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Wireless Test Report – 358251-1TRFWL

Applicant:

Teko Telecom Srl a Socio Unico

Product:

Very Very High-Power Amplifier

Model:

MWHPA0003UMTS-D

FCC ID:

XM2-WHPAAWF

Specification:

FCC 47 CFR Part 27

Miscellaneous wireless communications services

Date of issue: November 6, 2018

Test engineer(s):	Andrey Adelberg, Senior EMC/Wireless Specialist	Signature:	
Reviewed by:	David Duchesne, Senior EMC/Wireless Specialist	Signature:	

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Lab and test locations

Company name	Nemko Canada Inc.	
Test location	Ottawa site: 303 River Road, Ottawa, ON, Canada, K1V 1H2 Tel: +1 613 737 9680 Fax: +1 613 737 9691	
Test site registration	**Organization**	**Recognition numbers and location**
	FCC	CA2040 (Ottawa)
	ISED	CA2040A-4 (Ottawa
Website	www.nemko.com	

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 contained 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	Teko Telecom Srl a Socio Unico
Address	Via Meucci, 24/a I-40024 Castel S. Pietro Terme (BO), Italy

1.2 Test specifications

FCC 47 CFR Part 27	Miscellaneous Wireless Communications Services

1.3 Test methods

KDB 935210 D05 Indus Booster Basic Meas v01r02	Measurements guidance for industrial and non-consumer signal booster, repeater, and amplifier 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

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	November 6, 2018	Original report issued

Section 2. Summary of test results

2.1 Part 27 test results

Table 2.1-1: *Result summary*

Part	Test description	Verdict
KDB 935210 Clause 3.2	AGC threshold	Pass
§27.50(d)(2) and KDB 935210 Clause 3.5	Mean output power at RF antenna connector and booster gain	Pass
KDB 935210 Clause 3.3	Out-of-band rejection	Pass
§27.53(h) and KDB 935210 Clause 3.6	Spurious emissions at RF antenna connector	Pass
§27.53(h) and KDB 935210 Clause 3.8	Radiated spurious emissions	Pass
§27.54 and KDB 935210 Clause 3.7	Frequency stability	Not applicable [1]
§2.1049 and KDB 935210 Clause 3.4	Occupied bandwidth	Pass

Notes: [1] The EUT is not a Translator and does not alter the input signal in any way.

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	September 10, 2018
Nemko sample ID number	1

3.2 EUT information

Product name	Very Very High-Power Amplifier
Model	MWHPA0003UMTS-D
Serial number	None

3.3 Technical information

Operating bands	2110–2180 MHz and 2180–2200 MHz
Modulation type	LTE: AWGN
Emission bandwidth	5 MHz
Power requirements	10 A, 28-30 V_{DC}
Emission designator	5M00D7W
Gain	48 dB
Antenna information	External Antenna is not provided EUT used a 50 Ω termination.

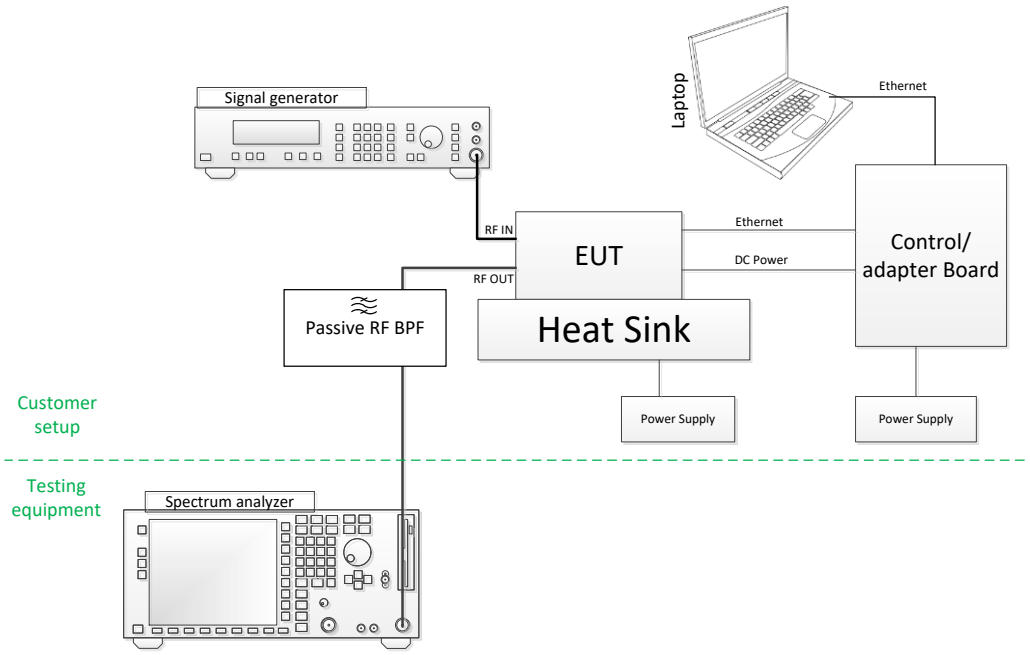
3.4 Product description and theory of operation

EUT is a high-power amplifier.

3.5 EUT exercise details

The EUT was controlled via a Laptop interface with GUI to configure the system. Input of the EUT was connected to signal generator which replicated the AWGN test signal that has a 4.1 MHz 99 % occupied bandwidth (OBW) (representative of a 5 MHz LTE channel) with a pseudo-random symbol pattern.

3.6 EUT setup diagram



aFigure 3.6-1: *Setup diagram*

Name	Info
Heat sink	Teko Telecom, domestic production
Supervision for amplifier	Teko Telecom M/N: MSPVRUV0001, S/N: 2015729111
External power supply for amplifier	TDK LAMBDA Z36-24-L-E, S/N: LOC-606A416-0001
External passive band pass filter	M/N: Teko 05 015 4270 S/N:18050850 (for 600 and 700 band)
External passive band pass filter	M/N: Teko 05 015 4315 (for AWF band), S/N:18010511415
Laptop	Dell E5440, S/N:9XV5N12
Signal Generator	Agilent M/N N5182A MXG, S/N: MY48180714

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

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.
Spectrum analyzer	Rohde & Schwarz	FSU	FA001877	1 year	Oct 26/18
Power meter	Agilent	E4418B	FA001678	1 year	June 5/19
Power sensor	HP	8482A	FA001944	1 year	May 30/19
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Mar. 26/19
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	Oct. 1/18
Horn antenna (1–18 GHz)	EMCO	3115	FA000649	1 year	Sept. 27/18
Preamp (1–18 GHz)	ETS-Lindgren	124334	FA002877	1 year	Nov. 14/18
50 Ω coax cable	Huber + Suhner	None	FA002830	1 year	May 8/19
50 Ω coax cable	C.C.A.	None	FA002555	1 year	May 1/19
Horn antenna (18–40 GHz)	EMCO	3116	FA001847	1 year	Oct. 1/18
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	—	VOU

Notes: VOU Verify on use.

Section 8. Testing data

8.1 KDB 935210 Clause 3.2 AGC threshold

8.1.1 Definitions and limits

Test EUT to find an AGC threshold.

8.1.2 Test summary

Test date	September 14, 2018
Test engineer	Andrey Adelberg

8.1.3 Observations, settings and special notes

The output power was measured by using a calibrated RMS power meter.
Test was repeated with input single carrier set to the 1 dB compression point.

8.1.4 Test data

Table 8.1-1: *AGC threshold results*

Frequency, MHz	AGC threshold level	RF power at the input, dBm	RF power at the output, dBm	Gain, dB
2112.5	Nominal	-2.58	45.35	47.93
2112.5	Nominal + 1 dB	-1.56	45.65	47.21
2145	Nominal	-2.58	45.62	48.20
2145	Nominal + 1 dB	-1.56	45.74	47.30
2177.5	Nominal	-2.58	45.54	48.12
2177.5	Nominal + 1 dB	-1.56	45.69	47.25
2182.5	Nominal	-2.66	45.52	48.18
2182.5	Nominal + 1 dB	-1.64	45.66	47.30
2190.0	Nominal	-3.15	44.92	48.07
2190.0	Nominal + 1 dB	-2.15	45.59	47.74
2197.5	Nominal	-3.15	44.85	48.00
2197.5	Nominal + 1 dB	-2.15	45.38	47.53

8.2 FCC 27.50(d) and KDB 935210 Clause 3.5 Mean output power at RF antenna connector and booster gain

8.2.1 Definitions and limits

FCC 27.50(d)

(2) The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:

(i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;

(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

(5) Equipment employed must be authorized in accordance with the provisions of §24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

8.2.2 Test summary

Test date	September 14, 2018
Test engineer	Andrey Adelberg

8.2.3 Observations, settings and special notes

The output power was measured by using a calibrated RMS power meter.
Test was repeated with input single carrier set to the 0.5 dB below AGC threshold level and 3 dB above AGC threshold level.

8.2.4 Test data

Table 8.2-1: *Gain measurement results*

Frequency, MHz	AGC threshold level	RF power at the input, dBm	RF power at the output, dBm	Gain, dB
2112.5	Nominal – 0.5 dB	-3.08	44.82	47.90
2112.5	Nominal + 3 dB	0.44	45.64	45.20
2145.0	Nominal – 0.5 dB	-3.08	45.18	48.26
2145.0	Nominal + 3 dB	0.44	45.75	45.31
21775.5	Nominal – 0.5 dB	-3.08	45.01	48.09
2177.5	Nominal + 3 dB	0.44	45.68	45.24
2182.5	Nominal – 0.5 dB	-3.17	45.02	48.19
2182.5	Nominal + 3 dB	0.36	45.66	45.30
2190.0	Nominal – 0.5 dB	-3.65	44.42	48.07
2190.0	Nominal + 3 dB	-0.13	45.57	45.70
2197.5	Nominal – 0.5 dB	-3.65	44.34	47.99
2197.5	Nominal + 3 dB	-0.13	45.39	45.52

8.2.4 Test data, continued

Table 8.2-2: *EIRP results*

Frequency, MHz	AGC threshold level	RF output power, dBm	EIRP limit, dBm/MHz	Margin, dB
2112.5	Nominal – 0.5 dB	44.82	62.15	17.33
2112.5	Nominal + 3 dB	45.64	62.15	16.51
2145.0	Nominal – 0.5 dB	45.18	62.15	16.97
2145.0	Nominal + 3 dB	45.75	62.15	16.40
2177.5	Nominal – 0.5 dB	45.01	62.15	17.14
2177.5	Nominal + 3 dB	45.68	62.15	16.47
2182.2	Nominal – 0.5 dB	45.02	62.15	17.13
2182.5	Nominal + 3 dB	45.66	62.15	16.49
2190.0	Nominal – 0.5 dB	44.42	62.15	17.73
2190.0	Nominal + 3 dB	45.57	62.15	16.58
2197.5	Nominal – 0.5 dB	44.34	62.15	17.81
2197.5	Nominal + 3 dB	45.39	62.15	16.76

Table 8.2-3: *Peak to Average ratio results*

Frequency, MHz	AGC threshold level	Peak to Average Ratio, dB	Peak to Average Ratio Limit, dBm	Margin, dB
2112.5	Nominal – 0.5 dB	7.85	13.00	5.15
2112.5	Nominal + 3 dB	7.85	13.00	5.15
2145	Nominal – 0.5 dB	7.85	13.00	5.15
2145	Nominal + 3 dB	7.76	13.00	5.24
2177.5	Nominal – 0.5 dB	7.79	13.00	5.21
2177.5	Nominal + 3 dB	7.82	13.00	5.18
2182.2	Nominal – 0.5 dB	7.85	13.00	5.15
2182.5	Nominal + 3 dB	7.85	13.00	5.15
2190	Nominal – 0.5 dB	7.79	13.00	5.21
2190	Nominal + 3 dB	7.76	13.00	5.24
2197.5	Nominal – 0.5 dB	7.79	13.00	5.21
2197.5	Nominal + 3 dB	7.76	13.00	5.24

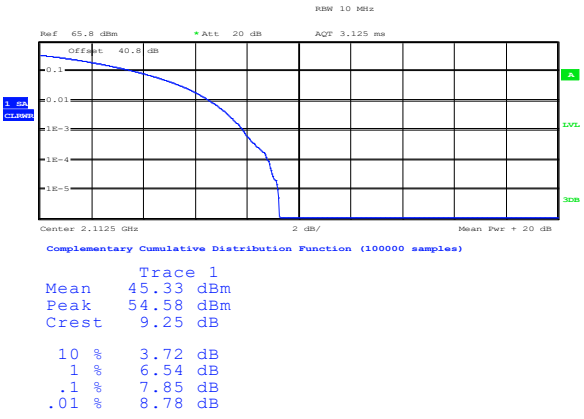


Figure 8.2-1: *Peak to average ratio at AGC threshold sample plot*

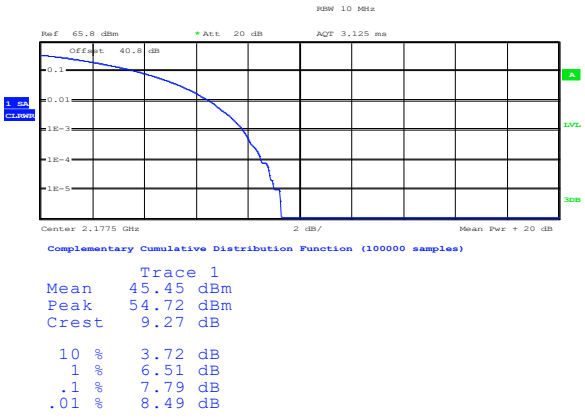


Figure 8.2-2: *Peak to average ratio above AGC threshold sample plot*

8.3 KDB 935210 Clause 3.3 Out-of-band rejection

8.3.1 Definitions and limits

Test EUT for out-of-band rejection of input signals to show the filter frequency response.

