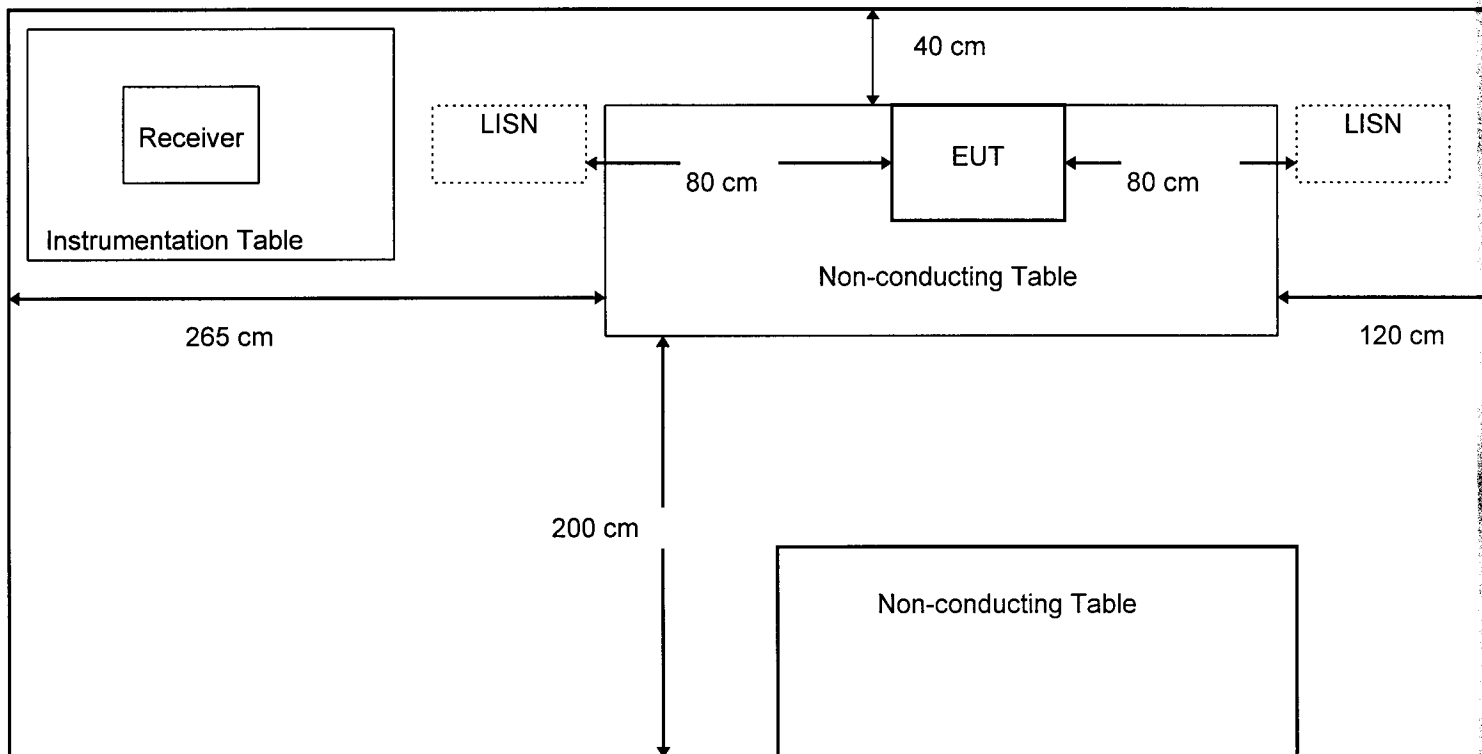
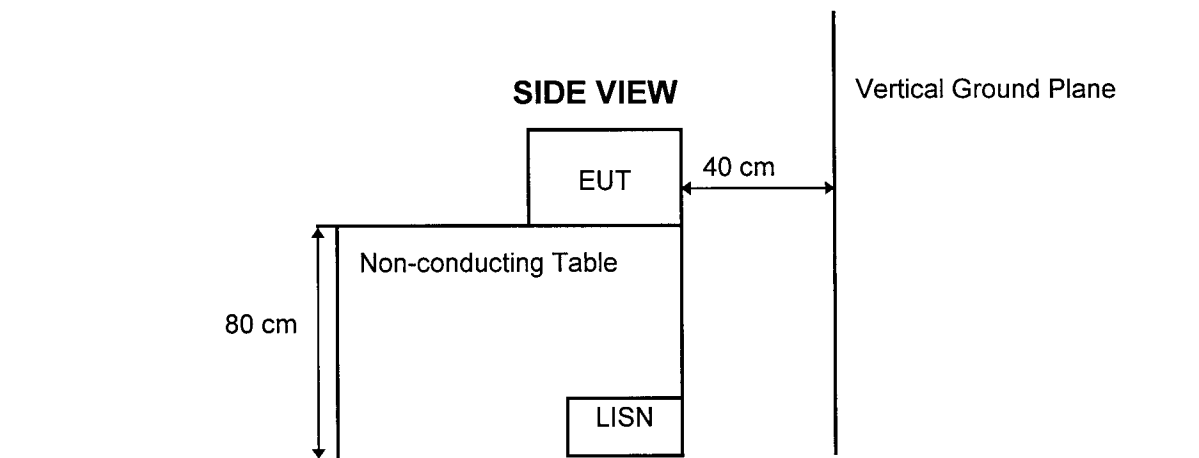


