Product Integrity Laboratory

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Certification Test Report
CFR 47 FCC Part 15, Subpart C
Project Code CG-730

(Report CG-730-EM-1-3)
This report supercedes CG-730-EM-1-2

Wireless Dynamics Inc.
SDiD 1212 and SDiD 1210
FCC ID#: SHFSDID121X
IC IC#: 5998A-SDID121X

Revision: 3
December 7, 2007

Prepared for:	Wireless Dynamics
Author:	Spencer Watson EMC Technologist

Approved by:	Nick Kobrosly Product Integrity Lab Manager

Report Summary

Test Facility	**NTS Canada** Product Integrity Laboratory 5151-47th Street, N.E. Calgary Alberta T3J 3R2
Accreditation Numbers	FCC 101386 IC 46405-3978 - File # IC3978-2 Standards Council of Canada Accredited Laboratory No. 440
Performed For	Wireless Dynamics Inc. 220, 3636 - 23 Street N.E. Calgary, AB T2E 8Z5 Phone #: (403) 219-8226 Fax #: (403) 250-1777
Customer Representative	Name: Jeff Carmichael Phone #: (403) 219-8223 Email Address: jcarmichael@wdi.ca
	Name: Damon Adams Phone #: (403) 219-8226 Email Address: dadams@wdi.ca
Responsible Manager	Name: Michael Loh Phone #: (403) 250-1818 Email Address: mloh@wdi.ca

Test Summary

Appendix	Standards		Description & Range	Deviations* from:			Pass / Fail	Criteria
	Base	Test Basis		Base Standard	Test Basis	NTS Procedure		
A	FCC CFR 47 Part 15.209 Class B	ANSI C63.4	Radiated Emissions (30 - 1000 MHz)	None	None	None	PASS	B
B	FCC CFR 47 Part 15.209 Class B	ANSI C63.4	Radiated Emissions (9KHz - 30 MHz)	None	None	None	PASS	B
C	FCC CFR 47 Part 15.207 Class B	ANSI C63.4	Conducted Emissions - Voltage (0.150 - 30 MHz)	None	None	None	PASS	B

The compliance test cases and respective test standards, as defined by the customer, may not be inclusive of all testing required by the Base Standards or fulfill the applicable regulatory requirements in their entirety. They do not reflect the opinions or recommendations of NTS

Test Result: The product presented for testing complied with test requirements as shown above.

Test Log & Signatures:

Appendix	Test Case	Start	End	Tester
A	Radiated Emissions (30 - 1000 MHz)	Oct.29 2007	Oct.29 2007	Lixin Wang and Spencer Watson EMC Technologist
B	Radiated Emissions (9KHz - 30 MHz)	Oct.29 2007	Oct.29 2007	Spencer Watson EMC Technologist
C	Conducted Emissions - Voltage (0.150 - 30 MHz)	Oct 30, 2007	Oct 30, 2007	Lixin Wang EMC Technologist

Prepared By: _____
Spencer Watson
EMC Technologist

Reviewed By: Nick Kobrosly On Behalf 2007.12.07 17:06:36 -07'00'
_____
Glen Moore
EMC Manager

Checked By: Robyn Zuehlke 2007.12.07 16:30:33 -07'00'
_____
Robyn Zuehlke
Quality Manager

Table of Contents

Register of Revisions

Revision	Date	Description of Revisions
0	December 3, 2007	First Draft
1	December 4, 2007	Changing to account for revision notes
2	December 5, 2007	More revision note changes. Added note about EUT orientations used for testing
3	December 7, 2007	Rule part and equipment clarifications as per ATCB revision notes.

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the tests applied by NTS Canada to demonstrate compliance of Wireless Dynamics SDiD 1212 and SDiD1210 to the applicable Electromagnetic Compatibility (EMC) standards as outlined in section 1.3.

The tests outlined may not be inclusive of all testing required by the Base Standards and may not fulfill the applicable regulatory requirements in their entirety.

1.2 ABBREVIATIONS AND DEFINITIONS

Abbreviation	Explanation
dB	Decibel
EMC	Electromagnetic Compatibility
Hz	Hertz
IEC	International Electrotechnical Commission
ITE	Information Technology Equipment
MHz	Megahertz
N/A	Not Applicable
NA	Not Available
μV	Microvolts
dBm	decibel relative to 1 mW
GHz	Giga Hertz
QA	Quality Assurance
EUT	Equipment Under Test
NDP	No Degradation in Performance
PI	Product Integrity
RF	Radio Frequency

Definitions:

Equipment Under Test (EUT): A representative ITE or functionally interactive group of ITE (that is a system), which includes one or more host units and is used for evaluation purposes.

Electromagnetic compatibility: EMC (abbreviation): The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

1.3 REFERENCES

- FCC CFR 47 Part 15 — CFR Title 47 – Telecommunications, Chapter I – Subpart C Intentional Radiators

International Standards

- CISPR 22 — Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement, 2005

American National Standards Institute

- ANSI C63.4-2003 — American National Standards for Methods of Measurements of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipments in the range of 9 kHz to 40 GHz, December 11, 2003

NTS Documentation

- NTS Radiated Emissions 30 MHz – 1GHz Automated Test Method SOP CAG EMC 01
- NTS Conducted Emissions 150kHz – 30 MHz Automated Test Method SOP COR EMC 04

2.0 EUT DESCRIPTION

All equipment information was supplied by the client and was not verified by NTS.

2.1 CONFIGURATION

Description of EUT

	Customer Name	Model(s)	Revision	Serial Number
EUT	Wireless Dynamics	SDiD 1212 and SDiD 1210	4803-1	079300000003
Classification	Tabletop			
Size (m)	63.5mm x 27.5mm x 10.15mm			
Weight	9 grams			
Description	Low frequency RFID reader with optional SD memory.			

2.1.1 SET UP CONFIGURATION

SDiD 1212

Quantity	EUT Description	P/N	S/N	Rev
1	RFID Reader SD Card	SDiD 1212	173900000004	R4803-1

2.1.2 TEST PLAN CONFIGURATION DEVIATIONS

None

2.1.3 EUT POWER

Voltage	3.0V to 3.6V
Number of Feeds	1
Gauge of cable	N/A
Current Draw	300mA max, RF field on
Special Requirements	Device is powered via an SD Port of a PDA or Handheld PC

2.1.4 TEST PLAN POWER DEVIATIONS

None

2.2 CABLES

EUT Cable List

Qty.	Model	Routing		Description	Cable Length (m)
		From	To		
N/A	N/A	N/A	N/A	N/A	N/A

2.2.1 TEST PLAN CABLE LIST DEVIATIONS

None

2.3 FREQUENCIES

EUT Frequency List

Module	Signal	Frequency (MHz)
XTAL Oscillator Frequency Reference	16MHz_CLK	16
HDX Frequency Divider	4MHz_CLK	4
PLL Synthesizer	17_177MHz_CLK	17.177
FDX Transceiver	FDX_TX1 and FDX_TX2	0.1342
HDX Transceiver	HDX_ANT1 and HDX_ANT2	0.13445
SD Bus	SD_CLK	Host dependent, 25 max by spec.

2.3.1 TEST PLAN FREQUENCY LIST DEVIATIONS

None

2.4 EUT SOFTWARE

Software Name	Software Release Number	Software Configuration
SDiD1212-070816-XX-UL-00 (EVT3 Hardware)	00	Transmit mode active, software selectable between HDX and FDX modes.

