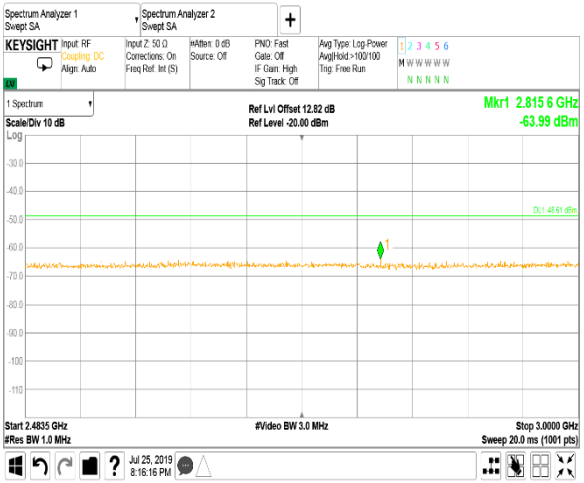
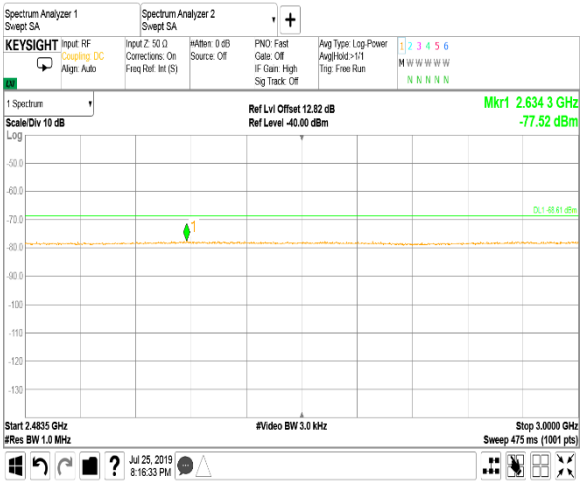
Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.6.65 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 5, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 1beam
MODULATION: QPSK

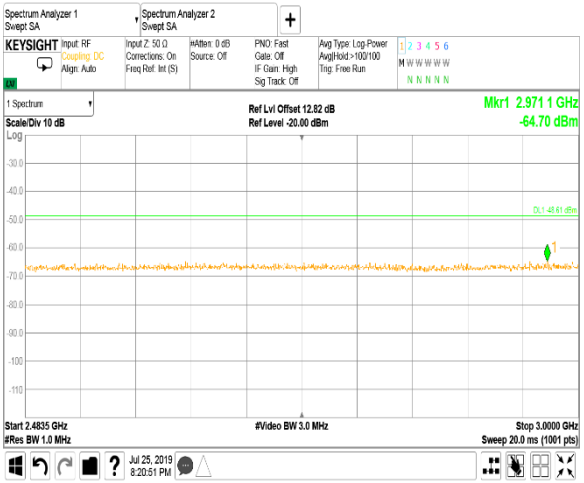


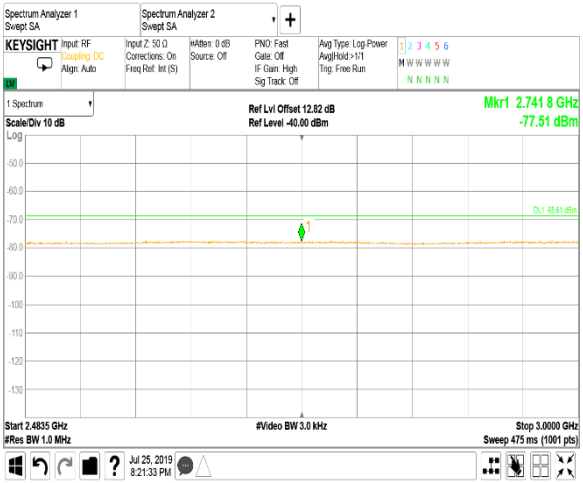
n



Plot 7.6.66 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 5, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 1beam
MODULATION: 64 QAM

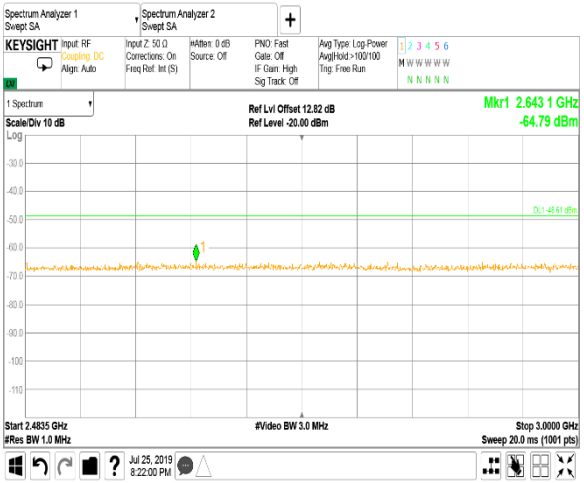


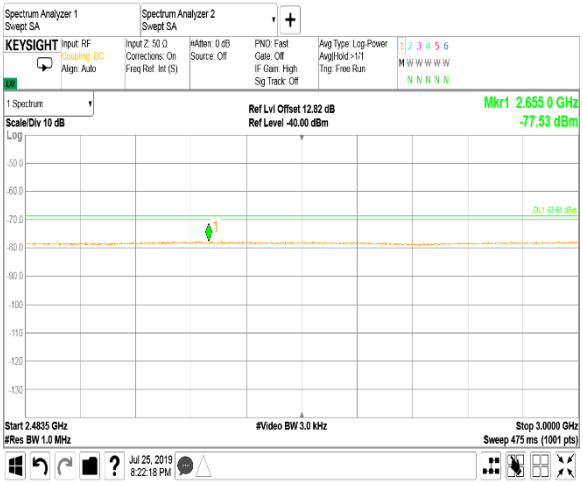


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.6.67 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 6, high carrier frequency

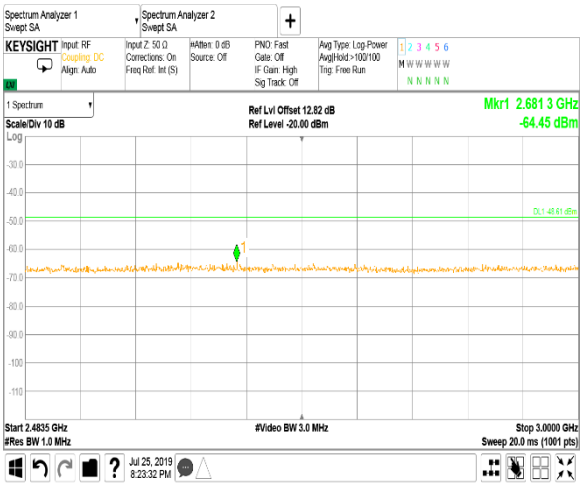
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 1beam
MODULATION: QPSK

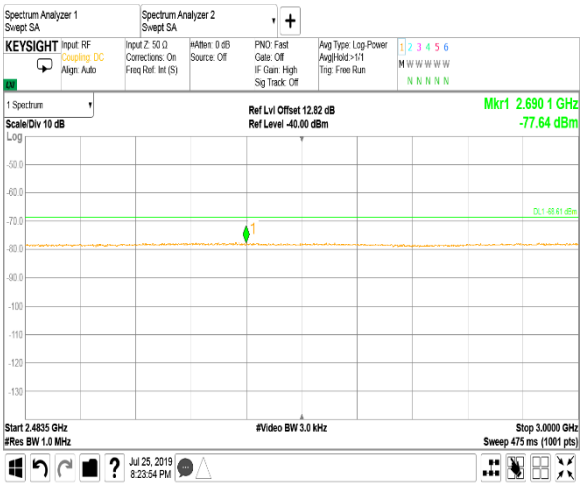




Plot 7.6.68 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 6, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 1beam
MODULATION: 64 QAM

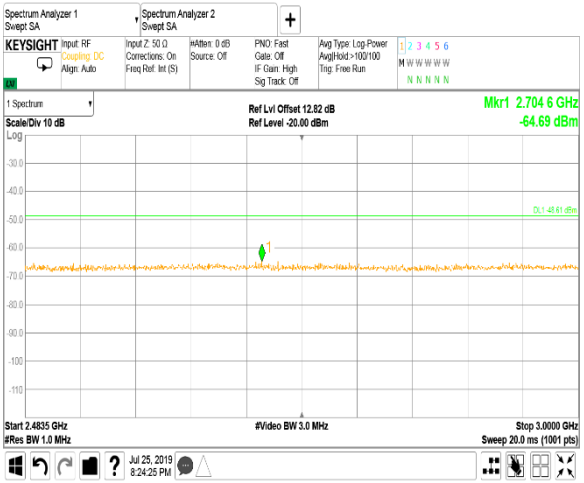


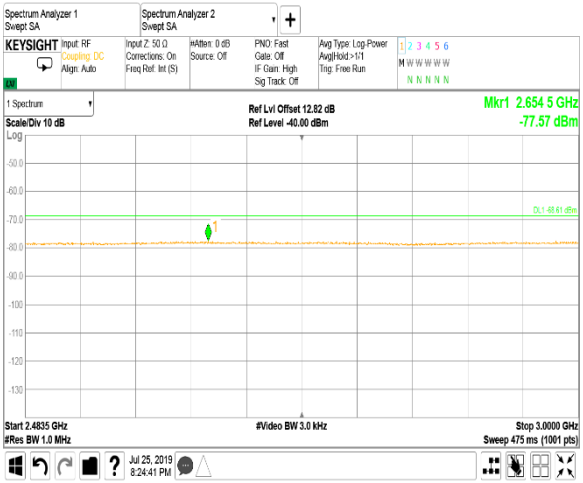


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.6.69 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 7, high carrier frequency

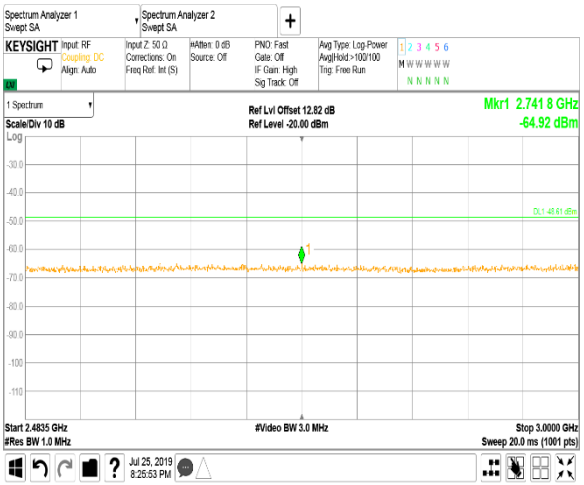
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 1beam
MODULATION: QPSK

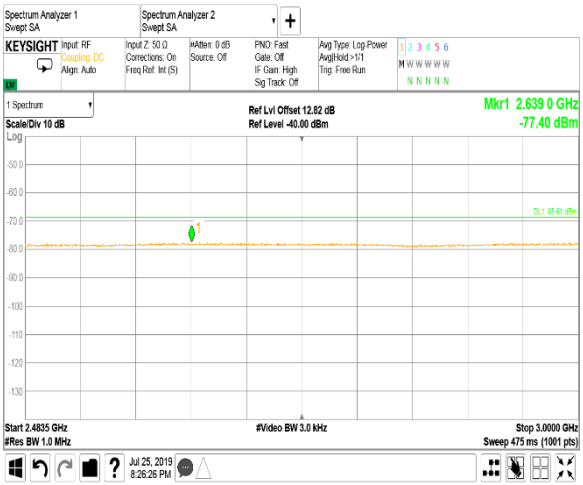




Plot 7.6.70 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 7, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 1beam
MODULATION: 64 QAM

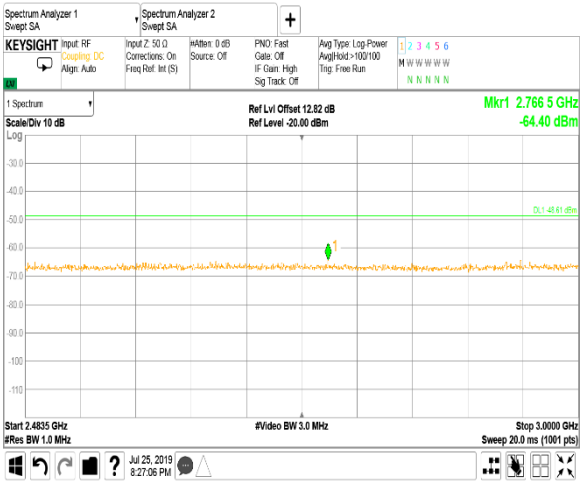


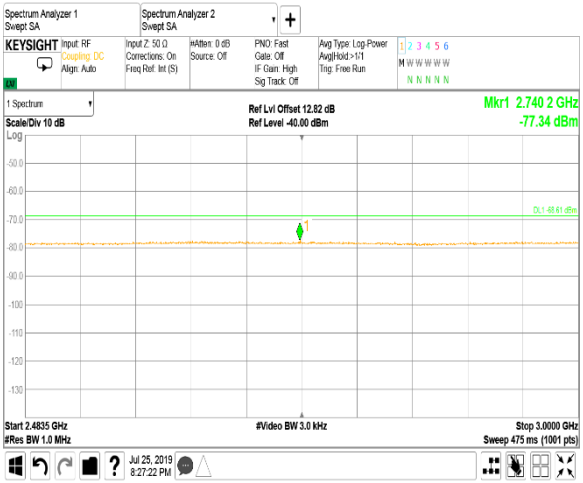


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.6.71 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 8, high carrier frequency

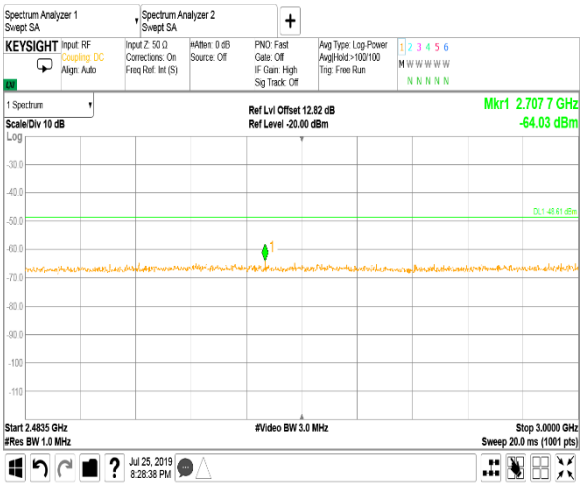
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 1beam
MODULATION: QPSK

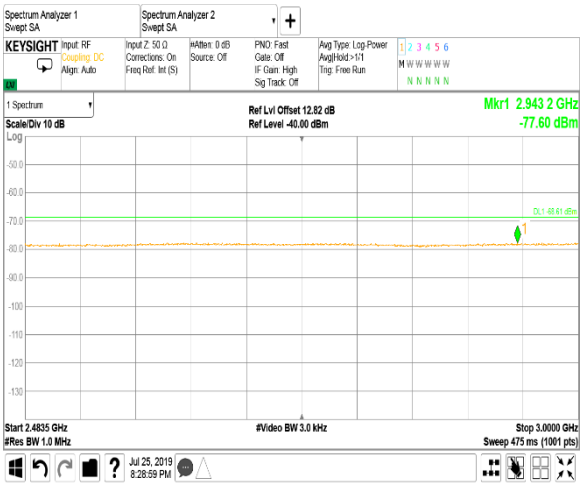




Plot 7.6.72 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 8, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 1beam
MODULATION: 64 QAM





Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

7.7 Band edge emissions at RF antenna connector for 3 non overlapping beam configuration

7.7.1 General

This test was performed to measure band edge emissions at RF antenna connector. Specification test limits are given in Table 7.6.1.

Table 7.7.1 Band edge emission limits

Output power	Assigned frequency, MHz	Attenuation below carrier*, dBc
Peak	902.0 – 928.0	20.0
	2400.0 – 2483.5	
	5725.0 – 5850.0	
Averaged over a time interval	902.0 – 928.0	**30.0**
	2400.0 – 2483.5	
	5725.0 – 5850.0	

* - Band edge emission limit is provided in terms of attenuation below the peak of modulated carrier measured with the same resolution bandwidth.

7.7.2 Test procedure

7.7.2.1 The EUT was set up as shown in Figure 7.6.1, energized normally modulated at the maximum data rate and its proper operation was checked.

7.7.2.2 The EUT was adjusted to produce maximum available to end user RF output power at the lowest carrier frequency.

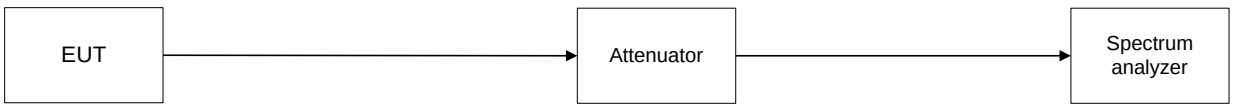
7.7.2.3 The spectrum analyzer span was set to capture the carrier frequency and associated modulation products. The resolution bandwidth was set wider than 1 % of the frequency span.

7.7.2.4 The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.

7.7.2.5 The maximum band edge emission and modulation product outside of the band were measured as provided in Table 7.6.2 and associated plots and referenced to the highest emission level measured within the authorized band.

7.7.2.6 The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the highest carrier frequency.

Figure 7.7.1 Band edge emission test setup



Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Table 7.7.2 Band edge emission outside restricted band test results

ASSIGNED FREQUENCY RANGE: 2400 - 2483.5 MHz
DETECTOR USED: Peak
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: ≥ RBW
CONFIGURATION: 3 non-overlapping beams
CHANNEL SPACING: 5 MHz

Antenna port	Frequency, MHz	Band edge emission, dBm	Emission at carrier, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
Modulation QPSK							
Chain #1	No emissions were found						Pass
Chain #2							
Chain #3							
Chain #4							
Chain #5							
Chain #6							
Chain #7							
Chain #8							
Modulation 64QAM							
Chain #1	No emissions were found						Pass
Chain #2							
Chain #3							
Chain #4							
Chain #5							
Chain #6							
Chain #7							
Chain #8							

*- Margin = Attenuation below carrier – specification limit.

Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

CHANNEL SPACING: 10 MHz

Antenna port	Frequency, MHz	Band edge emission, dBm	Emission at carrier, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
Modulation QPSK							
Chain #1	No emissions were found						Pass
Chain #2							
Chain #3							
Chain #4							
Chain #5							
Chain #6							
Chain #7							
Chain #8							
Modulation 64QAM							
Chain #1	No emissions were found						Pass
Chain #2							
Chain #3							
Chain #4							
Chain #5							
Chain #6							
Chain #7							
Chain #8							

*****- Margin = Attenuation below carrier – specification limit.

Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Table 7.7.3 Low band edge emission within restricted band test results

ASSIGNED FREQUENCY RANGE: 2400 - 2483.5 MHz
DETECTOR USED: Peak / Average
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
RESOLUTION BANDWIDTH: 1 MHz
VIDEO BANDWIDTH: ≥ RBW
CONFIGURATION: 3 non-overlapping beams
CHANNEL SPACING: 5 MHz

Modulation	Band edge	SA Reading, dBm								Sum , dBm
		Chain #1	Chain #2	Chain #3	Chain #4	Chain #5	Chain #6	Chain #7	Chain #8	
Detector Peak										
QPSK	2390.0	-72.08	-72.57	-72.86	-72.79	-71.48	-72.23	-72.63	-72.96	-63.42
64QAM	2390.0	-72.70	-72.08	-72.33	-73.09	-71.76	-70.89	-72.71	-73.00	-63.26
Detector Average										
QPSK	2390.0	-82.14	-82.58	-82.54	-82.31	-82.38	-82.23	-82.72	-82.58	-73.43
64QAM	2390.0	-82.55	-82.46	-82.80	-82.60	-82.49	-82.39	-82.18	-82.50	-73.49

CHANNEL SPACING: 10 MHz

Detector Peak										
QPSK	2390.0	-71.42	-72.61	-72.03	-72.72	-72.79	-72.69	-72.01	-72.57	-63.33
64QAM	2390.0	-72.97	-73.03	-72.97	-72.70	-72.25	-72.70	-72.58	-72.41	-63.69
Detector Average										
QPSK	2390.0	-82.32	-82.58	-82.47	-82.74	-82.39	-82.70	-81.91	-82.64	-73.46
64QAM	2390.0	-82.57	-82.85	-82.43	-82.65	-82.12	-82.78	-82.56	-82.30	-73.53

CHANNEL SPACING: 5 MHz

Detector peak, dBm				Limit, dBm	Margin, dB*	Detector average, dBm,		Limit, dBm	Margin, dB*	Verdict
Frequency, MHz	Emission	Cable loss, dB	Band edge result			Emission	Band edge result			
Modulation QPSK										
2390.0	-63.42	1.23	-64.65	-39.58	-25.07	-73.43	-74.66	-59.58	-15.08	Pass
Modulation 64QAM										
2390.0	-63.26	1.23	-64.49	-39.58	-24.91	-73.49	-74.72	-59.58	-15.14	Pass

CHANNEL SPACING: 10 MHz

Modulation QPSK										
2390.0	-63.33	1.23	-64.53	-39.58	-24.95	-73.46	-74.69	-59.58	-15.11	Pass
Modulation 64QAM										
2390.0	-63.69	1.23	-64.92	-39.58	-25.34	-73.53	-74.76	-59.58	-15.18	Pass

Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Table 7.7.4 High band edge emission within restricted band test results

ASSIGNED FREQUENCY RANGE: 2400 - 2483.5 MHz
DETECTOR USED: Peak / Average
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
RESOLUTION BANDWIDTH: 1 MHz
VIDEO BANDWIDTH: ≥ RBW
CONFIGURATION: 3 non-overlapping beams
CHANNEL SPACING: 5 MHz

Modulation	Band edge	SA Reading, dBm								Sum , dBm
		Chain #1	Chain #2	Chain #3	Chain #4	Chain #5	Chain #6	Chain #7	Chain #8	
Detector Peak										
QPSK	2483.5	-70.39	-69.71	-70.40	-71.11	-71.01	-70.86	-70.85	-70.64	-61.60
64QAM	2483.5	-71.00	-70.85	-70.83	-70.43	-70.65	-70.90	-70.01	-70.88	-61.68
Detector Average										
QPSK	2483.5	-80.87	-80.82	-80.31	-80.41	-80.86	-80.88	-80.70	-80.85	-71.71
64QAM	2483.5	-80.67	-80.55	-80.60	-80.46	-80.70	-80.86	-80.96	-80.34	-71.64

CHANNEL SPACING: 10 MHz

Detector Peak										
QPSK	2483.5	-69.56	-67.93	-69.40	-69.85	-69.38	-69.52	-69.75	-70.31	-60.41
64QAM	2483.5	-69.81	-69.42	-70.28	-69.75	-69.62	-69.03	-69.70	-69.33	-60.60
Detector Average										
QPSK	2483.5	-79.21	-79.60	-79.32	-79.67	-79.61	-79.45	-79.79	-79.46	-70.51
64QAM	2483.5	-79.84	-79.86	-79.83	-79.65	-79.55	-79.63	-79.33	-79.67	-70.67

CHANNEL SPACING: 5 MHz

Detector peak, dBm				Limit, dBm	Margin, dB*	Detector average, dBm,		Limit, dBm	Margin, dB*	Verdict
Frequency, MHz	Emission	Cable loss, dB	Band edge result			Emission	Band edge result			
High band edge										
Modulation QPSK										
2483.5	-61.60	1.23	-62.83	-39.58	-23.25	-71.71	-72.94	-59.58	-13.36	Pass
Modulation 64QAM										
2483.5	-61.68	1.23	-62.91	-39.58	-23.33	-71.64	-72.87	-59.58	-13.29	Pass

CHANNEL SPACING: 10 MHz

Modulation QPSK										
2483.5	-60.41	1.23	-61.64	-39.58	-22.06	-70.51	-71.74	-59.58	-12.16	Pass
Modulation 64QAM										
2483.5	-60.60	1.23	-61.83	-39.58	-22.25	-70.67	-71.90	-59.58	-12.32	Pass

Reference numbers of test equipment used

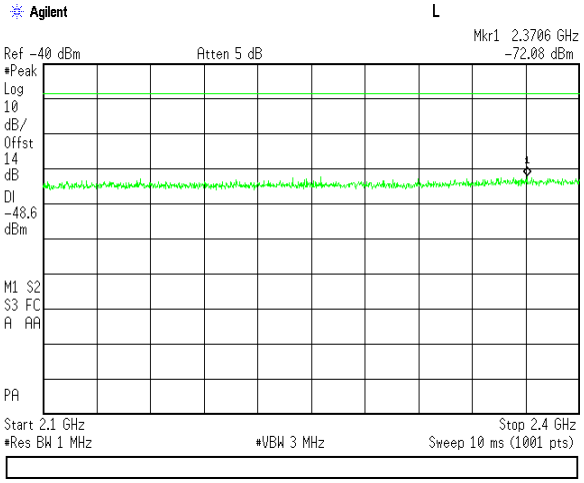
HL 3901	HL 4070	HL 4366	HL 5376	HL	HL	HL	HL

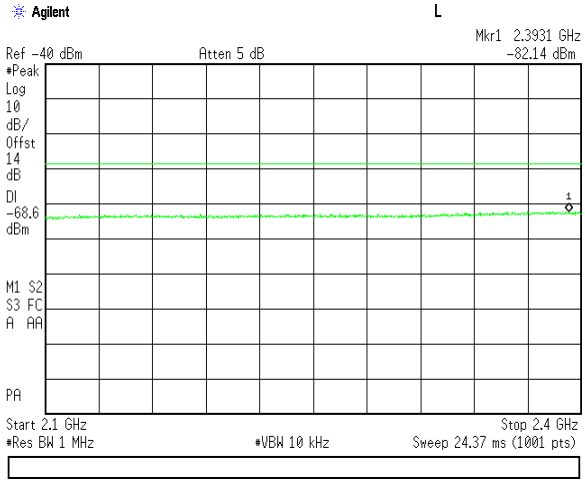
Full description is given in Appendix A.

Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.1 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 1, low carrier frequency

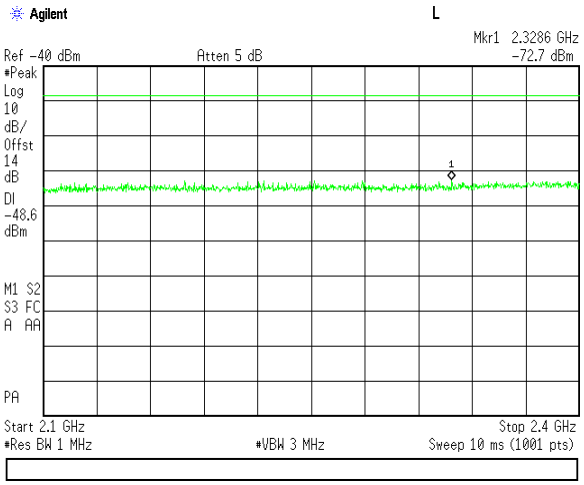
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

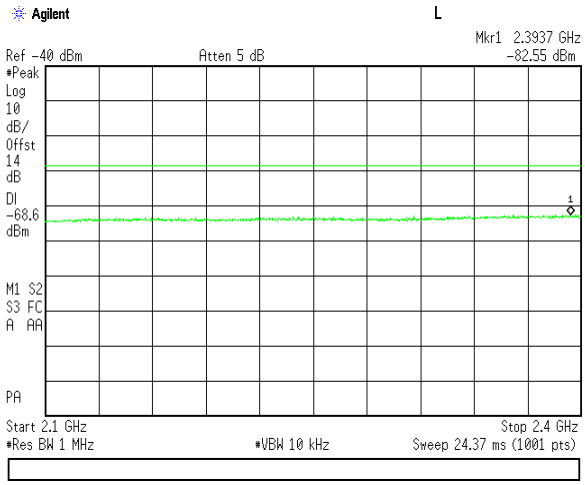




Plot 7.7.2 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 1, low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

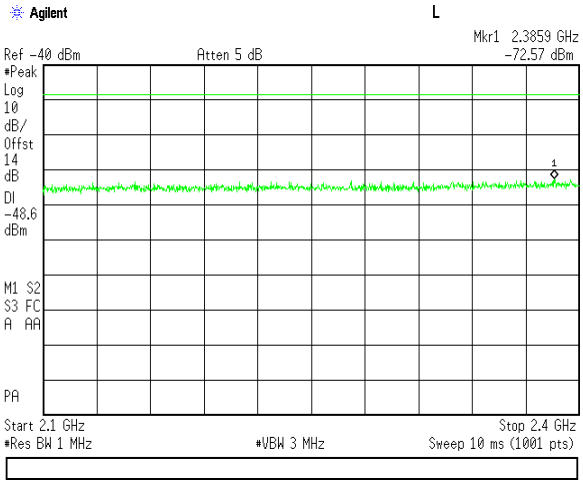


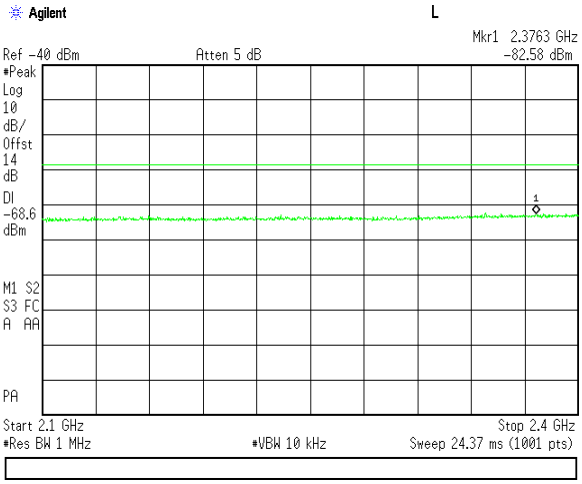


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.3 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 2, low carrier frequency

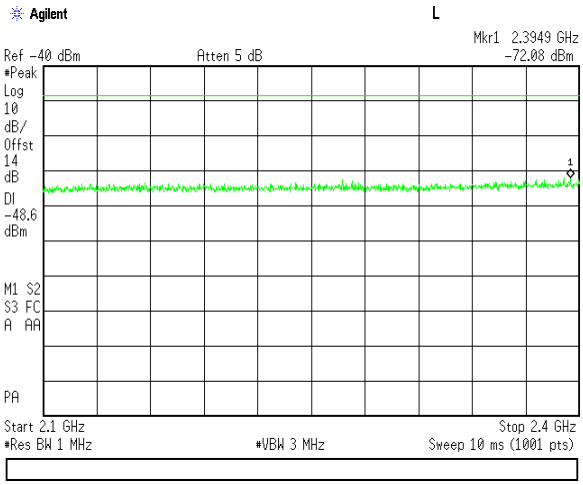
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

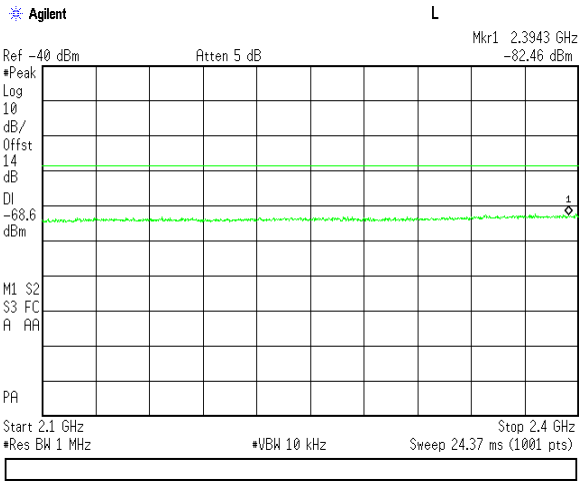




Plot 7.7.4 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 2, low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

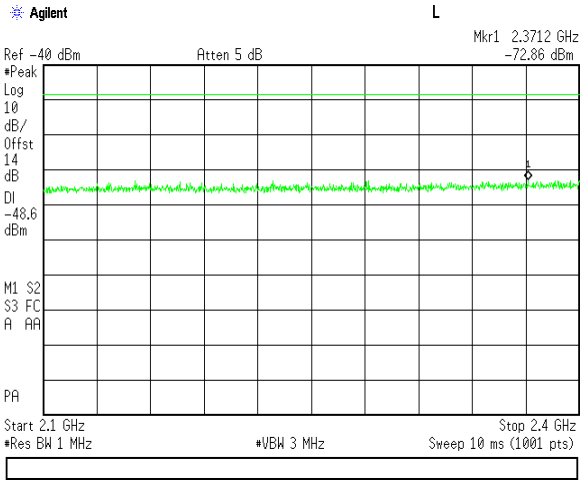


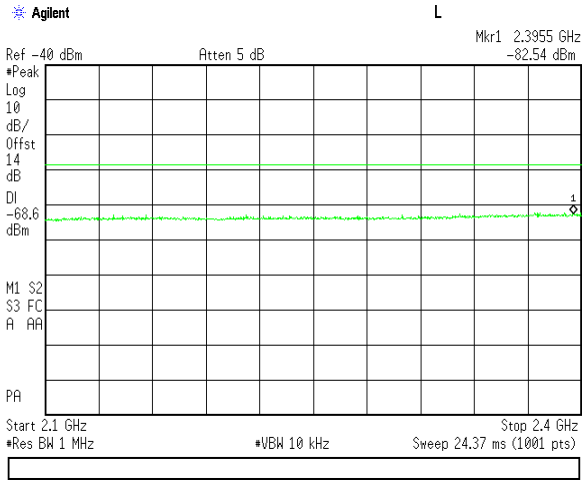


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.5 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 3, low carrier frequency

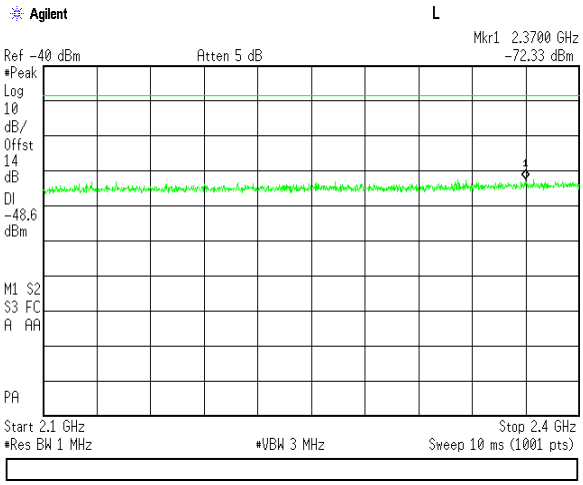
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

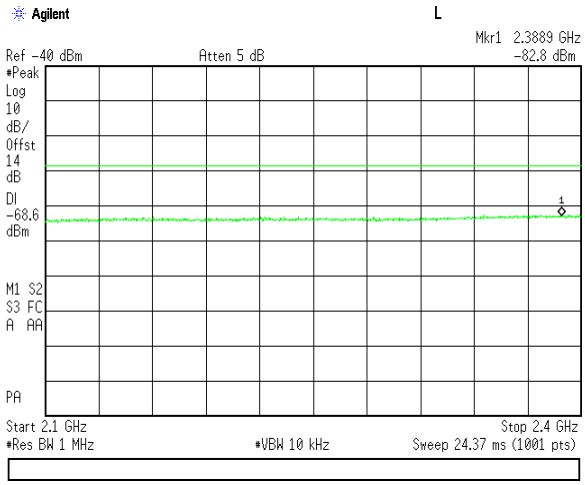




Plot 7.7.6 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 3, low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

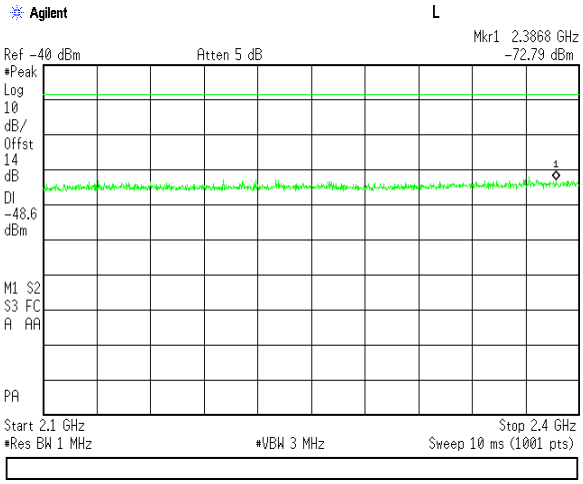


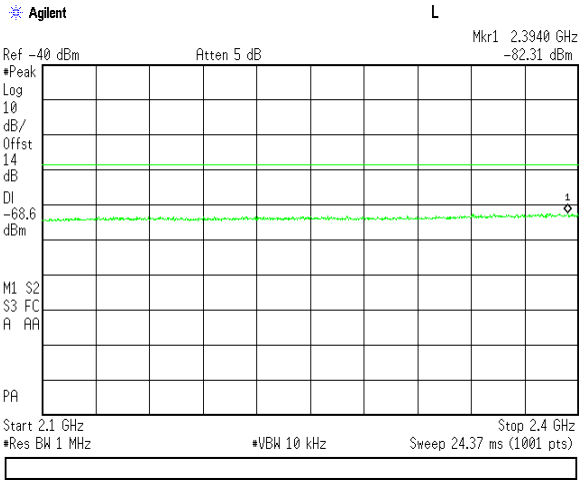


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.7 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 4, low carrier frequency

