

Test report

319271-2TRFWL

Date of issue: February 7, 2017

Applicant:

Redline Communications

Product:

Broad-band wireless infrastructure product

Model:

RDL-3100-RMA

FCC ID:

QC8-RDL3100RMA

Specifications:

◆ **FCC 47 CFR Part 15 Subpart E, §15.407**

Unlicensed National Information Infrastructure Devices

Test location

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

Tested by	Andrey Adelberg, Senior Wireless/EMC Specialist
Reviewed by	Kevin Rose, Wireless/EMC Specialist
Review date	February 7, 2017
Reviewer signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Redline Communications
Address	302 Town Center Blvd.
City	Markham
Province/State	Ontario
Postal/Zip code	L3R 0E8
Country	Canada

1.2 Test specifications

FCC 47 CFR Part 15, Subpart E, Clause 15.407	Unlicensed National Information Infrastructure Devices
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1.3 Test methods

789033 D02 General U-NII Test Procedures New Rules v01r03 (August 22, 2016)	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
662911 D01 Multiple Transmitter Output v02r01 (October 31, 2013)	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
662911 D02 MIMO with Cross Polarized Antenna v01 (October 25, 2011)	Emissions testing of transmitters with multiple outputs in the same band (MIMO) with Cross Polarized Antenna
ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was 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

Section 2. Summary of test results

2.1 FCC Part 15 Subpart C, general requirements test results

Part	Test description	Verdict
§15.31(e)	Variation of power source	Pass ¹
§15.203	Antenna requirement	Pass ²

Notes: ¹Measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, was performed with the supply voltage varied between 85 % and 115 % of the nominal rated supply voltage. No noticeable output power variation was observed

²The EUT is professionally installed equipment.

2.2 FCC Part 15 Subpart E, test results

Part	Test description	Verdict
§15.403(i)	Emission bandwidth	Not applicable
§15.407(a)(1)	Power and density limits within 5.15–5.25 GHz band	Pass
§15.407(a)(2)	Power and density limits within 5.25–5.35 GHz and 5.47–5.725 GHz bands	Not applicable
§15.407(a)(3)	Power and density limits within 5.725–5.85 GHz band	Not applicable
§15.407(b)(1)	Undesirable emission limits for 5.15–5.25 GHz band	Pass
§15.407(b)(2)	Undesirable emission limits for 5.25–5.35 GHz band	Not applicable
§15.407(b)(3)	Undesirable emission limits for 5.47–5.725 GHz bands	Not applicable
§15.407(b)(4)	Undesirable emission limits for 5.725–5.85 GHz band	Not applicable
§15.407(b)(6)	Conducted limits for U-NII devices using an AC power line	Pass
§15.407(e)	Minimum 6 dB bandwidth of U-NII devices within the 5.725–5.85 GHz band	Not applicable
§15.407(g)	Frequency stability	Pass
§15.407(h)(1) ¹	Transmit power control (TPC)	Not applicable
§15.407(h)(2) ¹	Dynamic Frequency Selection (DFS)	Not applicable

Note: ¹DFS and TPC requirements are only applicable to 5.25–5.35 GHz and 5.47–5.725 GHz bands

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	November 1, 2016
Nemko sample ID number	133-002803

3.2 EUT information

Product name	Broad-band wireless infrastructure product
Model	RDL-3100-RMA
Serial number	318SC16300082

3.3 Technical information

Frequency band	5150–5250 MHz
Frequency Min (MHz)	5160 (10 MHz channel); 5170 (20 MHz channel); 5170 (40 MHz channel)
Frequency Max (MHz)	5245 (10 MHz channel); 5240 (20 MHz channel); 5230 (40 MHz channel)
Measured BW (MHz) (26 dB)	9.55 (10 MHz channel); 19.31 (20 MHz channel); 38.78 (40 MHz channel)
Type of modulation	OFDM using 256-QAM, 128-QAM, 64-QAM, 16-QAM, QPSK and BPSK modulation for sub-carriers
Emission classification (F1D, G1D, D1D)	W7D
Transmitter spurious, Units @ distance	65.20 dBμV/m at 10.49 GHz
Power requirements	48 V _{DC} PoE via 120 V _{AC} , 60 Hz
Antenna information	10 dBi L-COM HG5158DP-10U, L-COM 24 dBi Dual Polarization Antenna 4.9–6.1 GHz, Redline 30-00362-00 32 dBi Redline A3FT3204LTPD Parabolic Antenna, 4.9–5.8 GHz, 4 degree, dual polarity The EUT is professionally installed.

3.4 Product description and theory of operation

The EUT is a 2x2 MIMO point-to-multipoint (PMP) carrier grade broadband wireless infrastructure product, designed to operate outdoors in the 5150–5250 MHz band.

3.5 EUT exercise details

The EUT was controlled to transmit at desired frequency and modulation from laptop using web interface at IP address: 192.168.25.2

3.6 EUT setup diagram

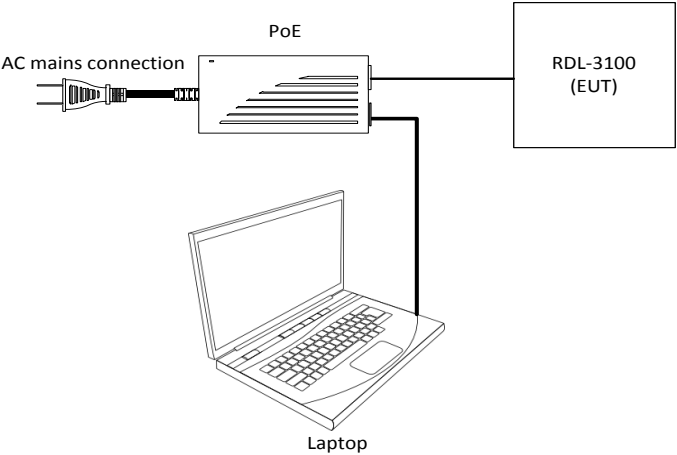


Figure 3.6-1: Setup diagram

3.7 EUT sub assemblies

Table 3.7-1: EUT sub assemblies

Description	Brand name	Model/Part number	Serial number
PoE	Cincon Electronics Co.	TRG60A-POE-L	1127

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 $\pm 5\%$, 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

Table 7.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	Dec. 01/16
Flush mount turntable	Sunol	FM2022	FA002082	—	NCR
Controller	Sunol	SC104V	FA002060	—	NCR
Antenna mast	Sunol	TLT2	FA002061	—	NCR
AC Power source	Chenwa	2700M-10k	FA002716	—	VOU
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Jan. 07/17
Spectrum analyzer	Rohde & Schwarz	FSU	FA001877	1 year	Apr. 15/17
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	Apr. 28/17
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1 year	Apr. 26/17
Horn antenna 18–40 GHz	EMCO	3116	FA001847	1 year	Apr. 15/17
Pre-amplifier (1–18 GHz)	JCA	JCA118-503	FA002091	1 year	April 26/17
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	—	VOU
Pre-amplifier (26–40 GHz)	Narda	DBL-2640N610	FA001556	—	VOU
LISN	Rohde & Schwarz	ENV216	FA002023	1 year	Mar. 08/17
Power meter	Agilent	N1911A	FA001946	1 year	Apr. 07/17
Power sensor	Agilent	N1922A	FA001947	1 year	Apr. 08/17
Temperature chamber	Espec	EPX-4H	FA002735	1 year	Jan 26/17

Note: NCR - no calibration required, VOU - verify on use

Section 8. Testing data

8.1 FCC 15.403(i) Emission bandwidth

8.1.1 Definitions and limits

For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

8.1.2 Test summary

Test date	November 4, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1008 mbar
Verdict	Pass	Relative humidity	32 %

8.1.3 Observations, settings and special notes

Spectrum analyser settings:

Resolution bandwidth	approximately 1% of the span
Video bandwidth	> RBW
Detector mode	Peak
Trace mode	Max Hold

8.1.4 Test data

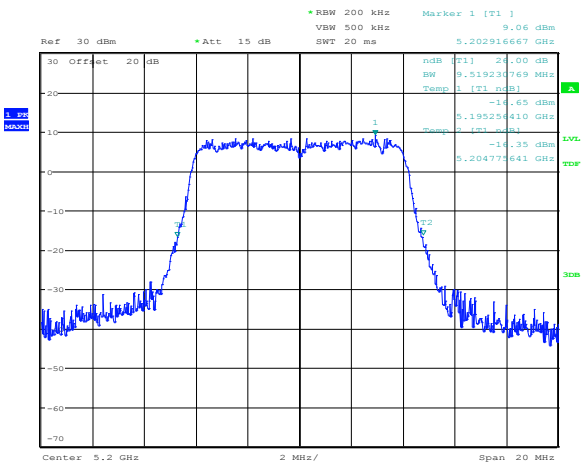
Table 8.1-1: Channel names description

Channel name	10-MHz channel	20-MHz channel	40-MHz channel
Low	5160.0	5170.0	5170.0
Mid	5200.0	5200.0	5200.0
High	5245.0	5240.0	5230.0

Table 8.1-2: 26 dB bandwidth results (in MHz)

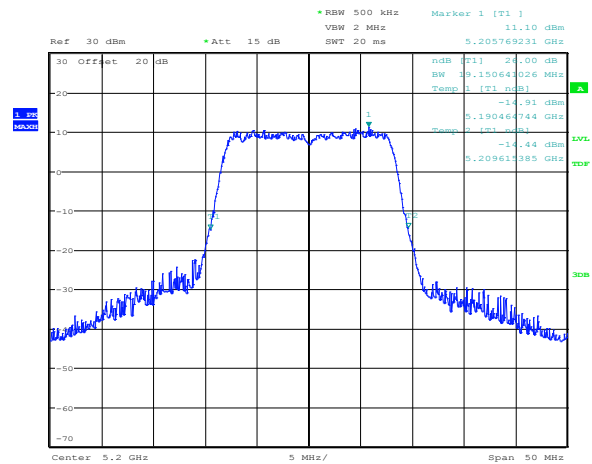
Modulation	Channel	10-MHz channel	20-MHz channel	40-MHz channel
BPSK	Low	9.49	19.15	38.46
	Mid	9.55	19.07	38.62
	High	9.49	19.15	38.46
256-QAM	Low	9.49	19.15	38.46
	Mid	9.52	19.15	38.78
	High	9.52	19.31	38.62

8.1.4 Test data, continued



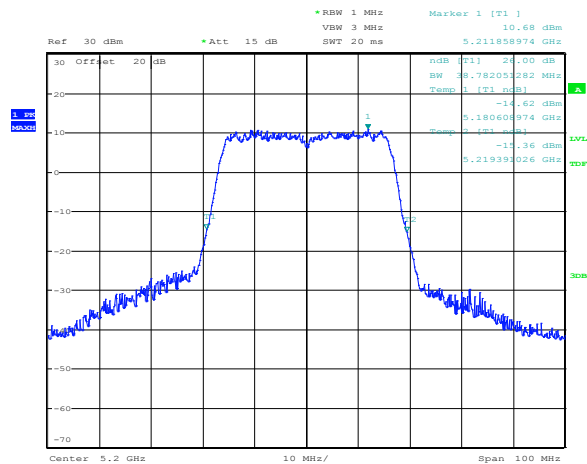
Date: 4.NOV.2016 10:05:35

Figure 8.1-1: 26 dB bandwidth of the 10 MHz channel, sample plot



Date: 4.NOV.2016 10:10:21

Figure 8.1-2: 26 dB bandwidth of the 20 MHz channel, sample plot



Date: 4.NOV.2016 10:13:08

Figure 8.1-3: 26 dB bandwidth of the 40 MHz channel, sample plot

8.2 FCC 15.407(a)(1) 5.15–5.25 GHz band output power and spectral density limits

8.2.1 Definitions and limits

- (i) For an outdoor access point operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30 dBm) provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

- (ii) For an indoor access point operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30 dBm) provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

- (iii) For fixed point-to-point access points operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30 dBm). In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

- (iv) For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24 dBm) provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.2.2 Test summary

Test date:	November 19, 2016	Temperature:	22 °C
Test engineer:	Andrey Adelberg	Air pressure:	1007 mbar
Verdict:	Pass	Relative humidity:	31 %

8.2.3 Observations, settings and special notes

As per manufacturer declaration, radio module RDL-3100 when operates in MIMO A (STBC/STC) mode or MIMO B (spatial multiplexing) modes, the only modes in which it transmits from both antennas, the transmitter output signals are completely uncorrelated.

Output power was tested using RMS power meter.
Spectrum analyzer settings for PSD measurement:

Resolution bandwidth	1 MHz
Video bandwidth	10 MHz
Frequency span	20 MHz (for 10 MHz channel), 50 MHz (for 20 MHz channel), 70 MHz (for 40 MHz channel)
Detector mode	RMS with video triggering on full power pulses
Trace mode	Power Averaging over 100 sweeps

Combined average output power was calculated as follows: $P_{combined} = 10 \times \log_{10} \left((10^{P_{cho}/10}) + (10^{P_{ch1}/10}) \right)$

EIRP was calculated as follows: $EIRP = P_{combined} + \text{antenna gain}$

Combined PPSD was calculated as follows: $PPSD_{combined} = 10 \times \log_{10} \left((10^{PSD_{cho}/10}) + (10^{PSD_{ch1}/10}) \right)$

Note: cable loss is 0.7 dB

Output power limit for 10 dBi antenna was calculated as follows: $30 \text{ dBm} - (10 \text{ dBi} - 0.7 \text{ dB} - 6 \text{ dBi}) = 26.70 \text{ dBm}$

PPSD limit was calculated as follows: $17 - (10 - 0.7 - 6) = 13.70 \text{ dBm/MHz}$

Output power limit for 24 dBi antenna was calculated as follows: $30 \text{ dBm} - (24 \text{ dBi} - 0.7 \text{ dB} - 6 \text{ dBi}) = 12.70 \text{ dBm}$

PPSD limit was calculated as follows: $17 - (24 - .07 - 6) = -0.30 \text{ dBm/MHz}$

Output power limit for 32 dBi antenna was calculated as follows: $30 \text{ dBm} - (32 \text{ dBi} - 0.7 \text{ dB} - 6 \text{ dBi}) = 4.70 \text{ dBm}$

PPSD limit was calculated as follows: $17 - (32 - 0.7 - 6) = -8.30 \text{ dBm/MHz}$

Table 8.2-1: Elevation vs gain for L-COM HG5158DP-10U, 10 dBi antenna

Angle, degree	Antenna gain, dBi
<30	+10
>30	-15

Table 8.2-2: Elevation vs gain for Redline 30-00362-00, 24 dBi antenna

Angle, degree	Antenna gain, dBi
<30	+24
>30	-14

Table 8.2-3: Elevation vs gain for Redline A3FT3204LTPD, 32 dBi antenna

Angle, degree	Antenna gain, dBi
<30	+32
>30	0

8.2.4 Test data

Table 8.2-4: Output power measurements results for 10 MHz channel, 10 dBi antenna

Modulation and data rate	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB	Tot. Gain, dBi	EIRP, dBm	Limit, dBm	Margin, dB
BPSK, 3.3 Mbps	5160.0	11.22	11.04	14.14	26.70	12.56	9.30	23.44	36.00	12.56
	5200.0	19.47	18.42	21.99	26.70	4.71	9.30	31.29	36.00	4.71
	5245.0	18.77	18.45	21.62	26.70	5.08	9.30	30.92	36.00	5.08
256-QAM 93.3 Mbps	5160.0	12.11	11.59	14.87	26.70	11.83	9.30	24.17	36.00	11.83
	5200.0	19.50	18.45	22.02	26.70	4.68	9.30	31.32	36.00	4.68
	5245.0	18.83	18.48	21.67	26.70	5.03	9.30	30.97	36.00	5.03

Note: Total antenna gain includes 0.7 dB loss of the cable

Table 8.2-5: Output power measurements results for 10 MHz channel, 24 dBi antenna

Modulation and data rate	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB	Tot. Gain, dBi	EIRP, dBm	Limit, dBm	Margin, dB
BPSK, 3.3 Mbps	5160.0	5.13	4.91	8.03	12.70	4.67	23.30	31.33	36.00	4.67
	5200.0	5.13	4.92	8.04	12.70	4.66	23.30	31.34	36.00	4.66
	5245.0	4.23	5.00	7.64	12.70	5.06	23.30	30.94	36.00	5.06
256-QAM 93.3 Mbps	5160.0	4.92	4.92	7.93	12.70	4.77	23.30	31.23	36.00	4.77
	5200.0	5.14	4.95	8.06	12.70	4.64	23.30	31.36	36.00	4.64
	5245.0	4.28	5.00	7.67	12.70	5.03	23.30	30.97	36.00	5.03

Note: Total antenna gain includes 0.7 dB loss of the cable

Table 8.2-6: Output power measurements results for 10 MHz channel, 32 dBi antenna

Modulation and data rate	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB	Tot. Gain, dBi	EIRP, dBm	Limit, dBm	Margin, dB
BPSK, 3.3 Mbps	5160.0	-3.11	-3.13	-0.11	4.70	4.81	31.30	31.19	36.00	4.81
	5200.0	-3.01	-3.55	-0.26	4.70	4.96	31.30	31.04	36.00	4.96
	5245.0	-3.90	-3.02	-0.43	4.70	5.13	31.30	30.87	36.00	5.13
256-QAM 93.3 Mbps	5160.0	-3.22	-3.44	-0.32	4.70	5.02	31.30	30.98	36.00	5.02
	5200.0	-3.37	-3.48	-0.41	4.70	5.11	31.30	30.89	36.00	5.11
	5245.0	-3.89	-3.28	-0.56	4.70	5.26	31.30	30.74	36.00	5.26

Note: Total antenna gain includes 0.7 dB loss of the cable

Table 8.2-7: Output power measurements results for 20 MHz channel, 10 dBi antenna

Modulation and data rate	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB	Tot. Gain, dBi	EIRP, dBm	Limit, dBm	Margin, dB
BPSK, 6.6 Mbps	5170.0	12.28	12.11	15.21	26.70	11.49	9.30	24.51	36.00	11.49
	5200.0	21.75	21.56	24.67	26.70	2.03	9.30	33.97	36.00	2.03
	5240.0	18.75	19.53	22.17	26.70	4.53	9.30	31.47	36.00	4.53
256-QAM 186.6 Mbps	5170.0	12.47	13.22	15.87	26.70	10.83	9.30	25.17	36.00	10.83
	5200.0	21.80	21.56	24.69	26.70	2.01	9.30	33.99	36.00	2.01
	5240.0	18.66	19.48	22.10	26.70	4.60	9.30	31.40	36.00	4.60

Note: Total antenna gain includes 0.7 dB loss of the cable

Table 8.2-8: Output power measurements results for 20 MHz channel, 24 dBi antenna

Modulation and data rate	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB	Tot. Gain, dBi	EIRP, dBm	Limit, dBm	Margin, dB
BPSK, 6.6 Mbps	5170.0	7.31	7.09	10.21	12.70	2.49	23.30	33.51	36.00	2.49
	5200.0	7.48	7.35	10.43	12.70	2.27	23.30	33.73	36.00	2.27
	5240.0	7.47	7.28	10.39	12.70	2.31	23.30	33.69	36.00	2.31
256-QAM 186.6 Mbps	5170.0	7.31	7.11	10.22	12.70	2.48	23.30	33.52	36.00	2.48
	5200.0	7.45	7.34	10.41	12.70	2.29	23.30	33.71	36.00	2.29
	5240.0	7.47	7.30	10.40	12.70	2.30	23.30	33.70	36.00	2.30

Note: Total antenna gain includes 0.7 dB loss of the cable

Table 8.2-9: Output power measurements results for 20 MHz channel, 32 dBi antenna

Modulation and data rate	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB	Tot. Gain, dBi	EIRP, dBm	Limit, dBm	Margin, dB
BPSK, 6.6 Mbps	5170.0	-0.82	-0.51	2.35	4.70	2.35	31.30	33.65	36.00	2.35
	5200.0	-0.95	-0.84	2.12	4.70	2.58	31.30	33.42	36.00	2.58
	5240.0	-0.89	-1.01	2.06	4.70	2.64	31.30	33.36	36.00	2.64
256-QAM 186.6 Mbps	5170.0	-0.82	-0.30	2.46	4.70	2.24	31.30	33.76	36.00	2.24
	5200.0	-0.67	-0.90	2.23	4.70	2.47	31.30	33.53	36.00	2.47
	5240.0	-0.69	-0.94	2.20	4.70	2.50	31.30	33.50	36.00	2.50

Note: Total antenna gain includes 0.7 dB loss of the cable

Table 8.2-10: Output power measurements results for 40 MHz channel, 10 dBi antenna

Modulation and data rate	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB	Tot. Gain, dBi	EIRP, dBm	Limit, dBm	Margin, dB
BPSK, 13.3 Mbps	5170.0	-3.08	-3.09	-0.07	26.70	26.77	9.30	9.23	36.00	26.77
	5200.0	22.01	21.97	25.00	26.70	1.70	9.30	34.30	36.00	1.70
	5230.0	18.71	17.45	21.14	26.70	5.56	9.30	30.44	36.00	5.56
256-QAM 373.3 Mbps	5170.0	13.44	13.26	16.36	26.70	10.34	9.30	25.66	36.00	10.34
	5200.0	22.01	21.89	24.96	26.70	1.74	9.30	34.26	36.00	1.74
	5230.0	18.56	18.41	21.50	26.70	5.20	9.30	30.80	36.00	5.20

Note: Total antenna gain includes 0.7 dB loss of the cable

Table 8.2-11: Output power measurements results for 40 MHz channel, 24 dBi antenna

Modulation and data rate	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB	Tot. Gain, dBi	EIRP, dBm	Limit, dBm	Margin, dB
BPSK, 13.3 Mbps	5170.0	9.04	8.93	12.00	12.70	0.70	23.30	35.30	36.00	0.70
	5200.0	9.02	8.91	11.98	12.70	0.72	23.30	35.28	36.00	0.72
	5230.0	8.95	8.84	11.91	12.70	0.79	23.30	35.21	36.00	0.79
256-QAM 373.3 Mbps	5170.0	8.84	8.76	11.81	12.70	0.89	23.30	35.11	36.00	0.89
	5200.0	9.00	8.96	11.99	12.70	0.71	23.30	35.29	36.00	0.71
	5230.0	8.96	9.00	11.99	12.70	0.71	23.30	35.29	36.00	0.71

Note: Total antenna gain includes 0.7 dB loss of the cable

Table 8.2-12: Output power measurements results for 40 MHz channel, 32 dBi antenna

Modulation and data rate	Frequency, MHz	Output power on ch0, dBm	Output power on ch1, dBm	Combined power, dBm	Limit, dBm	Margin, dB	Tot. Gain, dBi	EIRP, dBm	Limit, dBm	Margin, dB
BPSK, 13.3 Mbps	5170.0	0.80	0.85	3.84	4.70	0.86	31.30	35.14	36.00	0.86
	5200.0	0.78	0.73	3.77	4.70	0.93	31.30	35.07	36.00	0.93
	5230.0	0.68	0.63	3.67	4.70	1.03	31.30	34.97	36.00	1.03
256-QAM 373.3 Mbps	5170.0	0.57	0.60	3.60	4.70	1.10	31.30	34.90	36.00	1.10
	5200.0	0.77	0.74	3.77	4.70	0.93	31.30	35.07	36.00	0.93
	5230.0	0.67	0.64	3.67	4.70	1.03	31.30	34.97	36.00	1.03

Note: Total antenna gain includes 0.7 dB loss of the cable

Table 8.2-13: PSD measurements results for 10 MHz channel, 10 dBi antenna

Modulation and data rate	Frequency, MHz	PSD on ch0, dBm/MHz	PSD on ch1, dBm/MHz	Combined PSD, dBm/MHz	Limit, dBm/MHz	Margin, dB
BPSK, 3.3 Mbps	5160.0	3.09	3.08	6.10	13.70	7.60
	5200.0	11.04	9.99	13.56	13.70	0.14
	5245.0	10.45	10.36	13.42	13.70	0.28
256-QAM 93.3 Mbps	5160.0	3.59	3.66	6.64	13.70	7.06
	5200.0	11.01	10.00	13.54	13.70	0.16
	5245.0	10.47	10.38	13.44	13.70	0.26