2.5 MODE OF OPERATION

The Wireless Dynamics SDiD 1212 was tested in transmit mode with worst case results reported.

2.5.1 TEST PLAN MODE OF OPERATION LIST DEVIATIONS

None

3.0 SUPPORT EQUIPMENT

3.1 CONFIGURATION

All support equipment information was supplied by the client and was not verified by NTS.

Support Equipment List

Qty	Description	Model #	P/N	Serial Number
1	Intermec Handheld PC	CK60	CK61BU3C2N0E0100	08000701926
1	Intermec Handheld PC Power Supply	851-061-002	851-061-007	565856

3.2 CABLES

Support Cable List

Qty.	Model	Routing		Description	Cable Length (m)
		From	To		
N/A	N/A	N/A	N/A	N/A	N/A

APPENDICES

APPENDIX A: RADIATED EMISSIONS FCC 15.209 (30 MHZ – 1000 MHZ)

A.1. Base Standard & Test Basis

Base Standard	☒	CFR Title 47 – Telecommunications, Chapter I - FCC Part 15 – Radio Frequency Devices - Subpart C – Intentional Radiators
Test Basis	☒	ANSI C63.4-2001 Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

A.2. Specifications

Frequency	☐	**GR-1089-CORE**
		Class B
	☒	**47 CFR FCC Part 15.209**
10-m Limit	**Quasi-Peak**	
MHz	**dBµV/m**	
30 – 88	29.54	
88 – 216	33.06	
216 – 230	35.56	
230 – 960	35.56	
960 - 1000	43.52	

§ 15.205 Restricted bands of operation.

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1]0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	
13.36–13.41			

At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions.

A.3. Measurement Uncertainty

Radiated Emissions (dB)	Measurement Uncertainty	Expanded Uncertainty (K=2)
30 MHz – 1.0 GHz	+2.32/-2.36	+4.65/-4.72

Special Considerations

None

A.4. Test Results

Product Integrity Laboratory **V2.5**	**Project Number:**	CG-730	**Tester:**	Spencer Watson / Lixin Wang
	Model:	Wireless Dynamics SDiD 1212	**Test ID:**	RE02c-10m-730
	Comments:	Conf07: SDiD installed in PDA. PDA in Horizontal position, HDX With Memory. SDiD s/n: 073900000003/R4803-1.		

Standard: FCC15.209	**Measurement Distance:**	**<1GHz**	10	meters
		>1GHz	3	meters

Antenna Polarization	Frequency (MHz)	Measured Level (dBµV)	Measurement Detector	Correction Factors (dB/m)	Emission Level (dBµV/m)	Limit Line	Limit (dBµV/m)	Margin (dB)	Mast Height (cm)	Turntable Angle (degrees)
Horizontal	365.62	22.98	Q.Peak	-8.71	14.27	Q.Peak	35.56	21.29	242	293
Horizontal	416.00	31.59	Q.Peak	-7.29	24.30	Q.Peak	35.56	11.26	206	280
Horizontal	432.00	25.29	Q.Peak	-7.25	18.04	Q.Peak	35.56	17.52	177	279
Horizontal	867.75	30.42	Q.Peak	-2.52	27.90	Q.Peak	35.56	7.66	102	83
Horizontal	965.25	29.86	Q.Peak	-1.21	28.65	Q.Peak	43.52	14.87	277	327
Vertical	179.75	22.98	Q.Peak	-14.84	8.14	Q.Peak	33.06	24.92	100	343

Table 1: Radiated Emissions Data, 30 MHz – 1000 MHz

The emission with the least margin to the limit measured was 27.90 dBµV/m at 867.75 MHz, when antenna is Horizontal polarized. It has 7.66 dB margin to the FCC Subpart C 15.209 limit.

The highest emission measured was 28.65 dBµV/m at 965.25 MHz, when antenna is Horizontal polarized. It has 14.87 dB margin to the FCC Subpart C 15.209 limit.

EUT was tested in three orthogonal device orientations for radiated emissions testing. Worst case results are reported.

The EUT is in compliance with FCC Subpart C 15.209 and FCC Subpart C 15.205 requirements.

A.5. Observations

None

A.6. Test Data & Photographs

The test data and photographs collected during this test appear following this page.

A.7. Sample Calculation

Correction Factor = Antenna Correction Factor + Cable Loss
Emission Level = Measured Value + Correction Factor
Margin = Limit – Emission Level

A.8. Environmental Test Conditions

The environmental conditions reported on the plots are not accurate. The actual conditions are:
Temperature = 22 degrees C
Humidity = 36%
Pressure = 888 hPa

A.9. Tested By

This testing was conducted in accordance with the ISO 17025 scope of accreditation, table 1; Quality Manual.

Name:	Spencer Watson	and	Lixin Wang
Function:	EMC Technologist		EMC Technologist

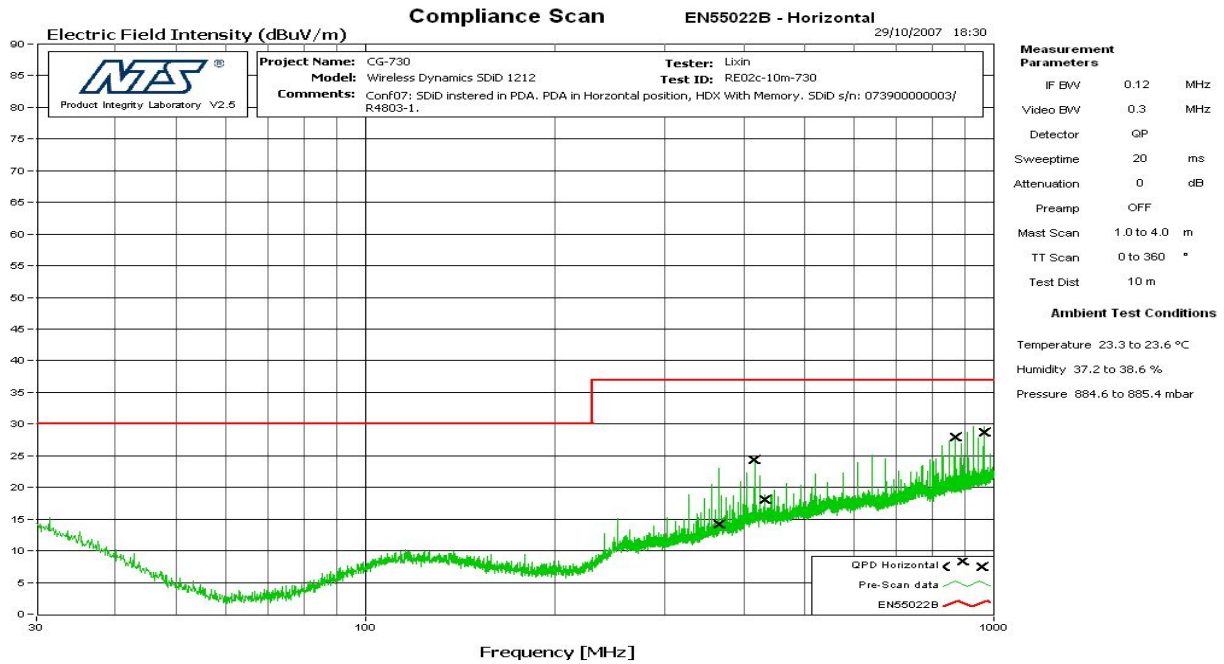

Figure 1: Radiated Emissions – Horizontal, 30 MHz – 1000 MHz (CISPR 22 Limits are shown on the plot but measurements are compared to FCC15.209)

