Cert. No. 1152.01
Electrical (EMC)

DATE: 06 March 2008

I.T.L. (PRODUCT TESTING) LTD.

FCC EMC/Radio Test Report

for

MobileAccess Networks

Equipment under test:

WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points

860M With WCE*

* See customer's declaration on page 7.

Written by: _____
D. Shidlowsky, Documentation

Approved by: _____
E. Pitt, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

Cert. No. 1152.01
Electrical (EMC)

Measurement/Technical Report for

MobileAccess Networks

WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points

860M With WCE

FCC ID: OJFMA860WCO

06 March 2008

This report concerns: Original Grant x Class II change

Class B verification ___ Class A verification_____Class I change

Equipment type: Direct Sequence Spread Spectrum Transmitter

Request Issue of Grant:

x Immediately upon completion of review

Limits used:

CISPR 22 _____ Part 15 x

Measurement procedure used is ANSI C63.4-2003.

Application for Certification prepared by:

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Applicant for this device: (different from "prepared by")

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1. General Information

1.1 Administrative Information

Manufacturer:	MobileAccess Networks
Manufacturer's Address:	8391 Old Courthouse Rd. Suite #300 Vienna, VA 22182 U.S.A. Tel: +1-541-758-2880 Fax: +1-703-848-0260
Manufacturer's Representative:	Steve Blum
Equipment Under Test (E.U.T):	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Equipment Model No.:	860M With WCE (See customer's declaration on following page).
Equipment Serial No.:	1. 860M: 73903D 2. WCE: 739038
Date of Receipt of E.U.T:	10.02.08
Start of Test:	10.02.08
End of Test:	06.03.08
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	See Section 2

Note: Tests using the spectrum analyzer HP 8592L, S/N 3826A01204, were performed between 11-21 February 2008.

15/11/2007

DECLARATION

I HEREBY DECLARE THAT THE FOLLOWING PRODUCT:

860M

IS IDENTICAL ELECTRONICALLY, PHYSICALLY, AND MECHANICALLY TO:

MA-860

Please relate to them all (from an EMC point of view) as the same product.

Thank you,

Signature: _____

Shai Rachamim
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Ofek One Center,Bldg.2
Northern Industrial Zone
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E-mail: ShaiR@MobileAccess.com
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1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 Product Description

The MobileAccess 860 WLAN Solution delivers pervasive WLAN coverage throughout enterprise environments using a unique multi-service wireless architecture. With the MA-860 approach, enterprises can seamlessly translate their WLAN investments and design expertise into a comprehensive, multi-service wireless solution.

The MA-860 combines WLAN services with signals from other wireless sources, including voice and data services from multiple wireless operators, public safety, and building automation applications. It then distributes the combined RF signals over a common set of broadband cables and antennas. One-Click calibration between the MA-860 module and the MobileAccess Wi-Fi Coverage Expander (WCE) ensures optimal coverage by mirroring the coverage footprint and system behavior of "AP-on-Ceiling" deployments for 802.11a and 802.11b/g WLAN services.

This Wire-it-Once™ approach spreads WLAN deployment costs across multiple wireless service needs, providing facility-wide coverage for WLAN and all other wireless services while creating a flexible infrastructure that adapts to evolving technology requirements.

In addition, the MA-860 WLAN solution locates Access Points (APs) in secure telecom closets alongside other LAN internetworking equipment, yielding significant operational benefits:

Provides physical security of the APs

Makes APs more accessible to IT staff

Reduces ongoing operational expenses

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing August 22, 2006).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Radiated Emission

The Open Site complies with the ±4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. System Test Configuration

2.1 Justification

The EUT consists of the 860M, WCE and an access point. The system combines 802.11 signals with the cellular signals. The cellular signal are represented in the setup by the CELL and PCS portion of the setup, which were connected to the EUT through MobileAccess standard infrastructure (i.e. RIU, BU, RHU and a controller) to represent a normal installation of the EUT. CELL and PCS portions were used for intermodulation tests only.

An “Exercise” SW on the laptops was used to trigger the access points to transmit continuously, while the EUT output was connected to the spectrum analyzer.

2.2 EUT Exercise Software

The Acces Point (AP) (as part of the EUT) was triggered to transmit using an “Exercise SW”.

The program “Air Magnet” was used to trigger the AP to continuously transmit packets.

2.3 Special Accessories

No special accessories were needed to achieve compliance.

2.4 Equipment Modifications

No modifications were necessary in order o achieve compliance.

2.5 Configuration of Tested System

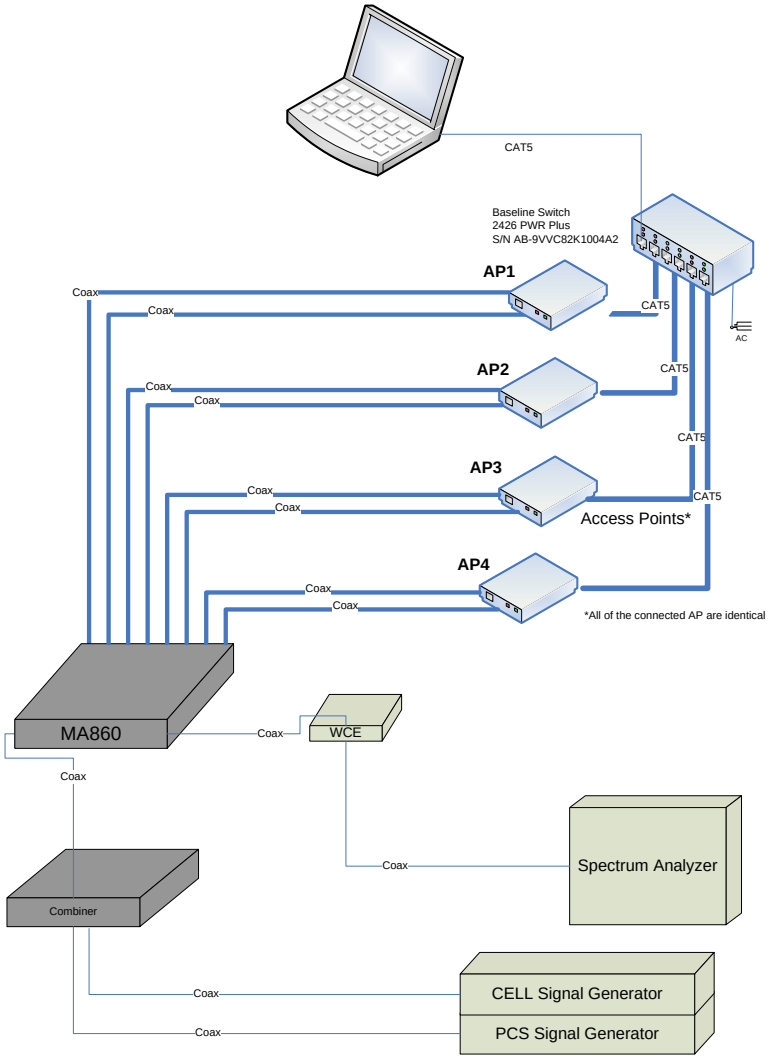


Figure 1. Configuration of Tested System

Note: The system was tested using four identical Colubris Access Points M/N MAP-330, S/N: 8060-00624, S/N: 8060-00522, S/N: 8060-00201, S/N: 8060-0065, FCC ID: RTP-550-10016-5.

3. Theory of Operation

3.1 Theory of Operation

mobileaccess

Making Wireless an Indoor State of Mind

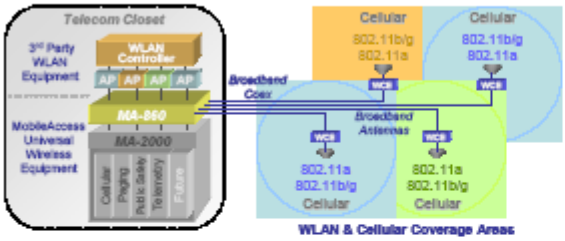
MA-860 WLAN Solution

MA-860 Solution Overview

The MobileAccess 860 WLAN Solution delivers pervasive WLAN coverage throughout enterprise environments using a unique multi-service wireless architecture. With the MA-860 approach, enterprises can seamlessly translate their WLAN investments and design expertise into a comprehensive, multi-service wireless solution.

The MA-860 combines WLAN services with signals from other wireless sources, including voice and data services from multiple wireless operators, public safety, and building automation applications. It then distributes the combined RF signals over a common set of broadband cables and antennas. One-Click calibration between the MA-860 module and the MobileAccess Wi-Fi Coverage Expander (WCE) ensures optimal coverage by mirroring the coverage footprint and system behavior of "AP-on-Ceiling" deployments for 802.11a and 802.11b/g WLAN services.

This Wire-it-Once™ approach spreads WLAN deployment costs across multiple wireless service needs, providing facility-wide coverage for WLAN and all other wireless services while creating a flexible infrastructure that adapts to evolving technology requirements.



In addition, the MA-860 WLAN solution locates Access Points (APs) in secure telecom closets alongside other LAN internetworking equipment, yielding significant operational benefits:

- Provides physical security of the APs
- Makes APs more accessible to IT staff
- Reduces ongoing operational expenses

MobileAccess 860 WLAN Module

Benefits

Cost-Effective Multi-Service Solution
- Delivers WLAN and other wireless RF signals over a single multi-service infrastructure
- Spreads WLAN deployment costs across multiple wireless services

Dependable WLAN Coverage
- MobileAccess WLAN architecture mirrors the behaviors and coverage footprint of "AP-on-Ceiling" deployment
- One-Click compensation ensures optimal 802.11b/g and 802.11a coverage
- Dedicated AP to antenna relationships ensure transparent support for WLAN applications such as VOIP and location services (RTLS)
- Redundant power option

Centralized & Secure AP Management
- Lowers operating expenses
- Provides physical security and simplifies management

Proactive End-to-End Monitoring
- Remote SNMP monitoring for status, alerting, and fault detection
- Monitoring extends to attached multi-service antennas

Simplified IT Deployment Model
- Uses standard WLAN design techniques

CISCO PARTNER Technology Developer

8391 Old Courthouse Road, Suite 300, Vienna, VA 22182
Tel: (866)436-9266, (703) 848-0200 TAC:(800) 787-1266 Fax:(703) 848-0280
www.mobileaccess.com

MA-860 Product Specifications

802.11 RF Parameters

860(M/R) with Wi-Fi Coverage Expander (WCE):

	802.11a	802.11b/g
Gain TX (dB)	0	0
Output Power (dBm)	17	b: 20 g: 17
Gain RX (dB)	4	4
NF RX (dB)	5	5
Flatness (dB)	+/- 2.0	+/- 1.5

860(M/R) Module Standalone:

	802.11a	802.11b/g
Insertion Loss (dB)	3	2
Flatness (dB)	+/- 1.0	+/- 1.0

Mobile Services Parameters

	Cell			PCS
Band (MHz)	698-960			1710-1990
Insertion Loss (dB)				
MA-860	1.0			2.5
WCE	1.2			3.5
System	2.2			6.0

RF Connections

860(M/R)

802.11 b/g	(4) SMA Female, 50 ohm
802.11 a	(4) SMA Female, 50 ohm
Mobile Services	(4) SMA Female, 50 ohm
Antenna Ports	(4) N-type Female, 50 ohm

WCE

Coax (860 facing)	(1) N-type Male
Coax (Ant facing)	(1) N-type Female

Standards and Approvals

FCC–47, CFR 15.109, Part 15 Sections B, C, and E
UL / IEC 60950 -1
UL1950 Fire Safety requirements
UL2043 Fire/Plenum (WCE)
CE EN 60950
CAN/CSA C22.2 No 60950

Management

The 860(M/R) can be configured and monitored through either a local RS-485 connection or a Web browser application via an RJ-45 Ethernet connection

Power

Power	2 DC Power Inputs DC-1 = 28V Mandatory DC Power, 66 Watts DC-2= 9.8V Optional Redundant Power, 40 Watts

Physical Specifications

Dimensions	860(M/R):	242 mm x 279 mm x 38 mm (9.54 in x 10.98 in x 1.5 in)
	WCE:	130 mm x 120 mm x 20 mm (5.12 in x 4.73in x 0.8 in)
Weight	860(M/R):	2.82 kg (6.2 lb)
	WCE:	0.80 kg (1.8 lb)

Environmental Specifications

Temperature	
Operating	0°C to +50°C (32°F to 122°F)
Storage	-20°C to +85°C (-4°C to 185°C)
Humidity	
Operating	95% (non-condensing)
Storage	95% (non-condensing)

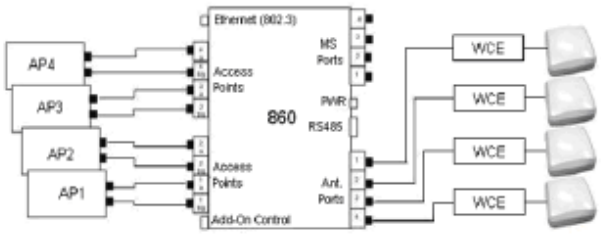
Ordering Information

860M	860 WLAN Module
860R	860 WLAN Module - Redundant Power Supply Option
WCE	Wi-Fi Coverage Expander

Accessory Kits for mounting 860(M/R):

AK-860-1000	860 with MA-1000
AK-860-1200	860 with MA-1200
AK-860-MDLT	860 with ModuLite
AK-860-2000	860 with MA-2000
AK-860-SA	860 stand alone
AK-860-2000L	860 with MA-2000 Lite
AK-860-PWR	Redundant Power Supply

Wiring Diagram



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Tel: (866)436-9266, (703) 848-0200 TAC (800) 787-1266 Fax:(703) 848-0280
www.mobileaccess.com

4. Spurious Radiated Emission in the Restricted Band, Below 1 GHz 5GHz Transmitter 802.11b/g+802.11a Signals

4.1 Test Specification

9kHz-1000 MHz, F.C.C., Part 15, Subpart C

4.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.1.

The frequency range 9 kHz-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 9 kHz-30 MHz, the loop antenna was rotated on its vertical axis, The antenna height (center of loop) was 1 meter.

In the frequency range 30-1000 MHz, the readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods:

Turning the E.U.T on and off.
Using a frequency span less than 10 MHz.
Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

The E.U.T. was tested at the operating frequencies of, 5180, 5200, 5240, 5745, 5765, and 5805 MHz using the following modulations: 64QAM, and BPSK.

4.3 Test Data

JUDGEMENT: Passed

No signals were found in the frequency band 9 kHz-1000 MHz.

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

The results for all three operating frequencies and modulations were the same.

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

4.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	November 12, 2007	1 year
RF Section	HP	85420E	3427A00103	November 12, 2007	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 22, 2007	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 22, 2007	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 15, 2007	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

4.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[dB\mu v/m]\ FS = RA + AF + CF$$

FS: Field Strength [dBμv/m]
RA: Receiver Amplitude [dBμv]
AF: Receiving Antenna Correction Factor [dB/m]
CF: Cable Attenuation Factor [dB]

No external pre-amplifiers are used.

5. Spurious Radiated Emission in the Restricted Band, Above 1 GHz 5GHz Transmitter 802.11b/g+802.11a Signals

5.1 Radiated Emission Above 1 GHz

The E.U.T operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.1.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.
In the frequency range 1-2.9 GHz, a computerized EMI receiver complying to CISPR 16 requirements was used.
In the frequency range 2.9-40.0 GHz, a spectrum analyzer including a low noise amplifier was used. During average measurements, the IF bandwidth was 1 MHz and the video bandwidth was 100Hz. During peak measurements, the IF bandwidth was 1 MHz and the video bandwidth was 3 MHz.
The test distance was 3 meters.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The E.U.T. was tested at the operating frequencies of, 5180, 5200, 5240, 5745, 5765, and 5805 MHz using the following modulations: 64QAM, and BPSK.

5.2 Test Data

JUDGEMENT: Passed by 10.7 dB

For the operating frequencies of 5180, 5200, and 5240, the signals in the frequency range of 1.0 – 40.0 GHz were more than 20 dB below the specification limit.

For the operation frequency of 5745 MHz, the margin between the emission level and the specification limit is 10.7 dB in the worst case at the frequency of 11490.00 MHz, horizontal polarization.

For the operation frequency of 5765 MHz, the margin between the emission level and the specification limit is 10.8 dB in the worst case at the frequency of 11530.00 MHz, horizontal polarization.

For the operation frequency of 5805 MHz, the margin between the emission level and the specification limit is 10.7 dB in the worst case at the frequency of 11610.00 MHz, horizontal polarization.

The results for all modulations were the same.

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 5745 MHz

Freq.	Polarity	Peak Amp	Peak. Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11490.00	H	52.8*	74.0	-21.2
11490.00	V	52.3*	74.0	-21.7

Figure 2. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 5745 MHz

Freq.	Polarity	Average Amp	Average Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11490.00	H	43.3*	54.0	-10.7
11490.00	V	43.1*	54.0	-10.9

Figure 3. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 5765 MHz

Freq.	Polarity	Peak Amp	Peak. Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11530.00	H	52.1*	74.0	-21.9
11530.00	V	52.0*	74.0	-22.0

Figure 4. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 5765 MHz

Freq.	Polarity	Average Amp	Average Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11530.00	H	43.2*	54.0	-10.8
11530.00	V	43.0*	54.0	-11.0

Figure 5. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 5805 MHz

Freq.	Polarity	Peak Amp	Peak. Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11610.00	H	52.0*	74.0	-22.0
11610.00	V	51.9*	74.0	-22.1

Figure 6. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 5805 MHz

Freq.	Polarity	Average Amp	Average Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11610.00	H	43.3*	54.0	-10.7
11610.00	V	43.1*	54.0	-10.9

Figure 7. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

5.3 Test Instrumentation Used, Radiated Measurements Above 1 GHz

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Receiver	HP	85422E	3411A00102	November 12, 2007	1 year
RF Section	HP	85420E	3427A00103	November 12, 2007	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A
Antenna-Log Periodic	A.H.System	SAS-200/511	253	February 4, 2007	2 years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 15, 2006	2 years
Horn Antenna	ARA	SWH-28	1008	December 8, 2006	2 year
Horn Antenna	Narda	V637	0410	December 8, 2006	2 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 2, 2007	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 9, 2008	1 year
Low Noise Amplifier	MK Milliwave	MKT6-3000 400-30-13P	399	January 9, 2008	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Spectrum Analyzer	HP	8546E	3442A00275	November 14, 2007	1 year
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

6. 26 dB Bandwidth 5 GHz Transmitter 802.11b/g+802.11a Signals

6.1 Test procedure

The E.U.T. was set to the applicable test frequency. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20 dB) and appropriate coaxial cable (cable loss = 1 dB). The spectrum analyzer was set to 300 kHz resolution BW. The spectrum bandwidth of the E.U.T. was measured and recorded.

The E.U.T. was tested at 5180, 5200, 5240, 5745, 5765, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

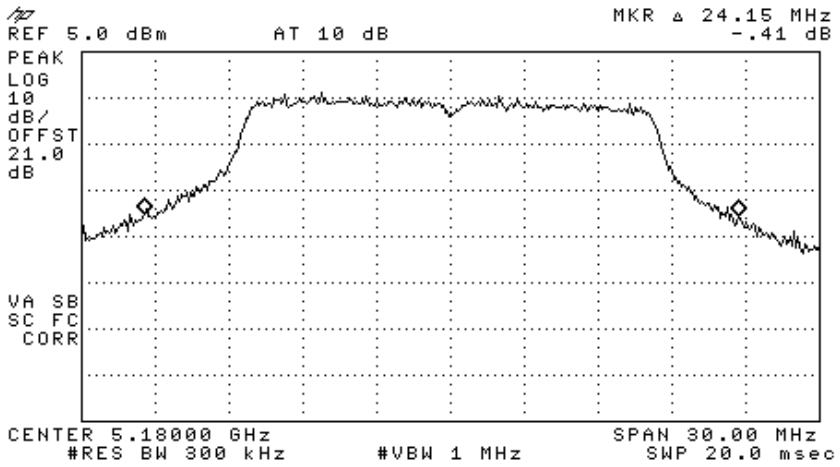

Figure 8 —5180 MHz 64QAM

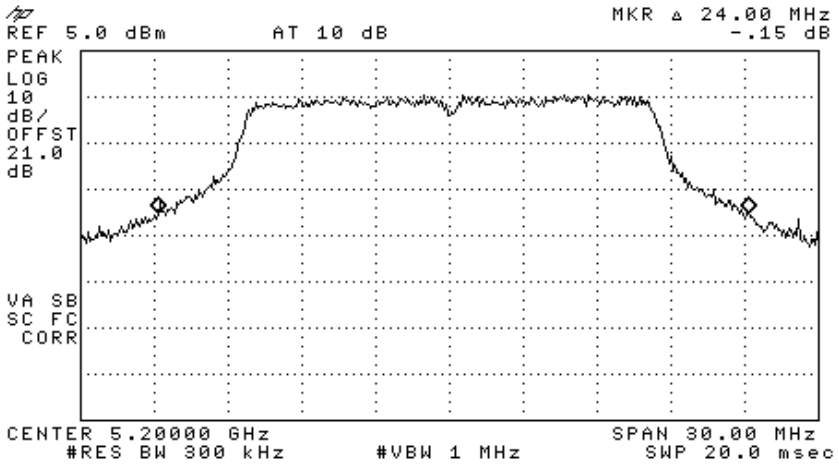

Figure 9 —5200 MHZ 64QAM

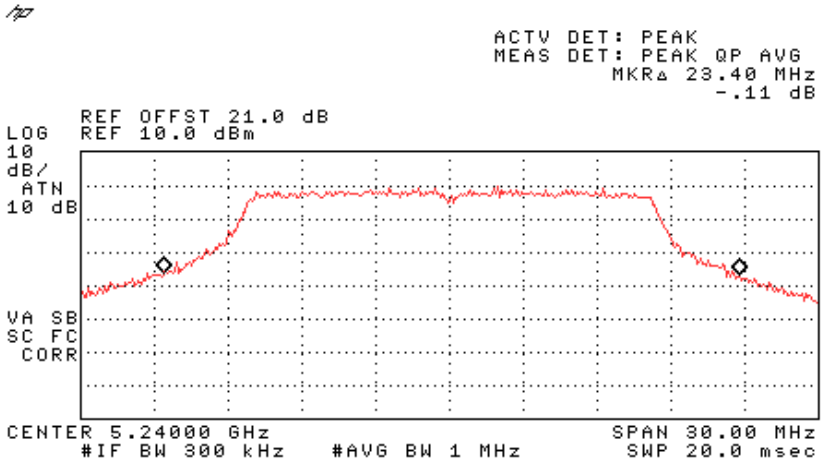

Figure 10 —5240 MHZ 64QAM

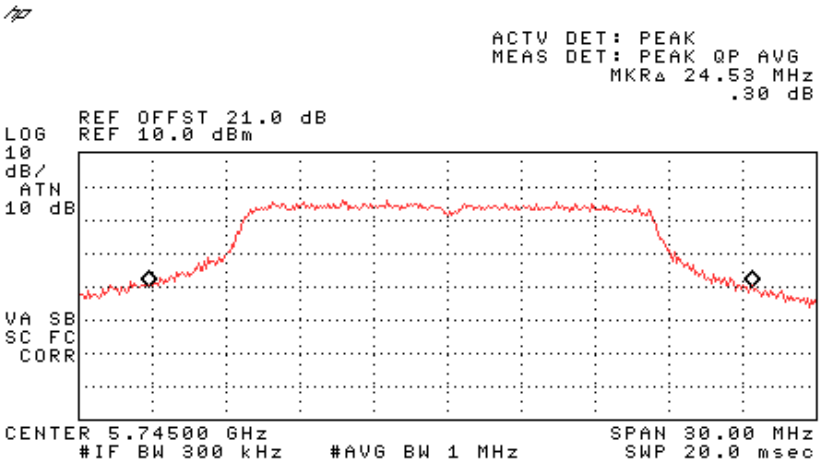

Figure 11 —5745 MHz 64QAM

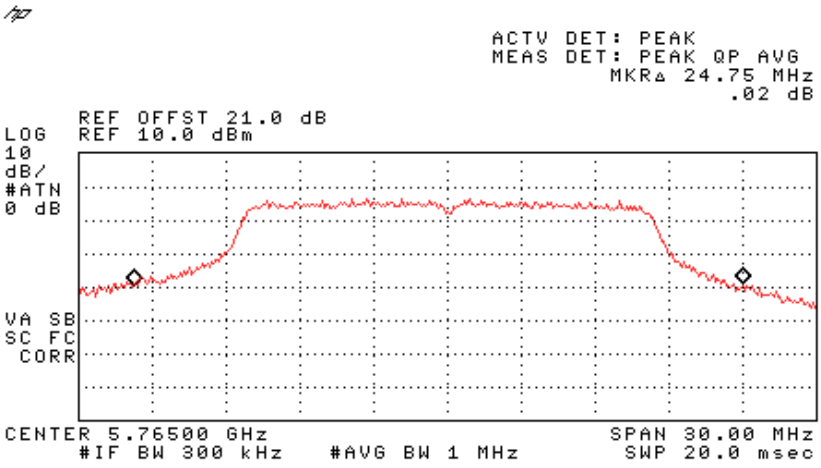

Figure 12 —5765 MHz 64QAM

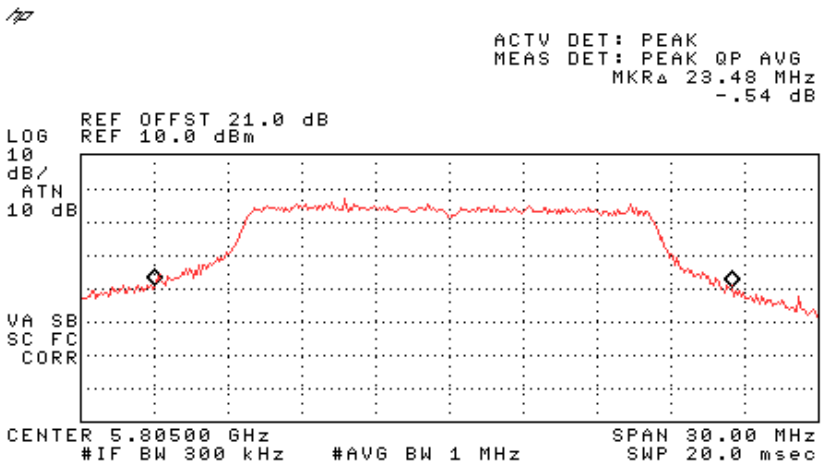

Figure 13 —5805 MHZ 64QAM

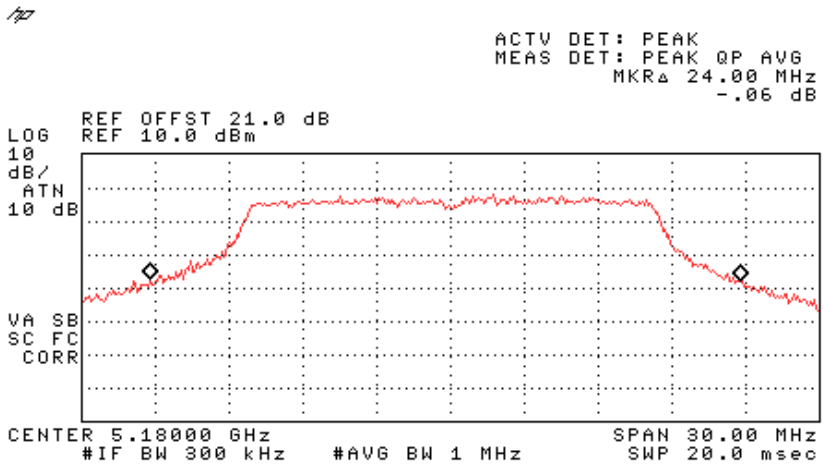

Figure 14 —5180 MHz BPSK

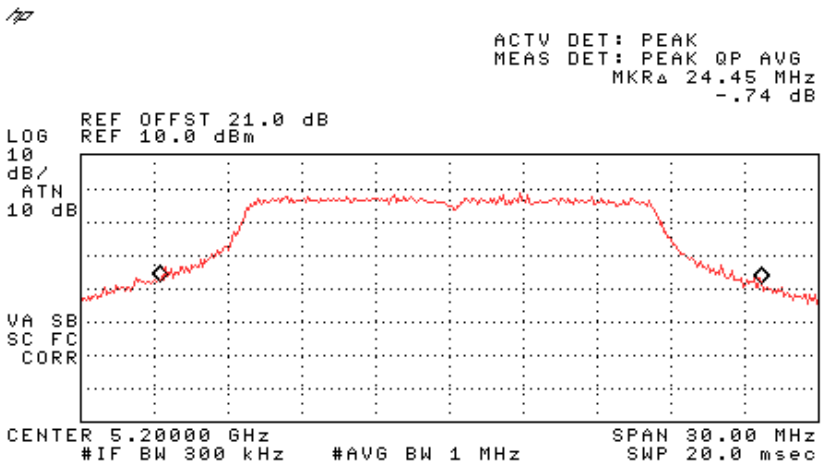

Figure 15 —5200 MHZ BPSK

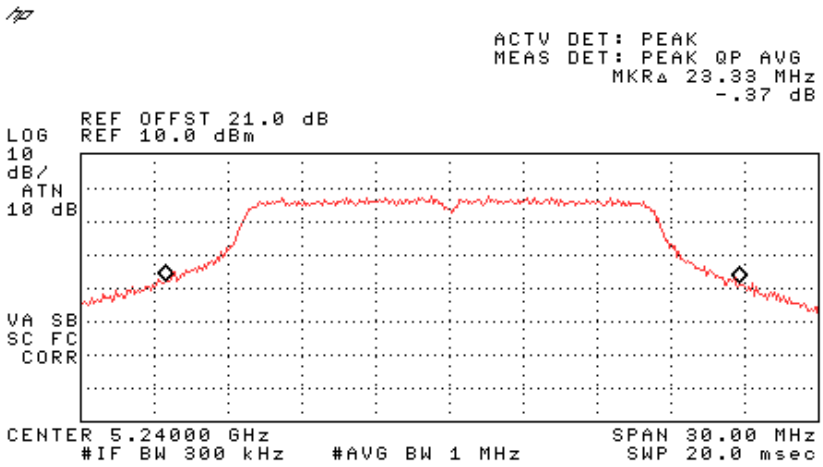

Figure 16 —5240 MHZ BPSK

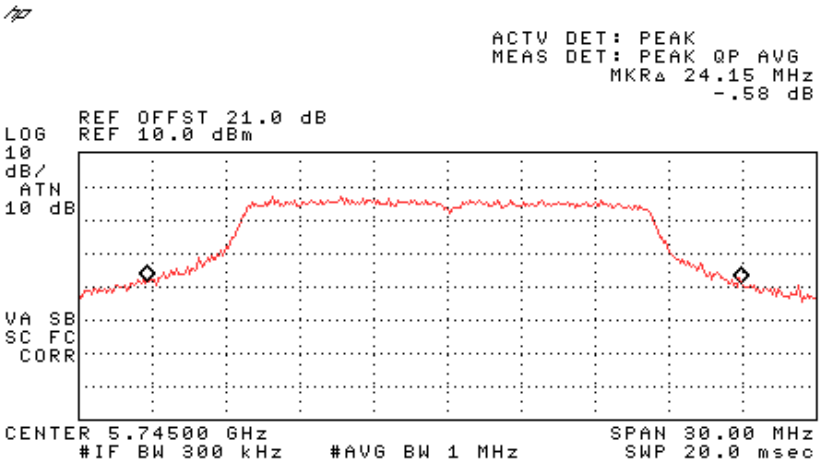

Figure 17 —5745 MHz BPSK

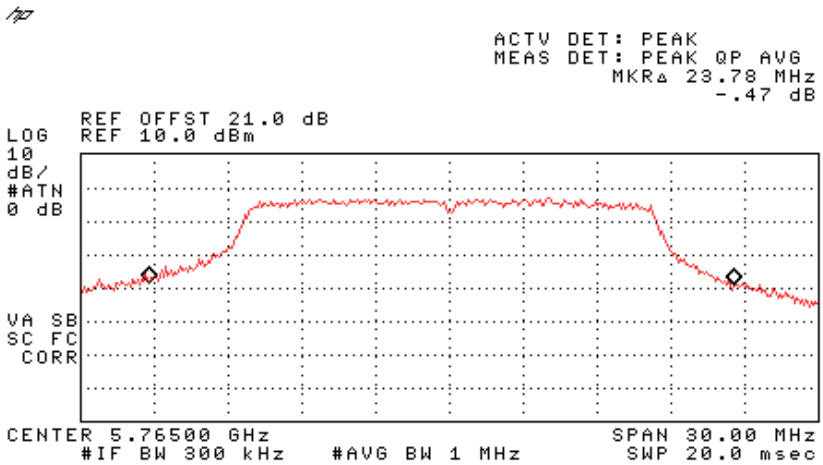

Figure 18 —5765 MHz BPSK

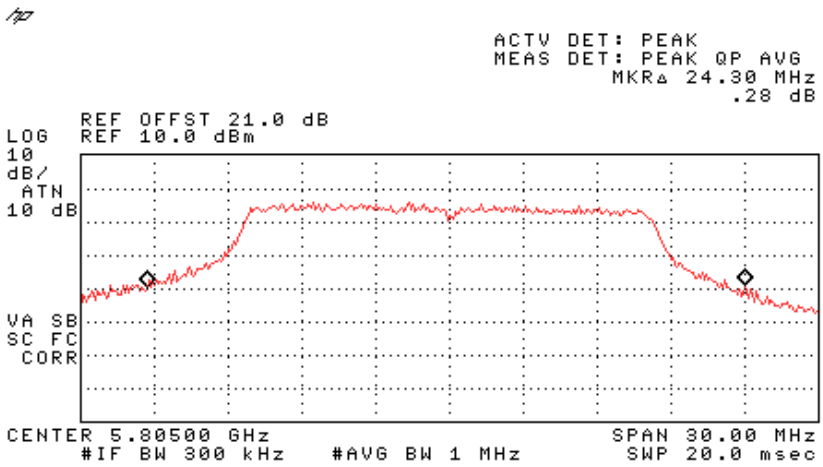

Figure 19 —5805 MHZ BPSK

Operation Frequency (MHz)	Modulation	26 dB Bandwidth (dBm)
5180	64QAM	24.15
	BPSK	24.00
5200	64QAM	23.40
	BPSK	24.53
5240	64QAM	24.75
	BPSK	23.48
5745	64QAM	24.00
	BPSK	24.45
5765	64QAM	23.33
	BPSK	24.15
5805	64QAM	23.78
	BPSK	24.30

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

6.2 Test Equipment Used.

26 dB Minimum Bandwidth

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year
Cable	Rhophase	KPS-1501-1000	A1675	February 8, 2008	1 year

Figure 20 Test Equipment Used

7. Maximum Conducted Output Power 5 GHz Transmitter 802.11b/g+802.11a Signals

7.1 Test procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (Cable Loss = 1 dB). The Spectrum Analyzer was set to 1.0 MHz resolution BW. Sample detector and maximum hold were used.

The E.U.T. was tested at 5180, 5200, 5240, 5745, 5765, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

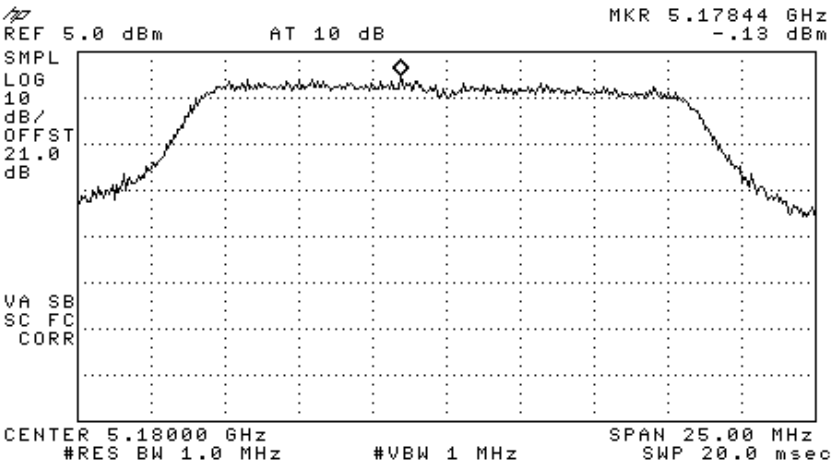

Figure 21 5180 MHz 64QAM

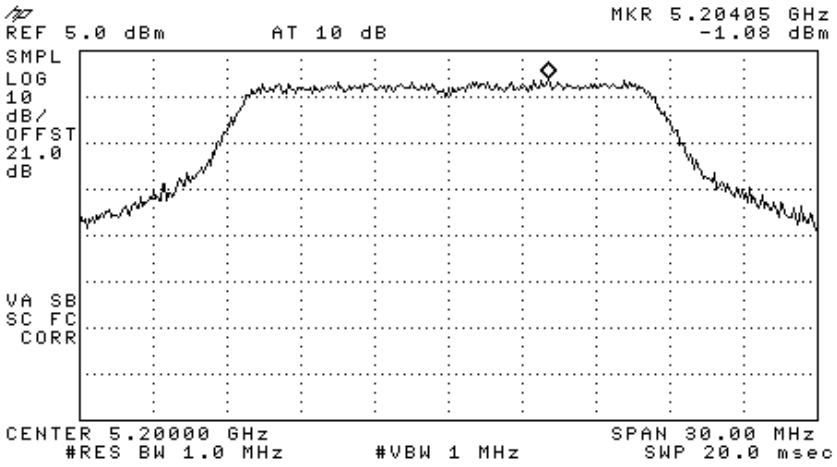

Figure 22 5200 MHz 64QAM

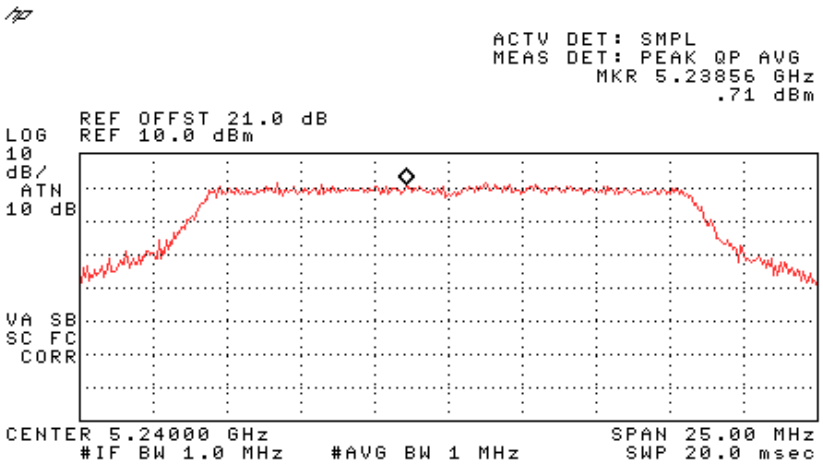

Figure 23 5240 MHz 64QAM

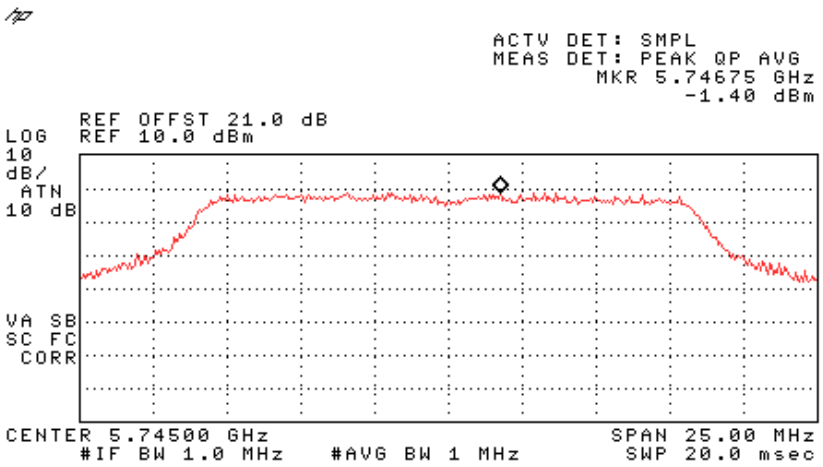

Figure 24 5745 MHz 64QAM

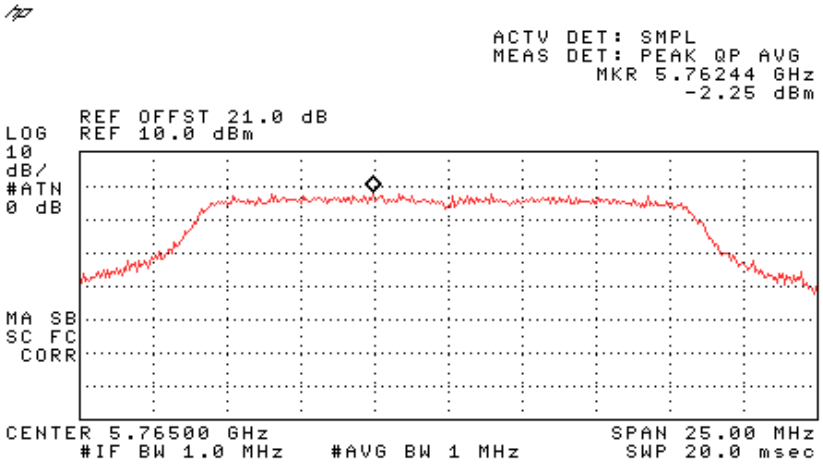

Figure 25 5765 MHz 64QAM

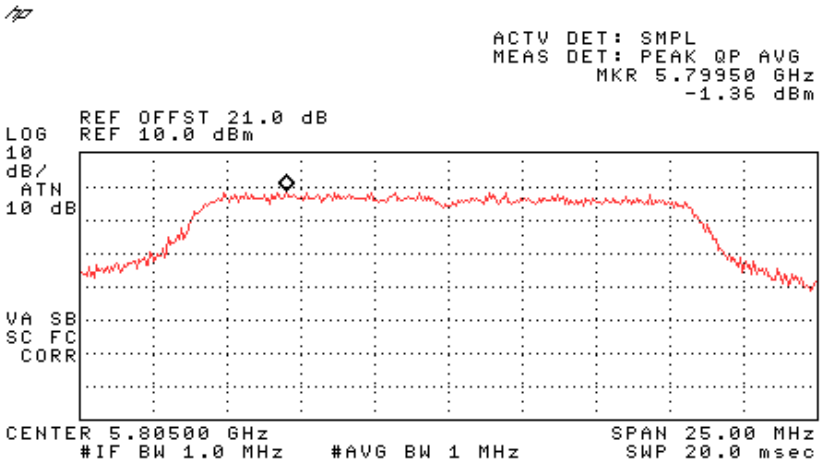

Figure 26 5805 MHz 64QAM

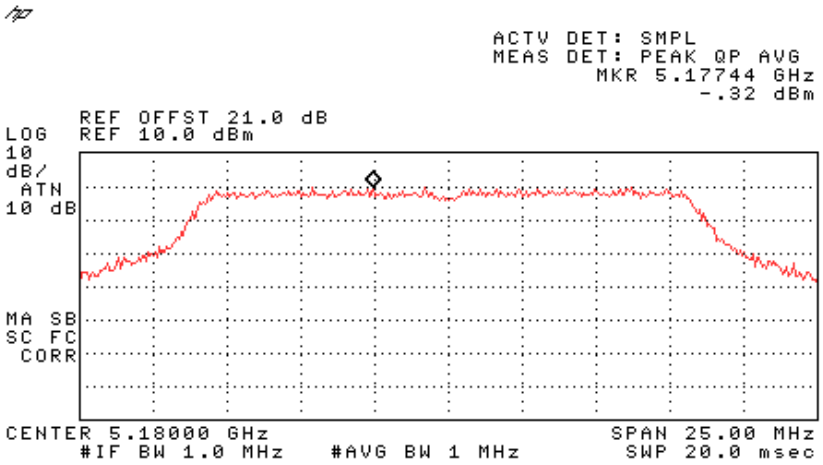

Figure 27 5180 MHz BPSK

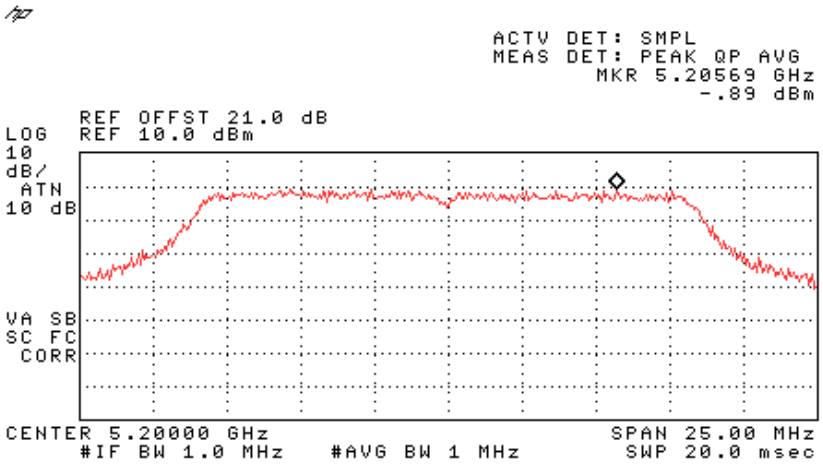

Figure 28 5200 MHz BPSK

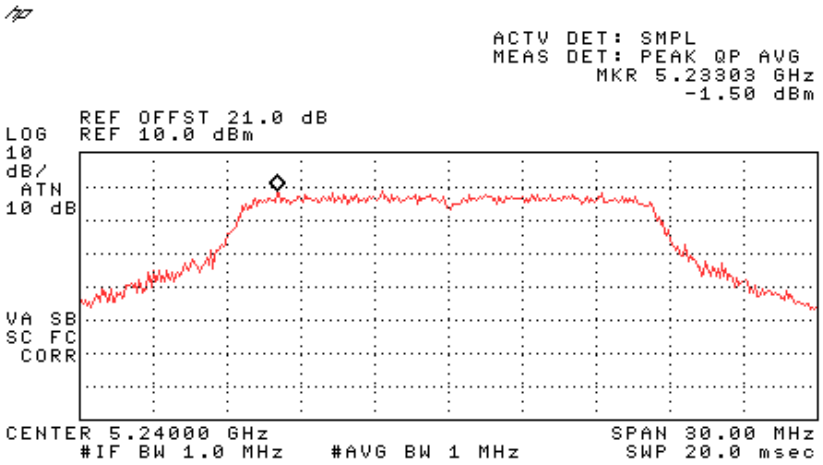

Figure 29 5240 MHz BPSK

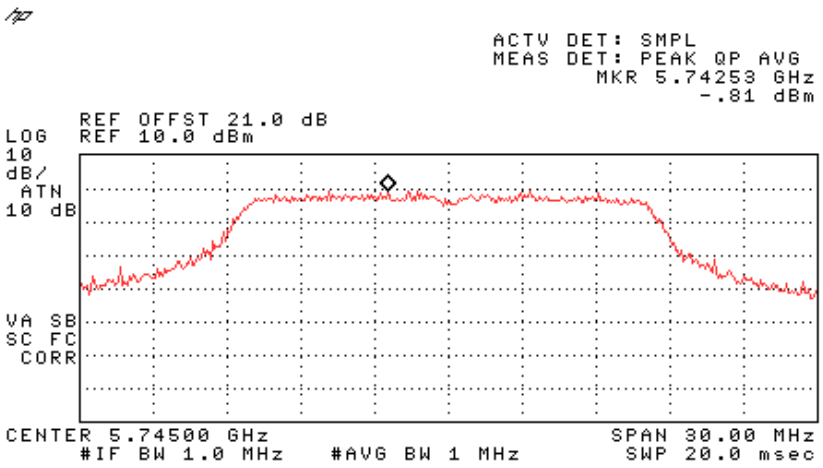

Figure 30 5745 MHz BPSK

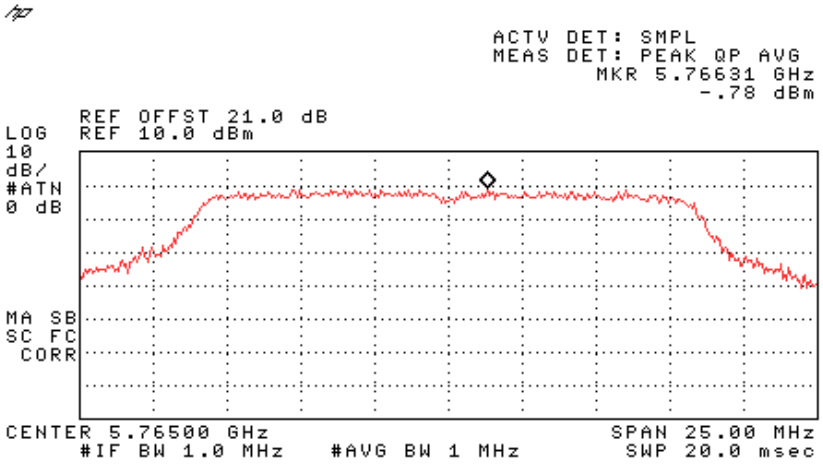

Figure 31 5765 MHz BPSK

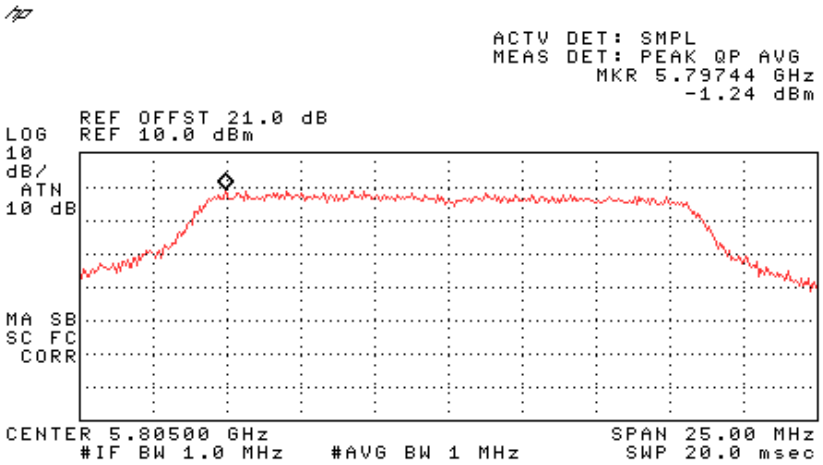

Figure 32 5805 MHz BPSK

7.2 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart E

Operation Frequency (MHz)	Modulation	Power (dBm)	Specification (dBm)	Margin (dB)
5180	64QAM	13.7	16.0	-2.30
	BPSK	13.5	16.0	-2.50
5200	64QAM	12.72	16.0	-3.28
	BPSK	13.0	16.0	-3.00
5240	64QAM	14.4	16.0	-1.60
	BPSK	12.2	16.0	-3.80
5745	64QAM	12.5	29.0	-16.50
	BPSK	13.0	29.0	-16.00
5765	64QAM	11.7	29.0	-17.30
	BPSK	13.0	29.0	-16.00
5805	64QAM	12.3	29.0	-16.70
	BPSK	12.6	29.0	-16.40

Figure 33 Maximum Peak Power Output

Note: Antenna Gain is 7 dBi

Peak Output Power = Reading + 10log EBW

For 5.18; 5.20, 5.24 GHz Peak Output Power Limit = 4 + 10log EBW – (Antenna Gain –6) or 16 whichever is less.

For 5.745; 5.765, 5.805 GHz Peak Output Power Limit = 17 + 10log EBW – (Antenna Gain –6) or 29 whichever is less.