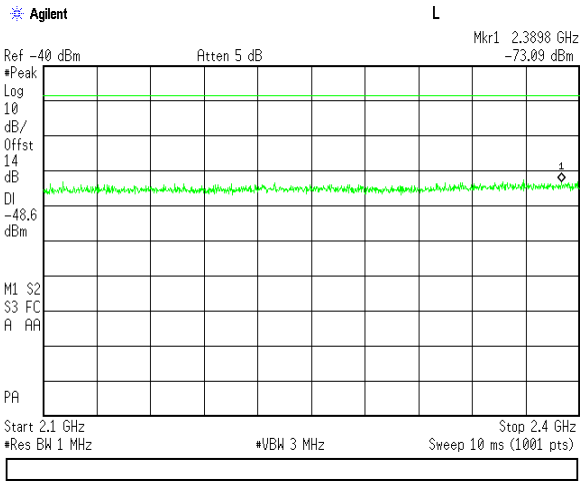
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

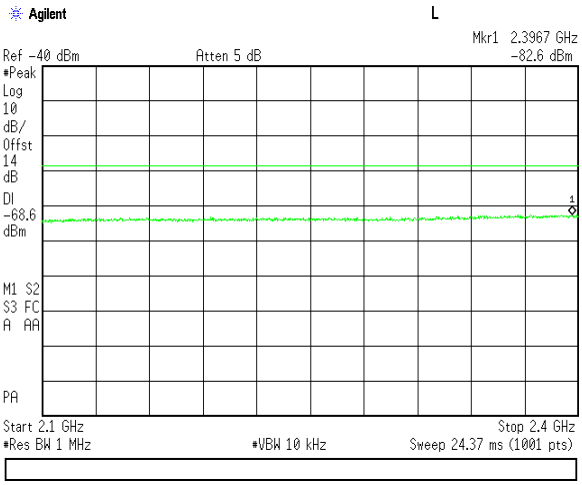




Plot 7.7.8 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 4, low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

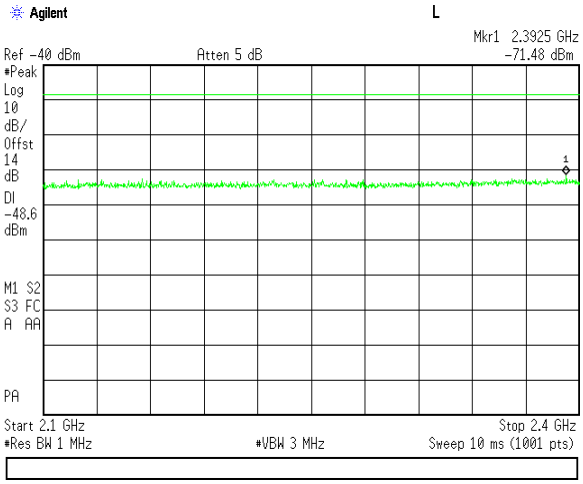


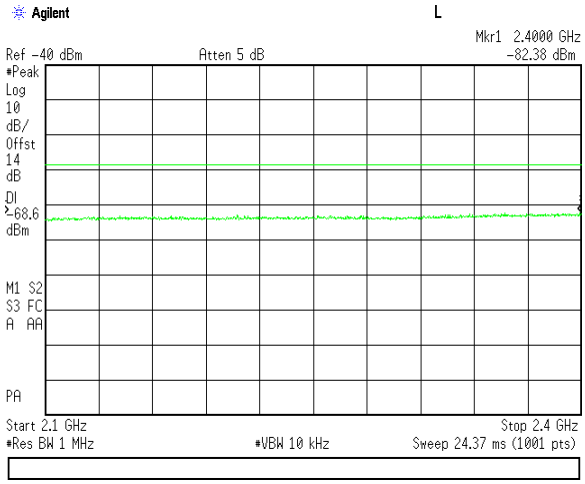


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.9 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 5, low carrier frequency

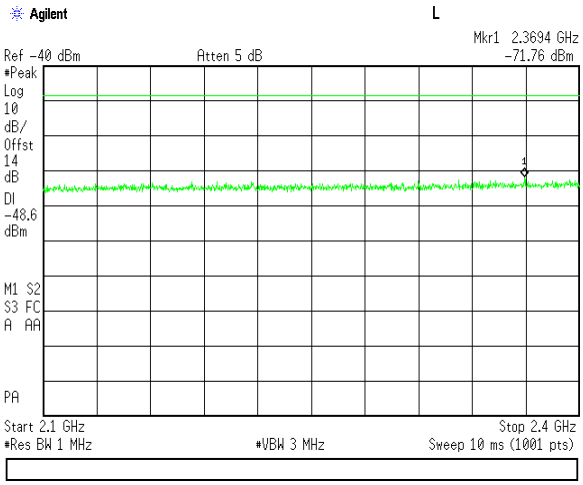
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

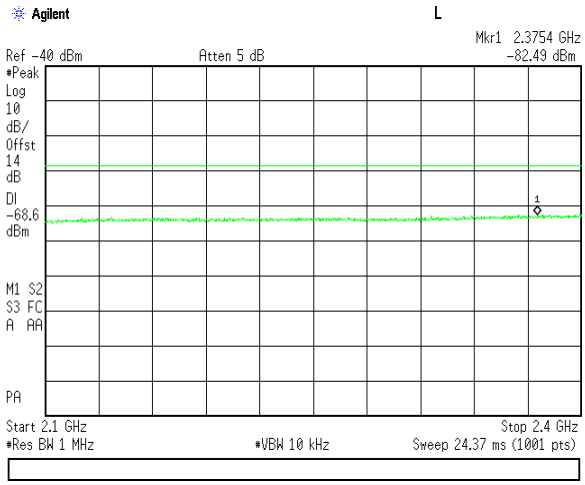




Plot 7.7.10 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 5, low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

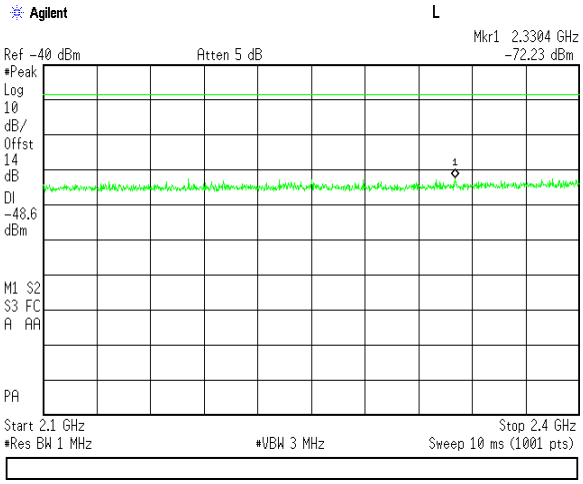


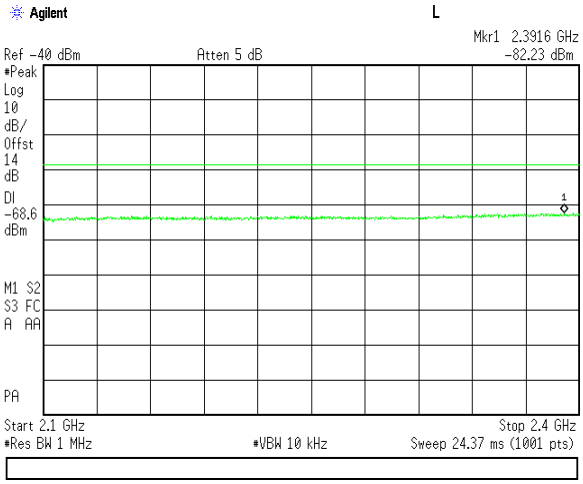


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.11 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 6, low carrier frequency

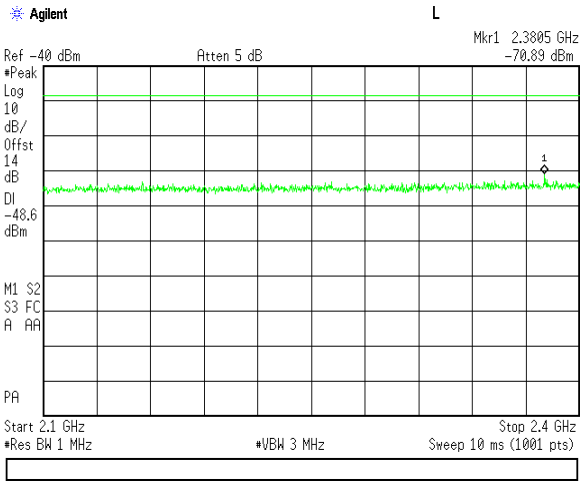
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

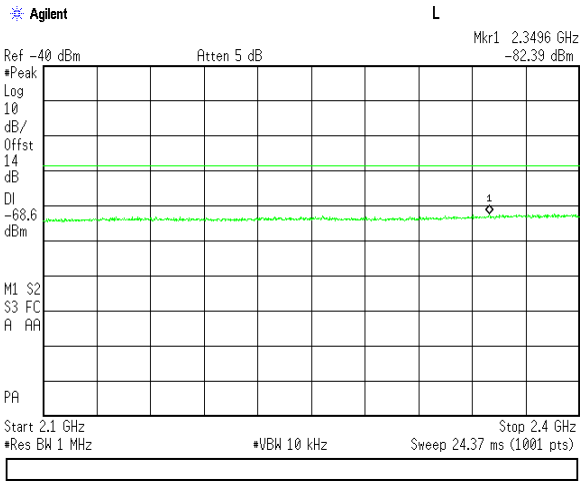




Plot 7.7.12 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 6, low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

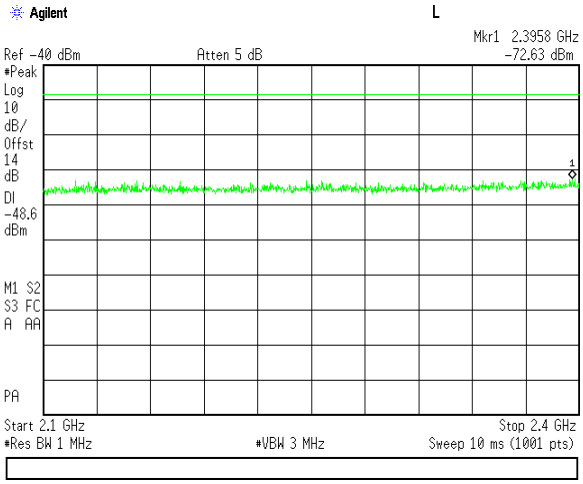


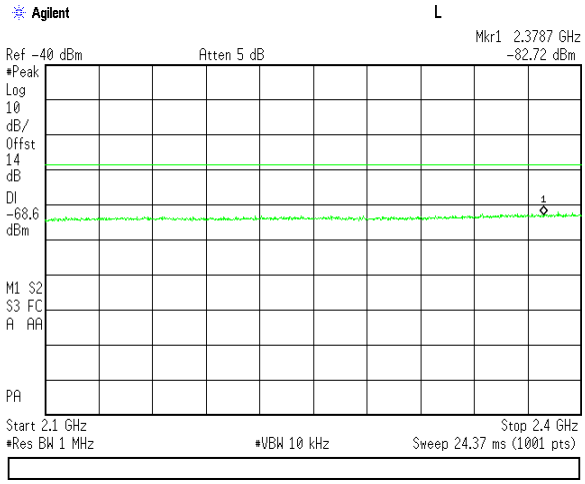


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.13 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 7, low carrier frequency

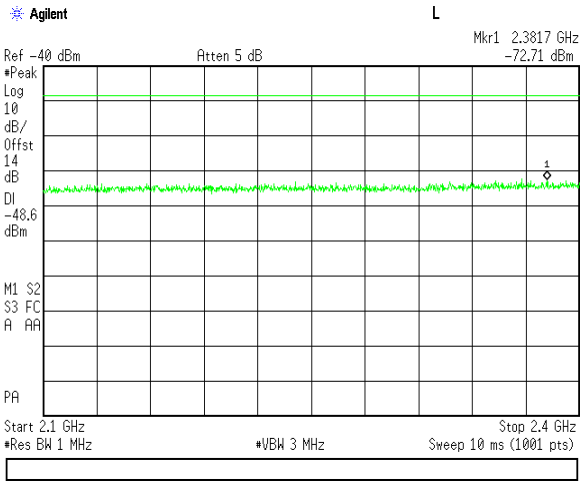
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

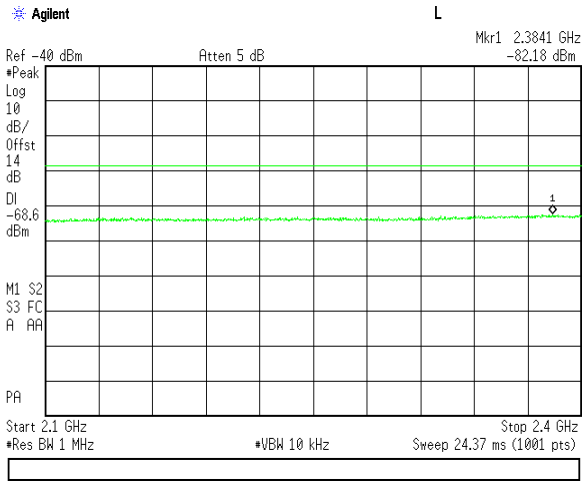




Plot 7.7.14 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 7, low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

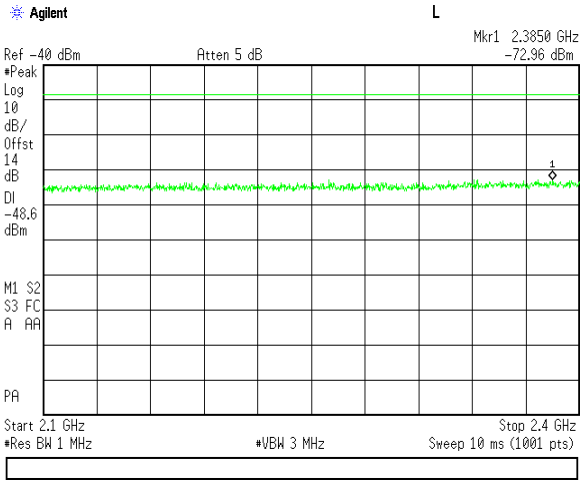


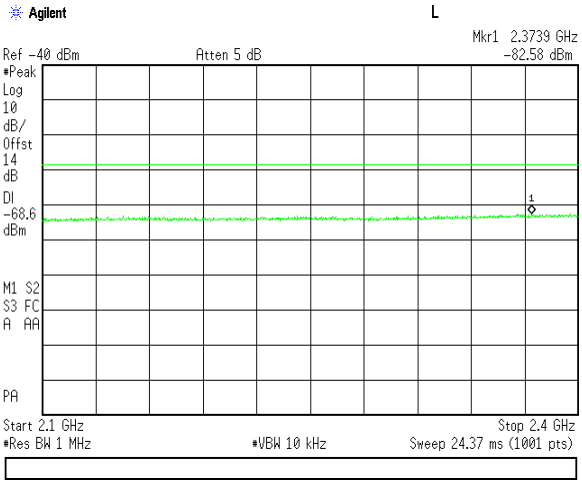


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.15 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 8, low carrier frequency

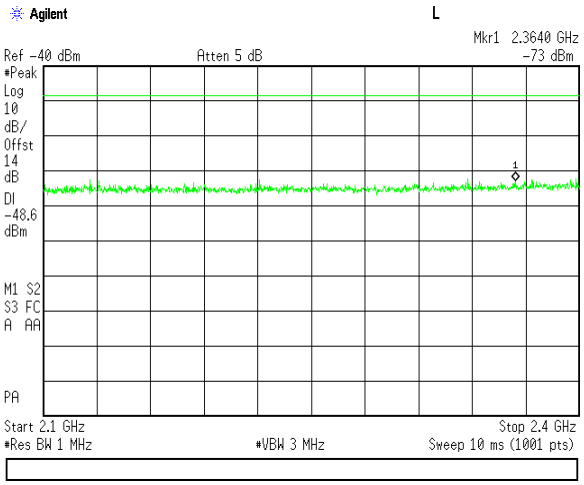
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

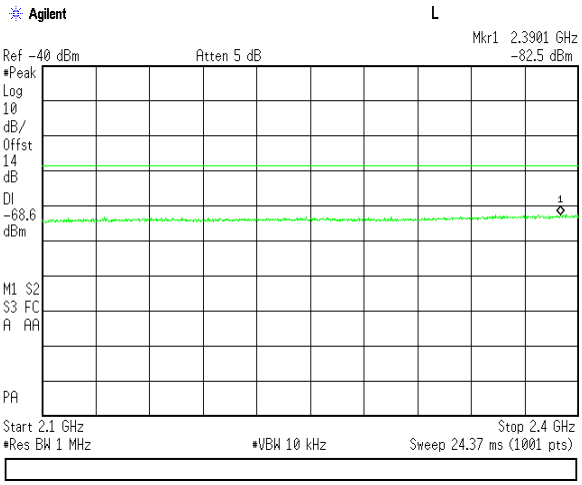




Plot 7.7.16 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 8, low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

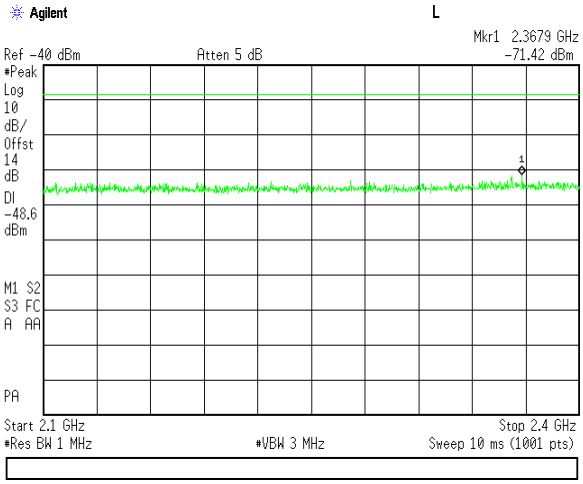


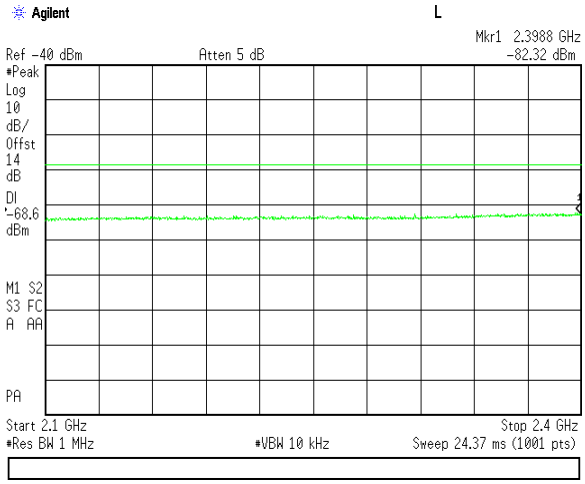


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.17 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 1, low carrier frequency