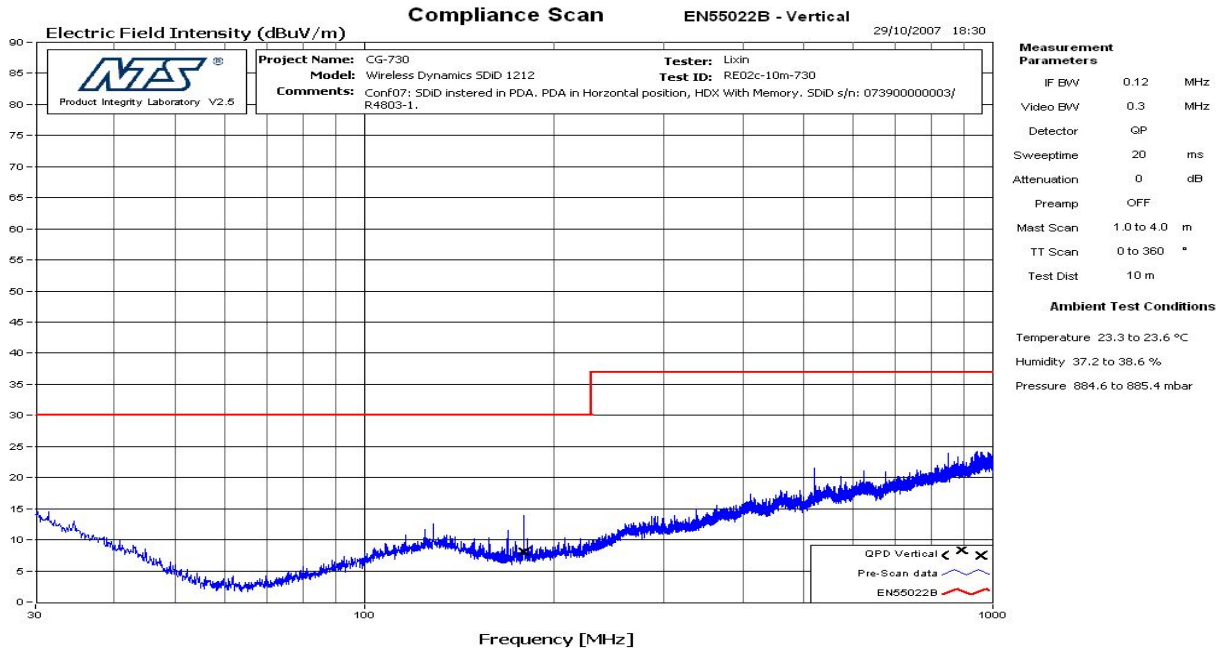

Figure 2: Radiated Emissions – Vertical, 30 MHz – 1000 MHz (CISPR 22 Limits are shown on the plot but measurements are compared to FCC15.209)

Figure 3: Radiated Emissions Compliance (30 – 1000 MHz) – EUT Setup

APPENDIX B: RADIATED EMISSIONS FCC 15.209 (9 KHZ – 30 MHZ)

B.1. Base Standard & Test Basis

Base Standard	☒	CFR Title 47 – Telecommunications, Chapter I - FCC Part 15 – Radio Frequency Devices - Subpart C – Intentional Radiators
Test Basis	☒	ANSI C63.4-2001 Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

B.2. Specifications

Frequency (F)	47 CFR FCC Part 15 Class B Limit		Limit at 3m
	Field Strength	Distance	
MHz	µV/m	m	dBµV/m
0.009 – 0.49	2400/ F(kHz)	300	128.5 to 93.8[1]
0.49 – 1.705	24000/ F(kHz)	30	73.8 to 63.0[1]
1.705 – 30	30	30	69.5

Notes:

1. [1] decrease with the logarithm of the frequency.
2. Limit is extrapolated from 300m and 30 to 3m by adding 80dB and 40dB respectively as per 15.31(f)(2).

B.3. Measurement Uncertainty

Radiated Emissions (dB)	Measurement Uncertainty	Expanded Uncertainty (K=2)
9 kHz – 30 MHz	+2.15/-2.19	+4.30/-4.38

Special Considerations

None

B.4. Test Results

Product Integrity Laboratory **V2.5**	**Project Number:**	CG-730	**Tester:**	Spencer Watson
	Model:	Wireless Dynamics SDiD 1212	**Test ID:**	RE01-10m-730
	Comments:	Conf02: SDiD installed in PDA. PDA in Vertical position, FDX With Memory. SDiD s/n: 073900000003/R4803-1.		

Standard:	FCC15.209	**Measurement Distance:**	3	meters

Antenna Polarization	Frequency (MHz)	Measured Level (dBµV)	Measurement Detector	Correction Factors (dB/m)	Emission Level (dBµV/m)	Limit Line	Limit (dBµV/m)	Margin (dB)
Parallel	0.0116	23.89	Peak	19.72	43.61	Q.Peak	126.35	82.74
Parallel	0.1346*	53.83	Peak	19.55	73.38	Q.Peak	105.02	31.64
Parallel	0.4156	22.57	Peak	19.5	42.07	Q.Peak	95.23	53.16
Perpendicular	0.0106	26.18	Peak	19.67	45.85	Q.Peak	127.08	81.23
Perpendicular	0.1344*	60.53	Peak	19.55	80.08	Q.Peak	105.04	24.96
Perpendicular	0.3824	28.13	Peak	19.51	47.64	Q.Peak	95.95	48.31

*indicates fundamental emission

Table 1: Radiated Emissions Data – FDX Mode, 9 kHz – 30 MHz

Product Integrity Laboratory **V2.5**	**Project Number:**	CG-730	**Tester:**	Spencer Watson
	Model:	Wireless Dynamics SDiD 1212	**Test ID:**	RE01-10m-730
	Comments:	Conf09: SDiD installed in PDA. PDA in Vertical position, HDX With Memory. SDiD s/n: 073900000003/R4803-1.		

Standard:	FCC15.209	**Measurement Distance:**	3	meters

Antenna Polarization	Frequency (MHz)	Measured Level (dBµV)	Measurement Detector	Correction Factors (dB/m)	Emission Level (dBµV/m)	Limit Line	Limit (dBµV/m)	Margin (dB)
Parallel	0.0111	25.09	Peak	19.7	44.79	Q.Peak	126.71	81.92
Parallel	0.1347*	53.2	Peak	19.55	72.75	Q.Peak	105.02	32.27
Parallel	0.4156	20.01	Peak	19.5	39.51	Q.Peak	95.23	55.72
Perpendicular	0.0114	23.51	Peak	19.71	43.22	Q.Peak	126.47	83.25
Perpendicular	0.1346*	59.82	Peak	19.55	79.37	Q.Peak	105.02	25.65
Perpendicular	0.4156	25.09	Peak	19.5	44.59	Q.Peak	95.23	50.64

* indicates fundamental emission

Table 2: Radiated Emissions Data – HDX Mode, 9 kHz – 30 MHz

The highest emission measured was 80.08 dBµV/m at 134.4 kHz, when antenna is Vertically polarized. It has 24.96 dB margin to the FCC 15.207 Subpart C limit.

EUT was tested in three orthogonal device orientations for radiated emissions testing. Worst case results are reported.

The EUT is in compliance with FCC Subpart C 15.207 and FCC Subpart C 15.205 requirements.

