HERMON LABORATORIES

839.01
Electrical

Hermon Laboratories Ltd.
Harakevet Industrial Zone, Binyamina 30500,
Israel
Tel. +972-4-6288001
Fax. +972-4-6288277
E-mail: mail@hermonlabs.com

TEST REPORT

ACCORDING TO: FCC part 27, part 15 subpart B

FOR:

WiNetworks Ltd.

Base Station Transceiver - 2.5 GHz

WiN 7225 (pBST)

Table of contents

HERMON LABORATORIES

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):	WiN7225 (pBST)
Hardware version:	0.2
Software release:	mfg 1.023
Receipt date	12/1/2008

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:	19254
Location:	Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started:	12/1/2008
Test completed:	12/22/2008
Test specification(s):	FCC part 27; part 15, subpart B

HERMON LABORATORIES

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.

	Name and Title	Date	Signature
Tested by:	Mr. L. Markel, test engineer	December 22, 2008	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	March 3, 2009	
Approved by:	Mr. M. Nikishin, EMC and Radio group manager	March 4, 2009	

HERMON LABORATORIES

6 EUT description

6.1 General information

The EUT, WiNetworks Pico WiMAX BST, model name WiN7225, is a single sector station used to enhance outdoor and indoor WiMAX coverage and capacity. The unit is easily installable, powered by PoE and supports remote management. The WiN7225 provides the full base station functionality necessary for serving a single sector and is available in 2.X GHz frequency range. It supports up to 512 subscriber units and its light weight and small footprint allow it to be easily mounted by one person on poles, street lamps or walls.
The WiNetworks Pico BST is a member of the Win-MAX E family, a line of mobile WiMAX broadband wireless access systems based on the 802.16e mobile WiMAX standard. Win-MAX E systems are designed for robustness and simplicity, offering feature-rich services with low deployment and operation costs, for unmatched operator competitiveness and fast ROI.
The EUT provides all the functionality necessary to communicate with fixed and mobile subscriber units according to the service criteria and customer Service Level Agreements (SLA). The end-to-end Quality of Service (QoS) ensures the same high quality WiMAX experience is delivered to customers outside or inside his/her home or small office.

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	8 m
			Laptop				
RF	Antenna	EUT	50 Ohm termination	N-type	2	NA	NA
Power	AC power	DC power supply	mains	IEC 60320	1	Unshielded	1.5 m

6.3 Support and test equipment

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

6.4 Operating frequencies

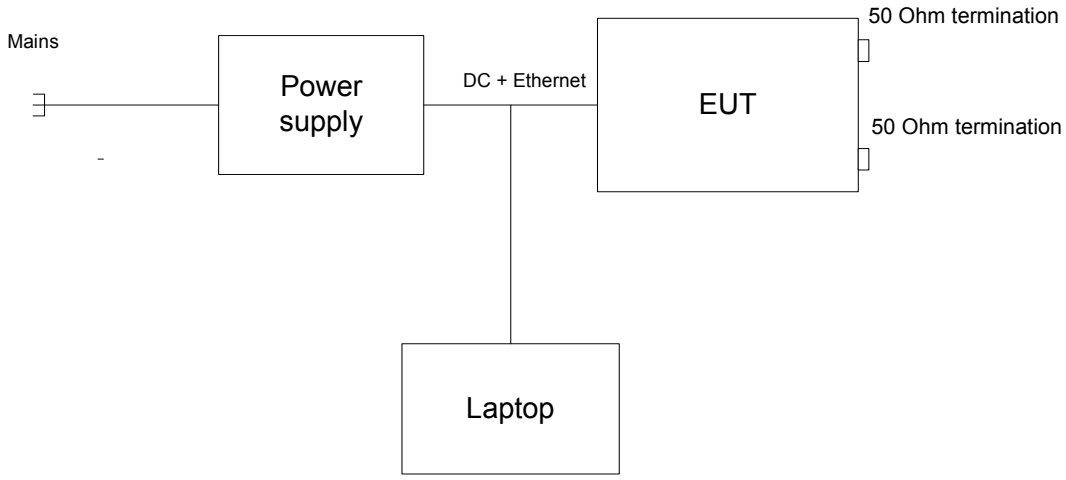
Source	Frequency, MHz	
Tx/Rx	2496-2690	
Clock	66	PCI
Clock	25	Ethernet PHY
Clock	10	GPS
Clock	50	Tx data sampling

6.5 Changes made in the EUT

To withstand the standard requirements the following changes were performed in the EUT software: the roll-off factor of transmit filter was increased from near zero value to 0.2.
It is manufacturer responsibility to implement the change in the production version of the EUT. In any case the test report applies to the tested item only.

HERMON LABORATORIES

6.6 Test configuration



HERMON LABORATORIES

6.7 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 – 2687.25 MHz						
RF channel bandwidth		5 MHz, 7 MHz, 10 MHz						
Maximum rated output power		At transmitter 50 Ω RF output connector					25.83 dBm	
Is transmitter output power variable?			No					
		V	Yes		continuous variable			
				V	stepped variable with stepsize		1 dB	
				minimum RF power			8 dBm	
				maximum RF power			25.83 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	ACE	AWMO-6-OT	7 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	66%

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 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	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

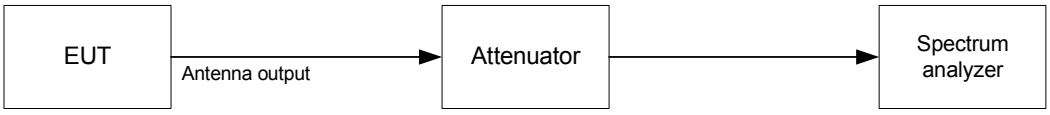
Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, kHz
2496.0 – 2690.0	26	NA

* - 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 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Table 7.1.2 Occupied bandwidth test results

DETECTOR USED: Average
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 3000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: QPSK
MODULATING SIGNAL: PRBS
CHANNEL BW: 5 MHz
BIT RATE: 4.19 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2499.00	4770.0	NA	NA	Pass
2504.75*	4770.0	NA	NA	Pass
2593.00	4770.0	NA	NA	Pass
2687.25	4785.0	NA	NA	Pass

DETECTOR USED: Average
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 3000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
CHANNEL BW: 5 MHz
BIT RATE: 12.565 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2499.00	4770.0	NA	NA	Pass
2504.75*	4785.0	NA	NA	Pass
2593.00	4785.0	NA	NA	Pass
2687.25	4785.0	NA	NA	Pass

DETECTOR USED: Average
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 3000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
CHANNEL BW: 5 MHz
BIT RATE: 18.85 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2499.0	4785.0	NA	NA	Pass
2504.75*	4770.0	NA	NA	Pass
2593.00	4785.0	NA	NA	Pass
2687.25	4785.0	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 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Table 7.1.3 Occupied bandwidth test results

DETECTOR USED: Average
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 3000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: QPSK
MODULATING SIGNAL: PRBS
CHANNEL BW: 7 MHz
BIT RATE: 4.19 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2501.0	6940.0	NA	NA	Pass
2596.0	6920.0	NA	NA	Pass
2686.0	6900.0	NA	NA	Pass

DETECTOR USED: Average
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000/3000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
CHANNEL BW: 7 MHz
BIT RATE: 12.565 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2501.0	6900.0	NA	NA	Pass
2596.0	6900.0	NA	NA	Pass
2686.0	6920.0	NA	NA	Pass

DETECTOR USED: Average
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000/3000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
CHANNEL BW: 7 MHz
BIT RATE: 18.85 Mbps

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2501.0	6880.0	NA	NA	Pass
2596.0	6900.0	NA	NA	Pass
2686.0	6920.0	NA	NA	Pass

Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

Table 7.1.4 Occupied bandwidth test results

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

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2501.75	9573.0	NA	NA	Pass
2596.00	9570.0	NA	NA	Pass
2684.50	9597.5	NA	NA	Pass

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

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2501.75	9542.5	NA	NA	Pass
2596.00	9570.0	NA	NA	Pass
2684.50	9570.0	NA	NA	Pass

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

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2501.75	9515.0	NA	NA	Pass
2596.00	9597.5	NA	NA	Pass
2684.50	9570.0	NA	NA	Pass

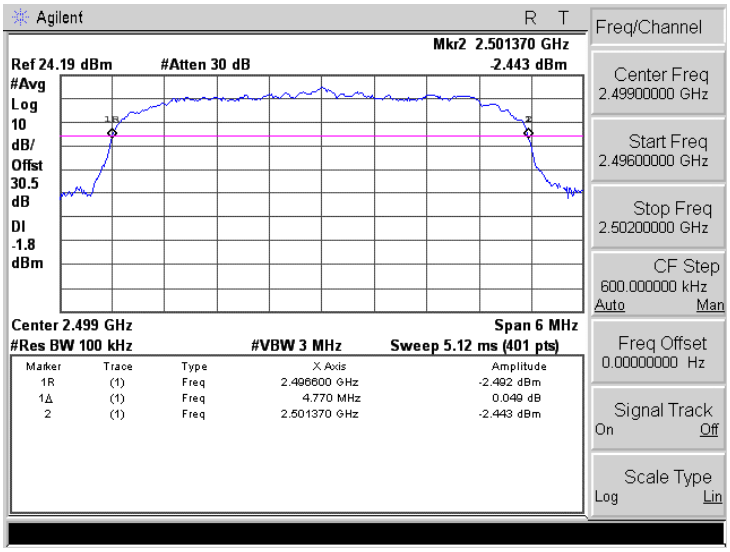
Reference numbers of test equipment used

HL 2909	HL 3321	HL 3386					

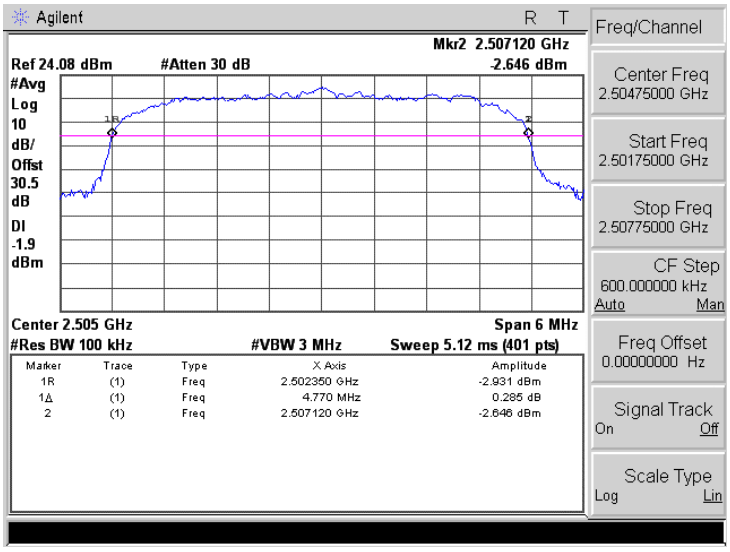
Full description is given in Appendix A.

Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	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

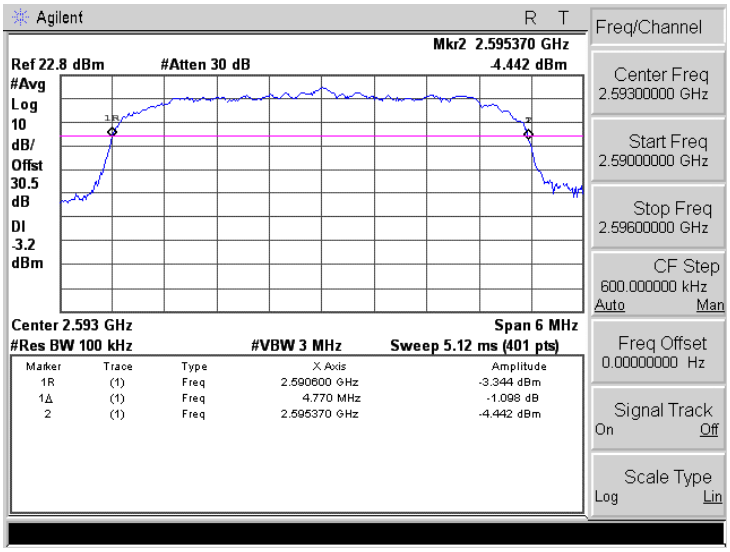


Plot 7.1.2 Occupied bandwidth test result at low frequency, 5 MHz BW, QPSK (2504.75 MHz)

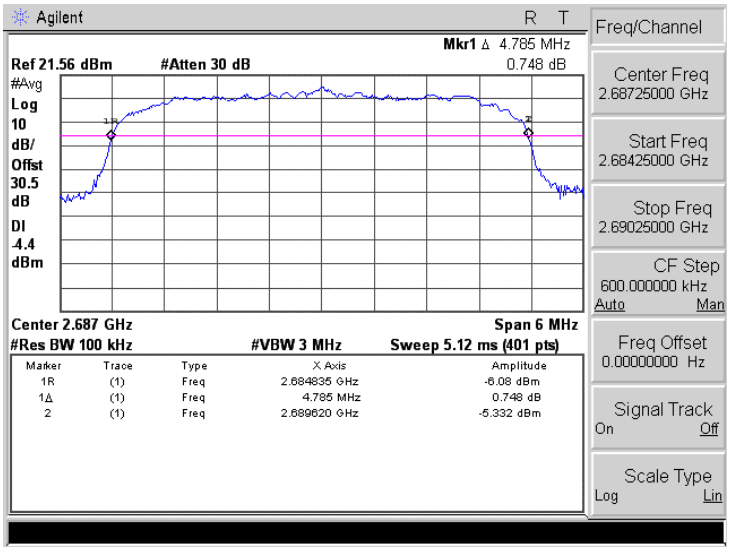


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

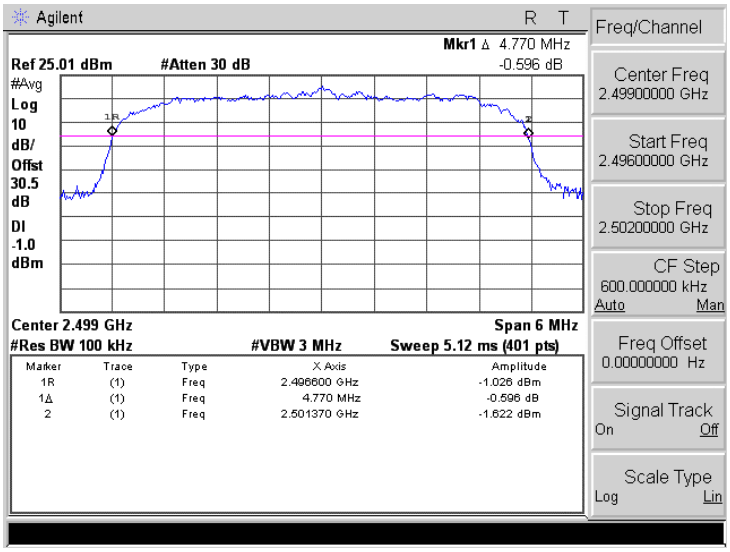


Plot 7.1.4 Occupied bandwidth test result at high frequency, 5 MHz BW, QPSK

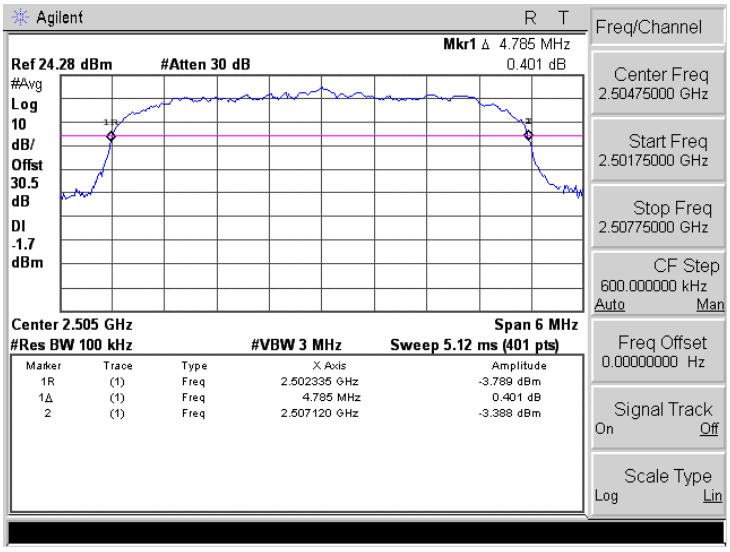


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

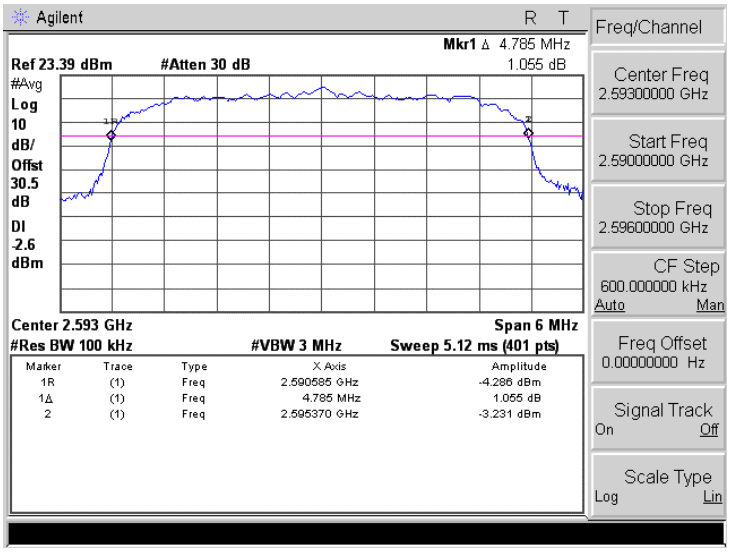


Plot 7.1.6 Occupied bandwidth test result at low frequency, 5 MHz BW, 16QAM (2504.75 MHz)

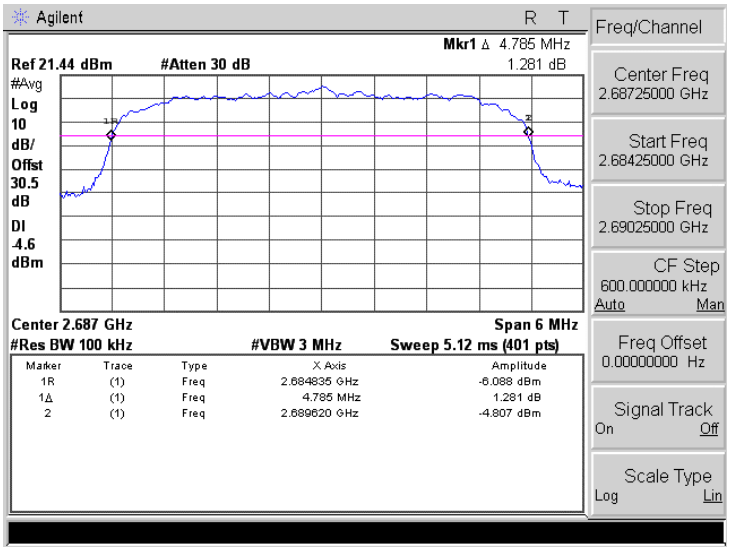


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

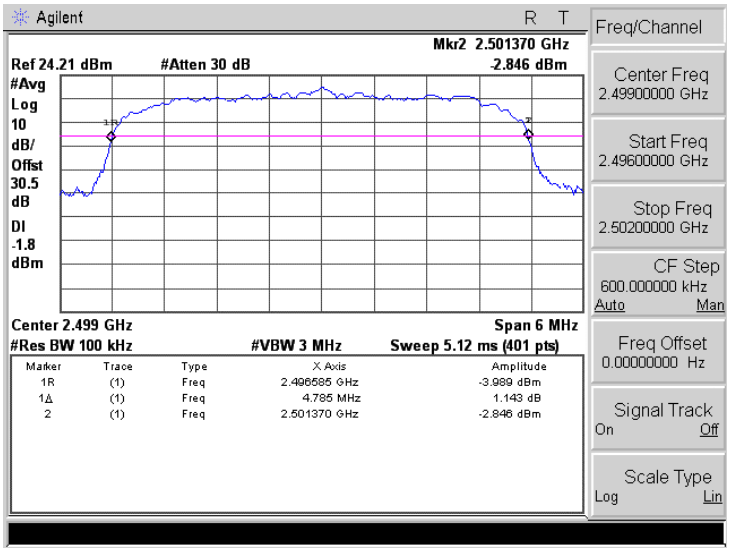


Plot 7.1.8 Occupied bandwidth test result at high frequency, 5 MHz BW, 16QAM

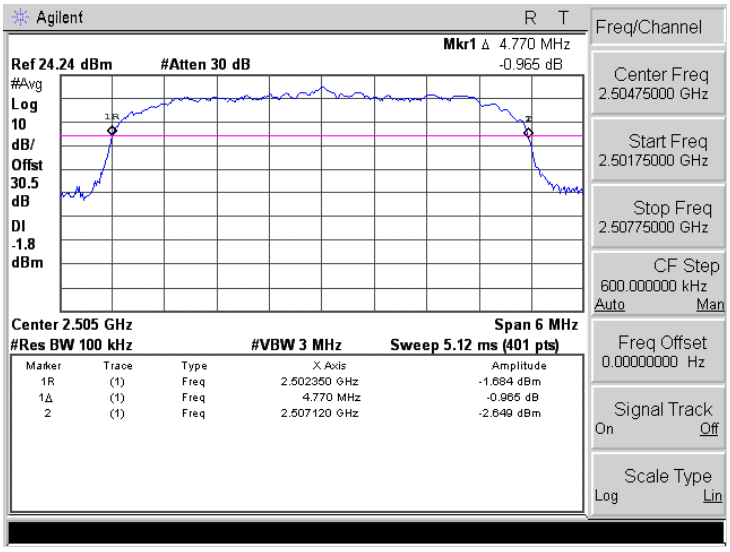


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

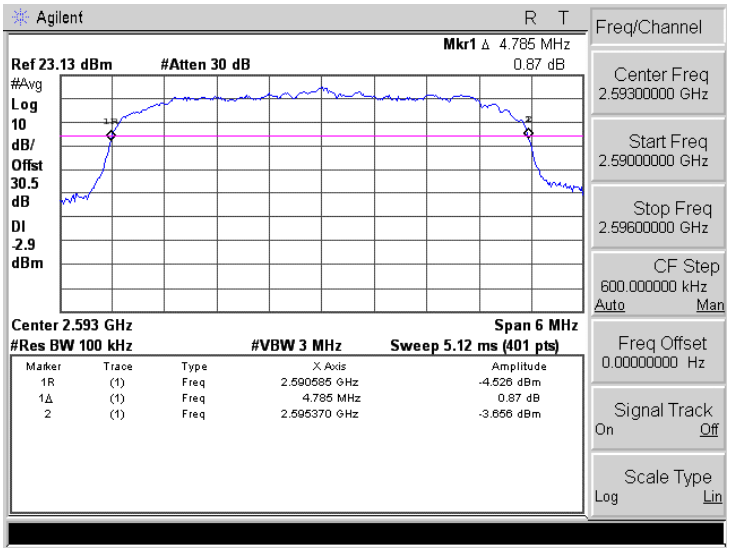


Plot 7.1.10 Occupied bandwidth test result at low frequency, 5 MHz BW, 64QAM (2504.75 MHz)

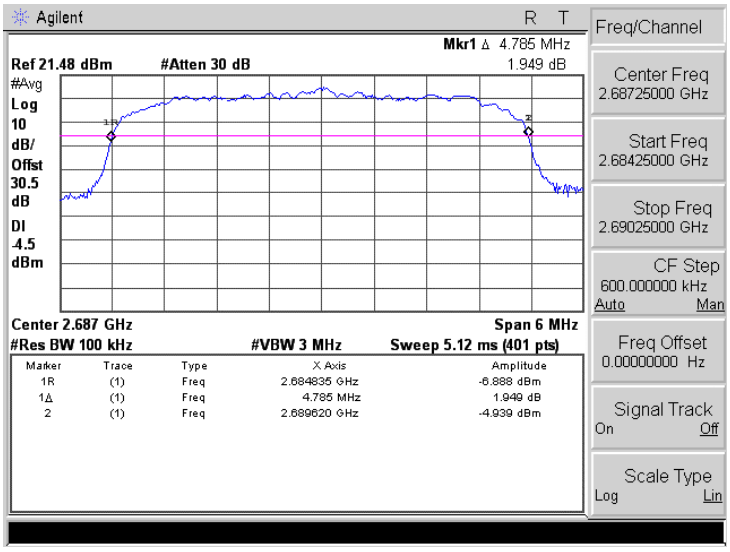


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

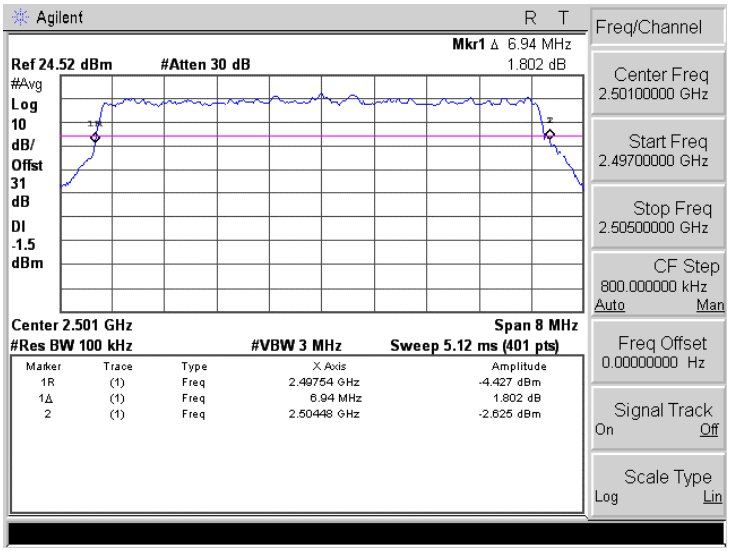


Plot 7.1.12 Occupied bandwidth test result at high frequency, 5 MHz BW, 64QAM

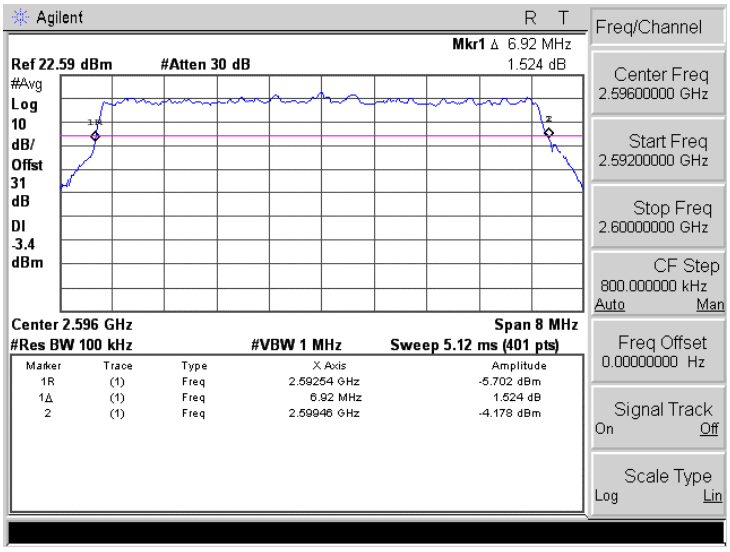


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

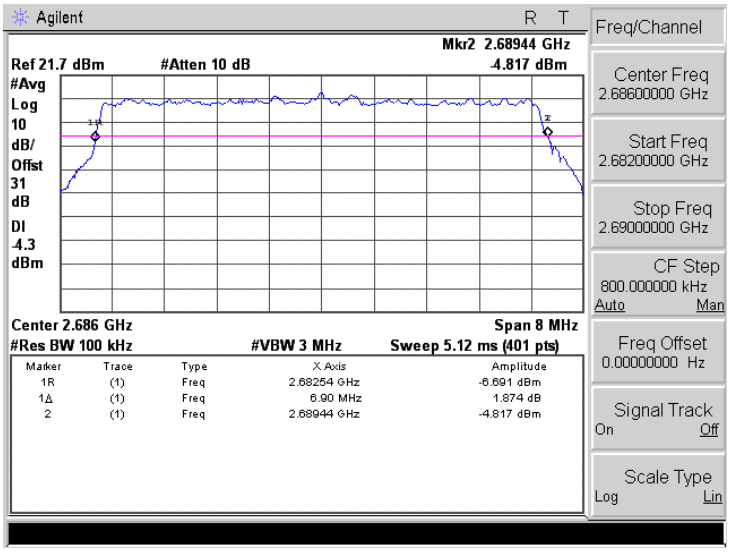


Plot 7.1.14 Occupied bandwidth test result at mid frequency, 7 MHz BW, QPSK

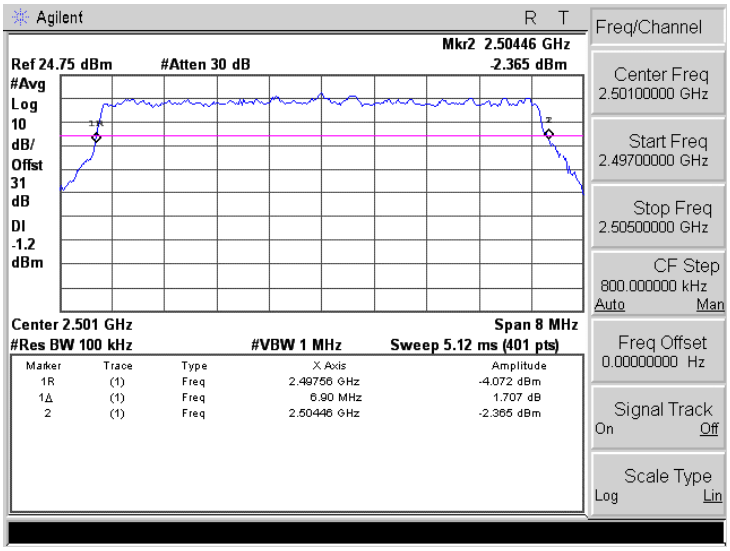


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

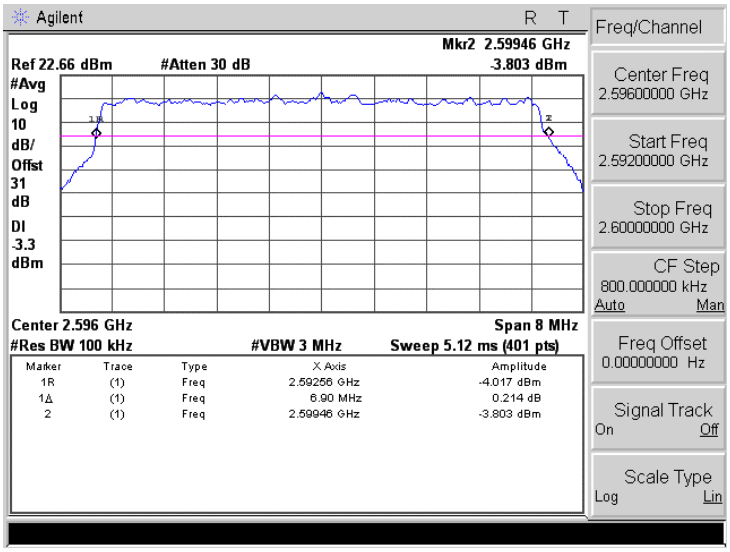


Plot 7.1.16 Occupied bandwidth test result at low frequency, 7 MHz BW, 16QAM

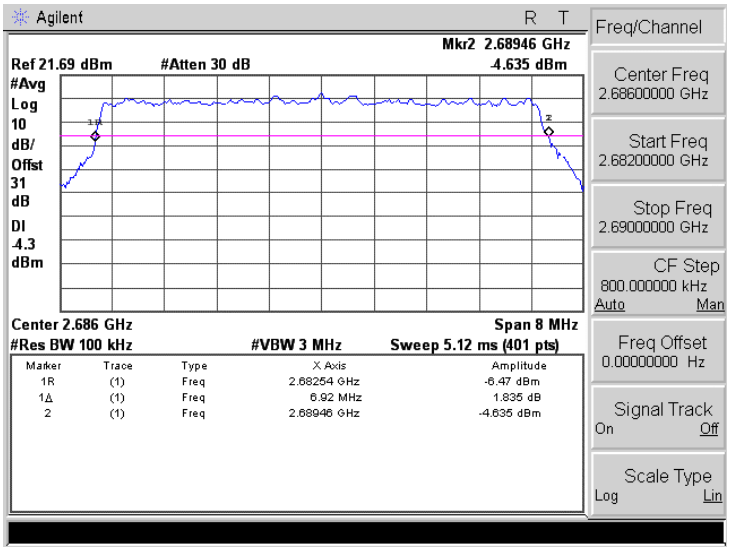


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

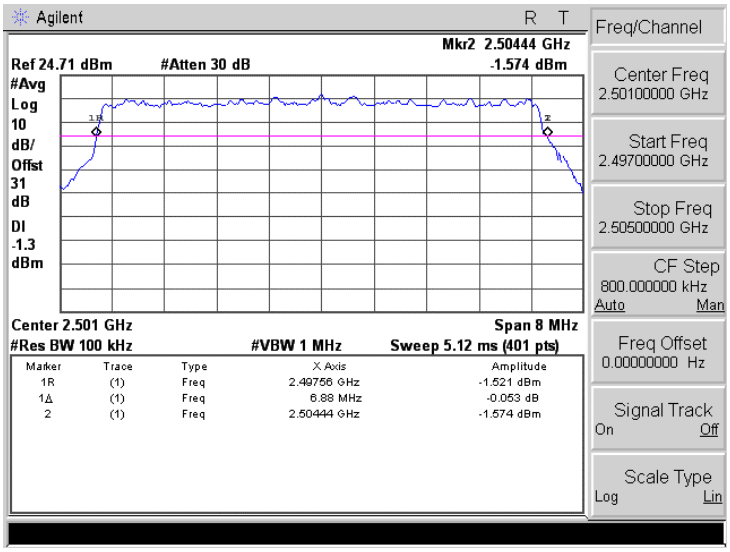


Plot 7.1.18 Occupied bandwidth test result at high frequency, 7 MHz BW, 16QAM

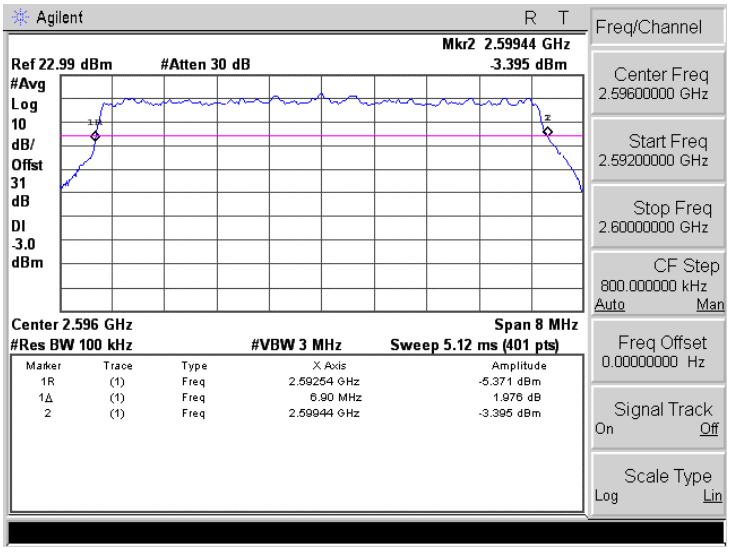


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

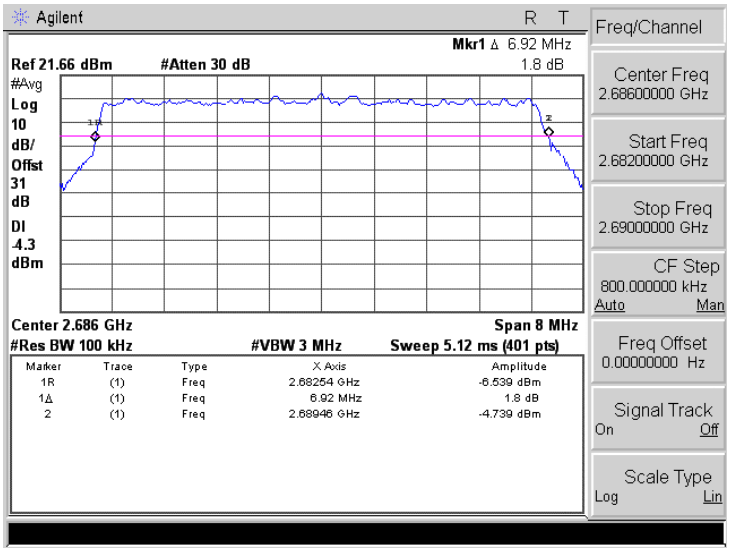


Plot 7.1.20 Occupied bandwidth test result at mid frequency, 7 MHz BW, 64QAM

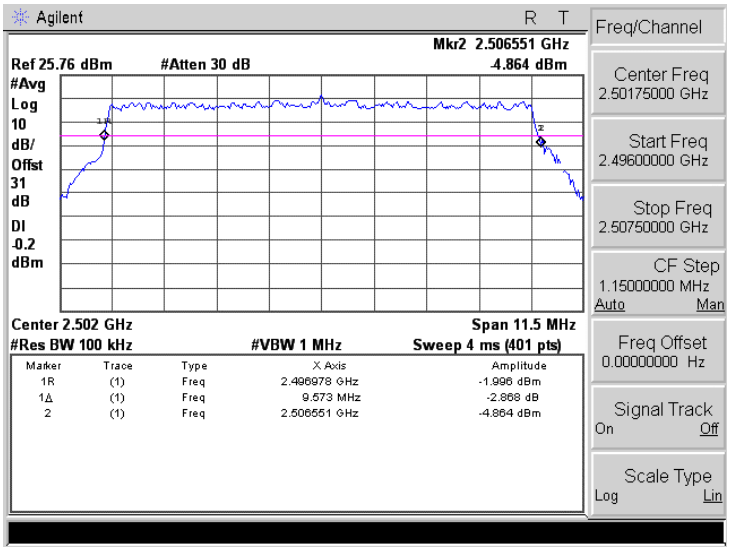


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

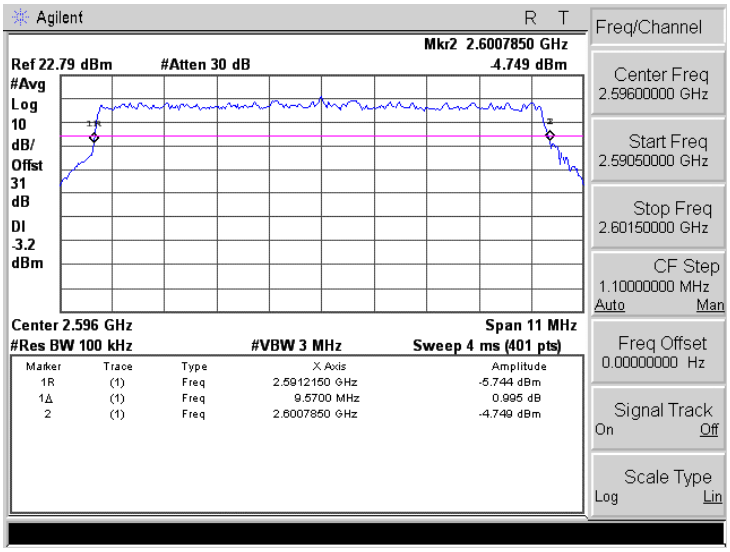


Plot 7.1.22 Occupied bandwidth test result at low frequency, 10 MHz BW, QPSK

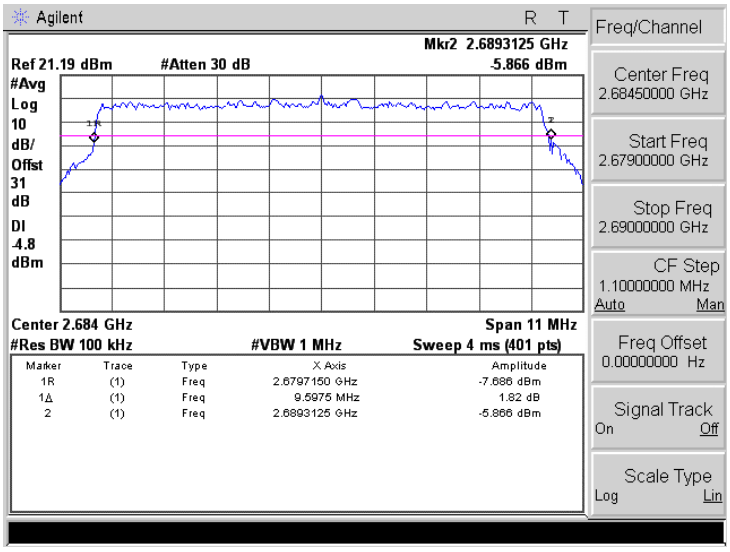


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

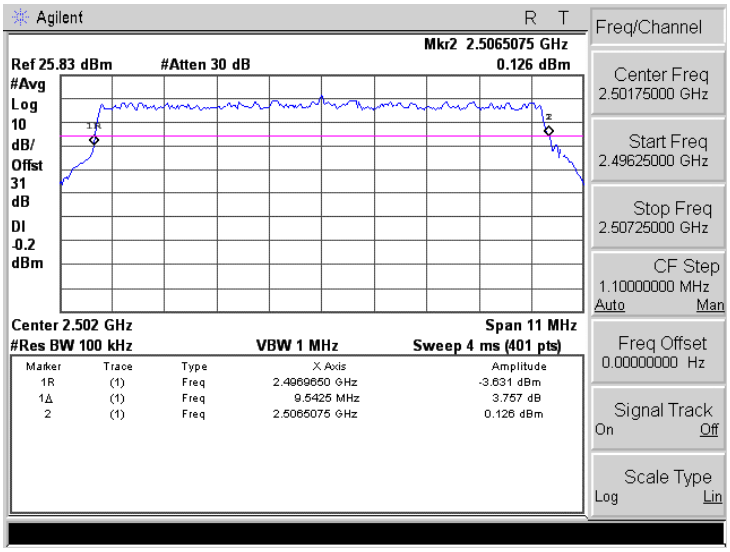


Plot 7.1.24 Occupied bandwidth test result at high frequency, 10 MHz BW, QPSK

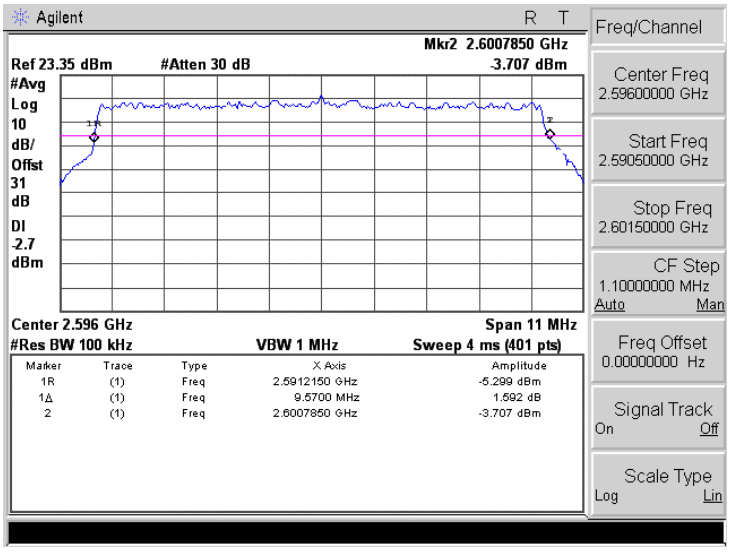


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

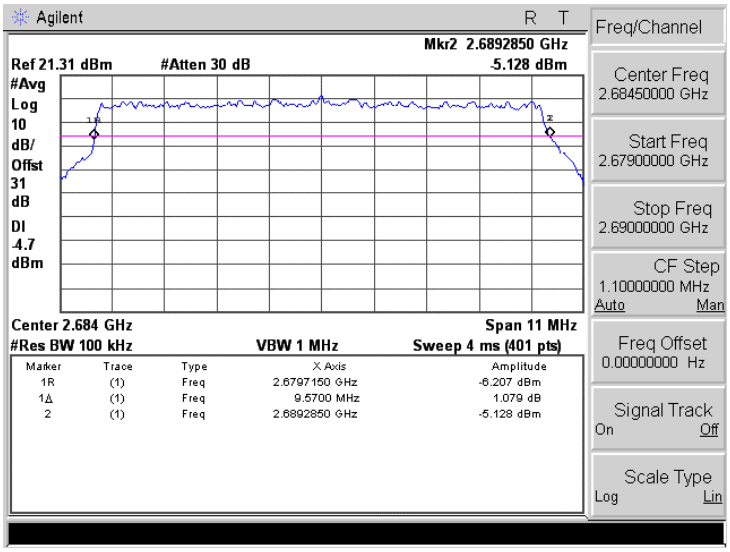


Plot 7.1.26 Occupied bandwidth test result at mid frequency, 10 MHz BW, 16QAM

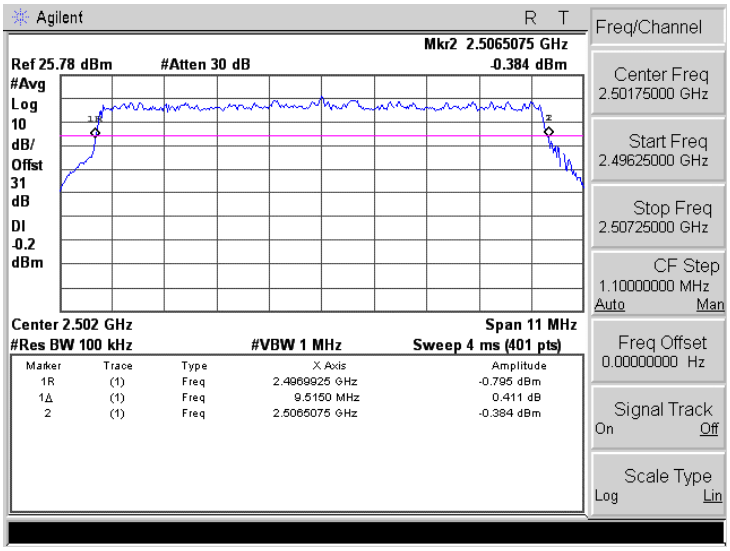


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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

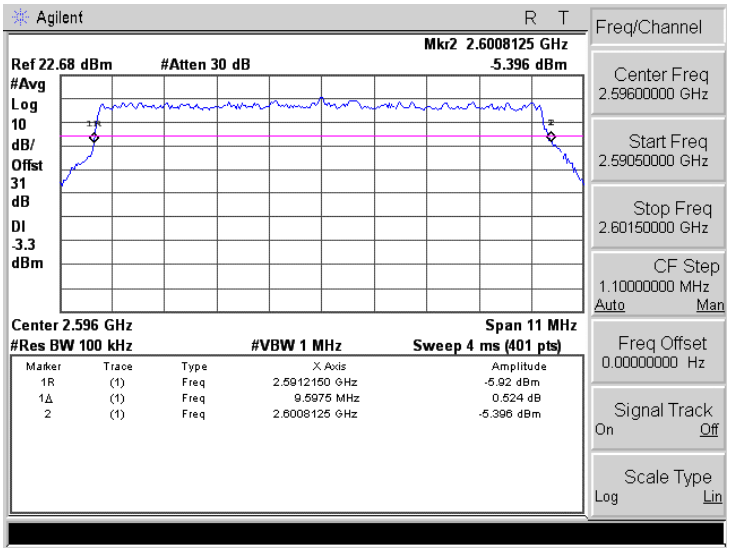


Plot 7.1.28 Occupied bandwidth test result at low frequency, 10 MHz BW, 64QAM

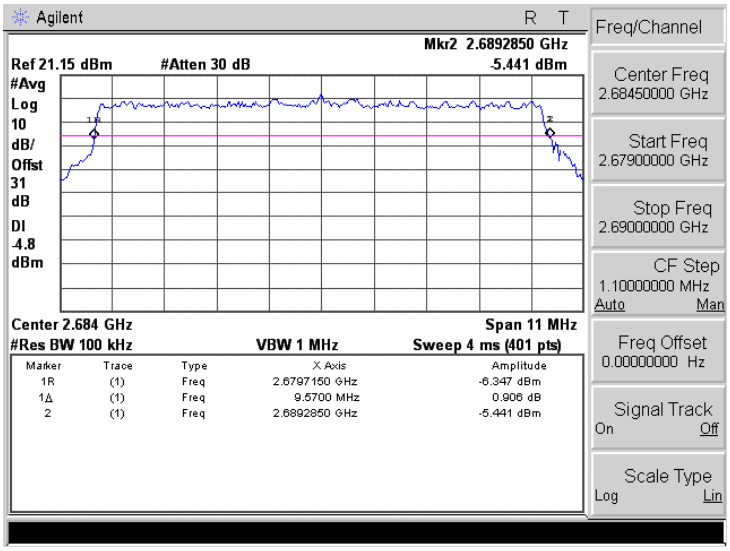


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/14/2008 4:43:14 PM		
Temperature: 22ºC	Air Pressure: 1012 hPa	Relative Humidity: 40 %	Power Supply: 48 VDC
Remarks:			

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



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



Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 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

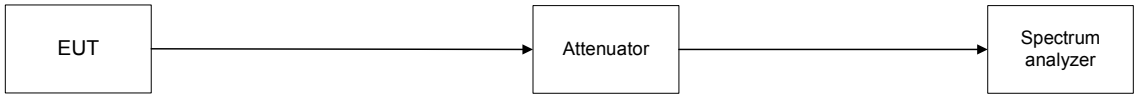
Assigned frequency range, MHz	Maximum peak output power dBm
2496.0 – 2690.0	63+10log(OBW*/CBW**)+10log(360/beamwidth)
	Maximum peak power density dBm/100 kHz
	EIRP+10log(0.1/CBW**)

*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 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 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: 7 dBi 360° Horizontal beam width (-3 dB BW)
TRANSMITTER OUTPUT POWER SETTINGS: TxGain = 10(for all channels)
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
2499.00	24.19	Included	Included	31.19	62.00	-30.81	Pass
2504.75	24.08	Included	Included	31.08	62.38	-31.30	Pass
2593.00	22.80	Included	Included	29.80	62.00	-32.20	Pass
2687.25	21.56	Included	Included	28.56	62.40	-33.84	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
2499.00	25.01	Included	Included	32.01	62.00	-29.99	Pass
2504.75	24.28	Included	Included	31.28	62.40	-31.12	Pass
2593.00	23.39	Included	Included	30.39	62.02	-31.63	Pass
2687.25	21.44	Included	Included	28.44	62.40	-33.96	Pass

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

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
2499.00	24.21	Included	Included	31.21	62.02	-30.81	Pass
2504.75	24.24	Included	Included	31.24	62.38	-31.14	Pass
2593.00	23.13	Included	Included	30.13	62.02	-31.89	Pass
2687.25	21.48	Included	Included	28.48	62.40	-33.92	Pass

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

Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 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:	7 dBi 360° Horizontal beam width (-3 dB BW)
TRANSMITTER OUTPUT POWER SETTINGS:	TxGain = 10(for all channels)
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
2499.00	-42.80	Included	Included	7.20	44.22	-32.35	Pass
2504.75	-42.91	Included	Included	7.09	44.98	-31.35	Pass
2593.00	-44.19	Included	Included	5.81	44.22	-33.10	Pass
2687.25	-45.43	Included	Included	4.57	44.99	-37.17	Pass

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

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
2499.00	-41.98	Included	Included	8.02	44.22	-32.35	Pass
2504.75	-42.71	Included	Included	7.29	44.99	-31.35	Pass
2593.00	-43.60	Included	Included	6.40	44.24	-33.1	Pass
2687.25	-45.55	Included	Included	4.45	44.99	-37.17	Pass

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

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
2499.00	-42.78	Included	Included	7.22	44.24	-32.35	Pass
2504.75	-42.75	Included	Included	7.25	44.98	-31.35	Pass
2593.00	-43.86	Included	Included	6.14	44.24	-33.10	Pass
2687.25	-45.51	Included	Included	4.49	44.99	-37.17	Pass

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

Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 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: 7 dBi 360° Horizontal beam width (-3 dB BW)
TRANSMITTER OUTPUT POWER SETTINGS: Tx gain = 10 (for all channels)
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
2501.00	24.52	Included	Included	31.52	60.81	-29.29	Pass
2596.00	22.59	Included	Included	29.59	60.61	-31.02	Pass
2686.00	21.7	Included	Included	28.70	60.97	-32.27	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
2501.00	24.75	Included	Included	31.75	60.78	-29.03	Pass
2596.00	22.66	Included	Included	29.66	60.60	-30.94	Pass
2686.00	21.69	Included	Included	28.69	60.99	-32.30	Pass

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

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
2501.00	24.71	Included	Included	31.71	60.77	-29.06	Pass
2596.00	22.99	Included	Included	29.99	60.60	-30.61	Pass
2686.00	21.66	Included	Included	28.66	60.99	-32.33	Pass

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

Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 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:	7 dBi 360° Horizontal beam width (-3 dB BW)
TRANSMITTER OUTPUT POWER SETTINGS:	Tx gain = 10 (for all channels)
DUTY CYCLE:	66%

MODULATION: QPSK
BIT RATE: 4.19 Mbps
CHANNEL BANDWIDTH: 7 MHz

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
2501.00	-43.93	Included	Included	6.07	40.20	-32.35	Pass
2596.00	-45.86	Included	Included	4.14	39.82	-33.10	Pass
2686.00	-46.75	Included	Included	3.25	40.56	-37.17	Pass

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

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
2501.00	-43.70	Included	Included	6.30	40.17	-32.35	Pass
2596.00	-45.79	Included	Included	4.21	39.80	-33.10	Pass
2686.00	-46.76	Included	Included	3.24	40.57	-37.17	Pass

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

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
2501.00	-43.74	Included	Included	6.26	40.16	-32.35	Pass
2596.00	-45.46	Included	Included	4.54	39.80	-33.10	Pass
2686.00	-46.79	Included	Included	3.21	40.57	-37.17	Pass

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

Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 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: 7 dBi 360° Horizontal beam width (-3 dB BW)
TRANSMITTER OUTPUT POWER SETTINGS: TxGain = 11 (for all channels)
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
2501.75	25.76	Included	Included	32.76	62.20	-29.44	Pass
2596.00	22.79	Included	Included	29.79	62.02	-32.23	Pass
2684.50	21.19	Included	Included	28.19	62.41	-34.22	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
2501.75	25.83	Included	Included	32.83	62.19	-29.36	Pass
2596.00	23.35	Included	Included	30.35	62.02	-31.67	Pass
2684.50	21.31	Included	Included	28.31	62.40	-34.09	Pass

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

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
2501.75	25.78	Included	Included	32.78	62.18	-29.40	Pass
2596.00	22.68	Included	Included	29.68	62.03	-32.35	Pass
2684.50	21.15	Included	Included	28.15	62.40	-34.25	Pass

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

Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 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:	7 dBi 360° Horizontal beam width (-3 dB BW)
TRANSMITTER OUTPUT POWER SETTINGS:	Tx gain = 11 (for all channels)
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
2501.75	-44.24	Included	Included	5.76	41.60	-32.35	Pass
2596.00	-47.22	Included	Included	2.78	41.23	-33.10	Pass
2684.50	-48.81	Included	Included	1.19	41.99	-37.17	Pass

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

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
2501.75	-44.17	Included	Included	5.83	41.58	-32.35	Pass
2596.00	-46.65	Included	Included	3.35	41.23	-33.10	Pass
2684.50	-48.69	Included	Included	1.31	41.98	-37.17	Pass

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

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
2501.75	-44.22	Included	Included	5.78	41.57	-32.35	Pass
2596.00	-47.32	Included	Included	2.68	41.24	-33.10	Pass
2684.50	-48.85	Included	Included	1.15	41.98	-37.17	Pass

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

Reference numbers of test equipment used

HL 2909	HL 3951	HL 3321	HL 3386				

Full description is given in Appendix A.

Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

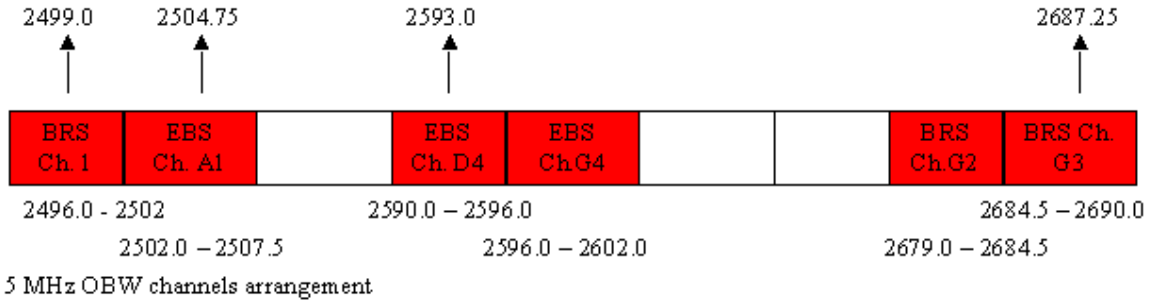
Table 7.2.8 Post transition frequency channels assignment

Channel	Channel BW, MHz	Peak power limit for 7 dBi gain antenna, dBm	Power density limit, dBm/kHz
5 MHz Single Channel			
2499.0 MHz: BRS Ch. 1	6.0	63+10log(OBW/6.0)	EIRP+10log(0.1/6.0)
2504.75 MHz: ERS Ch. A1	5.5	63+10log(OBW/5.5)	EIRP+10log(0.1/5.5)
2593.0 MHz: EBS Ch. D4	6.0	63+10log(OBW/6.0)	EIRP+10log(0.1/6.0)
2687.25 MHz: BRS Ch. G3	5.5	63+10log(OBW/5.5)	EIRP+10log(0.1/5.5)
7 MHz Dual Channel			
2501.0 MHz BRS Ch. 1+ EBS Ch. A1	11.5	63+10log(OBW/11.5)	EIRP+10log(0.1/11.5)
2596.0 MHz EBS Ch. D4+ EBS Ch. G4	12.0	63+10log(OBW/12.0)	EIRP+10log(0.1/12.0)
2686.0 MHz BRS Ch. G4+ BRS Ch. G3	11.0	63+10log(OBW/11.0)	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)	EIRP+10log(0.1/11.5)
2596.0 MHz EBS Ch. D4+ EBS Ch. G4	12.0	63+10log(OBW/12.0)	EIRP+10log(0.1/12.0)
2684.5 MHz BRS Ch. G4+ BRS Ch. G3	11.0	63+10log(OBW/11.0)	EIRP+10log(0.1/11.0)

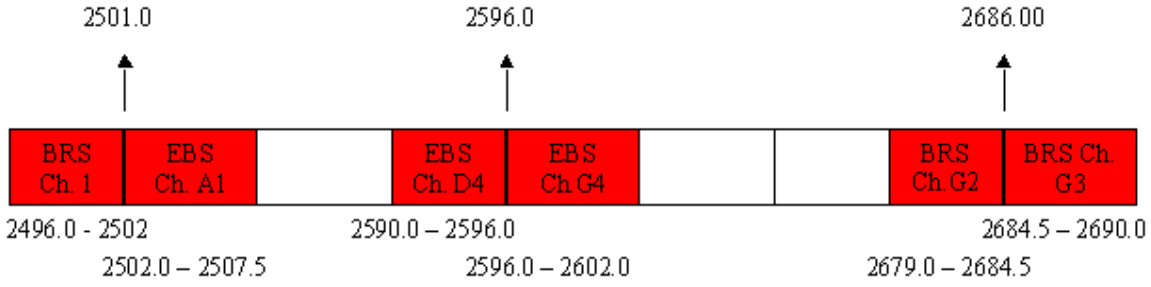
NOTE: Channels at post transition band were taken as the worst case

Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

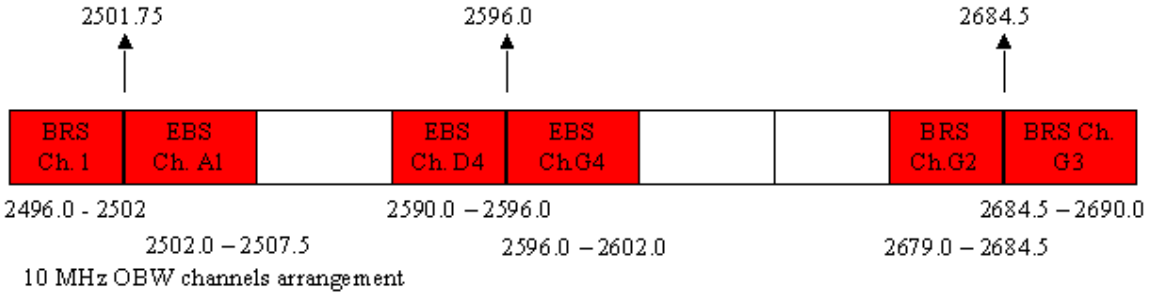
Figure 7.2.2 Post transition frequency channels arrangement



5 MHz OBW channels arrangement



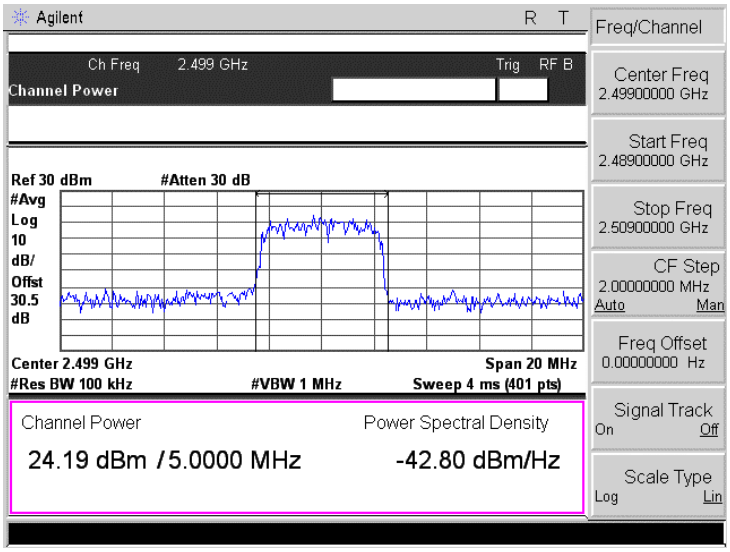
7 MHz OBW channels arrangement



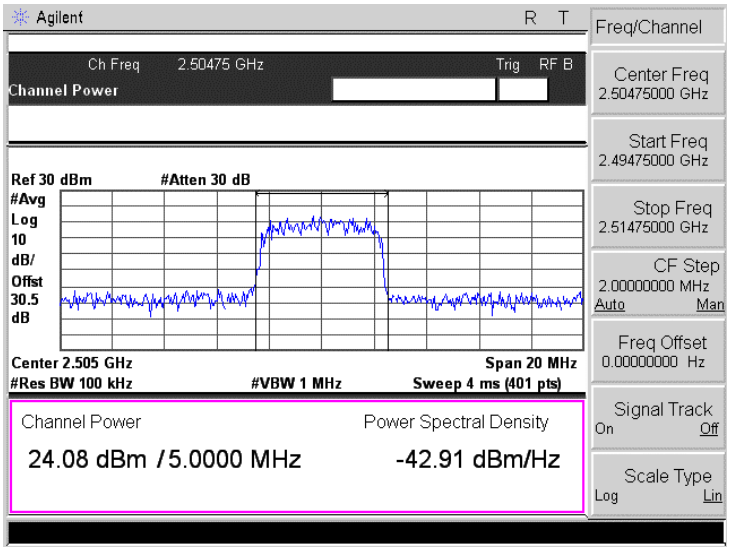
10 MHz OBW channels arrangement

Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 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 (Tx gain = 10)

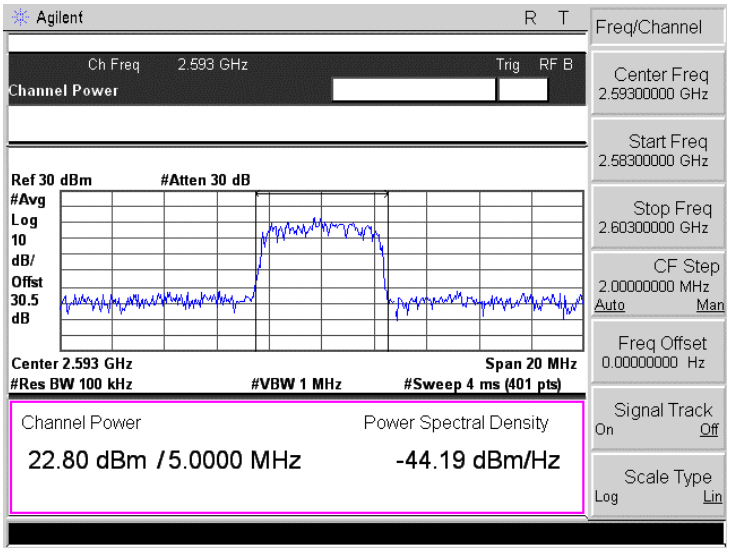


Plot 7.2.2 Peak output power test results at low frequency, 5 MHz, QPSK (Tx gain = 10), (2504.75 MHz)

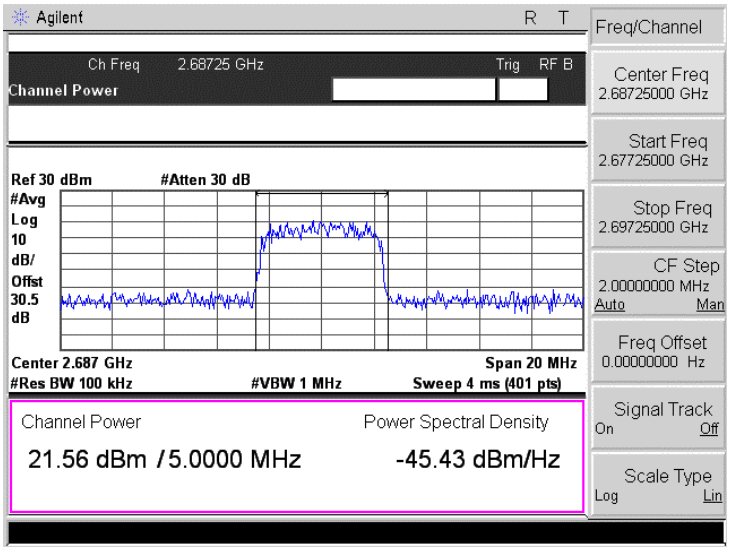


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.3 Peak output power test results at mid frequency, 5 MHz, QPSK (Tx gain = 10)

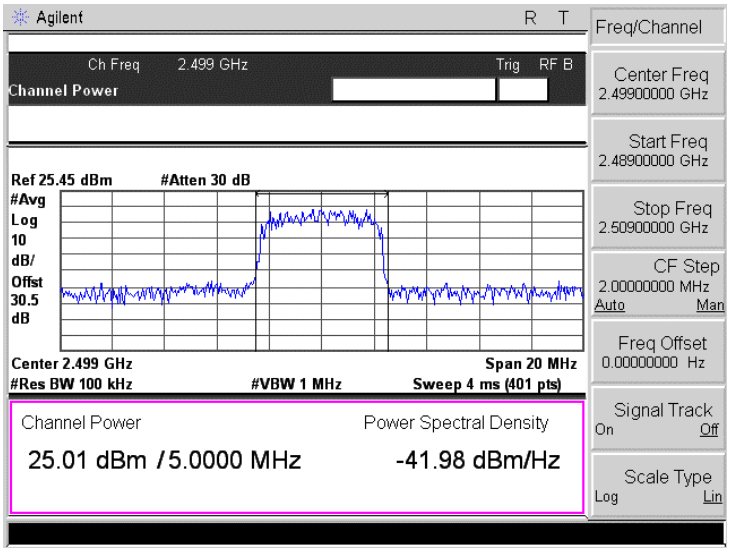


Plot 7.2.4 Peak output power test results at high frequency, 5 MHz, QPSK (Tx gain = 10)

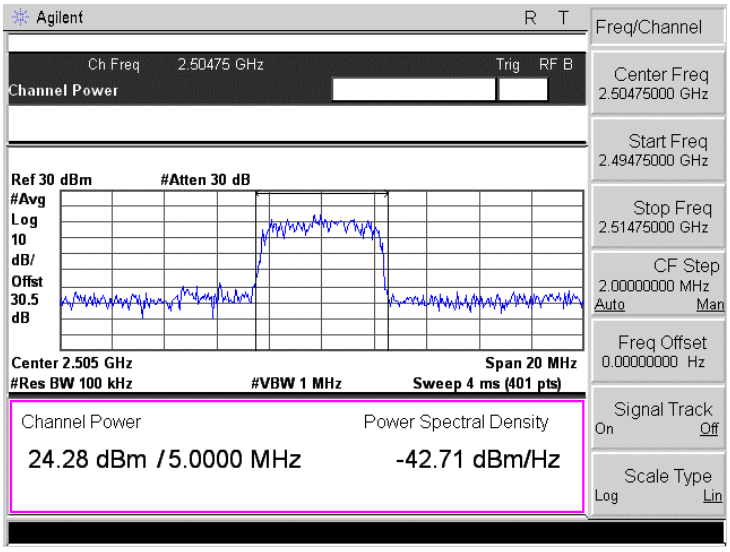


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.5 Peak output power test results at low frequency, 5 MHz, 16QAM (Tx gain = 10)

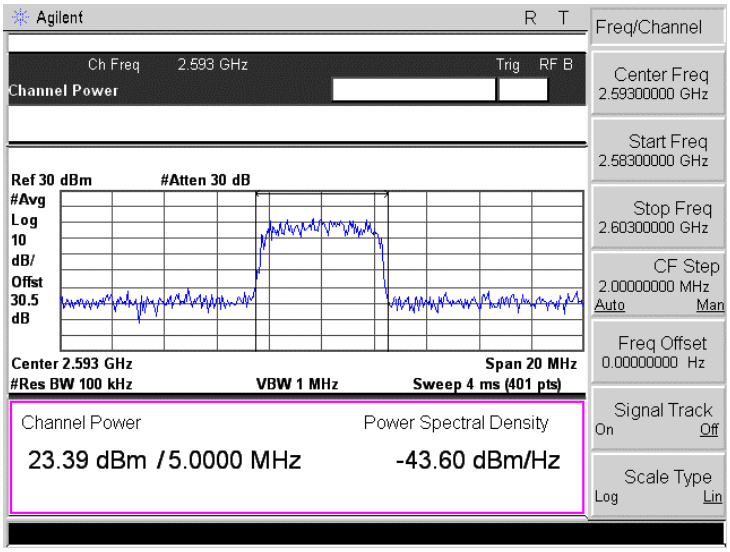


Plot 7.2.6 Peak output power test results at low frequency, 5 MHz, 16QAM (Tx gain = 10) (2504.75 MHz)

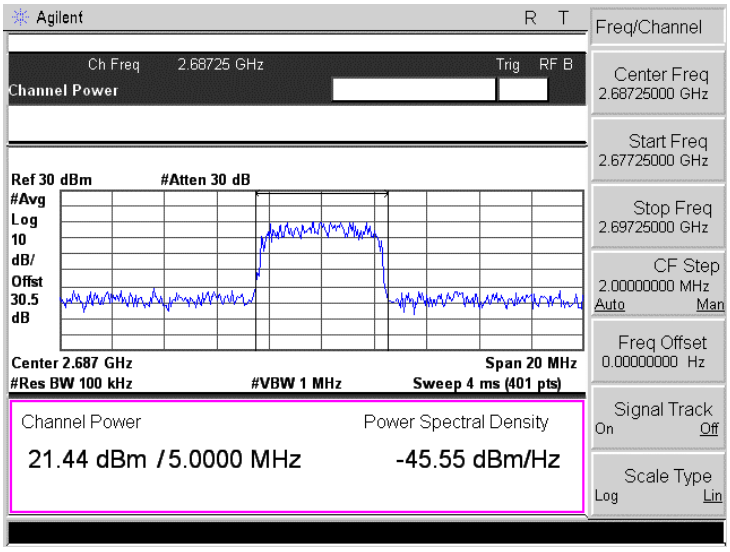


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.7 Peak output power test results at mid frequency, 5 MHz, 16QAM (Tx gain = 10)

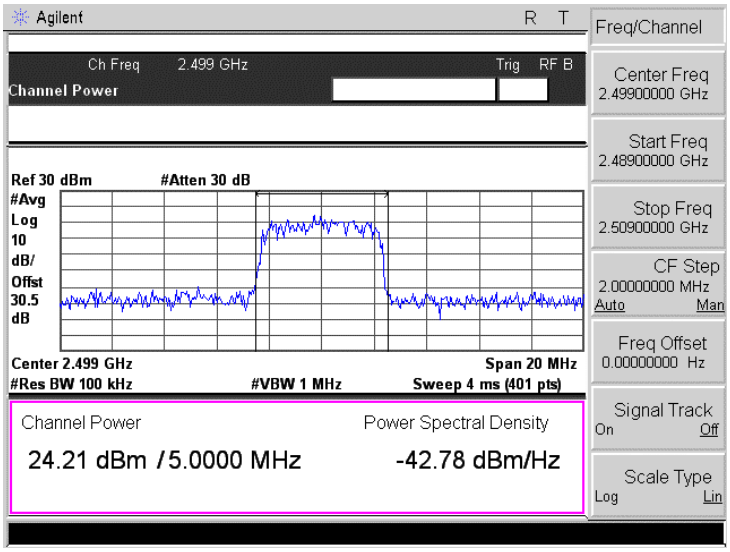


Plot 7.2.8 Peak output power test results at high frequency, 5 MHz, 16QAM (Tx gain = 10)

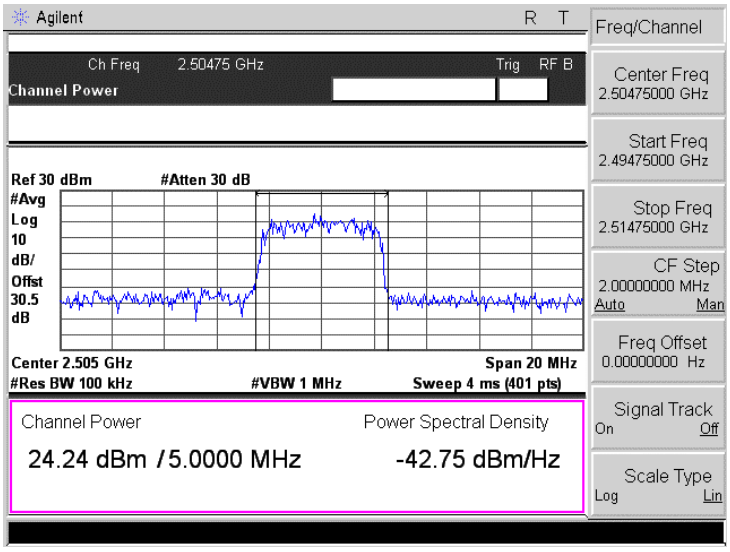


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.9 Peak output power test results at low frequency, 5 MHz, 64QAM (Tx gain = 10)

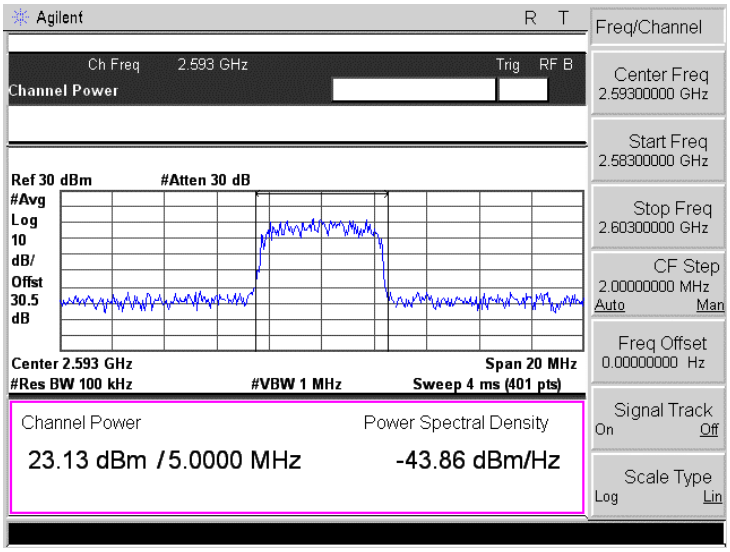


Plot 7.2.10 Peak output power test results at low frequency, 5 MHz ,64QAM (Tx gain = 10) (2504.75 MHz)

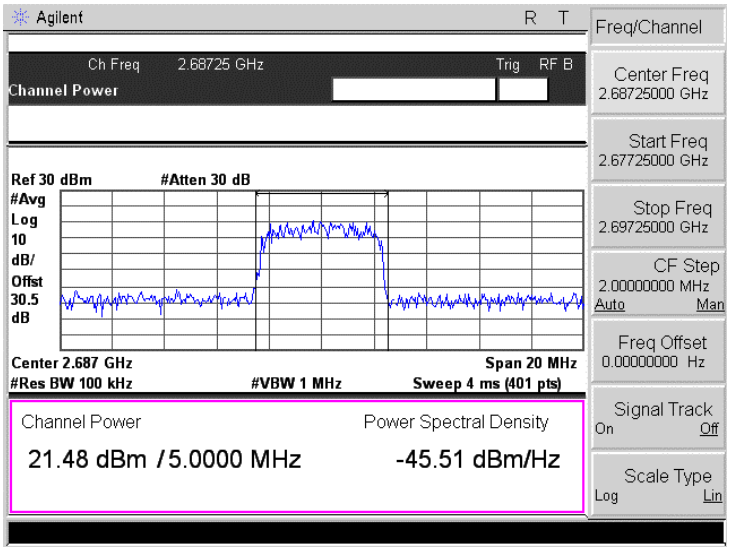


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.11 Peak output power test results at mid frequency, 5 MHz, 64QAM Tx gain = 10)

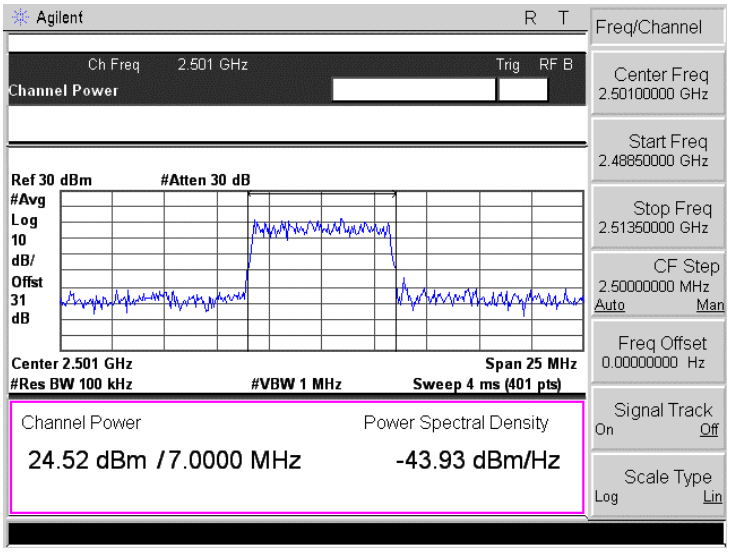


Plot 7.2.12 Peak output power test results at high frequency, 5 MHz, 64QAM (Tx gain = 10)

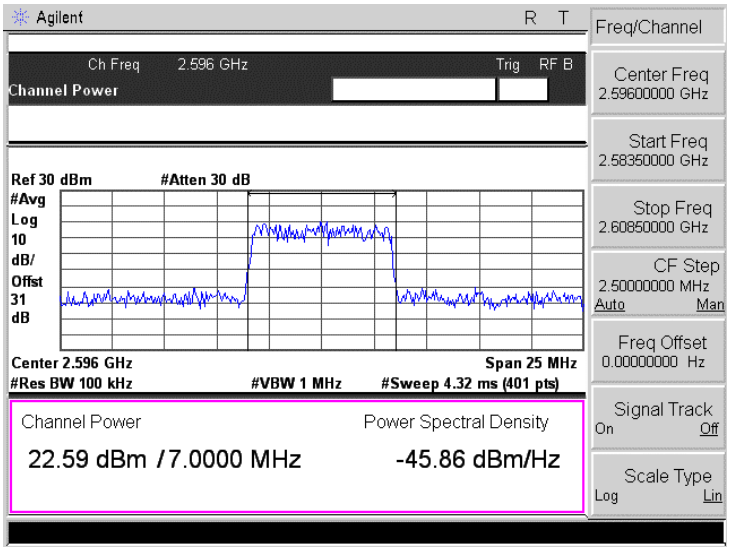


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.13 Peak output power test results at low frequency, 7 MHz, QPSK (Tx gain 10)

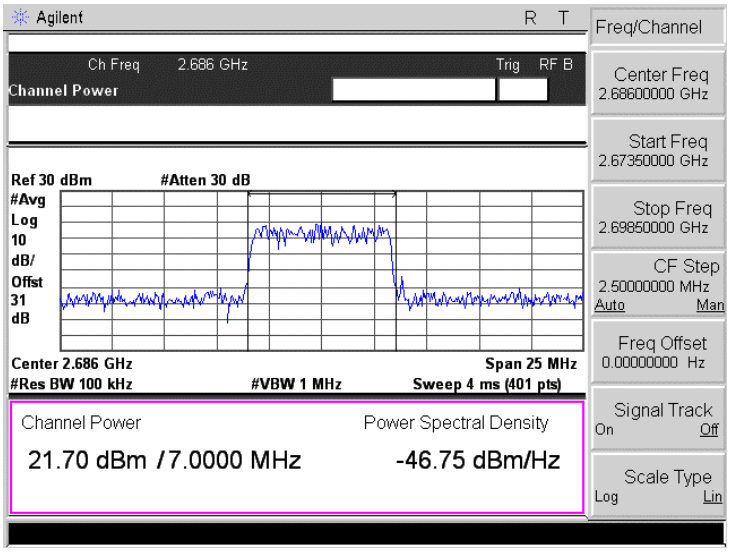


Plot 7.2.14 Peak output power test results at mid frequency, 7 MHz, QPSK (Tx gain 10)

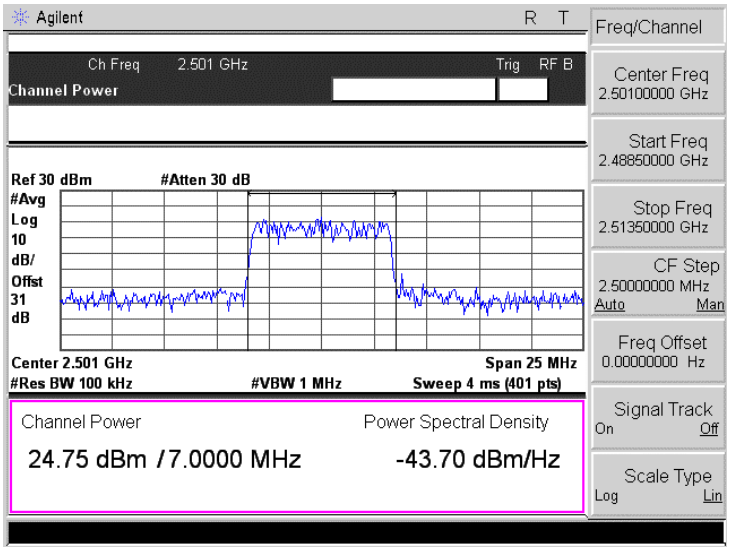


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.15 Peak output power test results at high frequency, 7 MHz, QPSK (Tx gain 10)

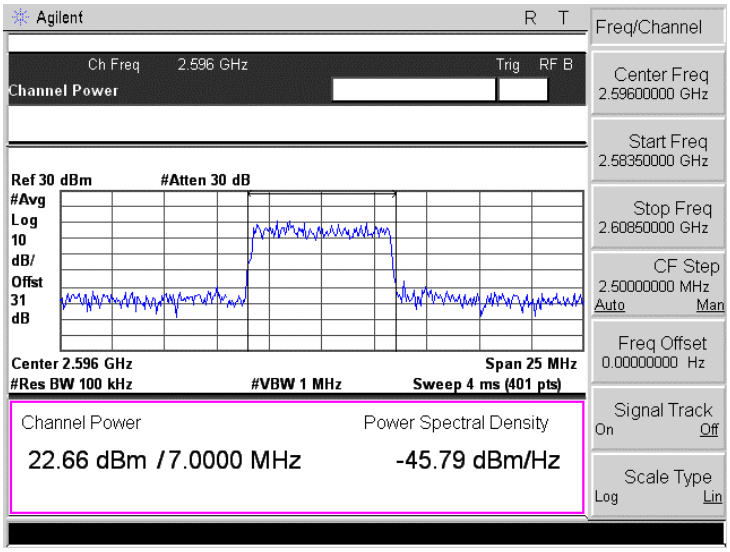


Plot 7.2.16 Peak output power test results at low frequency, 7 MHz, 16QAM (Tx gain 10)

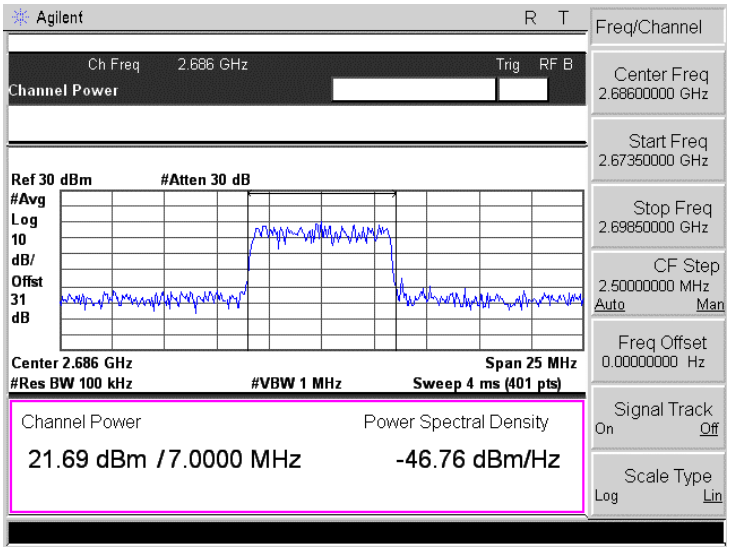


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.17 Peak output power test results at mid frequency, 7 MHz, 16QAM (Tx gain 10)

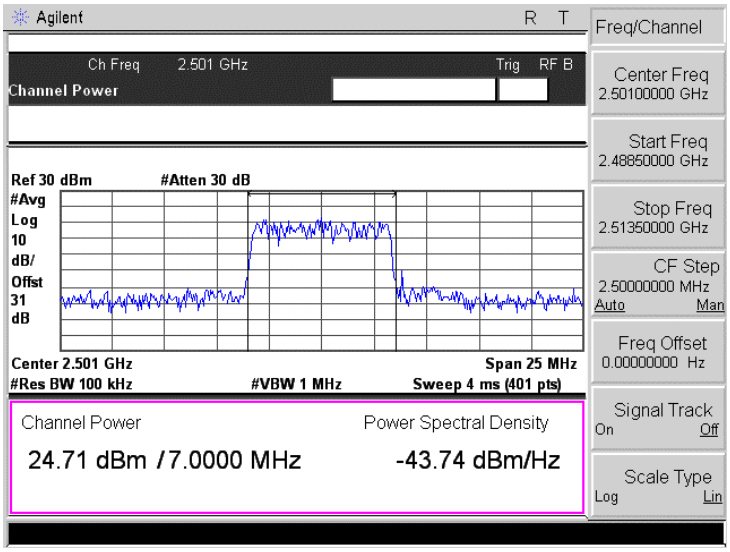


Plot 7.2.18 Peak output power test results at high frequency, 7 MHz, 16QAM (Tx gain 10)

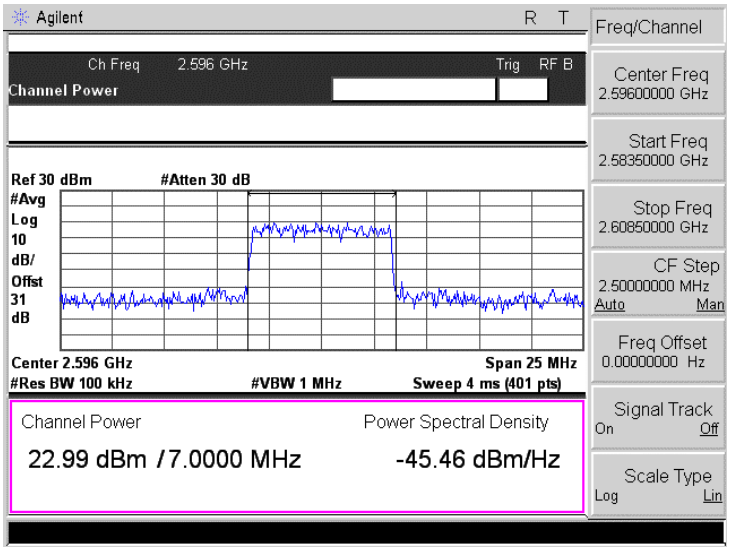


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.19 Peak output power test results at low frequency, 7 MHz, 64QAM (Tx gain 10)

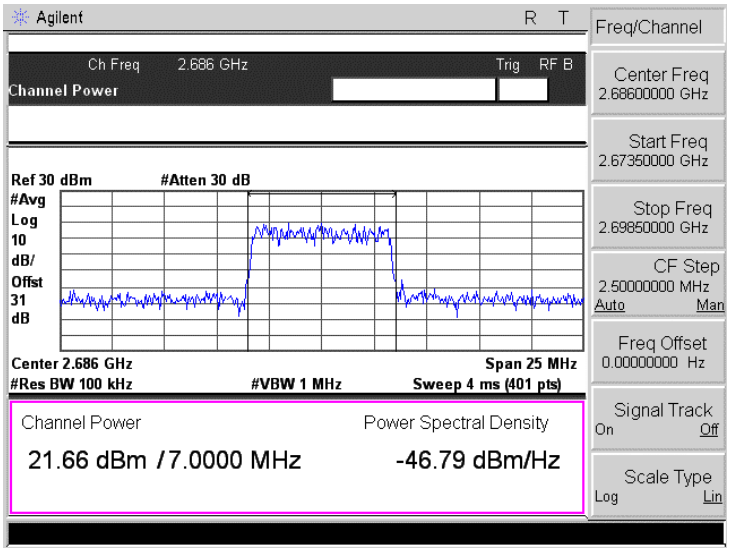


Plot 7.2.20 Peak output power test results at mid frequency, 7 MHz ,64QAM (Tx gain 10)

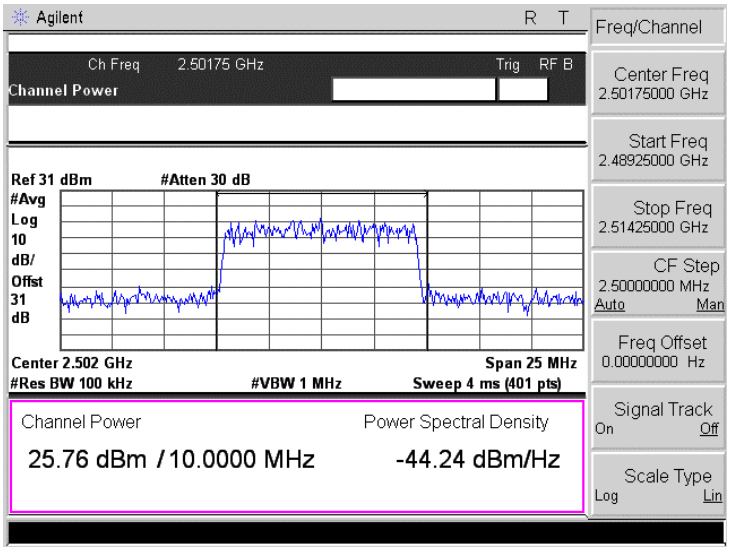


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.21 Peak output power test results at high frequency, 7 MHz, 64QAM (Tx gain 10)

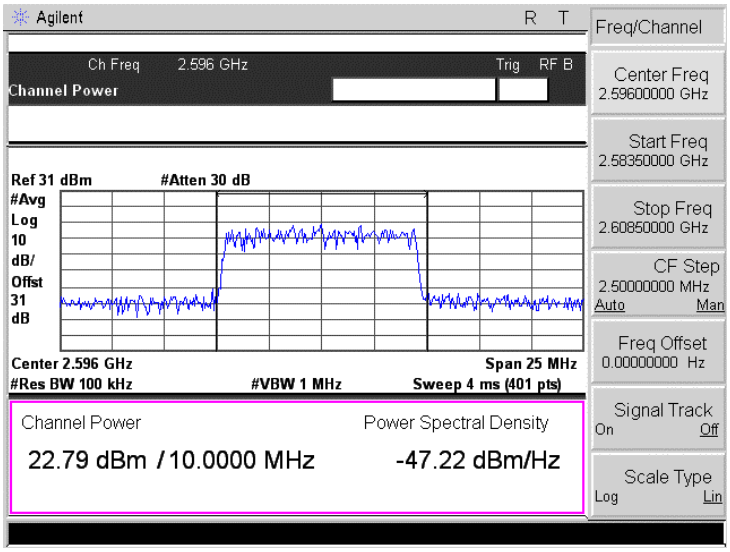


Plot 7.2.22 Peak output power test results at low frequency, 10 MHz, QPSK (Tx gain 11)

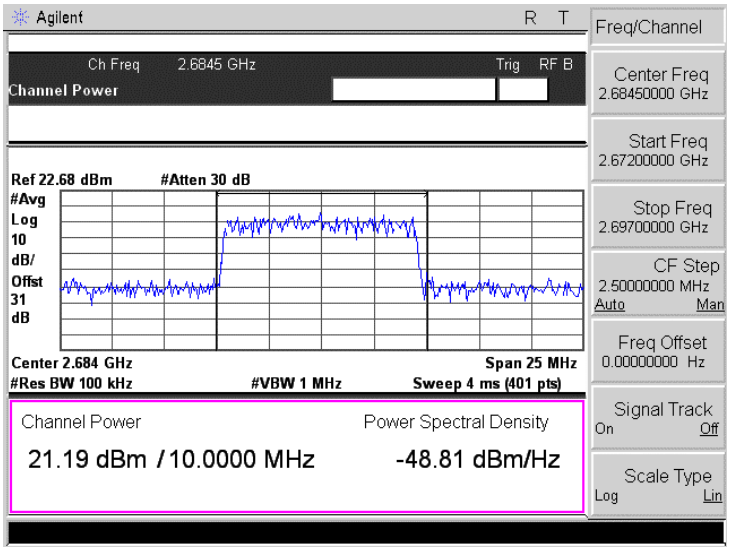


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.23 Peak output power test results at mid frequency, 10 MHz, QPSK (TX gain 11)

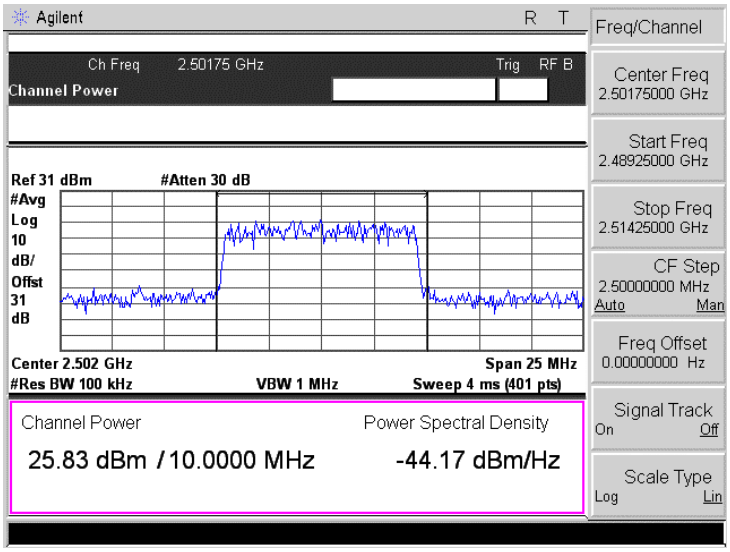


Plot 7.2.24 Peak output power test results at high frequency, 10 MHz, QPSK (TX gain 11)

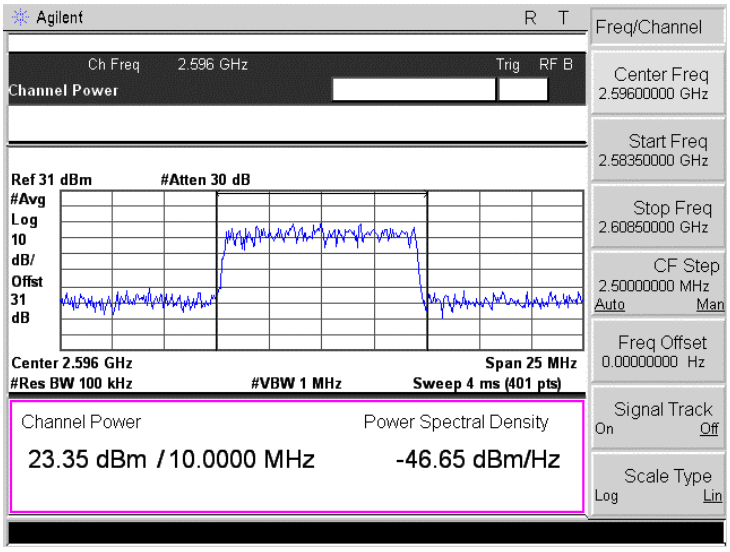


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.25 Peak output power test results at low frequency, 10 MHz, 16QAM (Tx gain 11)

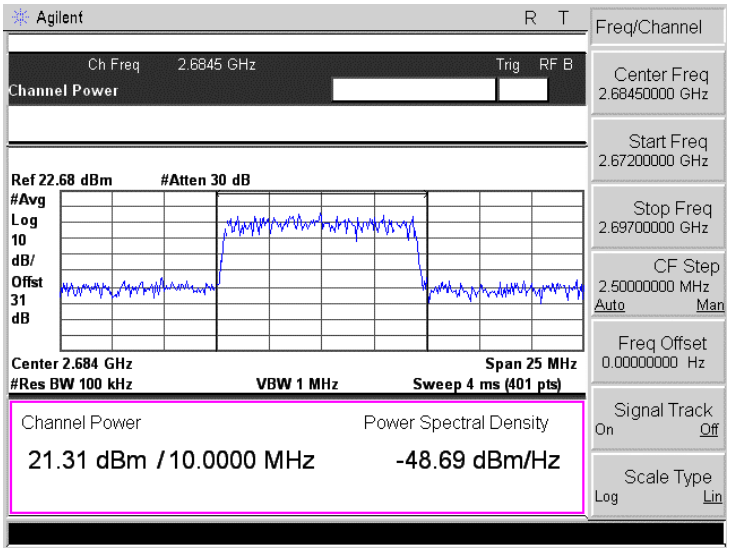


Plot 7.2.26 Peak output power test results at mid frequency, 10 MHz, 16QAM (Tx gain 11)

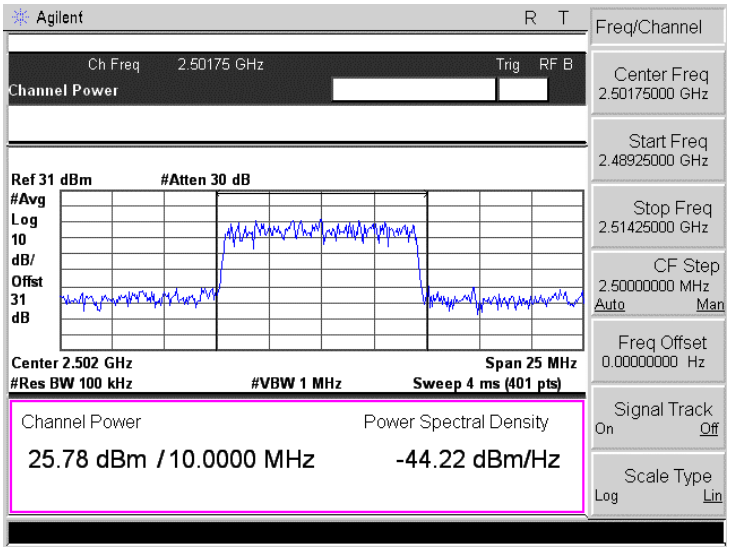


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.27 Peak output power test results at high frequency, 10 MHz, 16QAM (Tx gain 11)

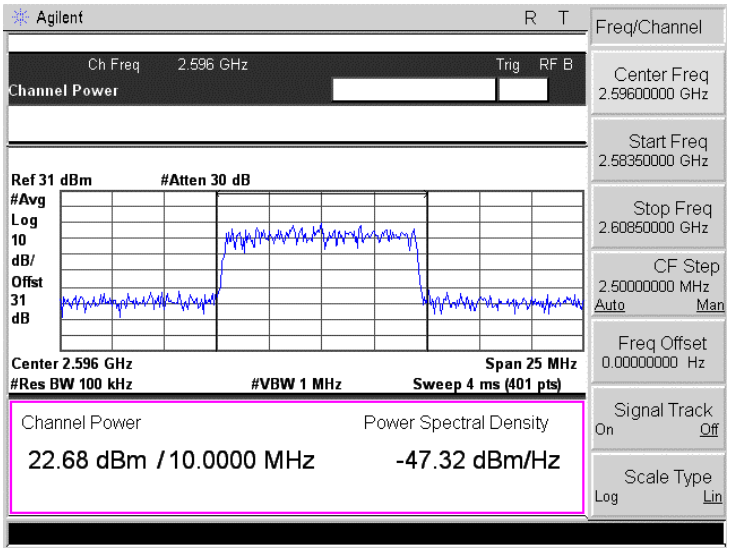


Plot 7.2.28 Peak output power test results at low frequency, 10 MHz, 64QAM (Tx gain 11)

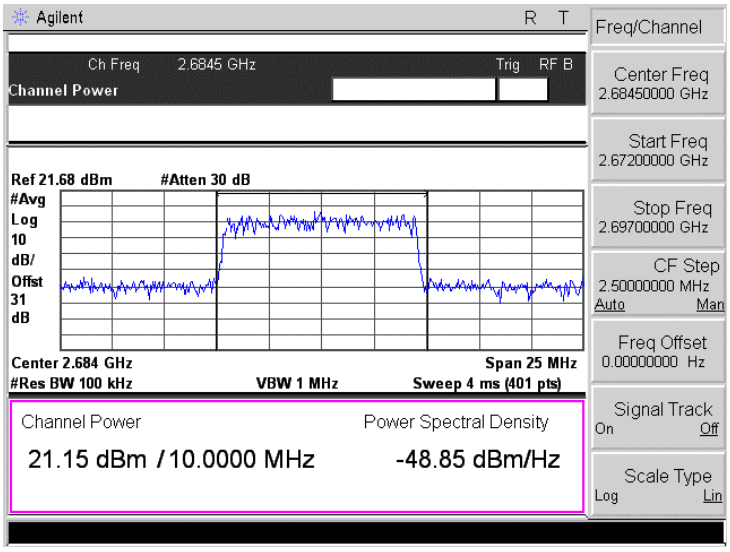


Test specification:	Section 90.205, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 1:49:41 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.2.29 Peak output power test results at mid frequency, 10 MHz, 64QAM (Tx gain 11)



Plot 7.2.30 Peak output power test results at high frequency, 10 MHz, 64QAM (Tx gain 11)



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 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.

Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 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

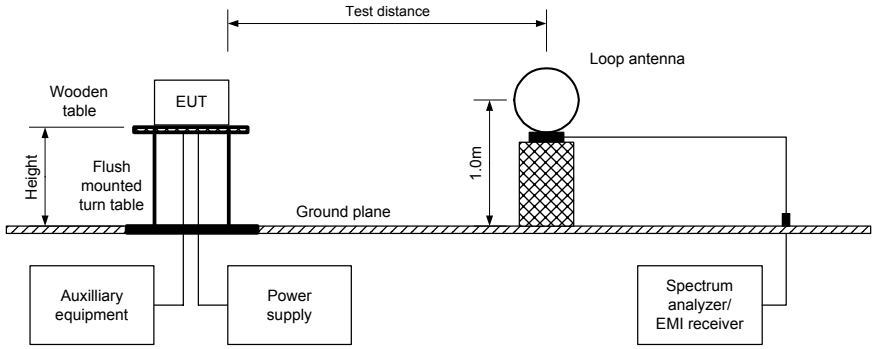
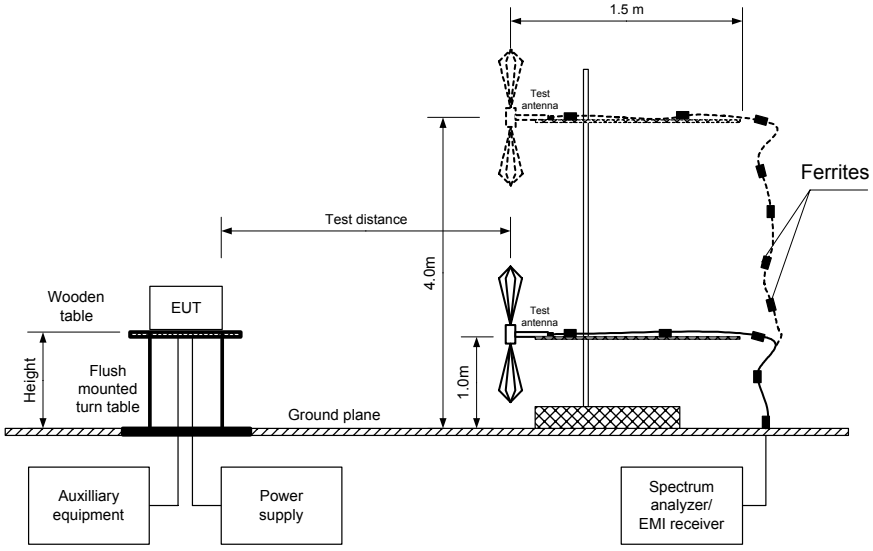


Figure 7.3.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 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:	16QAM
MODULATING SIGNAL:	PRBS
BIT RATE:	12.565 Mbps
TRANSMITTER OUTPUT POWER SETTINGS:	25.01 dBm at low frequency 23.39 dBm at mid frequency 21.44 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							
All emissions were found at least 20 dB below specified limit							
Mid carrier frequency 2593.00 MHz							
All emissions were found at least 20 dB below specified limit							
High carrier frequency 2687.25 MHz							
All emissions were found at least 20 dB below specified limit							

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

Reference numbers of test equipment used

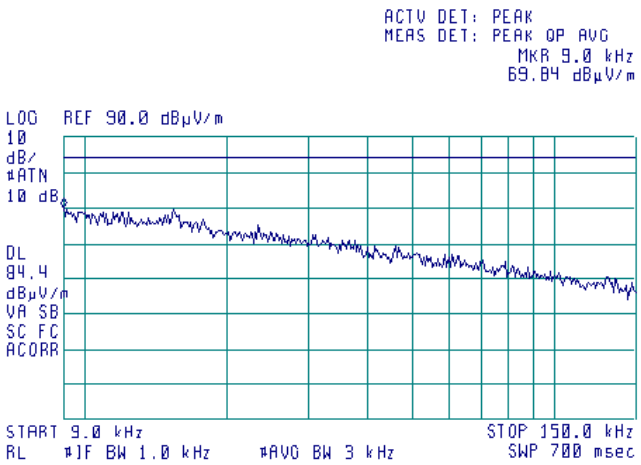
HL 0415	HL 0446	HL 0521	HL 0554	HL 0569	HL 0604	HL 0614	HL 0768
HL 0769	HL 0812	HL 1430	HL 1984	HL 2254	HL 2667	HL 2909	HL 2910
HL 3121	HL 3122	HL 3123	HL 3206	HL 3533	HL 3616		

Full description is given in Appendix A.

Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

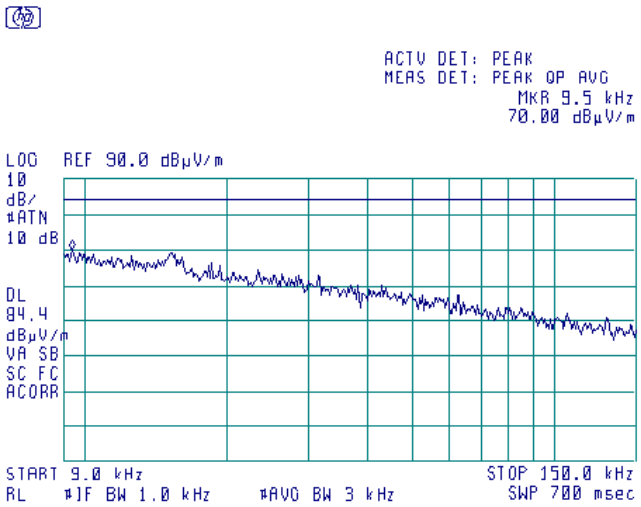
Plot 7.3.1 Radiated emission measurements in 9 - 150 kHz range

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

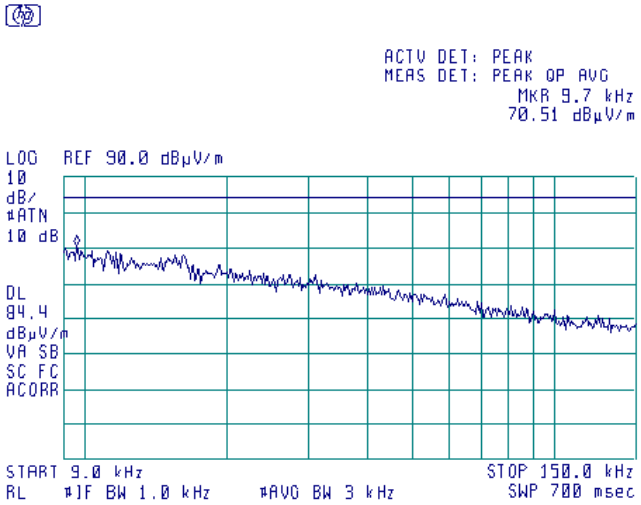
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

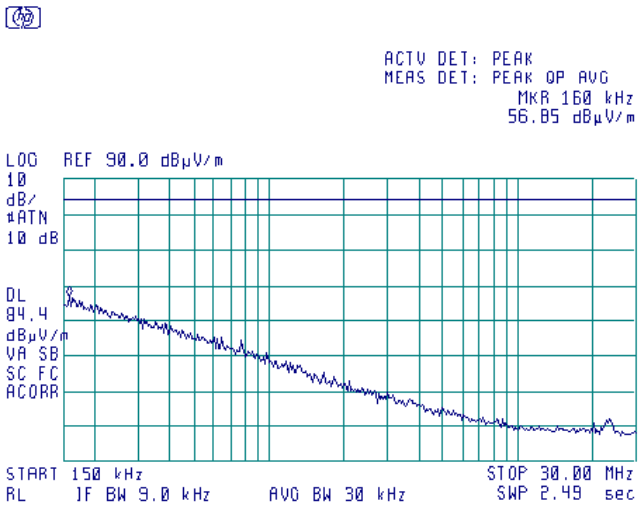
Plot 7.3.3 Radiated emission measurements in 9 - 150 kHz range

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

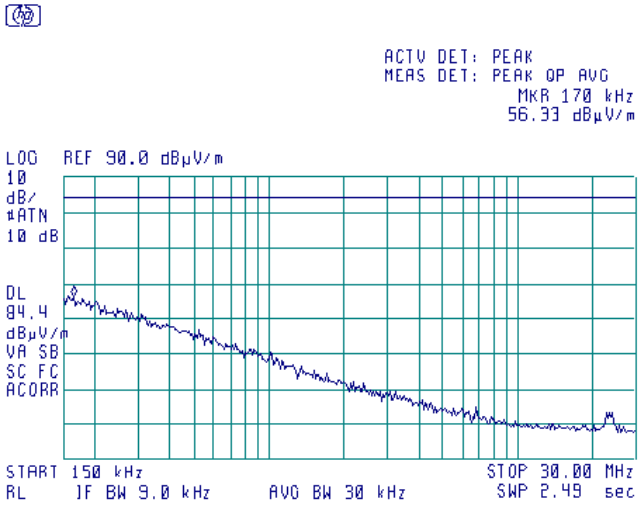
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

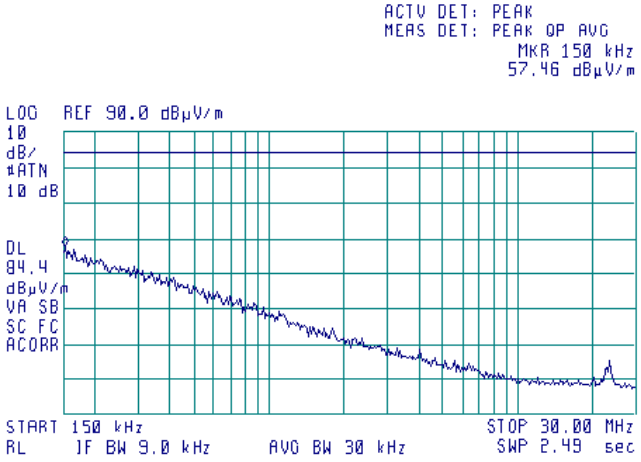
Plot 7.3.5 Radiated emission measurements in 0.15 - 30 MHz range

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

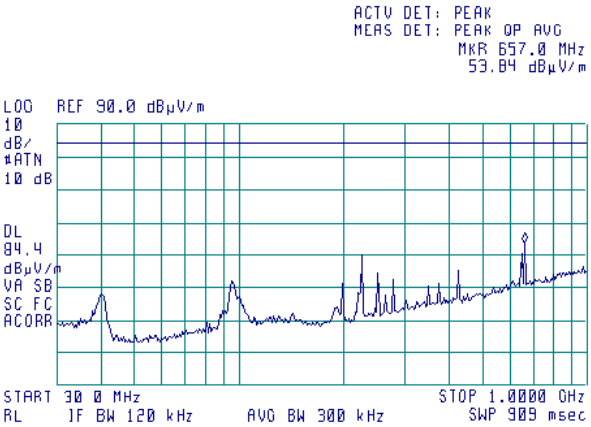
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.3.7 Radiated emission measurements in 30 - 1000 MHz range

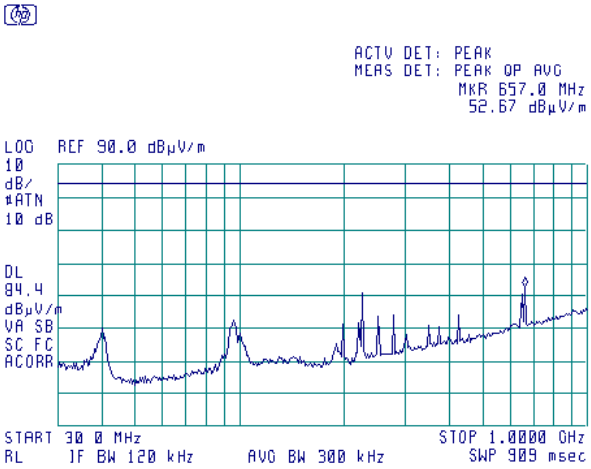
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



All spurious emissions are from digital part of EUT

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

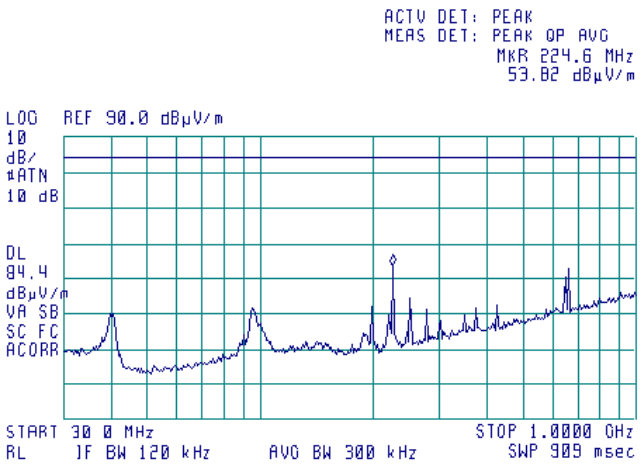


All spurious emissions are from digital part of EUT

Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 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

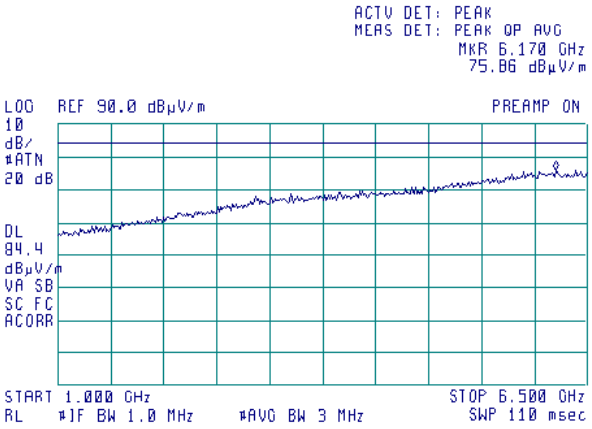


All spurious emissions are from digital part of EUT

Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

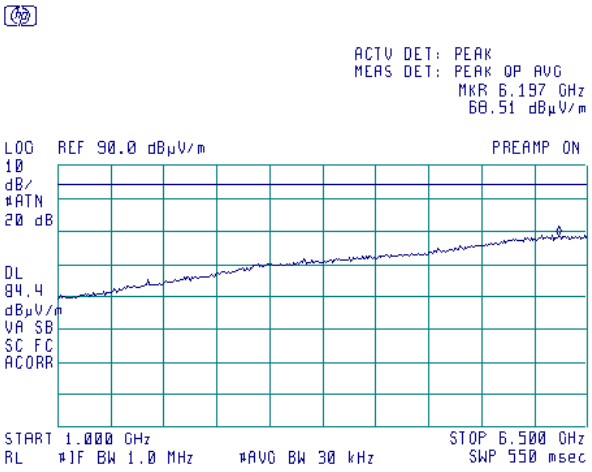
Plot 7.3.10 Radiated emission measurements in 1000 – 6500 MHz range

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



Plot 7.3.11 Radiated emission measurements in 1000 – 6500 MHz range

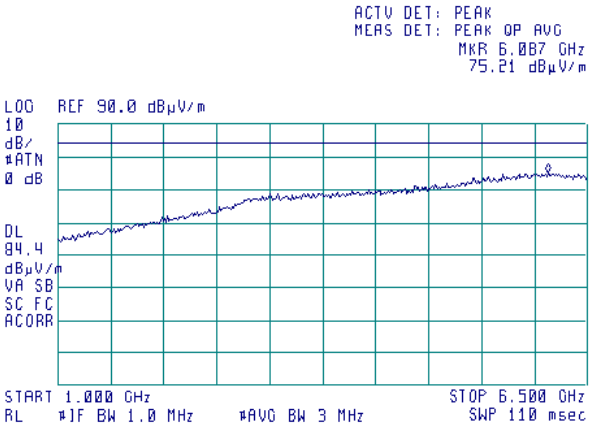
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
VBW:	30 kHz
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

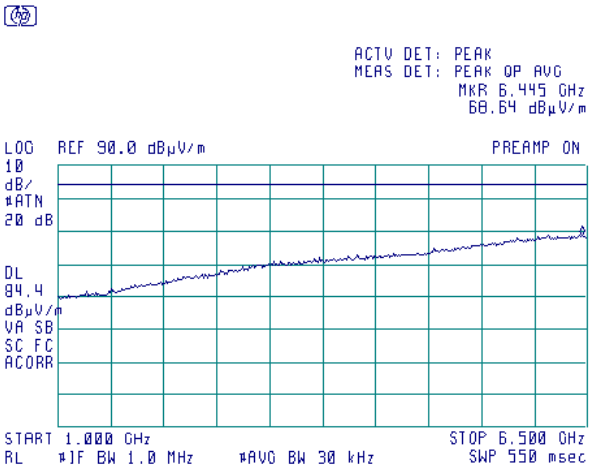
Plot 7.3.12 Radiated emission measurements in 1000 – 6500 MHz range

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



Plot 7.3.13 Radiated emission measurements in 1000 – 6500 MHz range

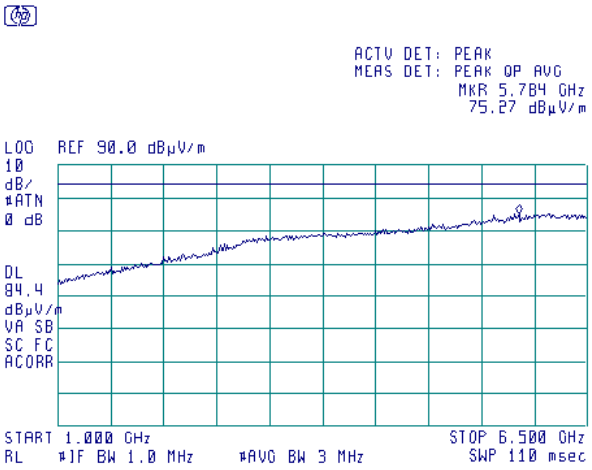
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
VBW:	30 kHz
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

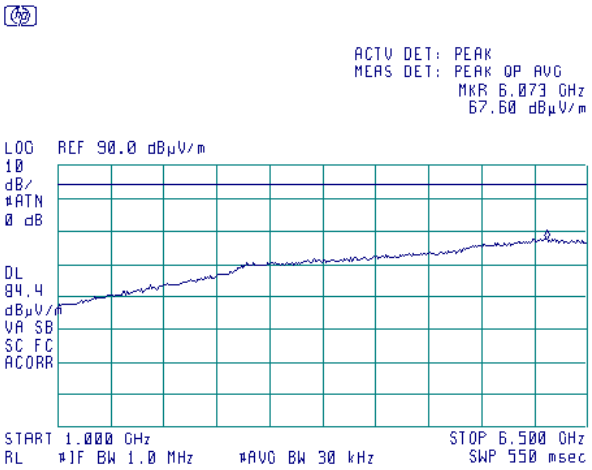
Plot 7.3.14 Radiated emission measurements in 1000 – 6500 MHz range

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



Plot 7.3.15 Radiated emission measurements in 1000 – 6500 MHz range

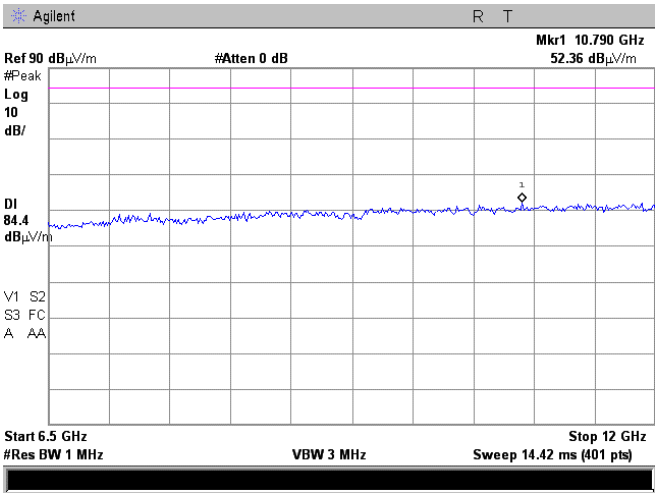
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
VBW:	30 kHz
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

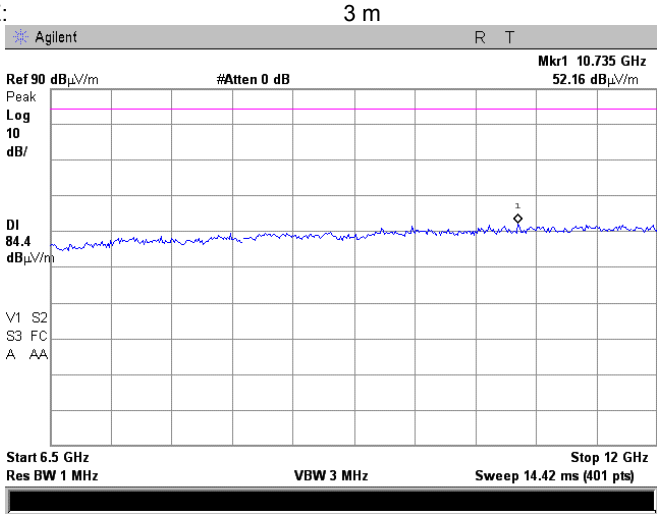
Plot 7.3.16 Radiated emission measurements in 6500 – 12000 MHz range

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



Plot 7.3.17 Radiated emission measurements in 6500 – 12000 MHz range

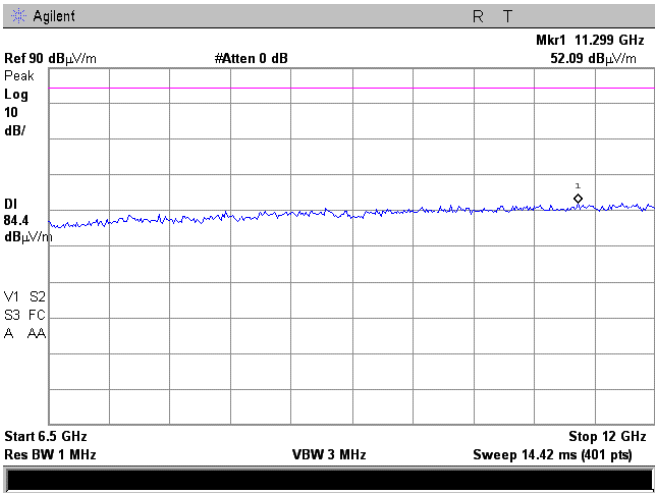
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

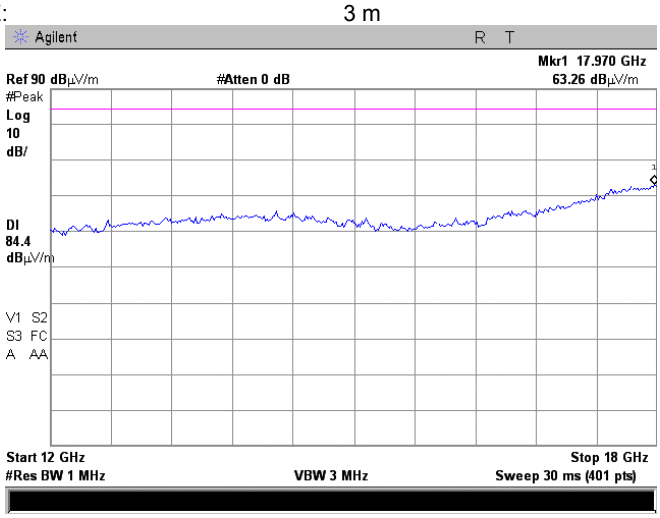
Plot 7.3.18 Radiated emission measurements in 6500 – 12000 MHz range

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



Plot 7.3.19 Radiated emission measurements in 12000 – 18000 MHz range

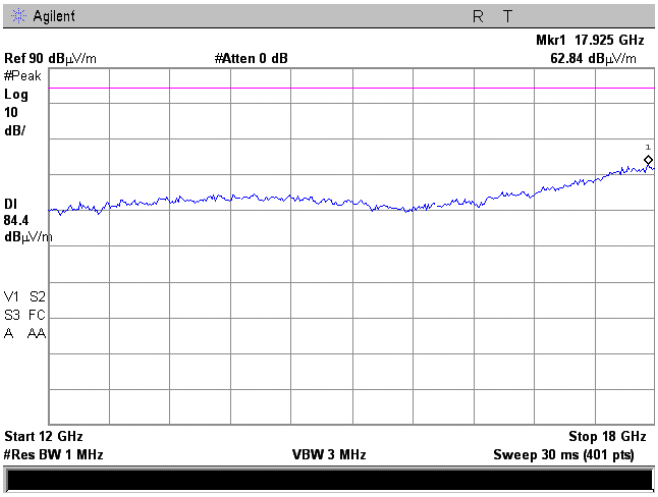
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

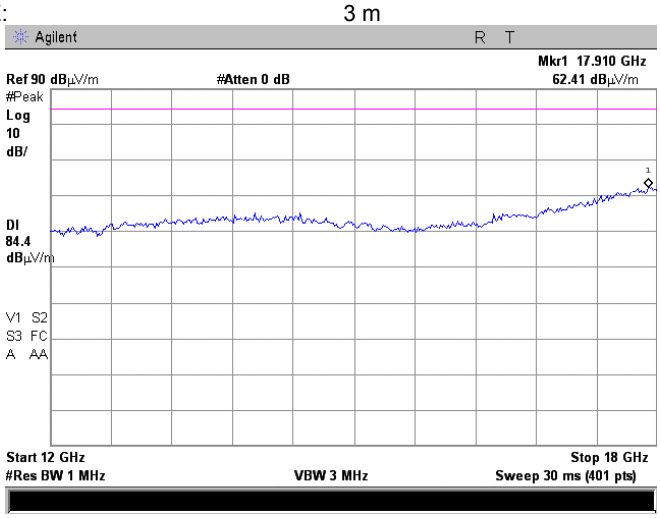
Plot 7.3.20 Radiated emission measurements in 12000 – 18000 MHz range

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



Plot 7.3.21 Radiated emission measurements in 12000 – 18000 MHz range

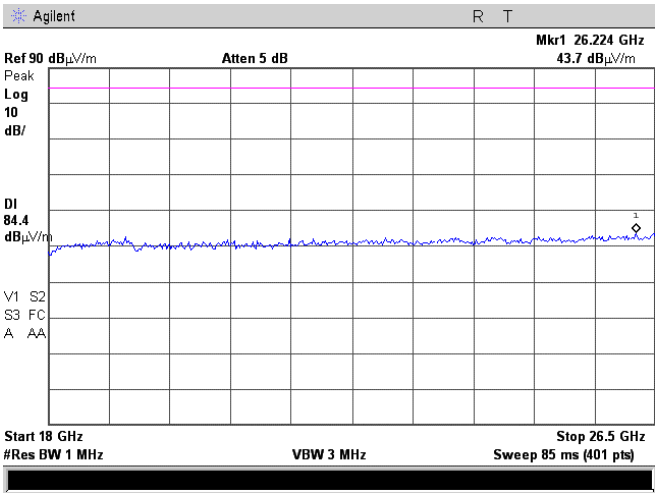
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

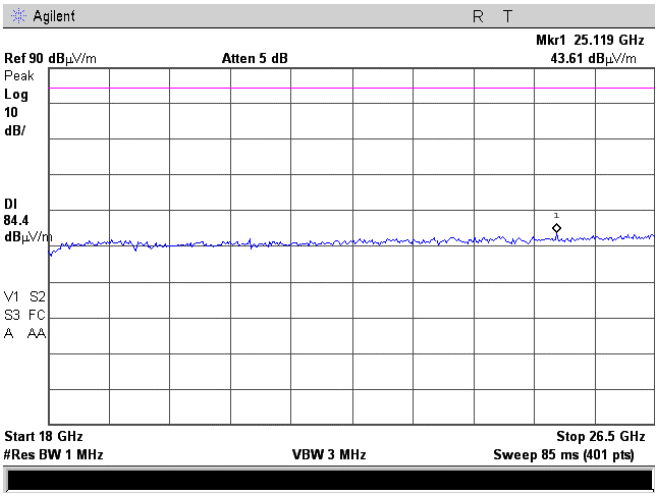
Plot 7.3.22 Radiated emission measurements in 18000 – 26500 MHz range

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



Plot 7.3.23 Radiated emission measurements in 18000 – 26500 MHz range

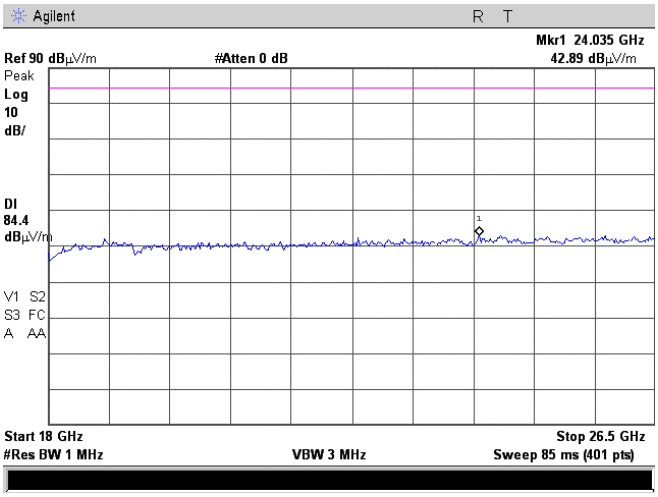
TEST SITE: OATS
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 90.210, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/22/2008 2:37:04 PM		
Temperature: 22ºC	Air Pressure: 1014 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

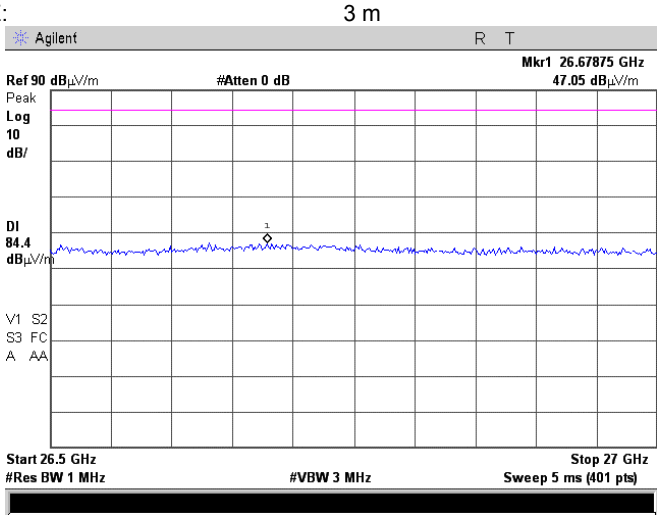
Plot 7.3.24 Radiated emission measurements in 18000 – 26500 MHz range

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



Plot 7.3.25 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 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	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. The test results are provided in Table 7.4.2 and associated plots.

Table 7.4.1 Spurious emission limits

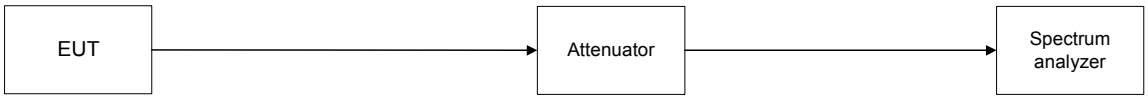
Frequency, MHz	Attenuation below carrier, dBc	ERP of spurious, dBm
0.009 – 10th harmonic*	43+10logP*	-13.0

* - 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 and associated plots.

Figure 7.4.1 Spurious emission test setup



Test specification:	**Section 90.210, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 48 %	**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
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								
2495.0000	-23.36	Included	Included	100	-23.36	-23.0	-0.36	Pass
2494.7000	-31.39	Included	Included	30	-31.39	-28.23	-3.16	Pass
2495.8450	-20.74	Included	Included	100	-20.74	-13.0	-7.74	Pass
2502.1000	-20.24	Included	Included	100	-20.24	-13.0	-7.24	Pass
2503.2800	-23.98	Included	Included	100	-23.98	-23.0	-0.98	Pass
Low carrier frequency (2504.75 MHz)								
2500.8075	-24.09	Included	Included	100	-24.09	-23.0	-1.09	Pass
2501.0000	-30.67	Included	Included	30	-30.67	-28.23	-2.44	Pass
2501.6500	-20.83	Included	Included	100	-20.83	-13.0	-7.83	Pass
2507.5075	-19.21	Included	Included	100	-19.21	-13.0	-6.21	Pass
2508.6010	-25.16	Included	Included	100	-25.16	-23.0	-2.16	Pass
Mid carrier frequency								
2588.8875	-21.52	Included	Included	300	-21.52	-18.23	-3.29	Pass
2589.6400	-27.89	Included	Included	100	-27.89	-13.0	-14.89	Pass
2596.0000	-22.02	Included	Included	100	-22.02	-13.0	-9.02	Pass
2597.0000	-27.57	Included	Included	100	-27.57	-23.0	-4.57	Pass
High carrier frequency								
2683.5000	-23.82	Included	Included	300	-23.82	-18.23	-5.59	Pass
2684.5000	-26.24	Included	Included	100	-26.24	-13.0	-13.24	Pass
2690.0025	-20.83	Included	Included	100	-20.83	-13.0	-7.83	Pass
2691.0000	-27.82	Included	Included	100	-27.82	-13.0	-14.82	Pass

*- Margin = Spurious emission – specification limit.

Test specification:	**Section 90.210, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 48 %	**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
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								
2495.0000	-24.90	Included	Included	100	-24.90	-23.0	-1.9	Pass
2495.9100	-21.98	Included	Included	100	-21.98	-13.0	-8.98	Pass
2502.0025	-20.48	Included	Included	100	-20.48	-13.0	-7.48	Pass
2503.3325	-24.49	Included	Included	100	-24.49	-23.0	-1.49	Pass
Low carrier frequency (2504.75 MHz)								
2499.9825	-23.91	Included	Included	100	-23.91	-23.0	-0.91	Pass
2500.8800	-29.82	Included	Included	30	-29.82	-28.23	-1.59	Pass
2501.7350	-21.39	Included	Included	100	-21.39	-13.0	-8.39	Pass
2507.5000	-18.61	Included	Included	100	-18.61	-13.0	-5.61	Pass
2509.0290	-25.01	Included	Included	100	-25.01	-23.0	-2.01	
Mid carrier frequency								
2589.0000	-27.16	Included	Included	100	-27.16	-23.0	-4.16	Pass
2589.6725	-24.40	Included	Included	100	-24.40	-13.0	-11.4	Pass
2596.0000	-21.09	Included	Included	100	-21.09	-13.0	-8.09	Pass
2597.0000	-26.67	Included	Included	100	-26.67	-23.0	-3.67	Pass
High carrier frequency								
2683.5000	-24.01	Included	Included	100	-24.01	-23.0	-1.01	Pass
2684.5000	-26.17	Included	Included	100	-26.17	-13.0	-13.17	Pass
2690.0075	-20.92	Included	Included	100	-20.92	-13.0	-7.92	Pass
2691.0000	-27.99	Included	Included	100	-27.99	-23.0	-4.99	Pass

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

Test specification:	**Section 90.210, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 48 %	**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
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								
2494.9875	-24.10	Included	Included	100	-24.10	-23.0	-1.1	Pass
2495.9800	-21.24	Included	Included	100	-21.24	-13.0	-8.24	Pass
2502.0050	-20.75	Included	Included	100	-20.75	-13.0	-7.75	Pass
2503.2800	-24.97	Included	Included	100	-24.97	-23.0	-1.97	Pass
Low carrier frequency (2504.75 MHz)								
2500.7800	-24.20	Included	Included	100	-24.20	-23.0	-1.2	Pass
2501.7200	-20.98	Included	Included	100	-20.98	-13.0	-7.98	Pass
2507.5000	-18.60	Included	Included	100	-18.60	-13.0	-5.6	Pass
2508.6910	-25.18	Included	Included	100	-25.18	-23.0	-2.18	Pass
Mid carrier frequency								
2589.0000	-27.72	Included	Included	100	-27.72	-23.0	-4.72	Pass
2589.8125	-24.74	Included	Included	100	-24.74	-13.0	-11.74	Pass
2596.0000	-21.12	Included	Included	100	-21.12	-13.0	-8.12	Pass
2597.0000	-26.57	Included	Included	100	-26.57	-23.0	-3.57	Pass
High carrier frequency								
2683.4730	-24.18	Included	Included	100	-24.18	-23.0	-1.18	Pass
2684.4975	-26.54	Included	Included	100	-26.54	-13.0	-13.54	Pass
2690.0175	-21.22	Included	Included	100	-21.22	-13.0	-8.22	Pass
2691.0000	-27.79	Included	Included	100	-27.79	-23.0	-4.79	Pass

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

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	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 – 27000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: QPSK
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
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								
2494.8125	-23.69	Included	Included	100	-23.69	-23.00	-0.69	Pass
2494.8125	-31.50	Included	Included	30	-31.50	-28.23	-3.27	Pass
2495.9825	-21.52	Included	Included	100	-21.52	-13.00	-8.52	Pass
2507.7550	-25.74	Included	Included	100	-25.74	-13.00	-12.74	Pass
2508.5860	-26.94			100	-26.94	-23.00	-3.94	
Mid carrier frequency								
2589.0000	-16.14	Included	Included	1000	-16.14	-13.00	-3.14	Pass
2589.8150	-30.11	Included	Included	100	-30.11	-13.00	-17.11	Pass
2602.0000	-30.32	Included	Included	100	-30.32	-13.00	-17.32	Pass
2603.0525	-15.40	Included	Included	1000	-15.40	-13.00	-2.4	Pass
High carrier frequency								
2677.7400	-22.62	Included	Included	1000	-22.62	-13.00	-9.62	Pass
2690.0000	-22.26	Included	Included	100	-22.26	-13.00	-9.26	Pass
2691.0225	-23.24	Included	Included	300	-23.24	-18.23	-5.01	Pass

*- Margin = Spurious emission – specification limit.

Test specification:	**Section 90.210, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 48 %	**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 – 27000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
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								
2494.8250	-23.97	Included	Included	100	-23.97	-23.00	-0.97	Pass
2494.8000	-31.62	Included	Included	30	-31.62	-28.23	-3.39	Pass
2495.9800	-21.90	Included	Included	100	-21.90	-13.00	-8.90	Pass
2507.7475	-25.93	Included	Included	100	-25.93	-13.00	-12.93	Pass
2508.5860	-28.14	Included	Included	100	-28.14	-23.00	-5.14	
Mid carrier frequency								
2589.0000	-16.04	Included	Included	1000	-16.04	-13.00	-3.04	Pass
2589.8200	-30.23	Included	Included	100	-30.23	-13.00	-17.23	Pass
2602.0350	-30.06	Included	Included	100	-30.06	-13.00	-17.06	Pass
2603.0175	-15.55	Included	Included	1000	-15.55	-13.00	-2.55	Pass
High carrier frequency								
2679.0000	-20.61	Included	Included	1000	-20.61	-13.0	-7.61	Pass
2690.0025	-22.00	Included	Included	100	-22.00	-13.0	-9.00	Pass
2691.0000	-23.11	Included	Included	300	-23.11	-18.23	-4.88	Pass

*- Margin = Spurious emission – specification limit.

Test specification:	**Section 90.210, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 48 %	**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 – 27000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
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								
2494.7875	-23.54	Included	Included	100	-23.54	-23.00	-10.54	Pass
2495.0000	-31.68	Included	Included	30	-31.68	-28.23	-18.68	Pass
2495.9850	-21.92	Included	Included	100	-21.92	-13.00	-3.69	Pass
2507.7625	-25.99	Included	Included	100	-25.99	-13.00	-12.99	Pass
2508.5290	-28.16	Included	Included	100	-28.16	-23.00	-5.16	Pass
Mid carrier frequency								
2589.0000	-16.30	Included	Included	1000	-16.30	-13.00	-3.3	Pass
2589.9750	-30.35	Included	Included	100	-30.35	-13.00	-17.35	Pass
2602.0300	-30.19	Included	Included	100	-30.19	-13.00	-11.96	Pass
2603.0875	-15.33	Included	Included	1000	-15.33	-13.00	-2.33	Pass
High carrier frequency								
2679.0000	-20.55	Included	Included	1000	-20.55	-13.00	-7.55	Pass
2690.0000	-22.10	Included	Included	100	-22.10	-13.00	-9.10	Pass
2691.0000	-23.16	Included	Included	300	-23.16	-18.23	-4.93	Pass

*- Margin = Spurious emission – specification limit.

Test specification:	**Section 90.210, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 48 %	**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 – 27000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: QPSK
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
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								
2493.8000	-25.29	Included	Included	100	-25.29	-23.00	-2.29	Pass
2495.9900	-24.80	Included	Included	100	-24.80	-13.00	-11.8	Pass
2508.3750	-24.18	Included	Included	100	-24.18	-13.00	-11.18	Pass
2510.4550	-26.29	Included	Included	100	-26.29	-23.00	-3.29	Pass
Mid carrier frequency								
2588.1000	-31.49	Included	Included	100	-31.49	-23.00	-8.49	Pass
2589.0625	-30.69	Included	Included	100	-30.69	-13.00	-17.69	Pass
2602.6400	-31.37	Included	Included	100	-31.37	-13.00	-18.37	Pass
2603.0525	-24.25	Included	Included	300	-24.25	-18.23	-6.02	Pass
High carrier frequency								
2677.9800	-23.70	Included	Included	300	-23.70	-18.23	-5.47	Pass
2678.9975	-19.82	Included	Included	100	-19.82	-13.00	-6.82	Pass
2690.0000	-19.59	Included	Included	100	-19.59	-13.00	-6.59	Pass
2691.2025	-28.44	Included	Included	300	-28.44	-18.23	-10.21	Pass

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

Test specification:	**Section 90.210, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 48 %	**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 – 27000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
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								
2493.8500	-24.57	Included	Included	100	-24.57	-23.00	-1.57	Pass
2495.9925	-24.43	Included	Included	100	-24.43	-13.00	-11.43	Pass
2508.3725	-24.09	Included	Included	100	-24.09	-13.00	-11.09	Pass
2510.4550	-25.51	Included	Included	100	-25.51	-23.00	-2.51	Pass
Mid carrier frequency								
2588.7300	-25.75	Included	Included	300	-25.75	-18.23	-7.52	Pass
2589.9450	-30.73	Included	Included	100	-30.73	-13.00	-17.73	Pass
2602.6575	-31.04	Included	Included	100	-31.04	-13.00	-18.04	Pass
2603.1400	-26.08	Included	Included	300	-26.08	-18.23	-7.85	Pass
High carrier frequency								
2678.0000	-24.04	Included	Included	300	-24.04	-18.23	-5.81	Pass
2679.0000	-19.71	Included	Included	100	-19.71	-13.00	-6.71	Pass
2690.0025	-19.29	Included	Included	100	-19.29	-13.00	-6.29	Pass
2691.1575	-28.57	Included	Included	300	-28.57	-18.23	-10.34	Pass

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

Test specification:	**Section 90.210, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 48 %	**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 – 27000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
BIT RATE: 18.85 Mbps
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								
2493.8125	-25.02	Included	Included	100	-25.02	-23.00	-2.02	Pass
2495.9900	-24.59	Included	Included	100	-24.59	-13.00	-11.59	Pass
2508.3550	-24.62	Included	Included	100	-24.62	-13.00	-11.62	Pass
2510.4260	-26.26	Included	Included	100	-26.26	-23.00	-3.26	Pass
Mid carrier frequency								
2588.6850	-26.23	Included	Included	300	-26.23	-18.23	-8.00	Pass
2589.9900	-30.65	Included	Included	100	-30.65	-13.00	-17.65	Pass
2602.6275	-31.22	Included	Included	100	-31.22	-13.00	-18.22	Pass
2603.0700	-25.72	Included	Included	300	-25.72	-18.23	-7.49	Pass
High carrier frequency								
2677.9800	-23.84	Included	Included	300	-23.84	-18.23	-5.61	Pass
2679.0000	-19.79	Included	Included	100	-19.79	-13.00	-6.79	Pass
2690.0025	-18.97	Included	Included	100	-18.97	-13.00	-5.97	Pass
2691.1800	-28.56	Included	Included	300	-28.56	-18.23	-10.33	Pass

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

NOTE: Spurious emissions were tested under 5 MHz channel bandwidth and 16QAM modulation as setting that produces maximum output power spectral density. However spurious emissions at near edges of channels were tested under each channel bandwidth and modulation.