Table 8.2-14: PSD measurements results for 10 MHz channel, 24 dBi antenna

Modulation and data rate	Frequency, MHz	PSD on ch0, dBm/MHz	PSD on ch1, dBm/MHz	Combined PSD, dBm/MHz	Limit, dBm/MHz	Margin, dB
BPSK, 3.3 Mbps	5160.0	-3.27	-3.37	-0.31	-0.30	0.01
	5200.0	-3.34	-3.39	-0.35	-0.30	0.05
	5245.0	-3.95	-3.12	-0.50	-0.30	0.20
256-QAM 93.3 Mbps	5160.0	-3.30	-3.39	-0.33	-0.30	0.03
	5200.0	-3.34	-3.37	-0.34	-0.30	0.04
	5245.0	-3.95	-3.13	-0.51	-0.30	0.21

Table 8.2-15: PSD measurements results for 10 MHz channel, 32 dBi antenna

Modulation and data rate	Frequency, MHz	PSD on ch0, dBm/MHz	PSD on ch1, dBm/MHz	Combined PSD, dBm/MHz	Limit, dBm/MHz	Margin, dB
BPSK, 3.3 Mbps	5160.0	-11.34	-11.50	-8.41	-8.30	0.11
	5200.0	-11.34	-11.38	-8.35	-8.30	0.05
	5245.0	-12.19	-11.28	-8.70	-8.30	0.40
256-QAM 93.3 Mbps	5160.0	-11.31	-11.49	-8.39	-8.30	0.09
	5200.0	-11.31	-11.40	-8.34	-8.30	0.04
	5245.0	-11.97	-11.27	-8.60	-8.30	0.30

Table 8.2-16: PSD measurements results for 20 MHz channel, 10 dBi antenna

Modulation and data rate	Frequency, MHz	PSD on ch0, dBm/MHz	PSD on ch1, dBm/MHz	Combined PSD, dBm/MHz	Limit, dBm/MHz	Margin, dB
BPSK, 6.6 Mbps	5170.0	1.44	1.33	4.40	13.70	9.30
	5200.0	10.62	10.60	13.62	13.70	0.08
	5240.0	7.48	8.44	11.00	13.70	2.70
256-QAM 186.6 Mbps	5170.0	1.16	1.84	4.52	13.70	9.18
	5200.0	10.66	10.51	13.60	13.70	0.10
	5240.0	7.71	8.47	11.12	13.70	2.58

Table 8.2-17: PSD measurements results for 20 MHz channel, 24 dBi antenna

Modulation and data rate	Frequency, MHz	PSD on ch0, dBm/MHz	PSD on ch1, dBm/MHz	Combined PSD, dBm/MHz	Limit, dBm/MHz	Margin, dB
BPSK, 6.6 Mbps	5170.0	-3.66	-3.93	-0.78	-0.30	0.48
	5200.0	-3.69	-3.75	-0.71	-0.30	0.41
	5240.0	-3.57	-3.71	-0.63	-0.30	0.33
256-QAM 186.6 Mbps	5170.0	-3.68	-3.91	-0.78	-0.30	0.48
	5200.0	-3.73	-3.75	-0.73	-0.30	0.43
	5240.0	-3.63	-3.69	-0.65	-0.30	0.35

Table 8.2-18: PSD measurements results for 20 MHz channel, 32 dBi antenna

Modulation and data rate	Frequency, MHz	PSD on ch0, dBm/MHz	PSD on ch1, dBm/MHz	Combined PSD, dBm/MHz	Limit, dBm/MHz	Margin, dB
BPSK, 6.6 Mbps	5170.0	-11.83	-11.13	-8.46	-8.30	0.16
	5200.0	-11.82	-11.83	-8.81	-8.30	0.51
	5240.0	-11.68	-11.85	-8.75	-8.30	0.45
256-QAM 186.6 Mbps	5170.0	-11.82	-11.07	-8.42	-8.30	0.12
	5200.0	-11.83	-11.86	-8.83	-8.30	0.53
	5240.0	-11.68	-11.80	-8.73	-8.30	0.43

Table 8.2-19: PSD measurements results for 40 MHz channel, 10 dBi antenna

Modulation and data rate	Frequency, MHz	PSD on ch0, dBm/MHz	PSD on ch1, dBm/MHz	Combined PSD, dBm/MHz	Limit, dBm/MHz	Margin, dB
BPSK, 13.3 Mbps	5170.0	-16.29	-16.81	-13.53	13.70	27.23
	5200.0	8.96	8.78	11.88	13.70	1.82
	5230.0	5.00	3.37	7.27	13.70	6.43
256-QAM 373.3 Mbps	5170.0	-0.51	-1.01	2.26	13.70	11.44
	5200.0	9.02	8.80	11.92	13.70	1.78
	5230.0	4.97	4.30	7.66	13.70	6.04

Table 8.2-20: PSD measurements results for 40 MHz channel, 24 dBi antenna

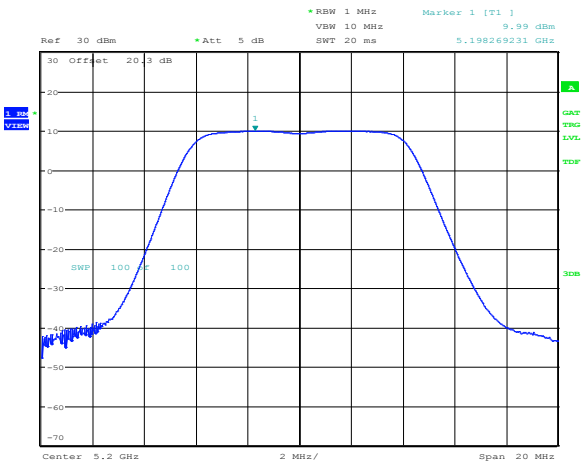
Modulation and data rate	Frequency, MHz	PSD on ch0, dBm/MHz	PSD on ch1, dBm/MHz	Combined PSD, dBm/MHz	Limit, dBm/MHz	Margin, dB
BPSK, 13.3 Mbps	5170.0	-4.32	-4.67	-1.48	-0.30	1.18
	5200.0	-4.40	-4.44	-1.41	-0.30	1.11
	5230.0	-4.09	-4.46	-1.26	-0.30	0.96
256-QAM 373.3 Mbps	5170.0	-4.30	-4.68	-1.48	-0.30	1.18
	5200.0	-4.28	-4.43	-1.34	-0.30	1.04
	5230.0	-4.15	-4.44	-1.28	-0.30	0.98

Table 8.2-21: PSD measurements results for 40 MHz channel, 32 dBi antenna

Modulation and data rate	Frequency, MHz	PSD on ch0, dBm/MHz	PSD on ch1, dBm/MHz	Combined PSD, dBm/MHz	Limit, dBm/MHz	Margin, dB
BPSK, 13.3 Mbps	5170.0	-12.61	-12.92	-9.75	-8.30	1.45
	5200.0	-12.62	-12.69	-9.64	-8.30	1.34
	5230.0	-12.38	-12.68	-9.52	-8.30	1.22
256-QAM 373.3 Mbps	5170.0	-12.52	-12.93	-9.71	-8.30	1.41
	5200.0	-12.64	-12.62	-9.62	-8.30	1.32
	5230.0	-12.30	-12.67	-9.47	-8.30	1.17

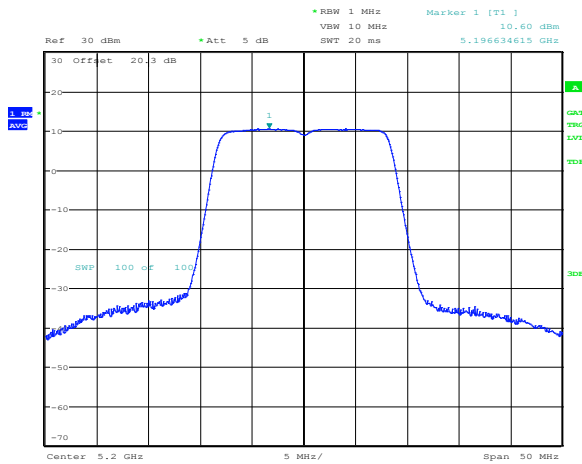
Section 8
Test name
Specification

Testing data
FCC 15.407(a)(1) and 5.15–5.25 GHz band output power and spectral density limits
FCC Part 15 Subpart E



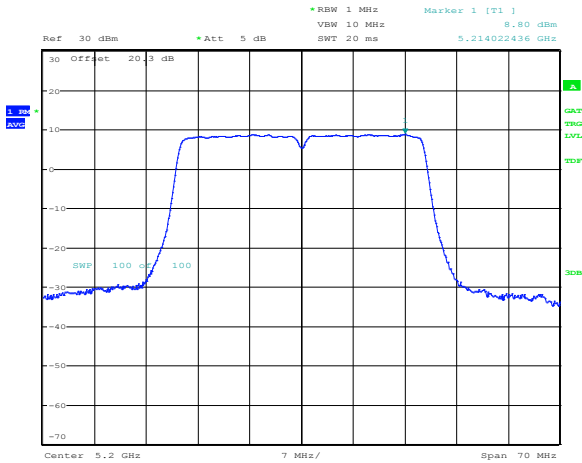
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Figure 8.2-1: Sample plot for PSD on 10 MHz channel



Date: 14.NOV.2016 11:15:09

Figure 8.2-2: Sample plot for PSD on 20 MHz channel



Date: 14.NOV.2016 11:17:23

Figure 8.2-3: Sample plot for PSD on 40 MHz channel

8.3 FCC 15.407(b) Undesirable (unwanted) emissions

8.3.1 Definitions and limits

- (1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.
(7) The provisions of § 15.205 apply to intentional radiators operating under this section.
(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

Table 8.3-1: FCC §15.209 Radiated emission limits

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

Notes: In the emission table above, the tighter limit applies at the band edges.

For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test

Table 8.3-2: FCC restricted frequency bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

8.3.2 Test summary

Test date:	November 15, 2016	Temperature:	23 °C
Test engineer:	Andrey Adelberg	Air pressure:	1010 mbar
Verdict:	Pass	Relative humidity:	32 %

8.3.3 Observations, settings and special notes

The spectrum was searched from 30 MHz to 40 GHz while the EUT was transmitting on both MIMO chains simultaneously.
 Radiated measurements below 18 GHz were performed at a distance of 3 m.
 Radiated measurements above 18 GHz and in the vicinity of the allocated band edges (around 5 GHz) were performed at a distance of 1 m.
 Cabinet radiation for 10 dBi antenna were performed while both antenna connectors were terminated with 50 Ω load.
 Radiated emissions for 24 dBi and 32 dBi antennas were performed with actual antennas connected to the RF antenna ports with dedicated cables.
 All conducted plots below corrected with antenna gains, RF cable losses and multiple antenna correction factors

Spectrum analyser for peak conducted measurements within restricted bands below 1 GHz:

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

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

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

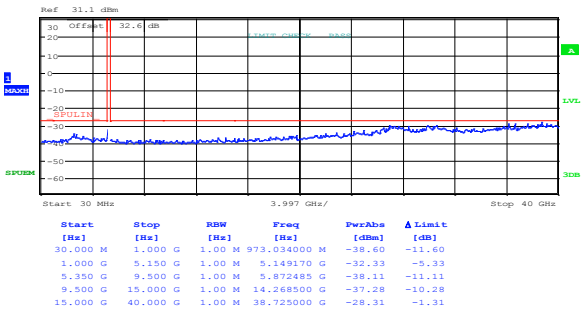
Spectrum analyser for average conducted measurements within restricted bands above 1 GHz for frequencies where peak results were above the average limit:

Resolution bandwidth:	1 MHz
Video bandwidth:	10 MHz
Detector mode:	RMS
Trace mode:	Power average
Number of averaging traces:	100

Spectrum analyser for peak conducted measurements outside restricted bands:

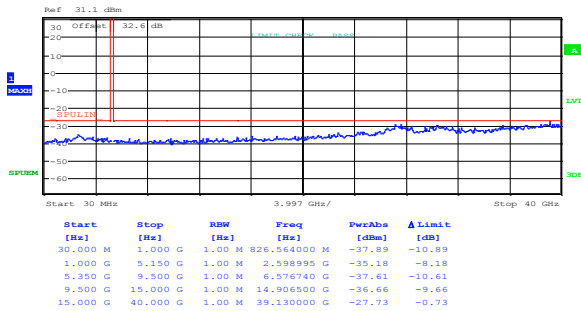
Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

8.3.4 Test data



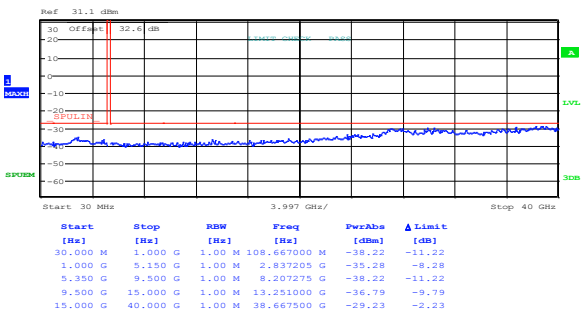
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Figure 8.3-1: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, low channel, BPSK, cho



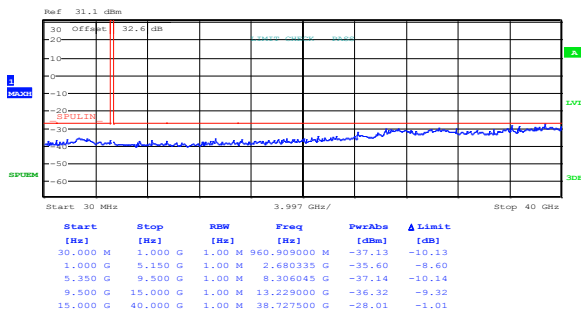
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Figure 8.3-2: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 15:43:27

Figure 8.3-3: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, high channel, BPSK, cho

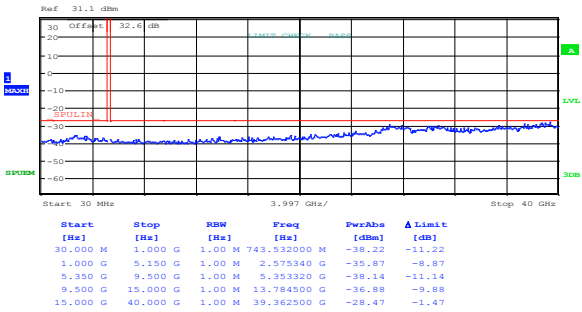


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Figure 8.3-4: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, low channel, BPSK, ch1

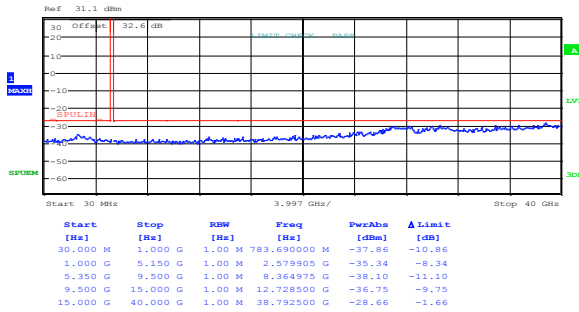
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



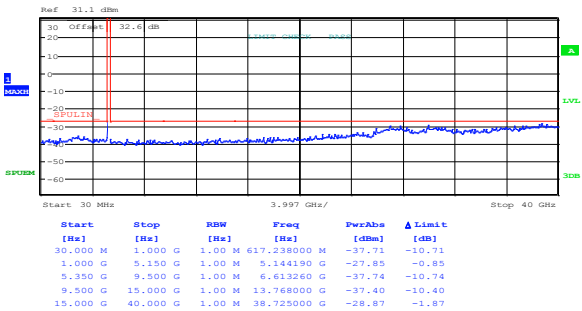
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Figure 8.3-5: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, BPSK, ch1



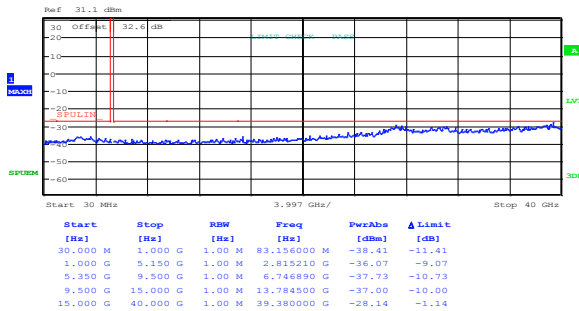
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Figure 8.3-6: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, high channel, BPSK, ch1



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Figure 8.3-7: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, low channel, 256-QAM, cho

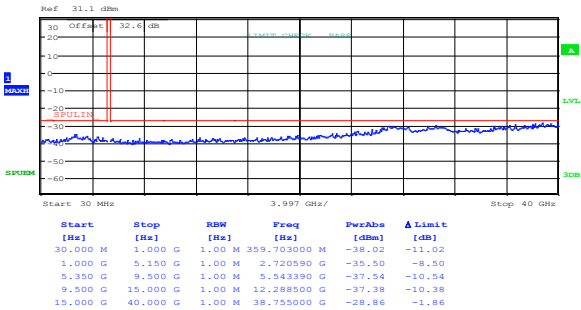


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Figure 8.3-8: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, 256-QAM, cho

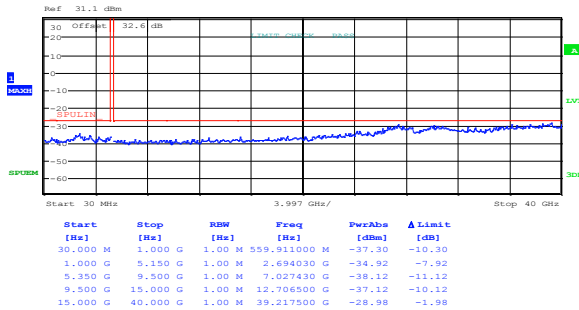
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FCC Part 15 Subpart E



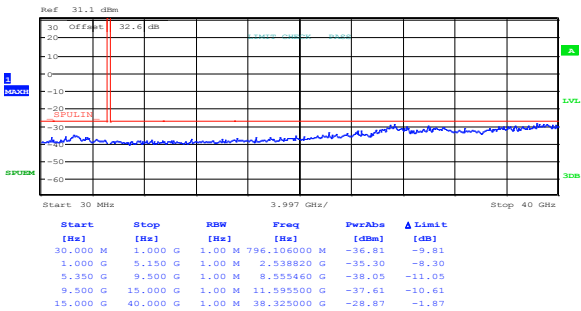
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Figure 8.3-9: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, high channel, 256-QAM, cho



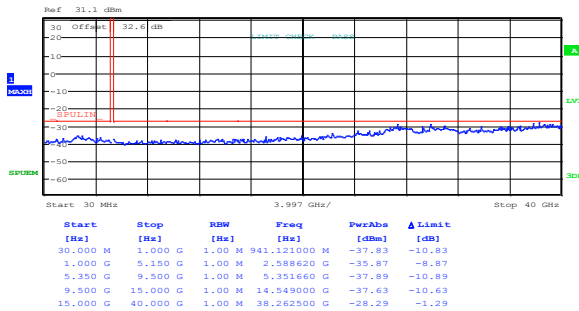
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Figure 8.3-10: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 16:14:57

Figure 8.3-11: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, 256-QAM, ch1

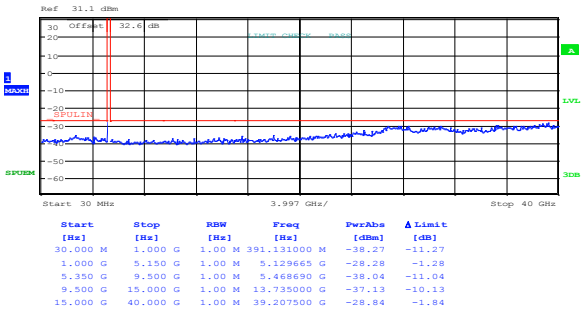


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Figure 8.3-12: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, high channel, 256-QAM, ch1

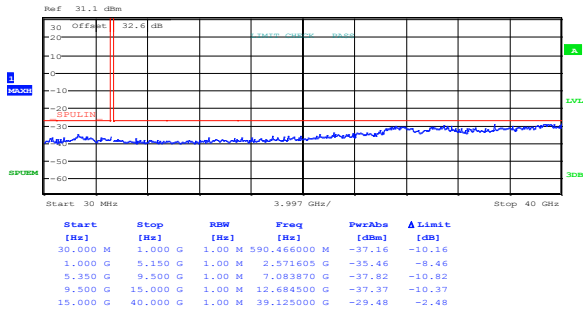
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



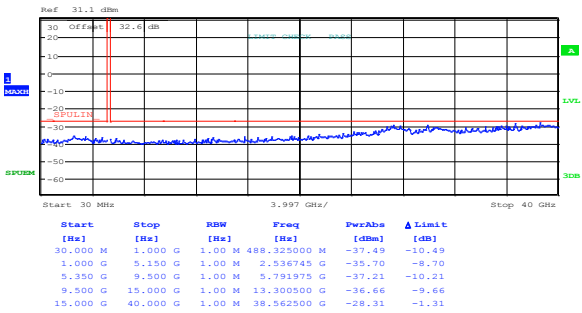
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Figure 8.3-13: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, low channel, BPSK, cho



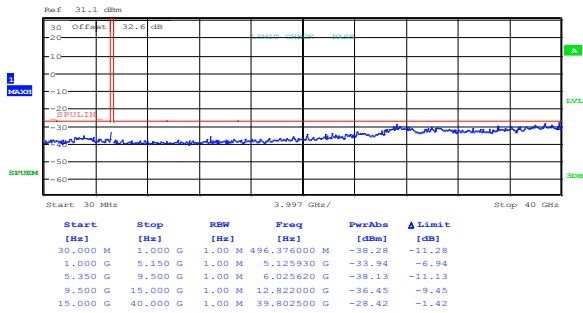
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Figure 8.3-14: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 16:35:56

Figure 8.3-15: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, high channel, BPSK, cho

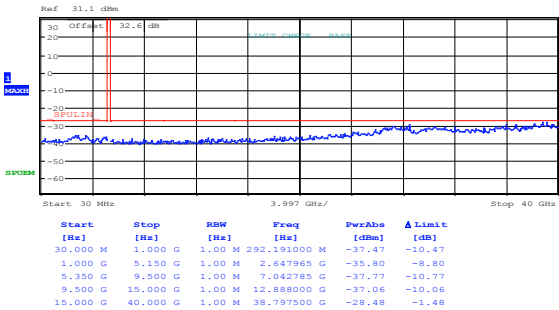


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Figure 8.3-16: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, low channel, BPSK, ch1

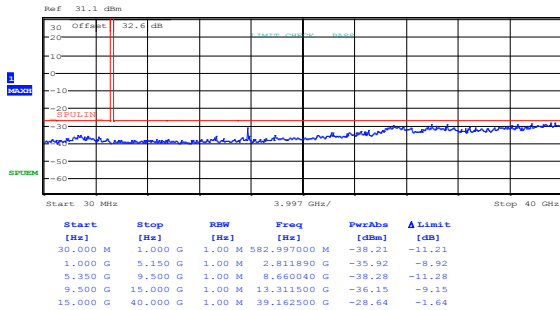
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FCC Part 15 Subpart E



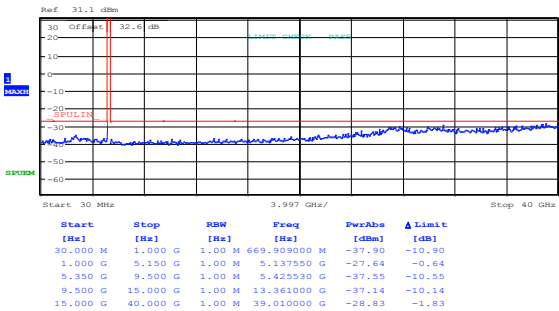
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Figure 8.3-17: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, BPSK, ch1



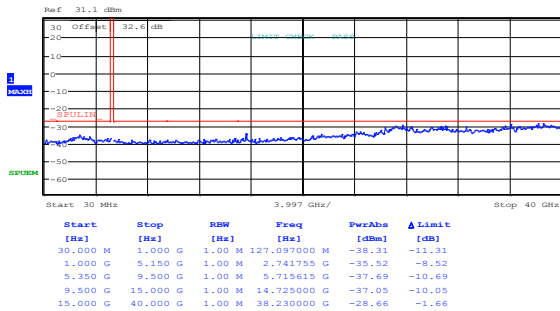
Date: 18.NOV.2016 16:35:12

Figure 8.3-18: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, high channel, BPSK, ch1



