



**M. Flom Associates, Inc. - Global Compliance Center**  
3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176  
www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

---

T R A N S M I T T E R      C E R T I F I C A T I O N

of

FCC ID: P8FCDPDWCH01  
MODEL: CDPDWCH01

to

FEDERAL COMMUNICATIONS COMMISSION

Rule Parts 15, 15.231

DATE OF REPORT: March 13, 2002

ON THE BEHALF OF THE APPLICANT:

Digital Angel Corporation

AT THE REQUEST OF:

P.O. #2 and #1018

Digital Angel Systems  
1451 Research Park Drive  
Riverside, CA 92507

Attention of:

Michael P. Dunn, Production Manager  
(909) 276-7180 ext. 231; FAX: -7191  
email: mdunn@digitalangel.net  
Dexing Pang, Ph. D., Director R&D  
(909) 276-7180 ext. 216; FAX: -7191  
email: dpang@digitalangel.net

SUPERVISED BY:

A handwritten signature in black ink that reads 'M. Flom P. Eng.' The signature is stylized with a large 'M' and a prominent 'F'.

Morton Flom, P. Eng.

LIST OF EXHIBITS  
(FCC **CERTIFICATION** (TRANSMITTERS) - REVISED 9/28/98)

APPLICANT: Digital Angel Corporation

FCC ID: P8FCDPDWCH01

BY APPLICANT:

- |   |   |
|---|---|
| 1. LETTER OF AUTHORIZATION                | x |
| 2. IDENTIFICATION DRAWINGS                |   |
| <u>x</u> LABEL                            |   |
| <u>x</u> LOCATION OF LABEL                |   |
| <u>x</u> COMPLIANCE STATEMENT             |   |
| <u>x</u> LOCATION OF COMPLIANCE STATEMENT |   |
| 3. DOCUMENTATION: 2.1033(b)               |   |
| (3) USER MANUAL                           | x |
| (4) OPERATIONAL DESCRIPTION               | x |
| (5) BLOCK DIAGRAM                         | x |
| (5) SCHEMATIC DIAGRAM                     | x |
| (7) PHOTOGRAPHS                           | x |
| PARTS LIST                                | x |
| ACTIVE DEVICES                            | x |

BY M.F.A. INC.

- A. TESTIMONIAL & STATEMENT OF CERTIFICATION
- B. STATEMENT OF QUALIFICATIONS

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO USER.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) SPECIAL ACCESSORIES.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

TABLE OF CONTENTS

RULE	DESCRIPTION	PAGE
	Test Report	1
2.1033(c)	General Information Required	2
	Standard Test Conditions and Engineering Practices	6
	Description Of Product	7
2.1046(a)	R. F. Power Output (Radiated)	9
2.1053(a)	Field Strength of Spurious Radiation	11

PAGE NO. 1 of 15.

*Required information per ISO/IEC Guide 25-1990, paragraph 13.2:*

a) TEST REPORT

b) Laboratory: M. Flom Associates, Inc.  
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107  
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d0230022

d) Client: Digital Angel Systems  
1451 Research Park Drive  
Riverside, CA 92507

e) Identification: CDPDWCH01  
FCC ID: P8FCDPDWCH01  
Description: UHF FM Portable Transmitter

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: March 13, 2002  
EUT Received: February 26, 2002

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:



Morton Flom, P. Eng.

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

PAGE NO. 2 of 15.

LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

IN ACCORDANCE WITH FCC RULES AND REGULATIONS,  
VOLUME II, PART 2 AND TO

15, 15.231(e)

Sub-part 2.1033

(c)(1): NAME AND ADDRESS OF APPLICANT:

Digital Angel Corporation  
490 Villaume Avenue  
South St. Paul, MN 55075-2445

MANUFACTURER:

Digital Angel Systems, Shenzhen Branch  
1 Dong - 6H Xiangjing Da Sha,  
2034 Lianhua Road, Futian District  
Shenzhen, P.R. China 518037

