

Test specification:	Section 90.210, Radiated spurious emissions					
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12					
Test mode:	Compliance					
Date(s):	04-Jan-24	verdict: PASS				
Temperature: 24 °C	Relative Humidity: 47 %	Air Pressure: 1018 hPa	Power: 48 VDC			
Remarks:						





Plot 7.4.2 Radiated emission measurements in 9 kHz - 30 MHz range





Test specification:	Section 90.210, Radiated spurious emissions					
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12					
Test mode:	Compliance					
Date(s):	04-Jan-24	verdict: PASS				
Temperature: 24 °C	Relative Humidity: 47 %	Air Pressure: 1018 hPa	Power: 48 VDC			
Remarks:						







Test specification:	Section 90.210, Radiated spurious emissions					
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12					
Test mode:	Compliance					
Date(s):	04-Jan-24	verdict: PASS				
Temperature: 24 °C	Relative Humidity: 47 %	Air Pressure: 1018 hPa	Power: 48 VDC			
Remarks:						





Plot 7.4.5 Radiated emission measurements in 30 - 1000 MHz range





Test specification:	Section 90.210, Radiated spurious emissions					
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12					
Test mode:	Compliance					
Date(s):	04-Jan-24	verdict: PASS				
Temperature: 24 °C	Relative Humidity: 47 %	Air Pressure: 1018 hPa	Power: 48 VDC			
Remarks:						





Plot 7.4.7 Radiated emission measurements in 1000 - 18000 MHz range

TEST SITE: CARRIER FREQUENCY: ANTENNA POLARIZATION: TEST DISTANCE: Semi anechoic chamber Low Vertical and Horizontal 3 m





Test specification:	Section 90.210, Radiated spurious emissions					
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12					
Test mode:	Compliance	Vardiate	DASS			
Date(s):	04-Jan-24	Verdict: PASS				
Temperature: 24 °C	Relative Humidity: 47 %	Air Pressure: 1018 hPa Power: 48 VDC				
Remarks:						





Plot 7.4.9 Radiated emission measurements in 1000 - 18000 MHz range





Test specification:	Section 90.210, Radiated spurious emissions					
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12					
Test mode:	Compliance	Vardiate	DASS			
Date(s):	04-Jan-24	Verdict: PASS				
Temperature: 24 °C	Relative Humidity: 47 %	Air Pressure: 1018 hPa Power: 48 VDC				
Remarks:						











Test specification:	Section 90.210, Radiated spurious emissions					
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12					
Test mode:	Compliance	Vardiate	DASS			
Date(s):	04-Jan-24	Verdict: PASS				
Temperature: 24 °C	Relative Humidity: 47 %	Air Pressure: 1018 hPa Power: 48 VDC				
Remarks:						

# Plot 7.4.12 Radiated emission measurements in 18000 - 40000 MHz range



Test specification:	Section 90.210, Conducted spurious emissions				
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m)				
Test mode:	Compliance	- Verdict: PASS			
Date(s):	03-Jan-24				
Temperature: 23 °C	Relative Humidity: 44 %	Air Pressure: 1016 hPa	Power: 48 VDC		
Remarks:					

# 7.5 Spurious emissions at RF antenna connector test

## 7.5.1 General

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

## Table 7.5.1 Spurious emission limits

Frequency, MHz	Spurious emission, dBm
0.009 – 10th harmonic*	-25

\* - spurious emission limits do not apply to the in band emission within ± 150 % of the authorized bandwidth from the carrier; investigated in course of emission mask testing. The high frequency is the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower

## 7.5.2 Test procedure

- **7.5.2.1** The EUT was set up as shown in Figure 7.5.1, energized and its proper operation was checked.
- 7.5.2.2 The EUT was adjusted to produce maximum available for end user RF output power.
- **7.5.2.3** The spurious emission was measured with spectrum analyzer as provided in Table 7.5.2, Table 7.5.3 and Table 7.5.4 and the associated plots.

