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Test report

341648-3TRFWL

Date of issue: March 22, 2018

Applicant: Stemco LP

Product: TailBat

Model: ATD003160 Model variant: N/A

FCC ID: SRA-ATD003160 IC Registration number: 7413A-ATD003160

Specifications:

- FCC Part 15 Subpart C §15.249

  Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz and 24.0–24.25 GHz

- IC RSS-210 Issue 9 August 2016, Annex B

  License-Exempt Radio Apparatus: Category I Equipment, Devices Operating in Frequency Bands for any Application, Bands 902-928 MHz, 2400-2483.5 MHz and 5725-5875 MHz

Test location

Company name:	Nemko USA, Inc.
Address:	2210 Faraday Ave, Suite 150
City:	Carlsbad
State:	California
Postal code:	92008
Country:	USA
Telephone:	+1 760 444 3500
Website:	www.nemko.com
FCC Site Number	Test Firm Registration Number: 392943 Designation Number: US5058
ISED Test Site	2040B-3

Tested by:	Nikolay Shtin, Sr. Wireless Engineer
Reviewed by:	Juan Manuel Gonzalez, EMC/Wireless Business Development Manager
Date:	March 22, 2018
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 the Nemko USA ISO/IEC 17025 accreditation.

Copyright notification

Table of Contents

Section 1 Report summary

1.1 Applicant and manufacturer

Company name	Stemco LP
Address	300 Industrial Blvd.
City	Longview
Province/State	Texas
Postal/Zip code	75602
Country	USA

1.2 Test specifications

FCC 47 CFR Part 15, Subpart C, Clause 15.249	Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz and 24.0–24.25 GHz
RSS-210, Issue 9 Annex B	Licence-Exempt Radio Apparatus: Category I Equipment, Devices Operating in Frequency Bands for any Application, Bands 902-928 MHz, 2400-2483.5 MHz and 5725-5875 MHz

1.3 Test methods

ANSI C63.10-2013	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 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
1TRF	Correct the operating frequency range in section 3.3 “Technical Information”
2TRF	Update Emissions designator, added Formulas in section 3.3, added Antenna details 18-26GHZ in equipment list., added test method in section 1.3. and requirements of FCC §15.31.
3TRF	Section 3.3: Update Operational Range to show center frequency of low and high channel. Table 8.2.3: Correct typo on High Channel from 2480MHZ to 2476MHZ.

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 applicable*
§15.31(e)	Variation of power source	Not applicable1
§15.215(c)	20 dB bandwidth	Pass

Notes: [1] *EUT is battery operated equipment, the tests was performed using a fully charged battery.*

**Not applicable. EUT is battery powered.*

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

Part	Test description	Verdict
§15.249(a)	Radiated emissions not in restricted bands	Pass
§15.249(b)	Fixed Point-to-Point operation in the 24.0–24.25 GHz band	Not applicable
§15.249(d)	Spurious emissions (except harmonics)	Pass

Notes: None

2.3 IC RSS-GEN, Issue 3, test results

Part	Test description	Verdict
§6.6	Occupied bandwidth	Pass
§8.8	AC power lines conducted emission limits	Not applicable*
§7.1.2	Receiver radiated emission limits	Not applicable**

**Not applicable. EUT is battery powered.*

***Not applicable. EUT has no Stand-Alone receiver port.*

2.4 RSS-210, Issue 9, test results

Part	Test description	Verdict
§B.10a	Radiated emissions (The field strength of fundamental and harmonic emissions)	Pass
§B.10b	Spurious emissions (except harmonics)	Pass

Notes: None

Section 3 Equipment under test (EUT) details

3.1 Sample information

Receipt date	December 18, 2017
Nemko sample ID number	EMCx1114

3.2 EUT information

Product name	TailBat
Model	ATD003160
Model variant	N/A
Serial number	N/A

3.3 Technical information

Operating band	2400–2483.5 MHz
Operating frequency	2406-2476 MHz
Modulation type	GFSK
Occupied bandwidth (20dB)	1.3686MHz
EIRP	99.38dBuV/m or 4.15dBm or 2.6mW (@2406MHz Channel) *see notes below for calculation details
Emission designator	F1D
Power requirements	+12VDC (Battery powered)
Antenna information	Peak antenna gain: 3 dBi The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator.
Notes	* **eirp = pt x gt = (E x d)²/30** where: • pt = transmitter output power in watts, • gt = numeric gain of the transmitting antenna (unitless), • E = electric field strength in V/m, • d = measurement distance in meters (m). And **V /m =10$^{(((dBuV/m) -120) / 20)}$**

3.4 Product description and theory of operation

The Equipment Under Test (EUT) was a Stemco LP TailBat (Model: ATD003160) Trailer Tail. The EUT is used to deploy a trailer tail on a heavy duty tractor trailer to increase aerodynamic efficiency. The EUT incorporates a low power radio operating in the 2400-2483.5 MHz ISM band.

3.5 EUT exercise details

EUT was set to fixed channel test mode transmitting modulated signal with maximum power.

3.6 EUT setup Figure

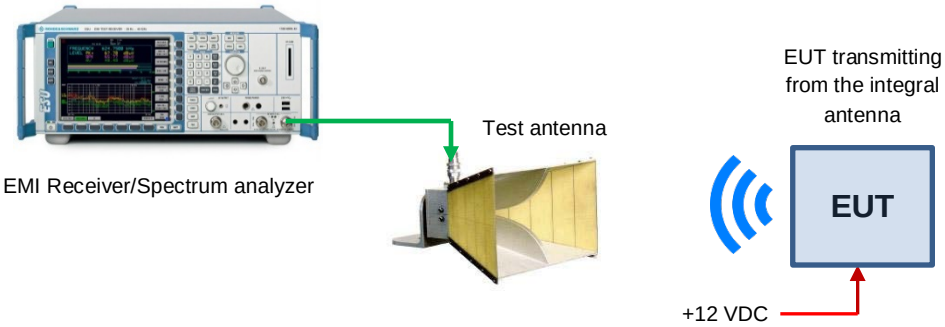


Figure 3.6-1: Setup Figure

3.7 EUT sub assemblies

Table 3.7-1: EUT sub assemblies

Description	Brand name	Model/Part number	Serial number
N/A	N/A	N/A	N/A

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
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