B.5. Observations

None

B.6. Test Data & Photographs

The test data and photographs collected during this test appear following this page.

B.7. Sample Calculation

Correction Factor = Antenna Correction Factor + Cable Loss
Emission Level = Measured Value + Correction Factor
Margin = Limit – Emission Level

B.8. Environmental Test Conditions

The environmental conditions reported on the plots are not accurate. The actual conditions are:
Temperature = 22 degrees C
Humidity = 36%
Pressure = 888 hPa

B.9. Tested By

This testing was conducted in accordance with the ISO 17025 scope of accreditation, table 1; Quality Manual.

Name: Spencer Watson
Function: EMC Technologist

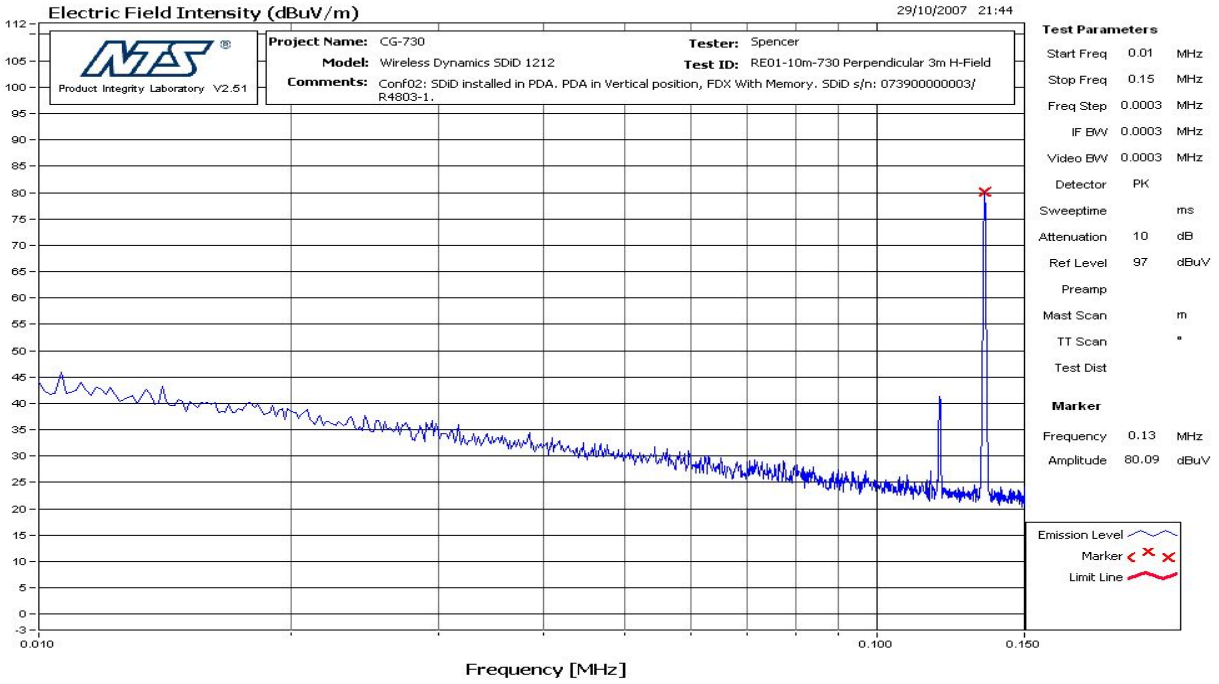

Figure 4: Radiated Emissions – Vertical FDX Mode, 9 kHz – 150 kHz

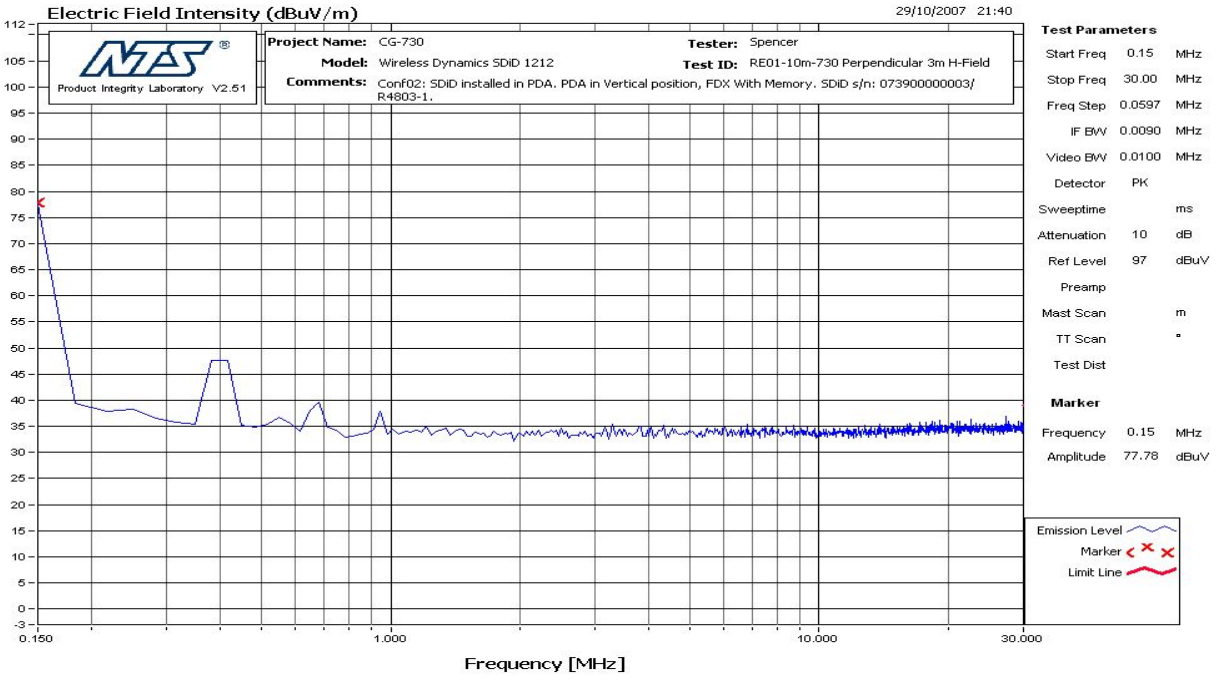

Figure 5: Radiated Emissions – Vertical FDX Mode, 150 kHz – 30 MHz

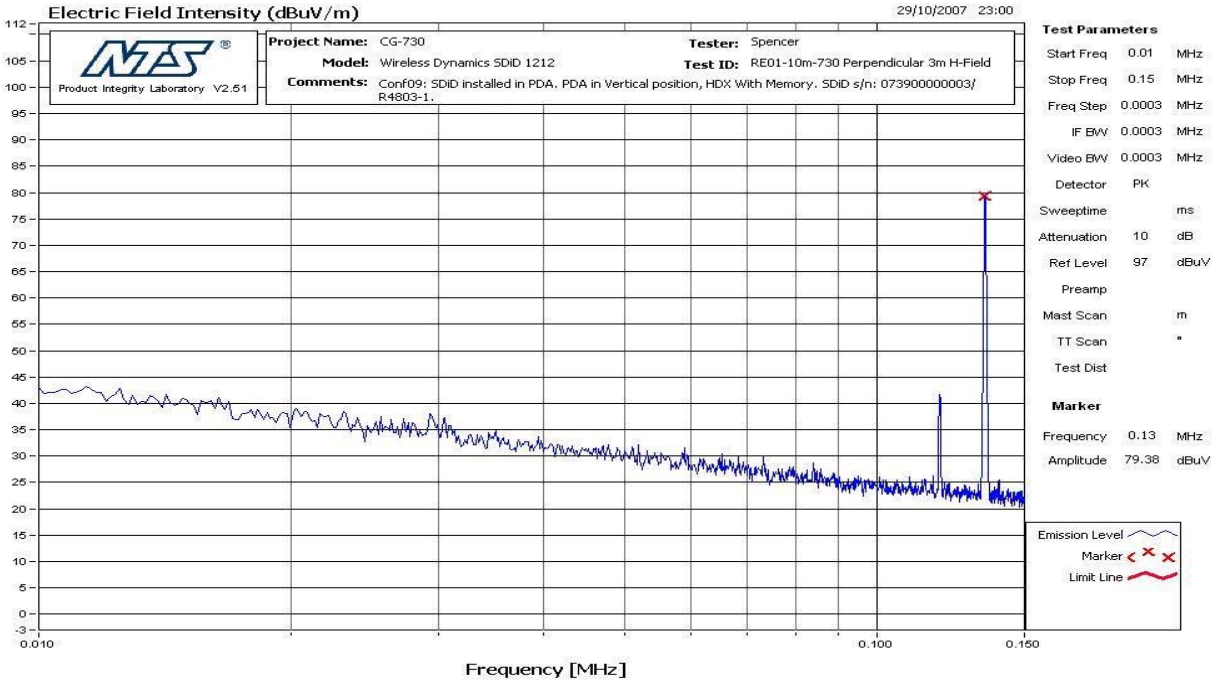

Figure 6: Radiated Emissions – Vertical HDX Mode, 9 kHz – 150 kHz

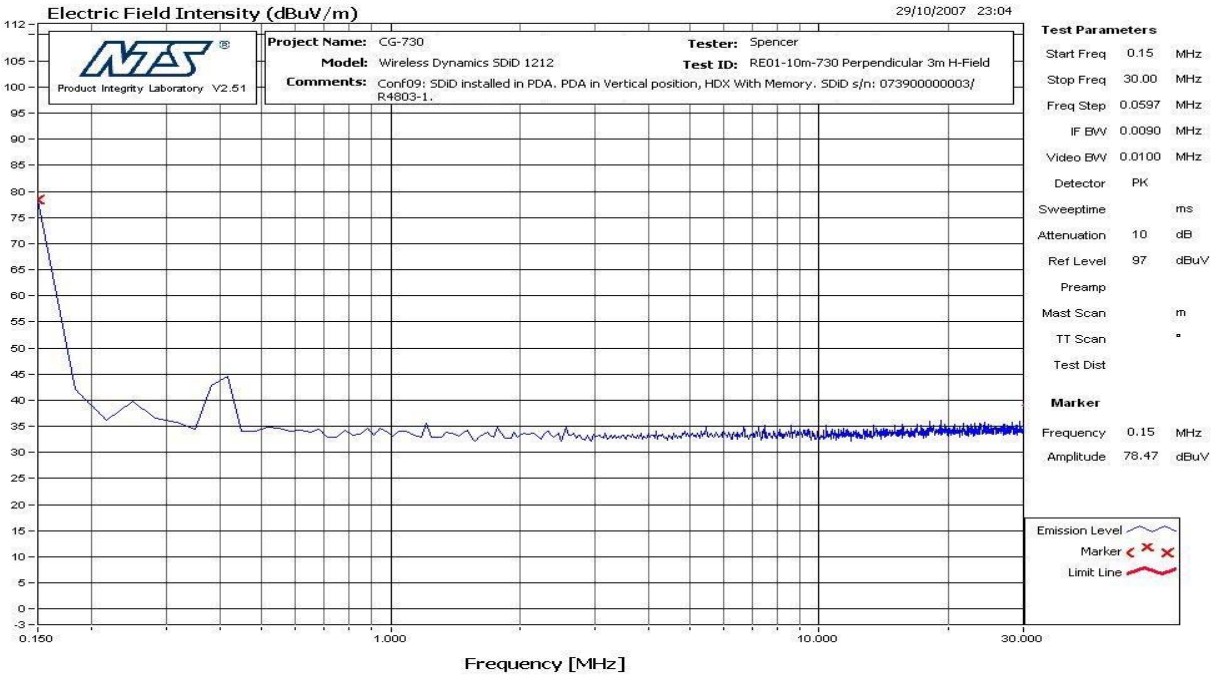

Figure 7: Radiated Emissions – Vertical HDX Mode, 150 kHz – 30 MHz

Figure 8: Radiated Emissions Compliance (9 kHz – 30 MHz) – EUT Setup

APPENDIX C: CONDUCTED EMISSIONS - VOLTAGE (0.150 – 30 MHZ)

BASE STANDARD & TEST BASIS

