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Test report

317749-1TRFWL

Date of issue: November 22, 2016

Applicant:

Digital Security Controls a div. of Tyco Safety Products Canada Ltd.

Product:

Self-Contained Wireless Security System

Model:

WS900-29

FCC ID: F5316WS90029

IC Registration number: 160A-WS90029

Specifications:

- FCC 47 CFR Part 15 Subpart C, §15.247

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

- RSS-247, Issue 1, May 2015, Section 5

  Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

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	FCC: 176392; IC: 2040A-4 (3 m semi anechoic chamber)

Tested by	David Duchesne, Senior EMC/Wireless Specialist
Reviewed by	Kevin Rose, Wireless/EMC Specialist
Review date	November 22, 2016
Reviewer 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

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Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Digital Security Controls a div. of Tyco Safety Products Ltd.
Address	3301 Langstaff Road, Concord, ON, Canada, L4K 4L2

1.2 Test specifications

FCC 47 CFR Part 15, Subpart C, Clause 15.247	Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5850 MHz
RSS-247, Issue 1, May 2015, Section 5	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

1.3 Test methods

558074 D01 DTS Meas Guidance v03 r05 (April 8, 2016)	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.5 below. 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

The product was assessed under Nemko project 309365-1. Only radiated spurious emissions tests were performed. EUT is being assessed for Class 2 permissive change.

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

Notes: None

Section 2. Summary of test results

2.1 FCC Part 15 Subpart C, general requirements test results

Table 2.1-1: *FCC part 15 Subpart C 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 antenna is located within the enclosure of EUT and not user accessible.

2.2 FCC Part 15 Subpart C, intentional radiators test results

Table 2.2-1: *FCC part 15 Subpart C, §15.247 test results*

Part	Test description	Verdict
§15.215(c)	20 dB bandwidth	Not tested
§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)(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)(3,4)	Maximum peak output power of systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands	Not tested
§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 for hybrid systems	Not applicable

Notes: None

2.3 IC RSS-GEN, Issue 4, test results

Table 2.3-1: *RSS GEN test results*

Part	Test description	Verdict
7.1.2	Receiver radiated emission limits	Not applicable[1]
7.1.3	Receiver conducted emission limits	Not applicable[1]
8.8	Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus	Not tested
6.6	Occupied bandwidth	Not tested

Notes: 1 According to sections 5.2 and 5.3 of RSS-Gen, Issue 4 the EUT does not have a stand-alone receiver neither scanner receiver, therefore exempt from receiver requirements.

2.4 IC RSS-247, Issue 1, test results

Table 2.4-1: *RSS 247 test results*

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

Notes: None

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	November 1, 2016
Nemko sample ID number	133-002226

3.2 EUT information

Product name	Self-Contained Wireless Security System
Model	WS900-29
Serial number	None

3.3 Technical information

All used IC test site(s) Reg. number		2040A-4
RSS number and Issue number		RSS-247 Issue 1, May 2015
Frequency band (MHz)		2400–2483.5
Frequency Min (MHz)		2412 (for 802.11b, 802.11g and 802.11n HT20) 2422 (for 802.11n HT40)
Frequency Max (MHz)		2462(for 802.11b, 802.11g and 802.11n HT20) 2452 (for 802.11n HT40)
RF power Max (W), Conducted ***Data from Project 309365-1***		0.115 (20.62 dBm for 802.11b), 0.087 (19.42 dBm for 802.11g), 0.086 (19.33 dBm for 802.11n HT20) 0.124 (20.95 dBm for 802.11n HT40)
Field strength, Units @ distance		N/A
Measured BW (MHz) ***Data from Project 309365-1***	(6 dB) (20 dB) (99%)	10.08 (802.11b), 16.44 (802.11g), 17.64 (802.11n HT20) and 35.70 (802.11n HT40) 16.44 (802.11b), 19.14 (802.11g), 19.62 (802.11n HT20) and 40.32 (802.11n HT40) 14.40 (802.11b), 16.80 (802.11g), 17.82 (802.11n HT20) and 36.68 (802.11n HT40)
Calculated BW (kHz), as per TRC-43		N/A
Type of modulation		802.11b/g/n HT20 and HT40
Emission classification		W7D
Transmitter spurious, Units @ distance		67.03 dBµV/m Peak and 47.19 dBµV/m Average @ 3 m @ 2389.91 MHz (20 MHz bandwidth) 71.20 dBµV/m Peak and 52.72 dBµV/m Average @ 3 m @ 2389.91 MHz (40 MHz bandwidth)
Power requirements		12 V_{DC} (Powered via external AC-DC adapter 90–264 V_{AC} 47–63 Hz) and via 7.5 V_{DC} battery
Antenna information		The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator. The antennas are a proprietary design by DSC and are integrated into the printed circuit board.

3.4 Product description and theory of operation

The Wireless alarm system has support for 128 wireless zones. It monitors the wireless initiating devices and activates the integrated siren when an alarm occurs and also provides communication of the alarm event over the integrated Wi-Fi interface. The control unit is also capable to communicate with Z-Wave compatible home automation devices. The security portion can be armed and disarmed via the integrated keypad. Trouble/alarm/signal strength status is indicated on the front panel using LED's.

3.5 EUT exercise details

EUT was connected to a laptop via Ethernet connector. A putty application was running on the computer that controlled the transmitter parameters. Client provided a modified sample with a direct connection to the antenna port for conducted measurements at the antenna ports.

