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Test report

237982-2TRFWL

Date of issue: January 21, 2014

Applicant:

ALCOMA a.s.

Product:

Alcoma-Point to point microwave radios

Model:

ZENITH24

FCC ID: 2ABD6AL24GMPBDP

IC Registration number: 11582A- AL24GMPBDP

Specifications:

- FCC 47 CFR 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

- RSS-210, Issue 8, December 2010, Annex 12

  Fixed Point-to-Point Systems in the Band 24.05–24.25 GHz

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

SCC Accredited LAB
LAB Accrédité CCN

Test location

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Country:	Canada
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Website:	www.nemko.com
Site number:	FCC: 176392; IC: 2040A-4 (3 m semi anechoic chamber)

Tested by:	Kevin Rose, Wireless/EMC Specialist
Reviewed by:	Andrey Adelberg, Senior Wireless/EMC Specialist
Date:	January 21, 2014
Signature:	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 1 Report summary

1.1 Applicant/ Manufacturer

Company name:	ALCOMA a.s.
Address:	Vinsova 11
City:	Prague 10
Postal/Zip code:	106 00
Country:	Czech Republic

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 8 Annex 12	Fixed Point-to-Point Systems in the Band 24.05–24.25 GHz

1.3 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.

1.4 Exclusions

None

1.5 Test report revision history

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

Section 2 Summary of test results

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

Part	Test description	Verdict
§15.207(a)	Conducted limits	Not applicable
§15.215(c)	20 dB bandwidth	Pass

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

Part	Test description	Verdict
§15.249(b)(1)	Radiated emissions not in restricted bands	Pass
§15.249(b)(2)	Frequency tolerance	Pass
§15.249(d)	Spurious emissions (except harmonics)	Pass

2.3 IC RSS-GEN, Issue 3, test results

Part	Test description	Verdict
§4.6.1	Occupied bandwidth	Pass
§7.2.4	AC power lines conducted emission limits	Not applicable

2.4 RSS-210, Issue 8, test results

Part	Test description	Verdict
§A12(a)	Radiated emissions not in restricted bands	Pass
§A12(b)	Frequency stability	Pass
§A12(d)	Spurious emissions (except harmonics)	Pass

Section 3 Equipment under test (EUT) details

3.1 Sample information

Receipt date	August 12, 2013
Nemko sample ID number	5 and 6

3.2 EUT information

Product name	Alcoma-Point to point microwave radios
Model	ZENITH24

3.3 Technical information

Operating band	24.05–24.25 GHz

Operating frequencies

Channel Bandwidth, MHz	Low radio, MHz	High radio, MHz
80	24,092	24,208
56	24,080	24,220
40	24,072	24,188
	24,112	24,228
28	24,066	24,206
	24,094	24,234
14	24,059	24,199
	24,101	24,241
7	24,055.5	24,195.5
	24,104.5	24,244.5
3.5	24,054.0	24,194.0
	24,106.5	24,246.5

Modulation type	QPSK, 8PSK. 8QAM, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM, and 1024QAM.

Occupied bandwidth (99 %)

Channel Bandwidth, MHz	Low radio 99% Bandwidth, MHz	High radio 99% Bandwidth, MHz
3.5	3.157	3.157
7	6.314	6.282
14	13.717	13.686
28	27.323	28.205
40	37.179	37.42
56	54.487	54.167
80	74.038	74.039

Emission designator	D7W
Power requirements	−48 V_{DC}
Antenna information	AL1-24/AP Gain 35 dBi (0.3 m) parabolic antenna
	AL1-24/APB Gain 41 dBi (0.6 m) parabolic antenna
	AL2-24/MP Gain 43 dBi (0.9 m) parabolic antenna
	AL4-24/MP Gain 45 dBi (1.2 m) parabolic antenna

3.4 Product description and theory of operation

The EUT is a point to point radio

3.5 EUT exercise details

The EUT was controlled via customer supplied software.

3.6 EUT setup Figure

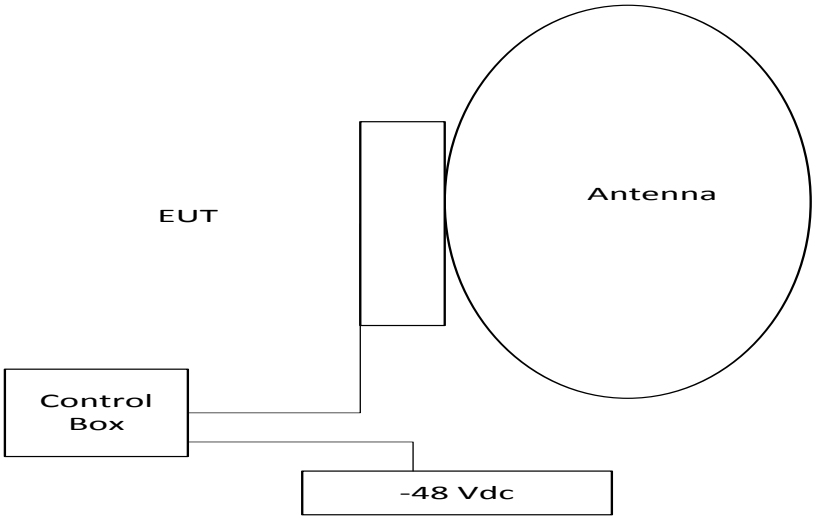


Figure 3.6-1: Setup Figure

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

Nemko Canada Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 “Uncertainty in EMC measurements.” Measurement uncertainty was calculated using the methods described in CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements; as well as described in UKAS LAB34: The expression of Uncertainty in EMC Testing. Measurement uncertainty calculations assume a coverage factor of K=2 with 95% certainty.

Section 7 Test equipment

7.1 Test equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	Mar. 09/14
Flush mount turntable	Sunol	FM2022	FA002082	—	NCR
Controller	Sunol	SC104V	FA002060	—	NCR
Antenna mast	Sunol	TLT2	FA002061	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 40	FA002071	1 year	Feb. 28/14
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	Feb. 21/14
Pre-amplifier (1–18 GHz)	JCA	JCA118-503	FA002091	1 year	June 21/14
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	—	VOU
Pre-amplifier (26–40 GHz)	Narda	DBL-2640N610	FA001556	—	VOU
50 Ω coax cable	Huber + Suhner	NONE	FA002392	1 year	July. 17/14
50 Ω coax cable	Huber + Suhner	NONE	FA002074	1 year	Aug. 23/13
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1 year	Feb. 21/14
Horn antenna (18–40 GHz)	EMCO	3116	FA001847	1 year	Sept. 06/13
Spectrum analyzer	Rohde & Schwarz	FSU	FA001877	1 year	Jan. 16/14
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	May 30/14
40–60 GHz Harmonic mixer	OML	WR19 M19HWD	FA002322	3 year	Mar. 16/14
40–60 GHz Standard gain horn	Millitech	U SGH-19	FA002322	—	VOU
60–90 GHz Harmonic mixer	OML	WR12 M12HWD	FA001524	3 year	Mar. 16/14
60–90 GHz Standard gain horn	Millitech	U SGH-12	FA001524	—	VOU
90–140 GHz Harmonic mixer	OML	WR08 M08HWD	FA001525	3 year	Mar. 16/14
90–140 GHz Standard gain horn	Millitech	U SGH-08	FA001525	—	VOU
Temperature chamber	Thermotron	SM-16C	FA001030	1 year	NCR
Multimeter	Fluke	16	FA001831	1 year	Jan. 30/14

Note: NCR - no calibration required

Section 8 Testing data

8.1 Clause 15.215(c) Emission bandwidth RSS Gen 4.6.1 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 4.6.1 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:	August 20, 2013	Temperature:	22 °C
Test engineer:	Kevin Rose	Air pressure:	1002 mbar
Verdict:	Pass	Relative humidity:	36 %

8.1.3 Observations/special notes

Table 8.1-1: Spectrum analyzer settings per channel bandwidth

EUT bandwidth, MHz	Spectrum analyzer RBW, MHz	Spectrum analyzer VBW, MHz
3.5	0.1	0.3
7	0.1	0.3
14	0.3	1
28	0.3	1
40	0.5	2
56	0.5	2
80	1.0	3

8.1.4 Test data

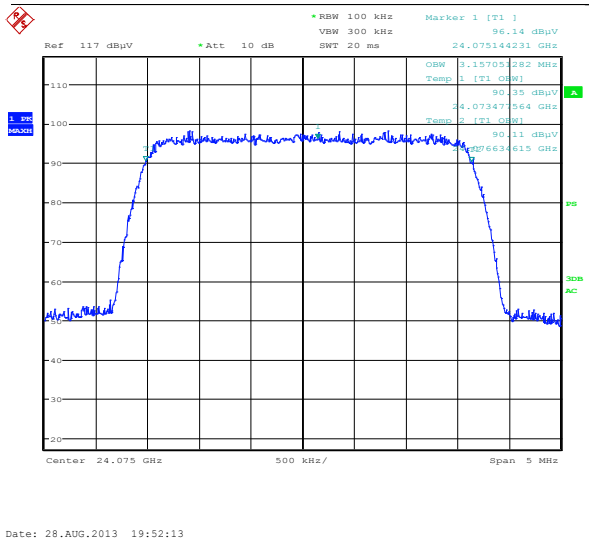
Table 8.1-2: 20 dB and 99% bandwidth results High Radio

Frequency, MHz	Channel Bandwidth, MHz	Modulation	99% bandwidth, MHz	20 dB bandwidth, MHz
24222	3.5	8PSK	3.157	3.462
24222	3.5	QPSK	3.149	3.429
24222	3.5	QAM1024	3.141	3.429
24225.5	7	8PSK	6.266	6.811
24223.5	7	QPSK	6.282	6.843
24223.5	7	QAM1024	6.234	6.795
24213	14	8PSK	12.981	14.199
24213	14	QPSK	13.686	14.968
24213	14	QAM1024	12.981	14.135
24206	28	8PSK	28.205	25.962
24206	28	QPSK	27.324	29.728
24206	28	QAM1024	25.962	28.285
24188	40	8PSK	37.420	40.865
24188	40	QPSK	37.179	40.705
24188	40	QAM1024	37.340	40.705
24220	56	8PSK	51.603	56.090
24220	56	QPSK	54.167	59.295
24220	56	QAM1024	51.603	56.571
24208	80	8PSK	74.039	80.288
24208	80	QPSK	73.878	80.609
24208	80	QAM1024	74.038	80.769

