

Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

7.5 Spurious emissions at RF antenna connector test

7.5.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.5.1.

Table 7.5.1 Spurious emission limits

Frequency, MHz	Conducted power of spurious, dBm/MHz
0.009 – below 3530.0	-40.0
3720.0 – 10th harmonic*	-40.0

7.5.2 Test procedure

- **7.5.2.1** The EUT was set up as shown in Figure 7.5.1, energized and its proper operation was checked.
- **7.5.2.2** The EUT was adjusted to produce maximum available for end user RF output power.
- **7.5.2.3** The spurious emission was measured with spectrum analyzer as provided in Table 7.5.2 and associated plots.

Figure 7.5.1 Spurious emission test setup





Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict.	FASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

Table 7.5.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 3550 - 3700 MHz INVESTIGATED FREQUENCY RANGE: 0.009 - 37000 MHz

DETECTOR USED: Peak

VIDEO BANDWIDTH: ≥ Resolution bandwidth

MODULATION: QPSK
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
NUMBER ANTENNA PORTS: N = 4

		Averag	e power (RMS)		
Frequency, MHz	Maximun emission per chain, dBm**	Total emission, dBm***	Limit, dBm	Margin, dB*	Verdict
Channel bandwid	dth 10 MHz				
Low carrier frequ	uency 3555 MHz				
36.9777	-47.67	-41.67	-40.00	-1.67	Pass
Mid carrier frequ	ency 3625 MHz				
36.8819	-47.53	-41.53	-40.00	-1.53	Pass
High carrier freq	uency 3695 MHz				
36.6207	-47.50	-41.50	-40.00	-1.50	Pass
Channel bandwid	dth 30 MHz				
Low carrier frequ	uency 3565 MHz				
36.7021	-47.62	-41.62	-40.00	-1.62	Pass
Mid carrier frequ	ency 3625 MHz				
36.9698	-47.56	-41.56	-40.00	-1.56	Pass
High carrier freq	uency 3685 MHz				
36.9199	-47.55	-41.55	-40.00	-1.55	Pass

^{*-} Margin = Total spurious emission - specification limit.

Reference numbers of test equipment used

HL 1294	HL 1295	HL 3287	HL 3301	HL 3355	HL 3437	HL 3781	HL 4355
HL 4425	HL 5232	HL 5233	HL 5286	HL 5372	HL 5409	HL 5636	HL 5637
HL 5642	HL 5644	HL 5686					

Full description is given in Appendix A.

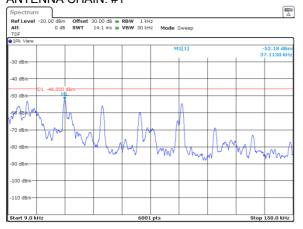
^{** -} Total emission = Maximum emission per chain + 10*log(N)

^{** -} SA Reading over 1 chain = Max SA reading (Chains #1&2 or chains #3&4)



Test specification: Section 96.41(e)(3), Conducted spurious emissions				
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	Remarks:			

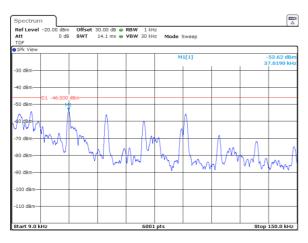
Plot 7.5.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

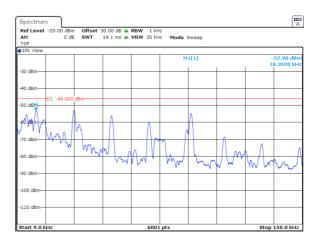


QPSK 10 MHz ANTENNA CHAIN: #2



ANTENNA CHAIN: #3

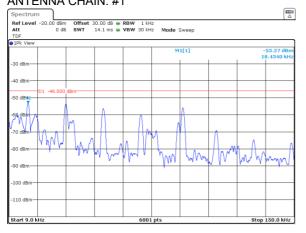






Test specification: Section 96.41(e)(3), Conducted spurious emissions				
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

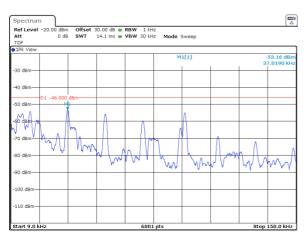
Plot 7.5.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency

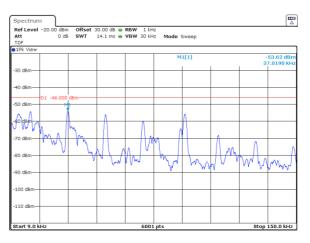


QPSK 10 MHz



ANTENNA CHAIN: #3



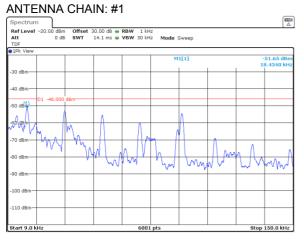




Test specification:	: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21	Verdict:	FASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

