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CERTIFICATION TEST REPORT FOR A 2400 - 2483.5 MHz DSSS TRANSCEIVER

Applicant:	PCOM Inc. 3175 S. Winchester Blvd. Campbell, CA 95008
Model:	DATAMETRO II
FCC ID:	KINDM2
Differences from original:	See Below
Operating Frequency:	2405.162 - 2477.946 MHz
RF Output Power:	0-29 dBm
FCC Rule Part:	15.247
Used For:	Data link
Power Source:	13.5 V battery operation Also works from 13.5 VDC tap on AC operated battery charger
Test Location:	Compliance Consulting Services 951F Monterey Road Morgan Hill, CA 95087

All tests were performed by me or under my supervision. The PCOM DATAMETRO II meets all emissions and modulation requirements specified under Parts 2 and 15 of the Commission's Rules.

THOMAS N. COKENIAS

20 December 1998

FCC ID: KINDM2

The maximum allowed output power depended on data rate and antenna type being used. Limiting factors were dependent on output power setting, on transmit antenna gain, and on the amplitude of emission bandedge energy in restricted bands starting at 2483.5 MHz and 2390 MHz.

Tests were performed using the following antennas:

Antenna Type	Manufacturer & Model	Gain
short whip	P-COM Inc	0 dBi
omni rod	Decibel DA9065-NT	8 dBi
yagi	Cushcraft	16 dBi
dish reflector	Conifer T2400C	24 dBi

SUMMARY OF ALLOWED TRANSMITTER SETTINGS**Model: 320**

Channel	Maximum Output Power			
	0 dBi	8 dBi	16 dBi	24 dBi
Ch 1	29 dBm	28 dBm	27 dBm	24 dBm
Ch 2	29 dBm	28 dBm	27 dBm	24 dBm
Ch 12	29 dBm	28 dBm	27 dBm	24 dBm
Ch 13	28 dBm	27 dBm	26 dBm	24 dBm
Ch 14	17 dBm	14 dBm	7 dBm	7 dBm
All others not listed	29 dBm	29 dBm	27dBm	24 dBm

Model: 1280

Channel	Maximum Output Power			
	0 dBi	8 dBi	16 dBi	24 dBi
Ch 1	22 dBm	20 dBm	21 dBm	7 dBm
Ch 2	25 dBm	22 dBm	24 dBm	24 dBm
Ch 3	29 dBm	28 dBm	27 dBm	24 dBm
Ch 4	29 dBm	28 dBm	27 dBm	24 dBm
Ch 5	28 dBm	27 dBm	27 dBm	24 dBm
Ch 6	25 dBm	23 dBm	23 dBm	14 dBm
Ch 7	21 dBm	17 dBm	15 dBm	NOT USED
Ch 8	19 dBm	16 dBm	15 dBm	NOT USED
Ch 9	19 dBm	15 dBm	15 dBm	NOT USED

EXHIBITS

EXHIBIT A: Letter Requesting Confidentiality under Sec. 0.457(d)

EXHIBIT B: Information for which Confidentiality is Requested

B1: Schematics

B2: Block Diagrams

B3: Theory of Operation

EXHIBIT C: Description of Differences from Device Originally Submitted for Certification

EXHIBIT D: Product Photographs

EXHIBIT E: User Manual and FCC ID Label

EXHIBIT F: Channel Frequency Assignment List

EXHIBIT G: Description of Antennas and Antenna Connector Per 15.203

EXHIBIT H: Report of Measurements

EXHIBIT A: Letter Requesting Confidentiality under Sec. 0.457(d)

- refer to attachment *confident.doc*

EXHIBIT B: Information for which Confidentiality is Requested

B1: Schematics

B2: Block Diagrams

B3: Theory of Operation

EXHIBIT C: Description of Model Differences

FCC ID# KINDM2

The detailed differences between the DataMetro II 1280 and the DataMetro II 320 are outlined on all of the schematics. We feel that the differences, along with the testing which has been performed, comply with the FCC Rules for Class II permissive changes.

