**DATE: 26 October 2009**

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

# FCC Radio Test Report

**for**

# MobileAccess Networks

## Equipment under test:

## WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points

## 860M-AU With WCE-AU

## 5 GHz Transmitter

Written by: _____

D. Shidlowsky, Documentation

Approved by: _____

A. Sharabi, Test Engineer

Approved by: _____

I. Raz, EMC Laboratory Manager

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This report relates only to items tested.

# Measurement/Technical Report for

MobileAccess Networks

WLAN Module With WCE (WiFi Coverage Extender) for

DAS With Four Meru AP-208 Access Points

## 860M-AU With WCE-AU

## FCC ID: OJFMA860WME-AU

| | | |
|---|---|---|
| This report concerns: | Original Grant: | X |
| | Class I Change: | |
| | Class II Change: | |

Equipment type: NII

Limits used:
47CFR15 Section 15.407

Measurement procedure used is ANSI C63.4-2003.


Application for Certification
prepared by:
Ishaishou Raz
ITL (Product Testing) Ltd.
Kfar Bin Nun
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Applicant for this device:
(different from "prepared by")
Steve Blum
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e-mail: sblum@mobileaccess.com

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# 1. General Information

## *1.1 Administrative Information*

| | |
|---|---|
| Manufacturer: | MobileAccess Networks |
| Manufacturer's Address: | 8391 Old Courthouse Rd.<br>Suite #300<br>Vienna, VA 22182<br>U.S.A.<br>Tel: +1-541-758-2880<br>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 Four Meru AP-208 Access Points |
| Equipment Model No.: | 860M-AU With WCE-AU |
| Equipment Serial No.: | 860M-AU: 0837451; WCE-AU: 08366A9 |
| Date of Receipt of E.U.T: | 20.10.09 |
| Start of Test: | 20.10.09 |
| End of Test: | 25.10.09 |
| Test Laboratory Location: | I.T.L (Product Testing) Ltd.<br>Kfar Bin Nun,<br>ISRAEL 99780 |
| Test Specifications: | See Section 2 |

## 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), IC File No.: 46405-4025; Site No. IC 4025B-1.
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 Septembert 3, 2009).
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 E.U.T. was originally authorized for FCC under FCC ID OJFMA860WME. Due to changes in both the 860M and the WCE a new certification was required. The above mentioned new certification was authorized for FCC under FCC ID: OJFMA860WCE-AU operating with 4 Cisco 1242 Access Points. An application for a new certification of the 860M-AU with WCE-AU is being submitted for use with Meru AP-208 Access Points.
Testing was performed, as with the Cisco Access Points (FCC ID: OJFMA860WCE-AU), according to correspondence with Mr. Joe Dichoso of the FCC dated 29 May 2008 :

"**From:** Steve Blum [mailto:sblum@mobileaccess.com]
**Sent:** Thursday, May 29, 2008 3:06 PM
**To:** Joe Dichoso
**Subject:** RE: FCC Guidance

Yes, we have two issues: summary of test data attached. Let me know if you need more details.

1. MobileAccess is requesting updated guidance on the part 15 testing for the model 860. The 860 is essentially a part 15 subpart C amplifier for 802.11 b/g/a WLAN services.

a. Main difference is the 860 couples licensed services (via certificated transmitters) onto the coax with the 802.11b/g and a services.

1. Licensed services are passively coupled and all services are filtered to prevent interference.

b. Previous guidance from FCC from March 2006, requires 3 sets of tests, b/g only, b/g and a, b/g with a and cell/pcs.

c. Test data from all submissions to date (summary attached) shows that "b/g and a" is worse case while passing all b/g and a tests.

**d. Request that guidance be modified to require only "b/g and a" test for future submissions**

1. MobileAccess agrees that the 860 is professionally installed and must be tested and sold with labels on transmitter for the specific transmitter approved.

**Reply: As before, the amplifier must be certified with a specific transmitter FCC ID XXXXXX it was tested with. Please note marketing requirements per 15.204(d). The amplifier must be marketed with the transmitter or designed in such a fashion that it can be used only with that transmitter. You can submit full tests with all "b/g and a" and cell/pcs active. Prescan tests can be made in all other modes.**

Steve Blum
Product Manager
MobileAccess
Office 541 758-2880
Mobile 541 990-3470
*Making Wireless an Indoor State of Mind*

*This electronic mail message and any attached files or documents contain information intended for the exclusive use of the party or parties to whom it is addressed and may contain information that is confidential, proprietary and/or privileged. If you are not an intended recipient, or the person responsible for delivering the e-mail to the intended recipient, you are hereby notified that you have received this message in error and that any viewing, copying, disclosure, distribution, dissemination, forwarding, printing or other use of this information is strictly prohibited and may be subject to legal restriction or sanction. Please notify the sender, by electronic mail or telephone, of any unintended recipients and destroy all copies of this message and the attachments (if any) without making any copies thereof."*

The EUT consists of the 860M, WCE and 4 identical access points. The system combines 802.11 signals with the cellular signals. The cellular signal are represented in the setup by the WMTS and AWS 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.

