

Test report

226893-1TRFWL

Date of issue: July 24, 2013

Applicant:

Stanley Healthcare, a Stanley Black & Decker, Inc. Company

Product:

BedCheck® Cordless Pad Transmitter

Model:

72110

FCC ID:

LA5-BCP1

IC Registered number:

2459A-BCP1

Specifications:

- ◆ **FCC 47 CFR Part 15 Subpart C, §15.231**
Periodic operation in the band 40.66–40.70 MHz and above 70 MHz
- ◆ **RSS-210, Issue 8, Annex 1.1**
Momentarily Operated Devices

Test location

Nemko Canada Inc.

303 River Road

Ottawa, ON, K1V 1H2

Canada

FCC test site registration number: 176392 and IC registered site number: 2040A-4 (3 m semi anechoic chamber)

Telephone +1 613 737 9680

Facsimile +1 613 737 9691

Toll free +1 800 563 6336

Website www.nemko.com

Tested by David Duchesne, Senior EMC/Wireless Specialist

Reviewed by



Andrey Adelberg, Senior Wireless/EMC Specialist

July 24, 2013

Date

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

June 14, 2013 2

Section 1	Report summary	4
1.1	Applicant	4
1.2	Manufacturer	4
1.3	Test specifications	4
1.4	Statement of compliance	4
1.5	Exclusions	4
1.6	Test report revision history	4
Section 2	Summary of test results	5
2.1	FCC Part 15 Subpart A and C – Test results	5
2.2	IC RSS-GEN Issue 3 and RSS-210, Issue 8 Annex 1, test 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	Product description and theory of operation	6
3.5	EUT exercise details	6
3.6	EUT setup details	6
Section 4	Engineering considerations	7
4.1	Modifications incorporated in the EUT	7
4.2	Technical judgment	7
4.3	Deviations from laboratory tests procedures	7
Section 5	Test conditions	8
5.1	Atmospheric conditions	8
5.2	Power supply range	8
Section 6	Measurement uncertainty	9
6.1	Uncertainty of measurement	9
Section 7	Test equipment	10
7.1	Test equipment list	10
Section 8	Testing data	11
8.1	FCC 15.231(a) and RSS-210 A1.1.1 Conditions for intentional radiators to comply with periodic operation	11
8.2	15.231(b) and RSS-210 A1.1.2 Field strength of emissions	14
8.3	FCC 15.231(c) and RSS-210 A1.1.3 Emission bandwidth of momentary signals	19
Section 9	Block diagrams of test set-ups	21
9.1	Radiated emissions set-up	21
Section 10	EUT photos	22
10.1	External photos	22

Section 1 Report summary

1.1 Applicant

Stanley Healthcare, a Stanley Black & Decker, Inc. Company
4600 Vine Street
Lincoln NE, USA
68503

1.2 Manufacturer

Same as applicant.

1.3 Test specifications

Table 1.3-1: Test specification

Standard	Description
FCC 47 CFR Part 15, Subpart C, Chapter 15.231	Periodic operation in the band 40.66–40.70 MHz and above 70 MHz
RSS-210, Issue 8 Annex 1.1	Momentarily Operated Devices
ANSI C64.3 v 2003	American National Standard for Methods of Measurement of Radio- Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

1.4 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.

1.5 Exclusions

None

1.6 Test report revision history

Table 1.6-1: Test report revision history

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

Section 2 Summary of test results

2.1 FCC Part 15 Subpart A and C – Test results

Table 2.1-1: FCC Part 15 – Radio frequency devices results

Part	Test description	Verdict
§15.31(e)	Variation of power source	See Notes ¹
§15.203	Antenna requirement	See Notes ²
§15.207(a)	Conducted limits	Not applicable ³
§15.231(a)	Conditions for intentional radiators to comply with periodic operation	Pass
§15.231(b)	Field strength of emissions	Pass
§15.231(c)	Emission bandwidth	Pass
§15.231(d)	Requirements for devices operating within 40.66–40.70 MHz band	Not applicable ⁴
§15.231(e)	Conditions for intentional radiators to comply with periodic operation	Not applicable ⁵

Notes:

- ¹ Fundamental field strength was measured with a fresh battery.
- ² The EUT is equipped with an integral antenna.
- ³ The EUT is battery powered.
- ⁴ The EUT does not operate in the frequency range of 40.66–40.70 MHz.
- ⁵ The EUT complies with requirement 15.231 (a).