## Figure 7.5.1 Spurious emission test setup





Test specification:	Section 90.210, Conducted spurious emissions				
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m)				
Test mode:	Compliance	- Verdict: PASS			
Date(s):	03-Jan-24				
Temperature: 23 °C	Relative Humidity: 44 %	Air Pressure: 1016 hPa Power: 48 VDC			
Remarks:					

#### Table 7.5.2 Spurious emission test results

ASSIGNED FF INVESTIGATE DETECTOR U VIDEO BANDA MODULATION MODULATING CHANNEL SP TRANSMITTE	REQUENCY F ED FREQUEN SED: WIDTH: I: S SIGNAL: ACING: R OUTPUT P	RANGE: ICY RANGE: OWER SETTII	NGS:	4940.0 – 4 0.009 – 40 Peak ≥ Resoluti QPSK (wo PRBS 10 MHz Maximum	4990.0 MHz 0000 MHz fon bandwidth orst case variar	nt)			
Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission*, dBm	Total Spurious emission**, dBm	Limit, dBm	Margin , dB***	Verdict
Low carrier f	requency								
4904.0	-31.63	Included	Included	1000	-31.63	-28.63	-25.0	-3.63	Pass
5008.0	-30.15	Included	Included	1000	-30.15	-27.15	-25.0	-2.15	Pass
Mid carrier fi	requency								
4888.6	-32.05	Included	Included	1000	-32.05	-29.05	-25.0	-4.05	Pass
4892.4	-33.13	Included	Included	1000	-33.13	-30.15	-25.0	-5.15	Pass
29156.5	-39.55	Included	Included	1000	-39.55	-36.55	-25.0	-11.55	Pass
High carrier frequency									
2884.7	-33.05	Included	Included	1000	-33.05	-30.05	-25.0	-5.05	Pass
5034.0	-30.29	Included	Included	1000	-30.29	-27.29	-25.0	-3.29	Pass
26083.5	-39.24	Included	Included	1000	-39.24	-36.24	-25.0	-11.24	Pass
31714.0	-39.84	Included	Included	1000	-39.84	-36.84	-25.0	-11.84	Pass

\* - SA Reading over 1 chain = Max SA reading (Chains #1 or chains #2)
 \*\* - Total emission = Maximum emission per chain + 10\*log(N)

\*\* - Margin = Spurious emission – specification limit.



Test specification:	Section 90.210, Conducted spurious emissions				
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m)				
Test mode:	Compliance	- Verdict: PASS			
Date(s):	03-Jan-24				
Temperature: 23 °C	Relative Humidity: 44 %	Air Pressure: 1016 hPa Power: 48 VDC			
Remarks:					

## Table 7.5.3 Spurious emission test results

ASSIGNED FF INVESTIGATE DETECTOR U VIDEO BANDV MODULATION MODULATING CHANNEL SP TRANSMITTE	REQUENCY F ID FREQUEN SED: VIDTH: I: SIGNAL: ACING: R OUTPUT P	ANGE: CY RANGE: OWER SETTIN	NGS:	4942.5 – 4 0.009 – 40 Peak ≥ Resoluti QPSK (wo PRBS 25 MHz Maximum	4987.5 MHz 0000 MHz ion bandwidth orst case variar	nt)			
Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission*, dBm	Total Spurious emission**, dBm	Limit, dBm	Margin , dB***	Verdict
Low carrier frequency									
4927.5	-30.07	Included	Included	1000	-30.07	-27.07	-25.0	-2.07	Pass
27083.0	-39.60	Included	Included	1000	-39.60	-36.60	-25.0	-11.60	Pass
Mid carrier frequency									
4927.5	-30.62	Included	Included	1000	-30.62	-27.62	-25.0	-2.62	Pass
High carrier	frequency		-	-				-	
4927.5	-31.45	Included	Included	1000	-31.45	-28.45	-25.0	-3.45	Pass
26.151.5	-39.69	Included	Included	1000	-39.69	-36.69	-25.0	-11.69	Pass

\* - SA Reading over 1 chain = Max SA reading (Chains #1 or chains #2)
\*\* - Total emission = Maximum emission per chain + 10\*log(N)
\*\* - Margin = Spurious emission – specification limit.



Test specification:	Section 90.210, Conducted	d spurious emissions				
Test procedure:	47 CFR, Sections 2.1051 and 90	0.210(m)				
Test mode:	Compliance	Vardiate				
Date(s):	03-Jan-24	verdict.	FA33			
Temperature: 23 °C	Relative Humidity: 44 %	Air Pressure: 1016 hPa	Power: 48 VDC			
Remarks:						