JUDGEMENT: Passed by 1.60 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

7.3 Test Equipment Used.

Peak Power Output

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 34 Test Equipment Used

8. Peak Power Spectral Density 5GHz Transmitter 802.11b/g+802.11a Signals

[In accordance with section 15.407(a)]

8.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20dB) and an appropriate coaxial cable (Cable Loss = 1 dB). The spectrum analyzer was set to 1 MHz resolution BW. and 1 MHz video BW. The spectrum peaks were located at at 5180, 5200, 5240, 5745, 5765, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

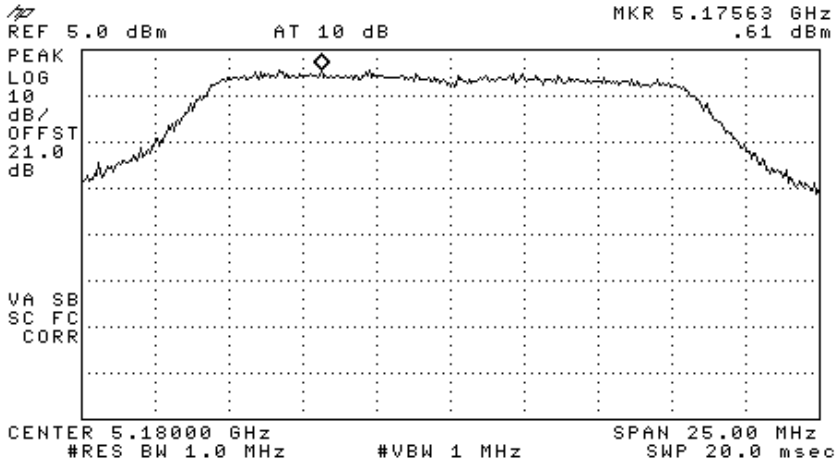

Figure 35 —5180 MHz 64QAM

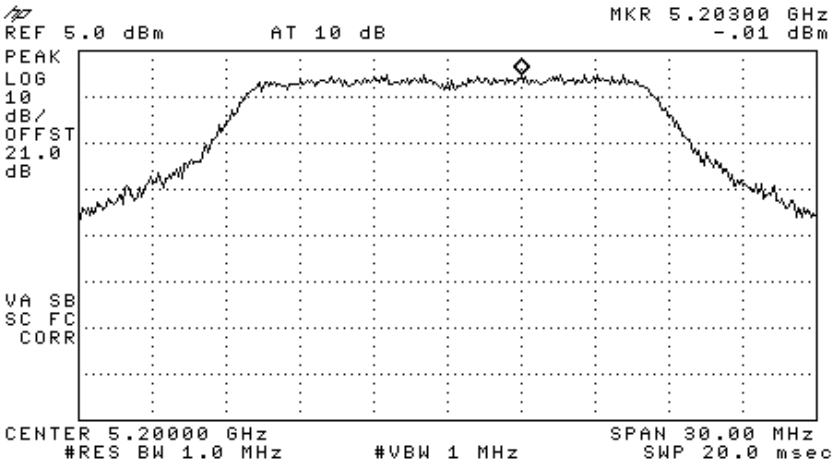

Figure 36 —5200 MHz 64QAM

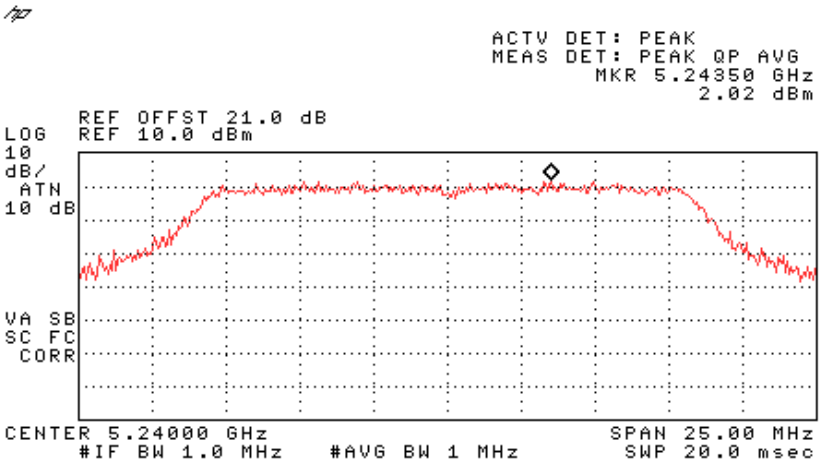

Figure 37 —5240 MHz 64QAM

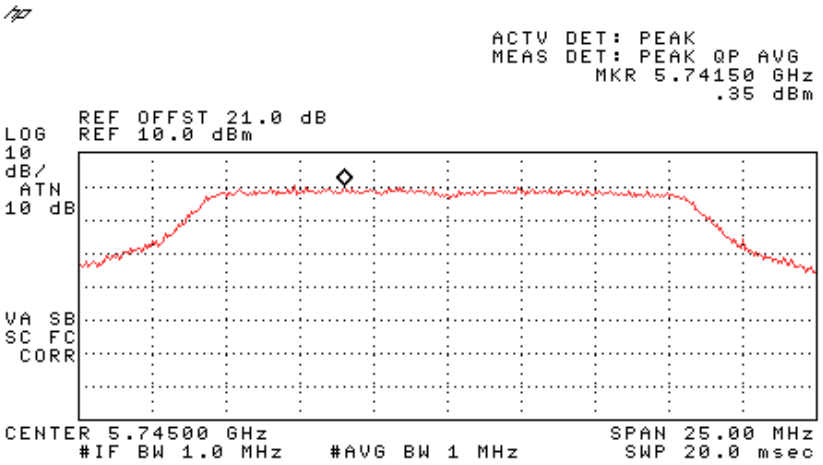

Figure 38 —5745 MHz 64QAM

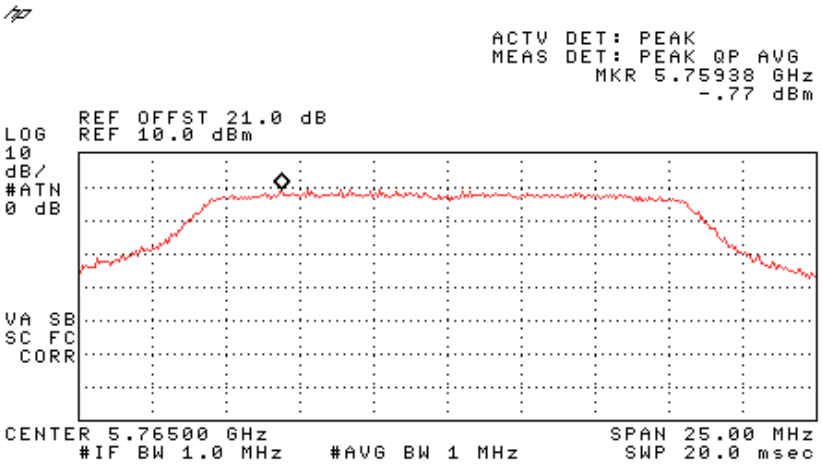

Figure 39 —5765 MHz 64QAM

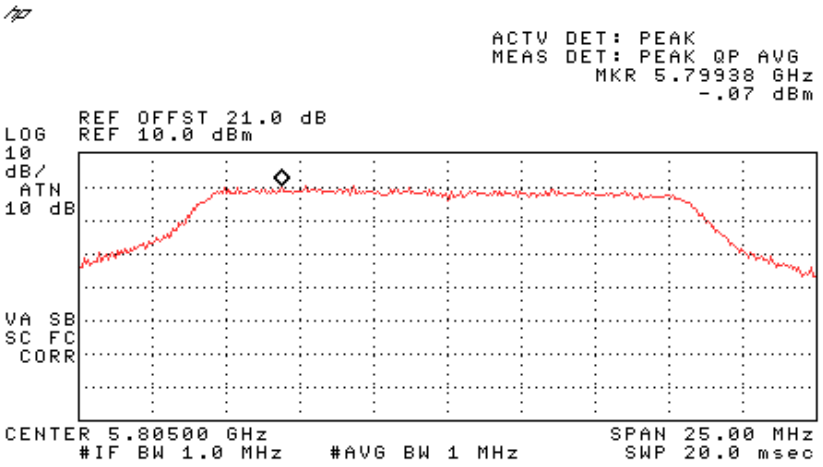

Figure 40 —5805 MHz 64QAM

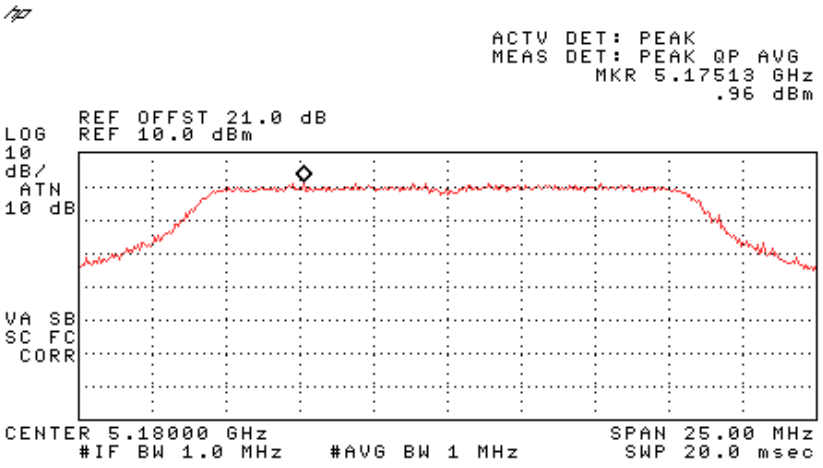

Figure 41 —5180 MHz BPSK

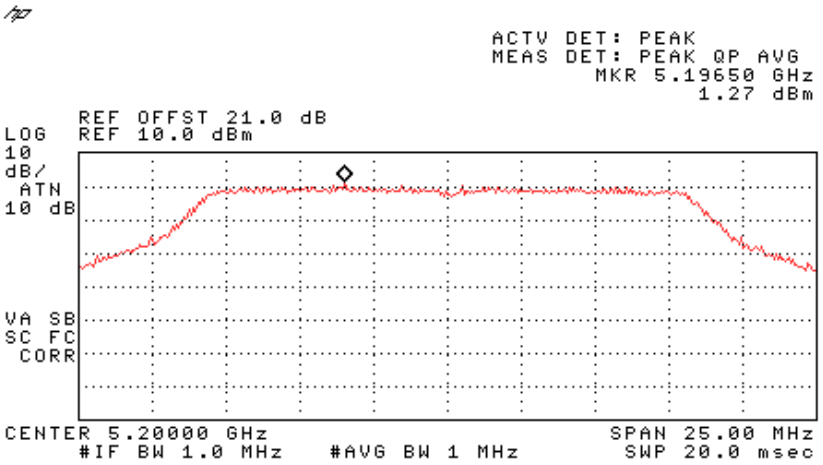

Figure 42 —5200 MHz BPSK

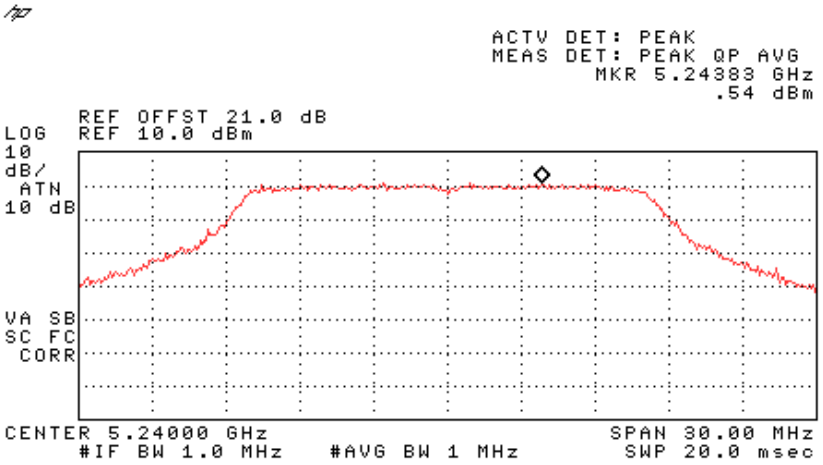

Figure 43 —5240 MHz BPSK

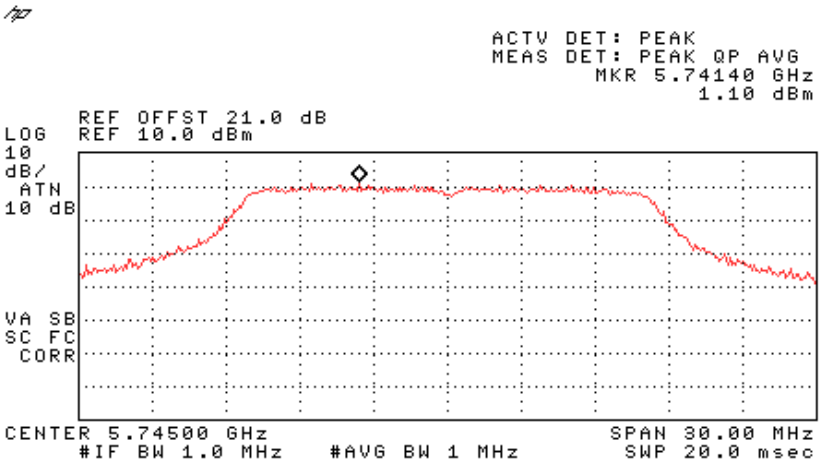

Figure 44 —5745 MHz BPSK

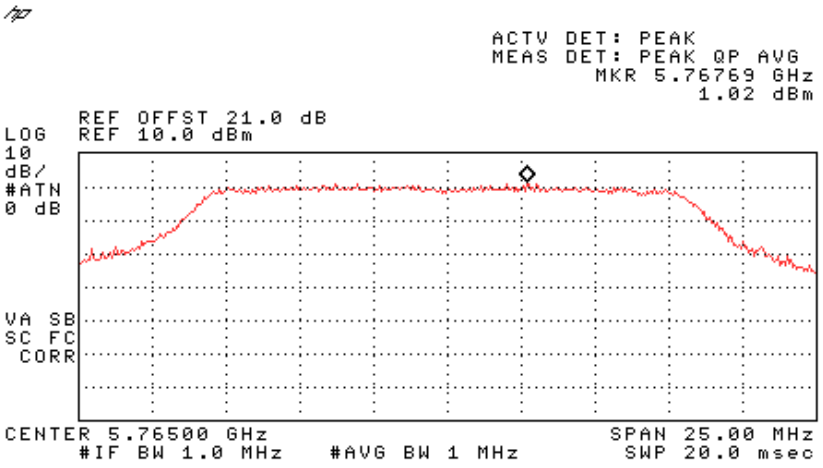

Figure 45 —5765 MHz BPSK

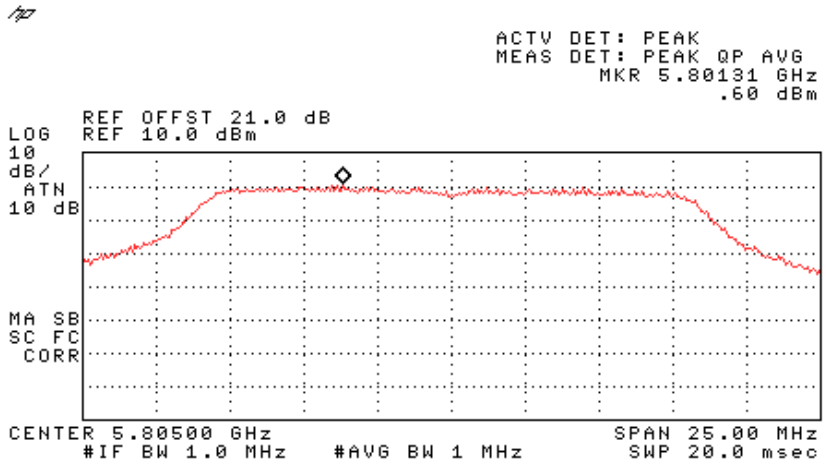

Figure 46 —5805 MHz BPSK

8.2 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart E (15.407(a))

Operation Frequency (MHz)	Modulation	Reading Spectrum Analyzer (dBm)	Specification (dBm)	Margin (dB)
5180	64QAM	0.61	3	-2.39
	BPSK	0.96	3	-2.04
5200	64QAM	0.01	3	-2.99
	BPSK	1.27	3	-1.73
5240	64QAM	2.02	3	-0.98
	BPSK	0.54	3	-2.46
5745	64QAM	0.35	16	-15.65
	BPSK	1.1	16	-14.90
5765	64QAM	0.77	16	-15.23
	BPSK	1.02	16	-14.98
5805	64QAM	0.07	16	-15.93
	BPSK	0.6	16	-15.40

Figure 47 Test Results

JUDGEMENT: Passed by 0.98 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

8.3 Test Equipment Used.

Peak Power Spectral Density

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 48 Test Equipment Used

9. Ratio of Peak Excursion of Modulation Envelope to Maximum Conducted Output Power 5GHz Transmitter 802.11b/g+802.11a Signals

[In accordance with section 15.407(a)(6)]

9.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20dB) and an appropriate coaxial cable (Cable Loss = 1 dB). The spectrum analyzer was set to 1 MHz resolution BW. and 1 MHz video BW.

Trace A: Sample Detector

Trace B: Peak Detector

The E.U.T. was tested at 5180, 5200, 5240, 5745, 5765,and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

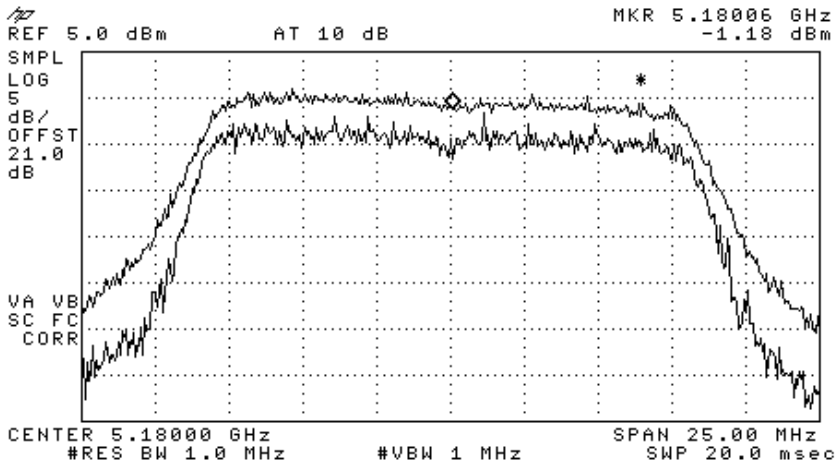

Figure 49 —5180 MHz 64QAM

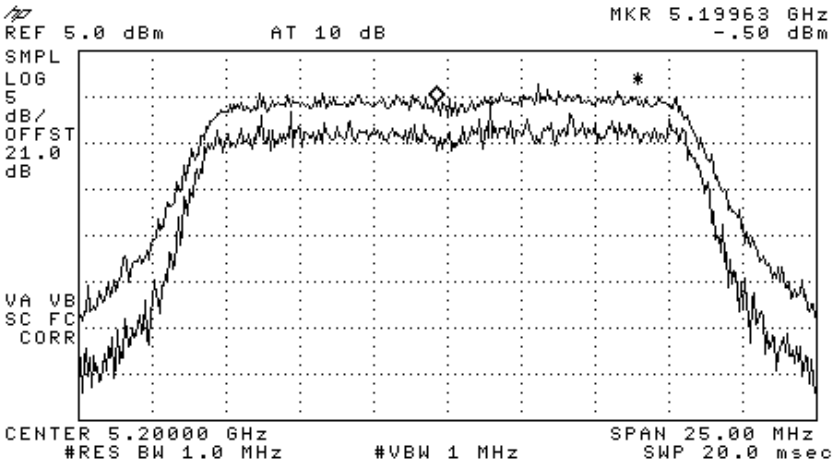

Figure 50 —5200 MHz 64QAM

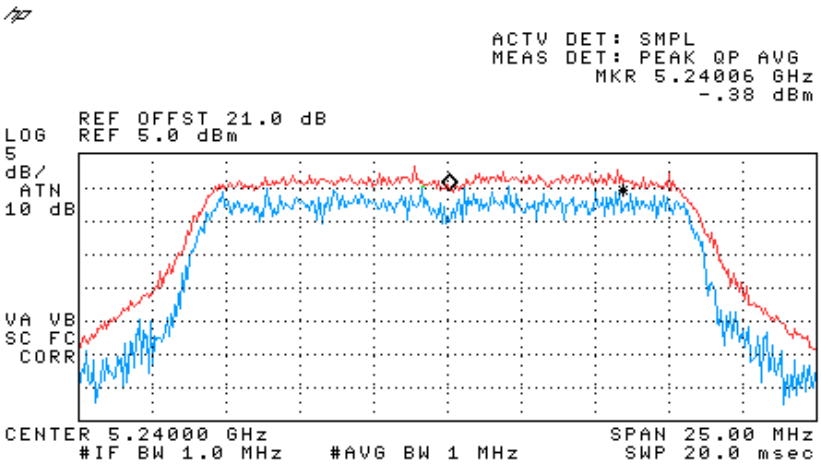

Figure 51 —5240 MHz 64QAM

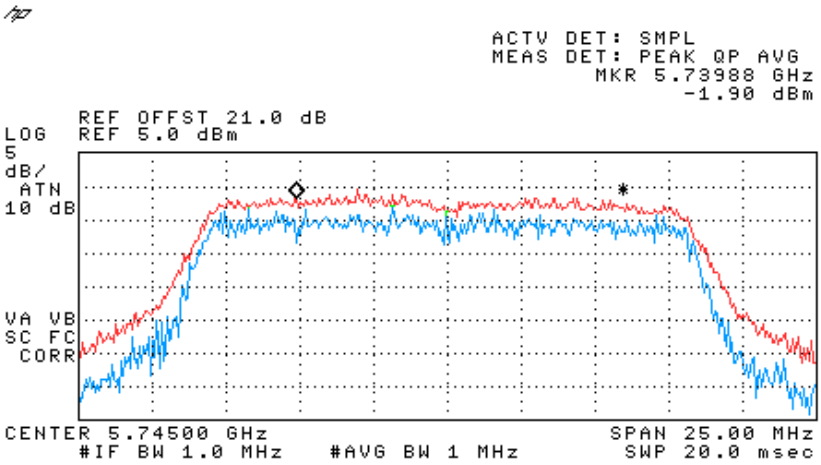

Figure 52 —5745 MHz 64QAM

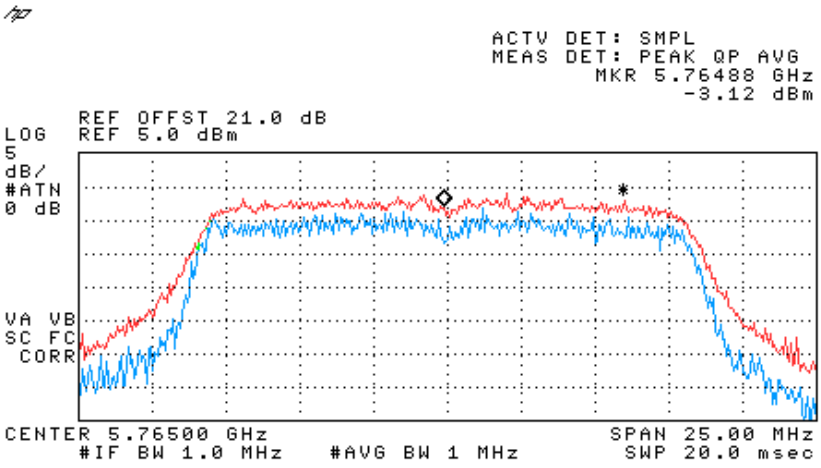

Figure 53 —5765 MHz 64QAM

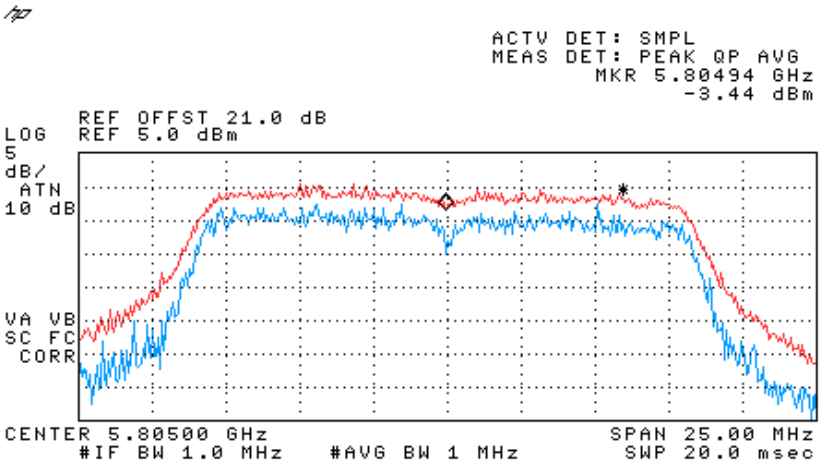

Figure 54 —5805 MHz 64QAM

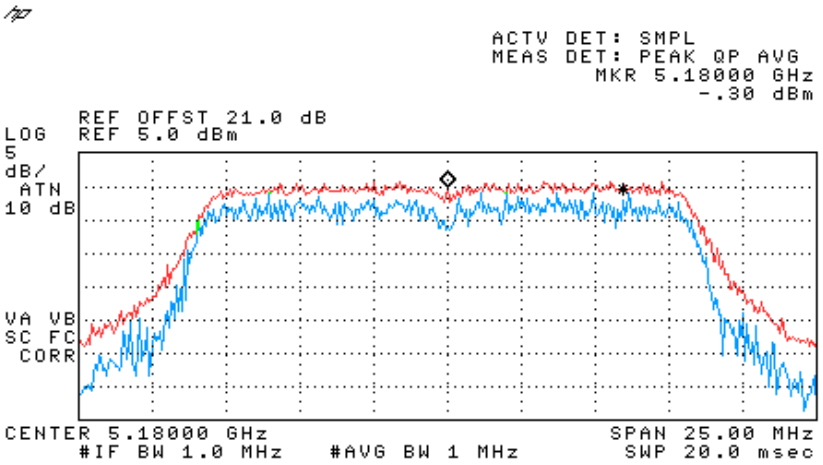

Figure 55 —5180 MHz BPSK

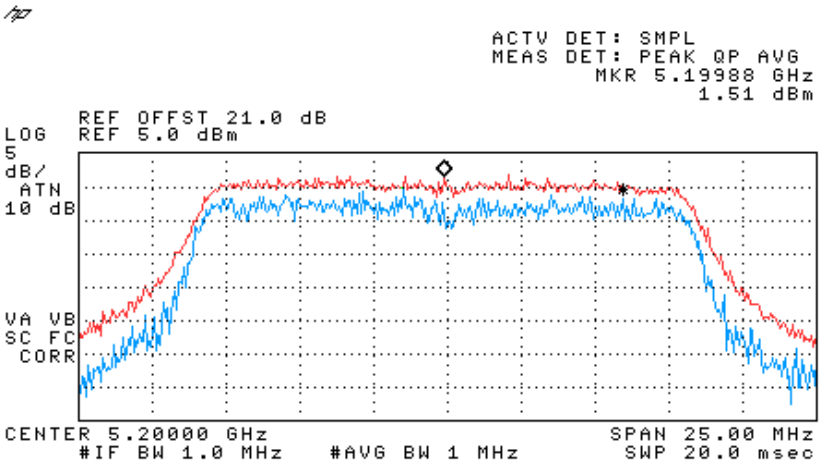

Figure 56 —5200 MHz BPSK

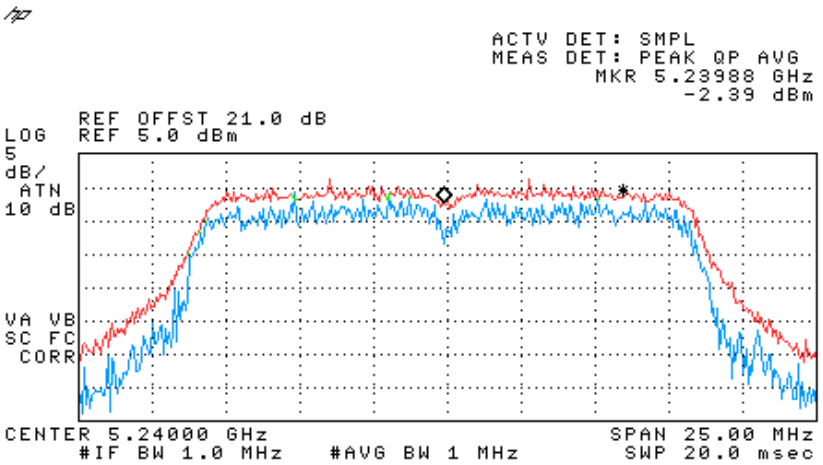

Figure 57 —5240 MHz BPSK

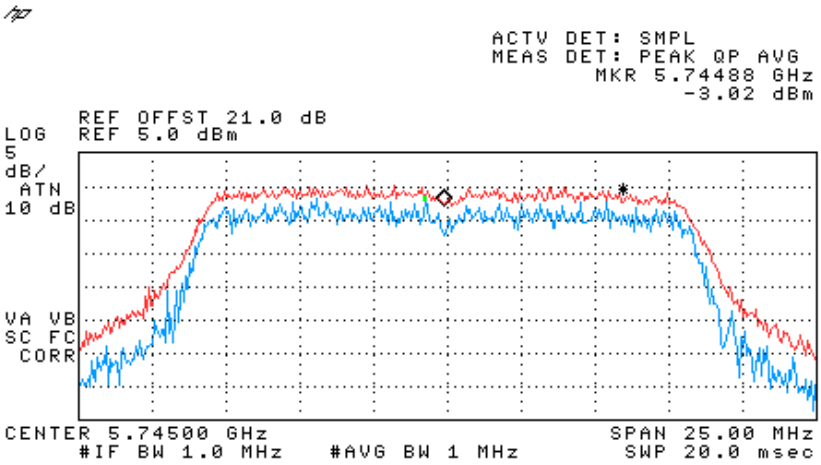

Figure 58 —5745 MHz BPSK

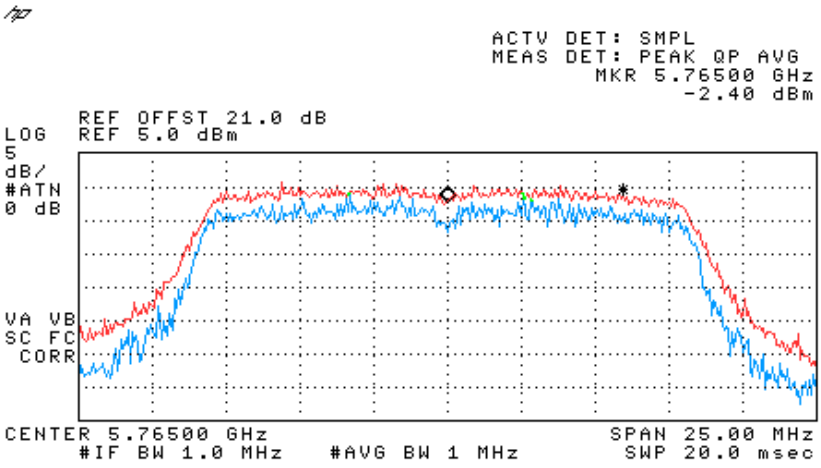

Figure 59 —5765 MHz BPSK

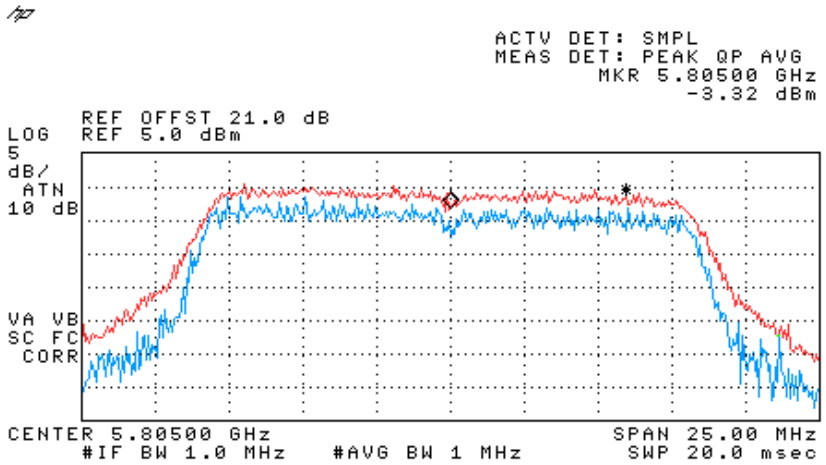

Figure 60 —5805 MHz BPSK

9.2 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart E (15.407(a)(6))

Operation Frequency (MHz)	Modulation	Delta (dB)	Specification (dB)	Margin (dB)
5180	64QAM	5.45	13	-7.55
	BPSK	5.9	13	-7.10
5200	64QAM	5.3	13	-7.70
	BPSK	6.0	13	-7.00
5240	64QAM	4.9	13	-8.10
	BPSK	6.1	13	-6.90
5745	64QAM	6.0	13	-7.00
	BPSK	4.3	13	-8.70
5765	64QAM	5.2	13	-7.80
	BPSK	4.5	13	-8.50
5805	64QAM	6.6	13	-6.40
	BPSK	4.4	13	-8.60

Figure 61 Test Results

JUDGEMENT: Passed by 6.40 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

9.3 Test Equipment Used.

Peak Power Spectral Density

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 62 Test Equipment Used

10. Peak Power Output Out of 5150-5250; 5725-5825 MHz Bands 5 GHz Transmitter 802.11b/g+802.11a Signals

10.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an appropriate coaxial cable. The spectrum analyzer was set to 1 MHz resolution BW except for the frequency range 9 kHz-150 kHz where the RBW was set to 1kHz and the frequency range 150 kHz-10.0 MHz where the RBW was set to 10kHz. The frequency range from 9 kHz to 40 GHz was scanned. Level of spectrum components out of the 5150-5250; 5725-5825 MHz bands was measured at the selected operation frequencies.

The E.U.T. was tested at 5180, 5200, 5240, 5745, 5765, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