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMC Test Receiver	Rohde & Schwarz	ESU 40	E1121	1 yr.	7/28/2018
Antenna, Bilog	Schaffner-Chase	CBL6111C	1480	1 yr.	7/21/2018
Antenna, Horn	EMCO	3115	1033	1 yr.	7/27/2018
Antenna, Horn	EMCO	3116	E1013	2yr	02-18-2018
Spectrum Analyzer	Rohde & Schwarz	FSV40	E1120	1 yr.	7-27-2018
Signal Generator	Rohde & Schwarz	SMB 100A	E1128	1 yr.	9-13-2018
High-pass filter	Wainwright Instruments GMBH	WHKX12-2493-2770-18000-60SS	N/A	N/A	Verified with FSV40
Band reject filter	Wainwright Instruments GMBH	WRCGV10-2363.5-2400-2483.5-2520-60SS	N/A	N/A	Verified with FSV40

Note: None

Section 8 Testing data

8.1 Clause 15.215(c) Emission bandwidth RSS Gen 6.6 Occupied bandwidth

8.1.1 Definitions and limits

Part 15.215(c)

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80 % of the permitted band in order to minimize the possibility of out-of-band operation.

RSS-Gen Clause 6.6 Occupied bandwidth

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99 percent emission bandwidth, as calculated or measured.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

The span between the two recorded frequencies is the occupied bandwidth.

8.1.2 Test summary

Test date:	December 22, 2017	Temperature:	20 °C
Test engineer:	Nikolay Shtin	Air pressure:	1006 mbar
Verdict:	Pass	Relative humidity:	53 %

8.1.3 Observations/special notes

None

8.1.4 Test data

Figure 8.1-1: 20 dB Bandwidth, Low CH

Figure 8.1-2: 20 dB Bandwidth, Mid CH

Figure 8.1-3: 20 dB Bandwidth, High CH

Table 8.1-1: 20 dB bandwidth results

Frequency (MHz)	20dB bandwidth (MHz)
2406	1.3087
2441	1.2737
2476	1.3686

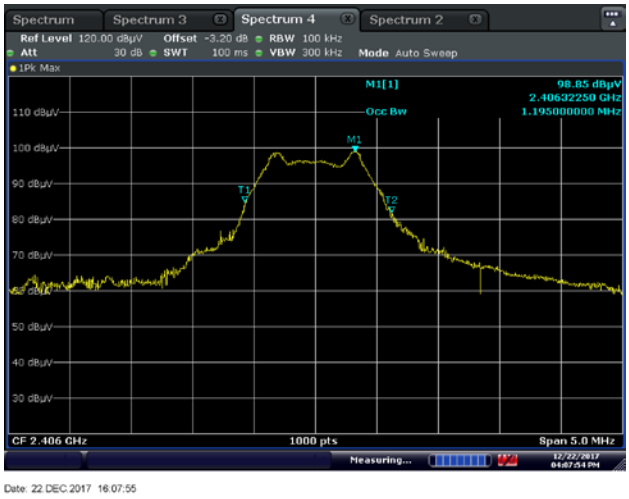


Figure 8.1-4: 99% OBW, Low CH

Figure 8.1-5: 99% OBW, Mid CH

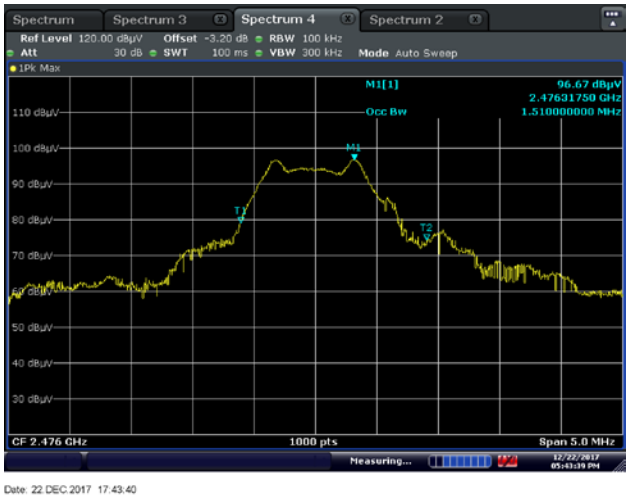


Figure 8.1-6: 99% OBW, High CH

Table 8.1-2: 99% bandwidth results

Frequency (MHz)	99 % bandwidth (MHz)
2406	1.195
2441	1.295
2476	1.510

8.2 Clause 15.249(a) RSS 210 B.10(a) Field strength of emissions not in restricted bands

8.2.1 Definitions and limits

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

Table 8.2-1: Field strength limits

Fundamental frequency	Field strength of fundamental		Field strength of spurious emissions	
(MHz)	**(mV/m)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**
902–928	50	94	500	54
2400–2483.5	50	94	500	54
5725–5875	50	94	500	54
24.0–24.25	250	108	2500	68

(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter (128 dBµV/m) at 3 meters along the antenna azimuth.

8.2.2 Test summary

Test date:	December 22, 2017	Temperature:	20 °C
Test engineer:	Nikolay Shtin	Air pressure:	1006 mbar
Verdict:	Pass	Relative humidity:	53 %

8.2.3 Observations/special notes

Table 8.2-2: §15.209 RSS Gen 8.9 – Radiated emission limits

Frequency (MHz)	Field strength		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

- The spectrum was searched from 30 MHz to the 10th harmonic.
- The EUT was measured on three orthogonal axes.
- All measurements were performed at a distance of 3 m.
- All measurements were performed:
- within 30–1000 MHz range: using a quasi-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 using a duty cycle/average factor for average results calculations.