Plot 7.5.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

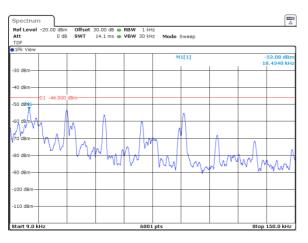
MODULATION: CHANNEL SPACING:

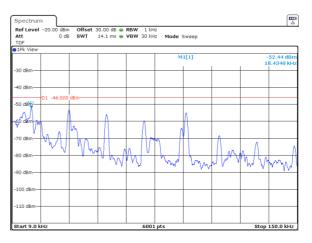


QPSK 10 MHz ANTENNA CHAIN:



ANTENNA CHAIN: #3

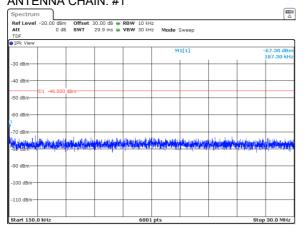




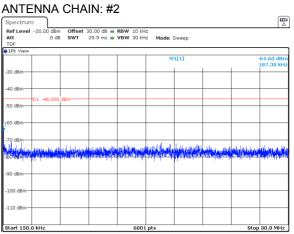


Test specification: Section 96.41(e)(3), Conducted spurious emissions				
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

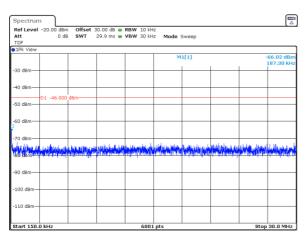
Plot 7.5.4 Spurious emission measurements in 150 kHz - 30 MHz range at low carrier frequency

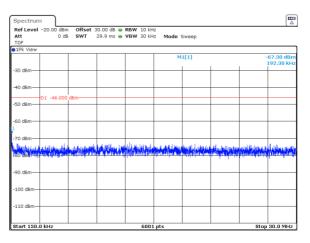


QPSK 10 MHz



ANTENNA CHAIN: #3

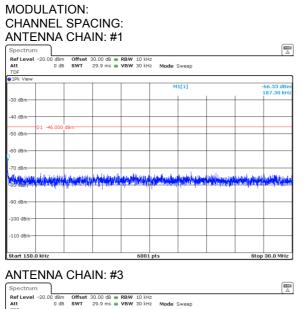


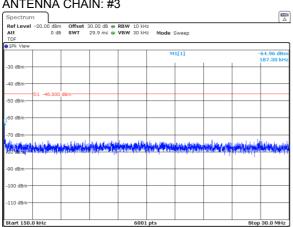


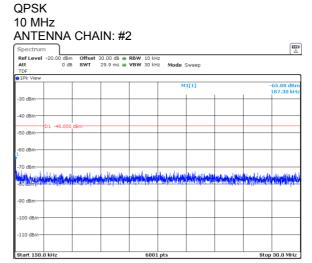


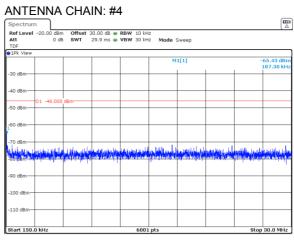
Test specification: Section 96.41(e)(3), Conducted spurious emissions				
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	Remarks:			

Plot 7.5.5 Spurious emission measurements in 150 kHz - 30 MHz range at mid carrier frequency





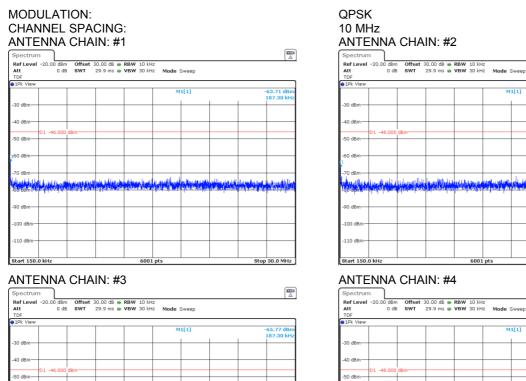






Test specification: Section 96.41(e)(3), Conducted spurious emissions				
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

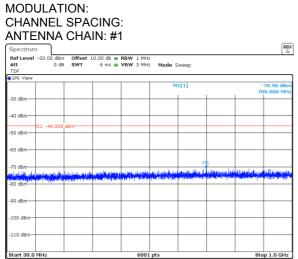
Plot 7.5.6 Spurious emission measurements in 150 kHz - 30 MHz range at high carrier frequency

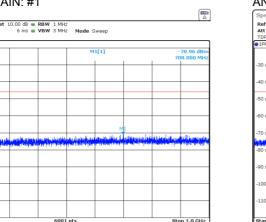


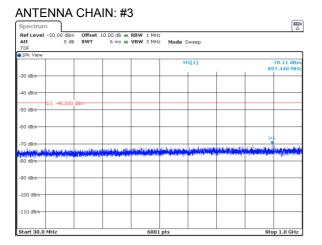


Test specification: Section 96.41(e)(3), Conducted spurious emissions				
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