Base Standard	☒	CFR Title 47 – Telecommunications, Chapter I - FCC Part 15 – Radio Frequency Devices - Subpart C – Intentional Radiators
Test Basis	☒	ANSI C63.4-2003 Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
Test Method	NTS Conducted Emissions 150kHz – 30MHz Automated Test Method 6.0A R2	

C.1. Specifications

Frequency	☐	**Class A**		☒	**FCC 15.207**	
Limit		**Quasi-Peak**	**Average**		**Quasi-Peak**	**Average**
MHz		**dBµV**	**dBµV**		**dBµV**	**dBµV**
0.150 – 0.500		79.00	66.00		66 to 56[1]	56 to 46[1]
0.500 – 5.00		73.00	60.00		56	46
5.00 – 30.00		73.00	60.00		60	50

Note 1: decrease with the logarithm of the frequency

C.2. Measurement Uncertainty

Conducted Current Emissions 150 kHz – 30 MHz	**Measurement Uncertainty**	**Expanded Uncertainty (K=2)**
(dB)	+1.21/-1.33	+2.41/-2.66

C.3. Deviations

Deviation Number	**Time & Date**	**Description and Justification of Deviation**	**Deviation Reference**			**Approval**
			Base Standard	**Test Basis**	**NTS Procedure**	
None						

C.4. Test Results

Product Integrity Laboratory **V2.5**	**Project Number:**	CG-730	**Tester:**	Lixin Wang	
	Model:	Wireless Dynamics SDiD 1212	**Test ID:**	CE02tc-10m-730	
	Comments:	Conf10: 120VAC,SDiD installed in PDA. PDA in Horizontal position, FDX With Memory. SDiD s/n: 073900000003/R4803-1.			

