

## TABLE OF CONTENTS LIST

APPLICANT: TELLUMAT(PTY) LIMITED.

FCC ID: ONJMDR2400-THD

TEST REPORT CONTAINING:

PAGE 1.....LETTER ABOUT CONFIDENTIALITY  
PAGE 2.....LETTER OF EXPLANATION  
PAGE 3.....TEST PROCEDURE  
PAGE 4.....BLOCK DIAGRAM OF TEST SET UP  
PAGE 5.....CIRCUIT DESCRIPTION  
PAGE 6.....15.247(a)(2) 6.0dB BANDWIDTH & POWER OUTPUT  
PAGE 7.....15.247(c) ANTENNA CONDUCTED SPURIOUS  
PAGE 8-9.....15.247(c) RADIATED SPURIOUS EMISSIONS  
PAGE 10.....METHOD OF MEASURING RADIATED SPURIOUS EMISSIONS  
PAGE 11.....15.247(d) POWER SPECTRAL DENSITY  
PAGE 12.....PROCESSING GAIN(FROM ATT)  
PAGE 13.....POWER LINE CONDUCTED SPURIOUS EMISSIONS

EXHIBITS CONTAINING:

EXHIBIT 1A.....POWER OF ATTORNEY LETTER  
EXHIBIT 1B.....PROFESSIONAL INSTALLATION LTTER  
EXHIBIT 1C.....CONFIDENTIALITY LETTER  
EXHIBIT 2.....PERMISSION LTTER FROM AIRONET  
EXHIBIT 3A-F.....TEST SET UP PHOTOGRAPHS  
EXHIBIT 4.....FCC ID LABEL SAMPLE  
EXHIBIT 5.....FCC ID LABEL LOCATION  
EXHIBIT 6A.....EXTERNAL FRONT VIEW PHOTOGRAPH  
EXHIBIT 6B.....EXTERNAL REAR VIEW PHOTOGRAPH  
EXHIBIT 6C.....INTERNAL COMPONENT SIDE PHOTOGRAPH  
EXHIBIT 6D-6E.....INTERNAL CHASSIS VIEW PHOTOGRAPHS  
EXHIBIT 6F-6H.....INTERNAL COMPONENT SIDE - PART OF RF PORTION  
EXHIBIT 7A-7C.....BLOCK DIAGRAMS  
EXHIBIT 8.....USER'S MANUAL  
EXHIBIT 9A-9B.....BANDWIDTH PLOTS  
EXHIBIT 10A-B.....SPECTRAL DENSITY PLOTS  
EXHIBIT 11A-B.....PLOTS OF POWER LINE CONDUCTED EMISSIONS

APPLICANT: TELLUMAT(PTY) LIMITED.

FCC ID: ONJMDR2400-THD

REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT

DATE: AUGUST 19, 1999

TABLE OF CONTENTS LIST

AUGUST 19, 1999

Federal Communications Commission  
Authorization and Evaluation Division  
7435 Oakland Mills Road  
Columbia, MD 21046

SUBJECT: TELLUMAT(PTY) LIMITED.  
FCC ID: ONJMDR2400-THD

To Whom It May Concern:

This will serve as a request for confidentiality for the schematics for the radio. The schematics will be sent directly from the manufacturer to the FCC upon request. Once the review of the application is complete and the schematics are no longer needed, they must be returned to the manufacturer, where they were sent from.

Should you have any questions or require any further information with regards to this, please feel free to contact me.

Sincerely,

S. S. Sanders

SSS/sh  
Encl.

APPLICANT: TELLUMAT(PTY) LIMITED.  
FCCID: ONJMDR2400-THD  
REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT  
DATE: AUGUST 19, 1999  
PAGE #: 1

AUGUST 19, 1999

Federal Communications Commission  
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7435 Oakland Mills Road  
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SUBJECT: TELLUMAT(PTY) LIMITED.  
FCCID: ONJMDR2400-THD

To Whom It May Concern:

Attached you will find an application for a direct sequence spread spectrum assembly that is intended to be professionally installed. This unit will only be installed by authorized dealers that have been trained at the manufacturer's facilities.

The model only operates in two(2) bands of frequencies, 2.411 to 2.430 GHz and 2.472 to 2.554 GHz and only comes in two configurations;

1. Yagi antenna(Long pointed white)
2. Parabolic Antenna.

The user manual will have the following statement in it;  
"WARNING! ALL PERSONNEL SHOULD STAY AT LEAST 1 METER(3.5') FROM ANTENNA TO AVOID EXPOSURE TO POSSIBLE MICROWAVE ENERGY."