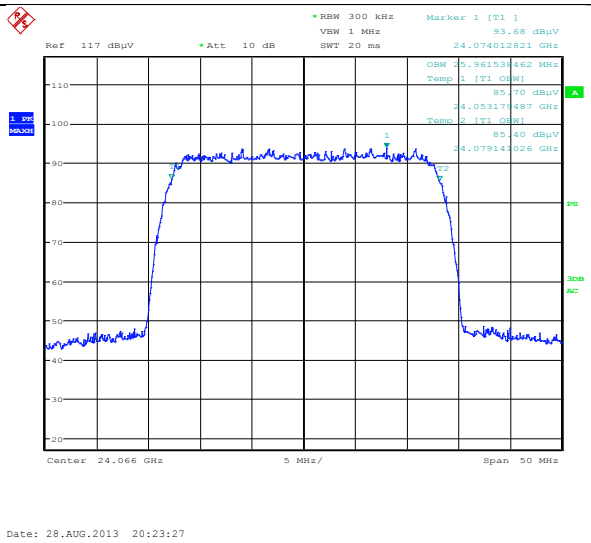
Table 8.1-3: 20 dB and 99% bandwidth results Low Radio

Frequency, MHz	Channel Bandwidth, MHz	Modulation	99% bandwidth, MHz	20 dB bandwidth, MHz
24075	3.5	8PSK	3.157	3.501
24075	3.5	QPSK	3.149	3.477
24075	3.5	QAM1024	3.141	3.461
24083.5	7	8PSK	6.233	6.794
24083.5	7	QPSK	6.314	6.875
24083.5	7	QAM1024	6.250	6.778
24073	14	8PSK	13.012	14.198
24073	14	QPSK	13.717	14.967
24073	14	QAM1024	13.012	14.231
24066	28	8PSK	25.961	28.365
24066	28	QPSK	27.323	29.887
24066	28	QAM1024	25.961	28.445
24072	40	8PSK	37.179	40.625
24072	40	QPSK	37.019	40.384
24072	40	QAM1024	37.259	40.625
24080	56	8PSK	51.762	56.891
24080	56	QPSK	54.487	59.615
24080	56	QAM1024	51.762	56.731
24092	80	8PSK	74.038	80.609
24092	80	QPSK	73.557	80.288
24092	80	QAM1024	73.878	80.609

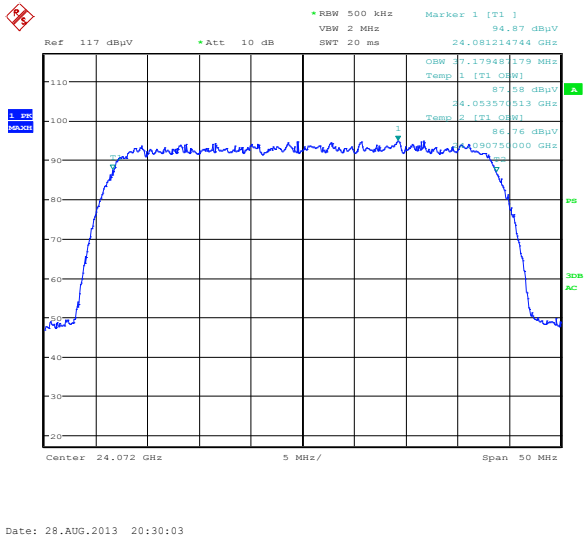
8.1.4 Test data continued



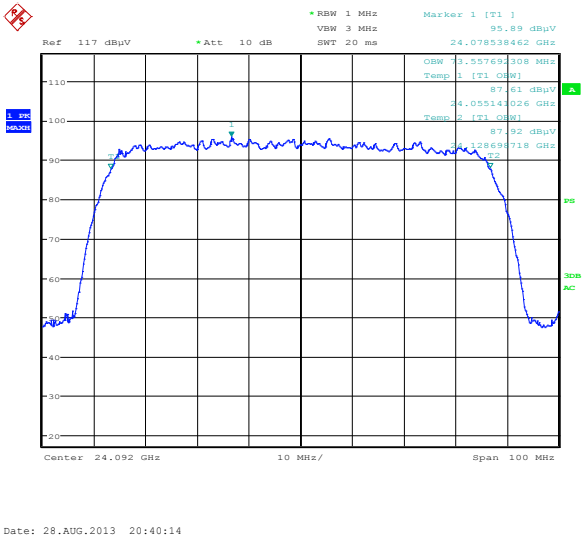
Plot 8.1-1: 99% 3.5 MHz example



Plot 8.1-2: 99% 28 MHz example

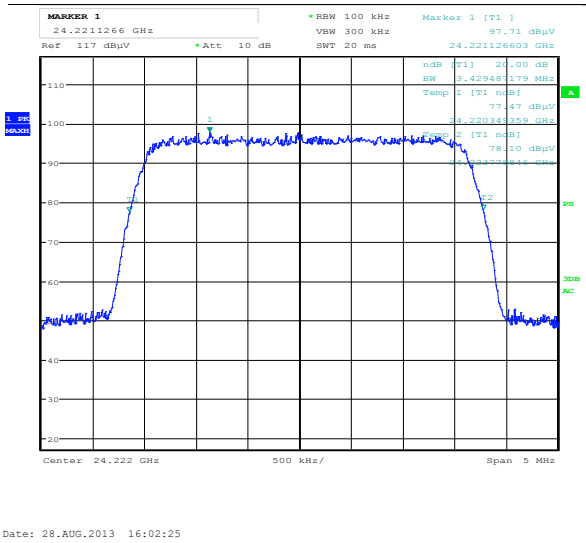


Plot 8.1-3: 99% 40 MHz example

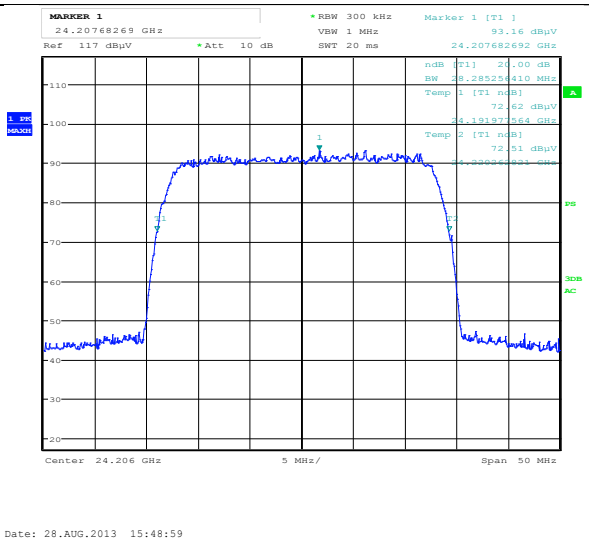


Plot 8.1-4: 99% 80 MHz example

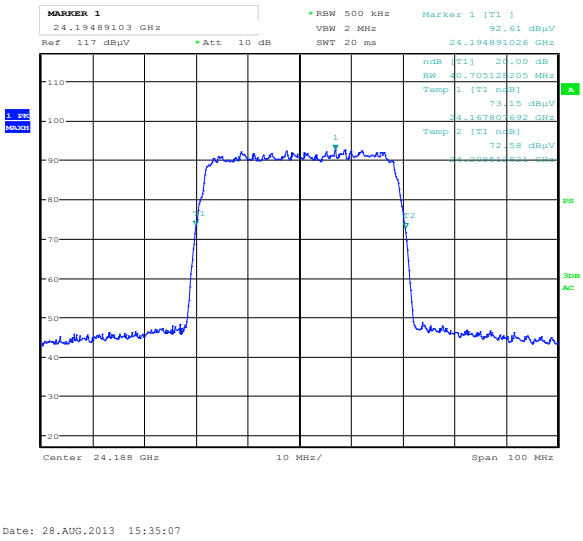
8.1.4 Test data continued



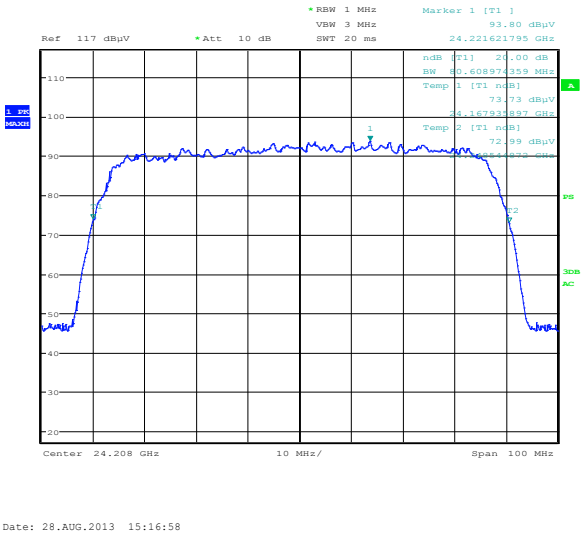
Plot 8.1-5: 20 dB 3.5 MHz example



Plot 8.1-6: 20 dB 28 MHz example



Plot 8.1-7: 20 dB 40 MHz example



Plot 8.1-8: 20 dB 80 MHz example

8.2 Clause 15.249 (b)(2) and RSS-210 A12(b) Frequency Tolerance

8.2.1 Definitions and limits

FCC: The frequency tolerance of the carrier signal shall be maintained within ±0.001% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

IC: The frequency of the carrier is maintained within a tolerance of ±0.001%.

8.2.2 Test summary

Test date:	August 13, 2013	Temperature:	23 °C
Test engineer:	Kevin Rose	Air pressure:	1004 mbar
Verdict:	Pass	Relative humidity:	34 %

8.2.3 Observations/special notes

0.001% of 24.07208006 GHz = 240.72 kHz

8.2.4 Test data

Table 8.2-1: Frequency drift measurement

Test conditions	Frequency, GHz	Offset, Hz	Limit, kHz
+50 °C, Nominal	24.07208006	0	240.72
+20 °C, +15 %	24.07208013	70	240.72
+20 °C, Nominal	24.07208006	Reference	
+20 °C, −15 %	24.07208013	70	240.72
−20 °C, Nominal	24.07208013	70	240.72

8.3 FCC Clause 15.249(b)(1) RSS-210 A12 (a) Field strength of emissions not in restricted bands

8.3.1 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 8.3-1: FCC Field strength limits

Fundamental frequency (MHz)	Field strength of fundamental (mV/m)	(dBµV/m)	Field strength of spurious emissions (µV/m)	(dBµV/m)
902–928	50	94	500	54
2400–2483.5	50	94	500	54
5725–5875	50	94	500	54
24000.0–24000.25	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.

Table 8.3-2: IC Field strength limits @ 3 meters

Fundamental frequency (GHz)	Field strength of fundamental (V/m)	(dBµV/m)
24.05–24.25	25	148

Table 8.3-3: IC power delivered to the antenna limits

Fundamental frequency (GHz)	Power delivered to the antenna (mW)
24.05–24.25	1

8.3.2 Test summary

Test date:	August 13, 2013	Temperature:	23 °C
Test engineer:	Kevin Rose	Air pressure:	1004 mbar
Verdict:	Pass	Relative humidity:	34 %

8.3.3 Observations/special notes

- The spectrum was searched from 30 MHz to the 100 GHz.
- No emissions were detected within 20 dB of the limit
- 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

Transmit output power was measured while supply voltage was varied from 40.8 VAC to 55.2 VAC (85 % to 115 % of the nominal rated supply voltage). No change in transmit output power was observed.