8.2.4 Test data, continued

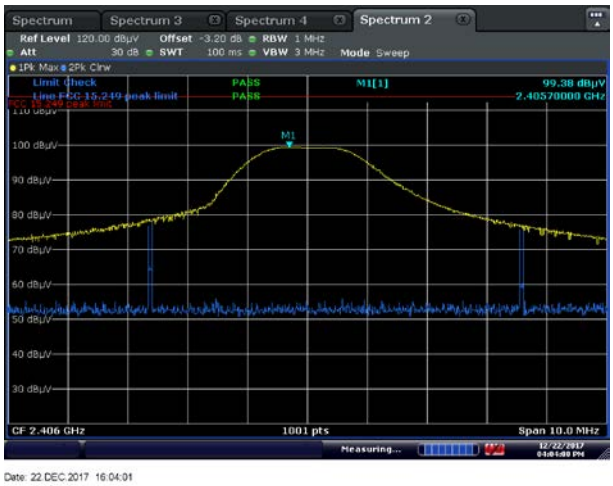


Figure 8.2-1: Fundamental emissions, Low CH

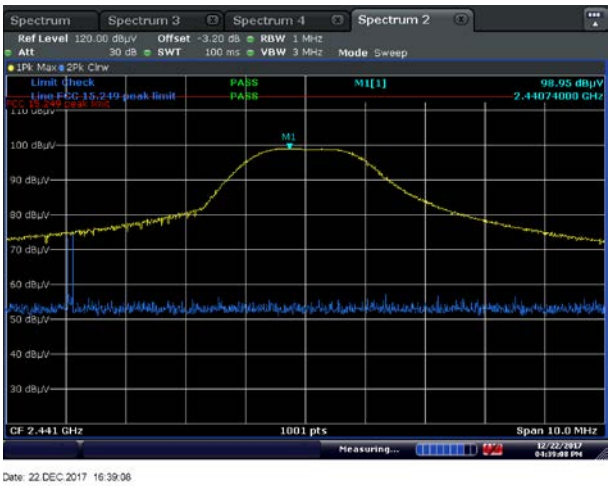


Figure 8.2-2: Fundamental emissions, Mid CH

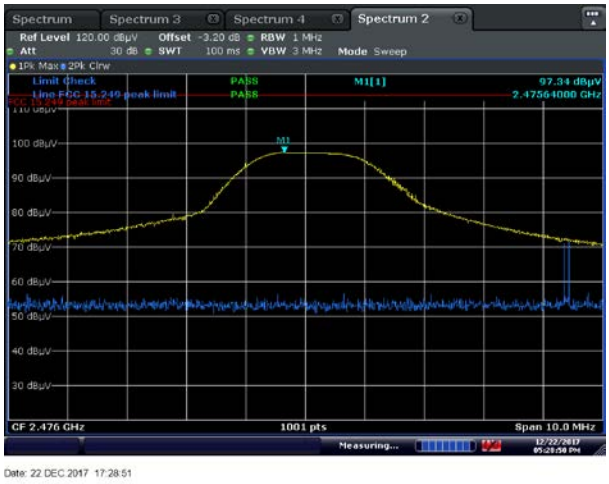


Figure 8.2-3: Fundamental emissions, High CH

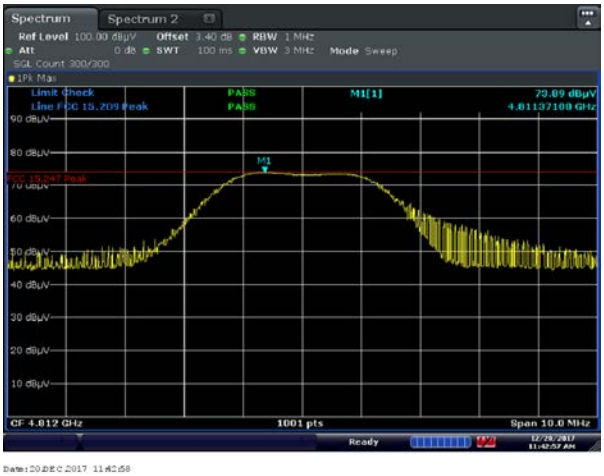


Figure 8.2-4: 2nd harmonic emissions, Low CH

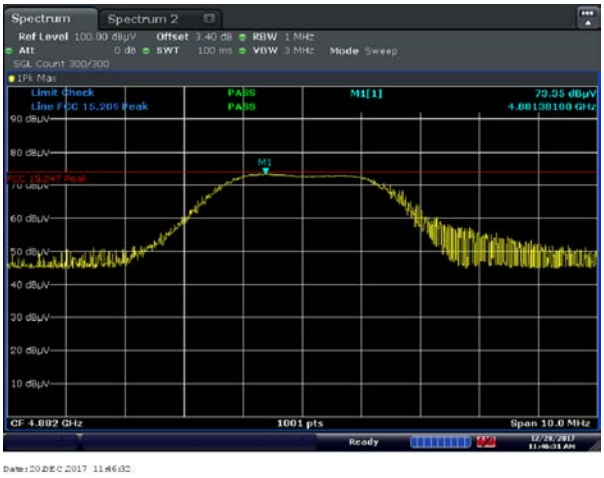


Figure 8.2-5: 2nd harmonic emissions, Mid CH

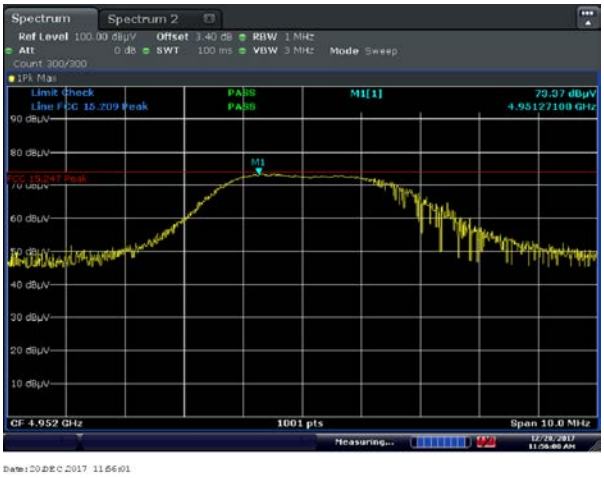


Figure 8.2-6: 2nd harmonic emissions, High CH

The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators) for determination of compliance. Limits have been adjusted to reflect 3 m requirements.