Differences include:

Digital Board	SD-14770-02	Sheet 2 Table 1
Frequency		
1280	81.92 MHz	
320	40.96 MHz	

Transceiver Board	SD-14000-07	Sheet 6 Table 1
Assembly Used		
1280	10.006 MHz	14000-060
320	10.3977 MHz	14000-030

Minor component variations between the two assemblies are also listed on Sheet 6, Table 1.

EXHIBIT D: Product Photographs

- see attachments *EUTphoto*.jpg*

EXHIBIT E: User Manual and FCC ID Label

- see attachments *PDM2_81170_00A.pdf* and *label.jpg*

EXHIBIT F: Channel Frequency Assignment List

- see attachment *frequencies.pdf*

EXHIBIT G: Description of Antennas and Antenna Connector

Per FCC Rule Para. 15.203

Note: EUT is professionally installed, therefore standard antenna cable connectors are allowed. Power levels are also set by the installer.

EXHIBIT H: Report of Measurements

EMISSIONS TEST REPORT FOR A LOW POWER TRANSMITTER

I. GENERAL INFORMATION

Requirement: FCC: 47CFR, Parts 2 and 15
Industry Canada: Guideline GL-36 and RSP-100

Applicant: PCOM Inc.
3175 S. Winchester Blvd.
Campbell, CA 95008

Product ID: FCC ID: KINDM2

Model Numbers: DATAMETRO II

II. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

The DATAMETRO II is a 2400 - 2483.5 MHz direct sequence spread spectrum (DSSS) transceiver used to link data between two or more units.

III. TEST LOCATION

All emissions tests were performed at:

Compliance Certification Services
561F Monterey Road
Morgan Hill, CA 95087
Phone: 408-752-8166 Fax: 408-752-8168

CCS has site descriptions on file with the FCC for 30 m, 10m and 3m site configurations. CCS is a NVLAP accredited facility.

Radiated emissions from the digital portion of the EUT were performed on siteB, one of the 3m/10 m sites.

IV. TEST PROCEDURES

Radiated Emissions

Test Requirement: FCC: 15.205, 15.209

Industry Canada: GL-36, 3.1.b3

Measurement Equipment Used:

HP 8563E Spectrum Analyzer

HP 8449 B Preamplifier, 1-26 GHz

ARA DRG-118/A Double Ridged Horn antenna, 1 - 18 GHz

ARA MWH 1826/B Standard Gain Horn Antenna, 18 - 26.5 GHz

QIM "The Workhorse" low loss cable, 9ft (loss: 0.85 dB/ft@ 26 GHz)

Microlab 150HX High Pass Filter (fo = 2100 MHz), 400Hx (fo=4000 MHz)

