

EMC QUALIFICATION TEST REPORT

INOVONICS WIRELESS CORPORATION ES SERIAL TRANCEIVER, EN3942XS

TESTED TO CONFORM WITH:

Emissions Standards

for

INFORMATION TECHNOLOGY EQUIPMENT (ITE)

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Laboratory Director

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12/CIS11a - IEC/CISPR 11, edition 3.1 (1999-08)
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12/CIS22 - IEC/CISPR 22 (1997) and EN 55022 (1998) + A1 (2000)
12/CIS22a - IEC/CISPR 22 (1993) and EN 55022 (1994), Amendment 1:1995 & Amendment 2: 1996
12/CIS22b - CNS13438 (1997)
12/EM02a - IEC 61000-3-2, Edition 2.1 (2001-10) and EN 61000-3-2 (2000), and AS/NZS 2279.1 (2000)
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12/EMO2c - BS EN 61000-3-2, ED. 2 (2001); IEC 610003-2, ED. 2 (2000)
12/EM03 - ICE 61000-3-3 (1995); EN 61000-3-3 (1995); AS/NZS 2279.3 (1995)
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12/EM03c - ICE 61000-3-3 (1994) with Amendment 1 (2001)
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12/FCC15b - ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart B
12/T51 - AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997)
12/I01 - IEC 61000-4-2, Ed. 2.1 (2001), A1, A2; EN 61000-4-2
12/I02 - IEC 61000-4-3, Ed. 2.0 (2002-03); EN 61000-4-3 (2002)
12/I03 - IEC 61000-4-4 (1995), A1 (2002), A2 (2001); EN 61000-4-4
12/I04 - IEC 61000-4-5, Ed. 1.1 (2001-04); EN 61000-4-5
12/I05 - IEC 61000-4-6, Ed. 2.0 (2003-05); EN 61000-4-6
12/I06 - IEC 61000-4-8, Ed. 1.1 (2001); EN 61000-4-8
12/I07 - IEC 61000-4-11, Ed. 1.1 (2001-03); EN 61000-4-11

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EMC QUALIFICATION TEST REPORT ES SERIAL TRANSCEIVER, EN3942XS

1.0 EXECUTIVE SUMMARY

1.1 PURPOSE

The purpose of this report is to present EMC test data and demonstrate conformity to the requirements of the prescribed standards for Emissions and/or Immunity.

1.2 CONFORMITY

The test article was tested to the standards listed in Table I with the indicated conformity status. All test methods were performed in accordance to with the standards listed.

TABLE I. EMISSIONS CONFORMITY SUMMARY

TEST TYPE	COMPLIANCE STANDARD	TESTING TECHNIQUE	TEST DESCRIPTION	PRODUCT CLASSIFICATION	CONFORMITY STATUS
EMISSIONS	<u>FCC Part 15.109</u> <u>ICES-003</u>	<input checked="" type="checkbox"/> IEC/EN 55022	Unintentional Radiated Emissions	Class B	PASSED
EMISSIONS	<u>FCC Part 15.205</u> <u>15.207</u> <u>15.209</u> <u>15.247</u> <u>ICES-003</u>	<input checked="" type="checkbox"/> IEC/EN 55022	Intentional Radiated Emissions		PASSED

1.3 EQUIPMENT UNDER TEST (EUT)

EUT NAME: **ES SERIAL TRANSCEIVER**
EUT MODEL/PART NUMBER(S): **EN3942XS**
EUT SERIAL NUMBER(S): **UNINTENTIONAL RADIATED EMISSIONS UUT - S/N: 2609815**
INTENTIONAL RADIATED EMISSIONS UUT - S/N: 2609830

2.0 EMISSIONS TEST STANDARDS

FCC Part 15, Subpart B
ICES-003

Class B
Class B

2.1 UNINTENTIONAL RADIATED EMISSIONS – 30 MHZ TO 1000 MHZ

Measurements for *Radiated Emissions* were performed over the frequency range of 30 MHz to 1000 MHz in the horizontal and vertical antenna polarities to the requirements of:

FCC 15.109
ICES-003

Class B
Class B

Testing Conditions

Date of Test: April 11, 2007
Temperature: 29°C
Relative Humidity: 33%
Test Voltage: 6 VDC
Test Operator: lws

Test Location

Criterion Technology Open Area Test Site

Test Distance

Antenna Distance: 3 meter(s) **Final Measurement(s)**

Test Equipment

- Hewlett-Packard Spectrum Analyzer, HP 8566B Hewlett-Packard Quasi-Peak Adapter, HP 85650A
 Hewlett-Packard Tracking Generator, HP 85645A
 Rohde and Schwarz Receiver, ESHS-30 Rohde and Schwarz Receiver, ESVS-30
 Mini Circuits Pre-Amp #2 Veratech Pre-Amp #3
 Chase BiLog Antenna, Model 1121 Antenna Research, Horn Antenna, Model DRG118/A
 EMCO BiConical Antenna, Model 3108 EMCO Log Periodic Antenna, Model 3146

Test Results of Radiated Emissions

Test Status: **PASSED** Frequency Range: 30 MHz to 1000 MHz

Minimum Margin to Limit: **-23.01** dB at **83.1997** MHz

Remarks

See: **APPENDIX A** for EUT Photographs **APPENDIX B** for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.2 **INTENTIONAL RADIATOR – 1 GHZ – 10 GHZ**

Measurements for *Intentional Radiated Emissions* were performed over the frequency range of 1 GHz to 10 GHz and horizontal and vertical antenna polarities to the requirements of:

FCC Part 15.205, 15.207, 15.209, 15.247
ICES-003

Testing Conditions

Date of Test: July 3, 2007
Temperature: 31°C
Relative Humidity: 28%
Test Voltage: 6 VDC
Test Operator: lws

Test Location**Criterion Technology Open Area Test Site**Test Distance

Antenna Distance: **3 meter(s)** **Final Measurement(s)**

Test Equipment

- Hewlett-Packard Spectrum Analyzer, HP 8566B Hewlett-Packard Quasi-Peak Adapter, HP 85650A
- Hewlett-Packard Tracking Generator, HP 85645A
- Rohde and Schwarz Receiver, ESHS-30 Rohde and Schwarz Receiver, ESVS-30
- Mini Circuits Pre-Amp #2 Veratech Pre-Amp #3
- Chase BiLog Antenna, Model 1121 Antenna Research, Horn Antenna, Model DRG118/A
- EMCO BiConnical Antenna, Model 3108 EMCO Log Periodic Antenna, Model 3146
- EMCO Active Loop, 6502 EMCO Horn, 3160-08