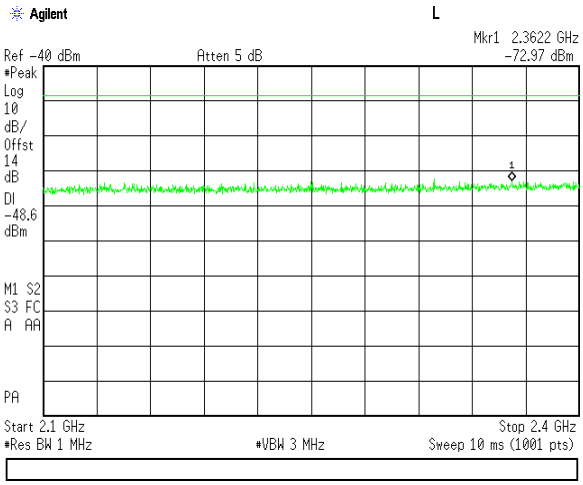
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

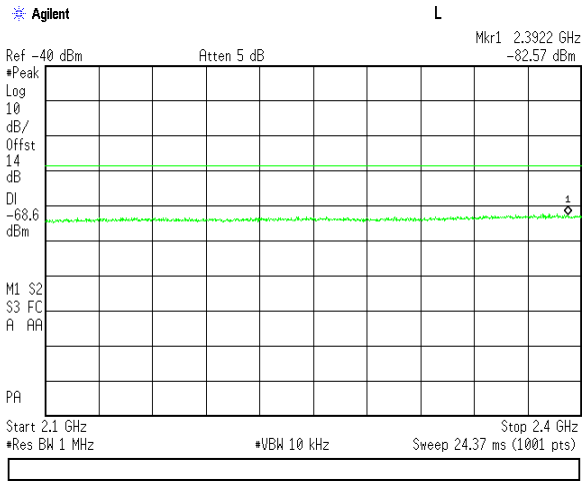




Plot 7.7.18 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 1, low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

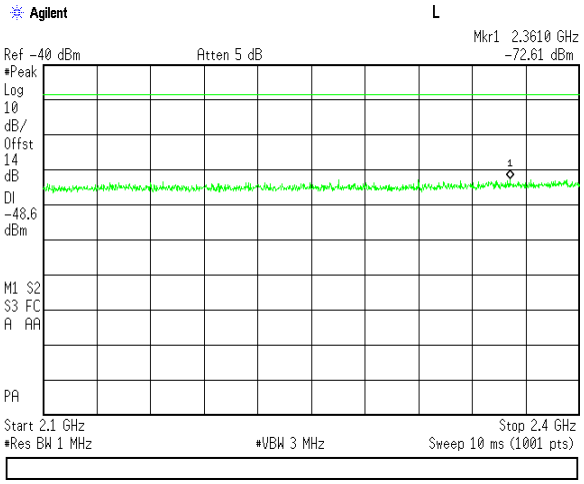


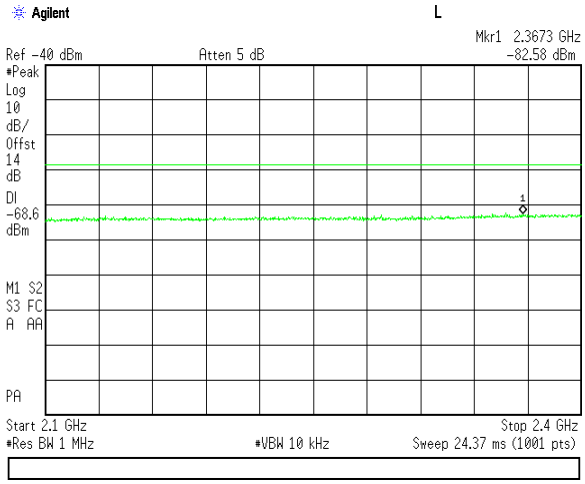


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.19 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 2, low carrier frequency

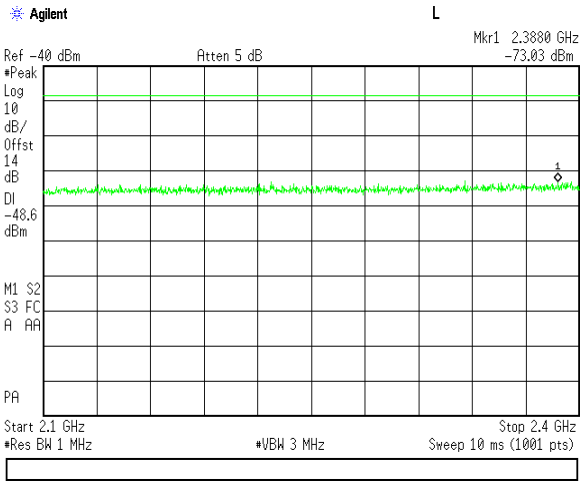
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

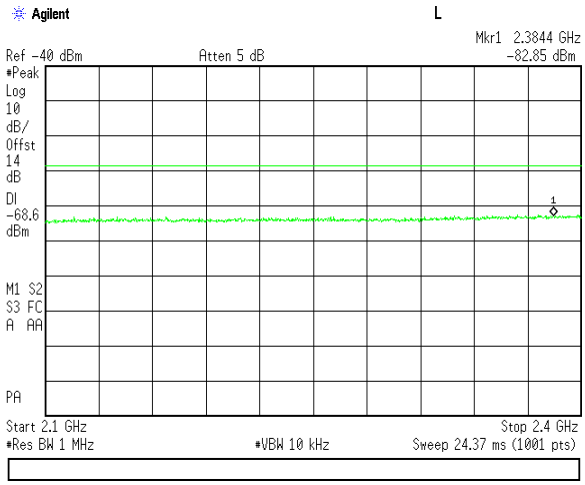




Plot 7.7.20 Spurious emission measurements in 2100 - 2400 MHz range at antenna chain # 2, low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

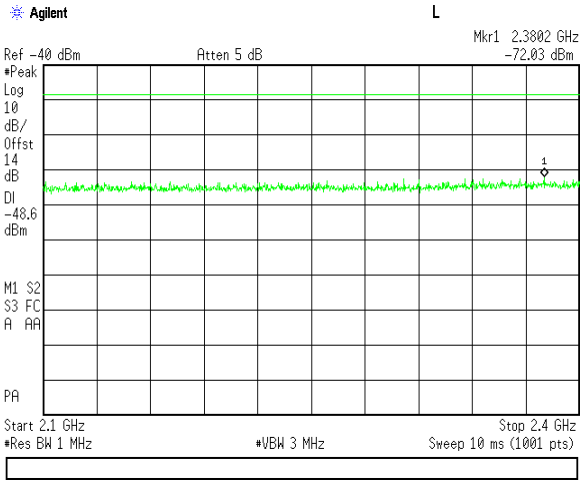


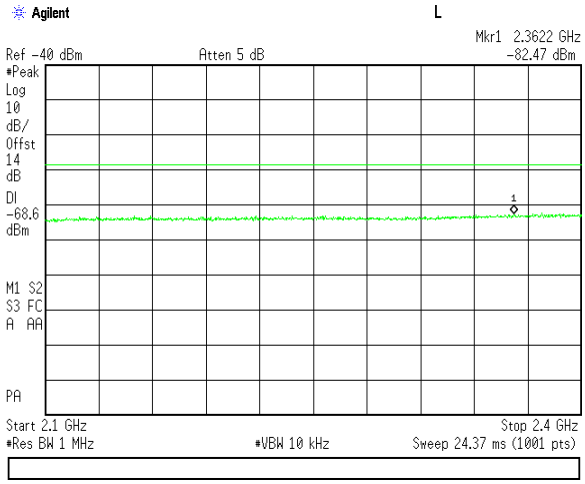


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.21 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 3, low carrier frequency

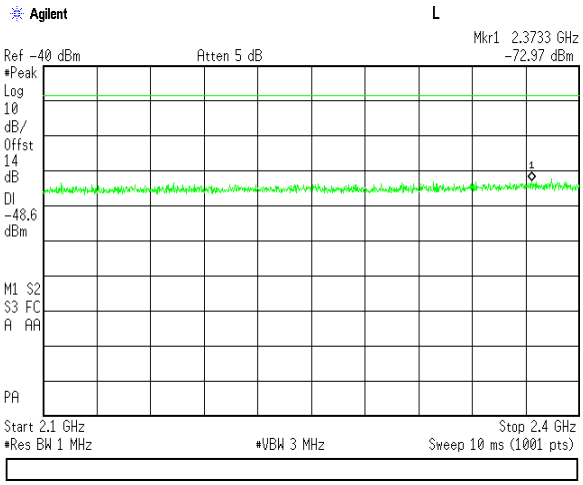
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

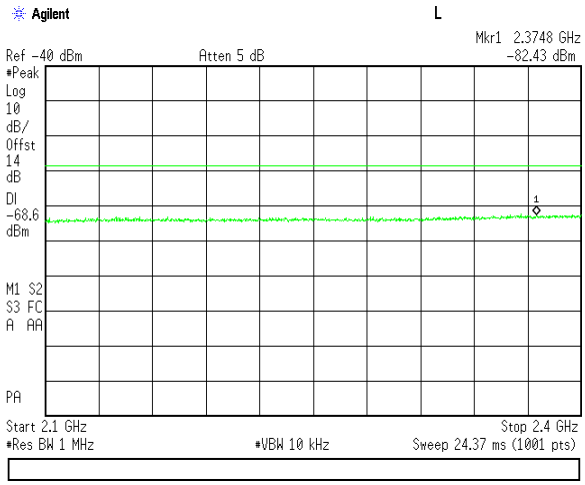




Plot 7.7.22 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 3, low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

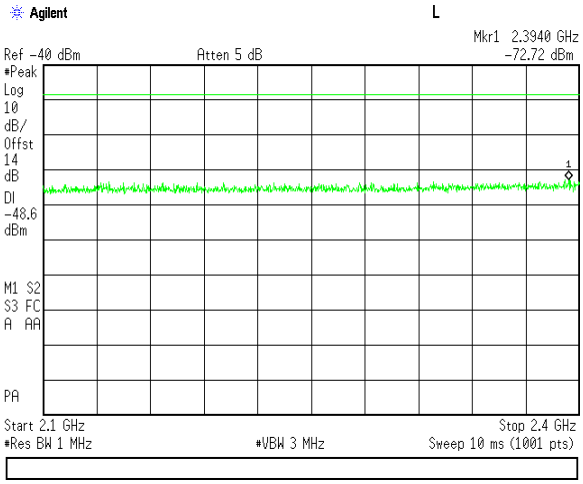


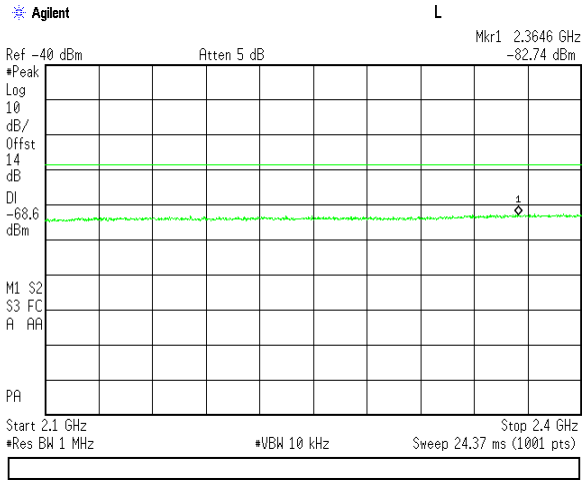


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.23 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 4, low carrier frequency

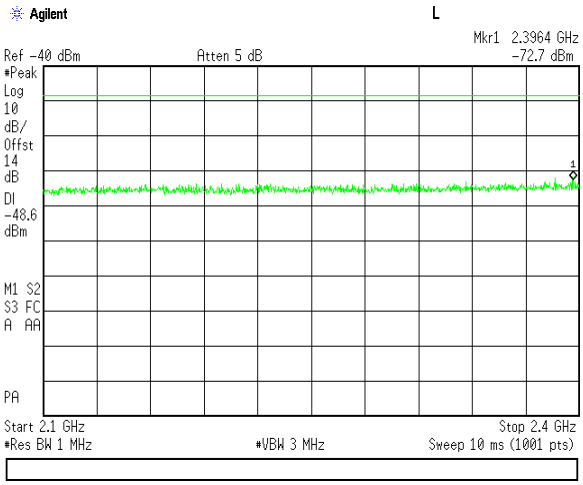
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

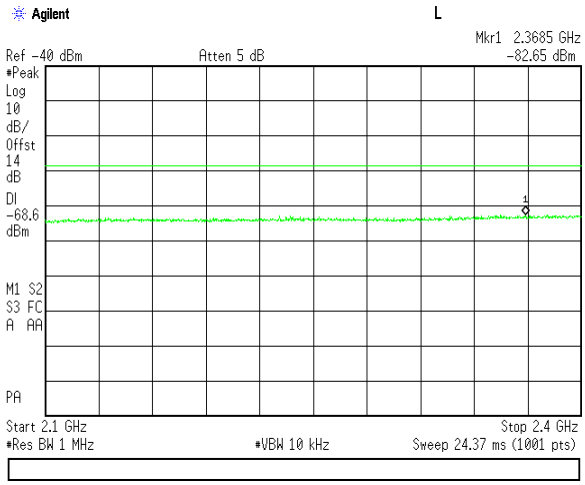




Plot 7.7.24 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 4, low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

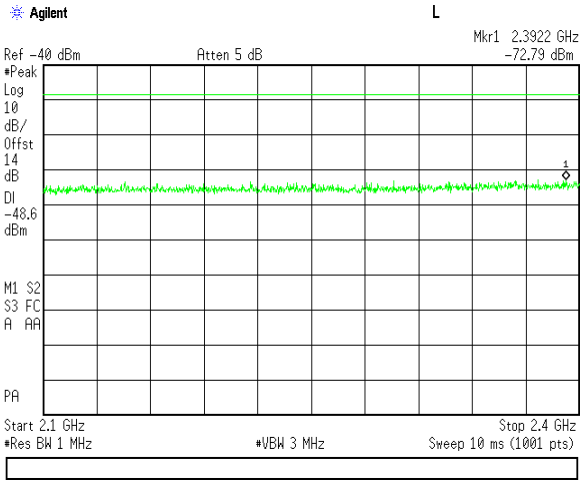


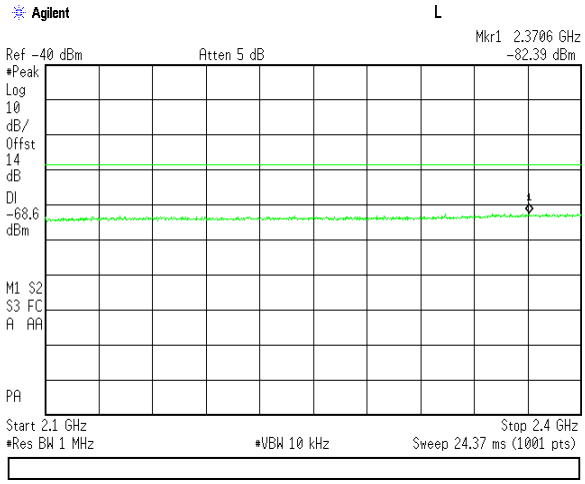


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.25 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 5, low carrier frequency

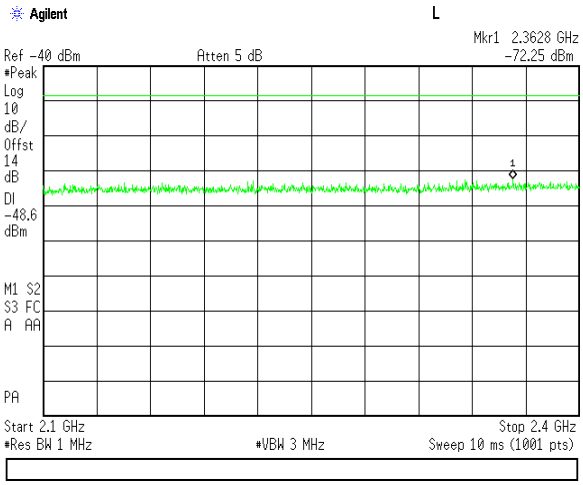
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

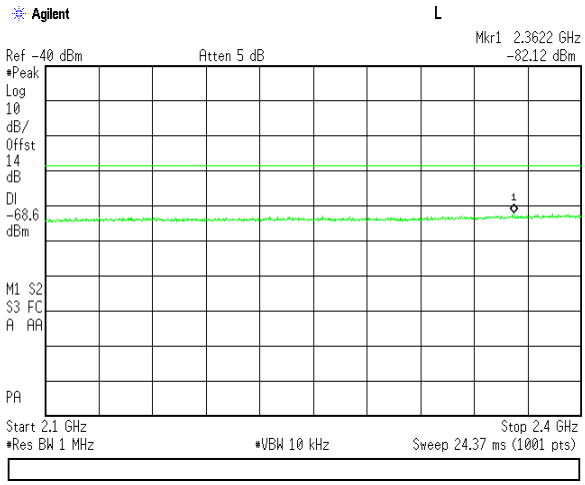




Plot 7.7.26 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 5, low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

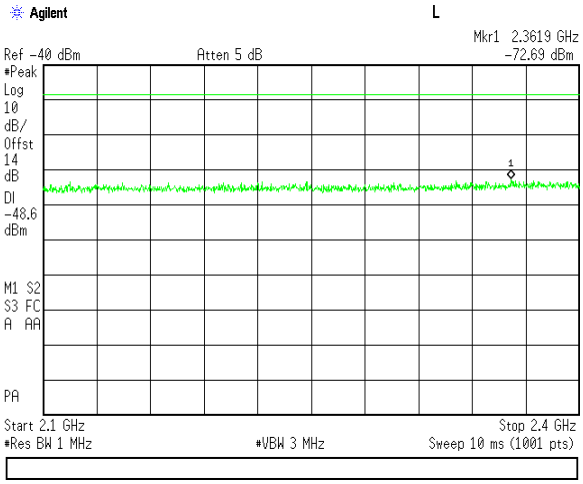


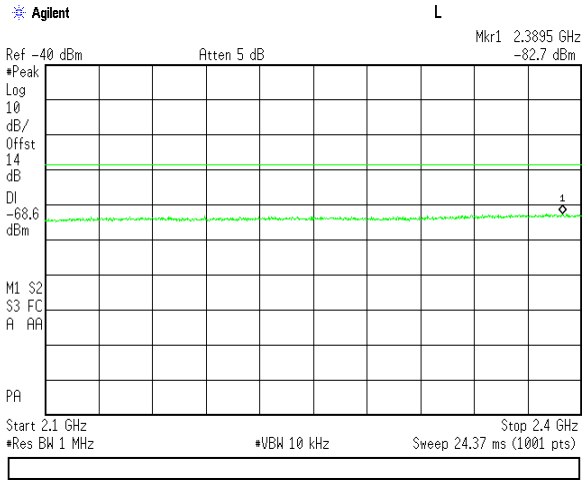


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.27 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 6, low carrier frequency