3.6 EUT setup diagram

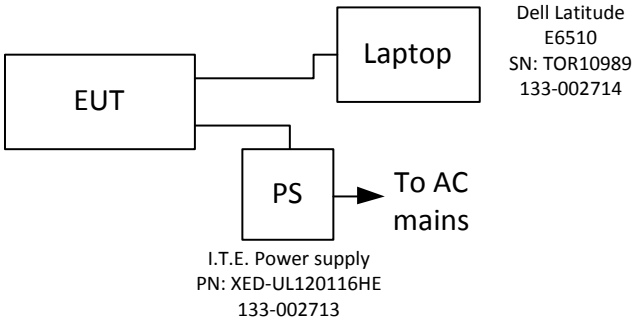


Figure 3.6-1: *Setup diagram*

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	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 ±5 %, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Test name	Measurement uncertainty, dB
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78

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.
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Jan. 07/17
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	Dec. 01/16
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	Apr. 28/17
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1 year	Apr. 26/17
Horn antenna 18–40 GHz	EMCO	3116	FA001847	1 year	Apr.15/17
Pre-amplifier (1–18 GHz)	JCA	JCA118-503	FA002091	1 year	April 26/17
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	—	VOU
Notch filter 2400–2483 MHz	Microwave Circuits	2400–2483 MHz	FA001940	—	VOU

Notes: None

Table 7.1-2: *test software*

Test description	Manufacturer of Software	Details
Radiated emissions – Ottawa	Rhode & Schwarz	EMC32, Software for EMC Measurements, Version 9.26.01

Notes: None

Section 8. Testing data

8.1 FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) emissions

8.1.1 Definitions and limits

FCC §15.247 (d):

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)).

RSS-247, Clause 5.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Table 8.1-1: *FCC §15.209 and RSS-Gen – Radiated emission limits*

Frequency, MHz	Field strength of emissions		Measurement distance, m
	µV/m	dBµV/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: 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 8.1-2: *IC restricted frequency bands*

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 this table 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

8.1.1 Definitions and limits, continued

Table 8.1-3: *FCC restricted frequency bands*

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			

8.1.2 Test summary

Radiated measurements:

Verdict	Pass				
Test date	November 1, 2016	Test engineer	David Duchesne		
Temperature	24 °C	Relative humidity	35 %	Air pressure	1010. mbar

8.1.3 Notes

- Only radiated emissions were performed
- Measurements were performed as per 558074 D01 DTS Meas Guidance v03r05
- The spectrum was searched from 30 MHz to the 10th harmonic.
- EUT was set to transmit with 100 % duty cycle.
- Power was measured using average method as detailed in section 9.2.2.1 of 558074 D01 DTS Meas Guidance v03r05. The spurious emissions limit of −30 dBc/100 kHz was used to determine compliance.
- For radiated spurious emissions at the upper band edge method as detailed in section 13.3.2 of 558074 D01 DTS Meas Guidance v03r05 was used to determine compliance

8.1.4 Setup details

Spectrum analyser settings for radiated measurements within restricted bands below 1 GHz:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for peak radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for average radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	10 Hz
Detector mode:	Peak
Trace mode:	Max Hold

8.1.5 Test data

Radiated spurious emissions within restricted bands, test results

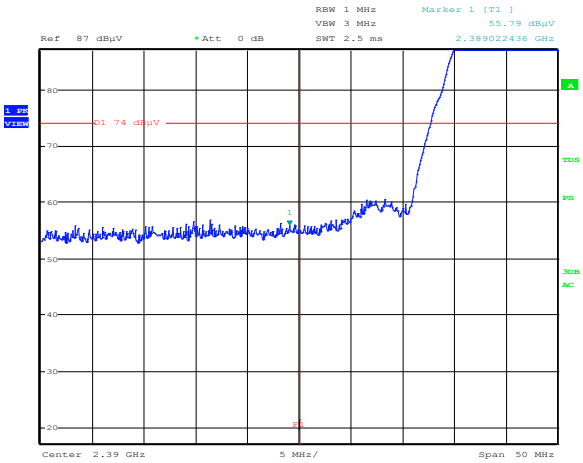


Figure 8.1-1: *Radiated spurious emissions Lower band edge for 802.11b, (TX 2412 MHz Low) – Peak*

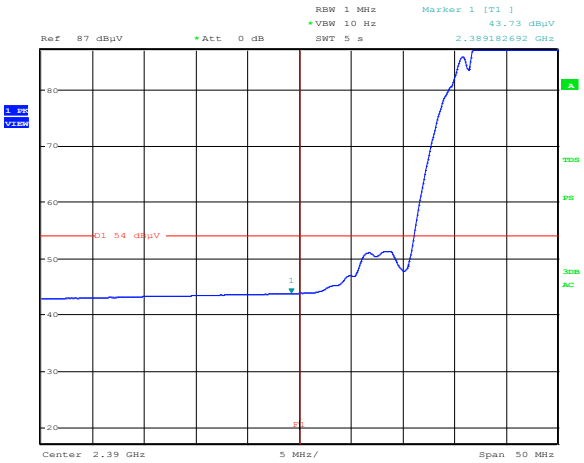


Figure 8.1-2: *Radiated spurious emissions Lower band edge for 802.11b, (TX 2412 MHz) – Average*

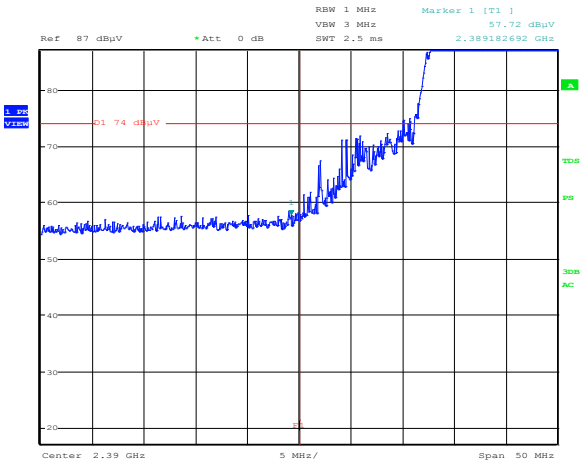


Figure 8.1-3: *Radiated spurious emissions Lower band edge for 802.11g, (TX 2412 MHz) – Peak*

