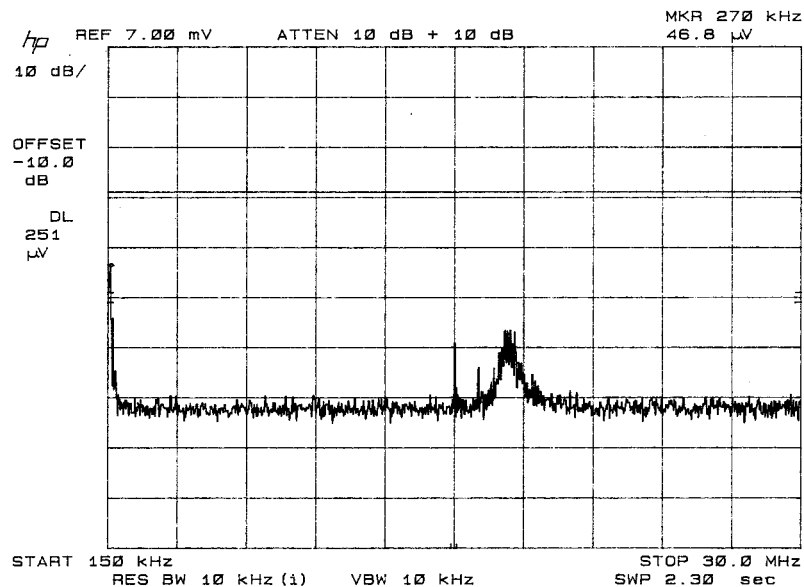
<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

POWER LINE CONDUCTED LINE 1



LINE 2



APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45
Newberry, Florida 32669
<http://www.timcoengr.com>
888.472.2424 F 352.472.2030 email: sid@timcoengr.com

2.1055 Frequency Stability:

Temperature and voltage tests were performed to verify that the frequency remains within the 2000Hz, specification limit.

The test was conducted as follows: The transmitter was placed in the temperature chamber at 25° C and allowed to stabilize for one hour. The temperature was then reduced to -30° C after which the transmitter was again allowed to stabilize for one hour. The transmitter was ON continuously because that is how it is used and again frequency readings were noted at 15-second intervals. The worst-case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50° C.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 98.000 050

TEMPERATURE°C	FREQUENCY MHz	PPM
-30	98.000 157	1.09
-20	97.999 993	-0.58
-10	98.000 013	-0.38
0	97.999 972	-0.80
10	98.000 023	-0.28
20	98.000 059	0.09
30	98.000 106	0.57
40	98.000 138	0.90
50	98.000 149	1.01

<u>VOLTAGE</u>	<u>VOLTAGE LEVEL</u>	<u>FREQUENCY</u>	<u>PPM</u>
-15%	102 VAC	98.000 049	0.01

RESULTS OF MEASUREMENTS: The test results indicates that the EUT meets the requirements.

TIMCO ENGINEERING INC.

849 NW State Road 45
Newberry, Florida 32669
<http://www.timcoengr.com>
888.472.2424 F 352.472.2030 email: sid@timcoengr.com

EMC Equipment List

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/26/01	3/26/04
3-Meter OATS	TEI	N/A	N/A	Listed 1/13/03	1/13/06
AC Voltmeter	HP	400FL	2213A14499	CAL 10/9/01	10/9/03
Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/15/03	4/15/05
Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 4/15/03	4/15/05
Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/15/03	4/15/05
Coaxial Cable #64	Semflex Inc.	60637	Timco #64	CHAR 1/24/02	1/24/04
Dipole Antenna Kit	Electro- Metrics	TDA-30/1-4	152	CAL 3/21/01	3/21/04
Dipole Antenna Kit	Electro- Metrics	TDA-30/1-4	153	CAL 9/26/02	9/26/05
Frequency Counter	HP	5385A	2730A03025	CAL 3/7/03	3/7/05
Hygro- Thermometer	Extech	445703	0602	CAL 10/4/02	10/4/04
Log-Periodic Antenna	Electro- Metrics	LPA-25	1122	CAL 10/2/01	10/2/03
Measuring Tape-7.5M	Kraftixx	7.5M PROFI		CHAR 2/1/02	2/1/04
Modulation Analyzer	HP	8901A	3435A06868	CAL 9/5/01	9/5/03
Multimeter	Fluke	FLUKE-77-3	79510405	CHAR 9/26/01	9/26/03
Silver Tower Preamplifier	HP	8449B	3008A01075	CHAR 1/28/02	1/28/04
Silver Tower Quasi-Peak Adapter	HP	85650A	3303A01844	CAL 10/14/02	10/14/04
Silver Tower RF Preselector	HP	85685A	2620A00294	CAL 10/14/02	10/14/04

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com

Silver Tower Spectrum Analyzer System One	HP	8566B Opt 462	3552A22064 3638A08608	CAL 10/14/02	10/14/04
	Audio Precision	System One	SYS1-45868	CHAR 4/25/02	4/25/04
Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 9/23/03	9/23/05
Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 9/23/03	9/23/05
Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 9/23/03	9/23/05
Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 9/23/03	9/23/05
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 1/22/02	1/22/04

APPLICANT: NiCOM USA, INC.

FCC ID: RMYNT250FP03

REPORT #: N\NiCOM\1717UT3\1717UT3TestReport.doc