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839.01
Electrical

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TEST REPORT

ACCORDING TO: FCC part 27, part 15 subpart B

FOR:

WiNetworks Ltd.

Base Station Transceiver - 2.5 GHz

WiN7025 (cBST)

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1 Applicant information

Client name:	WiNetworks Ltd.
Address:	32 Maskit Street, P.O.Box 12412, Herzeliya 46733, Israel
Telephone:	+972 9951 9556
Fax:	+972 9951 9557
E-mail:	shayc@winetworks.com
Contact name:	Mr. Shay Chaim

2 Equipment under test attributes

Product name:	Base Station operating in 2.5 GHz
Product type:	Transceiver
Model(s):	WiN7025 (cBST)
Serial number:	3108400022
Part number:	MD0C0088
Hardware version:	V0.3
Software release:	2.1.450.15
Receipt date	11/24/2008

3 Manufacturer information

Manufacturer name:	WiNetworks Ltd.
Address:	32 Maskit Street, P.O.Box 12412, Herzeliya 46733, Israel
Telephone:	+972 9951 9556
Fax:	+972 9951 9557
E-Mail:	shayc@winetworks.com
Contact name:	Mr. Shay Chaim

4 Test details

Project ID:	19244
Location:	Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started:	11/24/2008
Test completed:	12/22/2008
Test specification(s):	FCC part 27; part 15, subpart B

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5 Tests summary

Test	Status
Transmitter characteristics according to FCC part 27	
Section 27.50(h), Peak output power at RF antenna connector	Pass
Section 27.50(h)(4), Spectral power density	Pass
Section 27.52, RF safety	Pass, Ehxibit provided in Application for certification
Section 2.1049, Occupied bandwidth	Pass
Section 27.53(l)(4), Spurious emissions RF antenna connector	Pass
Section 27.53(l)(4), Radiated spurious emissions	Pass
Section 27.54, Frequency stability	Pass
Unintentional emissions	
Section 15.107, Conducted emission at AC power port	Pass
Section 15.109, Radiated emission	Pass

Testing was completed against all relevant requirements of the test standard. The results obtained indicate that the product under test complies in full with the requirements tested.
The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

This test report replaces the previously issued test report identified by Doc ID:WINRAD_FCC.19244.

	Name and Title	Date	Signature
Tested by:	Mr. L. Markel, test engineer	December 22, 2008	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	January 25, 2009	
Approved by:	Mr. M. Nikishin, EMC and Radio group manager	January 26, 2009	

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6 EUT description

6.1 General information

The WiNetworks WiN7025 is member of the Win-MAX E family, line of mobile WiMAX broadband wireless access systems based on the 802.16e mobile deployment and operation costs, for unmatched operator competitiveness and fast ROI.
The WiN7025 compact base station is an ideal, cost-effective solution for wireless access services designed for point-to-multipoint broadband wireless access applications in various conditions and locations.
The WiN7025 is one-sector base station which supports up to 800 subscriber units. By adding switch routing units, the system can be extended to as many sectors as required and can support additional subscribers and bandwidths.

6.2 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length
		From	To				
Signal	48 V DC& Ethernet	EUT	DC power supply	Custom	2	shielded	30 m
			Laptop				
RF	Antenna	EUT	50 Ohm termination	N-type	2	NA	NA

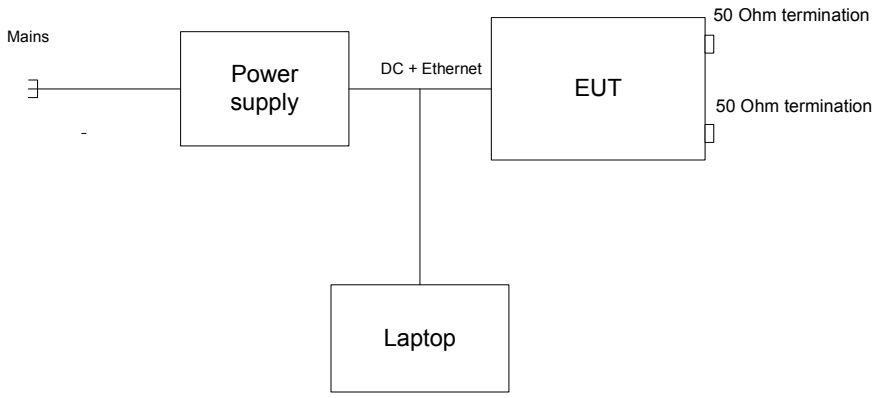
6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Laptop	Dell	PP22L	JX190A00
Adapter to laptop	Dell	0334B4848	0507049

6.4 Changes made in the EUT

No changes were implemented.

6.5 Test configuration



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6.6 Transmitter characteristics

Type of equipment								
V	Stand-alone (Equipment with or without its own control provisions)							
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)							
	Plug-in card (Equipment intended for a variety of host systems)							
Intended use		**Condition of use**						
V	fixed	Always at a distance more than 2 m from all people						
	mobile	Always at a distance more than 20 cm from all people						
	portable	May operate at a distance closer than 20 cm to human body						
Assigned frequency range		2496 – 2690 MHz						
Operating frequency range		2499 – 2687.5 MHz						
RF channel bandwidth		5 MHz, 7 MHz, 10 MHz						
Maximum rated output power		At transmitter 50 Ω RF output connector					21.5 dBm	
Is transmitter output power variable?			No					
		V	Yes		continuous variable			
				V	stepped variable with stepsize		0.5 dB	
				minimum RF power			10 dBm	
				maximum EIRP power			21.5 dBm	
Antenna connection								
unique coupling	standard connector	**V**	Integral	**V**	with temporary RF connector			
					without temporary RF connector			

Antenna/s technical characteristics

Type	Manufacturer	Model number	Gain
OMNI directional	MARS Antennas& RF Systems Ltd.	MA-WO25-9	9 dBi
Dual polarization broadband sector panel	Tongyu Communication Equipment Co., Ltd.	TDJ-232716D-90PT0	16 dBi

Transmitter 99% power bandwidth	5 MHz, 7 MHz, 10 MHz
Transmitter aggregate data rate/s	5 MHz BW: QPSK - 4.19 MBps, 16QAM – 12.565 MBps, 64QAM – 18.85 MBps 7 MHz BW: QPSK - 4.19 MBps, 16QAM – 12.565 MBps, 64QAM – 18.85 MBps 10 MHz BW: QPSK - 8.38 MBps, 16QAM – 25.13 MBps, 64QAM – 37.7 MBps
Type of modulation	QPSK, 16QAM, 64QAM
Type of multiplexing	OFDM
Modulating test signal (baseband)	PRBS
Maximum transmitter duty cycle in normal use	90%

Transmitter power source					
		Nominal rated voltage		Battery type	
V	DC	**Nominal rated voltage**	48 V (via DC power supply from the mains)		
	AC mains	**Nominal rated voltage**		Frequency	
Common power source for transmitter and receiver			**V** yes		no

Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	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

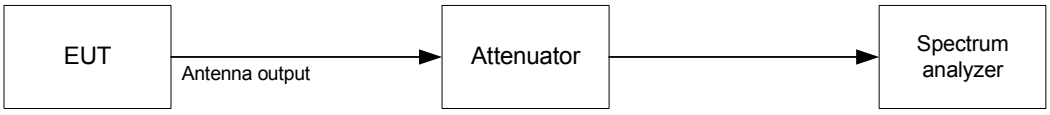
Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, kHz
2496.0 – 2690.0	26	NA

* - Modulation envelope reference points are provided in terms of attenuation below maximum measured carrier output 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 modulated carrier and the output power was measured.
7.1.2.3 The EUT was set to transmit the normally modulated carrier.
7.1.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.1.2, Table 7.1.3, Table 7.1.4 and the associated plots.

Figure 7.1.1 Occupied bandwidth test setup



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Table 7.1.2 Occupied bandwidth test results

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: QPSK
MODULATING SIGNAL: PRBS
RF CHANNEL BW: 5 MHz
BIT RATE: 4.19 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2499.00	5205.0	NA	NA	Pass
2504.75*	5205.0	NA	NA	Pass
2593.00	5280.0	NA	NA	Pass
2687.25	5280.0	NA	NA	Pass

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
RF CHANNEL BW: 5 MHz
BIT RATE: 12.565 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2499.00	5265.0	NA	NA	Pass
2504.75*	5190.0	NA	NA	Pass
2593.00	5265.0	NA	NA	Pass
2687.25	5220.0	NA	NA	Pass

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
RF CHANNEL BW: 5 MHz
BIT RATE: 18.85 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2498.75	5250.0	NA	NA	Pass
2504.75*	5280.0	NA	NA	Pass
2593.00	5220.0	NA	NA	Pass
2687.25	5235.0	NA	NA	Pass

*Alternate Channel at 2504.75 MHz center frequency was tested to show compliance with 5.5 MHz channel width.

Test specification:	**Section 2.1049, Occupied bandwidth**		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 40 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.1.3 Occupied bandwidth test results

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: QPSK
MODULATING SIGNAL: PRBS
RF CHANNEL BW: 7 MHz
BIT RATE: 4.19 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2500.0	7100.0	NA	NA	Pass
2596.0	7100.0	NA	NA	Pass
2686.0	7100.0	NA	NA	Pass

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
RF CHANNEL BW: 7 MHz
BIT RATE: 12.565 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2500.0	7140.0	NA	NA	Pass
2596.0	7100.0	NA	NA	Pass
2686.0	7120.0	NA	NA	Pass

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
RF CHANNEL BW: 7 MHz
BIT RATE: 18.85 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2500.0	7120.0	NA	NA	Pass
2596.0	7120.0	NA	NA	Pass
2686.0	7100.0	NA	NA	Pass

Test specification:	**Section 2.1049, Occupied bandwidth**		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 40 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.1.4 Occupied bandwidth test results

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: QPSK
MODULATING SIGNAL: PRBS
RF CHANNEL BW: 10 MHz
BIT RATE: 4.19 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2501.75	9900.0	NA	NA	Pass
2596.00	9872.5	NA	NA	Pass
2684.50	9872.5	NA	NA	Pass

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
RF CHANNEL BW: 10 MHz
BIT RATE: 12.565 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2501.75	9900.0	NA	NA	Pass
2596.00	9872.5	NA	NA	Pass
2684.50	9872.5	NA	NA	Pass

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
RF CHANNEL BW: 10 MHz
BIT RATE: 18.85 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2501.75	9900.0	NA	NA	Pass
2596.00	9900.0	NA	NA	Pass
2684.50	9872.5	NA	NA	Pass

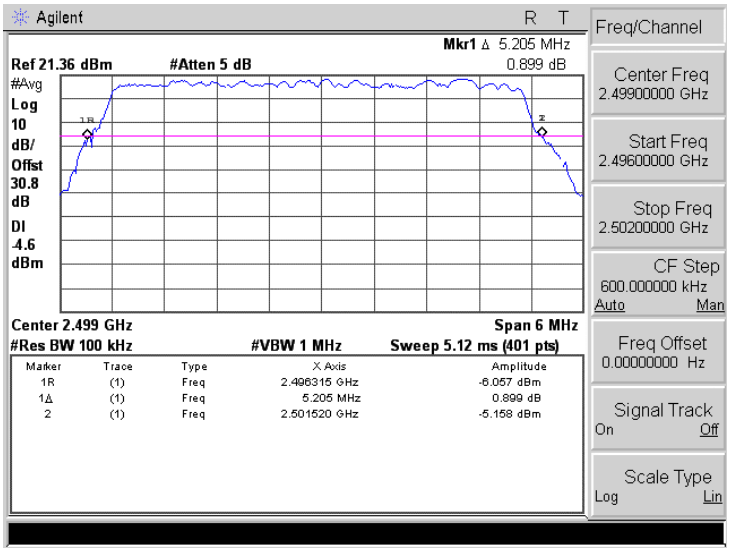
Reference numbers of test equipment used

HL 2909	HL 3951	HL 3321	HL 3386				

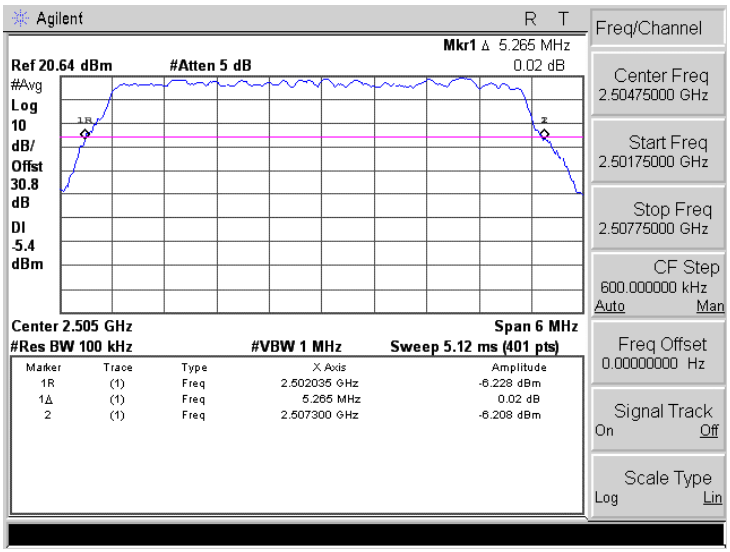
Full description is given in Appendix A.

Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.1 Occupied bandwidth test result at low frequency 5 MHz BW QPSK

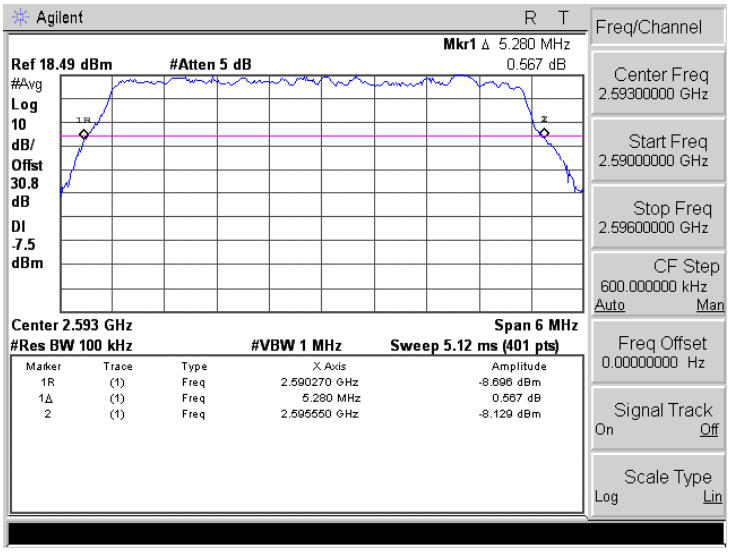


Plot 7.1.2 Occupied bandwidth test result at low frequency 5 MHz BW QPSK (2504.75 MHz)

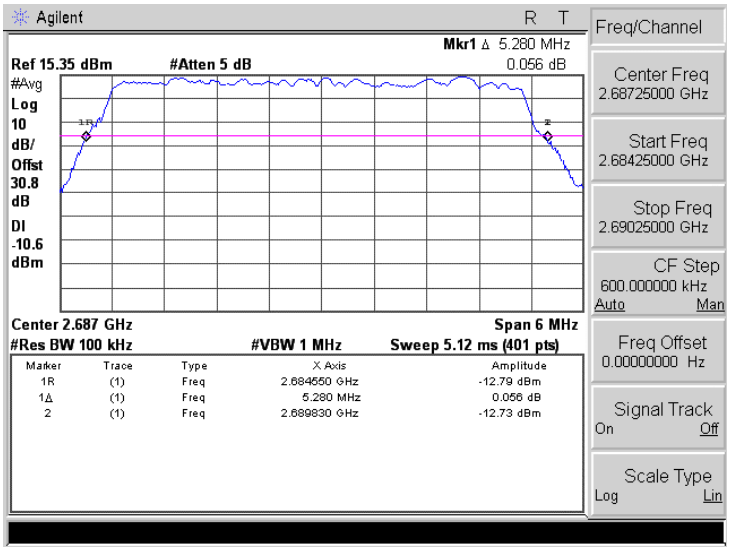


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.3 Occupied bandwidth test result at mid frequency 5 MHz BW QPSK

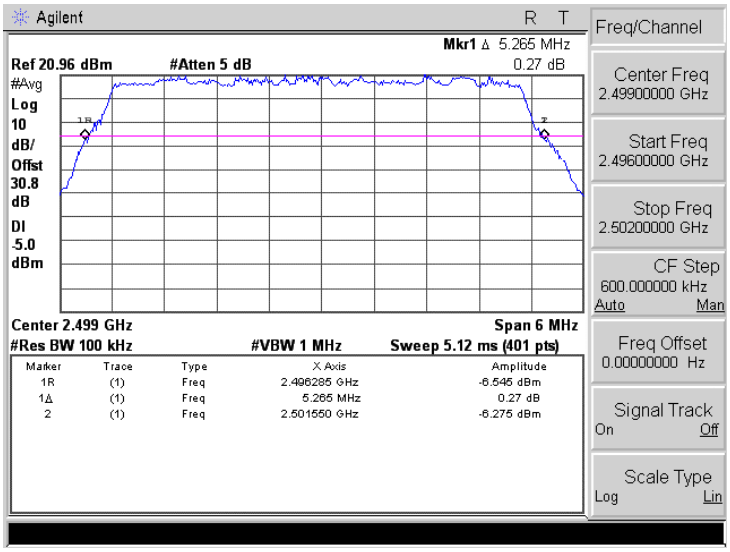


Plot 7.1.4 Occupied bandwidth test result at high frequency 5 MHz BW QPSK

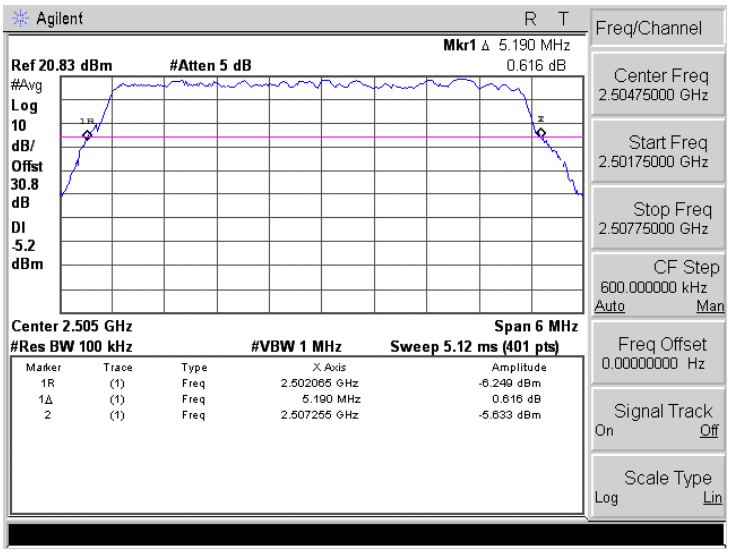


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.5 Occupied bandwidth test result at low frequency 5 MHz BW 16QAM

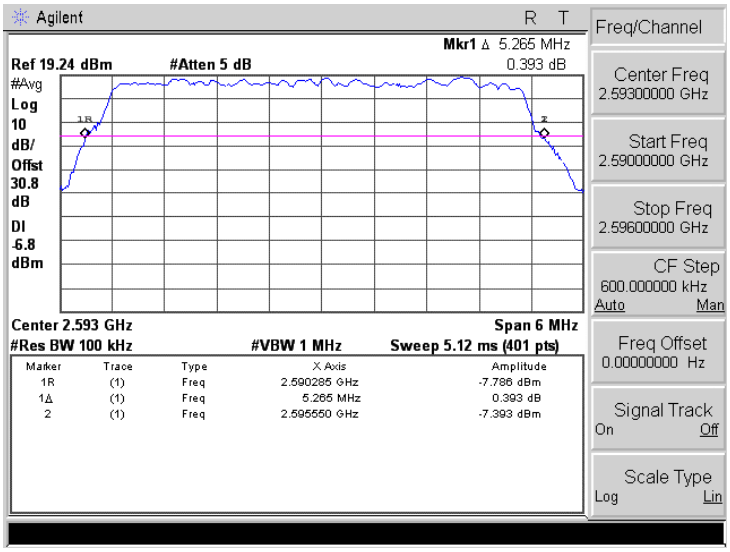


Plot 7.1.6 Occupied bandwidth test result at low frequency 5 MHz BW 16QAM (2504.75 MHz)

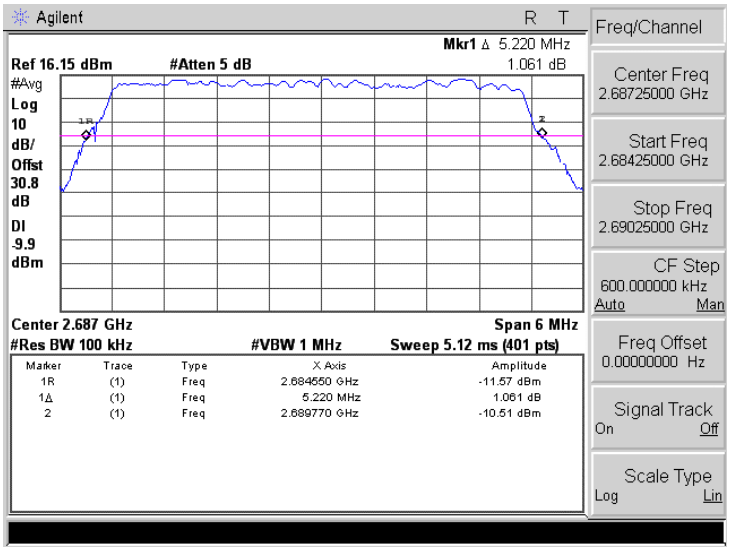


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.7 Occupied bandwidth test result at mid frequency 5 MHz BW 16QAM

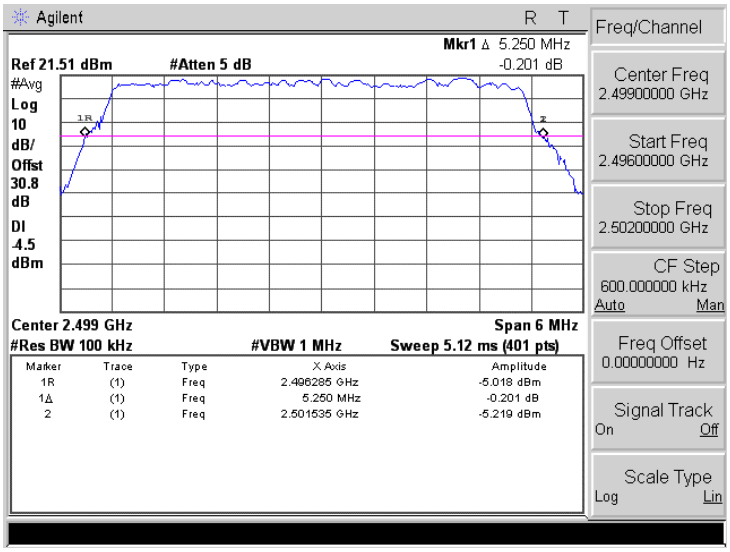


Plot 7.1.8 Occupied bandwidth test result at high frequency 5 MHz BW 16QAM

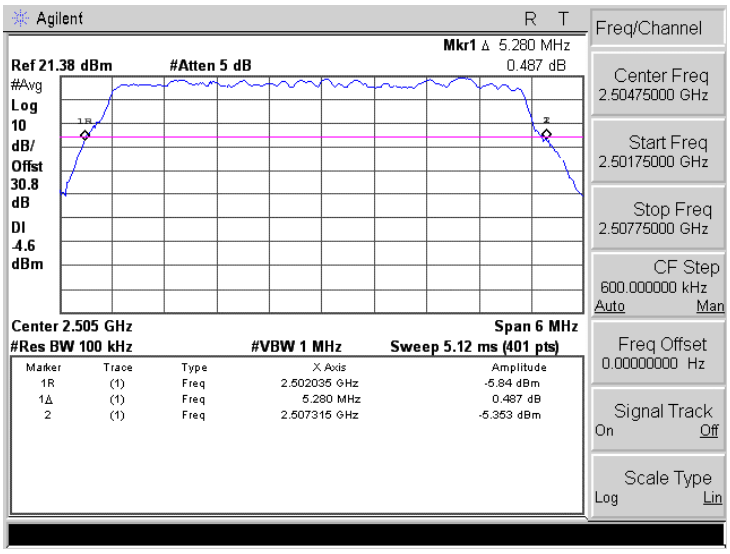


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.9 Occupied bandwidth test result at low frequency 5 MHz BW 64QAM

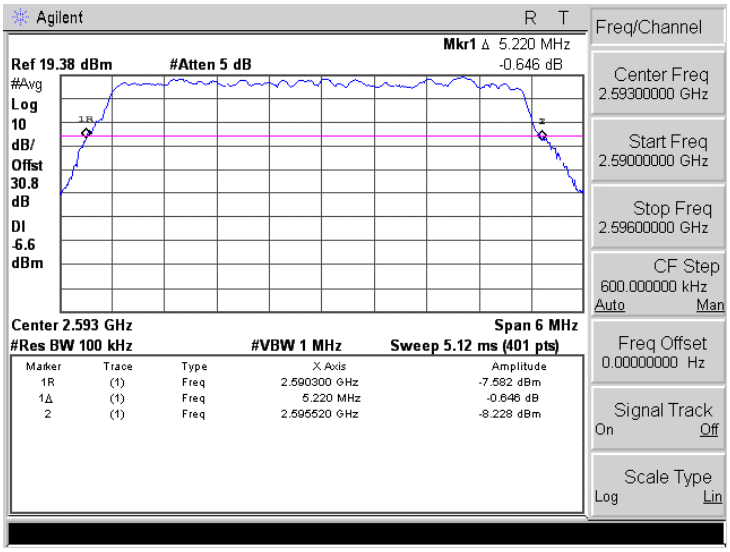


Plot 7.1.10 Occupied bandwidth test result at low frequency 5 MHz BW 64QAM (2504.75 MHz)

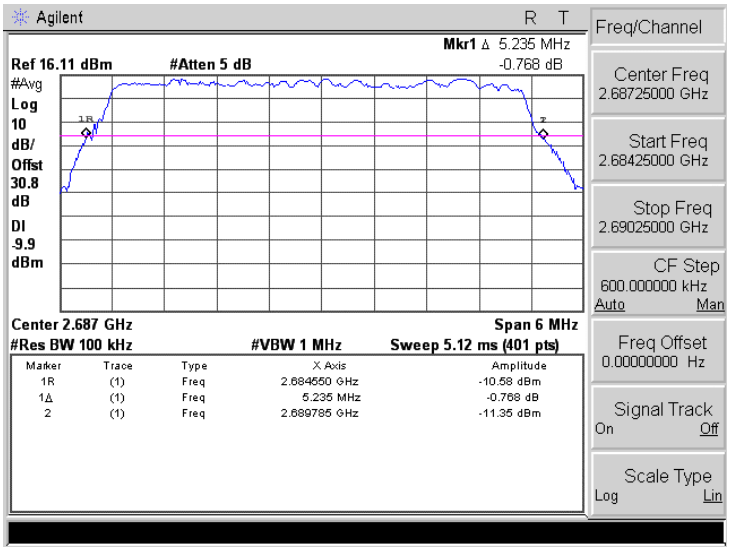


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.11 Occupied bandwidth test result at mid frequency 5 MHz BW 64QAM

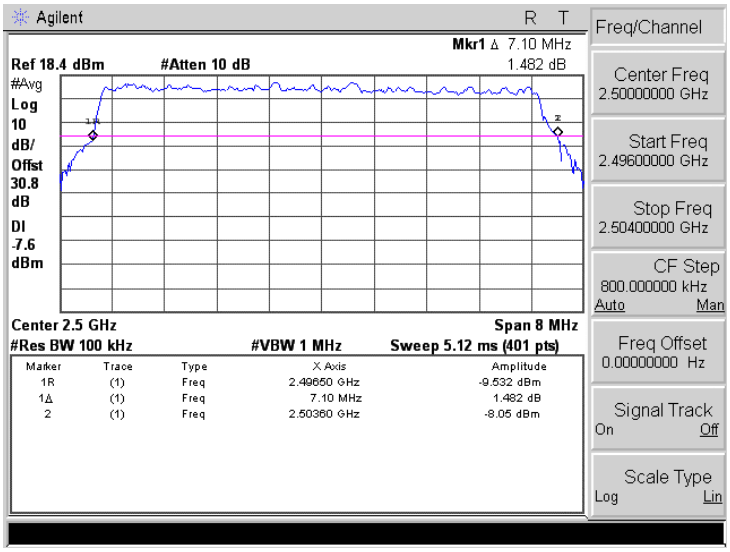


Plot 7.1.12 Occupied bandwidth test result at high frequency 5 MHz BW 64QAM

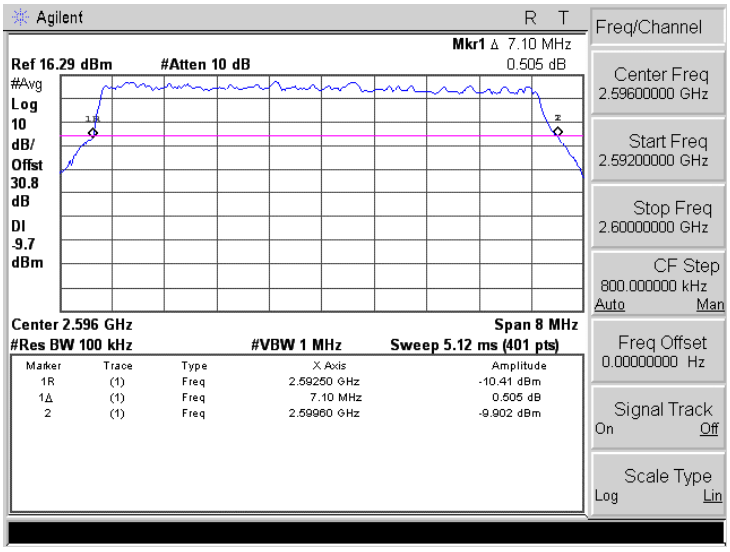


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.13 Occupied bandwidth test result at low frequency 7 MHz BW QPSK

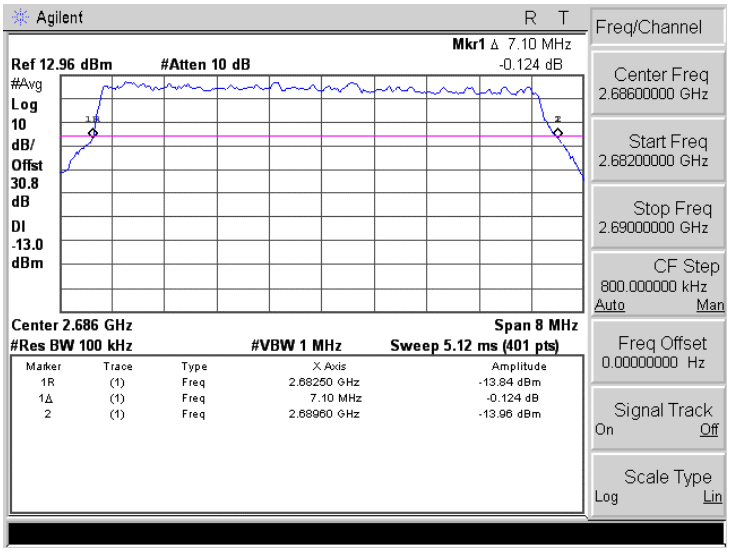


Plot 7.1.14 Occupied bandwidth test result at mid frequency 7 MHz BW QPSK



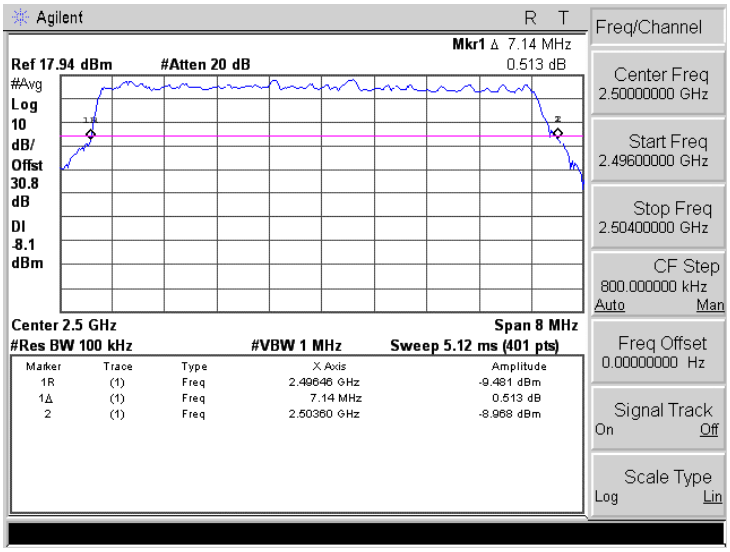
Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.15 Occupied bandwidth test result at high frequency 7 MHz BW QPSK

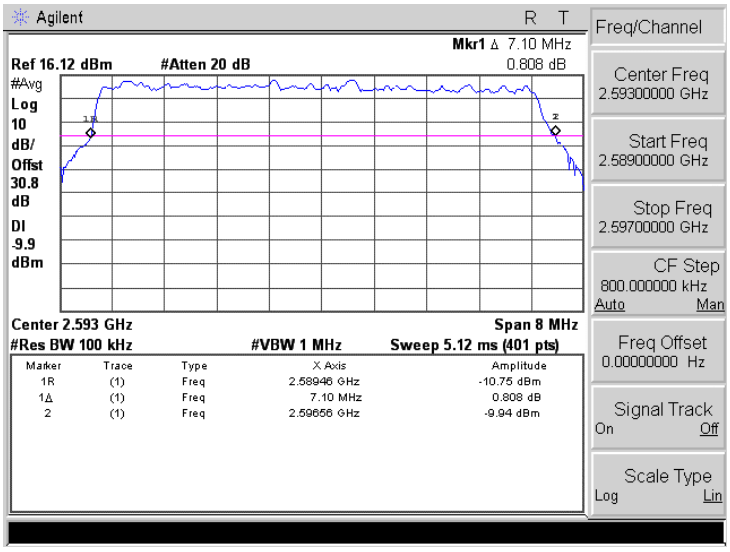


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.16 Occupied bandwidth test result at low frequency 7 MHz BW 16QAM

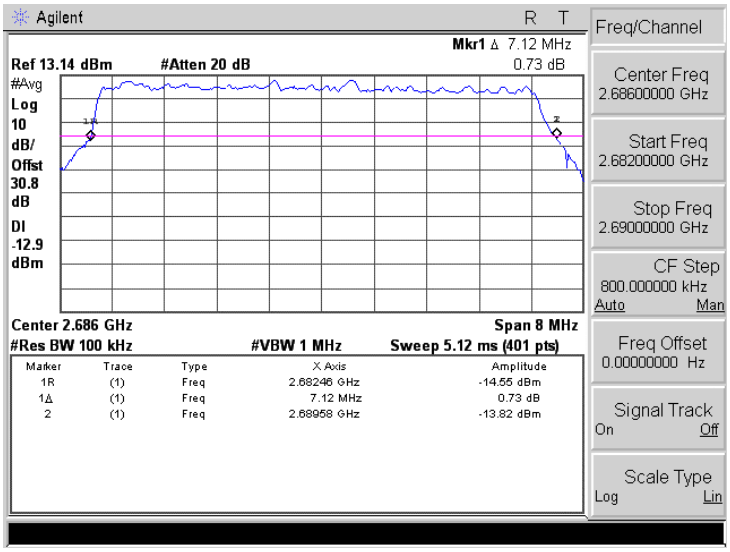


Plot 7.1.17 Occupied bandwidth test result at mid frequency 7 MHz BW 16QAM



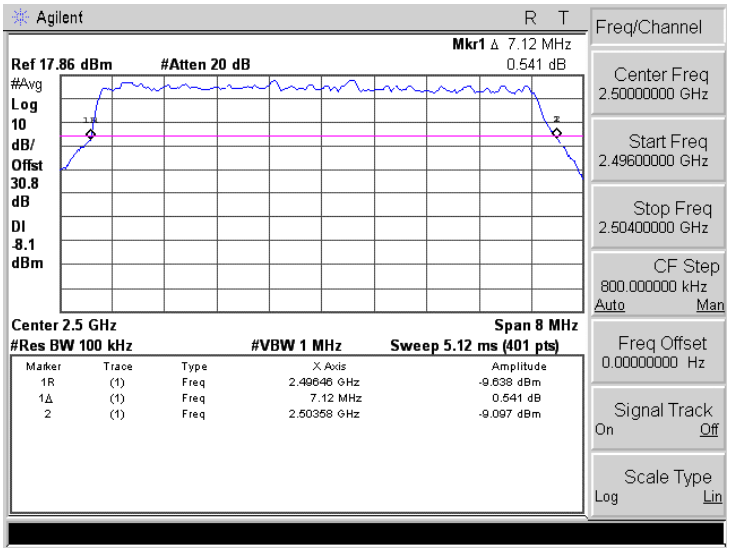
Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.18 Occupied bandwidth test result at high frequency 7 MHz BW 16QAM

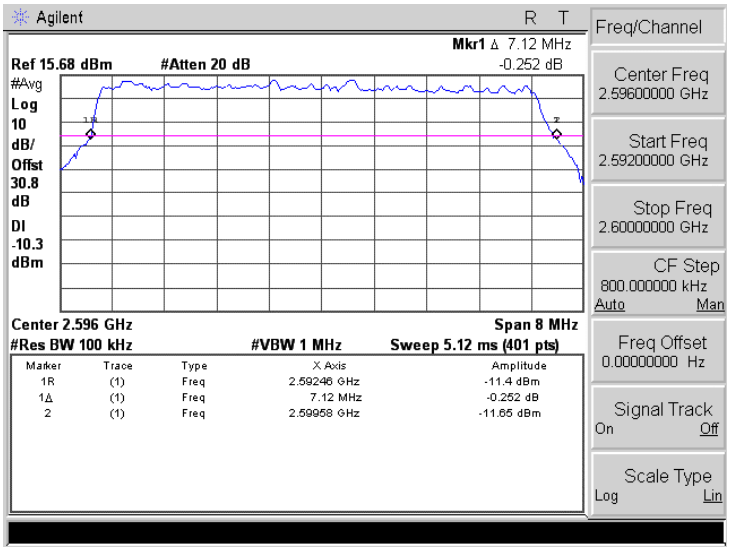


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.19 Occupied bandwidth test result at low frequency 7 MHz BW 64QAM

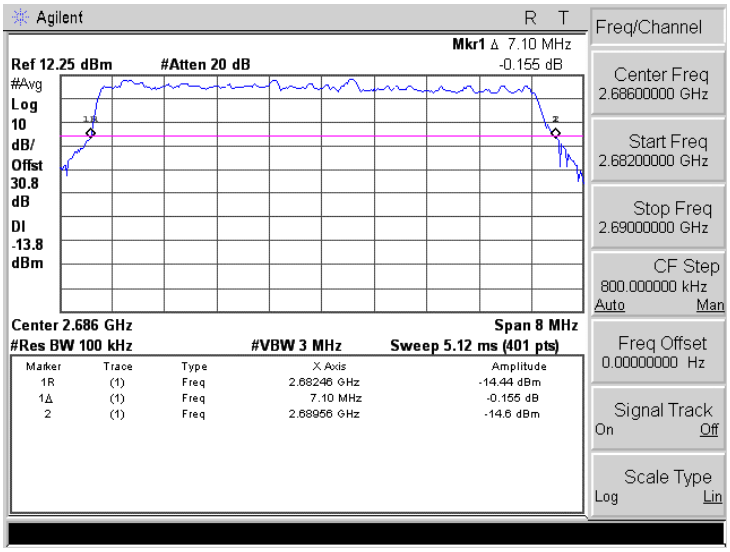


Plot 7.1.20 Occupied bandwidth test result at mid frequency 7 MHz BW 64QAM



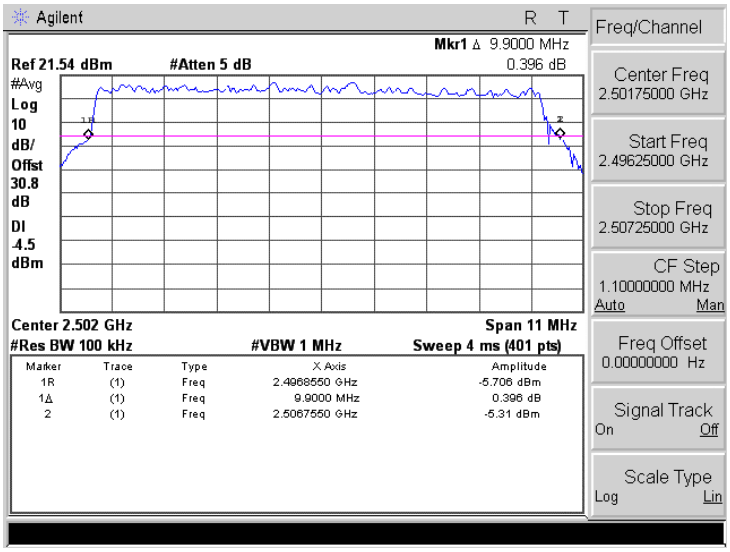
Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.21 Occupied bandwidth test result at high frequency 7 MHz BW 64QAM

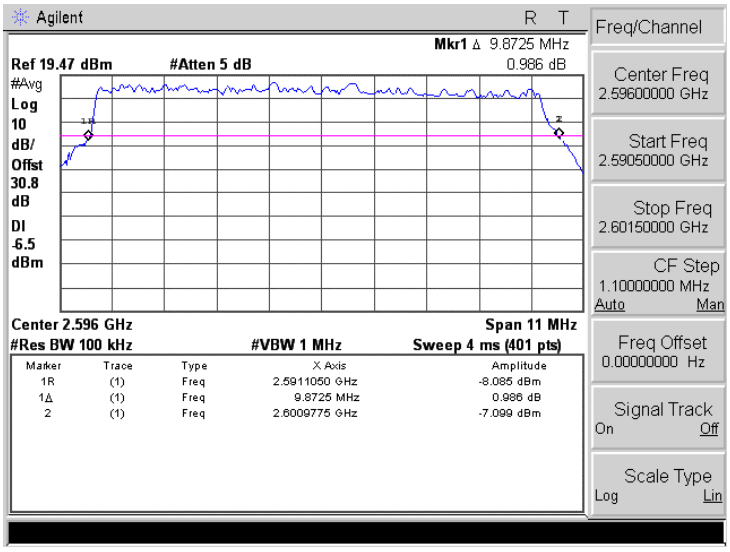


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.22 Occupied bandwidth test result at low frequency 10 MHz BW QPSK

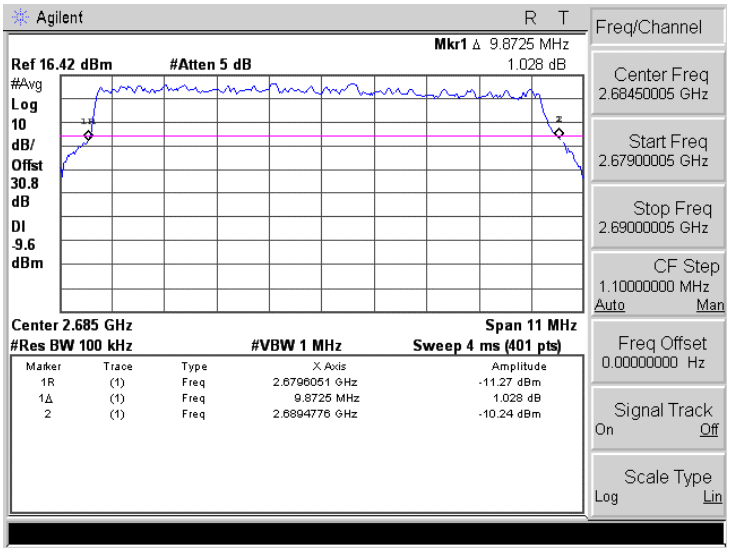


Plot 7.1.23 Occupied bandwidth test result at mid frequency 10 MHz BW QPSK



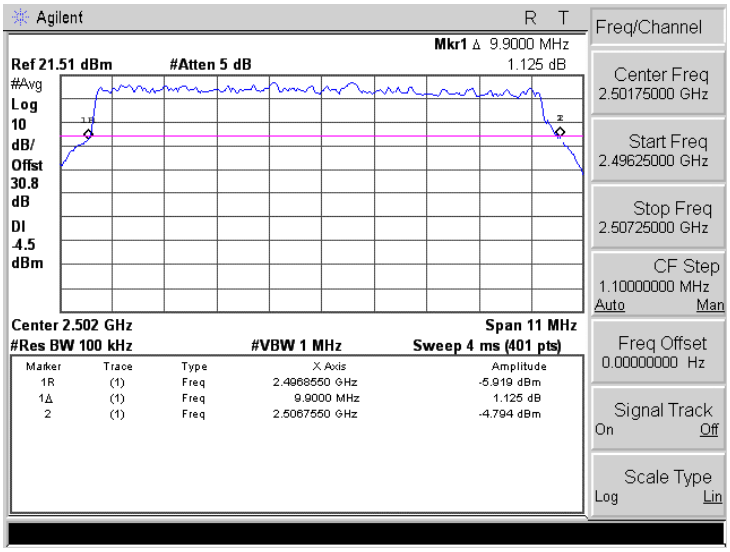
Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.24 Occupied bandwidth test result at high frequency 10 MHz BW QPSK

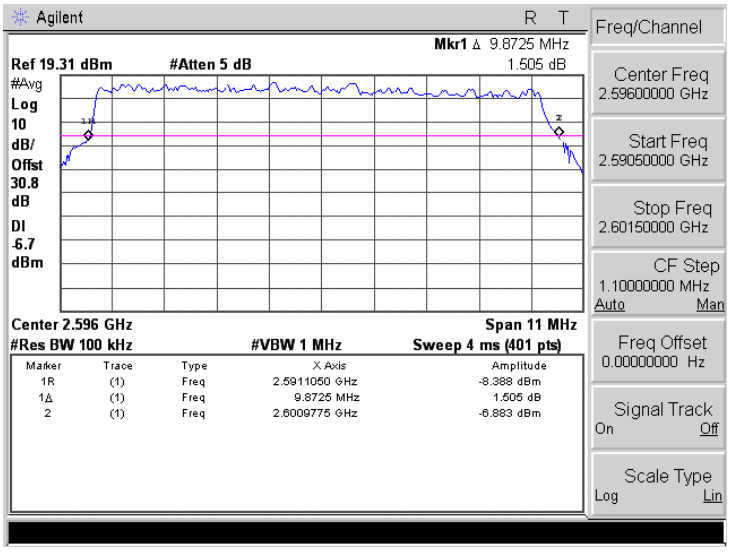


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.25 Occupied bandwidth test result at low frequency 10 MHz BW 16QAM

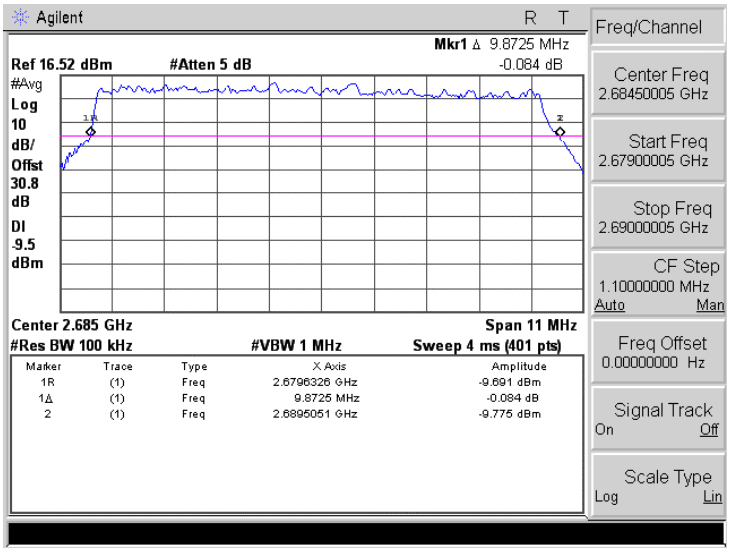


Plot 7.1.26 Occupied bandwidth test result at mid frequency 10 MHz BW 16QAM



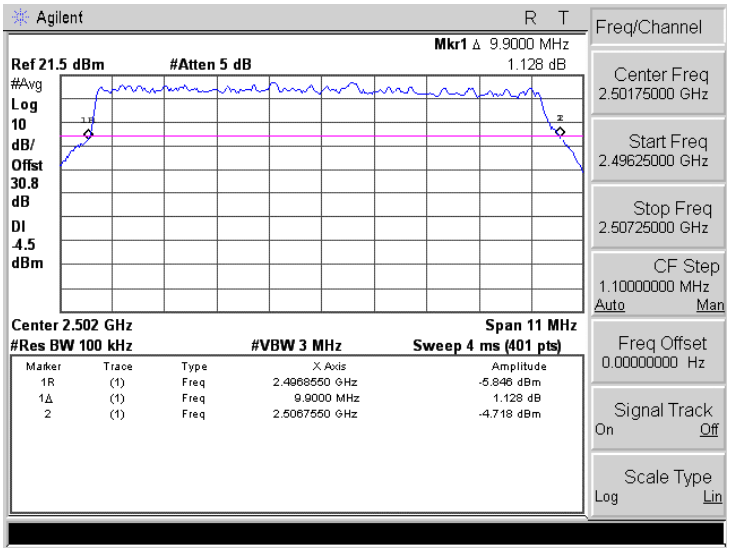
Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.27 Occupied bandwidth test result at high frequency 10 MHz BW 16QAM

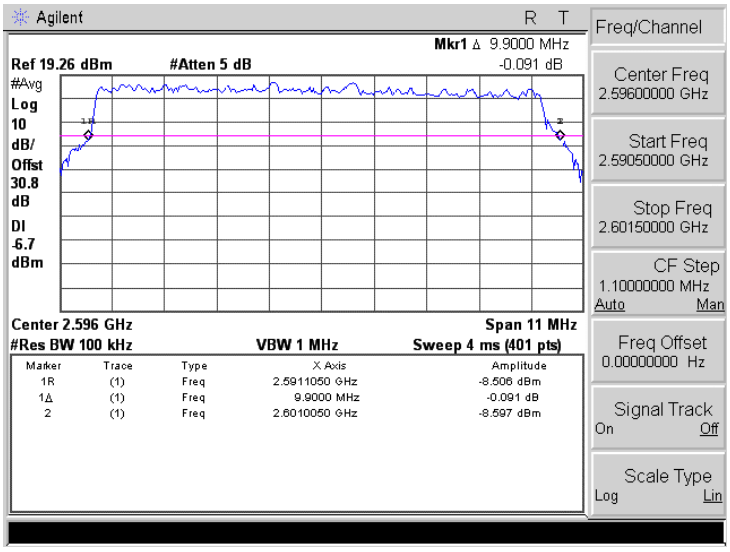


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.28 Occupied bandwidth test result at low frequency 10 MHz BW 64QAM

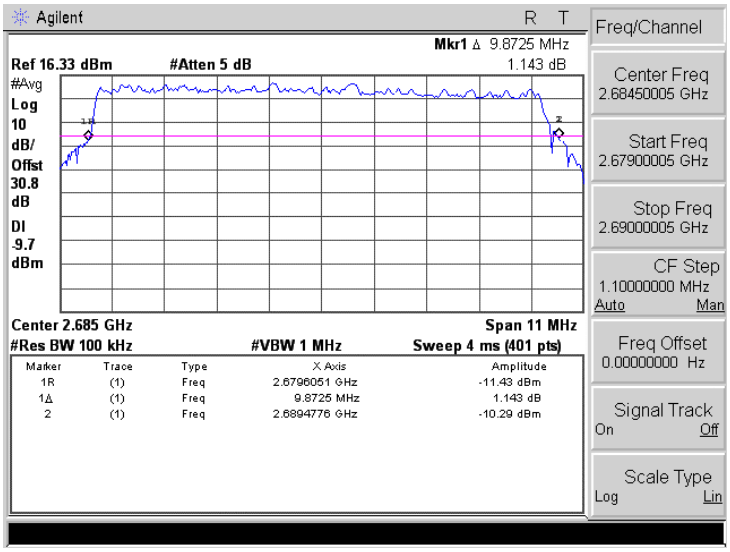


Plot 7.1.29 Occupied bandwidth test result at mid frequency 10 MHz BW 64QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 12:11:13 PM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Plot 7.1.30 Occupied bandwidth test result at high frequency 10 MHz BW 64QAM



Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

7.2 Peak output power test

7.2.1 General

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

Table 7.2.1 Peak output power limits

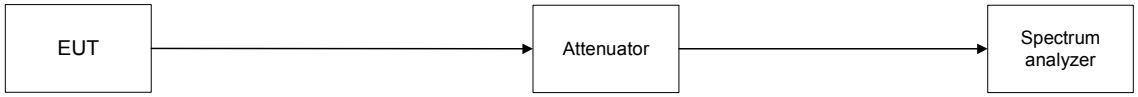
Assigned frequency range, MHz	Maximum peak output power (EIRP), dBm
2496.0 – 2690.0	63+10log(OBW*/(CBW**)MHz+10log(360/beamwidth)
	Maximum peak power density, dBm/100 kHz
	EIRP+10log(0.1/CBW**)

*OBW – actual channel width (occupied bandwidth)
**CBW – channel bandwidth

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 to the end user RF output power.
7.2.2.3 The resolution bandwidth of spectrum analyzer was set about 1% of the emission bandwidth and the average power was integrated over EBW with spectrum analyzer as provided in Table 7.2.2, Table 7.2.4, Table 7.2.6 and associated plots. The power spectral density test results are given in Table 7.2.3, Table 7.2.5, Table 7.2.7.