8.3.2 Test summary

Test date	September 14, 2018
Test engineer	Andrey Adelberg

8.3.3 Observations, settings and special notes

- The signal generator at the EUT input swept from 1995 MHz to 2315 MHz with CW signal.
- The testing was performed with spectrum analyser with the following settings:

Spectrum analyzer setting:

Frequency range	250% of passband
Detector mode	Peak
Resolution bandwidth	50 kHz and 1000 kHz
Video bandwidth	>RBW
Trace mode	Max Hold
Measurement time	Auto

8.3.4 Test data

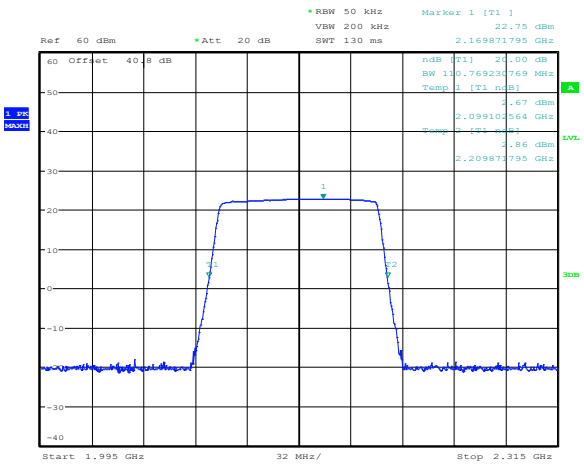


Figure 8.3-1: *Out-of-band rejection at 1 % of EBW*

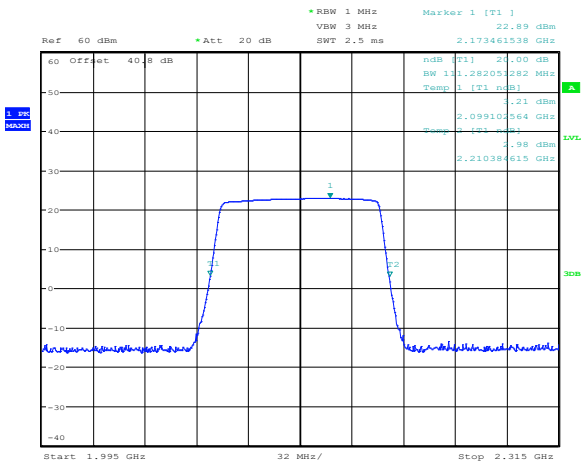


Figure 8.3-2: *Out-of-band rejection at 1 % of pass band*

Summary: 20 dB bandwidth of the filter is 111.3 MHz.

8.4 FCC 27.53(h) and KDB 935210 Clause 3.6 Spurious emissions at RF antenna connector

8.4.1 Definitions and limits

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

8.4.2 Test summary

Test date	September 14, 2018
Test engineer	Andrey Adelberg

8.4.3 Observations, settings and special notes

For intermodulation testing signal generator provided two identical adjacent channels at the EUT input.

Frequency range	30 MHz to 10th harmonic
Detector mode	RMS
Resolution bandwidth sweep	100 kHz (below 1 GHz), 1000 kHz (above 1 GHz)
Resolution bandwidth band edge	> 1 -5% of OBW
Video bandwidth	>RBW
Trace mode	Max Hold
Measurement time	Averaging

