

# Test report

## 337322-5TRFWL

Date of issue: November 9, 2017

Applicant:

**Redline Communications**

Product:

**Broad-band wireless infrastructure product**

Model:

**RDL-3000-RMG3**

FCC ID:

**QC8-RDL3000RMG3**

IC Registration number:

**4310A-RDL3000RMG3**

Specifications:

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

Unlicensed National Information Infrastructure Devices


◆ **RSS-247, Issue 2, Section 6, Feb 2017**

Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

Test location

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Site number	FCC: CA2041; IC: 2040G-5 (3 m semi anechoic chamber)

Tested by	Yong Huang Wireless/EMC Specialist
Reviewed by	Kevin Rose, Wireless/EMC Specialist
Review date	November 9, 2017
Reviewer signature	

Limits of responsibility

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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

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### 1.1 Applicant and manufacturer

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Company name	Redline Communications
Address	302 Town Center Blvd., 4 <sup>th</sup> floor, Markham, ON, Canada, L3R 0E8

### 1.2 Test specifications

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FCC 47 CFR Part 15, Subpart E, Clause 15.407	Unlicensed National Information Infrastructure Devices
RSS-247, Issue 2, February 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

### 1.3 Test methods

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789033 D02 General UNII Test Procedures New Rules v01r04 (May 2, 2017)	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
FCC 16-24 (March 2, 2016)	Memorandum opinion and order for U-NII-3 (5.725–5.85 GHz) band
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

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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

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None

### 1.6 Test report revision history

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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 <sup>1</sup>
§15.203	Antenna requirement	Pass <sup>2</sup>

Notes: <sup>1</sup> Measurements 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

<sup>2</sup> The EUT is a professionally installed equipment.

### 2.2 FCC Part 15 Subpart E, test results

Part	Test description	Verdict
§15.403(i)	Emission bandwidth	Pass
§15.407(a)(1)	Power and density limits within 5.15–5.25 GHz band	Not applicable
§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	Pass
§15.407(b)(1)	Undesirable emission limits for 5.15–5.25 GHz band	Not applicable
§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	Pass
§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	Pass
§15.407(g)	Frequency stability	Pass
§15.407(h)(1) <sup>1</sup>	Transmit power control (TPC)	Not applicable
§15.407(h)(2) <sup>1</sup>	Dynamic Frequency Selection (DFS)	Not applicable

Notes: <sup>1</sup> DFS and TPC requirements are only applicable to 5.25–5.35 GHz and 5.47–5.725 GHz bands

### 2.3 RSS-Gen, Issue 4, test results

Part	Test description	Verdict
6.6	Occupied Bandwidth	Pass
7.1.2 <sup>1</sup>	Receiver radiated emission limits	Not applicable
7.1.3 <sup>1</sup>	Receiver conducted emission limits	Not applicable
8.8	Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus	Pass
8.11 <sup>2</sup>	Frequency stability	Pass

Notes: <sup>1</sup> According to sections 5.2 and 5.3 of RSS-Gen, Issue 4: if EUT does not have a stand-alone receiver neither scanner receiver, then it exempt from receiver requirements.

<sup>2</sup> According to section 8.11 of RSS-Gen, Issue 4: if the frequency stability of the licence-exempt radio apparatus is not specified in the applicable standard (RSS), measurement of the frequency stability is not required

## 2.4 ISED RSS-247, Issue 2, test results

Section	Test description	Verdict
6.1 (1) <sup>1</sup>	Types of Modulation	Pass
6.2.1 (1)	Power limits for 5150–5250 MHz band	Not applicable
6.2.2 (1)	Power limits for 5250–5350 MHz band	Not applicable
6.2.3 (1)	Power limits for 5470–5600 MHz and 5650–5725 MHz bands	Not applicable
6.2.4 (1)	Power limits for 5725–5850 MHz band	Pass
6.2.4 (1)	Minimum 6 dB bandwidth	Pass
6.2.1 (2)	Unwanted emission limits for 5150–5250 MHz band	Not applicable
6.2.2 (2)	Unwanted emission limits for 5250–5350 MHz band	Not applicable
6.2.2 (2)	TPC requirements for devices with a maximum e.i.r.p. greater than 500 mW	Not applicable
6.2.2 (3)	E.i.r.p. at different elevations restrictions for 5250–5350 MHz band	Not applicable
6.2.3 (2)	Unwanted emission limits for 5470–5600 MHz and 5650–5725 MHz bands	Not applicable
6.2.4 (2)	Unwanted emission limits for 5725–5850 MHz band	Pass
6.3	Dynamic Frequency Selection (DFS) for devices operating in the bands 5250–5350 MHz, 5470–5600 MHz and 5650–5725 MHz	Not applicable

Notes: <sup>1</sup> The EUT employs digital modulations.

## Section 3. Equipment under test (EUT) details

### 3.1 Sample information

Receipt date	August 11, 2017
Nemko sample ID number	Item #1 and Item #2

### 3.2 EUT information

Product name	Broad-band wireless infrastructure product
Model	RDL-3000-RMG3
Serial number	157SC1710002 and 157SC1710006

### 3.3 Technical information

Applicant IC company number	4310A
IC UPN number	RDL3000RMG3
All used IC test site(s) Reg. number	2040G-5
RSS number and Issue number	RSS-247 Issue 2, Section 6, Feb. 2017
Frequency band	5725–5850 MHz
Frequency Min (MHz)	5727.5 (5 MHz channel), 5730 (10 MHz channel), 5735 (20 MHz channel)
Frequency Max (MHz)	5847.5 (5 MHz channel), 5845 (10 MHz channel), 5840 (20 MHz channel)
RF power Max (W), Conducted	0.4406 (26.44 dBm for 5 MHz channel), 0.4246 (26.28 dBm for 10 MHz channel), 0.4508 (26.54 dBm for 20 MHz channel)
Field strength, Units @ distance	N/A
Measured BW (kHz) (26 dB)	4730 (5 MHz channel), 9270 (10 MHz channel), 18530 (20 MHz channel)
Measured BW (kHz) (6 dB)	4090 (5 MHz channel), 8170 (10 MHz channel), 16350 (20 MHz channel)
Calculated BW (kHz), as per TRC-43	N/A
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
aTransmitter spurious, Units @ distance	53.82 dBuV/m at 3 m average at 5.07165 GHz
Power requirements	48 V <sub>DC</sub> PoE via 120 V <sub>AC</sub> , 60 Hz
Antenna information	10 dBi Omni-directional Antenna Redline AOD-DB-0512-02 and L-Com HG5158DP-10U 24 dBi Dual Polarization Antenna 4.9–6.1 GHz, Redline 30-00362-00 and Redline 30-00328-50 Dual Polarization Antenna (19dBi) 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

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The EUT is a 2×2 MIMO point-to-multipoint (PMP) and point-to-point (PTP) carrier grade broadband wireless infrastructure product, designed to operate in the 5725–5850 MHz band.

### 3.5 EUT exercise details

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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

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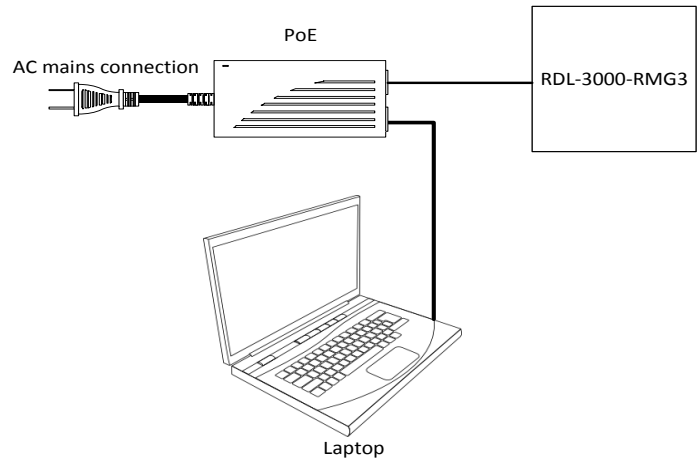


Figure 3.6-1: Setup diagram

### 3.7 EUT sub assemblies

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Table 3.7-1: EUT sub assemblies

Description	Brand name	Model/Part number	Serial number
PoE	Cincon Electronics Co.	TRG60A-POE-L	004652

## Section 4. Engineering considerations

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### 4.1 Modifications incorporated in the EUT

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The following modifications were performed by client:

0 ohm resistors have been added at R697 and R676 (RF1/GND and RF2/GND), this modified unit was used for spurious tests.

### 4.2 Technical judgment

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None

### 4.3 Deviations from laboratory tests procedures

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No deviations were made from laboratory procedures.

## Section 5. Test conditions

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### 5.1 Atmospheric conditions

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Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

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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

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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

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### 6.1 Uncertainty of measurement

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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.
Flush mount turntable	Sunol	FM2022	FA002550	—	NCR
Controller	Sunol	SC104V	FA002551	—	NCR
Antenna mast	Sunol	TLT2	FA002552	—	NCR
Spectrum analyzer	Rohde & Schwarz	FSV 40	FA002731	1 year	July 10/18
50 Ω coax cable	C.C.A.	None	FA002603	—	VOU
50 Ω coax cable	C.C.A.	None	FA002605	—	VOU
50 Ω coax cable	C.C.A.	None	FA002607	—	VOU
Bilog antenna (20–2000 MHz)	Sunol	JB1	FA002517	1 year	Oct. 5/17
Horn antenna (1–18 GHz)	EMCO	3115	FA001452	1 year	Oct. 26/17
Horn antenna (18–40 GHz)	EMCO	3116	FA002487	2 year	Aug. 16/18
Pre-amplifier (0.5–18 GHz)	COM-POWER	PAM-118A	FA002561	1 year	May 8/18
Pre-amplifier (18–40 GHz)	COM-POWER	PAM-840	FA002508	1 year	May 8/18
2400-2483 MHz Notch Filter	Microwave Circuits	N0324413	FA002693	—	VOU
50 Ω coax cable	HUBER+SUHNER	SUCOFLEX 100	FA002564	—	VOU
Power source	California Instruments	5001ix	FA001770	1 year	Feb 1/18
Power sensor	Rohde & Schwarz	NRP18S	FA002730	1 year	July 21/18
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 40	FA002071	1 year	May 3/18
Environmental Chamber	ESPEC	EPX-4H	FA002736	1 year	May 16/18
Multimeter	AMPPROBE	AM-530	FA002536	1 year	May 3/18
Flush mount turntable	Sunol	FM2022	FA002550	—	NCR

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

## Section 8. Testing data

### 8.1 FCC 15.207(a) and RSS-Gen 8.8 AC power line conducted emissions limits

#### 8.1.1 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 µH/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.

**ISED:**

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which 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 table below.

Unless the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in table below. The more stringent limit applies at the frequency range boundaries.

*Table 8.1-1: Conducted emissions limit*

Frequency of emission (MHz)	Conducted limit (dBµV)	
	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.

#### 8.1.2 Test summary

Test date:	September 15, 2017	Temperature:	24 °C
Test engineer:	Yong Huang	Air pressure:	1007 mbar
Verdict:	Pass	Relative humidity:	43 %

### 8.1.3 Observations, settings and special notes

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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.

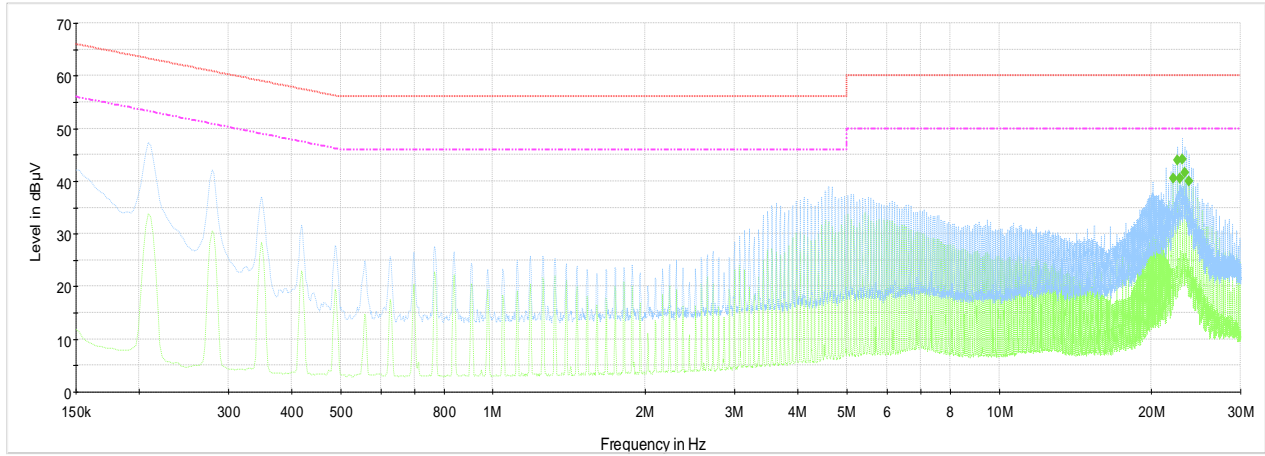
Receiver settings for preview measurements:

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

8.1.4 Test data

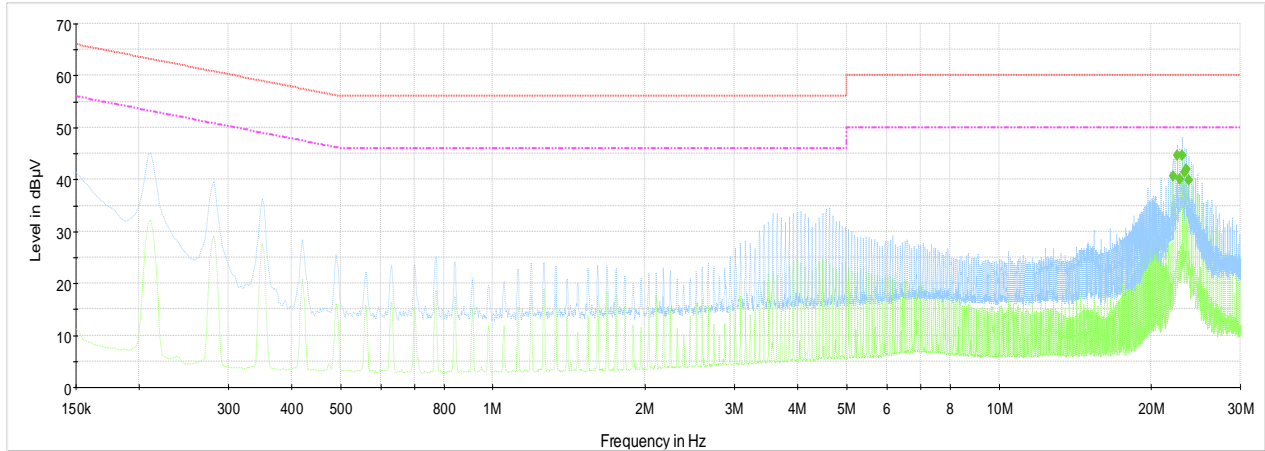


Plot 8.1-1: Conducted emissions on phase line

Table 8.1-2: Average conducted emissions results on phase line

Frequency, MHz	Average result, dBµV	Limit, dBµV	Margin, dB	Meas. Time, ms	Bandwidth, kHz	Correction, dB
22.053	40.5	50.0	9.6	100	9	10.7
22.528	43.9	50.0	6.1	100	9	10.7
22.764	40.5	50.0	9.5	100	9	10.8
23.001	44.2	50.0	5.9	100	9	10.8
23.239	41.6	50.0	8.4	100	9	10.8
23.712	39.9	50.0	10.1	100	9	10.8





**Plot 8.1-2:** Conducted emissions on neutral line

**Table 8.1-3:** Average conducted emissions results on neutral line

Frequency, MHz	Average result, dBµV	Limit, dBµV	Margin, dB	Meas. Time, ms	Bandwidth, kHz	Correction, dB
22.056	40.7	50.0	9.3	100	9	10.8
22.530	44.7	50.0	5.3	100	9	10.8
22.767	40.1	50.0	9.9	100	9	10.8
23.003	44.7	50.0	5.3	100	9	10.8
23.241	41.4	50.0	8.6	100	9	10.8
23.478	42.0	50.0	8.0	100	9	10.8
23.714	39.9	50.0	10.1	100	9	10.8

## 8.2 FCC 15.403(i) Emission bandwidth, 15.407(e) and RSS-247 6.2.4 (1) 6 dB bandwidth

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### 8.2.1 Definitions and limits

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**FCC:**

15.403(i) 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.

15.407(e) Within the 5.725–5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

**ISED:**

RSS-247, 6.2.4.1 For equipment operating in the band 5725–5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

### 8.2.2 Test summary

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Test date	September 19, 2017	Temperature	24 °C
Test engineer	Yong Huang	Air pressure	1020 mbar
Verdict	Pass	Relative humidity	45 %

### 8.2.3 Observations, settings and special notes

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Spectrum analyser settings:

Resolution bandwidth	approximately 1% of EBW (for 26 dB BW), 100 kHz (for 6 dB BW)
Video bandwidth	> RBW
Detector mode	Peak
Trace mode	Max Hold

## 8.2.4 Test data

**Table 8.2-1: Channel names description**

Channel name	5 MHz channel, MHz	10 MHz channel, MHz	20 MHz channel, MHz
Low	5727.5	5730	5735
Mid	5790	5790	5790
High	5847.5	5845	5840

**Table 8.2-2: 26 dB bandwidth results (in MHz)**

Modulation	Channel	5 MHz channel	10 MHz channel	20 MHz channel
BPSK	Low	4.63	9.23	18.45
	Mid	4.66	9.20	18.29
	High	4.64	9.23	18.49
256-QAM	Low	4.73	9.27	18.41
	Mid	4.66	9.19	18.29
	High	4.71	9.19	18.53

**Table 8.2-3: 6 dB bandwidth results (in MHz)**

Modulation	Channel	5 MHz channel	10 MHz channel	20 MHz channel	Minimum limit	Minimum margin
BPSK	Low	4.08	8.17	16.33	0.50	3.58
	Mid	4.09	8.17	16.35	0.50	3.59
	High	4.09	8.16	16.33	0.50	3.59
256-QAM	Low	4.09	8.17	16.32	0.50	3.59
	Mid	4.08	8.17	16.33	0.50	3.58
	High	4.08	8.17	16.35	0.50	3.58

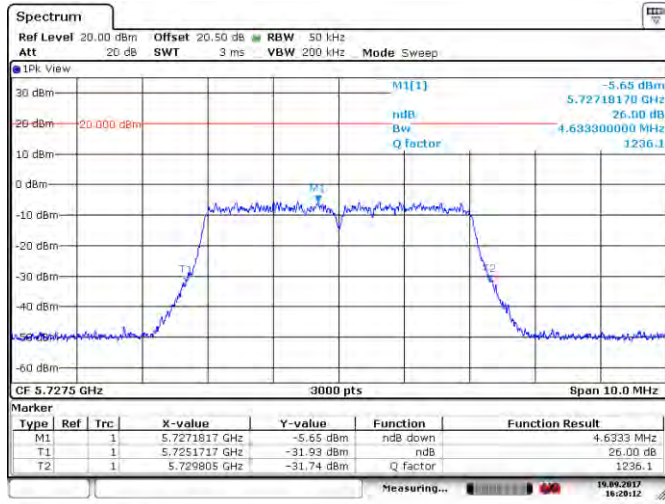


Figure 8.2-1: 26 dB bandwidth of the 5 MHz channel, sample plot

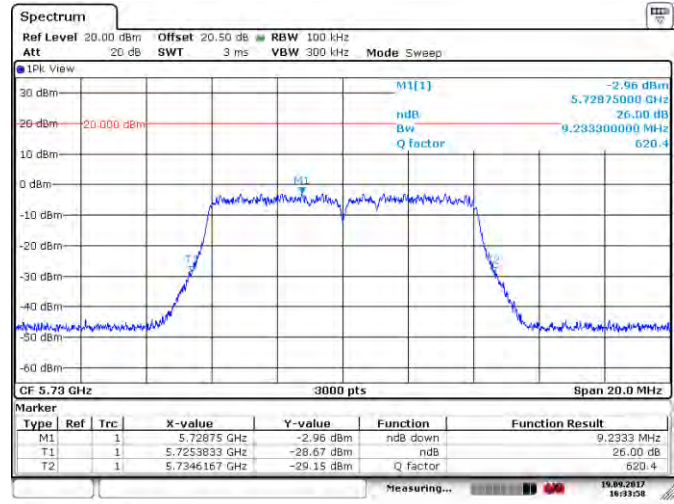


Figure 8.2-2: 26 dB bandwidth of the 10 MHz channel, sample plot

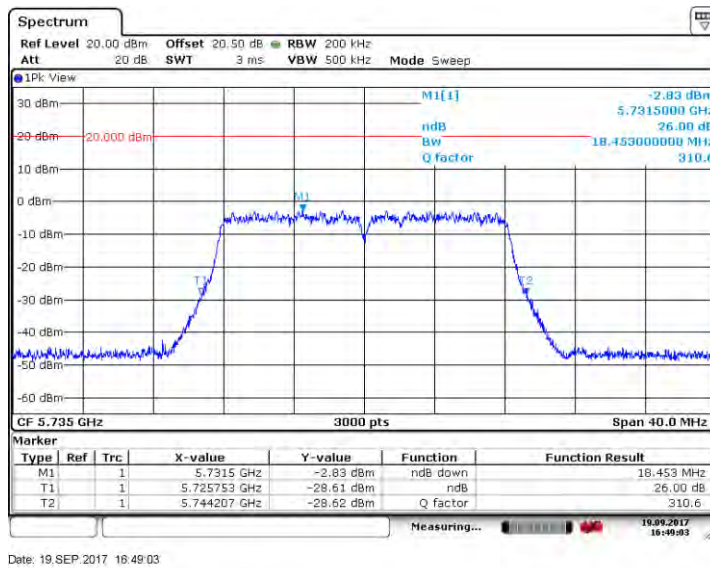


Figure 8.2-3: 26 dB bandwidth of the 20 MHz channel, sample plot

## 8.3 FCC 15.407(a)(3) and RSS-247 6.2.4 (1) 5.725–5.85 GHz band output power and spectral density limits

### 8.3.1 Definitions and limits

**FCC:**

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. 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.

**ISED:**

The maximum conducted output power shall not exceed 1 W. The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

### 8.3.2 Test summary

Test date	September 20, 2017	Temperature	24 °C
Test engineer	Yong Huang	Air pressure	1020 mbar
Verdict	Pass	Relative humidity	45 %

### 8.3.3 Observations, settings and special notes

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

Resolution bandwidth	500 kHz
Video bandwidth	2 MHz
Frequency span	10 MHz (for 5 MHz channel), 20 MHz (for 10 MHz channel), 40 MHz (for 20 MHz channel)
Detector mode	RMS with gated triggering on full power pulses
Trace mode	Power Averaging over 100 sweeps

For Point-to-multipoint applications output power calculation for 10 dBi antenna: 30 dBm – (10 dBi – 0.7 dB – 6 dBi) = 26.7 dBm; for 24 dBi antenna: 30 dBm – (24 dBi – 0.7 dB – 6 dBi) = 12.7 dBm and for 32 dBi antenna: 30 dBm – (32 dBi – 0.7 dB – 6 dBi) = 4.7 dBm. Note: cable loss is 0.7 dB.

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:

$$EIRP = P_{combined} + \text{antenna gain}$$

For antennas with the directional gain greater than 6 dBi, the maximum power spectral density limit was calculated as follows:

For 10 dBi antenna: 30 dBm/500 kHz – (10 dBi – 0.7 dB – 6 dBi) = 26.7 dBm/500 kHz; for 24 dBi antenna: 30 dBm/500 kHz – (24 dBi – 0.7 dB – 6 dBi) = 12.7 dBm/500 kHz and for 32 dBi antenna: 30 dBm/500 kHz – (32 dBi – 0.7 dB – 6 dBi) = 4.7 dBm/500 kHz.

### 8.3.4 Test data

**Table 8.3-1:** Output power measurements and EIRP calculation results for 5 MHz channel, PMP 10 dBi antenna

Modulation	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	5727.5	23.12	23.32	26.23	26.70	0.47	9.3	35.53	36.00	0.47
	5790	22.10	22.35	25.24	26.70	1.46	9.3	34.54	36.00	1.46
	5847.5	22.70	22.81	25.77	26.70	0.93	9.3	35.07	36.00	0.93
256-QAM	5727.5	23.30	23.55	26.44	26.70	0.26	9.3	35.74	36.00	0.26
	5790	22.11	22.60	25.37	26.70	1.33	9.3	34.67	36.00	1.33
	5847.5	22.71	22.99	25.86	26.70	0.84	9.3	35.16	36.00	0.84

**Table 8.3-2:** Output power measurements and EIRP calculations results for 5 MHz channel, PMP 24 dBi antenna gain

Modulation	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	5727.5	9.04	9.22	12.14	12.70	0.56	23.30	35.44	36.00	0.56
	5790	8.07	8.33	11.21	12.70	1.49	23.30	34.51	36.00	1.49
	5847.5	8.78	8.92	11.86	12.70	0.84	23.30	35.16	36.00	0.84
256-QAM	5727.5	9.08	9.23	12.17	12.70	0.53	23.30	35.47	36.00	0.53
	5790	8.08	8.22	11.16	12.70	1.54	23.30	34.46	36.00	1.54
	5847.5	8.82	8.98	11.91	12.70	0.79	23.30	35.21	36.00	0.79

**Table 8.3-3:** Output power measurements and EIRP calculations results for 5 MHz channel, PMP 32 dBi antenna gain

Modulation	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	5727.5	0.72	0.82	3.78	4.70	0.92	31.30	35.08	36.00	0.92
	5790	-0.13	0.03	2.96	4.70	1.74	31.30	34.26	36.00	1.74
	5847.5	0.74	0.88	3.82	4.70	0.88	31.30	35.12	36.00	0.88
256-QAM	5727.5	0.73	0.82	3.79	4.70	0.91	31.30	35.09	36.00	0.91
	5790	-0.15	0.02	2.95	4.70	1.75	31.30	34.25	36.00	1.75
	5847.5	0.77	0.81	3.80	4.70	0.90	31.30	35.10	36.00	0.90

**Table 8.3-4:** Output power measurements and EIRP calculation results for 10 MHz channel, PMP 10 dBi antenna

Modulation	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	5730.0	23.22	23.32	26.28	26.70	0.42	9.30	35.58	36.00	0.42
	5790.0	22.75	22.87	25.82	26.70	0.88	9.30	35.12	36.00	0.88
	5845.0	22.20	22.21	25.22	26.70	1.48	9.30	34.52	36.00	1.48
256-QAM	5730.0	23.21	23.29	26.26	26.70	0.44	9.30	35.56	36.00	0.44
	5790.0	22.75	22.72	25.75	26.70	0.95	9.30	35.05	36.00	0.95
	5845.0	22.24	22.23	25.25	26.70	1.45	9.30	34.55	36.00	1.45



**Table 8.3-5:** Output power measurements and EIRP calculations results for 10 MHz channel, PMP 24 dBi antenna gain

Modulation	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	5730.0	9.05	9.18	12.13	12.70	0.57	23.30	35.43	36.00	0.57
	5790.0	8.41	8.62	11.53	12.70	1.17	23.30	34.83	36.00	1.17
	5845.0	8.27	8.41	11.35	12.70	1.35	23.30	34.65	36.00	1.35
256-QAM	5730.0	9.05	9.16	12.12	12.70	0.58	23.30	35.42	36.00	0.58
	5790.0	8.40	8.65	11.54	12.70	1.16	23.30	34.84	36.00	1.16
	5845.0	8.22	8.44	11.34	12.70	1.36	23.30	34.64	36.00	1.36

**Table 8.3-6:** Output power measurements and EIRP calculations results for 10 MHz channel, PMP 32 dBi antenna gain

Modulation	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	5730.0	0.66	0.66	3.67	4.70	1.03	31.30	34.97	36.00	1.03
	5790.0	0.22	0.31	3.28	4.70	1.42	31.30	34.58	36.00	1.42
	5845.0	-0.02	-0.03	2.99	4.70	1.71	31.30	34.29	36.00	1.71
256-QAM	5730.0	0.66	0.76	3.72	4.70	0.98	31.30	35.02	36.00	0.98
	5790.0	0.23	0.44	3.35	4.70	1.35	31.30	34.65	36.00	1.35
	5845.0	-0.03	0.10	3.05	4.70	1.65	31.30	34.35	36.00	1.65

**Table 8.3-7:** Output power measurements and EIRP calculation results for 20 MHz channel, PMP 10 dBi antenna

Modulation	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	5735.0	23.42	23.55	26.50	26.70	0.20	9.30	35.80	36.00	0.20
	5790.0	22.84	22.96	25.91	26.70	0.79	9.30	35.21	36.00	0.79
	5840.0	22.56	22.86	25.72	26.70	0.98	9.30	35.02	36.00	0.98
256-QAM	5735.0	23.41	23.64	26.54	26.70	0.16	9.30	35.84	36.00	0.16
	5790.0	22.75	23.95	26.40	26.70	0.30	9.30	35.70	36.00	0.30
	5840.0	22.65	22.82	25.75	26.70	0.95	9.30	35.05	36.00	0.95

**Table 8.3-8:** Output power measurements and EIRP calculations results for 20 MHz channel, PMP 24 dBi antenna gain

Modulation	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	5735.0	9.08	9.19	12.15	12.70	0.55	23.30	35.45	36.00	0.55
	5790.0	8.60	8.77	11.70	12.70	1.00	23.30	35.00	36.00	1.00
	5840.0	8.45	8.92	11.70	12.70	1.00	23.30	35.00	36.00	1.00
256-QAM	5735.0	9.11	9.18	12.16	12.70	0.54	23.30	35.46	36.00	0.54
	5790.0	8.65	8.75	11.71	12.70	0.99	23.30	35.01	36.00	0.99
	5840.0	8.45	8.92	11.70	12.70	1.00	23.30	35.00	36.00	1.00

**Table 8.3-9:** Output power measurements and EIRP calculations results for 20 MHz channel, PMP 32 dBi antenna gain

Modulation	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	5735.0	0.84	0.99	3.93	4.70	0.77	31.30	35.23	36.00	0.77
	5790.0	0.30	0.55	3.44	4.70	1.26	31.30	34.74	36.00	1.26
	5840.0	0.26	0.54	3.41	4.70	1.29	31.30	34.71	36.00	1.29
256-QAM	5735.0	0.86	0.98	3.93	4.70	0.77	31.30	35.23	36.00	0.77
	5790.0	0.31	0.56	3.45	4.70	1.25	31.30	34.75	36.00	1.25
	5840.0	0.27	0.56	3.43	4.70	1.27	31.30	34.73	36.00	1.27



**Table 8.3-10:** PSD measurements results for 5 MHz channel, PMP 10 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5727.5	15.83	15.94	18.90	26.7	7.80
	5790	15.15	15.21	18.19	26.7	8.51
	5847.5	17.31	17.37	20.35	26.7	6.35
256-QAM	5727.5	15.88	15.97	18.94	26.7	7.76
	5790	15.29	15.33	18.32	26.7	8.38
	5847.5	17.74	17.75	20.76	26.7	5.94

**Table 8.3-11:** PSD measurements results for 5 MHz channel, PMP 24 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5727.5	1.44	1.50	4.48	12.7	8.22
	5790	1.03	1.05	4.05	12.7	8.65
	5847.5	3.88	3.98	6.94	12.7	5.76
256-QAM	5727.5	1.45	1.50	4.49	12.7	8.21
	5790	1.02	1.03	4.04	12.7	8.66
	5847.5	3.77	3.87	6.83	12.7	5.87

**Table 8.3-12:** PSD measurements results for 5 MHz channel, PMP 32 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5727.5	-6.88	-6.79	-3.82	4.7	8.52
	5790	-7.41	-7.33	-4.36	4.7	9.06
	5847.5	-6.23	-6.50	-3.35	4.7	8.05
256-QAM	5727.5	-6.55	-6.77	-3.65	4.7	8.35
	5790	-7.11	-7.25	-4.17	4.7	8.87
	5847.5	-6.54	-6.68	-3.60	4.7	8.30

**Table 8.3-13:** PSD measurements results for 10 MHz channel, PMP 10 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5730.0	12.73	12.95	15.85	26.7	10.85
	5790.0	12.00	12.15	15.09	26.7	11.61
	5845.0	13.93	13.95	16.95	26.7	9.75
256-QAM	5730.0	12.75	12.95	15.86	26.7	10.84
	5790.0	12.05	12.16	15.12	26.7	11.58
	5845.0	13.99	13.84	16.93	26.7	9.77

**Table 8.3-14:** PSD measurements results for 10 MHz channel, PMP 24 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5730.0	-1.48	-1.44	1.55	12.7	11.15
	5790.0	-2.26	-2.05	0.86	12.7	11.84
	5845.0	0.63	0.88	3.77	12.7	8.93
256-QAM	5730.0	-1.47	-1.35	1.60	12.7	11.10
	5790.0	-2.22	-1.99	0.91	12.7	11.79
	5845.0	0.66	0.95	3.82	12.7	8.88





**Table 8.3-15:** PSD measurements results for 10 MHz channel, PMP 32 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5730.0	-10.13	-10.05	-7.08	4.7	11.78
	5790.0	-10.80	-10.66	-7.72	4.7	12.42
	5845.0	-7.49	-7.10	-4.28	4.7	8.98
256-QAM	5730.0	-10.09	-10.22	-7.14	4.7	11.84
	5790.0	-10.75	-10.59	-7.66	4.7	12.36
	5845.0	-7.46	-7.16	-4.30	4.7	9.00