Test Results of Radiated Emissions

Test Status: **PASSED** Frequency Range: 1 GHz to 10 GHz

Minimum Margin to Limit: **-3.40** dB at **8347.9307** MHz

Remarks

See: **APPENDIX A** for EUT Photographs **APPENDIX B** for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.3 **INTENTIONAL RADIATOR – 900 MHZ – 1000 MHZ**

Measurements for *Intentional Radiated Emissions* were performed over the frequency range of 900 MHz to 1000 MHz and horizontal and vertical antenna polarities to the requirements of:

FCC Part 15.205, 15.207, 15.209, 15.247
ICES-003

Testing Conditions

Date of Test: July 3, 2007
Temperature: 31°C
Relative Humidity: 28%
Test Voltage: 6 VDC
Test Operator: lws

Test Location**Criterion Technology Open Area Test Site**Test Distance

Antenna Distance: **3 meter(s)** **Final Measurement(s)**

Test Equipment

- Hewlett-Packard Spectrum Analyzer, HP 8566B Hewlett-Packard Quasi-Peak Adapter, HP 85650A
- Hewlett-Packard Tracking Generator, HP 85645A
- Rohde and Schwarz Receiver, ESHS-30 Rohde and Schwarz Receiver, ESVS-30
- Mini Circuits Pre-Amp #2 Veratech Pre-Amp #3
- Chase BiLog Antenna, Model 1121 Antenna Research, Horn Antenna, Model DRG118/A
- EMCO BiConical Antenna, Model 3108 EMCO Log Periodic Antenna, Model 3146
- EMCO Active Loop, 6502 EMCO Horn, 3160-08

Test Results of Radiated Emissions

Test Status: **PASSED** Frequency Range: 900 MHz to 1000 MHz

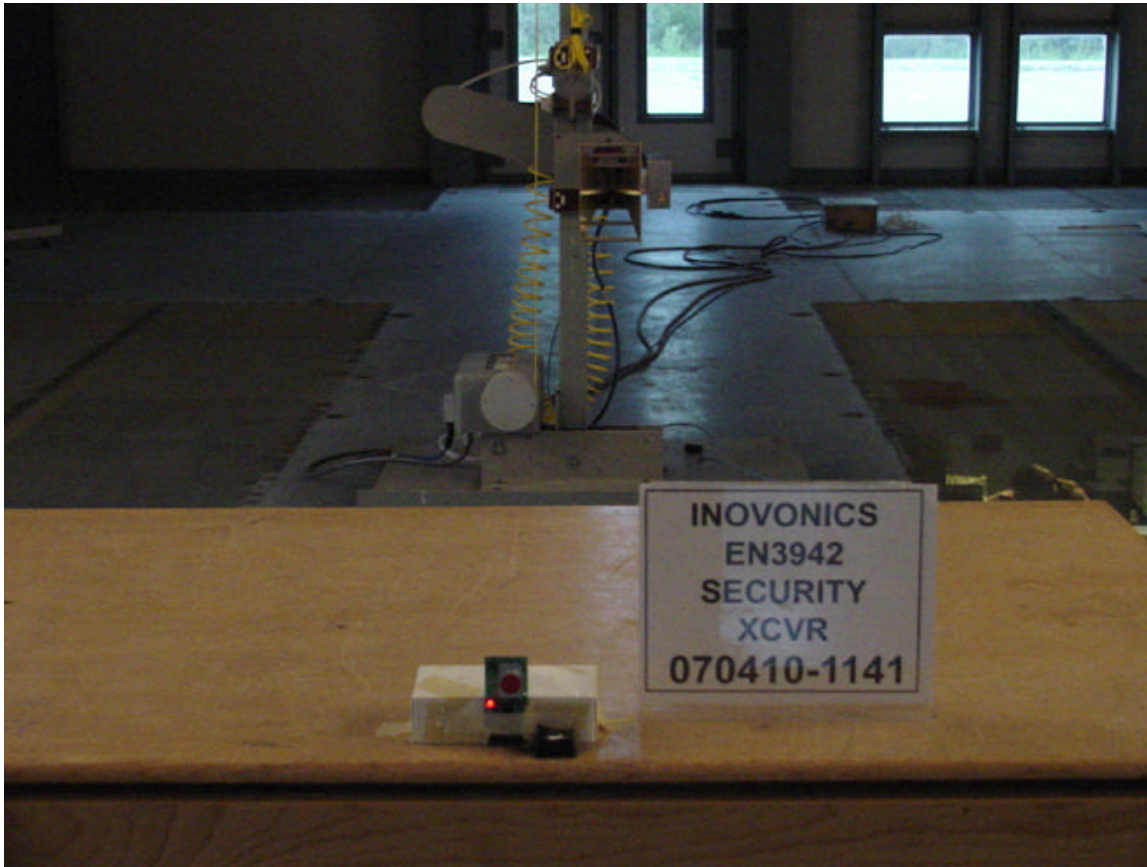
Minimum Margin to Limit: **-2.04** dB at **902.3481** MHz

Remarks

See: **APPENDIX A** for EUT Photographs **APPENDIX B** for Data Sheets
APPENDIX D for Test Equipment Calibration Status

