HERMON LABORATORIES

839.01
Electrical

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TEST REPORT

ACCORDING TO: FCC CFR47 part 27

FOR:

Airspan Networks Inc.

Subscriber Unit

Model: ProST 2.5G

Table of contents

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1 Applicant information

Client name:	Airspan Networks Inc.
Address:	777 Yamato Rd, Suite 310, Boca Raton 33431, Florida, USA
Telephone:	+1 561 893 8686
Fax:	+1 561 893 8671
E-mail:	zlevi@airspan.com
Contact name:	Mr. Levi Zion

2 Equipment under test attributes

Product name:	Subscriber unit 2.5 GHz
Product type:	Transceiver
Model(s):	ProST 2.5G
Receipt date	6/4/2009

3 Manufacturer information

Manufacturer name:	Airspan Networks Inc.
Address:	777 Yamato Rd, Suite 310, Boca Raton 33431, Florida, USA
Telephone:	+1 561 893 8686
Fax:	+1 561 893 8671
E-Mail:	zlevi@airspan.com
Contact name:	Mr. Levi Zion

4 Test details

Project ID:	19694
Location:	Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started:	6/4/2009
Test completed:	7/6/2009
Test specification(s):	FCC part 27

5 Tests summary

Test	Status
Transmitter characteristics	
Section 27.50(h)(2), Peak output power at RF antenna connector	Pass
Section 2.1091, 27.52, RF safety	Pass, exhibit provided in Application for certification
Section 27.53(m)(4), Spurious emissions at RF antenna connector	Pass
Section 27.53(m)(4), Band edge emissions at RF antenna connector	Pass
Section 27.53(m)(4), Radiated spurious emissions	Pass
Section 27.54, Frequency stability	Pass
Section 2.1049, Occupied bandwidth	Pass

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

This test report replaces the previously issued test report identified by Doc ID:AIRRAD_FCC.19694_ProST.

	Name and Title	Date	Signature
Tested by:	Mr. L. Markel, test engineer	June 30, 2009	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	July 8, 2009	
Approved by:	Mr. M. Nikishin, EMC and Radio group manager	July 9, 2009	

6 EUT description

6.1 General information

A subscriber premises radio, ProST 2.5G TDD is part of a WiMAX broadband fixed cellular wireless access system. The system provides a radio link between an end-user (a subscriber) and a network to give high-speed data access. The ProST's transceiver/receiver (Up to 64 QAM modulation, data rate up to 37 Mbps) uses OFDM and operating in TDD duplexing mode, equipped with an external antenna or internal antenna. The maximum RF output power can be reduced by software.
The ProST is installed outdoors and typically is mounted on a pole. The ProST transmits and receives traffic to and from the base station (i.e. BSR) respectively. The transceiver provides subscribers with "always-on" Internet, high speed data only, or data and voice (VoIP) services and is configured with a unique BSR reference number, preventing from relocating to another subscriber premises without authorization.

6.2 Ports and lines

Port type	Port description	Connected from	Connected to	Qty.	Cable type	Cable length	Indoor / outdoor
Power	DC Power	EUT	SDA (+ DATA)	1	UTP	10 m	Outdoor
Signal	RS-232	EUT (Maintance only)	Laptop	1	UTP	0.2 m	Outdoor
RF	Antenna	EUT	50 Ohm termination	1	Shielded	NA	NA

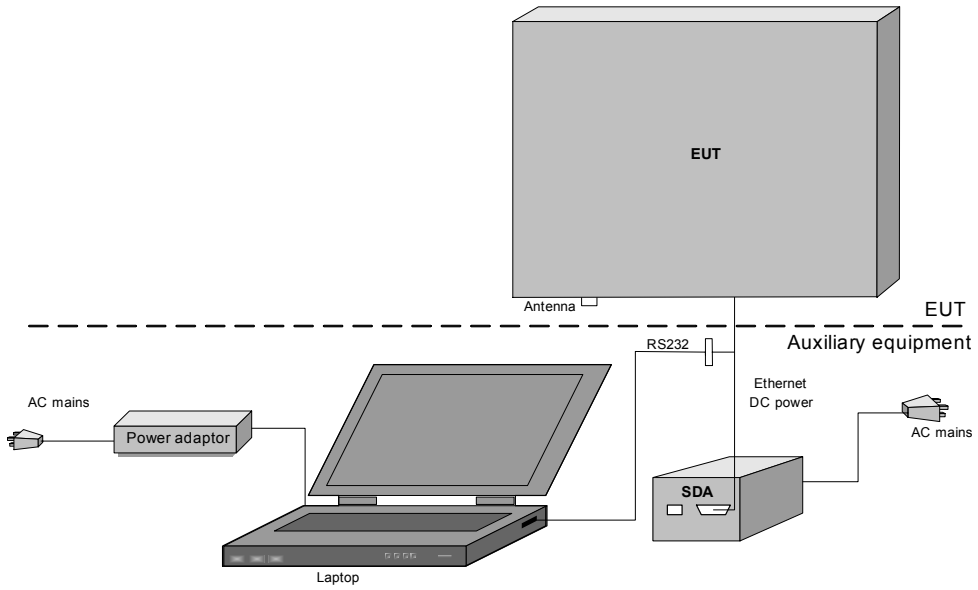
6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Laptop	IBM	X31	99-TXWYC
Laptop adaptor	IBM	NA	11S92P1014Z1 ZD2N74T2LS
SDA	Airspan	SDA-4S/VL type 2	753D6A0086
SDA (for conducted and radiated emission tests)	Airspan	SDA-4S Type 2	752D6C0444
Mouse	Microsoft	NA	X802382-004

6.4 Changes made in the EUT

No changes were implemented.

6.5 Test configuration



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6.6 Transmitter characteristics

Type of equipment	
V	Stand-alone (Equipment with or without its own control provisions)
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)
	Plug-in card (Equipment intended for a variety of host systems)

Intended use		**Condition of use**
V	fixed	Always at a distance more than 2 m from all people
	mobile	Always at a distance more than 20 cm from all people
	portable	May operate at a distance closer than 20 cm to human body

Assigned frequency range	2496.0 – 2690.0 MHz				
Operating frequency	2497.5 - 2688.5 MHz				
RF channel spacing	2.5 MHz, 5 MHz, 10 MHz				
Maximum rated output power	At transmitter 50 Ω RF output connector				dBm
Is transmitter output power variable?		No			
	V	Yes		continuous variable	
			V	stepped variable with stepsize	0.5 dB
				minimum RF power	-30 dBm
				maximum RF power	24.1 dBm

Antenna connection					
unique coupling	**V**	standard connector	Integral	**V**	with temporary RF connector
					without temporary RF connector

Antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Internal	MTI Wireless Edge Ltd.	MT – 344052/MV	14.5 dBi
External	MARS Antennas	MA-WA24-2XBRFC	17 dBi

Transmitter 99% power bandwidth	**Transmitter aggregate data rate/s, MBps**	**Type of modulation**
2.5 MHz	1.0475	BPSK
	2.095	QPSK
	6.2825	16QAM
	9.425	64QAM
5 MHz	2.095	BPSK
	4.19	QPSK
	12.565	16QAM
	18.85	64QAM
10 MHz	4.19	BPSK
	8.38	QPSK
	25.13	16QAM
	37.7	64QAM

Type of multiplexing	OFDM						
Modulating test signal (baseband)	PRBS						
Maximum transmitter duty cycle in normal use	90%						
Transmitter power source							
		Nominal rated voltage		Battery type			
V	DC	**Nominal rated voltage**	48 VDC via SDA				
	AC mains	**Nominal rated voltage**	120 V	Frequency	60 Hz		
Common power source for transmitter and receiver			**V**	yes		no	

Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
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

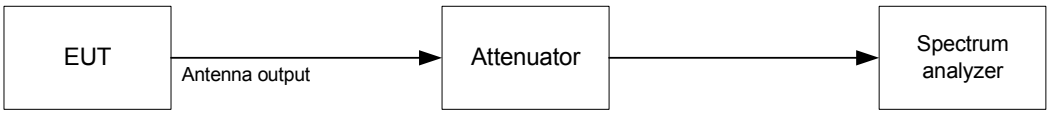
Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, kHz
2496.00 – 2690.0	26	NA

dBc - Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

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 unmodulated carrier and the reference peak power level 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 and the associated plots.

Figure 7.1.1 Occupied bandwidth test setup



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Table 7.1.2 Occupied bandwidth test results

DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 30 kHz
VIDEO BANDWIDTH: 300 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATING SIGNAL: PRBS
EBW: 2.5

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
BPSK 1.0475 Mbps				
2497.50	2422.50	NA	NA	Pass
2593.00	2437.50	NA	NA	Pass
2688.50	2430.00	NA	NA	Pass
QPSK 2.095 Mbps				
2497.50	2422.50	NA	NA	Pass
2593.00	2437.50	NA	NA	Pass
2688.50	2430.00	NA	NA	Pass
16QAM 6.2825 Mbps				
2497.50	2422.50	NA	NA	Pass
2593.00	2437.50	NA	NA	Pass
2688.50	2430.00	NA	NA	Pass
64QAM 9.425 Mbps				
2497.50	2422.50	NA	NA	Pass
2593.00	2445.00	NA	NA	Pass
2688.50	2430.00	NA	NA	Pass

DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 30 kHz
VIDEO BANDWIDTH: 300 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATING SIGNAL: PRBS
EBW: 5 MHz

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
BPSK 2.095 Mbps				
2498.50	4655.00	NA	NA	Pass
2593.00	4672.50	NA	NA	Pass
2687.50	4655.00	NA	NA	Pass
QPSK 4.19 Mbps				
2498.50	4655.00	NA	NA	Pass
2593.00	4672.50	NA	NA	Pass
2687.50	4655.00	NA	NA	Pass
16QAM 12.565 Mbps				
2498.50	4655.00	NA	NA	Pass
2593.00	4672.50	NA	NA	Pass
2687.50	4655.00	NA	NA	Pass
64QAM 18.85 Mbps				
2498.50	4655.00	NA	NA	Pass
2593.00	4672.50	NA	NA	Pass
2687.50	4655.00	NA	NA	Pass

Test specification:	**Section 2.1049, Occupied bandwidth**		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 41 %	**Power Supply:** 120VAC
Remarks:			

Table 7.1.2 Occupied bandwidth test results (continued)

DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 1000 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATING SIGNAL: PRBS
EBW: 10 MHz

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
BPSK 4.19 Mbps				
2501.75	9690.00	NA	NA	Pass
2596.00	9720.00	NA	NA	Pass
2684.50	9720.00	NA	NA	Pass
QPSK 8.38 Mbps				
2501.75	9690.00	NA	NA	Pass
2596.00	9720.00	NA	NA	Pass
2684.50	9720.00	NA	NA	Pass
16QAM 25.13 Mbps				
2501.75	9630.00	NA	NA	Pass
2596.00	9720.00	NA	NA	Pass
2684.50	9720.00	NA	NA	Pass
64QAM 37.7 Mbps				
2501.75	9630.00	NA	NA	Pass
2596.00	9720.00	NA	NA	Pass
2684.50	9720.00	NA	NA	Pass

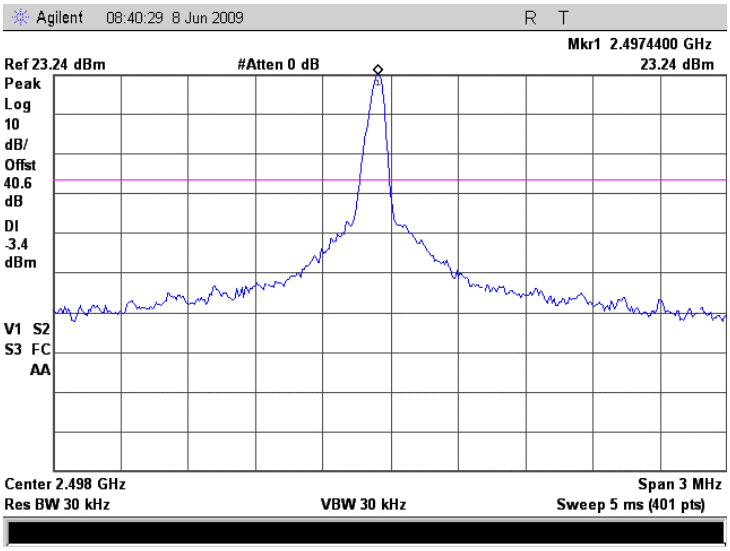
Reference numbers of test equipment used

HL 2780	HL 2953	HL 3439	HL 3442				

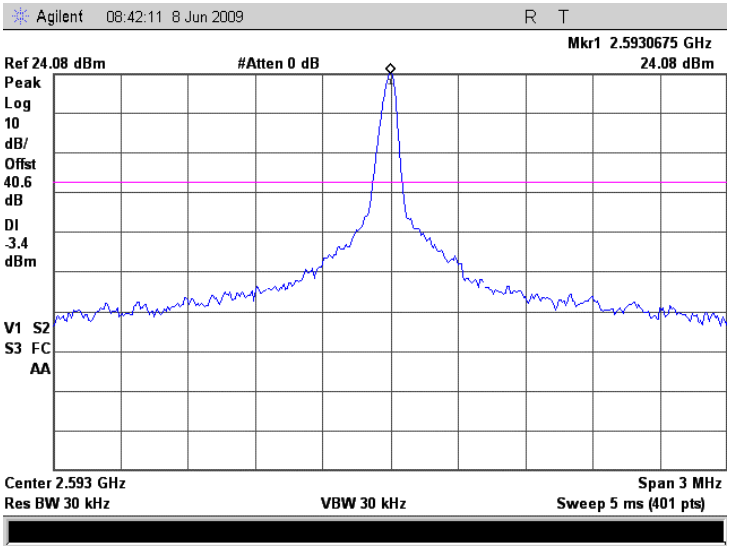
Full description is given in Appendix A.

Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.1 Occupied bandwidth test result at 2497.5 MHz, reference level unmodulated, 2.5 MHz EBW

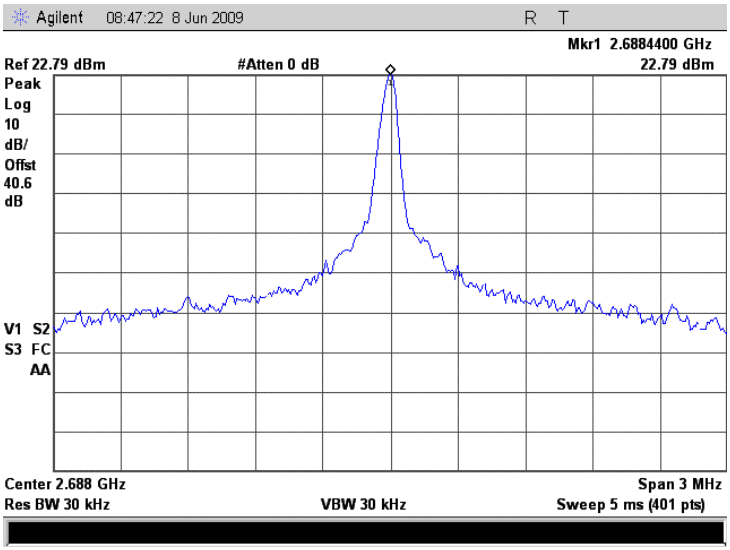


Plot 7.1.2 Occupied bandwidth test result at 2593.0 MHz, reference level unmodulated, 2.5 MHz EBW



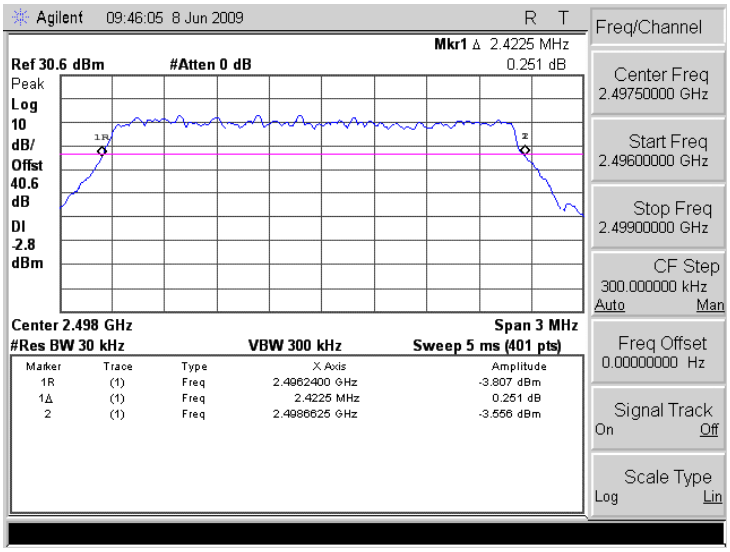
Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.3 Occupied bandwidth test result at 2688.5 MHz, reference level unmodulated, 2.5 MHz EBW

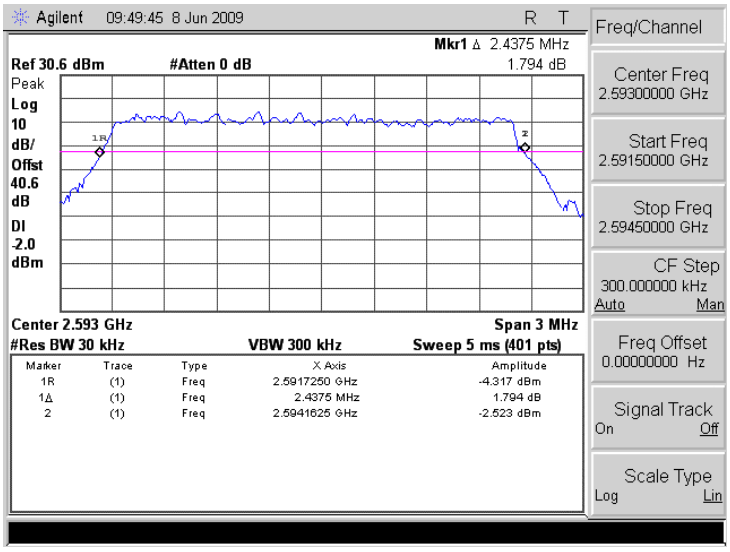


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.4 Occupied bandwidth test results at low frequency, BPSK, 2.5 MHz EBW

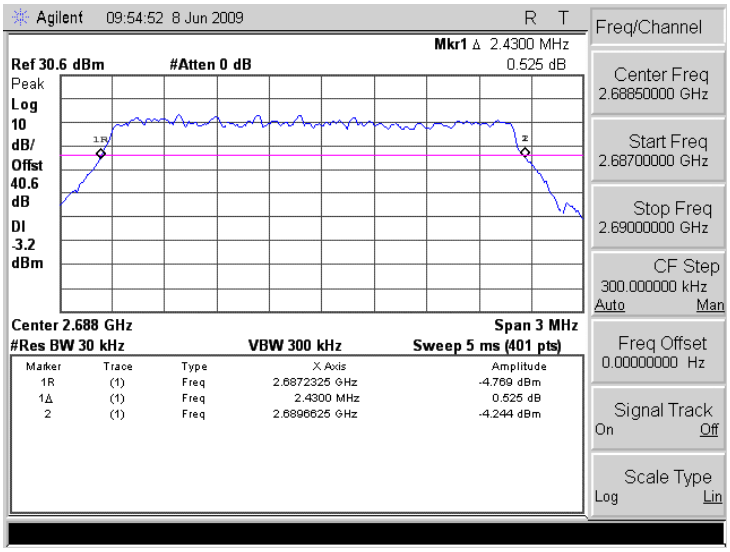


Plot 7.1.5 Occupied bandwidth test results at mid frequency, BPSK, 2.5 MHz EBW

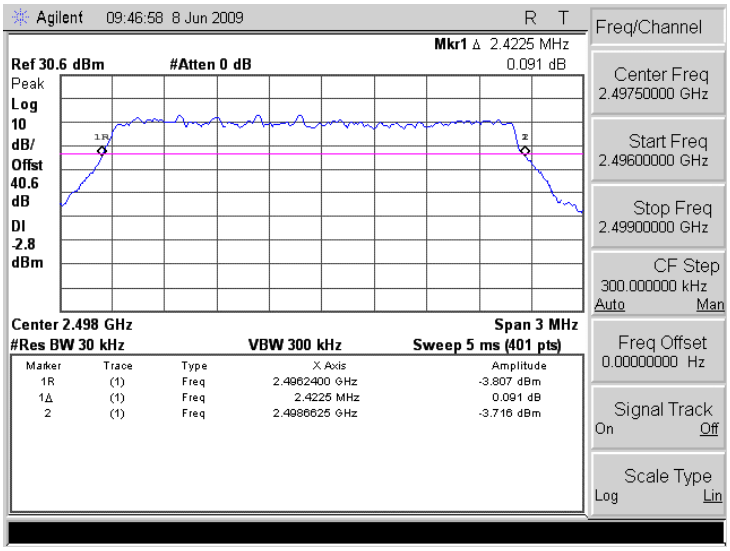


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.6 Occupied bandwidth test results at high frequency, BPSK, 2.5 MHz EBW

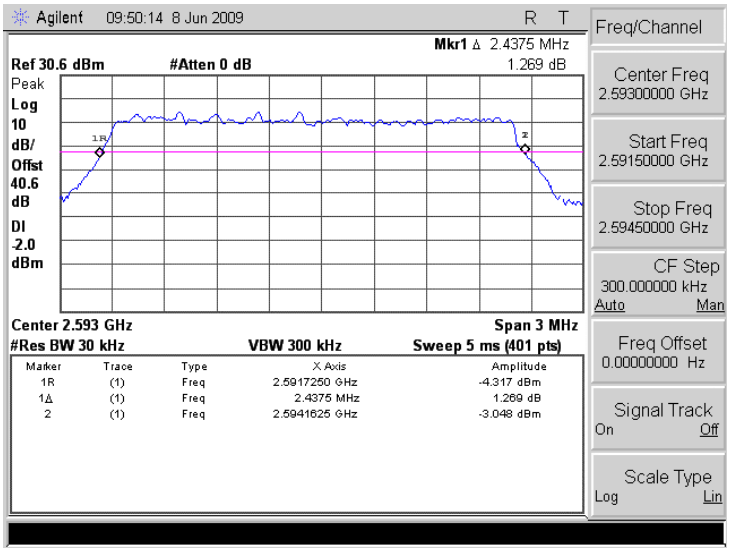


Plot 7.1.7 Occupied bandwidth test results at low frequency, QPSK, 2.5 MHz EBW

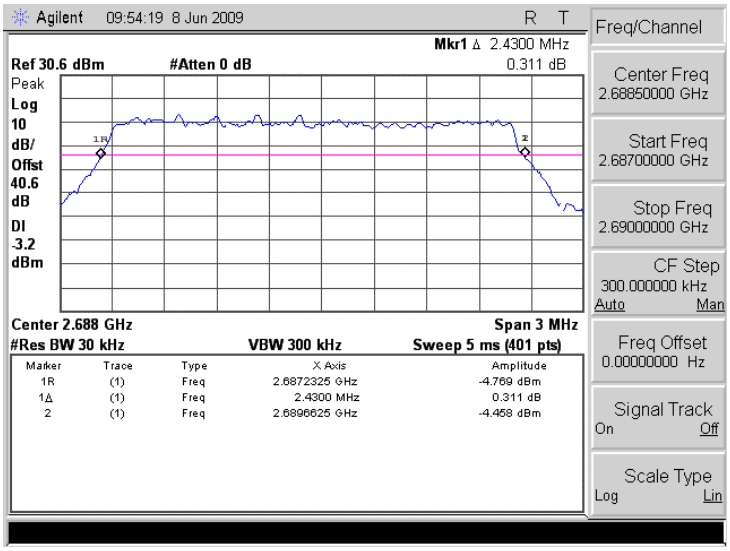


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.8 Occupied bandwidth test results at mid frequency, QPSK, 2.5 MHz EBW

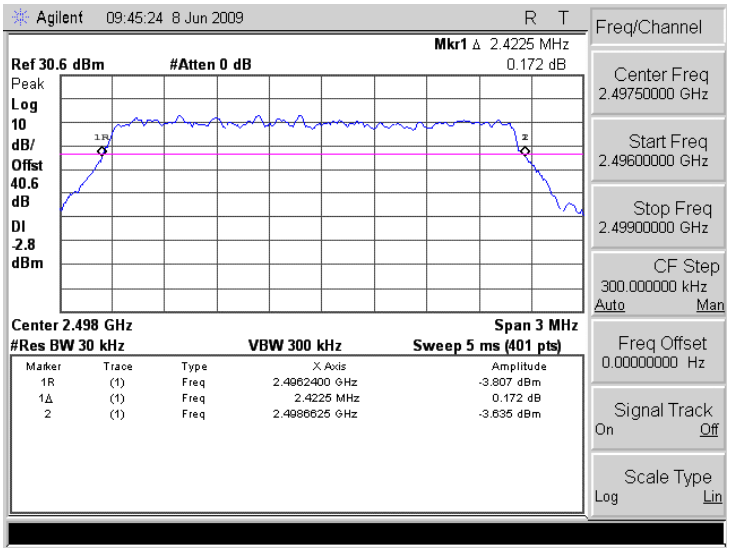


Plot 7.1.9 Occupied bandwidth test results at high frequency, QPSK, 2.5 MHz EBW

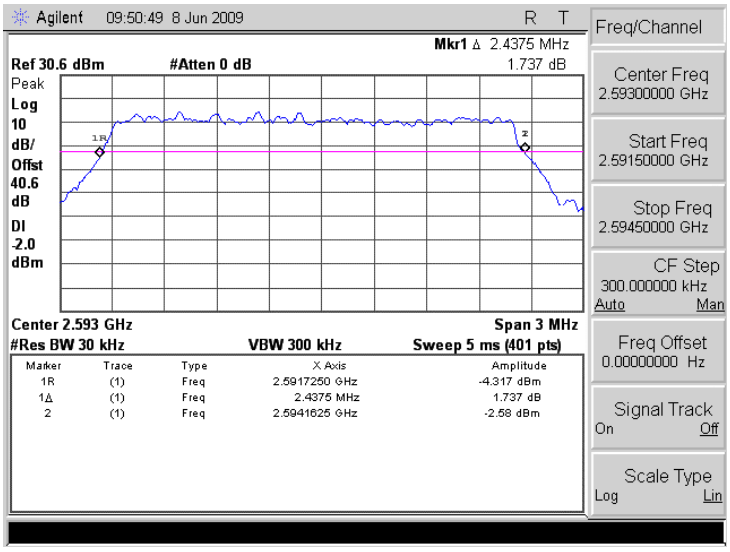


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.10 Occupied bandwidth test results at low frequency, 16QAM, 2.5 MHz EBW

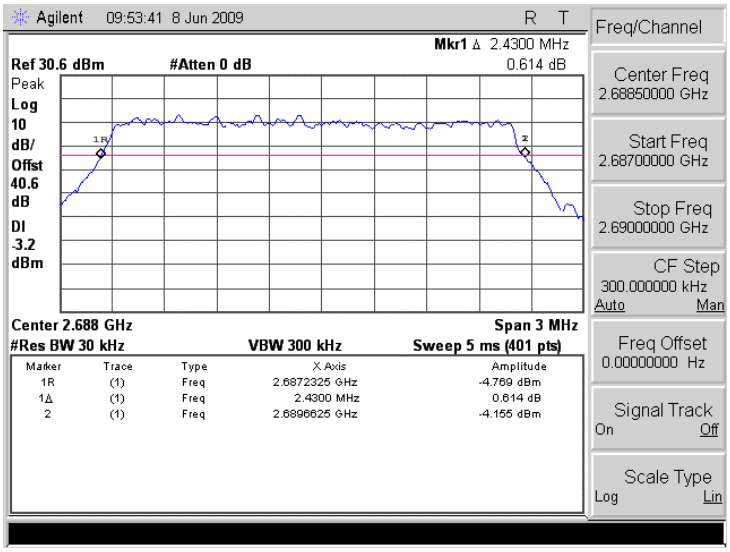


Plot 7.1.11 Occupied bandwidth test results at mid frequency, 16QAM, 2.5 MHz EBW

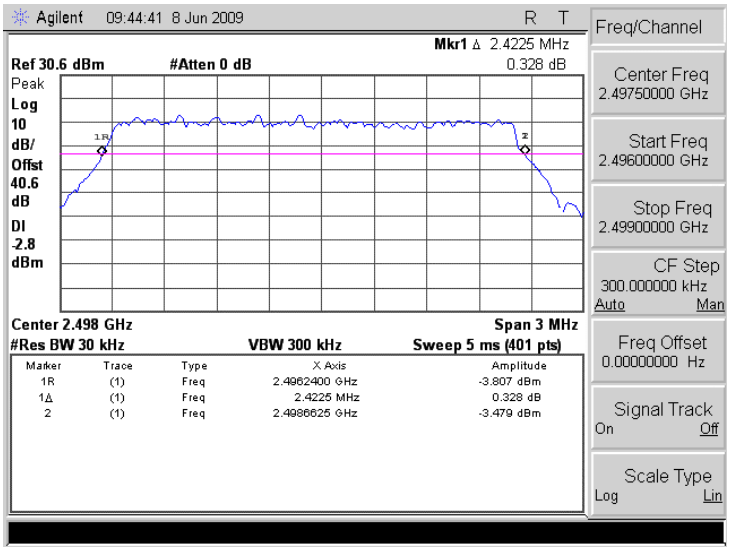


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.12 Occupied bandwidth test results at high frequency, 16QAM, 2.5 MHz EBW

