

Test report

250123-2TRFWL

Date of issue: July 11, 2014

Applicant:

Lotek Wireless Inc.

Product:

SRX800

Model:

SRX800

IC Registration number:

4272A-SRX800

Specification:

RSS-215 Issue 2, June 2009

Analogue Scanner Receivers

Test location

Company name:	Nemko Canada Inc.
Address:	303 River Road
City:	Ottawa
Province:	Ontario
Postal code:	K1V 1H2
Country:	Canada
Telephone:	+1 613 737 9680
Facsimile:	+1 613 737 9691
Toll free:	+1 800 563 6336
Website:	www.nemko.com
Site number:	2040A-4 (3 m semi anechoic chamber)

Tested by:	Kevin Rose, Wireless/EMC Specialist
Reviewed by:	Andrey Adelberg, Senior Wireless/EMC Specialist
Date:	July 11, 2014
Signature:	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

Nemko Canada Inc. authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

© Nemko Canada Inc.

Table of contents

Table of contents	3
Section 1. Report summary	4
1.1 Applicant and manufacturer	4
1.2 Test specifications	4
1.3 Statement of compliance	4
1.4 Exclusions	4
1.5 Test report revision history	4
Section 2. Summary of test results	5
2.1 RSS-215, Issue 2, tests results	5
Section 3. Equipment under test (EUT) details	6
3.1 Sample information	6
3.2 EUT information	6
3.3 Technical information	6
3.4 EUT exercise details	6
3.5 EUT setup	7
Section 4. Engineering considerations	8
4.1 Modifications incorporated in the EUT	8
4.2 Technical judgment	8
4.3 Deviations from laboratory tests procedures	8
Section 5. Test conditions	9
5.1 Atmospheric conditions	9
5.2 Power supply range	9
Section 6. Measurement uncertainty	10
6.1 Uncertainty of measurement	10
Section 7. Test equipment	11
Section 8. Testing data	12
8.1 Clause 5.1 Receiver spurious emissions	12
Section 9. Block diagrams of test set-ups	15
9.1 Radiated emissions set-up	15

Section 1. Report summary

1.1 Applicant and manufacturer

Company name:	Lotek Wireless Inc.
Address:	115 Pony Drive
City:	Newmarket
Province/State:	Ontario
Postal/Zip code:	L3Y 7B5
Country:	Canada

1.2 Test specifications

RSS-215, Issue 2, June 2009	Analogue Scanner Receivers
-----------------------------	----------------------------

1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.4 Exclusions

None

1.5 Test report revision history

Revision #	Details of changes made to test report
TRF	Original report issued



Section 2. Summary of test results

2.1 RSS-215, Issue 2, tests results

Part	Test description	Verdict
5	Receiver Standard Specifications	
5.1	Receiver Spurious Emissions	Pass

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	February 10, 2014
Nemko sample ID number	1

3.2 EUT information

Product name	SRX800
Model	SRX800
Serial number	0010

3.3 Technical information

Product name	SRX800
Model	SRX800
Serial number	0010
Frequency Band	138–174 MHz
Frequencies tested	138.3, 149.8, and 173.845 MHz
Part number	SRX800
Power requirements	9 V _{DC} , 1 A
Description/theory of operation	Telemetry Receiver. The telemetry receiver is a VHF receiver receiving OOK (ON-Off keyed) VHF signals, with a burst interval in the range of seconds. The system consists of: CPU board, RF receiver board (including audio amplifier and speaker), power management and interconnect board, keypad, LCD display, and GPS receiver). The CPU controls the system and is collecting information from the RF board, which is then displayed on the LCD. The receiving of the signal is also signaled via the incorporated speaker. The user can operate the receiver via a keypad.
Operational frequencies	138–176 MHz
Software details	Master firmware: V 4.0/ Slave firmware V 9.4/ Windows software V2.0.3648.16.

3.4 EUT exercise details

The EUT was receiving RF ID tags.

The test was performed on each frequency of operation and then in scan mode.

