

Compliance test report ID **235625-1TRFWL**

Date of issue
May 10, 2013

FCC 47 CFR Part 15 Subpart C, §15.247

Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5850 MHz

RSS-210, Issue 8 Annex 8

Frequency Hopping and Digital Modulation Systems Operating in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz Bands.

Applicant **Synapse Électronique**
Product **Wireless communication module**
Model **SE159**
FCC ID **OW7-SE159**
IC Reg # **10525A-SE159**

Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada. The tests included in this report are within the scope of this accreditation



Test location

Nemko Canada Inc.
303 River Road
Ottawa, ON, K1V 1H2
Canada
Test site FCC ID: 176392 and IC ID: 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 Kevin Rose, Wireless/EMC Specialist

Reviewed by

Andrey Adelberg, Senior Wireless/EMC Specialist **Date** May 10, 2013

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

- Section 1 Report summary 4**
 - 1.1 Applicant and manufacturer 4
 - 1.2 Test specifications 4
 - 1.3 Test guidance 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 C – general requirements, test results 5
 - 2.2 FCC Part 15 Subpart C – Intentional Radiators, test results 5
 - 2.3 IC RSS-GEN, Issue 3, test results 5
 - 2.4 IC RSS-210, Issue 8, test results 6
- Section 3 Equipment under test (EUT) details 7**
 - 3.1 Sample information 7
 - 3.2 EUT information 7
 - 3.3 Technical information 7
 - 3.4 Product description and theory of operation 7
 - 3.5 EUT exercise details 7
 - 3.6 EUT setup diagram 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**
 - 7.1 Test equipment list 11
- Section 8 Testing data 12**
 - 8.1 Transmitter output power and EIRP requirements for digital systems 12
 - 8.2 Spurious (out-of-band) emissions 14
- Section 9 Block diagrams of test set-ups 20**
 - 9.1 Radiated emissions set-up 20

Section 1 Report summary

1.1 Applicant and manufacturer

Synapse Électronique
1010, 7e Avenue, Grand-Mère
Québec, G9T 2B8, Canada

1.2 Test specifications

Standard	Description
FCC 47 CFR Part 15, Subpart C, Chapter 15.247	Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5850 MHz
RSS-210, Issue 8 Annex 8	Frequency Hopping and Digital Modulation Systems Operating in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz Bands

1.3 Test guidance

558074 D01 DTS Meas Guidance v03r01

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

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

Section 2 Summary of test results

2.1 FCC Part 15 Subpart C – general requirements, test results

Part	Test description	Verdict
§15.207(a)	Conducted limits	Not tested
§15.31(e)	Variation of power source	Pass ¹
§15.203	Antenna requirement	Pass ²

Notes:

¹ Measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, was performed with the supply voltage varied between 85 % and 115 % of the nominal rated supply voltage. No noticeable output power variation was observed

² The EUT has un-detachable, printed antenna

2.2 FCC Part 15 Subpart C – Intentional Radiators, test results

Part	Test description	Verdict
§15.247(a)(1)	Frequency hopping systems	
§15.247(a)(1)(i)	Frequency hopping systems operating in the 902–928 MHz band	Not applicable
§15.247(a)(1)(ii)	Frequency hopping systems operating in the 5725–5850 MHz band	Not applicable
§15.247(a)(1)(iii)	Frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
§15.247(a)(2)	Minimum 6 dB bandwidth for systems using digital modulation techniques	Not tested
§15.247(b)	Maximum conducted peak output power and EIRP	
§15.247(b)(1)	Maximum peak output power of frequency hopping systems operating in the 2400–2483.5 MHz band and 5725–5850 MHz band	Not applicable
§15.247(b)(2)	Maximum peak output power of frequency hopping systems operating in the 902–928 MHz band	Not applicable
§15.247(b)(3)	Maximum peak output power of systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands	Pass
§15.247(b)(4)	Conducted peak output power limitations	
§15.247(b)(4)(i)	Maximum peak output power for systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations.	Pass
§15.247(b)(4)(ii)	Maximum peak output power for systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations.	Not applicable
§15.247(c)(1)	Fixed point-to-point operation with directional antenna gains greater than 6 dBi	Not applicable
§15.247(c)(2)	Transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams	Not applicable
§15.247(d)	Spurious emissions	Pass
§15.247(e)	Power spectral density for digitally modulated devices	Not tested
§15.247(f)	Time of occupancy and power spectral density for hybrid systems	Not applicable

Notes: Class 2 Permissive change only peak power and spurious emissions were performed.