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

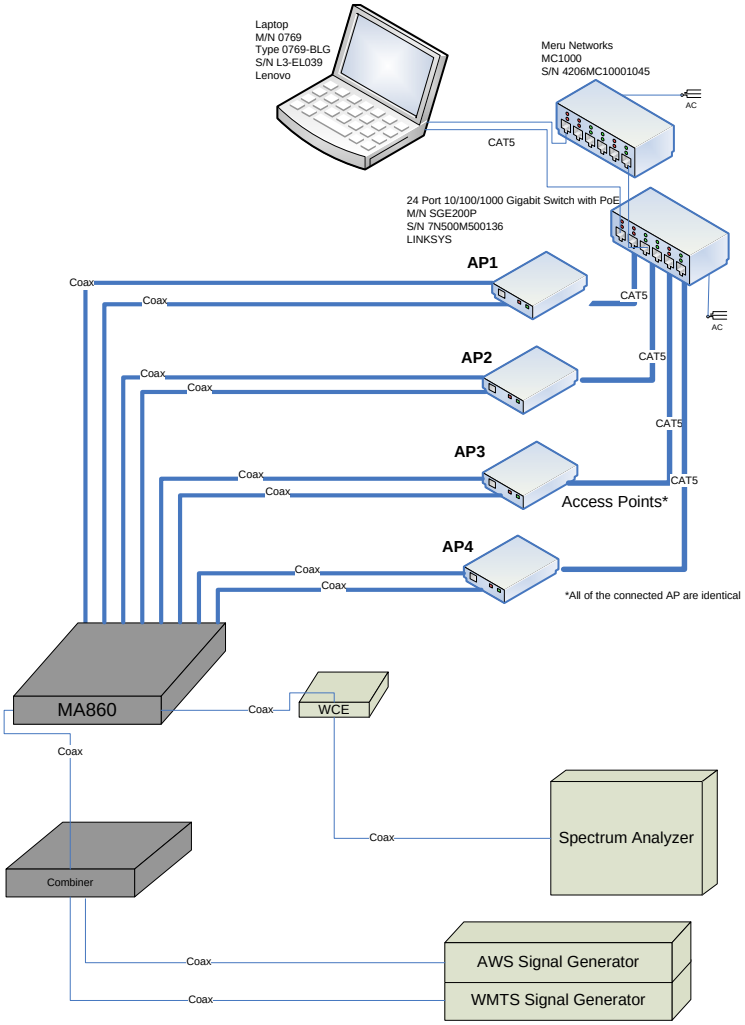



**Figure 1. Configuration of Tested System**

Notes:

1. The system was tested using four identical Meru Access Points M/N AP-208, S/N 3809AP208000CE606BC75, S/N 3809AP208000CE606BDDE,S/N 3809AP208000CE606BD86, S/N 30809AP208000CE606BD25; FCC ID: RE7-AP200R2.
2. The 860M-AU was configured as follows:

   DCAa Channel — 30

   DCAb/g Channel — 14

   Input cellular signals — 10dBm

3.

# 3. Theory of Operation

## 3.1 Theory of Operation

mobileaccess

Making Wireless an Indoor State of Mind

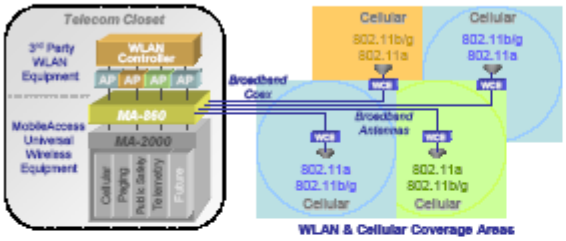
### MA-860 WLAN Solution

### 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.




WLAN & Cellular Coverage Areas

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

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www.mobileaccess.com

DRAFT

# 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<br>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<br>DC-1 = 28V Mandatory DC Power, 66 Watts<br>DC-2= 9.8V Optional Redundant Power, 40 Watts |

