

TEST REPORT

ACCORDING TO: FCC part 27: 2006

FOR:

RadWin Ltd.

High Capacity Carrier-Class Radio System

Models:

WL1000-ODU-HE/F25/BRS,
WL1000-ODU-HE/F25/BRS/EXT,
WL1000-ODU-HE/F25/BRS/INT,
AirMux-200/ODU-HE/F25BRS/EXT,
AirMux-200/ODU-HE/F25BRS/INT,
48-O-HE-25B-EX-AN, 48-O-HE-25B,
ODU-HE/F25/BRS/EXT, ODU-HE/F25/BRS/INT,
WB7230_OOU_2.5B_HE_EXT, WB7230_OOU_2.5B_HE_INT,
Aurora2-ODU-HE/F25/BRS/EXT,
Aurora2-ODU-HE/F25/BRS/INT,

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1 Applicant information

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E-mail: shlomo_weiss@radwin.com
Contact name: Mr. Shlomo Weiss

2 Equipment under test attributes

Product name: High Capacity Carrier-Class Radio System
Model(s): WL1000-ODU-HE/F25/BRS, S/N S25000000001
Receipt date 2/18/2007

3 Manufacturer information

Manufacturer name: RADWIN Ltd.
Address: 32 Habarzel str., Tel Aviv, Israel, 69710
Telephone: +972 3766 2988
Fax: +972 3766 2922
E-Mail: shlomo_weiss@radwin.com
Contact name: Mr. Shlomo Weiss




4 Test details

Project ID: 17746
Location: Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30500, Israel
Test started: 2/19/2007
Test completed: 3/13/2007
Test specification(s): FCC 47CFR:2006 part 27

5 Tests summary

Test	Status
Transmitter characteristics	
Section 2.1049, Occupied bandwidth	Pass
Section 27.50(h), Peak output power at RF antenna connector	Pass
Section 27.50(h)(4), Power spectral density	Pass
Section 27.52, section 2.1091, RF radiation exposure evaluation	Pass
Section 27.53(l)(2), Spurious emissions RF antenna terminal	Pass
Section 27.53(l)(2), Radiated spurious emissions	Pass
Section 27.54, Frequency stability	Pass

The results obtained indicate that the product under test does comply in full with the requirements tested. The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

	Name and Title	Date	Signature
Tested by:	Mr. A. Adelberg, test engineer	March 13, 2007	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	March 27, 2007	
Approved by:	Mr. M. Nikishin, EMC and Radio group leader	April 23, 2007	



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6 EUT description

6.1 General information

The EUT, is a point-to-point broadband wireless transmission system. The ODU is a separate unit of the system comprising ODU (outdoor unit) and IDU (indoor unit). The EUT provides high capacity connectivity of up to 54 Mbps. The ODU may be used with integral and external antenna.

According to the manufacturer declaration of identity the following EUT models:

- 1) WL1000-ODU-HE/F25/BRS,
- 2) WL1000-ODU-HE/F25/BRS/EXT
- 3) WL1000-ODU-HE/F25/BRS/INT
- 4) AirMux-200/ODU-HE/F25BRS/EXT
- 5) AirMux-200/ODU-HE/F25BRS/INT
- 6) 48-O-HE-25B-EX-AN
- 7) 48-O-HE-25B
- 8) ODU-HE/F25/BRS/EXT
- 9) ODU-HE/F25/BRS/INT
- 10) WB7230_OOU_2.5B_HE_EXT
- 11) WB7230_OOU_2.5B_HE_INT
- 12) Aurora2-ODU-HE/F25/BRS/EXT
- 13) Aurora2-ODU-HE/F25/BRS/INT

are electrically/electronically/mechanically identical and are the commercial names of the same WinLink 1000/F25 system. Therefore only model WL1000-ODU-HE/F25/BRS was tested.

6.2 Ports and lines

ODU configuration

Port type	Port description	Connected		Connector type	Q-ty	Cable type	Cable length, m	Indoor / outdoor
		From	To					
Power	-48 VDC	AC/DC adapter	IDU	Terminal block	1	unshielded	1.5	Indoor
RF	Antenna	ODU	50Ω termination	N-type	1	NA	NA	NA
Signal	IDU	IDU	ODU	RJ45	1	shielded	20	Outdoor
Signal	Sync	ODU	Not connected	RJ45	1	NA	NA	NA
Signal	Ethernet	IDU	LAPTOP	RJ45	1	FTP	100	Indoor

6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Laptop	Acer	1902	6019A5M
AC/DC adaptor	ELJINTEK Inc.	GPSU15E-8	0610EJ283716
IDU (for configuration with ODU)	Radwin Ltd.	WL1000	DE0000801267
AC/DC adaptor for IDU	Delta Electronics	AD8-60PB	104300CA9M

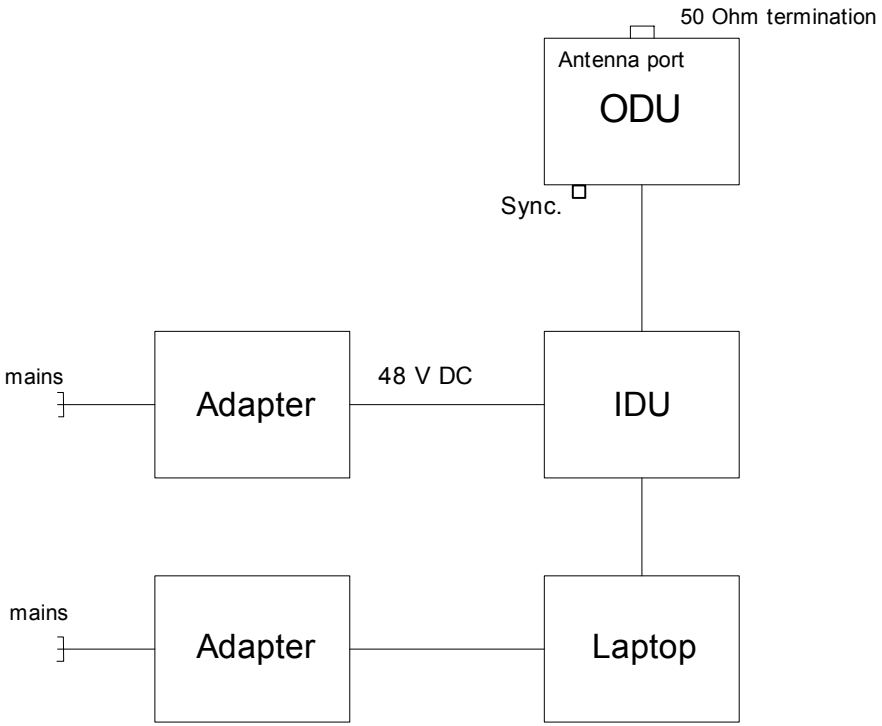
6.4 Changes made in the EUT

No changes were implemented.



6.5 Test configuration

6.5.1 ODU configuration





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6.6 Transmitter characteristics

Type of equipment			
X	Stand-alone (Equipment with or without its own control provisions)		
Intended use		Condition of use	
X	fixed	Always at a distance more than 2 m from all people	
Assigned frequency range		2496 - 2690 MHz	
Operating frequency range		2499 – 2687.25 MHz	
Maximum rated output power		At transmitter 50 Ω RF output connector	22 dBm@ 5.5/6/11/12 MHz CBW 17 dBm@ 22/24 MHz CBW
Antenna connection			
unique coupling	X	standard connector, N-type	integral X with temporary RF connector without temporary RF connector
Antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Planar Array (integral)	MTI Wireless Edge Ltd.	MT-344041/C/B	17.5 dBi
Grid (external)	Pacific Wireless	DC-24-HD-PF2PF	24 dBi
Transmitter 99% power bandwidth		5.5 MHz, 11 MHz, 22 MHz	
Transmitter aggregate data rate/s		5.5 MHz BW: 1.5; 2.25; 3; 4.5; 6; 9; 12; 13.5 MBps	
		11 MHz BW: 3; 4.5; 6; 9; 12; 18; 24; 27 MBps	
		22 MHz BW: 6; 9; 12; 18; 24; 36; 48; 54 MBps	
Type of modulation		BPSK, 4QAM, 16QAM, 64QAM	
Type of multiplexing		OFDM	
Modulating test signal (baseband)		PRBS	
Maximum transmitter duty cycle in normal use		100%	
Transmitter duty cycle supplied for test		100%	



Test specification:		Section 2.1049, Occupied bandwidth	
Test procedure:		Section 2.1049	
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

7 Transmitter tests according to 47CFR part 27 requirements

7.1 Occupied bandwidth test

7.1.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.1.1.

Table 7.1.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, kHz
2496 - 2690	26	NA

* - Modulation envelope reference points are provided in terms of attenuation below the transmitter power.

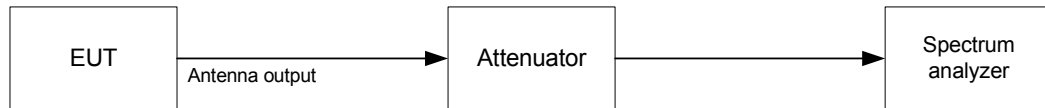
7.1.2 Test procedure

7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and its proper operation was checked.

7.1.2.2 The EUT was set to transmit the normally modulated carrier, with maximum rated power.

7.1.2.3 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.1.2 and the associated plots.

Figure 7.1.1 Occupied bandwidth test setup





Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Table 7.1.2 Occupied bandwidth test results

DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 100 kHz
 VIDEO BANDWIDTH: 1000 kHz
 MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
 MODULATION: QAM
 MODULATING SIGNAL: PRBS

Carrier frequency, MHz	Occupied bandwidth, MHz
Single channel	
1.5 Mbps data rate	
2499.00	4.8137
2593.00	4.7987
2687.25	4.6987
13.5 Mbps data rate	
2499.00	5.0688
2593.00	5.1138
2687.25	4.8362
Single channel (alternative low frequency)	
1.5 Mbps data rate	
2505.00	4.8612
13.5 Mbps data rate	
2505.00	5.0238
Dual channel	
3 Mbps data rate	
2507.50	8.7770
2590.00	8.7270
2684.50	8.7670
27 Mbps data rate	
2507.50	8.7370
2590.00	8.7370
2684.50	8.7370
Quad channel	
6 Mbps data rate	
2513.00	19.3920
2590.00	19.8420
2679.00	19.4550
54 Mbps data rate	
2513.00	19.6550
2590.00	20.1180
2679.00	19.7420

Reference numbers of test equipment used

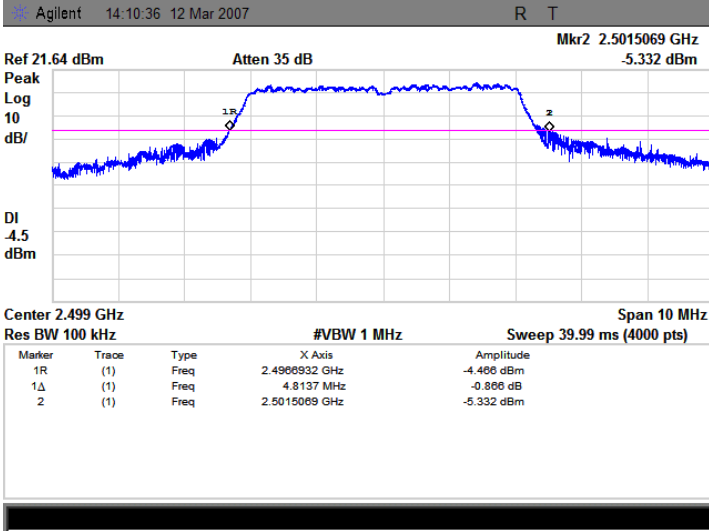
HL 2399	HL 2909					
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Full description is given in Appendix A.

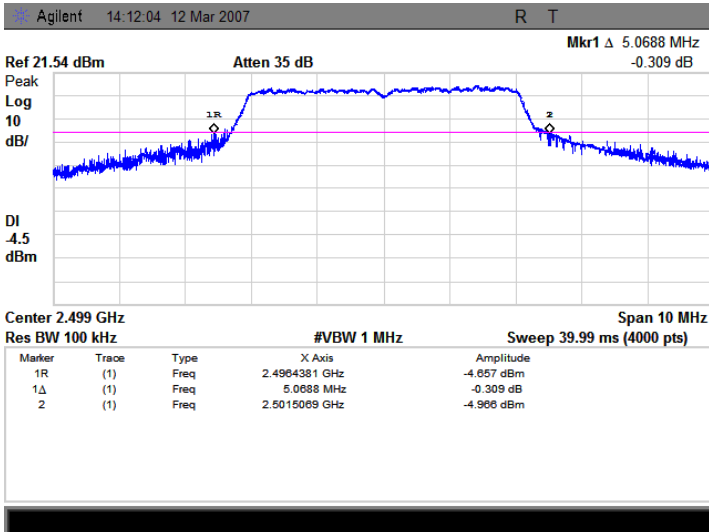


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.1 Occupied bandwidth test result at low frequency, 1.5 Mbps data rate (6 MHz)



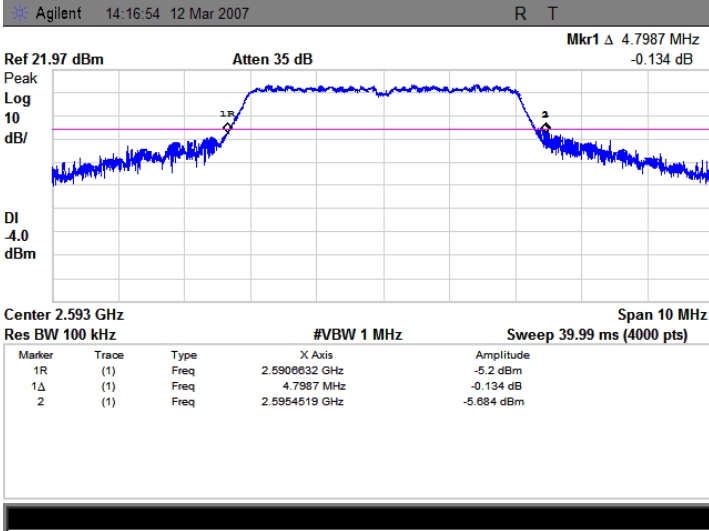
Plot 7.1.2 Occupied bandwidth test result at low frequency, 13.5 Mbps data rate (6 MHz)



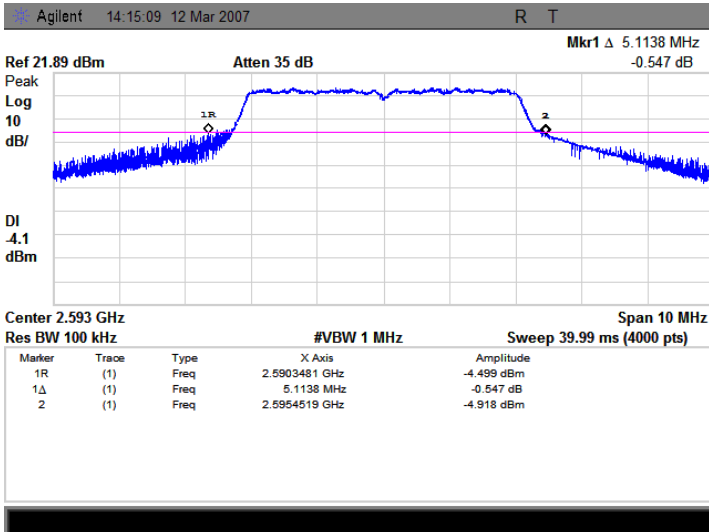


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.3 Occupied bandwidth test result at mid frequency, 1.5 Mbps data rate (6 MHz)



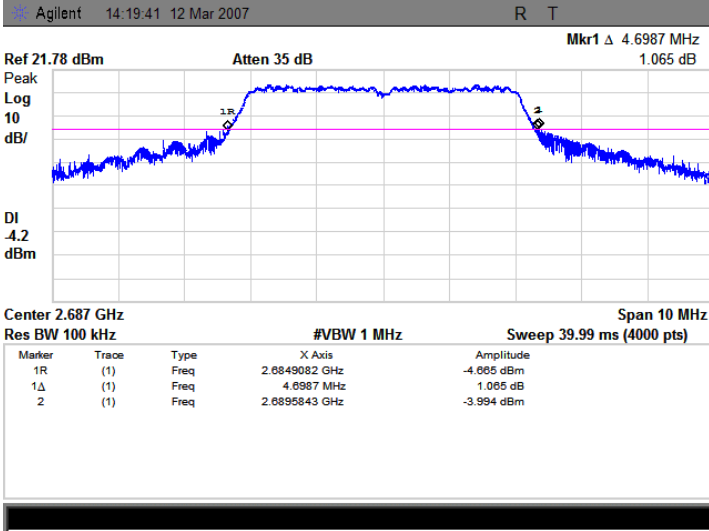
Plot 7.1.4 Occupied bandwidth test result at mid frequency, 13.5 Mbps data rate (6 MHz)



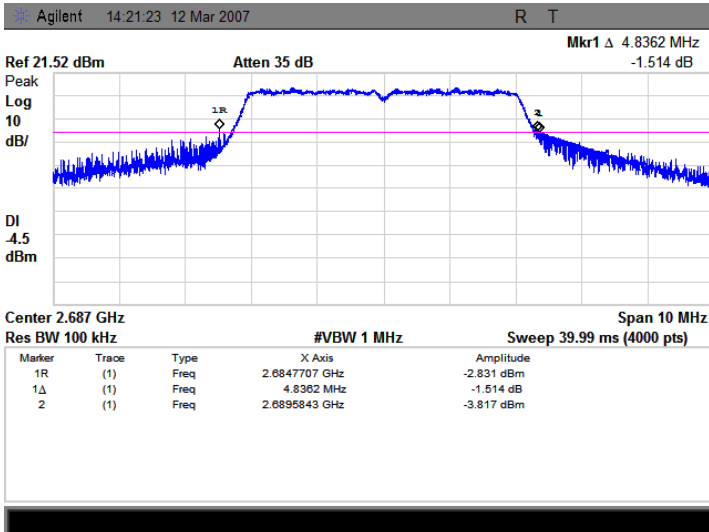


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.5 Occupied bandwidth test result at high frequency, 1.5 Mbps data rate (5.5 MHz)

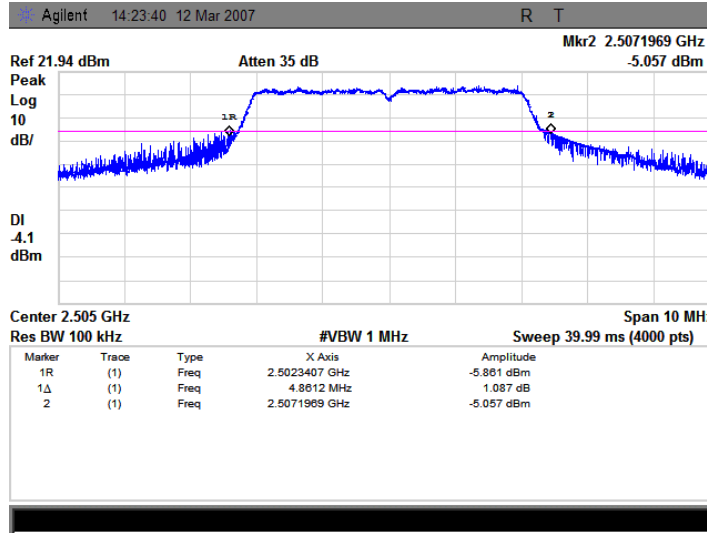


Plot 7.1.6 Occupied bandwidth test result at high frequency, 13.5 Mbps data rate (5.5 MHz)

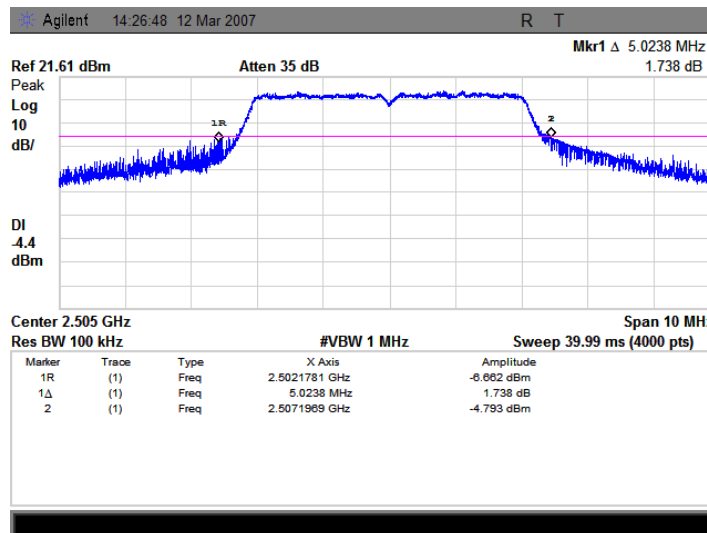


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.7 Occupied bandwidth test result at low frequency, 1.5 Mbps data rate (alternative)



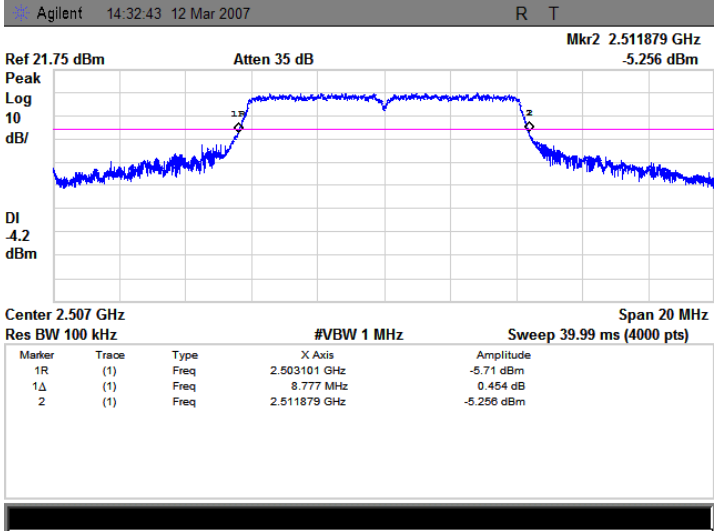
Plot 7.1.8 Occupied bandwidth test result at low frequency, 13.5 Mbps data rate (alternative)



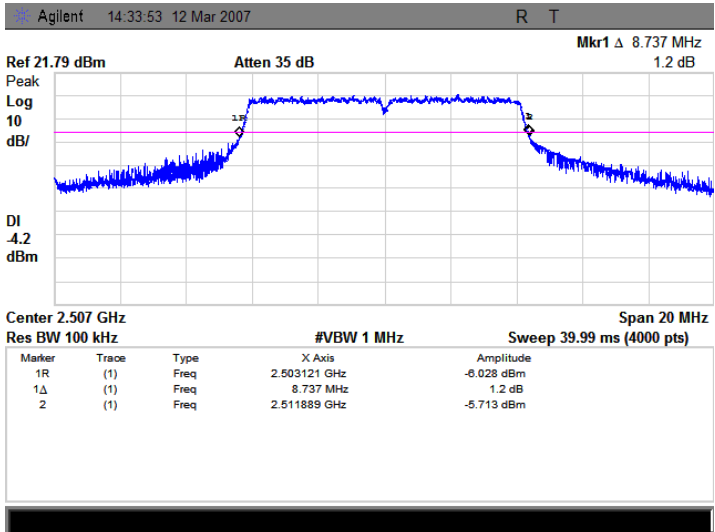


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.9 Occupied bandwidth test result at low frequency, 3 Mbps data rate (11 MHz)



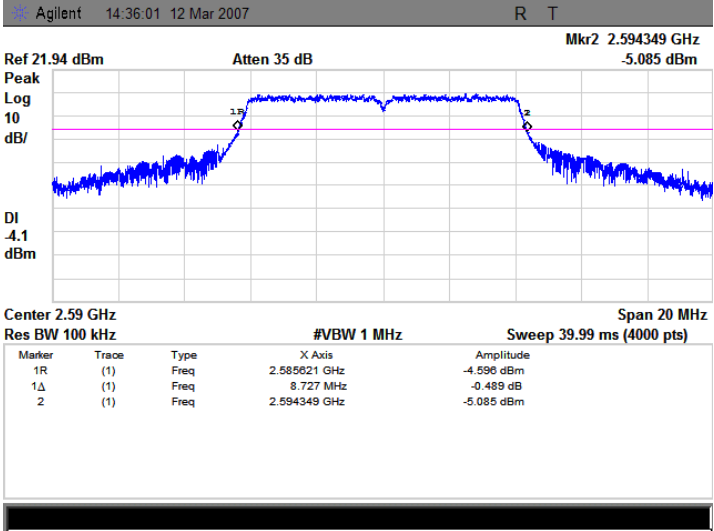
Plot 7.1.10 Occupied bandwidth test result at low frequency, 27 Mbps data rate (11 MHz)



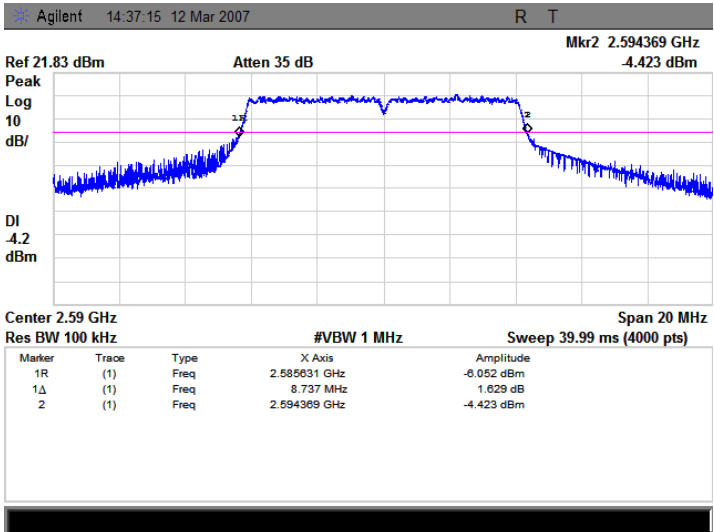


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.11 Occupied bandwidth test result at mid frequency, 3 Mbps data rate (12 MHz)



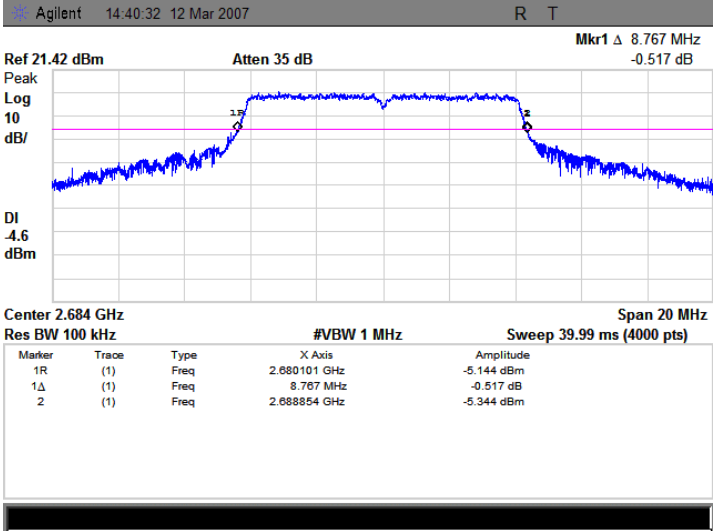
Plot 7.1.12 Occupied bandwidth test result at mid frequency, 27 Mbps data rate (12 MHz)



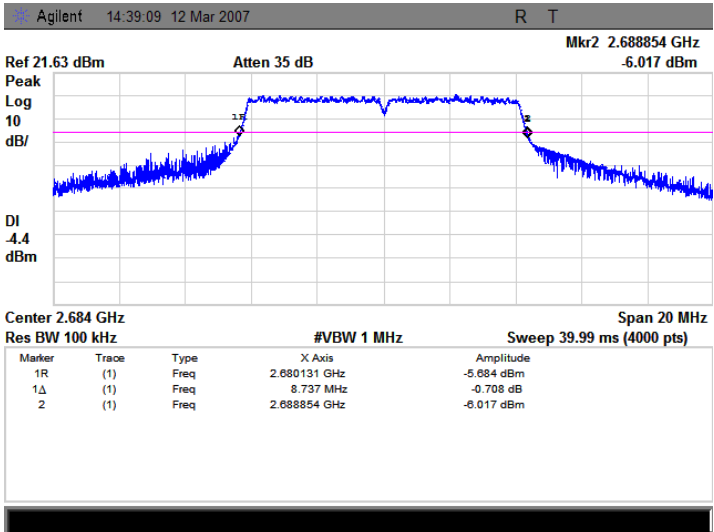


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.13 Occupied bandwidth test result at high frequency, 3 Mbps data rate (11 MHz)



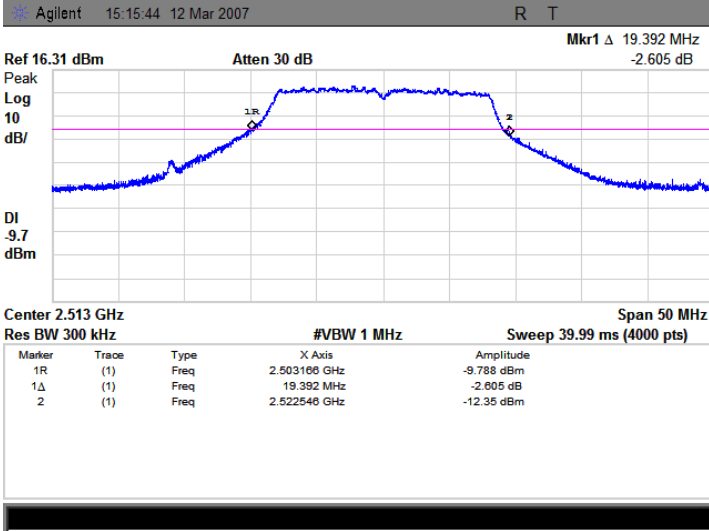
Plot 7.1.14 Occupied bandwidth test result at high frequency, 27 Mbps data rate (11 MHz)



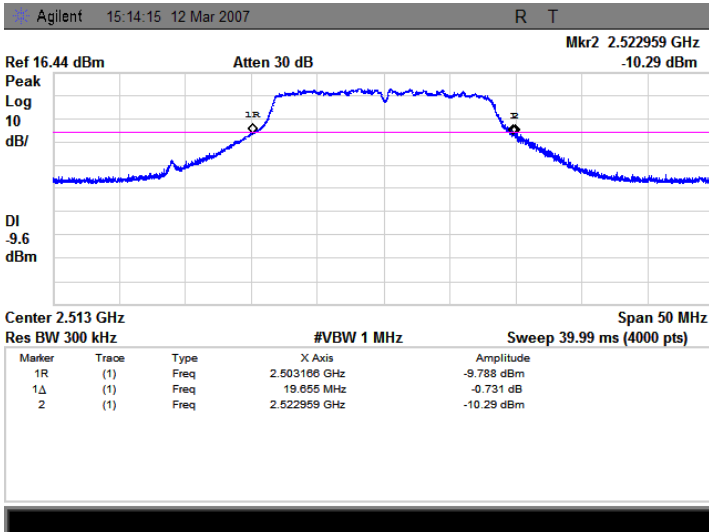


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.15 Occupied bandwidth test result at low frequency, 6 Mbps data rate (22 MHz)

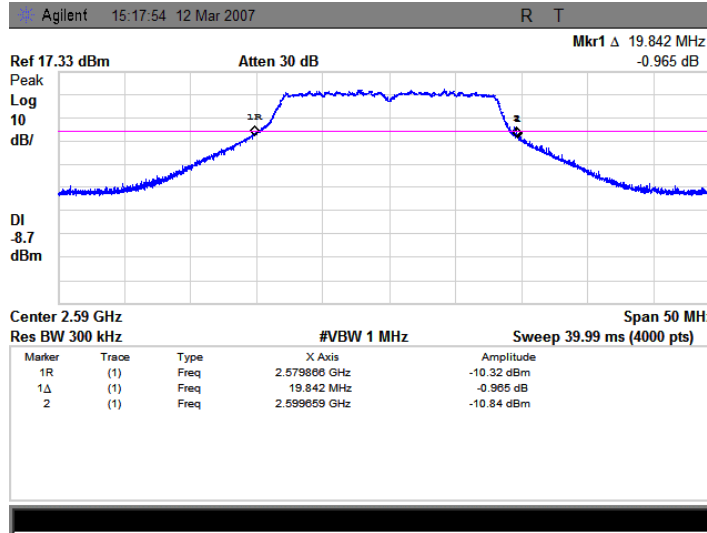


Plot 7.1.16 Occupied bandwidth test result at low frequency, 54 Mbps data rate (22 MHz)

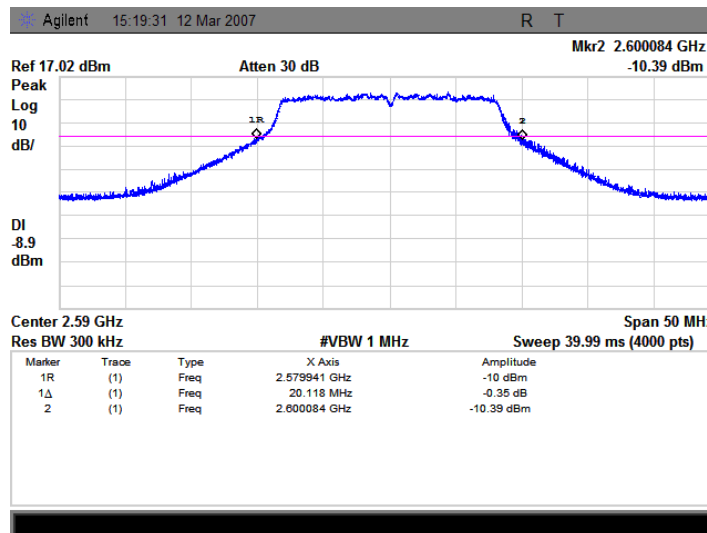


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.17 Occupied bandwidth test result at mid frequency, 6 Mbps data rate (24 MHz)



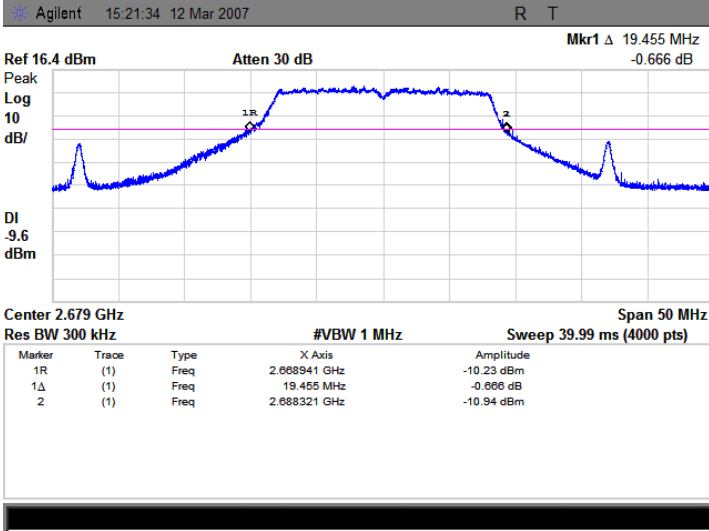
Plot 7.1.18 Occupied bandwidth test result at mid frequency, 54 Mbps data rate (24 MHz)



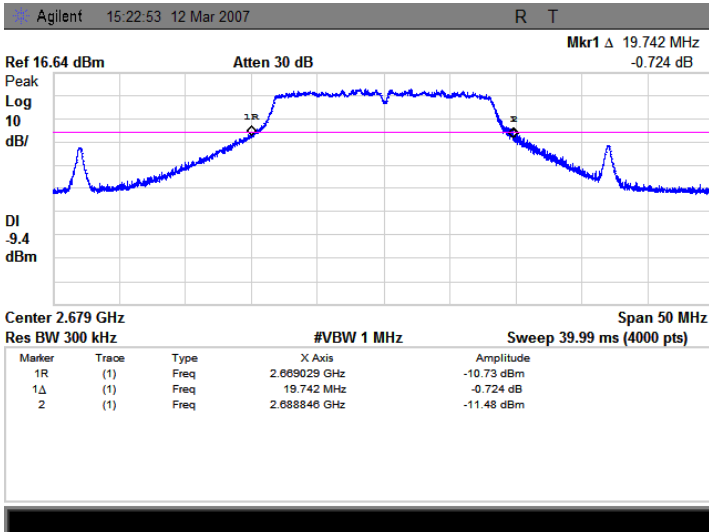


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	Section 2.1049		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.19 Occupied bandwidth test result at high frequency, 6 Mbps data rate (22 MHz)



Plot 7.1.20 Occupied bandwidth test result at high frequency, 54 Mbps data rate (22 MHz)





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Test specification: Section 27.50(h), Peak output power	
Test procedure: Section 27.50(h)	
Test mode: Compliance	Verdict: PASS
Date: 3/13/2007	
Temperature: 21°C	Air Pressure: 1006 hPa
Relative Humidity: 55 %	
Power Supply: 48 VDC	
Remarks:	

7.2 Peak output power and spectral power density

7.2.1 General

This test was performed to measure the maximum peak output power at the transmitter RF antenna connector. Specification test limits are given in Table 7.2.1 and Table 7.2.2.

Table 7.2.1 Peak output power limits

Assigned frequency range, MHz	EIRP limit, dBm
2496 - 2690	$63 + 10 \log\{BW / (6 \text{ or } 5.5) \text{ MHz}\}^*$

* - BW – actual channel width.

Table 7.2.2 Spectral power density limits

Assigned frequency range, MHz	EIRP of spectral power density limit, dBm
2496 - 2690	$\text{EIRP} + 10 \log\{0.1 / (6 \text{ or } 5.5) \text{ MHz}\}$

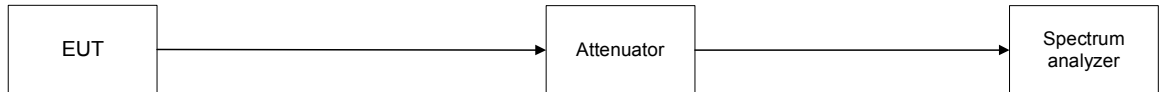
7.2.2 Test procedure

7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.

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

7.2.2.3 The resolution bandwidth of spectrum analyzer was set wider than 6 dB bandwidth of the EUT and the maximum peak output power was measured as provided in Table 7.2.3 and associated plots.

Figure 7.2.1 Peak output power test setup





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Test specification: Section 27.50(h), Peak output power	
Test procedure: Section 27.50(h)	
Test mode: Compliance	Verdict: PASS
Date: 3/13/2007	
Temperature: 21°C	Air Pressure: 1006 hPa
Remarks:	

Table 7.2.3 EIRP test results

ASSIGNED FREQUENCY: 2496 - 2690 MHz
 MODULATION: QAM
 MODULATING SIGNAL: PRBS
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 DETECTOR USED: RMS
 RESOLUTION BANDWIDTH: 30 kHz
 VIDEO BANDWIDTH: 300 kHz

Carrier frequency, MHz	Channel BW, MHz	Spectrum analyzer reading, dBm	Antenna gain, dB	EIRP, dBm	Limit*, dBm	Margin**, dE	Verdict
Single channel							
1.5 Mbps data rate							
2499.00	6.0	21.64	24.0	45.64	61.94	-16.30	Pass
2593.00	6.0	21.97	24.0	45.97	61.94	-15.97	Pass
2687.25	5.5	21.78	24.0	45.78	62.32	-16.54	Pass
13.5 Mbps data rate							
2499.00	6.0	21.54	24.0	45.54	62.07	-16.53	Pass
2593.00	6.0	21.89	24.0	45.89	62.07	-16.18	Pass
2687.25	5.5	21.52	24.0	45.52	62.44	-16.92	Pass
Single channel (alternative channel)							
1.5 Mbps data rate							
2505.00	5.5	21.94	24.0	45.94	62.32	-16.38	Pass
13.5 Mbps data rate							
2505.00	5.5	21.61	24.0	45.61	62.44	-16.83	Pass
Dual channel							
3 Mbps data rate							
2507.50	11.0	21.75	24.0	45.75	65.01	-19.26	Pass
2590.00	12.0	21.94	24.0	45.94	64.63	-18.69	Pass
2684.50	11.0	21.42	24.0	45.42	65.01	-19.59	Pass
27 Mbps data rate							
2507.50	11.0	21.79	24.0	45.79	65.01	-19.22	Pass
2590.00	12.0	21.83	24.0	45.83	64.63	-18.80	Pass
2684.50	11.0	21.63	24.0	45.63	65.01	-19.38	Pass
Quad channel							
6 Mbps data rate							
2513.00	22.0	16.31	24.0	40.31	68.47	-28.16	Pass
2590.00	24.0	17.33	24.0	41.33	68.09	-26.76	Pass
2679.00	22.0	16.40	24.0	40.40	68.47	-28.07	Pass
54 Mbps data rate							
2513.00	22.0	16.44	24.0	40.44	68.53	-28.09	Pass
2590.00	24.0	17.02	24.0	41.02	68.15	-27.13	Pass
2679.00	22.0	16.64	24.0	40.64	68.53	-27.89	Pass

* - The limit was calculated as follows:

Mode	Bit rate, MBps	Min BW, MHz	EIRP limit, dBm		Power density limit, dBm	
			6 MHz	5.5 MHz	6 MHz	5.5 MHz
Single	1.5	4.7	61.94	62.32	44.16	44.54
	13.5	4.84	62.07	62.44	44.29	44.66
Dual	3	8.73	64.63	65.01	46.85	47.23
	27	8.73	64.63	65.01	46.85	47.23
Quad	6	19.39	68.09	68.47	50.31	50.69
	54	19.65	68.15	68.53	50.37	50.75

** - Margin = Peak output power – specification limit.



HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power	
Test procedure:	Section 27.50(h)
Test mode:	Compliance
Date:	3/13/2007
Temperature: 21°C	Air Pressure: 1006 hPa
Verdict: PASS	
Remarks:	Relative Humidity: 55 % Power Supply: 48 VDC

Table 7.2.4 EIRP of spectral density test results

ASSIGNED FREQUENCY: 2496 - 2690 MHz
 MODULATION: QAM
 MODULATING SIGNAL: PRBS
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 DETECTOR USED: RMS
 RESOLUTION BANDWIDTH: 30 kHz
 VIDEO BANDWIDTH: 300 kHz

Carrier frequency, MHz	Channel BW, MHz	Spectrum analyzer reading, dBm/Hz	Antenna gain, dBi	Spectral power density*, dBm/100kHz	Limit**, dBm/100kHz	Margin***, dB	Verdict
Single channel							
1.5 Mbps data rate							
2499.00	6.0	-46.14	24.0	27.86	44.16	-16.30	Pass
2593.00	6.0	-45.82	24.0	28.18	44.16	-15.98	Pass
2687.25	5.5	-45.62	24.0	28.38	44.54	-16.16	Pass
13.5 Mbps data rate							
2499.00	6.0	-46.24	24.0	27.76	44.29	-16.53	Pass
2593.00	6.0	-45.89	24.0	28.11	44.29	-16.18	Pass
2687.25	5.5	-45.88	24.0	28.12	44.66	-16.54	Pass
Single channel (alternative channel)							
1.5 Mbps data rate							
2505.00	5.5	-45.66	24.0	28.34	44.54	-16.20	Pass
13.5 Mbps data rate							
2505.00	5.5	-45.79	24.0	28.21	44.66	-16.45	Pass
Dual channel							
3 Mbps data rate							
2507.50	11.0	-48.66	24.0	25.34	47.23	-21.89	Pass
2590.00	12.0	-48.85	24.0	25.15	46.85	-21.70	Pass
2684.50	11.0	-49.00	24.0	25.00	47.23	-22.23	Pass
27 Mbps data rate							
2507.50	11.0	-48.63	24.0	25.37	47.23	-21.86	Pass
2590.00	12.0	-48.96	24.0	25.04	46.85	-21.81	Pass
2684.50	11.0	-48.79	24.0	25.21	47.23	-22.02	Pass
Quad channel							
6 Mbps data rate							
2513.00	22.0	-57.11	24.0	16.89	50.69	-33.80	Pass
2590.00	24.0	-56.47	24.0	17.53	50.31	-32.78	Pass
2679.00	22.0	-57.02	24.0	16.98	50.69	-33.71	Pass
54 Mbps data rate							
2513.00	22.0	-56.98	24.0	17.02	50.75	-33.73	Pass
2590.00	24.0	-56.78	24.0	17.22	50.37	-33.15	Pass
2679.00	22.0	-56.78	24.0	17.22	50.75	-33.53	Pass

* - EIRP of Spectral power density = SA reading + BW factor = SA reading + 10log(100kHz/1Hz) = SA reading + 50 dB

** - For 6 MHz channel bandwidth the limit was calculated as follows:

$$\text{Spectral power density limit} = \text{EIRP limit} + 10\log(0.1 \text{ MHz} / 6.0 \text{ MHz})$$

For 5.5 MHz channel bandwidth the limit was calculated as follows:

$$\text{Spectral power density limit} = \text{EIRP limit} + 10\log(0.1 \text{ MHz} / 5.5 \text{ MHz})$$

*** - Margin = Peak output power – specification limit.

Reference numbers of test equipment used

HL 2399	HL 2909					
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Full description is given in Appendix A.