3.0 APPENDIX A: EUT PHOTOGRAPHS

3.1 RADIATED EMISSIONS



3.2 RADIATED EMISSIONS



3.3 RADIATED EMISSIONS



4.0 APPENDIX B: DATA SHEETS

4.1 EMISSIONS PLOT – UNINTENTIONAL RADIATOR - 30 MHZ TO 1 GHZ

Criterion Technology

EUT: ES Serial Transceiver, EN3942XS

Manufacturer: Inovonics Wireless Corporation

Tester: lws

EUT Information: tabletop, powered with 6 V dry cell

Test Information: 3m, 6 VDC, FCC 15.109 Class B

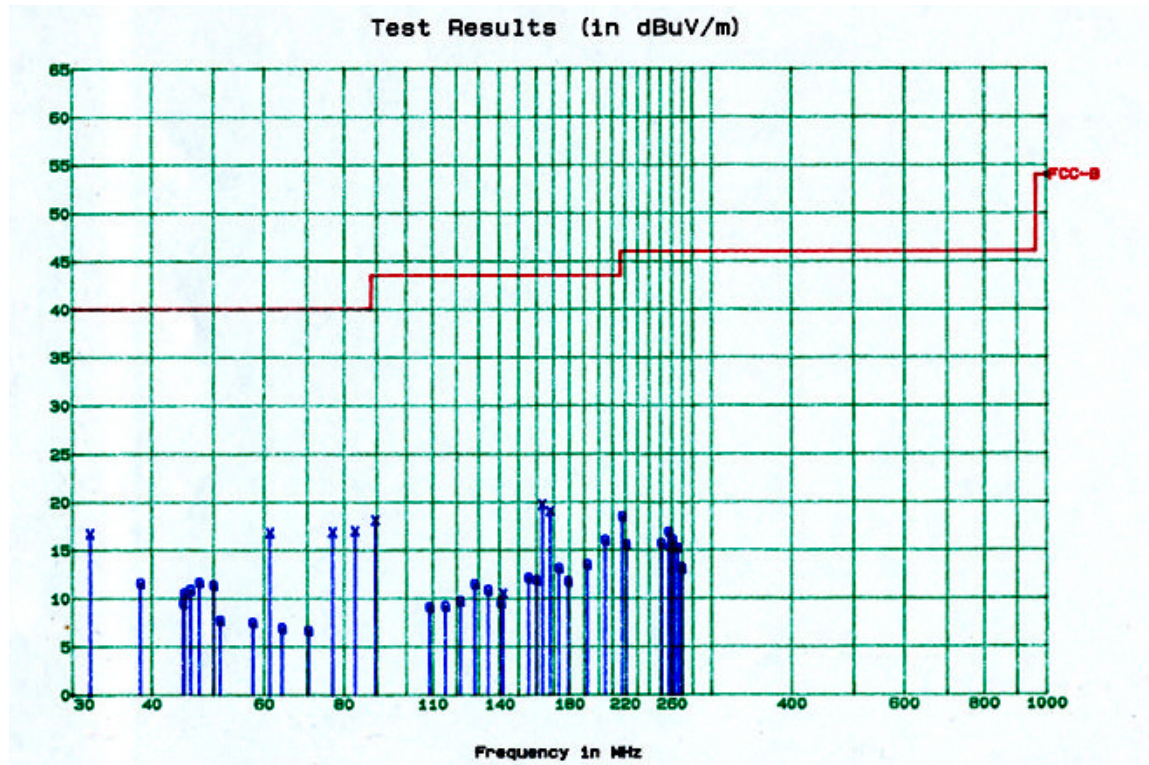
Test Cond: Temp: 29°C

Date: April 11, 2007

S/N: 2609815

SpiD: 070410-1141

Humidity: 33%



4.2 EMISSIONS TABLE – UNINTENTIONAL RADIATOR - 30 MHZ TO 1 GHZ**Notes:**

The third column below contains alpha characters which pertain to the type of measurements made. The following are the definitions for those characters: q = Quasi Peak, m = Maximized (cable, rotation and antenna height), s = scanned but no data taken, and a = average. For the first character in column four, a '-' indicates that value is below the limit while an '*' indicates that value is above the limit

If the list is sorted using "l-sort", then quasi-peak and average levels are weighted higher than peak levels and are moved to the front of the scan list.

The following keys help to better understand the data:

TT: Turntable position in degrees

Hght: Height of antenna in centimeters

Az: Azimuth, V = Vertical, H= Horizontal

Minimum Margin to Limit: **-23.01** dB at **83.1997** MHz

Criterion Technology Wed Apr 11 14:38:29 2007

EUT: ES Serial Transceiver, EN3942XS

S/N: 2609815

Manufacturer: Inovonics Wireless Corporation

Tester: lws Special ID: 070410-1141

EUT Information: table top powered with 6 V dry cell

Test information: 3 Meters, 6 VDC, FCC 15.109 Class B

Table 1: Scan List, sorted by margin to limit FCC-B, -35.0dB filter

<u>Freq. MHz</u>	<u>Value dBuV/m</u>	<u>Sts</u>	<u>Margin to FCC-B limits (dB)</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
83.1997	16.99	m	-23.01	166	169	H	6.4M clk
76.7997	16.86	m	-23.14	219	101	V	6.4M clk
61.2512	16.81	m	-23.19	20	154	H	.
31.9999	16.71	m	-23.29	55	100	V	6.4M clk
163.3280	19.72	m	-23.80	135	100	V	.
167.9612	19.04	m	-24.48	314	101	V	.
89.5450	18.11	m	-25.41	245	100	V	6.4M clk
204.7992	16.04	q	-27.48	270	101	V	12.8M clk
217.5991	18.49	q	-27.53	270	101	V	12.8M clk
47.4781	11.65	q	-28.35	-1	100	V	.
38.3998	11.60	q	-28.40	-1	100	V	6.4M clk
50.0042	11.38	q	-28.62	-1	100	V	.
45.9958	10.89	q	-29.11	-2	101	V	.
257.1404	16.88	q	-29.14	-1	100	V	.
44.9939	10.52	q	-29.48	-2	101	V	.
260.6803	16.07	q	-29.95	-1	100	V	.
191.9992	13.52	q	-30.00	270	101	V	12.8M clk
250.6312	15.69	q	-30.33	-2	101	V	.
173.3972	13.16	q	-30.36	-1	100	V	.
220.8412	15.58	q	-30.44	89	151	V	.
44.7998	9.49	q	-30.51	-3	101	V	6.4M clk
258.6402	15.31	q	-30.71	-1	100	V	.
262.2702	15.28	q	-30.74	-1	100	V	.
265.5403	15.24	q	-30.78	-1	100	V	.
155.4142	12.13	q	-31.39	-2	101	H	.
160.0002	11.89	q	-31.63	181	151	H	.
179.1993	11.79	q	-31.73	270	101	V	12.8M clk
127.9995	11.49	q	-32.03	270	101	V	6.4M clk
51.1998	7.71	q	-32.29	181	151	H	6.4M clk
57.5998	7.51	q	-32.49	180	101	H	6.4M clk
134.3994	10.86	q	-32.66	181	151	H	6.4M clk

