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Test & measurement services

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Electromagnetic Compatibility Test Data

Quick Scan Test results of a SmartChair, model Chair: Axia

Customer	:	Salland Electronics B.V. Katwolderweg 15 8041 AC ZWOLLE The Netherlands
Customer's representative	:	G. van Aalsum
In the capacity of	:	Manufacturer
Reference number	:	12C00103LBS01
Date of receipt	:	2012, February 02
Date of test	:	2012, February 02
Date of test data	:	2012 February, 13
Test engineer	:	M. van Dijk

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1 Summary

A summary of the test results gained from testing the SmartChair is shown in the table below.

	Standard	Class / level	Result (Pass/Fail)
Emission	EN 61000-6-3 (2007)	B	P[4]
Immunity	EN 61000-6-1 (2007)	3V/m 4/8kV	P[4]
Testplan	Not available	-	-

Note 1: The test results presented in this report relate only to the tested sample(s).

Note 2: The test results are based on the tested mode of operation(s), the applicable performance criteria and the acceptance criteria as described by the customer.

Note 3: At request of the customer, not all required tests as described in the standards are carried out.
Note 4: As far as tested. Due to the nature of a quick scan where as much information about the EUT must be obtained within the limited time available, tests are not carried out fully compliant but only partially.

The following table displays an evaluation of the test results, which are carried out to the SmartChair.

Test sequence	Test Description	Basic standard	EUT Modified during test (yes/no)	Result (Pass/Fail)
-	Conducted emission, test with a LISN	EN 55016-2-1 (2009) + A1 (2011)	-	NA
-	Conducted emission, test with a Current Probe	EN 55022 (2010)	-	NA
2	Radiated emission up to 1 GHz (FAC)	EN 55016-2-3 (2010) + A1 (2010)	No	Pass[2]
-	Radiated emission up to 1 GHz (SAC)	EN 55016-2-3 (2010) + A1 (2010)	-	NA
-	Radiated emission above 1 GHz (FAC)	EN 55016-2-3 (2010) + A1 (2010)	-	NA
-	Harmonics	EN 61000-3-2 (2006) + A1 (2009) + A2 (2009)	-	NA
-	Flicker	EN 61000-3-3 (2008)	-	NA
3	ESD	EN 61000-4-2 (2009)	No	Pass[2]
1	Radiated Immunity	EN 61000-4-3 (2006) + A1 (2008) + A2 (2010)	Yes	Pass[2]
-	EFT	EN 61000-4-4 (2004) + A1 (2010)	-	-
-	Surge	EN 61000-4-5 (2007)	-	-
-	Conducted Immunity	EN 61000-4-6 (2009)	-	-
-	Power frequency magnetic field [1]	EN 61000-4-8 (2010)	-	-
-	Voltage Dips and Voltage Variations[1]	EN 61000-4-11 (2004)	-	-

[1] Tests are excluded from accreditation.
[2] As far as tested, refer to note 4 above

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The table below shows details about tests that are not applicable.

Phenomenon	Comment
Conducted emission, mains terminals, continue (LISN)	The EUT is internal battery operated..
Conducted emission, telecommunications/network port (Current Probe)	The EUT doesn't have multi-user telecommunications / network ports such as ISDN or Ethernet.
Radiated emission above 1 GHz (FAR)	The highest frequency of the internal sources of the EUT is less than 108MHz.
Harmonics	The EUT is internal battery operated.
Flicker	The EUT is internal battery operated.
EFT	The EUT is internally battery operated. The EUT has no I/O cables.
Surge	The EUT is internally battery operated. The EUT has no I/O cables.
Conducted Immunity	The EUT is internally battery operated.. The EUT has no I/O cables.
Power Frequency Magnetic Field	The EUT doesn’t contain components which are sensitive to magnetic fields (ie Hall sensors).
Voltage Dips and Voltage Variations	The EUT is internally battery operated.

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2 EUT details

2.1 EUT

The condition of the EUT during reception was undamaged and fully functional.
The details for the EUT supplied for test were as follows.