HERMON LABORATORIES

Test specification:	Section 27.50(h), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict: PASS	
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

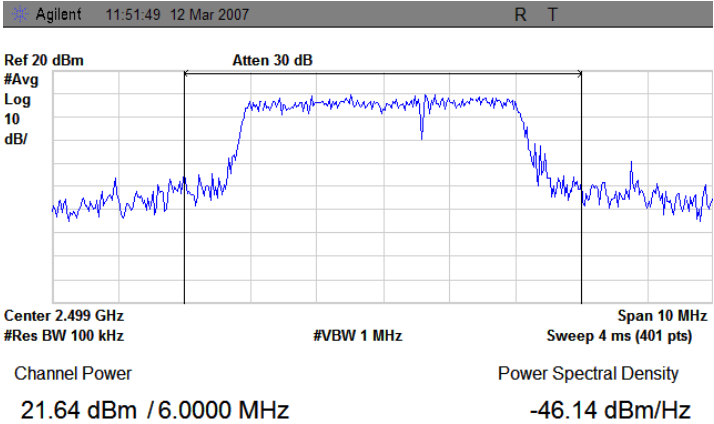
	Single channel	Dual channel	Quad channel
Low channel frequency	2499 MHz or 2504.75 MHz	2507.5 MHz	2513 MHz
	BRS Channel 1: 2496–2502 MHz or EBS Channel A1: 2502–2507.5 MHz	EBS Channel A1: 2502–2507.5 MHz EBS Channel A2: 2507.5–2513 MHz	EBS Channel A1: 2502–2507.5 MHz EBS Channel A2: 2507.5–2513 MHz EBS Channel A3: 2513–2518.5 MHz EBS Channel B1: 2518.5–2524 MHz
	6 MHz or 5.5 MHz	11 MHz	22 MHz
Mid channel frequency	2593 MHz	2590 MHz	2590 MHz
	EBS Channel D4: 2590–2596 MHz	EBS Channel C4: 2584–2590 MHz EBS Channel D4: 2590–2596 MHz	EBS Channel B4: 2578–2584 MHz EBS Channel C4: 2584–2590 MHz EBS Channel D4: 2590–2596 MHz EBS Channel G4: 2596–2602 MHz
	6 MHz	12 MHz	24 MHz
High channel frequency	2687.25 MHz	2684.5 MHz	2679 MHz
	BRS Channel G3: 2684.5–2690 MHz	BRS Channel G2: 2679–2684.5 MHz BRS Channel G3: 2684.5–2690 MHz	BRS Channel H3: 2668–2673.5 MHz BRS Channel G1: 2673.5–2679 MHz BRS Channel G2: 2679–2684.5 MHz BRS Channel G3: 2684.5–2690 MHz
	5.5 MHz	11 MHz	22 MHz



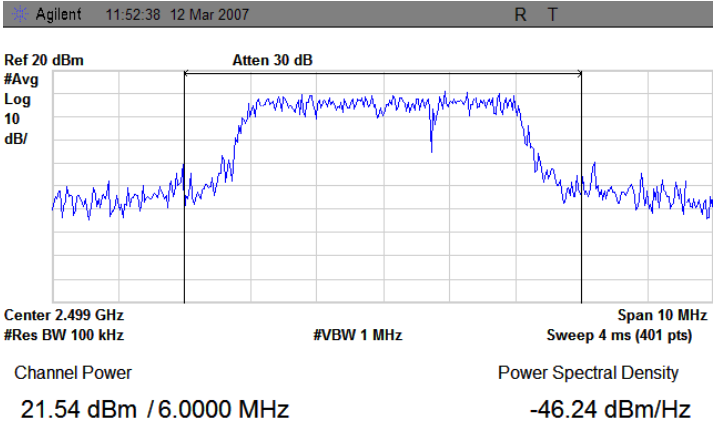
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.1 Peak output power at low frequency, 1.5 Mbps data rate (6.0 MHz CBW)



Plot 7.2.2 Peak output power at low frequency, 13.5 Mbps data rate (6.0 MHz CBW)

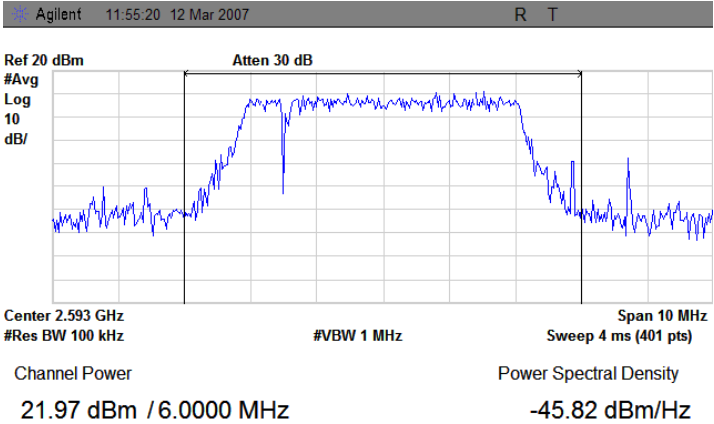




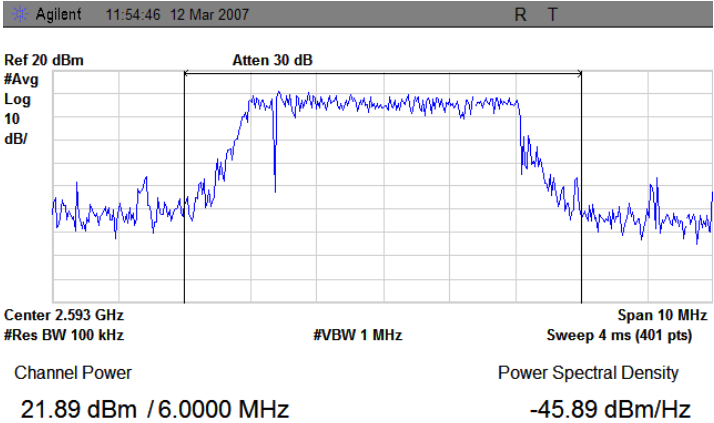
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance		Verdict: PASS	
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.3 Peak output power at mid frequency, 1.5 Mbps data rate (6.0 MHz CBW)



Plot 7.2.4 Peak output power at mid frequency, 13.5 Mbps data rate (6.0 MHz CBW)

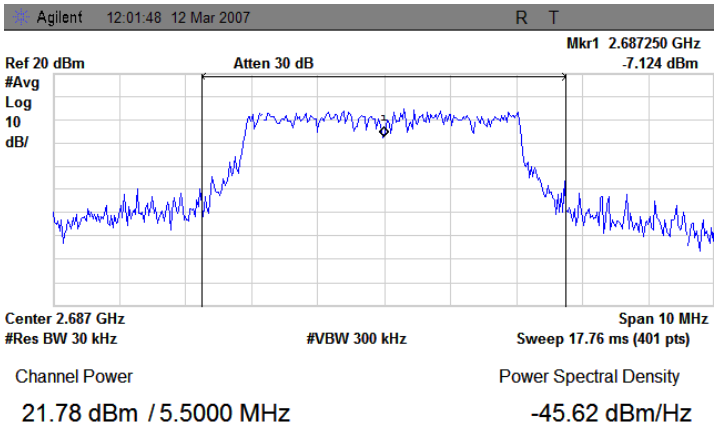




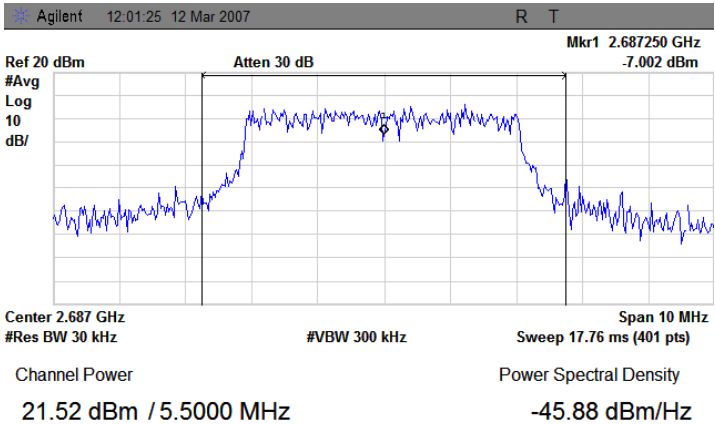
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance		Verdict: PASS	
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.5 Peak output power at high frequency, 1.5 Mbps data rate (5.5 MHz CBW)



Plot 7.2.6 Peak output power at high frequency, 13.5 Mbps data rate (5.5 MHz CBW)

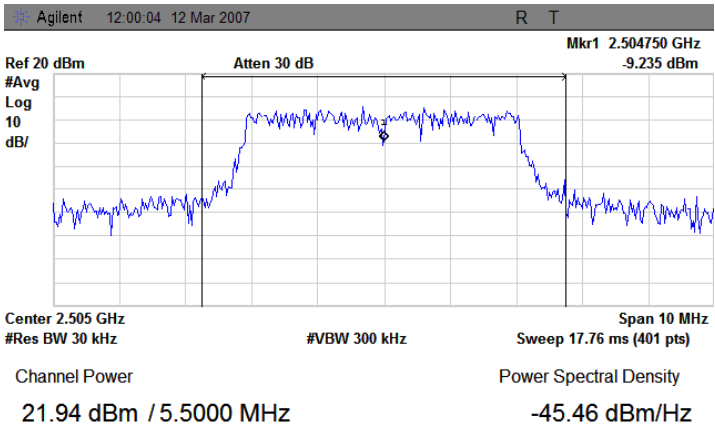




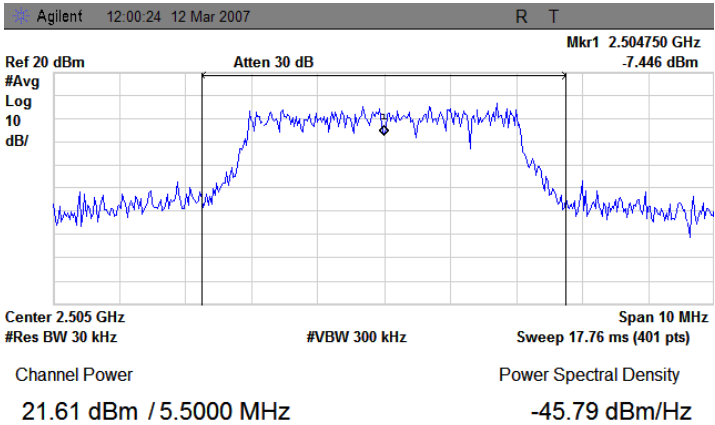
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.7 Peak output power at low frequency, 1.5 Mbps data rate (5.5 MHz CBW)



Plot 7.2.8 Peak output power at low frequency, 13.5 Mbps data rate (5.5 MHz CBW)

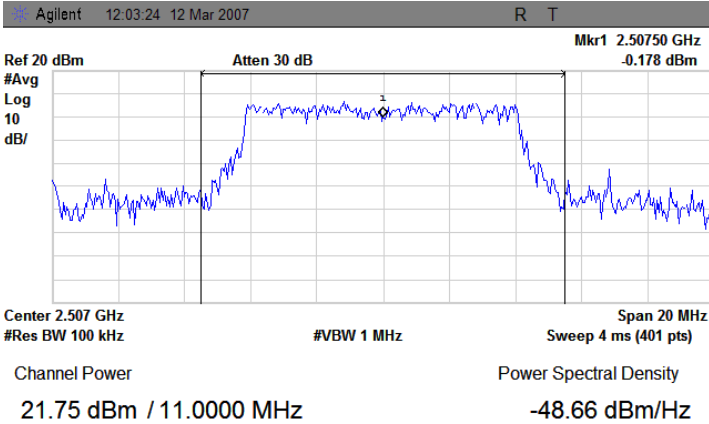




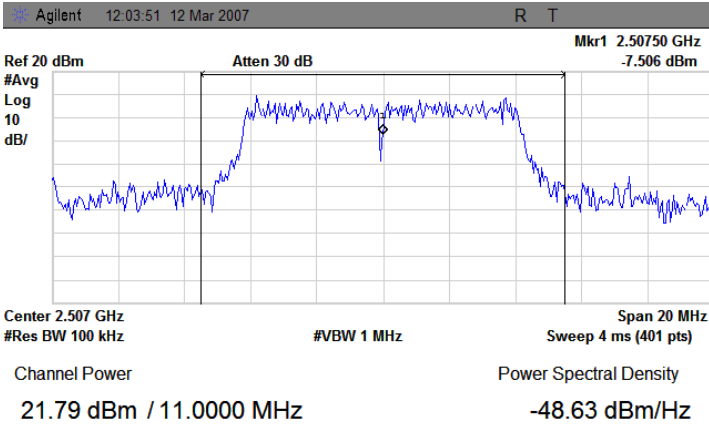
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance		Verdict: PASS	
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.9 Peak output power at low frequency, 3 Mbps data rate (11 MHz CBW)



Plot 7.2.10 Peak output power at low frequency, 27 Mbps data rate (11 MHz CBW)

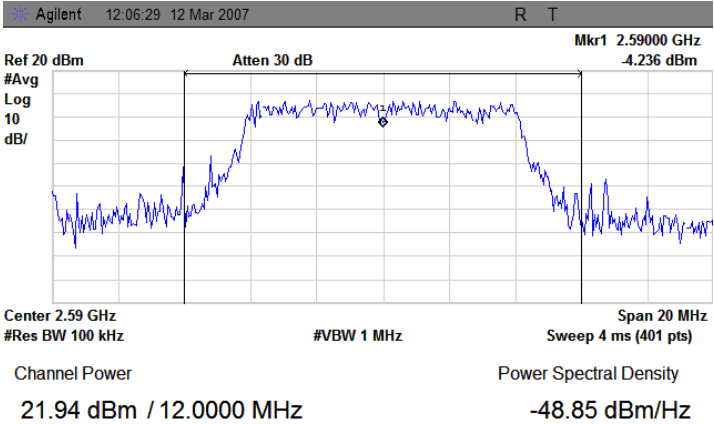




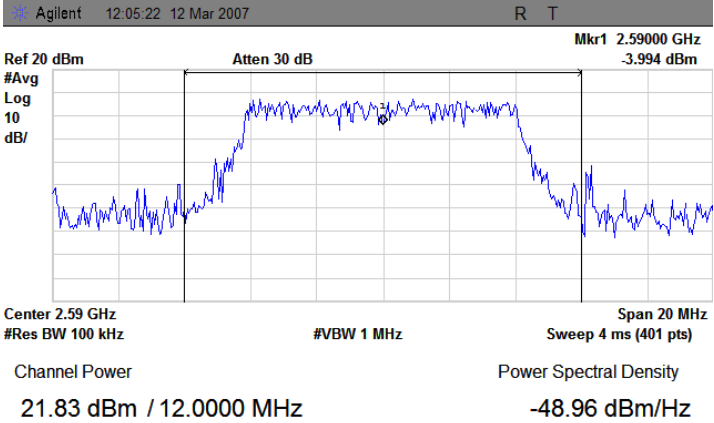
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance		Verdict: PASS	
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.11 Peak output power at mid frequency, 3 Mbps data rate (12 MHz CBW)



Plot 7.2.12 Peak output power at mid frequency, 27 Mbps data rate (12 MHz CBW)

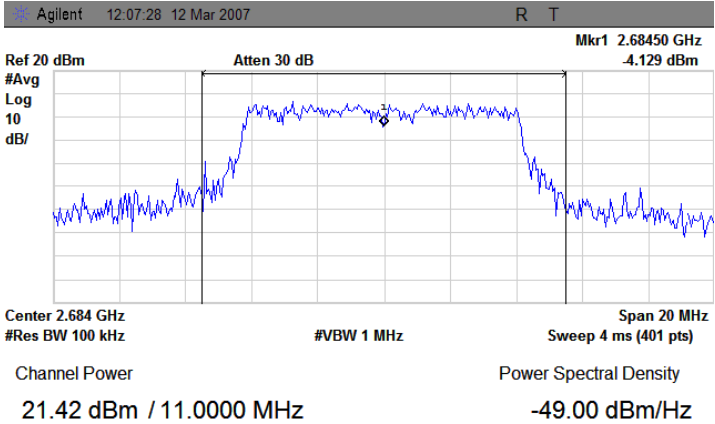




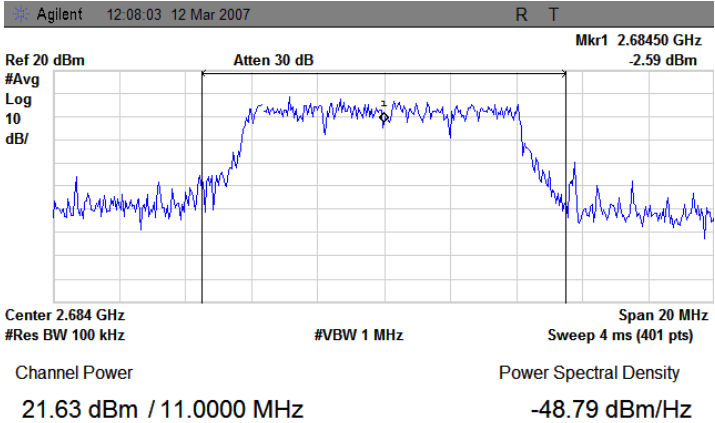
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance		Verdict: PASS	
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.13 Peak output power at high frequency, 3 Mbps data rate (11 MHz CBW)



Plot 7.2.14 Peak output power at high frequency, 27 Mbps data rate (11 MHz CBW)

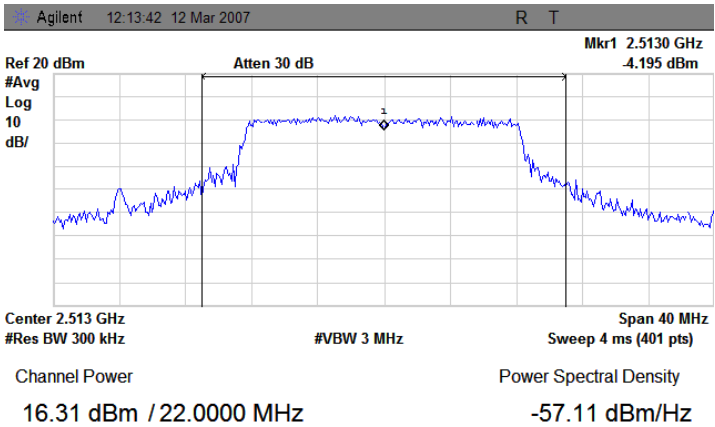




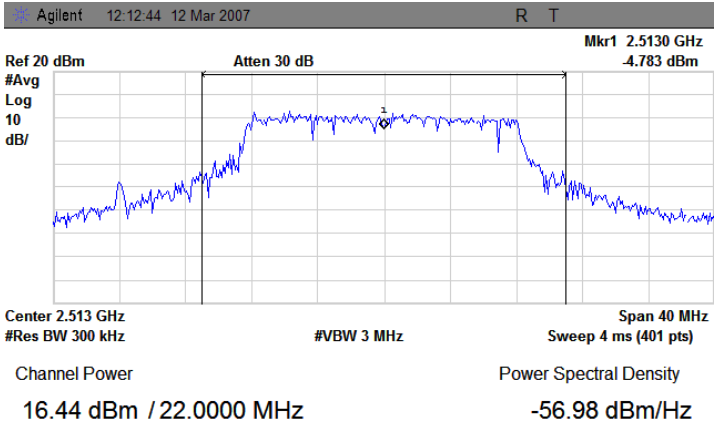
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance		Verdict: PASS	
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.15 Peak output power at low frequency, 6 Mbps data rate (22 MHz CBW)



Plot 7.2.16 Peak output power at low frequency, 54 Mbps data rate (22 MHz CBW)

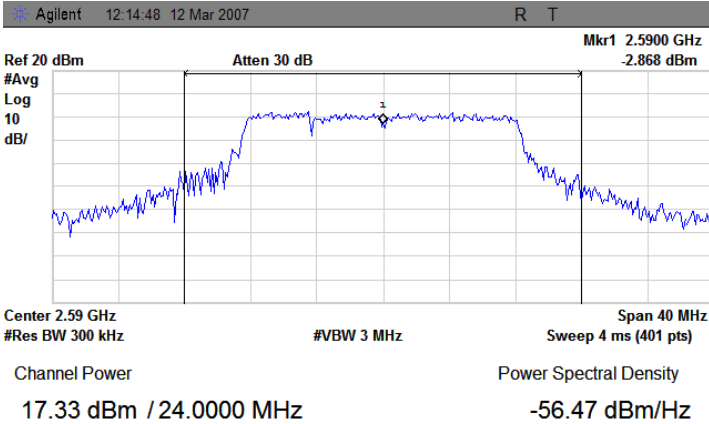




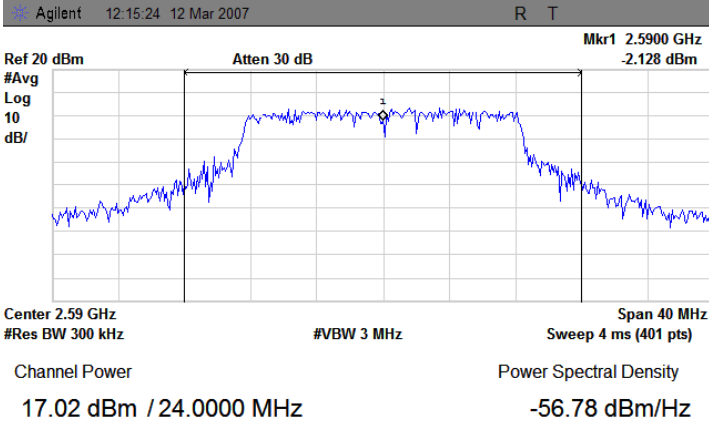
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.17 Peak output power at mid frequency, 6 Mbps data rate (24 MHz CBW)



Plot 7.2.18 Peak output power at mid frequency, 54 Mbps data rate (24 MHz CBW)

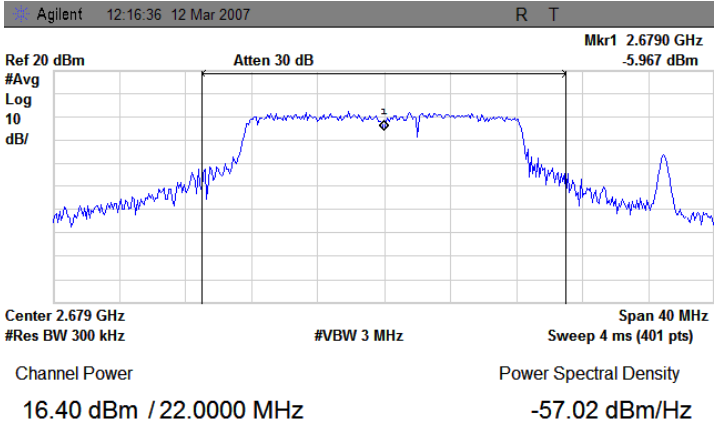




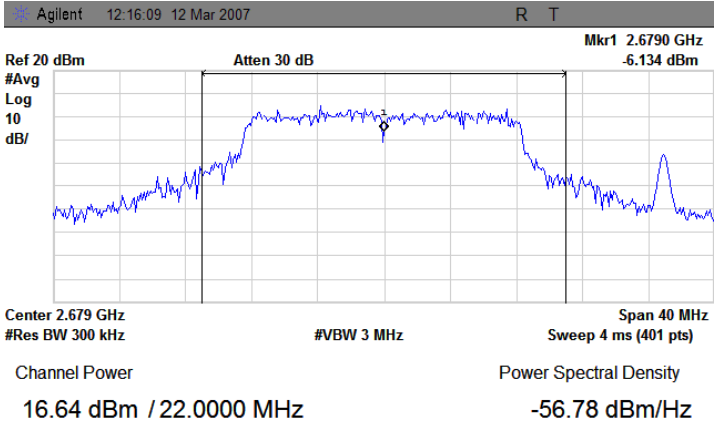
HERMON LABORATORIES

Test specification: Section 27.50(h), Peak output power			
Test procedure: Section 27.50(h)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.19 Peak output power at high frequency, 6 Mbps data rate (22 MHz CBW)



Plot 7.2.20 Peak output power at high frequency, 54 Mbps data rate (22 MHz CBW)





HERMON LABORATORIES

Test specification: Section 27.52, RF safety			
Test procedure:			
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

7.3 RF exposure

7.3.1 General

This test was performed to determine the minimum safe distance between the transmitter antenna and human to avoid public exposure in excess of limits for general population (uncontrolled exposure). Specification test limits are given in Table 7.3.1.

Table 7.3.1 RF exposure limits

Frequency range, MHz	Power density*		Electric field strength**, V/m
	mW/cm ²	W/m ²	
150.0 – 170.0	0.2	2.0	27.5
450.0 – 470.0	0.3 – 0.31	3.0 – 3.1	33.6 – 34.2
700.0	0.47	4.7	42.1
902.0 – 928.0	0.60 – 0.62	6.0 – 6.2	47.6 – 48.3
2400.0 – 10000.0	1.00	10.0	61.4

* - Power density limit within 300 - 1500 MHz was calculated according to the following equation: $S = F / 1500$, where S is power density in mW/cm² and F is frequency in MHz

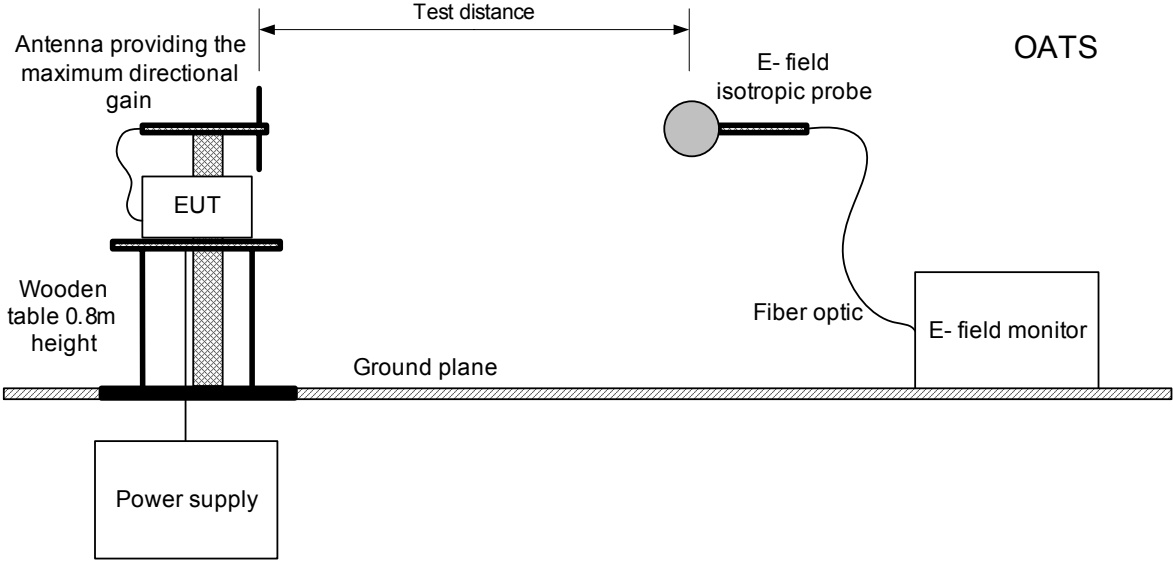
** - Electric field strength limit was calculated from power density as follows: $E = \sqrt{S \times 120 \times \pi}$, where E is electric field strength in V/m and S is power density in W/m²

7.3.2 Test procedure for E-field strength measurements

- 7.3.2.1 The EUT, connected to the antenna providing the maximum directional gain, was set up as shown in Figure 7.3.1.
- 7.3.2.2 The E-field probe was pointed to the EUT antenna zero azimuth at a 3 m distance, the maximum field strength reading was recorded in Table 7.3.2 and Table 7.3.3.
- 7.3.2.3 The E-field probe was slowly moved toward the EUT until E-field equivalent to the maximum permitted power density was measured.
- 7.3.2.4 The obtained antenna to probe distance was recorded in Table 7.3.2 and Table 7.3.3 as a minimum separation distance.
- 7.3.2.5 The test was repeated at the rest of test distances according to Table 7.3.2 and Table 7.3.3.

Test specification: Section 27.52, RF safety			
Test procedure:			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Figure 7.3.1 Maximum permissible exposure (MPE) measurement set up





Test specification: Section 27.52, RF safety			
Test procedure:			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks:			

Photograph 7.3.1 Maximum permissible exposure (MPE) measurement set up, external antenna



Photograph 7.3.2 Maximum permissible exposure (MPE) measurement set up, external antenna





Test specification: Section 27.52, RF safety	
Test procedure:	
Test mode: Compliance	Verdict: PASS
Date: 3/13/2007	
Temperature: 21°C	Air Pressure: 1006 hPa
Relative Humidity: 55 %	
Power Supply: 48 VDC	
Remarks:	

Table 7.3.2 Maximum permissible exposure (MPE) measurement, with external antenna

Test distance, m	Power density, mW/cm ²	Limit, mW/cm ²	Margin, mW/cm ²	Verdict
Low carrier frequency				
3.0	0.0348	1.00	-0.9652	Pass
2.5	0.0515	1.00	-0.9485	Pass
2.0	0.0631	1.00	-0.9369	Pass
1.5	0.0838	1.00	-0.9162	Pass
1.0	0.0921	1.00	-0.9079	Pass
0.5	0.0844	1.00	-0.9156	Pass
0.3	0.1569	1.00	-0.8431	Pass
0.2	0.1769	1.00	-0.8231	Pass
0.1	0.1118	1.00	-0.8882	Pass
0.05	0.1815	1.00	-0.8185	Pass
Mid carrier frequency				
3.0	0.0356	1.00	-0.9644	Pass
2.5	0.0525	1.00	-0.9475	Pass
2.0	0.0768	1.00	-0.9232	Pass
1.5	0.0871	1.00	-0.9129	Pass
1.0	0.0882	1.00	-0.9118	Pass
0.5	0.0614	1.00	-0.9386	Pass
0.3	0.1354	1.00	-0.8646	Pass
0.2	0.1812	1.00	-0.8188	Pass
0.1	0.1731	1.00	-0.8269	Pass
0.05	0.1510	1.00	-0.8490	Pass
High carrier frequency				
3.0	0.0341	1.00	-0.9659	Pass
2.5	0.0563	1.00	-0.9437	Pass
2.0	0.0835	1.00	-0.9165	Pass
1.5	0.1723	1.00	-0.8277	Pass
1.0	0.1453	1.00	-0.8547	Pass
0.5	0.0642	1.00	-0.9358	Pass
0.3	0.1935	1.00	-0.8065	Pass
0.2	0.3560	1.00	-0.6440	Pass
0.1	0.2280	1.00	-0.7720	Pass
0.05	0.3330	1.00	-0.6670	Pass



Test specification: Section 27.52, RF safety	
Test procedure:	
Test mode: Compliance	Verdict: PASS
Date: 3/13/2007	
Temperature: 21°C	Air Pressure: 1006 hPa
Relative Humidity: 55 %	
Power Supply: 48 VDC	
Remarks:	

Table 7.3.3 Maximum permissible exposure (MPE) measurement, with integrated antenna

Test distance, m	Power density, mW/cm ²	Limit, mW/cm ²	Margin, mW/cm ²	Verdict
Low carrier frequency				
3.0	0.0105	1.00	-0.9895	Pass
2.5	0.0135	1.00	-0.9865	Pass
2.0	0.0208	1.00	-0.9792	Pass
1.5	0.0393	1.00	-0.9607	Pass
1.0	0.0302	1.00	-0.9698	Pass
0.5	0.2390	1.00	-0.7610	Pass
0.3	0.4950	1.00	-0.5050	Pass
0.2	0.6070	1.00	-0.3930	Pass
0.1	0.3210	1.00	-0.6790	Pass
0.05	0.4120	1.00	-0.5880	Pass
Mid carrier frequency				
3.0	0.0167	1.00	-0.9833	Pass
2.5	0.0213	1.00	-0.9787	Pass
2.0	0.0320	1.00	-0.9680	Pass
1.5	0.0570	1.00	-0.9430	Pass
1.0	0.1027	1.00	-0.8973	Pass
0.5	0.3540	1.00	-0.6460	Pass
0.3	0.4260	1.00	-0.5740	Pass
0.2	0.4230	1.00	-0.5770	Pass
0.1	0.4400	1.00	-0.5600	Pass
0.05	0.8150	1.00	-0.1850	Pass
High carrier frequency				
3.0	0.0124	1.00	-0.9876	Pass
2.5	0.0143	1.00	-0.9857	Pass
2.0	0.0283	1.00	-0.9717	Pass
1.5	0.0497	1.00	-0.9503	Pass
1.0	0.0982	1.00	-0.9018	Pass
0.5	0.2250	1.00	-0.7750	Pass
0.3	0.4250	1.00	-0.5750	Pass
0.2	0.4750	1.00	-0.5250	Pass
0.1	0.4110	1.00	-0.5890	Pass
0.05	0.8400	1.00	-0.1600	Pass

Reference numbers of test equipment used

HL 2976						
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Full description is given in Appendix A.



Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

7.4 Spurious emissions at RF antenna connector test @5.5 MHz channel bandwidth

7.4.1 General

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

Table 7.4.1 Spurious emission limits

Frequency, MHz	Attenuation below carrier, dBc	Spurious emission, dBm
0.009 – 10th harmonic	43+10logP*	-13.0

* - P is transmitter output power in Watts

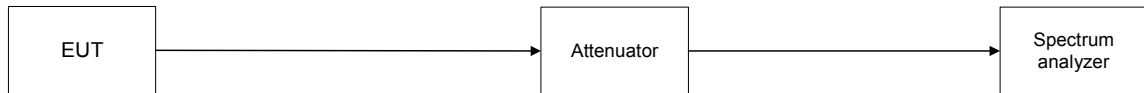
7.4.2 Test procedure

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

7.4.2.3 The spurious emission was measured with spectrum analyzer as provided in Table 7.4.2 and associated plots.

Figure 7.4.1 Spurious emission test setup





Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Table 7.4.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496 - 2690 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 – 27000 MHz
 DETECTOR USED: Peak
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 MODULATION: QAM
 MODULATING SIGNAL: PRBS
 BIT RATE: 13.5 Mbps
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 TRANSMITTER OUTPUT POWER: 21.54 dBm at low frequency
 21.89 dBm at mid frequency
 21.52 dBm at high frequency

Frequency, MHz	SA reading, dBm	Attenuations, dB	RBW, kHz	Used RBW, kHz	Spurious emission*, dBm	Attenuation below carrier, dBc	Limit**, dBc	Margin, dB***	Verdict
Low channel frequency									
2494.9350	-48.90	included	1000.0	0.3	-13.67	35.21	34.54	0.67	Pass
2495.9975	-24.70	included	50.0	10.0	-17.71	39.25	34.54	4.71	Pass
2502.0375	-35.93	included	50.0	1.0	-18.94	40.48	34.54	5.94	Pass
2503.1450	-48.39	included	1000.0	0.3	-13.16	34.70	34.54	0.16	Pass
2505.4125	-38.07	included	1000.0	10.0	-18.07	39.61	34.54	5.07	Pass
2538.1250	-23.86	included	1000.0	1000.0	-23.86	45.40	34.54	10.86	Pass
2655.9625	-16.27	included	1000.0	1000.0	-16.27	37.81	34.54	3.27	Pass
2595.9125	-15.28	included	1000.0	1000.0	-15.28	36.82	34.54	2.28	Pass
3095.8000	-19.15	included	1000.0	1000.0	-19.15	40.69	34.54	6.15	Pass
Mid channel frequency									
2552.2000	-24.09	included	1000.0	1000.0	-24.09	45.98	34.89	11.09	Pass
2588.6400	-45.28	included	1000.0	1.0	-15.28	37.17	34.89	2.28	Pass
2589.6400	-41.61	included	50.0	1.0	-24.62	46.51	34.89	11.62	Pass
2596.0575	-40.06	included	50.0	1.0	-23.07	44.96	34.89	10.07	Pass
2597.0450	-44.84	included	1000.0	1.0	-14.84	36.73	34.89	1.84	Pass
2600.0000	-15.86	included	1000.0	1000.0	-15.86	37.75	34.89	2.86	Pass
2657.0500	-15.73	included	1000.0	1000.0	-15.73	37.62	34.89	2.73	Pass
2697.0875	-15.32	included	1000.0	1000.0	-15.32	37.21	34.89	2.32	Pass
3096.9500	-19.33	included	1000.0	1000.0	-19.33	41.22	34.89	6.33	Pass
High channel frequency									
73.0180	-46.63	included	100.0	100.0	-46.63	68.15	34.52	33.63	Pass
219.3700	-51.88	included	100.0	100.0	-51.88	73.40	34.52	38.88	Pass
2278.5000	-24.11	included	1000.0	1000.0	-24.11	45.63	34.52	11.11	Pass
2657.8000	-15.98	included	1000.0	1000.0	-15.98	37.50	34.52	2.98	Pass
2683.4125	-43.82	included	1000.0	1.0	-13.82	35.34	34.52	0.82	Pass
2684.4950	-37.74	included	50.0	1.0	-20.75	42.27	34.52	7.75	Pass
2690.0425	-36.73	included	50.0	1.0	-19.74	41.26	34.52	6.74	Pass
2691.0000	-43.07	included	1000.0	1.0	-13.07	34.59	34.52	0.07	Pass
2697.8250	-14.97	included	1000.0	1000.0	-14.97	36.49	34.52	1.97	Pass
2710.7250	-23.16	included	1000.0	1000.0	-23.16	44.68	34.52	10.16	Pass
2737.9750	-24.40	included	1000.0	1000.0	-24.40	45.92	34.52	11.40	Pass
3097.8300	-19.47	included	1000.0	1000.0	-19.47	40.99	34.52	6.47	Pass

* - Spurious emission = SA reading + 10log(RBW / Used RBW)

** - The limit was calculated as follows:

$$Limit = 43 + 10 \cdot \log \left(\left(10^{\frac{Output\ power[dBm]}{10}} \right) / 1000 \right)$$

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

Reference numbers of test equipment used

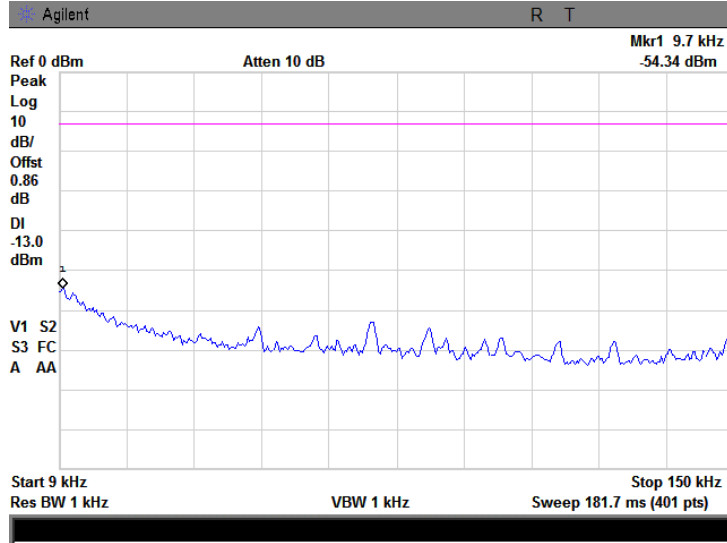
HL 2867	HL 2909					
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Full description is given in Appendix A.

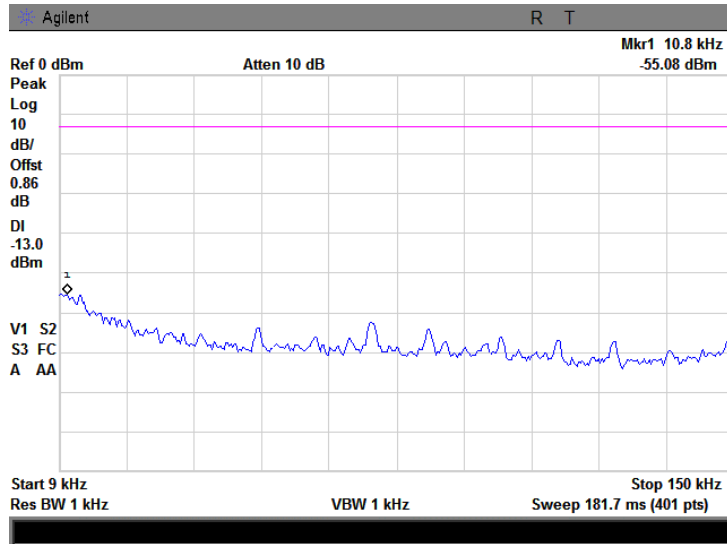


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency



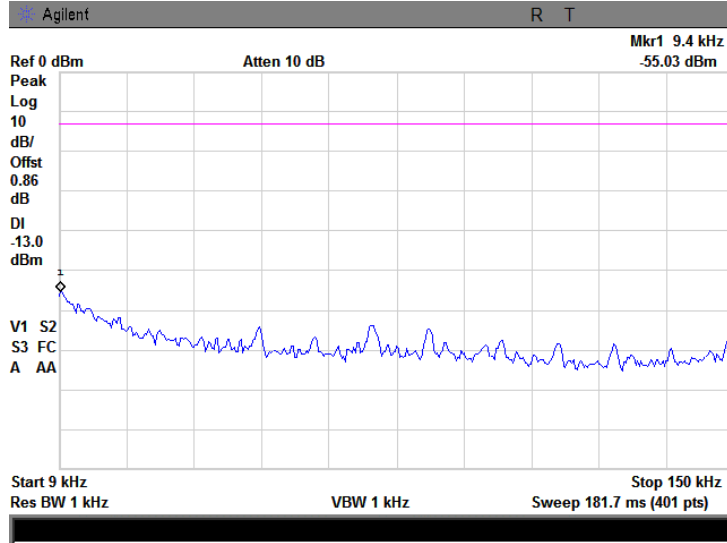
Plot 7.4.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency



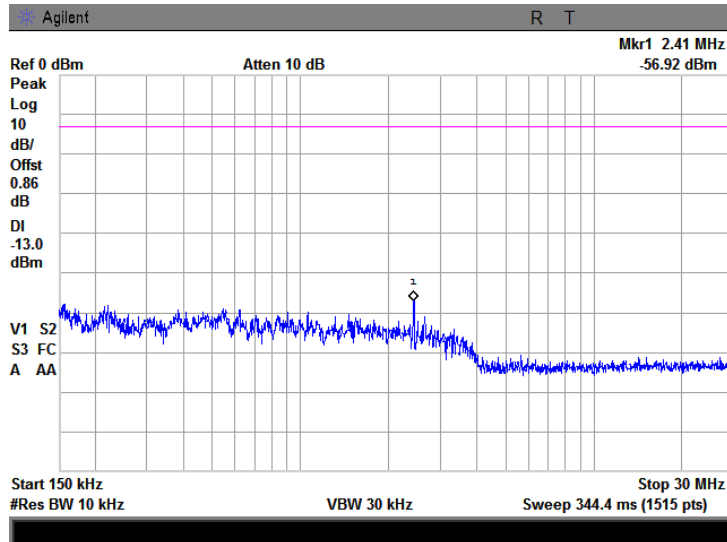


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency



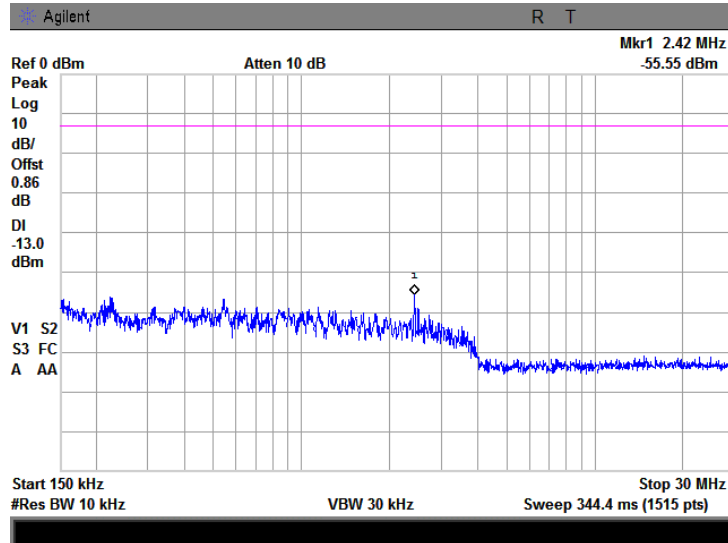
Plot 7.4.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency



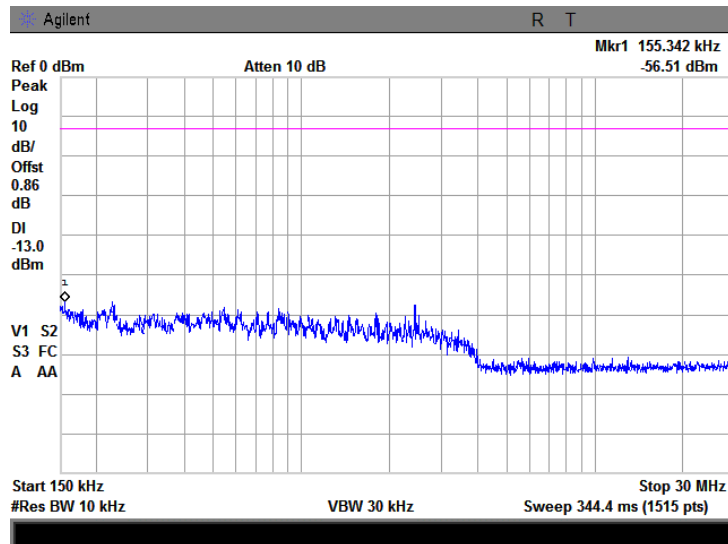


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance		Verdict: PASS	
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.5 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency



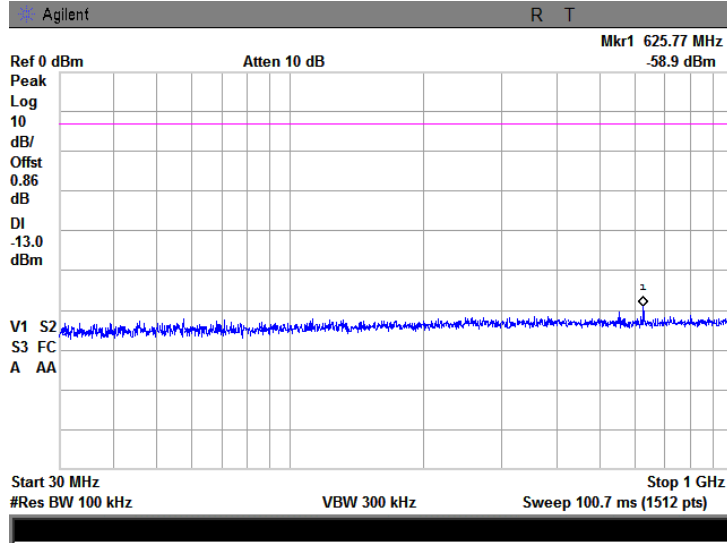
Plot 7.4.6 Spurious emission measurements in 0.15 - 30.0 MHz range at high carrier frequency



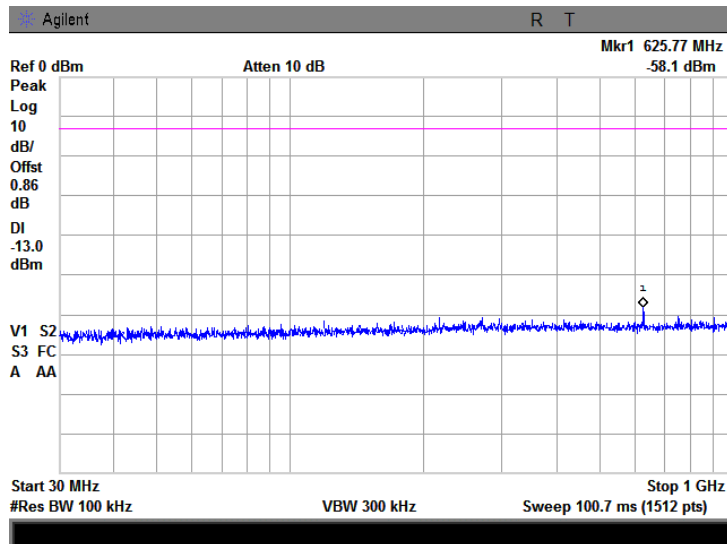


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.7 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency



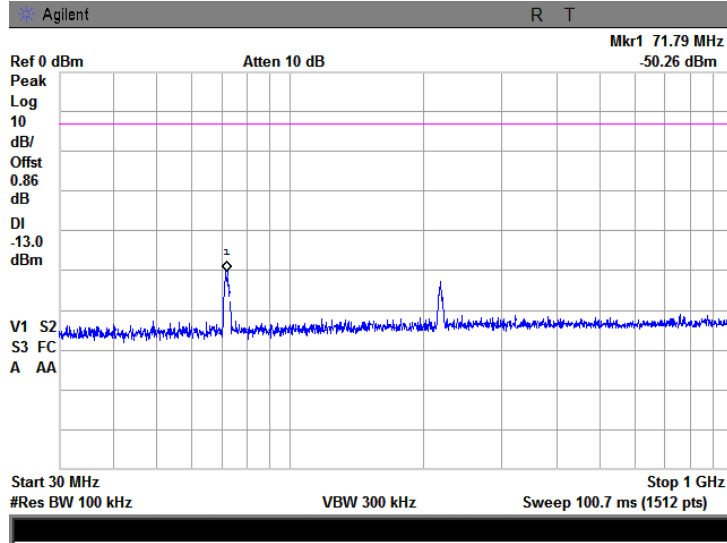
Plot 7.4.8 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency



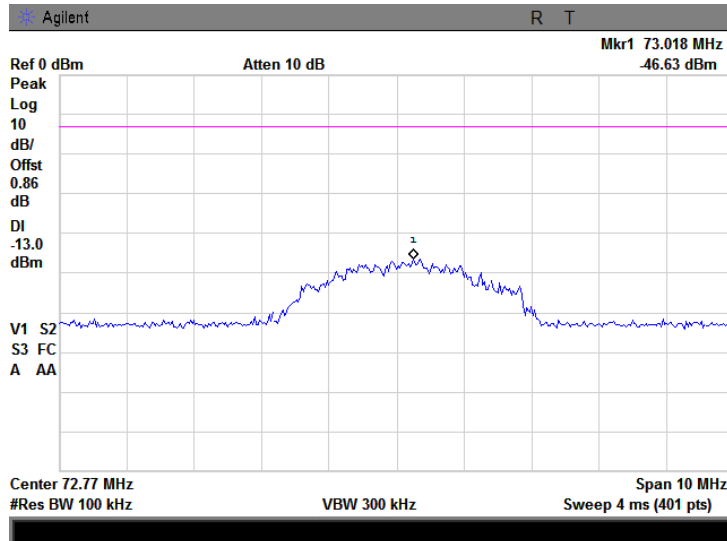


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.9 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency



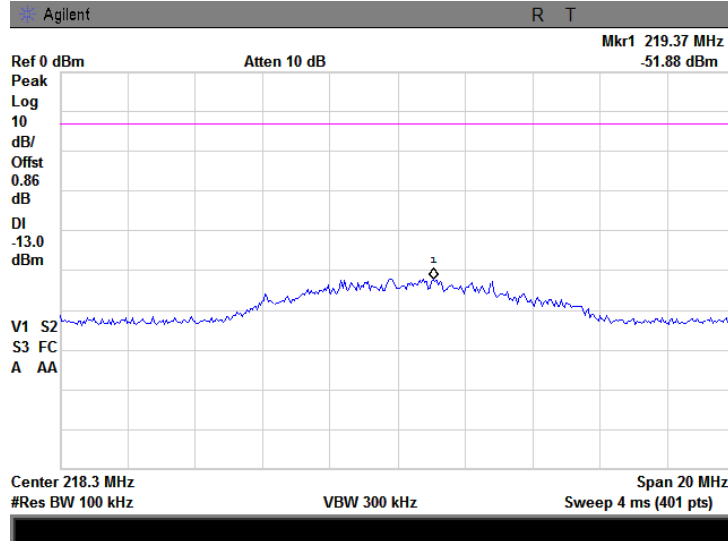
Plot 7.4.10 Spurious emission measurements at 73 MHz at high carrier frequency





Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

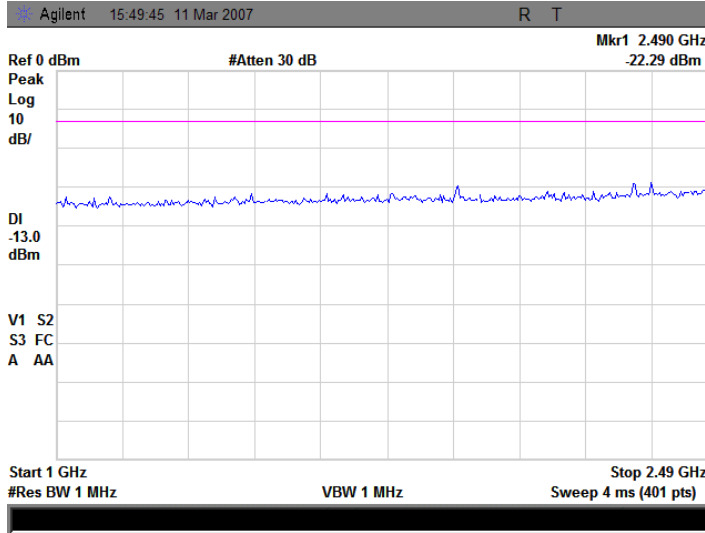
Plot 7.4.11 Spurious emission measurements at 219 MHz at high carrier frequency



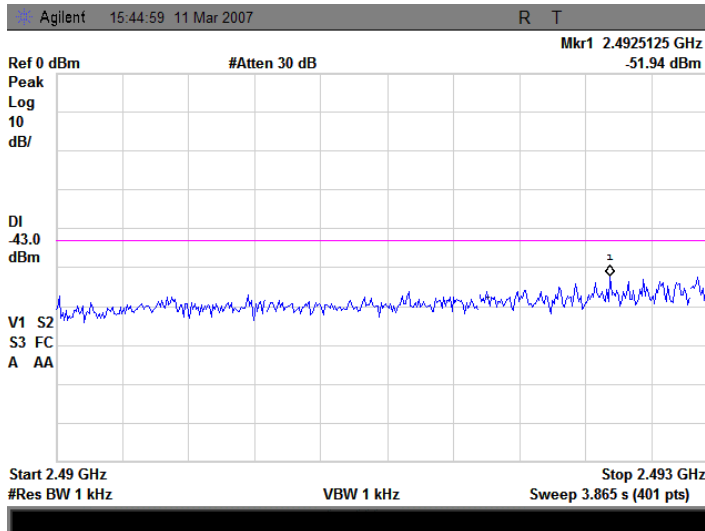


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.12 Spurious emission measurements in 1000 - 2490 MHz range at low carrier frequency



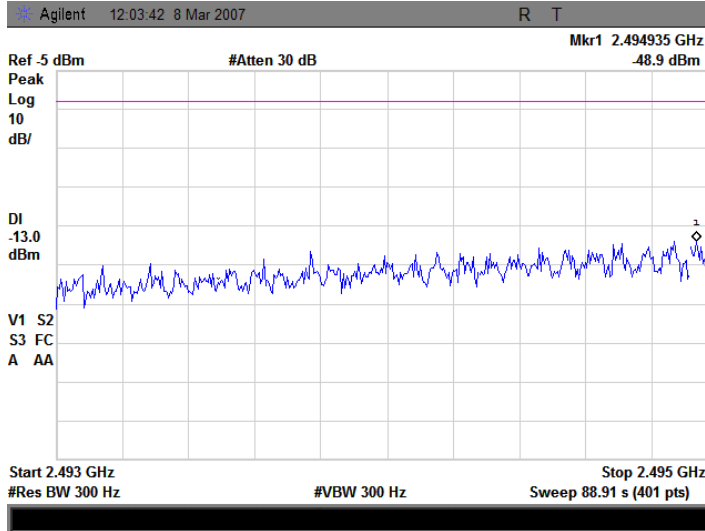
Plot 7.4.13 Spurious emission measurements in 2490 - 2493 MHz range at low carrier frequency



$$\text{Limit} = \text{Limit}(1\text{MHz}) - \text{BW factor} = \text{Limit}(1\text{MHz}) - 10\log(1\text{MHz}/1\text{kHz}) = -13 \text{ dBm} - 30 \text{ dB} = -43 \text{ dBm}$$

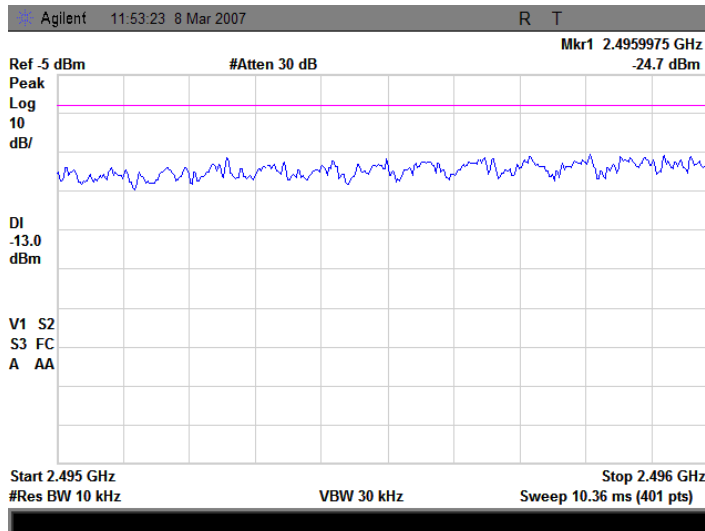
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.14 Spurious emission measurements in 2493 - 2495 MHz range at low carrier frequency



Signal = SA reading + BW factor = SA reading + $10\log(1\text{MHz}/300\text{Hz})$ = SA reading + 35 dB

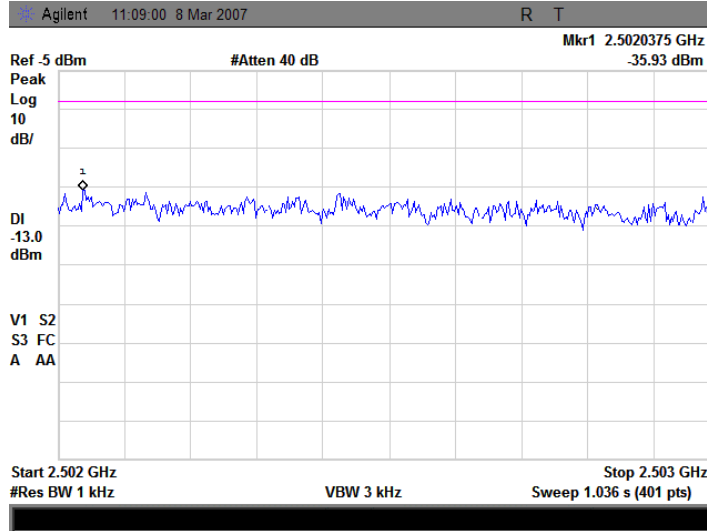
Plot 7.4.15 Spurious emission measurements in 2495 - 2496 MHz range at low carrier frequency



Signal = SA reading + BW factor = SA reading + $10\log(45\text{kHz}/10\text{kHz})$ = SA reading + 6.5 dB
1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
1% of OBW = 4.5MHz / 100 = 45 kHz

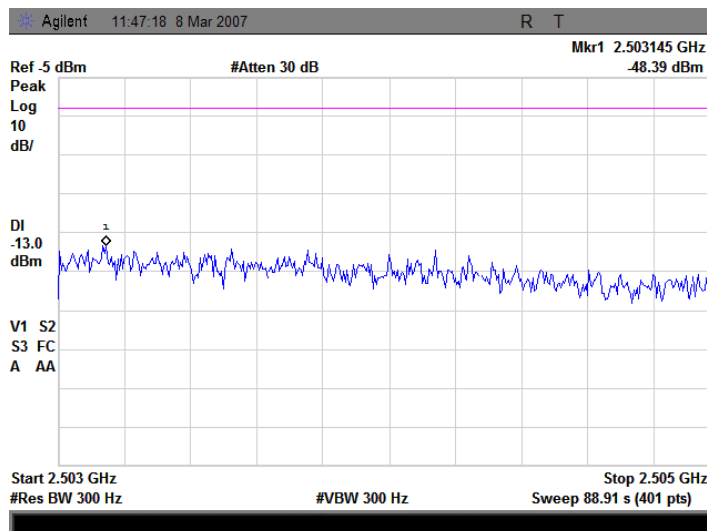
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.16 Spurious emission measurements in 2502 - 2503 MHz range at low carrier frequency



Signal = SA reading + BW factor = SA reading + $10\log(45\text{kHz}/1\text{kHz})$ = SA reading + 16.5 dB
1 MHz band immediately outside and adjacent to the frequency block (upper band edge)
1% of OBW = 4.5MHz / 100 = 45 kHz

Plot 7.4.17 Spurious emission measurements in 2503 - 2505 MHz range at low carrier frequency

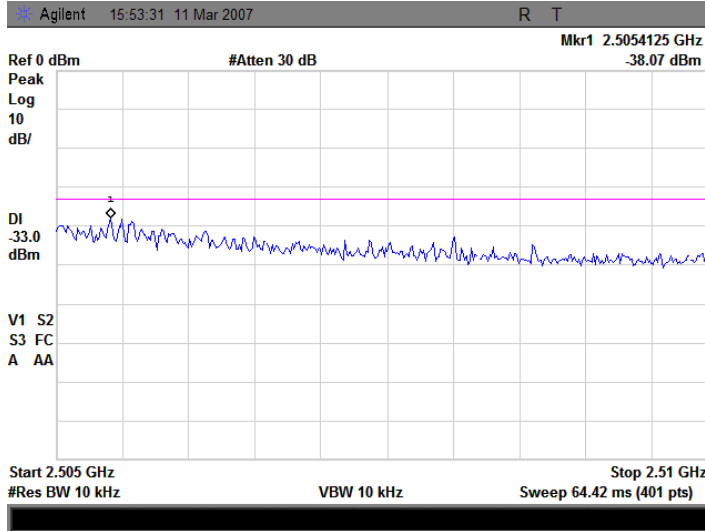


Signal = SA reading + BW factor = SA reading + $10\log(1\text{MHz}/300\text{Hz})$ = SA reading + 35 dB



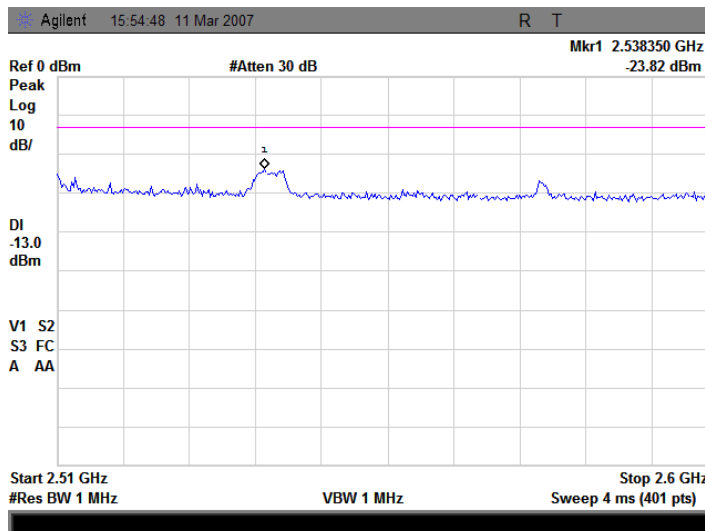
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.18 Spurious emission measurements in 2505 - 2510 MHz range at low carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/10kHz) = -13 dBm - 20 dB = -33 dBm

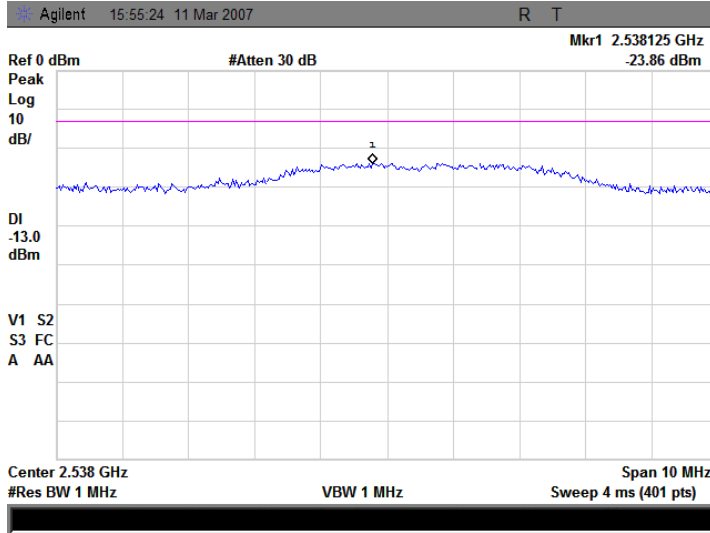
Plot 7.4.19 Spurious emission measurements in 2510 - 2600 MHz range at low carrier frequency



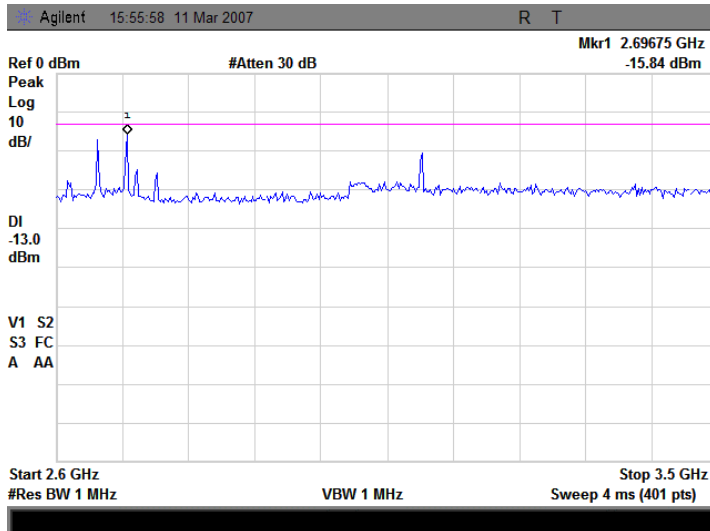


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.20 Spurious emission measurements at 2538 MHz at low carrier frequency



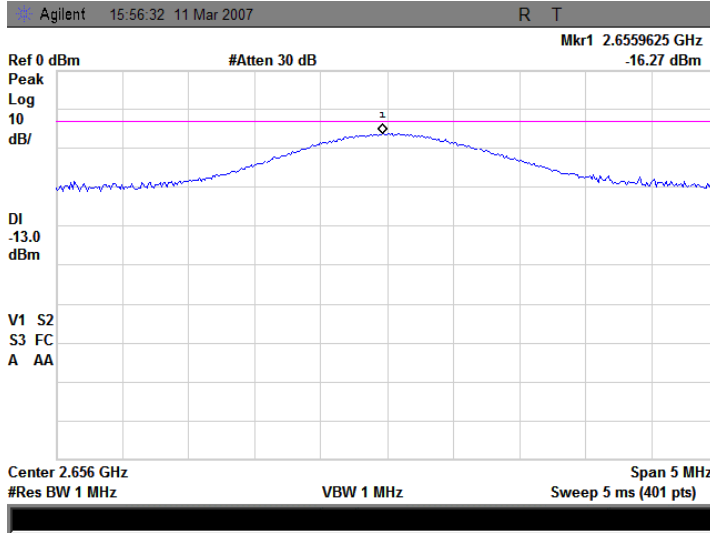
Plot 7.4.21 Spurious emission measurements in 2600 - 3500 MHz range at low carrier frequency



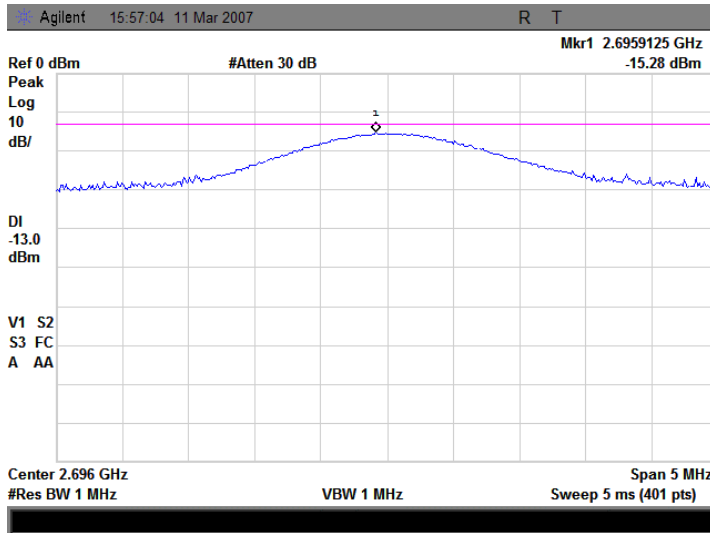


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.22 Spurious emission measurements at 2656 MHz at low carrier frequency



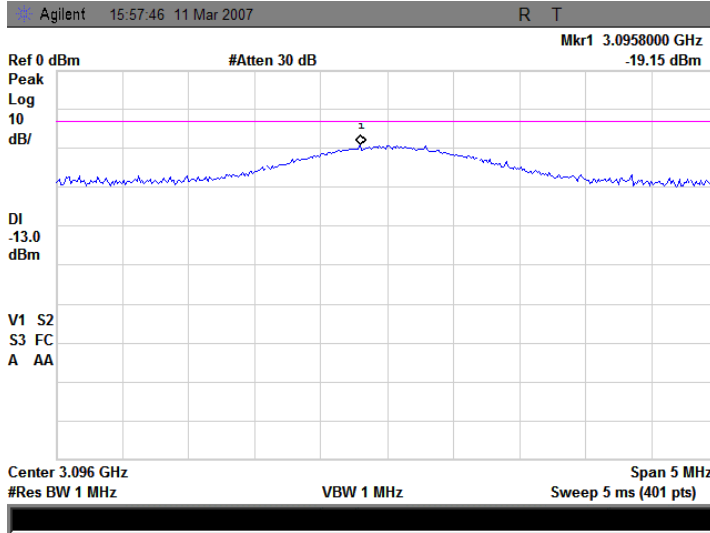
Plot 7.4.23 Spurious emission measurements at 2696 MHz at low carrier frequency



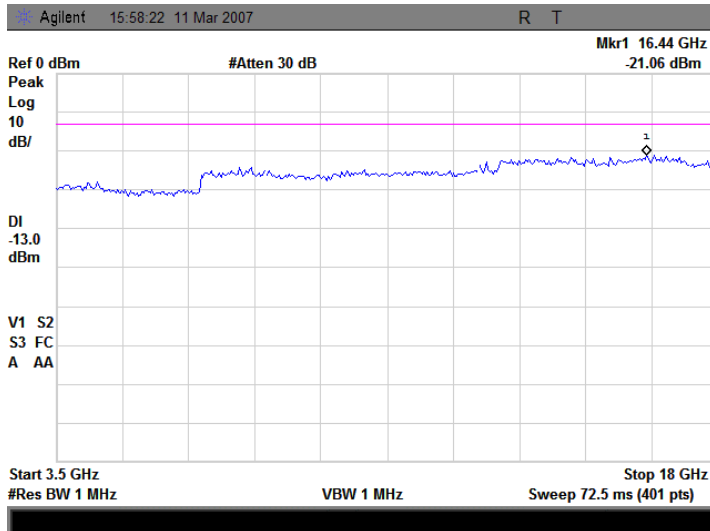


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.24 Spurious emission measurements at 3096 MHz at low carrier frequency



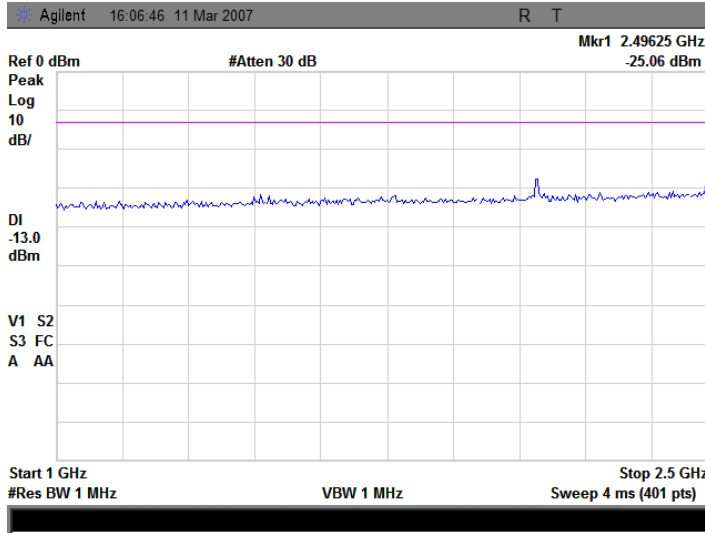
Plot 7.4.25 Spurious emission measurements in 3500 - 18000 MHz range at low carrier frequency



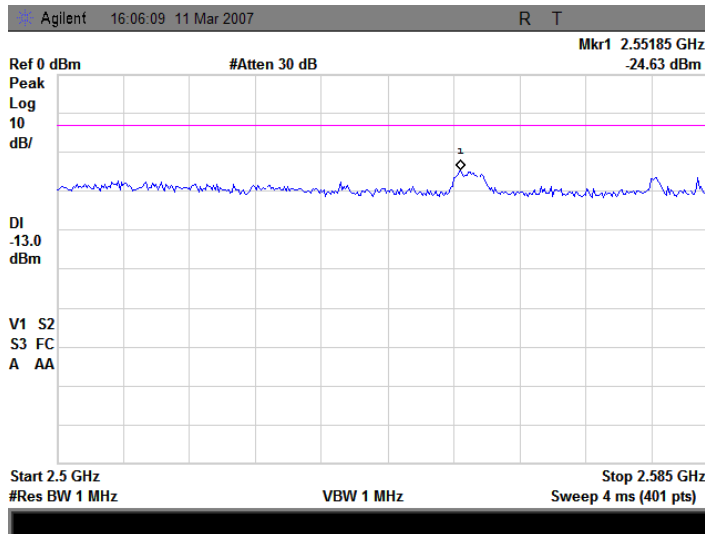


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.26 Spurious emission measurements in 1000 - 2500 MHz range at mid carrier frequency



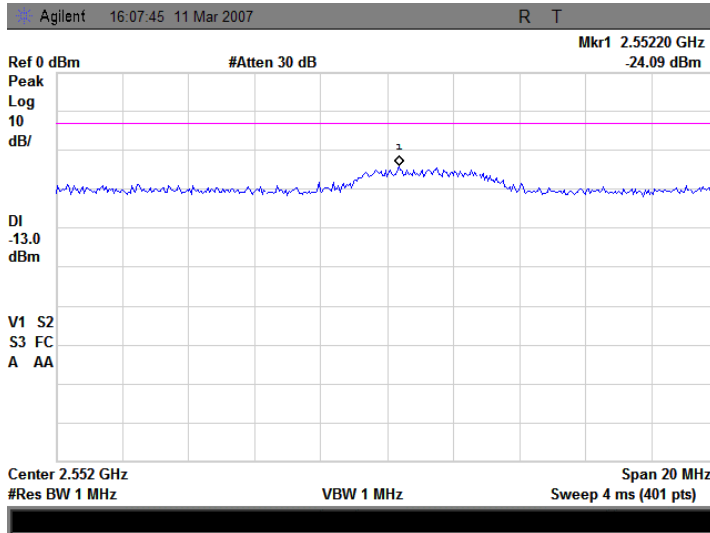
Plot 7.4.27 Spurious emission measurements in 2500 - 2585 MHz range at mid carrier frequency



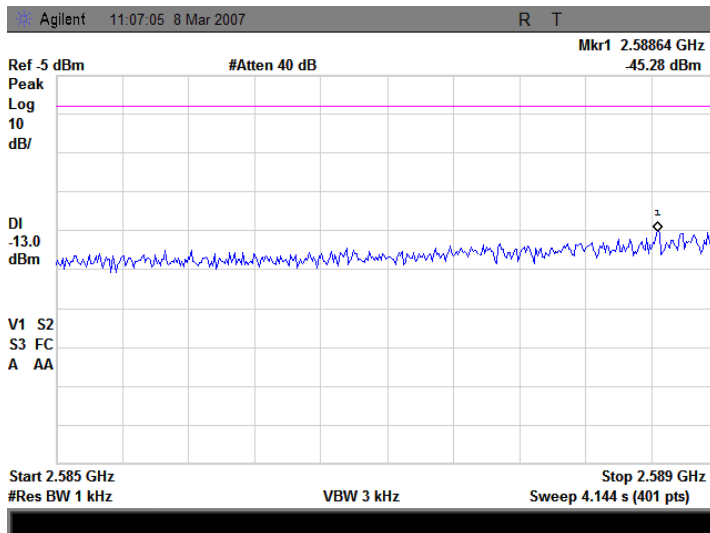


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.28 Spurious emission measurements at 2552 MHz at mid carrier frequency



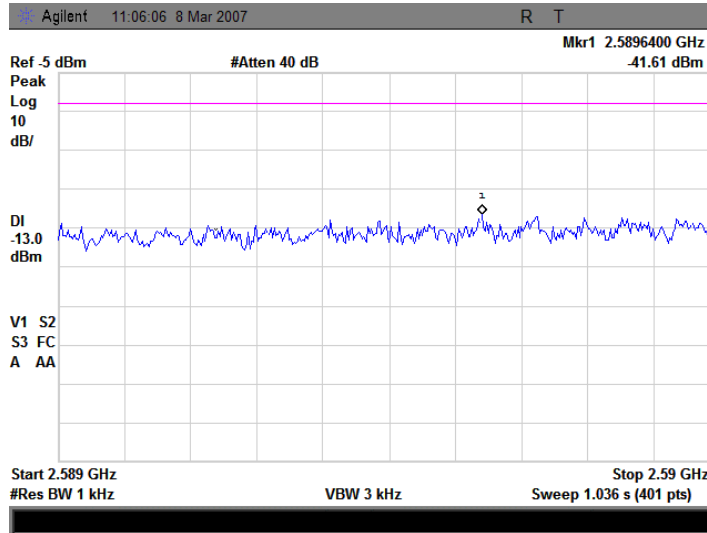
Plot 7.4.29 Spurious emission measurements in 2585 - 2589 MHz range at mid carrier frequency



Signal = SA reading + BW factor = SA reading + 10log(1MHz/1kHz) = SA reading + 30 dB

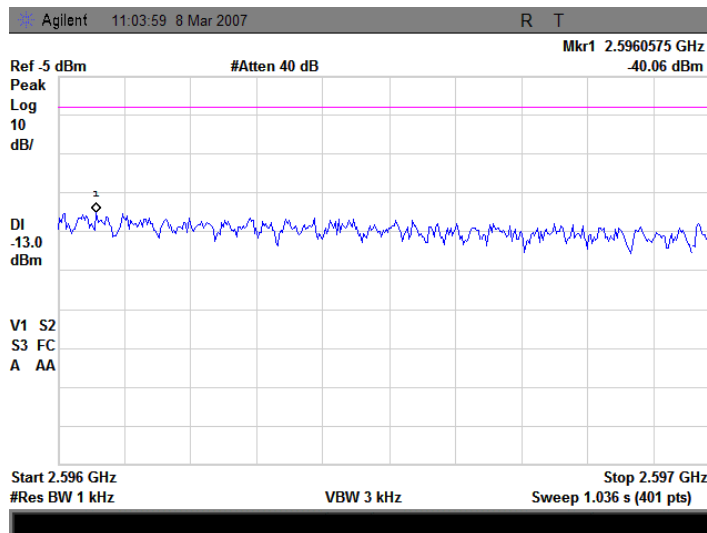
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.30 Spurious emission measurements in 2589 - 2590 MHz range at mid carrier frequency



Signal = SA reading + BW factor = SA reading + $10\log(45\text{kHz}/1\text{kHz})$ = SA reading + 16.5 dB
1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
1% of OBW = 4.5MHz / 100 = 45 kHz

Plot 7.4.31 Spurious emission measurements in 2596 - 2597 MHz range at mid carrier frequency

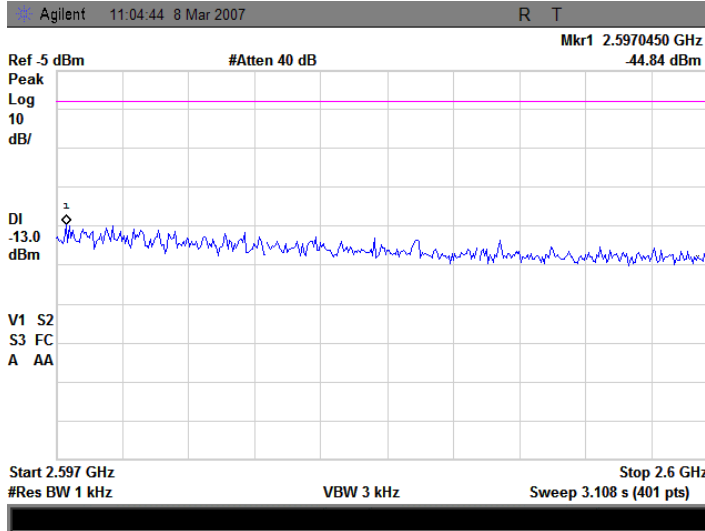


Signal = SA reading + BW factor = SA reading + $10\log(45\text{kHz}/1\text{kHz})$ = SA reading + 16.5 dB
1 MHz band immediately outside and adjacent to the frequency block (upper band edge)
1% of OBW = 4.5MHz / 100 = 45 kHz



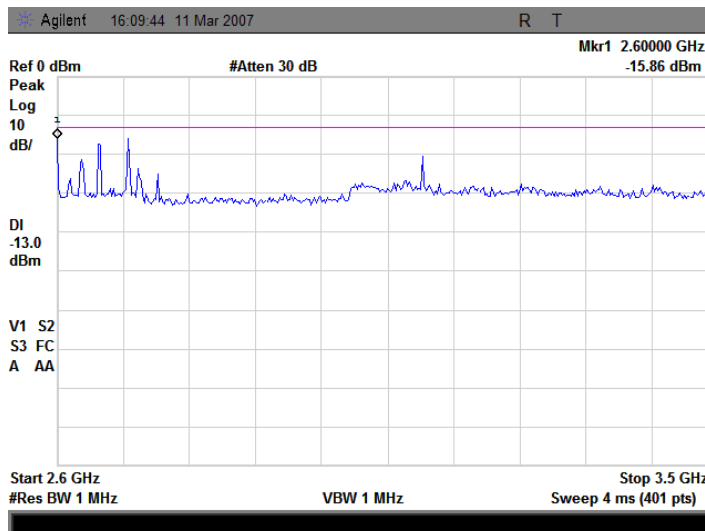
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.32 Spurious emission measurements in 2597 - 2600 MHz range at mid carrier frequency



Signal = SA reading + BW factor = SA reading + 10log(1MHz/1kHz) = SA reading + 30 dB

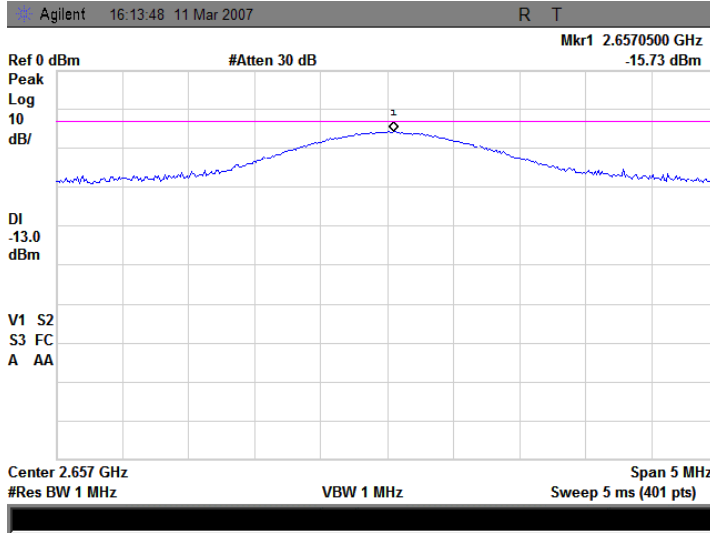
Plot 7.4.33 Spurious emission measurements in 2600 - 3500 MHz range at mid carrier frequency



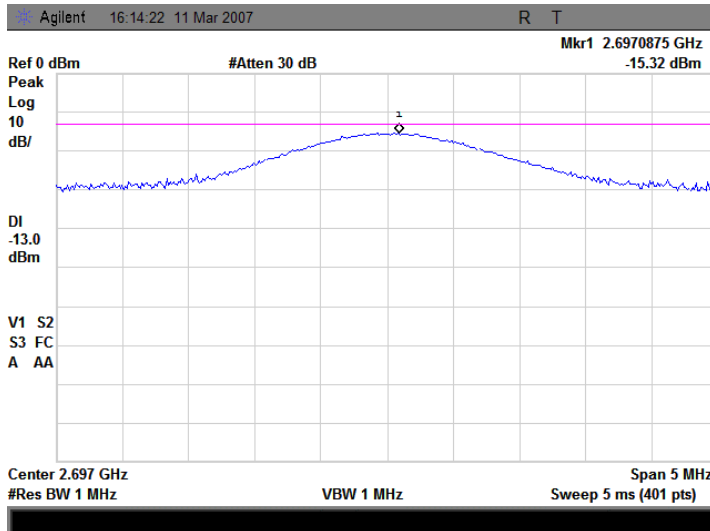


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.34 Spurious emission measurements in 2657 MHz at mid carrier frequency



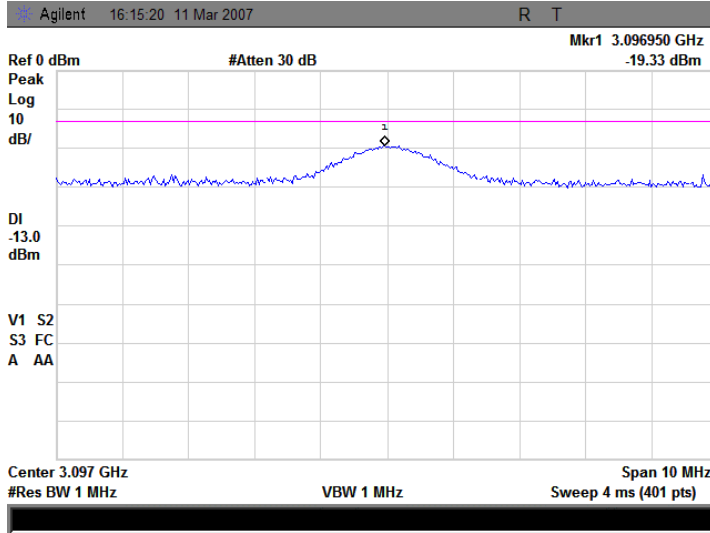
Plot 7.4.35 Spurious emission measurements in 2697 MHz at mid carrier frequency



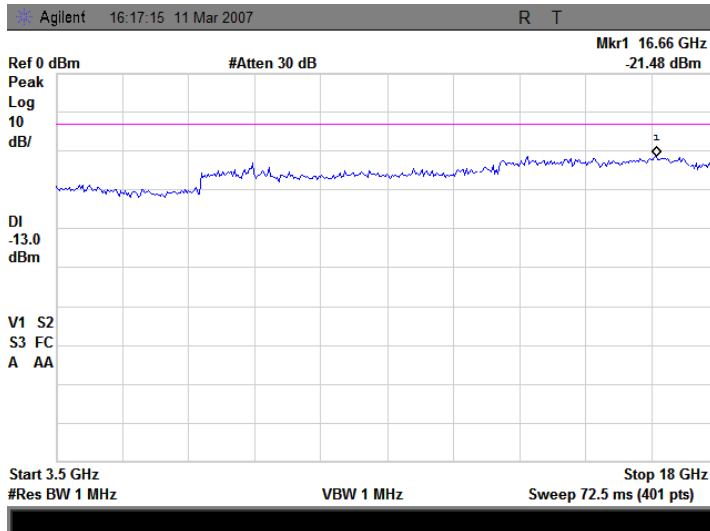


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.36 Spurious emission measurements in 3097 MHz at mid carrier frequency

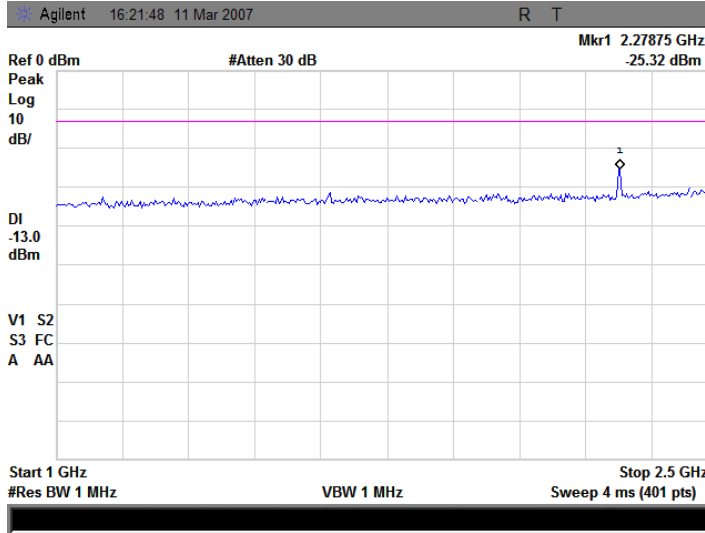


Plot 7.4.37 Spurious emission measurements in 3500 - 18000 MHz range at mid carrier frequency

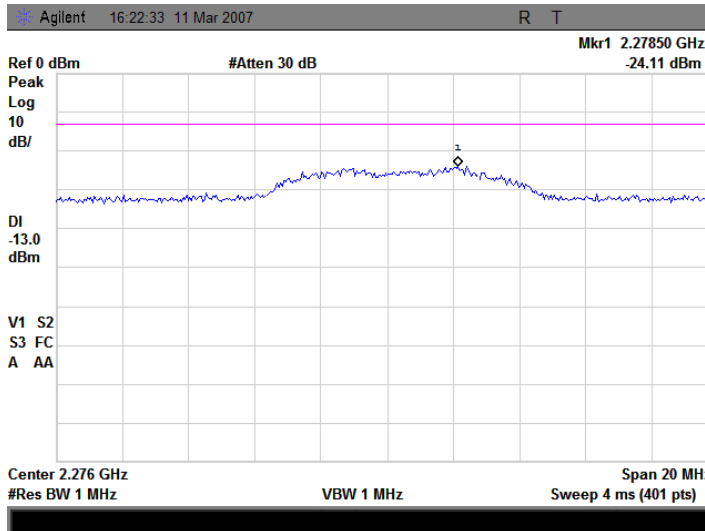


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.38 Spurious emission measurements in 1000 - 2500 MHz range at high carrier frequency



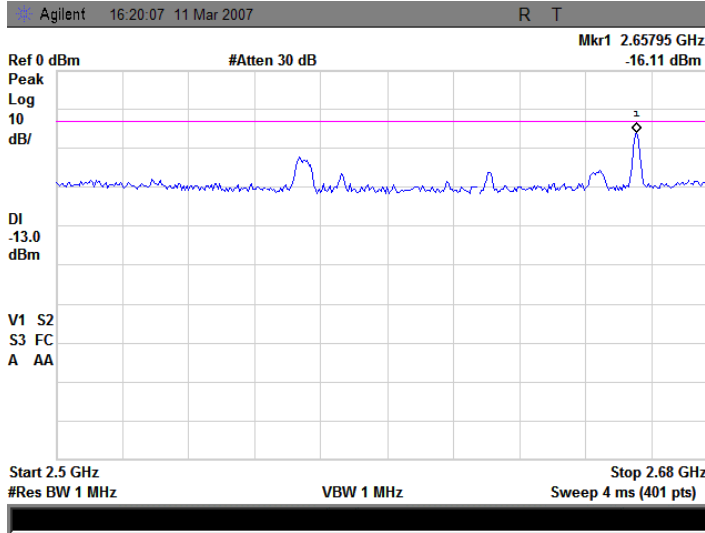
Plot 7.4.39 Spurious emission measurements at 2276 MHz at high carrier frequency



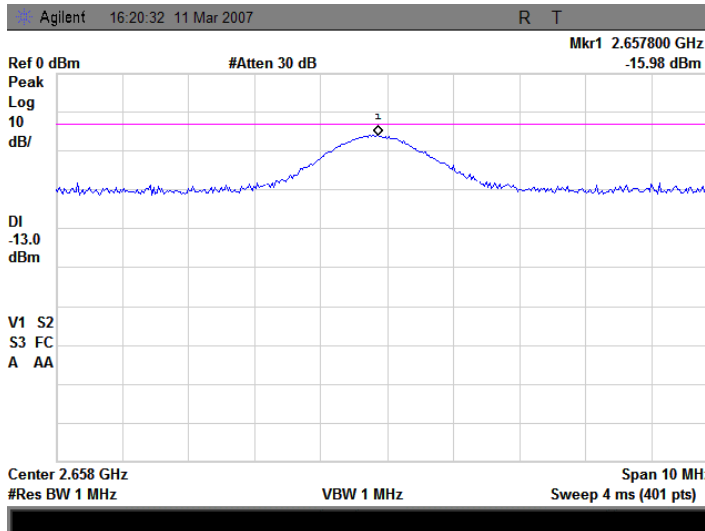


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.40 Spurious emission measurements in 2500 - 2680 MHz range at high carrier frequency



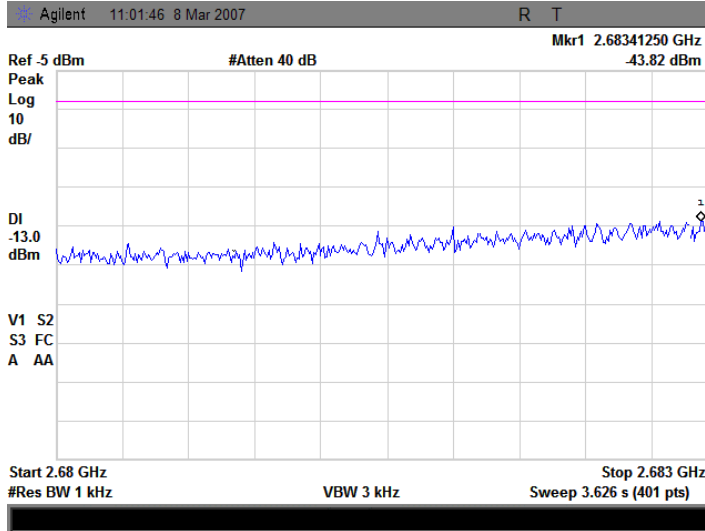
Plot 7.4.41 Spurious emission measurements at 2658 MHz at high carrier frequency





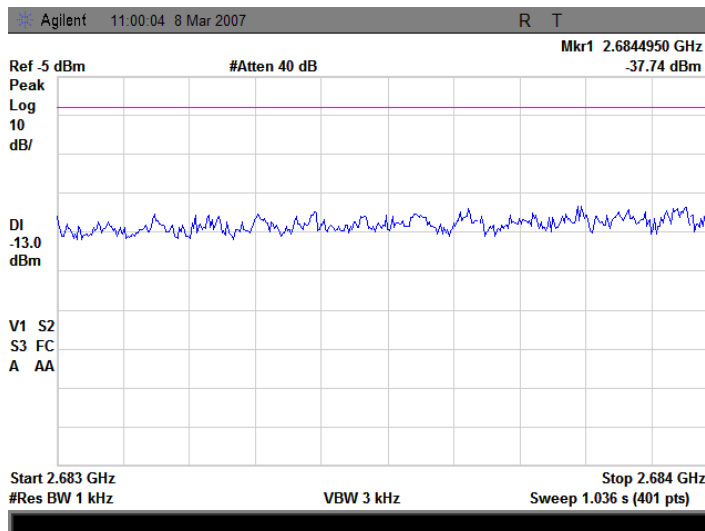
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.42 Spurious emission measurements in 2680 - 2683 MHz range at high carrier frequency



Signal = SA reading + BW factor = SA reading + 10log(1MHz/1kHz) = SA reading + 30 dB

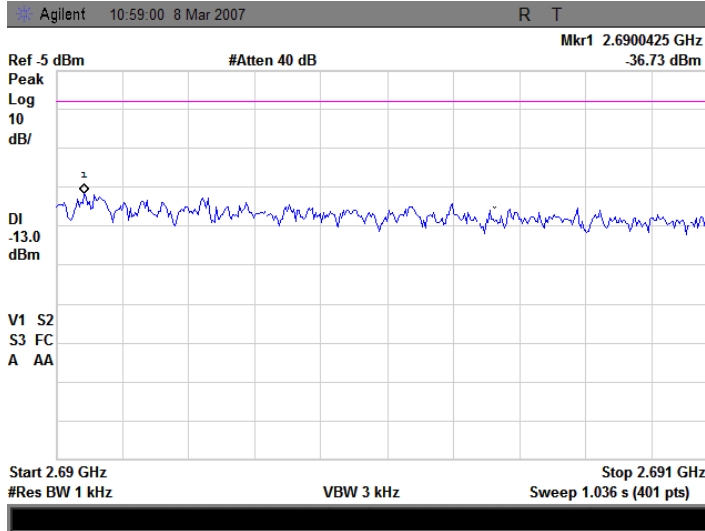
Plot 7.4.43 Spurious emission measurements in 2683 - 2684 MHz range at high carrier frequency



Signal = SA reading + BW factor = SA reading + 10log(45kHz/1kHz) = SA reading + 16.5 dB
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 4.5MHz / 100 = 45 kHz

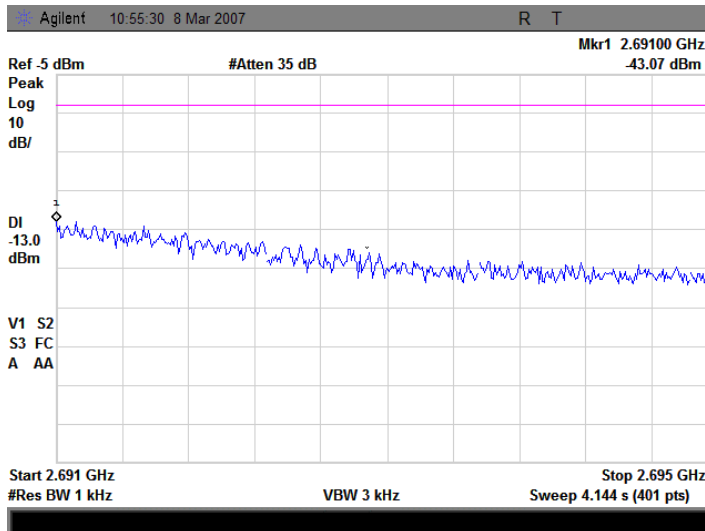
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.44 Spurious emission measurements in 2690 - 2691 MHz range at high carrier frequency



Signal = SA reading + BW factor = SA reading + $10\log(45\text{kHz}/1\text{kHz})$ = SA reading + 16.5 dB
1 MHz band immediately outside and adjacent to the frequency block (upper band edge)
1% of OBW = 4.5MHz / 100 = 45 kHz

Plot 7.4.45 Spurious emission measurements in 2691 - 2695 MHz range at high carrier frequency

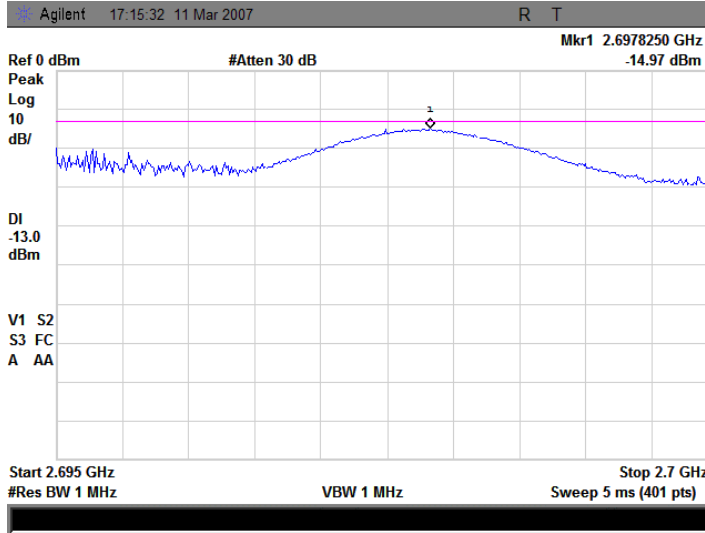


Signal = SA reading + BW factor = SA reading + $10\log(1\text{MHz}/1\text{kHz})$ = SA reading + 30 dB