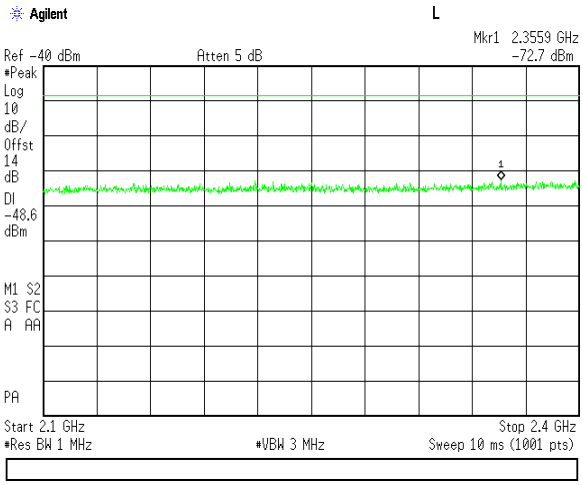
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

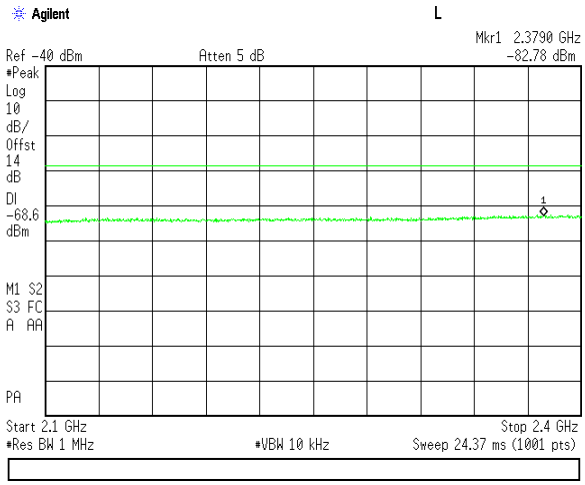




Plot 7.7.28 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 6, low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

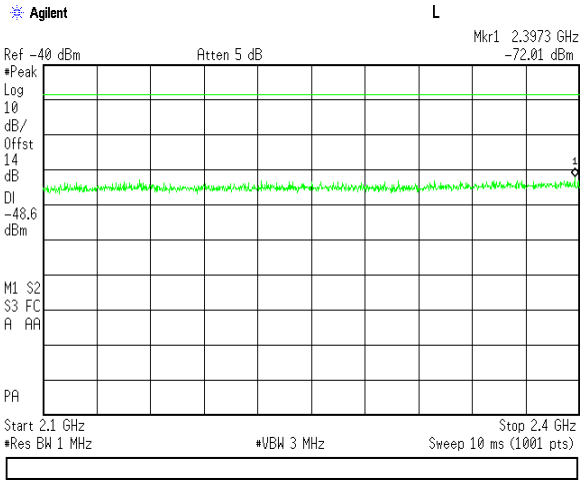


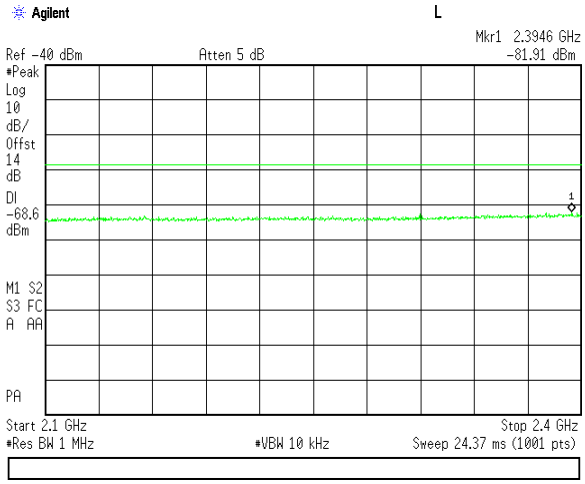


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.29 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 7, low carrier frequency

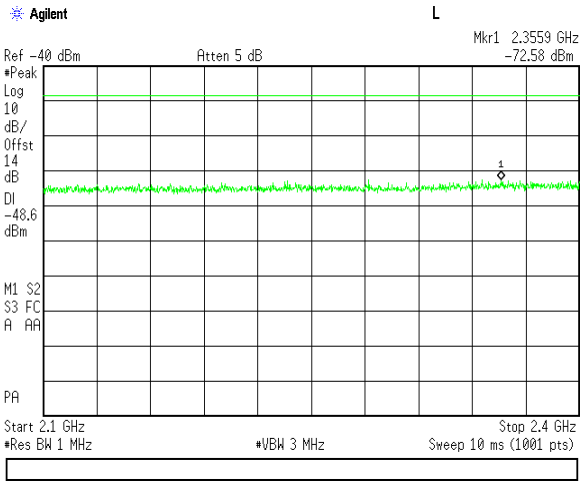
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

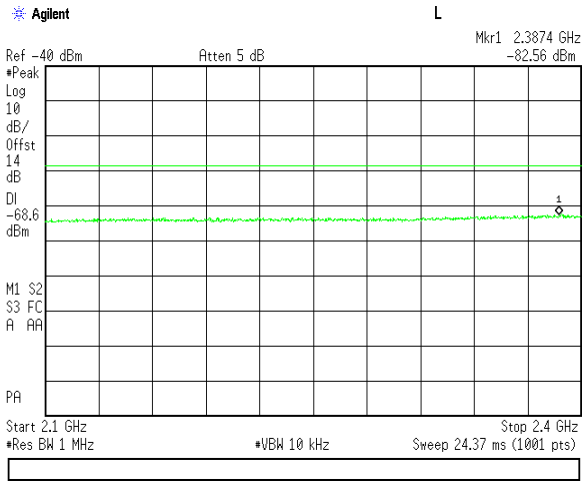




Plot 7.7.30 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 7, low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

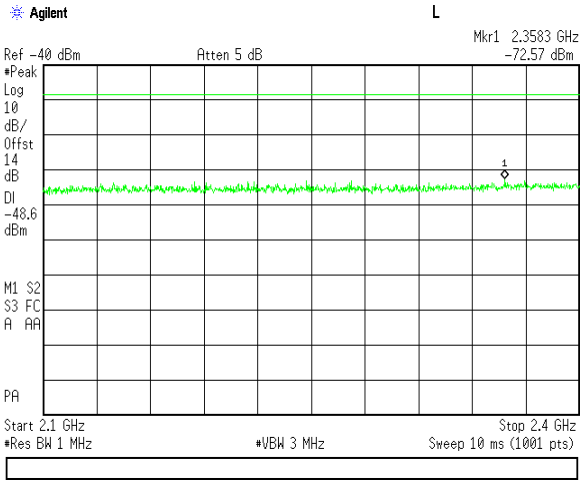


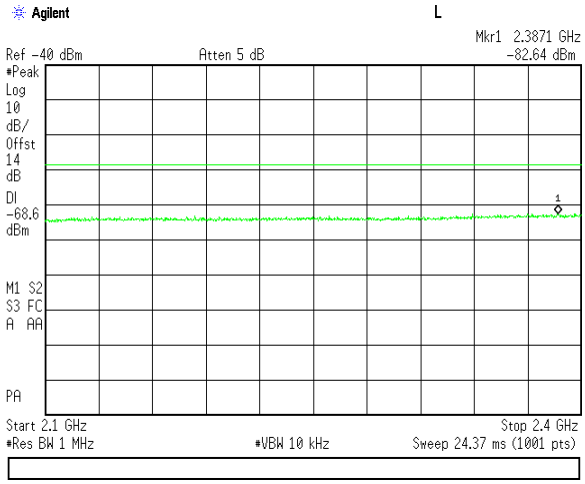


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.31 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 8, low carrier frequency

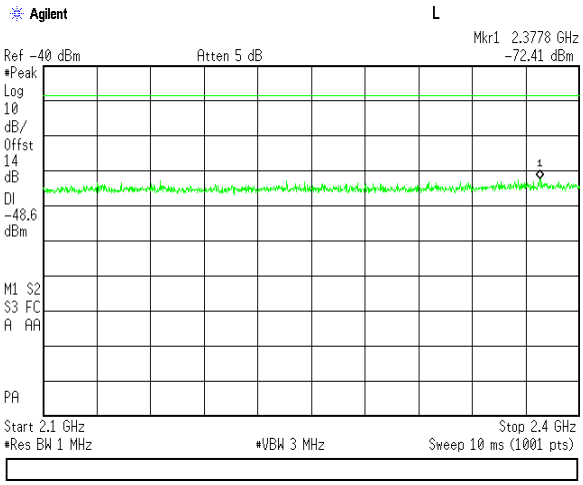
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

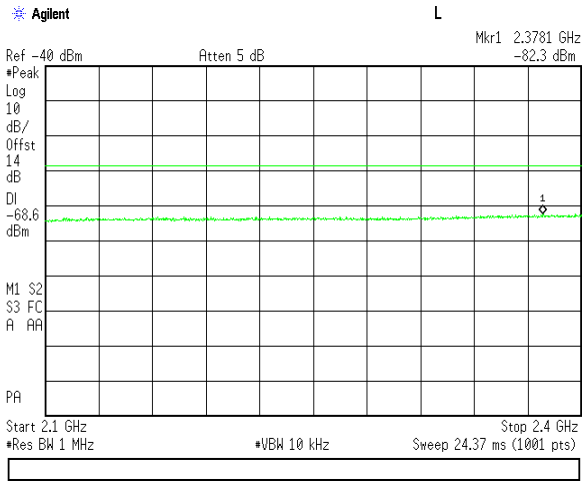




Plot 7.7.32 Band edge emission measurements in 2100 - 2400 MHz range at antenna chain # 8, low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

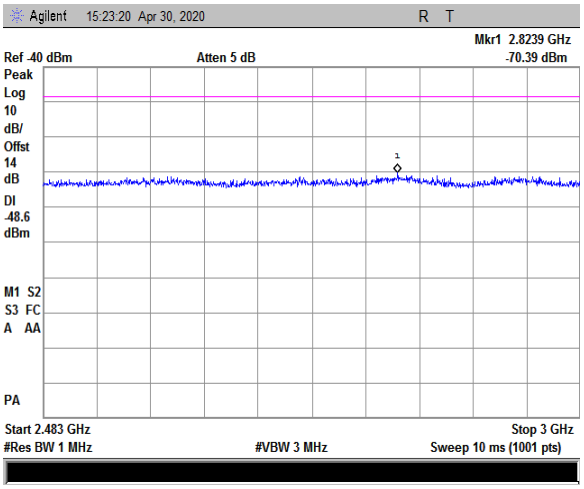


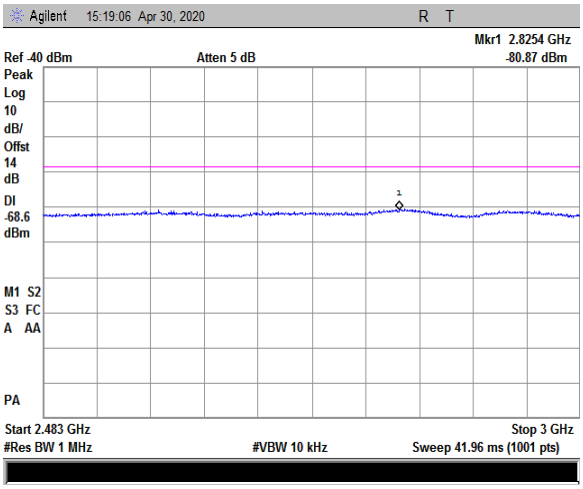


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.33 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 1, high carrier frequency

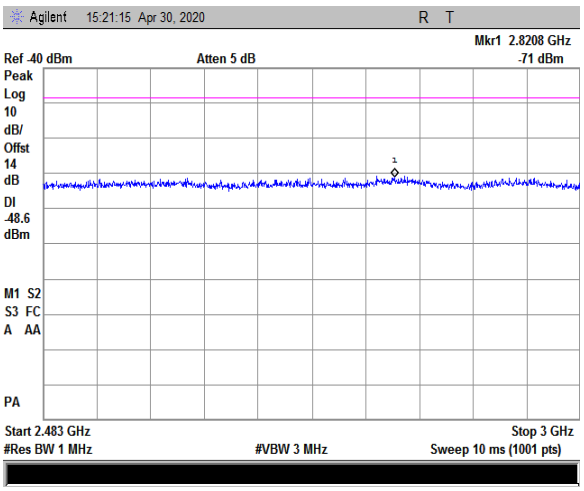
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

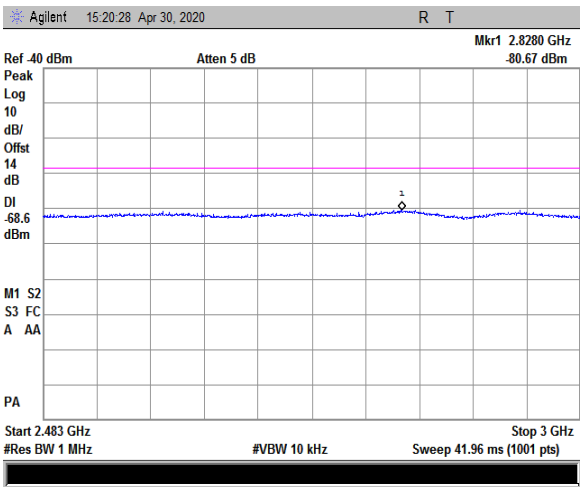




Plot 7.7.34 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 1, high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

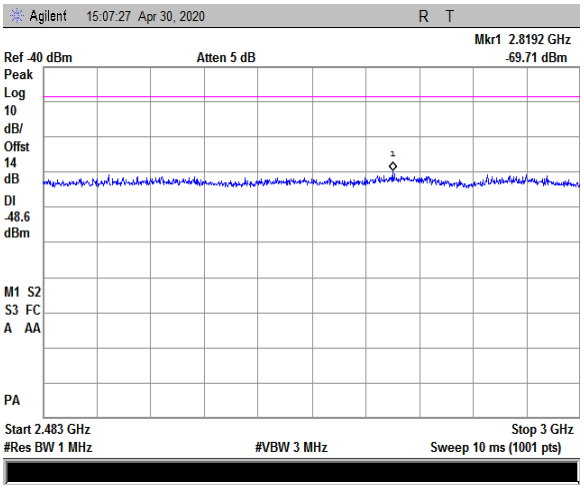


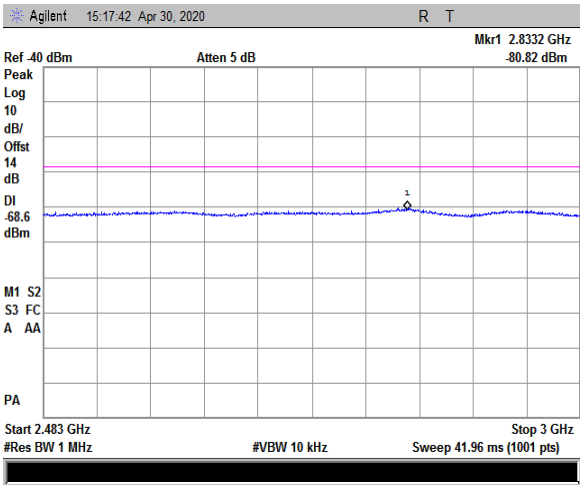


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.35 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 2, high carrier frequency

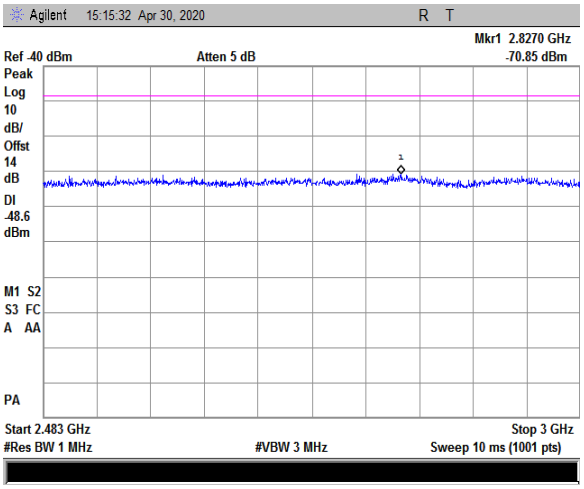
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

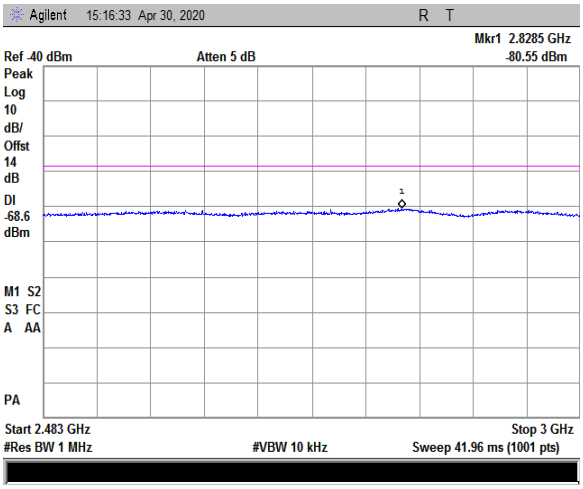




Plot 7.7.36 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 2, high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

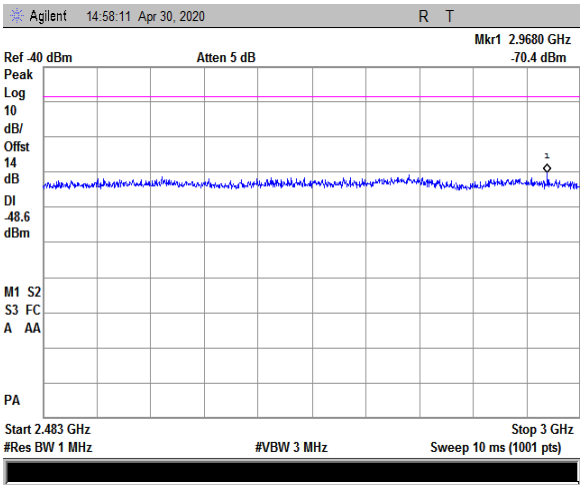


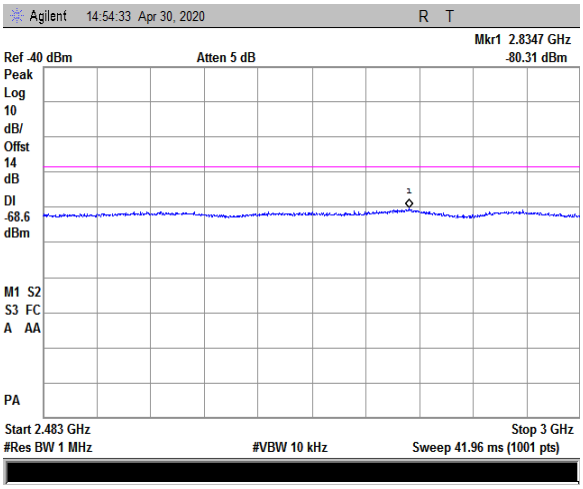


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.37 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 3, high carrier frequency