Date: 18.NOV.2016 17:16:57

Figure 8.3-19: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, low channel, 256-QAM, cho

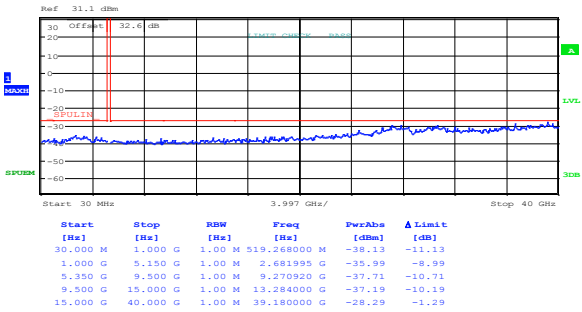


Date: 18.NOV.2016 16:37:11

Figure 8.3-20: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, 256-QAM, cho

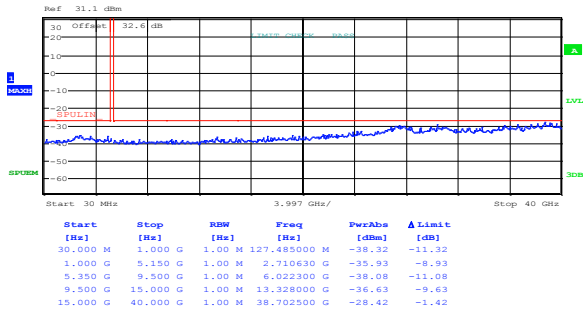
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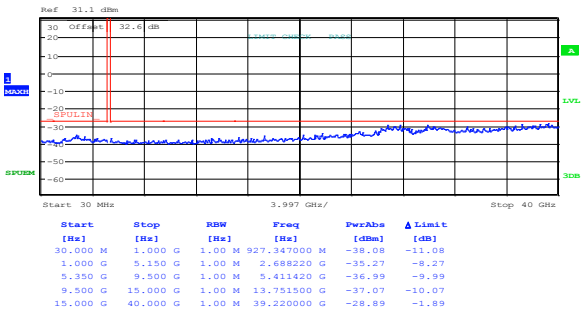
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Figure 8.3-21: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, high channel, 256-QAM, cho



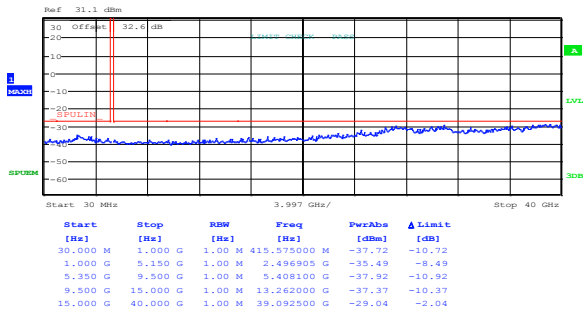
Date: 18.NOV.2016 16:32:02

Figure 8.3-22: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 16:33:50

Figure 8.3-23: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, 256-QAM, ch1

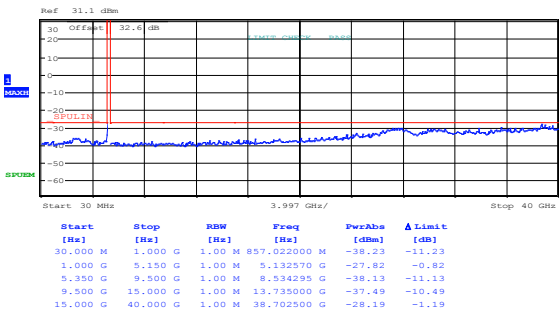


Date: 18.NOV.2016 16:34:25

Figure 8.3-24: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, high channel, 256-QAM, ch1

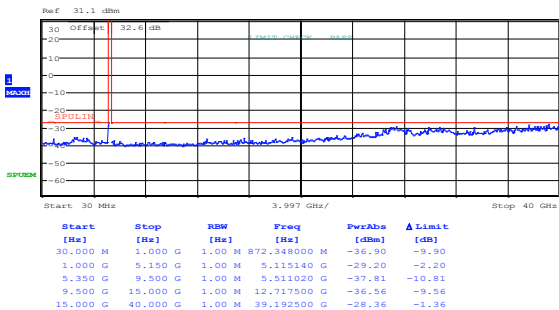
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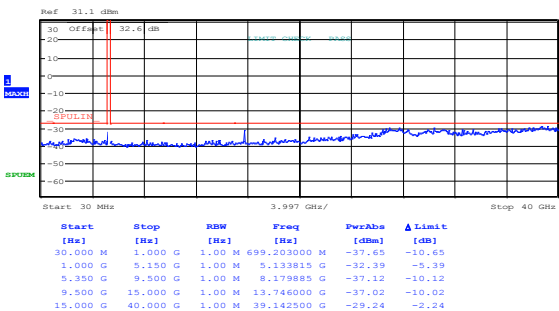
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Figure 8.3-25: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, low channel, BPSK, cho



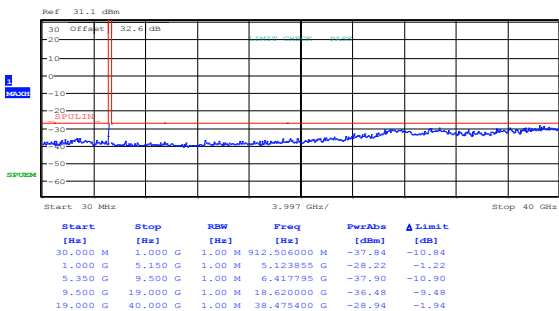
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Figure 8.3-26: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 17:35:13

Figure 8.3-27: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, high channel, BPSK, cho

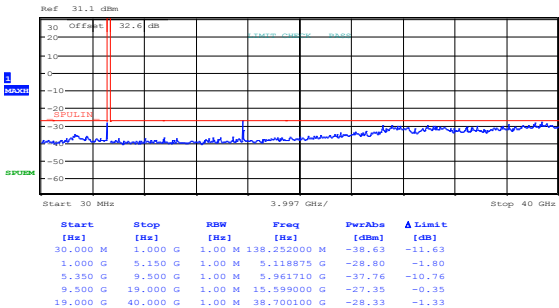


Date: 18.NOV.2016 17:43:48

Figure 8.3-28: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, low channel, BPSK, ch1

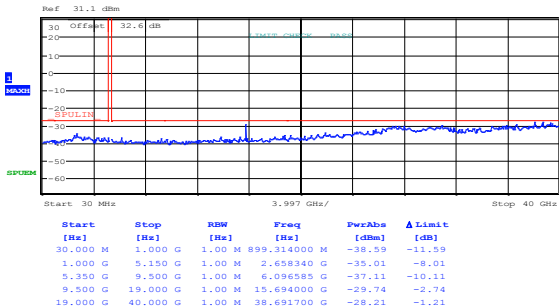
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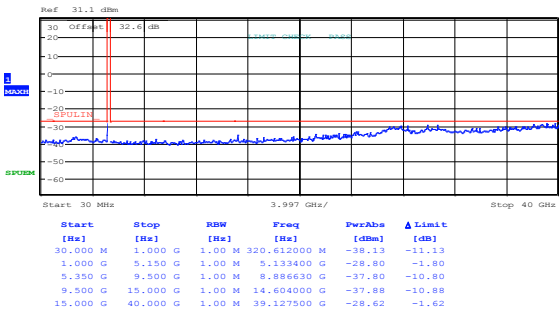
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Figure 8.3-29: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, mid channel, BPSK, ch1



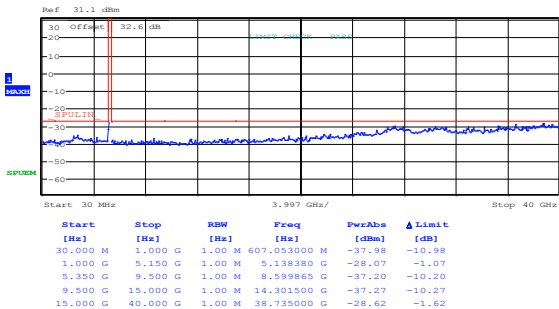
Date: 18.NOV.2016 17:37:46

Figure 8.3-30: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, high channel, BPSK, ch1



Date: 18.NOV.2016 17:29:08

Figure 8.3-31: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, low channel, 256-QAM, cho

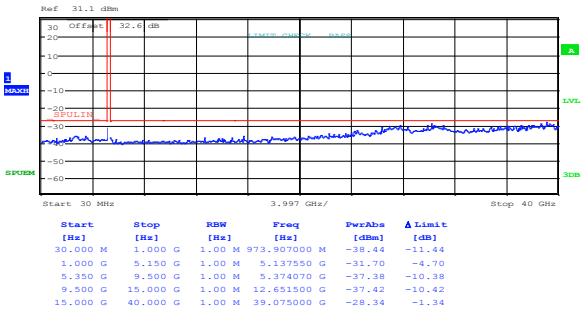


Date: 18.NOV.2016 17:34:13

Figure 8.3-32: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, mid channel, 256-QAM, cho

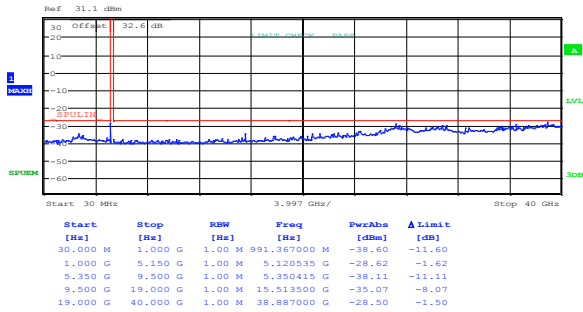
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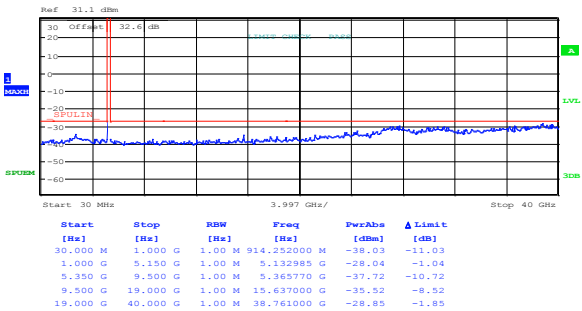
Date: 18.NOV.2016 17:34:51

Figure 8.3-33: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, high channel, 256-QAM, cho



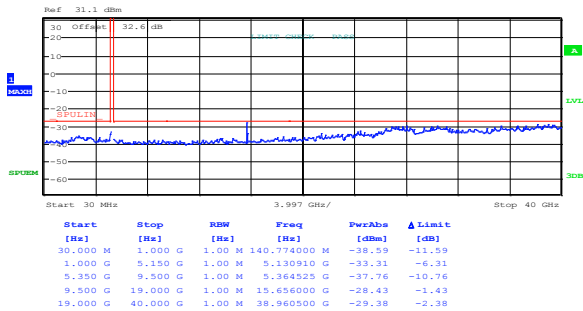
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Figure 8.3-34: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 17:41:22

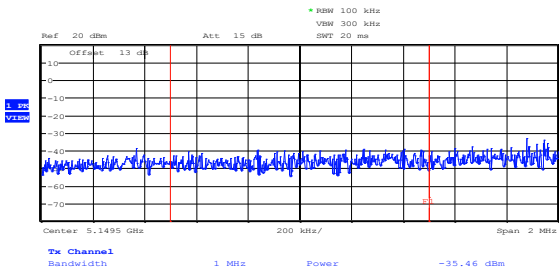
Figure 8.3-35: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, mid channel, 256-QAM, ch1



Date: 18.NOV.2016 17:38:18

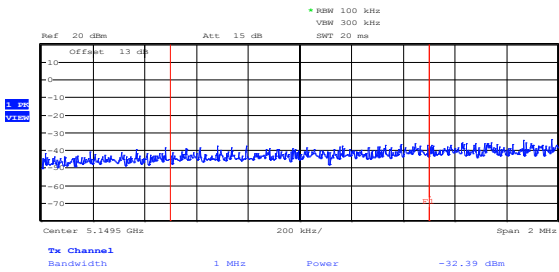
Figure 8.3-36: Spurious emissions outside restricted bands for 10 dBi antenna, 40 MHz channel, high channel, 256-QAM, ch1

Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm



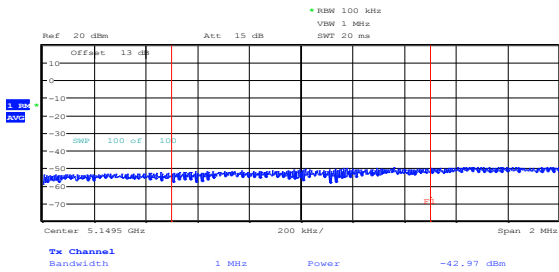
Date: 17.JAN.2017 10:22:58

Figure 8.3-37: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 10 MHz channel, BPSK, cho, peak



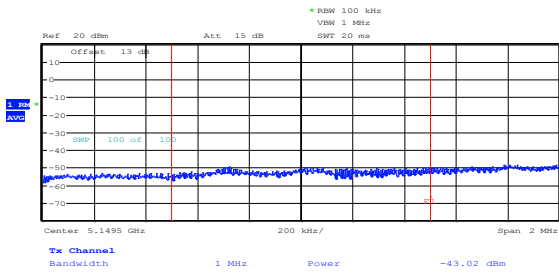
Date: 17.JAN.2017 10:37:49

Figure 8.3-39: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 10 MHz channel, BPSK, ch1, peak



Date: 17.JAN.2017 10:22:36

Figure 8.3-38: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 10 MHz channel, BPSK, cho, average

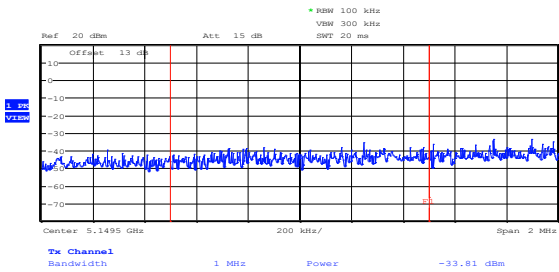


Date: 17.JAN.2017 10:37:30

Figure 8.3-40: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 10 MHz channel, BPSK, ch1, average

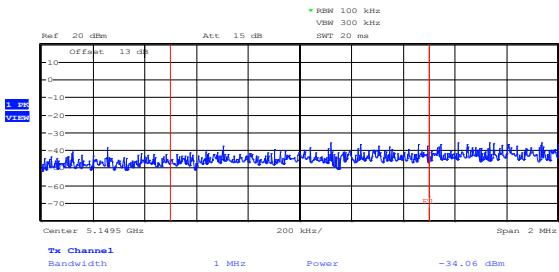


Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm



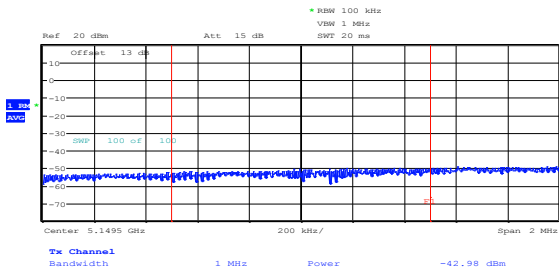
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Figure 8.3-41: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 10 MHz channel, 256-QAM, cho, peak



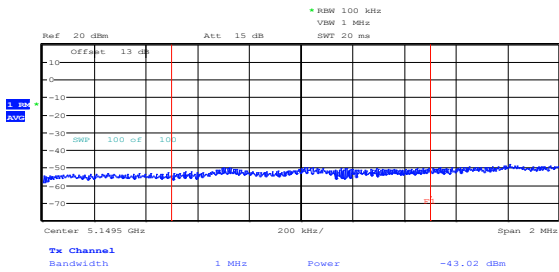
Date: 17.JAN.2017 10:37:57

Figure 8.3-43: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 10 MHz channel, 256-QAM, ch1, peak



Date: 17.JAN.2017 10:22:08

Figure 8.3-42: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 10 MHz channel, 256-QAM, cho, average



Date: 17.JAN.2017 10:37:10

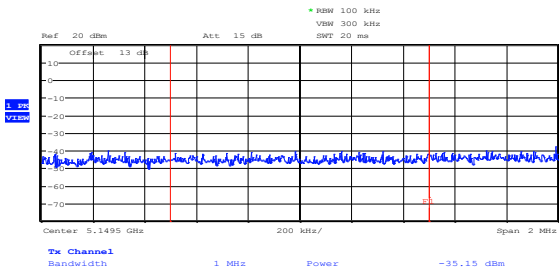
Figure 8.3-44: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 10 MHz channel, 256-QAM, ch1, average

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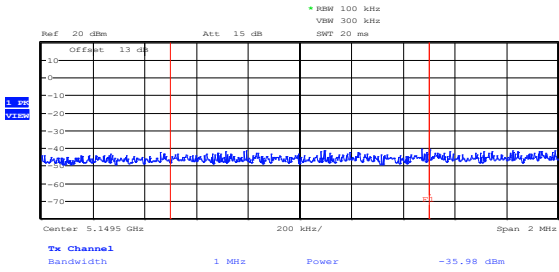


Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm



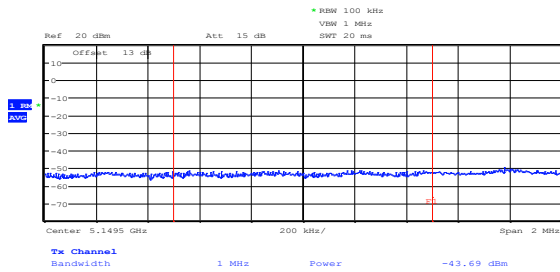
Date: 17.JAN.2017 10:26:44

Figure 8.3-45: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 20 MHz channel, BPSK, cho, peak



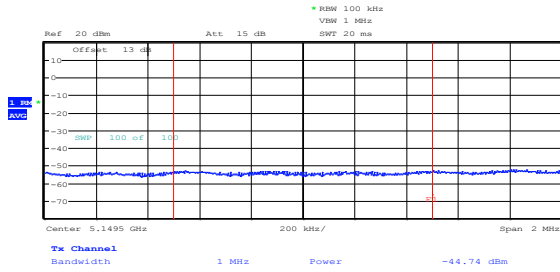
Date: 17.JAN.2017 10:35:41

Figure 8.3-47: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 20 MHz channel, BPSK, ch1, peak



Date: 17.JAN.2017 10:26:21

Figure 8.3-46: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 20 MHz channel, BPSK, cho, average

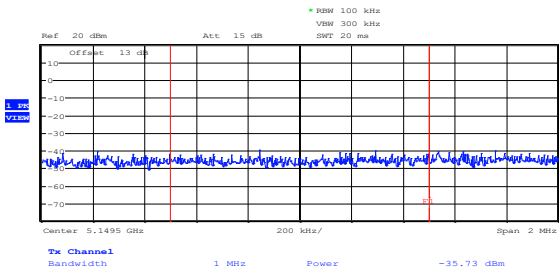


Date: 17.JAN.2017 10:35:25

Figure 8.3-48: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 20 MHz channel, BPSK, ch1, average

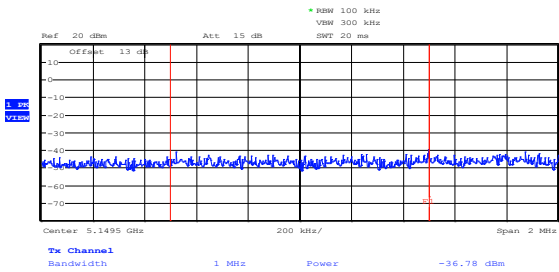


Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm



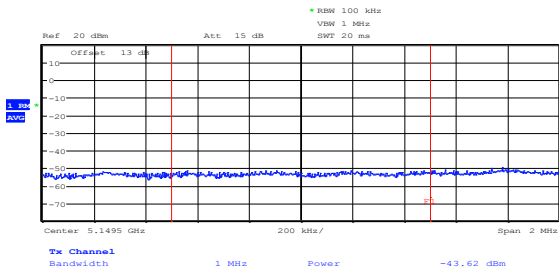
Date: 17.JAN.2017 10:26:55

Figure 8.3-49: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 20 MHz channel, 256-QAM, cho, peak



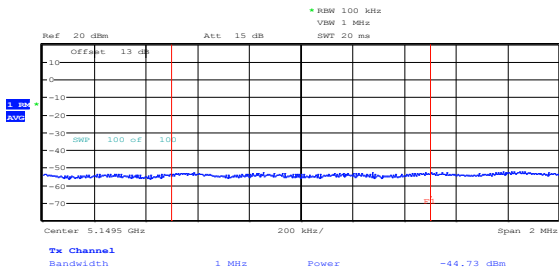
Date: 17.JAN.2017 10:35:54

Figure 8.3-51: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 20 MHz channel, 256-QAM, ch1, peak



Date: 17.JAN.2017 10:26:02

Figure 8.3-50: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 20 MHz channel, 256-QAM, cho, average

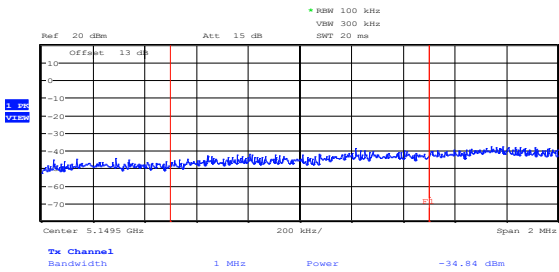


Date: 17.JAN.2017 10:34:53

Figure 8.3-52: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 20 MHz channel, 256-QAM, ch1, average

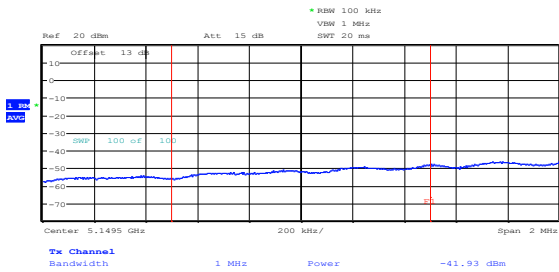


Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm



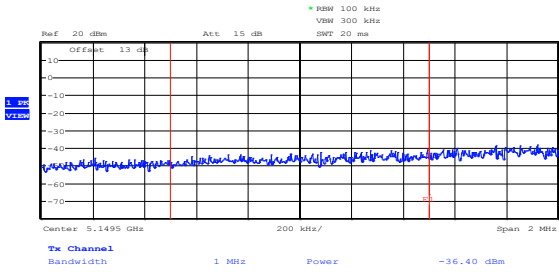
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Figure 8.3-53: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 40 MHz channel, BPSK, cho, peak



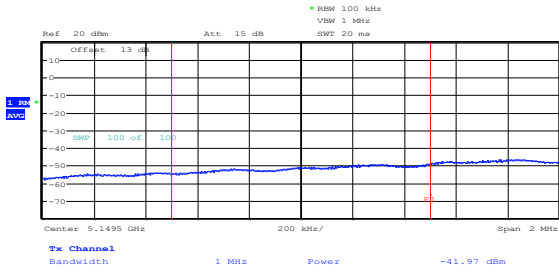
Date: 17.JAN.2017 10:29:38

Figure 8.3-54: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 40 MHz channel, BPSK, cho, average



Date: 17.JAN.2017 10:32:39

Figure 8.3-55: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 40 MHz channel, BPSK, ch1, peak

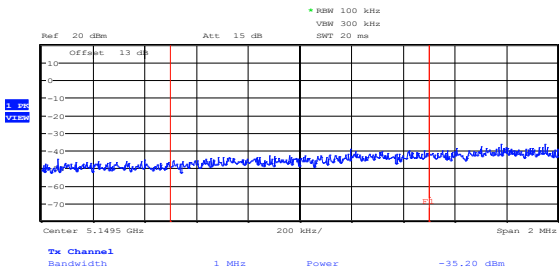


Date: 17.JAN.2017 10:32:24

Figure 8.3-56: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 40 MHz channel, BPSK, ch1, average

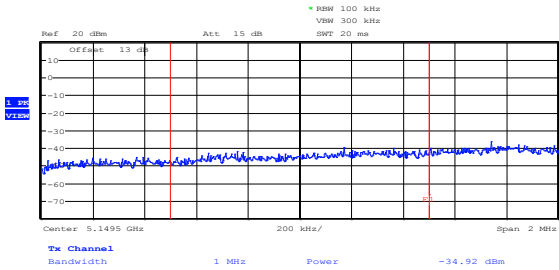


Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm



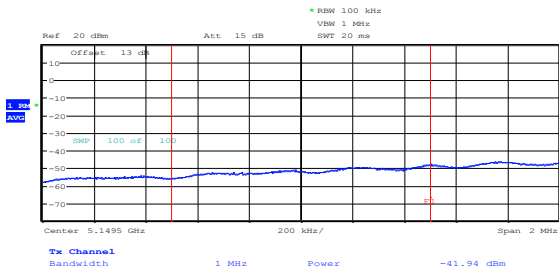
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Figure 8.3-57: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 40 MHz channel, 256-QAM, cho, peak



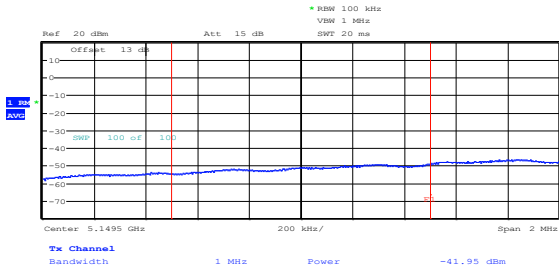
Date: 17.JAN.2017 10:32:46

Figure 8.3-59: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 40 MHz channel, 256-QAM, ch1, peak



Date: 17.JAN.2017 10:29:06

Figure 8.3-58: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 40 MHz channel, 256-QAM, cho, average



Date: 17.JAN.2017 10:31:57

Figure 8.3-60: Spurious restricted band edge emission at 5150 MHz for 10 dBi antenna, 40 MHz channel, 256-QAM, ch1, average

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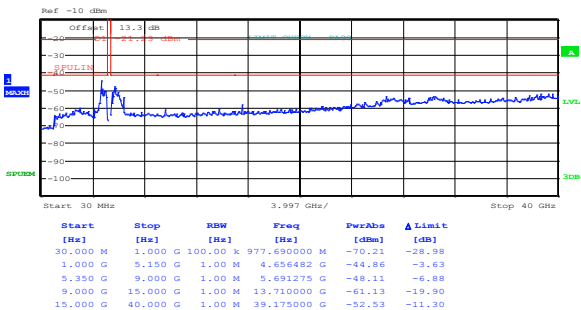
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Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm

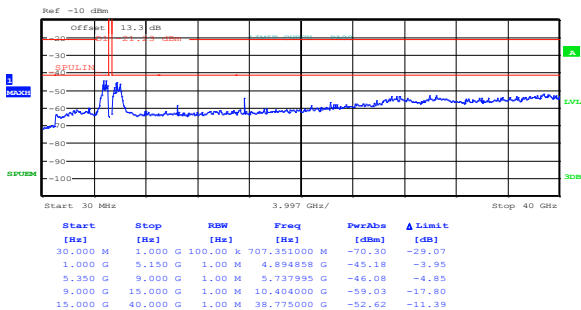
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

Plots below show EIRP trace measured using peak detector and compared with average limit. Where peak level of any emission has exceeded average limit line, that emission was then re-measured with RMS detector.