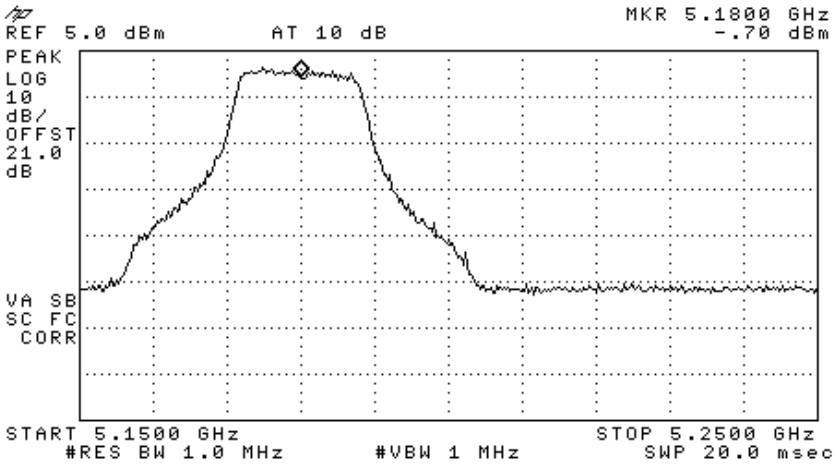

Figure 63 —5180 MHz 64QAM

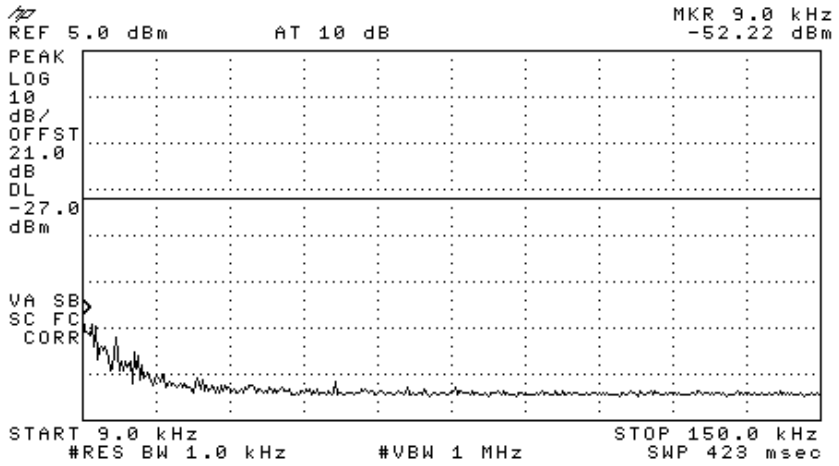

Figure 64 —5180 MHz 64QAM

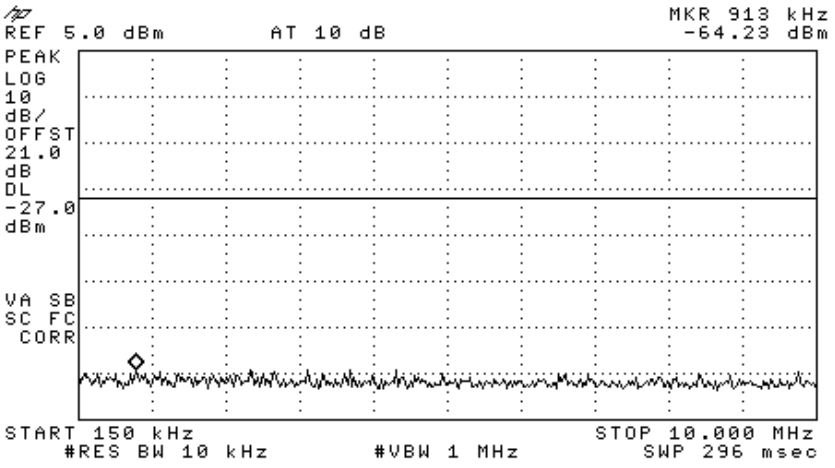

Figure 65 —5180 MHz 64QAM

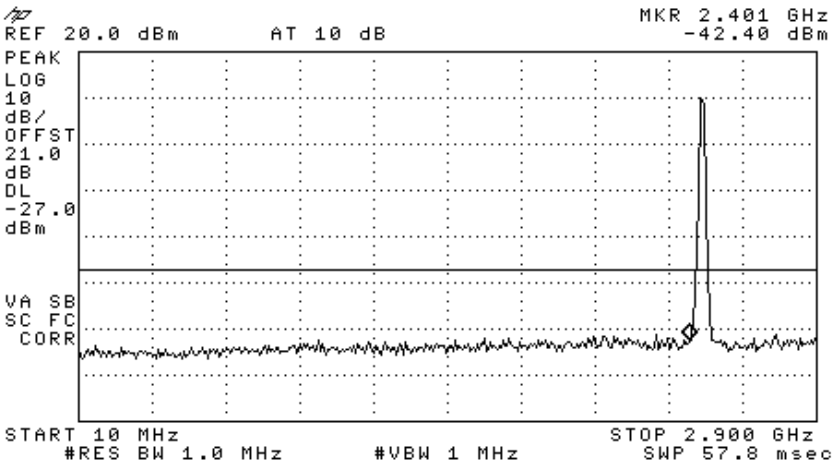

Figure 66 —5180 MHz 64QAM

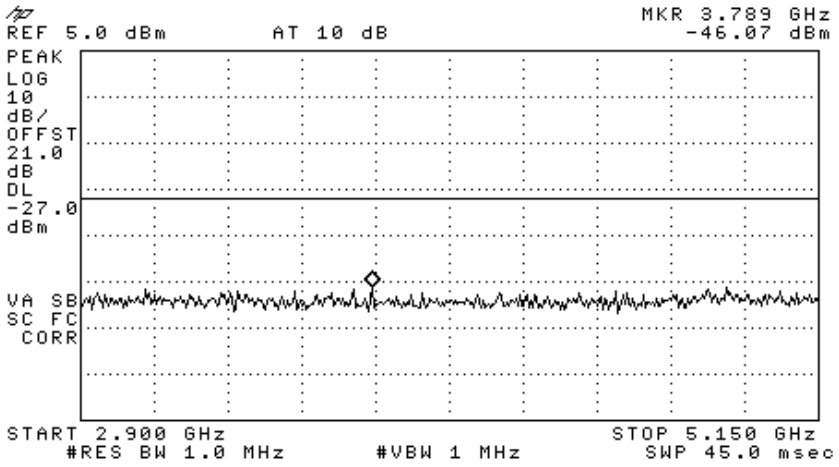

Figure 67 —5180 MHz 64QAM

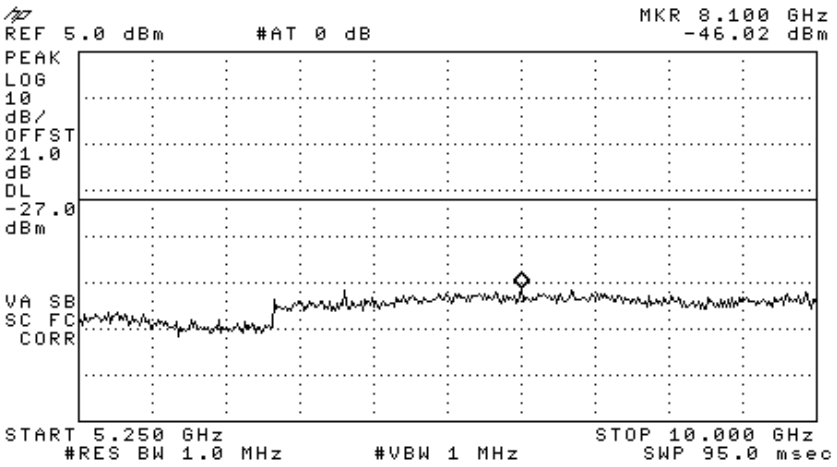

Figure 68 —5180 MHz 64QAM

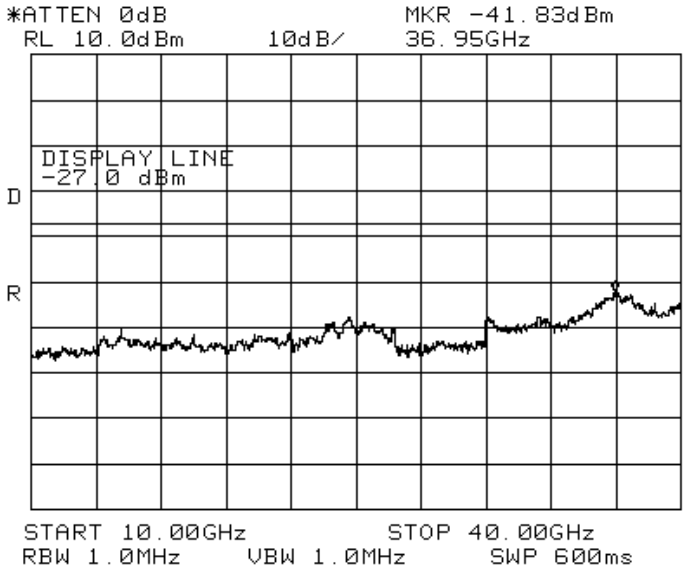

Figure 69 —5180 MHz 64QAM

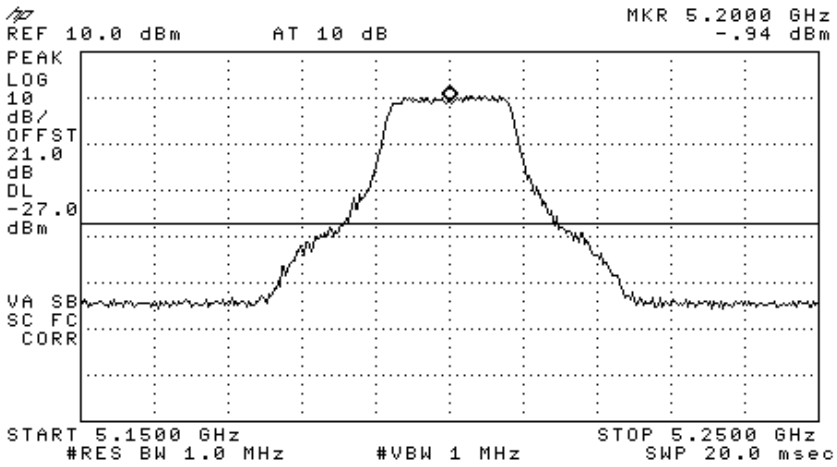

Figure 70 —5200 MHz 64QAM

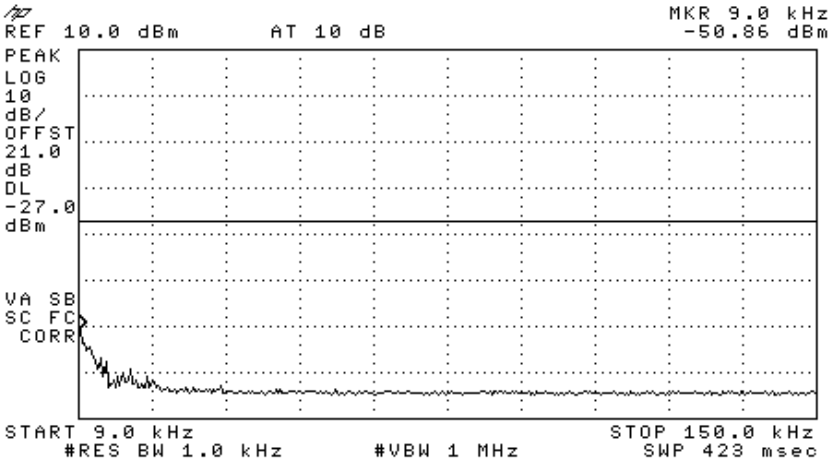

Figure 71 —5200 MHz 64QAM

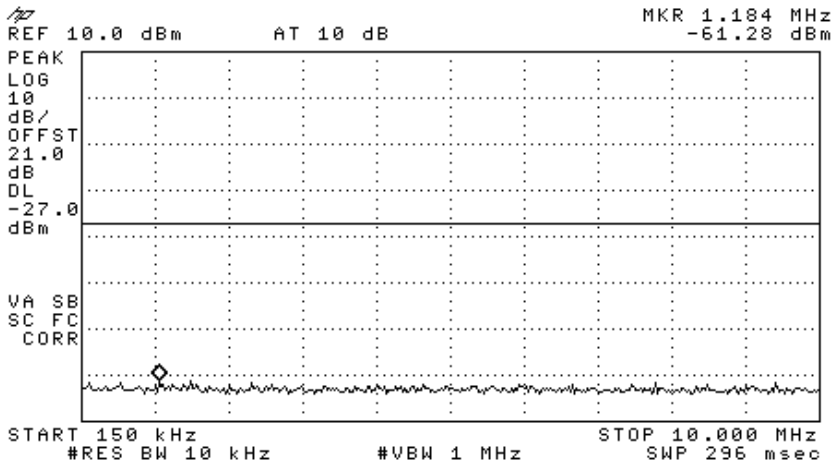

Figure 72 —5200 MHz 64QAM

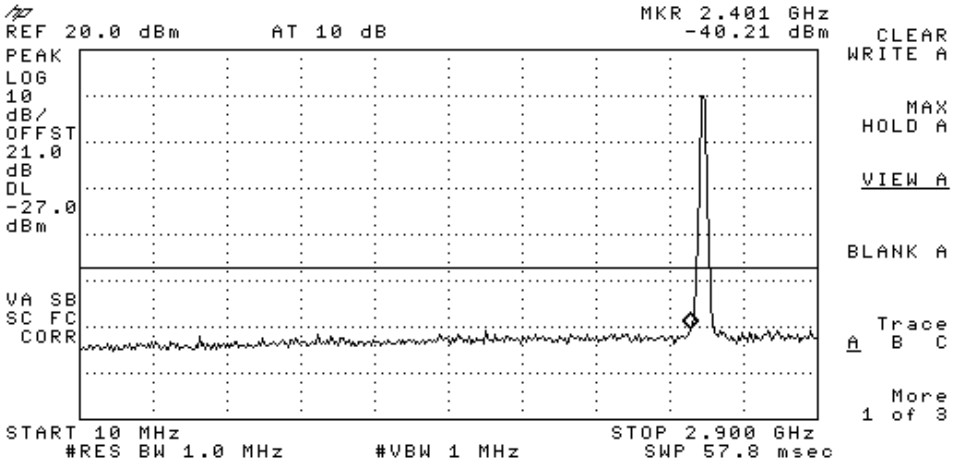

Figure 73 —5200 MHz 64QAM

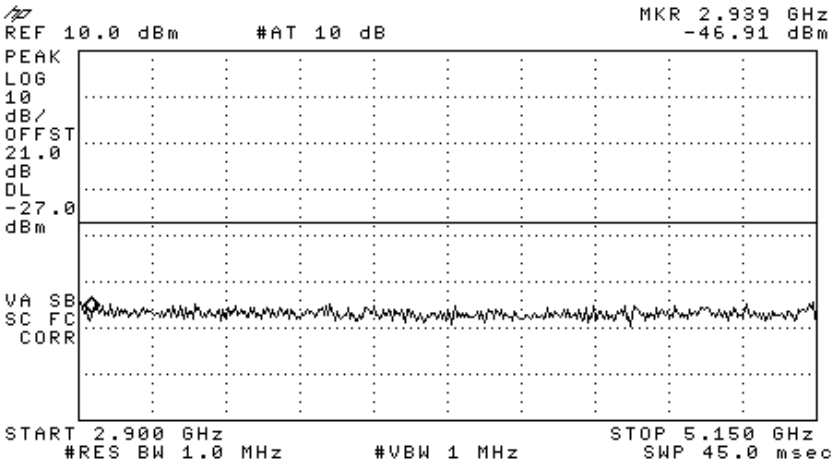

Figure 74 —5200 MHz 64QAM

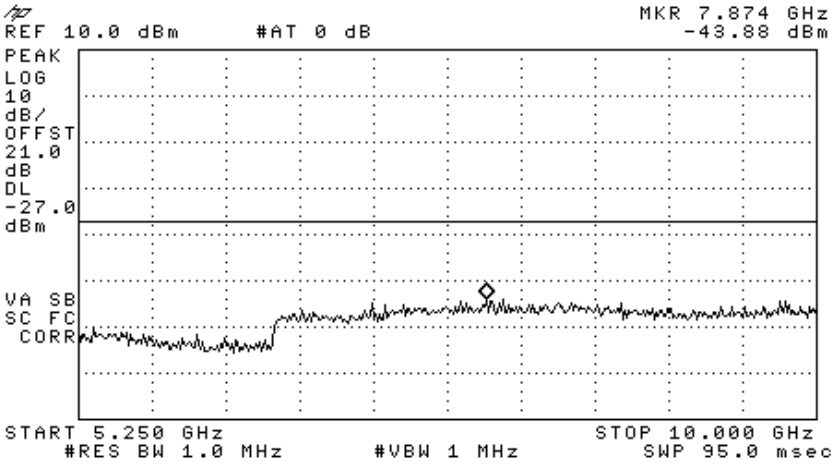

Figure 75 —5200 MHz 64QAM

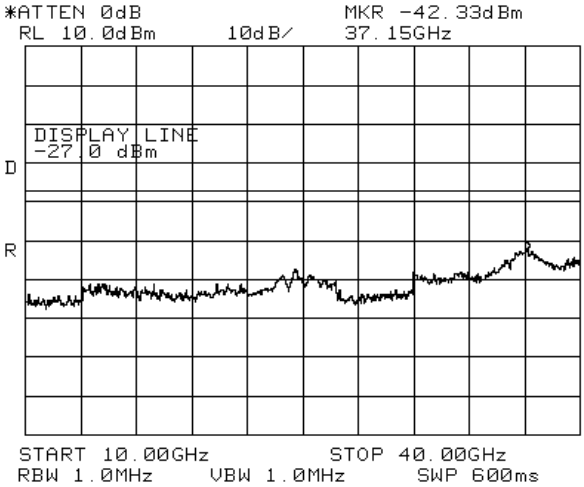

Figure 76 —5200 MHz 64QAM

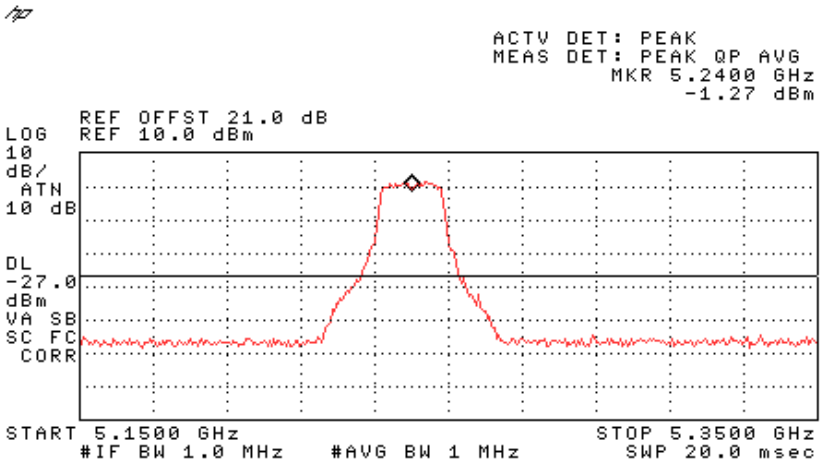

Figure 77 —5240 MHz 64QAM

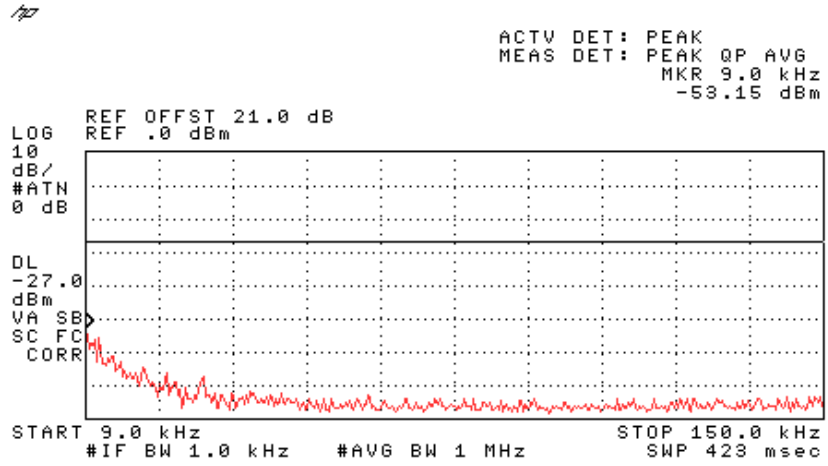

Figure 78 —5240 MHz 64QAM

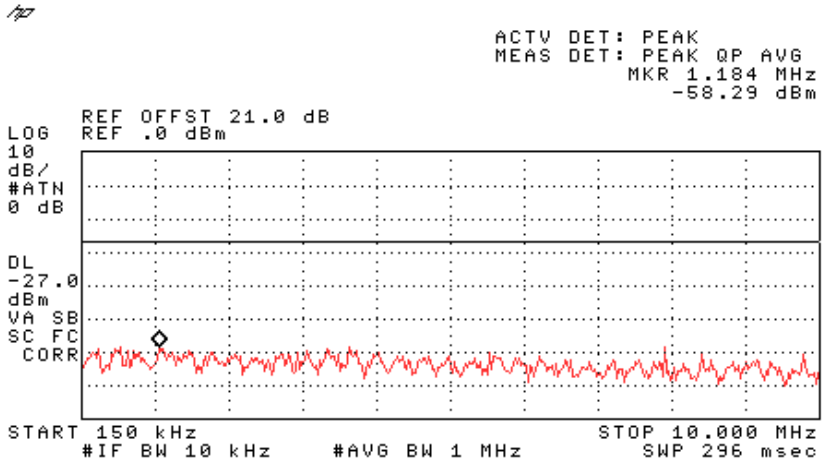

Figure 79 —5240 MHz 64QAM

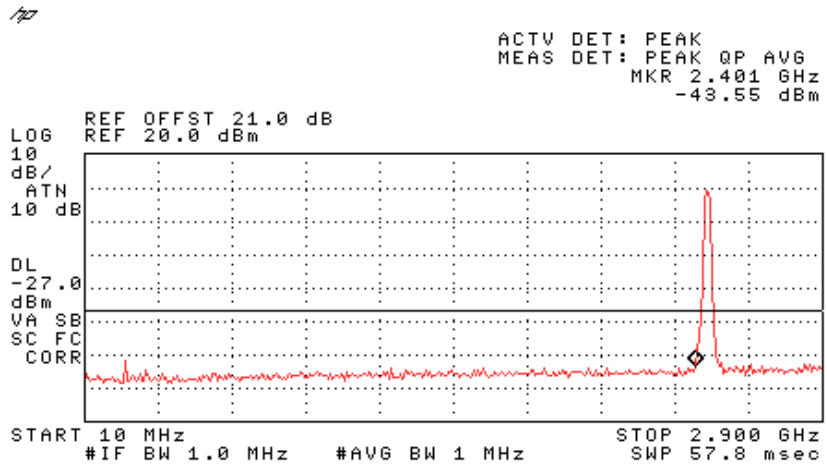

Figure 80 —5200 MHz 64QAM

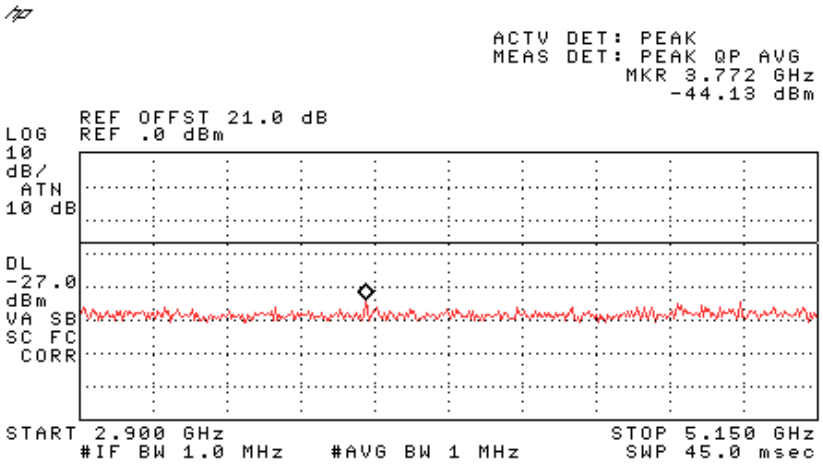

Figure 81 —5200 MHz 64QAM

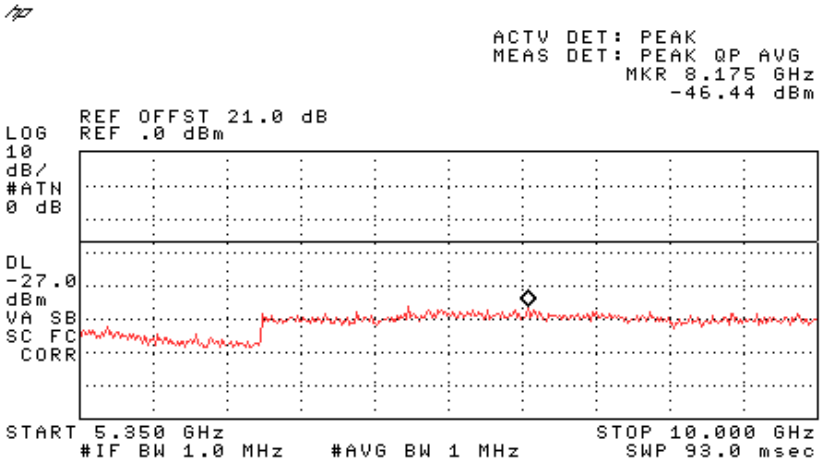

Figure 82 —5200 MHz 64QAM

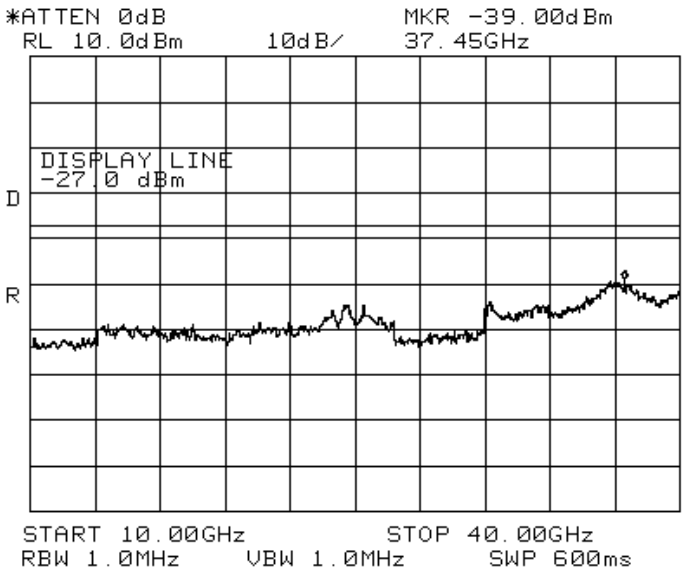

Figure 83 —5240 MHz 64QAM

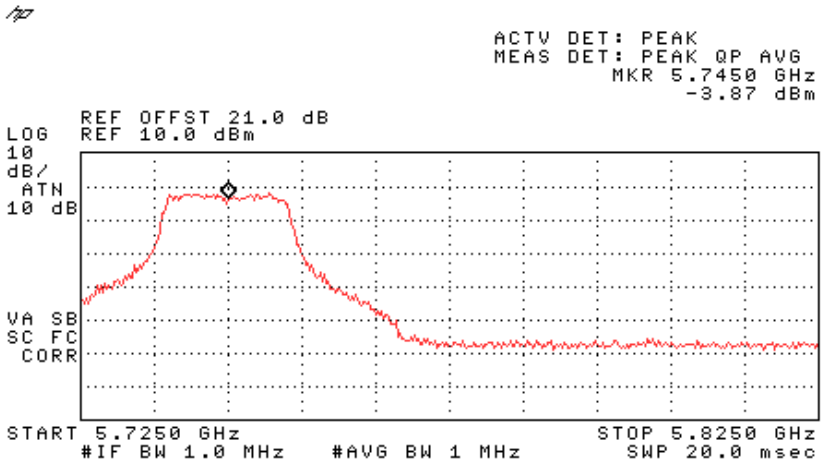

Figure 84 —5745 MHz 64QAM

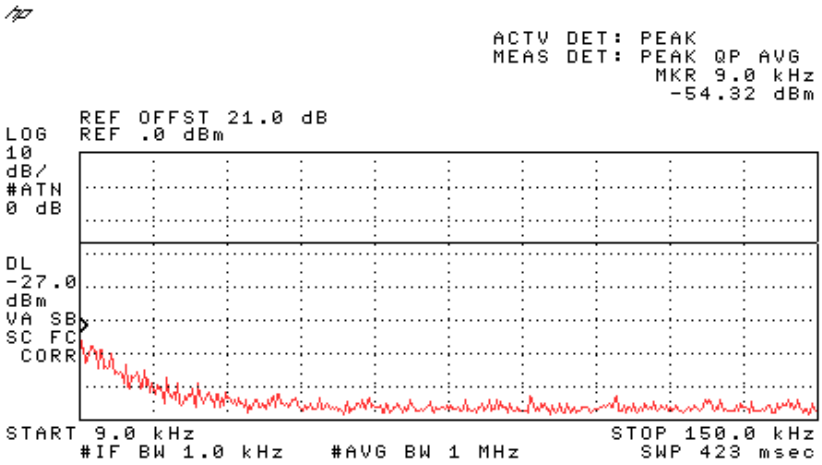

Figure 85 —5745 MHz 64QAM

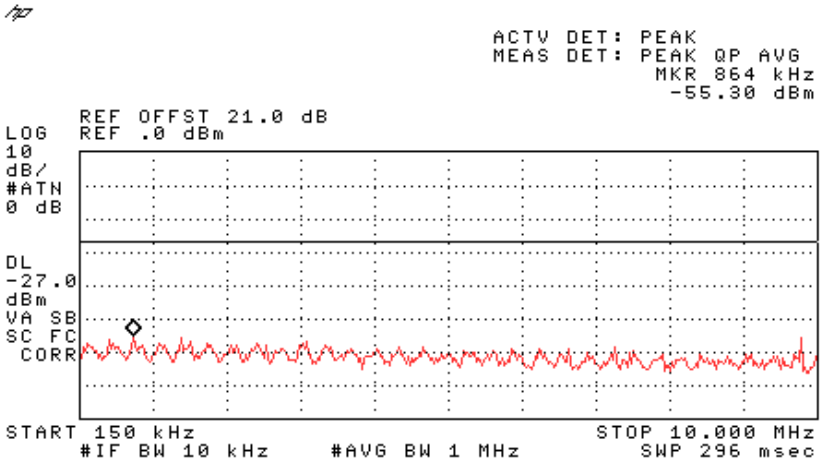

Figure 86 —5745 MHz 64QAM

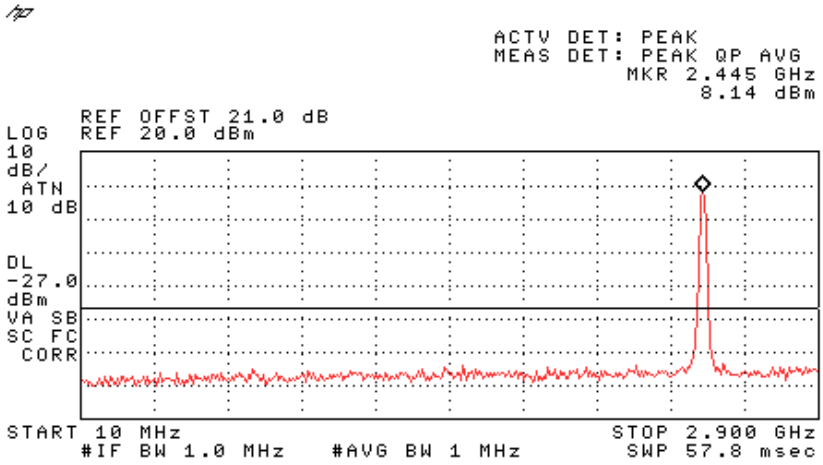

Figure 87 —5745 MHz 64QAM

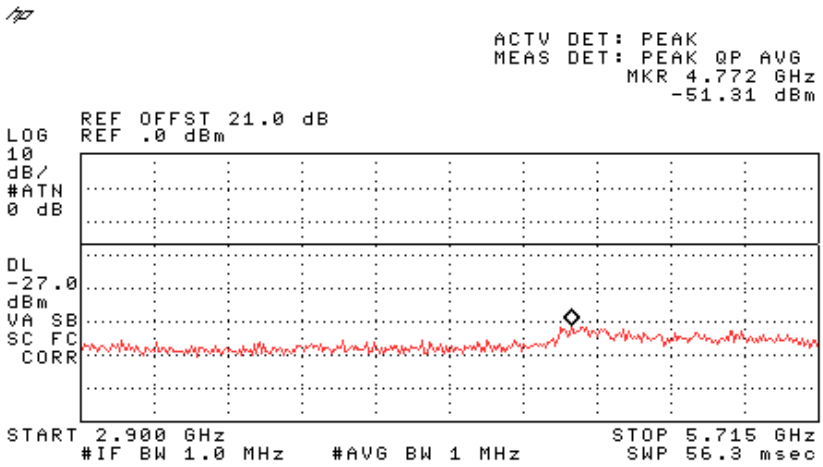

Figure 88 —5745 MHz 64QAM

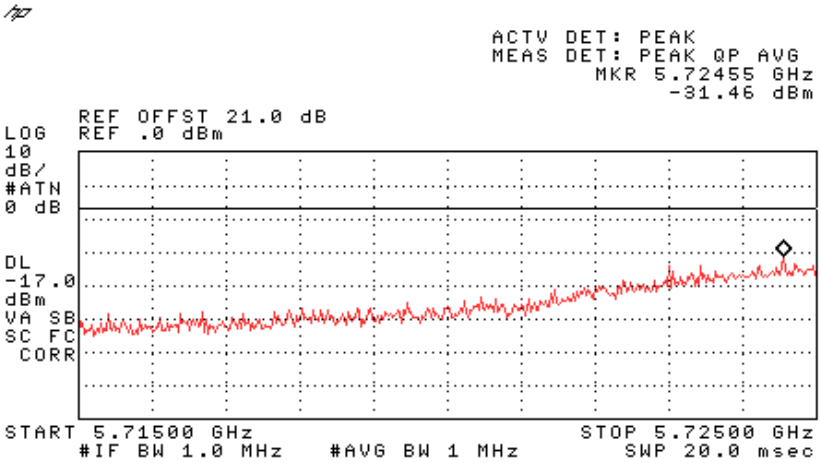

Figure 89 —5745 MHz 64QAM

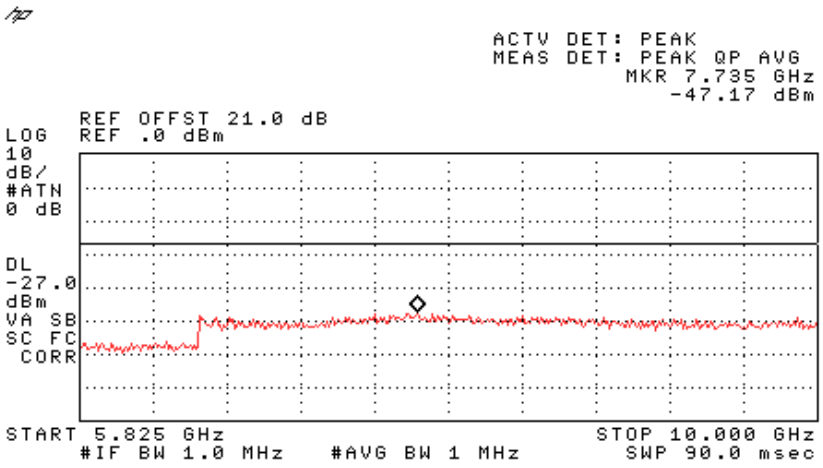

Figure 90 —5745 MHz 64QAM

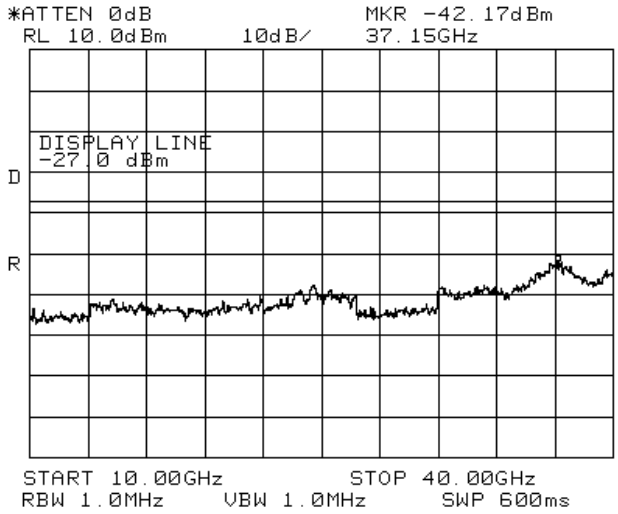

Figure 91 —5745 MHz 64QAM

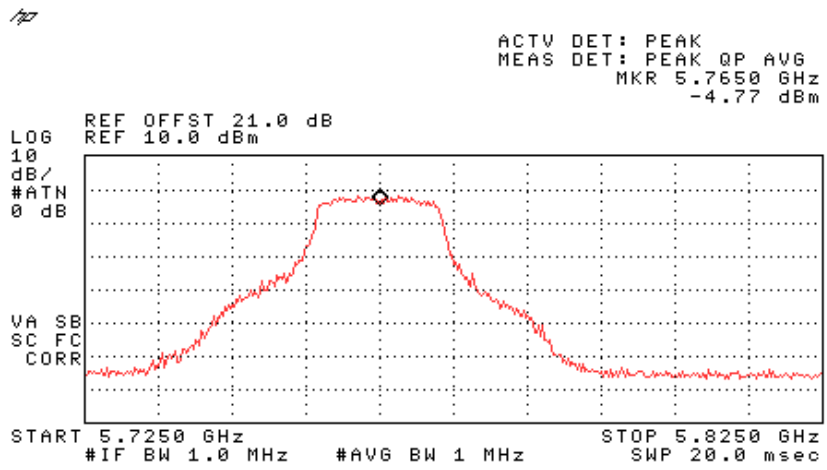

Figure 92 —5765 MHz 64QAM

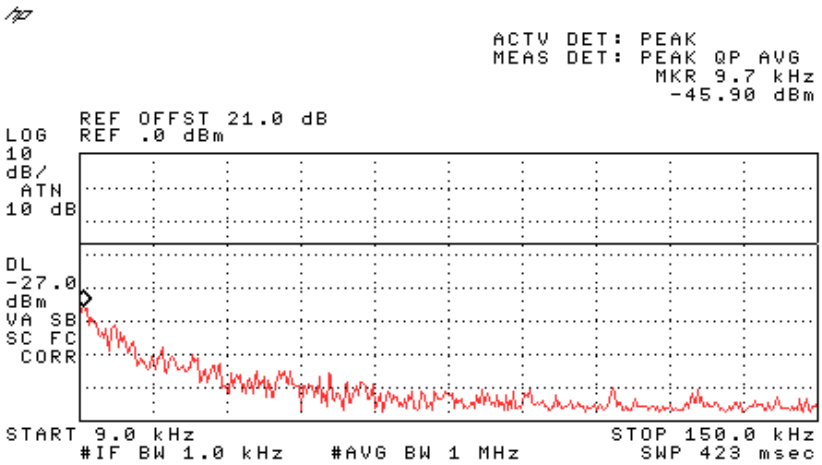

Figure 93 —5765 MHz 64QAM

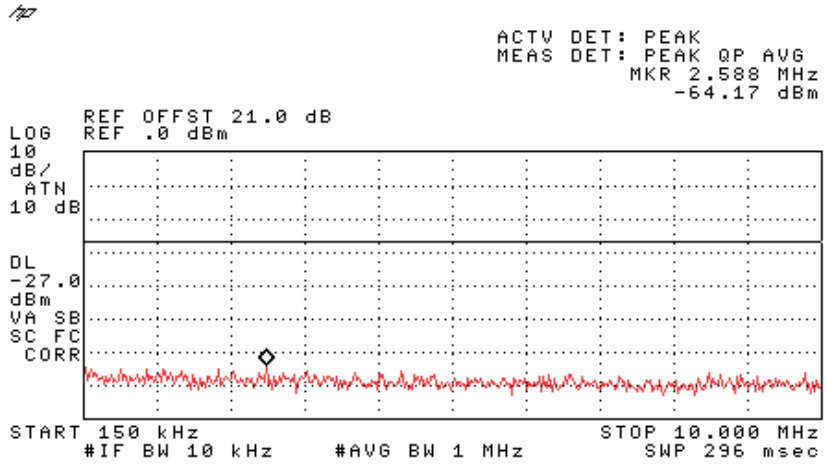

Figure 94 —5765 MHz 64QAM

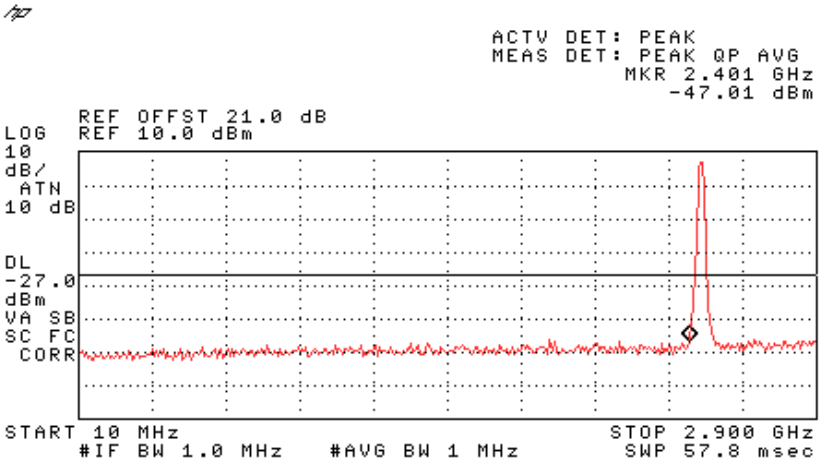

Figure 95 —5765 MHz 64QAM

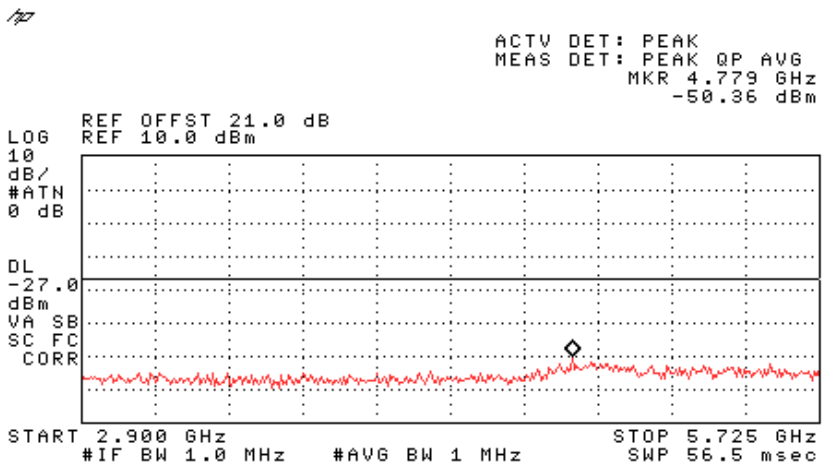

Figure 96 —5765 MHz 64QAM

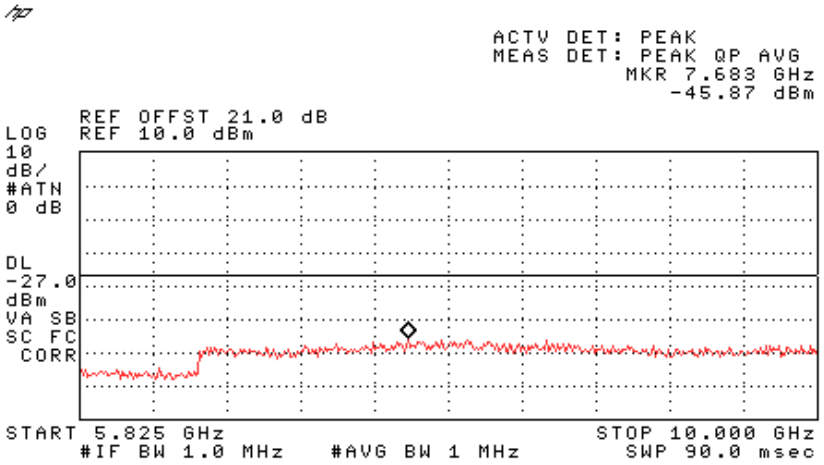

Figure 97 —5765 MHz 64QAM

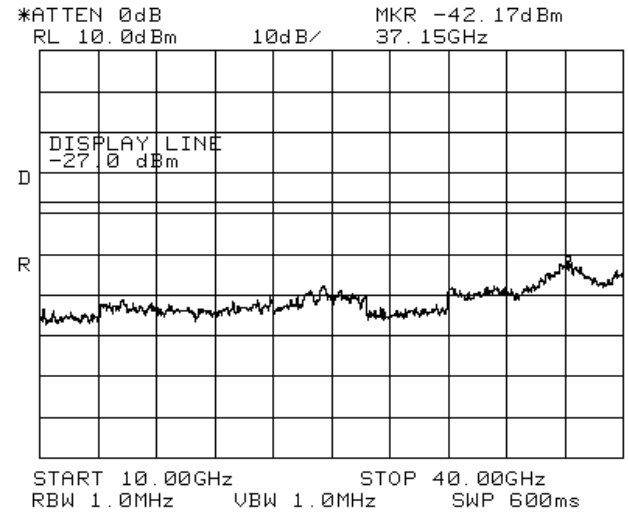

Figure 98 —5765 MHz 64QAM

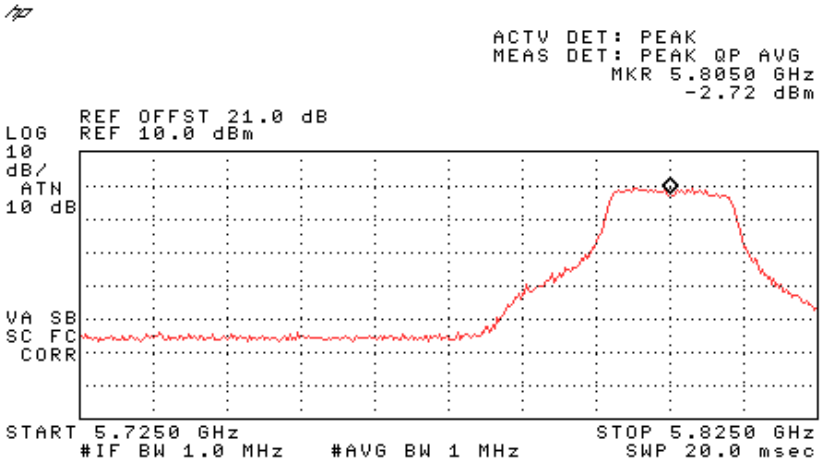

Figure 99 —5805 MHz 64QAM

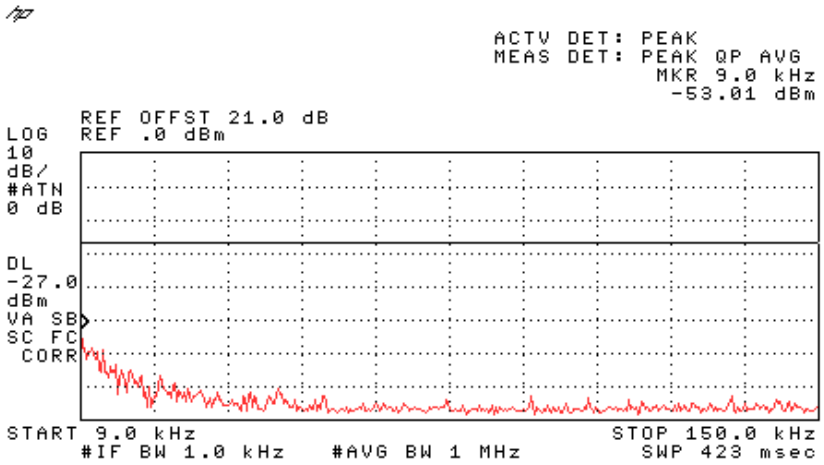

Figure 100 —5805 MHz 64QAM

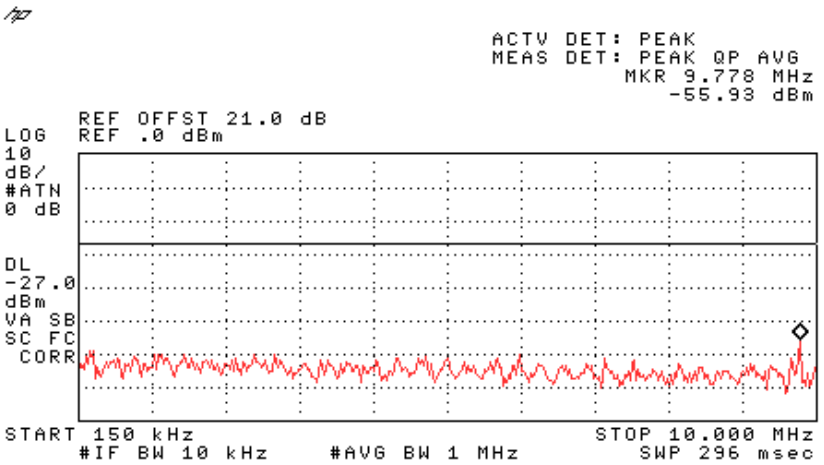

Figure 101 —5805 MHz 64QAM

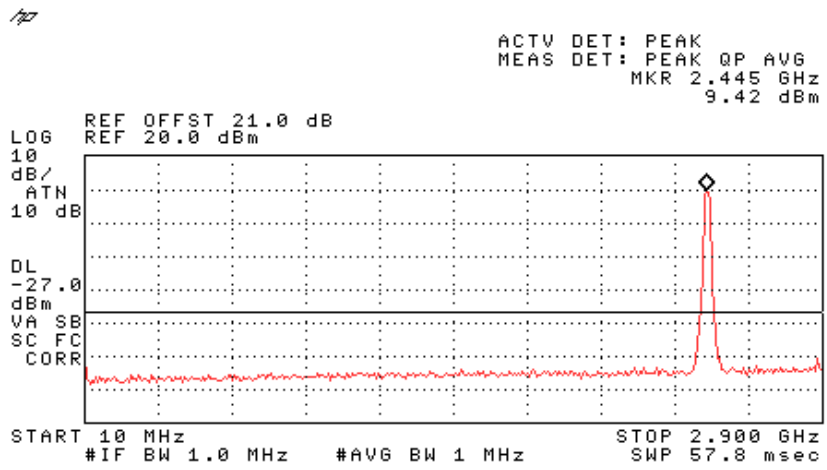

Figure 102 —5805 MHz 64QAM

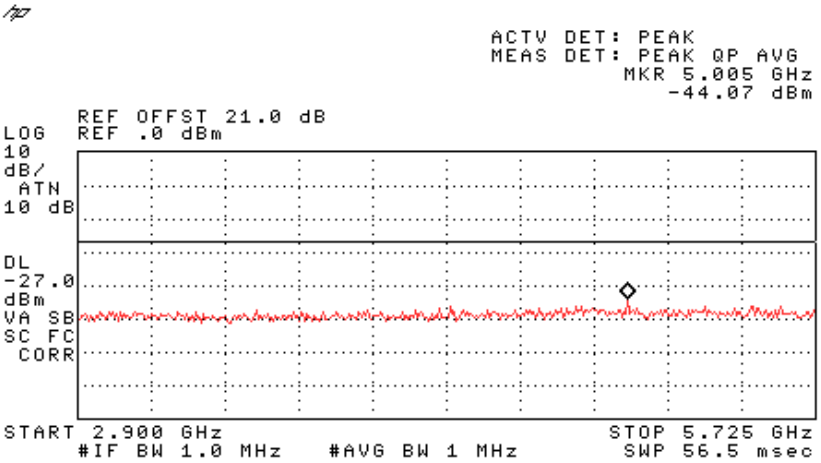

Figure 103 —5805 MHz 64QAM

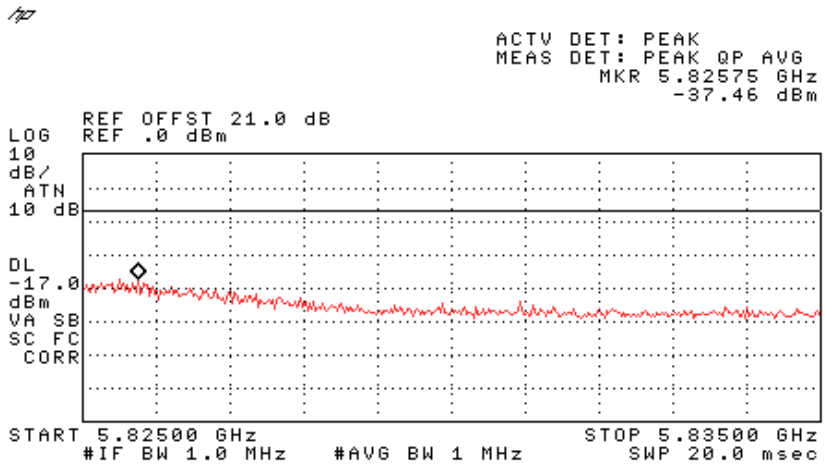

Figure 104 —5805 MHz 64QAM

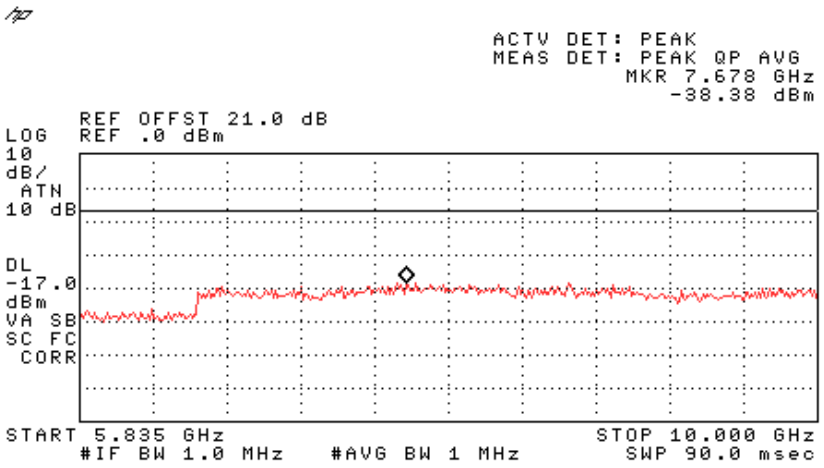

Figure 105 —5805 MHz 64QAM

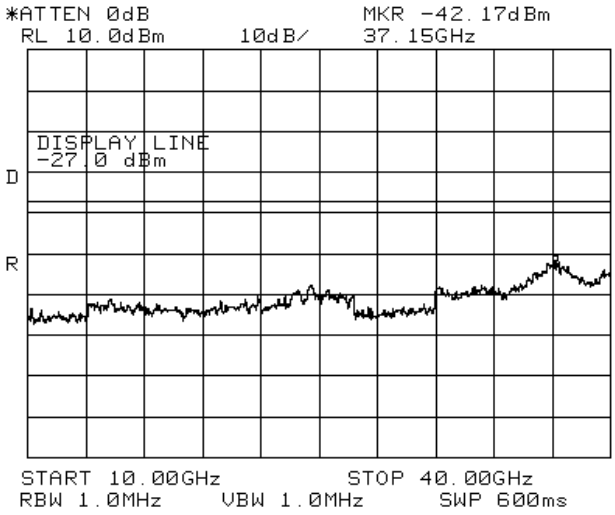

Figure 106 —5805 MHz 64QAM

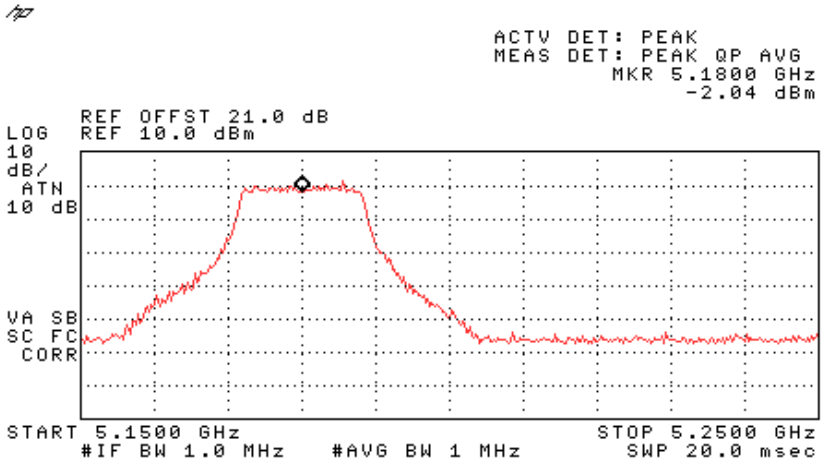

Figure 107 —5180 MHz BPSK

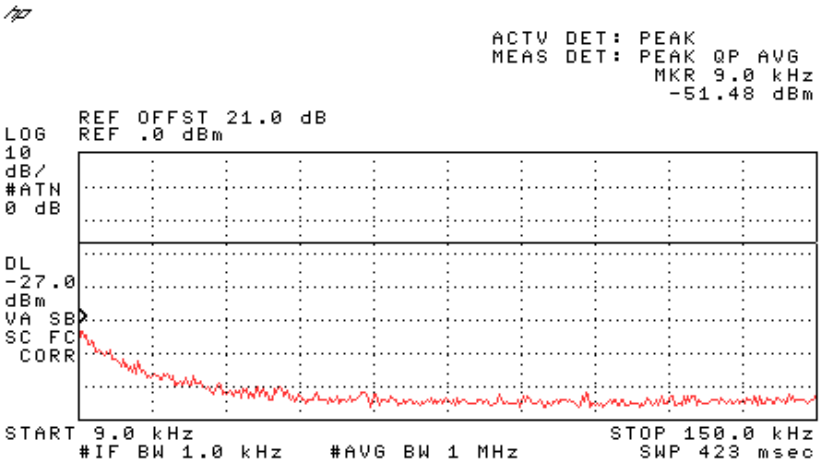

Figure 108 —5180 MHz BPSK

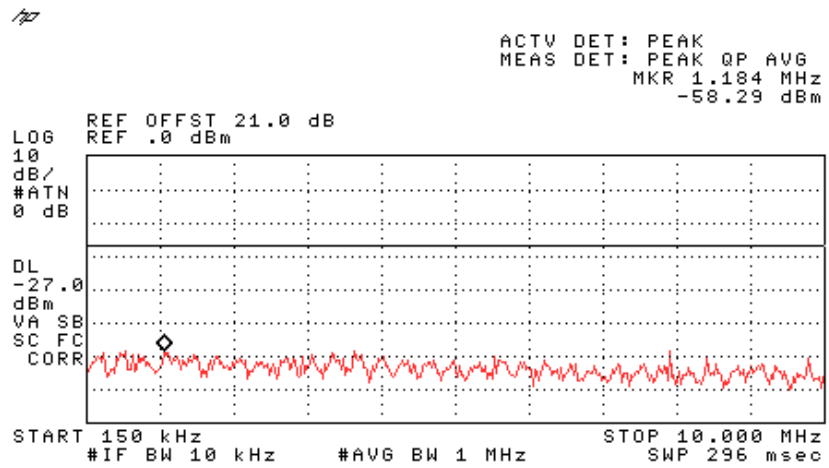

Figure 109 —5180 MHz BPSK

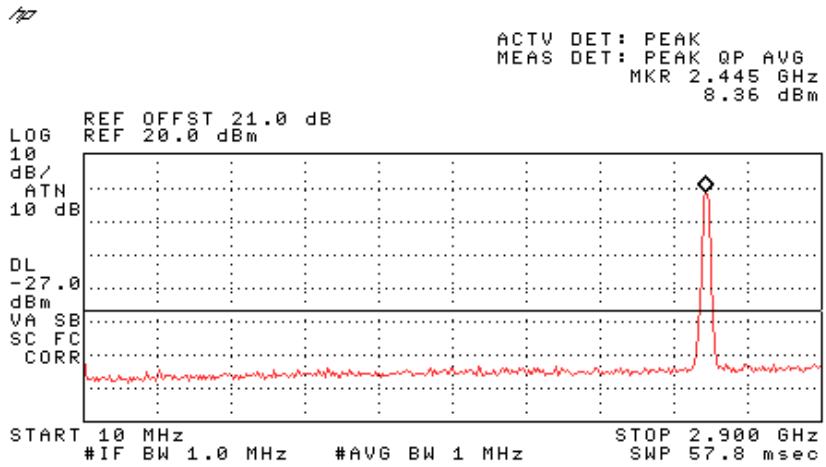

Figure 110 —5180 MHz BPSK

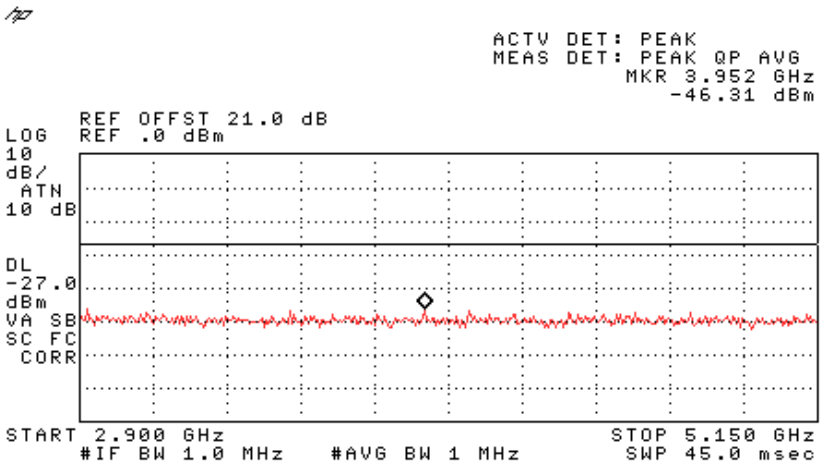

Figure 111 —5180 MHz BPSK

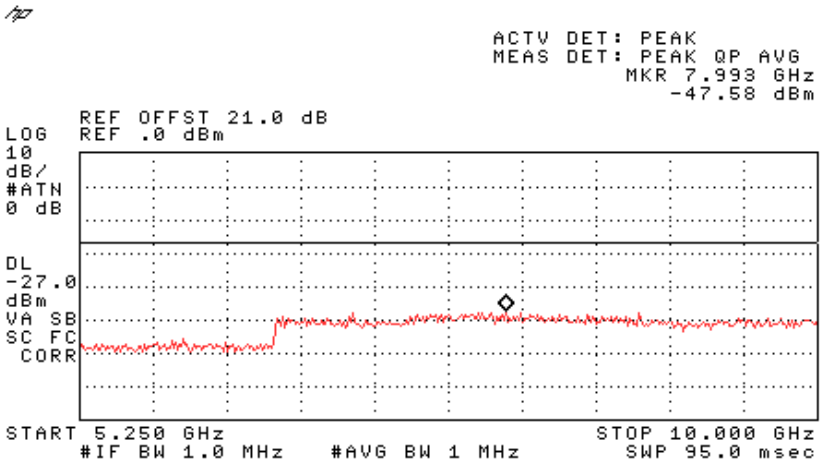

Figure 112 —5180 MHz BPSK

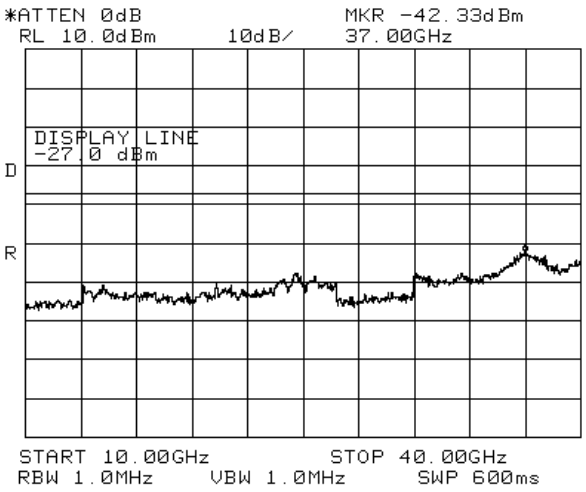

Figure 113 —5180 MHz BPSK

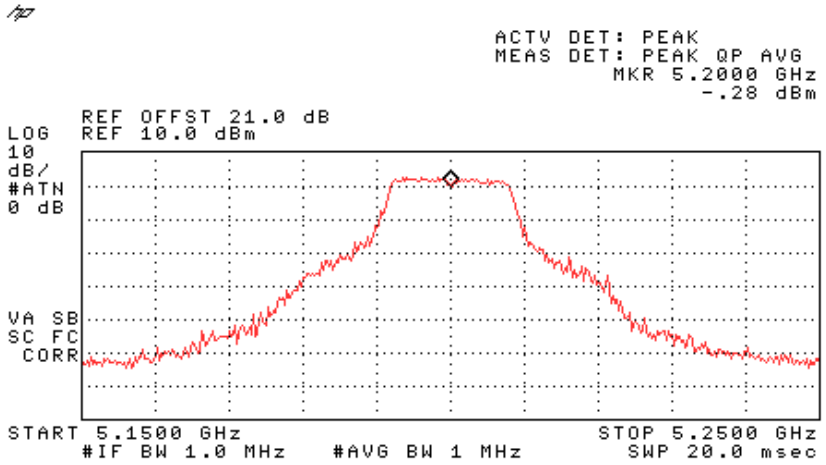

Figure 114 —5200 MHz BPSK

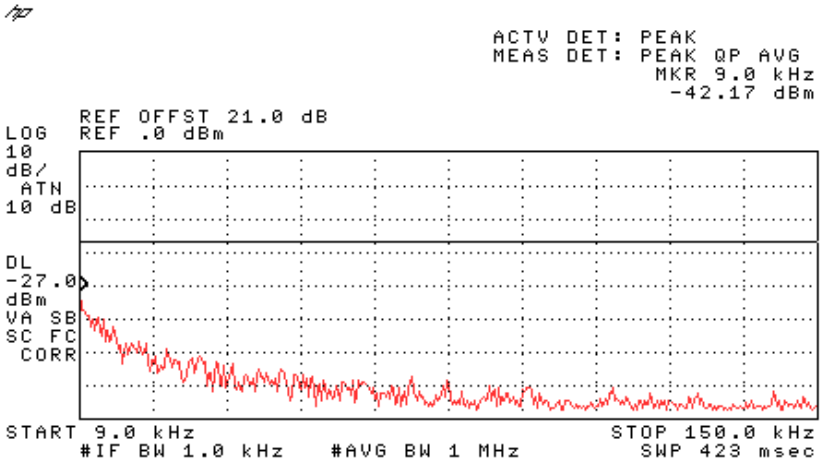

Figure 115 —5200 MHz BPSK

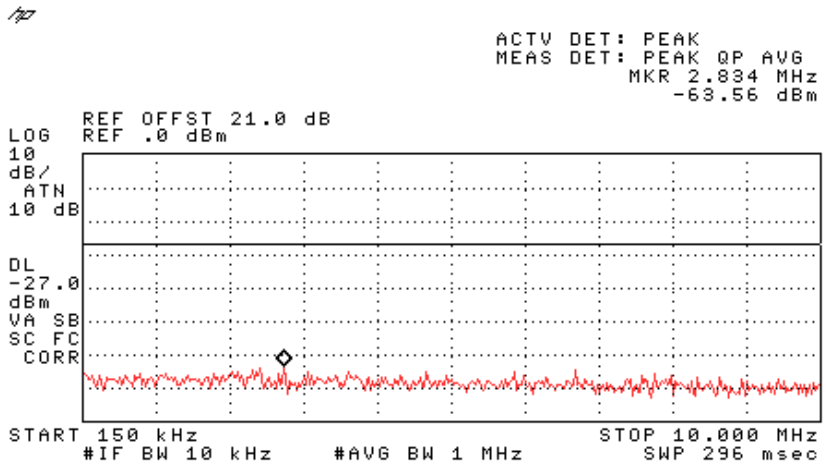

Figure 116 —5200 MHz BPSK

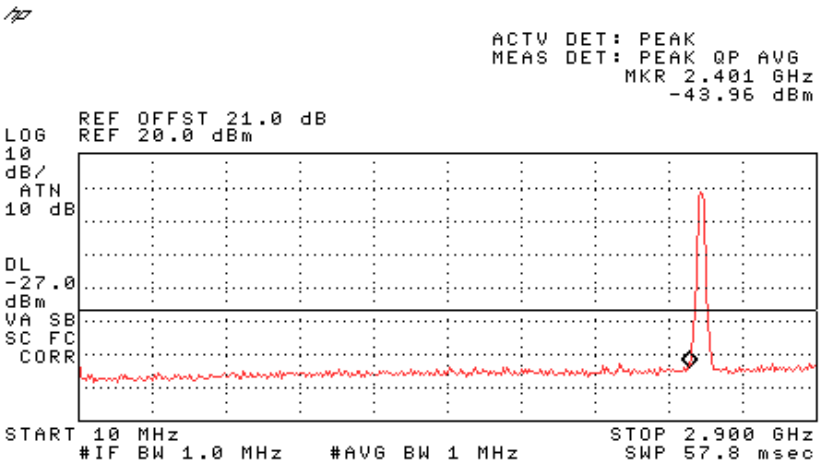

Figure 117 —5200 MHz BPSK

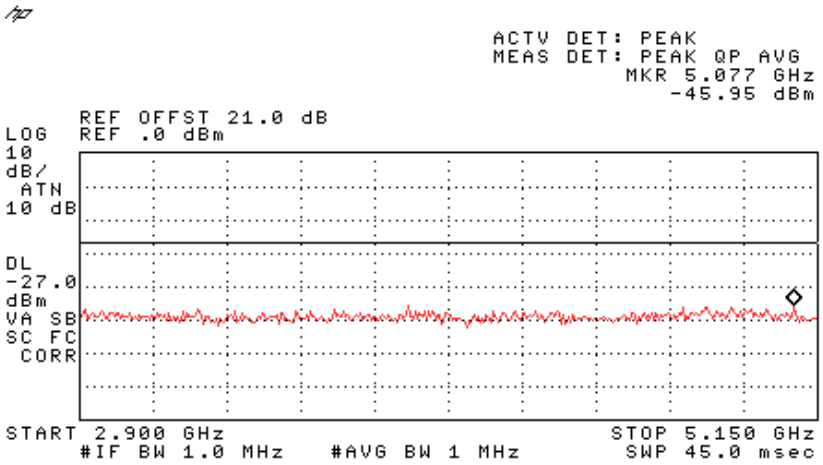

Figure 118 —5200 MHz BPSK

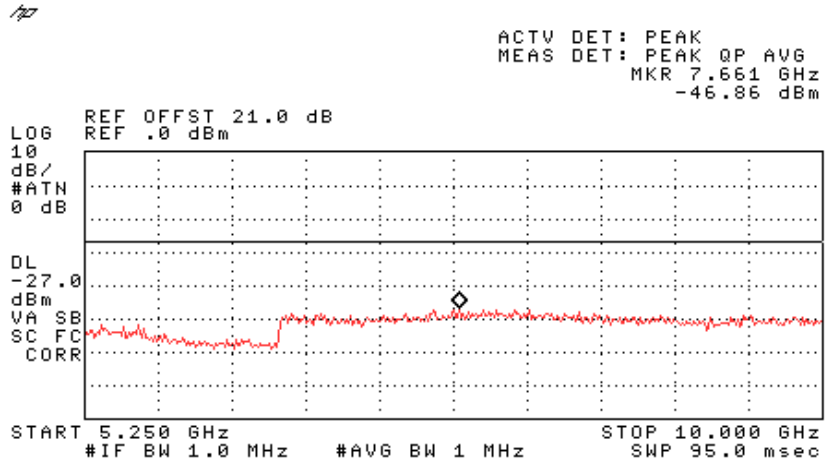

Figure 119 —5200 MHz BPSK

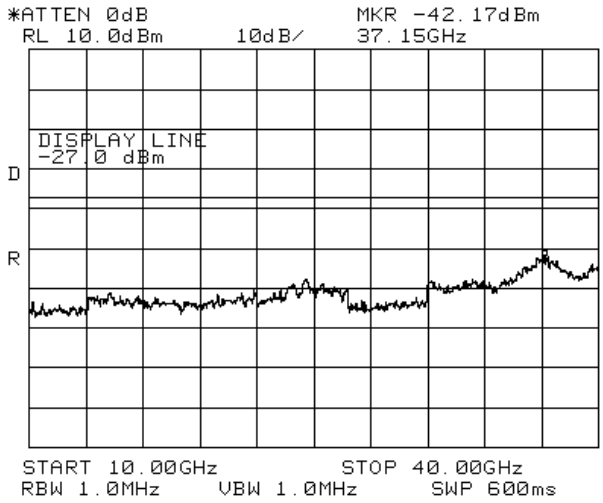

Figure 120 —5200 MHz BPSK

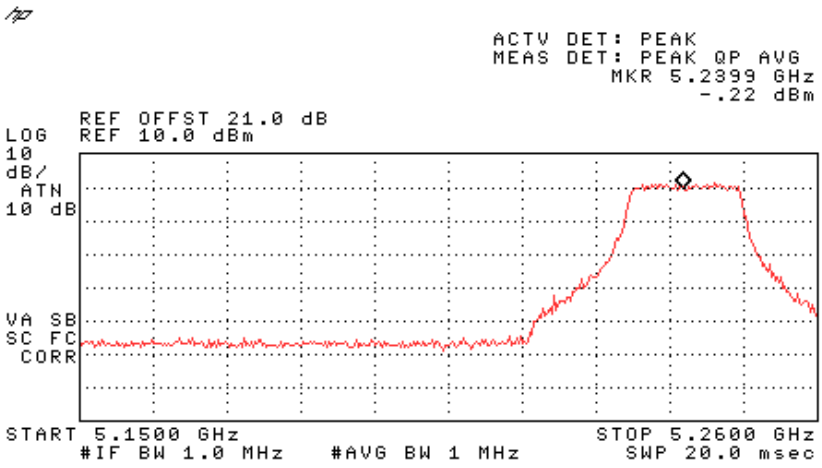

Figure 121 —5240 MHz BPSK

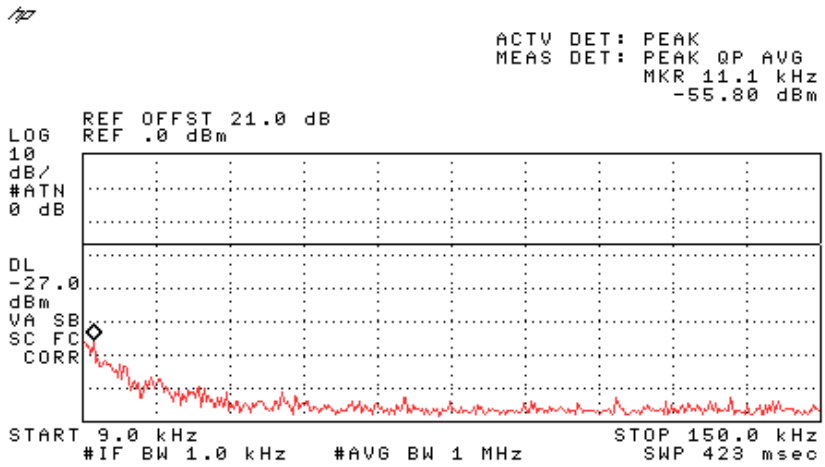

Figure 122 —5240 MHz BPSK

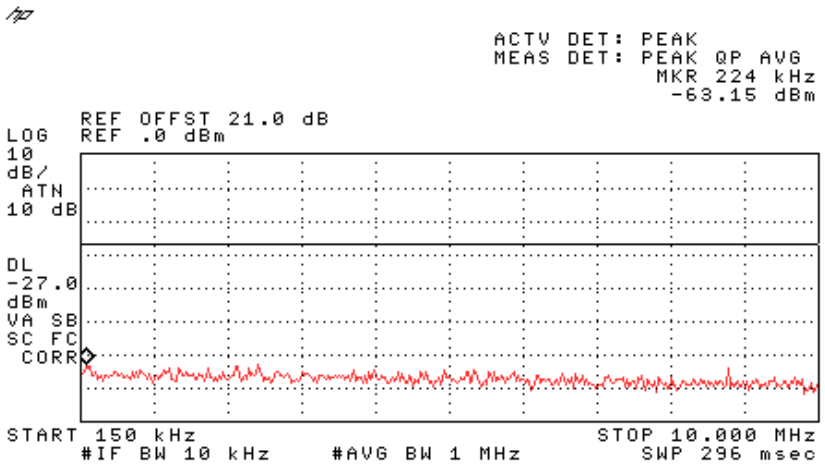

Figure 123 —5240 MHz BPSK

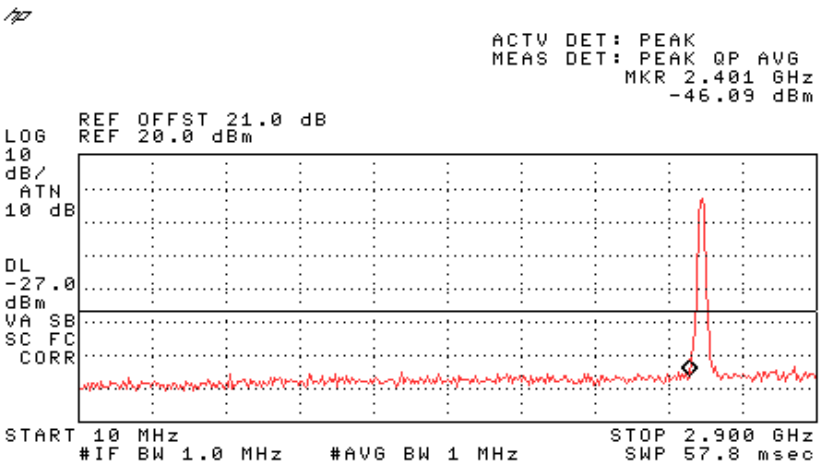

Figure 124 —5240 MHz BPSK

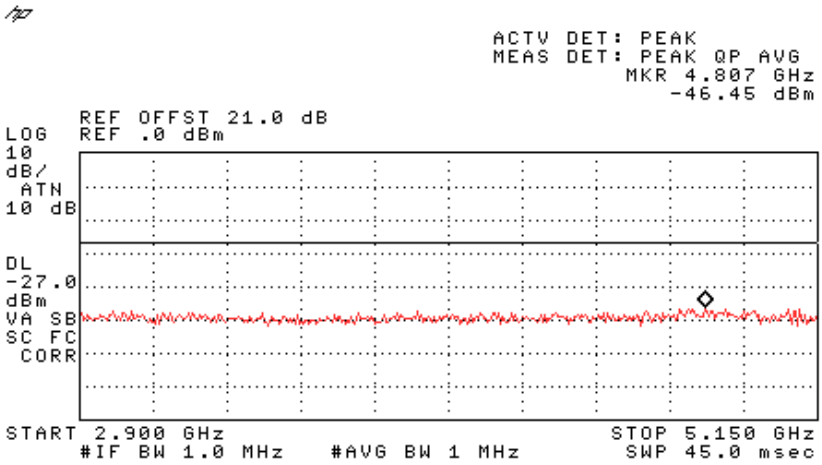

Figure 125 —5240 MHz BPSK

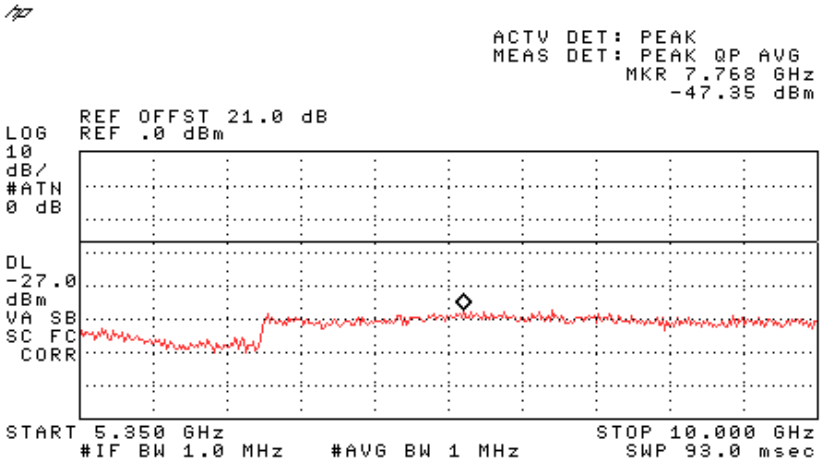

Figure 126 —5240 MHz BPSK

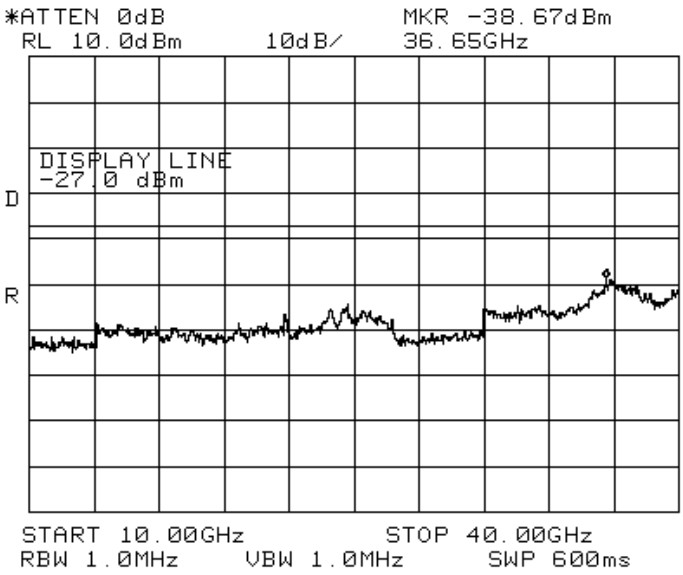

Figure 127 —5240 MHz BPSK

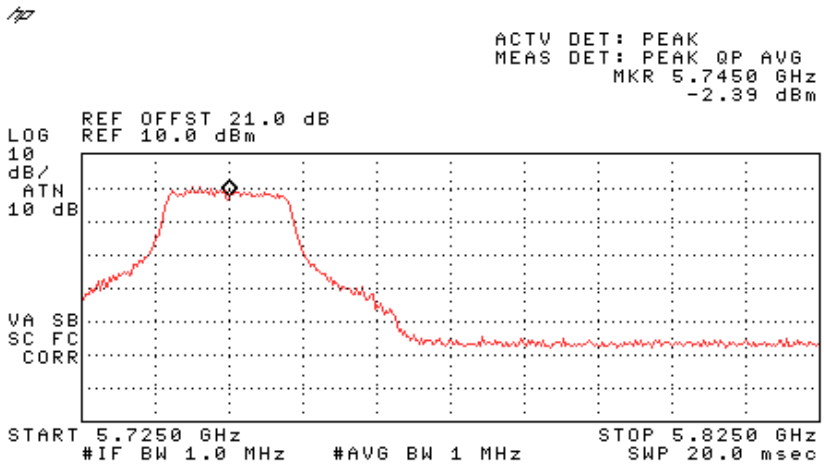

Figure 128 —5745 MHz BPSK

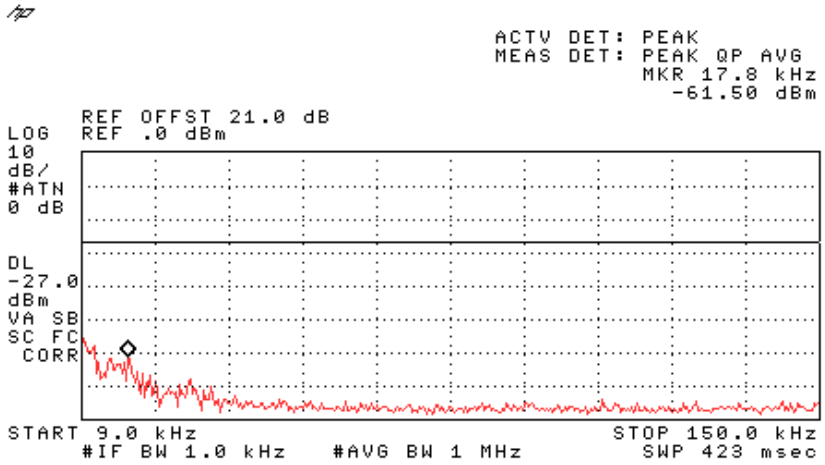

Figure 129 —5745 MHz BPSK

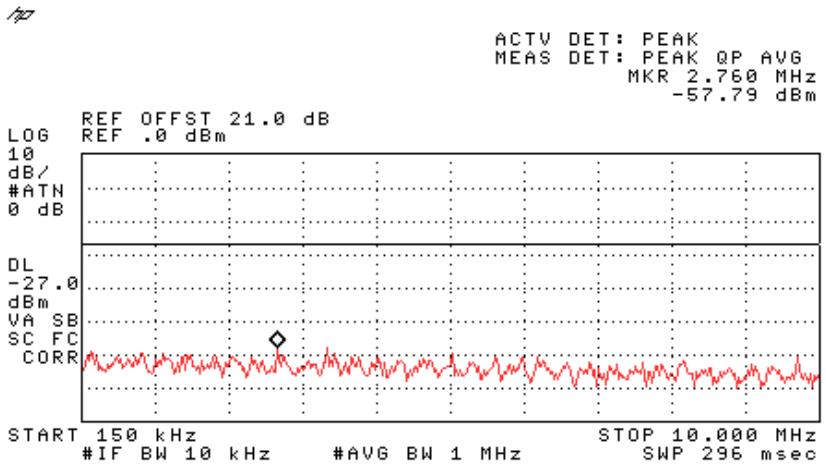

Figure 130 —5745 MHz BPSK

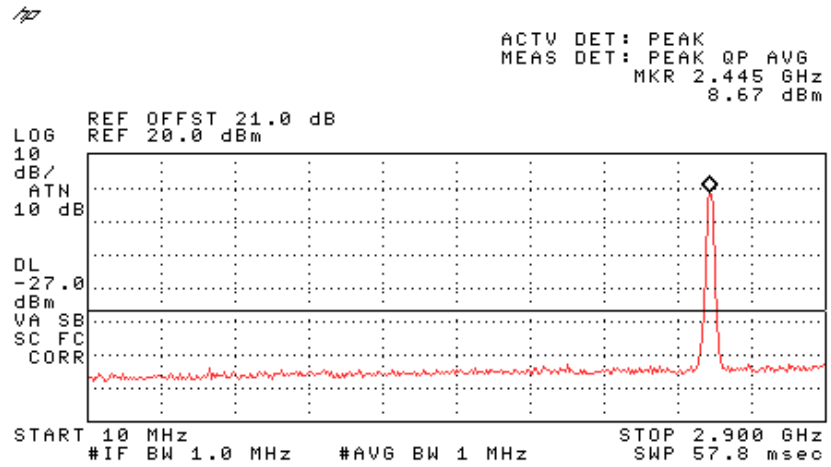

Figure 131 —5745 MHz BPSK

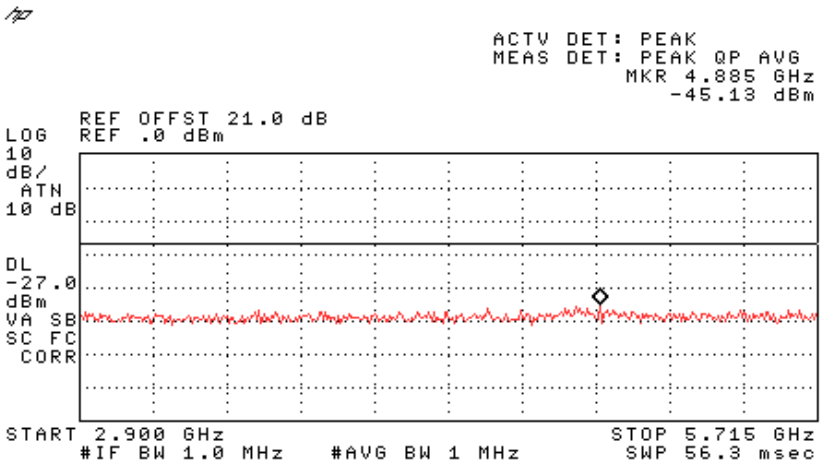

Figure 132 —5745 MHz BPSK

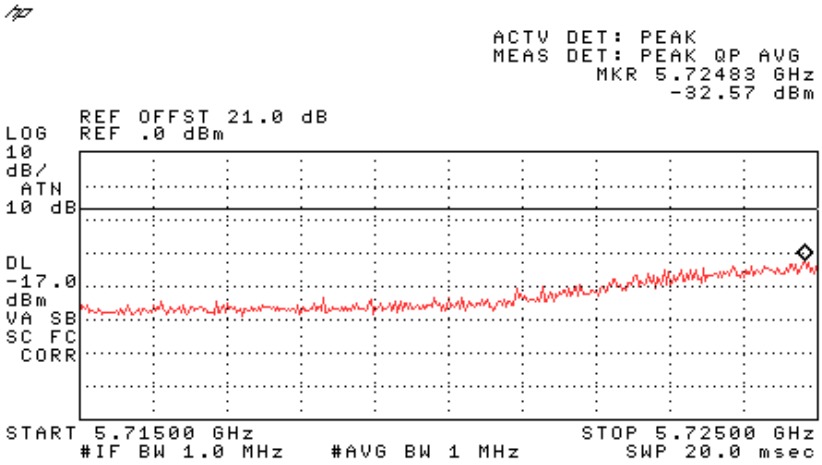

Figure 133 —5745 MHz BPSK

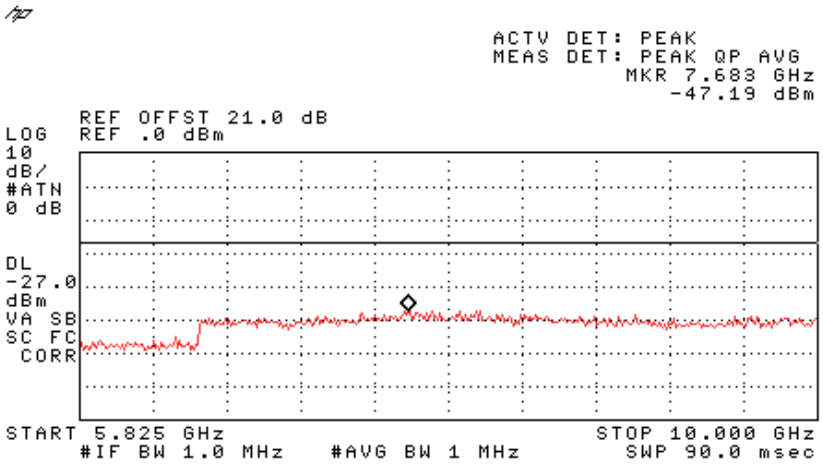

Figure 134 —5745 MHz BPSK

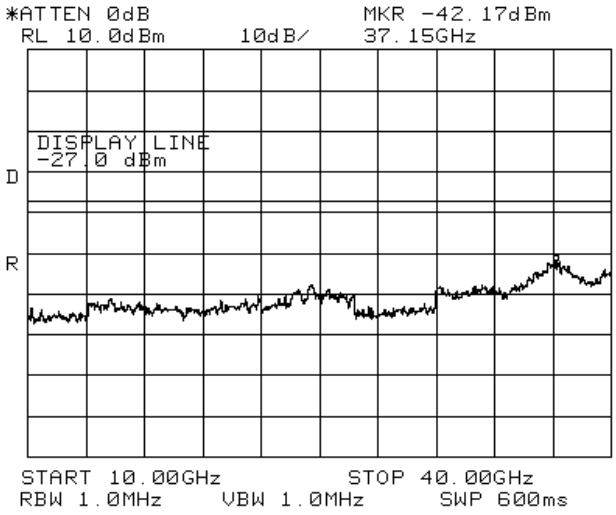

Figure 135 —5745 MHz BPSK

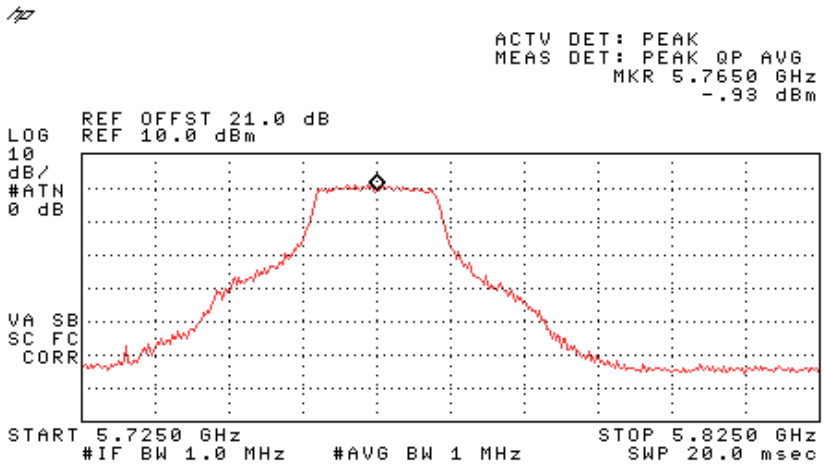

Figure 136 —5765 MHz BPSK

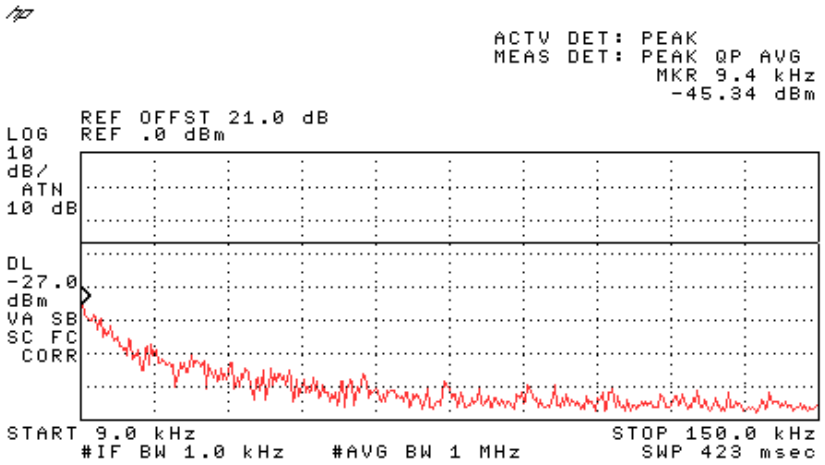

Figure 137 —5765 MHz BPSK

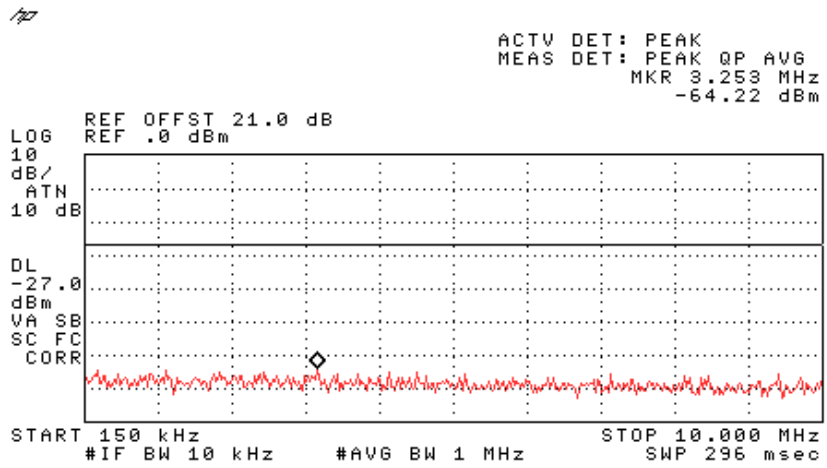

Figure 138 —5765 MHz BPSK

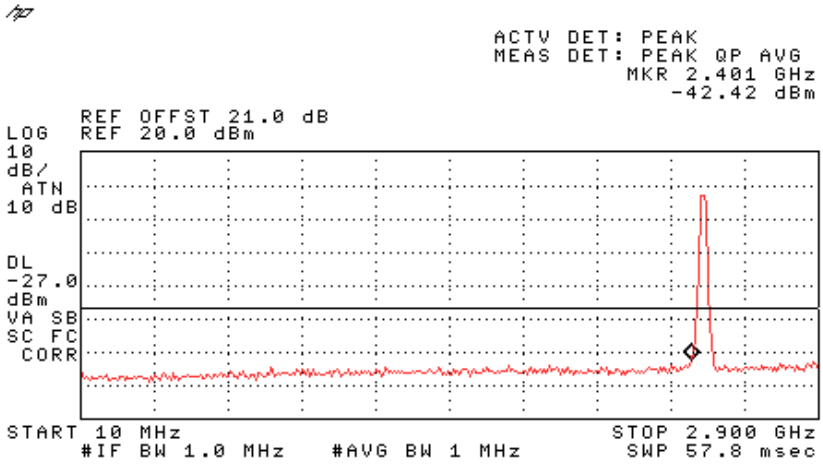

Figure 139 —5765 MHz BPSK

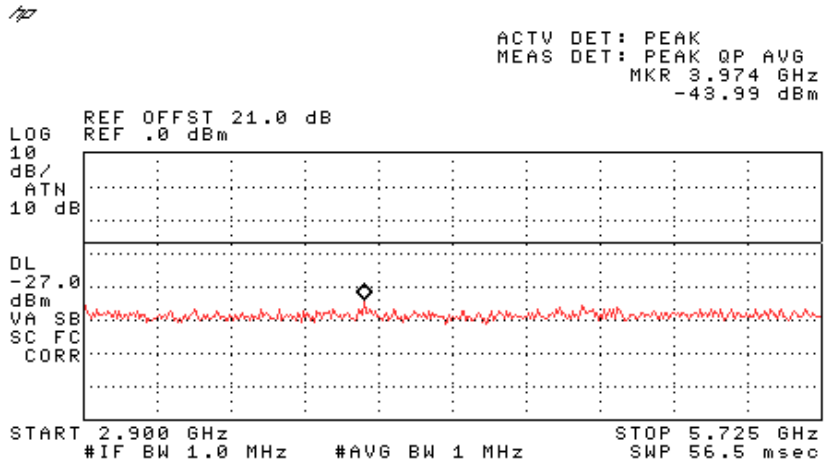

Figure 140 —5765 MHz BPSK

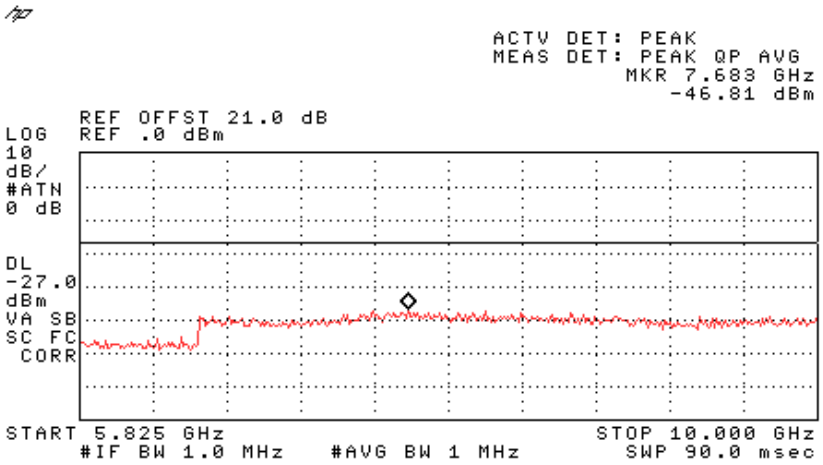

Figure 141 —5765 MHz BPSK

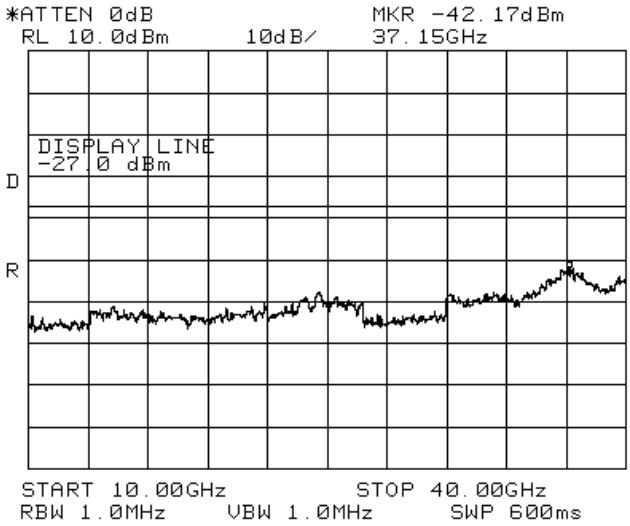

Figure 142 —5765 MHz BPSK

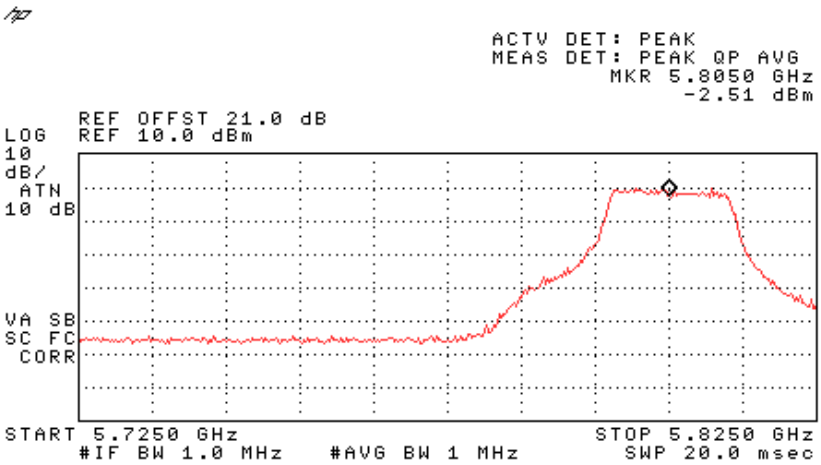

Figure 143 —5805 MHz BPSK

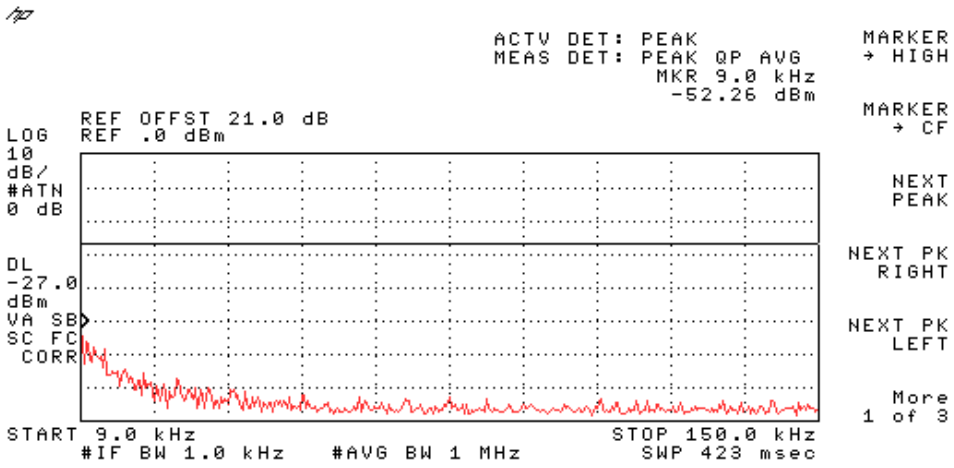

Figure 144 —5805 MHz BPSK

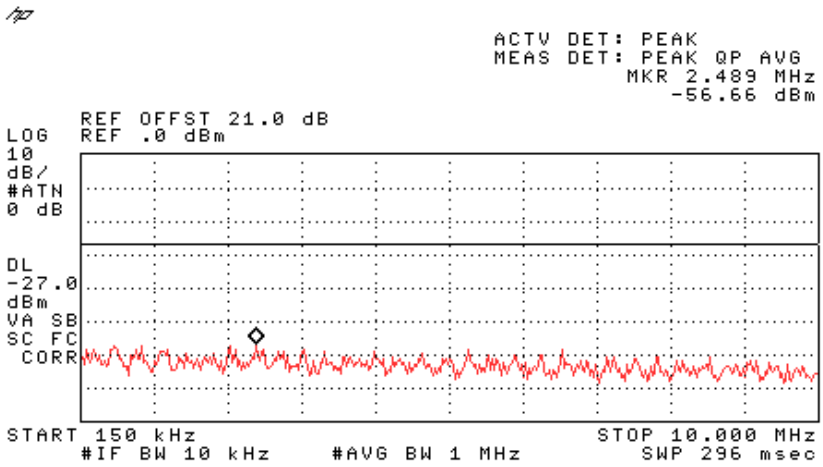

Figure 145 —5805 MHz BPSK

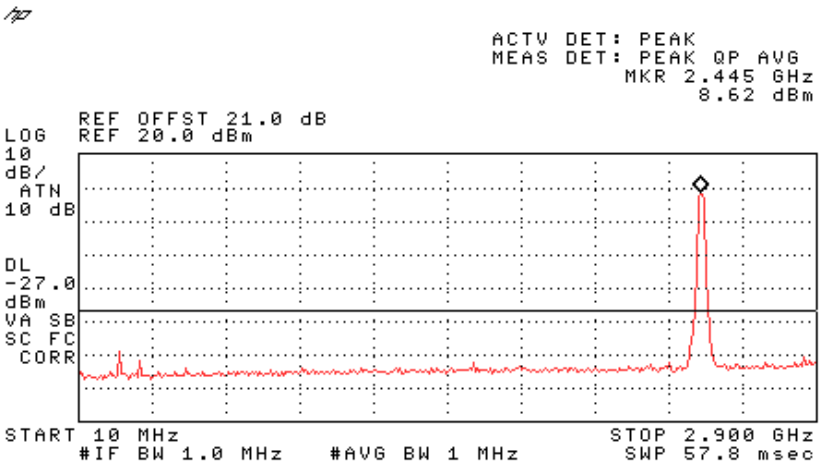

Figure 146 —5805 MHz BPSK

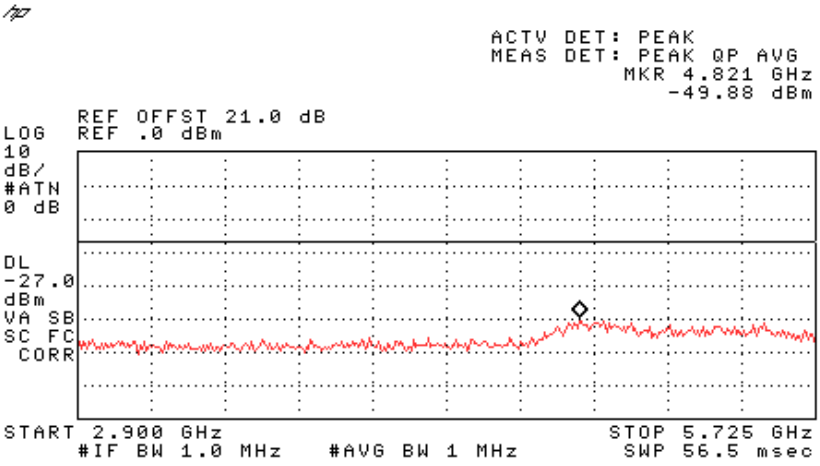

Figure 147 —5805 MHz BPSK

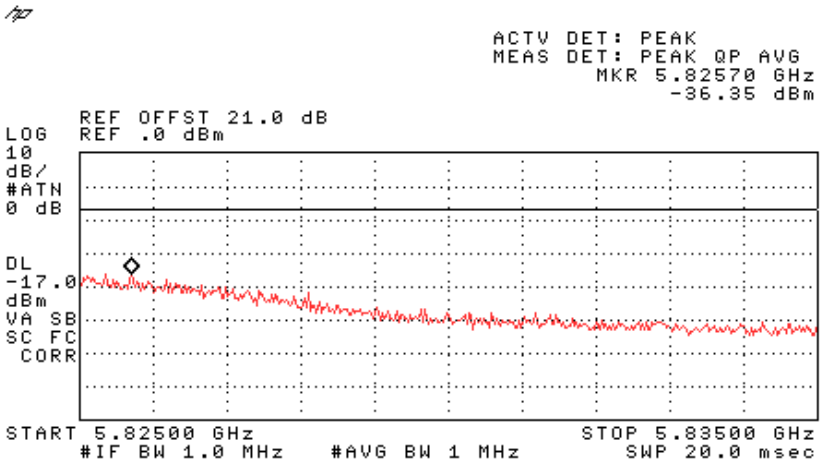

Figure 148 —5805 MHz BPSK

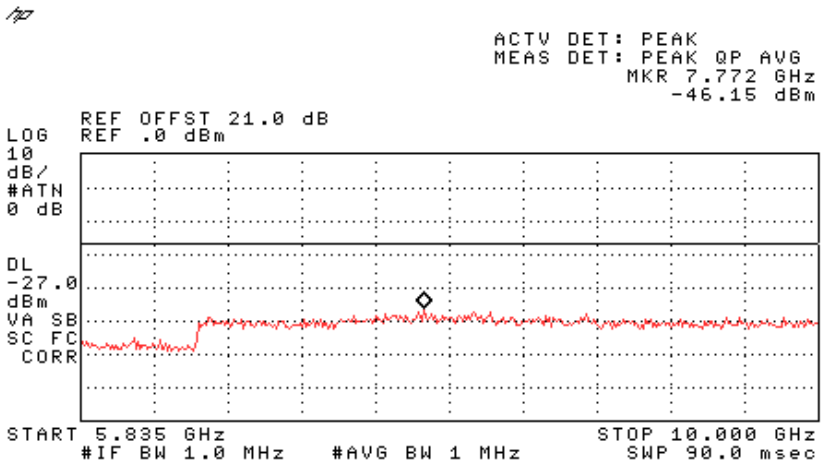

Figure 149 —5805 MHz BPSK

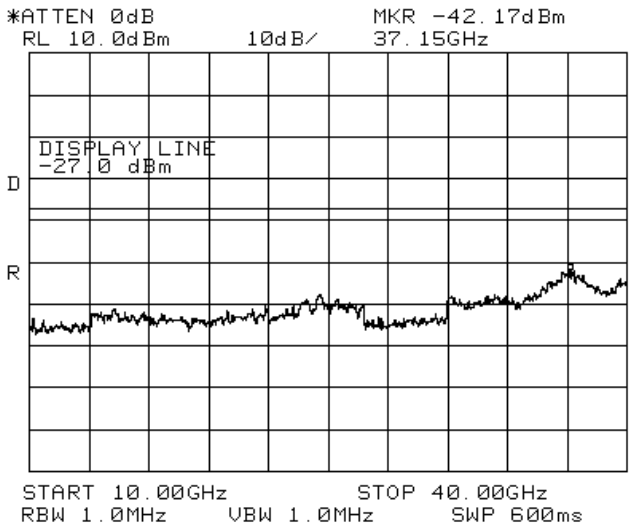

Figure 150 —5805 MHz BPSK

10.2 Results table

E.U.T Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart E

Operation Frequency (MHz)	Modulation	Reading (dBm)	Specification (dBm)	Margin (dB)
5180	64QAM	-41.83	-27.0	-14.83
	BPSK	-42.33	-27.0	-15.33
5200	64QAM	-40.21	-27.0	-13.21
	BPSK	-42.17	-27.0	-15.17
5240	64QAM	-39.00	-27.0	-12.00
	BPSK	-38.67	-27.0	-11.67
5745	64QAM	-42.17	-27.0	-15.17
	BPSK	-42.17	-27.0	-15.17
5765	64QAM	-42.17	-27.0	-15.17
	BPSK	-42.17	-27.0	-15.17
5805	64QAM	-42.17	-27.0	-15.17
	BPSK	-42.17	-27.0	-15.17

Figure 151 Peak Power Output of 5150-5250; 5725-5825 MHz Bands

JUDGEMENT: Passed by 11.67 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 09.03.08
Typed/Printed Name: E. Pitt

10.3 Test Equipment Used.

Peak Power Output of 5150-5825 MHz Band

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Spectrum Analyzer	HP	8564E	3442A00275	November 14, 2007	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 152 Test Equipment Used

11. Band Edge Spectrum 5GHz Transmitter 802.11b/g+802.11a Signals

[In Accordance with section 15.407)

11.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (cable loss = 1 dB). The spectrum analyzer was set to 1 MHz resolution BW. Maximum power level below 5150 MHz and above 5350 MHz was measured at 5180 MHz and 5240MHz correspondingly. Maximum power level below 5725 MHz and above 5825 MHz was measured at 5745 MHz and 5805 MHz correspondingly.

The E.U.T. was tested at 5180, 5240, 5745, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

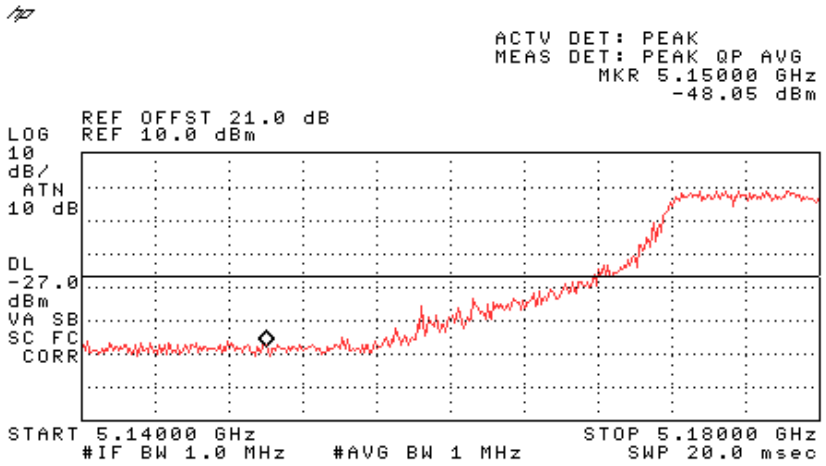

Figure 153 —5180 MHz 64QAM

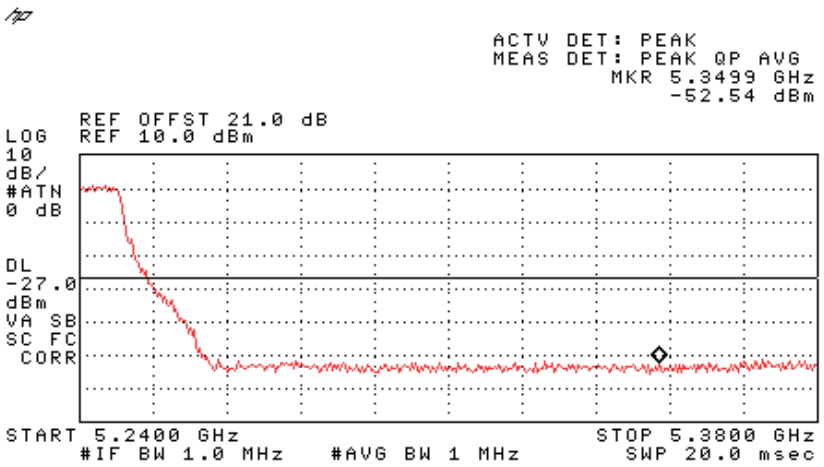

Figure 154 —5240 MHz 64QAM

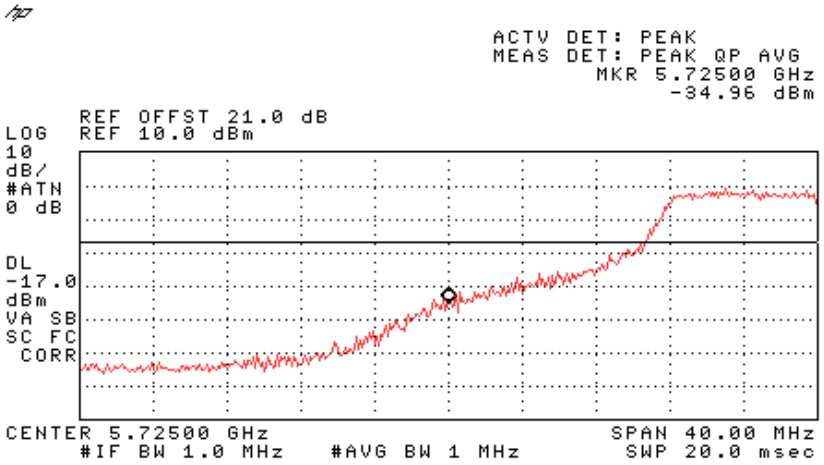

Figure 155 —5745 MHz 64QAM

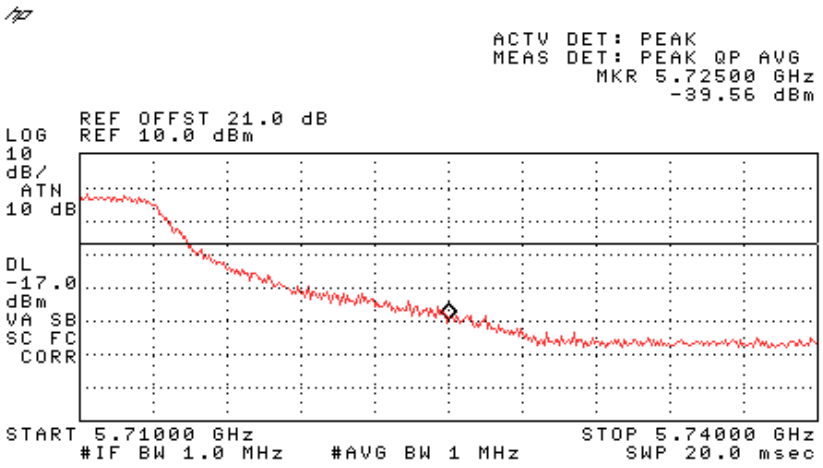

Figure 156 —5805 MHz 64QAM

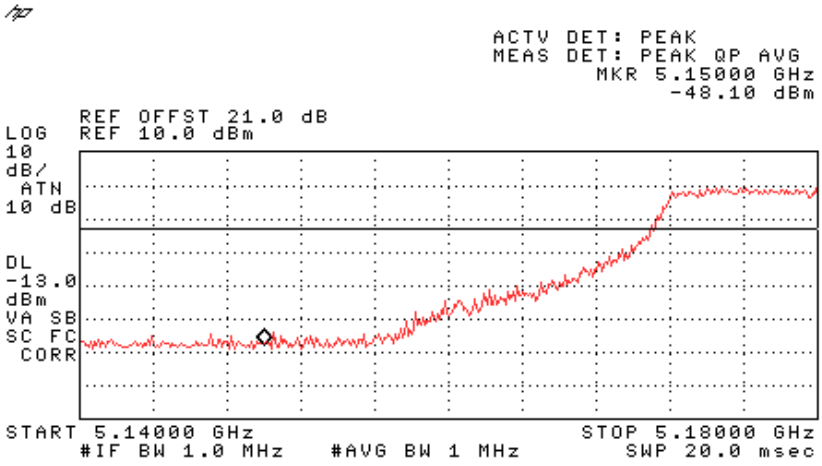

Figure 157 —5180 MHz BPSK

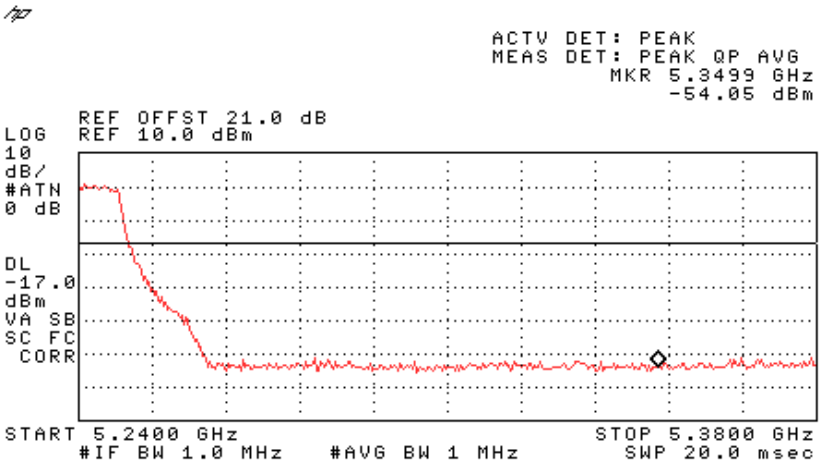

Figure 158 —5240 MHz BPSK

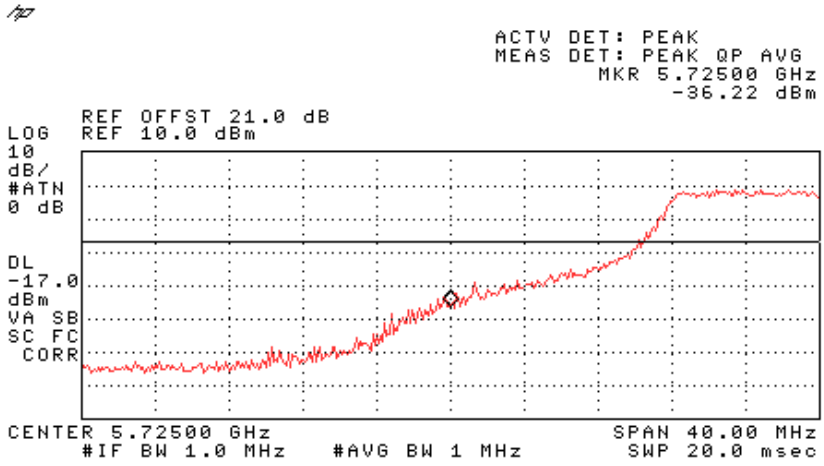

Figure 159 —5745 MHz BPSK

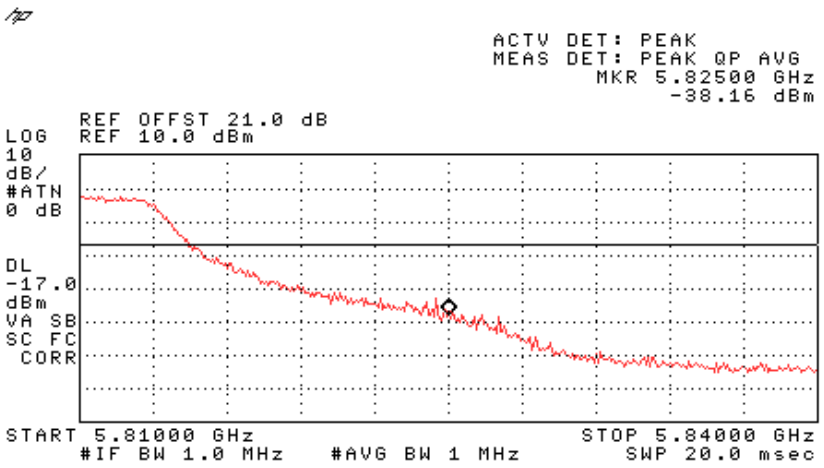

Figure 160 —5805 MHz BPSK

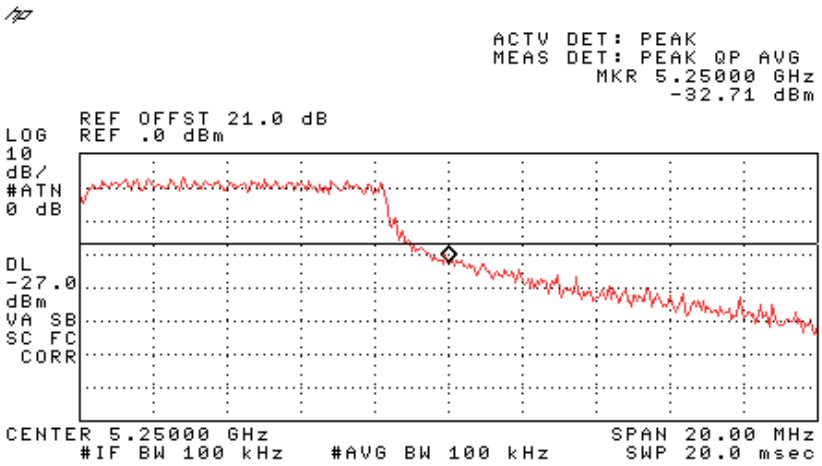

Figure 161 —Band Edge at 5.25 GHz Operation at 5.24 GHz 64QAM (Section 15.215(c))

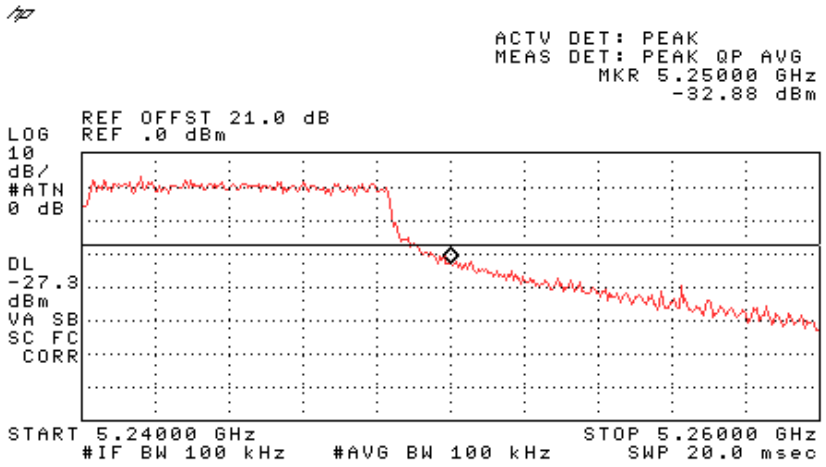

Figure 162 —Band Edge at 5.25 GHz Operation at 5.24 GHz BPSK (Section 15.215(c))

11.2 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart C (15.215(c))

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Result (dBc)	Specification (dBc)	Margin (dB)
5240	64QAM	5250	32.71	20.0	-12.71
	BPSK	5250	32.88	20.0	-12.88

Figure 163 Band Edge at 5.25 GHz operation at 5.24 GHz

JUDGEMENT: Passed by 12.71 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

11.3 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart C (15.407)

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Result (dBm)	Specification (dBm)	Margin (dB)
5180	64QAM	5150	-48.05	-27.0	-21.05
	BPSK	5150	-48.10	-13.0	-35.10
5240	64QAM	5350	-52.54	-27.0	-25.54
	BPSK	5350	-54.05	-17.0	-37.05
5725	64QAM	5725	-34.96	-17.0	-17.96
	BPSK	5725	-36.22	-17.0	-19.22
5825	64QAM	5725	-39.56	-17.0	-22.56
	BPSK	5825	-38.16	-17.0	-21.16

Figure 164 Band Edge Spectrum

JUDGEMENT: Passed by 17.96 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

11.4 Test Equipment Used.

Band edge Spectrum

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 165 Test Equipment Used

12. Antenna Gain 5GHz Transmitter 802.11b/g+802.11a Signals

The antenna gain is 7 dBi.

13. R.F Exposure/Safety 5GHz Transmitter 802.11b/g+802.11a Signals

Typical use of the E.U.T. is repeating WiFi signals for DAS. The typical placement of the E.U.T. is on a wall near the ceiling. The typical distance between the E.U.T. and the user in the worst case application, is >1 m.

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at 5745 MHz is: $1\frac{mW}{cm^2}$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2}$$

P_t- Transmitted Power (Peak) 27.5 mW= 14.4 dBm

G_T- Antenna Gain, 7 dBi = 5

R- Distance from Transmitter using 1 m worst case

(c) The peak power density is :