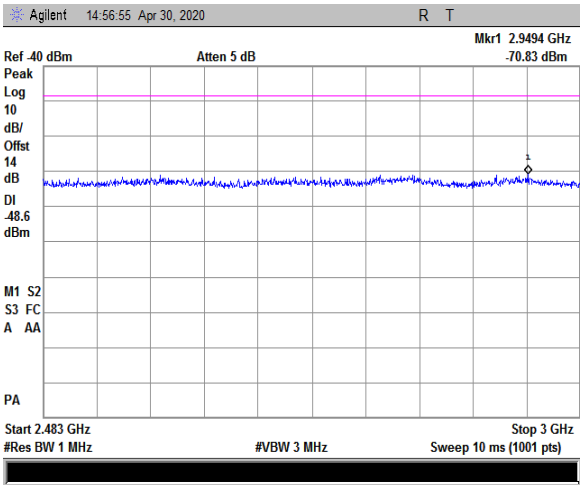
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

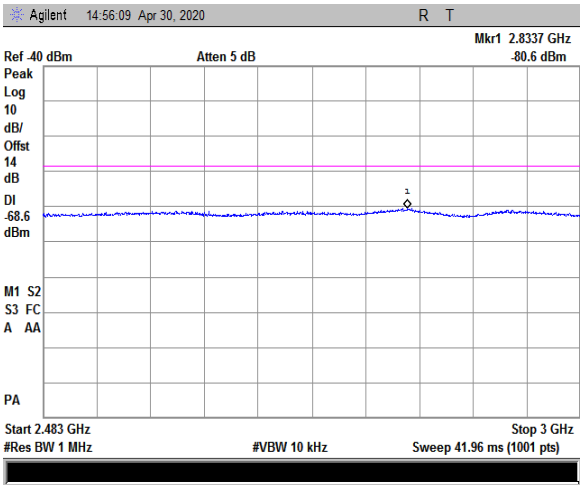




Plot 7.7.38 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 3, high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

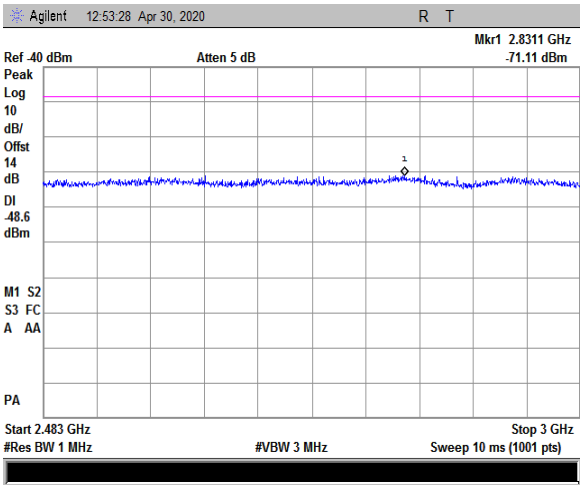


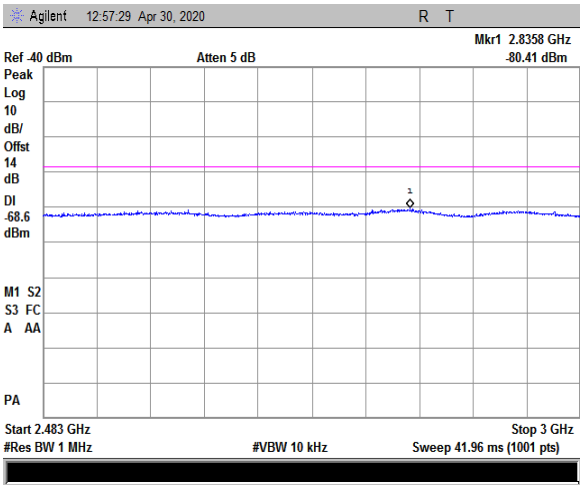


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.39 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 4, high carrier frequency

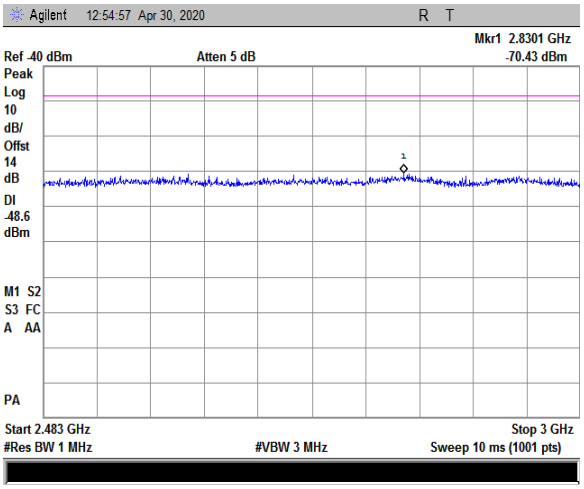
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

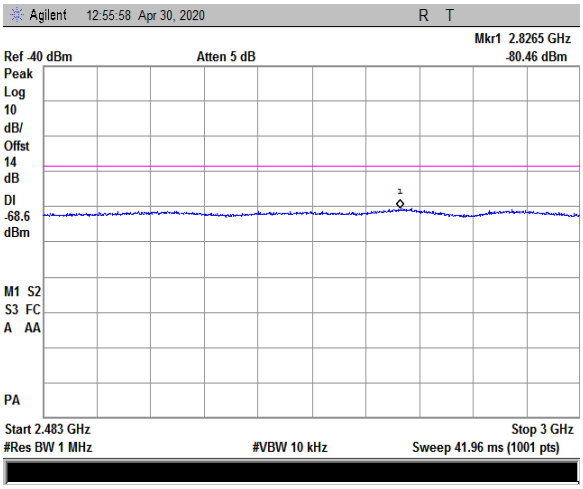




Plot 7.7.40 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 4, high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

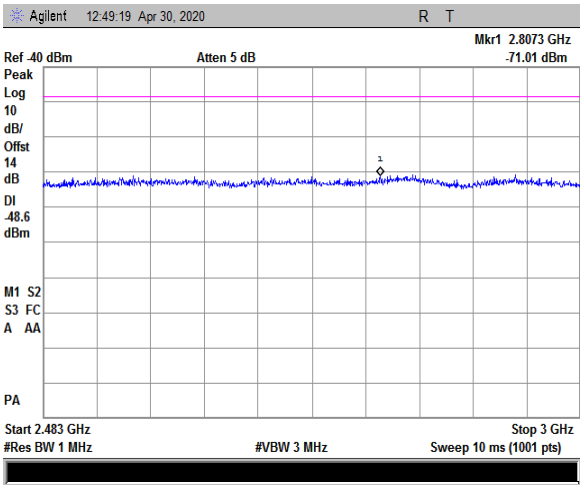


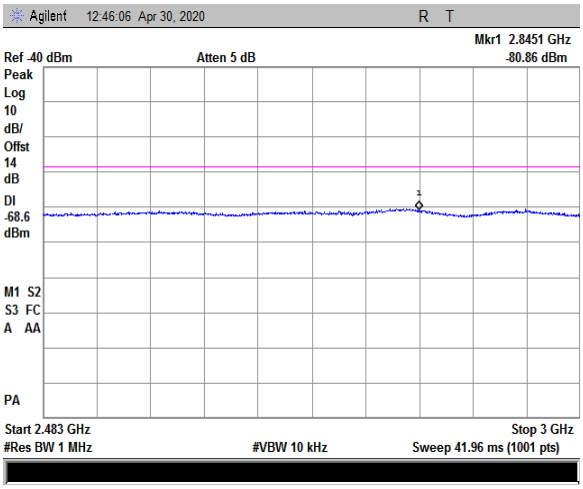


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.41 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 5, high carrier frequency

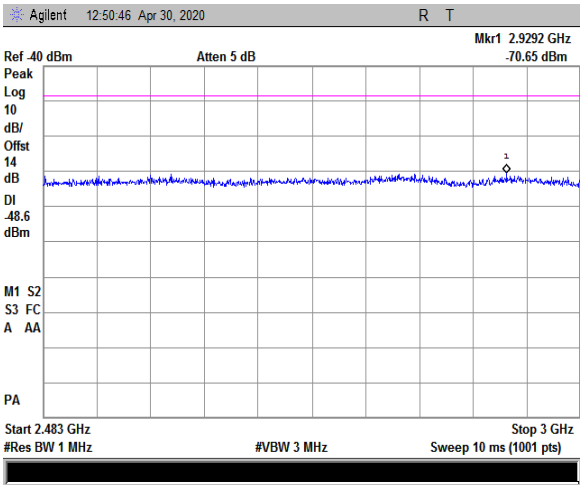
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

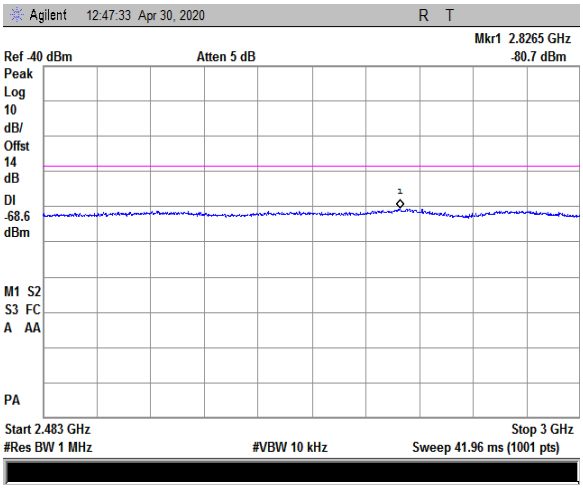




Plot 7.7.42 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 5, high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

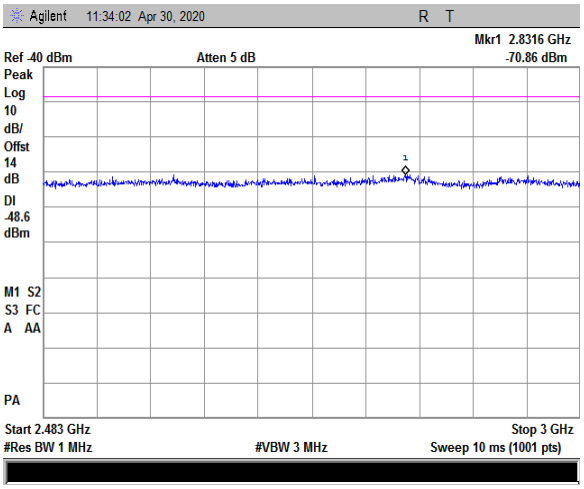


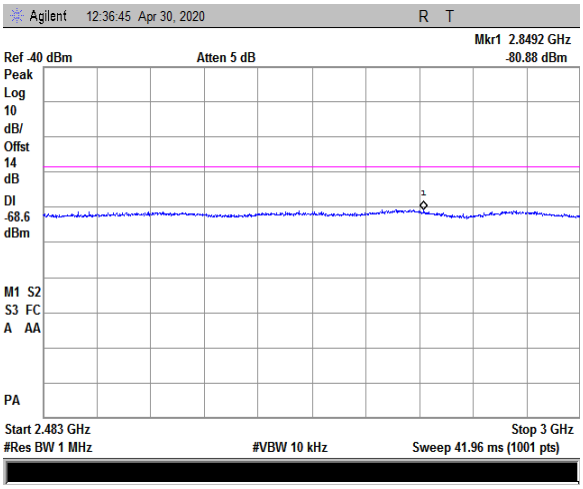


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.43 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 6, high carrier frequency

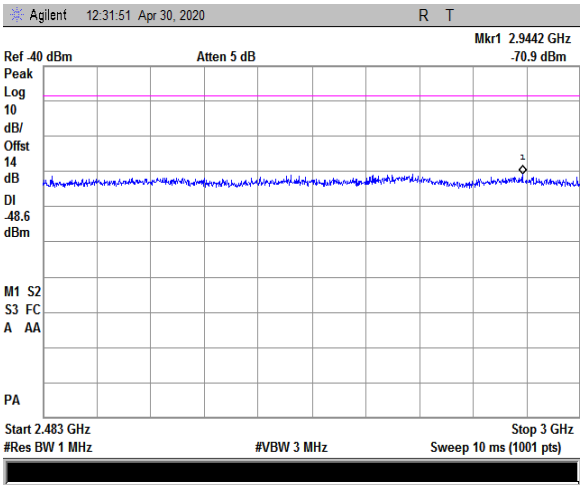
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

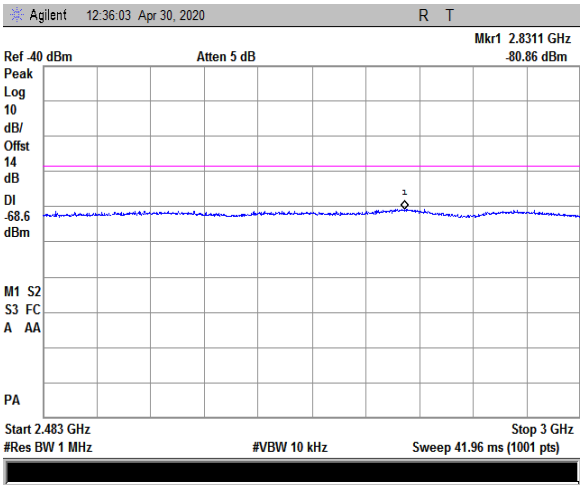




Plot 7.7.44 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 6, high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

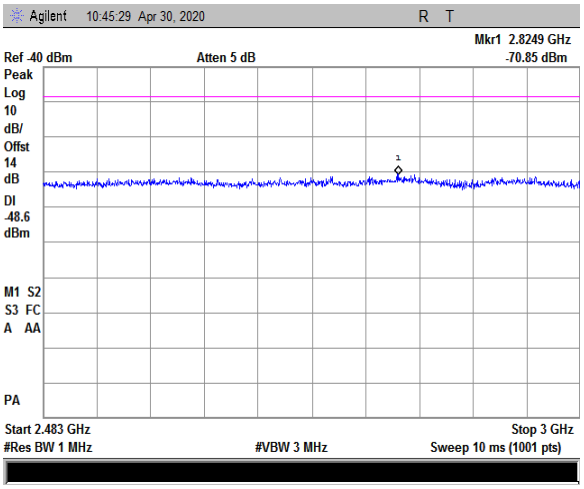


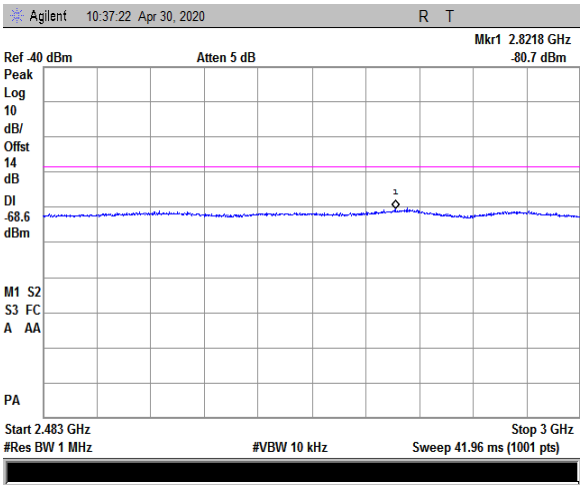


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.45 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 7, high carrier frequency

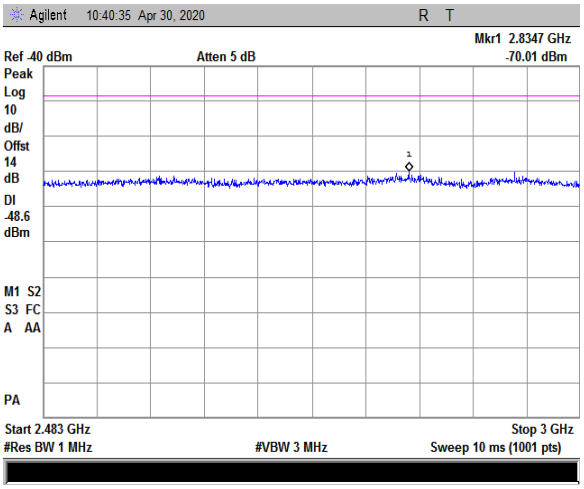
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

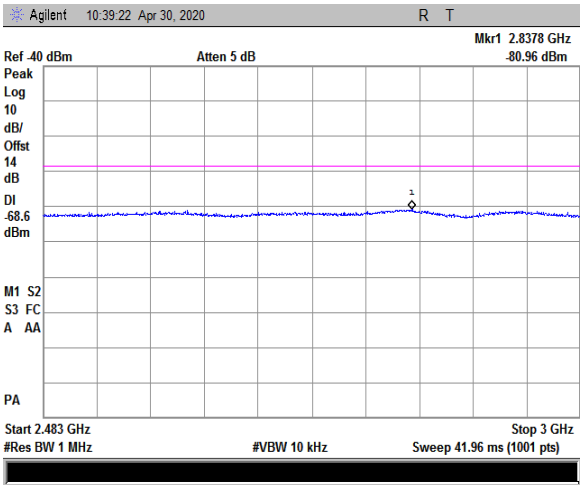




Plot 7.7.46 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 7, high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

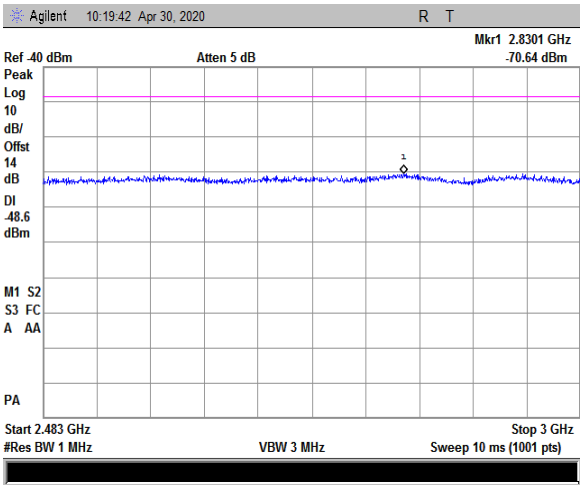


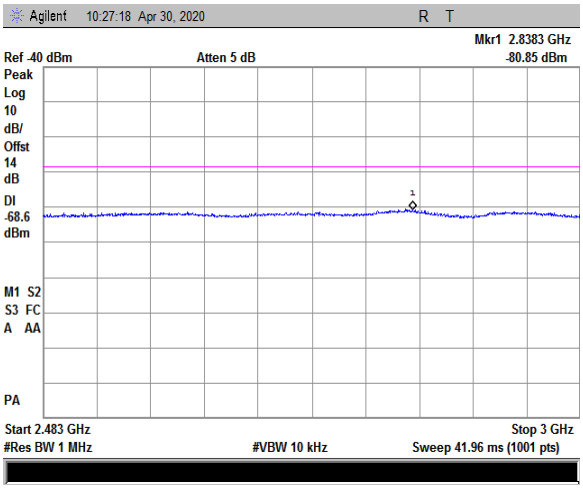


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.47 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 8, high carrier frequency

