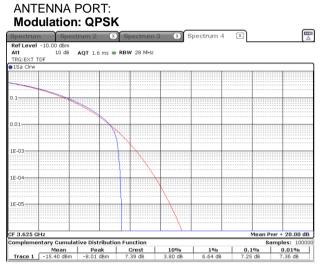


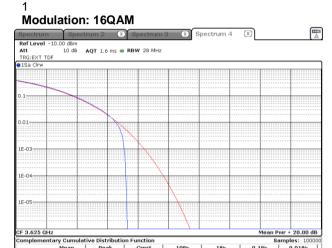
Test specification:	Section 96.41(g), Peak-to- average power ratio			
Test procedure:	Section 96.41(g)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	12-Aug-20	verdict.	PASS	
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz	
Remarks:				

Plot 7.2.5 Peak-to-average power ratio test results at mid frequency

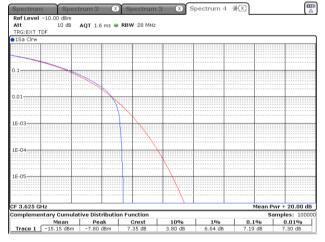
20 MHz

CHANNEL SPACING: ANTENNA PORT:







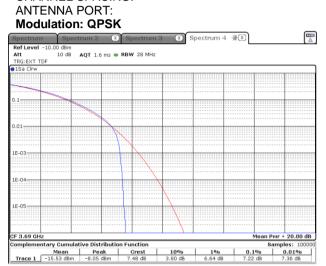




Test specification:	Section 96.41(g), Peak-to- average power ratio			
Test procedure:	Section 96.41(g)			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	12-Aug-20	verdict.	PASS	
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz	
Remarks:				

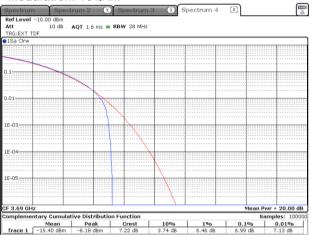
Plot 7.2.6 Peak-to-average power ratio test results at high frequency

CHANNEL SPACING:

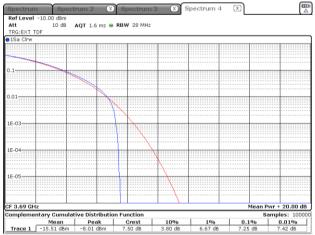


Modulation: 16QAM

20 MHz



Modulation: 64QAM







Test specification:	Section2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	03-Aug-20	verdict.	PASS
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz
Remarks:			

7.3 Occupied bandwidth test

7.3.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, %	Maximum allowed bandwidth, MHz
3550 - 3700	99	10 / 20 MHz

^{* -} Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

7.3.2 Test procedure

- **7.3.2.1** The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.
- **7.3.2.2** The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.
- **7.3.2.3** The EUT was set to transmit the normally modulated carrier.
- **7.3.2.4** The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.3.2 and the associated plots.

Figure 7.3.1 Occupied bandwidth test setup





Test specification:	Section2.1049, Occupied bandwidth			
Test procedure:	47 CFR, Section 2.1049			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	03-Aug-20	verdict.	PASS	
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz	
Remarks:				

Table 7.3.2 Occupied bandwidth test results

DETECTOR USED: Peak hold

RESOLUTION BANDWIDTH: 1-5% of the OBW

VIDEO BANDWIDTH: > RBW
MODULATION ENVELOPE REFERENCE POINTS: 99%

Carrier frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Margin, MHz	Verdict
Channel spacing 10 MHz			-	
Modulation QPSK				
3555.0	9.0549	10.0	-0.9451	Pass
3625.0	9.0666	10.0	-0.9334	Pass
3695.0	9.0441	10.0	-0.9559	Pass
Modulation 16QAM				
3555.0	9.0705	10.0	-0.9295	Pass
3625.0	9.0352	10.0	-0.9648	Pass
3695.0	9.0633	10.0	-0.9367	Pass
Modulation 64QAM				
3555.0	9.0378	10.0	-0.9622	Pass
3625.0	9.0370	10.0	-0.9630	Pass
3695.0	9.0337	10.0	-0.9663	Pass
Channel spacing 20 MHz				
Modulation QPSK				
3560.0	17.9003	20.0	-2.0997	Pass
3625.0	17.9159	20.0	-2.0841	Pass
3690.0	17.8840	20.0	-2.1160	Pass
Modulation 16QAM				
3560.0	17.9084	20.0	-2.0916	Pass
3625.0	17.8969	20.0	-2.1031	Pass
3690.0	17.8934	20.0	-2.1066	Pass
Modulation 64QAM				
3560.0	17.8793	20.0	-2.1207	Pass
3625.0	17.9014	20.0	-2.0986	Pass
3690.0	17.8986	20.0	-2.1014	Pass

Reference numbers of test equipment used

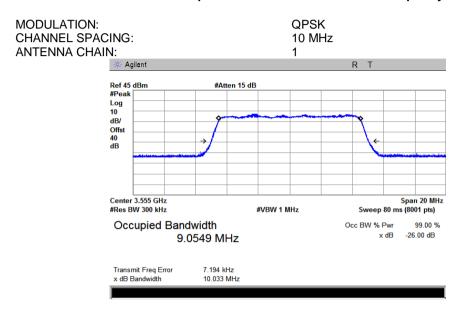
HL 2909	HL 3901	HL 5608			

Full description is given in Appendix A.