Test Set-Up

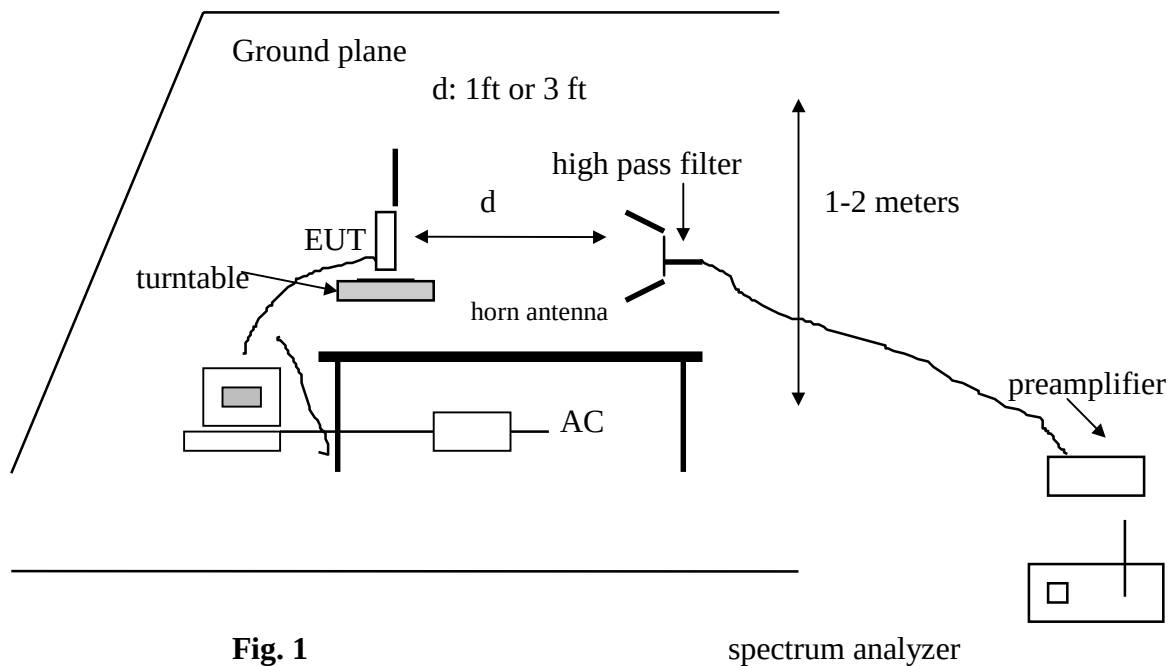


Fig. 1

spectrum analyzer

Test Procedures

1. The EUT was set to CH 3 and was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3 ft from the EUT. The EUT antenna was mounted vertically as per normal installation.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.
4. Steps 1 - 3 were repeated for CH 8 and CH 15.

Test Results: Refer to attached tabular data sheets

AC Line Conducted Emissions

Test Requirement: FCC: 15.107, 15.207

Industry Canada: GL-36, 3.2

Measurement Equipment Used:

Rohde & Schwarz EMI Receiver ESHS-20

Fischer Custom Communication LISN, FCC-LISN-50/250-25-2

Test Set-up

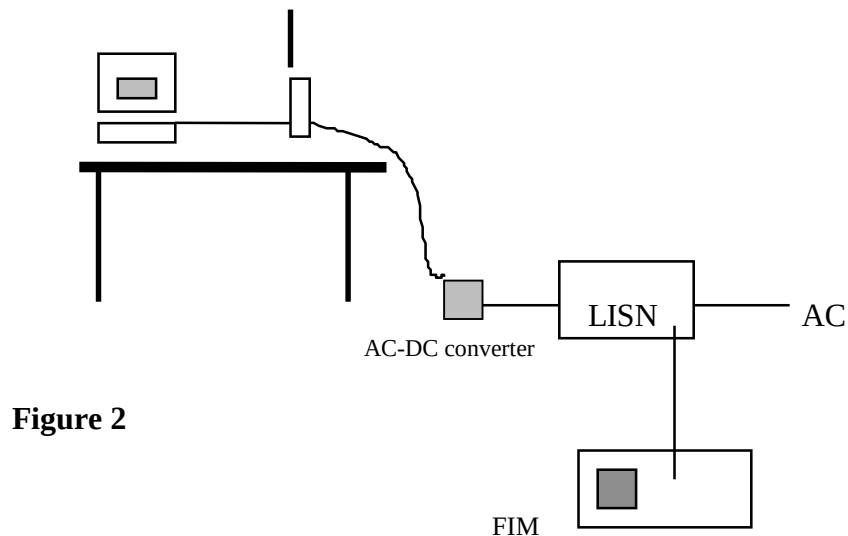


Figure 2

Test Procedure

1. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit on CH 3.

2. Line conducted data was recorded for both NEUTRAL and HOT lines.

Test Results

Refer to attachmente *ACCE120.jpg* and *ACCE230.jpg*

Minimum 6 dB Bandwidth for DSSS
Test Requirement: FCC: 15.247(a)2

Measurement Equipment Used:

HP 8563E Spectrum Analyzer
Coaxial attenuator, 10dB, DC-12.6 GHz
QIM “The Workhorse” low loss cable, 3ft (loss: 0.85 dB/ft@ 26 GHz)