Description	Sample
Name	SmartChair
Description	SmartChair
Manufacturer	Salland Electronics B.V.
Brand	Salland Electronics
Model number	Chair: Axia
Serial number	prototype
Power supply	4.5V internal battery
Rated Power	<20mA
Software release	Chair 1038013: V4.06, Chair 1038062: special test version, based on V4.07
Hardware release	1106HP01
Environment to be used	Domestic
System description	Not applicable

2.2 Cabling

The cable connections to EUT and peripheral equipment during testing are displayed in the table below.

No cables connected

The highest generated or used frequency of the EUT is 8 MHz.

3 Operating conditions during test

3.1 Test considerations

Quick Scan.

3.2 Mode(s) of operation

The test mode(s) during testing were defined as:

Mode of operation	Description
Mode 1	Emission mode: Normal operation mode. Vibration motor running
Mode 2	Continuous feedback mode (test mode)
Mode 3	Vibration motor is pulsing (on/off) Not used
Mode 4	Not applicable

3.3 Acceptance criteria

The criteria for recording a malfunction of operating during the immunity tests are shown in the table below.

Acceptance criterion	Description
Mode 1	Not applicable emission only.
Mode 2	Load condition of the load cells is indicated using four LEDs for four positions on the seat. If no loading takes place these are green, red otherwise. Indicators must remain stable during immunity tests. During the test no loading of load cells is effected. Indication should therefore remain green during the exposure to satisfy performance class A. Performance class B: Indicators may change status during the exposure, but should return to normal after the test. Performance class C: Indicators may change status during and after the test, but should return to normal after a reset or power cycle.
Mode 3	
Mode 4	Not applicable

The applicant's representative was present to witness the testing.

3.4 Test configuration

The EUT is tested as Floor standing equipment. The Appendixes of this report show pictures of the test configuration during the tests.

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4 Radiated emission up to 1 GHz (FAC)

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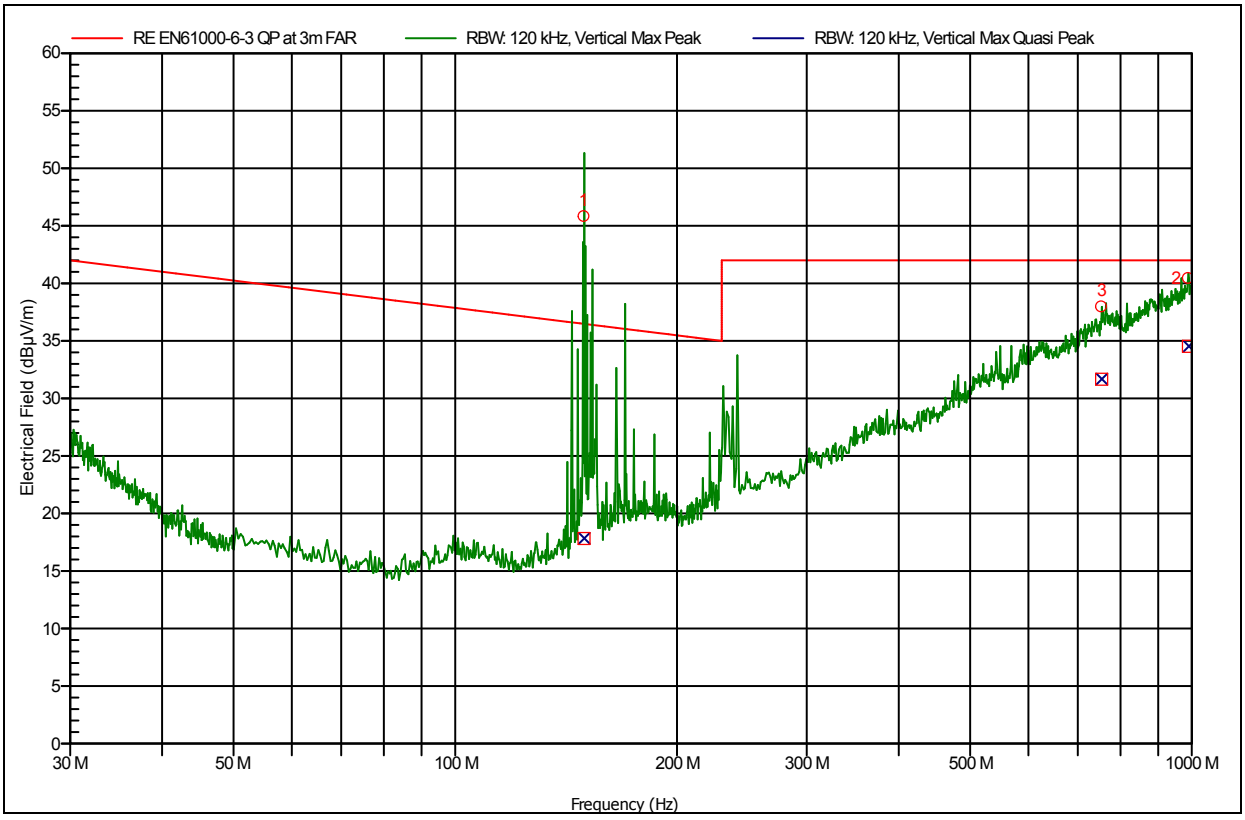
Result Radiated Emission Full Anechoic Chamber 30 MHz to 1000 MHz Vertical