268.4202	13.25	q	-32.77	-2	101	V	.
269.9203	13.09	q	-32.93	-2	101	V	.
141.7902	10.51	m	-33.01	-3	101	V	.
63.9997	6.94	q	-33.06	-3	101	H	6.4M clk
70.3997	6.68	q	-33.32	181	151	H	6.4M clk
121.5995	9.72	q	-33.80	270	101	H	6.4M clk
140.7994	9.52	q	-34.00	181	151	H	12.8M clk
115.1995	9.19	q	-34.33	181	151	H	6.4M clk
108.7996	9.09	q	-34.43	89	151	H	6.4M clk

Table 2: Scan List for FCC-B, sorted by Frequency, -35.0dB filter

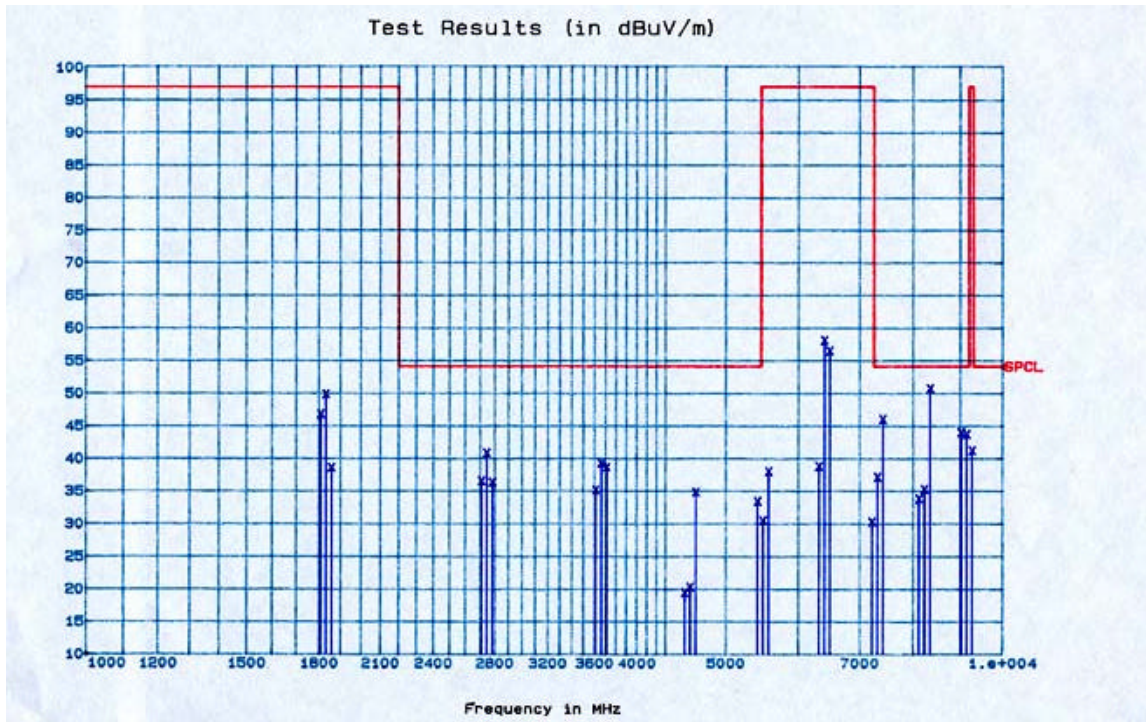
<u>Freq. MHz</u>	<u>Final Value dBuV/m</u>	<u>Sts</u>	<u>Margin to FCC-B limits (dB)</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
31.9999	16.71	m	-23.29	55	100	V	6.4M clk
38.3998	11.60	q	-28.40	-1	100	V	6.4M clk
44.7998	9.49	q	-30.51	-3	101	V	6.4M clk
44.9939	10.52	q	-29.48	-2	101	V	.
45.9958	10.89	q	-29.11	-2	101	V	.
47.4781	11.65	q	-28.35	-1	100	V	.
50.0042	11.38	q	-28.62	-1	100	V	.
51.1998	7.71	q	-32.29	181	151	H	6.4M clk
57.5998	7.51	q	-32.49	180	101	H	6.4M clk
61.2512	16.81	m	-23.19	20	154	H	.
63.9997	6.94	q	-33.06	-3	101	H	6.4M clk
70.3997	6.68	q	-33.32	181	151	H	6.4M clk
76.7997	16.86	m	-23.14	219	101	V	6.4M clk
83.1997	16.99	m	-23.01	166	169	H	6.4M clk
89.5450	18.11	m	-25.41	245	100	V	6.4M clk
108.7996	9.09	q	-34.43	89	151	H	6.4M clk
115.1995	9.19	q	-34.33	181	151	H	6.4M clk
121.5995	9.72	q	-33.80	270	101	H	6.4M clk
127.9995	11.49	q	-32.03	270	101	V	6.4M clk
134.3994	10.86	q	-32.66	181	151	H	6.4M clk
140.7994	9.52	q	-34.00	181	151	H	12.8M clk
141.7902	10.51	m	-33.01	-3	101	V	.
155.4142	12.13	q	-31.39	-2	101	H	.
160.0002	11.89	q	-31.63	181	151	H	.
163.3280	19.72	m	-23.80	135	100	V	.
167.9612	19.04	m	-24.48	314	101	V	.
173.3972	13.16	q	-30.36	-1	100	V	.
179.1993	11.79	q	-31.73	270	101	V	12.8M clk
191.9992	13.52	q	-30.00	270	101	V	12.8M clk
204.7992	16.04	q	-27.48	270	101	V	12.8M clk
217.5991	18.49	q	-27.53	270	101	V	12.8M clk
220.8412	15.58	q	-30.44	89	151	V	.
250.6312	15.69	q	-30.33	-2	101	V	.
257.1404	16.88	q	-29.14	-1	100	V	.
258.6402	15.31	q	-30.71	-1	100	V	.
260.6803	16.07	q	-29.95	-1	100	V	.
262.2702	15.28	q	-30.74	-1	100	V	.
265.5403	15.24	q	-30.78	-1	100	V	.
268.4202	13.25	q	-32.77	-2	101	V	.
269.9203	13.09	q	-32.93	-2	101	V	.