Test Set-up

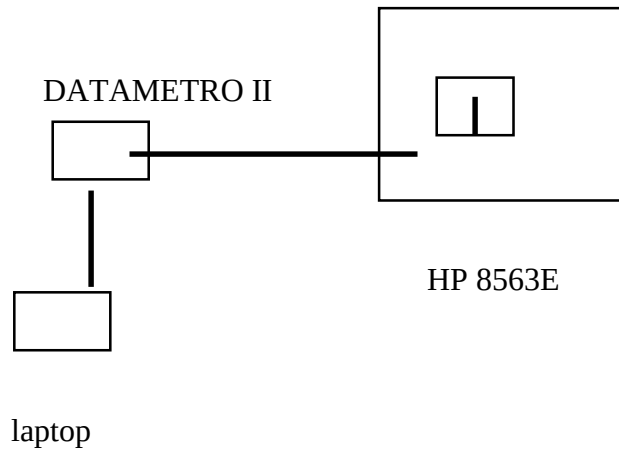


Figure 3

Test Procedures

1. The EUT was configured on a test bench as shown in Figure 3. The transmitter was set to a LOW channel. While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission occupied bandwidth.
2. The process in (1) was repeated for MID and HI channel.

Test Results: Refer to attachments *3206dB.jpg* and *12806dB.jpg*

RF Power Output

Test Requirement: FCC: 15.247(b)
Industry Canada: RSS-210, 6.2.2(o)(b)(3)

1. Measurement Equipment Used:

HP 8563E Spectrum Analyzer
QIM “The Workhorse” low loss cable, 3ft (loss: 0.85 dB/ft@ 26 GHz)

Test Set-up

Refer to Figure 3.

Test Procedures

1. The EUT was configured on a test bench as shown in Figure 3. The EUT was set to transmit on LOW channel. While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission.

Analyzer bandwidth settings:

RES BW = 3 MHz

VID BW = 3 MHz

2. The process in (1) was repeated for MID and HI channel.

Test Results

Refer to attachments *Pout320.jpg* and *Pout1280.jpg*.

2. Measurement Equipment Used:

HP 435B RF Power Meter

HP 8481A RF Power Sensor

Test Procedures

1. For each radio model the EUT was configured on a test bench and the sensor of the power meter was connected directly to the antenna port.. The EUT was set to transmit on LOW channel. While the transmitter broadcast a steady stream of digital data, the maximum power level was recorded.

2. The process in (1) was repeated for MID and HIGH channel.

Test Results

Model No.	Channel	Frequency, MHz	Output Power, dBm
1280	1	2421.452	28.8
	5	2441.464	29.1
	9	2461.476	29.0
320	1	2407.068	28.7
	5	2427.863	28.9
	14	2474.653	29.2

Out of Band Measurements

Test Requirement: FCC: 15.247(c)
Industry Canada: GL-36, B1.2(d)

Measurement Equipment Used:

HP 8563E Spectrum Analyzer
HP 8491A coaxial attenuator, 6 dB, DC-12.6 GHz
QIM “The Workhorse” low loss cable, 3ft (loss: 0.85 dB/ft@ 26 GHz)

Test Set-up

Refer to Figure 3.

Test Procedure

1. The EUT was set to transmit continuously at LOW channel.
2. Spectrum analyzer RES BW was set to 100 kHz, the MAX HOLD function was engaged. While the EUT was transmitting, the range 1 MHz - 24850 MHz was scanned continuously to capture all out-of-band transmitter emissions and compare their levels in relation to a display line placed 20 dB below the maximum amplitude of the transmitter.
3. The procedure was repeated for MID and HI channels.

Test Results

Refer to attachments *320Ch*out.jpg* and *1280Ch*out.jpg*.

Power Spectral Density Measurement

Test Requirement: FCC: 15.247(d)

Industry Canada: GL-36, Annex B, B1.2(a)

Measurement Equipment Used:

Measurement Equipment Used:

HP 8563E Spectrum Analyzer

HP 8491A coaxial attenuator, 6 dB, DC-12.6 GHz

QIM “The Workhorse” low loss cable, 3ft (loss: 0.85 dB/ft@ 26 GHz)

Test Set-up

Refer to Figure 3.

Test Procedure

The EUT was set to transmit on LOW channel. The center frequency of the spectrum analyzer was set to the frequency at which the peak of the output power envelope was located. The SPAN was decreased to 300 kHz, while making sure that the peak of the output power envelope was still at screen center. The RES BW and VID BW were set to 3 kHz, the SWEEP was set to 100 seconds, and the resultant trace was recorded and compared to a display line set to the 8 dBm limit.