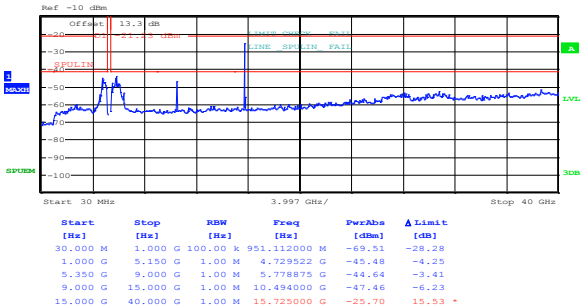
Date: 18.NOV.2016 22:23:28

Figure 8.3-61: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, low channel, BPSK, cho



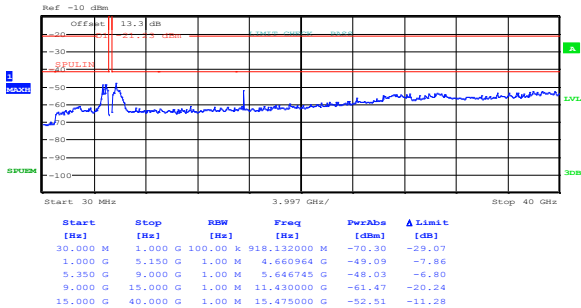
Date: 18.NOV.2016 22:21:34

Figure 8.3-62: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 22:16:10

Figure 8.3-63: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, high channel, BPSK, cho.



Date: 18.NOV.2016 22:11:29

Figure 8.3-64: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, low channel, BPSK, ch1

Average value of the exceeding emission is –46.49 dBm.

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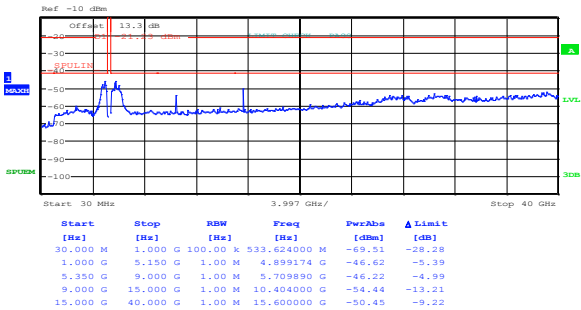
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Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm

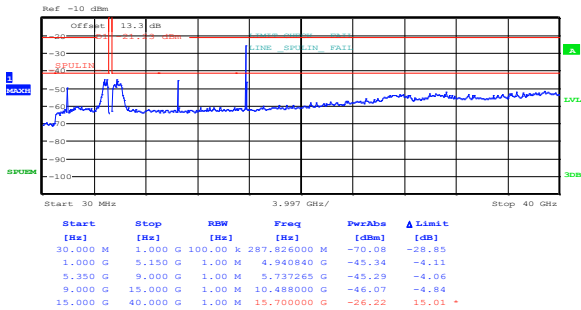
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

Plots below show EIRP trace measured using peak detector and compared with average limit. Where peak level of any emission has exceeded average limit line, that emission was then re-measured with RMS detector.



Date: 18.NOV.2016 22:13:20

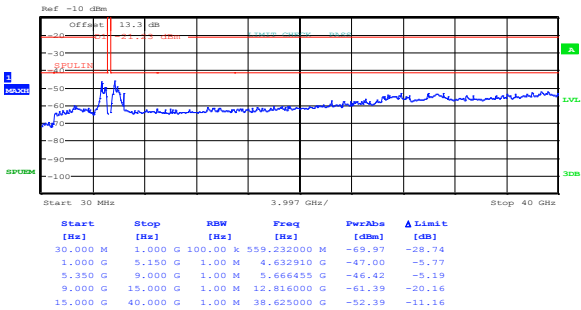
Figure 8.3-65: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, BPSK, ch1



Date: 18.NOV.2016 22:20:14

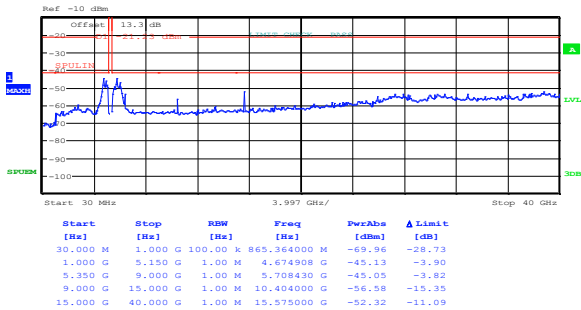
Figure 8.3-66: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, high channel, BPSK, ch1

Average value of the exceeding emission is –47.45 dBm.



Date: 18.NOV.2016 22:23:01

Figure 8.3-67: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, low channel, 256-QAM, cho



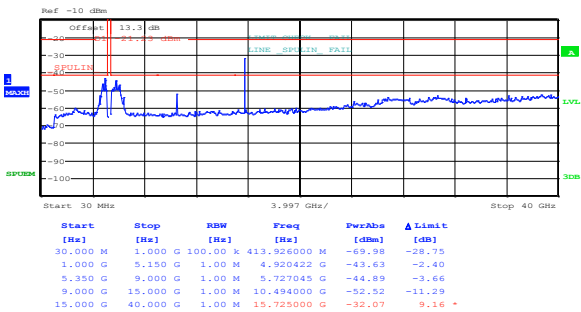
Date: 18.NOV.2016 22:22:10

Figure 8.3-68: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, 256-QAM, cho

Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm

Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

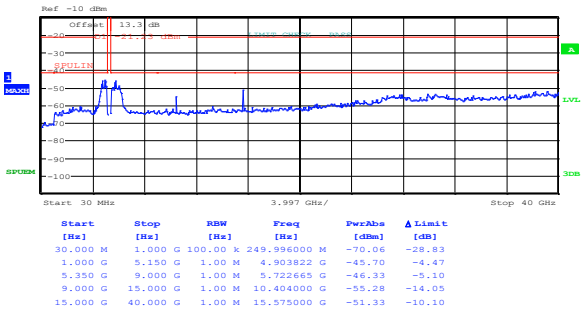
Plots below show EIRP trace measured using peak detector and compared with average limit. Where peak level of any emission has exceeded average limit line, that emission was then re-measured with RMS detector.



Date: 18.NOV.2016 22:16:41

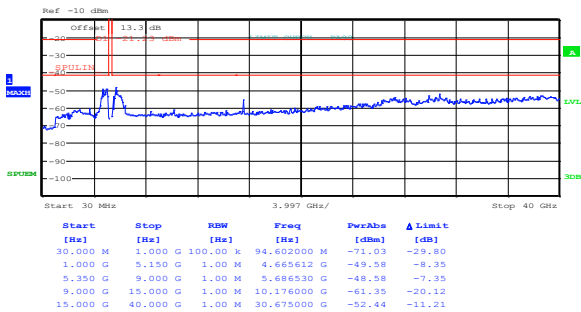
Figure 8.3-69: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, high channel, 256-QAM, cho

Average value of the exceeding emission is –54.75 dBm.



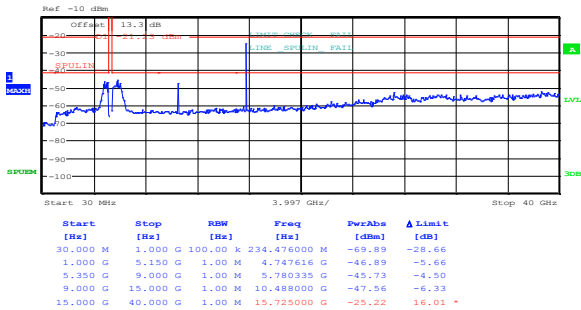
Date: 18.NOV.2016 22:12:54

Figure 8.3-71: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, 256-QAM, ch1



Date: 18.NOV.2016 22:12:05

Figure 8.3-70: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 22:18:52

Figure 8.3-72: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, high channel, 256-QAM, ch1

Average value of the exceeding emission is –48.14 dBm.

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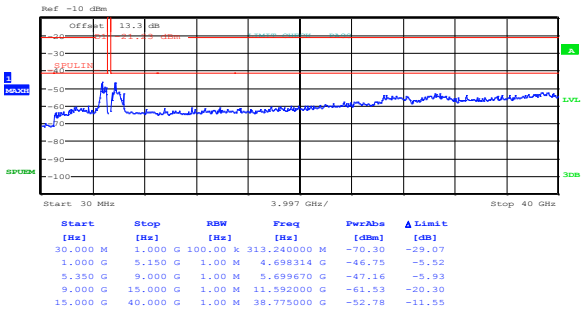
Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm

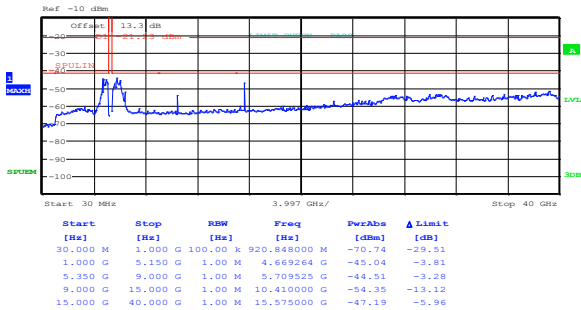
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

Plots below show EIRP trace measured using peak detector and compared with average limit. Where peak level of any emission has exceeded average limit line, that emission was then re-measured with RMS detector.



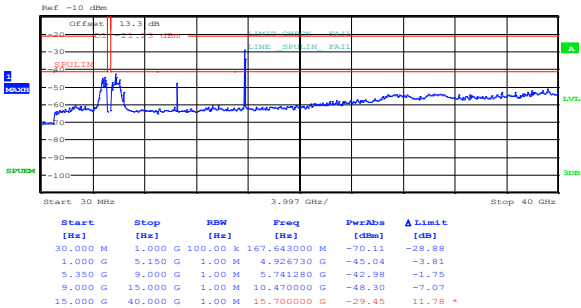
Date: 18.NOV.2016 21:56:38

Figure 8.3-73: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, low channel, BPSK, cho



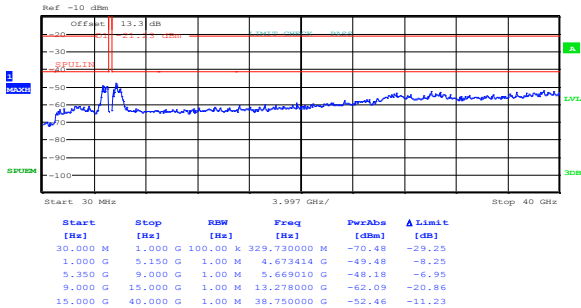
Date: 18.NOV.2016 21:59:24

Figure 8.3-74: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 22:01:57

Figure 8.3-75: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, high channel, BPSK, cho.



Date: 18.NOV.2016 22:09:48

Figure 8.3-76: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, low channel, BPSK, ch1

Average value of the exceeding emission is –52.01 dBm.

Section 8
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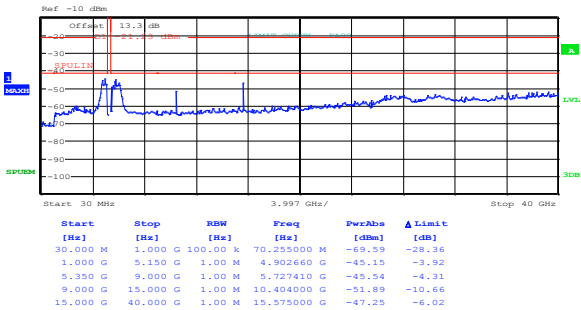
Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm

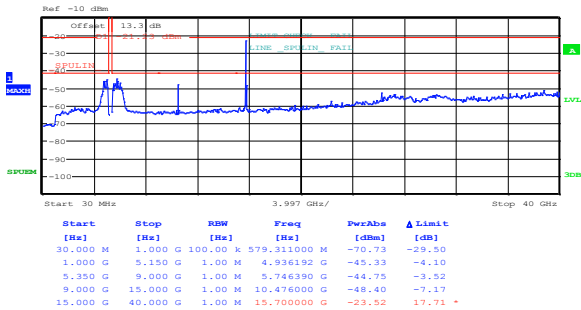
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

Plots below show EIRP trace measured using peak detector and compared with average limit. Where peak level of any emission has exceeded average limit line, that emission was then re-measured with RMS detector.



Date: 18.NOV.2016 22:07:53

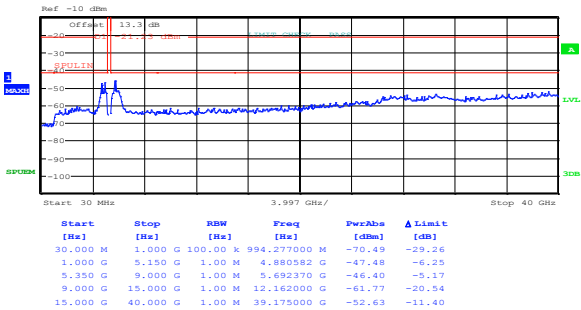
Figure 8.3-77: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, BPSK, ch1



Date: 18.NOV.2016 22:06:38

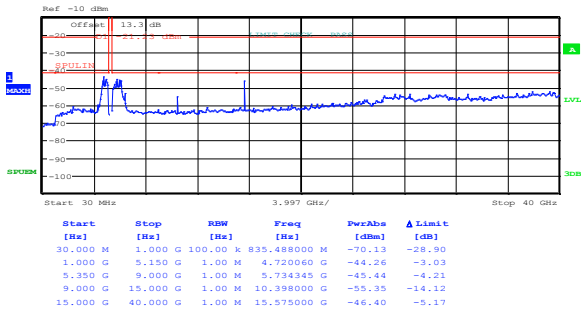
Figure 8.3-78: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, high channel, BPSK, ch1

Average value of the exceeding emission is –45.53 dBm.



Date: 18.NOV.2016 21:57:04

Figure 8.3-79: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, low channel, 256-QAM, cho



Date: 18.NOV.2016 21:57:50

Figure 8.3-80: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, 256-QAM, cho

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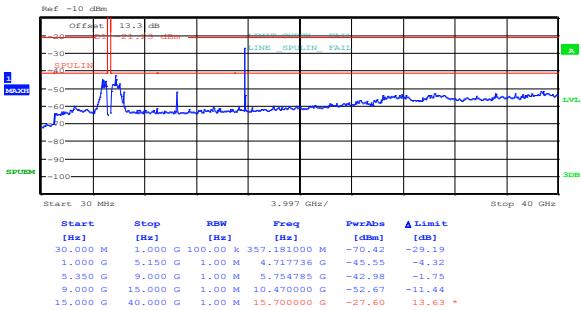
Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
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Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm

Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

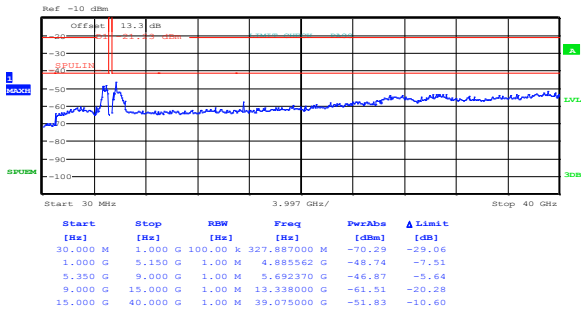
Plots below show EIRP trace measured using peak detector and compared with average limit. Where peak level of any emission has exceeded average limit line, that emission was then re-measured with RMS detector.



Date: 18.NOV.2016 22:04:25

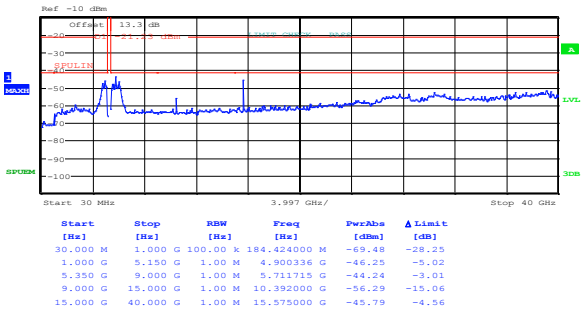
Figure 8.3-81: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, high channel, 256-QAM, cho

Average value of the exceeding emission is –49.66 dBm.



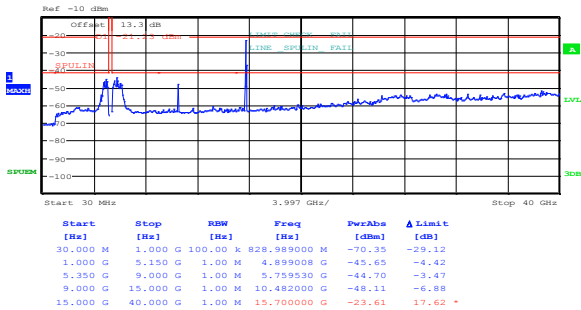
Date: 18.NOV.2016 22:09:24

Figure 8.3-82: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 22:08:29

Figure 8.3-83: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, 256-QAM, ch1



Date: 18.NOV.2016 22:06:01

Figure 8.3-84: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, high channel, 256-QAM, ch1

Average value of the exceeding emission is –44.12 dBm.

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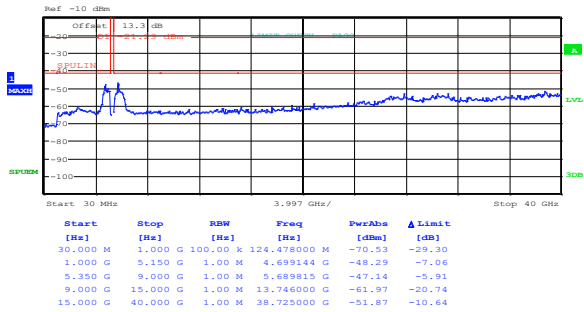
Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm

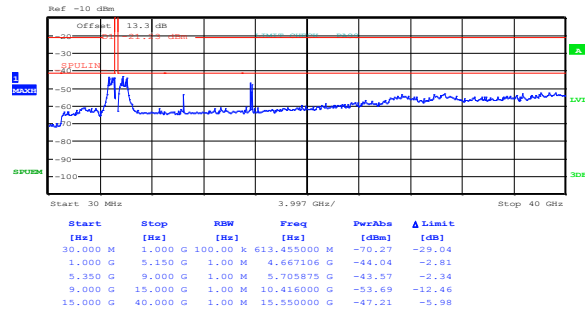
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

Plots below show EIRP trace measured using peak detector and compared with average limit. Where peak level of any emission has exceeded average limit line, that emission was then re-measured with RMS detector.



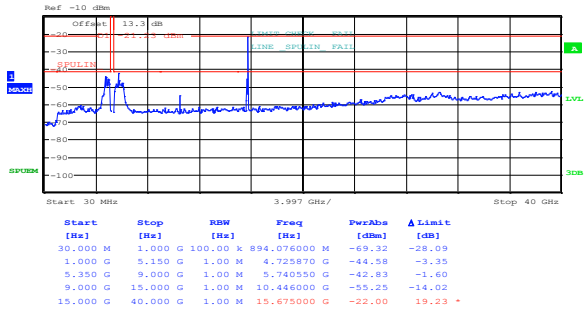
Date: 18.NOV.2016 21:54:14

Figure 8.3-85: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, low channel, BPSK, cho



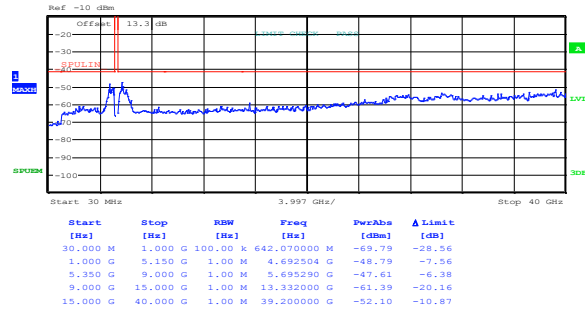
Date: 18.NOV.2016 21:52:41

Figure 8.3-86: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 21:51:29

Figure 8.3-87: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, high channel, BPSK, cho.



Date: 18.NOV.2016 21:17:51

Figure 8.3-88: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, low channel, BPSK, ch1

Average value of the exceeding emission is –42.04 dBm.

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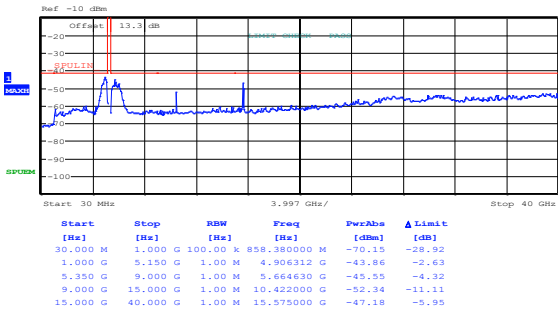
Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm

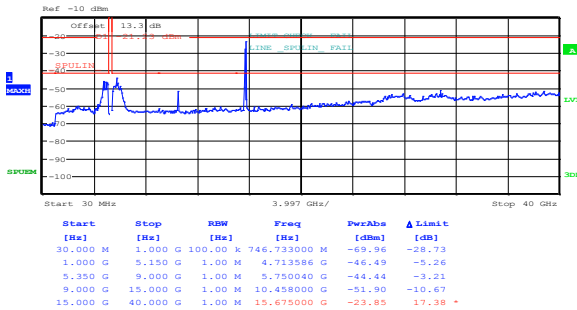
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

Plots below show EIRP trace measured using peak detector and compared with average limit. Where peak level of any emission has exceeded average limit line, that emission was then re-measured with RMS detector.