2.3 IC RSS-GEN, Issue 3, test results

Part	Test description	Verdict
4.6.1	Occupied bandwidth	Not tested
6.1	Receiver spurious emissions limits (radiated)	Not applicable
6.2	Receiver spurious emissions limits (antenna conducted)	Not applicable
7.2.4	AC power lines conducted emission limits	Not tested

Notes: ¹ According to Notice 2012-DRS0126 (from January 2012) section 2.2 of RSS-Gen, Issue 3 has been revised. The EUT does not have a stand-alone receiver neither scanner receiver, therefore exempt from receiver requirements.

Class 2 Permissive change: only peak power and spurious emissions were performed.

2.4 IC RSS-210, Issue 8, test results

Part	Test description	Verdict
A8.1	Frequency hopping systems	
A8.1 (a)	Bandwidth of a frequency hopping channel	Not applicable
A8.1 (b)	Minimum channel spacing for frequency hopping systems	Not applicable
A8.1 (c)	Frequency hopping systems operating in the 902–928 MHz band	Not applicable
A8.1 (d)	Frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
A8.1 (e)	Frequency hopping systems operating in the 5725–5850 MHz band	Not applicable
A8.2	Digital modulation systems	
A8.2 (a)	Minimum 6 dB bandwidth	Not tested
A8.2 (b)	Maximum power spectral density	Not tested
A8.3	Hybrid systems	
A8.3 (1)	Digital modulation turned off	Not applicable
A8.3 (2)	Frequency hopping turned off	Not applicable
A8.4	Transmitter output power and e.i.r.p. requirements	
A8.4 (1)	Frequency hopping systems operating in the 902–928 MHz band	Not applicable
A8.4 (2)	Frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
A8.4 (3)	Frequency hopping systems operating in the 5725–5850 MHz	Not applicable
A8.4 (4)	Systems employing digital modulation techniques	Pass
A8.4 (5)	Point-to-point systems in 2400–2483.5 MHz and 5725–5850 MHz band	Not applicable
A8.4 (6)	Transmitters which operate in the 2400–2483.5 MHz band with multiple directional beams	Not applicable
A8.5	Out-of-band emissions	Pass

Notes: Class 2 Permissive change: only peak power and spurious emissions were performed.

Section 3 Equipment under test (EUT) details

3.1 Sample information

Receipt date	April 16, 2013
Nemko sample ID number	1

3.2 EUT information

Product name	Wireless communication module
Model	SE159
Serial number	N/A
Part number	SE15901

3.3 Technical information

Operating band	2400.0–2483.5 MHz
Operating frequency	2405–2480 MHz
Modulation type	OQPSK
Occupied bandwidth (99 %)	2.69 MHz
Emission designator	2M69G1D
Power requirements	3 V _{DC} "AAA" type of batteries
Antenna information	1.5 dBi printed (non-detachable) PCB antenna

3.4 Product description and theory of operation

RF Module is used as a generic component that mainly used to add a communication link to customer product but can also integrate some basic application. The module is intended to be used with different type of alimentation and integrated in various HVAC equipment.

3.5 EUT exercise details

EUT was energized and controlled from PC via USB wireless transmitter using Portal software for channels and power selection.

3.6 EUT setup diagram

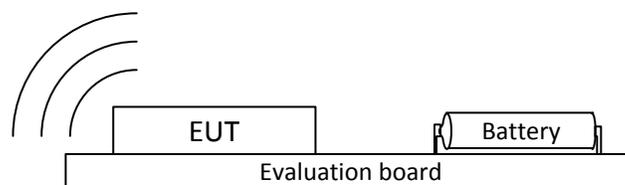


Diagram 3.6-1: Setup diagram



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

The Class 2 permissive change testing was based on the previous test results in Nemko Canada Inc. report 212141-1TRFWL issued August 1, 2012.