A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Table 8.2-3: Field strength measurement results

Frequency, (MHz)	Polarization, V/H	Peak Field strength, (dBµV/m)	Peak limit, (dBµV/m)	Margin, (dB)	Duty cycle factor	Avg. Field strength (dBµV/m)	Avg. limit (dBµV/m)	Margin (dB)
Fundamental								
2.406	H	99.38	114.0	14.62	42.23	57.15	94.0	36.85
2.441	H	98.95	114.0	15.05	42.23	56.72	94.0	37.28
2.476	H	97.34	114.0	16.66	42.23	55.11	94.0	38.89
Harmonics								
4812	H	73.89	73.9	0.01	42.23	31.66	53.9	22.24
4882	H	73.35	73.9	0.55	42.23	31.12	53.9	22.78
4952	H	73.37	73.9	0.53	42.23	31.14	53.9	22.76
No emissions other than the second harmonic were observed.								

Note: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.

Duty Cycle Correction Factor Calculation

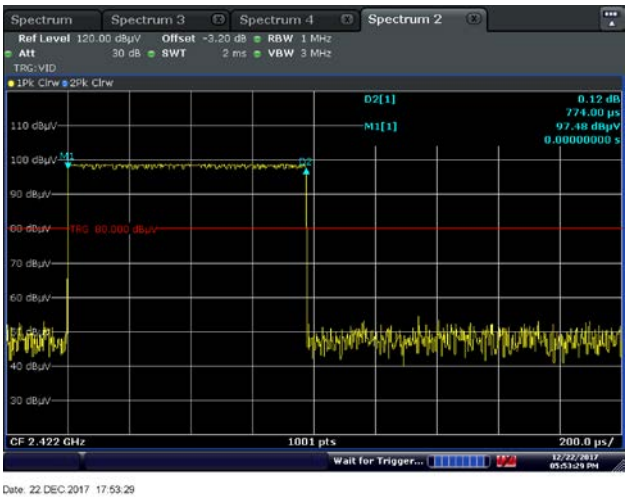


Figure 8.2-7: 2ms sweep (representative channel)

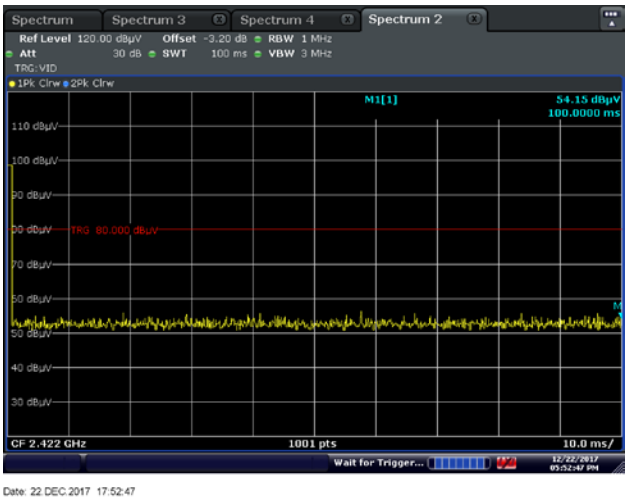


Figure 8.2-8: 100ms sweep (representative channel)

Duty Cycle Calculation: = 0.774 ms "On" time per 100 ms sweep
= 0.774 ms x 1 / 100

Duty Cycle Correction Factor = 20 log (0.00774)
= **-42.23 dB**

8.3 Clause 15.249(d) RSS 210 B.10(b) Spurious emissions (except for harmonics)

8.3.1 Definitions and limits

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Table 8.3-1: Field strength 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:
- F = fundamental frequency in kHz
- In the emission table above, the tighter limit applies at the band edges.
- For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

8.3.2 Test summary

Test date:	December 25, 2017	Temperature:	21 °C
Test engineer:	Nikolay Shtin	Air pressure:	1005 mbar
Verdict:	Pass	Relative humidity:	55 %

8.3.3 Observations/special notes

- The spectrum was searched from 30 MHz to the 10th harmonic.
- The EUT was measured on three orthogonal axes.
- Below 1 GHz all measurements were performed at a distance of 10 m.
- Above 1 GHz all measurements were performed at a distance of 3 m.
- All measurements were performed:
- within 30–1000 MHz range: using a quasi-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 using average detector with 1 MHz/3 MHz RBW/VBW for average results.