Date: 18.NOV.2016 21:19:08

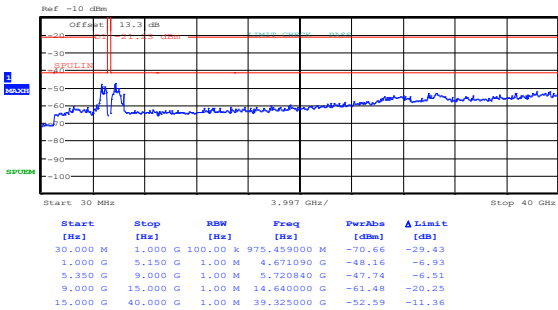
Figure 8.3-89: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, mid channel, BPSK, ch1



Date: 18.NOV.2016 21:46:25

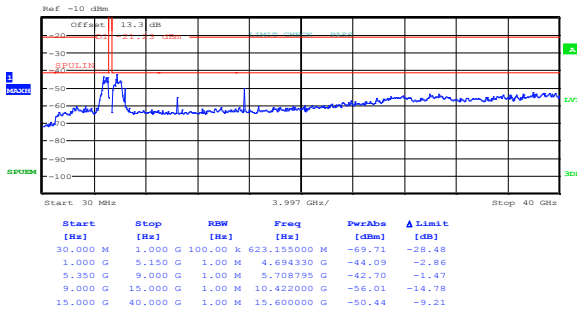
Figure 8.3-90: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, high channel, BPSK, ch1

Average value of the exceeding emission is –45.49 dBm.



Date: 18.NOV.2016 21:53:52

Figure 8.3-91: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, low channel, 256-QAM, cho



Date: 18.NOV.2016 21:53:10

Figure 8.3-92: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, mid channel, 256-QAM, cho

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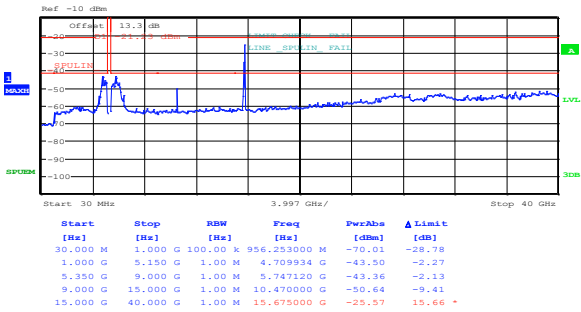
Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm

Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

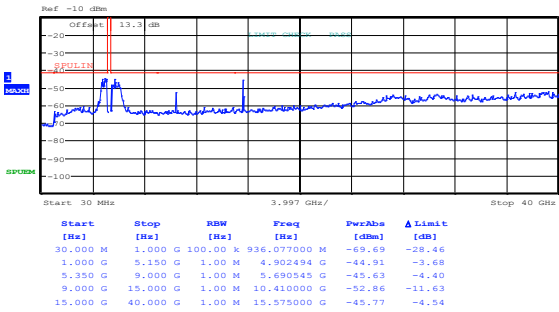
Plots below show EIRP trace measured using peak detector and compared with average limit. Where peak level of any emission has exceeded average limit line, that emission was then re-measured with RMS detector.



Date: 18.NOV.2016 21:50:07

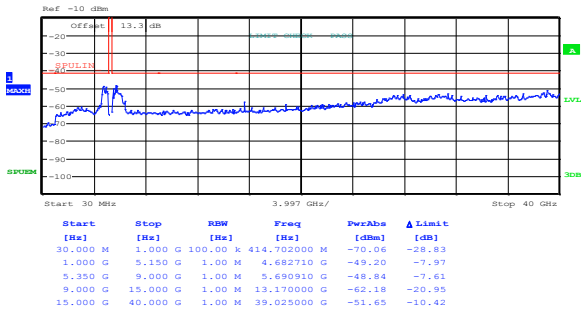
Figure 8.3-93: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, high channel, 256-QAM, cho

Average value of the exceeding emission is –46.41 dBm.



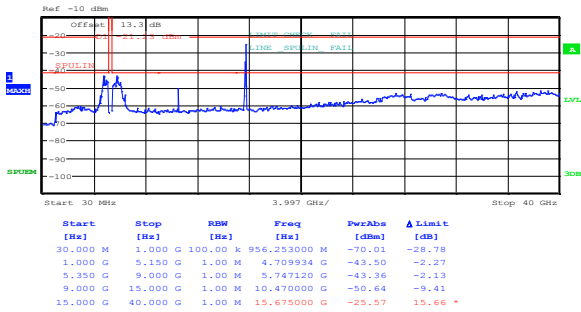
Date: 18.NOV.2016 21:19:38

Figure 8.3-95: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, mid channel, 256-QAM, ch1



Date: 18.NOV.2016 21:16:19

Figure 8.3-94: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, low channel, 256-QAM, ch1



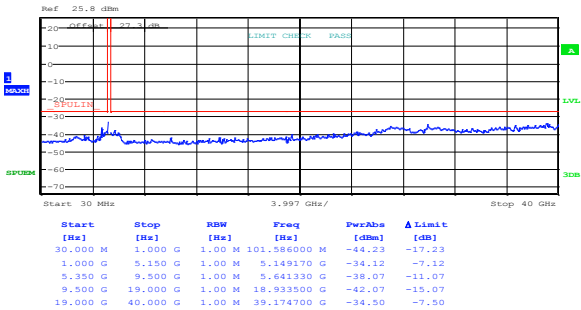
Date: 18.NOV.2016 21:50:07

Figure 8.3-96: Spurious emissions within restricted bands for 10 dBi antenna, 40 MHz channel, high channel, 256-QAM, ch1

Average value of the exceeding emission is –46.95 dBm.

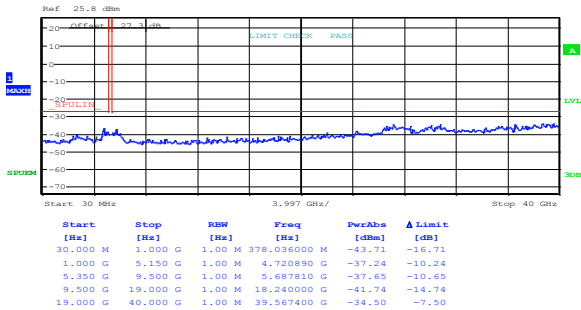
Section 8
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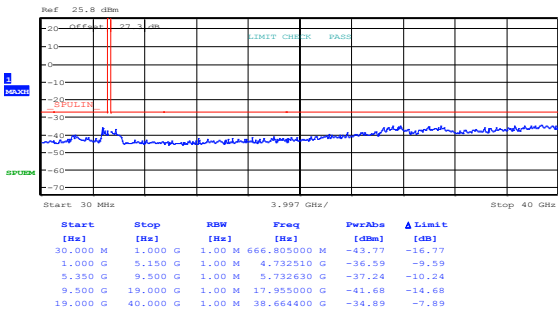
Date: 18.NOV.2016 18:22:28

Figure 8.3-97: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, low channel, BPSK, cho



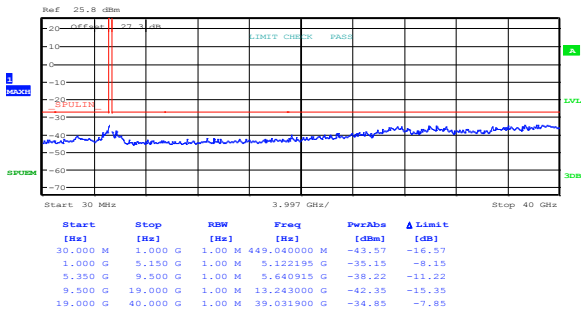
Date: 18.NOV.2016 18:21:52

Figure 8.3-98: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 18:20:09

Figure 8.3-99: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, high channel, BPSK, cho

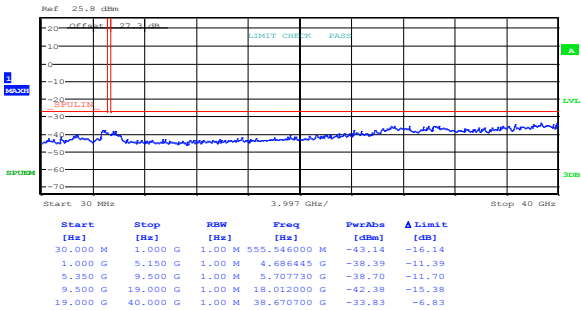


Date: 18.NOV.2016 17:49:44

Figure 8.3-100: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, low channel, BPSK, ch1

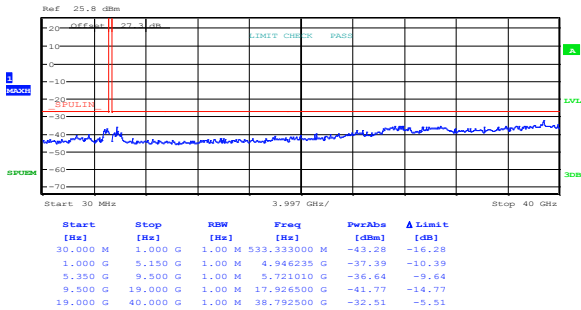
Section 8
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Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
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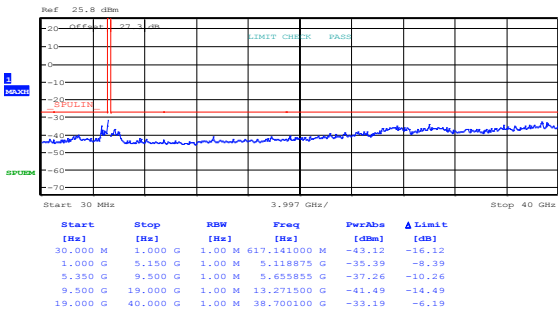
Date: 18.NOV.2016 17:50:17

Figure 8.3-101: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, mid channel, BPSK, ch1



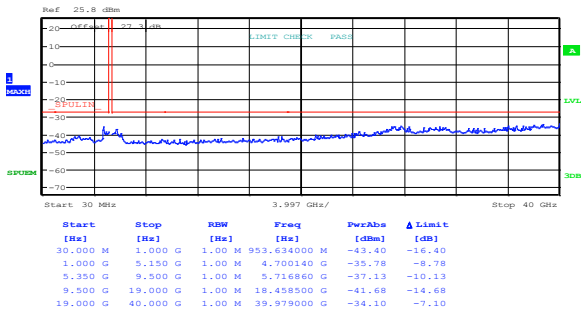
Date: 18.NOV.2016 18:19:28

Figure 8.3-102: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, high channel, BPSK, ch1



Date: 18.NOV.2016 18:22:51

Figure 8.3-103: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, low channel, 256-QAM, cho

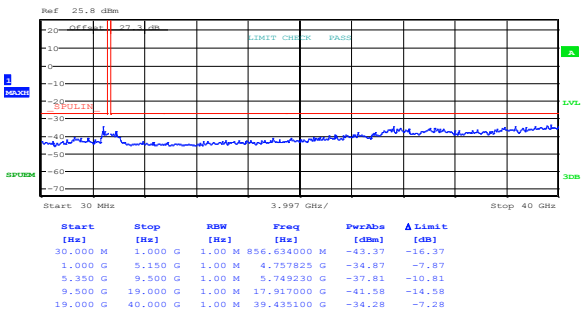


Date: 18.NOV.2016 18:21:24

Figure 8.3-104: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, mid channel, 256-QAM, cho

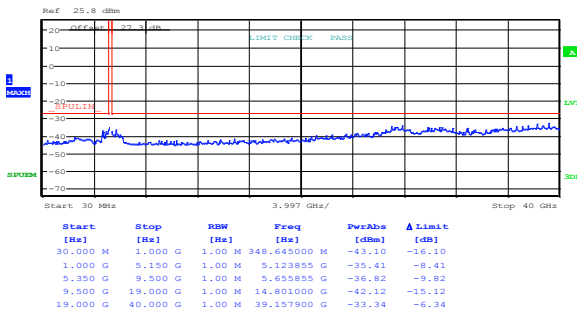
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
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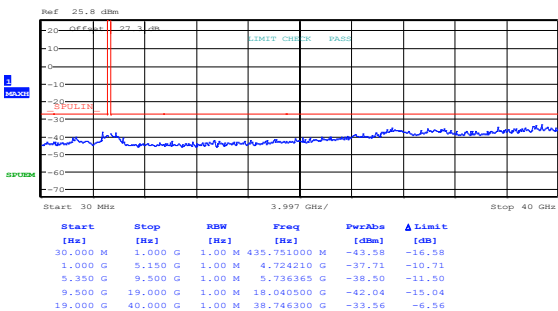
Date: 18.NOV.2016 18:20:47

Figure 8.3-105: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, high channel, 256-QAM, cho



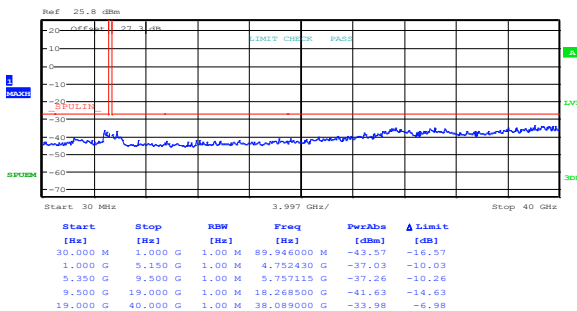
Date: 18.NOV.2016 17:48:30

Figure 8.3-106: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 17:51:52

Figure 8.3-107: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, mid channel, 256-QAM, ch1

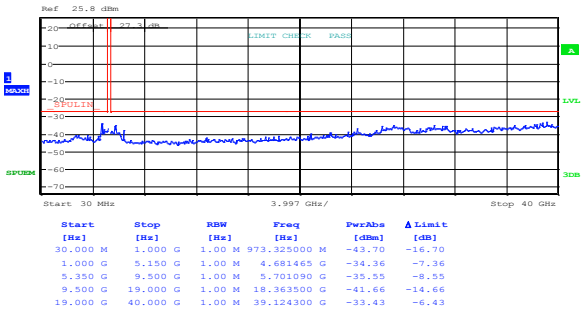


Date: 18.NOV.2016 18:19:05

Figure 8.3-108: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, high channel, 256-QAM, ch1

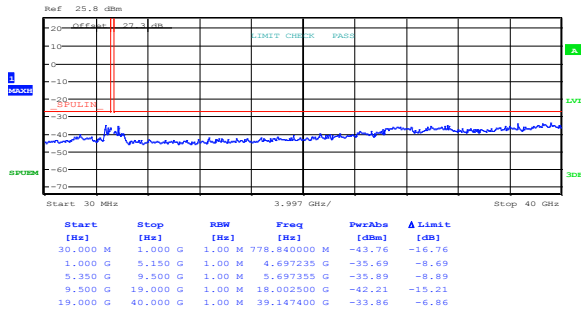
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
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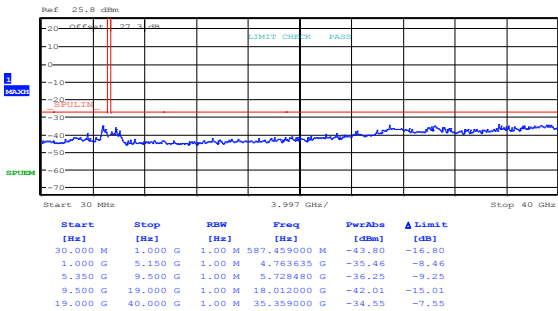
Date: 18.NOV.2016 18:24:19

Figure 8.3-109: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, low channel, BPSK, cho



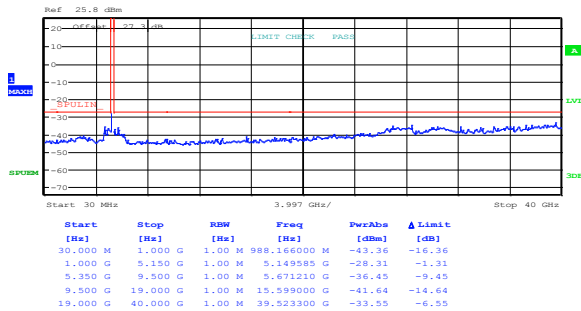
Date: 18.NOV.2016 18:24:58

Figure 8.3-110: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 18:26:19

Figure 8.3-111: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, high channel, BPSK, cho

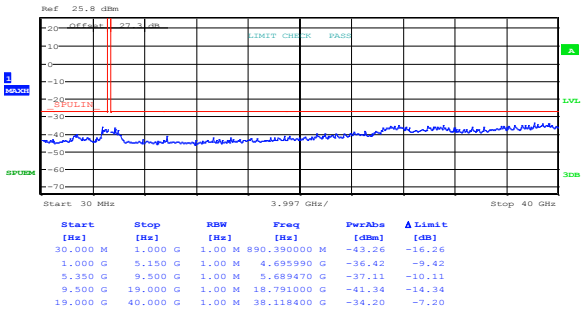


Date: 18.NOV.2016 18:28:46

Figure 8.3-112: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, low channel, BPSK, ch1

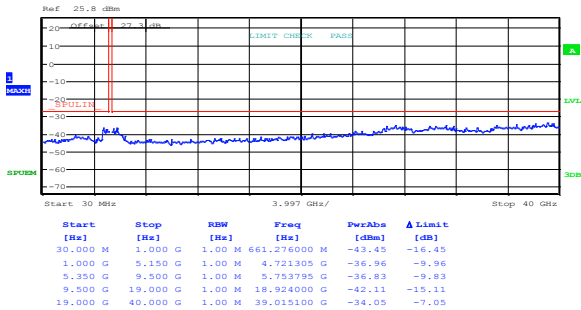
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



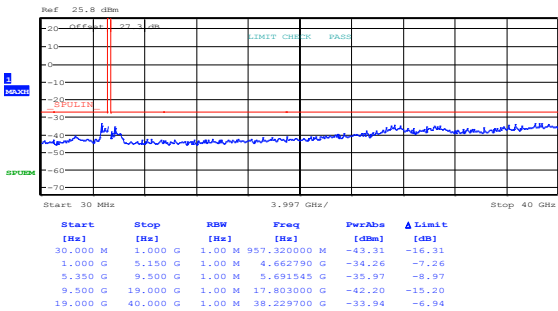
Date: 18.NOV.2016 18:28:11

Figure 8.3-113: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, mid channel, BPSK, ch1



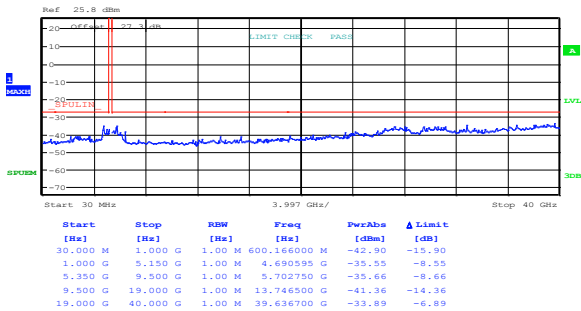
Date: 18.NOV.2016 18:26:50

Figure 8.3-114: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, high channel, BPSK, ch1



Date: 18.NOV.2016 18:23:48

Figure 8.3-115: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, low channel, 256-QAM, cho

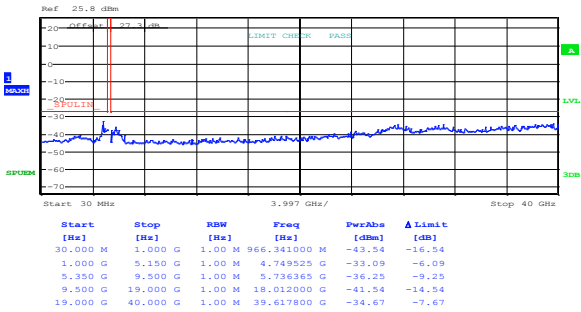


Date: 18.NOV.2016 18:25:19

Figure 8.3-116: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, mid channel, 256-QAM, cho

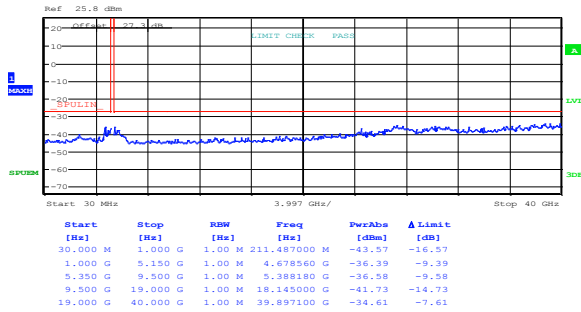
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
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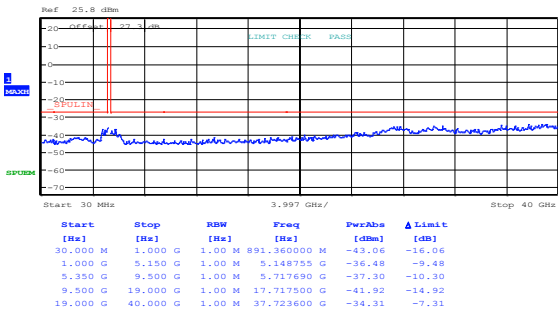
Date: 18.NOV.2016 18:25:55

Figure 8.3-117: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, high channel, 256-QAM, cho



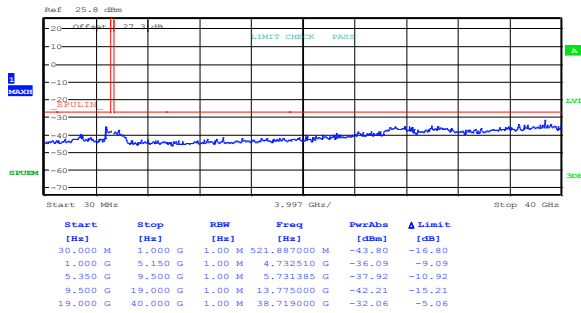
Date: 18.NOV.2016 18:29:08

Figure 8.3-118: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 18:27:46

Figure 8.3-119: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, mid channel, 256-QAM, ch1

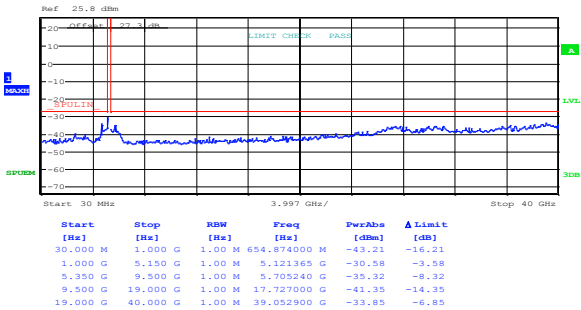


Date: 18.NOV.2016 18:27:12

Figure 8.3-120: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, high channel, 256-QAM, ch1

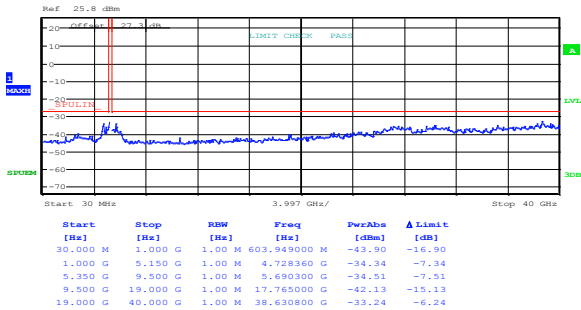
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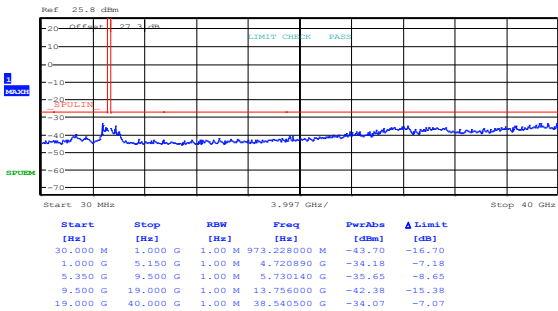
Date: 18.NOV.2016 18:46:16

