FCC PART 15, SUBPART B and C
TEST REPORT

for

TRANSCEIVER

MODEL: VIRTUAL CABLE

Prepared for

PENTAIR POOL PRODUCTS
10951 WEST LOS ANGELES AVENUE
MOORPARK, CALIFORNIA 93021

Prepared by:_____

MICHAEL CHRISTENSEN

Approved by:_____

KYLE FUJIMOTO

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: MARCH 7, 2003

	REPORT BODY	APPENDICES					TOTAL
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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Device Tested: Transceiver
Model: Virtual Cable
S/N: N/A

Product Description: See Expository Statement.

Modifications: The EUT was not modified during the testing.

Manufacturer: Pentair Pool Products
10951 West Los Angeles Avenue
Moorpark, California 93021

Test Dates: February 11 and 12, 2003

Test Specifications: EMI requirements
CFR Title 47, Part 15 Subpart B; and Subpart C, Sections 15.205, 15.207, 15.209, and 15.249

Test Procedure: ANSI C63.4: 1992

Test Deviations: The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz	Complies with the Class B limits of CFR Title 47, Part 15, Subpart B; and Subpart C, section 15.207 Highest Reading in Relation to Spec Limit: 41.46 dBµV @ 0.638 MHz (*U_c = 0.27 dB)
2	Radiated RF Emissions, 10 kHz - 9166 MHz	Complies with the Class B limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.249

*U_c = combined standard uncertainty

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Transceiver Model: Virtual Cable. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the Class B specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.249.

Note: For Conducted Emissions, the limits are based on the new amended FCC rules mandated by FCC document 02-157.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Pentair Pool Products

Kevin Murphy Engineer

Compatible Electronics, Inc.

Kyle Fujimoto Test Engineer
Michael Christensen Test Engineer

2.4 Date Test Sample was Received

The test sample was received on February 10, 2003.

2.5 Disposition of the Test Sample

The sample has not been returned to Pentair Pool Products as of March 7, 2003.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
U_c	Combined Standard Uncertainty

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
CFR Title 47, Subpart C	FCC Rules – Radio frequency devices – Intentional Radiators
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.
EN 55022: 1998	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
CISPR 22: 1997	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

The Transceiver Model: Virtual Cable (EUT) was connected to a pool/ spa controller system via its power/ signal port. The EUT was tested in a continuous transmit mode as well as a continuous receive mode.

The final radiated as well as conducted data was taken in the modes above. Please see Appendix D for the data sheets.

4.1.1 Cable Construction and Termination

Cable 1 This is a 1 meter unshielded cable connecting the EUT to the controller. The cable is hard wired at both ends.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
TRANSCEIVER (EUT)	PENTAIR POOL PRODUCTS	VIRTUAL CABLE	N/A	**P4HVIRTUALCABLE**
POOL/ SPA CONTROL SYSTEM	PENTAIR POOL PRODUCTS	i9+3	N/A	**N/A**

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Radiated Emissions Manual Test – Radiated	Compatible Electronics	N/A	N/A	N/A	N/A
Conducted Emissions Program	Compatible Electronics	N/A	N/A	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08784	June 14, 2002	June 14, 2003
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	3701A22279	June 14, 2002	June 14, 2003
Spectrum Analyzer – Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	June 14, 2002	June 14, 2003
Preamplifier	Com Power	PA-102	1017	January 2, 2003	January 2, 2004
Biconical Antenna	Com Power	AB-100	01548	September 19, 2002	September 19, 2003
Log Periodic Antenna	Com Power	AL-100	16089	October 4, 2002	October 4, 2003
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
Loop Antenna	Com-Power	AL-130	17070	June 19, 2002	June 19, 2003
Horn Antenna	Antenna Research	DRG-118/A	1053	January 13, 2002	January 13, 2004
Microwave Preamplifier	Com-Power	PA-122	25195	January 2, 2003	January 2, 2004

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was only grounded via the controller's power cord.

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4: 1992. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics conducted emissions software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

7.2 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 GHz. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps.

For the peak readings below 1000 MHz that were within 3 dB of the spec limit or higher, the quasi-peak adapter was used.

For the peak readings above 1000 MHz that were within 3dB of the spec limit or higher, the readings were averaged manually by narrowing the video filter down to 10 Hz and slowing the sweep time to keep the amplitude reading calibrated.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 9.2 GHz	1 MHz	Horn Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 1992. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results. The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.