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 $\pm 5\%$, 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

7.1 Test 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
Bilog antenna	Sunol	JB3	FA002108	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
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	May 16/13
Horn antenna #1	EMCO	3115	FA000649	1 year	Mar. 25/14
Horn antenna 18–26.5 GHz	Electro-metrics	SH-50/60-1	FA000479	—	VOU
1–18 GHz pre-amplifier	JCA	JCA118-503	FA002091	1 year	July 03/13
18–26 GHz pre-amplifier	Narda	BBS-1826N612	FA001550	—	VOU

Note: VOU - verify on use, NCR - no calibration required

Section 8 Testing data

8.1 Transmitter output power and EIRP requirements for digital systems

8.1.1 Definitions and limits

FCC Clause 15.247(b) and RSS-210 Clause A8.4 (4) Transmitter output power and e.i.r.p. requirements

FCC:

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

- (3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 W (30 dBm). As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.
- (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC:

With the digital modulation operation of the hybrid system turned off, the frequency hopping operation shall have an average time of occupancy on any frequency not exceeding 0.4 seconds within a duration in seconds equal to the number of hopping frequencies multiplied by 0.4.

A8.4 (4) Transmitter Output Power and e.i.r.p. Requirements for systems employing digital modulation techniques operating in the bands 902–928 MHz, 2400–2483.5 MHz and 5725–5850 MHz bands

For systems employing digital modulation techniques operating in the bands 902–928 MHz, 2400–2483.5 MHz and 5725–5850 MHz, the maximum peak conducted output power shall not exceed 1 W (30 dBm). Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4 W (36 dBm). As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power (see RSS-Gen).

8.1.2 Test summary

Test date	May 1, 2013	Test engineer	Kevin Rose	Verdict	Pass
Temperature	27 °C	Air pressure	1015 mbar	Relative humidity	35 %

8.1.3 Observations/special notes and procedures

Measurement Procedure 9.1.1 RBW ≥ DTS bandwidth (558074 D01 DTS Meas Guidance v03r01)

1. This procedure should be used when a spectrum/signal analyzer with a resolution bandwidth that is greater than or equal to the DTS bandwidth can be used to perform the measurement.
2. Set the RBW ≥ DTS bandwidth (according to 212141-1TRFWL, the DTS BW was 1.44 MHz)
3. Set VBW ≥ 3 x RBW.
4. Set span ≥ RBW.
5. Sweep time = auto couple.
6. Detector = peak.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use peak marker function to determine the peak amplitude level.

The EUT was measured on three orthogonal axis.
 All measurements were performed at a distance of 3 m.
 Only the worst data presented in the test report.

8.1.4 Test data

Table 8.1-1: EIRP results

Frequency (MHz)	Field strength (dBµV/m)	Conversion factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
2405	105.11	-95.23	9.88	36.00	26.12
2440	102.92	-95.23	7.69	36.00	28.31
2480	102.43	-95.23	7.20	36.00	28.80

Theoretical conversion from Field strength measured at 3 m to power conducted from the intentional radiator to the antenna or EIRP:

$$P (W) = \frac{E^2 R^2}{30G}$$

E = Measured field strength value (V/m)
 R = Measurement distance (m)
 G = Antenna Gain (numeric)

Therefore dBW = dBV/m + 20 × Log₁₀(3) – 10 × Log₁₀(30) – 10 × Log₁₀(G)
 From which we obtain:

$$\begin{aligned} \text{dBmW} &= \text{dB}\mu\text{V/m} - 120 + 20 \times \text{Log}_{10}(3) - 10 \times \text{Log}_{10}(30) - 10 \times \text{Log}_{10}(G) + 30 \\ &= \text{dB}\mu\text{V/m} - 95.23 - 10 \times \text{Log}_{10}(G) \end{aligned}$$

Output power [dBm] = Field Strength [dBµV/m] – 95.23 [dB] – Antenna gain [dBi]