2.2 IC RSS-GEN Issue 3 and RSS-210, Issue 8 Annex 1, test results

Table 2.2-1: IC RSS-GEN Issue 3 results

Part	Test description	Verdict
4.6.1	Occupied bandwidth	Please refer to RSS-210, A1.1.3
6.1	Receiver spurious emissions limits (radiated)	Not applicable ¹
6.2	Receiver spurious emissions limits (antenna conducted)	Not applicable ¹
7.2.4	AC power lines conducted emission limits	Not applicable ²

Notes:

- ¹ The EUT does not contain a receiver.
- ² The EUT is battery powered.

Table 2.2-2: IC RSS-210 Issue 8 Annex 1 results

Part	Test description	Verdict
A1.1.1	Types of momentary signals	Pass
A1.1.2	Field strength and frequency bands	Pass
A1.1.3	Bandwidth for momentary signals	Pass
A1.1.4	Frequency stability within 40.66–40.70 MHz band	Not applicable ¹
A1.1.5	Reduced field strengths	Not applicable ²

Notes:

- ¹ The EUT does not operate in the frequency range of 40.66–40.70 MHz.
- ² The EUT complies with requirement RSS-210 A1.1.2.

Section 3 Equipment under test (EUT) details

3.1 Sample information

Receipt date	May 21, 2013
Nemko sample ID number	Item #2

3.2 EUT information

Product name	BedCheck® Cordless Pad Transmitter
Model	72110
Serial number	130520-FFFF
Software version	Monitor firmware version 20-May-2013

3.3 Technical information

Operating frequency	433.4 MHz
Modulation type	On/Off Keying
Occupied bandwidth	20 dB bandwidth: 5.2 kHz 99% bandwidth: 19.4 kHz
Emission designator	19K4K1D
Power requirements	Battery (2 × CR2032 Batteries)
Antenna information	Integral antenna with −5.5 dBi gain

3.4 Product description and theory of operation

A pressure sensing switch in a bed or chair pad controls RF messages in the BedCheck® Cordless Pad Transmitter. A BedCheck® Cordless Monitor listens to these RF messages and generates an alarm when a patient unexpectedly exits the chair or bed.

3.5 EUT exercise details

Separate samples were provided with continuous carrier and continuous modulation transmission.

3.6 EUT setup details

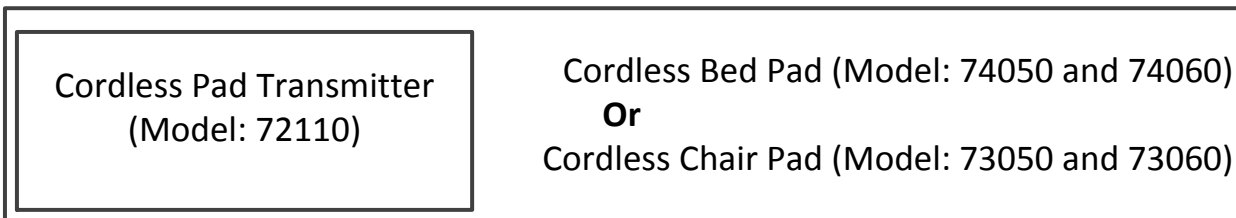


Figure 3.6-1: Setup diagram

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: 86–106 kPa

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 ± 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

7.1 Test equipment list

Table 7.1-1: 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
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 40	FA002071	1 year	Feb. 28/14
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 40	FA002071	1 year	Feb. 28/14
Bilog antenna	Sunol	JB3	FA002108	1 year	Feb. 21/14
Horn antenna #2	EMCO	3115	FA000825	1 year	Feb. 21/14
50 Ω coax cable	Huber + Suhner	NONE	FA002392	1 year	June. 27/13
50 Ω coax cable	Huber + Suhner	NONE	FA002074	1 year	Aug. 23/13
1–18 GHz pre-amplifier	JCA	JCA118-503	FA002091	1 year	July 03/13