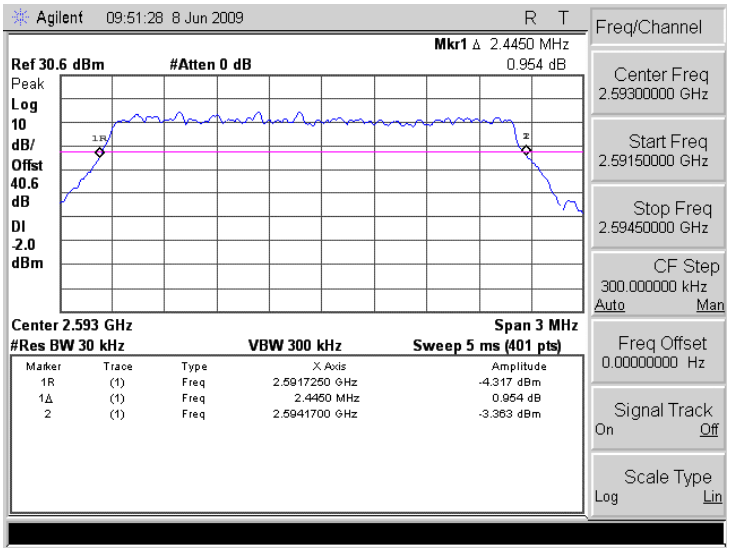


Plot 7.1.13 Occupied bandwidth test results at low frequency, 64QAM, 2.5 MHz EBW

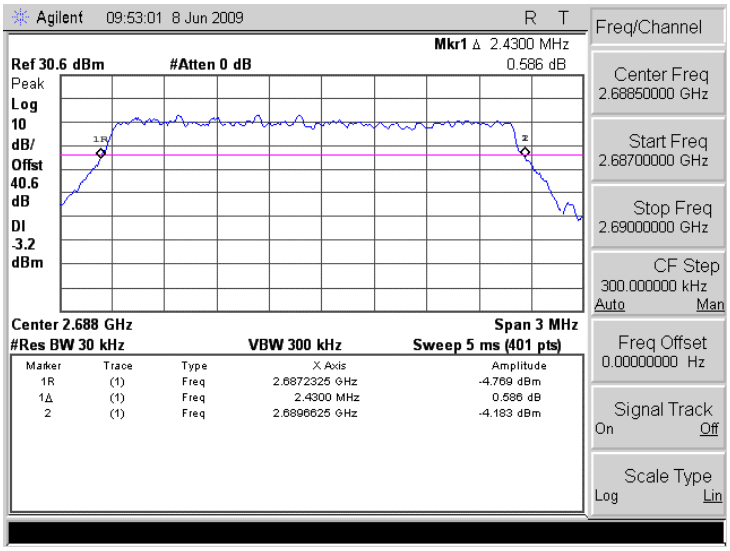


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.14 Occupied bandwidth test results at mid frequency, 64QAM, 2.5 MHz EBW

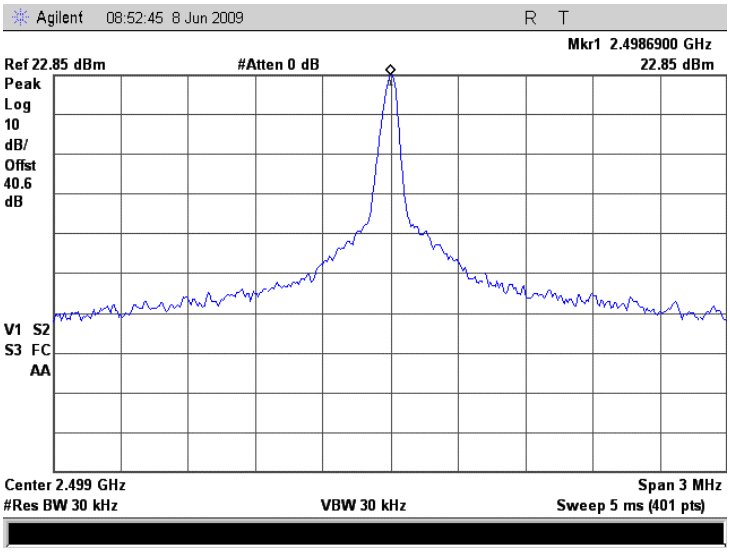


Plot 7.1.15 Occupied bandwidth test results at high frequency, 64QAM, 2.5 MHz EBW

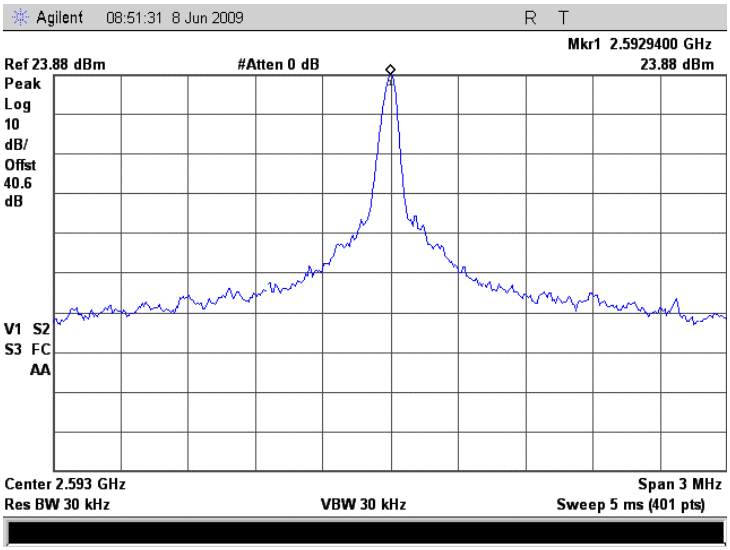


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.16 Occupied bandwidth test result at 2498.75 MHz, reference level unmodulated, 5 MHz EBW

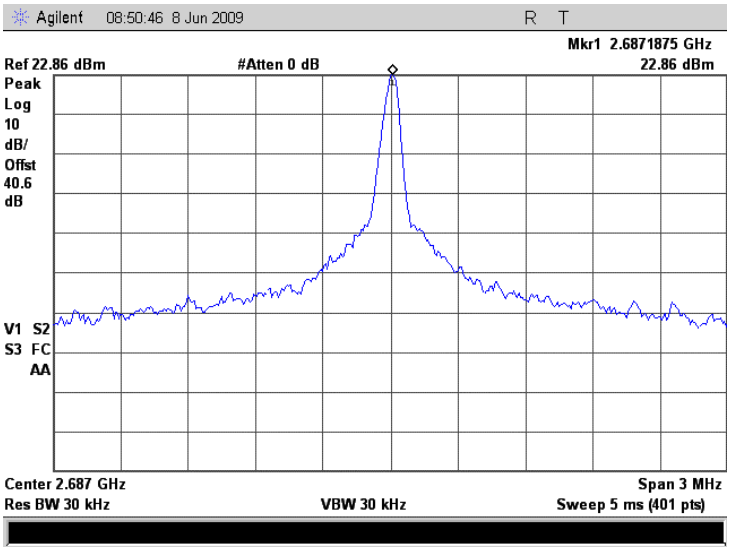


Plot 7.1.17 Occupied bandwidth test result at 2593.0 MHz, reference level unmodulated, 5 MHz EBW



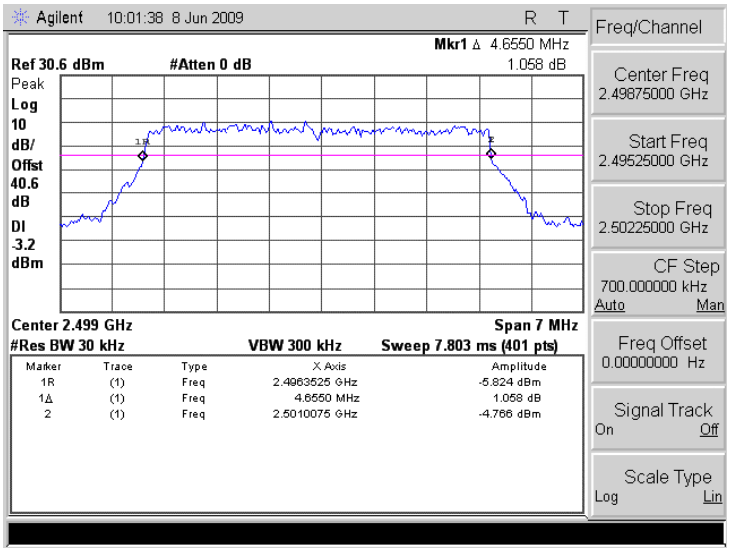
Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.18 Occupied bandwidth test result at 2687.25 MHz, reference level unmodulated, 5 MHz EBW

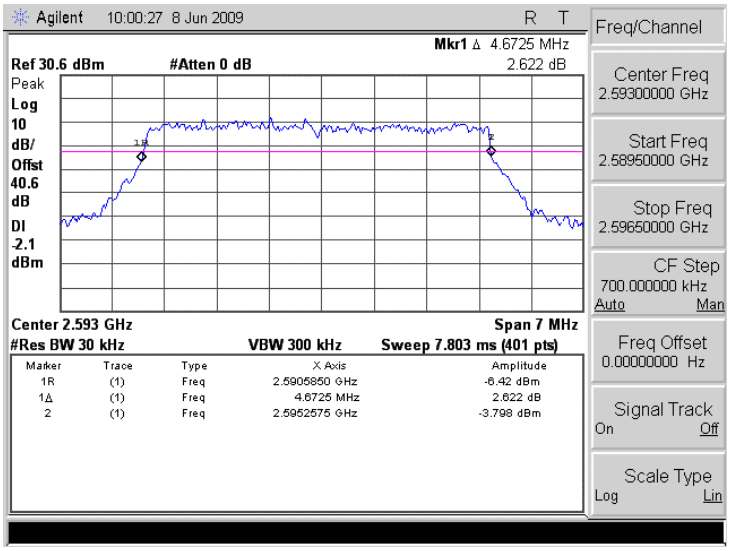


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.19 Occupied bandwidth test results at low frequency, BPSK, 5 MHz EBW

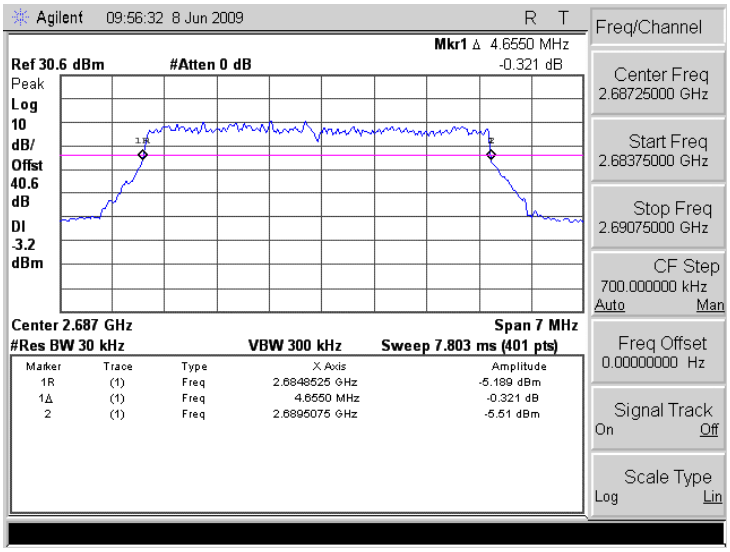


Plot 7.1.20 Occupied bandwidth test results at mid frequency, BPSK, 5 MHz EBW

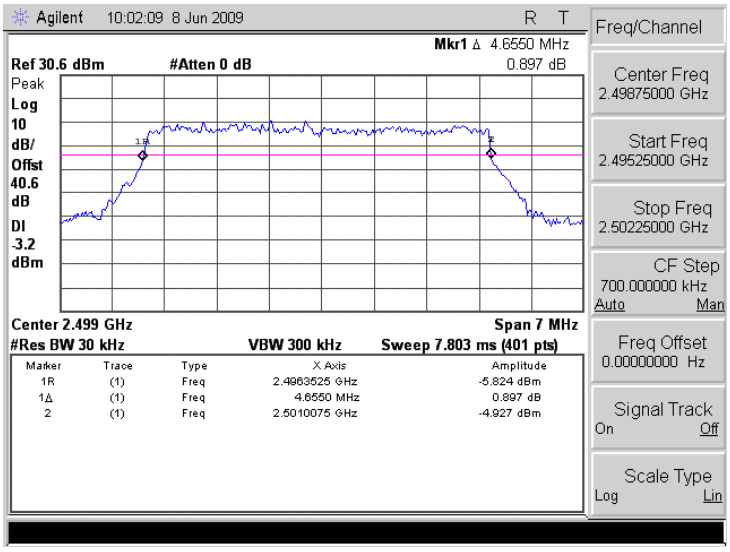


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.21 Occupied bandwidth test results at high frequency, BPSK, 5 MHz EBW

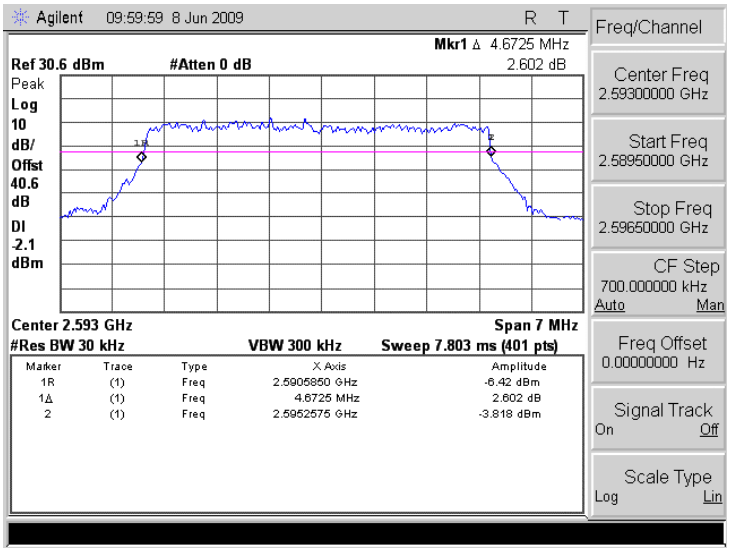


Plot 7.1.22 Occupied bandwidth test results at low frequency, QPSK, 5 MHz EBW

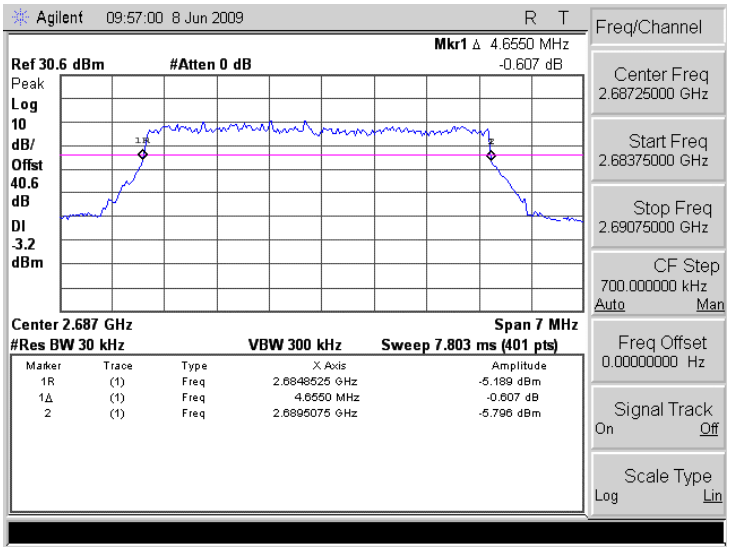


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.23 Occupied bandwidth test results at mid frequency, QPSK, 5 MHz EBW

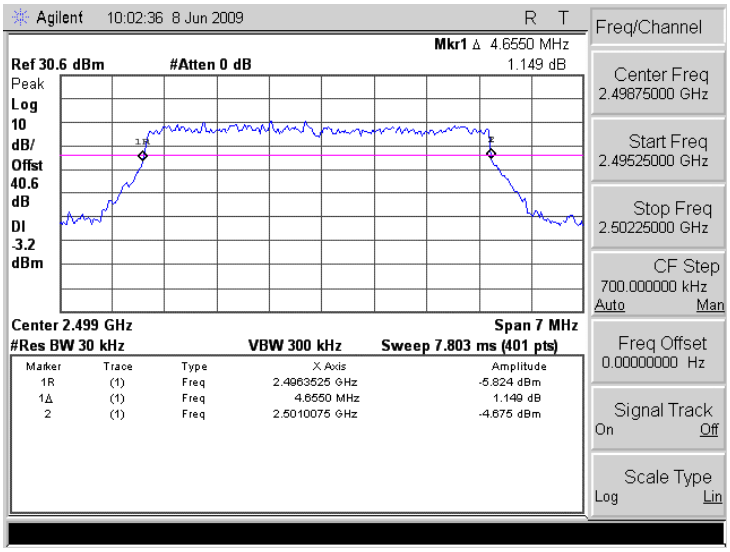


Plot 7.1.24 Occupied bandwidth test results at high frequency, QPSK, 5 MHz EBW

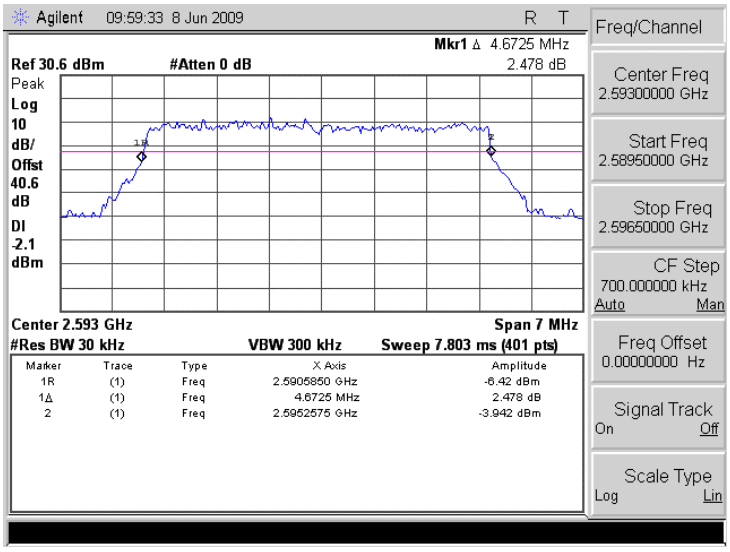


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.25 Occupied bandwidth test results at low frequency, 16QAM, 5 MHz EBW

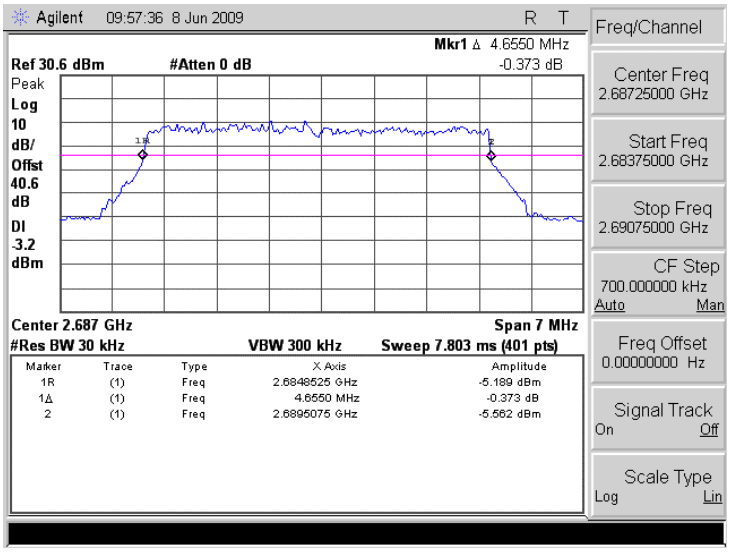


Plot 7.1.26 Occupied bandwidth test results at mid frequency, 16QAM, 5 MHz EBW

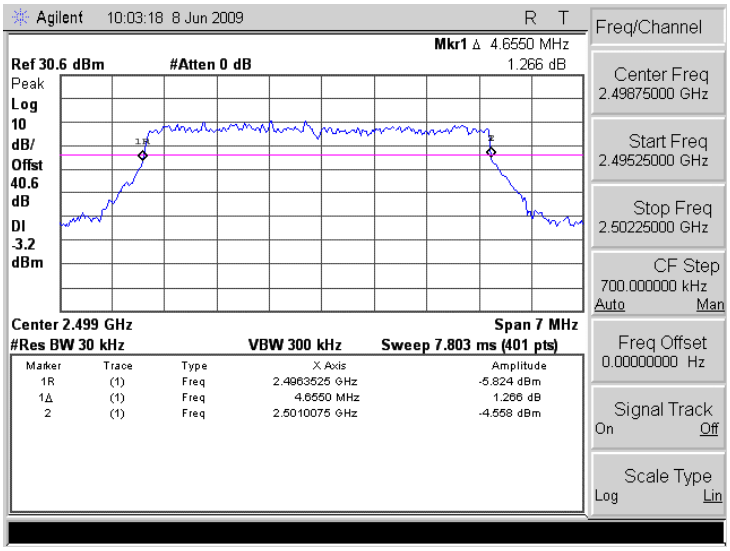


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.27 Occupied bandwidth test results at high frequency, 16QAM, 5 MHz EBW

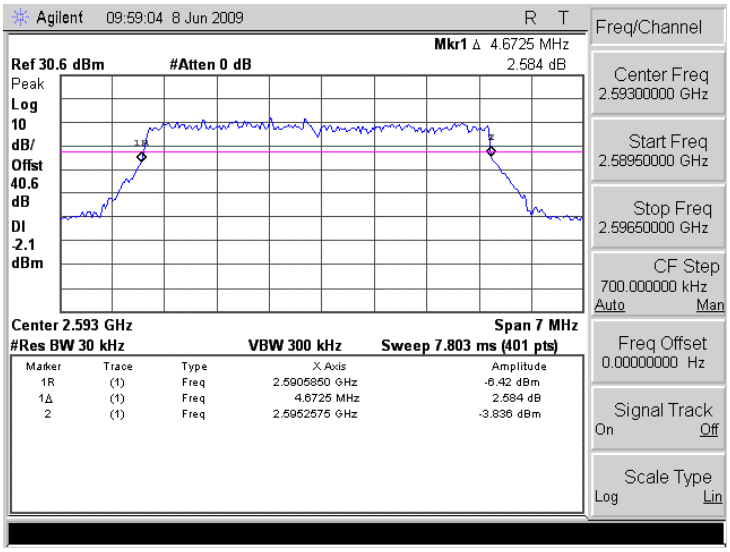


Plot 7.1.28 Occupied bandwidth test results at low frequency, 64QAM, 5 MHz EBW

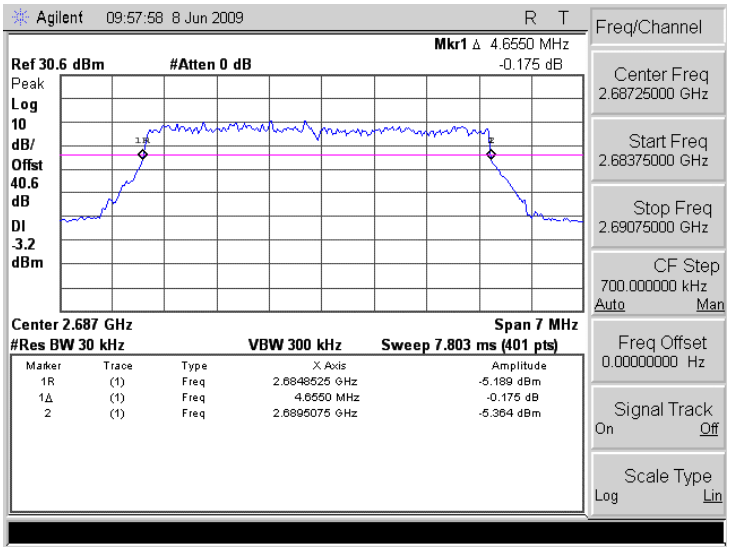


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.29 Occupied bandwidth test results at mid frequency, 64QAM, 5 MHz EBW

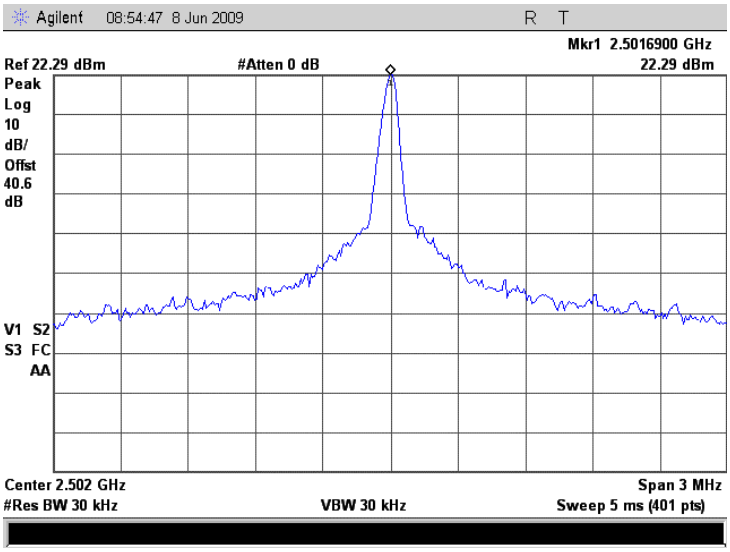


Plot 7.1.30 Occupied bandwidth test results at high frequency, 64QAM, 5 MHz EBW

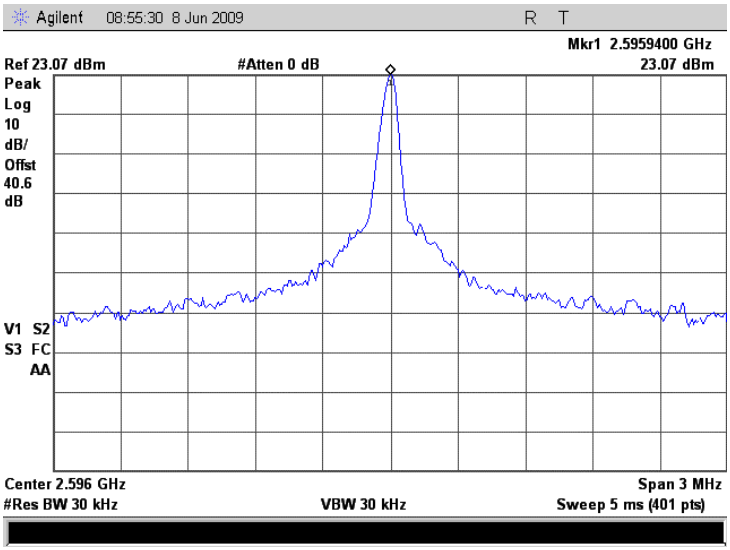


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.31 Occupied bandwidth test result at 2501.75 MHz, reference level unmodulated, 10 MHz EBW

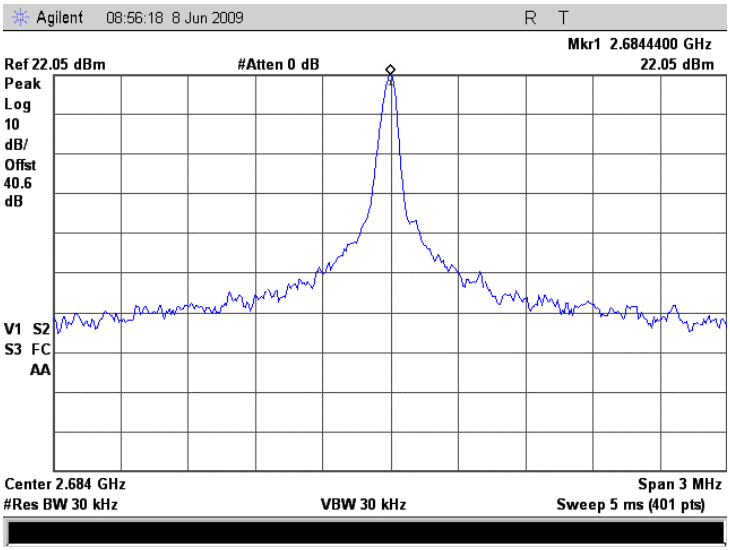


Plot 7.1.32 Occupied bandwidth test result at 2596.0 MHz, reference level unmodulated, 10 MHz EBW