Appendix A

Test Data Sheets

and

Test Setup Drawing(s)

TEST SETUP FOR EMISSIONS TESTINGWILD RIVER LAB
Screen Room**TOP VIEW****SIDE VIEW****Other Measurements:**

2 meters from top of EUT to ceiling

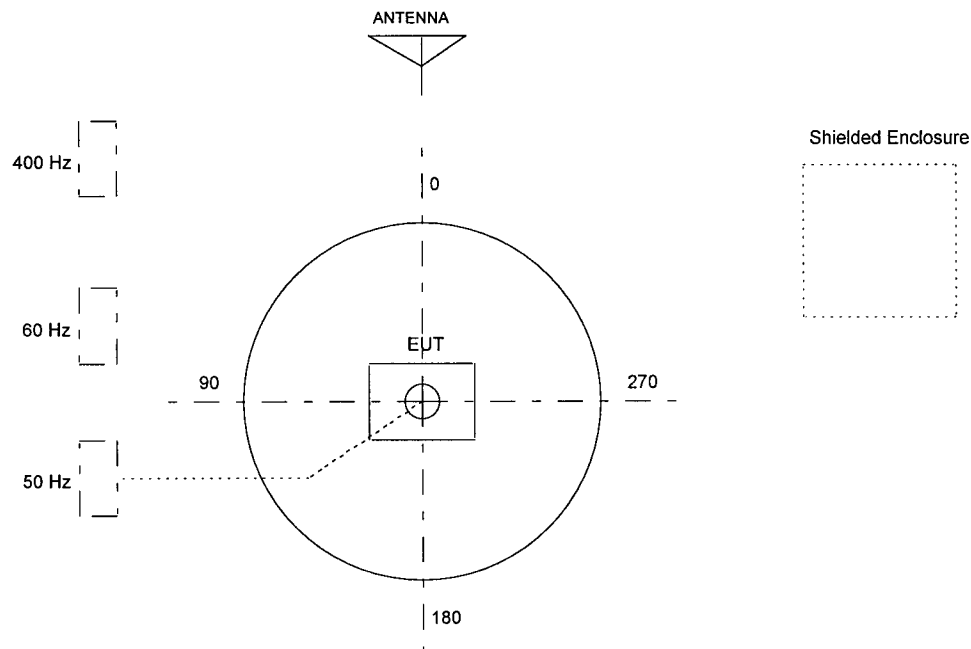
80 cm from closest part of EUT to the LISN

TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Large Test Site

Notes:

1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to the test area.
2. 50 Hz, 60 Hz, and 400 Hz are power panels for alternating current.
3. The antenna may be positioned horizontally 3, 10 or 30 meters from the center of the turntable.
4. The circle is a 6.7 meter diameter turntable.
5. A ground plane is in the plane of this sheet.
6. The test sample is shown in the azimuthal position representing zero degrees.