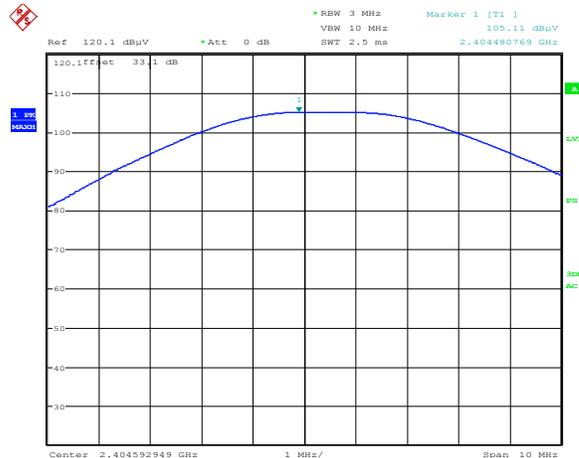
or:

EIRP [dBm] = Field Strength [dBµV/m] – 95.23 [dB]

Table 8.1-2: Output power results

Frequency (MHz)	EIRP (dBm)	Antenna gain (dBi)	Output power (dBm)	Limit (dBm)	Margin (dBm)
2405	9.88	1.50	8.38	30.00	21.62
2440	7.69	1.50	6.19	30.00	23.81
2480	7.20	1.50	5.70	30.00	24.30

Note: Output power [dBm] = EIRP [dBm] – Antenna gain [dBi]



Date: 1.MAY.2013 21:38:16

Figure 8.1: Peak power example

8.2 Spurious (out-of-band) emissions

8.2.1 Definitions and limits

FCC Clause 15.247(d): Spurious emissions
RSS-210 Clause A8.5 Out-of-band emissions

FCC:
 In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

IC:
 In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under Section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Table 8.2-1 is not required.

Table 8.2-1: FCC §15.209 and RSS-Gen – Radiated emission limits

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009–0.490*	2400/F	67.6–20×log ₁₀ (F)	300
0.490–1.705*	24000/F	87.6–20×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:

Note: *– applicable only to FCC requirements

Table 8.2-2: 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			

8.2.1 Definitions and limits, continued

Table 8.2-3: 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 8.2-3 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

8.2.2 Test summary

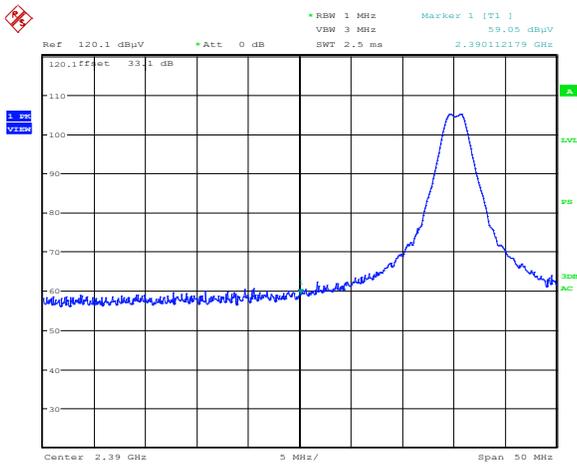
Test date	May 1, 2013	Test engineer	Kevin Rose	Verdict	Pass
Temperature	27 °C	Air pressure	1015 mbar	Relative humidity	35 %

8.2.3 Observations/special notes and procedures

- All measurements were performed radiated at a distance of 3 m.
- All measurements performed:
 - within 30–1000 MHz range: using a peak detector with 120 kHz/300 kHz RBW/VBW,
 - above 1 GHz: using peak detector with 1 MHz/3 MHz RBW/VBW for peak results and duty cycle correction factor for average results.
 - transmission was set to 100% duty cycle during the spurious measurement.

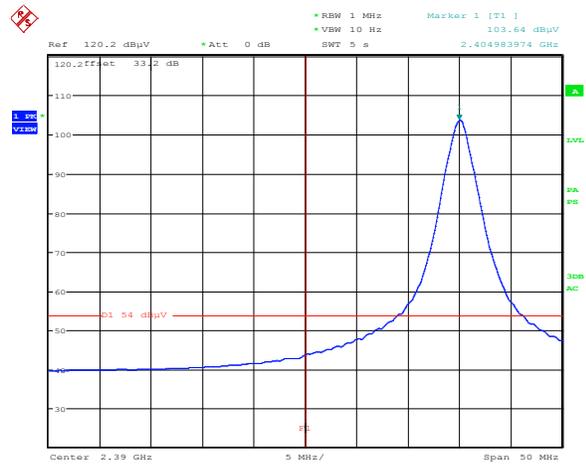
The spectrum was scanned from 30 MHz to 25 GHz. Only worst case results provided.