Standard: FCC15.207

Voltage/Line	Frequency (MHz)	Measurement Detector	Measured Value (dBμV)	Correction Factors (dB)	Emission Level (dBμV)	Limit Type	Limit (dBμV)	Margin (dB)
AC 120V Line1A	0.150	AV	29.57	12.36	41.93	AV	55.99	**14.06**
AC 120V Line1A	0.225	AV	25.10	11.50	36.60	AV	52.65	**16.05**
AC 120V Line1A	0.299	AV	24.03	11.13	35.16	AV	50.26	**15.10**
AC 120V Line1A	0.374	AV	23.60	10.96	34.56	AV	48.40	**13.84**
AC 120V Line1A	0.449	AV	25.76	10.86	36.62	AV	46.89	**10.27**
AC 120V Line1A	17.064	AV	32.21	11.49	43.70	AV	50.00	**6.30**
AC 120V NeutralA	0.150	AV	30.91	12.30	43.21	AV	55.99	**12.78**
AC 120V NeutralA	0.225	AV	26.14	11.43	37.57	AV	52.64	**15.07**
AC 120V NeutralA	0.299	AV	25.22	11.07	36.29	AV	50.26	**13.97**
AC 120V NeutralA	0.374	AV	26.34	10.89	37.23	AV	48.40	**11.17**
AC 120V NeutralA	0.449	AV	25.40	10.79	36.19	AV	46.89	**10.70**
AC 120V NeutralA	0.674	AV	21.34	10.68	32.02	AV	46.00	**13.98**

Table 3: Conducted Emissions Data (AV) – 120VAC @ 60Hz

Product Integrity Laboratory **V2.5**	**Project Number:**	CG-730	**Tester:**	Lixin Wang	
	Model:	Wireless Dynamics SDiD 1212	**Test ID:**	CE02tc-10m-730	
	Comments:	Conf10: 120VAC,SDiD installed in PDA. PDA in Horizontal position, FDX With Memory. SDiD s/n: 073900000003/R4803-1.			

Standard: FCC15.207

Voltage/Line	Frequency (MHz)	Measurement Detector	Measured Value (dBμV)	Correction Factors (dB)	Emission Level (dBμV)	Limit Type	Limit (dBμV)	Margin (dB)
AC 120V Line1A	0.150	QP	42.54	12.37	54.91	QP	65.99	**11.08**
AC 120V Line1A	0.225	QP	36.22	11.51	47.73	QP	62.65	**14.92**
AC 120V Line1A	0.300	QP	32.00	11.13	43.13	QP	60.26	**17.13**
AC 120V Line1A	0.374	QP	27.33	10.96	38.29	QP	58.40	**20.11**
AC 120V Line1A	0.449	QP	28.98	10.86	39.84	QP	56.89	**17.05**
AC 120V Line1A	17.067	QP	33.17	11.49	44.66	QP	60.00	**15.34**
AC 120V NeutralA	0.150	QP	42.52	12.29	54.81	QP	65.99	**11.18**
AC 120V NeutralA	0.225	QP	36.37	11.44	47.81	QP	62.65	**14.84**
AC 120V NeutralA	0.300	QP	32.31	11.07	43.38	QP	60.26	**16.88**
AC 120V NeutralA	0.374	QP	28.52	10.89	39.41	QP	58.40	**18.99**
AC 120V NeutralA	0.449	QP	28.93	10.79	39.72	QP	56.89	**17.17**
AC 120V NeutralA	0.674	QP	23.24	10.68	33.92	QP	56.00	**22.08**

Table 4: Conducted Emissions Data (QP) – 120VAC @ 60Hz

The highest emission measured was 43.70 dBμV/m at 17.064 MHz on LineA1 with average detection. It has 6.30 dB margin to the FCC 15.207 limit.

The highest emission measured was 54.91 dBμV/m at 150 kHz on LineA1 with quasi-peak detection. It has 11.08 dB margin to the FCC 15.207 limit.

The EUT is in compliance with FCC Part 15 Subpart C 15.207 requirements.

C.5. Observations

None

C.6. Sample Calculation

Correction Factor = LISN Correction Factor + Cable Loss
Emission Level = Measured Value + Correction Factor
Margin = Limit – Emission Level

C.7. Test Data & Photographs

The test data and photographs collected during this test appear following this page.

C.8. Tested By

This testing was conducted in accordance with the ISO 17025 scope of accreditation, table 1; Quality Manual.

Name: Lixin Wang
Function: EMC Technologist

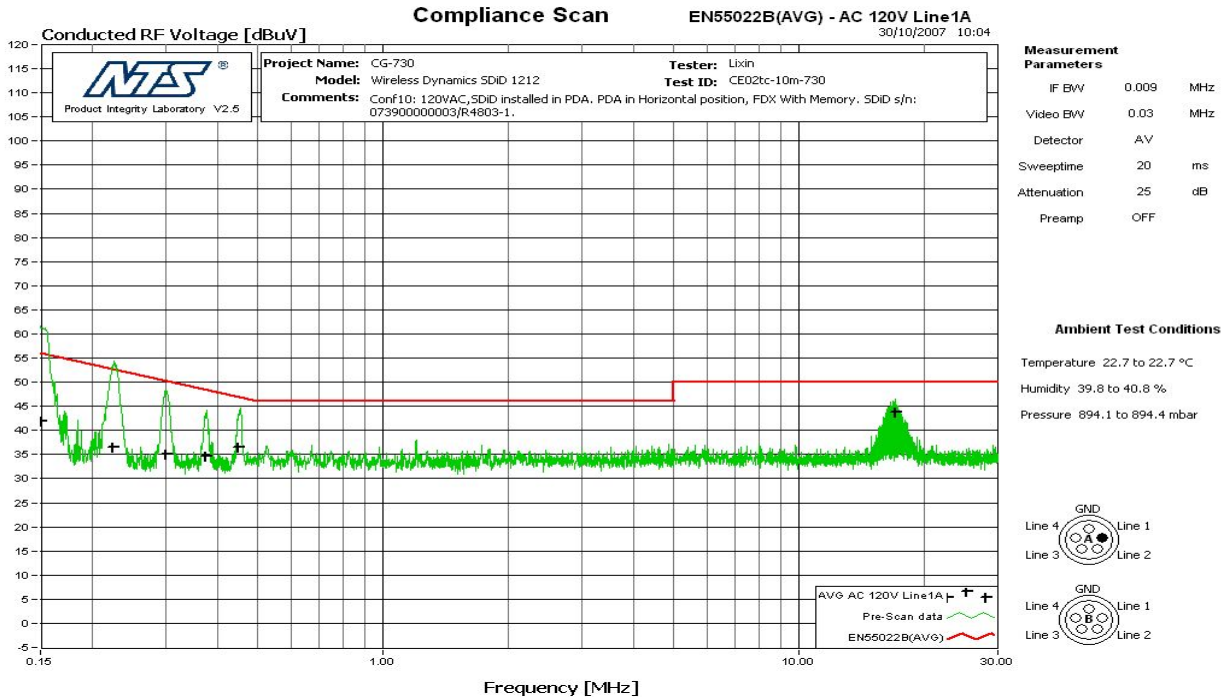

Figure 9: Conducted Emissions on AC Mains 120VAC 60 Hz (AVG Detector)