The antenna is intended to use outside.

Sincerely,

S. S. Sanders

SSS/sh  
Encl.

APPLICANT: TELLUMAT(PTY) LIMITED.  
FCCID: ONJMDR2400-THD  
REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT  
DATE: AUGUST 19, 1999  
PAGE #: 2

## TEST EQUIPMENT LIST

1. Spectrum Analyzer: Hewlett Packard 8566B - Opt 462, w/ preselector 85685A, & Quasi-Peak Adapter HP 85650A, & HP 8449B - OPT H02 Cal. 7/6/99
2. Signal Generator, Hewlett Packard 8640B, cal. 10/1/98
3. Signal Generator, HP 8614A Serial No.2015A07428 cal. 5/27/99
3. Eaton Biconical Antenna Model 94455-1  
20-200 MHz Serial No. 0997 Cal. 10/30/98
4. Electro-Metric Dipole Kit, 20-1000 MHz, Model TDA-30 10/31/98
5. Electro-Metric Horn 1-18 GHz, Model RGA-180, Cal. 10/30/98
6. Electro-Metric Antennas Model TDA-30/1-4,Cal. 10/15/98
7. Electro-Metric Line Impedance Stabilization Network Model No. EM-7821, Serial No. 101; 100KHz-30MHz 50uH. Cal.11/19/98
8. Electro-Metric Line Impedance Stabilization Network Model No. EM-7820, Serial No. 2682; 10KHz-30MHz 50uH. Cal. 11/19/98
9. Special low loss cable was used above 1 GHz
10. Tenney Temperature Chamber

## TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC. Shielded interface cables were used in all cases except for cables connecting to the telephone line and the power cords. A test program was run which simulated a normal data transmission on a network.

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-1992 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The ambient temperature of the UUT was 76oF with a humidity of 55%.

BANDWIDTH 6.0dB: The measurements were made with the spectrum analyzer's resolution bandwidth(RBW)=100KHz and the video bandwidth(VBW) =300KHz and the span set as shown on plot.

POWER OUTPUT: The RF power output was measured at the antenna feed point using a peak power meter.

ANTENNA CONDUCTED EMISSIONS: The RBW=100KHz, VBW=300KHz and the span set to 100MHz and the spectrum was scanned from 30MHz to the 10th Harmonic of the fundamental.

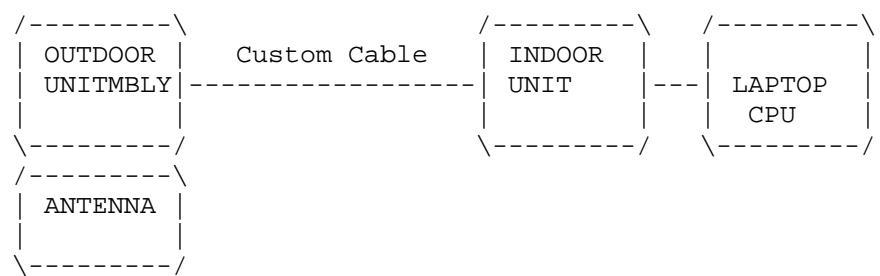
RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a preselector. The bandwidth(RBW) of the spectrum analyzer was 100kHz up to 1GHz and 1.0MHz above 1GHz with an appropriate sweep speed. The VBW above 1.0GHz was = 10Hz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 89oF with a humidity of 86%.

FCCID: ONJMDR2400-THD

REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT

DATE: AUGUST 19, 1999

PAGE #: 3



APPLICANT: TELLUMAT(PTY) LIMITED.  
FCCID: ONJMDR2400-THD  
REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT  
DATE: AUGUST 19, 1999  
PAGE #: 4

APPLICANT: TELLUMAT(PTY) LIMITED.  
FCC ID: ONJMDR2400-THD

CIRCUIT DESCRIPTION:

The ONJMDR2400-THD is a combination of the indoor unit the custom cable that connects the indoor unit to the outdoor unit, the outdoor unit and the antenna.

- A. Assembly #1 is with a Yagi Antenna(Long White).
- B. Assembly #2 is with a Parabolic Dish Antenna.

APPLICANT: TELLUMAT(PTY) LIMITED.  
FCCID: ONJMDR2400-THD

REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT

DATE: AUGUST 19, 1999

PAGE #: 5

APPLICANT: TELLUMAT (PTY) LIMITED.

FCC ID: ONJMDR2400-THD

NAME OF TEST: 6.0dB BANDWIDTH

RULES PART NUMBER: 15.247(a)(2)

REQUIREMENTS: The 6.0dB bandwidth must be greater than 500KHz.