Radiated Emissions (Spurious and Harmonics) Test (con't)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data. The final qualification data sheets are located in Appendix D.

8. CONCLUSIONS

The Transceiver Model: Virtual Cable meets all of the Class B specification limits defined in CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.249.

APPENDIX A

LABORATORY RECOGNITIONS

LABORATORY RECOGNITIONS

Compatible Electronics has the following agency accreditations:

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

Compatible Electronics is recognized or on file with the following agencies:

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.249 specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Transceiver
Model: Virtual Cable
S/N: N/A

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

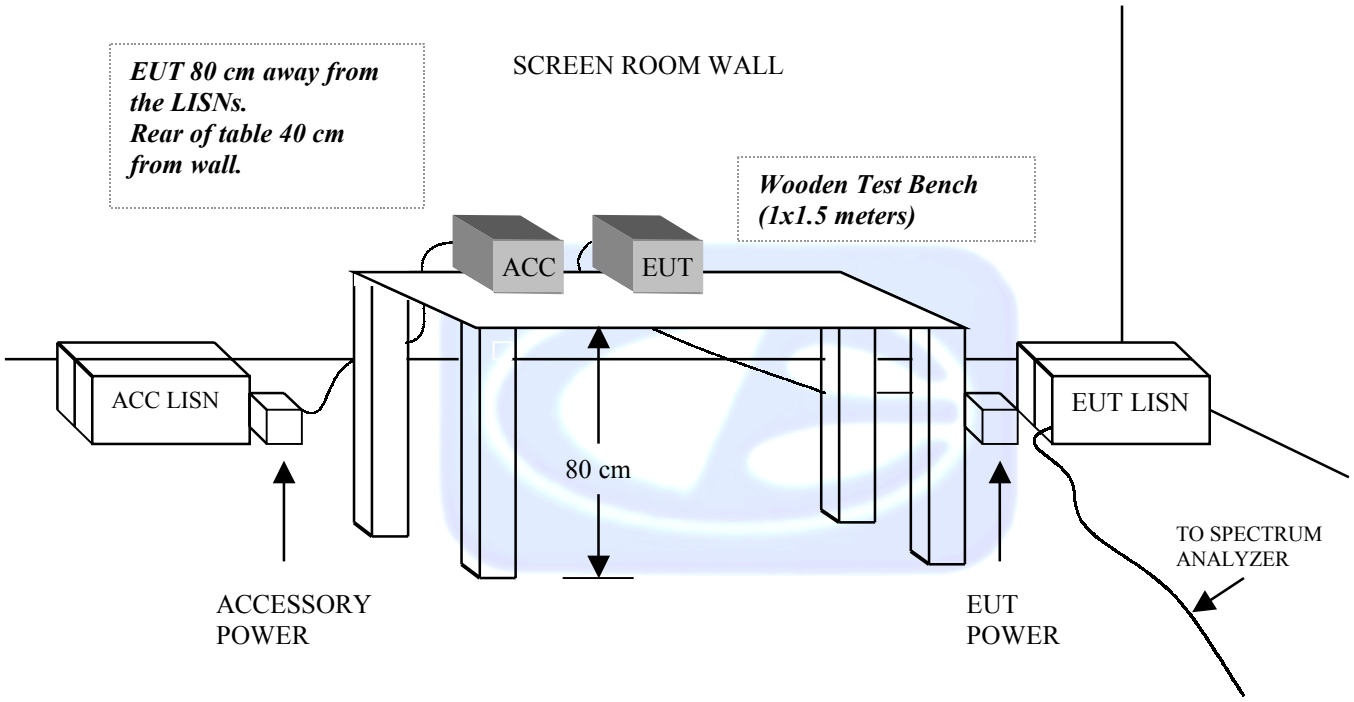
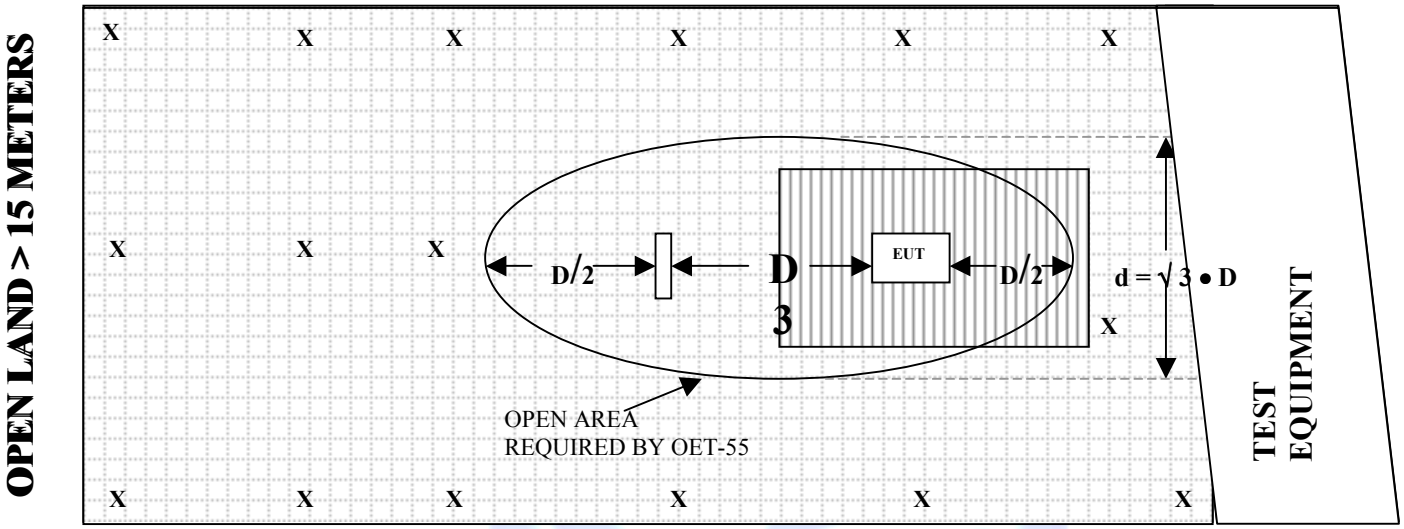


