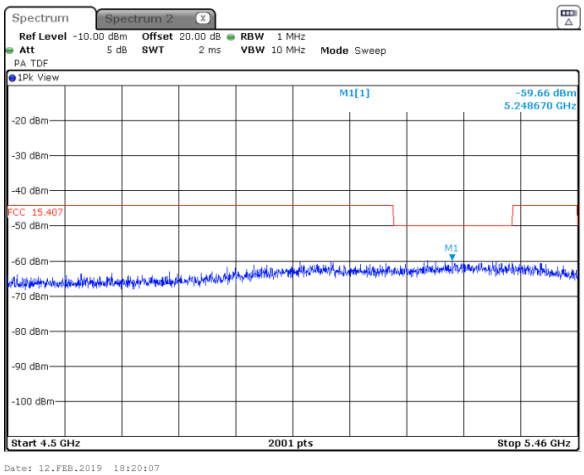
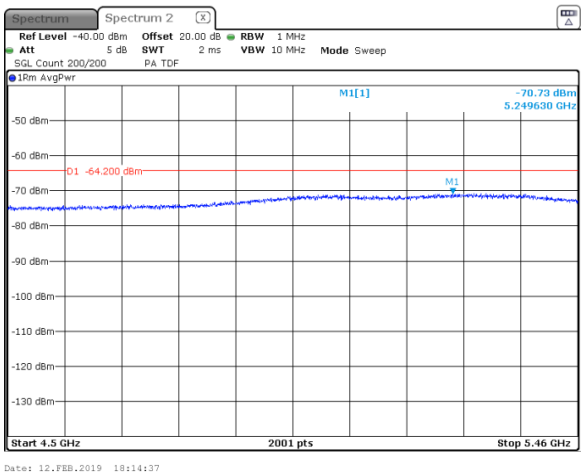
Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Feb-19		
Temperature: 26 ºC	Relative Humidity: 45 %	Air Pressure: 1020 hPa	Power: 48 VDC
Remarks:			

Plot 7.8.23 Conducted spurious emission measurements in the range 4.5 – 5.46 GHz

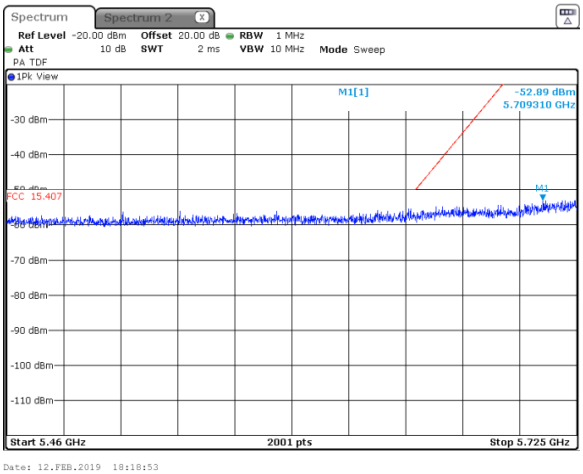
CARRIER FREQUENCY 5788 MHz
CHANNEL BANDWIDTH 20 MHz





Plot 7.8.24 Conducted spurious emission measurements in the range 5.46 – 5.725 GHz

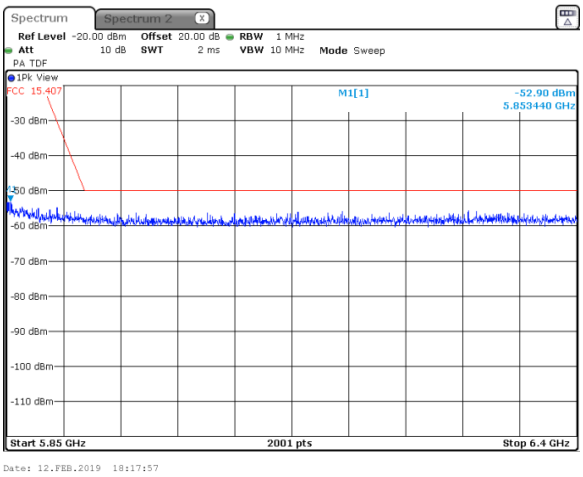
CARRIER FREQUENCY 5788 MHz
CHANNEL BANDWIDTH 20 MHz



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Feb-19		
Temperature: 26 ºC	Relative Humidity: 45 %	Air Pressure: 1020 hPa	Power: 48 VDC
Remarks:			

Plot 7.8.25 Conducted spurious emission measurements in the range 5.85 – 6.4 GHz

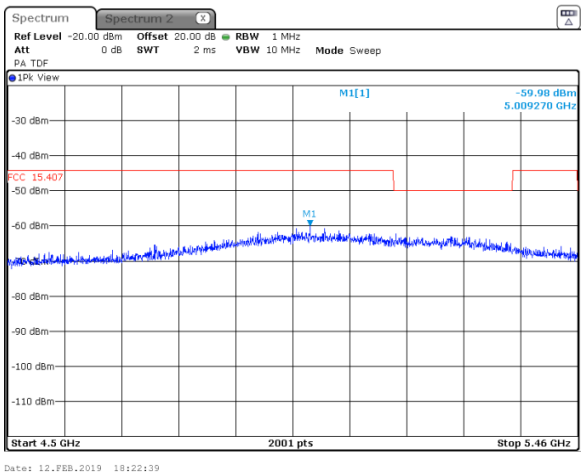
CARRIER FREQUENCY 5788 MHz
CHANNEL BANDWIDTH 20 MHz

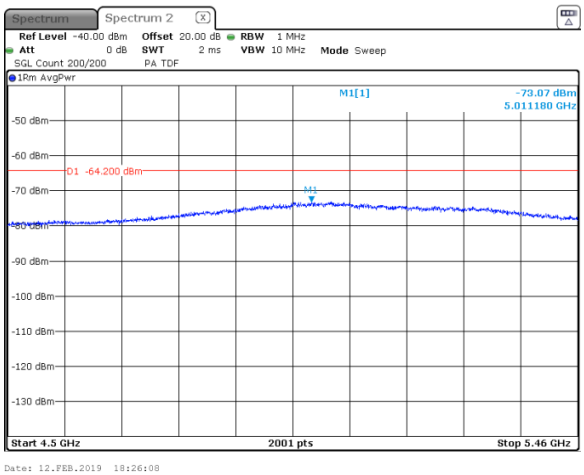


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Feb-19		
Temperature: 26 ºC	Relative Humidity: 45 %	Air Pressure: 1020 hPa	Power: 48 VDC
Remarks:			

Plot 7.8.26 Conducted spurious emission measurements in the range 4.5 – 5.46 GHz

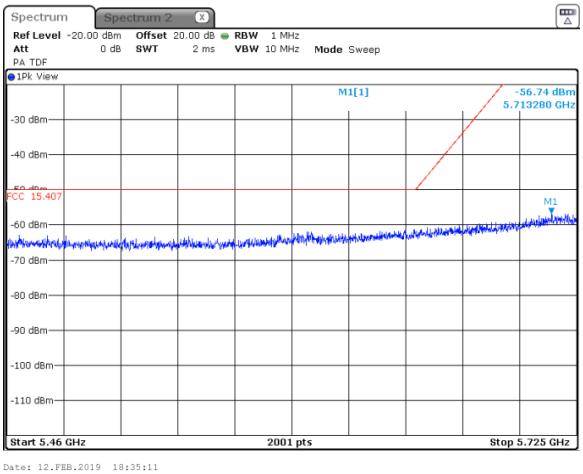
CARRIER FREQUENCY 5840 MHz
CHANNEL BANDWIDTH 20 MHz





Plot 7.8.27 Conducted spurious emission measurements in the range 5.46 – 5.725 GHz

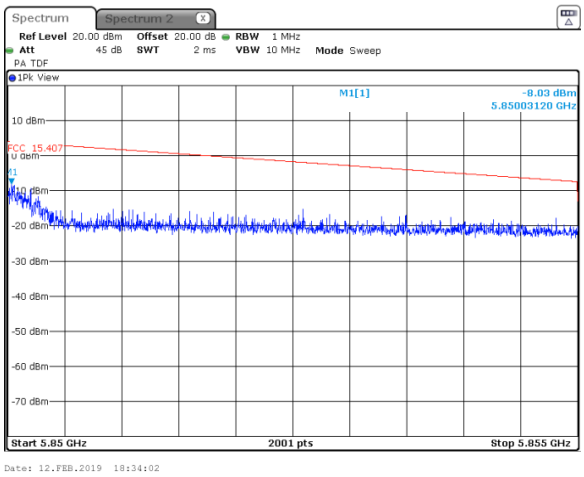
CARRIER FREQUENCY 5840 MHz
CHANNEL BANDWIDTH 20 MHz

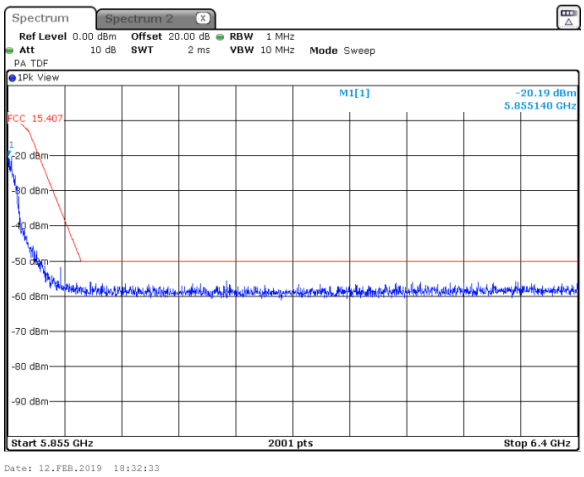


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Feb-19		
Temperature: 26 ºC	Relative Humidity: 45 %	Air Pressure: 1020 hPa	Power: 48 VDC
Remarks:			

Plot 7.8.28 Conducted spurious emission measurements in the range 5.85 – 6.4 GHz

CARRIER FREQUENCY 5840 MHz
CHANNEL BANDWIDTH 20 MHz





Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

7.9 Conducted out of band emissions at 5150 – 5250 MHz range

7.9.1 General

This test was performed to measure spurious emissions from the EUT near the band edges and within the pass band of the antenna. Specification test limits are given in Table 7.9.1 & EIRP of undesirable emission limits are given in Table 7.9.2

Table 7.9.1 Unwanted emissions limit within restricted bands above 1 GHz

Frequency, MHz	Field strength at 3 m, dB(μV/m)*		Equivalent EIRP*, dBm	
	Peak	Average	Peak	Average
1000 – 40000	74.0	54.0	-21.2	-41.2

* Equivalent EIRP was calculated as follow: Field strength – 95.2

Table 7.9.2 EIRP of undesirable emission limits outside restricted bands above 1 GHz

Frequency, MHz	EIRP of spurious, dBm/MHz
Outside 5150-5350 band	-27

7.9.2 Test procedure

7.9.2.1 The EUT was set up as shown in Figure 7.9.1, energized and the performance check was conducted.

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

7.9.2.3 The spectrum analyzer span was set to capture the carrier frequency and associated modulation products. The resolution bandwidth was set to 1 MHz.

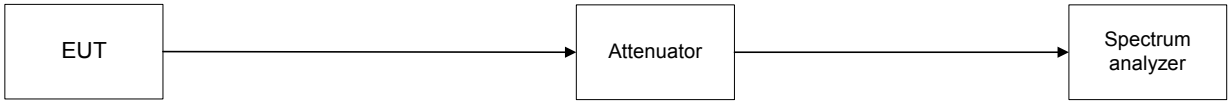
7.9.2.4 The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.

7.9.2.5 The maximum band edge emission and modulation product outside of the band were measured as provided in the associated tables and plots.