(c)(2): FCC ID: P8FCDPDWCH01

MODEL NO: CDPDWCH01

(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: N/A

(c)(5): FREQUENCY RANGE, MHz: 314.8 to 315.2

(c)(6): POWER RATING, Watts: 0.001  
       \_\_\_ Switchable \_\_\_ Variable   x   N/A

(c)(7): MAXIMUM POWER RATING, Watts: 50 mv/m @ 3m

15.203: ANTENNA REQUIREMENT:

  x   The antenna is permanently attached to the EUT  
       \_\_\_ The antenna uses a unique coupling  
       \_\_\_ The EUT must be professionally installed  
       \_\_\_ The antenna requirement does not apply

PAGE NO. 3 of 15.

Subpart 2.1033 (continued)

(c)(8): VOLTAGES & CURRENTS IN ALL ELEMENTS IN FINAL R. F. STAGE,  
INCLUDING FINAL TRANSISTOR OR SOLID STATE DEVICE:

COLLECTOR CURRENT, A = per manual  
COLLECTOR VOLTAGE, Vdc = per manual  
SUPPLY VOLTAGE, vdc = 3

(c)(9): TUNE-UP PROCEDURE:

PLEASE SEE ATTACHED EXHIBITS

(c)(10): CIRCUIT DIAGRAM/CIRCUIT DESCRIPTION:

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

PLEASE SEE ATTACHED EXHIBITS

(c)(11): LABEL INFORMATION:

PLEASE SEE ATTACHED EXHIBITS

(c)(12): PHOTOGRAPHS:

PLEASE SEE ATTACHED EXHIBITS

(c)(13): DIGITAL MODULATION DESCRIPTION:

     ATTACHED EXHIBITS  
  x   N/A

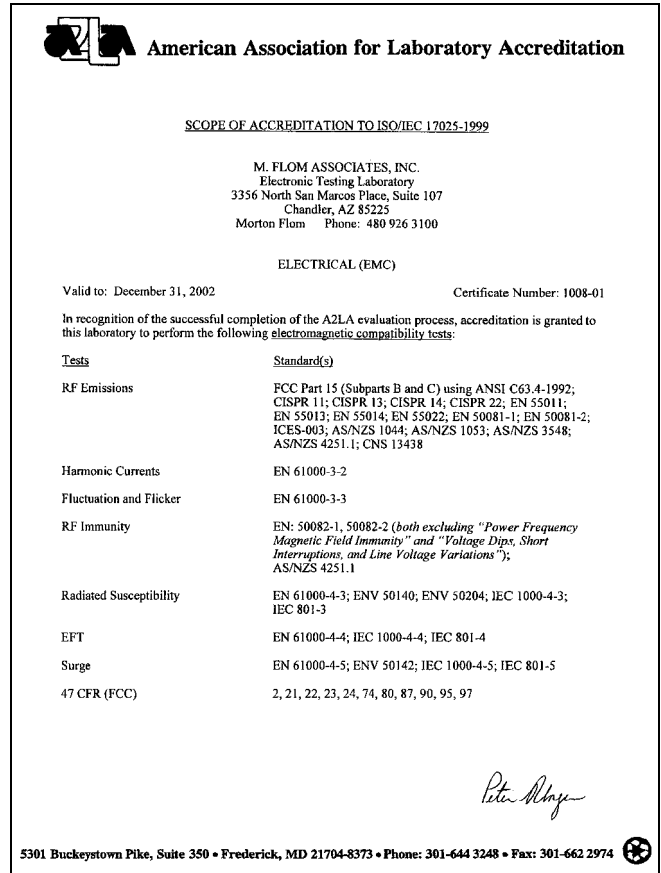
(c)(14): TEST AND MEASUREMENT DATA:

FOLLOWS

PAGE NO.

4 of 15.

M. Flom Associates, Inc. is accredited by the American Association for Laboratory Accreditation (A2LA) as shown in the scope below.



"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not covered by this laboratory's A2LA accreditation.



PAGE NO.

5 of 15.