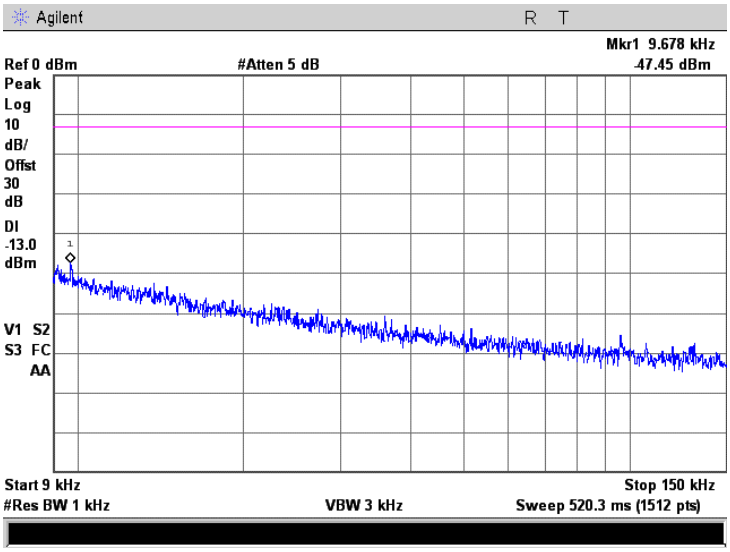
Reference numbers of test equipment used

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

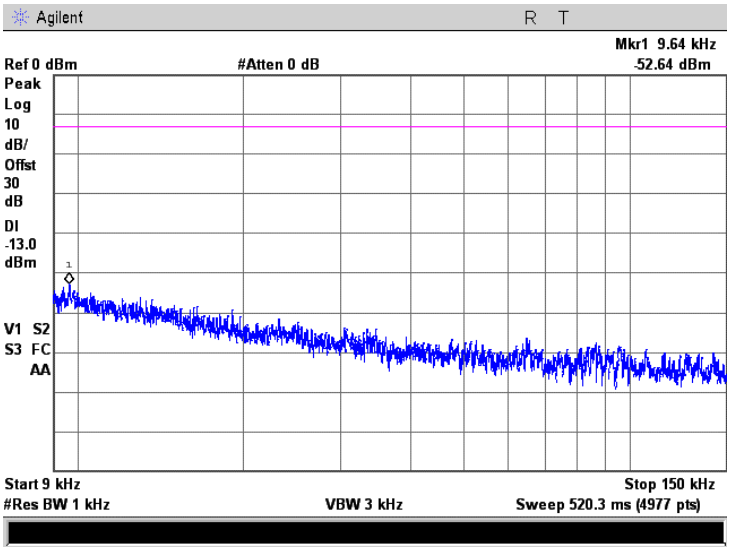
Full description is given in Appendix A.

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency (5MHz BW 16QAM)

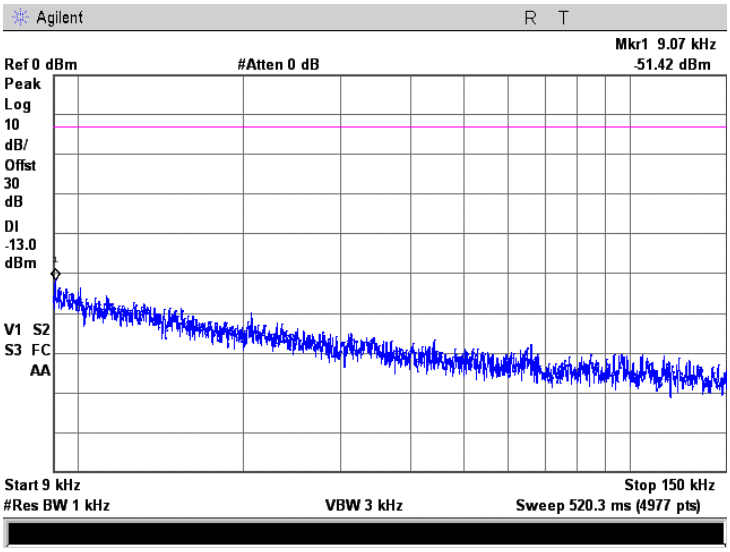


Plot 7.4.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency (5MHz BW 16QAM)

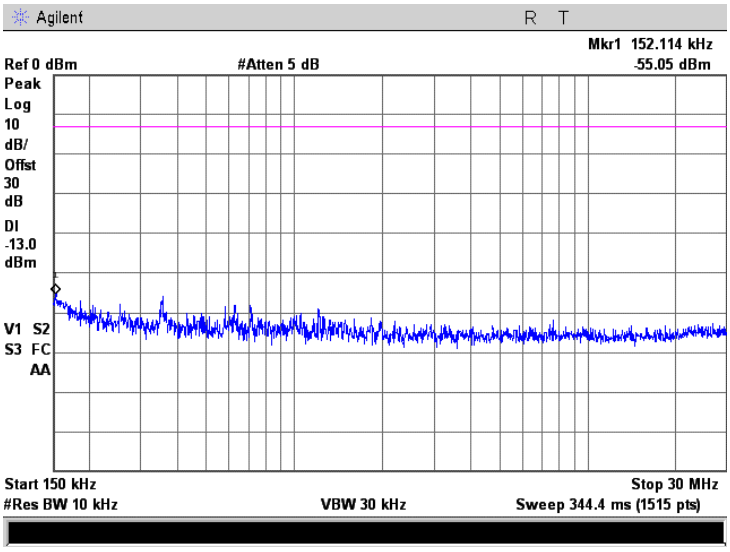


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency (5MHz BW 16QAM)

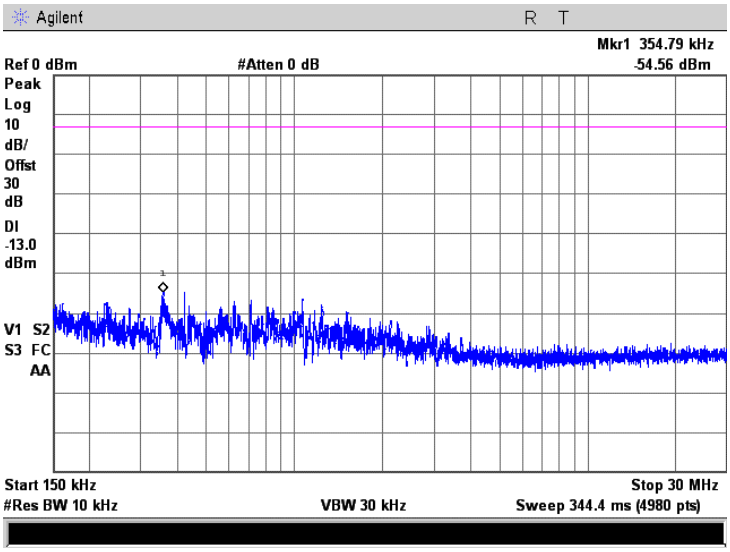


Plot 7.4.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency (5MHz BW 16QAM)

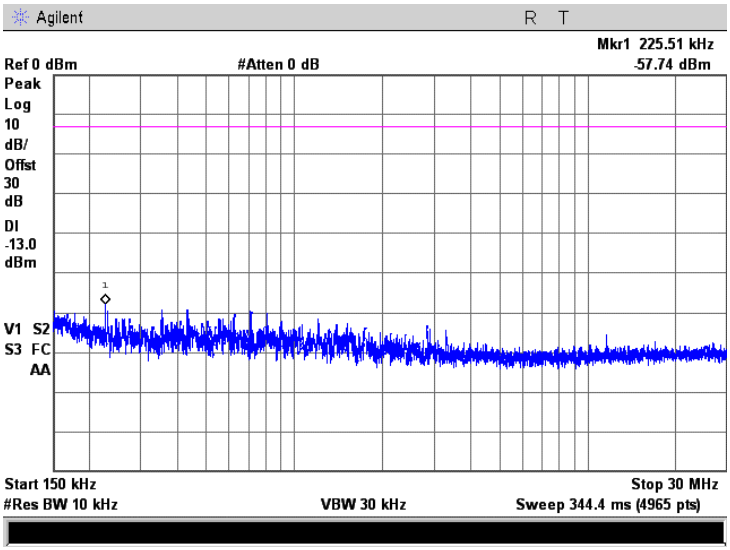


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.5 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency (5MHz BW 16QAM)

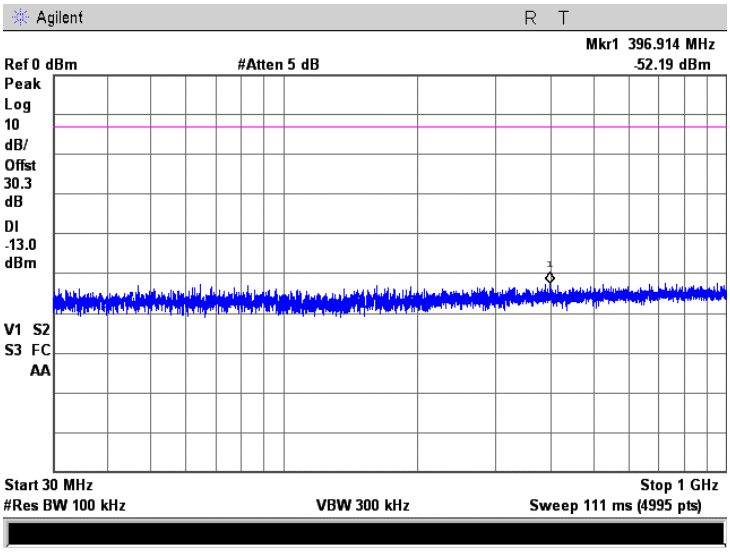


Plot 7.4.6 Spurious emission measurements in 0.15 – 30.0 MHz range at high carrier frequency (5MHz BW 16QAM)

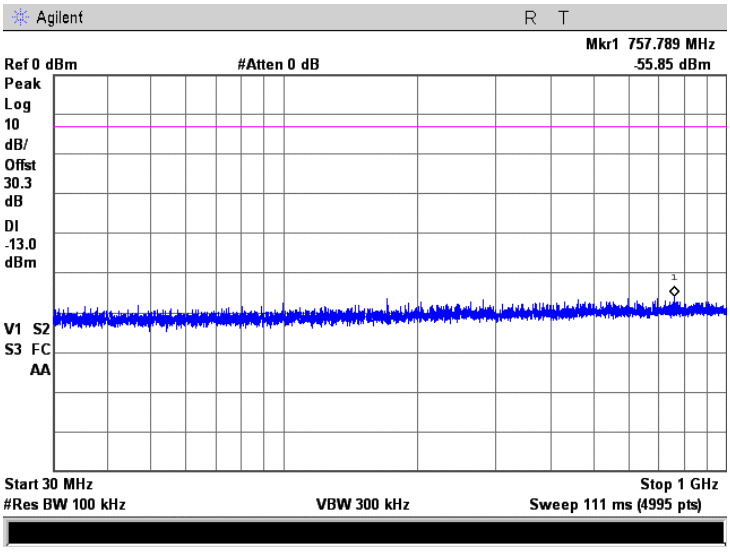


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.7 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency (5MHz BW 16QAM)

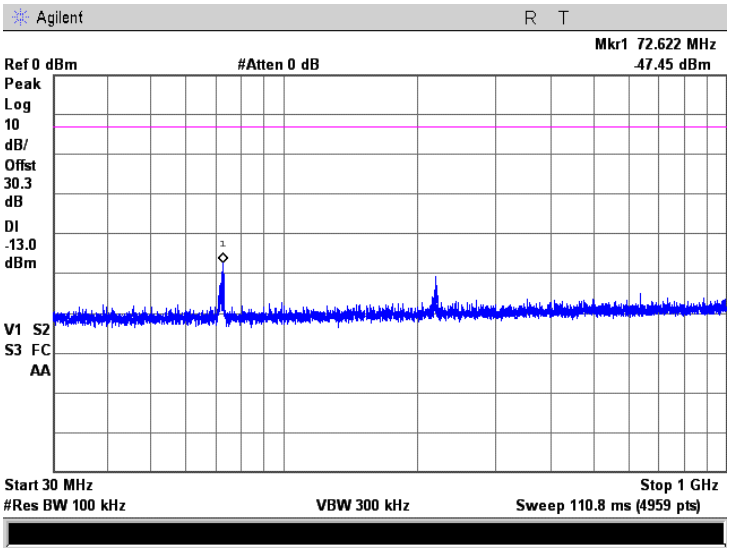


Plot 7.4.8 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency (5MHz BW 16QAM)

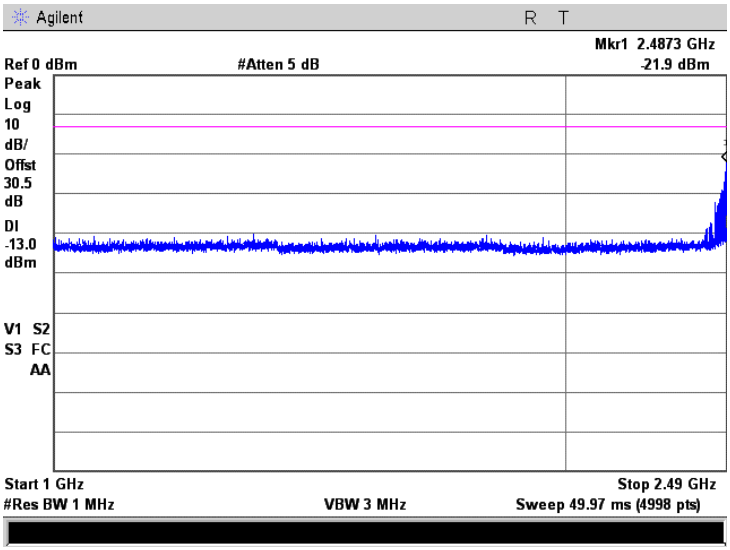


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.9 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency (5MHz BW 16QAM)

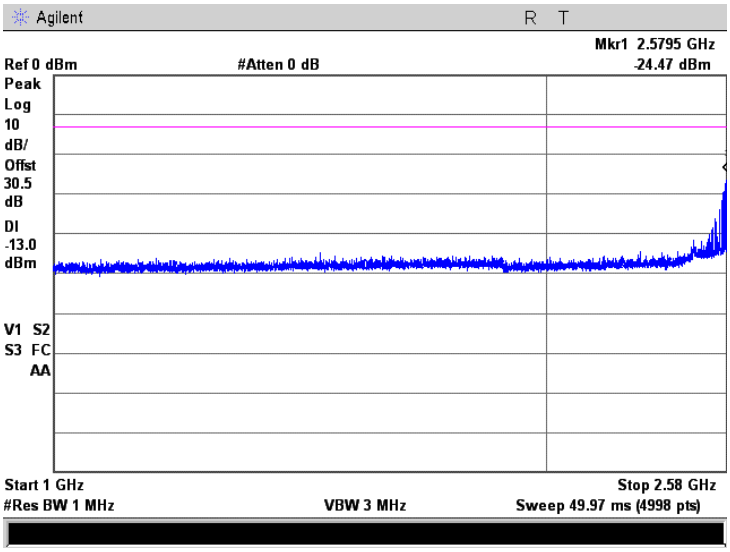


Plot 7.4.10 Spurious emission measurements in 1000 - 2490 MHz range at low carrier frequency (5MHz BW 16QAM)

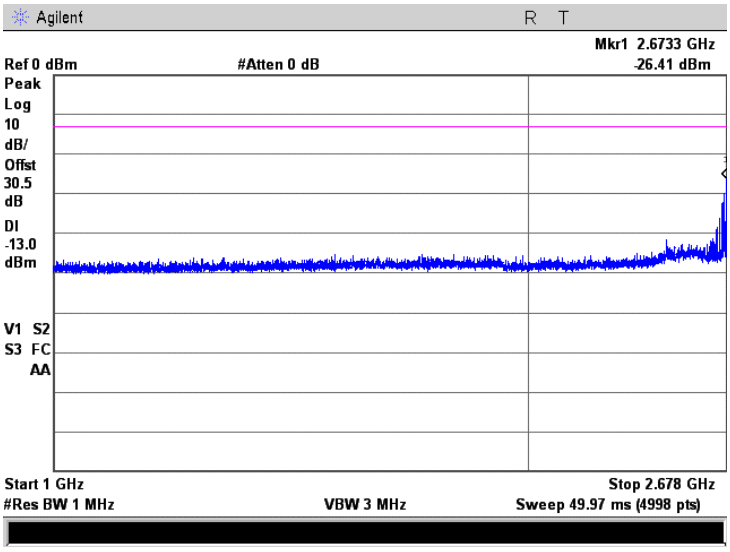


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.11 Spurious emission measurements in 1000 - 2580 MHz at mid carrier frequency (5MHz BW 16QAM)

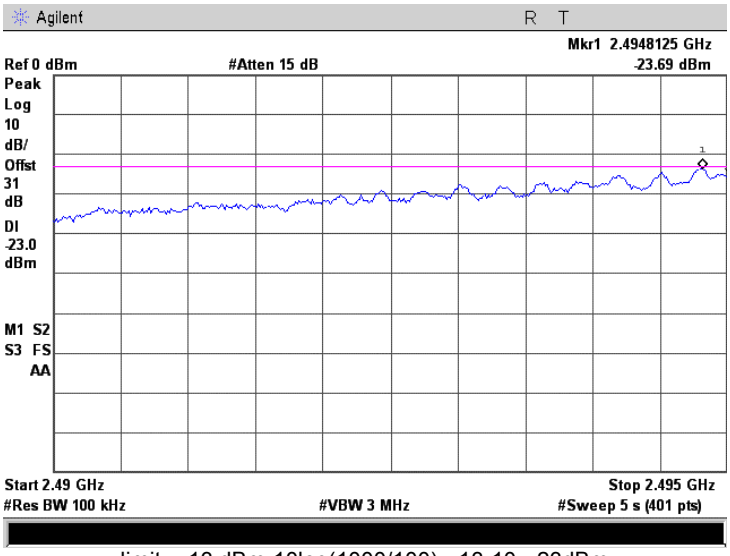


Plot 7.4.12 Spurious emission measurements in 1000 - 2678 MHz at high carrier frequency (5MHz BW 16QAM)



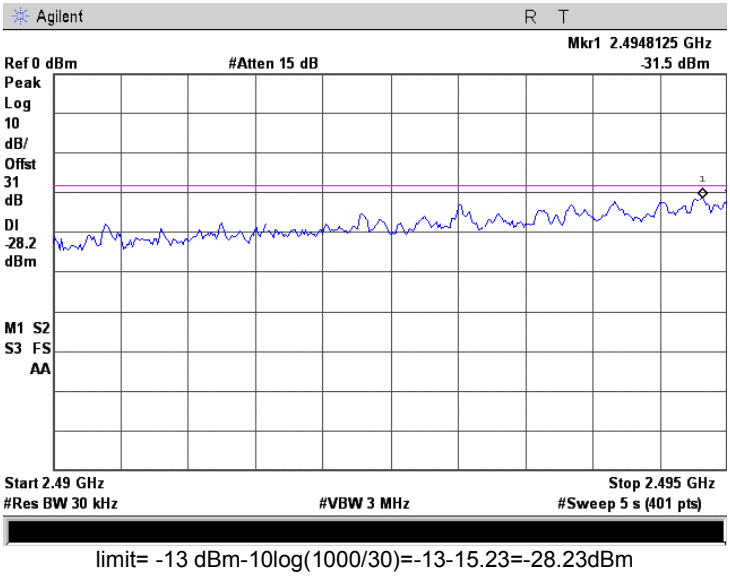
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.13 Band edges test results at low carrier frequency 2490 – 2495 MHz, 7 MHz QPSK, VBW=100 kHz



limit= -13 dBm-10log(1000/100)=-13-10=-23dBm

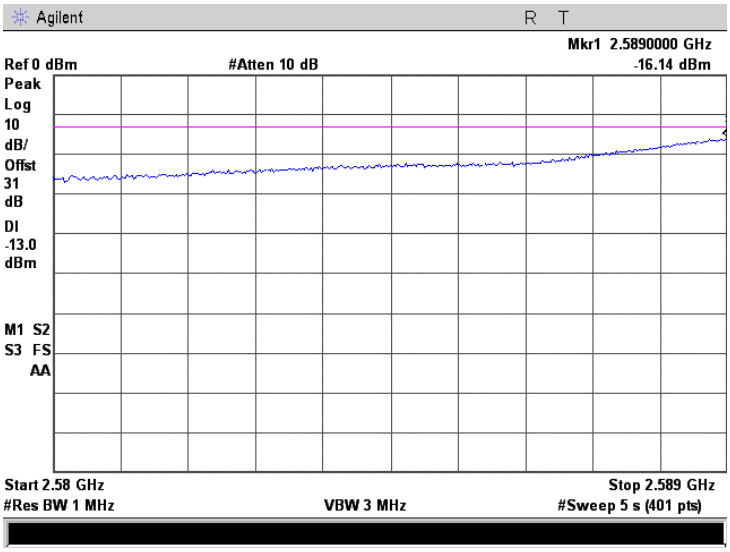
Plot 7.4.14 Band edges test results at low carrier frequency 2490 – 2495 MHz, 7 MHz QPSK, VBW=30 kHz



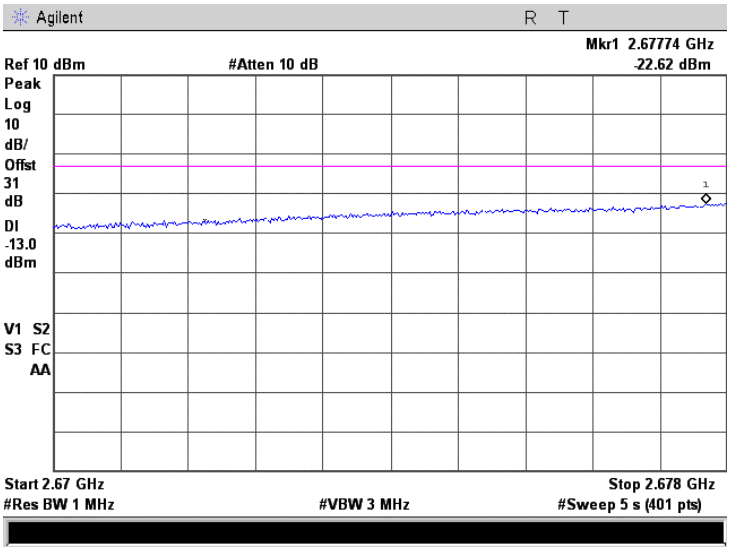
limit= -13 dBm-10log(1000/30)=-13-15.23=-28.23dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.15 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 7 MHz QPSK

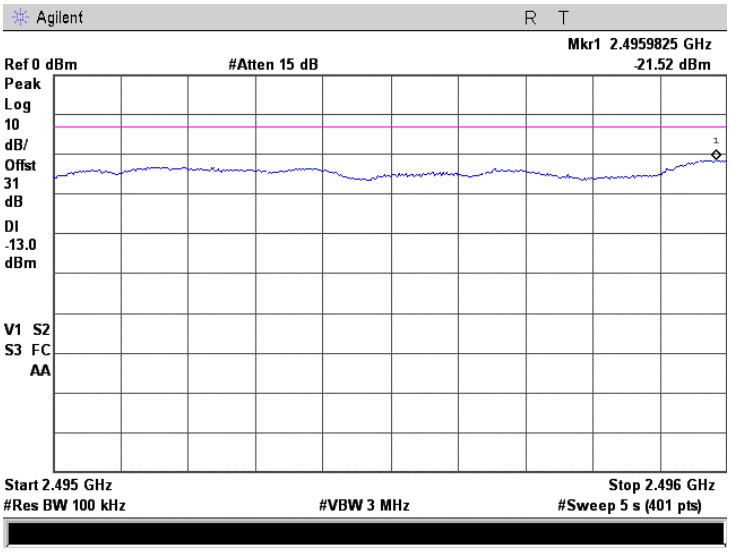


Plot 7.4.16 Band edges test results at high carrier frequency 2670 – 2678 MHz, 7 MHz QPSK

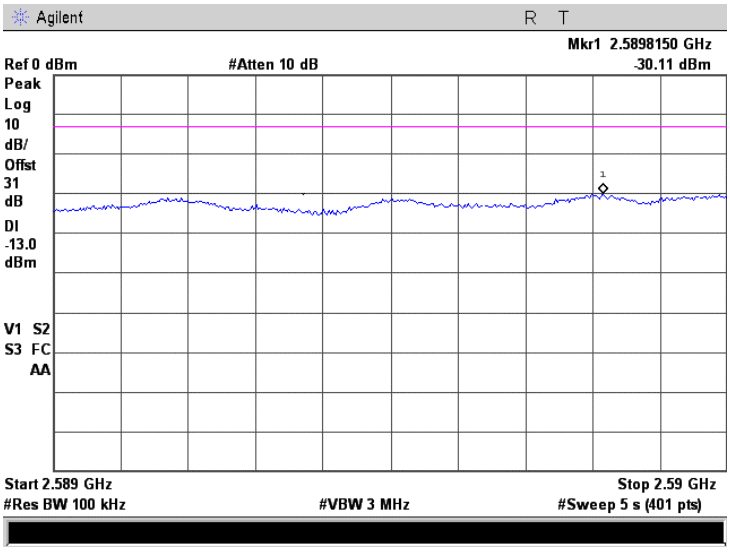


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.17 Band edges test results at low carrier frequency 2495 – 2496 MHz, 7 MHz QPSK

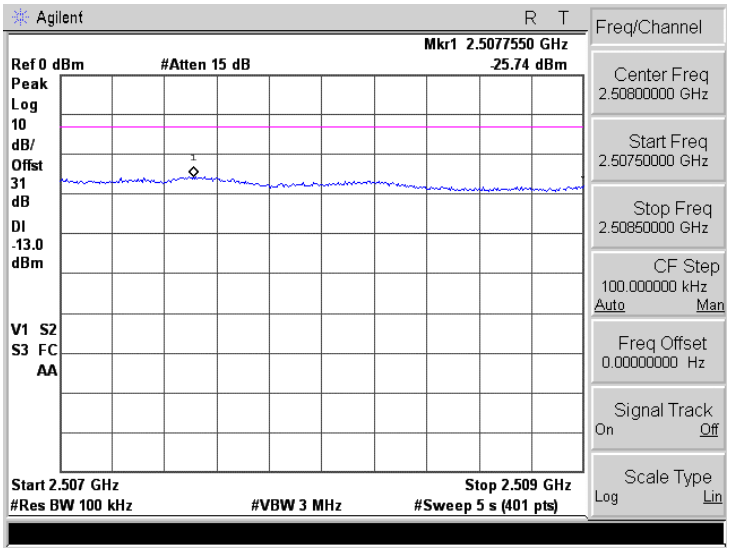


Plot 7.4.18 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 7 MHz QPSK

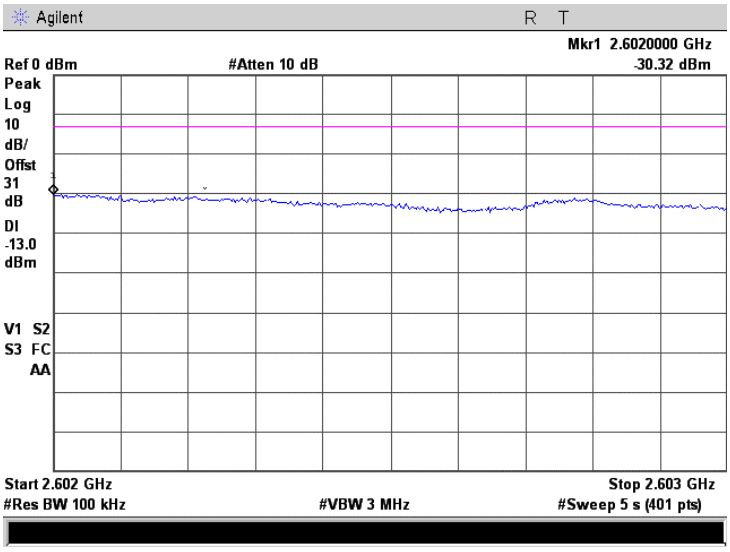


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.19 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 7 MHz QPSK

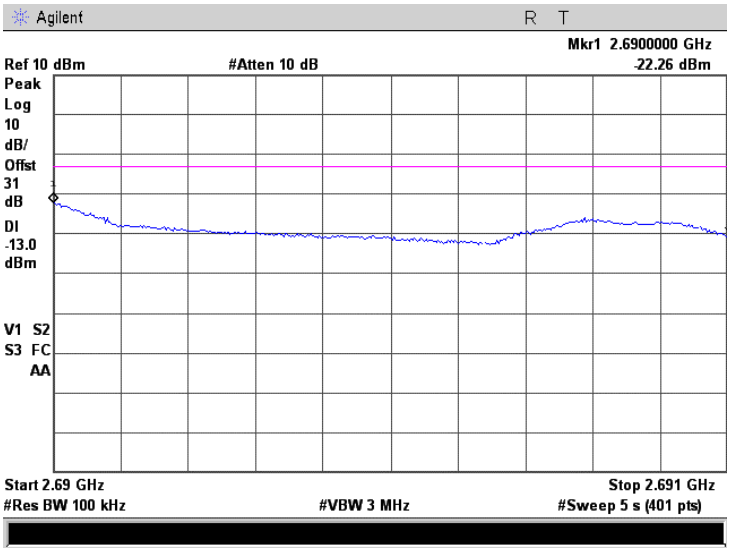


Plot 7.4.20 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 7 MHz QPSK

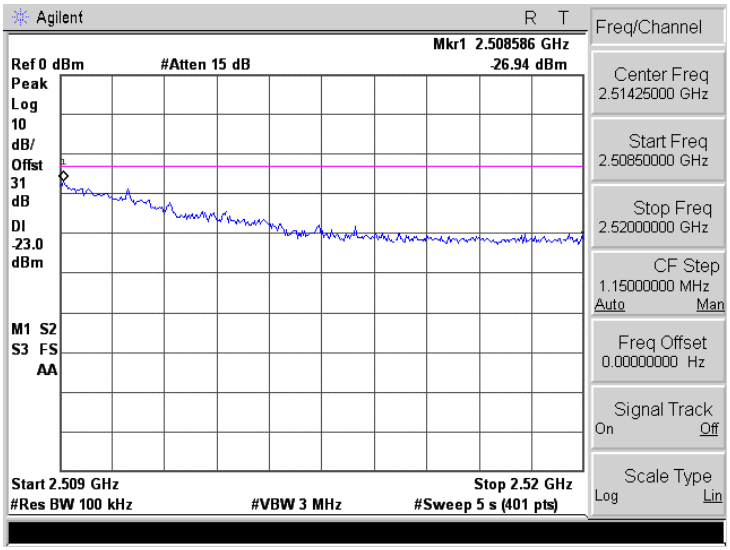


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



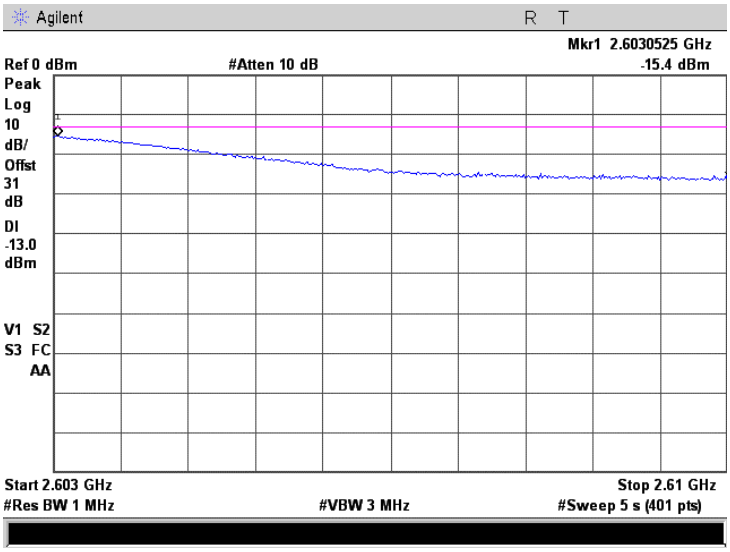
Plot 7.4.22 Band edges test results at mid carrier frequency 2508.5 – 2520 MHz, 7 MHz QPSK



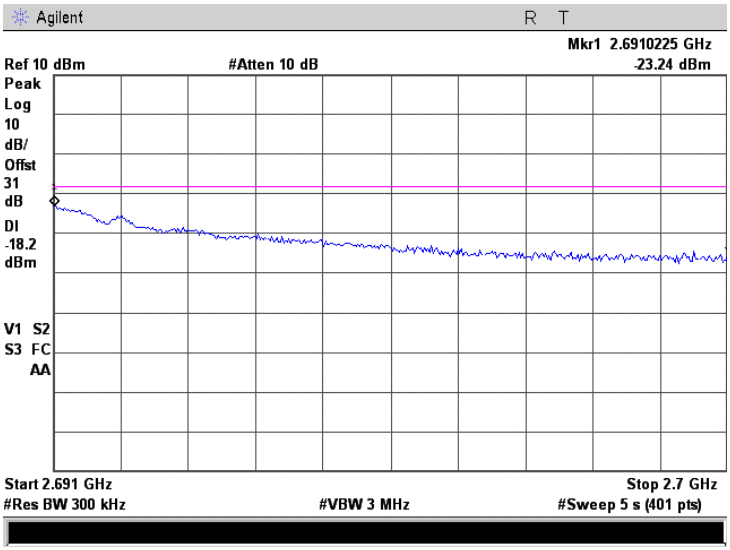
limit = 13-10log(1000/100) = -13-10= -23.0 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



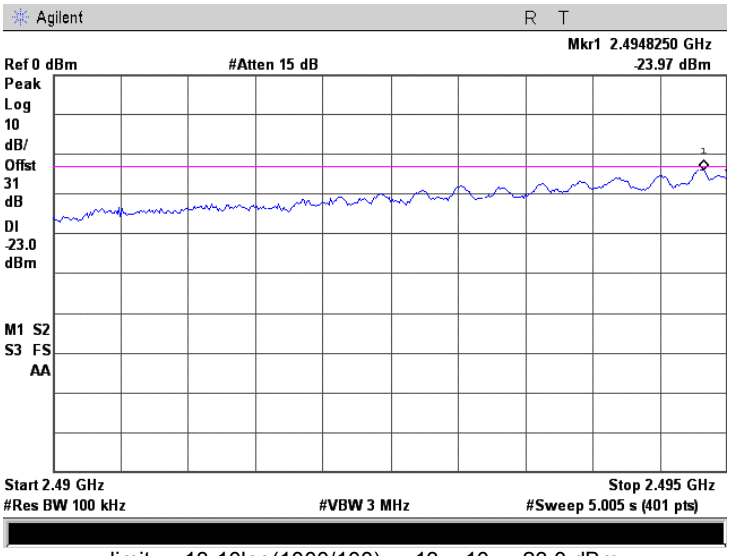
Plot 7.4.24 Band edges test results at high carrier frequency 2691.0 – 2700.0 MHz, 7 MHz QPSK



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

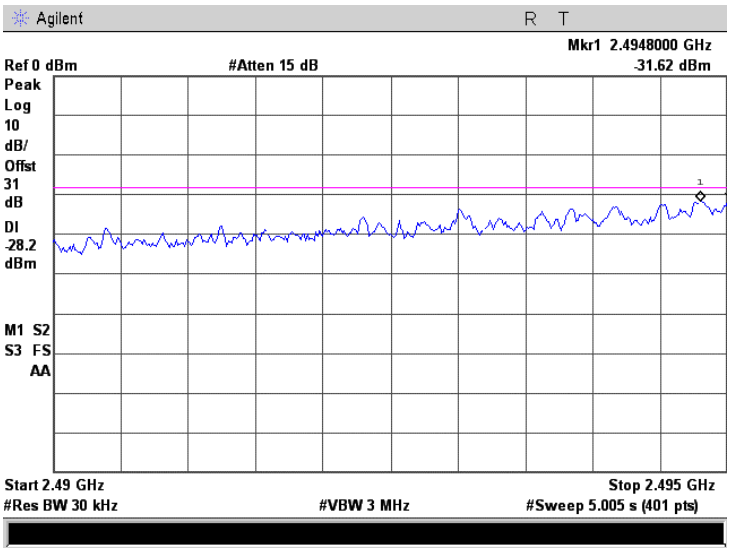
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.25 Band edges test results at low carrier frequency 2490 – 2495 MHz, 7 MHz 16QAM, VBW=100 kHz



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

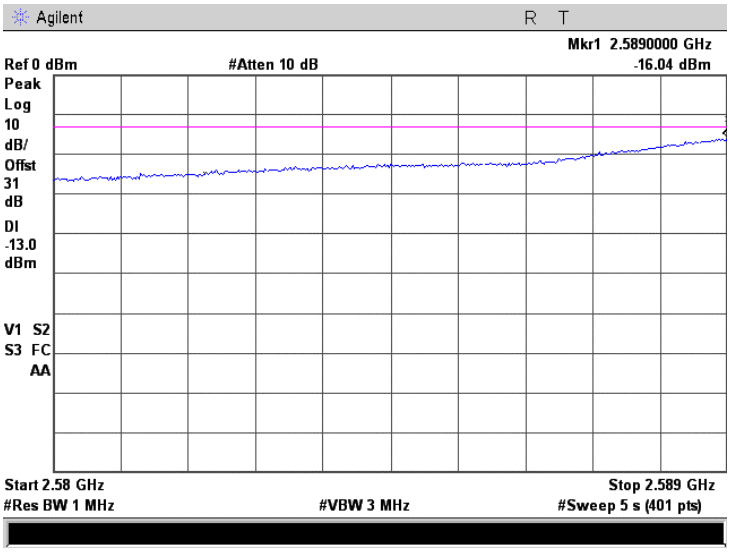
Plot 7.4.26 Band edges test results at low carrier frequency 2490 – 2495 MHz, 7 MHz 16QAM, VBW=30 kHz



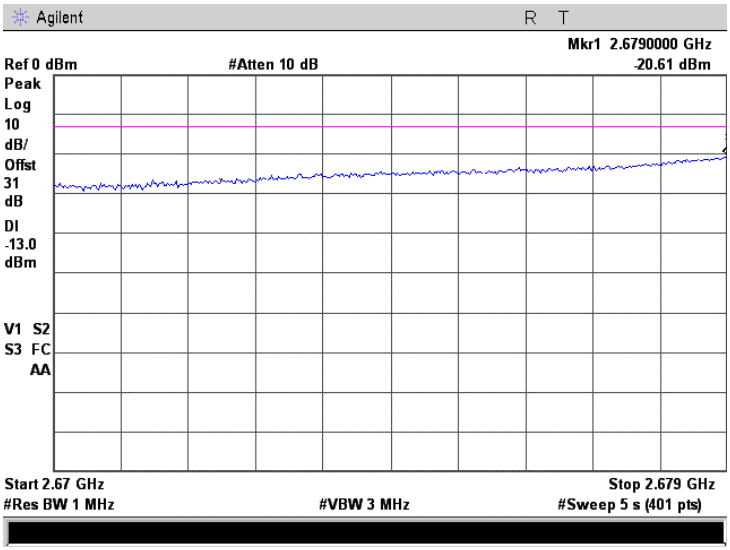
limit = -13-10log(1000/30) = -13 – 15.23 = -28.23 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.27 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 7 MHz 16QAM

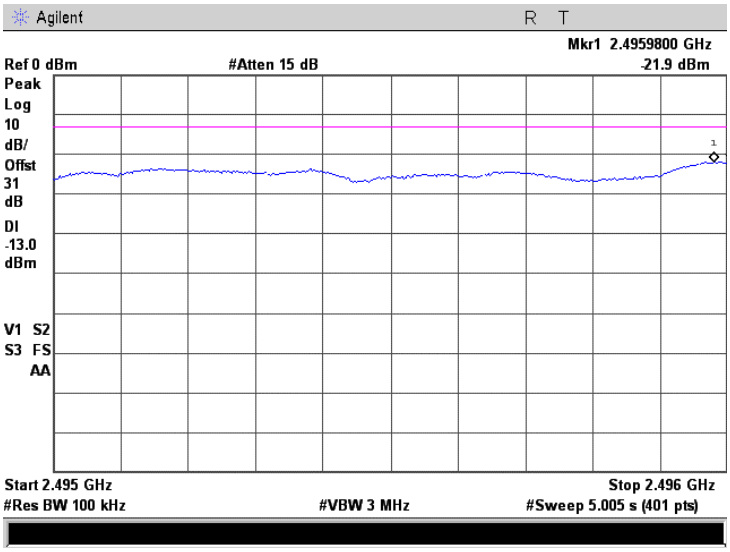


Plot 7.4.28 Band edges test results at high carrier frequency 2670 – 2679 MHz, 7 MHz 16QAM

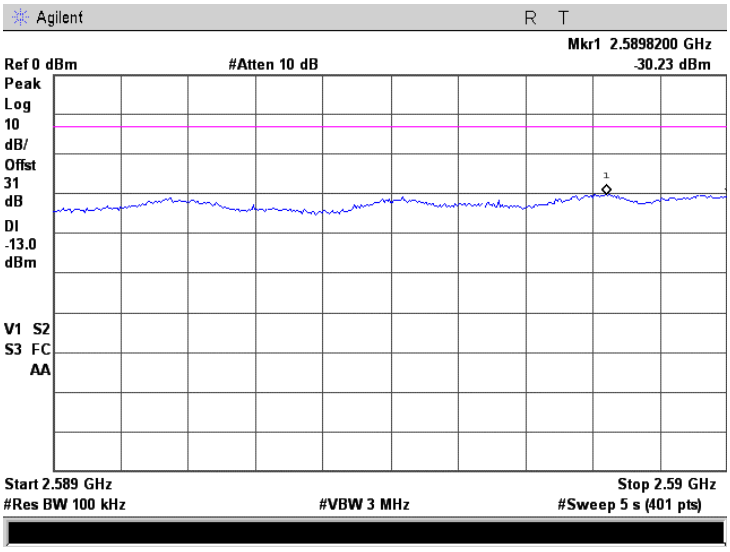


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.29 Band edges test results at low carrier frequency 2495 – 2496 MHz, 7 MHz 16QAM

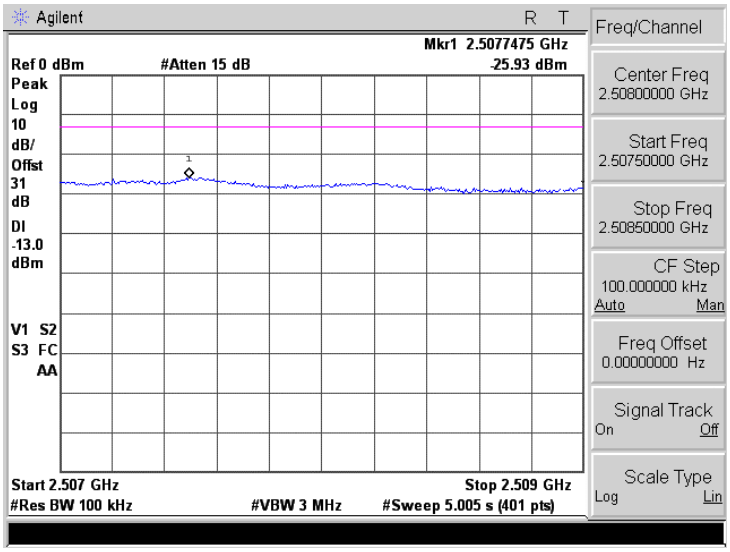


Plot 7.4.30 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 7 MHz 16QAM

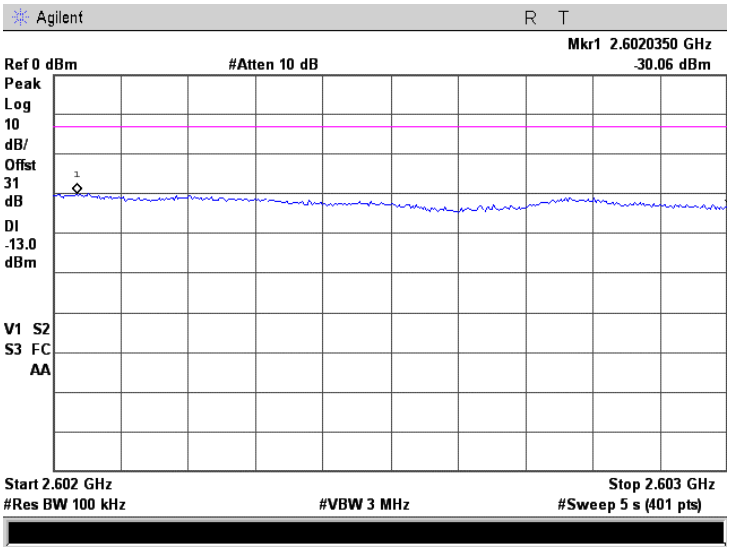


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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

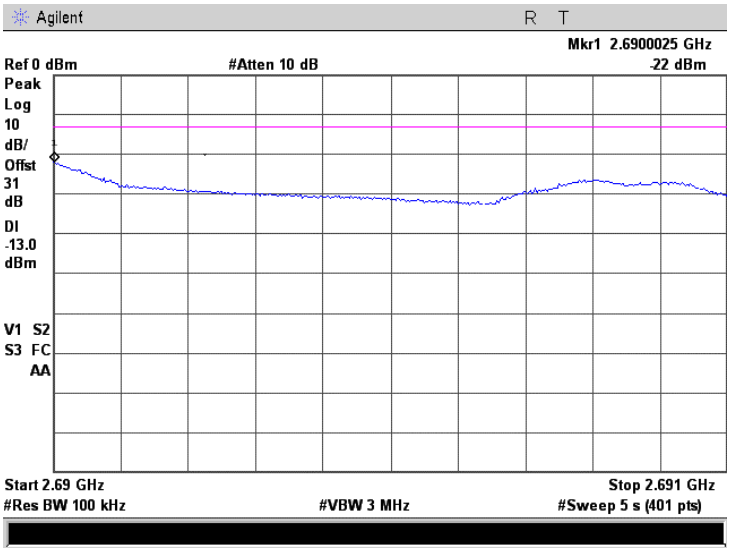


Plot 7.4.32 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 7 MHz 16QAM

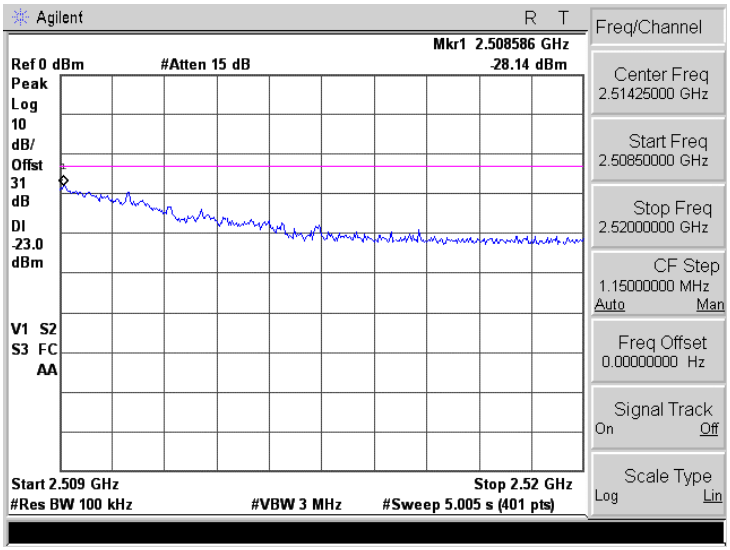


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



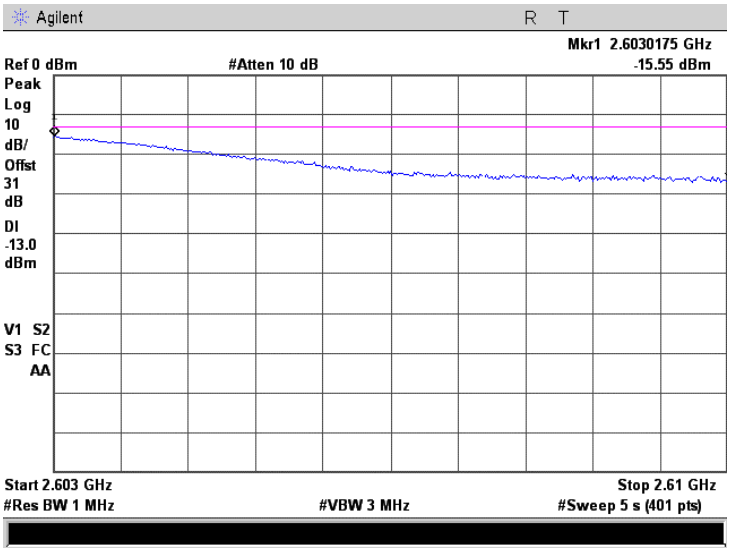
Plot 7.4.34 Band edges test results at low carrier frequency 2508.5 – 2520.0 MHz, 7 MHz 16QAM



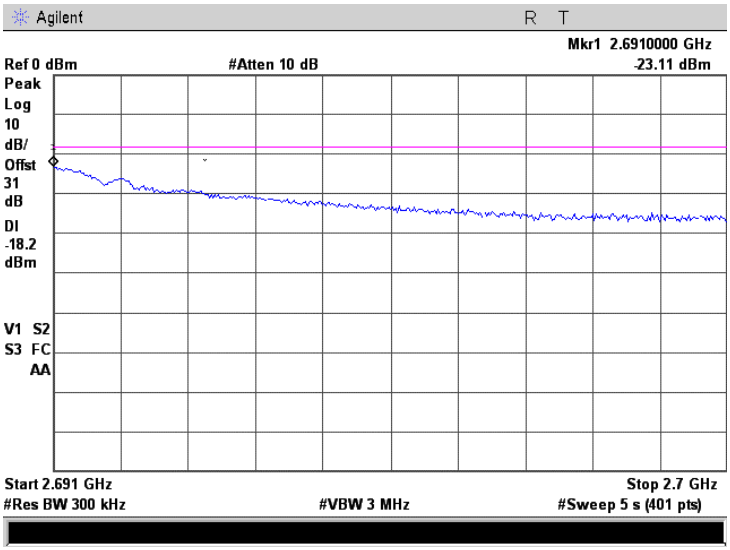
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