Figure 7.2.1 Peak output power test setup



Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.2 Peak output power test results for 5 MHz RF channel BW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	1000 kHz
MODULATING SIGNAL:	PRBS
MAXIMUM DEDICATED ANTENNA GAIN:	16 dBi 90° Half-power beamwidth (Hor)
MINIMUM DEDICATED ANTENNA GAIN:	9 dBi 360° 3 dB beamwidth (Hor)
TRANSMITTER OUTPUT POWER SETTINGS:	Low:54, Mid:54, High:54, IF:-25
DUTY CYCLE:	66%

MODULATION: QPSK
BIT RATE: 4.19 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm*	Limit, dBm	Margin, dB	Verdict
9 dBi Ant.							
2499.0	21.36	Included	Included	30.36	62.38	-32.02	Pass
2504.75	20.64	Included	Included	29.64	62.76	-33.12	Pass
2593.0	18.49	Included	Included	27.49	62.44	-34.95	Pass
2687.5	15.35	Included	Included	24.35	62.82	-38.47	Pass
16 dBi Ant							
2499.0	21.36	Included	Included	37.36	68.40	-31.04	Pass
2504.75	20.64	Included	Included	36.64	68.78	-32.14	Pass
2593.0	18.49	Included	Included	34.49	68.47	-33.98	Pass
2687.5	15.35	Included	Included	31.35	68.84	-37.49	Pass

* RF output power, dBm = Spectrum analyzer reading, dBm + antenna gain, dBi

MODULATION: 16QAM
BIT RATE: 12.565 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm*	Limit, dBm	Margin, dB	Verdict
9 dBi Ant.							
2499.0	20.96	Included	Included	29.96	62.43	-32.47	Pass
2504.75	20.83	Included	Included	29.83	62.75	-32.92	Pass
2593.0	19.24	Included	Included	28.24	62.43	-34.19	Pass
2687.5	16.15	Included	Included	25.15	62.77	-37.62	Pass
16 dBi Ant							
2499.0	20.96	Included	Included	36.96	68.45	-31.49	Pass
2504.75	20.83	Included	Included	36.83	68.77	-31.94	Pass
2593.0	19.24	Included	Included	35.24	68.45	-33.21	Pass
2687.5	16.15	Included	Included	32.15	68.79	-36.64	Pass

* RF output power, dBm = Spectrum analyzer reading, dBm + antenna gain, dBi

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.2 Peak output power test results for 5 MHz RF channel BW (continued)

MODULATION: 64QAM
BIT RATE: 18.85 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm*	Limit, dBm	Margin, dB	Verdict
9 dBi Ant.							
2499.0	21.51	Included	Included	30.51	62.42	-31.91	Pass
2504.75	21.38	Included	Included	30.38	62.82	-32.44	Pass
2593.00	19.38	Included	Included	28.38	62.40	-34.02	Pass
2687.50	16.11	Included	Included	25.11	62.79	-37.68	Pass
16 dBi Ant							
2499.0	21.51	Included	Included	37.51	68.44	-30.93	Pass
2504.75	21.38	Included	Included	37.38	68.84	-31.46	Pass
2593.00	19.38	Included	Included	35.38	68.42	-33.04	Pass
2687.50	16.11	Included	Included	32.11	68.81	-36.70	Pass

* RF output power, dBm = Spectrum analyzer reading, dBm + antenna gain, dBi

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.3 Power spectral density test results for 5 MHz RF channel BW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Average
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATING SIGNAL: PRBS
MAXIMUM DEDICATED ANTENNA GAIN: 16 dBi 90° Half-power beamwidth (Hor)
MINIMUM DEDICATED ANTENNA GAIN: 9 dBi 360° 3 dB beamwidth (Hor)
TRANSMITTER OUTPUT POWER SETTINGS: Low:54
Mid:54
High:54
IF:-25
DUTY CYCLE: 66%

MODULATION: QPSK
BIT RATE: 4.19 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	Spectral power density, dBm/100kHz*	Limit, dBm/100kHz	Margin, dB	Verdict
9 dBi Ant.							
2499.0	-45.63	Included	Included	13.37	44.60	-31.23	Pass
2504.75	-46.35	Included	Included	12.65	45.36	-32.71	Pass
2593.0	-48.50	Included	Included	10.50	44.66	-34.16	Pass
2687.5	-51.64	Included	Included	7.36	45.42	-38.06	Pass
16 dBi Ant							
2499.0	-45.63	Included	Included	20.37	50.62	-30.25	Pass
2504.75	-46.35	Included	Included	19.65	51.38	-31.73	Pass
2593.0	-48.50	Included	Included	17.50	50.68	-33.18	Pass
2687.5	-51.64	Included	Included	14.36	51.44	-37.08	Pass

*Spectral power density (dBm/100kHz) = Spectrum analyzer reading (dBm/Hz) + 50 dB + antenna gain

MODULATION: 16QAM
BIT RATE: 12.565 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	Spectral power density, dBm/100kHz*	Limit, dBm/100kHz	Margin, dB	Verdict
9 dBi Ant.							
2499.0	-46.03	Included	Included	12.97	44.65	-31.68	Pass
2504.75	-46.16	Included	Included	12.84	45.34	-32.50	Pass
2593.0	-47.75	Included	Included	11.25	44.65	-33.40	Pass
2687.5	-50.84	Included	Included	8.16	45.37	-37.21	Pass
16 dBi Ant							
2499.0	-46.03	Included	Included	19.97	50.67	-30.70	Pass
2504.75	-46.16	Included	Included	19.84	51.37	-31.53	Pass
2593.0	-47.75	Included	Included	18.25	50.67	-32.42	Pass
2687.5	-50.84	Included	Included	15.16	51.39	-36.23	Pass

*Spectral power density (dBm/100kHz) = Spectrum analyzer reading (dBm/Hz) + 50 dB + antenna gain

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.3 Power spectral density test results for 5 MHz RF channel BW (continued)

MODULATION: 64QAM
BIT RATE: 18.85 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	Spectral power density, dBm/100kHz*	Limit, dBm/100kHz	Margin, dB	Verdict
9 dBi Ant.							
2499.0	-45.48	Included	Included	13.52	44.64	-31.12	Pass
2504.75	-45.61	Included	Included	13.39	45.42	-32.03	Pass
2593.0	-47.61	Included	Included	11.39	44.61	-33.22	Pass
2687.5	-50.88	Included	Included	8.12	45.38	-37.26	Pass
16 dBi Ant							
2499.0	-45.48	Included	Included	20.52	50.66	-30.14	Pass
2504.75	-45.61	Included	Included	20.39	51.44	-31.05	Pass
2593.0	-47.61	Included	Included	18.39	50.63	-32.24	Pass
2687.5	-50.88	Included	Included	15.12	51.40	-36.28	Pass

*Spectral power density (dBm/100kHz) = Spectrum analyzer reading (dBm/Hz) + 50 dB + antenna gain

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.4 Peak output power test results for 7 MHz RF channel BW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	1000 kHz
MODULATING SIGNAL:	PRBS
MAXIMUM DEDICATED ANTENNA GAIN:	16 dBi 90° Half-power beamwidth (Hor)
MINIMUM DEDICATED ANTENNA GAIN:	9 dBi 360° 3 dB beamwidth (Hor)
TRANSMITTER OUTPUT POWER SETTINGS:	Low:50 Mid:50 High:50 IF:-25
DUTY CYCLE:	66%

MODULATION: QPSK
BIT RATE: 4.19 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm*	Limit, dBm	Margin, dB	Verdict
9 dBi Ant.							
2500.0	18.40	Included	Included	27.40	60.91	-33.51	Pass
2596.0	16.29	Included	Included	25.29	60.72	-35.43	Pass
2686.0	12.96	Included	Included	21.96	61.10	-39.14	Pass
16 dBi Ant							
2500.0	18.40	Included	Included	34.40	66.93	-32.53	Pass
2596.0	16.29	Included	Included	32.29	66.74	-34.45	Pass
2686.0	12.96	Included	Included	28.96	67.12	-38.16	Pass

* RF output power, dBm = Spectrum analyzer reading, dBm + antenna gain, dBi

MODULATION: 16QAM
BIT RATE: 12.565 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm*	Limit, dBm	Margin, dB	Verdict
9 dBi Ant.							
2500.0	17.94	Included	Included	26.94	60.93	-33.99	Pass
2596.0	16.07	Included	Included	25.07	60.72	-35.65	Pass
2686.0	13.14	Included	Included	22.14	61.11	-38.97	Pass
16 dBi Ant							
2500.0	17.94	Included	Included	33.94	66.95	-33.01	Pass
2596.0	16.07	Included	Included	32.07	66.74	-34.67	Pass
2686.0	13.14	Included	Included	29.14	67.13	-37.99	Pass

* RF output power, dBm = Spectrum analyzer reading, dBm + antenna gain, dBi

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.4 Peak output power test results for 7 MHz RF channel BW (continued)

MODULATION: 64QAM
BIT RATE: 18.85 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm*	Limit, dBm	Margin, dB	Verdict
9 dBi Ant.							
2500.0	17.86	Included	Included	26.86	60.92	-34.06	Pass
2596.0	15.68	Included	Included	24.68	60.73	-36.05	Pass
2686.0	12.25	Included	Included	21.25	61.10	-39.85	Pass
16 dBi Ant							
2500.0	17.86	Included	Included	33.86	66.94	-33.08	Pass
2596.0	15.68	Included	Included	31.68	66.75	-35.07	Pass
2686.0	12.25	Included	Included	28.25	67.12	-38.87	Pass

* RF output power, dBm = Spectrum analyzer reading, dBm + antenna gain, dBi

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.5 Power spectral density test results for 7 MHz RF channel BW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	1000 kHz
MODULATING SIGNAL:	PRBS
MAXIMUM DEDICATED ANTENNA GAIN:	16 dBi 90° Half-power beamwidth (Hor)
MINIMUM DEDICATED ANTENNA GAIN:	9 dBi 360° 3 dB beamwidth (Hor)
TRANSMITTER OUTPUT POWER SETTINGS:	Low:50 Mid:50 High:50 IF:-25
DUTY CYCLE:	66%
MODULATION:	QPSK
BIT RATE:	4.19 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	Spectral power density, dBm/100kHz*	Limit, dBm/100kHz	Margin, dB	Verdict
9 dBi Ant.							
2500.0	-50.05	Included	Included	8.95	40.30	-31.35	Pass
2596.0	-52.17	Included	Included	6.83	39.93	-33.10	Pass
2686.0	-55.49	Included	Included	3.51	40.68	-37.17	Pass
16 dBi Ant							
2500.0	-50.05	Included	Included	15.95	46.32	-30.37	Pass
2596.0	-52.17	Included	Included	13.83	45.95	-32.12	Pass
2686.0	-55.49	Included	Included	10.51	46.71	-36.20	Pass

*Spectral power density (dBm/100kHz) = Spectrum analyzer reading (dBm/Hz) + 50 dB + antenna gain

MODULATION:	16QAM
BIT RATE:	12.565 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	Spectral power density, dBm/100kHz*	Limit, dBm/100kHz	Margin, dB	Verdict
9 dBi Ant.							
2500.0	-50.51	Included	Included	8.49	40.32	-31.83	Pass
2596.0	-52.38	Included	Included	6.62	39.93	-33.31	Pass
2686.0	-55.31	Included	Included	3.69	40.70	-37.01	Pass
16 dBi Ant							
2500.0	-50.51	Included	Included	15.49	46.34	-30.85	Pass
2596.0	-52.38	Included	Included	13.62	45.95	-32.33	Pass
2686.0	-55.31	Included	Included	10.69	46.72	-36.03	Pass

*Spectral power density (dBm/100kHz) = Spectrum analyzer reading (dBm/Hz) + 50 dB + antenna gain

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.5 Power spectral density test results for 7 MHz RF channel BW (continued)

MODULATION: 64QAM
BIT RATE: 18.85 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	Spectral power density, dBm/100kHz*	Limit, dBm/100kHz	Margin, dB	Verdict
9 dBi Ant.							
2500.0	-50.59	Included	Included	8.41	40.31	-31.90	Pass
2596.0	-52.77	Included	Included	6.23	39.94	-33.71	Pass
2686.0	-56.20	Included	Included	2.80	40.68	-37.88	Pass
16 dBi Ant							
2500.0	-50.59	Included	Included	15.41	46.33	-30.92	Pass
2596.0	-52.77	Included	Included	13.23	45.96	-32.73	Pass
2686.0	-56.20	Included	Included	9.80	46.71	-36.91	Pass

*Spectral power density (dBm/100kHz) = Spectrum analyzer reading (dBm/Hz) + 50 dB + antenna gain

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.6 Peak output power test results for 10 MHz RF channel BW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	1000 kHz
MODULATING SIGNAL:	PRBS
MAXIMUM DEDICATED ANTENNA GAIN:	16 dBi 90° Half-power beamwidth (Hor)
MINIMUM DEDICATED ANTENNA GAIN:	9 dBi 360° 3 dB beamwidth (Hor)
TRANSMITTER OUTPUT POWER SETTINGS:	Low:56 Mid:56 High:56 IF:-25
DUTY CYCLE:	66%

MODULATION: QPSK
BIT RATE: 8.38 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm*	Limit, dBm	Margin, dB	Verdict
9 dBi Ant.							
2501.75	21.54	Included	Included	30.54	62.35	-31.81	Pass
2596.00	19.47	Included	Included	28.47	62.15	-33.68	Pass
2684.50	16.42	Included	Included	25.42	62.53	-37.11	Pass
16 dBi Ant							
2501.75	21.54	Included	Included	37.54	68.37	-30.83	Pass
2596.00	19.47	Included	Included	35.47	68.17	-32.70	Pass
2684.50	16.42	Included	Included	32.42	68.55	-36.13	Pass

* RF output power, dBm = Spectrum analyzer reading, dBm + antenna gain, dBi

MODULATION: 16QAM
BIT RATE: 25.13 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm*	Limit, dBm	Margin, dB	Verdict
9 dBi Ant.							
2501.75	21.51	Included	Included	30.51	62.35	-31.84	Pass
2596.00	19.31	Included	Included	28.31	62.15	-33.84	Pass
2684.50	16.52	Included	Included	25.52	62.53	-37.01	Pass
16 dBi Ant							
2501.75	21.51	Included	Included	37.51	68.37	-30.86	Pass
2596.00	19.31	Included	Included	35.31	68.17	-32.86	Pass
2684.50	16.52	Included	Included	32.52	68.55	-36.03	Pass

* RF output power, dBm = Spectrum analyzer reading, dBm + antenna gain, dBi

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.6 Peak output power test results for 10 MHz RF channel BW (continued)

MODULATION: 64QAM
BIT RATE: 37.7 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm*	Limit, dBm	Margin, dB	Verdict
9 dBi Ant.							
2501.75	21.50	Included	Included	30.50	62.35	-31.85	Pass
2596.00	19.26	Included	Included	28.26	62.16	-33.90	Pass
2684.50	16.33	Included	Included	25.33	62.53	-37.20	Pass
16 dBi Ant							
2501.75	21.50	Included	Included	37.50	68.37	-30.87	Pass
2596.00	19.26	Included	Included	35.26	68.19	-32.93	Pass
2684.50	16.33	Included	Included	32.33	68.55	-36.22	Pass

* RF output power, dBm = Spectrum analyzer reading, dBm + antenna gain, dBi

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.7 Power spectral density test results for 10 MHz RF channel BW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	1000 kHz
MODULATING SIGNAL:	PRBS
CHANNEL BANDWIDTH:	10 MHz
MAXIMUM DEDICATED ANTENNA GAIN:	16 dBi 90° Half-power beamwidth (Hor)
MINIMUM DEDICATED ANTENNA GAIN:	9 dBi 360° 3 dB beamwidth (Hor)
TRANSMITTER OUTPUT POWER SETTINGS:	Low:56 Mid:56 High:56 IF:-25
DUTY CYCLE:	66%
MODULATION:	QPSK
BIT RATE:	8.38 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	Spectral power density, dBm/100kHz*	Limit, dBm/100kHz	Margin, dB	Verdict
9 dBi Ant.							
2501.75	-48.46	Included	Included	10.54	41.74	-31.20	Pass
2596.00	-50.54	Included	Included	8.46	41.36	-32.90	Pass
2684.50	-53.58	Included	Included	5.42	42.12	-36.70	Pass
16 dBi Ant							
2501.75	-48.46	Included	Included	17.54	47.76	-30.22	Pass
2596.00	-50.54	Included	Included	15.46	47.38	-31.92	Pass
2684.50	-53.58	Included	Included	12.42	48.14	-35.72	Pass

*Spectral power density (dBm/100kHz) = Spectrum analyzer reading (dBm/Hz) + 50 dB + antenna gain

MODULATION:	16QAM
BIT RATE:	25.13 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	Spectral power density, dBm/100kHz*	Limit, dBm/100kHz	Margin, dB	Verdict
9 dBi Ant.							
2501.75	-48.49	Included	Included	10.51	41.74	-31.23	Pass
2596.00	-50.69	Included	Included	8.31	41.36	-33.05	Pass
2684.50	-53.48	Included	Included	5.52	42.12	-36.60	Pass
16 dBi Ant							
2501.75	-48.49	Included	Included	17.51	47.76	-30.25	Pass
2596.00	-50.69	Included	Included	15.31	47.38	-32.07	Pass
2684.50	-53.48	Included	Included	12.52	48.14	-35.62	Pass

*Spectral power density (dBm/100kHz) = Spectrum analyzer reading (dBm/Hz) + 50 dB + antenna gain

Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.2.7 Power spectral density test results for 10 MHz RF channel BW (continued)

MODULATION: 64QAM
BIT RATE: 37.7 Mbps

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	Spectral power density, dBm/100kHz*	Limit, dBm/100kHz	Margin, dB	Verdict
9 dBi Ant.							
2501.75	-48.50	Included	Included	10.50	41.74	-31.24	Pass
2596.00	-50.74	Included	Included	8.26	41.37	-33.11	Pass
2684.50	-53.67	Included	Included	5.33	42.12	-36.79	Pass
16 dBi Ant							
2501.75	-48.50	Included	Included	17.50	47.76	-30.26	Pass
2596.00	-50.74	Included	Included	15.26	47.39	-32.13	Pass
2684.50	-53.67	Included	Included	12.33	48.14	-35.81	Pass

*Spectral power density (dBm/100kHz) = Spectrum analyzer reading (dBm/Hz) + 50 dB + antenna gain

Reference numbers of test equipment used

HL 2909	HL 3321	HL 3386					

Full description is given in Appendix A.

Test specification:	**Section 27.50(h)(ii), Peak output power**		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	**Air Pressure:** 1014 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48 VDC
Remarks:			

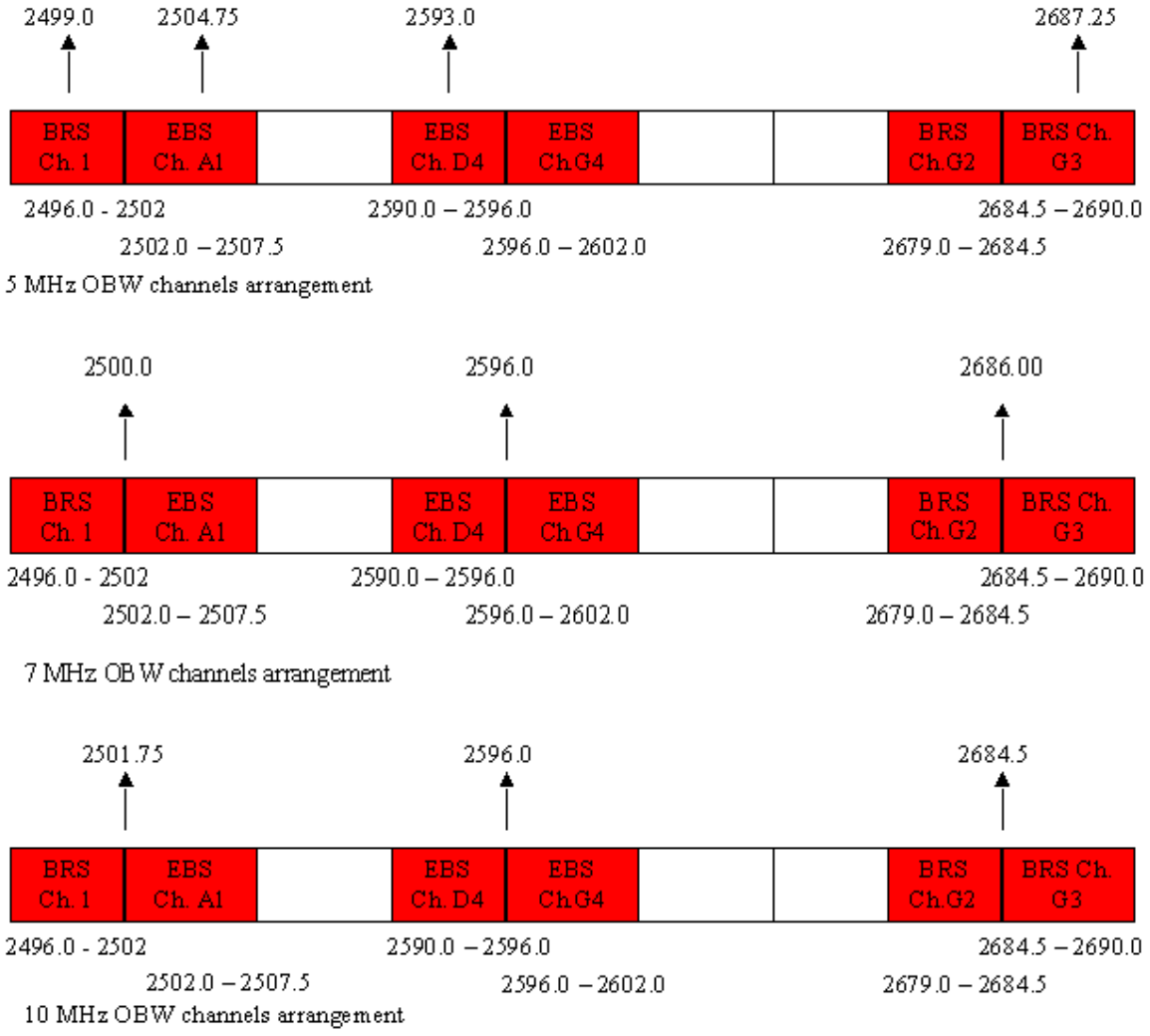
Table 7.2.8 Post transition frequency channels assignment

Channel	Channel BW, MHz	Peak power limit, dBm		Power density limit, dBm/kHz
		9 dBi antenna gain	16 dBi antenna gain	
5 MHz Single Channel				
2499.0 MHz: BRS Ch. 1	6.0	63+10log(OBW/6.0)	63+10log(OBW/6.0)+10log(360°/90°)	EIRP+10log(0.1/6.0)
2499.0 MHz: ERS Ch. A1	5.5	63+10log(OBW/5.5)	63+10log(OBW/5.5)+10log(360°/90°)	EIRP+10log(0.1/5.5)
2593.0 MHz: EBS Ch. D4	6.0	63+10log(OBW/6.0)	63+10log(OBW/6.0)+10log(360°/90°)	EIRP+10log(0.1/6.0)
2687.25 MHz: BRS Ch. G3	5.5	63+10log(OBW/5.5)	63+10log(OBW/5.5)+10log(360°/90°)	EIRP+10log(0.1/5.5)
7 MHz Dual Channel				
2500.0 MHz BRS Ch. 1 + EBS Ch. A1	11.5	63+10log(OBW/11.5)	63+10log(OBW/11.5)+10log(360°/90°)	EIRP+10log(0.1/11.5)
2596.0 MHz EBS Ch. D4 + EBS Ch. G4	12.0	63+10log(OBW/12.0)	63+10log(OBW/12.0)+10log(360°/90°)	EIRP+10log(0.1/12.0)
2686.0 MHz BRS Ch. G2 + BRS Ch. G3	11.0	63+10log(OBW/11.0)	63+10log(OBW/11.0)+10log(360°/90°)	EIRP+10log(0.1/11.0)
10 MHz Dual Channel				
2501.75 MHz BRS Ch. 1+ EBS Ch. A1	11.5	63+10log(OBW/11.5)	63+10log(OBW/11.5)+10log(360°/90°)	EIRP+10log(0.1/11.5)
2596.0 MHz EBS Ch. D4 + EBS Ch. G4	12.0	63+10log(OBW/12.0)	63+10log(OBW/12.0)+10log(360°/90°)	EIRP+10log(0.1/12.0)
2684.5 MHz BRS Ch. G2 + BRS Ch. G3	11.0	63+10log(OBW/11.0)	63+10log(OBW/11.0)+10log(360°/90°)	EIRP+10log(0.1/11.0)

NOTE: Channels at post transition band were taken as the worst case

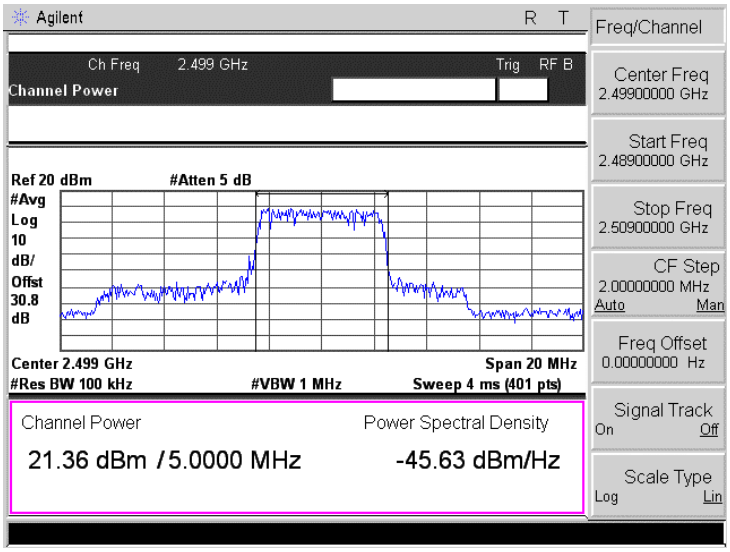
Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Figure 7.2.2 Post transition frequency channels arrangement

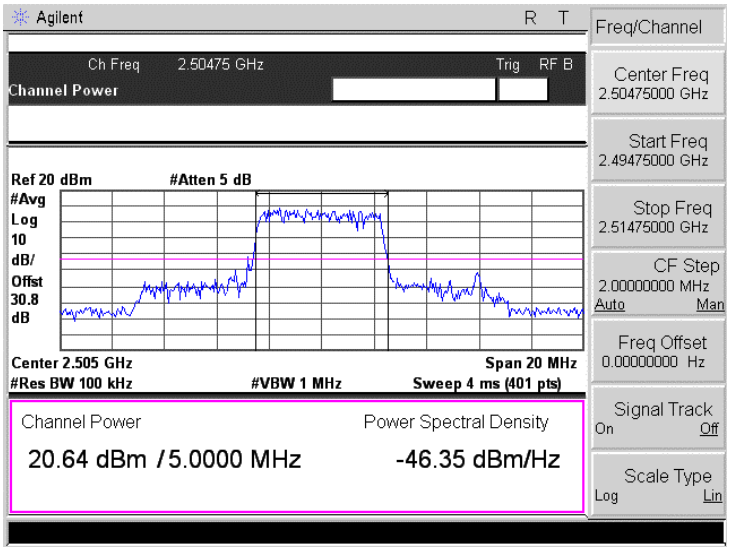


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.1 Peak output power test results at low frequency, 5 MHz, QPSK

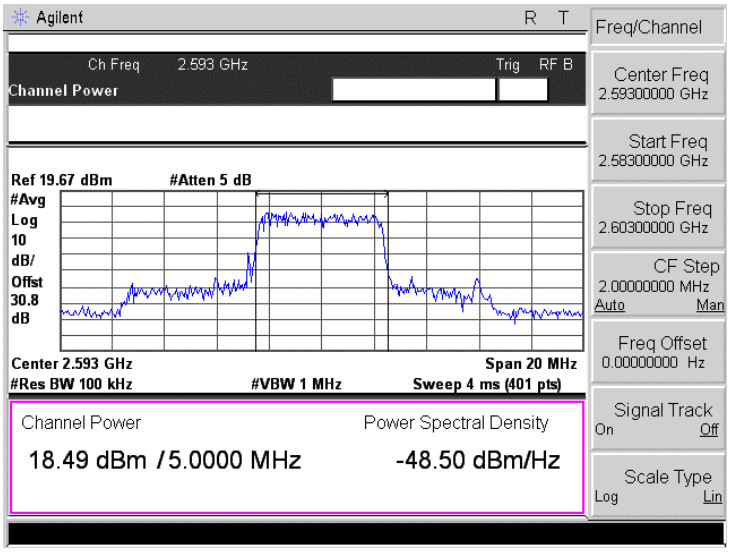


Plot 7.2.2 Peak output power test results at low frequency, 5 MHz, QPSK (2504.75 MHz)

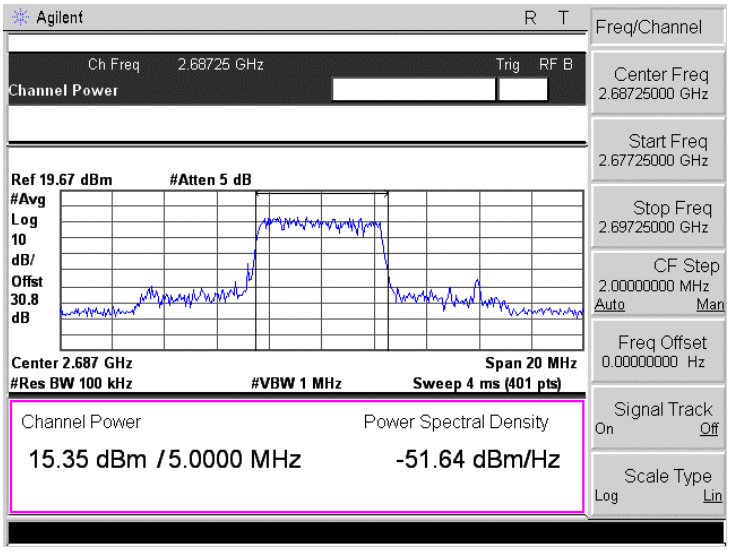


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.3 Peak output power test results at mid frequency, 5 MHz, QPSK

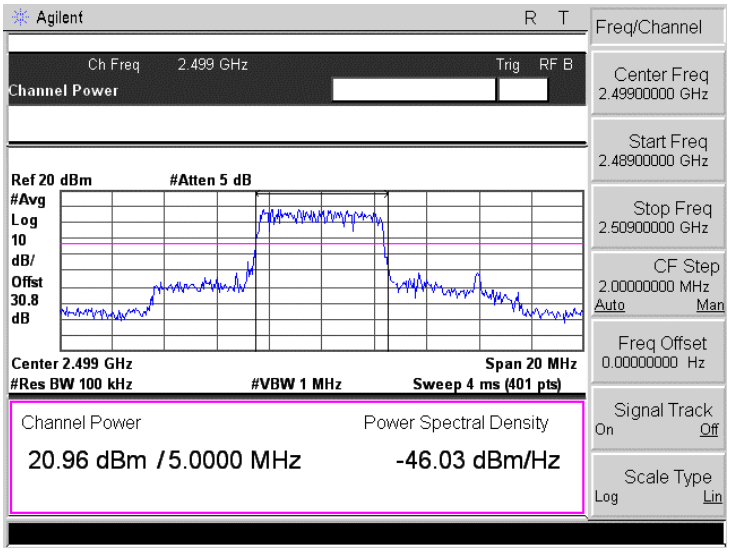


Plot 7.2.4 Peak output power test results at high frequency, 5 MHz, QPSK

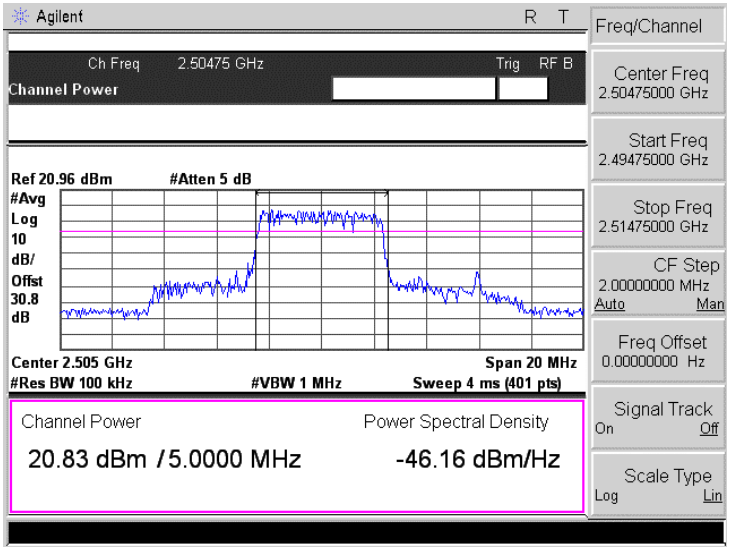


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.5 Peak output power test results at low frequency, 5 MHz, 16QAM

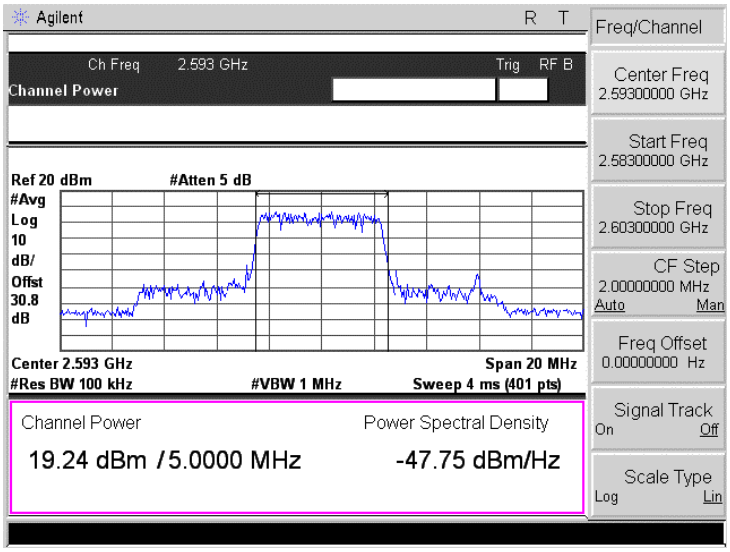


Plot 7.2.6 Peak output power test results at low frequency, 5 MHz, 16QAM (2504.75 MHz)

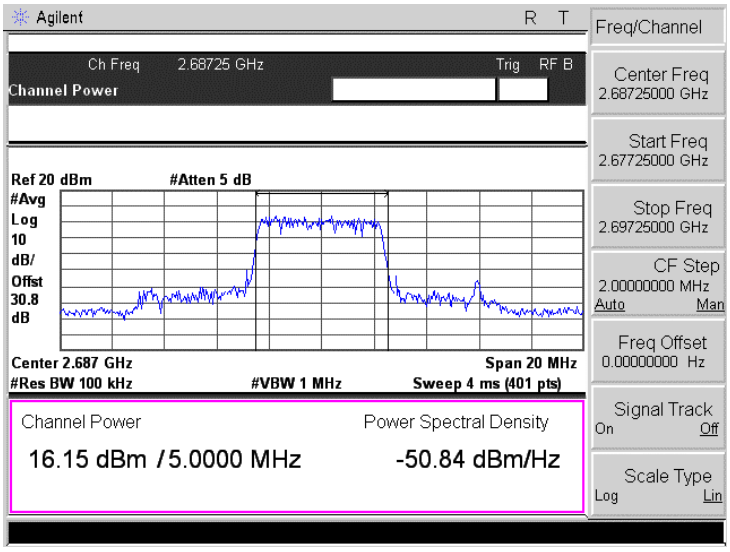


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.7 Peak output power test results at mid frequency, 5 MHz, 16QAM

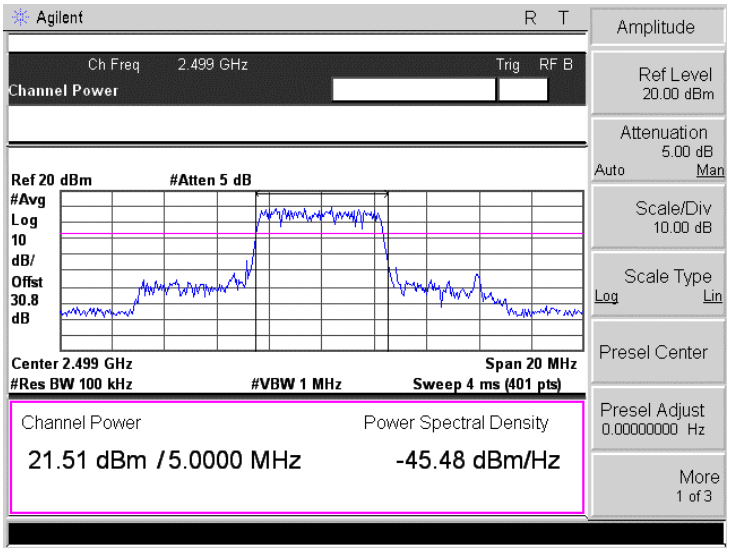


Plot 7.2.8 Peak output power test results at high frequency, 5 MHz, 16QAM

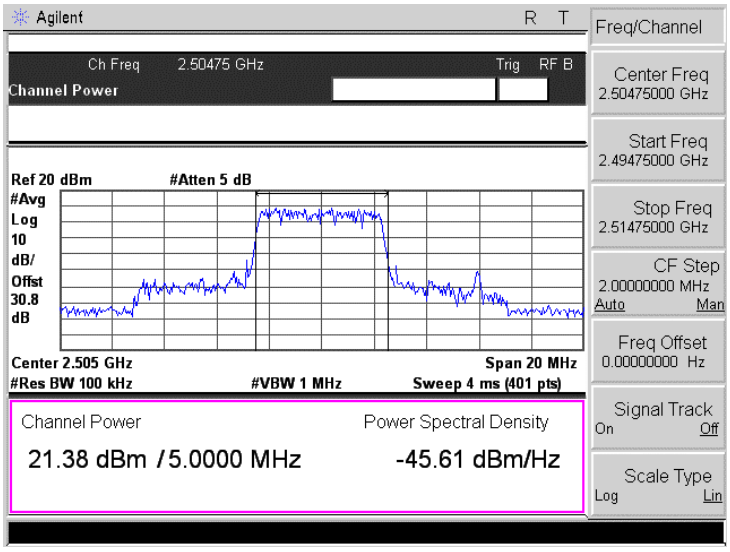


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.9 Peak output power test results at low frequency, 5 MHz, 64QAM

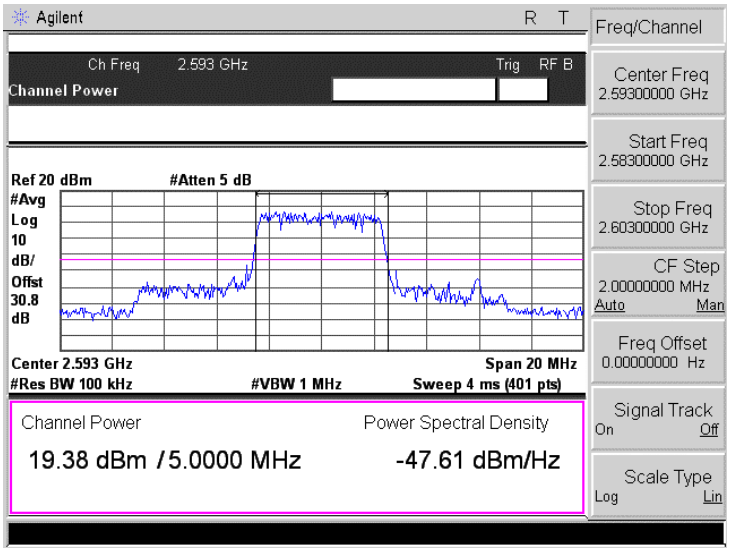


Plot 7.2.10 Peak output power test results at low frequency, 5 MHz, 64QAM (2504.75 MHz)

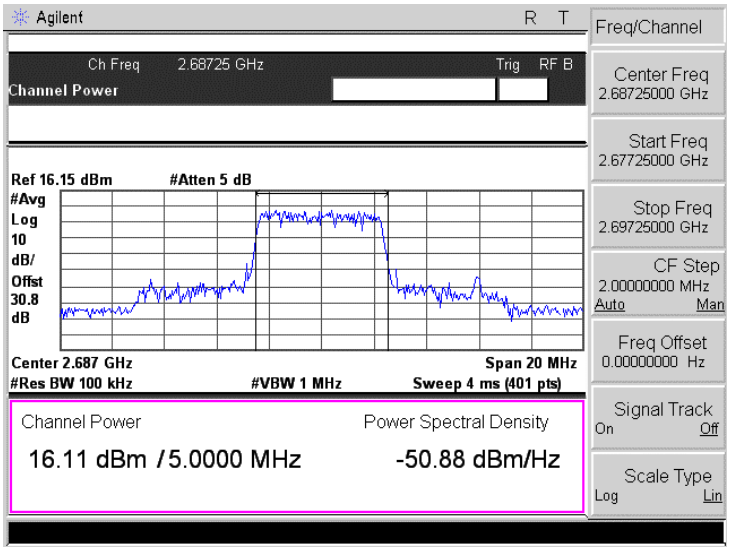


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.11 Peak output power test results at mid frequency, 5 MHz, 64QAM

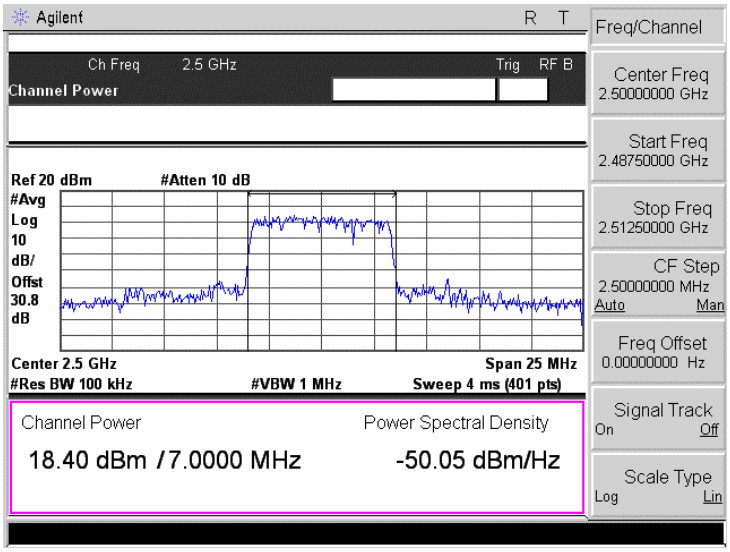


Plot 7.2.12 Peak output power test results at high frequency, 5 MHz, 64QAM

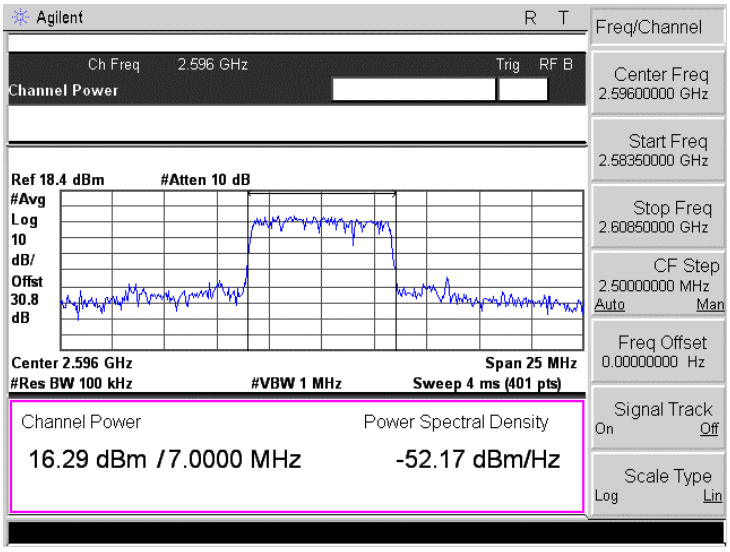


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.13 Peak output power test results at low frequency, 7 MHz, QPSK

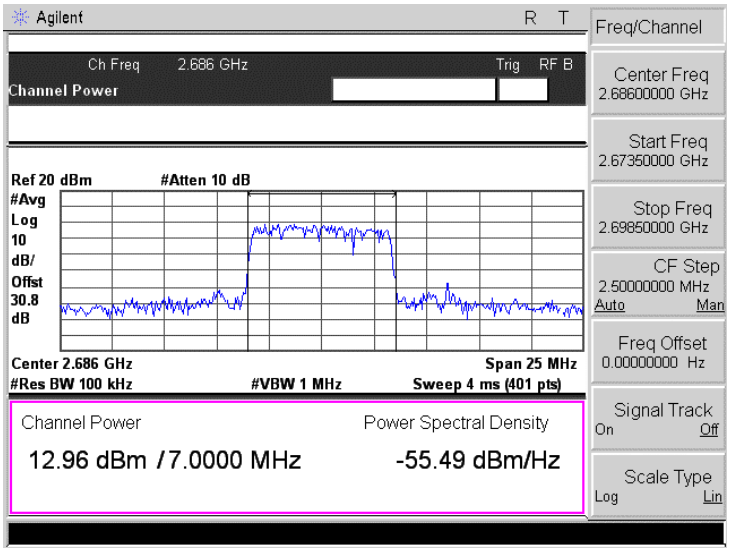


Plot 7.2.14 Peak output power test results at mid frequency, 7 MHz, QPSK



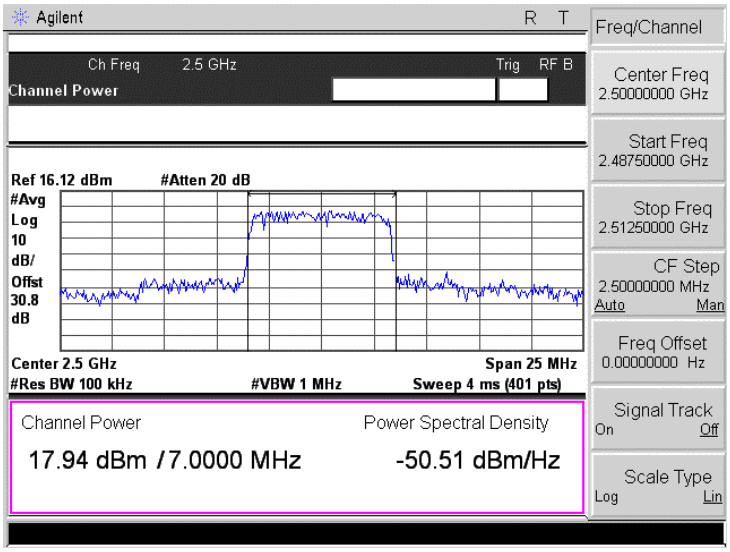
Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.15 Peak output power test results at high frequency, 7 MHz, QPSK

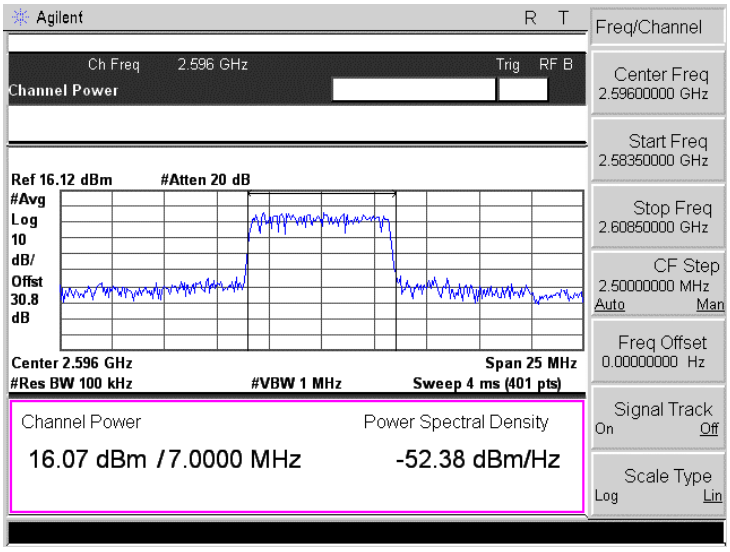


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.16 Peak output power test results at low frequency, 7 MHz, 16QAM

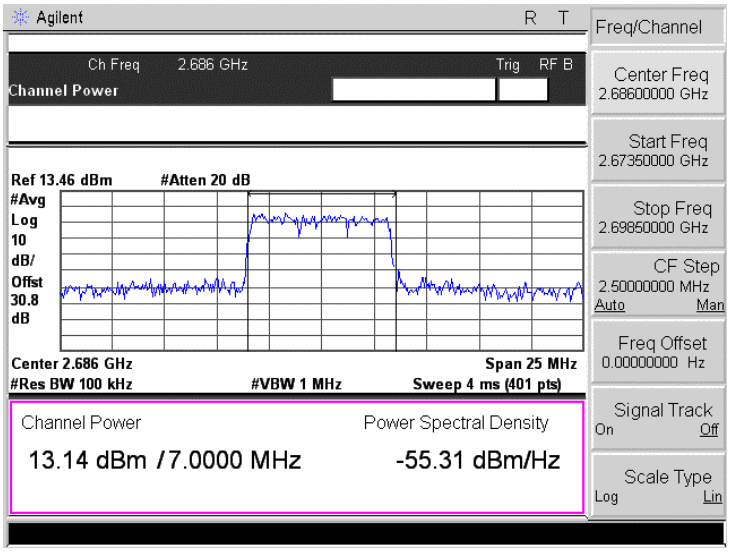


Plot 7.2.17 Peak output power test results at mid frequency, 7 MHz, 16QAM



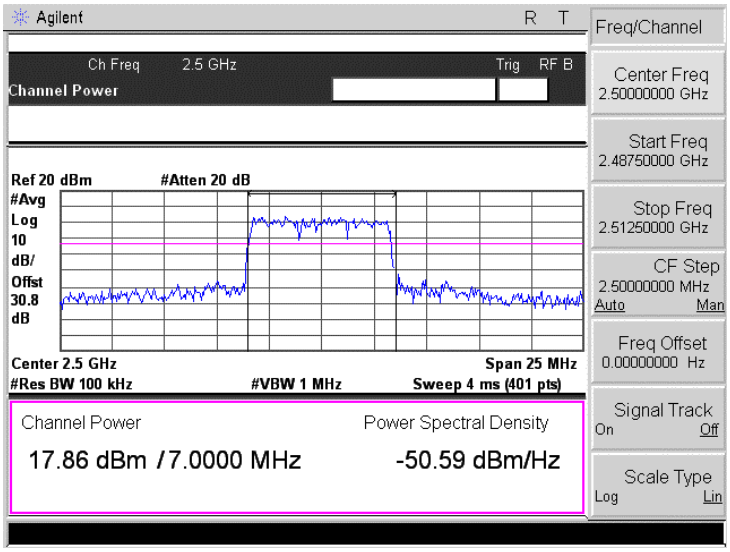
Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.18 Peak output power test results at high frequency, 7 MHz, 16QAM

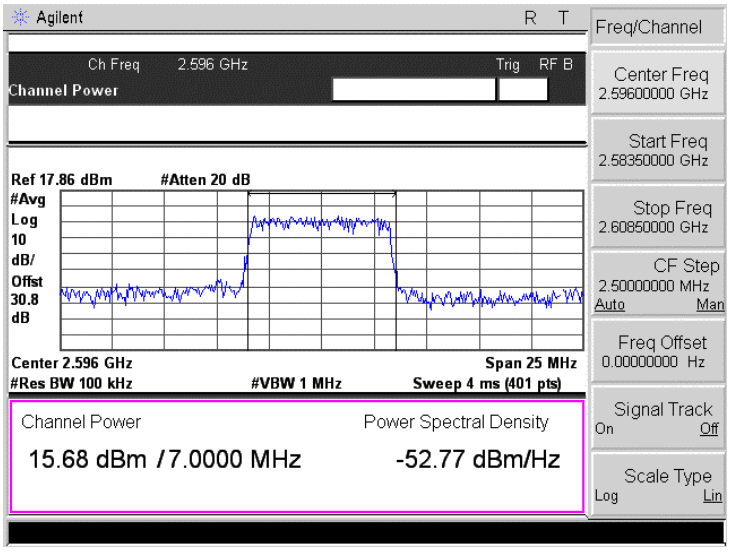


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.19 Peak output power test results at low frequency, 7 MHz, 64QAM

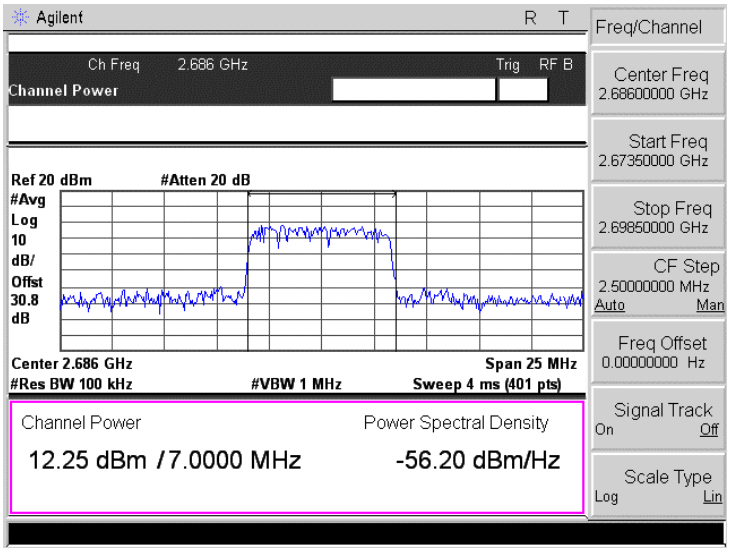


Plot 7.2.20 Peak output power test results at mid frequency, 7 MHz, 64QAM



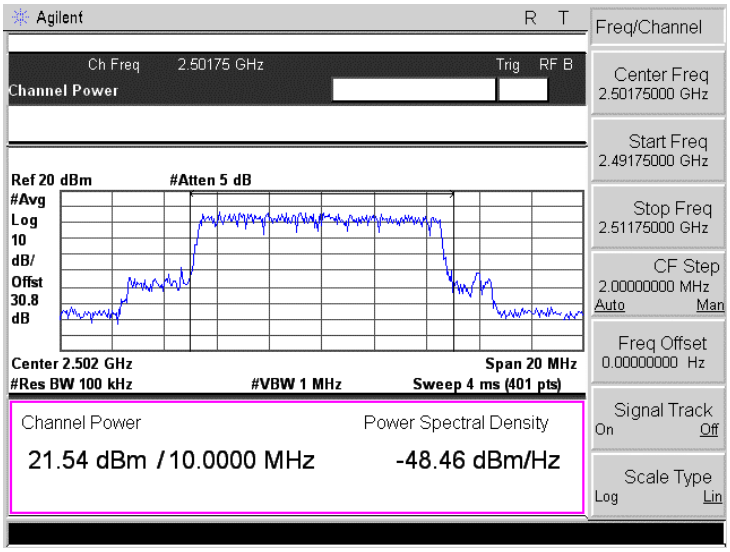
Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.21 Peak output power test results at high frequency, 7 MHz, 64QAM

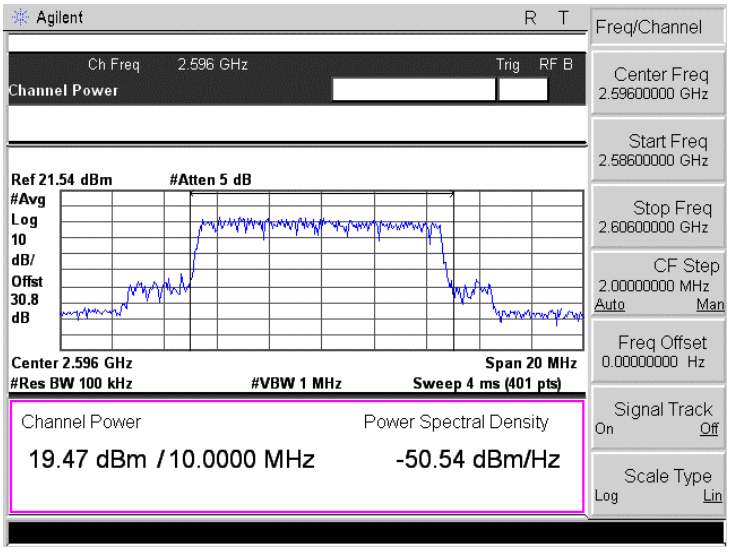


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.22 Peak output power test results at low frequency, 10 MHz, QPSK

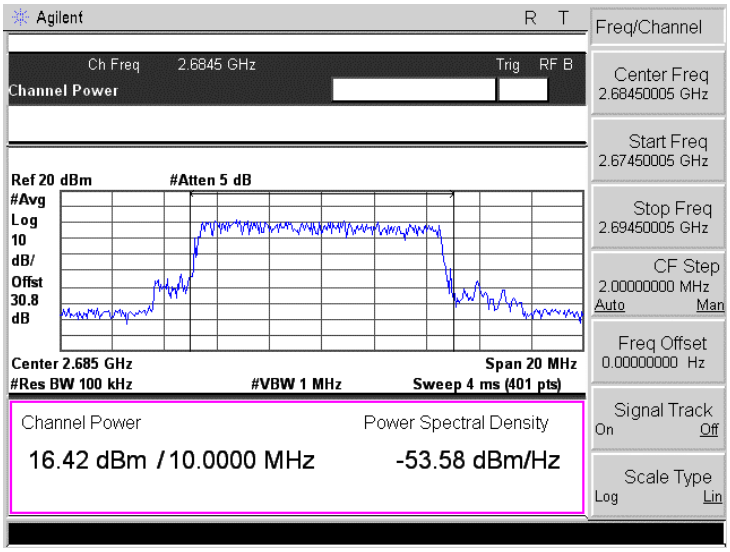


Plot 7.2.23 Peak output power test results at mid frequency, 10 MHz, QPSK



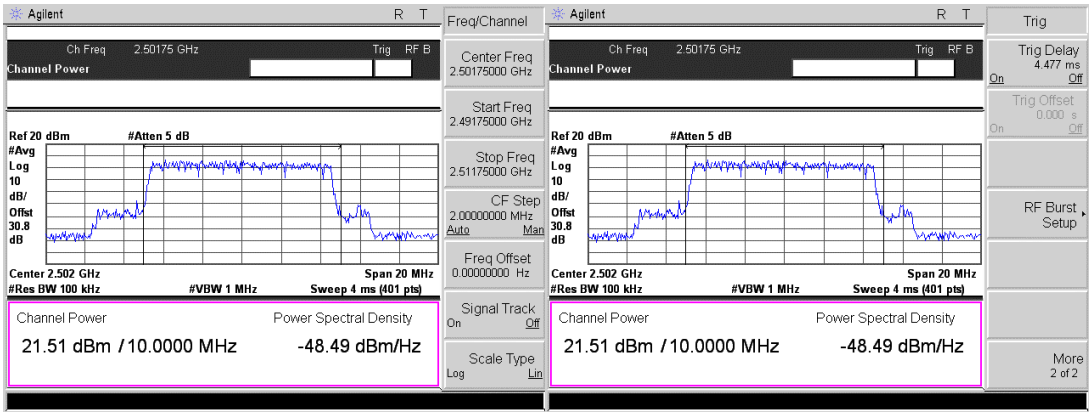
Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.24 Peak output power test results at high frequency, 10 MHz, QPSK

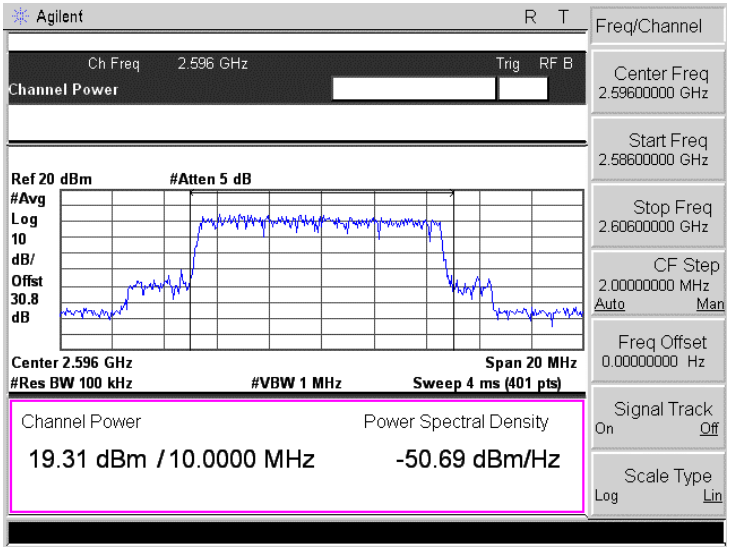


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.25 Peak output power test results at low frequency, 10 MHz, 16QAM

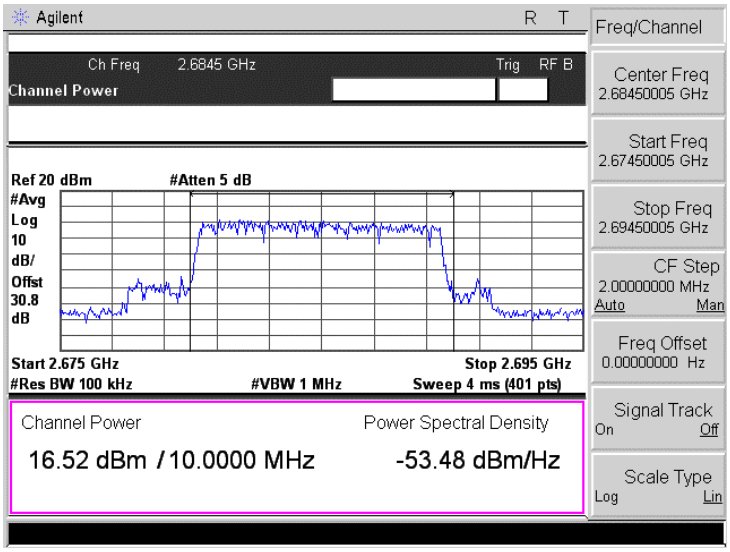


Plot 7.2.26 Peak output power test results at mid frequency, 10 MHz, 16QAM



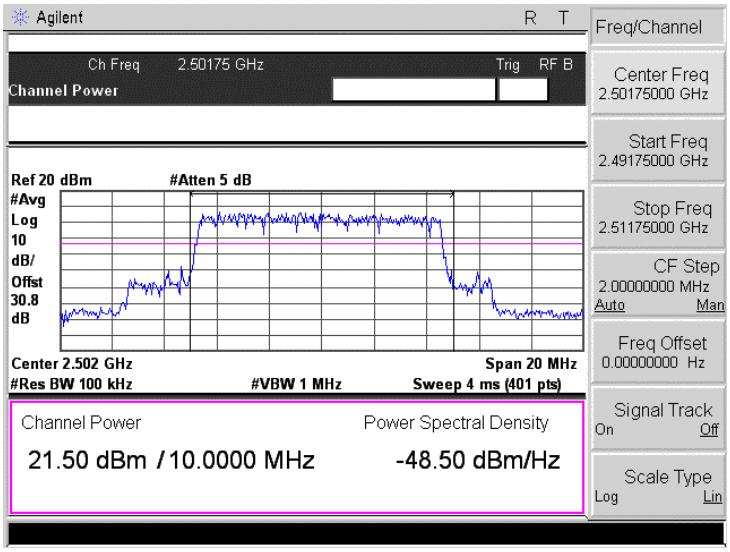
Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.27 Peak output power test results at high frequency, 10 MHz, 16QAM

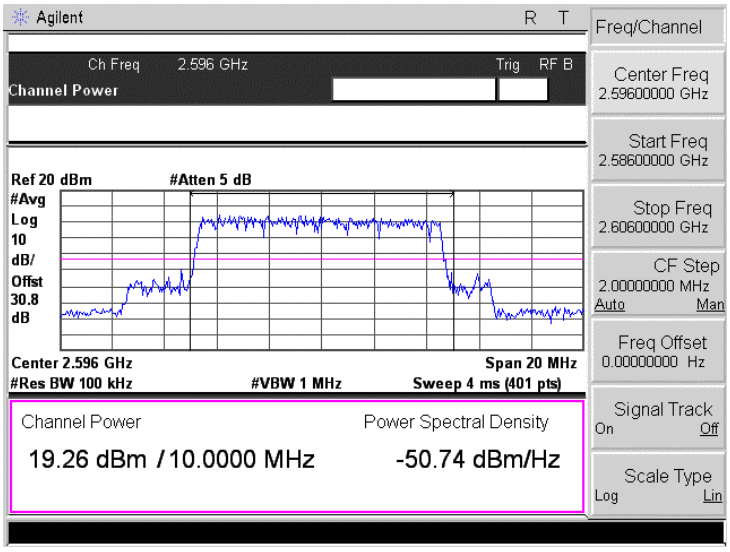


Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.28 Peak output power test results at low frequency, 10 MHz, 64QAM

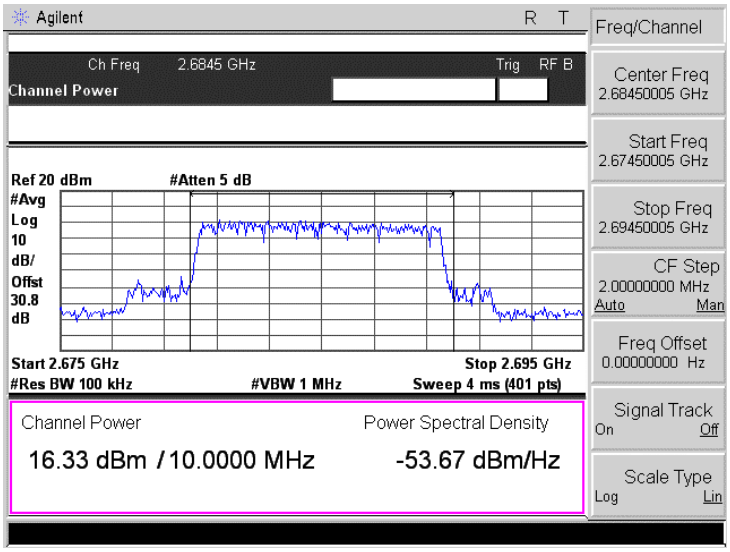


Plot 7.2.29 Peak output power test results at mid frequency, 10 MHz, 64QAM



Test specification:	Section 27.50(h)(ii), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:29:59 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.30 Peak output power test results at high frequency, 10 MHz, 64QAM



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

7.3 Radiated spurious emission measurements

7.3.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.3.1.