3.5 EUT setup

Table 3.5-1: EUT sub assemblies

Description	Brand name	Model/Part number	Serial number	Rev.
CPU Board	Lotek	200-2495	-	2.4
RF board	Lotek	200-2490	-	2.0
Power management and interconnect board	Lotek	200-2508	-	3
Keypad Assembly	Lotek	011-1351	-	N/A
LCD Display	Lotek	011-1245	-	N/A
GPS antenna assembly	Lotek	200-1249	-	N/A

Table 3.5-2: EUT interface ports

Description	Qty.
USB	1
RS-232 (9 pin DB, male)	1
VHF input (BNC)	1
GPS antenna connector (SMA female)	1

Table 3.5-3: Support equipment

Description	Brand name	Model/Part number	Serial number	Rev.
VHF antenna	Larsen	KD4-150-HQ	-	N/A
Wall Mount Power Supply 9 V _{DC} /1.3 A	Microchip	PS1000	-	N/A

Table 3.5-4: Inter-connection cables

Cable description	From	To	Length (m)
USB cable	Receiver	PC	1.8 m
RS-232 cable	Receiver	PC	1.8 m
GPS antenna with cable	Receiver	GPS antenna	2.5 m

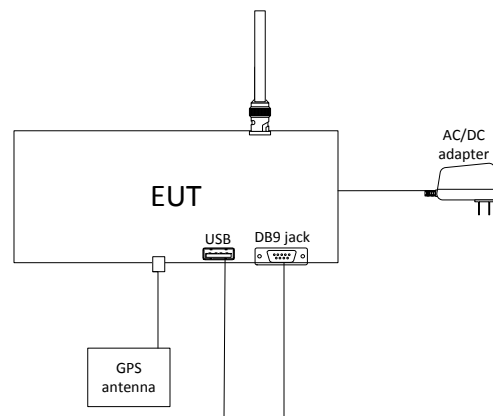


Figure 3.5-1: Setup diagram

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Nemko Canada Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 "Uncertainty in EMC measurements." Measurement uncertainty was calculated using the methods described in CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements; as well as described in UKAS LAB34: The expression of Uncertainty in EMC Testing. Measurement uncertainty calculations assume a coverage factor of $K=2$ with 95% certainty.

Section 7. Test equipment

Table 6.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	Mar. 09/14
Flush mount turntable	Sunol	FM2022	FA002082	—	NCR
Controller	Sunol	SC104V	FA002060	—	NCR
Antenna mast	Sunol	TLT2	FA002061	—	NCR
Power source	California Instruments	3001i	FA001021	1 year	June 04/14
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Oct. 24/14
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	Feb. 21/14
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1 year	Feb. 21/14
Pre-amplifier (1–18 GHz)	JCA	JCA118-503	FA002091	1 year	June 21/14
50 Ω coax cable	Huber + Suhner	NONE	FA002392	1 year	July. 17/14
50 Ω coax cable	C.C.A.	None	FA002555	1 year	Oct. 07/14

Notes: NCR - no calibration required

Table 6.1-2: Radiated disturbance test software details

Manufacturer of Software	Details
Rhode & Schwarz	EMC32, Software for EMC Measurements, Version 8.53.0

Notes: None

Section 8. Testing data

8.1 Clause 5.1 Receiver spurious emissions

8.1.1 Definition and limits

The scanner receiver spurious emissions are to be measured when the receiver is in the scanning mode and repeated when the scanning is stopped. Receiver spurious emissions shall comply with the limits specified in RSS-Gen.

Table 8.1-1: RSS-Gen – Radiated emission limits

Frequency, MHz	Field strength of emissions		Measurement distance, m
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.