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS

X	= GROUND RODS
	= GROUND SCREEN
D	= TEST DISTANCE (meters)
	= WOOD COVER

COM-POWER AB-100

BICONICAL ANTENNA

S/N: 01548

CALIBRATION DATE: SEPTEMBER 19, 2002

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	14.30	120	10.70
35	14.00	125	11.40
40	13.70	140	12.70
45	12.00	150	12.50
50	11.40	160	12.90
60	9.70	175	14.10
70	8.30	180	14.70
80	7.60	200	15.10
90	7.80	250	16.90
100	8.60	300	19.10

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16089

CALIBRATION DATE: OCTOBER 4, 2002

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	13.10	700	17.70
350	14.40	750	19.60
400	14.30	800	20.50
450	15.70	850	21.20
500	16.60	900	21.20
550	16.60	950	22.50
600	17.30	1000	24.60
650	18.80		

COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 2, 2003

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.5	300	38.5
40	38.5	350	38.4
50	38.5	400	38.2
60	38.5	450	37.8
70	38.5	500	38.0
80	38.5	550	38.2
90	38.3	600	38.2
100	38.3	650	38.0
125	38.6	700	38.1
150	38.5	750	37.7
175	38.4	800	37.4
200	38.5	850	37.9
225	38.5	900	37.2
250	38.4	950	36.8
275	38.4	1000	37.3

COM-POWER PA-122

MICROWAVE PREAMPLIFIER

S/N: 25195

CALIBRATION DATE: JANUARY 2, 2003

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	33.7	9.5	31.8
1.1	33.4	10.0	32.2
1.2	33.1	11.0	31.4
1.3	33.1	12.0	30.2
1.4	33.2	13.0	32.9
1.5	32.5	14.0	33.9
1.6	32.7	15.0	32.4
1.7	32.3	16.0	32.2
1.8	32.3	17.0	31.5
1.9	31.4	18.0	32.2
2.0	32.8	19.0	31.2
2.5	33.3	20.0	31.3
3.0	31.7	21.0	31.7
3.5	31.6	22.0	29.7
4.0	31.2		
4.5	31.2		
5.0	31.0		
5.5	31.3		
6.0	32.1		
6.5	32.1		
7.0	31.8		
7.5	32.0		
8.0	33.1		
8.5	32.0		
9.0	30.8		