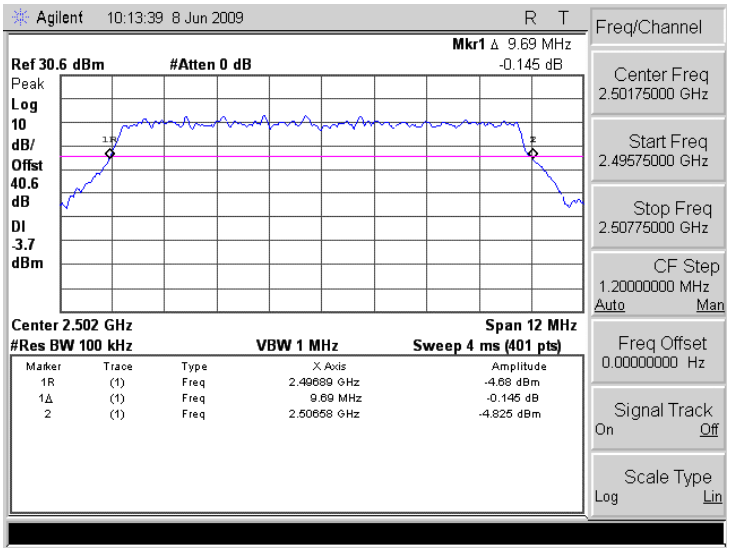
Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.33 Occupied bandwidth test result at 2684.5 MHz, reference level unmodulated, 10 MHz EBW

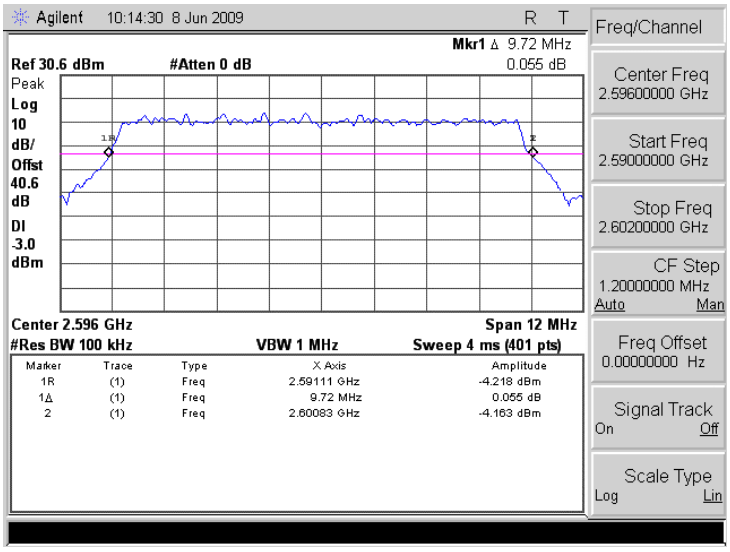


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.34 Occupied bandwidth test results at low frequency, BPSK, 10 MHz EBW

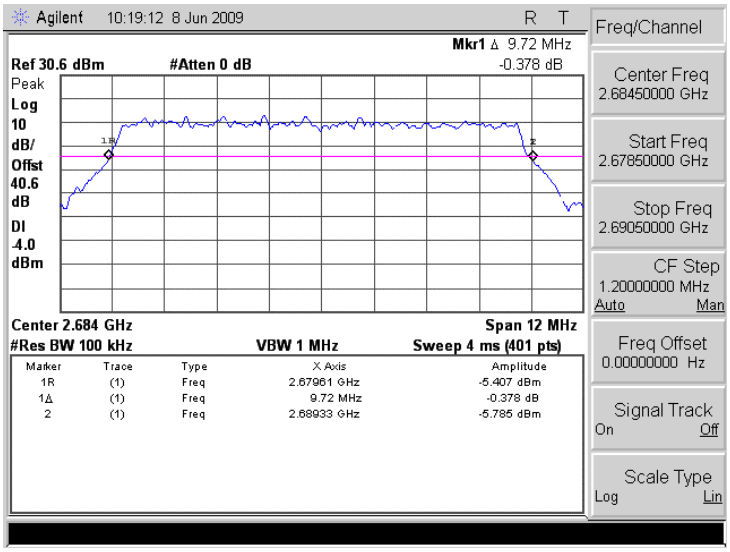


Plot 7.1.35 Occupied bandwidth test results at mid frequency, BPSK, 10 MHz EBW

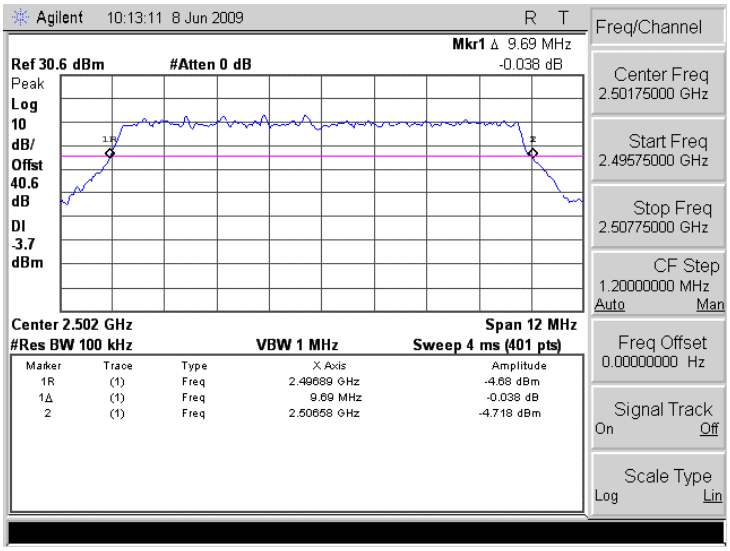


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.36 Occupied bandwidth test results at high frequency, BPSK, 10 MHz EBW

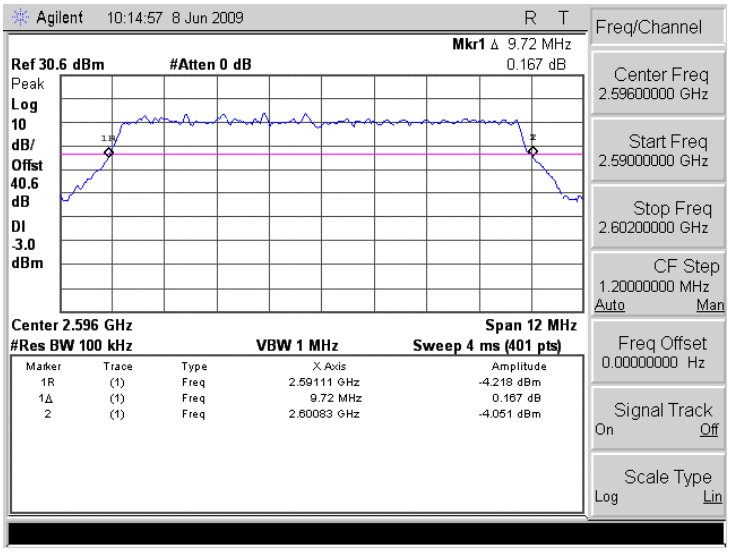


Plot 7.1.37 Occupied bandwidth test results at low frequency, QPSK, 10 MHz EBW

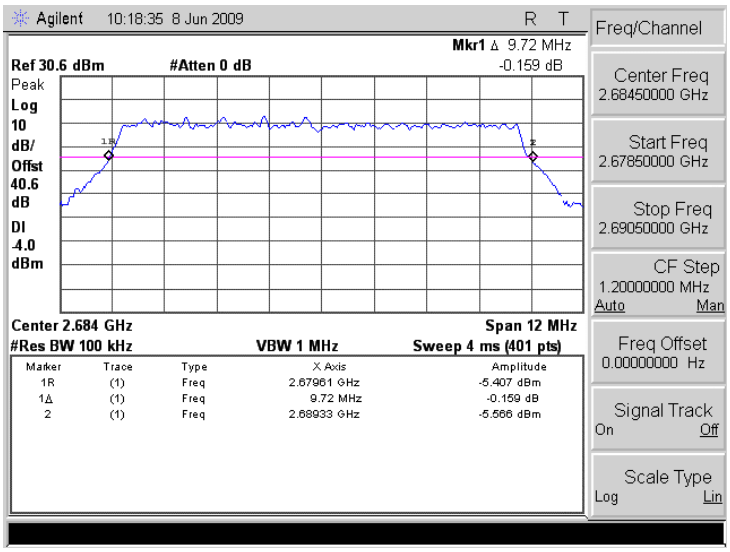


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.38 Occupied bandwidth test results at mid frequency, QPSK, 10 MHz EBW

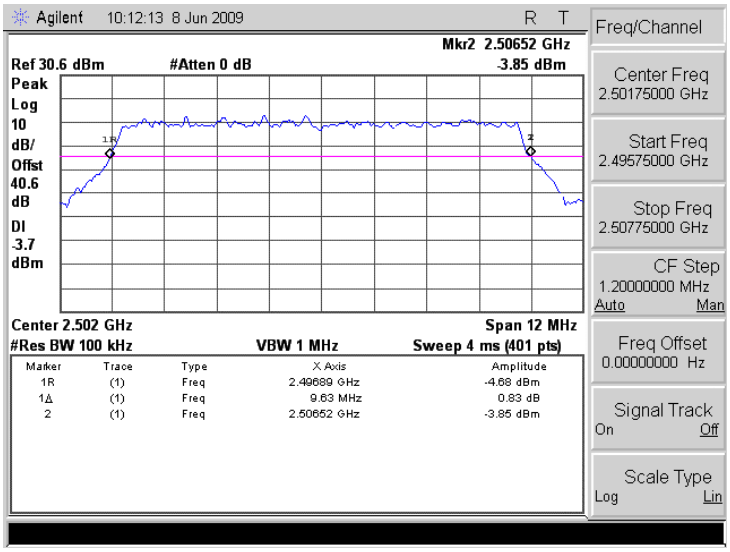


Plot 7.1.39 Occupied bandwidth test results at high frequency, QPSK, 10 MHz EBW

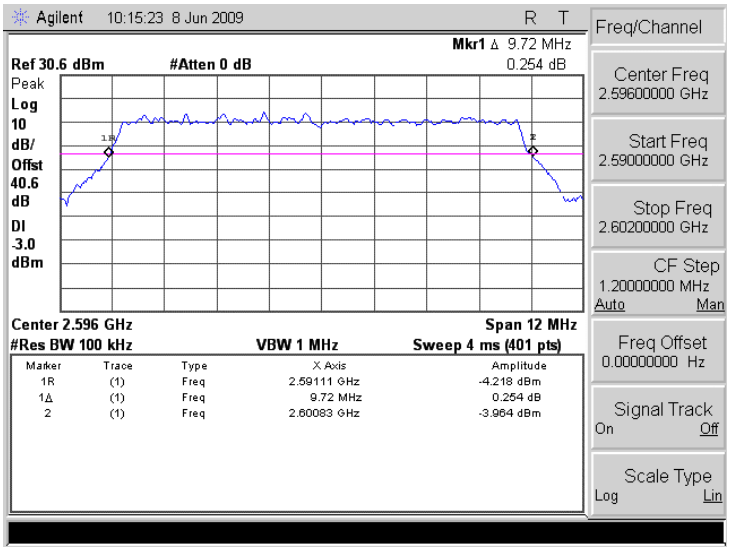


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.40 Occupied bandwidth test results at low frequency, 16QAM, 10 MHz EBW

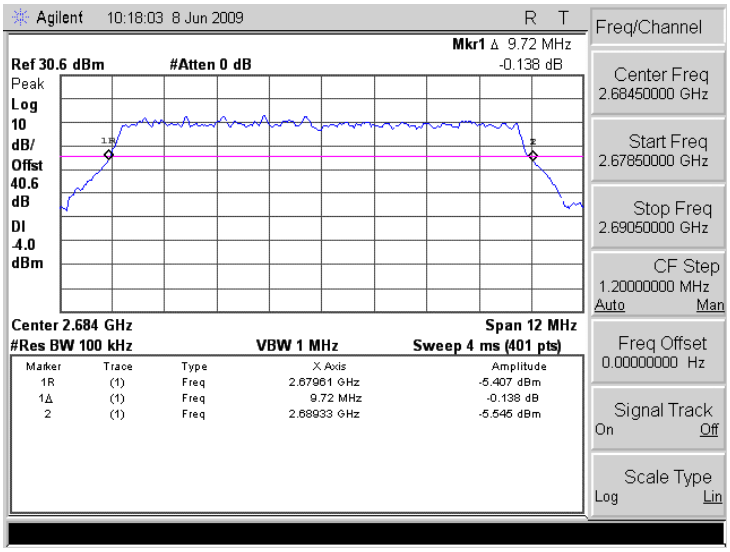


Plot 7.1.41 Occupied bandwidth test results at mid frequency, 16QAM, 10 MHz EBW

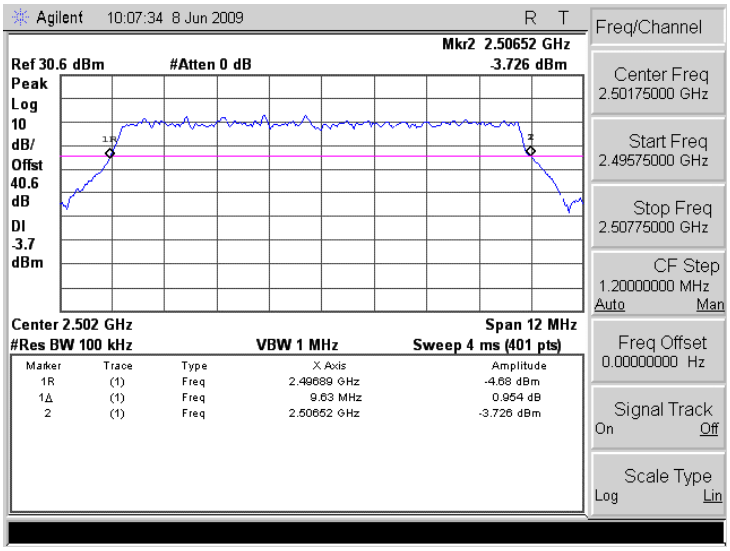


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.42 Occupied bandwidth test results at high frequency, 16QAM, 10 MHz EBW

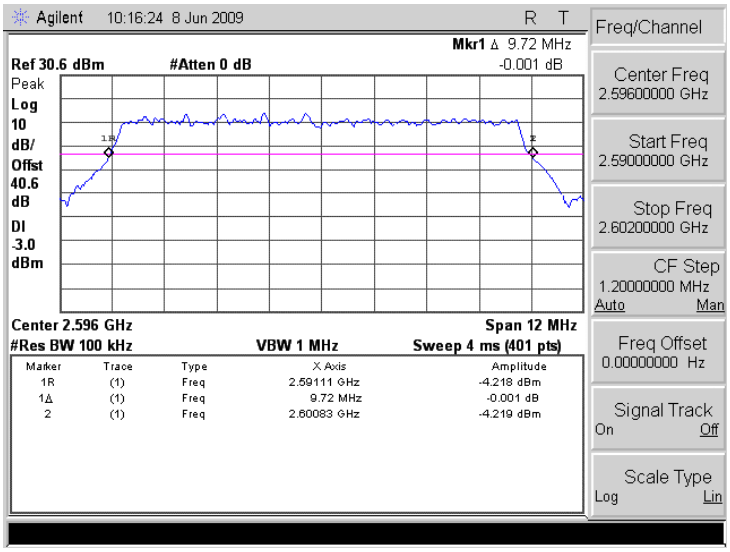


Plot 7.1.43 Occupied bandwidth test results at low frequency, 64QAM, 10 MHz EBW

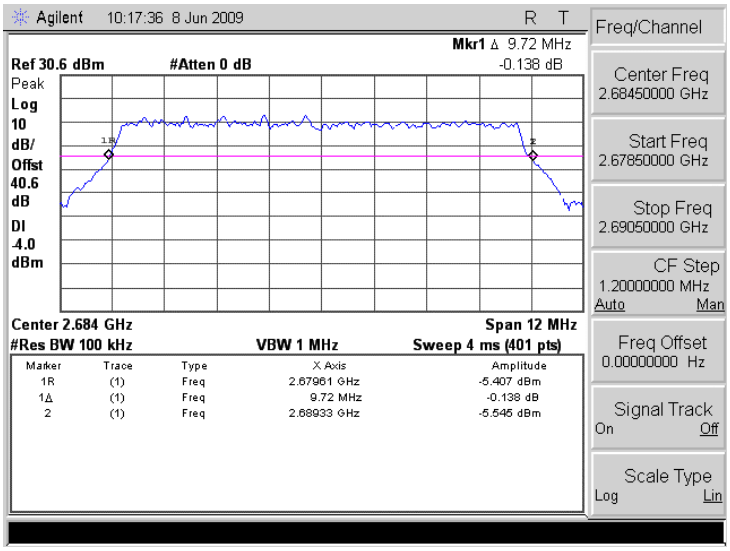


Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:40 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.1.44 Occupied bandwidth test results at mid frequency, 64QAM, 10 MHz EBW



Plot 7.1.45 Occupied bandwidth test results at high frequency, 64QAM, 10 MHz EBW



Test specification:	Section 27.50(h), Peak output power		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/24/2009 3:09:22 PM		
Temperature: 24.1 ºC	Air Pressure: 1008 hPa	Relative Humidity: 38 %	Power Supply: 120VAC
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

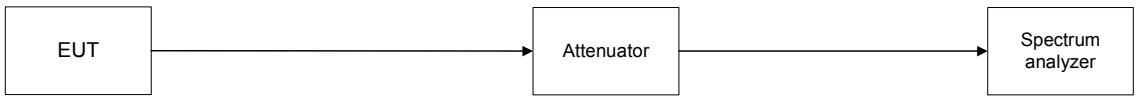
Assigned frequency range, MHz	Maximum peak output power*	
	W	dBm
2496.0 – 2690.0	2.0	33.0

* Note: conducted power for user stations.

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 peak output power was measured with spectrum analyzer as provided in Table 7.2.2 and the associated plots.

Figure 7.2.1 Peak output power test setup



Test specification:	**Section 27.50(h), Peak output power**		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	6/24/2009 3:09:22 PM		
Temperature: 24.1 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 38 %	**Power Supply:** 120VAC
Remarks:			

Table 7.2.2 Peak output power test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Power meter (Power Average during the burst)
RESOLUTION BANDWIDTH: NA
VIDEO BANDWIDTH: NA
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

EBW: 2.5 MHz

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm	Limit, dBm	Margin, dB	Verdict
BPSK 1.0475 Mbps							
2497.50	22.64	Included	Included	22.64	33.0	-10.36	Pass
2593.00	23.98	Included	Included	23.98	33.0	-9.02	Pass
2688.50	22.75	Included	Included	22.75	33.0	-10.25	Pass
QPSK 2.095 Mbps							
2497.50	22.63	Included	Included	22.63	33.0	-10.37	Pass
2593.00	23.98	Included	Included	23.98	33.0	-9.02	Pass
2688.50	22.78	Included	Included	22.78	33.0	-10.22	Pass
16QAM 6.2825 Mbps							
2497.50	22.64	Included	Included	22.64	33.0	-10.36	Pass
2593.00	23.98	Included	Included	23.98	33.0	-9.02	Pass
2688.50	22.79	Included	Included	22.79	33.0	-10.21	Pass
64QAM 9.425 Mbps							
2497.50	22.65	Included	Included	22.65	33.0	-10.35	Pass
2593.00	23.96	Included	Included	23.96	33.0	-9.04	Pass
2688.50	22.76	Included	Included	22.76	33.0	-10.24	Pass

EBW: 5 MHz

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm	Limit, dBm	Margin, dB	Verdict
BPSK 2.095 Mbps							
2498.75	22.73	Included	Included	22.73	33.0	-10.27	Pass
2593.00	23.97	Included	Included	23.97	33.0	-9.03	Pass
2687.25	22.78	Included	Included	22.78	33.0	-10.22	Pass
QPSK 4.19 Mbps							
2498.75	22.57	Included	Included	22.57	33.0	-10.43	Pass
2593.00	23.96	Included	Included	23.96	33.0	-9.04	Pass
2687.25	22.75	Included	Included	22.75	33.0	-10.25	Pass
16QAM 12.565 Mbps							
2498.75	22.59	Included	Included	22.59	33.0	-10.41	Pass
2593.00	23.99	Included	Included	23.99	33.0	-9.01	Pass
2687.25	22.77	Included	Included	22.77	33.0	-10.23	Pass
64QAM 18.85 Mbps							
2498.75	22.60	Included	Included	22.60	33.0	-10.40	Pass
2593.00	23.98	Included	Included	23.98	33.0	-9.02	Pass
2687.25	22.76	Included	Included	22.76	33.0	-10.24	Pass

Test specification:	**Section 27.50(h), Peak output power**		
Test procedure:	Section 27.50(h)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	6/24/2009 3:09:22 PM		
Temperature: 24.1 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 38 %	**Power Supply:** 120VAC
Remarks:			

Table 7.2.2 Peak output power test results (continued)

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Power meter (Power Average during the burst)
RESOLUTION BANDWIDTH: NA
VIDEO BANDWIDTH: NA
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
EBW: 10 MHz

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm	Limit, dBm	Margin, dB	Verdict
BPSK 4.19 Mbps							
2501.75	22.96	Included	Included	22.96	33.0	-10.04	Pass
2596.00	24.13	Included	Included	24.13	33.0	-8.87	Pass
2684.50	22.96	Included	Included	22.96	33.0	-10.04	Pass
QPSK 8.38 Mbps							
2501.75	22.98	Included	Included	22.98	33.0	-10.02	Pass
2596.00	24.14	Included	Included	24.14	33.0	-8.86	Pass
2684.50	22.97	Included	Included	22.97	33.0	-10.03	Pass
16QAM 25.13 Mbps							
2501.75	23.00	Included	Included	23.00	33.0	-10.00	Pass
2596.00	24.12	Included	Included	24.12	33.0	-8.88	Pass
2684.50	22.93	Included	Included	22.93	33.0	-10.07	Pass
64QAM 37.7 Mbps							
2501.75	22.99	Included	Included	22.99	33.0	-10.01	Pass
2596.00	24.10	Included	Included	24.10	33.0	-8.90	Pass
2684.50	22.98	Included	Included	22.98	33.0	-10.02	Pass

Reference numbers of test equipment used

HL 3301	HL 3302	HL 3439	HL 3442				

Full description is given in Appendix A.

Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

7.3 Conducted spurious emissions at the band edges (emission mask)

7.3.1 General

This test was performed to measure spurious emissions at RF antenna connector at the band edges. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Spurious emission limits

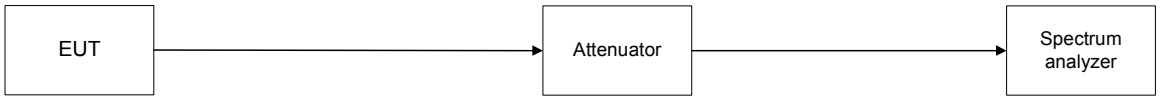
Channel, MHz	Frequency range, MHz	Attenuation below carrier, dBc
Channel bandwidth 2.5 MHz		
2497.50	2491.0 – 2496.0 & 2499.0 – 2504.0	43 + 10*Log (P*)
2593.00	2586.5 – 2591.5 & 2594.5 – 2599.5	
2688.50	2682.0 – 2687.0 & 2690.0 – 2695.0	
Channel bandwidth 5 MHz		
2498.75	2490.0 – 2496.0 & 2502.0 – 2507.0	43 + 10*Log (P*)
2593.00	2584.0 - 2590.0 & 2596.0 – 2602.0	43 + 10*Log (P*)
2687.25	2678.5 – 2684.5 & 2690.0 – 2696.0	43 + 10*Log (P*)
Channel bandwidth 10 MHz		
2501.75	2490.0 – 2496.0 & 2507.5 – 2513.5	43 + 10*Log (P*)
2596.00	2584.0 – 2590.0 & 2602.0 – 2608.0	43 + 10*Log (P*)
2684.50	2673.0 – 2679.0 & 2690.0 – 2696.0	43 + 10*Log (P*)

* - P is transmitter output power in Watts

7.3.2 Test procedure

7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.
7.3.2.2 The spurious emissions were measured with spectrum analyzer as provided in the associated plots.
7.3.2.3 The worst case results are were provided in Table 7.3.2 and in the associated plots.

Figure 7.3.1 Conducted spurious emission test setup



Test specification:	**Section 27.53(m)(4), Conducted spurious emissions at the band edges**		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 40 %	**Power Supply:** 120VAC
Remarks:			

Table 7.3.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: See Table 7.3.3 and Table 7.3.4
RBW: 1 % of EBW
DETECTOR USED: Average
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
MODULATION: BPSK, QPSK, 16QAM, 64QAM
The worst case results provided in the following table.

Frequency offset, ± MHz	SA reading, dBc low range	SA reading, dBc high range	RBW, kHz	Integration BW, kHz	Limit, dBc	Verdict
2.5 EBW						
Low carrier frequency 2497.5 MHz QPSK (Output power = 22.87 dBm)						
2	41.61	45.11	30	1000	35.87	Pass
3	49.22	48.90				
4	57.21	56.93				
5	58.73	59.10				
6	59.43	59.15				
Mid carrier frequency 2593.0 MHz QPSK (Output power = 23.16 dBm)						
2	41.42	44.75	30	1000	36.16	Pass
3	48.80	49.19				
4	57.52	57.26				
5	59.86	59.66				
6	60.37	60.48				
Mid carrier frequency 2688.5 MHz QPSK (Output power = 21.92 dBm)						
2	43.67	47.13	30	1000	34.92	Pass
3	50.77	51.92				
4	57.39	57.58				
5	58.81	58.59				
6	58.83	59.12				

Note: Output power measured with the same settings as band edge emissions.

Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

Table 7.3.2. Spurious emission test results (continued)

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: See Table 7.3.3 and Table 7.3.4
RBW: 1 % of EBW
DETECTOR USED: Average
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum (NOTE: Both EasyST and ProST were tested as configured to maximum output power for ProST)
MODULATION: BPSK, QPSK, 16QAM, 64QAM
The worst case results provided in the following table.

Frequency offset, ± MHz	SA reading, dBc low range	SA reading, dBc high range	RBW, kHz	Integration BW, kHz	Limit, dBc	Verdict
5 MHz EBW						
Low carrier frequency 2498.75 MHz 64QAM (Output power = 21.80 dBm)						
3.25	42.15	47.27	100	1000	34.8	Pass
4.25	47.69	50.78				
5.25	51.62	50.01				
6.25	58.70	58.68				
7.25	58.47	59.75				
8.25	59.30	59.81				
Mid carrier frequency 2593.0 MHz QPSK (Output power = 22.54 dBm)						
3.5	44.43	46.74	100	1000	35.54	Pass
4.5	49.40	51.85				
5.5	56.27	52.78				
6.5	57.19	58.51				
7.5	59.46	59.74				
8.5	59.84	60.41				
Mid carrier frequency 2687.25 MHz QPSK (Output power = 21.49 dBm)						
3.25	45.59	48.84	100	1000	34.49	Pass
4.25	51.50	51.28				
5.25	55.43	54.76				
6.25	57.72	59.20				
7.25	59.31	59.39				
8.25	59.60	60.06				

Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

Table 7.3.2. Spurious emission test results (continued)

Frequency offset, ± MHz	SA reading, dBc low range	SA reading, dBc high range	RBW, kHz	Integration BW, kHz	Limit, dBc	Verdict
10 MHz EBW						
Low carrier frequency 2501.75 MHz QPSK (Output power = 22.98 dBm)						
6.25	43.74	45.49	100	1000	35.98	Pass
7.25	46.26	46.84				
8.25	47.74	49.30				
9.25	48.18	49.96				
10.25	51.57	49.34				
11.25	53.67	51.87				
Mid carrier frequency 2596.0 MHz QPSK (Output power = 23.51 dBm)						
6.5	42.37	44.21	100	1000	36.51	Pass
7.5	45.18	46.62				
8.5	46.17	47.88				
9.5	48.45	47.84				
10.5	51.30	47.90				
11.5	52.29	52.32				
Mid carrier frequency 2684. 5 MHz BPSK (Output power = 22.96 dBm)						
6.0	42.66	46.93	100	1000	35.96	Pass
7.0	48.98	49.37				
8.0	49.84	50.83				
9.0	51.28	52.67				
10.0	52.29	51.79				
11.0	54.75	56.05				

Note: Output power measured with the same settings as band edge emissions
NOTE: For the rest test results please see Plots 7.3.1 - Plot 7.3.36

Reference numbers of test equipment used

HL 2909	HL 3437	HL 3442	HL 3559					

Full description is given in Appendix A.

Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

Table 7.3.3 Frequency offsets and corresponding frequency bands

Frequency offset, ± MHz	Reference BW, MHz	Frequency Bands, Low	Frequency Band, High
2.5 MHz EBW			
Low carrier frequency 2497. 5 MHz			
2	1	2495 - 2496	2499 - 2500
3	1	2494 - 2495	2500 - 2501
4	1	2493 - 2494	2501 - 2502
5	1	2492 - 2493	2502 - 2503
6	1	2491 - 2492	2503 - 2504
Mid carrier frequency 2593.00 MHz			
2	1	2590.5 - 2591.5	2594.5 - 2595.5
3	1	2589.5 - 2590.5	2595.5 - 2596.5
4	1	2588.5 - 2589.5	2596.5 - 2597.5
5	1	2587.5 - 2588.5	2597.5 - 2598.5
6	1	2586.5 - 2587.5	2598.5 -2599.5
High carrier frequency 2688.50 MHz			
2	1	2686 - 2687	2690 - 2691
3	1	2685 - 2686	2691 - 2692
4	1	2684 - 2685	2692 - 2693
5	1	2683 - 2684	2693 -2694
6	1	2682 - 2683	2694 - 2695
5 MHz EBW			
Low carrier frequency 2498.75 MHz			
3.25	1	2495 - 2496	2501.5 - 2502.5
4.25	1	2494 - 2495	2502.5 - 2503.5
5.25	1	2493 - 2494	2503.5 - 2504.5
6.25	1	2492 - 2493	2504.5 - 2505.5
7.25	1	2491 - 2492	2505.5 - 2506.5
8.25	1	2490 - 2491	2506.5 - 2507.5
Mid carrier frequency 2593.00 MHz			
3.5	1	2589 - 2590	2596 - 2597
4.5	1	2588 - 2589	2597 - 2598
5.5	1	2587 - 2588	2598 - 2599
6.5	1	2586 - 2587	2599 - 2600
7.5	1	2585 - 2586	2600 - 2601
8.5	1	2584 - 2585	2601 - 2602
High carrier frequency 2687.25 MHz			
3.25	1	2683.5 - 2684.5	2690 - 2691
4.25	1	2682.5 - 2683.5	2691 - 2692
5.25	1	2681.5 - 2682.5	2692 - 2693
6.25	1	2680.5 - 2681.5	2693 - 2694
7.25	1	2679.5 - 2680.5	2694 - 2695
8.25	1	2678.5 - 2679.5	2695 - 2696

Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

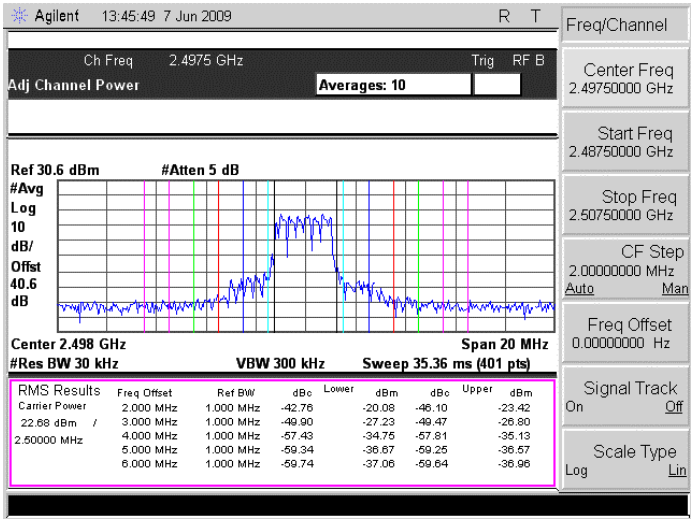
Table 7.3.4 Frequency offsets and corresponding frequency bands

10 MHz EBW			
Low carrier frequency 2501.75 MHz			
6.25	1	2495 - 2496	2507.5 - 2508.5
7.25	1	2494 - 2495	2508.5 - 2509.5
8.25	1	2493 - 2494	2509.5 - 2510.5
9.25	1	2492 - 2493	2510.5 - 2511.5
10.25	1	2491 -2492	2511.5 - 2512.5
11.25	1	2490 - 2491	2512.5 - 2513.5
Mid carrier frequency 2596.00 MHz			
6.5	1	2589 - 2590	2602 - 2603
7.5	1	2588 - 2589	2603 - 2604
8.5	1	2587 - 2588	2604 - 2605
9.5	1	2586 - 2587	2605 - 2606
10.5	1	2585 - 2586	2606 - 2607
11.5	1	2584 - 2585	2607 - 2608
High carrier frequency 2684. 5 MHz			
6	1	2678 - 2679	2690 - 2691
7	1	2677 - 2678	2691 - 2692
8	1	2676 - 2677	2692 - 2693
9	1	2675 - 2676	2693 - 2694
10	1	2674 - 2675	2694 - 2695
11	1	2673 - 2674	2695 - 2696

Test specification:	**Section 27.53(m)(4), Conducted spurious emissions at the band edges**		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 40 %	**Power Supply:** 120VAC
Remarks:			

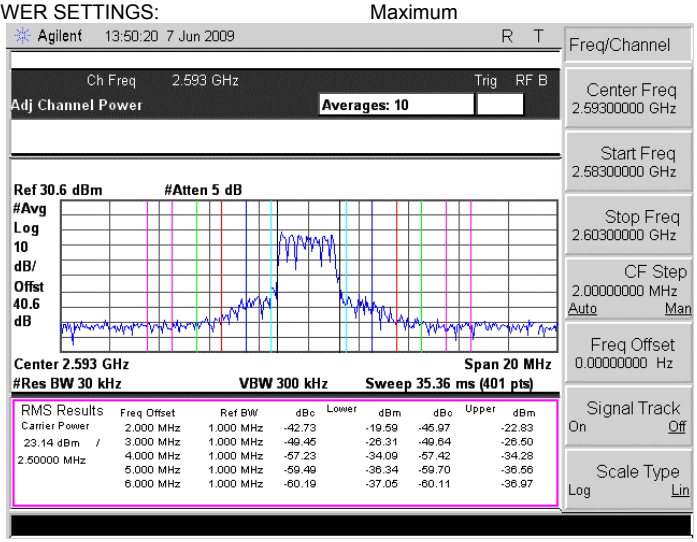
Plot 7.3.1 Emission mask test results at low carrier frequency, 2.5 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Peak
MODULATION:	BPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 7.3.2 Emission mask test results at mid carrier frequency, 2.5 MHz EBW

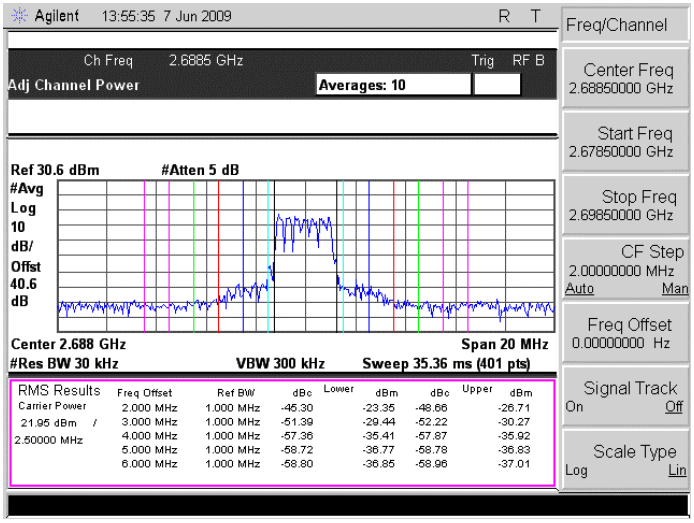
OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Peak
MODULATION:	BPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

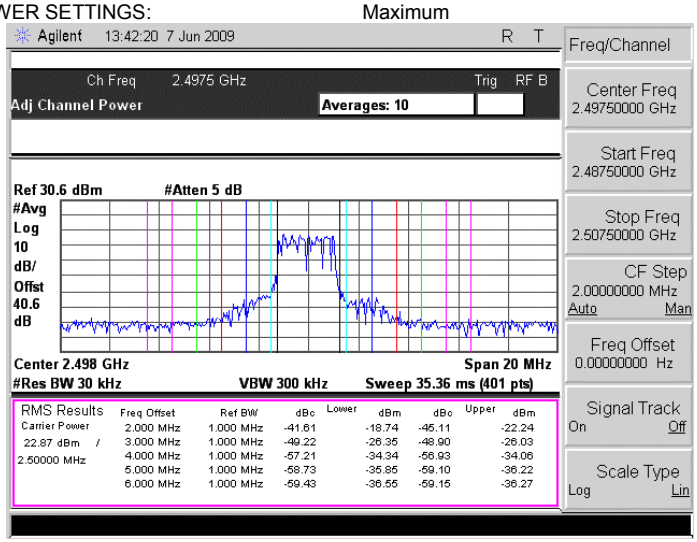
Plot 7.3.3 Emission mask test results at high carrier frequency, 2.5 MHz EBW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: BPSK
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Plot 7.3.4 Emission mask test results at low carrier frequency, 2.5 MHz EBW

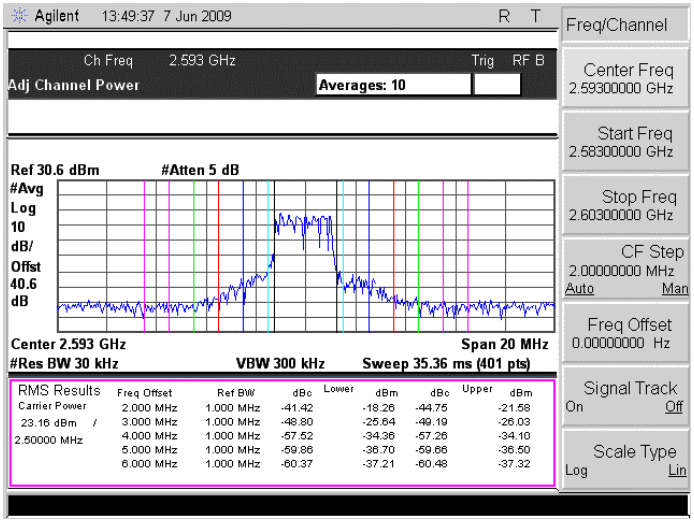
OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: QPSK
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

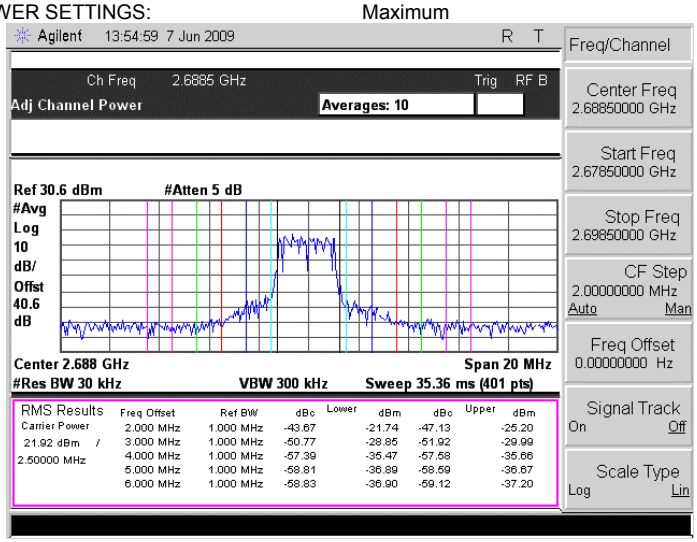
Plot 7.3.5 Emission mask test results at mid carrier frequency, 2.5 MHz EBW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: QPSK
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Plot 7.3.6 Emission mask test results at high carrier frequency, 2.5 MHz EBW

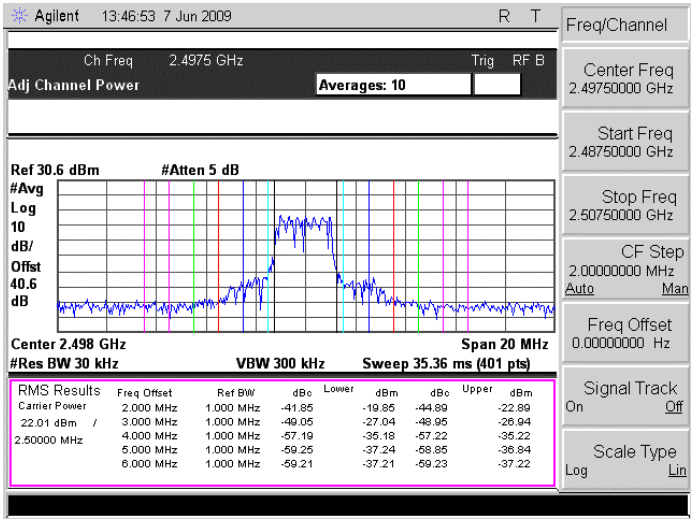
OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: QPSK
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

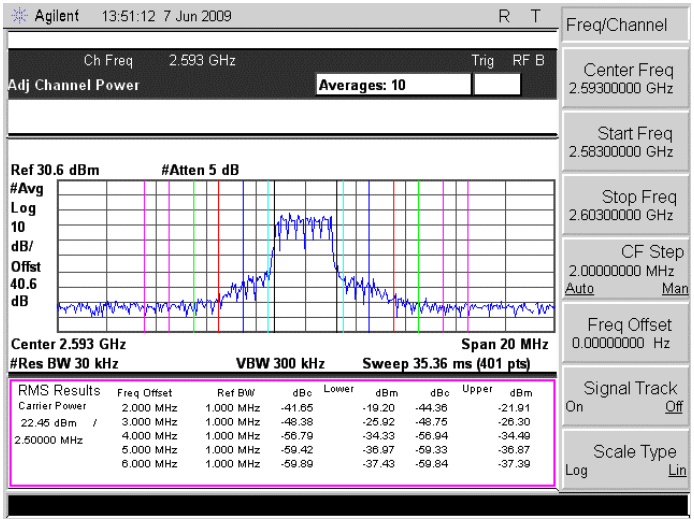
Plot 7.3.7 Emission mask test results at low carrier frequency, 2.5 MHz EBW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Plot 7.3.8 Emission mask test results at mid carrier frequency, 2.5 MHz EBW

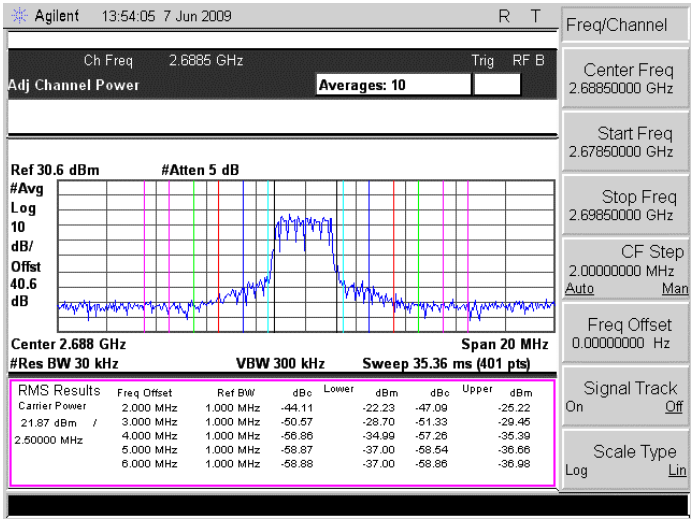
OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

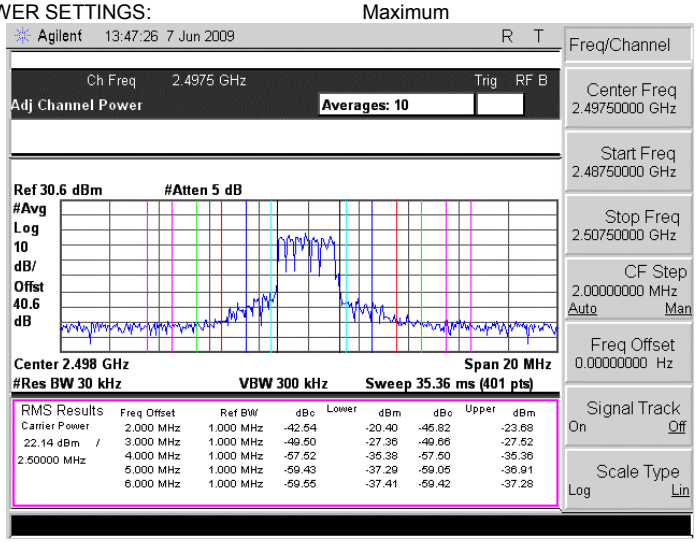
Plot 7.3.9 Emission mask test results at high carrier frequency, 2.5 MHz EBW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Plot 7.3.10 Emission mask test results at low carrier frequency, 2.5 MHz EBW

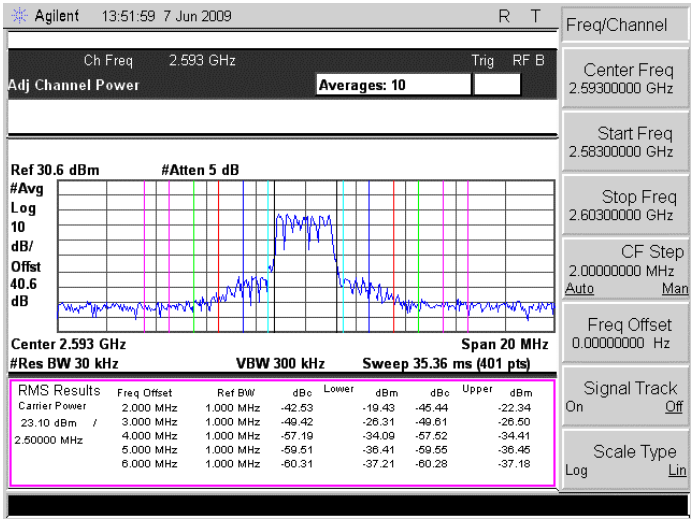
OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

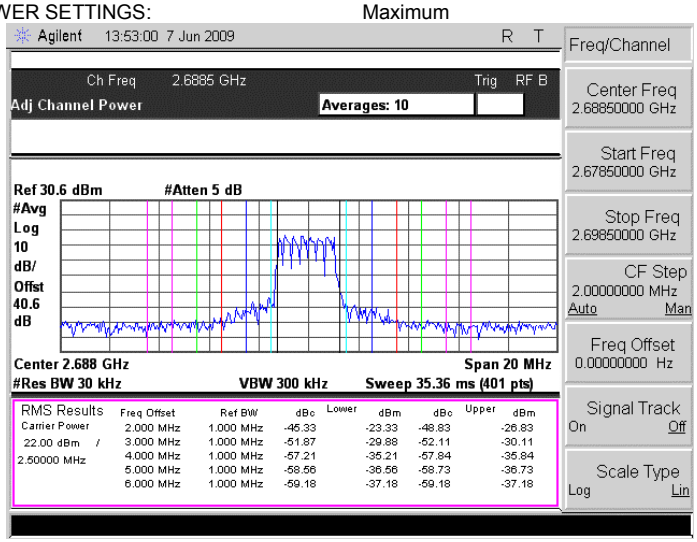
Plot 7.3.11 Emission mask test results at mid carrier frequency, 2.5 MHz EBW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Plot 7.3.12 Emission mask test results at high carrier frequency, 2.5 MHz EBW

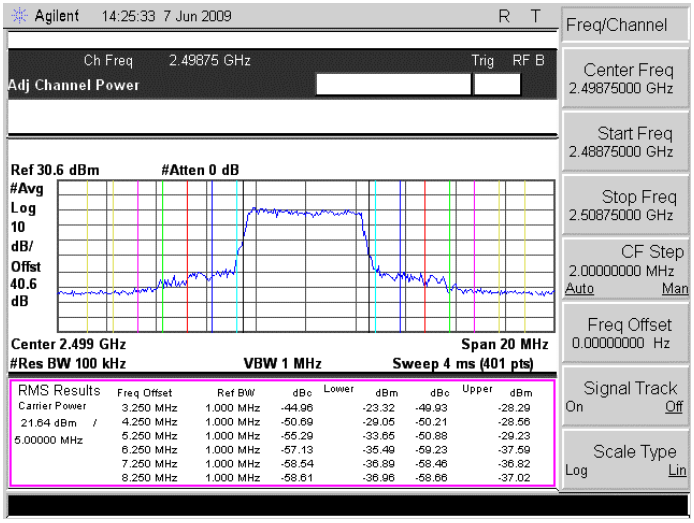
OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Peak
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

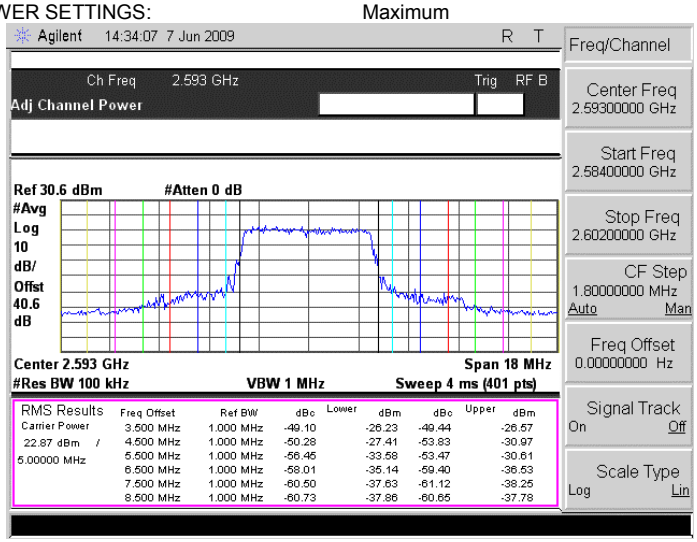
Plot 7.3.13 Emission mask test results at low carrier frequency, 5 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	BPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 7.3.14 Emission mask test results at mid carrier frequency, 5 MHz EBW

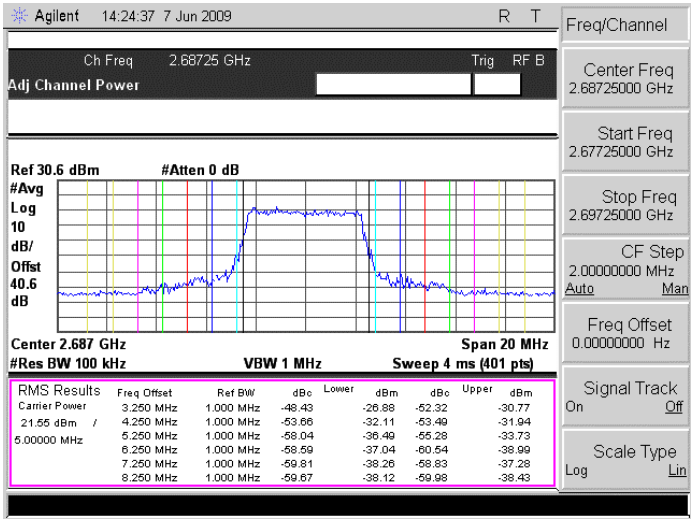
OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	BPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

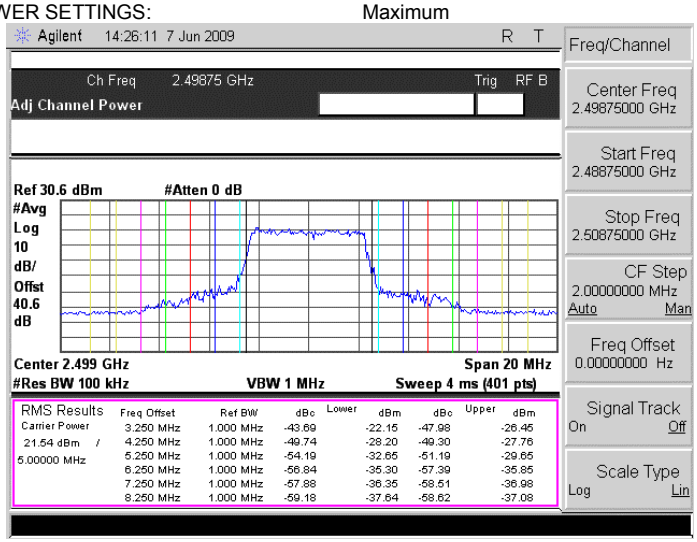
Plot 7.3.15 Emission mask test results at high carrier frequency, 5 MHz EBW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Average
MODULATION: BPSK
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Plot 7.3.16 Emission mask test results at low carrier frequency, 5 MHz EBW

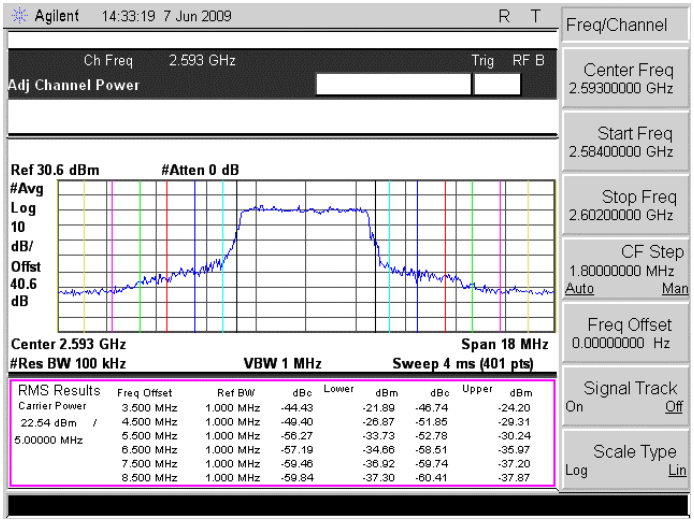
OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Average
MODULATION: QPSK
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

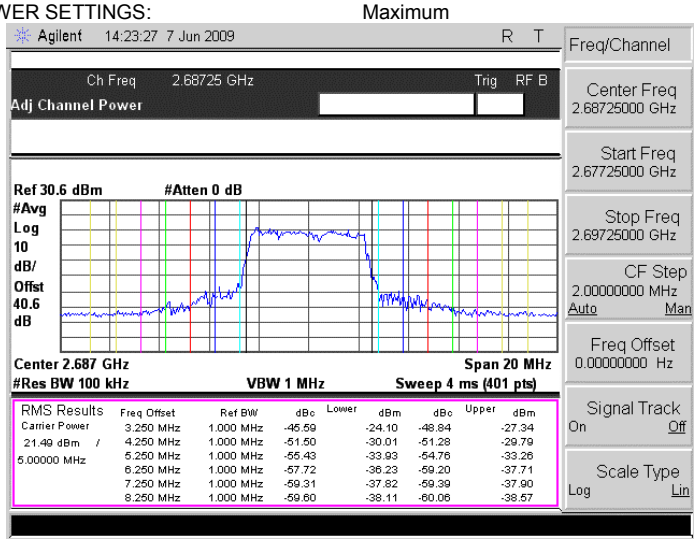
Plot 7.3.17 Emission mask test results at mid carrier frequency, 5 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	QPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 7.3.18 Emission mask test results at high carrier frequency, 5 MHz EBW

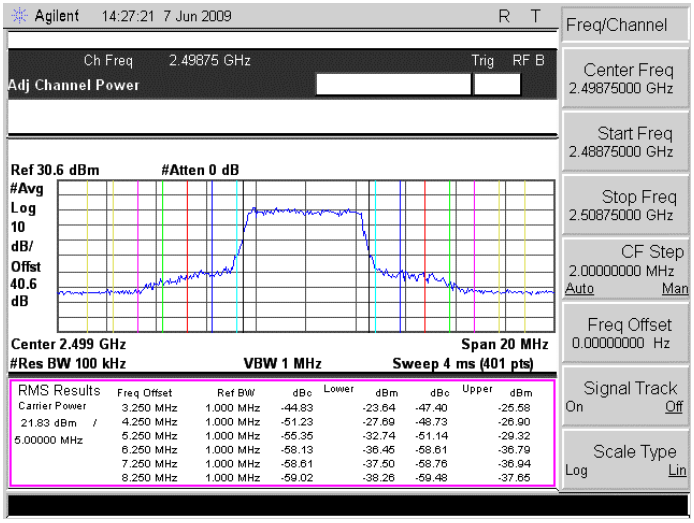
OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	QPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

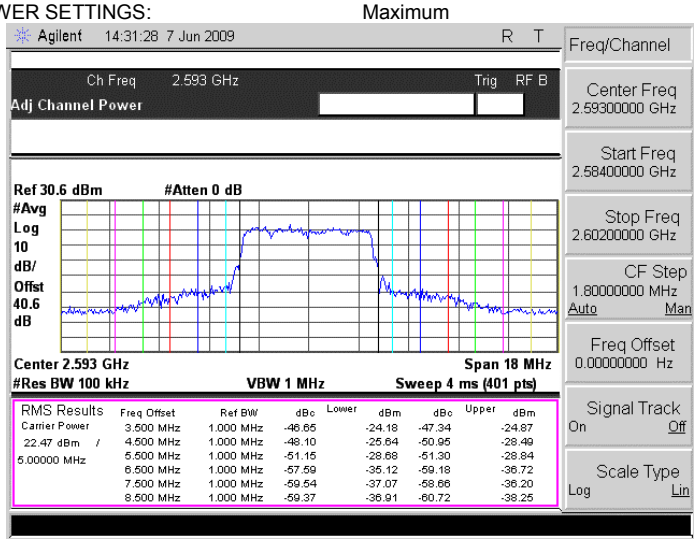
Plot 7.3.19 Emission mask test results at low carrier frequency, 5 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	16QAM
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 7.3.20 Emission mask test results at mid carrier frequency, 5 MHz EBW

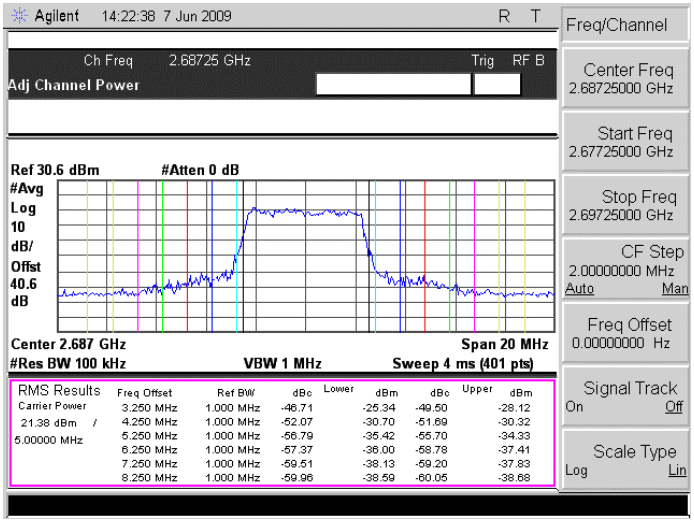
OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	16QAM
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