Sub-part  
2.1033(b):TEST AND MEASUREMENT DATA

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.1031, 2.1033, 2.1035, 2.1041, 2.1043, 2.1045, and the following individual Parts:

- \_\_\_\_\_ 15.209 Radiated emission limits; general requirements
- \_\_\_\_\_ 15.211 Tunnel radio systems
- \_\_\_\_\_ 15.213 Cable locating equipment
- \_\_\_\_\_ 15.214 Cordless telephones
- \_\_\_\_\_ 15.217 Operation in the band 160-190 kHz
- \_\_\_\_\_ 15.219 Operation in the band 510-1705 kHz
- \_\_\_\_\_ 15.221 Operation in the band 525-1705 kHz (leaky coax)
- \_\_\_\_\_ 15.223 Operation in the band 1.705-10 MHz
- \_\_\_\_\_ 15.225 Operation in the band 13.553-13.567 MHz
- \_\_\_\_\_ 15.227 Operation in the band 26-27.28 MHz (remote control)
- \_\_\_\_\_ 15.229 Operation in the band 40.66-40.70 MHz
- x \_\_\_\_\_ 15.231 Periodic operation in the band 40.66-40.70 MHz and above 70 MHz
- \_\_\_\_\_ 15.233 Operation within the bands 43.71-44.49, 46.60-46.98 MHz 48.75-49.51 MHz and 49.66-50.0 MHz
- \_\_\_\_\_ 15.235 Operation within the band 49.82-49.90 MHz
- \_\_\_\_\_ 15.237 Operation within the bands 72.0-73.0 MHz, 74.6-74.8 MHz and 75.2-76.0 MHz (auditory assistance)
- \_\_\_\_\_ 15.239 Operation in band 88-108 MHz
- \_\_\_\_\_ 15.241 Operation in the band 174-216 MHz (biomedical)
- \_\_\_\_\_ 15.243 Operation in the band 890-940 MHz (materials)
- \_\_\_\_\_ 15.245 Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz (filed disturbance sensors)
- \_\_\_\_\_ 15.247 Operation within bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz (spread spectrum)
- \_\_\_\_\_ 15.249 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz
- \_\_\_\_\_ 15.251 Operation within the bands 2.9-3.26 GHz, 3.267-3.332 GHz, 3.339-3.3458 GHz, and 3.358-3.6 GHz (vehicle identification systems)
- \_\_\_\_\_ 15.321 Specific requirements for asynchronous devices operating in the 1910-1920 MHz and 2390-2400 MHz bands (Unlicensed PCS)
- \_\_\_\_\_ 15.323 Specific requirements for isochronous devices operating in the 1920-1930 MHz sub-band (Unlicensed PCS)

PAGE NO.

6 of 15.

STANDARD TEST CONDITIONS  
and  
ENGINEERING PRACTICES

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992/2000 DRAFT, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst case measurements.

PAGE NO.

7 of 15.

Description of Product

The Digital Angel product consists of a CDPD septum with a transmitter contained in a watch case. This transmitter operates at a frequency of 315 MHz.

A pager also forms part of the septum. The pager receives the information signal from the watch transmitter and transmits it at a frequency of 824 - 849 MHz, the Amps Cellular Band.

The transmitter uses the Novatel Wireless module  
FCC ID: NBZNRM-6812, model NRM-6812-1 Certified on October 24, 1997  
and by Industry Canada on November 9, 1998, Certificate #9216A,  
Certification #322982306A.

The pager also contains a GPS receiver.

Test Procedure

The antennas in the watch and the pager are integral to these devices. The test results were obtained via radiated emission measurements on an OATS.