8.3.4 Test data

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 8.3-4: Field strength measurement results Low Radio

Frequency, GHz	Channel Bandwidth, MHz	1.2 m Antenna, dBµV/m	0.9 m Antenna, dBµV/m	0.6 m Antenna, dBµV/m	0.3 m Antenna, dBµV/m	FCC Limit , dBµV/m	IC Limit , dBµV/m
24.0785	3.5	127.96	127.25	127.24	124.03	128	148
24.0835	7	127.67	127.90	127.14	125.88	128	148
24.0730	14	127.60	127.85	127.90	125.76	128	148
24.0660	28	127.88	127.50	127.69	126.03	128	148
24.0720	40	127.46	127.92	127.92	126.32	128	148
24.0800	56	127.28	127.50	127.75	125.85	128	148
24.0920	80	126.69	127.36	127.90	125.97	128	148

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

Table 8.3-5: Field strength measurement results High Radio

Frequency, GHz	Channel Bandwidth, MHz	1.2 m Antenna, dBµV/m	0.9 m Antenna, dBµV/m	0.6 m Antenna, dBµV/m	0.3 m Antenna, dBµV/m	FCC Limit , dBµV/m	IC Limit , dBµV/m
24.1940	3.5	127.84	127.72	127.41	126.07	128	148
24.2235	7	127.71	127.56	127.68	127.18	128	148
24.2130	14	126.64	127.55	127.63	127.46	128	148
24.2060	28	127.04	127.85	127.97	127.64	128	148
24.1880	40	126.03	127.48	127.35	127.67	128	148
24.2200	56	127.59	127.20	127.35	127.69	128	148
24.2080	80	127.35	127.85	127.39	127.45	128	148

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

8.3.4 Test data continued

Table 8.3-6: IC Conducted output power results low Radio

Frequency, GHz	Channel BW, MHz	1.2 m Antenna, dBµV/m	Limit Margin, dBm	0.9 m Antenna, dBµV/m	Limit Margin, dBm	0.6 m Antenna, dBµV/m	Limit Margin, dBm	0.3 m Antenna, dBµV/m	Limit Margin, dBm	IC, Limit, dBm
24.0785	3.5	127.96	12.27	127.25	10.98	127.24	8.99	124.03	6.20	0
24.0835	7	127.67	12.56	127.90	10.33	127.14	9.09	125.88	4.35	0
24.0730	14	127.60	12.63	127.85	10.38	127.90	8.33	125.76	4.47	0
24.0660	28	127.88	12.35	127.50	10.73	127.69	8.54	126.03	4.20	0
24.0720	40	127.46	12.77	127.92	10.31	127.92	8.31	126.32	3.91	0
24.0800	56	127.28	12.95	127.50	10.73	127.75	8.48	125.85	4.38	0
24.0920	80	126.69	13.54	127.36	10.87	127.90	8.33	125.97	4.26	0

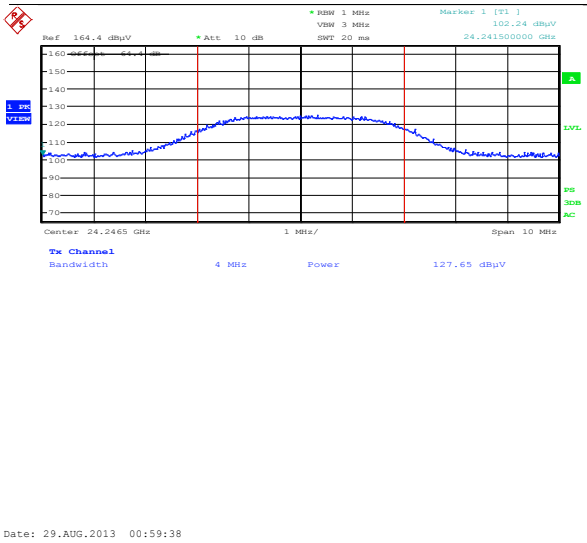
Note: Margin calculations: peak in dBµV/m − 95.23 dB − antenna gain in dBi

Table 8.3-7: IC Conducted output power results High Radio

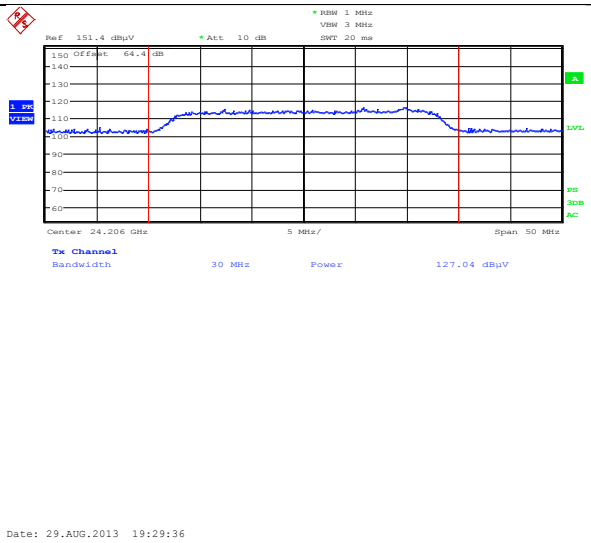
Frequency, GHz	Channel BW, MHz	1.2 m Antenna, dBµV/m	Limit Margin, dBm	0.9 m Antenna, dBµV/m	Limit Margin, dBm	0.6 m Antenna, dBµV/m	Limit Margin, dBm	0.3 m Antenna, dBµV/m	Limit Margin, dBm	IC, Limit, dBm
24.1940	3.5	127.84	12.39	127.72	10.51	127.41	8.82	126.07	4.16	0
24.2235	7	127.71	12.52	127.56	10.67	127.68	8.55	127.18	3.05	0
24.2130	14	126.64	13.59	127.55	10.68	127.63	8.60	127.46	2.77	0
24.2060	28	127.04	13.19	127.85	10.38	127.97	8.26	127.64	2.59	0
24.1880	40	126.03	14.20	127.48	10.75	127.35	8.88	127.67	2.56	0
24.2200	56	127.59	12.64	127.20	11.03	127.35	8.88	127.69	2.54	0
24.2080	80	127.35	12.88	127.85	10.38	127.39	8.84	127.45	2.78	0

Note: Margin calculation: peak in dBµV/m − 95.23 dB − antenna gain in dBi

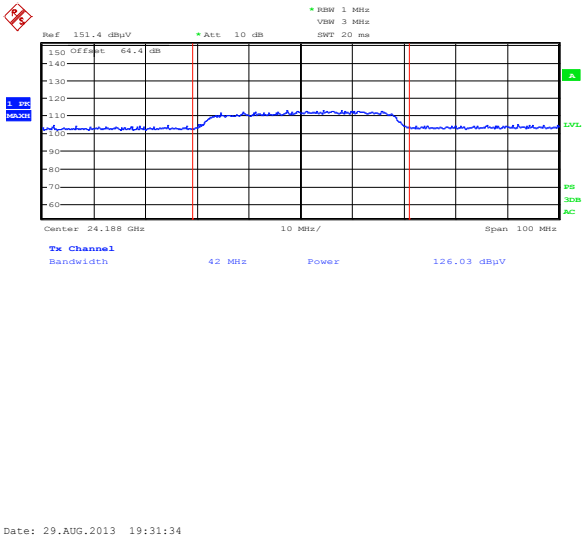
8.3.4 Test data continued



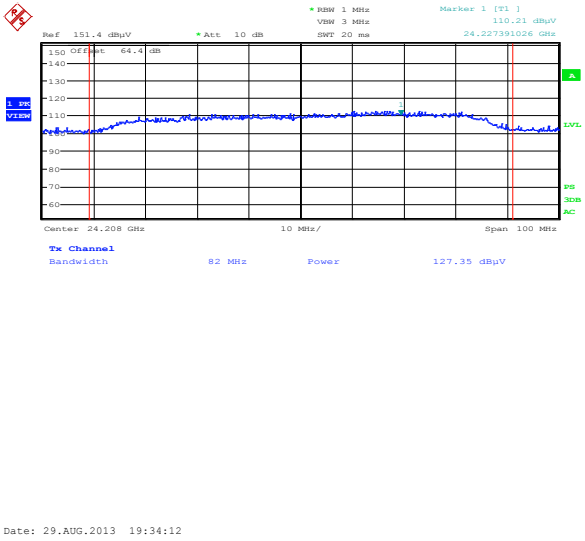
Plot 8.3-1: Peak power 3.5 MHz example



Plot 8.3-2: Peak power 28 MHz example



Plot 8.3-3: Peak power 40 MHz example



Plot 8.3-4: Peak power 80 MHz example

8.4 Clause 15.249(d) and RSS 210 A12 (d) Spurious emissions (except for harmonics)

8.4.1 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 the table below, whichever is the lesser attenuation.

Table 8.4-1: General field strength limits

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009–0.490	2400/F	$67.6-20\times\log_{10}(F)$	300
0.490–1.705	24000/F	$87.6-20\times\log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes:
- 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.

8.4.2 Test summary

Test date:	August 13, 2013	Temperature:	23 °C
Test engineer:	Kevin Rose	Air pressure:	1004 mbar
Verdict:	Pass	Relative humidity:	34 %

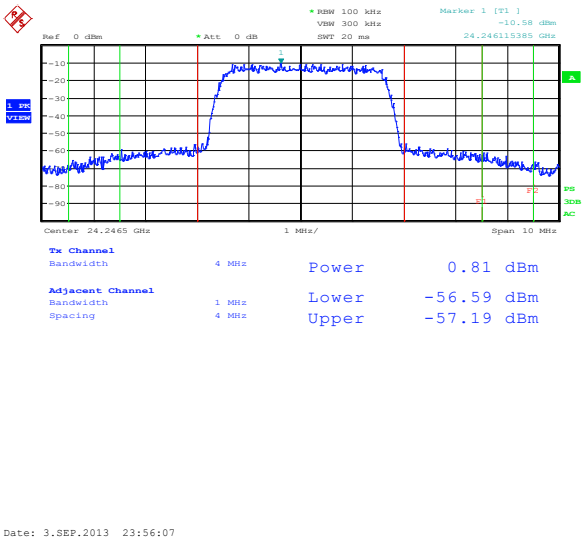
8.4.3 Observations/special notes

- The spectrum was searched from 30 MHz to the 100 GHz. No emissions were detected within 10 dB of the limit.
- All measurements were performed at a distance of 3 m. Emission above 10 GHz were performed at a close distance to achieve lower noise floor.
- All measurements were performed:
- within 30–1000 MHz range: using a peak detector with 100 kHz/300 kHz RBW/VBW,
- above 1 GHz: using peak detector with 1 MHz/3 MHz RBW/VBW for peak results

