

Wireless test report – 365116-1R1TRFWL

Applicant:

RØDE Microphones

Product:

Digital Wireless Audio Receiver

Name:

RØDE Microphones

Model:

RØDELink RX-DT

FCC ID:

2AEAN404001

ISED Registration number:

20091-404001

Specifications:

Low Power 0002 (LP0002) January 10, 2018

Low-power Radio-frequency Devices

Clause 3.10.1 Intentional radiators employing frequency hopping spread spectrum and digital modulation techniques

Date of issue: **May 29, 2019**

Test engineer(s): **David Duchesne, Senior EMC/Wireless Specialist**

Signature:



Reviewed by: **Andrey Adelberg, Senior Wireless/EMC Specialist**

Signature:



Test location(s)

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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.

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Section 1. Report summary

1.1 Applicant and manufacturer

Name and address of the applicant	RØDE Microphones 107 Carnarvon Street, 2128 Silverwater, Australia
Name and address of the manufacturer	RØDE Microphones 107 Carnarvon Street, 2128 Silverwater, Australia

1.2 Test specifications

LP0002 January 10, 2018, Clause 3.10.1	Intentional radiators employing frequency hopping spread spectrum and digital modulation techniques
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1.3 Test methods

558074 D01 DTS Meas Guidance v04 (April 5, 2017)	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
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 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

None

1.6 Test report revision history

Table 1.6-1: Test report revision history

Revision #	Date of issue	Details of changes made to test report
TRF	December 12, 2018	Original report issued
R1	December 12, 2018	Correction section 6.6, power level.

Section 2. Summary of test results

2.1 Testing period

Test start date	December 3, 2018
Test end date	December 7, 2018

2.2 LPOO02, intentional radiators test results

Table 2.2-1: Result summary

Part	Test description	Verdict
2.3	Conducted limits	Pass
3.10.1.2 (1)(A) or (B)	Maximum peak output power for frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
3.10.1.2 (1)(C)	Maximum peak output power of systems using digital modulation in the 2400–2483.5 MHz band	Pass
3.10.1.2 (2)	Maximum peak output power for frequency hopping systems operating in the 5725–5850 MHz band	Not applicable
3.10.1.3 (1)(A)	Fixed point-to-point operation within 2.4 GHz band with directional antenna gains greater than 6 dBi	Not applicable
3.10.1.3 (1)(B)	Transmitters that emit multiple directional beams	Not applicable
3.10.1.3 (2)	Fixed point-to-point operation within 5.8 GHz band with directional antenna gains greater than 6 dBi	Not applicable
3.10.1.5	Limits on emissions outside the frequency band (Spurious emissions)	Pass
3.10.1.6 (1)(A)	Hopping channel carrier frequencies separation requirements	Not applicable
3.10.1.6 (1)(A)(a)	Frequency hopping systems operating in the 2400–2483.5 MHz band, other requirements	Not applicable
3.10.1.6 (1)(A)(b)	Frequency hopping systems operating in the 5725–5850 MHz band, other requirements	Not applicable
3.10.1.6 (2)(A)	Minimum 6 dB bandwidth for systems using digital modulation techniques	Pass
3.10.1.6 (2)(B)	Power spectral density for digitally modulated devices	Pass
3.10.1.6 (3)	Hybrid systems requirements	Not applicable

Notes: The EUT is a battery-operated equipment, the testing was performed using fresh batteries.

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	November 14, 2018
Nemko sample ID number	Item # 1

3.2 EUT information

Product name	RØDE Microphones
Model	RØDELink RX-DT
Serial number	DM0007899
Hardware identity and/or version	V0002 rB
Software identity and/or version	V0009
Power requirements	15 V _{DC} (External AC Adapter: Input 100-240V 50/60Hz 0.6A, Output 15V DC, 1000mA)
Product description and theory of operation	The EUT is a Digital Wireless Audio Receiver with XLR and Audio Jack outputs. The equipment uses adaptive dynamic frequency selection.

3.3 Technical information

Frequency band	2400–2483.5 MHz
Frequency Min (MHz)	2403 (Low Channel)
Frequency Max (MHz)	2481 (High Channel)
RF power Min (W)	N/A
RF power Max (W), Conducted	0.0105 (10.2 dBm)
Field strength, Units @ distance	N/A
Measured BW (kHz) (99 %)	1370
Calculated BW (kHz), as per TRC-43	N/A
Type of modulation	Digital (GFSK)
Emission classification (F1D, G1D, D1D)	F1D
Transmitter spurious, dBμV/m @ 3 m	50.3 (average) at 2483.5 MHz
Antenna information	Number of Antennas :2 (Antennas are detachable) Type of antenna connector: Reverse SMA

3.4 EUT exercise details

The EUT was setup to continuously transmit at specific channels.

3.5 EUT setup diagram

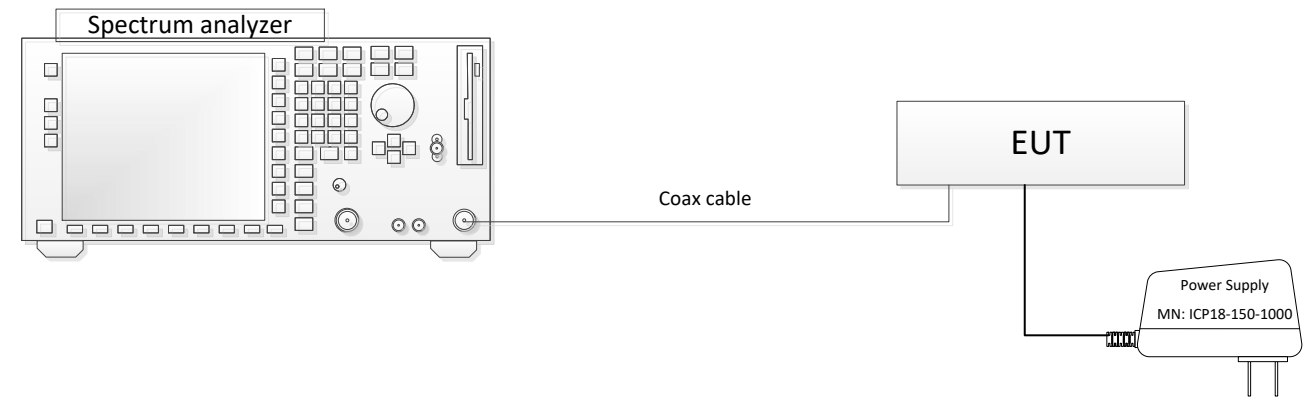


Figure 3.5-1: Setup diagram for antenna port measurements

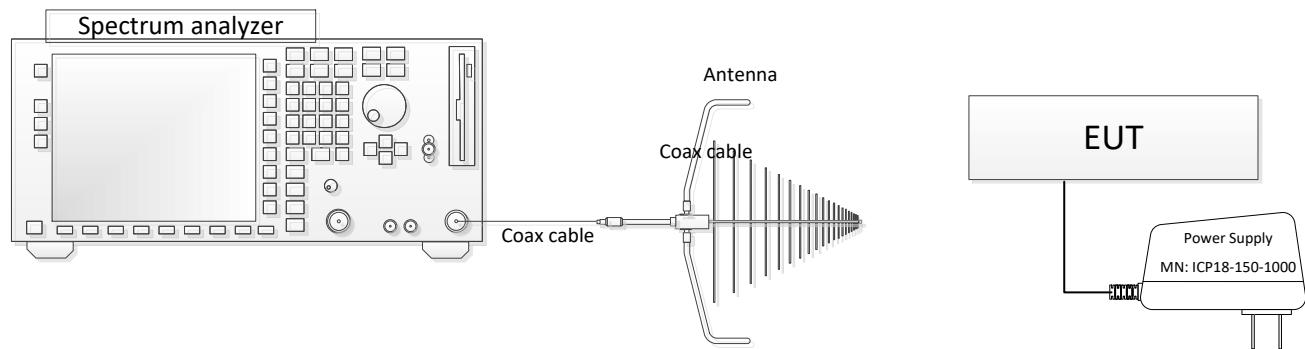


Figure 3.5-2: Setup diagram for radiated measurements

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT for compliance

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 $\pm 5\%$, 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.