T U V P R O D U C T S E R V I C E

RADIATED EMISSIONS

Large Test Site
 3 Meter Antenna Distance
 Equipment Under Test:
 ITI
 ADVENT WIRELESS TRANSCEIVER 55-756
 Notes: TRANSMIT MEASUREMENTS

Report W9420 Run 4
 Date 08-26-99 Page 1
 Engineer
 Tech: JCS
 Requester *JCS*

Frequency MHz	Level dBuV	Factor dB	Cable dB	Peak dBuV/m	Ave dBuV/m	Polar\ Height	15.231 dBuV/m	Limit
------------------	---------------	--------------	-------------	----------------	---------------	------------------	------------------	-------

RES BW AND VID BW = 100 KHZ

ALL SIGNALS MAXED FOR AZIMUTH AND ANTENNA HT.

(20 DB PEAK-AVERAGE DUTY CYCLE CORRECTION)

319.44	65.25	15.5	1.6	82.4	62.4	H --	75.8
319.44	58.55	15.5	1.6	75.7	55.7	V --	75.8
425.95	45.75	17	1.9	64.7	44.7	V --	55.8
425.95	46.4	17	1.9	65.3	45.3	H --	55.8
532.45	35.9	18.9	2.2	57	37	H --	55.8
532.45	44.1	18.9	2.2	65.2	45.2	V --	55.8
638.96	34.3	20.5	2.4	57.2	37.2	V --	55.8
638.96	32.1	20.5	2.4	55	35	H --	55.8

THE ABOVE MEASUREMENTS ARE WITHOUT A PREAMP.

THE FOLLOWING ARE WITH A 26.2 dB PREAMP:

745.46	4.68	21.7	2.7	29	9	H --	55.8
745.46	23.1	21.7	2.7	47.4	27.4	V --	55.8
851.95	11.45	22.9	2.9	37.2	17.2	V --	55.8
851.95	7.9	22.9	2.9	33.6	13.6	H --	55.8

NOISE FLOOR MEASUREMENTS:

958.46	5.85	24.5	3.1	33.4	13.4	H --	55.8
--------	------	------	-----	------	------	------	------

RES BW AND VIDEO BW RESET TO 1 MHZ

1064.9	6.3	24.7	3.3	34.3	14.3	H --	54
1064.9	4.7	24.7	3.3	32.7	12.7	V --	54
1171.4	-2.25	25.2	3.4	28.4	8.4	V --	54
1171.4	6.65	25.2	3.4	35.3	15.3	H --	54
1277.9	5.1	25.7	3.6	34.4	14.4	H --	55.8
1277.9	5.35	25.7	3.6	34.6	14.6	V --	55.8
1384.4	5.85	26.2	3.8	35.8	15.8	V --	54
1384.4	4.35	26.2	3.8	34.3	14.3	H --	54
1490.9	4.95	26.7	3.9	35.5	15.5	H --	54
1490.9	6.3	26.7	3.9	36.9	16.9	V --	54
1597.4	5.65	27.2	4.1	37	17	V --	54
1597.4	4.95	27.2	4.1	36.3	16.3	H --	54
1703.9	5.25	27.8	4.3	37.3	17.3	H --	54
1703.9	4.15	27.8	4.3	36.2	16.2	V --	54
1810.4	6.45	28.4	4.4	39.2	19.2	V --	55.8
1810.4	7.2	28.4	4.4	40	20	H --	55.8
1917.0	5.55	29	4.5	39	19	H --	55.8
1917.0	6.05	29	4.5	39.5	19.5	V --	55.8
2023.5	5.4	29.4	4.7	39.5	19.5	V --	55.8
2023.5	5.6	29.4	4.7	39.7	19.7	H --	55.8
2130.0	4.55	29.6	4.8	39	19	V --	55.8
2130.0	3.7	29.6	4.8	38.1	18.1	H --	55.8
2236.5	5.15	29.7	5	39.8	19.8	H --	54
2343.0	6.4	29.9	5.1	41.4	21.4	H --	54

T U V P R O D U C T S E R V I C E

RADIATED EMISSIONS

Large Test Site
 3 Meter Antenna Distance
 Equipment Under Test:
 ITI
 ADVENT WIRELESS TRANSCEIVER 55-756
 Notes: TRANSMIT MEASUREMENTS