Table 7.3.1 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 – 10th 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×P×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

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

7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and the performance check was conducted.
7.3.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna was rotated around its vertical axis.
7.3.2.3 The worst test results (the lowest margins) were recorded in Table 7.3.2 and shown in the associated plots.

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

7.3.3.1 The EUT was set up as shown in Figure 7.3.2, energized and the performance check was conducted.
7.3.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.
7.3.3.3 The worst test results (the lowest margins) were recorded in Table 7.3.2 and shown in the associated plots.

7.3.4 Test procedure for substitution ERP measurements of spurious

7.3.4.1 The test equipment was set up as shown in Figure 7.3.3 and energized.
7.3.4.2 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.
7.3.4.3 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.
7.3.4.4 The above procedure was performed in both, horizontal and vertical, polarizations of the test and substitution antennas.
7.3.4.5 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.
7.3.4.6 The above procedure was repeated at the rest of investigated frequencies.
7.3.4.7 The worst test results (the lowest margins) were recorded in Table 7.3.3 and shown in the associated plots.

Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Figure 7.3.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

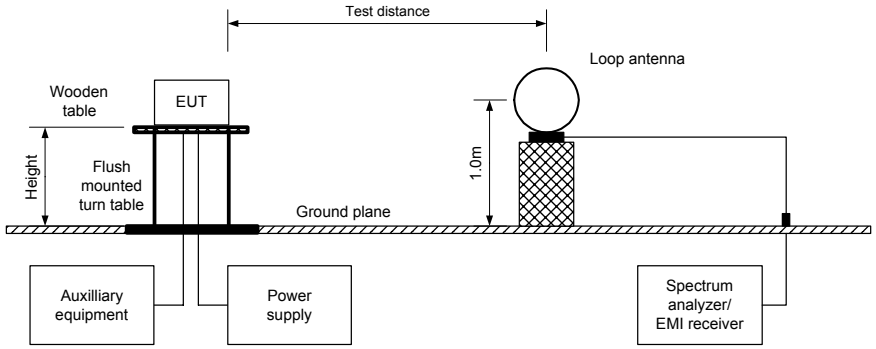
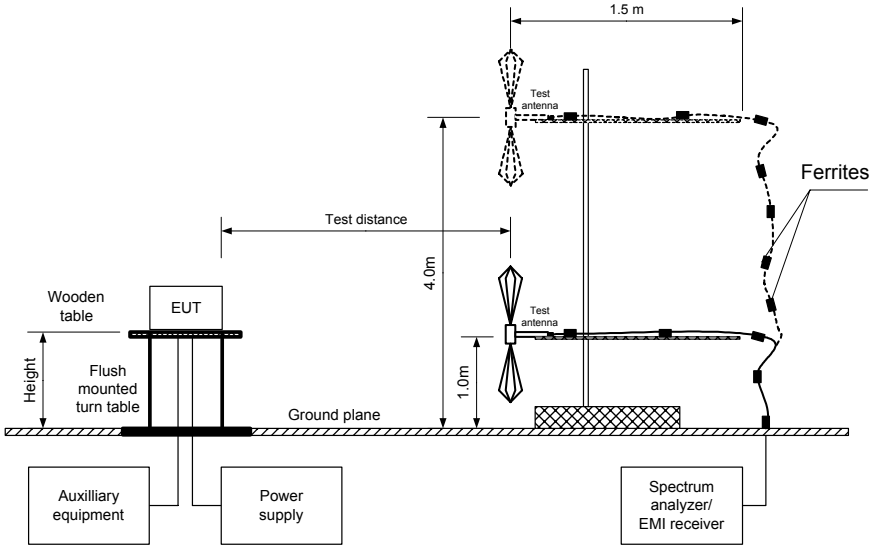
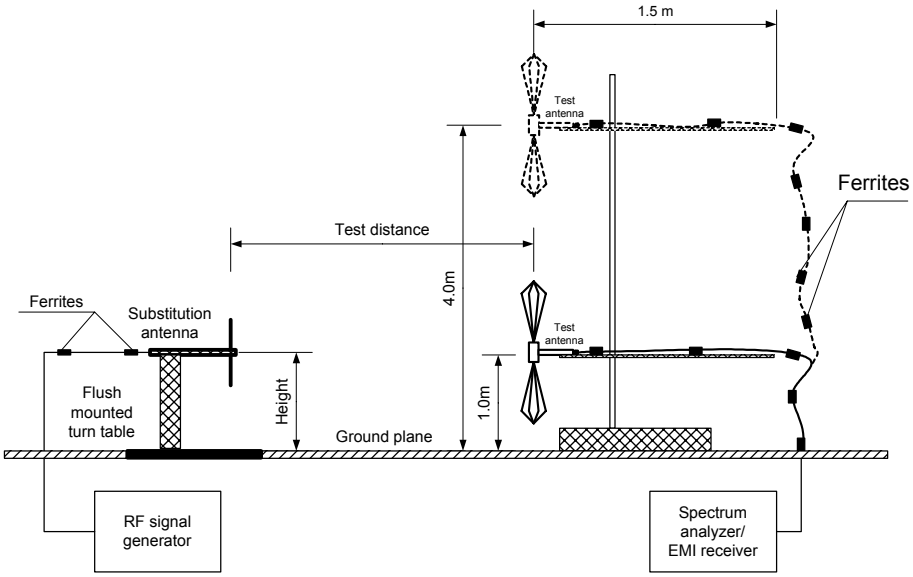


Figure 7.3.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Figure 7.3.3 Setup for substitution ERP measurements of spurious



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Table 7.3.2 Spurious emission field strength test results

ASSIGNED FREQUENCY RANGE:	2496.0 – 2690.0 MHz
TEST DISTANCE:	3 m
TEST SITE:	Semi anechoic chamber / 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 (above 1000 MHz)
MODULATION:	64QAM
MODULATING SIGNAL:	PRBS
BIT RATE:	18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS:	21.51 dBm at low frequency 19.38 dBm at mid frequency 16.11 dBm at high frequency

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 carrier frequency 2499.00 MHz							
300.0225	54.63	84.40	-29.77	120	V	1.1	010
Mid carrier frequency 2593.00 MHz							
300.0225	54.54	84.40	-29.86	120	V	1.1	340
High carrier frequency 2687.25 MHz							
300.0225	54.42	84.40	-29.98	120	V	1.1	000

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

Test specification:	**Section 27.53(l)(2), Radiated spurious emissions**		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.3.3 Substitution ERP of spurious test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
TRANSMITTER CARRIER ERP: 21.51 dBm at low frequency
19.38 dBm at mid frequency
16.15 dBm at high frequency
TEST SITE: Semi anechoic chamber / 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	Limit, dBm	Margin dB*	Verdict
Low carrier frequency										
300.0225	54.63	120	V	-43.20	-0.77	0.57	-44.54	-13.0	-31.54	Pass
Mid carrier frequency										
300.0225	54.54	120	V	-43.29	-0.77	0.57	-44.63	-13.0	-31.63	Pass
High carrier frequency										
300.0225	54.42	120	V	-43.41	-0.77	0.57	-44.75	-13.0	-31.75	Pass

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

Reference numbers of test equipment used

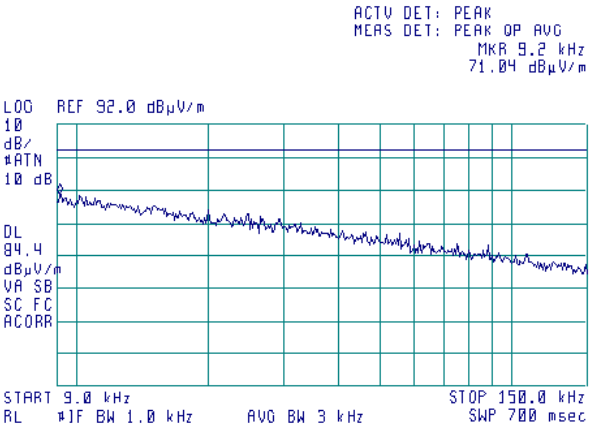
HL 0415	HL 0446	HL 0521	HL 0554	HL 0569	HL 0604	HL 0614	HL 0768
HL 0812	HL 1430	HL 1984	HL 2254	HL 2667	HL 2909	HL 2910	HL 3121
HL 3122	HL 3123	HL 3206	HL 3535				

Full description is given in Appendix A.

Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

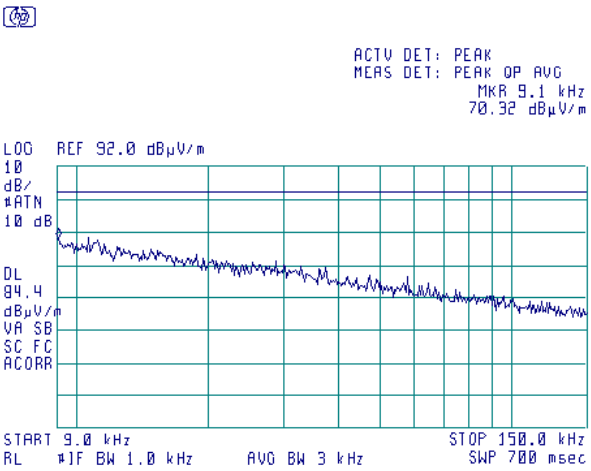
Plot 7.3.1 Radiated emission measurements in 9 - 150 kHz range

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



Plot 7.3.2 Radiated emission measurements in 9 - 150 kHz range

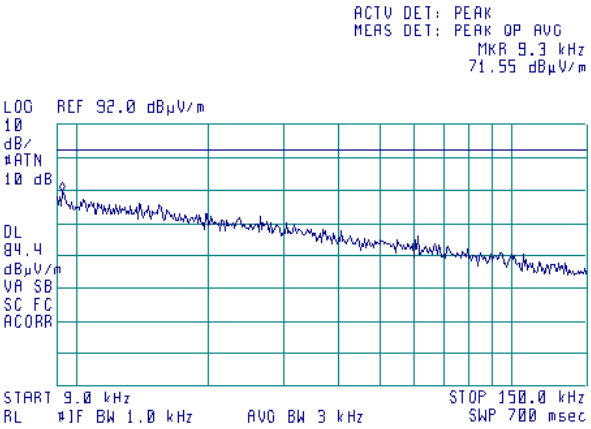
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

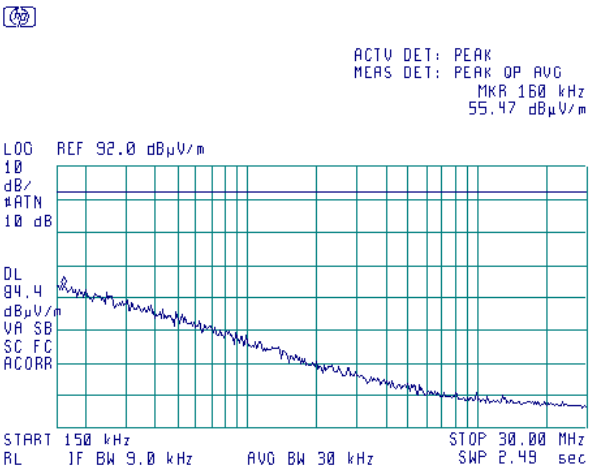
Plot 7.3.3 Radiated emission measurements in 9 - 150 kHz range

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



Plot 7.3.4 Radiated emission measurements in 0.15 - 30 MHz range

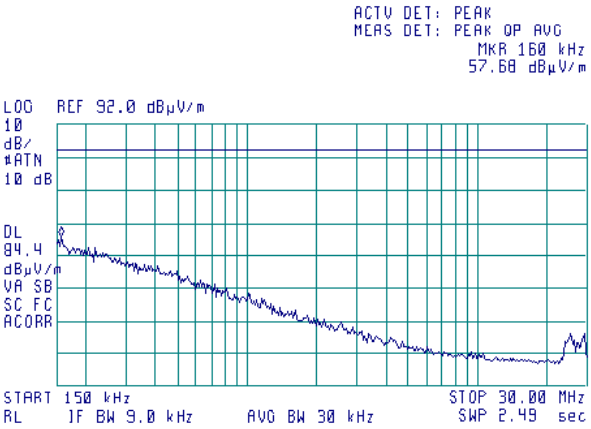
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

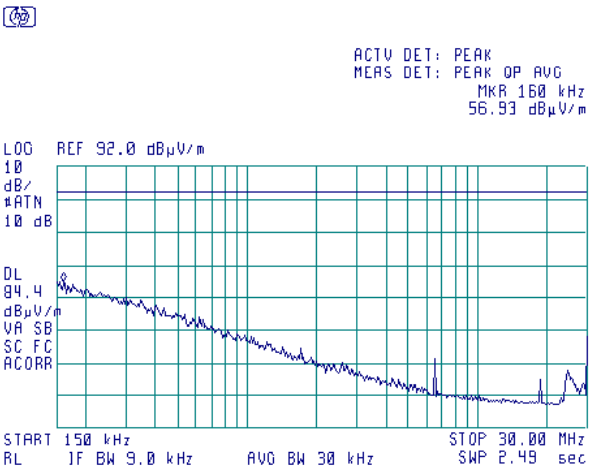
Plot 7.3.5 Radiated emission measurements in 0.15 - 30 MHz range

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



Plot 7.3.6 Radiated emission measurements in 0.15 - 30 MHz range

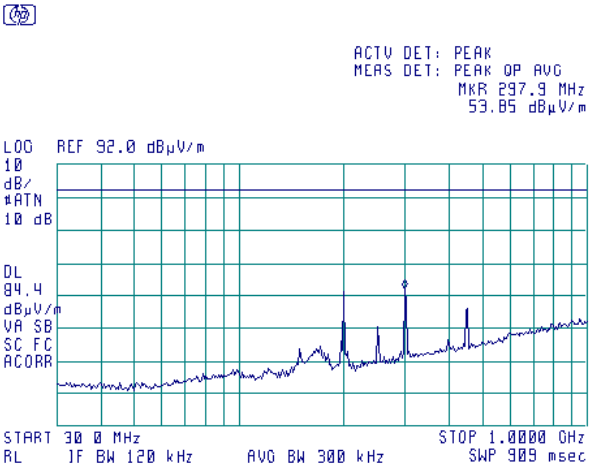
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

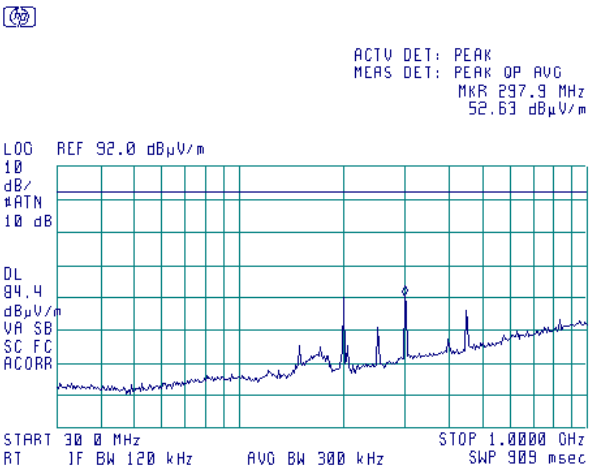
Plot 7.3.7 Radiated emission measurements in 30 - 1000 MHz range

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



Plot 7.3.8 Radiated emission measurements in 30 - 1000 MHz range

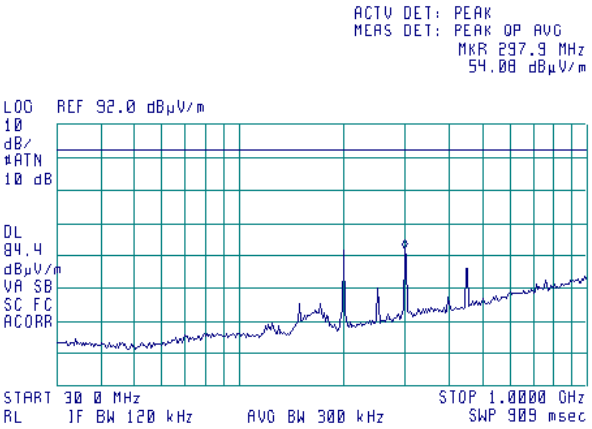
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

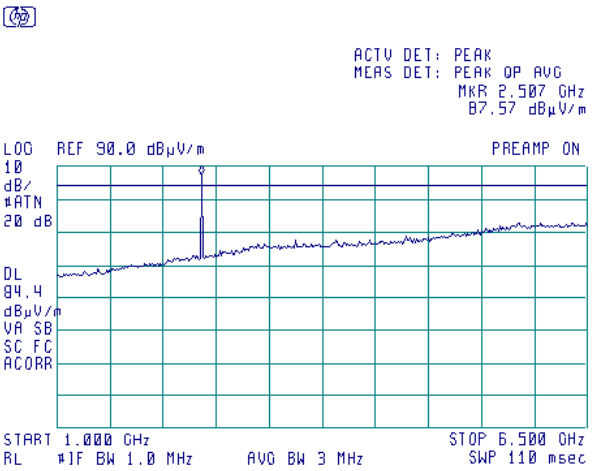
Plot 7.3.9 Radiated emission measurements in 30 - 1000 MHz range

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



Plot 7.3.10 Radiated emission measurements in 1000 – 6500 MHz range

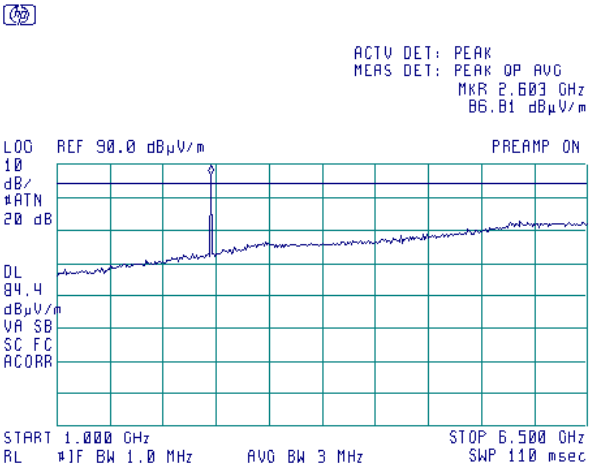
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.3.11 Radiated emission measurements in 1000 – 6500 MHz range

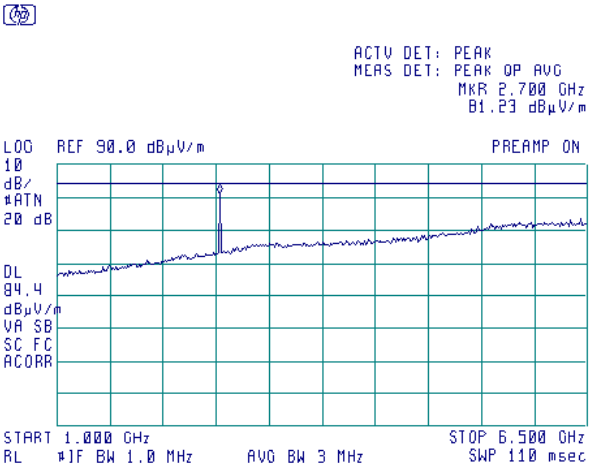
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



2593.0 MHz mid carrier frequency

Plot 7.3.12 Radiated emission measurements in 1000 – 6500 MHz range

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

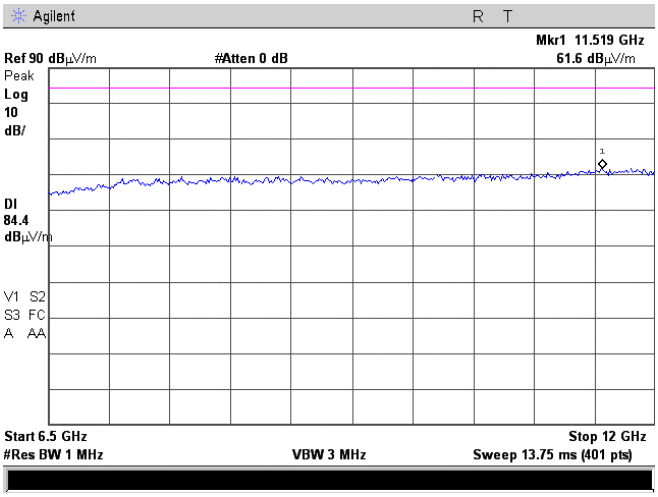


2687.25 MHz high carrier frequency

Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

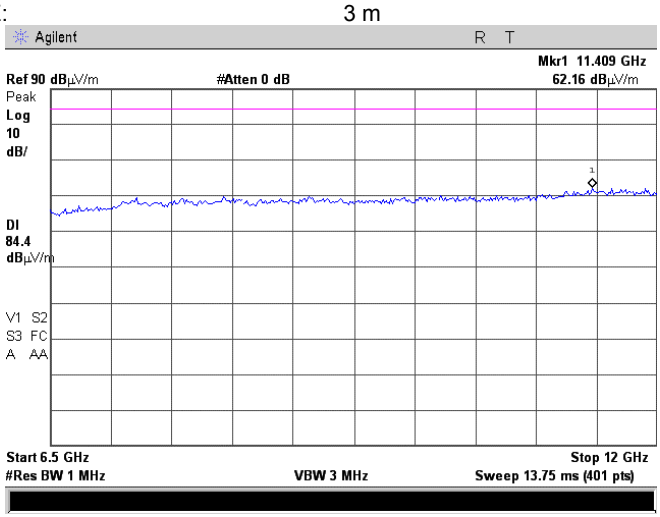
Plot 7.3.13 Radiated emission measurements in 6500 – 12000 MHz range

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



Plot 7.3.14 Radiated emission measurements in 6500 – 12000 MHz range

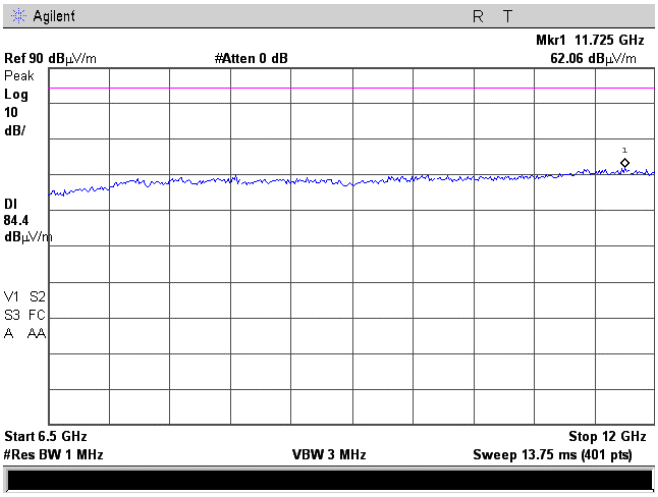
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

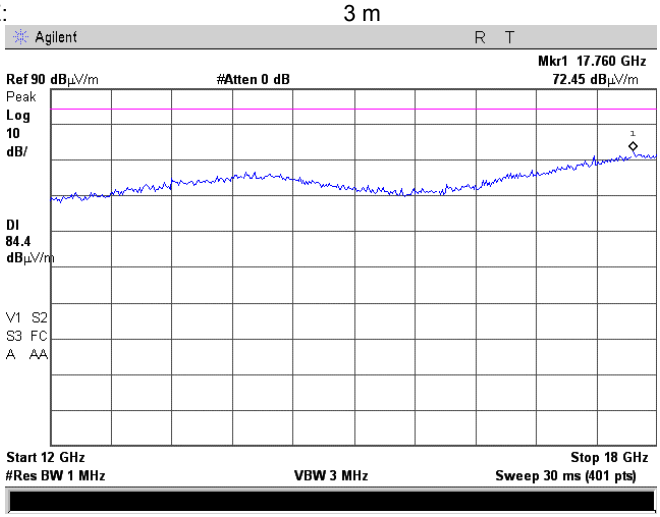
Plot 7.3.15 Radiated emission measurements in 6500 – 12000 MHz range

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



Plot 7.3.16 Radiated emission measurements in 12000 – 18000 MHz range

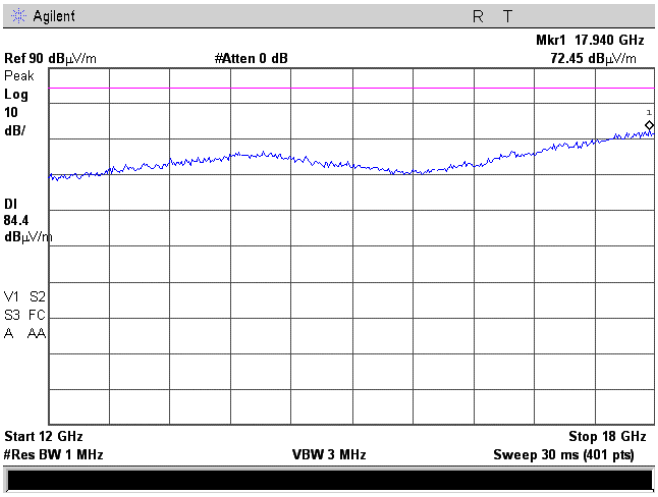
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

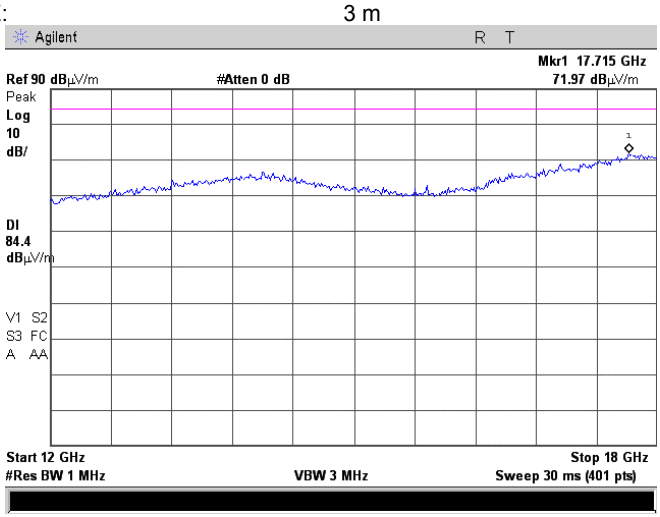
Plot 7.3.17 Radiated emission measurements in 12000 – 18000 MHz range

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



Plot 7.3.18 Radiated emission measurements in 12000 – 18000 MHz range

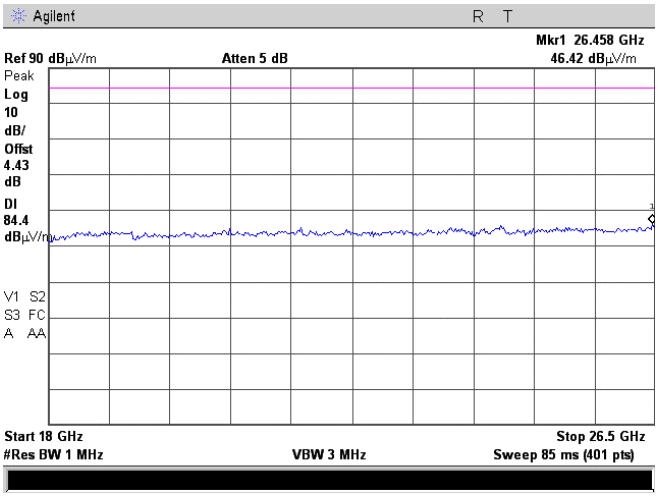
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

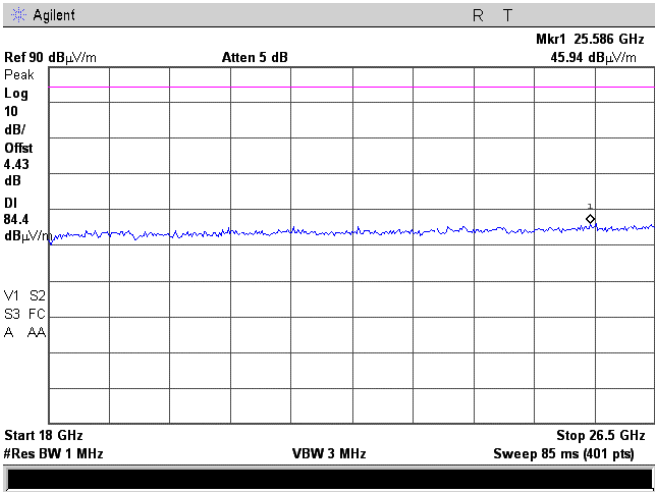
Plot 7.3.19 Radiated emission measurements in 18000 – 26500 MHz range

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



Plot 7.3.20 Radiated emission measurements in 18000 – 26500 MHz range

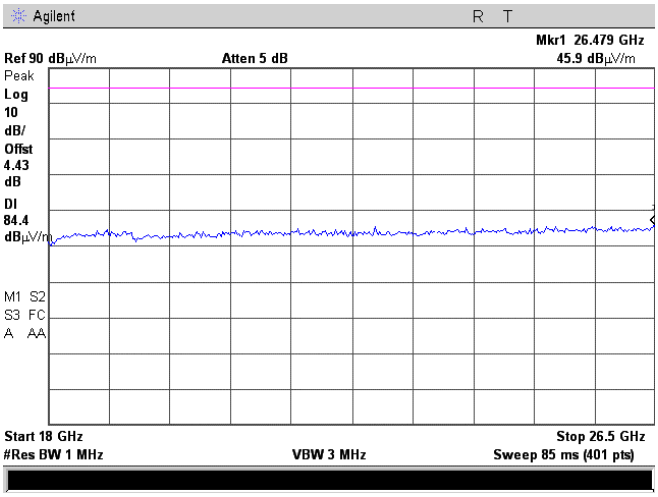
TEST SITE: OATS
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 27.53(l)(2), Radiated spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 12:22:21 PM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

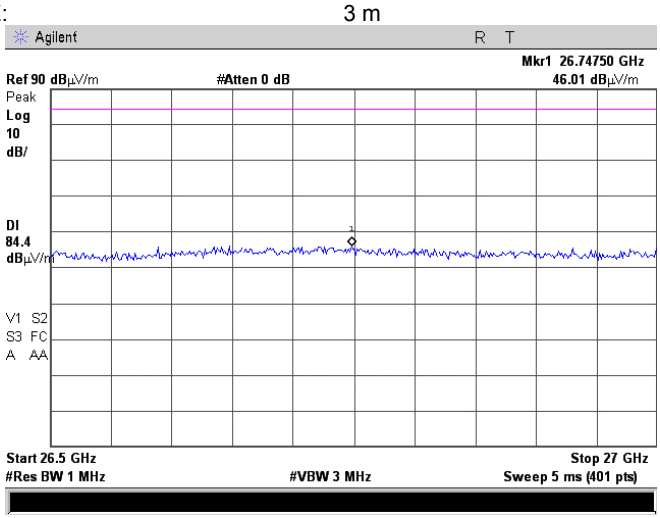
Plot 7.3.21 Radiated emission measurements in 18000 – 26500 MHz range

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



Plot 7.3.22 Radiated emission measurements in 26500 – 27000 MHz range

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



Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

7.4 Spurious emissions at RF antenna connector test

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	ERP of spurious, dBm
0.009 – 10th harmonic*	43+10logP*	-13.0

* - P is transmitter output power in Watts

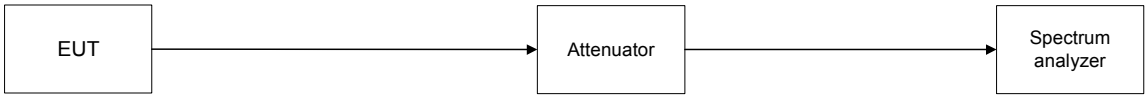
7.4.2 Test procedure

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 to Table 7.4.10 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 & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 43 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.4.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 28000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: QPSK
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
CHANNEL BW: 5 MHz
TRANSMITTER OUTPUT POWER: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
2490.0000	-22.97	Included	Included	1000	-22.97	-13.0	-9.97	Pass
2494.8875	-24.79	Included	Included	100	-24.79	-23.0	-1.79	Pass
2495.9975	-21.58	Included	Included	100	-21.58	-13.0	-8.58	Pass
2502.4375	-24.86	Included	Included	100	-24.86	-13.0	-11.86	Pass
2503.0175	-27.88	Included	Included	100	-27.88	-23.0	-4.88	Pass
Low carrier frequency (2504.75 MHz)								
2500.6150	-26.21	Included	Included	100	-26.21	-23.0	-3.21	Pass
2502.0000	-26.55	Included	Included	10	-26.55	-23.0	-3.55	Pass
2507.5025	-26.71	Included	Included	10	-26.71	-23.0	-3.71	Pass
2508.5110	-26.27	Included	Included	100	-26.27	-23.0	-3.27	Pass
Mid carrier frequency								
2580.0000	-29.27	Included	Included	1000	-29.27	-13.0	-16.27	Pass
2588.9550	-27.00	Included	Included	100	-27.00	-23.0	-4.00	Pass
2589.9925	-21.86	Included	Included	100	-21.86	-13.0	-8.86	Pass
2596.4325	-25.55	Included	Included	100	-25.55	-13.0	-12.55	Pass
2597.0150	-28.35	Included	Included	100	-28.35	-23.0	-5.35	Pass
High carrier frequency								
2675.8000	-30.22	Included	Included	1000	-30.22	-13.0	-17.22	Pass
2683.4450	-28.94	Included	Included	100	-28.94	-13.0	-15.94	Pass
2684.4975	-29.98	Included	Included	10	-29.98	-23.0	-6.98	Pass
2690.0100	-13.58	Included	Included	100	-13.58	-13.0	-0.58	Pass
2691.0000	-29.41	Included	Included	100	-29.41	-23.0	-6.41	Pass

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

Test specification:	**Section 27.53(l)(2), Spurious emissions**		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 43 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.4.3 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 28000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
CHANNEL BW: 5 MHz
TRANSMITTER OUTPUT POWER: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
2494.9500	-26.04	Included	Included	100	-26.04	-23.0	-3.04	Pass
2495.9875	-21.64	Included	Included	100	-21.64	-13.0	-8.64	Pass
2502.4350	-24.27	Included	Included	100	-24.27	-13.0	-11.27	Pass
2504.9983	-27.51	Included	Included	100	-27.51	-23.0	-4.51	Pass
Low carrier frequency (2504.75 MHz)								
2500.9450	-26.40	Included	Included	100	-26.40	-23.0	-3.40	Pass
2501.9975	-25.96	Included	Included	10	-25.96	-23.0	-12.96	Pass
2507.5075	-27.04	Included	Included	10	-27.04	-23.0	-14.04	Pass
2508.5230	-26.33	Included	Included	100	-26.33	-23.0	-3.33	Pass
Mid carrier frequency								
2587.9425	-26.27	Included	Included	100	-26.27	-23.0	-3.27	Pass
2589.9925	-22.44	Included	Included	100	-22.44	-13.0	-9.44	Pass
2596.2125	-25.97	Included	Included	100	-25.97	-13.0	-12.97	Pass
2598.9950	-28.67	Included	Included	100	-28.67	-23.0	-5.67	Pass
High carrier frequency								
2683.4590	-27.90	Included	Included	100	-27.90	-23.0	-4.90	Pass
2684.5000	-30.57	Included	Included	10	-30.57	-23.0	-7.57	Pass
2690.0075	-15.03	Included	Included	100	-15.03	-13.0	-2.03	Pass
2691.0000	-29.65	Included	Included	100	-29.65	-23.0	-6.65	Pass

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

Test specification:	**Section 27.53(l)(2), Spurious emissions**		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 43 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.4.4 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 28000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
CHANNEL BW: 5 MHz
TRANSMITTER OUTPUT POWER: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
2494.8750	-25.50	Included	Included	100	-25.50	-23.0	-2.50	Pass
2495.9975	-20.44	Included	Included	100	-20.44	-13.0	-7.44	Pass
2502.4275	-23.83	Included	Included	100	-23.83	-13.0	-10.83	Pass
2503.1750	-26.35	Included	Included	100	-26.35	-23.0	-3.35	Pass
Low carrier frequency (2504.75 MHz)								
2499.6525	-25.87	Included	Included	100	-25.87	-23.0	-2.87	Pass
2501.9975	-25.41	Included	Included	10	-25.41	-23.0	-2.41	Pass
2507.5050	-26.74	Included	Included	10	-26.74	-23.0	-3.74	Pass
2508.5230	-25.79	Included	Included	100	-25.79	-23.0	-2.79	Pass
Mid carrier frequency								
2588.9550	-26.03	Included	Included	100	-26.03	-23.0	-3.03	Pass
2589.9975	-22.02	Included	Included	100	-22.02	-13.0	-9.02	Pass
2596.4125	-25.83	Included	Included	100	-25.83	-13.0	-12.83	Pass
2597.0000	-27.90	Included	Included	100	-27.90	-23.0	-4.90	Pass
High carrier frequency								
2683.4860	-28.05	Included	Included	100	-28.05	-23.0	-5.05	Pass
2684.5000	-30.95	Included	Included	10	-30.95	-23.0	-7.95	Pass
2690.0000	-14.36	Included	Included	100	-14.36	-13.0	-1.36	Pass
2691.0000	-29.56	Included	Included	100	-29.56	-23.0	-6.56	Pass

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

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Table 7.4.5 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 28000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: QPSK
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
CHANNEL BW: 7 MHz
TRANSMITTER OUTPUT POWER: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
2494.5875	-44.13	Included	Included	1	-44.13	-43.0	-1.13	Pass
2495.9975	-16.33	Included	Included	100	-16.33	-13.0	-3.33	Pass
2507.5313	-18.81	Included	Included	1000	-18.81	-13.0	-5.81	Pass
2508.6613	-20.01	Included	Included	1000	-20.01	-13.0	-7.01	Pass
Mid carrier frequency								
2587.1325	-24.06	Included	Included	1000	-24.06	-13.0	-11.06	Pass
2589.8350	-33.67	Included	Included	100	-33.67	-13.0	-20.67	Pass
2602.0575	-27.54	Included	Included	100	-27.54	-13.0	-14.54	Pass
2603.0525	-18.59	Included	Included	1000	-18.59	-13.0	-5.59	Pass
High carrier frequency								
2676.1600	-27.17	Included	Included	1000	-27.17	-13.0	-14.17	Pass
2679.0000	-26.12	Included	Included	100	-26.12	-13.0	-13.12	Pass
2690.0000	-22.57	Included	Included	100	-22.57	-13.0	-9.57	Pass
2691.9900	-29.90	Included	Included	100	-29.90	-23.0	-6.90	Pass

*- Margin = Spurious emission – specification limit.

Test specification:	**Section 27.53(l)(2), Spurious emissions**		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 43 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.4.6 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 28000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
CHANNEL BW: 7 MHz
TRANSMITTER OUTPUT POWER: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
2494.9750	-24.47	Included	Included	100	-24.47	-23.0	-1.47	Pass
2495.9975	-17.00	Included	Included	100	-17.00	-13.0	-4.00	Pass
2508.1375	-31.79	Included	Included	100	-31.79	-13.0	-18.79	Pass
2508.9500	-20.20	Included	Included	1000	-20.20	-13.0	-7.20	Pass
Mid carrier frequency								
2588.9100	-20.20	Included	Included	1000	-20.20	-13.0	-7.20	Pass
2589.2875	-32.36	Included	Included	100	-32.36	-13.0	-19.36	Pass
2602.0000	-29.89	Included	Included	100	-29.89	-13.0	-16.89	Pass
2603.0175	-17.05	Included	Included	1000	-17.05	-13.0	-4.05	Pass
High carrier frequency								
2677.9800	-22.03	Included	Included	1000	-22.03	-13.0	-9.03	Pass
2678.1650	-34.73	Included	Included	100	-34.73	-13.0	-21.73	Pass
2690.0050	-25.26	Included	Included	100	-25.26	-13.0	-12.26	Pass
2691.3375	-31.30	Included	Included	100	-31.30	-23.0	-8.30	Pass

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

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Table 7.4.7 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 28000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
CHANNEL BW: 7 MHz
TRANSMITTER OUTPUT POWER: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
2495.0000	-25.43	Included	Included	100	-25.43	-23.0	-2.43	Pass
2496.0000	-17.35	Included	Included	100	-17.35	-13.0	-4.35	Pass
2507.6000	-32.76	Included	Included	100	-32.76	-13.0	-19.76	Pass
2508.6725	-19.62	Included	Included	1000	-19.62	-13.0	-6.62	Pass
Mid carrier frequency								
2588.7975	-20.38	Included	Included	1000	-20.38	-13.0	-7.38	Pass
2589.2800	-32.70	Included	Included	100	-32.70	-13.0	-19.70	Pass
2602.0200	-31.16	Included	Included	100	-31.16	-13.0	-18.16	Pass
2603.0175	-16.95	Included	Included	1000	-16.95	-13.0	-3.95	Pass
High carrier frequency								
2677.5000	-23.62	Included	Included	1000	-23.62	-13.0	-10.62	Pass
2678.5325	-34.74	Included	Included	100	-34.74	-13.0	-21.74	Pass
2690.0075	-27.13	Included	Included	100	-27.13	-13.0	-14.13	Pass
2691.3150	-31.23	Included	Included	100	-31.23	-23.0	-8.23	Pass

*- Margin = Spurious emission – specification limit.

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Table 7.4.8 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 28000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: QPSK
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
CHANNEL BW: 10 MHz
TRANSMITTER OUTPUT POWER: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
2494.1250	-24.99	Included	Included	100	-24.99	-23.0	-1.99	Pass
2495.9500	-23.74	Included	Included	100	-23.74	-13.0	-10.74	Pass
2507.6800	-25.16	Included	Included	100	-25.16	-13.0	-12.16	Pass
2509.9963	-26.95	Included	Included	100	-26.95	-23.0	-3.95	Pass
Mid carrier frequency								
2588.3925	-29.41	Included	Included	100	-29.41	-23.0	-6.41	Pass
2589.0850	-29.45	Included	Included	100	-29.45	-13.0	-16.45	Pass
2602.0050	-28.82	Included	Included	100	-28.82	-13.0	-15.82	Pass
2604.5925	-31.01	Included	Included	100	-31.01	-23.0	-8.01	Pass
High carrier frequency								
2676.7000	-29.65	Included	Included	100	-29.65	-23.0	-6.65	Pass
2679.0000	-18.08	Included	Included	100	-18.08	-13.0	-5.08	Pass
2690.0000	-20.44	Included	Included	100	-20.44	-13.0	-7.44	Pass
2693.0925	-32.89	Included	Included	100	-32.89	-23.0	-9.89	Pass

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

Test specification:	**Section 27.53(l)(2), Spurious emissions**		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 43 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.4.9 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 28000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
CHANNEL BW: 10 MHz
TRANSMITTER OUTPUT POWER: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
2494.0875	-26.18	Included	Included	100	-26.18	-23.0	-3.18	Pass
2495.9975	-24.12	Included	Included	100	-24.12	-13.0	-11.12	Pass
2507.6925	-25.12	Included	Included	100	-25.12	-13.0	-12.12	Pass
2509.9850	-27.38	Included	Included	100	-27.38	-23.0	-4.38	Pass
Mid carrier frequency								
2588.3475	-28.26	Included	Included	100	-28.26	-23.0	-5.26	Pass
2589.2100	-28.55	Included	Included	100	-28.55	-13.0	-15.55	Pass
2602.0000	-28.44	Included	Included	100	-28.44	-13.0	-15.44	Pass
2604.6450	-31.12	Included	Included	100	-31.12	-23.0	-8.12	Pass
High carrier frequency								
2676.6600	-29.67	Included	Included	100	-29.67	-23.0	-6.67	Pass
2679.0000	-17.86	Included	Included	100	-17.86	-13.0	-4.86	Pass
2690.0075	-20.73	Included	Included	100	-20.73	-13.0	-7.73	Pass
2693.1375	-32.16	Included	Included	100	-32.16	-23.0	-9.16	Pass

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

Test specification:	**Section 27.53(l)(2), Spurious emissions**		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 43 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.4.10 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 28000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
CHANNEL BW: 10 MHz
TRANSMITTER OUTPUT POWER: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
2495.0000	-26.20	Included	Included	100	-26.20	-23.0	-3.20	Pass
2495.9950	-22.79	Included	Included	100	-22.79	-13.0	-9.79	Pass
2507.7175	-24.80	Included	Included	100	-24.80	-13.0	-11.80	Pass
2509.9963	-27.36	Included	Included	100	-27.36	-23.0	-4.36	Pass
Mid carrier frequency								
2588.3475	-28.56	Included	Included	100	-28.56	-23.0	-5.56	Pass
2589.1000	-28.91	Included	Included	100	-28.91	-13.0	-15.91	Pass
2602.0000	-28.22	Included	Included	100	-28.22	-13.0	-15.22	Pass
2604.6450	-30.92	Included	Included	100	-30.92	-23.0	-7.92	Pass
High carrier frequency								
2676.6800	-30.04	Included	Included	100	-30.04	-23.0	-7.04	Pass
2679.0000	-18.01	Included	Included	100	-18.01	-13.0	-5.01	Pass
2690.0025	-21.24	Included	Included	100	-21.24	-13.0	-8.24	Pass
2693.1150	-32.59	Included	Included	100	-32.59	-23.0	-9.59	Pass

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

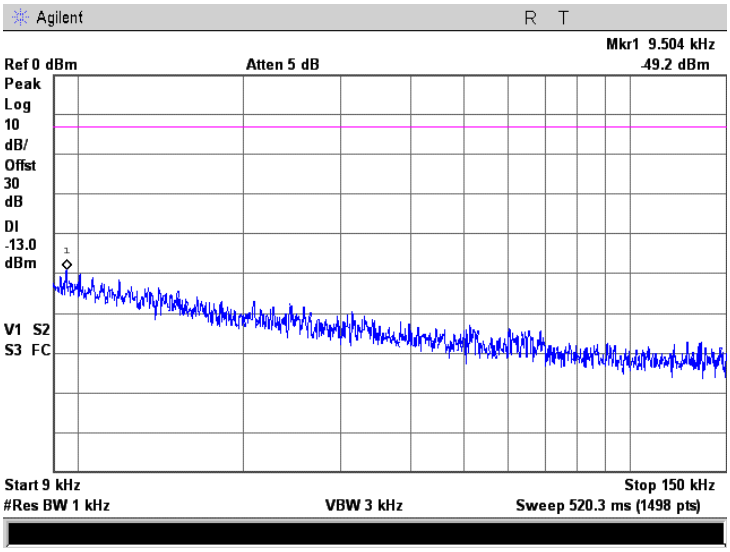
Reference numbers of test equipment used

HL 1424	HL 2254	HL 2909	HL 2953	HL 3321	HL 3386	HL 3455	

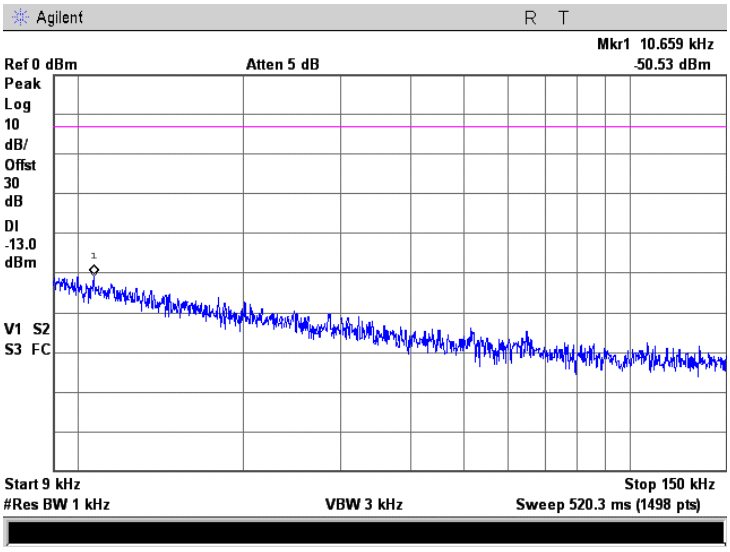
Full description is given in Appendix A.