ANTENNA RESEARCH DRG-118/A

HORN ANTENNA

S/N: 1053

CALIBRATION DATE: JANUARY 13, 2002

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	25.5	9.5	39.1
1.5	26.6	10.0	39.7
2.0	29.4	10.5	40.9
2.5	30.4	11.0	40.7
3.0	31.2	11.5	42.4
3.5	32.3	12.0	42.6
4.0	32.9	12.5	42.4
4.5	33.0	13.0	41.5
5.0	34.8	13.5	41.0
5.5	35.2	14.0	40.5
6.0	36.4	14.5	43.6
6.5	36.6	15.0	43.7
7.0	38.8	15.5	43.3
7.5	38.8	16.0	42.8
8.0	38.0	16.5	43.0
8.5	38.1	17.0	42.7
9.0	39.9	17.5	44.0
		18.0	41.8

COM-POWER AL-130

LOOP ANTENNA

S/N: 17070

CALIBRATION DATE: JUNE 19, 2002

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-40.4	11.1
0.01	-40.3	11.2
0.02	-41.2	10.3
0.05	-41.6	9.9
0.07	-41.4	10.1
0.1	-41.7	9.8
0.2	-44.0	7.5
0.3	-41.6	9.9
0.5	-41.3	10.2
0.7	-41.4	10.1
1	-40.9	10.6
2	-40.6	10.9
3	-40.5	11.0
4	-40.8	10.7
5	-40.2	11.3
10	-40.7	10.8
15	-41.4	10.1
20	-41.6	9.9
25	-41.7	9.8
30	-42.9	8.6

FRONT VIEW

PENTAIR POOL PRODUCTS
TRANSCEIVER
MODEL: VIRTUAL CABLE
FCC SUBPART B AND C - RADIATED EMISSIONS – 02-11-03 and 02-12-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

PENTAIR POOL PRODUCTS
TRANSCEIVER
MODEL: VIRTUAL CABLE
FCC SUBPART B AND C - RADIATED EMISSIONS – 02-11-03 and 02-12-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

PENTAIR POOL PRODUCTS
TRANSCEIVER
MODEL: VIRTUAL CABLE
FCC SUBPART B AND C - CONDUCTED EMISSIONS – 02-12-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

PENTAIR POOL PRODUCTS
TRANSCEIVER
MODEL: VIRTUAL CABLE
FCC SUBPART B AND C - CONDUCTED EMISSIONS – 02-12-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

Page: 1 of 1

Test location: Compatible Electronics
Customer : Robin Viola Date : 2/12/2003
Manufacturer : Pentair Pool Products Time : 8.46
EUT name : Transceiver
Model : Virtual Cable
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor(20*log(test/spec)) : 0.00
Test Mode : RADIATED SPURIOUS EMISSIONS
VERTICAL AND HORIZONTAL POLARIZATION
30 MHz TO 300 MHz
TESTED BY: KIRIT RAMANI

Pol	Freq	Rdng	Cable loss	Ant factor	Amp gain	Cor'd rdg = R	limit = L	Delta R-L
	MHz	dBuV	dB	dB	dB	dBuV	dBuV/m	dB
1V	32.08	50.20	0.84	14.18	38.40	26.82	40.00	-13.18
2V	64.08	49.70	1.48	9.13	38.40	21.91	40.00	-18.09
3V	128.08	53.30	2.02	11.67	38.40	28.59	43.50	-14.91
4V	160.08	46.80	2.36	12.91	38.32	23.75	43.50	-19.75
5H	32.08	51.30	0.84	14.18	38.40	27.92	40.00	-12.08
6H	64.09	45.20	1.48	9.13	38.40	17.41	40.00	-22.59
7H	160.08	45.70	2.36	12.91	38.32	22.65	43.50	-20.85
8H	128.06	45.40	2.02	11.67	38.40	20.69	43.50	-22.81

Page: 1 of 1

Test location: Compatible Electronics
Customer : Robin Viola Date : 2/11/2003
Manufacturer : Pentair Pool Products Time : 16.45
EUT name : Transceiver
Model : Virtual Cable
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor(20*log(test/spec)) : 0.00
Test Mode : RADIATED SPURIOUS EMISSIONS
VERTICAL POLARIZATION
300 MHz TO 9200 MHz
TESTED BY: KIRIT RAMANI