PAGE NO. 8 of 15.  
NAME OF TEST: Signaling Restriction  
SPECIFICATION: 47 CFR 15.231(a)

PROVISIONS

TO PARAGRAPH 15.231

- (a) Types of momentary signals  
 \_\_\_\_\_ The EUT only transmits a control signal.  
x The EUT meets the requirements provided in (e).
- (a)(1) Manually operated transmitters  
 \_\_\_\_\_ The EUT can not be manually activated.  
x The EUT ceases transmission within 33 milliseconds of  
 \_\_\_\_\_ deactivation.  
 \_\_\_\_\_ The EUT is employed during emergencies.
- (a)(2) Automatically activated transmitters  
 \_\_\_\_\_ The EUT can not be automatically activated.  
x The EUT does not transmit for more than 5 seconds.  
 \_\_\_\_\_ The EUT only operates during an alarm condition.
- (a)(3) Automatically activated transmitters  
x The EUT does not transmit at regular predetermined intervals.  
 \_\_\_\_\_ The EUT meets the requirements provided in (e).  
 \_\_\_\_\_ The EUT does not transmit more than one, one second per hour.
- (a)(4) Emergency transmitters  
x The EUT is not an emergency transmitter.  
 \_\_\_\_\_ The EUT only operates during an alarm condition.

PAGE NO. 9 of 15.

NAME OF TEST: R. F. Power Output (Radiated)

SPECIFICATION: 47 CFR 2.1046(a)

TEST EQUIPMENT: As per attached page

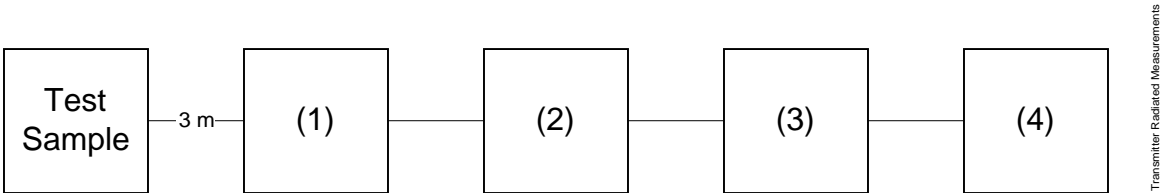
MEASUREMENT PROCEDURE (RADIATED)

1. The EUT was placed on an open-field site and its radiated field strength at a known distance was measured by means of a spectrum analyzer. Equivalent loading was calculated from the equation  $P_t = ((E \times R)^2 / 49.2)$  watts, where  $R = 3m$ .
2. Measurement accuracy is  $\pm 1.5$  dB.

MEASUREMENT RESULTS

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	$\mu V/m$ @ 3m	ERP, dBm	Limit
315.00	315.00	2001	-41	2416 $\mu V$

TRANSMITTER RADIATED MEASUREMENTS



Asset Description  
(as applicable)

s/n

(1)	<u>TRANSDUCER</u>	
	i00091 Emco 3115	001469
	i00089 Aprel Log Periodic	001500
(2)	<u>HIGH PASS FILTER</u>	
	i00 Narda $\mu$ PAD (In-Band Only)	
	i00 Trilithic	
	(Out-Of-Band Only)	
(3)	<u>PREAMP</u>	
	i00028 HP 8449 (+30 dB)	2749A00121
(4)	<u>SPECTRUM ANALYZER</u>	
	i00048 HP 8566B	2511A01467
	i00057 HP 8557A	1531A00191
	i00029 HP 8563E	3213A00104

PAGE NO. 11 of 15.

NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

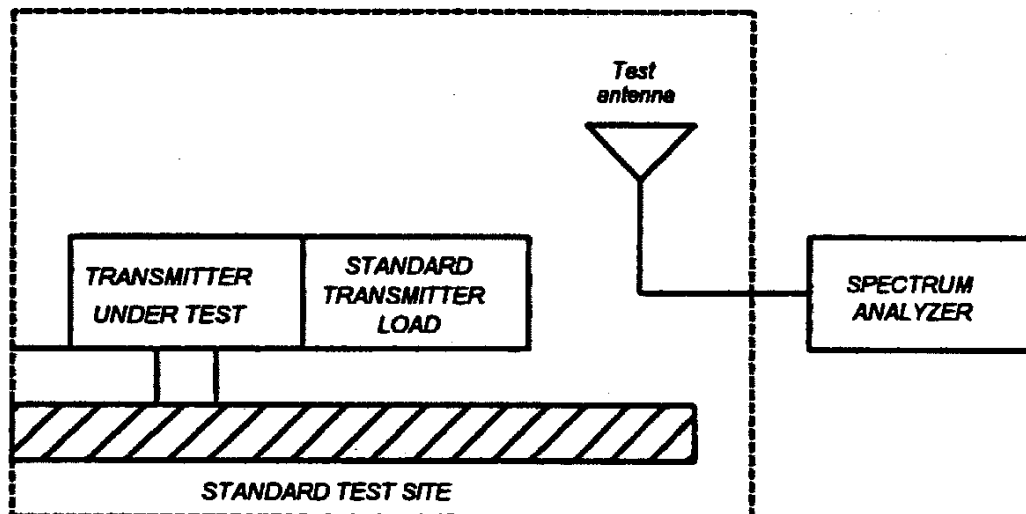
GUIDE: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