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

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

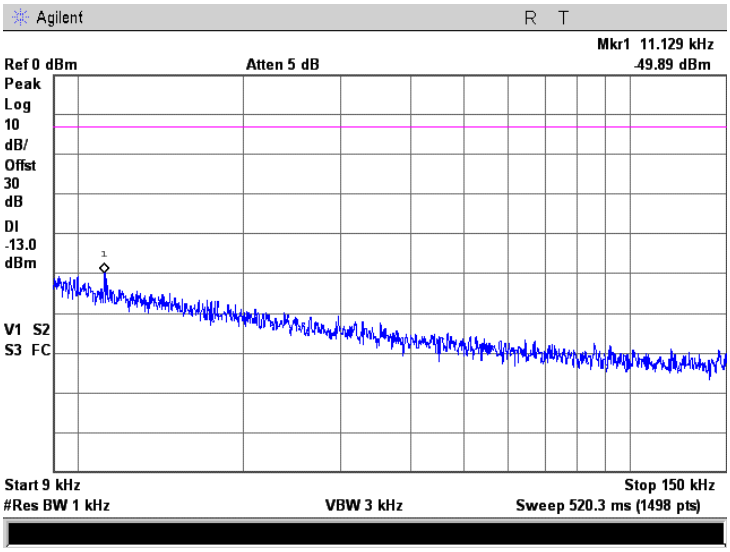


Plot 7.4.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency

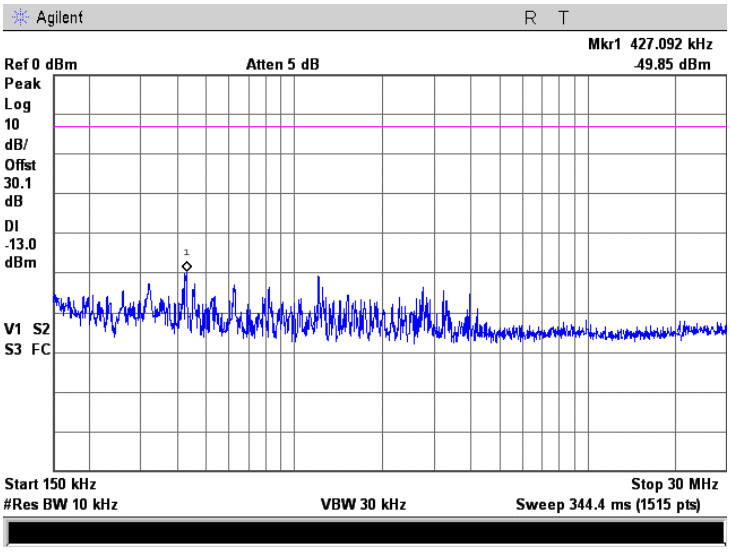


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

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

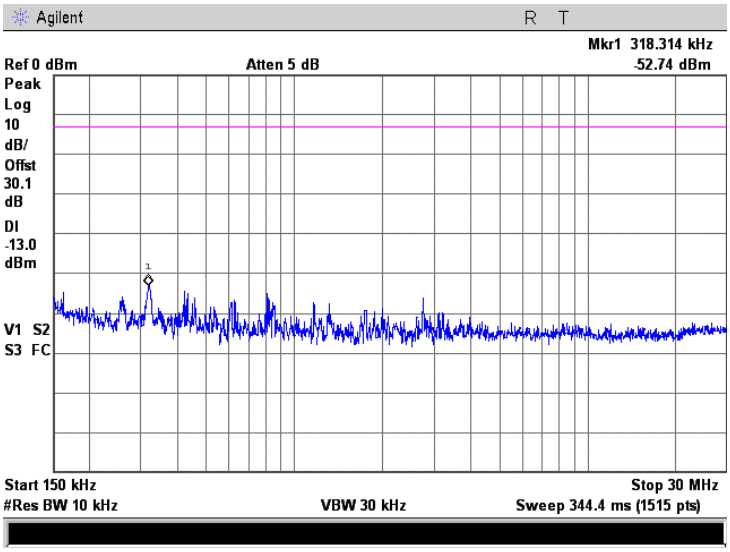


Plot 7.4.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

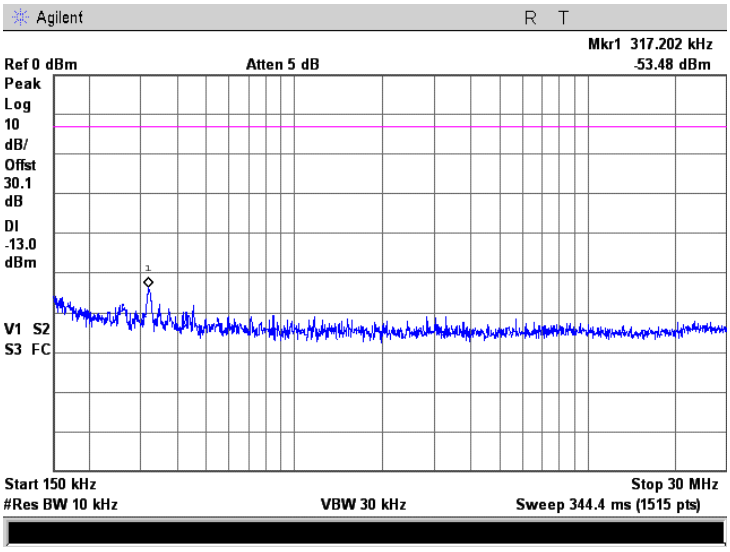


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

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

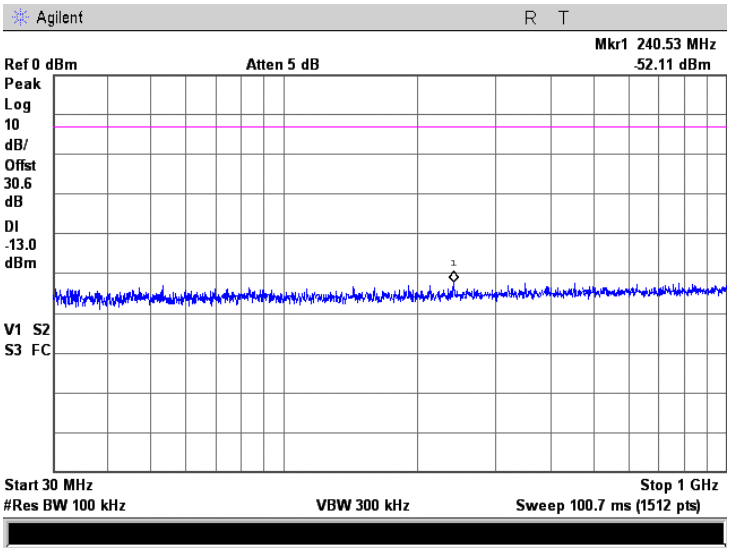


Plot 7.4.6 Spurious emission measurements in 0.15 – 30.0 MHz range at high carrier frequency

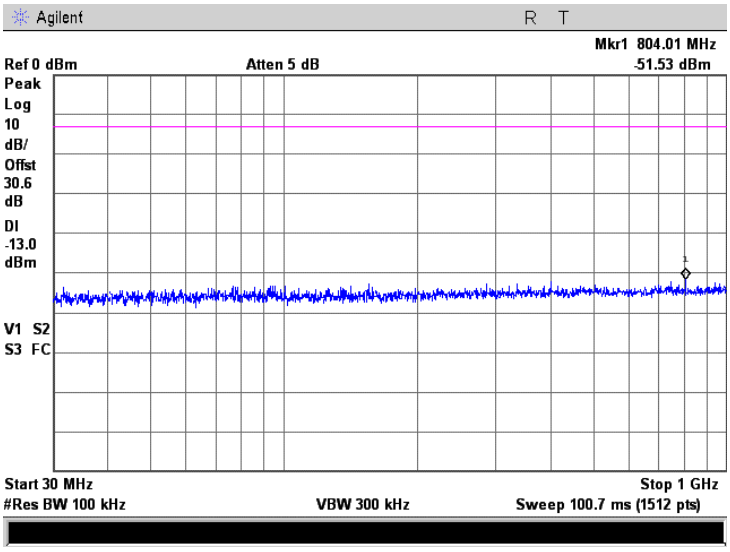


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

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

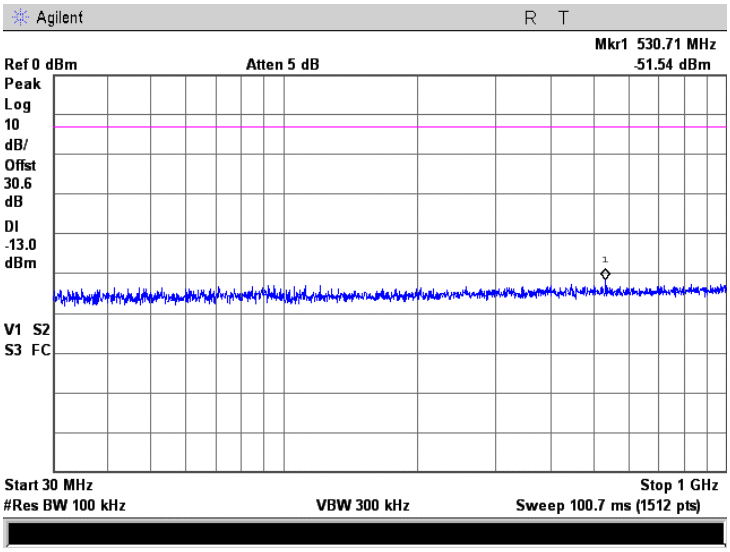


Plot 7.4.8 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency

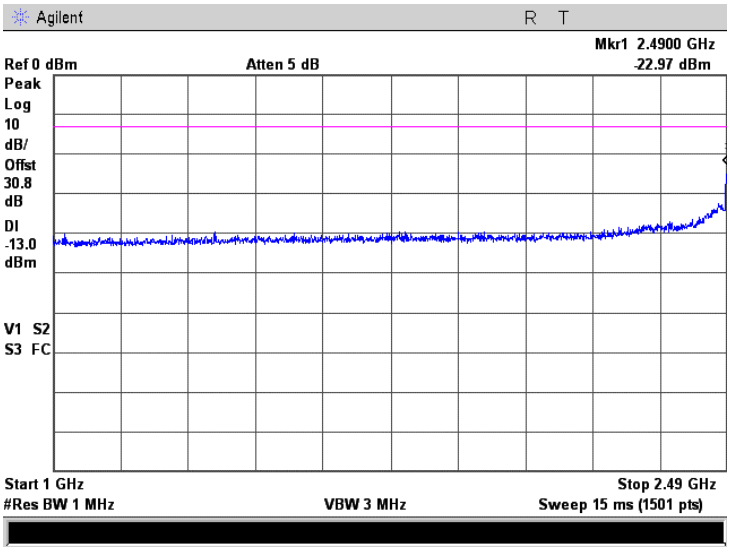


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

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

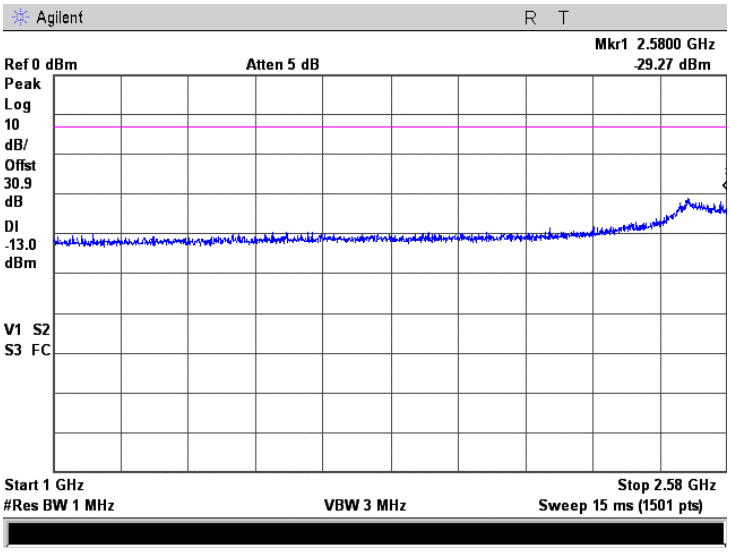


Plot 7.4.10 Spurious emission measurements in 1000 - 2490 MHz range at low carrier frequency

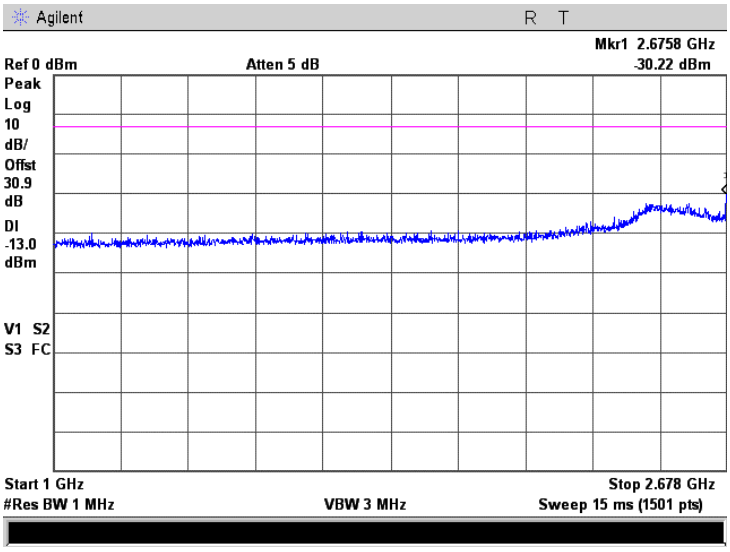


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.11 Spurious emission measurements in 1000 - 2580 MHz at mid carrier frequency

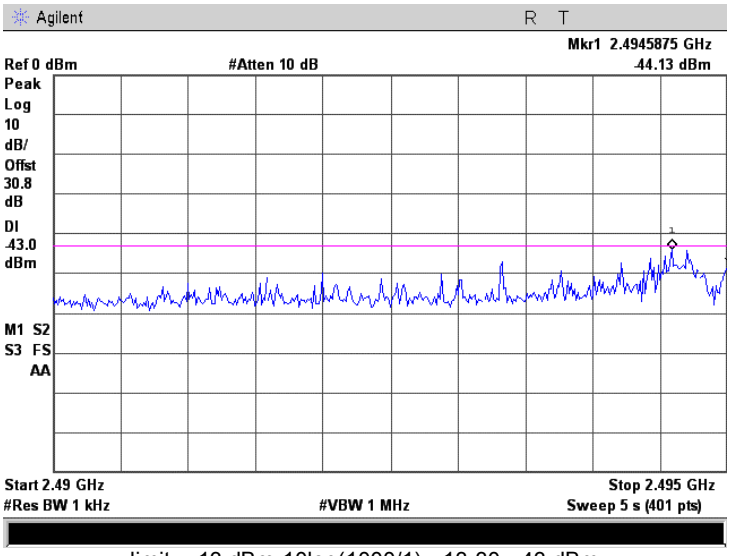


Plot 7.4.12 Spurious emission measurements in 1000 - 2678 MHz at high carrier frequency



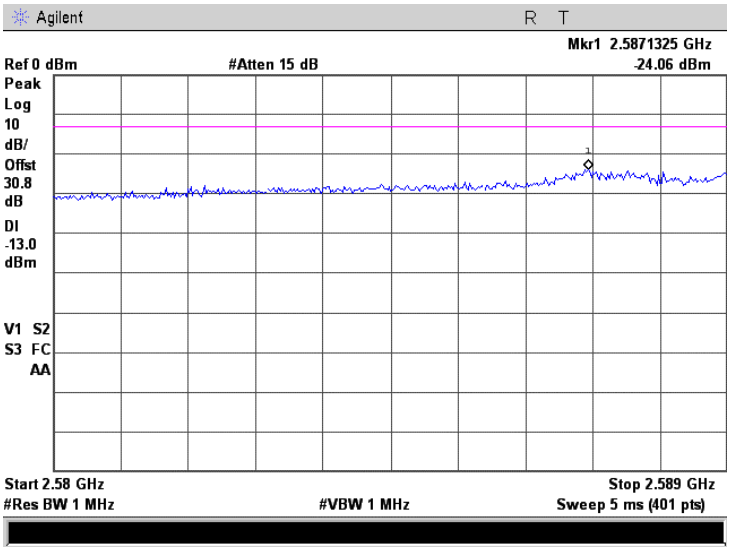
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.13 Band edges test results at low carrier frequency 2490 – 2495 MHz, 7 MHz, QPSK



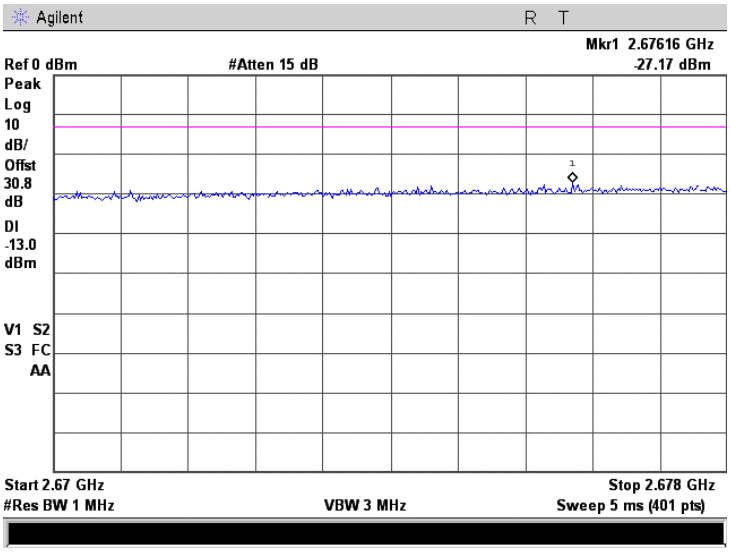
limit= -13 dBm-10log(1000/1)=-13-30=-43 dBm

Plot 7.4.14 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 7 MHz, QPSK

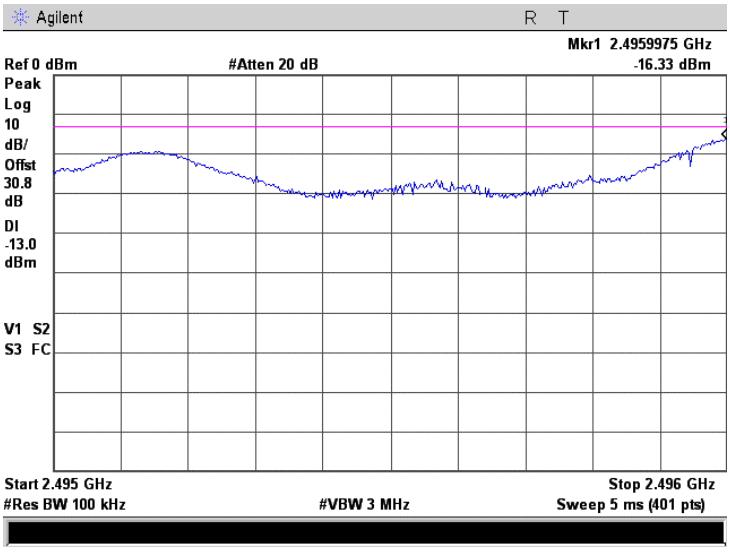


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.15 Band edges test results at high carrier frequency 2670 – 2678 MHz, 7 MHz, QPSK

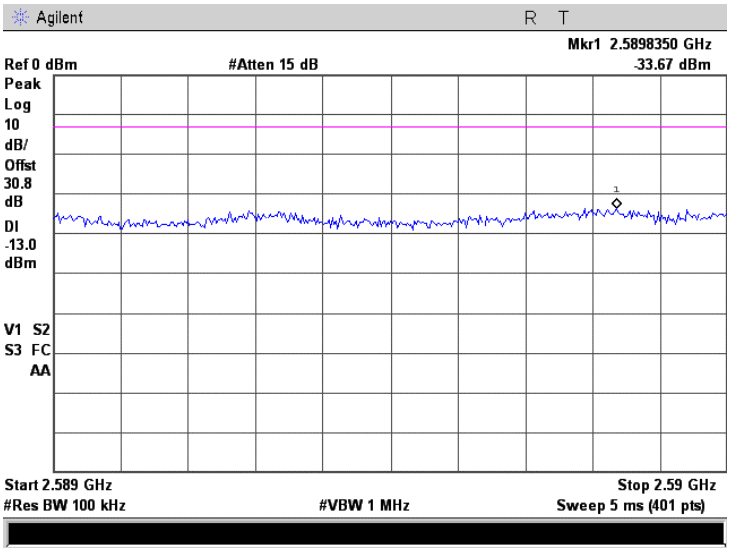


Plot 7.4.16 Band edges test results at low carrier frequency 2495 – 2496 MHz, 7 MHz, QPSK

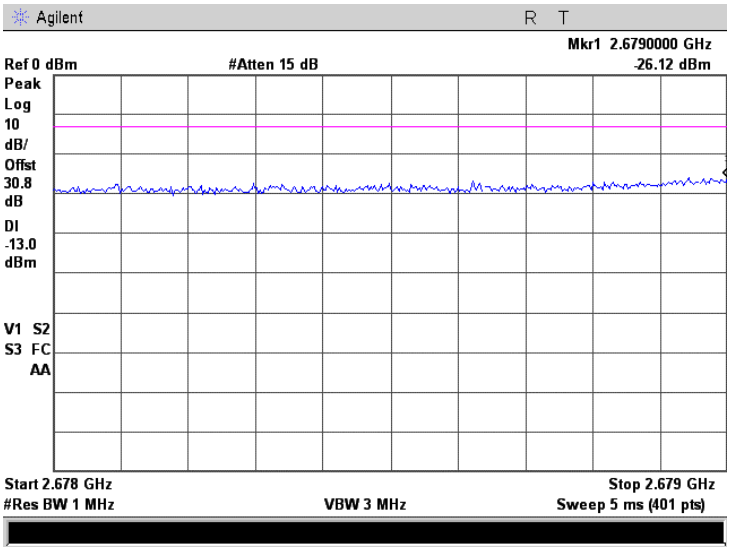


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.17 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 7 MHz, QPSK

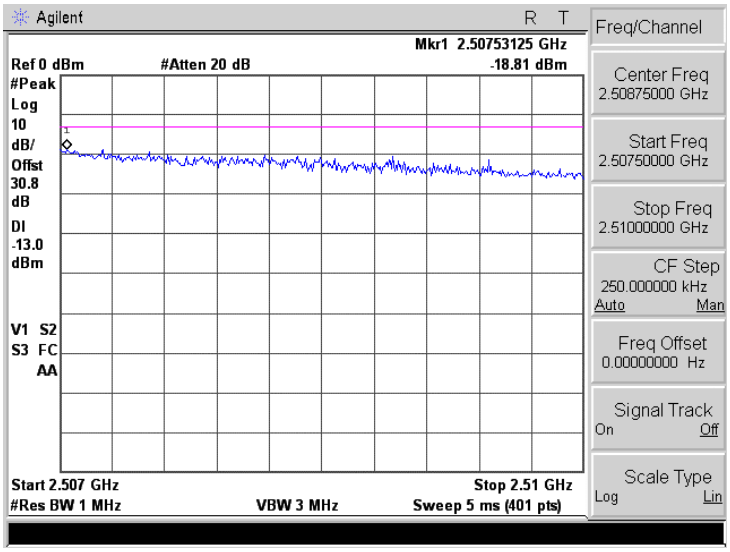


Plot 7.4.18 Band edges test results at high carrier frequency 2678 – 2679 MHz, 7 MHz, QPSK

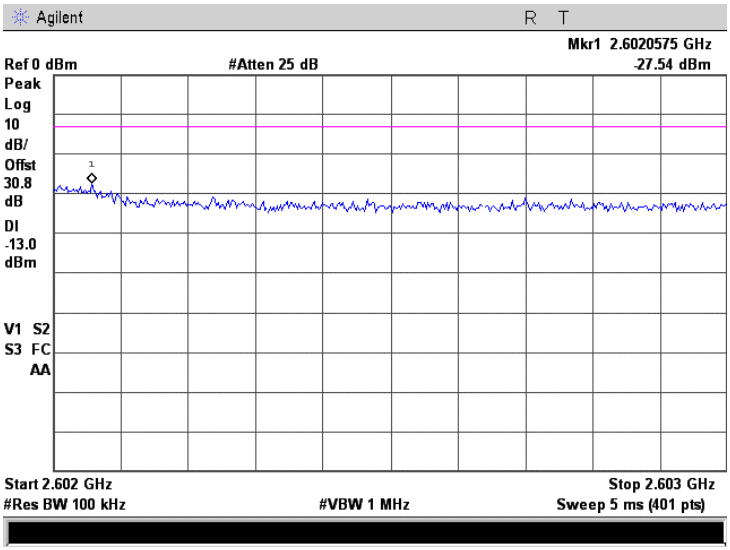


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.19 Band edges test results at low carrier frequency 2507.5 – 2510.0 MHz, 7 MHz, QPSK

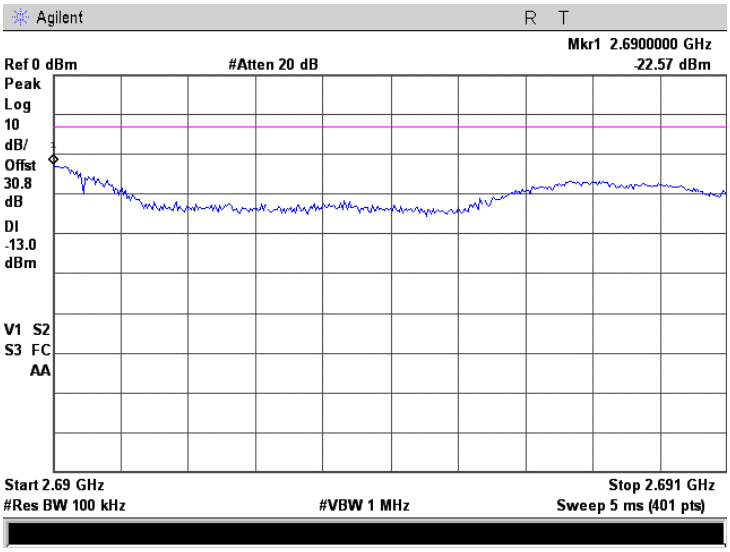


Plot 7.4.20 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 7 MHz, QPSK

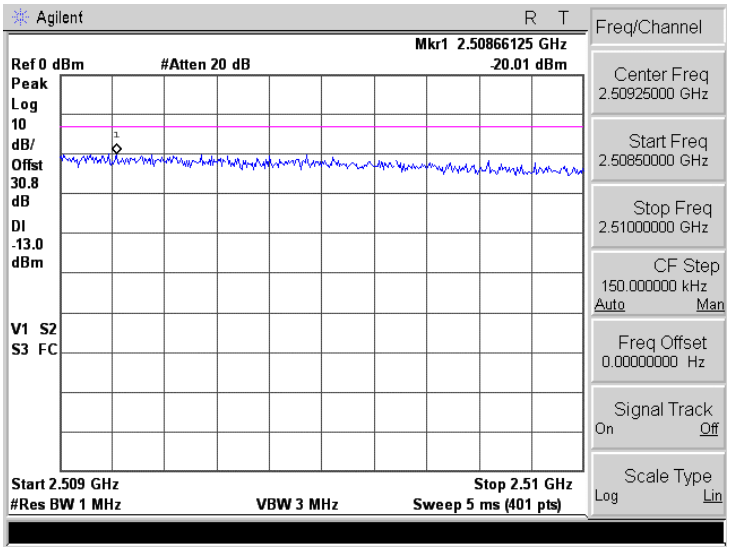


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.21 Band edges test results at high carrier frequency 2690.0 – 2691.0 MHz, 7 MHz, QPSK

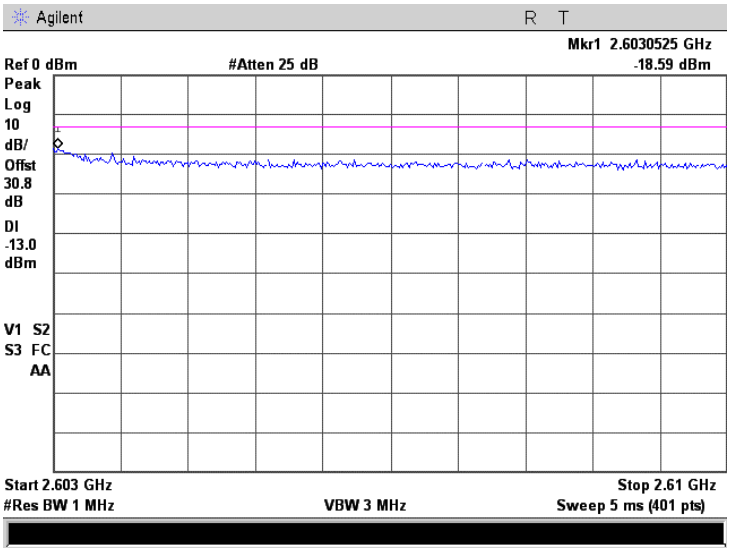


Plot 7.4.22 Band edges test results at mid carrier frequency 2508.5 – 2510 MHz, 7 MHz, QPSK

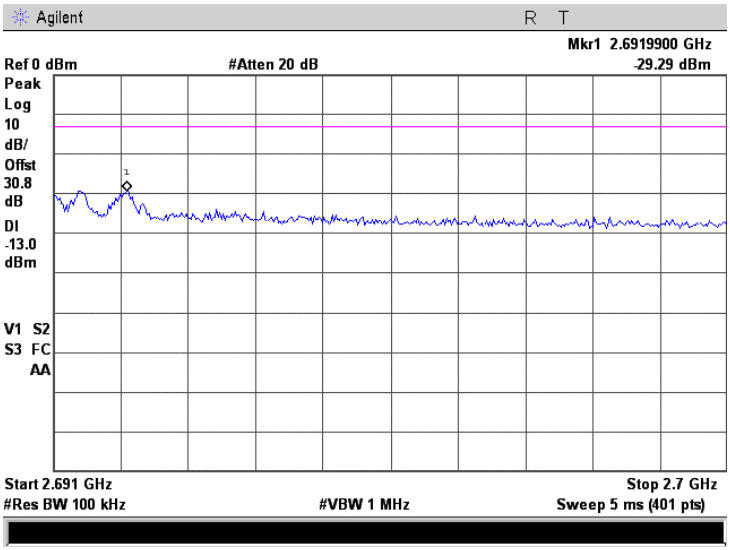


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.23 Band edges test results at mid carrier frequency 2603 – 2610 MH, 7 MHz, QPSK



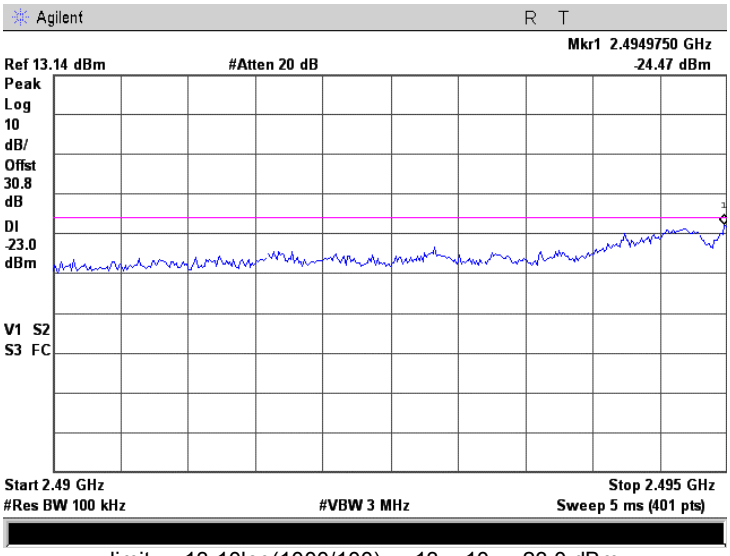
Plot 7.4.24 Band edges test results at high carrier frequency 2691.0 – 2700.0 MHz, 7 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

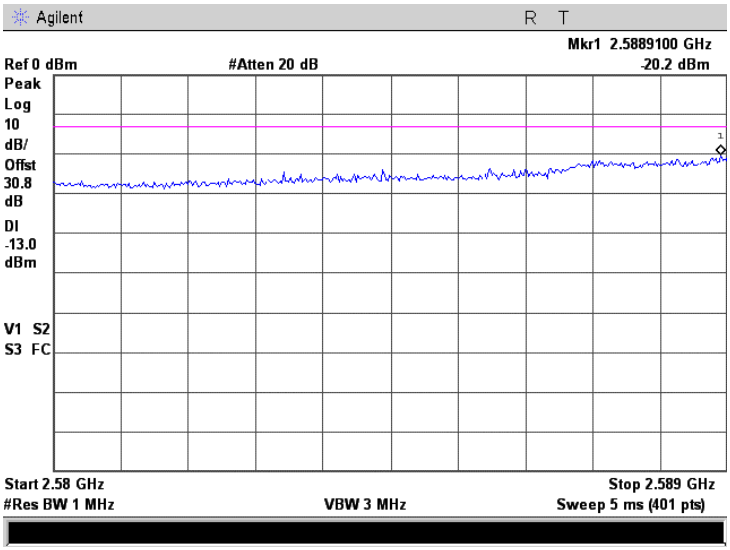
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.25 Band edges test results at low carrier frequency 2490 – 2495 MHz, 7 MHz, 16QAM



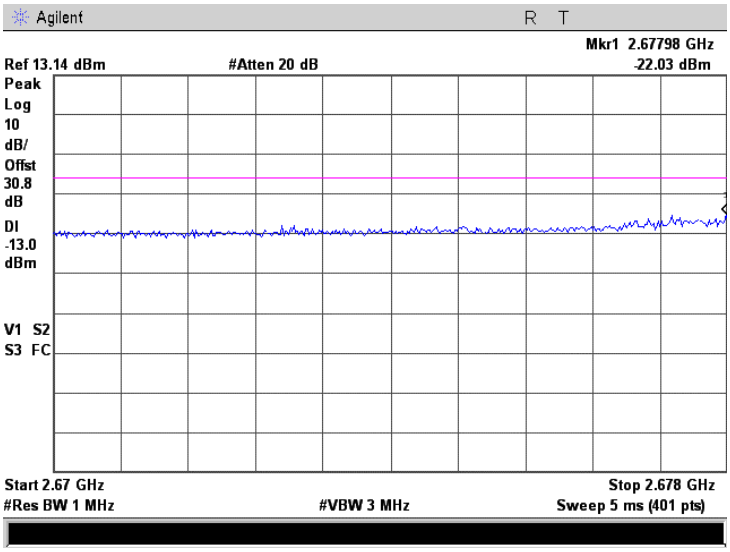
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Plot 7.4.26 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 7 MHz, 16QAM

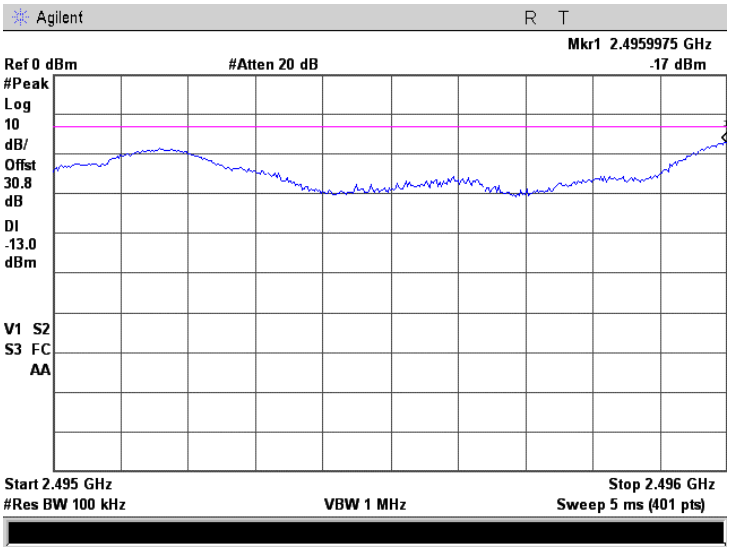


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.27 Band edges test results at high carrier frequency 2670 – 2678 MHz, 7 MHz, 16QAM

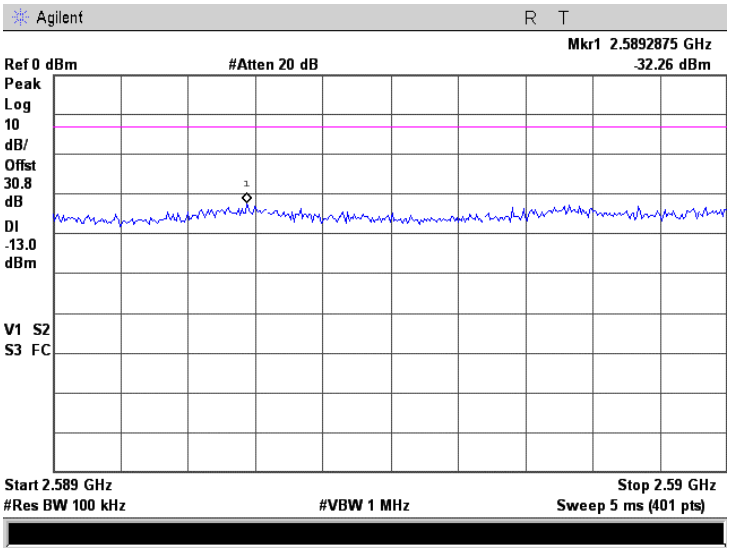


Plot 7.4.28 Band edges test results at low carrier frequency 2495 – 2496 MHz, 7 MHz, 16QAM

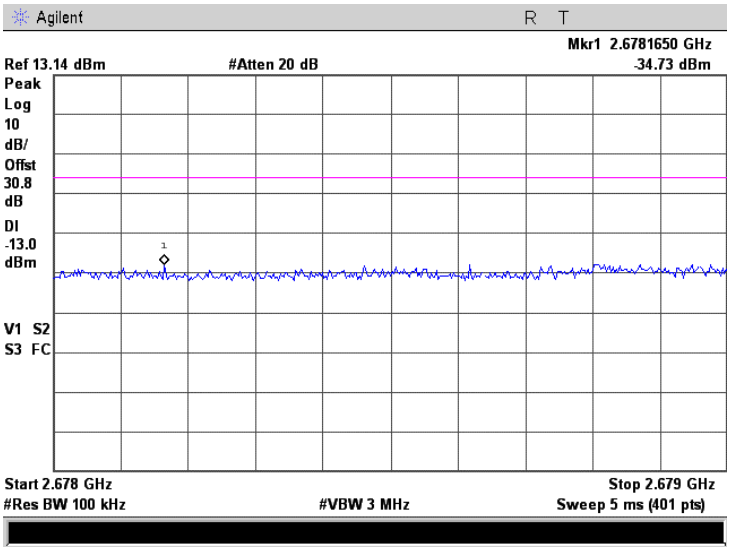


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.29 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 7 MHz, 16QAM

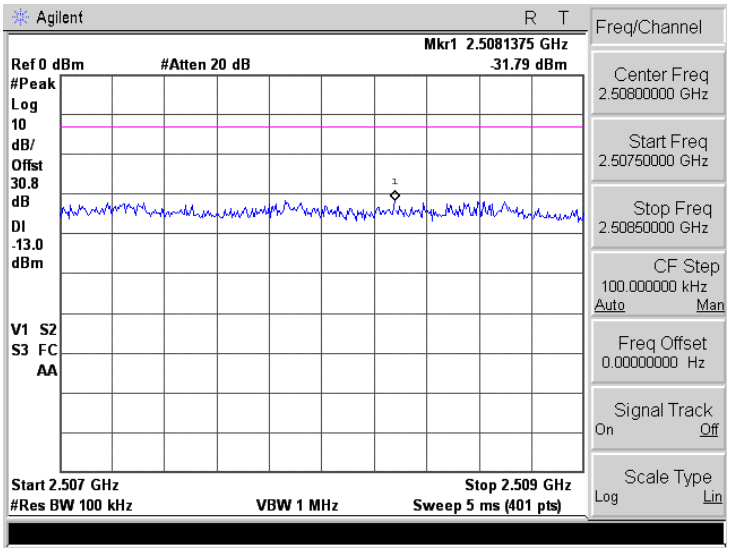


Plot 7.4.30 Band edges test results at high carrier frequency 2678 – 2679 MHz, 7 MHz, 16QAM

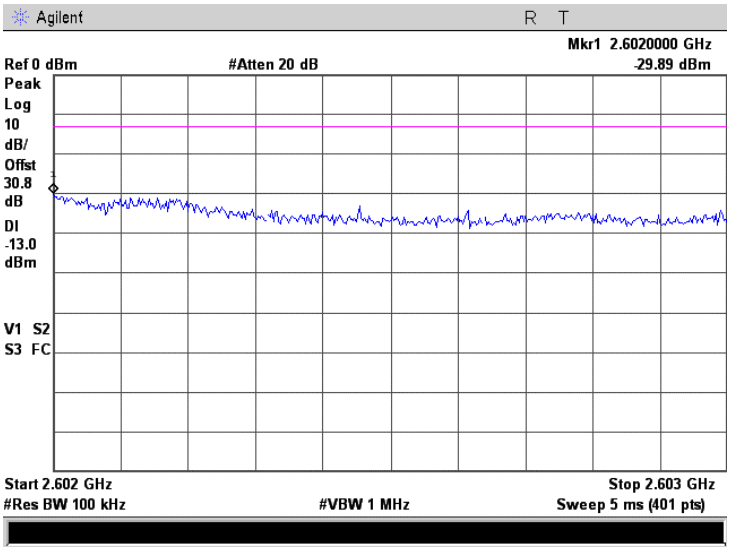


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.31 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 7 MHz, 16QAM

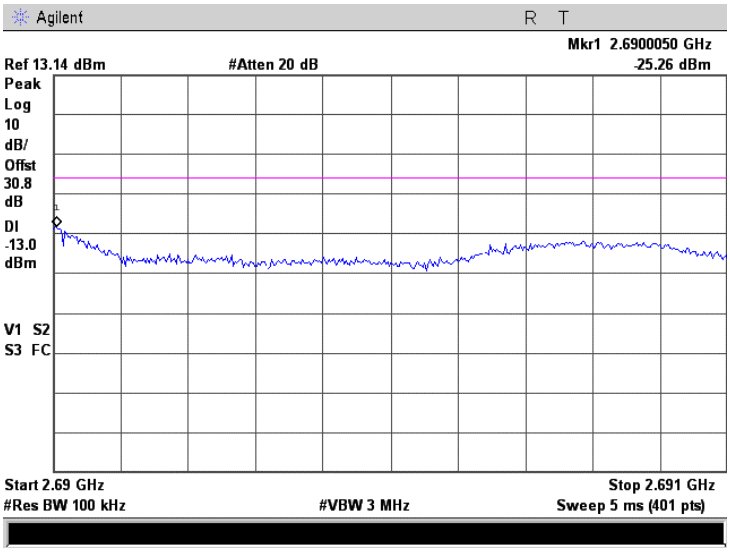


Plot 7.4.32 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 7 MHz, 16QAM

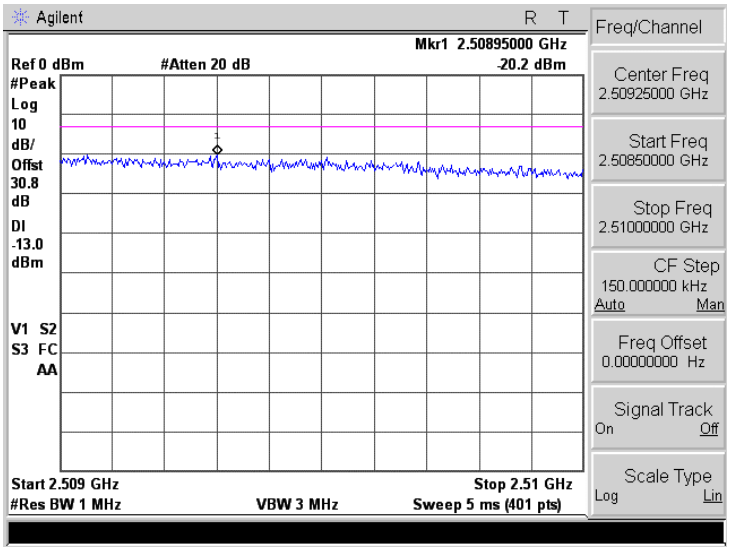


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.33 Band edges test results at high carrier frequency 2690 – 2691 MHz, 7 MHz, 16QAM

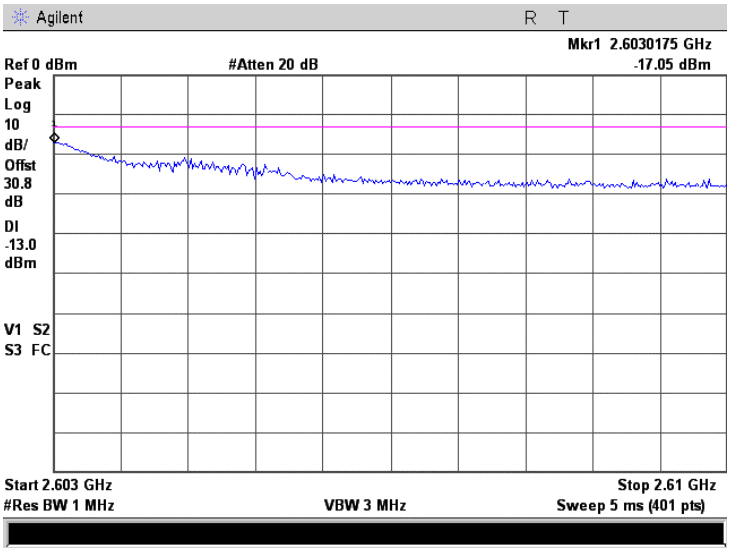


Plot 7.4.34 Band edges test results at low carrier frequency 2508.5 – 2510.0 MHz, 7 MHz, 16QAM

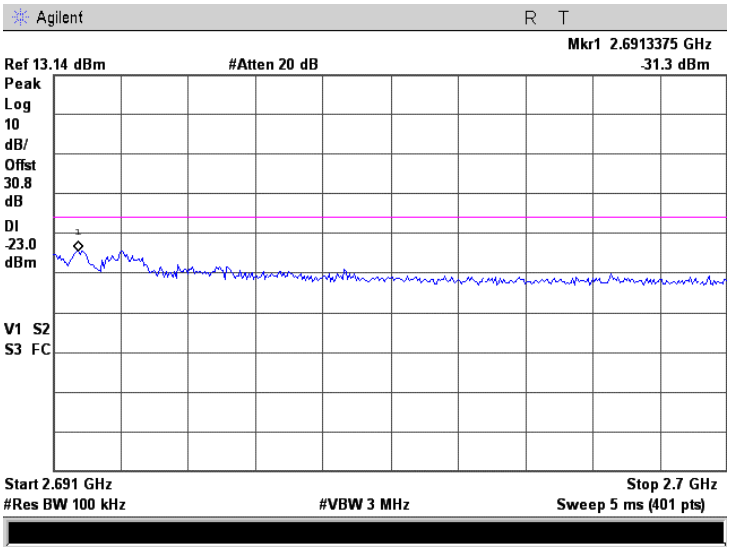


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.35 Band edges test results at mid carrier frequency 2603 – 2610 MHz, 7 MHz, 16QAM



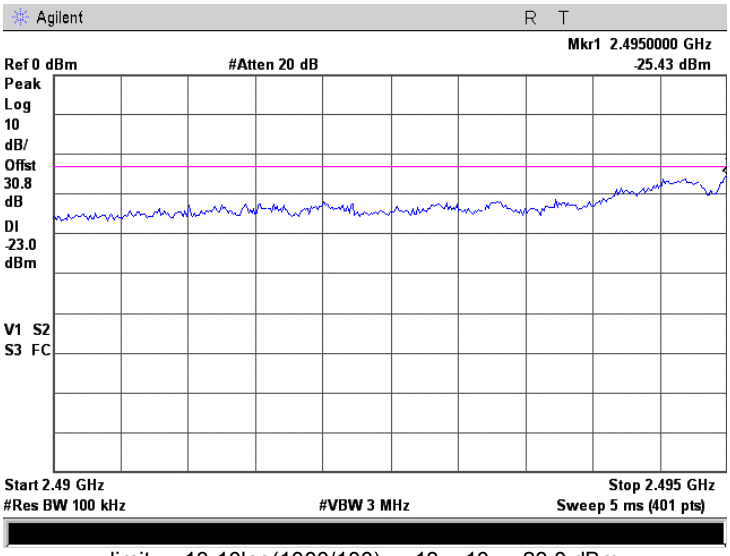
Plot 7.4.36 Band edges test results at high carrier frequency 2691 – 2700 MHz, 7 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

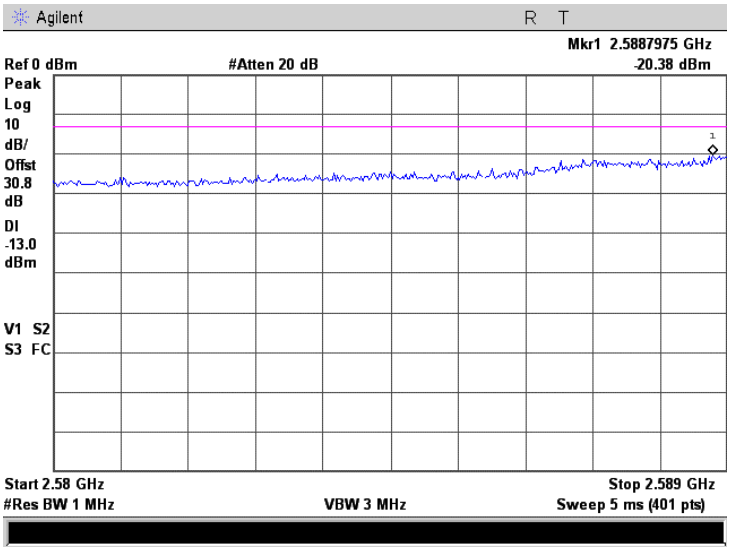
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.37 Band edges test results at low carrier frequency 2490 – 2495 MHz, 7 MHz, 64QAM



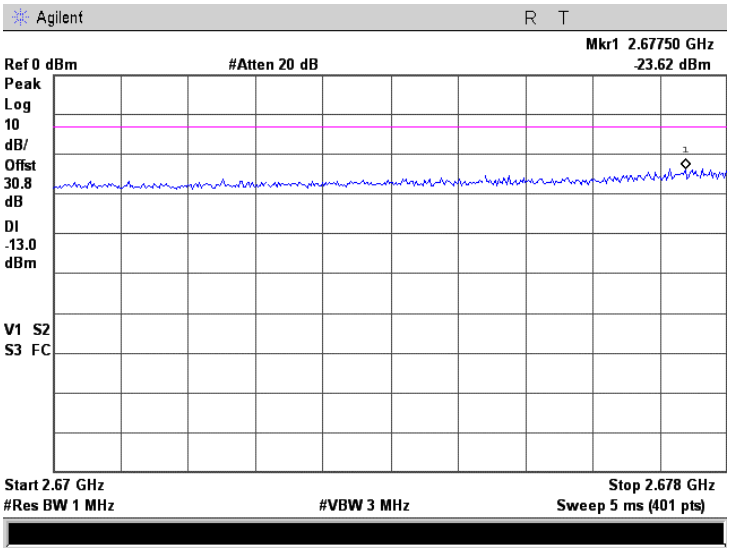
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Plot 7.4.38 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 7 MHz, 64QAM

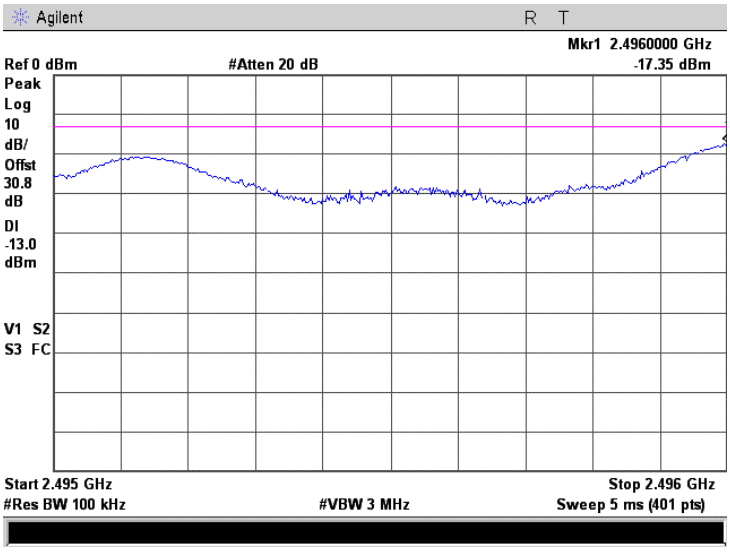


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.39 Band edges test results at high carrier frequency 2670 – 2678 MHz, 7 MHz, 64QAM

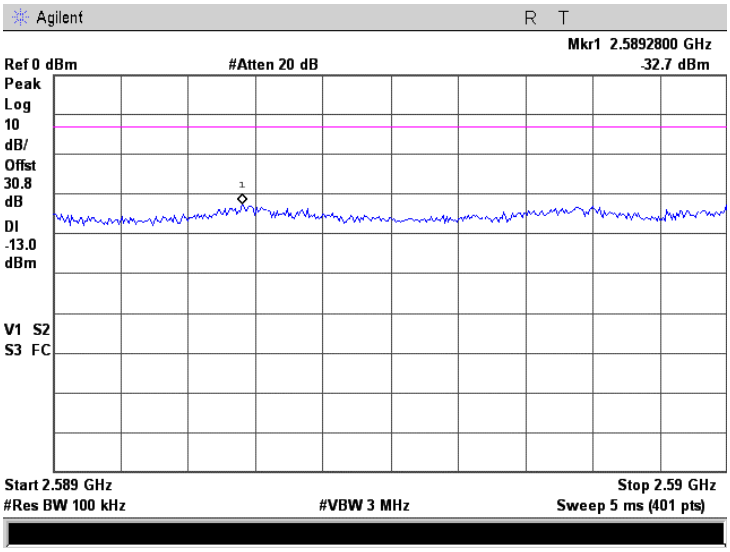


Plot 7.4.40 Band edges test results at low carrier frequency 2495 – 2496 MHz, 7 MHz, 64QAM

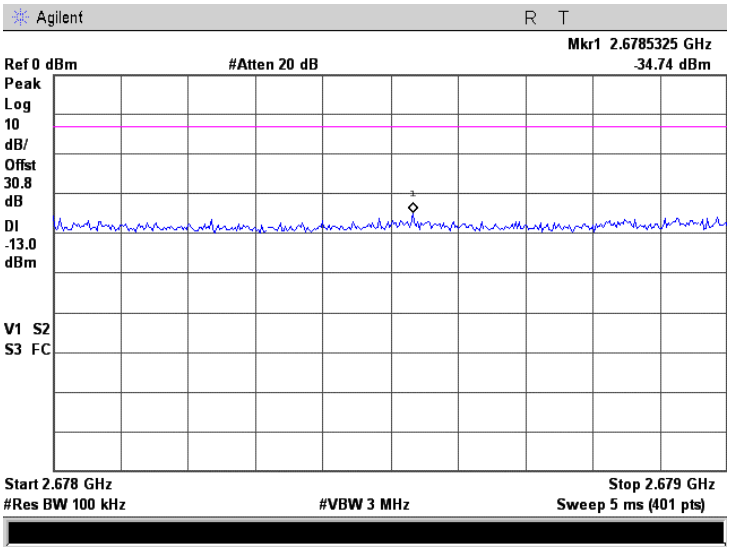


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.41 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 7 MHz, 64QAM

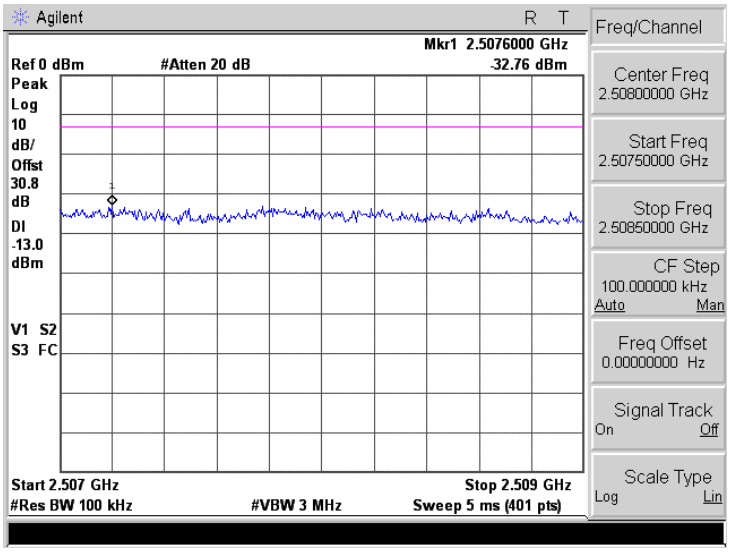


Plot 7.4.42 Band edges test results at high carrier frequency 2495 – 2496 MHz, 7 MHz, 64QAM

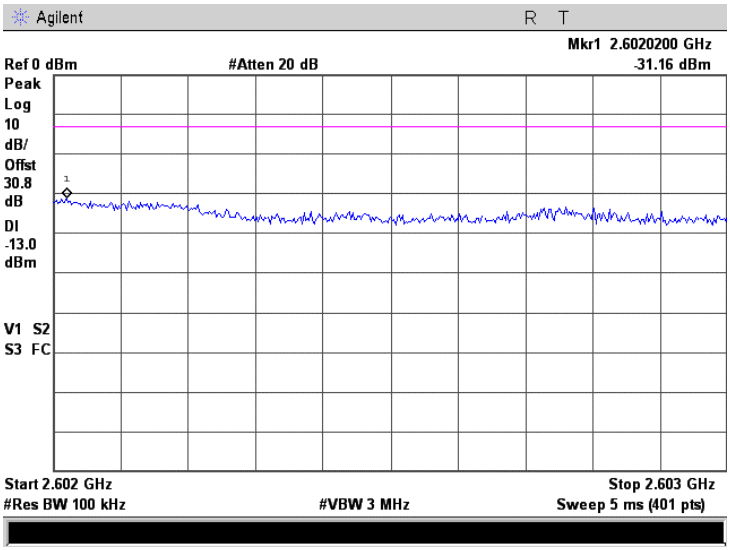


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.43 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 7 MHz, 64QAM

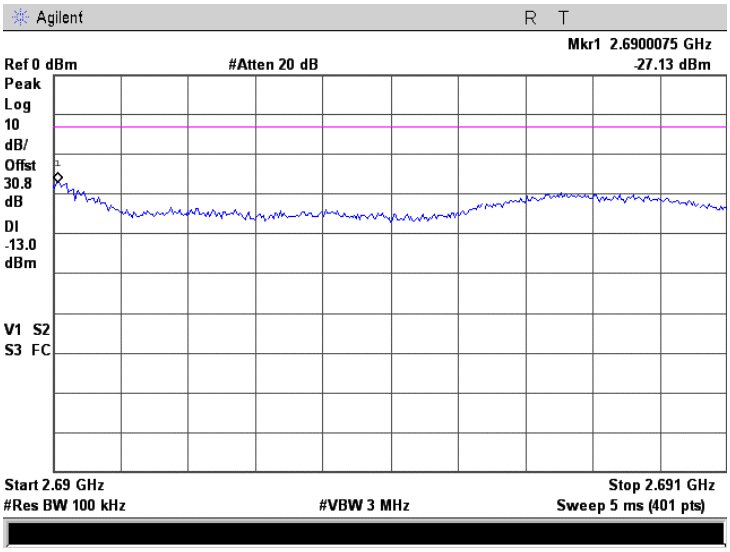


Plot 7.4.44 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 7 MHz, 64QAM

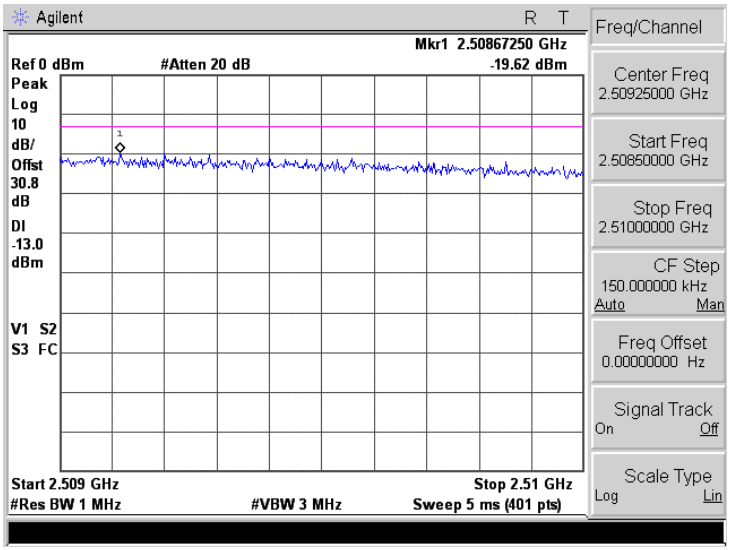


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.45 Band edges test results at high carrier frequency 2690 – 2691 MHz, 7 MHz, 64QAM

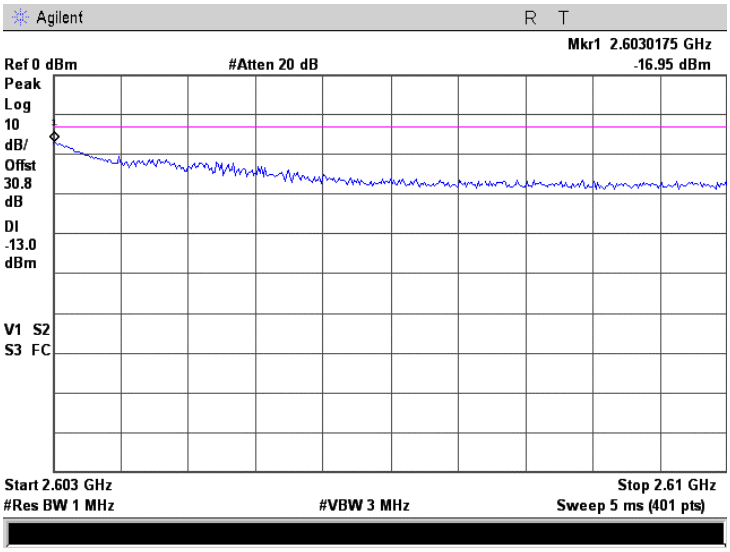


Plot 7.4.46 Band edges test results at low carrier frequency 2508.5 – 2510 MHz, 7 MHz, 64QAM

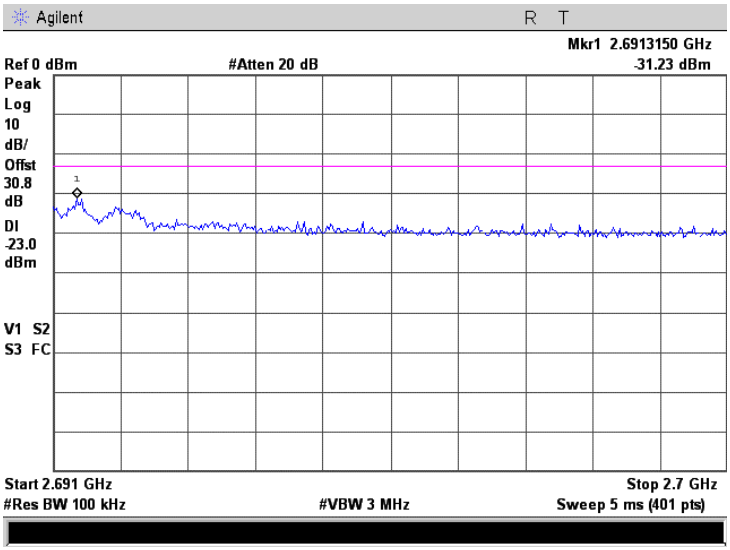


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.47 Band edges test results at mid carrier frequency 2603 – 2610 MHz, 7 MHz, 64QAM



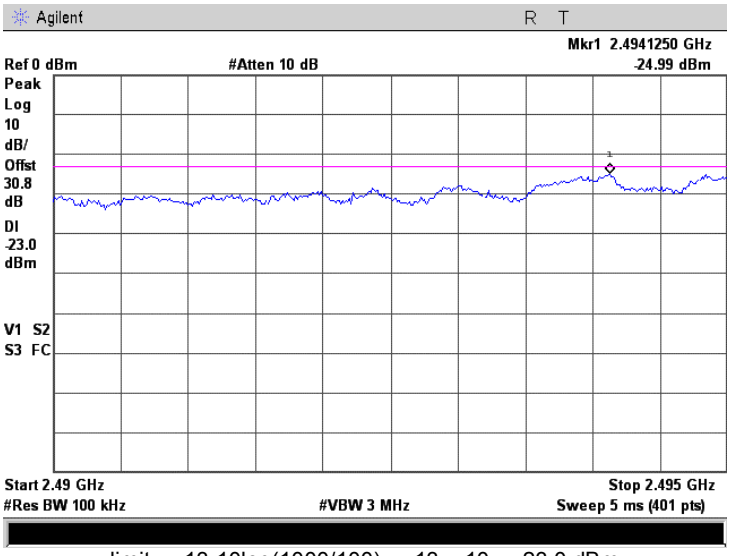
Plot 7.4.48 Band edges test results at high carrier frequency 2691 – 2700 MHz, 7 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