8.2.4 Test data



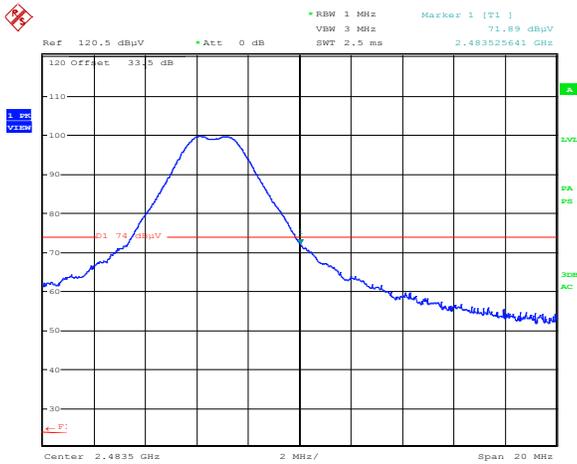
Date: 1.MAY.2013 21:39:29

Figure 8.2-1: Lower restricted band edge 1 MHz RBW, 1 MHz VBW



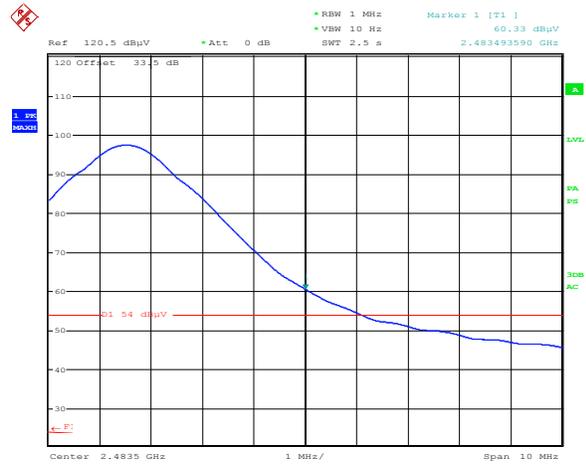
Date: 1.MAY.2013 15:57:19

Figure 8.2-2: Lower restricted band edge 1 MHz RBW, 10 Hz VBW



Date: 1.MAY.2013 16:08:49

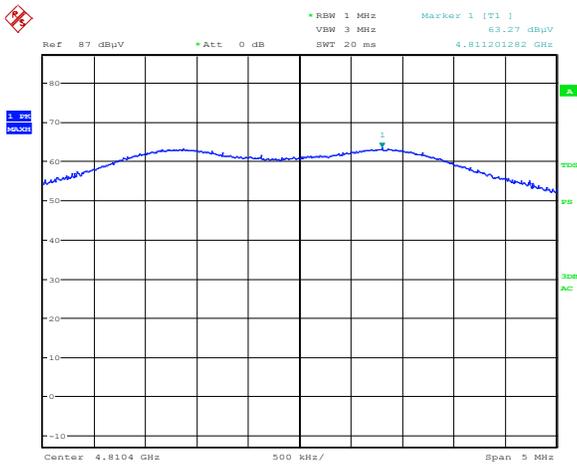
Figure 8.2-3: Upper restricted band edge 1 MHz RBW, 1 MHz VBW



Date: 1.MAY.2013 16:41:48

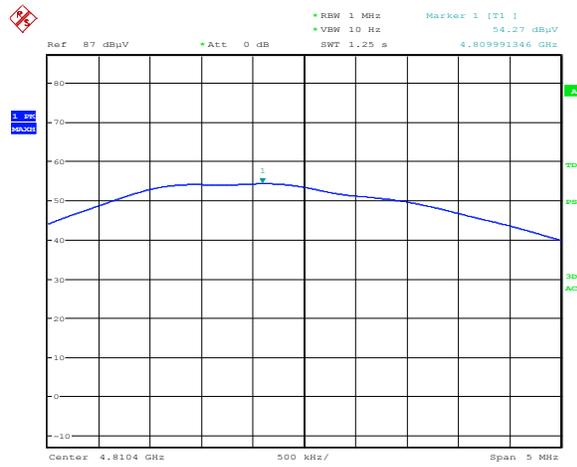
Figure 8.2-4: Upper restricted band edge 1 MHz RBW, 10 Hz VBW