**Table 8.3-16:** PSD measurements results for 20 MHz channel, PMP 10 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5735.0	9.82	9.92	12.88	26.7	13.82
	5790.0	8.97	9.05	12.02	26.7	14.68
	5840.0	9.40	9.53	12.48	26.7	14.22
256-QAM	5735.0	9.85	9.92	12.90	26.7	13.80
	5790.0	8.95	9.06	12.02	26.7	14.68
	5840.0	9.42	9.49	12.47	26.7	14.23

**Table 8.3-17:** PSD measurements results for 20 MHz channel, PMP 24 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5735.0	-4.41	-4.12	-1.25	12.7	13.95
	5790.0	-5.12	-5.09	-2.09	12.7	14.79
	5840.0	-4.40	-4.22	-1.30	12.7	14.00
256-QAM	5735.0	-4.35	-4.20	-1.26	12.7	13.96
	5790.0	-4.95	-5.06	-1.99	12.7	14.69
	5840.0	-4.39	-4.19	-1.28	12.7	13.98

**Table 8.3-18:** PSD measurements results for 20 MHz channel, PMP 32 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5735.0	-12.88	-12.77	-9.81	4.7	14.51
	5790.0	-13.57	-13.41	-10.48	4.7	15.18
	5840.0	-12.88	-12.54	-9.70	4.7	14.40
256-QAM	5735.0	-12.76	-12.65	-9.69	4.7	14.39
	5790.0	-13.61	-13.55	-10.57	4.7	15.27
	5840.0	-12.91	-12.88	-9.88	4.7	14.58



**Table 8.3-19:** Output power measurements and EIRP calculation results for 5 MHz channel, PTP 10 dBi antennas

Modulation	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB
BPSK	5727.5	23.12	23.32	26.23	30.00	3.77
	5790	22.10	22.35	25.24	30.00	4.76
	5847.5	22.70	22.81	25.77	30.00	4.23
256-QAM	5727.5	23.30	23.55	26.44	30.00	3.56
	5790	22.11	22.60	25.37	30.00	4.63
	5847.5	22.71	22.99	25.86	30.00	4.14

**Table 8.3-20:** Output power measurements and EIRP calculation results for 5 MHz channel, PTP 24 dBi antennas

Modulation	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB
BPSK	5727.5	9.04	9.22	12.14	30.00	17.86
	5790	22.10	22.35	25.24	30.00	4.76
	5847.5	8.78	8.92	11.86	30.00	18.14
256-QAM	5727.5	9.08	9.23	12.17	30.00	17.83
	5790	22.11	22.60	25.37	30.00	4.63
	5847.5	8.82	8.98	11.91	30.00	18.09

**Table 8.3-21:** Output power measurements and EIRP calculations results for 5 MHz channel, PTP 32 dBi antenna gain

Modulation	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB
BPSK	5727.5	0.72	0.82	3.78	30.00	26.22
	5790	19.94	19.95	22.96	30.00	7.04
	5847.5	0.74	0.88	3.82	30.00	26.18
256-QAM	5727.5	0.73	0.82	3.79	30.00	26.21
	5790	19.87	20.03	22.96	30.00	7.04
	5847.5	0.77	0.81	3.80	30.00	26.20

**Table 8.3-22:** Output power measurements and EIRP calculation results for 10 MHz channel, PTP 10 dBi antennas

Modulation	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB
BPSK	5730.0	23.22	23.32	26.28	30.00	3.72
	5790.0	22.75	22.87	25.82	30.00	4.18
	5845.0	22.20	22.21	25.22	30.00	4.78
256-QAM	5730.0	23.21	23.29	26.26	30.00	3.74
	5790.0	22.75	22.72	25.75	30.00	4.25
	5845.0	22.24	22.23	25.25	30.00	4.75

**Table 8.3-23:** Output power measurements and EIRP calculations results for 10 MHz channel, PTP 24 dBi antenna gain

Modulation	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB
BPSK	5730.0	9.05	9.18	12.13	30.00	17.87
	5790.0	22.75	22.87	25.82	30.00	4.18
	5845.0	8.27	8.41	11.35	30.00	18.65
256-QAM	5730.0	9.05	9.16	12.12	30.00	17.88
	5790.0	22.75	22.72	25.75	30.00	4.25
	5845.0	8.22	8.44	11.34	30.00	18.66



**Table 8.3-24:** Output power measurements and EIRP calculations results for 10 MHz channel, PTP 32 dBi antenna gain

Modulation	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB
BPSK	5730.0	0.66	0.66	3.67	30.00	26.33
	5790.0	20.65	20.65	23.66	30.00	6.34
	5845.0	-0.02	-0.03	2.99	30.00	27.01
256-QAM	5730.0	0.66	0.76	3.72	30.00	26.28
	5790.0	20.71	20.86	23.80	30.00	6.20
	5845.0	-0.03	0.10	3.05	30.00	26.95

**Table 8.3-25:** Output power measurements and EIRP calculation results for 20 MHz channel, PTP 10 dBi antennas

Modulation	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB
BPSK	5735.0	23.42	23.55	26.50	30.00	3.50
	5790.0	22.84	22.96	25.91	30.00	4.09
	5840.0	22.56	22.86	25.72	30.00	4.28
256-QAM	5735.0	23.41	23.64	26.54	30.00	3.46
	5790.0	22.75	23.95	26.40	30.00	3.60
	5840.0	22.65	22.82	25.75	30.00	4.25

**Table 8.3-26:** Output power measurements and EIRP calculation results for 20 MHz channel, PTP 24 dBi antenna

Modulation	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB
BPSK	5735.0	9.08	9.19	12.15	30.00	17.85
	5790.0	22.84	22.96	25.91	30.00	4.09
	5840.0	8.45	8.92	11.70	30.00	18.30
256-QAM	5735.0	9.11	9.18	12.16	30.00	17.84
	5790.0	22.75	23.95	26.40	30.00	3.60
	5840.0	8.45	8.92	11.70	30.00	18.30

**Table 8.3-27:** Output power measurements and EIRP calculation results for 20 MHz channel, PTP 32 dBi antenna

Modulation	Frequency, MHz	Output power on ch0, dBm	Output power on ch0, dBm	Combined power, dBm	Limit, dBm	Margin, dB
BPSK	5735.0	0.84	0.99	3.93	30.00	26.07
	5790.0	20.98	20.90	23.95	30.00	6.05
	5840.0	0.26	0.54	3.41	30.00	26.59
256-QAM	5735.0	0.86	0.98	3.93	30.00	26.07
	5790.0	20.96	20.98	23.98	30.00	6.02
	5840.0	0.27	0.56	3.43	30.00	26.57



**Table 8.3-28:** PSD measurements results for 5 MHz channel, PTP 10 dBi antennas

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5727.5	15.83	15.94	18.90	30	11.10
	5790	15.15	15.21	18.19	30	11.81
	5847.5	17.31	17.37	20.35	30	9.65
256-QAM	5727.5	15.88	15.97	18.94	30	11.06
	5790	15.29	15.33	18.32	30	11.68
	5847.5	17.74	17.75	20.76	30	9.24

**Table 8.3-29:** PSD measurements results for 5 MHz channel, PTP 24 dBi antennas

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5727.5	1.44	1.50	4.48	30	25.52
	5790	15.15	15.21	18.19	30	11.81
	5847.5	3.88	3.98	6.94	30	23.06
256-QAM	5727.5	1.45	1.50	4.49	30	25.51
	5790	15.29	15.33	18.32	30	11.68
	5847.5	3.77	3.87	6.83	30	23.17

**Table 8.3-30:** PSD measurements results for 5 MHz channel, PTP 32 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5727.5	-6.88	-6.79	-3.82	30	33.82
	5790	12.25	12.33	15.30	30	14.70
	5847.5	-6.23	-6.50	-3.35	30	33.35
256-QAM	5727.5	-6.55	-6.77	-3.65	30	33.65
	5790	12.47	12.40	15.45	30	14.55
	5847.5	-6.54	-6.68	-3.60	30	33.60

**Table 8.3-31:** PSD measurements results for 10 MHz channel, PTP 10 dBi antennas

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5730.0	12.73	12.95	15.85	30	14.15
	5790.0	12.00	12.15	15.09	30	14.91
	5845.0	13.93	13.95	16.95	30	13.05
256-QAM	5730.0	12.75	12.95	15.86	30	14.14
	5790.0	12.05	12.16	15.12	30	14.88
	5845.0	13.99	13.84	16.93	30	13.07

**Table 8.3-32:** PSD measurements results for 10 MHz channel, 24 PTP dBi antennas

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5730.0	-1.48	-1.44	1.55	30	28.45
	5790.0	12.00	12.15	15.09	30	14.91
	5845.0	0.63	0.88	3.77	30	26.23
256-QAM	5730.0	-1.47	-1.35	1.60	30	28.40
	5790.0	12.05	12.16	15.12	30	14.88
	5845.0	0.66	0.95	3.82	30	26.18



**Table 8.3-33:** PSD measurements results for 10 MHz channel, PTP 32 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5730.0	-10.13	-10.05	-7.08	30	37.08
	5790.0	10.21	10.39	13.31	30	16.69
	5845.0	-7.49	-7.10	-4.28	30	34.28
256-QAM	5730.0	-10.09	-10.22	-7.14	30	37.14
	5790.0	10.26	10.29	13.29	30	16.71
	5845.0	-7.46	-7.16	-4.30	30	34.30

**Table 8.3-34:** PSD measurements results for 20 MHz channel, PTP 10 dBi antennas

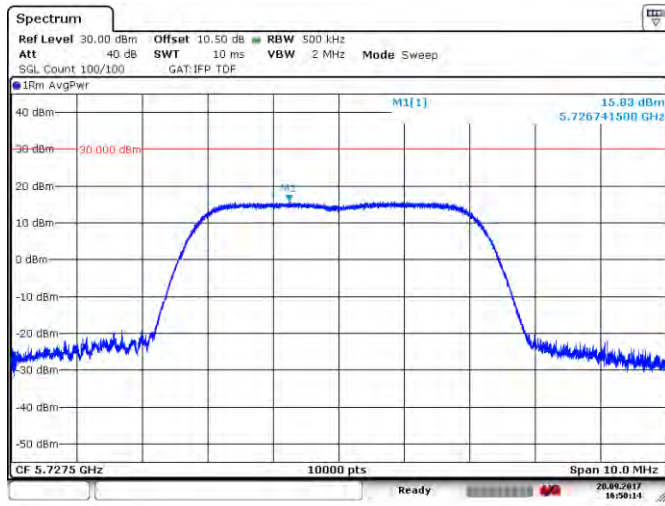
Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5735.0	9.82	9.92	12.88	30	17.12
	5790.0	8.97	9.05	12.02	30	17.98
	5840.0	9.40	9.53	12.48	30	17.52
256-QAM	5735.0	9.85	9.92	12.90	30	17.10
	5790.0	8.95	9.06	12.02	30	17.98
	5840.0	9.42	9.49	12.47	30	17.53

**Table 8.3-35:** PSD measurements results for 20 MHz channel, PTP 24 dBi antennas

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5735.0	-4.41	-4.12	-1.25	30	31.25
	5790.0	8.97	9.05	12.02	30	17.98
	5840.0	-4.40	-4.22	-1.30	30	31.30
256-QAM	5735.0	-4.35	-4.20	-1.26	30	31.26
	5790.0	8.95	9.06	12.02	30	17.98
	5840.0	-4.39	-4.19	-1.28	30	31.28

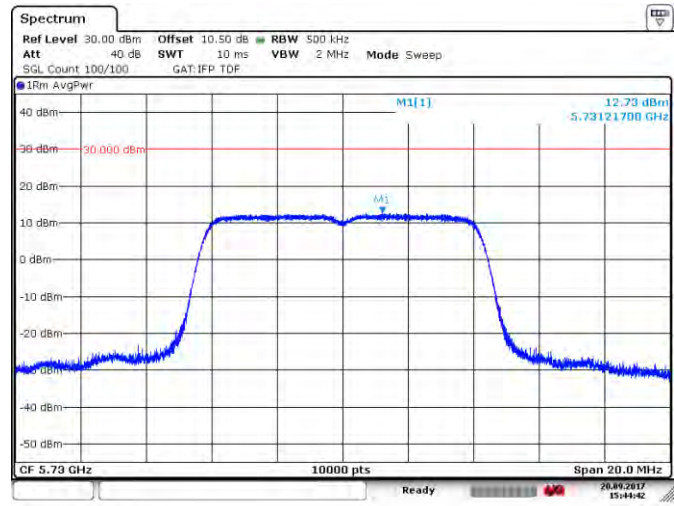
**Table 8.3-36:** PSD measurements results for 20 MHz channel, PTP 32 dBi antenna

Modulation	Frequency, MHz	PSD on ch0, dBm/0.5 MHz	PSD on ch1, dBm/0.5 MHz	Combined PSD, dBm/0.5 MHz	Limit, dBm/0.5 MHz	Margin, dB
BPSK	5735.0	-12.88	-12.77	-9.81	30	39.81
	5790.0	7.68	7.93	10.82	30	19.18
	5840.0	-12.88	-12.54	-9.70	30	39.70
256-QAM	5735.0	-12.76	-12.65	-9.69	30	39.69
	5790.0	7.72	8.04	10.89	30	19.11
	5840.0	-12.91	-12.88	-9.88	30	39.88



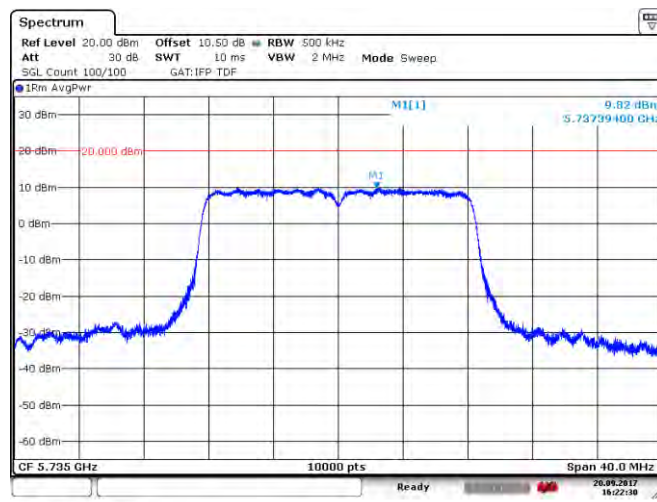
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**Figure 8.3-1:** Sample plot for PSD on 5 MHz channel



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**Figure 8.3-2:** Sample plot for PSD on 10 MHz channel



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**Figure 8.3-3:** Sample plot for PSD on 20 MHz channel

## 8.4 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions

### 8.4.1 Definitions and limits

#### FCC:

- (i) All emissions shall be limited to a level of  $-27$  dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- (ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

#### ISED:

Devices operating in the band 5725-5850 MHz with antenna gain greater than 10 dBi can have unwanted emissions that comply with either the limits in this section or in section 5.5 until six (6) months after the publication date of this standard for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2018.

Devices operating in the band 5725-5850 MHz with antenna gain of 10 dBi or less can have unwanted emissions that comply with either the limits in this section or in section 5.5 until April 1, 2018 for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2020.

Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

- 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
- 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
- 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to  $-27$  dBm/MHz at 75 MHz above or below the band edges; and
- $-27$  dBm/MHz at frequencies more than 75 MHz above or below the band edges.

**Table 8.4-1: FCC §15.209 and RSS-Gen – Radiated emission limits**

Frequency, MHz	Field strength of emissions		Measurement distance, m
	$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$	
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 8.4-2: ISED restricted frequency bands**

MHz	MHz	MHz	GHz
0.090–0.110	12.51975–12.52025	399.9–410	5.35–5.46
2.1735–2.1905	12.57675–12.57725	608–614	7.25–7.75
3.020–3.026	13.36–13.41	960–1427	8.025–8.5
4.125–4.128	16.42–16.423	1435–1626.5	9.0–9.2
4.17725–4.17775	16.69475–16.69525	1645.5–1646.5	9.3–9.5
4.20725–4.20775	16.80425–16.80475	1660–1710	10.6–12.7
5.677–5.683	25.5–25.67	1718.8–1722.2	13.25–13.4
6.215–6.218	37.5–38.25	2200–2300	14.47–14.5
6.26775–6.26825	73–74.6	2310–2390	15.35–16.2
6.31175–6.31225	74.8–75.2	2655–2900	17.7–21.4
8.291–8.294	108–138	3260–3267	22.01–23.12
8.362–8.366	156.52475–156.52525	3332–3339	23.6–24.0
8.37625–8.38675	156.7–156.9	3345.8–3358	31.2–31.8
8.41425–8.41475	240–285	3500–4400	36.43–36.5
12.29–12.293	322–335.4	4500–5150	Above 38.6

Note: Certain frequency bands listed in Table 8.4-2 and above 38.6 GHz are designated for low-power license-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard

**Table 8.4-3: 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			

## 8.4.2 Test summary

Test date:	September 12, 2017 to September 27, 2017	Temperature:	24 °C
Test engineer:	Yong Huang	Air pressure:	1007 mbar
Verdict:	Pass	Relative humidity:	43 %



### 8.4.3 Observations, settings and special notes

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The spectrum was searched from 30 MHz to 40 GHz while the EUT was transmitting on both MIMO chains simultaneously.  
 As per customer, the transmitter output signals on the two chains are completely uncorrelated.  
 Conducted measurements were performed on both of the 2 antenna ports, with the highest and the lowest data rate, the worse case is presented.  
 All conducted plots below corrected with antenna gains, RF cable losses and multiple antenna correction factors  
 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. No emissions related to RF transmitter were detected within 6 dB below the limit.

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

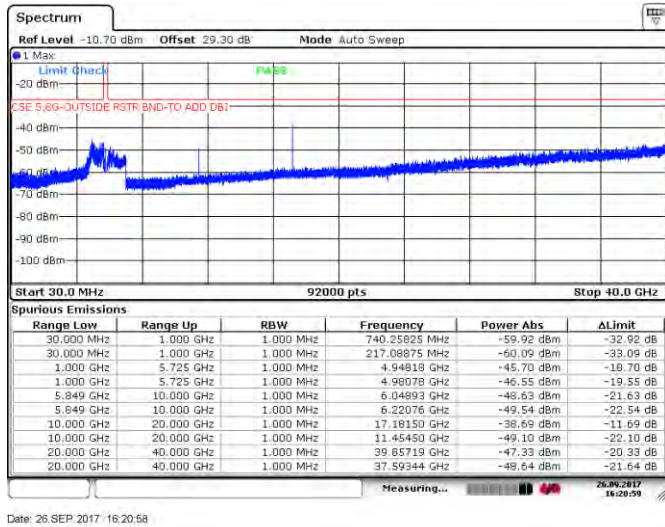
Spectrum analyser for average conducted measurements within restricted bands above 1 GHz for frequencies where peak results were above the average limit:

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

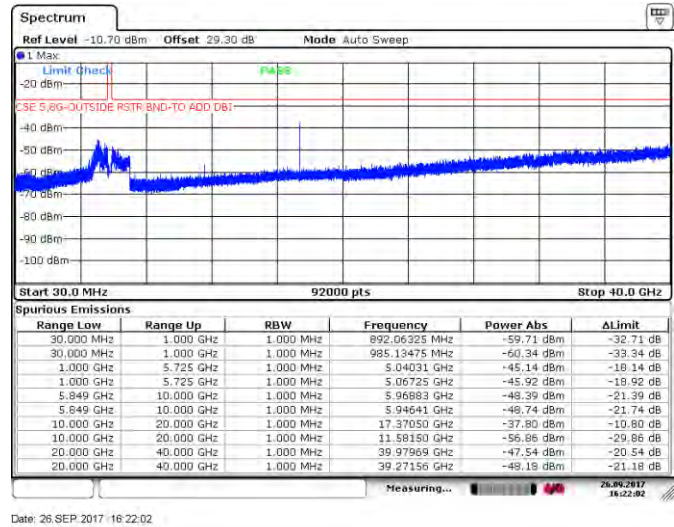
Spectrum analyser for peak conducted measurements outside restricted bands:

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

8.4.4 Test data



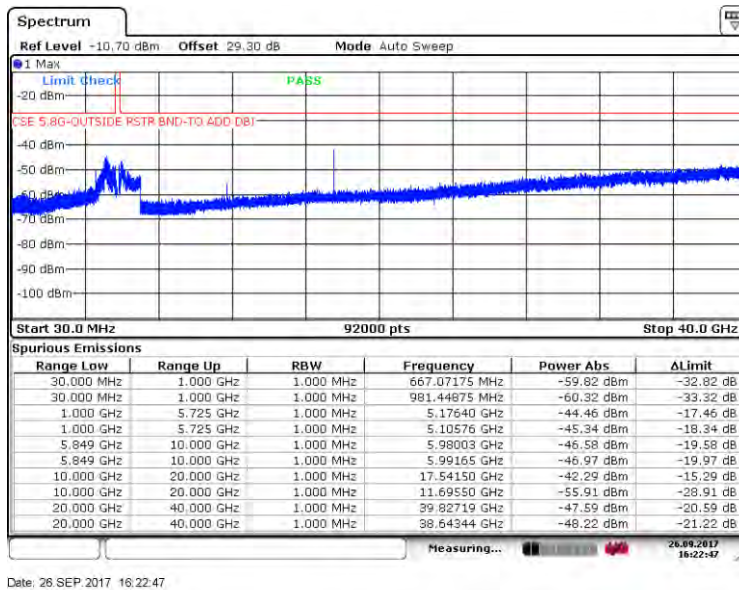
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Date: 26 SEP 2017 16:22:02

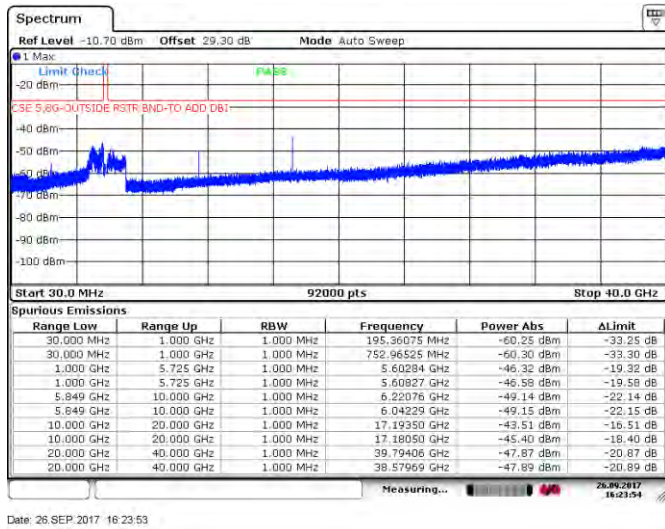
Figure 8.4-1: Spurious emissions outside restricted bands for 10 dBi antenna, 5 MHz channel, low channel, PMP application

Figure 8.4-2: Spurious emissions outside restricted bands for 10 dBi antenna, 5 MHz channel, mid channel, PMP application

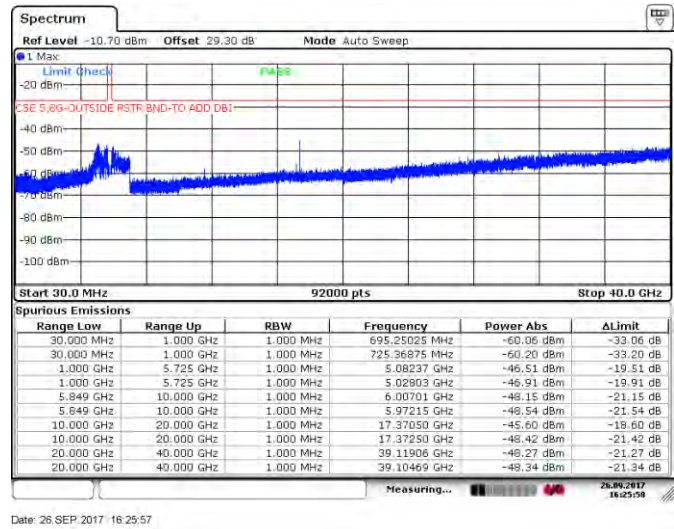


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Figure 8.4-3: Spurious emissions outside restricted bands for 10 dBi antenna, 5 MHz channel, high channel, PMP application



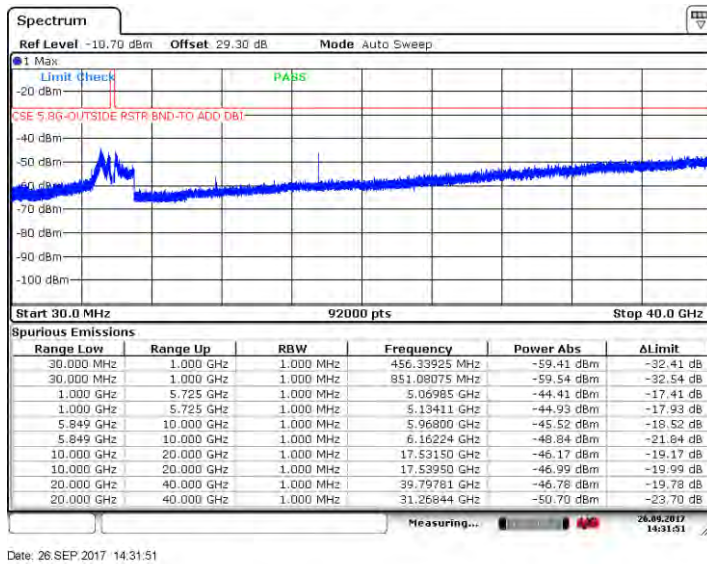
Date: 26 SEP 2017 16:23:53



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Figure 8.4-4: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, low channel, PMP application

Figure 8.4-5: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, PMP application



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Figure 8.4-6: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, high channel, PMP application

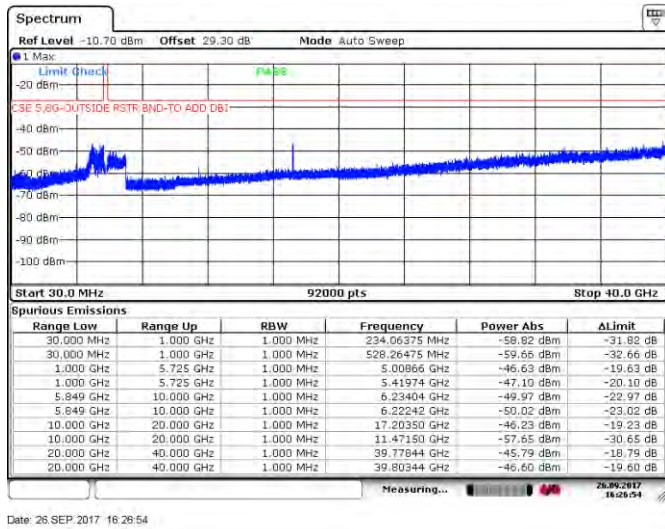


Figure 8.4-7: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, low channel, PMP application

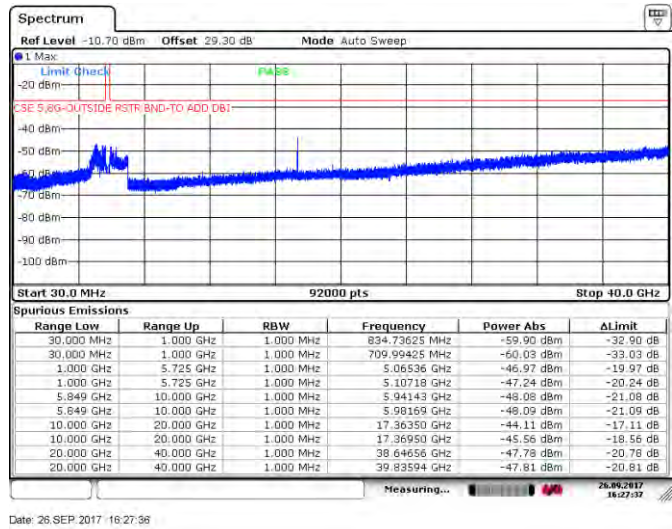


Figure 8.4-8: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, PMP application

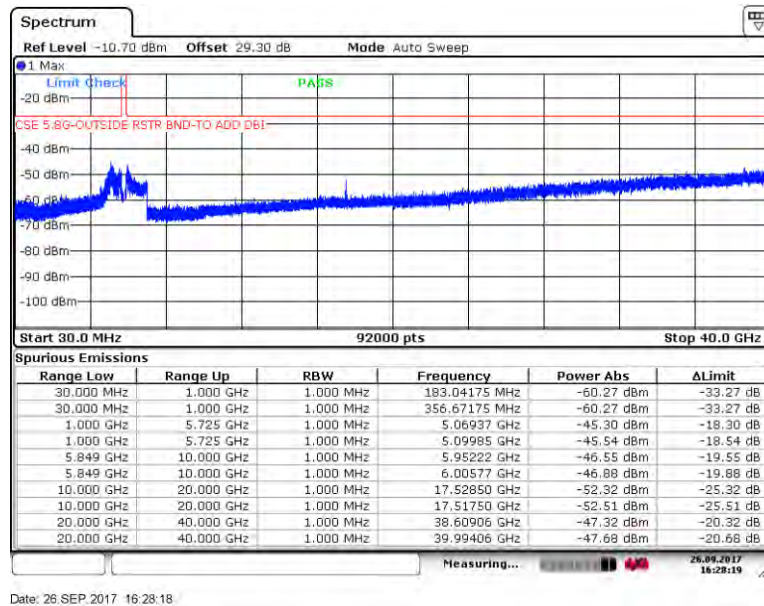
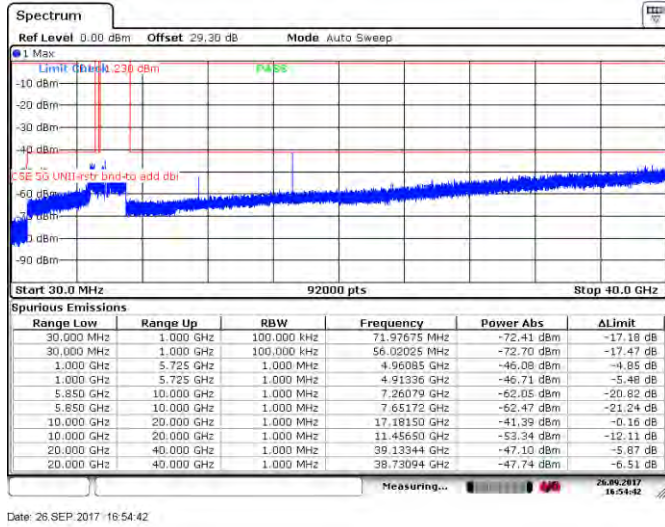


Figure 8.4-9: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, high channel, PMP application

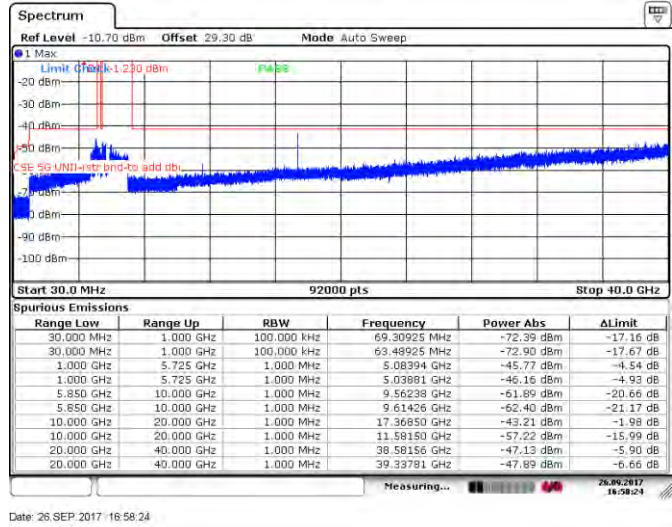


Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm  
 Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm



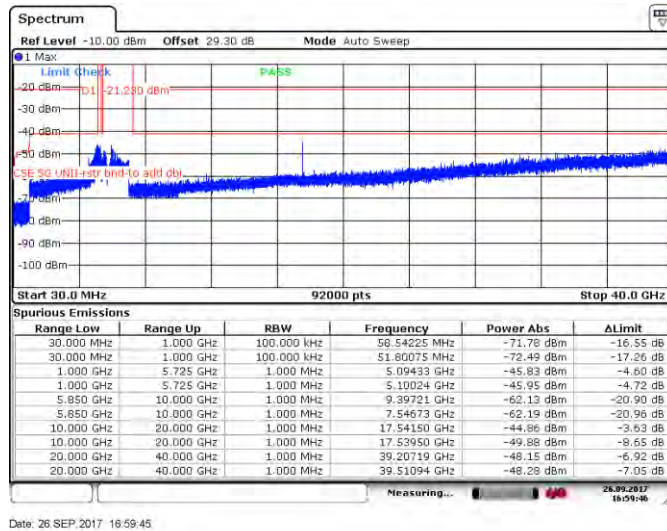
Date: 26 SEP 2017 16:54:42

Figure 8.4-10: Spurious emissions within restricted bands for 10 dBi antenna, 5 MHz channel, low channel, PMP application



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Figure 8.4-11: Spurious emissions within restricted bands for 10 dBi antenna, 5 MHz channel, mid channel, PMP application