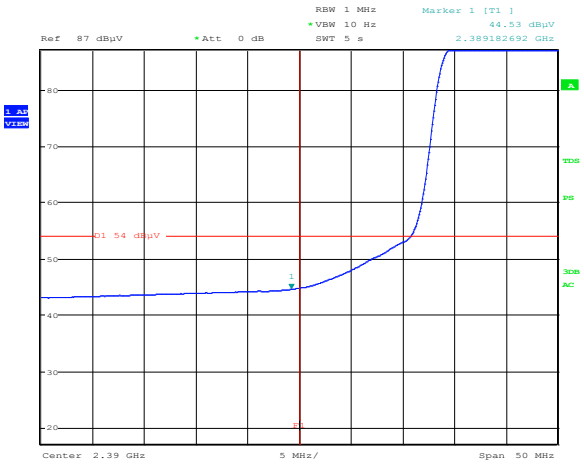


Figure 8.1-4: *Radiated spurious emissions Lower band edge for 802.11g, (TX 2412 MHz) – Average*

8.1.5 Test data, continued

Radiated spurious emissions within restricted bands, test results

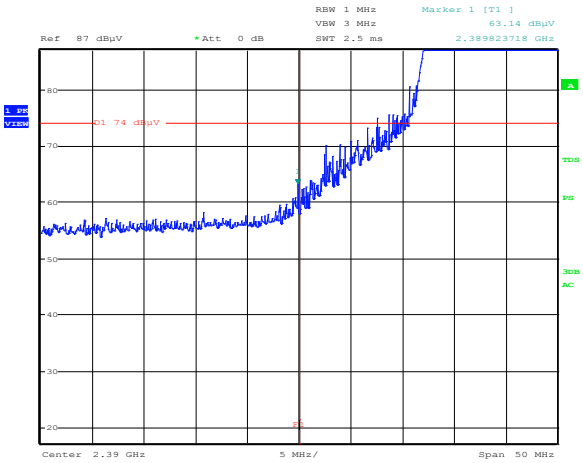


Figure 8.1-5: *Radiated spurious emissions Lower band edge for 802.11n HT20, (TX 2412 MHz) – Peak*

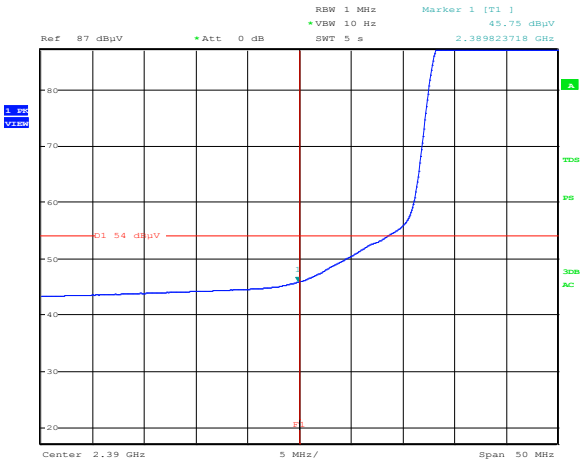


Figure 8.1-6: *Radiated spurious emissions Lower band edge for 802.11n HT20, (TX 2412 MHz) – Average*

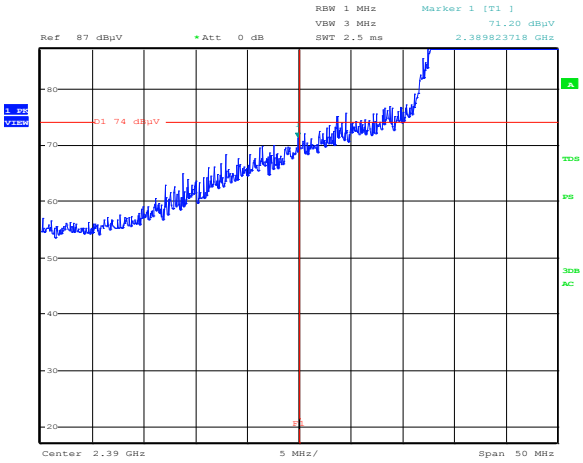


Figure 8.1-7: *Radiated spurious emissions Lower band edge for 802.11n HT40, (TX 2422 MHz) – Peak*

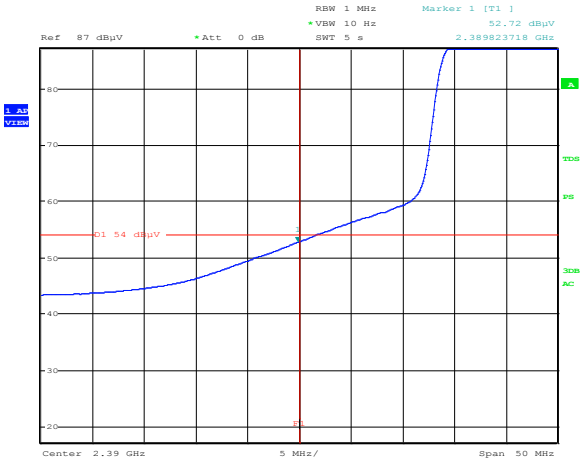


Figure 8.1-8: *Radiated spurious emissions Lower band edge for 802.11n HT40, (TX 2422 MHz) – Average*

8.1.5 Test data, continued

Radiated spurious emissions within restricted bands, test results

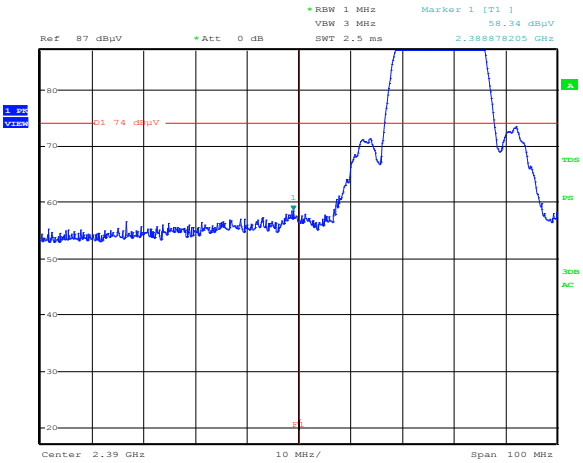


Figure 8.1-9: *Radiated spurious emissions Lower band edge for 802.11b, (TX 2417 MHz Low) – Peak*