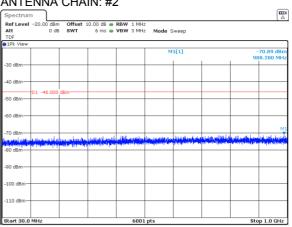
Plot 7.5.7 Spurious emission measurements in 30 MHz - 1000 MHz range at low carrier frequency

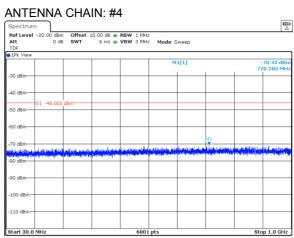








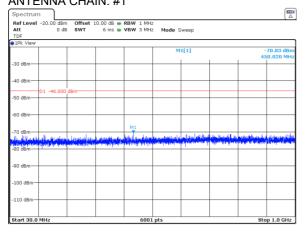




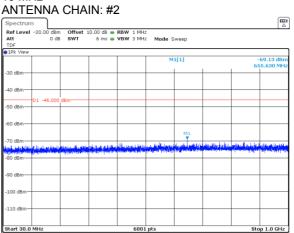


Test specification:	est specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21			
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

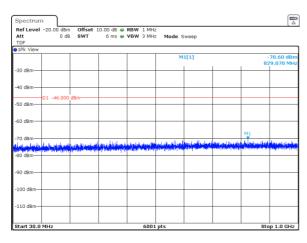
Plot 7.5.8 Spurious emission measurements in 30 MHz - 1000 MHz range at mid carrier frequency

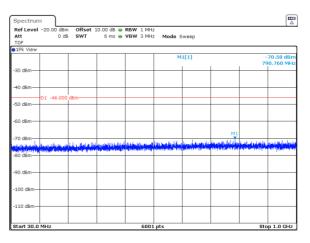


QPSK 10 MHz ANTENNA CHAIN:



ANTENNA CHAIN: #3

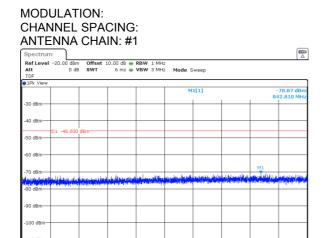




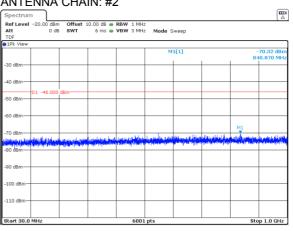


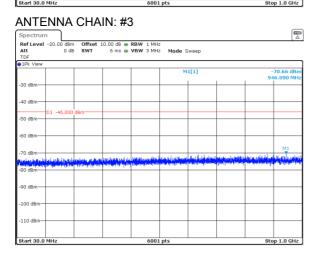
Test specification:	est specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21			
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

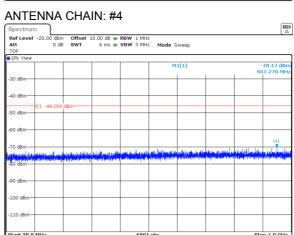
Plot 7.5.9 Spurious emission measurements in 30 MHz - 1000 MHz range at high carrier frequency







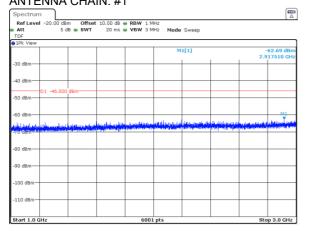




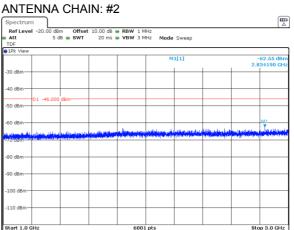


Test specification:	est specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21			
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

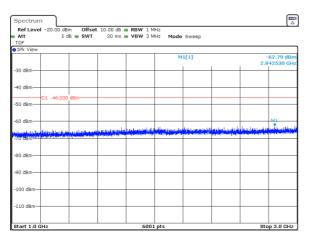
Plot 7.5.10 Spurious emission measurements in 1000 - 3000 MHz range at low carrier frequency

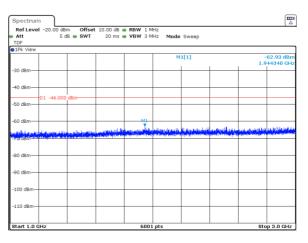


QPSK 10 MHz



ANTENNA CHAIN: #3



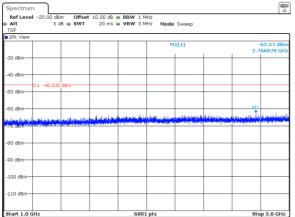


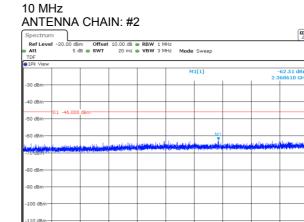


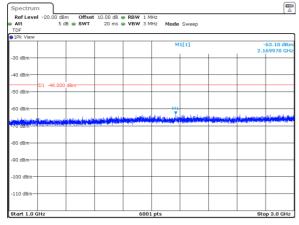
Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	-			