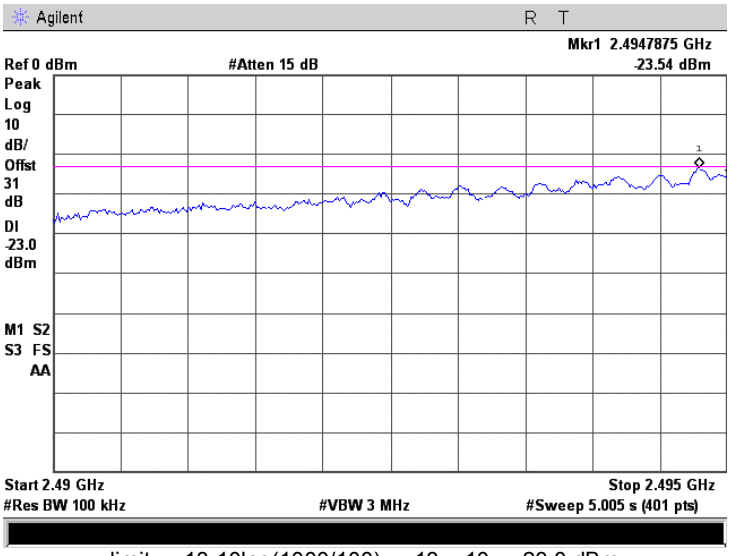
Plot 7.4.36 Band edges test results at high carrier frequency 2691 – 2700 MHz, 7 MHz 16QAM



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

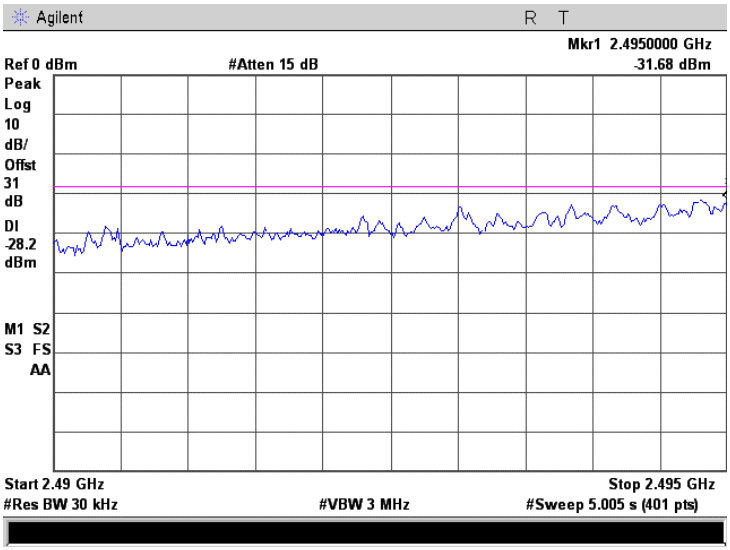
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.37 Band edges test results at low carrier frequency 2490 – 2495 MHz, 7 MHz 64QAM, VBW=100 kHz



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

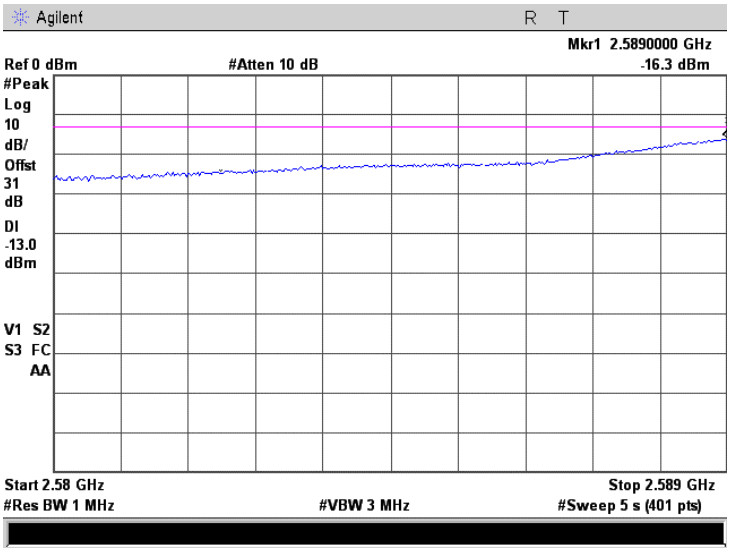
Plot 7.4.38 Band edges test results at low carrier frequency 2490 – 2495 MHz, 7 MHz 64QAM, VBW=30 kHz



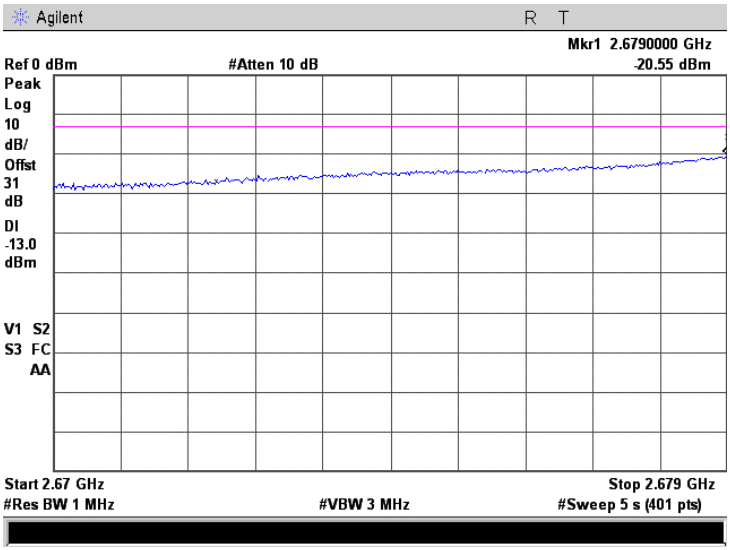
limit = -13-10log(1000/30) = -13 – 15.23 = -28.23 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.39 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 7 MHz 64QAM

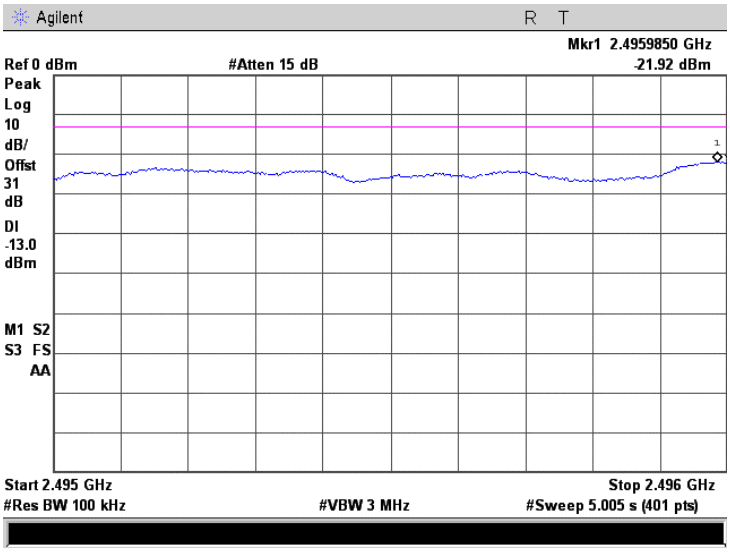


Plot 7.4.40 Band edges test results at high carrier frequency 2670 – 2679 MHz, 7 MHz 64QAM

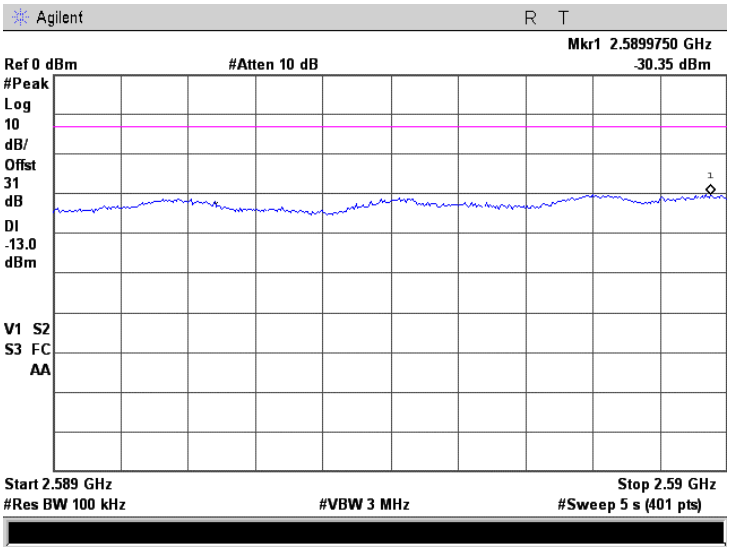


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.41 Band edges test results at low carrier frequency 2495 – 2496 MHz, 7 MHz 64QAM

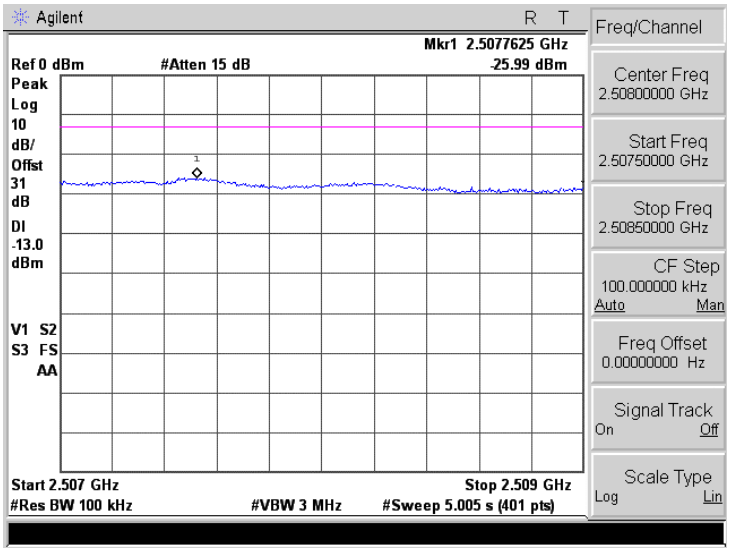


Plot 7.4.42 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 7 MHz 64QAM

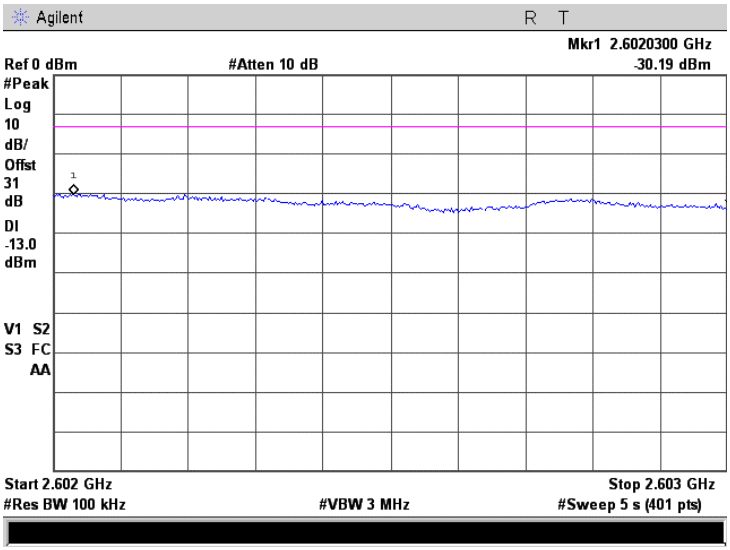


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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

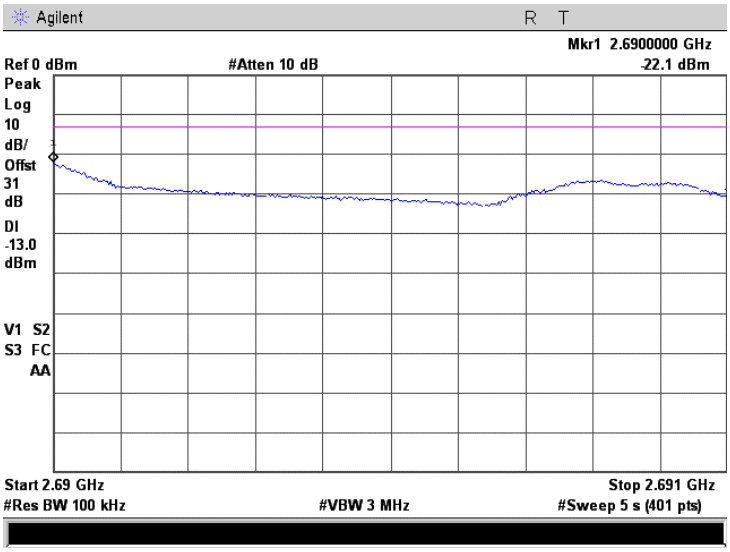


Plot 7.4.44 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 7 MHz 64QAM

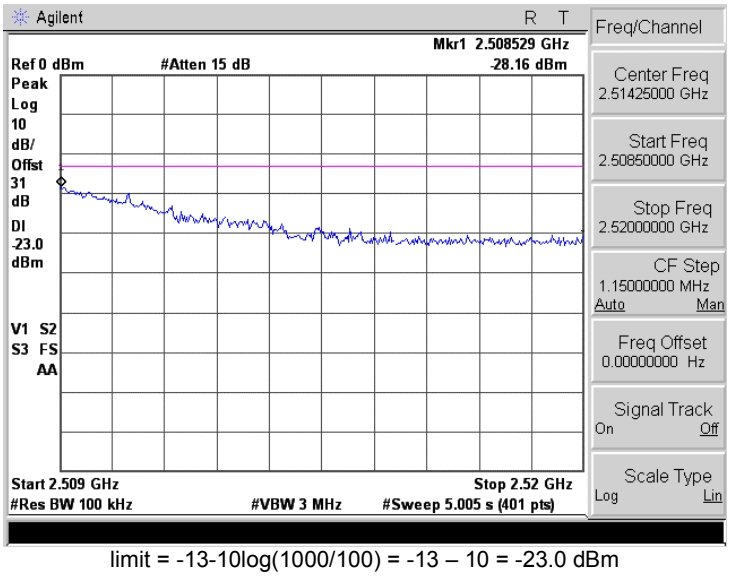


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



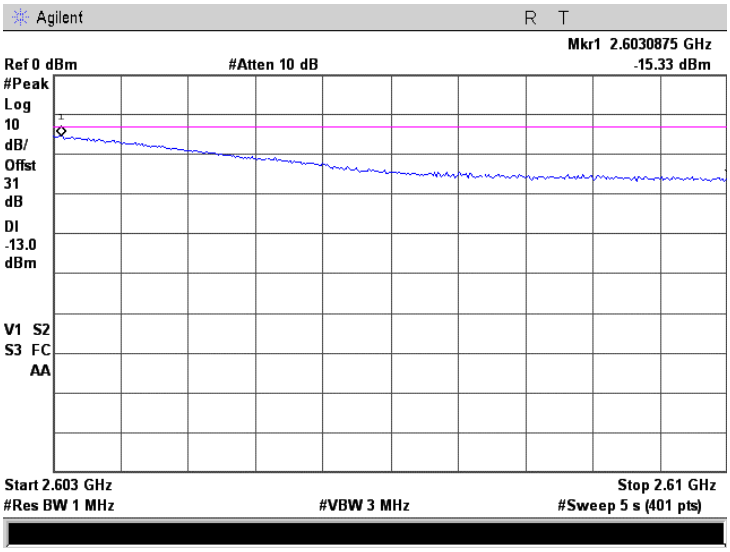
Plot 7.4.46 Band edges test results at low carrier frequency 2508.5 – 2520 MHz, 7 MHz 64QAM



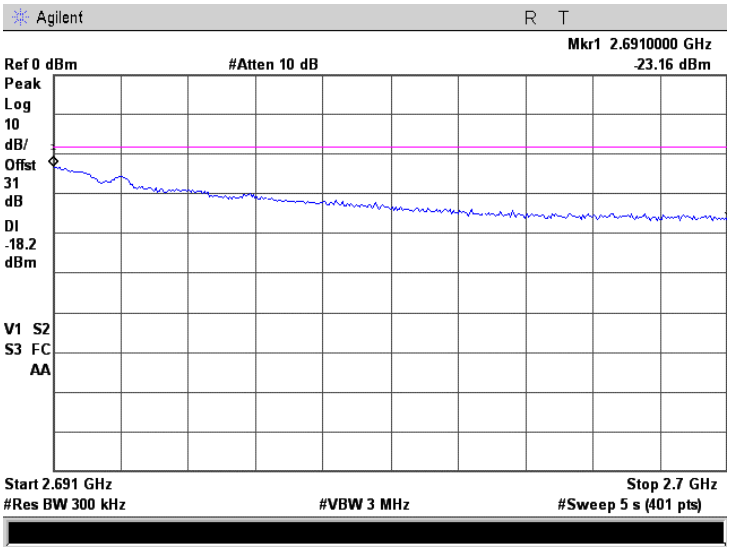
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



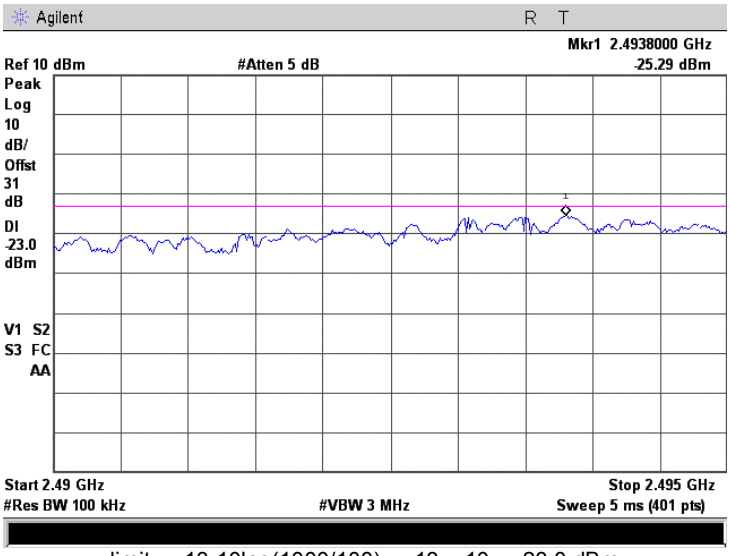
Plot 7.4.48 Band edges test results at high carrier frequency 2691 – 2700 MHz, 7 MHz 64QAM



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

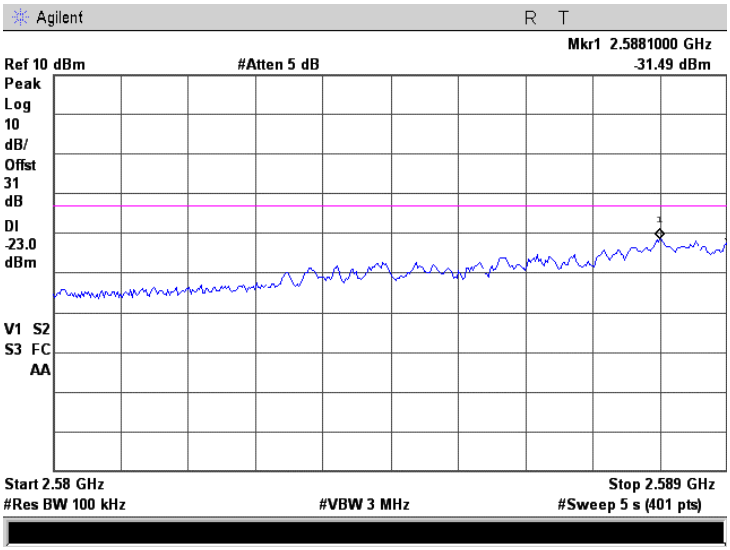
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 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

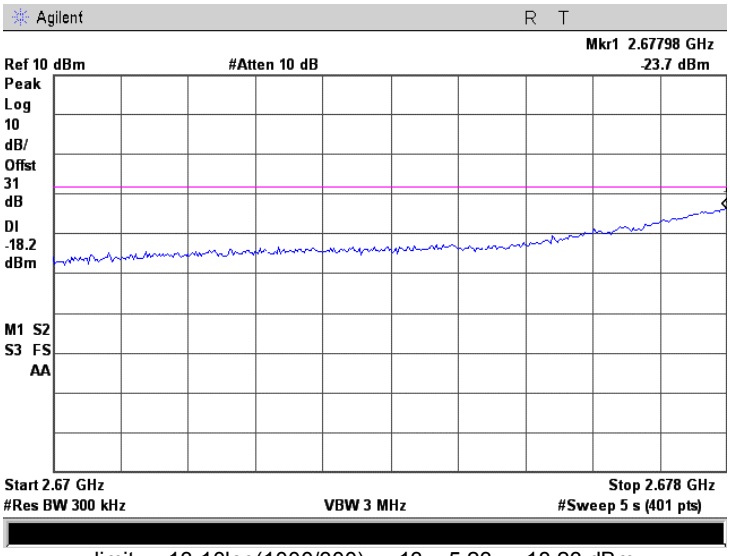
Plot 7.4.50 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 10 MHz QPSK



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

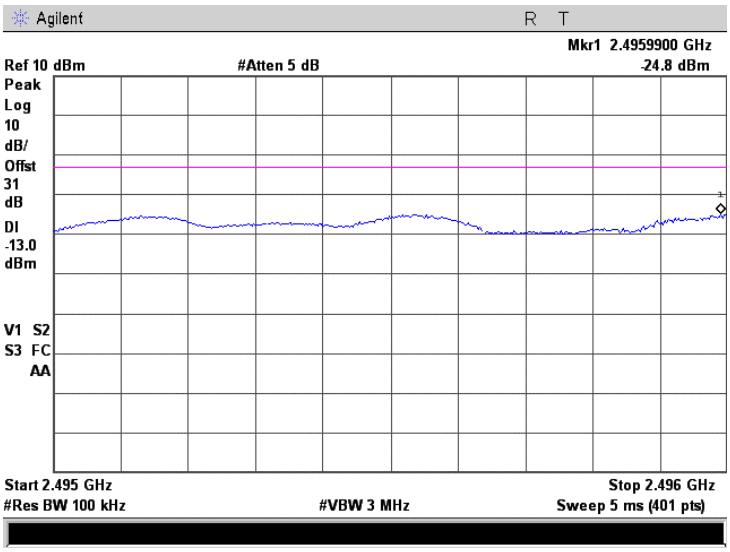
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



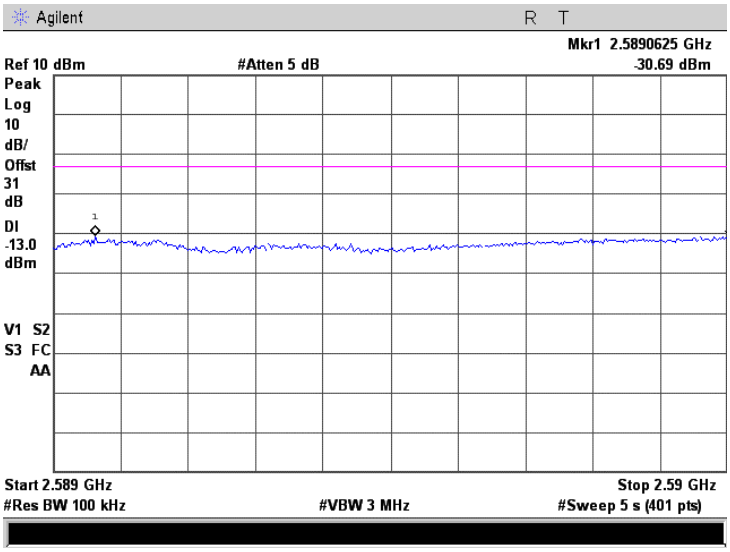
limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

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

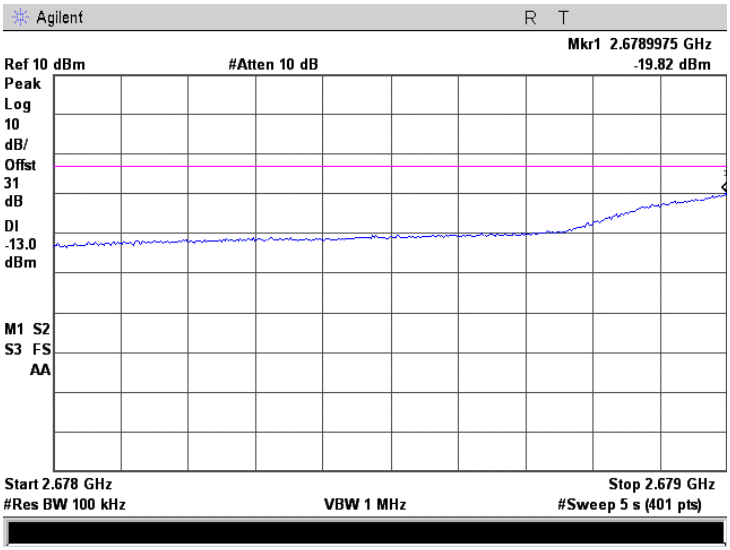


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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

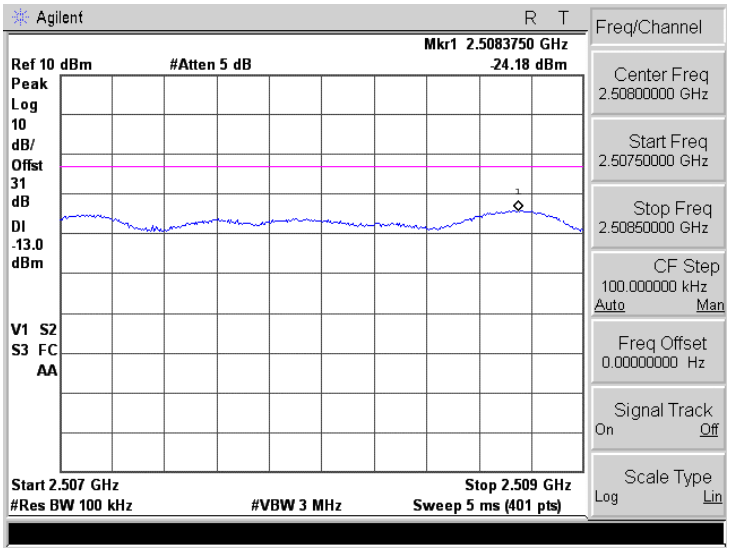


Plot 7.4.54 Band edges test results at high carrier frequency 2678 – 2679 MHz, 10 MHz QPSK

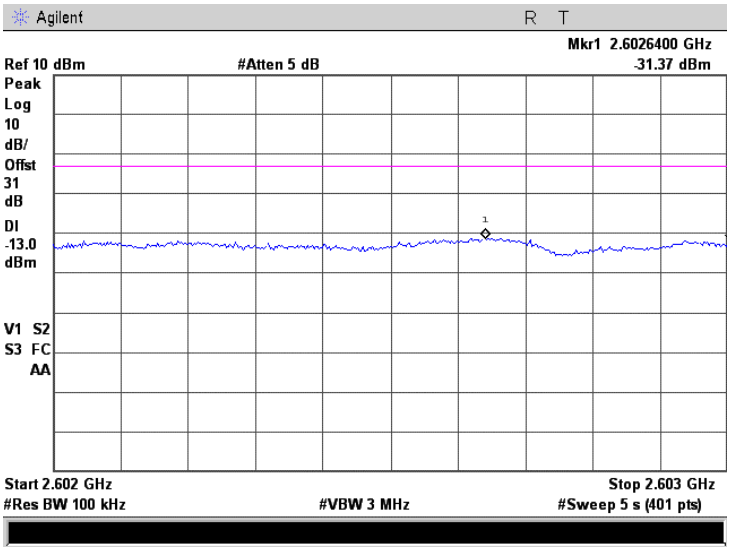


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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

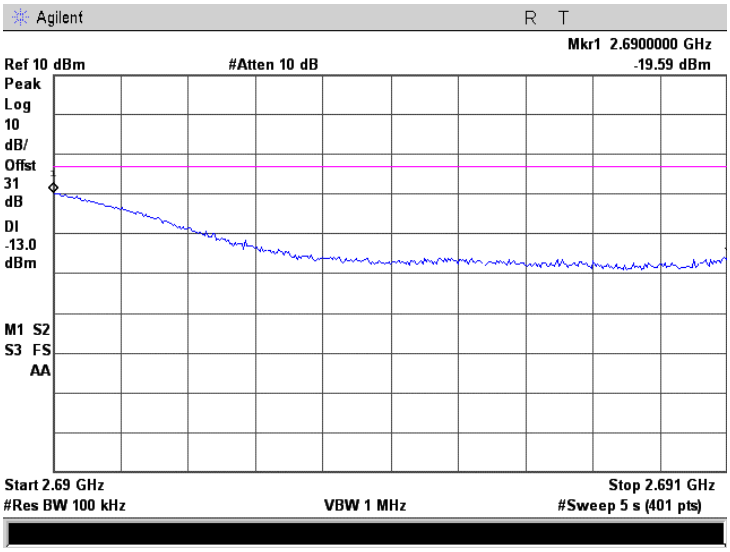


Plot 7.4.56 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 10 MHz QPSK

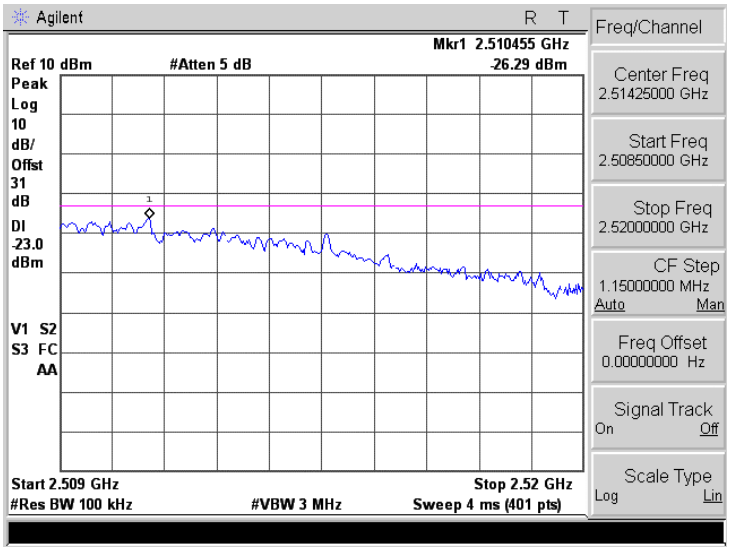


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



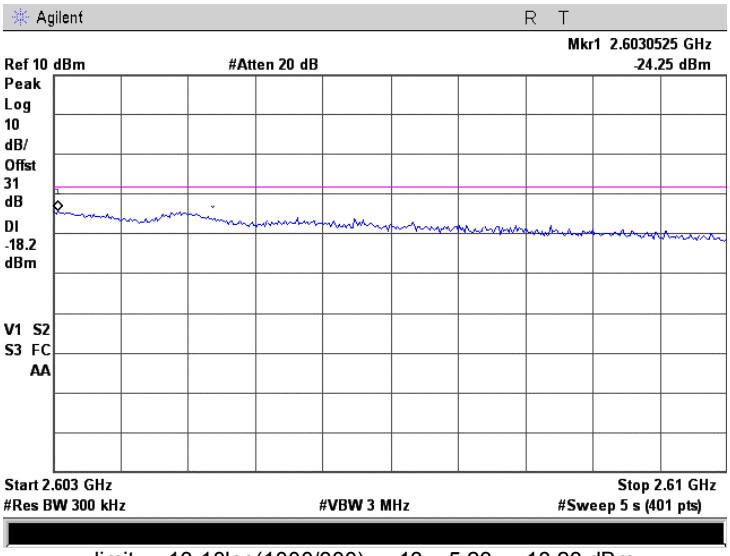
Plot 7.4.58 Band edges test results at mid carrier frequency 2508.5 – 2520 MHz, 10 MHz QPSK



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

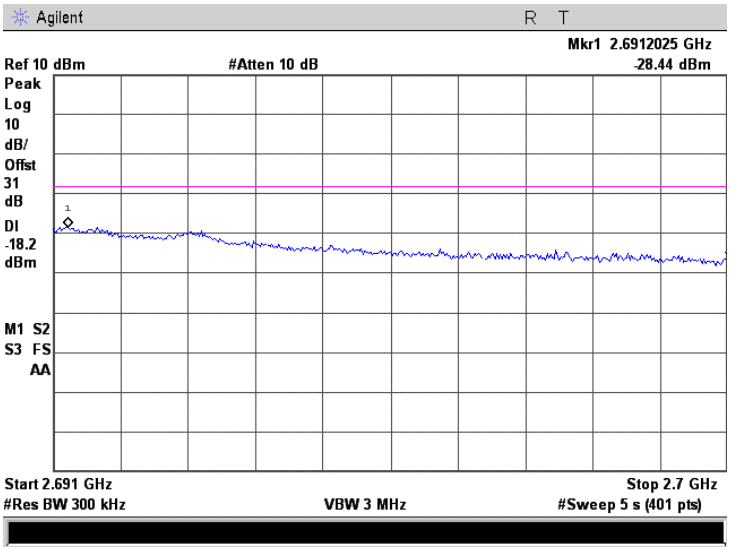
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

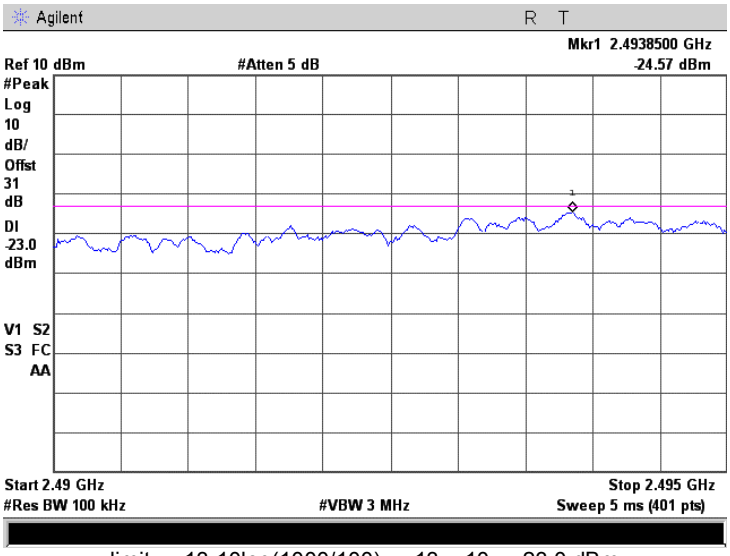
Plot 7.4.60 Band edges test results at high carrier frequency 2691.0 – 2700.0 MHz, 10 MHz QPSK



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

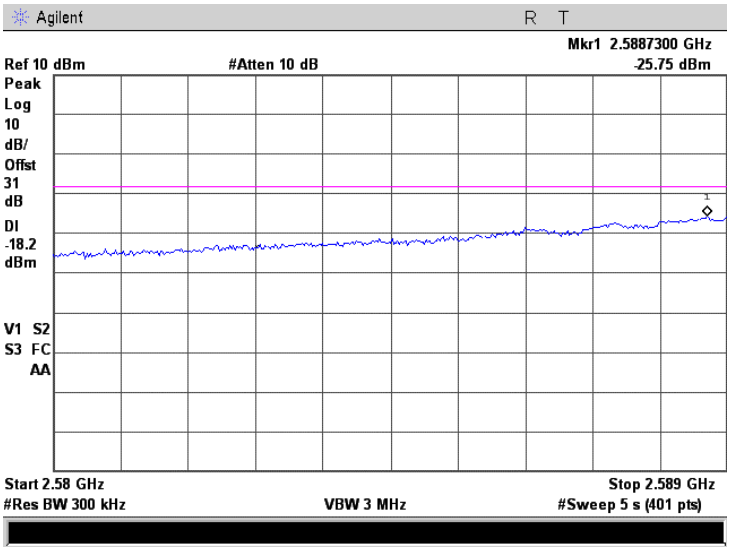
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 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

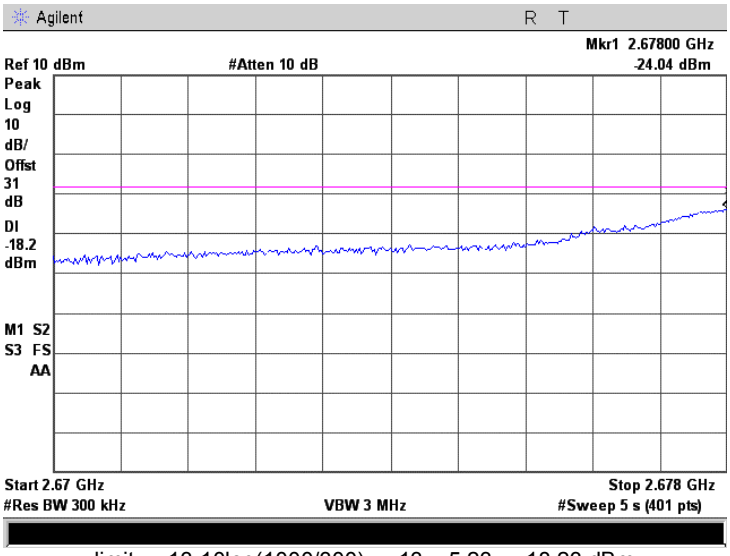
Plot 7.4.62 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 10 MHz 16QAM



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

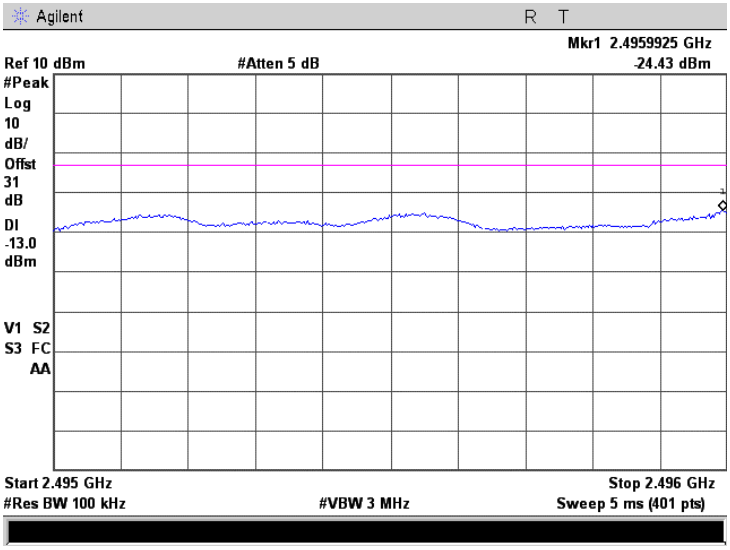
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



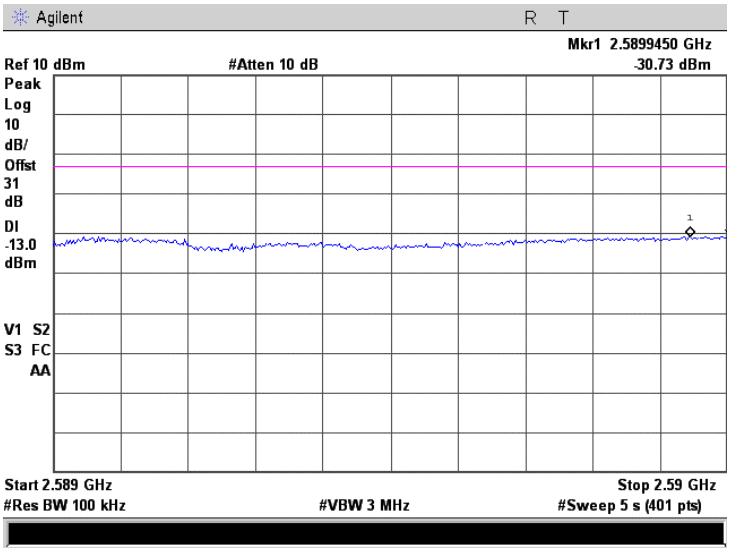
limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

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

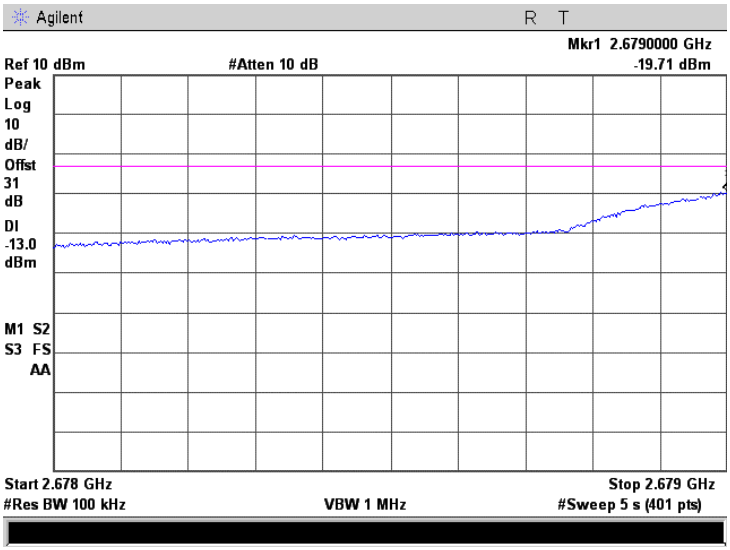


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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

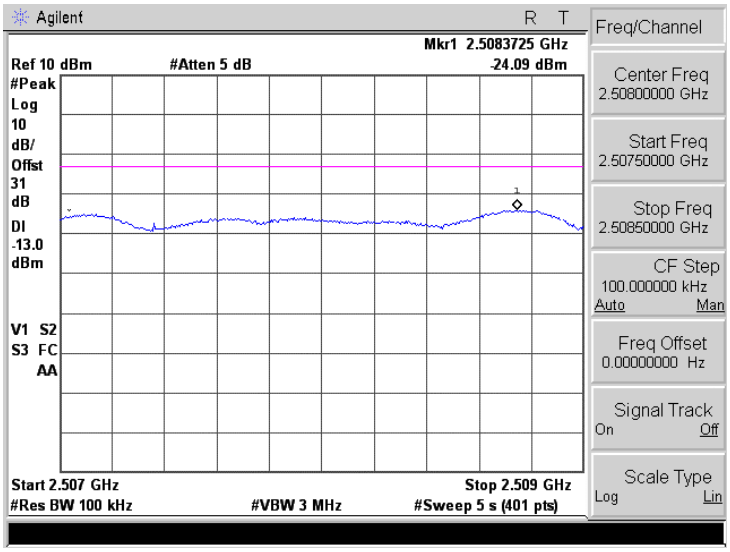


Plot 7.4.66 Band edges test results at high carrier frequency 2678 – 2679 MHz, 10 MHz 16QAM

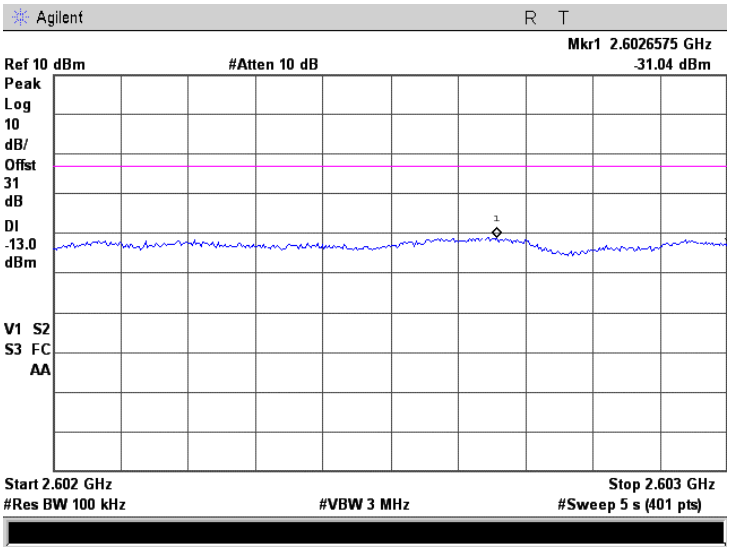


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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

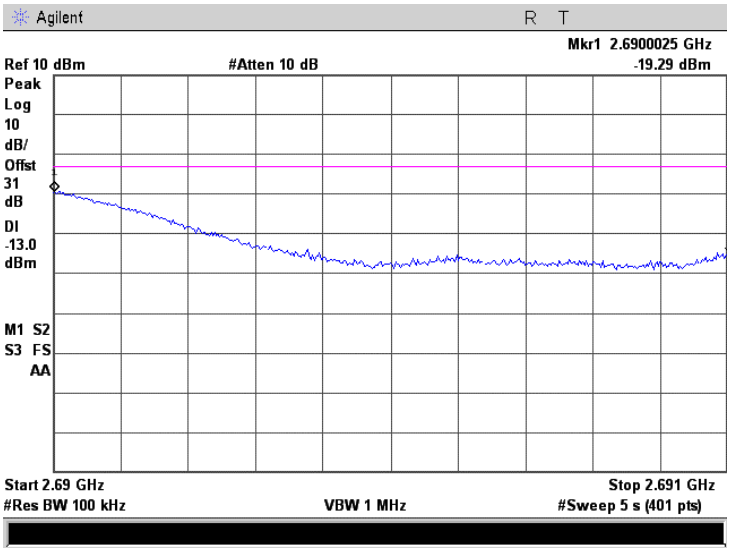


Plot 7.4.68 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 10 MHz 16QAM

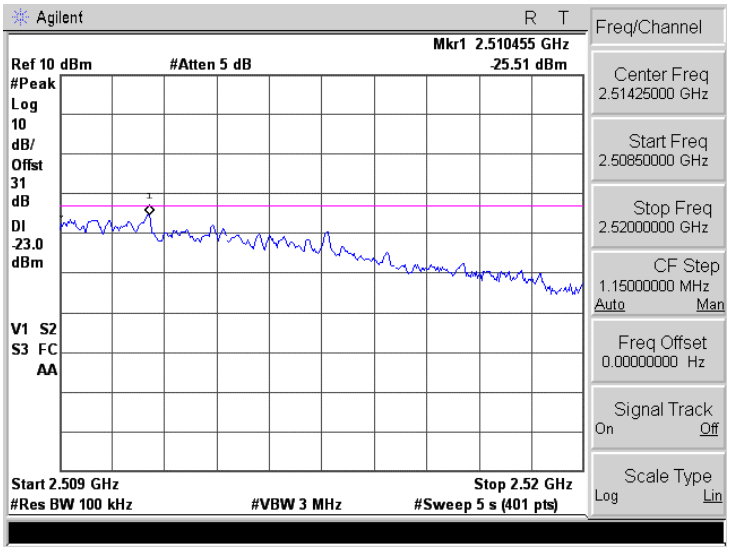


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



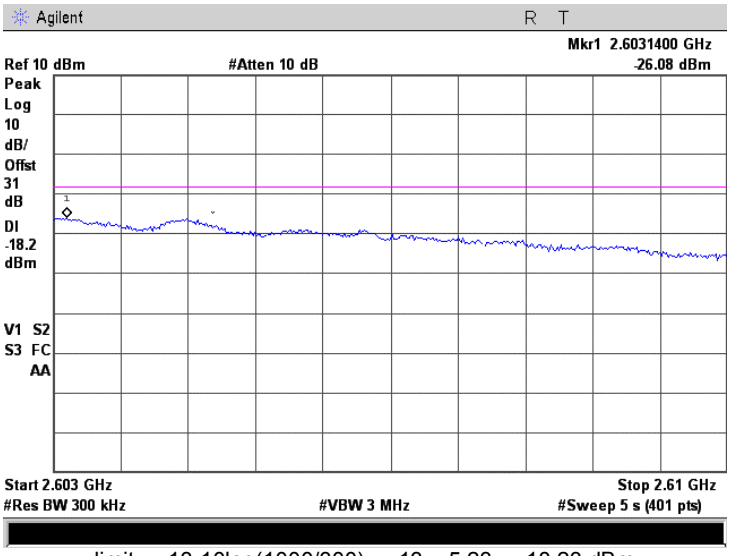
Plot 7.4.70 Band edges test results at low carrier frequency 2508.5 – 2510.0 MHz, 10 MHz 16QAM



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

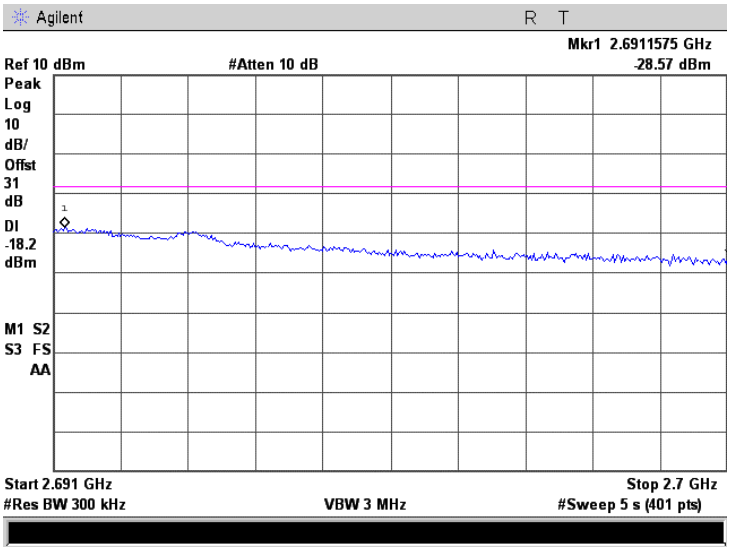
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