Notes: None

Table 7.1-2: Test software details

Test description	Manufacturer of Software	Details
Radiated emissions	Rhode & Schwarz	EMC32, Software for EMC Measurements, Version 8.53.0

Notes: None

Section 8 Testing data

8.1 FCC 15.231(a) and RSS-210 A1.1.1 Conditions for intentional radiators to comply with periodic operation

8.1.1 Definitions and limits

FCC:

The provisions of this section are restricted to periodic operation within the band 40.66–40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

- 1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- 2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- 3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.
- 4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition
- 5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

IC:

The following conditions shall be met to comply with the provisions for momentary operation:

- a. A manually operated transmitter shall employ a push-to-operate switch and be under manual control at all transmission times. When released, the transmitter shall cease transmission (holdover time of up to 5 seconds is permitted).
- b. Transmitter activated automatically shall cease transmission within 5 seconds after activation, (i.e. maximum 5 seconds of operation).
- c. Periodic transmissions at regular predetermined intervals are not permitted, except as provided in A.1.1.5. However, polling or supervision transmissions, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmission does not exceed 2 seconds per hour for each transmitter.
- d. Intentional radiators employed for radio control purposes during emergencies involving fire, security of goods (e.g. burglar alarms), and safety-of-life, when activated to signal an alarm, may operate during the interval of the alarm condition.

8.1.2 Test summary

Verdict Pass

8.1.3 Observations/special notes

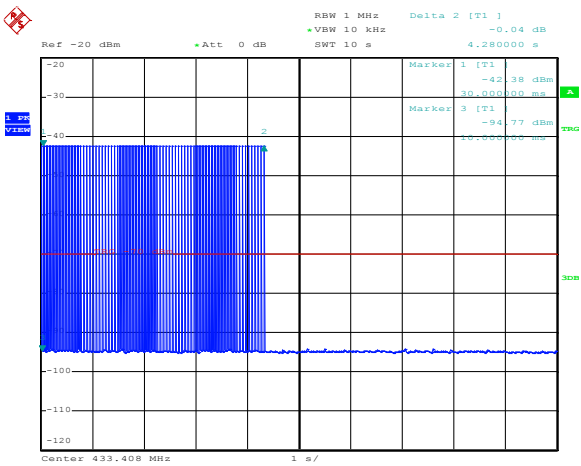
None

8.1.4 Setup details

Test date	May 27, 2013	Test engineer	David Duchesne	Relative humidity	26.2 %
Temperature	25.5 °C	Air pressure	1008.3 mbar		

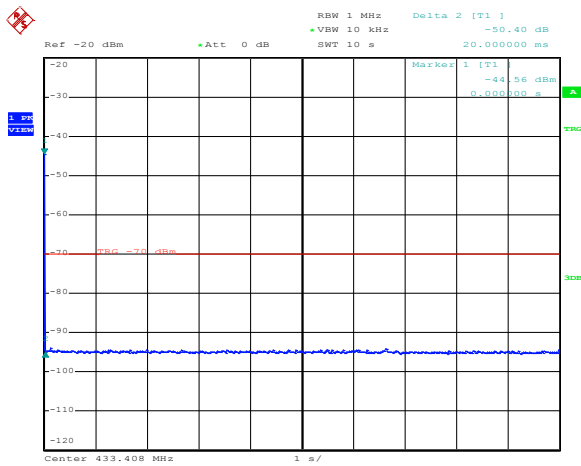
8.1.5 Test data

- IC FCC
- a) 1) The transmitter when manually activated will automatically deactivate the within 4.28 seconds after being triggered. See **Figure 8.1-1**.
- b) 2) The automatically activated transmitter (supervision) ceases transmission within 5 seconds after activation. See **Figure 8.1-2**.
- c) 3) The EUT periodically transmits a supervision transmission for security and safety applications. The total duration of transmissions does not exceed more than two seconds per hour. See **Figure 8.1-2** and **Figure 8.1-3**.
Total on-time over one hour is $9.8 \text{ ms} \times 201 = 1.97 \text{ s}$
(Burst width is 9.8 ms, Burst repetition is 17.9 s, Total bursts within one hour is $3600 \div 17.9 = 201$)
- d) 4) The EUT usage is not for radio control purposes during emergencies. The EUT operates as in 15.231(a)(2) during an alarm state.
- 5) The EUT does not transmit set-up information