Report W9420 Run 4
 Date 08-26-99 Page 2
 Engineer
 Tech: JCS
 Requester

Frequency MHz	Level dBuV	Factor dB	Cable dB	Peak dBuV/m	Ave dBuV/m	Polar\ Height	15.231 Limit dBuV/m
2449.5	4.95	30	5.2	40.2	20.2	H --	55.8
2556.0	6.9	30.2	5.3	42.5	22.5	H --	55.8
2662.5	6.3	30.5	5.5	42.2	22.2	H --	54
2769.0	6.2	30.7	5.6	42.5	22.5	H --	54
2875.5	7.4	30.9	5.7	44	24	H --	54
2982.0	4.4	31.2	5.8	41.4	21.4	H --	55.8
3088.5	6.05	31.7	5.9	43.7	23.7	H --	55.8

RES BW = 100 kHz

NO PREAMP:

212.94	49.8	12	1.3	63.1	43.1	H --	55.8
212.94	57.55	12	1.3	70.9	50.9	V --	55.8

NO OTHER TRANSMITTER HARMONICS OR SPURIOUS SIGNALS DETECTED 30 MHz TO 3000 MHz

T U V P R O D U C T S E R V I C E

RADIATED EMISSIONS

Large Test Site
 3 Meter Antenna Distance
 Equipment Under Test:
 ITI
 ADVENT WIRELESS TRANSCEIVER 55-756
 Notes: TRANSMIT MEASUREMENTS

Figure _____

Report W9420 Run 4
 Date 08-26-99 Page 3
 Engineer _____
 Tech: JCS _____
 Requester _____

Measurement Summary

Frequency MHz	----- Final dBuV/m	----- uV/m	Azimuth deg	Polar\ Height	Delta 15.231	Delta
212.94	50.9	350.75	--	V --	-4.9	
319.44	62.4	1318.2	--	H --	-13.4	
425.95	45.3	184.07	--	H --	-10.5	
532.45	45.2	181.97	--	V --	-10.6	
638.96	37.2	72.443	--	V --	-8.8	
745.46	27.4	23.442	--	V --	-28.4	
851.95	17.2	7.2243	--	V --	-38.6	
958.46	13.4	4.6773	--	H --	-42.4	
1064.9	14.3	5.188	--	H --	-39.7	
1171.4	15.3	5.8210	--	H --	-38.7	
1277.9	14.6	5.3703	--	V --	-41.2	
1384.4	15.8	6.1659	--	V --	-38.2	
1490.9	16.9	6.9984	--	V --	-37.1	
1597.4	17	7.0794	--	V --	-37	
1703.9	17.3	7.3282	--	H --	-36.7	
1810.4	20	10	--	H --	-35.8	
1917.0	19.5	9.4406	--	V --	-36.3	
2023.5	19.7	9.6605	--	H --	-36.1	
2130.0	19	8.9125	--	V --	-36.8	
2236.5	19.8	9.7723	--	H --	-34.2	
2343.0	21.4	11.748	--	H --	-32.6	
2449.5	20.2	10.232	--	H --	-35.6	
2556.0	22.5	13.335	--	H --	-33.3	
2662.5	22.2	12.882	--	H --	-31.8	
2769.0	22.5	13.335	--	H --	-31.5	
2875.5	24	15.848	--	H --	-30	
2982.0	21.4	11.748	--	H --	-34.4	
3088.5	23.7	15.310	--	H --	-32.1	

File W9420 Run 4

T U V P R O D U C T S E R V I C E

RADIATED EMISSIONS

Large Test Site
 3 Meter Antenna Distance
 Equipment Under Test:
 ITI
 ADVENT WIRELESS TRANSCEIVER 55-756
 Notes: RECEIVE MEASUREMENTS

Report W9420 Run 3
 Date 08-26-99 Page 1
 Engineer _____
 Tech: JCS _____
 Requester _____

Frequency MHz	Level dBuV	Factor dB	Cable dB	Final dBuV/m	Az deg	Polar\ Height	Delta FCC B	Delta