Figure 8.3-121: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, low channel, BPSK, cho



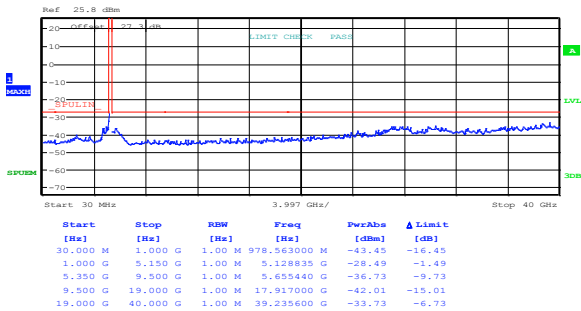
Date: 18.NOV.2016 18:42:59

Figure 8.3-122: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 18:44:23

Figure 8.3-123: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, high channel, BPSK, cho

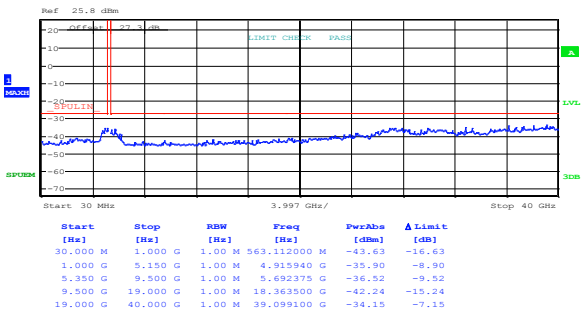


Date: 18.NOV.2016 18:36:56

Figure 8.3-124: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, low channel, BPSK, ch1

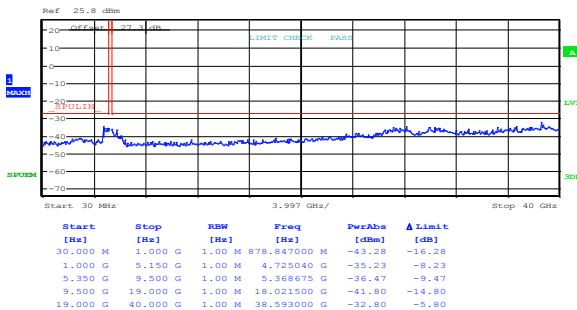
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



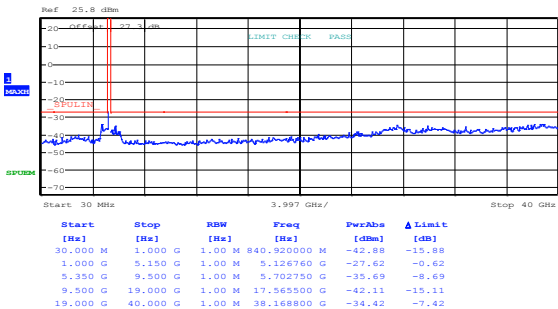
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Figure 8.3-125: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, mid channel, BPSK, ch1



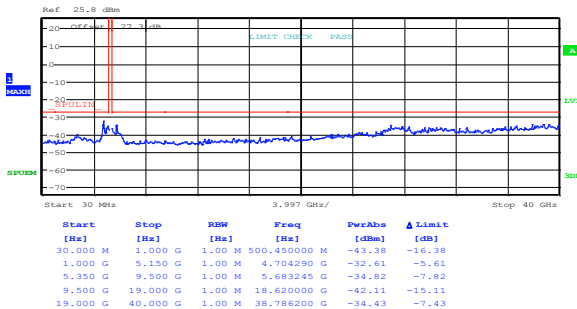
Date: 18.NOV.2016 18:35:46

Figure 8.3-126: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, high channel, BPSK, ch1



Date: 18.NOV.2016 18:48:15

Figure 8.3-127: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, low channel, 256-QAM, cho

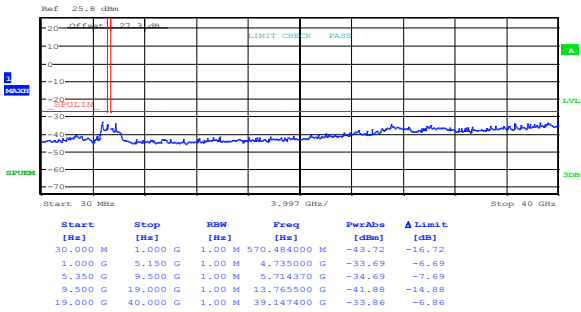


Date: 18.NOV.2016 18:43:29

Figure 8.3-128: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, mid channel, 256-QAM, cho

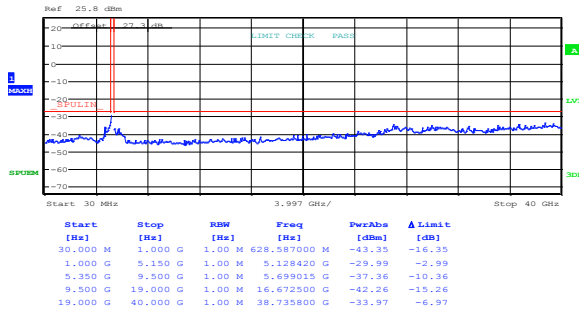
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



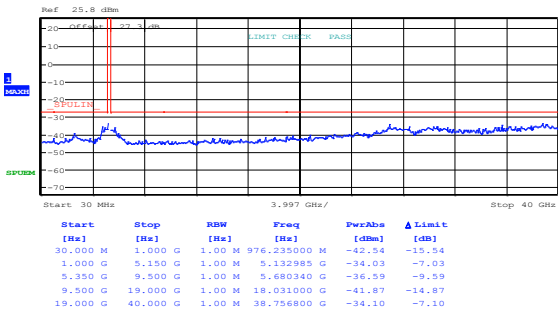
Date: 18.NOV.2016 18:44:02

Figure 8.3-129: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, high channel, 256-QAM, cho



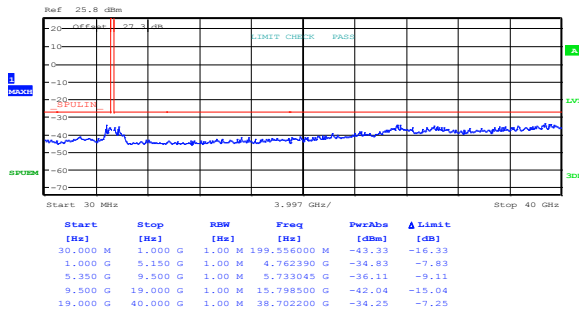
Date: 18.NOV.2016 18:38:44

Figure 8.3-130: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 18:39:42

Figure 8.3-131: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, mid channel, 256-QAM, ch1

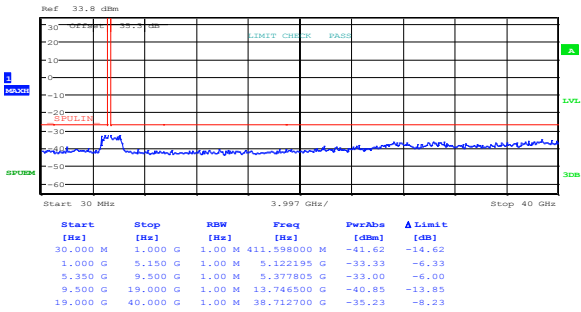


Date: 18.NOV.2016 18:35:22

Figure 8.3-132: Spurious emissions outside restricted bands for 24 dBi antenna, 40 MHz channel, high channel, 256-QAM, ch1

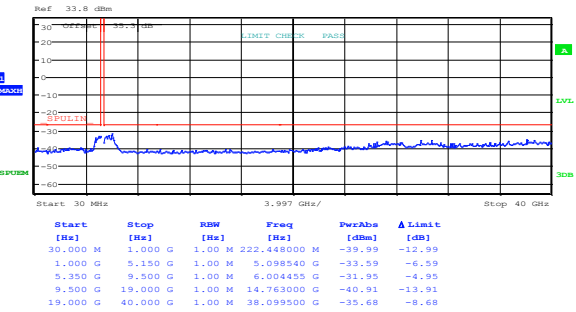
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



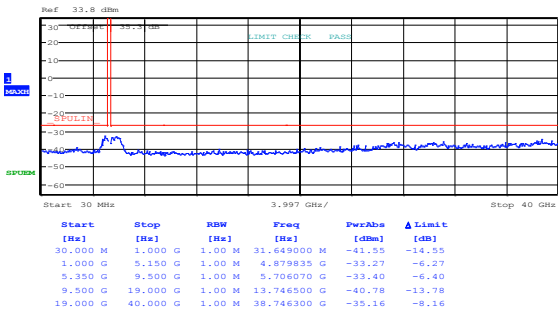
Date: 18.NOV.2016 19:18:28

Figure 8.3-133: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, low channel, BPSK, cho



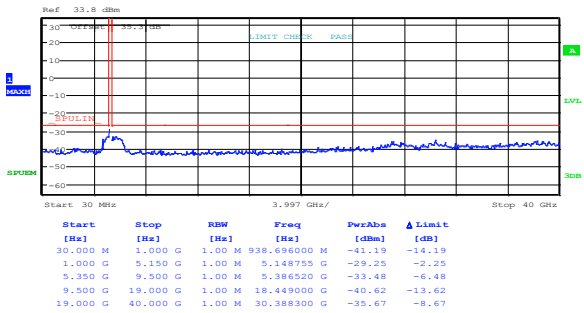
Date: 18.NOV.2016 19:17:49

Figure 8.3-134: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 19:16:09

Figure 8.3-135: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, high channel, BPSK, cho

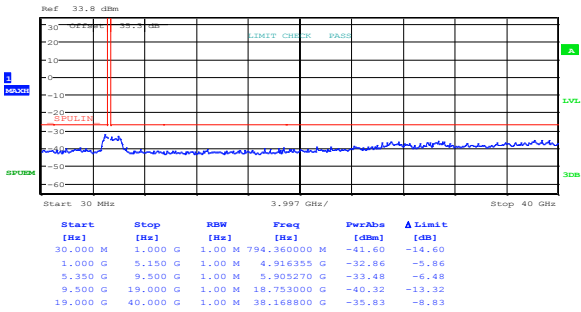


Date: 18.NOV.2016 19:13:25

Figure 8.3-136: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, low channel, BPSK, ch1

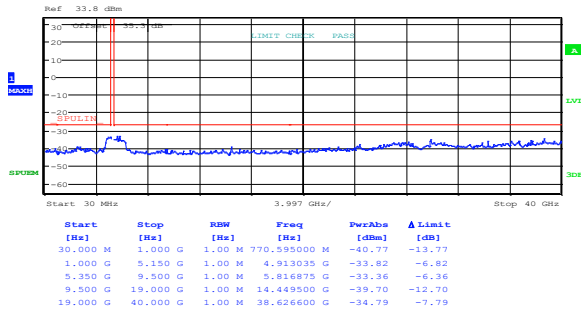
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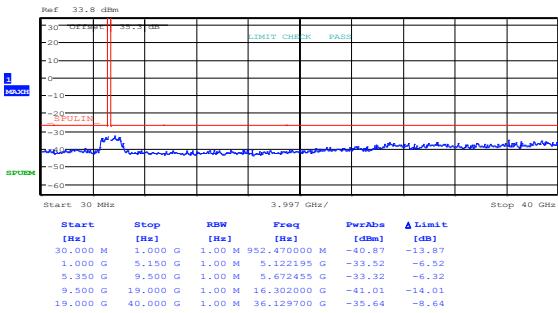
Date: 18.NOV.2016 19:14:02

Figure 8.3-137: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, BPSK, ch1



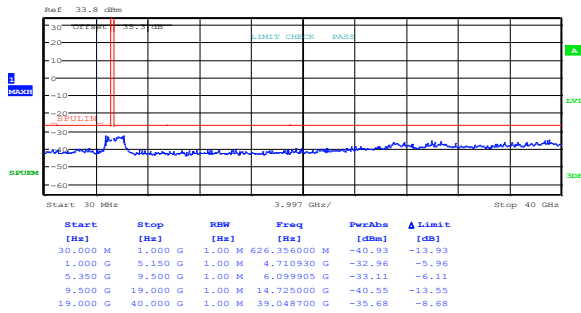
Date: 18.NOV.2016 19:15:34

Figure 8.3-138: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, high channel, BPSK, ch1



Date: 18.NOV.2016 19:18:54

Figure 8.3-139: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, low channel, 256-QAM, cho

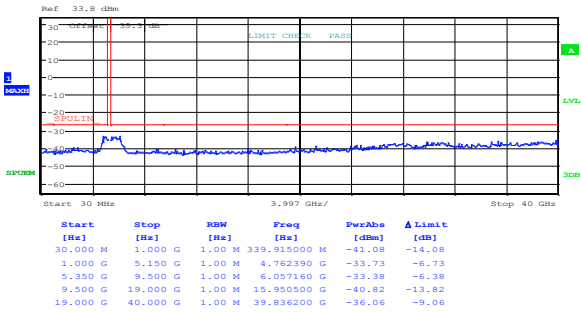


Date: 18.NOV.2016 19:17:06

Figure 8.3-140: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, 256-QAM, cho

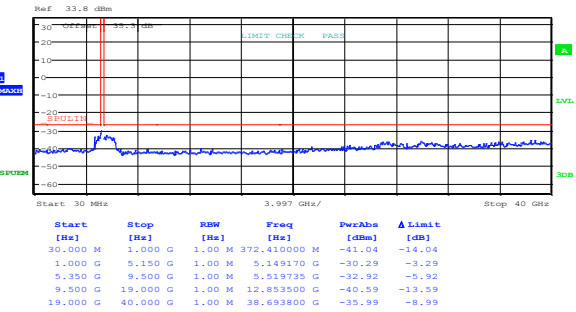
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



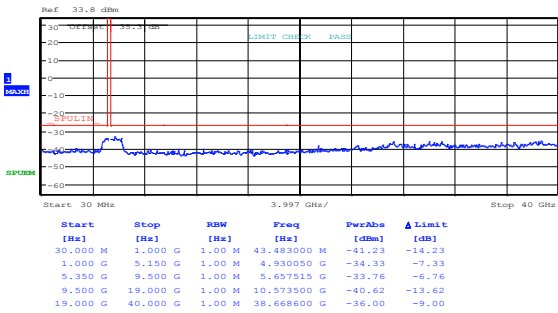
Date: 18.NOV.2016 19:16:34

Figure 8.3-141: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, high channel, 256-QAM, cho



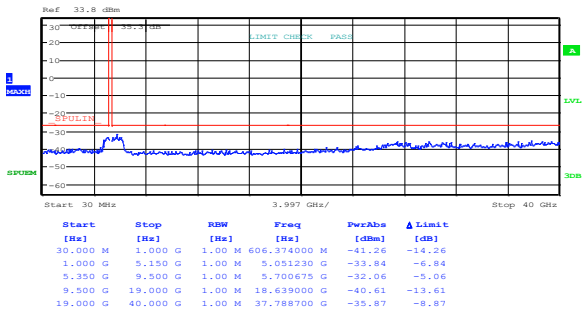
Date: 18.NOV.2016 19:12:52

Figure 8.3-142: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 19:14:27

Figure 8.3-143: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, 256-QAM, ch1

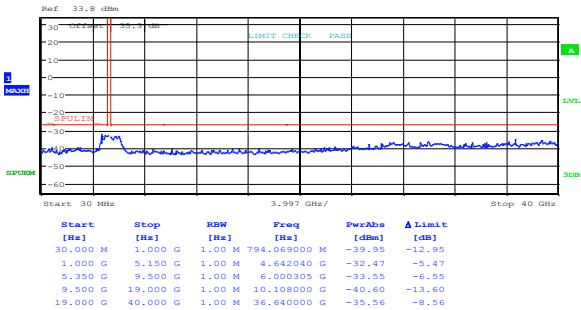


Date: 18.NOV.2016 19:15:05

Figure 8.3-144: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, high channel, 256-QAM, ch1

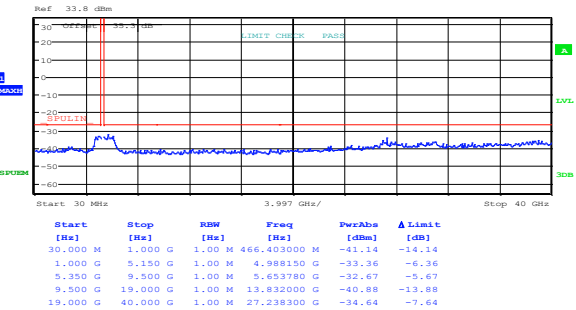
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



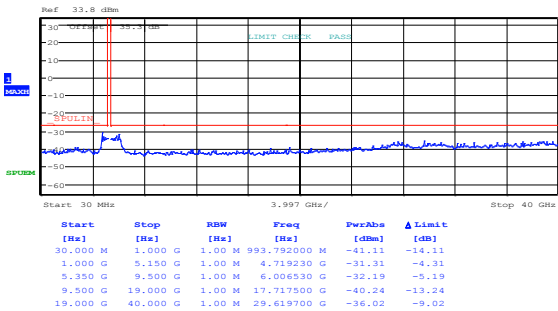
Date: 18.NOV.2016 18:58:28

Figure 8.3-145: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, low channel, BPSK, cho



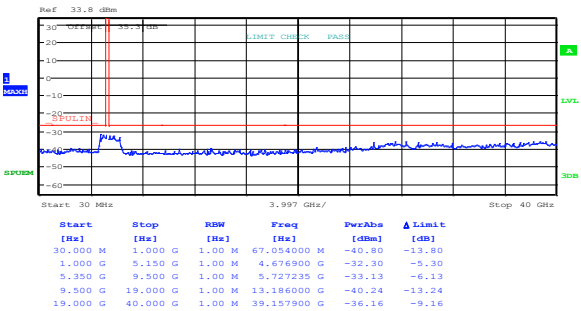
Date: 18.NOV.2016 18:57:52

Figure 8.3-146: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 18:55:56

Figure 8.3-147: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, high channel, BPSK, cho

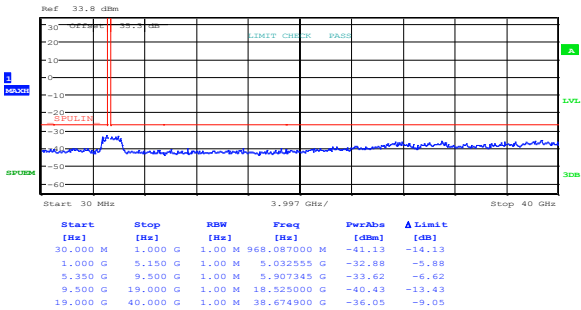


Date: 18.NOV.2016 19:03:29

Figure 8.3-148: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, low channel, BPSK, ch1

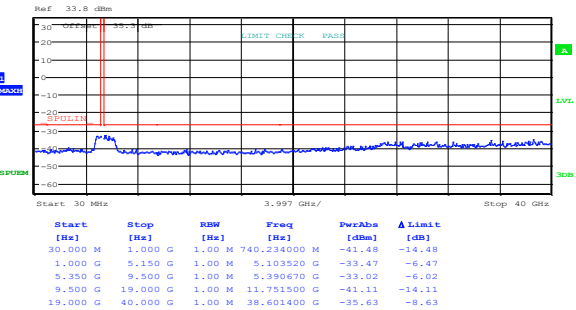
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



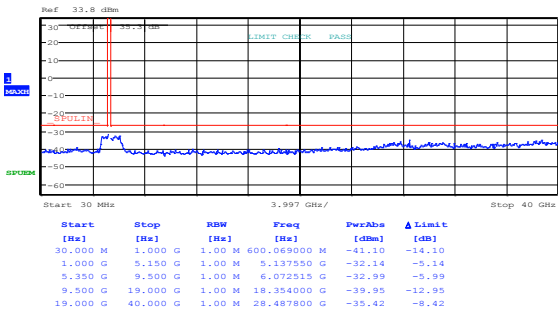
Date: 18.NOV.2016 19:04:18

Figure 8.3-149: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, BPSK, ch1



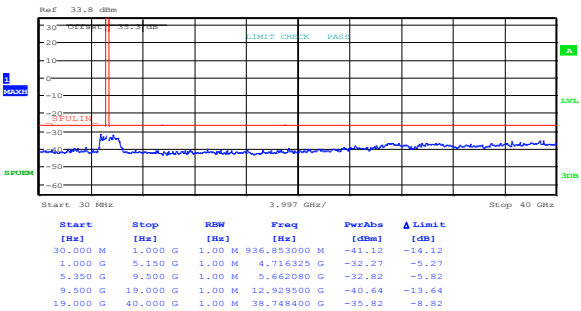
Date: 18.NOV.2016 19:06:41

Figure 8.3-150: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, high channel, BPSK, ch1



Date: 18.NOV.2016 18:59:03

Figure 8.3-151: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, low channel, 256-QAM, cho

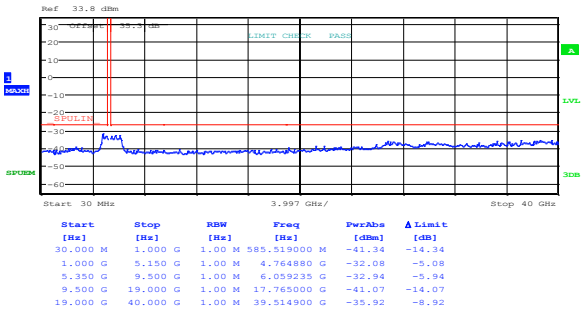


Date: 18.NOV.2016 18:57:21

Figure 8.3-152: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, 256-QAM, cho

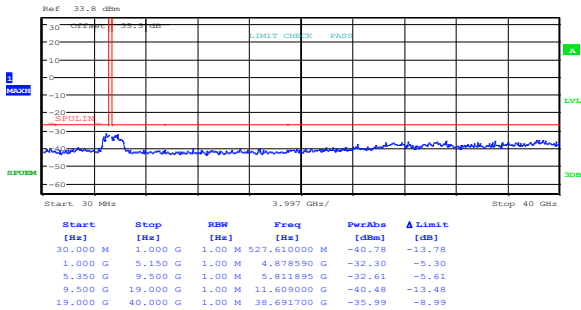
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



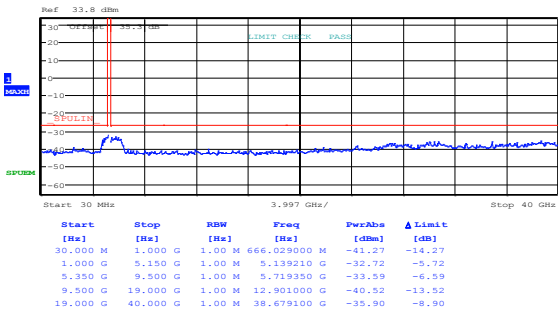
Date: 18.NOV.2016 18:56:27

Figure 8.3-153: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, high channel, 256-QAM, cho



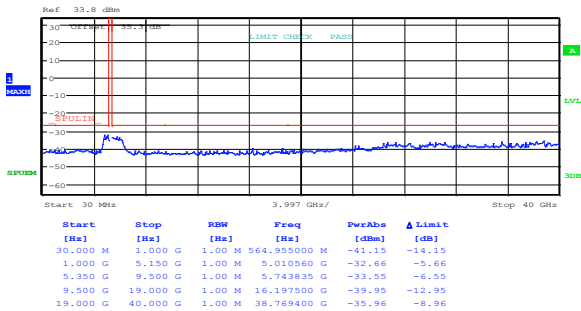
Date: 18.NOV.2016 19:00:03

Figure 8.3-154: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 19:04:43

Figure 8.3-155: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, 256-QAM, ch1

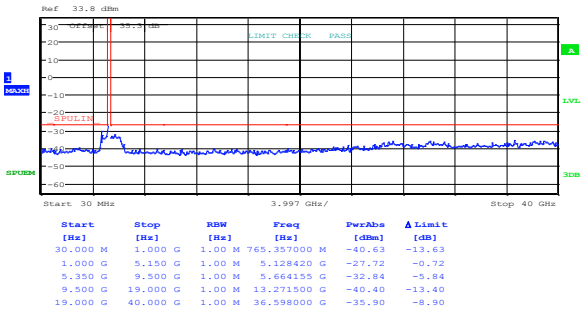


Date: 18.NOV.2016 19:06:18

Figure 8.3-156: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, high channel, 256-QAM, ch1