Date: 27.MAY.2013 15:42:03

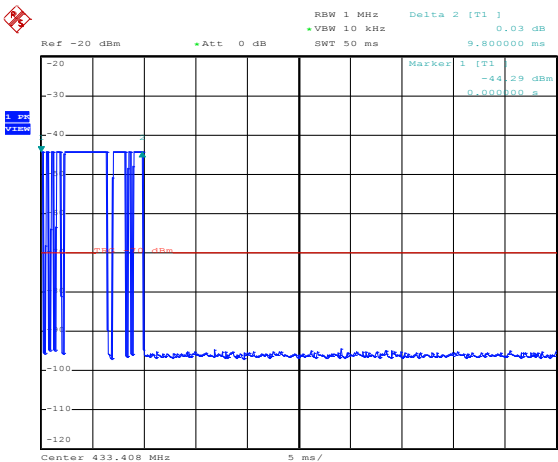
Figure 8.1-1: Manual transmission length



Date: 27.MAY.2013 15:43:24

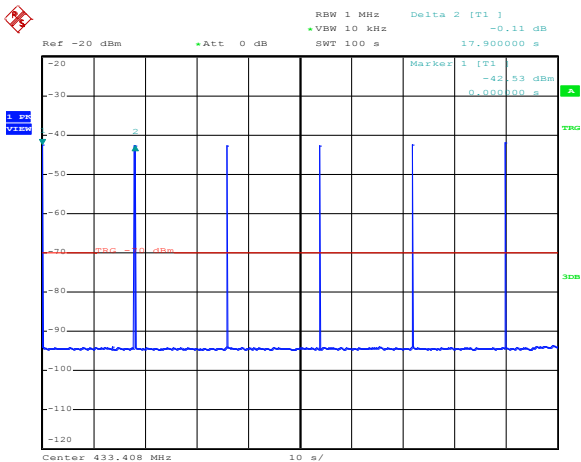
Figure 8.1-2: Automatic transmission (supervision) length

8.1.5 Test data, continued



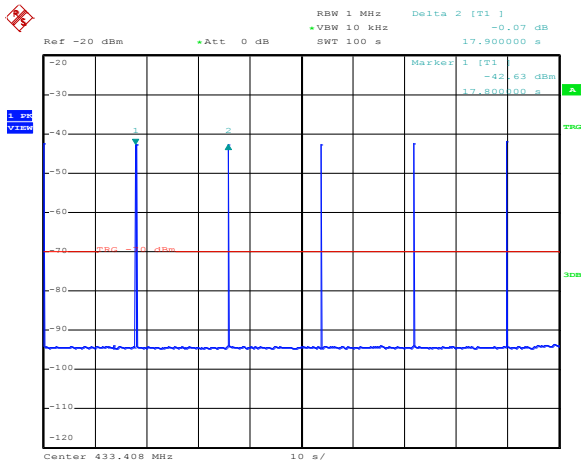
Date: 27.MAY.2013 15:44:38

Figure 8.1-3: Single supervision burst width



Date: 27.MAY.2013 15:48:34

Figure 8.1-4: Supervision repetition



Date: 27.MAY.2013 15:49:04

Figure 8.1-5: Supervision repetition

8.2 15.231(b) and RSS-210 A1.1.2 Field strength of emissions

8.2.1 Definitions and limits

FCC:

In addition to the provisions of §15.205 the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Table 8.2-1: Field strength limits for FCC

Frequency (MHz)	Field strength of fundamental		Field strength of spurious emissions	
	(μV/m)	(dBμV/m)	(μV/m)	(dBμV/m)
40.66–40.70	2,250	67	225	47
70–130	1,250	61.9	125	41.9
130–174	1,250 to 3,750*	61.9 to 71.5*	125 to 375*	41.9 to 51.5*
174–260	3,750	71.5	375	51.5
260–470	3,750 to 12,500*	71.5 to 81.9*	375 to 1,250*	51.5 to 61.9*
Above 470	12,500	81.9	1,250	61.9

Notes: * Linear interpolation

- 1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.
- 2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.
- 3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

IC:

- 1) The field strength of emissions from momentarily operated intentional radiators shall not exceed the limits in **Table 8.2-2**.
- 2) Intentional radiators shall demonstrate compliance with the field strength limits shown in **Table 8.2-2**, based on the average value of the measured emissions.
 - Alternatively, compliance with the limit in Table A may be demonstrated using a CISPR quasi-peak detector. If average measurements are employed, the requirements of Pulsed Operation of RSS-Gen apply regarding pulsed operation for averaging pulsed emissions and for limiting peak emissions.
- 3) The field strength limits shown in **Table 8.2-2** are based on the fundamental frequency of the intentional radiator. Unwanted emissions shall be attenuated to the limits listed in RSS-Gen or to the limits shown in **Table 8.2-2**, whichever are less stringent.

Table 8.2-2: Permissible field strength limits for momentarily operated devices for IC

Fundamental frequency excluding restricted band frequencies of RSS-Gen (MHz)	Field strength of fundamental ¹ at 3 m		Field strength of spurious emissions ¹ at 3 m	
	(μV/m)	(dBμV/m)	(μV/m)	(dBμV/m)
40.66–40.70		See section A2.7		
70–130	1,250	61.9	125	41.9
130–174	1,250 to 3,750*	61.9 to 71.5*	125 to 375*	41.9 to 51.5*
174–260 ²	3,750	71.5	375	51.5
260–470 ²	3,750 to 12,500*	71.5 to 81.9*	375 to 1,250*	51.5 to 61.9*
Above 470	12,500	81.9	1,250	61.9

Notes: ¹ Limits on the field strength of emissions, as shown in this table, are based on the average value of the measured emissions. As an alternative, compliance with the limits in this table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

* Linear interpolation with frequency F in MHz:

For 130–174 MHz: FS (microvolts/m) = (56.82 × F) – 6136

For 260–470 MHz: FS (microvolts/m) = (41.67 × F) – 7083

² The frequency band 225–399.9 MHz is allocated for Government of Canada usage. There are different types of operations in different parts of this band of frequencies, including communications with aircraft and operations using high-power transmitters. Besides avoiding the restricted frequency bands listed in RSS-Gen, it is recommended that the entire 225–399.9 MHz band be avoided.

8.2.2 Test summary

Verdict Pass

8.2.3 Observations/special notes

Table 8.2-3: FCC §15.209 and RSS-Gen – Radiated emission limits

Frequency (MHz)	Field strength		Measurement distance (m)
	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)	
0.009–0.490*	2400/F	$67.6-20\times\log_{10}(F)$	300
0.490–1.705*	24000/F	$87.6-20\times\log_{10}(F)$	30
1.705–30.0*	30	29.5	30
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:
- F = fundamental frequency in kHz
 - In the emission table above, the tighter limit applies at the band edges.
 - For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Table 8.2-4: FCC Restricted bands of operation

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
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	Above 38.6
13.36–13.41			

Notes: None

8.2.3 Observations/special notes, continued

Table 8.2-5: IC Restricted bands of operation

MHz	MHz	MHz	GHz
0.090–0.110	12.51975–12.52025	399.9–410	5.35–5.46
2.1735–2.1905	12.57675–12.57725	608–614	7.25–7.75
3.020–3.026	13.36–13.41	960–1427	8.025–8.5
4.125–4.128	16.42–16.423	1435–1626.5	9.0–9.2
4.17725–4.17775	16.69475–16.69525	1645.5–1646.5	9.3–9.5
4.20725–4.20775	16.80425–16.80475	1660–1710	10.6–12.7
5.677–5.683	25.5–25.67	1718.8–1722.2	13.25–13.4
6.215–6.218	37.5–38.25	2200–2300	14.47–14.5
6.26775–6.26825	73–74.6	2310–2390	15.35–16.2
6.31175–6.31225	74.8–75.2	2655–2900	17.7–21.4
8.291–8.294	108–138	3260–3267	22.01–23.12
8.362–8.366	156.52475–156.52525	3332–3339	23.6–24.0
8.37625–8.38675	156.7–156.9	3345.8–3358	31.2–31.8
8.41425–8.41475	240–285	3500–4400	36.43–36.5
12.29–12.293	322–335.4	4500–5150	Above 38.6