0 CW, VERT ANT HT = 1 M								
48.006	5.9	11.2	.6	17.7	--	V --	-22.3	
48.006	5.9	11.2	.6	17.7	--	V --	-22.3	
50.042	4.9	11	.6	16.5	--	V --	-23.5	
56.03	10.75	10.3	.6	21.7	--	V --	-18.3	
64.028	6.35	9.1	.7	16.1	--	V --	-23.9	
84.009	5.5	7.8	.8	14.1	--	V --	-25.9	
56 MHZ MAXED AT 290 CW, VERT ANT HT = 1 M								
56.03	11.62	10.3	.6	22.5	--	V --	-17.5	
205 MHZ MAXED AT 149 DEGREES CW, VERT ANT HT MAXED AT 1 M								
205.87	17.72	12.2	1.3	31.2	--	H --	-12.3	
205.87	11.1	12.2	1.3	24.6	--	V --	-18.9	
308 MHZ MAXED AT 220 CW, HOR ANT HT MAXED AT 1 M								
308.80	21.78	16.2	1.6	39.6	--	H --	-6.4	
308.80	11.81	16.2	1.6	29.7	--	V --	-16.3	
411.74	4	16.7	1.9	22.6	--	H --	-23.4	
411.74	4.15	16.7	1.9	22.7	--	H --	-23.3	
411.74	3.04	16.7	1.9	21.6	--	V --	-24.4	
514.67	1.35	19.3	2.2	22.8	--	V --	-23.2	
514.67	3.5	19.3	2.2	24.9	--	H --	-21.1	

NO FURTHER SIGNIFICANT EUT EMISSIONS DETECTED 30 MHZ TO 1000 MHZ, VERT/HOR AN

T U V P R O D U C T S E R V I C E

RADIATED EMISSIONS

Large Test Site
 3 Meter Antenna Distance
 Equipment Under Test:
 ITI
 ADVENT WIRELESS TRANSCEIVER 55-756
 Notes: RECEIVE MEASUREMENTS

Figure _____

Report W9420 Run 3
 Date 08-26-99 Page 2
 Engineer _____
 Tech: JCS _____
 Requester _____

Measurement Summary

Frequency MHz	----- Final dBuV/m	----- uV/m	Azimuth deg	Polar\ Height	Delta FCC B	Delta
48.006	17.7	7.6736	--	V --	-22.3	
50.042	16.5	6.6834	--	V --	-23.5	
56.03	22.5	13.335	--	V --	-17.5	
64.028	16.1	6.3826	--	V --	-23.9	
84.009	14.1	5.0699	--	V --	-25.9	
205.87	31.2	36.307	--	H --	-12.3	
308.80	39.6	95.499	--	H --	-6.4	
411.74	22.7	13.645	--	H --	-23.3	
514.67	24.9	17.579	--	H --	-21.1	