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Figure 8.4-12: Spurious emissions within restricted bands for 10 dBi antenna, 5 MHz channel, high channel, PMP application

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

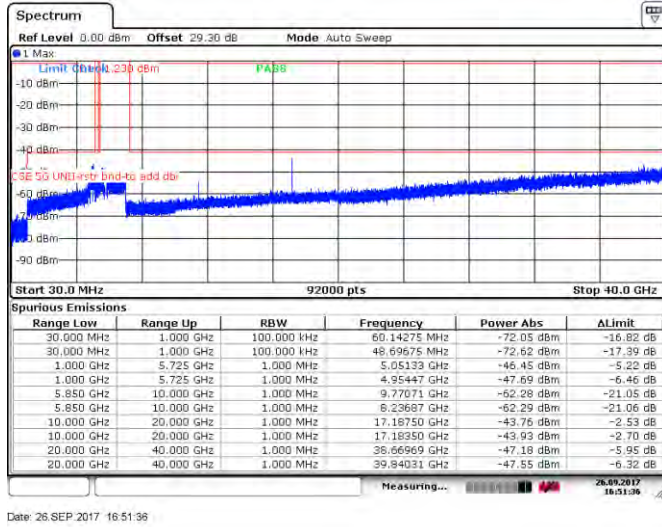


Figure 8.4-13: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, low channel, PMP application

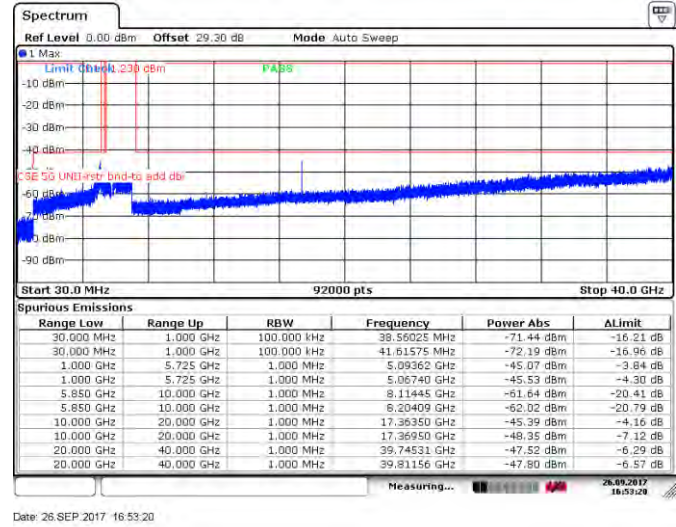


Figure 8.4-14: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, PMP application

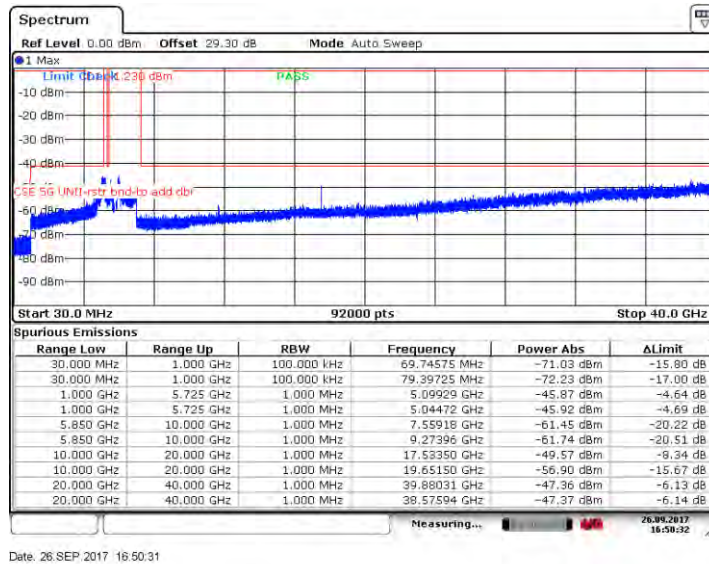


Figure 8.4-15: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, high channel, PMP application

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

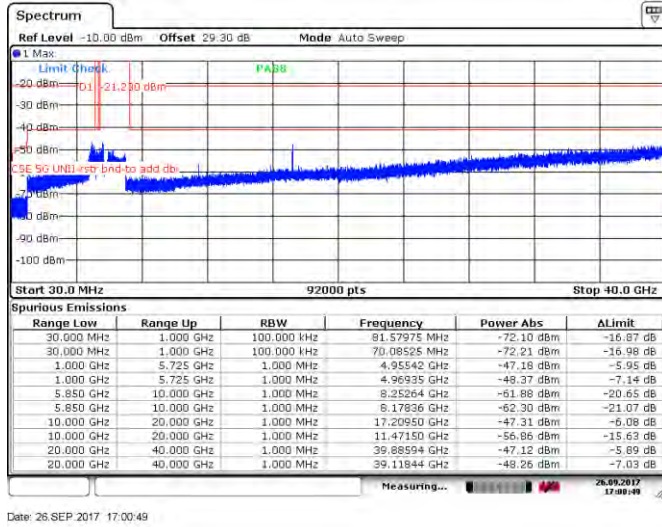


Figure 8.4-16: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, low channel, PMP application

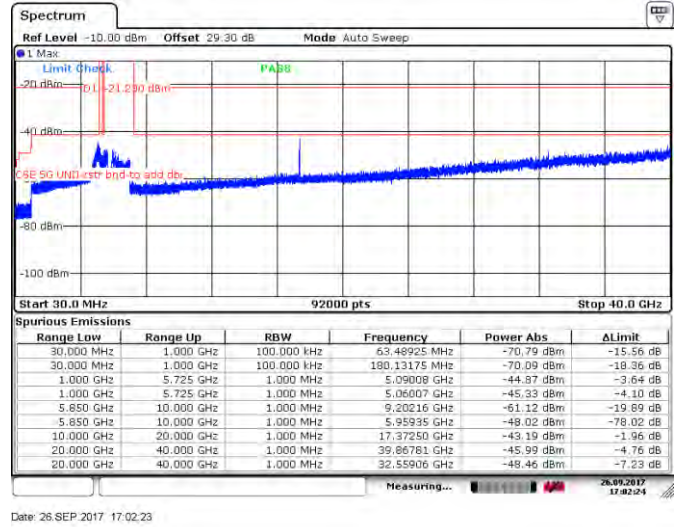


Figure 8.4-17: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, PMP application

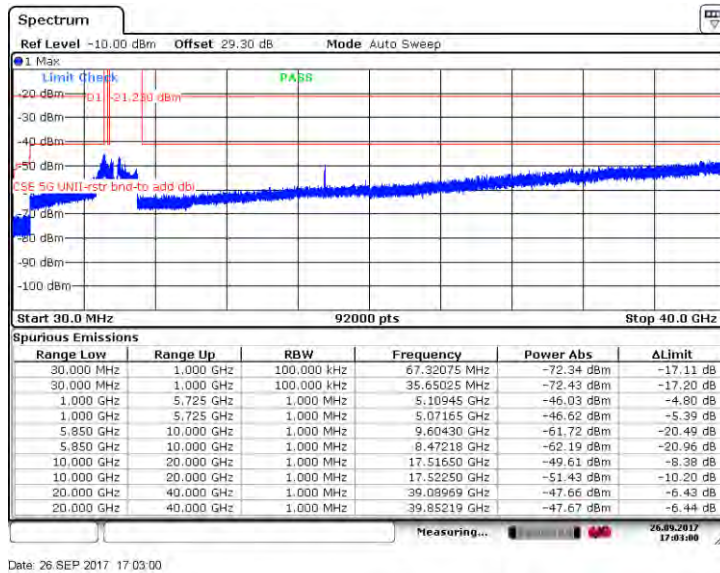
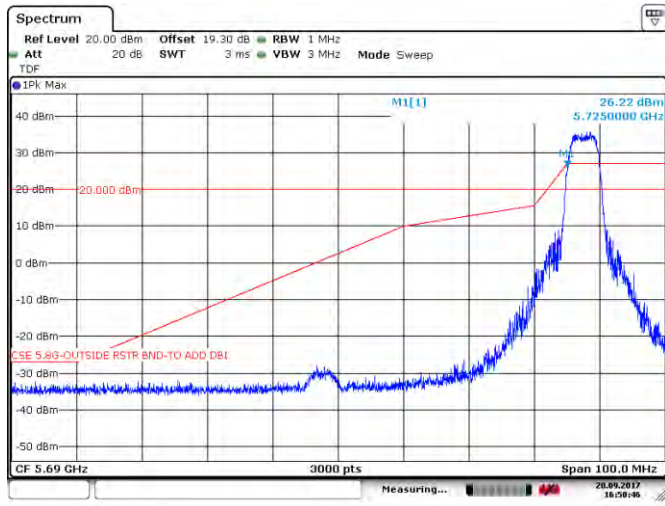


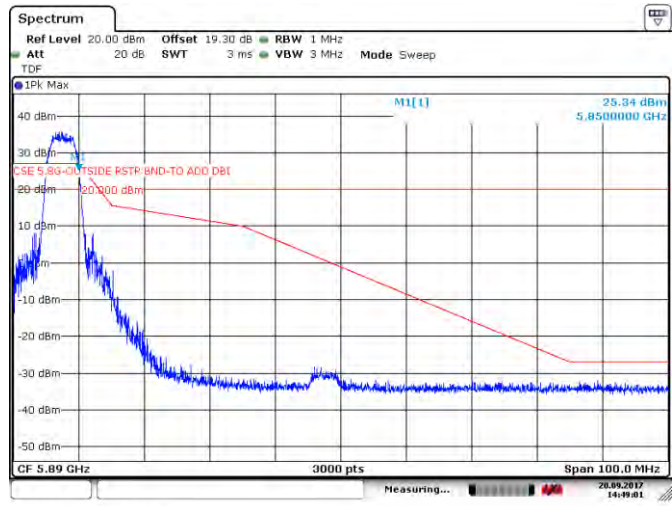
Figure 8.4-18: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, high channel, PMP application





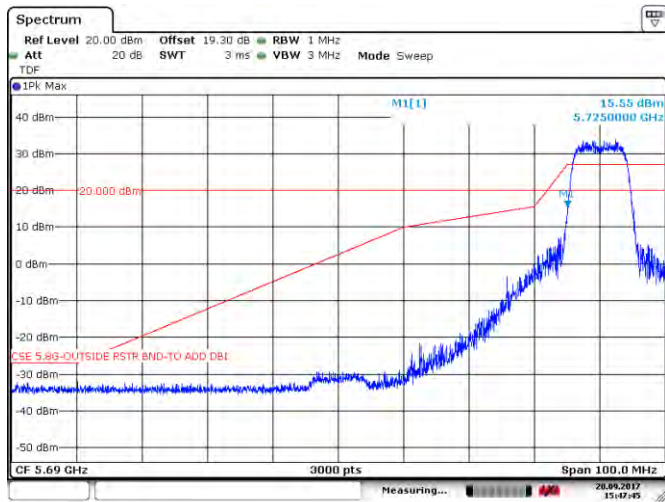
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Figure 8.4-19: Lower band edge for 10 dBi antenna, 5 MHz channel, PMP application



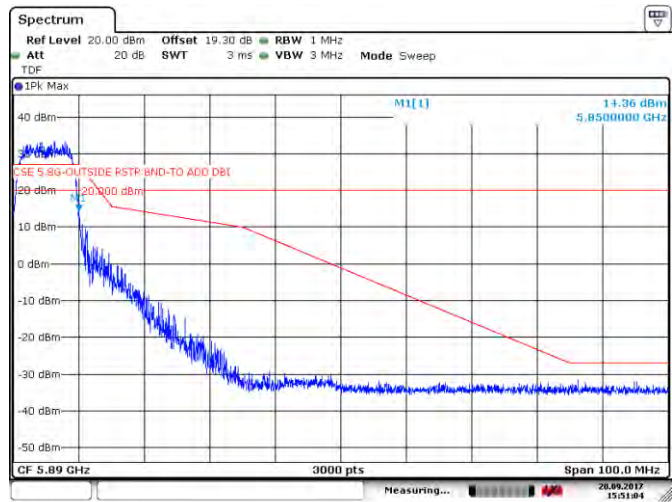
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Figure 8.4-20: Upper band edge for 10 dBi antenna, 5 MHz channel, PMP application



Date: 20.SEP.2017 15:47:45

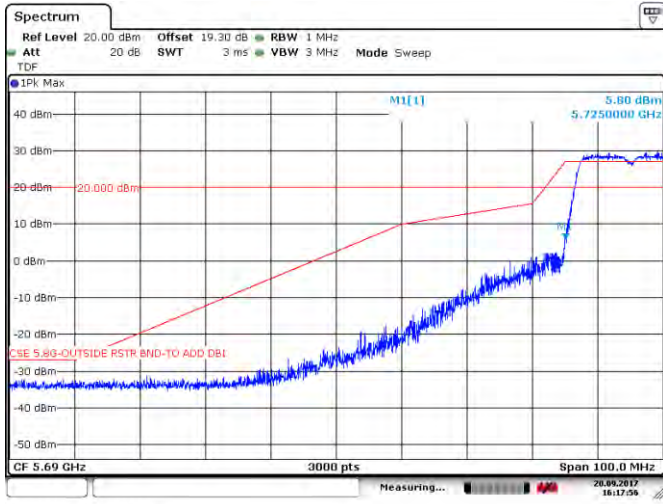
Figure 8.4-21: Lower band edge for 10 dBi antenna, 10 MHz channel, PMP application



Date: 20.SEP.2017 15:51:04

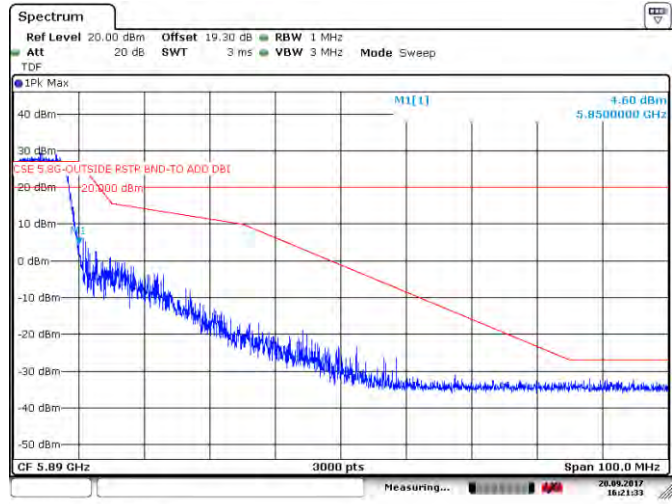
Figure 8.4-22: Upper band edge for 10 dBi antenna, 10 MHz channel, PMP application





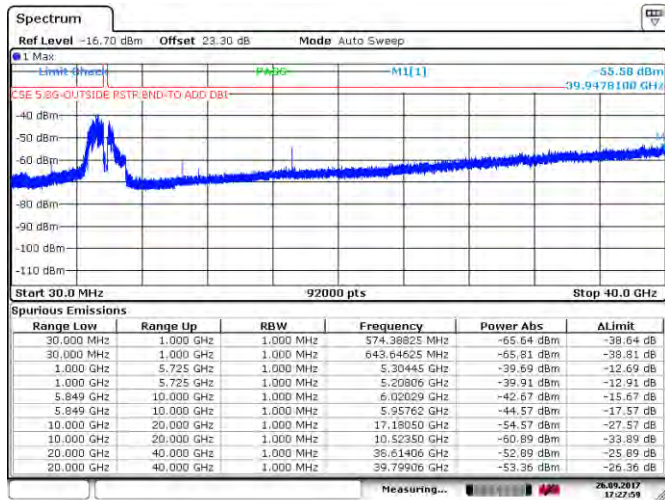
Date: 20.SEP.2017 16:17:56

Figure 8.4-23: Lower band edge for 10 dBi antenna, 20 MHz channel, PMP application



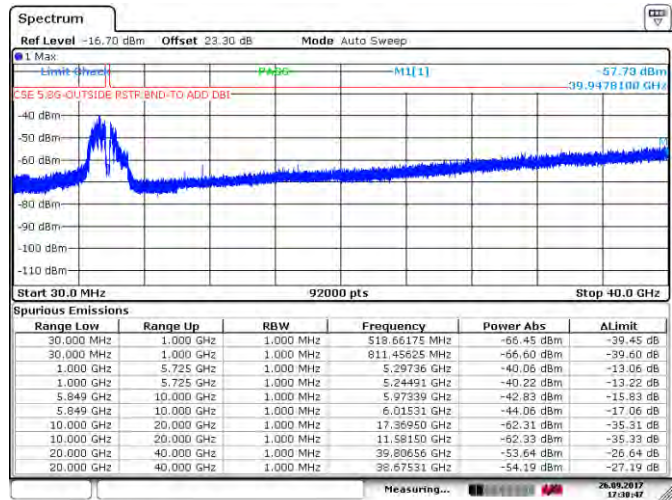
Date: 20.SEP.2017 16:21:33

Figure 8.4-24: Upper band edge for 10 dBi antenna, 20 MHz channel, PMP application



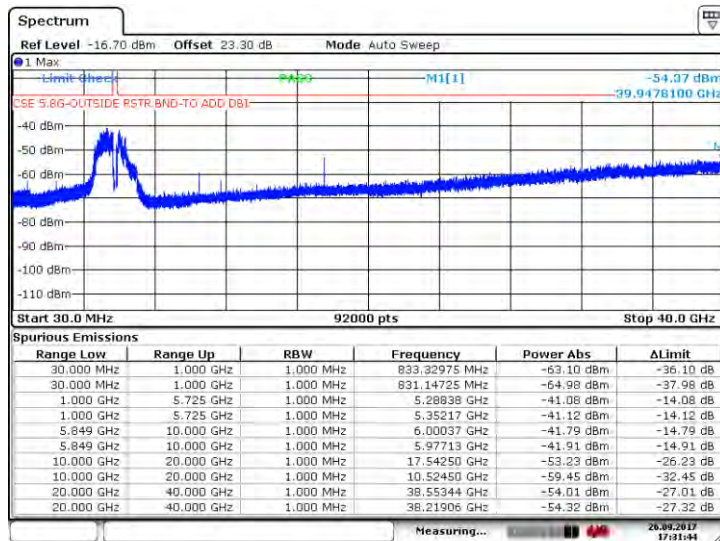
Date: 26.SEP.2017 17:27:58

Figure 8.4-25: Spurious emissions outside restricted bands for 24 dBi antenna, 5 MHz channel, low channel, PMP application



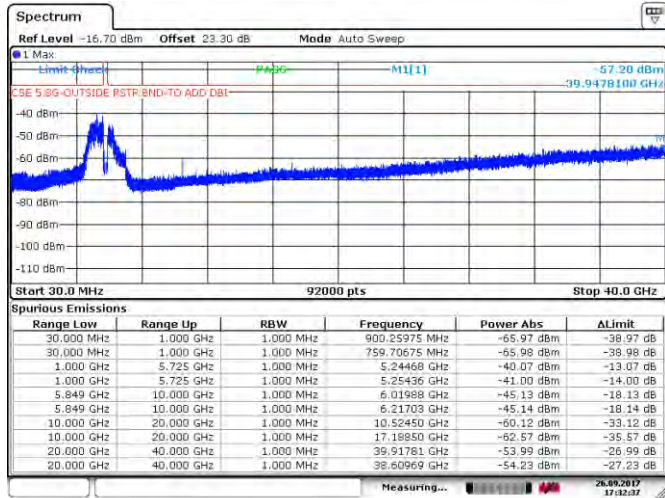
Date: 26.SEP.2017 17:30:47

Figure 8.4-26: Spurious emissions outside restricted bands for 24 dBi antenna, 5 MHz channel, mid channel, PMP application



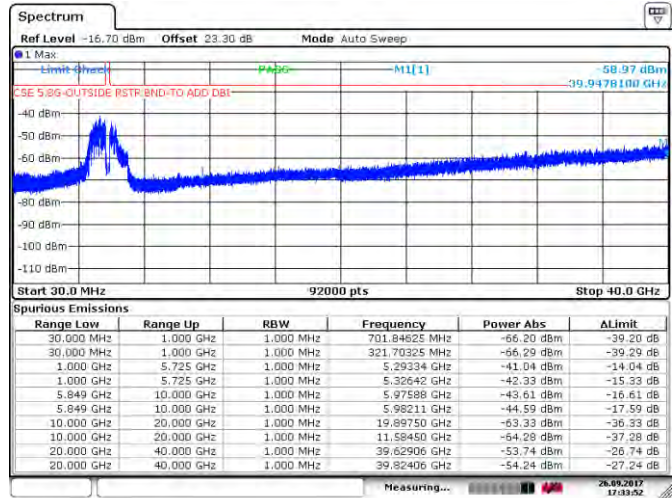
Date: 26.SEP.2017 17:31:44

Figure 8.4-27: Spurious emissions outside restricted bands for 24 dBi antenna, 5 MHz channel, high channel, PMP application



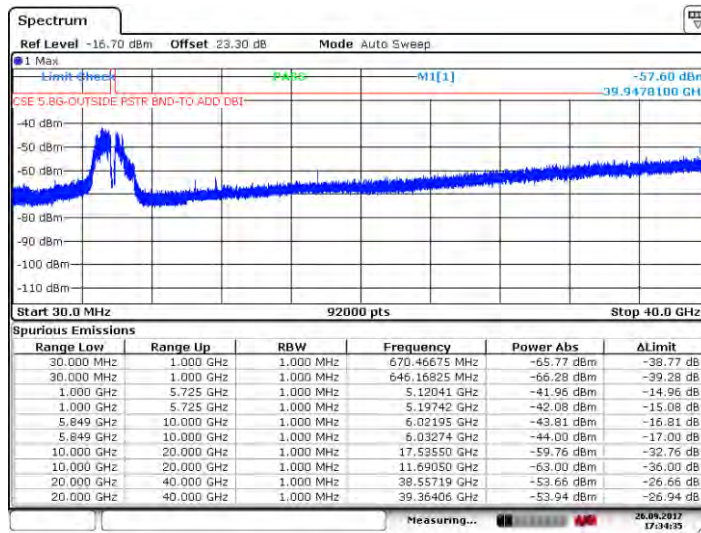
Date: 26 SEP 2017 17:32:56

Figure 8.4-28: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, low channel, PMP application



Date: 26 SEP 2017 17:33:52

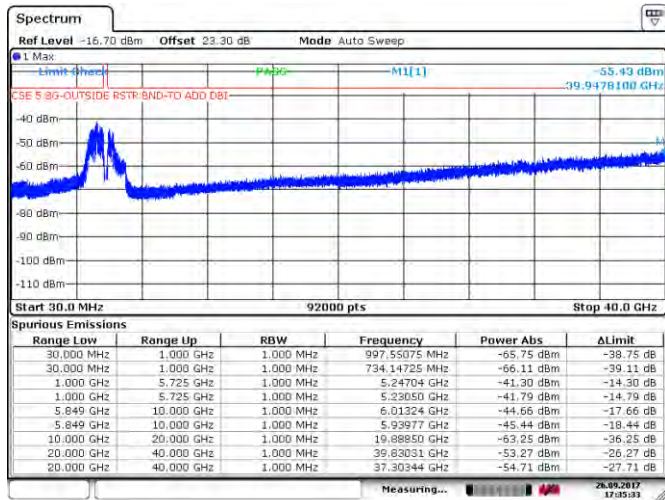
Figure 8.4-29: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, mid channel, PMP application



Date: 26 SEP 2017 17:34:35

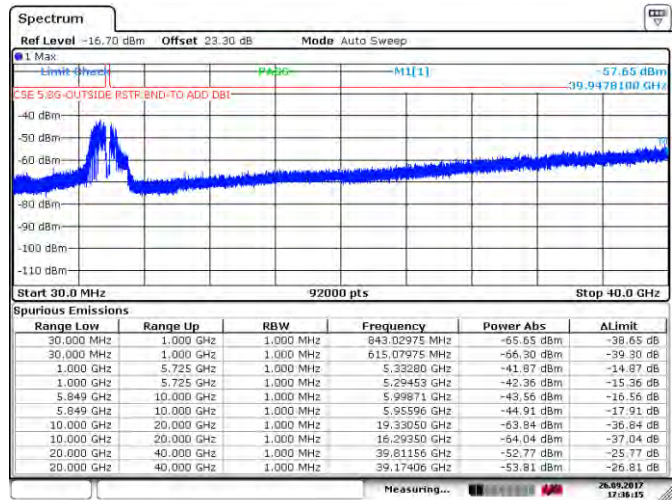
Figure 8.4-30: Spurious emissions outside restricted bands for 24 dBi antenna, 10 MHz channel, high channel, PMP application





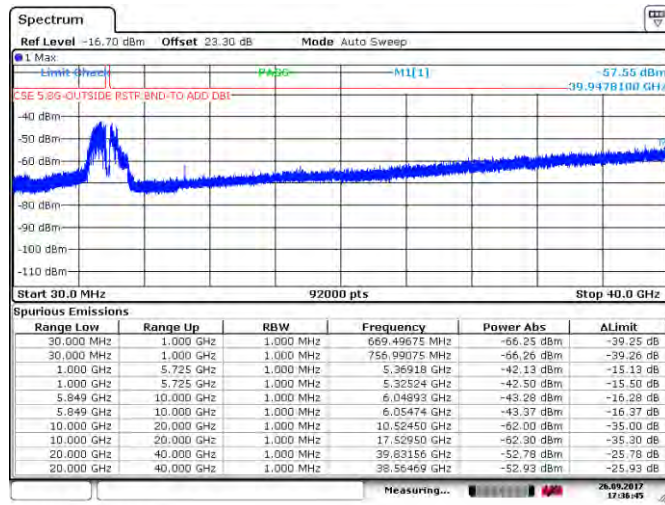
Date: 26 SEP 2017 17:35:33

Figure 8.4-31: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, low channel, PMP application



Date: 26 SEP 2017 17:36:15

Figure 8.4-32: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, mid channel, PMP application



Date: 26 SEP 2017 17:36:45

Figure 8.4-33: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, high channel, PMP application

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

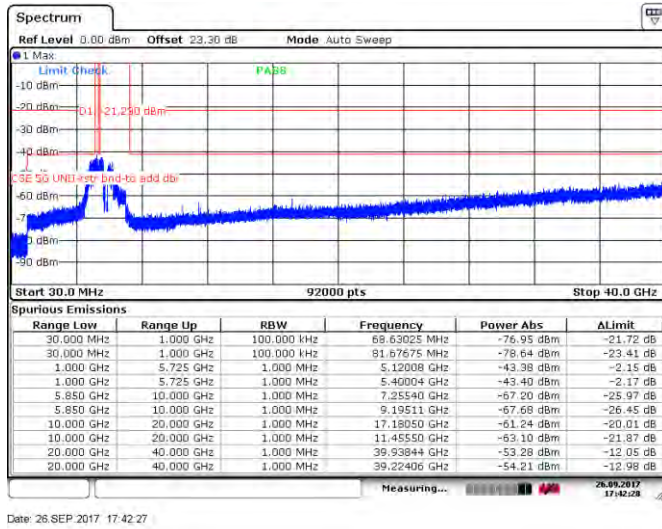


Figure 8.4-34: Spurious emissions within restricted bands for 24 dBi antenna, 5 MHz channel, low channel, PMP application

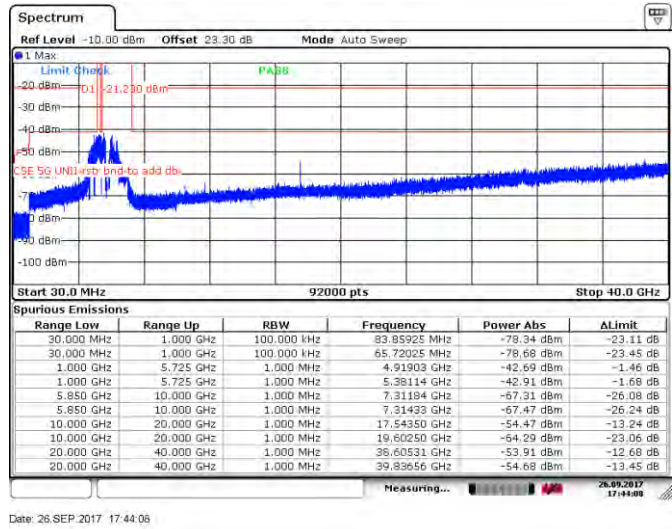


Figure 8.4-35: Spurious emissions within restricted bands for 24 dBi antenna, 5 MHz channel, mid channel, PMP application

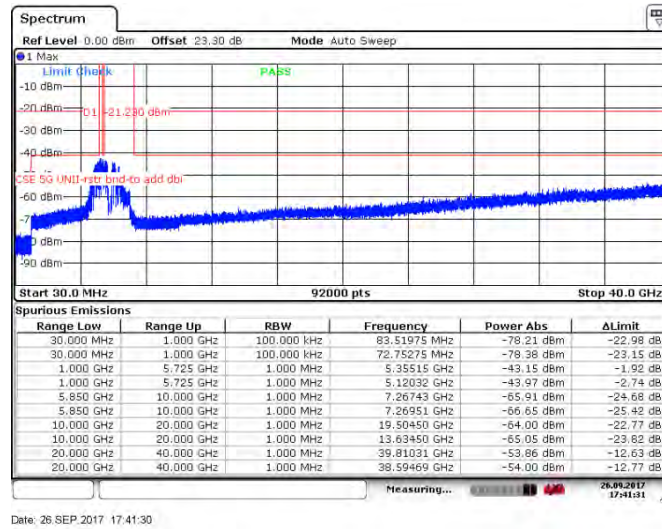
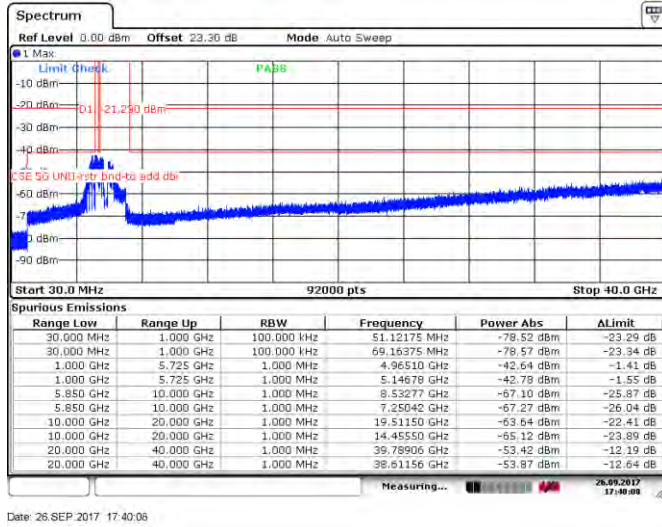


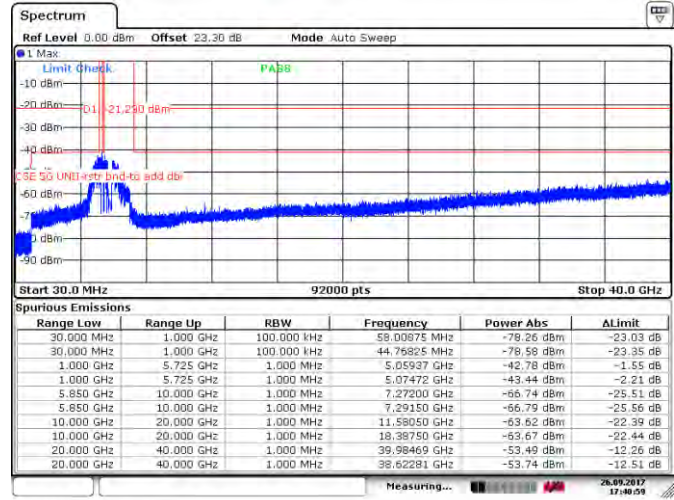
Figure 8.4-36: Spurious emissions within restricted bands for 24 dBi antenna, 5 MHz channel, high channel, PMP application

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



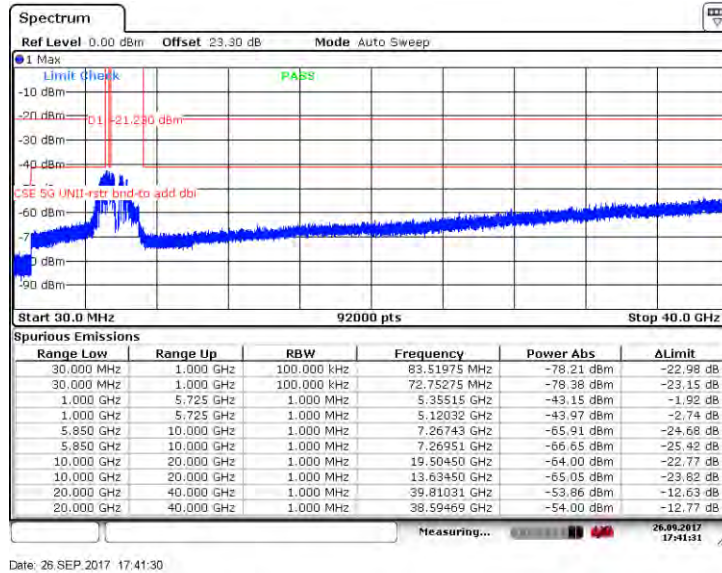
Date: 26 SEP 2017 17:40:06

Figure 8.4-37: Spurious emissions within restricted bands for 24 dBi antenna, 10 MHz channel, low channel, PMP application