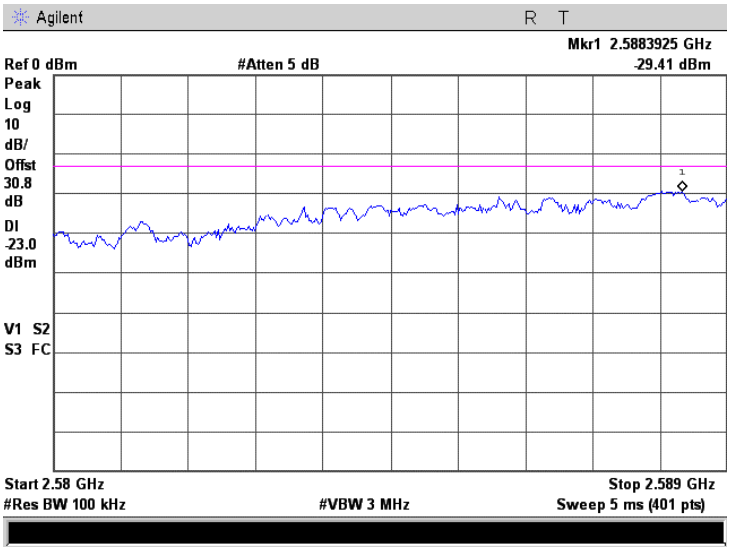
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.49 Band edges test results at low carrier frequency 2490 – 2495 MHz, 10 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

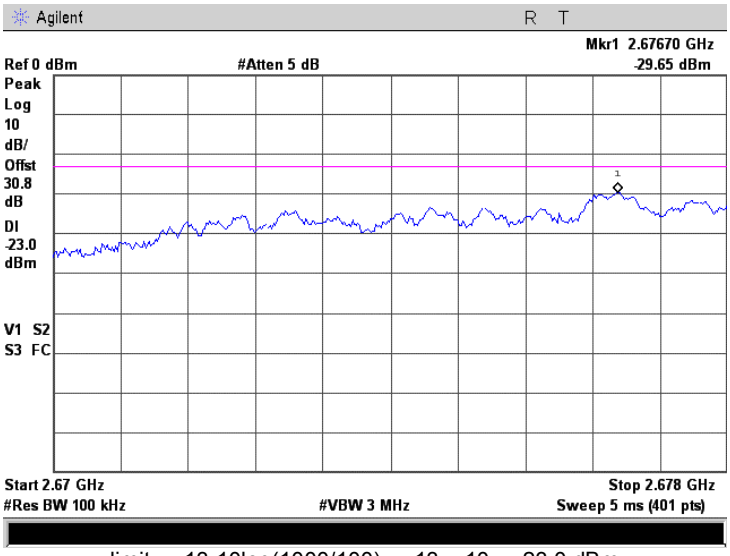
Plot 7.4.50 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 10 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

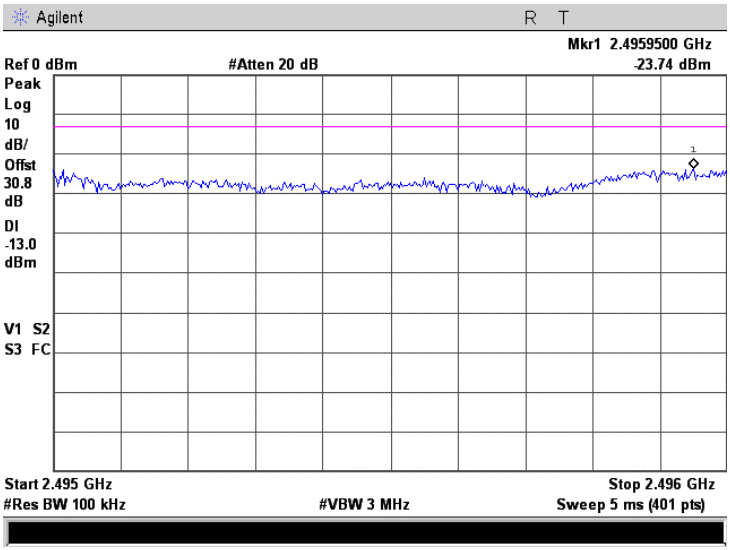
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.51 Band edges test results at high carrier frequency 2670 – 2678 MHz, 10 MHz, QPSK



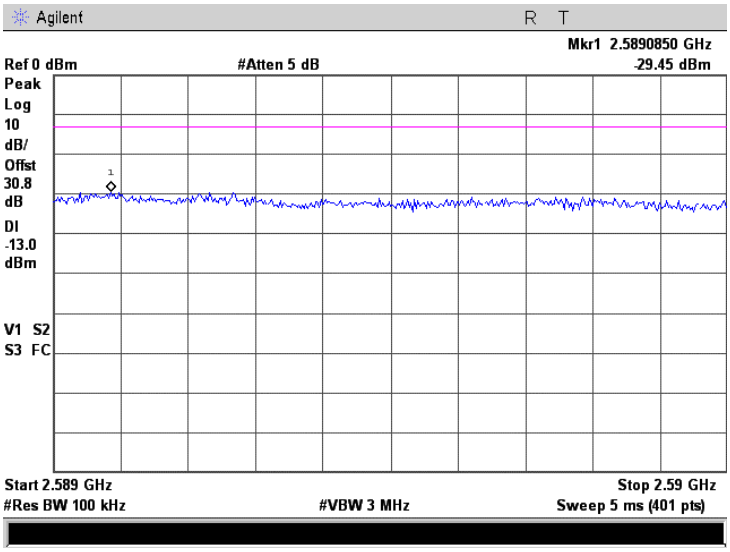
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Plot 7.4.52 Band edges test results at low carrier frequency 2495 – 2496 MHz, 10 MHz, QPSK

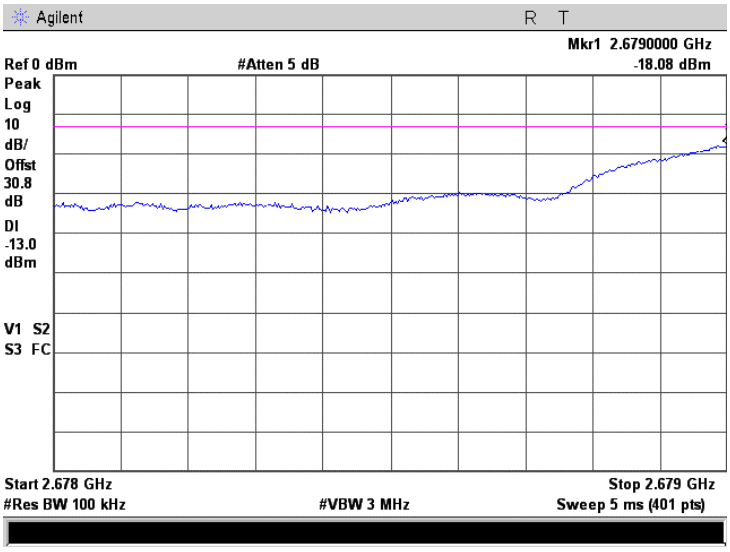


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.53 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 10 MHz, QPSK

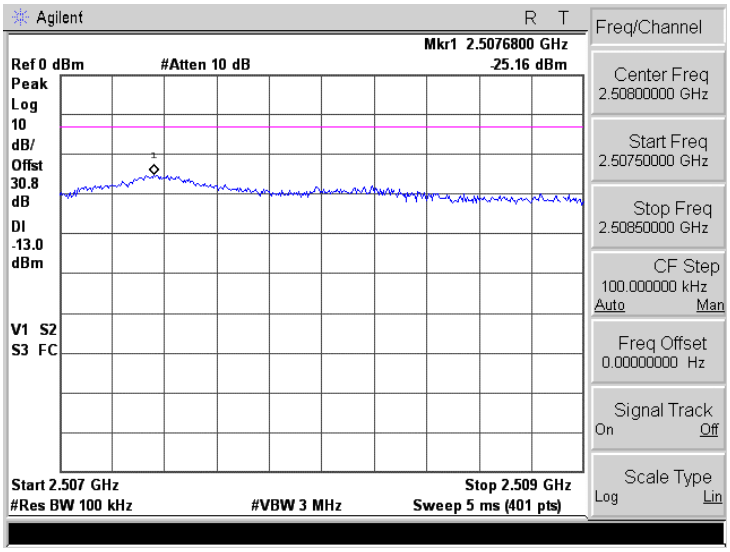


Plot 7.4.54 Band edges test results at high carrier frequency 2678 – 2679 MHz, 10 MHz, QPSK

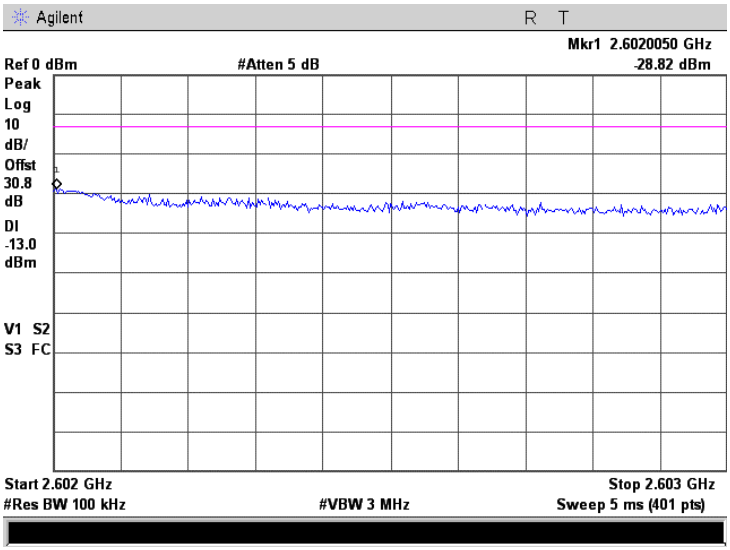


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.55 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 10 MHz, QPSK

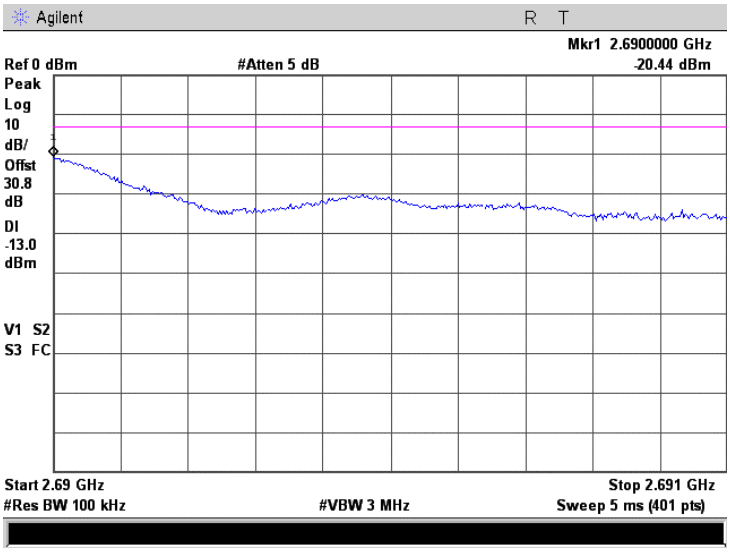


Plot 7.4.56 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 10 MHz, QPSK

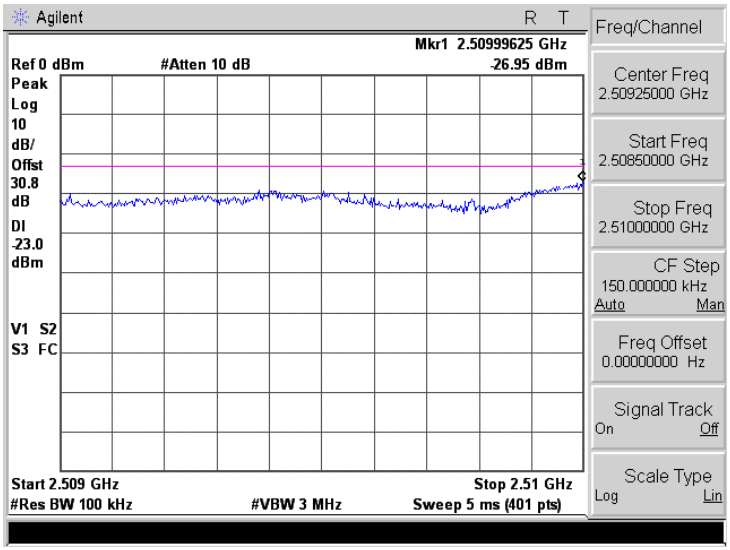


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.57 Band edges test results at high carrier frequency 2690.0 – 2691.0 MHz, 10 MHz, QPSK



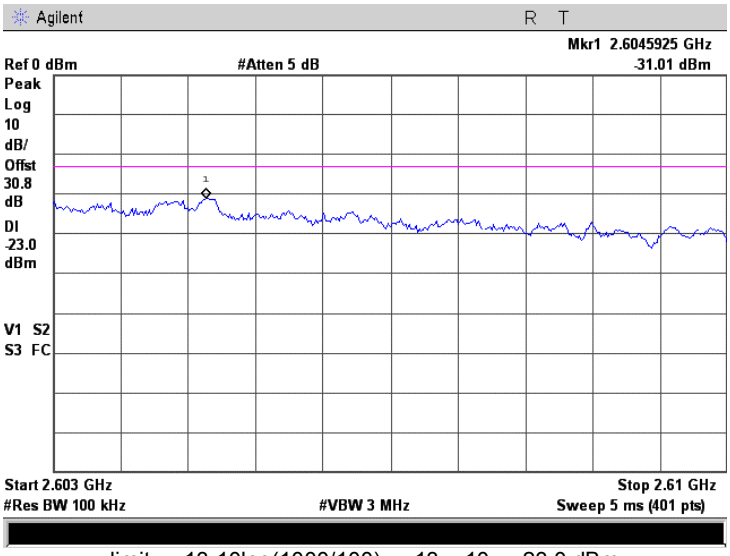
Plot 7.4.58 Band edges test results at mid carrier frequency 2508.5 – 2510 MHz, 10 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

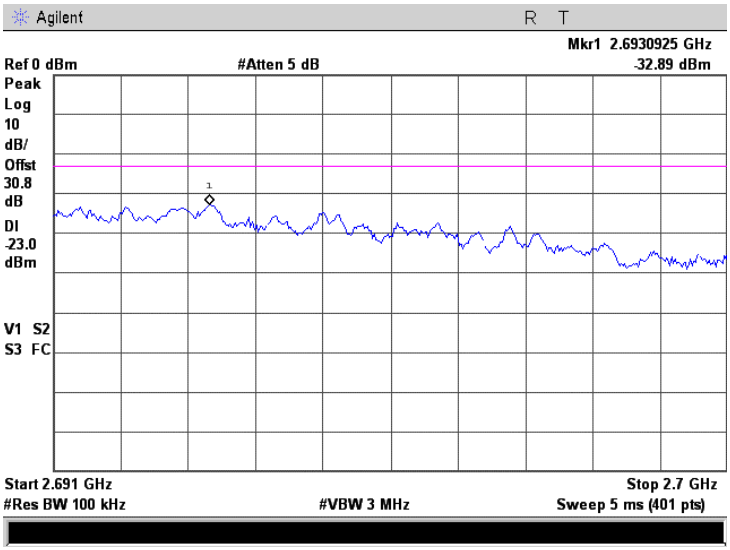
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.59 Band edges test results at mid carrier frequency 2603 – 2610 MHz, 10 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

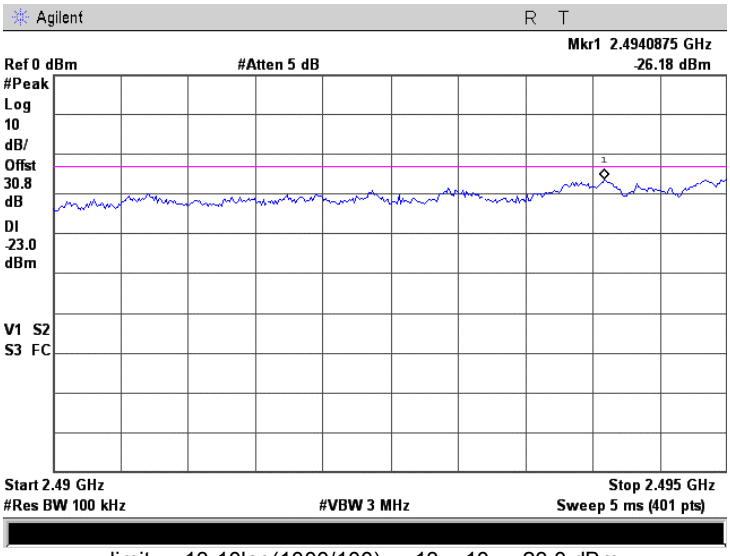
Plot 7.4.60 Band edges test results at high carrier frequency 2691.0 – 2700.0 MHz, 10 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

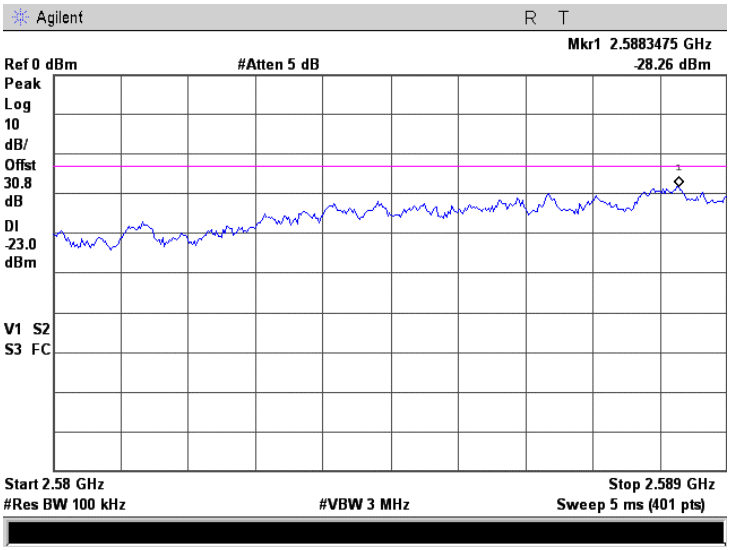
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.61 Band edges test results at low carrier frequency 2490 – 2495 MHz, 10 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

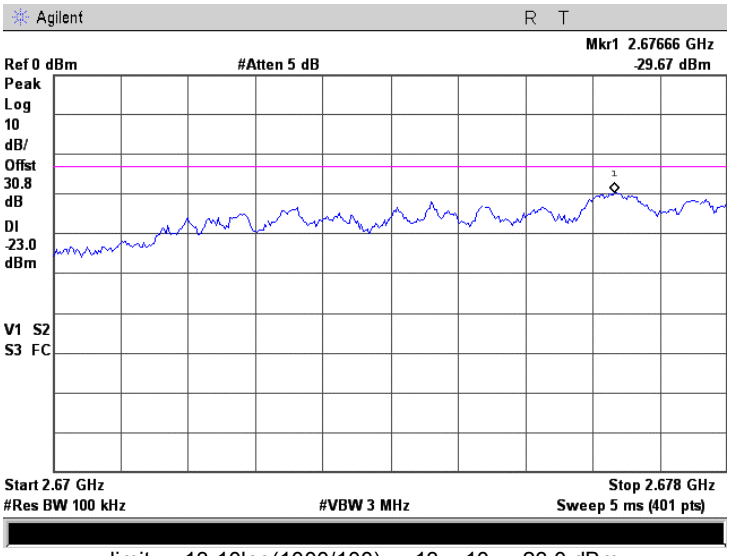
Plot 7.4.62 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 10 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

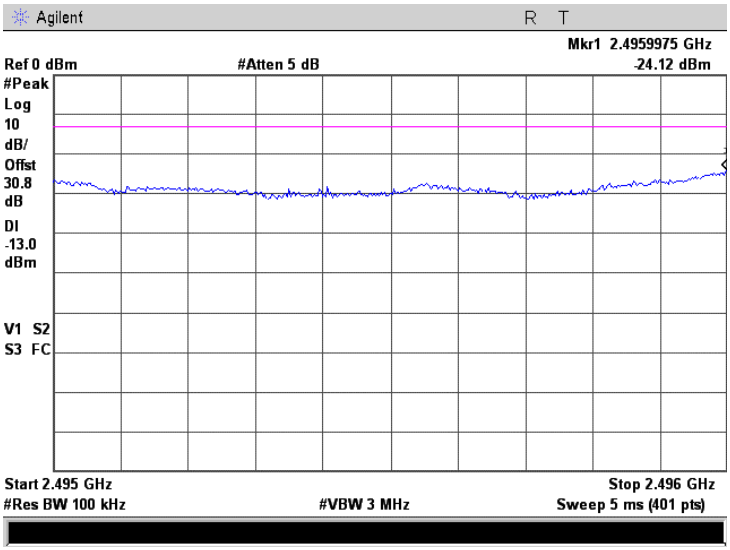
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.63 Band edges test results at high carrier frequency 2670 – 2678 MHz, 10 MHz, 16QAM



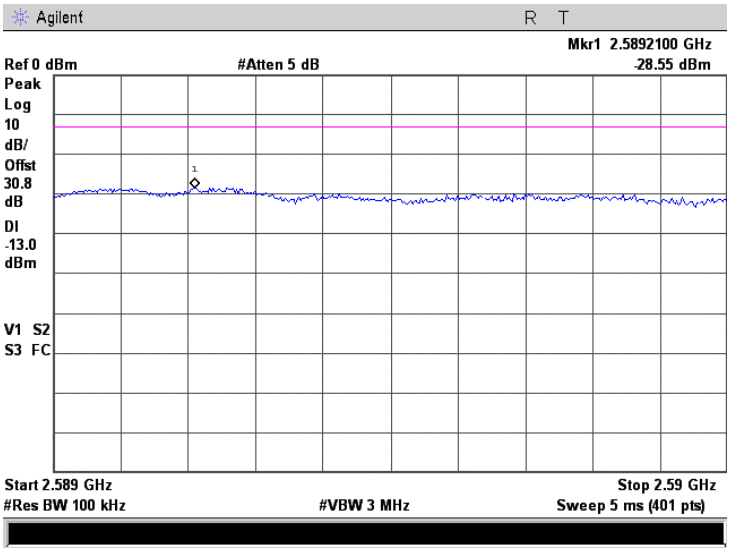
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Plot 7.4.64 Band edges test results at low carrier frequency 2495 – 2496 MHz, 10 MHz, 16QAM

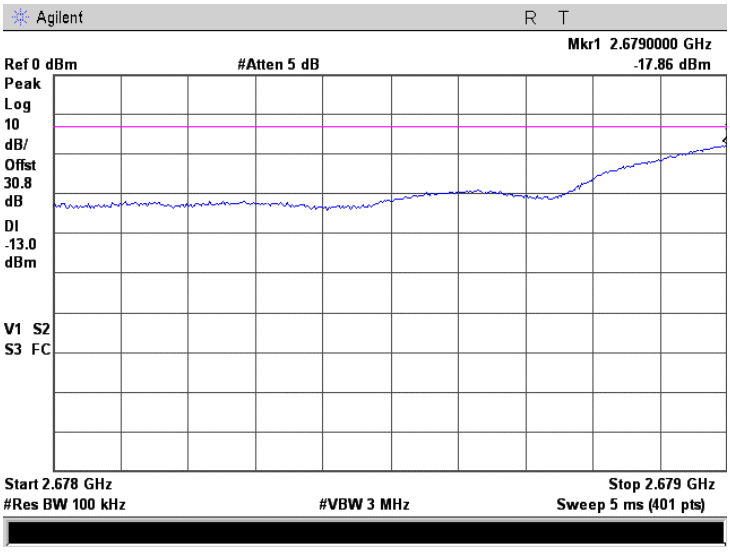


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.65 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 10 MHz, 16QAM

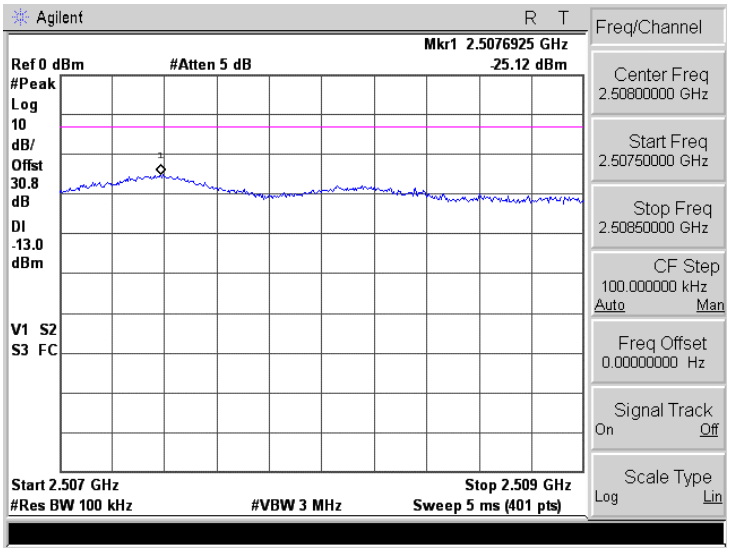


Plot 7.4.66 Band edges test results at high carrier frequency 2678 – 2679 MHz, 10 MHz, 16QAM

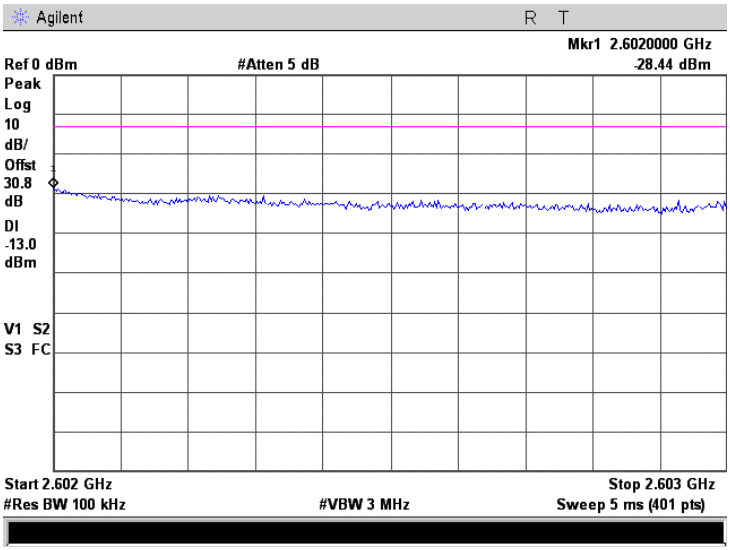


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.67 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 10 MHz, 16QAM

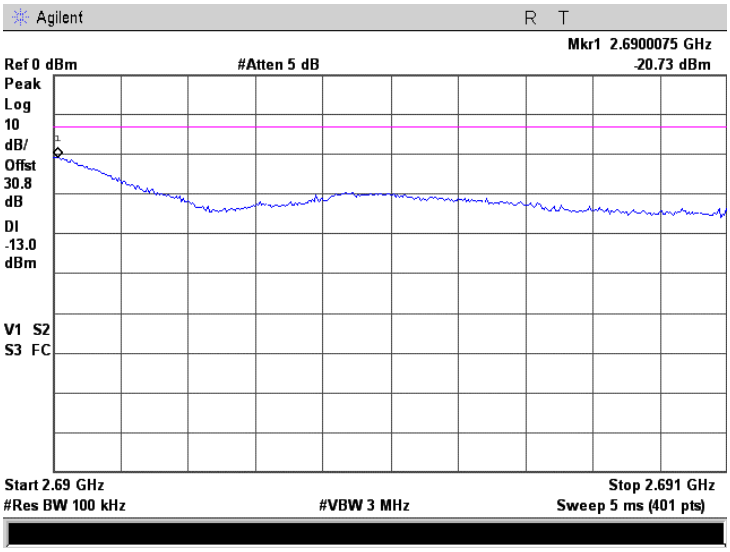


Plot 7.4.68 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 10 MHz, 16QAM

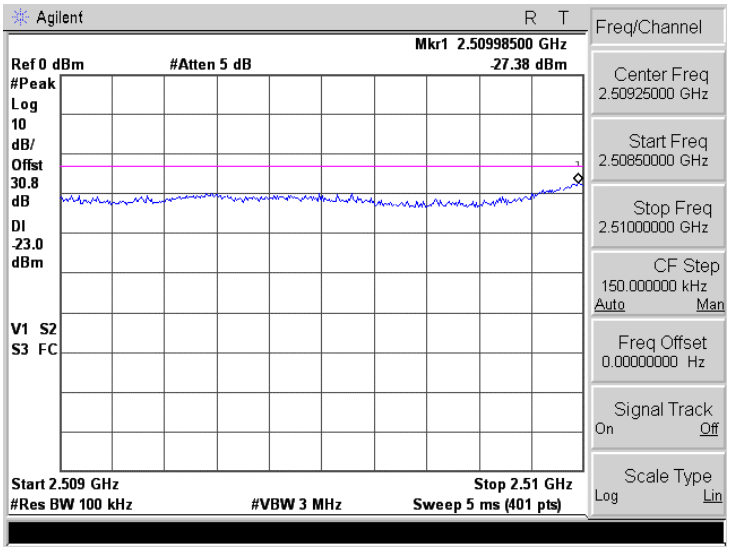


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.69 Band edges test results at high carrier frequency 2690 – 2691 MHz, 10 MHz, 16QAM



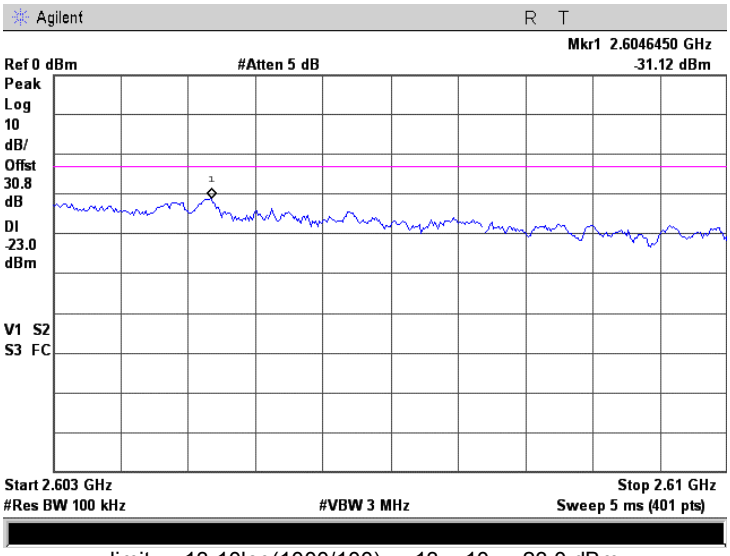
Plot 7.4.70 Band edges test results at low carrier frequency 2508.5 – 2510.0 MHz, 10 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

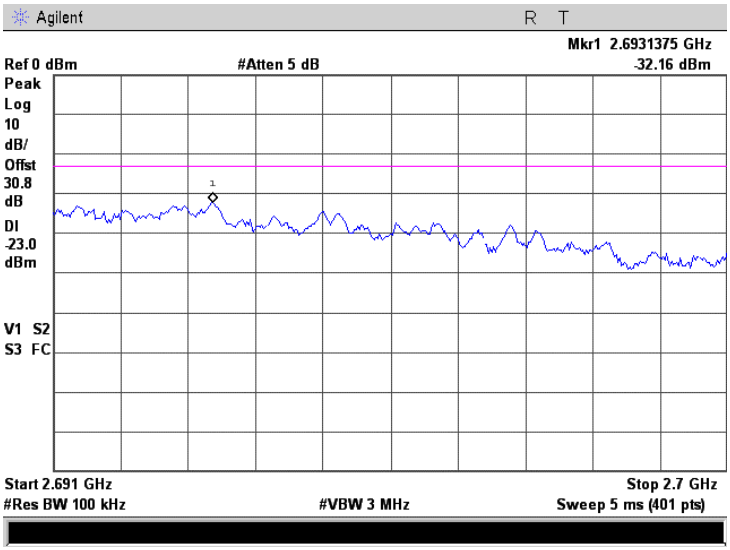
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.71 Band edges test results at mid carrier frequency 2603 – 2610 MHz, 10 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

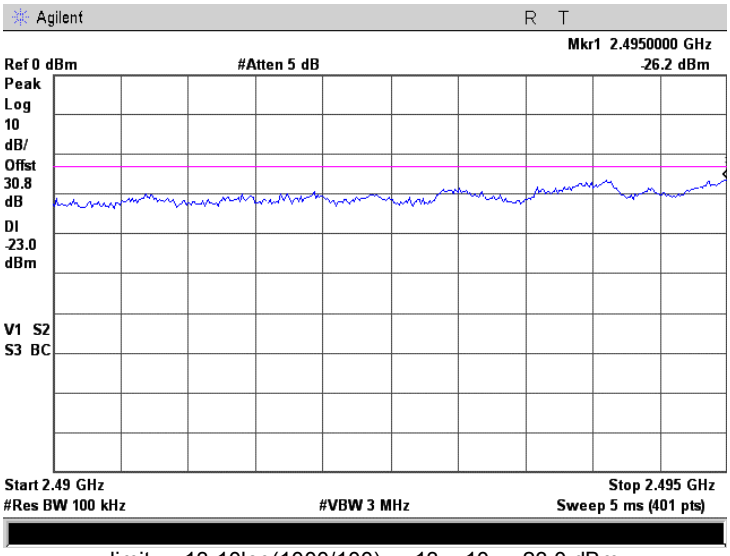
Plot 7.4.72 Band edges test results at high carrier frequency 2691 – 2700 MHz, 10 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

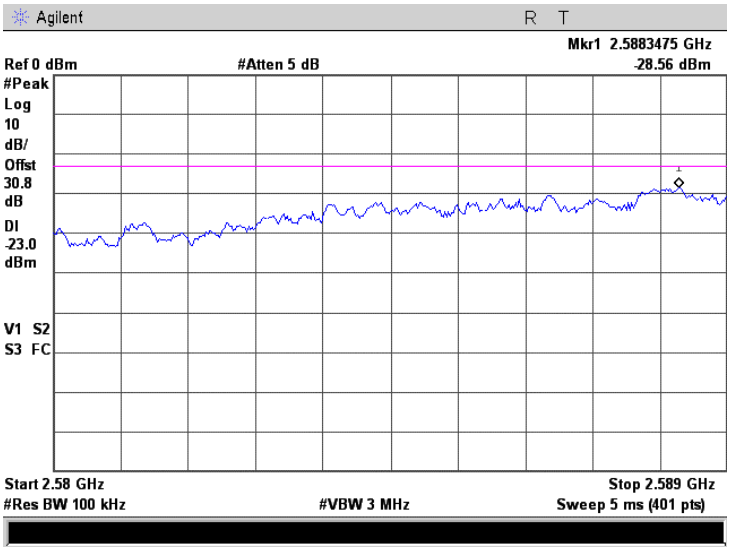
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.73 Band edges test results at low carrier frequency 2490 – 2495 MHz, 10 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

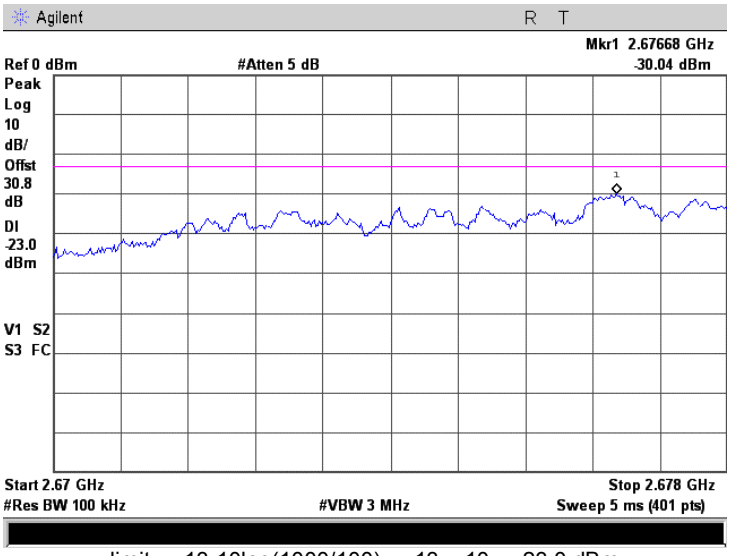
Plot 7.4.74 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 10 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

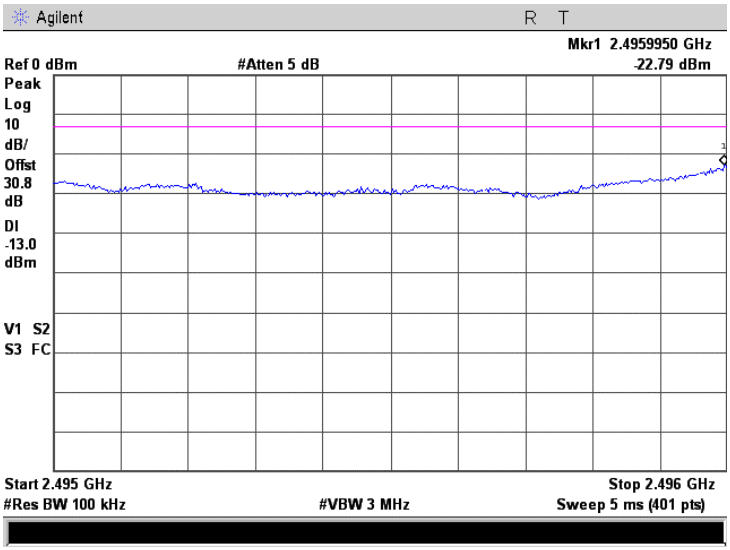
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.75 Band edges test results at high carrier frequency 2670 – 2678 MHz, 10 MHz, 64QAM



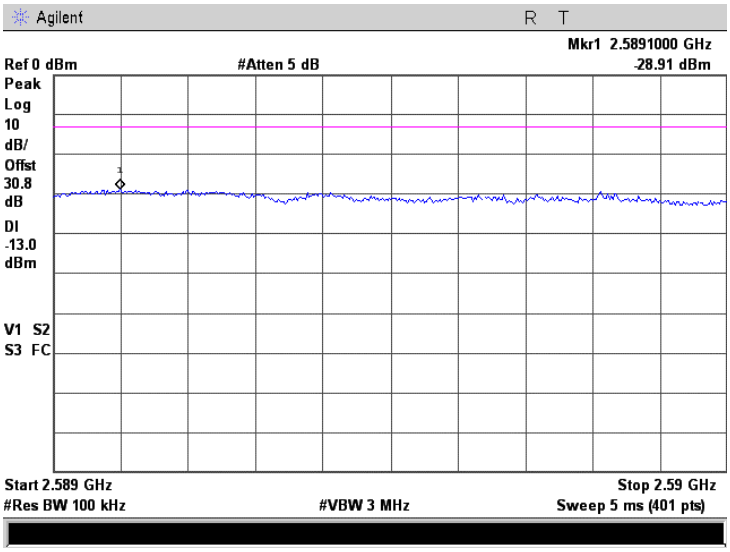
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Plot 7.4.76 Band edges test results at low carrier frequency 2495 – 2496 MHz, 10 MHz, 64QAM

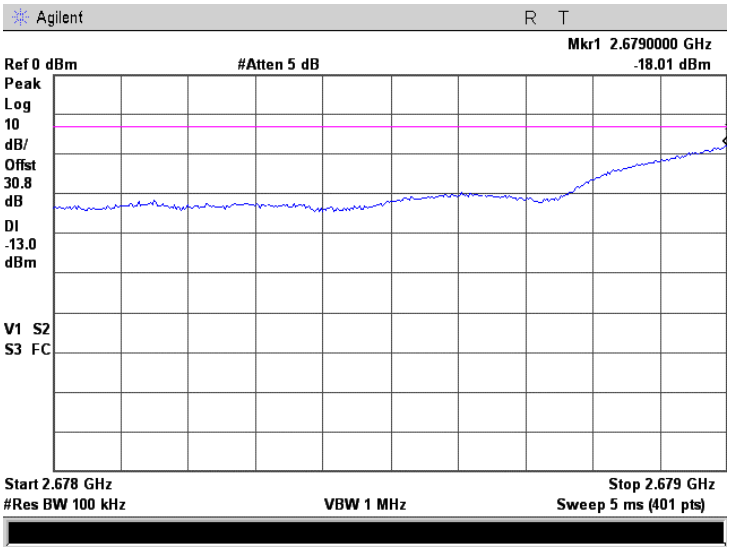


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.77 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 10 MHz, 64QAM

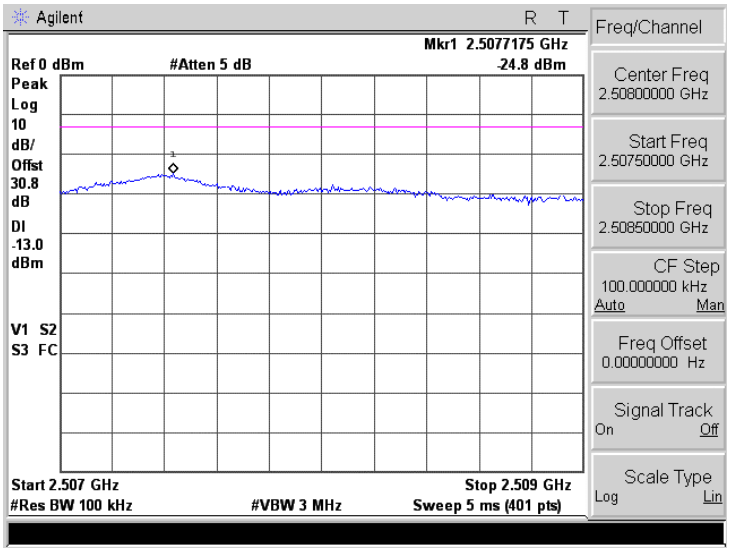


Plot 7.4.78 Band edges test results at high carrier frequency 2678 – 2679 MHz, 10 MHz, 64QAM

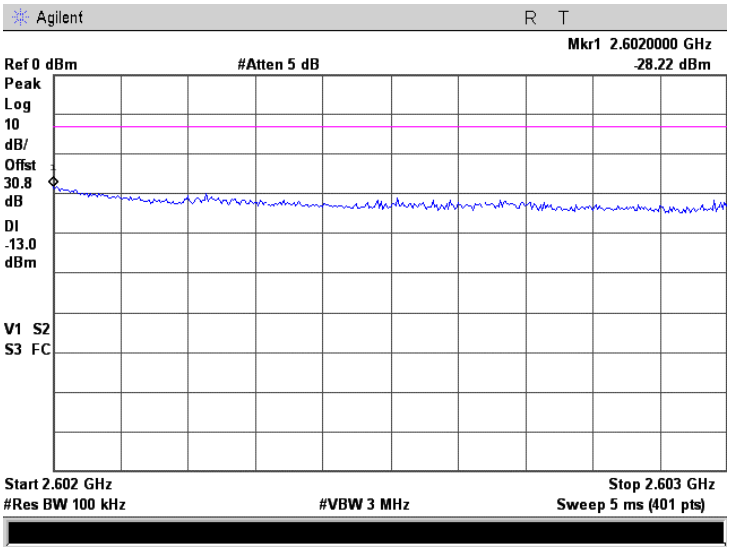


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.79 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 10 MHz, 64QAM

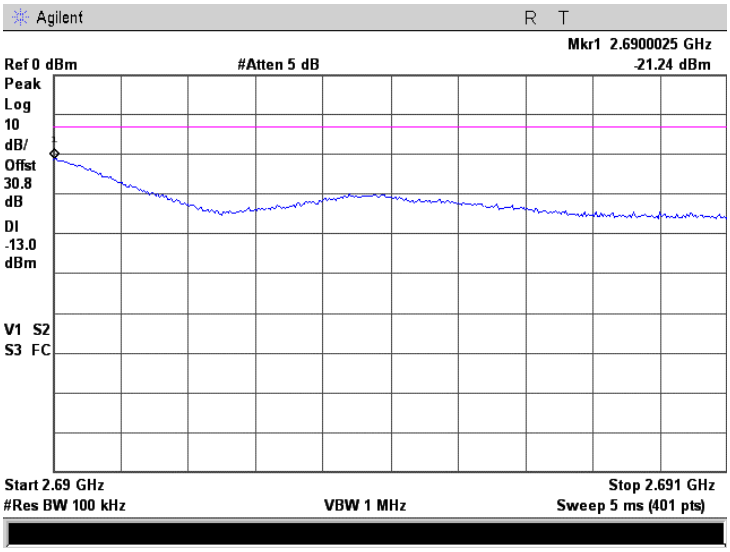


Plot 7.4.80 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 10 MHz, 64QAM

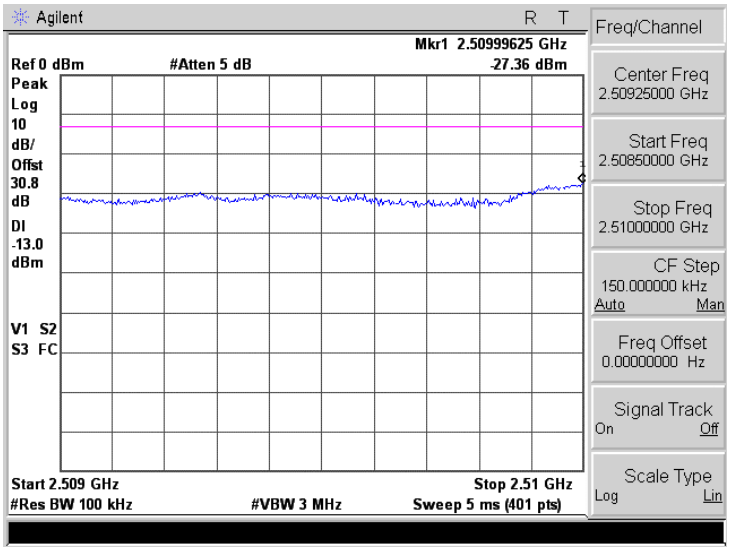


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.81 Band edges test results at high carrier frequency 2690 – 2691 MHz, 10 MHz, 64QAM



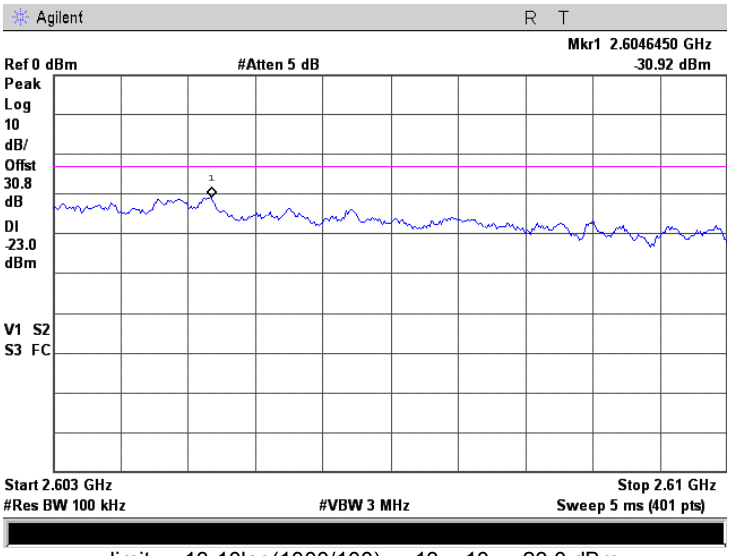
Plot 7.4.82 Band edges test results at low carrier frequency 2508.5 – 2510 MHz, 10 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

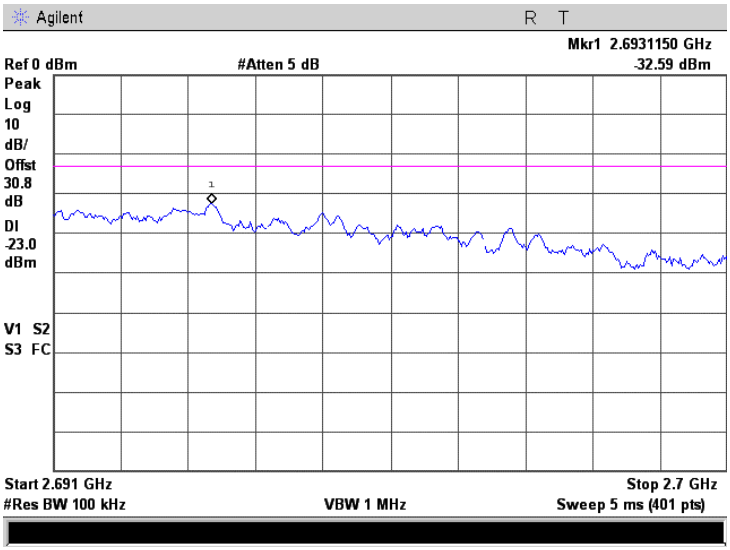
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.83 Band edges test results at mid carrier frequency 2603 – 2610 MHz, 10 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

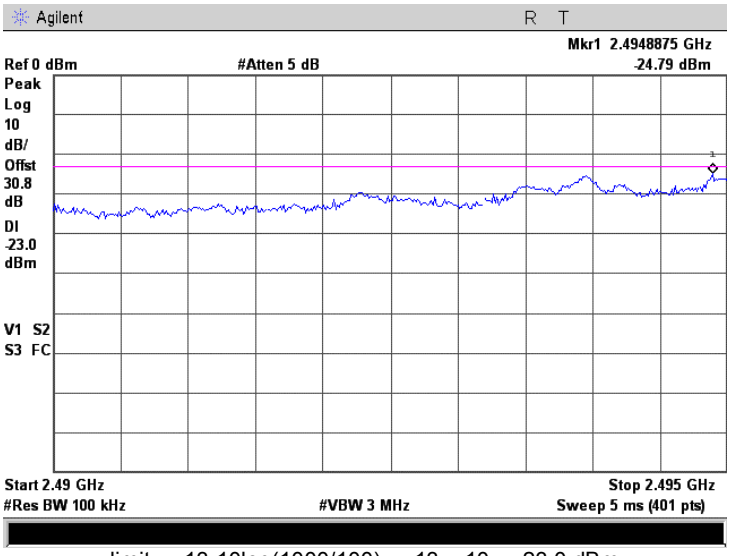
Plot 7.4.84 Band edges test results at high carrier frequency 2691 – 2700 MHz, 10 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

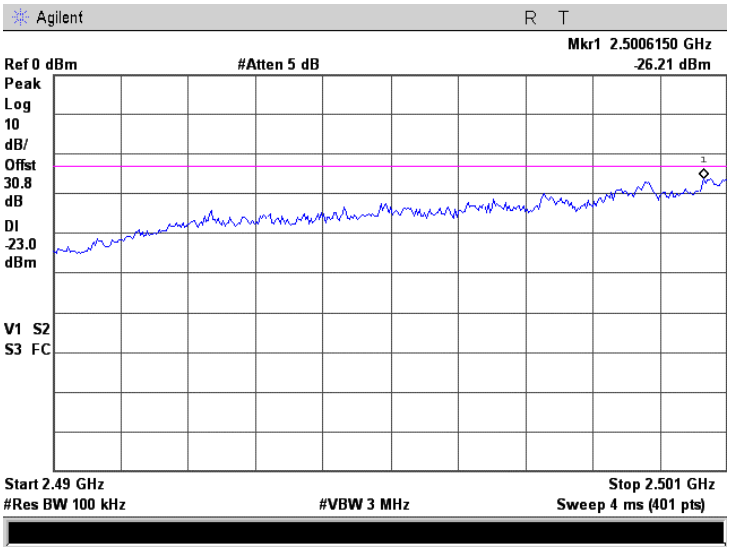
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.85 Band edges test results at low carrier frequency 2490 – 2495 MHz, 5 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

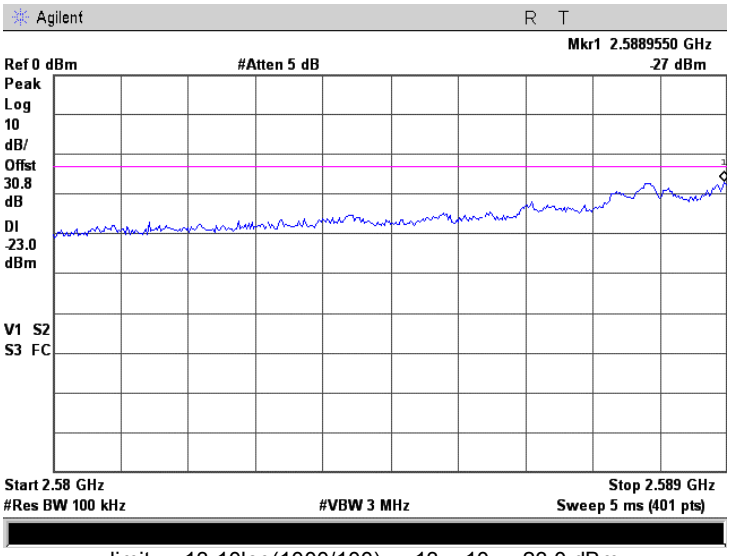
Plot 7.4.86 Band edges test results at low carrier frequency 2490 – 2501 MHz, 5 MHz, QPSK (2504.75 MHz)



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

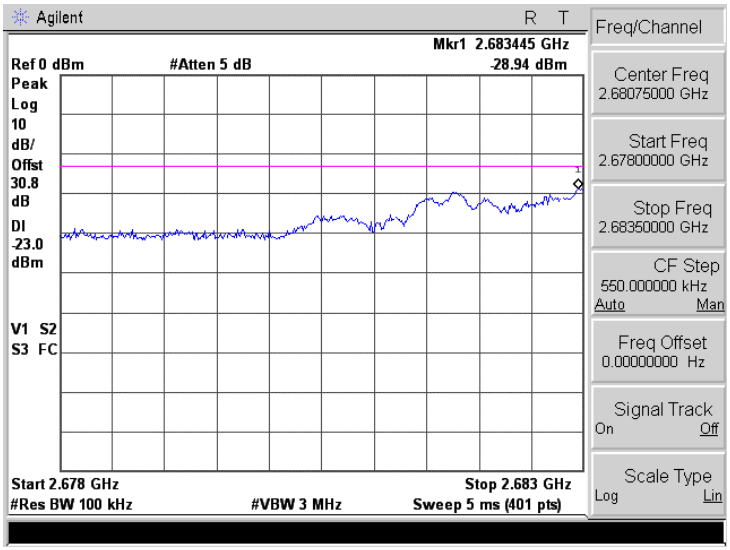
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.87 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 5 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

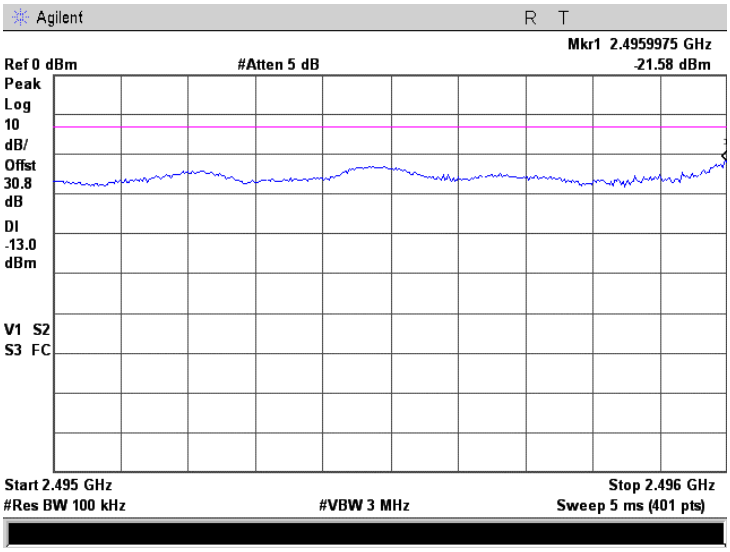
Plot 7.4.88 Band edges test results at high carrier frequency 2678 – 2683.5 MHz, 5 MHz, QPSK



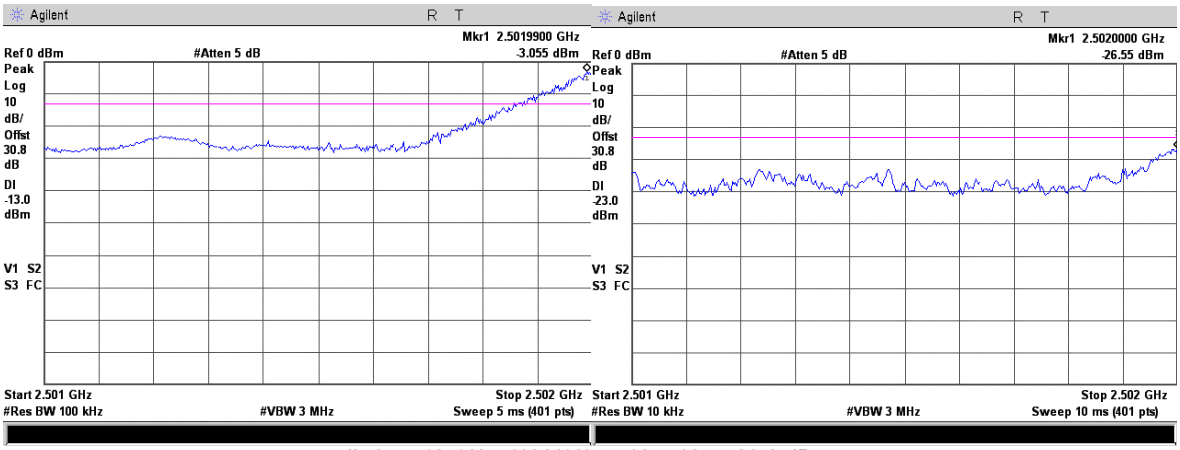
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.89 Band edges test results at low carrier frequency 2495 – 2496 MHz, 5 MHz, QPSK