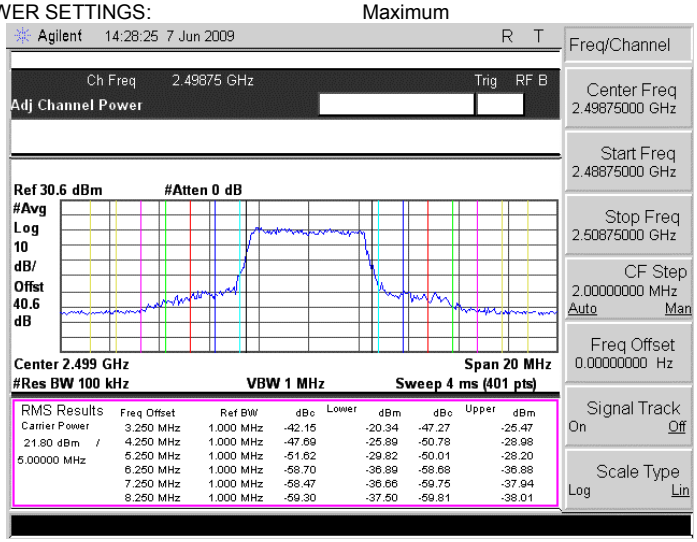
Plot 7.3.21 Emission mask test results at high carrier frequency, 5 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	16QAM
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 7.3.22 Emission mask test results at low carrier frequency, 5 MHz EBW

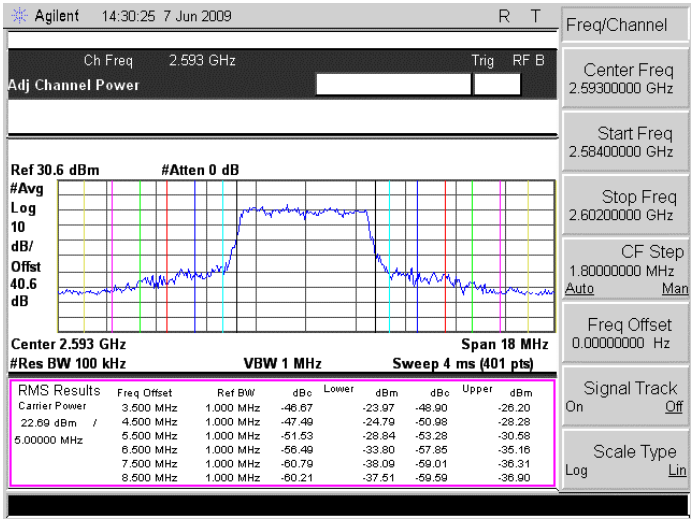
OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	64QAM
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

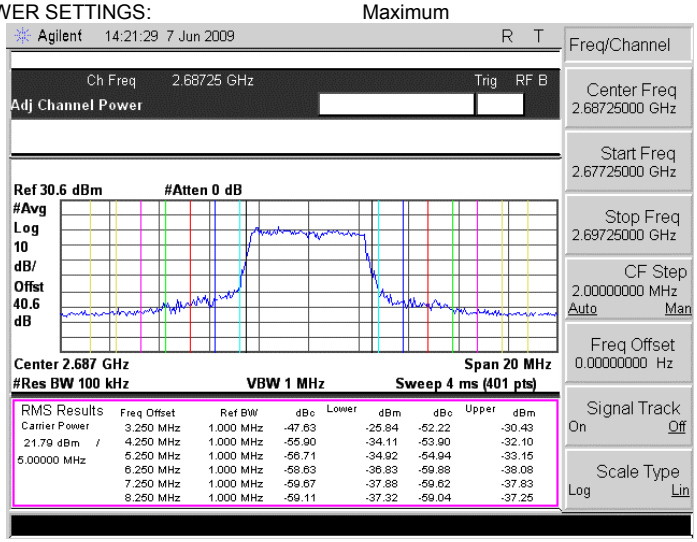
Plot 7.3.23 Emission mask test results at mid carrier frequency, 5 MHz EBW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Average
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Plot 7.3.24 Emission mask test results at high carrier frequency, 5 MHz EBW

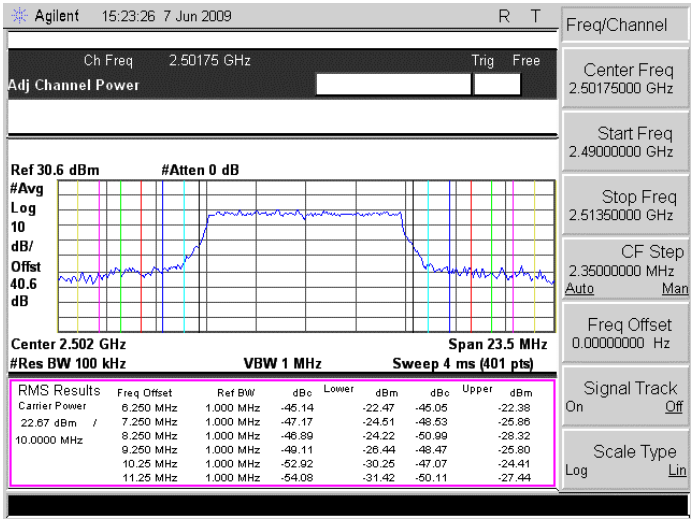
OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Average
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

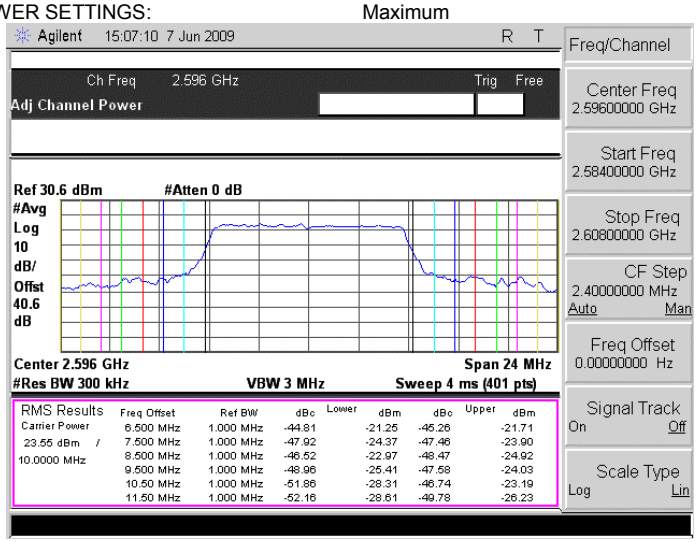
Plot 7.3.25 Emission mask test results at low carrier frequency, 10 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	BPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 7.3.26 Emission mask test results at mid carrier frequency, 10 MHz EBW

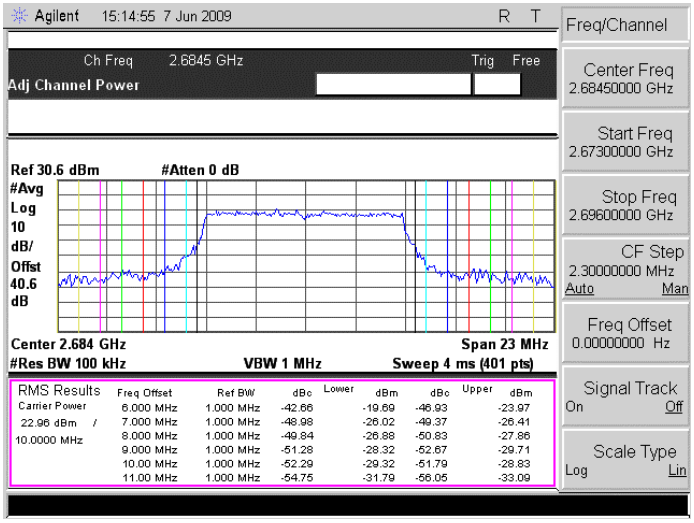
OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	BPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

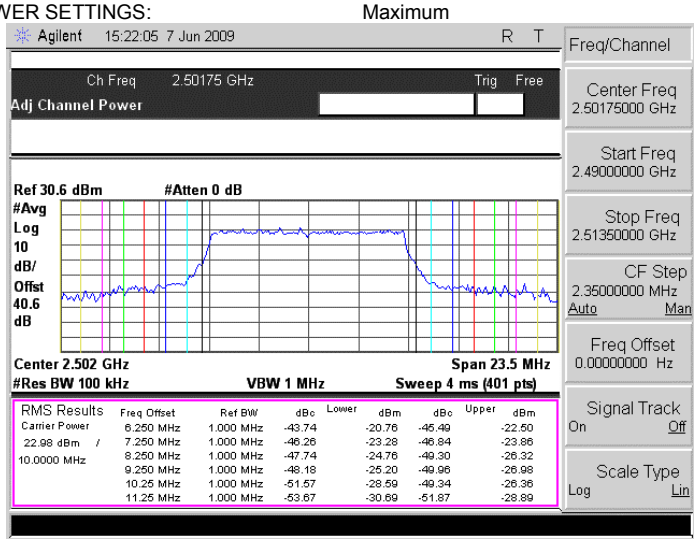
Plot 7.3.27 Emission mask test results at high carrier frequency, 10 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	BPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 7.3.28 Emission mask test results at low carrier frequency, 10 MHz EBW

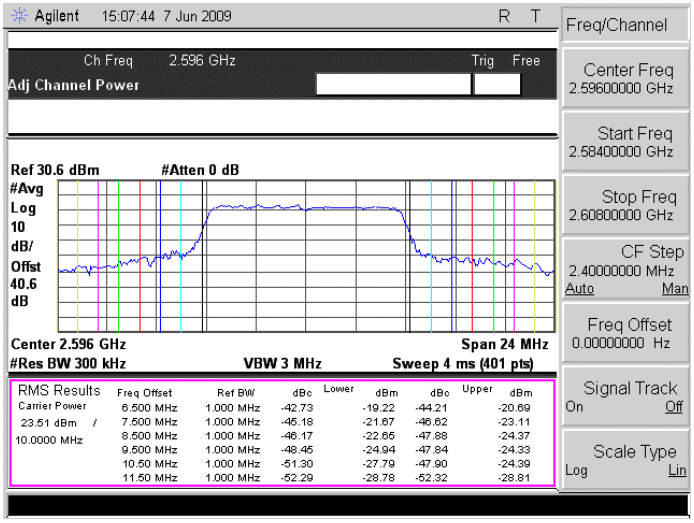
OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	QPSK
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

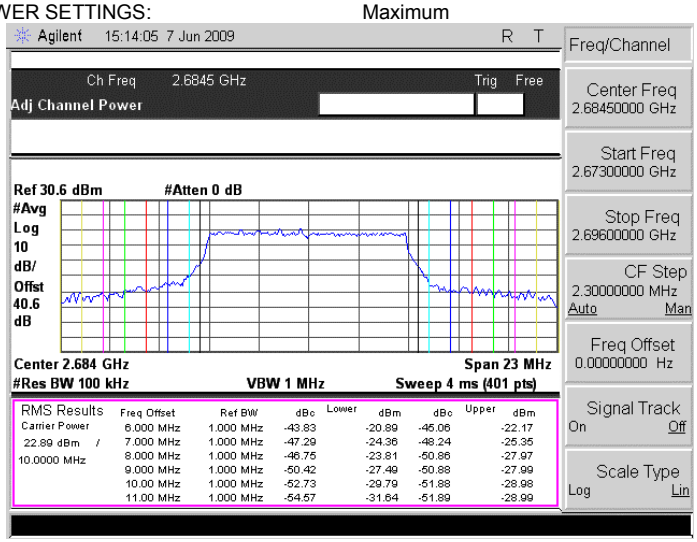
Plot 7.3.29 Emission mask test results at mid carrier frequency, 10 MHz EBW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Average
MODULATION: QPSK
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Plot 7.3.30 Emission mask test results at high carrier frequency, 10 MHz EBW

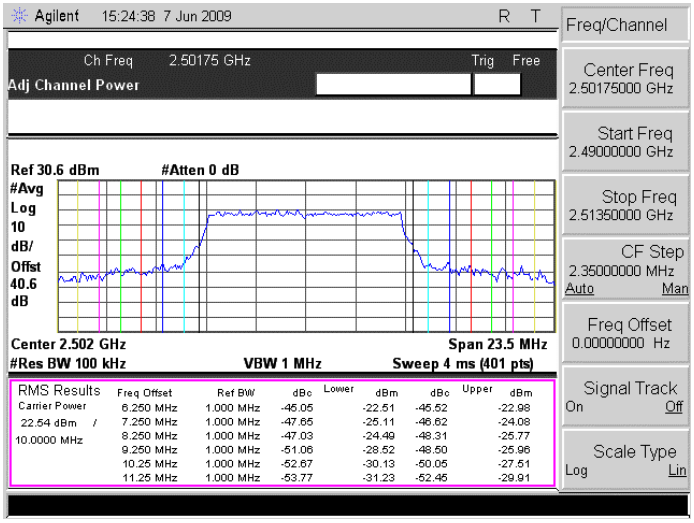
OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Average
MODULATION: QPSK
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

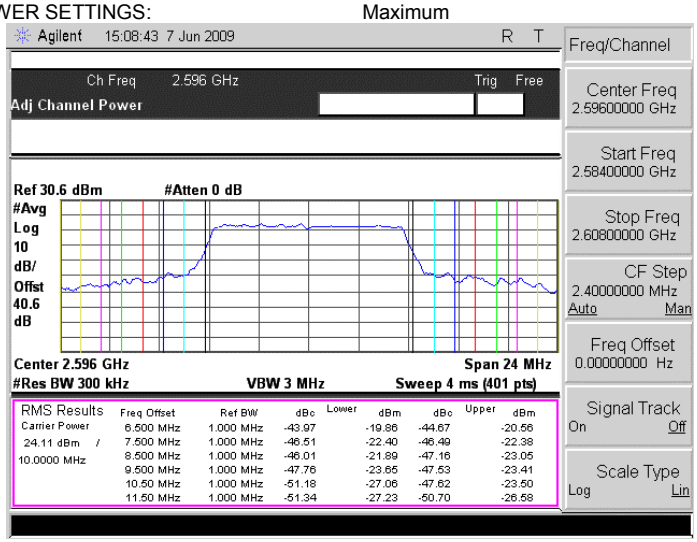
Plot 7.3.31 Emission mask test results at low carrier frequency, 10 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	16QAM
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 7.3.32 Emission mask test results at mid carrier frequency, 10 MHz EBW

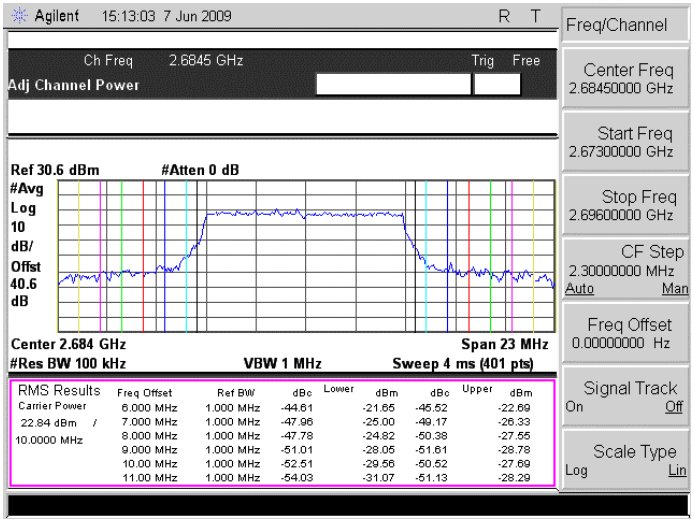
OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	16QAM
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

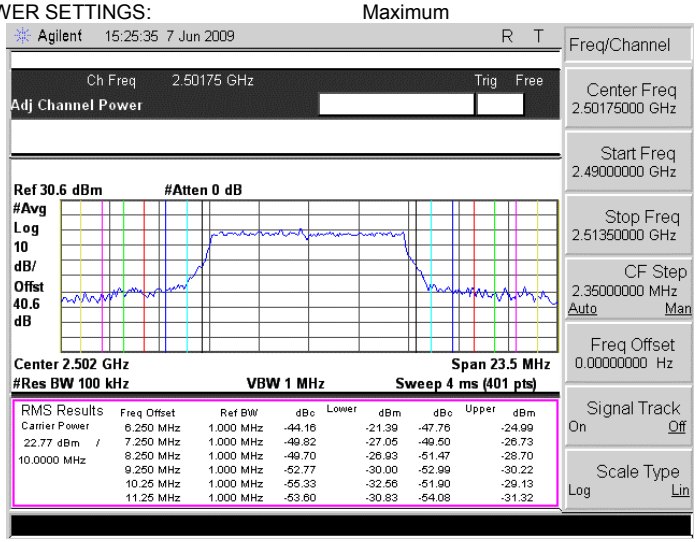
Plot 7.3.33 Emission mask test results at high carrier frequency, 10 MHz EBW

OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Average
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Plot 7.3.34 Emission mask test results at low carrier frequency, 10 MHz EBW

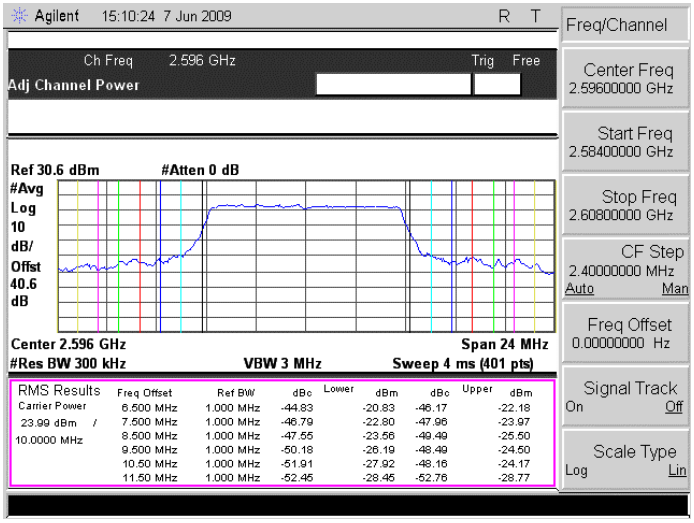
OPERATING FREQUENCY RANGE: 2496.0 – 2690.0 MHz
DETECTOR USED: Average
MODULATION: 64QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions at the band edges		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:24:16 PM		
Temperature: 24.3 ºC	Air Pressure: 1008 hPa	Relative Humidity: 40 %	Power Supply: 120VAC
Remarks:			

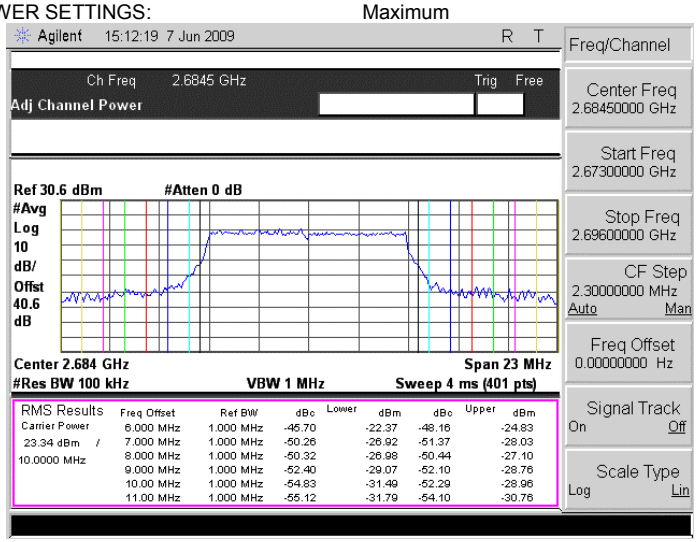
Plot 7.3.35 Emission mask test results at mid carrier frequency, 10 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	64QAM
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 7.3.36 Emission mask test results at high carrier frequency, 10 MHz EBW

OPERATING FREQUENCY RANGE:	2496.0 – 2690.0 MHz
DETECTOR USED:	Average
MODULATION:	64QAM
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

7.4 Spurious emissions at RF antenna connector test

7.4.1 General

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

Table 7.4.1 Spurious emission limits

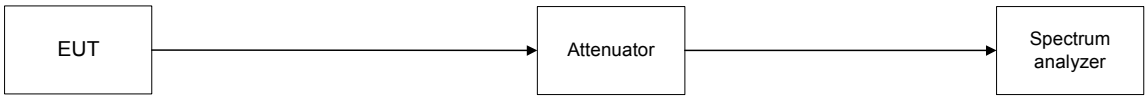
Frequency, MHz	Attenuation below carrier, dBc	ERP of spurious, dBm
0.009 – 10th harmonic*	43+10logP**	-13.0

* - spurious emission limits do not apply to the in band emission within ± 5.5 MHz (for mobile subscriber unit) of the authorized bandwidth from the carrier; investigated in course of emission mask testing
** - 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 the associated plots.

Figure 7.4.1 Spurious emission test setup



Test specification:	**Section 27.53(m)(4), Conducted spurious emissions**		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 41 %	**Power Supply:** 120VAC
Remarks:			

Table 7.4.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2496.0 – 2690.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 27000 MHz except:
2491.5 – 2504.0 MHz for low channel
2586.5 – 2599.5 for mid channel
2682.0 – 2696.0 MHz for high channel)
See NOTE 2
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 16QAM
MODULATING SIGNAL: PRBS
BIT RATE: 6.2825 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency								
4994.300	-42.33	Included	Included	1000	-42.33	-13.00	-29.33	Pass
7492.040	-19.17	Included	Included	1000	-19.17	-13.00	-6.17	Pass
Mid carrier frequency								
5185.420	-44.33	Included	Included	1000	-44.33	-13.00	-21.33	Pass
7778.670	-14.50	Included	Included	1000	-14.50	-13.00	-1.50	Pass
High carrier frequency								
73.625	-49.91	Included	Included	1000	-49.91	-13.00	-36.91	Pass
5376.130	-49.50	Included	Included	1000	-49.50	-13.00	-36.50	Pass
8065.350	-22.33	Included	Included	1000	-22.33	-13.00	-9.33	Pass

*- Margin = Spurious emission – specification limit.
NOTE 1: Spurious emissions test was performed at 2.5 MHz EBW with 16QAM modulation as configuration that produces maximum output power spectral density.
NOTE 2: For band edge emissions please see "Emission at the band edges" test report.

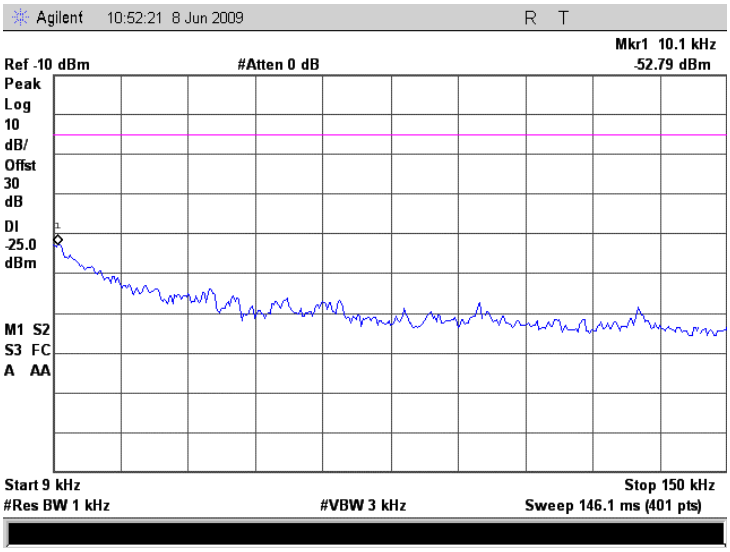
Reference numbers of test equipment used

HL 2909	HL 2953	HL 3439	HL 3442				

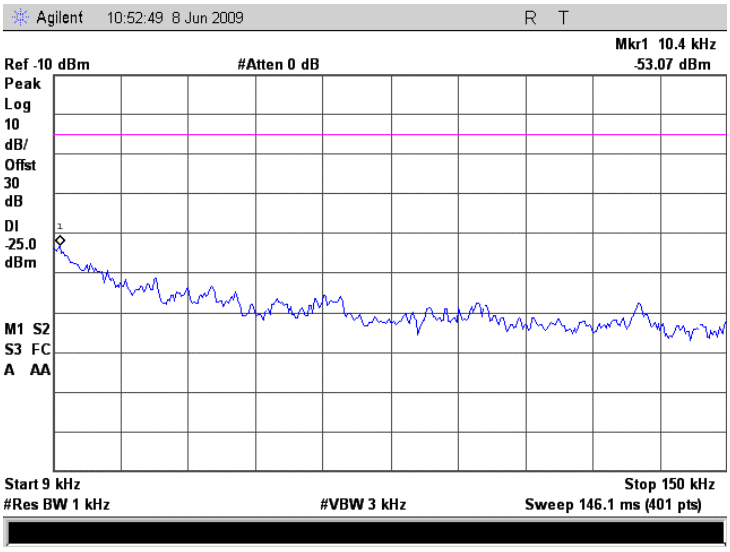
Full description is given in Appendix A.

Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

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

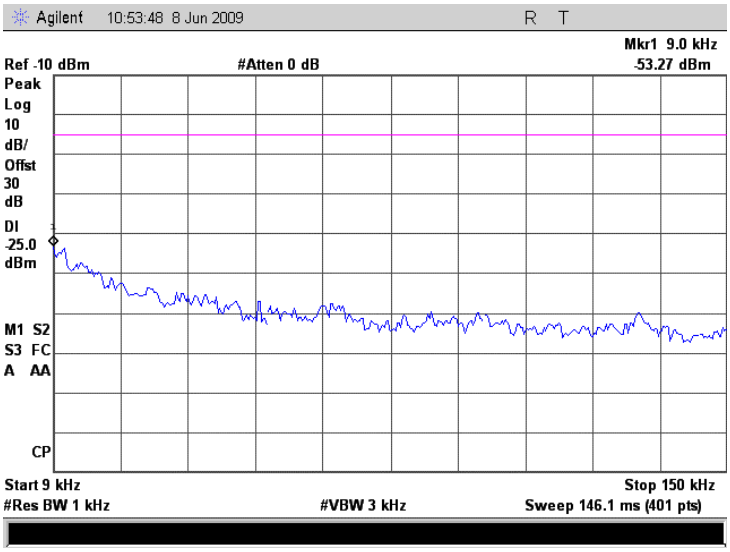


Plot 7.4.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency

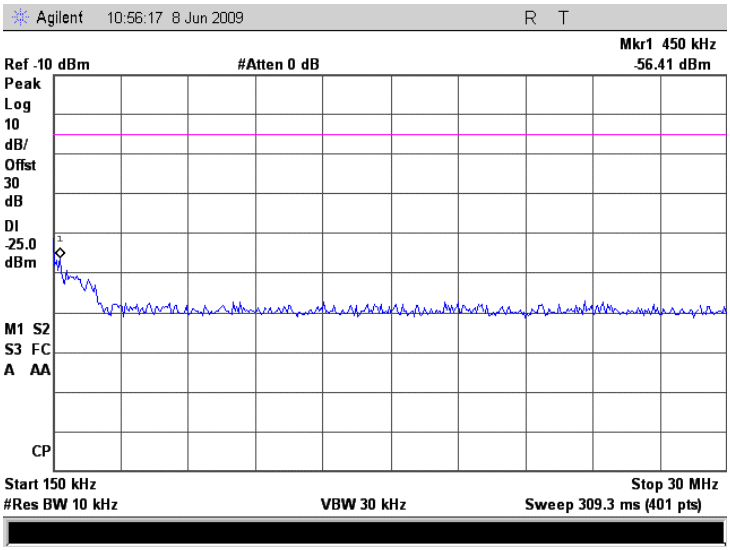


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

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

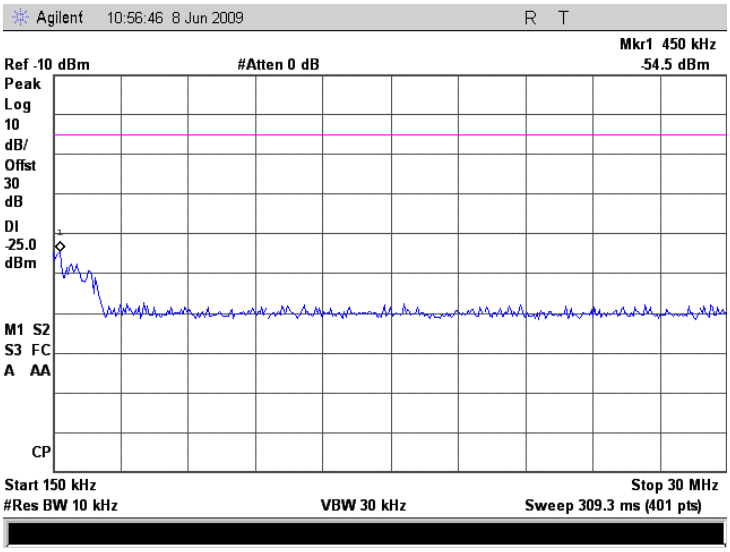


Plot 7.4.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

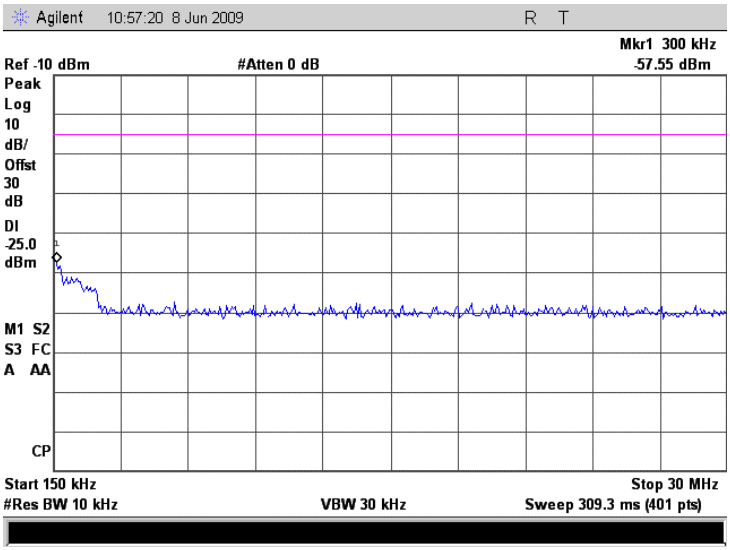


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

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

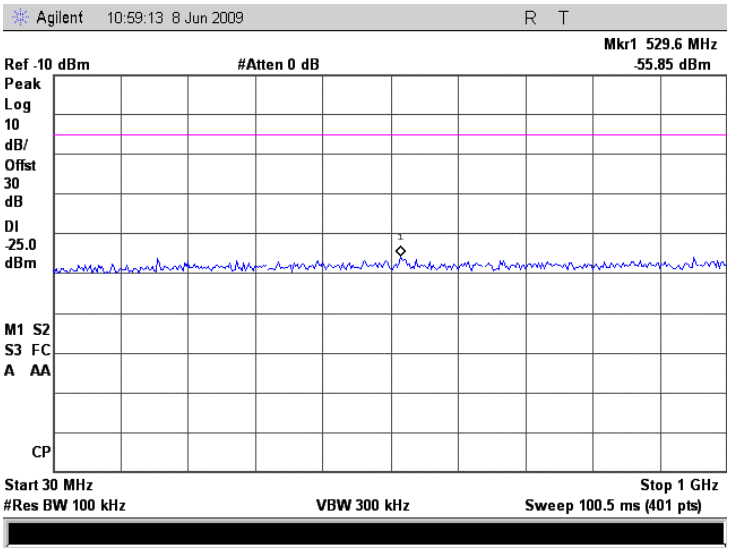


Plot 7.4.6 Spurious emission measurements in 0.15 – 30.0 MHz range at high carrier frequency

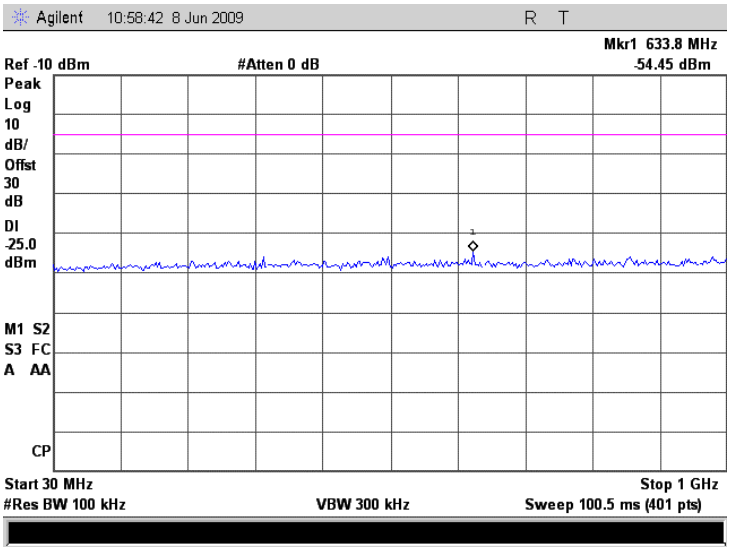


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

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

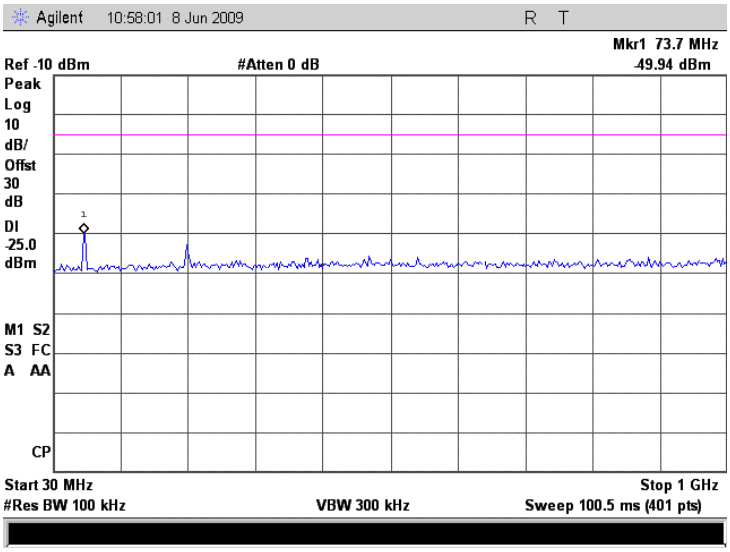


Plot 7.4.8 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency

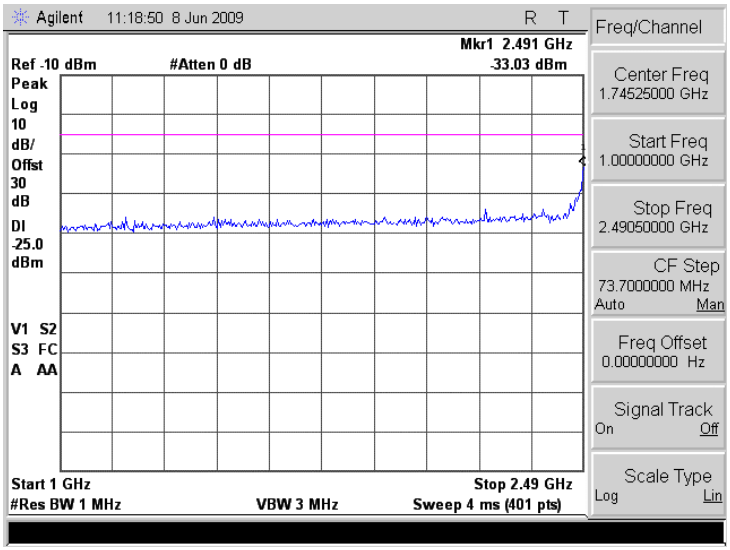


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

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

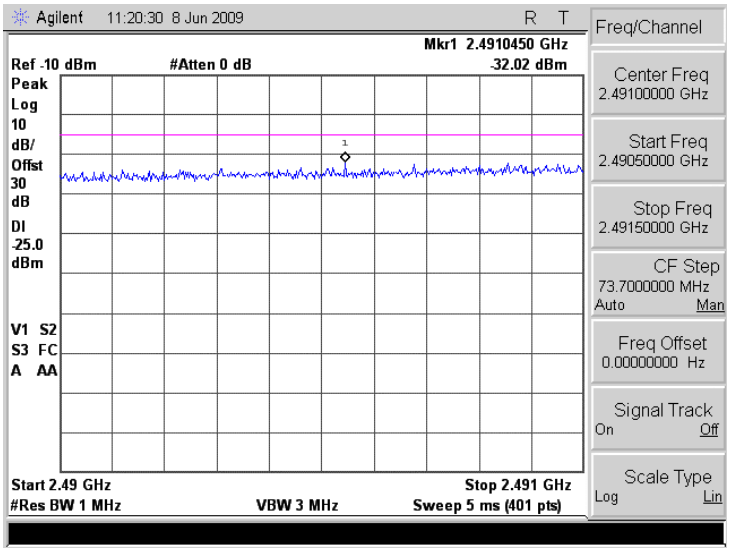


Plot 7.4.10 Spurious emission measurements in 1000 – 2490.5 MHz range at low carrier frequency

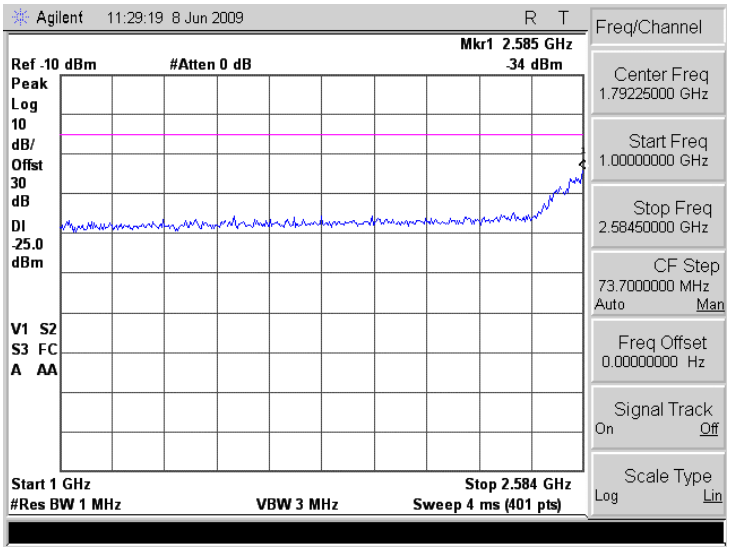


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.11 Spurious emission measurements in 2490.5 – 2491.5 MHz range at low carrier frequency

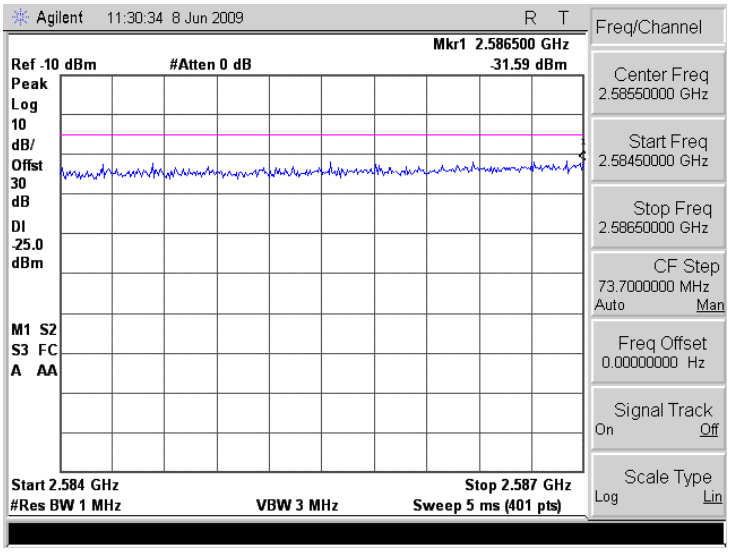


Plot 7.4.12 Spurious emission measurements in 1000 – 2584.5 MHz at mid carrier frequency

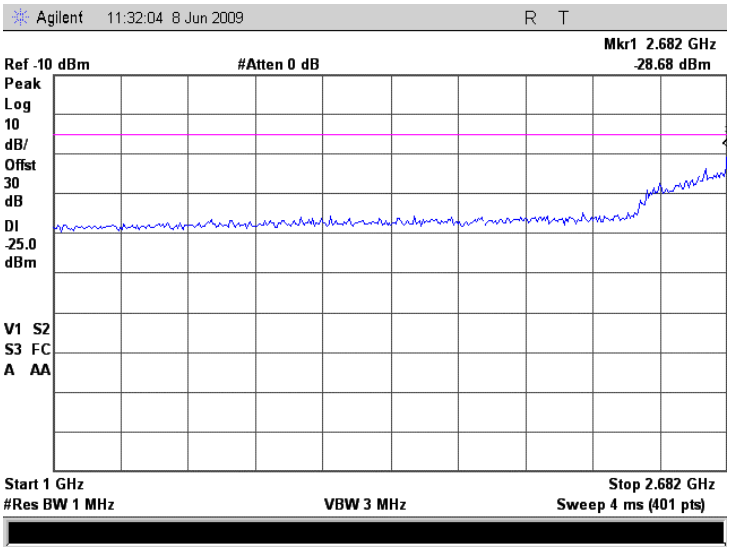


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.13 Spurious emission measurements in 2584.5 – 2586.5 MHz at mid carrier frequency

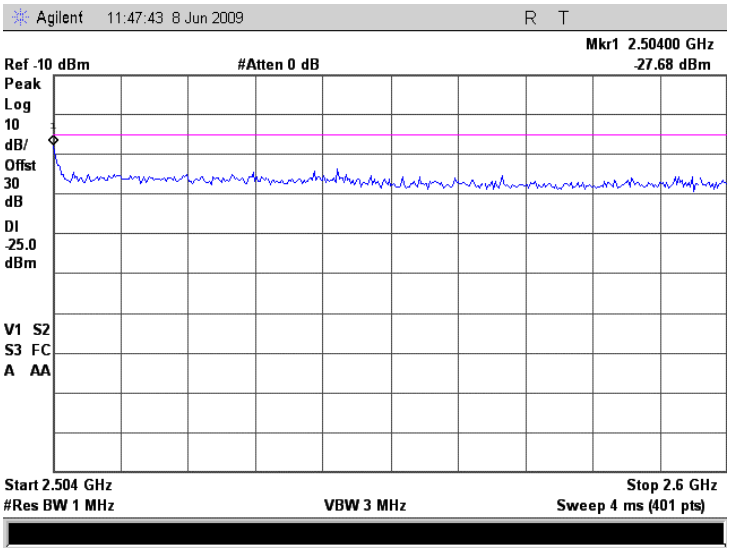


Plot 7.4.14 Spurious emission measurements in 1000 – 2682.0 MHz at high carrier frequency

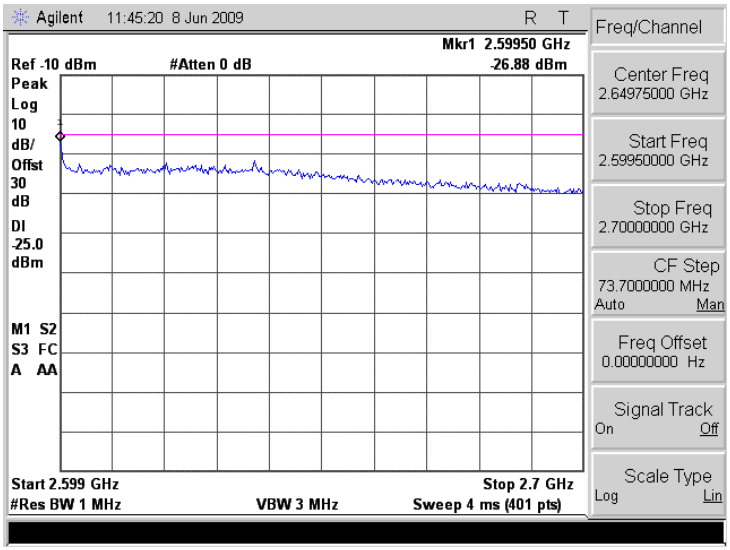


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.15 Spurious emission measurements in 2504 – 2600 MHz range at low carrier frequency

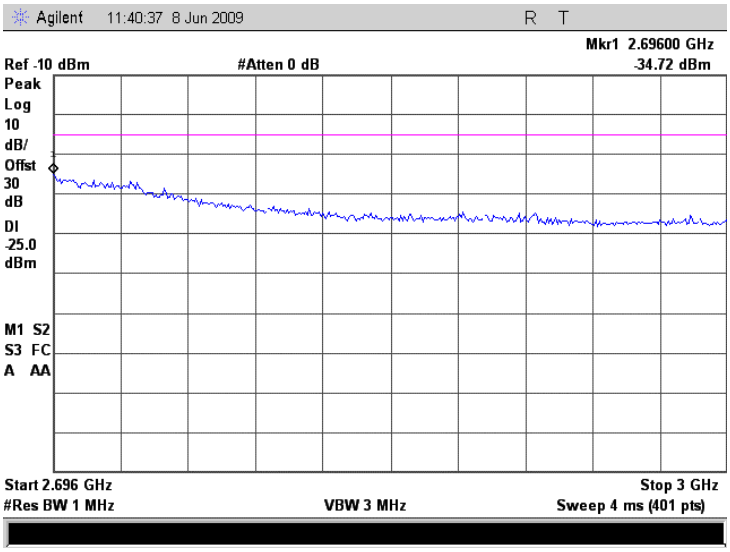


Plot 7.4.16 Spurious emission measurements in 2599.5 – 2700 MHz at mid carrier frequency

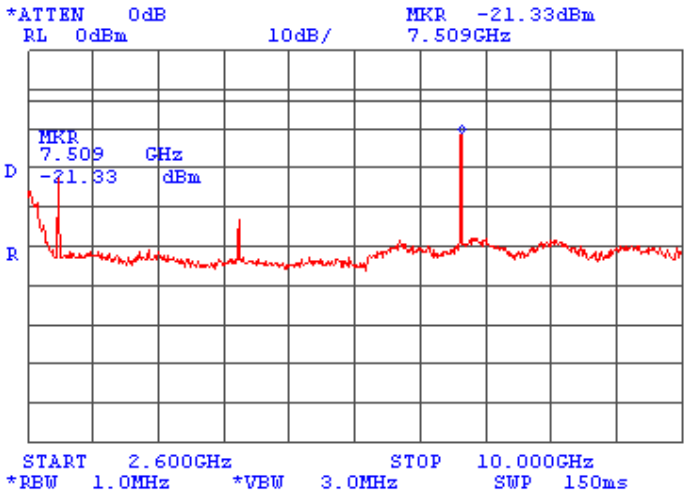


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.17 Spurious emission measurements in 2696 – 3000.0 MHz at high carrier frequency

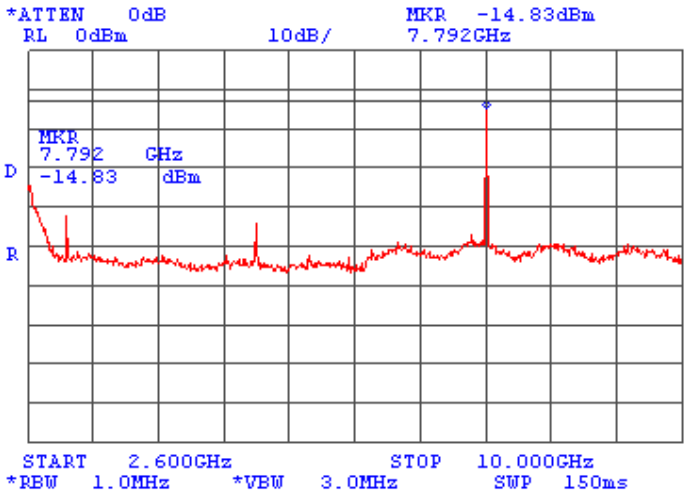


Plot 7.4.18 Spurious emission measurements in 2600 – 10000 MHz range at low carrier frequency

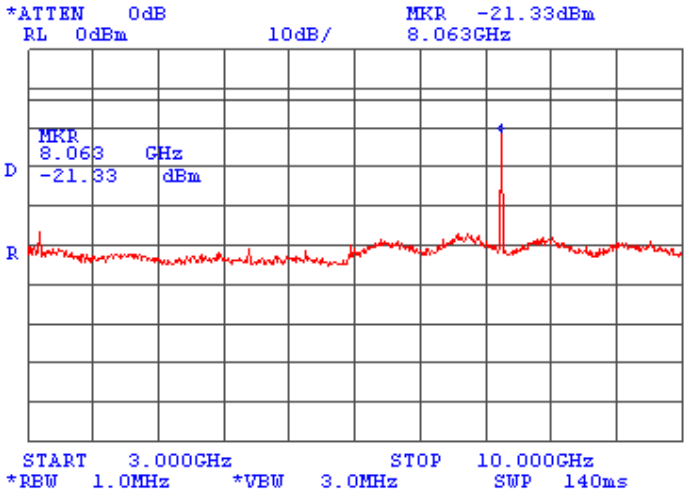


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.19 Spurious emission measurements in 2600 – 10000 MHz at mid carrier frequency

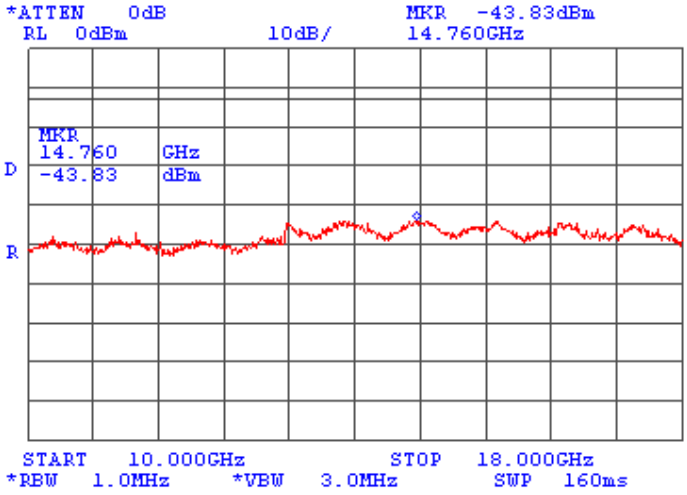


Plot 7.4.20 Spurious emission measurements in 3000 – 10000 MHz at high carrier frequency

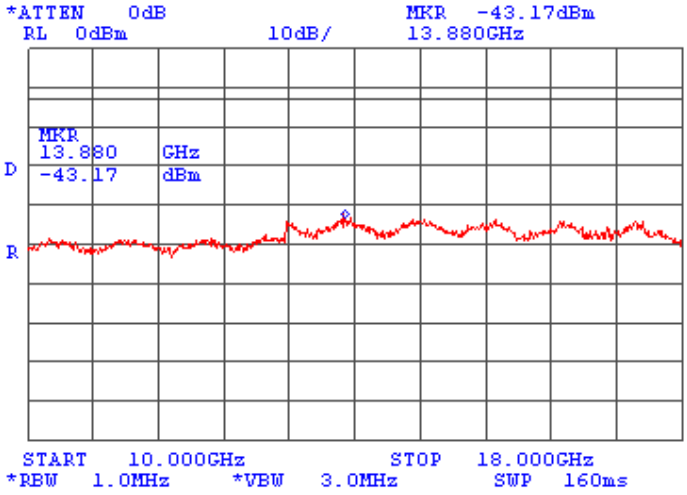


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.21 Spurious emission measurements in 10000 – 18000 MHz range at low carrier frequency

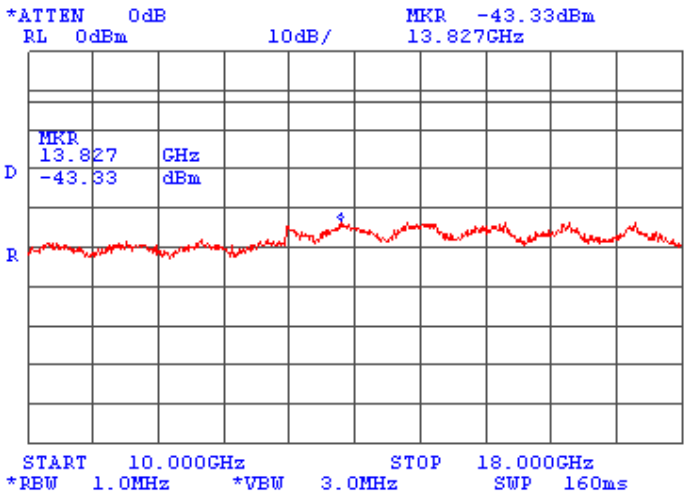


Plot 7.4.22 Spurious emission measurements in 10000 – 18000 MHz at mid carrier frequency

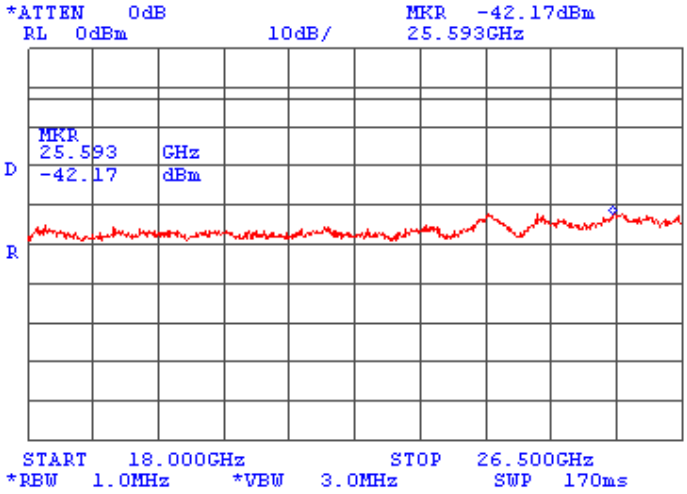


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.23 Spurious emission measurements in 10000 – 18000 MHz at high carrier frequency

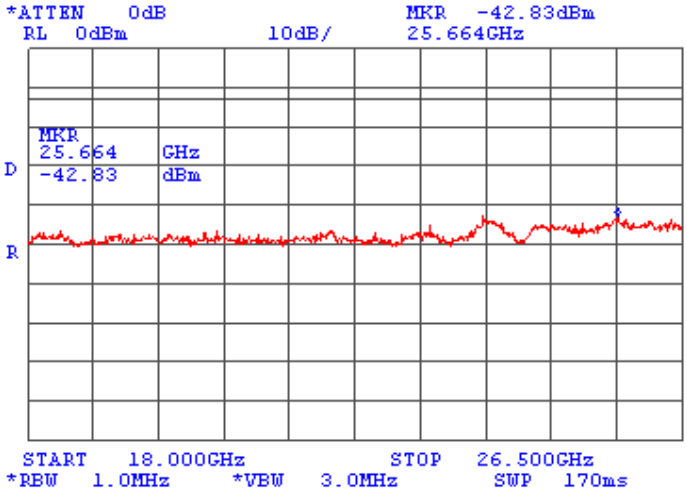


Plot 7.4.24 Spurious emission measurements in 18000 – 26500 MHz range at low carrier frequency

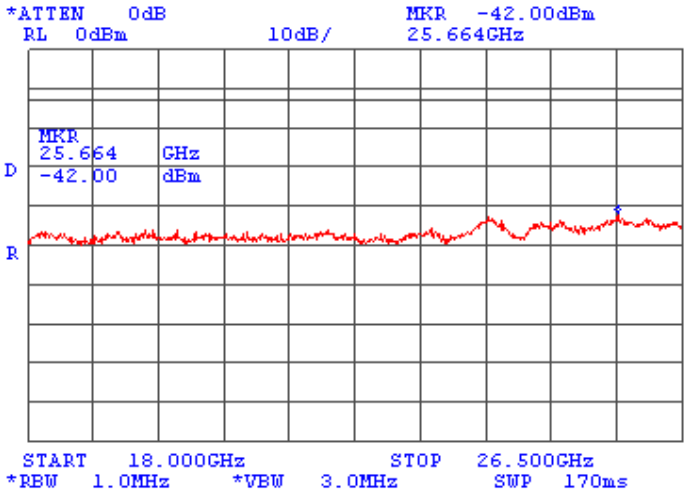


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.25 Spurious emission measurements in 18000 – 26500 MHz at mid carrier frequency

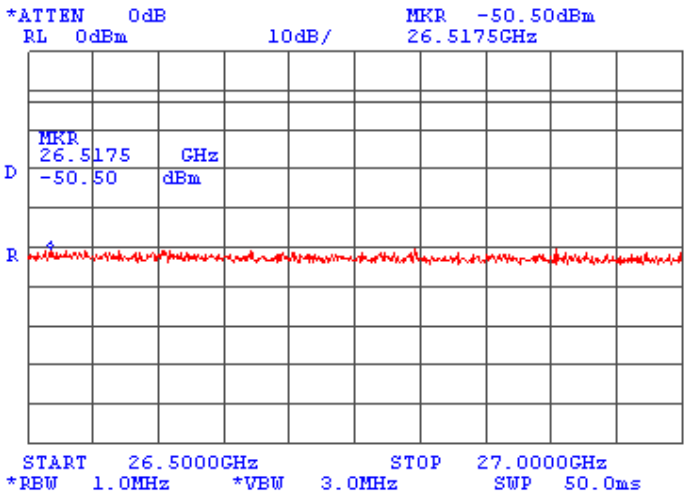


Plot 7.4.26 Spurious emission measurements in 18000 – 26500 MHz at high carrier frequency