7.9.2.6 The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the mid and highest carrier frequencies.

7.9.2.7 Test results are shown in the Table 7.9.3, Table 7.9.4, Table 7.9.5 and the associated plots.

Figure 7.9.1 Setup for conducted spurious emissions



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Table 7.9.3 Conducted spurious emission within restricted band test results

ASSIGNED FREQUENCY RANGE: 5.15 – 5.25 GHz
INVESTIGATED FREQUENCY RANGE: 4500 - 6400 MHz
MODULATION: QPSK
DETECTOR USED: Peak
RESOLUTION BANDWIDTH 1000 kHz
EUT CONFIGURATION: 1 carrier, 1 sector (4 ports to 2 dual slant antennas), non-coherent signal
CHANNEL BANWIDTH: 10 MHz

Frequency, MHz	Antenna gain, dBi	Antenna gain array*, dB	Peak				Average				Verdict
			SA reading, dBm	EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	SA reading, dBm	EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	
Low carrier frequency											
5149.840	17.0	3.0	-49.25	-29.25	-21.2	-8.05	-65.09	-42.62	-41.2	-1.42	Pass
5497.599	17.0	3.0	-59.01	-39.01	-21.2	-17.81	-70.65	-48.18	-41.2	-6.98	Pass
Mid carrier frequency											
4915.300	17.0	3.0	-50.88	-30.88	-21.2	-9.68	-64.42	-41.95	-41.2	-0.75	Pass
5406.539	17.0	3.0	-56.11	-36.11	-21.2	-14.91	-72.71	-50.24	-41.2	-9.04	Pass
High carrier frequency											
4915.300	17.0	3.0	-50.39	-30.39	-21.2	-9.19	-64.07	-41.60	-41.2	-0.40	Pass
5369.103	17.0	3.0	-50.38	-30.38	-21.2	-9.18	-69.60	-47.13	-41.2	-5.93	Pass

CHANNEL BANWIDTH: 15 MHz

Frequency, MHz	Antenna gain, dBi	Antenna gain array*, dB	Peak				Average				Verdict
			SA reading, dBm	EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	SA reading, dBm	EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	
Low carrier frequency											
5149.840	17.0	3.0	-48.43	-28.43	-21.2	-7.23	-63.79	-41.32	-41.2	-0.12	Pass
5391.367	17.0	3.0	-54.51	-34.51	-21.2	-13.31	-69.68	-47.21	-41.2	-6.01	Pass
Mid carrier frequency											
5115.080	17.0	3.0	-51.45	-31.45	-21.2	-10.25	-65.00	-42.53	-41.2	-1.33	Pass
5378.668	17.0	3.0	-50.01	-30.01	-21.2	-8.81	-71.38	-48.91	-41.2	-7.71	Pass
High carrier frequency											
4871.130	17.0	3.0	-53.12	-33.12	-21.2	-11.92	-64.31	-41.84	-41.2	-0.64	Pass
5419.843	17.0	3.0	-54.02	-34.02	-21.2	-12.82	-72.08	-49.61	-41.2	-8.41	Pass

Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Table 7.9.3 Conducted spurious emission within restricted band test results

ASSIGNED FREQUENCY RANGE: 5.15 – 5.25 GHz
INVESTIGATED FREQUENCY RANGE: 4500 - 6400 MHz
MODULATION: QPSK
DETECTOR USED: Peak
RESOLUTION BANDWIDTH 1000 kHz
EUT CONFIGURATION: 1 carrier, 1 sector (4 ports to 2 dual slant antennas), non-coherent signal
CHANNEL BANWIDTH: 20 MHz

Frequency, MHz	Antenna gain, dBi	Antenna gain array*, dB	Peak				Average				Verdict
			SA reading, dBm	Peak EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	SA reading, dBm	Average EIRP****, dBm/MHz	Limit, dBm	Margin***, dB	
Low carrier frequency											
5149.190	17.0	3.0	-46.18	-26.18	-21.2	-4.98	-63.72	-41.25	-41.2	-0.05	Pass
5406.869	17.0	3.0	-52.12	-32.12	-21.2	-10.92	-66.05	-43.58	-41.2	-2.38	Pass
Mid carrier frequency											
4915.300	17.0	3.0	-56.23	-36.23	-21.2	-15.03	-64.09	-41.62	-41.2	-0.42	Pass
5406.759	17.0	3.0	-57.64	-37.64	-21.2	-16.44	-72.06	-49.59	-41.2	-8.39	Pass
High carrier frequency											
4915.300	17.0	3.0	-54.79	-34.79	-21.2	-13.59	-63.87	-41.40	-41.2	-0.20	Pass
5406.869	17.0	3.0	-58.11	-38.11	-21.2	-16.91	-71.25	-48.78	-41.2	-7.58	Pass

* - Antenna gain array = 10log(N_{ant}), where N_{ant} = 2 *(two cross-polarized antennas with non-coherent signals)*
** - Peak EIRP = SA reading + Antenna gain + Antenna gain array
******* - Margin = EIRP – specified limit.
******** - Average EIRP = SA reading + Antenna gain + Antenna gain array + Duty cycle factor

Table 7.9.4 Duty cycle factor calculation

Burst dration, ms	Burst period, ms	Duty cycle*	Duty cycle factor**, dB
2.83	5.00	0.566	2.47

*- Duty cycle = *Burst duration / Burst period*
** - Duty cycle factor = *10log(1/Duty cycle)*

Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Table 7.9.5 Conducted spurious emission outside restricted band test results

ASSIGNED FREQUENCY RANGE: 5.15 – 5.25 GHz
INVESTIGATED FREQUENCY RANGE: 4500 - 6400 MHz
MODULATION: QPSK
DETECTOR USED: Peak
RESOLUTION BANDWIDTH 1000 kHz
EUT CONFIGURATION: 1 carrier, 1 sector (4 ports to 2 dual slant antennas), non-coherent signal

CHANNEL BANWIDTH: 10 MHz

Frequency, MHz	SA reading, dBm	Antenna gain, dBi	Antenna gain array*, dB	EIRP**, dBm/MHz	Limit, dBm/MHz	Margin***, dB	Verdict
Low carrier frequency							
5499.700	-58.97	17.0	3.0	-38.97	-27.0	-11.97	Pass
Mid carrier frequency							
5690.890	-50.52	17.0	3.0	-30.52	-27.0	-3.52	Pass
High carrier frequency							
5736.460	-50.15	17.0	3.0	-30.15	-27.0	-3.15	Pass

CHANNEL BANWIDTH: 15 MHz

Frequency, MHz	SA reading, dBm	Antenna gain, dBi	Antenna gain array*, dB	EIRP**, dBm/MHz	Limit, dBm/MHz	Margin***, dB	Verdict
Low carrier frequency							
5932.820	-55.24	17.0	3.0	-35.24	-27.0	-8.24	Pass
Mid carrier frequency							
5753.370	-51.27	17.0	3.0	-31.27	-27.0	-4.27	Pass
High carrier frequency							
5795.180	-51.53	17.0	3.0	-31.53	-27.0	-4.53	Pass

CHANNEL BANWIDTH: 20 MHz

Frequency, MHz	SA reading, dBm	Antenna gain, dBi	Antenna gain array*, dB	EIRP**, dBm/MHz	Limit, dBm/MHz	Margin***, dB	Verdict
Low carrier frequency							
5576.740	-57.78	17.0	3.0	-37.78	-27.0	-10.78	Pass
Mid carrier frequency							
5697.000	-53.33	17.0	3.0	-33.33	-27.0	-6.33	Pass
High carrier frequency							
5730.350	-52.53	17.0	3.0	-32.53	-27.0	-5.53	Pass

* - Antenna gain array = 10log(N_{ant}), where N_{ant} = 2 *(two cross-polarized antennas)*

** - EIRP = SA reading + Antenna gain + Antenna gain array

******* - Margin = EIRP – specified limit.

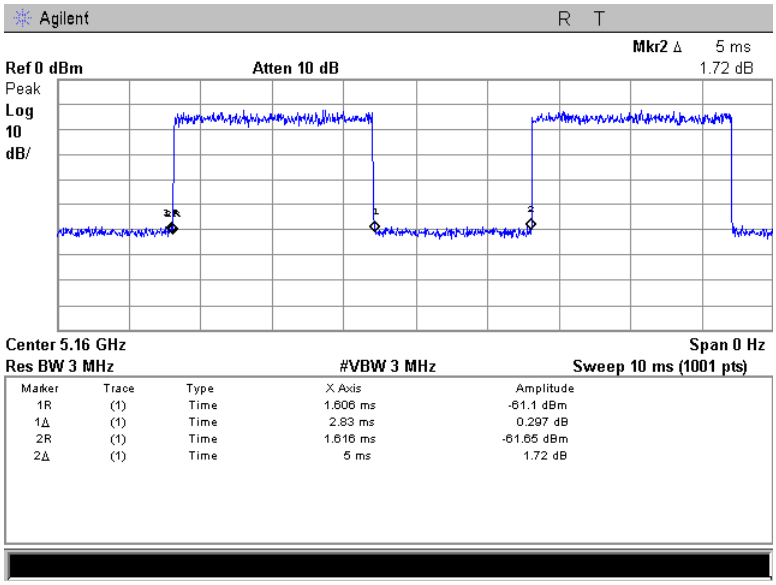
Reference numbers of test equipment used

HL 3901	HL 4355						

Full description is given in Appendix A.

Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

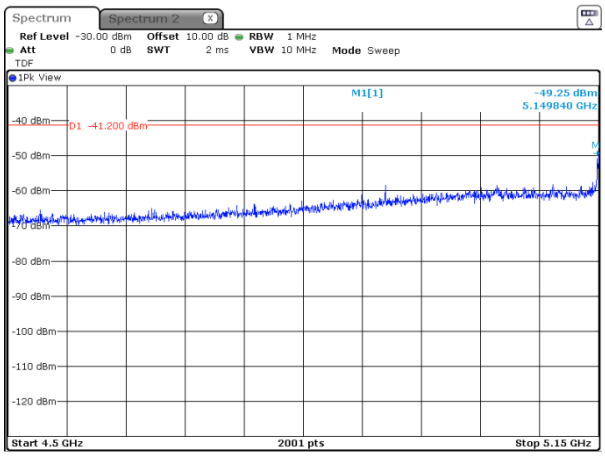
Plot 7.9.1 Duty cycle

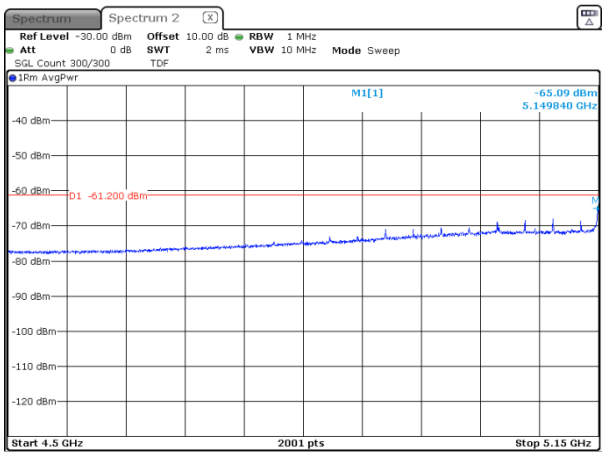


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.2 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

CARRIER FREQUENCY 5160 MHz
CHANNEL BANDWIDTH 10 MHz

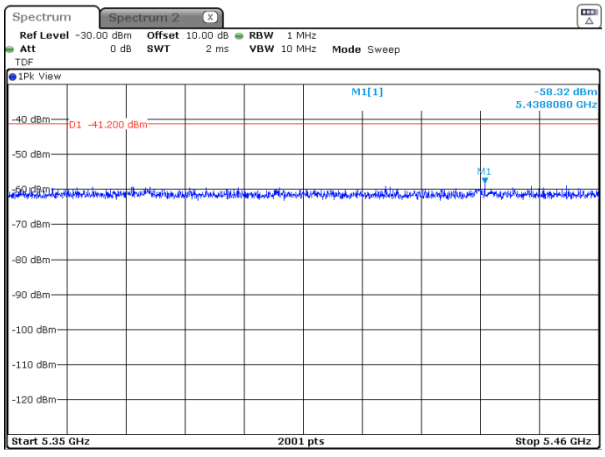


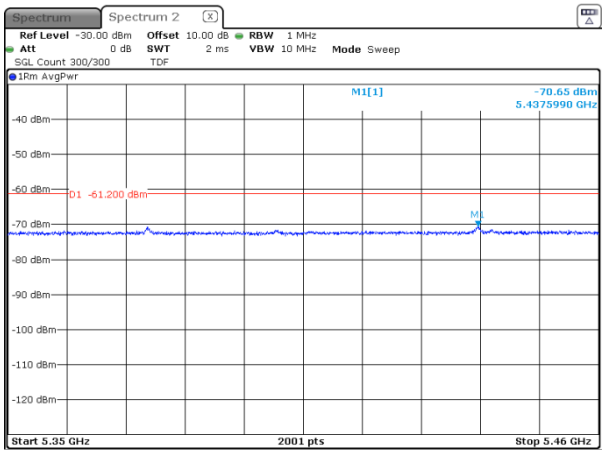


*Applied Limit = Specification limit – Antenna Gain – Antenna Array gain

Plot 7.9.3 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5160 MHz
CHANNEL BANDWIDTH 10 MHz