Table 6.1-1: Measurement uncertainty

Test name	Measurement uncertainty, dB
All antenna port measurements	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78
AC power line conducted emissions	3.55

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	Jan. 9/19
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Mar 26/19
Bilog antenna (20–2000 MHz)	Sun AR	JB1	FA003009	1 year	Sept. 6/19
Spectrum analyzer	Rohde & Schwarz	FSU	FA001877	1 year	Oct 26/19
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1 year	Oct. 8/19
Preamp (1–18 GHz)	ETS-Lindgren	124334	FA002877	1 year	Nov. 4/19
50 Ω coax cable	C.C.A.	None	FA002555	1 year	May 1/19
50 Ω coax cable	Huber + Suhner	None	FA002830	1 year	May 8/19
Notch filter 2400–2483 MHz	Microwave Circuits	2400–2483 MHz	FA001940	—	VOU
LISN	Rohde & Schwarz	ENV216	FA002515	1 year	Apr. 30/19
50 Ω coax cable	C.C.A.	None	FA002556	1 year	May 1/19

Notes: VOU - verify on use

Section 8. Testing data

8.1 Clause 3.10.1.6 (2)(A) Minimum 6 dB bandwidth for systems using digital modulation tech

8.1.1 Definitions and limits

For digitally modulated systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

8.1.2 Test summary

Verdict	Pass
Test date	December 10, 2018
Test engineer	David Duchesne

8.1.3 Observations, settings and special notes

None

8.1.4 Test data

Table 8.1-1: 6 dB bandwidth results

Frequency, MHz	6 dB bandwidth, kHz	Minimum limit, kHz	Margin, kHz
Antenna port 1			
2403	785.3	500.0	285.3
2441	729.2	500.0	229.2
2481	729.2	500.0	229.2
Antenna port 2			
2403	777.2	500.0	277.2
2441	769.2	500.0	269.2
2481	761.2	500.0	261.2

Notes: None

Table 8.1-2: 99 % bandwidth results

Frequency, MHz	99 % bandwidth, MHz
Antenna port 1	
2403	1.37
2441	1.36
2481	1.36
Antenna port 2	
2403	1.36
2441	1.36
2481	1.36

Notes: There is no 99% occupied bandwidth requirement, this value is reported for information only.

8.1.4 Test data, continued

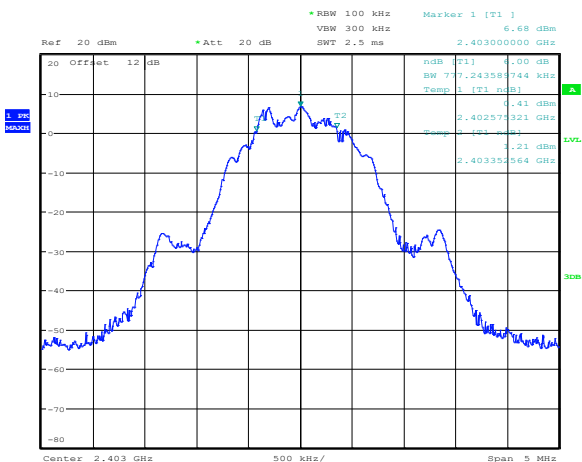


Figure 8.1-1: 6 dB bandwidth on low channel – Sample plot

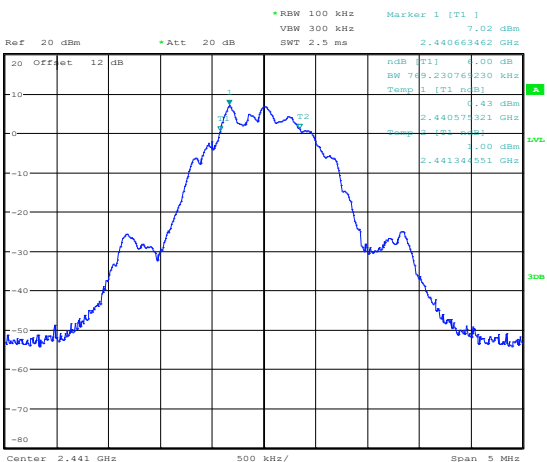


Figure 8.1-2: 6 dB bandwidth on mid channel – Sample plot

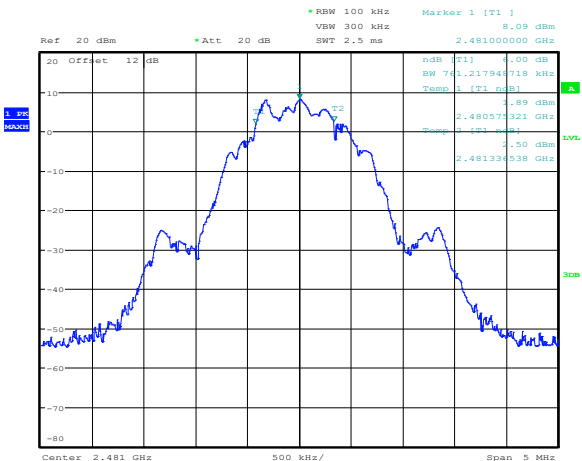


Figure 8.1-3: 6 dB bandwidth on high channel – Sample plot

8.1.4 Test data, continued

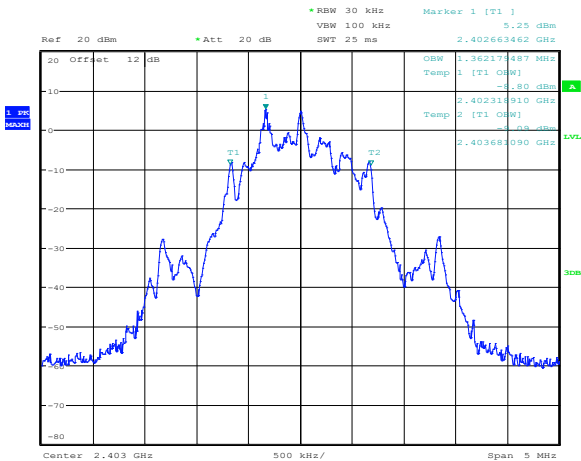


Figure 8.1-4: 99 % bandwidth on low channel – Sample plot

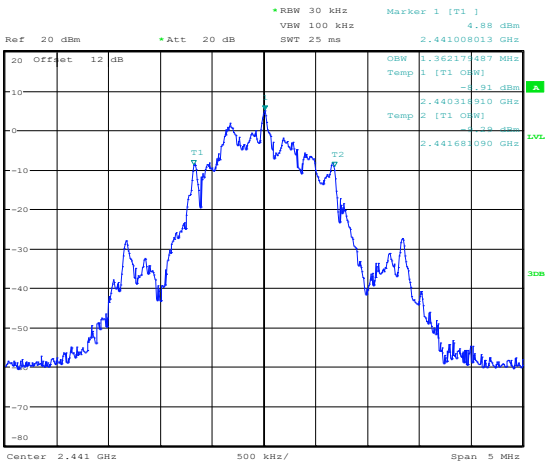


Figure 8.1-5: 99 % bandwidth on mid channel – Sample plot

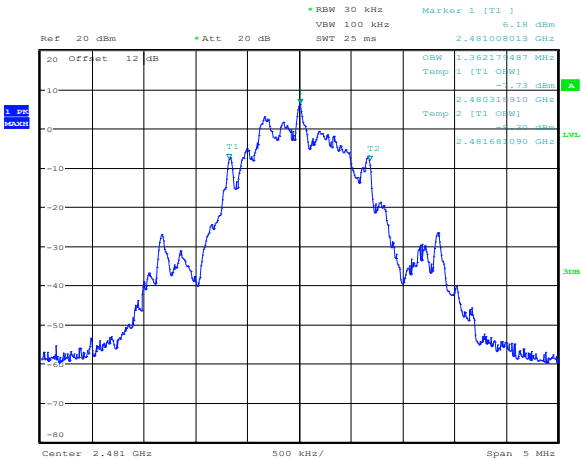


Figure 8.1-6: 99 % bandwidth on high channel – Sample plot

8.2 Clause 3.10.1.2 (1)(C) Transmitter maximum peak output power for systems using digital modulation

8.2.1 Definitions and limits

The maximum peak output power for systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30 dBm).

3.10.1.2 (3) When using the transmitting antennas with the directional gain over 6 dBi except for (1) and (2), the maximum conducted output power shall be reduced in equal quantity according to the total dBi of the antenna directional gain over 6 dBi.

3.10.1.2 (1)(A) Systems operating in the 2400–2483.5 MHz band, for fixed, point-to-point operations, the peak conducted output power of the intentional radiator shall be reduced by 1 dB for every 3 dBi when the directional gain of the antenna exceeds 6 dBi.

3.10.1.2 (2) When operating in 5725–5850 MHz and by fixed point-to-point operation, the directional gain of the transmitting antenna shall exceed 6 dBi without reducing the maximum conducted output power.

8.2.2 Test summary

Verdict	Pass
Test date	December 10, 2018
Test engineer	David Duchesne

8.2.3 Observations, settings and special notes

The test was performed according to DTS guidelines using peak method.