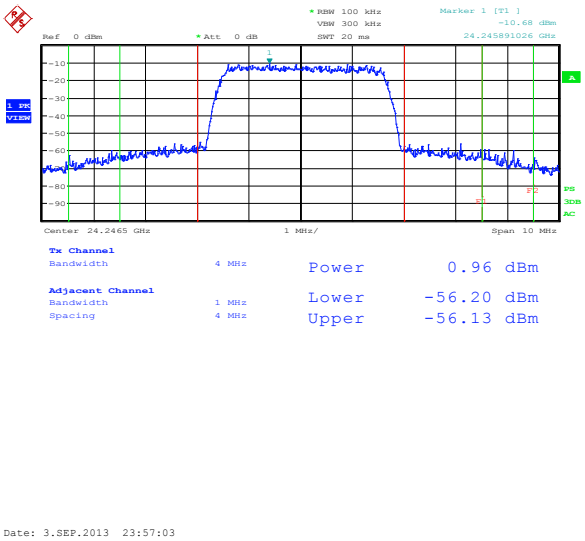
Table 8.4-2: Distance correction factor

Frequency range, GHz	Measurement Distance, m	Correction Factor, dB
0.03–10	3	0
10–18	1	10.5
18–40	0.3	20
40–100	0.03	40

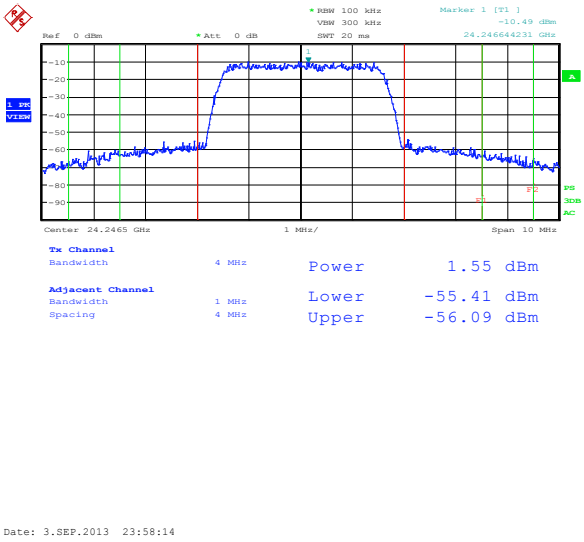
8.4.4 Test data



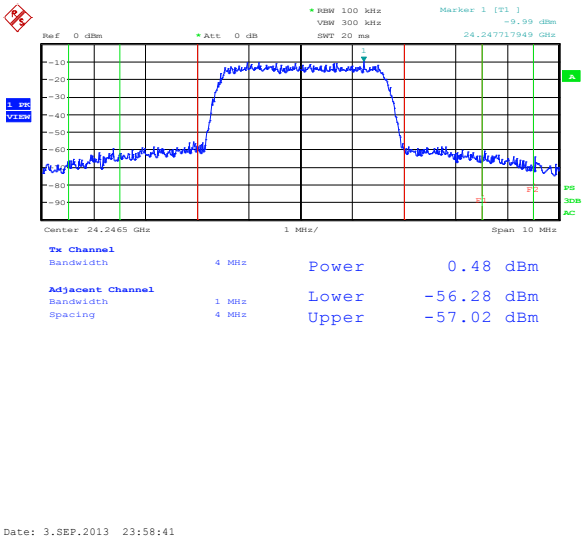
Plot 8.4-1: -50 dBc 3.5 MHz QPSK upper band edge



Plot 8.4-2: -50 dBc 3.5 MHz 8PSK upper band edge

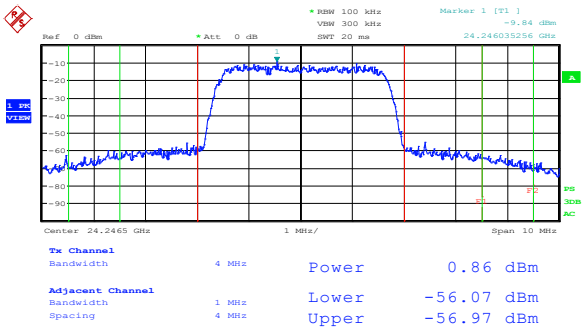


Plot 8.4-3: -50 dBc 3.5 MHz 16QAM upper band edge



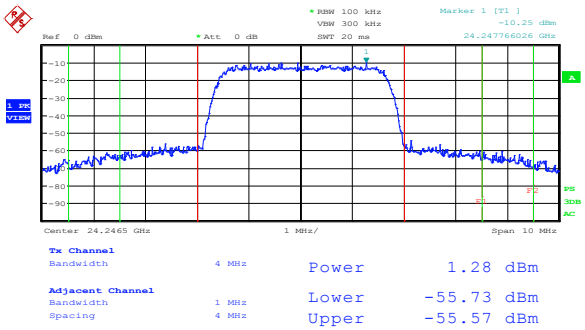
Plot 8.4-4: -50 dBc 3.5 MHz 32QAM upper band edge

8.4.4 Test data continued



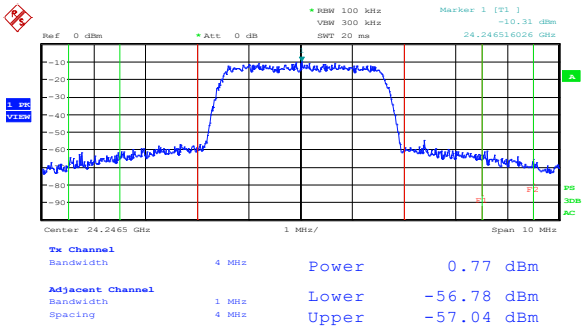
Date: 3.SEP.2013 23:59:04

Plot 8.4-5: -50 dBc 3.5 MHz 64QAM upper band edge



Date: 3.SEP.2013 23:59:29

Plot 8.4-6: -50 dBc 3.5 MHz 128QAM upper band edge



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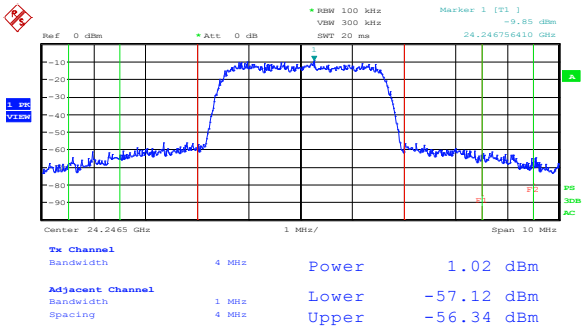
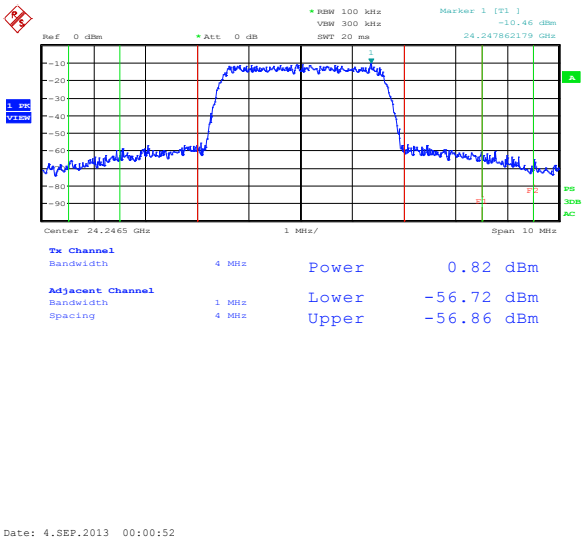
Plot 8.4-7: -50 dBc 3.5 MHz 256QAM upper band edge



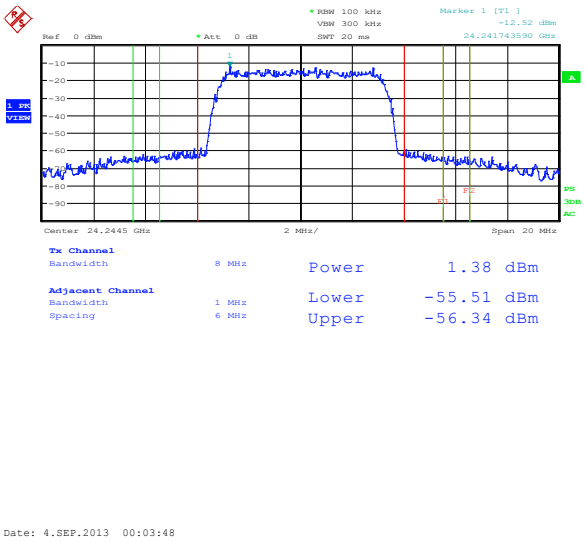
Date: 4.SEP.2013 00:00:23

Plot 8.4-8: -50 dBc 3.5 MHz 512QAM upper band edge

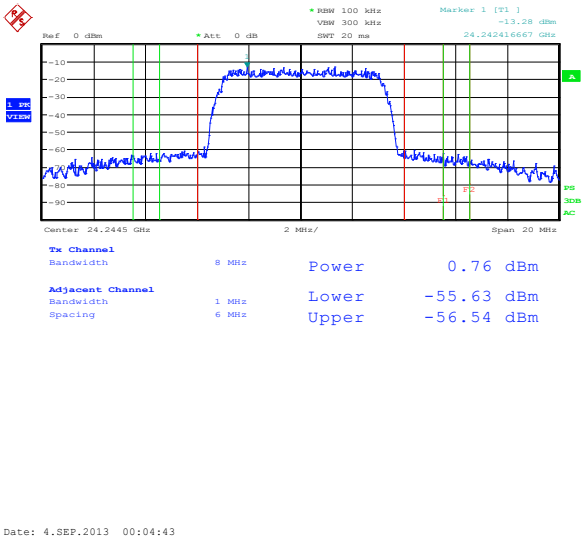
8.4.4 Test data continued



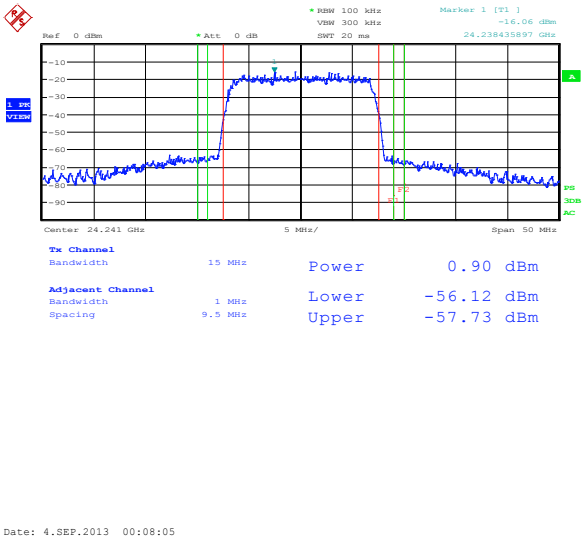
Plot 8.4-9: -50 dBc 3.5 MHz 1024QAM upper band edge