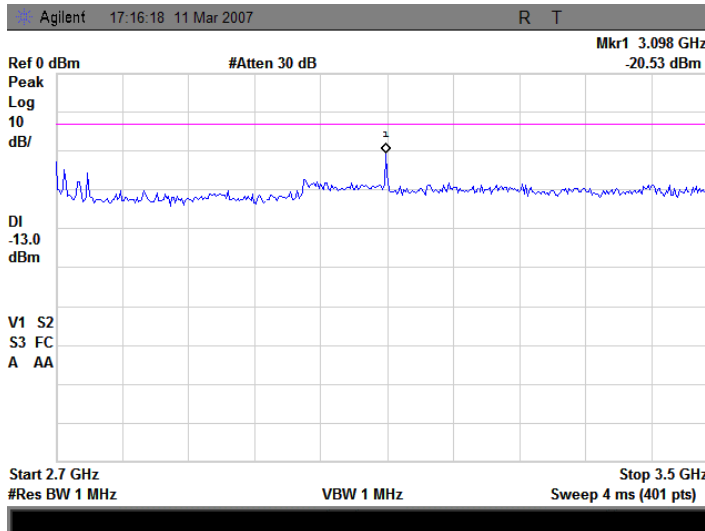


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.46 Spurious emission measurements in 2695 - 2700 MHz range at high carrier frequency



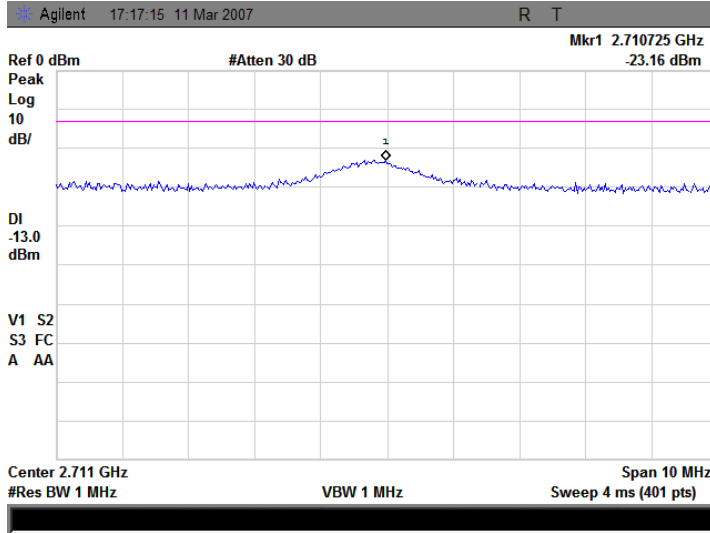
Plot 7.4.47 Spurious emission measurements in 2700 - 3500 MHz range at high carrier frequency



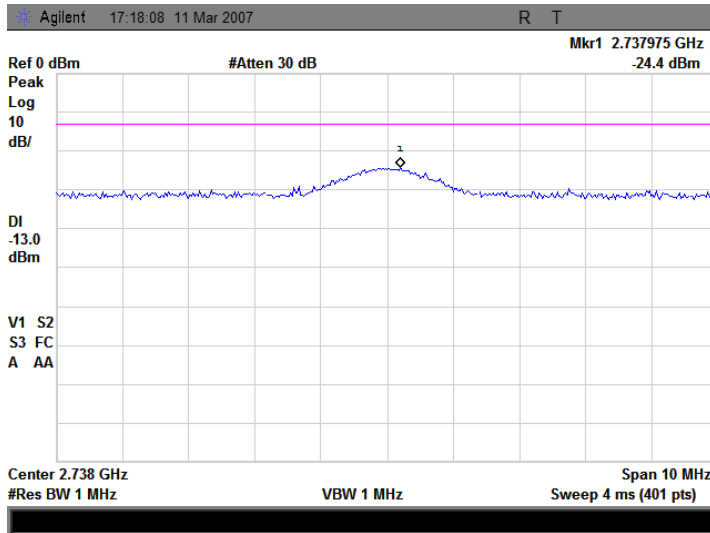


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.48 Spurious emission measurements at 2711 MHz at high carrier frequency



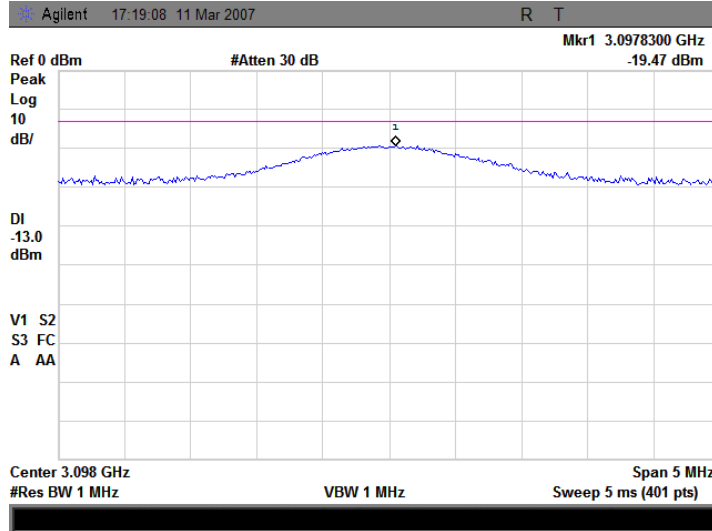
Plot 7.4.49 Spurious emission measurements at 2738 MHz at high carrier frequency



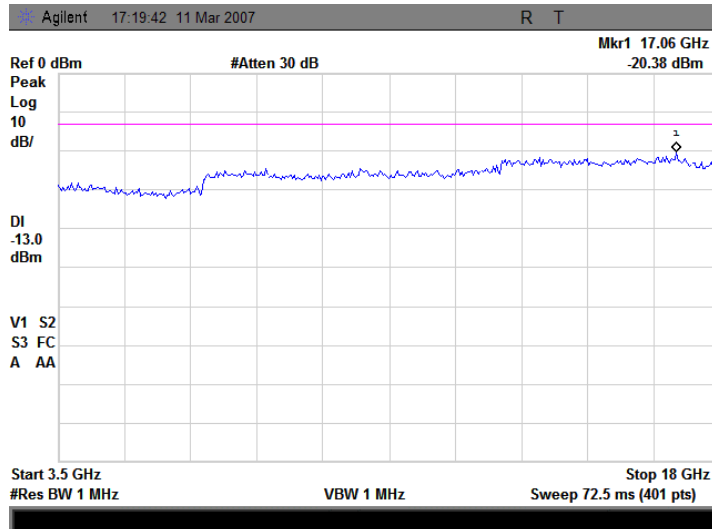


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.50 Spurious emission measurements at 3098 MHz at high carrier frequency



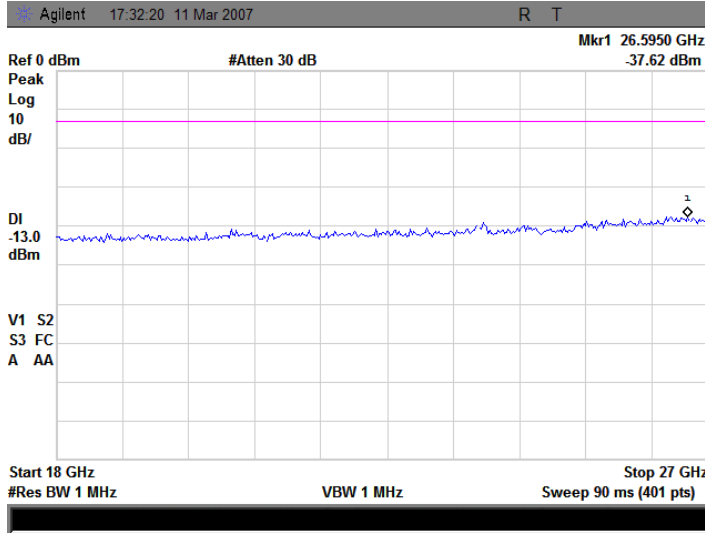
Plot 7.4.51 Spurious emission measurements in 3500 - 18000 MHz range at high carrier frequency



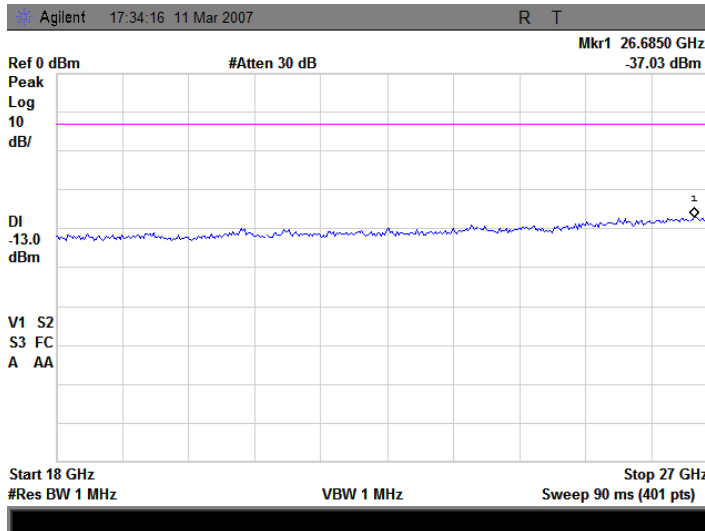


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.52 Spurious emission measurements in 18000 - 27000 MHz range at low carrier frequency



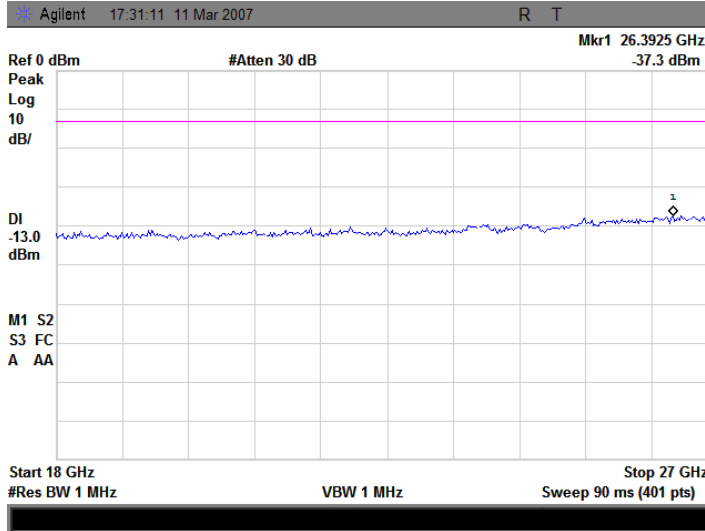
Plot 7.4.53 Spurious emission measurements in 18000 - 27000 MHz range at mid carrier frequency





Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 5.5 MHz CBW			

Plot 7.4.54 Spurious emission measurements in 18000 - 27000 MHz range at high carrier frequency





Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

7.5 Spurious emissions at RF antenna connector test @ 11 MHz channel bandwidth

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	Attenuation below carrier, dBc	Spurious emission, dBm
0.009 – 10th harmonic	43+10logP*	-13.0

* - P is transmitter output power in Watts

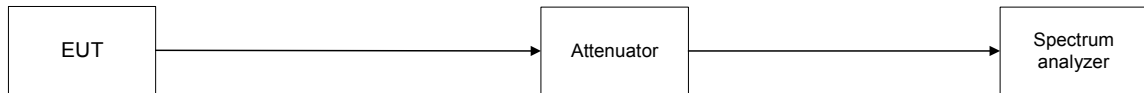
7.5.2 Test procedure

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 and associated plots.

Figure 7.5.1 Spurious emission test setup





Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Table 7.5.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496 - 2690 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 – 27000 MHz
 DETECTOR USED: Peak
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 MODULATION: QAM
 MODULATING SIGNAL: PRBS
 BIT RATE: 27 Mbps
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 TRANSMITTER OUTPUT POWER: 21.79 dBm at low frequency,
 21.83 dBm at mid frequency,
 21.63 dBm at high frequency

Frequency, MHz	SA reading, dBm	Attenuations, dB	RBW, kHz	Used RBW, kHz	Spurious emission*, dBm	Attenuation below carrier, dBc	Limit**, dBc	Margin, dB***	Verdict
Low channel frequency									
2497.0000	-30.99	included	1000.0	30.0	-15.76	37.55	34.79	2.76	Pass
2497.4950	Combination of Broadband emission from the carrier skirt and Narrowband spurious emission								Pass****
2499.9600	-49.37	included	1000.0	0.3	-14.14	35.93	34.79	1.14	Pass
2500.9750	-43.44	included	1000.0	1.0	-13.44	35.23	34.79	0.44	Pass
2501.3725	-39.93	included	87.0	1.0	-20.53	42.32	34.79	7.53	Pass
2513.3025	-39.67	included	87.0	1.0	-20.27	42.06	34.79	7.27	Pass
2514.2250	-48.34	included	1000.0	0.3	-13.11	34.90	34.79	0.11	Pass
2516.4150	-51.84	included	1000.0	0.3	-16.61	38.40	34.79	3.61	Pass
2537.4750	-36.59	included	1000.0	100.0	-26.59	48.38	34.79	13.59	Pass
2657.5000	-15.67	included	1000.0	1000.0	-15.67	37.46	34.79	2.67	Pass
2697.3875	-15.22	included	1000.0	1000.0	-15.22	37.01	34.79	2.22	Pass
3097.5000	-18.92	included	1000.0	1000.0	-18.92	40.71	34.79	5.92	Pass
Mid channel frequency									
2500.1750	-23.31	included	1000.0	1000.0	-23.31	45.14	34.83	10.31	Pass
2580.3690	-24.00	included	1000.0	100.0	-14.00	35.83	34.83	1.00	Pass
2582.5313	-34.52	included	1000.0	10.0	-14.52	36.35	34.83	1.52	Pass
2583.4275	-45.65	included	87.0	1.0	-26.25	48.08	34.83	13.25	Pass
2596.0725	-46.35	included	87.0	1.0	-26.95	48.78	34.83	13.95	Pass
2597.0200	-47.08	included	1000.0	1.0	-17.08	38.91	34.83	4.08	Pass
2599.3850	-39.76	included	1000.0	10.0	-19.76	41.59	34.83	6.76	Pass
2660.0050	-15.71	included	1000.0	1000.0	-15.71	37.54	34.83	2.71	Pass
2700.0475	-15.56	included	1000.0	1000.0	-15.56	37.39	34.83	2.56	Pass
3100.0750	-18.59	included	1000.0	1000.0	-18.59	40.42	34.83	5.59	Pass
High channel frequency									
73.0180	-46.63	included	100.0	100.0	-46.63	68.26	34.63	33.63	Pass
219.3700	-51.88	included	100.0	100.0	-51.88	73.51	34.63	38.88	Pass
2495.6750	-24.21	included	1000.0	1000.0	-24.21	45.84	34.63	11.21	Pass
2655.4875	-15.10	included	1000.0	1000.0	-15.10	36.73	34.63	2.10	Pass
2671.5100	-16.26	included	1000.0	1000.0	-16.26	37.89	34.63	3.26	Pass
2677.6400	-43.46	included	1000.0	1.0	-13.46	35.09	34.63	0.46	Pass
2678.3800	-41.88	included	87.0	1.0	-22.48	44.11	34.63	9.48	Pass
2690.0050	-42.01	included	87.0	1.0	-22.61	44.24	34.63	9.61	Pass
2691.0600	-45.15	included	1000.0	1000.0	-45.15	66.78	34.63	32.15	Pass
2695.5050	Combination of Broadband emission from the carrier skirt and Narrowband spurious emission								Pass****
2699.0000	-19.55	included	1000.0	1000.0	-19.55	41.18	34.63	6.55	Pass
3095.5500	-19.11	included	1000.0	1000.0	-19.11	40.74	34.63	6.11	Pass

* - Spurious emission = SA reading + 10log(RBW / Used RBW)

** - The limit was calculated as follows:

$$Limit = 43 + 10 \cdot \log \left(\left(10^{\frac{Output\ power [dBm]}{10}} \right) / 1000 \right)$$

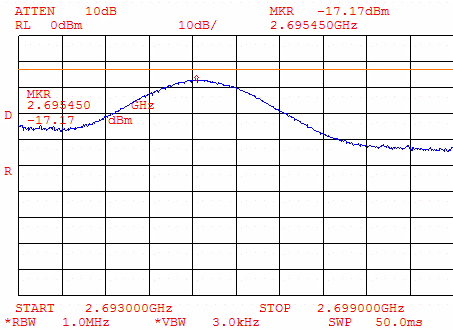
*** - Margin = Attenuation below carrier – specification limit.



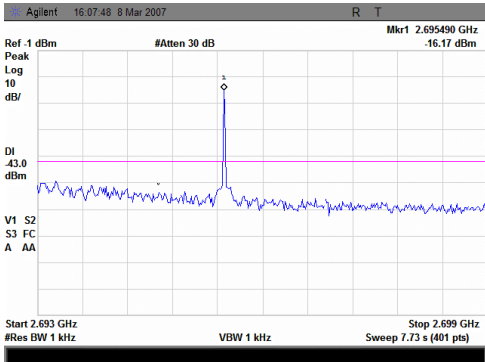
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Date: 3/13/2007	Verdict: PASS	
Temperature: 21°C		Air Pressure: 1006 hPa	Relative Humidity: 55 %
Remarks: 11 MHz CBW			

****Note: the explanation is provided below

Taking into account that 2.6954 GHz is a narrow band emission, after the averaging (see below) high frequency noise-like signals originating from broad band source are disappeared...



revealing only NB signal. With 1 MHz RBW the value of the emission is -17.17 dBm, that is more that 3 dB below the limit. From the following plot it could be seen that the margin between broad band noise and the limit is also more that 3 dB.



Power of superposition of two signals could be maximum 3 dB above the single signal (2 times if the superposition comprises from two signals with identical power value). The superposition of the signals (narrow band and broad band) is below the limit.

The same explanation is applicable for the 2497 MHz spurious emission.

Reference numbers of test equipment used

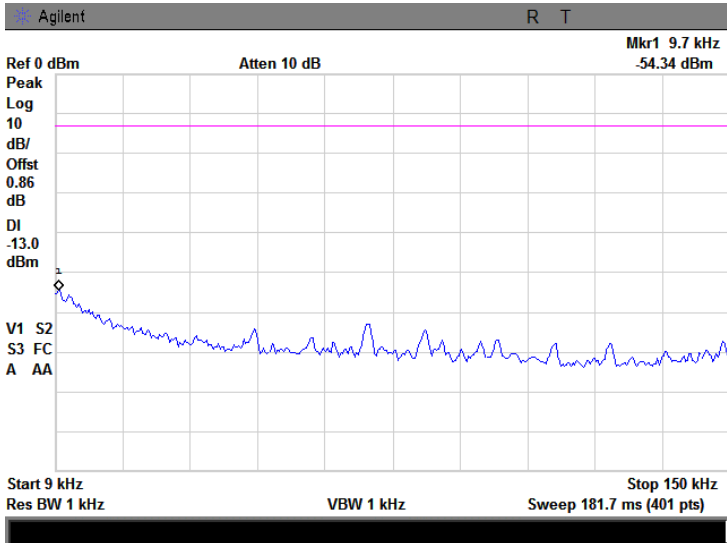
HL 2867	HL 2909					
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Full description is given in Appendix A.

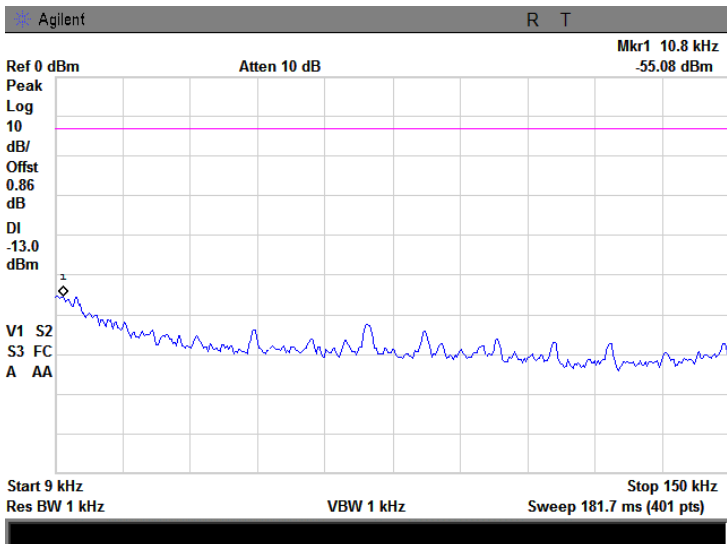


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency



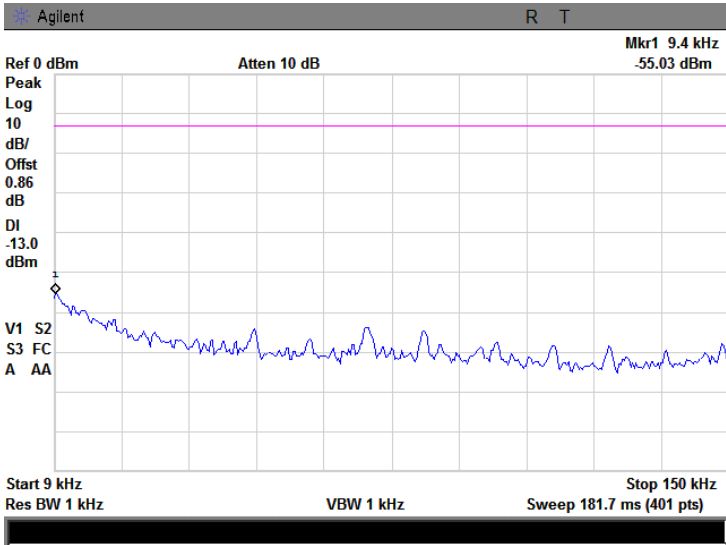
Plot 7.5.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency



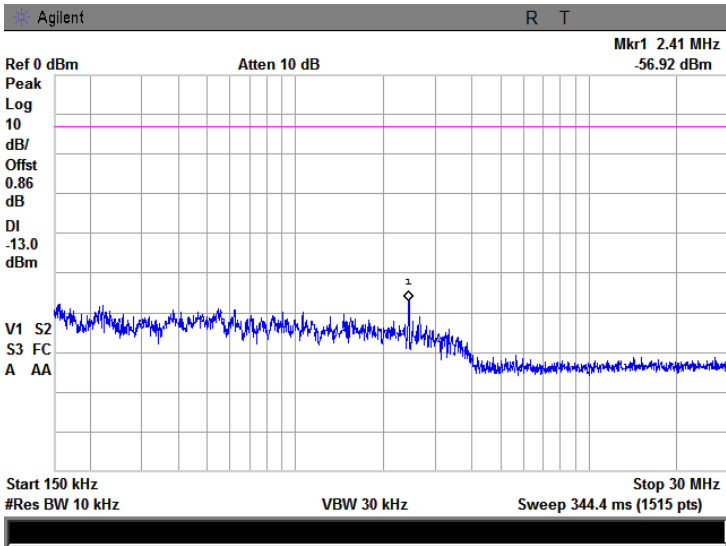


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency



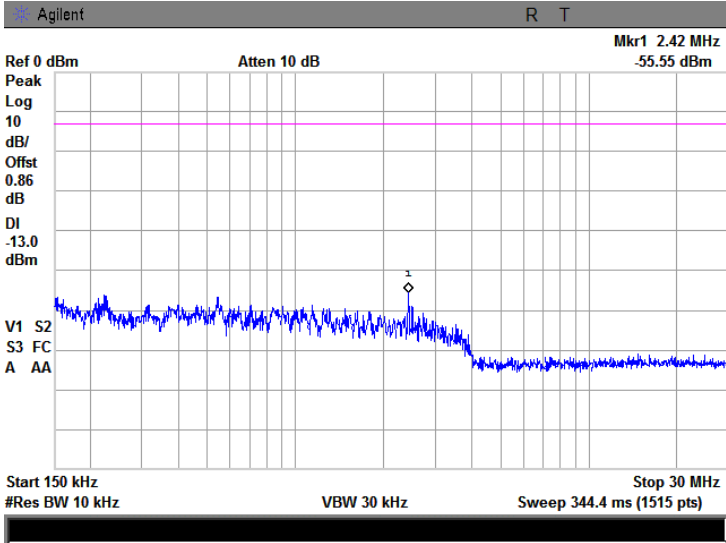
Plot 7.5.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency



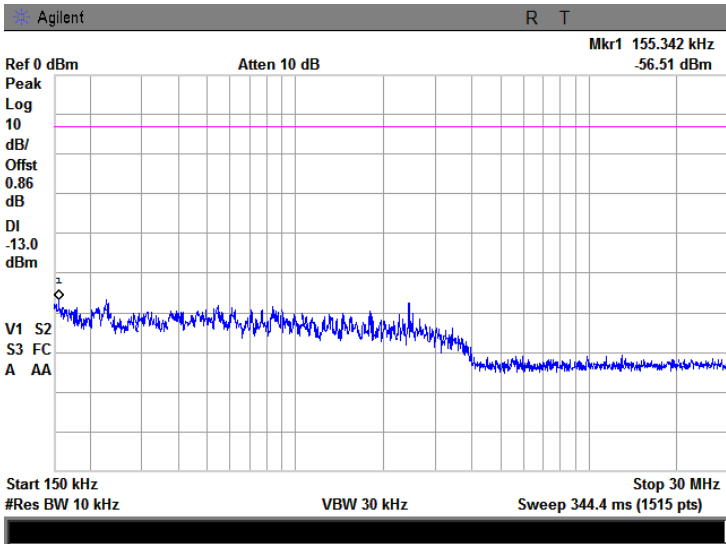


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.5 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency



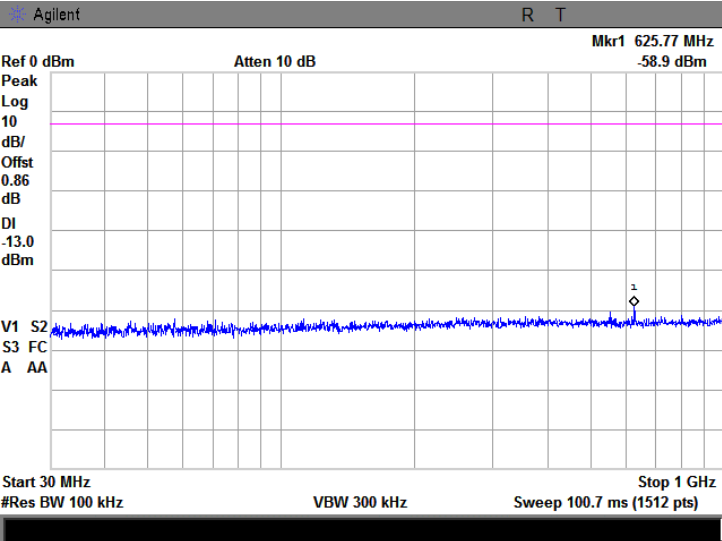
Plot 7.5.6 Spurious emission measurements in 0.15 - 30.0 MHz range at high carrier frequency



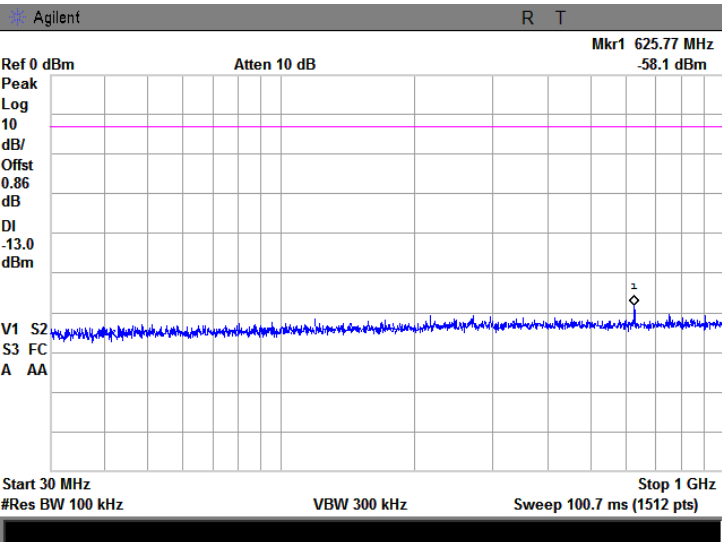


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.7 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency



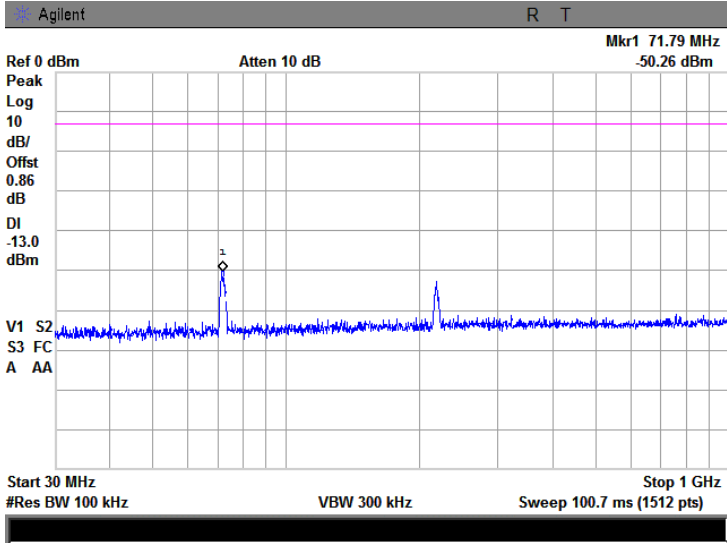
Plot 7.5.8 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency



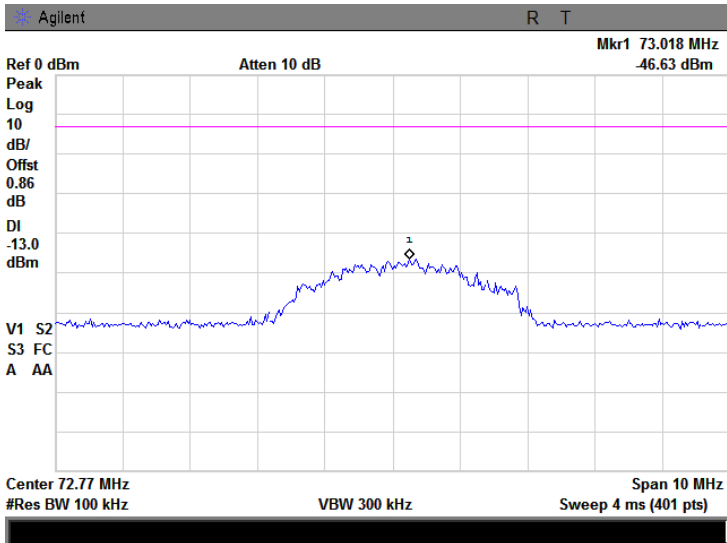


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.9 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency



Plot 7.5.10 Spurious emission measurements at 73 MHz at high carrier frequency

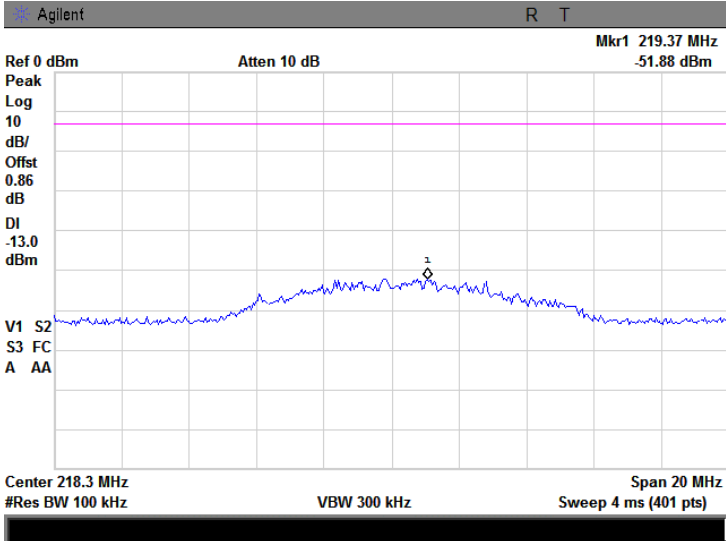




HERMON LABORATORIES

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

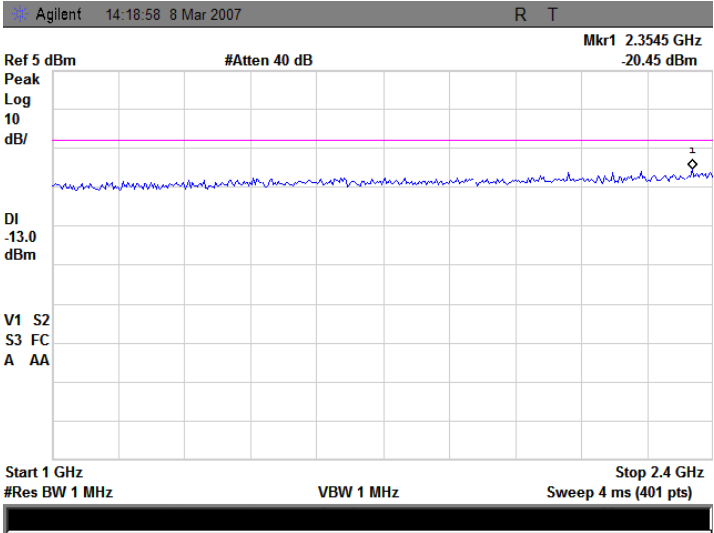
Plot 7.5.11 Spurious emission measurements at 219 MHz at high carrier frequency



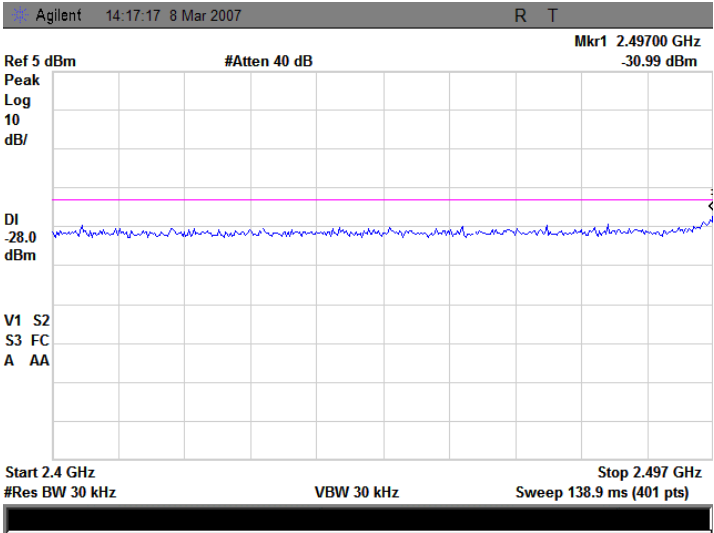


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.12 Spurious emission measurements in 1000 - 2400 MHz range at low carrier frequency



Plot 7.5.13 Spurious emission measurements in 2400 - 2497 MHz range at low carrier frequency

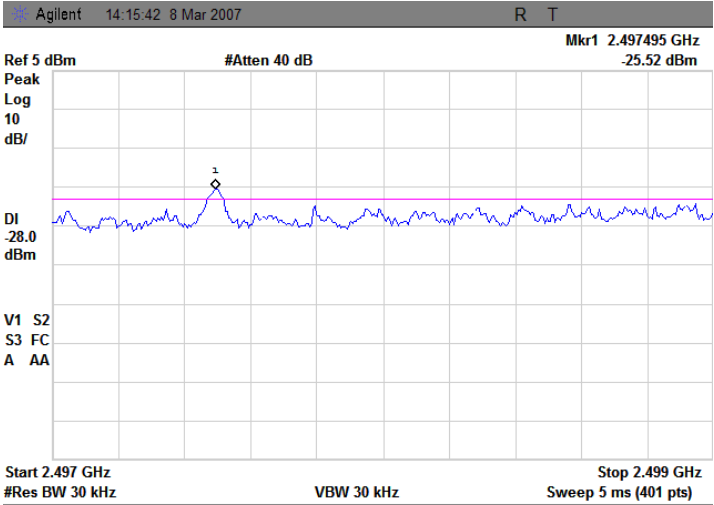


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/30kHz) = -13 dBm - 15 dB = -28 dBm



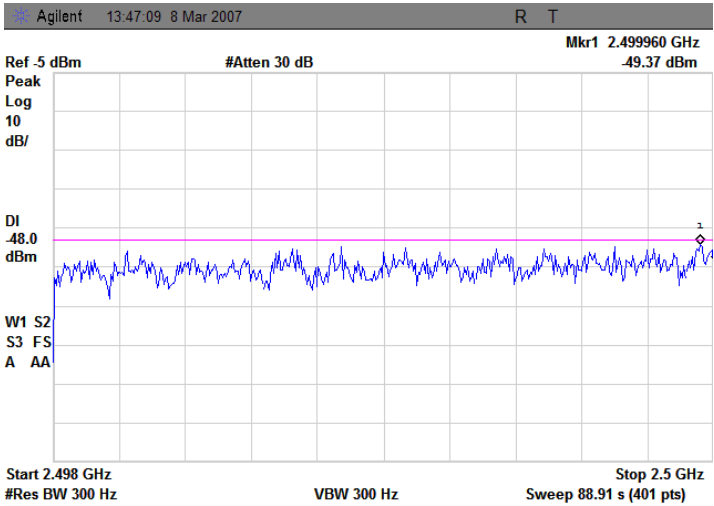
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.14 Spurious emission measurements in 2497 - 2499 MHz range at low carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/30kHz) = -13 dBm - 15 dB = -28 dBm

Plot 7.5.15 Spurious emission measurements in 2498 - 2500 MHz range at low carrier frequency

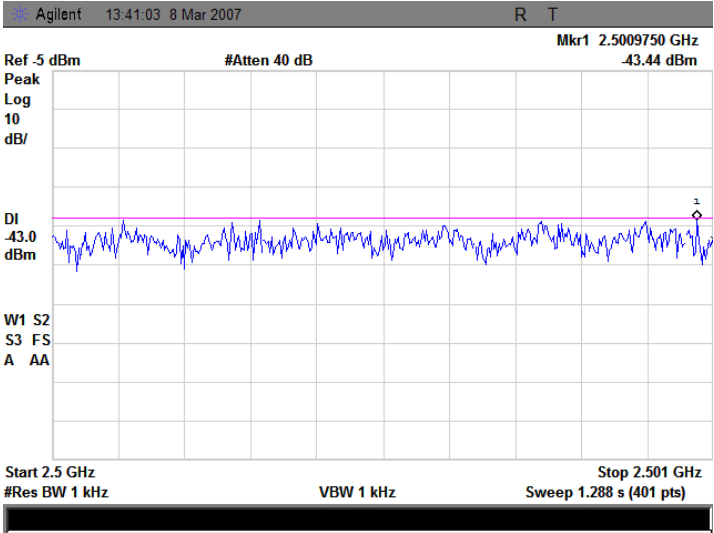


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/300Hz) = -13 dBm - 35 dB = -48 dBm



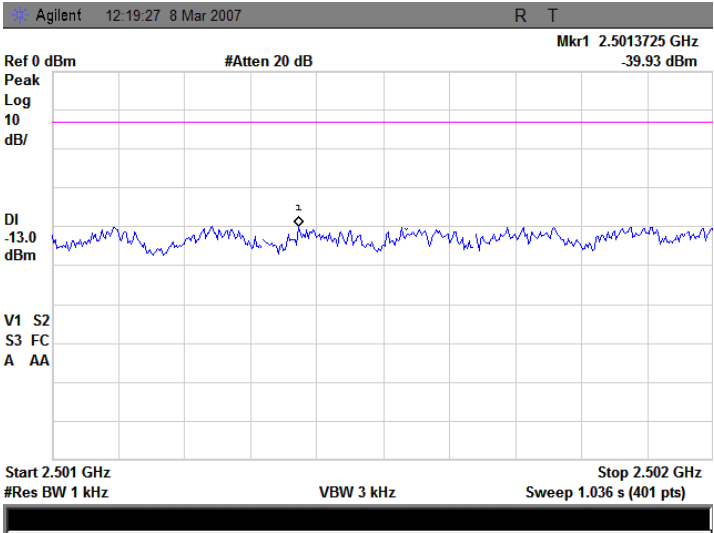
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.16 Spurious emission measurements in 2500 - 2501 MHz range at low carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm

Plot 7.5.17 Spurious emission measurements in 2501 - 2502 MHz range at low carrier frequency

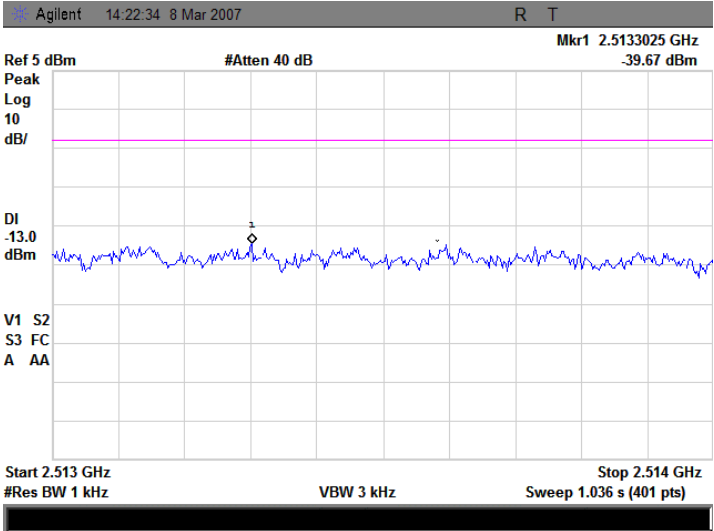


Signal = SA reading + BW factor = SA reading + 10log(87kHz/1kHz) = SA reading + 19.4 dB
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 8.7MHz / 100 = 87 kHz



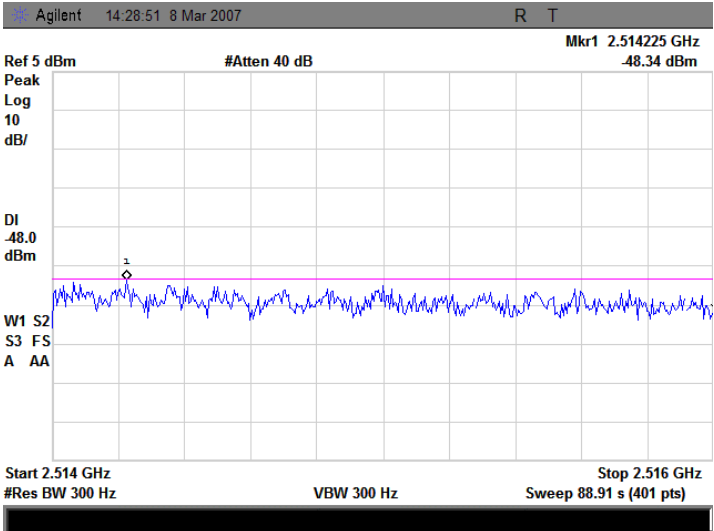
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.18 Spurious emission measurements in 2513 - 2514 MHz range at low carrier frequency



Signal = SA reading + BW factor = SA reading + $10\log(87\text{kHz}/1\text{kHz})$ = SA reading + 19.4 dB
 1 MHz band immediately outside and adjacent to the frequency block (upper band edge)
 1% of OBW = 8.7MHz / 100 = 87 kHz

Plot 7.5.19 Spurious emission measurements in 2514 - 2516 MHz range at low carrier frequency

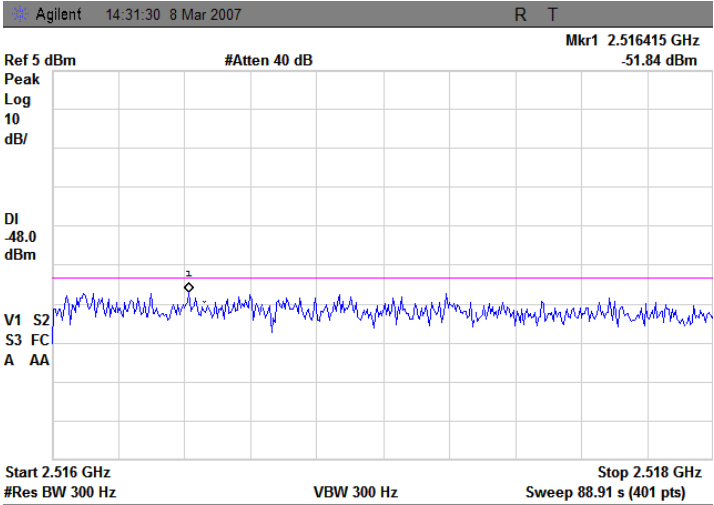


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - $10\log(1\text{MHz}/300\text{Hz})$ = -13 dBm - 35 dB = -48 dBm



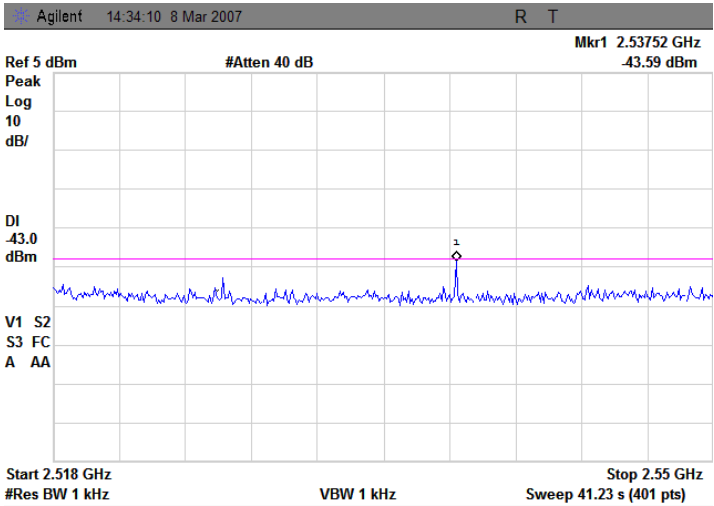
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.20 Spurious emission measurements in 2516 - 2518 MHz range at low carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/300Hz) = -13 dBm - 35 dB = -48 dBm

Plot 7.5.21 Spurious emission measurements in 2518 - 2550 MHz range at low carrier frequency

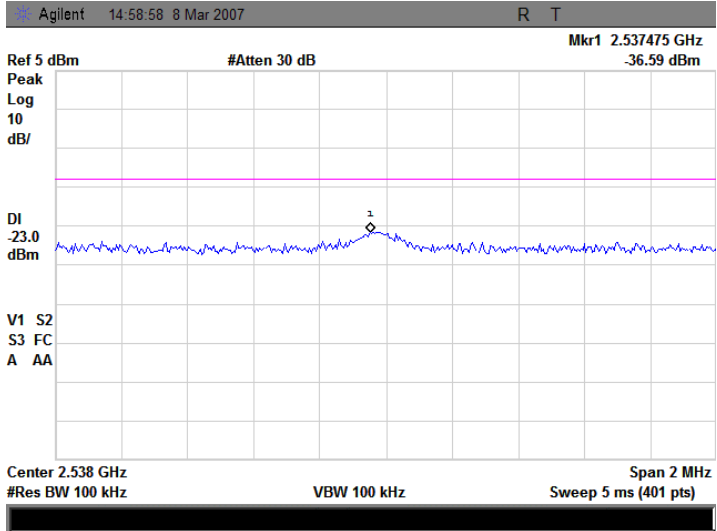


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1Hz) = -13 dBm - 30 dB = -43 dBm



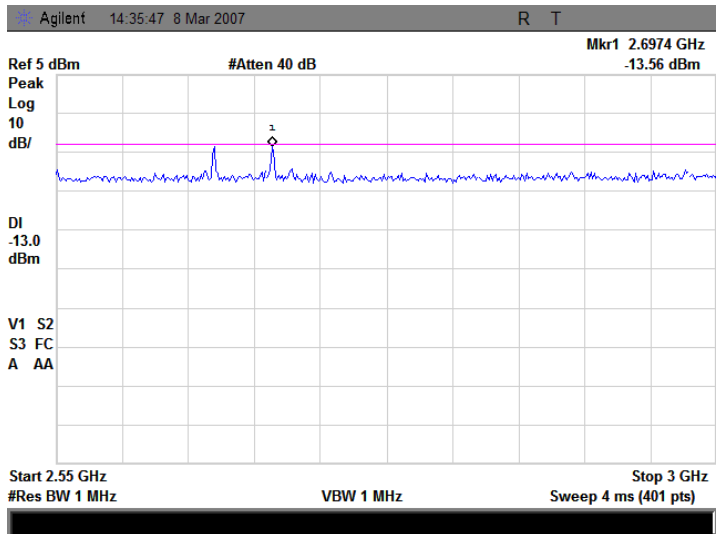
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.22 Spurious emission measurements in 2538 MHz at low carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/100kHz) = -13 dBm - 10 dB = -23 dBm