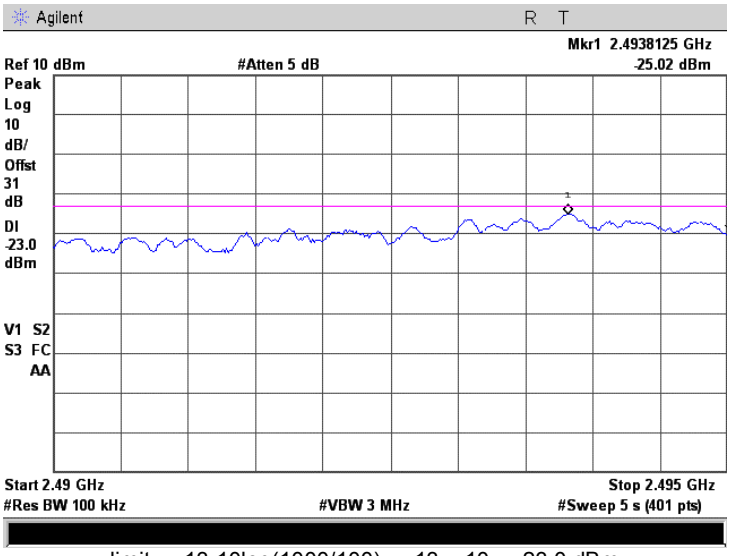
Plot 7.4.72 Band edges test results at high carrier frequency 2691 – 2700 MHz, 10 MHz 16QAM



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

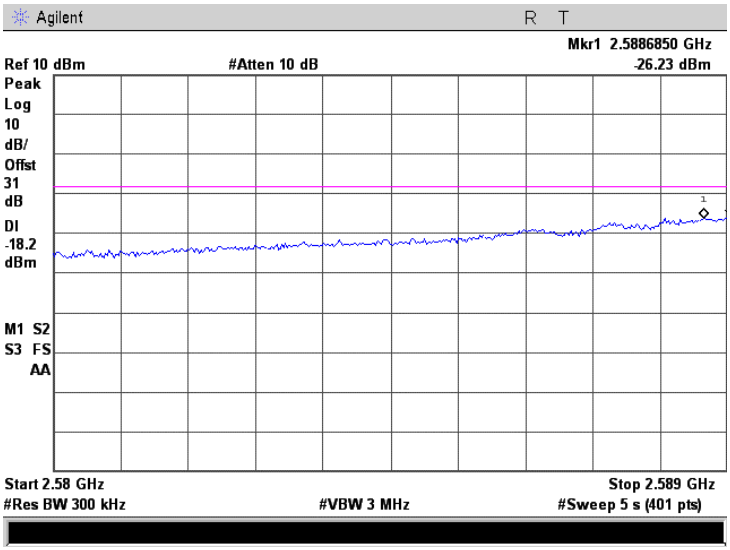
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 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

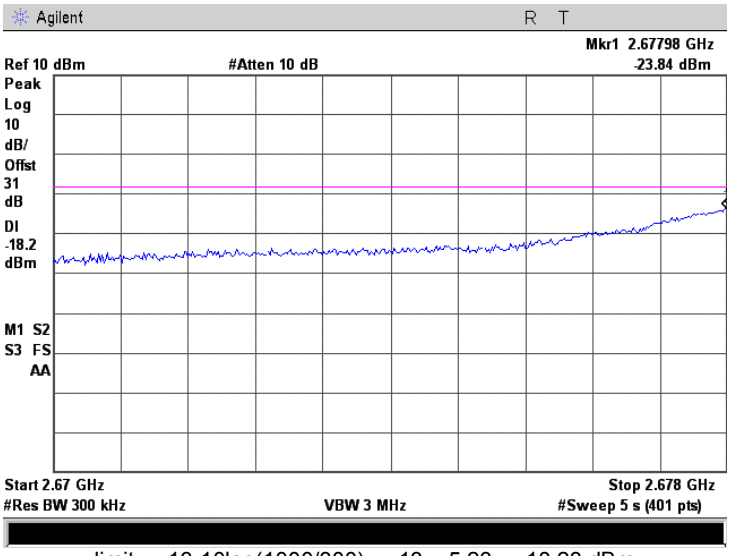
Plot 7.4.74 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 10 MHz 64QAM



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

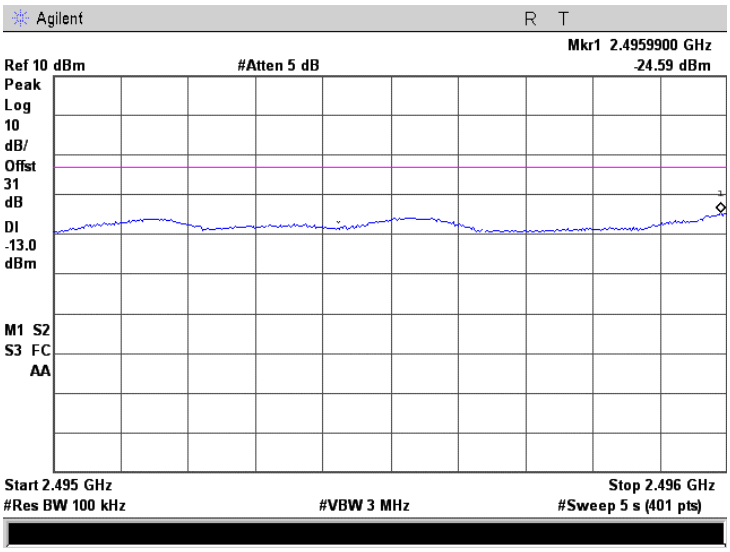
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



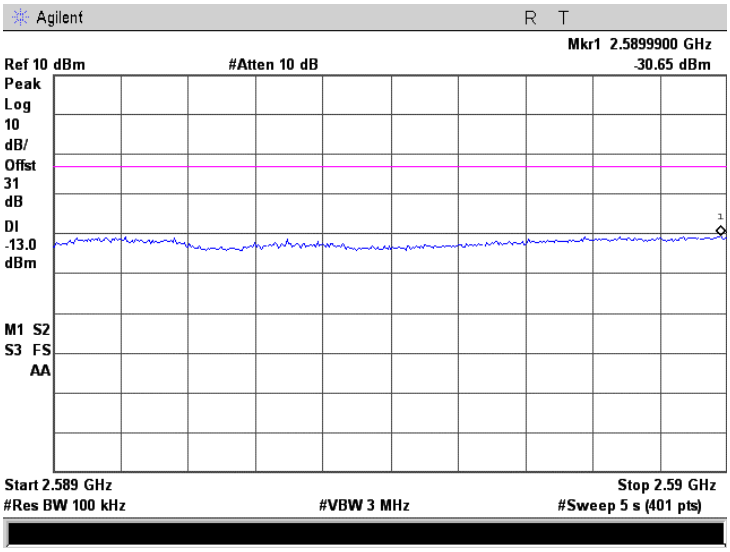
limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

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

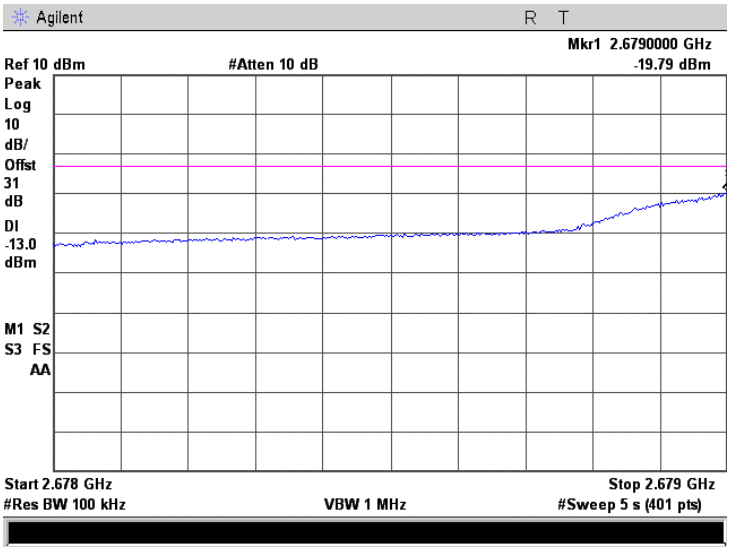


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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

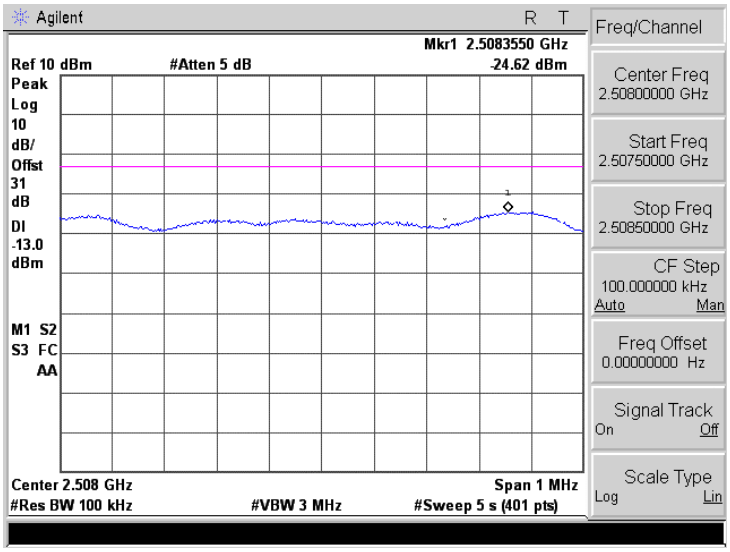


Plot 7.4.78 Band edges test results at high carrier frequency 2678 – 2679 MHz, 10 MHz 64QAM

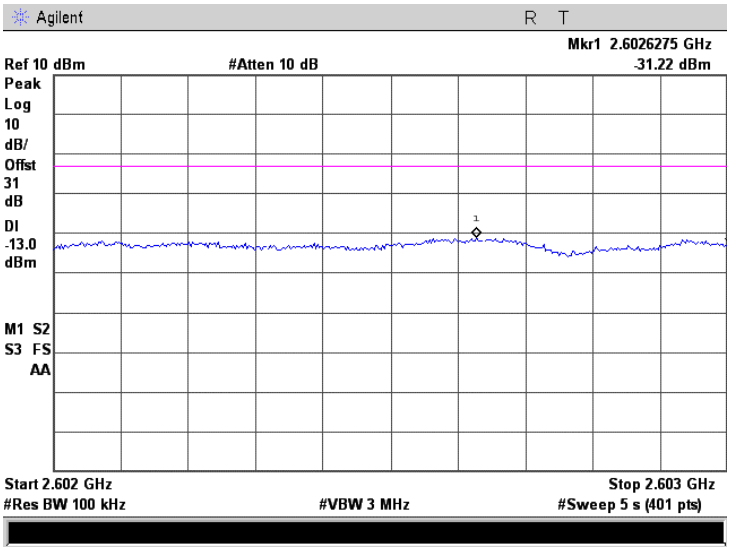


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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

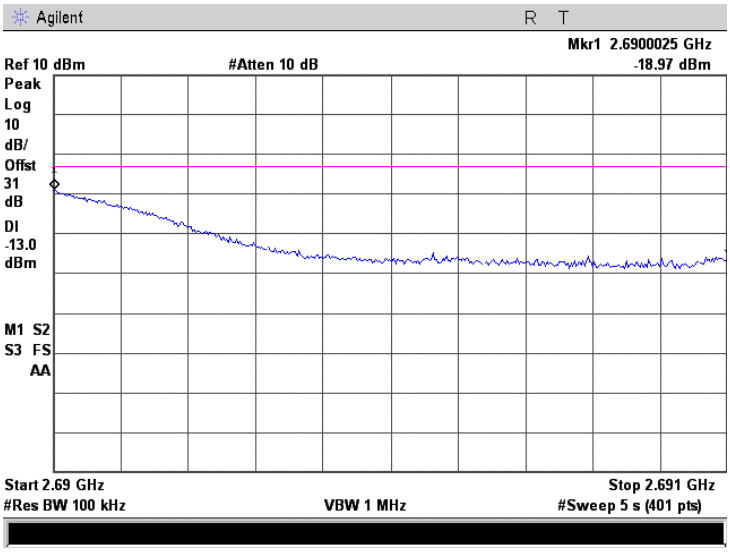


Plot 7.4.80 Band edges test results at mid carrier frequency 2602 – 2603 MHz, 10 MHz 64QAM

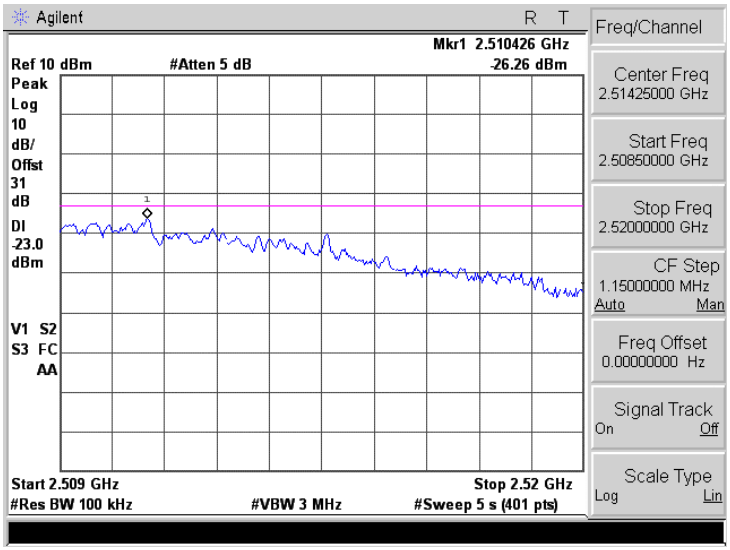


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



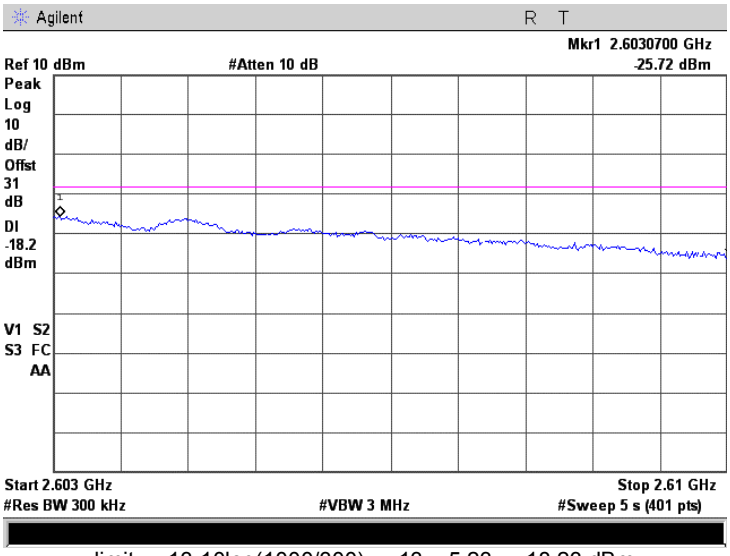
Plot 7.4.82 Band edges test results at low carrier frequency 2508.5 – 2510 MH,z 10 MHz 64QAM



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

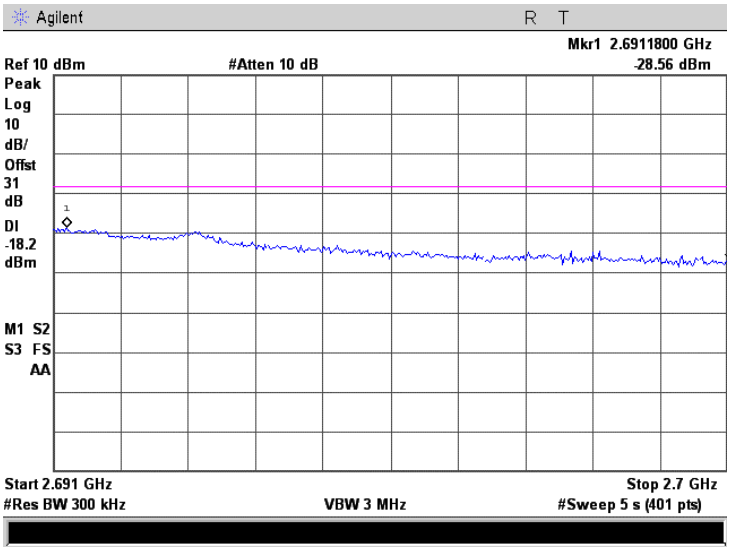
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

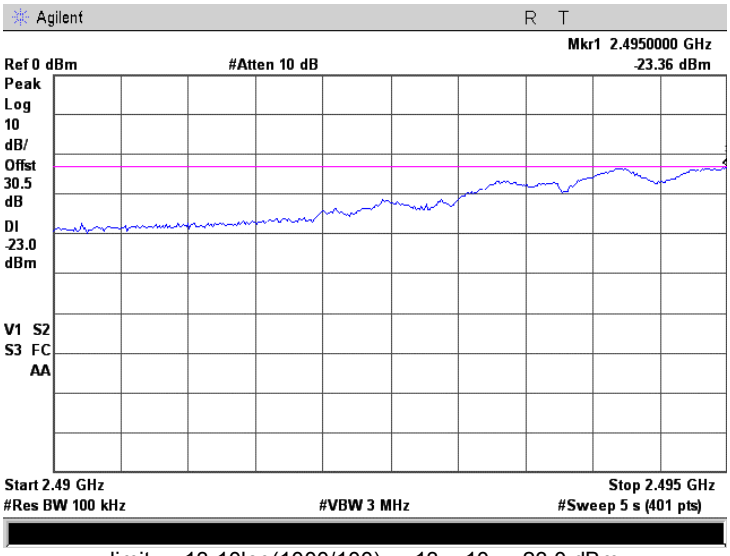
Plot 7.4.84 Band edges test results at high carrier frequency 2691 – 2700 MHz, 10 MHz 64QAM



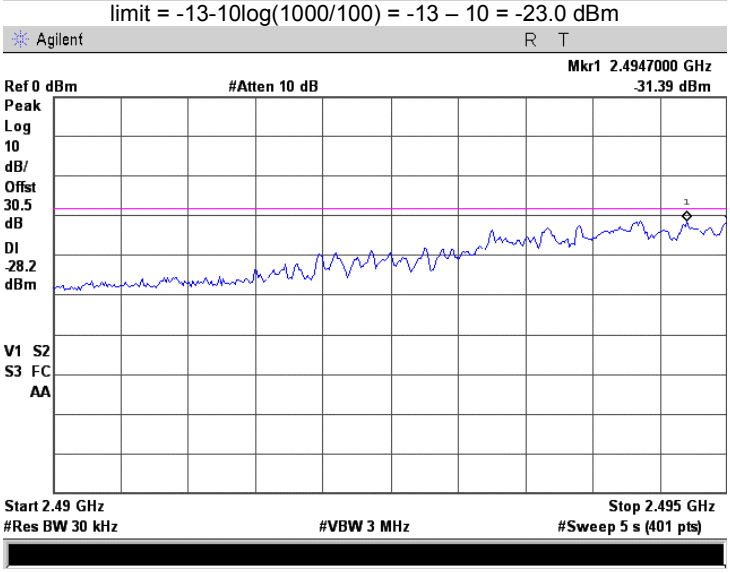
limit = -13-10log(1000/300) = -13 – 5.23 = -18.23 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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



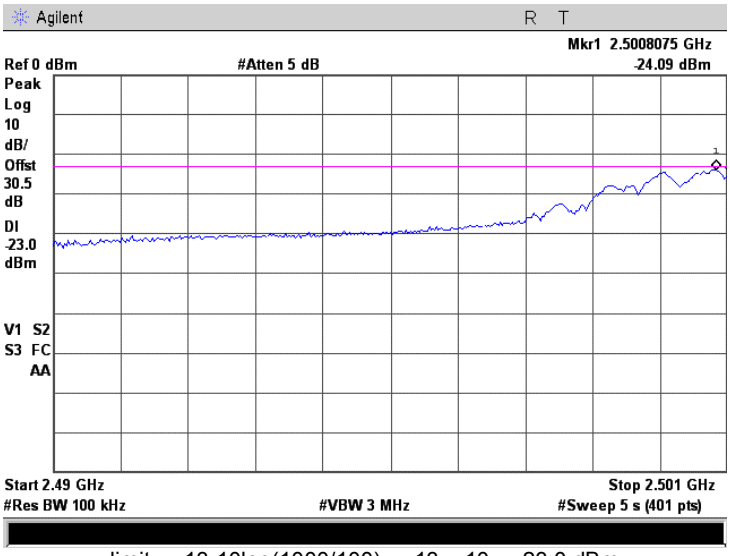
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm



limit = -13-10log(1000/30) = -13 – 15.23 = -18.23 dBm

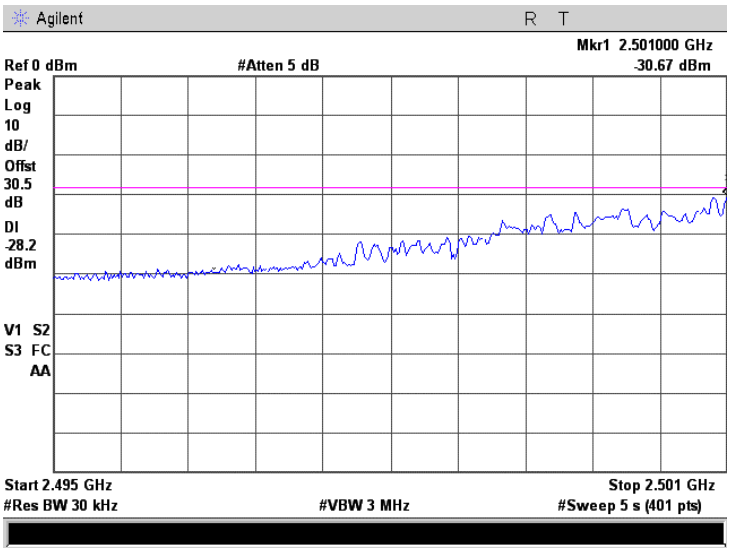
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

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

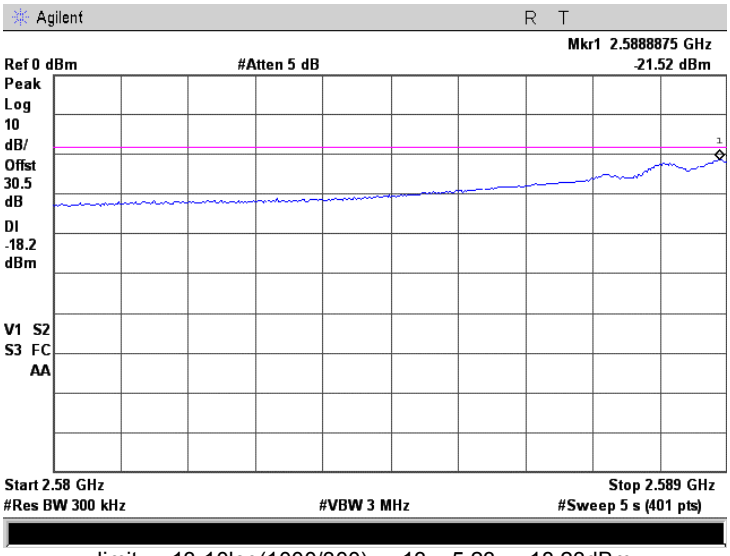
Plot 7.4.87 Band edges test results at low carrier frequency 2495 – 2501 MHz, 5 MHz QPSK (2504.75 MHz)



limit = -13-10log(1000/100) = -13 – 15.23= -28.23dBm

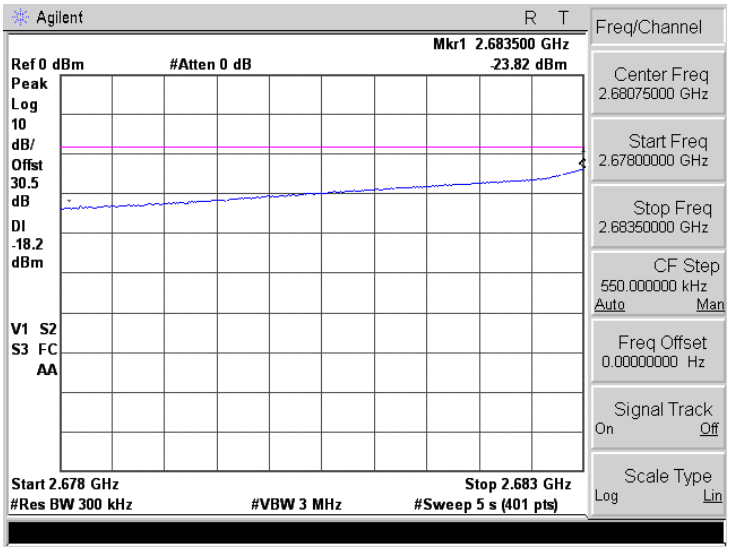
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.88 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 5 MHz QPSK



limit = -13-10log(1000/300) = -13 – 5.23 = -18.23dBm

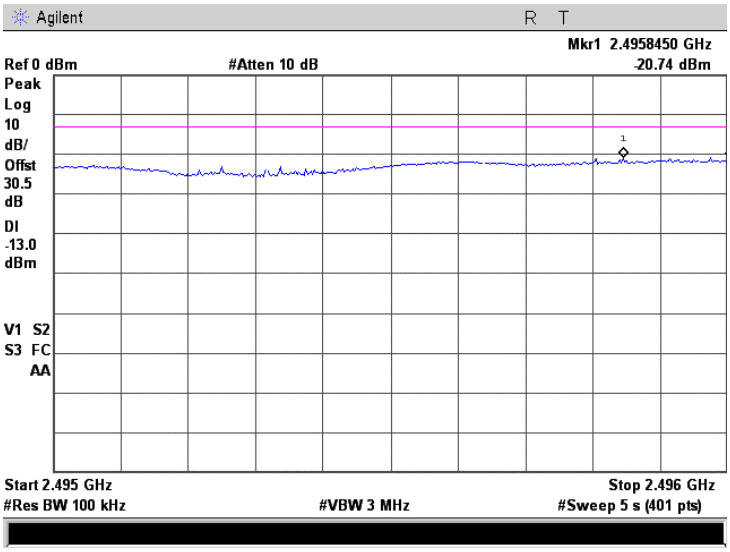
Plot 7.4.89 Band edges test results at high carrier frequency 2678 – 2683.5 MHz, 5 MHz QPSK



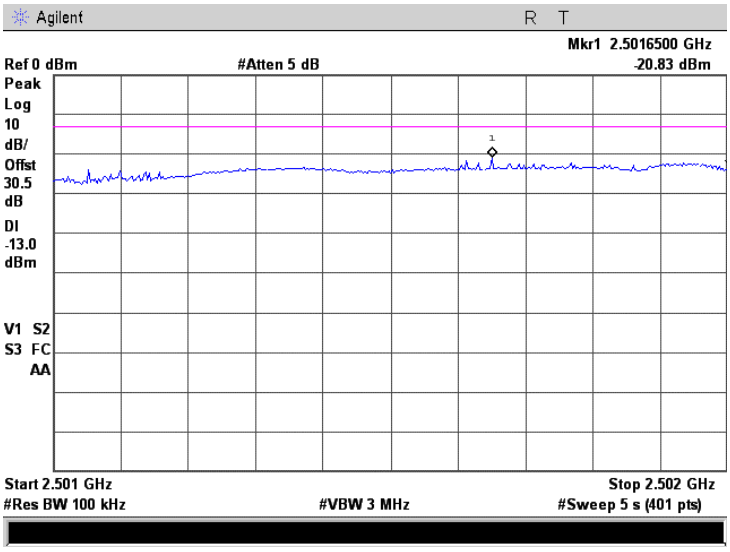
limit = -13-10log(1000/300) = -13 – 15.23 = -18.23 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.90 Band edges test results at low carrier frequency 2495 – 2496 MHz, 5 MHz QPSK

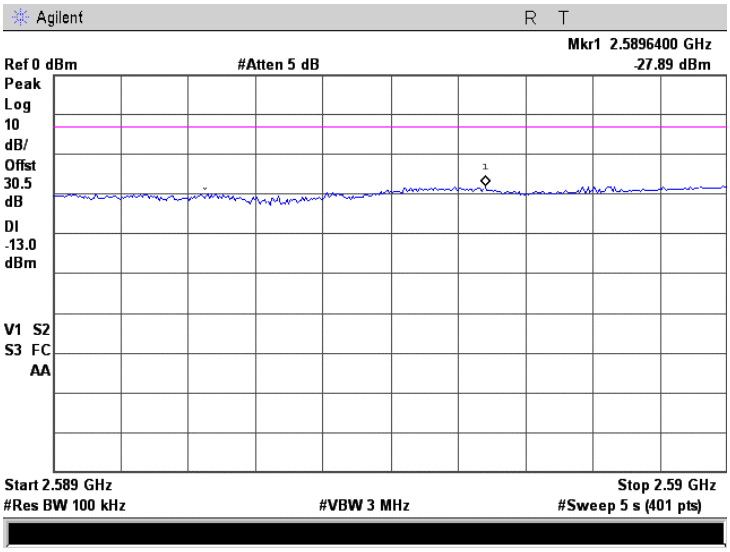


Plot 7.4.91 Band edges test results at low carrier frequency 2501 – 2502 MHz, 5 MHz QPSK (2504.75 MHz)

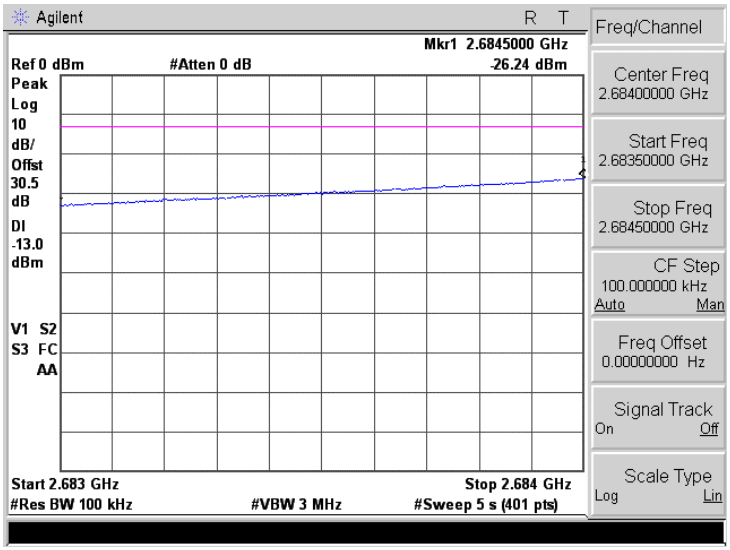


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.92 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 5 MHz QPSK

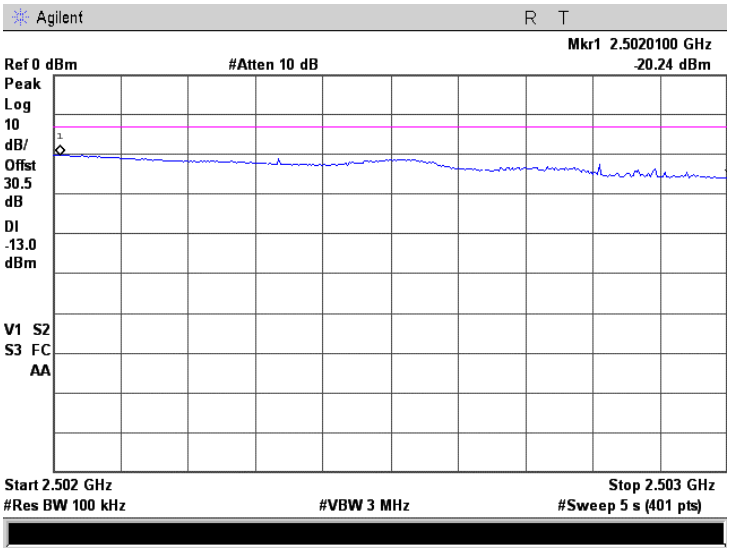


Plot 7.4.93 Band edges test results at high carrier frequency 2683.5 – 2684.5 MHz, 5 MHz QPSK

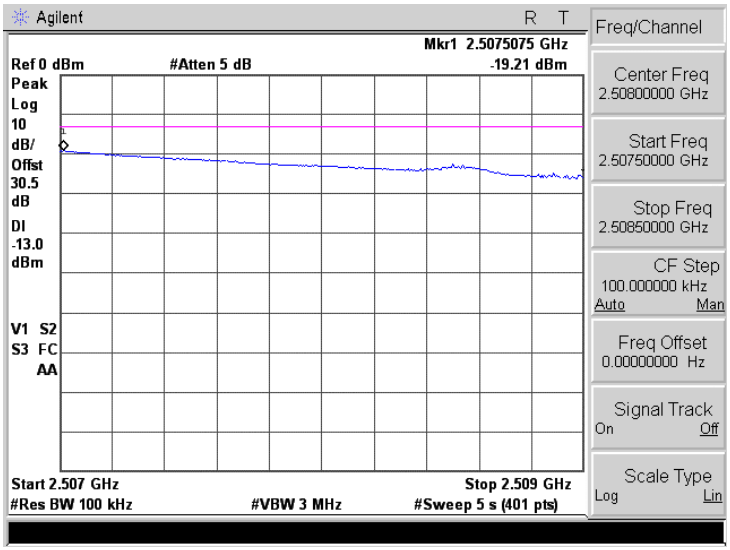


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.94 Band edges test results at low carrier frequency 2502 – 2503 MHz, 5 MHz QPSK

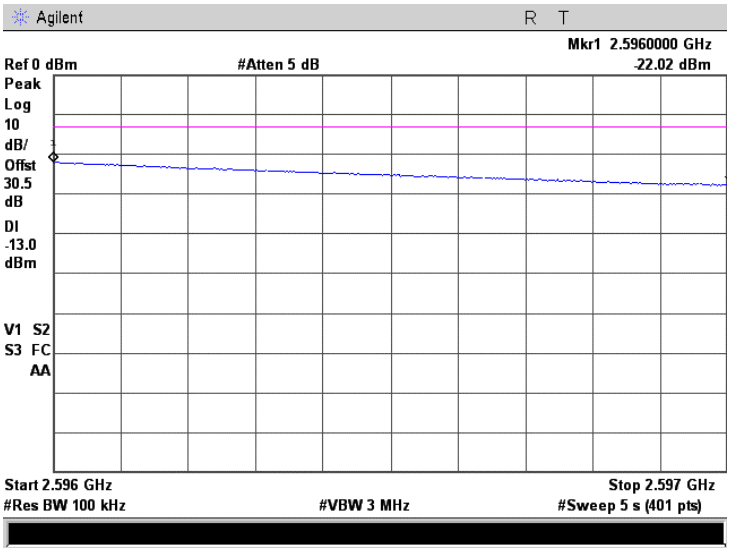


Plot 7.4.95 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 5 MHz QPSK (2504.75 MHz)

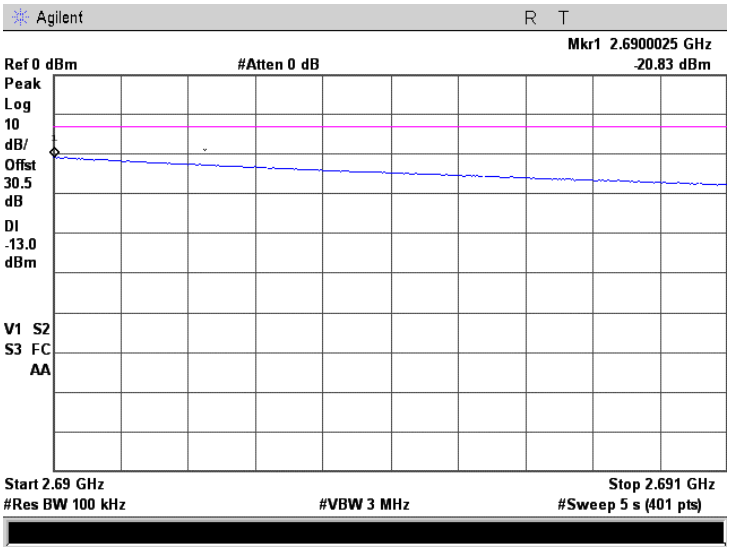


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.96 Band edges test results at mid carrier frequency 2596 – 2597 MHz, 5 MHz QPSK

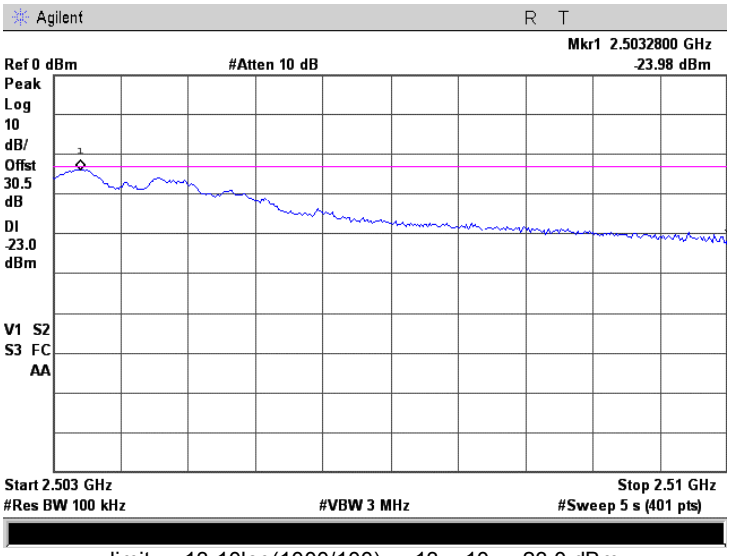


Plot 7.4.97 Band edges test results at high carrier frequency 2690.0 – 2691.0 MHz, 5 MHz QPSK



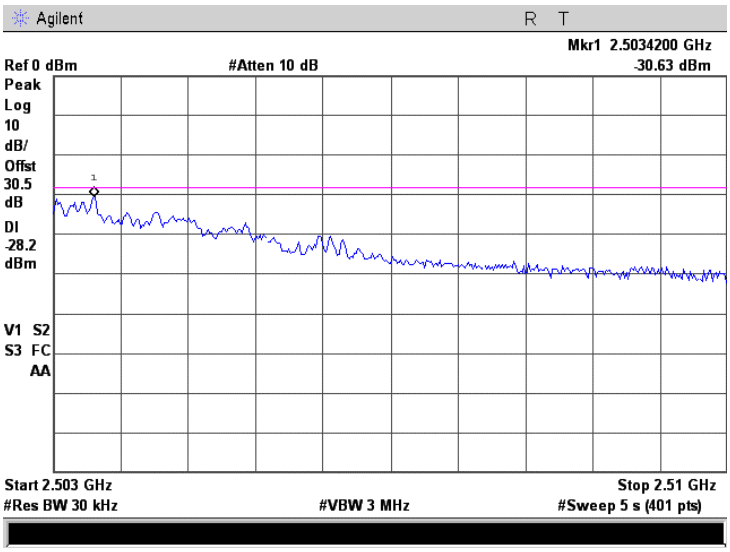
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.98 Band edges test results at low carrier frequency 2503 – 2510 MHz, 5 MHz QPSK, VBW=100 kHz



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

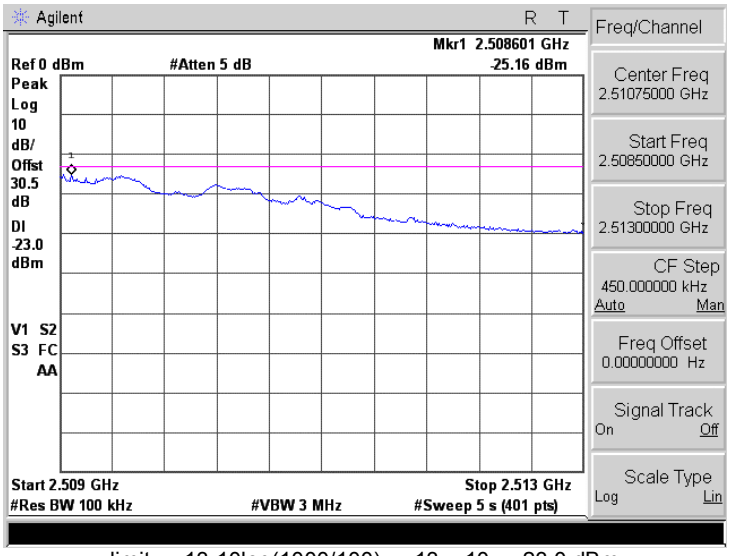
Plot 7.4.99 Band edges test results at low carrier frequency 2503 – 2510 MHz, 5 MHz QPSK, VBW=30 kHz



limit = -13-10log(1000/30) = -13 – 15.23 = -28.23 dBm

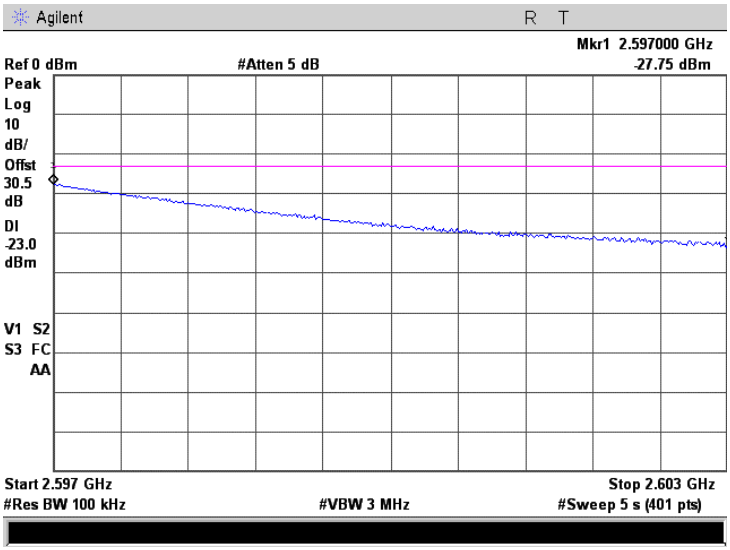
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.100 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

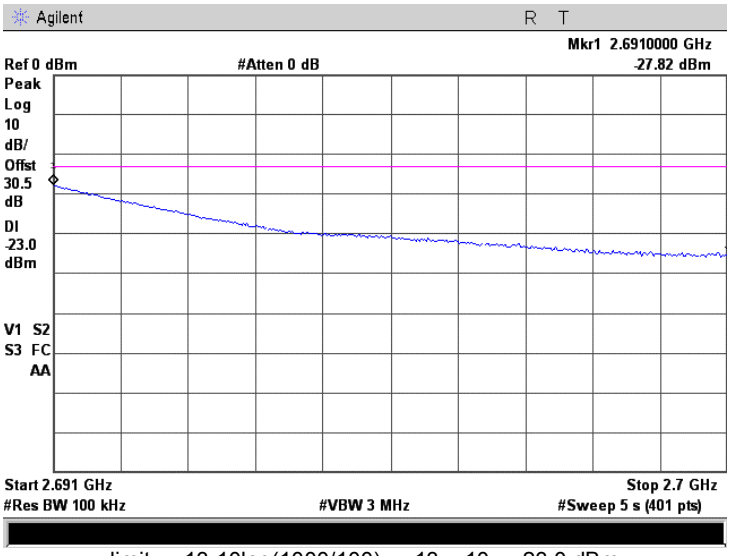
Plot 7.4.101 Band edges test results at mid carrier frequency 2597 – 2603 MHz, 5 MHz QPSK



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

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

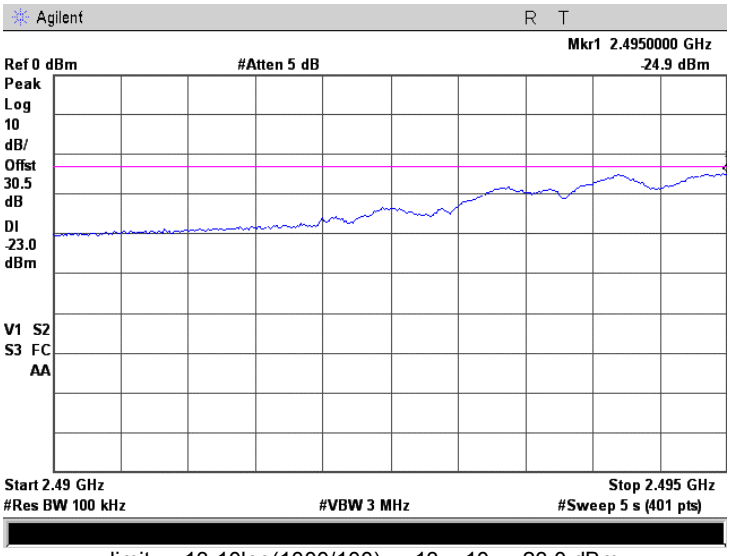
Plot 7.4.102 Band edges test results at high carrier frequency 2691.0 – 2700.0 MHz, 5 MHz QPSK



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

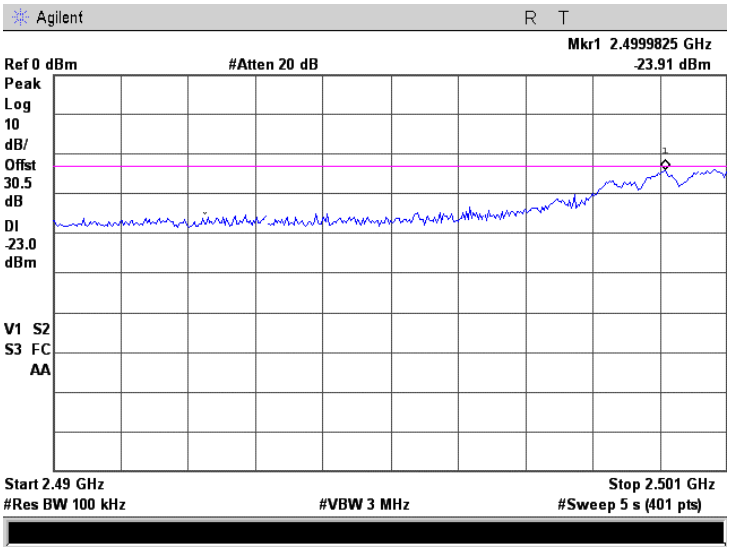
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.103 Band edges test results at low carrier frequency 2490 – 2495 MHz, 5 MHz 16QAM



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

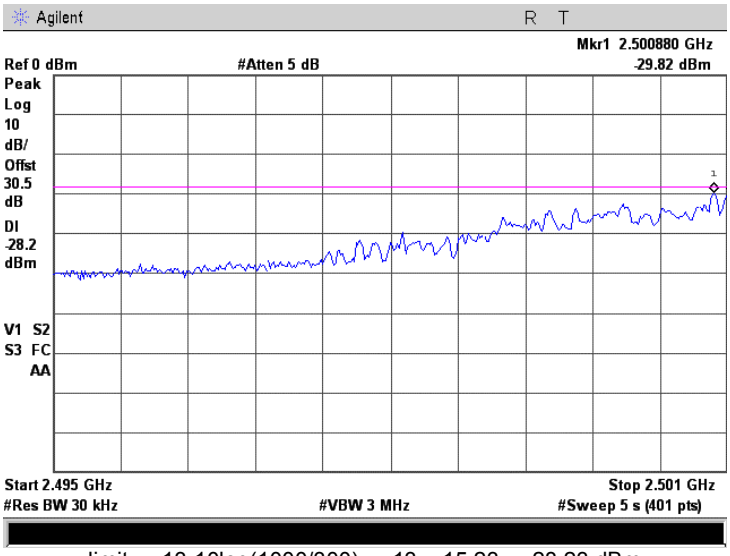
Plot 7.4.104 Band edges test results at low carrier frequency 2490 – 2501 MHz, 5 MHz 16QAM (2504.75 MHz)