## Physical Specifications

| | | |
|---|---|---|
| Dimensions | 860(M/R): | 242 mm x 279 mm x 38 mm<br>(9.54 in x 10.98 in x 1.5 in) |
| | WCE: | 130 mm x 120 mm x 20 mm<br>(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) |

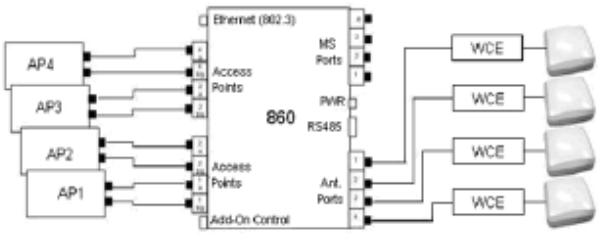
## Ordering Information

| | |
|---|---|
| 860M | 860 WLAN Module |
| 860R | 860 WLAN Module<br>- 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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# 4. Conducted Emission Data

## 4.1 Test Specification

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 3.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room, with the E.U.T placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall.

The E.U.T was powered from 115 V AC / 60 Hz via a 50 Ohm / 50 µHn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, and using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

## 4.3 Measured Data

JUDGEMENT: Passed by 6.1 dB

The margin between the emission levels and the specification limit was, in the worst case, 6.5 dB for the phase line at 1.20 MHz and 6.1 dB for the neutral line at 1.20 MHz.

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

The details of the highest emissions are given in *Figure 2* to *Figure 5*.
TEST PERSONNEL:

Tester Signature: _____ Date: 28.10.09

Typed/Printed Name: A. Sharabi

# Conducted Emission

| | |
|---|---|
| E.U.T Description | WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

| | |
|---|---|
| Specification: | FCC Part 15, Subpart C |
| Lead: | Phase |
| Detectors: | Peak, Quasi-peak, Average |

| Signal Number | Frequency (MHz) | Peak (dBuV) | QP (dBuV) | QP Delta L 1 (dB) | Avg (dBuV) | Av Delta L 2 (dB) | Corr (dB) |
|---|---|---|---|---|---|---|---|
| 1 | 0.154275 | 56.5 | 52.8 | -13.0 | 42.5 | -13.3 | 0.0 |
| 2 | 0.234059 | 46.3 | 42.4 | -20.0 | 37.3 | -15.0 | 0.0 |
| 3 | 1.201843 | 41.0 | 40.4 | -15.6 | 39.5 | -6.5 | 0.0 |
| 4 | 4.790426 | 45.5 | 43.8 | -12.2 | 34.7 | -11.3 | 0.0 |
| 5 | 11.242821 | 48.2 | 45.8 | -14.1 | 36.8 | -13.2 | 0.0 |
| 6 | 18.269898 | 43.9 | 40.9 | -19.1 | 32.2 | -17.8 | 0.0 |

**Figure 2. Detectors: Peak, Quasi-peak, AVERAGE .**

*Note: QP Delta/Av Delta refer 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.*

# Conducted Emission

| | |
|---|---|
| E.U.T Description | WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

Specification: FCC Part 15, Subpart C
Lead: Phase
Detectors: Peak, Quasi-peak, Average