Date: 26 SEP 2017 17:40:58

Figure 8.4-38: Spurious emissions within restricted bands for 24 dBi antenna, 10 MHz channel, mid channel, PMP application



Date: 26 SEP 2017 17:41:30

Figure 8.4-39: Spurious emissions within restricted bands for 24 dBi antenna, 10 MHz channel, high channel, PMP application



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

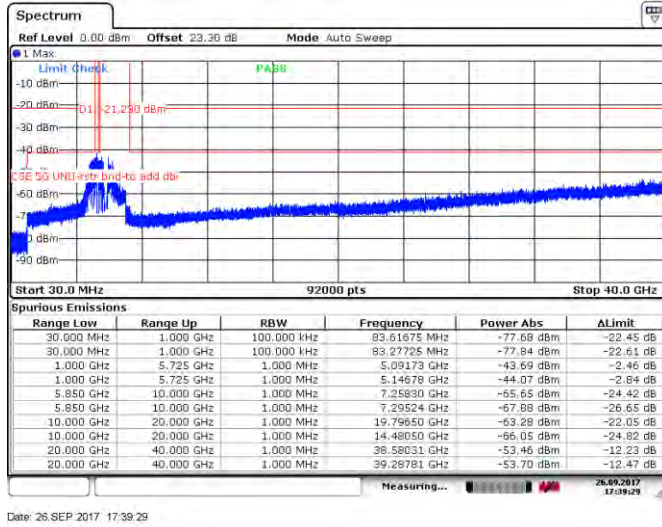


Figure 8.4-40: Spurious emissions within restricted bands for 24 dBi antenna, 20 MHz channel, low channel, PMP application

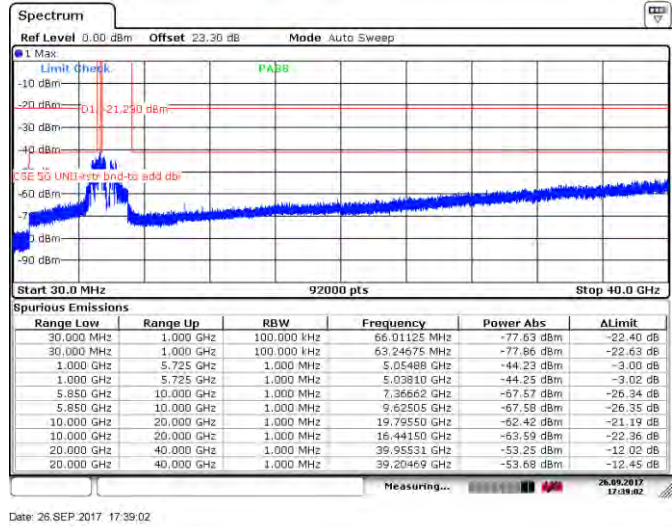


Figure 8.4-41: Spurious emissions within restricted bands for 24 dBi antenna, 20 MHz channel, mid channel, PMP application

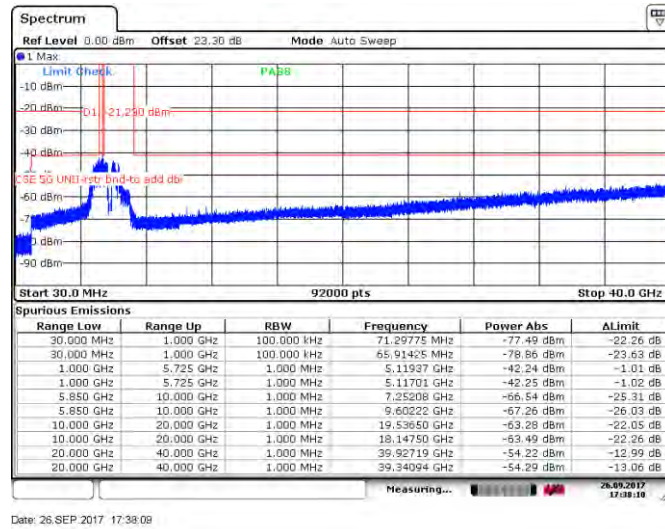
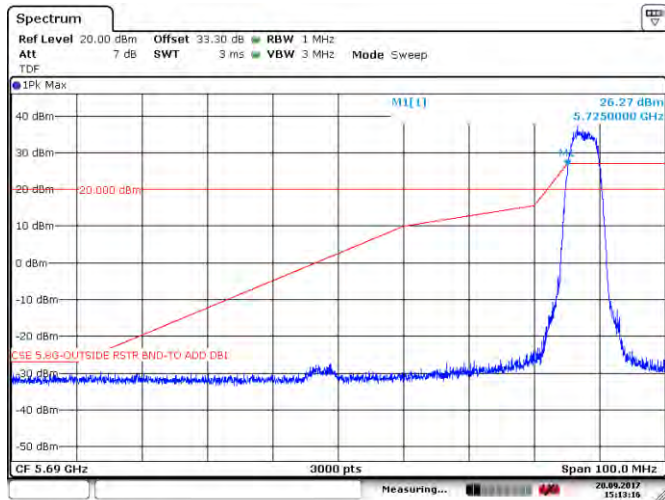
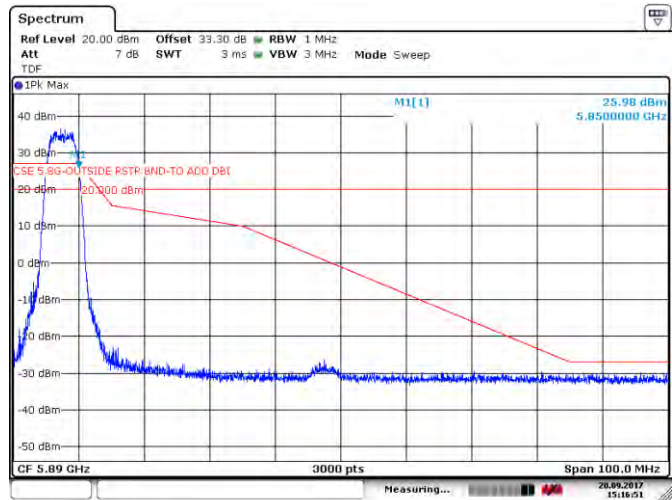


Figure 8.4-42: Spurious emissions within restricted bands for 24 dBi antenna, 20 MHz channel, high channel, PMP application



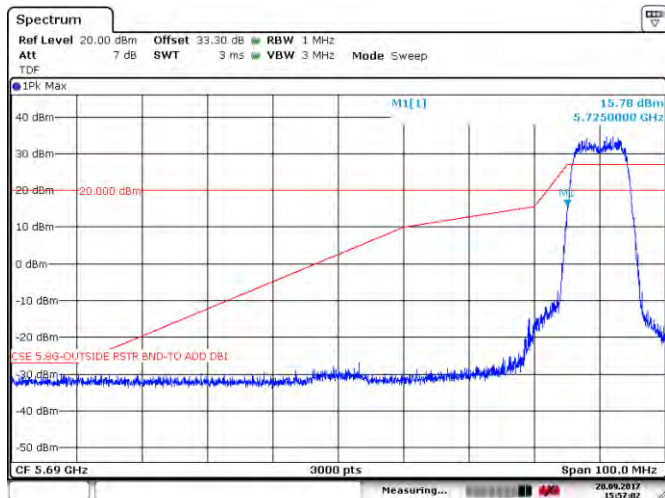
Date: 20.SEP.2017 15:13:16

Figure 8.4-43: Lower band edge for 24 dBi antenna, 5 MHz channel, PMP application



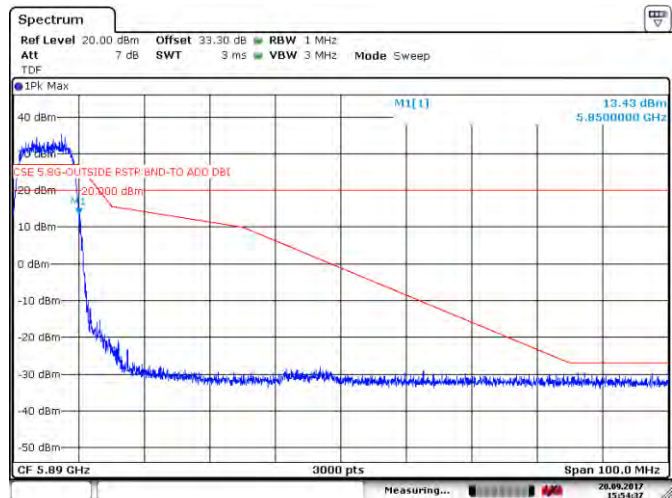
Date: 20.SEP.2017 15:16:51

Figure 8.4-44: Upper band edge for 24 dBi antenna, 5 MHz channel, PMP application



Date: 20.SEP.2017 15:57:02

Figure 8.4-45: Lower band edge for 24 dBi antenna, 10 MHz channel, PMP application



Date: 20.SEP.2017 15:54:38

Figure 8.4-46: Upper band edge for 24 dBi antenna, 10 MHz channel, PMP application



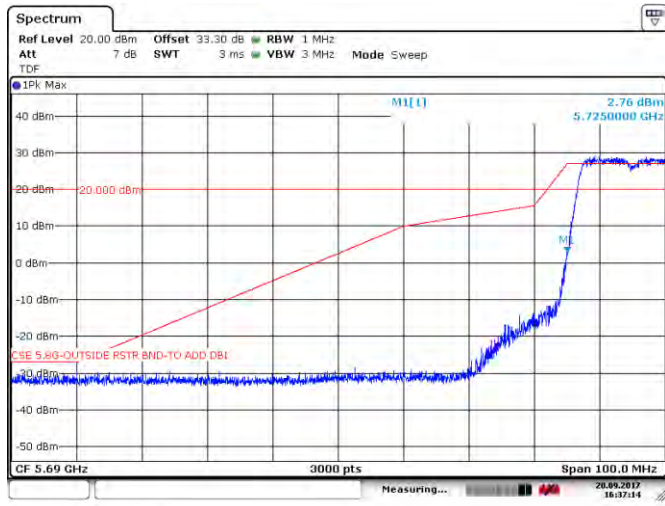


Figure 8.4-47: Lower band edge for 24 dBi antenna, 20 MHz channel, PMP application

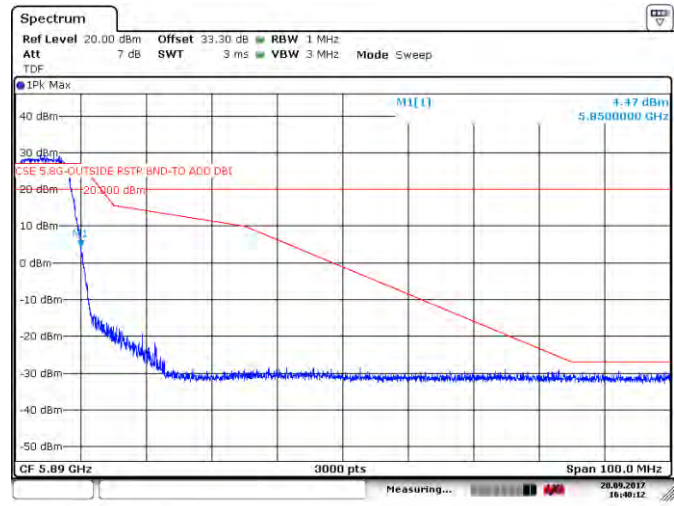
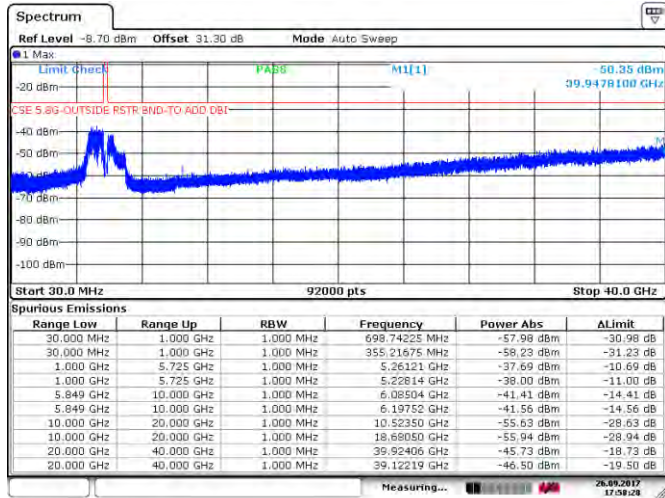
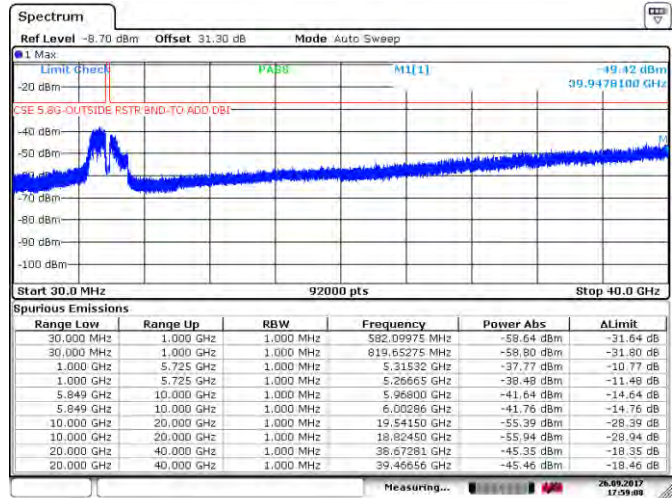


Figure 8.4-48: Upper band edge for 24 dBi antenna, 20 MHz channel, PMP application



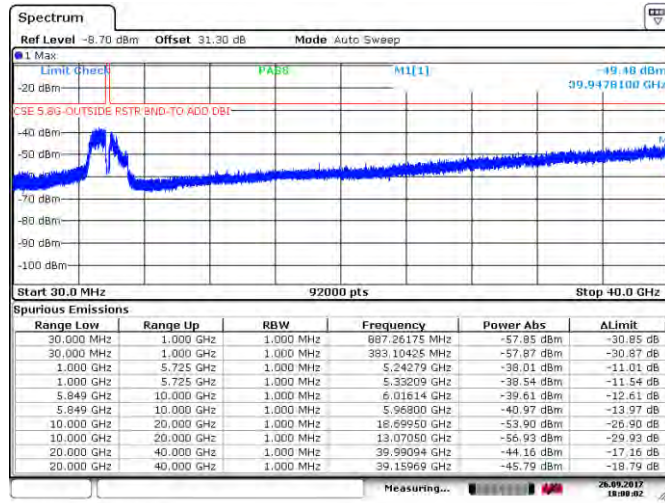
Date: 26 SEP 2017 17:58:27

Figure 8.4-49: Spurious emissions outside restricted bands for 32 dBi antenna, 5 MHz channel, low channel, PMP application



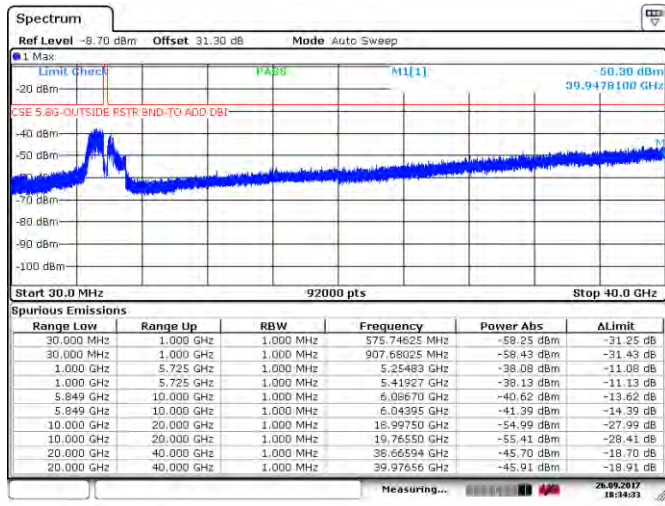
Date: 26 SEP 2017 17:59:07

Figure 8.4-50: Spurious emissions outside restricted bands for 32 dBi antenna, 5 MHz channel, mid channel, PMP application



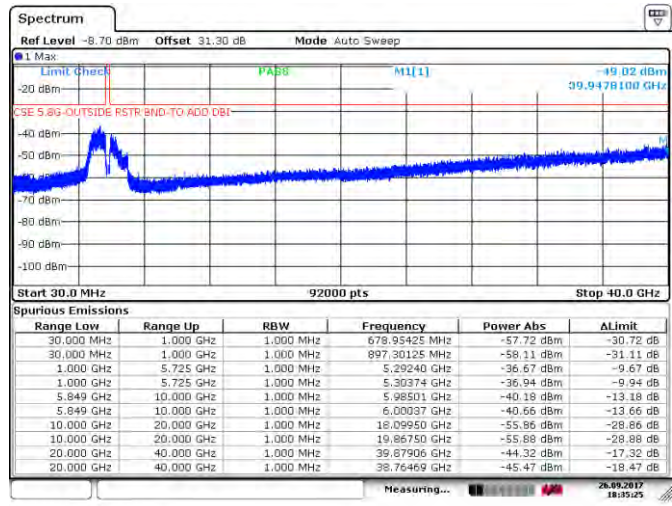
Date: 26 SEP 2017 18:00:01

Figure 8.4-51: Spurious emissions outside restricted bands for 32 dBi antenna, 5 MHz channel, high channel, PMP application



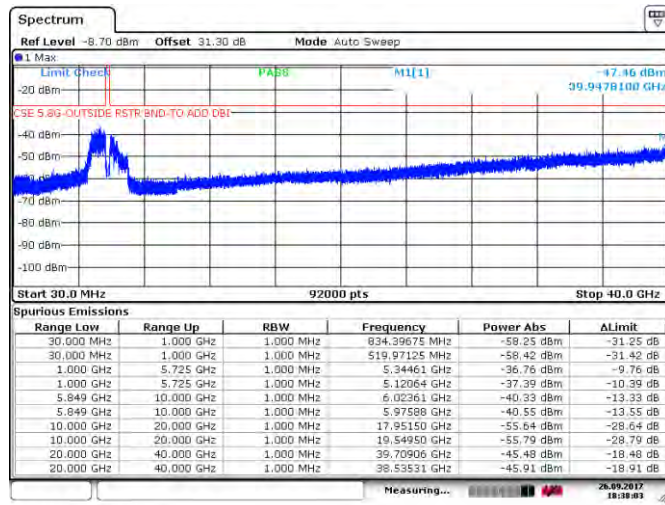
Date: 26 SEP 2017 18:34:33

Figure 8.4-52: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, low channel, PMP application



Date: 26 SEP 2017 16:35:24

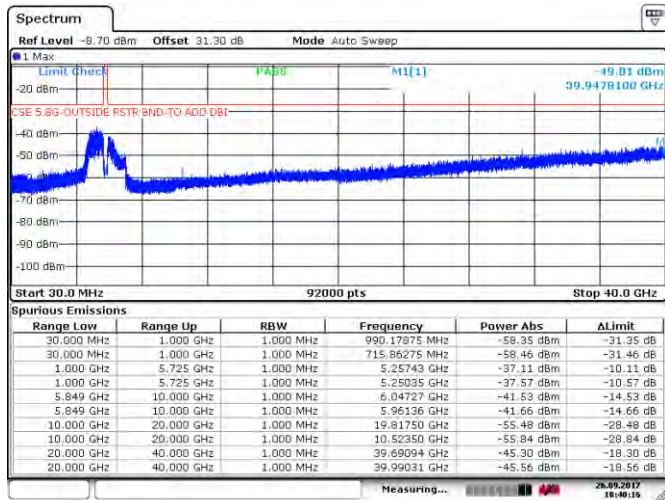
Figure 8.4-53: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, PMP application



Date: 26 SEP 2017 16:38:03

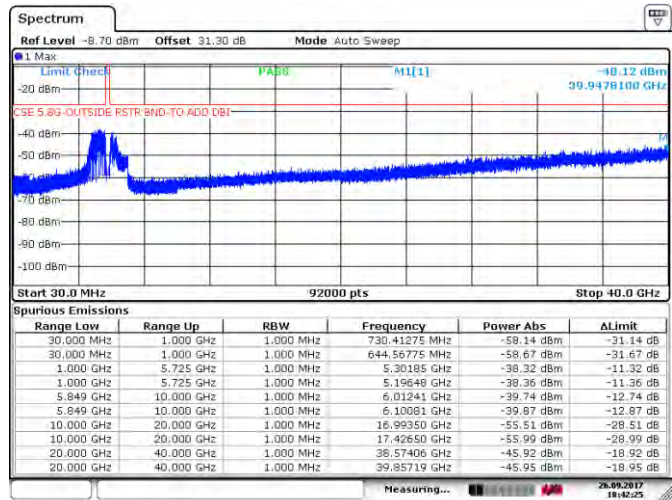
Figure 8.4-54: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, high channel, PMP application





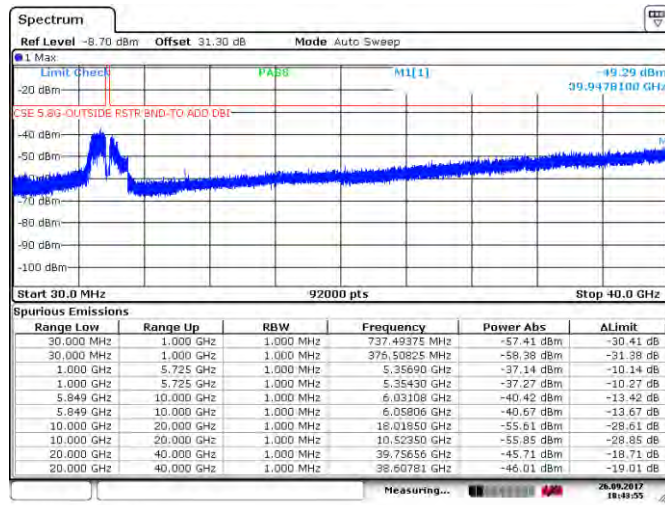
Date: 26 SEP 2017 18:40:16

Figure 8.4-55: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, low channel, PMP application



Date: 26 SEP 2017 18:42:24

Figure 8.4-56: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, PMP application



Date: 26 SEP 2017 18:43:54

Figure 8.4-57: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, high channel, PMP application

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**Test name**  
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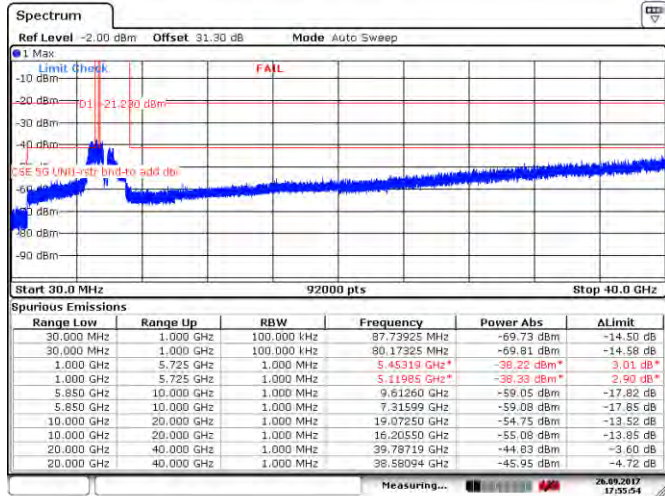
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

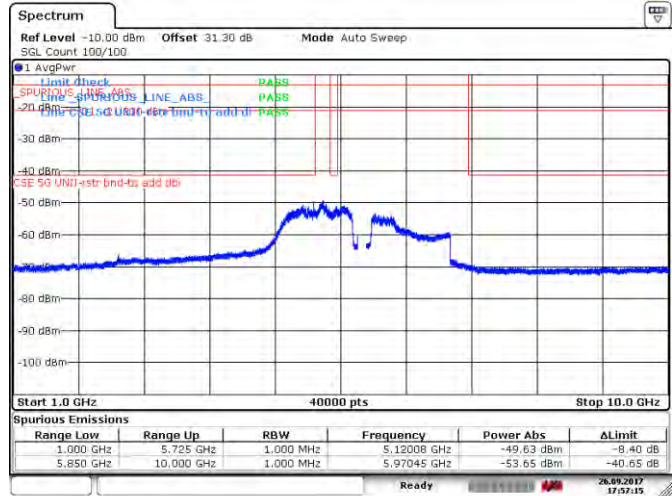
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



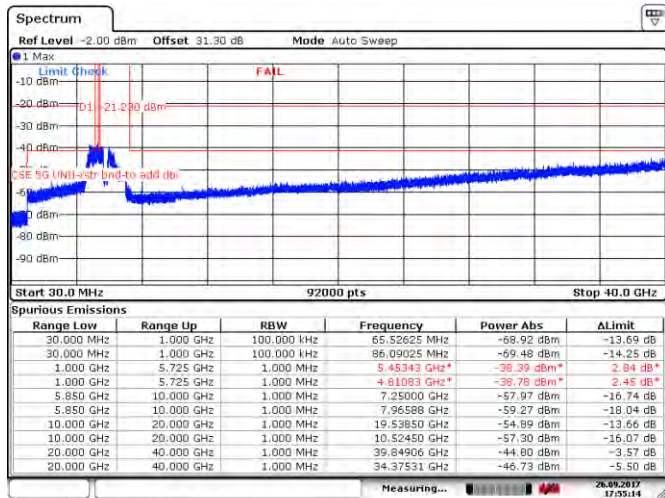
Date: 26 SEP 2017 17:55:53

**Figure 8.4-58:** Peak Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, low channel, PMP application



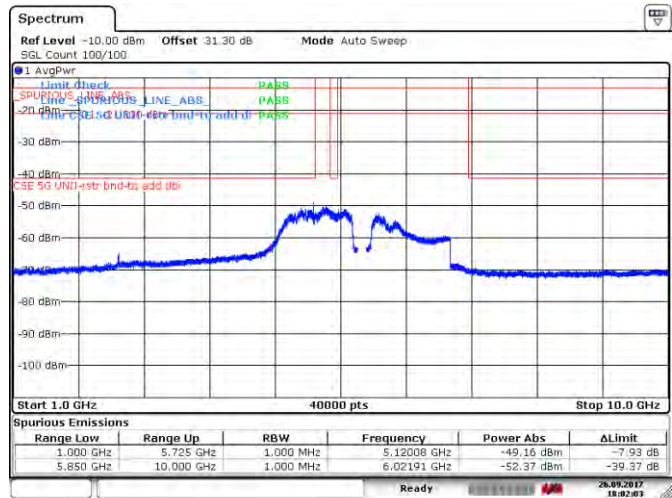
Date: 26 SEP 2017 17:57:15

**Figure 8.4-59:** Average Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, low channel, PMP application



Date: 26 SEP 2017 17:55:13

**Figure 8.4-60:** Peak Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, mid channel, PMP application



Date: 26 SEP 2017 18:02:03

**Figure 8.4-61:** Average Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, mid channel, PMP application



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**Specification**

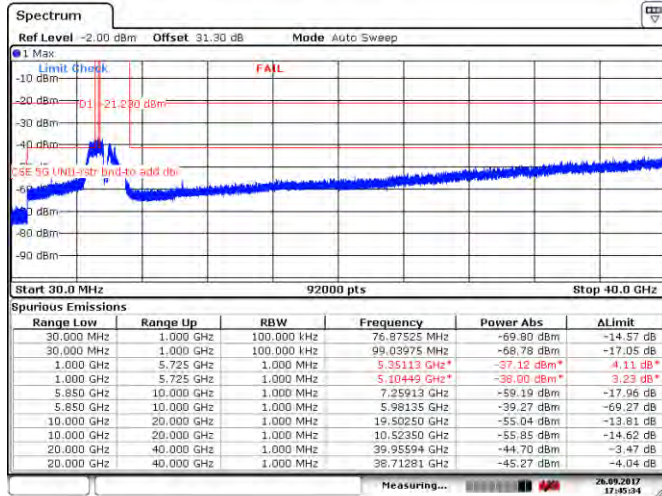
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

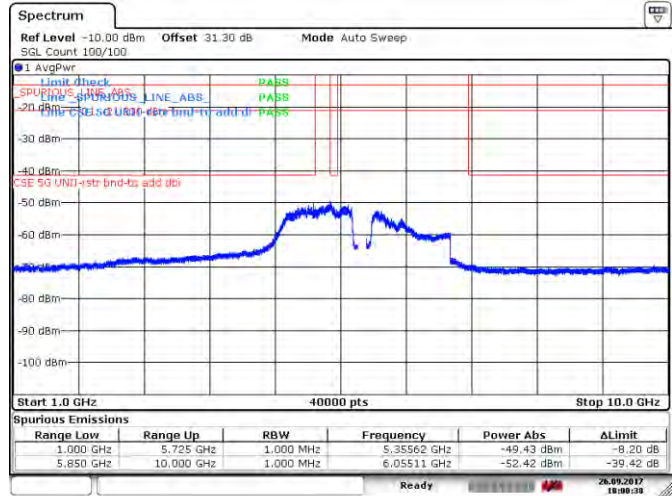
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



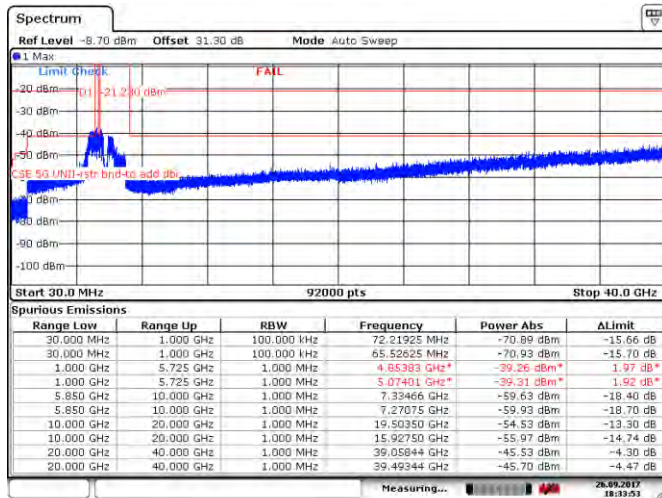
Date: 26 SEP 2017 17:45:33

**Figure 8.4-62:** Peak Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, high channel, PMP application



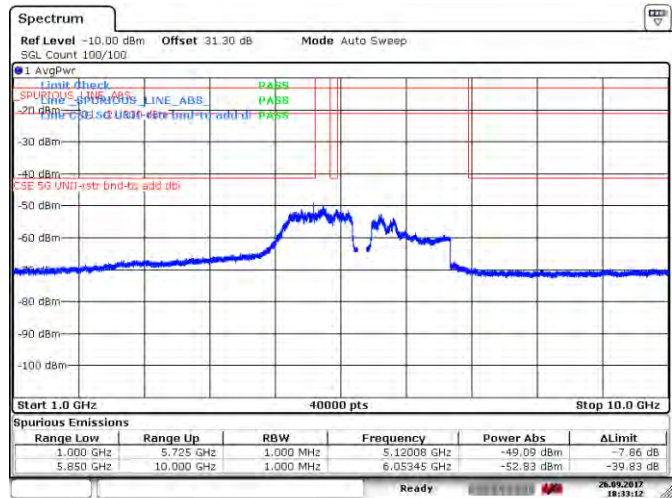
Date: 26 SEP 2017 16:00:38

**Figure 8.4-63:** Average Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, high channel, PMP application



Date: 26 SEP 2017 18:33:52

**Figure 8.4-64:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, low channel, PMP application



Date: 26 SEP 2017 18:33:11

**Figure 8.4-65:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, PMP application

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**Test name**  
**Specification**

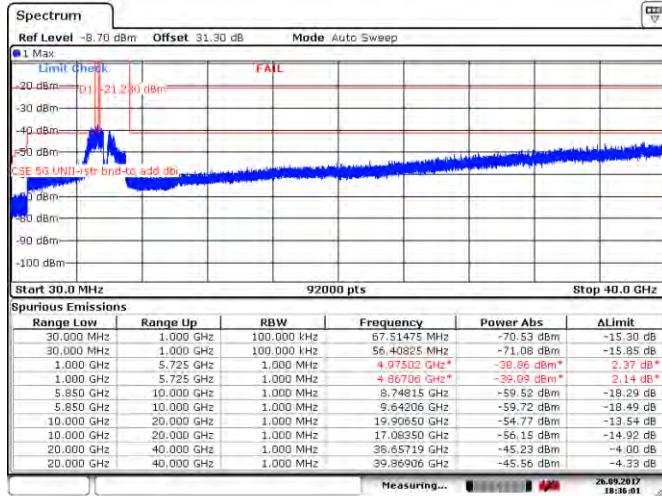
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

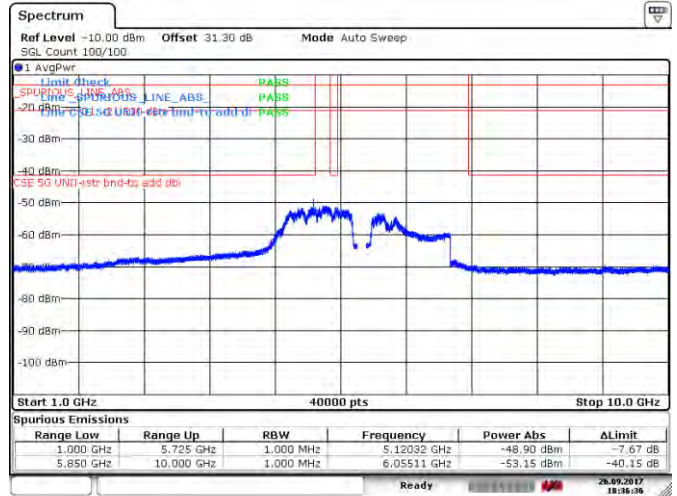
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