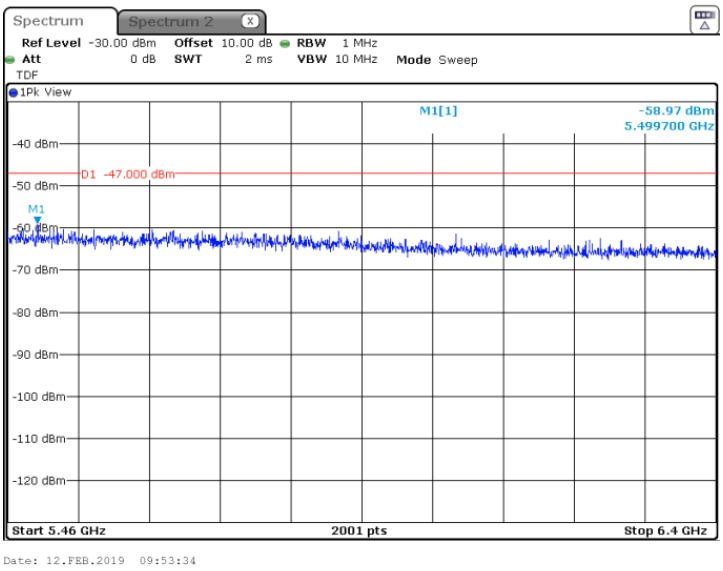




Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.4 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

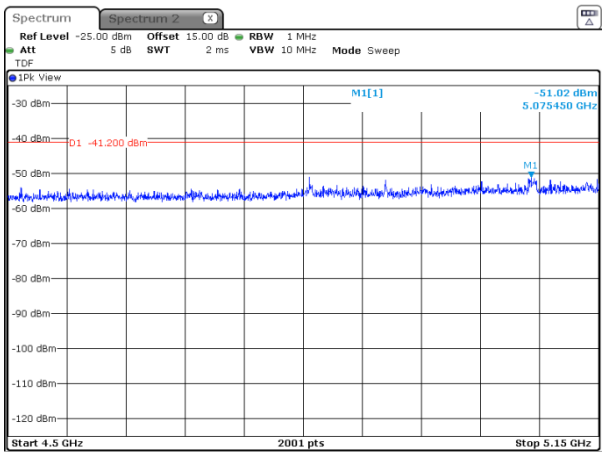
CARRIER FREQUENCY 5160 MHz
CHANNEL BANDWIDTH 10 MHz

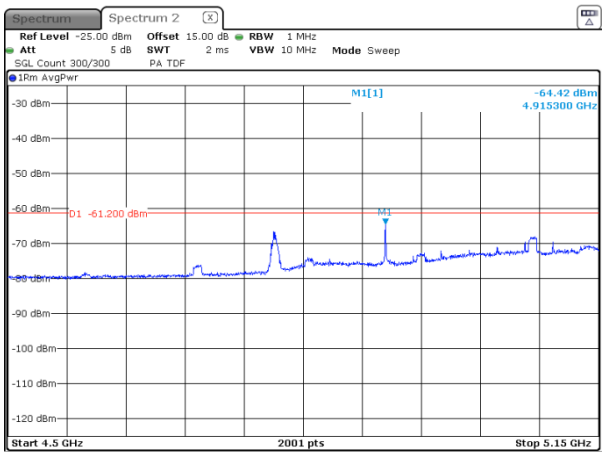


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.5 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

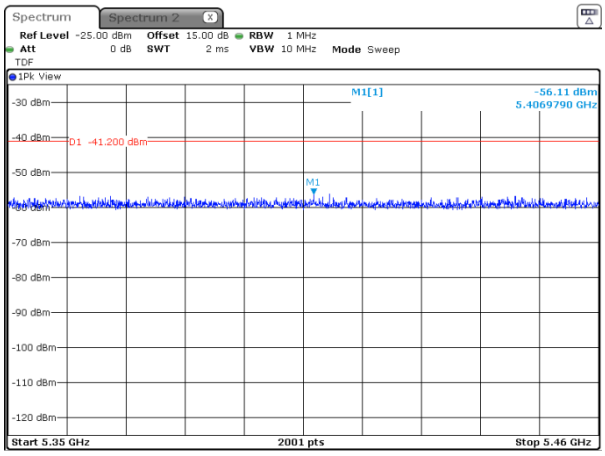
CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 10 MHz

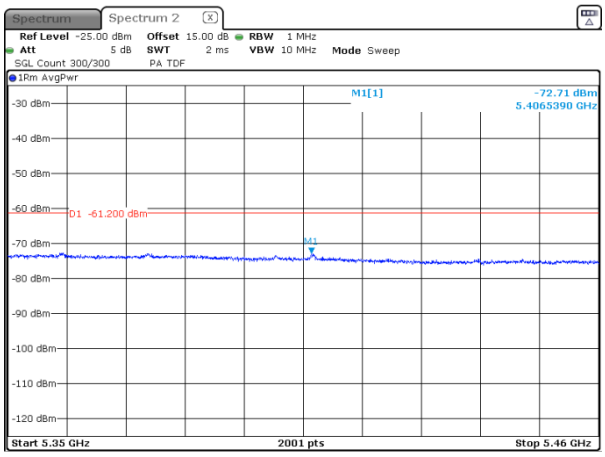




Plot 7.9.6 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 10 MHz

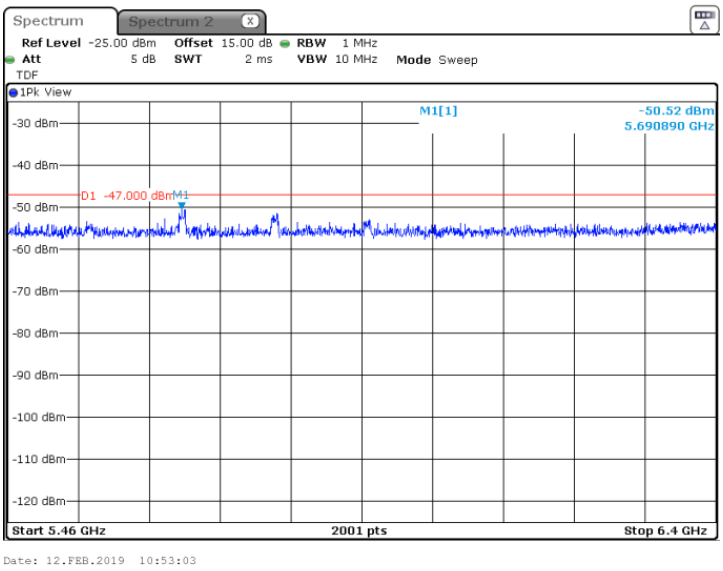




Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.7 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

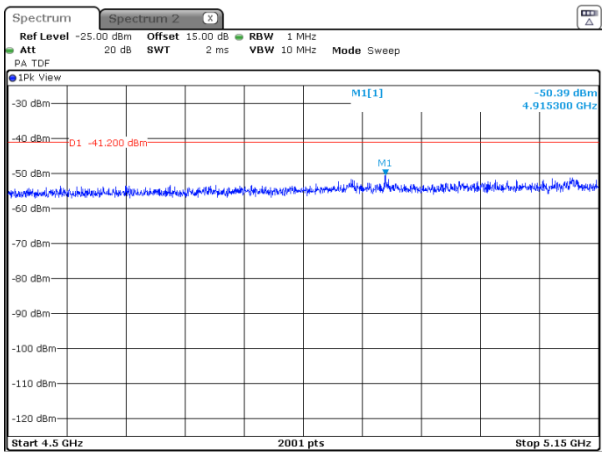
CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 10 MHz

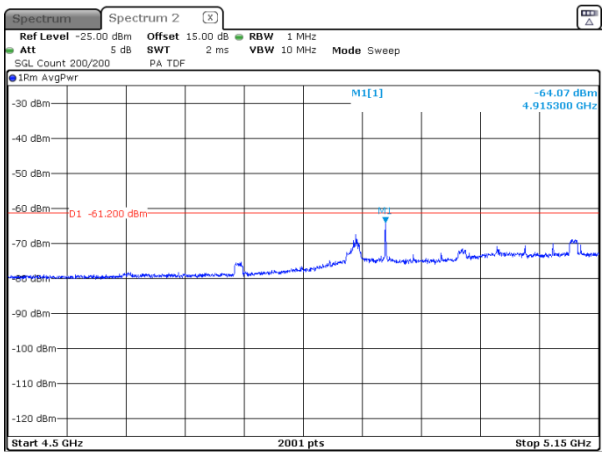


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.8 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

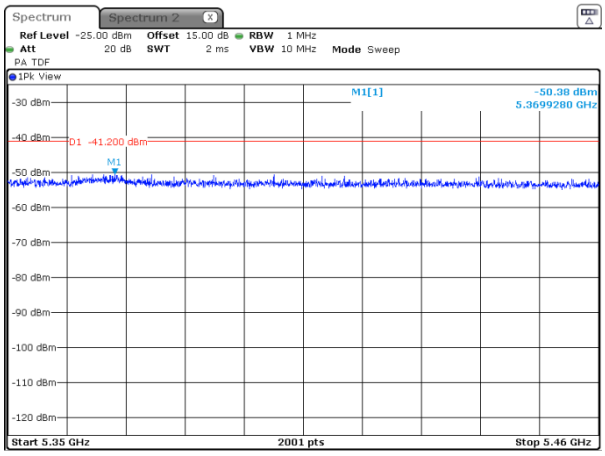
CARRIER FREQUENCY 5245 MHz
CHANNEL BANDWIDTH 10 MHz

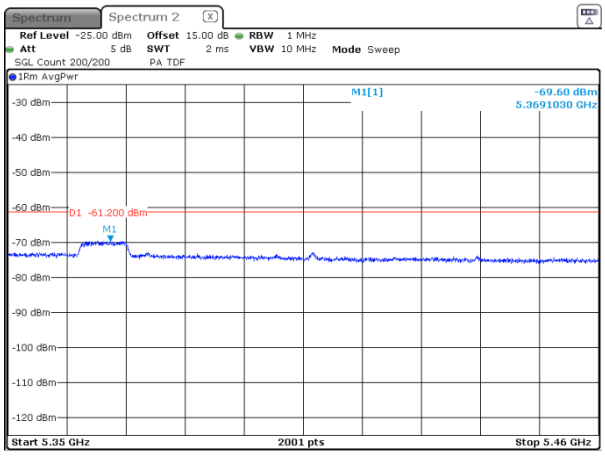




Plot 7.9.9 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5245 MHz
CHANNEL BANDWIDTH 10 MHz

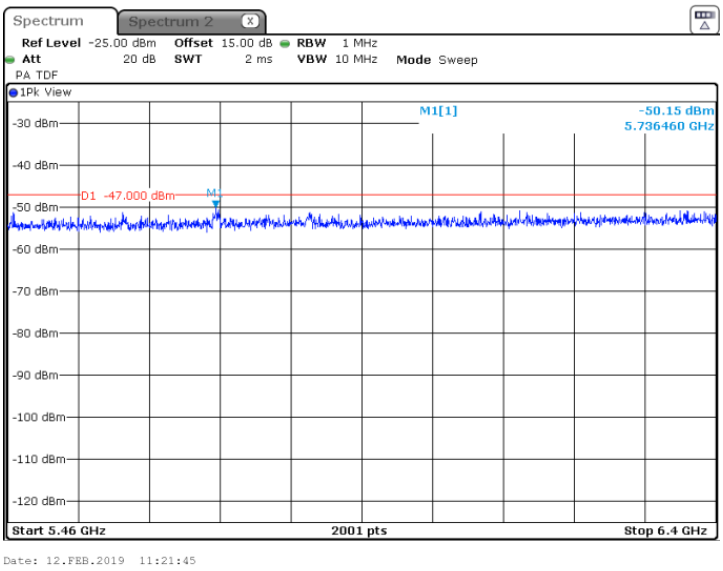




Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.10 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