8.4.4 Test data

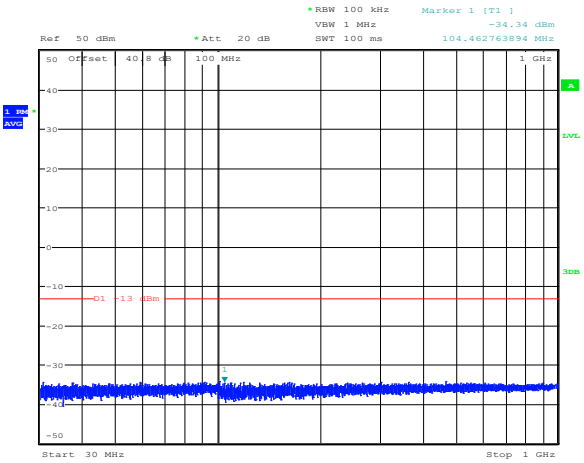


Figure 8.4-1: *Conducted spurious emissions below 1 GHz for low channel (AWE)*

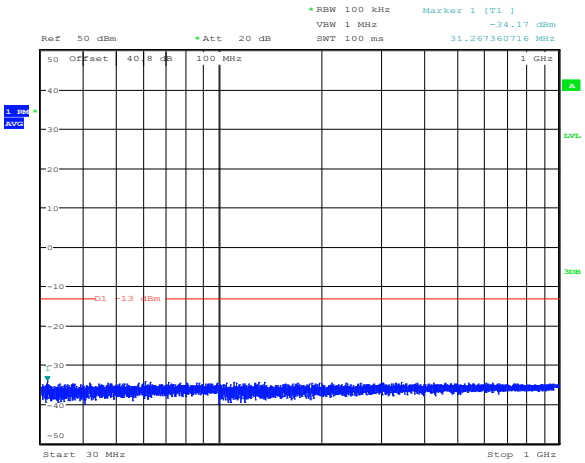


Figure 8.4-2: *Conducted spurious emissions below 1 GHz for mid channel (AWE)*

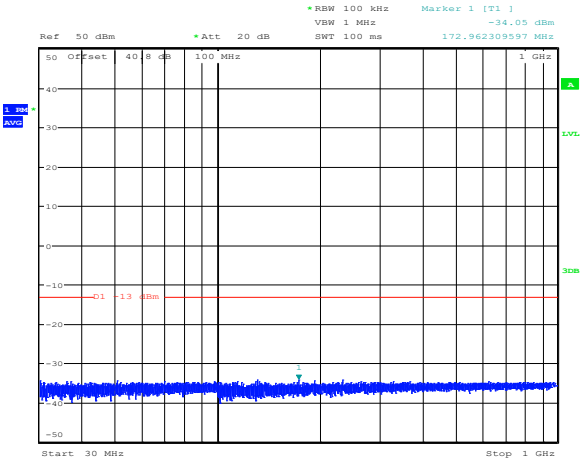


Figure 8.4-3: *Conducted spurious emissions below 1 GHz for high channel (AWE)*

8.4.4 Test data, continued

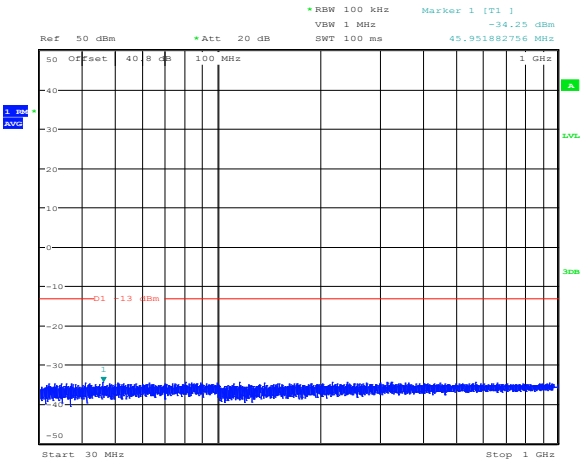


Figure 8.4-4: *Conducted spurious emissions below 1 GHz for low channel (AWS)*

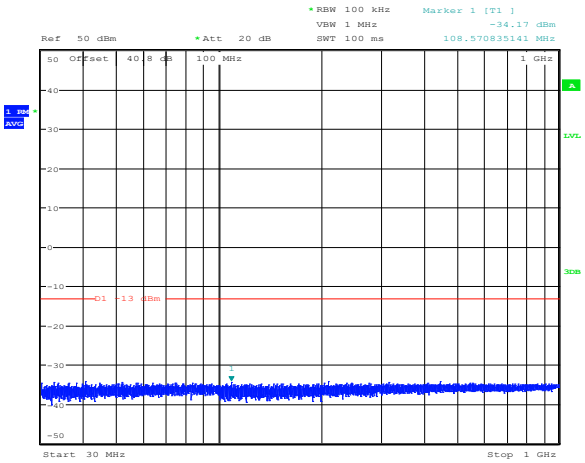


Figure 8.4-5: *Conducted spurious emissions below 1 GHz for mid channel (AWS)*

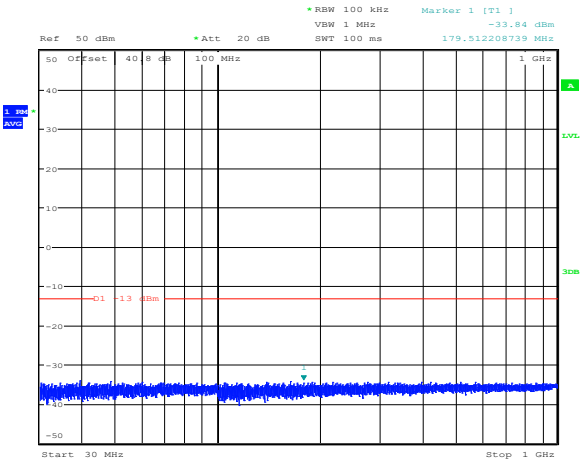


Figure 8.4-6: *Conducted spurious emissions below 1 GHz for high channel (AWS)*

8.4.4 Test data, continued

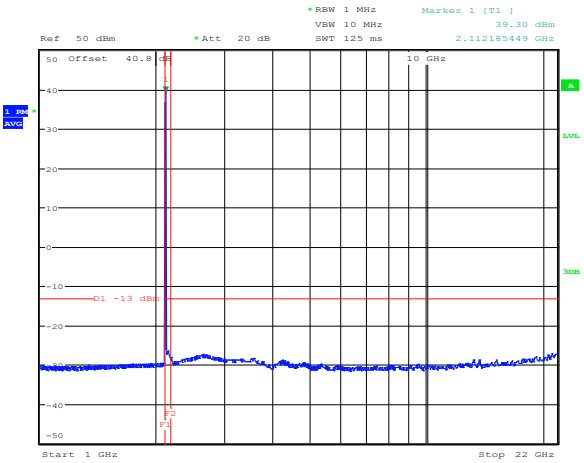


Figure 8.4-7: *Conducted spurious emissions above 1 GHz for low channel (AWE)*

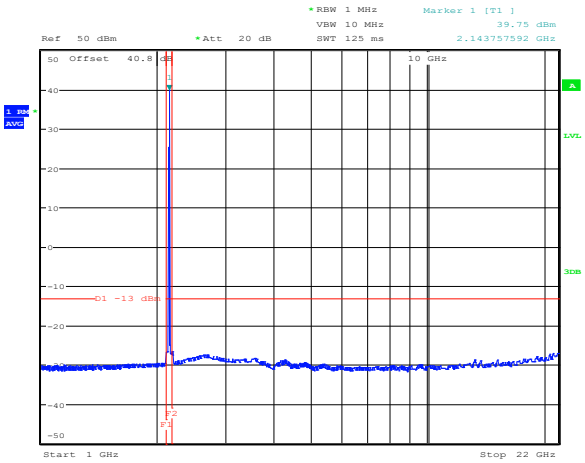


Figure 8.4-8: *Conducted spurious emissions above 1 GHz for mid channel (AWE)*

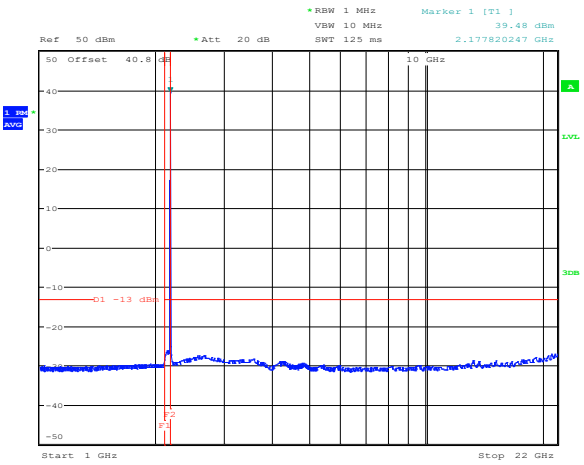


Figure 8.4-9: *Conducted spurious emissions above 1 GHz for high channel (AWE)*

8.4.4 Test data, continued

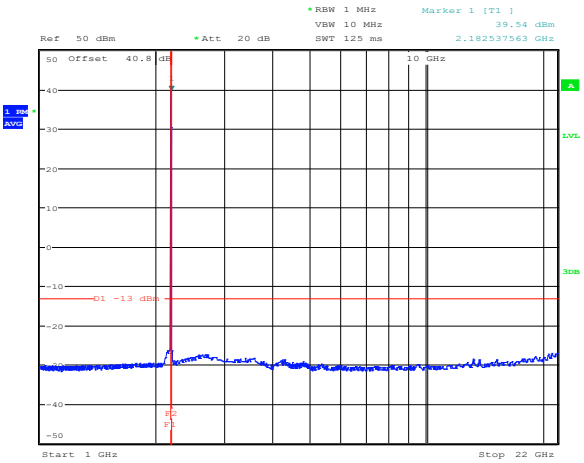


Figure 8.4-10: *Conducted spurious emissions above 1 GHz for low channel (AWS)*

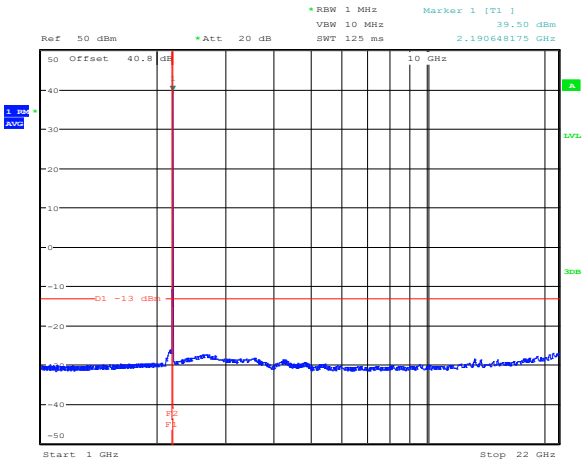


Figure 8.4-11: *Conducted spurious emissions above 1 GHz for mid channel (AWS)*

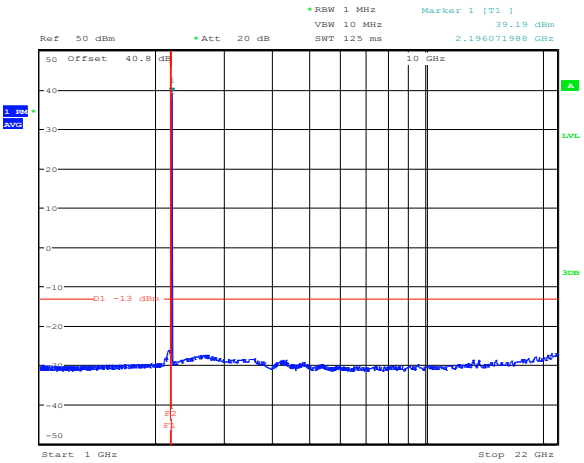


Figure 8.4-12: *Conducted spurious emissions above 1 GHz for high channel (AWS)*

8.4.4 Test data, continued

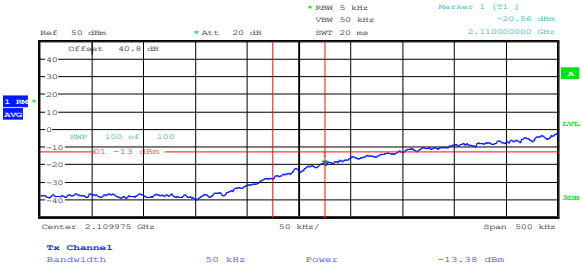


Figure 8.4-13: *Conducted lower band edge at 2110 MHz at AGC threshold (AWE)*

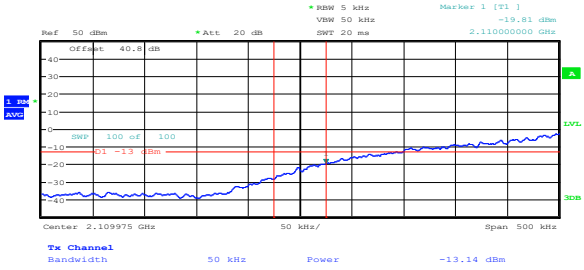


Figure 8.4-14: *Conducted lower band edge at 2110 MHz at AGC threshold + 3 dB (AWE)*

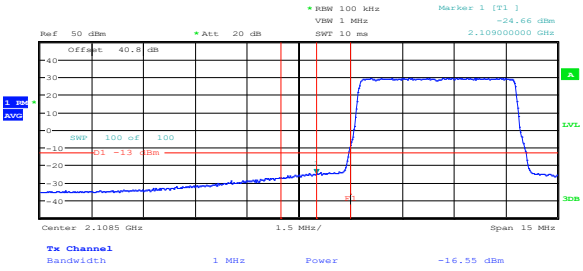


Figure 8.4-15: *Conducted lower band edge at 2110 -1 MHz at AGC threshold (AWE)*

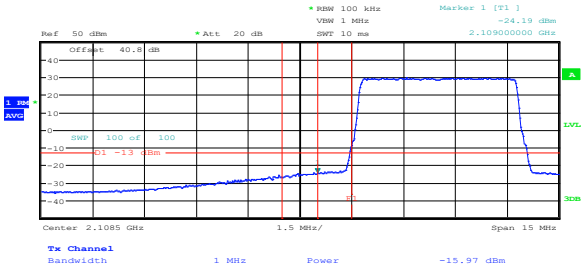


Figure 8.4-16: *Conducted lower band edge at 2110 -1 MHz at AGC threshold + 3 dB (AWE)*

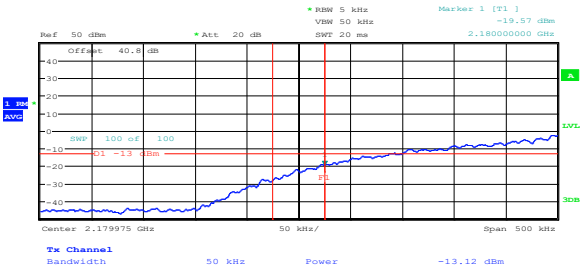


Figure 8.4-17: *Conducted lower band edge at 2180 MHz at AGC threshold (AWS)*

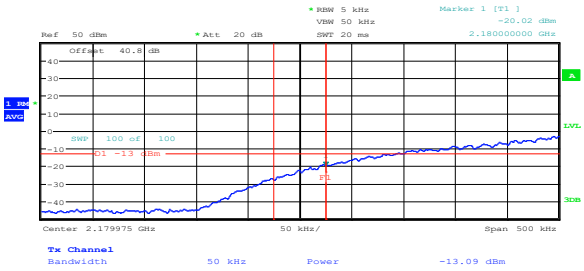


Figure 8.4-18: *Conducted lower band edge at 2180 MHz at AGC threshold + 3 dB (AWS)*

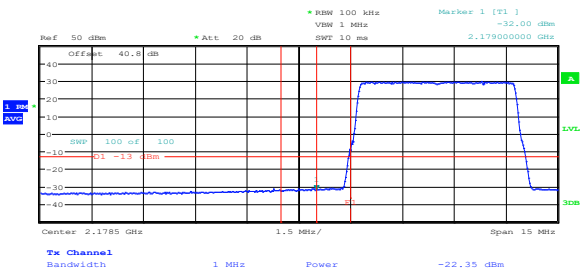


Figure 8.4-19: *Conducted lower band edge at 2180 -1 MHz at AGC threshold (AWS)*

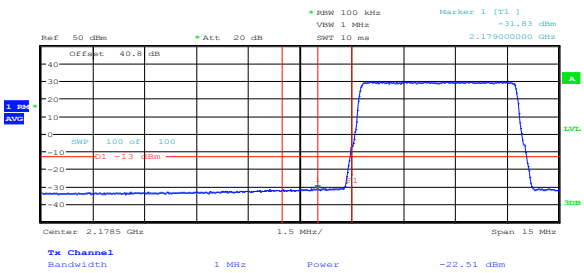


Figure 8.4-20: *Conducted lower band edge at 2180-1 MHz at AGC threshold + 3 dB*

8.4.4 Test data, continued

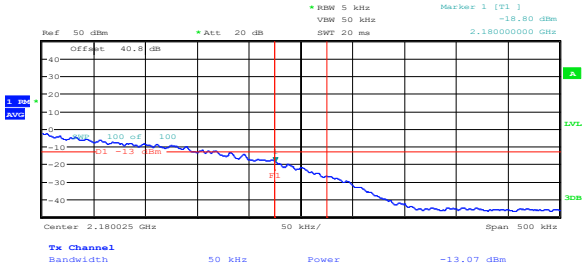


Figure 8.4-21: *Conducted upper band edge at 2180 MHz at AGC threshold (AWE)*

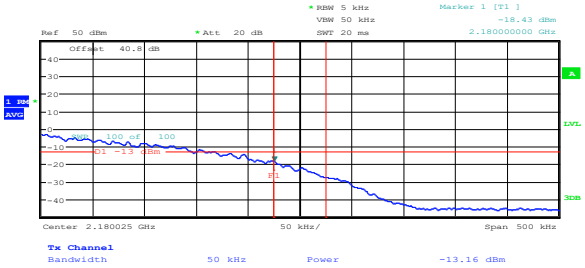


Figure 8.4-22: *Conducted upper band edge at 2180 MHz at AGC threshold + 3 dB (AWE)*

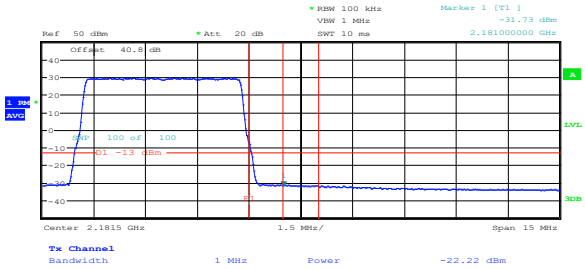


Figure 8.4-23: *Conducted upper band edge at 2180 +1 MHz at AGC threshold (AWE)*

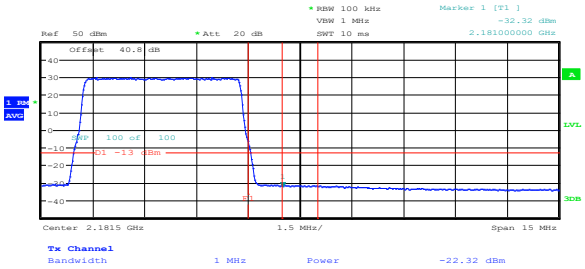


Figure 8.4-24: *Conducted upper band edge at 2180 +1 MHz at AGC threshold + 3 dB (AWE)*

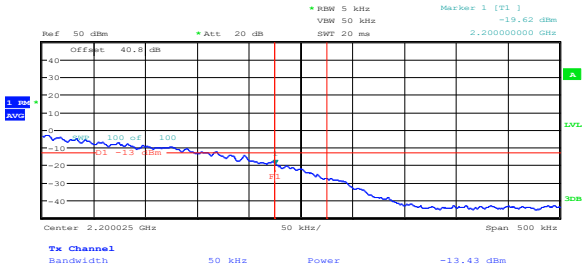


Figure 8.4-25: *Conducted upper band edge at 2200MHz at AGC threshold (AWS)*

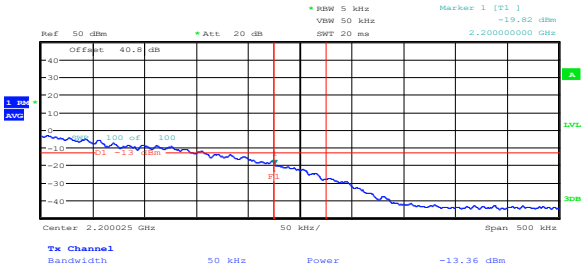


Figure 8.4-26: *Conducted upper band edge at 2200 MHz at AGC threshold + 3 dB (AWS)*

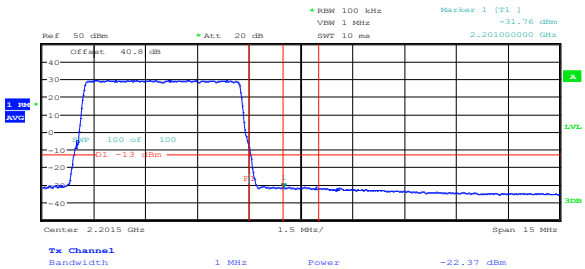


Figure 8.4-27: *Conducted upper band edge at 2200 +1 MHz at AGC threshold (AWS)*

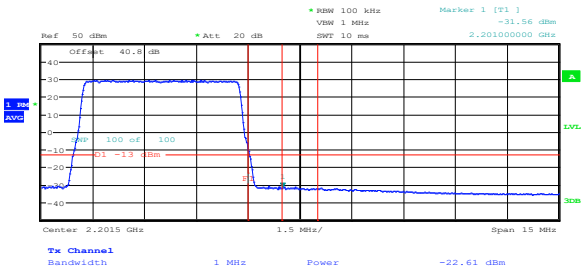


Figure 8.4-28: *Conducted upper band edge at 2220 +1 MHz at AGC threshold + 3 dB (AWS)*