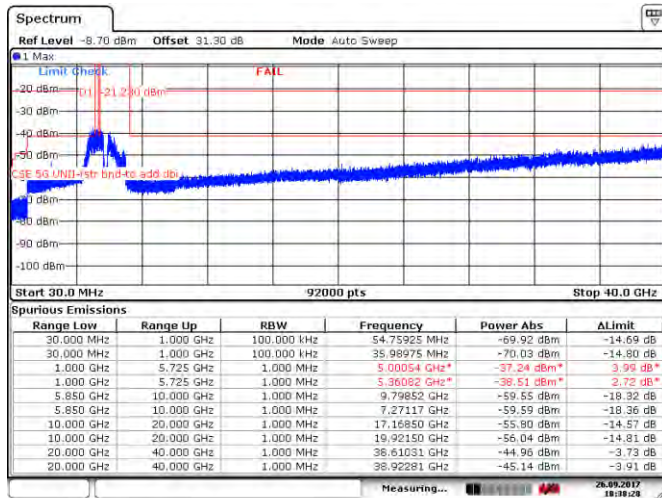
Date: 26 SEP 2017 18:38:01

**Figure 8.4-66:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, PMP application



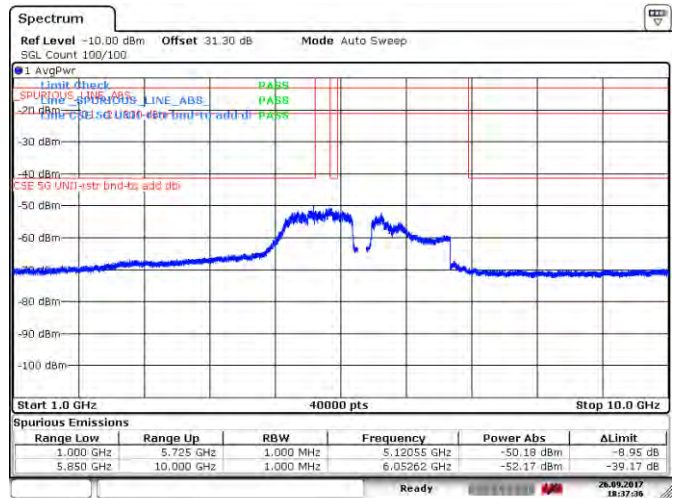
Date: 26 SEP 2017 18:38:35

**Figure 8.4-67:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, PMP application



Date: 26 SEP 2017 18:38:28

**Figure 8.4-68:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, high channel, PMP application



Date: 26 SEP 2017 18:37:58

**Figure 8.4-69:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, high channel, PMP application



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**Specification**

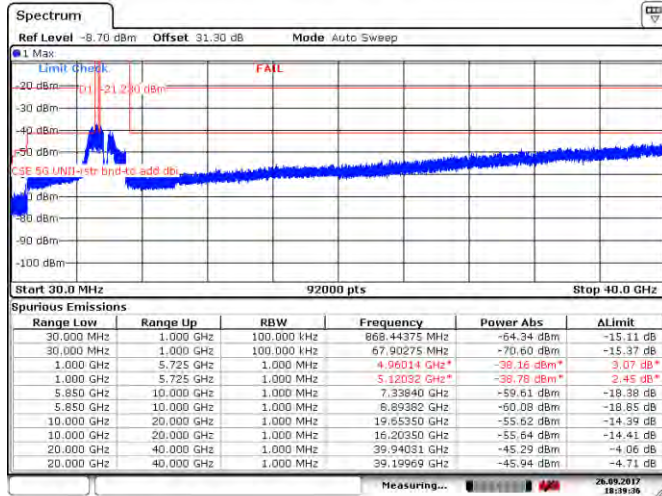
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

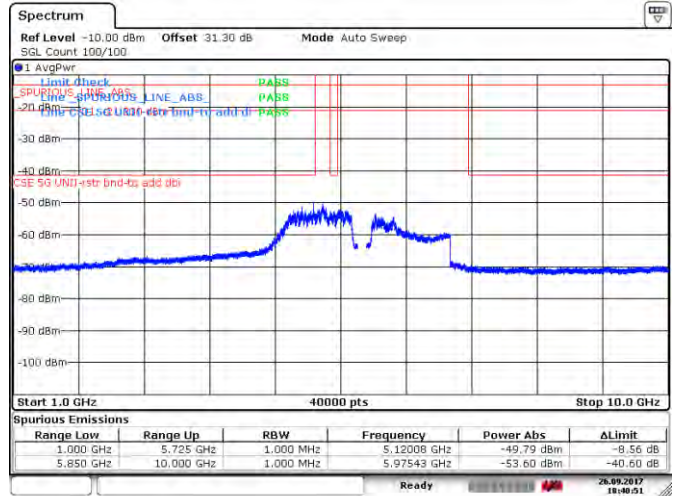
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



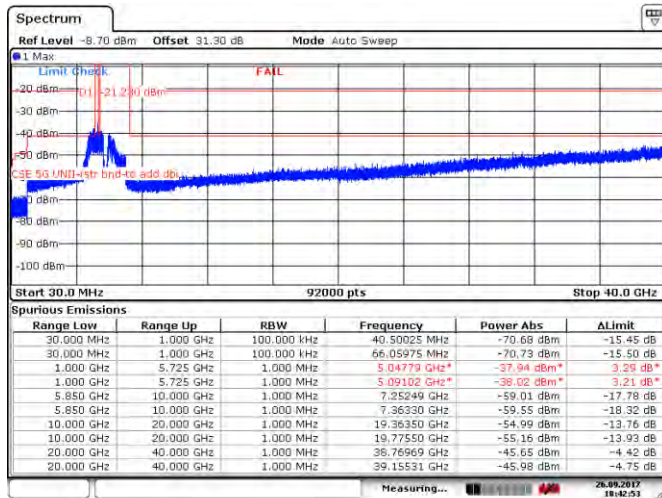
Date: 26 SEP 2017 18:39:36

**Figure 8.4-70:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, low channel, PMP application



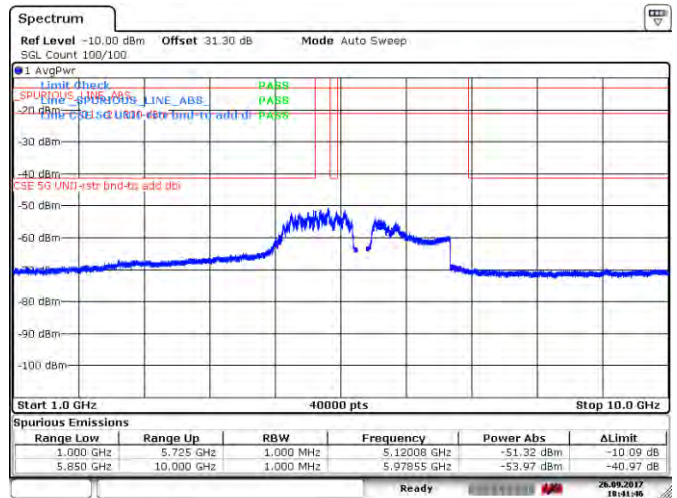
Date: 26 SEP 2017 18:40:52

**Figure 8.4-71:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, low channel, PMP application



Date: 26 SEP 2017 18:42:52

**Figure 8.4-72:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, PMP application



Date: 26 SEP 2017 18:41:46

**Figure 8.4-73:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, PMP application



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**Test name**  
**Specification**

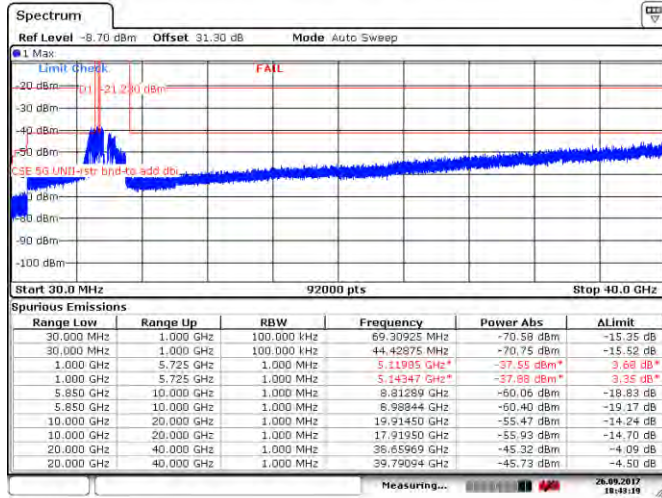
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



Peak limit EIRP equivalent:  $74 \text{ dB}\mu\text{V/m} - 95.23 \text{ dB} = -21.23 \text{ dBm}$

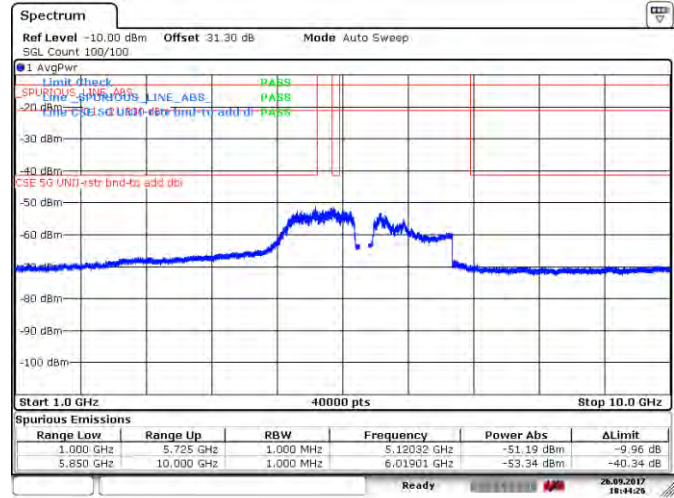
Average limit EIRP equivalent:  $54 \text{ dB}\mu\text{V/m} - 95.23 \text{ dB} = -41.23 \text{ dBm}$

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: 26 SEP 2017 16:43:19

**Figure 8.4-74:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, high channel, PMP application



Date: 26 SEP 2017 16:44:26

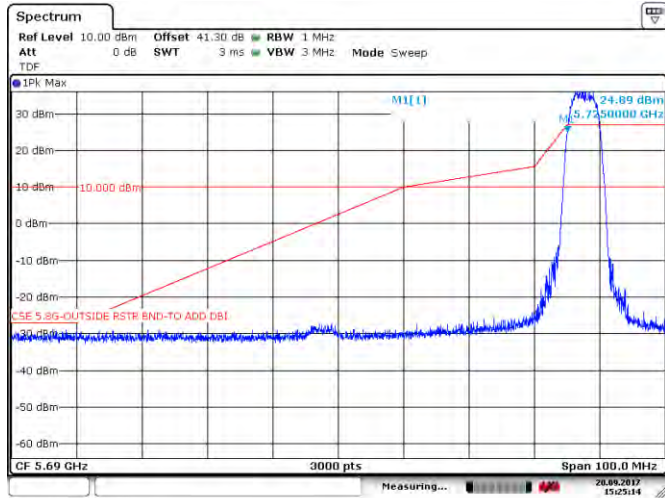
**Figure 8.4-75:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, high channel, PMP application

**Section 8**  
**Test name**  
**Specification**

Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2

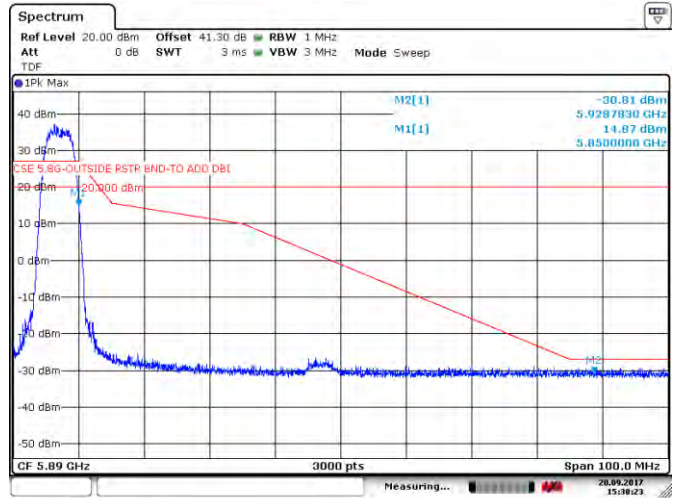


Peak limit EIRP equivalent:  $74 \text{ dB}\mu\text{V}/\text{m} - 95.23 \text{ dB} = -21.23 \text{ dBm}$   
 Average limit EIRP equivalent:  $54 \text{ dB}\mu\text{V}/\text{m} - 95.23 \text{ dB} = -41.23 \text{ dBm}$



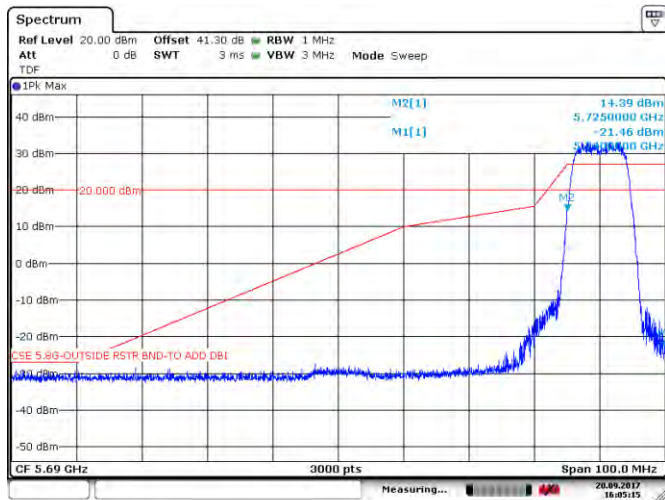
Date: 20 SEP 2017 15:25:15

**Figure 8.4-76:** Lower band edge for 32 dBi antenna, 5 MHz channel, PMP application



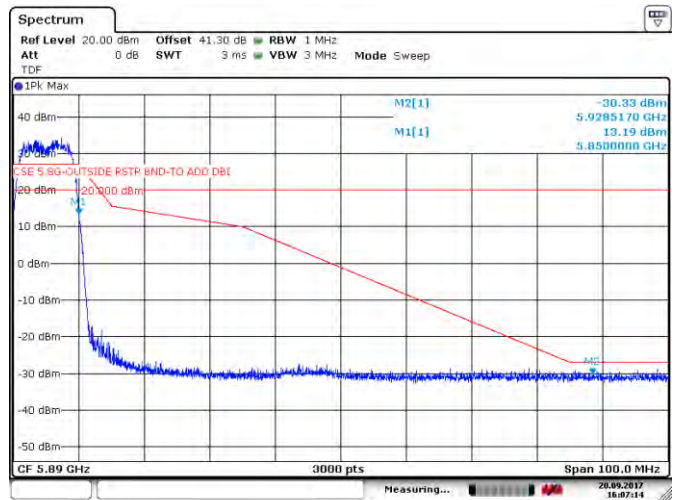
Date: 20 SEP 2017 15:30:23

**Figure 8.4-77:** Upper band edge for 32 dBi antenna, 5 MHz channel, PMP application



Date: 20 SEP 2017 16:05:16

**Figure 8.4-78:** Lower band edge for 32 dBi antenna, 10 MHz channel, PMP application



Date: 20 SEP 2017 16:07:14

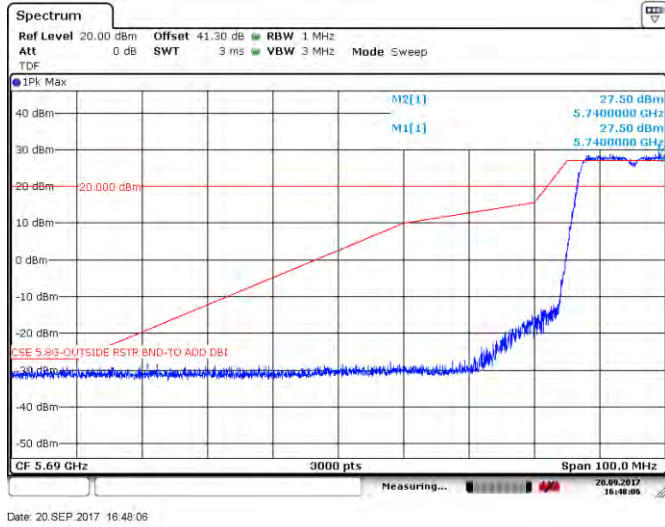
**Figure 8.4-79:** Upper band edge for 32 dBi antenna, 10 MHz channel, PMP application

**Section 8**  
**Test name**  
**Specification**

Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2

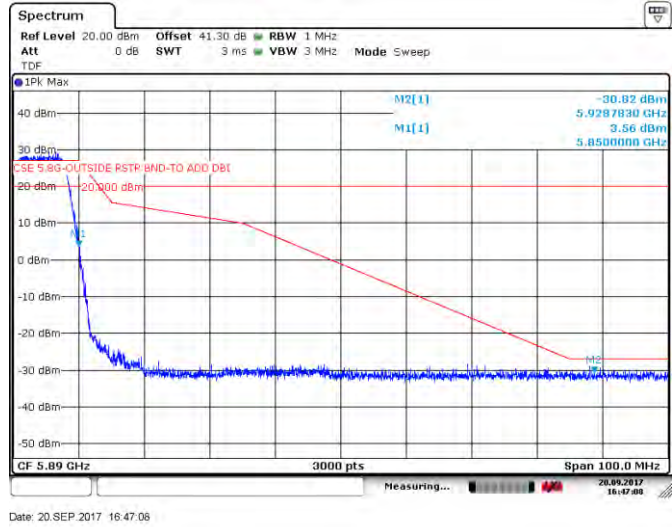


Peak limit EIRP equivalent: 74 dBμV/m – 95.23 dB = –21.23 dBm  
 Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm



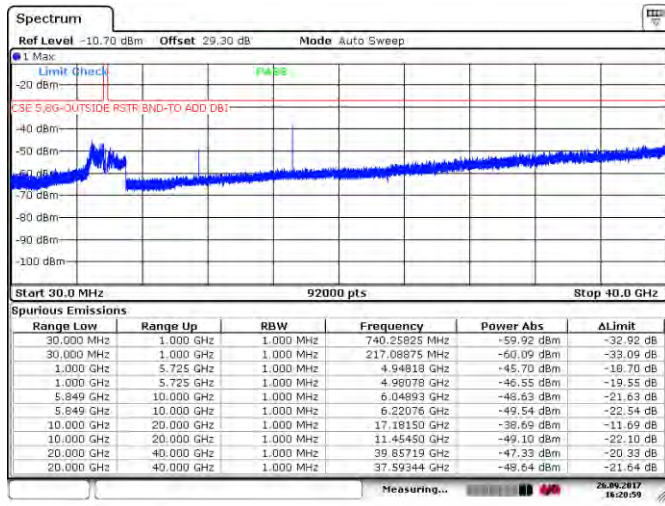
Date: 20 SEP 2017 16:48:06

**Figure 8.4-80:** Lower band edge for 32 dBi antenna, 20 MHz channel, PMP application



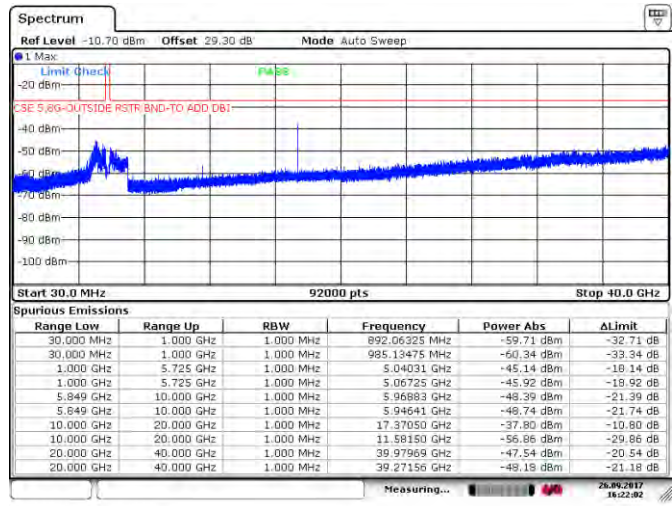
Date: 20 SEP 2017 16:47:05

**Figure 8.4-81:** Upper band edge for 32 dBi antenna, 20 MHz channel, PMP application



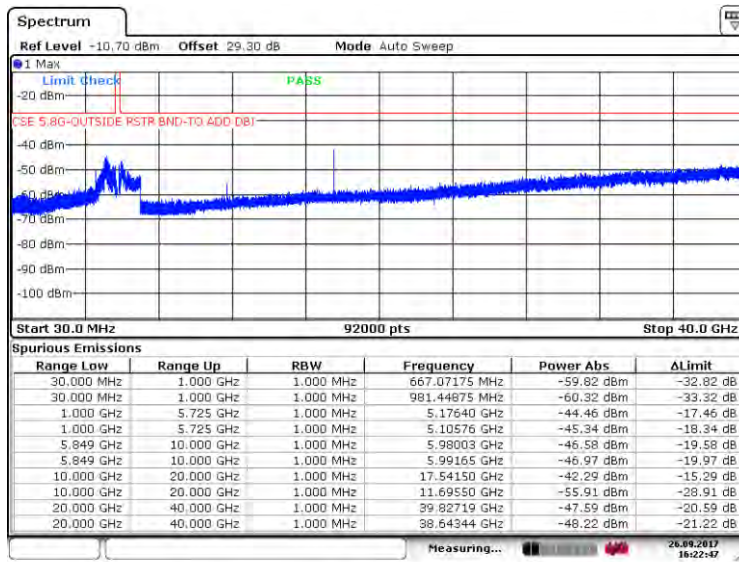
Date: 26 SEP 2017 16:20:58

Figure 8.4-82: Spurious emissions outside restricted bands for 10 dBi antenna, 5 MHz channel, low channel, PTP application



Date: 26 SEP 2017 16:22:02

Figure 8.4-83: Spurious emissions outside restricted bands for 10 dBi antenna, 5 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 16:22:47

Figure 8.4-84: Spurious emissions outside restricted bands for 10 dBi antenna, 5 MHz channel, high channel, PTP application



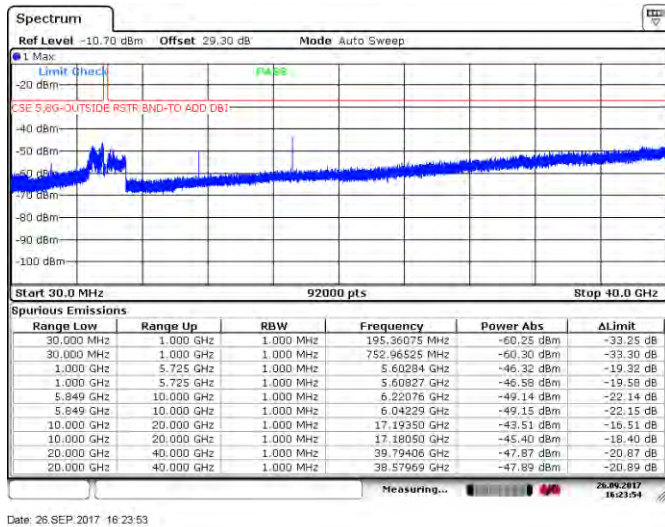


Figure 8.4-85: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, low channel, PTP application

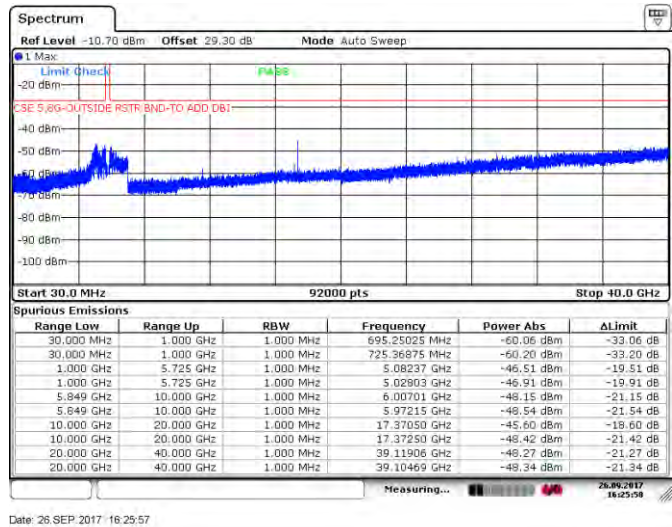


Figure 8.4-86: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, PTP application

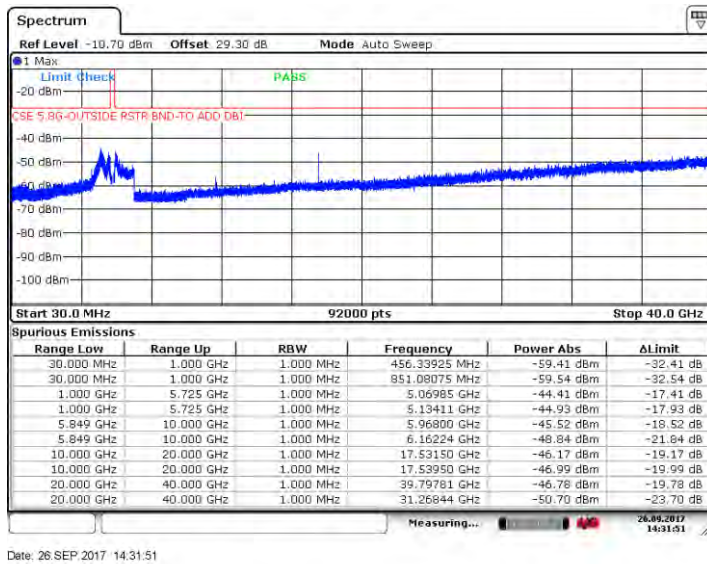
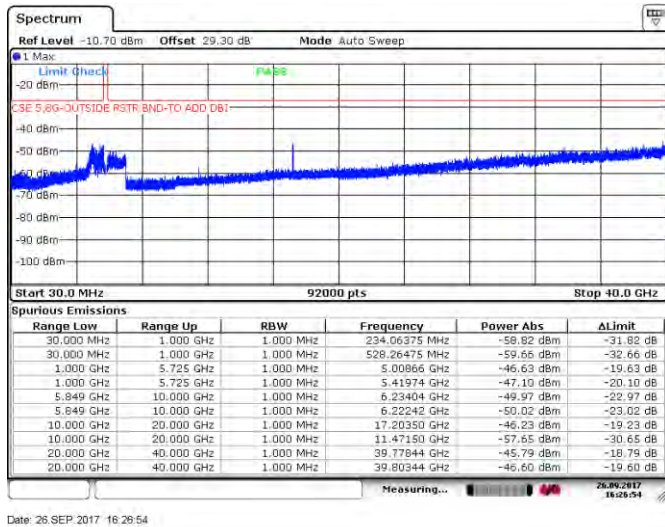
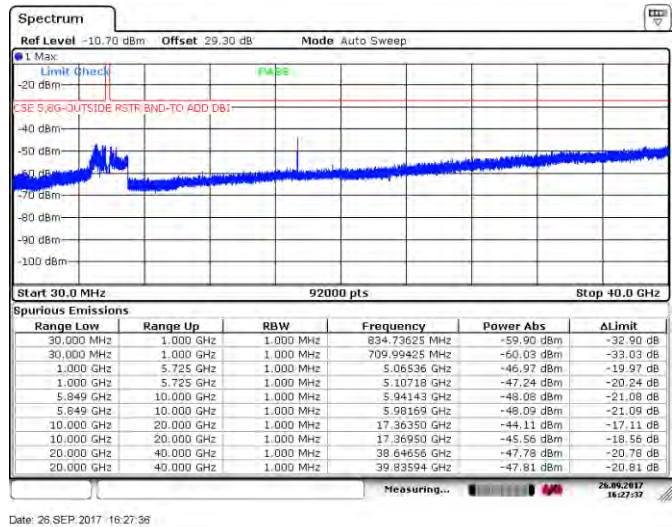


Figure 8.4-87: Spurious emissions outside restricted bands for 10 dBi antenna, 10 MHz channel, high channel, PTP application



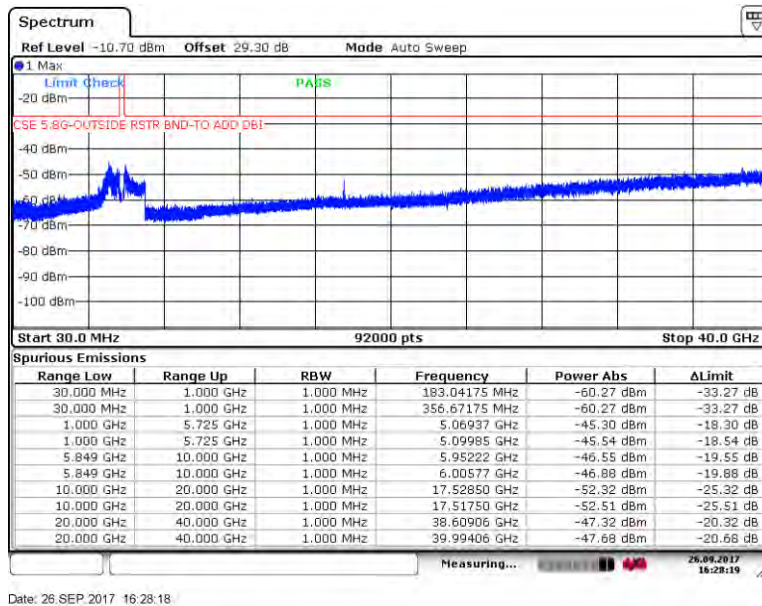
Date: 26 SEP 2017 16:28:54

Figure 8.4-88: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, low channel, PTP application



Date: 26 SEP 2017 16:27:36

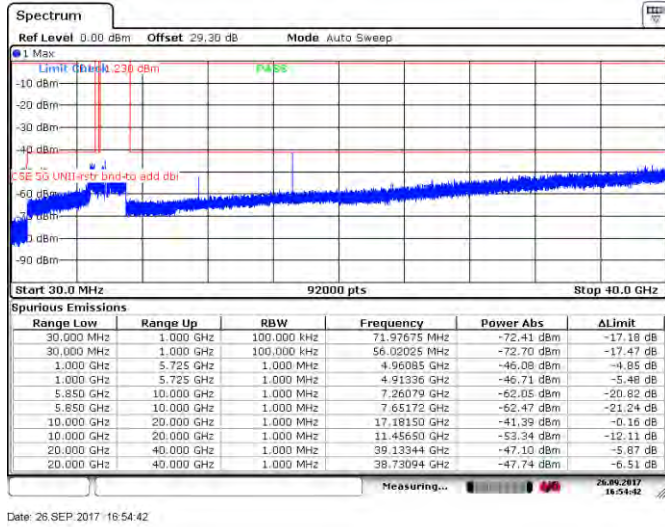
Figure 8.4-89: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 16:28:18

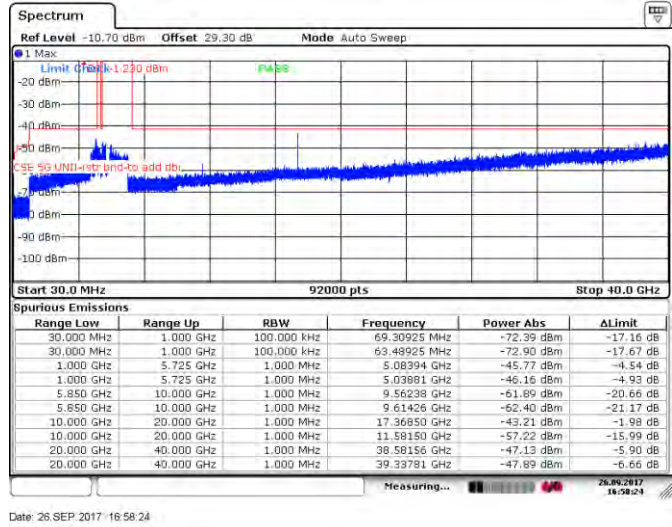
Figure 8.4-90: Spurious emissions outside restricted bands for 10 dBi antenna, 20 MHz channel, high channel, PTP application

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



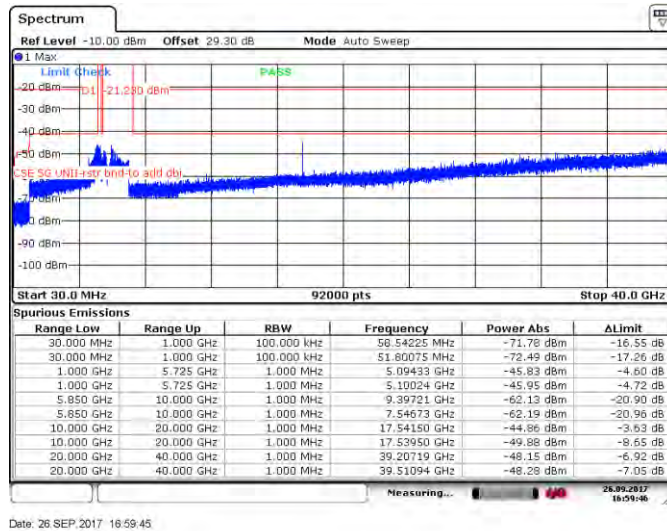
Date: 26 SEP 2017 16:54:42

Figure 8.4-91: Spurious emissions within restricted bands for 10 dBi antenna, 5 MHz channel, low channel, PTP application