MEASUREMENT PROCEDURE

1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

1.2.12.2 Method of Measurement

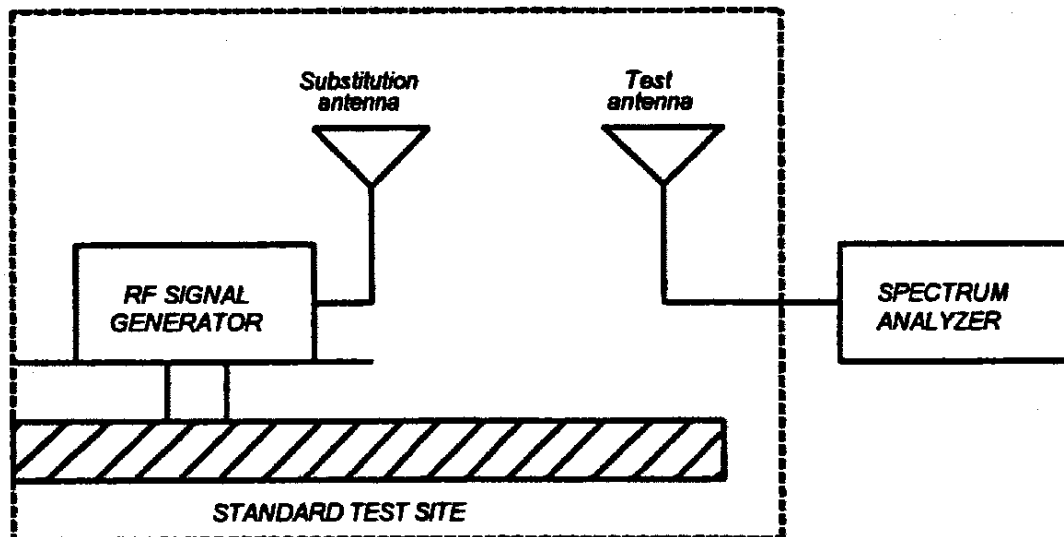
- A) Connect the equipment as illustrated
- B) Adjust the spectrum analyzer for the following settings:
  - 1) Resolution Bandwidth 10 kHz (<1 GHz), 1 MHz (> 1GHz).
  - 2) Video Bandwidth  $\geq 3$  times Resolution Bandwidth, or 30 kHz (22.917)
  - 3) Sweep Speed  $\leq 2000$  Hz/second
  - 4) Detector Mode = Mean or Average Power
- C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load which is placed on the turntable. The RF cable to this load should be of minimum length.



PAGE NO. 12 of 15.

NAME OF TEST: Field Strength of Spurious Radiation (Cont.)

- D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to  $\pm$  the test bandwidth (see section 1.3.4.4).
- E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
- F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.



- G) Reconnect the equipment as illustrated.
- H) Keep the spectrum analyzer adjusted as in step B).
- I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.



PAGE NO. 13 of 15.

NAME OF TEST: Field Strength of Spurious Radiation (Cont.)

- J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
- K) Repeat step J) with both antennas vertically polarized for each spurious frequency.
- L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
- M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB =  
 $10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step l)}$

NOTE: It is permissible that other antennas provided can be referenced to a dipole.