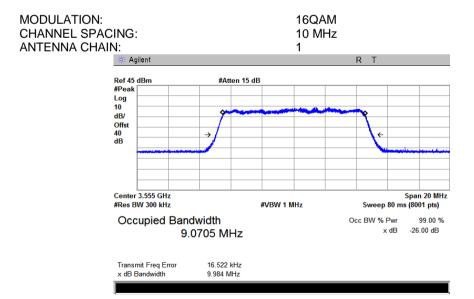


Test specification:	Section2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	03-Aug-20	verdict.	PASS
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz
Remarks:	-		

Plot 7.3.1 Occupied bandwidth test result at low frequency



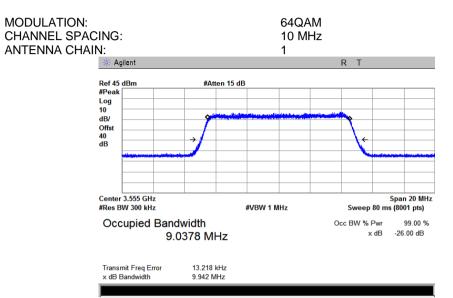
Plot 7.3.2 Occupied bandwidth test result at low frequency





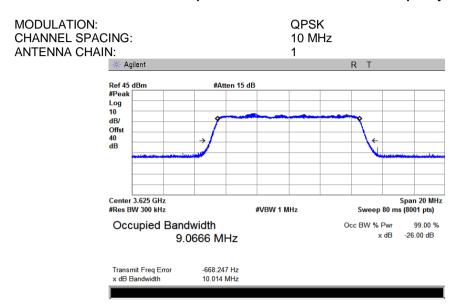
Test specification:	Section2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	03-Aug-20	verdict.	PASS
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz
Remarks:	-		

Plot 7.3.3 Occupied bandwidth test result at low frequency

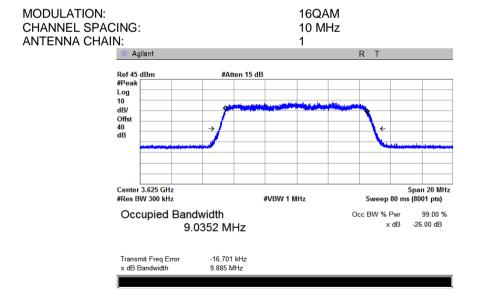




Plot 7.3.4 Occupied bandwidth test result at mid frequency



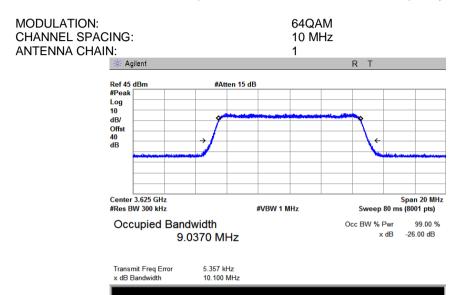
Plot 7.3.5 Occupied bandwidth test result at mid frequency





Test specification:	Section2.1049, Occupied bandwidth			
Test procedure:	47 CFR, Section 2.1049			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	03-Aug-20	verdict.	PASS	
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz	
Remarks:				

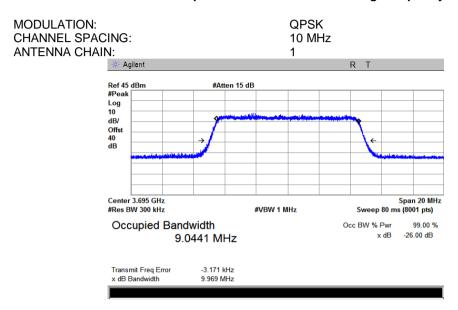
Plot 7.3.6 Occupied bandwidth test result at mid frequency



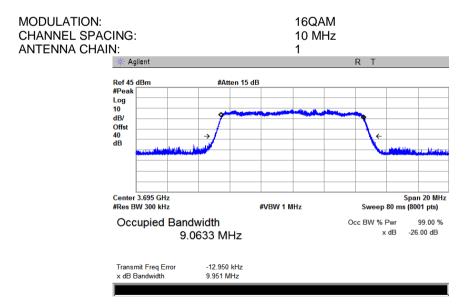


Test specification:	Section2.1049, Occupied bandwidth			
Test procedure:	47 CFR, Section 2.1049			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	03-Aug-20	verdict.	PASS	
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz	
Remarks:				

Plot 7.3.7 Occupied bandwidth test result at high frequency



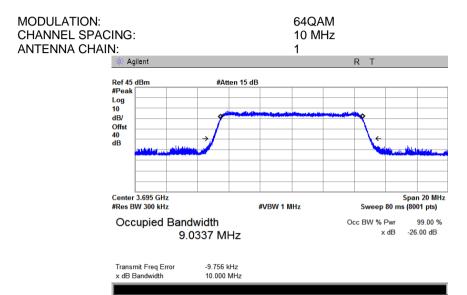
Plot 7.3.8 Occupied bandwidth test result at high frequency





Test specification:	Section2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	03-Aug-20	verdict.	PASS
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz
Remarks:	-		