Date: 26 SEP 2017 16:58:24

Figure 8.4-92: Spurious emissions within restricted bands for 10 dBi antenna, 5 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 16:59:45

Figure 8.4-93: Spurious emissions within restricted bands for 10 dBi antenna, 5 MHz channel, high channel, PTP application



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

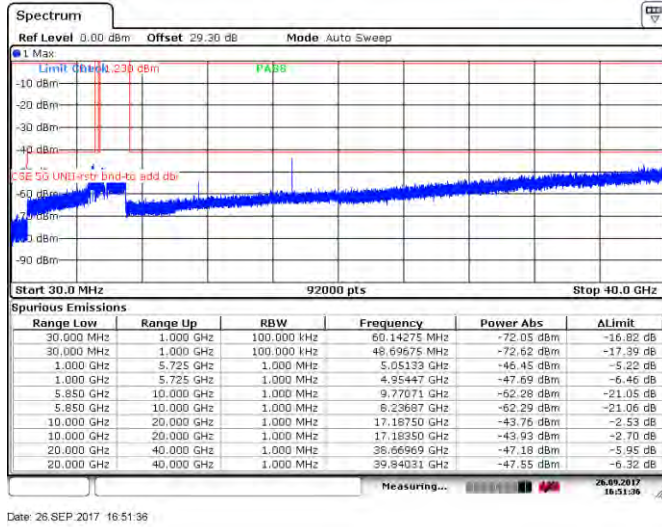


Figure 8.4-94: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, low channel, PTP application

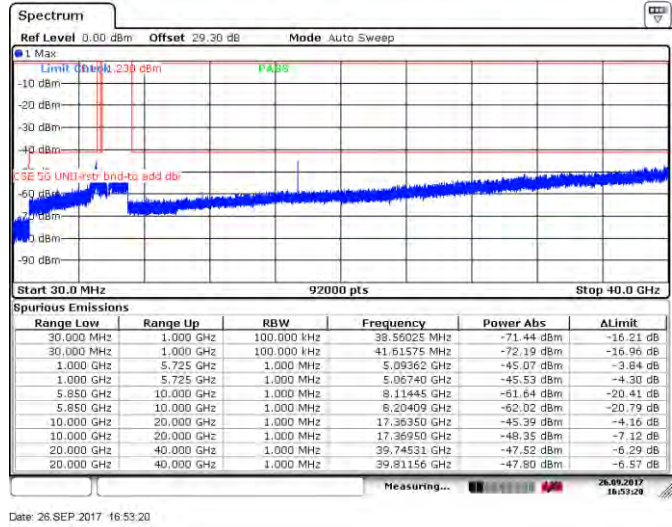


Figure 8.4-95: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, mid channel, PTP application

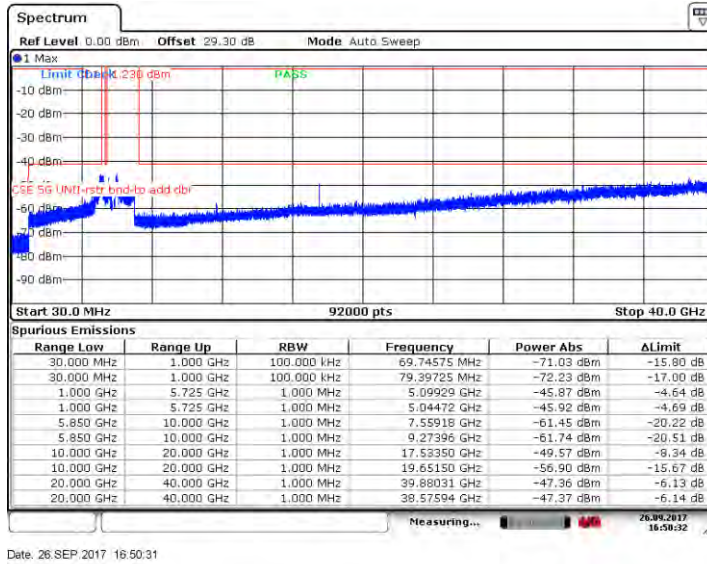


Figure 8.4-96: Spurious emissions within restricted bands for 10 dBi antenna, 10 MHz channel, high channel, PTP application



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

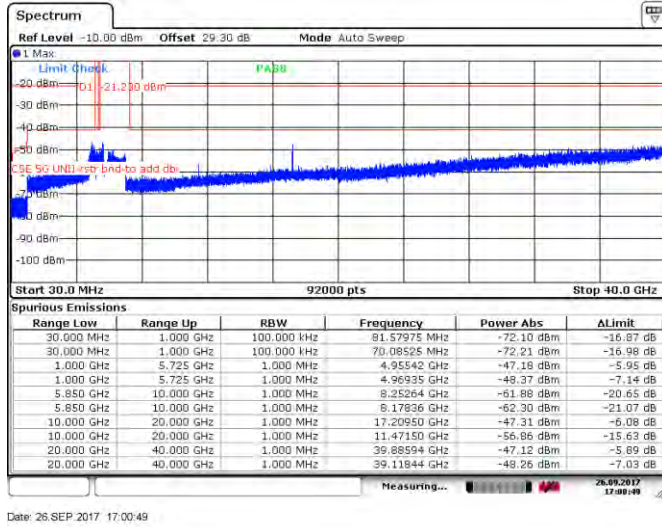


Figure 8.4-97: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, low channel, PTP application

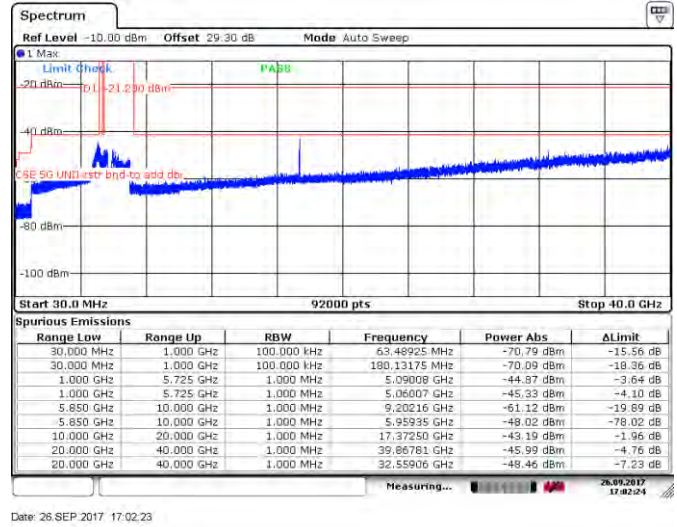


Figure 8.4-98: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, mid channel, PTP application

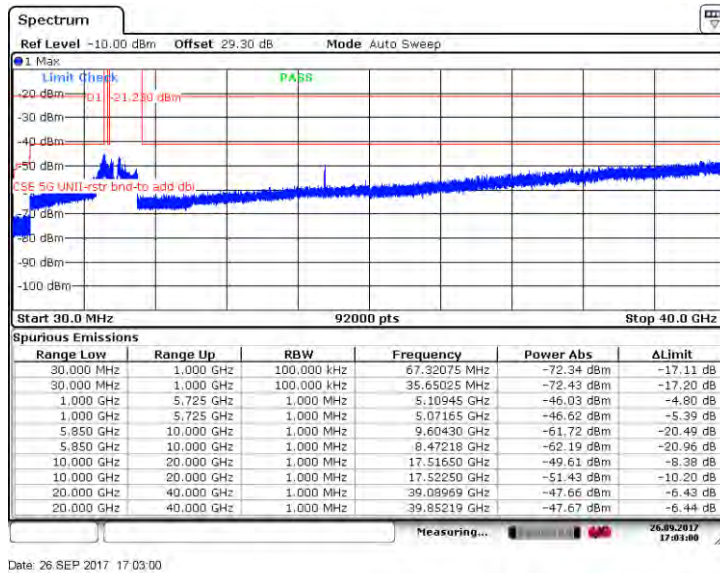
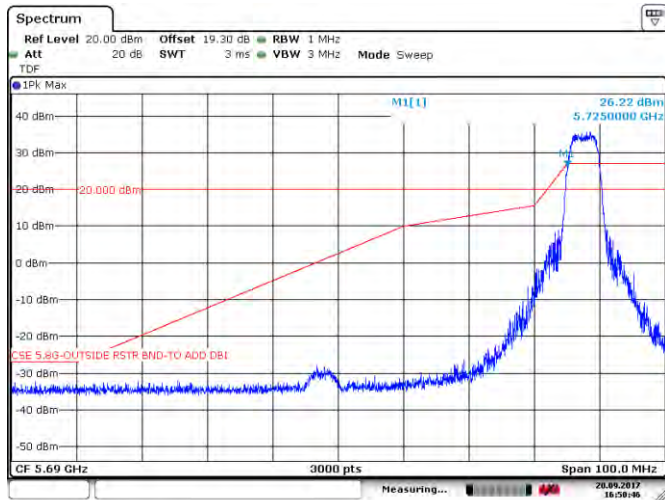
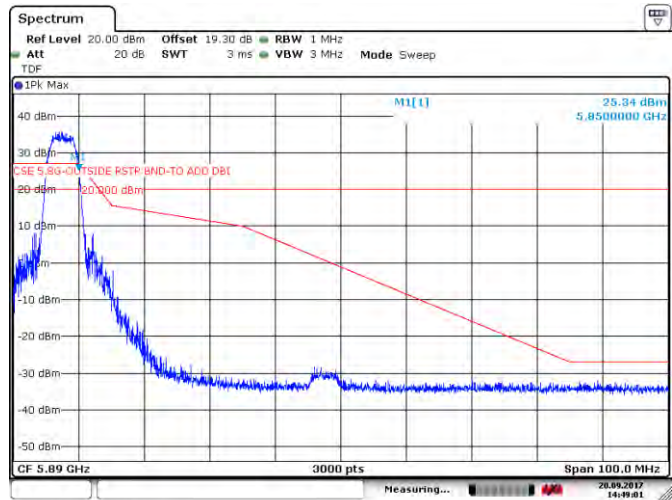


Figure 8.4-99: Spurious emissions within restricted bands for 10 dBi antenna, 20 MHz channel, high channel, PTP application



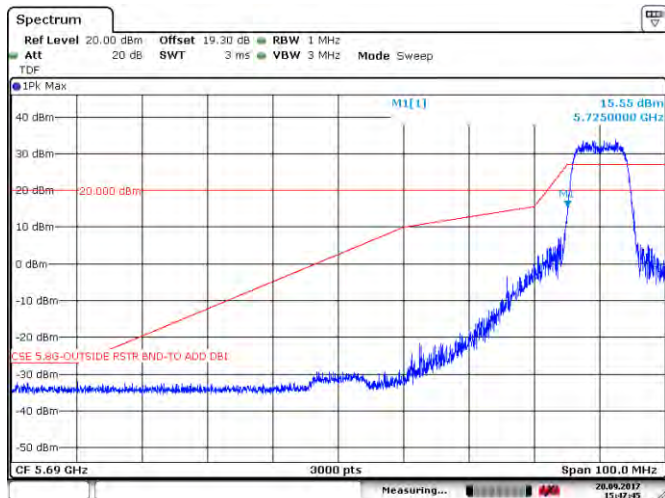
Date: 20.SEP.2017 16:50:46

**Figure 8.4-100:** Lower band edge for 10 dBi antenna, 5 MHz channel, PTP application



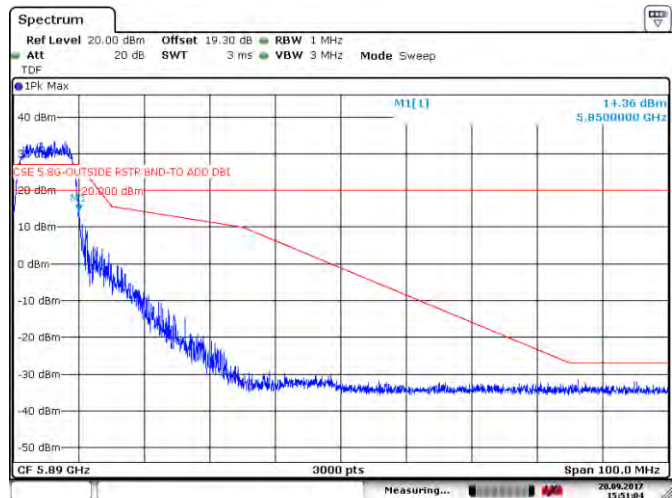
Date: 20.SEP.2017 14:49:01

**Figure 8.4-101:** Upper band edge for 10 dBi antenna, 5 MHz channel, PTP application



Date: 20.SEP.2017 15:47:45

**Figure 8.4-102:** Lower band edge for 10 dBi antenna, 10 MHz channel, PTP application



Date: 20.SEP.2017 15:51:04

**Figure 8.4-103:** Upper band edge for 10 dBi antenna, 10 MHz channel, PTP application

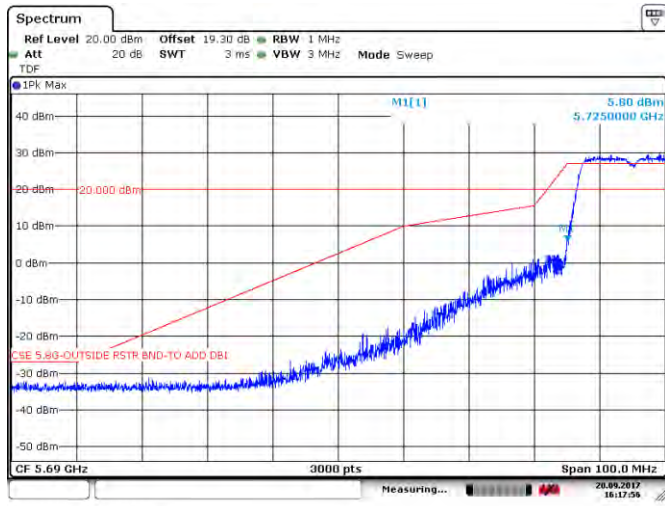


Figure 8.4-104: Lower band edge for 10 dBi antenna, 20 MHz channel, PTP application

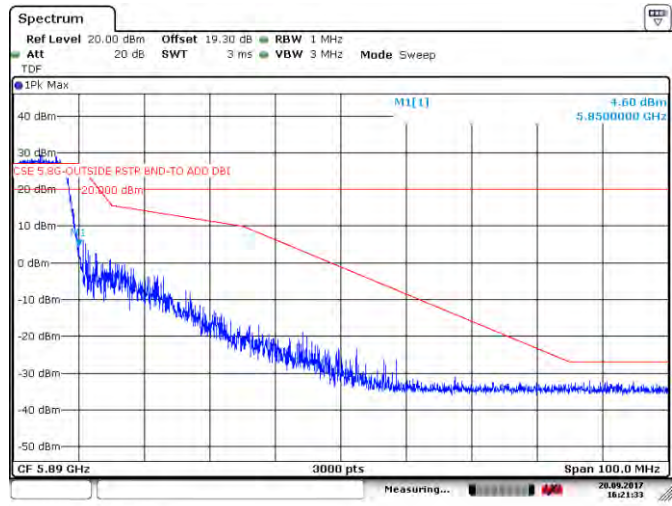
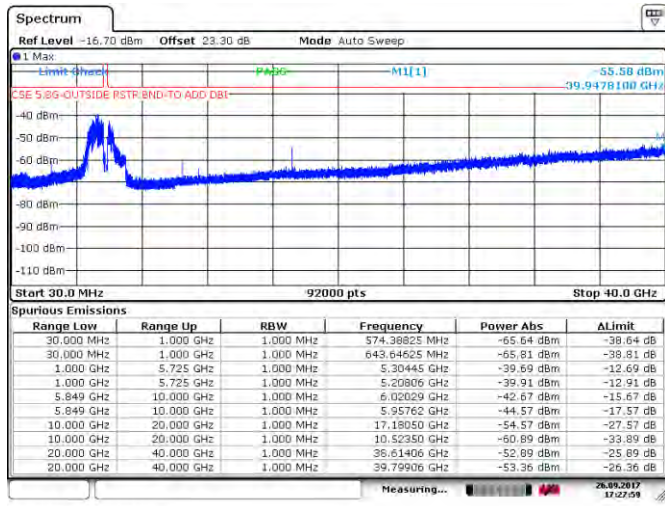


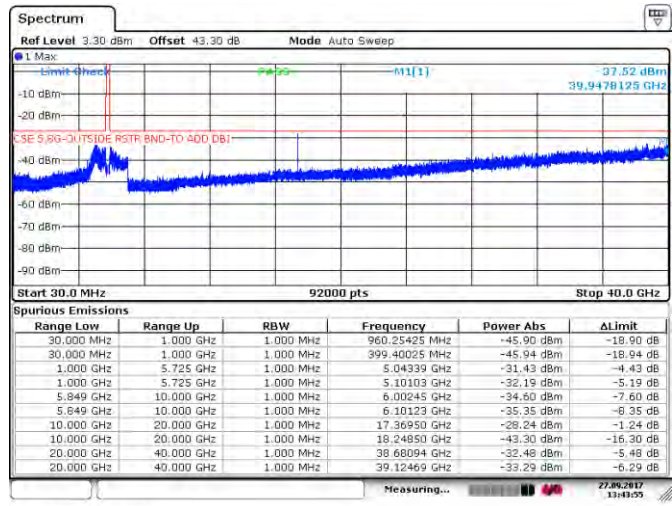
Figure 8.4-105: Upper band edge for 10 dBi antenna, 20 MHz channel, PTP application





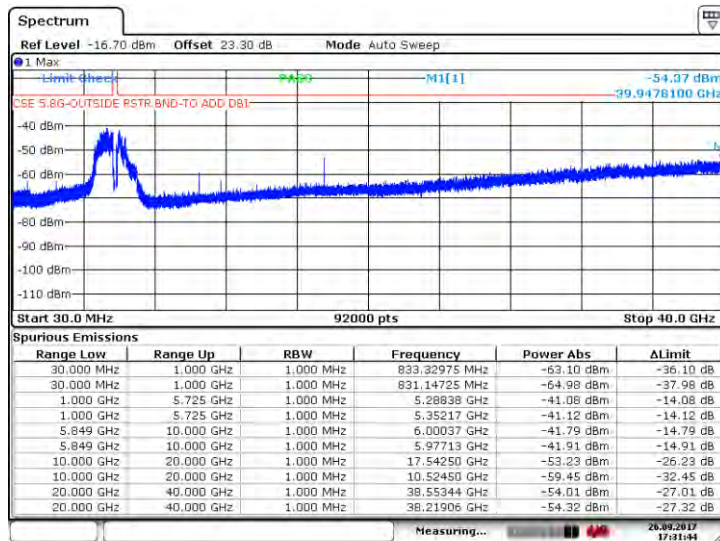
Date: 26 SEP 2017 17:27:58

Figure 8.4-106: Spurious emissions outside restricted bands for 24 dBi antenna, 5 MHz channel, low channel, PTP application



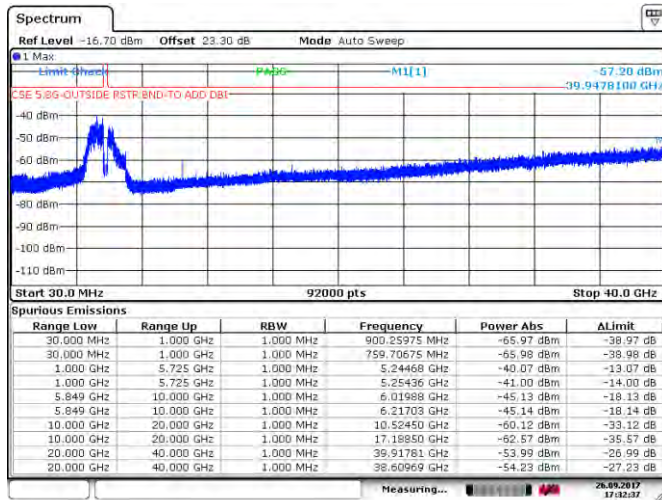
Date: 27 SEP 2017 13:43:54

Figure 8.4-107: Spurious emissions outside restricted bands for 24 dBi antenna, 5 MHz channel, mid channel, PTP application



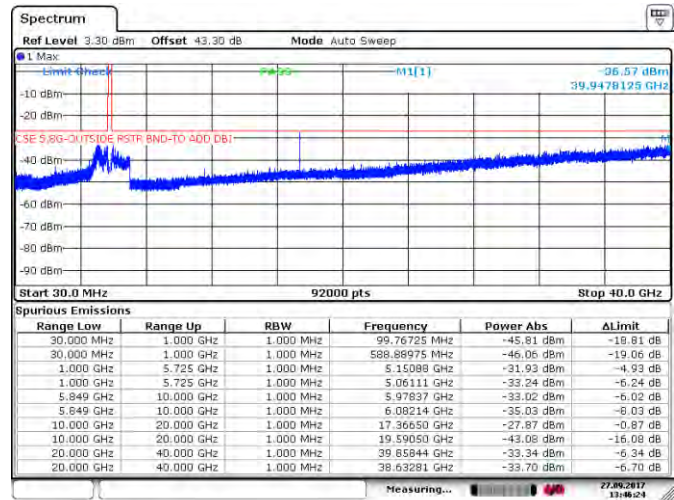
Date: 26 SEP 2017 17:31:44

Figure 8.4-108: Spurious emissions outside restricted bands for 24 dBi antenna, 5 MHz channel, high channel, PTP application



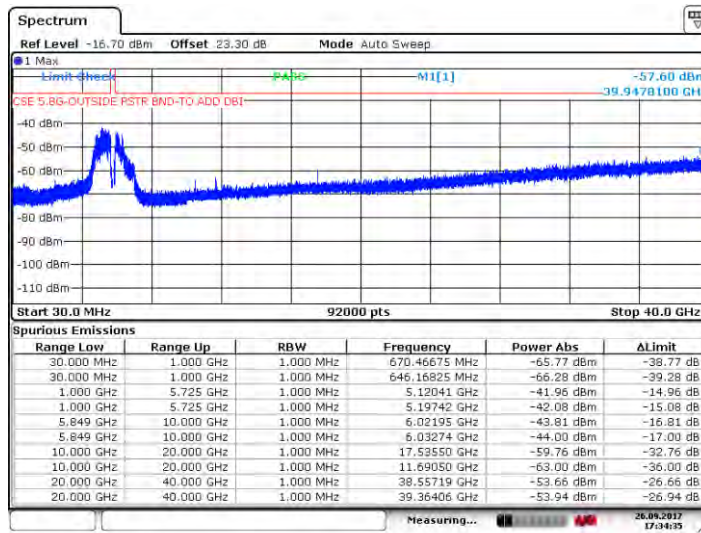
Date: 26 SEP 2017 17:32:56

Figure 8.4-109: Spurious emissions outside restricted bands for 24 dB antenna, 10 MHz channel, low channel, PTP application



Date: 27 SEP 2017 13:46:23

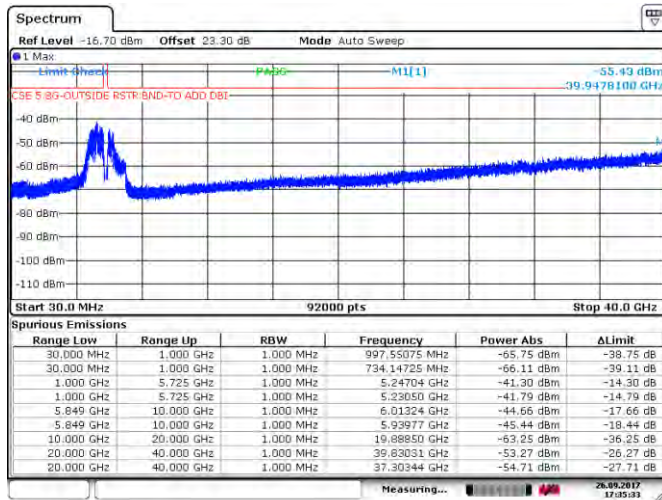
Figure 8.4-110: Spurious emissions outside restricted bands for 24 dB antenna, 10 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 17:34:35

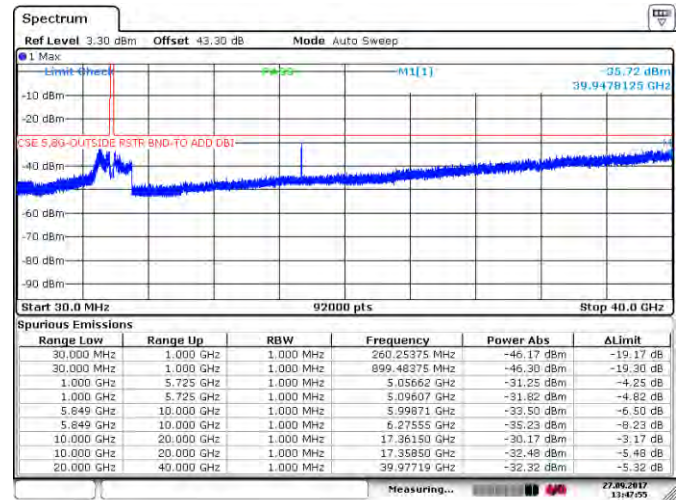
Figure 8.4-111: Spurious emissions outside restricted bands for 24 dB antenna, 10 MHz channel, high channel, PTP application





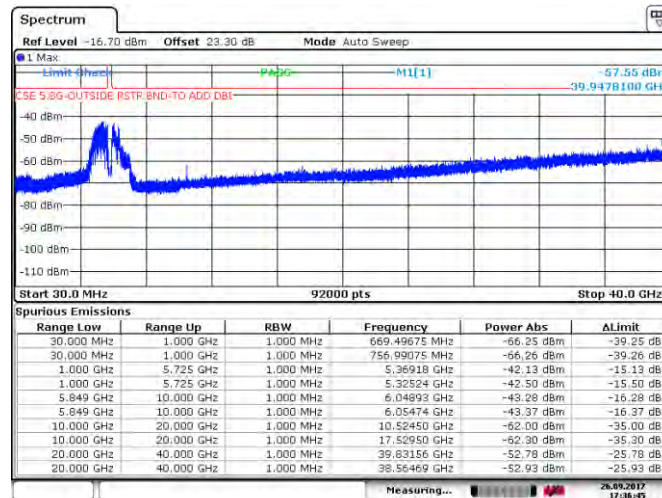
Date: 26 SEP 2017 17:35:33

Figure 8.4-112: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, low channel, PTP application



Date: 27 SEP 2017 13:47:54

Figure 8.4-113: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 17:36:45

Figure 8.4-114: Spurious emissions outside restricted bands for 24 dBi antenna, 20 MHz channel, high channel, PTP application

**Section 8**  
**Test name**  
**Specification**

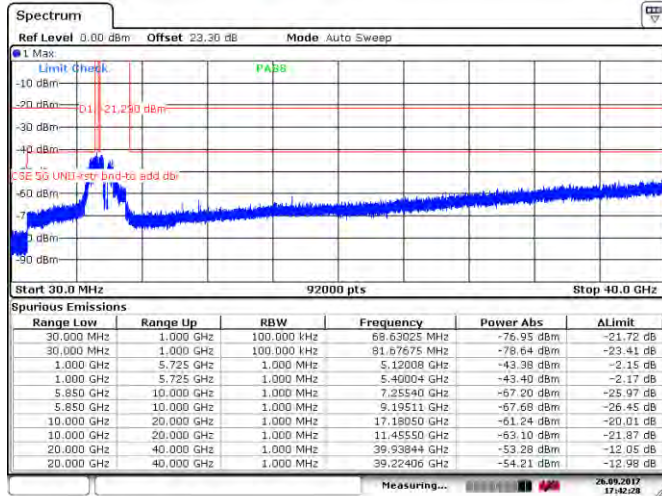
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

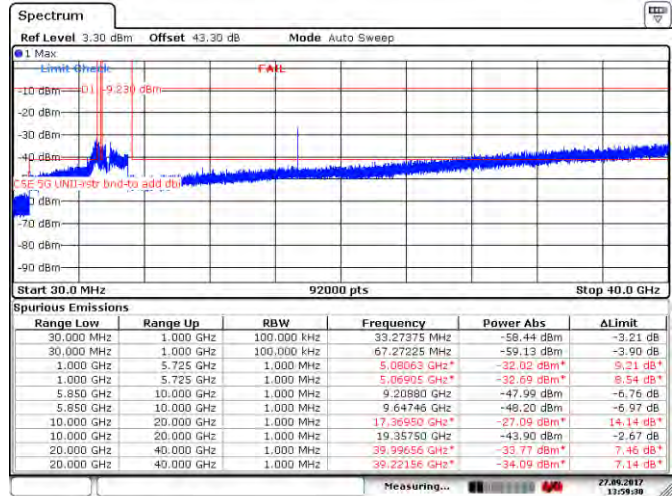
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



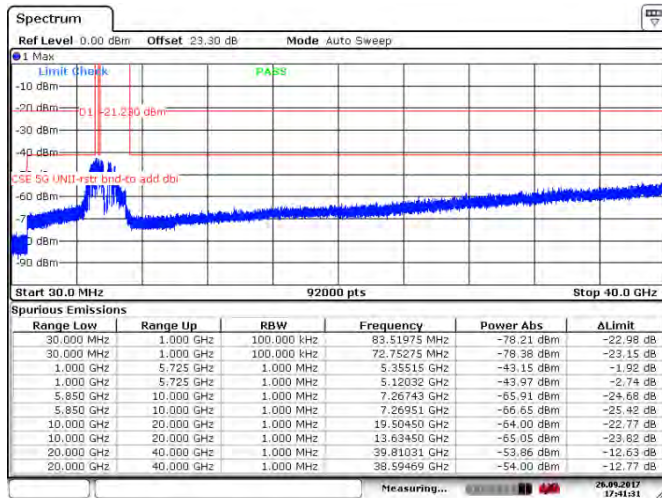
Date: 26 SEP 2017 17:42:27

**Figure 8.4-115:** Spurious emissions within restricted bands for 24 dBi antenna, 5 MHz channel, low channel, PTP application



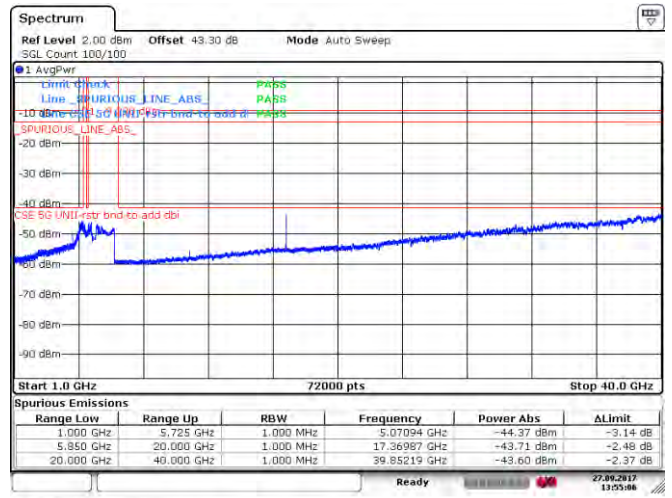
Date: 27 SEP 2017 13:59:30

**Figure 8.4-116:** Spurious emissions within restricted bands for 24 dBi antenna, 5 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 17:41:30

**Figure 8.4-117:** Spurious emissions within restricted bands for 24 dBi antenna, 5 MHz channel, high channel, PTP application



Date: 27 SEP 2017 13:55:05

**Figure 8.4-118:** Average Spurious emissions within restricted bands for 24 dBi antenna, 5 MHz channel, mid channel, PTP application



**Section 8**  
**Test name**  
**Specification**

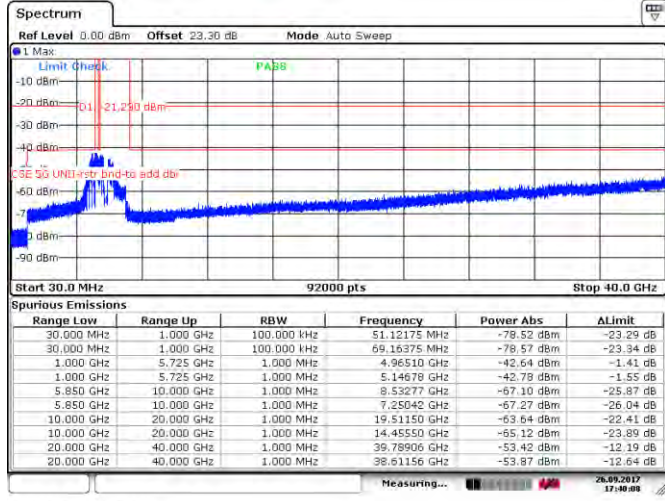
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



Peak limit EIRP equivalent:  $74 \text{ dB}\mu\text{V}/\text{m} - 95.23 \text{ dB} = -21.23 \text{ dBm}$

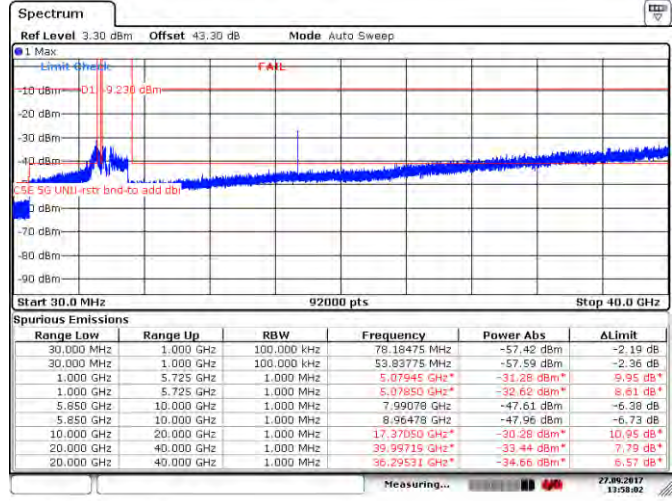
Average limit EIRP equivalent:  $54 \text{ dB}\mu\text{V}/\text{m} - 95.23 \text{ dB} = -41.23 \text{ dBm}$

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.