$$S_p = \frac{27.5 \times 5}{4\pi(100)^2} = 1.1 \times 10^{-3} \frac{mW}{cm^2}$$

(d) The duty cycle of transmission in actual worst case is 50%.

The average power source is:

$13.75mW$

(e) The averaged power density of the E.U.T. is:

$$S_{AV} = 0.55 \times 10^{-3} \frac{mW}{cm^2}$$

(f) This is 3 orders of magnitude below the FCC limit.

14. Radiated Emission Per FCC Part 15 Sub-Part B Test Data 802.11b/g+802.11a Signals

14.1 Test Specification

30-40000 MHz, FCC Part 15, Subpart B, CLASS A

14.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 4.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The frequency range 30-40000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 2.9 - 40 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization. Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The emissions were measured at a distance of 3 meters.
The E.U.T. was tested in both Rx and Tx modes.
The E.U.T. was tested at the operating frequencies of, 5180, 5200, 5240, 5745, 5765, and 5805 MHz using the following modulations: 64QAM, and BPSK.

14.3 Test Data

JUDGEMENT: Passed by 4.9 dB.

The margin between the emission level and the specification limit is 4.9 dB in the worst case at the frequency of 128.38 MHz, vertical polarization.

The signals in the band 1.0 – 40.0 GHz were more than 20 dB below the specification limit.

The EUT met the requirements of the F.C.C. Part 15, Subpart B, Class A, specification.

The results for all three operating frequencies and modulations were the same.

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

Radiated Emission

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Signal Number	Frequency (MHz)	Peak dBuV/m	QP dBuV/m	QP Delta L 1 (dB)	Av Delta L 2 (dB)	Corr (dB)
1	299.894100	39.0	33.3	-23.5		23.4
2	375.000000	42.3	38.9	-18.0		18.7
3	500.015000	43.7	40.1	-16.8		21.0
4	625.010000	43.2	38.5	-18.4		24.7
5	700.010000	43.4	39.7	-17.2		25.3
6	750.010000	43.5	38.8	-18.1		25.8

Figure 166. Radiated Emission. Antenna Polarization: HORIZONTAL. Detectors: Peak, Quasi-peak

Note: QP Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

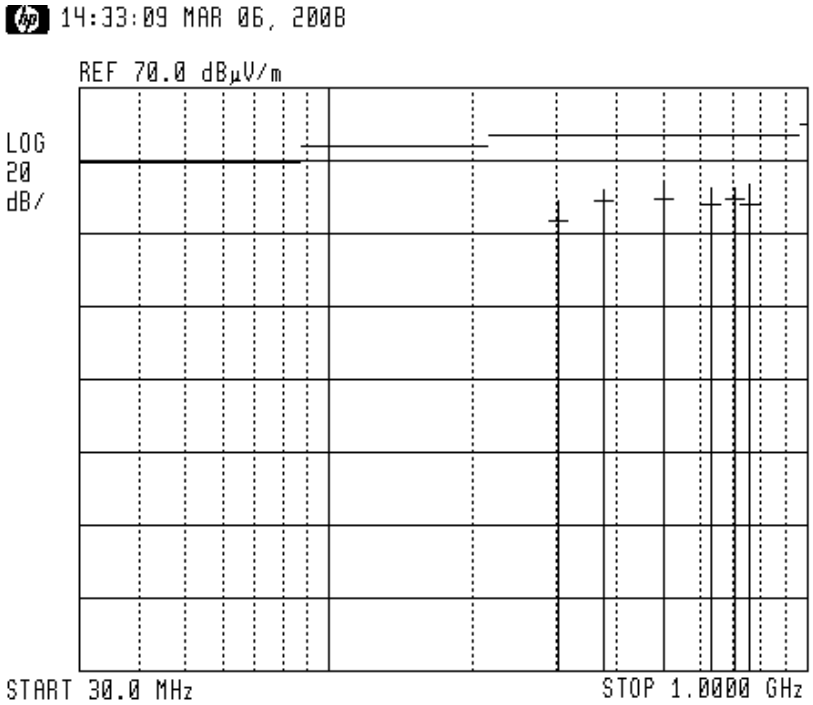

Figure 167. Radiated Emission. Antenna Polarization: HORIZONTAL Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*

Radiated Emission

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Vertical
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Signal Number	Frequency (MHz)	Peak dBuV/m	QP dBuV/m	QP Delta L 1 (dB)	Av Delta L 2 (dB)	Corr (dB)
1	56.970000	40.2	34.9	-14.6		10.8
2	125.005000	42.3	40.9	-13.1		13.8
3	128.380000	52.0	49.1	-4.9		13.9
4	250.007500	53.2	51.9	-5.0		20.9
5	256.850000	46.5	42.0	-14.9		21.3
6	500.000000	43.5	40.0	-16.9		21.0
7	700.015000	45.8	40.7	-16.2		25.3

Figure 168. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note: QP Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Vertical
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

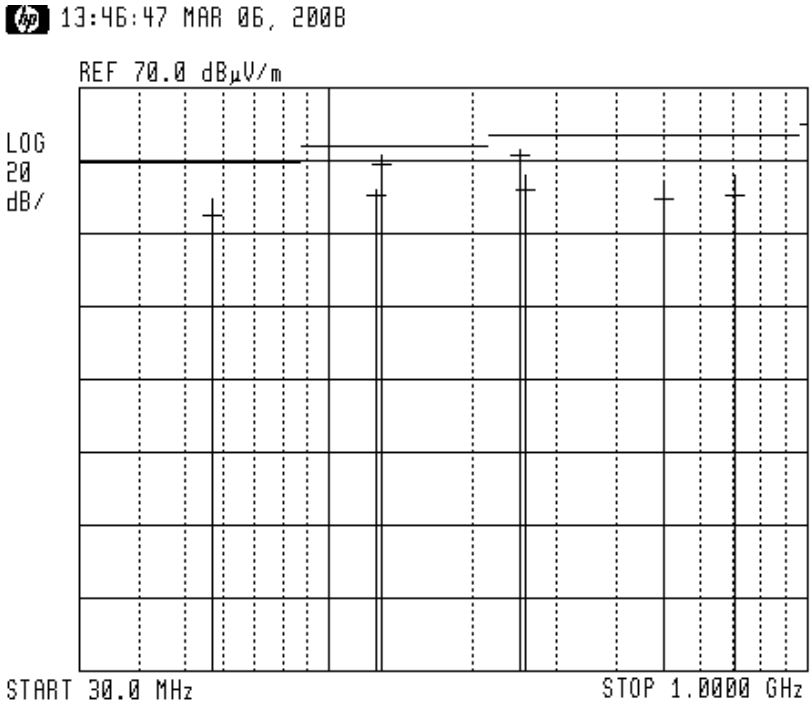

Figure 169. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*

14.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial No.	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 12, 2007	1Year
RF Filter Section	HP	85420E	3705A00248	November 12, 2007	1Year
Antenna Biconical	ARA	BCD 235/B	1041	March 22, 2007	1Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 22, 2007	1 Year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	February 4, 2007	2 Years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 15, 2006	2 Years
Horn Antenna	ARA	SWH-28	1008	December 8, 2006	2 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 2, 2007	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 9, 2007	1 Year
Low Noise Amplifier	MK Milliwave	MKT6-3000 4000-30-13P	399	January 9, 2007	1 Year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	November 14, 2007	1 Year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

14.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

No external pre-amplifiers are used.

15. Spurious Radiated Emission in the Restricted Band, Below 1 GHz 5GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

15.1 Test Specification

9kHz-1000 MHz, F.C.C., Part 15, Subpart C

15.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.1.

The frequency range 9 kHz-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 9 kHz-30 MHz, the loop antenna was rotated on its vertical axis, The antenna height (center of loop) was 1 meter.

In the frequency range 30-1000 MHz, the readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods:

Turning the E.U.T on and off.
Using a frequency span less than 10 MHz.
Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

The E.U.T. was tested at the operating frequencies of, 5180, 5200, 5240, 5745, 5765, and 5805 MHz using the following modulations:,64QAM, and BPSK.

15.3 Test Data

JUDGEMENT: Passed

No signals were found in the frequency band 9 kHz-1000 MHz.

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

The results for all three operating frequencies and modulations were the same.

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

15.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	November 12, 2007	1 year
RF Section	HP	85420E	3427A00103	November 12, 2007	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 22, 2007	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 22, 2007	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 15, 2007	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

15.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[dB\mu v/m]\ FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

No external pre-amplifiers are used.

16. Spurious Radiated Emission in the Restricted Band, Above 1 GHz 5GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

16.1 Radiated Emission Above 1 GHz

The E.U.T operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.1.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.
In the frequency range 1-2.9 GHz, a computerized EMI receiver complying to CISPR 16 requirements was used.
In the frequency range 2.9-40.0 GHz, a spectrum analyzer including a low noise amplifier was used. During average measurements, the IF bandwidth was 1 MHz and the video bandwidth was 100Hz. During peak measurements, the IF bandwidth was 1 MHz and the video bandwidth was 3 MHz.
The test distance was 3 meters.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The E.U.T. was tested at the operating frequencies of, 5180, 5200, 5240, 5745, 5765, and 5805 MHz using the following modulations: 64QAM, and BPSK.

16.2 Test Data

JUDGEMENT: Passed by 10.7 dB

For the operating frequencies of 5180, 5200, and 5240, the signals in the frequency range of 1.0 – 40.0 GHz were more than 20 dB below the specification limit.

For the operation frequency of 5745 MHz, the margin between the emission level and the specification limit is 10.7 dB in the worst case at the frequency of 11490.00 MHz, horizontal polarization.

For the operation frequency of 5765 MHz, the margin between the emission level and the specification limit is 10.8 dB in the worst case at the frequency of 11530.00 MHz, horizontal polarization.

For the operation frequency of 5805 MHz, the margin between the emission level and the specification limit is 10.7 dB in the worst case at the frequency of 11610.00 MHz, horizontal polarization.

The results for all modulations were the same.

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 5745 MHz

Freq.	Polarity	Peak Amp	Peak. Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11490.00	H	52.8*	74.0	-21.2
11490.00	V	52.3*	74.0	-21.7

Figure 170. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 5745 MHz

Freq.	Polarity	Average Amp	Average Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11490.00	H	43.3*	54.0	-10.7
11490.00	V	43.1*	54.0	-10.9

Figure 171. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 5765 MHz

Freq.	Polarity	Peak Amp	Peak. Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11530.00	H	52.1*	74.0	-21.9
11530.00	V	52.0*	74.0	-22.0

Figure 172. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 5765 MHz

Freq.	Polarity	Average Amp	Average Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11530.00	H	43.2*	54.0	-10.8
11530.00	V	43.0*	54.0	-11.0

Figure 173. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 5805 MHz

Freq.	Polarity	Peak Amp	Peak. Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11610.00	H	52.0*	74.0	-22.0
11610.00	V	51.9*	74.0	-22.1

Figure 174. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 40.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 5805 MHz

Freq.	Polarity	Average Amp	Average Specification	Peak. Margin
(MHz)	(H/V)	(dBµV/m)	(dB µV/m)	(dB)
11610.00	H	43.3*	54.0	-10.7
11610.00	V	43.1*	54.0	-10.9

Figure 175. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

16.3 Test Instrumentation Used, Radiated Measurements Above 1 GHz

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Receiver	HP	85422E	3411A00102	November 12, 2007	1 year
RF Section	HP	85420E	3427A00103	November 12, 2007	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A
Antenna-Log Periodic	A.H.System	SAS-200/511	253	February 4, 2007	2 years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 15, 2006	2 years
Horn Antenna	ARA	SWH-28	1008	December 8, 2006	2 year
Horn Antenna	Narda	V637	0410	December 8, 2006	2 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 2, 2007	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 9, 2008	1 year
Low Noise Amplifier	MK Milliwave	MKT6-3000 400-30-13P	399	January 9, 2008	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Spectrum Analyzer	HP	8546E	3442A00275	November 14, 2007	1 year
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

17. 26 dB Bandwidth 5 GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

17.1 Test procedure

The E.U.T. was set to the applicable test frequency. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20 dB) and appropriate coaxial cable (cable loss = 1 dB). The spectrum analyzer was set to 300 kHz resolution BW. The spectrum bandwidth of the E.U.T. was measured and recorded.