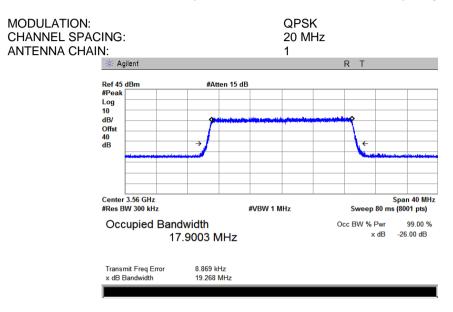
Plot 7.3.9 Occupied bandwidth test result at high frequency



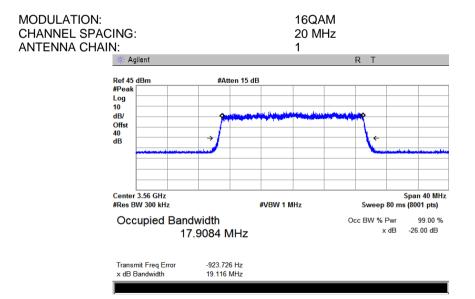


Test specification:	Section2.1049, Occupied bandwidth				
Test procedure:	47 CFR, Section 2.1049				
Test mode:	Compliance	Verdict:	PASS		
Date(s):	03-Aug-20	verdict.	PASS		
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz		
Remarks:					

Plot 7.3.10 Occupied bandwidth test result at low frequency



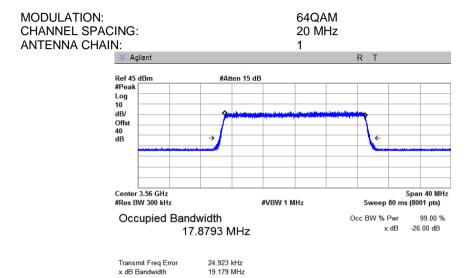
Plot 7.3.11 Occupied bandwidth test result at low frequency





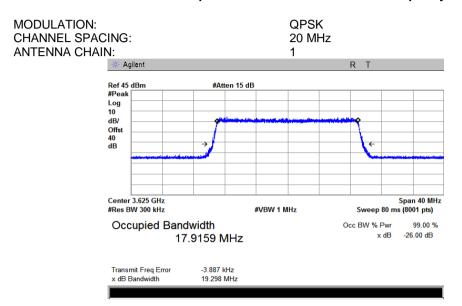
Test specification:	Section2.1049, Occupied	Section2.1049, Occupied bandwidth				
Test procedure:	47 CFR, Section 2.1049					
Test mode:	Compliance	Verdict:	PASS			
Date(s):	03-Aug-20	verdict.	PASS			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz			
Remarks:	-					

Plot 7.3.12 Occupied bandwidth test result at low frequency

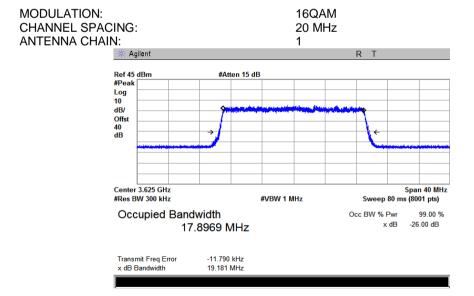




Plot 7.3.13 Occupied bandwidth test result at mid frequency



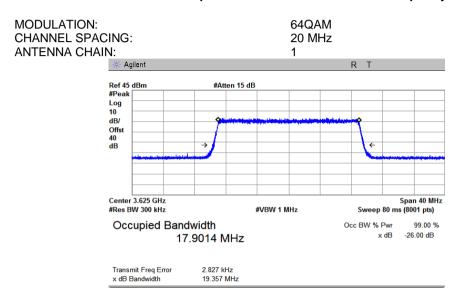
Plot 7.3.14 Occupied bandwidth test result at mid frequency





Test specification:	Section2.1049, Occupied	Section2.1049, Occupied bandwidth				
Test procedure:	47 CFR, Section 2.1049					
Test mode:	Compliance	Verdict:	PASS			
Date(s):	03-Aug-20	verdict.	PASS			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz			
Remarks:	-					

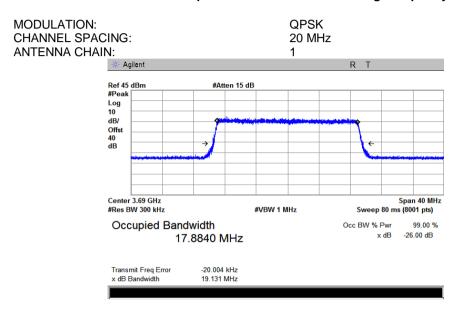
Plot 7.3.15 Occupied bandwidth test result at mid frequency



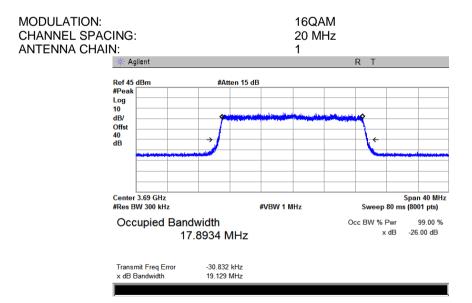


Test specification:	Section2.1049, Occupied	Section2.1049, Occupied bandwidth				
Test procedure:	47 CFR, Section 2.1049					
Test mode:	Compliance	Verdict:	PASS			
Date(s):	03-Aug-20	verdict.	PASS			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz			
Remarks:						