8.4.4 Test data, continued

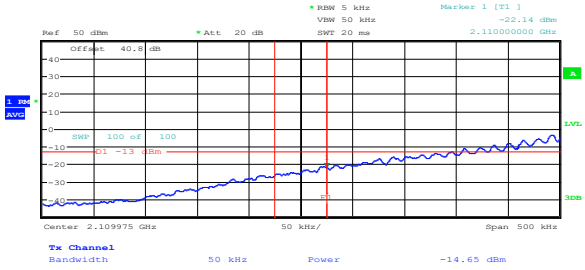


Figure 8.4-29: *Conducted lower band edge at 2110 MHz at AGC threshold (intermodulation) (AWE)*

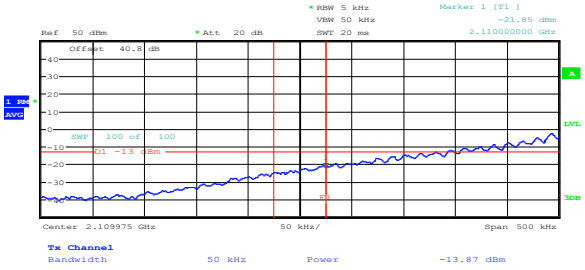


Figure 8.4-30: *Conducted lower band edge at 2110 MHz at AGC threshold + 3 dB (intermodulation) (AWE)*

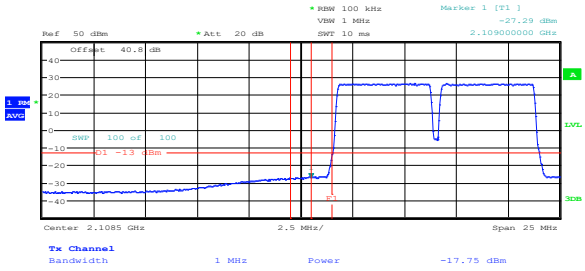


Figure 8.4-31: *Conducted lower band edge at 2110 - 1 MHz at AGC threshold (intermodulation) (AWE)*

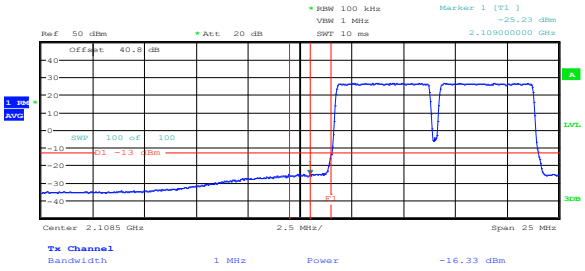


Figure 8.4-32: *Conducted lower band edge at 2110 - 1 MHz at AGC threshold + 3 dB (intermodulation) (AWE)*

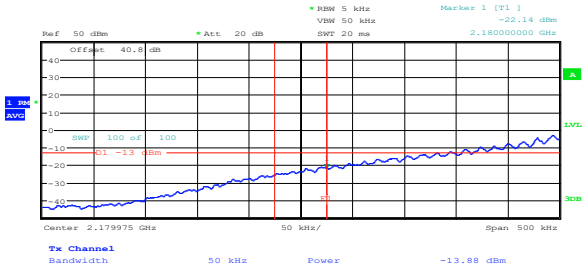


Figure 8.4-33: *Conducted lower band edge at 2180 MHz at AGC threshold (intermodulation) (AWS)*

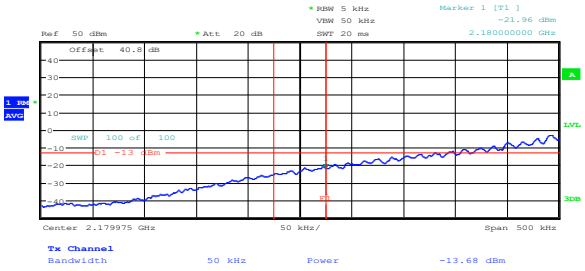


Figure 8.4-34: *Conducted lower band edge at 2180 MHz at AGC threshold + 3 dB (intermodulation) (AWS)*

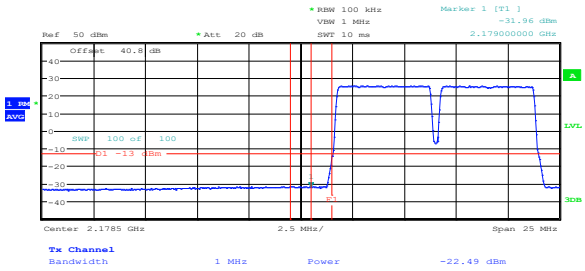


Figure 8.4-35: *Conducted lower band edge at 2180 - 1 MHz at AGC threshold (intermodulation) (AWS)*

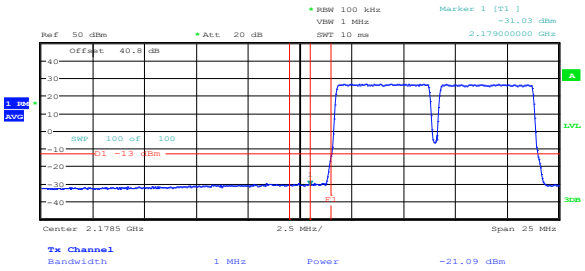


Figure 8.4-36: *Conducted lower band edge at 2180 - 1 MHz at AGC threshold + 3 dB (intermodulation) (AWS)*

8.4.4 Test data, continued

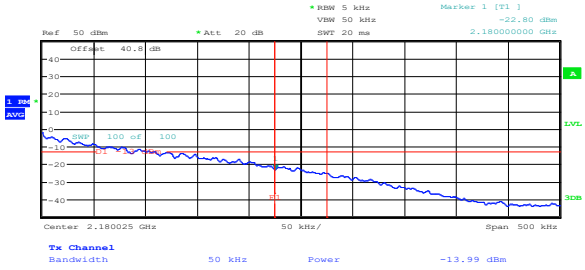


Figure 8.4-37: *Conducted upper band edge at 2180 MHz at AGC threshold (intermodulation) (AWE)*

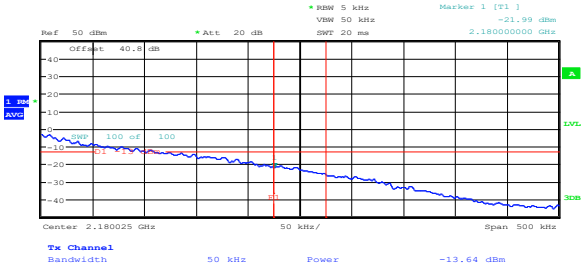


Figure 8.4-38: *Conducted upper band edge at 2180 MHz at AGC threshold + 3 dB (intermodulation) (AWE)*

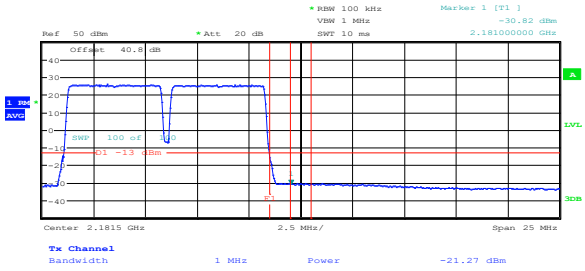


Figure 8.4-39: *Conducted lower band edge at 2180 + 1 MHz at AGC threshold (intermodulation) (AWE)*

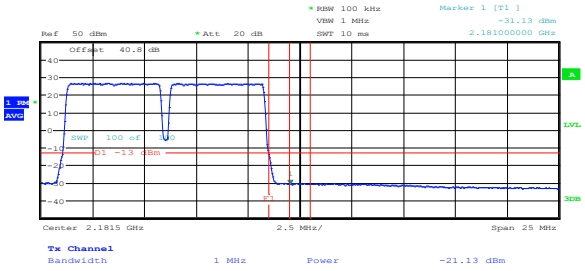


Figure 8.4-40: *Conducted lower band edge at 2180 + 1 MHz at AGC threshold + 3 dB (intermodulation) (AWE)*

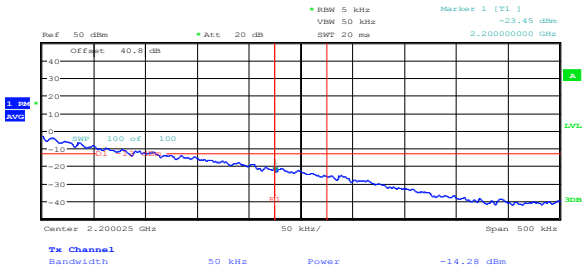


Figure 8.4-41: *Conducted upper band edge at 2200 MHz at AGC threshold (intermodulation) (AWS)*

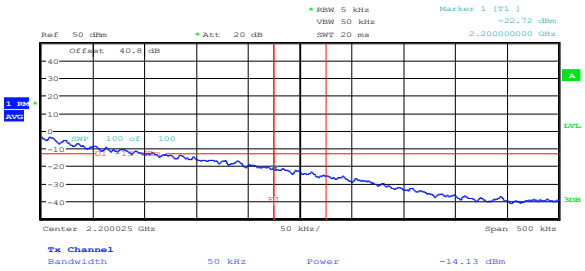


Figure 8.4-42: *Conducted upper band edge at 2200 MHz at AGC threshold + 3 dB (intermodulation) (AWS)*

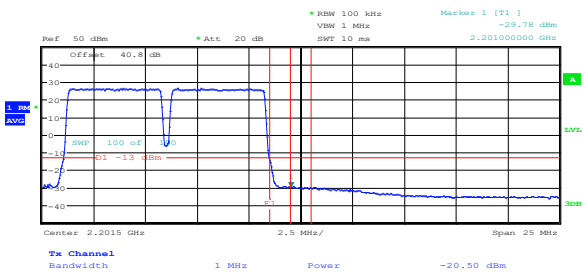


Figure 8.4-43: *Conducted lower band edge at 2200 + 1 MHz at AGC threshold (intermodulation) (AWS)*

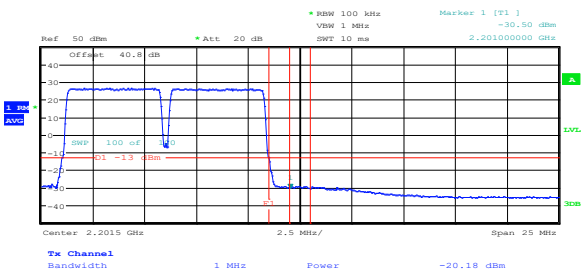


Figure 8.4-44: *Conducted lower band edge at 2200 + 1 MHz at AGC threshold + 3 dB (intermodulation) (AWS)*

8.5 FCC 27.53(h) and KDB 935210 Clause 3.8 Radiated spurious emissions

8.5.1 Definitions and limits

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.
(2) Additional protection levels. Notwithstanding the foregoing paragraph (h)(1) of this section:
(i) Operations in the 2180-2200 MHz band are subject to the out-of-band emission requirements set forth in §27.1134 for the protection of federal government operations operating in the 2200-2290 MHz band.
27.1134(e) Protection of Federal operations in the 2200-2290 MHz band—(1) Default emission limits. Except as provided in paragraph (e)(2) of this section, the following default out-of-band emissions limits shall apply for AWS-4 operations in the 2180-2200 MHz band.
(i) For these AWS-4 operations, the power of any emissions on all frequencies between 2200 and 2290 MHz shall not exceed an EIRP of −100.6 dBW/4 kHz (−70.6 dBm/4 kHz).