8.1.2 Test summary

Verdict	Pass		
Test date	February 12, 2014	Temperature	22 °C
Test engineer	Kevin Rose	Air pressure	1004 mbar
Test location	Ottawa	Relative humidity	36 %

8.1.3 Setup details

EUT setup configuration	Table top
Test facility	3 m Semi anechoic chamber
Measuring distance	3 m
Antenna height variation	1–4 m
Turn table position	0–360°
Measurement details	A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

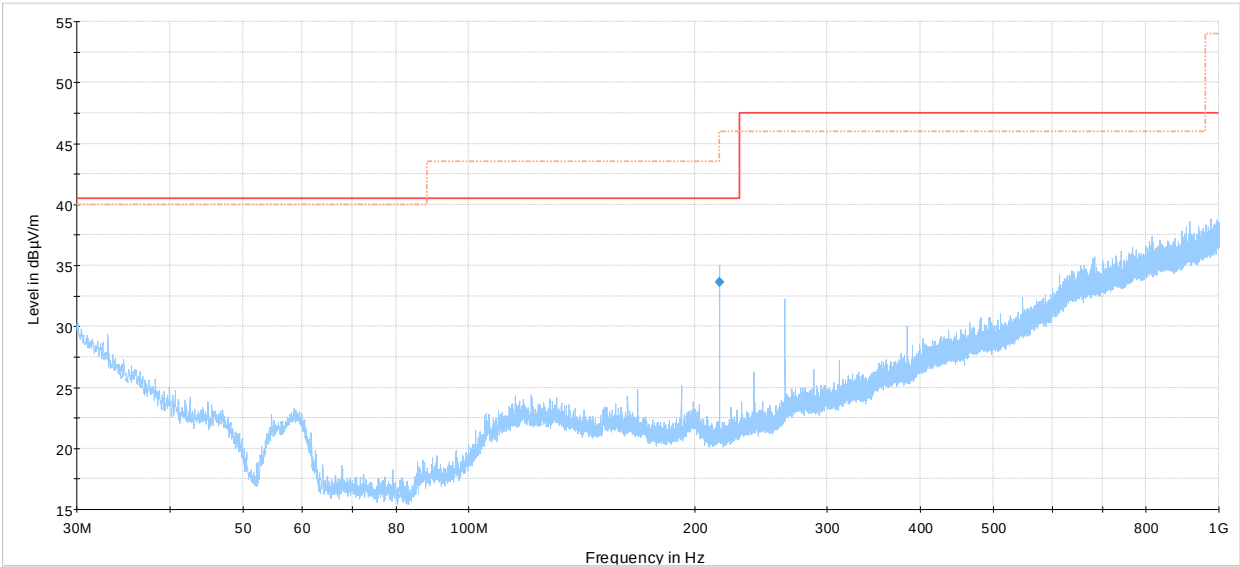
Receiver/spectrum analyzer settings for frequencies below 1 GHz:

Resolution bandwidth	120 kHz
Video bandwidth	300 kHz
Detector mode	Peak (preview measurement); Quasi-peak (final measurement)
Trace mode	Max Hold
Measurement time	100 ms (preview measurement); 1000 ms (final measurement)

Receiver/spectrum analyzer settings for frequencies above 1 GHz:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	Peak (preview); Peak and Average (final)
Trace mode	Max Hold
Measurement time	100 ms (preview); 1000 ms (final)

8.1.4 Test data



NEX-250123 RE Scan 30-1000 MHz
— CISPR 22 - Class B 3m QP
— FCC Part 15 - Class B 3m QP and Average
— Preview Result 1-PK+
◆ Final Result 1-QPK

The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

The test was performed on each frequency of operation and then in scan mode. Worst case data is presented

Figure 8.1-1: Radiated disturbance spectral plot (30 to 1000 MHz)

Table 8.1-2: Radiated disturbance (Quasi-Peak) results

Frequency (MHz)	Quasi-Peak field strength ¹ (dBµV/m)	Measurement time (ms)	Bandwidth (kHz)	Antenna height (cm)	Pol. (V/H)	Turn table position (°)	Correction factor ² (dB)	Margin (dB)	3 m Quasi-Peak limit ³ (dBµV/m)
216.0	33.6	1000.0	120	100.0	V	22.0	13.0	12.4	43.5

Notes: ¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

² Correction factor = antenna factor ACF (dB) + cable loss (dB)

Sample calculation: 33.6 dBµV/m (field strength) = 20.6 dBµV (receiver reading) + 13.0 dB (Correction factor)

8.1.5 Setup photos



Figure 8.1-2: Radiated disturbance setup photo



Figure 8.1-3: Radiated disturbance setup photo

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up

