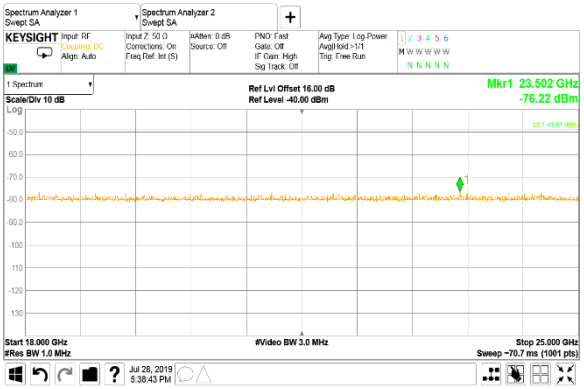
Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

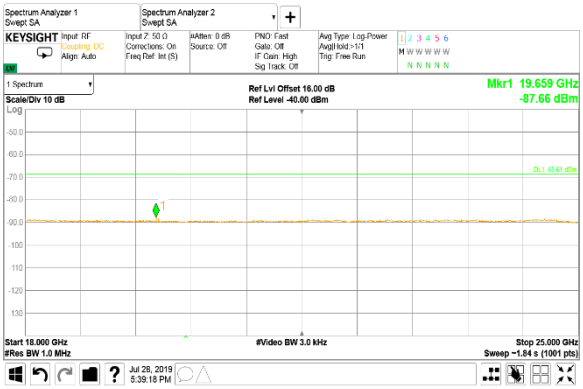
Plot 7.4.274 Spurious emission measurements in 18 - 25 GHz range at low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #4

RBW = 1 MHz; VBW = 3 MHz



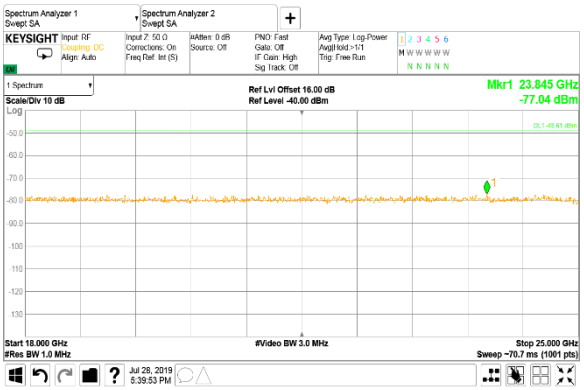
RBW = 1 MHz; VBW = 3 kHz



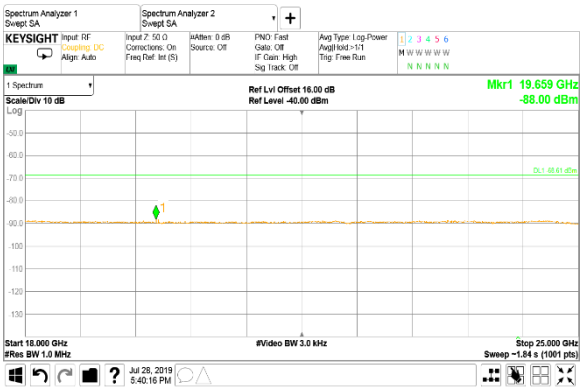
Plot 7.4.275 Spurious emission measurements in 18 - 25 GHz range at mid carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #4

RBW = 1 MHz; VBW = 3 MHz



RBW = 1 MHz; VBW = 3 kHz

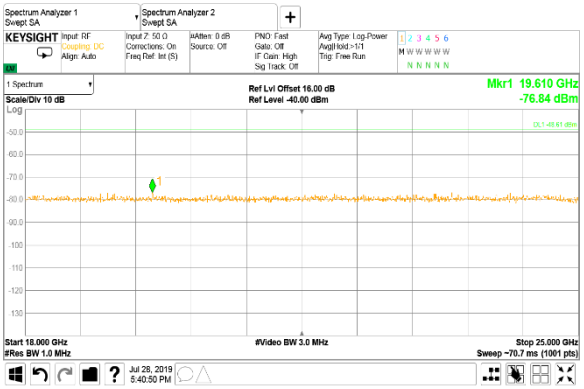


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

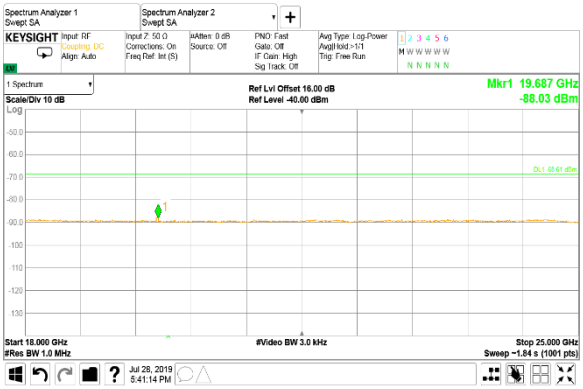
Plot 7.4.276 Spurious emission measurements in 18 - 25 GHz range at high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #4

RBW = 1 MHz; VBW = 3 MHz



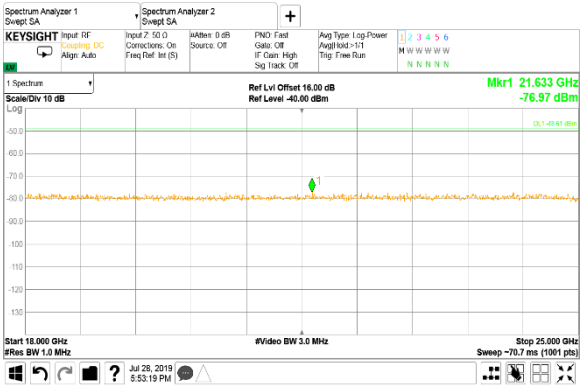
RBW = 1 MHz; VBW = 3 kHz



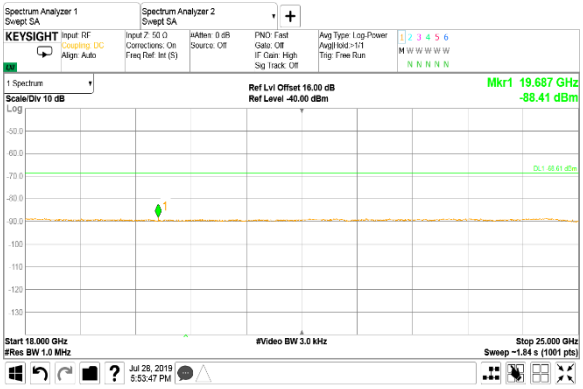
Plot 7.4.277 Spurious emission measurements in 18 - 25 GHz range at low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #5