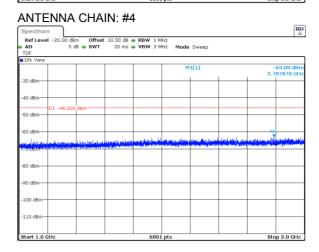
Plot 7.5.11 Spurious emission measurements in 1000 - 3000 MHz range at mid carrier frequency









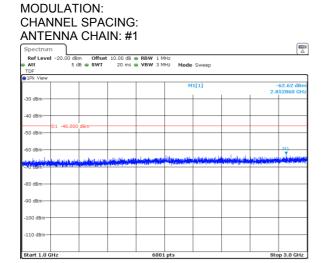


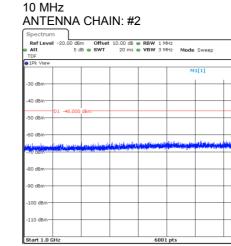


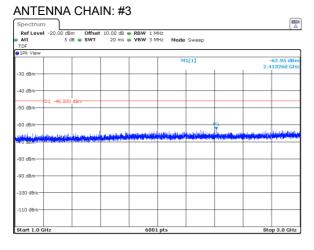
Test specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict: PASS	
Date(s):	14-Dec-21	verdict:	PASS
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

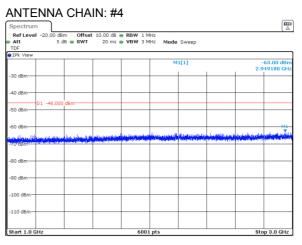
Plot 7.5.12 Spurious emission measurements in 1000 - 3000 MHz range at high carrier frequency

QPSK







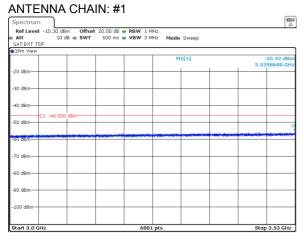




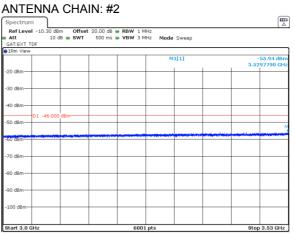
Test specification:	est specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21			
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

Plot 7.5.13 Spurious emission measurements in 3000 - 3530 MHz range at low carrier frequency

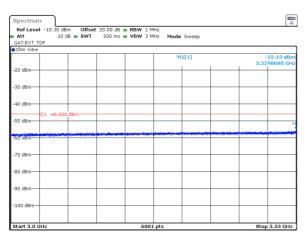
MODULATION: CHANNEL SPACING:

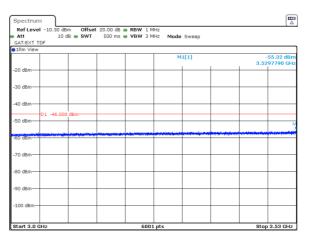


QPSK 10 MHz



ANTENNA CHAIN: #3

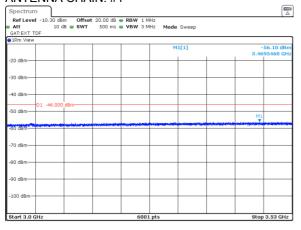




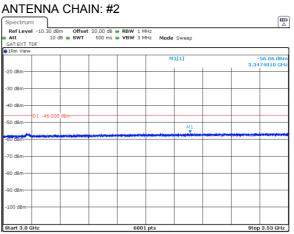


Test specification:	specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21			
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

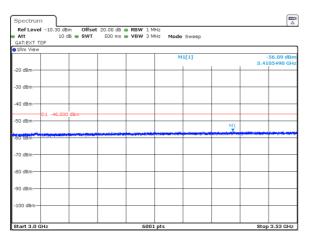
Plot 7.5.14 Spurious emission measurements in 3000 - 3530 MHz range at mid carrier frequency

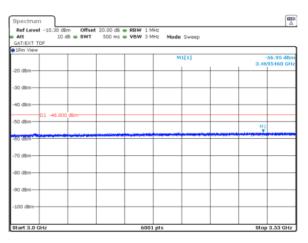


QPSK 10 MHz



ANTENNA CHAIN: #3

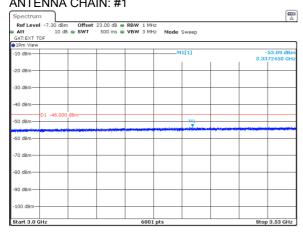




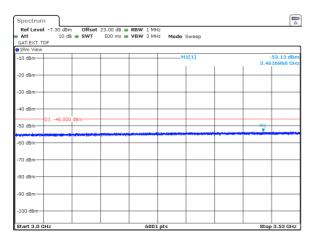


Test specification:	specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21			
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

Plot 7.5.15 Spurious emission measurements in 3000 - 3530 MHz range at high carrier frequency