8.2.4 Test data, continued



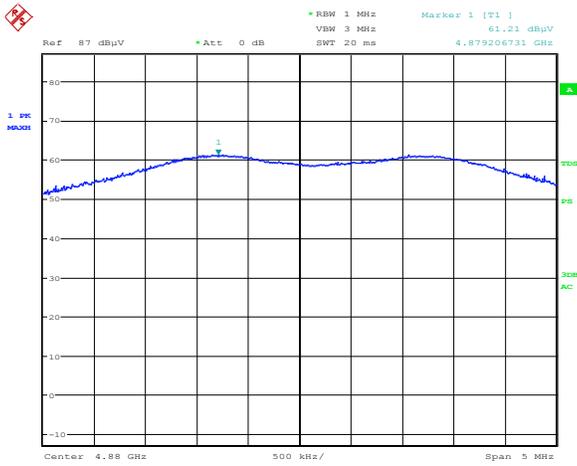
Date: 1.MAY.2013 17:18:39

Figure 8.2-5: 2nd harmonic of low channel, peak measurement



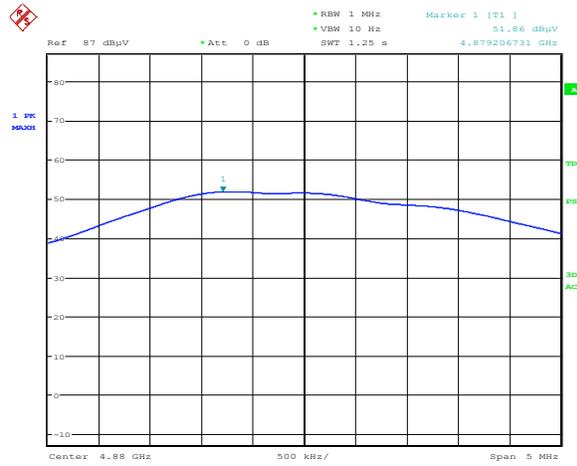
Date: 1.MAY.2013 17:17:43

Figure 8.2-6: 2nd harmonic of low channel, average measurement



Date: 1.MAY.2013 17:14:15

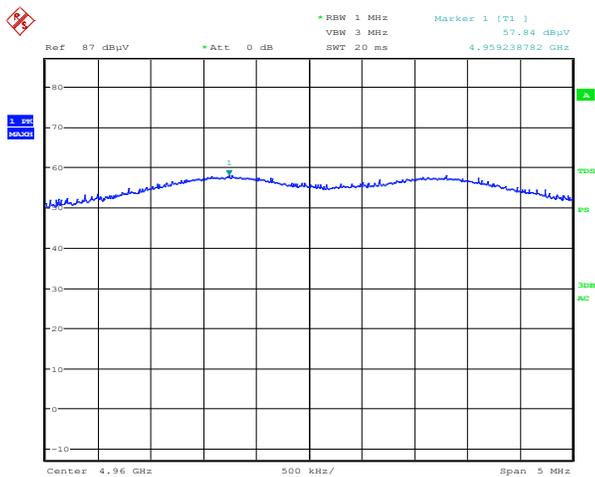
Figure 8.2-7: 2nd harmonic of mid channel, peak measurement



Date: 1.MAY.2013 17:14:40

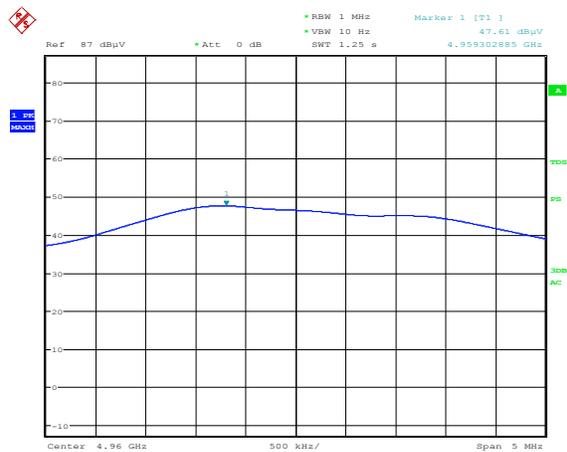
Figure 8.2-8: 2nd harmonic of mid channel, average measurement