8.3.4 Test data

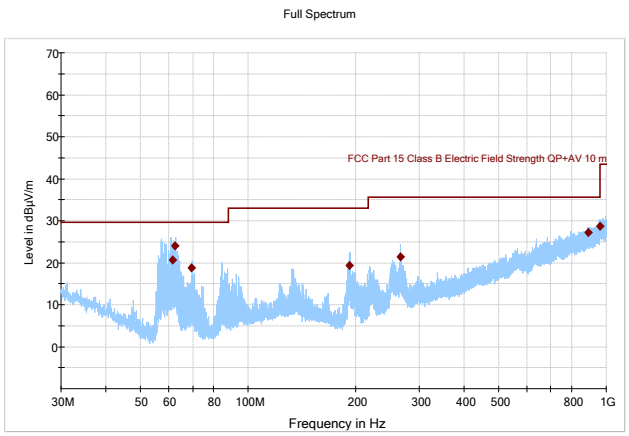


Figure 8.3-1: Radiated spurious emissions, low channel, 30-1000MHz

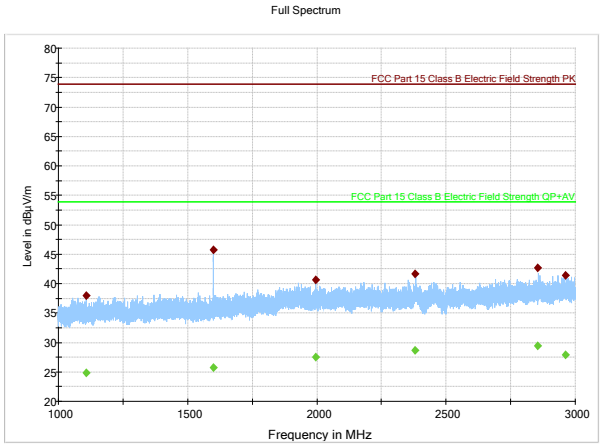


Figure 8.3-2: Radiated spurious emissions, low channel, 1-3GHz

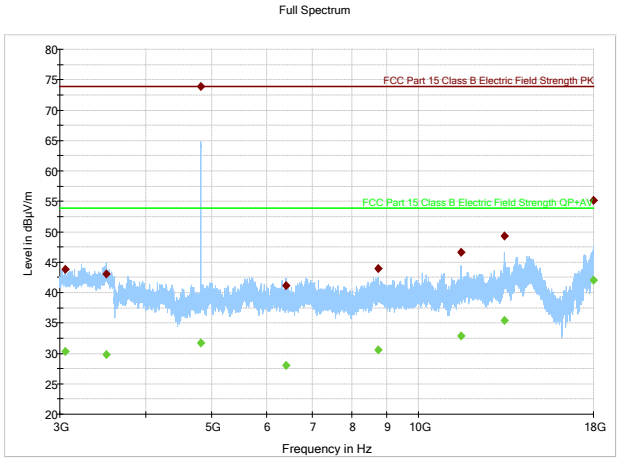


Figure 8.3-3: Radiated spurious emissions, low channel, 3-18GHz

Table 8.3-2: Radiated field strength measurement results for low channel 2406 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
61.430667	20.60	29.55	8.95	5000.0	120.000	293.6	V	214.0
62.346000	23.93	29.55	5.62	5000.0	120.000	210.0	V	324.0
69.362333	18.71	29.55	10.84	5000.0	120.000	235.5	V	245.0
191.719333	19.38	33.05	13.67	5000.0	120.000	120.0	V	72.0
265.835000	21.39	35.55	14.16	5000.0	120.000	123.7	V	146.0
888.508667	27.21	35.55	8.34	5000.0	120.000	404.8	V	341.0
958.114667	28.74	35.55	6.81	5000.0	120.000	374.5	V	292.0

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1107.233333	---	24.87	53.90	29.03	5000.0	1000.000	410.0	H	25.0
1107.233333	37.96	---	73.90	35.94	5000.0	1000.000	410.0	H	25.0
1600.500000	45.77	---	73.90	28.13	5000.0	1000.000	348.0	H	64.0
1600.500000	---	25.78	53.90	28.12	5000.0	1000.000	348.0	H	64.0
1995.366667	---	27.46	53.90	26.44	5000.0	1000.000	404.7	V	25.0
1995.366667	40.62	---	73.90	33.28	5000.0	1000.000	404.7	V	25.0
2381.166667	---	28.66	53.90	25.24	5000.0	1000.000	366.9	H	154.0
2381.166667	41.60	---	73.90	32.30	5000.0	1000.000	366.9	H	154.0
2854.300000	---	29.38	53.90	24.52	5000.0	1000.000	318.7	H	338.0
2854.300000	42.62	---	73.90	31.28	5000.0	1000.000	318.7	H	338.0
2961.300000	41.41	---	73.90	32.49	5000.0	1000.000	175.2	H	42.0
2961.300000	---	27.90	53.90	26.00	5000.0	1000.000	175.2	H	42.0

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
3056.900000	---	30.35	53.90	23.55	5000.0	1000.000	108.8	H	56.0
3056.900000	43.85	---	73.90	30.05	5000.0	1000.000	108.8	H	56.0
3504.000000	---	29.76	53.90	24.14	5000.0	1000.000	114.3	H	0.0
3504.000000	43.02	---	73.90	30.88	5000.0	1000.000	114.3	H	0.0
4812.900000	73.89	---	73.90	0.01	5000.0	1000.000	124.7	H	0.0
4812.900000	---	31.66	53.90	22.24	5000.0	1000.000	124.7	H	0.0
6412.500000	41.11	---	73.90	32.79	5000.0	1000.000	136.7	H	232.0
6412.500000	---	27.97	53.90	25.93	5000.0	1000.000	136.7	H	232.0
8726.300000	---	30.55	53.90	23.35	5000.0	1000.000	178.4	H	86.0
8726.300000	43.97	---	73.90	29.93	5000.0	1000.000	178.4	H	86.0
11546.100000	46.58	---	73.90	27.32	5000.0	1000.000	239.7	H	146.0
11546.100000	---	32.86	53.90	21.04	5000.0	1000.000	239.7	H	146.0
13359.800000	---	35.43	53.90	18.47	5000.0	1000.000	111.1	H	274.0
13359.800000	49.31	---	73.90	24.59	5000.0	1000.000	111.1	H	274.0
17997.500000	55.16	---	73.90	18.74	5000.0	1000.000	306.7	H	92.0
17997.500000	---	42.06	53.90	11.84	5000.0	1000.000	306.7	H	92.0