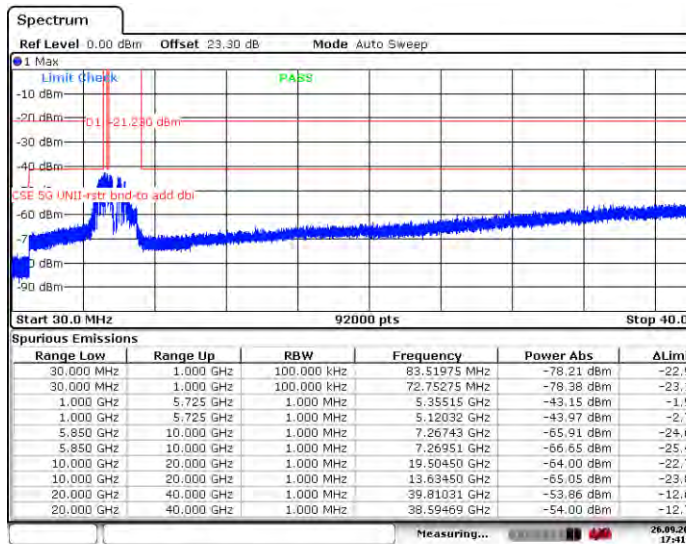
Date: 26 SEP 2017 17:40:06

**Figure 8.4-119:** Spurious emissions within restricted bands for 24 dBi antenna, 10 MHz channel, low channel, PTP application



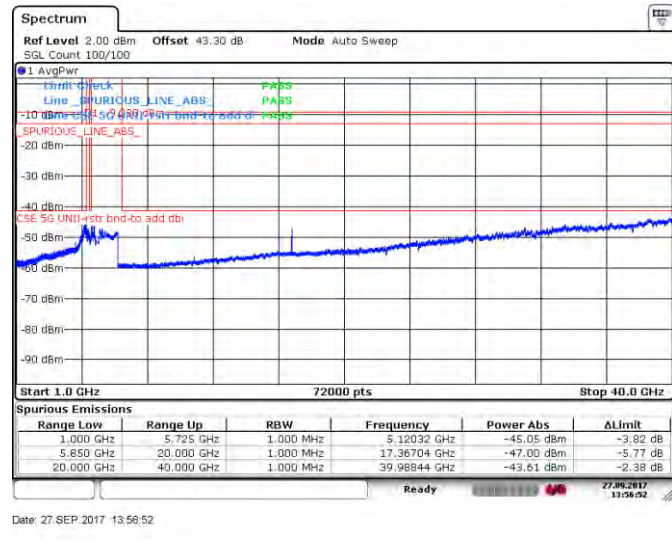
Date: 27 SEP 2017 13:58:01

**Figure 8.4-120:** Spurious emissions within restricted bands for 24 dBi antenna, 10 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 17:41:30

**Figure 8.4-121:** Spurious emissions within restricted bands for 24 dBi antenna, 10 MHz channel, high channel, PTP application



Date: 27 SEP 2017 13:58:52

**Figure 8.4-122:** Average Spurious emissions within restricted bands for 24 dBi antenna, 10 MHz channel, mid channel, PTP application

**Section 8**  
**Test name**  
**Specification**

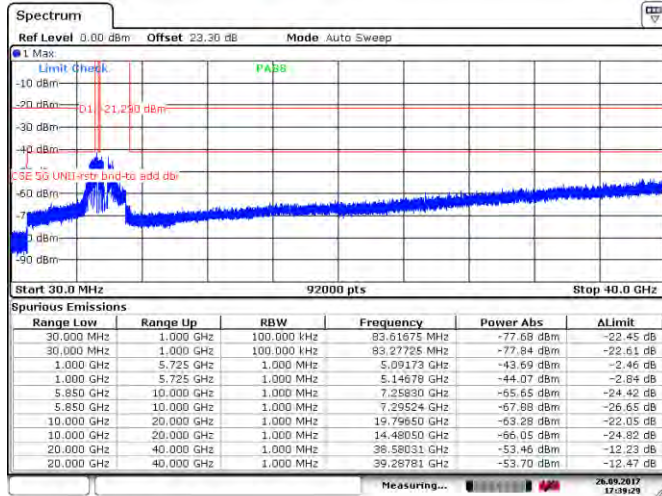
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

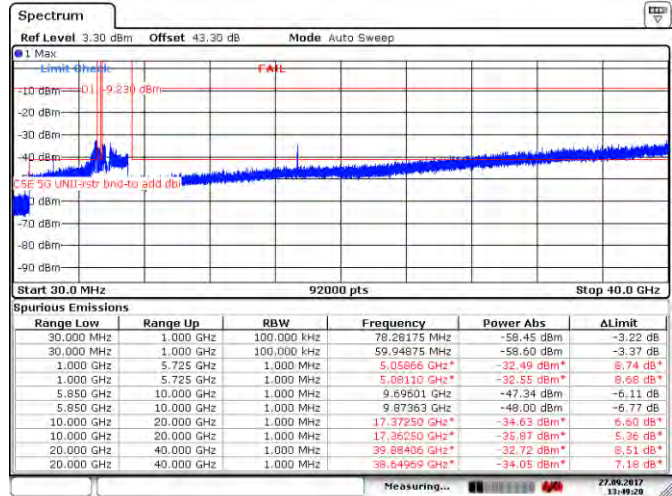
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



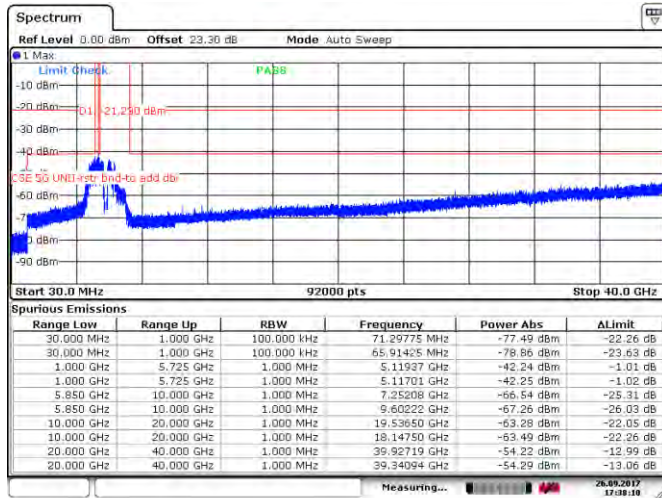
Date: 26 SEP 2017 17:39:29

**Figure 8.4-123:** Spurious emissions within restricted bands for 24 dBi antenna, 20 MHz channel, low channel, PTP application



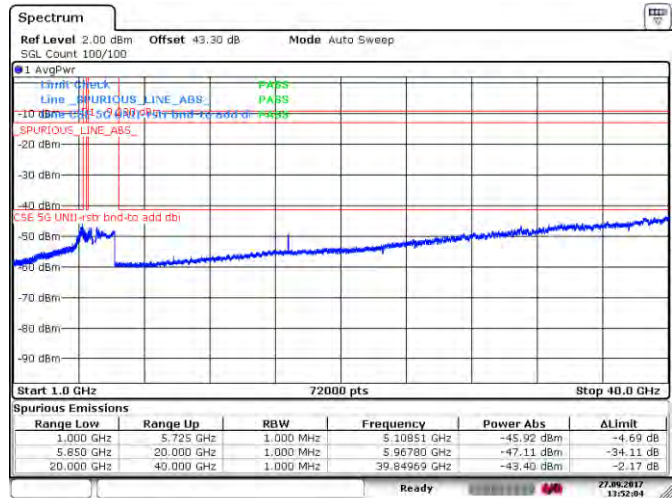
Date: 27 SEP 2017 13:49:19

**Figure 8.4-124:** Spurious emissions within restricted bands for 24 dBi antenna, 20 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 17:39:09

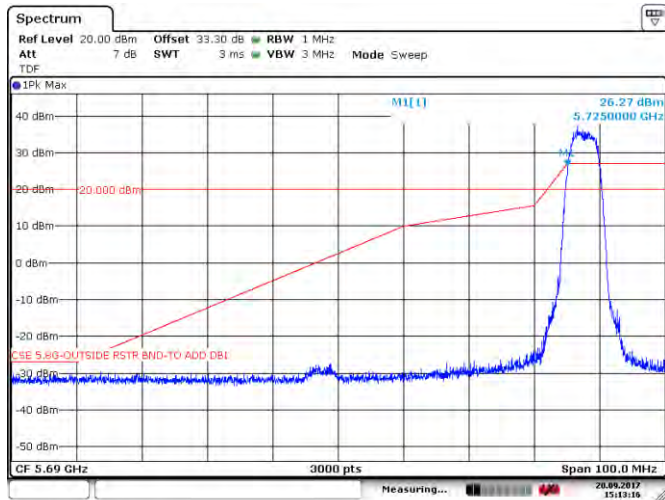
**Figure 8.4-125:** Spurious emissions within restricted bands for 24 dBi antenna, 20 MHz channel, high channel, PTP application



Date: 27 SEP 2017 13:52:04

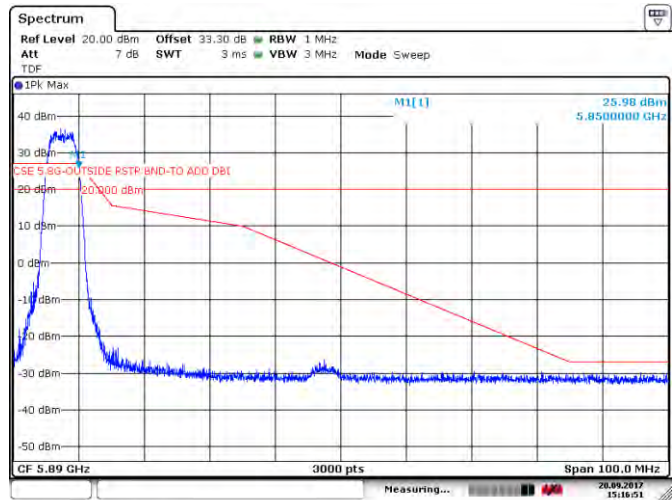
**Figure 8.4-126:** Average Spurious emissions within restricted bands for 24 dBi antenna, 20 MHz channel, mid channel, PTP application





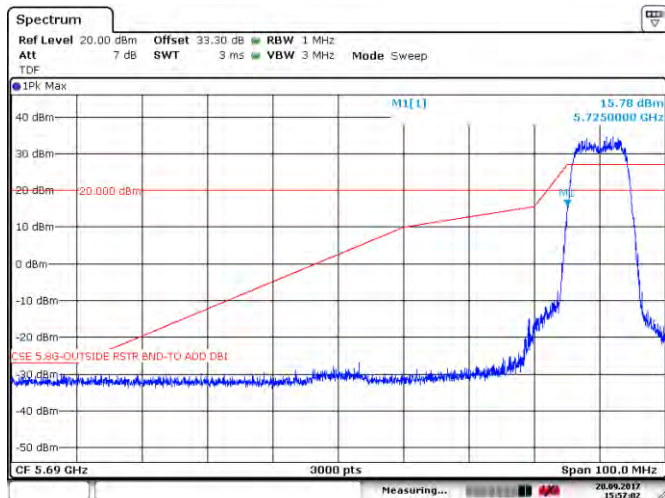
Date: 20.SEP.2017 15:13:16

**Figure 8.4-127:** Lower band edge for 24 dBi antenna, 5 MHz channel, PTP application



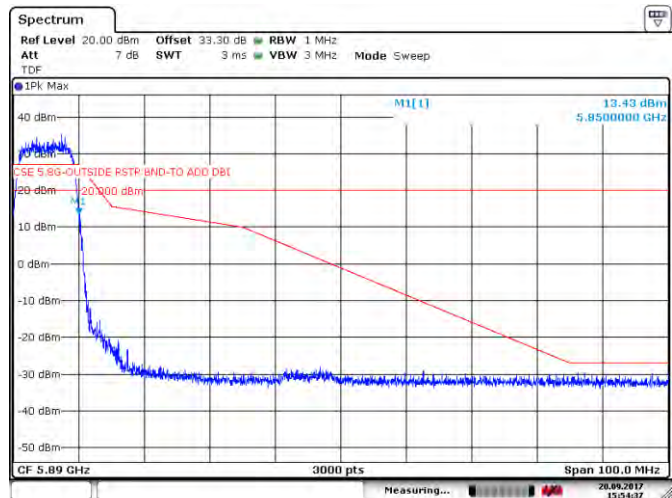
Date: 20.SEP.2017 15:16:51

**Figure 8.4-128:** Upper band edge for 24 dBi antenna, 5 MHz channel, PTP application



Date: 20.SEP.2017 15:57:02

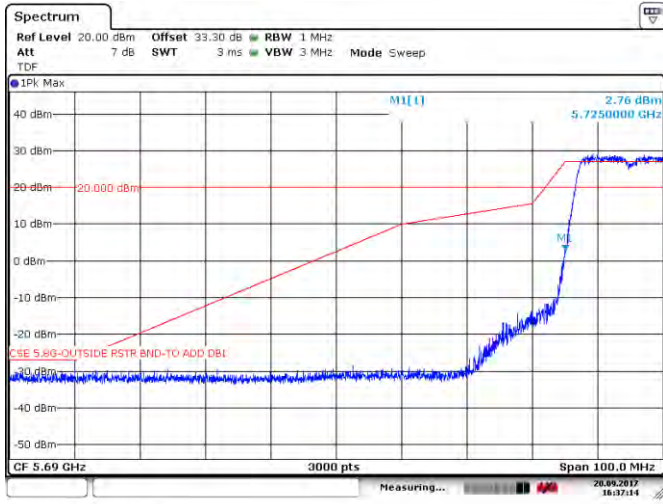
**Figure 8.4-129:** Lower band edge for 24 dBi antenna, 10 MHz channel, PTP application



Date: 20.SEP.2017 15:54:38

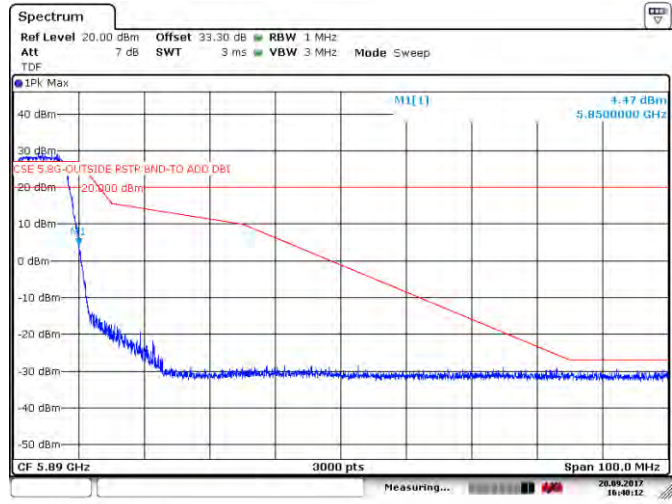
**Figure 8.4-130:** Upper band edge for 24 dBi antenna, 10 MHz channel, PTP application





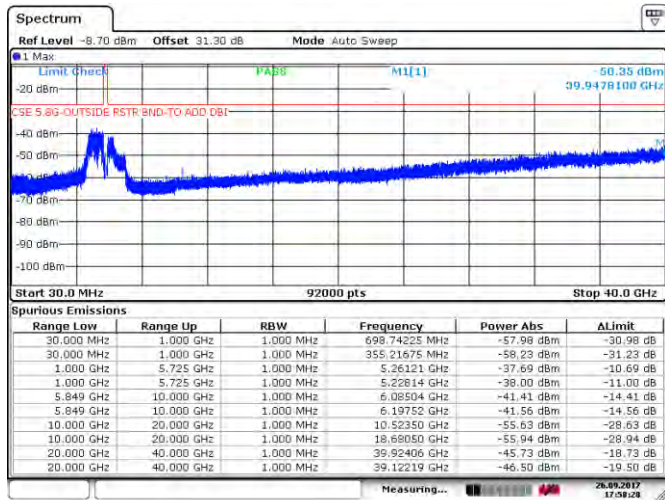
Date: 20.SEP.2017 16:37:13

Figure 8.4-131: Lower band edge for 24 dBi antenna, 20 MHz channel, PTP application



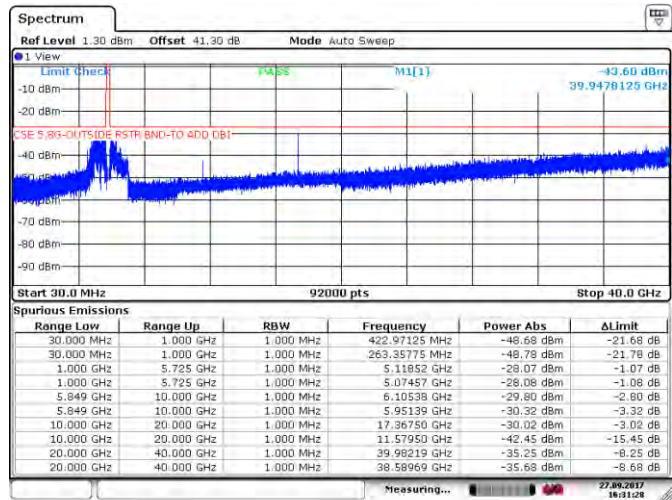
Date: 20.SEP.2017 16:40:13

Figure 8.4-132: Upper band edge for 24 dBi antenna, 20 MHz channel, PTP application



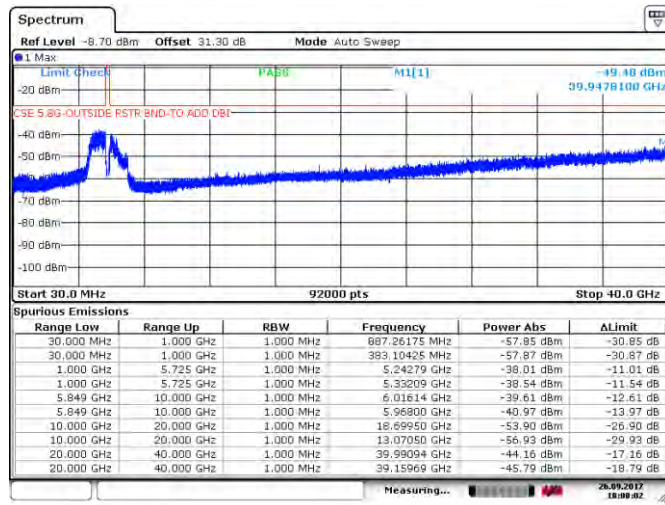
Date: 26 SEP 2017 17:58:27

Figure 8.4-133: Spurious emissions outside restricted bands for 32 dBi antenna, 5 MHz channel, low channel, PTP application



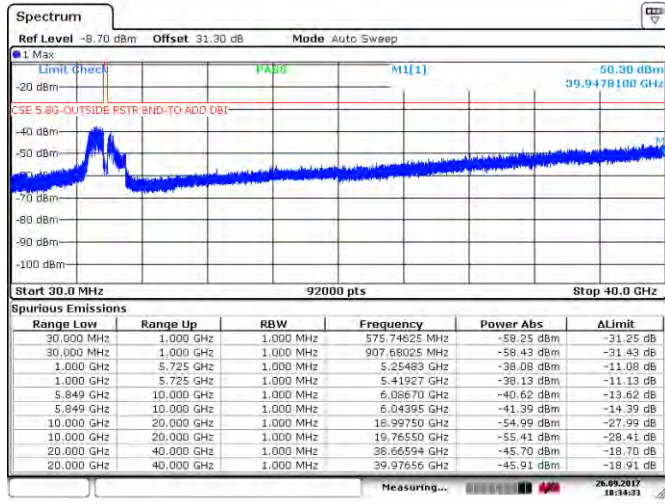
Date: 27 SEP 2017 16:31:28

Figure 8.4-134: Spurious emissions outside restricted bands for 32 dBi antenna, 5 MHz channel, mid channel, PTP application



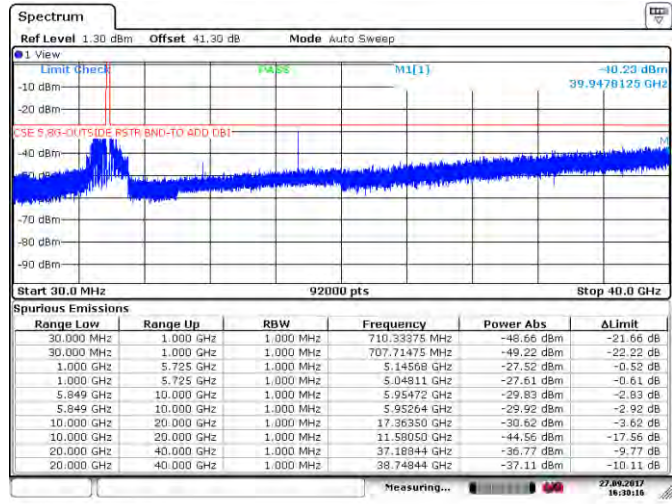
Date: 26 SEP 2017 16:00:01

Figure 8.4-135: Spurious emissions outside restricted bands for 32 dBi antenna, 5 MHz channel, high channel, PTP application



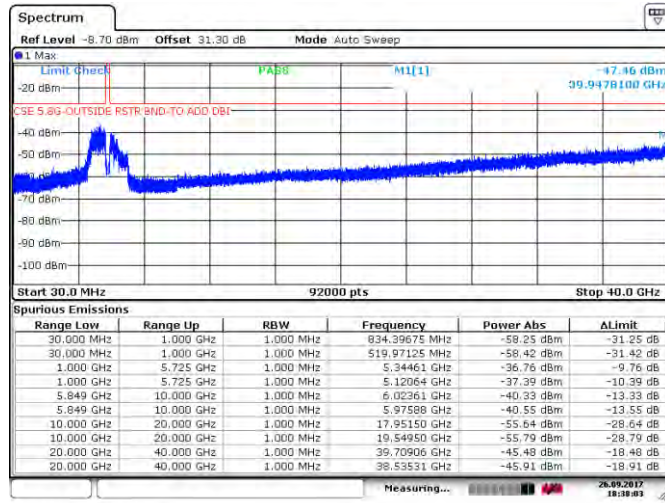
Date: 26 SEP 2017 18:34:33

Figure 8.4-136: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, low channel, PTP application



Date: 27 SEP 2017 16:30:16

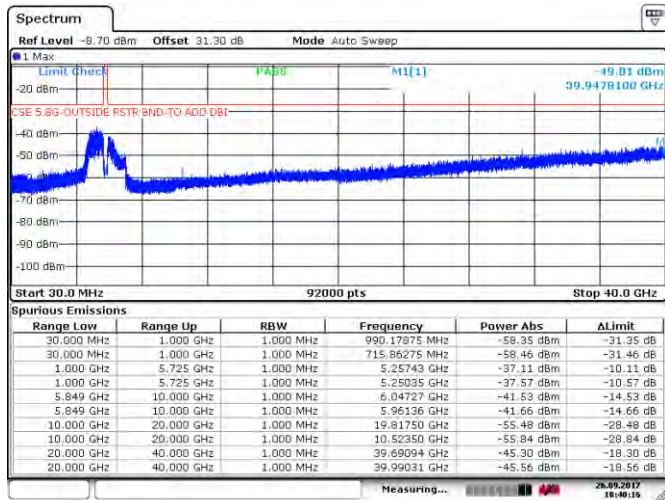
Figure 8.4-137: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 16:38:03

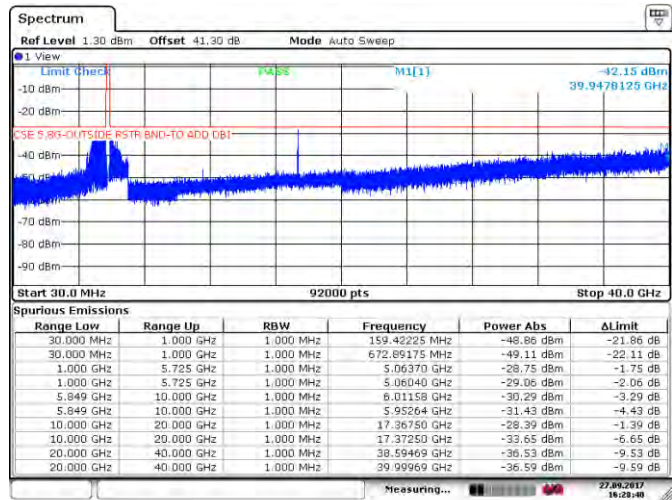
Figure 8.4-138: Spurious emissions outside restricted bands for 32 dBi antenna, 10 MHz channel, high channel, PTP application





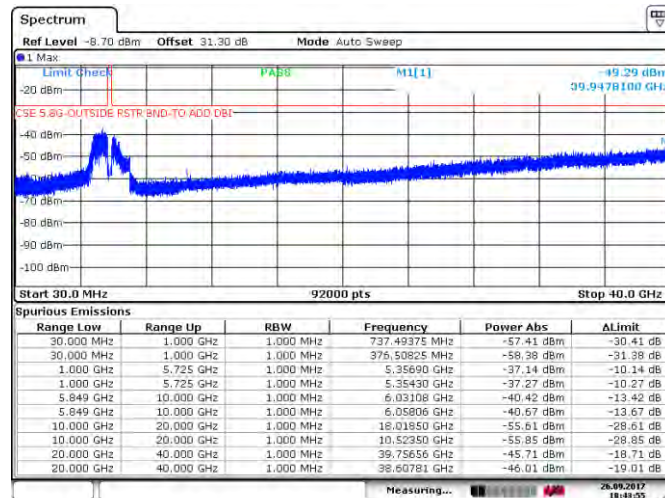
Date: 26 SEP 2017 18:40:16

Figure 8.4-139: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, low channel, PTP application



Date: 27 SEP 2017 16:28:40

Figure 8.4-140: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, PTP application



Date: 26 SEP 2017 18:43:54

Figure 8.4-141: Spurious emissions outside restricted bands for 32 dBi antenna, 20 MHz channel, high channel, PTP application

**Section 8**  
**Test name**  
**Specification**

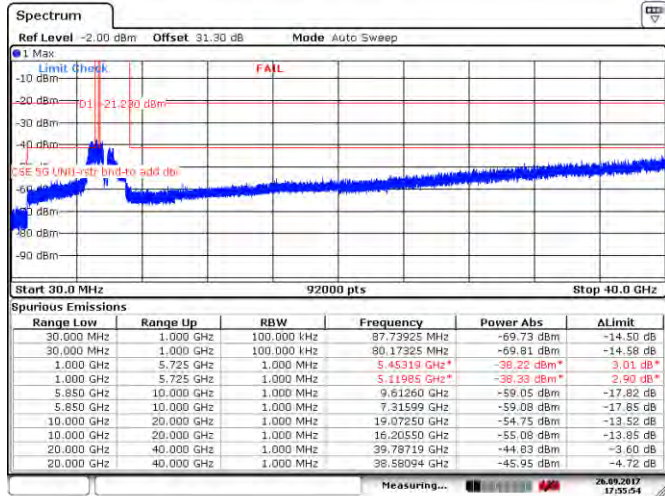
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

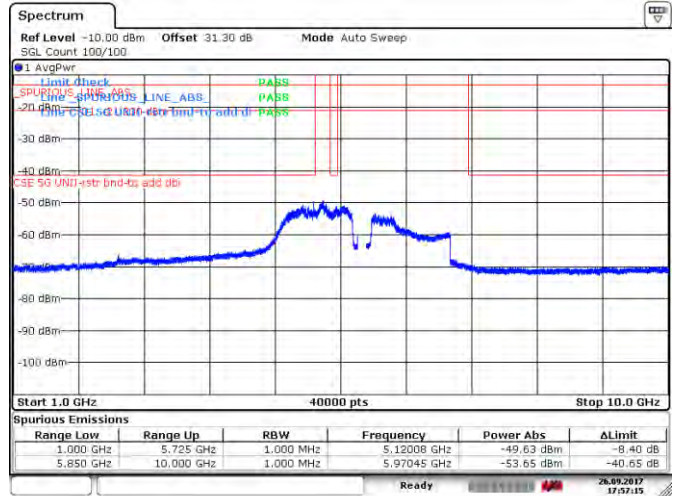
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



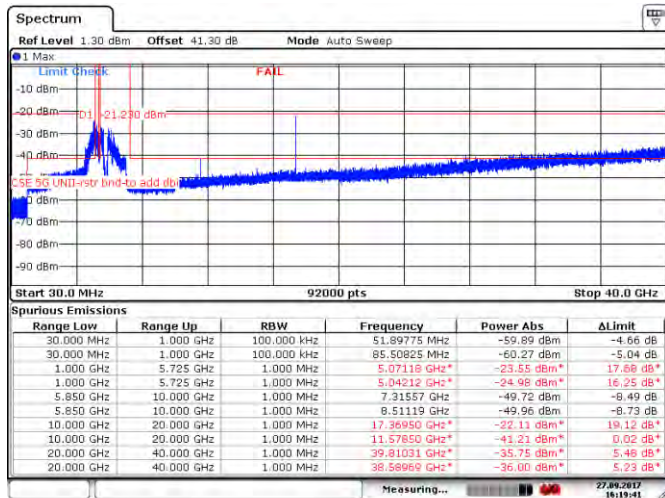
Date: 26 SEP 2017 17:55:53

**Figure 8.4-142:** Peak Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, low channel, PTP application



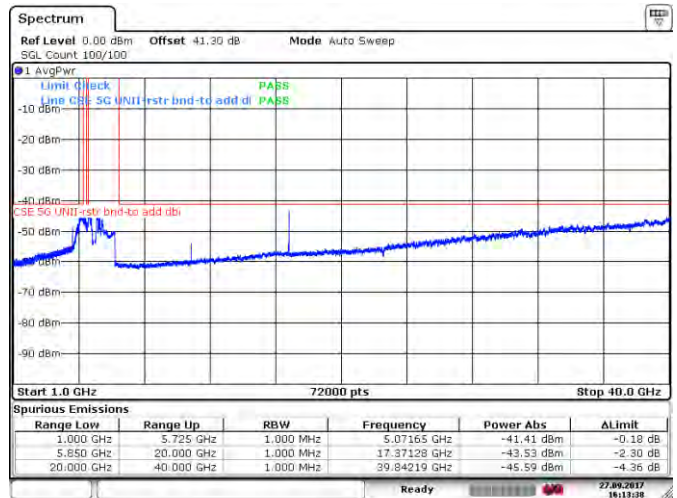
Date: 26 SEP 2017 17:57:15

**Figure 8.4-143:** Average Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, low channel, PTP application



Date: 27 SEP 2017 16:19:41

**Figure 8.4-144:** Peak Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, mid channel, PTP application



Date: 27 SEP 2017 16:13:38

**Figure 8.4-145:** Average Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, mid channel, PTP application



**Section 8**  
**Test name**  
**Specification**

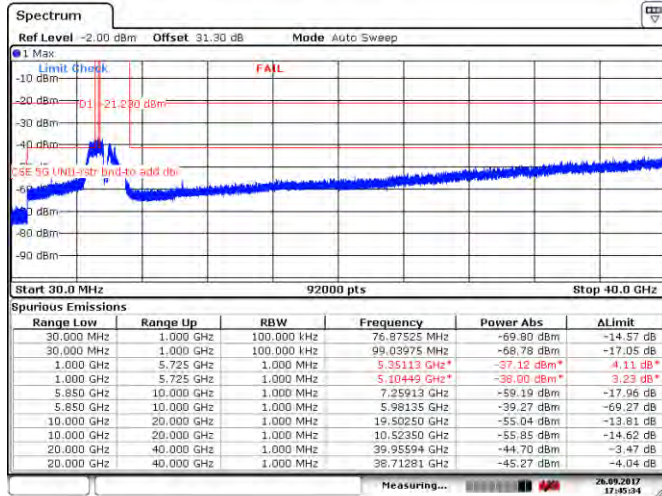
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

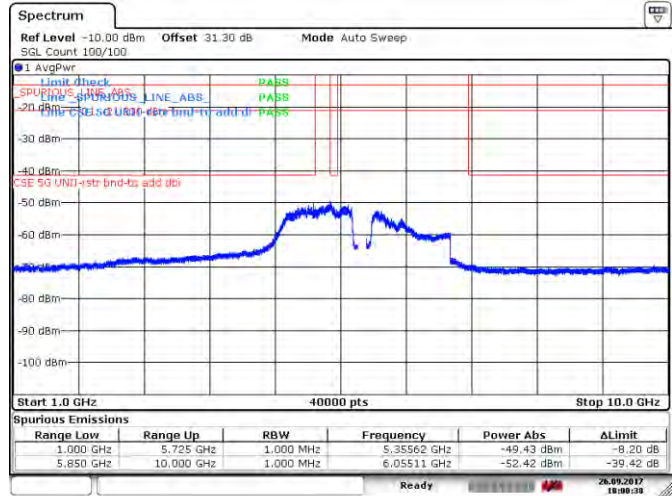
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