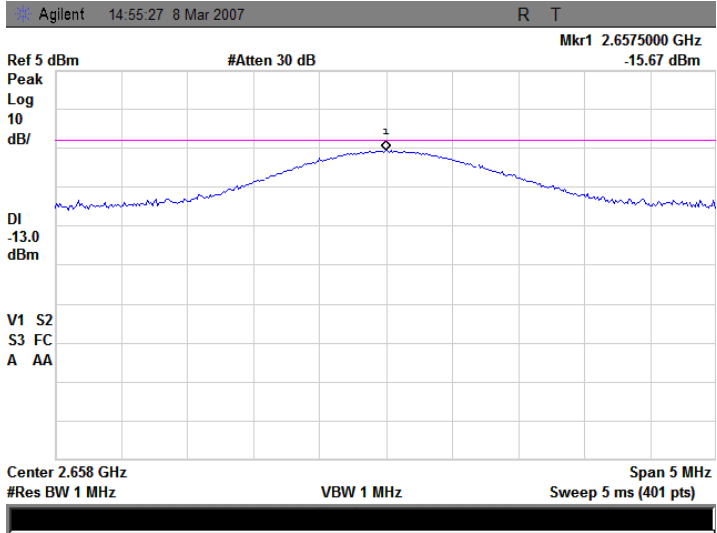
Plot 7.5.23 Spurious emission measurements in 2550 - 3000 MHz range at low carrier frequency



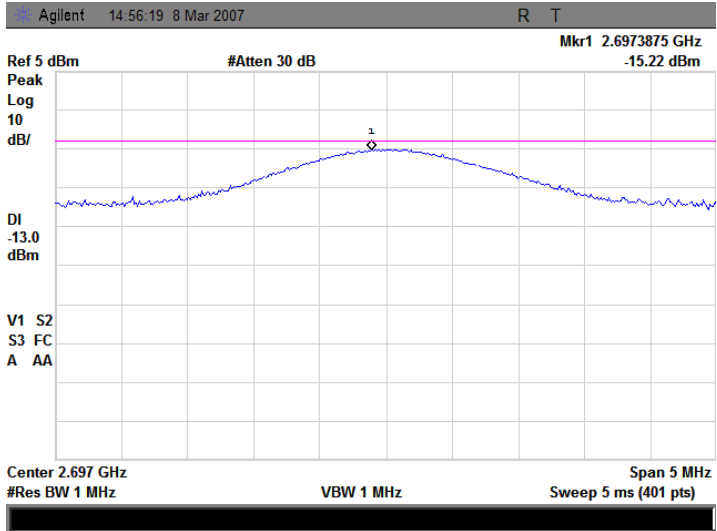


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.24 Spurious emission measurements at 2658 MHz at low carrier frequency



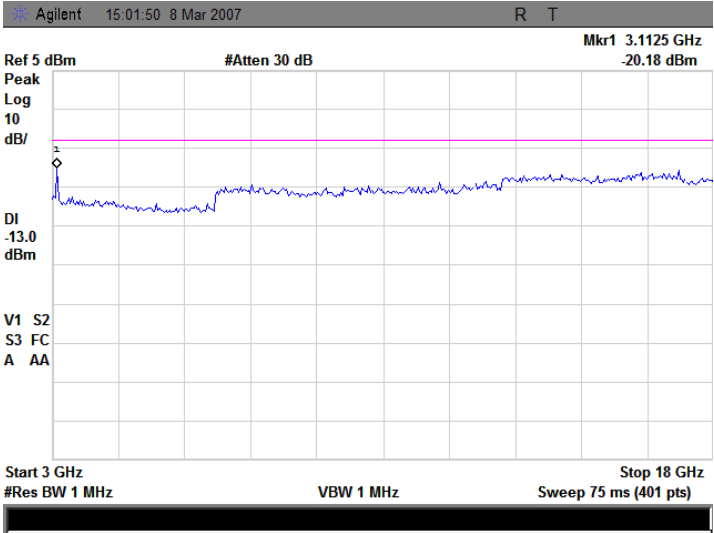
Plot 7.5.25 Spurious emission measurements at 2697 MHz at low carrier frequency



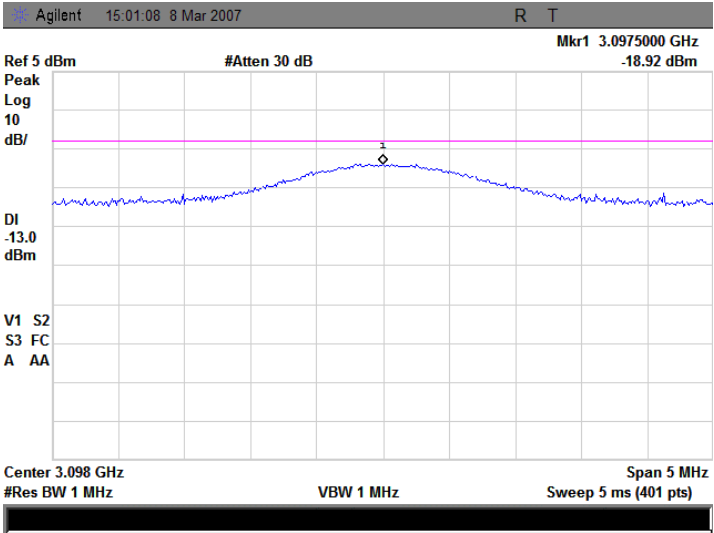


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.26 Spurious emission measurements in 3000 - 18000 MHz range at low carrier frequency



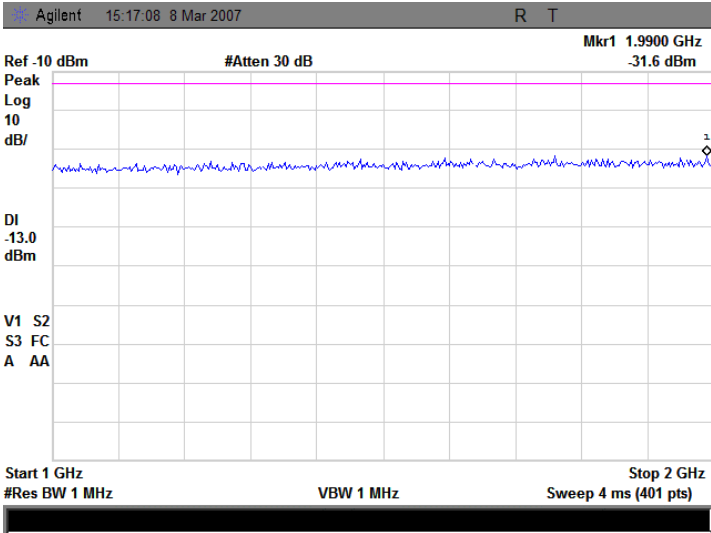
Plot 7.5.27 Spurious emission measurements at 3098 MHz at low carrier frequency



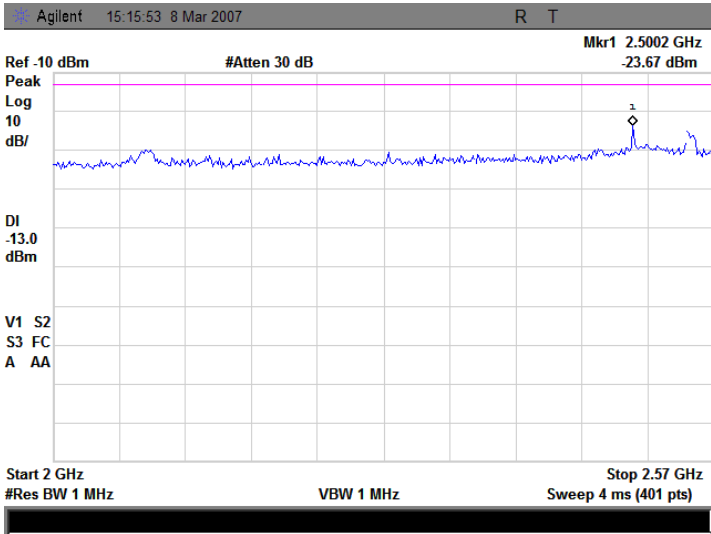


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.28 Spurious emission measurements in 1000 - 2000 MHz range at mid carrier frequency



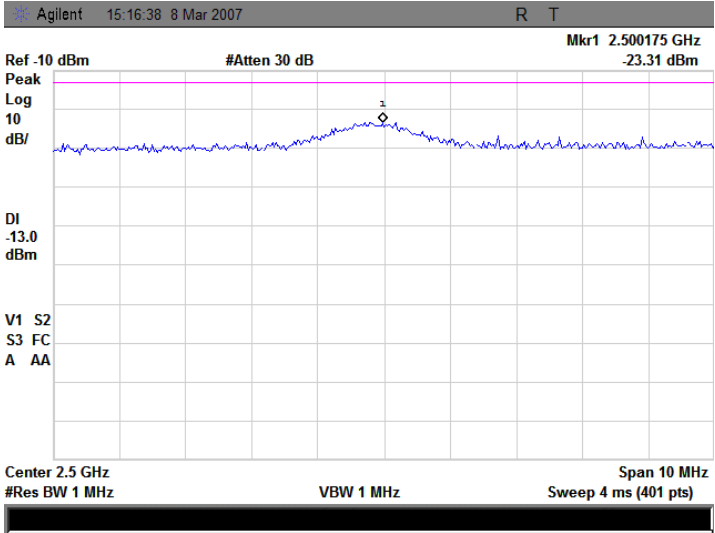
Plot 7.5.29 Spurious emission measurements in 2000 - 2570 MHz range at mid carrier frequency



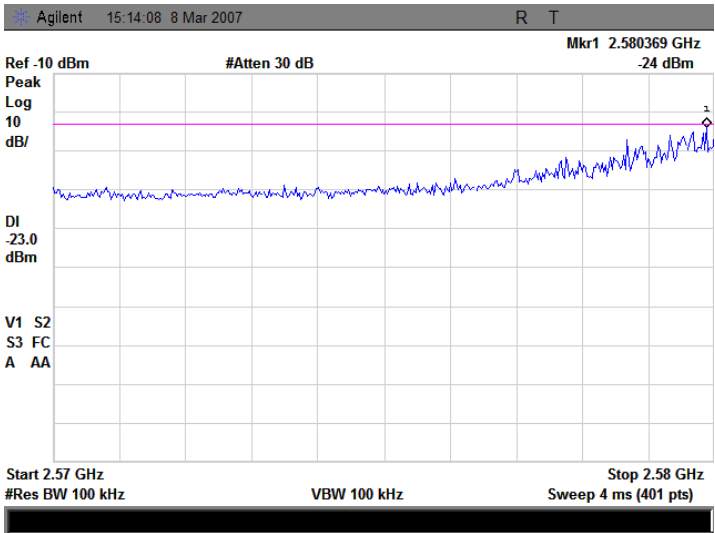


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.30 Spurious emission measurements at 2552 MHz at mid carrier frequency



Plot 7.5.31 Spurious emission measurements in 2570 – 2580.5 MHz range at mid carrier frequency

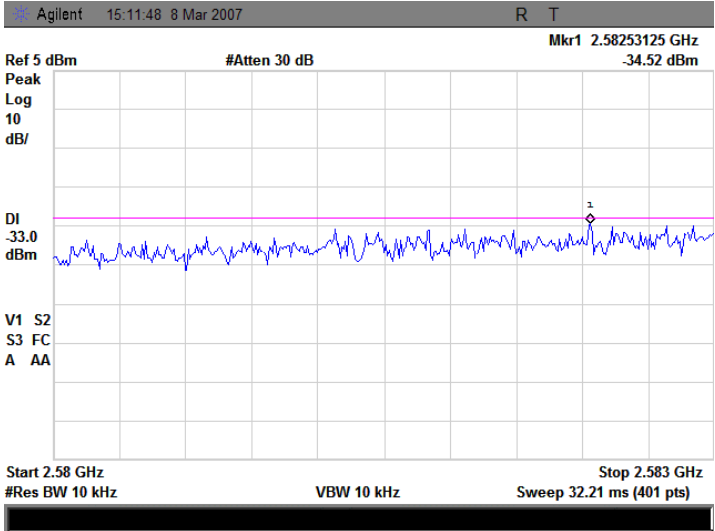


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/100kHz) = -13 dBm - 10 dB = -23 dBm



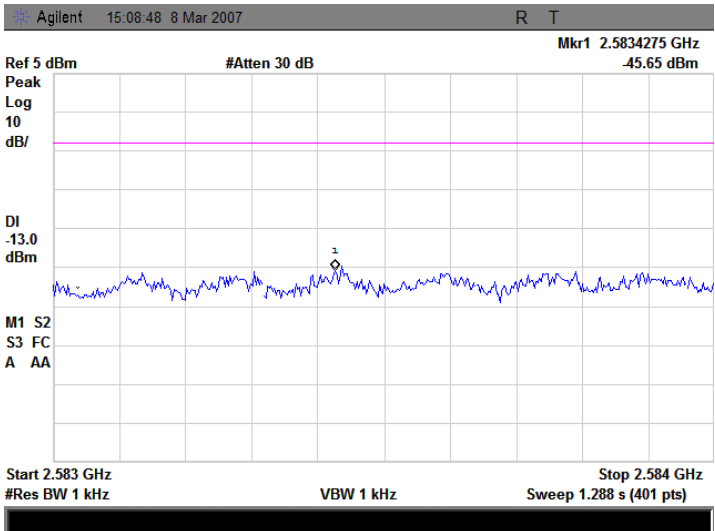
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.32 Spurious emission measurements in 2580.5 – 2583 MHz range at mid carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/10kHz) = -13 dBm - 20 dB = -33 dBm

Plot 7.5.33 Spurious emission measurements in 2583 - 2584 MHz range at mid carrier frequency

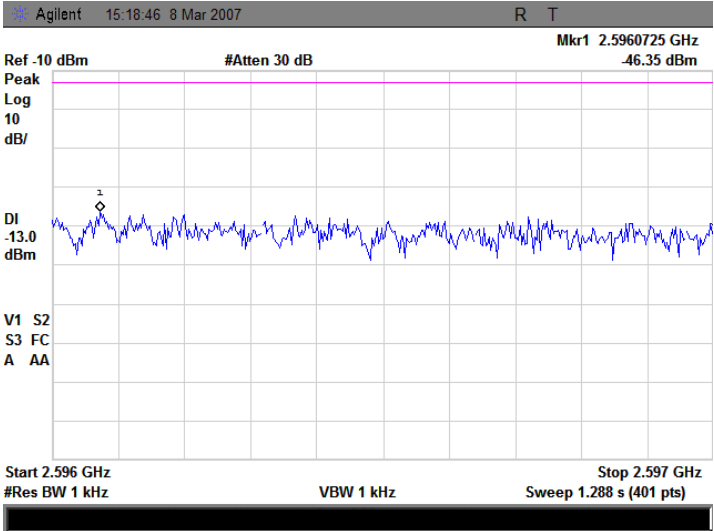


Signal = SA reading + BW factor = SA reading + 10log(87kHz/1kHz) = SA reading + 19.4 dB
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 8.7MHz / 100 = 87 kHz



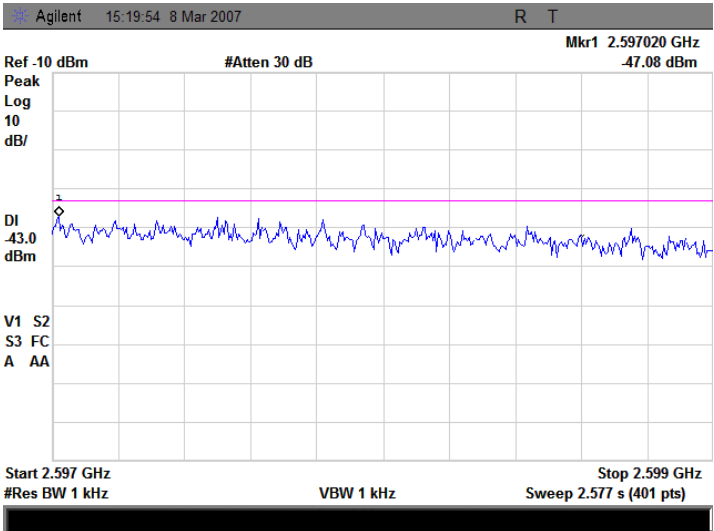
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.34 Spurious emission measurements in 2596 - 2597 MHz range at mid carrier frequency



Signal = SA reading + BW factor = SA reading + $10\log(87\text{kHz}/1\text{kHz})$ = SA reading + 19.4 dB
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 8.7MHz / 100 = 87 kHz

Plot 7.5.35 Spurious emission measurements in 2597 - 2599 MHz range at mid carrier frequency

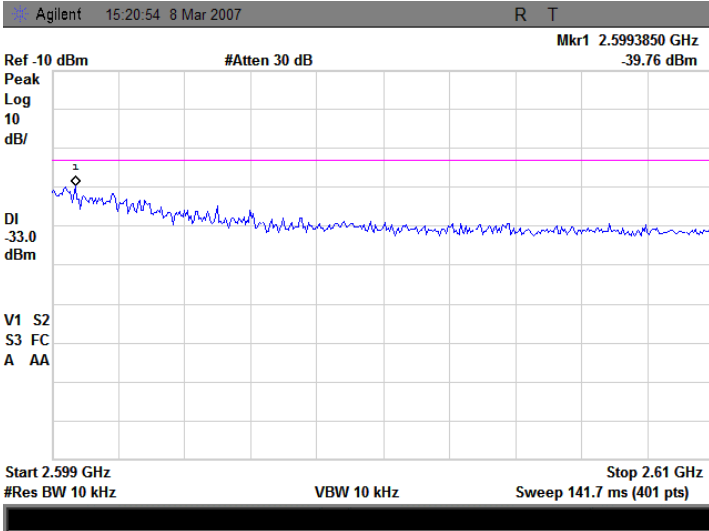


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - $10\log(1\text{MHz}/1\text{kHz})$ = -13 dBm - 30 dB = -43 dBm



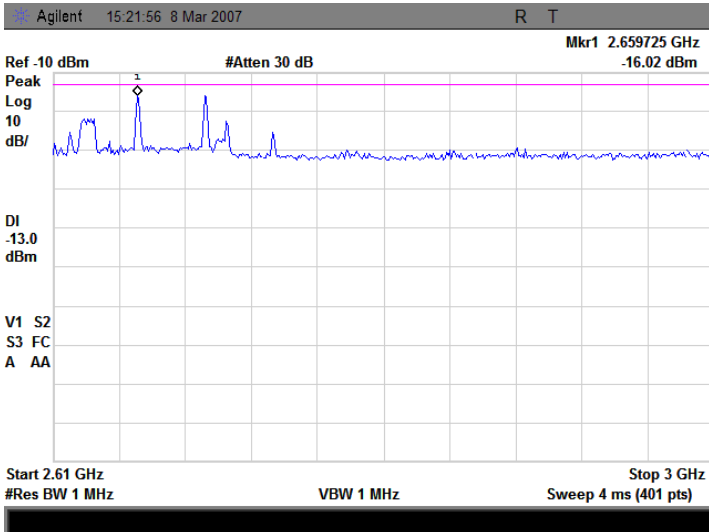
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.36 Spurious emission measurements in 2599 - 2610 MHz range at mid carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/10kHz) = -13 dBm - 20 dB = -33 dBm

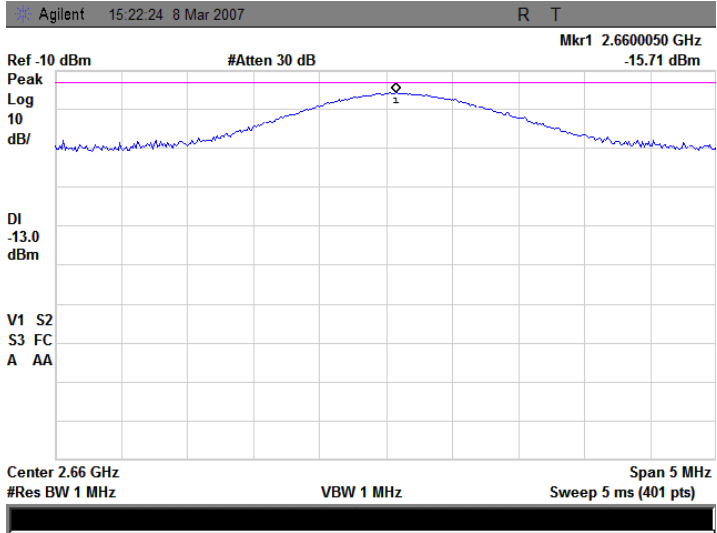
Plot 7.5.37 Spurious emission measurements in 2610 - 3000 MHz range at mid carrier frequency



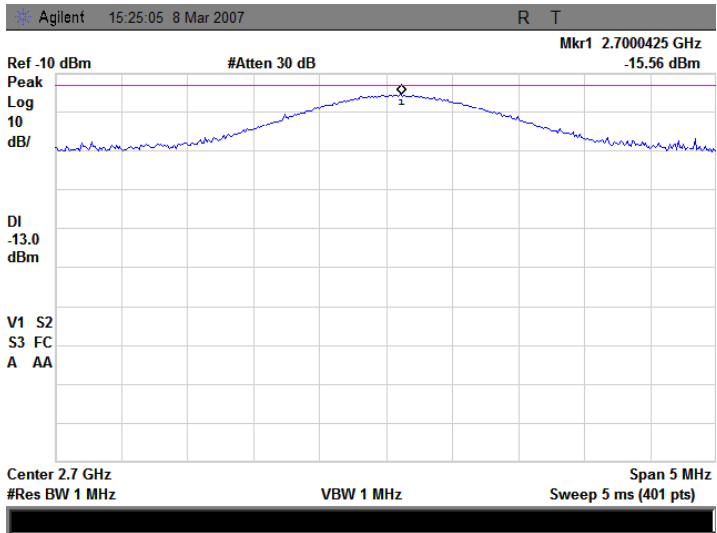


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.38 Spurious emission measurements in 2660 MHz at mid carrier frequency



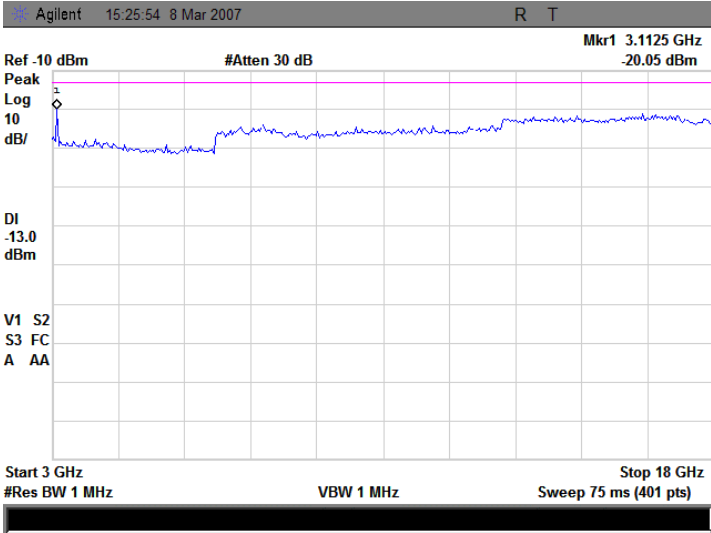
Plot 7.5.39 Spurious emission measurements in 2697 MHz at mid carrier frequency



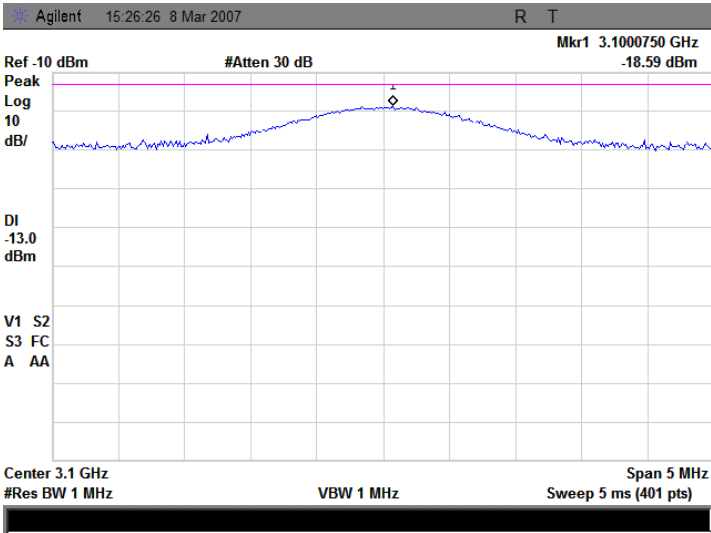


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.40 Spurious emission measurements in 3000 - 18000 MHz range at mid carrier frequency



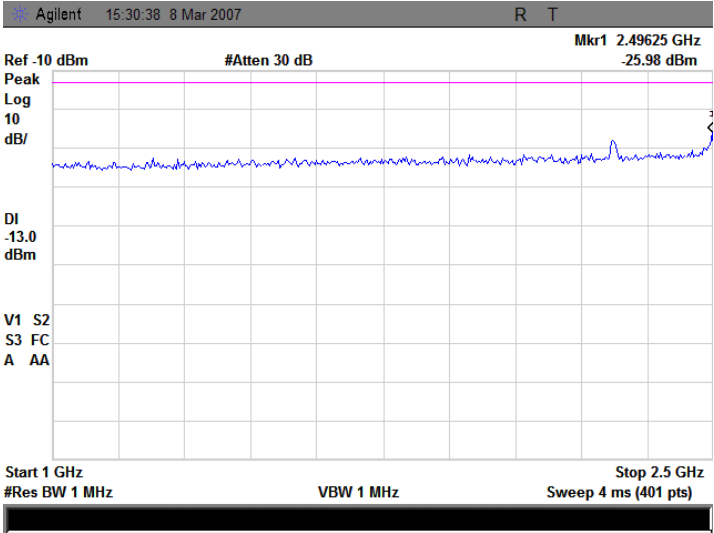
Plot 7.5.41 Spurious emission measurements in 3100 MHz at mid carrier frequency



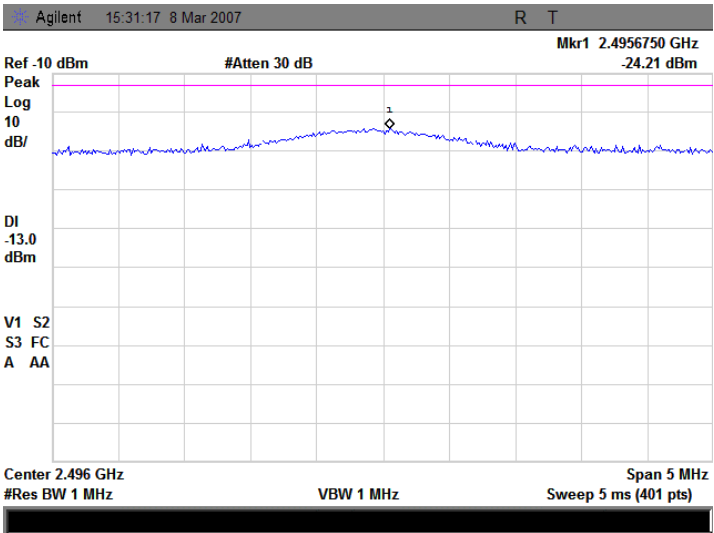


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.42 Spurious emission measurements in 1000 - 2500 MHz range at high carrier frequency



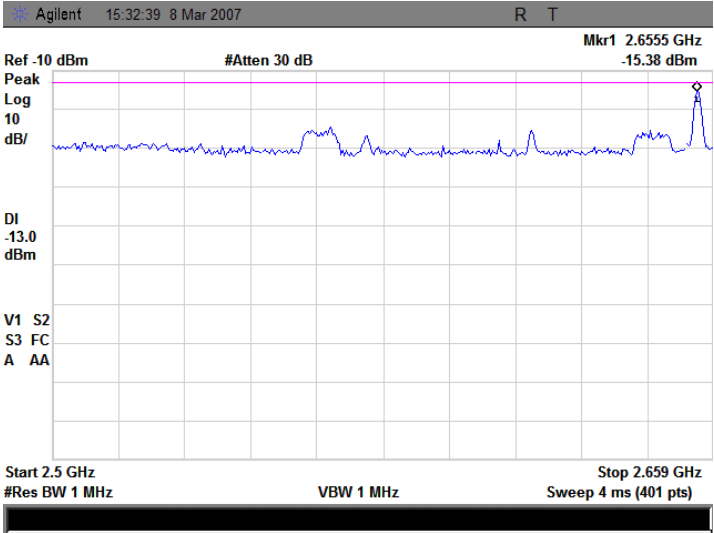
Plot 7.5.43 Spurious emission measurements at 2496 MHz at high carrier frequency



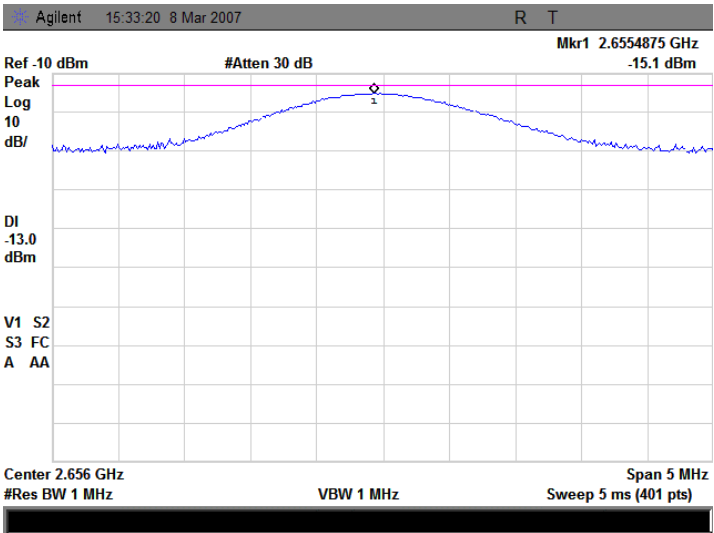


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.44 Spurious emission measurements in 2500 - 2659 MHz range at high carrier frequency



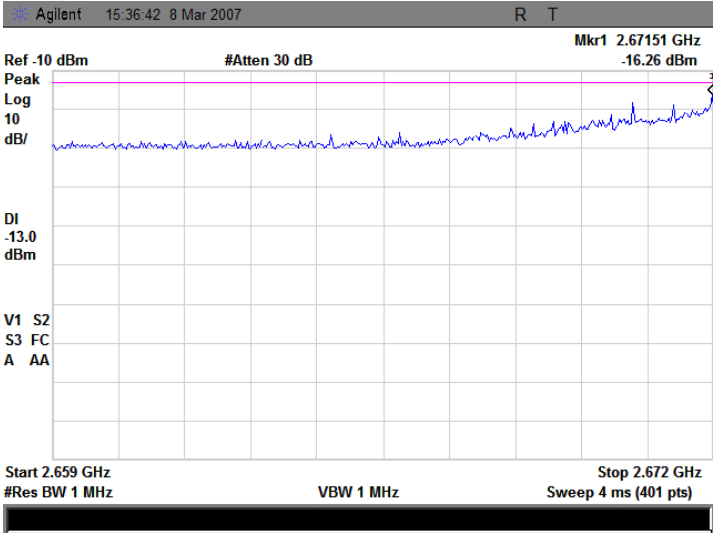
Plot 7.5.45 Spurious emission measurements at 2658 MHz at high carrier frequency



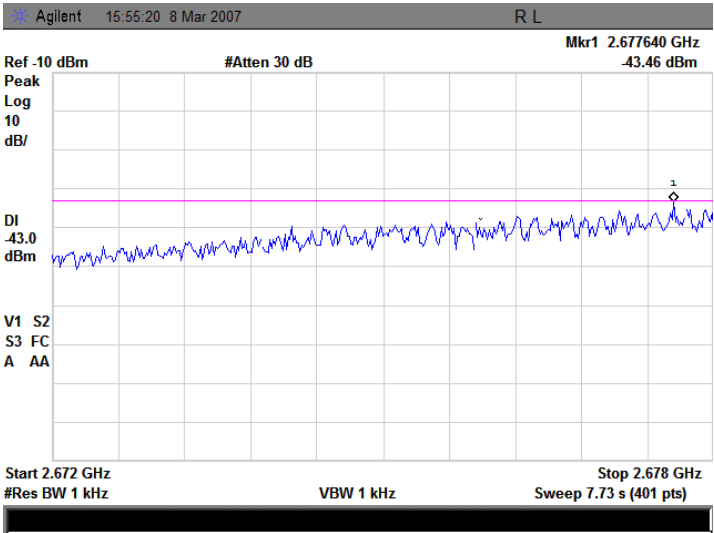


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.46 Spurious emission measurements in 2659 - 2672 MHz range at high carrier frequency



Plot 7.5.47 Spurious emission measurements in 2680 - 2683 MHz range at high carrier frequency

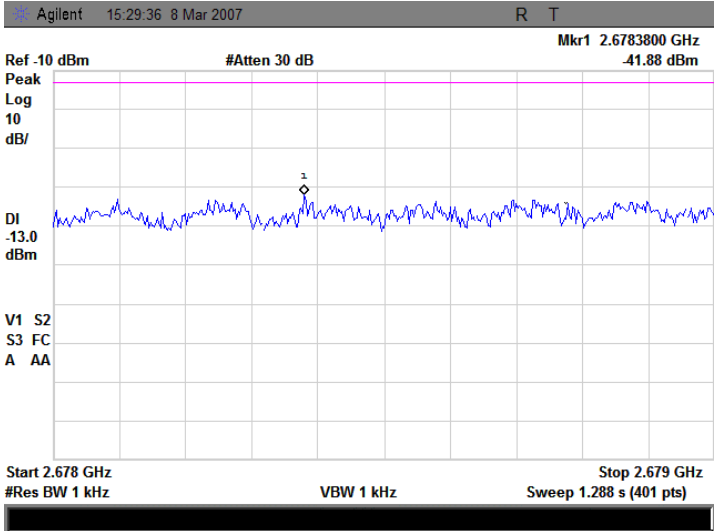


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm



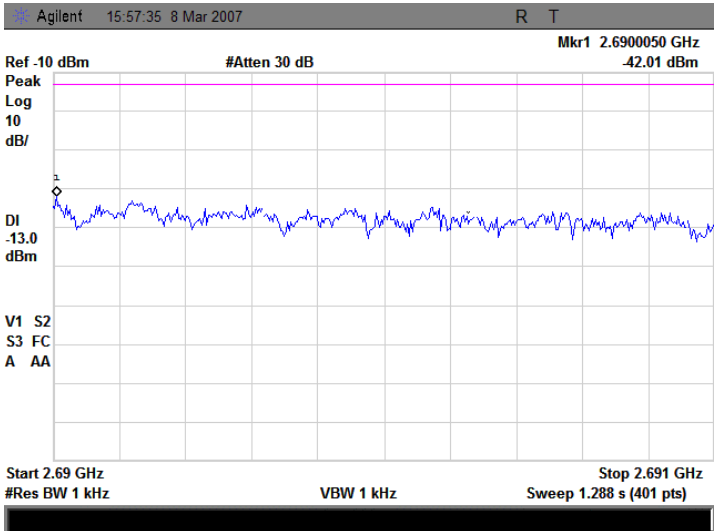
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.48 Spurious emission measurements in 2678 - 2679 MHz range at high carrier frequency



Signal = SA reading + BW factor = SA reading + $10\log(87\text{kHz}/1\text{kHz})$ = SA reading + 19.4 dB
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 8.7MHz / 100 = 87 kHz

Plot 7.5.49 Spurious emission measurements in 2690 - 2691 MHz range at high carrier frequency

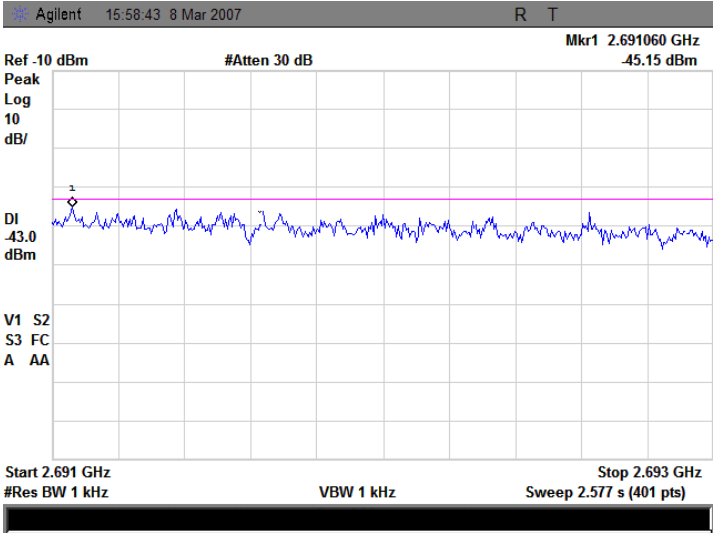


Signal = SA reading + BW factor = SA reading + $10\log(87\text{kHz}/1\text{kHz})$ = SA reading + 19.4 dB
 1 MHz band immediately outside and adjacent to the frequency block (upper band edge)
 1% of OBW = 8.7MHz / 100 = 87 kHz



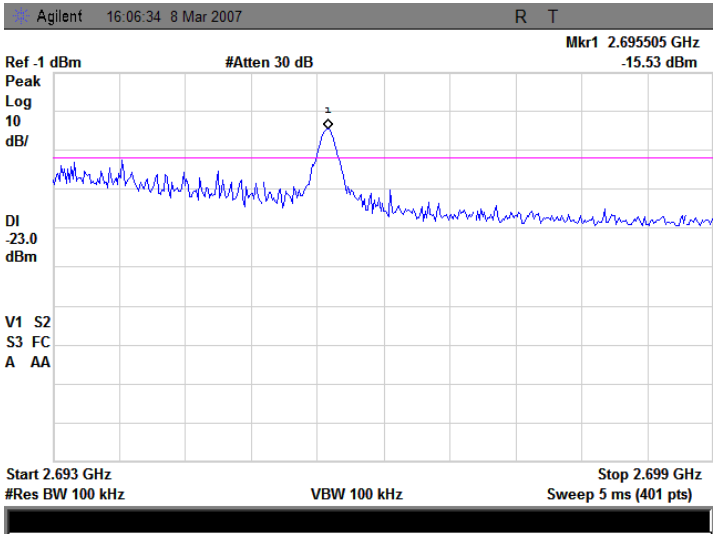
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.50 Spurious emission measurements in 2691 - 2693 MHz range at high carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm

Plot 7.5.51 Spurious emission measurements in 2693 - 2699 MHz range at high carrier frequency

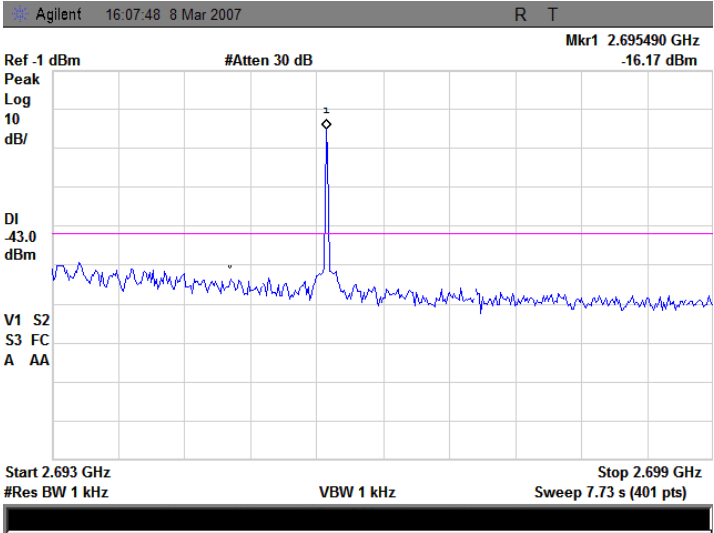


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/100kHz) = -13 dBm - 10 dB = -23 dBm



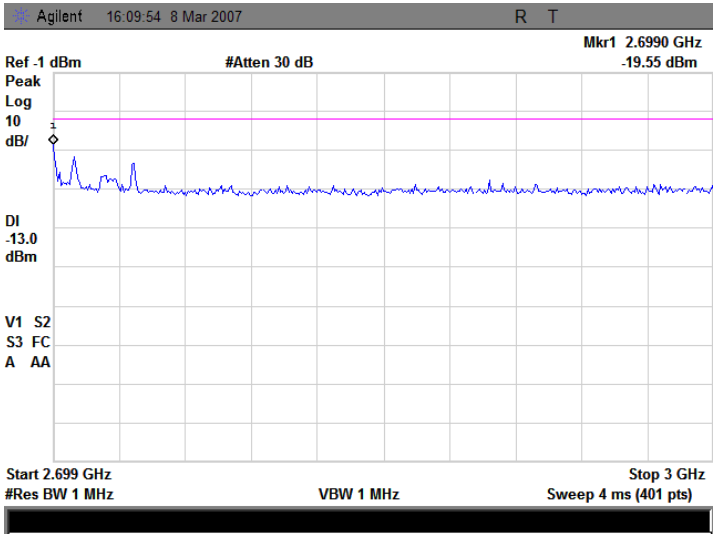
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.52 Spurious emission measurements in 2693 - 2699 MHz range at high carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm

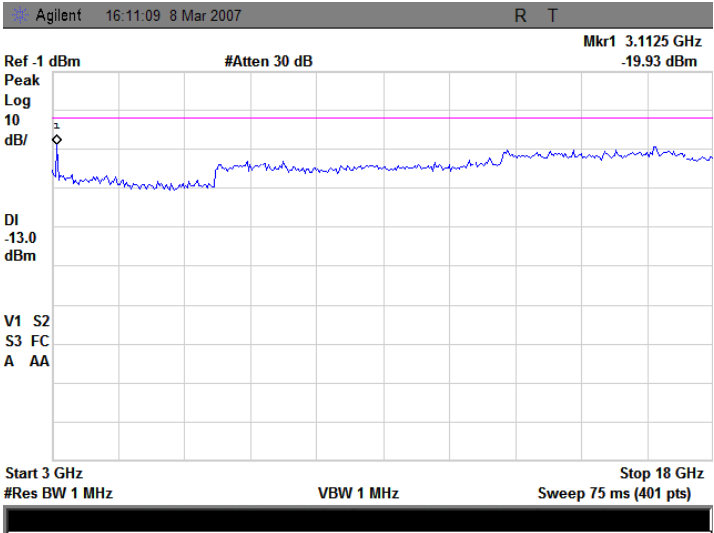
Plot 7.5.53 Spurious emission measurements in 2699 - 3000 MHz range at high carrier frequency



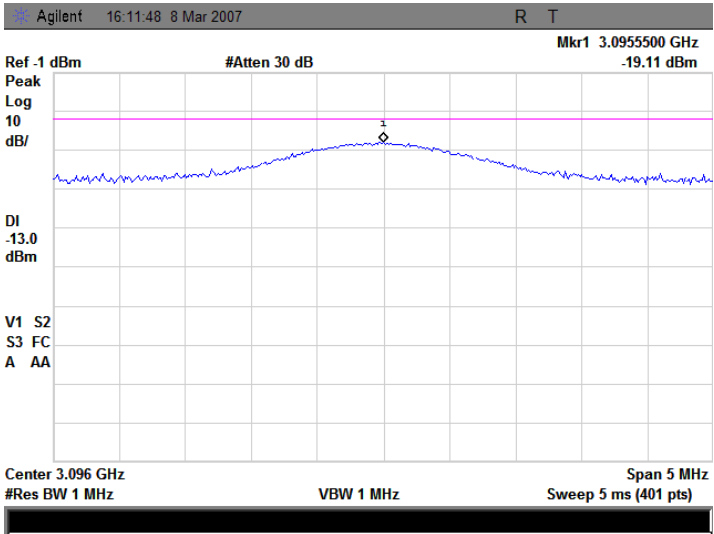


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.54 Spurious emission measurements in 3000 - 18000 MHz range at high carrier frequency



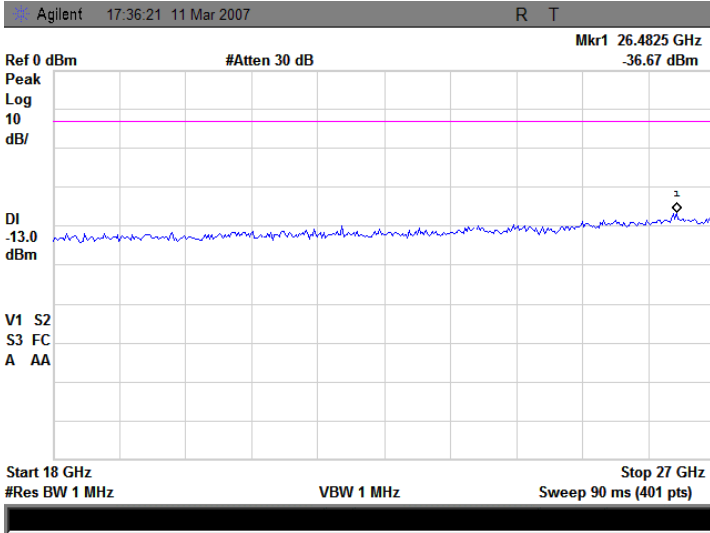
Plot 7.5.55 Spurious emission measurements at 2711 MHz at high carrier frequency



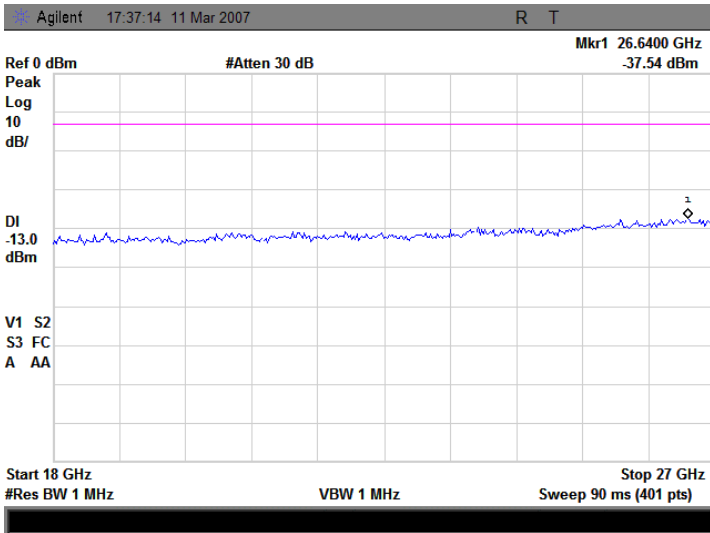


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.56 Spurious emission measurements in 18000 - 27000 MHz range at low carrier frequency



Plot 7.5.57 Spurious emission measurements in 18000 - 27000 MHz range at mid carrier frequency

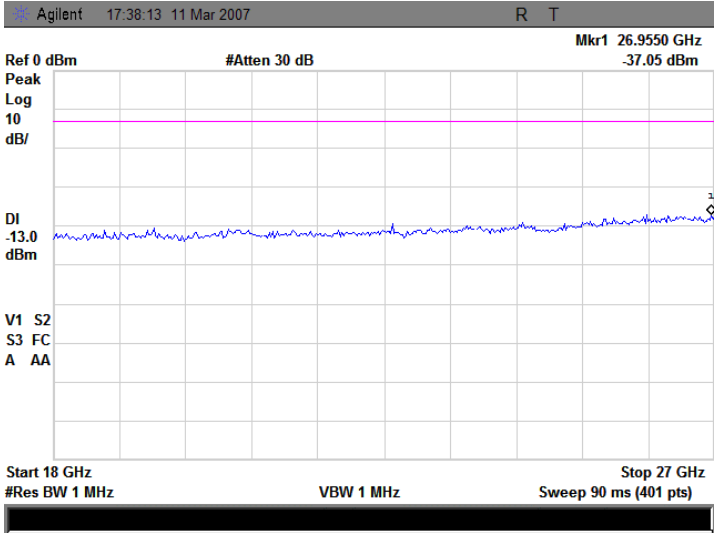




HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 11 MHz CBW			

Plot 7.5.58 Spurious emission measurements in 18000 - 27000 MHz range at high carrier frequency





Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

7.6 Spurious emissions at RF antenna connector test @22 MHz channel bandwidth

7.6.1 General

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

Table 7.6.1 Spurious emission limits

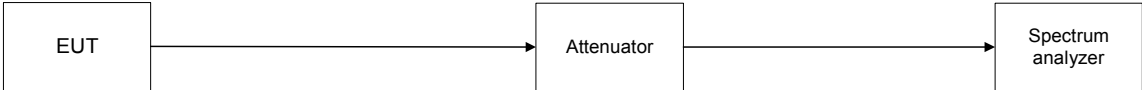
Frequency, MHz	Attenuation below carrier, dBc	Spurious emission, dBm
0.009 – 10th harmonic	43+10logP*	-13.0

* - P is transmitter output power in Watts

7.6.2 Test procedure

- 7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and its proper operation was checked.
- 7.6.2.2 The EUT was adjusted to produce maximum available for end user RF output power.
- 7.6.2.3 The spurious emission was measured with spectrum analyzer as provided in Table 7.6.2 and associated plots.