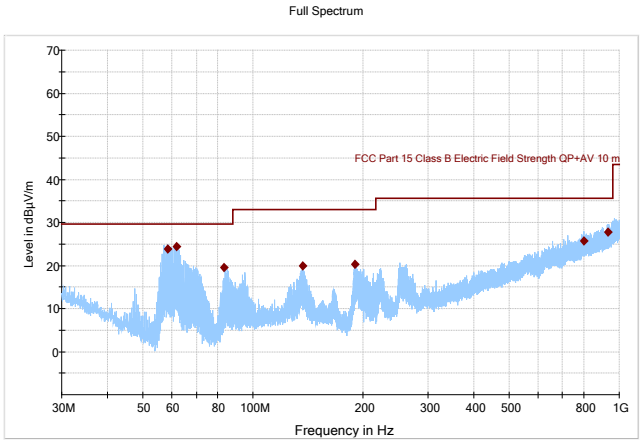


Figure 8.3-4: Radiated spurious emissions, Mid channel, 30-1000MHz

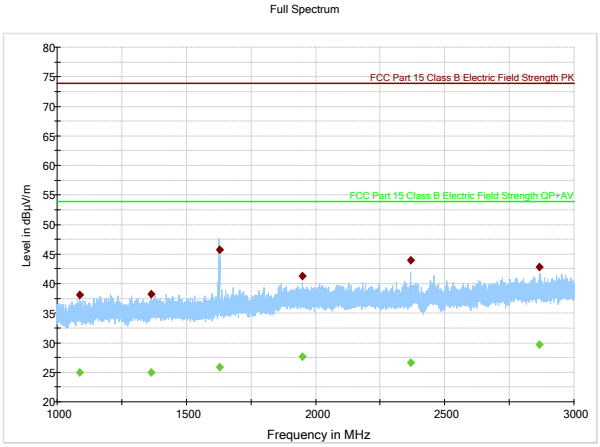


Figure 8.3-5: Radiated spurious emissions, Mid channel, 1-3GHz

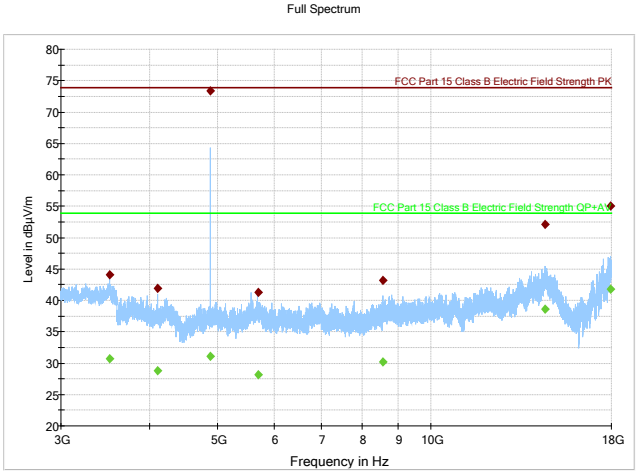


Figure 8.3-6: Radiated spurious emissions, Mid channel, 3-18GHz

Table 8.3-3: Radiated field strength measurement results for Mid channel 2441 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
58.316333	23.85	29.55	5.70	5000.0	120.000	257.0	V	244.0
61.783667	24.33	29.55	5.22	5000.0	120.000	291.5	V	205.0
83.347333	19.58	29.55	9.97	5000.0	120.000	146.2	V	0.0
136.344333	19.91	33.05	13.14	5000.0	120.000	119.6	V	41.0
190.005000	20.24	33.05	12.81	5000.0	120.000	117.4	V	236.0
800.259000	25.61	35.55	9.94	5000.0	120.000	100.0	V	64.0
931.541000	27.79	35.55	7.76	5000.0	120.000	176.5	V	304.0

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1088.366667	---	25.02	53.90	28.88	5000.0	1000.000	387.9	H	335.0
1088.366667	38.03	---	73.90	35.87	5000.0	1000.000	387.9	H	335.0
1364.900000	38.20	---	73.90	35.70	5000.0	1000.000	158.2	V	0.0
1364.900000	---	24.92	53.90	28.98	5000.0	1000.000	158.2	V	0.0
1628.966667	---	25.85	53.90	28.05	5000.0	1000.000	120.3	H	326.0
1628.966667	45.77	---	73.90	28.13	5000.0	1000.000	120.3	H	326.0
1949.766667	41.30	---	73.90	32.60	5000.0	1000.000	351.7	V	276.0
1949.766667	---	27.64	53.90	26.26	5000.0	1000.000	351.7	V	276.0
2368.500000	43.97	---	73.90	29.93	5000.0	1000.000	132.4	H	162.0
2368.500000	---	26.69	53.90	27.21	5000.0	1000.000	132.4	H	162.0
2866.100000	42.85	---	73.90	31.05	5000.0	1000.000	410.0	H	41.0
2866.100000	---	29.62	53.90	24.28	5000.0	1000.000	410.0	H	41.0

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
3513.000000	44.04	---	73.90	29.86	5000.0	1000.000	389.0	H	236.0
3513.000000	---	30.66	53.90	23.24	5000.0	1000.000	389.0	H	236.0
4112.000000	41.95	---	73.90	31.95	5000.0	1000.000	347.5	V	0.0
4112.000000	---	28.79	53.90	25.11	5000.0	1000.000	347.5	V	0.0
4882.500000	73.35	---	73.90	0.55	5000.0	1000.000	100.0	H	220.0
4882.500000	---	31.12	53.90	22.78	5000.0	1000.000	100.0	H	220.0
5696.000000	41.27	---	73.90	32.63	5000.0	1000.000	98.0	H	275.0
5696.000000	---	28.20	53.90	25.70	5000.0	1000.000	98.0	H	275.0
8565.300000	---	30.14	53.90	23.76	5000.0	1000.000	236.0	H	305.0
8565.300000	43.16	---	73.90	30.74	5000.0	1000.000	236.0	H	305.0
14493.400000	52.12	---	73.90	21.78	5000.0	1000.000	231.3	H	162.0
14493.400000	---	38.57	53.90	15.33	5000.0	1000.000	231.3	H	162.0
17930.200000	55.07	---	73.90	18.83	5000.0	1000.000	360.4	V	357.0
17930.200000	---	41.79	53.90	12.11	5000.0	1000.000	360.4	V	357.0