8.5.2 Test summary

Test date	September 14, 2018
Test engineer	Andrey Adelberg

8.5.3 Observations, settings and special notes

Receiver/Spectrum Analyzer settings:

Frequency range	30 MHz to 10th harmonic
Detector mode	Peak
Resolution bandwidth	100 kHz (below 1 GHz), 1000 kHz (above 1 GHz), 5 kHz (within 2.2–2.29 GHz)
Video bandwidth	>RBW
Trace mode	Max Hold

8.5.4 Test data

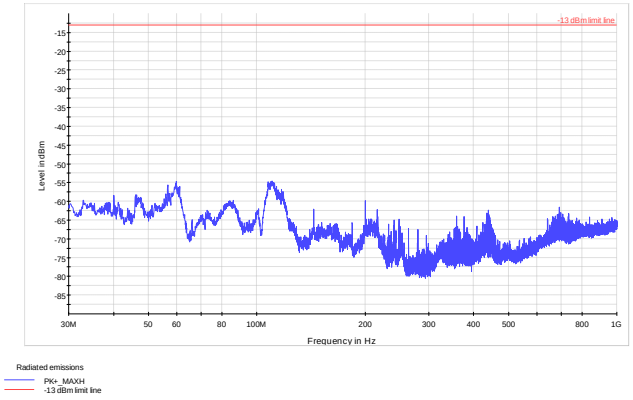


Figure 8.5-1: *Radiated spurious emissions within 30 MHz to 1 GHz – Low Channel (AWE)*

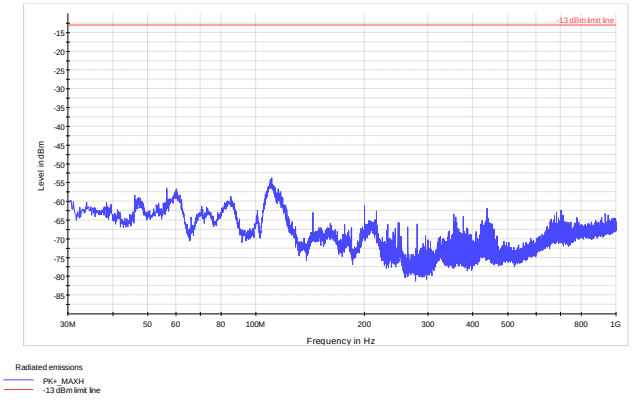


Figure 8.5-2: *Radiated spurious emissions within 30 MHz to 1 GHz – Middle Channel (AWE)*

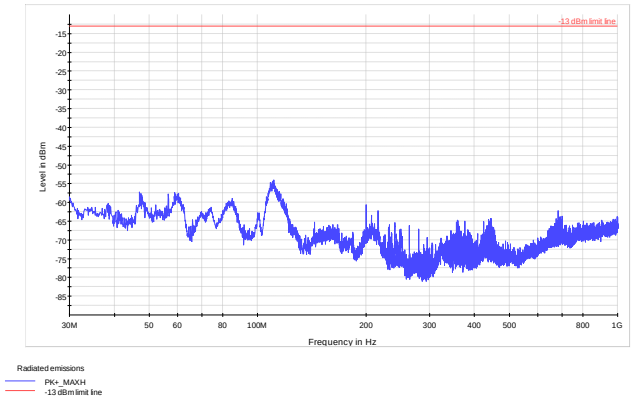


Figure 8.5-3: *Radiated spurious emissions within 30 MHz to 1 GHz – High Channel (AWE)*

8.5.4 Test data, continued

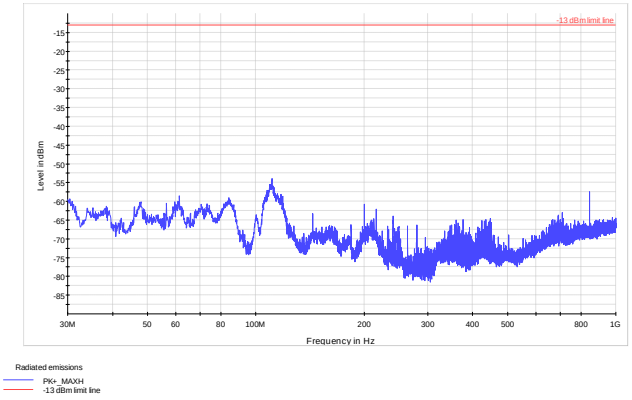


Figure 8.5-4: *Radiated spurious emissions within 30 MHz to 1 GHz – Low Channel (AWS)*

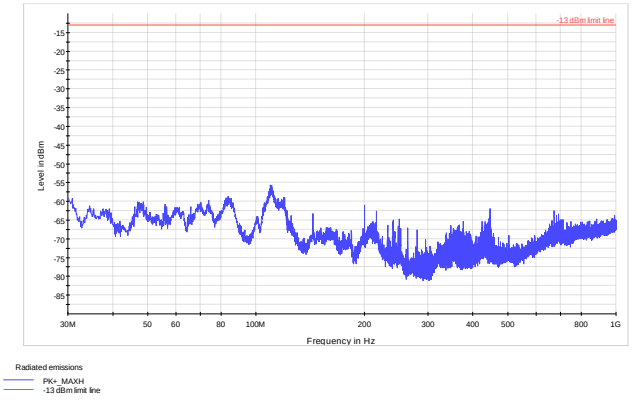


Figure 8.5-5: *Radiated spurious emissions within 30 MHz to 1 GHz – Middle Channel (AWS)*

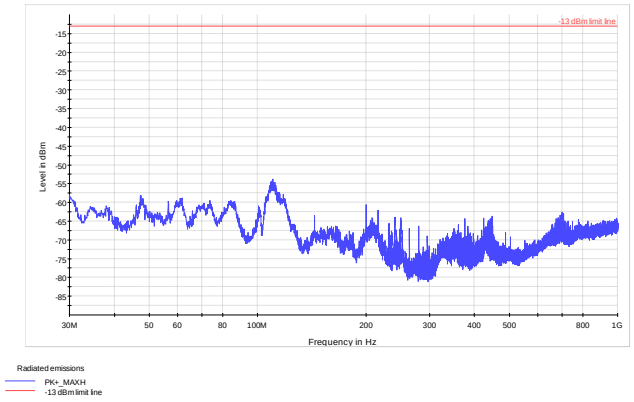


Figure 8.5-6: *Radiated spurious emissions within 30 MHz to 1 GHz – High Channel (AWS)*

8.5.4 Test data, continued

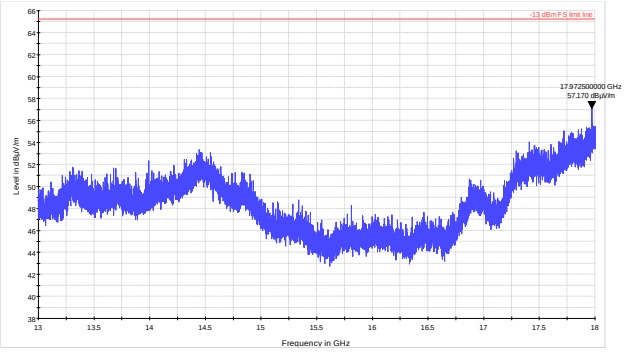


Figure 8.5-7: *Radiated spurious emissions within 1 to 12.75 GHz – Low Channel (AWE)*

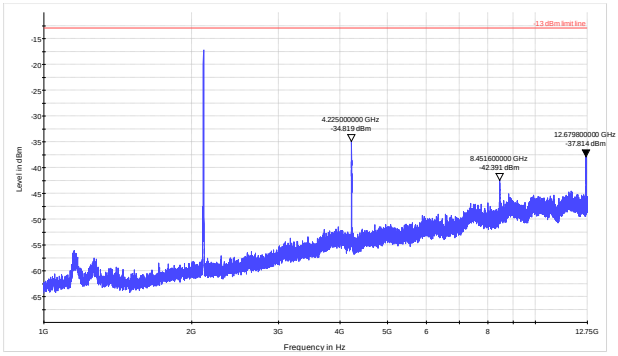


Figure 8.5-8: *Radiated spurious emissions within 13 to 18 GHz – Low Channel (AWE)*

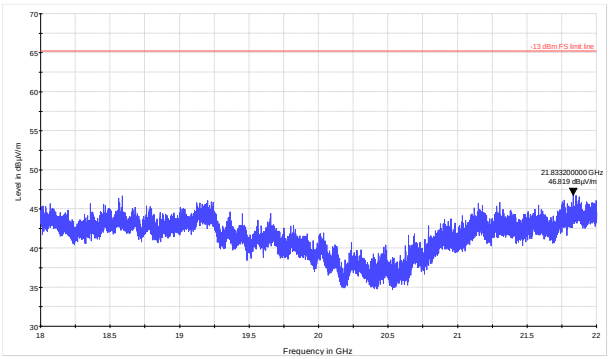


Figure 8.5-9: *Radiated spurious emissions within 18 to 22 GHz – Low Channel (AWE)*

8.5.4 Test data, continued

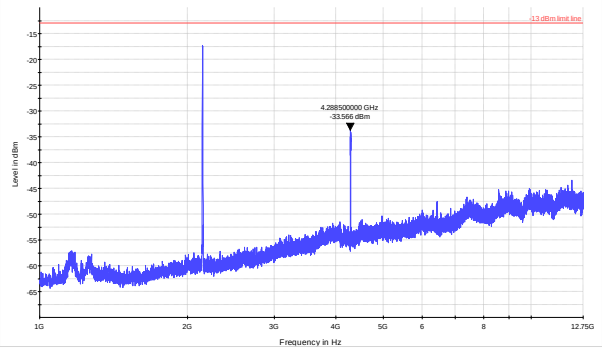


Figure 8.5-10: *Radiated spurious emissions within 1 to 12.75 GHz – Middle Channel (AWE)*

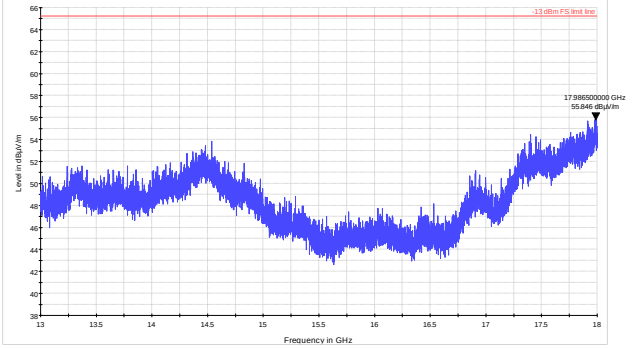


Figure 8.5-11: *Radiated spurious emissions within 13 to 18 GHz – Middle Channel (AWE)*

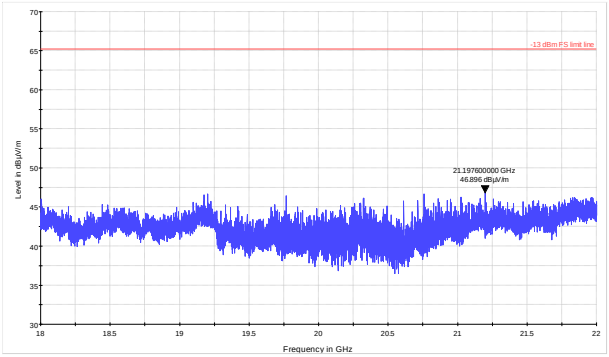


Figure 8.5-12: *Radiated spurious emissions within 18 to 22 GHz – Middle Channel (AWE)*

8.5.4 Test data, continued

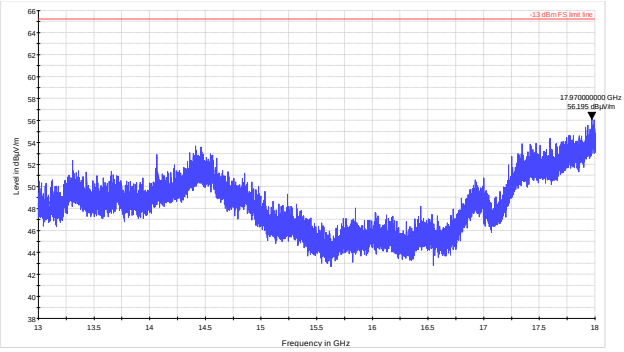


Figure 8.5-13: *Radiated spurious emissions within 1 to 12.75 GHz – High Channel (AWE)*

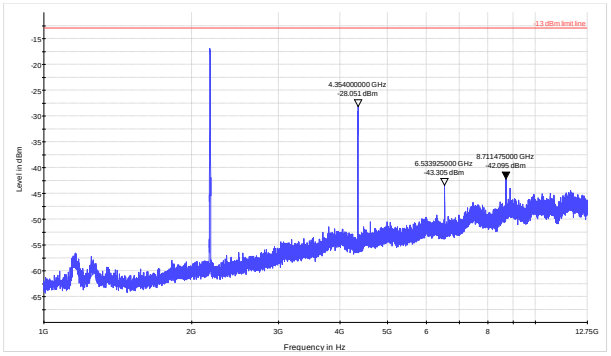


Figure 8.5-14: *Radiated spurious emissions within 13 to 18 GHz – High Channel (AWE)*

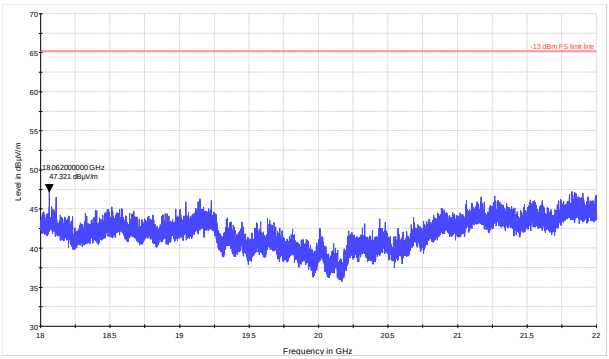


Figure 8.5-15: *Radiated spurious emissions within 18 to 22 GHz – High Channel (AWE)*