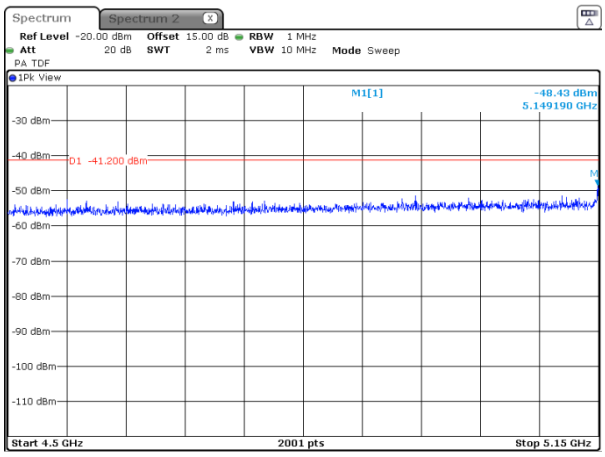
CARRIER FREQUENCY 5245 MHz
CHANNEL BANDWIDTH 10 MHz

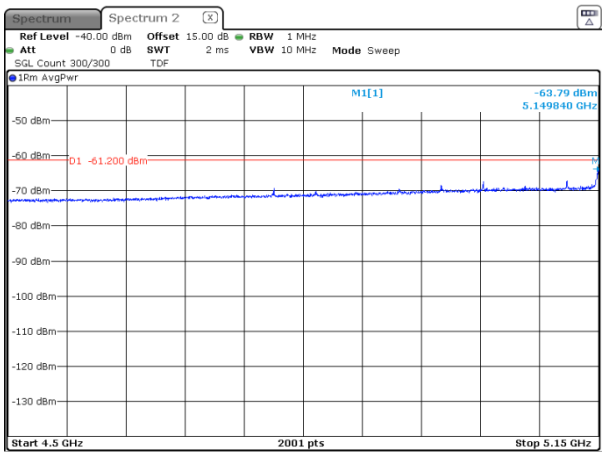


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.11 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

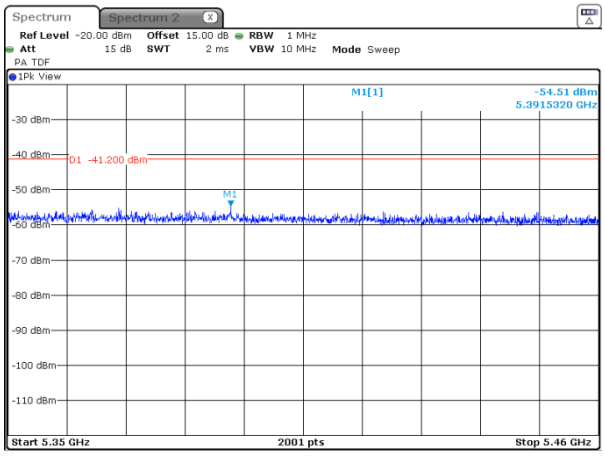
CARRIER FREQUENCY 5165 MHz
CHANNEL BANDWIDTH 15 MHz

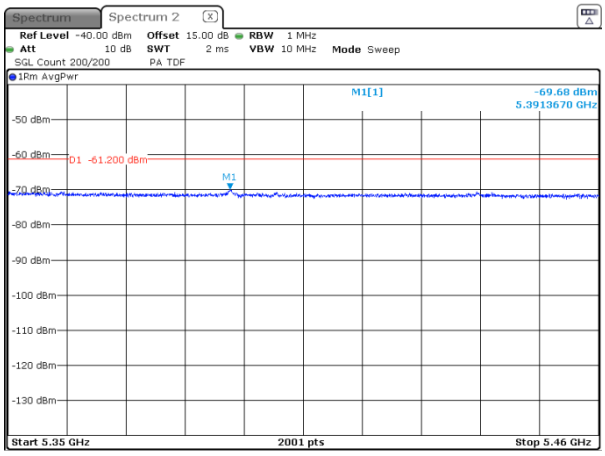




Plot 7.9.12 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5165 MHz
CHANNEL BANDWIDTH 15 MHz

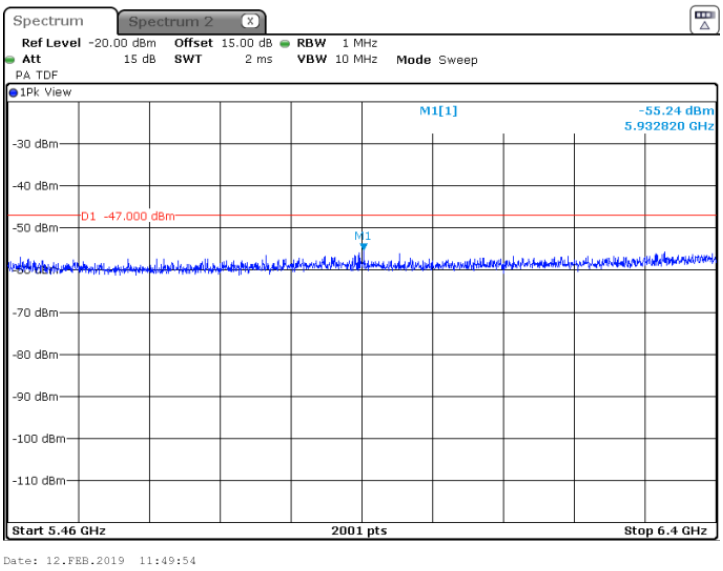




Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.13 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

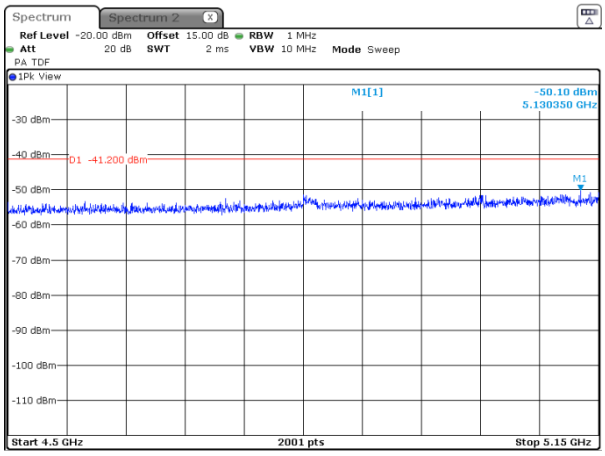
CARRIER FREQUENCY 5165 MHz
CHANNEL BANDWIDTH 15 MHz

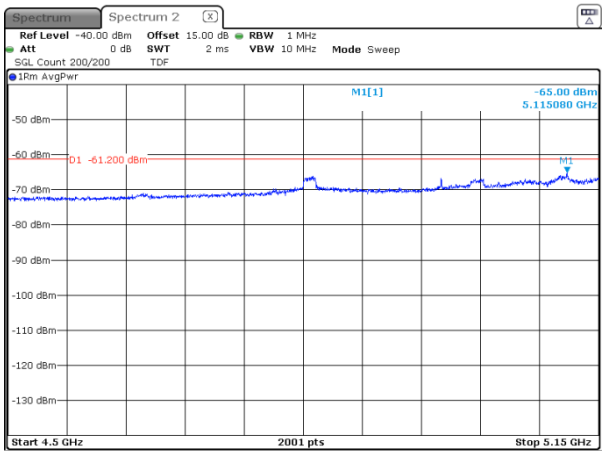


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.14 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

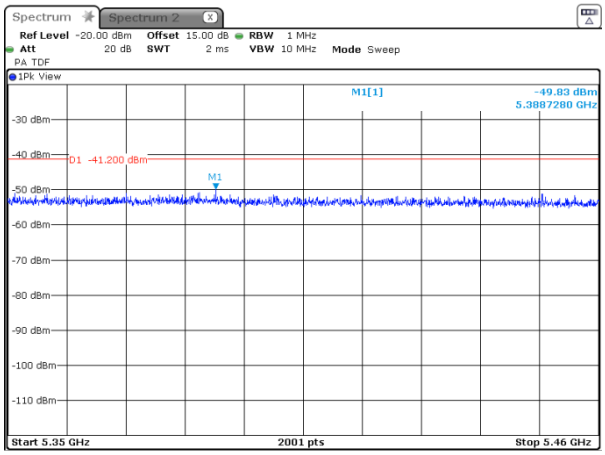
CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 15 MHz

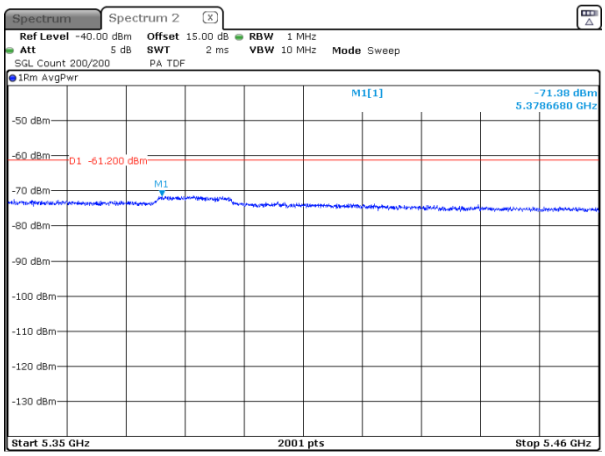




Plot 7.9.15 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 15 MHz

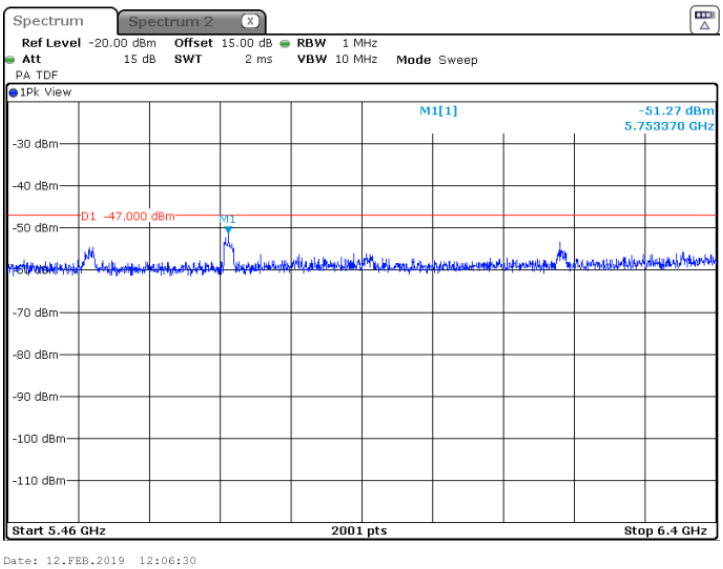




Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.16 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

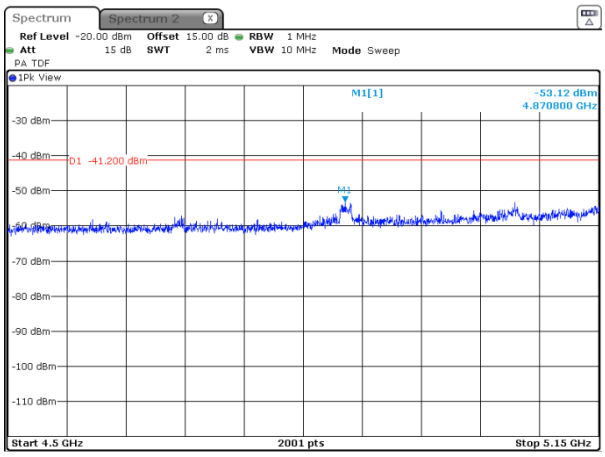
CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 15 MHz

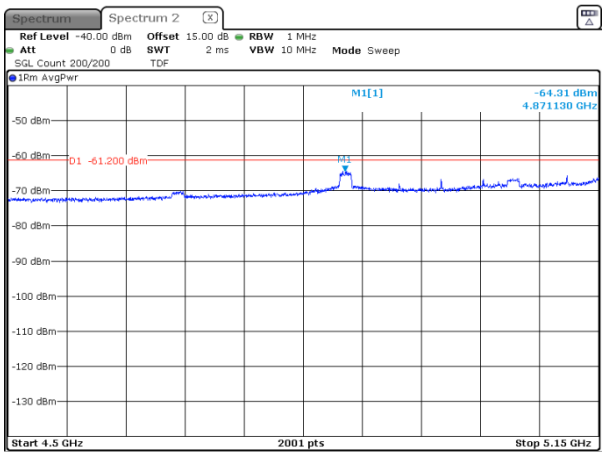


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.17 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