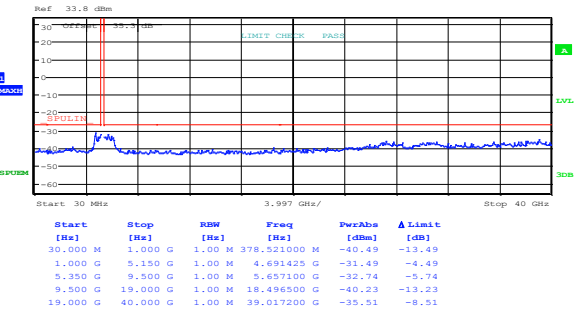
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



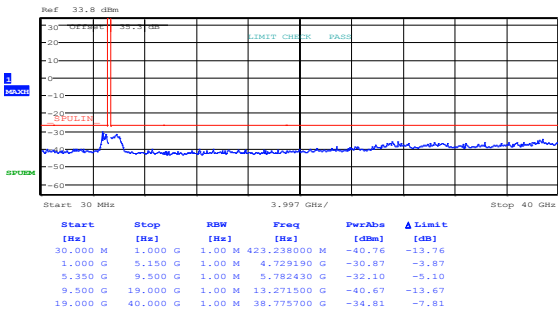
Date: 18.NOV.2016 18:52:06

Figure 8.3-157: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, low channel, BPSK, cho



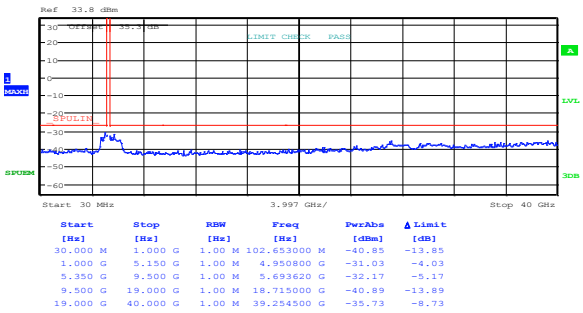
Date: 18.NOV.2016 18:52:39

Figure 8.3-158: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, mid channel, BPSK, cho



Date: 18.NOV.2016 18:54:36

Figure 8.3-159: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, high channel, BPSK, cho

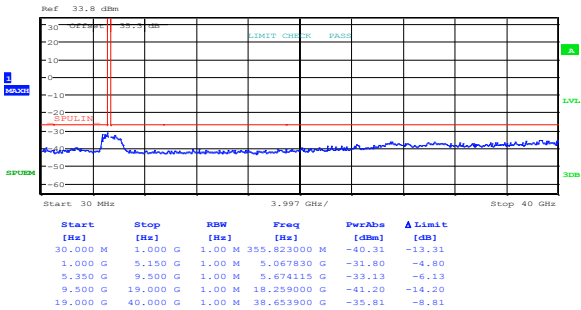


Date: 18.NOV.2016 19:10:13

Figure 8.3-160: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, low channel, BPSK, ch1

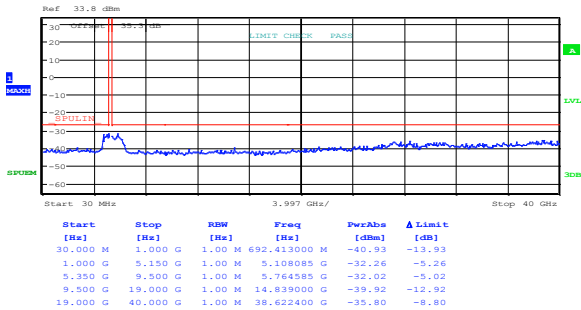
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



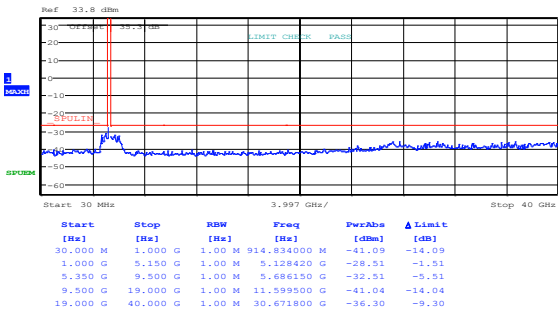
Date: 18.NOV.2016 19:09:17

Figure 8.3-161: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, mid channel, BPSK, ch1



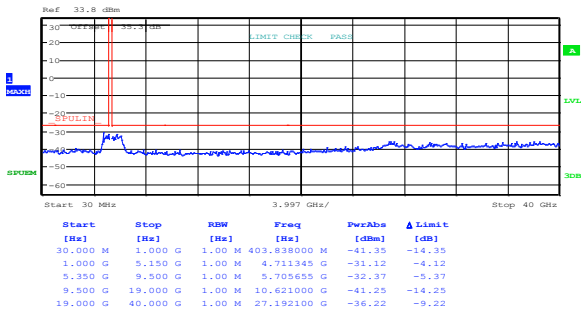
Date: 18.NOV.2016 19:07:50

Figure 8.3-162: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, high channel, BPSK, ch1



Date: 18.NOV.2016 18:51:00

Figure 8.3-163: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, low channel, 256-QAM, cho

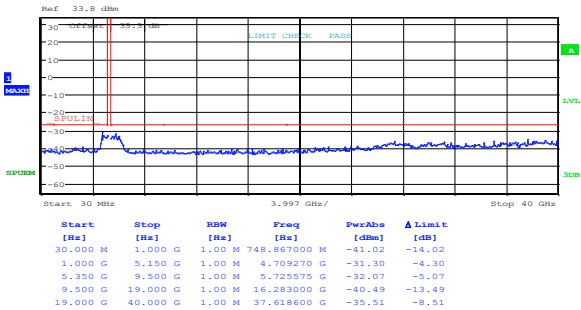


Date: 18.NOV.2016 18:53:00

Figure 8.3-164: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, mid channel, 256-QAM, cho

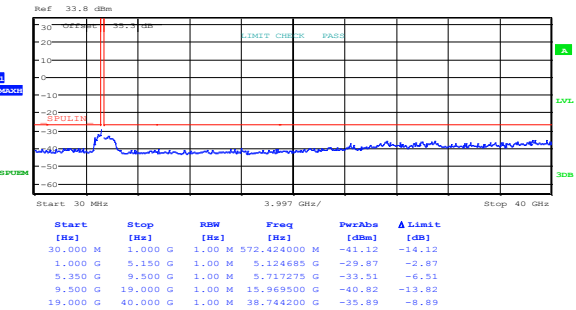
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



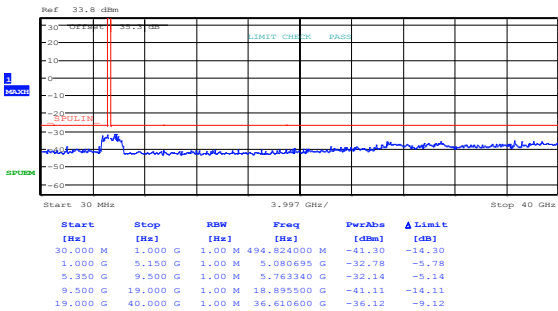
Date: 18.NOV.2016 18:54:17

Figure 8.3-165: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, high channel, 256-QAM, cho



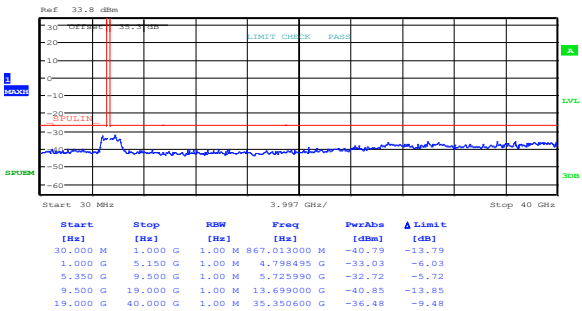
Date: 18.NOV.2016 19:11:39

Figure 8.3-166: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, low channel, 256-QAM, ch1



Date: 18.NOV.2016 19:08:52

Figure 8.3-167: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, mid channel, 256-QAM, ch1

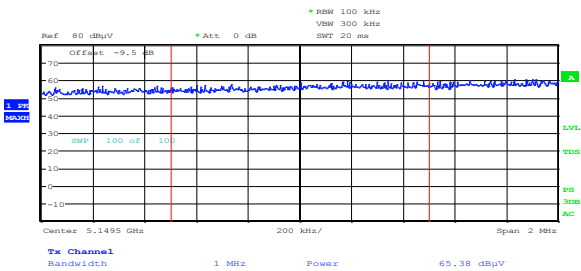


Date: 18.NOV.2016 19:08:18

Figure 8.3-168: Spurious emissions outside restricted bands for 32 dBi antenna, 40 MHz channel, high channel, 256-QAM, ch1

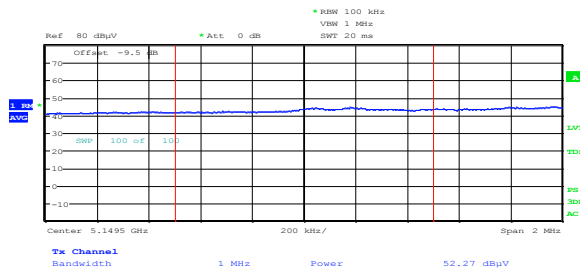
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



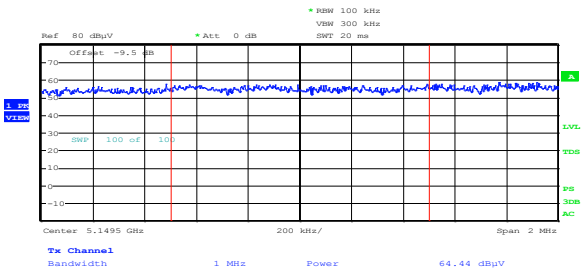
Date: 16.NOV.2016 14:43:28

Figure 8.3-169: Spurious restricted band edge emission at 5150 MHz, 24 dBi antenna, 10 MHz channel, peak



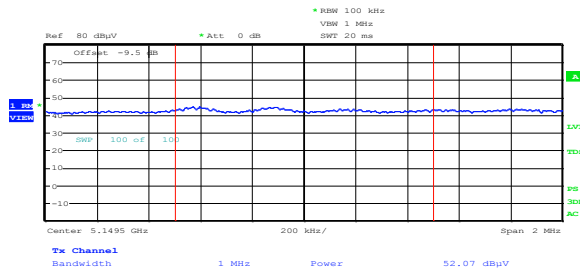
Date: 16.NOV.2016 14:43:26

Figure 8.3-170: Spurious restricted band edge emission at 5150 MHz, 24 dBi antenna, 10 MHz channel, average



Date: 16.NOV.2016 14:44:36

Figure 8.3-171: Spurious restricted band edge emission at 5150 MHz, 24 dBi antenna, 20 MHz channel, peak



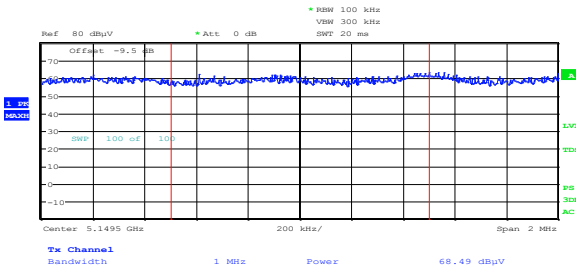
Date: 16.NOV.2016 14:45:02

Figure 8.3-172: Spurious restricted band edge emission at 5150 MHz, 24 dBi antenna, 20 MHz channel, average

Note: Measurement results shown on the plots above were performed at the distance of 1 m in order to improve signal-to-noise ratio.

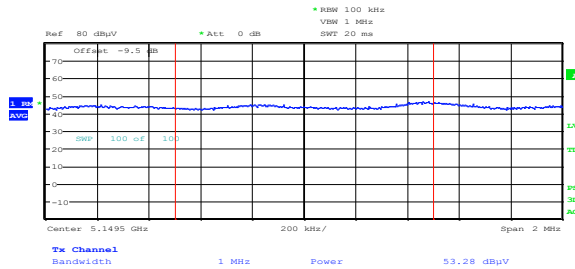
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



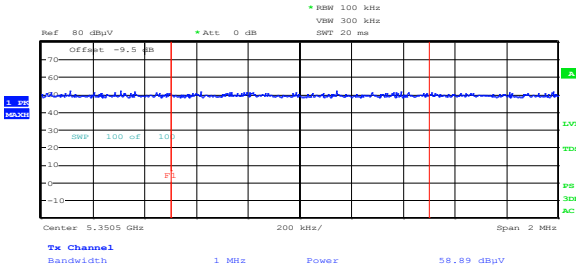
Date: 16.NOV.2016 14:49:25

Figure 8.3-173: Spurious restricted band edge emission at 5150 MHz, 24 dBi antenna, 40 MHz channel, peak



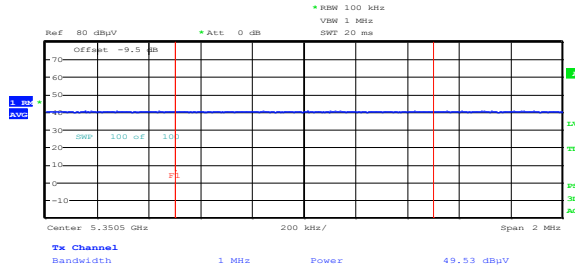
Date: 16.NOV.2016 14:49:00

Figure 8.3-174: Spurious restricted band edge emission at 5150 MHz, 24 dBi antenna, 40 MHz channel, average



Date: 16.NOV.2016 15:05:55

Figure 8.3-175: Spurious restricted band edge emission at 5350 MHz, 24 dBi antenna, 10 MHz channel, peak



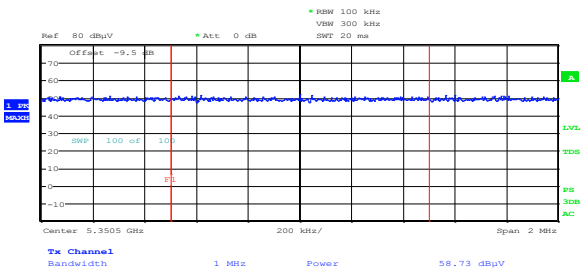
Date: 16.NOV.2016 15:06:09

Figure 8.3-176: Spurious restricted band edge emission at 5350 MHz, 24 dBi antenna, 10 MHz channel, average

Note: Measurement results shown on the plots above were performed at the distance of 1 m in order to improve signal-to-noise ratio.

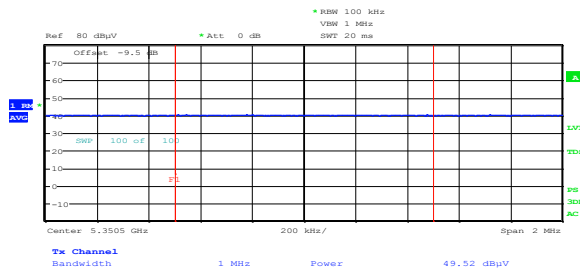
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



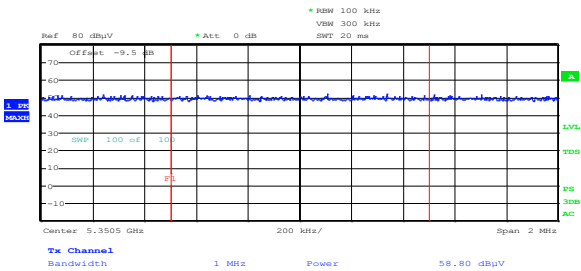
Date: 16.NOV.2016 15:04:54

Figure 8.3-177: Spurious restricted band edge emission at 5350 MHz, 24 dBi antenna, 20 MHz channel, peak



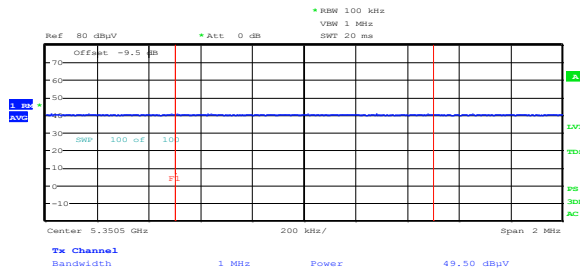
Date: 16.NOV.2016 15:04:37

Figure 8.3-178: Spurious restricted band edge emission at 5350 MHz, 24 dBi antenna, 20 MHz channel, average



Date: 16.NOV.2016 14:58:40

Figure 8.3-179: Spurious restricted band edge emission at 5350 MHz, 24 dBi antenna, 40 MHz channel, peak



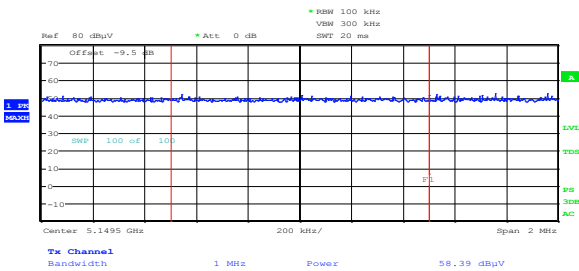
Date: 16.NOV.2016 14:58:52

Figure 8.3-180: Spurious restricted band edge emission at 5350 MHz, 24 dBi antenna, 40 MHz channel, average

Note: Measurement results shown on the plots above were performed at the distance of 1 m in order to improve signal-to-noise ratio.

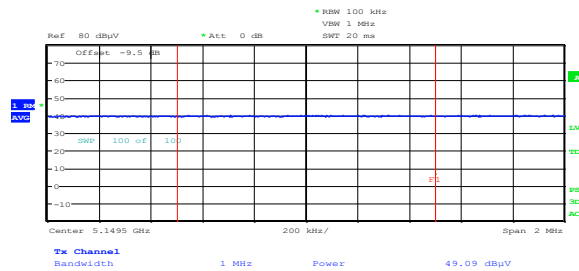
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



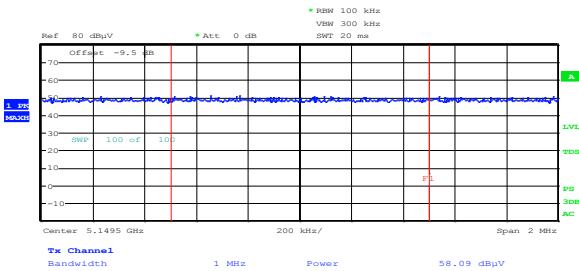
Date: 16.NOV.2016 15:22:24

Figure 8.3-181: Spurious restricted band edge emission at 5150 MHz, 32 dBi antenna, 10 MHz channel, peak



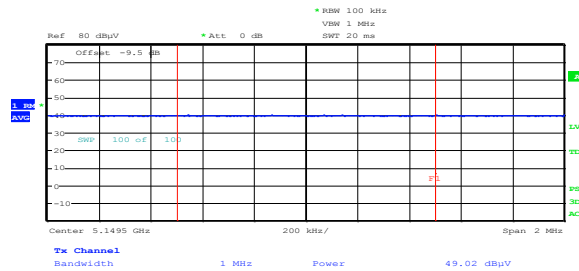
Date: 16.NOV.2016 15:22:39

Figure 8.3-182: Spurious restricted band edge emission at 5150 MHz, 32 dBi antenna, 10 MHz channel, average



Date: 16.NOV.2016 15:21:37

Figure 8.3-183: Spurious restricted band edge emission at 5150 MHz, 32 dBi antenna, 20 MHz channel, peak



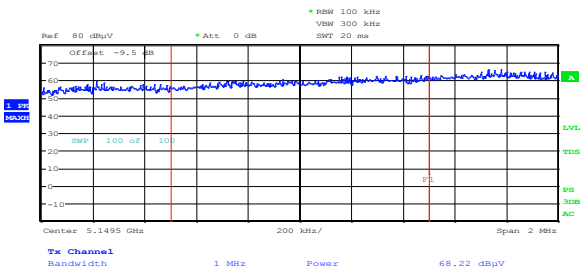
Date: 16.NOV.2016 15:21:21

Figure 8.3-184: Spurious restricted band edge emission at 5150 MHz, 32 dBi antenna, 20 MHz channel, average

Note: Measurement results shown on the plots above were performed at the distance of 1 m in order to improve signal-to-noise ratio.

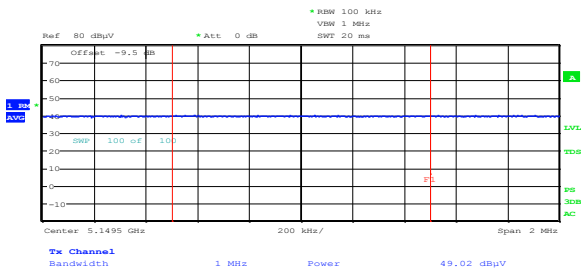
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



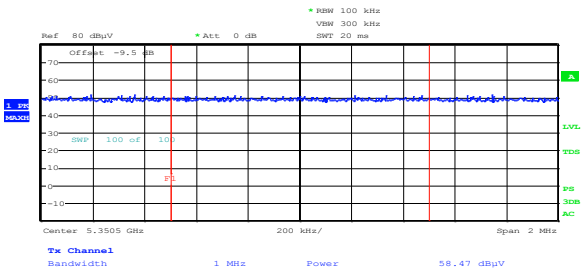
Date: 16.NOV.2016 15:19:59

Figure 8.3-185: Spurious restricted band edge emission at 5150 MHz, 32 dBi antenna, 40 MHz channel, peak



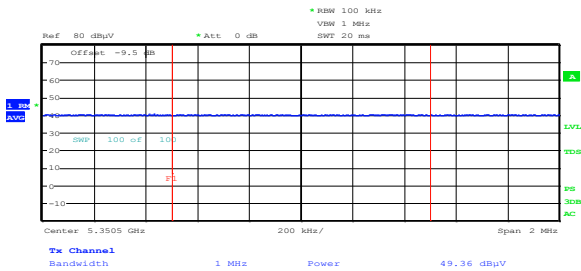
Date: 16.NOV.2016 15:21:13

Figure 8.3-186: Spurious restricted band edge emission at 5150 MHz, 32 dBi antenna, 40 MHz channel, average



Date: 16.NOV.2016 15:17:08

Figure 8.3-187: Spurious restricted band edge emission at 5350 MHz, 32 dBi antenna, 10 MHz channel, peak



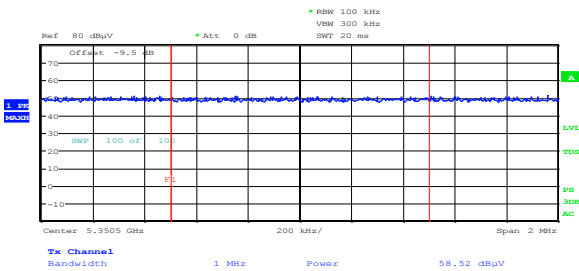
Date: 16.NOV.2016 15:16:52

Figure 8.3-188: Spurious restricted band edge emission at 5350 MHz, 32 dBi antenna, 10 MHz channel, average

Note: Measurement results shown on the plots above were performed at the distance of 1 m in order to improve signal-to-noise ratio.