RBW = 1 MHz; VBW = 3 MHz



RBW = 1 MHz; VBW = 3 kHz

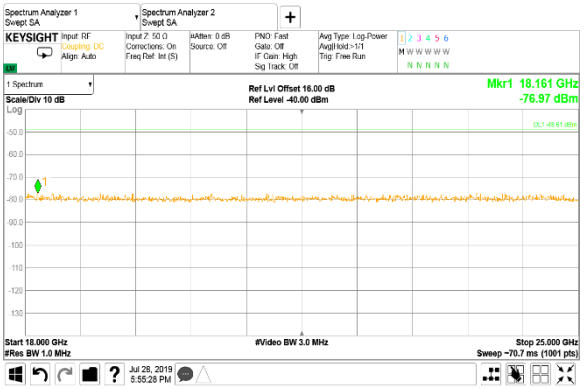


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

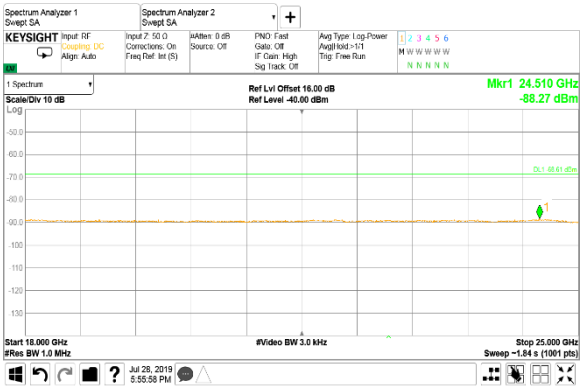
Plot 7.4.278 Spurious emission measurements in 18 - 25 GHz range at mid carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #5

RBW = 1 MHz; VBW = 3 MHz



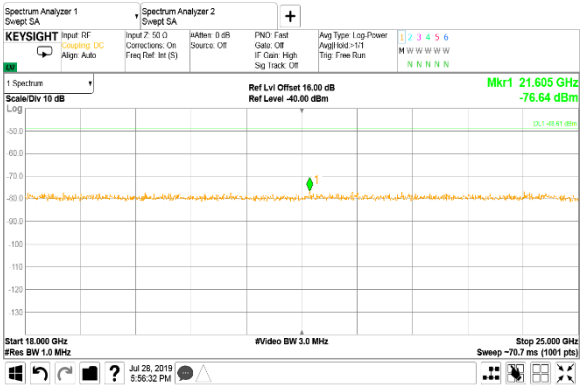
RBW = 1 MHz; VBW = 3 kHz



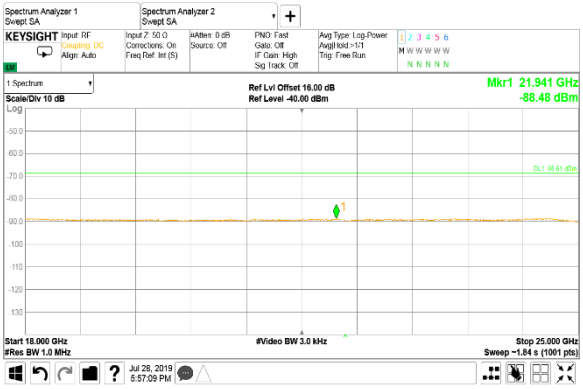
Plot 7.4.279 Spurious emission measurements in 18 - 25 GHz range at high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #5

RBW = 1 MHz; VBW = 3 MHz



RBW = 1 MHz; VBW = 3 kHz

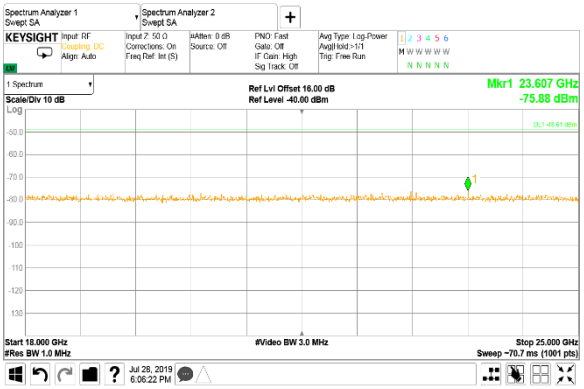


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

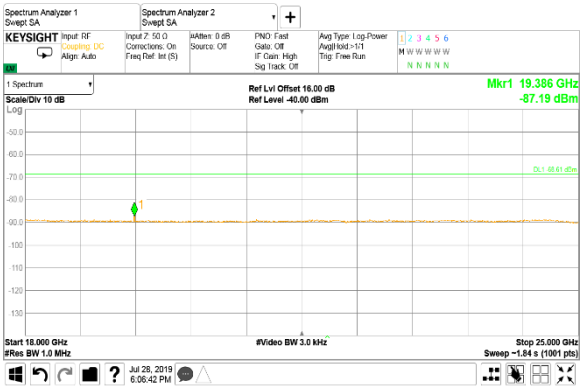
Plot 7.4.280 Spurious emission measurements in 18 - 25 GHz range at low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #6

RBW = 1 MHz; VBW = 3 MHz



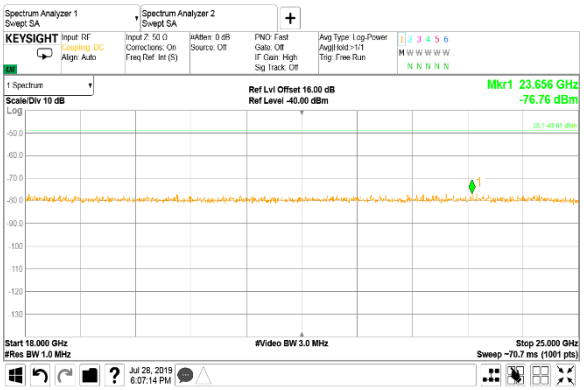
RBW = 1 MHz; VBW = 3 kHz



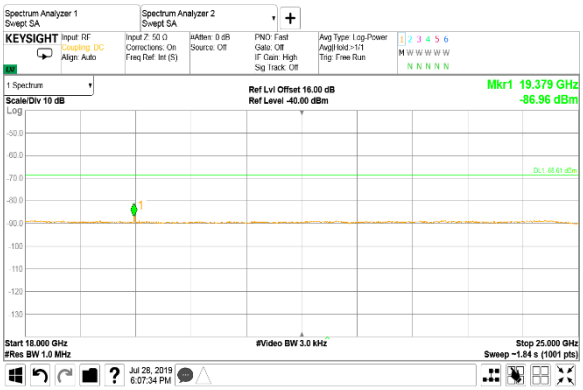
Plot 7.4.281 Spurious emission measurements in 18 - 25 GHz range at mid carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #6