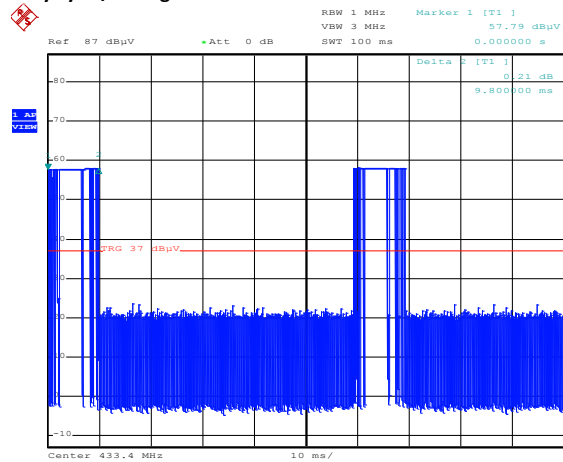
Notes: Certain frequency bands listed in **Table 8.2-5** and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this standard

8.2.4 Setup Details

Test date	May 27, 2013	Test engineer	David Duchesne	Relative humidity	26.2 %
Temperature	25.5 °C	Air pressure	1008.3 mbar		

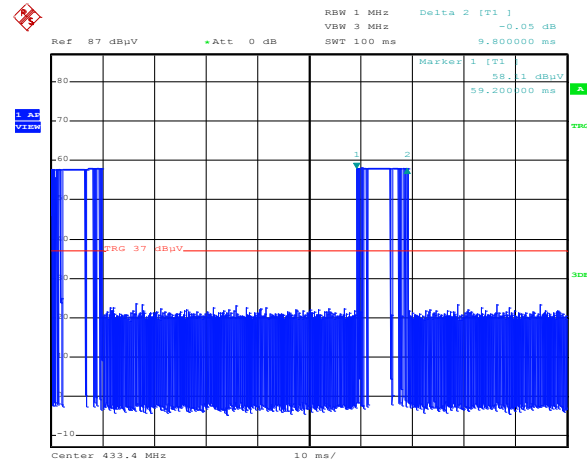
8.2.5 Test data

Duty cycle/average factor calculations



Date: 27.MAY.2013 15:11:40

Figure 8.2-1: Burst length



Date: 27.MAY.2013 15:12:28

Figure 8.2-2: Burst length

$T_{X100\text{ ms}} = 19.6\text{ ms}$ (two bursts, 9.8 ms each)

$$\text{Duty cycle/average factor} = 20 \times \log_{10} \left(\frac{T_{X100\text{ ms}}}{100\text{ ms}} \right) = 20 \times \log_{10} \left(\frac{19.6\text{ ms}}{100\text{ ms}} \right) = -14.15\text{ dB}$$

Table 8.2-6: Fundamental field strength results.

Freq. (MHz)	Ant. Pol. (V/H)	Meas. peak field strength ¹ (dBμV/m)	Peak field strength limit (dBμV/m)	Peak field strength margin ³ (dB)	Duty cycle correction factor (dB)	Calculated average field strength ² (dBμV/m)	Average field strength limit (dBμV/m)	Average field strength margin ³ (dB)
433.4	V	87.81	100.81	13.00	-14.15	73.66	80.81	7.15
433.4	H	89.73	100.81	11.08	-14.15	75.58	80.81	5.23

Note: Average limit calculation: For 260–470 MHz: FS (μV/m) = $(41.67 \times F) - 7083 = (41.67 \times 433.4) - 7083 = 10976.778\text{ μV/m} \rightarrow 20 \times \log_{10}(10976.778) = 80.79\text{ dBμV/m}$

Table 8.2-7: Radiated spurious emissions field strength results.