MEASUREMENT: The 6.0dB bandwidth measured 8.60MHz@2.430GHz & 10.4MHz @2.475GHz

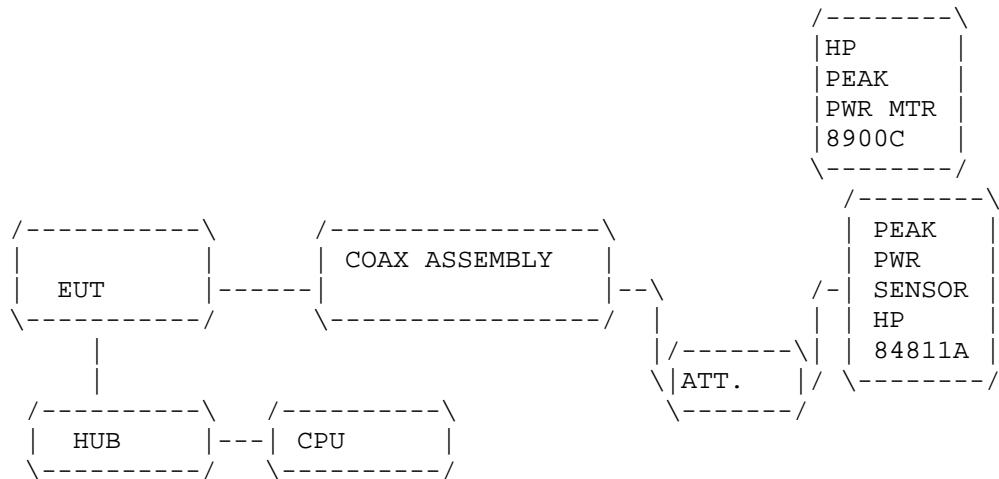
MEASUREMENT DATA: See plot on the next page.

NAME OF TEST: POWER OUTPUT

RULES PART NUMBER: 15.247(b)

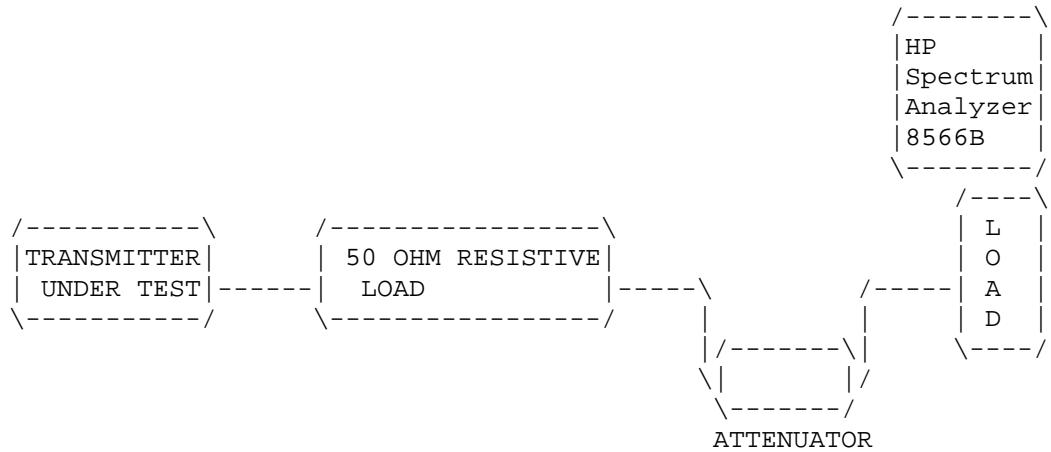
MEASUREMENT: 4.50 mWATTS or 6.5dBm

15.247(c) Method of Measuring RF Power output:  
The Peak power Sensor was connected in place of the antenna. Each configuration was tested with the coax cable length as described.



APPLICANT: TELLUMAT (PTY) LIMITED.  
 FCCID: ONJMDR2400-THD  
 REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT  
 DATE: AUGUST 19, 1999  
 PAGE #: 6

15.247(c) Method of Measuring RF Conducted Spurious Emissions



NAME OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

REQUIREMENTS: Emissions must be at least 20dB down from the highest emission level within the authorized band as measured with a 100KHz RBW.

	EMISSION FREQUENCY MHz	dB BELOW CARRIER
LOW FREQUENCY		
	2412.0	00.0
	4824.0	-35.3
	7235.0	-52.8
	9649.0	-64.7
	12,059.0	-64.5
	2430.0	00.0
	4860.0	-35.6
	7290.0	-52.4
	9721.0	-64.9
	12,148.0	-64.5
HIGH FREQUENCY		
	2472.0	00.0
	4944.0	-36.6
	7415.0	-52.2
	9888.0	-68.4
	2554.0	00.0
	5109.0	-36.9

7662.4	-52.3
10,216.0	-68.8

NOTE: THE SPECTRUM WAS SCANNED TO THE TENTH HARMONIC.