Pol	Freq	Rdng	Cable loss	Ant factor	Amp gain	Cor'd rdg = R	limit = L	Delta R-L
	MHz	dBuV	dB	dB	dB	dBuV	dBuV/m	dB
1V	416.07	42.40	3.86	14.75	38.17	22.84	46.00	-23.16
2V	384.05	42.50	3.74	14.33	38.30	22.27	46.00	-23.73
3V	352.05	42.50	3.61	14.40	38.30	22.20	46.00	-23.80
4V	320.06	41.40	3.42	13.62	38.30	20.14	46.00	-25.86
5V	448.10	42.50	3.99	15.65	37.92	24.22	46.00	-21.78
6V	512.08	42.10	4.40	16.60	38.12	24.98	46.00	-21.02
7H	352.09	42.40	3.61	14.40	38.30	22.10	46.00	-23.90
8H	384.09	44.00	3.74	14.33	38.30	23.77	46.00	-22.23
9H	416.04	42.70	3.86	14.75	38.17	23.14	46.00	-22.86
10H	448.04	42.60	3.99	15.65	37.92	24.32	46.00	-21.68
11H	512.08	42.00	4.40	16.60	38.12	24.88	46.00	-21.12

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	**Pentair Pool Products**	**DATE**	**2/11/03**
EUT	**Pool/Spa Control System**	**DUTY CYCLE**	**N/A %**
MODEL	**Intelli Touch**	**PEAK TO AVG**	**N/A dB**
S/N	**N/A**	**TEST DIST.**	**3 Meters**
TEST ENGINEER	**Kirit Ramani**	**LAB**	**D**

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
916.5790	89.3	A	H	1.0	45	X	LOW	21.6	5.7	37.2	0.0	0.0	**79.5**	**-14.5**	**94.0**	
916.5790	100.3	100.2 A	H	1.0	270	Y	LOW	21.6	5.7	37.2	0.0	0.0	**90.4**	**-3.6**	**94.0**	
916.5790	97.2	A	H	1.0	180	Z	LOW	21.6	5.7	37.2	0.0	0.0	**87.4**	**-6.6**	**94.0**	
916.5790	100.7	100.4 A	V	1.0	180	X	LOW	21.6	5.7	37.2	0.0	0.0	**90.6**	**-3.4**	**94.0**	
916.5790	93.3	A	V	1.0	180	Y	LOW	21.6	5.7	37.2	0.0	0.0	**83.5**	**-10.5**	**94.0**	
916.5790	91.6	A	V	1.3	135	Z	LOW	21.6	5.7	37.2	0.0	0.0	**81.8**	**-12.2**	**94.0**	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	**Pentair Pool Products**	**DATE**	**2/11/03**
EUT	**Pool/Spa Control System**	**DUTY CYCLE**	**N/A %**
MODEL	**Intelli Touch**	**PEAK TO AVG**	**N/A dB**
S/N	**N/A**	**TEST DIST.**	**3 Meters**
TEST ENGINEER	**Kirit Ramani**	**LAB**	**D**

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
1833.1580	45.1	A	H	1.0	180	X	LOW	28.5	2.5	32.4	0.0	0.0	**43.6**	**-10.4**	**54.0**	
1833.1580	44.1	A	H	1.0	180	Y	LOW	28.5	2.5	32.4	0.0	0.0	**42.6**	**-11.4**	**54.0**	
1833.1580	43.3	A	H	1.0	90	Z	LOW	28.5	2.5	32.4	0.0	0.0	**41.8**	**-12.2**	**54.0**	
1833.1580	43.8	A	V	1.3	180	X	LOW	28.5	2.5	32.4	0.0	0.0	**42.3**	**-11.7**	**54.0**	
1833.1580	43.8	A	V	1.0	90	Y	LOW	28.5	2.5	32.4	0.0	0.0	**42.3**	**-11.7**	**54.0**	
1833.1580	45.1	A	V	1.0	225	Z	LOW	28.5	2.5	32.4	0.0	0.0	**43.6**	**-10.4**	**54.0**	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	**Pentair Pool Products**	**DATE**	**2/11/03**
EUT	**Pool/Spa Control System**	**DUTY CYCLE**	**N/A %**
MODEL	**Intelli Touch**	**PEAK TO AVG**	**N/A dB**
S/N	**N/A**	**TEST DIST.**	**3 Meters**
TEST ENGINEER	**Kirit Ramani**	**LAB**	**D**