Minimum Passing Margin for FCC B is 6.4 dB at 308.80 MHz

File W9420 Run 3

CONDUCTED EMISSIONS ON ADVENT TRANSCEIVER

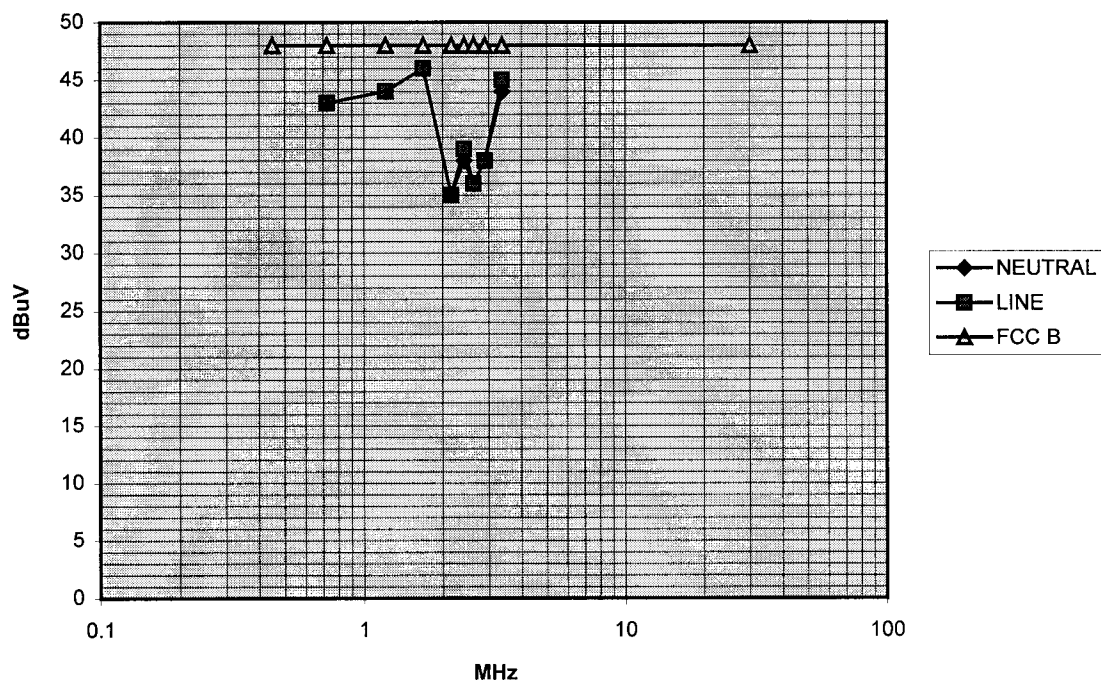
TEST REPORT #W9420

DATE 22 MARCH 1999

MHz	dBuV NEUTRAL	dBuV LINE	spec limit FCC B	margin-dB FCC B
0.45			48	48
0.725	43	43	48	5
1.21	44	44	48	4
1.69	46	46	48	2
2.16	35	35	48	13
2.42	38	39	48	9
2.63	36	36	48	12
2.9	38	38	48	10
3.38	44	45	48	3
30			48	48

QUASI-PEAK - 60 HZ - 115 VAC

QUASI-PEAK CONDUCTED EMISSIONS ON ADVENT TRANSCEIVER



Interactive Technologies Inc**3.1.2 Supervisory Calculation [§15.231(a)(3)]**

As permitted, this device will transmit three packets for supervision purposes. The inter-packet delay is a random time between 100 mS and 450 mS. The packet itself may be as long as 30 ms depending on the data sent. The longest time to conclude a supervisory transmission is then:

$$3 * 30 \text{ mS} + 2 * 450 \text{ mS} = 990 \text{ mS}$$

3.1.3 Duty Cycle Correction Factor [§15.231(b)(2) and §15.35(c)]

The transmitter employs amplitude modulation and transmits 64 bits. Each bit, except for one, has an "ON" time of 122 μ S. One bit has an on time of 366 μ S. The total on time of a single packet is:

$$64 * 122 \mu\text{S} + 366 \mu\text{S} = 8.174 \text{ mS.}$$

Only one packet is sent in any given 100 mS window for a duty cycle correction factor of:
 $20 * \text{LOG}(8.174/100) = -21.75 \text{ dB}$

The maximum allowed correction factor is 20 dB.