RBW = 1 MHz; VBW = 3 MHz



RBW = 1 MHz; VBW = 3 kHz

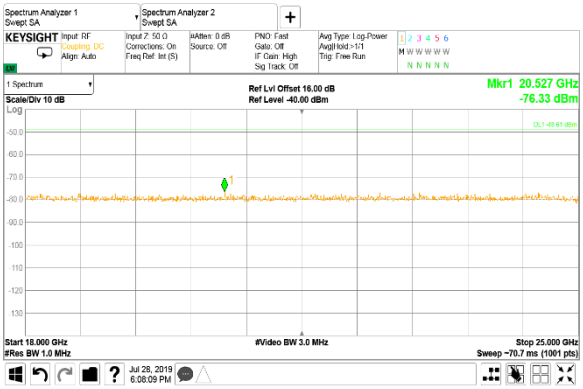


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

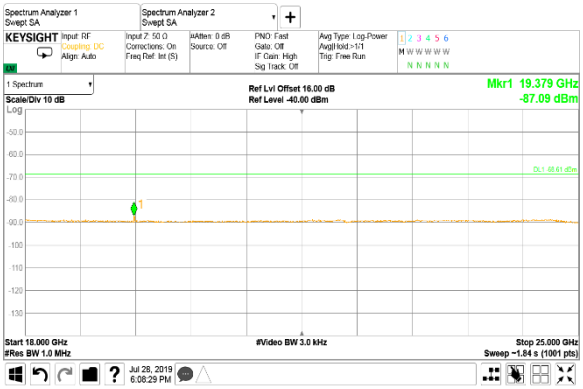
Plot 7.4.282 Spurious emission measurements in 18 - 25 GHz range at high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #6

RBW = 1 MHz; VBW = 3 MHz



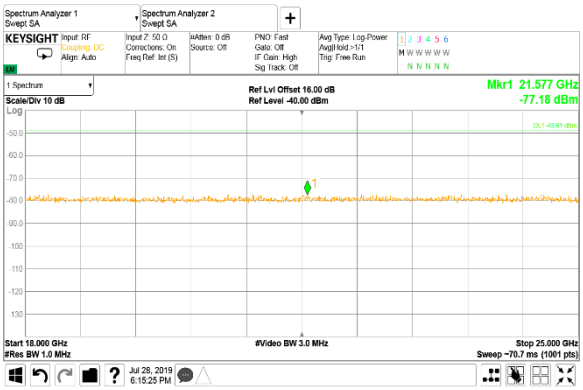
RBW = 1 MHz; VBW = 3 kHz



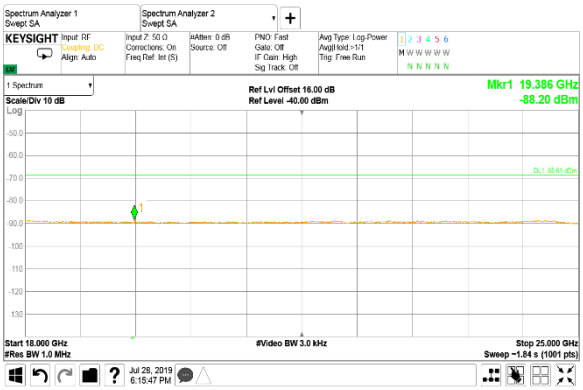
Plot 7.4.283 Spurious emission measurements in 18 - 25 GHz range at low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #7

RBW = 1 MHz; VBW = 3 MHz



RBW = 1 MHz; VBW = 3 kHz

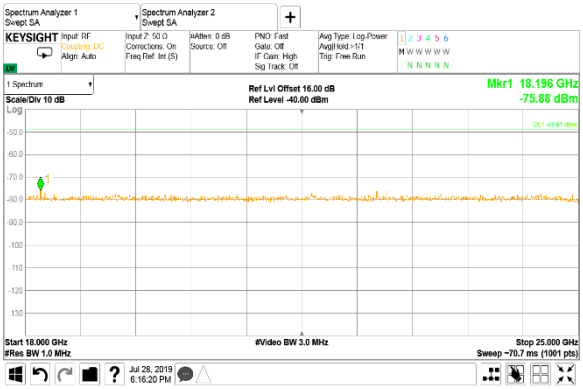


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

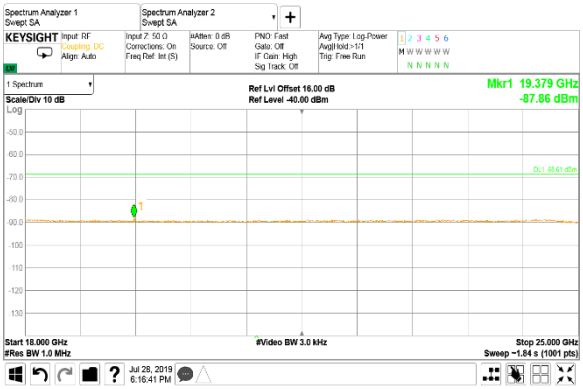
Plot 7.4.284 Spurious emission measurements in 18 - 25 GHz range at mid carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #7

RBW = 1 MHz; VBW = 3 MHz



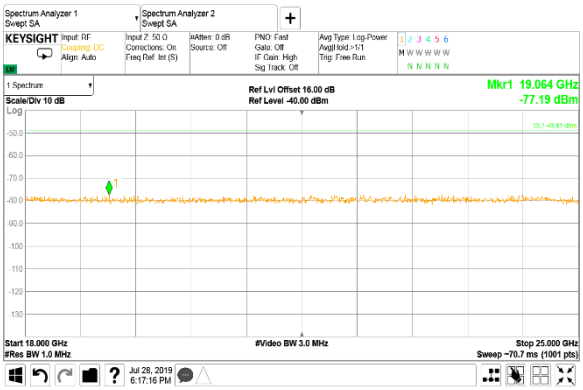
RBW = 1 MHz; VBW = 3 kHz



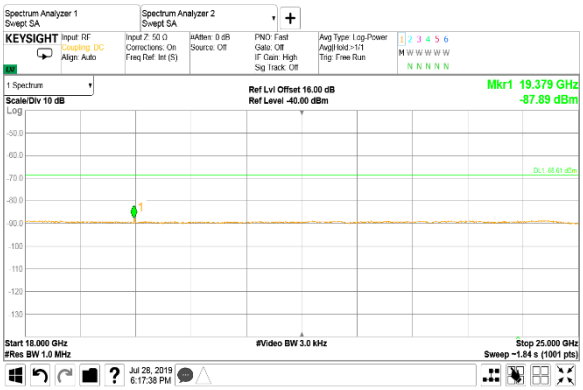
Plot 7.4.285 Spurious emission measurements in 18 - 25 GHz range at high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #7