Table 3: Complete Scan List Sorted by Frequency

Freq, MHz	I-val before xducer factors dBuV	Final Value dBuV/m	Sts	TT	Hght	Az	Time	Comment
31.9999	21.71	16.71	m	55	100	V	Wed Apr 11 14:26:48 2007	6.4M clk
38.3998	19.57	11.60	q	-1	100	V	Wed Apr 11 11:39:29 2007	6.4M clk
44.7998	20.75	9.49	q	-3	101	V	Wed Apr 11 09:43:19 2007	6.4M clk
44.9939	21.90	10.52	q	-2	101	V	Wed Apr 11 11:22:29 2007	.
45.9958	22.87	10.89	q	-2	101	V	Wed Apr 11 11:22:44 2007	.
47.4781	24.49	11.65	q	-1	100	V	Wed Apr 11 11:41:03 2007	.
50.0042	25.49	11.38	q	-1	100	V	Wed Apr 11 11:40:39 2007	.
51.1998	22.28	7.71	q	181	151	H	Wed Apr 11 11:53:22 2007	6.4M clk
57.5998	23.42	7.51	q	180	101	H	Wed Apr 11 10:00:28 2007	6.4M clk
61.2512	32.88	16.81	m	20	154	H	Wed Apr 11 14:32:06 2007	.
63.9997	23.03	6.94	q	-3	101	H	Wed Apr 11 09:38:48 2007	6.4M clk
70.3997	22.42	6.68	q	181	151	H	Wed Apr 11 11:53:33 2007	6.4M clk
76.7997	31.77	16.86	m	219	101	V	Wed Apr 11 14:35:13 2007	6.4M clk
83.1997	30.77	16.99	m	166	169	H	Wed Apr 11 13:35:46 2007	6.4M clk
89.5450	31.26	18.11	m	245	100	V	Wed Apr 11 13:28:04 2007	6.4M clk
108.7996	19.63	9.09	q	89	151	H	Wed Apr 11 11:47:04 2007	6.4M clk
115.1995	19.60	9.19	q	181	151	H	Wed Apr 11 11:53:53 2007	6.4M clk
121.5995	19.30	9.72	q	270	101	H	Wed Apr 11 10:03:00 2007	6.4M clk
127.9995	21.08	11.49	q	270	101	V	Wed Apr 11 10:04:22 2007	6.4M clk
134.3994	20.26	10.86	q	181	151	H	Wed Apr 11 11:54:00 2007	6.4M clk
140.7994	19.08	9.52	q	181	151	H	Wed Apr 11 11:54:03 2007	12.8M clk
141.7902	20.10	10.51	m	-3	101	V	Wed Apr 11 13:42:53 2007	.
155.4142	22.79	12.13	q	-2	101	H	Wed Apr 11 11:07:37 2007	.
160.0002	22.76	11.89	q	181	151	H	Wed Apr 11 11:54:11 2007	.
163.3280	30.82	19.72	m	135	100	V	Wed Apr 11 13:45:50 2007	.
166.3993	19.39	8.06	q	181	151	H	Wed Apr 11 11:54:18 2007	12.8M clk
167.9612	30.62	19.04	m	314	101	V	Wed Apr 11 14:23:59 2007	.
173.3972	24.66	13.16	q	-1	100	V	Wed Apr 11 11:41:10 2007	.
179.1993	23.82	11.79	q	270	101	V	Wed Apr 11 10:04:33 2007	12.8M clk
191.9992	25.37	13.52	q	270	101	V	Wed Apr 11 10:04:36 2007	12.8M clk
204.7992	27.19	16.04	q	270	101	V	Wed Apr 11 10:04:38 2007	12.8M clk
217.5991	29.59	18.49	q	270	101	V	Wed Apr 11 10:04:41 2007	12.8M clk
220.8412	26.48	15.58	q	89	151	V	Wed Apr 11 11:50:02 2007	.
230.3990	18.37	8.70	q	269	151	H	Wed Apr 11 12:02:02 2007	12.8M clk
243.1990	18.30	9.44	q	90	101	V	Wed Apr 11 09:58:22 2007	12.8M clk
250.6312	23.66	15.69	q	-2	101	V	Wed Apr 11 11:30:34 2007	.
255.9989	18.13	10.49	q	181	151	H	Wed Apr 11 11:54:42 2007	12.8M clk
257.1404	24.55	16.88	q	-1	100	V	Wed Apr 11 11:41:16 2007	.
258.6402	23.05	15.31	q	-1	100	V	Wed Apr 11 11:41:19 2007	.
260.6803	23.96	16.07	q	-1	100	V	Wed Apr 11 11:41:21 2007	.
262.2702	23.22	15.28	q	-1	100	V	Wed Apr 11 11:41:23 2007	.
265.5403	23.28	15.24	q	-1	100	V	Wed Apr 11 11:41:25 2007	.
268.4202	21.26	13.25	q	-2	101	V	Wed Apr 11 11:33:44 2007	.
268.7989	18.38	10.38	q	270	101	V	Wed Apr 11 10:04:49 2007	12.8M clk
269.9203	21.04	13.09	q	-2	101	V	Wed Apr 11 11:34:09 2007	.

4.3 EMISSIONS PLOT – INTENTIONAL RADIATOR - 1 GHZ TO 10 GHZ

Criterion Technology Date: July 3, 2007
EUT: ES Serial Transceiver, EN3942XS S/N: 2609830
Manufacturer: Inovonics Wireless Corporation
Tester: lws SpiD: 070410-1141
EUT Information: tabletop, powered with 6 V dry cell
Test Information: 3m, 6 VDC, FCC Part 15.205, 15.207, 15.209, 15.247
Test Cond: Temp: 31°C Humidity: 28%



4.4 EMISSIONS TABLE – INTENTIONAL RADIATOR - 1 GHZ TO 10 GHZ**Notes:**

The third column below contains alpha characters which pertain to the type of measurements made. The following are the definitions for those characters: q = Quasi Peak, m = Maximized (cable, rotation and antenna height), s = scanned but no data taken, and a = average. For the first character in column four, a '-' indicates that value is below the limit while an '*' indicates that value is above the limit

If the list is sorted using "l-sort", then quasi-peak and average levels are weighted higher than peak levels and are moved to the front of the scan list.