APPLICANT: TELLUMAT(PTY) LIMITED.  
 FCCID: ONJMDR2400-THD  
 REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT  
 DATE: AUGUST 19, 1999  
 PAGE #: 7

15.247(c) &15.109(b) Field strength of spurious emissions:

REQUIREMENTS: Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

TEST DATA:

EMISSION FREQUENCY MHz	METER READING @ 3m dBuV	COAX LOSS dB	FIELD STRENGTH dBuV/m	ATT. LEVEL dB	ATT. MARGIN dB	ANT.
<b>YAGI ANTENNA</b>						
2412.00	63.60	1.09	29.03	93.72	0.0	33.28
4824.00R	15.80	1.45	33.93	51.18	51.18	2.82
7239.00	6.30	1.82	36.64	44.76	44.76	9.24
9648.00	-5.50	2.11	38.59	35.21	35.21	18.79
2430.00	62.50	1.09	29.08	92.67	0.0	34.33
4860.00R	16.20	1.46	33.97	51.63	51.63	2.37
7290.00R	7.70	1.82	36.70	46.23	46.23	7.77
9720.00	-7.00	2.12	38.64	33.76	58.91	20.24
2454.00	63.70	1.10	29.14	93.93	0.0	33.07
4908.00R	16.70	1.47	34.02	52.19	52.19	1.81
7362.00R	11.20	1.84	36.78	49.82	49.82	4.18
9816.00	-6.50	2.13	38.71	34.33	34.33	19.67
2472.00	63.80	1.10	29.18	94.08	0.0	32.92
4914.00R	17.00	1.47	34.03	52.50	41.50	1.50
7414.00R	12.10	1.84	36.84	50.78	43.30	3.22
9890.00	-7.00	2.14	38.76	33.89	60.19	20.11

APPLICANT: TELLUMAT(PTY) LIMITED.

FCCID: ONJMDR2400-THD  
REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT  
DATE: AUGUST 19, 1999  
PAGE #: 8

15.247(c) &15.109(b) Field strength of spurious emissions:

TEST DATA:

EMISSION FREQUENCY MHz	METER READING @ 3m	COAX LOSS dB	FIELD STRENGTH dBuV/m	ATT. LEVEL dB	MARGIN dB	ANT.
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PARABOLIC ANTENNA

2412.00	67.40	1.09	29.03	97.52	0.0	29.48	V
4824.00R	16.00	1.45	33.93	51.38	51.38	2.62	V
7239.00	7.00	1.82	36.64	45.46	45.46	8.54	V
9648.00	-6.50	2.11	38.59	34.21	34.21	19.79	V
2430.00	66.50	1.09	29.08	96.67	0.0	30.33	V
4860.00R	16.20	1.46	33.97	51.63	51.63	2.37	V
7290.00R	7.70	1.82	36.70	46.23	46.44	7.77	V
9720.00	-7.00	2.12	38.64	33.76	58.91	20.24	V
2454.00	67.90	1.10	29.14	98.13	0.0	28.87	V
4908.00R	16.20	1.47	34.02	51.69	51.69	2.31	V
7362.00R	11.20	1.84	36.78	49.82	49.82	4.18	V
7362.00R	10.60	1.84	36.78	49.22	49.22	4.78	V
9816.00	-7.00	2.13	38.71	33.83	33.83	20.17	V
2472.00	67.00	1.10	29.18	97.28	0.0	31.28	V
4944.00R	15.90	1.47	34.06	51.43	45.85	2.57	V
7416.00R	13.60	1.84	36.84	52.29	44.99	1.71	V
9888.00	-7.00	2.14	38.75	33.89	63.39	20.11	V

METHOD OF MEASUREMENT: The procedure used was ANSI STANDARD C63.4-1992 except the spread spectrum portion was connected to its custom antenna at a height of 1.5 meters. The spectrum was scanned from 30MHz to at least the tenth harmonic of the fundamental. Above 1.0GHz the RBW was 1.0MHz and the VBW was 10Hz. The case was opened and the power removed from the radio in order to determine which emissions were digital. Measurements were made at the open field test site of TIMCO ENGINEERING

INC. located at 6051 N.W. 19th LANE, GAINESVILLE, FL 32605.