The E.U.T. was tested at 5180, 5200, 5240, 5745, 5765, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

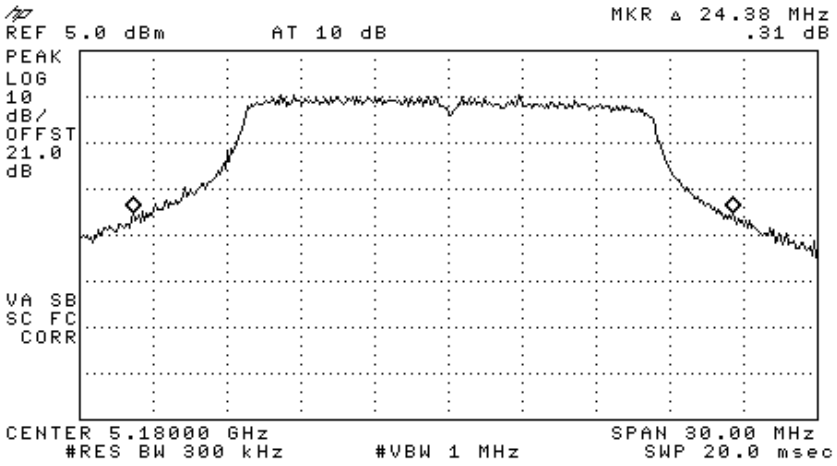

Figure 176 —5180 MHz 64QAM

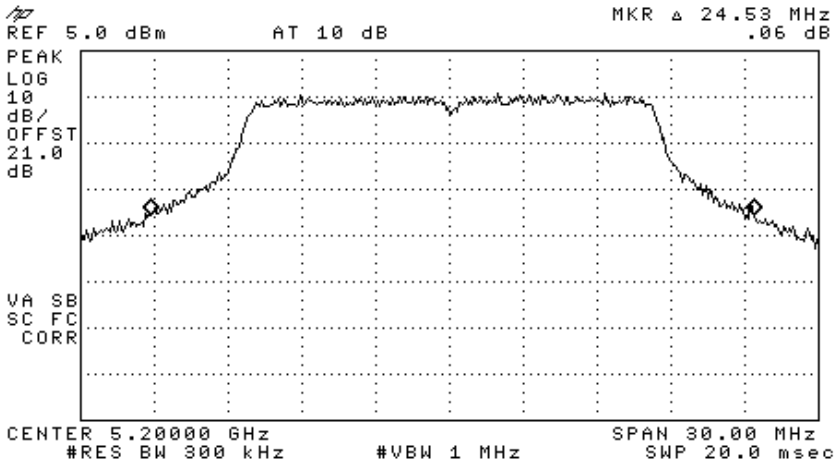

Figure 177 —5200 MHZ 64QAM

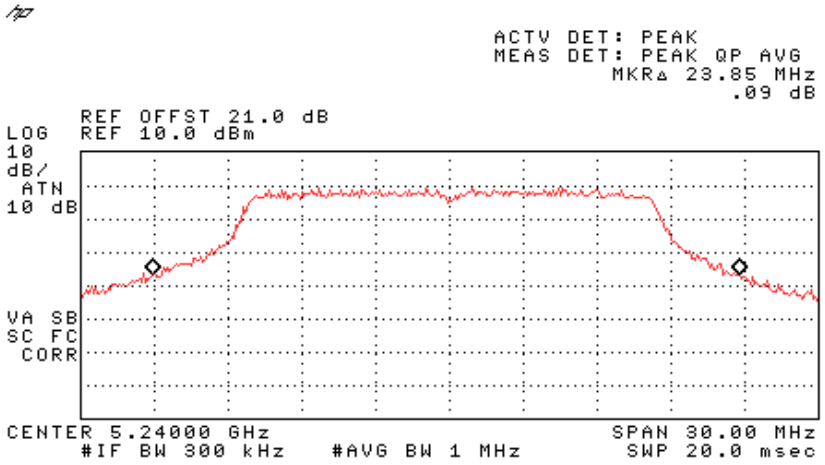

Figure 178 —5240 MHZ 64QAM

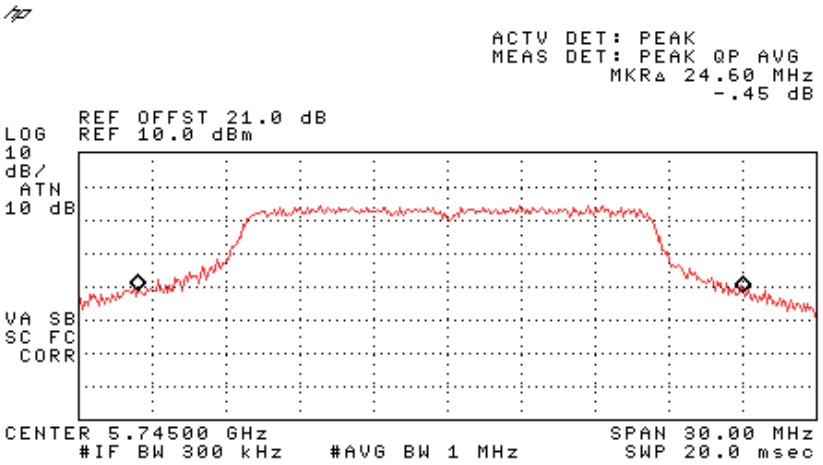

Figure 179 —5745 MHz 64QAM

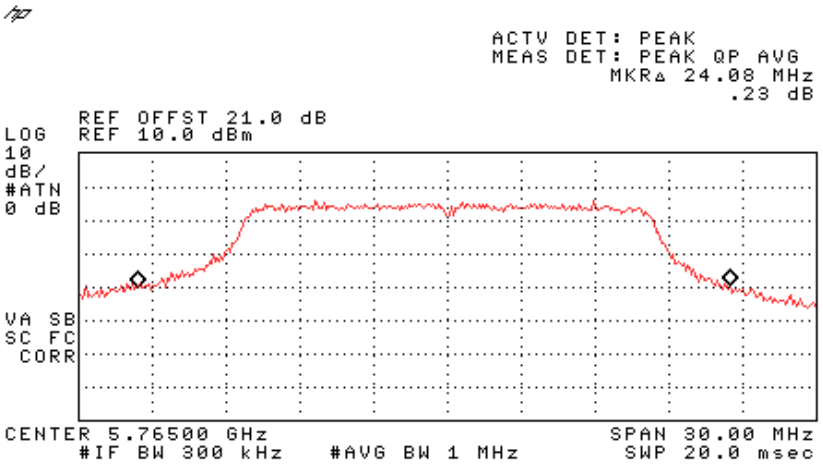

Figure 180 —5765 MHz 64QAM

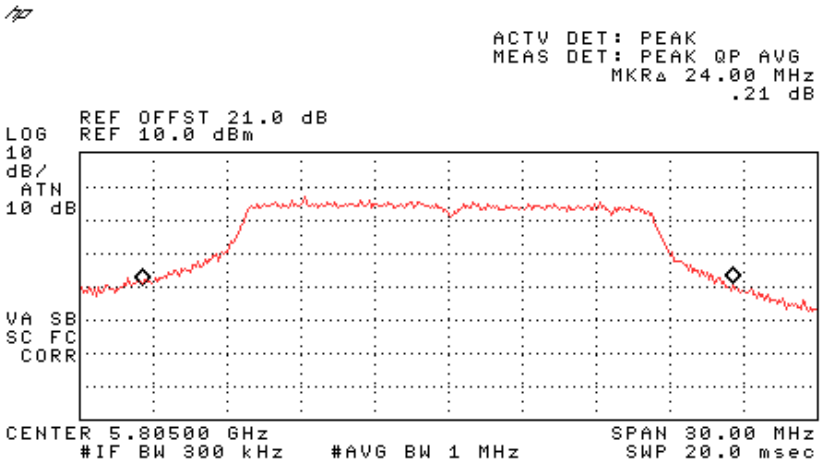

Figure 181 —5805 MHZ 64QAM

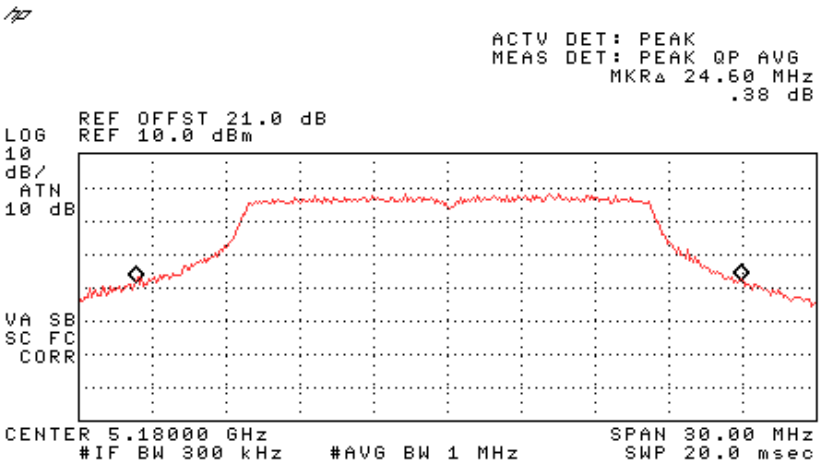

Figure 182 —5180 MHz BPSK

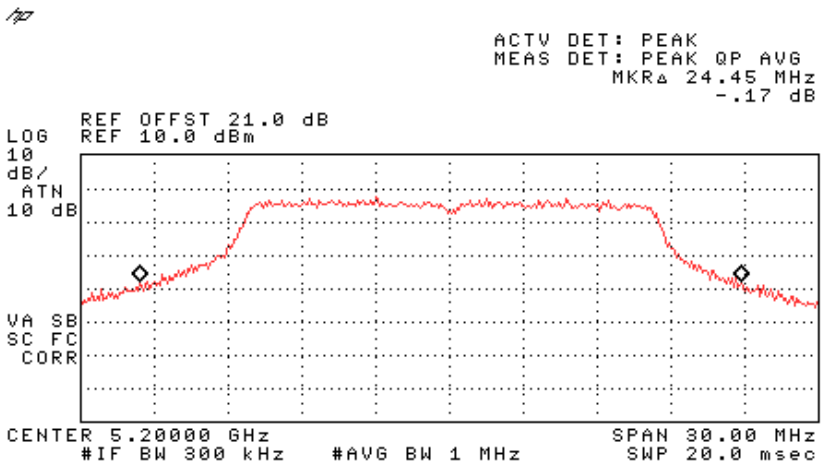

Figure 183 —5200 MHZ BPSK

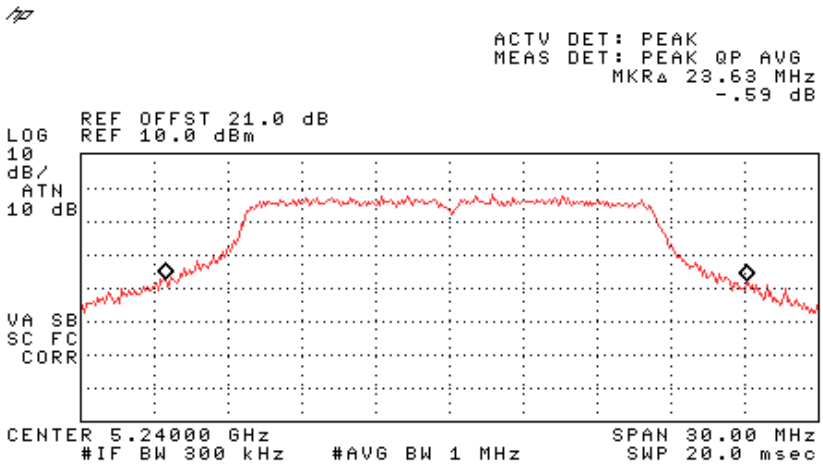

Figure 184 —5240 MHZ BPSK

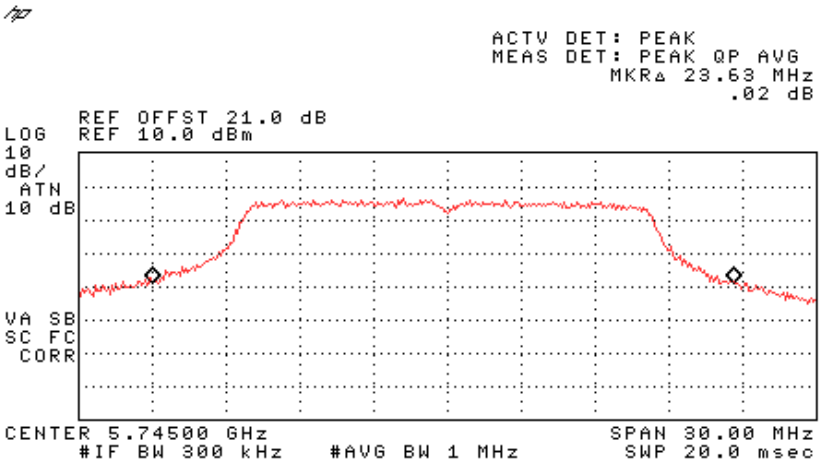

Figure 185 —5745 MHz BPSK

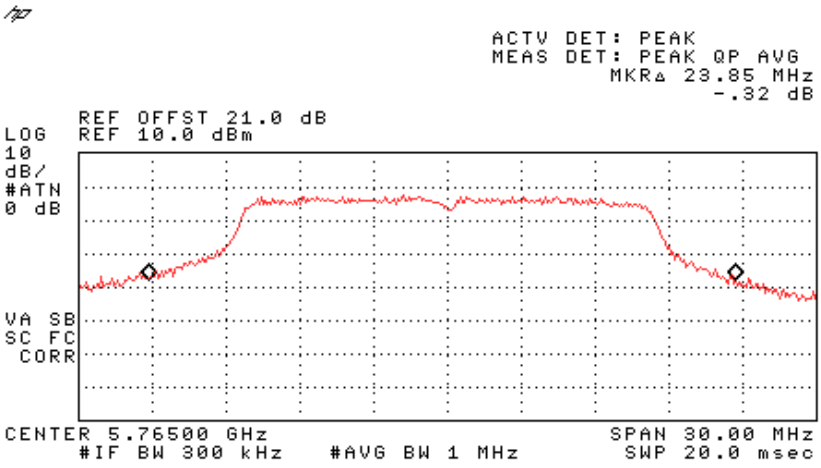

Figure 186 —5765 MHz BPSK

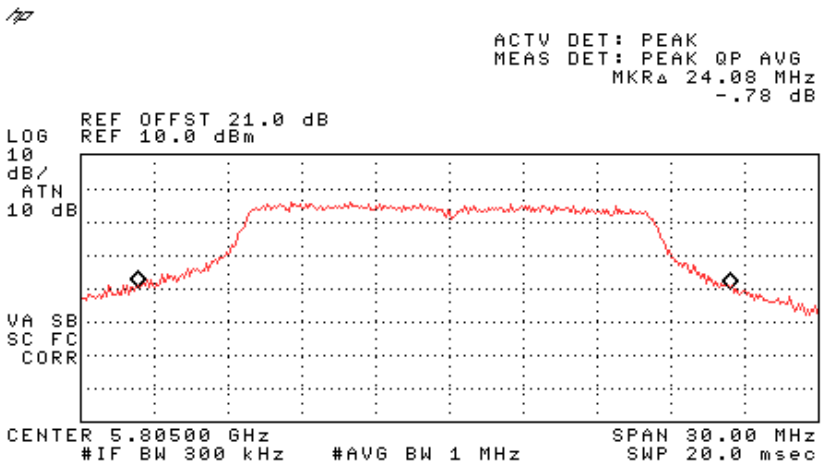

Figure 187 —5805 MHZ BPSK

Operation Frequency (MHz)	Modulation	26 dB Bandwidth (dBm)
5180	64QAM	24.38
	BPSK	24.60
5200	64QAM	24.53
	BPSK	24.45
5240	64QAM	23.85
	BPSK	23.63
5745	64QAM	24.60
	BPSK	23.63
5765	64QAM	24.08
	BPSK	23.85
5805	64QAM	24.00
	BPSK	24.08

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

17.2 Test Equipment Used.

26 dB Minimum Bandwidth

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year
Cable	Rhophase	KPS-1501-1000	A1675	February 8, 2008	1 year

Figure 188 Test Equipment Used

18. Maximum Conducted Output Power 5 GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

18.1 Test procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (Cable Loss = 1 dB). The Spectrum Analyzer was set to 1.0 MHz resolution BW. Sample detector and maximum hold were used.

The E.U.T. was tested at 5180, 5200, 5240, 5745, 5765, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

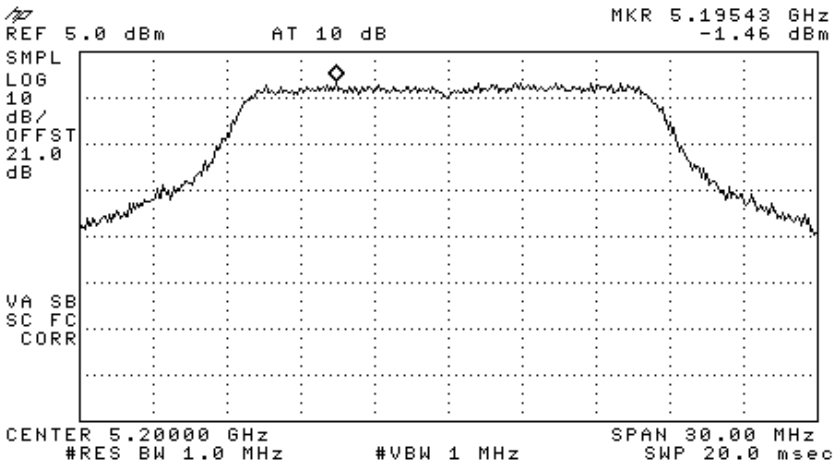

Figure 189 5180 MHz 64QAM

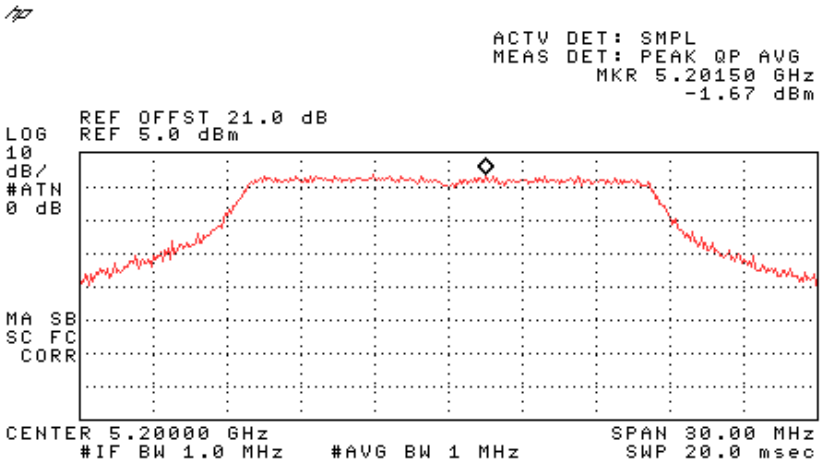

Figure 190 5200 MHz 64QAM

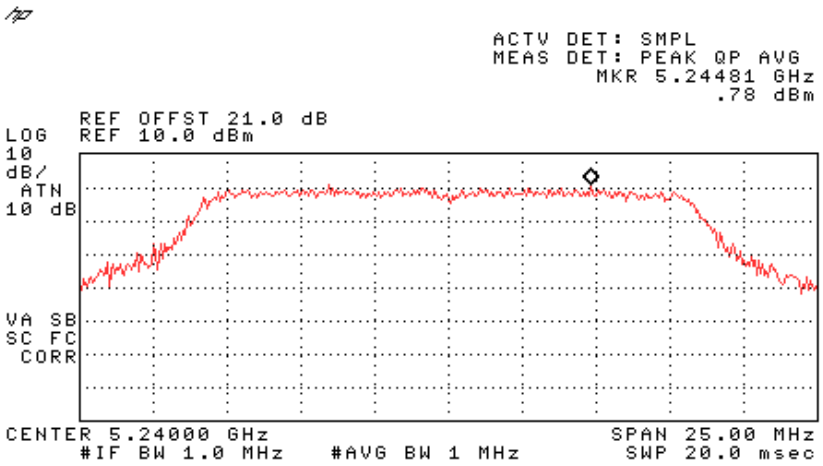

Figure 191 5240 MHz 64QAM

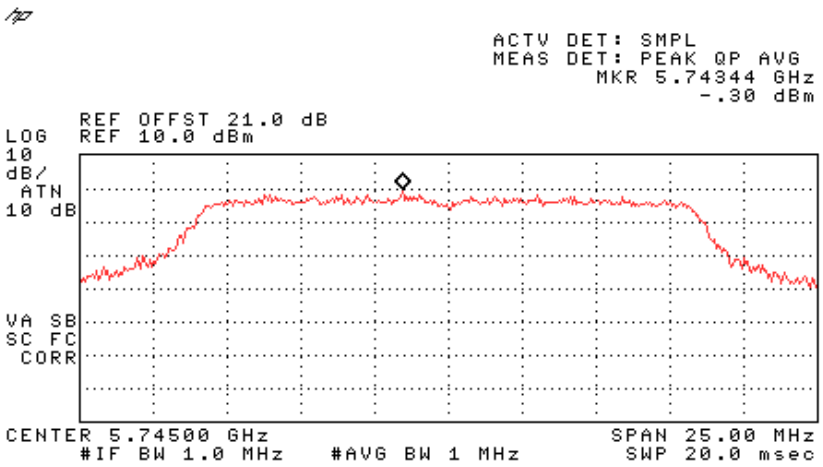

Figure 192 5745 MHz 64QAM

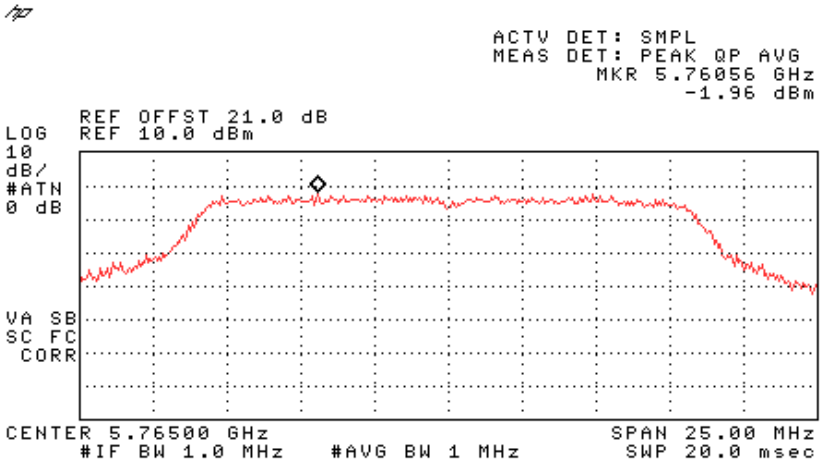

Figure 193 5765 MHz 64QAM

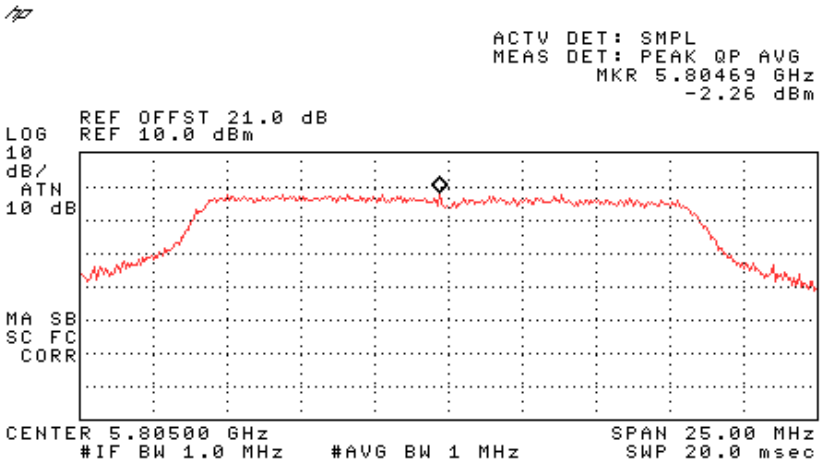

Figure 194 5805 MHz 64QAM

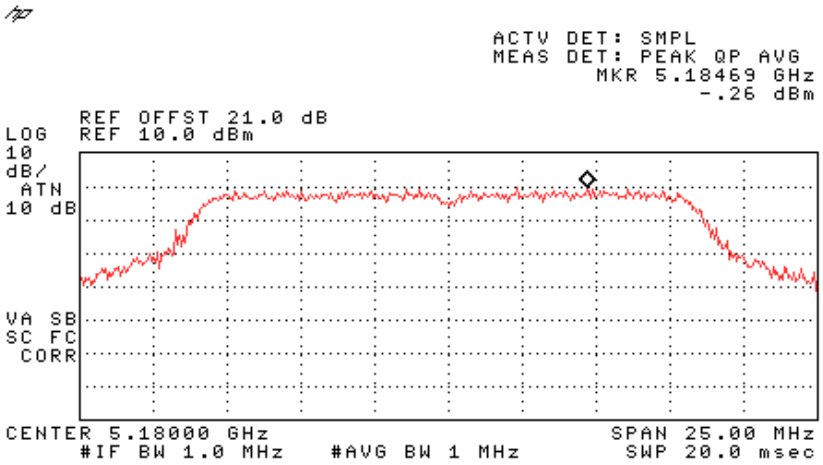

Figure 195 5180 MHz BPSK

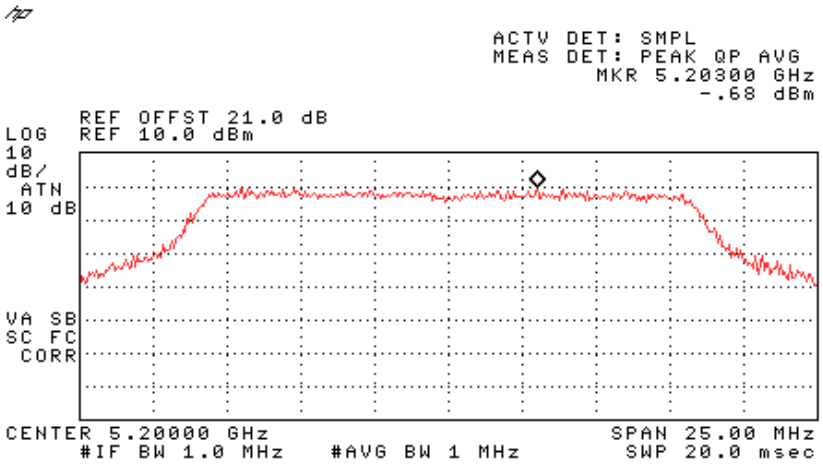

Figure 196 5200 MHz BPSK

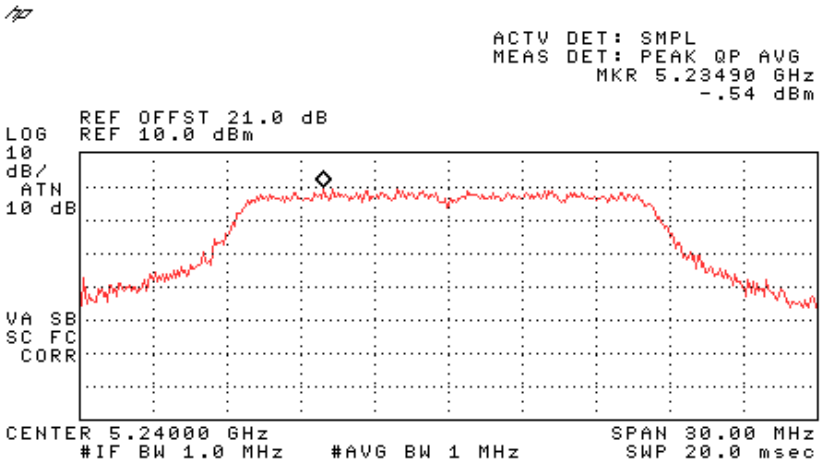

Figure 197 5240 MHz BPSK

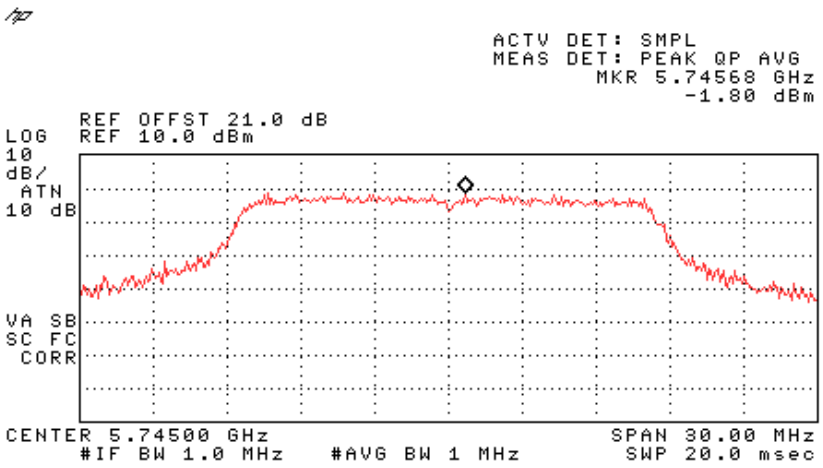

Figure 198 5745 MHz BPSK

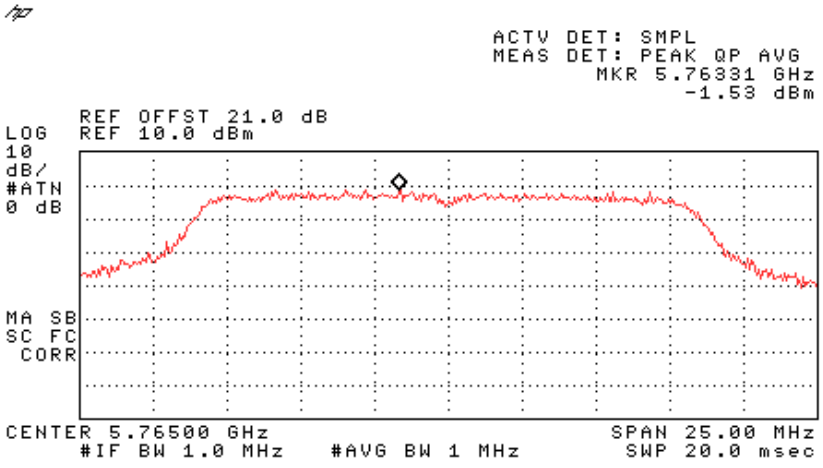

Figure 199 5765 MHz BPSK

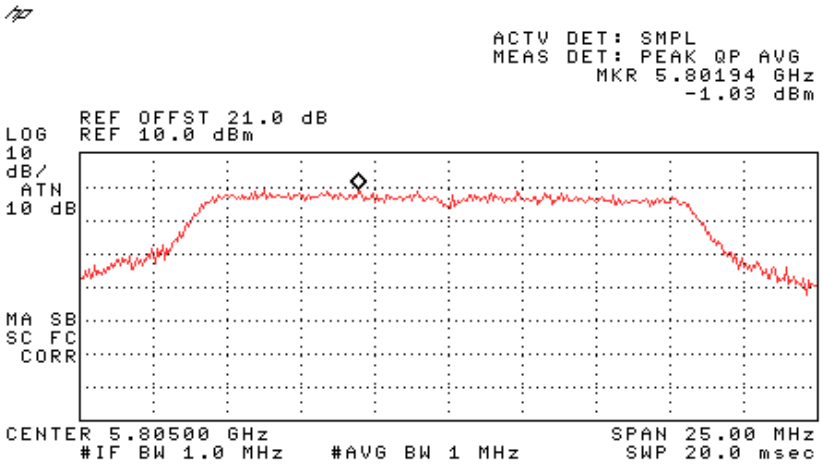

Figure 200 5805 MHz BPSK

18.2 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart E

Operation Frequency (MHz)	Modulation	Power (dBm)	Specification (dBm)	Margin (dB)
5180	64QAM	12.44	16	-3.56
	BPSK	13.65	16	-2.35
5200	64QAM	12.2	16	-3.80
	BPSK	13.2	16	-2.80
5240	64QAM	14.6	16	-1.40
	BPSK	13.2	16	-2.80
5745	64QAM	13.6	29	-15.40
	BPSK	11.9	29	-17.10
5765	64QAM	11.9	29	-17.10
	BPSK	12.2	29	-16.80
5805	64QAM	11.5	29	-17.50
	BPSK	12.8	29	-16.20

Figure 201 Maximum Peak Power Output

Note: Antenna Gain is 7 dBi

Peak Output Power = Reading + 10log EBW

For 5.18; 5.20, 5.24 GHz Peak Output Power Limit = 4 + 10log EBW – (Antenna Gain –6) or 16 whichever is less.

For 5.745; 5.765, 5.805 GHz Peak Output Power Limit = 17 + 10log EBW – (Antenna Gain –6) or 29 whichever is less.

JUDGEMENT: Passed by 1.40 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

18.3 Test Equipment Used.

Peak Power Output

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 202 Test Equipment Used

19. Peak Power Spectral Density 5GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

[In accordance with section 15.407(a)]

19.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20dB) and an appropriate coaxial cable (Cable Loss = 1 dB). The spectrum analyzer was set to 1 MHz resolution BW. and 1 MHz video BW. The spectrum peaks were located at at 5180, 5200, 5240, 5745, 5765, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

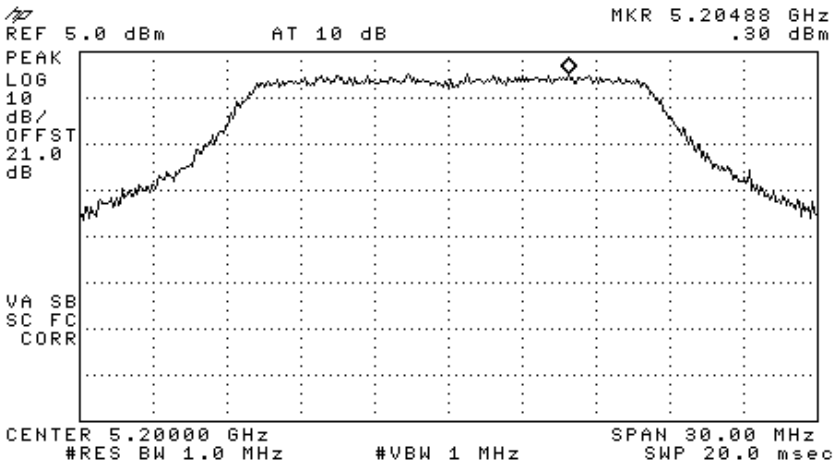

Figure 203 —5180 MHz 64QAM

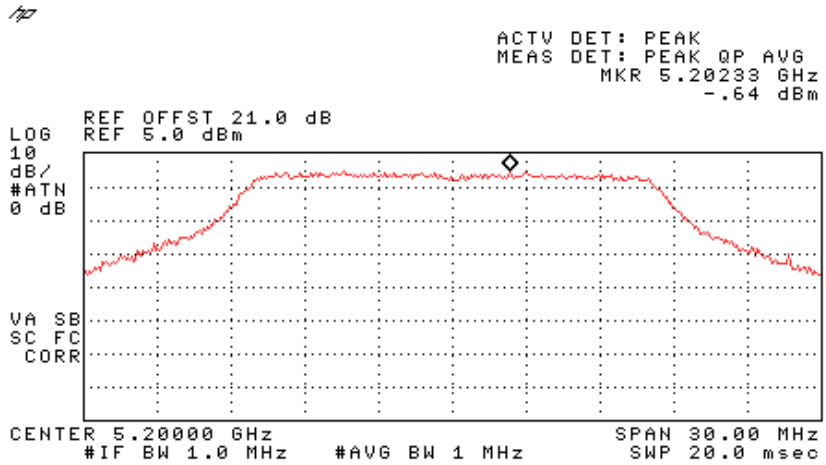

Figure 204 —5200 MHz 64QAM

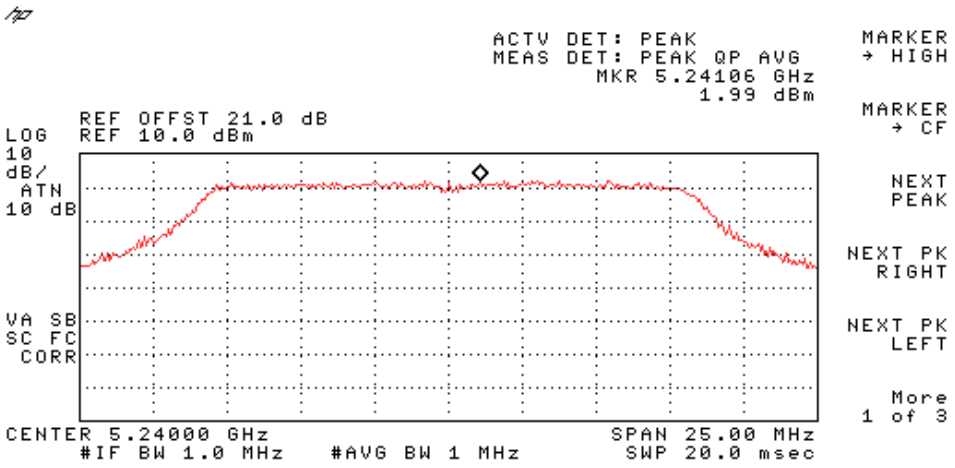

Figure 205 —5240 MHz 64QAM

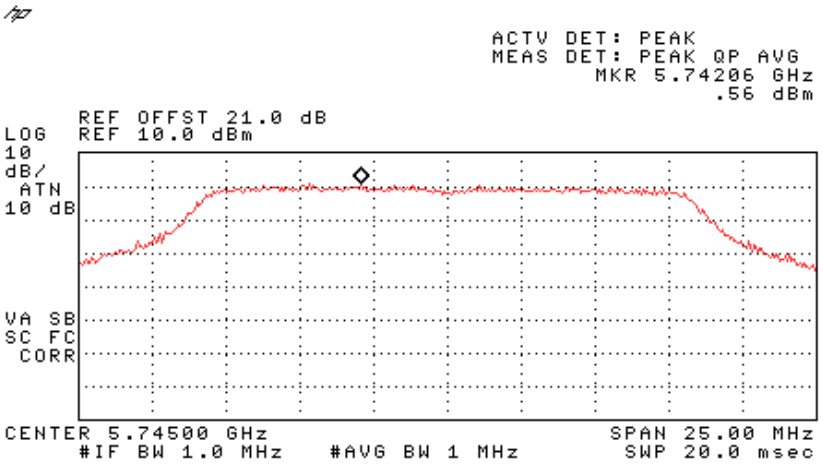

Figure 206 —5745 MHz 64QAM

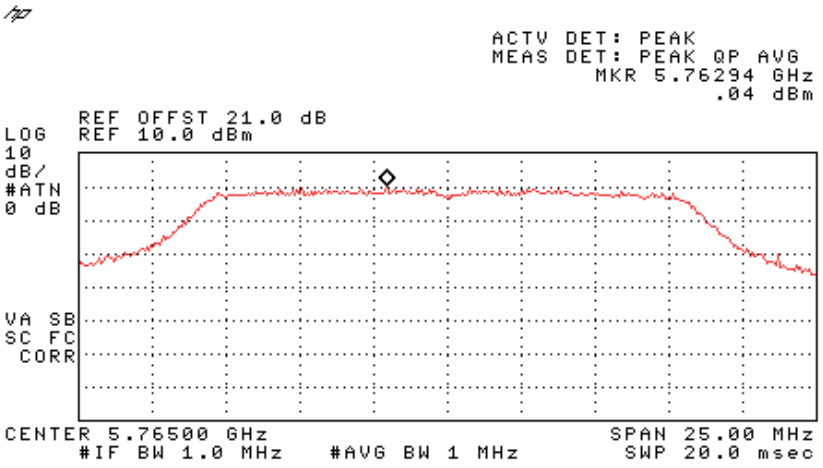

Figure 207 —5765 MHz 64QAM

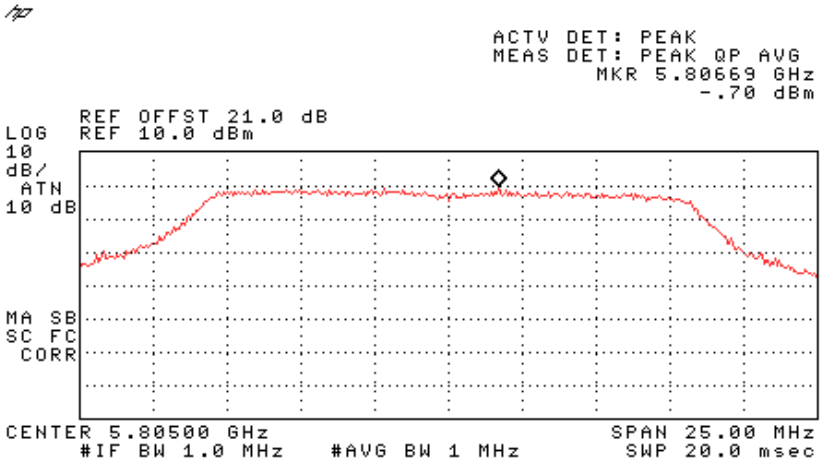

Figure 208 —5805 MHz 64QAM

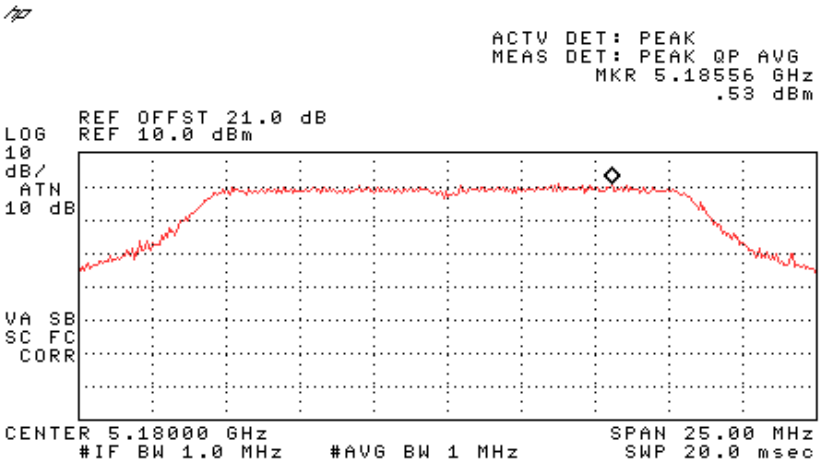

Figure 209 —5180 MHz BPSK

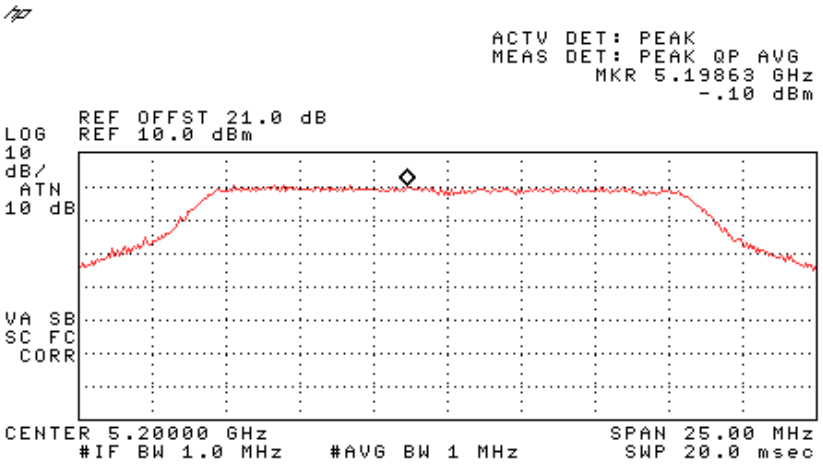

Figure 210 —5200 MHz BPSK

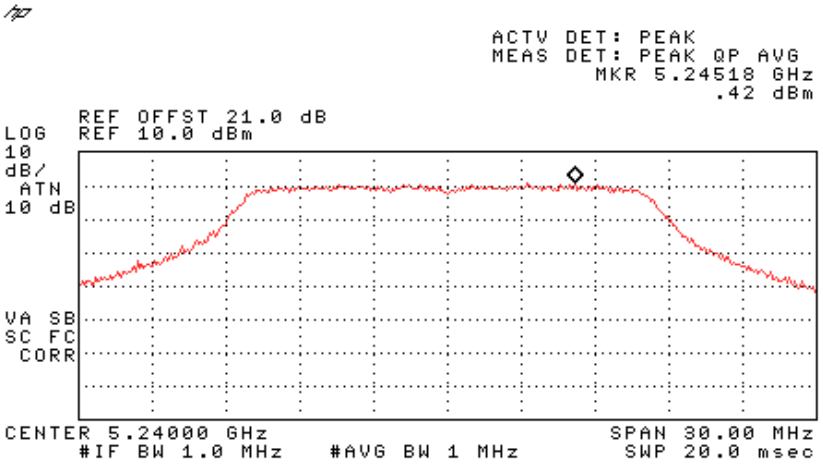

Figure 211 —5240 MHz BPSK

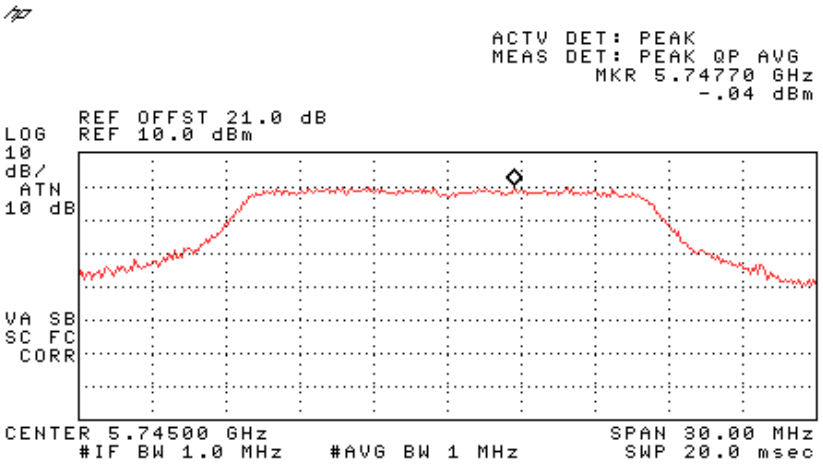

Figure 212 —5745 MHz BPSK

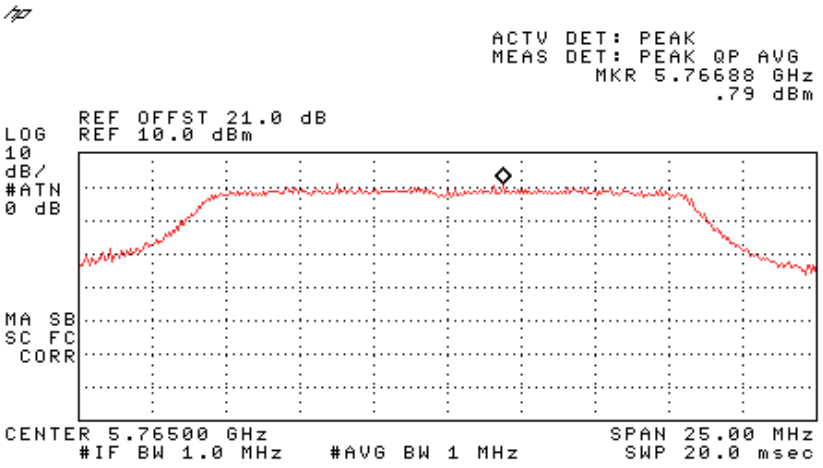

Figure 213 —5765 MHz BPSK

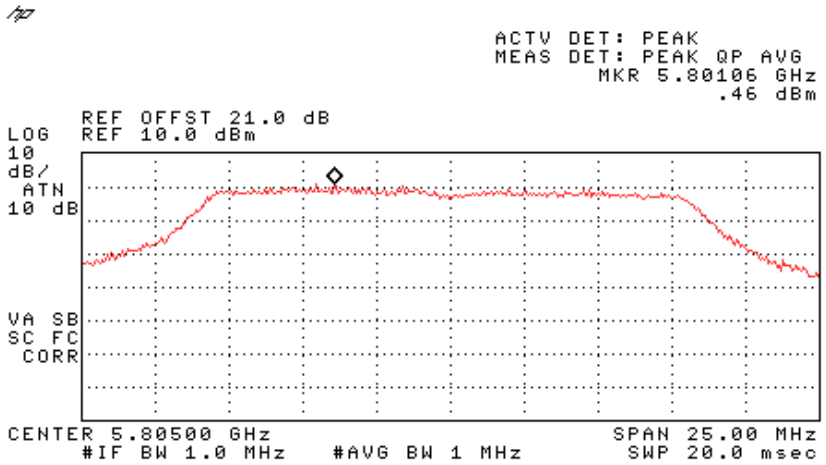

Figure 214 —5805 MHz BPSK

19.2 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart E (15.407(a))

Operation Frequency (MHz)	Modulation	Reading Spectrum Analyzer (dBm)	Specification (dBm)	Margin (dB)
5180	64QAM	0.3	3	-2.70
	BPSK	0.53	3	-2.47
5200	64QAM	0.64	3	-2.36
	BPSK	0.1	3	-2.90
5240	64QAM	1.99	3	-1.01
	BPSK	0.42	3	-2.58
5745	64QAM	0.56	16	-15.44
	BPSK	0.04	16	-15.96
5765	64QAM	0.04	16	-15.96
	BPSK	0.79	16	-15.21
5805	64QAM	0.7	16	-15.30
	BPSK	0.46	16	-15.54

Figure 215 Test Results

JUDGEMENT: Passed by 1.01 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

19.3 Test Equipment Used.

Peak Power Spectral Density

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 216 Test Equipment Used

20. Ratio of Peak Excursion of Modulation Envelope to Maximum Conducted Output Power 5GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

[In accordance with section 15.407(a)(6)]

20.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20dB) and an appropriate coaxial cable (Cable Loss = 1 dB). The spectrum analyzer was set to 1 MHz resolution BW. and 1 MHz video BW.