Figure 7.6.1 Spurious emission test setup





Test specification: Section 27.53(l)(2), Spurious emissions	
Test procedure: Section 27.53(l)(2)	
Test mode: Compliance	Verdict: PASS
Date: 3/13/2007	
Temperature: 21°C	Air Pressure: 1006 hPa
Relative Humidity: 55 %	
Power Supply: 48 VDC	
Remarks: 22 MHz CBW	

Table 7.6.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496 - 2690 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 – 27000 MHz
 DETECTOR USED: Peak
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 MODULATION: QAM
 MODULATING SIGNAL: PRBS
 BIT RATE: 54 Mbps
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	SA reading, dBm	Attenuations, dB	RBW, kHz	Used RBW, kHz	Spurious emission*, dBm	Attenuation below carrier, dBc	Limit**, dBc	Margin, dB***	Verdict
Low channel frequency									
2498.7500	-16.97	included	1000.0	1000.0	-16.97	33.41	29.44	3.97	Pass
2500.8150	-44.15	included	1000.0	1.0	-14.15	30.59	29.44	1.15	Pass
2501.8375	-41.05	included	200.0	1.0	-18.04	34.48	29.44	5.04	Pass
2524.1800	-43.93	included	200.0	1.0	-13.93	30.37	29.44	0.93	Pass
2525.1875	-46.59	included	1000.0	1.0	-16.59	33.03	29.44	3.59	Pass
2656.9875	-16.22	included	1000.0	1000.0	-16.22	32.66	29.44	3.22	Pass
2696.3750	-15.44	included	1000.0	1000.0	-15.44	31.88	29.44	2.44	Pass
3096.9625	-19.22	included	1000.0	1000.0	-19.22	35.66	29.44	6.22	Pass
Mid channel frequency									
2499.9500	-23.61	included	1000.0	1000.0	-23.61	40.63	30.02	10.61	Pass
2574.3700	-52.21	included	1000.0	1.0	-22.21	39.23	30.02	9.21	Pass
2576.9300	-46.15	included	1000.0	1.0	-16.15	33.17	30.02	3.15	Pass
2577.8725	-42.78	included	200.0	1.0	-19.77	36.79	30.02	6.77	Pass
2602.1225	-43.73	included	200.0	1.0	-20.72	37.74	30.02	7.72	Pass
2603.1200	-46.68	included	1000.0	1.0	-16.68	33.70	30.02	3.68	Pass
2605.3400	-17.85	included	1000.0	1000.0	-17.85	34.87	30.02	4.85	Pass
2660.0250	-16.80	included	1000.0	1000.0	-16.80	33.82	30.02	3.80	Pass
2699.8925	-16.05	included	1000.0	1000.0	-16.05	33.07	30.02	3.05	Pass
3100.0625	-19.21	included	1000.0	1000.0	-19.21	36.23	30.02	6.21	Pass
High channel frequency									
73.0180	-46.63	included	100.0	100.0	-46.63	63.27	29.64	33.63	Pass
219.3700	-51.88	included	100.0	100.0	-51.88	68.52	29.64	38.88	Pass
2496.0000	-24.82	included	1000.0	1000.0	-24.82	41.46	29.64	11.82	Pass
2664.9875	-48.51	included	1000.0	1.0	-18.51	35.15	29.64	5.51	Pass
2665.8250	-48.66	included	1000.0	0.3	-13.43	30.07	29.64	0.43	Pass
2666.6225	-48.44	included	1000.0	0.3	-13.21	29.85	29.64	0.21	Pass
2667.5625	-38.70	included	200.0	1.0	-15.69	32.33	29.64	2.69	Pass
2690.1325	-46.78	included	200.0	1.0	-23.77	40.41	29.64	10.77	Pass
2691.4187	-48.26	included	1000.0	0.3	-13.03	29.67	29.64	0.03	Pass
2692.0000	-13.04	included	1000.0	1000.0	-13.04	29.68	29.64	0.04	Pass
2697.0825	-18.11	included	1000.0	1000.0	-18.11	34.75	29.64	5.11	Pass
2708.5500	-22.87	included	1000.0	1000.0	-22.87	39.51	29.64	9.87	Pass
2735.8100	-23.63	included	1000.0	1000.0	-23.63	40.27	29.64	10.63	Pass
3095.4000	-19.86	included	1000.0	1000.0	-19.86	36.50	29.64	6.86	Pass

* - Spurious emission = SA reading + 10log(RBW / Used RBW)

** - The limit was calculated as follows:

$$Limit = 43 + 10 \cdot \log \left(\left(10^{\frac{Output\ power\ [dBm]}{10}} \right) / 1000 \right)$$

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

Reference numbers of test equipment used

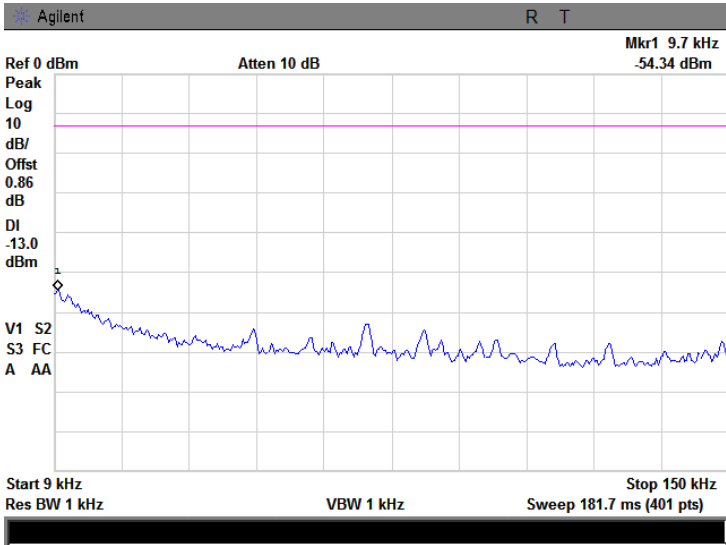
HL 2867	HL 2909						
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Full description is given in Appendix A.

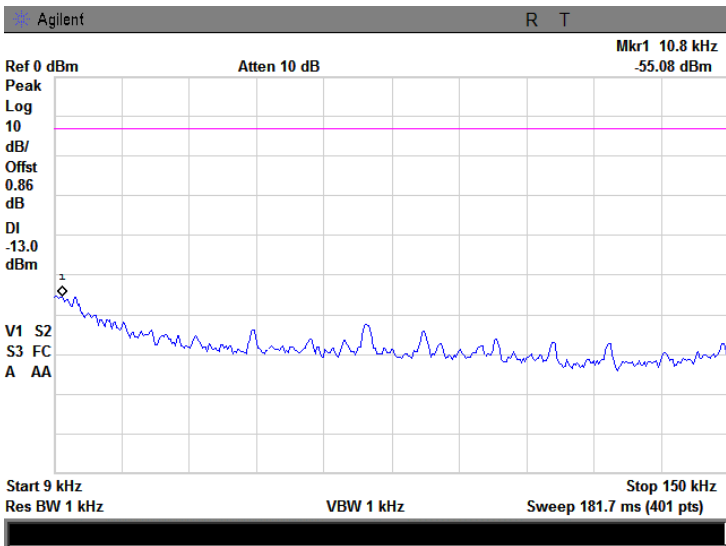


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency



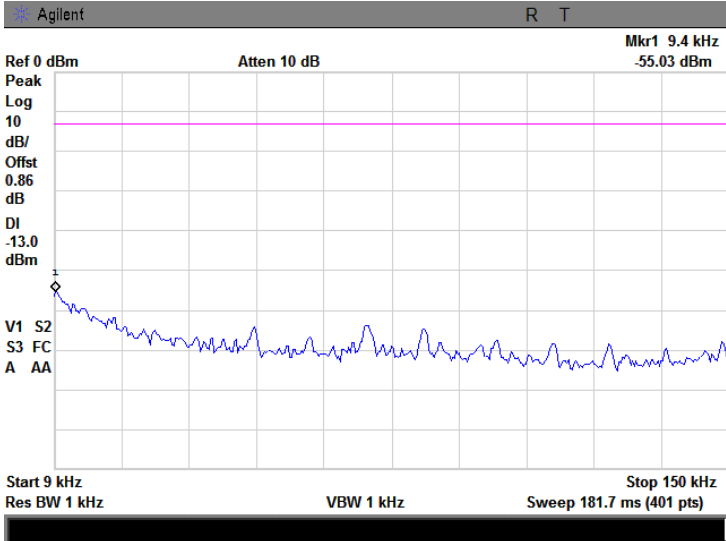
Plot 7.6.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency



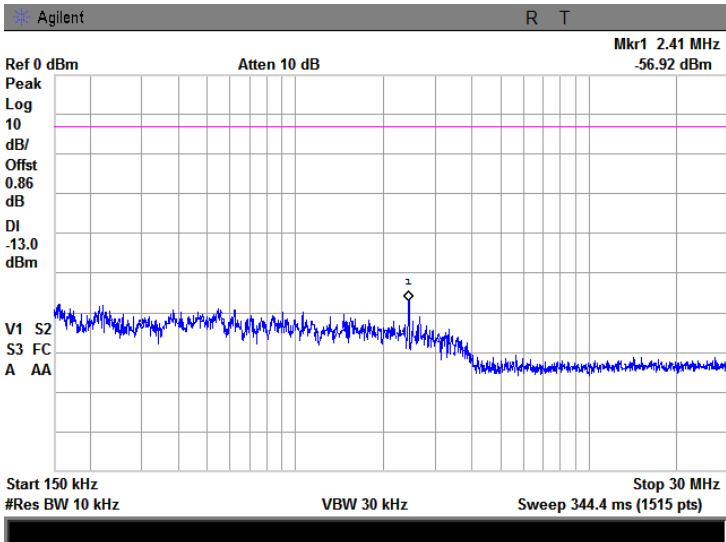


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency



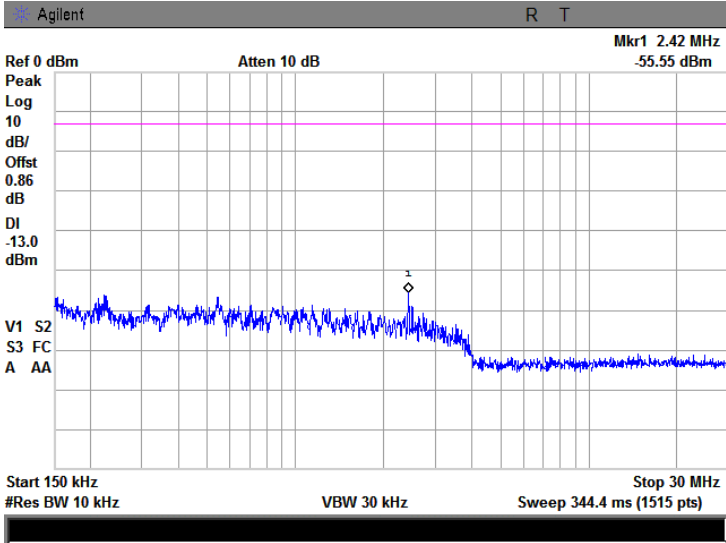
Plot 7.6.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency



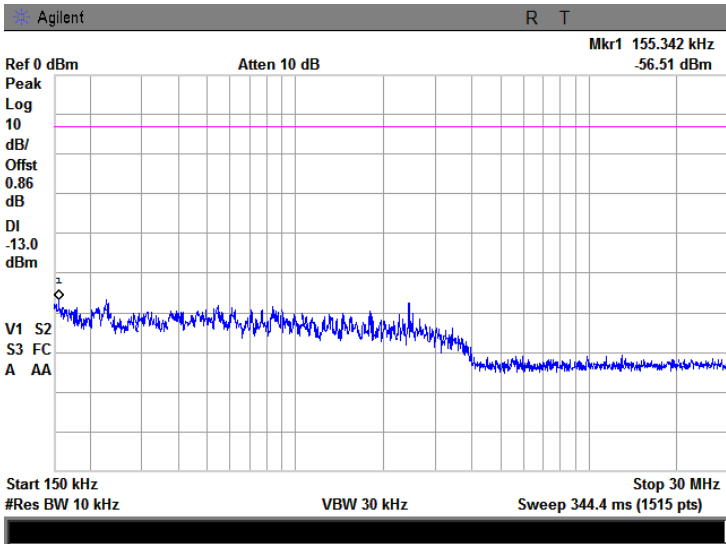


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.5 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency



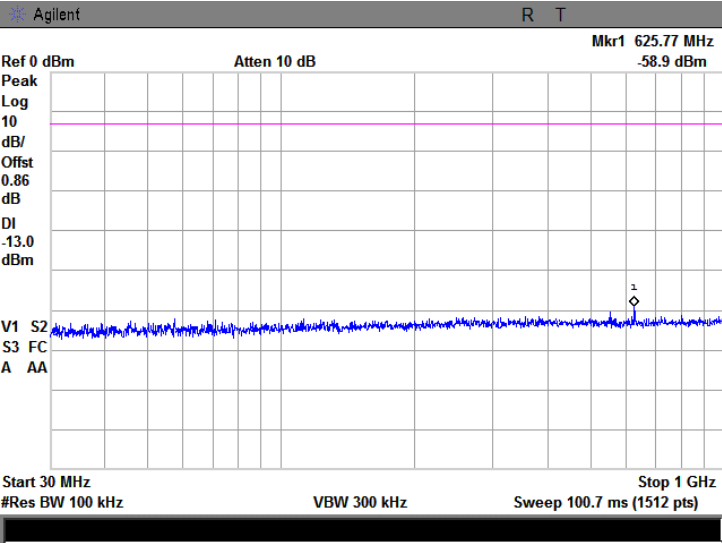
Plot 7.6.6 Spurious emission measurements in 0.15 - 30.0 MHz range at high carrier frequency



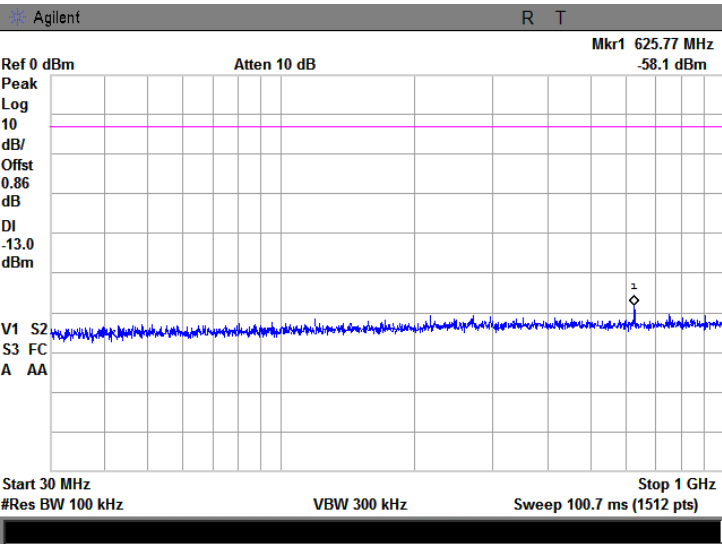


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.7 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency



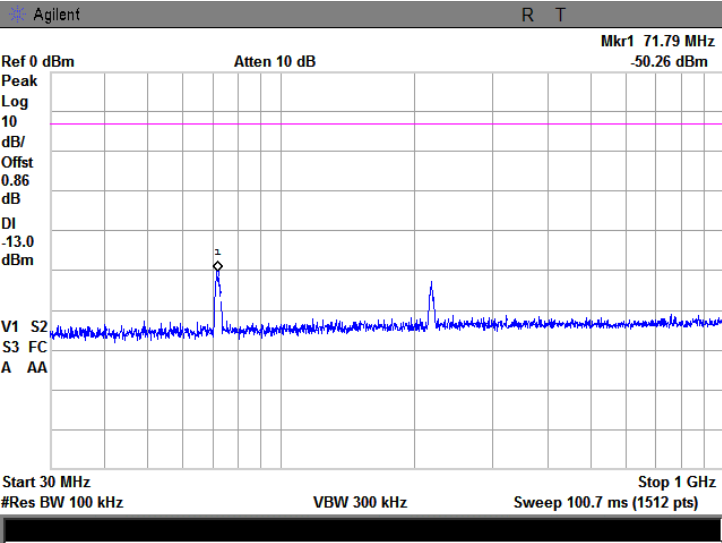
Plot 7.6.8 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency



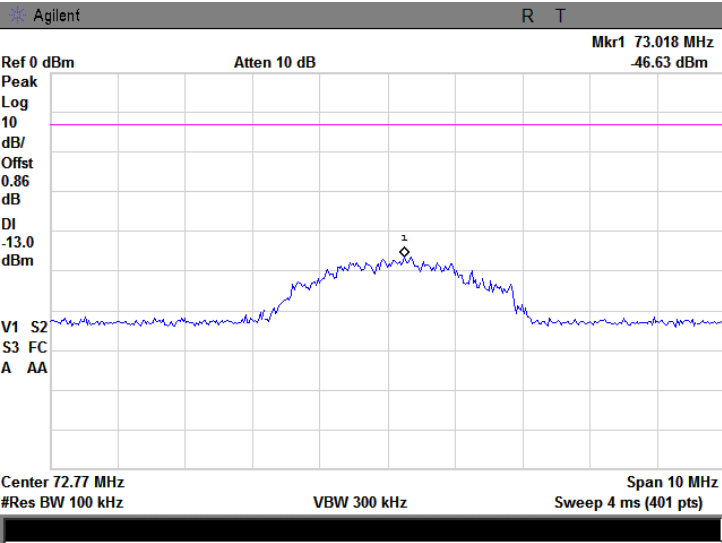


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.9 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency



Plot 7.6.10 Spurious emission measurements at 73 MHz at high carrier frequency

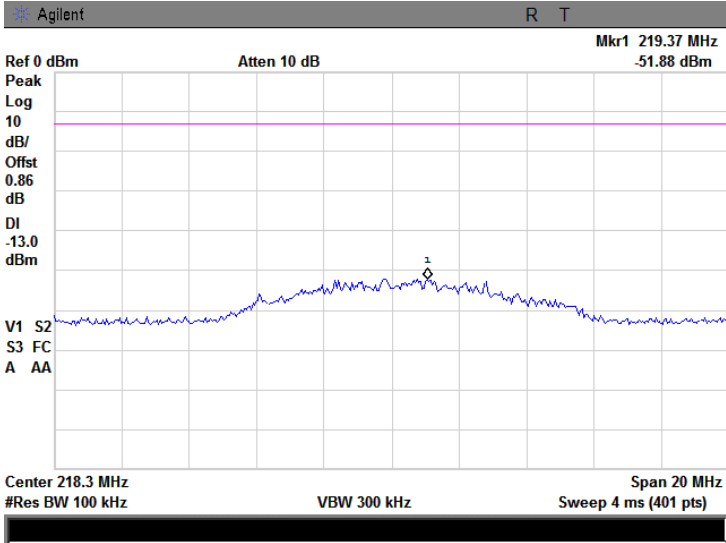




HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance		Verdict: PASS	
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

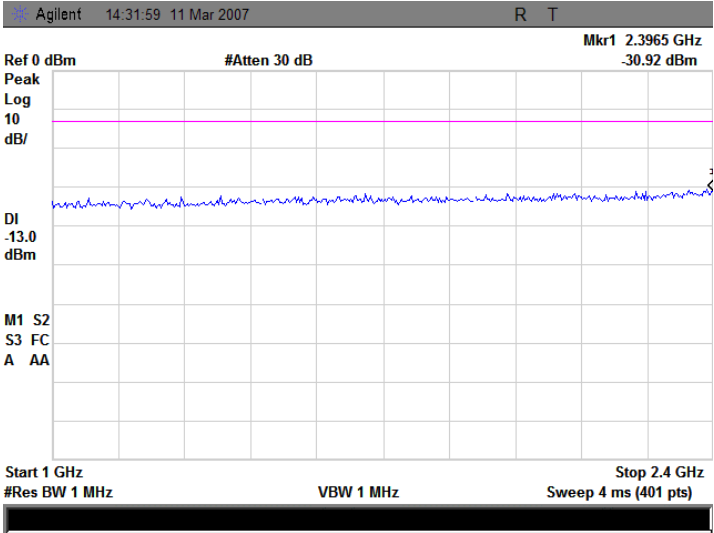
Plot 7.6.11 Spurious emission measurements at 219 MHz at high carrier frequency



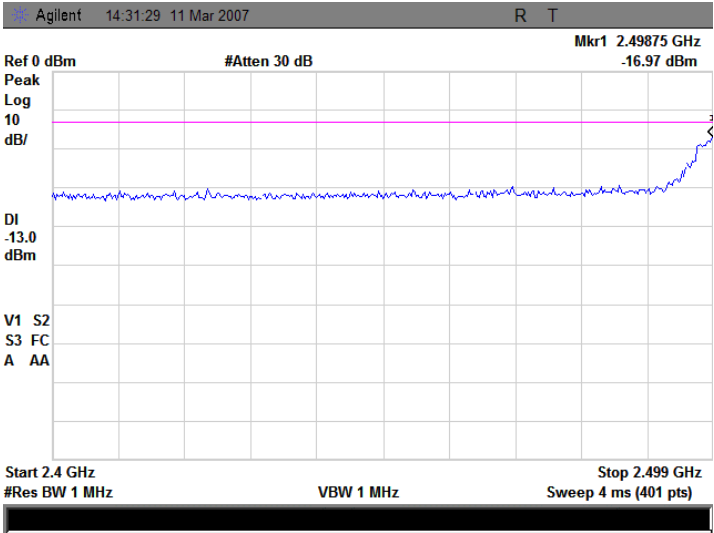


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.12 Spurious emission measurements in 1000 - 2400 MHz range at low carrier frequency



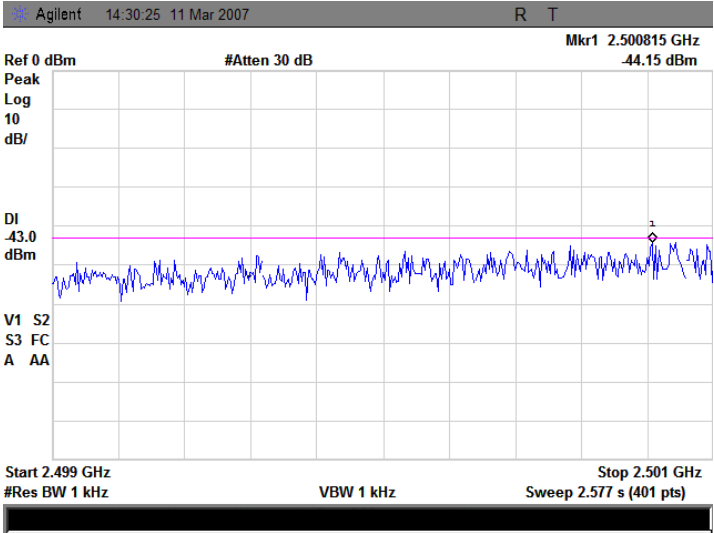
Plot 7.6.13 Spurious emission measurements in 2400 - 2499 MHz range at low carrier frequency





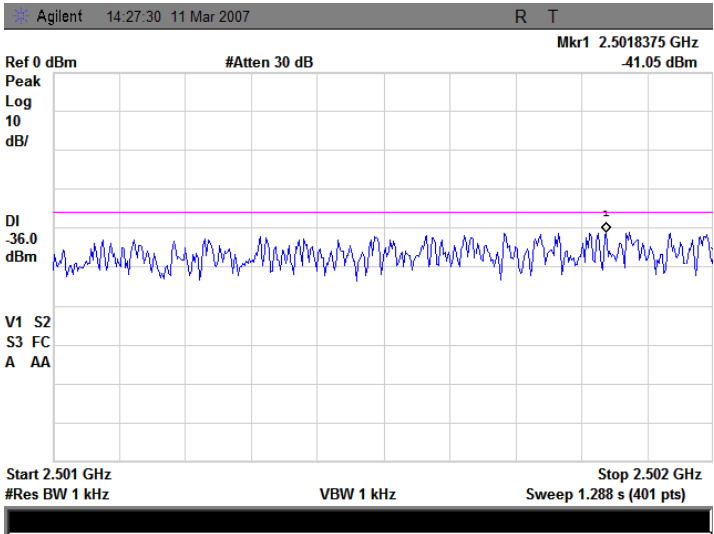
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.14 Spurious emission measurements in 2499 - 2501 MHz range at low carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm

Plot 7.6.15 Spurious emission measurements in 2501 - 2502 MHz range at low carrier frequency

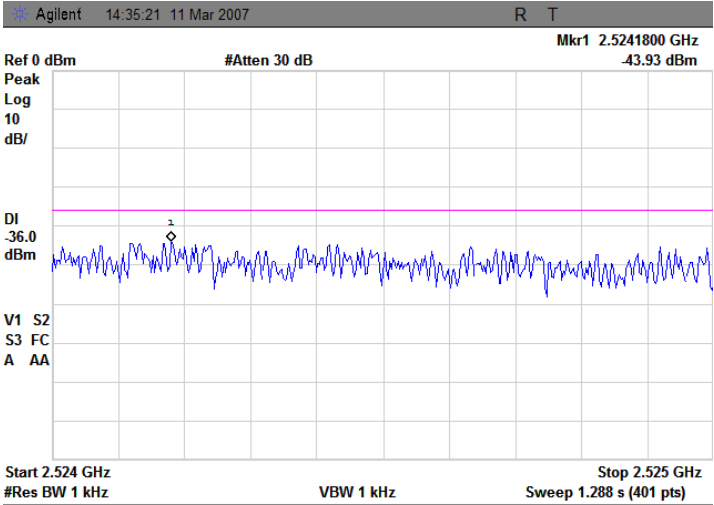


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(200kHz/1kHz) = -13 dBm - 23 dB = -36 dBm
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 20MHz / 100 = 200 kHz



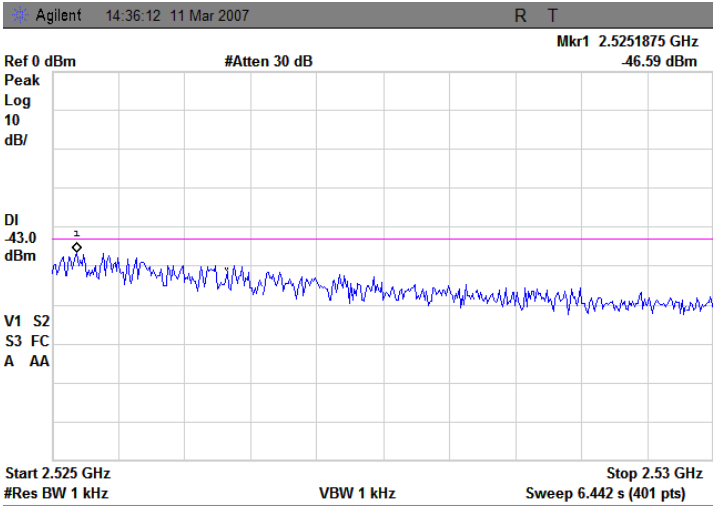
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.16 Spurious emission measurements in 2524 - 2525 MHz range at low carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(200kHz/1kHz) = -13 dBm - 23 dB = -36 dBm
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 20MHz / 100 = 200 kHz

Plot 7.6.17 Spurious emission measurements in 2525 - 2530 MHz range at low carrier frequency

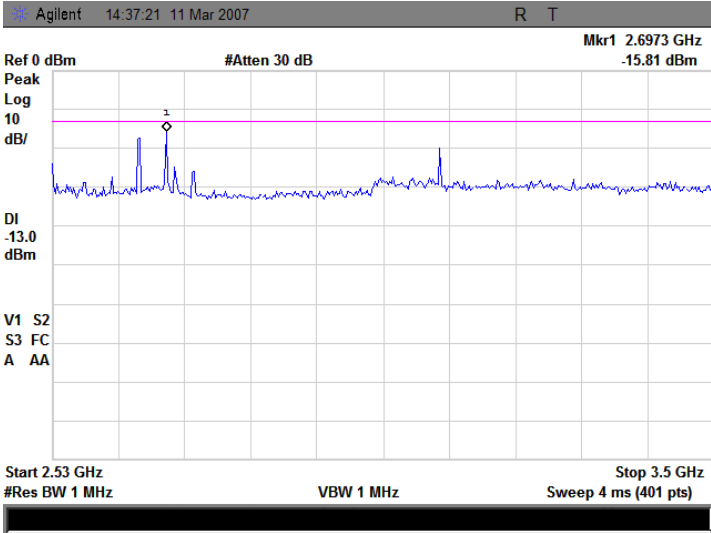


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm

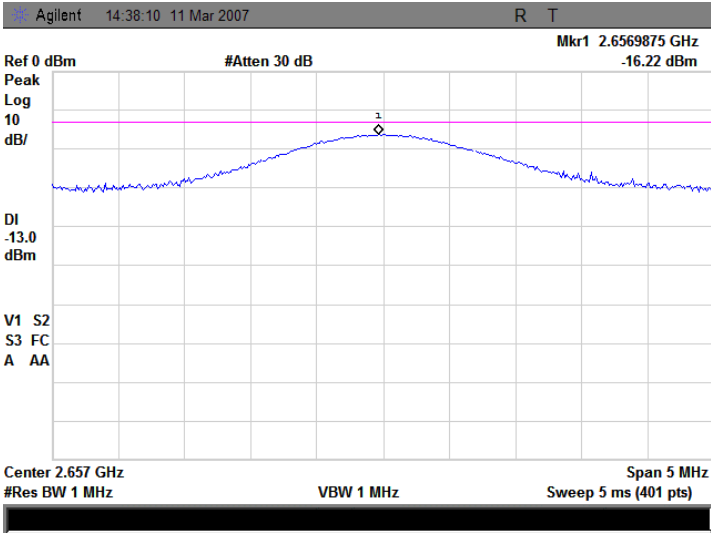


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.18 Spurious emission measurements in 2530 - 3500 MHz range at low carrier frequency



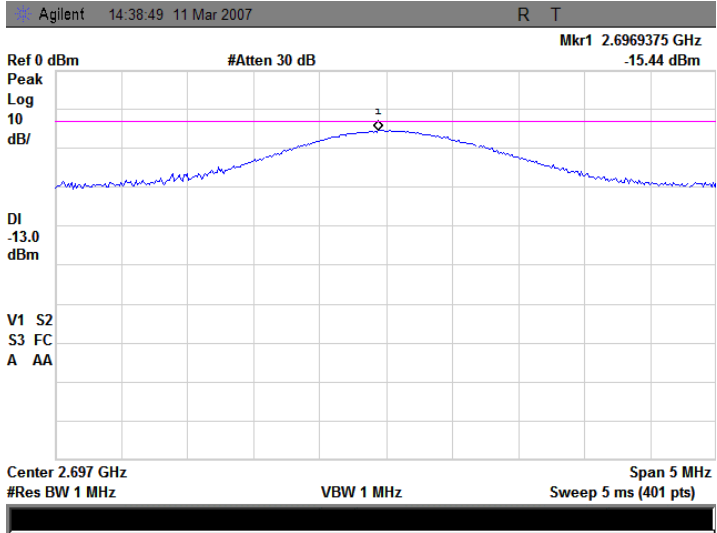
Plot 7.6.19 Spurious emission measurements in 2657 MHz at low carrier frequency



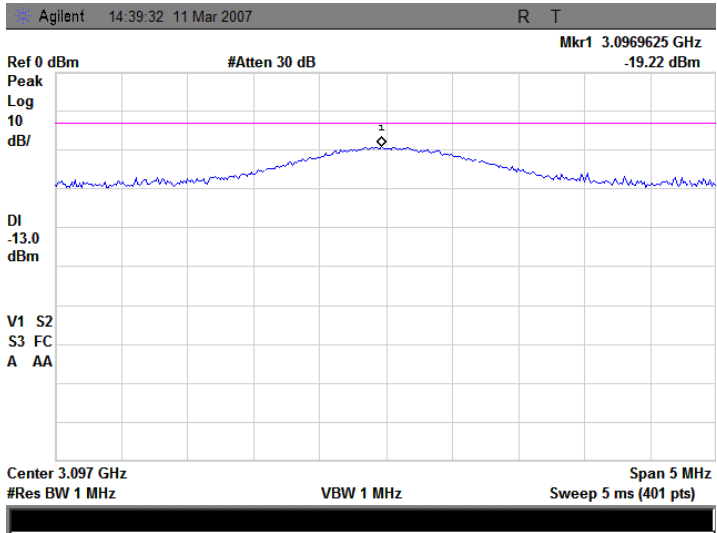


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.20 Spurious emission measurements in 2697 MHz at low carrier frequency



Plot 7.6.21 Spurious emission measurements in 3097 MHz at low carrier frequency

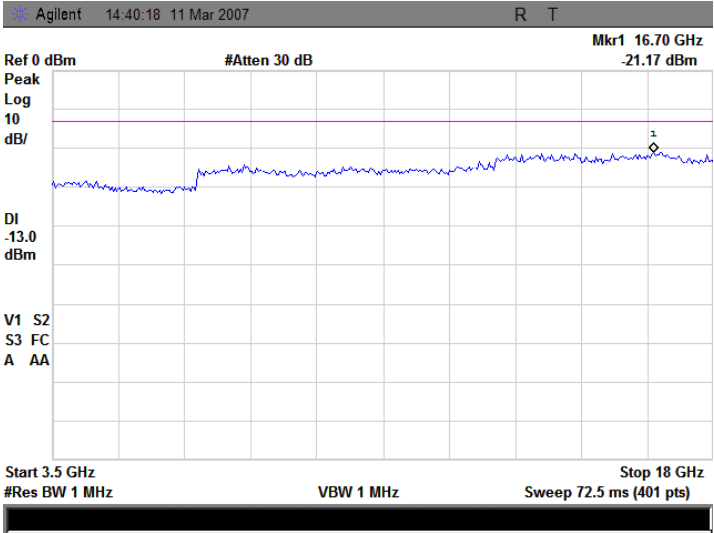




HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

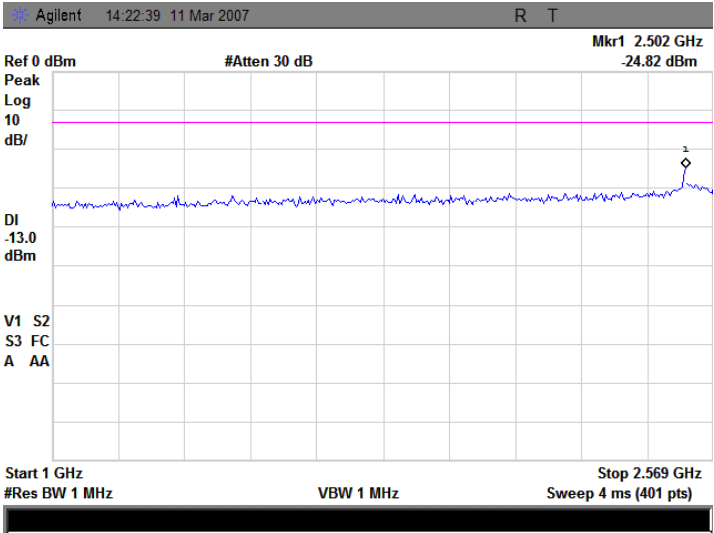
Plot 7.6.22 Spurious emission measurements in 3500 - 18000 MHz range at low carrier frequency



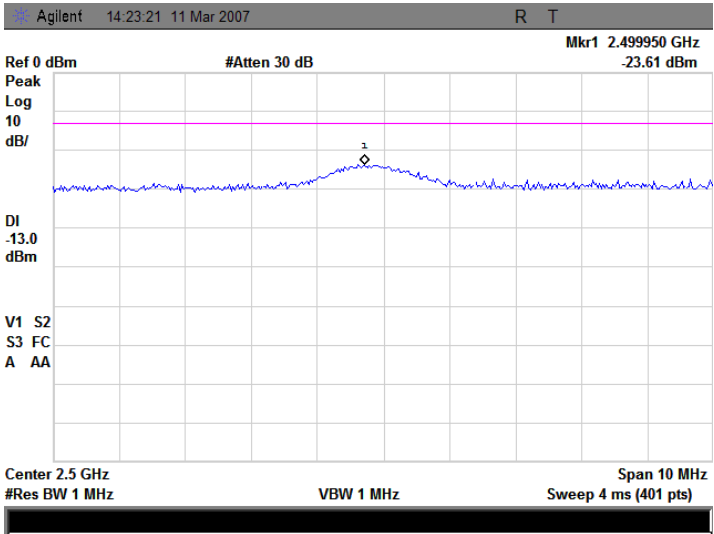


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.23 Spurious emission measurements in 1000 - 2569 MHz range at mid carrier frequency



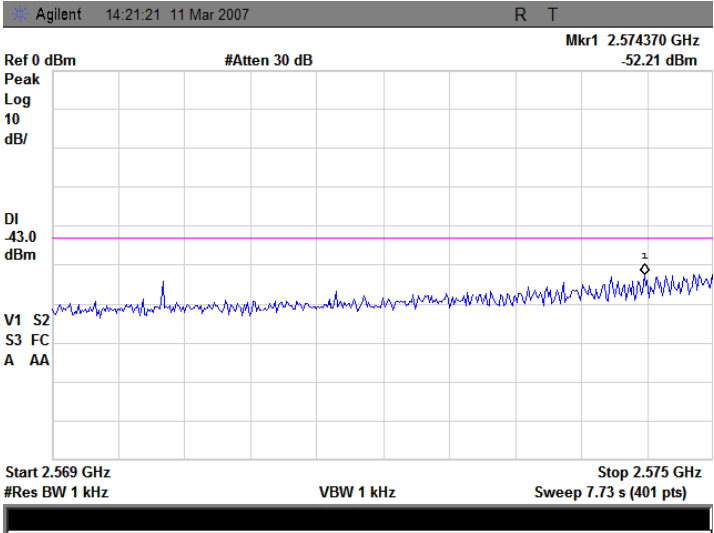
Plot 7.6.24 Spurious emission measurements at 2500 MHz at mid carrier frequency





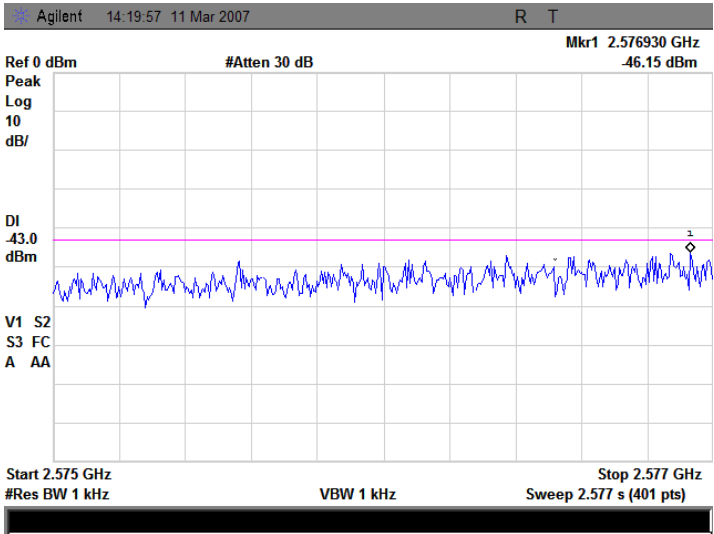
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.25 Spurious emission measurements in 2569 – 2575 MHz range at mid carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm

Plot 7.6.26 Spurious emission measurements in 2575 – 2577 MHz range at mid carrier frequency

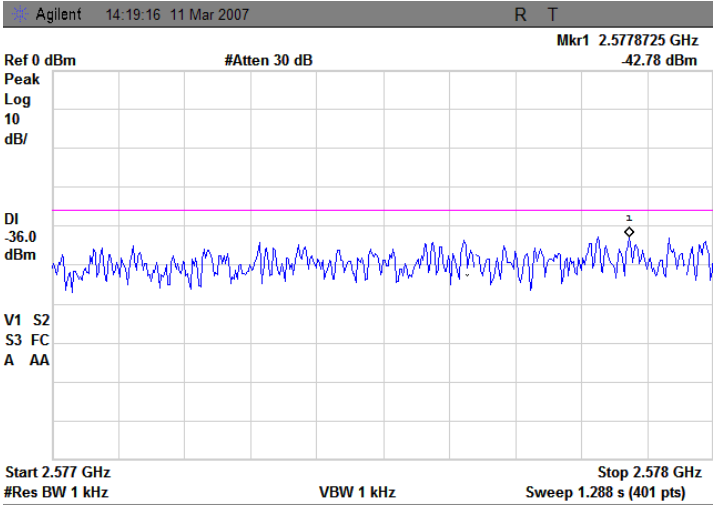


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm



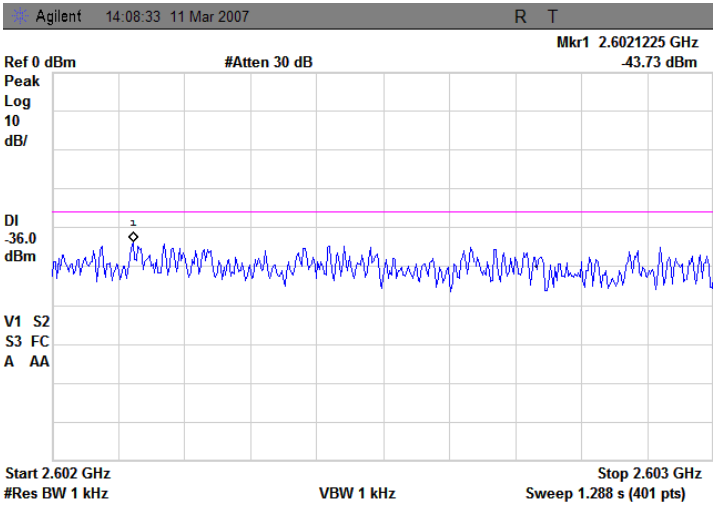
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.27 Spurious emission measurements in 2577 - 2578 MHz range at mid carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(200kHz/1kHz) = -13 dBm - 23 dB = -36 dBm
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 20MHz / 100 = 200 kHz

Plot 7.6.28 Spurious emission measurements in 2602 - 2603 MHz range at mid carrier frequency

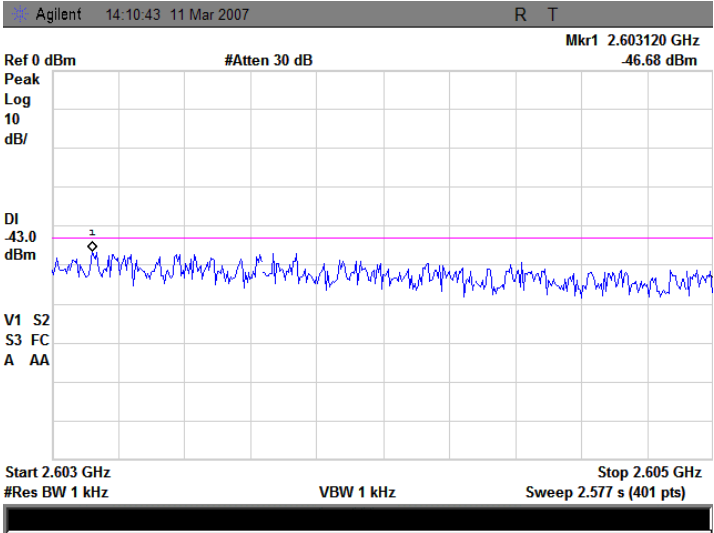


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(200kHz/1kHz) = -13 dBm - 23 dB = -36 dBm
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 20MHz / 100 = 200 kHz



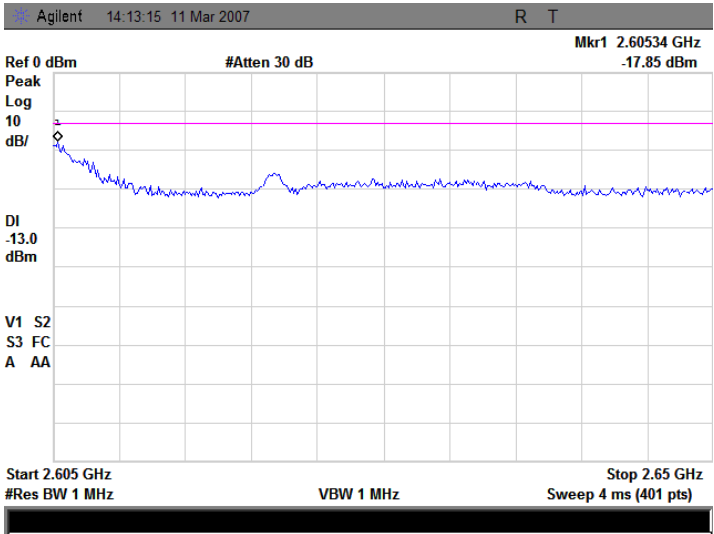
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.29 Spurious emission measurements in 2603 - 2605 MHz range at mid carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm

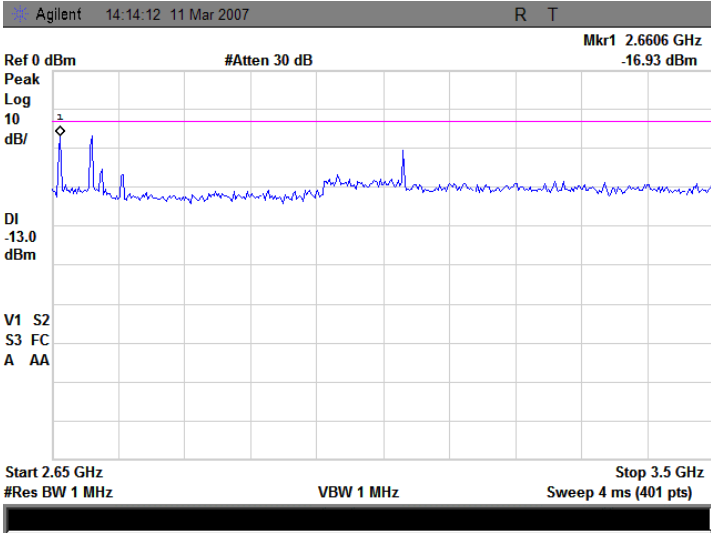
Plot 7.6.30 Spurious emission measurements in 2605 - 2650 MHz range at mid carrier frequency



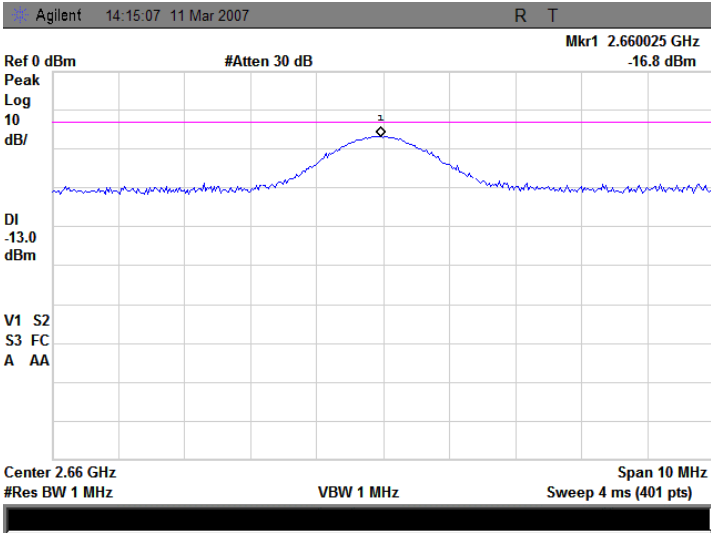


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.31 Spurious emission measurements in 2660 - 3500 MHz range at mid carrier frequency



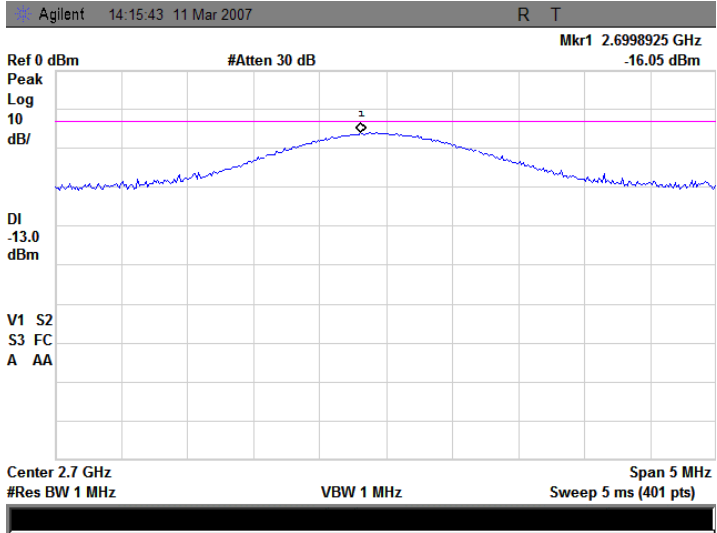
Plot 7.6.32 Spurious emission measurements in 2660 MHz at mid carrier frequency