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2749.7370	41.1	A	H	1.0	180	X	LOW	30.8	4.0	31.2	0.0	0.0	**44.7**	**-9.3**	**54.0**	
2749.7370	40.1	A	H	1.0	135	Y	LOW	30.8	4.0	31.2	0.0	0.0	**43.7**	**-10.3**	**54.0**	
2749.7370	38.4	A	H	1.0	90	Z	LOW	30.8	4.0	31.2	0.0	0.0	**42.0**	**-12.0**	**54.0**	
2749.7370	38.9	A	V	1.0	180	X	LOW	30.8	4.0	31.2	0.0	0.0	**42.5**	**-11.5**	**54.0**	
2749.7370	39.1	A	V	1.5	180	Y	LOW	30.8	4.0	31.2	0.0	0.0	**42.7**	**-11.3**	**54.0**	
2749.7370	39.3	A	V	1.3	180	Z	LOW	30.8	4.0	31.2	0.0	0.0	**42.9**	**-11.1**	**54.0**	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

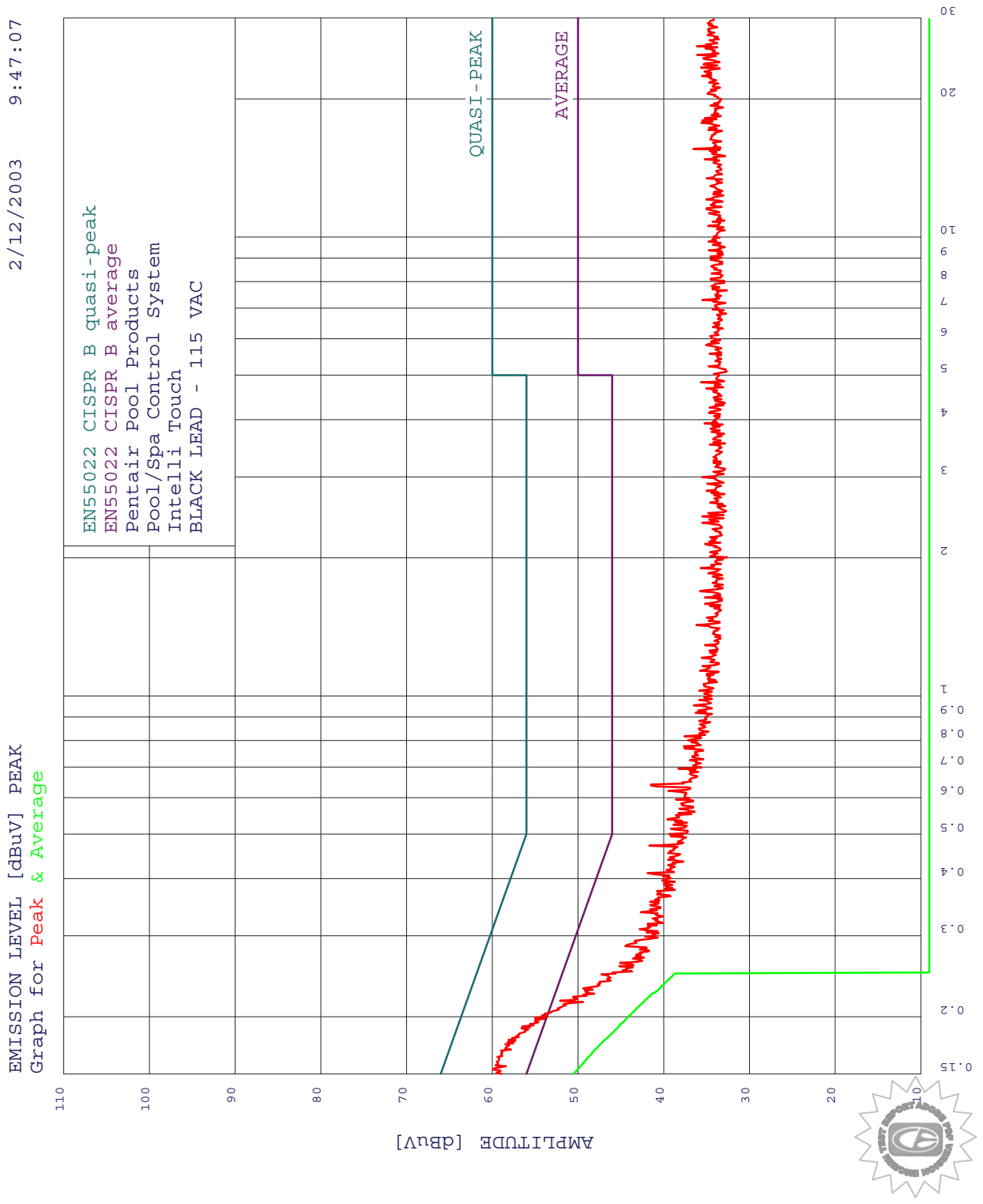
COMPANY	**Pentair Pool Products**	**DATE**	**2/11/03**
EUT	**Pool/Spa Control System**	**DUTY CYCLE**	**N/A %**
MODEL	**Intelli Touch**	**PEAK TO AVG**	**N/A dB**
S/N	**N/A**	**TEST DIST.**	**3 Meters**
TEST ENGINEER	**Kirit Ramani**	**LAB**	**D**