Trace A: Sample Detector

Trace B: Peak Detector

The E.U.T. was tested at 5180, 5200, 5240, 5745, 5765,and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

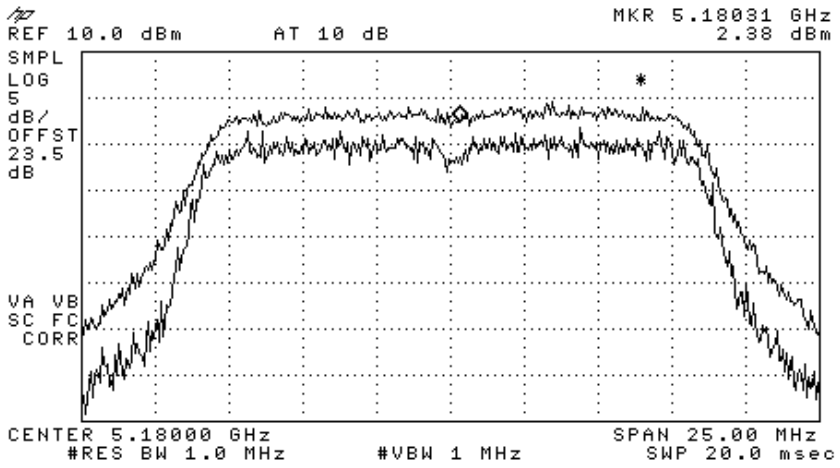

Figure 217 —5180 MHz 64QAM

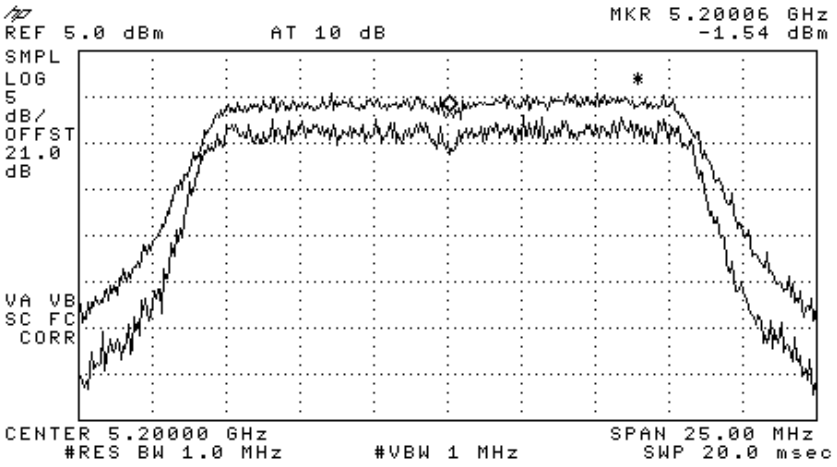

Figure 218 —5200 MHz 64QAM

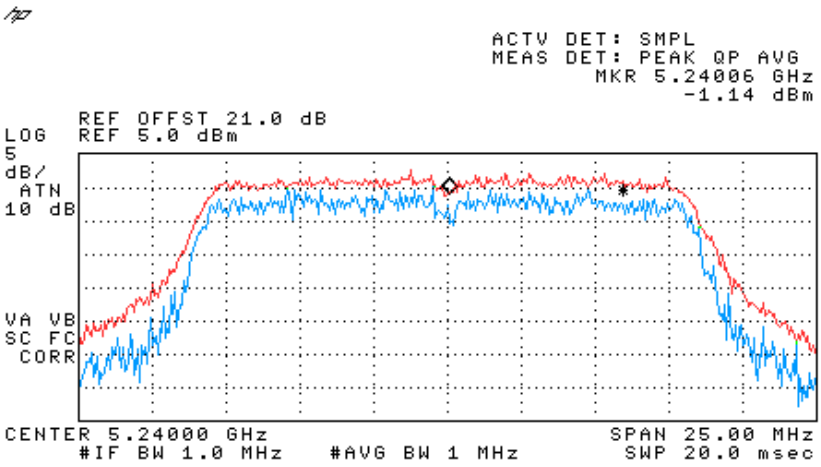

Figure 219 —5240 MHz 64QAM

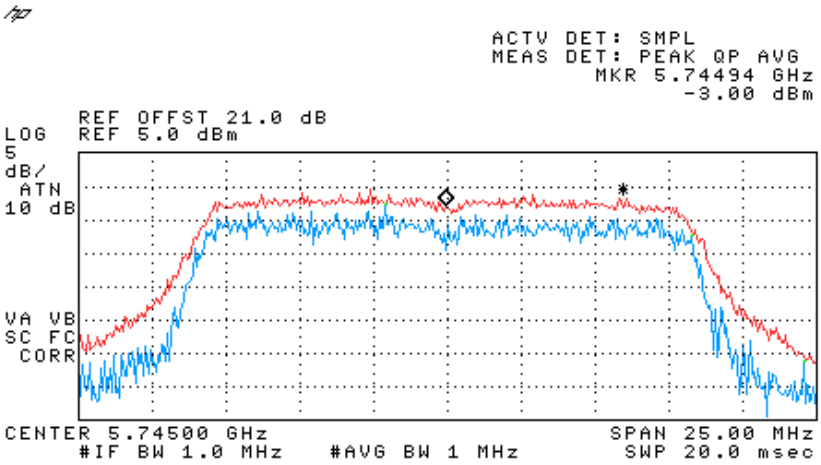

Figure 220 —5745 MHz 64QAM

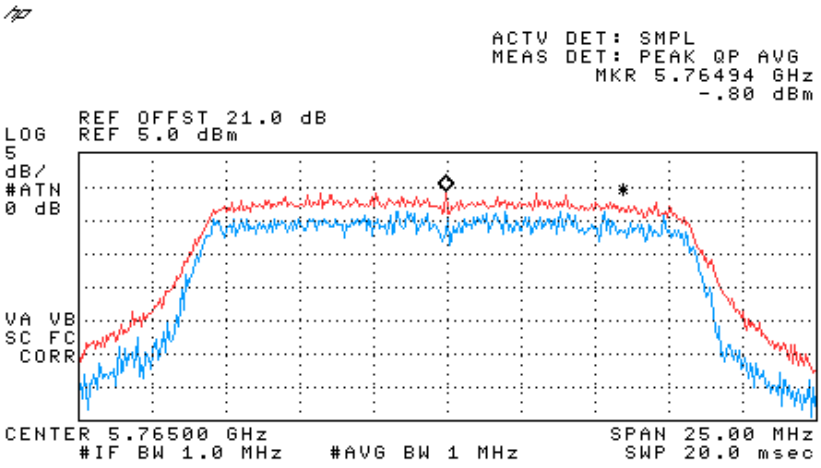

Figure 221 —5765 MHz 64QAM

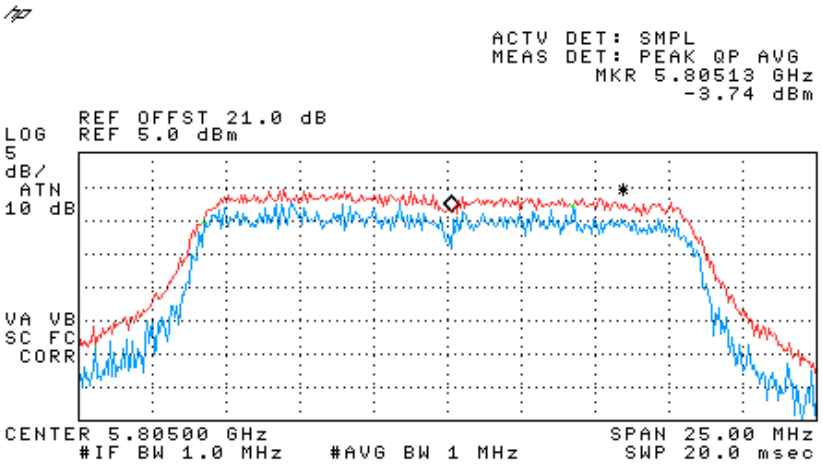

Figure 222 —5805 MHz 64QAM

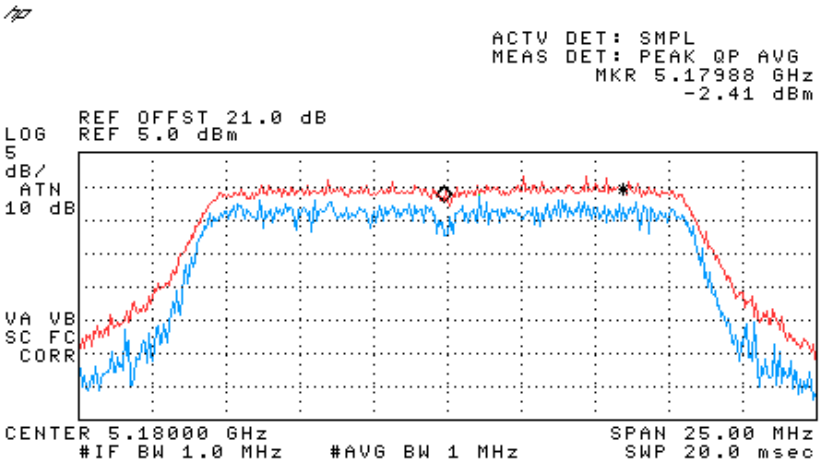

Figure 223 —5180 MHz BPSK

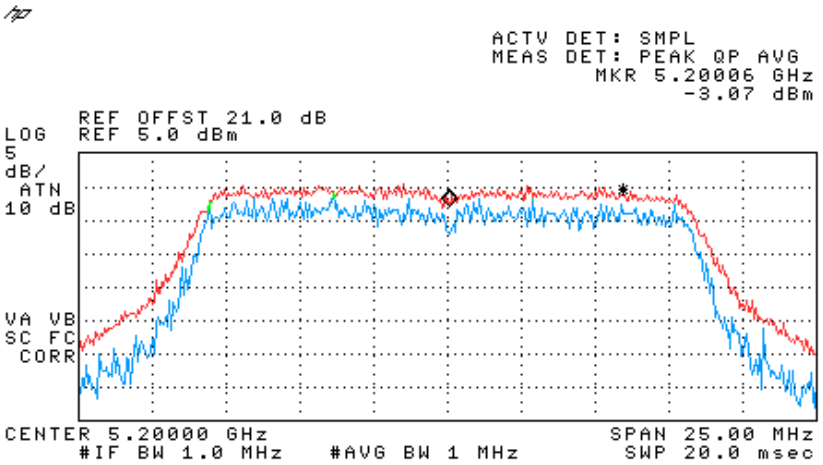

Figure 224 —5200 MHz BPSK

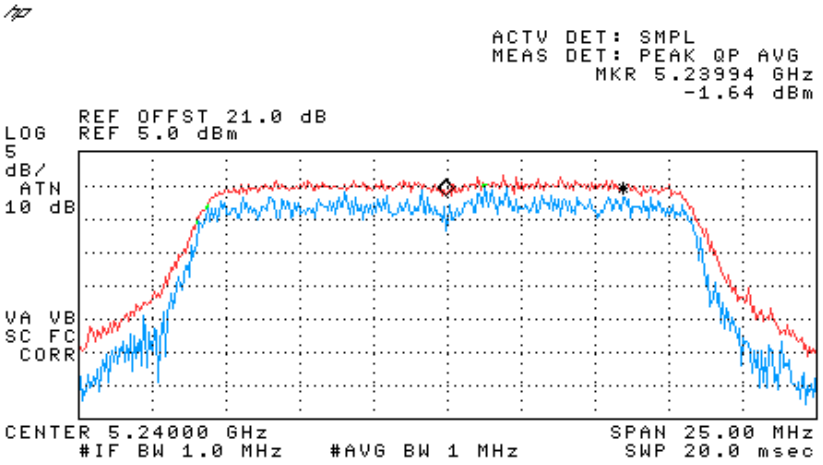

Figure 225 —5240 MHz BPSK

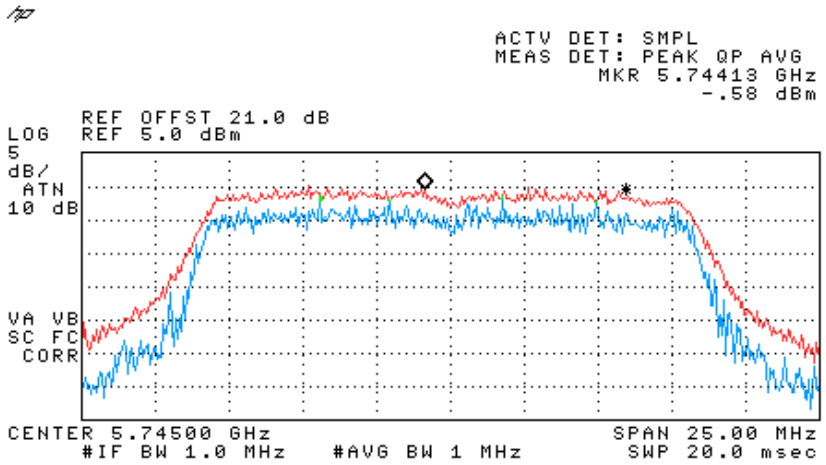

Figure 226 —5745 MHz BPSK

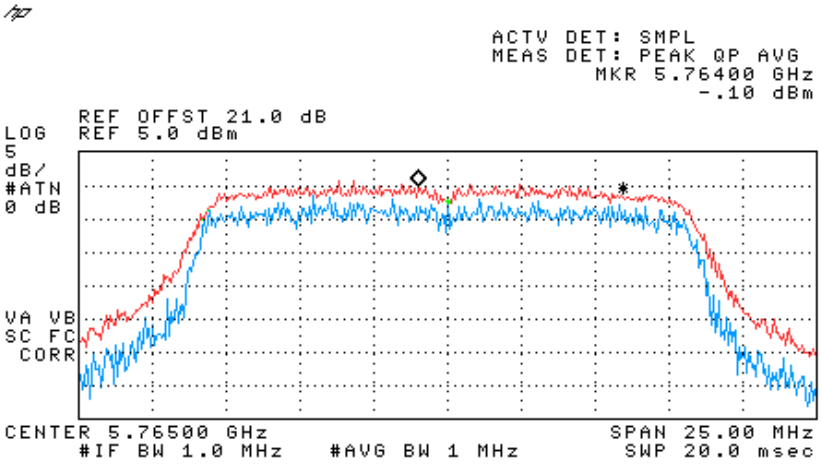

Figure 227 —5765 MHz BPSK

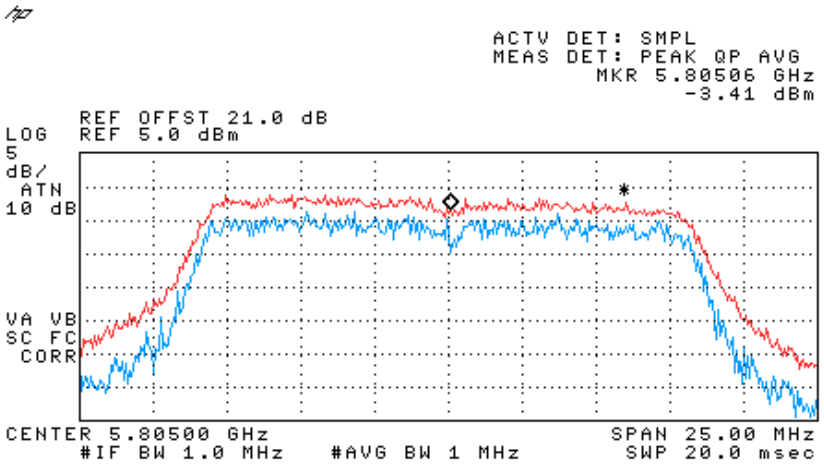

Figure 228 —5805 MHz BPSK

20.2 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart E (15.407(a)(6))

Operation Frequency (MHz)	Modulation	Delta (dB)	Specification (dB)	Margin (dB)
5180	64QAM	4.5	13	-8.5
	BPSK	5.0	13	-8.0
5200	64QAM	4.7	13	-8.3
	BPSK	4.1	13	-8.9
5240	64QAM	4.4	13	-8.6
	BPSK	5.3	13	-7.7
5745	64QAM	6.4	13	-6.6
	BPSK	4.3	13	-8.7
5765	64QAM	6.3	13	-6.7
	BPSK	5.0	13	-8.0
5805	64QAM	5.8	13	-7.2
	BPSK	6.5	13	-6.5

Figure 229 Test Results

JUDGEMENT: Passed by 6.5 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

20.3 Test Equipment Used.

Peak Power Spectral Density

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 230 Test Equipment Used

21. Peak Power Output Out of 5150-5250; 5725-5825 MHz Bands 5 GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

21.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an appropriate coaxial cable. The spectrum analyzer was set to 1 MHz resolution BW except for the frequency range 9 kHz-150 kHz where the RBW was set to 1kHz and the frequency range 150 kHz-10.0 MHz where the RBW was set to 10kHz. The frequency range from 9 kHz to 40 GHz was scanned. Level of spectrum components out of the 5150-5250; 5725-5825 MHz bands was measured at the selected operation frequencies.

The E.U.T. was tested at 5180, 5200, 5240, 5745, 5765, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