The test was repeated for MID and HI channels.

Test Results

Refer to attachments *320psd.jpg* and *1280psd.jpg*.

Process Gain Measurement

Test Requirement: FCC: 15.247(e)

Industry Canada: GL-36, B1.2.(b)

Performed by manufacturer. Refer to attachment *1280process.pdf* and *320process.pdf*.

Radiated Emissions from ITE Portion of EUT

Test Requirement:

FCC: 15.109

Industry Canada: ICES-003, 5.3

Measurement Equipment Used:

HP 8568A Spectrum Analyzer

HP 8447D Preamplifier

Eaton 94456-1 Biconical Antenna, 20 - 200 MHz

EMCO 3146 Log Periodic Antenna, 200 - 1000 MHz

Test Set-up

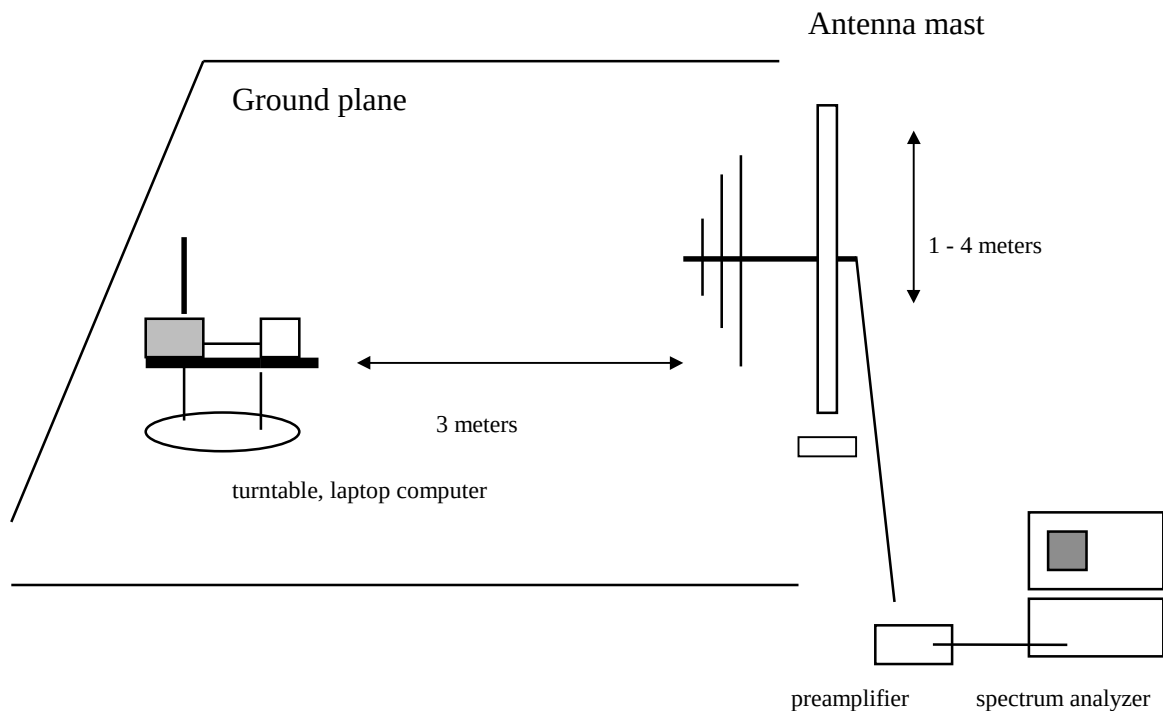


Fig. 5

Test Procedure

The EUT was set to RECEIVE mode. Radiation emissions from the digital portion of the EUT were measured according to the dictates of ANSI C63.4.

Test Results

Refer to attachments *320EN22B.jpg* and *1280EN22B.jpg*

V. CERTIFICATION OF DATA

All radiated and conducted measurements described in this report were performed by, or were witnessed and supervised by, the undersigned. To the best of his knowledge and belief, test equipment calibrations, test procedures, and test data were accurate and as reported here.

T.N. COKENIAS

20 December 1998