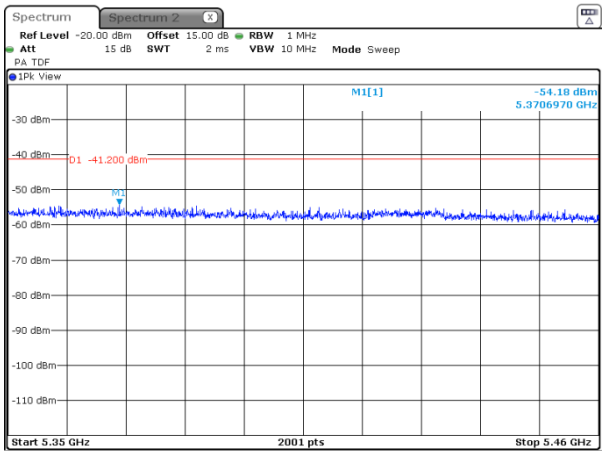
CARRIER FREQUENCY 5240 MHz
CHANNEL BANDWIDTH 15 MHz

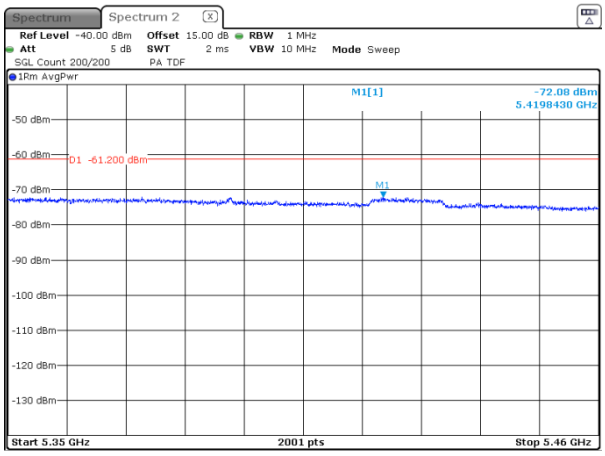




Plot 7.9.18 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5240 MHz
CHANNEL BANDWIDTH 15 MHz

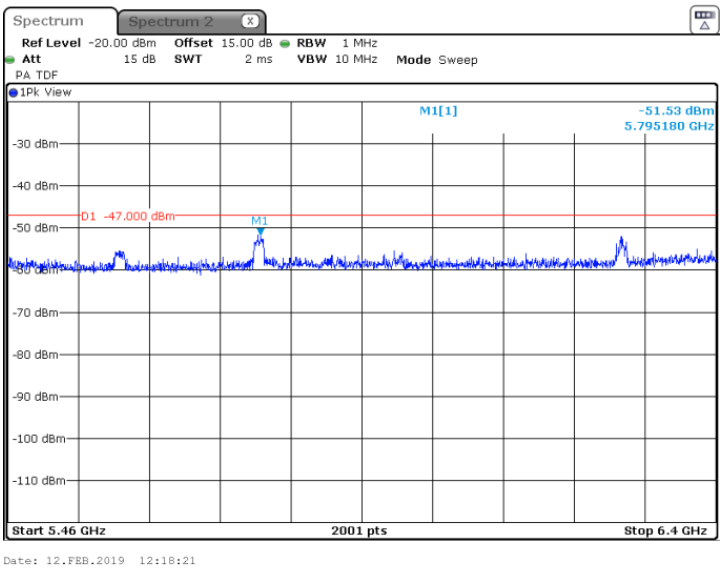




Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.19 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

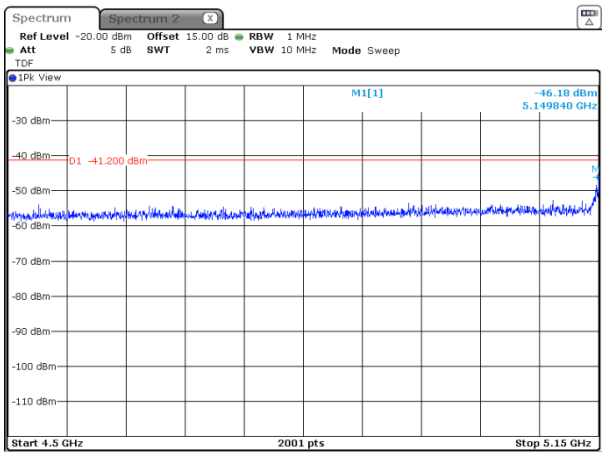
CARRIER FREQUENCY 5240 MHz
CHANNEL BANDWIDTH 15 MHz

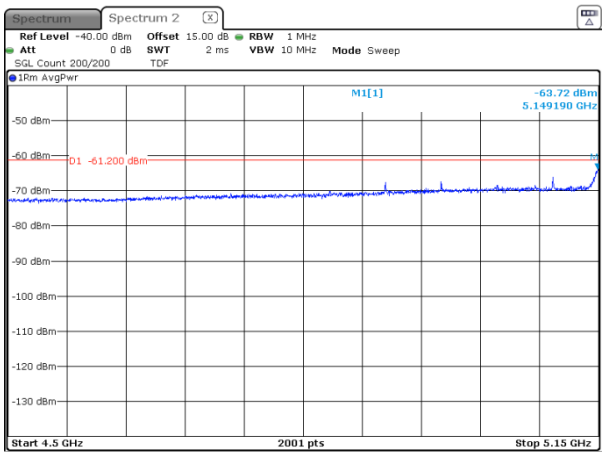


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.20 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

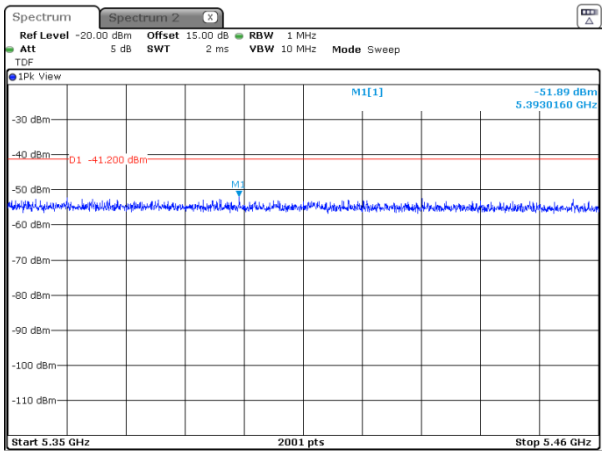
CARRIER FREQUENCY 5165 MHz
CHANNEL BANDWIDTH 20 MHz

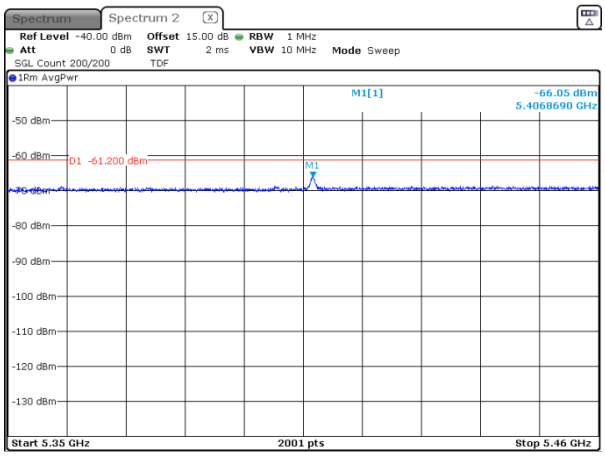




Plot 7.9.21 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5165 MHz
CHANNEL BANDWIDTH 20 MHz

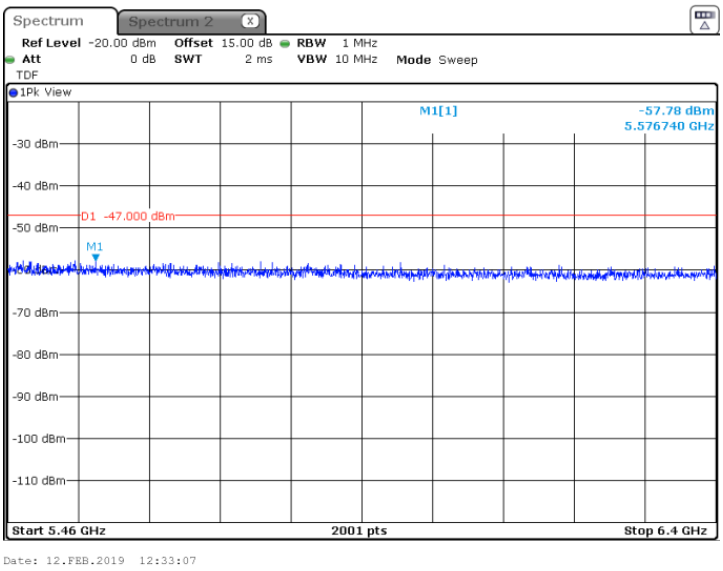




Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.22 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

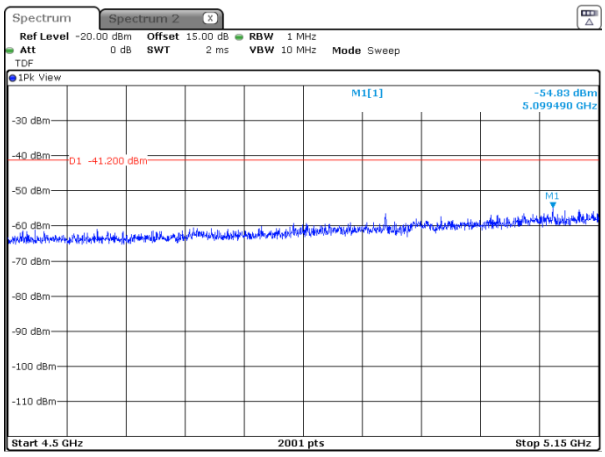
CARRIER FREQUENCY 5165 MHz
CHANNEL BANDWIDTH 20 MHz

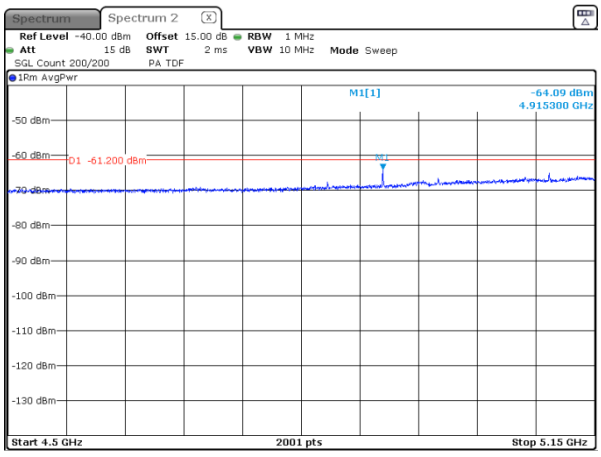


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.23 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

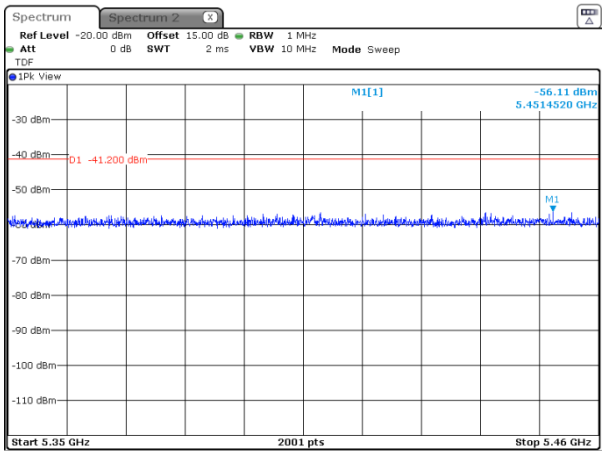
CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 20 MHz