8.5.4 Test data, continued

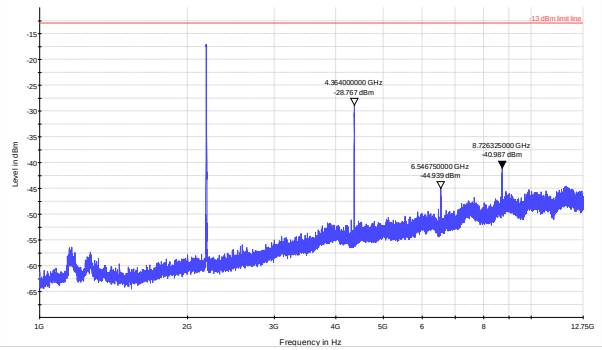


Figure 8.5-16: *Radiated spurious emissions within 1 to 12.75 GHz – Low Channel (AWS)*

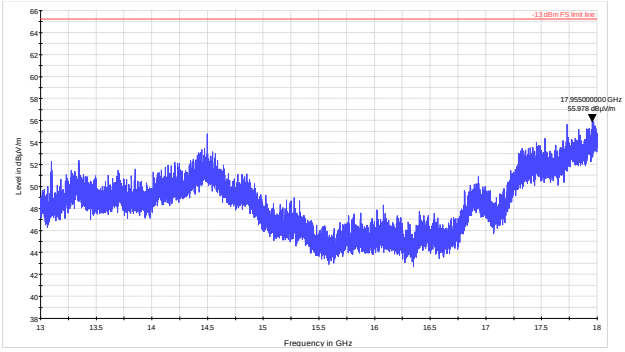


Figure 8.5-17: *Radiated spurious emissions within 13 to 18 GHz – Low Channel (AWS)*

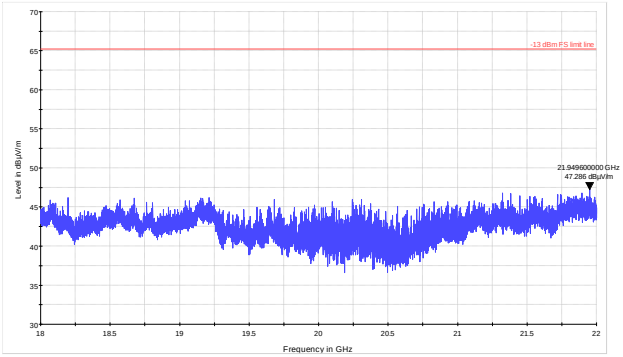


Figure 8.5-18: *Radiated spurious emissions within 18 to 22 GHz – Low Channel (AWS)*

8.5.4 Test data, continued

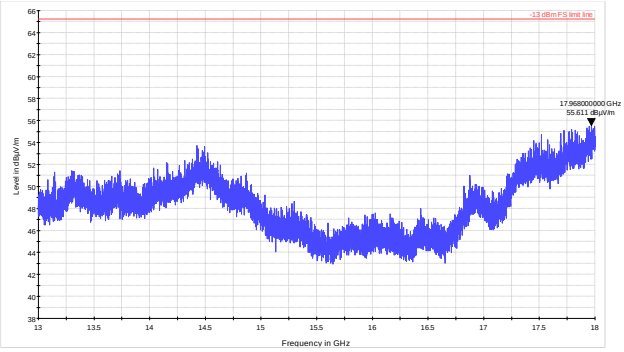


Figure 8.5-19: *Radiated spurious emissions within 1 to 12.75 GHz – Middle Channel (AWS)*

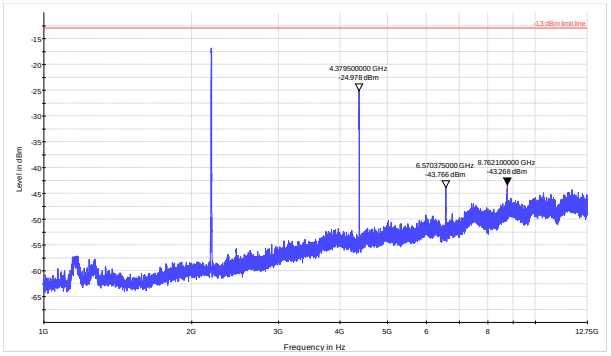


Figure 8.5-20: *Radiated spurious emissions within 13 to 18 GHz – Middle Channel (AWS)*

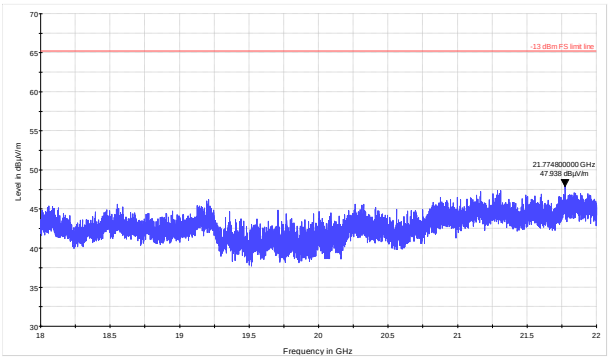


Figure 8.5-21: *Radiated spurious emissions within 18 to 22 GHz – Middle Channel (AWS)*

8.5.4 Test data, continued

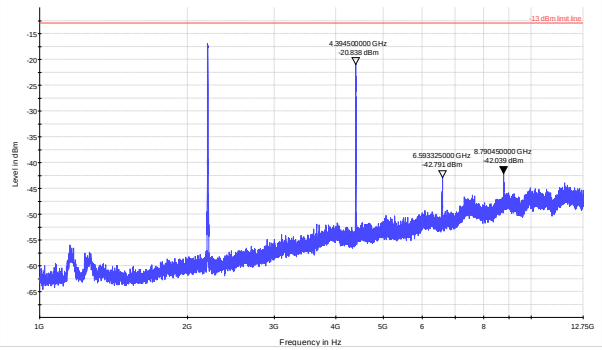


Figure 8.5-22: *Radiated spurious emissions within 1 to 12.75 GHz – High Channel (AWS)*

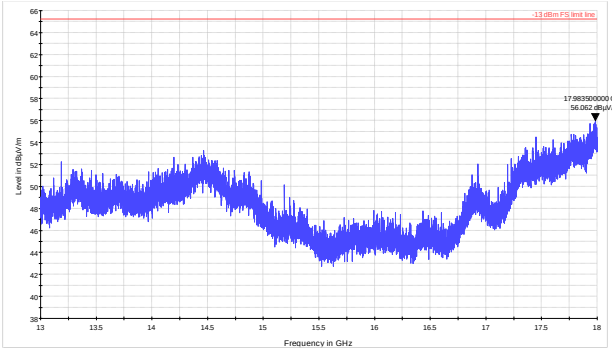


Figure 8.5-23: *Radiated spurious emissions within 13 to 18 GHz – High Channel (AWS)*

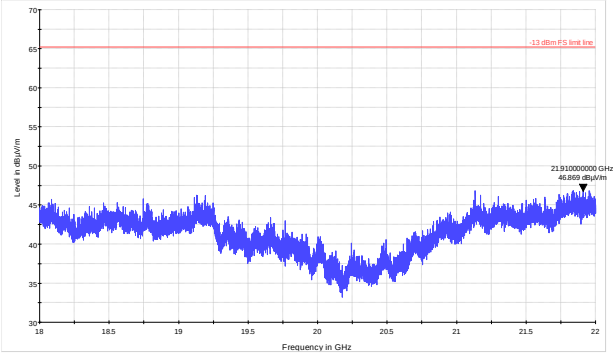


Figure 8.5-24: *Radiated spurious emissions within 18 to 22 GHz – High Channel (AWS)*

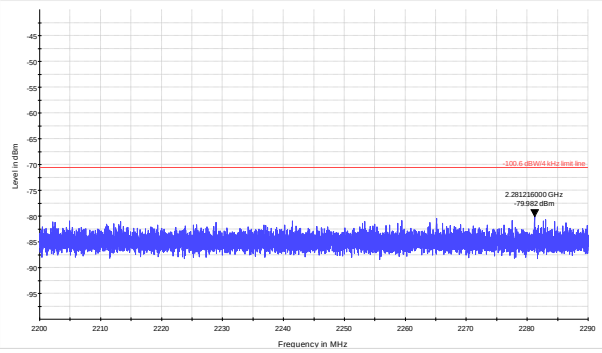


Figure 8.5-25: *Radiated spurious emissions within 2.2–2.29 GHz Low Channel (AWS)*

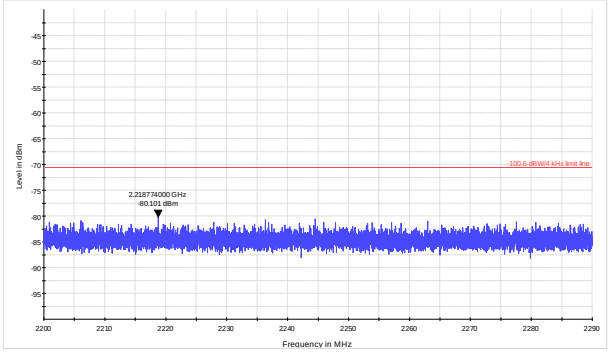


Figure 8.5-26: *Radiated spurious emissions within 2.2–2.29 GHz Mid Channel (AWS)*

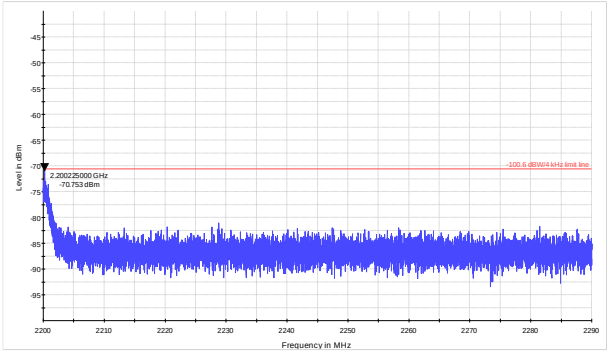


Figure 8.5-27: *Radiated spurious emissions within 2.2–2.29 GHz High Channel (AWS)*

8.6 Part 2.1049 and KDB 935210 Clause 3.4 Occupied bandwidth: input versus output signal comparison

8.6.1 Definitions and limits

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. The spectral shape of the output should look similar to the input. Input OBW and output OBW were assessed and compared side by side.

8.6.2 Test summary

Test date	September 14, 2018
Test engineer	Andrey Adelberg

8.6.3 Observations, settings and special notes

Spectrum analyzer settings:

Detector mode	Peak
Resolution bandwidth	≥1 % of OBW
Video bandwidth	≥ RBW
Trace mode	Max Hold

8.6.4 Test data

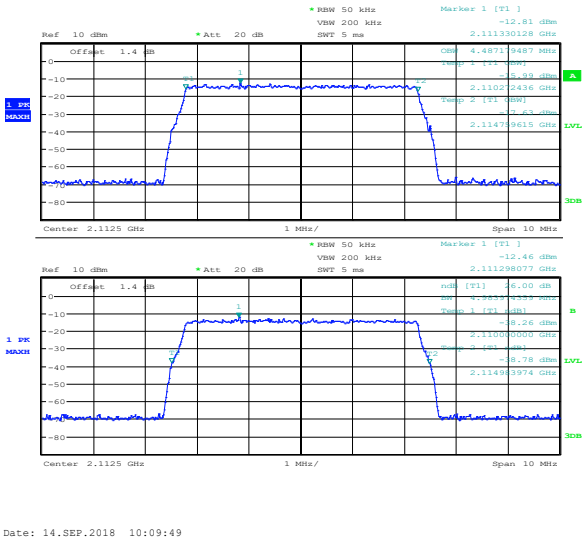


Figure 8.6-1: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold, low channel (AWE)*

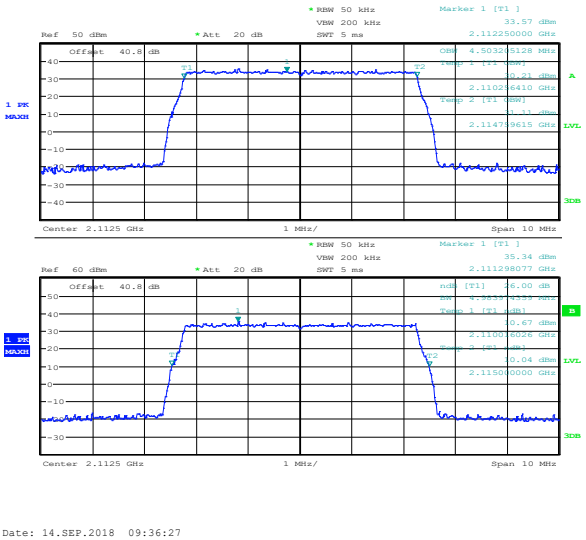


Figure 8.6-2: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold, low channel (AWE)*