The following keys help to better understand the data:

TT: Turntable position in degrees

Hght: Height of antenna in centimeters

Az: Azimuth, V = Vertical, H= Horizontal

Minimum Margin to Limit: **-3.40** dB at **8347.9307** MHz

Criterion Technology Tue Jul 03 16:50:51 2007

EUT: ES Serial Transceiver, EN-3942XS

S/N: 2609830

Manufacturer: Inovonics Wireless Corporation

Tester: lws Special ID: 070410-1141

EUT Information: table top powered with 6 V dry cell

Test information: 3 Meters, 6VDC, FCC pert 15.205, 15.207, 15.209, 15.247

Table 1: Scan List, sorted by margin to limit SPCL, -70.0dB filter

<u>Freq. MHz</u>	<u>Value dbuV/m</u>	<u>Sts</u>	<u>Margin to SPCL limits (dB)</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
8347.9307	50.60	m	-3.40	321	128	H	927 harm
7420.3848	45.88	m	-8.12	46	152	H	927 harm
9023.4810	43.87	m	-10.13	211	118	V	902 harm
9147.4747	43.56	m	-10.44	361	122	V	914 harm
2744.2449	40.71	m	-13.29	363	101	V	914 harm
3658.9932	39.19	m	-14.81	210	117	H	914 harm
3710.1924	38.58	m	-15.42	55	110	V	927 harm
7317.9864	37.02	m	-16.98	128	187	V	914 harm
2707.0443	36.44	m	-17.56	360	100	V	902 harm
2782.6443	36.25	m	-17.75	293	103	V	927 harm
8232.7272	35.15	m	-18.85	198	111	V	914 harm
3609.3924	35.05	m	-18.95	194	100	H	902 harm
4637.7405	34.73	m	-19.27	208	115	H	927 harm
8121.1306	33.69	m	-20.31	220	100	H	902 harm
5414.0886	33.32	m	-20.68	224	119	V	902 harm
4573.7415	20.24	m	-33.76	181	109	V	914 harm
4511.7405	19.41	m	-34.59	151	100	H	902 harm
6403.2381	57.94	m	-38.86	231	102	H	914 harm
6492.8374	56.34	m	-40.46	273	137	H	927 harm
1829.4966	49.73	m	-47.07	24	156	H	914 harm
1804.6962	46.66	m	-50.14	176	101	V	902 harm
9275.4810	41.09	m	-55.71	167	105	H	927 harm
6316.4367	38.69	m	-58.11	178	101	V	902 harm
1855.0962	38.48	m	-58.32	10	152	H	927 harm
5565.2886	37.87	m	-58.93	45	128	H	927 harm
5488.4898	30.40	m	-66.40	312	152	V	914 harm
7218.7848	30.19	m	-66.61	32	142	V	902 harm

Table 2: Scan List for SPCL, sorted by Frequency, -70.0dB filter

<u>Freq. MHz</u>	<u>Final Value dbuV/m</u>	<u>Sts</u>	<u>Margin to SPCL limits (dB)</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
1804.6962	46.66	m	-50.14	176	101	V	902 harm
1829.4966	49.73	m	-47.07	24	156	H	914 harm
1855.0962	38.48	m	-58.32	10	152	H	927 harm
2707.0443	36.44	m	-17.56	360	100	V	902 harm
2744.2449	40.71	m	-13.29	363	101	V	914 harm
2782.6443	36.25	m	-17.75	293	103	V	927 harm
3609.3924	35.05	m	-18.95	194	100	H	902 harm
3658.9932	39.19	m	-14.81	210	117	H	914 harm
3710.1924	38.58	m	-15.42	55	110	V	927 harm
4511.7405	19.41	m	-34.59	151	100	H	902 harm
4573.7415	20.24	m	-33.76	181	109	V	914 harm
4637.7405	34.73	m	-19.27	208	115	H	927 harm
5414.0886	33.32	m	-20.68	224	119	V	902 harm
5488.4898	30.40	m	-66.40	312	152	V	914 harm
5565.2886	37.87	m	-58.93	45	128	H	927 harm
6316.4367	38.69	m	-58.11	178	101	V	902 harm
6403.2381	57.94	m	-38.86	231	102	H	914 harm
6492.8374	56.34	m	-40.46	273	137	H	927 harm
7218.7848	30.19	m	-66.61	32	142	V	902 harm
7317.9864	37.02	m	-16.98	128	187	V	914 harm
7420.3848	45.88	m	-8.12	46	152	H	927 harm
8121.1306	33.69	m	-20.31	220	100	H	902 harm
8232.7272	35.15	m	-18.85	198	111	V	914 harm
8347.9307	50.60	m	-3.40	321	128	H	927 harm
9023.4810	43.87	m	-10.13	211	118	V	902 harm
9147.4747	43.56	m	-10.44	361	122	V	914 harm
9275.4810	41.09	m	-55.71	167	105	H	927 harm

Table 3: Complete Scan List Sorted by Frequency

Freq, MHz	I-val before xducr factors dBuV	Final Value dBuV/m	Sts	TT	Hght	Az	Time	Comment
1804.6962	52.64	46.66	m	176	101	V	Tue Jul 03 13:46:13 2007	902 harm
1829.4966	55.41	49.73	m	24	156	H	Tue Jul 03 14:46:18 2007	914 harm
1855.0962	43.82	38.48	m	10	152	H	Tue Jul 03 15:52:43 2007	927 harm
2707.0443	37.28	36.44	m	360	100	V	Tue Jul 03 13:50:26 2007	902 harm
2744.2449	42.04	40.71	m	363	101	V	Wed Jun 27 17:45:35 2007	914 harm
2782.6443	38.08	36.25	m	293	103	V	Tue Jul 03 16:00:21 2007	927 harm
3609.3924	34.31	35.05	m	194	100	H	Tue Jul 03 13:57:57 2007	902 harm
3658.9932	38.45	39.19	m	210	117	H	Tue Jul 03 15:01:41 2007	914 harm
3710.1924	38.19	38.58	m	55	110	V	Tue Jul 03 16:04:37 2007	927 harm
4511.7405	18.26	19.41	m	151	100	H	Tue Jul 03 14:05:12 2007	902 harm
4573.7415	19.09	20.24	m	181	109	V	Tue Jul 03 15:10:24 2007	914 harm
4637.7405	33.11	34.73	m	208	115	H	Tue Jul 03 16:18:15 2007	927 harm
5414.0886	28.45	33.32	m	224	119	V	Wed Jun 27 17:09:49 2007	902 harm
5488.4898	25.75	30.40	m	312	152	V	Tue Jul 03 15:15:10 2007	914 harm
5565.2886	33.22	37.87	m	45	128	H	Tue Jul 03 16:29:19 2007	927 harm
6316.4367	29.17	38.69	m	178	101	V	Tue Jul 03 14:12:47 2007	902 harm
6403.2381	47.06	57.94	m	231	102	H	Wed Jun 27 18:00:52 2007	914 harm
6492.8374	44.95	56.34	m	273	137	H	Tue Jul 03 16:33:36 2007	927 harm
7218.7848	16.25	30.19	m	32	142	V	Wed Jun 27 17:19:46 2007	902 harm
7317.9864	22.92	37.02	m	128	187	V	Tue Jul 03 15:34:40 2007	914 harm
7420.3848	30.69	45.88	m	46	152	H	Tue Jul 03 16:47:41 2007	927 harm
8121.1306	17.93	33.69	m	220	100	H	Tue Jul 03 14:28:18 2007	902 harm
8232.7272	19.43	35.15	m	198	111	V	Tue Jul 03 11:41:26 2007	914 harm
8347.9307	33.97	50.60	m	321	128	H	Tue Jul 03 10:36:47 2007	927 harm
9023.4810	15.77	43.87	m	211	118	V	Tue Jul 03 11:33:14 2007	902 harm
9147.4747	19.69	43.56	m	361	122	V	Tue Jul 03 11:44:56 2007	914 harm
9275.4810	20.48	41.09	m	167	105	H	Tue Jul 03 10:57:32 2007	927 harm