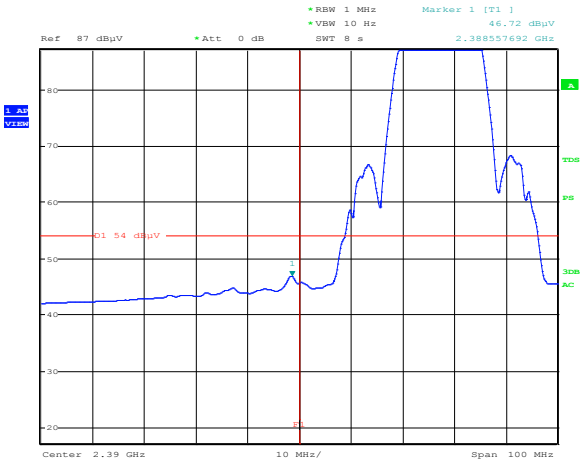


Figure 8.1-10: *Radiated spurious emissions Lower band edge for 802.11b, (TX 2417 MHz) – Average*

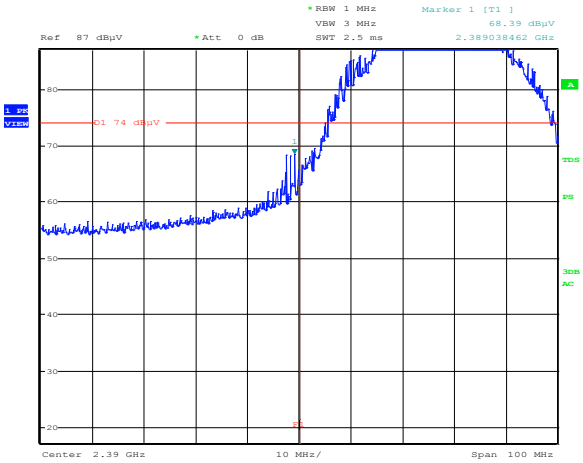


Figure 8.1-11: *Radiated spurious emissions Lower band edge for 802.11g, (TX 2417 MHz) – Peak*

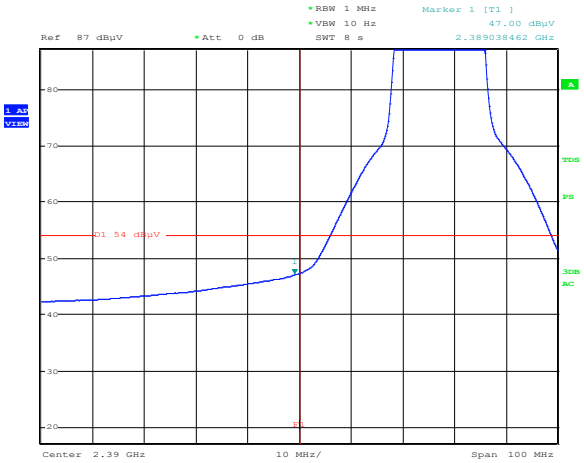


Figure 8.1-12: *Radiated spurious emissions Lower band edge for 802.11g, (TX 2417 MHz) – Average*

8.1.5 Test data, continued

Radiated spurious emissions within restricted bands, test results

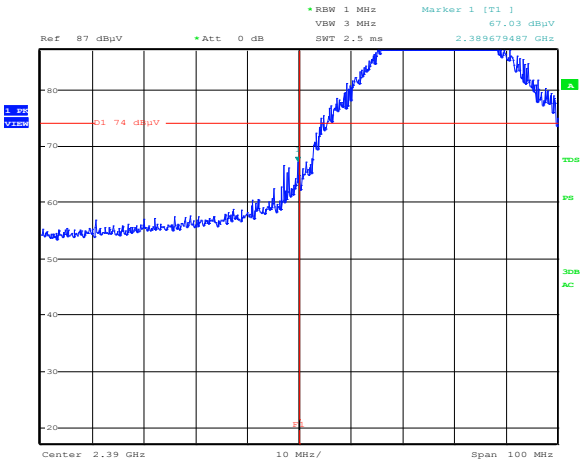


Figure 8.1-13: *Radiated spurious emissions Lower band edge for 802.11n HT20, (TX 2417 MHz) – Peak*

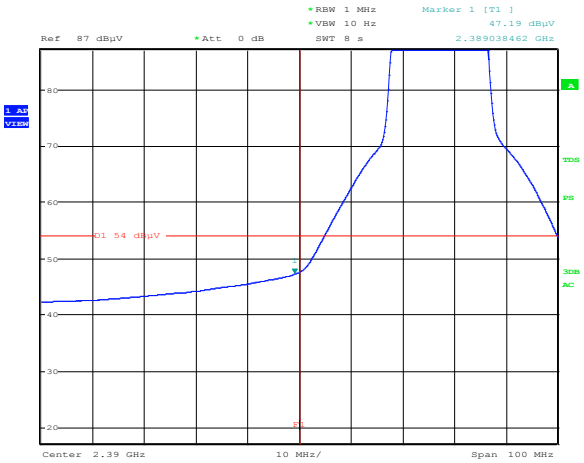


Figure 8.1-14: *Radiated spurious emissions Lower band edge for 802.11n HT20, (TX 2417 MHz) – Average*