MAR Δ 37 KHz
.80 JB

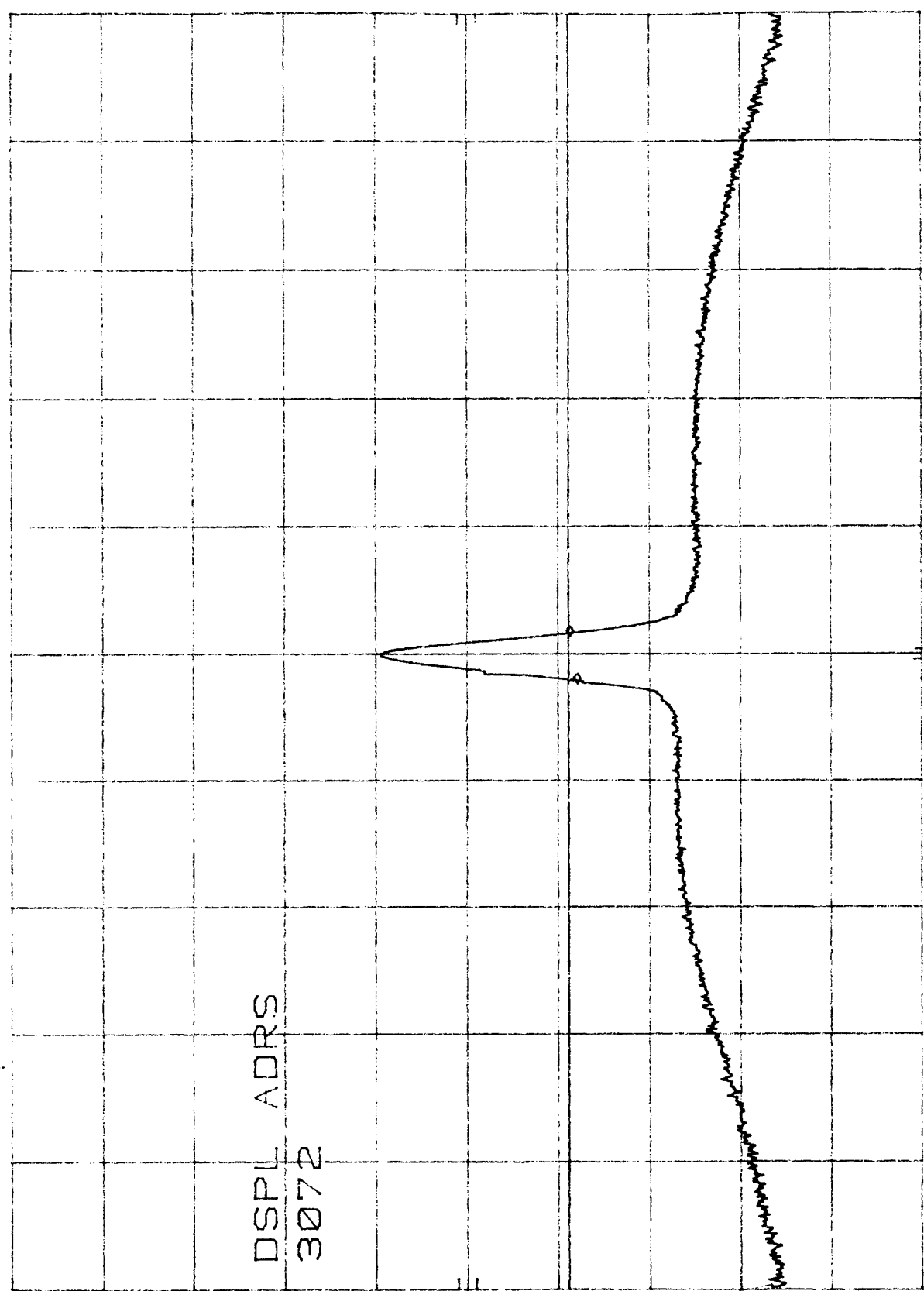
REF 107.0 dBμV ATTEN 10 JB

70

10 dB/

DSPL ADRS
3072

DL 45.8
dBμV



SPAN 1.000 MHz
SWP 30 msec

VBW 10 KHz

CENTER 319.512 MHz
RES BW 10 KHz

Appendix B

Constructional Data Form

and

Product Information Form(s)

Constructional Data Form

Not Applicable

PRODUCT INFORMATION FORM

NOTE: It is required to complete both 1) a Product Information Form for each unit under test and 2) a Constructional Data Form for each system tested as outlined in the enclosed instructions.

*** Please show the exact spelling [including spacing, capitalization, etc] as you want shown on the After Test Documentation.**

***Company Name** Interactive Technologies Inc

***Company Address** 2266 North 2nd Street
North St Paul MN. 55109

Customer Representatives G. Gray

***Equipment Description** Advent Wireless Transceiver
55-756

***Model Number** 60-821-95 ***Serial Number** X2

Type of Test

☐ Development
☒ Initial Design Verification
☐ Design Change (Please describe exact changes below)
☐ Production Sample (Audit Test)
☐

Changes Made

Oscillator Frequencies 106.5 MHz
102.9 MHz
10.7 MHz

Power Interface		Power Supply	
Frequency	<u>60 Hz</u>	Description	<u>24 VAC</u>
Voltage	<u></u>	Manufacturer	<u>TX</u>
# of Phases	<u>1</u>	Model Number	<u></u>
Current	<u>5 amps</u>	Switching Freq	<u></u>