8.2.4 Test data

Table 8.2-1: Output power measurements results

Frequency, MHz	Conducted output power, dBm		Margin, dB	Antenna gain, dBi	EIRP, dBm	EIRP limit, dBm	EIRP margin, dB
	Measured	Limit					
Antenna port 1							
2403	8.7	30.0	21.3	-2.2	6.5	36.0	29.5
2441	9.2	30.0	20.8	-0.1	9.1	36.0	26.9
2481	10.2	30.0	19.8	-1.1	9.1	36.0	26.9
Antenna port 2							
2403	7.6	30.0	22.40	-2.2	5.4	36.0	30.6
2441	7.7	30.0	22.30	-0.1	7.6	36.0	28.4
2481	9.0	30.0	21.00	-1.1	7.9	36.0	28.1

Notes: None

8.2.4 Test data, continued

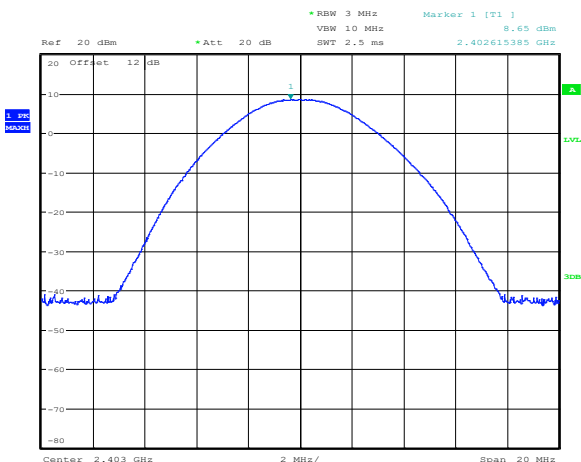


Figure 8.2-1: Output power on low channel – Sample plot

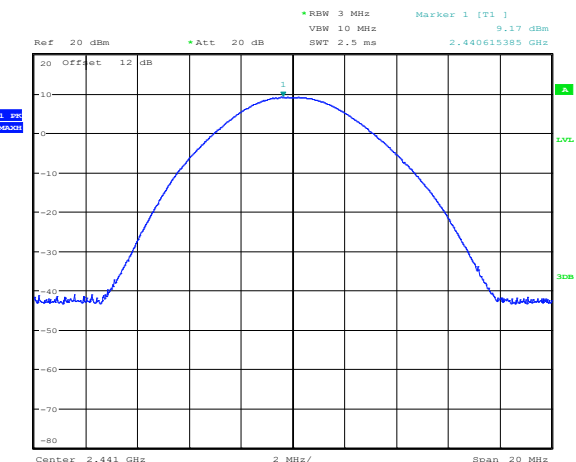


Figure 8.2-2: Output power on mid channel – Sample plot

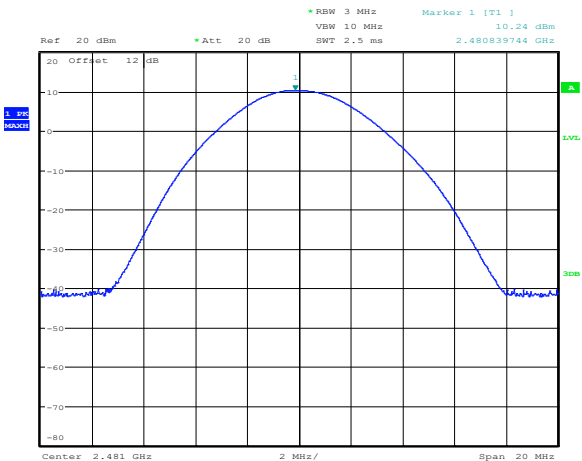


Figure 8.2-3: Output power on high channel – Sample plot

8.3 Clause 3.10.1.5 Spurious emissions

8.3.1 Definitions and limits

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 below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, the attenuation shall be as below:

3.10.1.5 (1) The attenuation shall be at least 20 dB when the conducted power is measured according to Appendix II of this section, based on either an RF conducted or a radiated measurement.

3.10.1.5 (2) The attenuation shall be at least 30 dB when the conducted power is measured according to the paragraph (1) (C) of this section 3.10.1.2.

In addition, radiated emissions that fall under Section 2.7 the restricted bands must also comply with the radiated emission limit specified in Section 2.8.

Table 8.3-1: Section 2.8 Radiated emission limits

Frequency, MHz	Field strength of emissions		Measurement distance, m
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(\text{F})$	300
0.490–1.705	24000/F	$87.6 - 20 \times \log_{10}(\text{F})$	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. F is in kHz units

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 8.3-2: Section 2.7 Restricted frequency bands

MHz	MHz	MHz
0.090–0.110	240.00–285.00	3332.0–3339.0
0.490–0.510	322.00–335.40	3345.8–3358.0
2.172–2.198	399.90–410.00	3500.0–4400.0
3.013–3.033	485.00–510.00	4500.0–5250.0
4.115–4.198	608.00–614.00	5350.0–5460.0
5.670–5.690	703.00–748.00	7250.0–7750.0
6.200–6.300	758.00–803.00	8025.0–8500.0
8.230–8.400	825.00–915.00	9000.0–9200.0
12.265–12.600	930.00–1240.0	9300.0–9500.0
13.340–13.430	1300.0–1427.0	10600–12700
14.965–15.020	1435.0–1626.5	13250–13400
16.700–16.755	1660.0–1785.0	14470–14500
19.965–20.020	1805.0–1880.0	15350–16200
25.500–25.700	1885.0–1900.0	17700–21400
37.475–38.275	1905.0–1985.0	22010–23120
73.500–75.400	2010.0–2025.0	23600–24000
108.00–138.00	2110.0–2170.0	31200–31800
149.90–150.05	2200.0–2300.0	36430–36500
156.70–156.90	2310.0–2390.0	Above 38600
162.01–167.17	2483.5–2900.0	
167.72–173.20	3260.0–3267.0	

Notes: None

8.3.2 Test summary

Verdict	Pass
Test date	December 11, 2018
Test engineer	David Duchesne

8.3.3 Observations, settings and special notes

- The spectrum was searched from 30 MHz to the 10th harmonic.
- Cabinet radiation measurements were performed at a distance of 3 m.
- Radiated measurements were measured on both antennas and the EUT was rotated in 3 planes to find the maximum value.
- Since fundamental power was tested using peak power method, the spurious emissions outside restricted bands limit is –20 dBc/100 kHz
- Conducted plots have been corrected with associated transducer factors (i.e. cable loss attenuators).
- Radiated plots are a summation of a vertical and horizontal scan. The spectral plots have been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

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:	VBW $\geq [3 \times \text{RBW}]$.
Detector mode:	RMS
Trace mode:	Averaging type = power
Sweeps:	100.
Notes:	Plus correction factor for duty cycle.

Spectrum analyser settings for conducted spurious emissions outside restricted bands measurements:

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

8.3.4 Test data

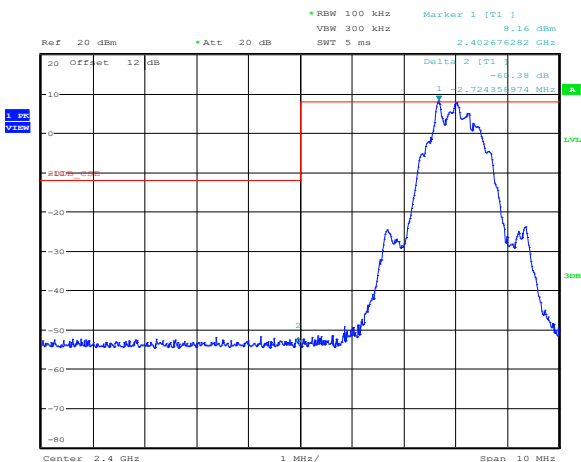


Figure 8.3-1: Conducted spurious emissions outside restricted bands at the lower band edge (2400 MHz), on low channel – Antenna port 1

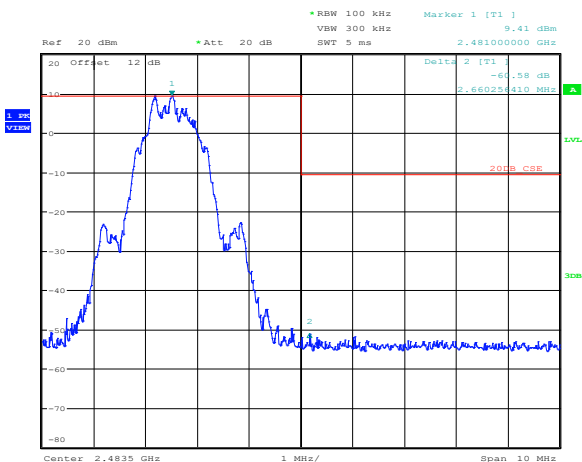


Figure 8.3-2: Conducted spurious emissions outside restricted bands at the upper band edge (2483.5 MHz), on high channel – Antenna port 1