8.1.5 Test data, continued

Radiated spurious emissions within restricted bands, test results

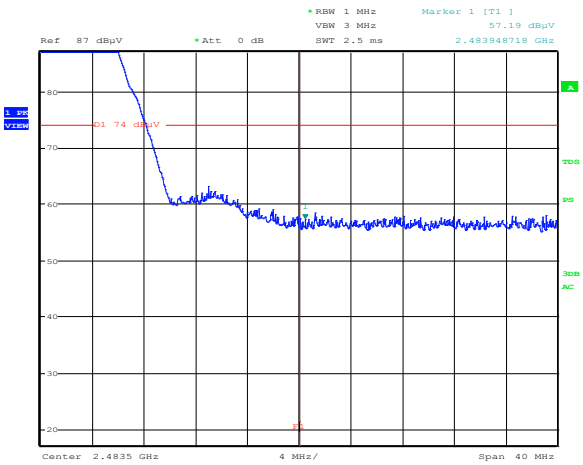


Figure 8.1-15: *Radiated spurious emissions Upper band edge for 802.11b, (TX 2462 MHz) – Peak*

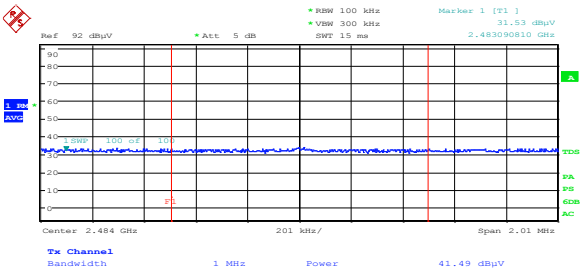


Figure 8.1-16: *Radiated spurious emissions Upper band edge for 802.11b, (TX 2462 MHz) – Average*

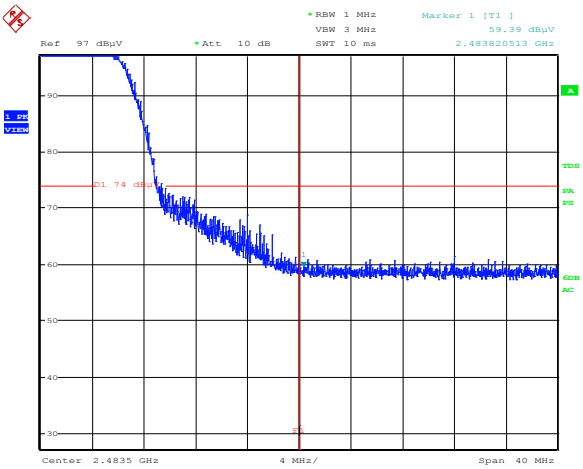


Figure 8.1-17: *Radiated spurious emissions Upper band edge for 802.11g, (TX 2462 MHz) – Peak*

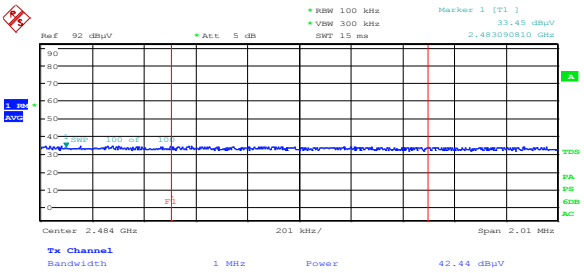


Figure 8.1-18: *Radiated spurious emissions Upper band edge for 802.11g, (TX 2462 MHz) – Average*

8.1.5 Test data, continued

Radiated spurious emissions within restricted bands, test results

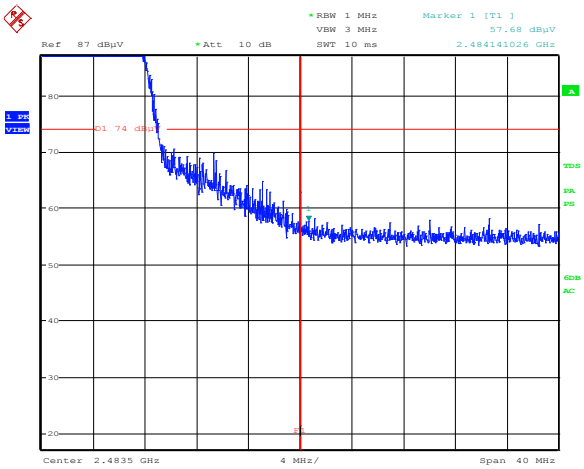


Figure 8.1-19: *Radiated spurious emissions Upper band edge for 802.11n HT20, (TX 2462 MHz) – Peak*

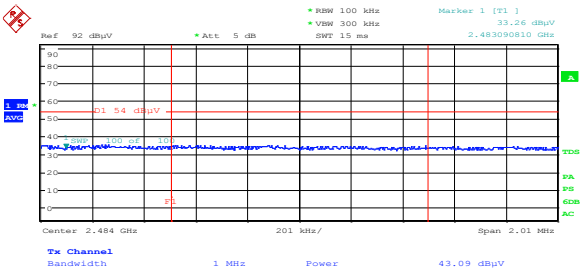


Figure 8.1-20: *Radiated spurious emissions Upper band edge for 802.11n HT20, (TX 2462 MHz) – Average*

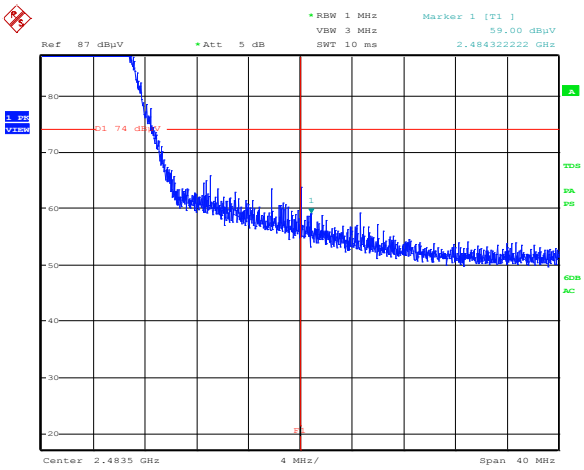


Figure 8.1-21: *Radiated spurious emissions Upper band edge for 802.11n HT40, (TX 2452 MHz) – Peak*