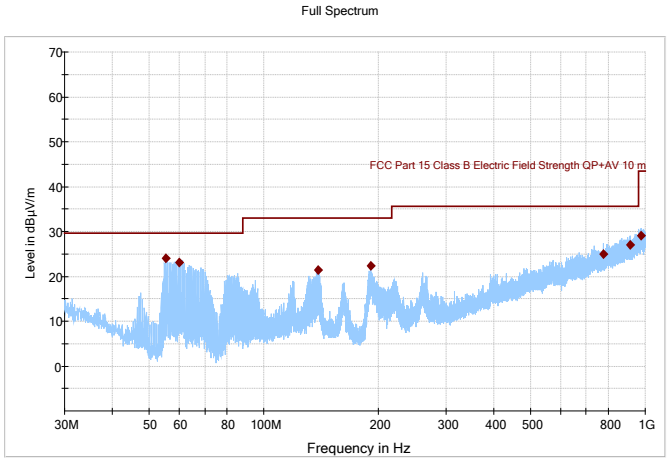


Figure 8.3-7: Radiated spurious emissions, High channel, 30-1000MHz

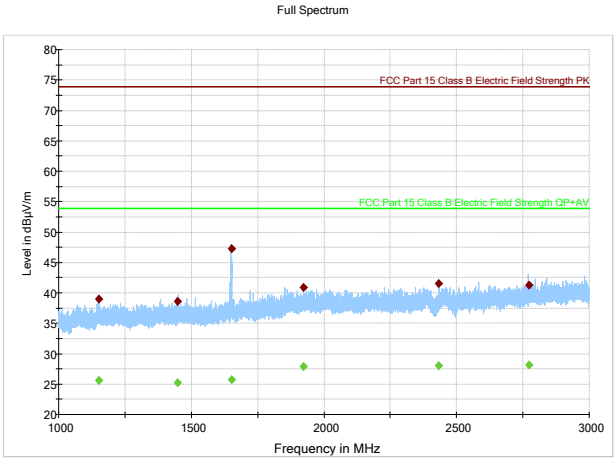


Figure 8.3-8: Radiated spurious emissions, High channel, 1-3GHz

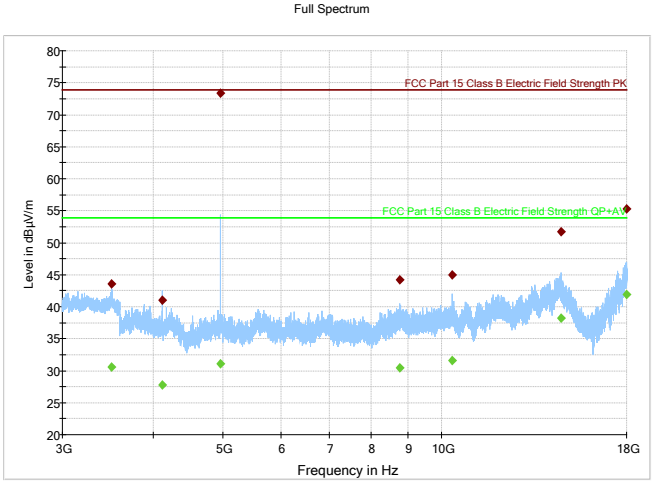


Figure 8.3-9: Radiated spurious emissions, High channel, 3-18GHz

Table 8.3-4: Radiated field strength measurement results for High channel 2476 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
55.381667	23.98	29.55	5.57	5000.0	120.000	114.0	V	126.0
60.032667	23.10	29.55	6.45	5000.0	120.000	184.4	V	224.0
139.006000	21.37	33.05	11.68	5000.0	120.000	100.0	V	94.0
190.518000	22.41	33.05	10.64	5000.0	120.000	122.9	V	63.0
775.443333	24.94	35.55	10.61	5000.0	120.000	359.4	H	118.0
914.006000	27.04	35.55	8.51	5000.0	120.000	109.6	V	85.0
976.341333	29.01	43.45	14.44	5000.0	120.000	394.7	V	0.0

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1151.100000	39.02	---	73.90	34.88	5000.0	1000.000	372.6	V	33.0
1151.100000	---	25.58	53.90	28.32	5000.0	1000.000	372.6	V	33.0
1449.100000	38.64	---	73.90	35.26	5000.0	1000.000	165.1	H	116.0
1449.100000	---	25.26	53.90	28.64	5000.0	1000.000	165.1	H	116.0
1651.100000	47.27	---	73.90	26.63	5000.0	1000.000	193.9	H	334.0
1651.100000	---	25.77	53.90	28.13	5000.0	1000.000	193.9	H	334.0
1924.300000	---	27.93	53.90	25.97	5000.0	1000.000	396.7	H	0.0
1924.300000	40.91	---	73.90	32.99	5000.0	1000.000	396.7	H	0.0
2431.633333	---	27.97	53.90	25.93	5000.0	1000.000	351.7	H	299.0
2431.633333	41.57	---	73.90	32.33	5000.0	1000.000	351.7	H	299.0
2772.366667	41.28	---	73.90	32.62	5000.0	1000.000	112.1	V	116.0
2772.366667	---	28.11	53.90	25.79	5000.0	1000.000	112.1	V	116.0

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
3503.000000	43.60	---	73.90	30.30	5000.0	1000.000	339.0	H	58.0
3503.000000	---	30.58	53.90	23.32	5000.0	1000.000	339.0	H	58.0
4121.000000	---	27.73	53.90	26.17	5000.0	1000.000	404.7	V	64.0
4121.000000	41.05	---	73.90	32.85	5000.0	1000.000	404.7	V	64.0
4951.200000	---	31.14	53.90	22.76	5000.0	1000.000	258.3	H	63.0
4951.200000	73.37	---	73.90	0.53	5000.0	1000.000	258.3	H	63.0
8757.700000	---	30.50	53.90	23.40	5000.0	1000.000	341.7	H	18.0
8757.700000	44.24	---	73.90	29.66	5000.0	1000.000	341.7	H	18.0
10342.700000	45.00	---	73.90	28.90	5000.0	1000.000	183.0	V	0.0
10342.700000	---	31.54	53.90	22.36	5000.0	1000.000	183.0	V	0.0
14604.100000	51.78	---	73.90	22.12	5000.0	1000.000	303.7	H	169.0
14604.100000	---	38.28	53.90	15.62	5000.0	1000.000	303.7	H	169.0
17999.300000	55.34	---	73.90	18.56	5000.0	1000.000	212.1	H	302.0
17999.300000	---	41.94	53.90	11.96	5000.0	1000.000	212.1	H	302.0

Test data, contuned

Table 8.3-5: Field strength measurement results for band edges

Frequency, (MHz)	Polarization, V/H	Peak Field strength, (dBµV/m)	Peak limit, (dBµV/m)	Margin, (dB)	Duty cycle factor	Avg. Field strength (dBµV/m)	Avg. limit (dBµV/m)	Margin (dB)
Low channel								
2400	H	72.03	73.9	1.87	42.23	29.80	53.9	24.20
High channel								
2483.5	H	66.31	73.9	7.59	42.23	24.08	53.9	29.82

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Average results were calculated using Peak measurments and Duty cycle correction factor.