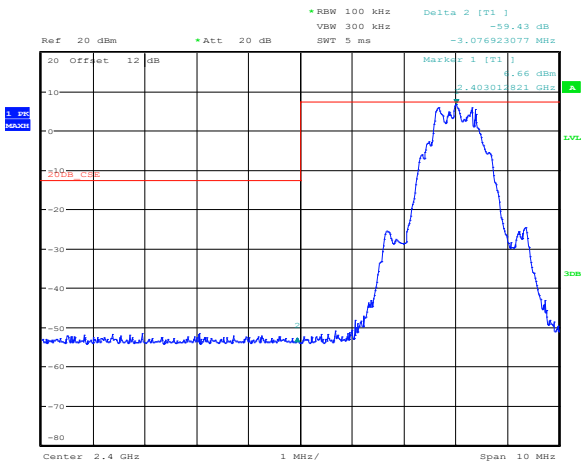


Figure 8.3-3: Conducted spurious emissions outside restricted bands at the lower band edge (2400 MHz), on low channel – Antenna port 2

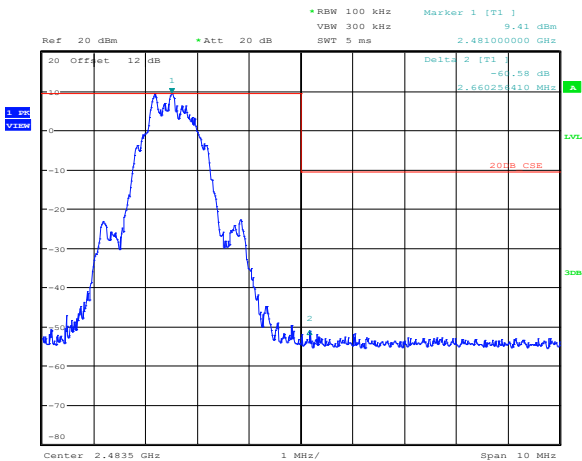


Figure 8.3-4: Conducted spurious emissions outside restricted bands at the upper band edge (2483.5 MHz), on high channel – Antenna port 2

8.3.4 Test data, continued

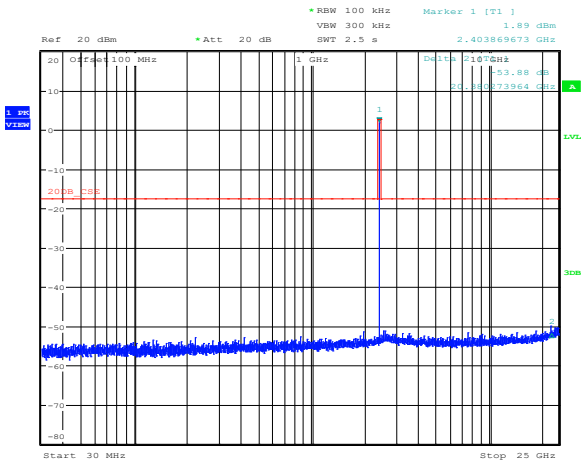


Figure 8.3-5: Conducted spurious emissions outside restricted bands on low channel – Antenna port 1

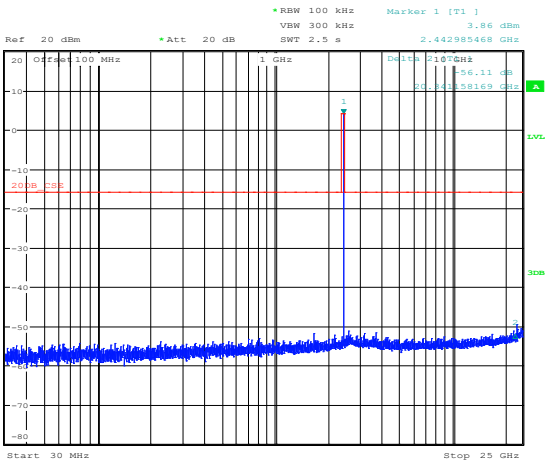


Figure 8.3-6: Conducted spurious emissions outside restricted bands on mid channel – Antenna port 1

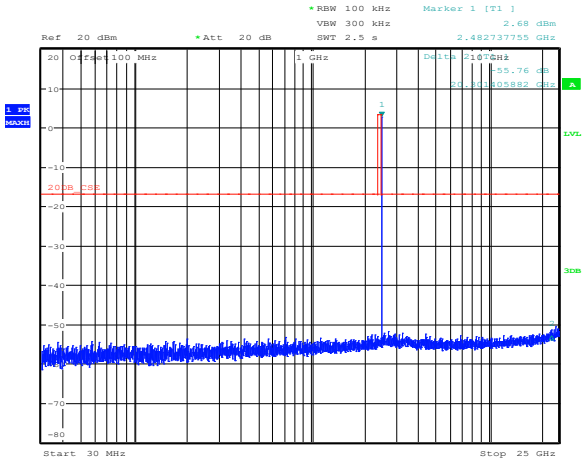


Figure 8.3-7: Conducted spurious emissions outside restricted bands on high channel – Antenna port 1

8.3.4 Test data, continued

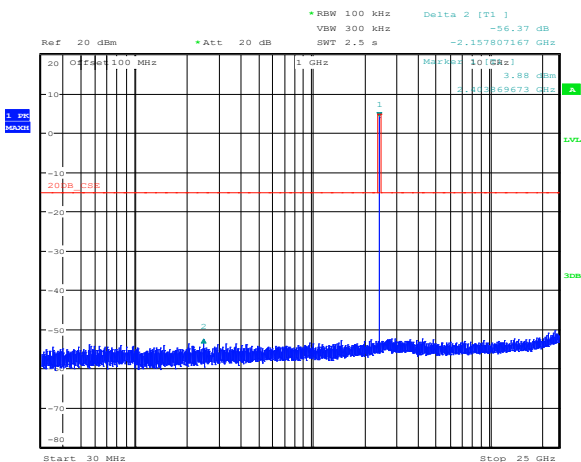


Figure 8.3-8: Conducted spurious emissions outside restricted bands on low channel – Antenna port 2

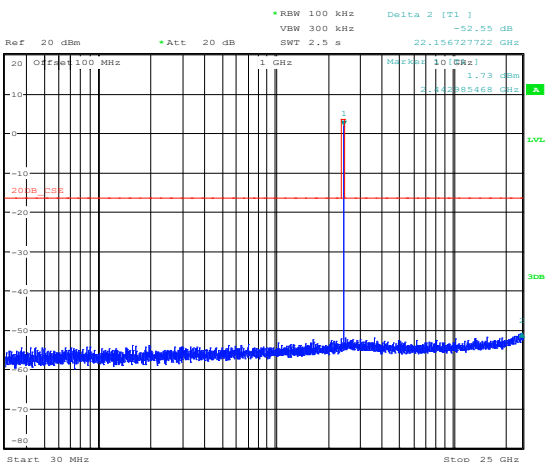


Figure 8.3-9: Conducted spurious emissions outside restricted bands on mid channel – Antenna port 2

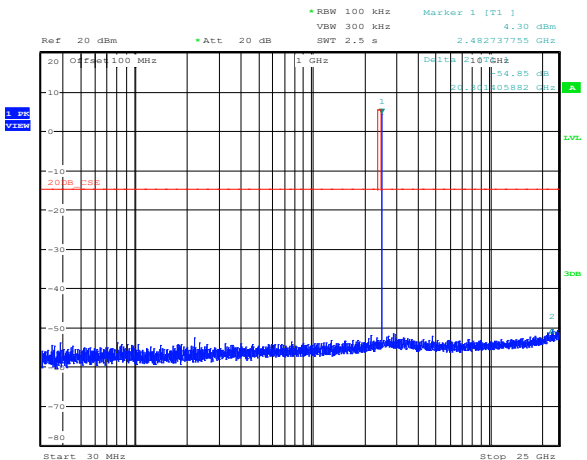


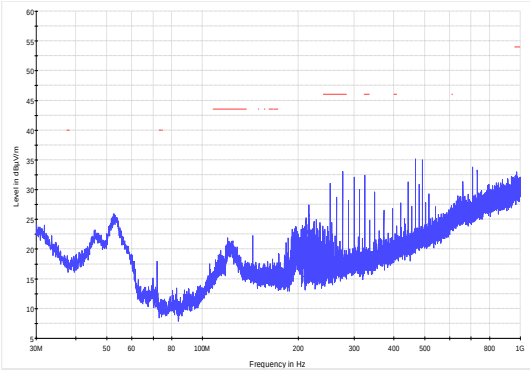
Figure 8.3-10: Conducted spurious emissions outside restricted bands on high channel – Antenna port 2