#### Table 7.5.4 Spurious emission test results

ASSIGNED F INVESTIGAT DETECTOR I VIDEO BAND MODULATIO MODULATIN CHANNEL SF TRANSMITTE	REQUENCY ED FREQUEI USED: WIDTH: N: G SIGNAL: PACING: ER OUTPUT I	RANGE: NCY RANGE: POWER SETTI	INGS:	4942.5 – 0.009 – 4 Peak ≥ Resolut QPSK (w PRBS 50 MHz Maximum	4987.5 MHz 0000 MHz tion bandwidth orst case varia	nt)			
Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission*, dBm	Total Spurious emission**, dBm	Limit, dBm	Margin , dB***	Verdict
Low carrier frequency									
No spurious emissions were found									
Mid carrier fr	equency								
4455.4	-36.68	Included	Included	1000	-36.73	-33.73	-25.0	-8.73	Pass
4474.5	-37.10	Included	Included	1000	-37.10	-34.10	-25.0	-9.10	Pass
4583.7	-38.35	Included	Included	1000	-38.35	-36.35	-25.0	-11.35	Pass
4915.0	-32.65	Included	Included	1000	-32.65	-29.65	-25.0	-4.65	Pass
5015.0	-34.76	Included	Included	1000	-34.76	-31.76	-25.0	-6.76	Pass
31576.5	-39.37	Included	Included	1000	-39.37	-36.37	-25.0	-11.37	Pass
High carrier	frequency								
			No spurio	ous emissi	ons were found	1			

\* - SA Reading over 1 chain = Max SA reading (Chains #1 or chains #2)
\*\* - Total emission = Maximum emission per chain + 10\*log(N)
\*\* - Margin = Spurious emission – specification limit.

#### Reference numbers of test equipment used

		HL 3357	HL 5376	HL 5596	HL 5636	HL 3818	HL 5626		
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Full description is given in Appendix A.



Test specification:	Section 90.210, Conducted	I spurious emissions				
Test procedure:	47 CFR, Sections 2.1051 and 90	0.210(m)				
Test mode:	Compliance	Vardiate	DAGG			
Date(s):	03-Jan-24	verdict.	FA33			
Temperature: 23 °C	Relative Humidity: 44 %	Air Pressure: 1016 hPa	Power: 48 VDC			
Remarks:						











Test specification:	Section 90.210, Conducted	l spurious emissions				
Test procedure:	47 CFR, Sections 2.1051 and 90	0.210(m)				
Test mode:	Compliance	Vardiate	DAGG			
Date(s):	03-Jan-24	verdict.	FA33			
Temperature: 23 °C	Relative Humidity: 44 %	Air Pressure: 1016 hPa	Power: 48 VDC			
Remarks:						





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

MODULATION: CHANNEL SPACING: ANTENNA CHAIN: #1



QPSK (worst case variant) 10 MHz ANTENNA CHAIN: #2





Test specification:	Section 90.210, Conducted	I spurious emissions				
Test procedure:	47 CFR, Sections 2.1051 and 90	0.210(m)				
Test mode:	Compliance	Vardiate	DAGG			
Date(s):	03-Jan-24	verdict.	FA33			
Temperature: 23 °C	Relative Humidity: 44 %	Air Pressure: 1016 hPa	Power: 48 VDC			
Remarks:						

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



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





Test specification:	Section 90.210, Conducted	t spurious emissions				
Test procedure:	47 CFR, Sections 2.1051 and 90	).210(m)				
Test mode:	Compliance	Vardiate				
Date(s):	03-Jan-24	verdict:	PASS			
Temperature: 23 °C	Relative Humidity: 44 %	Air Pressure: 1016 hPa	Power: 48 VDC			
Remarks:						

## Plot 7.5.7 Spurious emission measurements in 30 - 1400 MHz range at low carrier frequency



## Plot 7.5.8 Spurious emission measurements in 30 - 1400 MHz range at mid carrier frequency

#### MODULATION: CHANNEL SPACING: ANTENNA CHAIN: #1

QPSK (worst case variant) 10 MHz ANTENNA CHAIN: #2





Test specification:	Section 90.210, Conducted	I spurious emissions				
Test procedure:	47 CFR, Sections 2.1051 and 90	0.210(m)				
Test mode:	Compliance	Vardiate	DAGG			
Date(s):	03-Jan-24	verdict.	FA33			
Temperature: 23 °C	Relative Humidity: 44 %	Air Pressure: 1016 hPa	Power: 48 VDC			
Remarks:						

Plot 7.5.9 Spurious emission measurements in 30 - 1400 MHz range at high carrier frequency



## Plot 7.5.10 Spurious emission measurements in 1400 - 3000 MHz range at low carrier frequency

MODULATION: CHANNEL SPACING: ANTENNA CHAIN: #1

QPSK (worst case variant) 10 MHz ANTENNA CHAIN: #2