Plot 8.4-10: -50 dBc 7 MHz QPSK upper band edge

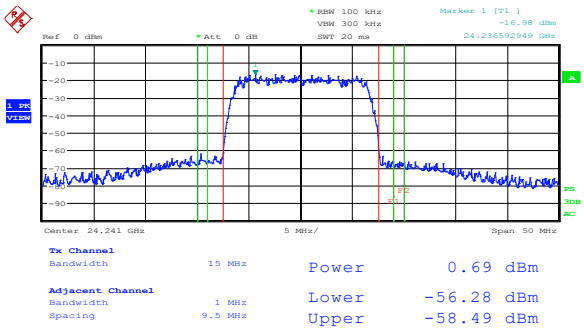


Plot 8.4-11: -50 dBc 7 MHz 1024QAM upper band edge



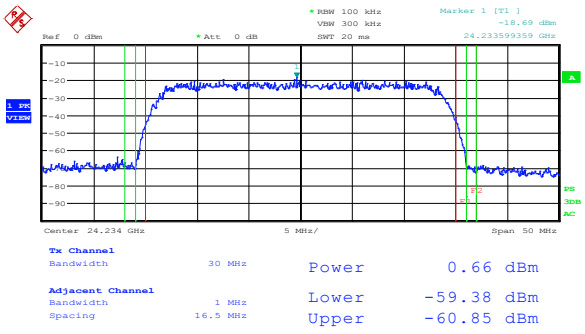
Plot 8.4-12: -50 dBc 14 MHz QPSK upper band edge

8.4.4 Test data continued



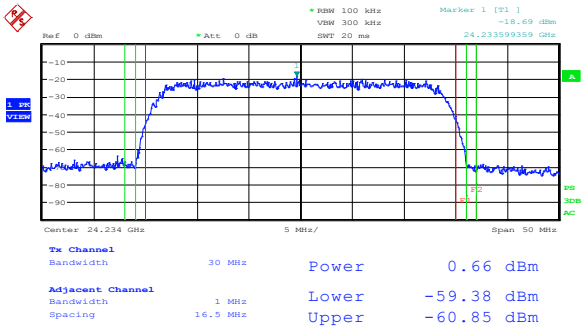
Date: 4.SEP.2013 00:07:19

Plot 8.4-13: -50 dBc 14 MHz 1024QAM upper band edge



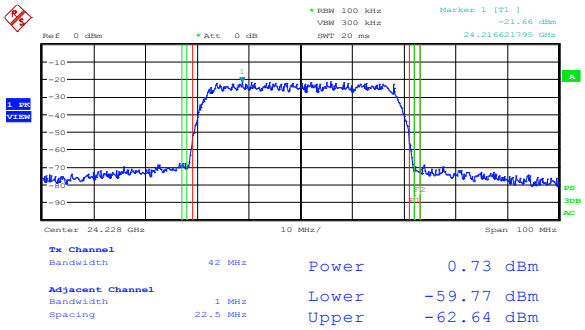
Date: 4.SEP.2013 00:10:09

Plot 8.4-14: -50 dBc 28 MHz QPSK upper band edge



Date: 4.SEP.2013 00:10:38

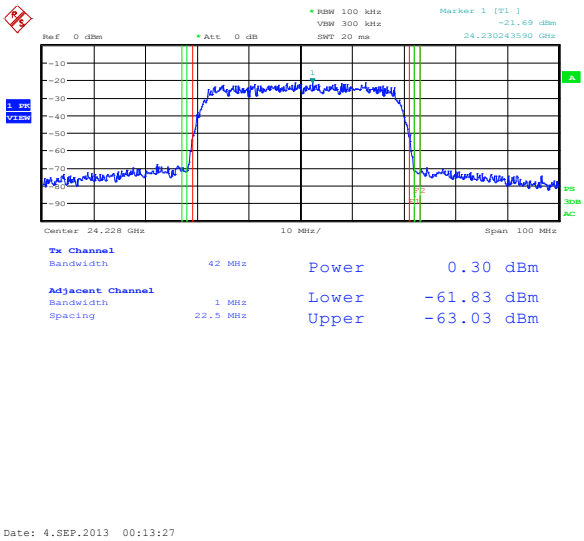
Plot 8.4-15: -50 dBc 28 MHz 1024QAM upper band edge



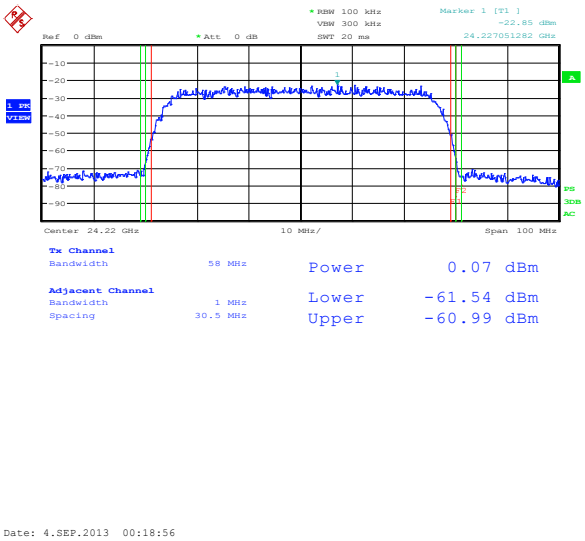
Date: 4.SEP.2013 00:14:10

Plot 8.4-16: -50 dBc 40 MHz QPSK upper band edge

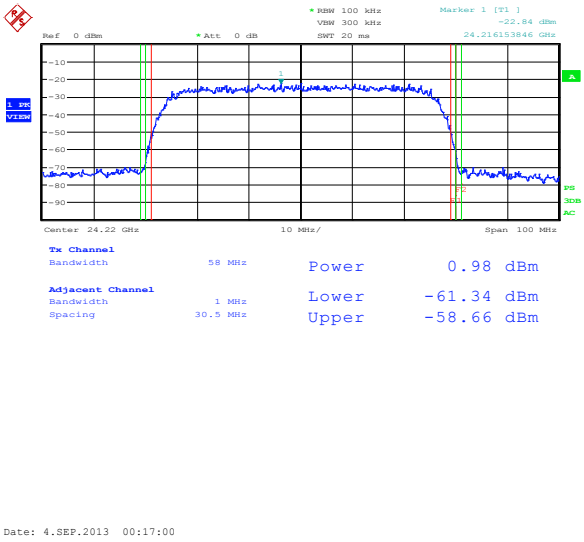
8.4.4 Test data continued



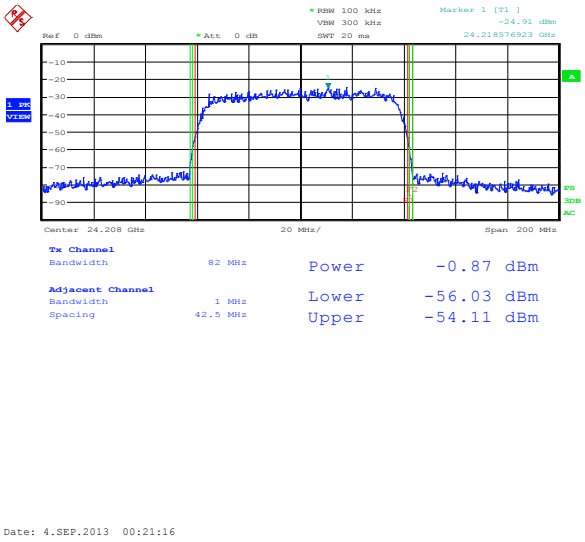
Plot 8.4-17: -50 dBc 40 MHz 1024QAM upper band edge