8.3.4 Test data, continued

Table 8.3-3: Radiated field strength measurement results

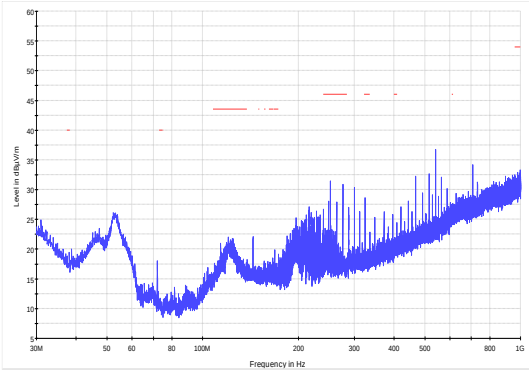
Channel	Frequency, MHz	Peak Field strength, dBμV/m		Peak Margin, dB	Average Field strength, dBμV/m		Average Margin, dB
		Measured	Limit			Limit	
Antenna port 1							
Low	2389.5	44.9	74.0	29.1		54.0	9.1
High	2483.5	50.3	74.0	23.7		54.0	3.7
Antenna port 2							
Low	2389.8	44.9	74.0	29.1		54.0	9.1
High	2483.5	45.2	74.0	28.8		54.0	8.8

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
The peak was compliant with the average limit. Therefore, the EUT was deemed to meet the average requirement.



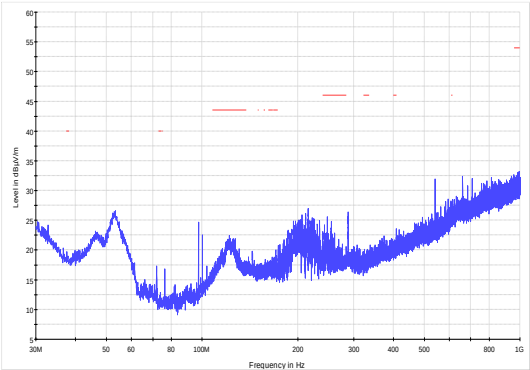
Notes: Red line = restricted band average limit

Figure 8.3-11: Radiated spurious emissions within restricted bands on low channel below 1 GHz – Antenna port 1



Notes: Red line = restricted band average limit

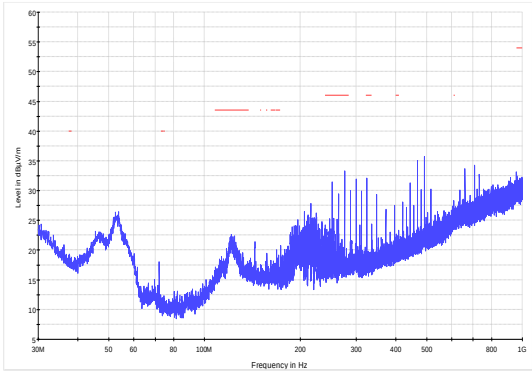
Figure 8.3-12: Radiated spurious emissions within restricted bands on mid channel below 1 GHz – Antenna port 1



Notes: Red line = restricted band average limit

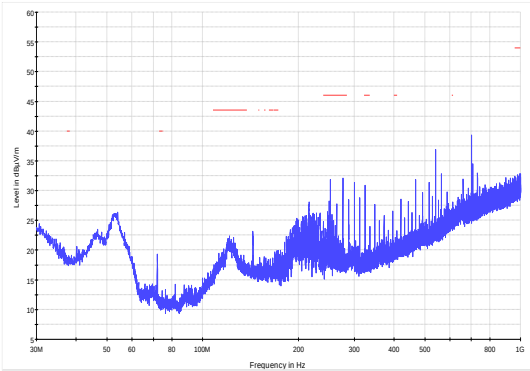
Figure 8.3-13: Radiated spurious emissions within restricted bands on high channel below 1 GHz – Antenna port 1

8.3.4 Test data, continued



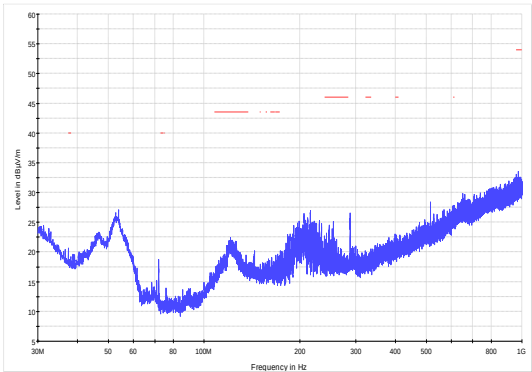
Notes: Red line = restricted band average limit

Figure 8.3-14: Radiated spurious emissions within restricted bands on low channel below 1 GHz – Antenna port 2



Notes: Red line = restricted band average limit

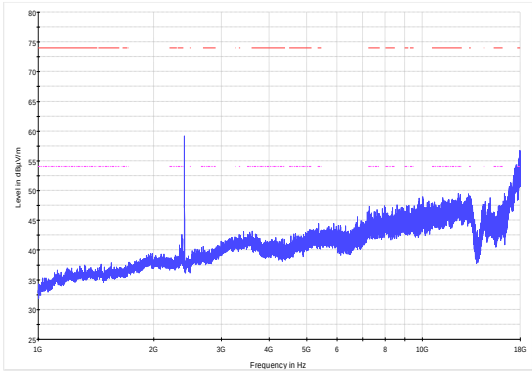
Figure 8.3-15: Radiated spurious emissions within restricted bands on mid channel below 1 GHz – Antenna port 2



Notes: Red line = restricted band average limit

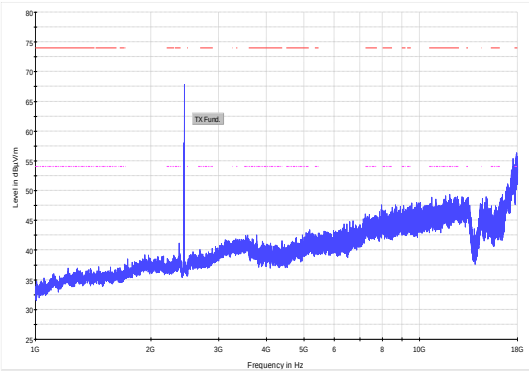
Figure 8.3-16: Radiated spurious emissions within restricted bands on high channel below 1 GHz – Antenna port 2

8.3.4 Test data, continued



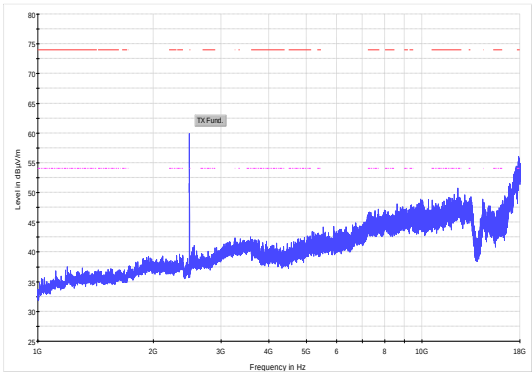
Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-17: Radiated spurious emissions within restricted bands on low channel between 1 and 18 GHz – Antenna port 1



Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-18: Radiated spurious emissions within restricted bands on mid channel between 1 and 18 GHz – Antenna port 1

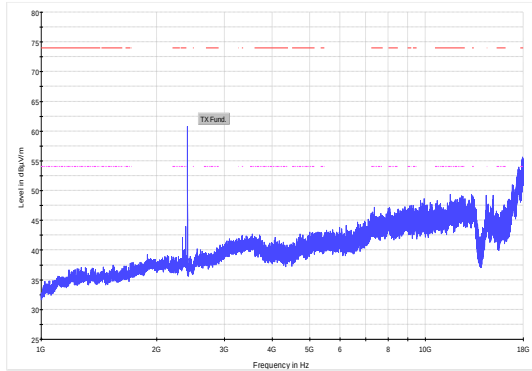


Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-19: Radiated spurious emissions within restricted bands on high channel between 1 and 18 GHz – Antenna port 1

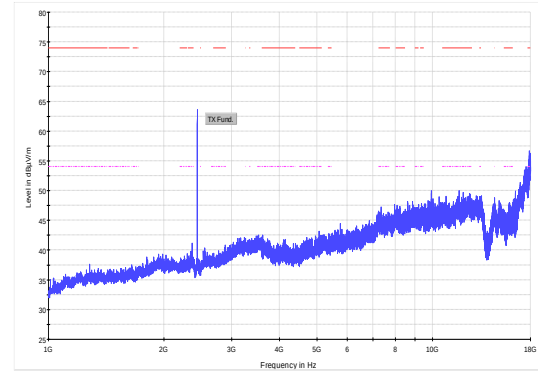
Special notes: Further investigation was verified from 17.7–18.0 GHz where the peak was above the average limit. No emissions were detected from the EUT.