8.2.4 Test data, continued



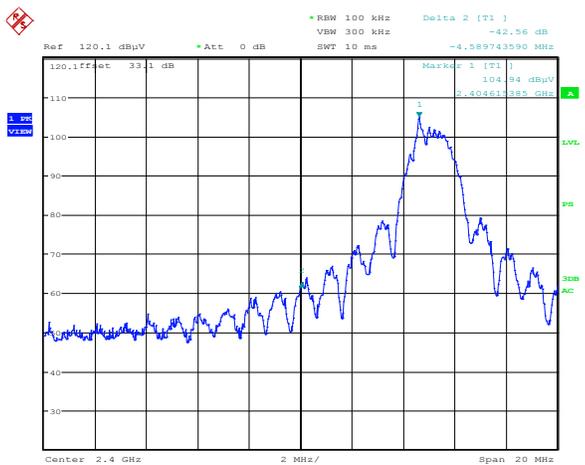
Date: 1.MAY.2013 17:21:25

Figure 8.2-9: 2nd harmonic of high channel, peak measurement



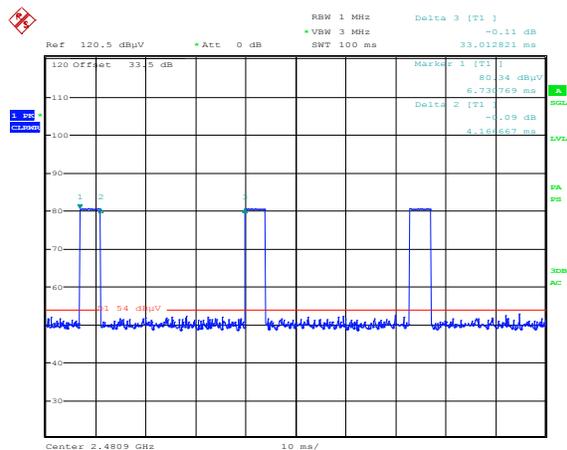
Date: 1.MAY.2013 17:21:51

Figure 8.2-10: 2nd harmonic of high channel, average measurement



Date: 1.MAY.2013 21:41:03

Figure 8.2-11: Lower band edge



Date: 1.MAY.2013 16:49:50

Figure 8.2-12: Duty cycle correction factor

Note: 4.17 ms pulse × 3 pulses = 12.51 ms (Tx_{on})
 $20 \times \log_{10}(Tx_{on} \div 100 \text{ ms}) = -18.1 \text{ dB}$

Table 8.2-4: Non Restricted emissions results

Frequency (MHz)	Measured (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2400.00	62.38	84.94	22.56

Note: Limit is 20 dB below the in-band PSD of 100 kHz, which was 104.94 dBµV/m.

8.2.4 Test data, continued

Table 8.2-5: Peak Spurious emissions results

Channel	Frequency (MHz)	Field strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Low	2390.0	59.05	74.00	14.95
Low	4810.0	63.27	74.00	10.73
Mid	4880.0	61.21	74.00	12.79
High	2483.5	71.89	74.00	2.11
High	4960.0	57.84	74.00	16.16

Table 8.2-6: Average Spurious emissions results

Channel	Frequency (MHz)	Average Field strength (dBµV/m)	Duty cycle correction (dB)	Corrected Field strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Low	2390.0	44.50	-18.10	26.40	54.00	27.60
Low	4810.0	54.27	-18.10	36.17	54.00	17.83
Mid	4880.0	51.86	-18.10	33.76	54.00	20.24
High	2483.5	60.33	-18.10	42.23	54.00	11.77
High	4960.0	47.61	-18.10	29.51	54.00	24.49

Note: 4.17 ms pulse × 3 pulses = 12.51 ms. The duty cycle formula is $(20 \times \log_{10} (T_{\text{on}} \div 100 \text{ ms})) = -18.1 \text{ dB}$ correction factor. Refer to Figure 8.2-12

Section 9 Block diagrams of test set-ups

9.1 Radiated emissions set-up