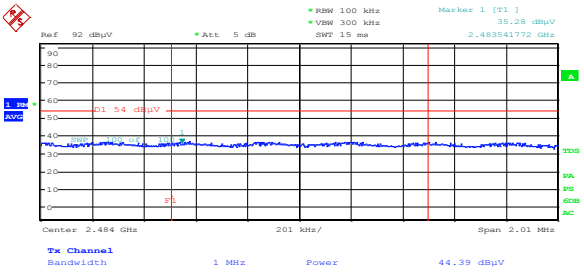


Figure 8.1-22: *Radiated spurious emissions Upper band edge for 802.11n HT40, (TX 2452 MHz Low Channel) – Average*

8.1.5 Test data, continued

Radiated spurious emissions within restricted bands, test results

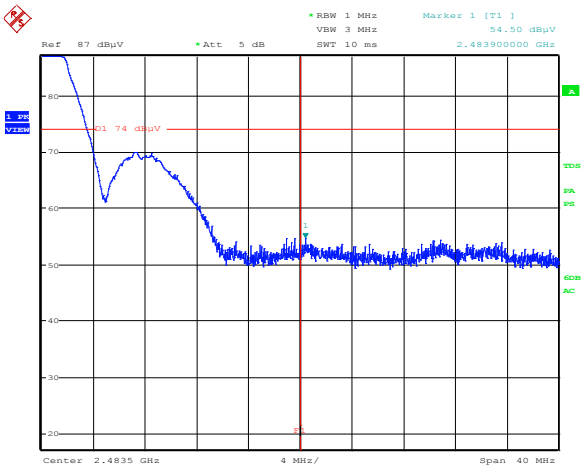


Figure 8.1-23: *Radiated spurious emissions Upper band edge for 802.11b, (TX 2457 MHz) – Peak*

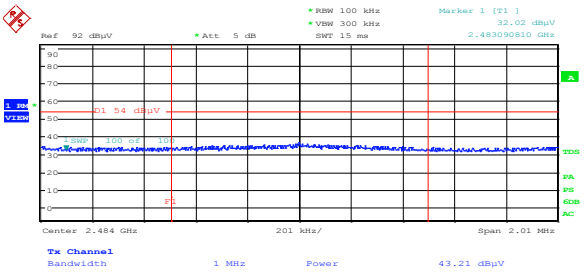


Figure 8.1-24: *Radiated spurious emissions Upper band edge for 802.11b, (TX 2457 MHz) – Average*

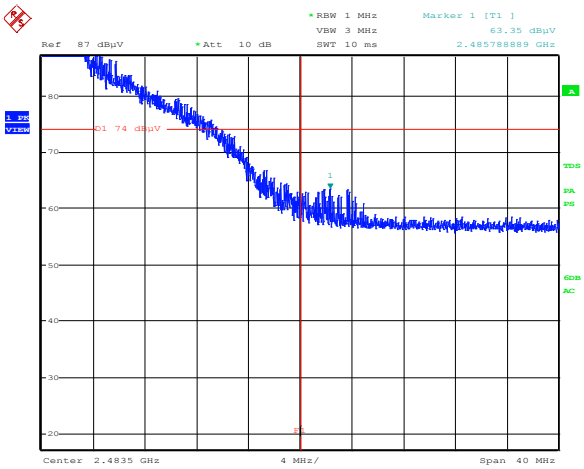


Figure 8.1-25: *Radiated spurious emissions Upper band edge for 802.11g, (TX 2457 MHz) – Peak*

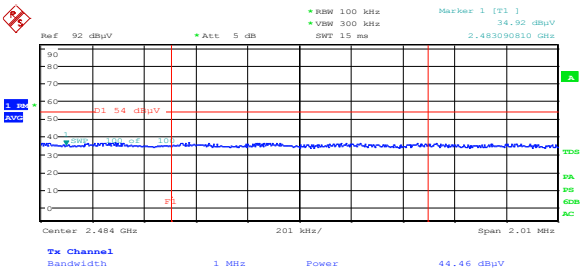


Figure 8.1-26: *Radiated spurious emissions Upper band edge for 802.11g, (TX 2457 MHz) – Average*

8.1.5 Test data, continued

Radiated spurious emissions within restricted bands, test results

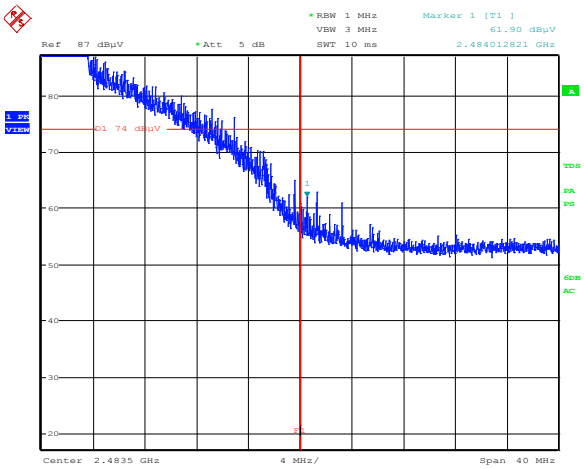


Figure 8.1-27: *Radiated spurious emissions Upper band edge for 802.11n HT20, (TX 2457 MHz) – Peak*

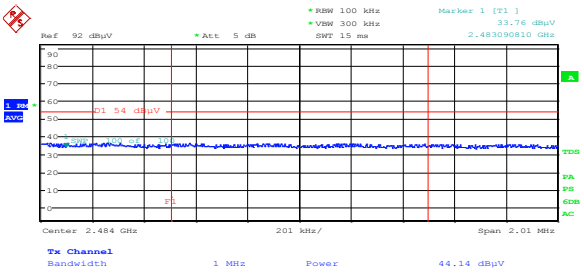


Figure 8.1-28: *Radiated spurious emissions Upper band edge for 802.11n HT20, (TX 2457 MHz) – Average*