Plot 7.3.16 Occupied bandwidth test result at high frequency



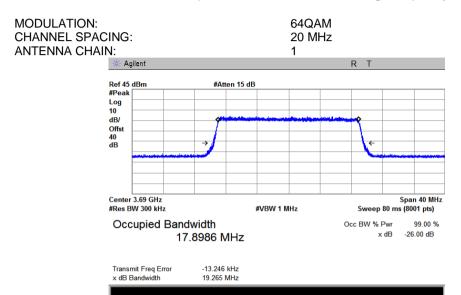
Plot 7.3.17 Occupied bandwidth test result at high frequency





Test specification:	Section2.1049, Occupied b	Section2.1049, Occupied bandwidth				
Test procedure:	47 CFR, Section 2.1049					
Test mode:	Compliance	Verdict:	PASS			
Date(s):	03-Aug-20	verdict.	PASS			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 230 VAC, 50 Hz			
Remarks:						

Plot 7.3.18 Occupied bandwidth test result at high frequency





Test specification:	Section 96.41(e), Emission	Section 96.41(e), Emission mask			
Test procedure:	Section 96.41(e)(3)				
Test mode:	Compliance	Verdict:	PASS		
Date(s):	04-Aug-20	verdict.	PASS		
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz		
Remarks:					

7.4 Emission outside the fundamental test

7.4.1 General

This test was performed to measure Emission outside the fundamental at RF antenna connector. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Emission outside the fundamental limits

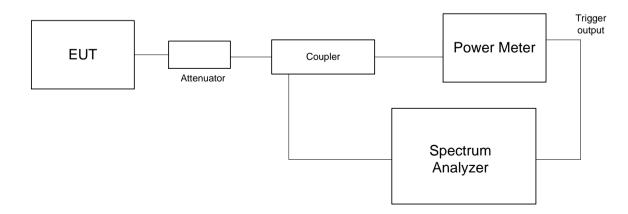
Frequency displacement from frequency block	Limit*, dBm/MHz	RBW, kHz
Channel Spacing 10 MHz		
0 – 1 MHz	- 13	100
0 – 10 MHz	- 13	1000
10 – 20 MHz	- 25	1000
Above 3530 MHz and below 3720 MHz	- 25	1000
Below 3530 MHz and above 3720 MHz	- 40	1000
Channel Spacing 20 MHz		
0 – 1 MHz	- 13	100
0 – 10 MHz	- 13	1000
10 – 20 MHz	- 25	1000
Above 3530 MHz and below 3720 MHz	- 25	1000
Below 3530 MHz and above 3720 MHz	- 40	1000

^{* -} Limit at each antenna connector (amount of antennas N = 2)

7.4.2 Test procedure

- **7.4.2.1** The EUT was set up as shown in Figure 7.4.1, energized and its proper operation was checked.
- **7.4.2.2** The Emission outside the fundamental was measured with spectrum analyzer as provided in Table 7.4.2, Table 7.4.3 and the the associated plots.

Figure 7.4.1 Emission outside the fundamental test setup





Test specification:	Section 96.41(e), Emission	Section 96.41(e), Emission mask				
Test procedure:	Section 96.41(e)(3)					
Test mode:	Compliance	Verdict:	PASS			
Date(s):	04-Aug-20	verdict.	PASS			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz			
Remarks:						

Table 7.4.2 Emission outside the fundamental test results

ASSIGNED FREQUENCY RANGE: 3550.0 −3700.0 MHz
DETECTOR USED: Average (gated)
VIDEO BANDWIDTH: ≥ Resolution bandwidth
EBW: 10 MHz

EBW: YOUNG THE STATE OF CHAINS: STATE OF CHAINS:

ANTENNA PORT: Worst case

Fragueray	TOICT.		Total band adapt	DDW	luto avoti on	I imali	
Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Integration BW, kHz	Limit, dBm	Verdict
QPSK							
Low frequen	cy 3555.0 MHz						
3549.50	Low	-27.00	-24.00	100	1000	-13.0	
3539.50	Low	-38.92	-35.92	100	1000	-25.0	Pass
3560.50	High	-26.04	-23.04	100	1000	-13.0	Pass
3570.50	High	-36.52	-33.52	100	1000	-25.0	
Mid frequenc	cy 3625.0 MHz						
3619.50	Low	-26.78	-23.78	100	1000	-13.0	
3609.50	Low	-36.56	-33.56	100	1000	-25.0	Pass
3630.50	High	-25.99	-22.99	100	1000	-13.0	Pass
3640.50	High	-35.98	-32.98	100	1000	-25.0	
High frequer	ncy 3695.0 MHz	-					
3689.50	Low	-25.02	-22.02	100	1000	-13.0	
3679.50	Low	-34.01	-31.01	100	1000	-25.0	Pass
3700.50	High	-25.44	-22.44	100	1000	-13.0	Pass
3710.50	High	-36.93	-33.93	100	1000	-25.0	
64 QAM							
Low frequen	cy 3555.0 MHz						
3549.50	Low	-27.64	24.64	100	1000	-13.0	
3539.50	Low	-38.83	35.83	100	1000	-25.0	Pass
3560.50	High	-26.84	-23.84	100	1000	-13.0	Pass
3570.50	High	-35.84	-32.84	100	1000	-25.0	
Mid frequenc	cy 3625.0 MHz						
3619.50	Low	-26.47	-23.47	100	1000	-13.0	
3609.50	Low	-34.66	-31.66	100	1000	-25.0	Door
3630.50	High	-26.33	-23.33	100	1000	-13.0	Pass
3640.50	High	-34.43	-31.43	100	1000	-25.0	
High frequer	ncy 3695.0 MHz						
3689.50	Low	-24.96	21.96	100	1000	-13.0	
3679.50	Low	-33.82	-30.82	100	1000	-25.0	Door
3700.50	High	-25.56	22.56	100	1000	-13.0	Pass
3710.50	High	-37.74	-34.74	100	1000	-25.0	