RBW = 1 MHz; VBW = 3 MHz



RBW = 1 MHz; VBW = 3 kHz

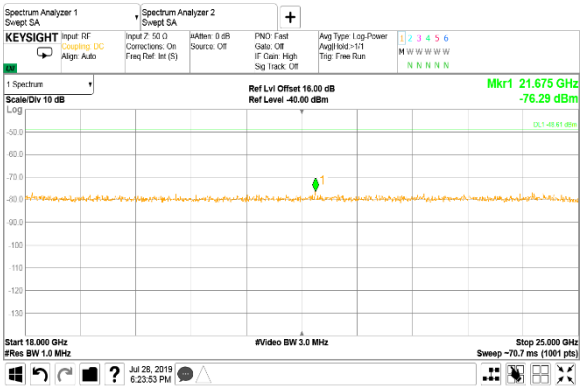


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

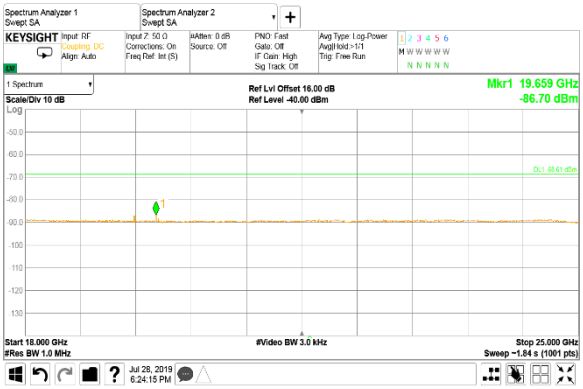
Plot 7.4.286 Spurious emission measurements in 18 - 25 GHz range at low carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #8

RBW = 1 MHz; VBW = 3 MHz



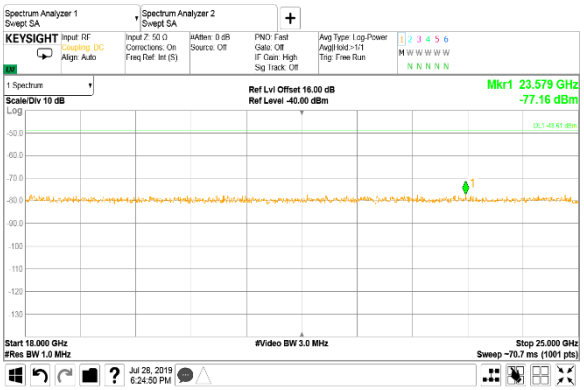
RBW = 1 MHz; VBW = 3 kHz



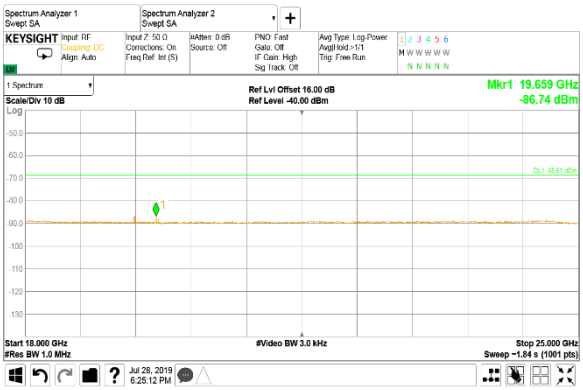
Plot 7.4.287 Spurious emission measurements in 18 - 25 GHz range at mid carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #8

RBW = 1 MHz; VBW = 3 MHz



RBW = 1 MHz; VBW = 3 kHz

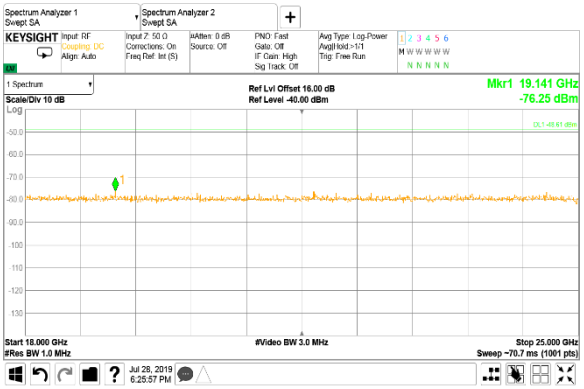


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

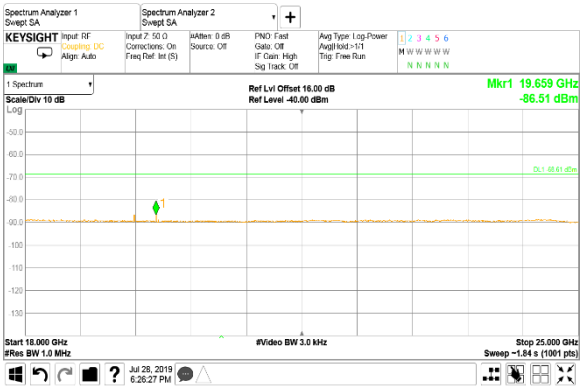
Plot 7.4.288 Spurious emission measurements in 18 - 25 GHz range at high carrier frequency

CHANNEL BANDWIDTH: 10 MHz
CONFIGURATION: ONE BEAM
ANTENNA PORT: #8

RBW = 1 MHz; VBW = 3 MHz



RBW = 1 MHz; VBW = 3 kHz



Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

7.5 Spurious emissions at RF antenna connector for 3 non overlapping beam configuration

7.5.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.4.1.

Table 7.5.1 Spurious emission limits

Frequency*, MHz	Attenuation below carrier*, dBc
0.009 – 10th harmonic	20.0

* - The above limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.
** - Spurious emission limit is provided in terms of attenuation below the peak of modulated carrier measured with the same resolution bandwidth.