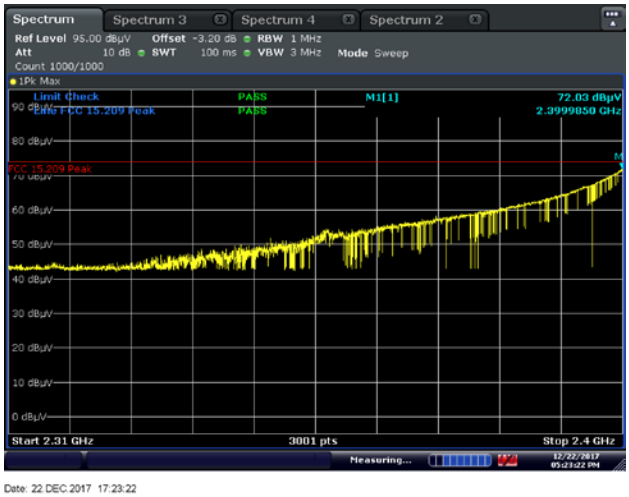


Figure 8.3-10: Lower band-edge and immediate restricted band (low channel 2406MHZ)

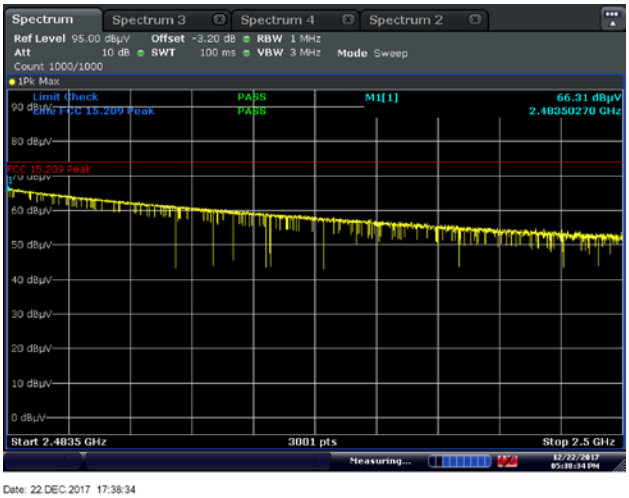
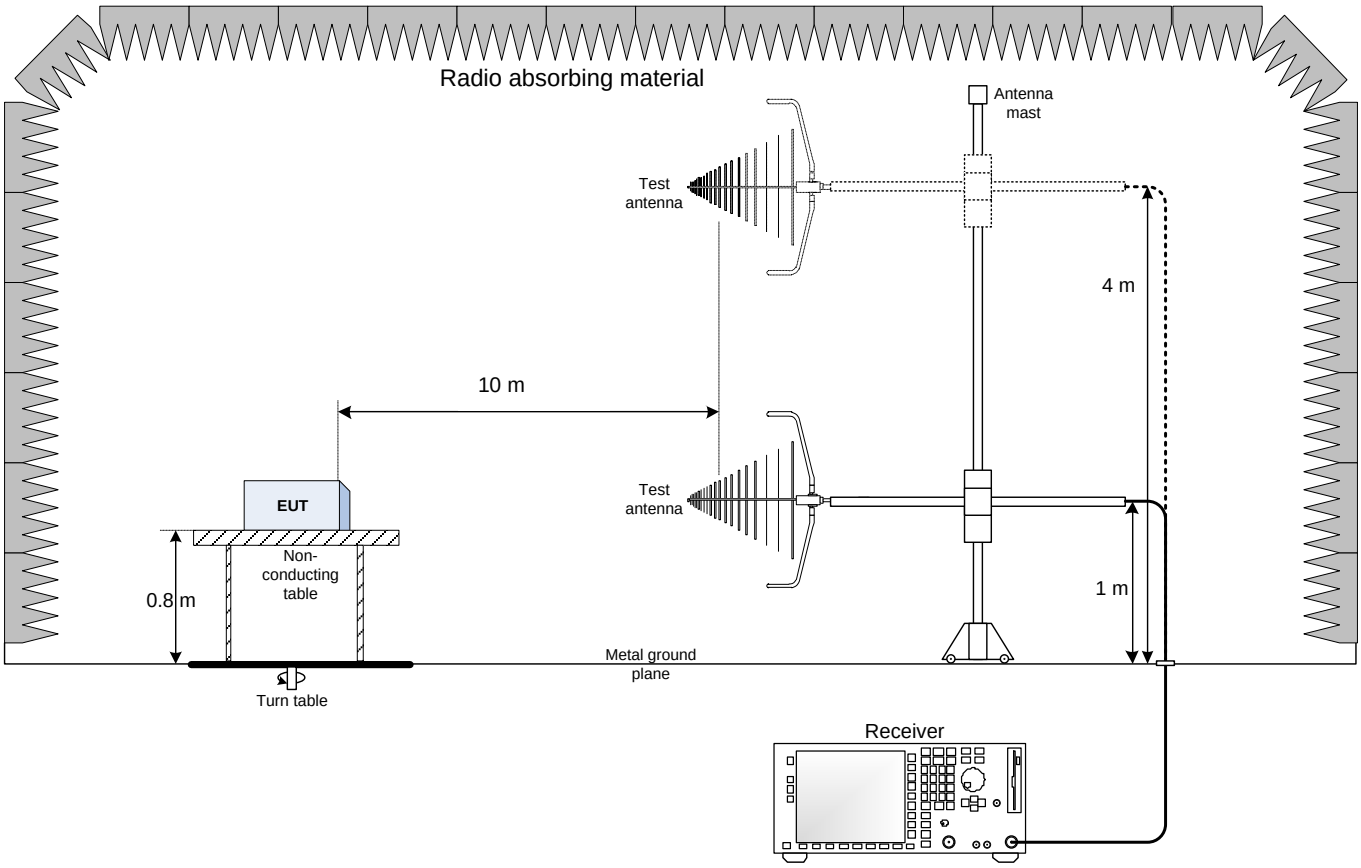


Figure 8.3-11: Upper band-edge and immediate restricted band (high channel 2476MHZ)

Section 9 Block Figures of test set-ups

9.1 Radiated emissions set-up – Below 1GHz



9.2 Radiated emissions set-up – Above 1GHz