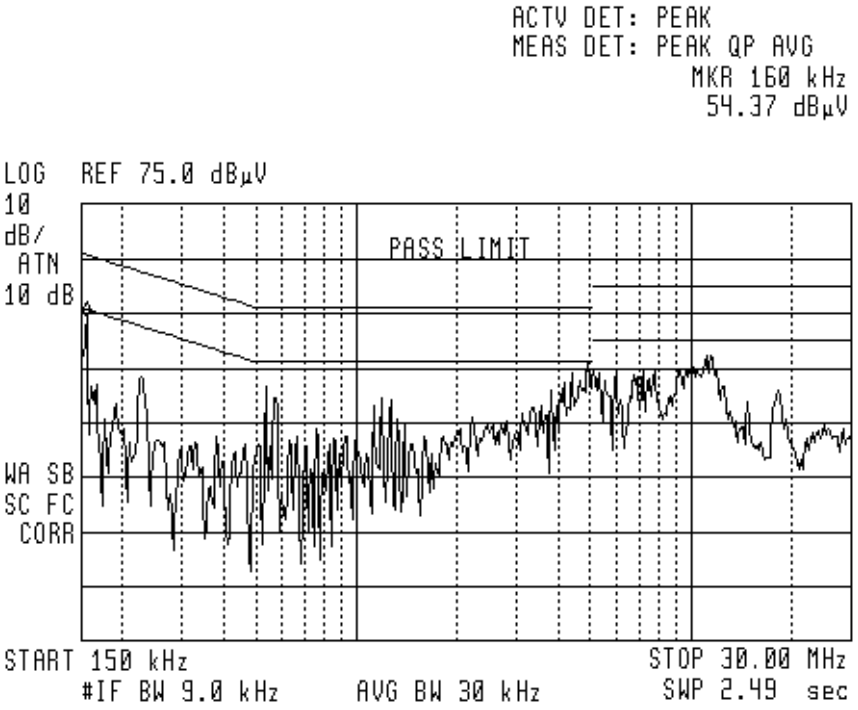



**Figure 3. Detectors: Peak, Quasi-peak, Average**

# Conducted Emission

| | |
|---|---|
| E.U.T Description | WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

| | |
|---|---|
| Specification: | FCC Part 15, Subpart C |
| Lead: | Neutral |
| Detectors: | Peak, Quasi-peak, Average |

| Signal Number | Frequency (MHz) | Peak (dBuV) | QP (dBuV) | QP Delta L 1 (dB) | Avg (dBuV) | Av Delta L 2 (dB) | Corr (dB) |
|---|---|---|---|---|---|---|---|
| 1 | 0.155320 | 57.2 | 53.3 | -12.4 | 43.1 | -12.6 | 0.0 |
| 2 | 0.575270 | 32.8 | 30.5 | -25.5 | 25.3 | -20.7 | 0.0 |
| 3 | 1.204248 | 41.0 | 40.3 | -15.7 | 39.9 | -6.1 | 0.0 |
| 4 | 5.047167 | 47.1 | 45.1 | -14.9 | 37.6 | -12.4 | 0.0 |
| 5 | 7.218620 | 50.6 | 47.9 | -12.1 | 39.0 | -11.1 | 0.0 |
| 6 | 12.393453 | 46.0 | 44.4 | -15.6 | 34.6 | -15.4 | 0.0 |

**Figure 4. Detectors: Peak, Quasi-peak, AVERAGE**

*Note: QP Delta/Av Delta refer 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.*

# Conducted Emission

| | |
|---|---|
| E.U.T Description | WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

| | |
|---|---|
| Specification: | FCC Part 15, Subpart C |
| Lead: | Neutral |
| Detectors: | Peak, Quasi-peak, Average |