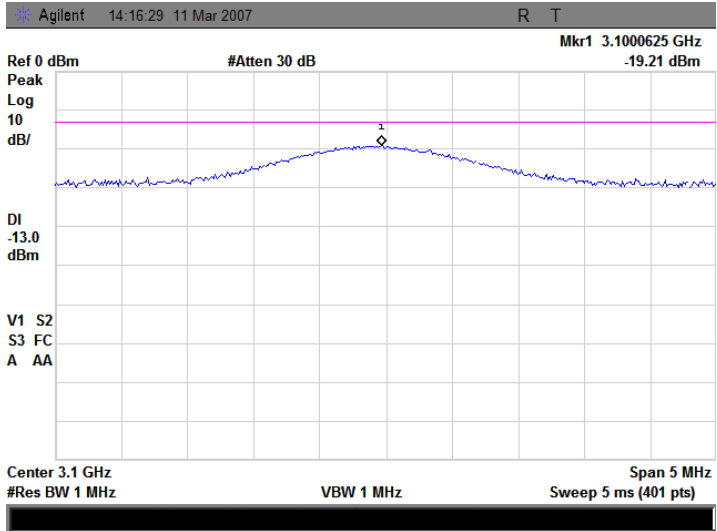


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.33 Spurious emission measurements in 2700 MHz at mid carrier frequency



Plot 7.6.34 Spurious emission measurements in 3100 MHz at mid carrier frequency

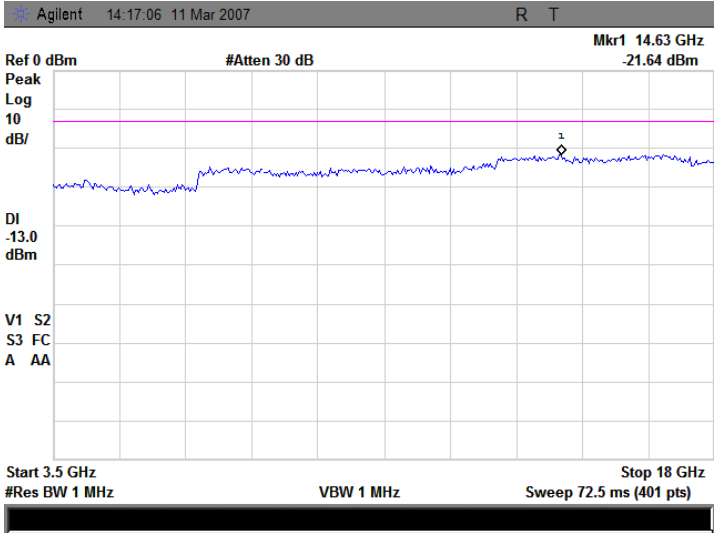




HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

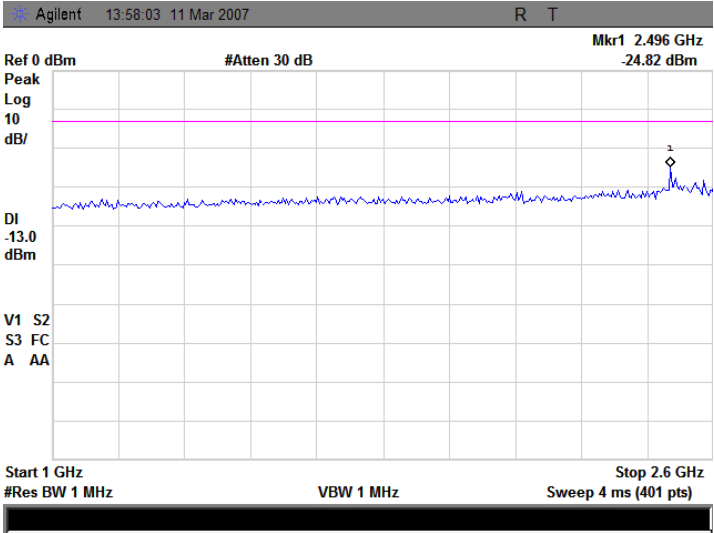
Plot 7.6.35 Spurious emission measurements in 3500 - 18000 MHz range at mid carrier frequency



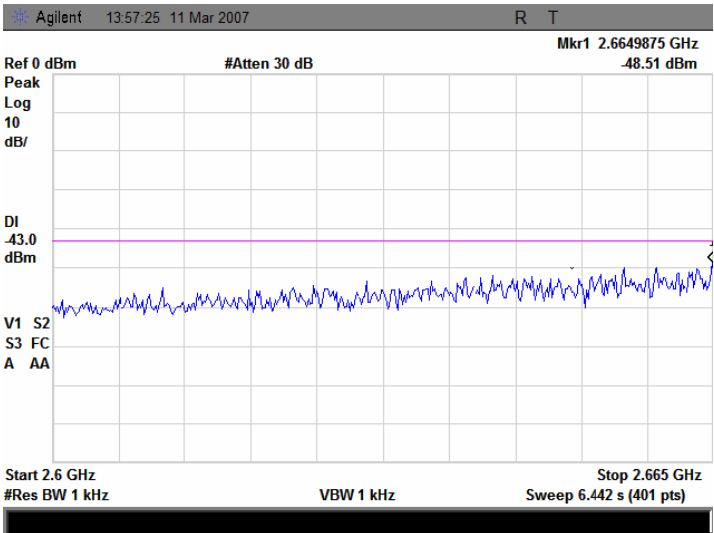


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.36 Spurious emission measurements in 1000 - 2600 MHz range at high carrier frequency



Plot 7.6.37 Spurious emission measurements in 2600 - 2665 MHz range at high carrier frequency

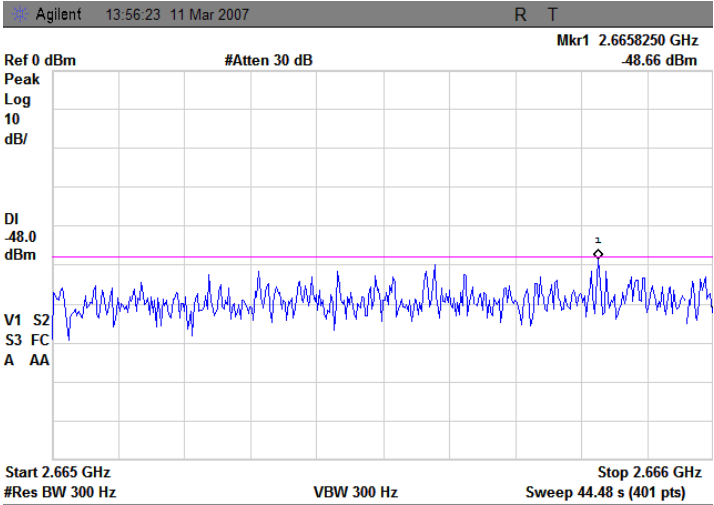


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/1kHz) = -13 dBm - 30 dB = -43 dBm



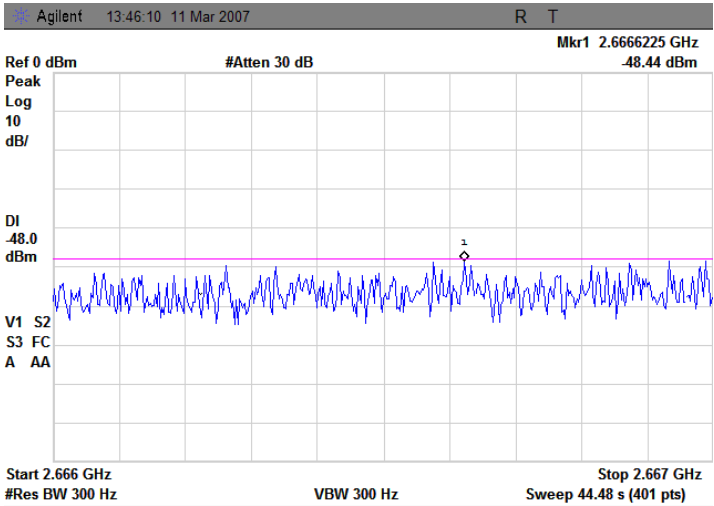
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.38 Spurious emission measurements in 2665 - 2666 MHz range at high carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/300Hz) = -13 dBm - 35 dB = -48 dBm

Plot 7.6.39 Spurious emission measurements in 2666 - 2667 MHz range at high carrier frequency

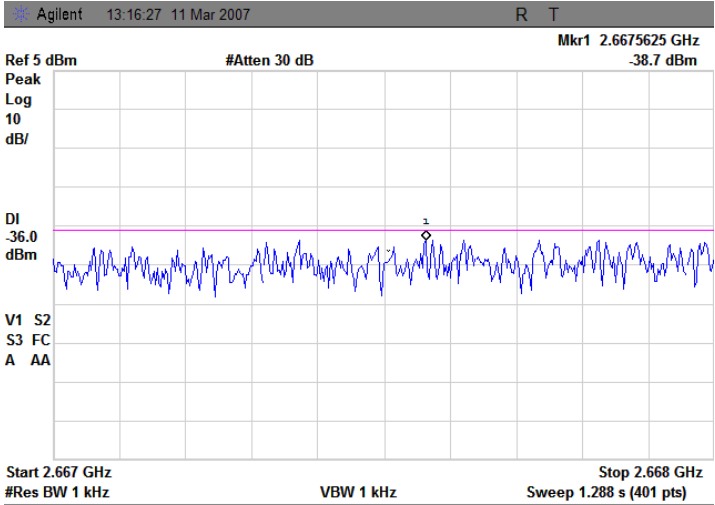


Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/300Hz) = -13 dBm - 35 dB = -48 dBm



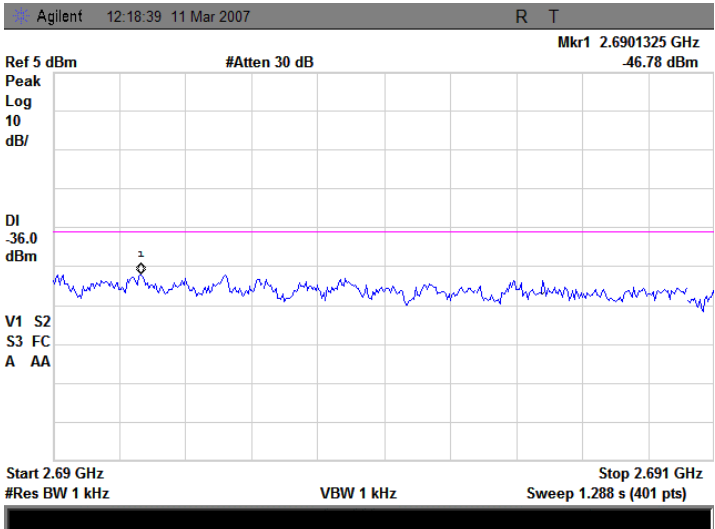
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.40 Spurious emission measurements in 2667 - 2668 MHz range at high carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(200kHz/1kHz) = -13 dBm - 23 dB = -36 dBm
 1 MHz band immediately outside and adjacent to the frequency block (lower band edge)
 1% of OBW = 20MHz / 100 = 200 kHz

Plot 7.6.41 Spurious emission measurements in 2690 - 2691 MHz range at high carrier frequency

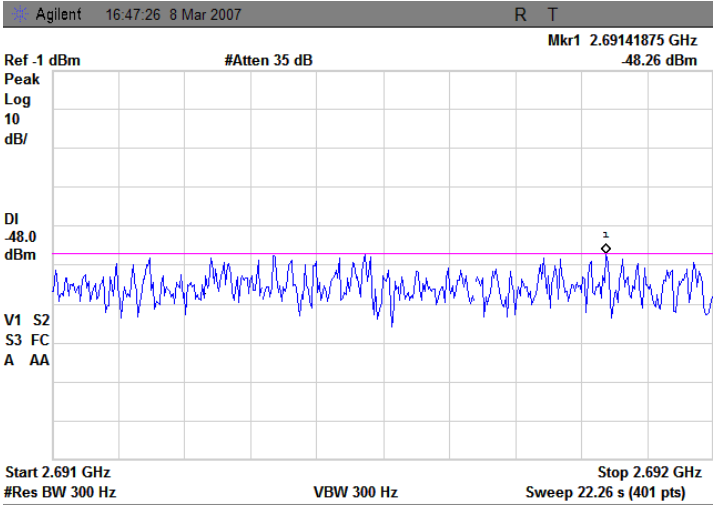


Signal = SA reading + BW factor = SA reading + 10log(87kHz/1kHz) = SA reading + 19.4 dB
 1 MHz band immediately outside and adjacent to the frequency block (upper band edge)
 1% of OBW = 8.7MHz / 100 = 87 kHz



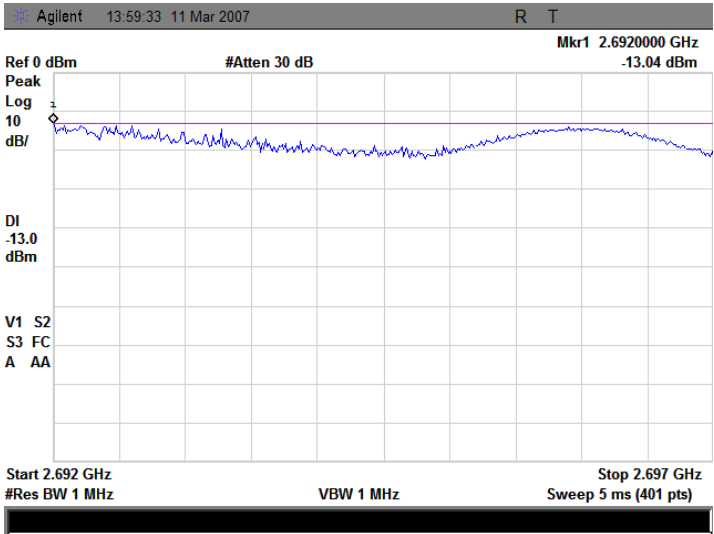
Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.42 Spurious emission measurements in 2691 - 2692 MHz range at high carrier frequency



Limit = Limit(1MHz) - BW factor = Limit(1MHz) - 10log(1MHz/300Hz) = -13 dBm - 35 dB = -48 dBm

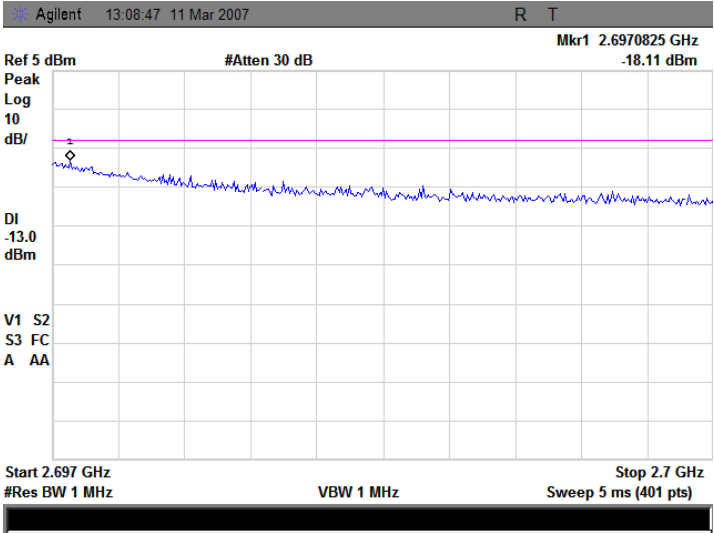
Plot 7.6.43 Spurious emission measurements in 2692 - 2697 MHz range at high carrier frequency



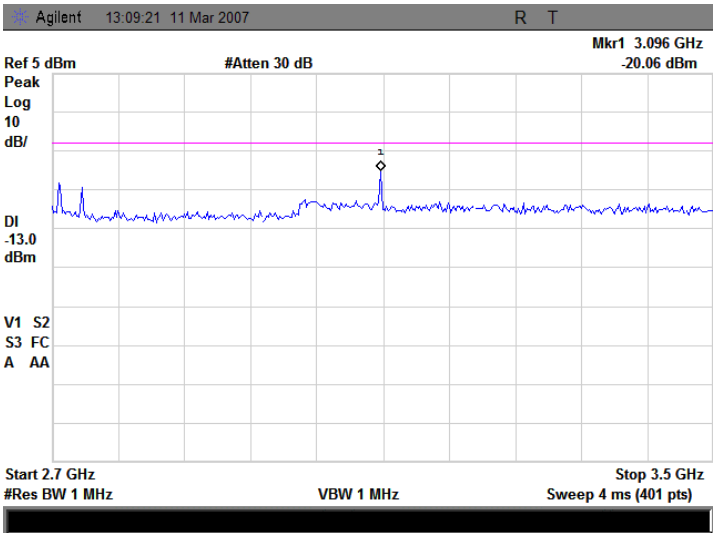


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.44 Spurious emission measurements in 2697 - 2700 MHz range at high carrier frequency



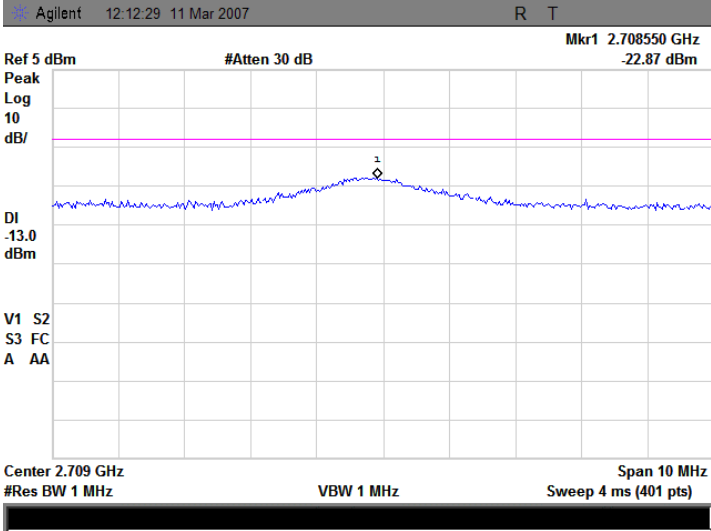
Plot 7.6.45 Spurious emission measurements in 2700 - 3500 MHz range at high carrier frequency



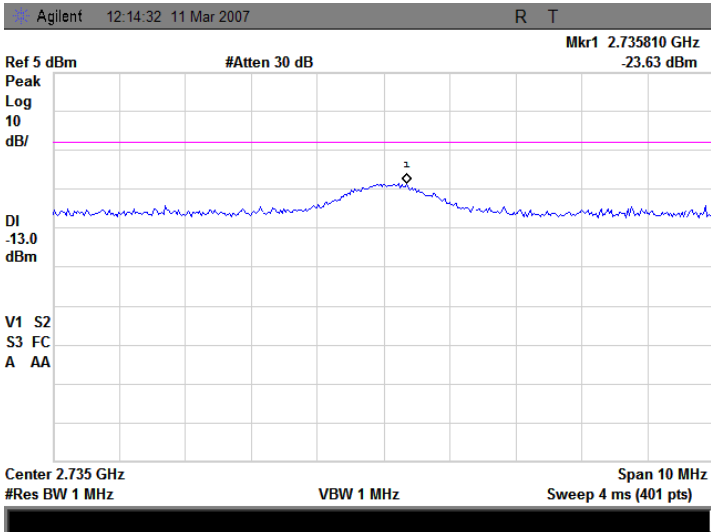


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	3/13/2007		
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.46 Spurious emission measurements at 2709 MHz at high carrier frequency



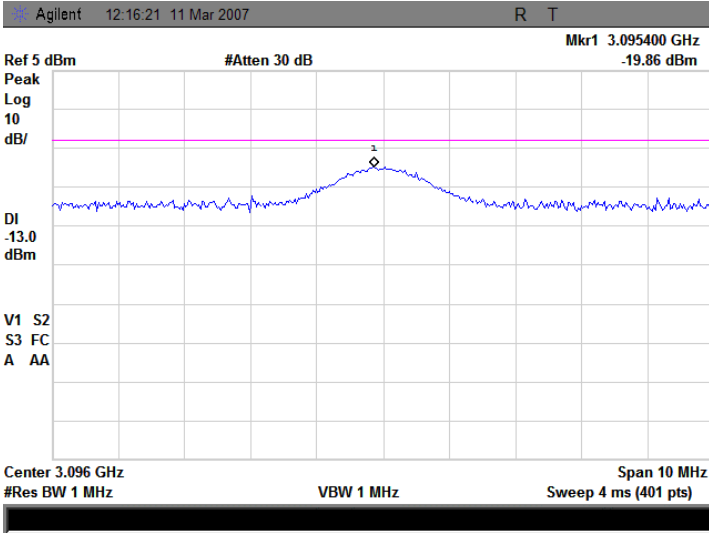
Plot 7.6.47 Spurious emission measurements at 2735 MHz at high carrier frequency



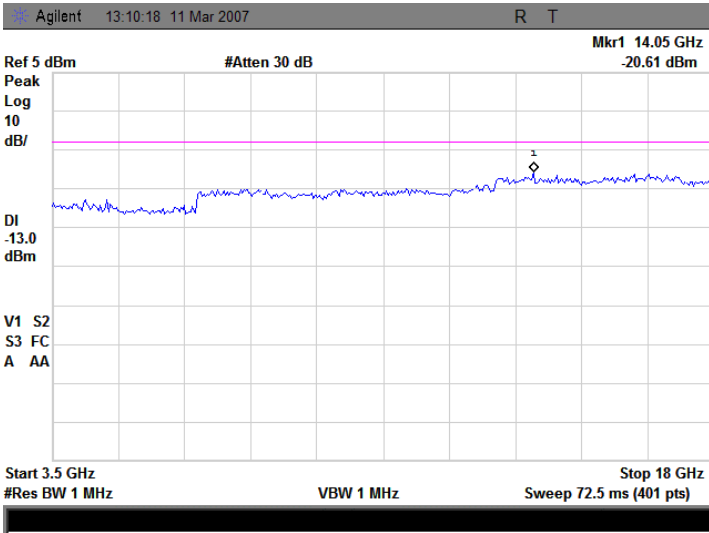


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.48 Spurious emission measurements at 3096 MHz at high carrier frequency



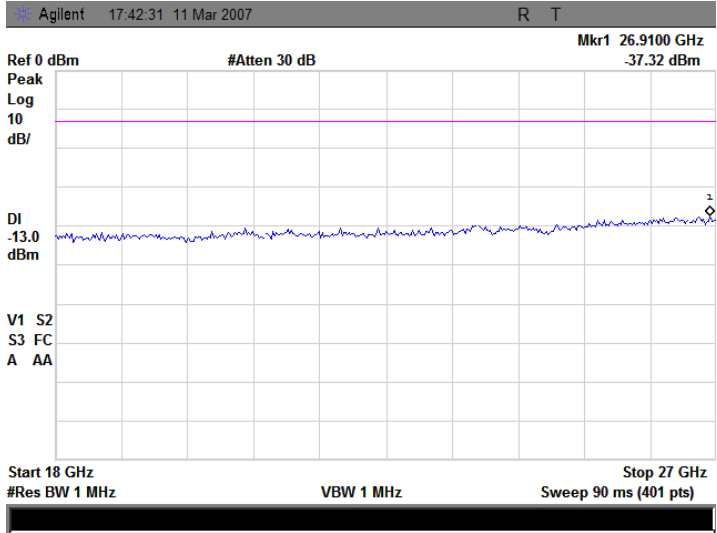
Plot 7.6.49 Spurious emission measurements in 3000 - 18000 MHz range at high carrier frequency



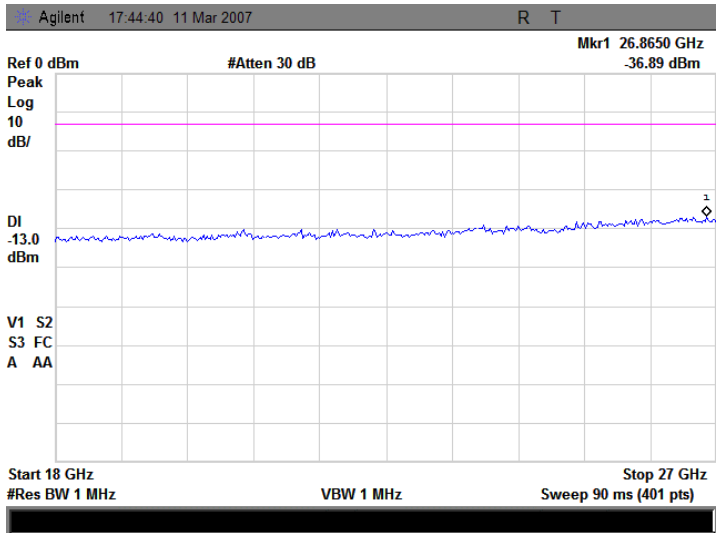


Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.50 Spurious emission measurements in 18000 - 27000 MHz range at low carrier frequency



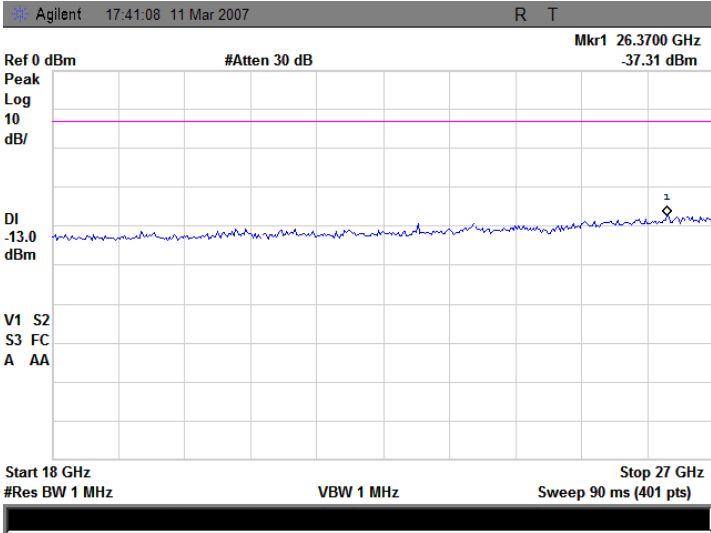
Plot 7.6.51 Spurious emission measurements in 18000 - 27000 MHz range at mid carrier frequency





Test specification: Section 27.53(l)(2), Spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 3/13/2007			
Temperature: 21°C	Air Pressure: 1006 hPa	Relative Humidity: 55 %	Power Supply: 48 VDC
Remarks: 22 MHz CBW			

Plot 7.6.52 Spurious emission measurements in 18000 - 27000 MHz range at high carrier frequency





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Test specification: Section 27.53(l)(2), Radiated spurious emissions	
Test procedure: Section 27.53(l)(2)	
Test mode: Compliance	Verdict: PASS
Date: 2/19/2007	
Temperature: 20°C	Air Pressure: 1012 hPa
Relative Humidity: 48 %	
Power Supply: 48 VDC	
Remarks:	

7.7 Radiated spurious emission measurements

7.7.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.7.1.

Table 7.7.1 Radiated spurious emission test limits

Frequency, MHz	Attenuation below carrier dBc	ERP of spurious, dBm	Equivalent field strength limit @ 3m, dB(μV/m)***
0.009 – 10 th harmonic*	43+10logP**	-13	84.4

* - Excluding the in band emission within ± 250 % of the authorized bandwidth from the carrier

** - P is transmitter output power in Watts

*** - Equivalent field strength limit was calculated from maximum allowed ERP of spurious as follows: $E = \sqrt{30 \times P \times 1.64} / r$, where P is ERP in Watts, 1.64 is numeric gain of ideal dipole and r is antenna to EUT distance in meters

7.7.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

7.7.2.1 The EUT was set up as shown in Figure 7.7.1, energized and the performance check was conducted.

7.7.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated around its vertical axis.

7.7.2.3 The worst test results (the lowest margins) were recorded in Table 7.7.2 and shown in the associated plots.

7.7.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.7.3.1 The EUT was set up as shown in Figure 7.7.2, energized and the performance check was conducted.

7.7.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.

7.7.3.3 The worst test results (the lowest margins) were recorded in Table 7.7.2 and shown in the associated plots.

7.7.4 Test procedure for substitution ERP measurements of spurious

7.7.4.1 The test equipment was set up as shown in Figure 7.7.3 and energized.

7.7.4.2 RF signal generator was set to the frequency of investigated spurious emission and the RF output level was preliminary adjusted to produce the same field strength as it was measured from the EUT.

7.7.4.3 The test antenna height was swept from 1 to 4 m to find maximum emission from substitution antenna and RF signal generator output was fine adjusted to produce the same field strength as it was measured from the EUT.

7.7.4.4 The above procedure was performed in both, horizontal and vertical, polarizations of the test and substitution antennas.

7.7.4.5 The ERP of spurious emissions was calculated as a sum of signal generator output power in dBm and antenna gain in dBd reduced by cable loss in dB.

7.7.4.6 The above procedure was repeated at the rest of investigated frequencies.

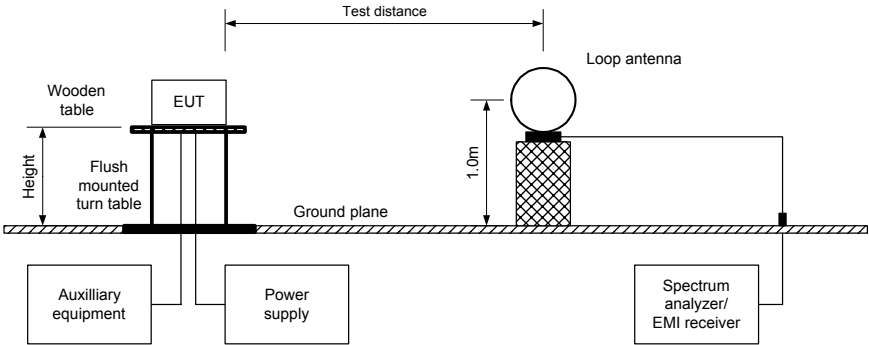
7.7.4.7 The worst test results (the lowest margins) were recorded in Table 7.7.3 and shown in the associated plots.



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Test specification: Section 27.53(l)(2), Radiated spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 2/19/2007			
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Figure 7.7.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band



Photograph 7.7.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

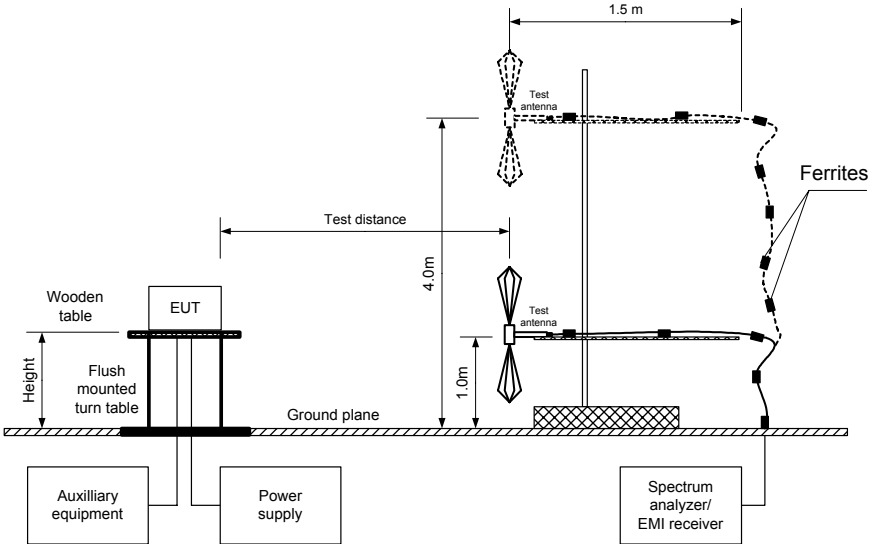




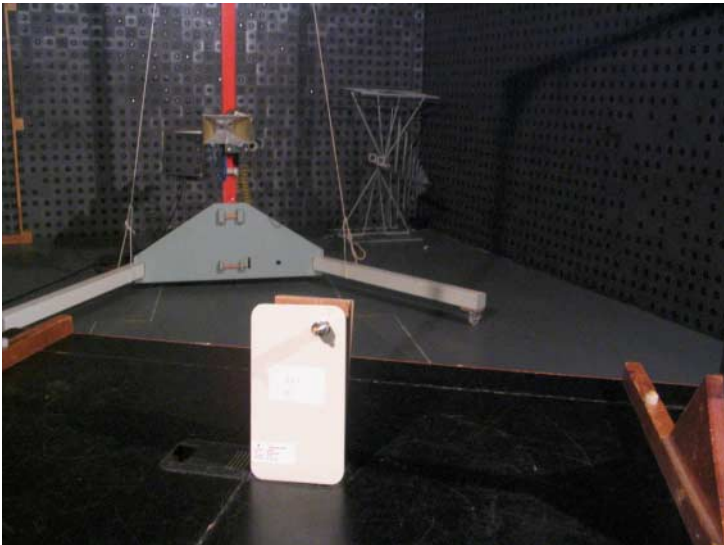
HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Radiated spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance		Verdict: PASS	
Date: 2/19/2007			
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Figure 7.7.2 Setup for spurious emission field strength measurements above 30 MHz



Photograph 7.7.2 Setup for spurious emission field strength measurements above 30 MHz

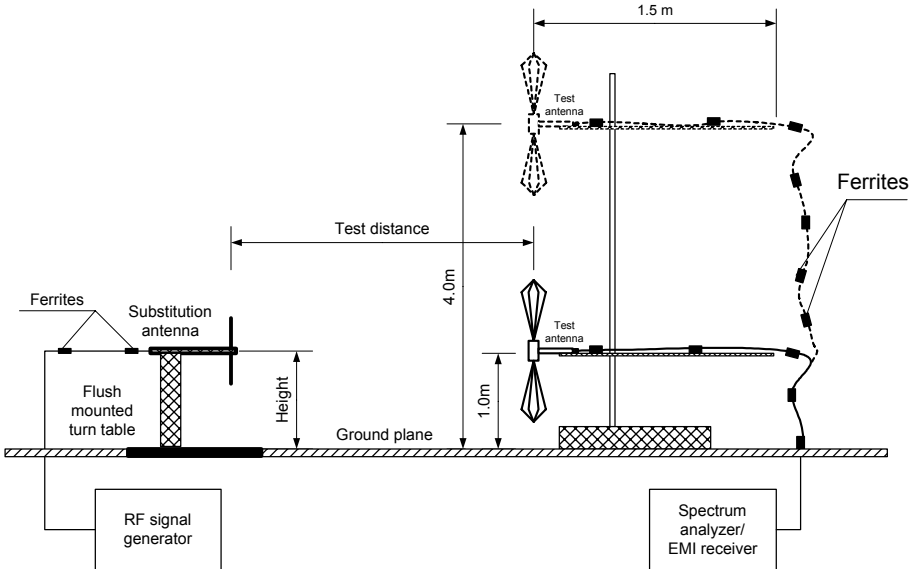




HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Radiated spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance		Verdict: PASS	
Date: 2/19/2007			
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Figure 7.7.3 Setup for substitution ERP measurements of spurious





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Test specification: Section 27.53(l)(2), Radiated spurious emissions	
Test procedure: Section 27.53(l)(2)	
Test mode: Compliance	Verdict: PASS
Date: 2/19/2007	
Temperature: 20°C	Air Pressure: 1012 hPa
Remarks:	

Table 7.7.2 Spurious emission field strength test results for single channel

ASSIGNED FREQUENCY RANGE: 2496 – 2690 MHz
 TEST DISTANCE: 3 m
 TEST SITE: OATS
 EUT HEIGHT: 0.8 m
 INVESTIGATED FREQUENCY RANGE: 0.009 – 27000 MHz
 DETECTOR USED: Peak
 VIDEO BANDWIDTH: > Resolution bandwidth
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 MHz)
 Double ridged guide (1 GHz – 18 GHz)
 Standard gain horn (above 18 GHz)
 MODULATION: QAM
 MODULATING SIGNAL: PRBS
 BIT RATE: 1.5 Mbps
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Field strength, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
Low channel frequency, 6 MHz CBW							
7497.05	76.73	84.40	-7.67	1000	V	1	0
Mid channel frequency, 5.5 MHz CBW							
7779.40	76.26	84.40	-8.14	1000	V	1	0
High channel frequency, 6 MHz CBW							
8060.15	76.23	84.40	-8.17	1000	V	1	0

*- Margin = Field strength of spurious – calculated field strength limit.
 **- EUT front panel refers to 0 degrees position of turntable.

Table 7.7.3 Substitution ERP of spurious test results

ASSIGNED FREQUENCY RANGE: 2496 – 2690 MHz
 TEST SITE: OATS
 TEST DISTANCE: 3 m
 SUBSTITUTION ANTENNA HEIGHT: 0.8 m
 DETECTOR USED: Peak
 VIDEO BANDWIDTH: > Resolution bandwidth
 SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)
 Double ridged guide (above 1000 MHz)

Frequency MHz	Field strength dB(µV/m)	RBW, kHz	Antenna polarization	RF generator output, dBm	Ant gain dBd	Cable loss, dB	ERP, dBm	Attenuation below carrier dBc	Limit, dBc	Margin dB*	Verdict
Low channel frequency, 6 MHz CBW											
7497.05	76.73	1000	V	-26.10	4.71	2.11	-23.50	-13	-13	-10.50	Pass
Mid channel frequency, 5.5 MHz CBW											
7779.40	76.26	1000	V	-27.34	5.99	2.15	-23.50	-13	-13	-10.50	Pass
High channel frequency, 6 MHz CBW											
8060.15	76.23	1000	V	-27.54	6.85	2.18	-22.87	-13	-13	-9.87	Pass

*- Margin = Spurious emission – specification limit.

Reference numbers of test equipment used

HL 0446	HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604
HL 1947	HL 2009	HL 2259	HL 2432	HL 2780			

Full description is given in Appendix A.



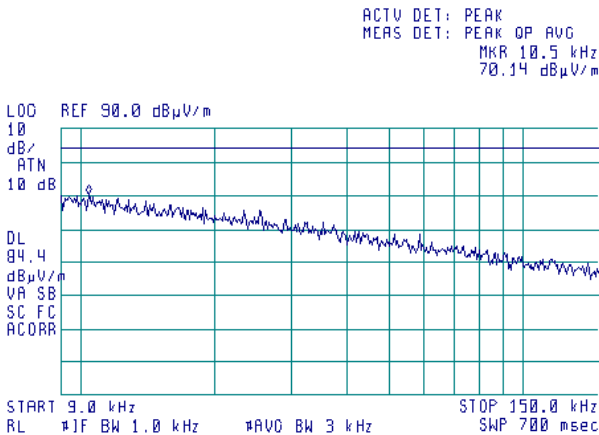
HERMON LABORATORIES

Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.7.1 Radiated emission measurements in 9 - 150 kHz range

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

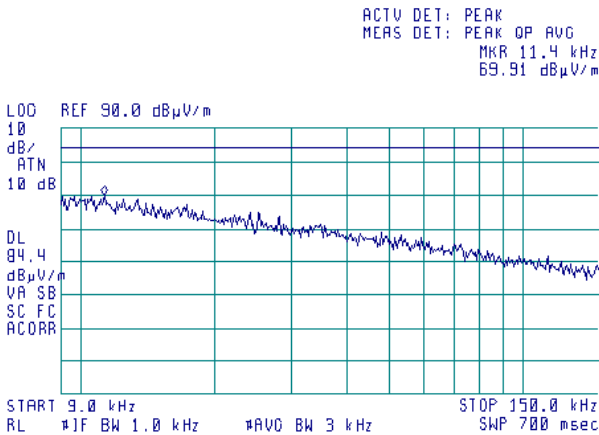
19:40:12 FEB 18, 2007



Plot 7.7.2 Radiated emission measurements in 9 - 150 kHz range

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

19:43:17 FEB 18, 2007





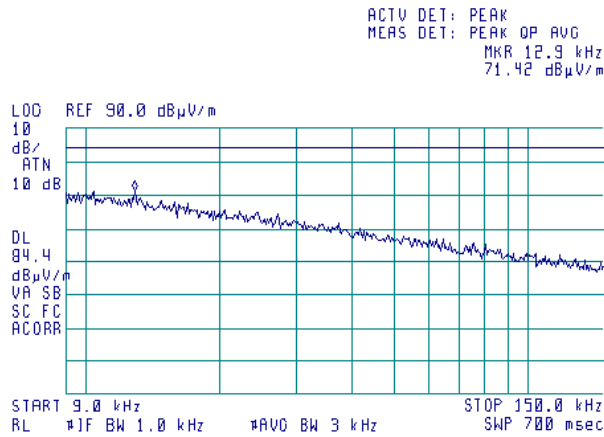
HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Radiated spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 2/19/2007			
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.7.3 Radiated emission measurements in 9 - 150 kHz range

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

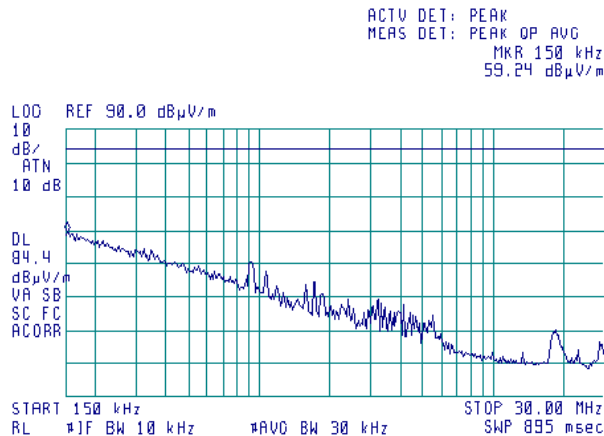
19:29:06 FEB 18, 2007



Plot 7.7.4 Radiated emission measurements in 0.15 - 30 MHz range

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

19:37:41 FEB 18, 2007





HERMON LABORATORIES

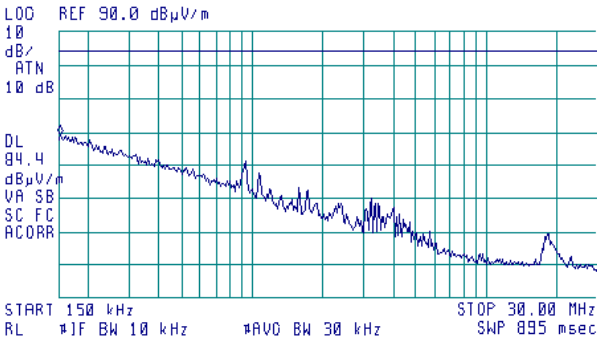
Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.7.5 Radiated emission measurements in 0.15 - 30 MHz range

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

19:46:28 FEB 18, 2007

ACTV DET: PEAK
 MEAS DET: PEAK OP AVG
 MKR 150 kHz
 59.17 dBµV/m

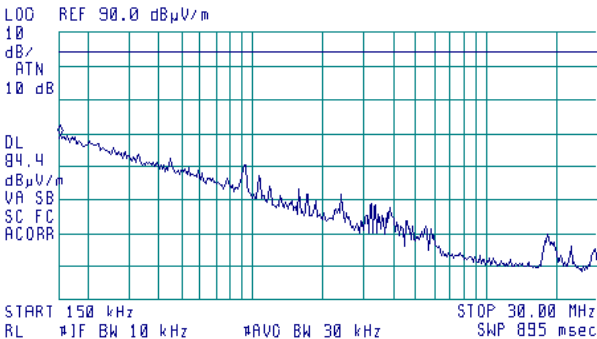


Plot 7.7.6 Radiated emission measurements in 0.15 - 30 MHz range

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

19:33:24 FEB 18, 2007

ACTV DET: PEAK
 MEAS DET: PEAK OP AVG
 MKR 150 kHz
 59.31 dBµV/m





HERMON LABORATORIES

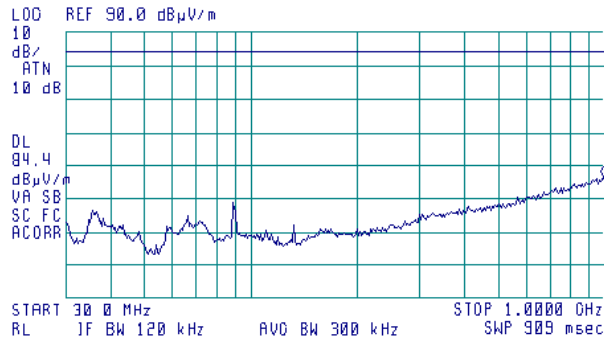
Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.7.7 Radiated emission measurements in 30 - 1000 MHz range

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

18:34:17 FEB 18, 2007

ACTV DET: PEAK
 MEAS DET: PEAK OP AVG
 MKR 998.5 MHz
 46.53 dBµV/m

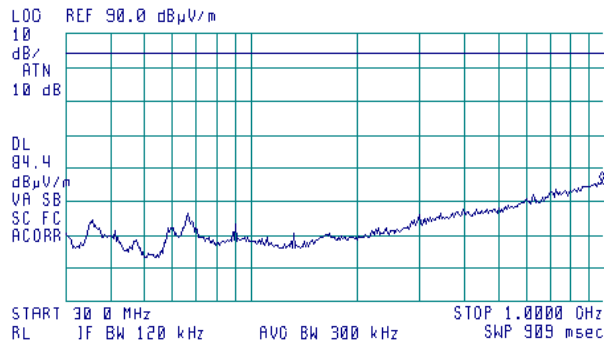


Plot 7.7.8 Radiated emission measurements in 30 - 1000 MHz range

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

18:46:58 FEB 18, 2007

ACTV DET: PEAK
 MEAS DET: PEAK OP AVG
 MKR 988.9 MHz
 45.94 dBµV/m





HERMON LABORATORIES

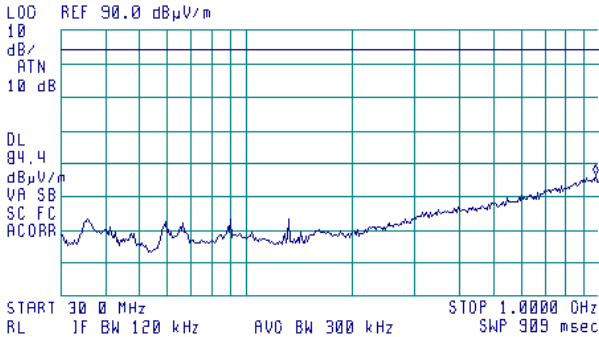
Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.7.9 Radiated emission measurements in 30 - 1000 MHz range

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

18:54:49 FEB 18, 2007

ACTV DET: PEAK
 MEAS DET: PEAK OP AVG
 MKR 971.4 MHz
 46.68 dBµV/m

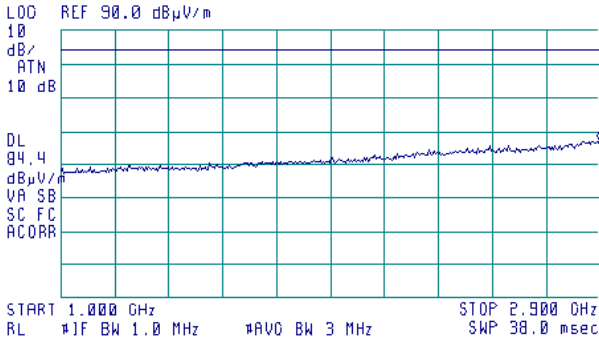


Plot 7.7.10 Radiated emission measurements in 1000 – 2900 MHz range

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

20:39:29 FEB 18, 2007

ACTV DET: PEAK
 MEAS DET: PEAK OP AVG
 MKR 2.900 GHz
 57.12 dBµV/m





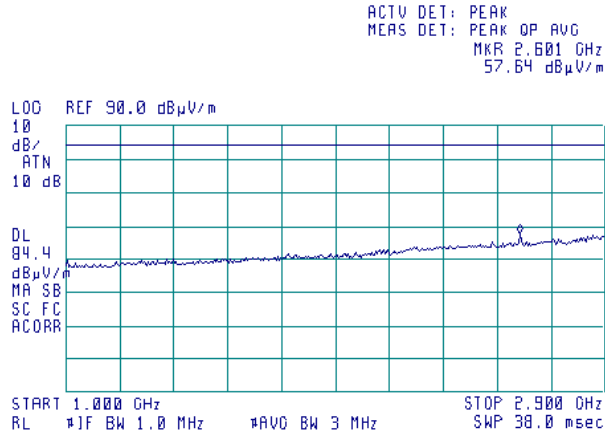
HERMON LABORATORIES

Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.7.11 Radiated emission measurements in 1000 – 2900 MHz range