8.3.4 Test data, continued



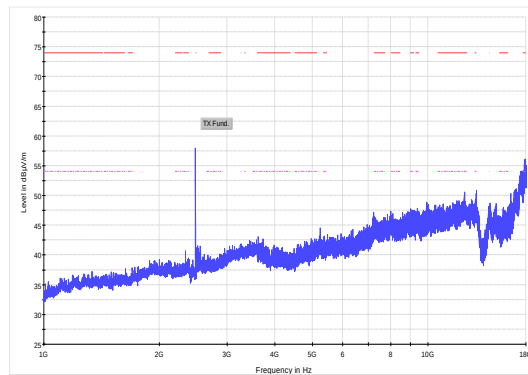
Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-20: Radiated spurious emissions within restricted bands on low channel between 1 and 18 GHz – Antenna port 2



Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-21: Radiated spurious emissions within restricted bands on mid channel between 1 and 18 GHz – Antenna port 2

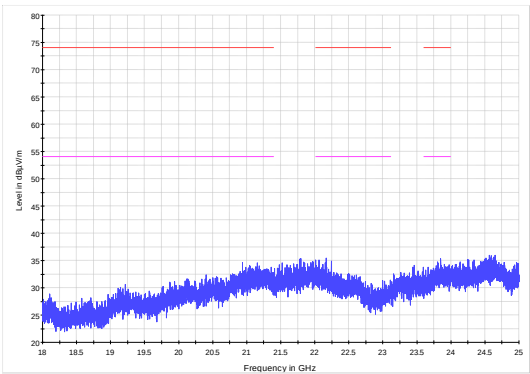


Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-22: Radiated spurious emissions within restricted bands on high channel between 1 and 18 GHz – Antenna port 2

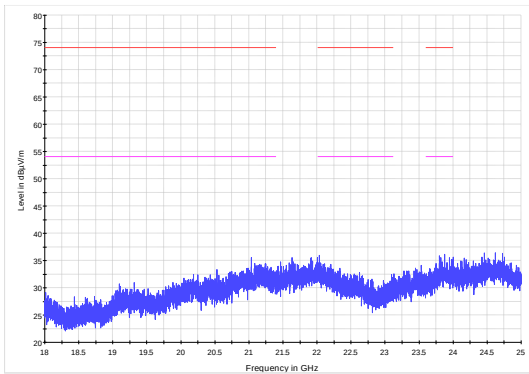
Special notes: Further investigation was verified from 17.7–18.0 GHz where the peak was above the average limit. No emissions were detected from the EUT.

8.3.4 Test data, continued



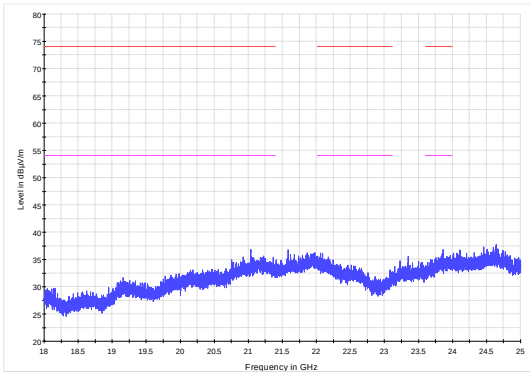
Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-23: Radiated spurious emissions within restricted bands on low channel between 18 and 25 GHz – Antenna port 1



Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

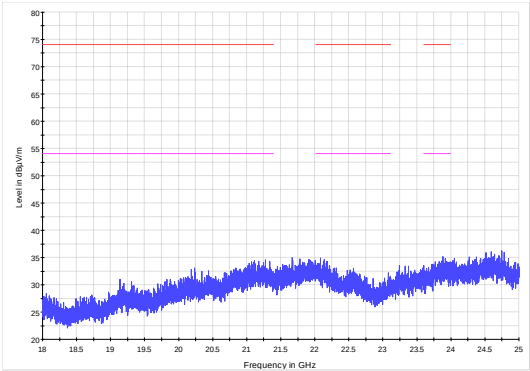
Figure 8.3-24: Radiated spurious emissions within restricted bands on mid channel between 18 and 25 GHz – Antenna port 1



Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

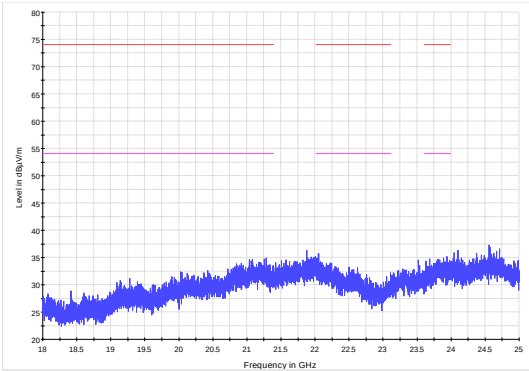
Figure 8.3-25: Radiated spurious emissions within restricted bands on high channel between 18 and 25 GHz – Antenna port 1

8.3.4 Test data, continued



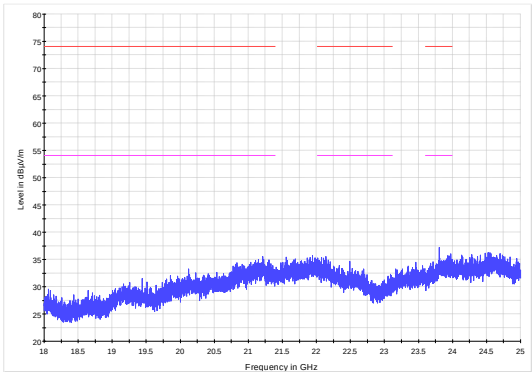
Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-26: Radiated spurious emissions within restricted bands on low channel between 18 and 25 GHz – Antenna port 2



Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-27: Radiated spurious emissions within restricted bands on mid channel between 18 and 25 GHz – Antenna port 2



Notes: Red line = restricted band peak limit, Pink line = restricted band average limit

Figure 8.3-28: Radiated spurious emissions within restricted bands on high channel between 18 and 25 GHz – Antenna port 2

8.3.5 Setup photos



Figure 8.3-29: Radiated spurious emissions setup photo – below 1 GHz



Figure 8.3-30: Radiated spurious emissions setup photo – below 1 GHz

8.3.5 Setup photos, continued

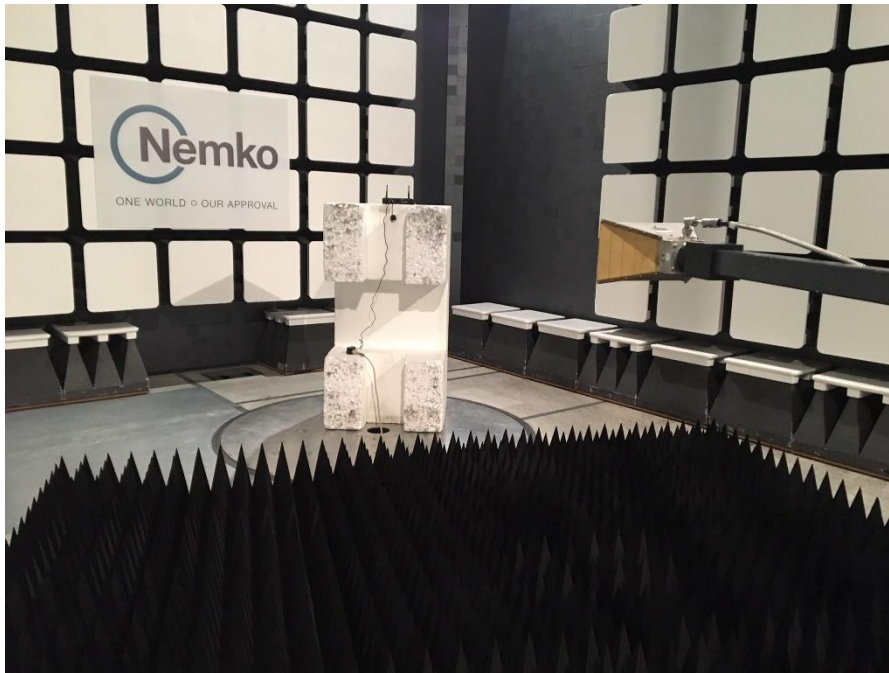


Figure 8.3-31: Radiated spurious emissions setup photo – above 1 GHz



Figure 8.3-32: Radiated spurious emissions setup photo – above 1 GHz

8.4 Clause 3.10.1.6 (2)(B) Peak power spectral density for digitally modulated devices

8.4.1 Definitions and limits

For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.4.2 Test summary

Verdict	Pass
Test date	December 10, 2018
Test engineer	David Duchesne

8.4.3 Observations, settings and special notes

The output power was tested using peak detector, therefore PSD test was performed using method described in section 10.2 PKPSD of the 558074 D01 DTS Meas Guidance v03r01.