8.1.5 Test data, continued

Spurious emissions within restricted bands, test results continued

Table 8.1-4: *Spurious emissions within restricted bands*

Modulation	Freq., MHz	Modulation coding scheme	Freq., MHz	Pol.	Peak field strength[1], dBµV/m	Peak field strength limit, dBµV/m	Peak margin, dB	Average field strength[1], dBµV/m	Average field strength limit, dBµV/m	Average margin, dB
Low band edge (Power setting 30)										
802.11b	2412	CCK: 1 Mbps	2389.91	H	55.79	74.00	18.21	43.73	54.00	10.27
802.11g	2412	OFDM: BPSK_1/2_6Mbps	2389.91	H	57.72	74.00	16.28	44.52	54.00	9.48
802.11n HT20	2412	OFDM: BPSK_1/2_6.5Mbps	2389.91	H	62.14	74.00	11.86	45.75	54.00	8.25
802.11n HT40	2422	OFDM: BPSK_1/2_6.5Mbps	2389.91	H	71.20	74.00	2.80	52.72	54.00	1.28
Low band edge (Power setting 40)										
802.11b	2417	CCK: 1 Mbps	2389.91	H	58.34	74.00	15.66	46.72	54.00	7.28
802.11g	2417	OFDM: BPSK_1/2_6Mbps	2389.91	H	68.39	74.00	5.61	47.00	54.00	7.00
802.11n HT20	2417	OFDM: BPSK_1/2_6.5Mbps	2389.91	H	67.03	74.00	6.97	47.19	54.00	6.81
High band edge (Power setting 30)										
802.11b	2462	CCK: 1 Mbps	2483.50	H	57.19	74.00	16.81	41.49	54.00	12.51
802.11g	2462	OFDM: BPSK_1/2_6Mbps	2483.50	H	59.39	74.00	14.61	42.44	54.00	11.56
802.11n HT20	2462	OFDM: BPSK_1/2_6.5Mbps	2483.50	H	57.68	74.00	16.32	43.09	54.00	10.91
High band edge (Power setting 23)										
802.11n HT40	2452	OFDM: BPSK_1/2_6.5Mbps	2483.50	H	59.00	74.00	15.00	44.39	54.00	9.61
High band edge (Power setting 40)										
802.11b	2457	CCK: 1 Mbps	2483.50	H	54.50	74.00	19.50	43.21	54.00	10.79
802.11g	2457	OFDM: BPSK_1/2_6Mbps	2483.50	H	63.35	74.00	10.65	44.46	54.00	9.54
802.11n HT20	2457	OFDM: BPSK_1/2_6.5Mbps	2483.50	H	61.90	74.00	12.10	44.14	54.00	9.86

Notes: [1] Field strength (dBµV/m) = Spectrum analyzer value (dBµV) + transducer factors (dB)
Transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators.

All other emissions were greater than 20 dB from limit.

8.1.6 Setup photos

Figure 8.1-29: *Radiated spurious (out-of-band) emissions setup photo – 30 to 1000 MHz*

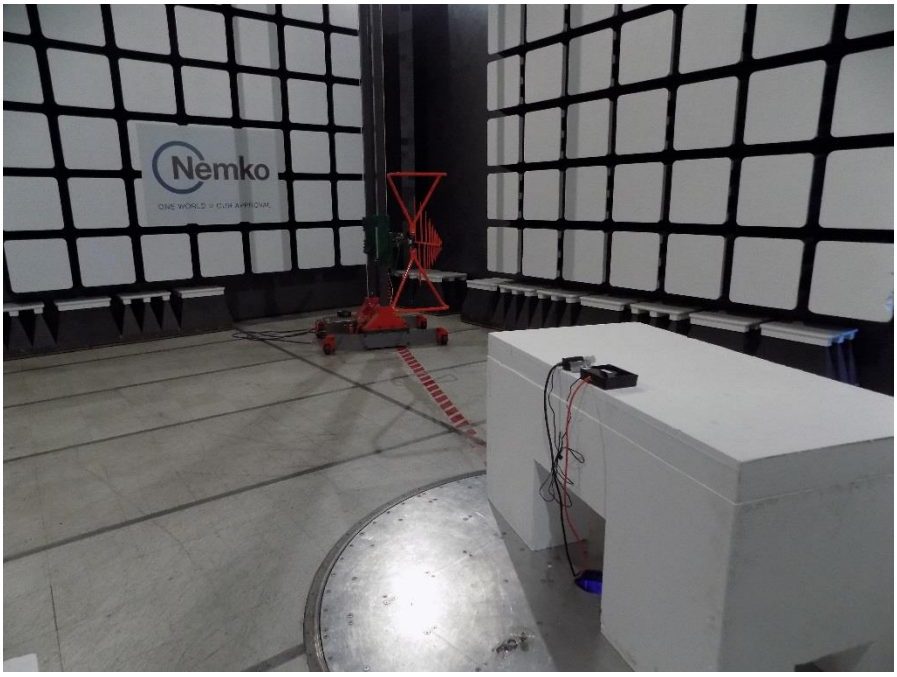


Figure 8.1-30: *Radiated spurious (out-of-band) emissions setup photo – 30 to 1000 MHz*