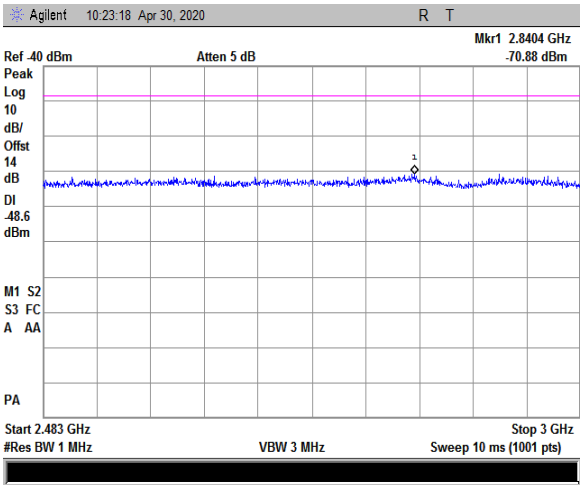
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

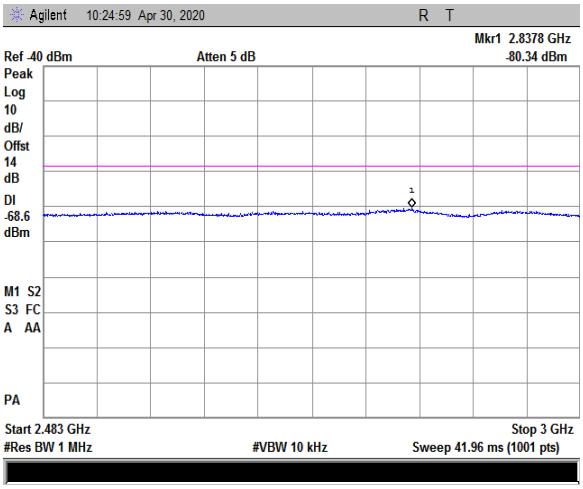




Plot 7.7.48 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 8, high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

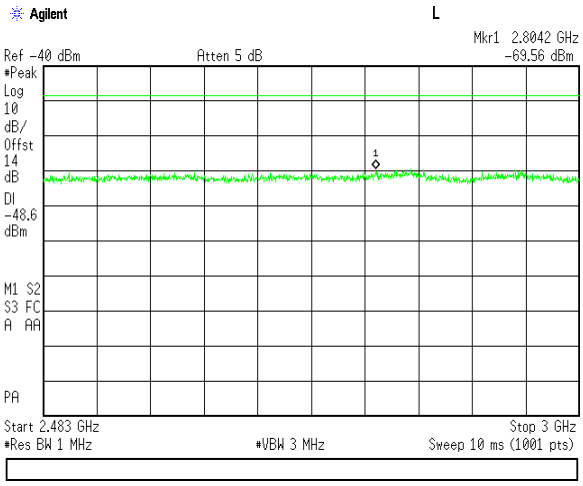


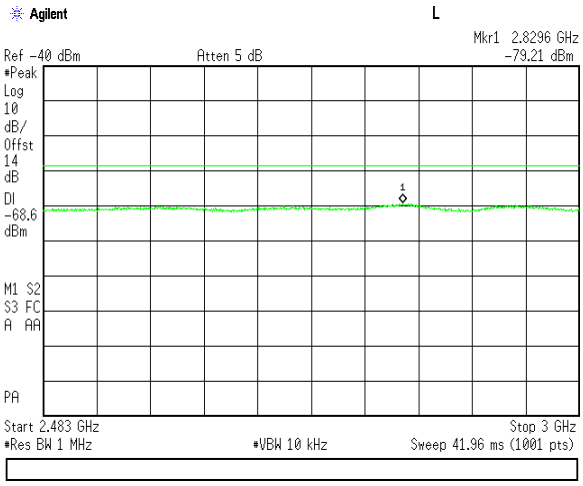


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.49 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 1, high carrier frequency

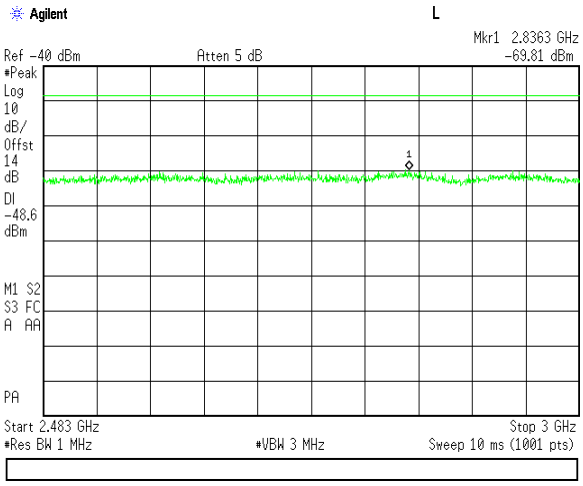
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

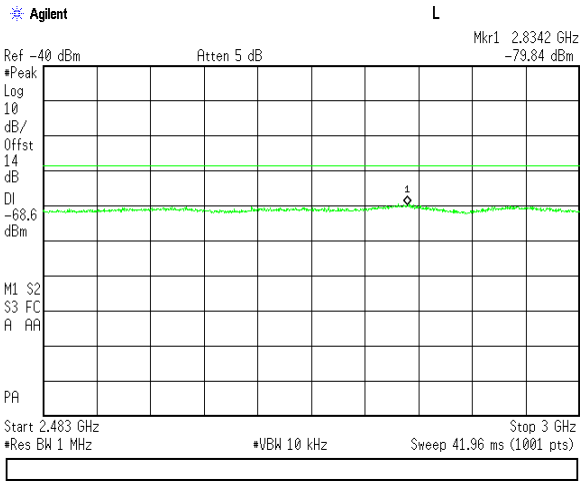




Plot 7.7.50 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 1, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

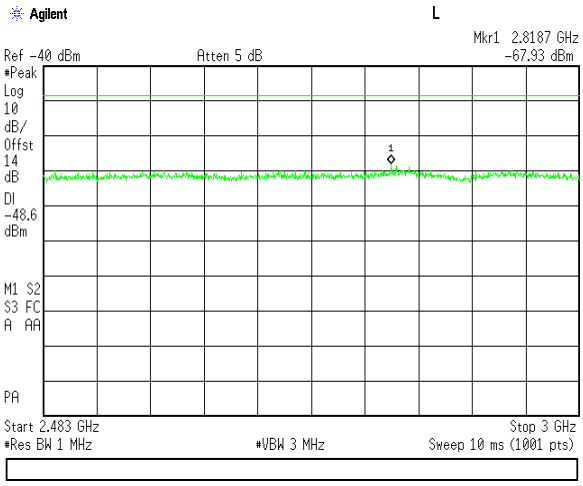


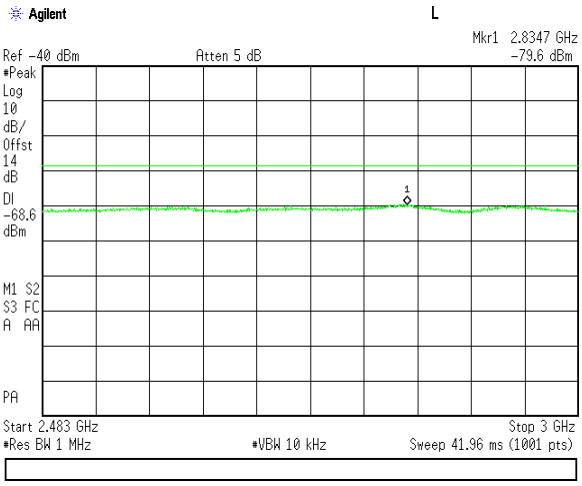


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.51 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 2, high carrier frequency

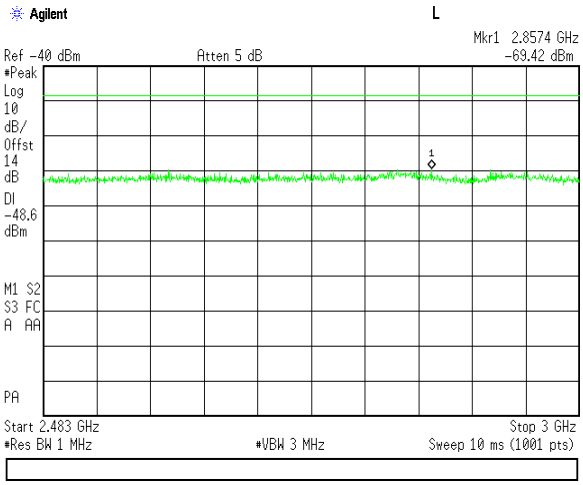
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

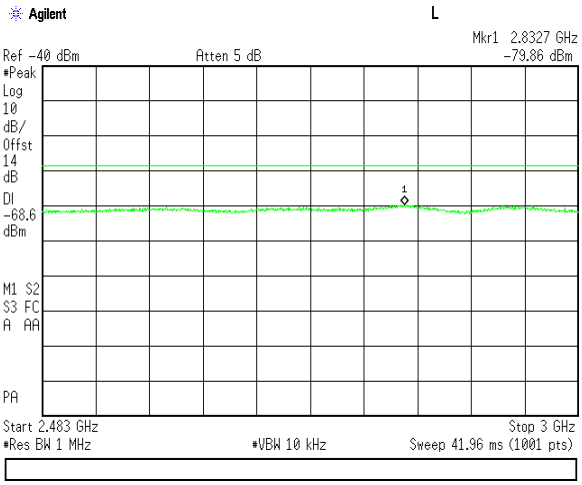




Plot 7.7.52 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 2, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

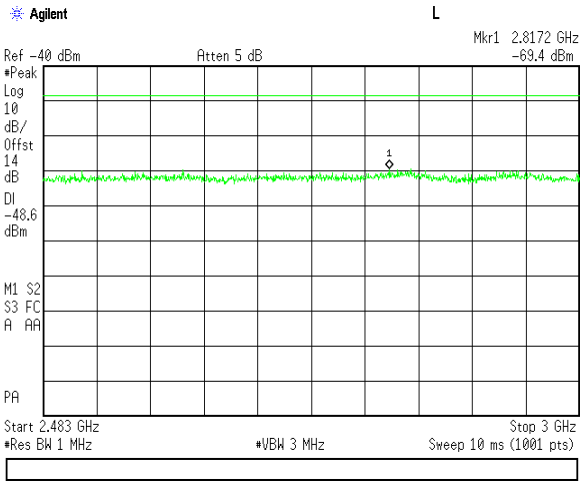


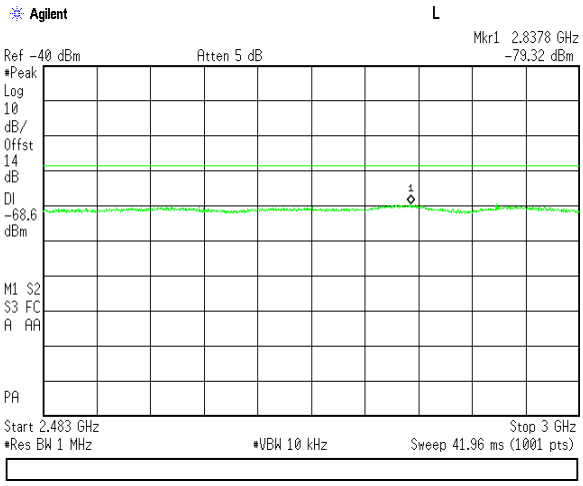


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.53 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 3, high carrier frequency

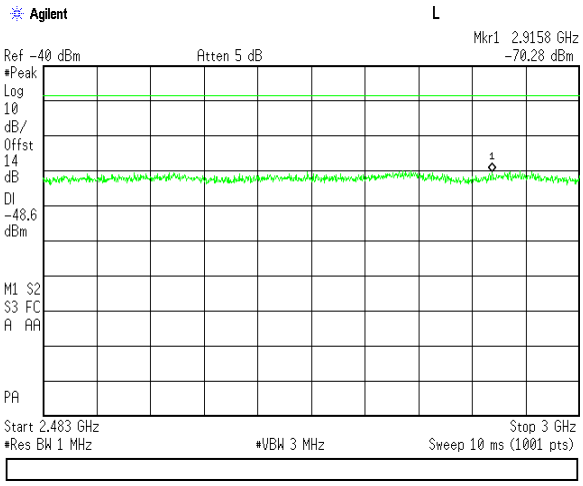
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

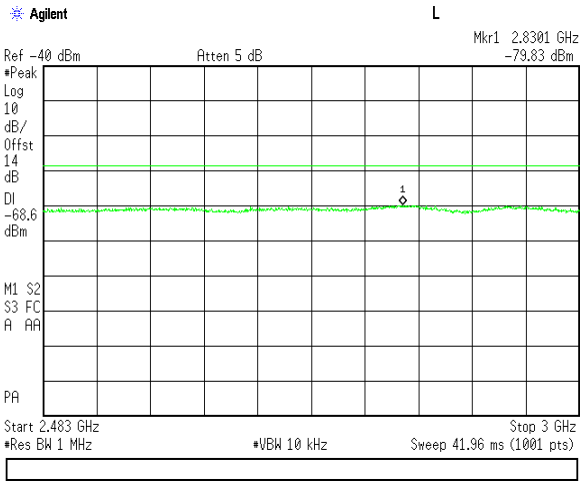




Plot 7.7.54 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 3, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

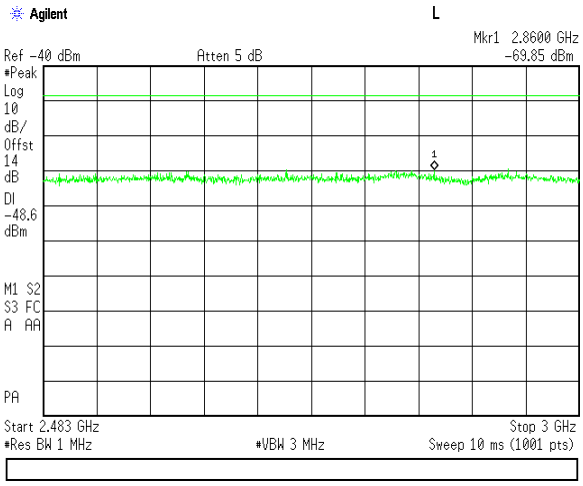


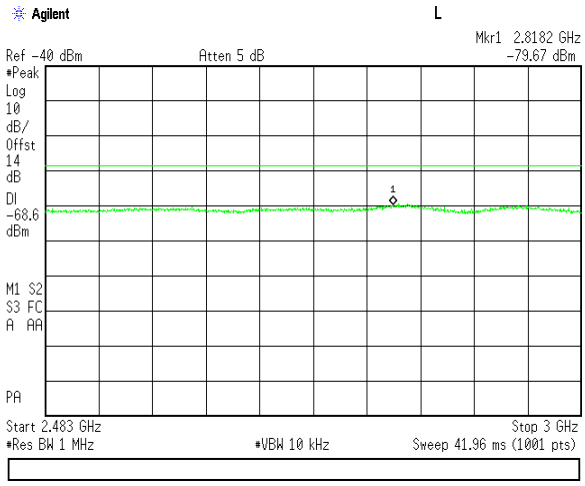


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.55 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 4, high carrier frequency

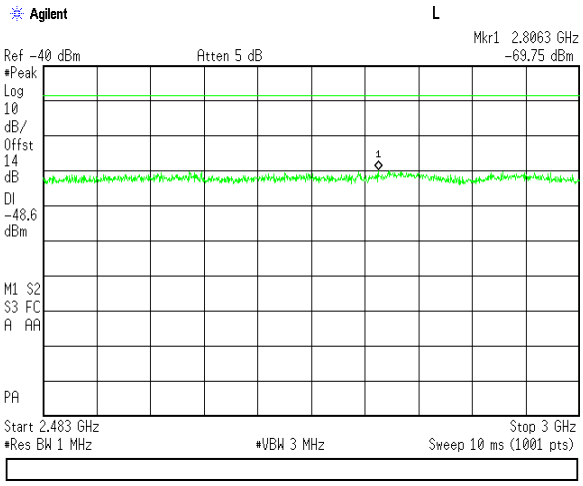
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

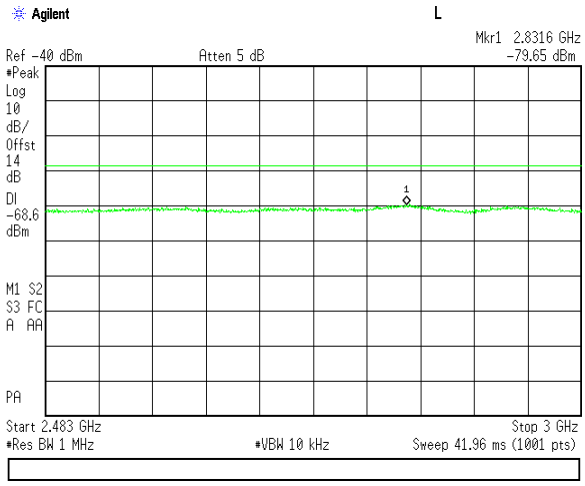




Plot 7.7.56 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 4, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

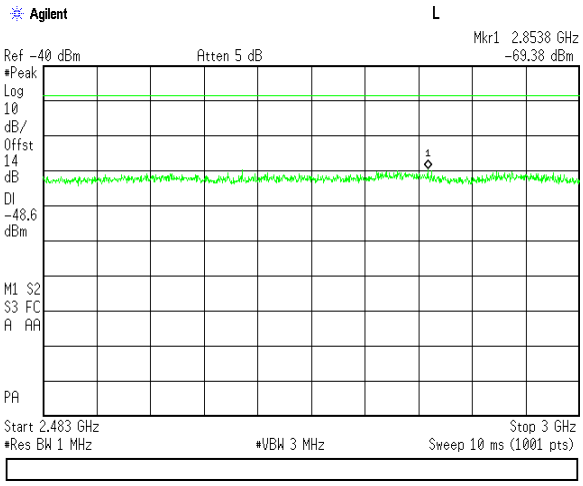


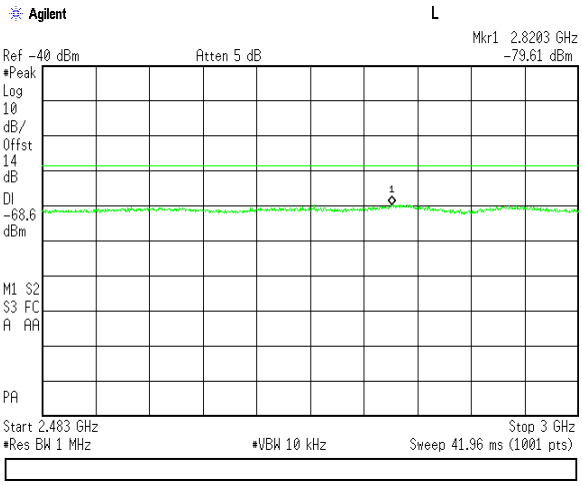


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.57 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 5, high carrier frequency