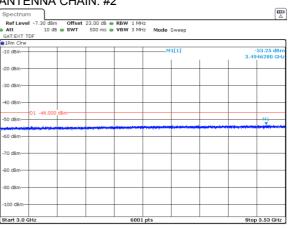


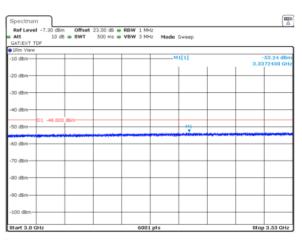
ANTENNA CHAIN: #3



QPSK 10 MHz

ANTENNA CHAIN: #2

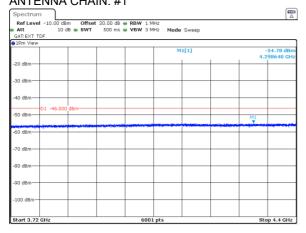




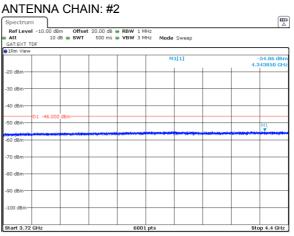


Test specification:	est specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21			
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

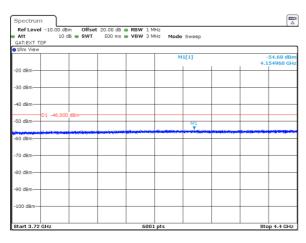
Plot 7.5.16 Spurious emission measurements in 3720 - 4400 MHz range at low carrier frequency

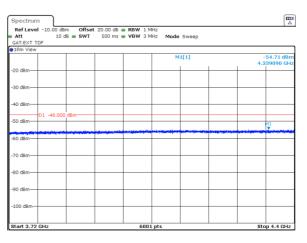


QPSK 10 MHz ANTENNA CHAIN: #2



ANTENNA CHAIN: #3





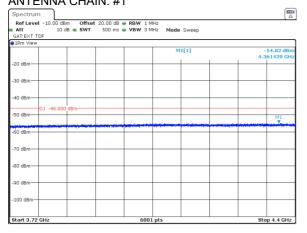


Test specification:	est specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21			
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

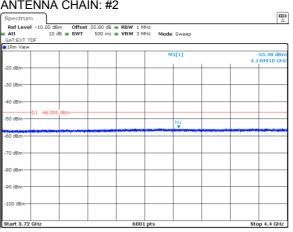
Plot 7.5.17 Spurious emission measurements in 3720 - 4400 MHz range at mid carrier frequency

QPSK

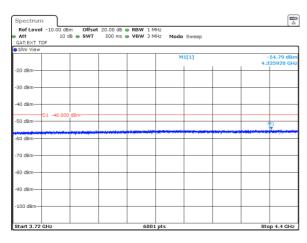
MODULATION: CHANNEL SPACING: ANTENNA CHAIN: #1

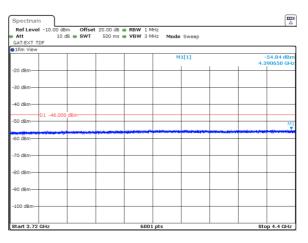


10 MHz ANTENNA CHAIN: #2



ANTENNA CHAIN: #3



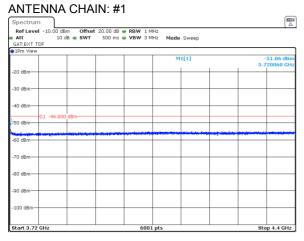




Test specification:	est specification: Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21			
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

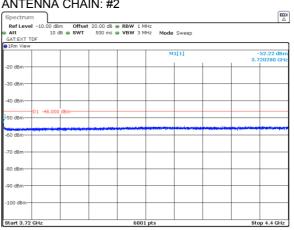
Plot 7.5.18 Spurious emission measurements in 3720 - 4400 MHz range at high carrier frequency

MODULATION: CHANNEL SPACING:

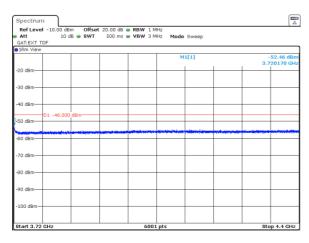


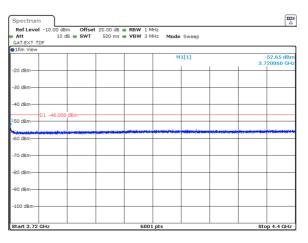
10 MHz ANTENNA CHAIN: #2

QPSK



ANTENNA CHAIN: #3

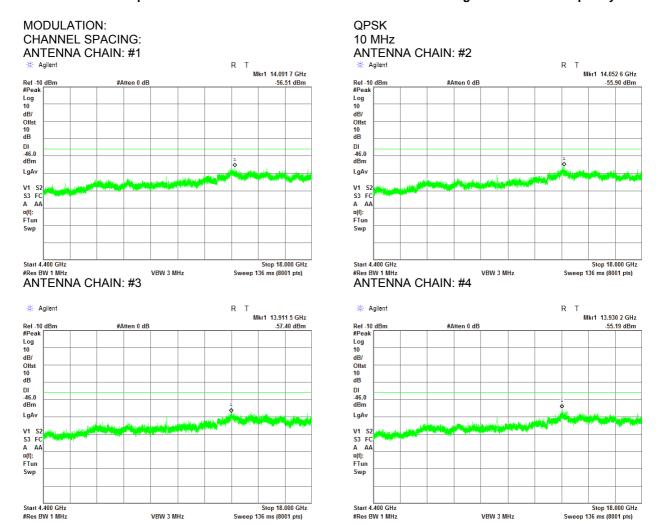






Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

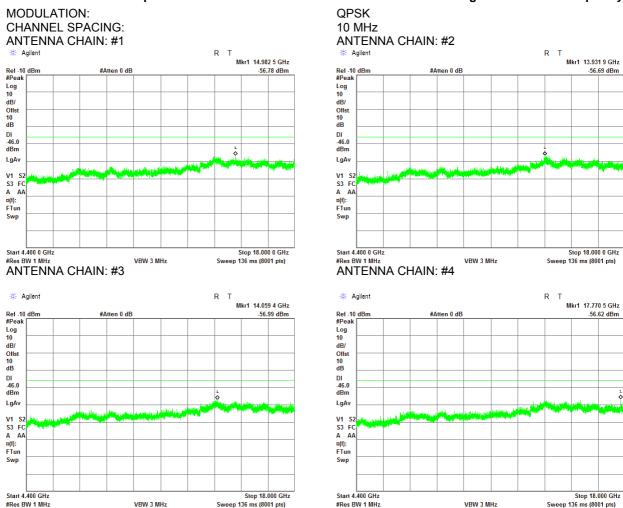
Plot 7.5.19 Spurious emission measurements in 4400 - 18000 MHz range at low carrier frequency





Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict.	FASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

Plot 7.5.20 Spurious emission measurements in 4400 - 18000 MHz range at mid carrier frequency



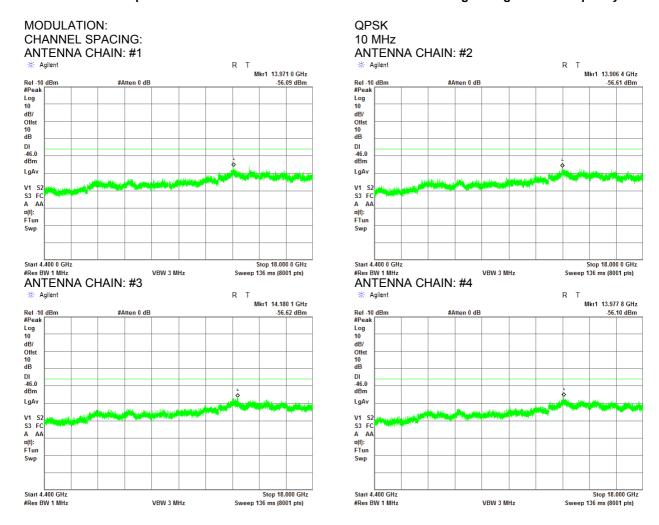
VBW 3 MHz

VBW 3 MHz



Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21	verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

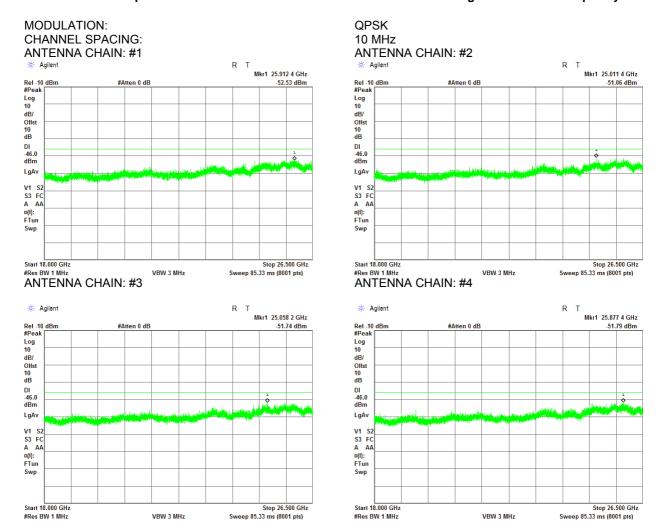
Plot 7.5.21 Spurious emission measurements in 4400 - 18000 MHz range at high carrier frequency





Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict.	FASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

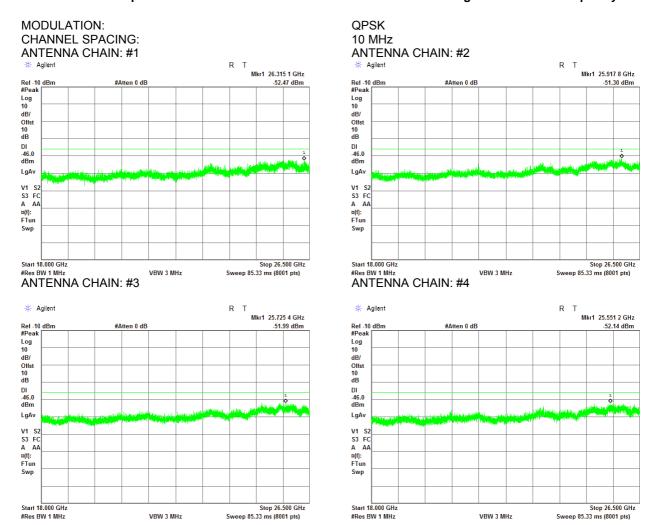
Plot 7.5.22 Spurious emission measurements in 18000 - 26500 MHz range at low carrier frequency





Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21	Verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

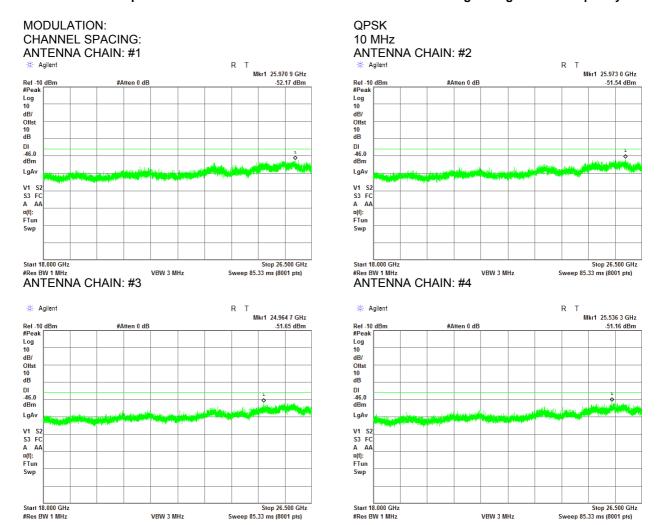
Plot 7.5.23 Spurious emission measurements in 18000 - 26500 MHz range at mid carrier frequency





Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict: PASS	
Date(s):	14-Dec-21	verdict:	PASS
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

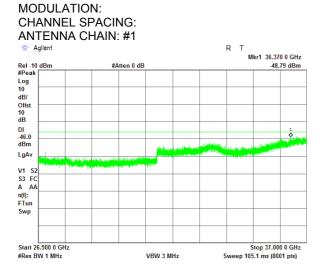
Plot 7.5.24 Spurious emission measurements in 18000 - 26500 MHz range at high carrier frequency



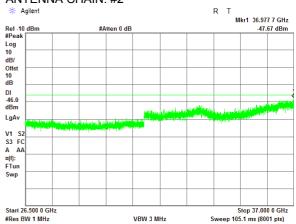


Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict.	FASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

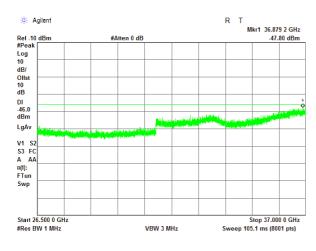
Plot 7.5.25 Spurious emission measurements in 26500 - 37000 MHz range at low carrier frequency

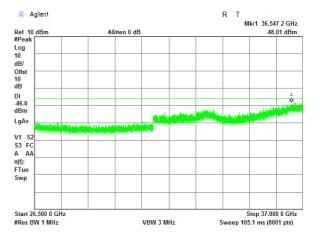


QPSK 10 MHz ANTENNA CHAIN: #2



ANTENNA CHAIN: #3

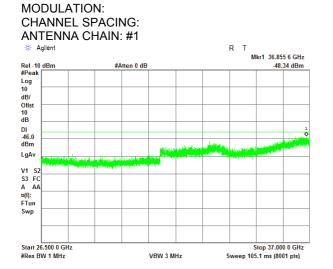




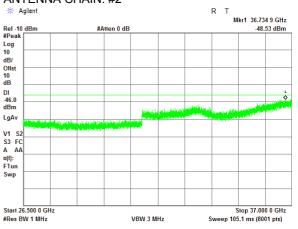


Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict.	FASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

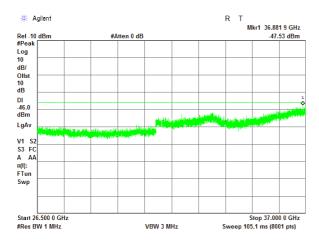
Plot 7.5.26 Spurious emission measurements in 26500 - 37000 MHz range at mid carrier frequency

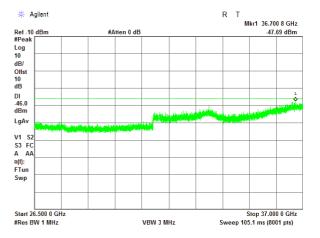


QPSK 10 MHz ANTENNA CHAIN: #2



ANTENNA CHAIN: #3

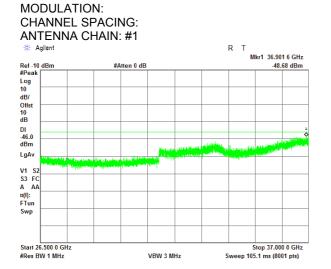




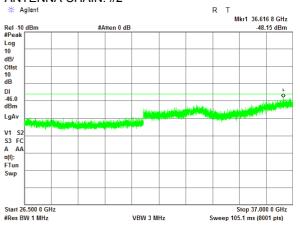


Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict.	FASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