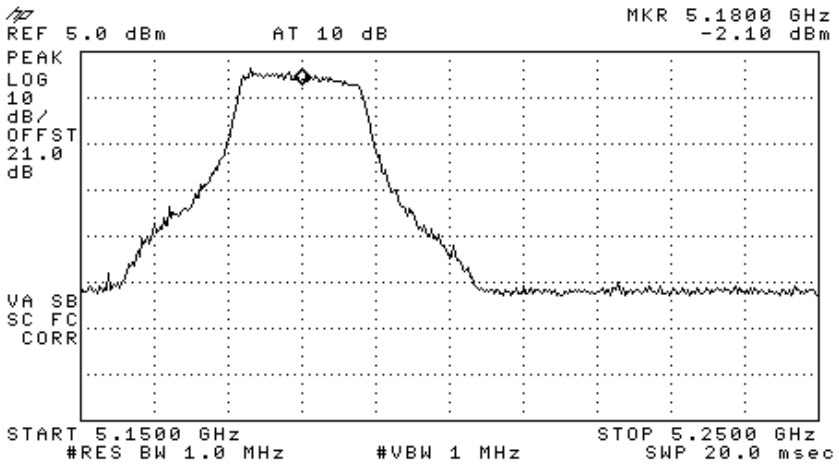

Figure 231 —5180 MHz 64QAM

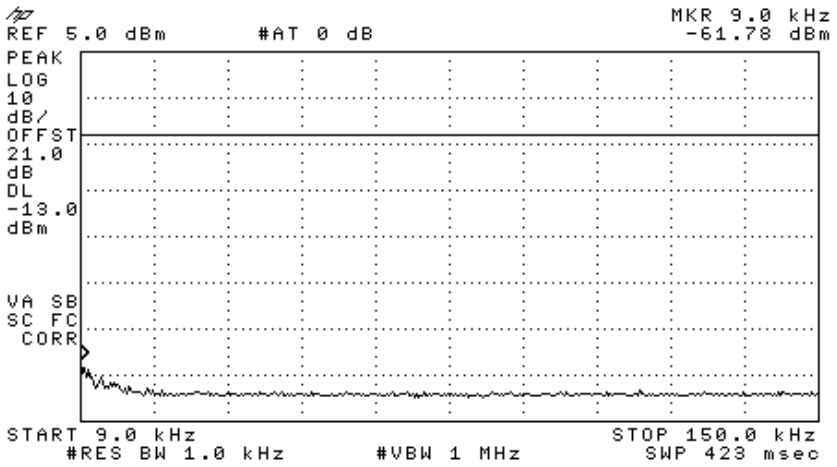

Figure 232 —5180 MHz 64QAM

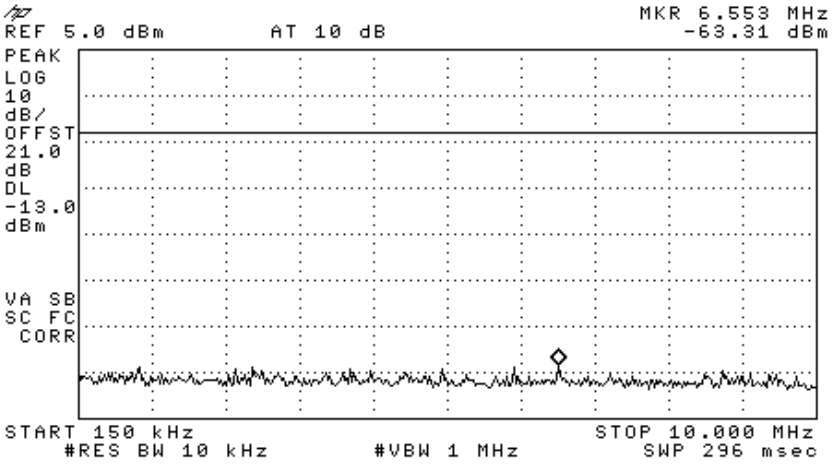

Figure 233 —5180 MHz 64QAM

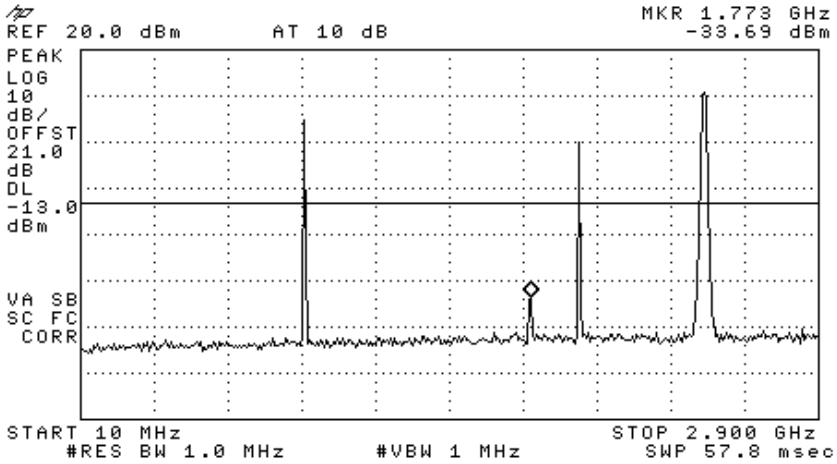

Figure 234 —5180 MHz 64QAM

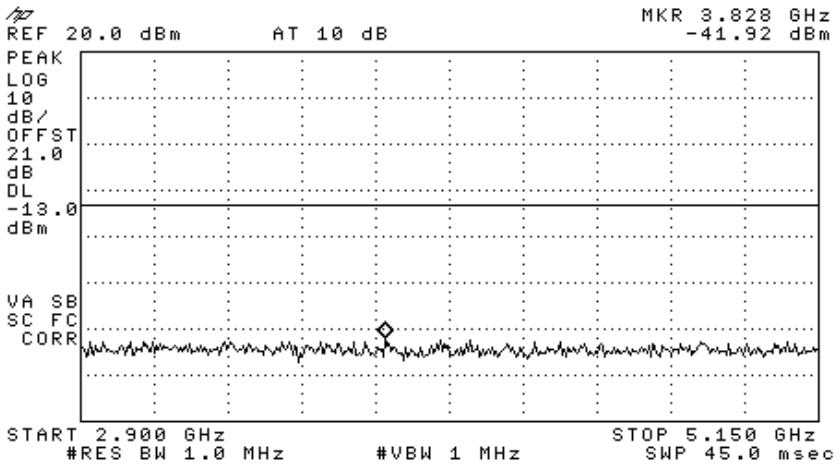

Figure 235 —5180 MHz 64QAM

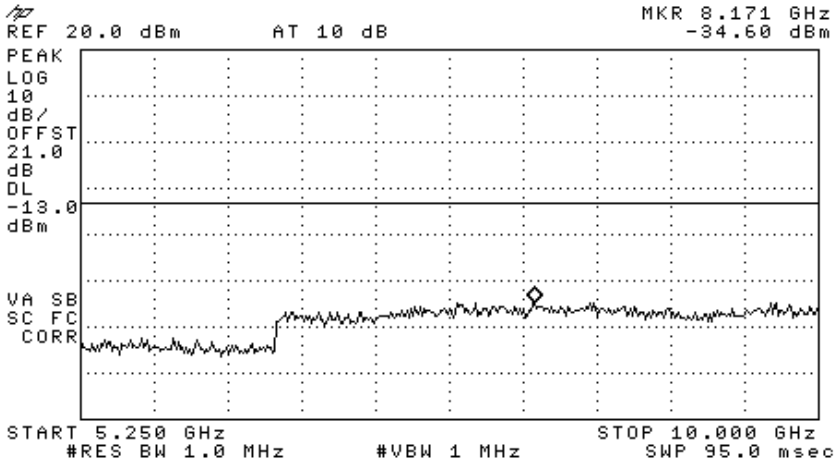

Figure 236 —5180 MHz 64QAM

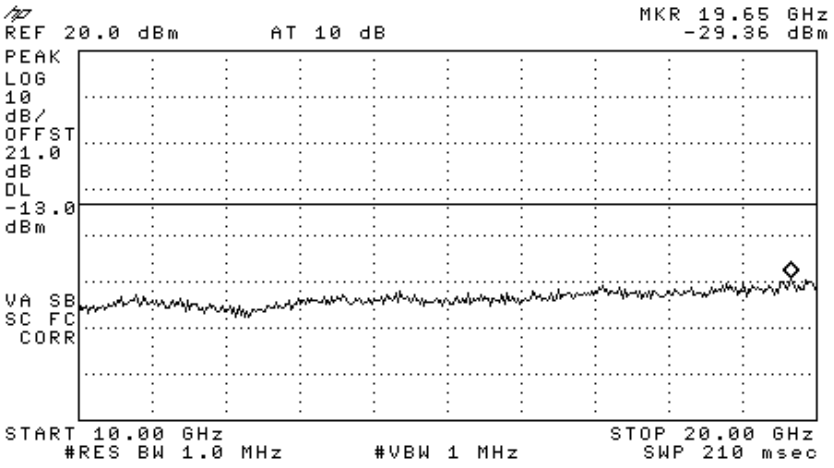

Figure 237 —5180 MHz 64QAM

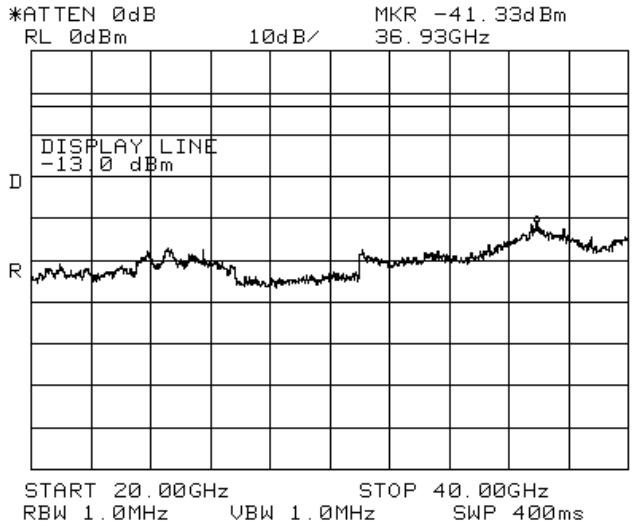

Figure 238 —5180 MHz 64QAM

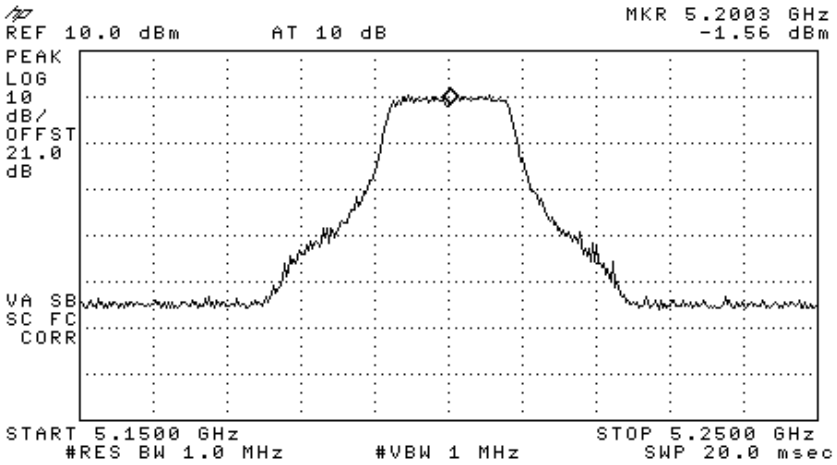

Figure 239 —5200 MHz 64QAM

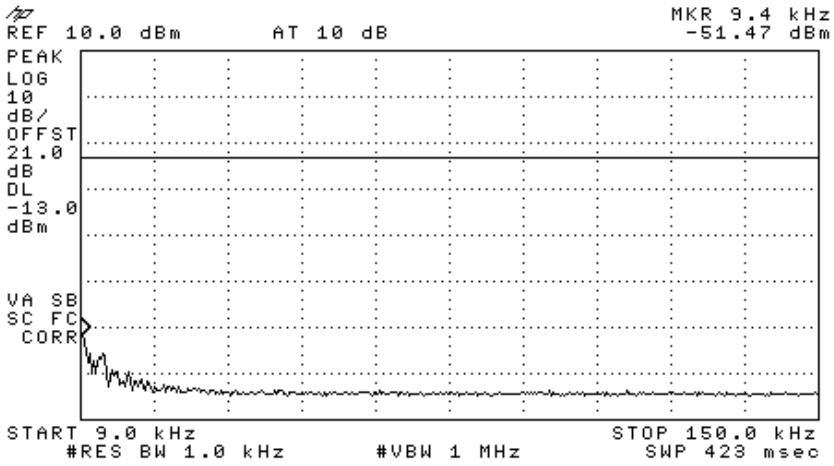

Figure 240 —5200 MHz 64QAM

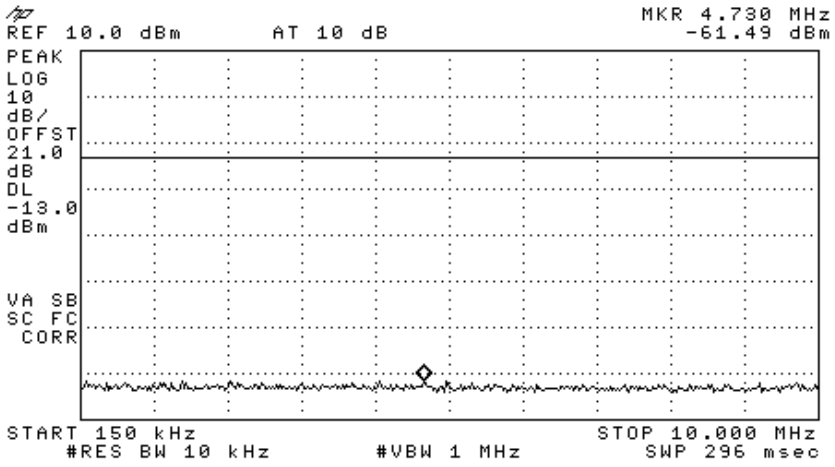

Figure 241 —5200 MHz 64QAM

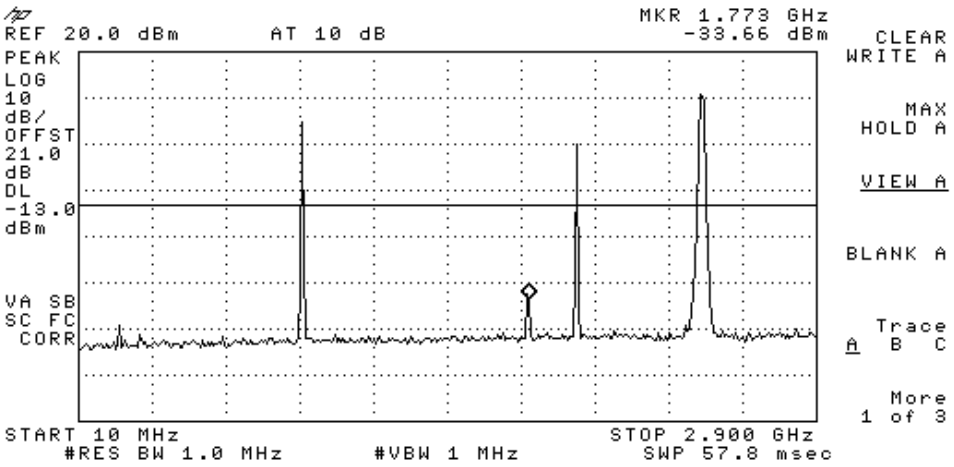

Figure 242 —5200 MHz 64QAM

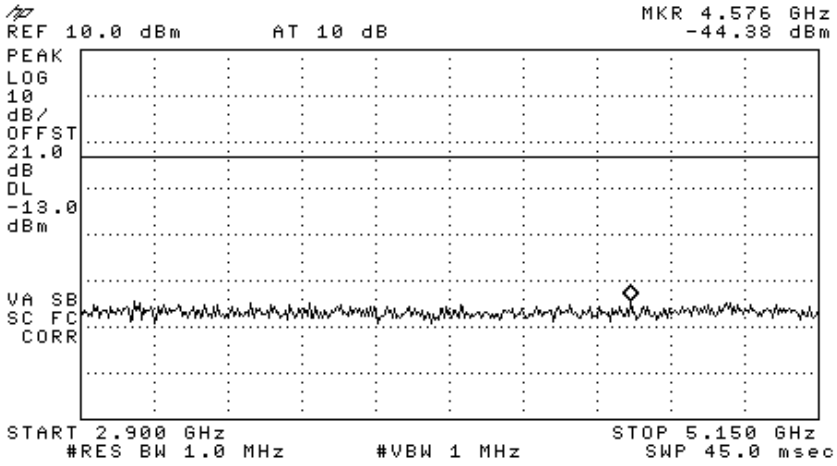

Figure 243 —5200 MHz 64QAM

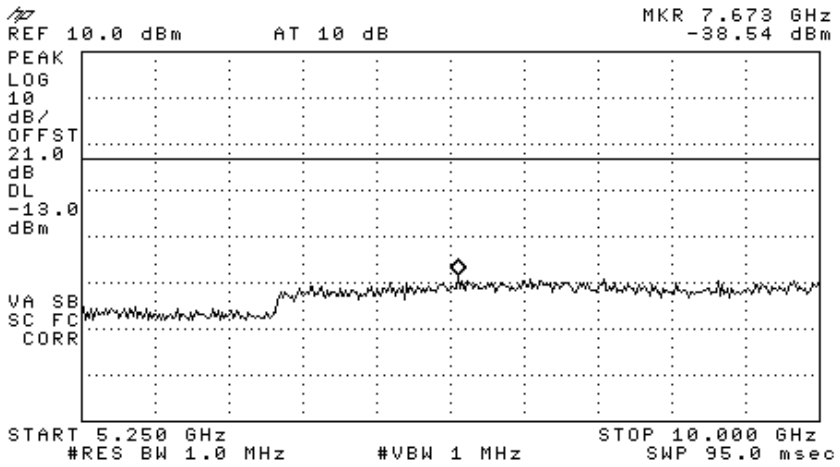

Figure 244 —5200 MHz 64QAM

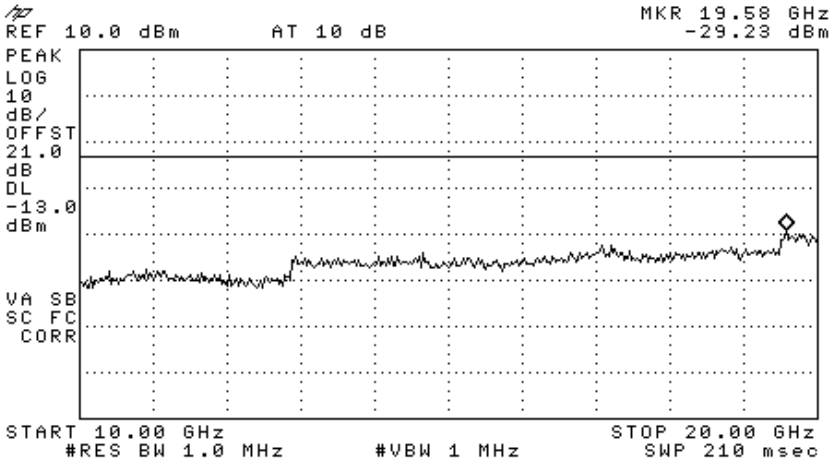

Figure 245 —5200 MHz 64QAM

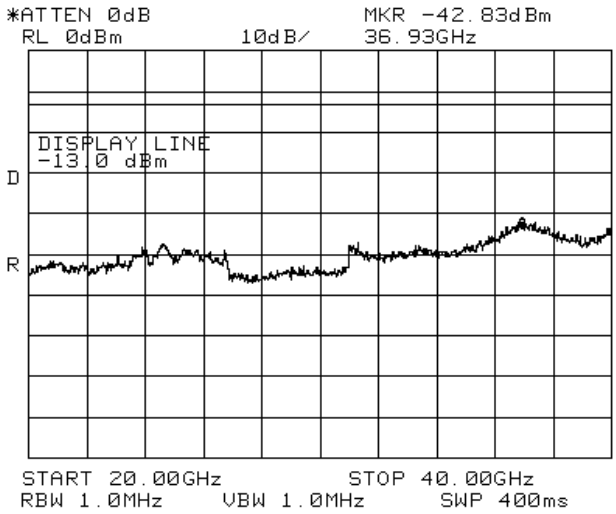

Figure 246 —5200 MHz 64QAM

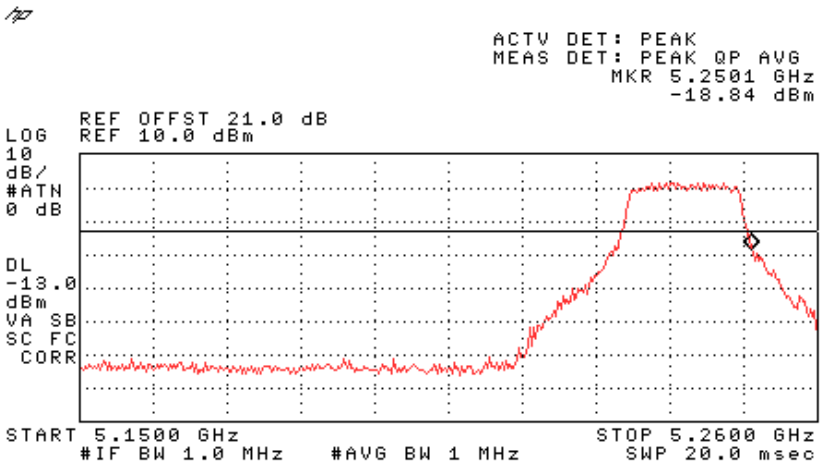

Figure 247 —5240 MHz 64QAM

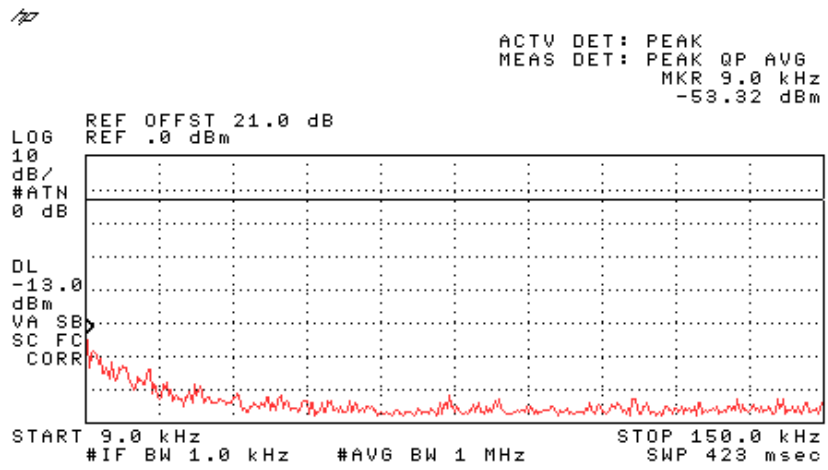

Figure 248 —5240 MHz 64QAM

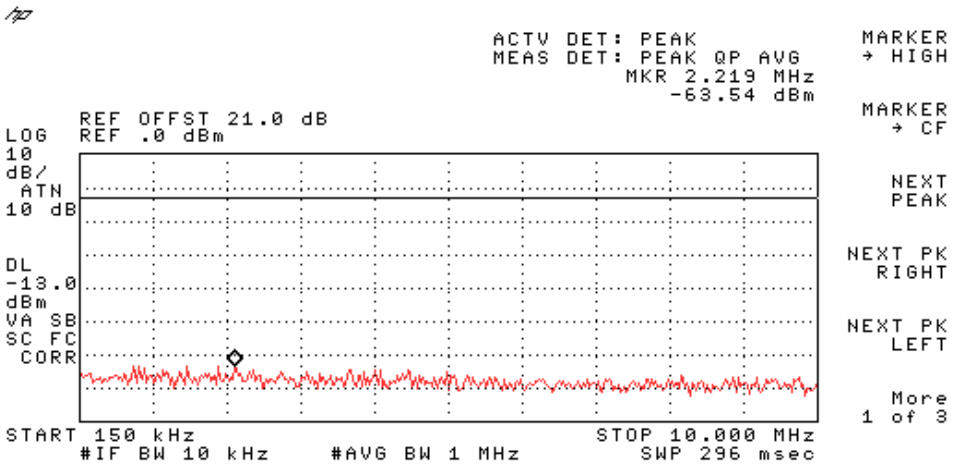

Figure 249 —5240 MHz 64QAM

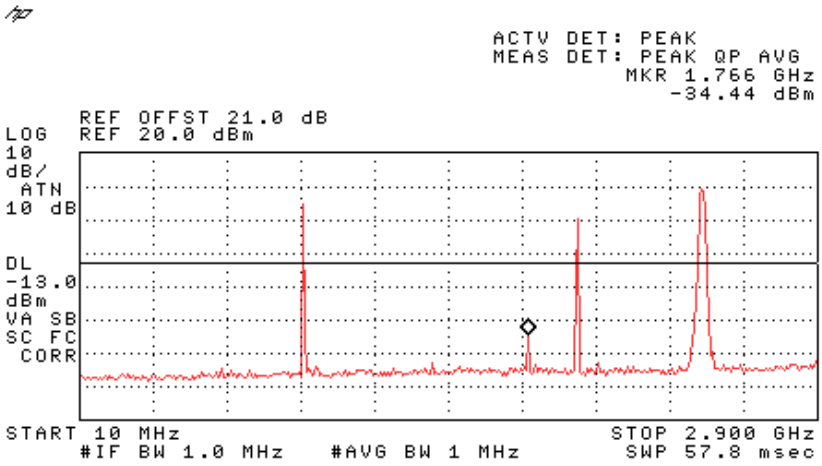

Figure 250 —5240 MHz 64QAM

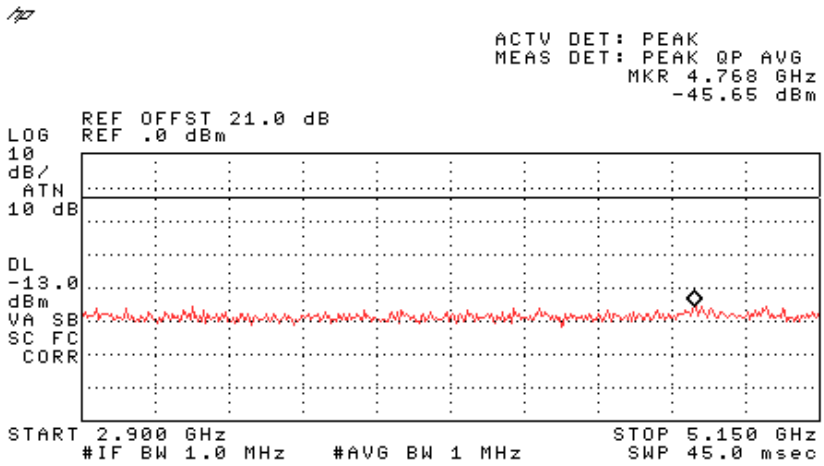

Figure 251 —5240 MHz 64QAM

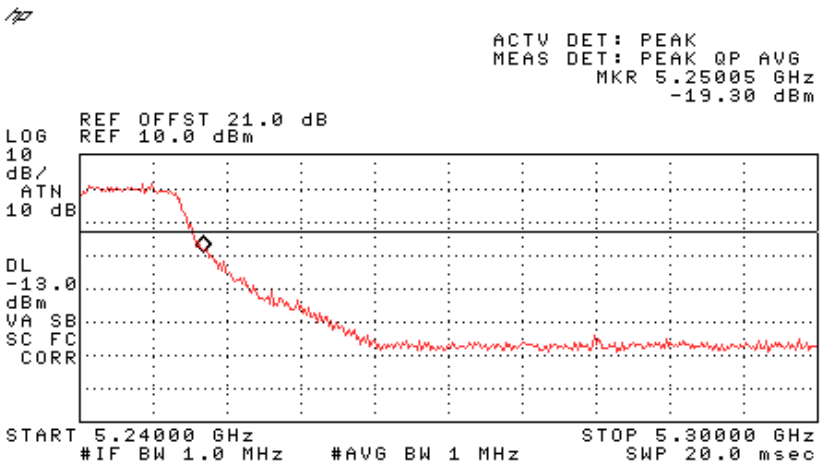

Figure 252 —5240 MHz 64QAM

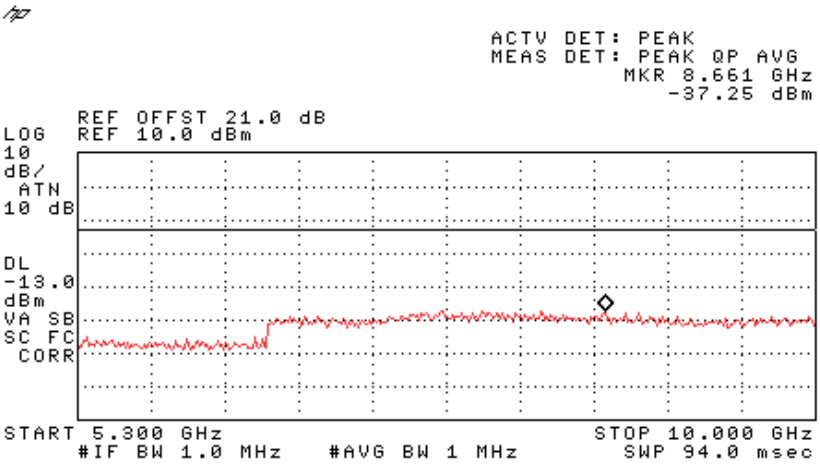

Figure 253 —5240 MHz 64QAM

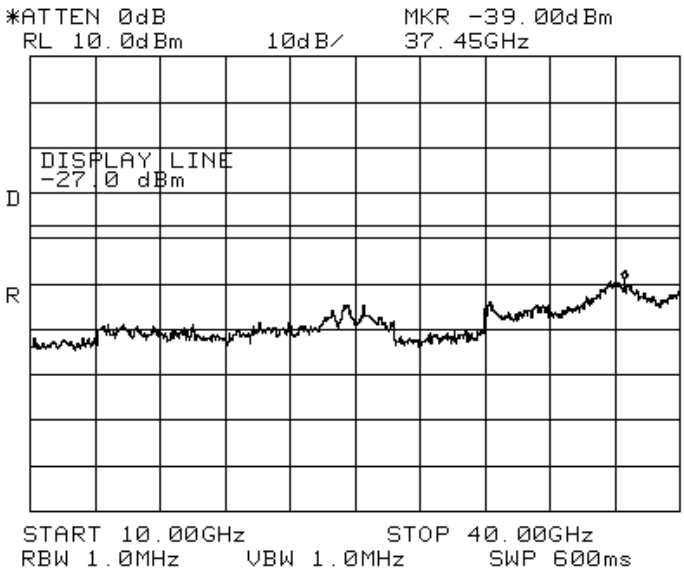

Figure 254 —5240 MHz 64QAM

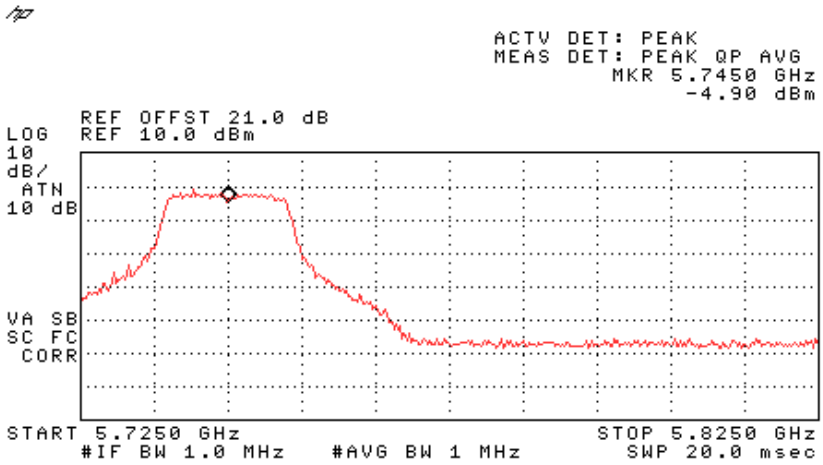

Figure 255 —5745 MHz 64QAM

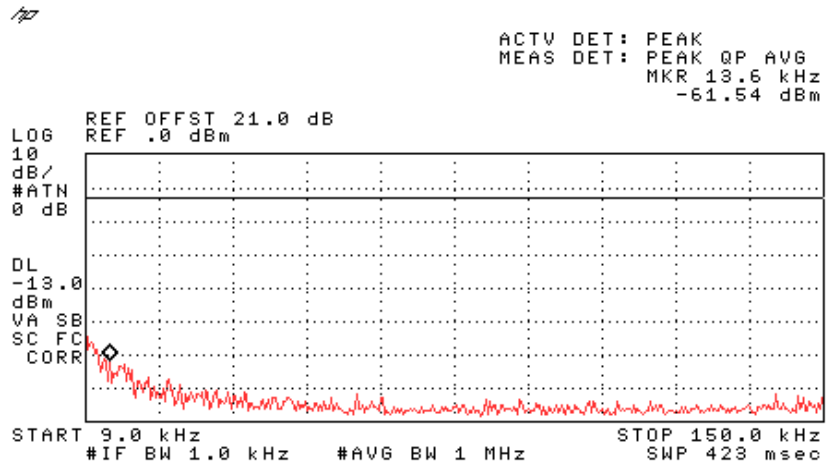

Figure 256 —5745 MHz 64QAM

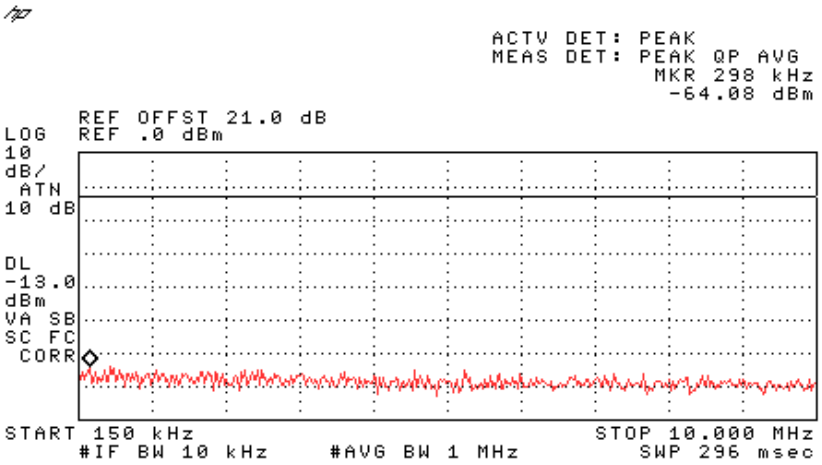

Figure 257 —5745 MHz 64QAM

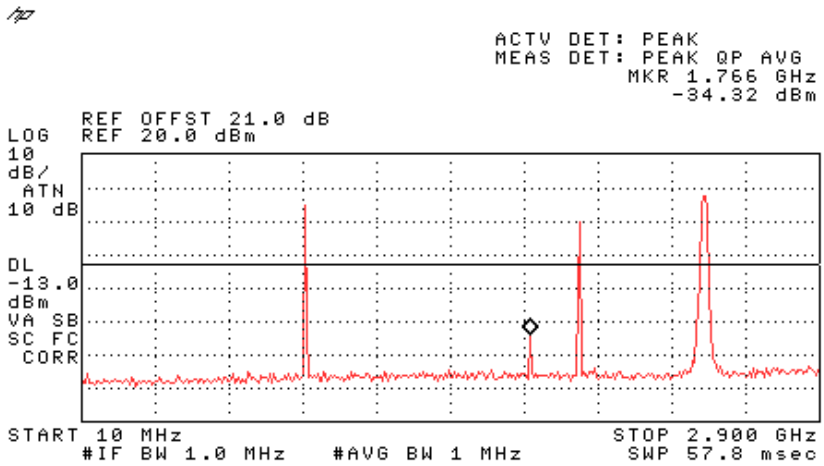

Figure 258 —5745 MHz 64QAM

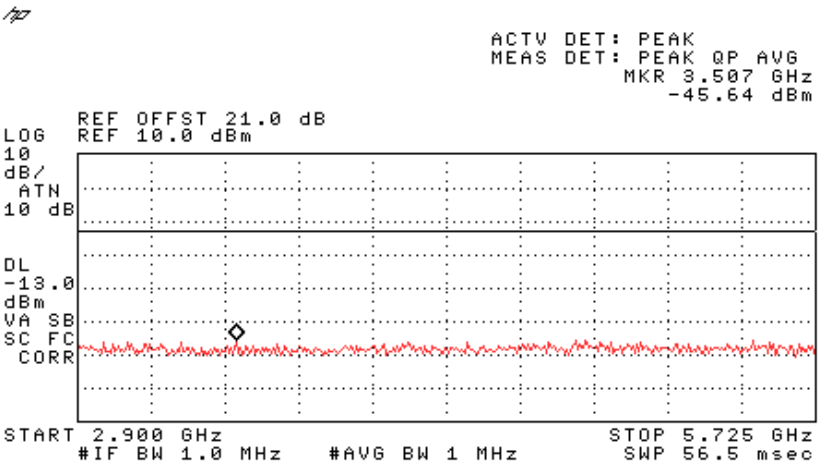

Figure 259 —5745 MHz 64QAM

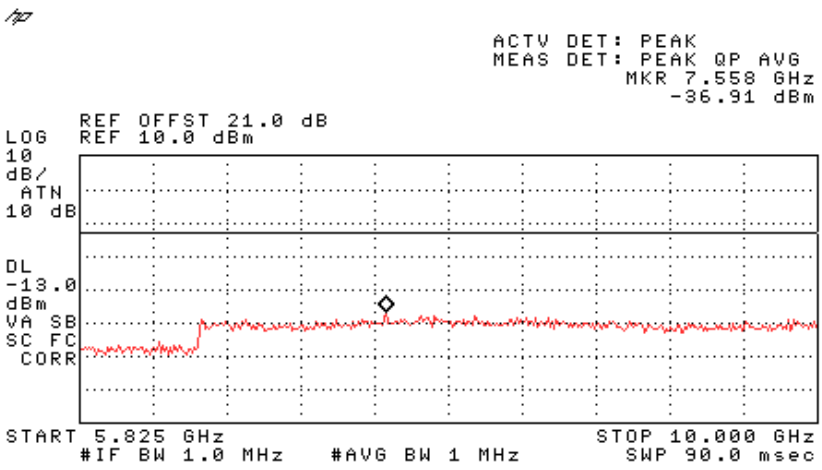

Figure 260 —5745 MHz 64QAM

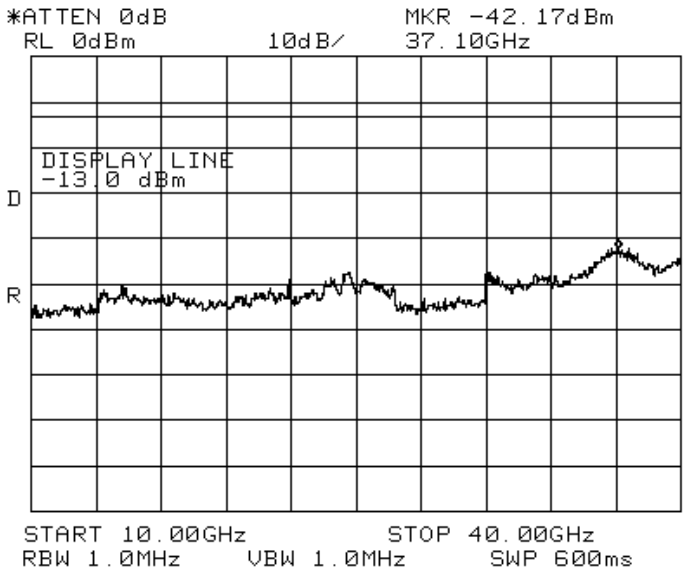

Figure 261 —5745 MHz 64QAM

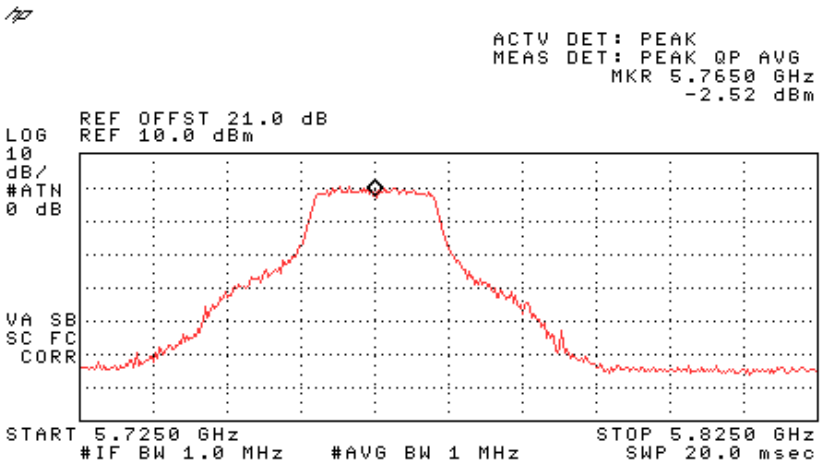

Figure 262 —5765 MHz 64QAM

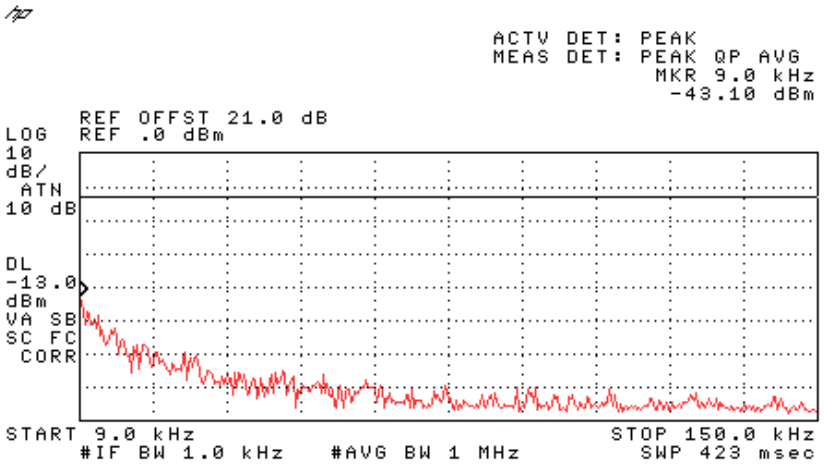

Figure 263 —5765 MHz 64QAM

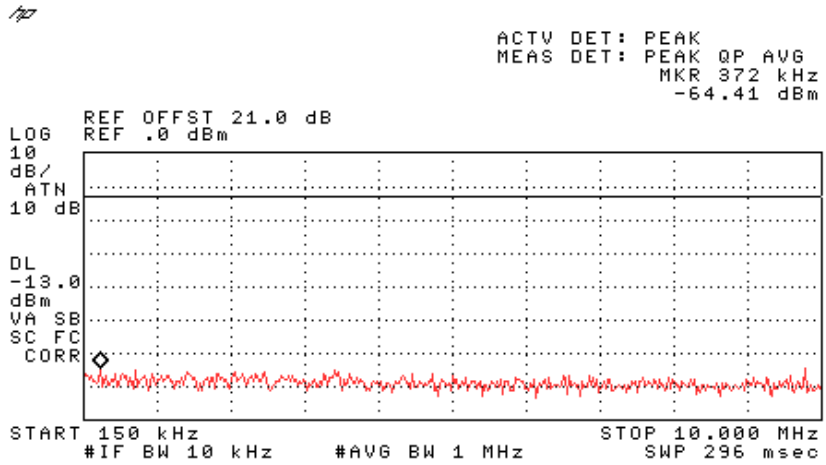

Figure 264 —5765 MHz 64QAM

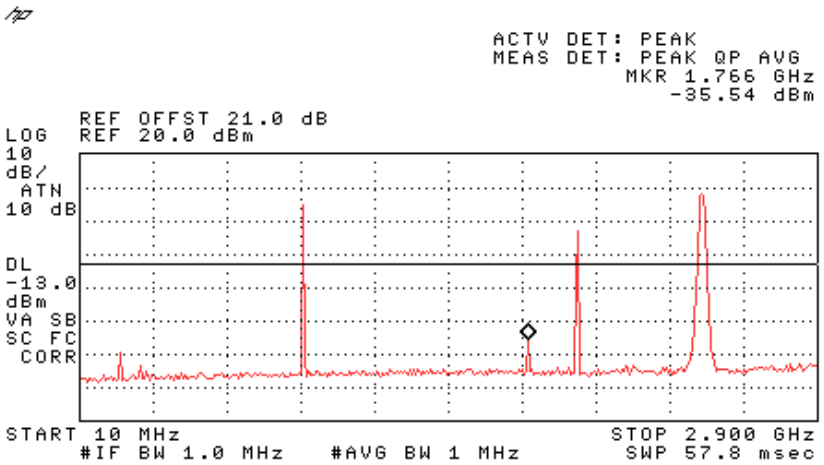

Figure 265 —5765 MHz 64QAM

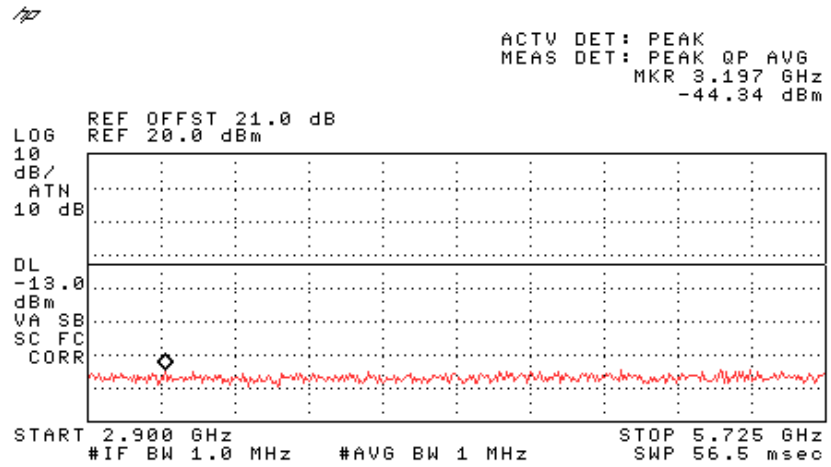

Figure 266 —5765 MHz 64QAM

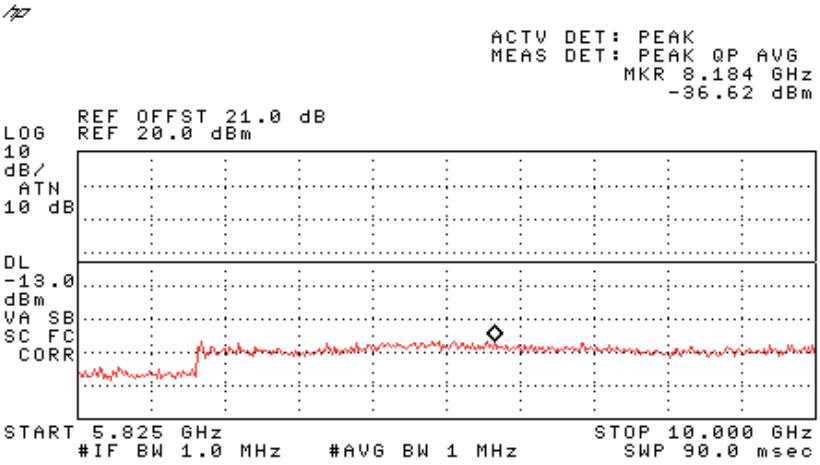

Figure 267 —5765 MHz 64QAM

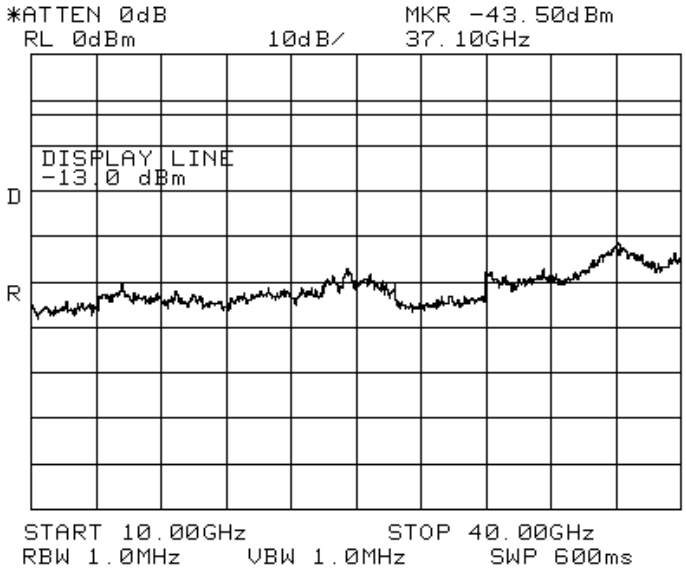

Figure 268 —5765 MHz 64QAM

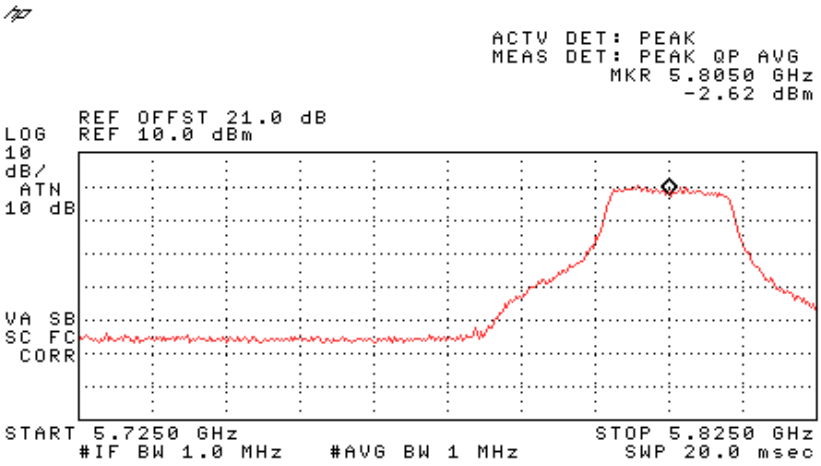

Figure 269 —5805 MHz 64QAM

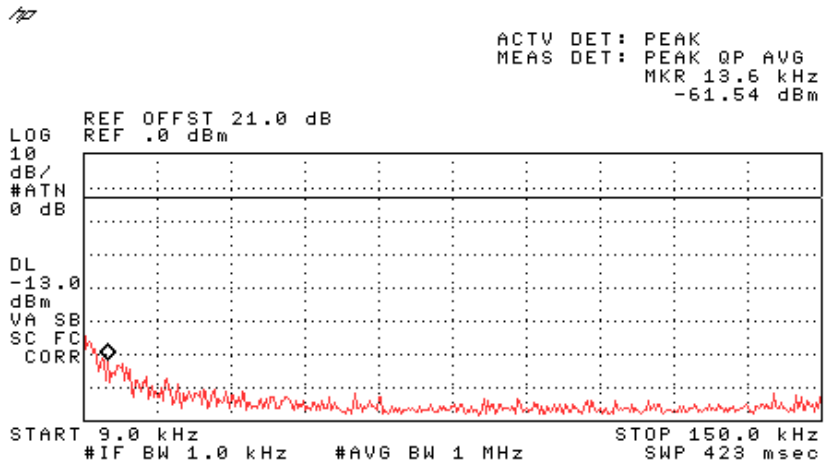

Figure 270 —5805 MHz 64QAM

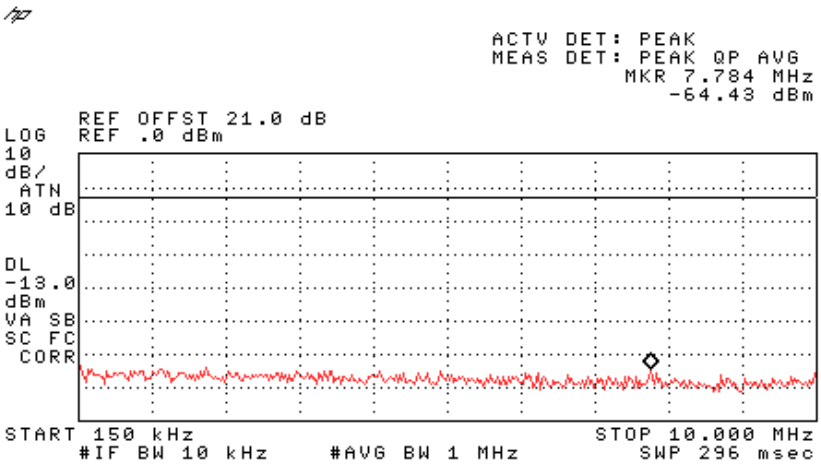

Figure 271 —5805 MHz 64QAM

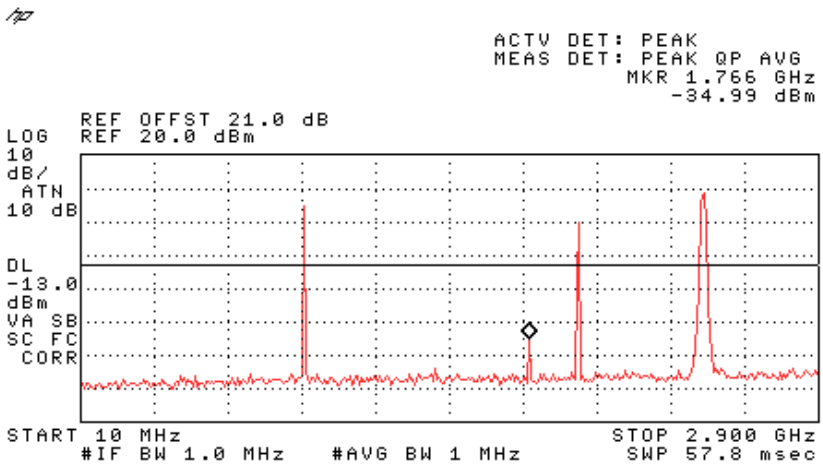

Figure 272 —5805 MHz 64QAM

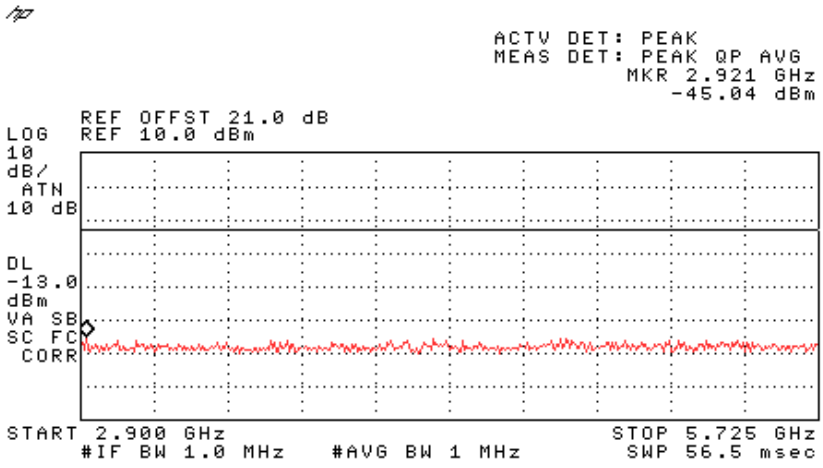

Figure 273 —5805 MHz 64QAM

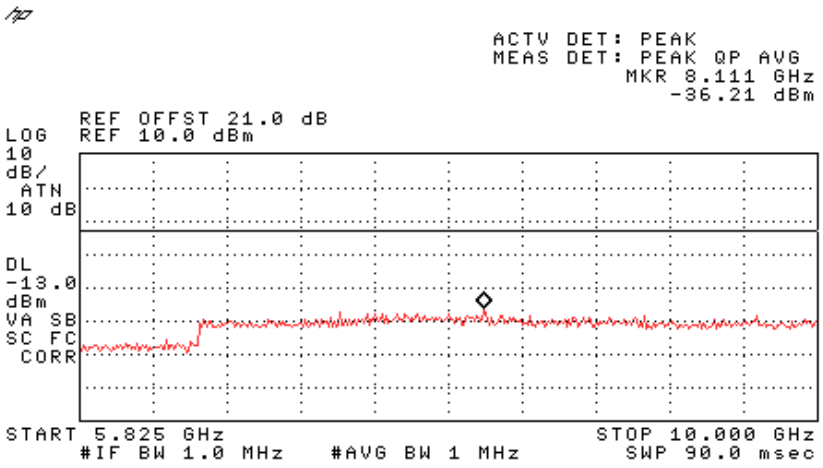

Figure 274 —5805 MHz 64QAM

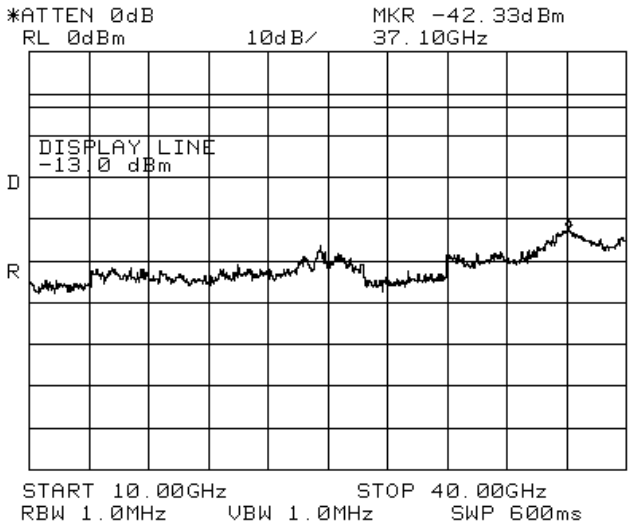

Figure 275 —5805 MHz 64QAM

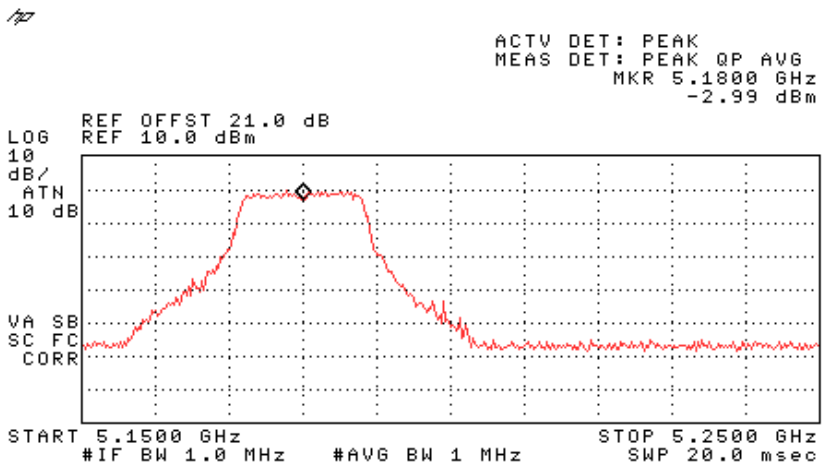

Figure 276 —5180 MHz BPSK

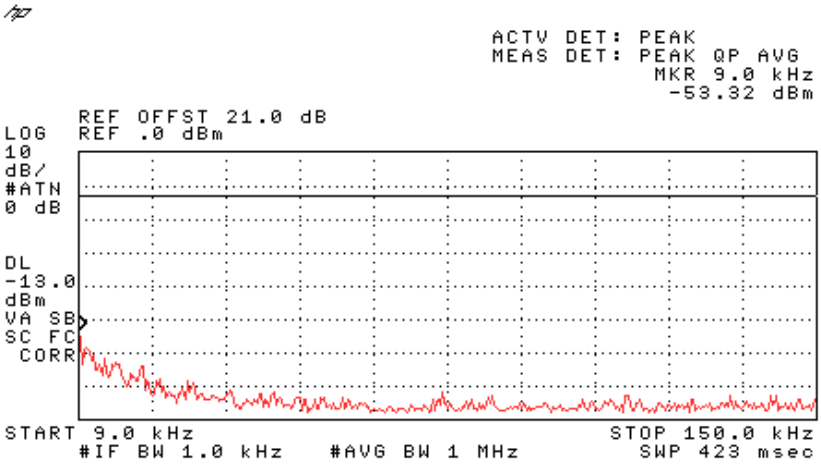

Figure 277 —5180 MHz BPSK

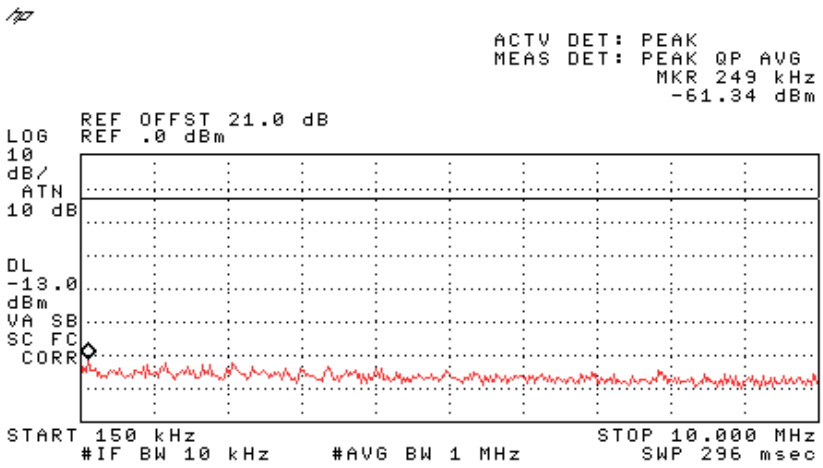

Figure 278 —5180 MHz BPSK

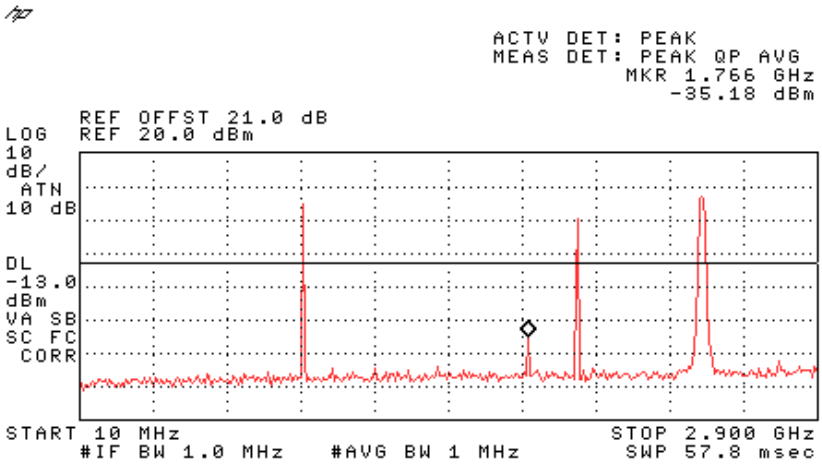

Figure 279 —5180 MHz BPSK

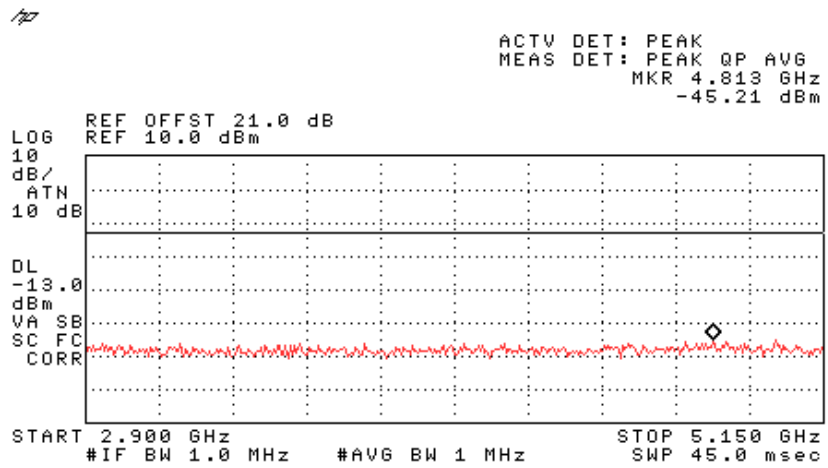

Figure 280 —5180 MHz BPSK

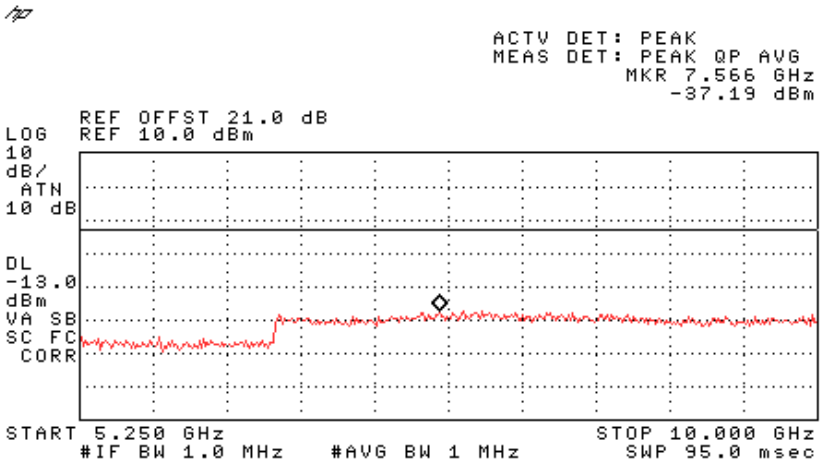

Figure 281 —5180 MHz BPSK

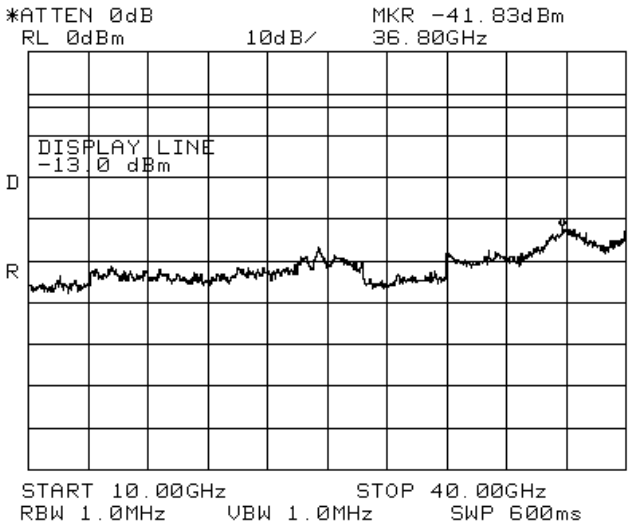

Figure 282 —5180 MHz BPSK

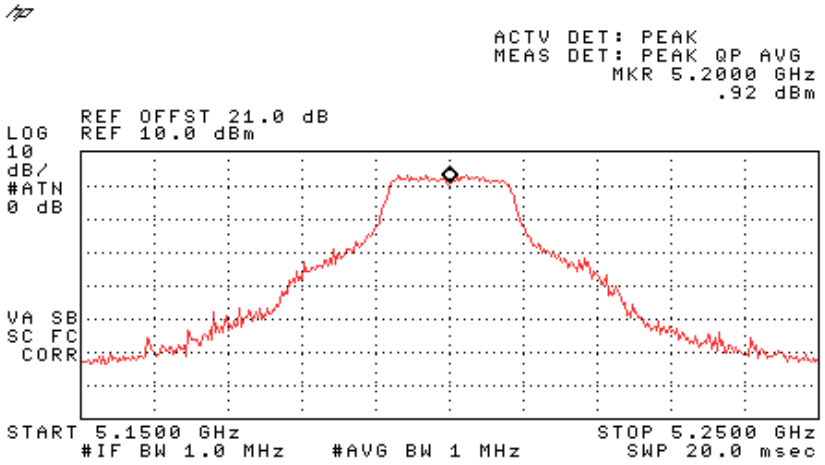

Figure 283 —5200 MHz BPSK

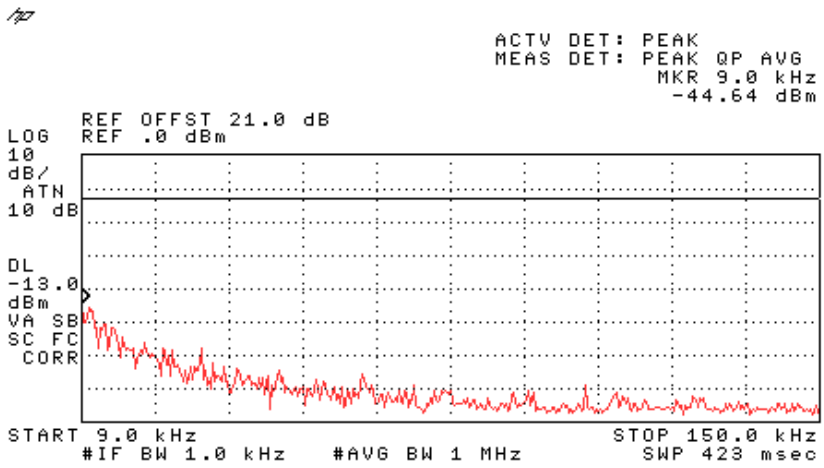

Figure 284 —5200 MHz BPSK

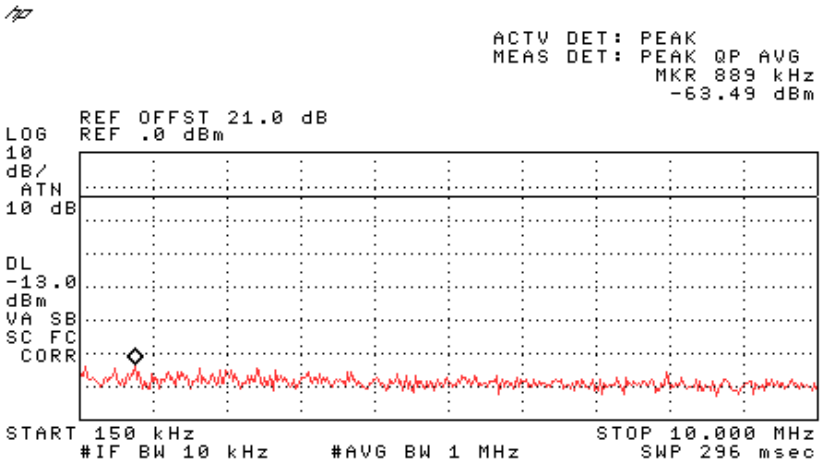

Figure 285 —5200 MHz BPSK

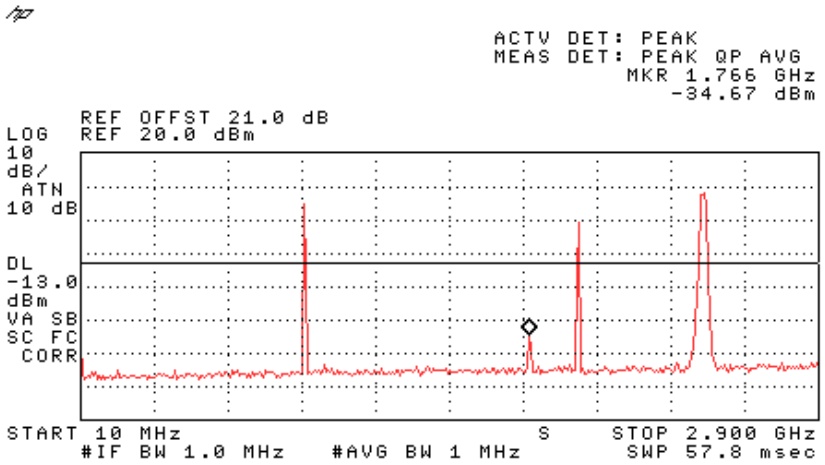

Figure 286 —5200 MHz BPSK

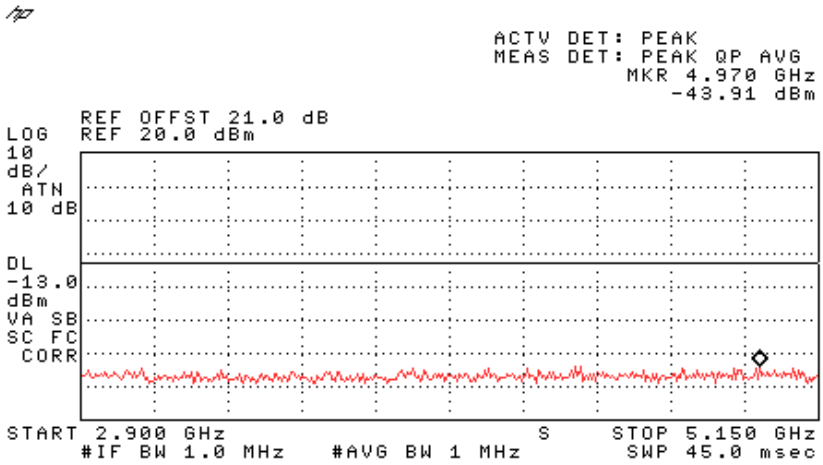

Figure 287 —5200 MHz BPSK

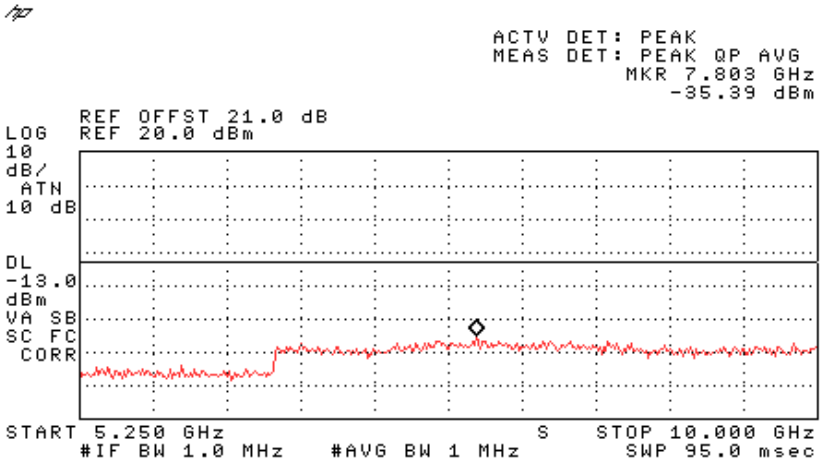

Figure 288 —5200 MHz BPSK

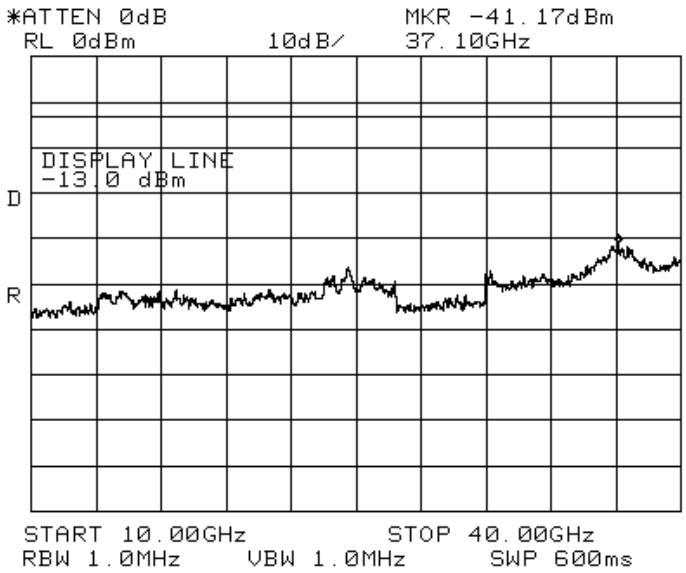

Figure 289 —5200 MHz BPSK

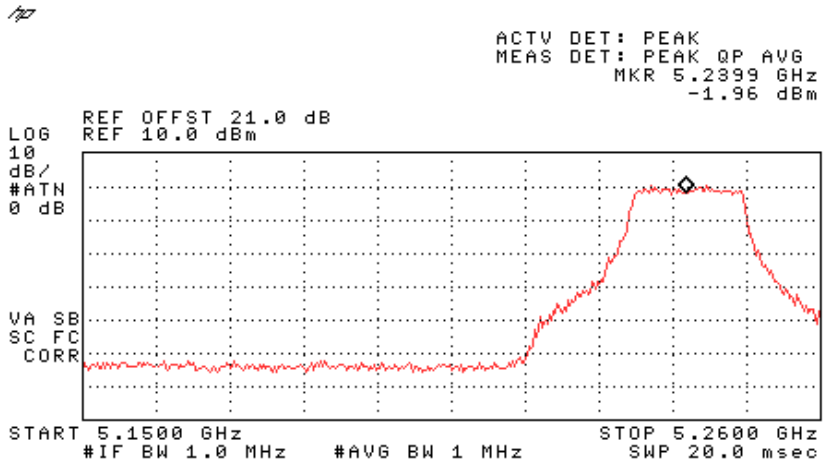

Figure 290 —5240 MHz BPSK

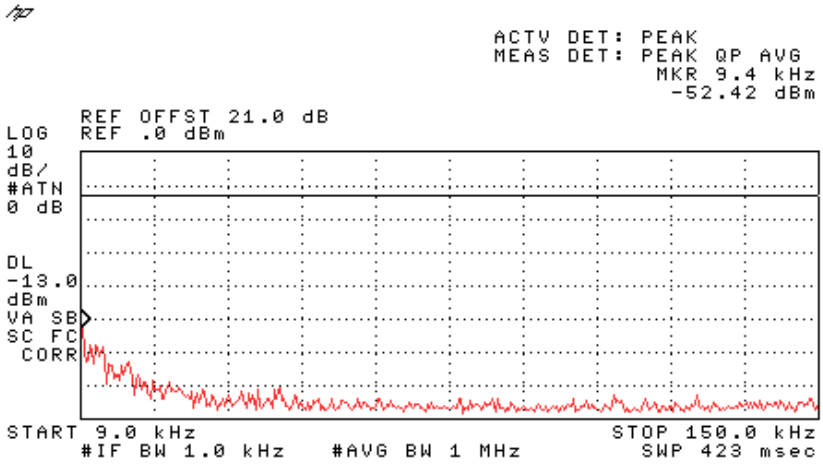

Figure 291 —5240 MHz BPSK

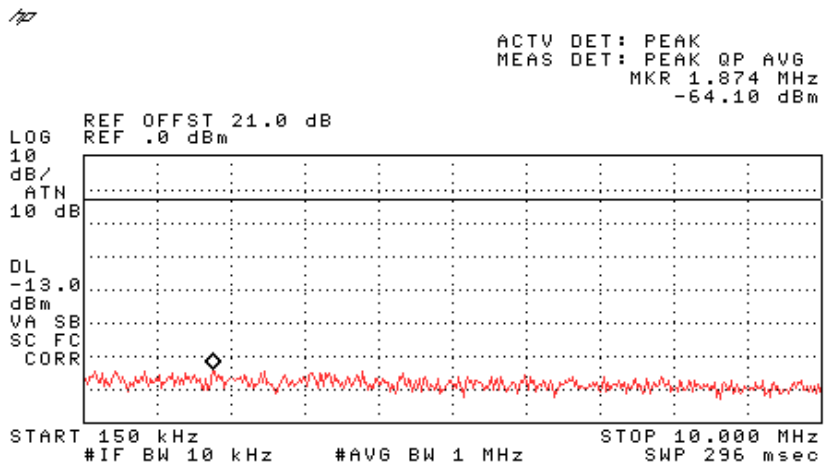

Figure 292 —5240 MHz BPSK

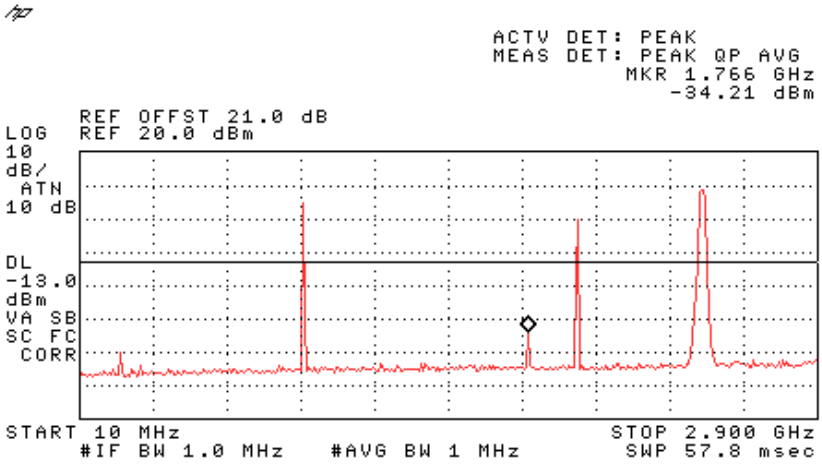

Figure 293 —5240 MHz BPSK

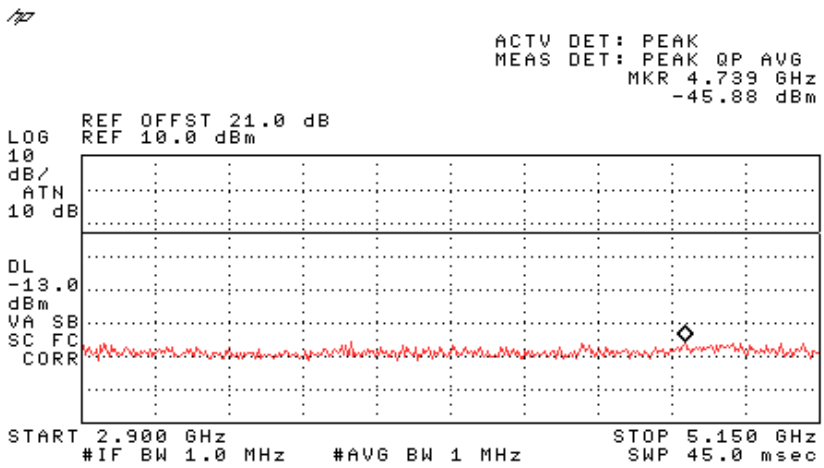

Figure 294 —5240 MHz BPSK

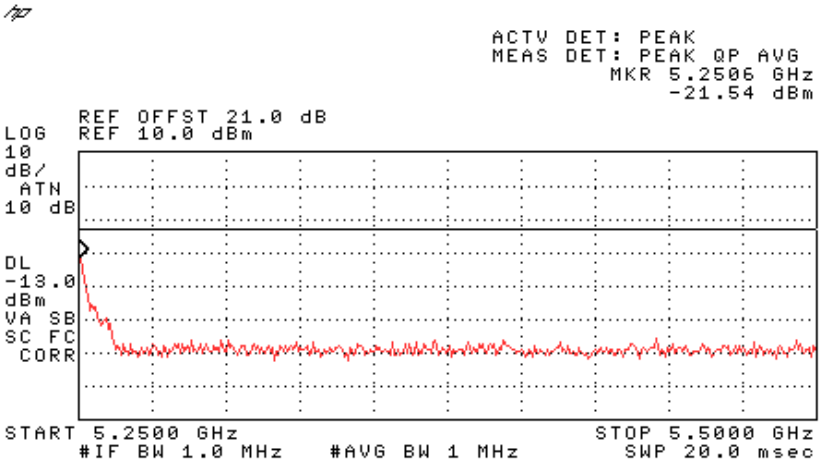

Figure 295 —5240 MHz BPSK

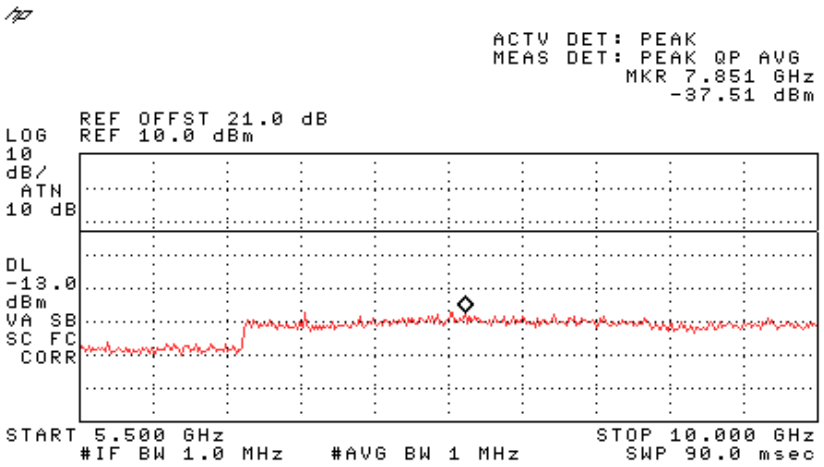

Figure 296 —5240 MHz BPSK

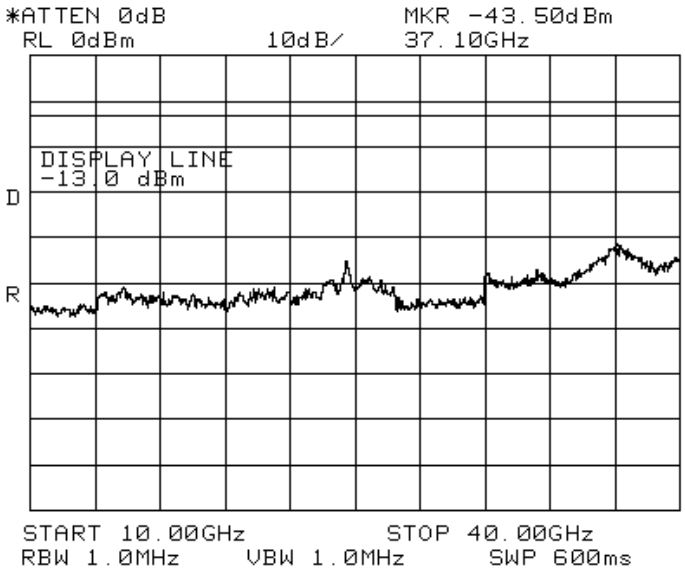

Figure 297 —5240 MHz BPSK

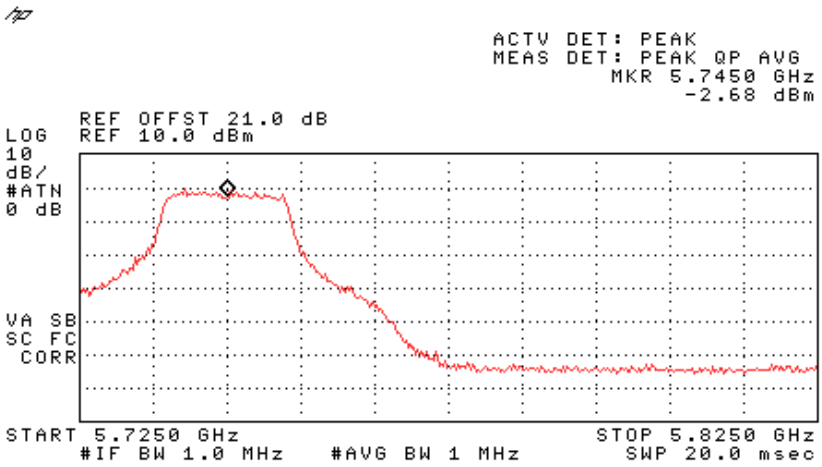

Figure 298 —5745 MHz BPSK

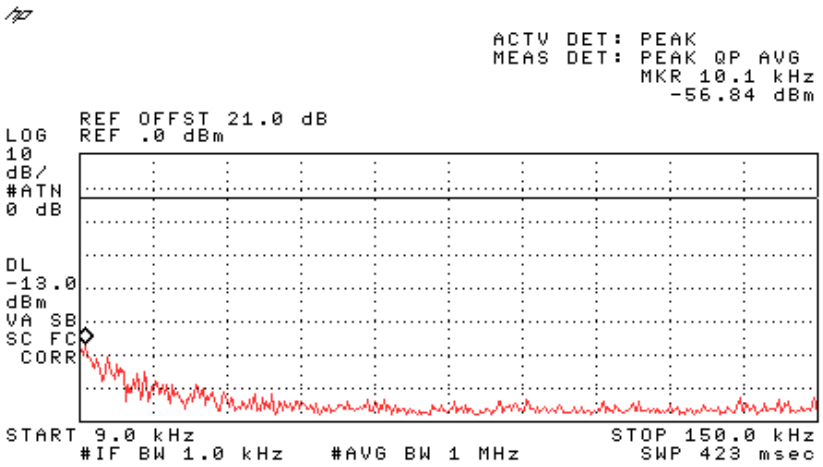

Figure 299 —5745 MHz BPSK

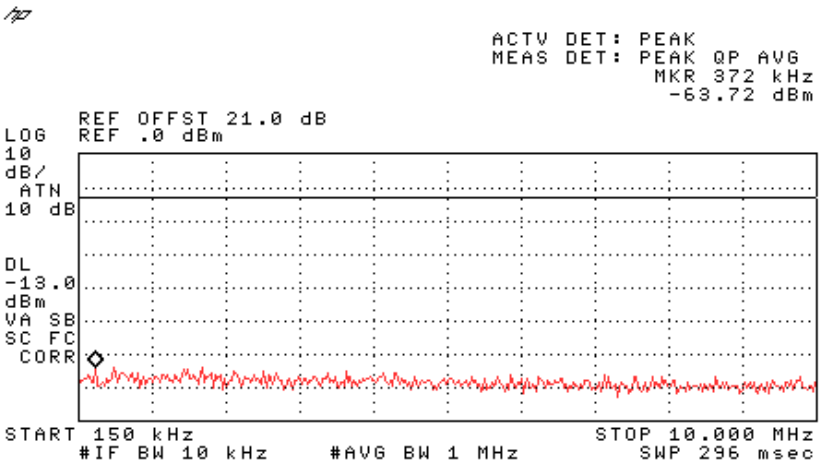

Figure 300 —5745 MHz BPSK

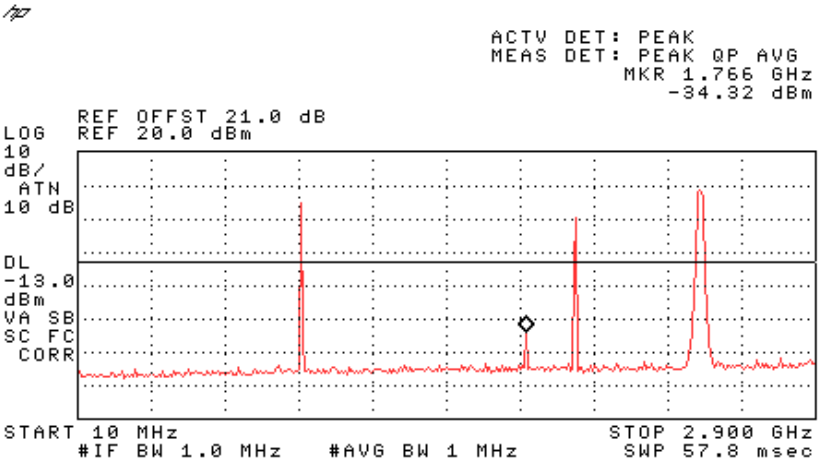

Figure 301 —5745 MHz BPSK

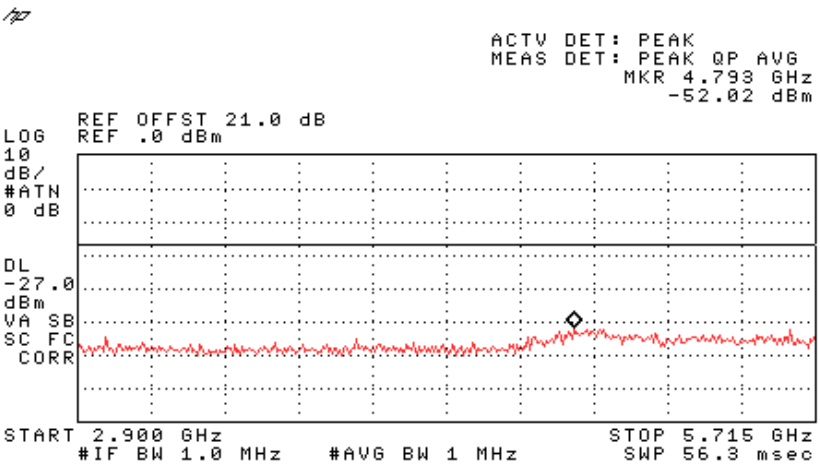

Figure 302 —5745 MHz BPSK

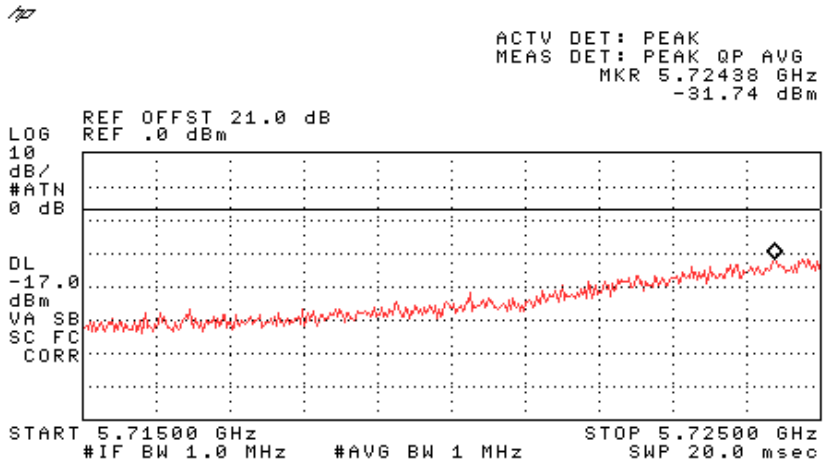

Figure 303 —5745 MHz BPSK

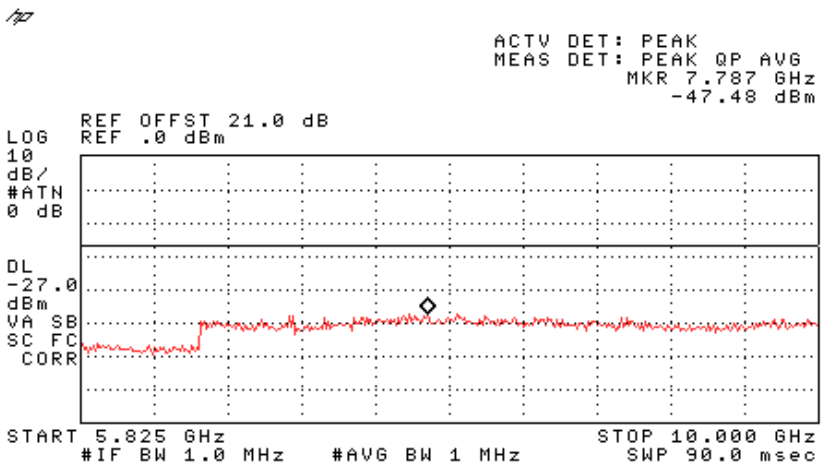

Figure 304 —5745 MHz BPSK

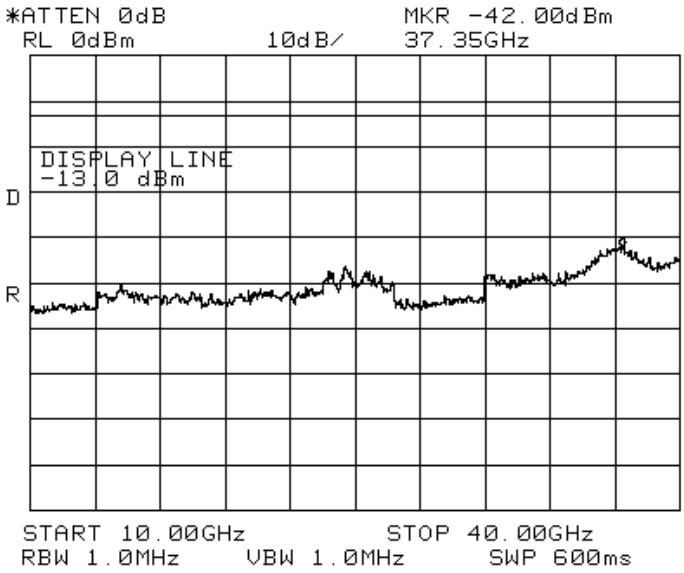

Figure 305 —5745 MHz BPSK

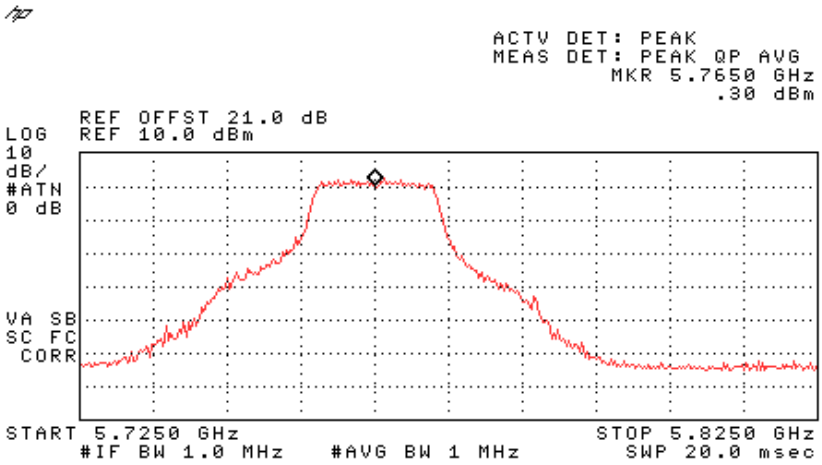

Figure 306 —5765 MHz BPSK

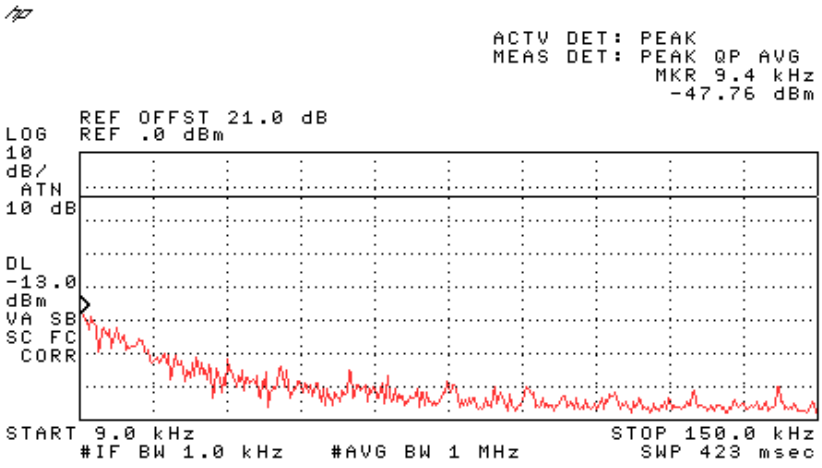

Figure 307 —5765 MHz BPSK

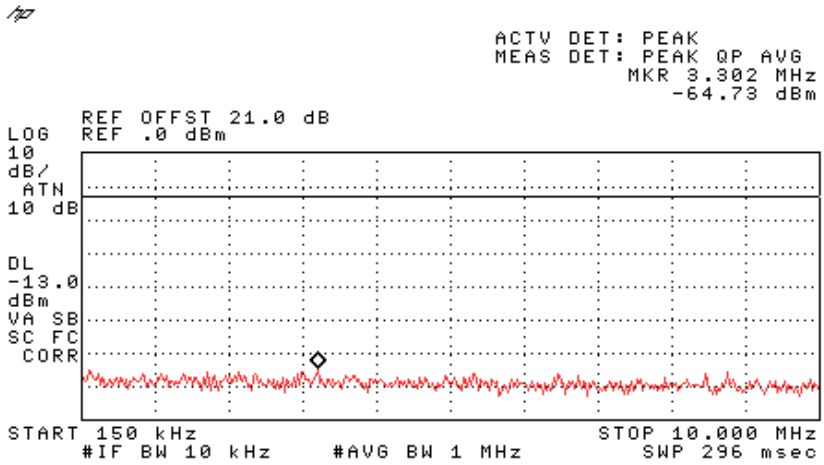

Figure 308 —5765 MHz BPSK

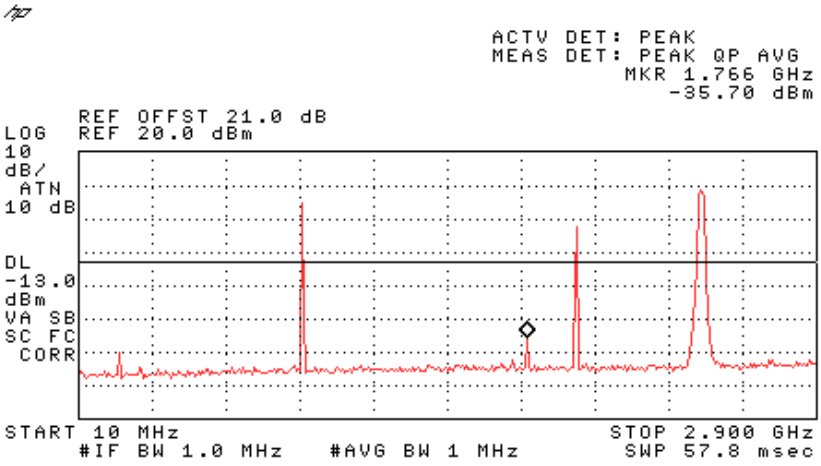

Figure 309 —5765 MHz BPSK

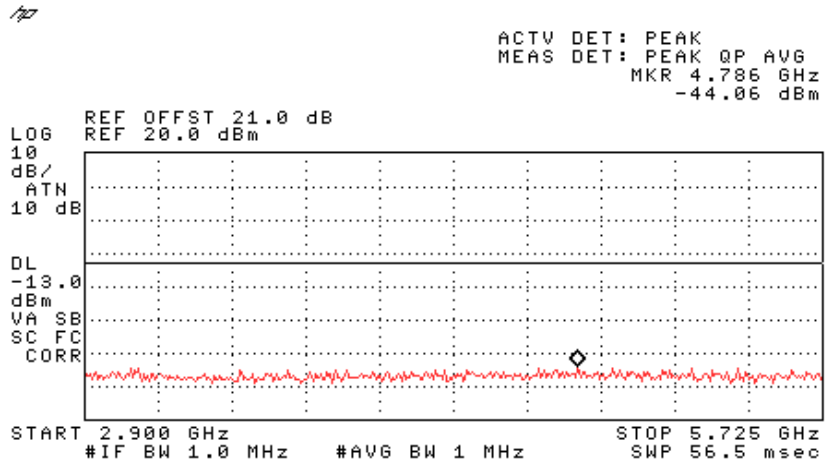

Figure 310 —5765 MHz BPSK

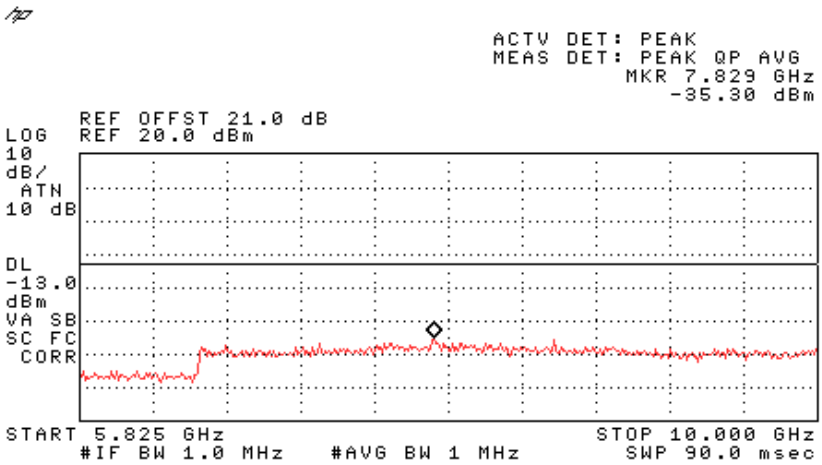

Figure 311 —5765 MHz BPSK

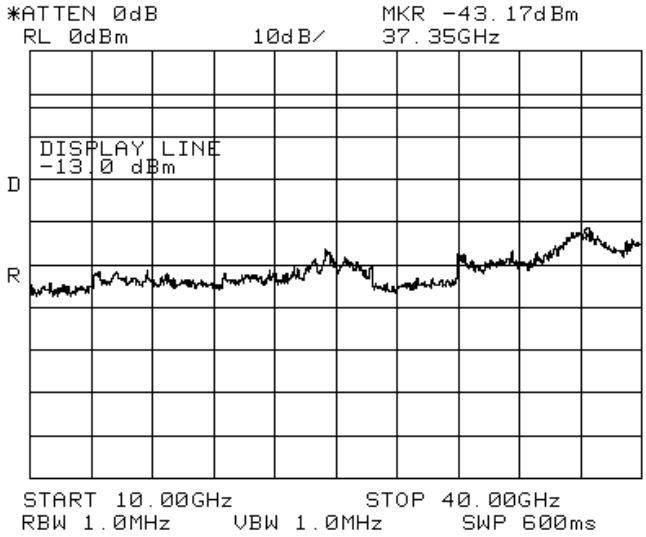

Figure 312 —5765 MHz BPSK

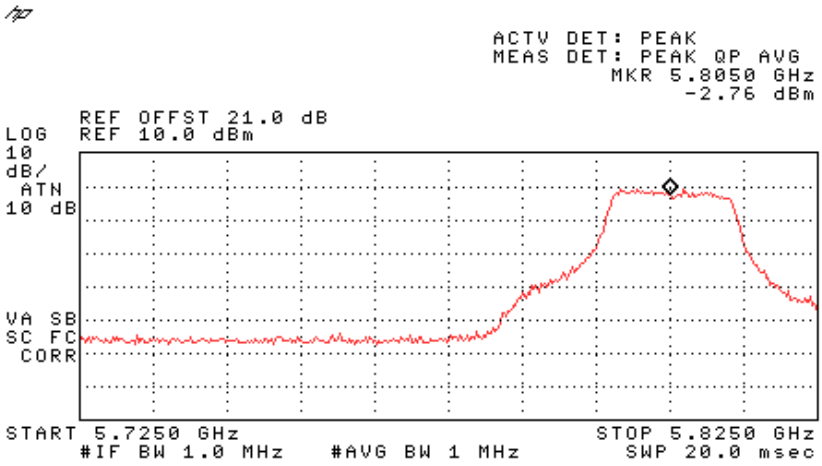

Figure 313 —5805 MHz BPSK

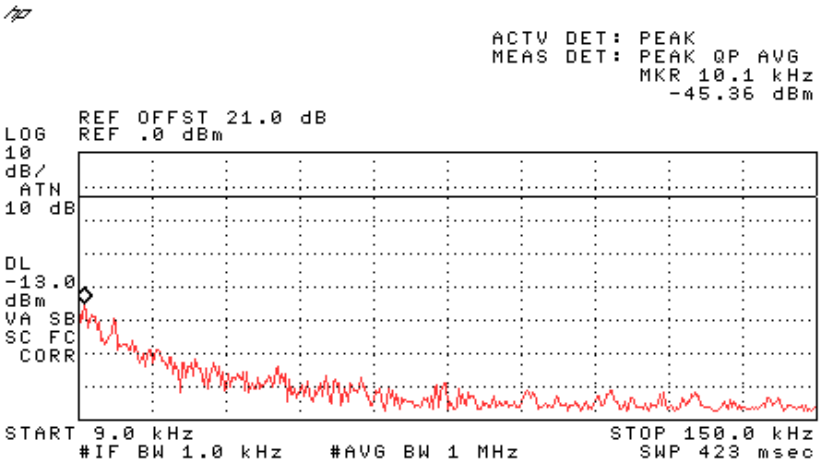

Figure 314 —5805 MHz BPSK

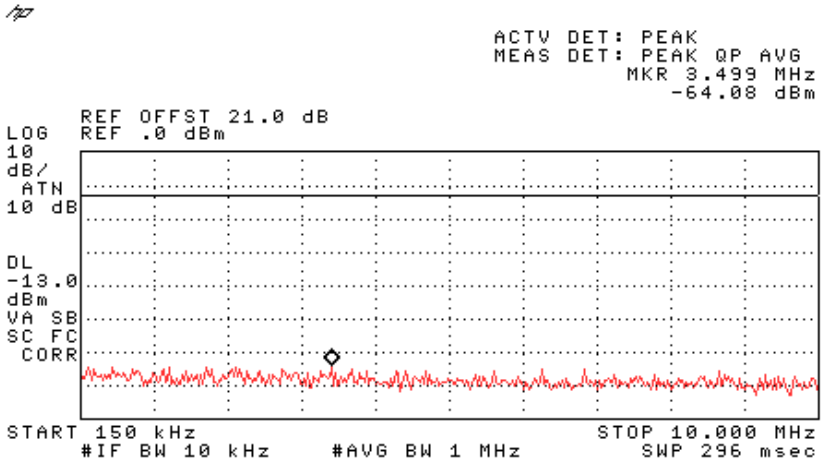

Figure 315 —5805 MHz BPSK

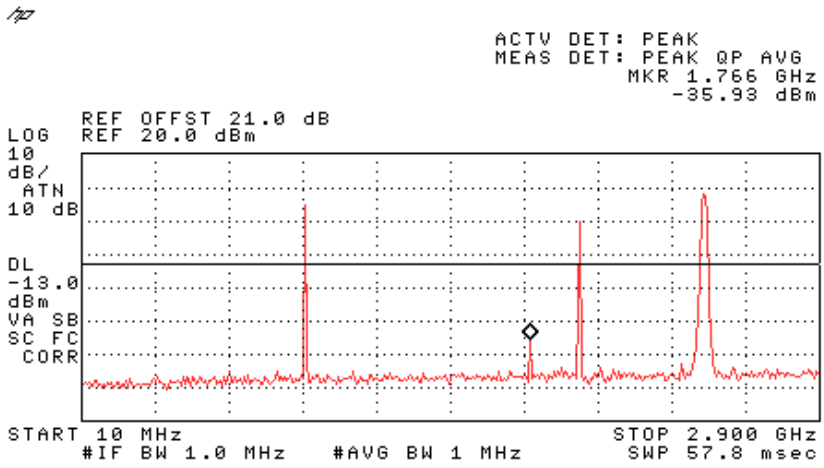

Figure 316 —5805 MHz BPSK

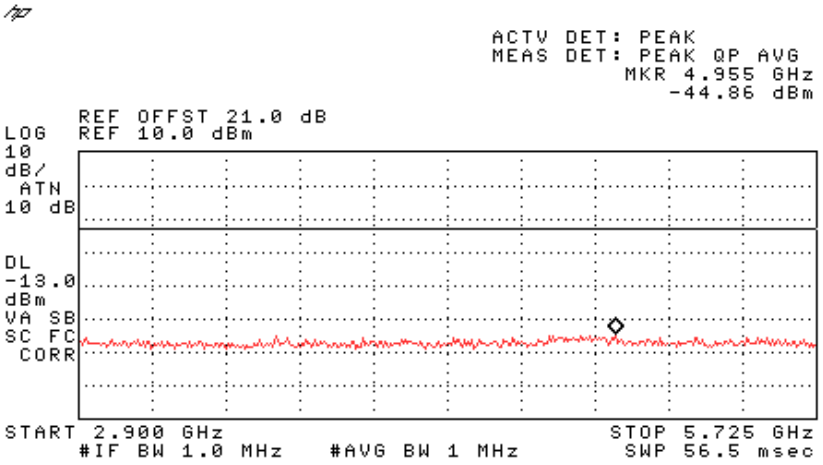

Figure 317 —5805 MHz BPSK

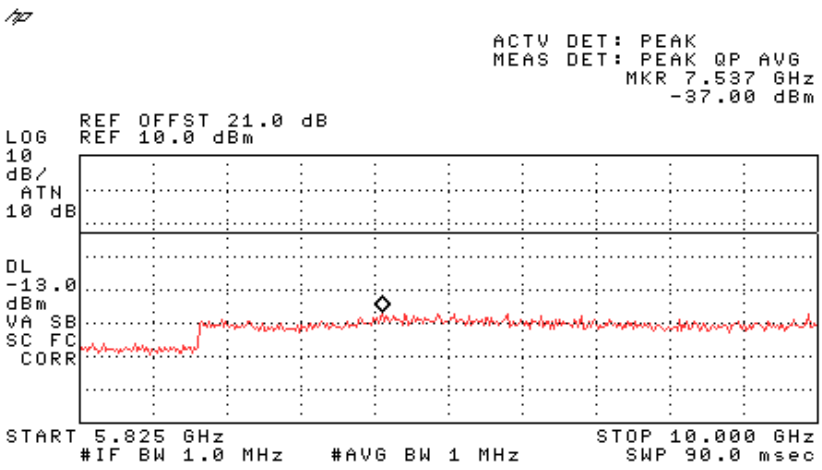

Figure 318 —5805 MHz BPSK

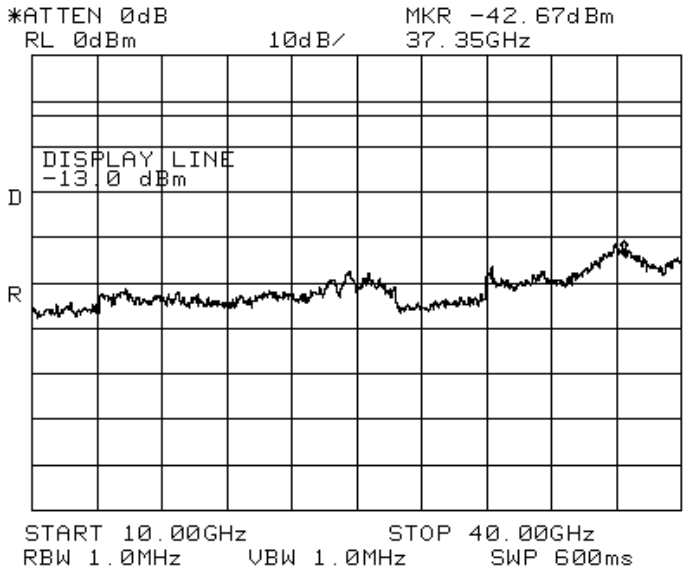

Figure 319 —5805 MHz BPSK

21.2 Results table

E.U.T Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart E

Operation Frequency (MHz)	Modulation	Reading (dBm)	Specification (dBm)	Margin (dB)
5180	64QAM	-33.69	-13.0	-20.69
	BPSK	-35.18	-13.0	-22.18
5200	64QAM	-29.23	-13.0	-16.23
	BPSK	-34.67	-13.0	-21.67
5240	64QAM	-19.30	-13.0	-6.30
	BPSK	-21.54	-13.0	-8.54
5745	64QAM	-34.32	-13.0	-21.32
	BPSK	-31.74	-13.0	-18.74
5765	64QAM	-35.54	-13.0	-22.54
	BPSK	-35.30	-13.0	-22.30
5805	64QAM	-34.99	-13.0	-21.99
	BPSK	-35.93	-13.0	-22.93

Figure 320 Peak Power Output of 5150-5250; 5725-5825 MHz Bands

JUDGEMENT: Passed by 6.30 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 09.03.08
Typed/Printed Name: E. Pitt

21.3 Test Equipment Used.

Peak Power Output of 5150-5825 MHz Band

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 year
Spectrum Analyzer	HP	8564E	3442A00275	November 14, 2007	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 321 Test Equipment Used

22. Band Edge Spectrum 5GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

[In Accordance with section 15.407)

22.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (cable loss = 1 dB). The spectrum analyzer was set to 1 MHz resolution BW. Maximum power level below 5150 MHz and above 5350 MHz was measured at 5180 MHz and 5240MHz correspondingly. Maximum power level below 5725 MHz and above 5825 MHz was measured at 5745 MHz and 5805 MHz correspondingly.

The E.U.T. was tested at 5180, 5240, 5745, and 5805 MHz with the following modulations: 64QAM (54Mbit/sec) and BPSK (6Mbit/sec).

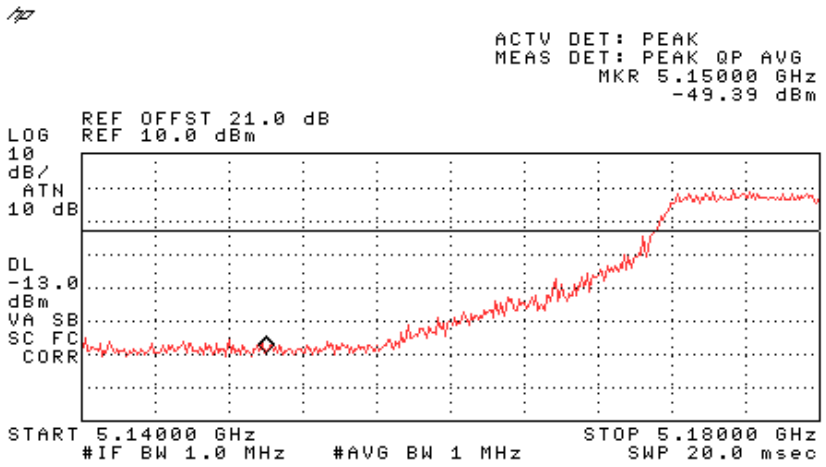

Figure 322 —5180 MHz 64QAM

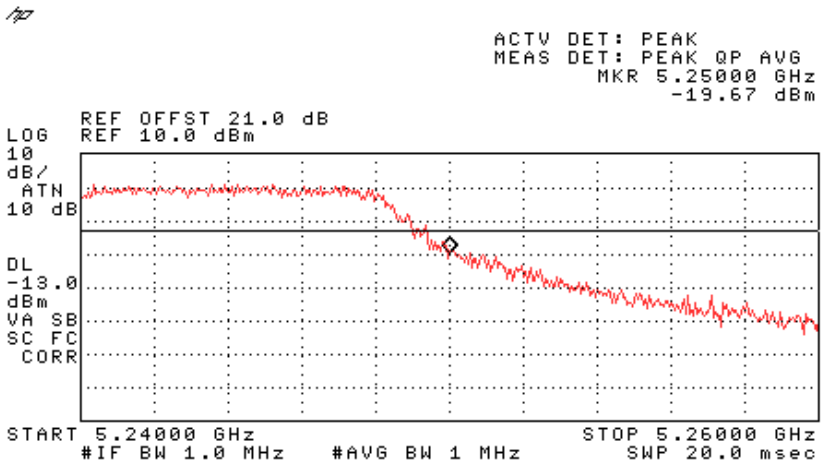

Figure 323 —5240 MHz 64QAM

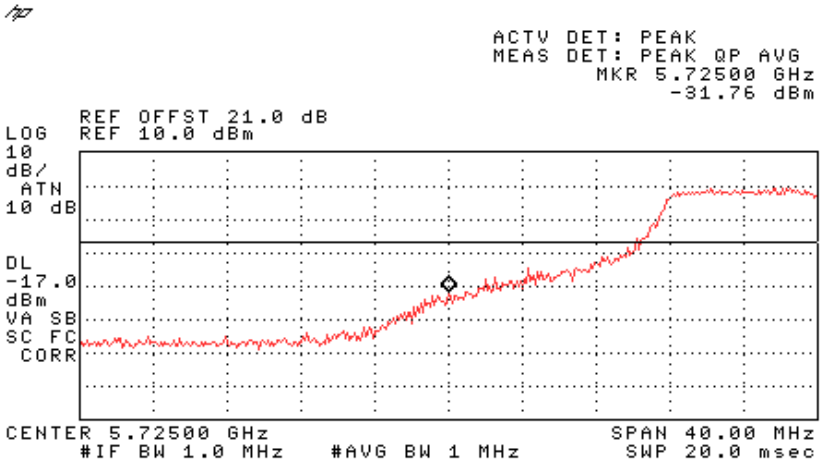

Figure 324 —5745 MHz 64QAM

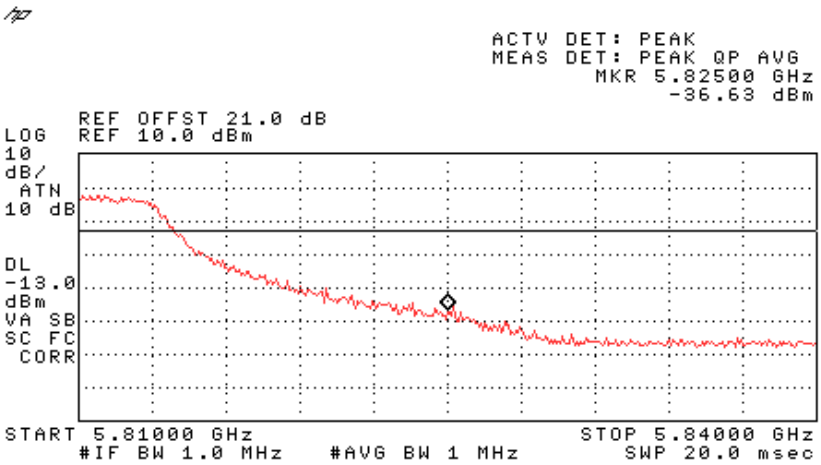

Figure 325 —5805 MHz 64QAM

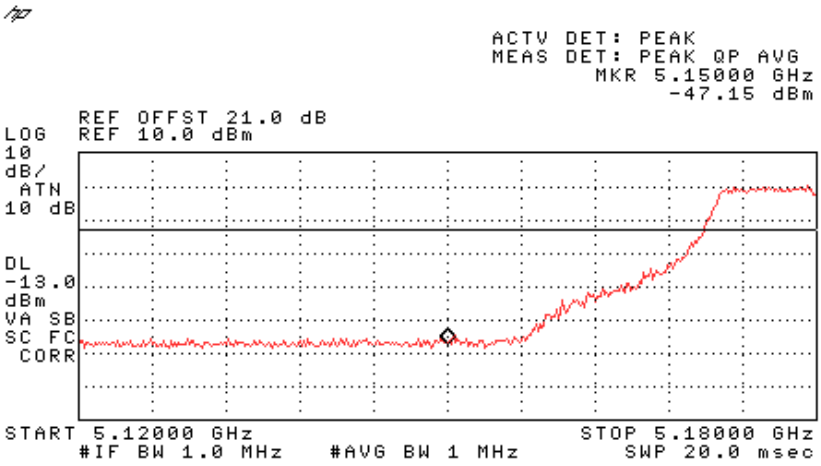

Figure 326 —5180 MHz BPSK

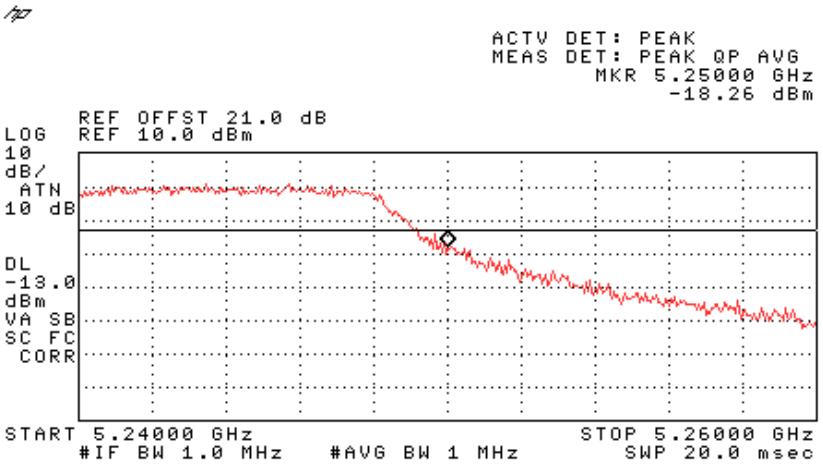

Figure 327 —5240 MHz BPSK

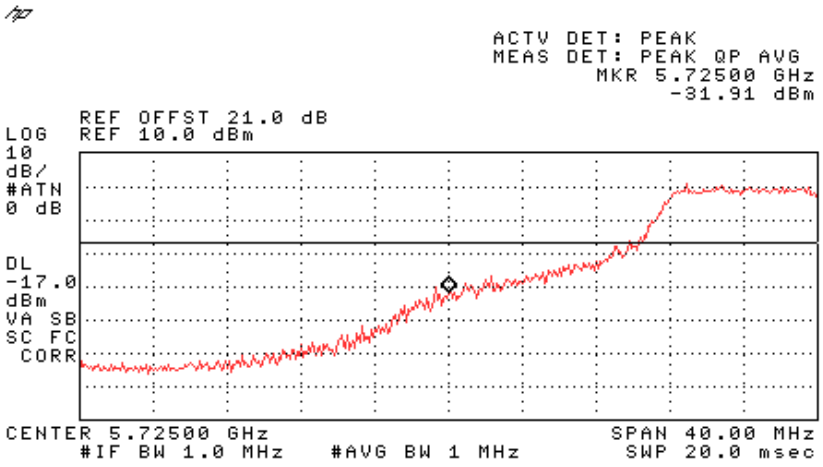

Figure 328 —5745 MHz BPSK

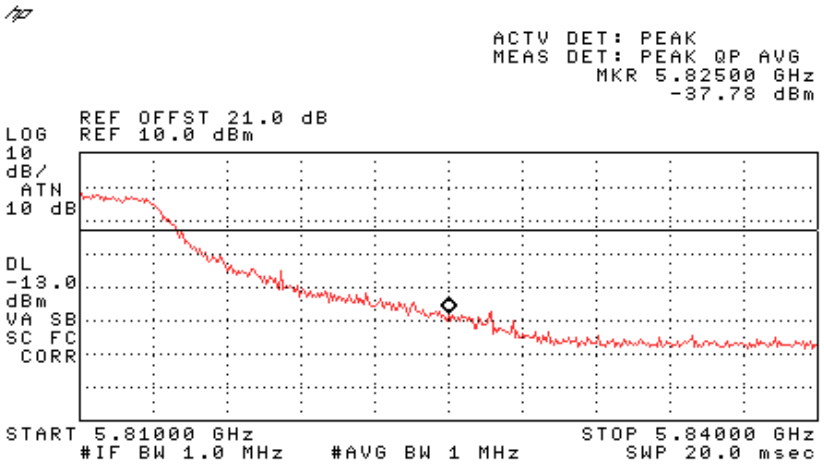

Figure 329 —5805 MHz BPSK

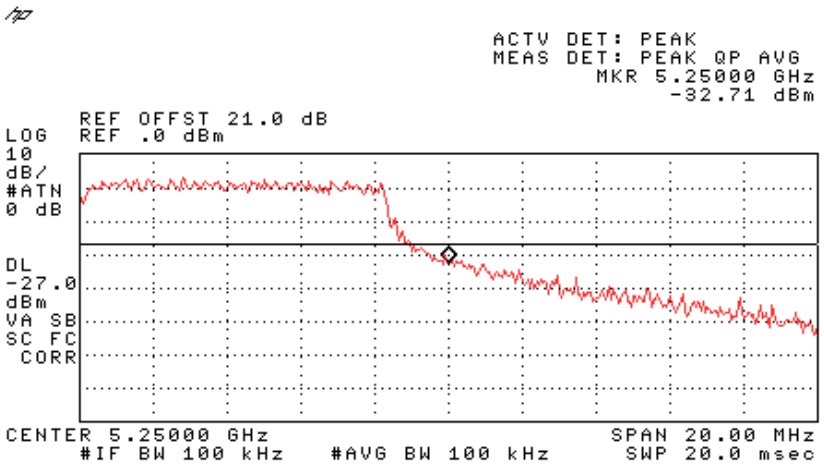

Figure 330 —Band Edge at 5.25 GHz Operation at 5.24 GHz 64QAM (Section 15.215(c))

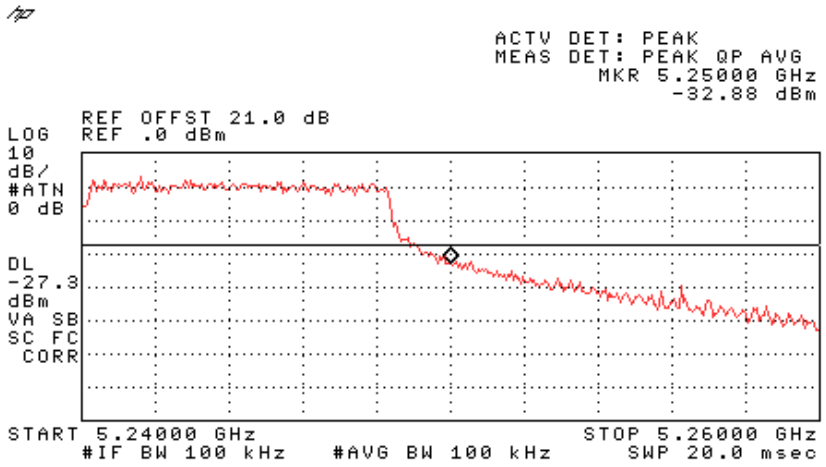

Figure 331 —Band Edge at 5.25 GHz Operation at 5.24 GHz BPSK (Section 15.215(c))

22.2 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart C (15.215(c))

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Result (dBc)	Specification (dBc)	Margin (dB)
5240	64QAM	5250	32.71	20.0	-12.71
	BPSK	5250	32.88	20.0	-12.88

Figure 332 Band Edge at 5.25 GHz operation at 5.24 GHz

JUDGEMENT: Passed by 12.71 dB

TEST PERSONNEL:

Tester Signature: _____ _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

22.3 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Model No.: 860M With WCE
Serial Number: 1. 860M: 73903D 2. WCE: 739038
Specification: F.C.C. Part 15, Subpart C (15.407)

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Result (dBm)	Specification (dBm)	Margin (dB)
5180	64QAM	5150	-49.39	-13.0	-36.39
	BPSK	5150	-47.15	-13.0	-34.15
5240	64QAM	5250	-19.67	-13.0	-6.67
	BPSK	5250	-18.26	-13.0	-5.26
5725	64QAM	5725	-31.76	-17.0	-14.76
	BPSK	5725	-31.91	-17.0	-14.91
5825	64QAM	5825	-36.63	-13.0	-23.63
	BPSK	-5825	-37.78	-13.0	-24.78

Figure 333 Band Edge Spectrum

JUDGEMENT: Passed by 5.26 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

22.4 Test Equipment Used.

Band edge Spectrum

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer		8593EM	3536A00120	February 26, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 334 Test Equipment Used

23. Antenna Gain 5GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

The antenna gain is 7 dBi.

24. R.F Exposure/Safety 5GHz Transmitter 802.11b/g+802.11a + CELL + PCS Signals

Typical use of the E.U.T. is repeating WiFi signals for DAS. The typical placement of the E.U.T. is on a wall near the ceiling. The typical distance between the E.U.T. and the user in the worst case application, is >1 m.

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1307(b)(1) Requirements

(f) FCC limits at 5745 MHz is: $1\frac{mW}{cm^2}$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(g) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2}$$

P_t- Transmitted Power (Peak) 28.8 mW= 14.6 dBm

G_T- Antenna Gain, 7 dBi = 5