^{* -} Total band edge = SA reading + 10*log(N) = SA reading +3 dB



Test specification:	Section 96.41(e), Emission	Section 96.41(e), Emission mask				
Test procedure:	Section 96.41(e)(3)					
Test mode:	Compliance	Verdict:	PASS			
Date(s):	04-Aug-20	verdict.	PASS			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz			
Remarks:	-					

Table 7.4.3 Emission outside the fundamental test results

ASSIGNED FREQUENCY RANGE: 3550.0 -3700.0 MHz DETECTOR USED: Average (gated) ≥ Resolution bandwidth VIDEO BANDWIDTH:

EBW: 20 MHz

NUMBER OF CHAINS: 8 Worst case

ANTENNA	PORT:	V	Vorst case				
Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Integration BW, kHz	Limit, dBm	Verdict
QPSK							
Low frequen	cy 3560.0 MHz						
3549.50	Low	-30.31	-27.31	100	1000	-13.0	
3539.50	Low	-42.27	-39.78	100	1000	-25.0	Pass
3570.50	High	-29.87	-27.68	100	1000	-13.0	F 455
3580.50	High	-37.94	-34.94	100	1000	-25.0	
Mid frequence	cy 3625.0 MHz						
3615.50	Low	-28.50	-25.50	100	1000	-13.0	
3604.50	Low	-38.24	-35.24	100	1000	-25.0	Pass
3635.50	High	-27.86	-24.86	100	1000	-13.0	F 455
3645.50	High	-37.23	-34.23	100	1000	-25.0	
High frequer	ncy 3690.0 MHz						
3679.50	Low	-26.46	-23.46	100	1000	-13.0	
3669.50	Low	-35.35	-32.35	100	1000	-25.0	Pass
3700.50	High	-28.42	-25.42	100	1000	-13.0	F 455
3710.50	High	-38.17	-35.17	100	1000	-25.0	
64 QAM							
Low frequen	cy 3560.0 MHz						
3549.50	Low	-30.1	-27.10	100	1000	-13.0	
3539.50	Low	-40.79	-37.79	100	1000	-25.0	Pass
3570.50	High	-29.66	-26.66	100	1000	-13.0	F 455
3580.50	High	-38.50	-35.50	100	1000	-25.0	
	cy 3625.0 MHz						
3615.50	Low	-28.88	-25.88	100	1000	-13.0	
3604.50	Low	-37.78	-34.78	100	1000	-25.0	Pass
3635.50	High	-28.29	-25.29	100	1000	-13.0	газэ
3645.50	High	-36.90	-33.90	100	1000	-25.0	
	ncy 3690.0 MHz						
3679.50	Low	-27.27	-24.27	100	1000	-13.0]
3669.50	Low	-35.60	-32.60	100	1000	-25.0	Pass
3700.50	High	-28.52	-25.52	100	1000	-13.0	rass
3710.50	High	-38.40	-35.40	100	1000	-25.0	

^{* -} Total band edge = SA reading + 10*log(N) = SA reading +3 dB

Reference numbers of test equipment used

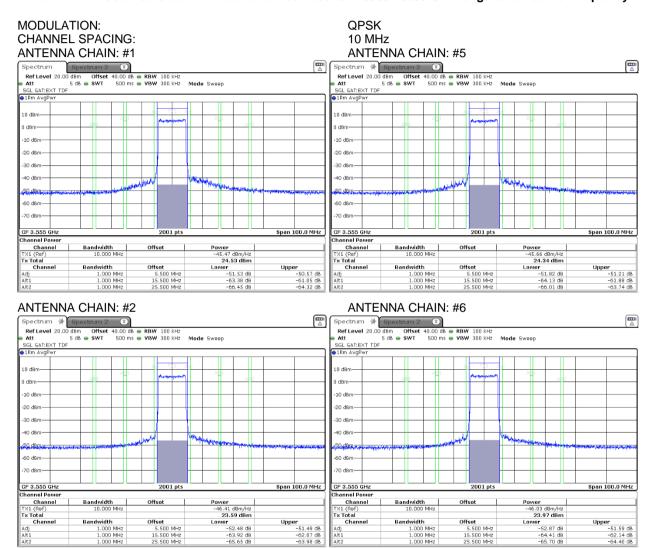
		HL 3301	HL 3302	HL 4355	HL 3901	HL 4366			
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Full description is given in Appendix A.