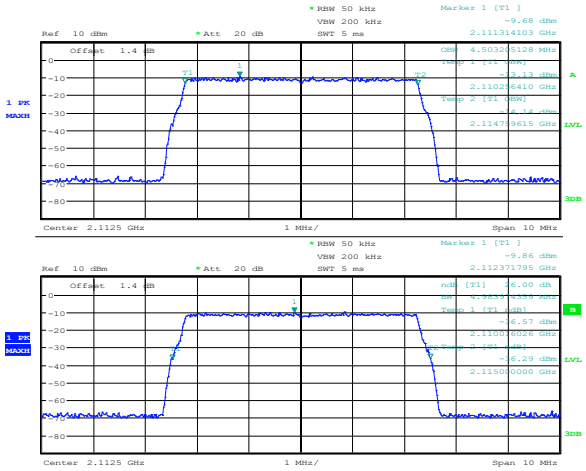


Figure 8.6-3: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold +3 dB, Low channel (AWE)*

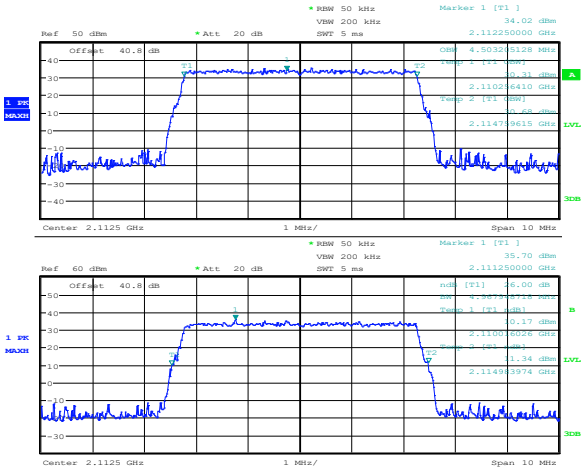


Figure 8.6-4: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold +3 dB, Low channel (AWE)*

8.6.4 Test data, continued

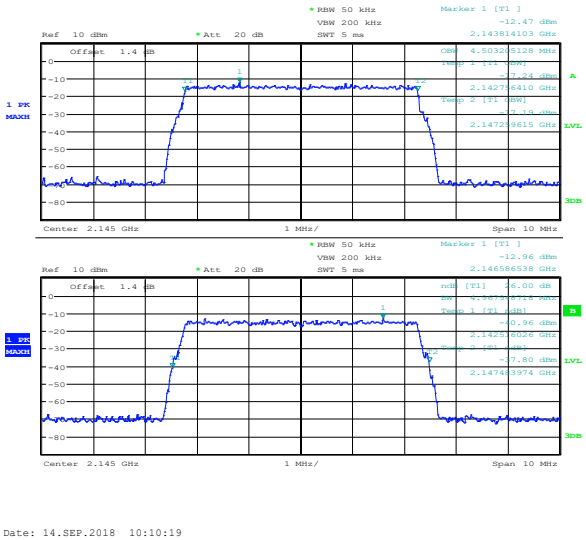


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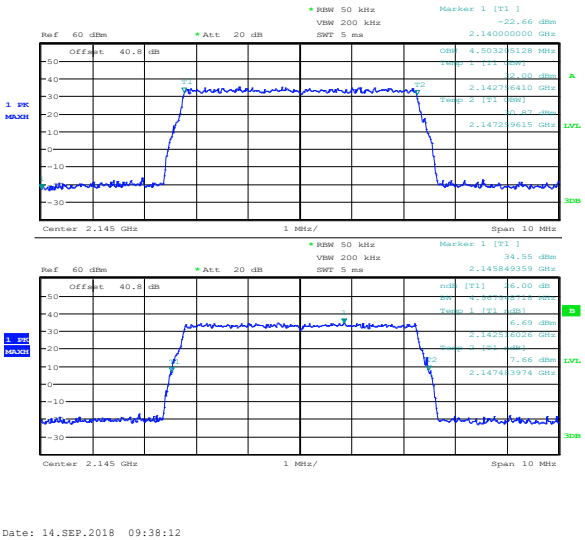
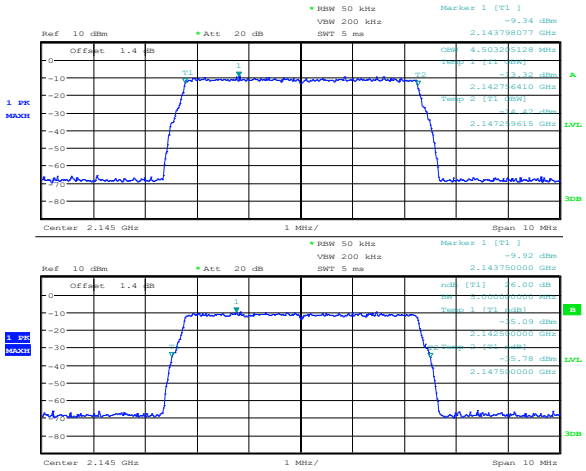
Figure 8.6-5: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold, Middle channel (AWE)*



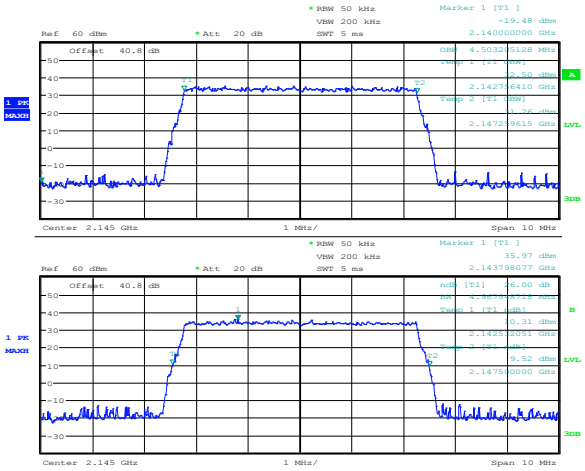
Date: 14.SEP.2018 09:38:12

Figure 8.6-6: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold, Middle channel (AWE)*



Date: 14.SEP.2018 10:11:06

Figure 8.6-7: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold +3 dB, Middle channel (AWE)*



Date: 14.SEP.2018 09:37:50

Figure 8.6-8: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold +3 dB, Middle channel (AWE)*

8.6.4 Test data, continued

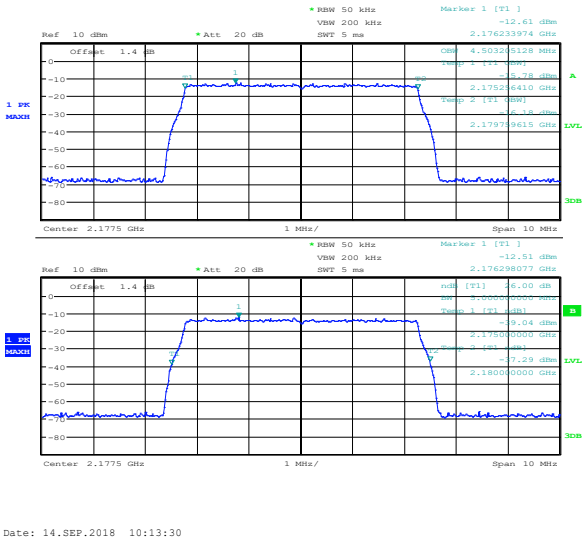


Figure 8.6-9: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold, High channel (AWE)*

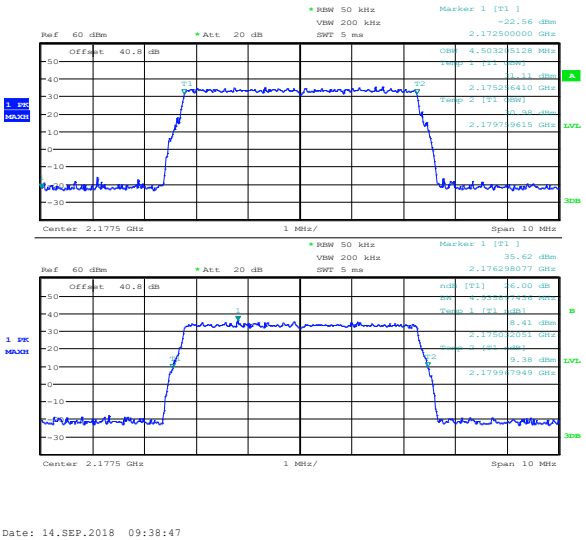


Figure 8.6-10: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold, High channel (AWE)*

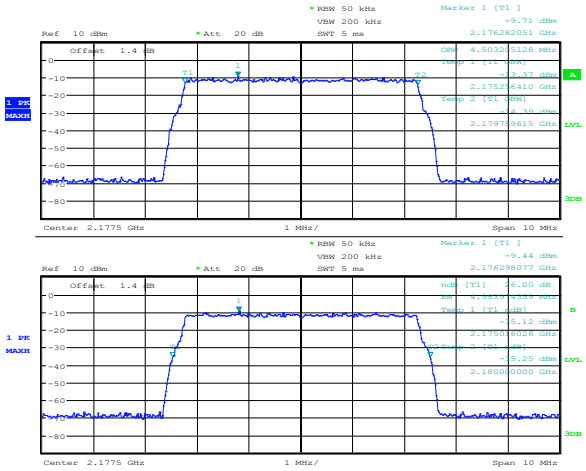


Figure 8.6-11: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold +3 dB, High channel (AWE)*

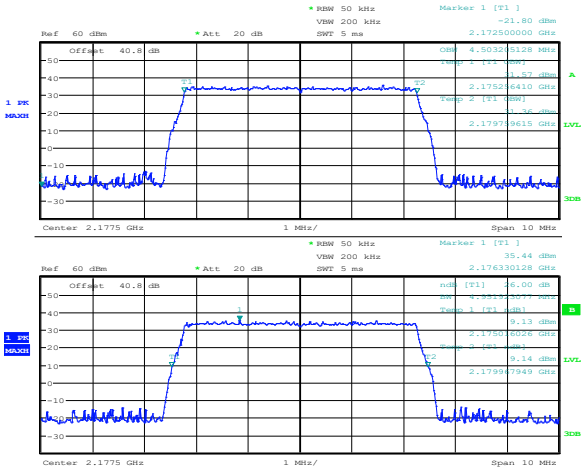
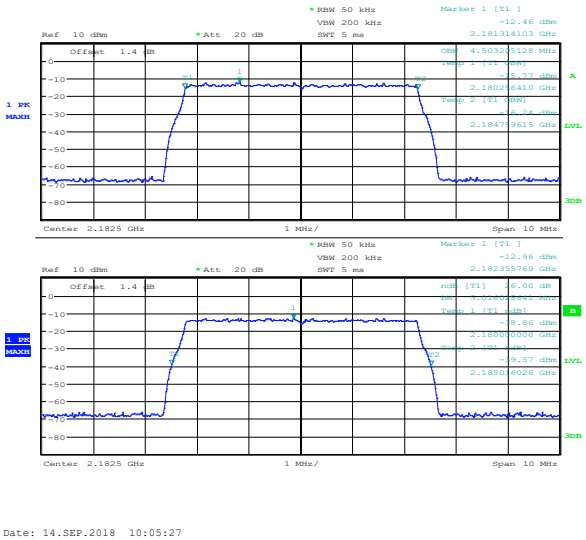


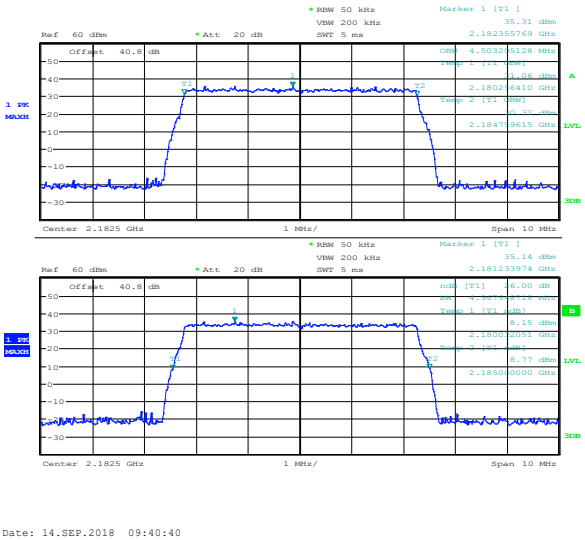
Figure 8.6-12: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold +3 dB, High channel (AWE)*

8.6.4 Test data, continued



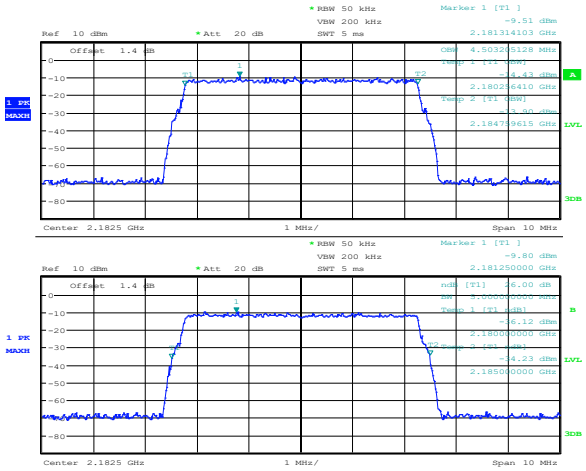
Date: 14.SEP.2018 10:05:27

Figure 8.6-13: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold, low channel (AWS)*