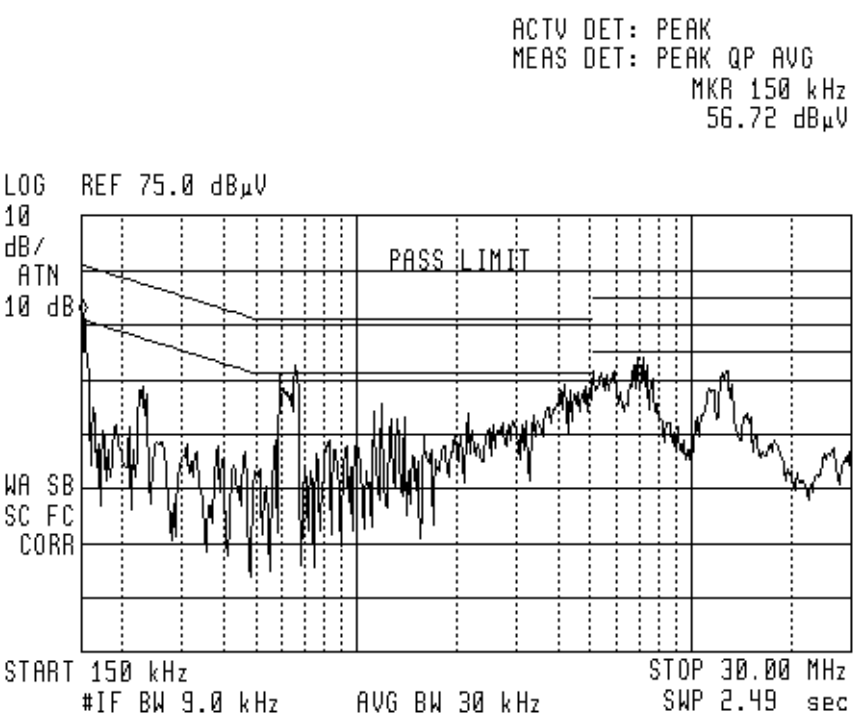



**Figure 5 Conducted Emission: NEUTRAL**
**Detectors: Peak, Quasi-peak, Average**

## 4.4 Test Instrumentation Used, Conducted Measurement

| Instrument | Manufacturer | Model | Serial No. | Last Calibration Date | Period |
|---|---|---|---|---|---|
| LISN | Fischer | FCC-LISN-2A | 127 | March 3, 2009 | 1 Year |
| LISN | Fischer | FCC-LISN-2A | 128 | March 3, 2009 | 1 Year |
| EMI Receiver | HP | 85422E | 3906A00276 | November 17, 2008 | 1Year |
| RF Filter Section | HP | 85420E | 3705A00248 | November 16, 2008 | 1Year |
| Printer | HP | LaserJet 2200 | JPKGC19982 | N/A | N/A |

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

## *5.1 Test Specification*

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

## *5.2 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.

## *5.3 Test Data*

JUDGEMENT: Passed

The signals in the band 9 kHz – 1.0 GHz were below the spectrum analyzer noise level, at least 20 dB below the specification limit.
The results for all operating frequencies and modulations were the same.

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

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

TEST PERSONNEL:

Tester Signature: _____ Date: 28.10.09

Typed/Printed Name: A. Sharabi

## 5.4 Test Instrumentation Used, Radiated Measurements

| Instrument | Manufacturer | Model | Serial Number | Calibration | Period |
|---|---|---|---|---|---|
| EMI Receiver | HP | 85422E | 3906A00276 | November 17, 2008 | 1 year |
| RF Section | HP | 85420E | 3705A00248 | November 16, 2008 | 1 year |
| Antenna Bioconical | ARA | BCD 235/B | 1041 | March 25, 2009 | 1 year |
| Antenna Log Periodic | ARA | LPD-2010/A | 1038 | November 06, 2008 | 1 year |
| Active Loop Antenna | EMCO | 6502 | 9506-2950 | October 15, 2009 | 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 |

## 5.5 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.

# 6. Spurious Radiated Emission in the Restricted Band, Above 1 GHz 802.11b/g+802.11a + WMTS + AWS Signals

## *6.1 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.

## 6.2 Test Data

JUDGEMENT: Passed by 3.0 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 3.9 dB in the worst case at the frequency of 11490.00 MHz, vertical polarization.

For the operation frequency of 5765 MHz, the margin between the emission level and the specification limit is 3.1 dB in the worst case at the frequency of 11530.00 MHz, vertical polarization.

For the operation frequency of 5805 MHz, the margin between the emission level and the specification limit is 3.0 dB in the worst case at the frequency of 11610.00 MHz, vertical 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: 28.10.09

Typed/Printed Name: A. Sharabi

# Radiated Emission Above 1 GHz

| | |
|---|---|
| E.U.T Description | WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

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. (MHz) | Polarity (H/V) | Peak Reading (dBµV/m) | Peak. Specification (dB µV/m) | Peak. Margin (dB) |
|---|---|---|---|---|
| 11490.00 | H | 60.2 | 74.0 | -13.8 |
| 11490.00 | V | 61.6 | 74.0 | -12.4 |

**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 Reading" 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 Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

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 Reading | Average Specification | Peak. Margin |
|---|---|---|---|---|
| (MHz) | (H/V) | (dBµV/m) | (dB µV/m) | (dB) |
| 11490.00 | H | 49.8 | 54.0 | -4.2 |
| 11490.00 | V | 50.1 | 54.0 | -3.9 |

**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 Reading" 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 Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

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. (MHz) | Polarity (H/V) | Peak Reading (dBµV/m) | Peak. Specification (dB µV/m) | Peak. Margin (dB) |
|---|---|---|---|---|
| 11530.00 | H | 60.1 | 74.0 | -13.9 |
| 11530.00 | V | 61.0 | 74.0 | -13.0 |

**Figure 8. 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 Reading" 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 Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

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 Reading | Average Specification | Peak. Margin |
|---|---|---|---|---|
| (MHz) | (H/V) | (dBµV/m) | (dB µV/m) | (dB) |
| 11530.00 | H | 50.6 | 54.0 | -3.4 |
| 11530.00 | V | 50.9 | 54.0 | -3.1 |

**Figure 9. 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 Reading" 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 Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

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 Reading | Peak. Specification | Peak. Margin |
|---|---|---|---|---|
| (MHz) | (H/V) | (dBµV/m) | (dB µV/m) | (dB) |
| 11610.00 | H | 60.3 | 74.0 | -13.7 |
| 11610.00 | V | 61.2 | 74.0 | -12.8 |