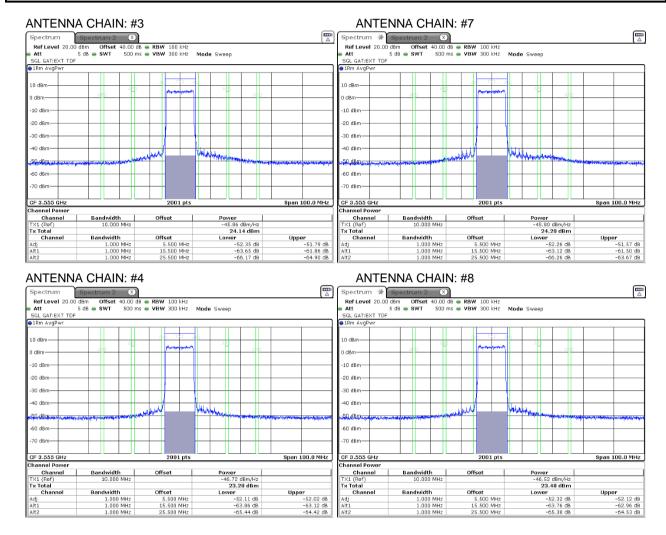
Plot 7.4.1 Emission outside the fundamental test results in 3505 - 3605 GHz range at low carrier frequency







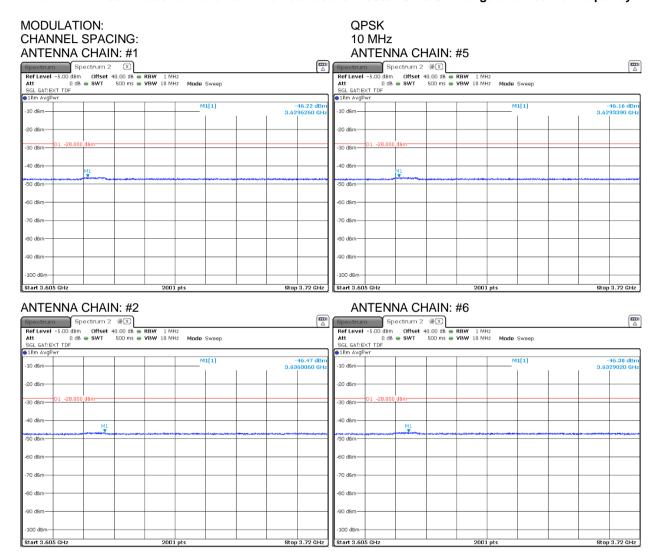
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Aug-20	verdict.	PASS
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz
Remarks:			







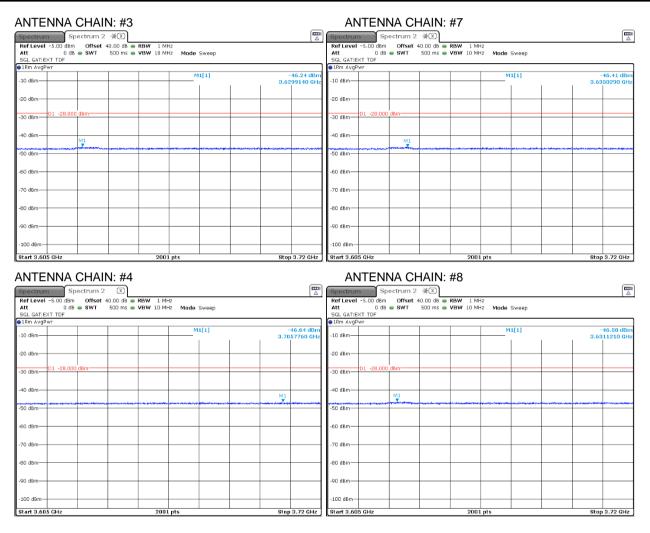
Plot 7.4.2 Emission outside the fundamental test results in 3605 - 3720 GHz range at low carrier frequency







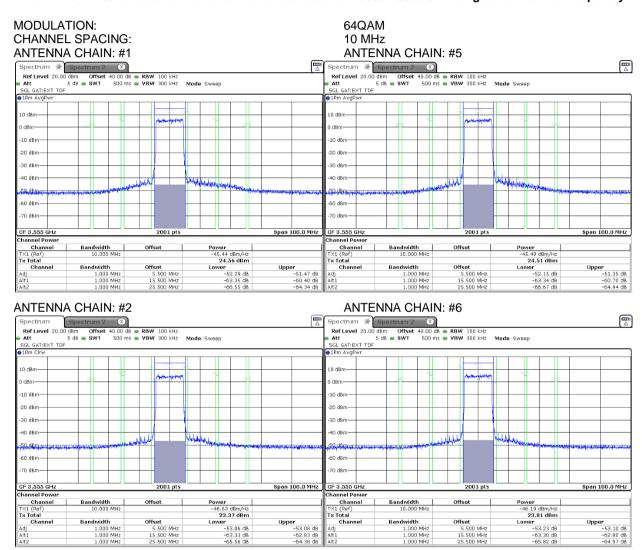
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Aug-20	verdict.	PASS
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz
Remarks:			