Plot 8.4-18: -50 dBc 56 MHz QPSK upper band edge

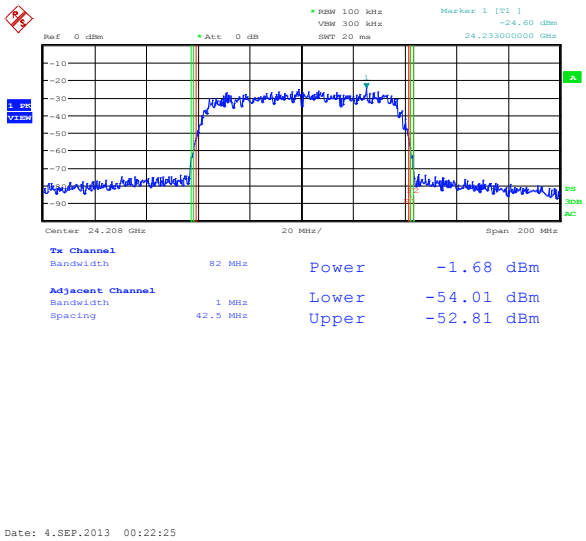


Plot 8.4-19: -50 dBc 56 MHz 1024QAM upper band edge

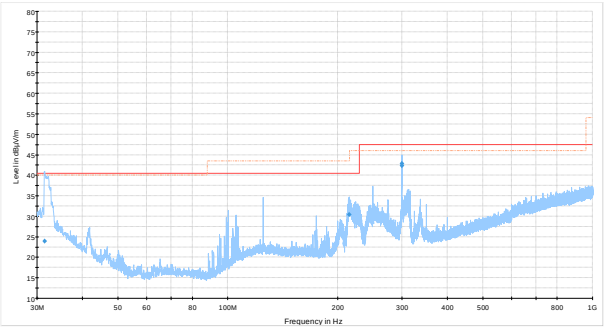


Plot 8.4-20: -50 dBc 80 MHz QPSK upper band edge

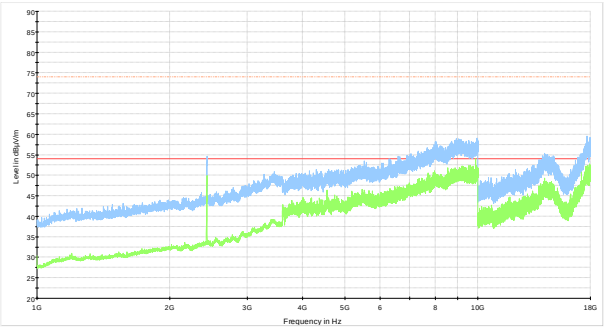
8.4.4 Test data continued



Plot 8.4-21: -50 dBc 80 MHz 1024QAM upper band edge

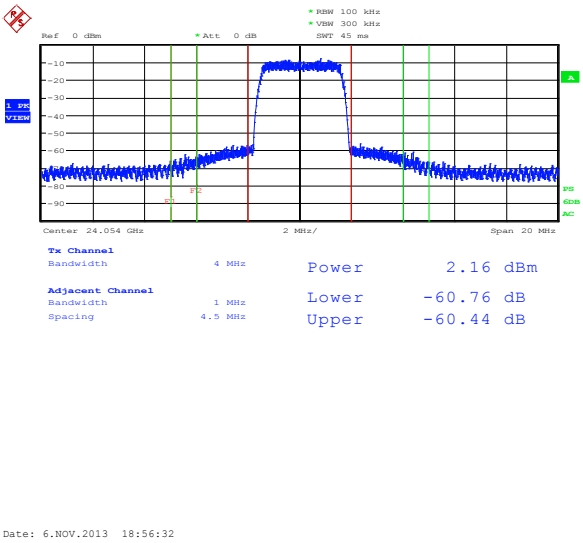


Plot 8.4-22: 30–1000 MHz Spurious

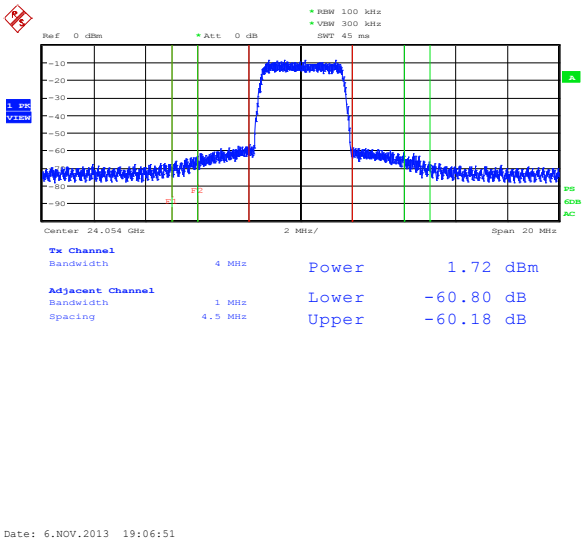


Plot 8.4-23: 1–18 GHz Spurious

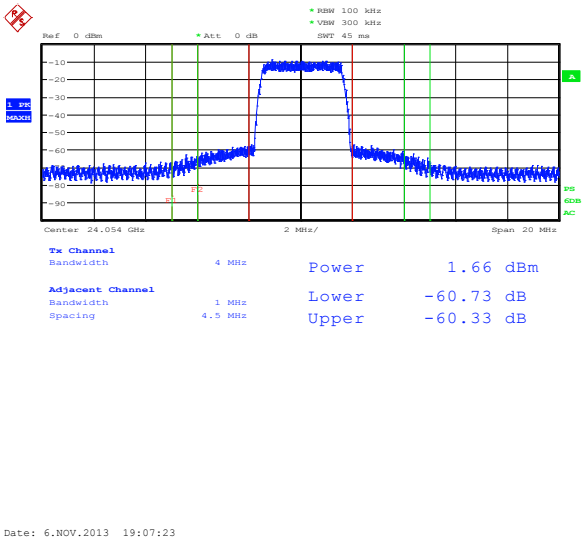
8.4.4 Test data



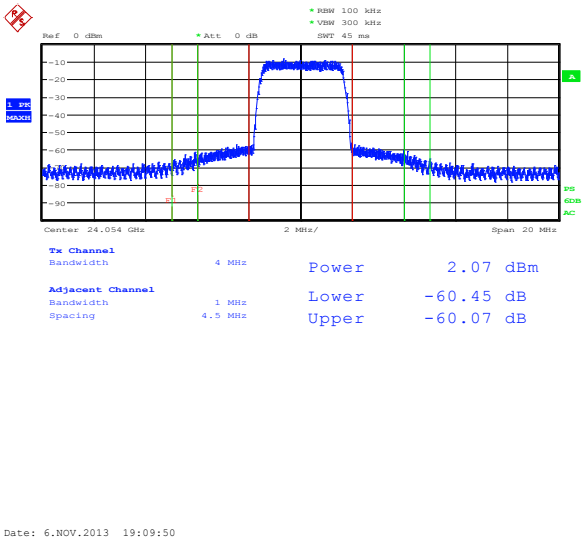
Plot 8.4-24: -50 dBc 3.5 MHz QPSK Lower bandedge



Plot 8.4-25: -50 dBc 3.5 MHz 8PSK Lower bandedge

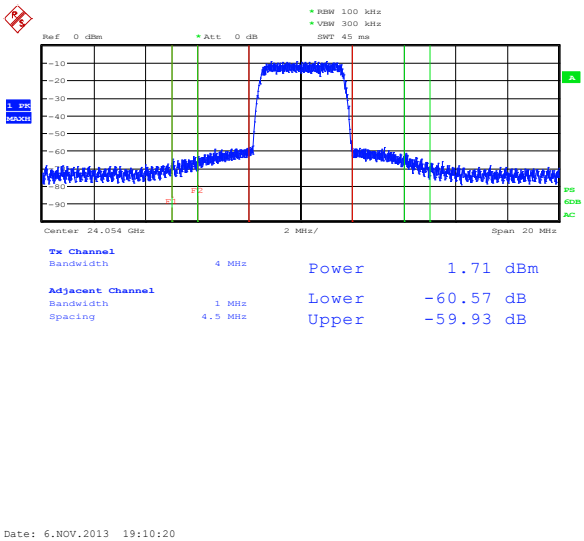


Plot 8.4-26: -50 dBc 3.5 MHz 16QAM Lower bandedge

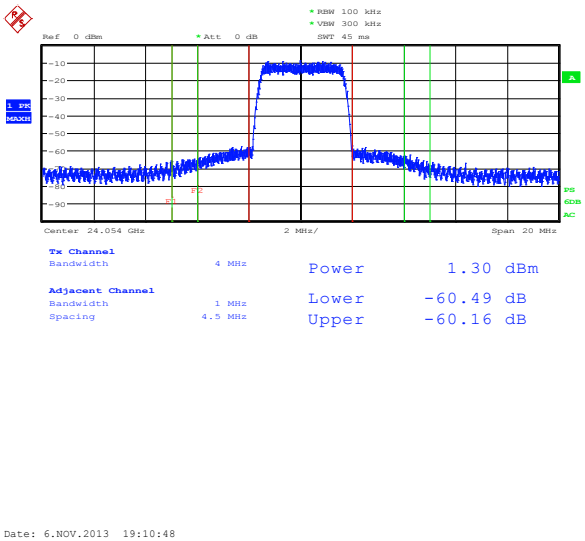


Plot 8.4-27: -50 dBc 3.5 MHz 32QAM Lower bandedge

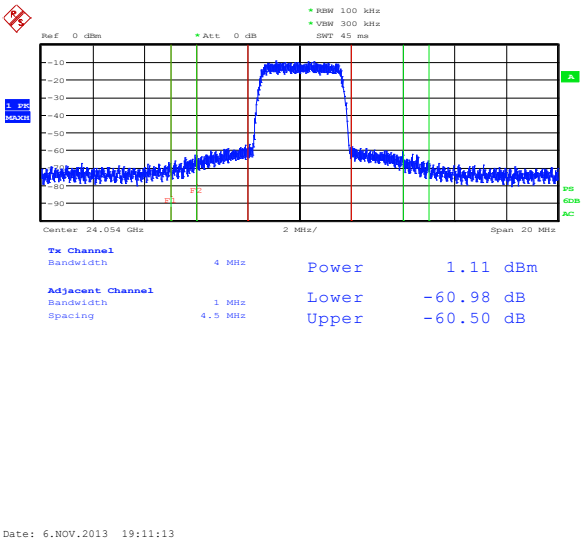
8.4.4 Test data continued



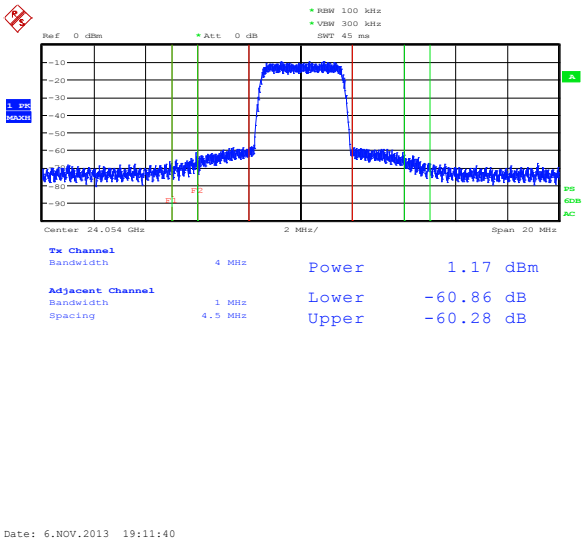
Plot 8.4-28: -50 dBc 3.5 MHz 64QAM Lower band edge



Plot 8.4-29: -50 dBc 3.5 MHz 128QAM Lower band edge

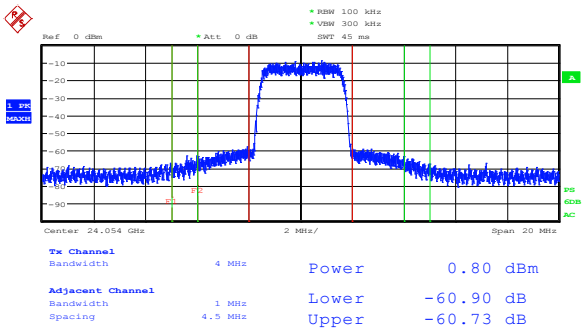


Plot 8.4-30: -50 dBc 3.5 MHz 256QAM Lower band edge



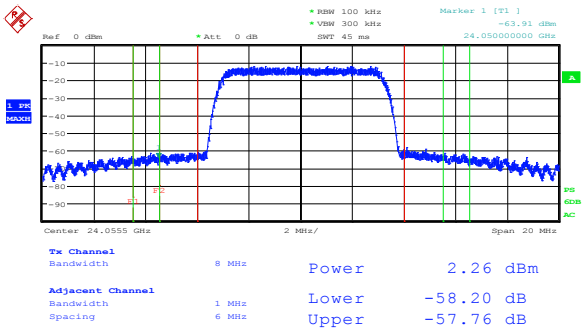
Plot 8.4-31: -50 dBc 3.5 MHz 512QAM Lower band edge