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

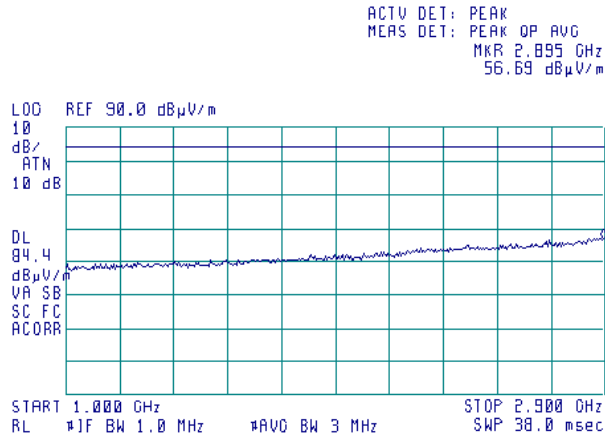
20:35:36 FEB 18, 2007



Plot 7.7.12 Radiated emission measurements in 1000 – 2900 MHz range

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

20:31:27 FEB 18, 2007



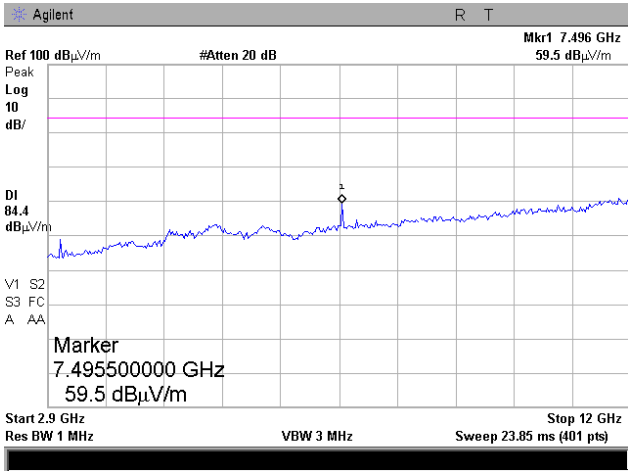


HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Radiated spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 2/19/2007			
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

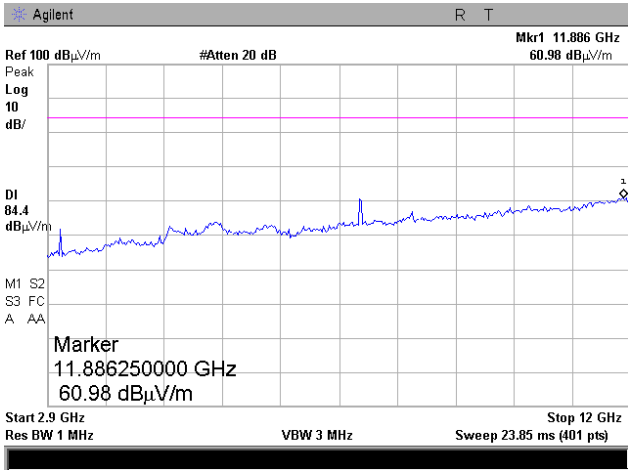
Plot 7.7.13 Radiated emission measurements in 2900 – 12000 MHz range

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



Plot 7.7.14 Radiated emission measurements in 2900 – 12000 MHz range

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



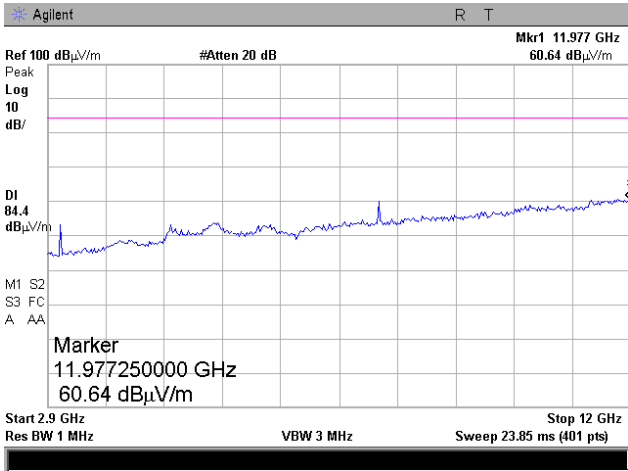


HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Radiated spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 2/19/2007			
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

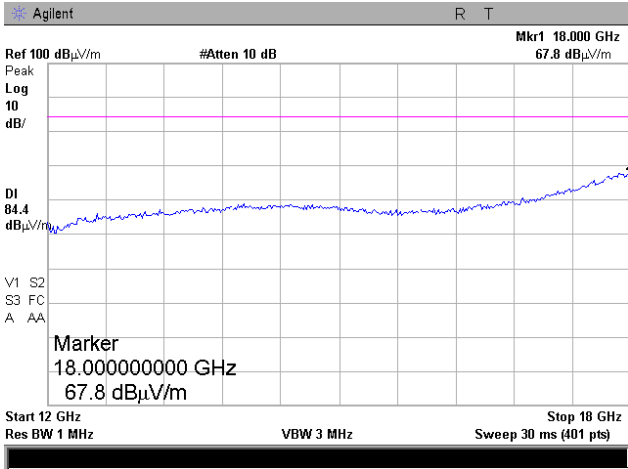
Plot 7.7.15 Radiated emission measurements in 2900 – 12000 MHz range

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



Plot 7.7.16 Radiated emission measurements in 12000 – 18000 MHz range

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

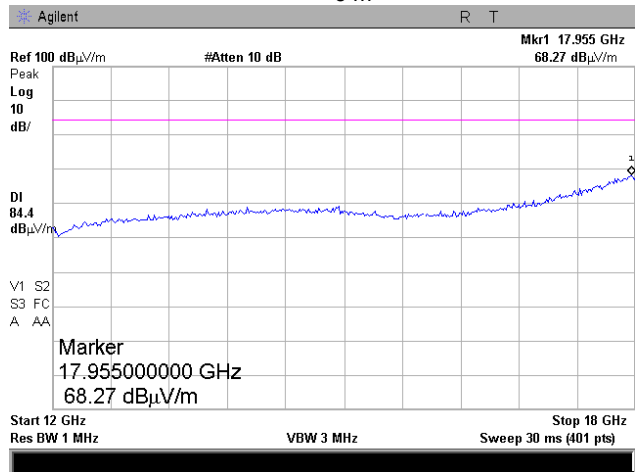




Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

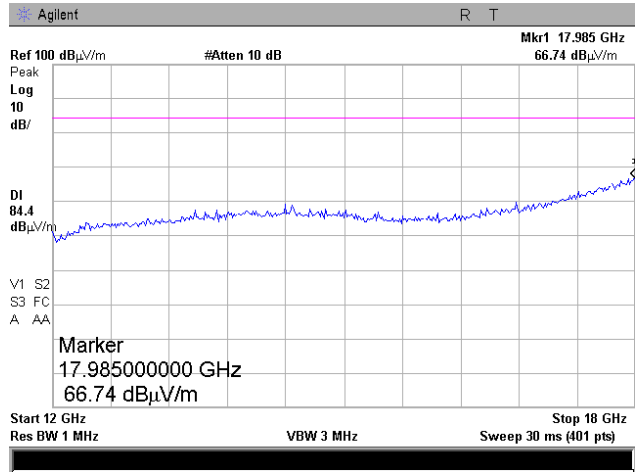
Plot 7.7.17 Radiated emission measurements in 12000 – 18000 MHz range

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



Plot 7.7.18 Radiated emission measurements in 12000 – 18000 MHz range

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

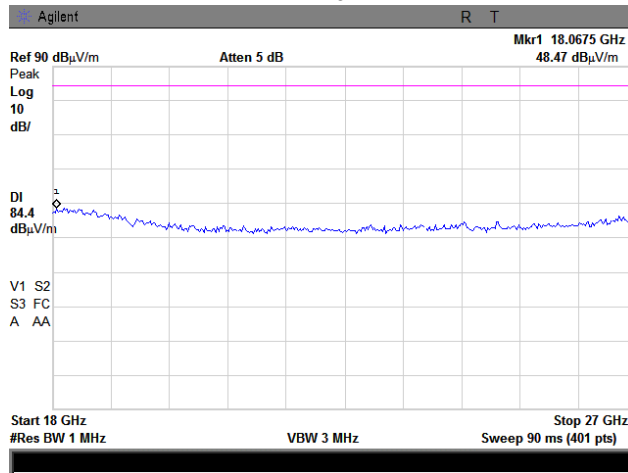




Test specification: Section 27.53(l)(2), Radiated spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 2/19/2007			
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

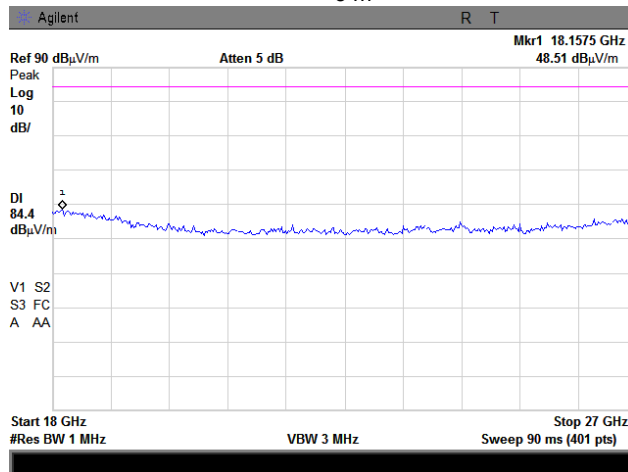
Plot 7.7.19 Radiated emission measurements in 18.0 – 27.0 GHz range

TEST SITE: OATS
 CARRIER FREQUENCY: Low
 ANTENNA POLARIZATION: Vertical and Horizontal
 TEST DISTANCE: 3 m



Plot 7.7.20 Radiated emission measurements in 18.0 – 27.0 GHz range

TEST SITE: OATS
 CARRIER FREQUENCY: Mid
 ANTENNA POLARIZATION: Vertical and Horizontal
 TEST DISTANCE: 3 m



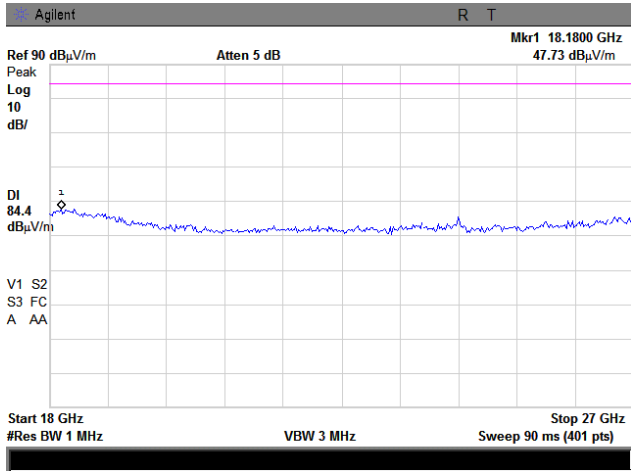


HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Radiated spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 2/19/2007			
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.7.21 Radiated emission measurements in 18.0 – 27.0 GHz range

TEST SITE: OATS
 CARRIER FREQUENCY: High
 ANTENNA POLARIZATION: Vertical and Horizontal
 TEST DISTANCE: 3 m



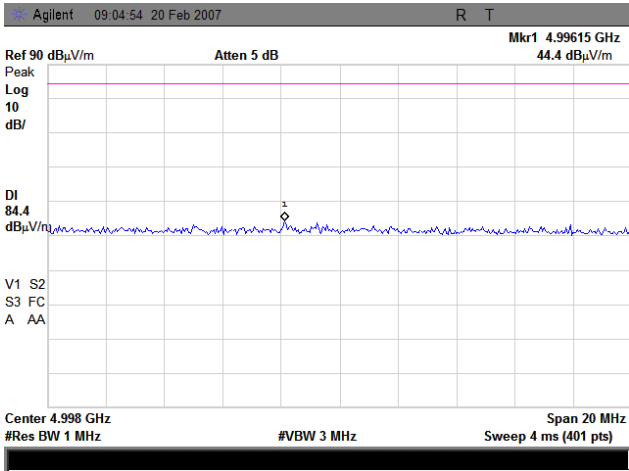


HERMON LABORATORIES

Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

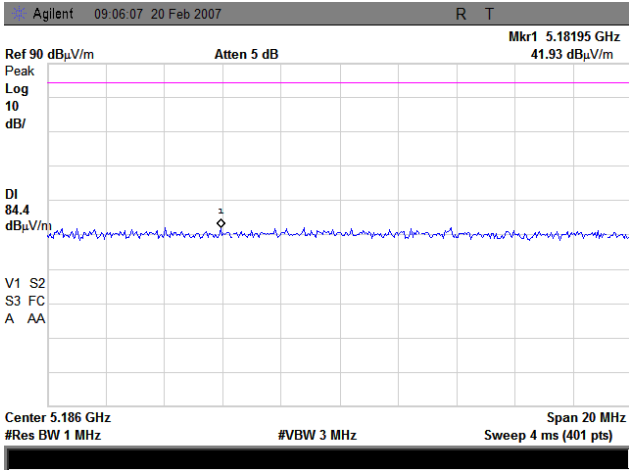
Plot 7.7.22 Radiated emission measurements at the 2nd harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: Low
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m



Plot 7.7.23 Radiated emission measurements at the 2nd harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: Mid
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m



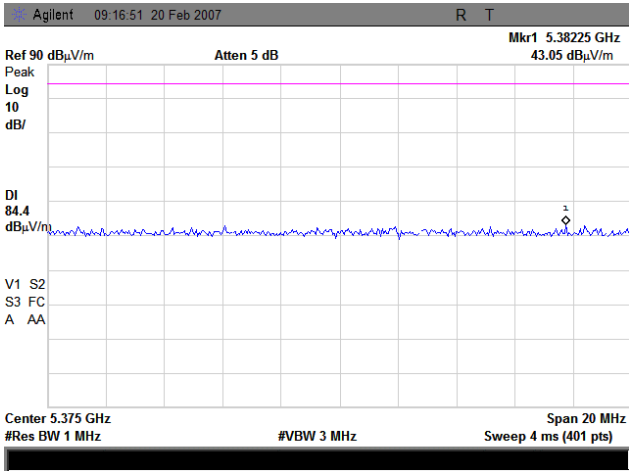


HERMON LABORATORIES

Test specification: Section 27.53(l)(2), Radiated spurious emissions			
Test procedure: Section 27.53(l)(2)			
Test mode: Compliance	Verdict: PASS		
Date: 2/19/2007			
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

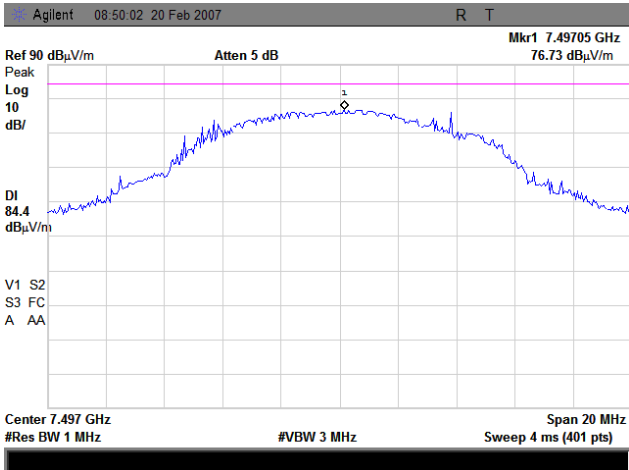
Plot 7.7.24 Radiated emission measurements at the 2nd harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: High
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m



Plot 7.7.25 Radiated emission measurements at the 3rd harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: Low
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m

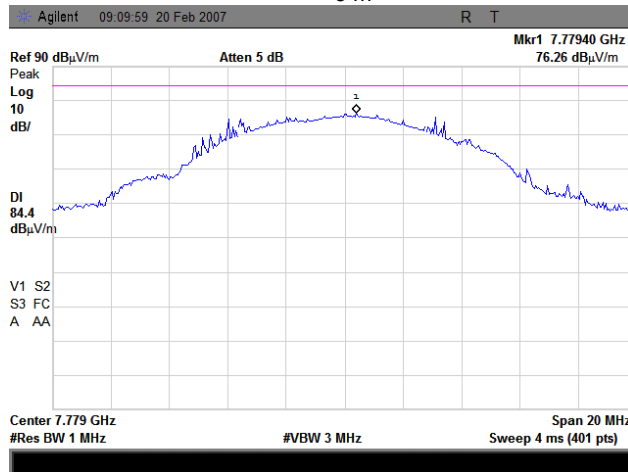




Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

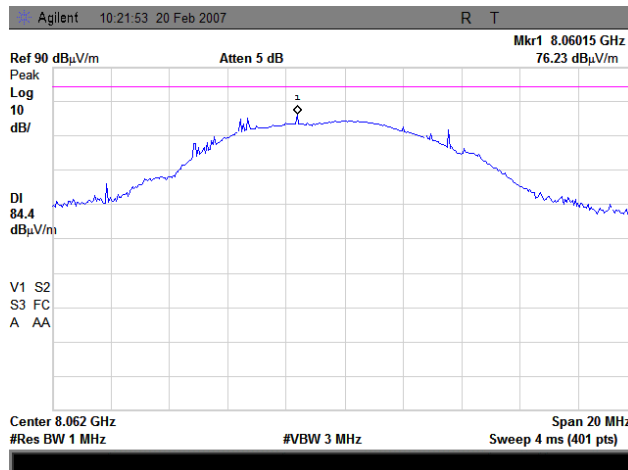
Plot 7.7.26 Radiated emission measurements at the 3rd harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: Mid
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m



Plot 7.7.27 Radiated emission measurements at the 3rd harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: High
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m

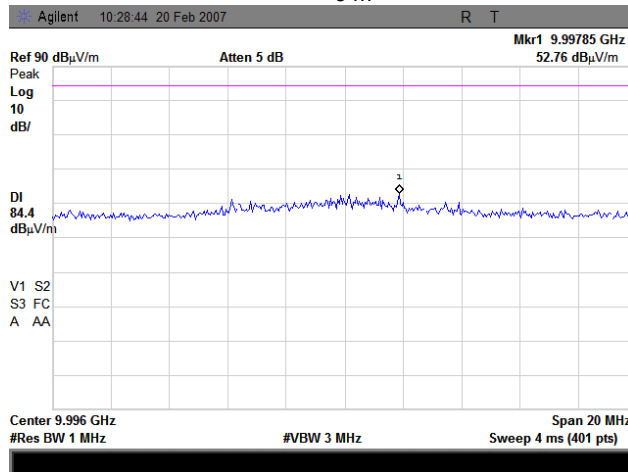




Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

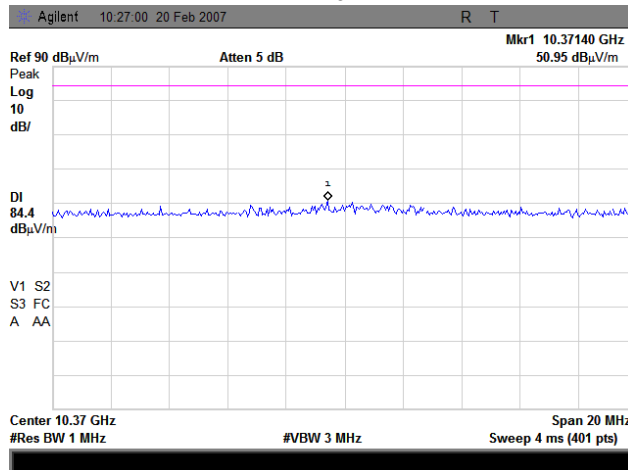
Plot 7.7.28 Radiated emission measurements at the 4th harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: Low
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m



Plot 7.7.29 Radiated emission measurements at the 4th harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: Mid
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m



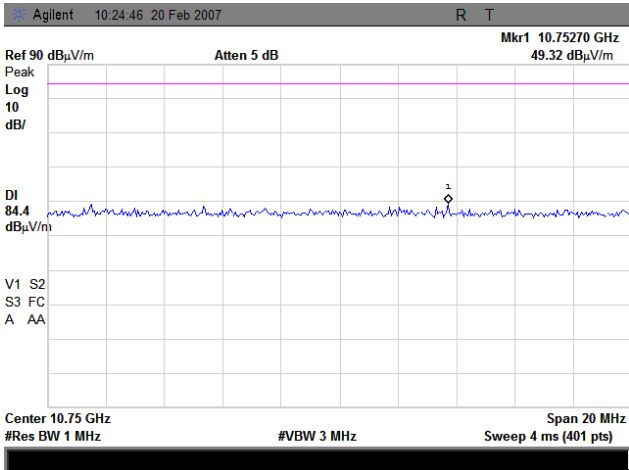


HERMON LABORATORIES

Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

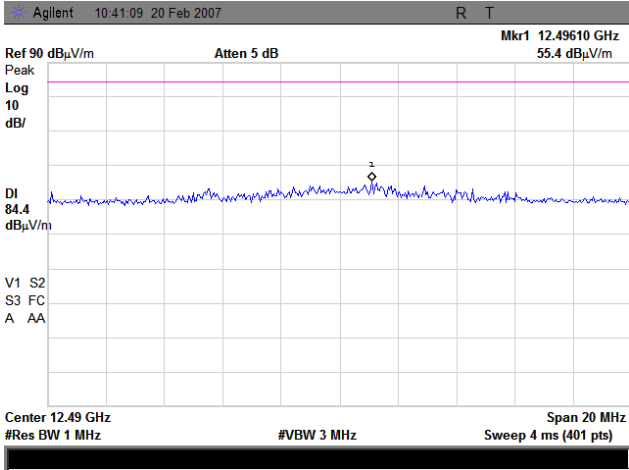
Plot 7.7.30 Radiated emission measurements at the 4th harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: High
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m



Plot 7.7.31 Radiated emission measurements at the 5th harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: Low
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m



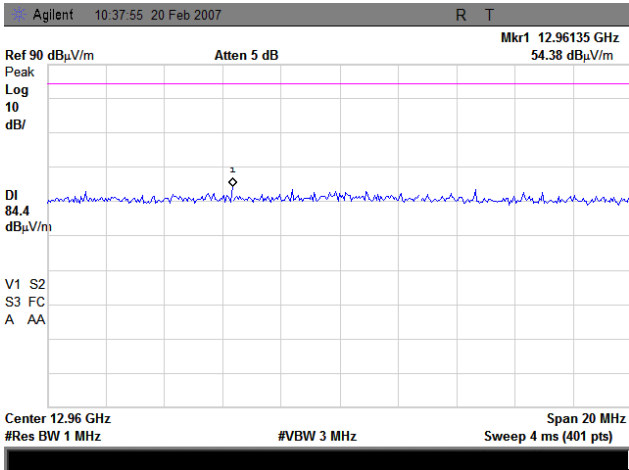


HERMON LABORATORIES

Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date:	2/19/2007		
Temperature: 20°C	Air Pressure: 1012 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

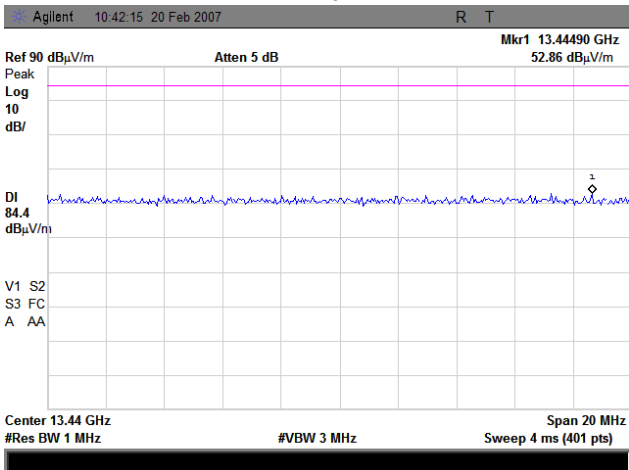
Plot 7.7.32 Radiated emission measurements at the 5th harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: Mid
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m



Plot 7.7.33 Radiated emission measurements at the 5th harmonic

TEST SITE: OATS
 CARRIER FREQUENCY: High
 ANTENNA POLARIZATION: Vertical and horizontal
 TEST DISTANCE: 3 m





HERMON LABORATORIES

Test specification:	Section .27.54, Frequency stability test		
Test procedure:	Section 2.1055		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2006 4:38:11 PM		
Temperature: 26 °C	Air Pressure: 1010 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

7.8 Frequency stability test

7.8.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.8.1.

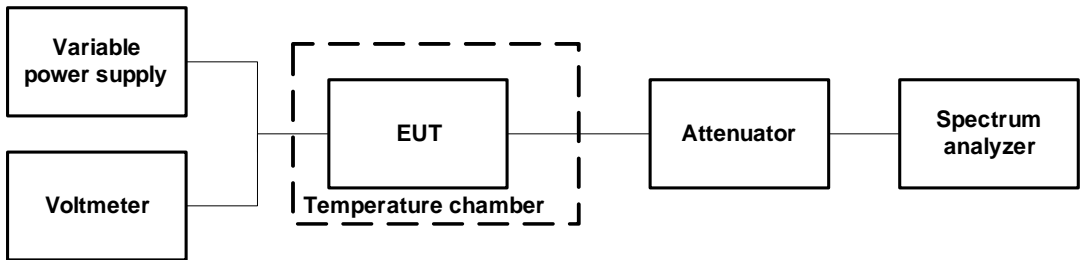
Table 7.8.1 Frequency stability limits

Assigned frequency, MHz	Frequency stability limits
2496 – 2690	The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

7.8.2 Test procedure

- 7.8.2.1 The EUT was set up as shown in Figure 7.8.1, energized and its proper operation was checked.
- 7.8.2.2 The EUT power was turned off. Temperature within test chamber was set to +30°C and a period of time sufficient to stabilize all of the oscillator circuit components was allowed.
- 7.8.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.
- 7.8.2.4 The above procedure was repeated at 0°C and at the lowest test temperature.
- 7.8.2.5 The EUT was powered on and carrier frequency was measured at start up moment and at the end of stabilization period at the rest of test temperatures and voltages. The EUT was powered off.
- 7.8.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 7.8.2.

Figure 7.8.1 Frequency stability test setup





HERMON LABORATORIES

Test specification: Section .27.54, Frequency stability test	
Test procedure: Section 2.1055	
Test mode: Compliance	Verdict: PASS
Date & Time: 7/5/2006 4:38:11 PM	
Temperature: 26 °C	Air Pressure: 1010 hPa
Remarks:	

Table 7.8.2 Frequency stability test results

OPERATING FREQUENCY: 2496 – 2690 MHz
 NOMINAL POWER VOLTAGE: 120 VAC
 TEMPERATURE STABILIZATION PERIOD: 20 min
 POWER DURING TEMPERATURE TRANSITION: Off
 SPECTRUM ANALYZER MODE: Counter
 RESOLUTION BANDWIDTH: 300 Hz
 VIDEO BANDWIDTH: 300 Hz

T, °C	Voltage V	Frequency, MHz							Max frequency drift, H	
		Start up	1 st min	2 nd min	3 rd min	4 th min	5 th min	10 th min	Positive	Negative
Low carrier frequency										
-30	nominal	2498.999140	2498.999142	2498.999151	2498.999136	2498.999127	2498.999095	2498.999096	0	-8767
-20	nominal	2498.996917	NA	NA	NA	NA	NA	2498.996710	0	-11153
-10	nominal	2498.999164	NA	NA	NA	NA	NA	2498.998981	0	-8881
0	nominal	2498.996315	2498.996306	2498.996297	2498.996288	2498.996282	2498.996276	2498.996261	0	-11602
10	nominal	2498.996232	NA	NA	NA	NA	NA	2498.996224	0	-11639
20	15%	2499.003618	NA	NA	NA	NA	NA	2499.003907	0	-4244
20	nominal	2499.007785	NA	NA	NA	NA	NA	2499.007863	0	-78
20	-15%	2499.003322	NA	NA	NA	NA	NA	2499.003603	0	-4541
30	nominal	2498.999677	2498.999514	2498.999455	2498.999384	2498.999326	2498.999274	2498.998120	0	-9742
40	nominal	2499.003884	NA	NA	NA	NA	NA	2499.003787	0	-4075
50	nominal	2499.003197	NA	NA	NA	NA	NA	2499.003444	0	-4666
Mid carrier frequency										
-30	nominal	2592.988260	2592.988196	2592.988149	2592.988135	2592.988126	2592.988080	2592.987822	0	-14428
-20	nominal	2592.993599	NA	NA	NA	NA	NA	2592.993397	0	-8853
-10	nominal	2592.996011	NA	NA	NA	NA	NA	2592.995870	0	-6380
0	nominal	2592.996263	2592.996263	2592.996269	2592.996239	2592.996204	2592.996192	2592.996162	0	-6088
10	nominal	2592.996098	NA	NA	NA	NA	NA	2592.996112	0	-6152
20	15%	2593.000717	NA	NA	NA	NA	NA	2593.001247	0	-1533
20	nominal	2593.001750	NA	NA	NA	NA	NA	2593.002250	0	-500
20	-15%	2593.000093	NA	NA	NA	NA	NA	2593.000388	0	-2157
30	nominal	2593.001983	2593.002023	2593.002030	2593.002042	2593.002044	2593.002049	2593.002050	0	-267
40	nominal	2593.004158	NA	NA	NA	NA	NA	2593.004063	1908	0
50	nominal	2593.011206	NA	NA	NA	NA	NA	2593.011760	9510	0
High carrier frequency										
-30	nominal	2687.239009	2687.238783	2687.238570	2687.238570	2687.238059	2687.237931	2687.237812	0	-12063
-20	nominal	2687.243348	NA	NA	NA	NA	NA	2687.243390	0	-6527
-10	nominal	2687.248911	NA	NA	NA	NA	NA	2687.248851	0	-1024
0	nominal	2687.249078	2687.249076	2687.249085	2687.249090	2687.249094	2687.248900	2687.249110	0	-975
10	nominal	2687.245799	NA	NA	NA	NA	NA	2687.245791	0	-4084
20	15%	2687.251276	NA	NA	NA	NA	NA	2687.251627	1752	0
20	nominal	2687.249125	NA	NA	NA	NA	NA	2687.249875	0	-750
20	-15%	2687.249875	NA	NA	NA	NA	NA	2687.250062	187	0
30	nominal	2687.251981	2687.252001	2687.252004	2687.252003	2687.252000	2687.252001	2687.251996	2129	0
40	nominal	2687.259772	NA	NA	NA	NA	NA	2687.254558	9897	0
50	nominal	2687.262358	NA	NA	NA	NA	NA	2687.262593	12718	0



HERMON LABORATORIES

Test specification: Section .27.54, Frequency stability test	
Test procedure: Section 2.1055	
Test mode: Compliance	Verdict: PASS
Date & Time: 7/5/2006 4:38:11 PM	
Temperature: 26 °C	Air Pressure: 1010 hPa
Remarks:	

Table 7.8.3 Transmission occupied bandwidth with frequency drift test results

Lower measured band edge, MHz*	Upper measured band edge, MHz*	Lower calculated** band edge, MHz	Upper calculated** band edge, MHz	Lower specified band edge, MHz	Upper specified band edge, MHz	Lower Margin***, MHz	Upper Margin***, MHz	Verdict
Single channel								
1.5 Mbps data rate								
2496.6932	2501.5069	2496.6816	2501.5069	2496.00	2502.00	-0.6816	0.4931	Pass
2590.6632	2595.4619	2590.6488	2595.4714	2590.00	2596.00	-0.6488	0.5286	Pass
2684.9082	2689.6069	2684.8961	2689.6196	2684.50	2690.00	-0.3961	0.3804	Pass
13.5 Mbps data rate								
2496.4381	2501.5069	2496.4265	2501.5069	2496.00	2502.00	-0.4265	0.4931	Pass
2590.3481	2595.4619	2590.3337	2595.4714	2590.00	2596.00	-0.3337	0.5286	Pass
2684.7707	2689.6069	2684.7586	2689.6196	2684.50	2690.00	-0.2586	0.3804	Pass
Single channel								
1.5 Mbps data rate								
2502.3407	2507.2019	2502.3291	2507.2019	2502.00	2507.50	-0.3407	0.2981	Pass
13.5 Mbps data rate								
2502.1781	2507.2019	2502.1665	2507.2019	2502.00	2507.50	-0.1781	0.2981	Pass
Dual channel								
3 Mbps data rate								
2503.101	2511.8780	2503.0894	2511.8780	2502.00	2513.00	-1.0894	1.1220	Pass
2585.621	2594.3480	2585.6066	2594.3575	2584.00	2596.00	-1.6066	1.6425	Pass
2680.101	2688.8680	2680.0889	2688.8807	2679.00	2690.00	-1.0889	1.1193	Pass
27 Mbps data rate								
2503.121	2511.8580	2503.1094	2511.8580	2502.00	2513.00	-1.1094	1.1420	Pass
2585.631	2594.3680	2585.6166	2594.3775	2584.00	2596.00	-1.6166	1.6225	Pass
2680.131	2688.8680	2680.1189	2688.8807	2679.00	2690.00	-1.1189	1.1193	Pass
Quad channel								
6 Mbps data rate								
2503.166	2522.5580	2503.1544	2522.5580	2502.00	2524.00	-1.1660	1.4420	Pass
2579.866	2599.7080	2579.8516	2599.7175	2578.00	2602.00	-1.8660	2.2825	Pass
2668.941	2688.3960	2668.9289	2688.4087	2668.00	2690.00	-0.9410	1.5913	Pass
54 Mbps data rate								
2503.166	2522.8210	2503.1544	2522.8210	2502.00	2524.00	-1.1660	1.1790	Pass
2579.941	2600.0590	2579.9266	2600.0685	2578.00	2602.00	-1.9410	1.9315	Pass
2669.029	2688.7710	2669.0169	2688.7837	2668.00	2690.00	-1.0290	1.2163	Pass

* - measured under normal test conditions
 ** - Measured band edge with proper drift addition
 *** - Margin = Calculated band edge – specified band edge

Reference numbers of test equipment used

HL 0493	HL 2909						
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Full description is given in Appendix A.



HERMON LABORATORIES

8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	28-Jun-06	28-Jun-07
0465	Anechoic Chamber 9(L) x 6.5(W) x 5.5(H) m	HL	AC - 1	023	23-Aug-05	23-Aug-08
0493	Oven temperature, -45°C ÷ +125°C	Thermotron	S-1.2 Mini-Max	4016	09-Feb-07	09-Feb-08
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard	8546A	3617A 00319, 3448A002 53	26-Sep-06	26-Sep-07
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m	HL	GORE-3	176	02-Dec-06	02-Dec-07
0592	Position Controller	HL	L2- SR3000 (HL CRL- 3)	100	18-May-06	18-May-07
0593	Antenna Mast, 1-4 m Pneumatic	Madgesh	AM-F1	101	02-Feb-07	02-Feb-08
0594	Turn Table FOR ANECHOIC CHAMBER flush mount d=1.2 m Pneumatic	HL	TT- WDC1	102	26-Jan-07	26-Jan-08
0604	Antenna BiconiLog Log-Periodic/T Bow- TIE 26 - 2000 MHz	EMCO	3141	9611-1011	10-Jan-07	10-Jan-08
1947	Cable 18 GHz, 6.5 m, blue	Rhophase Microwave Ltd	NPS- 1803A- 6500-NPS	T4974	10-Feb-07	10-Feb-08
2009	Cable RF, 8 m	Alpha Wire	RG-214	C-56	02-Dec-06	02-Dec-07
2259	Amplifier Low Noise 2-20 GHz	Sophia Wireless	LNA0220- C	0223	05-Nov-06	05-Nov-07
2399	Cable 40 GHz, 1.5 m, blue	Rhophase Microwave Ltd.	KPS- 1503A- 1500-KPS	X2945	6-Apr-06	6-Apr-07
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	03-Mar-07	03-Mar-08
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	11-Jun-06	11-Jun-07
2867	Cable, 18 GHz, 0.9 m, SMA - SMA	Gore	Right Angle	91P72076	16-Febr-07	16-Febr-08
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	10-Apr-06	10-Apr-07
2976	Fieldmeter with EF2 isotropic probe (100kHz-2.5GHz) & electric field probe (0.1V/m-200 V/m),supplied in a carrying case	CHAUVIN ARNOUX	C.A 43	2976	6-Sept-06	6-Sept-07



9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted carrier power at RF antenna connector	Below 12.4 GHz: ± 1.7 dB 12.4 GHz to 40 GHz: ± 2.3 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Occupied bandwidth	± 8.0 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Radiated emissions at 3 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.



HERMON LABORATORIES

10 APPENDIX C Test facility description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility. Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47) and by Industry Canada for electromagnetic emissions (file numbers IC 2186-1 for OATS and IC 2186-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01).

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11 APPENDIX D Specification references

47CFR part 27: 2006	Miscellaneous wireless communications services
47CFR part 1: 2006	Practice and procedure
47CFR part 2: 2006	Frequency allocations and radio treaty matters; general rules and regulations
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI/TIA/EIA-603-A:2001	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards



HERMON LABORATORIES

12 APPENDIX E Abbreviations and acronyms

A	ampere
AC	alternating current
AM	amplitude modulation
AVRG	average (detector)
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μ V)	decibel referred to one microvolt
dB(μ V/m)	decibel referred to one microvolt per meter
dB(μ A)	decibel referred to one microampere
DC	direct current
DTS	digital transmission system
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
k	kilo
kHz	kilohertz
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μ s	microsecond
NA	not applicable
NT	not tested
OATS	open area test site
Ω	Ohm
PM	pulse modulation
PS	power supply
ppm	part per million (10^{-6})
QP	quasi-peak
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt



HERMON LABORATORIES

13 APPENDIX F Test equipment correction factors

**Antenna Factor
 Active Loop Antenna
 EMC Test Systems, model 6502, S/N 2857, HL 0446**

Frequency, MHz	Magnetic Antenna Factor, dB(S/m)	Electric Antenna Factor, dB(1/m)
0.009	-32.8	18.7
0.010	-33.8	17.7
0.020	-38.3	13.2
0.050	-41.1	10.4
0.075	-41.3	10.2
0.100	-41.6	9.9
0.150	-41.7	9.8
0.250	-41.6	9.9
0.500	-41.8	9.7
0.750	-41.9	9.6
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.1
4.000	-41.4	10.1
5.000	-41.5	10.0
10.000	-41.9	9.6
15.000	-41.9	9.6
20.000	-42.2	9.3
25.000	-42.8	8.7
30.000	-44.0	7.5

Antenna factor in dB(S/m) is to be added to receiver meter reading in dB(μ V) to convert it into field intensity in dB(μ A/m).
 Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field intensity in dB(μ V/m).



Antenna factor
Biconilog antenna EMCO Model 3141
Ser.No.1011, HL 0604

Frequency, MHz	Antenna Factor, dB(1/m)	Frequency, MHz	Antenna Factor, dB(1/m)
26	7.8	940	24.0
28	7.8	960	24.1
30	7.8	980	24.5
40	7.2	1000	24.9
60	7.1	1020	25.0
70	8.5	1040	25.2
80	9.4	1060	25.4
90	9.8	1080	25.6
100	9.7	1100	25.7
110	9.3	1120	26.0
120	8.8	1140	26.4
130	8.7	1160	27.0
140	9.2	1180	27.0
150	9.8	1200	26.7
160	10.2	1220	26.5
170	10.4	1240	26.5
180	10.4	1260	26.5
190	10.3	1280	26.6
200	10.6	1300	27.0
220	11.6	1320	27.8
240	12.4	1340	28.3
260	12.8	1360	28.2
280	13.7	1380	27.9
300	14.7	1400	27.9
320	15.2	1420	27.9
340	15.4	1440	27.8
360	16.1	1460	27.8
380	16.4	1480	28.0
400	16.6	1500	28.5
420	16.7	1520	28.9
440	17.0	1540	29.6
460	17.7	1560	29.8
480	18.1	1580	29.6
500	18.5	1600	29.5
520	19.1	1620	29.3
540	19.5	1640	29.2
560	19.8	1660	29.4
580	20.6	1680	29.6
600	21.3	1700	29.8
620	21.5	1720	30.3
640	21.2	1740	30.8
660	21.4	1760	31.1
680	21.9	1780	31.0
700	22.2	1800	30.9
720	22.2	1820	30.7
740	22.1	1840	30.6
760	22.3	1860	30.6
780	22.6	1880	30.6
800	22.7	1900	30.6
820	22.9	1920	30.7
840	23.1	1940	30.9
860	23.4	1960	31.2
880	23.8	1980	31.6
900	24.1	2000	32.0
920	24.1		

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).



Antenna factor
Double-ridged wave guide horn antenna
EMC Test Systems, model 3115, serial no: 00027177, HL2432

Frequency, MHz	Antenna gain, dBi	Antenna factor. dB(1/m)
1000.0	5.5	24.7
1500.0	8.0	25.7
2000.0	8.4	27.8
2500.0	9.3	28.9
3000.0	9.0	30.7
3500.0	9.3	31.8
4000.0	9.3	33.0
4500.0	10.4	32.8
5000.0	10.0	34.2
5500.0	10.1	34.9
6000.0	10.6	35.2
6500.0	11.0	35.4
7000.0	10.8	36.3
7500.0	10.4	37.3
8000.0	10.8	37.5
8500.0	10.8	38.0
9000.0	11.0	38.3
9500.0	11.5	38.3
10000.0	11.5	38.7
10500.0	11.9	38.7
11000.0	12.2	38.9
11500.0	11.9	39.5
12000.0	12.3	39.5
12500.0	12.7	39.4
13000.0	12.0	40.5
13500.0	12.0	40.8
14000.0	11.6	41.5
14500.0	12.2	41.3
15000.0	13.6	40.2
15500.0	15.3	38.7
16000.0	15.8	38.5
16500.0	14.8	39.8
17000.0	12.9	41.9
17500.0	9.2	45.8
18000.0	6.2	49.1

Antenna factor is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).



Cable loss
Cable Coaxial, GORE A2P01POL118, 2.3 m, model:GORE-3, HL 0589
+ Cable Coaxial, ANDREW PSWJ4, 6m, model: ANDREW-6, HL 1004

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	30	0.33	≤ 6.5	±0.12
2	50	0.40		
3	100	0.57		
4	300	0.97		
5	500	1.25		
6	800	1.59		
7	1000	1.81		
8	1200	1.97		
9	1400	2.15		
10	1600	2.28		
11	1800	2.43		
12	2000	2.61		
13	2200	2.75		
14	2400	2.89		
15	2600	2.97		
16	2800	3.21	≤ 6.5	±0.12
17	3000	3.32		
18	3300	3.47		
19	3600	3.62		
20	3900	3.84		
21	4200	3.92		
22	4500	4.07		±0.17
23	4800	4.36		
24	5100	4.62		
25	5400	4.78		
26	5700	5.16		
27	6000	5.67		
28	6500	5.99		



Cable loss
Cable 18 GHz, 6.5 m, blue, model: NPS-1803A-6500-NPS, S/N T4974, HL 1947

Frequency, GHz	Cable loss, dB
0.03	0.30
0.05	0.38
0.10	0.53
0.20	0.74
0.30	0.91
0.40	1.05
0.50	1.18
0.60	1.29
0.70	1.40
0.80	1.50
0.90	1.59
1.00	1.68
1.10	1.77
1.20	1.86
1.30	1.94
1.40	2.01
1.50	2.08
1.60	2.16
1.70	2.22
1.80	2.29
1.90	2.36
2.00	2.42
2.10	2.48
2.20	2.54
2.30	2.60
2.40	2.66
2.50	2.71
2.60	2.77
2.70	2.83
2.80	2.89
2.90	2.95
3.10	3.06
3.30	3.17
3.50	3.28
3.70	3.39
3.90	3.51
4.10	3.62
4.30	3.76
4.50	3.87
4.70	4.01
4.90	4.10
5.10	4.21
5.30	4.31
5.50	4.43
5.70	4.56
5.90	4.71

Frequency, GHz	Cable loss, dB
6.10	4.87
6.30	4.95
6.50	4.94
6.70	4.88
6.90	4.87
7.10	4.83
7.30	4.85
7.50	4.86
7.70	4.91
7.90	4.96
8.10	5.03
8.30	5.08
8.50	5.13
8.70	5.21
8.90	5.22
9.10	5.34
9.30	5.35
9.50	5.52
9.70	5.51
9.90	5.66
10.10	5.70
10.30	5.78
10.50	5.79
10.70	5.82
10.90	5.86
11.10	5.94
11.30	6.06
11.50	6.21
11.70	6.44
11.90	6.61
12.10	6.76
12.40	6.68
13.00	6.66
13.50	6.81
14.00	6.90
14.50	6.90
15.00	6.97
15.50	7.17
16.00	7.28
16.50	7.27
17.00	7.38
17.50	7.68
18.00	7.92



HERMON LABORATORIES

Cable loss
RF cable 8 m, model RG-214, HL 2009

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	1	0.10	NA	±0.12
2	10	0.14		
3	30	0.25		
4	50	0.34		
5	100	0.53		
6	300	0.99		
7	500	1.31		
8	800	1.73		
9	1000	1.98		
10	1100	2.11		
11	1200	2.21		
12	1300	2.35		
13	1400	2.46		
14	1500	2.55		
15	1600	2.68		
16	1700	2.78		
17	1800	2.88		
18	1900	2.98		
19	2000	3.09		



HERMON LABORATORIES

Cable loss

Cable coaxial, 40GHz, 1.5 m, Blue, Rhophase Microwave Limited, model: KPS-1503A-1500-KPS, HL 2399

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.07	6.5	1.57	15.50	2.50
0.05	0.10	6.7	1.60	16.00	2.51
0.1	0.16	6.9	1.55	16.50	2.58
0.2	0.26	7.1	1.65	17.00	2.65
0.3	0.33	7.3	1.65	17.50	2.73
0.5	0.38	7.5	1.70	18.00	2.74
0.7	0.41	7.7	1.71	18.50	2.67
0.9	0.58	7.9	1.73	19.00	2.67
1.1	0.64	8.1	1.79	19.50	2.74
1.3	0.70	8.3	1.81	20.00	2.69
1.5	0.75	8.5	1.84	20.50	2.80
1.7	0.79	8.7	1.85	21.00	2.82
1.9	0.83	8.9	1.90	21.50	2.87
2.1	0.88	9.1	1.95	22.00	2.87
2.3	0.93	9.3	1.93	22.50	2.92
2.5	0.97	9.5	1.98	23.50	3.04
2.7	1.01	9.7	1.96	24.00	3.05
2.9	1.04	9.9	2.03	24.50	3.03
3.1	1.08	10.1	1.99	25.00	3.11
3.3	1.14	10.30	2.02	25.50	3.10
3.5	1.17	10.50	2.02	26.00	3.17
3.7	1.21	10.70	2.02	26.50	3.11
3.9	1.24	10.90	2.08	27.00	3.16
4.1	1.26	11.10	2.02	28.00	3.19
4.3	1.26	11.30	2.09	29.00	3.19
4.5	1.29	11.50	2.05	30.00	3.30
4.7	1.34	11.70	2.11	31.00	3.31
4.9	1.34	11.90	2.11	32.00	3.35
5.1	1.40	12.10	2.12	33.00	3.46
5.3	1.43	12.40	2.17	34.00	3.45
5.5	1.45	13.00	2.29	35.00	3.49
5.7	1.47	13.50	2.31	36.00	3.54
5.9	1.40	14.00	2.43	37.00	3.62
6.1	1.53	14.50	2.43	39.00	3.69
6.3	1.55	15.00	2.46	40.00	3.75



HERMON LABORATORIES

Cable loss
Cable coaxial, Gore, 18 GHz, 0.9 m, SMA - SMA, model Right Angle, S/N 91P72076
HL 2867

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
10	0.06	5750	0.68	12000	1.06
30	0.04	6000	0.69	12250	1.07
100	0.07	6250	0.70	12500	1.09
250	0.14	6500	0.73	12750	1.09
500	0.19	6750	0.74	13000	1.15
750	0.22	7000	0.78	13250	1.17
1000	0.26	7250	0.77	13500	1.16
1250	0.27	7500	0.79	13750	1.17
1500	0.31	7750	0.81	14000	1.14
1750	0.35	8000	0.86	14250	1.13
2000	0.38	8250	0.86	14500	1.06
2250	0.41	8500	0.87	14750	1.12
2500	0.43	8750	0.87	15000	1.16
2750	0.46	9000	0.88	15250	1.11
3000	0.48	9250	0.89	15500	1.06
3250	0.51	9500	0.90	15750	1.12
3500	0.53	9750	0.94	16000	1.20
3750	0.55	10000	1.00	16250	1.25
4000	0.56	10250	1.01	16500	1.24
4250	0.58	10500	1.02	16750	1.34
4500	0.60	10750	1.01	17000	1.35
4750	0.62	11000	1.01	17250	1.35
5000	0.64	11250	1.01	17500	1.36
5250	0.67	11500	1.01	17750	1.40
5500	0.68	11750	1.05	18000	1.51