7.5.2 Test procedure

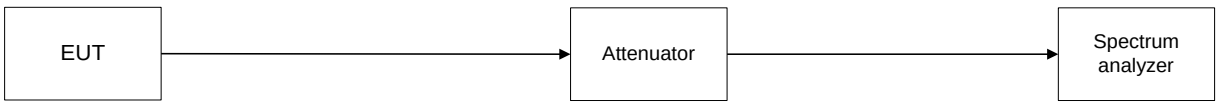
7.5.2.1 The EUT was set up as shown in Figure 7.4.1, energized and its proper operation was checked.

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

7.5.2.3 The highest emission level within the authorized band was measured.

7.5.2.4 The spurious emission was measured with spectrum analyzer as provided in Table 7.4.2 and Table 7.4.3 and Table 7.4.4 and associated plots and referenced to the highest emission level measured within the authorized band.

Figure 7.5.1 Spurious emission test setup



Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
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 7.5.2 Field strength of spurious emissions for 3 non-overlapping beams above 1 GHz within restricted bands

ASSIGNED FREQUENCY:	2400.0 -2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	1000 – 25000 MHz
TEST DISTANCE:	3 m
MODULATION:	QPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
RESOLUTION BANDWIDTH:	1000 kHz
TEST ANTENNA TYPE:	Double ridged guide
NUMBER ANTENNA PORTS:	N = 8

Frequency, MHz	Peak power (VBW=3 MHz)				Average power (VBW=3 kHz)				Verdict
	Measured, dBm	Total, dBm***	Limit, dBm*	Margin, dB**	Measured, dBm	Total, dBm***	Limit, dBm*	Margin, dB**	
Channel bandwidth 5 MHz									
Low carrier frequency 2448.2 MHz									
No emissions were found									Pass
Mid carrier frequency 2458.2 MHz									
No emissions were found									Pass
High carrier frequency 2473.2 MHz									
No emissions were found									Pass
Channel bandwidth 10 MHz									
Low carrier frequency 2450.7 MHz									
No emissions were found									Pass
Mid carrier frequency 2460.7 MHz									
No emissions were found									Pass
High carrier frequency 2470.7 MHz									
No emissions were found									Pass

* - Limit = Radiated spurious emission limit – Directional Antenna Gain
****** - Margin = Total emission - specification limit.
******* - Total emission = Maximum emission per chain + 10*log(N)

Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.2		
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 7.5.3 Field strength of spurious emissions for 3 non-overlapping beams below 1 GHz within restricted bands

ASSIGNED FREQUENCY:	2400.0 -2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	0.009 – 1000 MHz
TEST DISTANCE:	3 m
MODULATION:	QPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
RESOLUTION BANDWIDTH:	0.2 kHz (9 kHz – 150 kHz) 9.0 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1000 MHz)
VIDEO BANDWIDTH:	> Resolution bandwidth
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconilog (30 MHz – 1000 MHz)

Frequency, MHz	**Peak emission, dB(µV/m)**	**Quasi-peak**			**Verdict**
		Measured emission, dB(µV/m)	**Limit, dB(µV/m)**	**Margin, dB***	
Low carrier frequency 2448.2 / 2450.7 MHz					
No emissions were found					Pass
Mid carrier frequency 2458.2 / 2460.7 MHz					
No emissions were found					Pass
High carrier frequency 2473.2 / 2470.7 MHz					
No emissions were found					Pass

*****- Margin = Measured emission - specification limit.

Test specification:	**Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.2		
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 7.5.4 Spurious emission for 3 non-overlapping beams outside restricted bands test results

ASSIGNED FREQUENCY RANGE: 2400.0 -2483.5 MHz
INVESTIGATED FREQUENCY RANGE: 1000 – 25 000 MHz
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 300 kHz
MODULATION: QPSK
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Spurious emission, dBm	Emission at carrier, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
Low carrier frequency 2448.2 / 2450.7 MHz						
No emission were found						Pass
Mid carrier frequency 2458.2 / 2460.7 MHz						
No emission were found						Pass
High carrier frequency 2473.2 / 2470.7 MHz						
No emission were found						Pass

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

Reference numbers of test equipment used

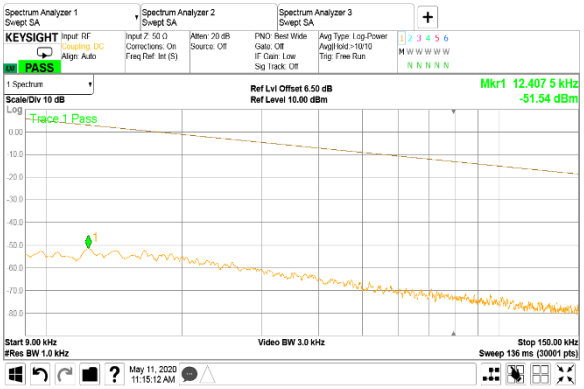
HL 1809	HL 5376	HL 3901	HL 4366	HL 4338			

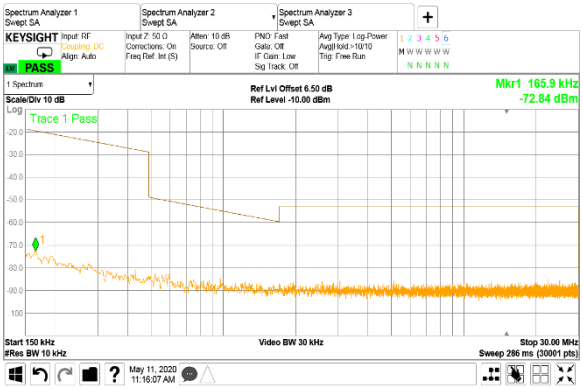
Full description is given in Appendix A.

Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
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 7.5.1 Spurious emission measurements in 9 kHz - 30 MHz range at low carrier frequency

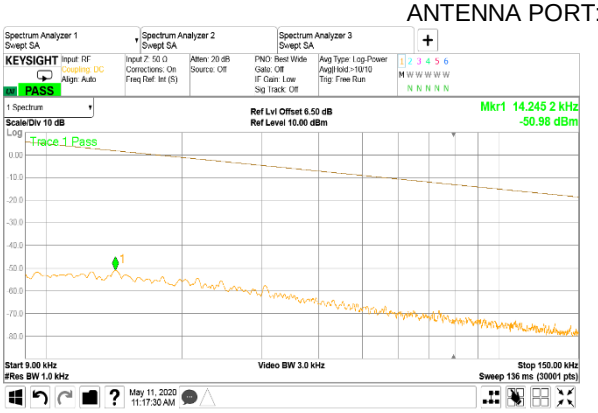
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #1

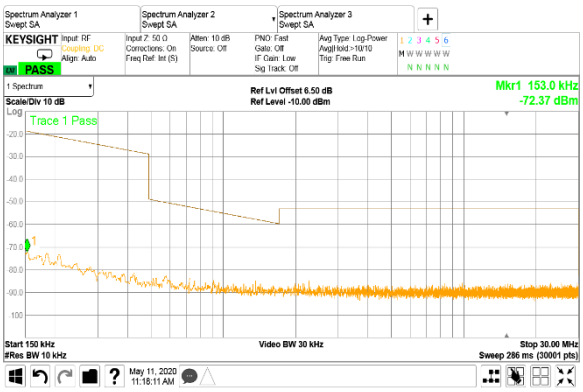




Plot 7.5.2 Spurious emission measurements in 9 kHz - 30 MHz range at mid carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #1

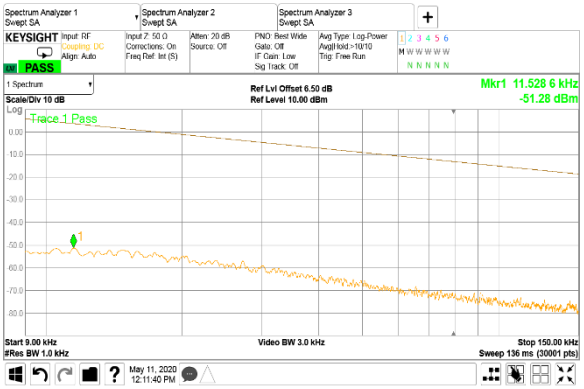


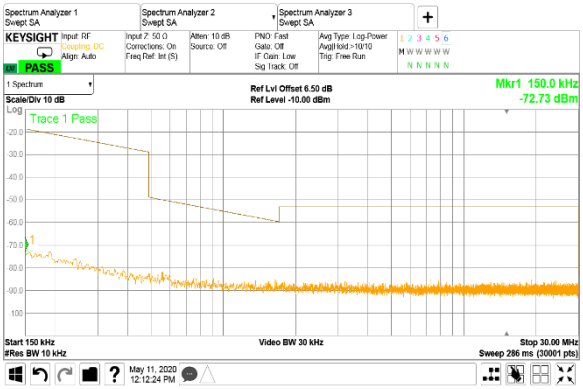


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

Plot 7.5.3 Spurious emission measurements in 9 kHz - 30 MHz range at high carrier frequency

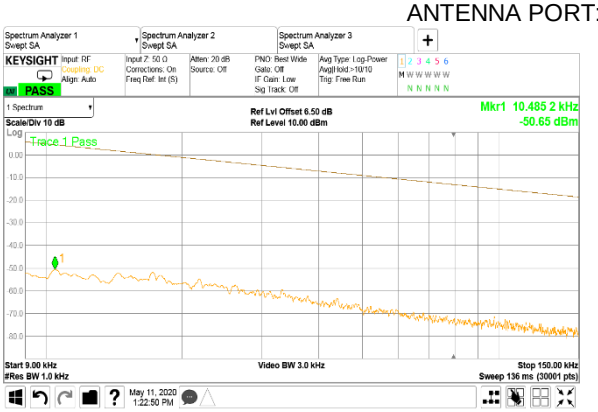
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #1

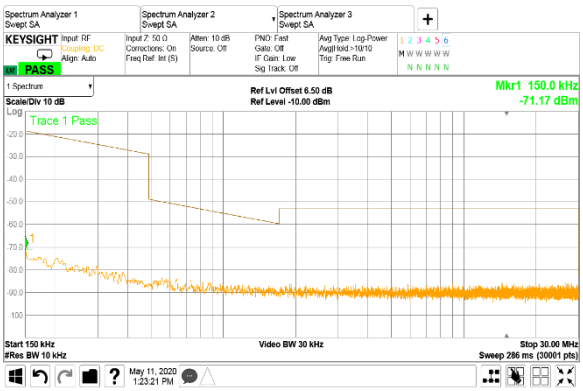




Plot 7.5.4 Spurious emission measurements in 9 kHz - 30 MHz range at low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #2

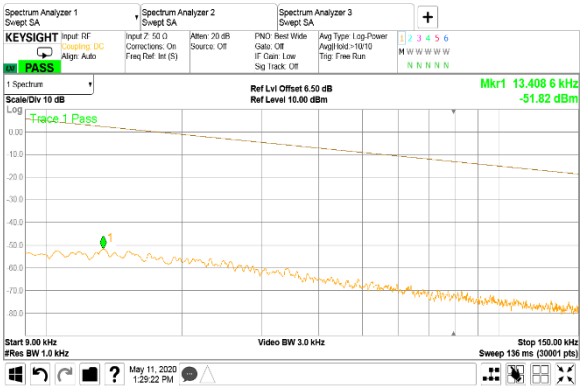


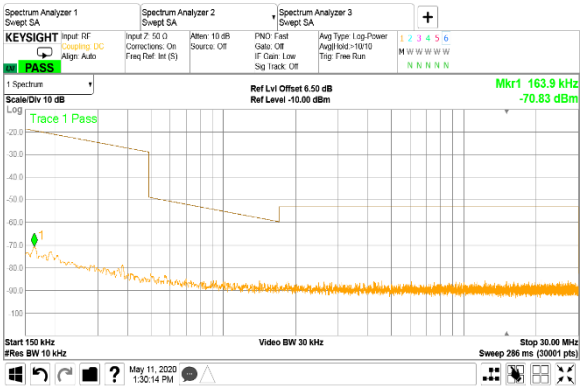


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

Plot 7.5.5 Spurious emission measurements in 9 kHz - 30 MHz range at mid carrier frequency

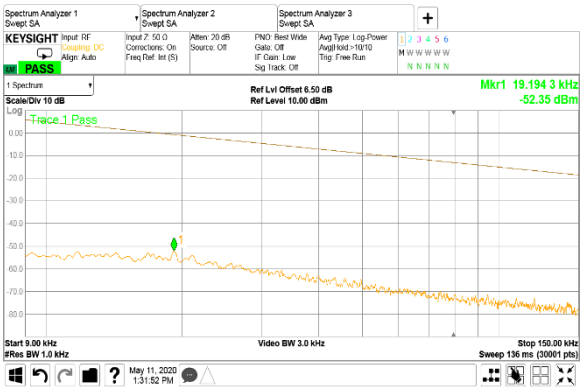
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #2