R- Distance from Transmitter using 1 m worst case

(h) The peak power density is :

$$S_p = \frac{28.8 \times 5}{4\pi(100)^2} = 1.15 \times 10^{-3} \frac{mW}{cm^2}$$

(i) The duty cycle of transmission in actual worst case is 50%.

The average power source is:

$14.4mW$

(j) The averaged power density of the E.U.T. is:

$$S_{AV} = 0.57 \times 10^{-3} \frac{mW}{cm^2}$$

(f) This is 3 orders of magnitude below the FCC limit.

25. Radiated Emission Per FCC Part 15 Sub-Part B Test Data 802.11b/g+802.11a + CELL + PCS Signals

25.1 Test Specification

30-40000 MHz, FCC Part 15, Subpart B, CLASS A

25.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 4.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The frequency range 30-40000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 2.9 - 40 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization. Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The emissions were measured at a distance of 3 meters.
The E.U.T. was tested in both Rx and Tx modes.
The E.U.T. was tested at the operating frequencies of, 5180, 5200, 5240, 5745, 5765, and 5805 MHz using the following modulations: 64QAM, and BPSK.

25.3 Test Data

JUDGEMENT: Passed by 4.9 dB.

The margin between the emission level and the specification limit is 4.9 dB in the worst case at the frequency of 128.38 MHz, vertical polarization.

The signals in the band 1.0 – 40.0 GHz were more than 20 dB below the specification limit.

The EUT met the requirements of the F.C.C. Part 15, Subpart B, Class A, specification.

The results for all three operating frequencies and modulations were the same.

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

Radiated Emission

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Signal Number	Frequency (MHz)	Peak dBuV/m	QP dBuV/m	QP Delta L 1 (dB)	Av Delta L 2 (dB)	Corr (dB)
1	299.894100	39.0	33.3	-23.5		23.4
2	375.000000	42.3	38.9	-18.0		18.7
3	500.015000	43.7	40.1	-16.8		21.0
4	625.010000	43.2	38.5	-18.4		24.7
5	700.010000	43.4	39.7	-17.2		25.3
6	750.010000	43.5	38.8	-18.1		25.8

Figure 335. Radiated Emission. Antenna Polarization: HORIZONTAL. Detectors: Peak, Quasi-peak

Note: QP Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

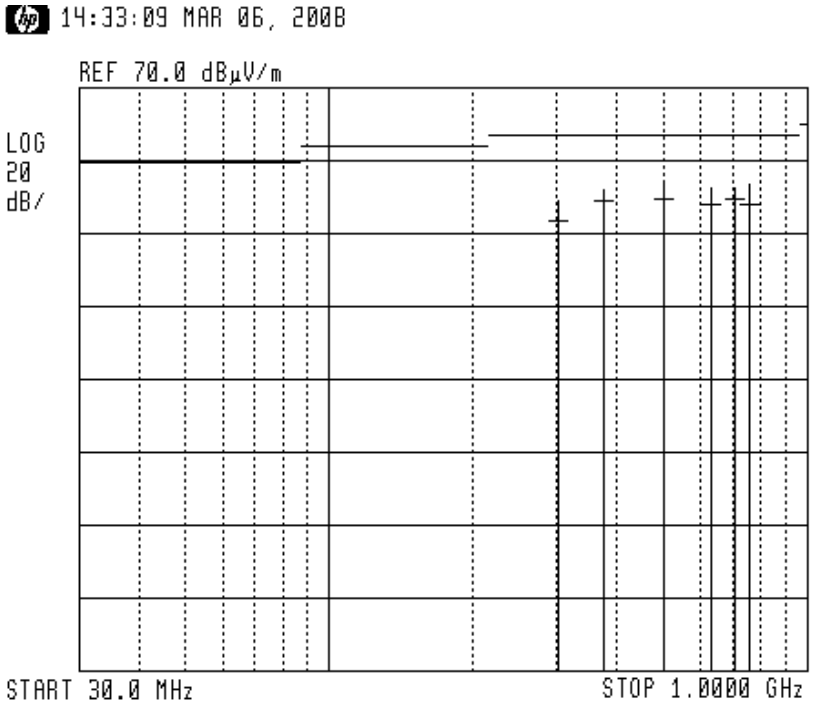

Figure 336. Radiated Emission. Antenna Polarization: HORIZONTAL Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*

Radiated Emission

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Vertical
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Signal Number	Frequency (MHz)	Peak dBuV/m	QP dBuV/m	QP Delta L 1 (dB)	Av Delta L 2 (dB)	Corr (dB)
1	56.970000	40.2	34.9	-14.6		10.8
2	125.005000	42.3	40.9	-13.1		13.8
3	128.380000	52.0	49.1	-4.9		13.9
4	250.007500	53.2	51.9	-5.0		20.9
5	256.850000	46.5	42.0	-14.9		21.3
6	500.000000	43.5	40.0	-16.9		21.0
7	700.015000	45.8	40.7	-16.2		25.3

Figure 337. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note: QP Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	WLAN Module With WCE (WiFi Coverage Extender) for DAS With 4 Colubris MAP-330 Access Points
Type	860M With WCE
Serial Number:	1. 860M: 73903D 2. WCE: 739038

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Vertical
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

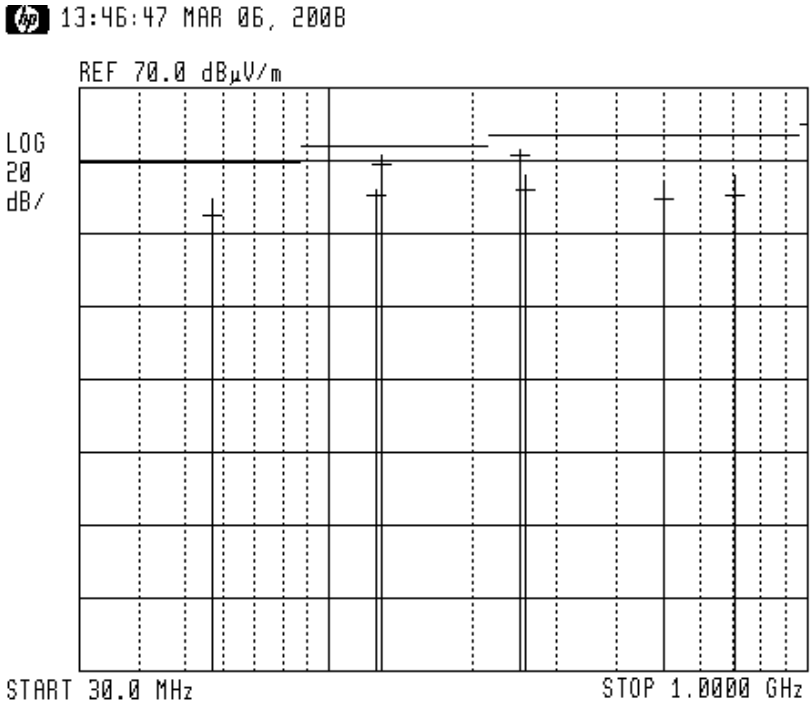

Figure 338. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*

25.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial No.	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 12, 2007	1Year
RF Filter Section	HP	85420E	3705A00248	November 12, 2007	1Year
Antenna Biconical	ARA	BCD 235/B	1041	March 22, 2007	1Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 22, 2007	1 Year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	February 4, 2007	2 Years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 15, 2006	2 Years
Horn Antenna	ARA	SWH-28	1008	December 8, 2006	2 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 2, 2007	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 9, 2007	1 Year
Low Noise Amplifier	MK Milliwave	MKT6-3000 4000-30-13P	399	January 9, 2007	1 Year
Spectrum Analyzer	HP	8593EM	3536A00120	February 26, 2008	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	November 14, 2007	1 Year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

25.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

No external pre-amplifiers are used.

26. Intermodulation Tests

26.1 Test procedure

An access point having maximum RF output power was used for this test.

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20 dB) and an appropriate coaxial cable
(cable loss = 3.5 dB). The spectrum analyzer was set to 1 kHz resolution BW for the frequency range 9.0-150.0 kHz, 10kHz for the frequency range 10kHz–10.0MHz, 100kHz for the frequency range 10.0MHz-2.4385GHz, and 1MHz for the frequency range 2.4385-25.0GHz.

4 input signals were sent simultaneously to the E.U.T. as follows:

802.11b/g: in the frequency range 2400-2483 MHz, 2412MHz 64QAM

802.11a: in the frequency range 5150-5250 MHz, 5180MHz BPSK

CELL: in the frequency range 869-894 MHz, 890MHz FM dev. 100kHz

PCS: in the frequency range 1930-1990 MHz, 1985MHz CDMA

The frequency range of 9kHz – 40.0GHz was scanned for unwanted signals.

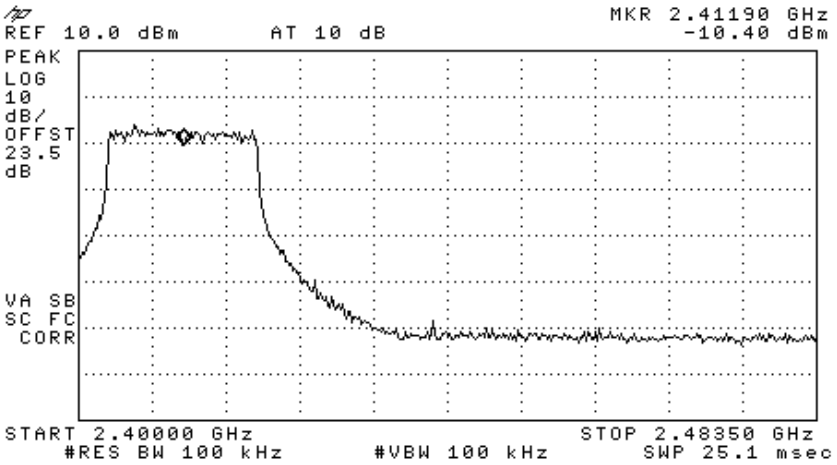

Figure 339 —2412MHz 64QAM

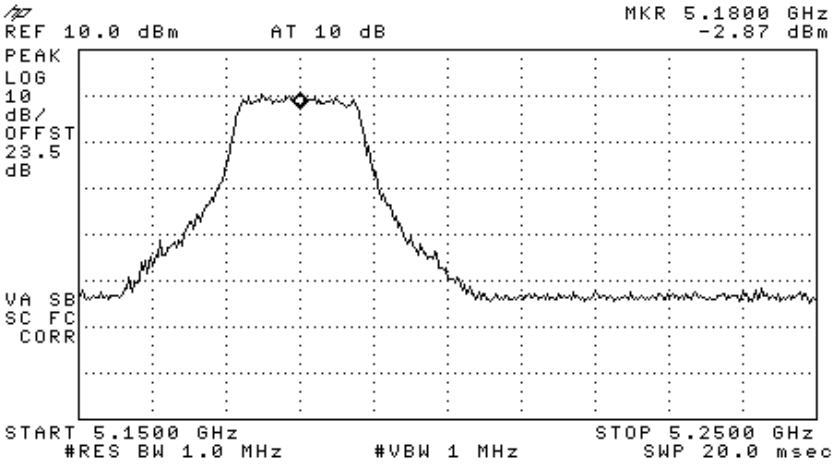

Figure 340 —5180MHz BPSK

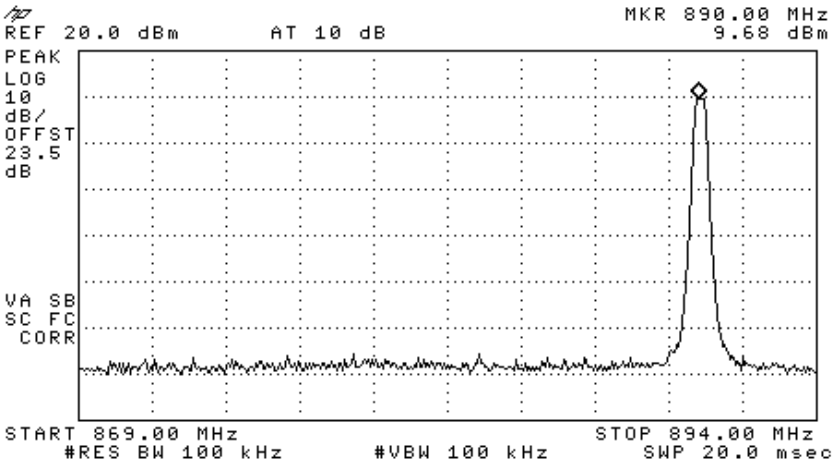

Figure 341 —890MHz FM

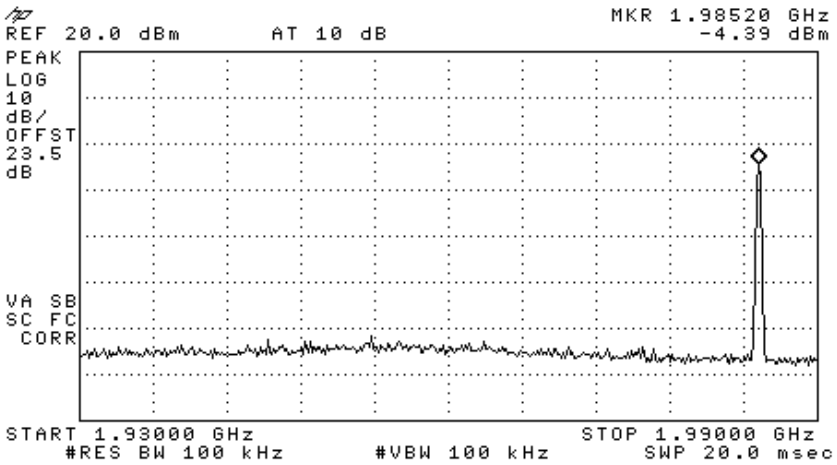

Figure 342 —1985MHz CDMA

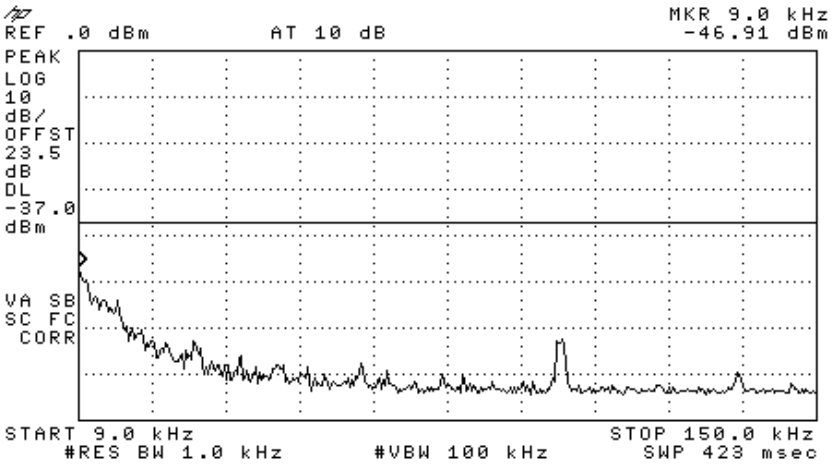

Figure 343

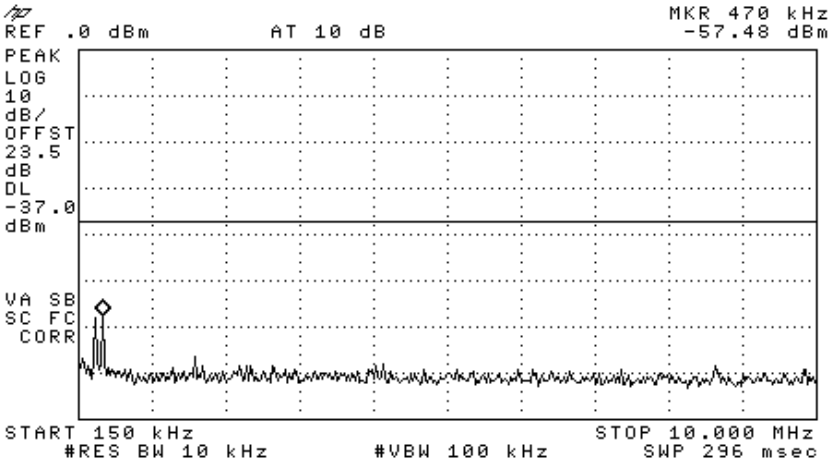

Figure 344

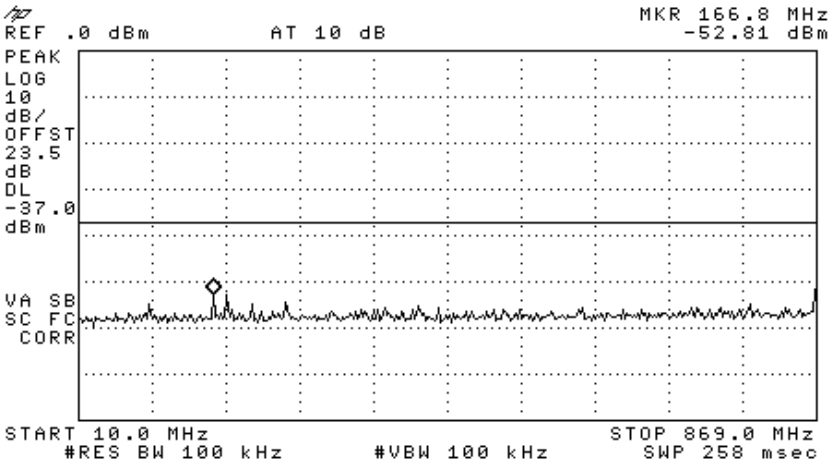

Figure 345

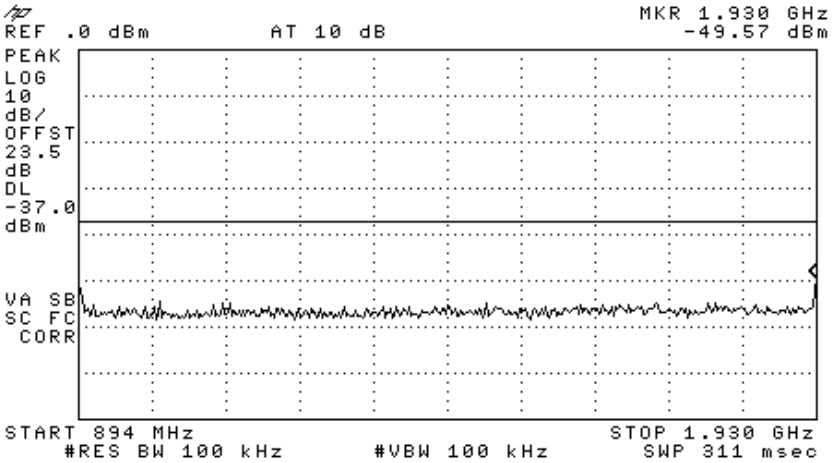

Figure 346

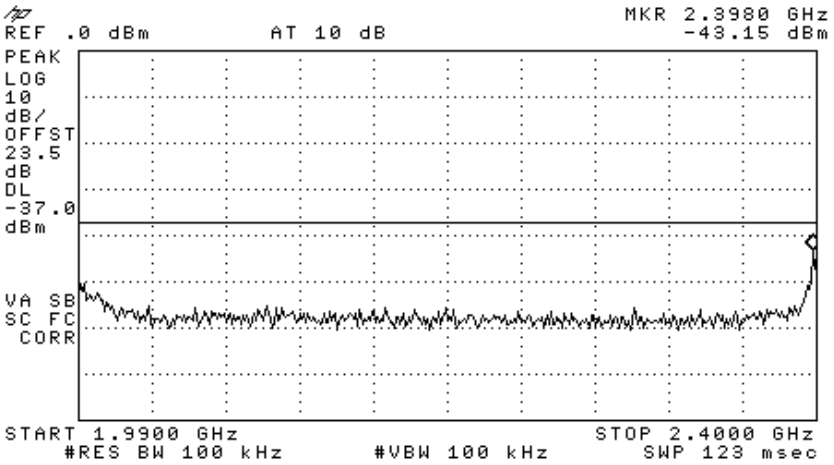

Figure 347

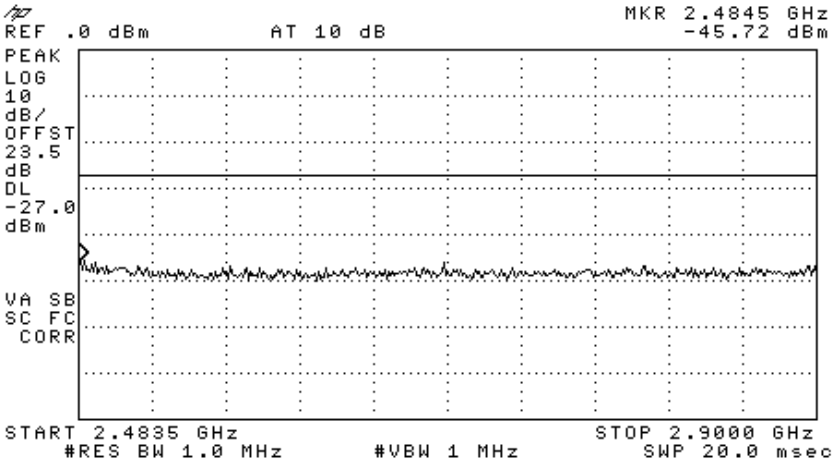

Figure 348

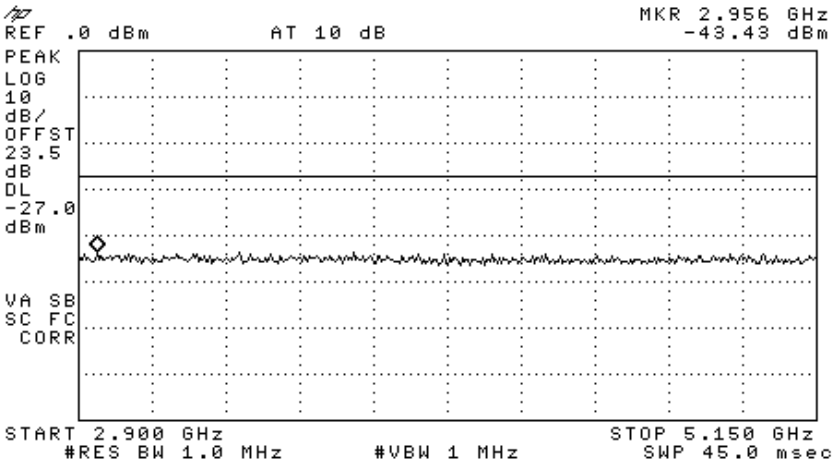

Figure 349

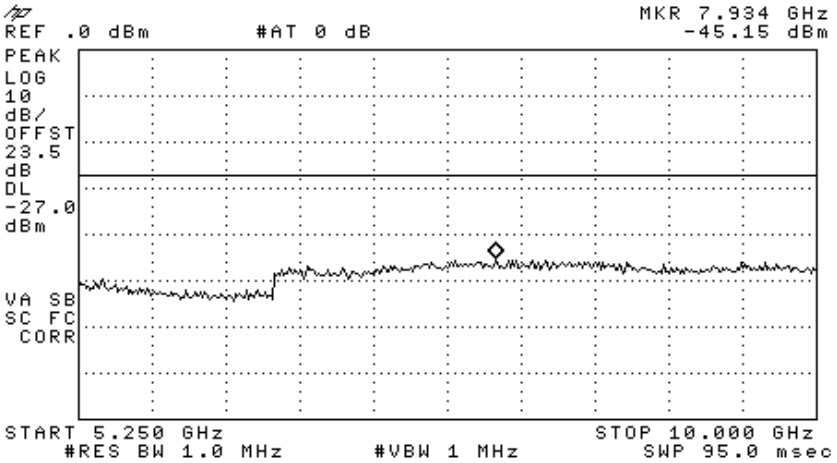

Figure 350

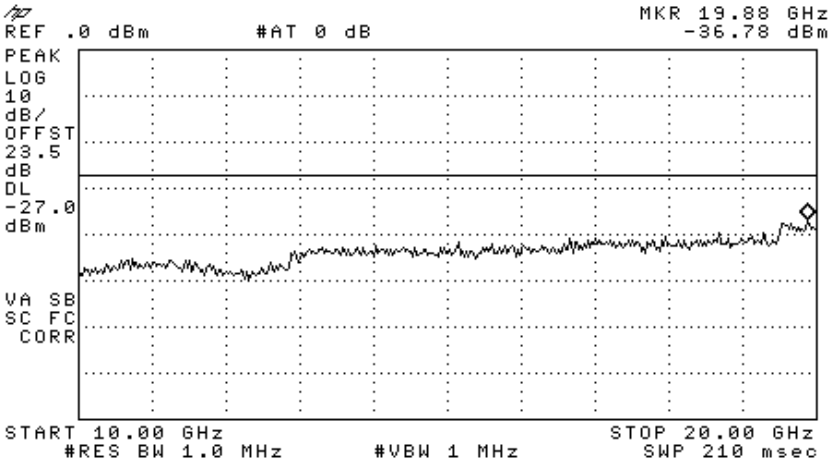

Figure 351

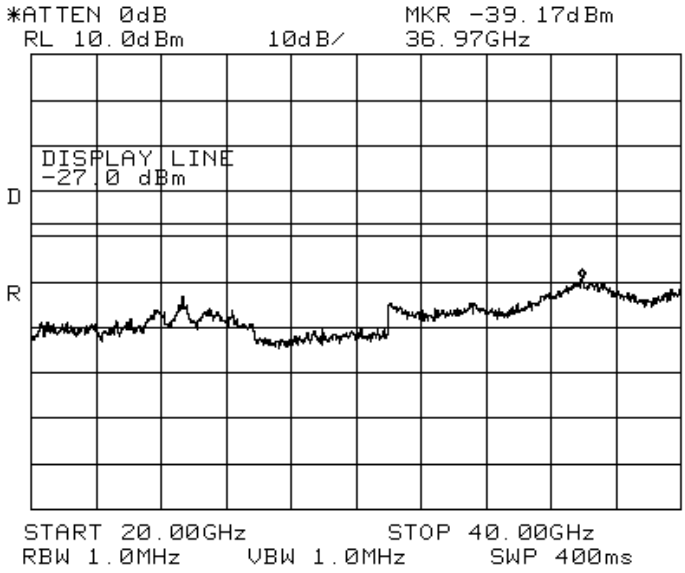

Figure 352

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 09.03.08

Typed/Printed Name: E. Pitt

26.2 Test Equipment Used.

Intermodulation

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 22, 2007	1 year
Spectrum Analyzer	HP	8564E	3442A00275	November 26, 2006	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	May 9, 2007	1 year
Cable	Rhophase	KPS-1501-1000	A1675	February 8, 2007	1 year

Figure 353 Test Equipment Used

27. APPENDIX A - CORRECTION FACTORS

27.1 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3
20.0	0.6
30.0	0.8
40.0	0.9
50.0	1.1
60.0	1.2
70.0	1.3
80.0	1.4
90.0	1.6
100.0	1.7
150.0	2.0
200.0	2.3
250.0	2.7
300.0	3.1
350.0	3.4
400.0	3.7
450.0	4.0
500.0	4.3
600.0	4.7
700.0	5.3
800.0	5.9
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.3
1400.0	7.8
1600.0	8.4
1800.0	9.1
2000.0	9.9
2300.0	11.2
2600.0	12.2
2900.0	13.0

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 27 meters.

3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

27.2 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. The cable type is RG-8.

2. The overall length of the cable is 10 meters.

27.3 Correction factors for CABLE

from spectrum analyzer to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.

2. The cable is used for measurements above 2.9 GHz.

3. The overall length of the cable is 10 meters.

27.4 Correction factors for CABLE

from EMI receiver to test antenna at 10 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3
20.0	0.8
30.0	0.9
40.0	1.2
50.0	1.4
60.0	1.6
70.0	1.8
80.0	1.9
90.0	2.0
100.0	2.1
150.0	2.6
200.0	3.2
250.0	3.8
300.0	4.2
350.0	4.6
400.0	5.1
450.0	5.3
500.0	5.6
600.0	6.3
700.0	7.0
800.0	7.6
900.0	8.0
1000.0	8.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	9.8
1400.0	10.0
1600.0	11.3
1800.0	12.2
2000.0	13.1
2300.0	14.5
2600.0	15.9
2900.0	16.4

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 34 meters.

3. The above data is located in file 34M10MO.CBL on the disk marked "Radiated Emissions Tests EMI Receiver".

12.6 Correction factors for LOG PERIODIC ANTENNA

Type LPD 2010/A
at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	12.5
400.0	15.4
500.0	16.1
600.0	19.2
700.0	19.4
800.0	19.9
900.0	21.2
1000.0	23.5

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.8
400.0	15.3
500.0	15.6
600.0	18.7
700.0	19.1
800.0	20.2
900.0	21.1
1000.0	23.2

NOTES:

1. *Antenna serial number is 1038.*
2. *The above lists are located in file number 38M3O.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.*
3. *The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".*

27.5 Correction factors for LOG PERIODIC ANTENNA

Type SAS-200/511
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. Antenna serial number is 253.

2. The above lists are located in file number SAS3M0.ANT for a 3 meter range.

3. The files mentioned above are located on the disk marked "Antenna Factors".

27.6 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, at 3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.

2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

27.7 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, 10 meter range

FREQUENCY (MHz)	AFE (dB/m)
30.0	12.1
40.0	10.6
50.0	10.6
60.0	8.9
70.0	8.5
80.0	9.6
90.0	9.4
100.0	9.6
110.0	10.3
120.0	10.7
130.0	12.6
140.0	12.7
150.0	12.7
160.0	13.8
170.0	13.7
180.0	14.9
190.0	13.4
200.0	13.1
210.0	14.0
220.0	14.5
230.0	15.8
240.0	16.0
250.0	16.6
260.0	16.7
270.0	18.3
280.0	18.5
290.0	19.3
300.0	20.9

NOTES:

1. *Antenna serial number is 1041.*
2. *The above list is located in file 41BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".*

27.8 Correction factors for Double-Ridged Waveguide Horn

Model: 3115, S/N 29845
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			

27.9 Correction factors for Horn Antenna

Model: SWH-28
at 1 meter range.

FREQUENCY (GHz)	AFE (dB /m)	Gain (dB1)
18.0	40.3	16.1
19.0	40.3	16.3
20.0	40.3	16.1
21.0	40.3	16.3
22.0	40.4	16.8
23.0	40.5	16.4
24.0	40.5	16.6
25.0	40.5	16.7
26.0	40.6	16.4

27.10 Correction factors for Horn Antenna

Model: V637

FREQUENCY (GHz)	AFE (dB /m)	Gain (dB1)
26.0	43.6	14.9
27.0	43.7	15.1
28.0	43.8	15.3
29.0	43.9	15.5
30.0	43.9	15.8
31.0	44.0	16.0
32.0	44.1	16.2
33.0	44.1	16.4
34.0	44.1	16.7
35.0	44.2	16.9
36.0	44.2	17.1
37.0	44.2	17.4
38.0	44.2	17.6
39.0	44.2	17.8
40.0	44.2	18.0

27.11 Correction factors for ACTIVE LOOP ANTENNA

Model 6502
S/N 9506-2950

FREQUENCY	Magnetic Antenna Factor	Electric Antenna Factor
(MHz)	(dB)	(dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2