4.5 INTENTIONAL RADIATOR – 900 MHZ TO 1000 MHZ

Fundamental Freq (MHz)	band position	Pwr level before rcvr pads	Rcvr atten pads (db)	Pwr Out (dbuv/m) @ 3 M unit standing up	FCC Pout limit (dbuv/m)	Margin to limit (db)
902.3481	lower	74.96	42	116.96	119	-2.04
914.7483	middle	74.81	42	116.81	119	-2.19
927.5481	upper	74.85	42	116.85	119	-2.15

5.0 APPENDIX C: PRODUCT INFORMATION FORM**CRITERION TECHNOLOGY PRODUCT INFORMATION FORM****General Information**Date: 5/17/2007Company Name: Inovonics Wireless Corporation
Company Address: 315 CTC Blvd., Louisville, CO 80027**Contacts:**Compliance Engineer: Dave Henke Phone: 303-209-7163 Email: dave@inovonics.com
Design Engineer: Dave Henke Phone: 303-209-7163 Email: dave@inovonics.com**Test Description**De-Bug _____ Formal (Initial) _____ Formal (Re-Verification) _____**Market Information (Check all that Apply)**USA Canada Euro. Union _____ Taiwan _____ Japan _____ New Zealand _____ Australia _____
Other _____**Product Information**Name: ES Serial Transceiver Model Number: EN3942XS
Serial Numbers: Unintentional radiated Emissions - 2609815
Unintentional radiated Emissions - 2609830Product Dimensions: 1 1/2" x 3" x 3/8" Weight: 3oz**Product Power Source:****Battery**Type User supplies battery or DC power supply. During testing two CR123A lithium batteries at 3 V each were connected in series.**AC Supply**Input Voltage Range(s) _____
Phases _____ Delta _____ Wye _____
Current _____
Frequency _____
Manufacturer _____
Model Number _____**Topology**Linear _____ Switching Mode _____ Switching Frequency _____**Support Equipment (if used):**HPF Minicircuits, VHF -1500**Operation Firmware:**Special firmware that provides a CW signal at low, middle, and high operating frequencies.**Operating Modes: (Please Include Cycle Time)**CW signals at 902.4, 914.8 and 927.6 MHz (switchable between these three frequencies).Time necessary for EUT to be exercised and able to fully respond: <0.001 seconds.

Test Type – Emissions (Please check all that apply):

Information Technology Equipment

Class A _____
 Class B _____
 Oscillator/Clock Frequencies (MHz) _____

Industrial, Scientific, Medical Equipment

Class A _____
 Class B _____
 Oscillator/Clock Frequencies (MHz) _____

Unintentional Radiator

Class A _____
 Class B X
 Oscillator/Clock Frequencies (MHz) 12.8 MHz, 6.4 MHz

Receiver

Type (Regen., Superhet., Direct Conv., Homodyne) Direct Conversion
 Local Oscillator Frequencies 902.4 Mhz to 927.6 MHz
 Frequency Range 902.4 Mhz to 927.6 MHz

Intentional Radiator

Fundamental Frequency Range 902.4 Mhz to 927.6 MHz
 Local Oscillator Frequencies 902.4 Mhz to 927.6 MHz
 Power Output (to antenna) 100 mW
 Integral Antenna (Yes/No) Yes
 Modulation Type (AM, CM, Pulse, Spread Spectrum) Spread Spectrum & FSK
 Control Circuits (Microprocessor/Micro-controller) MSP430F149
 Oscillator/Clock Frequencies (MHz) 12.8 MHz, 6.4 MHz

EMISSIONS

To be compliant with C63.4-2003 test methodology, for the emissions testing, the equipment must be exercising all of the functionality within the capability of the Equipment under test. In addition, the equipment must be equipped in the configuration of maximum capability which will be offered to customers,. The test software installed in the Equipment Under Test (EUT) must exercise all of the modules in this maximum capability configuration.

Description of the maximum capability configuration: The UUT is configured to transmit a high, medium, and low frequency continuous-wave carrier

Name and revision # of the test software used for the emissions: Special FCC – compliance Firmware installed.