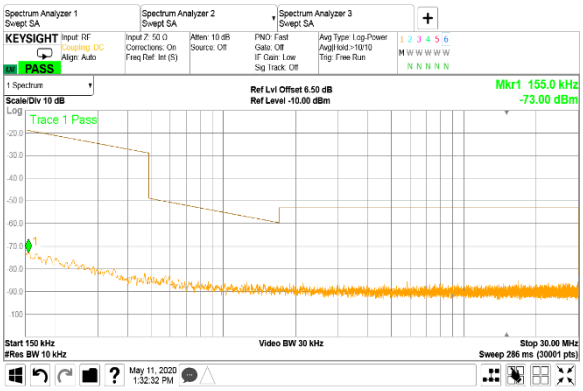




Plot 7.5.6 Spurious emission measurements in 9 kHz - 30 MHz range at high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #2

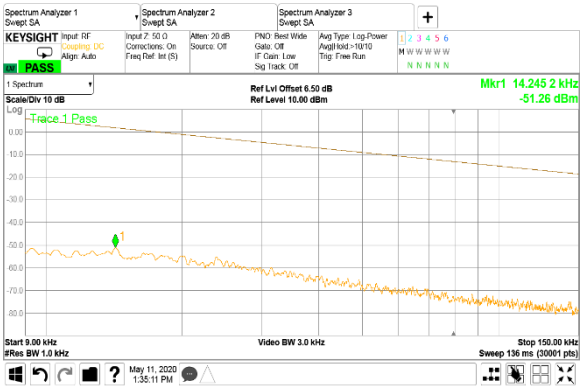


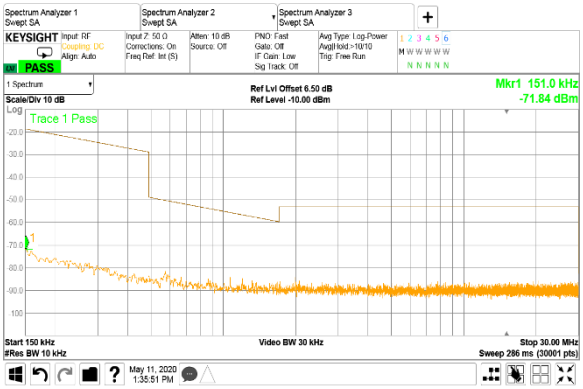


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

Plot 7.5.7 Spurious emission measurements in 9 kHz - 30 MHz range at low carrier frequency

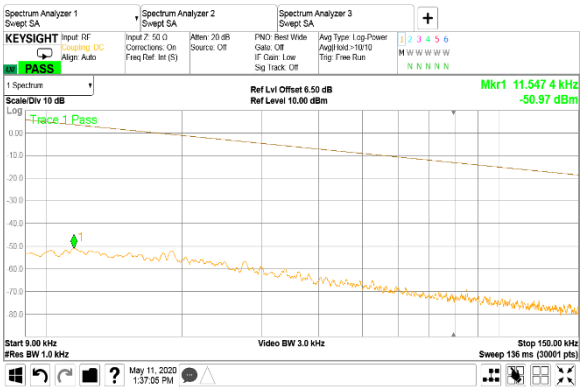
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #3

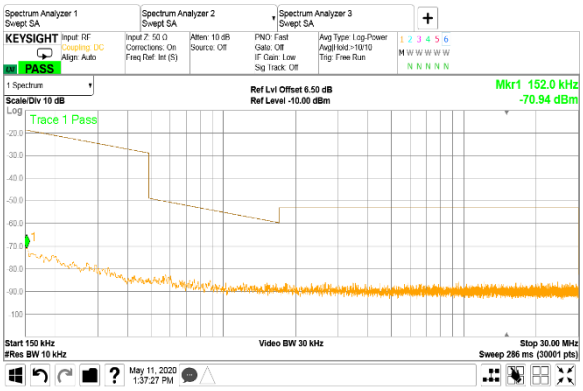




Plot 7.5.8 Spurious emission measurements in 9 kHz - 30 MHz range at mid carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #3

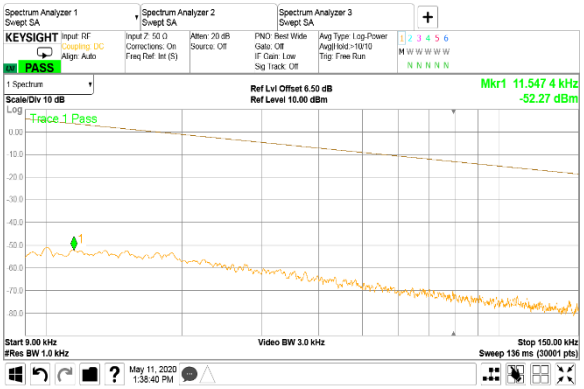


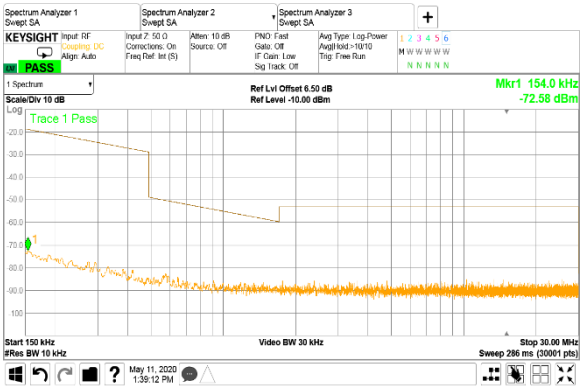


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

Plot 7.5.9 Spurious emission measurements in 9 kHz - 30 MHz range at high carrier frequency

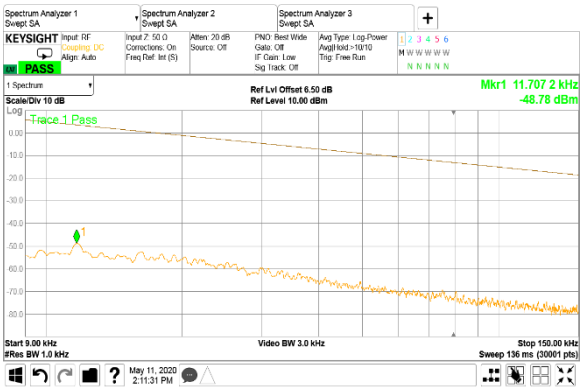
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #3