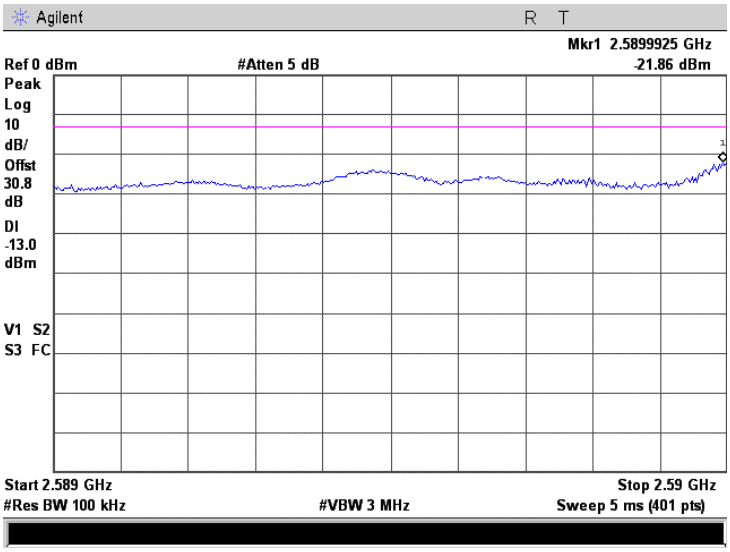
Plot 7.4.90 Band edges test results at low carrier frequency 2501 – 2502 MHz, 5 MHz, QPSK (2504.75 MHz)



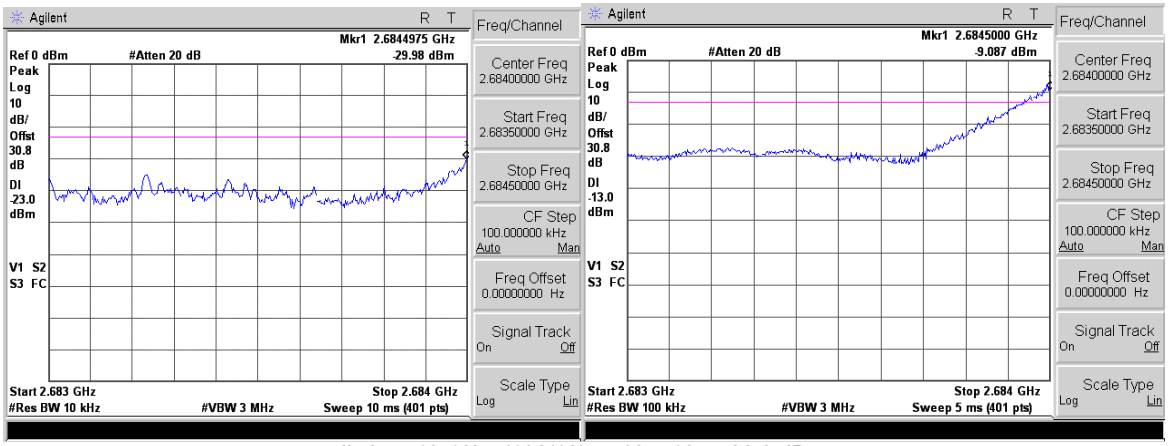
limit = -13-10log(100/10) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.91 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 5 MHz, QPSK



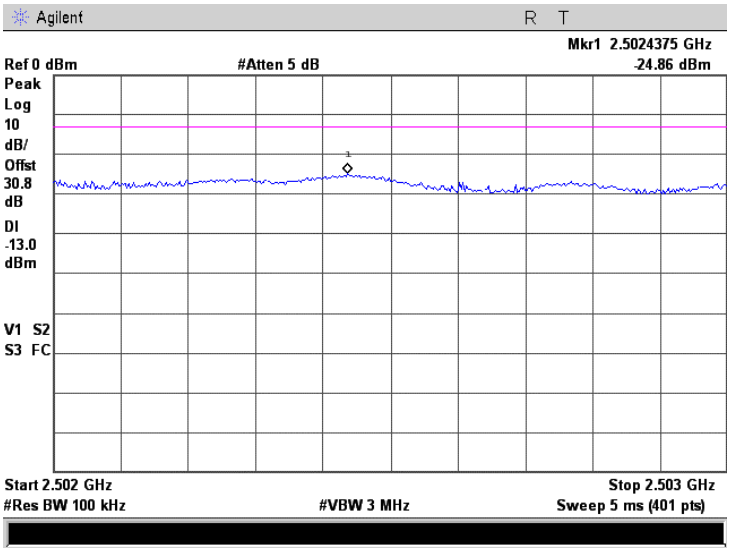
Plot 7.4.92 Band edges test results at high carrier frequency 2683.5 – 2684.5 MHz 5 MHz QPSK



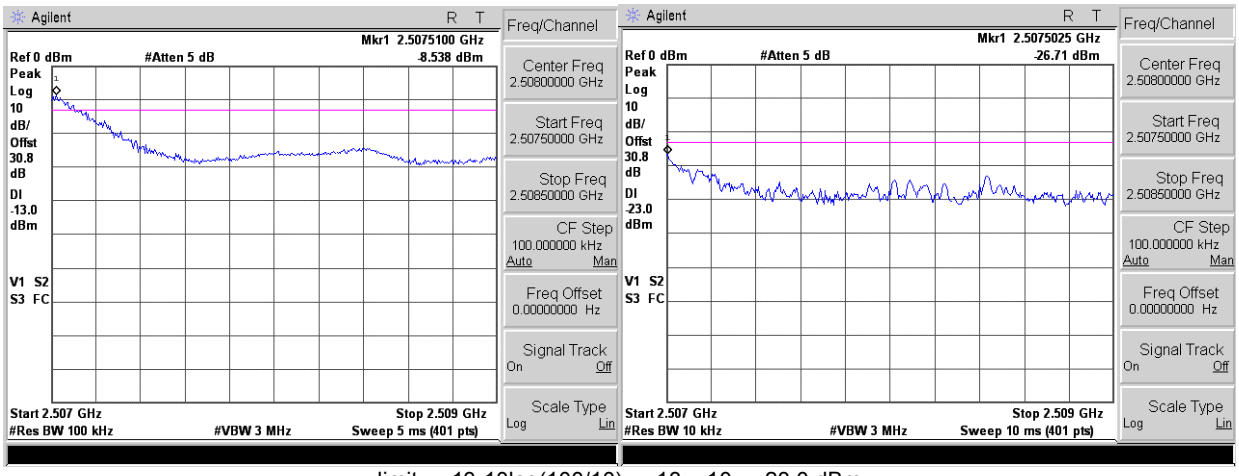
limit = -13-10log(100/10) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.93 Band edges test results at low carrier frequency 2502 – 2503 MHz, 5 MHz, QPSK



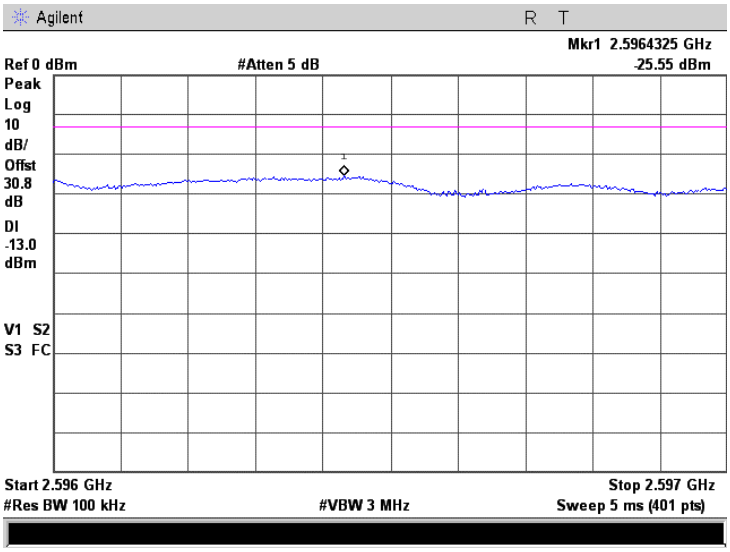
Plot 7.4.94 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 5 MHz, QPSK (2504.75 MHz)



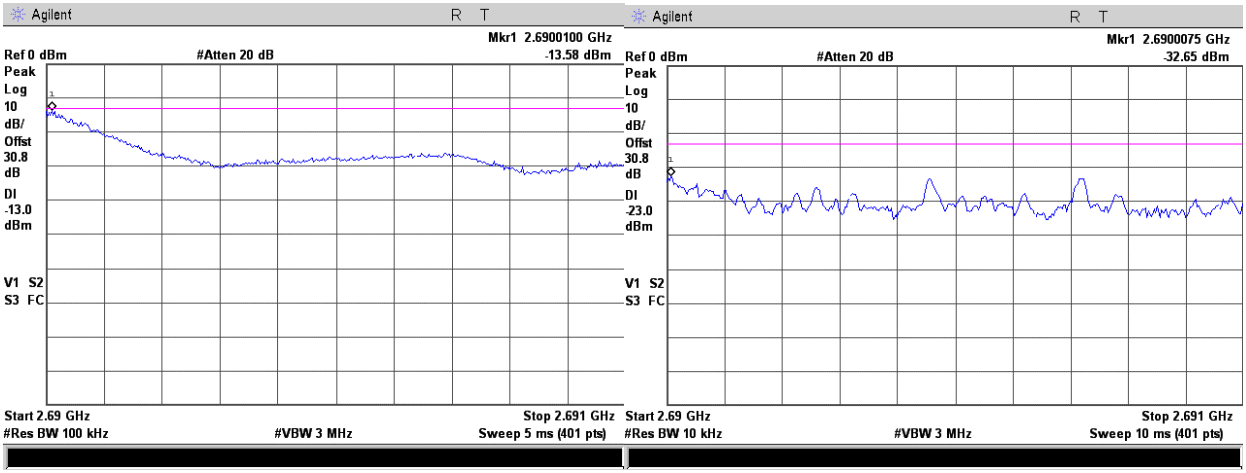
limit = -13-10log(100/10) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.95 Band edges test results at mid carrier frequency 2596 – 2597 MHz, 5 MHz, QPSK



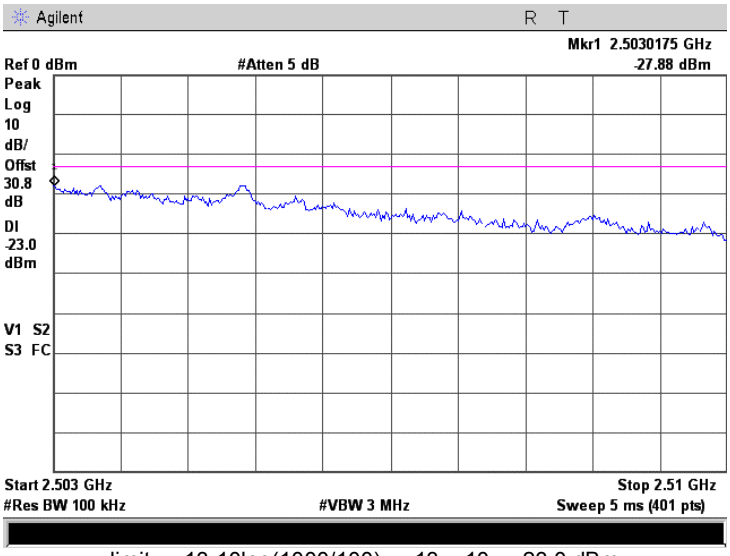
Plot 7.4.96 Band edges test results at high carrier frequency 2690.0 – 2691.0 MHz, 5 MHz, QPSK



limit = -13-10log(100/10) = -13 – 10 = -23.0 dBm

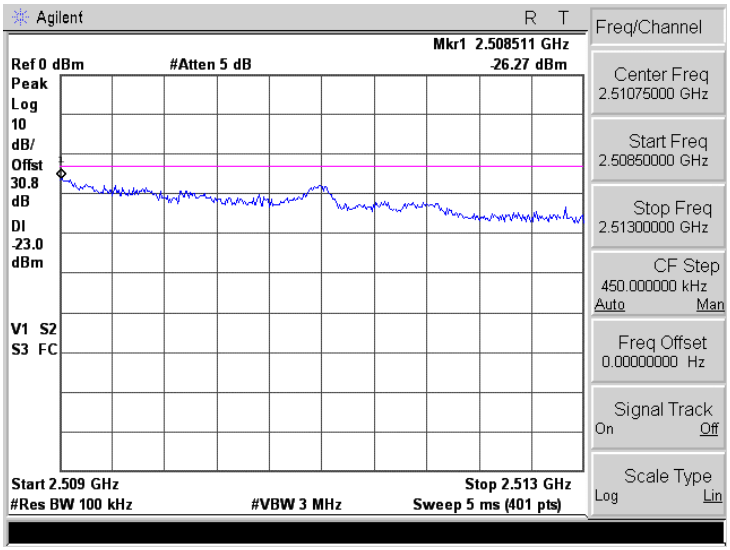
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.97 Band edges test results at low carrier frequency 2503 – 2510 MHz, 5 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

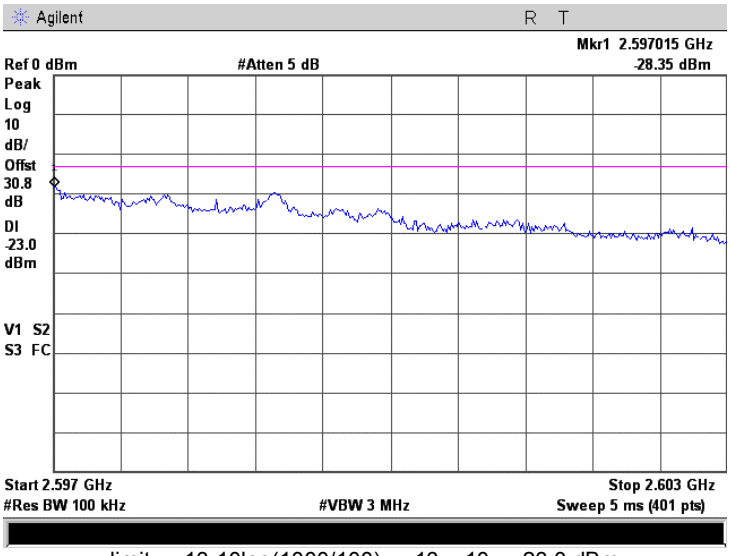
Plot 7.4.98 Band edges test results at low carrier frequency 2508.5 – 2513 MHz, 5 MHz, QPSK (2504.75 MHz)



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

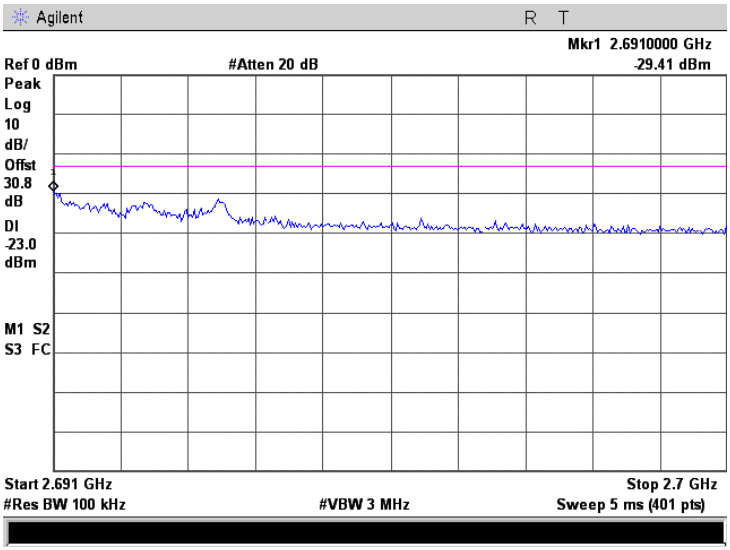
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.99 Band edges test results at mid carrier frequency 2597 – 2603 MHz, 5 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

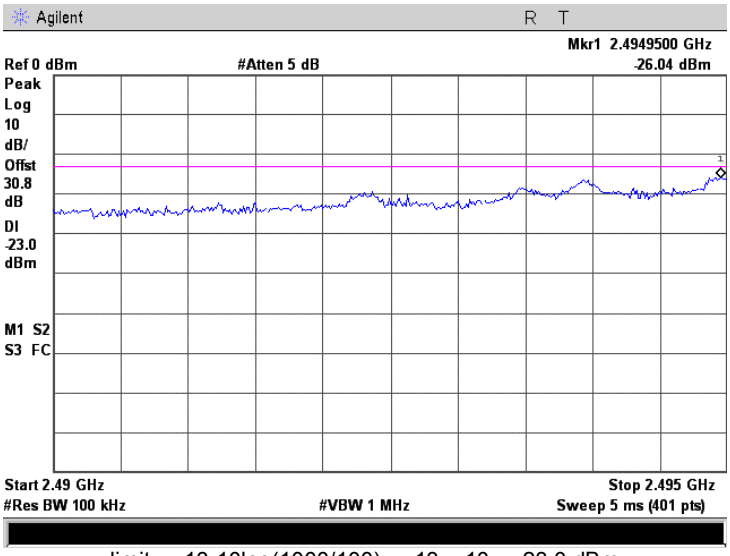
Plot 7.4.100 Band edges test results at high carrier frequency 2691.0 – 2700.0 MHz, 5 MHz, QPSK



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

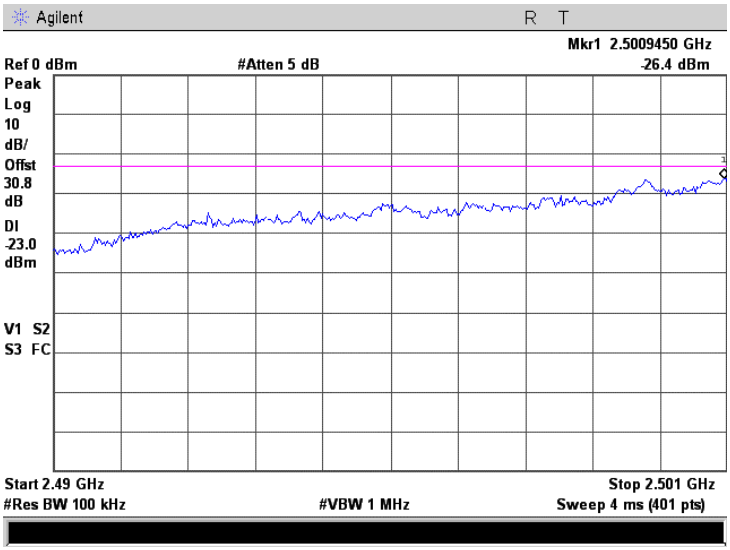
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.101 Band edges test results at low carrier frequency 2490 – 2495 MHz, 5 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

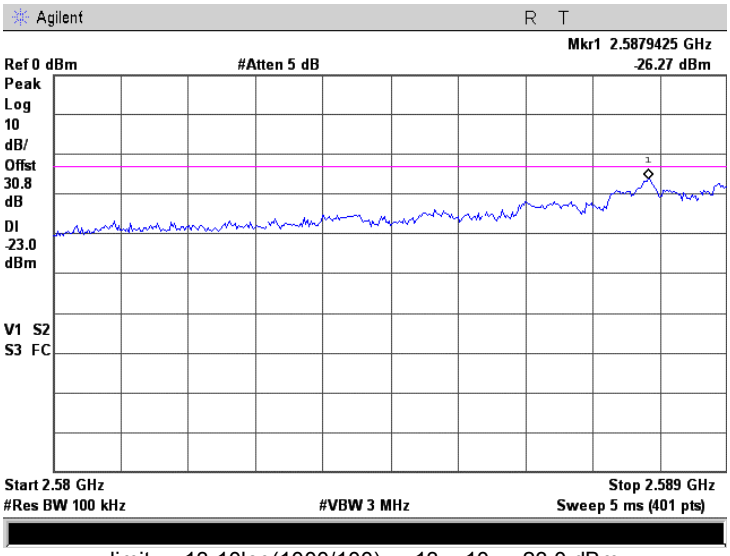
Plot 7.4.102 Band edges test results at low carrier frequency 2490 – 2501 MHz, 5 MHz, 16QAM (2504.75 MHz)



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

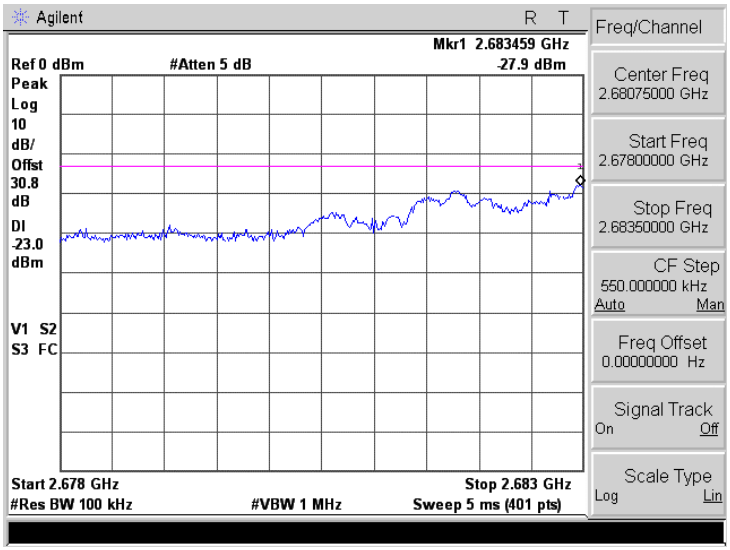
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.103 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 5 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

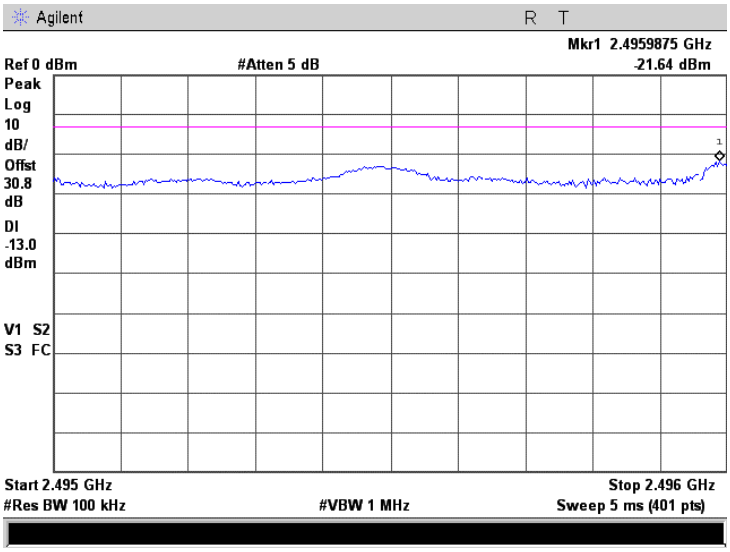
Plot 7.4.104 Band edges test results at high carrier frequency 2678 – 2683.5 MHz, 5 MHz, 16QAM



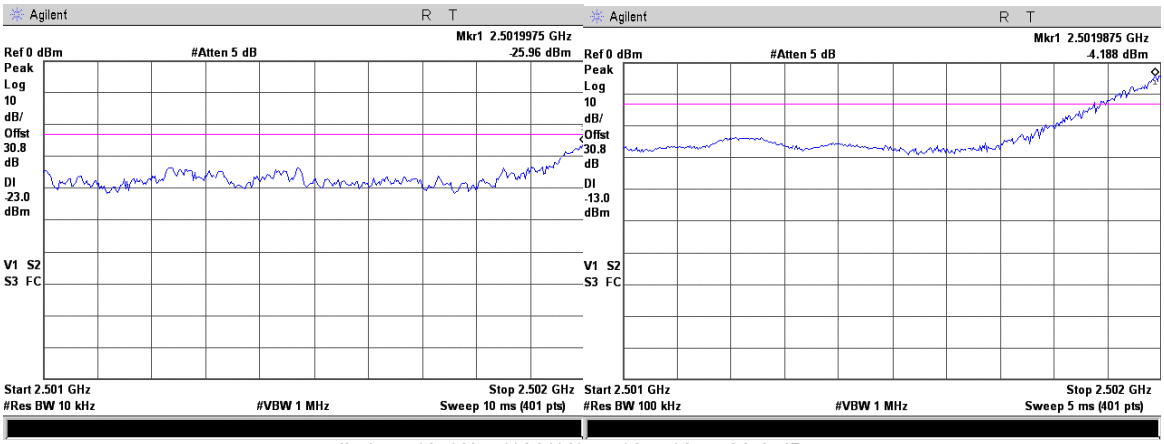
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.105 Band edges test results at low carrier frequency 2495 – 2496 MHz, 5 MHz, 16QAM



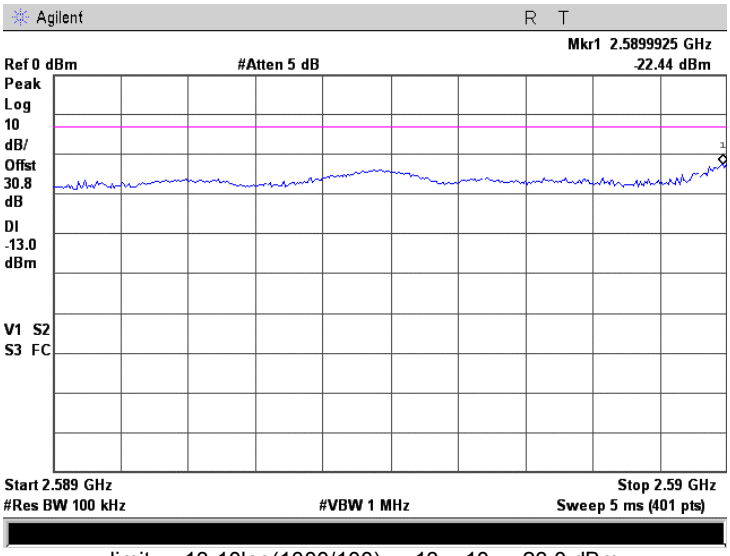
Plot 7.4.106 Band edges test results at low carrier frequency 2501 – 2502 MHz, 5 MHz, 16QAM (2504.75 MHz)



limit = -13-10log(100/10) = -13 – 10 = -23.0 dBm

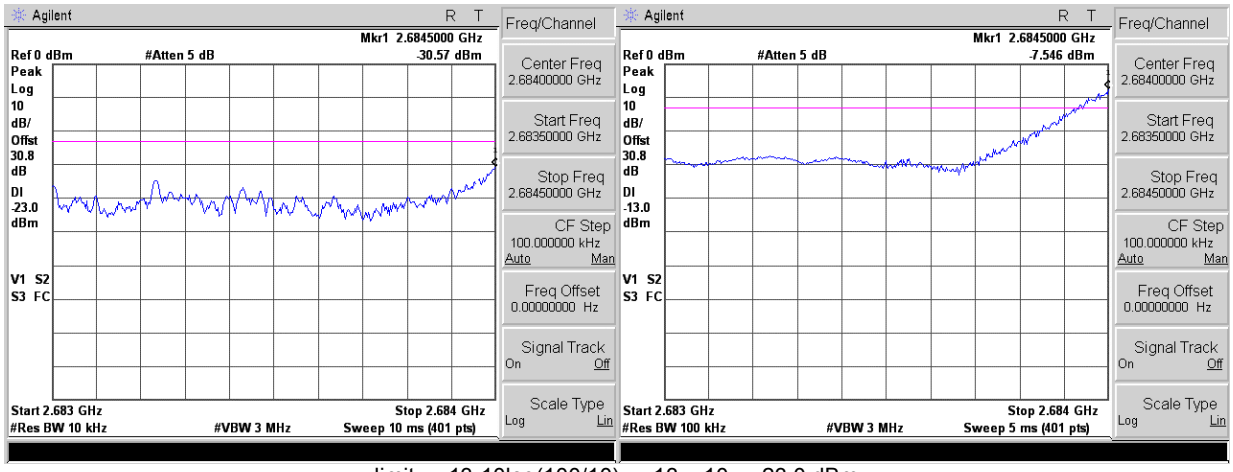
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.107 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 5 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

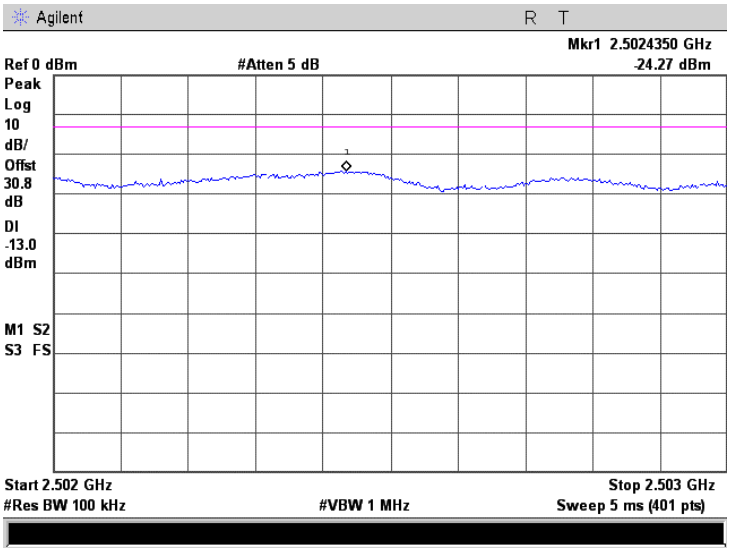
Plot 7.4.108 Band edges test results at high carrier frequency 2683.5 – 2684.5 MHz, 5 MHz, 16QAM



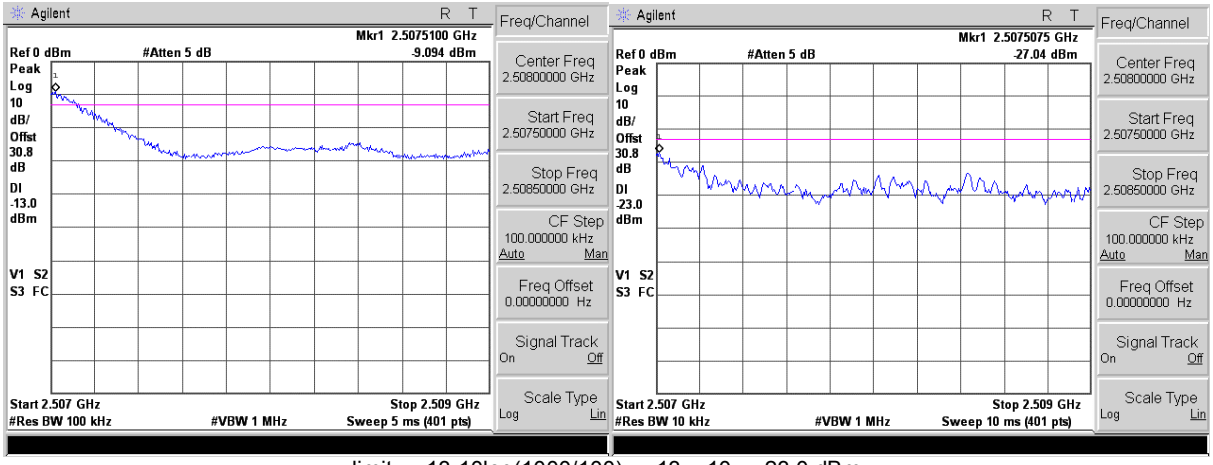
limit = -13-10log(100/10) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.109 Band edges test results at low carrier frequency 2502 – 2503 MHz, 5 MHz, 16QAM



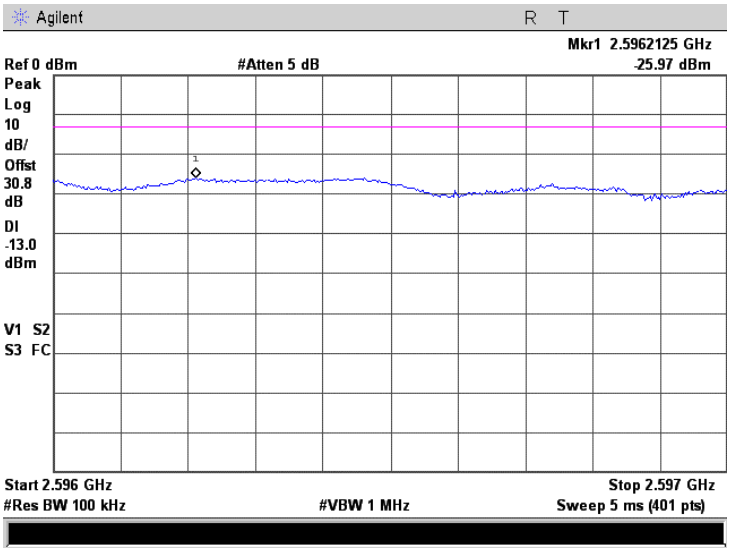
Plot 7.4.110 Band edges test results at mid carrier frequency 2507.5 – 2508.5 MHz, 5 MHz, 16QAM (2504.75 MHz)



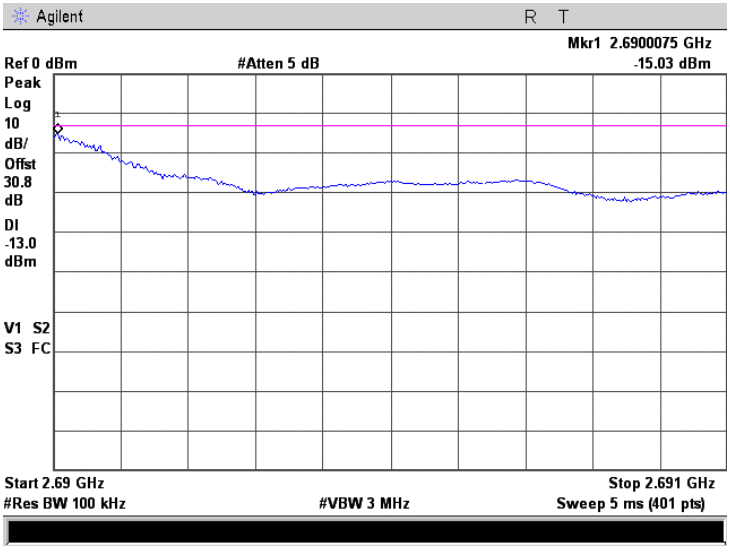
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.111 Band edges test results at mid carrier frequency 2596 – 2597 MHz, 5 MHz, 16QAM

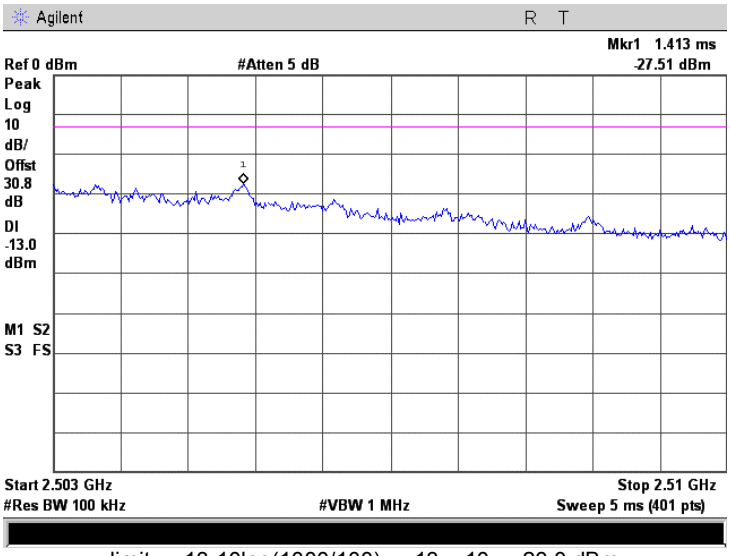


Plot 7.4.112 Band edges test results at high carrier frequency 2690 – 2691 MHz, 5 MHz, 16QAM



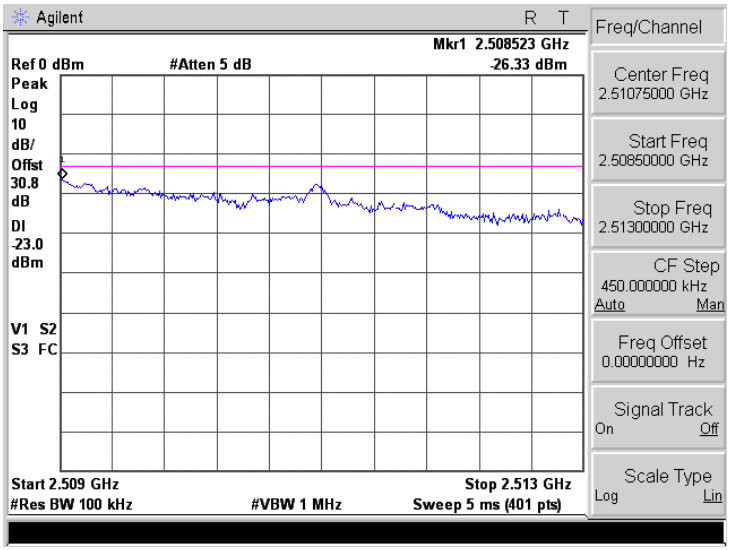
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.113 Band edges test results at low carrier frequency 2503 – 2510.0 MHz, 5 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

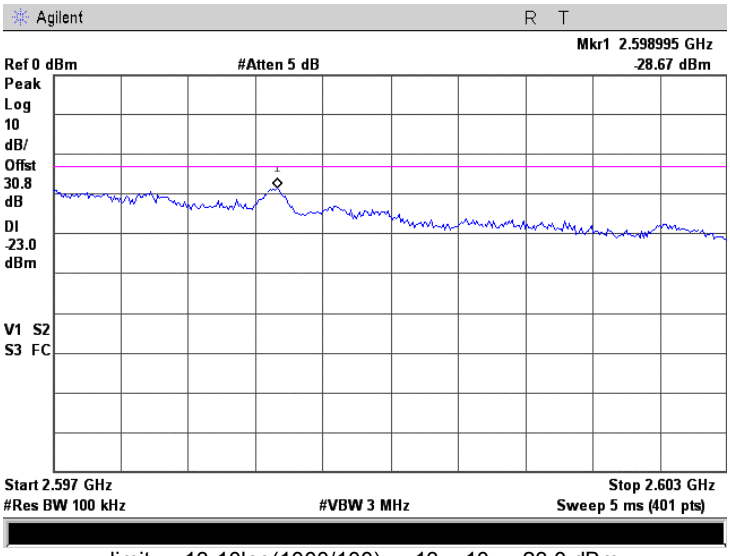
Plot 7.4.114 Band edges test results at low carrier frequency 2508.5 – 2513 MHz, 5 MHz, 16QAM (2504.75 MHz)



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

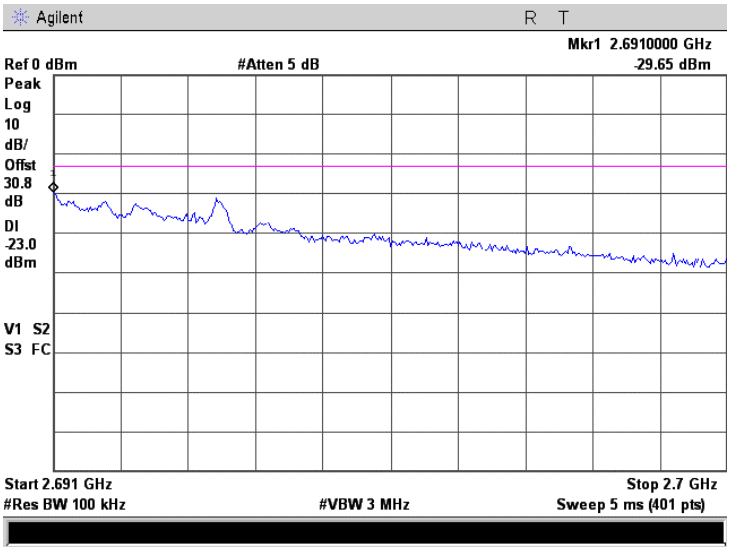
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.115 Band edges test results at mid carrier frequency 2597 – 2603 MHz, 5 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

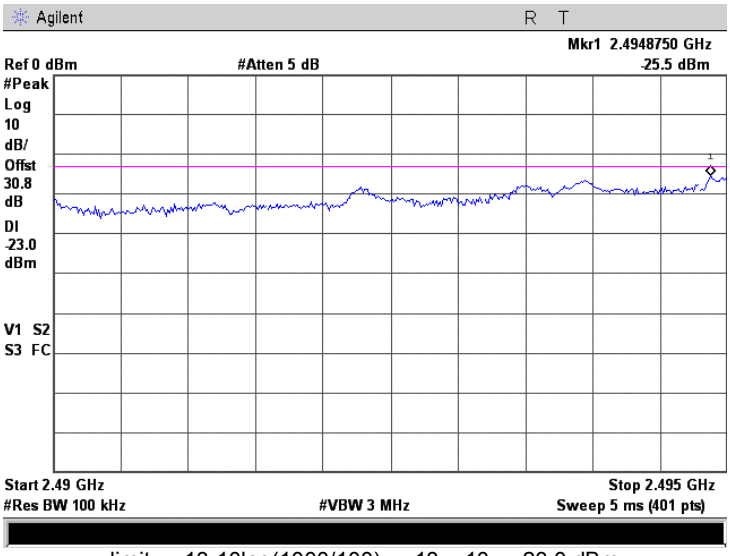
Plot 7.4.116 Band edges test results at high carrier frequency 2691 – 2700 MHz, 5 MHz, 16QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

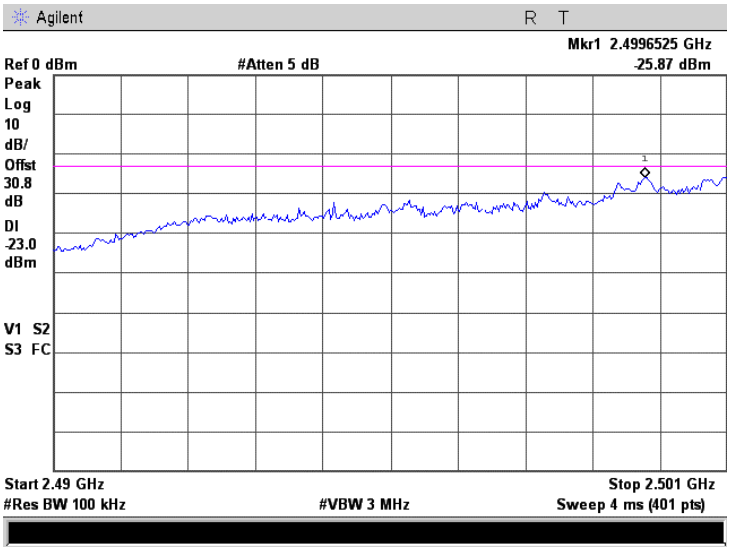
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.117 Band edges test results at low carrier frequency 2490 – 2495 MHz, 5 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

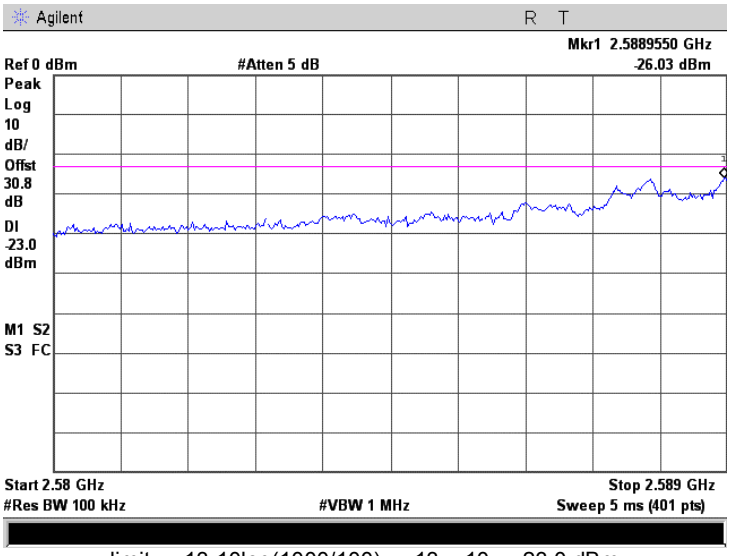
Plot 7.4.118 Band edges test results at low carrier frequency 2490 – 2501 MHz, 5 MHz, 64QAM (2504.75 MHz)



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

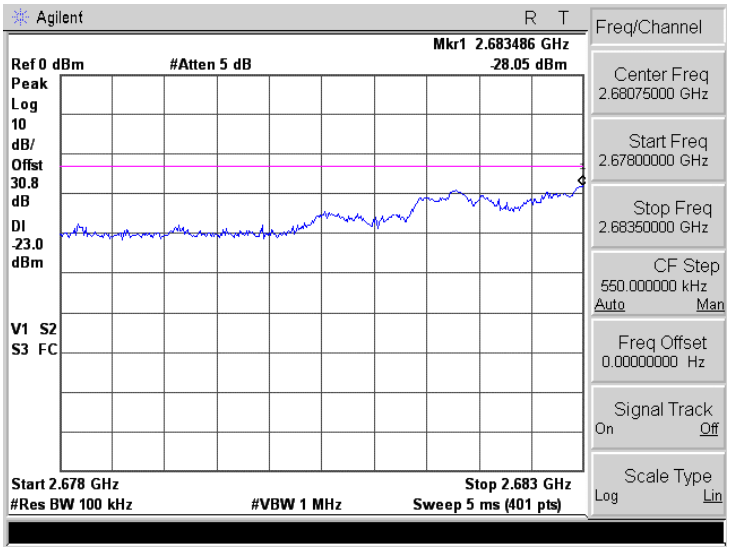
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.119 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 5 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

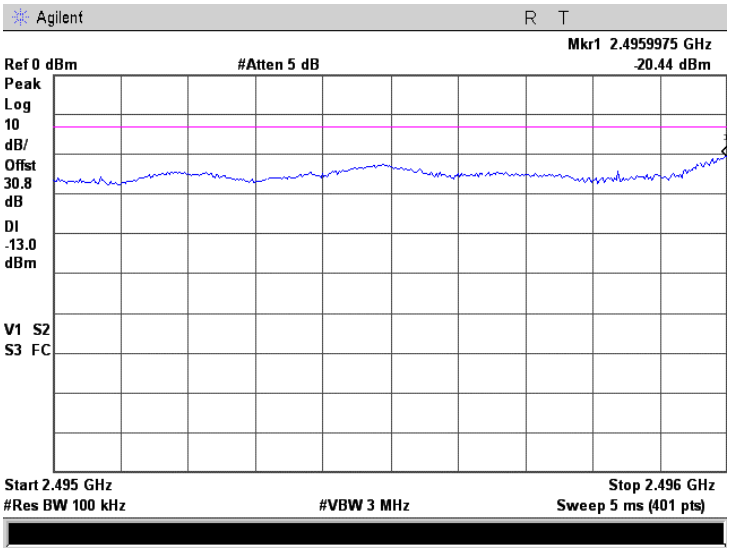
Plot 7.4.120 Band edges test results at high carrier frequency 2678 – 2683.5 MHz, 5 MHz, 64QAM



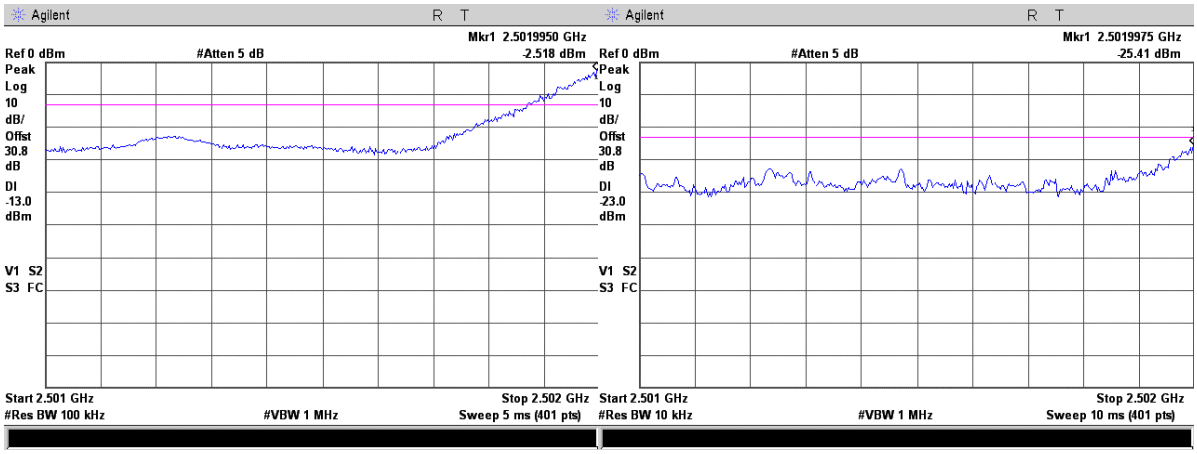
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.121 Band edges test results at low carrier frequency 2495 – 2496 MHz, 5 MHz, 64QAM



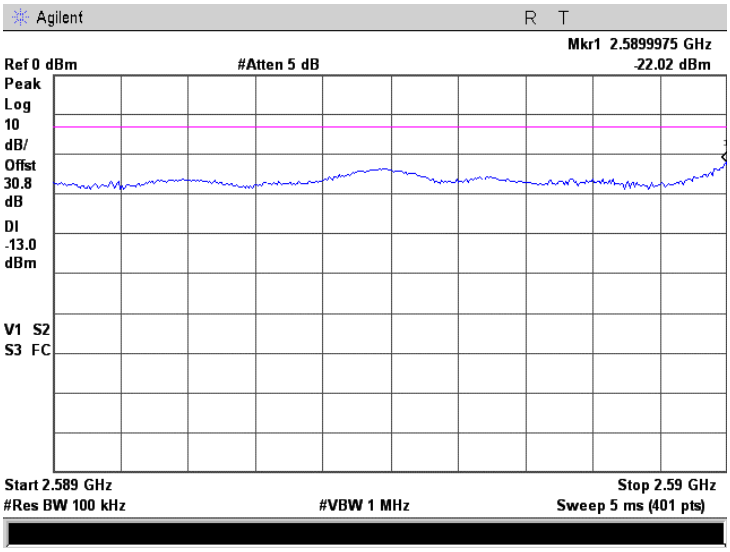
Plot 7.4.122 Band edges test results at mid carrier frequency 2501 – 2502 MHz, 5 MHz, 64QAM (2504.75 MHz)



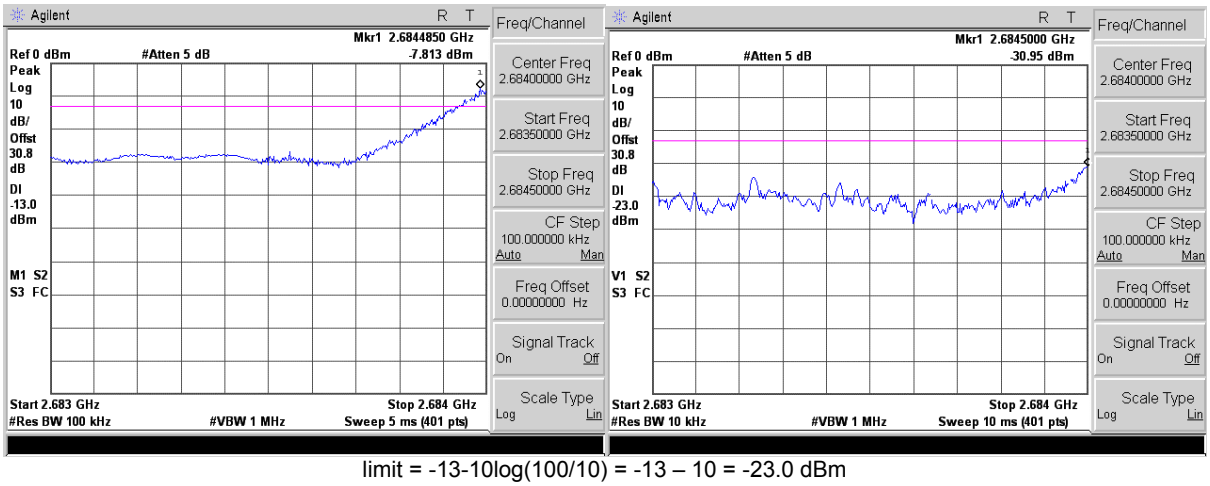
limit = -13-10log(100/10) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.123 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 5 MHz, 64QAM



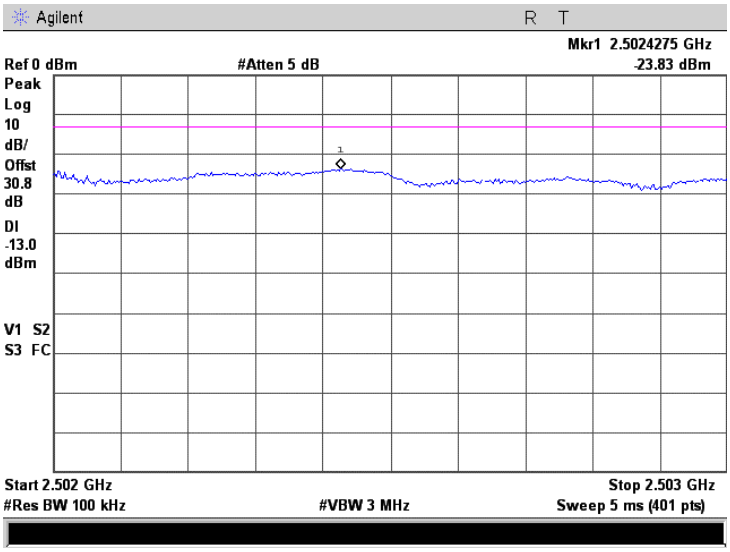
Plot 7.4.124 Band edges test results at high carrier frequency 2683.5 – 2684.5 MHz, 5 MHz, 64QAM



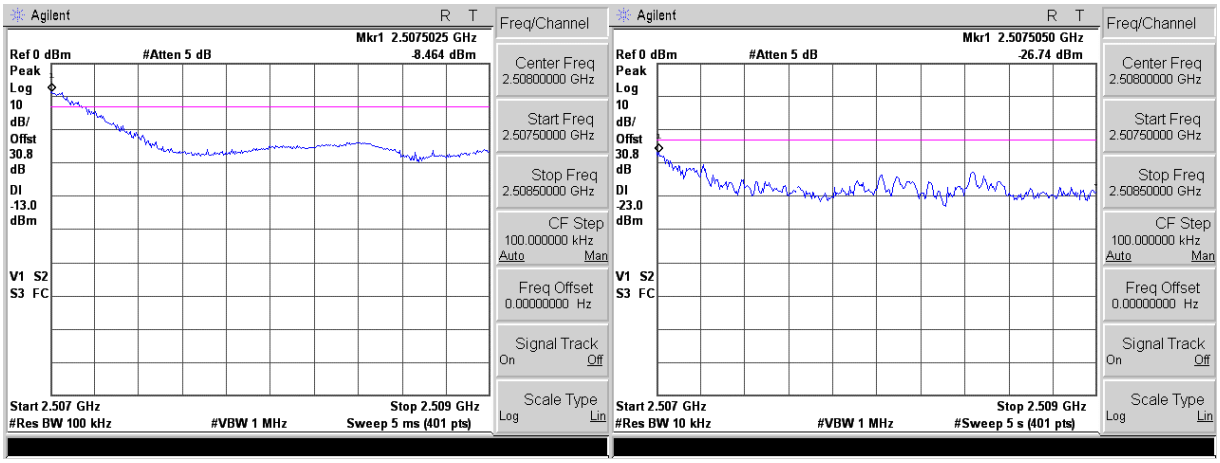
limit = -13-10log(100/10) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.125 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 5 MHz, 64QAM



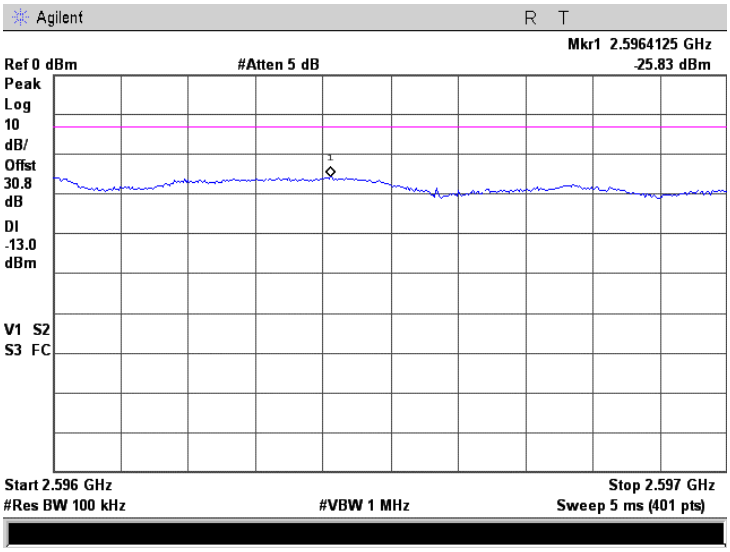
Plot 7.4.126 Band edges test results at mid carrier frequency 2507.5 – 2508.5 MHz, 5 MHz, 64QAM (2504.75 MHz)



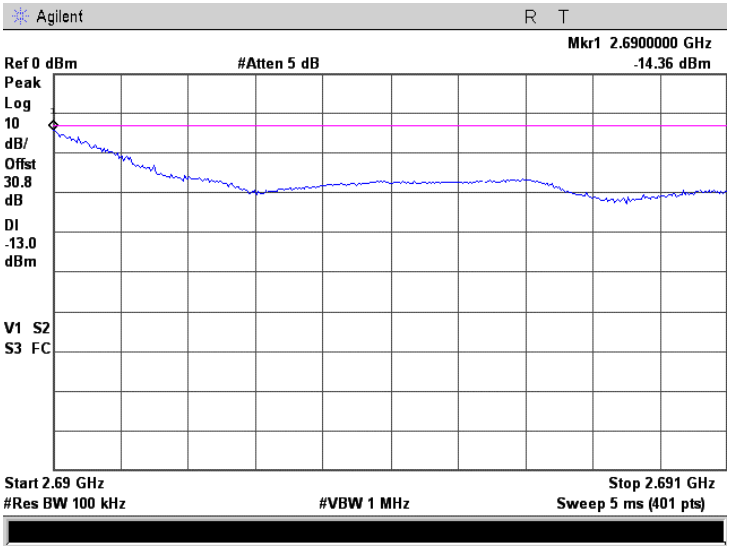
limit = -13-10log(100/10) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.127 Band edges test results at mid carrier frequency 2596 – 2597 MHz, 5 MHz, 64QAM