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
3666.3160	38.9	A	H	1.0	180	X	LOW	32.5	5.0	31.8	0.0	0.0	**44.7**	**-9.3**	**54.0**	
3666.3160	--	-- A	H	--	--	Y	LOW	32.5	5.0	31.8	0.0	0.0	--	--	--	**No Emission Found**
3666.3160	--	-- A	H	--	--	Z	LOW	32.5	5.0	31.8	0.0	0.0	--	--	--	**No Emission Found**
3666.3160	--	-- A	V	--	--	X	LOW	32.5	5.0	31.8	0.0	0.0	--	--	--	**No Emission Found**
3666.3160	--	-- A	V	--	--	Y	LOW	32.5	5.0	31.8	0.0	0.0	--	--	--	**No Emission Found**
3666.3160	--	-- A	V	--	--	Z	LOW	32.5	5.0	31.8	0.0	0.0	--	--	--	**No Emission Found**

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

No Harmonics Nor Emissions Found
After the 4th Harmoinic


2/12/2003 9:47:07
EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average
EN55022 CISPR B quasi-peak
EN55022 CISPR B average
Pentair Pool Products
Pool/Spa Control System
Intelli Touch
BLACK LEAD - 115 VAC
QUASI-PEAK
AVERAGE
AMPLITUDE [dBuV]
FREQUENCY [MHz]
110
100
90
80
70
60
50
40
30
20
10
30
20
10
9
8
7
6
5
4
3
2
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.15

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Pentair Pool Products
Pool/Spa Control System
Intelli Touch
Black Lead - 115 VAC
TEST ENGINEER : Kirit Ramani

7 highest peaks above -50.00 dB of AVERAGE limit line
Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.150	58.91	56.00	2.91*
2	0.638	41.46	46.00	-4.54
3	0.472	41.67	46.49	-4.81
4	0.411	41.88	47.63	-5.75
5	4.827	35.64	46.00	-10.36
6	15.566	36.53	50.00	-13.47
7	26.034	36.13	50.00	-13.87

* Please see the Average Readings on the Next Page and on the Plot

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Pentair Pool Products
Pool/Spa Control System
Intelli Touch
Black Lead - 115 VAC
TEST ENGINEER : Kirit Ramani