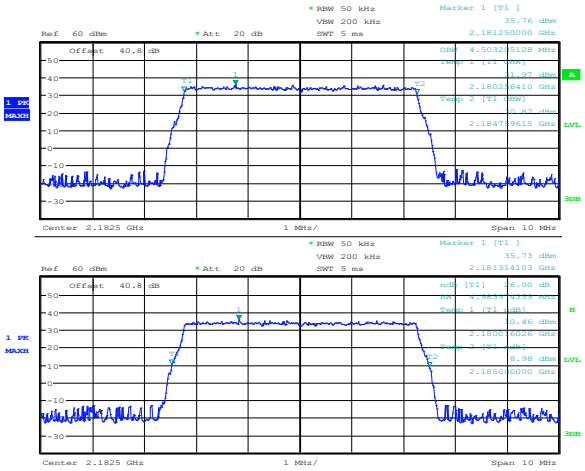
Date: 14.SEP.2018 09:40:40

Figure 8.6-14: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold, low channel (AWS)*



Date: 14.SEP.2018 10:05:50

Figure 8.6-15: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold +3 dB, Low channel (AWS)*



Date: 14.SEP.2018 09:40:11

Figure 8.6-16: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold +3 dB, Low channel (AWS)*

8.6.4 Test data, continued

Figure 8.6-17: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold, Middle channel (AWS)*

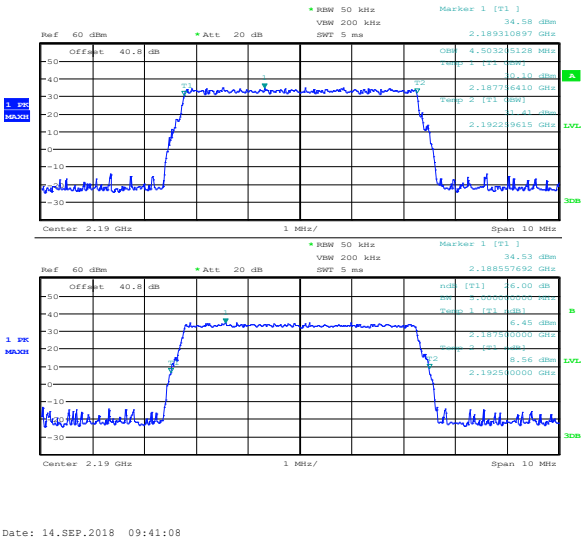


Figure 8.6-18: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold, Middle channel (AWS)*

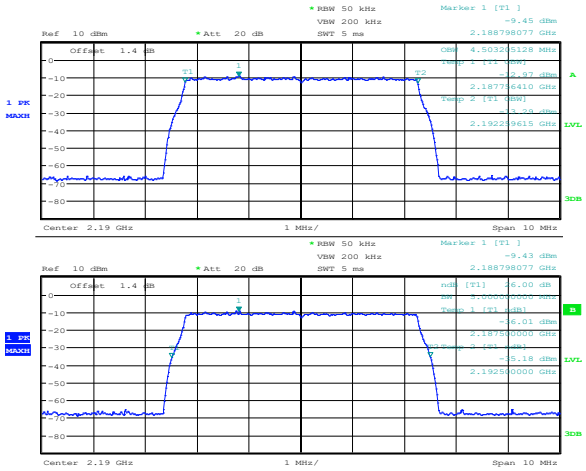


Figure 8.6-19: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold +3 dB, Middle channel (AWS)*

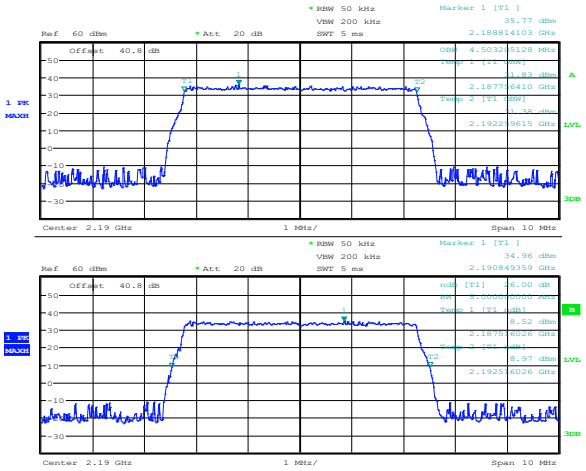


Figure 8.6-20: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold +3 dB, Middle channel (AWS)*

8.6.4 Test data, continued

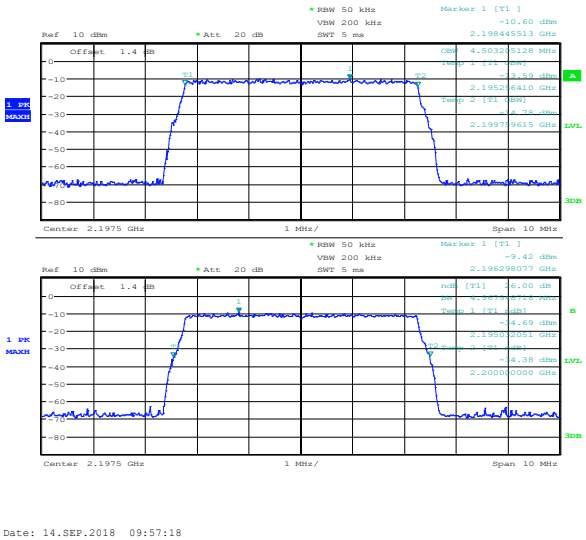


Figure 8.6-21: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold, High channel (AWS)*

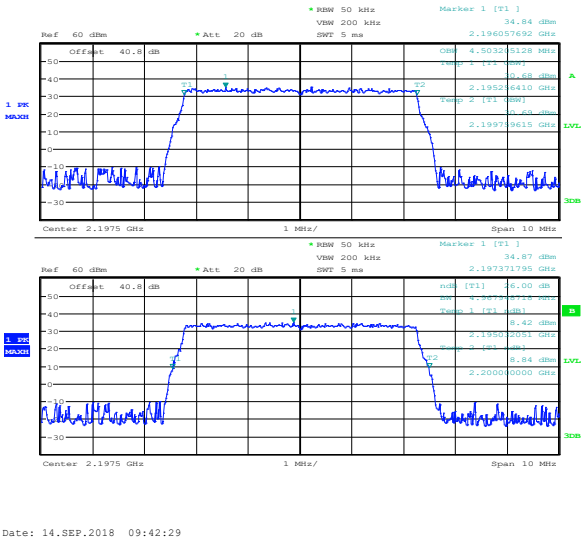


Figure 8.6-22: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold, High channel (AWS)*

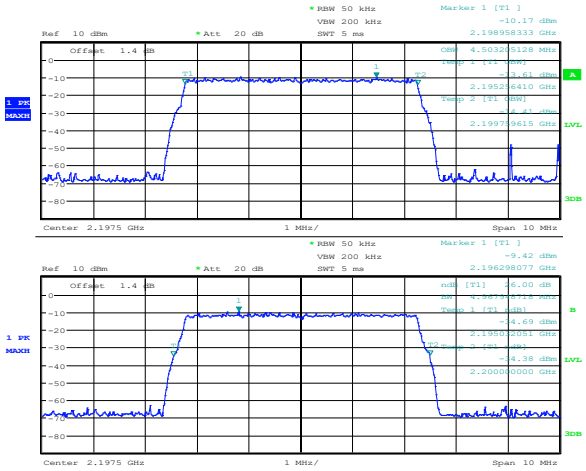


Figure 8.6-23: *99% OBW and 26 dB EBW at the input of the EUT at AGC threshold +3 dB, High channel (AWS)*

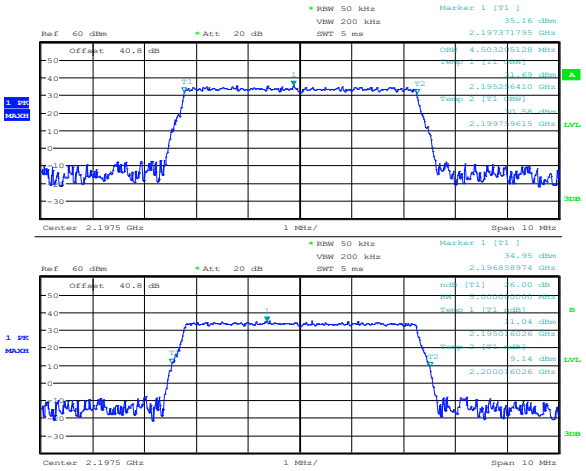


Figure 8.6-24: *99% OBW and 26 dB EBW at the output of the EUT at AGC threshold +3 dB, High channel (AWS)*

Section 9. Setup Photos

9.1 Set-up

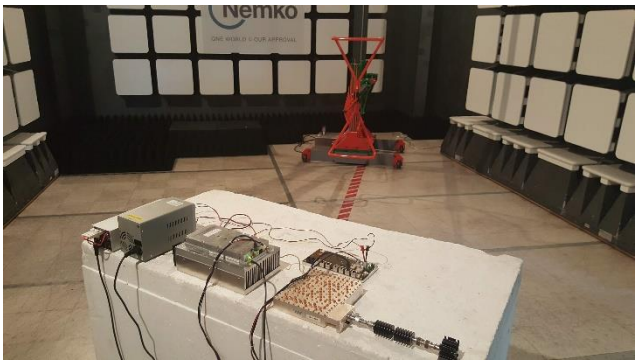


Figure 9.1-1: *Radiated setup photo below 1 GHz*

Figure 9.1-2: *Radiated setup photo below 1 GHz*

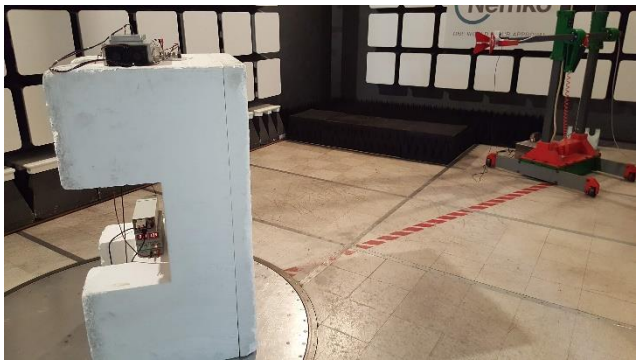
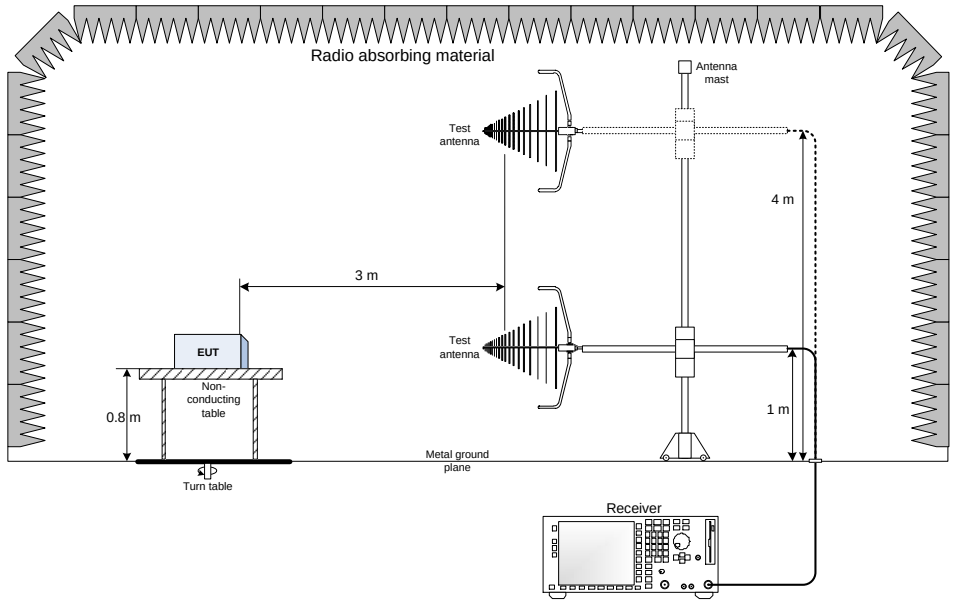


Figure 9.1-3: *Radiated setup photo above 1 GHz*

Section 10. Block diagrams of test set-ups

10.1 Radiated emissions set-up for frequencies below 1 GHz



10.2 Radiated emissions set-up for frequencies above 1 GHz