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

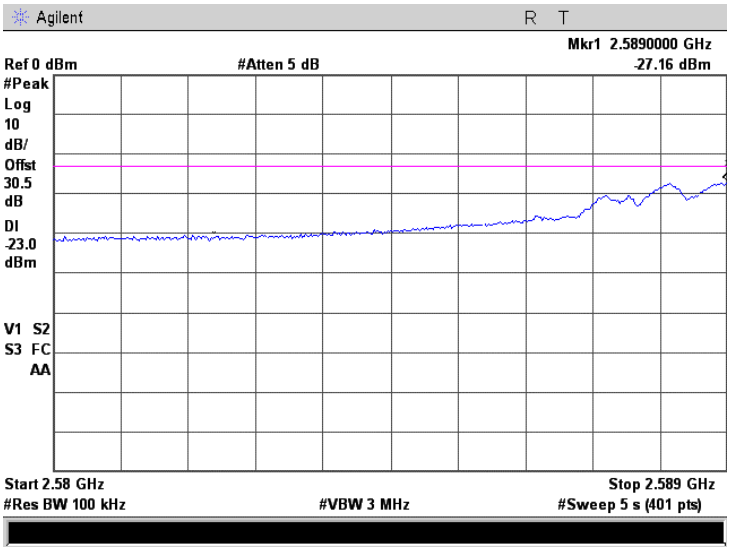
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.105 Band edges test results at low carrier frequency 2495 – 2501 MHz, 5 MHz 16QAM (2504.75 MHz)



limit = -13-10log(1000/300) = -13 – 15.23 = -28.23 dBm

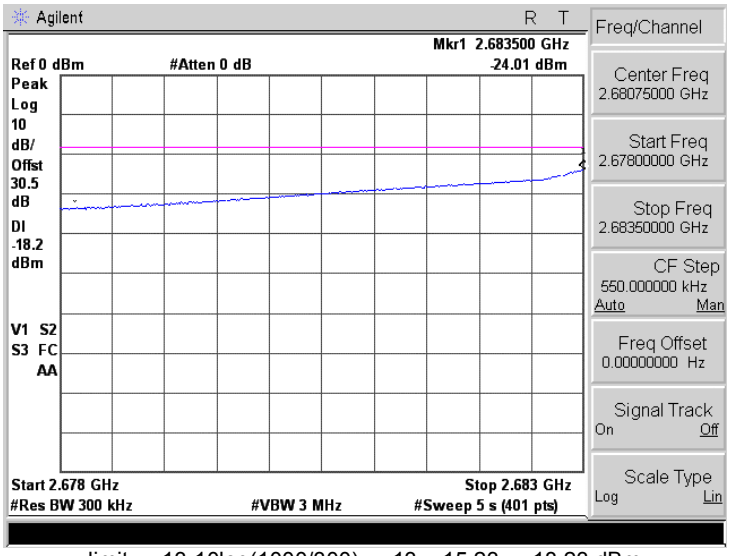
Plot 7.4.106 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 5 MHz 16QAM



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

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

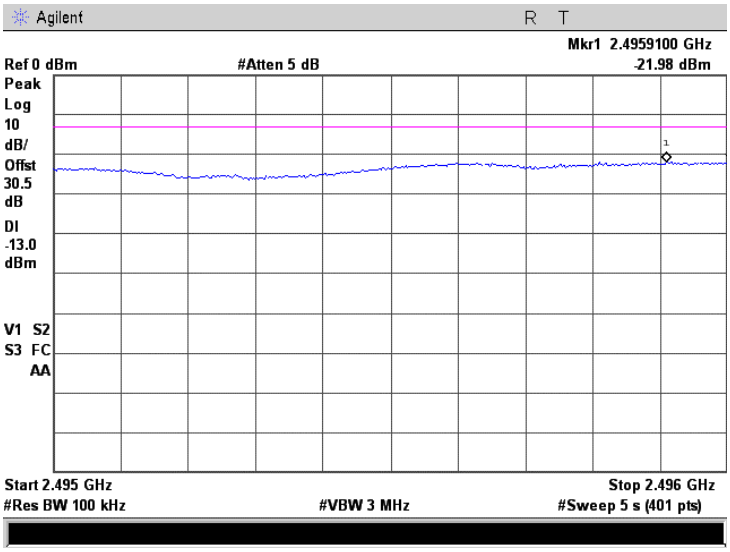
Plot 7.4.107 Band edges test results at high carrier frequency 2678 – 2683.5 MHz, 5 MHz 16QAM



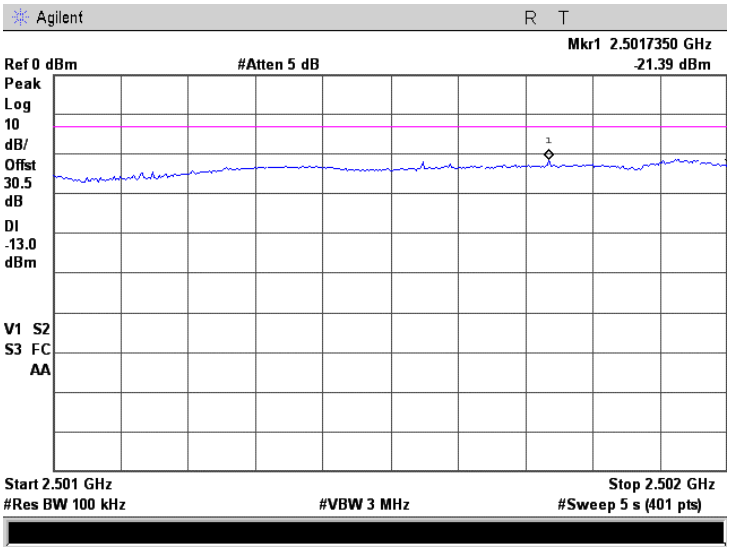
limit = -13-10log(1000/300) = -13 – 15.23 = -18.23 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.108 Band edges test results at low carrier frequency 2495 – 2496 MHz, 5 MHz 16QAM

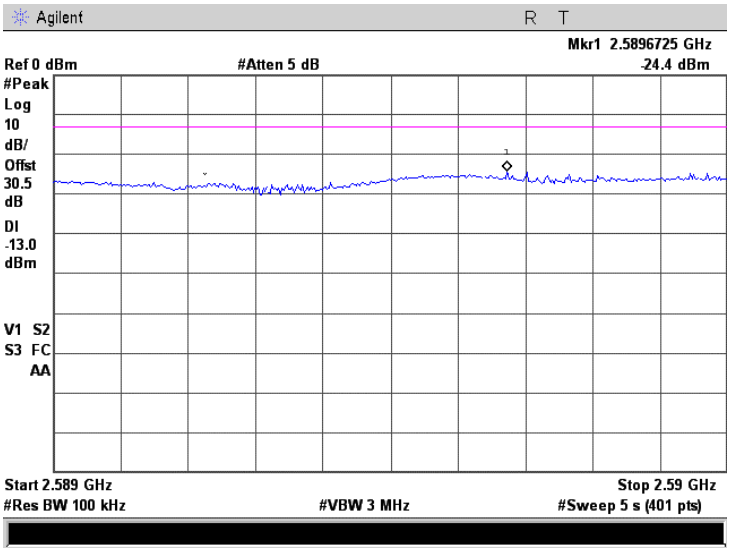


Plot 7.4.109 Band edges test results at low carrier frequency 2501 – 2502 MHz, 5 MHz 16QAM (2504.75 MHz)

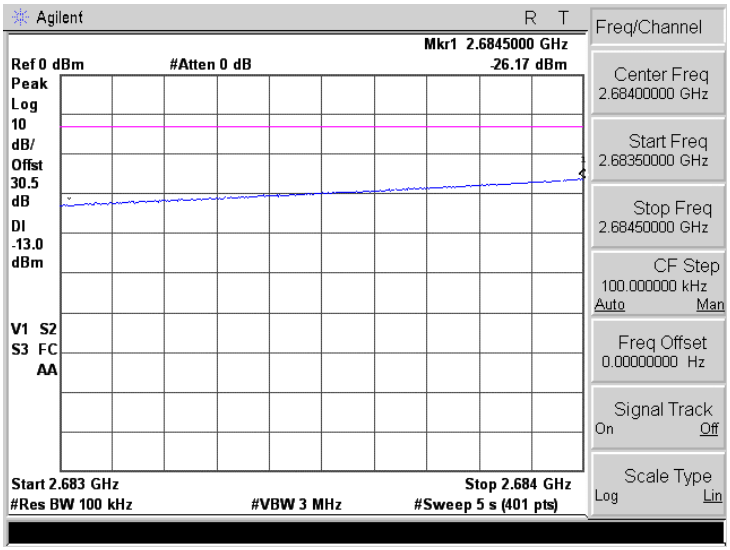


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.110 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 5 MHz 16QAM

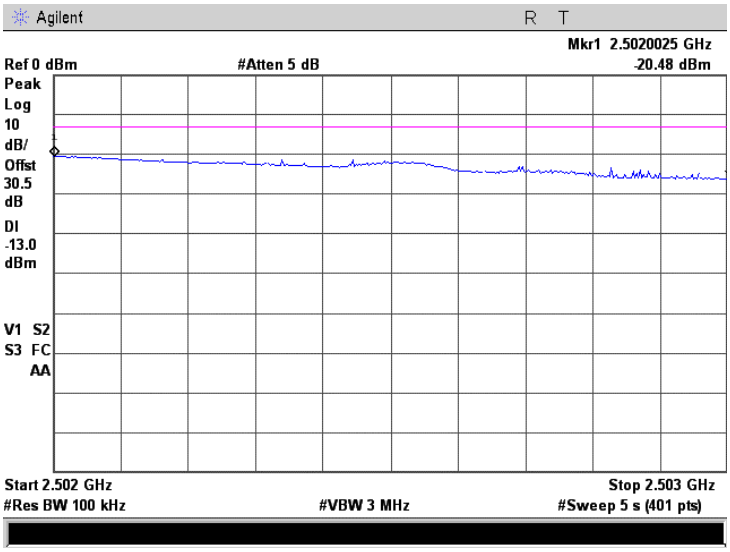


Plot 7.4.111 Band edges test results at high carrier frequency 2683.5 – 2684.5 MHz, 5 MHz 16QAM

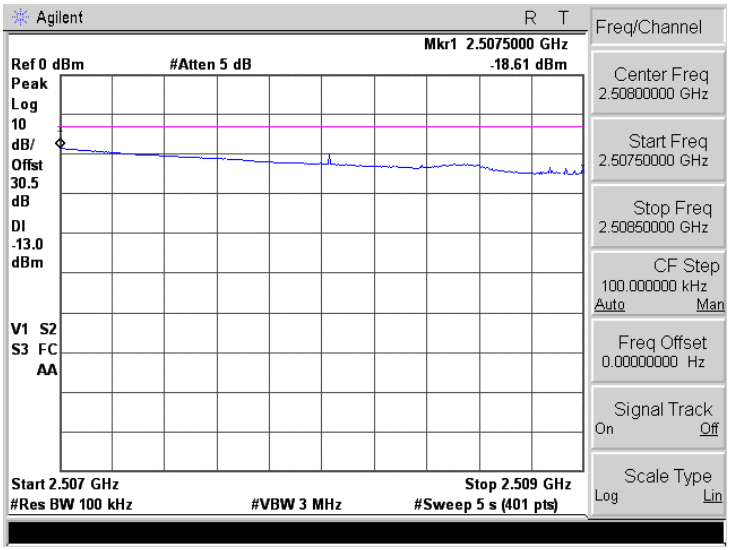


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.112 Band edges test results at low carrier frequency 2502 – 2503 MHz, 5 MHz 16QAM

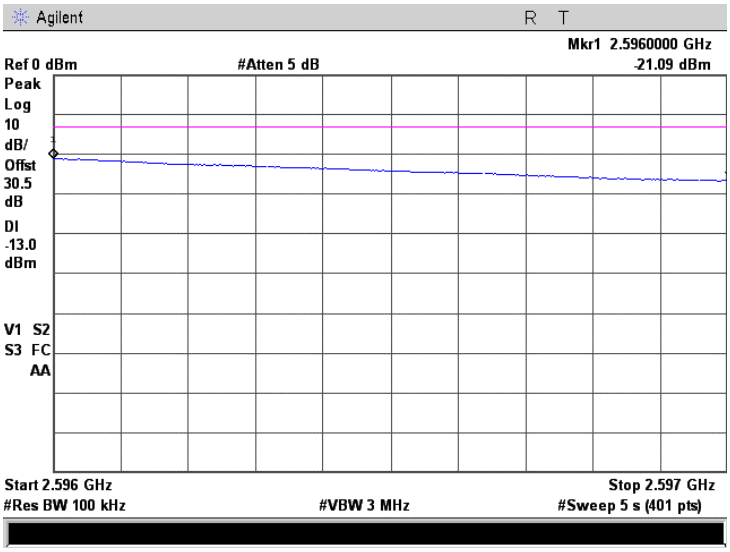


Plot 7.4.113 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 5 MHz 16QAM (2504.75 MHz)

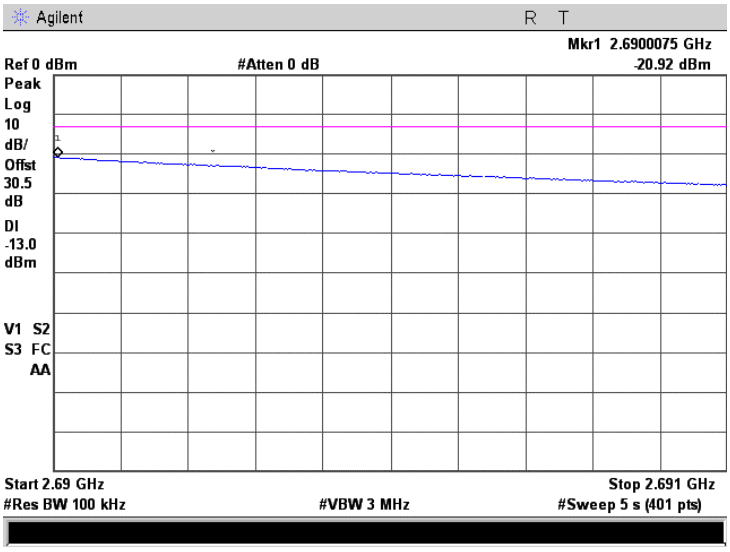


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.114 Band edges test results at mid carrier frequency 2596 – 2597 MHz, 5 MHz 16QAM

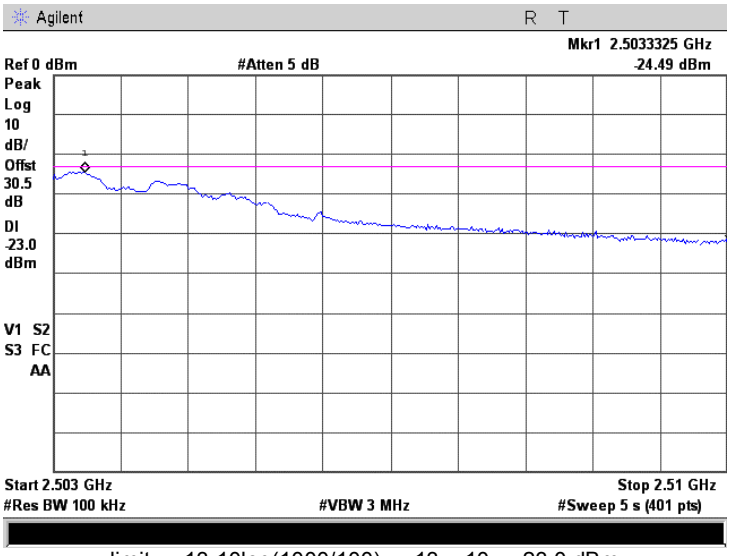


Plot 7.4.115 Band edges test results at high carrier frequency 2690 – 2691 MHz, 5 MHz 16QAM



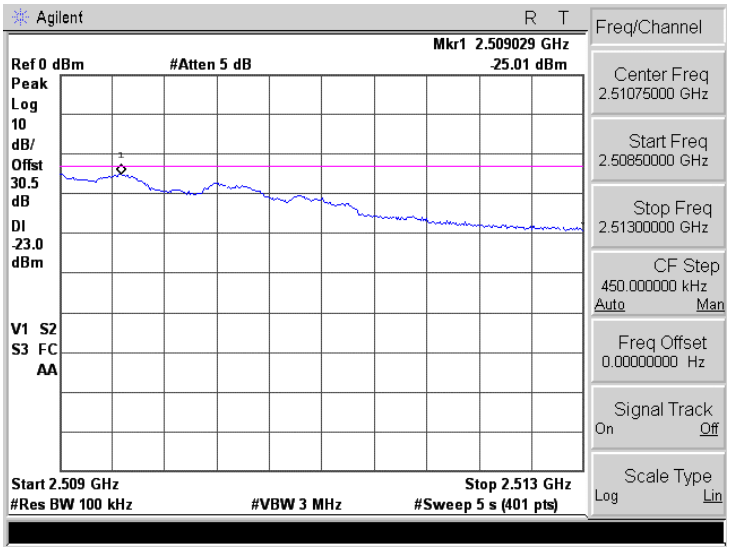
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.116 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

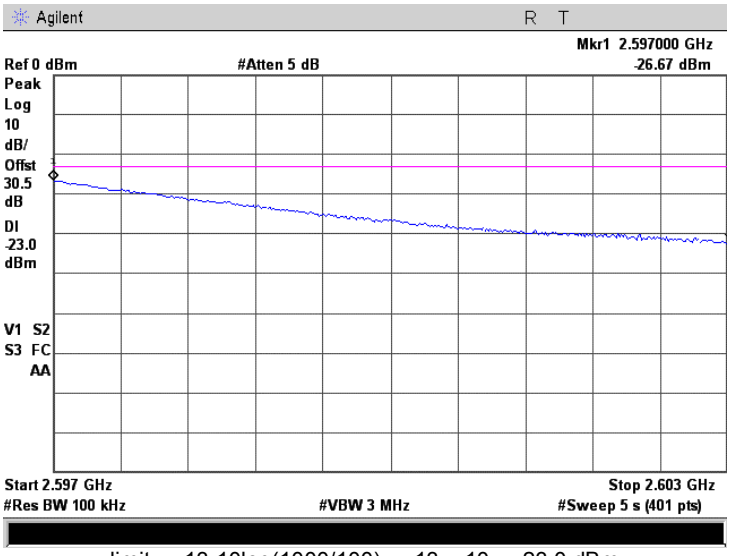
Plot 7.4.117 Band edges test results at low carrier frequency 2508.5 – 2513 MHz, 5 MHz 16QAM (2504.75 MHz)



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

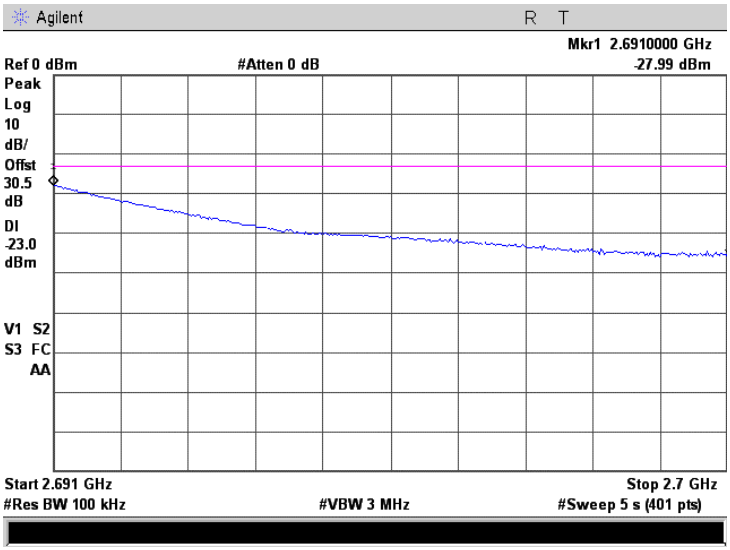
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.118 Band edges test results at mid carrier frequency 2597 – 2603 MHz, 5 MHz 16QAM



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

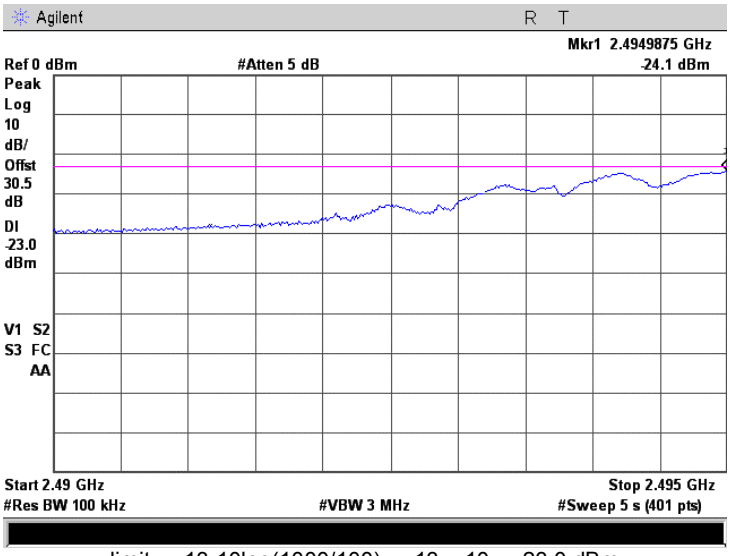
Plot 7.4.119 Band edges test results at high carrier frequency 2691 – 2700 MHz, 5 MHz 16QAM



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

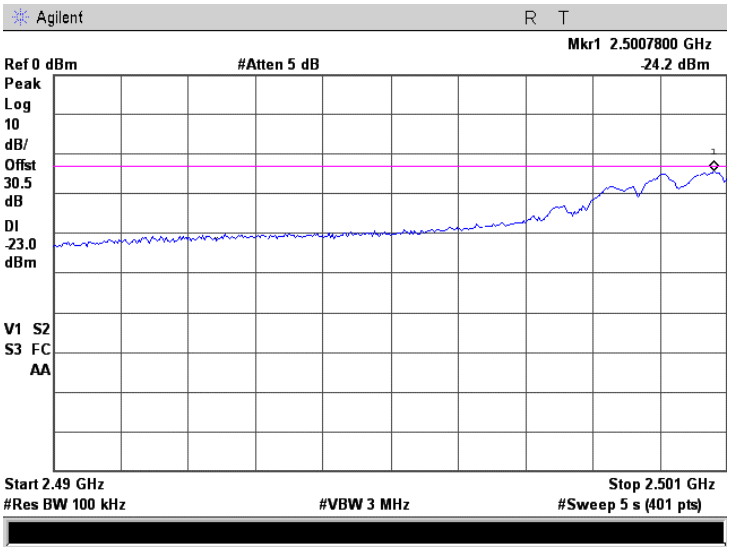
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.120 Band edges test results at low carrier frequency 2490 – 2495 MH, 5 MHz 64QAM



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

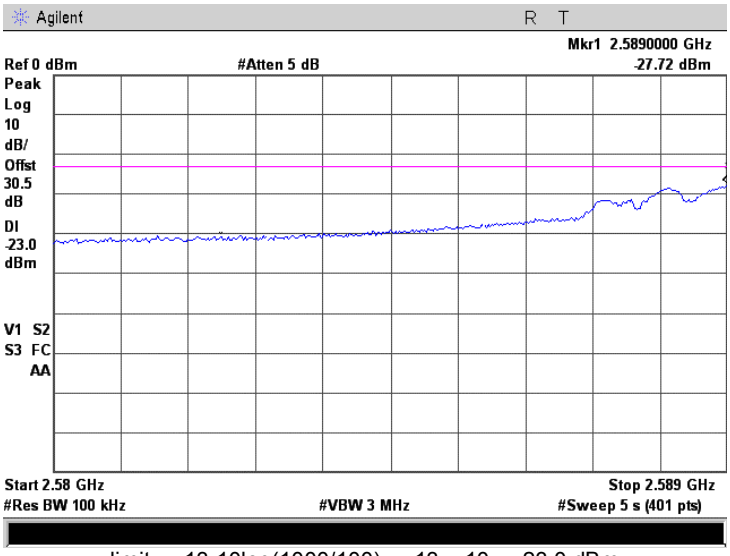
Plot 7.4.121 Band edges test results at low carrier frequency 2490 – 2501 MHz, 5 MHz 64QAM (2504.75 MHz)



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

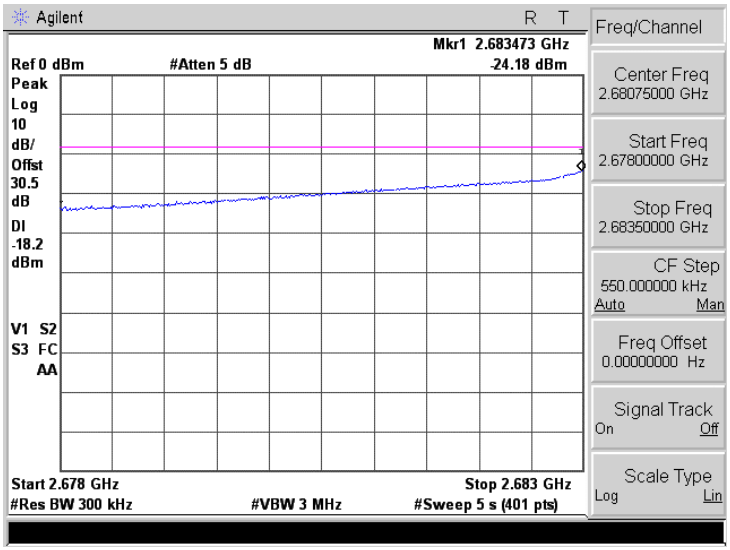
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.122 Band edges test results at mid carrier frequency 2580 – 2589 MHz, 5 MHz 64QAM



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

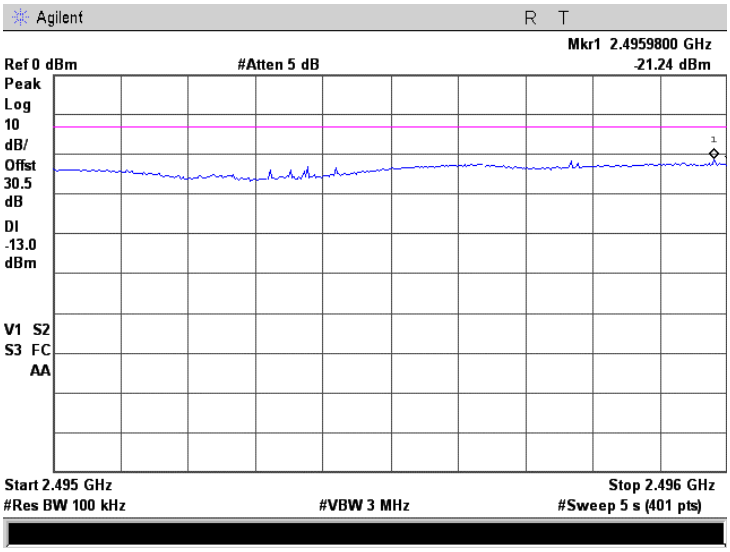
Plot 7.4.123 Band edges test results at high carrier frequency 2678 – 2683.5 MHz, 5 MHz 64QAM



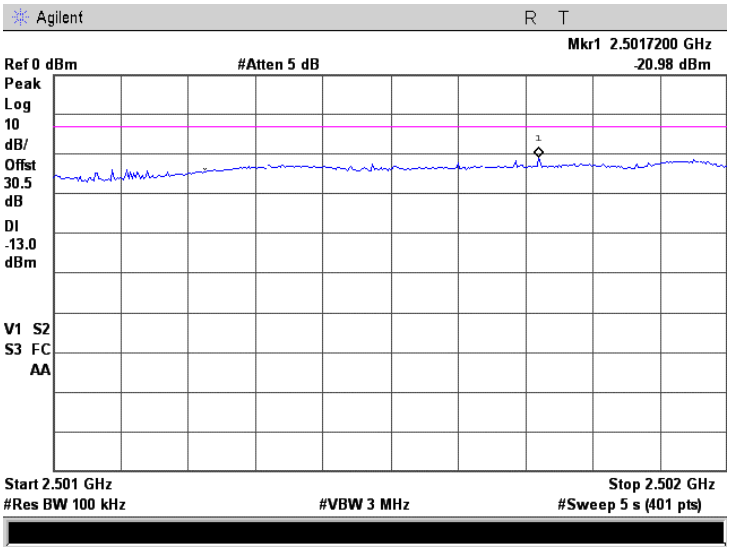
limit = -13-10log(1000/300) = -13 – 15.23 = -18.23 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.124 Band edges test results at low carrier frequency 2495 – 2496 MHz, 5 MHz 64QAM

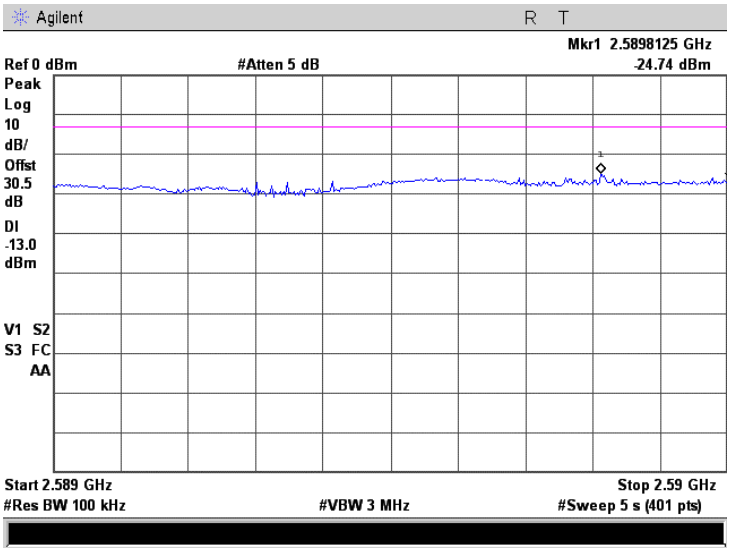


Plot 7.4.125 Band edges test results at low carrier frequency 2501 – 2502 MHz 5 MHz, 64QAM (2504.75 MHz)

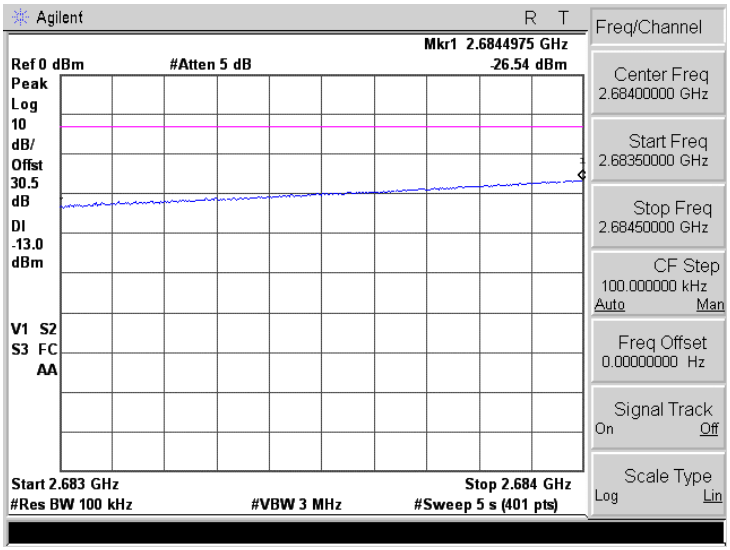


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.126 Band edges test results at mid carrier frequency 2589 – 2590 MHz, 5 MHz 64QAM

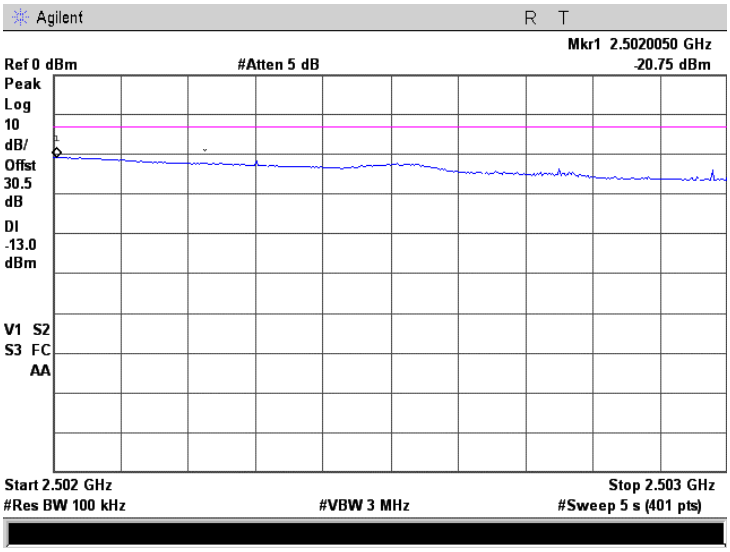


Plot 7.4.127 Band edges test results at high carrier frequency 2683.5 – 2684.5 MHz, 5 MHz 64QAM

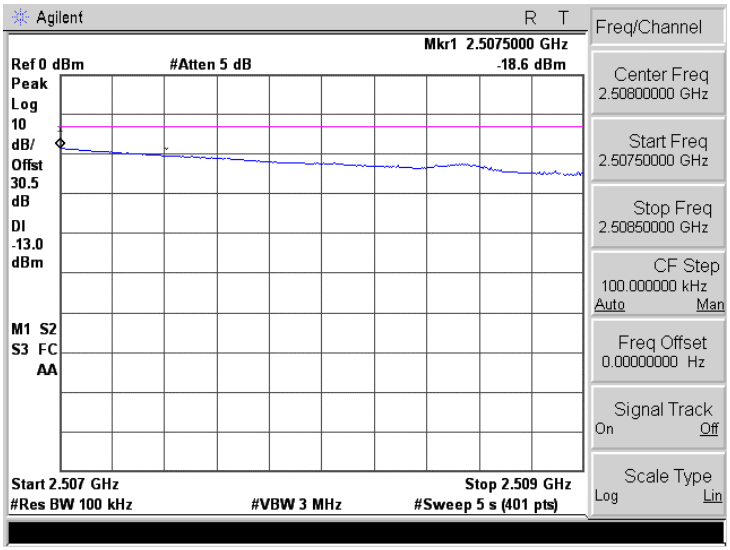


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.128 Band edges test results at low carrier frequency 2502 – 2503 MHz, 5 MHz 64QAM

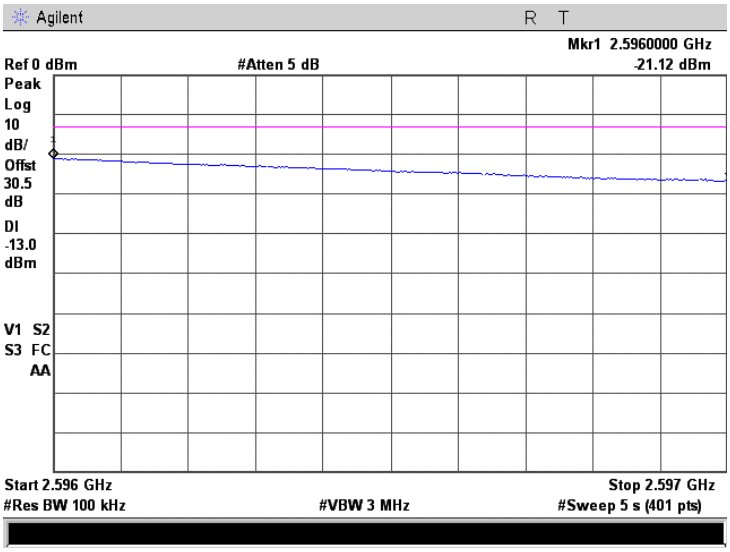


Plot 7.4.129 Band edges test results at low carrier frequency 2507.5 – 2508.5 MHz, 5 MHz 64QAM (2504.75 MHz)

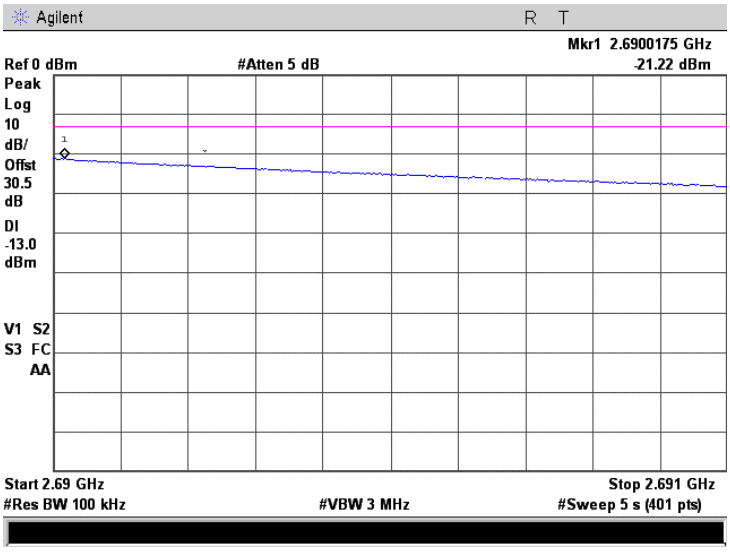


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.130 Band edges test results at mid carrier frequency 2596 – 2597 MHz, 5 MHz 64QAM

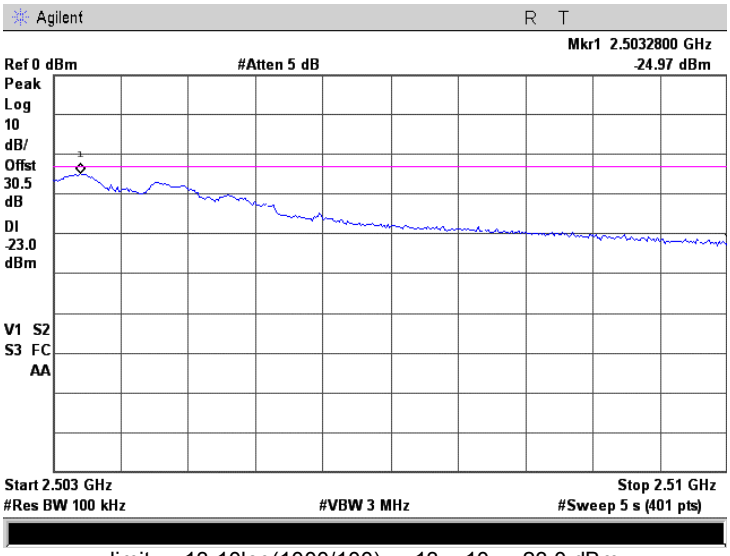


Plot 7.4.131 Band edges test results at high carrier frequency 2690 – 2691 MHz, 5 MHz 64QAM



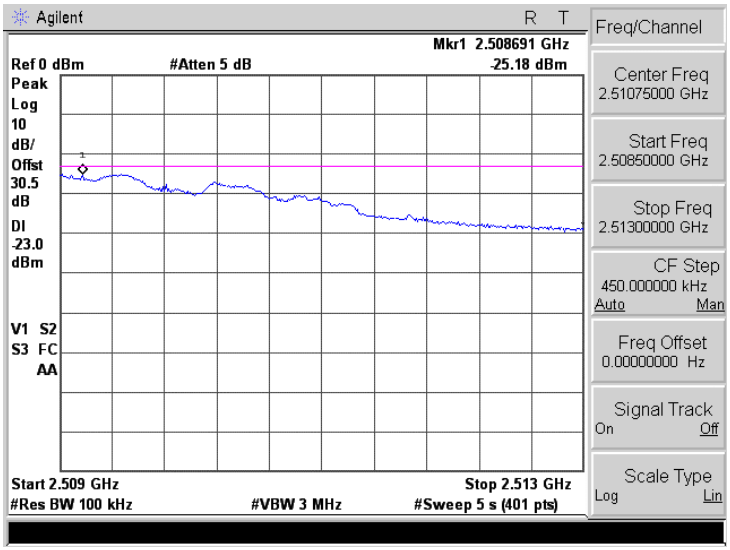
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.132 Band edges test results at low carrier frequency 2503 – 2510 MHz, 5 MHz 64QAM



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

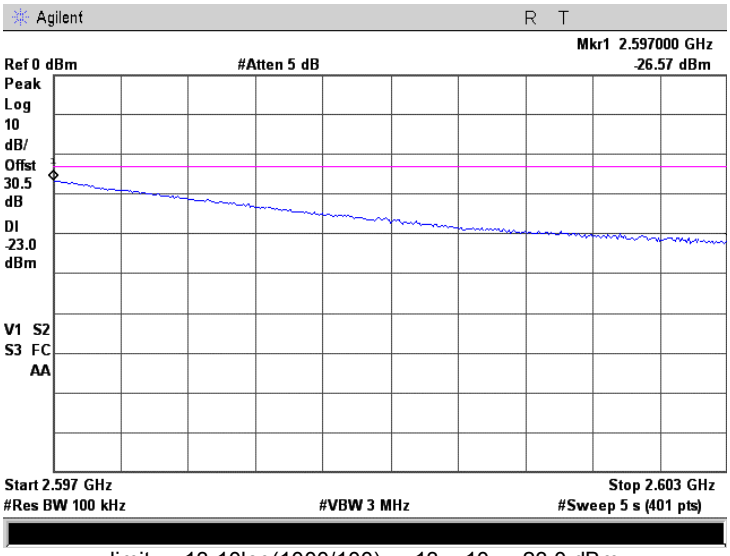
Plot 7.4.133 Band edges test results at low carrier frequency 2508.5 – 2513 MHz, 5 MHz 64QAM (2504.75 MHz)



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

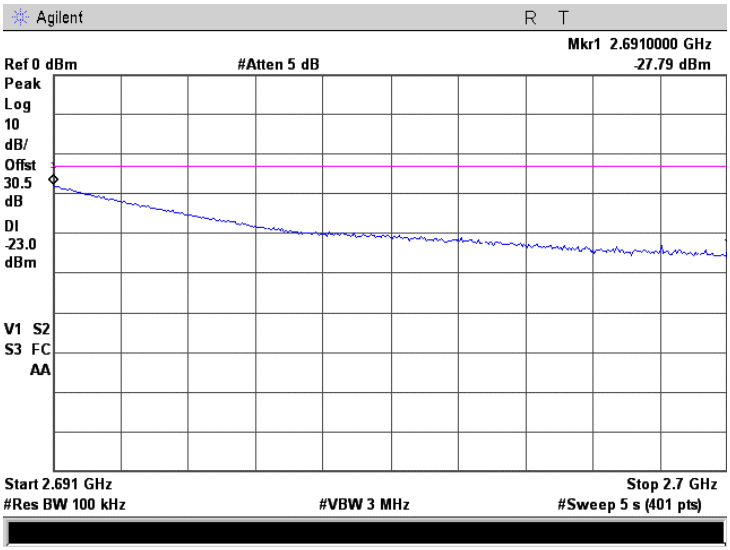
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.134 Band edges test results at mid carrier frequency 2597 – 2603 MHz, 5 MHz 64QAM



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

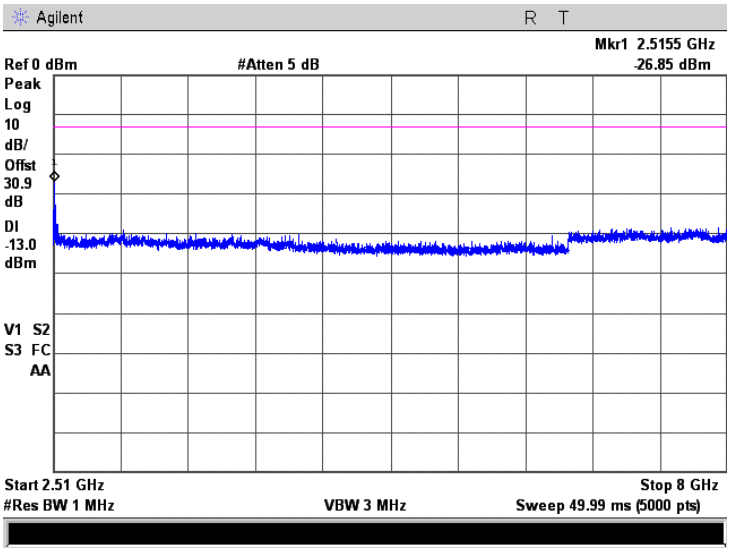
Plot 7.4.135 Band edges test results at high carrier frequency 2691 – 2700 MHz, 5 MHz 64QAM



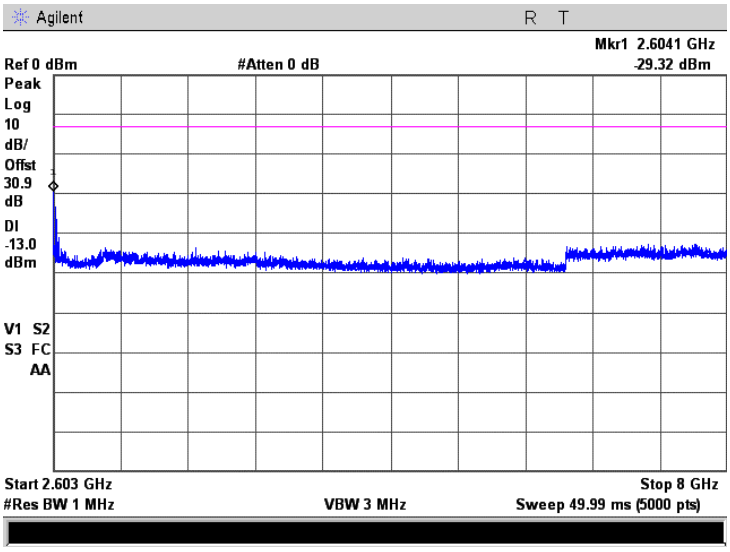
limit = -13-10log(1000/100) = -13 – 10 = -23.0 dBm

Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.136 Spurious emission measurements in 2510 - 8000 MHz range at low carrier frequency (5MHz BW 16QAM)

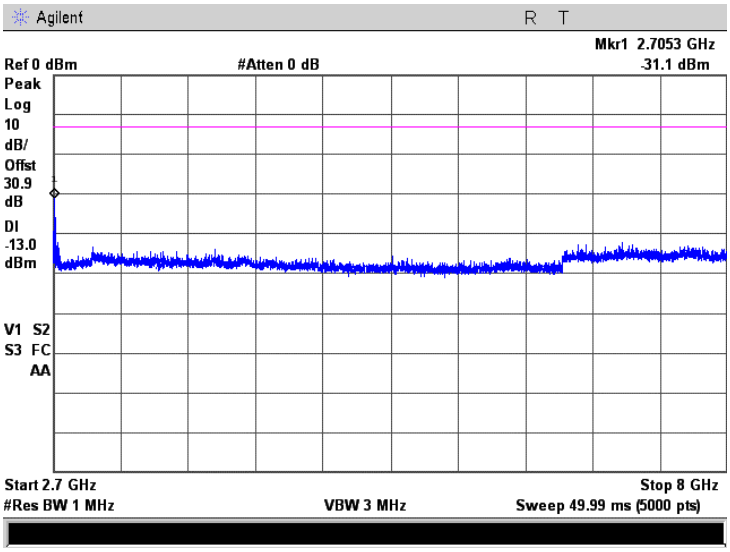


Plot 7.4.137 Spurious emission measurements in 2603 - 8000 MHz at mid carrier frequency (5MHz BW 16QAM)



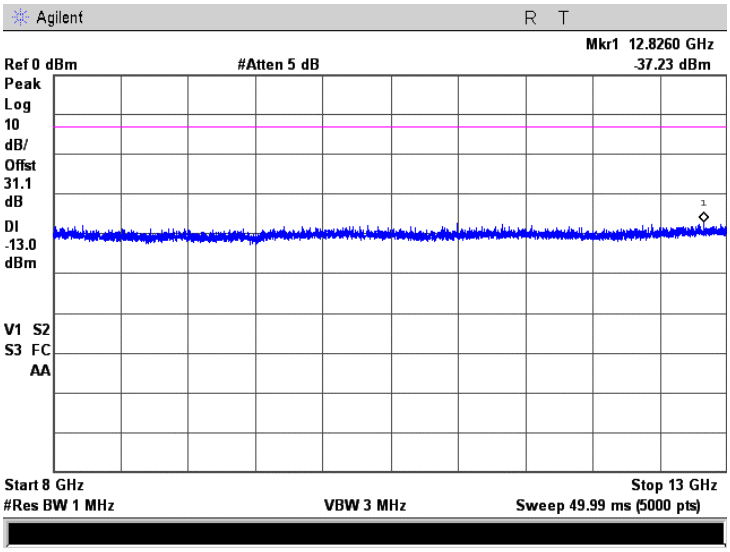
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.138 Spurious emission measurements in 2700 - 8000 MHz at high carrier frequency (5MHz BW 16QAM)

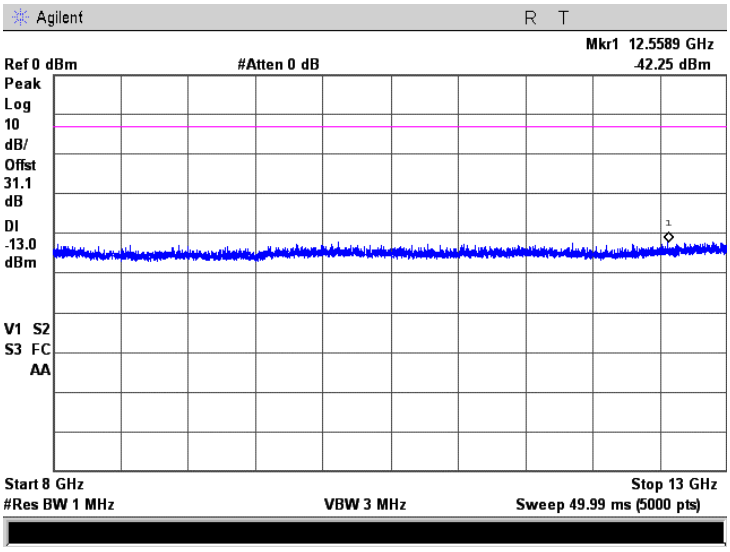


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.139 Spurious emission measurements in 8000 - 13000 MHz range at low carrier frequency (5MHz BW 6QAM)