8.4.4 Test data continued



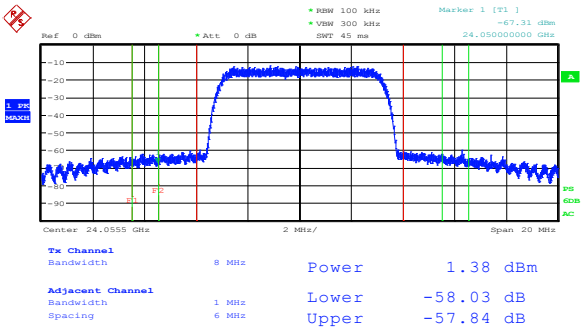
Date: 6.NOV.2013 19:12:08

Plot 8.4-32: -50 dBc 3.5 MHz 1024QAM Lower band edge



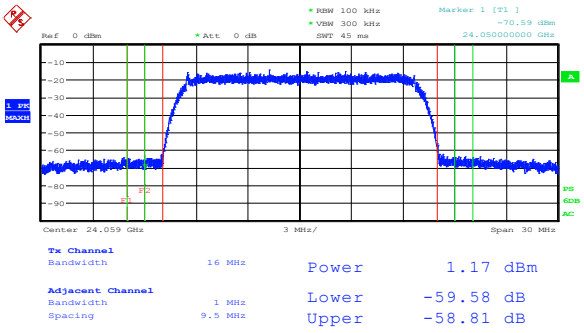
Date: 6.NOV.2013 19:14:54

Plot 8.4-33: -50 dBc 7 MHz QPSK Lower band edge



Date: 6.NOV.2013 19:15:58

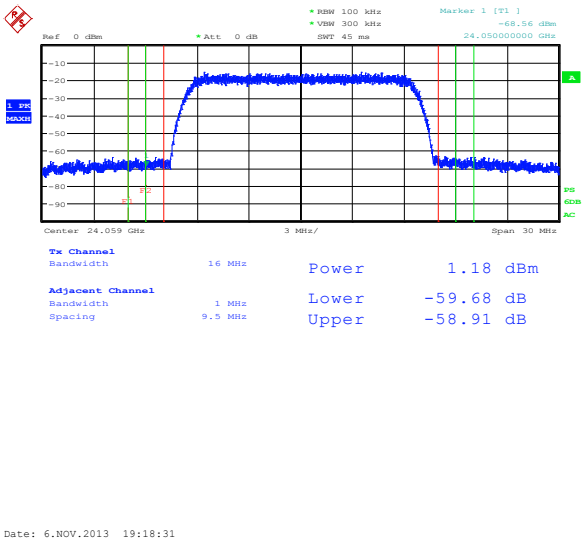
Plot 8.4-34: -50 dBc 7 MHz 1024QAM Lower bandedge



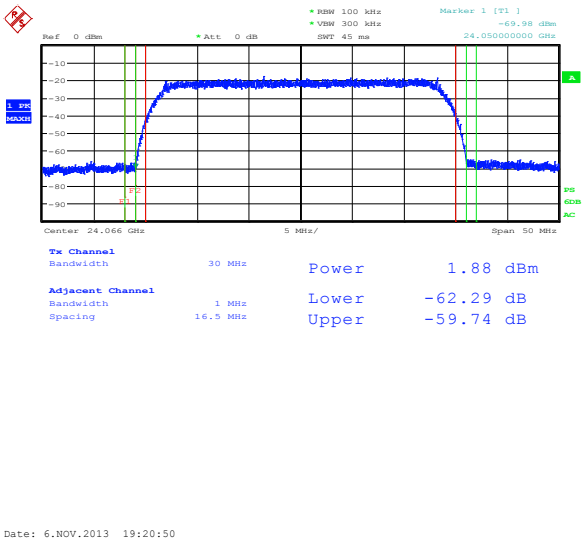
Date: 6.NOV.2013 19:19:06

Plot 8.4-35: -50 dBc 14 MHz QPSK Lower bandedge

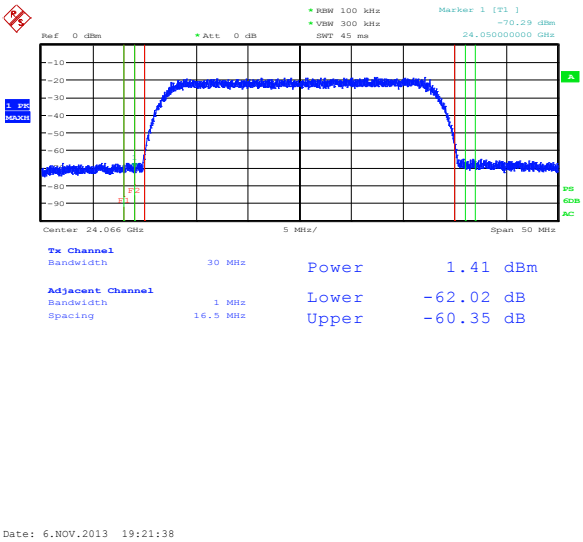
8.4.4 Test data continued



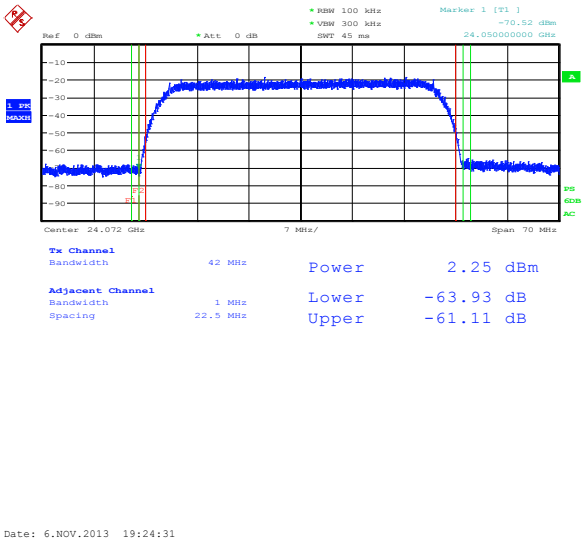
Plot 8.4-36: -50 dBc 14 MHz 1024QAM Lower band edge



Plot 8.4-37: -50 dBc 28 MHz QPSK Lower band edge

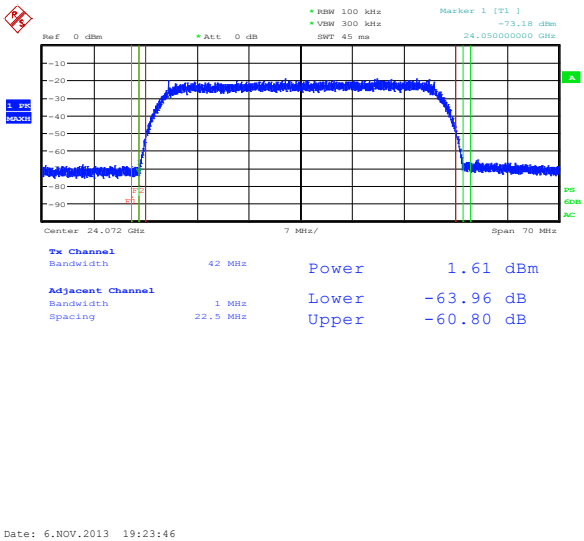


Plot 8.4-38: -50 dBc 28 MHz 1024QAM Lower band edge

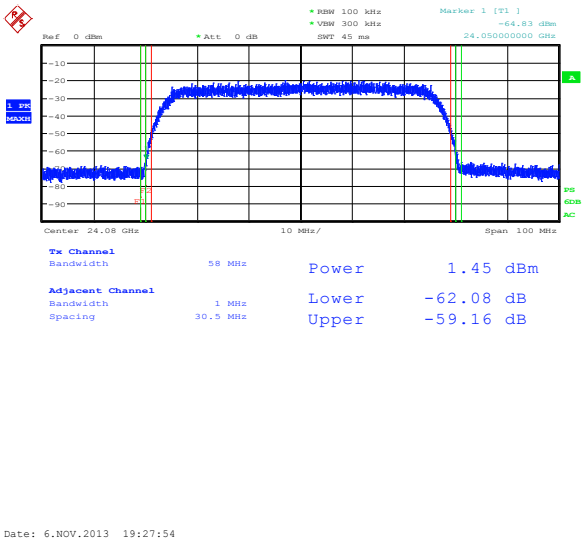


Plot 8.4-39: -50 dBc 40 MHz QPSK Lower band edge

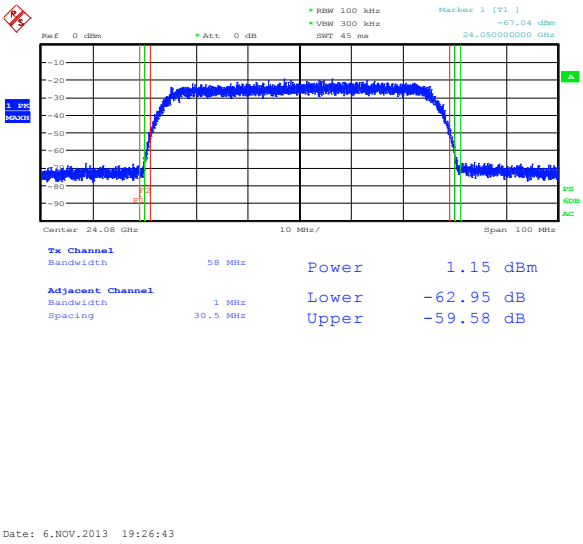
8.4.4 Test data continued



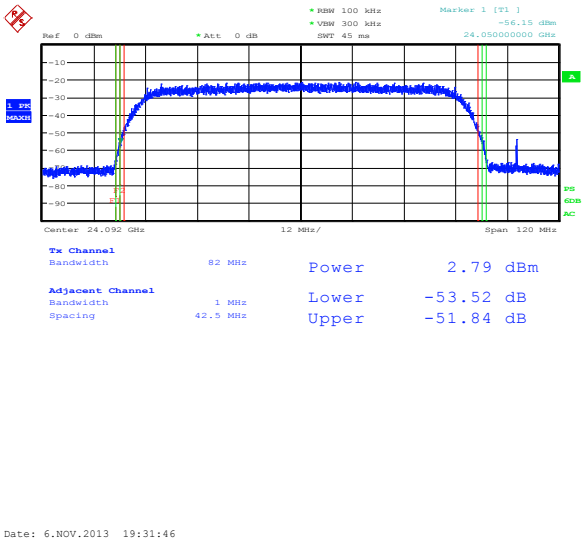
Plot 8.4-40: -50 dBc 40 MHz 1024QAM Lower band edge