Power Cable

☐ Hardwired	☐ Flexible
☐ Shielded	☐ Unshielded
☐ Attached	☒ Removable

Power Line Filter

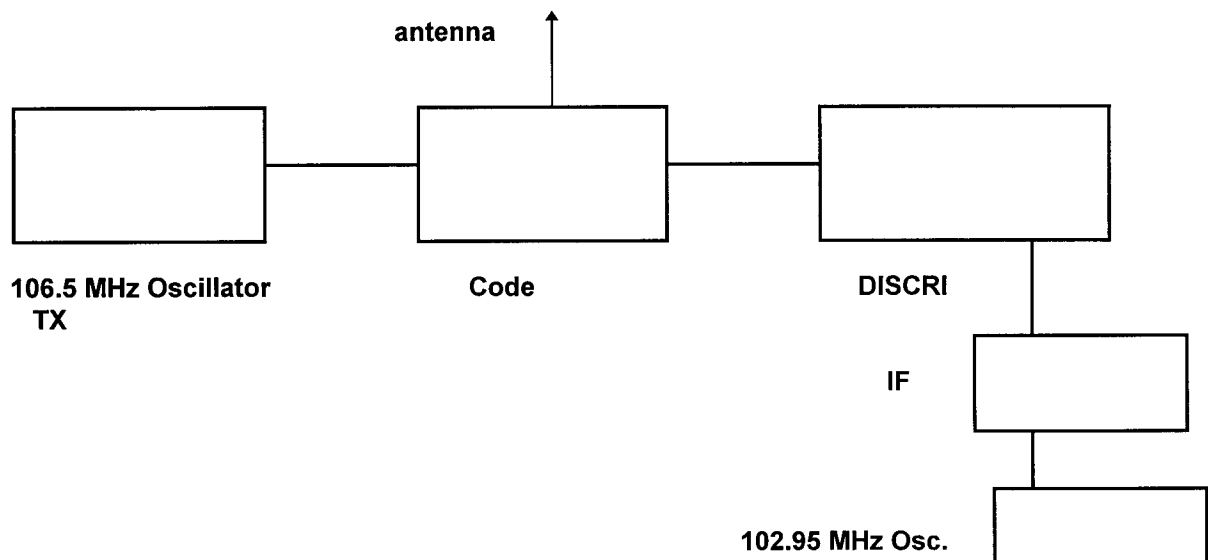
Manufacturer None Model Number

Cabinet Shielding Provision: None.**Software and/or Operating Modes: Transmit and Receive @ 319.5 MHz****Interfacing Equipment or Simulators**

Description	Model Number	Serial Number	FCC ID#
None			

I/O Cables

Function	Length (meters)	Shielded	Analog/Digital	Active During Test
Power + 12 VDC	1	N	A	Y
GND	1	N	A	Y
BUS	1	N	A	Y
BUS	1	N	A	Y
BUS	1	N	A	Y
BUS	1	N	A	Y

Block Diagram:

Interactive Technologies Inc**3. Lab Measurements Discussion / Test Notes****3.1 Test Notes**

3.1.1 Transmissions shall cease within 5 seconds of activation [§15.231(a)(2)]

In the event of a smoke alarm, 8 packets are sent in the transmission. The packet duration is, at most, 30 mS, see **Duty Cycle Correction Factor** [§15.231(b)(2) and §15.35(c)]. The time between packets random between 100 mS and 450 mS so the length of the longest transmission is:

$$8*30\text{mS} + 7*450\text{mS} = 3.39 \text{ seconds.}$$

So long as the fire alarm condition is present, the device will re-transmit every minute as allowed in §15.231(a)(4).

The following plot shows an 8-packet transmission that concludes in less than 5 seconds.

Appendix C

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ± 4.5 dB. The equipment comprising the test systems are calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit.

To convert between dB μ V and μ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

RADIATED EMISSIONS

The final level, expressed in dB μ V/m, is arrived at by taking the reading from the spectrum analyzer (Level dB μ V) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has the FCC limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment B. The amplifier gain is automatically accounted for by using an analyzer offset.

Example:

Frequency (MHz)	Level (dB μ V)	+	Factor & Cable (dB)	=	Final (dB μ V/m)	-	FCC Limit (dB μ V/m)	=	Delta FCC (dB)
32.21	13.9	+	16.3	=	30.2	-	40.0	=	-9.8

DETAILS OF TEST PROCEDURES**General Standard Information**

The test methods used comply with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 60 Hz power interface of the EUT are measured in the frequency range of 450 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. Intentional radiators are rotated through three orthogonal axes to determine the attitude that maximizes the emissions.