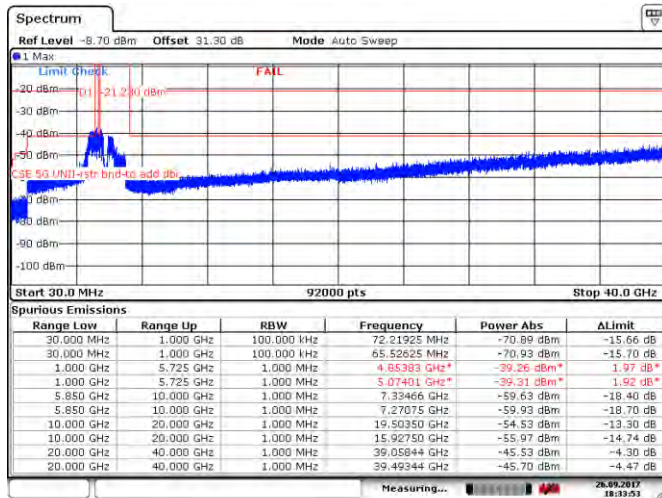
Date: 26 SEP 2017 17:45:33

**Figure 8.4-146:** Peak Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, high channel, PTP application



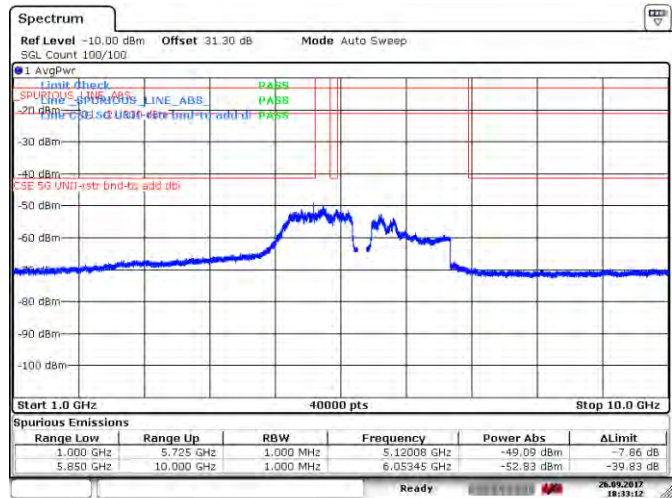
Date: 26 SEP 2017 16:00:38

**Figure 8.4-147:** Average Spurious emissions within restricted bands for 32 dBi antenna, 5 MHz channel, high channel, PTP application



Date: 26 SEP 2017 18:33:52

**Figure 8.4-148:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, low channel, PTP application



Date: 26 SEP 2017 18:33:11

**Figure 8.4-149:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, low channel, PTP application

**Section 8**  
**Test name**  
**Specification**

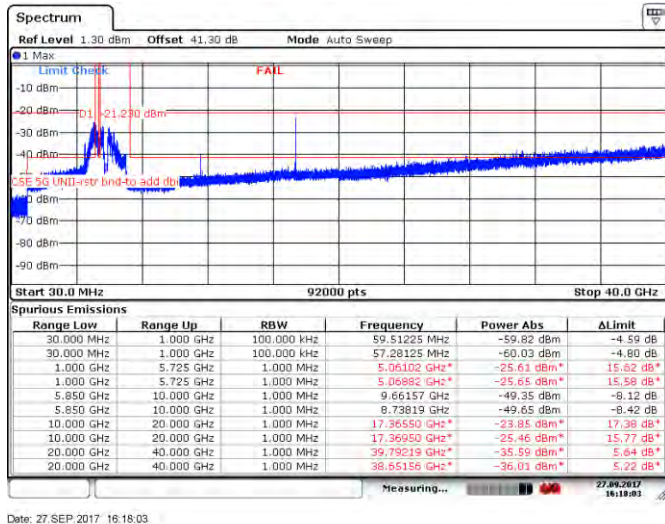
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

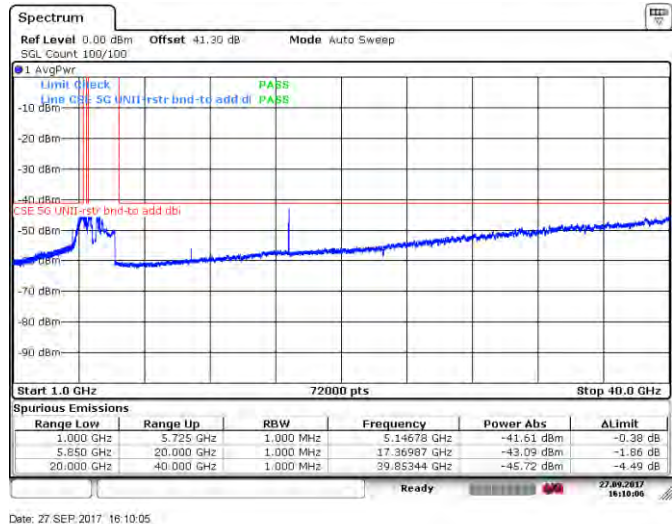
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



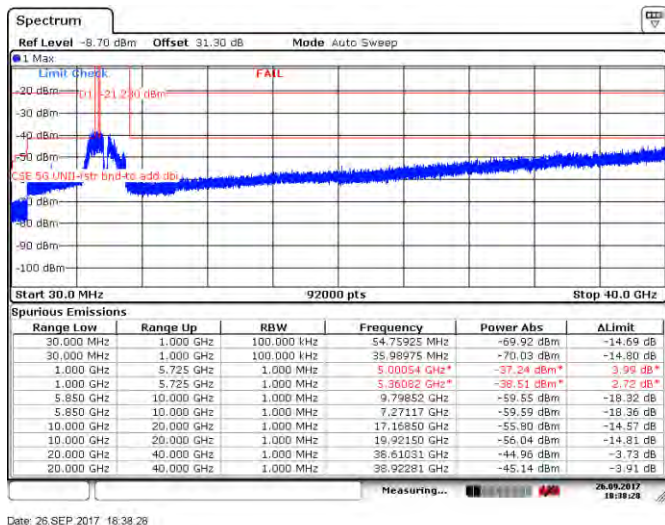
Date: 27.SEP.2017 16:18:03

**Figure 8.4-150:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, PTP application



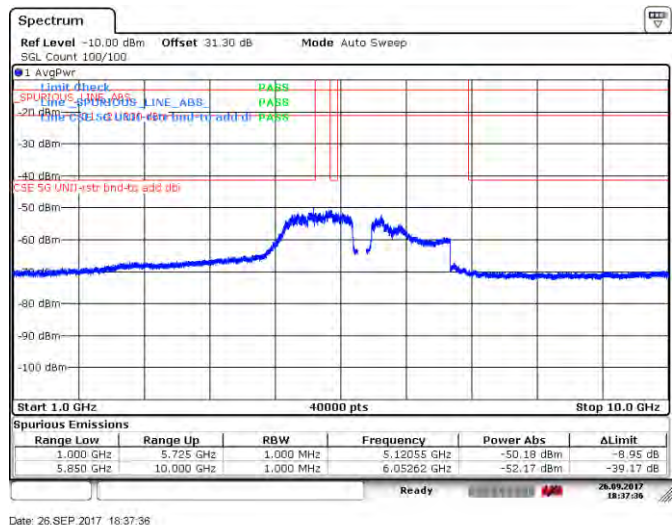
Date: 27.SEP.2017 16:10:05

**Figure 8.4-151:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, mid channel, PTP application



Date: 26.SEP.2017 18:38:28

**Figure 8.4-152:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, high channel, PTP application



Date: 26.SEP.2017 18:37:38

**Figure 8.4-153:** Spurious emissions within restricted bands for 32 dBi antenna, 10 MHz channel, high channel, PTP application



**Section 8**  
**Test name**  
**Specification**

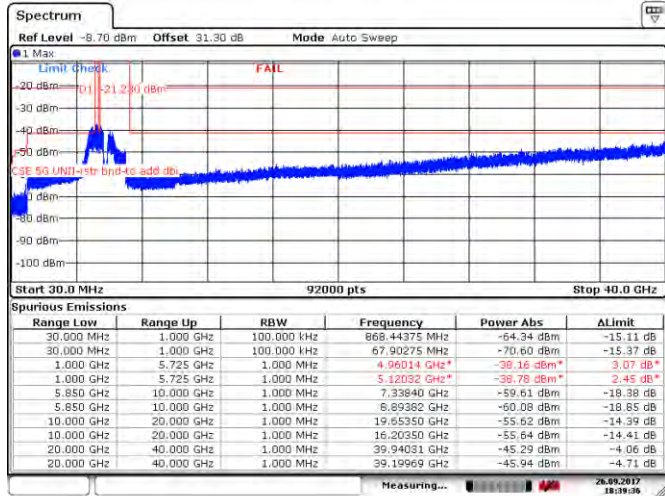
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



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

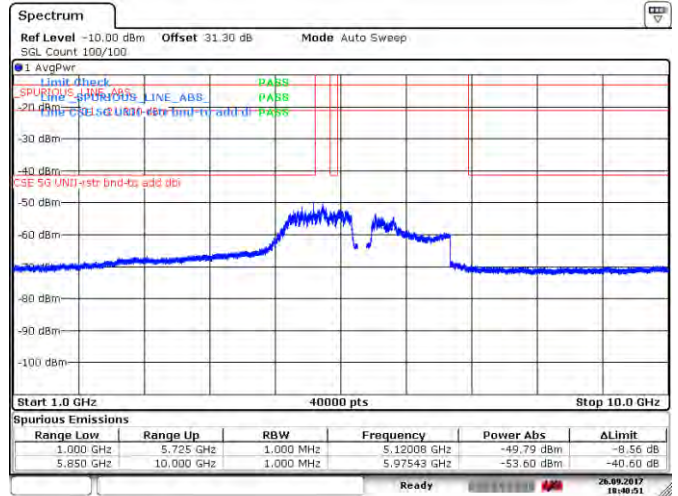
Average limit EIRP equivalent: 54 dBμV/m – 95.23 dB = –41.23 dBm

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.



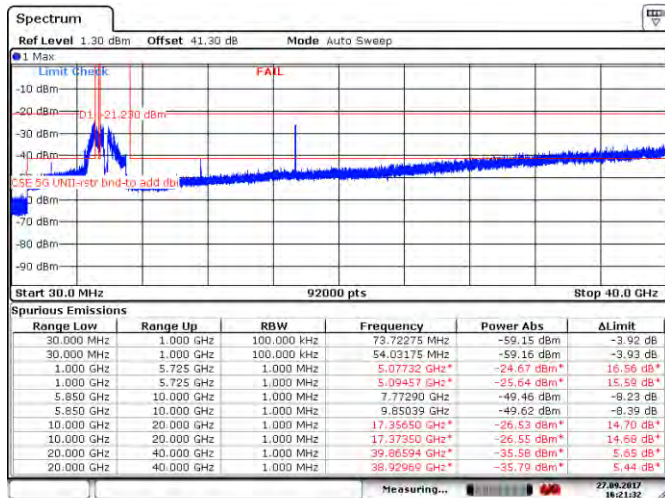
Date: 26 SEP 2017 16:39:36

**Figure 8.4-154:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, low channel, PTP application



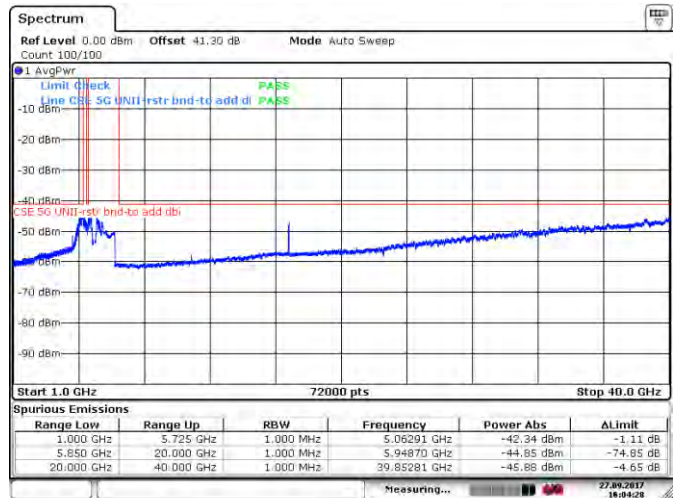
Date: 26 SEP 2017 16:40:52

**Figure 8.4-155:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, low channel, PTP application



Date: 27 SEP 2017 16:21:32

**Figure 8.4-156:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, PTP application



Date: 27 SEP 2017 16:04:28

**Figure 8.4-157:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, mid channel, PTP application

**Section 8**  
**Test name**  
**Specification**

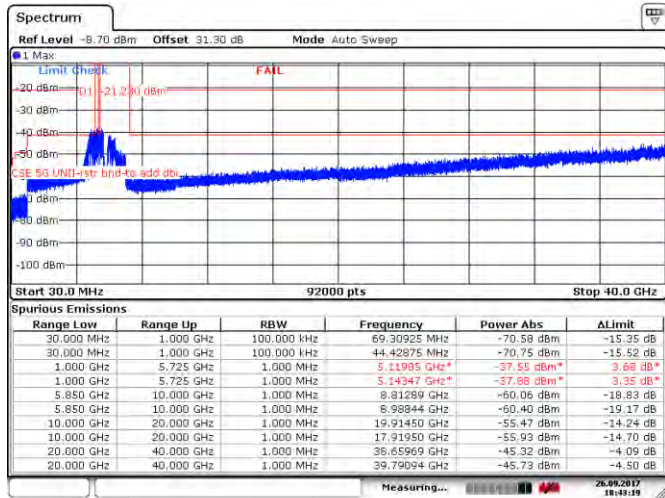
Testing data  
 FCC 15.407(b) and RSS-247 6.2.4 (2) Spurious (out-of-band) emissions  
 FCC Part 15 Subpart E and RSS-247 Issue 2



Peak limit EIRP equivalent:  $74 \text{ dB}\mu\text{V/m} - 95.23 \text{ dB} = -21.23 \text{ dBm}$

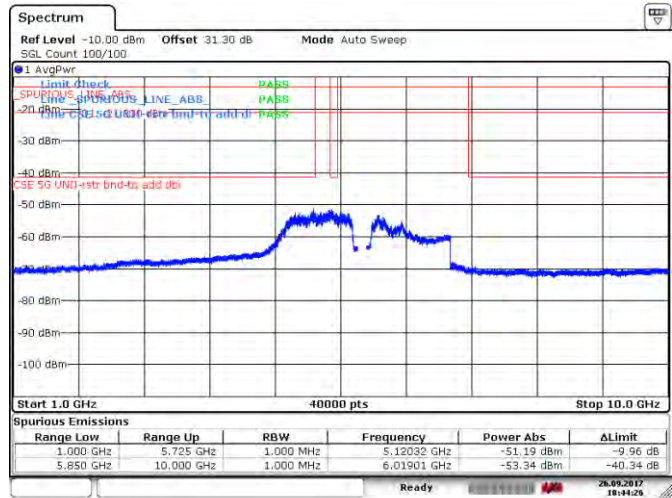
Average limit EIRP equivalent:  $54 \text{ dB}\mu\text{V/m} - 95.23 \text{ dB} = -41.23 \text{ dBm}$

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: 26 SEP 2017 16:43:19

**Figure 8.4-158:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, high channel, PTP application

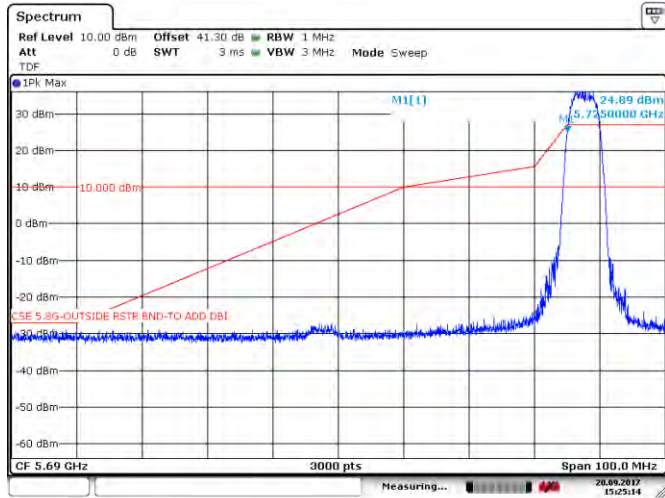


Date: 26 SEP 2017 16:44:26

**Figure 8.4-159:** Spurious emissions within restricted bands for 32 dBi antenna, 20 MHz channel, high channel, PTP application

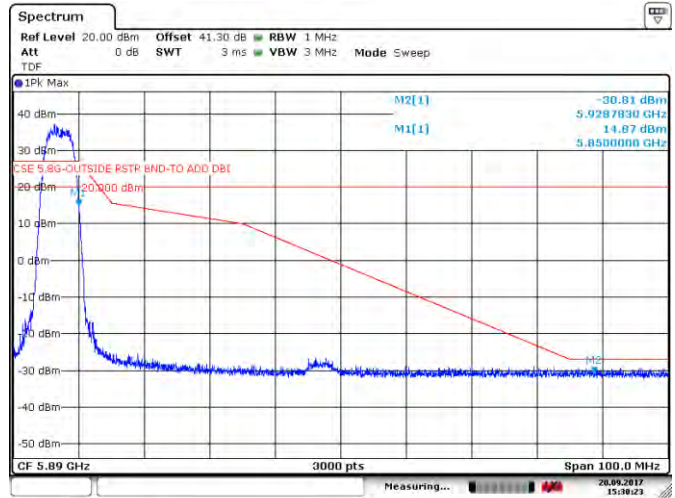
Peak limit EIRP equivalent:  $74 \text{ dB}\mu\text{V}/\text{m} - 95.23 \text{ dB} = -21.23 \text{ dBm}$

Average limit EIRP equivalent:  $54 \text{ dB}\mu\text{V}/\text{m} - 95.23 \text{ dB} = -41.23 \text{ dBm}$



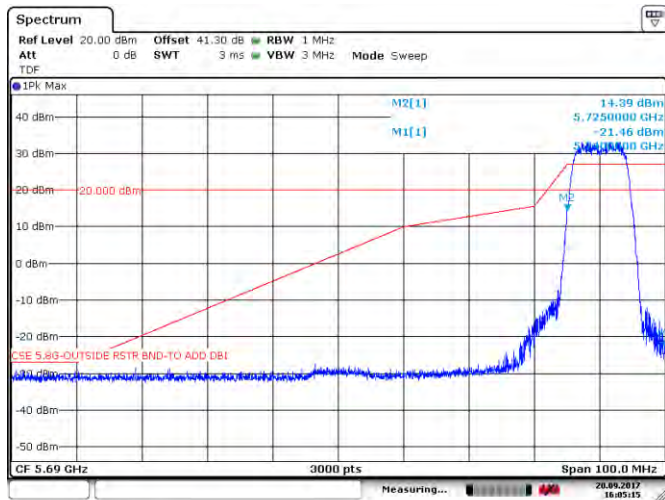
Date: 20 SEP 2017 15:25:15

**Figure 8.4-160:** Lower band edge for 32 dBi antenna, 5 MHz channel, PTP application



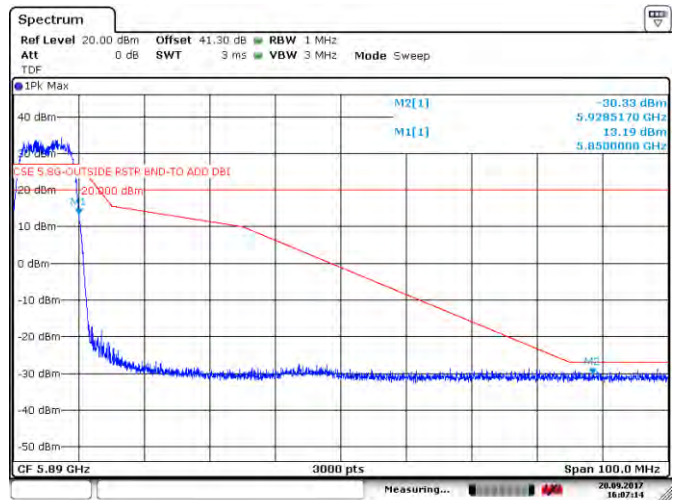
Date: 20 SEP 2017 15:30:23

**Figure 8.4-161:** Upper band edge for 32 dBi antenna, 5 MHz channel, PTP application



Date: 20 SEP 2017 16:05:16

**Figure 8.4-162:** Lower band edge for 32 dBi antenna, 10 MHz channel, PTP application

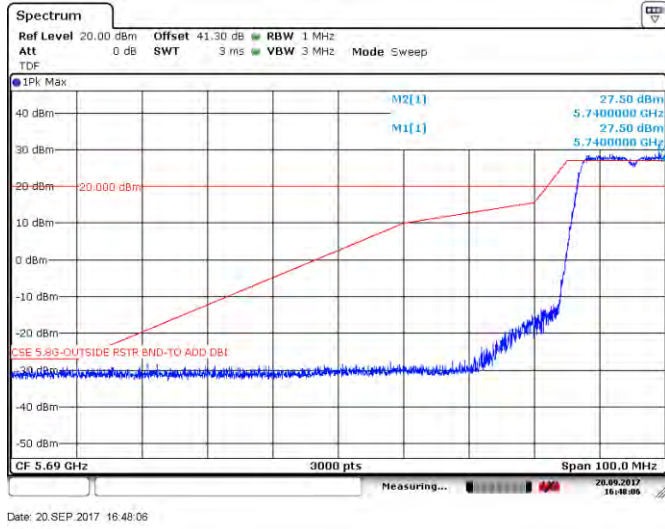


Date: 20 SEP 2017 16:07:14

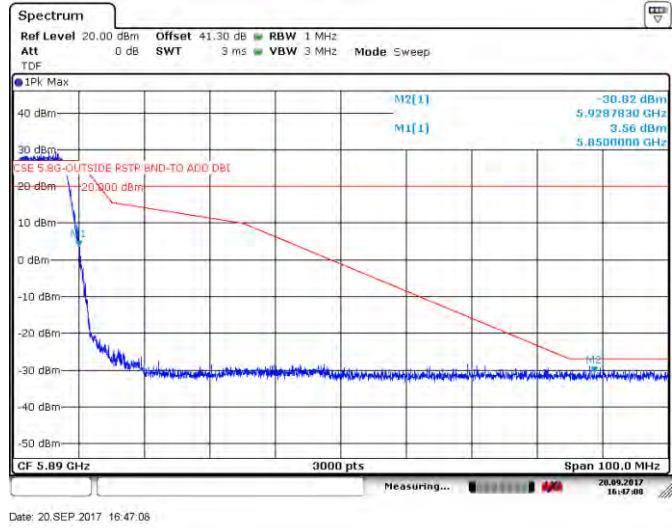
**Figure 8.4-163:** Upper band edge for 32 dBi antenna, 10 MHz channel, PTP application



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



**Figure 8.4-164:** Lower band edge for 32 dBi antenna, 20 MHz channel, PTP application



**Figure 8.4-165:** Upper band edge for 32 dBi antenna, 20 MHz channel, PTP application

## 8.5 FCC 15.407(g) and RSS-Gen 8.11 Frequency stability

### 8.5.1 Definitions and limits

Manufacturers of U-NII (IC: LE-LAN) 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:	September 25, 2017	Temperature:	25 °C
Test engineer:	Yong Huang	Air pressure:	1007 mbar
Verdict:	Pass	Relative humidity:	45 %

### 8.5.3 Observations, settings and special notes

Spectrum analyser settings:

Resolution bandwidth:	50 Hz
Video bandwidth:	50 Hz
Detector mode:	Peak
Trace mode:	Max Hold

### 8.5.4 Test data

**Table 8.5-1: Frequency drift measurement**

Test conditions	Nominal frequency, GHz	Frequency, GHz	Drift, Hz
+50 °C, Nominal	5.79000000	5.79005370	-21600
+40 °C, Nominal	5.79000000	5.79005690	-18400
+30 °C, Nominal	5.79000000	5.79006790	-7400
+20 °C, +15 %	5.79000000	5.79007530	0
+20 °C, Nominal	5.79000000	5.79007530	reference
+20 °C, -15 %	5.79000000	5.79007530	0
+10 °C, Nominal	5.79000000	5.79008930	14000
0 °C, Nominal	5.79000000	5.79009750	22200
-10 °C, Nominal	5.79000000	5.79009830	23000
-20 °C, Nominal	5.79000000	5.79008850	13200
-30 °C, Nominal	5.79000000	5.79007490	-400

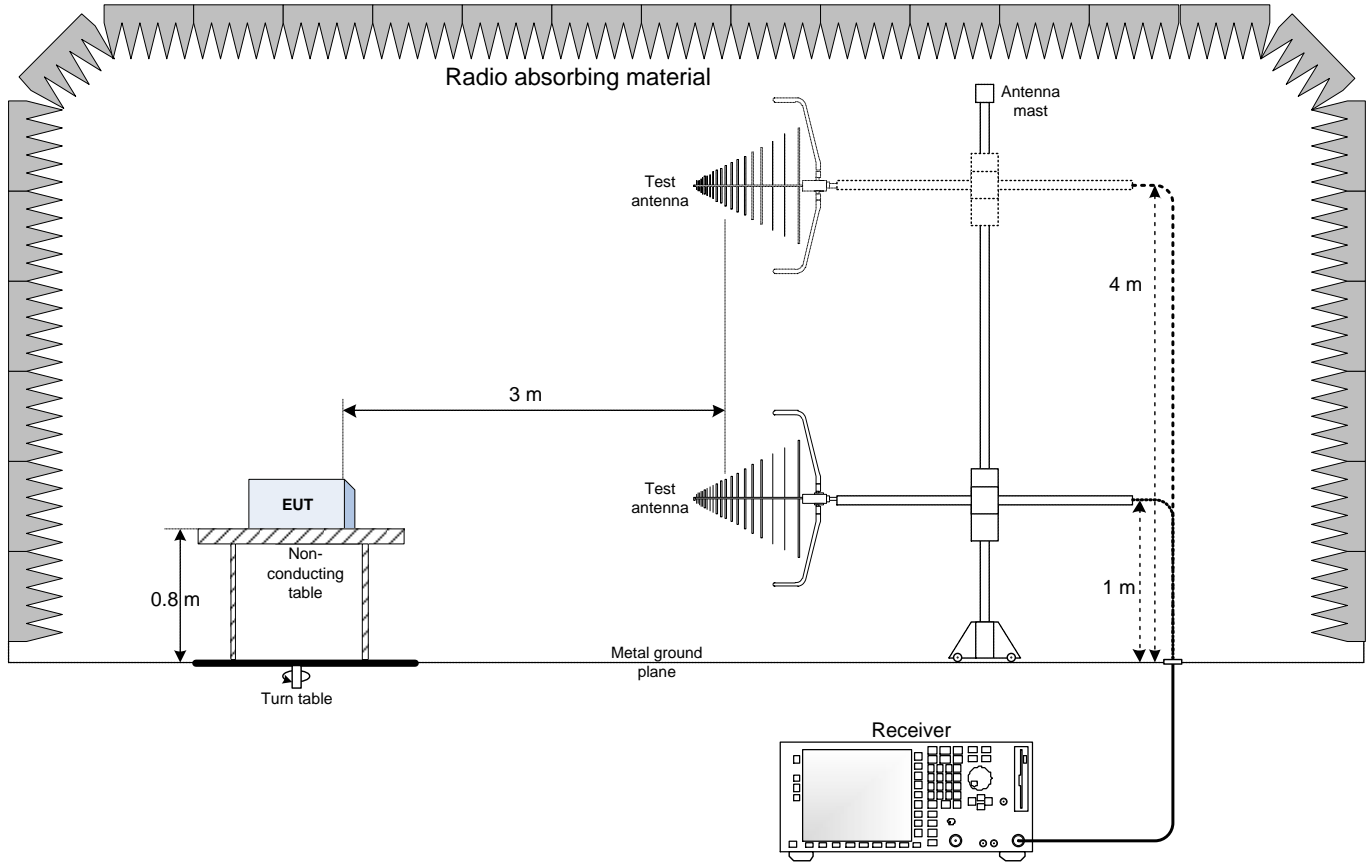
Minimum lower band edge margin is more than 2.6 MHz

Minimum upper band edge margin is more than 175 kHz

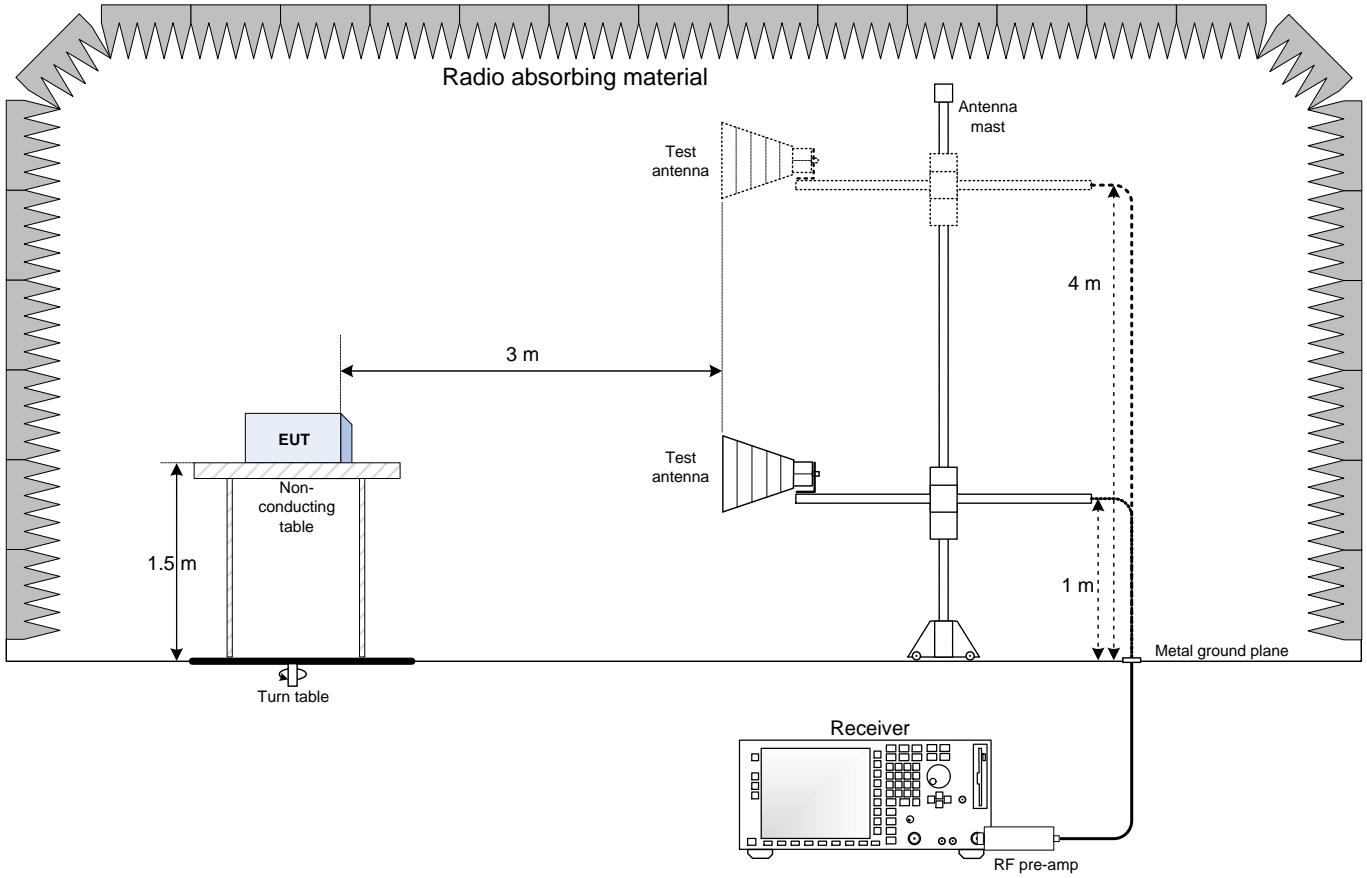
The frequency drifts in above table are within these minimum margins, the emissions are deemed to maintain within the band of operation.

## Section 9. Block diagrams of test set-ups

### 9.1 Radiated emissions set-up for frequencies below 1 GHz



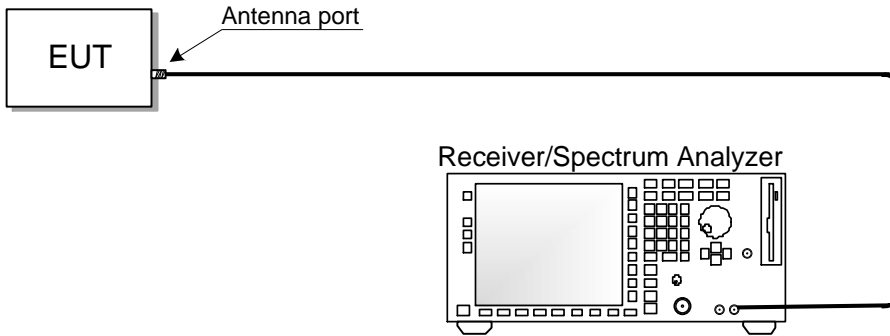
9.2 Radiated emissions set-up for frequencies above 1 GHz





9.3 Conducted antenna port set-up

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9.4 Conducted emissions set-up

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