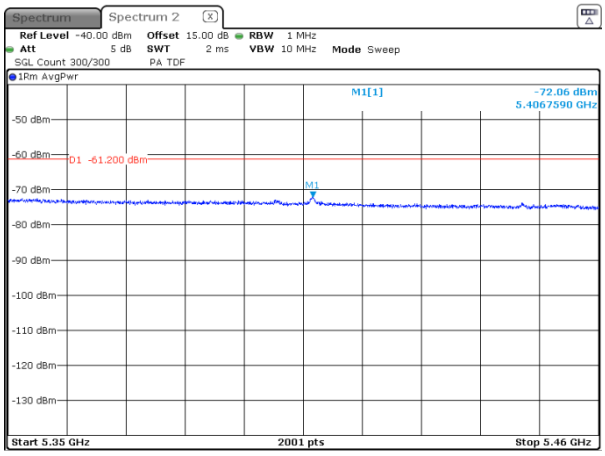




Plot 7.9.24 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 20 MHz

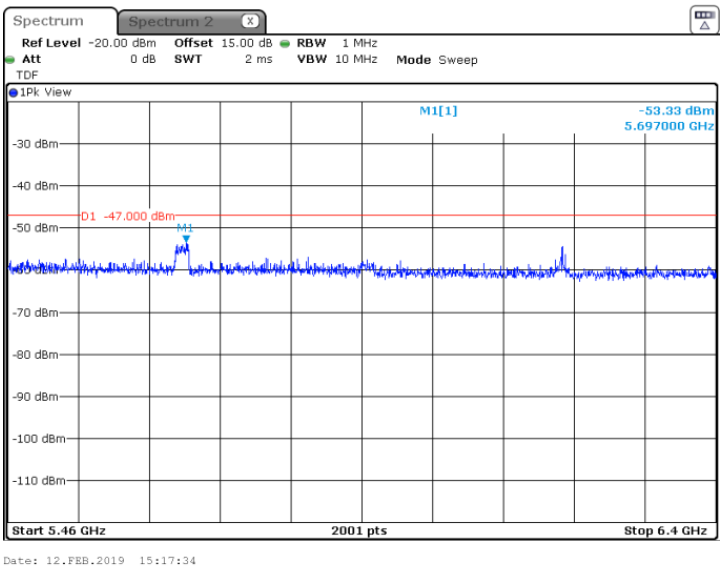




Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.25 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

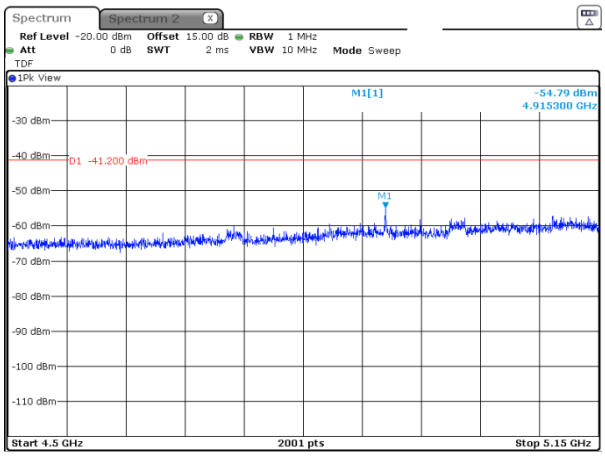
CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 20 MHz

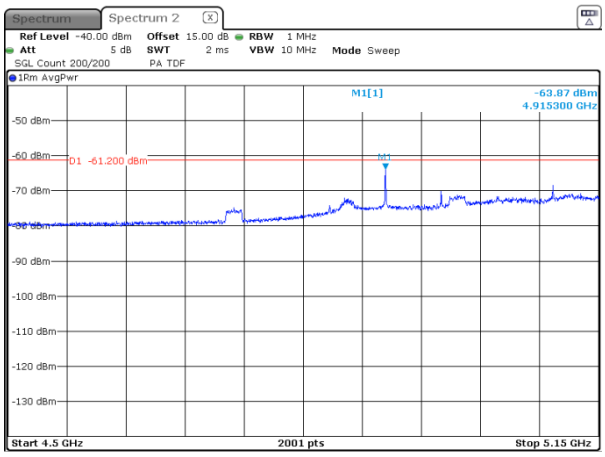


Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.26 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

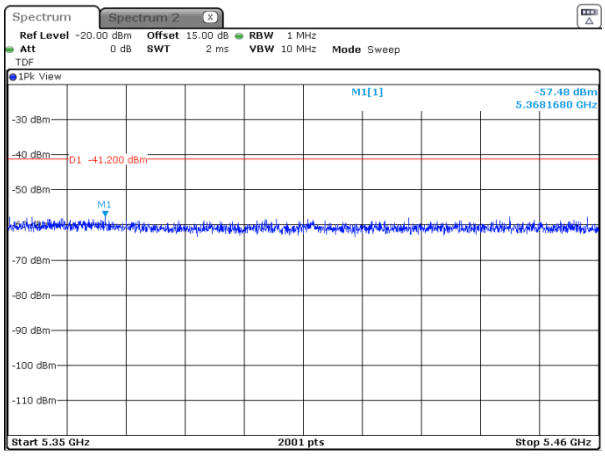
CARRIER FREQUENCY 5240 MHz
CHANNEL BANDWIDTH 20 MHz

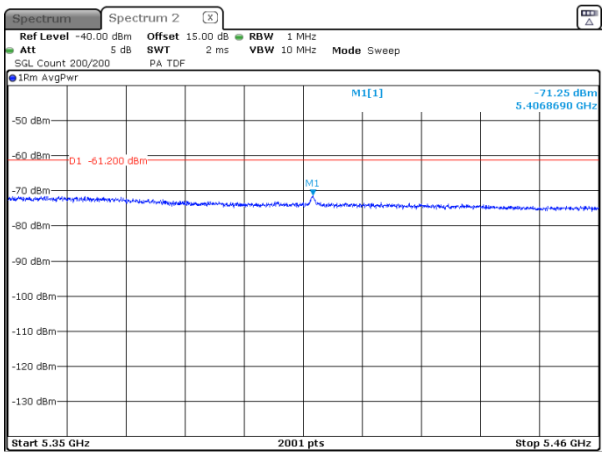




Plot 7.9.27 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5240 MHz
CHANNEL BANDWIDTH 20 MHz

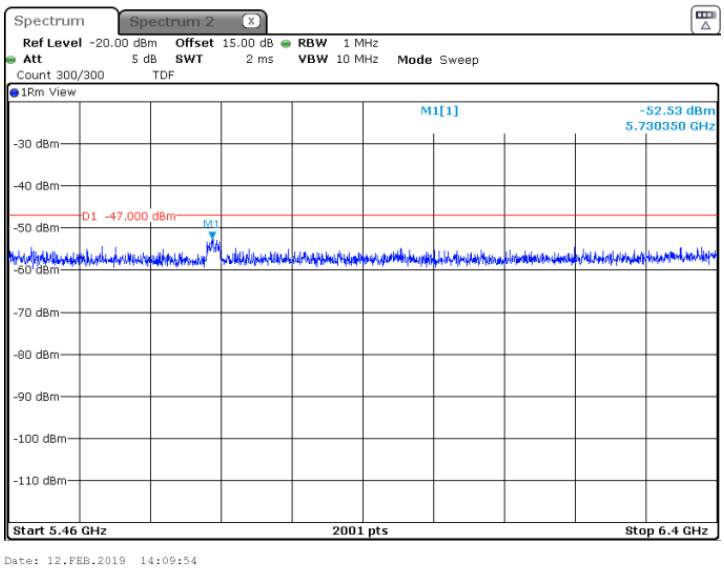




Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.9.28 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

CARRIER FREQUENCY 5240 MHz
CHANNEL BANDWIDTH 20 MHz



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

7.10 Conducted out of band emissions at 5150 – 5250 MHz range

7.10.1 General

This test was performed to measure spurious emissions from the EUT near the band edges and within the pass band of the antenna. Specification test limits are given in Table 7.10.1 & EIRP of undesirable emission limits are given in Table 7.10.2

Table 7.10.1 Unwanted emissions limit within restricted bands above 1 GHz

Frequency, MHz	Field strength at 3 m, dB(μV/m)*		Equivalent EIRP*, dBm	
	Peak	Average	Peak	Average
1000 – 40000	74.0	54.0	-21.2	-41.2

* Equivalent EIRP was calculated as follow: Field strength – 95.2

Table 7.10.2 EIRP of undesirable emission limits outside restricted bands above 1 GHz

Frequency, MHz	EIRP of spurious, dBm/MHz
Outside 5150-5350 band	-27

Test procedure

7.10.1.1 The EUT was set up as shown in Figure 7.10.1, energized and the performance check was conducted.

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

7.10.1.3 The spectrum analyzer span was set to capture the carrier frequency and associated modulation products. The resolution bandwidth was set to 1 MHz.

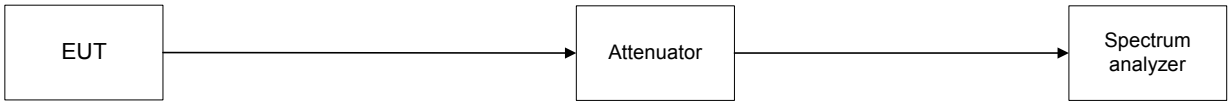
7.10.1.4 The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.

7.10.1.5 The maximum band edge emission and modulation product outside of the band were measured as provided in the associated tables and plots.

7.10.1.6 The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the mid and highest carrier frequencies.

7.10.1.7 Test results are shown in the Table 7.10.3, Table 7.10.4, Table 7.10.5 and the associated plots.

Figure 7.10.1 Setup for conducted spurious emissions



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Table 7.10.3 Conducted spurious emission within restricted band test results

ASSIGNED FREQUENCY: 5.15 – 5.25 GHz
INVESTIGATED FREQUENCY RANGE: 4500 - 6400 MHz
MODULATION: QPSK
DETECTOR USED: Peak/Average
RESOLUTION BANDWIDTH: 1000 kHz
EUT CONFIGURATION: 1 carrier, 1 sector (4 ports to 2 dual slant antennas), coherent signal
CHANNEL BANWIDTH: 10 MHz

Frequency, MHz	Antenna gain, dBi	Antenna gain array*, dB	Peak				Average				Verdict
			SA reading, dBm	EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	SA reading, dBm	EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	
Low carrier frequency											
5149.840	17.0	6.0	-50.10	-27.1	-21.2	-5.90	-67.53	-42.06	-41.2	-0.86	Pass
5406.814	17.0	6.0	-59.92	-36.92	-21.2	-15.72	-70.22	-44.75	-41.2	-3.55	Pass
Mid carrier frequency											
5099.490	17.0	6.0	-56.85	-33.85	-21.2	-12.65	-67.96	-42.49	-41.2	-1.29	Pass
5406.594	17.0	6.0	-56.56	-33.56	-21.2	-12.36	-69.84	-44.37	-41.2	-3.17	Pass
High carrier frequency											
5099.490	17.0	6.0	-57.82	-34.82	-21.2	-13.62	-67.28	-41.81	-41.2	-0.61	Pass
5368.443	17.0	6.0	-58.21	-35.21	-21.2	-14.01	-69.75	-44.28	-41.2	-3.08	Pass

CHANNEL BANWIDTH: 15 MHz

Frequency, MHz	Antenna gain, dBi	Antenna gain array*, dB	Peak				Average				Verdict
			SA reading, dBm	EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	SA reading, dBm	EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	
Low carrier frequency											
5149.510	17.0	6.0	-46.69	-23.69	-21.2	-2.49	-67.41	-41.94	-41.2	-0.74	Pass
5391.312	17.0	6.0	-55.81	-32.81	-21.2	-11.61	-69.58	-44.11	-41.2	-2.91	Pass
Mid carrier frequency											
5115.080	17.0	6.0	-55.42	-32.42	-21.2	-11.22	-67.53	-42.06	-41.2	-0.86	Pass
5391.422	17.0	6.0	-56.13	-33.13	-21.2	-11.93	-69.68	-44.21	-41.2	-3.01	Pass
High carrier frequency											
5115.080	17.0	6.0	-54.81	-31.81	-21.2	-10.61	-67.60	-42.13	-41.2	-0.93	Pass
5391.422	17.0	6.0	-55.32	-32.32	-21.2	-11.12	-69.70	-44.23	-41.2	-3.03	Pass

Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Table 7.10.3 Conducted spurious emission within restricted band test results

ASSIGNED FREQUENCY RANGE: 5.15 – 5.25 GHz
INVESTIGATED FREQUENCY RANGE: 4500 - 6400 MHz
MODULATION: QPSK
DETECTOR USED: Peak
RESOLUTION BANDWIDTH 1000 kHz
EUT CONFIGURATION: 1 carrier, 1 sector (4 ports to 2 dual slant antennas), coherent signal
CHANNEL BANWIDTH: 20 MHz