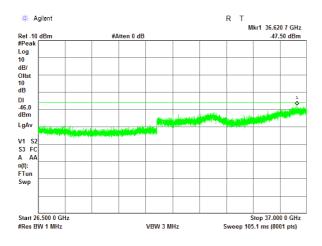
Plot 7.5.27 Spurious emission measurements in 26500 - 37000 MHz range at high carrier frequency

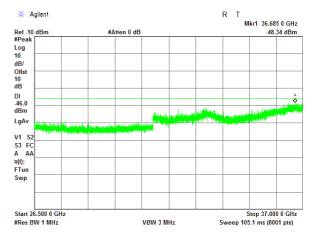


QPSK 10 MHz ANTENNA CHAIN: #2



ANTENNA CHAIN: #3







Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	14-Dec-21	verdict.	FASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:				

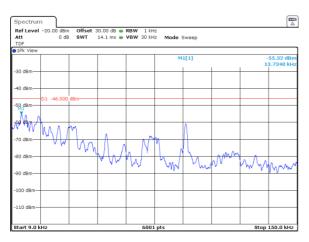
Plot 7.5.28 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

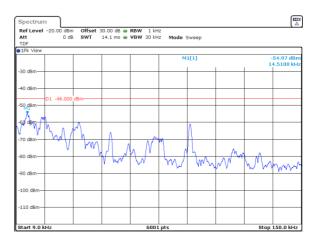


QPSK 30 MHz



ANTENNA CHAIN: #3

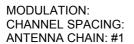


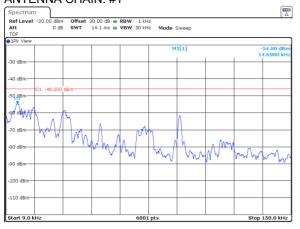




Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21	Verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

Plot 7.5.29 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency



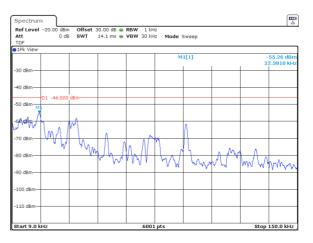


QPSK 30 MHz



ANTENNA CHAIN: #3

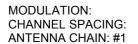






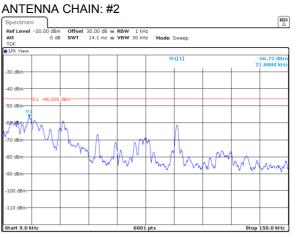
Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21	Verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

Plot 7.5.30 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

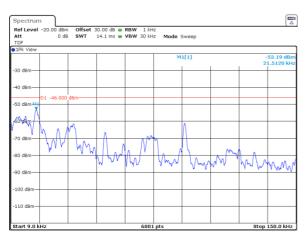


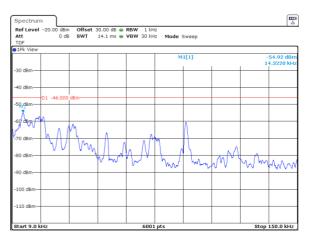


QPSK
30 MHz



ANTENNA CHAIN: #3

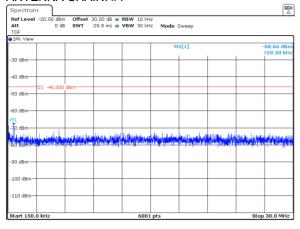




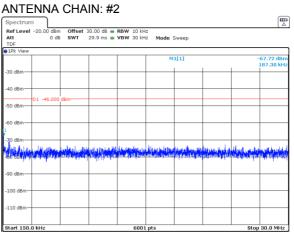


Test specification:	Section 96.41(e)(3), Conducted spurious emissions			
Test procedure:	Section 96.41(e)(3)			
Test mode:	Compliance	Verdict: PASS		
Date(s):	14-Dec-21	Verdict:	PASS	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC	
Remarks:	•			

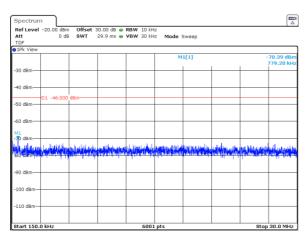
Plot 7.5.31 Spurious emission measurements in 150 kHz - 30 MHz range at low carrier frequency

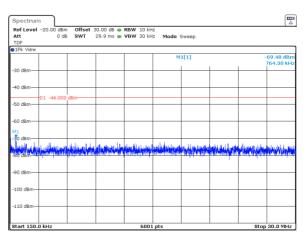


QPSK 30 MHz



ANTENNA CHAIN: #3







Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	: PASS
Date(s):	14-Dec-21	verdict:	
Temperature: 24 °C	Relative Humidity: 53 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:	-		

Plot 7.5.32 Spurious emission measurements in 150 kHz - 30 MHz range at mid carrier frequency