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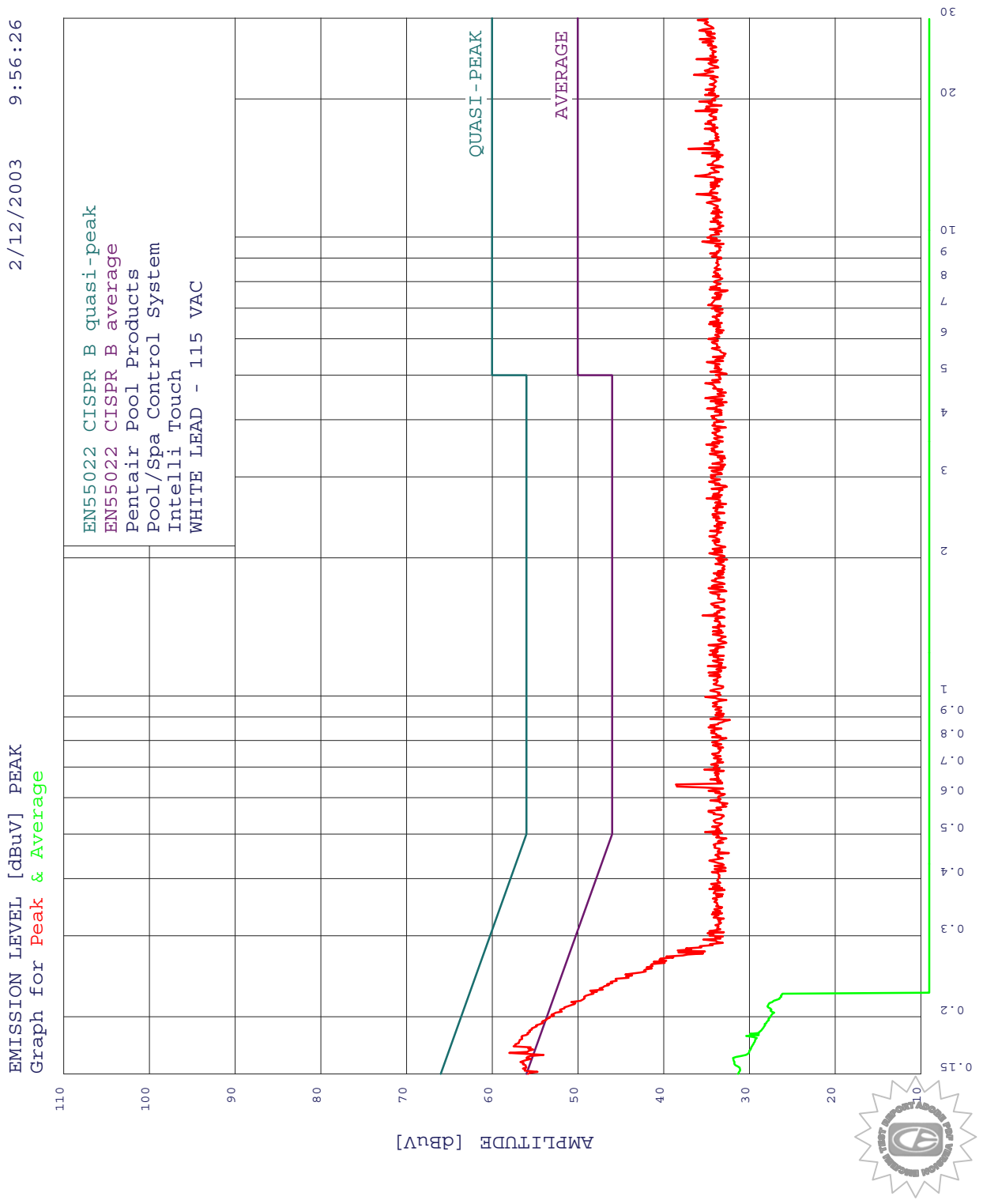
1 highest peaks above -50.00 dB of AVERAGE limit line
Peak criteria : 0.10 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.150	50.48	56.00	-5.52


2/12/2003 9:56:26
EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average
EN55022 CISPR B quasi-peak
EN55022 CISPR B average
Pentair Pool Products
Pool/Spa Control System
Intelli Touch
WHITE LEAD - 115 VAC
QUASI-PEAK
AVERAGE
AMPLITUDE [dBuV]
FREQUENCY [MHz]

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Pentair Pool Products
Pool/Spa Control System
Intelli Touch
White Lead - 115 VAC
TEST ENGINEER : Kirit Ramani

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8 highest peaks above -50.00 dB of AVERAGE limit line
Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.167	58.00	55.12	2.88*
2	0.150	55.82	56.00	-0.18*
3	0.641	38.56	46.00	-7.44
4	0.279	38.38	50.85	-12.47
5	15.566	37.12	50.00	-12.88
6	22.562	36.49	50.00	-13.51
7	13.570	36.34	50.00	-13.66
8	12.399	36.19	50.00	-13.81

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* Please see the Average Readings on the Next Page and on the Plot

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Pentair Pool Products
Pool/Spa Control System
Intelli Touch
White Lead - 115 VAC
TEST ENGINEER : Kirit Ramani

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6 highest peaks above -50.00 dB of AVERAGE limit line
Peak criteria : 0.10 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.163	31.90	55.33	-23.43
2	0.182	30.36	54.41	-24.04
3	0.184	29.91	54.32	-24.41
4	0.150	31.31	56.00	-24.69
5	0.211	27.89	53.18	-25.29
6	0.206	27.53	53.36	-25.83