Plot 8.4-41: -50 dBc 56 MHz QPSK Lower band edge

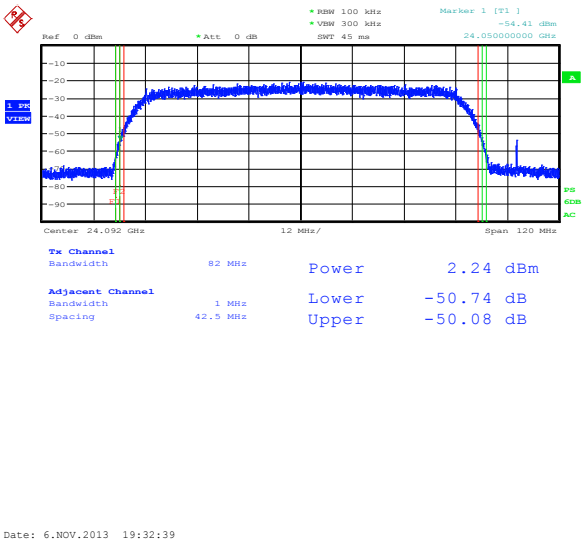


Plot 8.4-42: -50 dBc 56 MHz 1024QAM Lower band edge



Plot 8.4-43: -50 dBc 80 MHz QPSK Lower band edge

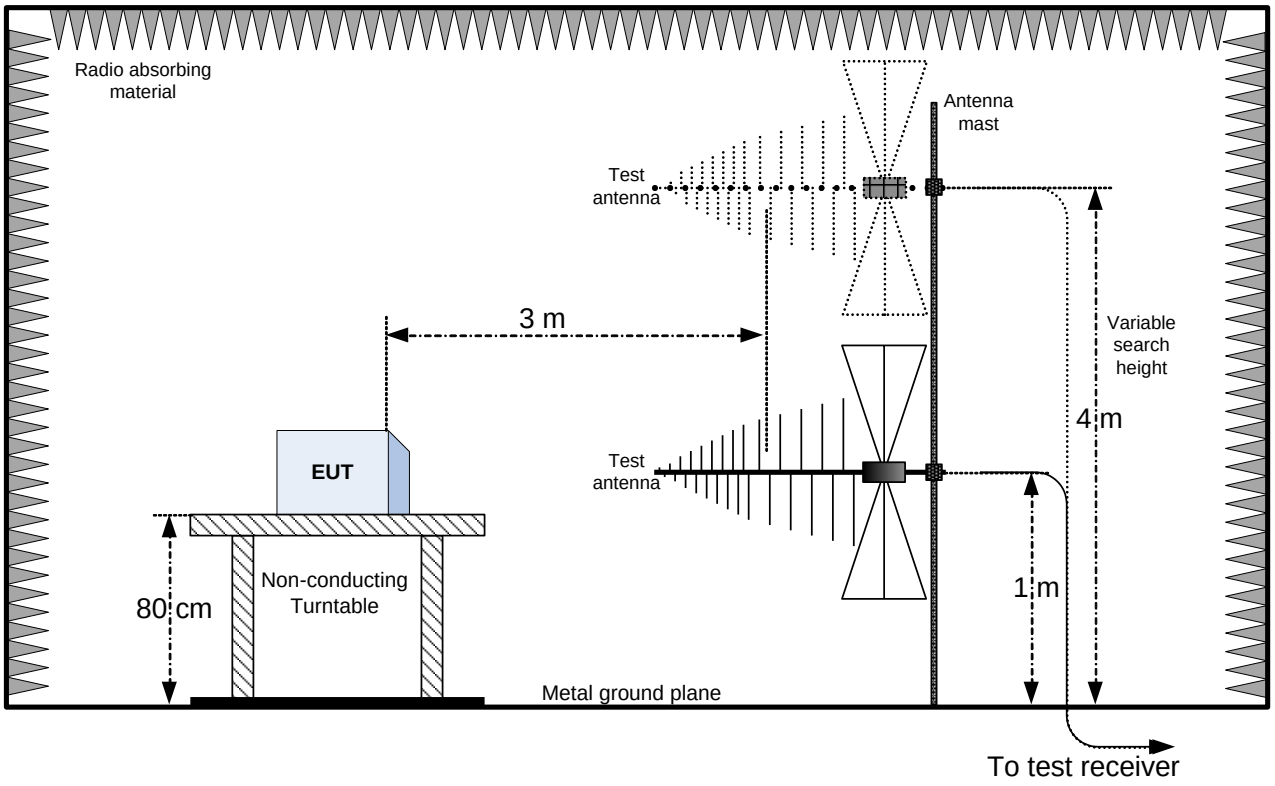
8.4.4 Test data continued



Plot 8.4-44: -50 dBc 80 MHz 1024QAM Lower band edge

Section 9 Block Figures of test set-ups

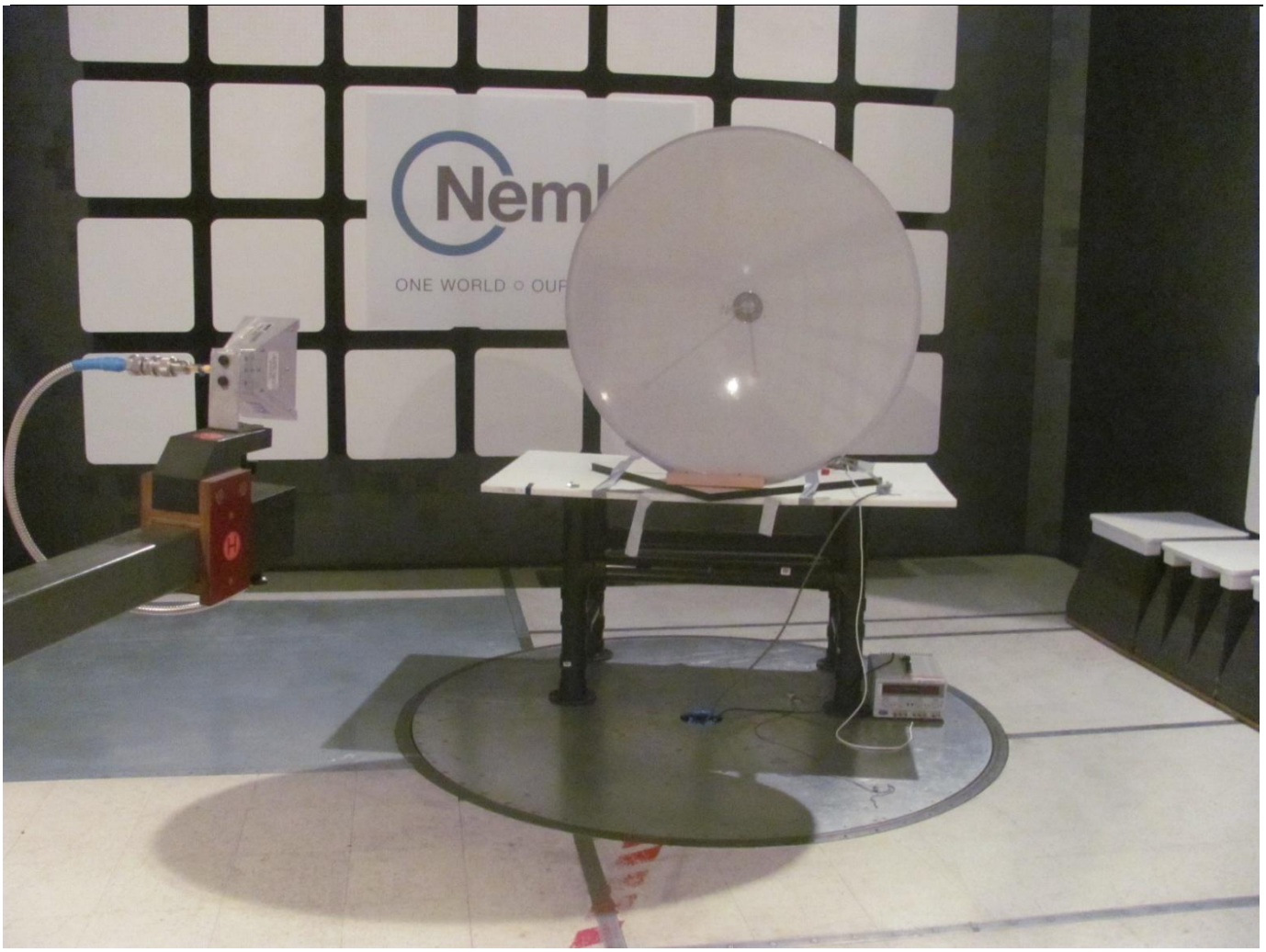
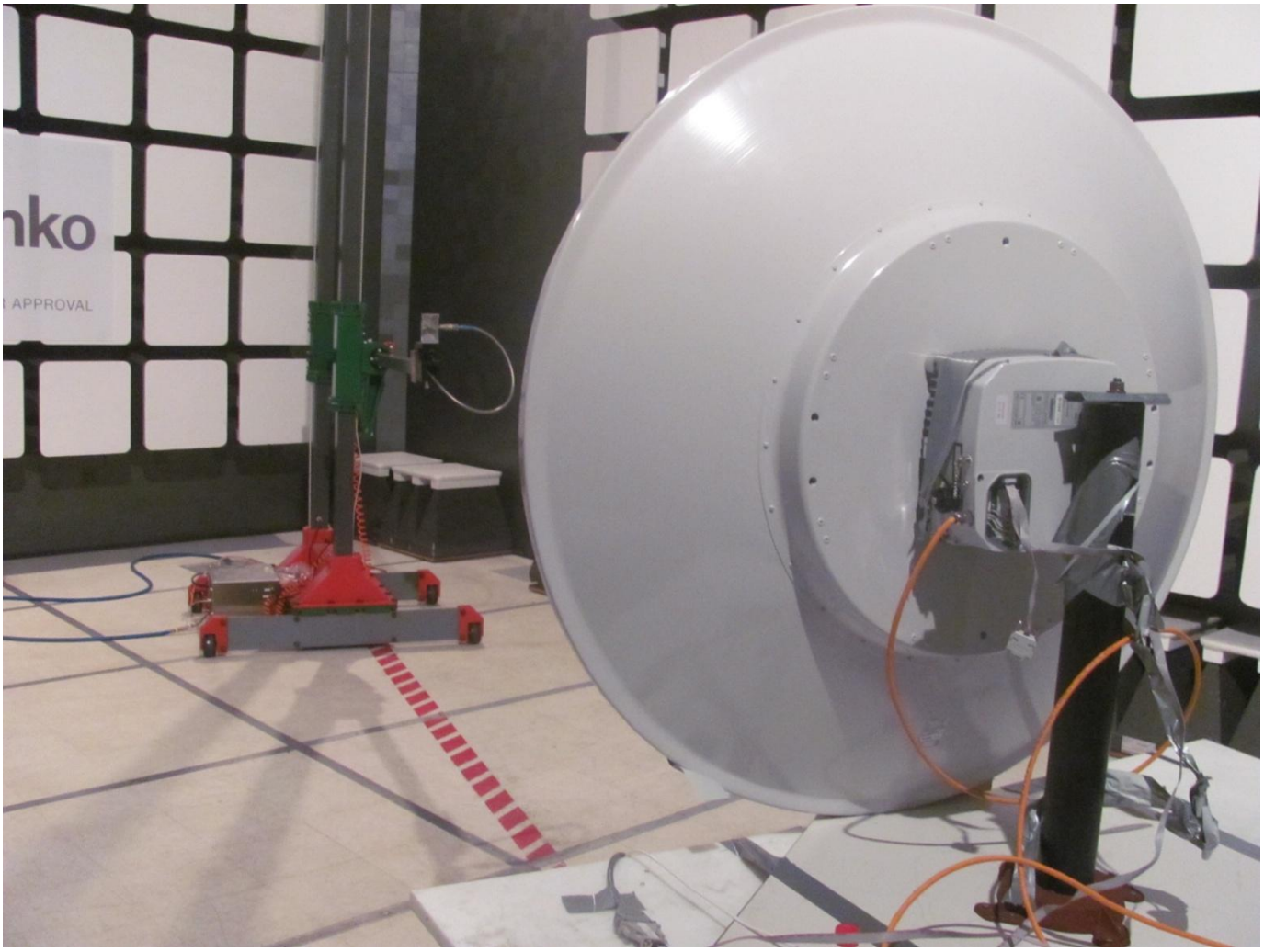
9.1 Radiated emissions set-up



Section 10 EUT photos

10.1 External photos

10.1.1 EUT front view



10.1.2 EUT rear view