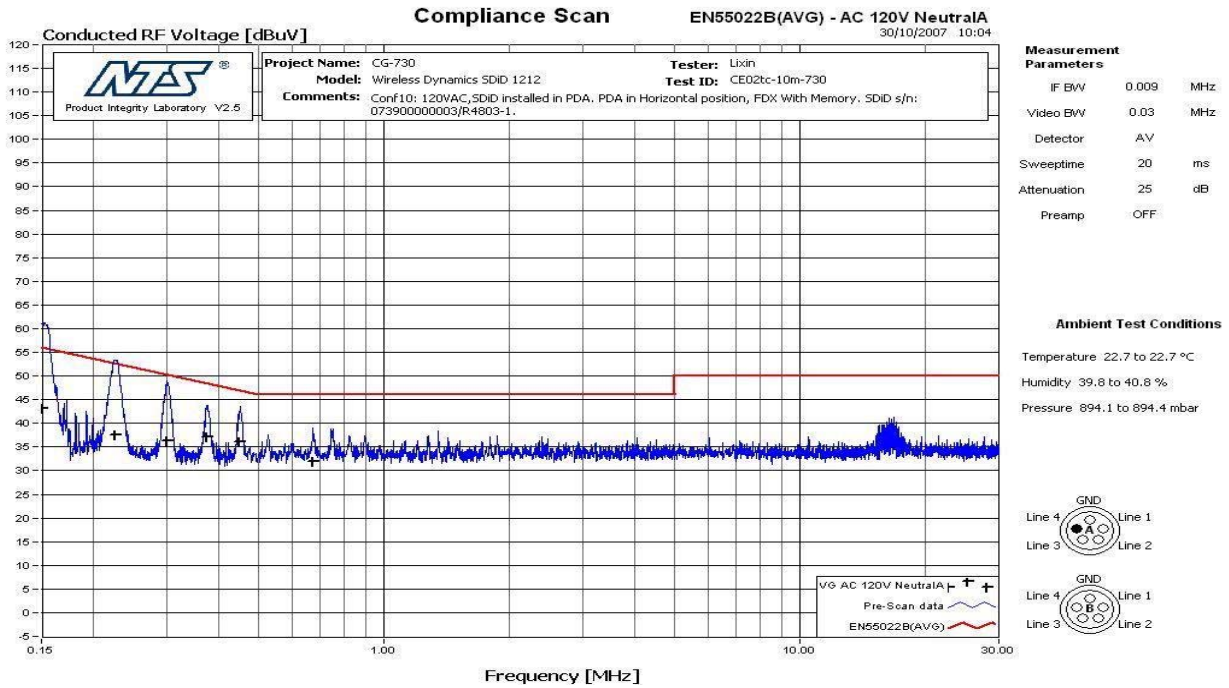

Figure 10: Conducted Emissions on AC Mains 120VAC 60 Hz (AVG Detector)

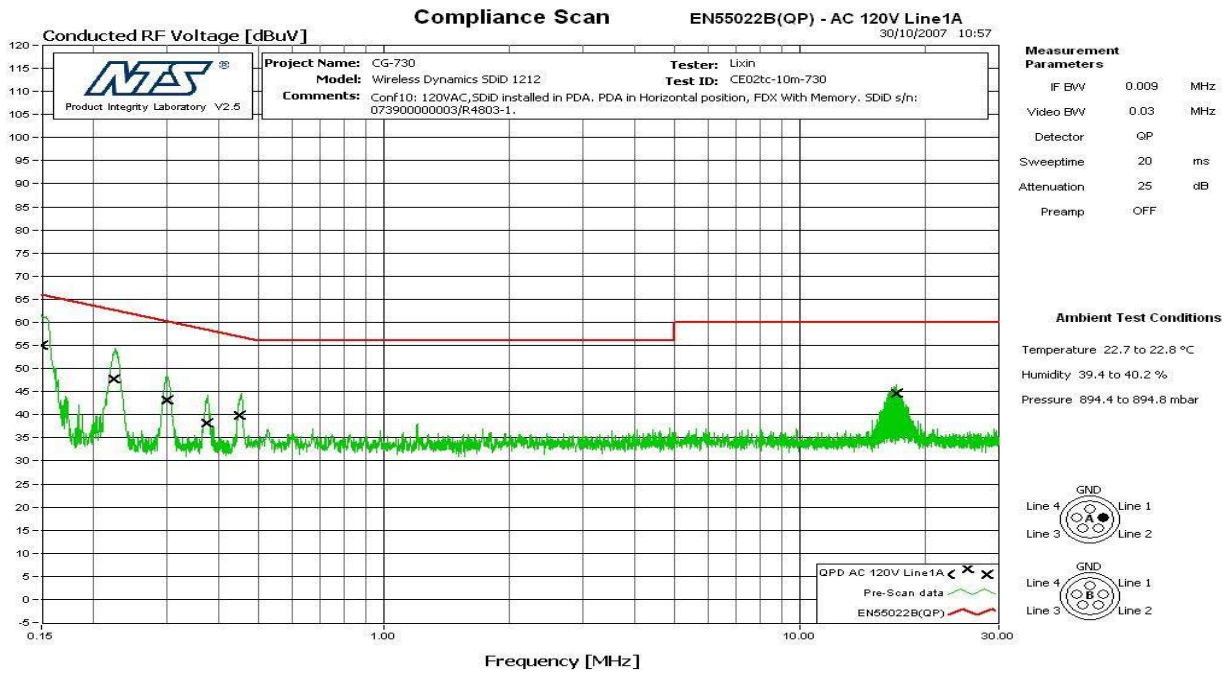

Figure 11: Conducted Emissions on AC Mains 120VAC 60 Hz (QP Detector)

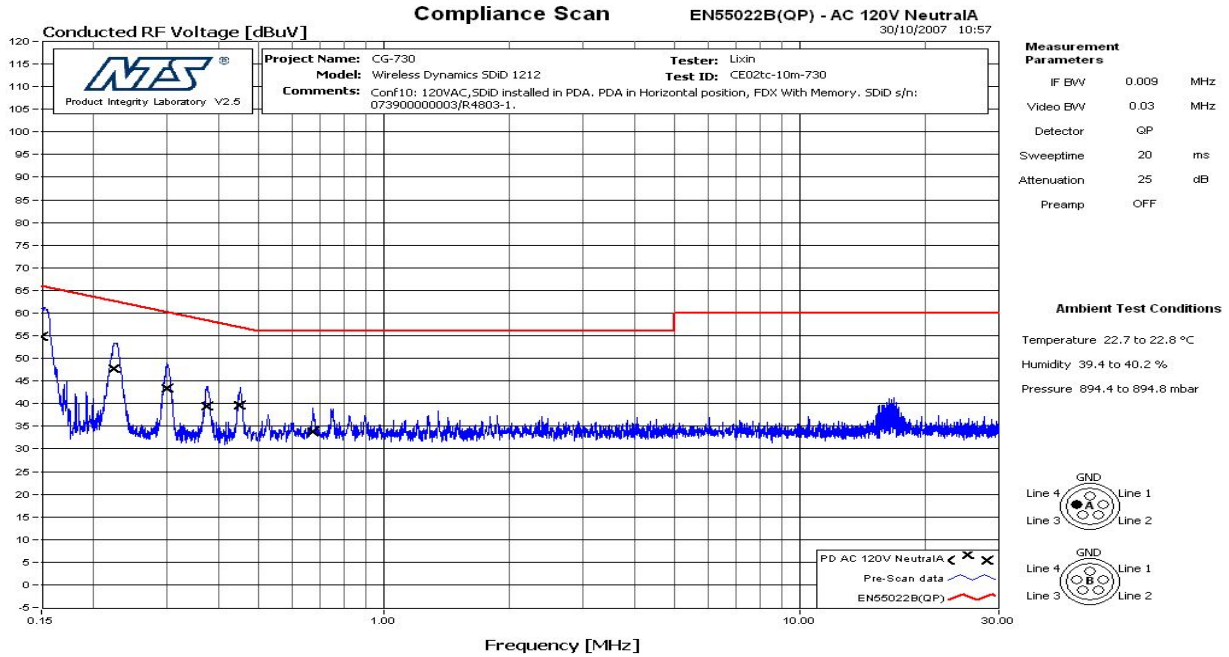

Figure 12: Conducted Emissions on AC Mains 120VAC 60 Hz (QP Detector)