APPLICANT: TELLUMAT(PTY) LIMITED.

FCCID: ONJMDR2400-THD

REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT

DATE: AUGUST 19, 1999

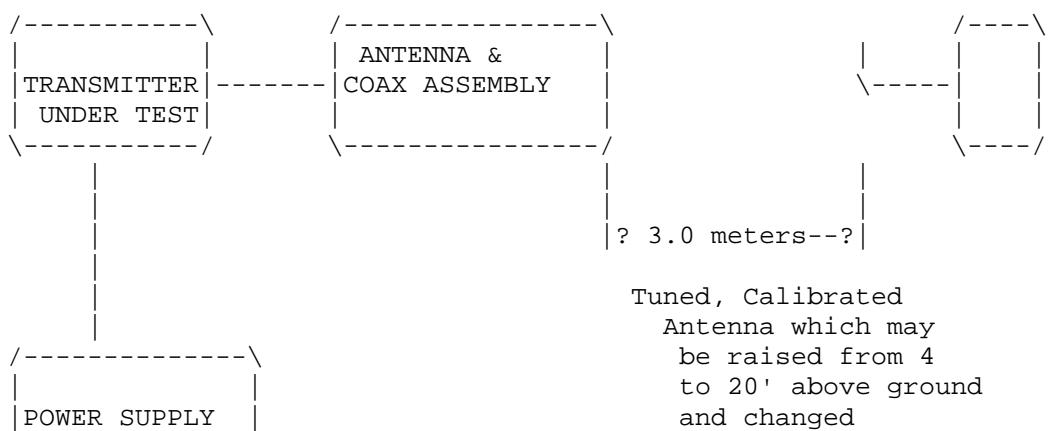
PAGE #: 8

2.993(a)(b)

2.993(a)(b) Continued Field strength of spurious emissions:

Method of Measuring Radiated Spurious Emissions

Hewlett Packard  
Spectrum  
Analyzer  
HP8566A



|  
\\-----/

in polarization

Equipment placed 4' above ground  
on a rotatable platform.

APPLICANT: TELLUMAT(PTY) LIMITED.

FCCID: ONJMDR2400-THD

REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT

DATE: AUGUST 19, 1999  
PAGE #: 9

APPLICANT: TELLUMAT(PTY) LIMITED.

FCC ID: ONJMDR2400-THD

NAME OF TEST: POWER SPECTRAL DENSITY

RULES PART NUMBER: 15.247(d)

REQUIREMENTS: The peak level measured must be no greater than  
-3.0dBm.

DATA: THE PLOT ON THE FOLLOWING PAGE SHOWS A PEAK LEVEL OF  
-53.0 dBm PLUS THE ATTENUATOR OF 50dB GIVES A LEVEL  
OF -3.0dBm.

APPLICANT: TELLUMAT(PTY) LIMITED.  
FCCID: ONJMDR2400-THD  
REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT  
DATE: AUGUST 19, 1999  
PAGE #: 10

APPLICANT: TELLUMAT(PTY) LIMITED.

FCC ID: ONJMDR2400-THD

NAME OF TEST: PROCESSING GAIN

RULES PART NUMBER: 15.247(e)

REQUIREMENTS:

DATA: The configuration in this application use the Aironet radio  
FCC ID: LOZOS5-1A as it was originally approved. We have enclosed a  
portion of the original report with the processing gain information.

APPLICANT: TELLUMAT(PTY) LIMITED.  
FCCID: ONJMDR2400-THD  
REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT  
DATE: AUGUST 19, 1999  
PAGE #: 11

APPLICANT: TELLUMAT(PTY) LIMITED.  
FCC ID: ONJMDR2400-THD - ASSEMBLY #1 AND #3  
NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE  
RULES PART NUMBER: 15.107(a) - Class B Computing Device  
REQUIREMENTS: .45 - 30 MHz 250 uV OR 47.96 dBuV  
TEST PROCEDURE: ANSI STANDARD C63.4-1992. The spectrum  
was scanned from .45 to 30 MHz.  
TEST DATA:

THE HIGHEST EMISSION READ FOR LINE 1 WAS 95.5uV @ 630KHz.

THE HIGHEST EMISSION READ FOR LINE 2 WAS 232.0uV @ 450KHz.

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: \_\_\_\_\_ DATE: AUGUST 19, 1999

APPLICANT: TELLUMAT(PTY) LIMITED.  
FCCID: ONJMDR2400-THD  
REPORT #: F:\CUS\T\TELLUMAT\TEL366A9\TEL366A9.RPT  
DATE: AUGUST 19, 1999  
PAGE #: 12