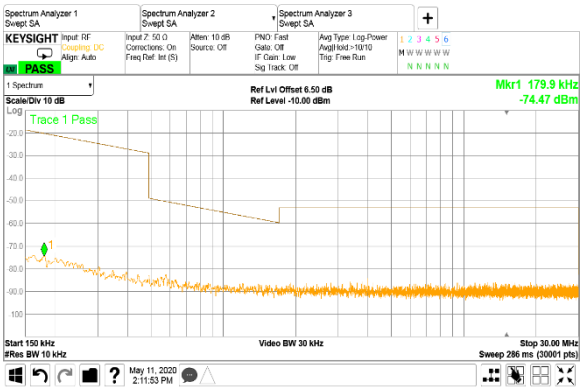




Plot 7.5.10 Spurious emission measurements in 9 kHz - 30 MHz range at low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #4

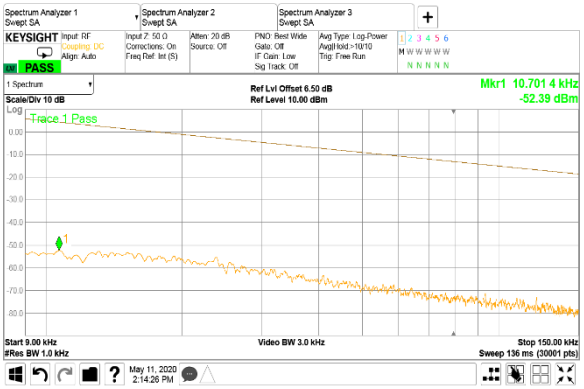


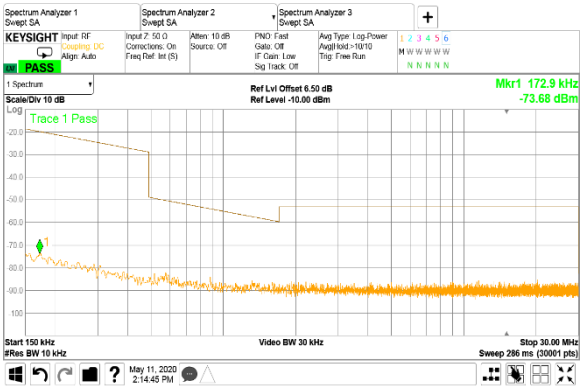


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

Plot 7.5.11 Spurious emission measurements in 9 kHz - 30 MHz range at mid carrier frequency

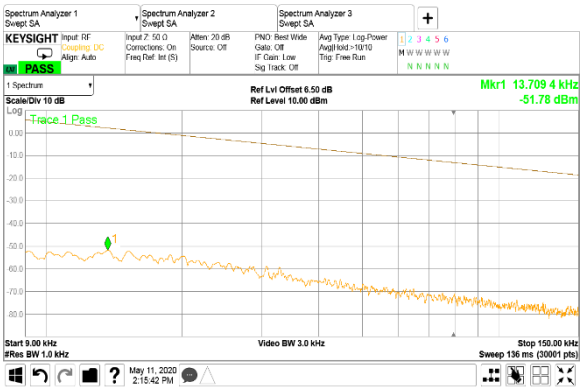
CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #4

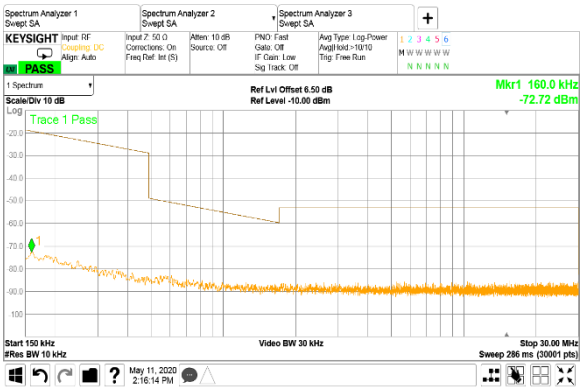




Plot 7.5.12 Spurious emission measurements in 9 kHz - 30 MHz range at high carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #4

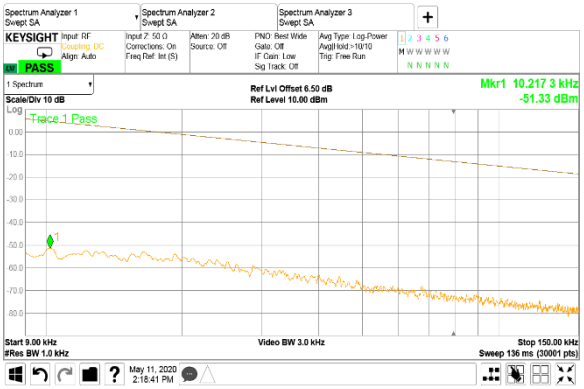


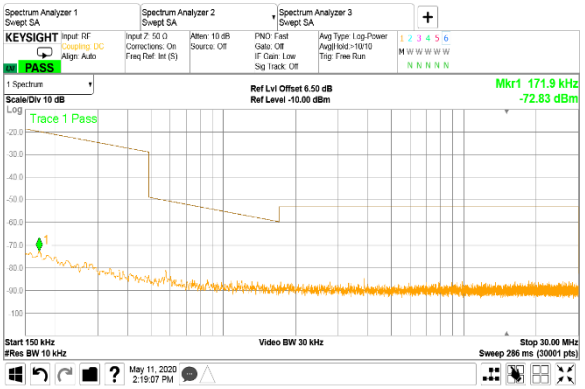


Test specification:	Section 15.247(d) / RSS-247 section 5.5, Conducted spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	28-Jul-19		
Temperature: 24 ºC	Relative Humidity: 44 %	Air Pressure: 1004 hPa	Power: 48 VDC
Remarks:			

Plot 7.5.13 Spurious emission measurements in 9 kHz - 30 MHz range at low carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #5





Plot 7.5.14 Spurious emission measurements in 9 kHz - 30 MHz range at mid carrier frequency

CHANNEL BANDWIDTH: 5 MHz
CONFIGURATION: 3 Non-Overlapping Beams
ANTENNA PORT: #5