Freq. (MHz)	Ant. Pol. (V/H)	Meas. peak field strength ¹ (dBμV/m)	Peak field strength limit (dBμV/m)	Peak field strength margin ³ (dB)	Duty cycle correction factor (dB)	Calculated average field strength ² (dBμV/m)	Average field strength limit (dBμV/m)	Average field strength margin ³ (dB)
1300.2	H	42.80	74.00	31.00	-14.15	28.65	54.00	25.35

- Notes:
- Test facility: 3 m Semi anechoic chamber
 - Measuring distance (m): 3
 - Antenna height variation (m): 1–4
 - The spectrum was searched from 30 MHz to the 10th harmonic.
 - The EUT was measured on three orthogonal axis
 - Spectrum analyzer setting for measurements:
 - 30 to 1000 MHz: Peak detector, RBW = 100 kHz, VBW = 300 kHz, Measurement time = 100 ms
 - Above 1 GHz: Peak detector, RBW = 1 MHz, VBW = 3 MHz, Measurement time = 100 ms

¹ Field strength (dBμV/m) = spectrum analyzer value (dBμV) + correction factor (dB)
Correction factor = antenna factor ACF (dB) + cable loss (dB) – amplifier gain (dB)
Sample calculation: 66.68 dBμV/m (field strength) = 77.58 dBμV (receiver reading) + (–10.9 dB) (Correction factor)

² Calculated average field strength (dBμV/m) = measured Peak field strength (dBμV/m) + Duty cycle correction factor (dB). Duty cycle correction factor as calculated from §15.35 (c)

³ Margin (dB) = field strength limit – field strength measurement

8.2.6 Setup photos



Figure 8.2-3: Emissions setup photo



Figure 8.2-4: Emissions setup photo

8.3 FCC 15.231(c) and RSS-210 A1.1.3 Emission bandwidth of momentary signals

8.3.1 Definitions and limits

FCC:

The bandwidth of the emission shall be no wider than 0.25 % of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5 % of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

IC:

For the purpose of Section A1.1, the 99 % bandwidth shall be no wider than 0.25 % of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5 % of the centre frequency.

8.3.2 Test summary

Verdict Pass

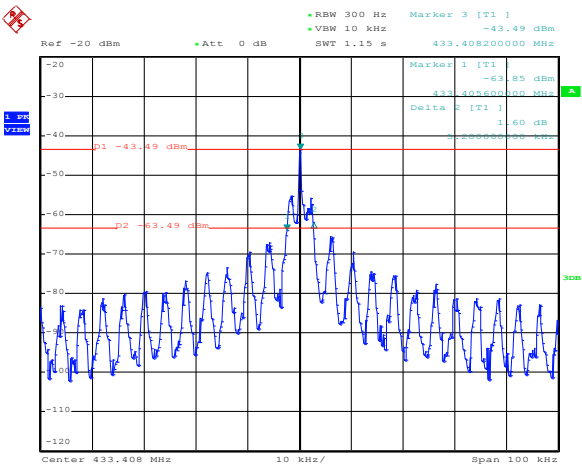
8.3.3 Observations/special notes

The test was performed using peak detector of the spectrum analyzer with RBW no narrower than 1 % of the emission bandwidth.

8.3.4 Setup details

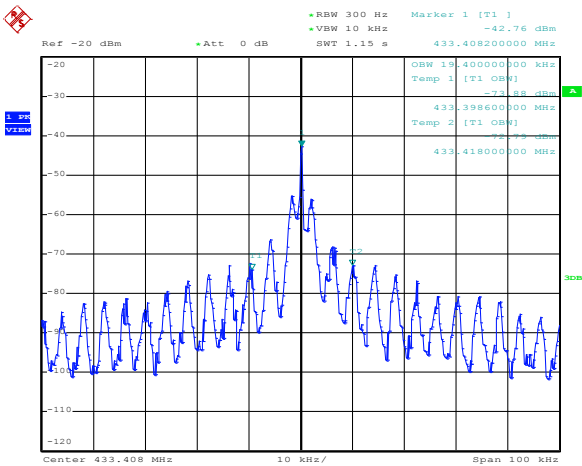
Test date	May 27, 2013	Test engineer	David Duchesne	Relative humidity	26.2 %
Temperature	25.5 °C	Air pressure	1008.3 mbar		