Frequency, MHz	Antenna gain, dBi	Antenna gain array*, dB	Peak				Average				Verdict
			SA reading, dBm	Peak EIRP**, dBm/MHz	Limit, dBm	Margin***, dB	SA reading, dBm	Average EIRP****, dBm/MHz	Limit, dBm	Margin***, dB	
Low carrier frequency											
5149.840	17.0	6.0	-46.87	-23.87	-21.2	-2.67	-66.71	-41.24	-41.2	-0.04	Pass
5391.312	17.0	6.0	-59.18	-36.18	-21.2	-14.98	-69.94	-44.47	-41.2	-3.27	Pass
Mid carrier frequency											
5115.080	17.0	6.0	-56.13	-33.13	-21.2	-11.93	-66.76	-41.29	-41.2	-0.09	Pass
5391.037	17.0	6.0	-59.84	-36.84	-21.2	-15.64	-69.72	-44.25	-41.2	-3.05	Pass
High carrier frequency											
5115.080	17.0	6.0	-54.91	-31.91	-21.2	-10.71	-66.91	-41.44	-41.2	-0.24	Pass
5391.422	17.0	6.0	-55.82	-32.82	-21.2	-11.62	-69.77	-44.30	-41.2	-3.10	Pass

* - Antenna gain array = 10log(N_{ant}), where N_{ant} = 4 *(two cross-polarized antennas with coherent signals)*
** - Peak EIRP = SA reading + Antenna gain + Antenna gain array
******* - Margin = EIRP – specified limit.
******** - Average EIRP = SA reading + Antenna gain + Antenna gain array + Duty cycle factor

Table 7.10.4 Duty cycle factor calculation

Burst dration, ms	Burst period, ms	Duty cycle*	Duty cycle factor**, dB
2.83	5.00	0.566	2.47

*- Duty cycle = *Burst duration / Burst period*
** - Duty cycle factor = *10log(1/Duty cycle)*

Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Table 7.10.5 Conducted spurious emission outside restricted band test results

ASSIGNED FREQUENCY RANGE: 5.15 – 5.25 GHz
INVESTIGATED FREQUENCY RANGE: 4500 - 6400 MHz
MODULATION: QPSK
DETECTOR USED: Peak
RESOLUTION BANDWIDTH 1000 kHz
EUT CONFIGURATION: 1 carrier, 1 sector (4 ports to 2 dual slant antennas), coherent signal

CHANNEL BANWIDTH: 10 MHz

Frequency, MHz	SA reading, dBm	Antenna gain, dBi	Antenna gain array*, dB	EIRP**, dBm/MHz	Limit, dBm/MHz	Margin***, dB	Verdict
Low carrier frequency							
5600.220	-57.40	17.0	6.0	-34.40	-27.0	-7.40	Pass
Mid carrier frequency							
5608.210	-56.23	17.0	6.0	-33.23	-27.0	-6.23	Pass
High carrier frequency							
6287.490	-55.16	17.0	6.0	-32.16	-27.0	-5.16	Pass

CHANNEL BANWIDTH: 15 MHz

Frequency, MHz	SA reading, dBm	Antenna gain, dBi	Antenna gain array*, dB	EIRP**, dBm/MHz	Limit, dBm/MHz	Margin***, dB	Verdict
Low carrier frequency							
5885.370	-56.32	17.0	6.0	-33.32	-27.0	-6.32	Pass
Mid carrier frequency							
5752.900	-56.61	17.0	6.0	-33.61	-27.0	-6.61	Pass
High carrier frequency							
5792.360	-55.39	17.0	6.0	-32.39	-27.0	-5.39	Pass

CHANNEL BANWIDTH: 20 MHz

Frequency, MHz	SA reading, dBm	Antenna gain, dBi	Antenna gain array*, dB	EIRP**, dBm/MHz	Limit, dBm/MHz	Margin***, dB	Verdict
Low carrier frequency							
5658.950	-59.69	17.0	6.0	-36.69	-27.0	-9.69	Pass
Mid carrier frequency							
6194.010	-55.86	17.0	6.0	-32.86	-27.0	-5.86	Pass
High carrier frequency							
5789.540	-55.97	17.0	6.0	-32.97	-27.0	-5.97	Pass

* - Antenna gain array = 10log(N_{ant}), where N_{ant} = 2 *(two cross-polarized antennas)*

** - EIRP = SA reading + Antenna gain + Antenna gain array

******* - Margin = EIRP – specified limit.

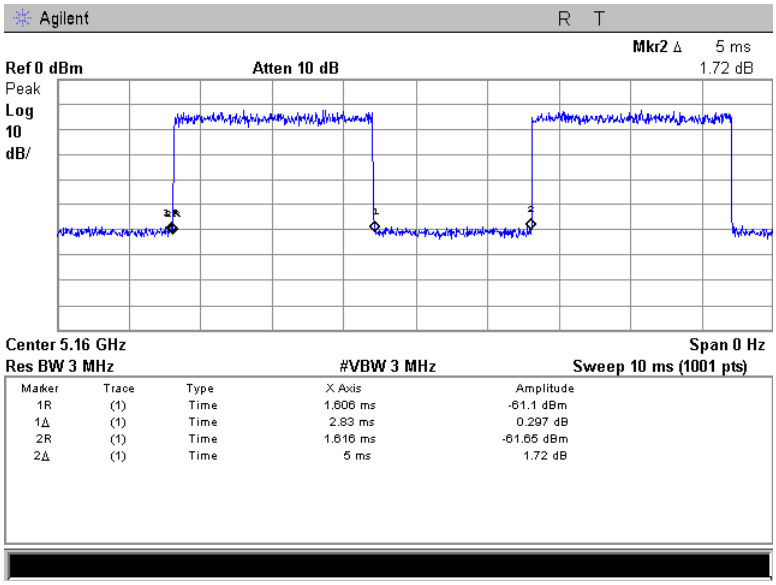
Reference numbers of test equipment used

HL 3901	HL 4355						

Full description is given in Appendix A.

Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

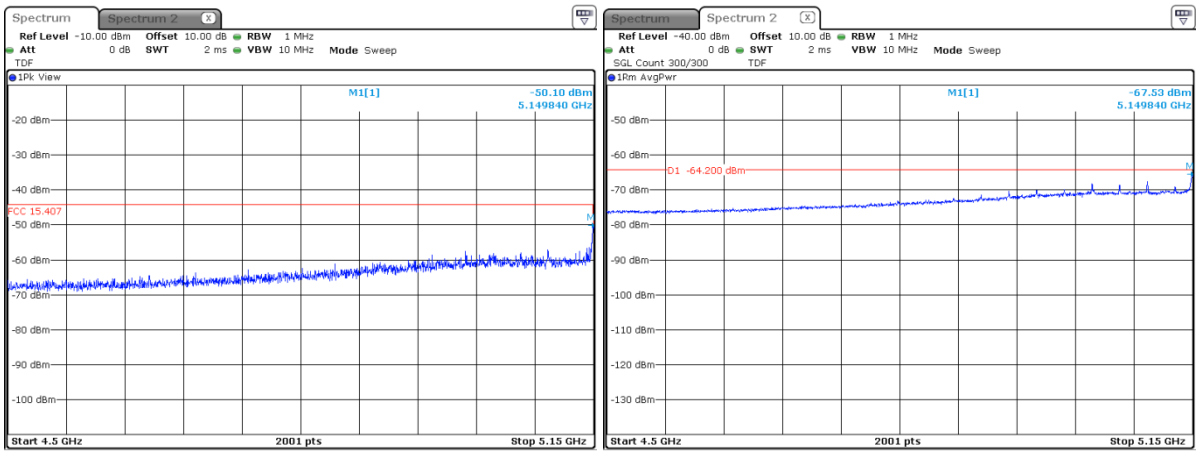
Plot 7.10.1 Duty cycle



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.10.2 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

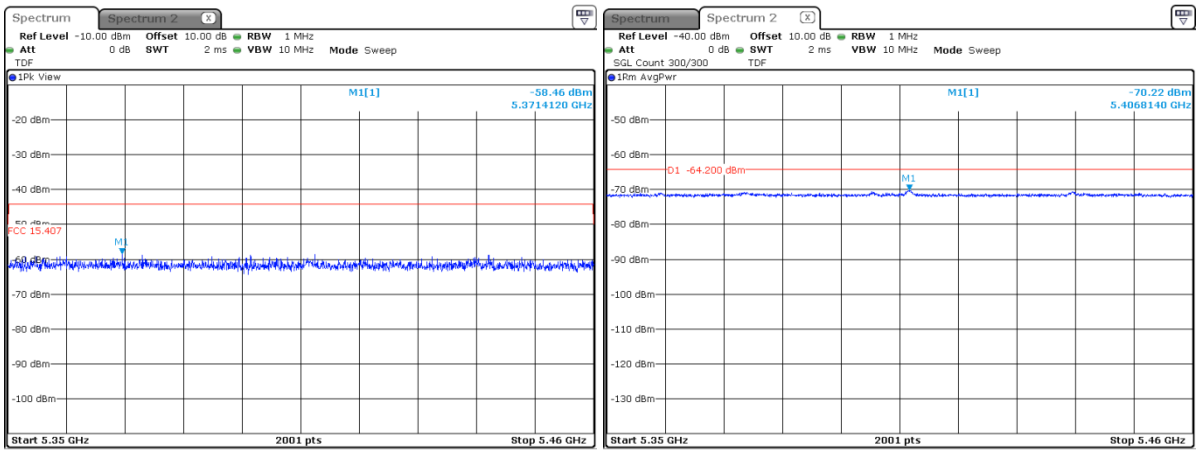
CARRIER FREQUENCY 5160 MHz
CHANNEL BANDWIDTH 10 MHz



*Applied Limit = Specification limit – Antenna Gain – Antenna Array gain

Plot 7.10.3 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

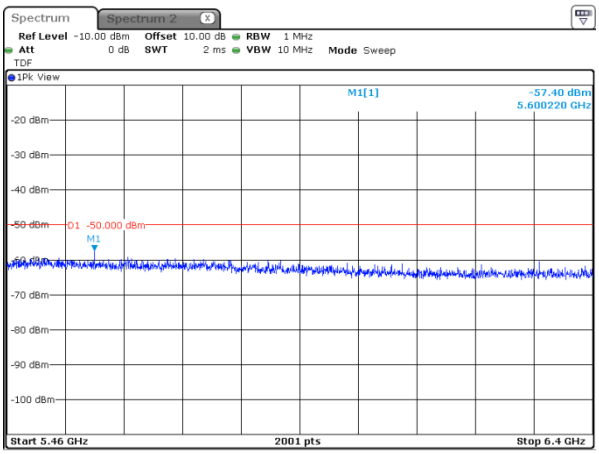
CARRIER FREQUENCY 5160 MHz
CHANNEL BANDWIDTH 10 MHz



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.10.4 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

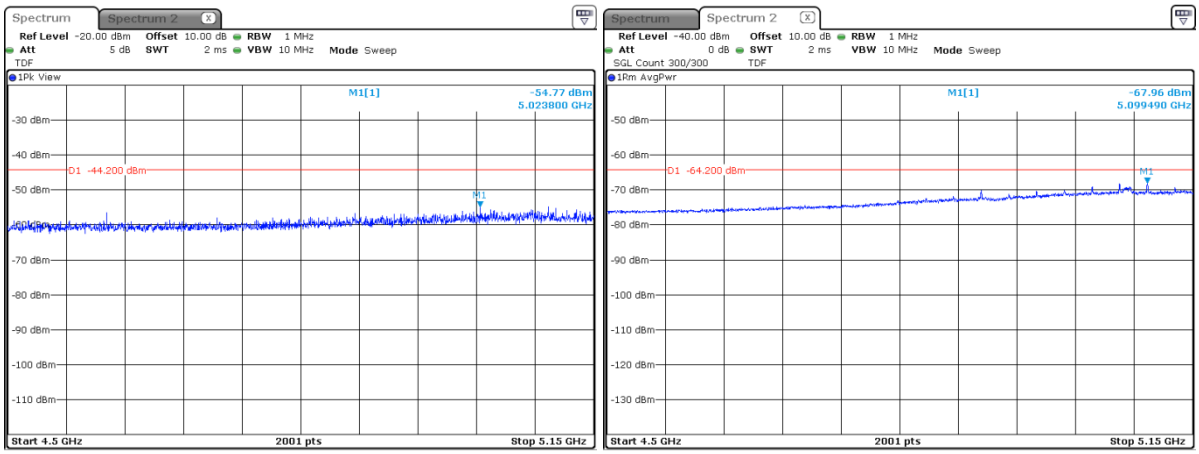
CARRIER FREQUENCY 5160 MHz
CHANNEL BANDWIDTH 10 MHz