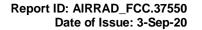






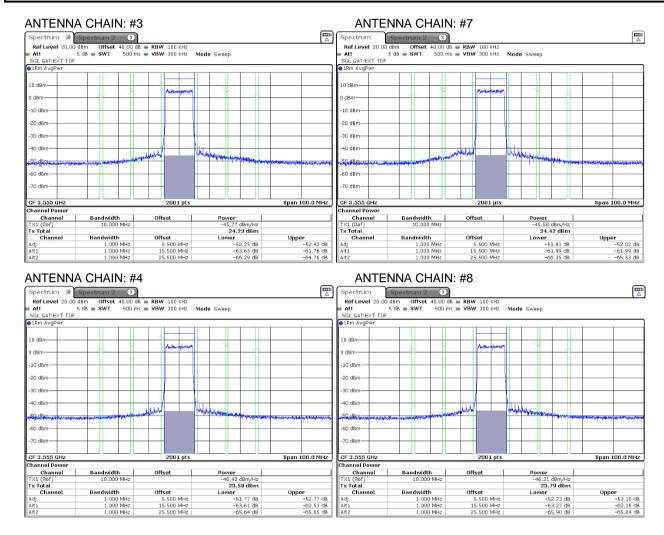
Plot 7.4.3 Emission outside the fundamental test results in 3505 - 3605 GHz range at low carrier frequency







Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Aug-20	verdict.	
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz
Remarks:	-		







Start 3.605 GHz

 Test specification:
 Section 96.41(e), Emission mask

 Test procedure:
 Section 96.41(e)(3)

 Test mode:
 Compliance

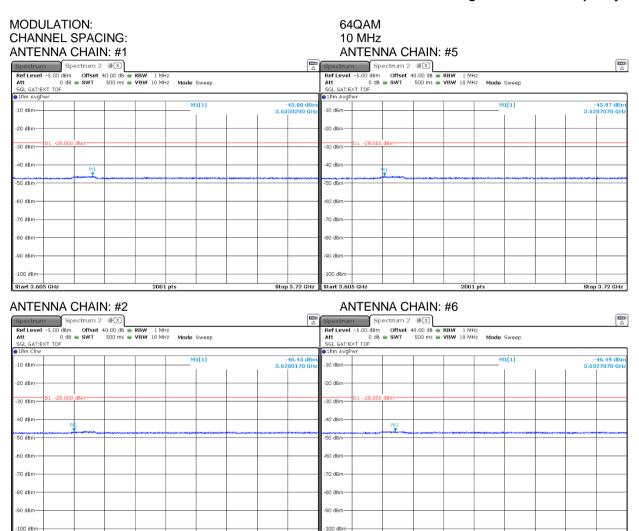
 Date(s):
 04-Aug-20

 Temperature: 24.2 °C
 Relative Humidity: 49 %

 Remarks:
 Air Pressure: 1010 hPa

 Power: 63 VAC, 50 Hz

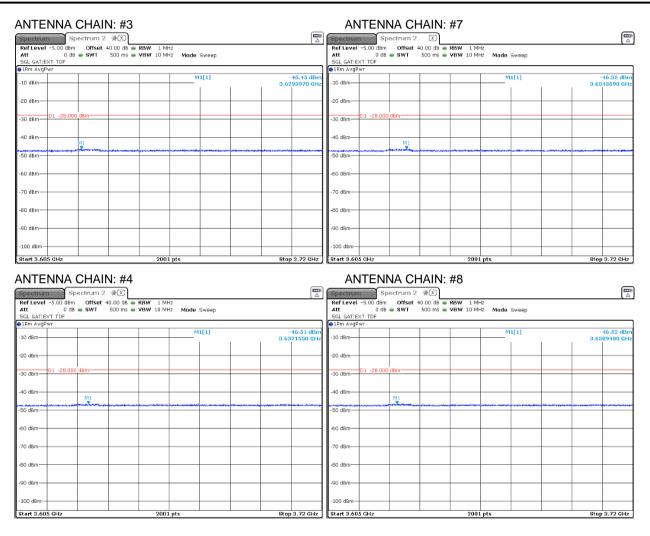
Plot 7.4.4 Emission outside the fundamental test results in 3605 - 3720 GHz range at low carrier frequency