8.4.4 Test data

Table 8.4-1: PSD measurements results

Frequency, MHz	PSD, dBm/3 kHz	PSD limit, dBm/3 kHz	Margin, dB
Antenna port 1			
2403	-9.6	8.0	17.6
2441	-9.7	8.0	17.7
2481	-9.0	8.0	17.0
Antenna port 2			
2403	-11.1	8.0	19.1
2441	-11.4	8.0	19.4
2481	-10.5	8.0	18.5

Notes: None

8.4.4 Test data, continued

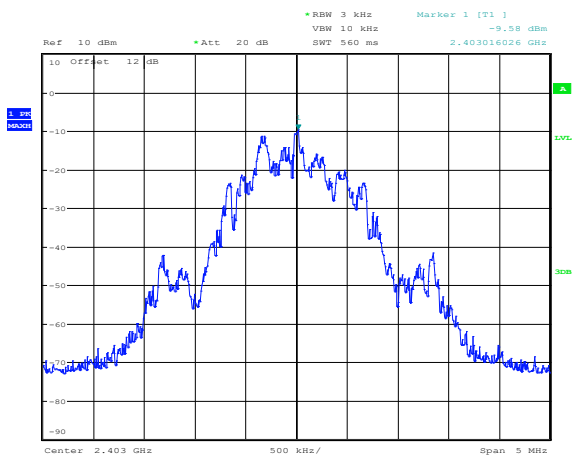


Figure 8.4-1: PSD sample plot on low channel – Sample plot

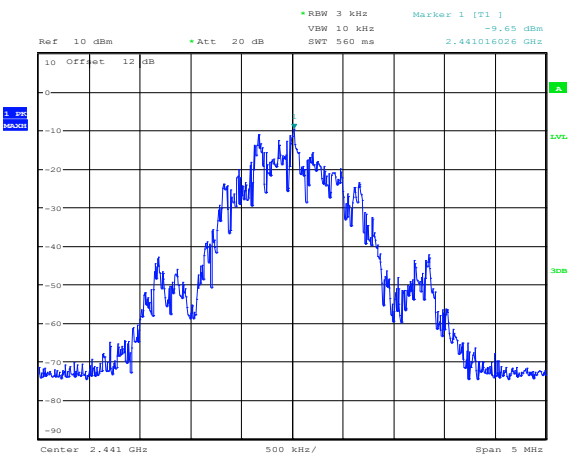


Figure 8.4-2: PSD sample plot on mid channel – Sample plot

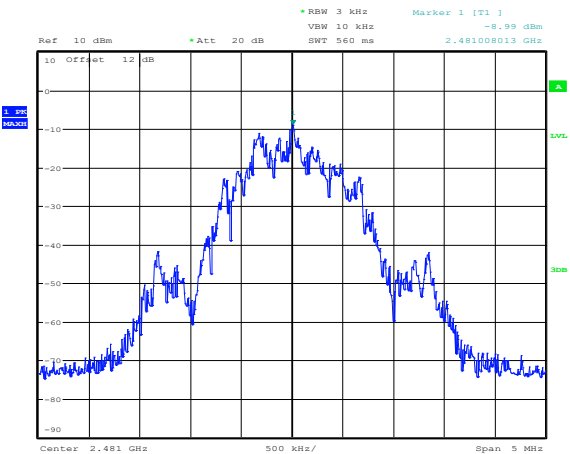


Figure 8.4-3: PSD sample plot on high channel – Sample plot

8.5 Clause 2.3 Conducted limits – from AC mains power ports

8.5.1 Definitions and limits

For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall be less than or equal the limits in the following table, as measured using a 50 [μ]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.

Table 8.5-1: Clause 2.3 Conducted limits – from AC mains power ports

Frequency range [MHz]	Measurement		Limits [dBμV]
	Coupling device	Detector type/ bandwidth	
0.15–0.5	AMN	Quasi Peak/9 kHz	66–56
0.5–5			56
5–30			60
0.15–0.5	AMN	CAverage/9 kHz	56–46
0.5–5			46
5–30			50

Notes: The lower limit shall apply at the transition frequency.

8.5.2 Test summary

Verdict	Pass
Test date	December 11, 2018
Test engineer	David Duchesne

8.5.3 Observations, settings and special notes

- Where tabular data has not been provided, no emissions were observed within 10 dB of the specified limit when measured with the appropriate detector.
- Where less than 6 measurements per detector has been provided, fewer than 6 emissions were observed within 10 dB of the specified limit when measured with the appropriate detector.
- The spectral plots have been corrected with transducer factors. (i.e. cable loss, LISN factors, and attenuators)

Port under test – Coupling device	AC input of External AC-DC adapter – Artificial Mains Network (AMN)
EUT power input during test	110 V _{AC} , 60 Hz
EUT setup configuration	Table top
Measurement details	A preview measurement was generated with the receiver in continuous scan mode. Emissions detected within 10 dB or above the limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Receiver settings:

Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Detector mode	Peak and Average (Preview measurement), Quasi-peak and CAverage (Final measurement)
Trace mode	Max Hold
Measurement time	– 100 ms (Peak and Average preview measurement) – 100 ms (Quasi-peak final measurement) – 160 ms (CAverage final measurement)

8.5.5 Test data

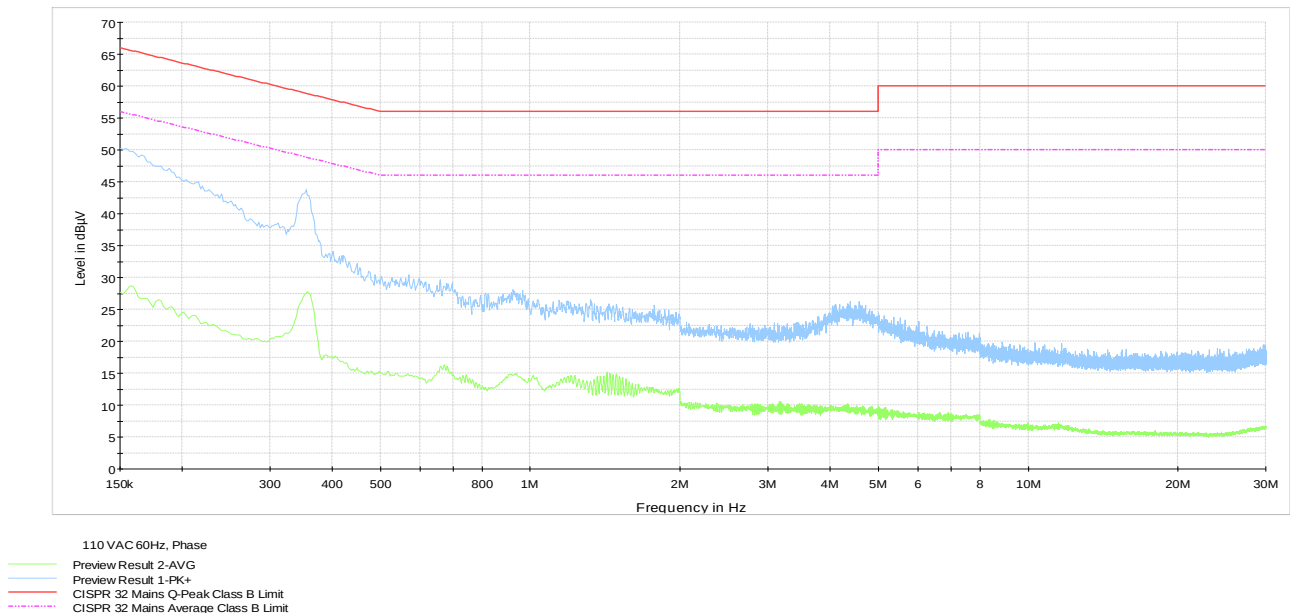


Figure 8.5-1: Conducted emissions – from AC mains power ports spectral plot on phase line