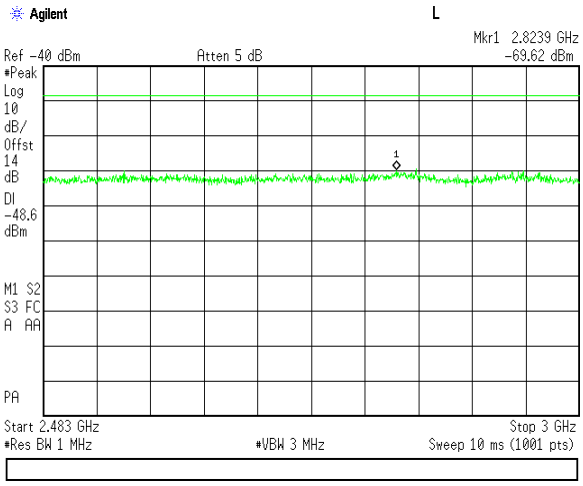
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

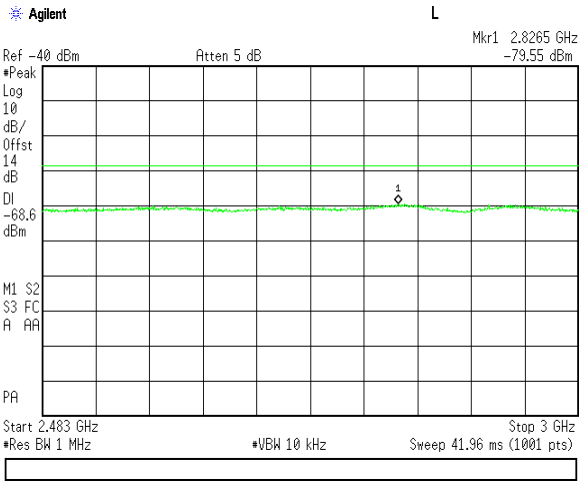




Plot 7.7.58 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 5, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

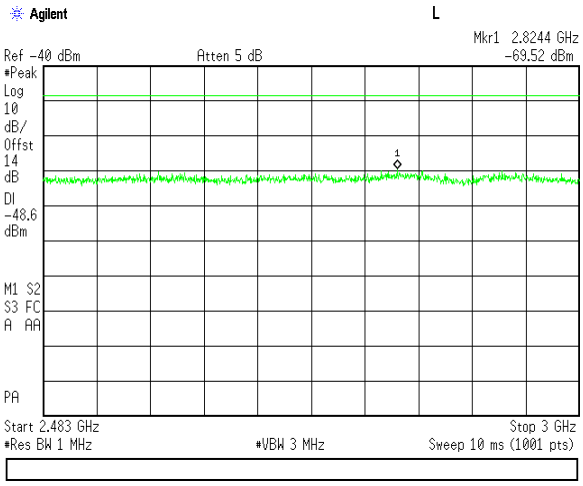


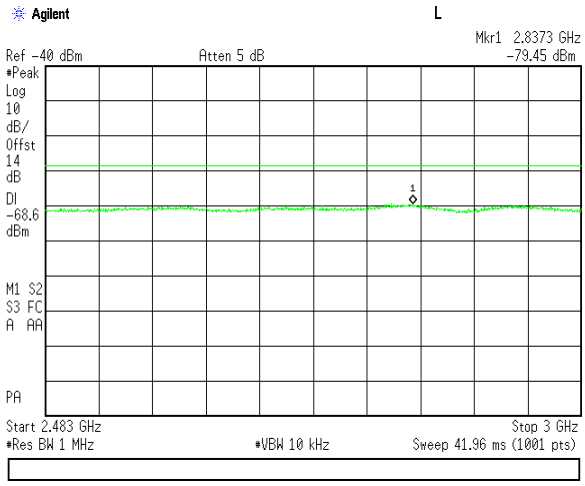


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.59 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 6, high carrier frequency

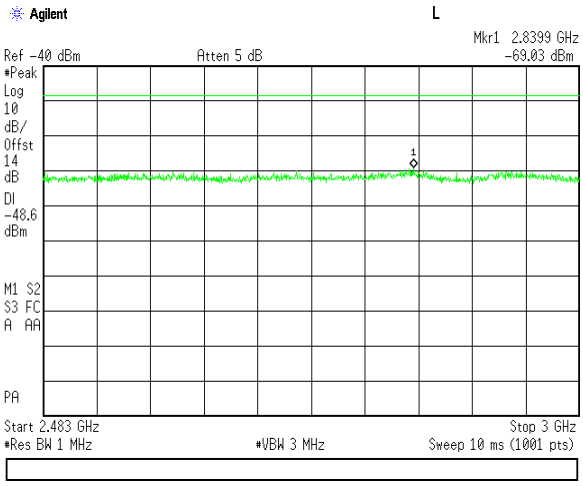
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

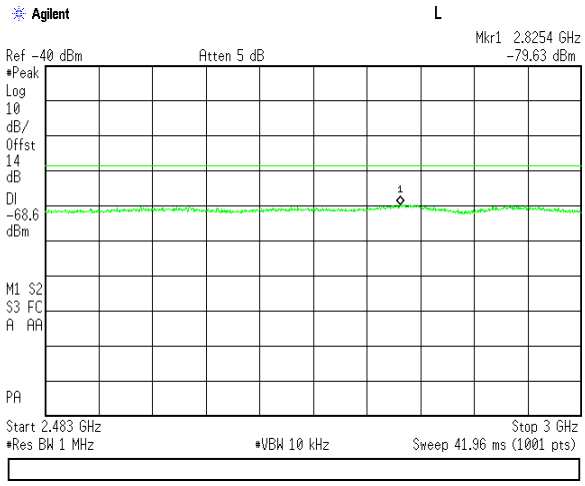




Plot 7.7.60 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 6, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

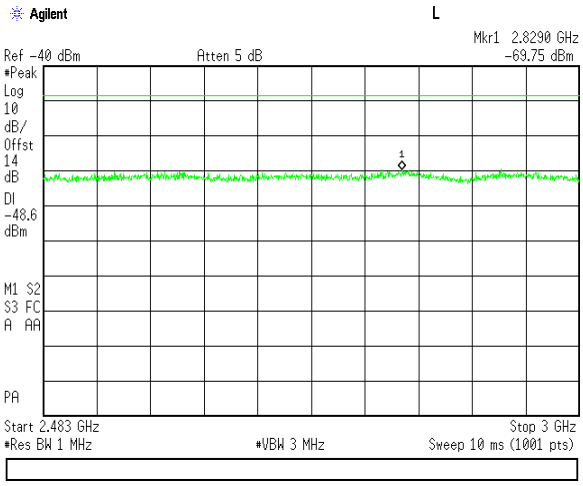


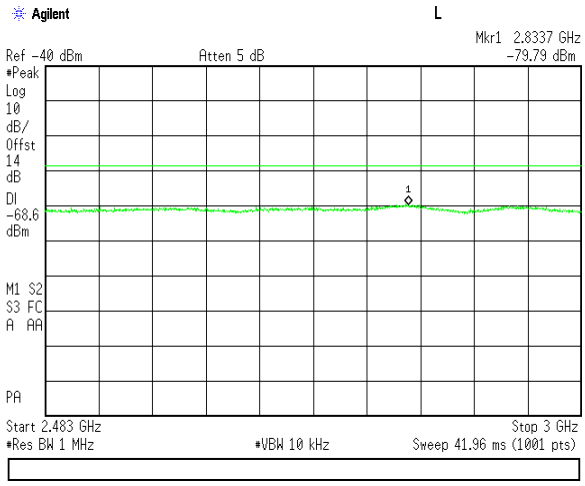


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.61 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 7, high carrier frequency

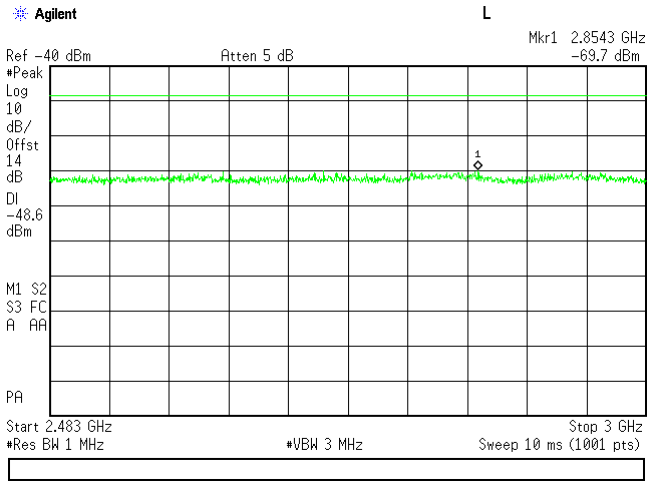
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

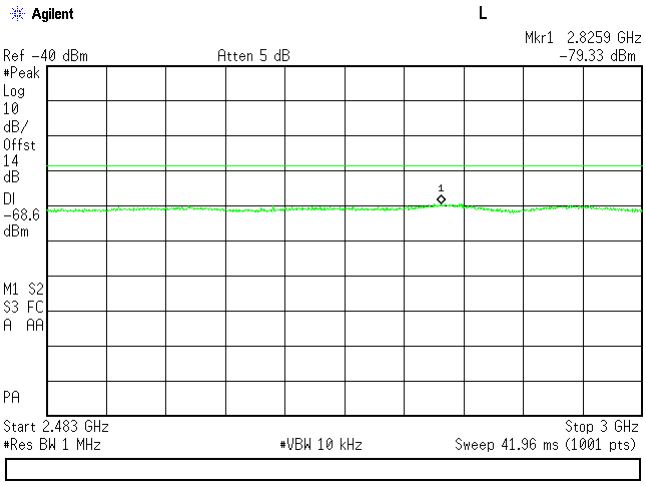




Plot 7.7.62 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 7, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM

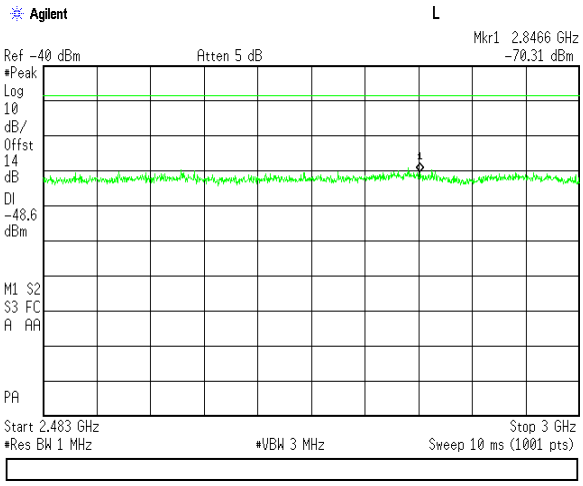


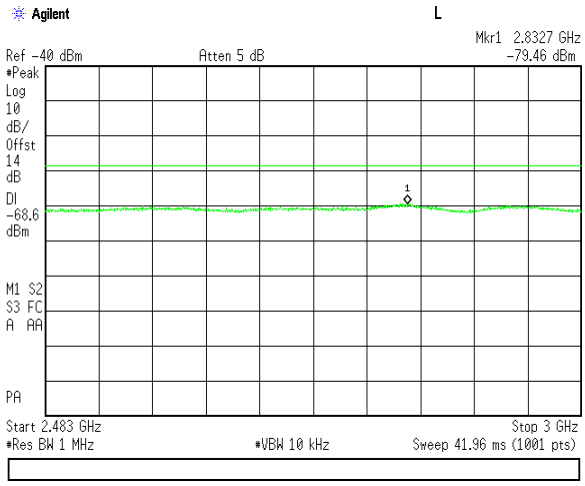


Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	**Relative Humidity:** 44 %	**Air Pressure:** 1004 hPa	**Power:** 48 VDC
Remarks:			

Plot 7.7.63 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 8, high carrier frequency

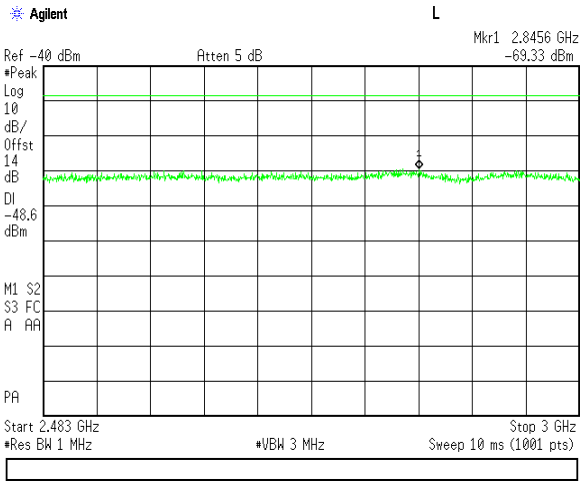
CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: QPSK

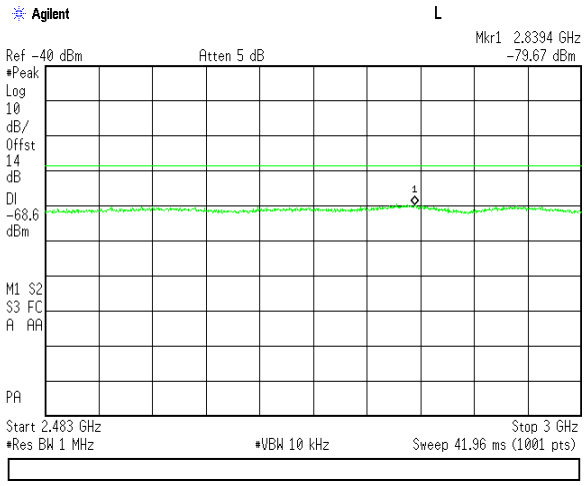




Plot 7.7.64 Band edge emission measurements in 2483.5 - 3000 MHz range at antenna chain # 8, high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: 3 non-overlapping beams
MODULATION: 64 QAM





Test specification:	Section 15.247(e) / RSS-247 section 5.2(2), Peak spectral power density		
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	20-Jun-19 - 24-Jun-19		
Temperature: 24.4 ºC	Relative Humidity: 49 %	Air Pressure: 1007 hPa	Power: 48 VDC
Remarks:			

7.8 Peak spectral power density

7.8.1 General

This test was performed to measure the peak spectral power density at the transmitter RF antenna connector. Specification test limits are given in Table 7.8.1.

Table 7.8.1 Peak spectral power density limits

Assigned frequency range, MHz	Measurement bandwidth, kHz	Peak spectral power density, dBm
2400-2483.5	3.0	8.0

7.8.2 Test procedure

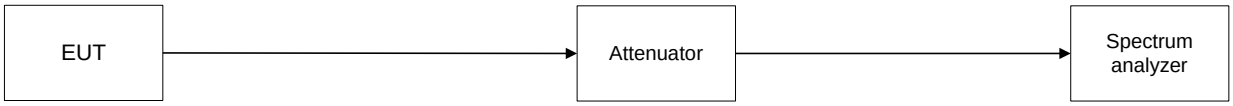
7.8.2.1 The EUT was set up as shown in Figure 7.8.1, energized and its proper operation was checked.

7.8.2.2 The EUT was adjusted to produce maximum available to end user RF output power.

7.8.2.3 The frequency span of spectrum analyzer was set to capture the entire 6 dB band of the transmitter, in peak hold mode with resolution bandwidth set to 3.0 kHz, video bandwidth wider than resolution bandwidth, auto sweep time and sufficient number of sweeps was allowed for trace stabilization. The spectrum lines spacing was verified to be wider than 3 kHz. Otherwise the resolution bandwidth was reduced until individual spectrum lines were resolved and the power of individual spectrum lines was integrated over 3 kHz band.

7.8.2.4 The peak of emission was zoomed with span set just wide enough to capture the emission peak area and sweep time was set equal to span width divided by resolution bandwidth. Spectrum analyzer was set in peak hold mode, sufficient number of sweeps was allowed for trace stabilization and peak spectral power density was measured as provided in Table 7.8.2 and associated plots.

Figure 7.8.1 Peak spectral power density test setup



Test specification:	**Section 15.247(e) / RSS-247 section 5.2(2), Peak spectral power density**		
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	20-Jun-19 - 24-Jun-19		
Temperature: 24.4 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 48 VDC
Remarks:			

Table 7.8.2 Peak spectral power density test results

ASSIGNED FREQUENCY:	2400 - 2483.5 MHz
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Average
DUTY CYCLE:	100%
RESOLUTION BANDWIDTH:	3 kHz
VIDEO BANDWIDTH:	10 kHz
CONFIGURATION:	1 beam
BANDWIDTH:	5 MHz

Carrier frequency, MHz	Chain, #1, dBm	Chain, #2, dBm	Chain, #3, dBm	Chain, #4, dBm	Chain, #5, dBm	Chain, #6, dBm	Chain, #7, dBm	Chain, #8, dBm	Sum PSD, dBm
Modulation QPSK									
2448.2	-9.06	-10.86	-9.80	-10.66	-11.04	-11.18	-9.63	-9.76	-1.19
2458.2	-9.44	-10.93	-10.13	-10.89	-11.02	-10.78	-9.81	-9.82	-1.31
2473.2	-8.76	-10.52	-9.26	-10.54	-10.65	-10.86	-9.45	-9.66	-0.90
Modulation 64QAM									
2448.2	-9.95	-10.91	-9.63	-10.43	-11.10	-10.65	-9.35	-9.56	-1.15
2458.2	-9.65	-10.66	-10.32	-10.54	-11.22	-10.44	-9.98	-9.52	-1.26
2473.2	-9.50	-10.40	-9.49	-10.40	-10.54	-10.83	-9.50	-9.46	-0.98

Carrier frequency, MHz	Sum PSD, dBm	External attenuation, dB	Feeder loss, dB	Total PSD,** dBm	Limit, dBm	Margin*, dB	Verdict
Modulation QPSK							
2448.2	-1.19	Included	1.23	-2.42	1.00	-3.42	Pass
2458.2	-1.31	Included	1.23	-2.54	1.00	-3.54	Pass
2473.2	-0.90	Included	1.23	-2.13	1.00	-3.13	Pass
Modulation 64QAM							
2448.2	-1.15	Included	1.23	-2.38	1.00	-3.38	Pass
2458.2	-1.26	Included	1.23	-2.49	1.00	-3.49	Pass
2473.2	-0.98	Included	1.23	-2.21	1.00	-3.21	Pass

* - Margin = Total PSD – specification limit.
** - Total PSD = Sum PSD – Feeder loss
*** - Sum PSD = ∑10log(PSD per Chain #x/10), where #x = 1,2,…,8 number of chain