Stop 3.72 GHz Start 3.605 GHz



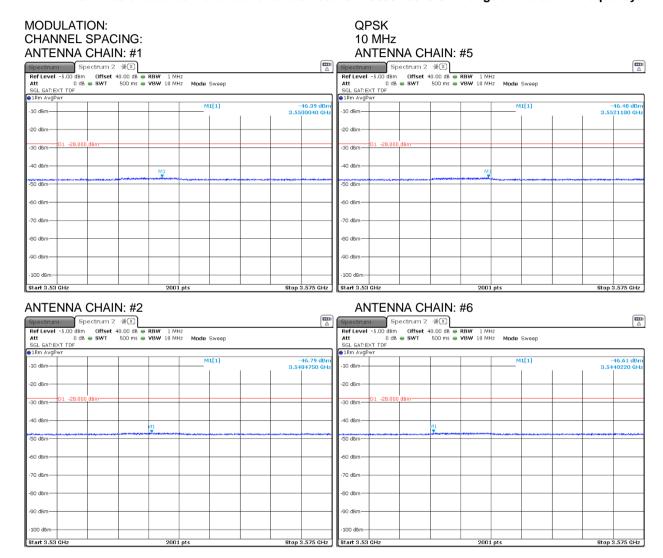








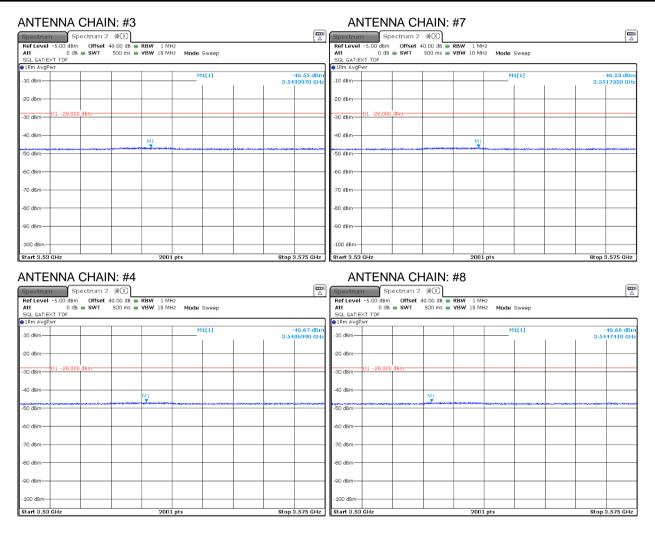
Plot 7.4.5 Emission outside the fundamental test results in 3530 - 3575 GHz range at mid carrier frequency







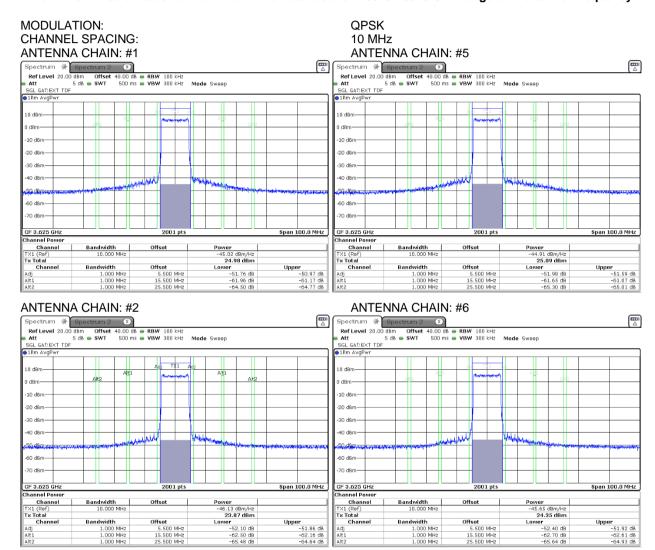
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Aug-20	verdict.	PASS
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz
Remarks:			







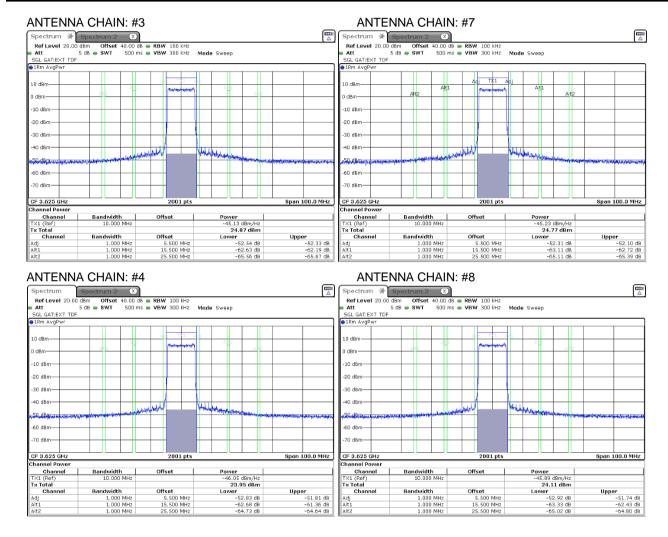
Plot 7.4.6 Emission outside the fundamental test results in 3575 - 3675 GHz range at mid carrier frequency







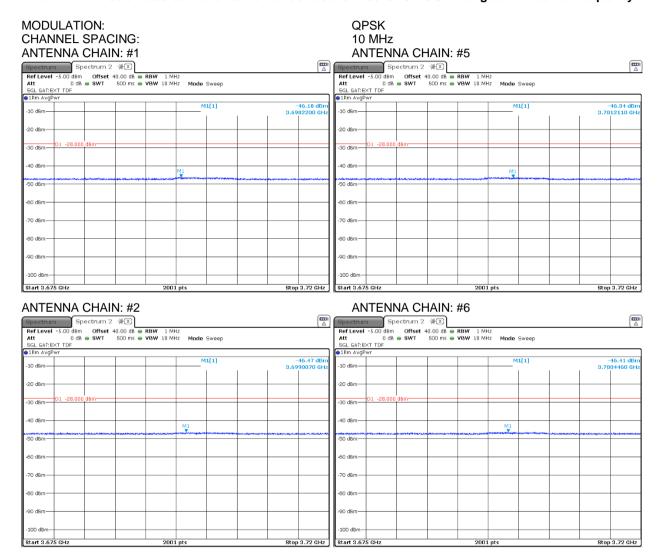
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Aug-20	verdict.	PASS
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz
Remarks:			







Plot 7.4.7 Emission outside the fundamental test results in 3675 - 3720 GHz range at mid carrier frequency







Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Aug-20		
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 63 VAC, 50 Hz
Remarks:	-		