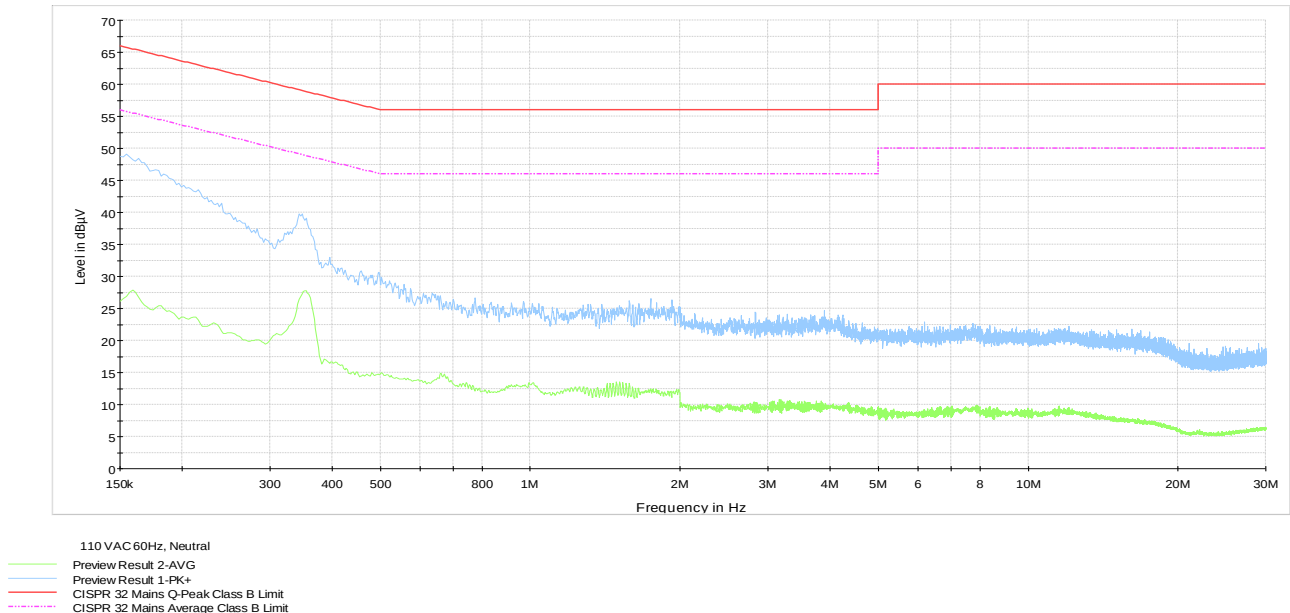


Figure 8.5-2: Conducted emissions – from AC mains power ports spectral plot on neutral line

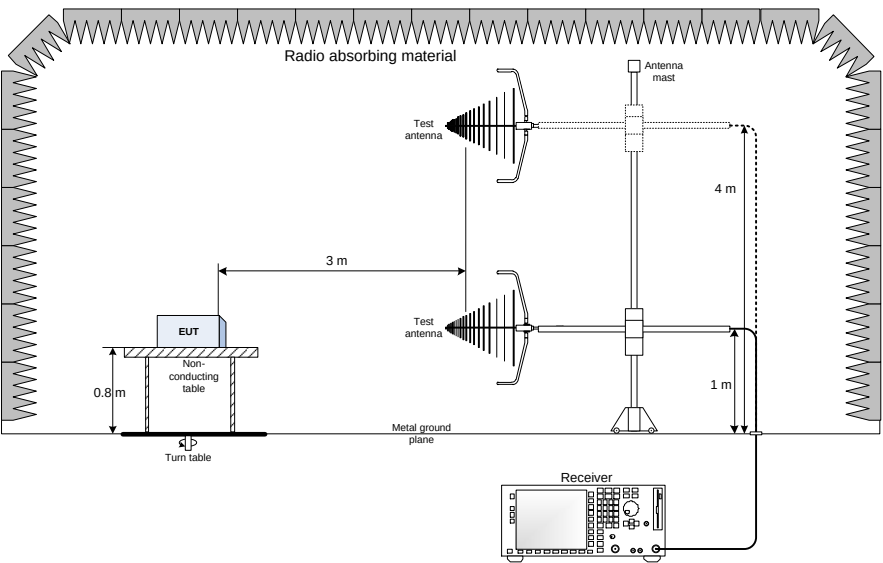
8.5.6 Setup photos



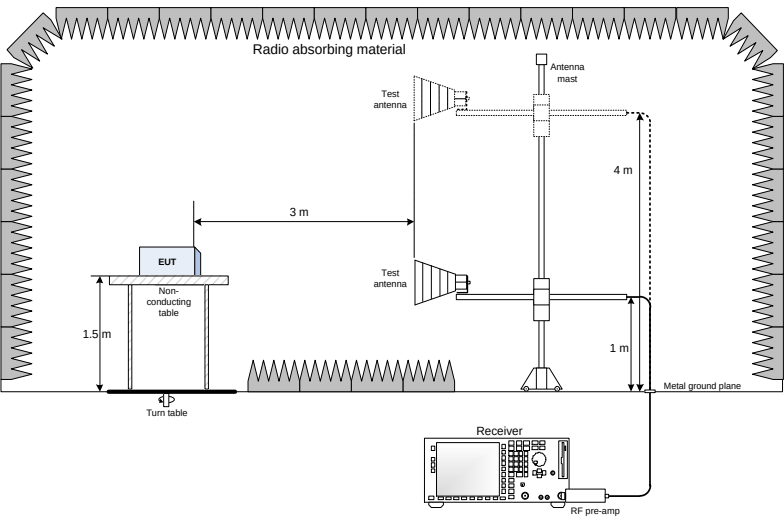
Figure 8.5-3: *Conducted emissions – from AC mains power ports setup photo*

Section 9. Block diagrams of test set-ups

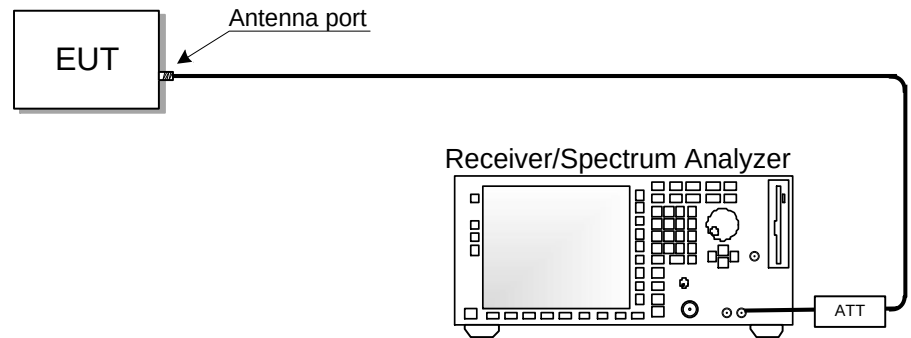
9.1 Radiated emissions set-up for frequencies below 1 GHz



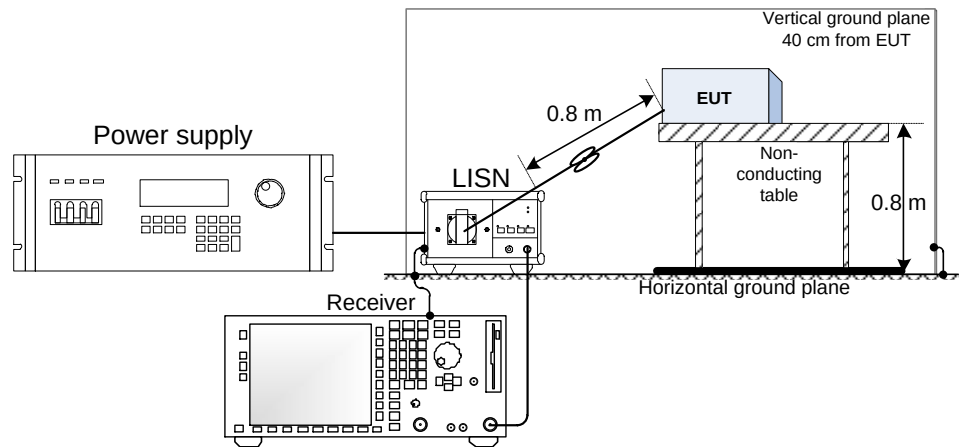
9.2 Radiated emissions set-up for frequencies above 1 GHz



9.3 Antenna port set-up



9.4 Conducted emissions set-up



Section 10. EUT photos

10.1 External photos



End of report