8.1.6 Setup photos, continued

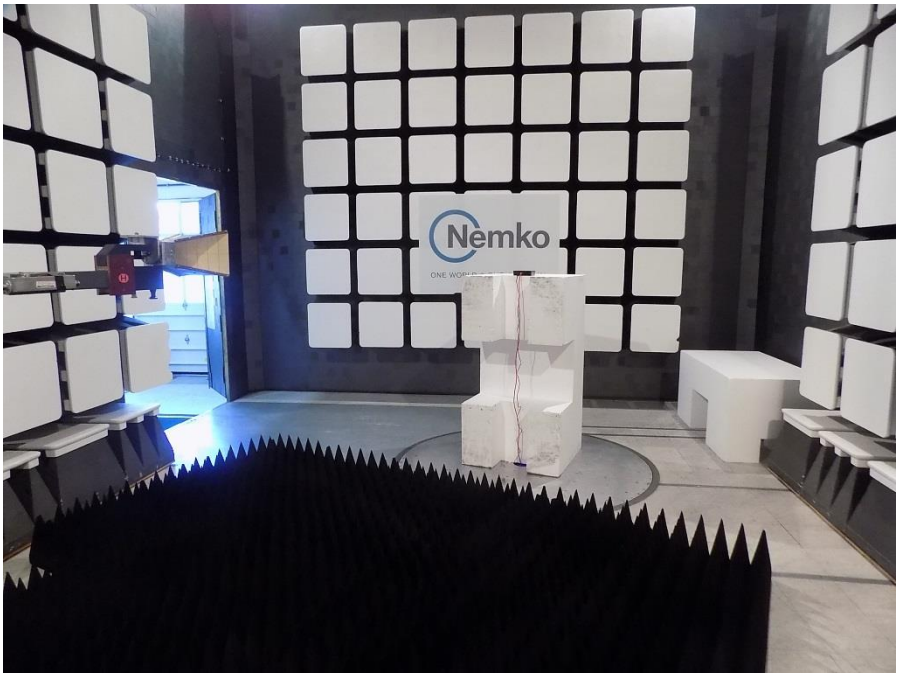


Figure 8.1-31: *Radiated spurious (out-of-band) emissions setup photo – above 1 GHz*

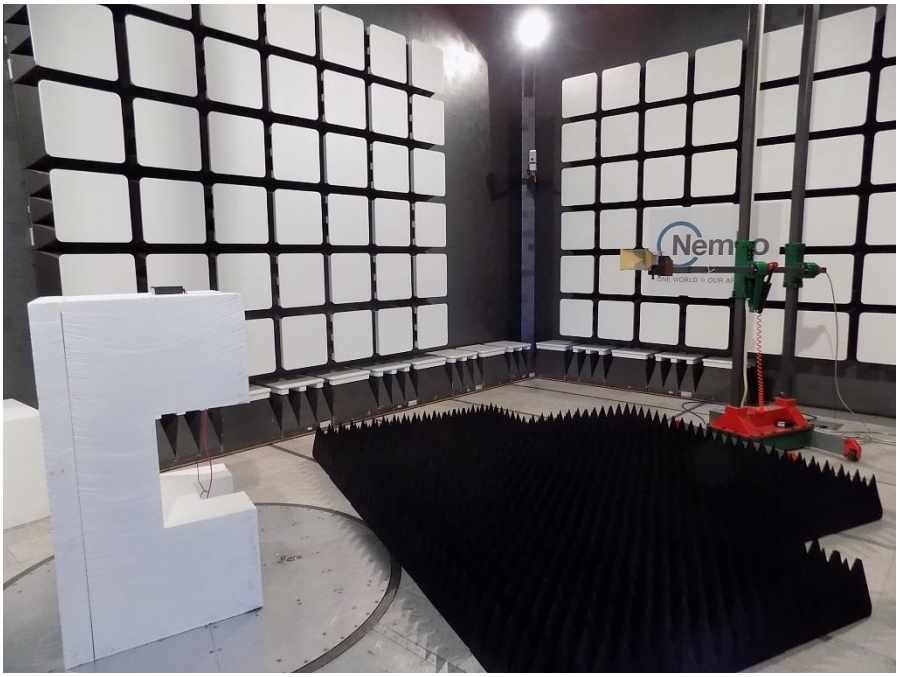
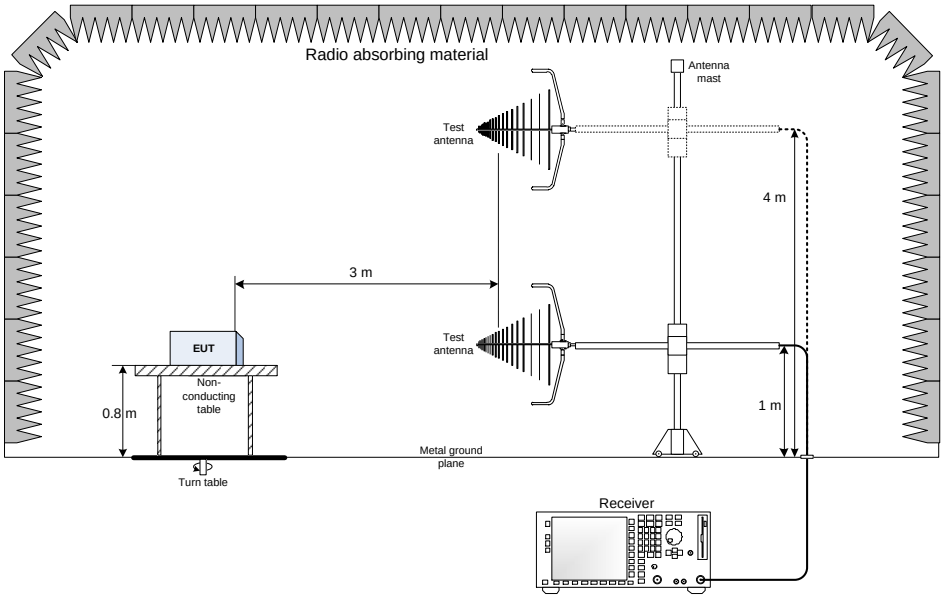


Figure 8.1-32: *Radiated spurious (out-of-band) emissions setup photo – above 1 GHz*

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up for frequencies below 1 GHz



9.2 Radiated emissions set-up for frequencies above 1 GHz