6.0 TEST APPENDIX D: TEST EQUIPMENT AND CALIBRATION STATUS

Manufacturer	Name/Description	Model Number	Serial Number	Cal. Due Date
Veratech	Preamp (AMP2)	unknown	N/A	7/7/2007
EMCO	Horn	3160-08	1147	7/8/2007
Rohde/ Schwarz	HF Receiver	ESHS-30	826003/011	7/10/2007
EMCO	biconnical antenna	3108	9103-2441	7/22/2007
EMCO	log periodic antenna	3146	9004-2763	7/23/2007
Chase	Bilog 30 - 1000 MHz	CB6111	1121	7/23/2007
Microwave Technologies	Standard Gain Horn & Harmonic Mixer	12A-18 & HP1197OK	19527JE & 2332A01314	8/1/2007
Rohde/ Schwarz	LISN	ESH2-Z5	828739-001	8/3/2007
FCC	CDN	FCC-801-M3-25	9714	8/9/2007
FCC	EM Clamp	F2031	309	8/9/2007
Amplifier Research	Directional Coupler	DC2600	302981	8/9/2007
Solar Electronics	LISN	8012-50-R-24-BNC	892310	8/9/2007
Amplifier Research	Power Amplifier	100W1000M1	20214	9/5/2007
Dickson	Temperature/ RH Recorder	THDX	5300245	9/15/2007
Amplifier Research	Power Amplifier	150A100A	20183	9/20/2007
Tegam	Current Probe	925236-1	12588	9/20/2007
Rohde/ Schwarz	VHF/UHF Receiver	ESVS-30	863342014	9/24/2007
Hewlett Packard	Signal Generator	HP 8648D	3642000145	10/11/2007
Haefely Trench	EFT Tester	PEFT Junior	583-333-51	12/12/2007
Haefely Trench	Surge Coupler	FP-Surge 32.1	083-925-05	12/12/2007
Haefely Trench	Surge Generator	PSURGE 6.1	083-906-07	12/12/2007
Haefely Trench	Interrupter tester	Pline 1610	083-970-07	12/12/2007
Hewlett Packard	Tracking Generator	HP85645A	3210A00124	12/26/2007
Haefely Trench	ESD Gun	PESD 1600	H605100	1/25/2008
Hewlett Packard	Spectrum Analyzer Display	HP 85662A	2403A07322	2/4/2008
Hewlett Packard	Quasi Peak Adapter	85650A	2403A07322	2/4/2008
Hewlett Packard	Spectrum Analyzer	HP 8566B	2421A00527	2/4/2008
Hewlett Packard	Pulse Generator	HP 8116A	2901G09493	2/22/2008
Heise	Barometer	710A	S7-15256	2/22/2008
Amplifier Research	E-Field Probe	FP2000	19682	5/13/2008
Amplifier Research	E-Field Probe	FP2080	20236	6/19/2008
Antenna Research	1-18 GHz Horn	DRG118/A	1056	6/19/2008
EMCO	Active Loop	6502	2626	6/19/2008
Haefely Trench	Test Mag	Mag 100	80162	12/12/2008
Calforina Instruments	AC Power Source Pacs-1	5001IX-CTS-411	55637/ 72242	2/21/2009

7.0 APPENDIX E: TEST DIRECTIVES, STANDARDS AND METHODS

7.1.1 EUROPEAN DIRECTIVES, STANDARDS AND METHODS

89/336/EEC: Council Directive of 03 May 1989 on the Approximation of the Laws of the Member States Relating to Electromagnetic Compatibility, OJEC No. L 139/19-26, Aug 1993.

BS DD ENV 50204 (CENELEC): Testing and Measurement Techniques; Radiated Electromagnetic Field from Digital Radio Telephones - Immunity Test, 1996.

EN 55011 (CENELEC): ISM Radio-Frequency Equipment Radio Disturbance Characteristics - Limits and Methods of Measurement, 2007.

EN 55014-1 (CENELEC): Part 1. Electromagnetic Compatibility Requirements for Household Appliances, Electric Tools and Similar Apparatus - Part 1. Emission - Product Family Standard, 2006.

EN 55022 (CENELEC): ITE - Radio-Frequency Equipment Radio Disturbance Characteristics - Limits and Methods of Measurement, 2006.

EN 55024 (CENELEC): ITE - Immunity Characteristics - Limits and Methods of Measurement, 2003.

EN 55103-1: Product Family standard for audio, video, audio - visual and entertainment lighting control apparatus for professional use. Part 1: Emissions, April 1997.

EN 55103-2: Product Family standard for audio, video, audio - visual and entertainment lighting control apparatus for professional use. Part 2: Immunity, April 1997.

EN 60601-1-2 (CENELEC): Medical Electrical Equipment. Part 1. General Requirements for Safety - Section 1.2. Collateral Standard: Electromagnetic Compatibility - Requirements and Tests, A1:2006.

EN 61000-6-2: EMC- Part 6-2. Generic Standard-Immunity for Industrial Environments, 2005.

EN 61000-6-3: EMC- Part 6-3. Generic Standard-Emissions for residential, commercial and light-industrial Environments 2007.

EN61000-6-4 (CENELEC): EMC - Generic Emission Standard, Part 6-4: Industrial Environment, 2007.

EN 61000-3-2 (CENELEC): EMC - Part 2. Limits for Harmonic Current Emissions (Equipment Input Current ≤ 16 A per phase), with Amendment 14, 2006.

EN 61000-3-3 (CENELEC): EMC - Part 3. Limitation of Voltage Fluctuation and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤ 16 A, 1998, A1:2001, A2:2005, A3:2006.

EN 61000-4-7 (CENELEC): EMC – Part 4-7 Testing and measurement techniques – General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto: 2002, incorporating corrigenda Nos. 1:2004 and 2:2005.

EN 61000-4-2 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 2. Electrostatic Discharge Immunity Test, with Amendments 1 & 2, 2001.

EN 61000-4-3 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 3. Radiated, Radio-Frequency, Electromagnetic Field Immunity, 2006.

EN 61000-4-4 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 4. Electrical Fast Transient/Burst Immunity Test, incorporating corrigendum no. 1: January 2007.

EN 61000-4-5 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 5. Surge Immunity Test, 2006.

EN 61000-4-6 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 6. Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields, 2005.

EN 61000-4-8 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 8. Power Frequency Magnetic Field Immunity Test, 1993 with the incorporation of amendment A1:2001.

EN 61000-4-11 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 11. Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests, 2004

EN 61326 (CENELEC): Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements, 1997, with the incorporation of amendments A1:1998, A2:2001 and A3:2003.

7.1.2 47 CFR FCC PART 15 RADIO FREQUENCY DEVICES: OCT 2006

Subpart A General.

Subpart B Unintentional Radiators.

Subpart C Intentional Radiators.

Subpart D Unlicensed Personal Communications Service Devices.

7.1.3 47 CFR FCC PART 22 PUBLIC MOBILE SERVICES: OCT 2006

7.1.4 47 CFR FCC PART 24 PERSONAL COMMUNICATIONS SERVICES: OCT 2006

7.1.5 JAPAN

VCCI V-3

7.1.6 CANADA

ICES-001: Interference-Causing Equipment Standard - ISM RF Generators, 2006.

ICES-003: Interference-Causing Equipment Standard - Digital Apparatus, 2004.

7.1.7 AUSTRALIA/NEW ZEALAND

SAA AS/NZ 3548: Limits and Methods of Measurement of Radio Disturbance Characteristics of ITE, 1997.

AS/NZS CISPR22

7.1.8 CHINA

CNS13438, 1997.

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