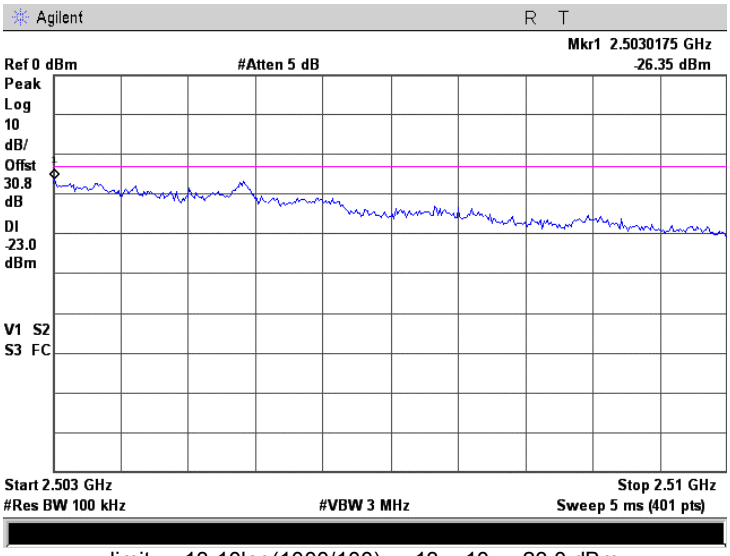


Plot 7.4.128 Band edges test results at high carrier frequency 2690 – 2691 MHz, 5 MHz, 64QAM



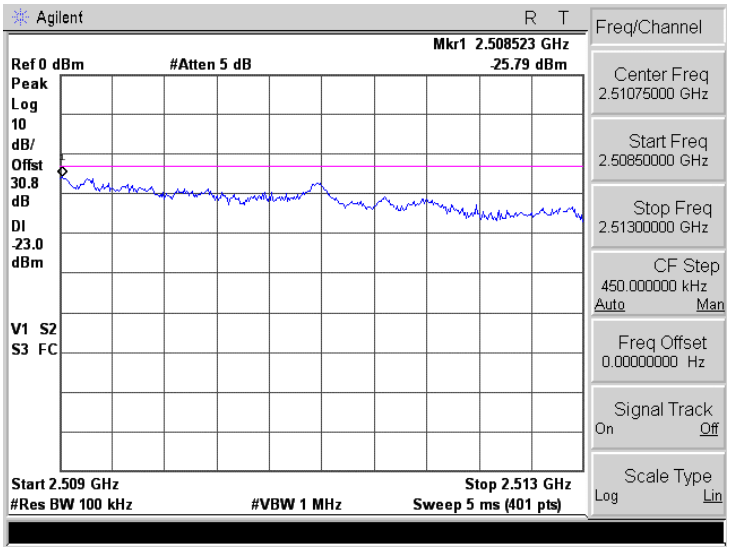
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.129 Band edges test results at low carrier frequency 2503 – 2510 MHz, 5 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

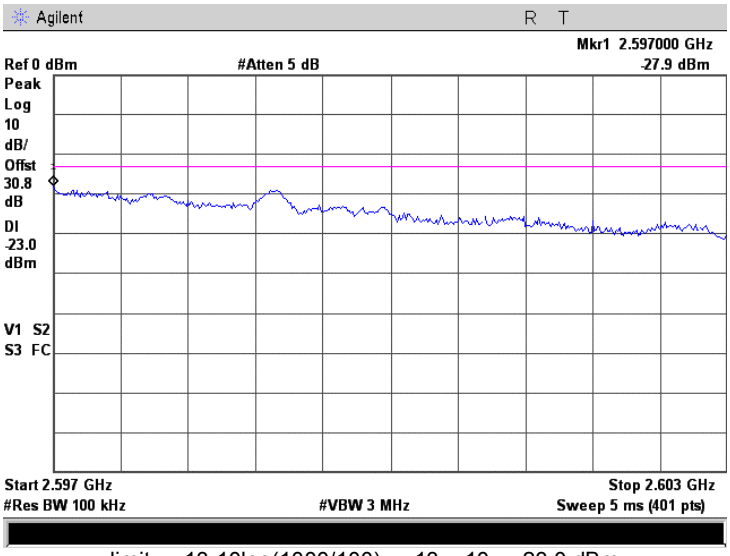
Plot 7.4.130 Band edges test results at low carrier frequency 2508.5 – 2513 MHz, 5 MHz, 64QAM (2504.75 MHz)



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

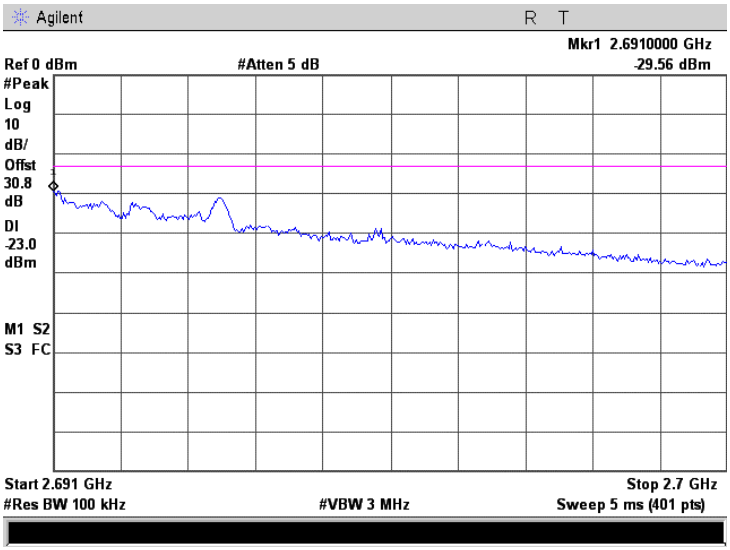
Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.131 Band edges test results at mid carrier frequency 2597 – 2603 MHz, 5 MHz, 64QAM



limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

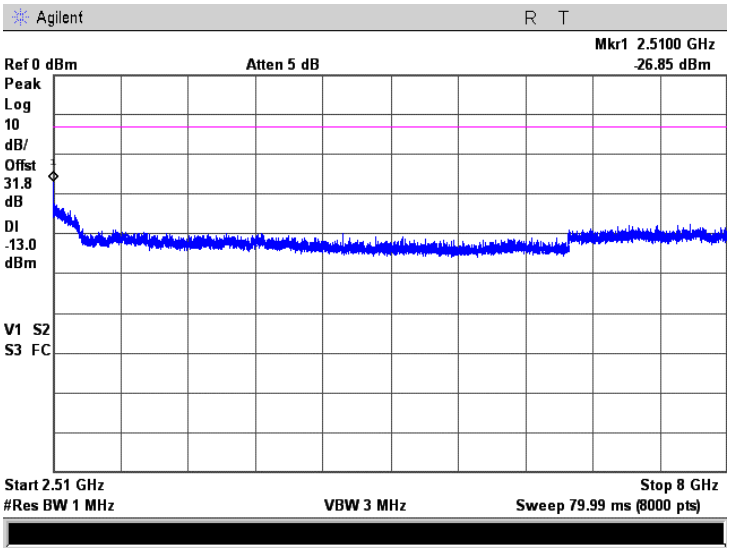
Plot 7.4.132 Band edges test results at high carrier frequency 2691 – 2700 MHz, 5 MHz, 64QAM



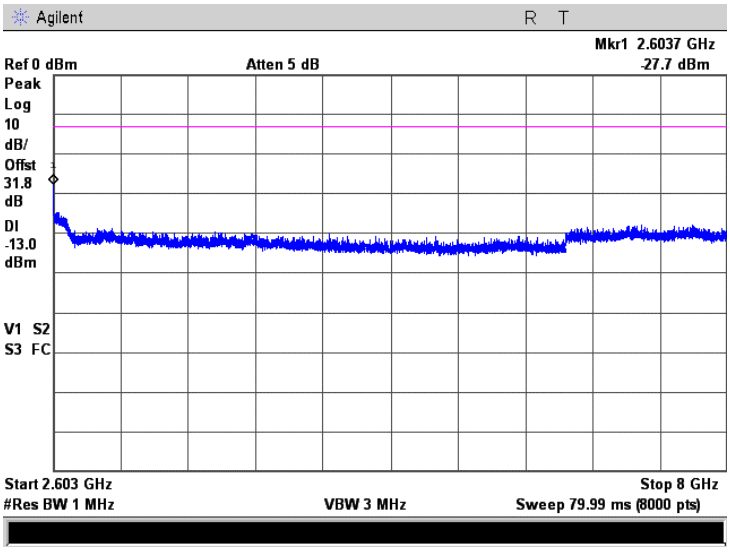
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.133 Spurious emission measurements in 2510 - 8000 MHz range at low carrier frequency

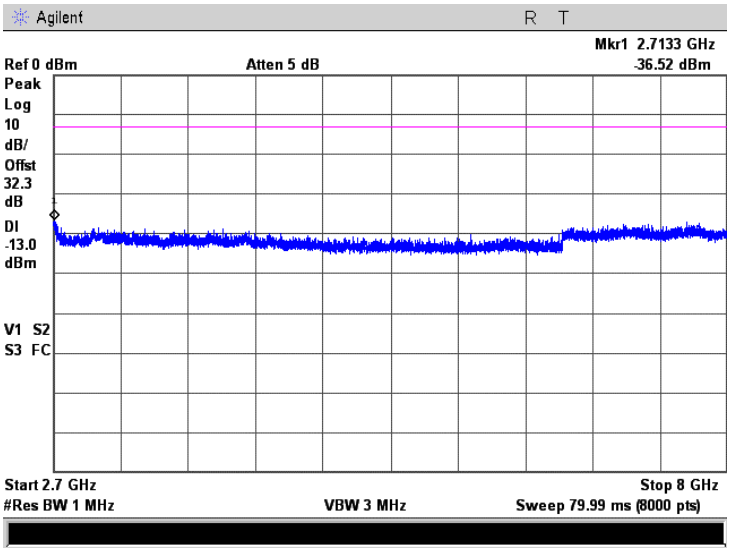


Plot 7.4.134 Spurious emission measurements in 2603 - 8000 MHz at mid carrier frequency

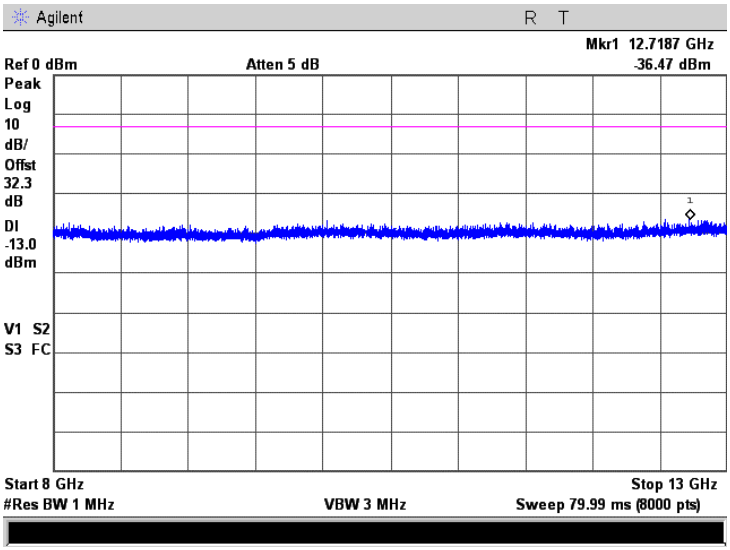


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.135 Spurious emission measurements in 2700 - 8000 MHz at high carrier frequency

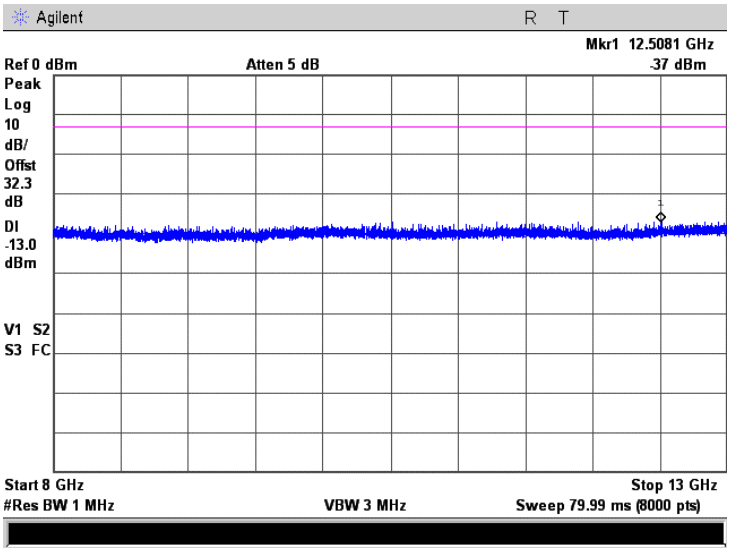


Plot 7.4.136 Spurious emission measurements in 8000 - 13000 MHz range at low carrier frequency

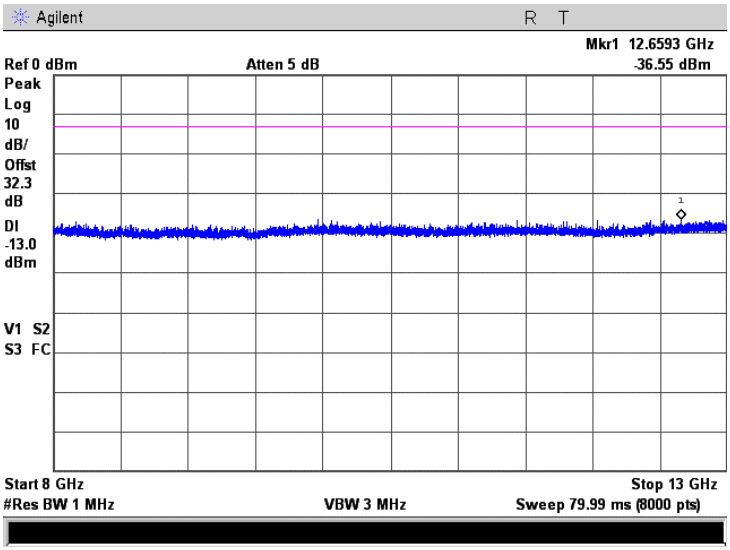


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.137 Spurious emission measurements in 8000 - 13000 MHz at mid carrier frequency

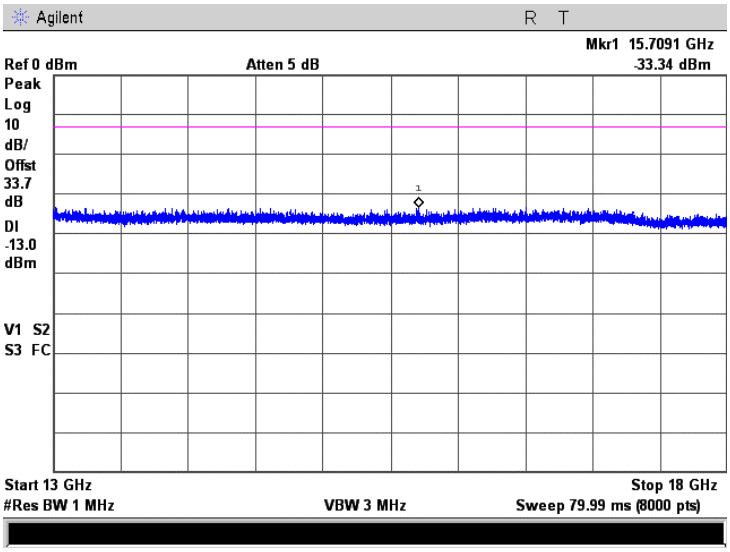


Plot 7.4.138 Spurious emission measurements in 8000 - 13000 MHz at high carrier frequency

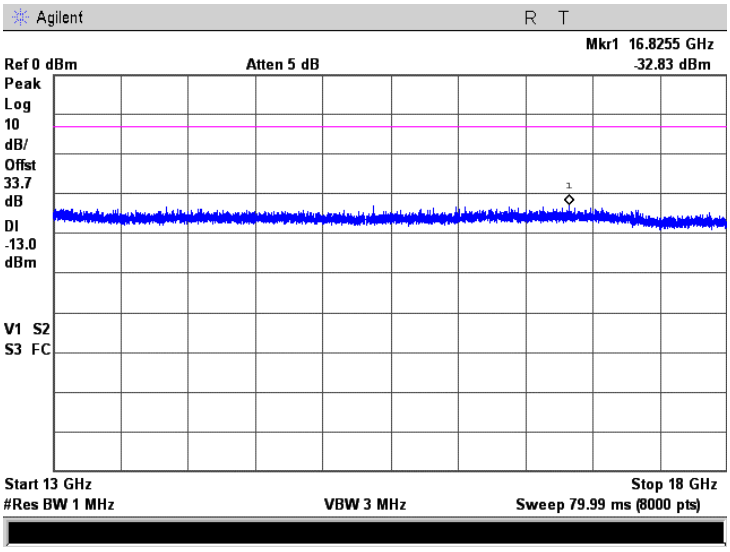


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.139 Spurious emission measurements in 13000 - 18000 MHz range at low carrier frequency

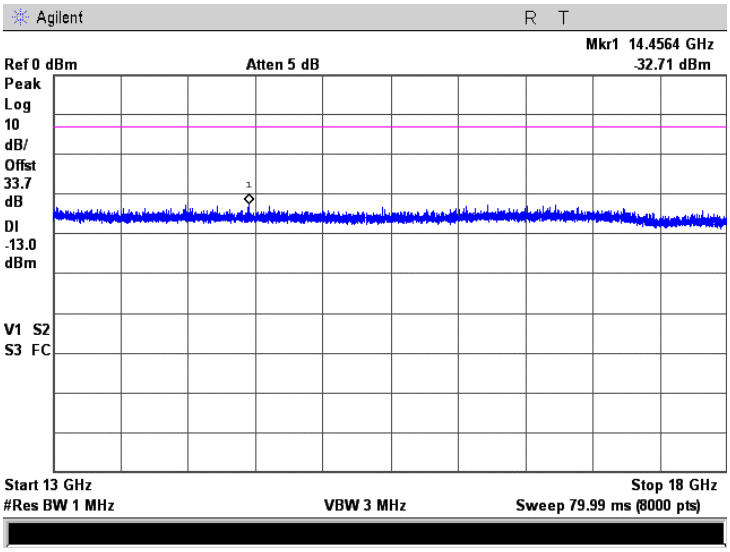


Plot 7.4.140 Spurious emission measurements in 13000 - 18000 MHz at mid carrier frequency

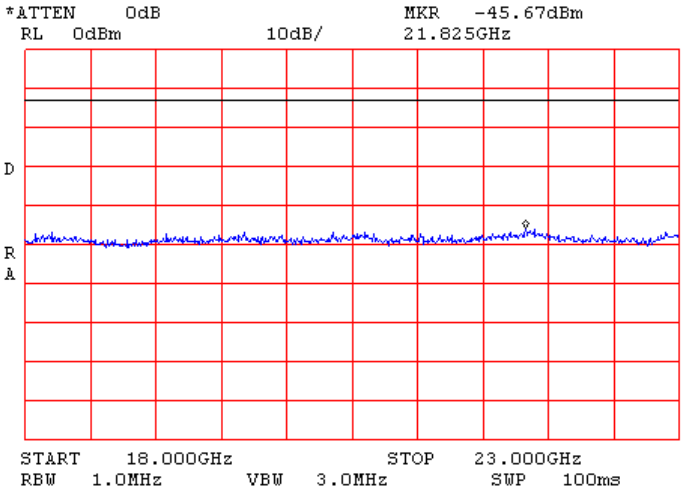


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.141 Spurious emission measurements in 13000 - 18000 MHz at high carrier frequency

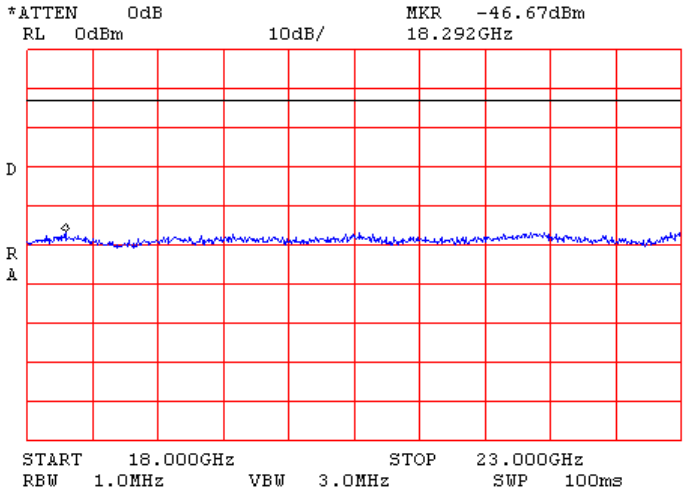


Plot 7.4.142 Spurious emission measurements in 18000 - 23000 MHz range at low carrier frequency

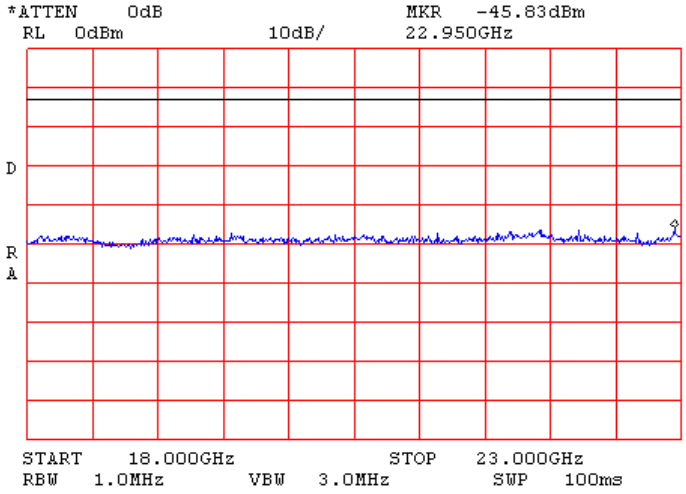


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.143 Spurious emission measurements in 18000 - 23000 MHz at mid carrier frequency

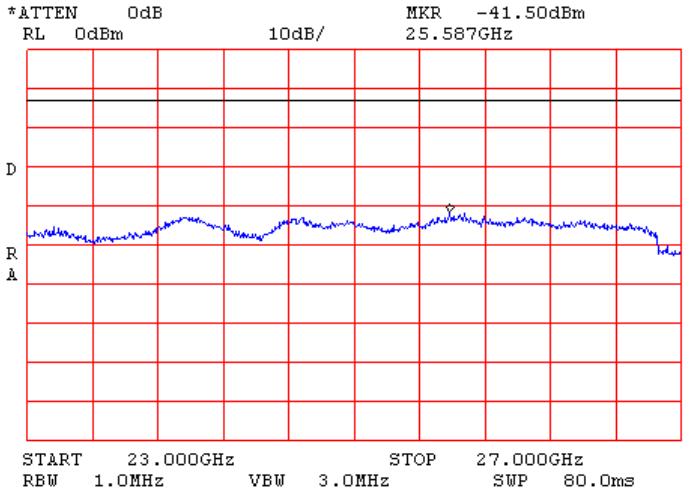


Plot 7.4.144 Spurious emission measurements in 18000 - 23000 MHz at high carrier frequency

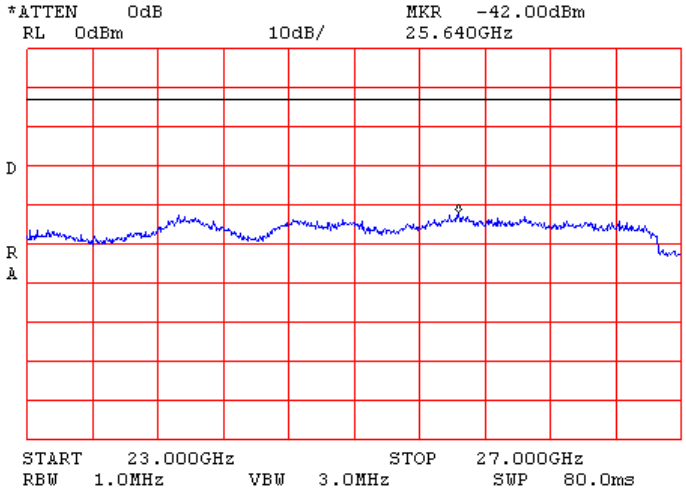


Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.145 Spurious emission measurements in 23000 - 27000 MHz range at low carrier frequency

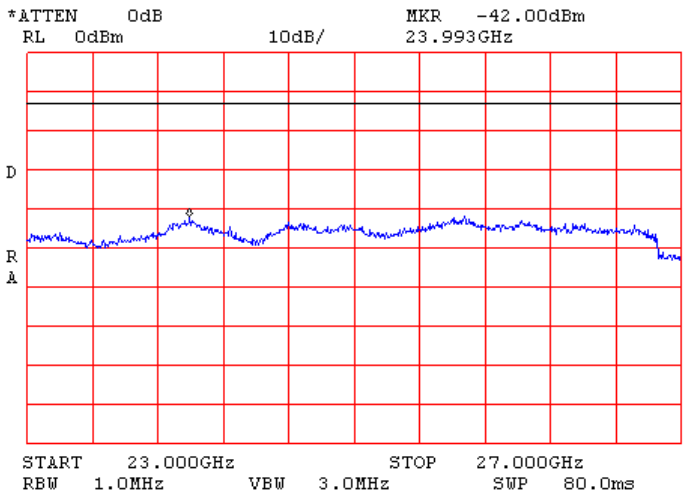


Plot 7.4.146 Spurious emission measurements in 23000 - 27000 MHz at mid carrier frequency



Test specification:	Section 27.53(l)(2), Spurious emissions		
Test procedure:	Section 27.53(l)(2)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/8/2008 10:24:29 PM		
Temperature: 23ºC	Air Pressure: 1011 hPa	Relative Humidity: 43 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.147 Spurious emission measurements in 23000 - 27000 MHz at high carrier frequency



Test specification:	Section .27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 9:01:00 AM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

7.5 Frequency stability test

7.5.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.5.1. The test results are provided in Table 7.5.2.

Table 7.5.1 Frequency stability limits

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

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 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.

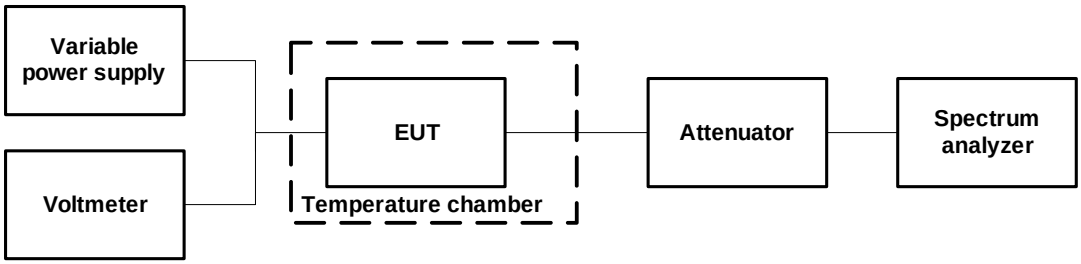
7.5.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.

7.5.2.4 The above procedure was repeated at 0˚C and at the lowest test temperature.

7.5.2.5 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.

7.5.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 7.5.2, Table 7.5.3.

Figure 7.5.1 Frequency stability test setup



Test specification:	**Section .27.54, Frequency stability**		
Test procedure:	47 CFR, Section 2.1055		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/9/2008 9:01:00 AM		
Temperature: 23ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 40 %	**Power Supply:** 48 VDC
Remarks:			

Table 7.5.2 Frequency stability test results

OPERATING FREQUENCY: 2496 – 2690 MHz
NOMINAL POWER VOLTAGE: 48 VDC
TEMPERATURE STABILIZATION PERIOD: 20 min
POWER DURING TEMPERATURE TRANSITION: Off
SPECTRUM ANALYZER MODE: Peak Hold
RESOLUTION BANDWIDTH: 100 Hz
VIDEO BANDWIDTH: 300 Hz

T, ºC	Voltage, V	Frequency, MHz							Max frequency drift Hz	
		Start up	1st min	2nd min	3rd min	4th min	5th min	10th min	Positive	Negative
Low carrier frequency 2499.00 MHz										
-30	nominal	2499.000691	2499.000667	2499.000633	2499.000591	2499.000573	2499.000573	2499.000587	0.00	-127.00
-20	nominal	2499.000613	NA	NA	NA	NA	NA	2499.000624	0.00	-87.00
-10	nominal	2499.000529	NA	NA	NA	NA	NA	2499.000417	0.00	-283.00
0	nominal	2499.000633	2499.000559	2499.000551	2499.000549	2499.000548	2499.000547	2499.000559	0.00	-153.00
10	nominal	2499.000642	NA	NA	NA	NA	NA	2499.000642	0.00	-58.00
20	15%	2499.000630	NA	NA	NA	NA	NA	2499.000637	0.00	-70.00
20	nominal	2499.000675	NA	NA	NA	NA	NA	2499.000700	0.00	-25.00
20	-15%	2499.000630	NA	NA	NA	NA	NA	2499.000629	0.00	-71.00
30	nominal	2499.000669	2499.000666	2499.000663	2499.000658	2499.000654	2499.000649	2499.000523	0.00	-177.00
40	nominal	2499.000662	NA	NA	NA	NA	NA	2499.000367	0.00	-333.00
50	nominal	2499.000438	2499.000422	2499.000403	2499.000388	2499.000376	2499.000362	2499.000208	0.00	-492.00
Mid carrier frequency 2593.00 MHz										
-30	nominal	2593.000725	2593.000669	2593.000630	2593.000596	2593.000595	2593.000597	2593.000617	68.00	-62.00
-20	nominal	2593.000764	NA	NA	NA	NA	NA	2593.000647	107.00	-10.00
-10	nominal	2593.000530	NA	NA	NA	NA	NA	2593.000440	0.00	-217.00
0	nominal	2593.000584	2593.000588	2593.000591	2593.000592	2593.000594	2593.000595	2593.000602	0.00	-73.00
10	nominal	2593.000673	NA	NA	NA	NA	NA	2593.000669	16.00	0.00
20	15%	2593.000662	NA	NA	NA	NA	NA	2593.000659	5.00	0.00
20	nominal	2593.000700	NA	NA	NA	NA	NA	2593.000657*	43.00	0.00
20	-15%	2593.000656	NA	NA	NA	NA	NA	2593.000655	0.00	-2.00
30	nominal	2593.000543	2593.000542	2593.000541	2593.000541	2593.000540	2593.000539	2593.000536	0.00	-121.00
40	nominal	2593.000385	NA	NA	NA	NA	NA	2593.000366	0.00	-291.00
50	nominal	2593.000331	2593.000328	2593.000323	2593.000317	2593.000314	2593.000311	2593.000213	0.00	-444.00
High carrier frequency 2687.25 MHz										
-30	nominal	2687.250739	2687.250735	2687.250724	2687.250709	2687.250684	2687.250653	2687.250637	57.00	-45.00
-20	nominal	2687.250671	NA	NA	NA	NA	NA	2687.250684	2.00	-11.00
-10	nominal	2687.250466	NA	NA	NA	NA	NA	2687.250483	0.00	-216.00
0	nominal	2687.250692	2687.250692	2687.250692	2687.250692	2687.250693	2687.250697	2687.250701	19.00	0.00
10	nominal	2687.250713	NA	NA	NA	NA	NA	2687.250701	31.00	0.00
20	15%	2687.250685	NA	NA	NA	NA	NA	2687.250681	3.00	-1.00
20	nominal	2687.250685	NA	NA	NA	NA	NA	2687.250682*	3.00	0.00
20	-15%	2687.250680	NA	NA	NA	NA	NA	2687.250681	0.00	-2.00
30	nominal	2687.250655	2687.250647	2687.250639	2687.250630	2687.250628	2687.250624	2687.250590	0.00	-92.00
40	nominal	2687.250387	NA	NA	NA	NA	NA	2687.250369	0.00	-313.00
50	nominal	2687.250220	2687.250216	2687.250213	2687.250209	2687.250205	2687.250203	2687.250188	0.00	-494.00

* - Reference frequency

Test specification:	Section .27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/9/2008 9:01:00 AM		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Table 7.5.3 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
5 MHz BW, 2504.75 MHz								
QPSK								
2502.035000	2507.300000	2502.034508	2507.300000	2502.0	2507.5	0.03	-0.2	Pass
16QAM								
2502.065000	2507.255000	2502.064508	2507.255000	2502.0	2507.5	0.06451	-0.245	Pass
64QAM								
2502.035000	2507.315000	2502.034508	2507.315000	2502.0	2507.5	0.03451	-0.185	Pass
5 MHz BW								
QPSK								
2496.315000	2501.520000	2496.314508	2501.520000	2496.0	2502.0	0.31451	-0.48	Pass
2590.270000	2595.550000	2590.269556	2595.550107	2590.0	2596.0	0.26956	-0.449893	Pass
2684.550000	2689.830000	2684.549506	2689.830057	2684.5	2690.0	0.04951	-0.169943	Pass
16QAM								
2496.285000	2501.550000	2496.284508	2501.550000	2496.0	2502.0	0.28451	-0.45	Pass
2590.285000	2595.550000	2590.284556	2595.550107	2590.0	2596.0	0.28456	-0.449893	Pass
2684.550000	2689.770000	2684.549506	2689.770057	2684.5	2690.0	0.04951	-0.229943	Pass
64QAM								
2496.285000	2501.535000	2496.284508	2501.535	2496.0	2502.0	0.28451	-0.465	Pass
2590.300000	2595.520000	2590.299556	2595.520107	2590.0	2596.0	0.29956	-0.479893	Pass
2684.550000	2689.785000	2684.549506	2689.785057	2684.5	2690.0	0.04951	-0.214943	Pass
7 MHz BW								
QPSK								
2496.500000	2503.600000	2496.499508	2503.600000	2496.0	2507.5	0.49951	-3.9	Pass
2592.500000	2599.600000	2592.499556	2599.600107	2590.0	2602.0	2.49956	-2.399893	Pass
2682.500000	2689.600000	2682.499506	2689.600057	2679.0	2690.0	3.49951	-0.399943	Pass
16QAM								
2496.46	2503.6	2496.459508	2503.6	2496	2507.5	0.45951	-3.9	Pass
2592.46	2599.56	2592.459556	2599.560107	2590	2602	2.45956	-2.439893	Pass
2682.46	2689.58	2682.459506	2689.580057	2679	2690	3.45951	-0.419943	Pass
64QAM								
2496.460000	2503.580000	2496.459508	2503.580000	2496.0	2507.5	0.45951	-3.92	Pass
2592.460000	2599.580000	2592.459556	2599.580107	2590.0	2602.0	2.45956	-2.419893	Pass
2682.460000	2689.560000	2682.459506	2689.560057	2679.0	2690.0	3.45951	-0.439943	Pass
10 MHz BW								
QPSK								
2496.855000	2506.755000	2496.854508	2506.755000	2496.0	2507.5	0.85451	0.745	Pass
2591.105000	2600.977500	2591.104556	2600.977607	2590.0	2602.0	1.10456	1.022393	Pass
2679.605100	2689.477600	2679.604606	2689.477657	2679.0	2690.0	0.60461	0.522343	Pass
16QAM								
2496.855	2506.755	2496.854508	2506.755	2496.0	2507.5	0.85451	-0.745	Pass
2591.105	2600.9775	2591.104556	2600.977607	2590.0	2602.0	1.10456	-1.022393	Pass
2679.6326	2689.5051	2679.632106	2689.505157	2679.0	2690.0	0.63211	-0.494843	Pass
64QAM								
2496.855000	2506.755000	2496.854508	2506.755000	2496.0	2507.5	0.85451	-0.745	Pass
2591.105000	2601.005000	2591.104556	2601.005107	2590.0	2602.0	1.10456	-0.994893	Pass
2679.605100	2689.477600	2679.604606	2689.477657	2679.0	2690.0	0.60461	-0.522343	Pass

* - measured under normal test conditions at 26 dBc points
** - Measured band edge with proper drift addition
*** - Margin = Calculated band edge – specified band edge

Reference numbers of test equipment used

HL 2909	HL 3286	HL 3321	HL 3386				

Full description is given in Appendix A.

Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/2/2008 5:13:34 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 45 %	Power Supply: 48 VDC
Remarks:			

8 Emissions tests according to 47CFR part 15 subpart B requirements

8.1 Conducted emissions

8.1.1 General

This test was performed to measure common mode conducted emissions at the mains power port. Specification test limits are given in Table 8.1.1.

Table 8.1.1 Limits for conducted emissions

Frequency, MHz	Class B limit, dB(μV)		Class A limit, dB(μV)	
	QP	AVRG	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*	79	66
0.5 - 5.0	56	46	73	60
5.0 - 30	60	50	73	60

* The limit decreases linearly with the logarithm of frequency.

8.1.2 Test procedure

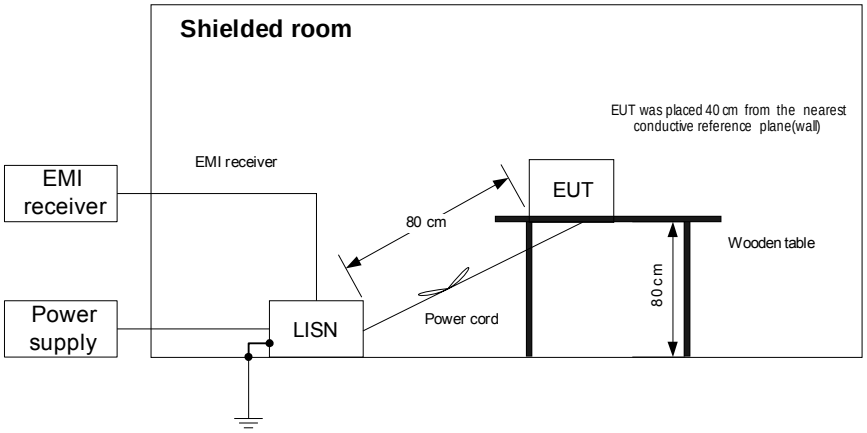
8.1.2.1 The EUT was set up as shown in Figure 8.1.1, energized and the performance check was conducted.

8.1.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 8.1.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

8.1.2.3 The position of the device cables was varied to determine maximum emission level.

8.1.2.4 The worst test results (the lowest margins) were recorded in Table 8.1.2 and shown in the associated plots.

Figure 8.1.1 Setup for conducted emission measurements, table-top equipment



Test specification:	**Section 15.107, Conducted emission at AC power port**		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/2/2008 5:13:34 PM		
Temperature: 23ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 45 %	**Power Supply:** 48 VDC
Remarks:			

Table 8.1.2 Conducted emission test results

LINE:	AC mains
LIMIT:	Class A
EUT OPERATING MODE:	Receive / Stand-by
EUT SET UP:	TABLE-TOP
TEST SITE:	SHIELDED ROOM
DETECTORS USED:	PEAK / QUASI-PEAK / AVERAGE
FREQUENCY RANGE:	150 kHz - 30 MHz
RESOLUTION BANDWIDTH:	9 kHz

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.169808	54.39	53.26	79.00	-25.74	38.62	66.00	-27.38	L1	Pass
1.277057	53.13	52.48	73.00	-20.52	43.08	60.00	-16.92		
1.447075	53.05	52.37	73.00	-20.63	43.35	60.00	-16.65		
1.957849	53.71	52.89	73.00	-20.11	41.77	60.00	-18.23		
2.610018	52.30	50.91	73.00	-22.09	41.37	60.00	-18.63		
19.077350	54.57	53.27	73.00	-19.73	45.33	60.00	-14.67		
0.226319	50.52	49.43	79.00	-29.57	35.19	66.00	-30.81	L2	Pass
0.651147	52.14	51.62	73.00	-21.38	43.36	60.00	-16.64		
1.331464	53.60	53.04	73.00	-19.96	44.08	60.00	-15.92		
1.813251	52.58	51.56	73.00	-21.44	41.97	60.00	-18.03		
2.011634	53.91	53.21	73.00	-19.79	43.71	60.00	-16.29		
18.823025	54.87	52.97	73.00	-20.03	44.90	60.00	-15.10		

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

Reference numbers of test equipment used

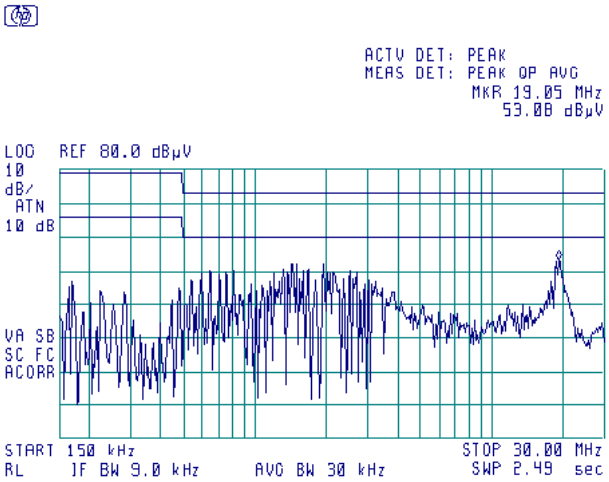
HL 0787	HL 1205	HL 1425	HL 2382	HL 2888	HL 3544		

Full description is given in Appendix A.

Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/2/2008 5:13:34 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 45 %	Power Supply: 48 VDC
Remarks:			

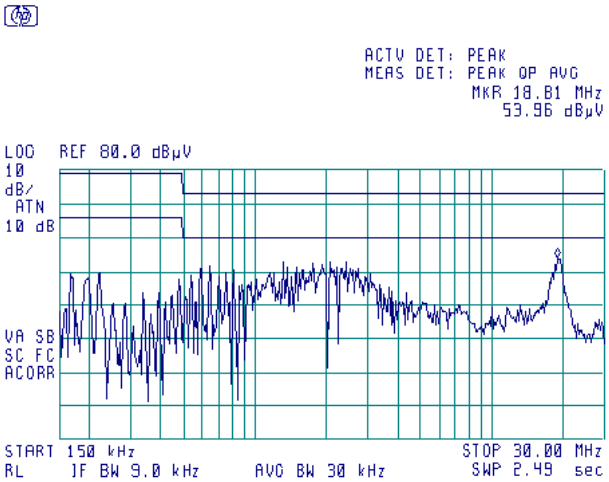
Plot 8.1.1 Conducted emission measurements

LINE: L1
LIMIT: Class A
EUT OPERATING MODE: Receive / Stand-by
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 8.1.2 Conducted emission measurements

LINE: L2
LIMIT: Class A
EUT OPERATING MODE: Receive / Stand-by
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:45:25 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

8.2 Radiated emission measurements

8.2.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 8.2.1.

Table 8.2.1 Radiated emission test limits

Frequency, MHz	Class B limit, dB(μV/m)		Class A limit, dB(μV/m)	
	10 m distance	3 m distance	10 m distance	3 m distance
30 - 88	29.5*	40.0	39.0	49.5*
88 - 216	33.0*	43.5	43.5	54.0*
216 - 960	35.5*	46.0	46.4	56.9*
Above 960	43.5*	54.0	49.5	60.0*

* The limit for test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows: $Lim_{S2} = Lim_{S1} + 20 \log (S_1/S_2)$,
where S_1 and S_2 – standard defined and test distance respectively in meters.

8.2.2 Test procedure for measurements in semi-anechoic chamber

8.2.2.1 The EUT was set up as shown in **Error! Reference source not found.**, energized and the performance check was conducted.

8.2.2.2 The specified frequency range was investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal and the EUT cables position was varied.

8.2.2.3 The worst test results (the lowest margins) were recorded in **Error! Reference source not found.** and shown in the associated plots.

8.2.3 Test procedure for measurements at OATS

8.2.3.1 The EUT was set up as shown in **Error! Reference source not found.** and associated photograph/s, energized and the performance check was conducted.

8.2.3.2 Preliminary measurements were performed in the anechoic chamber at 3 m test distance. The specified frequency range was investigated with biconical and log periodic antennas connected to EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed, its polarization was switched from vertical to horizontal and the EUT cables position was varied.

8.2.3.3 The EUT was set up as shown in **Error! Reference source not found.**, energized and the performance check was conducted.

8.2.3.4 Final measurements were performed at the open area test site at 10 m test distance. The EUT wires and cables were arranged to produce maximum emission as it was found during preliminary measurements. The frequencies yield the worst test results (the lowest margins) during preliminary testing were investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m and its polarization was changed from vertical to horizontal. At frequencies where high ambient noise was encountered, the final measurements were taken in the anechoic chamber at 3 m distance.

8.2.3.5 The worst test results (the lowest margins) were recorded in **Error! Reference source not found.** and shown in the associated plots.

Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:45:25 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

Figure 8.2.1 Setup for radiated emission measurements in anechoic chamber, table-top equipment

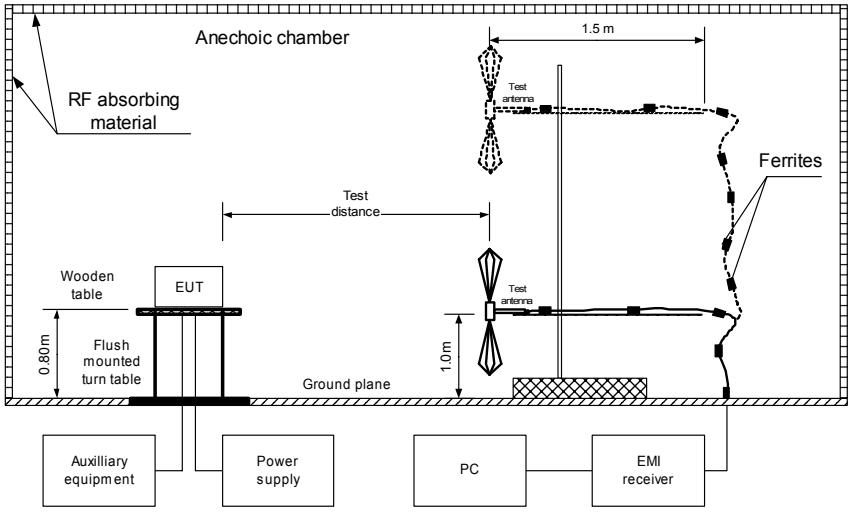
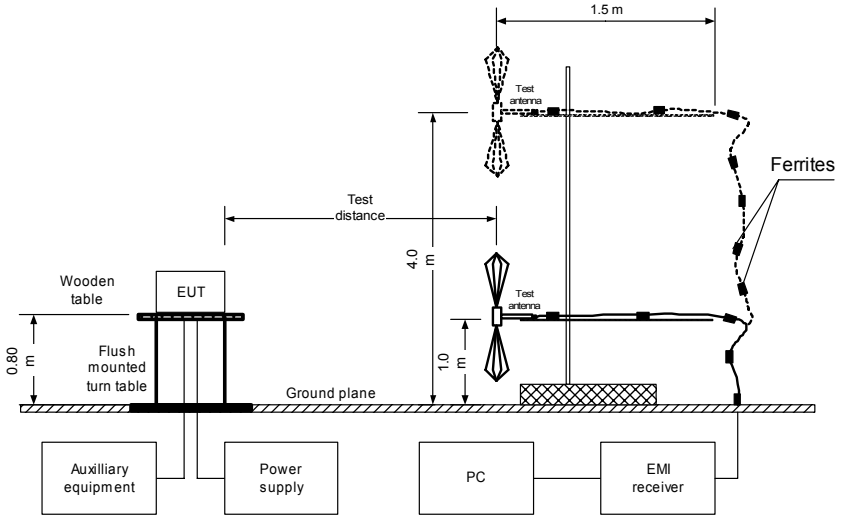


Figure 8.2.2 Setup for radiated emission measurements at OATS, table-top equipment



Test specification:	**Section 15.109, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/4/2008 4:45:25 PM		
Temperature: 23ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 46 %	**Power Supply:** 48 VDC
Remarks:			

Table 8.2.2 Radiated emission test results

EUT SET UP: TABLE-TOP
LIMIT: Class A
EUT OPERATING MODE: Receive / Stand-by
TEST SITE: OATS
TEST DISTANCE: 10 m
DETECTORS USED: PEAK / QUASI-PEAK
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

Frequency, MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
152.810500	44.8	42.8	43.5	-0.7	V	1.0	304	Pass
182.288750	44.3	41.7	43.5	-1.8	V	1.4	292	
250.014750	33.6	30.2	46.4	-16.2	V	1.0	97	
350.025750	39.6	38.3	46.4	-8.1	V	1.1	149	
500.014862	40.0	38.5	46.4	-7.9	V	1.0	4	
550.026250	34.0	31.9	46.4	-14.5	H	1.9	157	

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz -
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak emission, dB(µV/m)	Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
1349.99250	57.20	50.57	60.00	-9.43	V	1.0	351	Pass
2020.04250	48.21	37.57	60.00	-22.43	H	1.5	229	

*****- Margin = Measured emission - specification limit.
******- EUT front panel refer to 0 degrees position of turntable.

Reference numbers of test equipment used

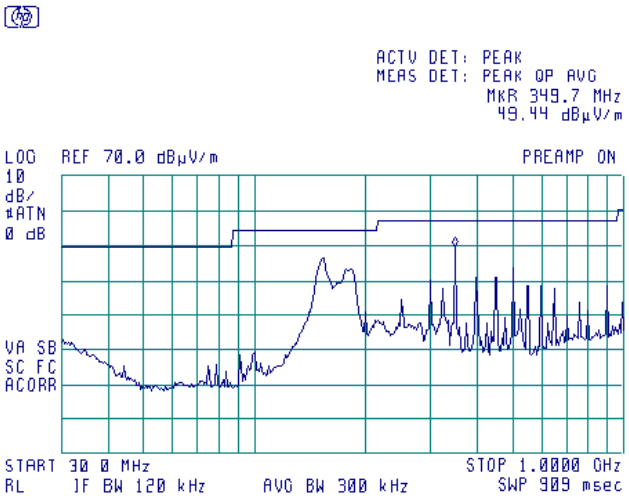
HL 0415	HL 0554	HL 0784	HL 0812	HL 0813	HL 1425	HL 1430	HL 1552
HL 1984	HL 1984	HL 2697	HL 2780	HL 2882	HL 3119		

Full description is given in Appendix A.

Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:45:25 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

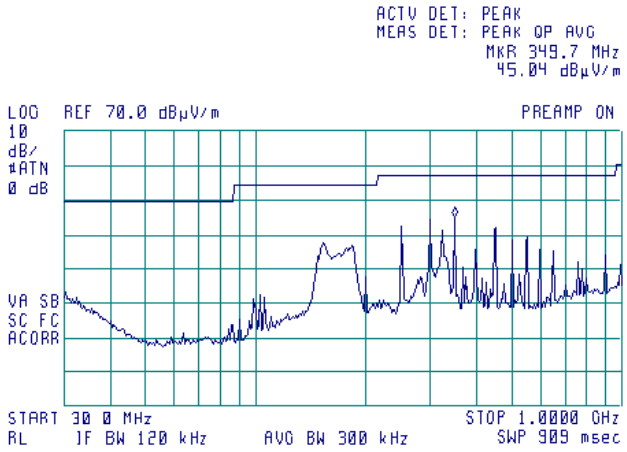
Plot 8.2.1 Radiated emission measurements in 30 - 1000 MHz range, vertical antenna polarization

TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by



Plot 8.2.2 Radiated emission measurements in 30 - 1000 MHz range, horizontal antenna polarization

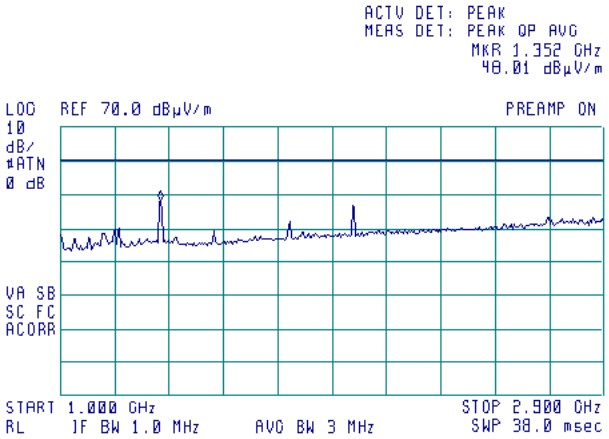
TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:45:25 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

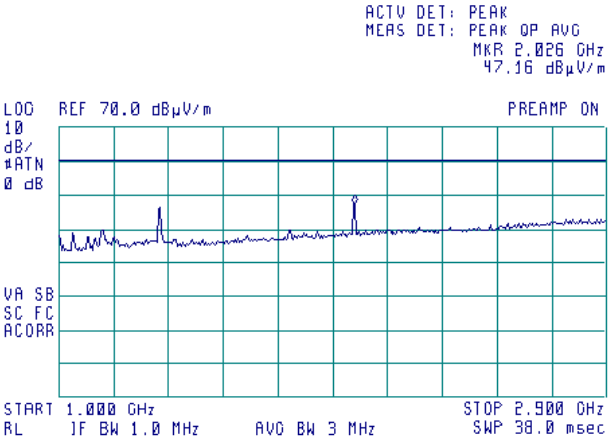
Plot 8.2.3 Radiated emission measurements in 1000 - 2900 MHz range, vertical antenna polarization

TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by



Plot 8.2.4 Radiated emission measurements in 1000 - 2900 MHz range, horizontal antenna polarization

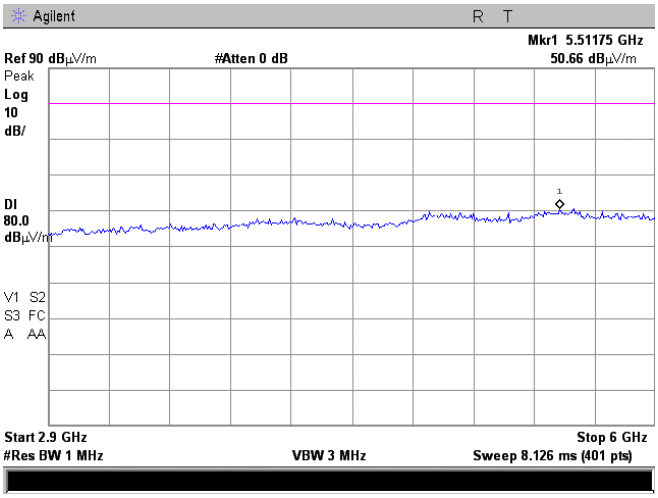
TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:45:25 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

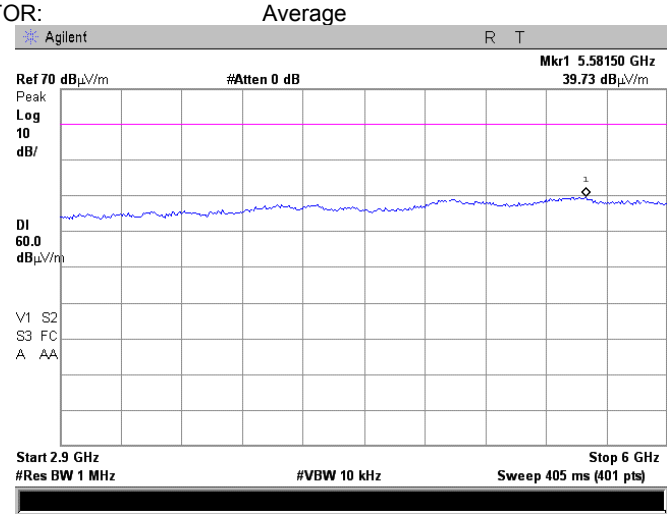
Plot 8.2.5 Radiated emission measurements in 2900 - 6000 MHz range, vertical antenna polarization

TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by
DETECTOR:	Peak



Plot 8.2.6 Radiated emission measurements in 2900 - 6000 MHz range, vertical antenna polarization

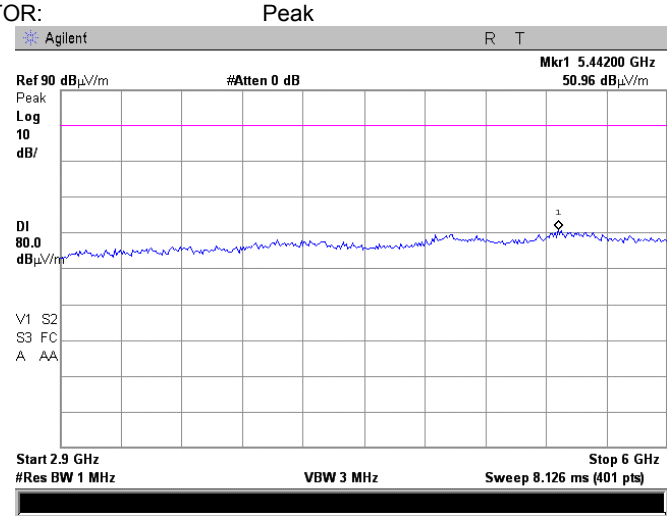
TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by
DETECTOR:	Average



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:45:25 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

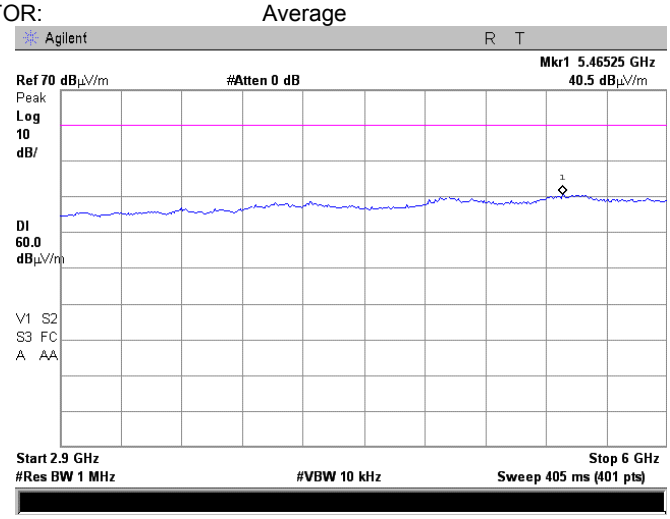
Plot 8.2.7 Radiated emission measurements in 2900 - 6000 MHz range, horizontal antenna polarization

TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by
DETECTOR:	Peak



Plot 8.2.8 Radiated emission measurements in 2900 - 6000 MHz range, horizontal antenna polarization

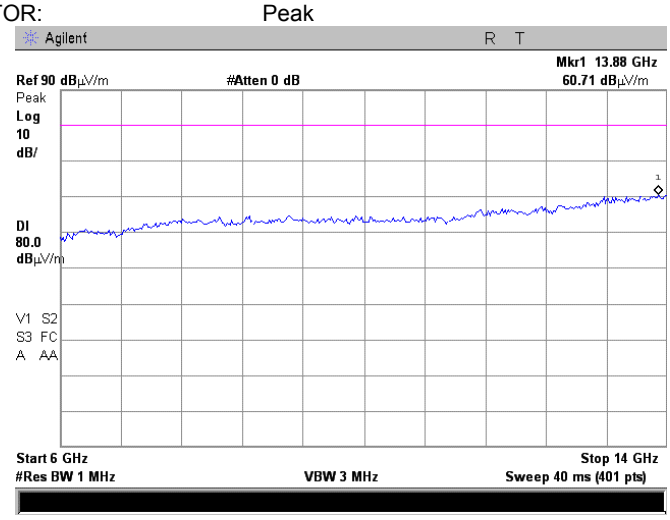
TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by
DETECTOR:	Average



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:45:25 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

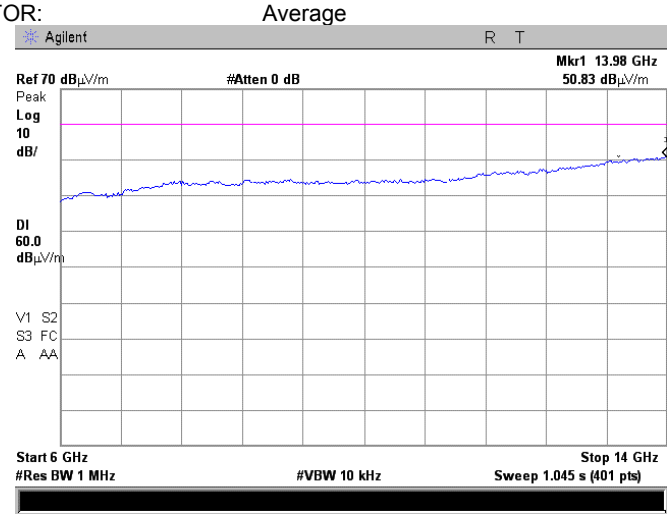
Plot 8.2.9 Radiated emission measurements in 6000 - 14000 MHz range, vertical antenna polarization

TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by
DETECTOR:	Peak



Plot 8.2.10 Radiated emission measurements in 6000 - 14000 MHz range, vertical antenna polarization

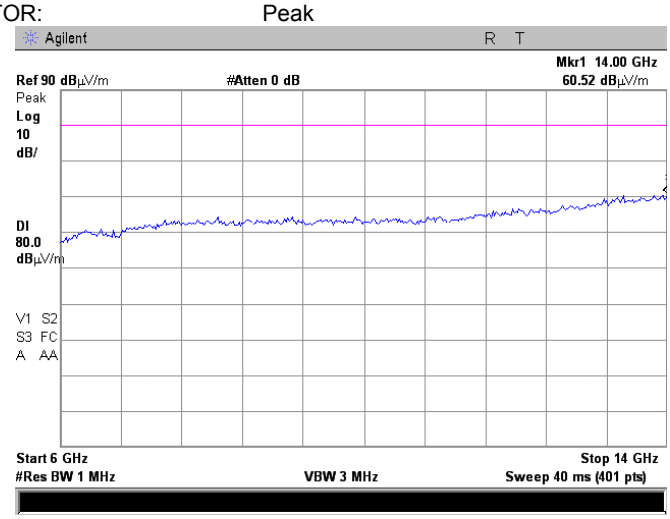
TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by
DETECTOR:	Average



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:45:25 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

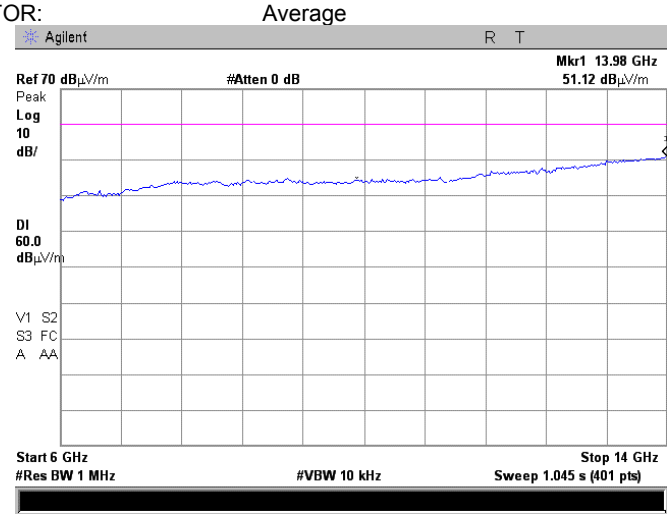
Plot 8.2.11 Radiated emission measurements in 6000 - 14000 MHz range, horizontal antenna polarization

TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by
DETECTOR:	Peak



Plot 8.2.12 Radiated emission measurements in 6000 - 14000 MHz range, horizontal antenna polarization

TEST SITE:	Anechoic chamber
LIMIT:	Class A
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive / Stand-by
DETECTOR:	Average



9 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0415	Cable, Coax, RF, RG-214	Hermon Laboratories	CC-3	056	02-Dec-08	02-Dec-09
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	29-Jun-08	29-Jun-09
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard Co	8546A	3617A 00319, 3448A002 53	29-Aug-08	29-Aug-09
0554	Amplifier, 2-18 GHz RF	Miteq	AFD4	104300	28-Feb-08	28-Feb-09
0569	Antenna, Log Periodic, 200 - 1000 MHz	Electro-Metrics	LPA 25/30	1953	25-Sep-07	25-Sep-09
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	11-Jan-09	11-Jan-10
0614	Antenna, Dipole, Tunable, 200 - 500 MHz	Electro-Metrics	TDS-30-1	334	29-Jan-08	29-Jan-09
0768	Antenna Standard Gain Horn,18-26.5 GHz, WR-42, 25 dB gain	Quinstar Technology	QWH-4200-BA	110	08-Dec-06	08-Dec-09
0784	Antenna X-WING BILOG, 20 MHz - 2 GHz	Schaffner-Chase EMC	CBL6140 A	1120	11-Jan-09	11-Jan-10
0787	Transient Limiter 9 kHz-200 MHz	Hewlett Packard Co	11947A	3107A018 77	16-Oct-08	16-Oct-09
0812	Cable Coax, RG-214, 11.5 m, N-type connectors	Hermon Laboratories	C214-11	148	02-Dec-08	02-Dec-09
0813	Cable Coax, RG-214, 12 m, N-type connectors	Hermon Laboratories	C214-12	149	02-Dec-08	02-Dec-09
1205	One phase voltage regulator, 2kVA, 0-250V	Hermon Laboratories	TDGC-2	109	05-Aug-08	05-Aug-09
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies	8564EC	3946A002 19	30-Dec-99	30-Dec-00
1425	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1426, HL1427	Agilent Technologies	8542E	3710A002 22, 3705A002 04	03-Sep-08	03-Sep-09
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies	8542E	3807A002 62,3705A0 0217	31-Aug-08	31-Aug-09
1552	Cable RF, 8 m	Alpha Wire	RG-214	1552	02-Dec-08	02-Dec-09
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	03-Mar-08	03-Mar-09
2254	Cable 40 GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	10-Jun-08	10-Jun-09
2382	Transformer, Isolation, 230/230, 1.8 kVA	Taiyo Yuden, Inc.	LGY1.8-21	FJ0411	30-Dec-08	30-Dec-09
2667	Signal generator, 9 kHz - 3.3 GHz	Rohde & Schwarz	SML03	101909	25-Sep-08	25-Sep-10
2697	Antenna, 30 MHz - 3.0 GHz	Sunol Sciences. Corp. Pleasanton, California USA	JB3	A022805	11-Jan-09	11-Jan-10

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY45102466	11-Jun-07	11-Jun-09
2882	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC-MNFN-3.0	211539001	11-Feb-08	11-Feb-09
2888	LISN Two-line V-Network 50 Ohm / 50 uH + 5 Ohm, 16A, MIL STD 461E, CISPR 16-1	Rolf Heine	NNB-2/16Z	02/10018	09-Jul-08	09-Jul-09
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY41444762	07-May-07	07-May-09
2910	Cable 18 GHz, 3 m, SMA-SMA	Gore	NA	989370	30-Dec-08	30-Dec-09
2953	Cable, RF, 18 GHz, 1.2 m, SMA-SMA	Gore	10020014	NA	05-Oct-08	05-Oct-09
3119	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC-MNFN-3.0	211539004	07-Dec-08	07-Dec-09
3121	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3121	07-Dec-08	07-Dec-09
3122	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3122	07-Dec-08	07-Dec-09
3123	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3123	30-Dec-08	30-Dec-09
3206	Cable 40 GHz, 0.6 m	Gore	GOR245	05118336	10-Jun-08	10-Jun-09
3286	Temperature Chamber, (-40 to +170) °C	Thermotron	EL-8-CH-1-1-CO2	21-9048	09-Sep-08	09-Sep-09
3321	Attenuator DC to 22 GHz, 30 dB, 50 W	Aeroflex / Weinschel	86-30-12	380	30-Dec-08	30-Dec-09
3386	Microwave Cable Assembly, 26.5 GHz, 1.0 m, N type/N type	Suhner Sucoflex	104EA	3386	12-Feb-08	12-Feb-09
3455	Medium Power Fixed Coaxial Attenuator DC to 40 GHz, 20 dB, 5 W	Aeroflex / Weinschel	75A-20-12	1182	17-Mar-08	17-Mar-09
3535	Amplifier, low noise, 18 to 40 GHz	Quinstar Technology	QLJ-18404537-J0	11159003001	07-Dec-08	07-Dec-09
3544	Cable RF, BNC-BNC, 8 m	Hermon Laboratories	RG-58	NA	26-Jun-08	26-Jun-09

10 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Transmitter tests	
Carrier power conducted at antenna connector	± 1.7 dB
Carrier power radiated (substitution method)	± 4.5 dB
Occupied bandwidth	±8%
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
Spurious emissions radiated 30 MHz – 40 GHz (substitution method)	± 4.5 dB
Frequency error	30 – 300 MHz: ± 50.5 Hz (1.68 ppm) 300 – 1000 MHz: ± 168 Hz (0.56 ppm)
Transient frequency behaviour	187 Hz ± 13.9 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Unintentional radiator tests	
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
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.

11 APPENDIX C Test laboratory 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 2186A-1 for OATS and IC 2186A-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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12 APPENDIX D Specification references

FCC 47CFR part 27: 2007	Miscellaneous wireless communications services
FCC 47CFR part 1: 2007	Practice and procedure
FCC 47CFR part 2: 2007	Frequency allocations and radio treaty matters; general rules and regulations
FCC 47CFR part 15: 2007	Radio Frequency Devices
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2005	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-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

13 APPENDIX E 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(μV) to convert it into field intensity in dB(μA/m).
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
Standard gain horn antenna
Quinstar Technology
Model QWH, Ser.No.112, HL 0768

Frequency min, GHz	Frequency max, GHz	Antenna factor, dB(1/m)
18.000	26.500	32.01
26.500	40.000	35.48
40.000	60.000	39.03
60.000	90.000	42.55
90.000	140.000	46.23
140.000	220.000	50.11

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
Log periodic antenna
Electro-Metrics, model LPA-25/30
Ser.No.1953, HL 0569

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
200	15.2	625	25.2
225	15.1	650	25.8
250	16.3	675	27.2
275	17.2	700	27.6
300	19.6	725	27.6
325	18.4	750	27.6
350	19.0	775	28.0
375	20.0	800	28.2
400	20.9	825	29.4
425	21.3	850	29.9
450	22.1	875	30.0
475	22.7	900	30.4
500	23.2	925	30.6
525	23.9	950	30.8
550	24.2	975	31.6
575	24.6	1000	32.1
600	24.7		

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
Biconilog antenna
CHASE Model CBL6140A
Serial no: 1120, HL 0784

Frequency, MHz	Antenna factor, dB
30.0	4.3
35.0	7.3
40.0	8.8
45.0	9.3
50.0	9.6
60.0	9.9
70.0	9.2
80.0	7.6
90.0	7.6
100.0	8.8
120.0	7.2
125.0	7.5
140.0	7.7
150.0	7.9
160.0	11.4
175.0	8.6
180.0	8.8
200.0	9.8
250.0	12.5
300.0	12.2
350.0	14.8
400.0	16.1
450.0	16.5
500.0	17.6
550.0	18.3
600.0	18.5
650.0	19.8
700.0	20.1
750.0	20.8
800.0	21.2
850.0	22.0
900.0	22.2
950.0	23.2
1000.0	23.8

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

Biconilog antenna EMCO, model 3141, serial number 1011, HL 0604

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

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
Model 3115, S/N 9911-5964, HL 1984

Frequency, MHz	Antenna factor, dB(1/m)
1000.0	24.7
1500.0	25.7
2000.0	27.6
2500.0	28.9
3000.0	31.2
3500.0	32.0
4000.0	32.5
4500.0	32.7
5000.0	33.6
5500.0	35.1
6000.0	35.4
6500.0	34.9
7000.0	36.1
7500.0	37.8
8000.0	38.0
8500.0	38.1
9000.0	39.1
9500.0	38.3
10000.0	38.6
10500.0	38.2
11000.0	38.7
11500.0	39.5
12000.0	40.0
12500.0	40.4
13000.0	40.5
13500.0	41.1
14000.0	41.6
14500.0	41.7
15000.0	38.7
15500.0	38.2
16000.0	38.8
16500.0	40.5
17000.0	42.5
17500.0	45.9
18000.0	49.4

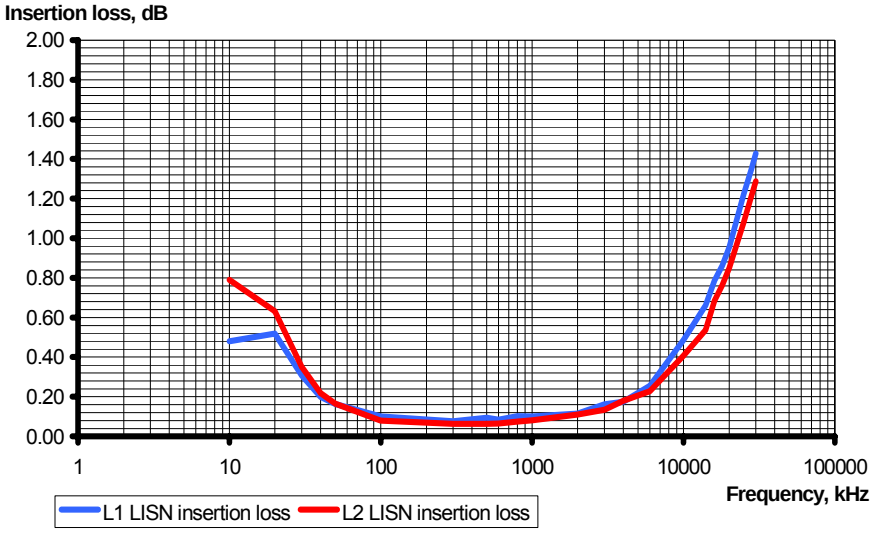
Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

Antenna calibration
Sunol Sciences Inc., model JB3, serial number A022805, HL 2697

Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain
30	22.2	-22.5	0.01	620	19.7	6.3	4.27	1215	24.9	7.0	5.05	1810	28.3	7.1	5.08	2405	30.9	6.9	4.93
35	18.5	-17.4	0.02	625	19.7	6.5	4.42	1220	24.9	7.0	4.99	1815	28.5	6.9	4.91	2410	30.9	6.9	4.89
40	14.7	-12.5	0.06	630	19.6	6.6	4.57	1225	25.1	6.9	4.91	1820	28.6	6.8	4.74	2415	31.0	6.9	4.85
45	11.3	-8.1	0.16	635	19.7	6.5	4.48	1230	25.2	6.8	4.82	1825	28.7	6.8	4.75	2420	31.0	6.8	4.82
45	11.3	-8.1	0.16	640	19.9	6.4	4.40	1235	25.1	7.0	4.96	1830	28.7	6.8	4.76	2425	31.1	6.8	4.81
50	8.9	-4.7	0.34	645	19.9	6.5	4.45	1240	25.0	7.1	5.09	1835	28.7	6.7	4.72	2430	31.0	6.9	4.87
55	7.9	-2.8	0.52	650	19.9	6.5	4.51	1245	25.0	7.1	5.12	1840	28.8	6.7	4.69	2435	31.0	6.9	4.88
60	7.8	-2.1	0.62	655	19.9	6.6	4.60	1250	25.0	7.1	5.15	1845	28.6	6.9	4.90	2440	31.2	6.8	4.74
65	8.5	-2.0	0.63	660	19.9	6.7	4.69	1255	25.0	7.2	5.25	1850	28.4	7.1	5.12	2445	31.1	6.9	4.91
70	9.0	-1.9	0.64	665	19.9	6.7	4.70	1260	24.9	7.3	5.36	1855	28.5	7.0	5.07	2450	31.0	7.0	4.96
75	8.8	-1.1	0.78	670	20.0	6.7	4.71	1265	25.0	7.3	5.31	1860	28.6	7.0	5.01	2455	31.0	7.0	5.01
80	8.4	-0.2	0.97	675	20.1	6.7	4.71	1270	25.1	7.2	5.26	1865	28.5	7.1	5.17	2460	30.9	7.2	5.19
85	8.0	0.8	1.20	680	20.1	6.7	4.71	1275	25.3	7.0	5.05	1870	28.4	7.3	5.33	2465	31.1	6.9	4.95
90	8.2	1.1	1.29	685	20.1	6.8	4.79	1280	25.5	6.8	4.84	1875	28.4	7.2	5.28	2470	31.3	6.8	4.76
95	9.2	0.5	1.13	690	20.1	6.9	4.88	1285	25.4	7.0	4.97	1880	28.5	7.2	5.22	2475	31.4	6.7	4.69
100	10.6	-0.4	0.92	695	20.2	6.8	4.82	1290	25.3	7.1	5.10	1885	28.5	7.2	5.22	2480	31.3	6.8	4.79
110	12.6	-1.6	0.70	705	20.4	6.8	4.75	1300	25.2	7.3	5.33	1895	28.6	7.2	5.24	2490	31.1	7.0	4.99
120	13.9	-2.1	0.62	715	20.5	6.8	4.80	1310	25.5	7.1	5.09	1905	28.5	7.3	5.36	2500	30.9	7.2	5.27
125	14.2	-2.0	0.63	720	20.5	6.9	4.85	1315	25.4	7.2	5.23	1910	28.5	7.4	5.45	2505	31.1	7.1	5.15
130	14.2	-1.7	0.68	725	20.6	6.8	4.81	1320	25.3	7.3	5.36	1915	28.5	7.3	5.38	2510	31.0	7.2	5.22
140	13.4	-0.3	0.94	735	20.9	6.7	4.65	1330	25.6	7.0	5.06	1925	28.6	7.3	5.35	2520	31.2	7.0	5.05
150	12.9	0.8	1.21	745	21.0	6.6	4.59	1340	25.7	7.1	5.09	1935	28.5	7.4	5.54	2530	31.0	7.3	5.37
160	12.7	1.6	1.44	755	21.0	6.8	4.74	1350	25.7	7.1	5.17	1945	28.5	7.5	5.59	2540	31.2	7.1	5.09
165	12.5	2.0	1.59	760	21.0	6.8	4.83	1355	25.8	7.0	5.06	1950	28.6	7.4	5.48	2545	31.0	7.3	5.43
170	12.2	2.6	1.83	765	21.1	6.8	4.73	1360	25.9	6.9	4.95	1955	28.6	7.5	5.57	2550	31.0	7.3	5.39
175	11.8	3.3	2.13	770	21.3	6.7	4.64	1365	26.0	6.9	4.95	1960	28.6	7.5	5.65	2555	31.1	7.2	5.30
180	11.6	3.7	2.36	775	21.3	6.7	4.68	1370	26.0	7.0	4.96	1965	28.7	7.4	5.47	2560	31.0	7.4	5.47
185	11.5	4.0	2.54	780	21.3	6.7	4.72	1375	26.0	7.0	5.01	1970	28.9	7.2	5.29	2565	30.8	7.6	5.70
190	11.6	4.2	2.61	785	21.3	6.8	4.77	1380	26.0	7.0	5.06	1975	28.9	7.2	5.22	2570	31.1	7.3	5.37
200	13.1	3.2	2.07	795	21.4	6.8	4.79	1390	26.1	6.9	4.92	1985	29.1	7.1	5.11	2580	31.6	6.9	4.87
205	12.0	4.4	2.76	800	21.5	6.8	4.77	1395	26.2	6.9	4.94	1990	29.1	7.0	5.06	2585	31.6	6.8	4.79
210	11.0	5.6	3.66	805	21.6	6.7	4.71	1400	26.2	7.0	4.96	1995	29.1	7.1	5.09	2590	31.6	6.9	4.88
215	11.3	5.6	3.59	810	21.7	6.7	4.65	1405	26.1	7.0	5.02	2000	29.1	7.1	5.11	2595	31.5	7.0	4.97
220	11.6	5.5	3.52	815	21.7	6.7	4.72	1410	26.1	7.1	5.09	2005	29.1	7.1	5.16	2600	31.6	6.9	4.86
225	11.7	5.5	3.55	820	21.7	6.8	4.80	1415	26.2	7.0	5.02	2010	29.1	7.1	5.15	2605	31.3	7.2	5.30
230	11.9	5.5	3.57	825	21.7	6.8	4.82	1420	26.3	7.0	4.96	2015	29.2	7.1	5.13	2610	31.4	7.1	5.15
235	12.1	5.5	3.56	830	21.7	6.9	4.85	1425	26.2	7.1	5.10	2020	29.2	7.1	5.18	2615	31.7	6.9	4.88
240	12.3	5.5	3.54	835	21.8	6.8	4.82	1430	26.1	7.2	5.25	2025	29.3	7.1	5.08	2620	31.6	7.0	4.97
245	12.3	5.7	3.71	840	21.9	6.8	4.80	1435	26.1	7.2	5.24	2030	29.3	7.0	5.05	2625	31.4	7.1	5.17
250	12.3	5.9	3.88	845	21.9	6.8	4.83	1440	26.2	7.2	5.24	2035	29.3	7.1	5.07	2630	31.6	7.0	5.00
255	12.5	5.9	3.85	850	21.9	6.9	4.86	1445	26.3	1	5.11	2040	29.3	7.1	5.13	2635	31.8	6.8	4.82
260	12.7	5.8	3.83	855	22.0	6.8	4.80	1450	26.5	7.0	4.98	2045	29.2	7.2	5.23	2640	31.7	7.0	4.98
265	13.2	5.5	3.54	860	22.1	6.8	4.74	1455	26.4	7.1	5.07	2050	29.2	7.2	5.27	2645	31.7	6.9	4.93
270	13.7	5.2	3.27	865	22.0	6.9	4.92	1460	26.4	7.1	5.17	2055	29.3	7.2	5.21	2650	31.8	6.9	4.85
275	13.7	5.3	3.39	870	21.9	7.1	5.11	1465	26.4	7.2	5.19	2060	29.5	7.0	5.02	2655	31.8	6.9	4.85
280	13.7	5.4	3.50	875	22.0	7.1	5.08	1470	26.4	7.2	5.22	2065	29.4	7.1	5.08	2660	31.7	7.0	5.02
285	13.7	5.6	3.61	880	22.1	7.0	5.05	1475	26.4	7.1	5.17	2070	29.4	7.1	5.10	2665	32.0	6.7	4.71
290	13.7	5.7	3.72	885	22.1	7.0	5.06	1480	26.5	7.1	5.12	2075	29.5	7.0	5.01	2670	32.0	6.7	4.67
295	13.8	5.8	3.77	890	22.1	7.0	5.09	1485	26.5	7.1	5.14	2080	29.8	6.8	4.76	2675	31.9	6.8	4.81
300	13.9	5.8	3.81	895	22.2	7.1	5.09	1490	26.5	7.1	5.17	2085	29.7	6.9	4.89	2680	31.7	7.0	5.04
305	14.0	5.9	3.85	900	22.2	7.1	5.12	1495	26.5	7.2	5.24	2090	29.7	6.9	4.86	2685	31.9	6.8	4.83
310	14.1	5.9	3.88	905	22.3	7.1	5.09	1500	26.5	7.2	5.31	2095	29.8	6.8	4.78	2690	32.1	6.7	4.72
315	14.3	5.9	3.89	910	22.3	7.0	5.05	1505	26.5	7.2	5.27	2100	29.9	6.8	4.75	2695	32.1	6.7	4.71
320	14.4	5.9	3.90	915	22.4	7.0	4.99	1510	26.6	7.2	5.23	2105	29.8	6.8	4.81	2700	32.0	6.8	4.81
325	14.5	5.9	3.92	920	22.6	6.9	4.92	1515	26.6	7.2	5.30	2110	29.9	6.8	4.78	2705	32.0	6.8	4.80
330	14.6	5.9	3.93	925	22.7	6.9	4.85	1520	26.5	7.3	5.38	2115	29.9	6.8	4.76	2710	32.1	6.8	4.79
335	14.7	6.0	4.02	930	22.8	6.8	4.77	1525	26.6	7.3	5.37	2120	29.9	6.8	4.84	2715	32.1	6.7	4.71
340	14.7	6.2	4.12	935	22.8	6.8	4.83	1530	26.6	7.3	5.36	2125	29.9	6.9	4.89	2720	32.4	6.5	4.47
345	14.9	6.1	4.06	940	22.8	6.9	4.89	1535	26.6	7.4	5.44	2130	29.9	6.9	4.90	2725	32.2	6.7	4.63
350	15.1	6.0	3.99	945	22.8	6.9	4.87	1540	26.5	7.4	5.53	2135	29.8	6.9	4.94	2730	31.9	7.0	5.05
355	15.3	5.9	3.88	950	22.9	6.9	4.85	1545	26.5	7.5	5.58	2140	29.8	7.1	5.08	2735	31.6	7.4	5.44
360	15.6	5.8	3.78	955	23.0	6.8	4.81	1550	26.5	7.5	5.63	2145	29.9	6.9	4.92	2740	31.6	7.1	5.46
365	15.5	5.9	3.89	960	23.1	6.8	4.77	1555	26.7	7.3	5.39	2150	29.9	7.0	4.98	2745	31.9	7.0	5.06
370	15.5	6.0	4.01	965	23.1	6.7	4.73	1560	26.9	7.1	5.16	2155	29.8	7.1	5.10	2750	32.0	6.9	4.94
375	15.6	6.1	4.03	970	23.2	6.7	4.69	1565	26.9	7.2	5.23	2160	29.8	7.1	5.09	2755	32.0	7.0	4.98
380	15.7	6.1	4.05	975	23.3	6.6	4.62	1570	26.9	7.2	5.30	2165	29.9	7.0	5.00	2760	32.0	7.0	5.06
385	15.7	6.2	4.15	980	23.5	6.6	4.54	1575	27.0	7.2	5.23	2170	29.9	7.1	5.07	2765	32.2	6.8	4.80
390	15.7	6.3	4.25	985	23.5	6.6	4.52	1580	27.0	7.1	5.17	2175	29.8	7.2	5.20	2770	32.3	6.8	4.73
395	15.9	6.3	4.22	990	23.6	6.5	4.50	1585	27.0	7.2	5.20	2180	29.8	7.2	5.27	2775	32.3	6.8	4.77
400	16.0	6.2	4.18	995	23.6	6.5	4.48	1590	27.0	7.2	5.22	2185	29.8	7.2	5.27	2780	32.3	6.8	4.82
405	16.3	6.1	4.07	1000	23.7	6.5	4.46	1595	27.0	7.2	5.29	2190	29.8	7.2	5.28	2785	32.7	6.4	4.41
410	16.5	6.0	3.96	1005	23.7	6.5	4.51	1600	27.0	7.3	5.36	2195	29.8	7.2	5.30	2790	32.8	6.3	4.25
415	16.5	6.0	4.00	1010	23.7	6.6	4.57	1605	27.0	7.3	5.38	2200	29.7	7.3	5.38	2795	32.8	6.4	4.33
420	16.6	6.1	4.03	1015	23.7	6.6	4.55	1610	27.0	7.3	5.41	2205	29.7	7.3	5.41	2800	32.5	6.7	4.66
425	16.6	6.1	4.10	1020	23.8	6.6	4.54	1615	27.1	7.3	5.33	2210	29.7	7.4	5.47	2805	32.5	6.6	4.62
430	16.7	6.2	4.16	1025	23.8	6.6	4.62	1620	27.2	7.2	5.27	2215	29.7	7.4	5.54	2810	32.5	6.7	4.70
435	16.9	6.1	4.05	1030	23.7	6.7	4.70	1625	27.2	7.2	5.30	2220	29.7	7.5	5.57	2815	32.3	6.9	4.85
440	17.1	5.9	3.93	1035	23.7	6.8	4.81	1630	27.2	7.3	5.33	2225	29.8	7.3	5.43	2820	32.2	7.0	5.01
445	17.2	6.0	3.97	1040	23.6	6.9	4.92	1635	27.2	7.3	5.35	2230	29.8	7.4	5.45	2825	32.3	7.0	4.96
450	17.2	6.0	4.00	1045	23.7	6.9	4.91	1640	27.2	7.3	5.36	2235	29.7	7.5	5.61	2830	32.4	6.8	4.80
455	17.3	6.1	4.04	1050	23.7	6.9	4.91	1645	27.3	7.2	5.22	2240	29.5	7.7	5.86	2835	32.5	6.7	4.68
460	17.4	6.1	4.07	1055	23.7	7.0	5.01	1650	27.5	7.1	5.09	2245	29.8	7.4	5.53	2840	32.5	6.8	4.78
465	17.5	6.1	4.05	1060	23.6	7.1	5.11	1655	27.5	7.1	5.11	2250	30.0	7.3	5.35	2845	32.6	6.6	4.62
470	17.6	6.1	4.04	1065	23.7	7.0	5.06	1660	27.5	7.1	5.13	2255	30.0	7.2	5.28	2850	32.6	6.7	4.70
475	17.7	6.0	3.99	1070	23.8	7.0	5.01	1665	27.6	7.0	5.06	2260	30.1	7.2	5.24	2855	32.4	6.9	4.88
480	17.9	5.9	3.93	1075	23.8	7.0	5.01	1670	27.7	7.0	4.99	2265	30.1	7.2	5.20	2860	32.4	7.0	4.98
485	18.0	5.9	3.88	1080	23.9	7.0	5.01	1675	27.7	7.0	5.02	2270	30.2	7.1	5.12	2865	32.8	6.5	4.52
490	18.2	5.8	3.82	1085	24.0	7.0	4.96	1680	27.7	7.0	5.05	2275	30.3	7.0	5.05	2870	33.0	6.3	4.30
495	18.0	6.0	4.02	1090	24.0	6.9	4.91	1685	27.7	7.0	5.01	2280	30.0	7.0	5.06	2875	33.0	6.4	4.38
500	17.9	6.3	4.23	1095	24.1	6.9	4.86	1690	27.8	7.0	4.98	2285	30.3	7.0	5.05	2880	32.5	6.9	4.87
505	17.9	6.3	4.29	1100	24.2	6.8	4.82	1695	27.8	7.0	5.01	2290	30.3	7.1	5.07	2885	33.0	6.4	4.40
510	18.0	6.4	4.36	1105	24.3	6.8	4.80	1700	27.8	7.0	5.03	2295	30.3	7.1	5.13	2890	33.1	6.3	4.28
515	18.1	6.4	4.34	1110	24.3	6.8	4.78	1705	27.8	7.1	5.09	2300	30.2	7.2	5.23	2895	33.1	6.4	4.34
520	18.2	6.4	4.32	1115	24.3	6.8	4.79	1710	27.7	7.1	5.16	2305	30.3	7.2	5.20	2900	33.0	6.4	4.41
525	18.2	6.4	4.36	1120	24.4	6.8	4.80	1715	27.8	7.1	5.08	2310	30.2	7.3	5.35	2905	32.9	6.6	4.58
530	18.3	6.4	4.39	1125	24.3	6.9	4.90	1720	27.9	7.0	5.00	2315	30.1	7.4	5.45	2910	32.9	6.5	4.51
535	18.3	6.4	4.41	1130	24.3	7.0	5.00	1725	28.0	7.0	4.99	2320	30.3	7.2	5.27	2915	33.1	6.4	4.33
540	18.4	6.4	4.41	1135	24.4	6.9	4.90	1730	28.0	7.0	4.98	2325	304	7.2	5.22	2920	33.3	6.2	4.16
545	18.4	6.5	4.47	1140	24.5	6.8	4.81	1735	28.0	7.0	5.02	2330	30.4	7.1	5.13	2925	33.0	6.5	4.45
550	18.4	6.6	4.53	1145	24.6	6.8	4.76	1740	28.0	7.1	5.07	2335	30.5	7.0	5.07	2930	33.0	6.5	4.51
555	18.6	6.5	4.45	1150	24.7	6.7	4.71	1745	28.0	7.0	5.04	2340	30.5	7.1	5.11	2935	33.0	6.5	4.48
560	18.8	6.4	4.37	1155	24.7	6.8	4.76	1750	28.1	7.0	5.01	2345	30.6	7.0	5.07	2940	33.0	6.5	4.52
565	18.9	6.4	4.33	1160	24.7	6.8	4.80	1755	27.9	7.1	5.17	2350	30.5	7.1	5.12	2945	33.1	6.5	4.42
570	19.0	6.3	4.28	1165	24.7	6.8	4.81	1760	27.8	7.3	5.34	2355	30.6	7.1	5.08	2950	33.2	6.4	4.32
575	19.1	6.3	4.31	1170	24.7	6.8	4.81	1765	27.9	7.3	5.31	2360	30.9	6.8	4.79	2955	33.3	6.3	4.27
580	19.1	6.4	4.33	1175	24.8	6.8	4.84	1770	27.9	7.2	5.28	2365	31.0	6.7	4.66	2960	33.3	6.3	4.30
590	19.1	6.6	4.52	1185	24.8	6.9	4.92	1780	27.9	7.3	5.35	2375	31.1	6.6	4.60	2970	33.3	6.4	4.36
595	19.0	6.6	4.62	1190	24.7	7.0	4.99	1785	28.1	7.2	5.21	2380	31.1	6.6	4.61	2975	33.0	6.6	4.60
600	19.0	6.7	4.72	1195	24.7	7.0	5.02	1790	28.2	7.0	5.07	2385	31.1	6.7	4.62	2980	32.9	6.8	4.74
610	19.1	6.8	4.76	1205	24.08	7.1	5.08	1800	28.3	7.0	5.06	2395	31.2	6.6	4.60	2990	32.9	6.8	4.82
615	19.4	6.5	4.51	1210	24.8	7.1	5.11	1805	28.3	7.1	5.07	2400	30.9	6.9	4.93	3000	33.4	6.4	4.33

Correction factor
Line impedance stabilization network
Model NNB-2/16Z, Rolf Heine, HL 2888

Frequency, kHz	Insertion loss,dB		Measurement Uncertainty, dB
	L1	N	
10	0.48	0.79	±0.6
20	0.52	0.63	
30	0.31	0.35	
40	0.20	0.22	
50	0.16	0.17	
100	0.10	0.08	
300	0.08	0.06	
500	0.10	0.06	
600	0.09	0.07	
800	0.10	0.07	
1000	0.10	0.08	
2000	0.12	0.11	
3000	0.16	0.14	
4000	0.17	0.18	
6000	0.26	0.23	
10000	0.49	0.41	
14000	0.66	0.54	
16000	0.79	0.69	
18000	0.86	0.76	
20000	0.96	0.85	
25000	1.22	1.08	
28000	1.35	1.21	
30000	1.43	1.29	



Cable loss
Cable Coaxial, RG-58/RG-214, s/n 056, HL 0415
+ Cable Coaxial, RG-214, 11.5m, s/n 148, HL 0812

No.	Frequency, MHz	Cable loss, dB	Measured uncertainty, dB
1	20	0.73	±0.12
2	30	0.91	
3	50	1.2	
4	80	1.56	
5	100	1.76	
6	200	2.59	
7	300	3.26	
8	400	3.93	
9	500	4.42	
10	600	4.92	
11	700	5.36	
12	800	5.88	
13	900	6.41	
14	1000	6.71	
15	1500	8.63	
16	2000	10.39	

Cable loss
Cable RG-214, HL 0813

No.	Frequency, MHz	Cable loss, dB
1	10	0.15
2	20	0.40
3	30	0.51
4	40	0.61
5	50	0.68
6	60	0.76
7	70	0.80
8	80	0.92
9	90	0.96
10	100	0.99
11	200	1.60
12	300	1.85
13	400	2.25
14	500	2.43
15	600	2.80
16	700	3.14
17	800	3.34
18	900	3.75
19	1000	4.05
20	1200	4.41
21	1400	4.81
22	1600	5.18
23	1800	5.58
24	2000	6.09
25	2500	7.27
26	2900	8.01

Cable loss
RF cable 8 m, model RG-214, HL 1552

No.	Frequency, MHz	Cable loss, dB	Measurement uncertainty, dB	Notes
1	0.010	0.01	±0.05	
2	0.1	0.01		
3	1	0.03		
4	10	0.12		
5	20	0.23		
6	30	0.30		
7	40	0.32		
8	50	0.34		
9	60	0.39		
10	70	0.43		
11	80	0.48		
12	90	0.50		
13	100	0.55		
14	200	0.78		
15	300	1.04		
16	400	1.16		
17	500	1.33		
18	600	1.51		
19	700	1.65		
20	800	1.77		
21	900	1.92		
22	1000	2.04		
23	1200	2.26		
24	1400	2.49		
25	1600	2.74		
26	1800	2.94		
27	2000	3.18		
28	2500	3.65		
29	2900	4.08		

Correction factor
Cable loss
Cable 40 GHz, 0.8 m, blue, model: KPS-1503A-800-KPS, S/N W4907, HL 2254

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.04	5.10	0.80	15.00	1.49
0.05	0.07	5.30	0.83	15.50	1.49
0.10	0.09	5.50	0.83	16.00	1.46
0.20	0.15	5.70	0.84	16.50	1.47
0.30	0.19	5.90	0.87	17.00	1.50
0.40	0.25	6.10	0.86	17.50	1.57
0.50	0.29	6.30	0.89	18.00	1.63
0.60	0.33	6.50	0.90	18.50	1.57
0.70	0.37	6.70	0.89	19.00	1.63
0.80	0.41	6.90	0.93	19.50	1.65
0.90	0.44	7.10	0.92	20.00	1.64
1.00	0.45	7.30	0.95	20.50	1.75
1.10	0.48	7.50	0.96	21.00	1.72
1.20	0.51	7.70	0.97	21.50	1.78
1.30	0.53	7.90	1.01	22.00	1.76
1.40	0.54	8.10	1.00	22.50	1.72
1.50	0.57	8.30	1.05	23.00	1.83
1.60	0.59	8.50	1.04	23.50	1.80
1.70	0.04	8.70	1.07	24.00	1.90
1.80	0.07	8.90	1.11	24.50	1.81
1.90	0.09	9.10	1.09	25.00	1.98
2.00	0.15	9.30	1.14	25.50	1.91
2.10	0.19	9.50	1.12	26.00	2.02
2.20	0.25	9.70	1.15	26.50	1.92
2.30	0.29	9.90	1.16	27.00	1.97
2.40	0.33	10.10	1.16	28.00	2.02
2.50	0.37	10.30	1.19	29.00	1.95
2.60	0.41	10.50	1.14	30.00	1.94
2.70	0.44	10.70	1.19	31.00	2.11
2.80	0.45	10.90	1.17	32.00	2.17
2.90	0.48	11.10	1.13	33.00	2.27
3.10	0.61	11.30	1.20	34.00	2.27
3.30	0.64	11.50	1.13	35.00	2.29
3.50	0.65	11.70	1.20	36.00	2.35
3.70	0.68	11.90	1.18	37.00	2.37
3.90	0.69	12.10	1.14	38.00	2.40
4.10	0.71	12.40	1.19	39.00	2.57
4.30	0.73	13.00	1.34	40.00	2.36
4.50	0.75	13.50	1.33		
4.70	0.77	14.00	1.48		
4.90	0.79	14.50	1.45		

Cable loss
Cable coaxial, Bird, 18 GHz, N-type, M-F, model TC-MNFN-3.0, S/N 211539 001
HL 2882

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.08	5750	1.78	12000	2.57
30	0.12	6000	1.84	12250	2.62
100	0.22	6250	1.87	12500	2.66
250	0.35	6500	1.92	12750	2.68
500	0.49	6750	1.96	13000	2.67
750	0.60	7000	2.01	13250	2.75
1000	0.68	7250	2.08	13500	2.77
1250	0.78	7500	2.12	13750	2.90
1500	0.85	7750	2.19	14000	3.00
1750	0.92	8000	2.22	14250	3.12
2000	0.98	8250	2.28	14500	2.98
2250	1.06	8500	2.29	14750	3.03
2500	1.11	8750	2.27	15000	2.99
2750	1.19	9000	2.28	15250	2.99
3000	1.25	9250	2.26	15500	2.98
3250	1.30	9500	2.29	15750	2.98
3500	1.34	9750	2.33	16000	2.99
3750	1.40	10000	2.34	16250	3.05
4000	1.45	10250	2.41	16500	3.11
4250	1.51	10500	2.46	16750	3.18
4500	1.54	10750	2.48	17000	3.23
4750	1.59	11000	2.48	17250	3.21
5000	1.63	11250	2.52	17500	3.22
5250	1.68	11500	2.53	17750	3.22
5500	1.72	11750	2.56	18000	3.25

Cable loss
Cable coaxial, Gore, 18 GHz, 3m, SMA-SMA, S/N 989370
HL 2910

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.07	5750	2.97	12000	5.05
30	0.19	6000	2.91	12250	4.44
100	0.36	6250	3.23	12500	4.82
250	0.53	6500	3.42	12750	5.22
500	0.77	6750	3.17	13000	5.02
750	0.94	7000	3.56	13250	5.00
1000	1.10	7250	3.77	13500	5.09
1250	1.19	7500	3.48	13750	4.70
1500	1.35	7750	3.81	14000	5.03
1750	1.51	8000	3.82	14250	5.17
2000	1.57	8250	3.62	14500	4.92
2250	1.69	8500	3.95	14750	4.91
2500	1.76	8750	4.00	15000	5.03
2750	1.83	9000	3.80	15250	4.93
3000	2.02	9250	4.09	15500	5.28
3250	2.17	9500	4.12	15750	5.60
3500	2.13	9750	4.11	16000	5.16
3750	2.23	10000	4.36	16250	5.45
4000	2.40	10250	4.75	16500	5.78
4250	2.31	10500	4.61	16750	5.47
4500	2.52	10750	4.26	17000	5.21
4750	2.77	11000	4.62	17250	5.53
5000	2.82	11250	4.55	17500	5.53
5250	2.77	11500	4.59	17750	5.71
5500	3.04	11750	5.20	18000	5.77

Cable loss
Cable coaxial, Gore, 25.5 GHz, 1.2 m, SMA-SMA, S/N 10020014
HL 2953

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	8750	1.28	18000	1.84
30	0.06	9000	1.30	18250	1.91
100	0.12	9250	1.35	18500	1.94
250	0.19	9500	1.34	18750	1.92
500	0.27	9750	1.36	19000	1.95
750	0.34	10000	1.33	19250	2.00
1000	0.40	10250	1.38	19500	1.96
1250	0.45	10500	1.39	19750	2.02
1500	0.50	10750	1.39	20000	1.92
1750	0.54	11000	1.43	20250	2.04
2000	0.57	11250	1.42	20500	2.00
2250	0.60	11500	1.48	20750	2.09
2500	0.64	11750	1.49	21000	2.01
2750	0.67	12000	1.59	21250	2.07
3000	0.70	12250	1.50	21500	2.20
3250	0.74	12500	1.55	21750	2.10
3500	0.76	12750	1.55	22000	2.24
3750	0.80	13000	1.61	22250	2.25
4000	0.83	13250	1.62	22500	2.12
4250	0.85	13500	1.56	22750	2.05
4500	0.87	13750	1.61	23000	2.10
4750	0.91	14000	1.57	23250	2.03
5000	0.92	14250	1.66	23500	2.08
5250	0.96	14500	1.58	23750	2.14
5500	0.99	14750	1.69	24000	2.16
5750	0.99	15000	1.71	24250	2.25
6000	1.03	15250	1.74	24500	2.17
6250	1.05	15500	1.75	24750	2.32
6500	1.07	15750	1.72	25000	2.32
6750	1.08	16000	1.89	25250	2.32
7000	1.12	16250	1.79	25500	2.41
7250	1.13	16500	1.84	25750	2.31
7500	1.15	16750	1.82	26000	2.28
7750	1.20	17000	1.79	26250	2.32
8000	1.20	17250	1.78	26500	2.29
8250	1.23	17500	1.85		
8500	1.27	17750	1.83		

Cable loss
Cable 18 GHz, N-type, M-F, 3 m, Bird Electronic Corp., model TC-MNFN-3.0, S/N 211539004
HL 3119

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	3600	1.34	7400	2.00	11200	2.48	15100	2.90
30	0.09	3700	1.36	7500	2.01	11300	2.45	15200	2.89
50	0.11	3800	1.37	7600	2.03	11400	2.51	15300	2.91
100	0.23	3900	1.39	7700	2.05	11500	2.45	15400	2.85
200	0.30	4000	1.39	7800	2.07	11600	2.49	15500	2.83
300	0.42	4100	1.42	7900	2.06	11700	2.51	15600	2.89
400	0.39	4200	1.45	8000	2.06	11800	2.50	15700	2.85
500	0.47	4300	1.47	8100	2.09	11900	2.52	15800	2.87
600	0.49	4400	1.49	8200	2.10	12000	2.48	15900	2.91
700	0.63	4500	1.51	8300	2.11	12100	2.53	16000	2.90
800	0.62	4600	1.53	8400	2.15	12200	2.54	16100	2.94
900	0.70	4700	1.55	8500	2.15	12300	2.56	16200	2.91
1000	0.70	4800	1.54	8600	2.17	12400	2.57	16300	2.96
1100	0.77	4900	1.57	8700	2.19	12500	2.57	16400	3.01
1200	0.78	5000	1.60	8800	2.20	12600	2.55	16500	3.01
1300	0.83	5100	1.60	8900	2.21	12700	2.50	16600	2.98
1400	0.86	5200	1.62	9000	2.22	12800	2.57	16700	3.00
1500	0.85	5300	1.65	9100	2.23	12900	2.57	16800	3.01
1600	0.94	5400	1.66	9200	2.25	13000	2.55	16900	3.06
1700	0.90	5500	1.69	9300	2.24	13100	2.62	17000	3.07
1800	0.90	5600	1.70	9400	2.28	13200	2.60	17100	3.09
1900	0.95	5700	1.72	9500	2.28	13300	2.67	17200	3.10
2000	0.97	5800	1.74	9600	2.27	13400	2.66	17300	3.11
2100	1.00	5900	1.75	9700	2.30	13500	2.71	17400	3.16
2200	1.02	6000	1.77	9800	2.30	13600	2.73	17500	3.15
2300	1.05	6100	1.79	9900	2.34	13700	2.73	17600	3.21
2400	1.08	6200	1.82	10000	2.32	13800	2.85	17700	3.21
2500	1.10	6300	1.83	10100	2.31	13900	2.83	17800	3.18
2600	1.13	6400	1.83	10200	2.31	14000	2.83	17900	3.25
2700	1.15	6500	1.87	10300	2.26	14100	2.83	18000	3.14
2800	1.17	6600	1.88	10400	2.32	14200	2.84		
2900	1.21	6700	1.90	10500	2.26	14300	2.90		
3000	1.22	6800	1.93	10600	2.26	14400	2.84		
3100	1.25	6900	1.92	10700	2.31	14600	2.88		
3200	1.27	7000	1.95	10800	2.24	14700	2.85		
3300	1.29	7100	1.96	10900	2.39	14800	2.92		
3400	1.28	7200	1.99	11000	2.41	14900	2.93		
3500	1.31	7300	2.00	11100	2.46	15000	2.83		

Cable loss
Microwave Cable Assembly, 18 GHz, 6.4 m, SMA – SMA, Huber-Suhner, model 198-9155-00
HL 3121

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.08	3600	2.10	7400	3.08	11200	3.85	15100	4.58
30	0.18	3700	2.14	7500	3.11	11300	3.85	15200	4.60
50	0.26	3800	2.18	7600	3.14	11400	3.86	15300	4.63
100	0.34	3900	2.19	7700	3.16	11500	3.86	15400	4.65
200	0.47	4000	2.25	7800	3.18	11600	3.87	15500	4.71
300	0.59	4100	2.25	7900	3.20	11700	3.85	15600	4.70
400	0.66	4200	2.28	8000	3.22	11800	3.96	15700	4.69
500	0.75	4300	2.35	8100	3.26	11900	3.92	15800	4.71
600	0.83	4400	2.35	8200	3.27	12000	3.92	15900	4.74
700	0.90	4500	2.38	8300	3.29	12100	3.94	16000	4.69
800	0.96	4600	2.43	8400	3.30	12200	3.94	16100	4.72
900	1.02	4700	2.43	8500	3.31	12300	3.99	16200	4.71
1000	1.07	4800	2.45	8600	3.33	12400	4.02	16300	4.74
1100	1.12	4900	2.48	8700	3.35	12500	4.10	16400	4.74
1200	1.15	5000	2.55	8800	3.36	12600	4.09	16500	4.75
1300	1.22	5100	2.54	8900	3.38	12700	4.15	16600	4.78
1400	1.28	5200	2.56	9000	3.40	12800	4.15	16700	4.86
1500	1.29	5300	2.58	9100	3.41	12900	4.08	16800	4.84
1600	1.36	5400	2.61	9200	3.45	13000	4.21	16900	4.83
1700	1.40	5500	2.64	9300	3.48	13100	4.19	17000	4.86
1800	1.45	5600	2.69	9400	3.52	13200	4.29	17100	4.83
1900	1.51	5700	2.67	9500	3.54	13300	4.24	17200	4.90
2000	1.50	5800	2.71	9600	3.59	13400	4.26	17300	4.91
2100	1.56	5900	2.73	9700	3.59	13500	4.26	17400	4.94
2200	1.59	6000	2.75	9800	3.62	13600	4.29	17500	4.93
2300	1.63	6100	2.81	9900	3.70	13700	4.35	17600	4.93
2400	1.73	6200	2.80	10000	3.70	13800	4.31	17700	5.00
2500	1.73	6300	2.82	10100	3.72	13900	4.29	17800	5.01
2600	1.78	6400	2.85	10200	3.73	14000	4.32	17900	5.00
2700	1.84	6500	2.87	10300	3.75	14100	4.33	18000	5.00
2800	1.84	6600	2.90	10400	3.76	14200	4.34		
2900	1.91	6700	2.91	10500	3.77	14300	4.36		
3000	1.91	6800	2.94	10600	3.79	14400	4.38		
3100	1.97	6900	2.96	10700	3.80	14600	4.42		
3200	1.98	7000	2.98	10800	3.81	14700	4.42		
3300	2.04	7100	3.01	10900	3.81	14800	4.55		
3400	2.04	7200	3.02	11000	3.83	14900	4.55		
3500	2.10	7300	3.04	11100	3.84	15000	4.55		

Cable loss
Microwave Cable Assembly, 18 GHz, 6.4 m, SMA – SMA, Huber-Suhner, model 198-9155-00
HL 3123

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.11	3600	1.97	7400	3.12	11200	3.90	15100	4.74
30	0.17	3700	1.97	7500	3.13	11300	3.93	15200	4.70
50	0.25	3800	2.03	7600	3.16	11400	3.88	15300	4.73
100	0.32	3900	2.04	7700	3.18	11500	3.87	15400	4.78
200	0.46	4000	2.10	7800	3.20	11600	3.90	15500	4.75
300	0.58	4100	1.97	7900	3.23	11700	3.86	15600	4.76
400	0.65	4200	1.97	8000	3.25	11800	3.88	15700	4.75
500	0.74	4300	2.03	8100	3.26	11900	3.86	15800	4.78
600	0.82	4400	2.04	8200	3.28	12000	3.89	15900	4.79
700	0.89	4500	2.10	8300	3.31	12100	3.94	16000	4.73
800	0.95	4600	1.97	8400	3.31	12200	3.92	16100	4.78
900	1.01	4700	1.97	8500	3.32	12300	3.96	16200	4.84
1000	1.07	4800	2.03	8600	3.34	12400	4.01	16300	4.90
1100	1.11	4900	2.04	8700	3.35	12500	4.07	16400	4.87
1200	1.17	5000	2.10	8800	3.37	12600	4.08	16500	4.90
1300	1.22	5100	2.53	8900	3.39	12700	4.17	16600	4.98
1400	1.27	5200	2.55	9000	3.42	12800	4.26	16700	5.05
1500	1.29	5300	2.60	9100	3.43	12900	4.16	16800	5.04
1600	1.35	5400	2.61	9200	3.51	13000	4.21	16900	5.02
1700	1.40	5500	2.64	9300	3.52	13100	4.24	17000	5.09
1800	1.44	5600	2.70	9400	3.54	13200	4.27	17100	5.07
1900	1.51	5700	2.67	9500	3.63	13300	4.31	17200	5.10
2000	1.49	5800	2.71	9600	3.61	13400	4.33	17300	5.13
2100	1.55	5900	2.74	9700	3.71	13500	4.25	17400	5.23
2200	1.58	6000	2.80	9800	3.66	13600	4.27	17500	5.21
2300	1.62	6100	2.79	9900	3.77	13700	4.33	17600	5.22
2400	1.72	6200	2.81	10000	3.75	13800	4.33	17700	5.36
2500	1.76	6300	2.83	10100	3.77	13900	4.31	17800	5.35
2600	1.78	6400	2.86	10200	3.80	14000	4.30	17900	5.45
2700	1.80	6500	2.88	10300	3.79	14100	4.30	18000	5.43
2800	1.86	6600	2.90	10400	3.87	14200	4.31		
2900	1.90	6700	2.92	10500	3.83	14300	4.37		
3000	1.90	6800	2.98	10600	3.88	14400	4.35		
3100	1.97	6900	2.98	10700	3.86	14600	4.53		
3200	1.97	7000	3.00	10800	3.87	14700	4.50		
3300	2.03	7100	3.02	10900	3.90	14800	4.62		
3400	2.04	7200	3.04	11000	3.84	14900	4.65		
3500	2.10	7300	3.06	11100	3.88	15000	4.79		

Cable loss
Cable coaxial, Microwave Cable Assembly, 104EA, 26.5 GHz, 1.0 m
Suhner Sucoflex, HL 3386

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.04	5000	0.62	10200	0.92	15500	1.16
30	0.06	5100	0.64	10300	0.94	15600	1.19
50	0.07	5200	0.67	10400	0.94	15700	1.18
100	0.09	5300	0.70	10500	0.91	15800	1.20
200	0.12	5400	0.71	10600	1.00	15900	1.20
300	0.16	5500	0.72	10700	0.88	16000	1.18
400	0.18	5600	0.75	10800	0.90	16100	1.19
500	0.19	5700	0.74	10900	0.90	16200	1.17
600	0.19	5800	0.74	11000	0.88	16300	1.18
700	0.23	5900	0.82	11100	0.93	16400	1.19
800	0.27	6000	0.83	11200	0.94	16500	1.18
900	0.26	6100	0.86	11300	1.00	16600	1.15
1000	0.27	6200	0.85	11400	0.98	16700	1.15
1100	0.28	6300	0.78	11500	0.92	16800	1.14
1200	0.32	6400	0.78	11600	0.93	16900	1.16
1300	0.28	6500	0.77	11700	1.01	17000	1.18
1400	0.32	6600	0.85	11800	1.00	17100	1.21
1500	0.32	6700	0.85	11900	1.01	17200	1.20
1600	0.34	6800	0.89	12000	0.98	17300	1.20
1700	0.35	6900	0.85	12100	1.03	17400	1.24
1800	0.36	7000	0.80	12200	1.04	17500	1.22
1900	0.42	7100	0.79	12300	1.08	17600	1.20
2000	0.36	7200	0.81	12400	1.09	17700	1.19
2100	0.37	7300	0.84	12500	1.03	17800	1.20
2200	0.40	7400	0.87	12600	1.02	17900	1.21
2300	0.41	7500	0.89	12700	1.04	18000	1.22
2400	0.43	7600	0.87	12800	1.04	18500	1.05
2500	0.43	7700	0.89	12900	1.04	19000	1.68
2600	0.44	7800	0.86	13000	1.07	19500	0.82
2700	0.46	7900	0.86	13100	1.08	20000	1.58
2800	0.46	8000	0.91	13200	1.11	20500	1.00
2900	0.47	8100	0.93	13300	1.14	21000	1.45
3000	0.48	8200	0.97	13400	1.15	21500	1.33
3100	0.48	8300	0.91	13500	1.14	22000	1.24
3200	0.49	8400	0.92	13600	1.12	22500	1.03
3300	0.50	8500	0.84	13700	1.13	23000	1.61
3400	0.51	8600	0.85	13800	1.13	23500	0.60
3500	0.54	8700	0.89	13900	1.17	24000	1.97
3600	0.57	8800	0.95	14000	1.14	24500	1.32
3700	0.55	8900	0.90	14100	1.15	25000	1.85
3800	0.55	9000	0.89	14200	1.13	25500	-0.24
3900	0.56	9100	0.87	14300	1.15	26000	0.68
4000	0.56	9200	0.87	14400	1.13	26500	0.86
4100	0.58	9300	0.85	14600	1.12		
4200	0.59	9400	0.86	14700	1.15		
4300	0.60	9500	0.87	14800	1.18		
4400	0.63	9600	0.89	14900	1.20		
4500	0.62	9700	0.87	15000	1.16		
4600	0.63	9800	0.89	15100	1.17		
4700	0.63	9900	0.91	15200	1.15		
4800	0.62	10000	0.89	15300	1.17		
4900	0.61	10100	0.88	15400	1.16		

14 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μV)	decibel referred to one microvolt
dB(μV/m)	decibel referred to one microvolt per meter
dB(μA)	decibel referred to one microampere
dBΩ	decibel referred to one Ohm
DC	direct current
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
μs	microsecond
NA	not applicable
NB	narrow band
NT	not tested
OATS	open area test site
Ω	Ohm
QP	quasi-peak
PCB	printed circuit board
PM	pulse modulation
PS	power supply
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt
VA	volt-ampere

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