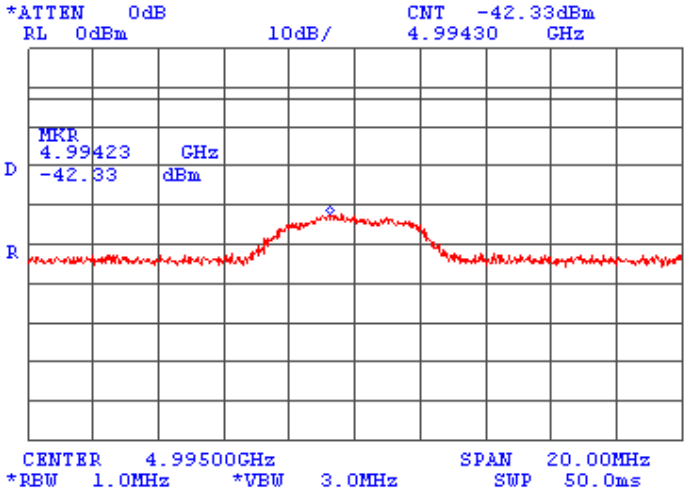
Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.27 Spurious emission measurements in 18000 – 26500 MHz at high carrier frequency

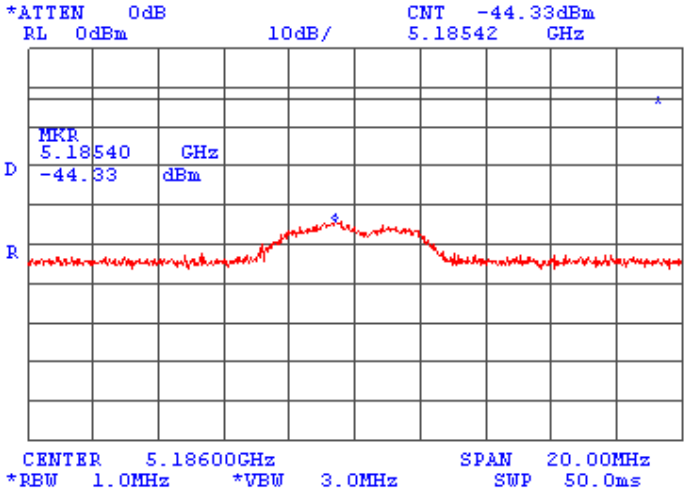


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.28 Conducted spurious emission measurements at the 2nd harmonic of low carrier frequency

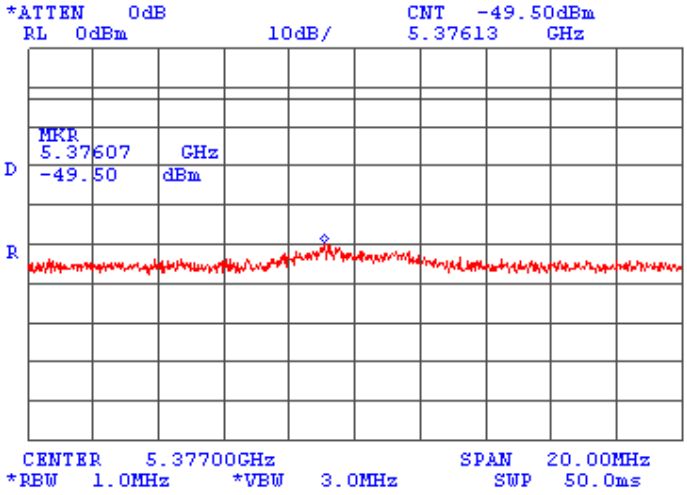


Plot 7.4.29 Conducted spurious emission measurements at the 2nd harmonic of mid carrier frequency

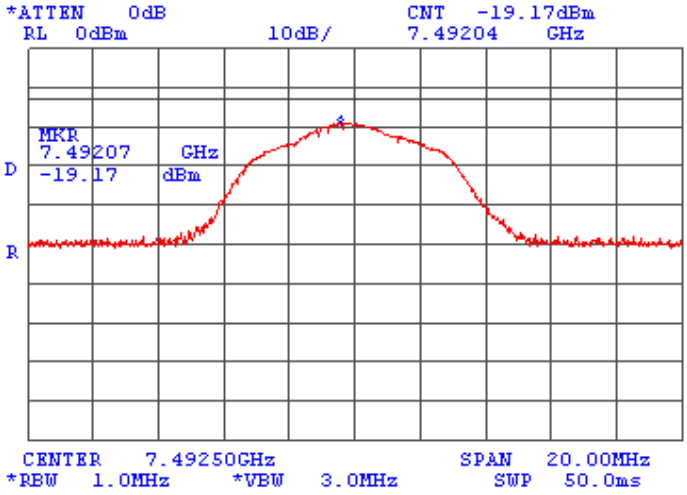


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.30 Conducted spurious emission measurements at the 2nd harmonic of high carrier frequency

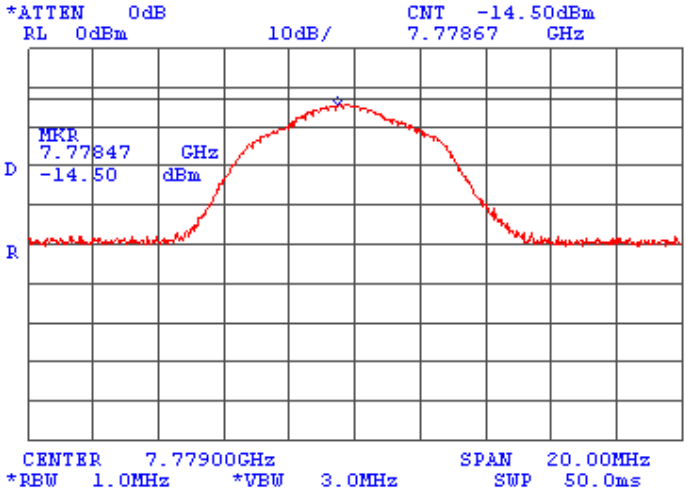


Plot 7.4.31 Conducted spurious emission measurements at the 3rd harmonic of low carrier frequency

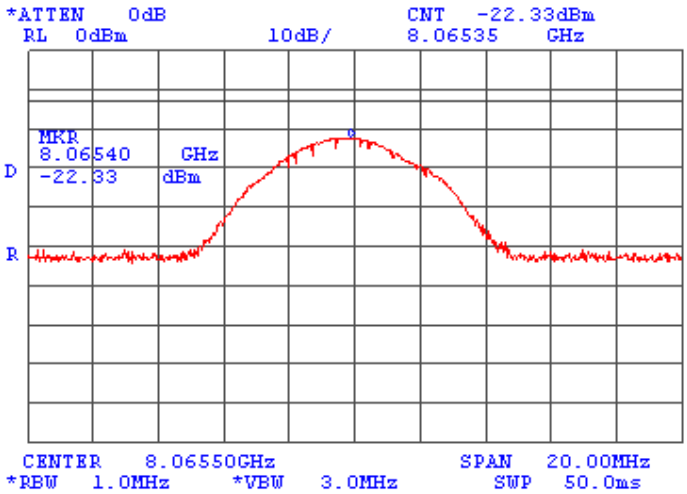


Test specification:	Section 27.53(m)(4), Conducted spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/30/2009 5:33:45 PM		
Temperature: 24.3 ºC	Air Pressure: 1007 hPa	Relative Humidity: 41 %	Power Supply: 120VAC
Remarks:			

Plot 7.4.32 Conducted spurious emission measurements at the 3rd harmonic of mid carrier frequency



Plot 7.4.33 Conducted spurious emission measurements at the 3rd harmonic of high carrier frequency



Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

7.5 Radiated spurious emission measurements

7.5.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.5.1.

Table 7.5.1 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

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

7.5.2.1 The EUT was set up as shown in Figure 7.5.1, energized and the performance check was conducted.
7.5.2.2 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.
7.5.2.3 The worst test results (the lowest margins) were recorded in Table 7.5.2 and shown in the associated plots.

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

7.5.3.1 The EUT was set up as shown in Figure 7.5.2, energized and the performance check was conducted.
7.5.3.2 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.
7.5.3.3 The worst test results (the lowest margins) were recorded in Table 7.5.2 and shown in the associated plots.

Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

Figure 7.5.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

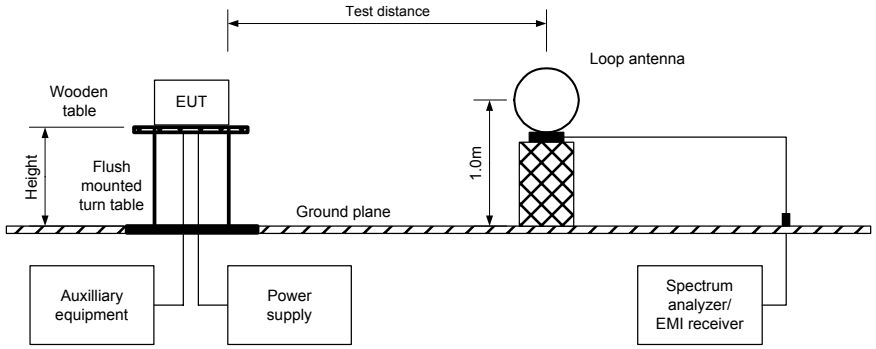
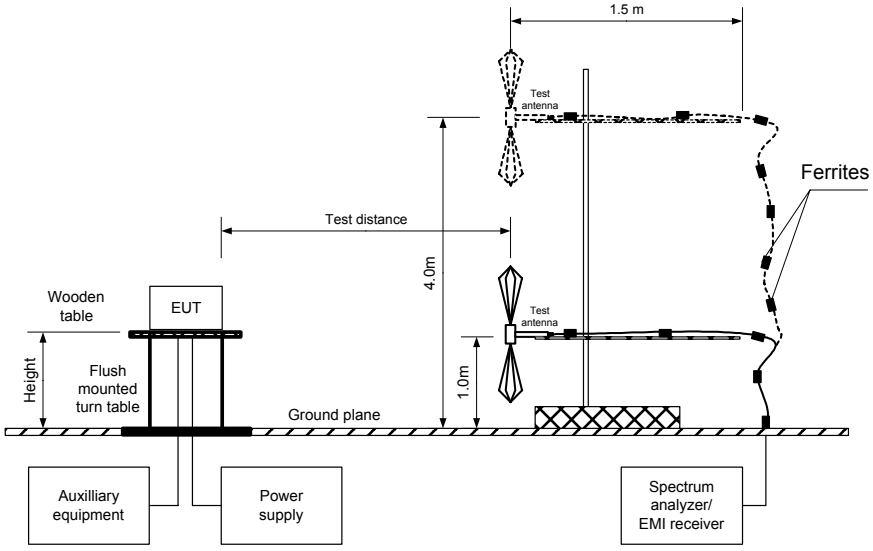


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	**Section 27.53(m)(4), Radiated spurious emissions**		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 60 %	**Power Supply:** 120VAC
Remarks:			

Table 7.5.2 Spurious emission field strength test results

ASSIGNED FREQUENCY RANGE:	2496.0 – 2690.0 MHz
TEST DISTANCE:	3 m
TEST SITE:	Anechoic chamber / OATS
EUT HEIGHT:	0.8 m
INVESTIGATED FREQUENCY RANGE:	0.009 – 27000 MHz
DETECTOR USED:	Peak
VIDEO BANDWIDTH:	> Resolution bandwidth
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconilog (30 MHz – 1000 MHz) Double ridged guide (above 1000 MHz)
MODULATION:	64QAM
MODULATING SIGNAL:	PRBS
BIT RATE:	9.425 Mbps
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum (SEE NOTE 1)

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
All emissions were found at least 20 dB below the specified limit							

Verdict: Pass

*- Margin = Field strength of spurious – calculated field strength limit.
**- EUT front panel refers to 0 degrees position of turntable.
NOTE1: The 2.5 MHz EBW was chosen as configuration that produces the maximum power density.

Reference numbers of test equipment used

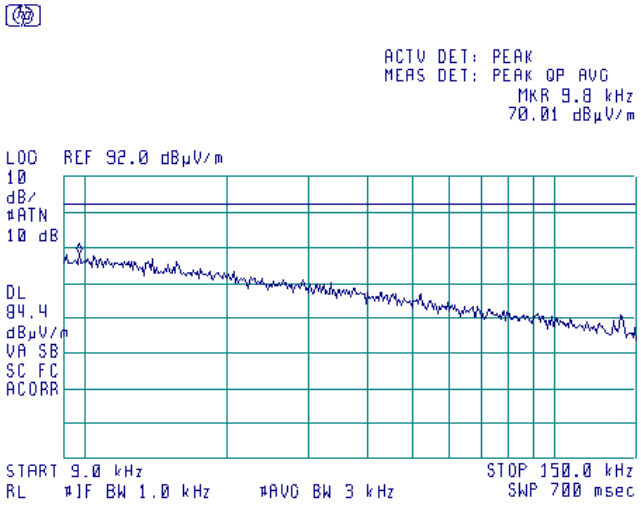
HL 0446	HL 0521	HL 0604	HL 0661	HL 1116	HL 1425	HL 1984	HL 2254
HL 2432	HL 2909	HL 3120	HL 3207	HL 3533	HL 3534	HL 3535	

Full description is given in Appendix A.

Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

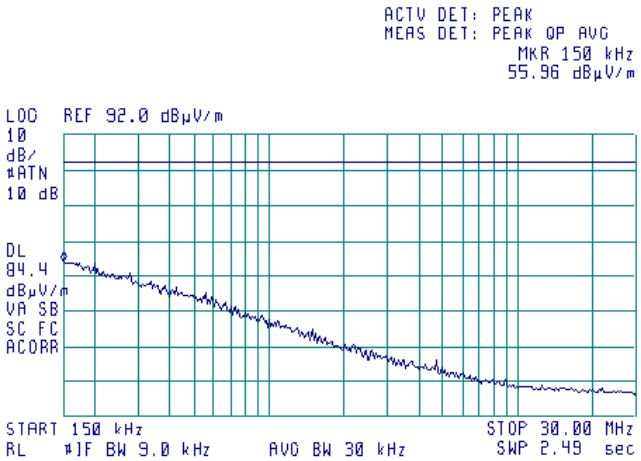
Plot 7.5.1 Radiated emission measurements in 9 - 150 kHz range

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



Plot 7.5.2 Radiated emission measurements in 0.15 - 30 MHz range

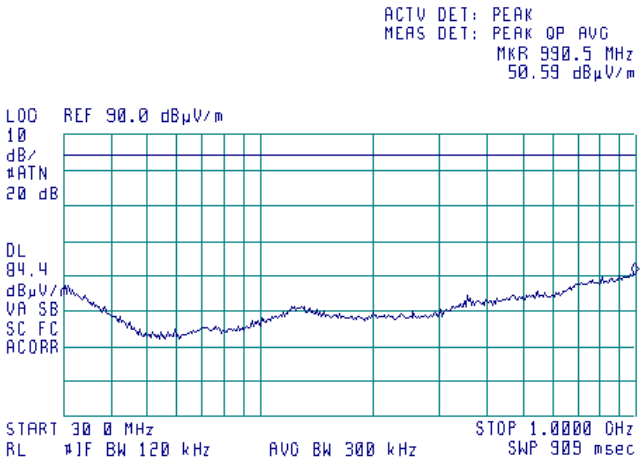
TEST SITE:	Fully anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

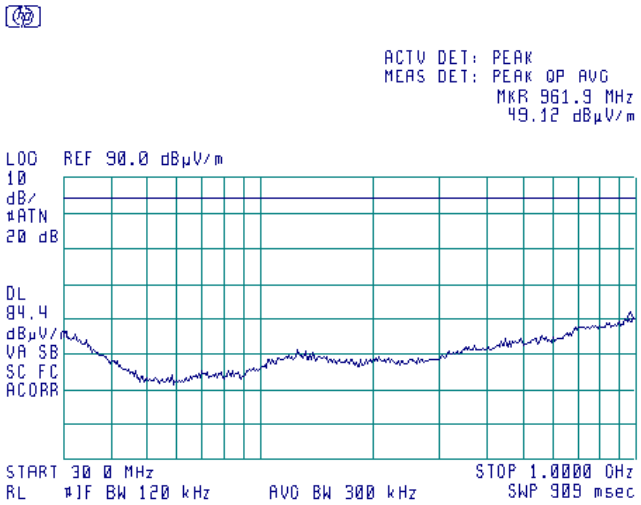
Plot 7.5.3 Radiated emission measurements in 30 - 1000 MHz range

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



Plot 7.5.4 Radiated emission measurements in 30 - 1000 MHz range

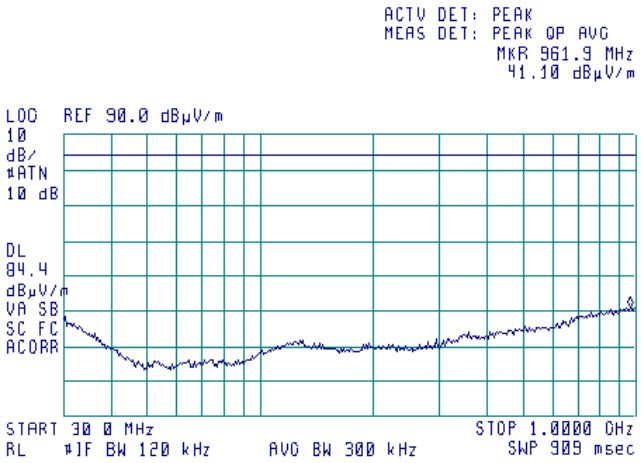
TEST SITE:	Fully anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

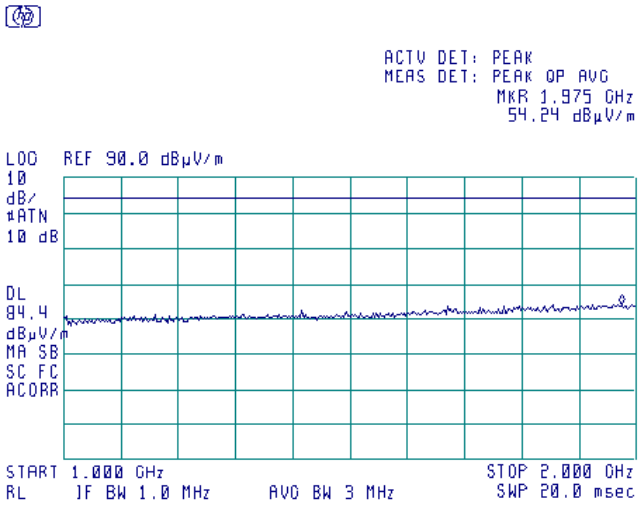
Plot 7.5.5 Radiated emission measurements in 30 - 1000 MHz range

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



Plot 7.5.6 Radiated emission measurements in 1000 - 2000 MHz range

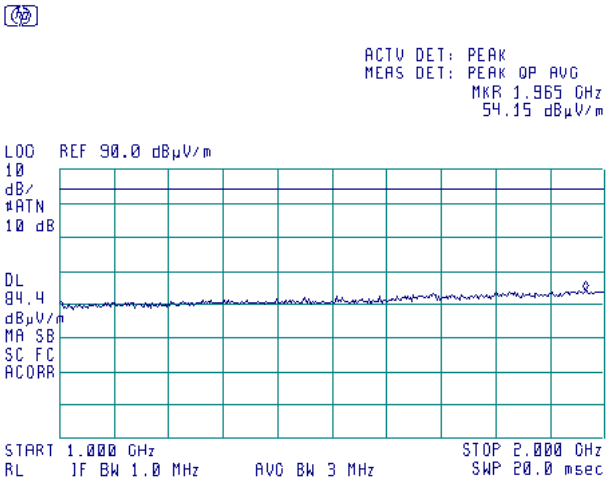
TEST SITE:	Fully anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

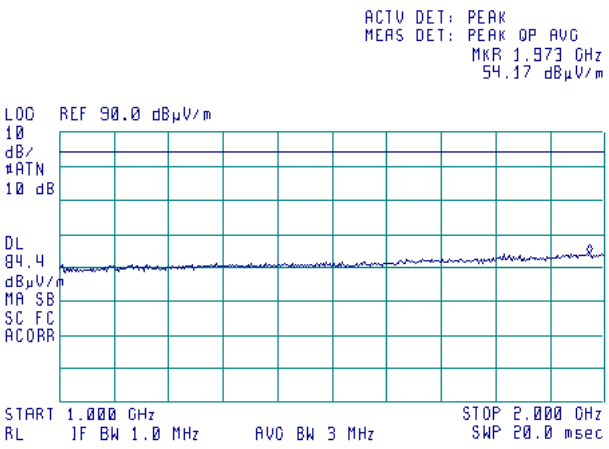
Plot 7.5.7 Radiated emission measurements in 1000 - 2000 MHz range

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



Plot 7.5.8 Radiated emission measurements in 1000 - 2000 MHz range

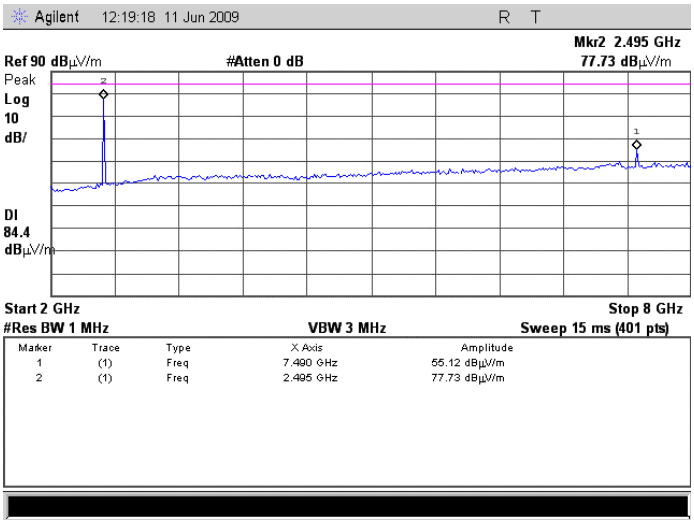
TEST SITE:	Fully anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

Plot 7.5.9 Radiated emission measurements in 2000 - 8000 MHz range

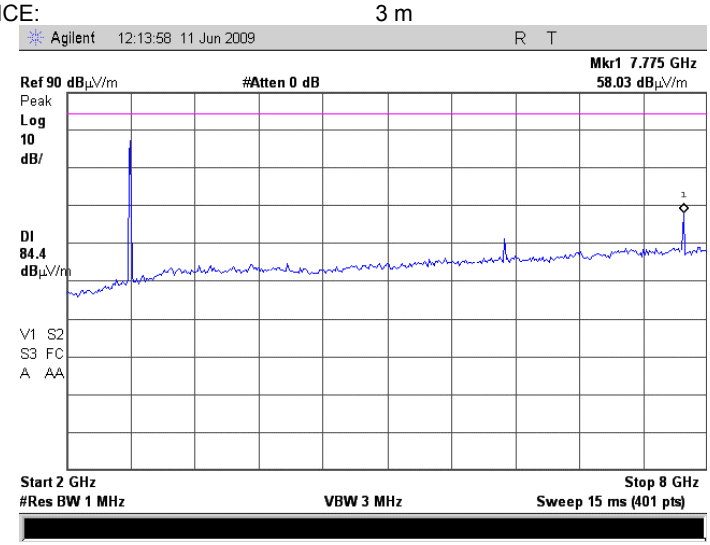
TEST SITE: Fully anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



2497.5 MHz – low channel carrier

Plot 7.5.10 Radiated emission measurements in 2000 - 8000 MHz range

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

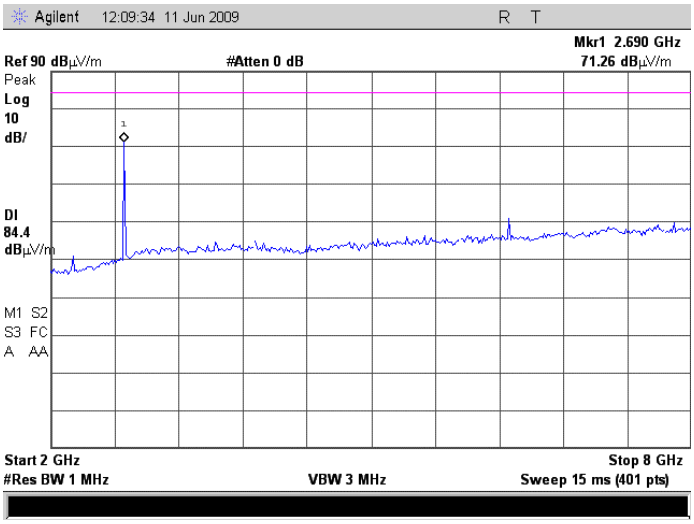


2593.0 MHz– mid channel carrier

Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

Plot 7.5.11 Radiated emission measurements in 2000 - 8000 MHz range

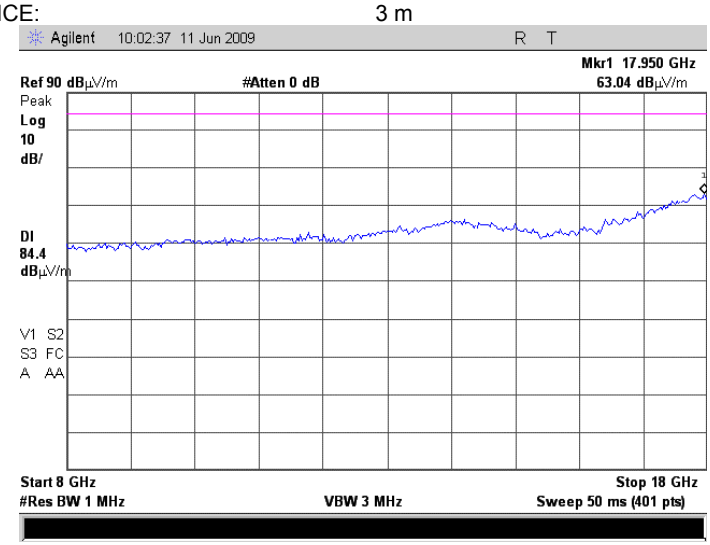
TEST SITE:	Fully anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



2688.5 MHz– high channel carrirer

Plot 7.5.12 Radiated emission measurements in 8000 – 18000 MHz range

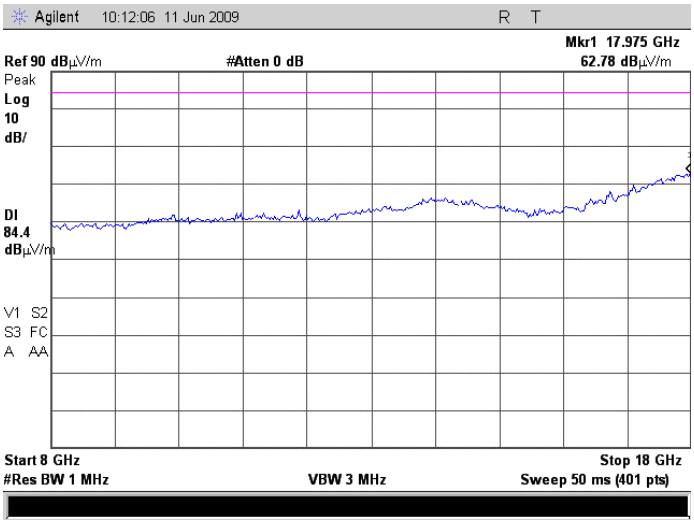
TEST SITE:	Fully anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

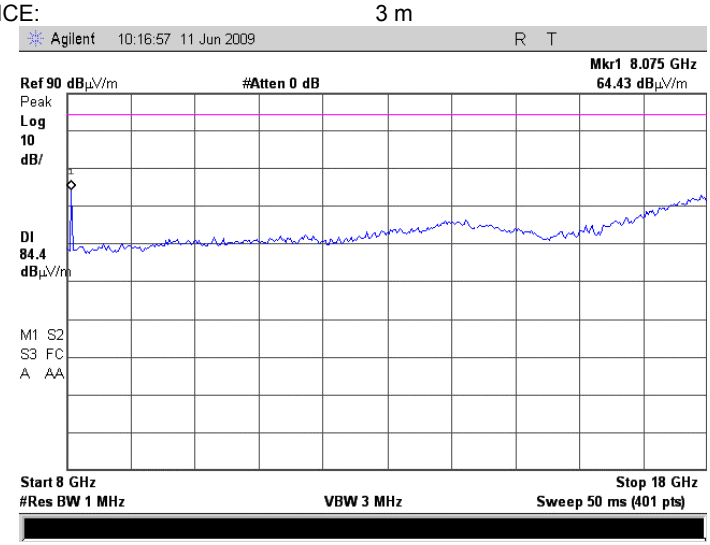
Plot 7.5.13 Radiated emission measurements in 8000 – 18000 MHz range

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



Plot 7.5.14 Radiated emission measurements in 8000 – 18000 MHz range

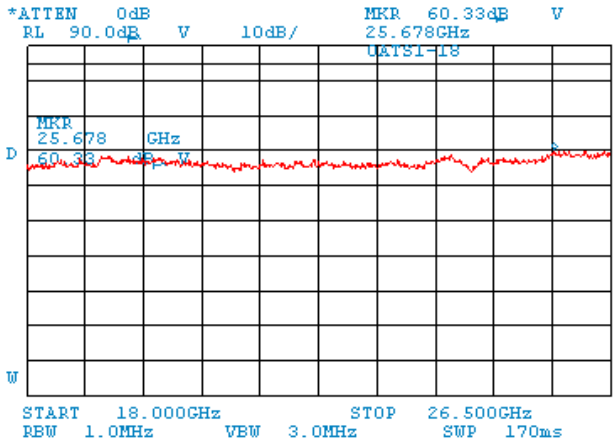
TEST SITE:	Fully anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

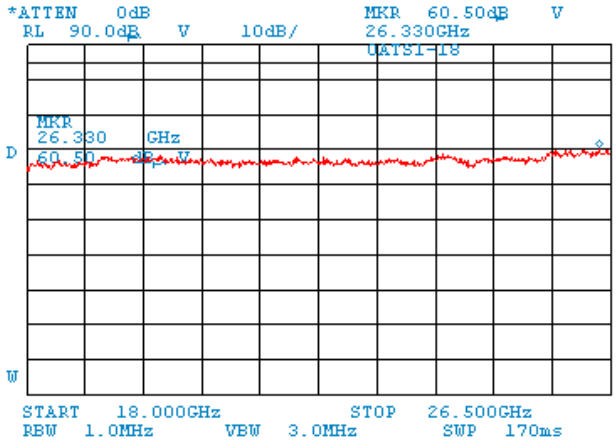
Plot 7.5.15 Radiated emission measurements in 18000 – 26500 MHz range

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



Plot 7.5.16 Radiated emission measurements in 18000 – 26500 MHz range

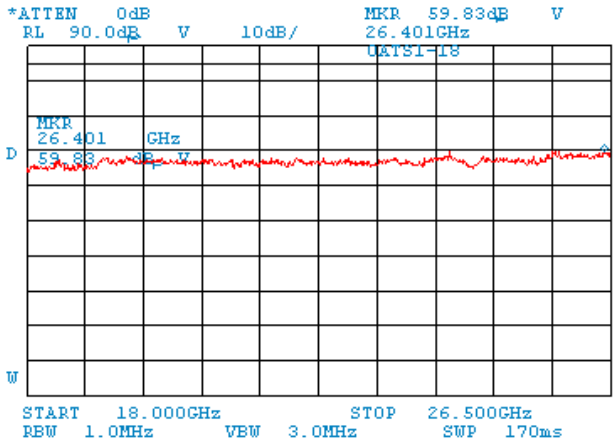
TEST SITE:	OATS
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 27.53(m)(4), Radiated spurious emissions		
Test procedure:	Section 27.53(m)(4)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:58:39 PM		
Temperature: 26 ºC	Air Pressure: 1007 hPa	Relative Humidity: 60 %	Power Supply: 120VAC
Remarks:			

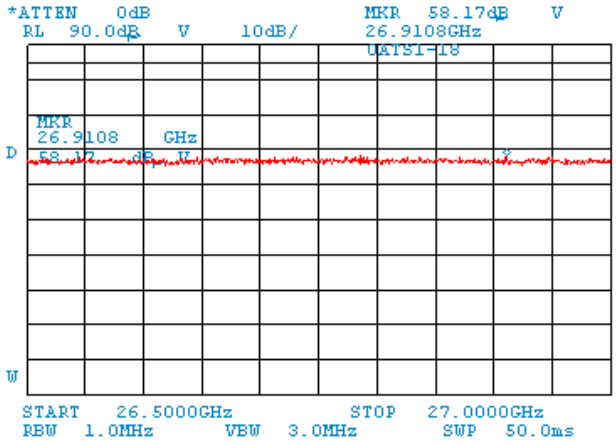
Plot 7.5.17 Radiated emission measurements in 18000 – 26500 MHz range

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



Plot 7.5.18 Radiated emission measurements in 26500 – 27000 MHz range

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



Test specification:	Section 27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055; TIA/EIA-603-C Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:02 PM		
Temperature: 25.8 ºC	Air Pressure: 1010 hPa	Relative Humidity: 38 %	Power Supply: 120 VAC
Remarks:			

7.6 Frequency stability test

7.6.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.6.1.