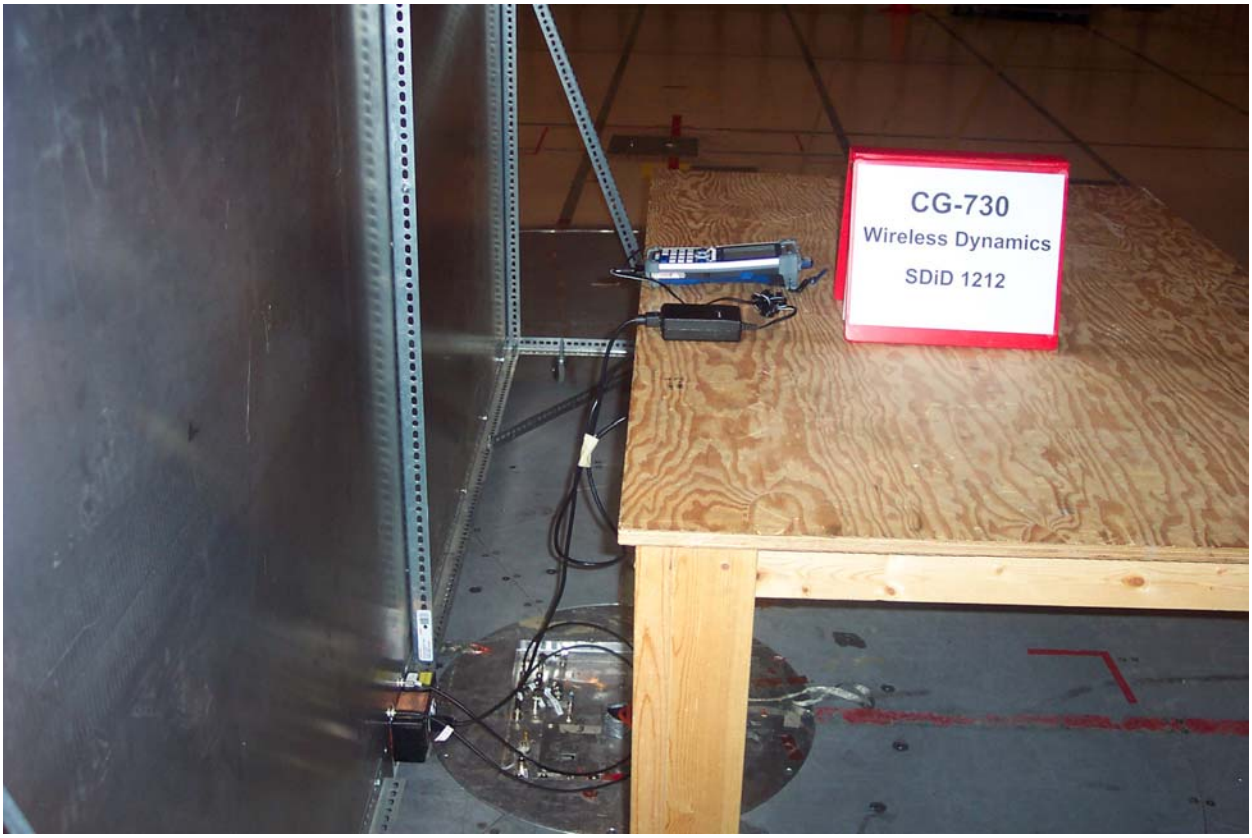

Figure 13: Conducted Emissions on AC Mains (0.15 – 30 MHz) - Setup

APPENDIX D: EMISSION TEST EQUIPMENTS LIST

D.1. Radiated Emissions 30 MHz – 1 GHz Measurement Equipment

Description	Manufacturer	Type/Model	Asset #	Cal Due	Cal Date
10m ANECHOIC CHAMBER					
Bilog Antenna	Schaffner	CBL 6112D	CG1177	10OCT08	10OCT07
RF Cable	Suhner Sucoflex	Ferrite bead loaded cable	CG0398	13APR08	13APR06
Digital Barometer / Thermometer	Cole-Parmer	1870	CG0728	19JUN08	19JUN07
CONTROL ROOM					
Test Receiver	Rohde & Schwarz	ESMI	CG0433/ CG0434	27FEB08	27FEB07
Mast Controller	EMCO	2090	CG0179	N/A	N/A
Multi Device Controller TT1 (Turntable)	EMCO	2090	CG0178	N/A	N/A
RF 10m East site Link				13APR08	13APR06
- Cable 1	Suhner Sucoflex	NA	CG0690		
- Cable 2	Suhner Sucoflex	NA	CG0634		
- Cable 3	Suhner Sucoflex	NA	CG0660		
- Cable 4	Suhner Sucoflex	NA	CG0661		
- Amplifier	Hewlett Packard	8447F	CG0177		

D.2. Conducted Emissions 150 kHz – 30 MHz Measurement Equipment

Descriptions		Manufacturer	Type/Model	Serial #	Cal Due	Cal Date
10m ANECHOIC CHAMBER						
A LISN Link					18JAN08	18JAN06
-LISN A Switch	☒ A	NA	NA	CG0675		
-Cable Switch to Limiter	☒ A	NA	NA	CG0663		
- Cable LISN to Switch	☒ A1	Sucoflex	NA	CG0667	18JAN08	18JAN06
	☐ A2	Sucoflex	NA	CG0668	18JAN08	18JAN06
	☐ A3	Sucoflex	NA	CG0669	18JAN08	18JAN06
	☒ A4	Sucoflex	NA	CG0671	18JAN08	18JAN06
- Table Top LISN	☒ TT	EMCO	3825	CG0367	05JAN08	05JAN06
- LISN	☐ A1	EMCO	38100/1SPEC	CG0465	26JAN08	26JAN06
- LISN	☐ A2	EMCO	38100/1SPEC	CG0282	26JAN08	26JAN06
- LISN	☐ A3	EMCO	38100/1SPEC	CG0367	26JAN08	26JAN06
- LISN	☐ A4	EMCO	38100/1SPEC	CG0279	26JAN08	26JAN06
Digital Barometer / Thermometer		Cole-Parmer	1870	CG0728	19JUN08	19JUN07
CONTROL ROOM						
Test Receiver		Rohde & Schwarz	ESMI	CG0433/ CG0434	27FEB08	27FEB07
Mast Controller		EMCO	2090	CG0179		
Cable Transient limiter to Receiver		NA	NA	CG0678	18JAN08	18JAN06
A LISN Link					18JAN08	18JAN06
-LISN A Limiter	☒ A	NA	NA	CG0677		
-Cable to Limiter	☒ A	NA	NA	CG0663		

D.3. Radiated Emissions E-Field 10 KHz – 30 MHz Measurement Equipment

Descriptions	Manufacturer	Type/Model	Asset #	Cal Due	Cal Date
10m ANECHOIC CHAMBER					
Loop Antenna (Rx) 10 KHz – 30 MHz	Rohde & Schwarz	HFH2-Z2	CG0701	02JUL08	02JUL07
E-field link Cable 10 kHz – 35 MHz	Sucoflex	NA	CG0667	8JAN08	8JAN06
Digital Barometer / Thermometer	Cole-Parmer	1870	CG0728	19JUN08	19JUN07
CONTROL ROOM					
Test Receiver	Rohde & Schwarz	ESMI	CG0433/ CG0434	27FEB08	27FEB07
Cable to Receiver	NA	NA	CG0685	18JAN08	18JAN06

END OF DOCUMENT