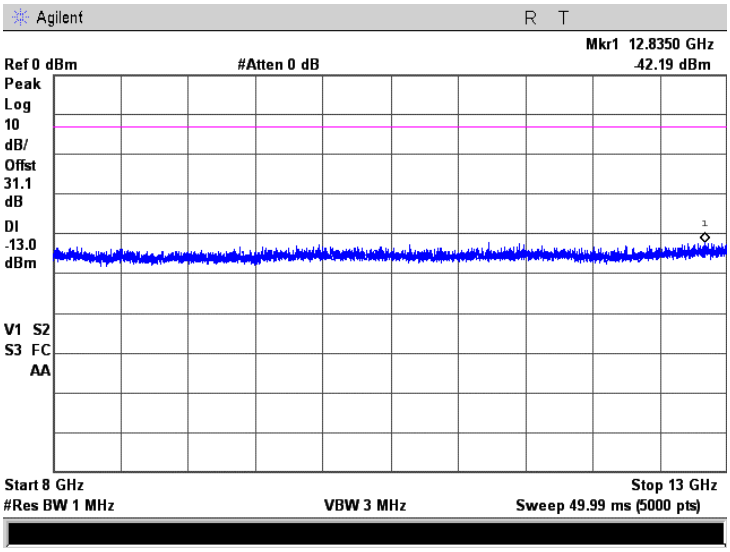


Plot 7.4.140 Spurious emission measurements in 8000 - 13000 MHz at mid carrier frequency (5MHz BW 16QAM)



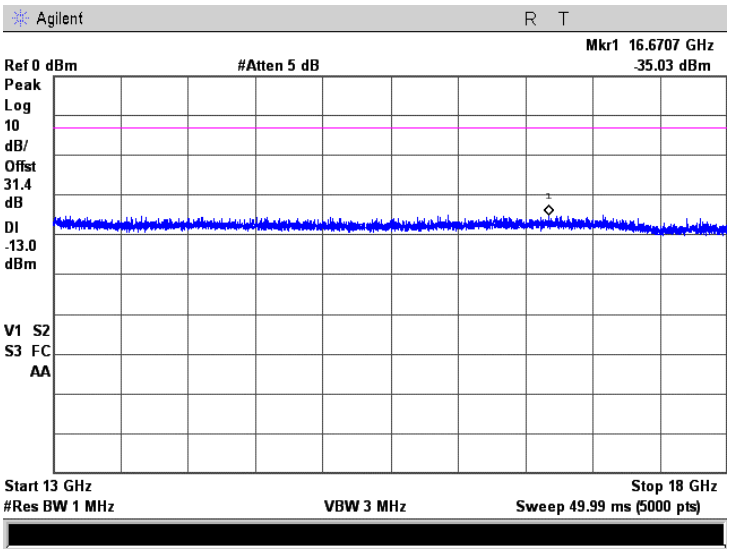
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.141 Spurious emission measurements in 8000 - 13000 MHz at high carrier frequency (5MHz BW 16QAM)

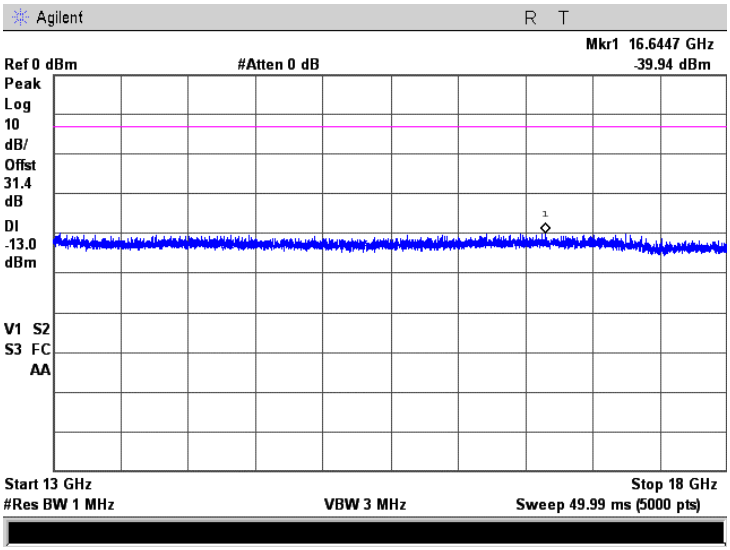


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.142 Spurious emission measurements in 13000 - 18000 MHz range at low carrier frequency (5MHz BW 64QAM)

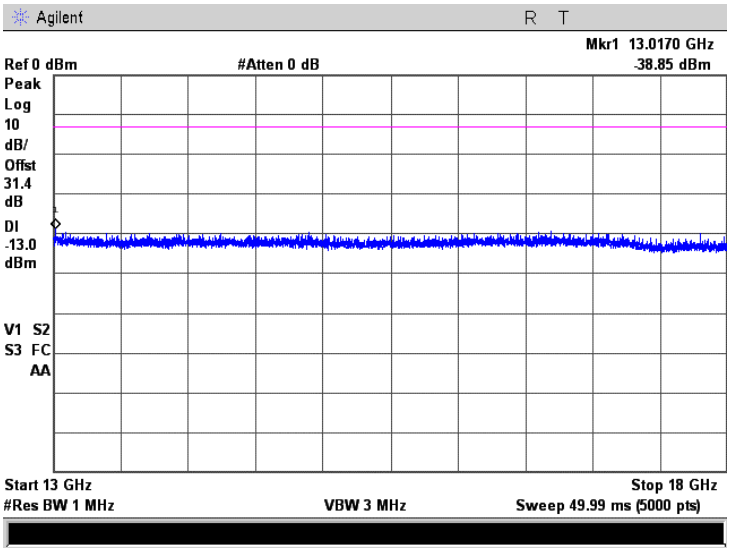


Plot 7.4.143 Spurious emission measurements in 13000 - 18000 MHz at mid carrier frequency (5MHz BW 16QAM)



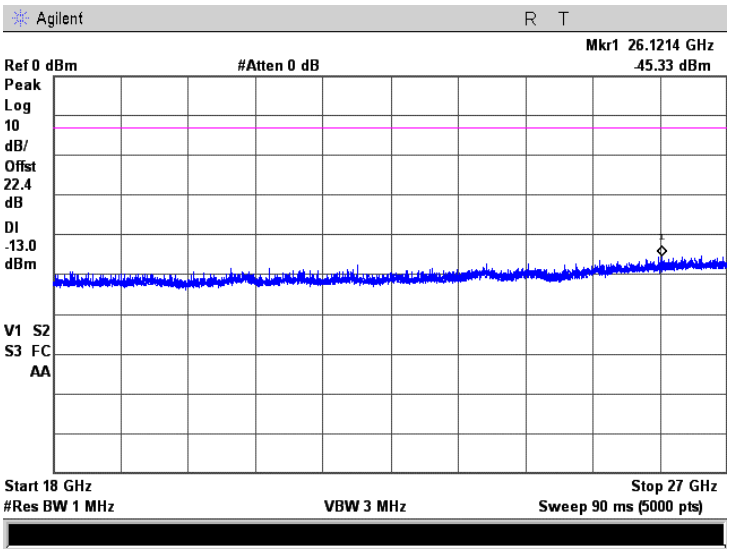
Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.144 Spurious emission measurements in 13000 - 18000 MHz at high carrier frequency (5MHz BW 16QAM)

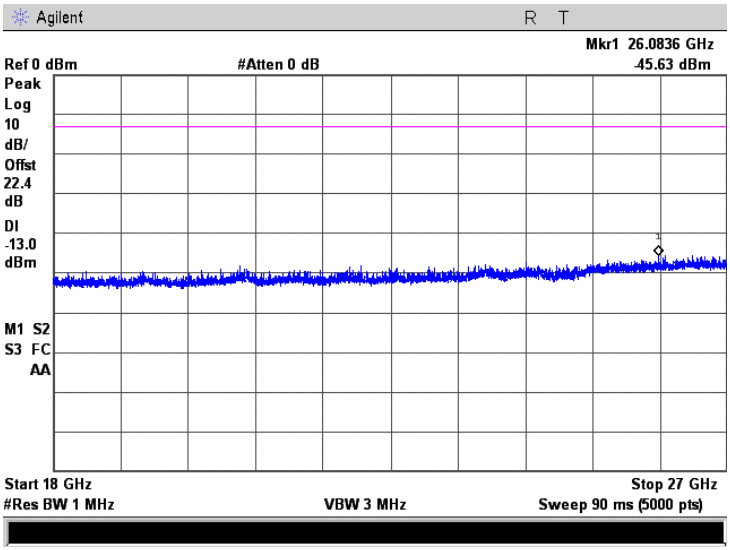


Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.145 Spurious emission measurements in 18000 - 27000 MHz range at low carrier frequency (5MHz BW 16QAM)

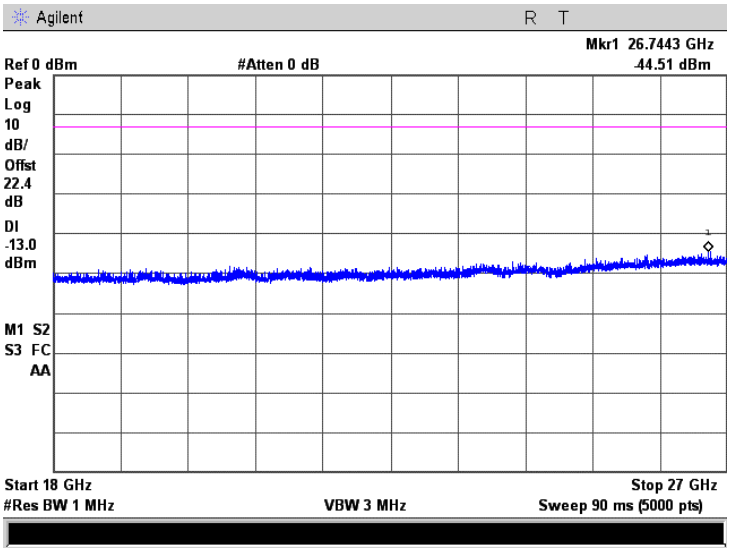


Plot 7.4.146 Spurious emission measurements in 18000 - 27000 MHz at mid carrier frequency (5MHz BW 16QAM)



Test specification:	Section 90.210, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/21/2008 9:46:42 AM		
Temperature: 22ºC	Air Pressure: 1015 hPa	Relative Humidity: 48 %	Power Supply: 48 VDC
Remarks:			

Plot 7.4.147 Spurious emission measurements in 18000 - 27000 MHz at high carrier frequency (5MHz BW 16QAM)



Test specification:	Section 90.213, Frequency stability		
Test procedure:	47 CFR, Section 2.1055; TIA/EIA-603-A Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/15/2008 5:11:42 PM		
Temperature: 22ºC	Air Pressure: 1008 hPa	Relative Humidity: 45%	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.

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.

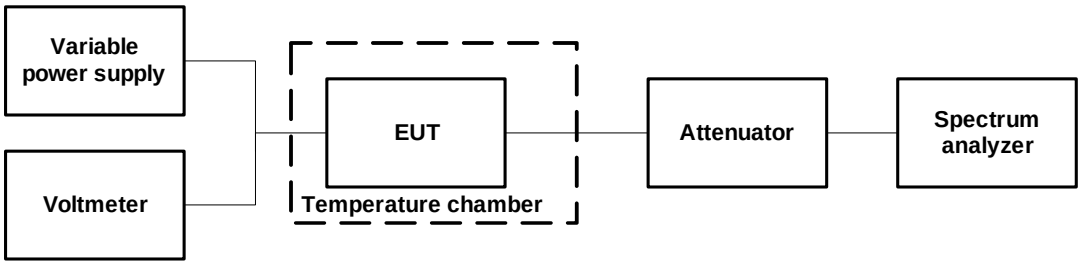
7.5.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.

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.

Figure 7.5.1 Frequency stability test setup



Test specification:	**Section 90.213, Frequency stability**		
Test procedure:	47 CFR, Section 2.1055; TIA/EIA-603-A Section 2.2.2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/15/2008 5:11:42 PM		
Temperature: 22ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 45%	**Power Supply:** 48 VDC
Remarks:			

Table 7.5.2 Frequency stability test results

OPERATING FREQUENCY: 2496 – 2690 MHz
NOMINAL POWER VOLTAGE: 120 VAC
TEMPERATURE STABILIZATION PERIOD: 20 min
POWER DURING TEMPERATURE TRANSITION: Off
SPECTRUM ANALYZER MODE: Peak Hold
RESOLUTION BANDWIDTH: 3 Hz
VIDEO BANDWIDTH: 10 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	2498.998555	2498.998491	2498.998515	2498.998535	2498.998554	2498.998576	2498.998817	0.000000	-1212.00
-20	nominal	2498.998755	NA	NA	NA	NA	NA	2498.999205	0.000000	-948.00
-10	nominal	2498.999265	NA	NA	NA	NA	NA	2498.999397	0.000000	-438.00
0	nominal	2498.999213	2498.999612	2498.999715	2498.999764	2498.999800	2498.999821	2498.999933	230.00000	-490.00
10	nominal	2499.000051	NA	NA	NA	NA	NA	2499.000083	380.00000	0.00
20	15%	2498.999801	NA	NA	NA	NA	NA	2498.999740	98.000000	0.00
20	nominal	2498.999712	NA	NA	NA	NA	NA	2498.999703	9.000000	0.00
20	-15%	2498.999791	NA	NA	NA	NA	NA	2498.999742	88.000000	0.00
30	nominal	2498.999973	2498.999887	2498.999825	2498.999796	2498.999766	2498.999741	2498.999557	270.00000	-146.00
40	nominal	2498.999155	NA	NA	NA	NA	NA	2498.999016	0.000000	-687.00
50	nominal	2498.999550	2498.999361	2498.999296	2498.999239	2498.999188	2498.999140	2498.998907	0.000000	-796.00
Mid carrier frequency 2596.00 MHz										
-30	nominal	2595.998775	2595.998786	2595.998783	2595.998786	2595.998789	2595.998790	2595.998797	0.00	-1208.30
-20	nominal	2595.999215	NA	NA	NA	NA	NA	2595.999200	0.00	-783.30
-10	nominal	2595.999285	NA	NA	NA	NA	NA	2595.999256	0.00	-727.30
0	nominal	2595.999437	2595.999813	2595.999897	2595.999924	2595.999942	2595.999954	2596.000040	56.70	-546.30
10	nominal	2596.000066	NA	NA	NA	NA	NA	2596.000082	98.70	0.00
20	15%	2595.999774	NA	NA	NA	NA	NA	2595.999764	0.00	-219.30
20	nominal	2595.999913	NA	NA	NA	NA	NA	2595.999983	0.00	-70.30
20	-15%	2596.000187	NA	NA	NA	NA	NA	2595.999987	203.70	0.00
30	nominal	2595.999540	2595.999531	2595.999523	2595.999520	2595.999513	2595.999508	2595.999481	0.00	-502.30
40	nominal	2595.999311	NA	NA	NA	NA	NA	2595.999060	0.00	-923.30
50	nominal	2595.998884	2595.998845	2595.998849	2595.998849	2595.998849	2595.998849	2595.998851	0.00	-1138.30
High carrier frequency 2687.25 MHz										
-30	nominal	2687.248737	2687.248742	2687.248753	2687.248753	2687.248753	2687.248753	2687.248761	0.00	-1045.00
-20	nominal	2687.249165	NA	NA	NA	NA	NA	2687.249140	0.00	-642.00
-10	nominal	2687.248727	NA	NA	NA	NA	NA	2687.249275	0.00	-1055.00
0	nominal	2687.249330	2687.249822	2687.249917	2687.249952	2687.249969	2687.249983	2687.250050	268.00	-452.00
10	nominal	2687.250041	NA	NA	NA	NA	NA	2687.250059	277.00	0.00
20	15%	2687.249873	NA	NA	NA	NA	NA	2687.249789	91.00	0.00
20	nominal	2687.249818	NA	NA	NA	NA	NA	2687.249782	36.00	0.00
20	-15%	2687.249806	NA	NA	NA	NA	NA	2687.249763	24.00	-19.00
30	nominal	2687.249612	2687.249596	2687.249568	2687.249551	2687.249540	2687.249531	2687.249482	0.00	-300.00
40	nominal	2687.249578	NA	NA	NA	NA	NA	2687.249139	0.00	-643.00
50	nominal	2687.248791	2687.248762	2687.248771	2687.248774	2687.248777	2687.248783	2687.248842	0.00	-1020.00

* - Reference frequency

Test specification:	Section 90.213, Frequency stability		
Test procedure:	47 CFR, Section 2.1055; TIA/EIA-603-A Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/15/2008 5:11:42 PM		
Temperature: 22ºC	Air Pressure: 1008 hPa	Relative Humidity: 45%	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								
2502.35	2507.12	2502.348788	2507.120380	2502	2507.5	-0.35	-0.37962	Pass
16QAM								
2502.335	2507.12	2502.333788	2507.12038	2502	2507.5	-0.33379	-0.37962	Pass
64QAM								
2502.35	2507.12	2502.348788	2507.12038	2502	2507.5	-0.34879	-0.37962	Pass
5 MHz BW								
QPSK								
2496.6	2501.37	2496.598788	2501.37038	2496	2502	-0.59879	-0.62962	Pass
2590.6	2595.37	2590.598792	2595.370204	2590	2596	-0.59879	-0.6298	Pass
2684.835	2689.62	2684.833945	2689.620277	2684.5	2690	-0.33395	-0.37972	Pass
16QAM								
2496.6	2501.37	2496.598788	2501.37038	2496	2502	-0.59879	-0.62962	Pass
2590.585	2595.37	2590.583792	2595.370204	2590	2596	-0.58379	-0.6298	Pass
2684.835	2689.62	2684.833945	2689.620277	2684.5	2690	-0.33395	-0.37972	Pass
64QAM								
2496.585	2501.37	2496.583788	2501.37038	2496	2502	-0.58379	-0.62962	Pass
2590.585	2595.37	2590.583792	2595.370204	2590	2596	-0.58379	-0.6298	Pass
2684.835	2689.62	2684.833945	2689.620277	2684.5	2690	-0.33395	-0.37972	Pass
7 MHz BW								
QPSK								
2497.54	2504.48	2497.538788	2504.48038	2496	2507.5	-1.53879	-3.01962	Pass
2592.54	2599.46	2592.538792	2599.460204	2590	2602	-2.53879	-2.5398	Pass
2682.54	2689.44	2682.538945	2689.440277	2679	2690	-3.53895	-0.55972	Pass
16QAM								
2497.56	2504.46	2497.558788	2504.46038	2496	2507.5	-1.55879	-3.03962	Pass
2592.56	2599.46	2592.558792	2599.460204	2590	2602	-2.55879	-2.5398	Pass
2682.54	2689.46	2682.538945	2689.460277	2679	2690	-3.53895	-0.53972	Pass
64QAM								
2497.56	2504.44	2497.558788	2504.44038	2496	2507.5	-1.55879	-3.05962	Pass
2592.54	2599.44	2592.538792	2599.440204	2590	2602	-2.53879	-2.5598	Pass
2682.54	2689.46	2682.538945	2689.460277	2679	2690	-3.53895	-0.53972	Pass
10 MHz BW								
QPSK								
2496.978	2506.551	2496.976788	2506.55138	2496	2507.5	-0.97679	-0.94862	Pass
2591.215	2600.785	2591.213792	2600.785204	2590	2602	-1.21379	-1.2148	Pass
2679.715	2689.3125	2679.713945	2689.312777	2679	2690	-0.71395	-0.68722	Pass
16QAM								
2496.965	2506.5075	2496.963788	2506.50788	2496	2507.5	-0.96379	-0.99212	Pass
2591.215	2600.785	2591.213792	2600.785204	2590	2602	-1.21379	-1.2148	Pass
2679.715	2689.285	2679.713945	2689.285277	2679	2690	-0.71395	-0.71472	Pass
64QAM								
2496.9925	2506.5075	2496.991288	2506.50788	2496	2507.5	-0.99129	-0.99212	Pass
2591.215	2600.8125	2591.213792	2600.812704	2590	2602	-1.21379	-1.1873	Pass
2679.715	2689.285	2679.713945	2689.285277	2679	2690	-0.71395	-0.71472	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 Class A, AC power lines conducted emissions		
Test procedure:	ANSI C63.4, Section 11.5		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/3/2008 12:24:25 PM		
Temperature: 23ºC	Air Pressure: 1009 hPa	Relative Humidity: 44 %	Power Supply: 48 VDC
Remarks:			

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

8.1 Conducted emissions

8.1.1 General

This test was performed to measure the common mode conducted emissions at the EUT power port. The 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

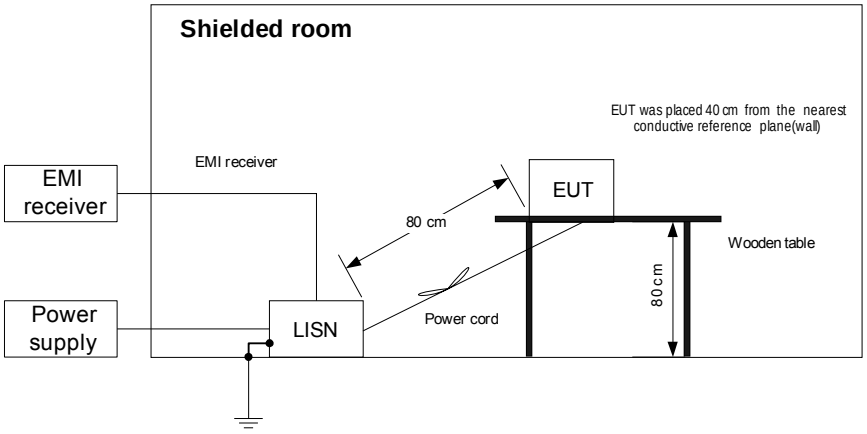
8.1.2.1 The EUT was set up as shown in Figure 8.1.1 and the associated photographs, energized and the EUT performance was checked.

8.1.2.2 The measurements were performed at the EUT power terminals with the LISN connected to the EMI receiver in the frequency range referred to in Table 8.1.2. The unused coaxial connector of the LISN was terminated with 50 Ohm.

8.1.2.3 The position of the EUT cables was varied to find the highest emission.

8.1.2.4 The worst test results with respect to the limits were recorded in Table 8.1.2 and shown in the associated plots.

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



Test specification:	**Section 15.107 Class A, AC power lines conducted emissions**		
Test procedure:	ANSI C63.4, Section 11.5		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/3/2008 12:24:25 PM		
Temperature: 23ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 44 %	**Power Supply:** 48 VDC
Remarks:			

Table 8.1.2 Conducted emission test results

LINE: AC mains
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*		
0.155238	46.70	45.95	65.74	-19.79	36.87	55.74	-18.87	L1	Pass
0.158950	42.40	39.42	65.56	-26.14	29.27	55.56	-26.29		
0.170000	26.31	17.63	65.02	-47.39	3.17	55.02	-51.85		
0.203638	41.35	40.40	63.51	-23.11	32.22	53.51	-21.29		
0.254045	34.36	33.17	61.67	-28.50	24.65	51.67	-27.02		
0.305785	30.58	29.40	60.10	-30.70	21.30	50.10	-28.80		
0.461935	28.27	27.30	56.71	-29.41	25.01	46.71	-21.70		
0.152490	47.40	46.65	65.88	-19.23	36.76	55.88	-19.12	L2	Pass
0.203660	41.00	40.17	63.51	-23.34	30.32	53.51	-23.19		
0.255145	33.45	17.82	61.63	-43.81	-4.54	51.63	-56.17		
0.306430	28.54	27.32	60.08	-32.76	19.18	50.08	-30.90		
0.357810	24.76	23.35	58.84	-35.49	-9.78	48.84	-58.62		
0.461085	27.80	26.56	56.73	-30.17	23.66	46.73	-23.07		

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

Reference numbers of test equipment used

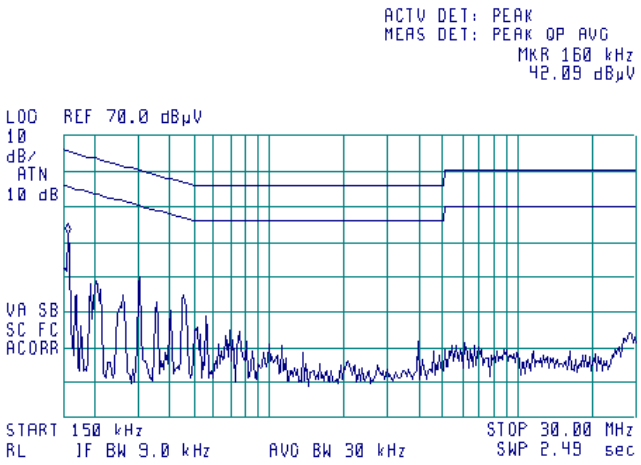
HL 0787	HL 1430	HL 1613	HL 2888	HL 3612			

Full description is given in Appendix A.

Test specification:	Section 15.107 Class A, AC power lines conducted emissions		
Test procedure:	ANSI C63.4, Section 11.5		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/3/2008 12:24:25 PM		
Temperature: 23ºC	Air Pressure: 1009 hPa	Relative Humidity: 44 %	Power Supply: 48 VDC
Remarks:			

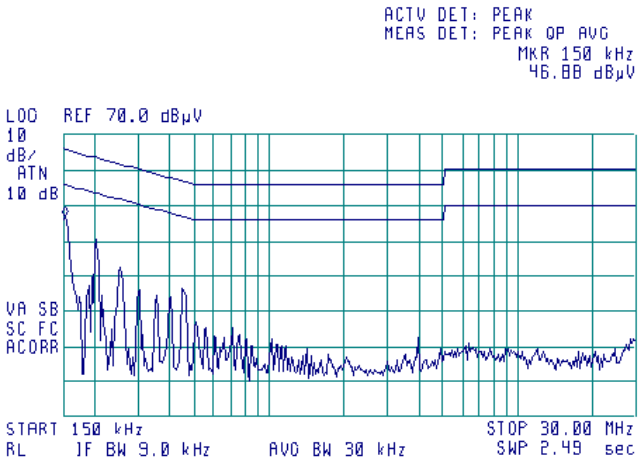
Plot 8.1.1 Conducted emission measurements

LINE: L1
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 8.1.2 Conducted emission measurements

LINE: L2
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	Section 15.109 Class A, Radiated emissions		
Test procedure:	ANSI C63.4, Section 11.6		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:55:00 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. The 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 a 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 – the standard defined and the 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 Figure 8.2.1 and the associated photograph/s, energized and the EUT performance was checked.

8.2.2.2 The measurements were performed in the anechoic chamber at 3 m test distance. The specified frequency range was investigated with the antenna connected to the EMI receiver. To find the highest emission the turntable was rotated 360^0 and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal polarizations. The EUT cables position was varied to maximize emission.

8.2.2.3 The worst test results with respect to the limits were recorded in Table 8.2.2 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 Figure 8.2.1 and the associated photograph/s, energized and the EUT performance was checked.

8.2.3.2 The preliminary measurements were performed in the anechoic chamber at 3 m test distance. The specified frequency range was investigated with the antenna connected to the EMI receiver. To find the highest emission the turntable was rotated 360^0 and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal polarizations. The EUT cables position was varied to maximize emission.

8.2.3.3 The EUT was set up as shown in Figure 8.2.2 and the associated photograph/s, energized and the EUT performance was checked.

8.2.3.4 The final measurements were performed at the open area test site at 10 m test distance with the antenna connected to the EMI receiver. The EUT wires and cables were arranged to produce the highest emission as it was found during the preliminary measurements. The frequencies, produced the highest emissions with respect to the limits during the preliminary test were investigated. To find the highest emission the turntable was rotated 360^0 and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal polarizations. At frequencies, where the high ambient noise was encountered, the final measurements were taken at 3 m distance.

8.2.3.5 The worst test results with respect to the limits were recorded in Table 8.2.2 and shown in the associated plots.

Test specification:	Section 15.109 Class A, Radiated emissions		
Test procedure:	ANSI C63.4, Section 11.6		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:55:00 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 EUT

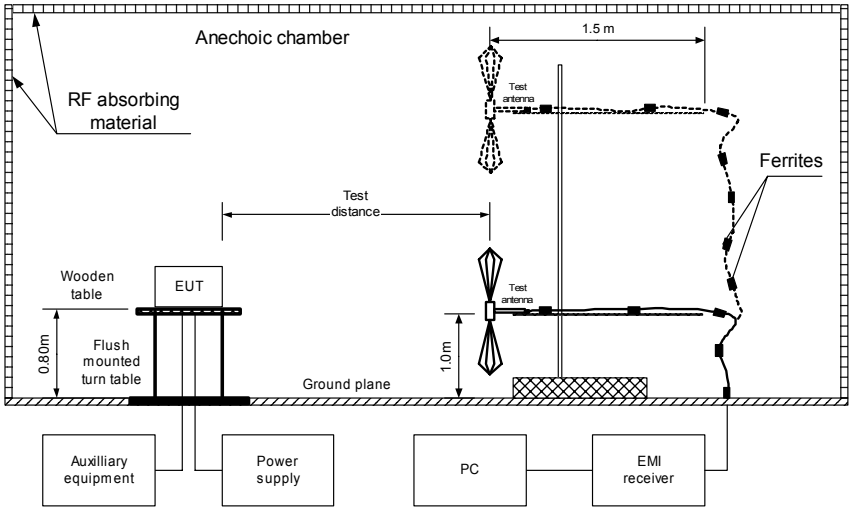
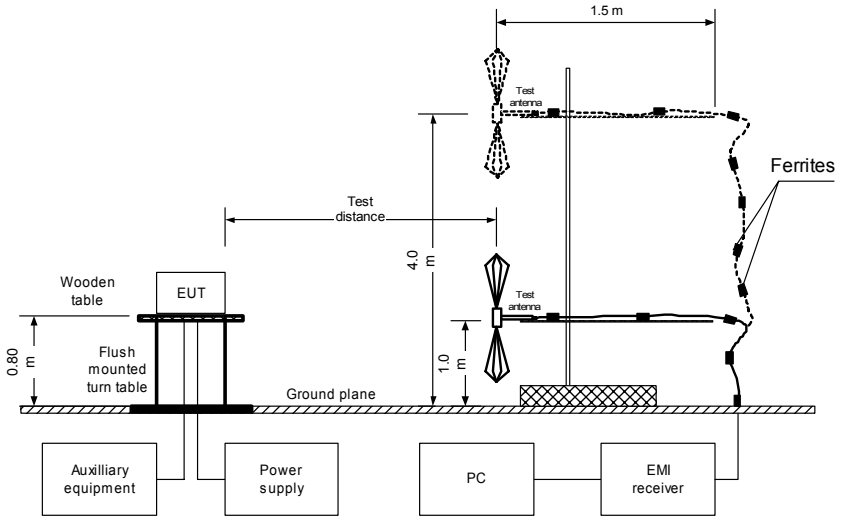


Figure 8.2.2 Setup for radiated emission measurements at OATS, table-top EUT



Test specification:	**Section 15.109 Class A, Radiated emissions**		
Test procedure:	ANSI C63.4, Section 11.6		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	12/4/2008 4:55:00 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
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*				
225.028000	46.8	45.3	46.4	-1.1	H	3.2	199	Pass
660.022000	50.8	45.6	46.4	-0.8	H	1.5	153	

EUT SET UP: TABLE-TOP
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 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*				
38.886250	47.29	41.94	49.50	-7.56	V	1.0	180	Pass
100.160250	45.55	41.63	54.00	-12.37	V	1.0	270	
198.000500	40.25	37.60	54.00	-16.40	V	1.0	0	
224.993750	57.92	56.50	57.00	-0.50	H	1.5	90	
274.994500	46.52	43.31	57.00	-13.69	H	1.3	180	
660.005000	61.87	56.75	57.00	-0.25	H	1.1	190	
799.997500	45.33	43.98	57.00	-13.02	H	1.0	150	

TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz – 6000 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*				
1188.05500	46.56	27.14	60.00	-32.86	V	1.0	170	Pass
2309.94000	46.91	39.24	60.00	-20.76	H	1.5	330	
2504.10000	61.35	41.57	60.00	-18.43	H	2.5	20	

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

Reference numbers of test equipment used

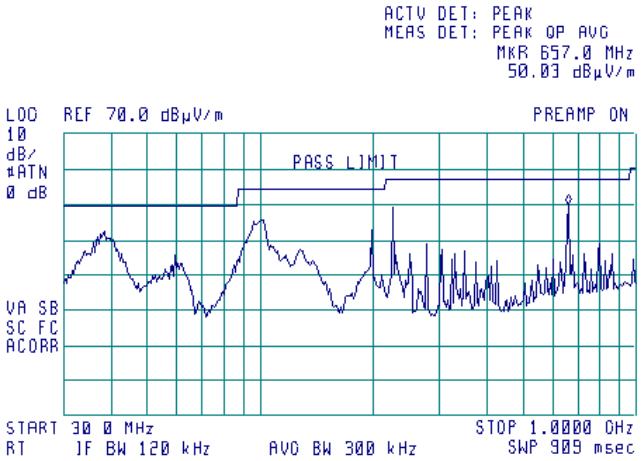
HL 0521	HL 0554	HL 0604	HL 0784	HL 0813	HL 1430	HL 1552	HL 1567
HL 1984	HL 2780	HL 2882	HL 3121	HL 3123			

Full description is given in Appendix A.

Test specification:	Section 15.109 Class A, Radiated emissions		
Test procedure:	ANSI C63.4, Section 11.6		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:55:00 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

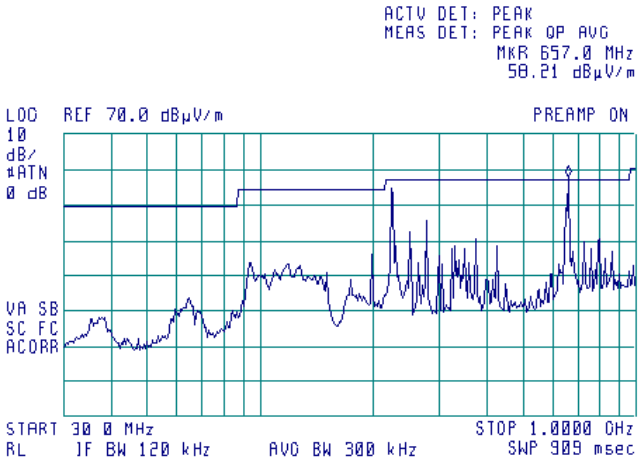
Plot 8.2.1 Radiated emission measurements in 30 - 1000 MHz range, vertical antenna polarization

TEST SITE: Semi Anechoic chamber
TEST DISTANCE: 3 m



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

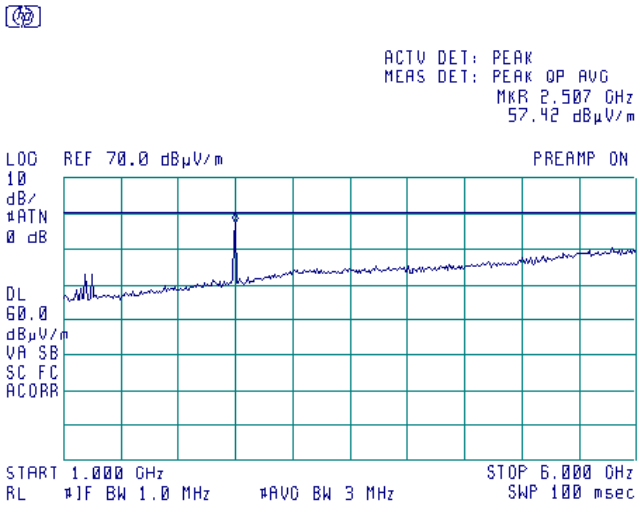
TEST SITE: Semi Anechoic chamber
TEST DISTANCE: 3 m



Test specification:	Section 15.109 Class A, Radiated emissions		
Test procedure:	ANSI C63.4, Section 11.6		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:55:00 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

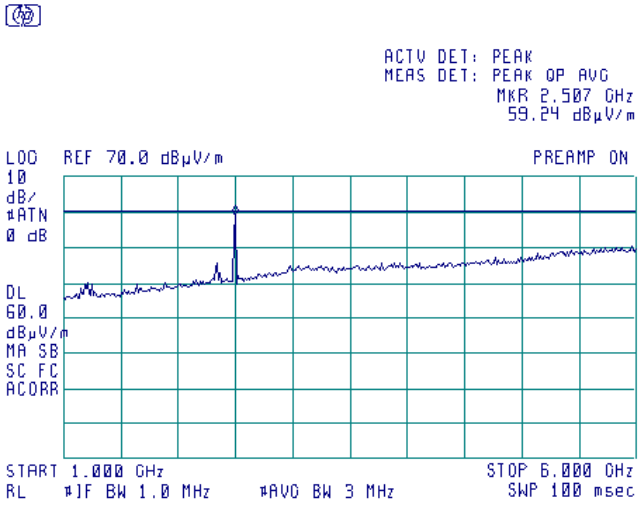
Plot 8.2.3 Radiated emission measurements in 1000 - 6000 MHz range, vertical antenna polarization

TEST SITE: Semi Anechoic chamber
TEST DISTANCE: 3 m



Plot 8.2.4 Radiated emission measurements in 1000 - 6000 MHz range, horizontal antenna polarization

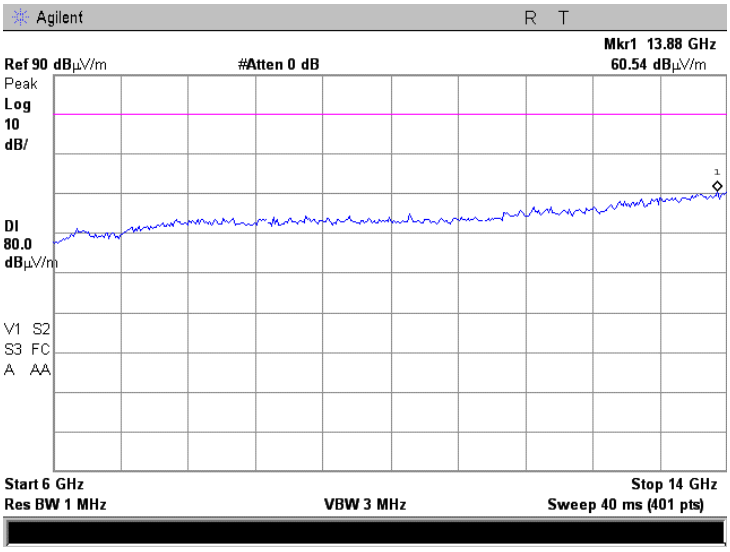
TEST SITE: Semi Anechoic chamber
TEST DISTANCE: 3 m



Test specification:	Section 15.109 Class A, Radiated emissions		
Test procedure:	ANSI C63.4, Section 11.6		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:55:00 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

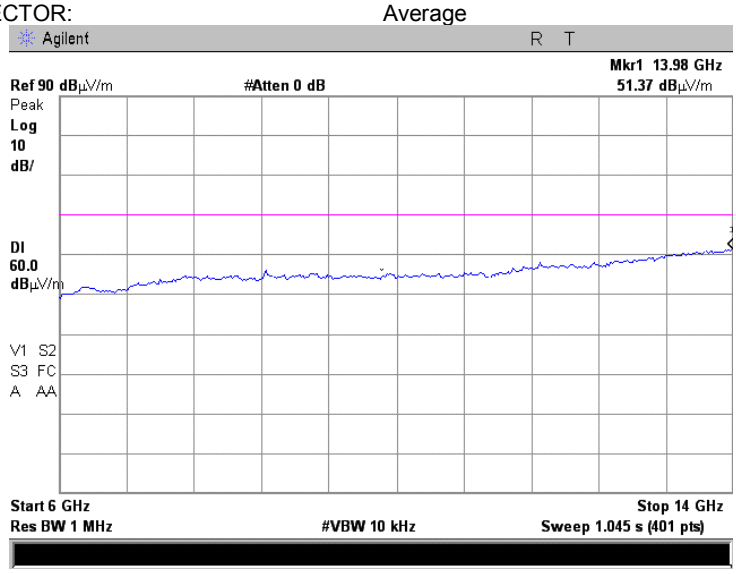
Plot 8.2.5 Radiated emission measurements in 6000 - 14000 MHz range, vertical antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 8.2.6 Radiated emission measurements in 6000 - 14000 MHz range, vertical antenna polarization

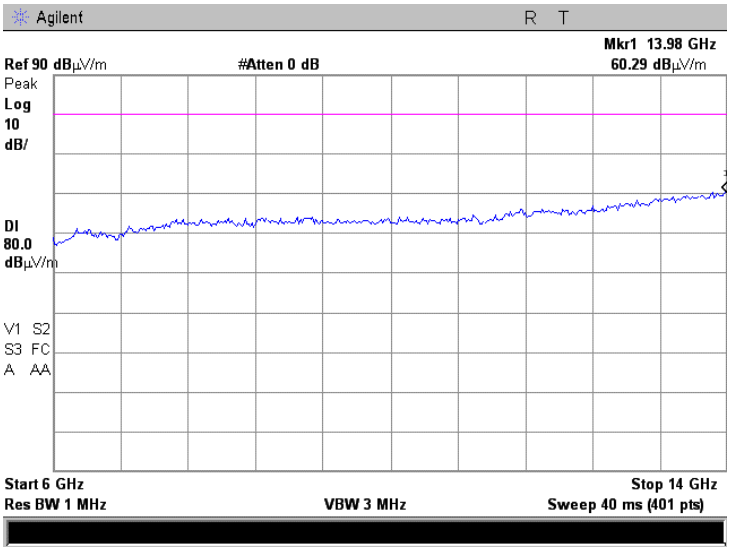
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Average



Test specification:	Section 15.109 Class A, Radiated emissions		
Test procedure:	ANSI C63.4, Section 11.6		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	12/4/2008 4:55:00 PM		
Temperature: 23ºC	Air Pressure: 1008 hPa	Relative Humidity: 46 %	Power Supply: 48 VDC
Remarks:			

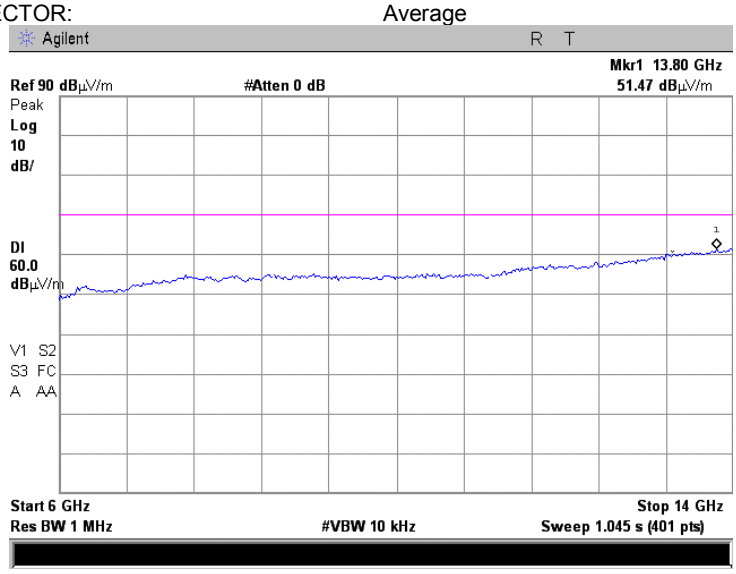
Plot 8.2.7 Radiated emission measurements in 6000 - 14000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 8.2.8 Radiated emission measurements in 6000 - 14000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
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
0769	Antenna Standard Gain Horn, 26.5-40 GHz, WR28, 25 dB gain	Quinstar Technology	QWH-2800-BA	112	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
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies	8564EC	3946A002 19	30-Dec-99	30-Dec-00
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
1567	Cable RF, 2 m	Huber-Suhner	Sucoflex 104PE	13095/4PE	30-Dec-08	30-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
2667	Signal generator, 9 kHz - 3.3 GHz	Rohde & Schwarz	SML03	101909	25-Sep-08	25-Sep-10
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	11-Jun-07	11-Jun-09
2882	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC-MNFN-3.0	211539 001	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

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
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-99	30-Dec-00
2953	Cable, RF, 18 GHz, 1.2 m, SMA-SMA	Gore	10020014	NA	05-Oct-08	05-Oct-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-99	30-Dec-00
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-99	30-Dec-00
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
3533	Amplifier, low noise, 6 to 18 GHz	Quinstar Technology	QLJ-06184040-J0	11159001001	07-Dec-08	07-Dec-09
3612	Cable RF, 17.5 m, N type-N type	Teldor	RG-214/U	NA	17-Nov-08	17-Nov-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).

Address: P.O. Box 23, Binyamina 30500, Israel.
Telephone: +972 4628 8001
Fax: +972 4628 8277
e-mail: mail@hermonlabs.com
website: www.hermonlabs.com

Person for contact: Mr. Alex Usoskin, CEO.

12 APPENDIX D Specification references

FCC 47CFR part 90: 2008	Private land mobile radio services
FCC 47CFR part 1: 2008	Practice and procedure
FCC 47CFR part 2: 2008	Frequency allocations and radio treaty matters; general rules and regulations
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 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, 0769

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).

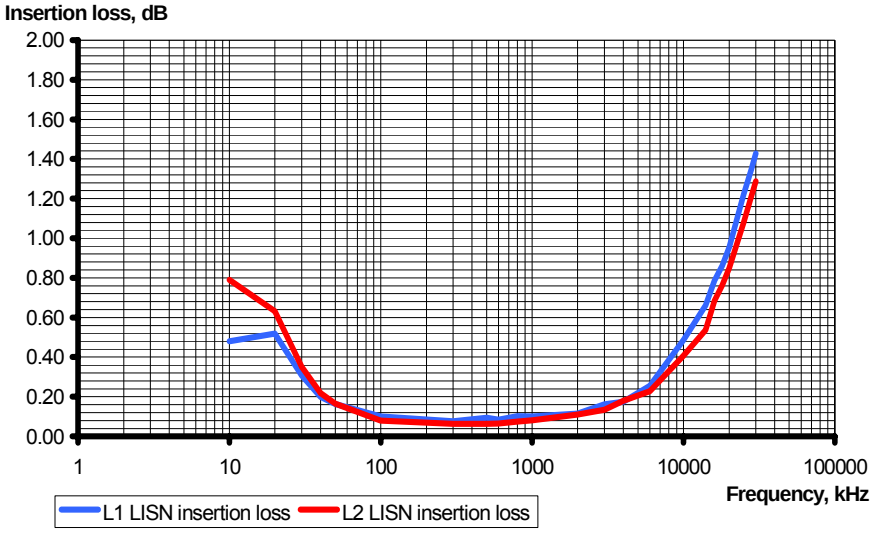
Antenna factor
Double-ridged wave guide horn antenna
Model 3115, S/N 9911-5964, HL 1984

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).

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
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 3122

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	2.08	7400	3.07	11200	3.92	15100	4.61
30	0.17	3700	2.12	7500	3.09	11300	3.95	15200	4.58
50	0.23	3800	2.15	7600	3.14	11400	3.93	15300	4.62
100	0.32	3900	2.18	7700	3.15	11500	3.93	15400	4.62
200	0.47	4000	2.21	7800	3.19	11600	3.94	15500	4.65
300	0.58	4100	2.24	7900	3.22	11700	3.97	15600	4.66
400	0.66	4200	2.27	8000	3.20	11800	3.98	15700	4.66
500	0.74	4300	2.31	8100	3.21	11900	4.08	15800	4.72
600	0.81	4400	2.31	8200	3.24	12000	4.03	15900	4.78
700	0.88	4500	2.36	8300	3.27	12100	4.06	16000	4.89
800	0.95	4600	2.37	8400	3.32	12200	4.05	16100	4.95
900	1.00	4700	2.40	8500	3.35	12300	4.16	16200	4.92
1000	1.06	4800	2.43	8600	3.35	12400	4.18	16300	4.95
1100	1.11	4900	2.45	8700	3.33	12500	4.20	16400	5.02
1200	1.16	5000	2.50	8800	3.37	12600	4.22	16500	5.04
1300	1.21	5100	2.51	8900	3.39	12700	4.23	16600	5.06
1400	1.26	5200	2.55	9000	3.45	12800	4.28	16700	5.17
1500	1.31	5300	2.56	9100	3.46	12900	4.26	16800	5.16
1600	1.35	5400	2.59	9200	3.47	13000	4.28	16900	5.19
1700	1.39	5500	2.62	9300	3.46	13100	4.28	17000	5.23
1800	1.44	5600	2.65	9400	3.50	13200	4.28	17100	5.30
1900	1.47	5700	2.67	9500	3.50	13300	4.29	17200	5.26
2000	1.52	5800	2.71	9600	3.53	13400	4.34	17300	5.30
2100	1.55	5900	2.72	9700	3.52	13500	4.31	17400	5.30
2200	1.60	6000	2.73	9800	3.54	13600	4.35	17500	5.36
2300	1.63	6100	2.76	9900	3.56	13700	4.36	17600	5.40
2400	1.67	6200	2.78	10000	3.57	13800	4.37	17700	5.47
2500	1.70	6300	2.81	10100	3.60	13900	4.41	17800	5.56
2600	1.74	6400	2.85	10200	3.69	14000	4.42	17900	5.45
2700	1.78	6500	2.87	10300	3.69	14100	4.45	18000	5.47
2800	1.83	6600	2.87	10400	3.67	14200	4.49		
2900	1.85	6700	2.90	10500	3.70	14300	4.55		
3000	1.89	6800	2.91	10600	3.70	14400	4.62		
3100	1.92	6900	2.96	10700	3.76	14600	4.54		
3200	1.96	7000	2.99	10800	3.88	14700	4.58		
3300	1.99	7100	3.01	10900	3.88	14800	4.57		
3400	2.03	7200	3.04	11000	3.85	14900	4.65		
3500	2.06	7300	3.08	11100	3.85	15000	4.64		

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

END OF DOCUMENT