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

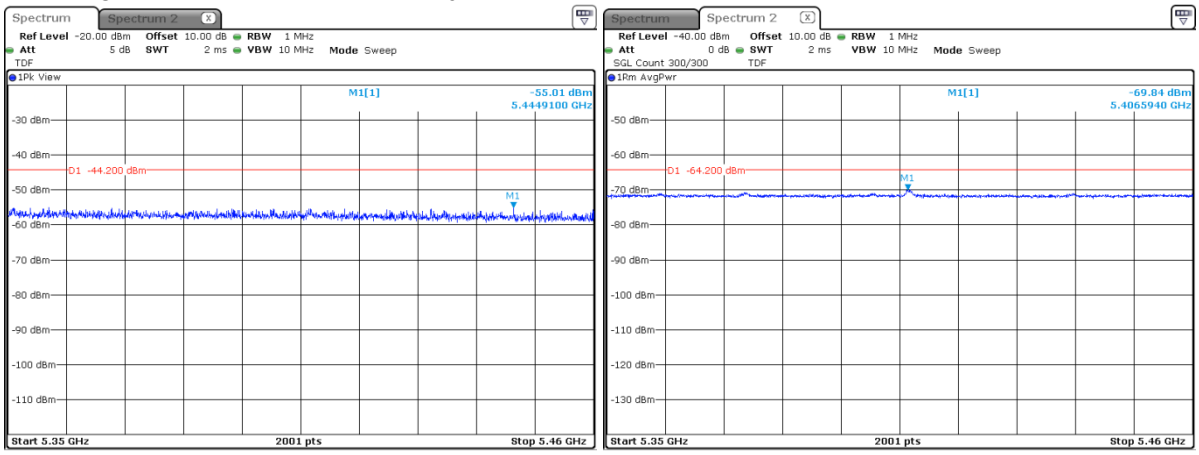
Plot 7.10.5 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 10 MHz



Plot 7.10.6 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

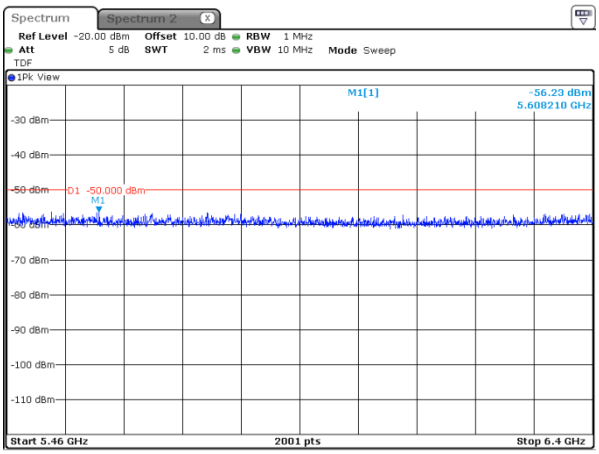
CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 10 MHz



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.10.7 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

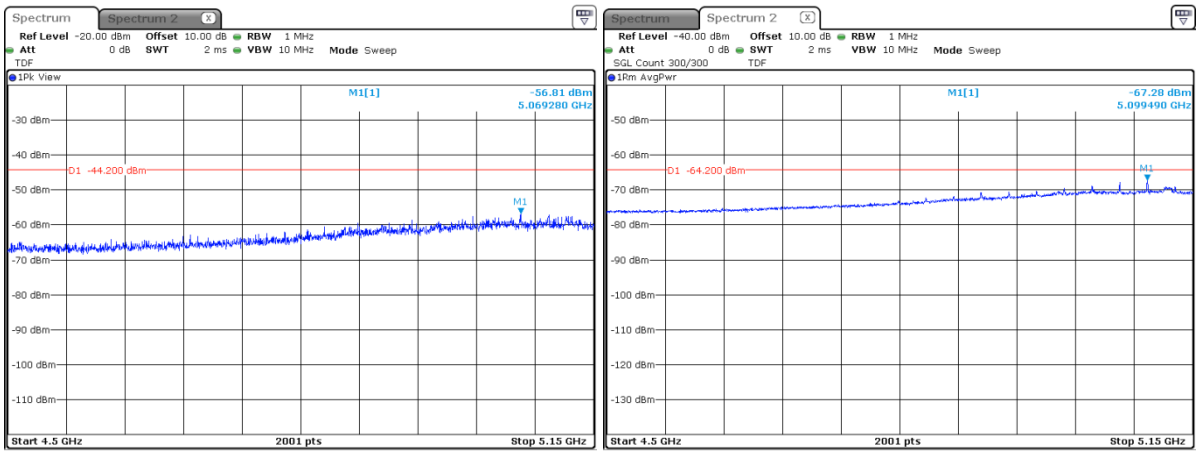
CARRIER FREQUENCY 5200 MHz
CHANNEL BANDWIDTH 10 MHz



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

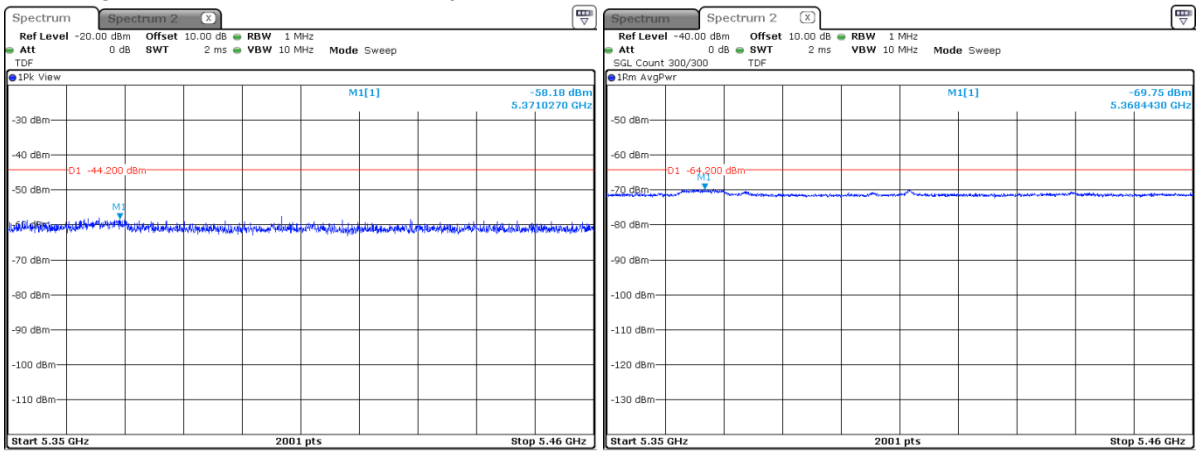
Plot 7.10.8 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

CARRIER FREQUENCY 5245 MHz
CHANNEL BANDWIDTH 10 MHz



Plot 7.10.9 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

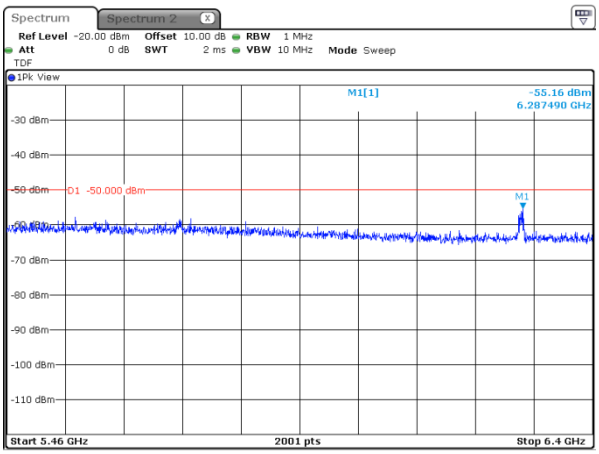
CARRIER FREQUENCY 5245 MHz
CHANNEL BANDWIDTH 10 MHz



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.10.10 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

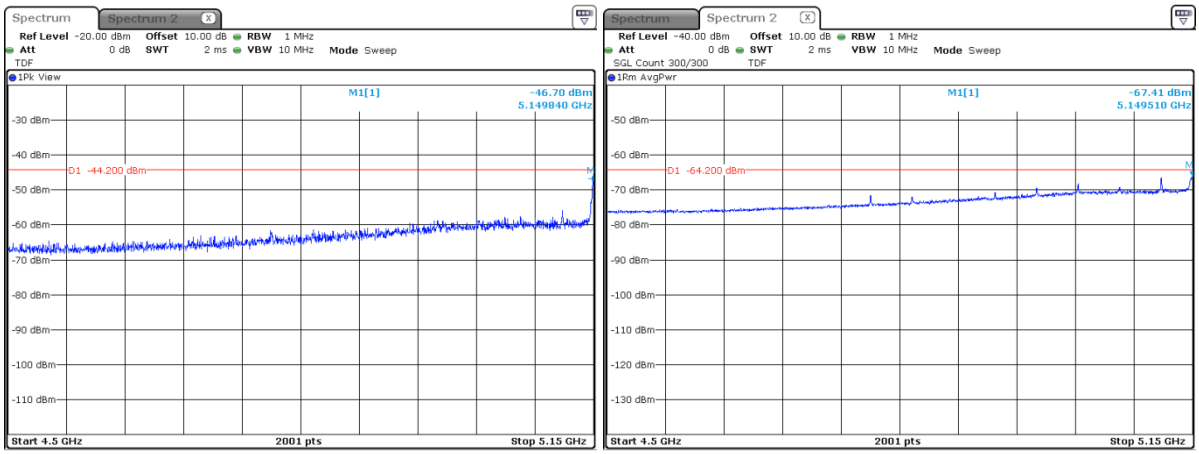
CARRIER FREQUENCY 5245 MHz
CHANNEL BANDWIDTH 10 MHz



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

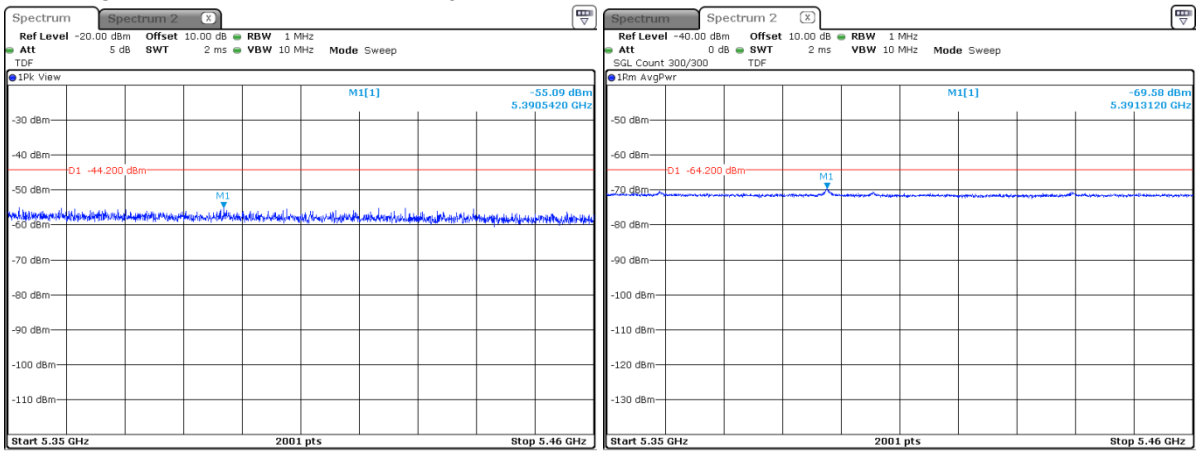
Plot 7.10.11 Conducted spurious emission measurements in the range 4.5 – 5.15 GHz

CARRIER FREQUENCY 5165 MHz
CHANNEL BANDWIDTH 15 MHz



Plot 7.10.12 Conducted spurious emission measurements in the range 5.35 – 5.46 GHz

CARRIER FREQUENCY 5165 MHz
CHANNEL BANDWIDTH 15 MHz



Test specification:	FCC section 15.407(b), Conducted out of band emissions		
Test procedure:	KDB 662911; KDB 789033, ANSI C63.10, section 12.7.6 & 12.7.7		
Test mode:	Compliance	Verdict:	PASS
Date(s):	10-Feb-19		
Temperature: 25 ºC	Relative Humidity: 48 %	Air Pressure: 1019 hPa	Power: 48 VDC
Remarks:			

Plot 7.10.13 Conducted spurious emission measurements in the range 5.46 – 6.4 GHz

CARRIER FREQUENCY 5165 MHz
CHANNEL BANDWIDTH 15 MHz