PIN number:	12C00103	Bandwidth:	120 kHz
Test ID:	48	Antenna Distance:	3 m
Mode of operation:	Mode 1	Antenna Height:	1.3 m



Detected Peaks

Nr	Frequency	Peak	Quasi-Peak	Quasi-Peak Limit	Angle	Status
1	149.547 MHz	45.8 dBµV/m	17.8 dBµV/m	36.5 dBµV/m	0 Degree	Pass
2	989.237 MHz	40.4 dBµV/m	34.5 dBµV/m	42 dBµV/m	248 Degree	Pass
3	754.101 MHz	37.9 dBµV/m	31.7 dBµV/m	42 dBµV/m	248 Degree	Pass

Remarks

Pass.

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5 Electro Static Discharges (ESD)

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Test Results of Electro Static Discharge test

PIN number	12C00103
Test ID	49
Temperature	22 °Celsius
Humidity	60 %
Mode of operation	Mode 2
Remarks	Pass, The lower levels were tested also, no influence observed

Settings

Number of single discharges at each spot	10
Time interval between discharges	1 sec.

Test Results air discharge

Discharge location	Testlevel	Note	Result
Enclosure	8000 V	See remarks	Pass
Enclosure	-8000 V	See remarks	Pass

Test Results contact discharge

Discharge location	Testlevel	Note	Result
Enclosure	4000 V	See remarks	Pass
Enclosure	-4000 V	See remarks	Pass

Test Results at Horizontal Coupling Plane

Discharge location	Testlevel	Note	Result
Enclosure	4000 V	See remarks	Pass
Enclosure	-4000 V	See remarks	Pass

Test Results at Vertical Coupling Plane

Discharge location	Testlevel	Note	Result
Enclosure	4000 V	See remarks	Pass
Enclosure	-4000 V	See remarks	Pass

6 Radiated Immunity

Test Results of Radiated Immunity test 80 MHz to 1000 MHz Vertical

PIN number	12C00103
Test ID	37
Mode of operation	Mode 2
Angle, observation and result	Influence observed at 90, 150 and between 220 and 250MHz. Red LED's switch on.

Settings

Frequency step	logarithmic step of 1%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	10 V/m
Distance	3 m		

Test Results of Radiated Immunity test 80 MHz to 1000 MHz Vertical

PIN number	12C00103
Test ID	38
Mode of operation	Mode 2
Angle, observation and result	Influence observed at 230Mhz and 290Mhz. Red LED's switch on.

Settings

Frequency step	logarithmic step of 1%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	3 V/m
Distance	3 m		

Test Results of Radiated Immunity test 80 MHz to 1000 MHz Vertical

PIN number	12C00103
Test ID	39
Mode of operation	Mode 2, test specimen 2
Angle, observation and result	No influence observed.

Settings

Frequency step	logarithmic step of 1%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	3 V/m
Distance	3 m		

Test Results of Radiated Immunity test 80 MHz to 1000 MHz Horizontal

PIN number	12C00103
Test ID	40
Mode of operation	Mode 2, test specimen 2
Angle, observation and result	No influence observed.