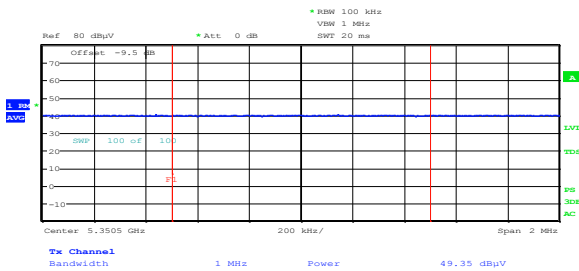
Section 8
Test name
Specification

Testing data
FCC 15.407(b) Undesirable (unwanted) emissions
FCC Part 15 Subpart E



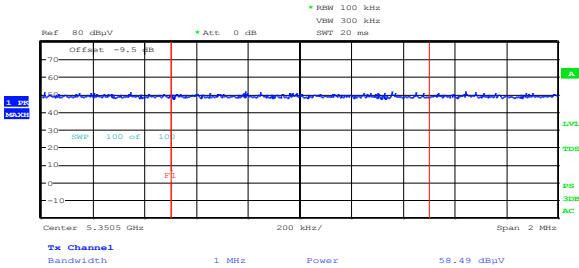
Date: 16.NOV.2016 15:17:56

Figure 8.3-189: Spurious restricted band edge emission at 5350 MHz, 32 dBi antenna, 20 MHz channel, peak



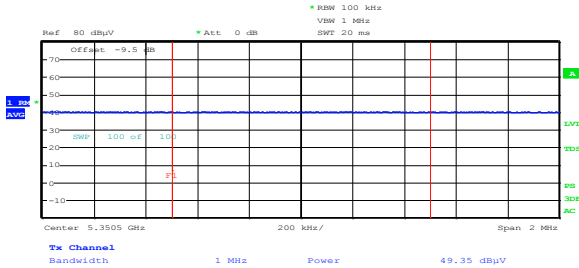
Date: 16.NOV.2016 15:18:09

Figure 8.3-190: Spurious restricted band edge emission at 5350 MHz, 32 dBi antenna, 20 MHz channel, average



Date: 16.NOV.2016 15:19:13

Figure 8.3-191: Spurious restricted band edge emission at 5350 MHz, 32 dBi antenna, 40 MHz channel, peak



Date: 16.NOV.2016 15:18:58

Figure 8.3-192: Spurious restricted band edge emission at 5350 MHz, 32 dBi antenna, 40 MHz channel, average

Note: Measurement results shown on the plots above were performed at the distance of 1 m in order to improve signal-to-noise ratio.

Table 8.3-3: Radiated field strength measurement results outside restricted bands for 10 dBi antenna

Channel	Frequency, MHz	Peak Field strength, dBμV/m	Limit, dBμV/m	Margin, dB
10 MHz, low	10330	57.13	68.23	11.10
10 MHz, mid	10400	57.71	68.23	10.52
10 MHz, high	10490	65.20	68.23	3.03
20 MHz, low	10350	55.99	68.23	12.24
20 MHz, mid	10400	57.88	68.23	10.35
20 MHz, high	10480	60.51	68.23	7.72
40 MHz, low	10370	54.60	68.23	13.63
40 MHz, mid	10400	56.27	68.23	11.96
40 MHz, high	10460	57.23	68.23	11.00

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
3 m field strength limit line equivalent is: $-27 \text{ dBm/MHz} + 95.23 \text{ dB} = 68.23 \text{ dBμV/m}$ per 1 MHz.

Table 8.3-4: Radiated field strength measurement results outside restricted bands measured with 24 dBi antenna

Channel	Frequency, MHz	Peak Field strength, dBμV/m	Limit, dBμV/m	Margin, dB
10 MHz, low	10330	66.21	68.23	2.02
10 MHz, mid	10400	65.87	68.23	2.36
10 MHz, high	10490	65.68	68.23	2.55
20 MHz, low	10350	64.75	68.23	3.48
20 MHz, mid	10400	67.18	68.23	1.05
20 MHz, high	10480	64.39	68.23	3.84
40 MHz, low	10370	61.74	68.23	6.49
40 MHz, mid	10400	64.75	68.23	3.48
40 MHz, high	10460	64.37	68.23	3.86

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
3 m field strength limit line equivalent is: $-27 \text{ dBm/MHz} + 95.23 \text{ dB} = 68.23 \text{ dBμV/m}$ per 1 MHz.

Table 8.3-5: Radiated field strength measurement results outside restricted bands measured with 32 dBi antenna

Channel	Frequency, MHz	Peak Field strength, dBμV/m	Limit, dBμV/m	Margin, dB
10 MHz, low	10330	63.84	68.23	4.39
10 MHz, mid	10400	63.33	68.23	4.90
10 MHz, high	10490	63.62	68.23	4.61
20 MHz, low	10350	62.36	68.23	5.87
20 MHz, mid	10400	67.13	68.23	1.10
20 MHz, high	10480	64.36	68.23	3.87
40 MHz, low	10370	60.81	68.23	7.42
40 MHz, mid	10400	61.47	68.23	6.76
40 MHz, high	10460	63.71	68.23	4.52

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
3 m field strength limit line equivalent is: $-27 \text{ dBm/MHz} + 95.23 \text{ dB} = 68.23 \text{ dBμV/m}$ per 1 MHz.

Table 8.3-6: Radiated field strength measurement results within restricted bands measured with 24 dBi antenna

Channel	Frequency, MHz	Peak Field strength, dBµV/m	Peak limit, dBµV/m	Margin, dB	Average Field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
10 MHz, low	15480	66.99	74.00	7.01	41.99	54.00	12.01
10 MHz, mid	15600	65.97	74.00	8.03	40.97	54.00	13.03
10 MHz, high	15735	66.67	74.00	7.33	41.67	54.00	12.33
20 MHz, low	15510	64.07	74.00	9.93	39.07	54.00	14.93
20 MHz, mid	15600	67.12	74.00	6.88	42.12	54.00	11.88
20 MHz, high	15720	65.23	74.00	8.77	40.23	54.00	13.77
40 MHz, low	15510	67.57	74.00	6.43	42.57	54.00	11.43
40 MHz, mid	15600	64.79	74.00	9.21	39.79	54.00	14.21
40 MHz, high	15690	64.11	74.00	9.89	39.11	54.00	14.89

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

Table 8.3-7: Radiated field strength measurement results within restricted bands measured with 32 dBi antenna

Channel	Frequency, MHz	Peak Field strength, dBµV/m	Peak limit, dBµV/m	Margin, dB	Average Field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
10 MHz, low	15480	68.81	74.00	5.19	43.81	54.00	10.19
10 MHz, mid	15600	67.33	74.00	6.67	42.33	54.00	11.67
10 MHz, high	15735	65.68	74.00	8.32	40.68	54.00	13.32
20 MHz, low	15510	68.27	74.00	5.73	43.27	54.00	10.73
20 MHz, mid	15600	67.26	74.00	6.74	42.26	54.00	11.74
20 MHz, high	15720	65.33	74.00	8.67	40.33	54.00	13.67
40 MHz, low	15510	64.65	74.00	9.35	39.65	54.00	14.35
40 MHz, mid	15600	66.82	74.00	7.18	41.82	54.00	12.18
40 MHz, high	15690	67.65	74.00	6.35	42.65	54.00	11.35

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

8.4 FCC 15.207(a) AC power line conducted emissions limits

8.4.1 Definitions and limits

FCC §15.407(6)(b):

Any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207

FCC §15.207(a):

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Table 8.4-1: Conducted emissions limit

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average**
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

Note: * - The level decreases linearly with the logarithm of the frequency.

** - A linear average detector is required.

8.4.2 Test summary

Test date	November 16, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1007 mbar
Verdict	Pass	Relative humidity	32 %

8.4.3 Observations, settings and special notes

The EUT was set up as tabletop configuration.

The spectral scan has been corrected with transducer factors (i.e. cable loss, LISN factors, and attenuators) for determination of compliance.

A preview measurement was generated with the receiver in continuous scan mode. 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.

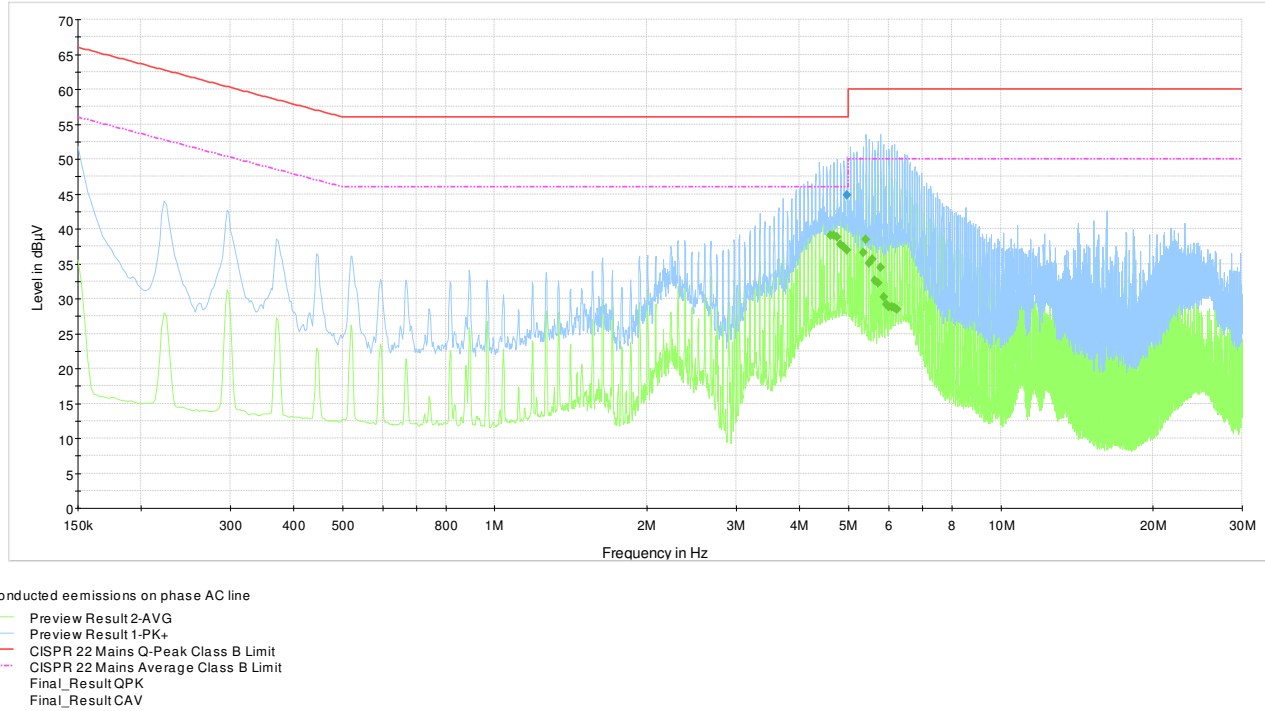
Receiver settings for preview measurements:

Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Detector mode	Peak and Average
Trace mode	Max Hold
Measurement time	100 ms

Receiver settings for final measurements:

Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Detector mode	Quasi-Peak and Average
Trace mode	Max Hold
Measurement time	100 ms

8.4.4 Test data



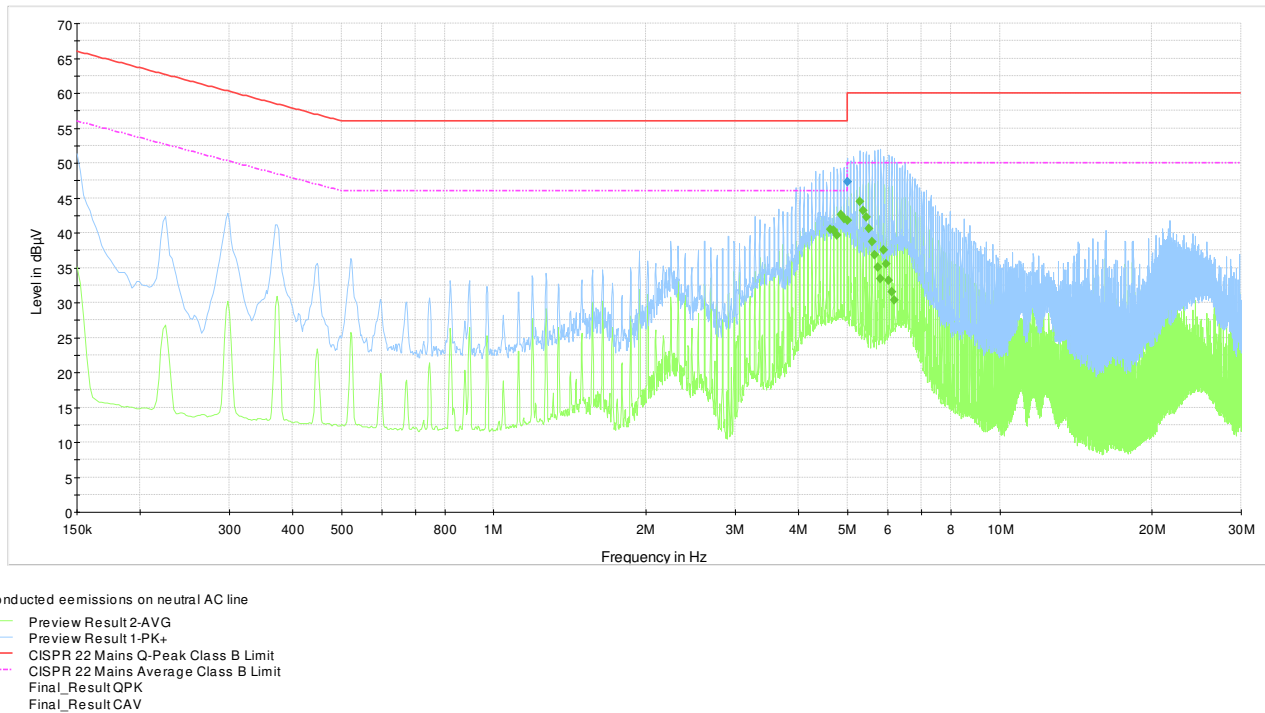
Plot 8.4-1: Conducted emissions on phase line

Table 8.4-2: Quasi-Peak conducted emissions results on phase line

Frequency, MHz	Q-Peak result, dBµV	Limit, dBµV	Margin, dB	Meas. Time, ms	Bandwidth, kHz	Correction, dB
4.974000	44.87	56.00	11.13	100	9	10.0

Table 8.4-3: Average conducted emissions results on phase line

Frequency, MHz	Average result, dBµV	Limit, dBµV	Margin, dB	Meas. Time, ms	Bandwidth, kHz	Correction, dB
4.602750	39.05	46.00	6.95	100	9	10.0
4.677000	39.10	46.00	6.90	100	9	10.0
4.751250	38.85	46.00	7.15	100	9	10.0
4.825500	37.80	46.00	8.20	100	9	10.0
4.899750	37.37	46.00	8.63	100	9	10.0
4.974000	36.92	46.00	9.08	100	9	10.0
5.345250	36.57	50.00	13.43	100	9	10.0
5.419500	38.44	50.00	11.56	100	9	10.0
5.493750	35.03	50.00	14.97	100	9	10.0
5.568000	35.65	50.00	14.35	100	9	10.0
5.642250	32.56	50.00	17.44	100	9	10.0
5.716500	32.21	50.00	17.79	100	9	10.0
5.790750	34.42	50.00	15.58	100	9	10.0



Plot 8.4-2: Conducted emissions on neutral line

Table 8.4-4: Quasi-Peak conducted emissions results on neutral line

Frequency, MHz	Q-Peak result, dBµV	Limit, dBµV	Margin, dB	Meas. Time, ms	Bandwidth, kHz	Correction, dB
4.996500	47.27	56.00	8.73	100	9	10.0

Table 8.4-5: Average conducted emissions results on neutral line

Frequency, MHz	Average result, dBµV	Limit, dBµV	Margin, dB	Meas. Time, ms	Bandwidth, kHz	Correction, dB
4.623000	40.46	46.00	5.54	100	9	10.0
4.697250	40.30	46.00	5.70	100	9	10.0
4.771500	39.66	46.00	6.34	100	9	10.0
4.848000	42.55	46.00	3.45	100	9	10.0
4.922250	41.99	46.00	4.01	100	9	10.0
4.996500	41.74	46.00	4.26	100	9	10.0
5.295750	44.50	50.00	5.50	100	9	10.0
5.370000	43.13	50.00	6.87	100	9	10.0
5.444250	42.25	50.00	7.75	100	9	10.0
5.518500	40.62	50.00	9.38	100	9	10.0
5.592750	38.65	50.00	11.35	100	9	10.0
5.667000	36.81	50.00	13.19	100	9	10.0
5.741250	35.09	50.00	14.91	100	9	10.0

8.5 FCC 15.407(g) Frequency stability

8.5.1 Definitions and limits

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

8.5.2 Test summary

Test date:	November 19, 2016	Temperature:	22 °C
Test engineer:	Andrey Adelberg	Air pressure:	1007 mbar
Verdict:	Pass	Relative humidity:	31 %

8.5.3 Observations, settings and special notes

Spectrum analyser settings:

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

8.5.4 Test data

Table 8.5-1: Frequency drift measurement

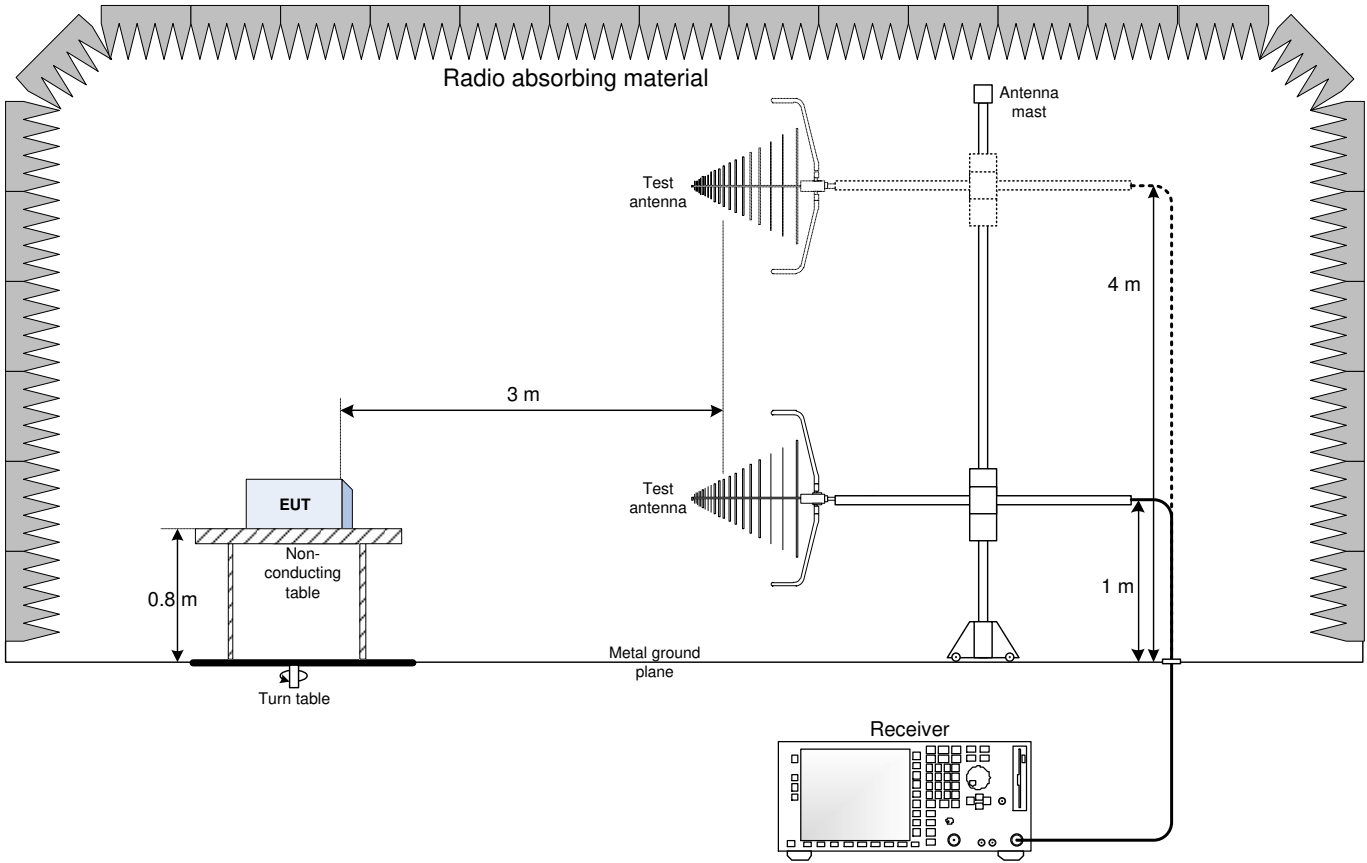
Test conditions	Frequency, GHz	Drift, Hz
+50 °C, Nominal	5.200018478	-222
+40 °C, Nominal	5.200018430	-270
+30 °C, Nominal	5.200018583	-117
+20 °C, +15 %	5.200018721	21
+20 °C, Nominal	5.200018700	Reference
+20 °C, -15 %	5.200018833	133
+10 °C, Nominal	5.200018976	276
0 °C, Nominal	5.200018920	220
-10 °C, Nominal	5.200019018	318
-20 °C, Nominal	5.200019154	454
-30 °C, Nominal	5.200019207	507

Minimum lower band edge margin is more than 5 MHz.

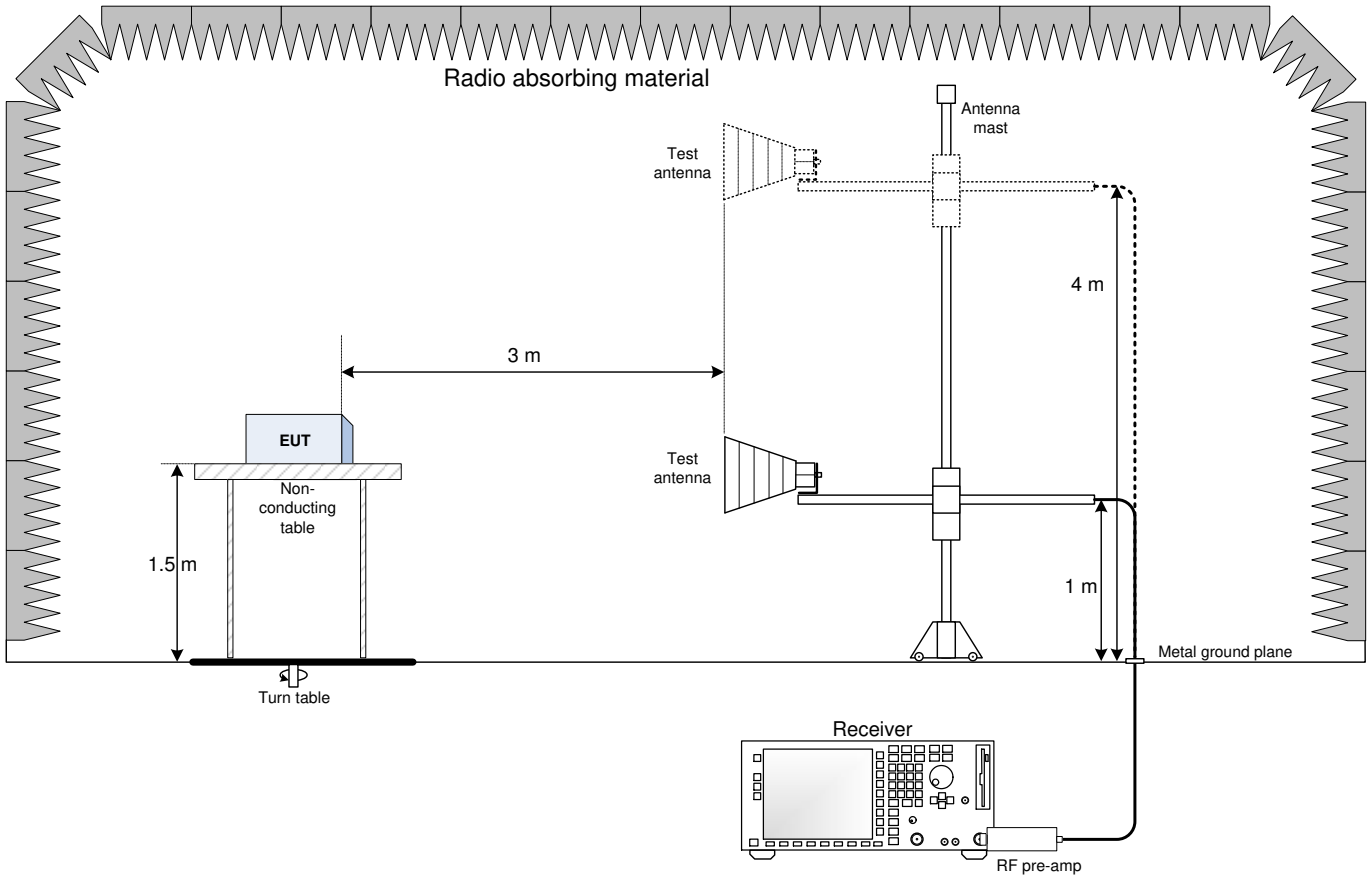
Minimum upper band edge margin is more than 400 kHz

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up for frequencies below 1 GHz



9.2 Radiated emissions set-up for frequencies above 1 GHz



9.3 Conducted emissions set-up