Test Equipment:

Asset Description (as applicable)	s/n	Cycle	Last Cal
<small>Per ANSI C63.4-1992/2000 Draft, 10.1.4</small>			
<u>TRANSDUCER</u>			
i00088 EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-01
i00065 EMCO 3301-B Active Monopole	2635	12 mo.	Sep-01
i00089 Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-01
i00103 EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-01
<u>AMPLIFIER</u>			
i00028 HP 8449A	2749A00121	12 mo.	Mar-01
<u>SPECTRUM ANALYZER</u>			
i00029 HP 8563E	3213A00104	12 mo.	Jan-02
i00033 HP 85462A	3625A00357	12 mo.	Jan-02
i00048 HP 8566B	2511AD1467	6 mo.	Jan-02

PAGE NO.

14 of 15.

TEST SETUP: Radiated Emissions  
g0220119: 2002-Feb-27 Wed 10:49:00  
STATE: 0:General



TEST SETUP: Radiated Emissions  
g0220120: 2002-Feb-27 Wed 10:49:00  
STATE: 0:General



PAGE NO. 15 of 15.

NAME OF TEST: Field Strength of Spurious Radiation  
 g0220134: 2002-Feb-27 Wed 09:12:00  
 STATE: 2:High Power

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	ERP, dBm	ERP, dbc
315.000000	629.860000	-65	≤ -66.1 (110 μv)
315.000000	944.790000	-94.2	≤ -66.1 (110 μv)
315.000000	1259.720000	-81.2	≤ -66.1 (110 μv)
315.000000	1574.650000	-84.4	≤ -66.1 (110 μv)
315.000000	1889.575000	-76.7	≤ -66.1 (110 μv)
315.000000	2204.515000	-77.7	≤ -66.1 (110 μv)
315.000000	2519.450000	-87.1	≤ -66.1 (110 μv)
315.000000	2834.380000	-86.6	≤ -66.1 (110 μv)
315.000000	3149.270000	-102.4	≤ -66.1 (110 μv)

RADIATED MEASUREMENTS  
FOR PART 15 TRANSMITTERS W/ INTEGRAL ANTENNAS

Radiated Measurements

<u>RANGE OF MEASUREMENT</u>	<u>SPECIFICATION</u>	<u>RESOLUTION B/W</u>	<u>VIDEO B/A</u>
30 to 1000 MHz	CISPR	$\geq 100$ kHz	$\geq 100$ kHz
>1000 MHz	FCC, 15.37(b)	1 MHz	$\geq 1$ MHz
(if averaging)	FCC, 15.37(b)	1 MHz	10 Hz

Measuring Equipment

a. ANTENNAS:

EMCO 3109	20 - 300 MHz
APREL AALP2001	200 - 1000 MHz
APREL AAB20200	20 - 200 MHz
APREL AAH118	1 - 18 GHz

b. INSTRUMENTS:

HP8566B	Spectrum Analyzer
HP85685A	Preselector, w/ preamp below 2 GHz
HP85650A	Quasi Peak Adapter
HP8449	Preamp, above 2 GHz

All test instrumentation is calibrated every January and every July. In addition, all test instrumentation is calibrated daily, or as required by the manufacturer. A Calibration Agreement is maintained with Hewlett Packard.

Occupied Bandwidth

Occupied Bandwidth is measured as a radiated signal without attenuators and/or filter. RBW, VBW and scan settings as shown were set to produce a meaningful result in accordance with ANSI C63.4, Section 13.1.7.

Part 15.21, Information to User

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly avoided by the party responsible for compliance could void the user's authority to operate the equipment.

TESTIMONIAL  
AND  
STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY THAT:

1. THAT the application was prepared either by, or under the direct supervision of, the undersigned.
2. THAT the technical data supplied with the application was taken under my direction and supervision.
3. THAT the data was obtained on representative units, randomly selected.
4. THAT, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

CERTIFYING ENGINEER:

A handwritten signature in black ink, appearing to read "M. Flom P. Eng.", with a horizontal line drawn underneath the signature.

Morton Flom, P. Eng.