Table 7.6.1 Frequency stability limits

Assigned frequency, MHz	Maximum allowed frequency displacement
2496.0 – 2690.0	The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

7.6.2 Test procedure

7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and its proper operation was checked.

7.6.2.2 The EUT 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.

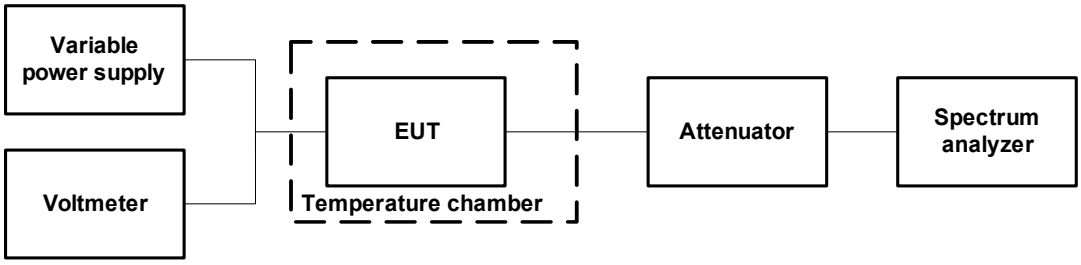
7.6.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.

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

7.6.2.5 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.

7.6.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 7.6.2.

Figure 7.6.1 Frequency stability test setup



Test specification:	**Section 27.54, Frequency stability**		
Test procedure:	47 CFR, Section 2.1055; TIA/EIA-603-C Section 2.2.2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	6/22/2009 5:13:02 PM		
Temperature: 25.8 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 38 %	**Power Supply:** 120 VAC
Remarks:			

Table 7.6.2 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: 1 kHz
VIDEO BANDWIDTH: 3 kHz

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 2497.50 MHz										
-30	nominal	2497.442465	2497.442753	2497.442744	2497.442743	2497.442746	2497.442752	2497.442768	882.00000	0.00
-20	nominal	2497.442970	NA	NA	NA	NA	NA	2497.442676	1084.0000	0.00
-10	nominal	2497.443061	NA	NA	NA	NA	NA	2497.443033	1175.0000	0.00
0	nominal	2497.442379	2497.442354	2497.442348	2497.442345	2497.442342	2497.442342	2497.442340	493.00000	0.00
10	nominal	2497.442048	NA	NA	NA	NA	NA	2497.442052	166.00000	0.00
20	15%	2497.439655	NA	NA	NA	NA	NA	2497.439388	0.000000	-2498.00
20	nominal	2497.442242	NA	NA	NA	NA	NA	2497.441886*	356.00000	0.00
20	-15%	2497.439476	NA	NA	NA	NA	NA	2497.439197	0.000000	-2689.00
30	nominal	2497.441040	2497.441067	2497.441071	2497.441075	2497.441000	2497.441080	2497.441102	0.000000	-886.00
40	nominal	2497.440590	NA	NA	NA	NA	NA	2497.440506	0.000000	-1380.00
50	nominal	2497.439883	2497.439892	2497.439880	2497.439869	2497.439861	2497.439864	2497.439867	0.000000	-2025.00
Mid carrier frequency 2593.00 MHz										
-30	nominal	2592.940952	2592.941018	2592.941019	2592.941021	2592.941025	2592.941028	2592.941030	920.00	0.00
-20	nominal	2592.940953	NA	NA	NA	NA	NA	2592.940943	843.00	0.00
-10	nominal	2592.941339	NA	NA	NA	NA	NA	2592.941315	1229.00	0.00
0	nominal	2592.940561	2592.940556	2592.940554	2592.940550	2592.940548	2592.940547	2592.940546	451.00	0.00
10	nominal	2592.940275	NA	NA	NA	NA	NA	2592.940261	165.00	0.00
20	15%	2592.937873	NA	NA	NA	NA	NA	2592.937789	0.00	-2321.00
20	nominal	2592.940093	NA	NA	NA	NA	NA	2592.940110*	0.00	-17.00
20	-15%	2592.937293	NA	NA	NA	NA	NA	2592.937199	0.00	-2911.00
30	nominal	2592.939178	2592.939186	2592.939192	2592.939197	2592.939201	2592.939207	2592.939230	0.00	-932.00
40	nominal	2592.938660	NA	NA	NA	NA	NA	2592.938662	0.00	-1450.00
50	nominal	2592.938917	2592.938008	2592.938008	2592.938000	2592.937982	2592.937964	2592.937880	0.00	-2230.00
High carrier frequency 2688.50 MHz										
-30	nominal	2688.439128	2688.439269	2688.439263	2688.439261	2688.439262	2688.439262	2688.439263	909.00	0.00
-20	nominal	2688.439263	NA	NA	NA	NA	NA	2688.439203	903.00	0.00
-10	nominal	2688.438704	NA	NA	NA	NA	NA	2688.439595	1235.00	0.00
0	nominal	2688.438769	2688.438767	2688.438767	2688.438466	2688.438766	2688.438767	2688.438768	409.00	0.00
10	nominal	2688.438744	NA	NA	NA	NA	NA	2688.438487	384.00	0.00
20	15%	2688.436651	NA	NA	NA	NA	NA	2688.436012	0.00	-2348.00
20	nominal	2688.438323	NA	NA	NA	NA	NA	2688.438360*	0.00	-37.00
20	-15%	2688.436710	NA	NA	NA	NA	NA	2688.436286	0.00	-2074.00
30	nominal	2688.437851	2688.437591	2688.437508	2688.437449	2688.437403	2688.437376	2688.437349	0.00	-1011.00
40	nominal	2688.436810	NA	NA	NA	NA	NA	2688.436810	0.00	-1550.00
50	nominal	2688.435995	2688.435979	2688.435970	2688.435960	2688.435946	2688.435947	2688.435959	0.00	-2414.00

* - Reference frequency (T, ºC = 20ºC, V = nominal, after 10^t minutes)

Table 7.6.3 Maximum frequency displacement

Channel	Maximum frequency displacement			
	ppm		Hz	
	Negative	Positive	Negative	Positive
Low (2497.5 MHz)	-1.0767	0.4705	-2689.00	1175.00
Mid (2593.0 MHz)	-1.1226	0.4740	-2911.00	1229.00
High (2688.5 MHz)	-0.8733	0.4594	-2348.00	1235.00

Test specification:	Section 27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055; TIA/EIA-603-C Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/22/2009 5:13:02 PM		
Temperature: 25.8 ºC	Air Pressure: 1010 hPa	Relative Humidity: 38 %	Power Supply: 120 VAC
Remarks:			

Table 7.6.4 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
2.5 MHz BW								
BPSK								
2496.24	2498.6625	2496.237311	2498.663675	2496	2502	-0.23731	-3.33633	Pass
2591.725	2594.1625	2591.722089	2594.163729	2590	2596	-1.72209	-1.83627	Pass
2687.2325	2689.6625	2687.230086	2689.663735	2684.5	2690	-2.73009	-0.33627	Pass
QPSK								
2496.24	2498.6625	2496.237311	2498.663675	2496	2502	-0.23731	-3.33633	Pass
2591.725	2594.1625	2591.722089	2594.163729	2590	2596	-1.72209	-1.83627	Pass
2687.2325	2689.6625	2687.230086	2689.663735	2684.5	2690	-2.73009	-0.33627	Pass
16QAM								
2496.24	2498.6625	2496.237311	2498.663675	2496	2502	-0.23731	-3.33633	Pass
2591.725	2594.1625	2591.722089	2594.163729	2590	2596	-1.72209	-1.83627	Pass
2687.2325	2689.6625	2687.230086	2689.663735	2684.5	2690	-2.73009	-0.33627	Pass
64QAM								
2496.24	2498.6625	2496.237311	2498.663675	2496	2502	-0.23731	-3.33633	Pass
2591.725	2594.17	2591.722089	2594.171229	2590	2596	-1.72209	-1.82877	Pass
2687.2325	2689.6625	2687.230086	2689.663735	2684.5	2690	-2.73009	-0.33627	Pass
5 MHz BW								
BPSK								
2496.3525	2501.0075	2496.349811	2501.008675	2496	2502	-0.34981	-0.99132	Pass
2590.585	2595.2575	2590.582089	2595.258729	2590	2596	-0.58209	-0.74127	Pass
2684.8525	2689.5075	2684.850086	2689.508735	2684.5	2690	-0.35009	-0.49127	Pass
QPSK								
2496.3525	2501.0075	2496.349811	2501.008675	2496	2502	-0.34981	-0.99132	Pass
2590.585	2595.2575	2590.582089	2595.258729	2590	2596	-0.58209	-0.74127	Pass
2684.8525	2689.5075	2684.850086	2689.508735	2684.5	2690	-0.35009	-0.49127	Pass
16QAM								
2496.3525	2501.0075	2496.349811	2501.008675	2496	2502	-0.34981	-0.99132	Pass
2590.585	2595.2575	2590.582089	2595.258729	2590	2596	-0.58209	-0.74127	Pass
2684.8525	2689.5075	2684.850086	2689.508735	2684.5	2690	-0.35009	-0.49127	Pass
64QAM								
2496.3525	2501.0075	2496.349811	2501.008675	2496	2502	-0.34981	-0.99132	Pass
2590.585	2595.2575	2590.582089	2595.258729	2590	2596	-0.58209	-0.74127	Pass
2684.8525	2689.5075	2684.850086	2689.508735	2679	2690	-5.85009	-0.49127	Pass

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

Test specification:	**Section 27.54, Frequency stability**		
Test procedure:	47 CFR, Section 2.1055; TIA/EIA-603-C Section 2.2.2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	6/22/2009 5:13:02 PM		
Temperature: 25.8 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 38 %	**Power Supply:** 120 VAC
Remarks:			

Table 7.6.4 Transmission occupied bandwidth with frequency drift test results (continued)

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
10 MHz BW								
BPSK								
2496.89	2506.58	2496.887311	2506.581175	2496	2507.5	-0.88731	-0.91883	Pass
2591.11	2600.83	2591.107089	2600.831229	2590	2602	-1.10709	-1.16877	Pass
2679.61	2689.33	2679.607586	2689.331235	2679	2690	-0.60759	-0.66877	Pass
QPSK								
2496.89	2506.58	2496.887311	2506.581175	2496	2507.5	-0.88731	-0.91883	Pass
2591.11	2600.83	2591.107089	2600.831229	2590	2602	-1.10709	-1.16877	Pass
2679.61	2689.33	2679.607586	2689.331235	2679	2690	-0.60759	-0.66877	Pass
16QAM								
2496.89	2506.52	2496.887311	2506.521175	2496	2507.5	-0.88731	-0.97883	Pass
2591.11	2600.83	2591.107089	2600.831229	2590	2602	-1.10709	-1.16877	Pass
2679.61	2689.33	2679.607586	2689.331235	2679	2690	-0.60759	-0.66877	Pass
64QAM								
2496.89	2506.52	2496.887311	2506.521175	2496	2507.5	-0.88731	-0.97883	Pass
2591.11	2600.83	2591.107089	2600.831229	2590	2602	-1.10709	-1.16877	Pass
2679.61	2689.33	2679.607586	2689.331235	2679	2690	-0.60759	-0.66877	Pass

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

Reference numbers of test equipment used

HL 3001	HL 3286	HL 3386					

Full description is given in Appendix A.

8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	29-Jun-09	29-Jun-10
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
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	11-Jan-09	11-Jan-10
0661	Generator Swept Signal, 10 MHz to 40 GHz, + 10 dBm	HP	83640B	3614A002 66	17-Sep-08	17-Sep-09
1116	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz	Hermon Laboratories	A1-18	186	23-Jan-09	23-Jan-10
1425	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1426, HL1427	Agilent Technologies	8542E	3710A002 22, 3705A002 04	03-Sep-08	03-Sep-09
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	23-Jan-09	23-Jan-10
2254	Cable 40 GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	11-Jun-09	11-Jun-10
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	23-Jan-09	23-Jan-10
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	05-Jul-09	05-Jul-11
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	07-May-08	07-May-10
2953	Cable, RF, 18 GHz, 1.2 m, SMA-SMA	Gore	10020014	NA	05-Oct-08	05-Oct-09
3001	EMC Analyzer, 9 kHz to 3 GHz	Agilent Technologies	E7402A	US394401 80	23-Nov-08	23-Nov-09
3120	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3120	01-Jan-09	01-Jan-10
3207	Cable 40 GHz, 1.2 m	Gore	GOR245	05118337	11-Jun-09	11-Jun-10
3286	Temperature Chamber, (-40 to +170) °C	Thermotron	EL-8-CH-1-1-CO2	21-9048	09-Sep-08	09-Sep-09
3301	Power Meter, P-series, 50 MHz to 40 GHz	Agilent Technologies	N1911A	MY451010 57	03-Dec-08	03-Dec-09
3302	Power sensor, P-Series, 50 MHz to 40 GHz, -35/30 to 20 dBm	Agilent Technologies	N1922A	MY452405 86	05-Dec-08	05-Dec-09
3386	Microwave Cable Assembly, 26.5 GHz, 1.0 m, N type/N type	Suhner Sucoflex	104EA	3386	04-Feb-09	04-Feb-10
3437	Precision Fixed Attenuator, 50 Ohm, 5 W, 10 dB, DC to 18 GHz	Mini-Circuits	BW-S10W5+	NA	08-Mar-09	08-Mar-10
3439	Precision Fixed Attenuator, 50 Ohm, 5 W, 20 dB, DC to 18 GHz	Mini-Circuits	BW-S20W5+	NA	08-Mar-09	08-Mar-10
3442	Precision Fixed Attenuator, 50 Ohm, 5 W, 20 dB, DC to 18 GHz	Mini-Circuits	BW-S20W5+	NA	08-Mar-09	08-Mar-10
3533	Amplifier, low noise, 6 to 18 GHz	Quinstar Technology	QLJ-06184040-J0	111590010 01	07-Dec-08	07-Dec-09
3534	Amplifier, low noise, 6 to 18 GHz	Quinstar Technology	QLJ-06184040-J0	111590010 02	07-Dec-08	07-Dec-09

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
3535	Amplifier, low noise, 18 to 40 GHz	Quinstar Technology	QLJ-18404537-J0	11159003001	07-Dec-08	07-Dec-09
3559	Cable 40 GHz, SMA-SMA, 0.95 m, Blue	Gore	PHASEFLEX	03771245	10-Aug-08	10-Aug-09

9 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 %

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.

10 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), Registration Numbers 90624 for OATS and 90623 for the anechoic chamber; 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), has a status of a Telefication - Listed Testing Laboratory, Certificate No. L138/00. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01).

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11 APPENDIX D Specification references

FCC 47CFR part 27: 2008	Miscellaneous wireless communications 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: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI/TIA/EIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

12 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

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

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

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

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

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

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

Antenna factor
Double-ridged guide horn antenna
Model 3115, serial number: 00027177, HL 2432

Frequency, MHz	Antenna factor. dB(1/m)
1000.0	24.7
1500.0	25.7
2000.0	27.8
2500.0	28.9
3000.0	30.7
3500.0	31.8
4000.0	33.0
4500.0	32.8
5000.0	34.2
5500.0	34.9
6000.0	35.2
6500.0	35.4
7000.0	36.3
7500.0	37.3
8000.0	37.5
8500.0	38.0
9000.0	38.3
9500.0	38.3
10000.0	38.7
10500.0	38.7
11000.0	38.9
11500.0	39.5
12000.0	39.5
12500.0	39.4
13000.0	40.5
13500.0	40.8
14000.0	41.5
14500.0	41.3
15000.0	40.2
15500.0	38.7
16000.0	38.5
16500.0	39.8
17000.0	41.9
17500.0	45.8
18000.0	49.1

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

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, 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 3120

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	0.09	3600	2.13	7400	3.14	11200	3.93	15100	4.64
30	0.19	3700	2.19	7500	3.17	11300	3.93	15200	4.63
50	0.27	3800	2.21	7600	3.20	11400	3.94	15300	4.65
100	0.35	3900	2.22	7700	3.26	11500	3.92	15400	4.66
200	0.49	4000	2.28	7800	3.25	11600	3.92	15500	4.71
300	0.61	4100	2.28	7900	3.27	11700	3.89	15600	4.70
400	0.68	4200	2.31	8000	3.28	11800	3.94	15700	4.71
500	0.77	4300	2.37	8100	3.29	11900	3.95	15800	4.72
600	0.85	4400	2.38	8200	3.37	12000	3.96	15900	4.71
700	0.91	4500	2.40	8300	3.34	12100	4.06	16000	4.77
800	0.98	4600	2.45	8400	3.35	12200	4.01	16100	4.75
900	1.04	4700	2.45	8500	3.36	12300	4.11	16200	4.76
1000	1.09	4800	2.48	8600	3.38	12400	4.11	16300	4.81
1100	1.14	4900	2.53	8700	3.40	12500	4.17	16400	4.80
1200	1.16	5000	2.57	8800	3.42	12600	4.19	16500	4.84
1300	1.24	5100	2.56	8900	3.46	12700	4.27	16600	4.85
1400	1.29	5200	2.59	9000	3.47	12800	4.35	16700	4.88
1500	1.30	5300	2.61	9100	3.48	12900	4.22	16800	4.88
1600	1.38	5400	2.64	9200	3.52	13000	4.33	16900	4.86
1700	1.43	5500	2.68	9300	3.54	13100	4.30	17000	4.88
1800	1.47	5600	2.74	9400	3.58	13200	4.38	17100	4.85
1900	1.54	5700	2.71	9500	3.59	13300	4.34	17200	4.89
2000	1.52	5800	2.74	9600	3.67	13400	4.36	17300	4.91
2100	1.58	5900	2.78	9700	3.65	13500	4.32	17400	4.92
2200	1.61	6000	2.79	9800	3.72	13600	4.32	17500	4.91
2300	1.71	6100	2.82	9900	3.71	13700	4.39	17600	4.91
2400	1.75	6200	2.84	10000	3.80	13800	4.37	17700	4.97
2500	1.76	6300	2.86	10100	3.76	13900	4.41	17800	5.00
2600	1.80	6400	2.89	10200	3.84	14000	4.39	17900	5.00
2700	1.86	6500	2.90	10300	3.81	14100	4.38	18000	5.04
2800	1.86	6600	2.92	10400	3.84	14200	4.39		
2900	1.93	6700	2.95	10500	3.85	14300	4.43		
3000	1.93	6800	2.98	10600	3.86	14400	4.46		
3100	2.00	6900	3.01	10700	3.88	14600	4.53		
3200	2.03	7000	3.02	10800	3.89	14700	4.51		
3300	2.03	7100	3.06	10900	3.95	14800	4.64		
3400	2.09	7200	3.08	11000	3.89	14900	4.61		
3500	2.13	7300	3.10	11100	3.93	15000	4.65		

Cable loss
Cable coaxial, GORE-TEX, GOR245, 40 GHz, 1.2 m, SMA-SMA, S/N 05118337
HL 3207

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	0.17	5000	1.54	10200	2.26	15500	2.77	31500	4.07
30	0.14	5100	1.54	10300	2.26	15600	2.78	32000	4.03
50	0.16	5200	1.56	10400	2.24	15700	2.81	32500	3.93
100	0.22	5300	1.59	10500	2.23	15800	2.81	33000	4.00
200	0.30	5400	1.60	10600	2.25	15900	2.84	33500	4.09
300	0.38	5500	1.61	10700	2.31	16000	2.91	34000	4.08
400	0.44	5600	1.63	10800	2.34	16100	2.92	34500	4.13
500	0.48	5700	1.66	10900	2.38	16200	2.88	35000	4.15
600	0.54	5800	1.68	11000	2.38	16300	2.90	35500	4.18
700	0.58	5900	1.68	11100	2.38	16400	2.93	36000	4.22
800	0.62	6000	1.71	11200	2.37	16500	2.92	36500	4.25
900	0.65	6100	1.71	11300	2.38	16600	2.97	37000	4.26
1000	0.69	6200	1.73	11400	2.40	16700	3.02	37500	4.40
1100	0.73	6300	1.75	11500	2.41	16800	3.02	38000	4.40
1200	0.76	6400	1.76	11600	2.44	16900	3.01	38500	4.52
1300	0.78	6500	1.78	11700	2.44	17000	3.04	39000	4.54
1400	0.81	6600	1.77	11800	2.44	17100	3.08	39500	4.36
1500	0.85	6700	1.79	11900	2.45	17200	3.05	40000	4.48
1600	0.87	6800	1.80	12000	2.46	17300	3.06		
1700	0.90	6900	1.83	12100	2.45	17400	3.06		
1800	0.93	7000	1.84	12200	2.45	17500	3.07		
1900	0.96	7100	1.86	12300	2.48	17600	3.08		
2000	0.95	7200	1.88	12400	2.49	17700	3.09		
2100	0.98	7300	1.86	12500	2.51	17800	3.12		
2200	1.00	7400	1.87	12600	2.53	17900	3.09		
2300	1.02	7500	1.90	12700	2.51	18000	3.08		
2400	1.04	7600	1.91	12800	2.52	18500	3.11		
2500	1.06	7700	1.95	12900	2.54	19000	3.14		
2600	1.08	7800	1.98	13000	2.56	19500	3.20		
2700	1.11	7900	1.99	13100	2.56	20000	3.24		
2800	1.14	8000	1.98	13200	2.59	20500	3.31		
2900	1.15	8100	1.98	13300	2.59	21000	3.38		
3000	1.17	8200	2.00	13400	2.60	21500	3.44		
3100	1.19	8300	2.01	13500	2.65	22000	3.45		
3200	1.20	8400	2.05	13600	2.71	22500	3.45		
3300	1.24	8500	2.07	13700	2.71	23000	3.47		
3400	1.26	8600	2.08	13800	2.69	23500	3.47		
3500	1.27	8700	2.09	13900	2.67	24000	3.54		
3600	1.28	8800	2.09	14000	2.68	24500	3.62		
3700	1.32	8900	2.10	14100	2.68	25000	3.73		
3800	1.32	9000	2.12	14200	2.74	25500	3.77		
3900	1.35	9100	2.12	14300	2.77	26000	3.71		
4000	1.36	9200	2.15	14400	2.80	26500	3.73		
4100	1.39	9300	2.13	14600	2.74	27000	3.73		
4200	1.40	9400	2.16	14700	2.73	27500	3.78		
4300	1.41	9500	2.17	14800	2.75	28000	3.81		
4400	1.43	9600	2.17	14900	2.75	28500	3.81		
4500	1.47	9700	2.18	15000	2.77	29000	3.80		
4600	1.46	9800	2.16	15100	2.76	29500	3.81		
4700	1.49	9900	2.17	15200	2.76	30000	3.89		
4800	1.50	10000	2.20	15300	2.77	30500	4.03		
4900	1.52	10100	2.22	15400	2.79	31000	4.01		

Cable loss
Cable coaxial, Microwave Cable Assembly, 104EA, 18 GHz, 1.0 m
Suhner Sucoflex, HL 3386

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.05	5750	1.01	12000	1.29
30	0.07	6000	1.02	12250	1.33
100	0.12	6250	1.02	12500	1.36
250	0.18	6500	0.95	12750	1.35
500	0.26	6750	0.96	13000	1.36
750	0.32	7000	1.01	13250	1.39
1000	0.35	7250	1.04	13500	1.37
1250	0.41	7500	1.09	13750	1.43
1500	0.45	7750	1.12	14000	1.46
1750	0.50	8000	1.13	14250	1.39
2000	0.54	8250	1.15	14500	1.36
2250	0.57	8500	1.15	14750	1.47
2500	0.61	8750	1.15	15000	1.47
2750	0.64	9000	1.16	15250	1.41
3000	0.67	9250	1.14	15500	1.52
3250	0.70	9500	1.14	15750	1.54
3500	0.71	9750	1.19	16000	1.49
3750	0.74	10000	1.20	16250	1.48
4000	0.77	10250	1.22	16500	1.52
4250	0.80	10500	1.23	16750	1.56
4500	0.84	10750	1.22	17000	1.57
4750	0.85	11000	1.21	17250	1.53
5000	0.84	11250	1.24	17500	1.55
5250	0.85	11500	1.26	17750	1.55
5500	0.92	11750	1.28	18000	1.54

Cable loss
Cable coaxial, GORE, PHASEFLEX, 40 GHz, 0.95 m, SMA-SMA, S/N 03771245
HL 3559

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss,dB
30	0.08	10000	0.96	20500	1.59	31000	2.24
100	0.10	10500	0.99	21000	1.63	31500	2.71
500	0.22	11000	1.02	21500	1.70	32000	2.47
1000	0.32	11500	1.07	22000	1.71	32500	2.37
1500	0.40	12000	1.13	22500	1.60	33000	2.35
2000	0.41	12500	1.16	23000	1.58	33500	2.34
2500	0.44	13000	1.26	23500	1.64	34000	2.31
3000	0.53	13500	1.26	24000	1.68	34500	2.43
3500	0.54	14000	1.22	24500	1.79	35000	2.45
4000	0.62	14500	1.26	25000	1.86	35500	2.48
4500	0.62	15000	1.27	25500	1.77	36000	3.60
5000	0.67	15500	1.29	26000	1.78	36500	2.62
5500	0.70	16000	1.39	26500	1.83	37000	2.45
6000	0.72	16500	1.50	27000	1.87	37500	2.47
6500	0.76	17000	1.49	27500	1.97	38000	2.38
7000	0.83	17500	1.37	28000	2.69	38500	2.41
7500	0.85	18000	1.40	28500	1.94	39000	2.56
8000	0.89	18500	1.41	29000	2.02	39500	2.71
8500	0.91	19000	1.48	29500	2.05	40000	2.69
9000	0.95	19500	1.61	30000	2.11		
9500	0.96	20000	1.59	30500	2.11		

13 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
CBW	channel bandwidth
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
EBW	emission bandwidth
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
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