8.3.5 Test data



Date: 27.MAY.2013 15:31:44

Figure 8.3-1: 20 dB bandwidth



Date: 27.MAY.2013 15:28:21

Figure 8.3-2: 99 % bandwidth

Table 8.3-1: 20 dB bandwidth results

20 dB bandwidth (kHz)	Limit (kHz)
5.2	1083.5

Notes: Limit: 0.25 % of 433.4 MHz is 1083.5 kHz

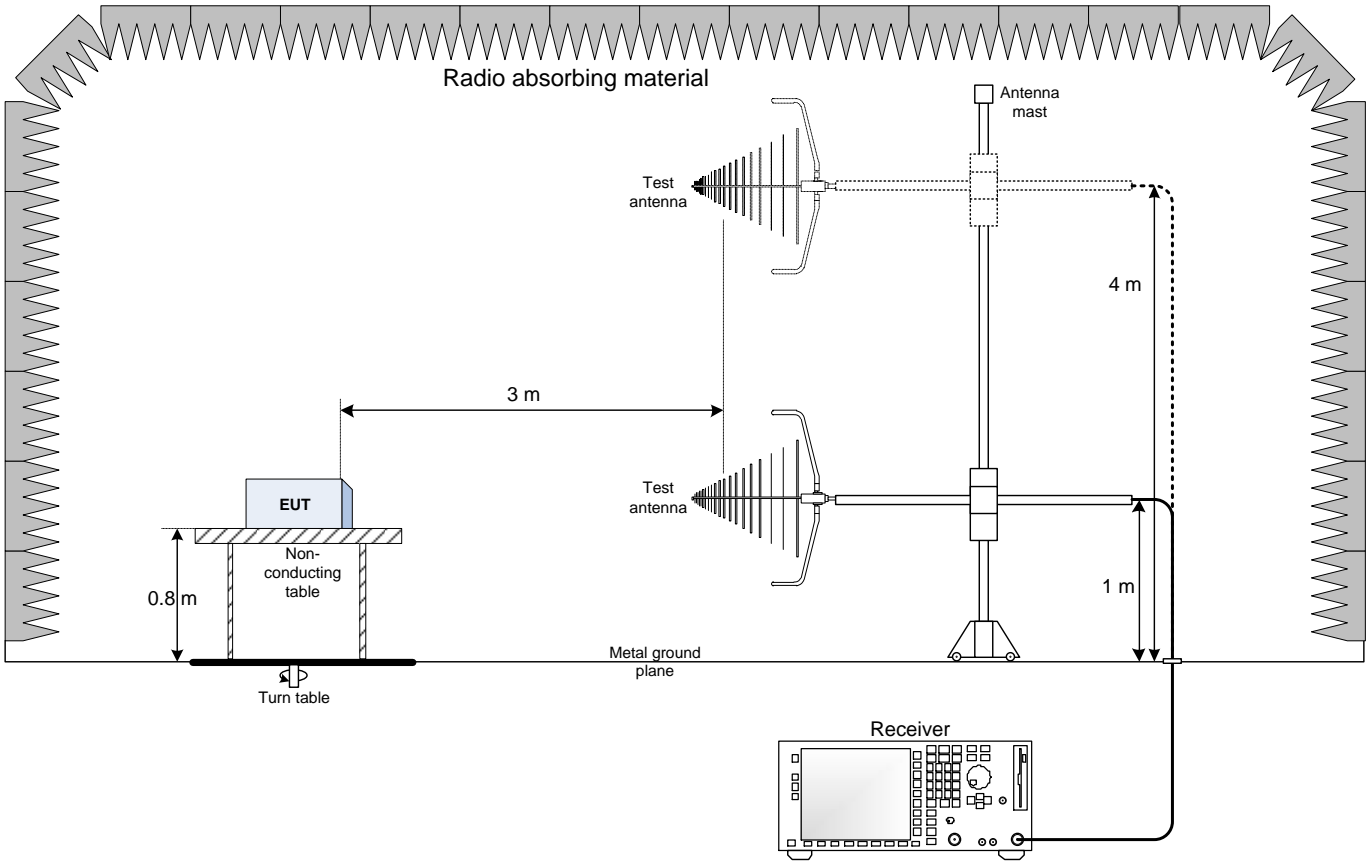
Table 8.3-2: 99 % bandwidth results

99 % bandwidth (kHz)	Limit (kHz)
19.4	1083.5

Notes: Limit: 0.25 % of 433.4 MHz is 1083.5 kHz

Section 9 Block diagrams of test set-ups

9.1 Radiated emissions set-up



Section 10 EUT photos

10.1 External photos



Figure 10.1-1: external photos