Settings

Frequency step	logarithmic step of 1%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	3 V/m
Distance	3 m		

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Test Results of Radiated Immunity test 80 MHz to 1000 MHz Horizontal

PIN number	12C00103
Test ID	41
Mode of operation	Mode 2, test specimen 2 Quick scan
Angle, observation and result	Influence observed at frequencies between 150 and 170Mhz and 250 and 300MHz. Red LED's switch on.

Settings

Frequency step	logarithmic step of 3%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	10 V/m
Distance	3 m		

Test Results of Radiated Immunity test 80 MHz to 1000 MHz Vertical

PIN number	12C00103
Test ID	42
Mode of operation	Mode 2, test specimen 1, Sensitivity parameters changed.
Angle, observation and result	Influence observed at 190MHz. Red LED's switch on.

Settings

Frequency step	logarithmic step of 1%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	3 V/m
Distance	3 m		

Test Results of Radiated Immunity test 80 MHz to 1000 MHz Vertical

PIN number	12C00103
Test ID	43
Mode of operation	Mode 2, test specimen 1, Sensitivity parameters changed upper and lower limits doubled. Averaging changed from 2 to 4.
Angle, observation and result	No influence observed.

Settings

Frequency step	logarithmic step of 1%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	3 V/m
Distance	3 m		

Test Results of Radiated Immunity test 80 MHz to 1000 MHz Vertical

PIN number	12C00103
Test ID	44
Mode of operation	Mode 2, test specimen 1, Sensitivity parameters changed upper and lower limits doubled. Averaging changed back to 2.iso limit values the sum of the values is taken to trigger one LED.
Angle, observation and result	No influence observed.

Settings

Frequency step	logarithmic step of 1%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	3 V/m
Distance	3 m		

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Test Results of Radiated Immunity test 80 MHz to 529.848 MHz Vertical

PIN number	12C00103
Test ID	45
Mode of operation	Mode 2, test specimen 1, Sensitivity parameters changed upper and lower limits doubled. Averaging changed back to 2.iso limit values the sum of the values is taken to trigger one LED.
Angle, observation and result	Influence observed at various frequencies: 90MHz, 150MHz and frequencies between 220 and 320MHz. Green LED (upper right) comes on.

Settings

Frequency step	logarithmic step of 1%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	10 V/m
Distance	3 m		

Test Results of Radiated Immunity test 80 MHz to 1000 MHz Vertical

PIN number	12C00103
Test ID	46
Mode of operation	Mode 2, test specimen 1, Sensitivity parameters changed upper and lower limits doubled. Averaging changed back to 4.iso limit values the sum of the values is taken to trigger one LED.
Angle, observation and result	No observable influence.

Settings

Frequency step	logarithmic step of 1%	Modulation	1000 Hz. 80% AM
Dwell time	1 s	Test level	10 V/m
Distance	3 m		

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7 Equipment List

Radiated Emission Full Anechoic Room 30 MHz to 1000 MHz

Device Type	Brand	Type	ID
Antenna tower	D.A.R.E!! Development	-	1364
Turn table	D.A.R.E!! Development	RadiTurn	1373
Spectrum analyser	Rohde & Schwarz	ESIB 26	1397
Antenna	EMCO	3142	1147
Cable preamp -> analyser	D.A.R.E!! Development	-	1274

ESD

Device Type	Brand	Type	ID
ESD gun	Haefely Trench	PESD 3000	1185

Radiated Immunity 80 MHz to 1000 MHz

Device Type	Brand	Type	ID
Amplifier	Prana	AP32MT215	1347
Field sensor 1	D.A.R.E!! Development	RadiSense IV	1349
Signal generator	Rohde & Schwarz	SME 03	1470
Antenna	EMCO	3142	1147
Turn table	D.A.R.E!! Development	RadiTurn	1373
Coupler	Prana	AP32MT215 Coupler	1347
Forward power meter	D.A.R.E!! Development	RPR1018A + RPR1006A	1460/1458
Cable SG -> amplifier	D.A.R.E!! Development	-	1243
Cable coupler -> antenna	D.A.R.E!! Development	-	1274
Antenna tower	D.A.R.E!! Development	-	1364

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