**Figure 10. 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 Reading" 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 Four Meru AP-208 Access Points |
| Type | 860M-AU With WCE-AU |
| Serial Number: | 860M-AU: 0837451; WCE-AU: 08366A9 |

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 Reading | Average Specification | Peak. Margin |
|---|---|---|---|---|
| (MHz) | (H/V) | (dBµV/m) | (dB µV/m) | (dB) |
| 11610.00 | H | 49.7 | 54.0 | -4.3 |
| 11610.00 | V | 51.0 | 54.0 | -3.0 |

**Figure 11. 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 Reading" includes correction factor.

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

### 6.3 Test Instrumentation Used, Radiated Measurements Above 1 GHz

| Instrument | Manufacturer | Model | Serial Number | Calibration | Period |
|---|---|---|---|---|---|
| Receiver | HP | 85422E | 3411A00102 | November 17, 2008 | 1 year |
| RF Section | HP | 85420E | 3427A00103 | November 16, 2008 | 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 | January 29, 2009 | 2 years |
| Double Ridged Waveguide Horn Antenna | EMCO | 3115 | 29845 | March 16, 2008 | 2 years |
| Horn Antenna | ARA | SWH-28 | 1008 | December 23, 2008 | 2 year |
| Horn Antenna | Narda | V637 | 0410 | December 23, 2008 | 2 year |
| Low Noise Amplifier | DBS MICROWAVE | LNA-DBS-0411N313 | 013 | November 3, 2008 | 1 year |
| Low Noise Amplifier | Sophia Wireless | LNA 28-B | 232 | January 9, 2009 | 1 year |
| Low Noise Amplifier | MK Milliwave | MKT6-3000 400-30-13P | 399 | January 15, 2009 | 1 year |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | March 17, 2009 | 1 year |
| Spectrum Analyzer | HP | 8546E | 3442A00275 | December 15, 2008 | 1 year |
| Printer | HP | LaserJet 2200 | JPKGC19982 | N/A | N/A |

# 7. 26 dB Bandwidth 802.11b/g+802.11a +WMTS + AWS Signals

## *7.1 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. 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).

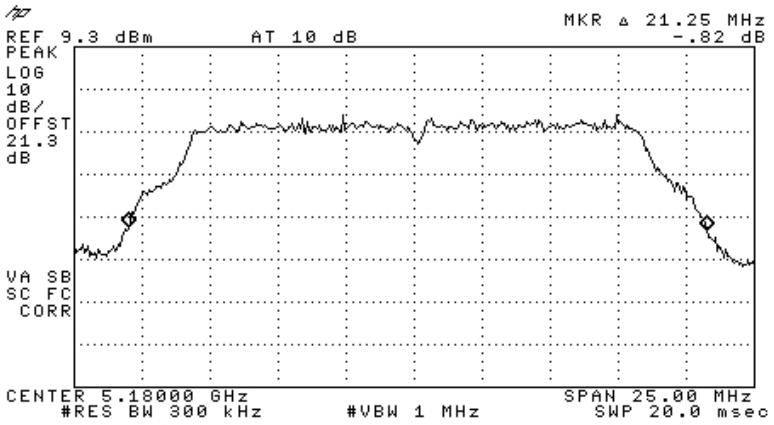



Figure 12 —5180 MHz 64QAM

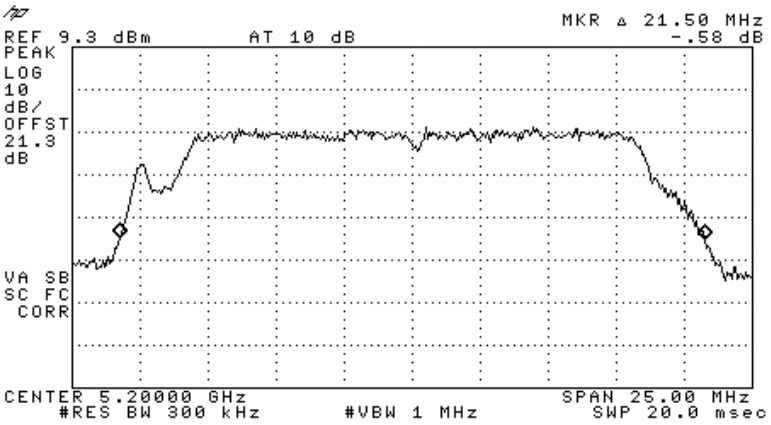



Figure 13 —5200 MHZ 64QAM

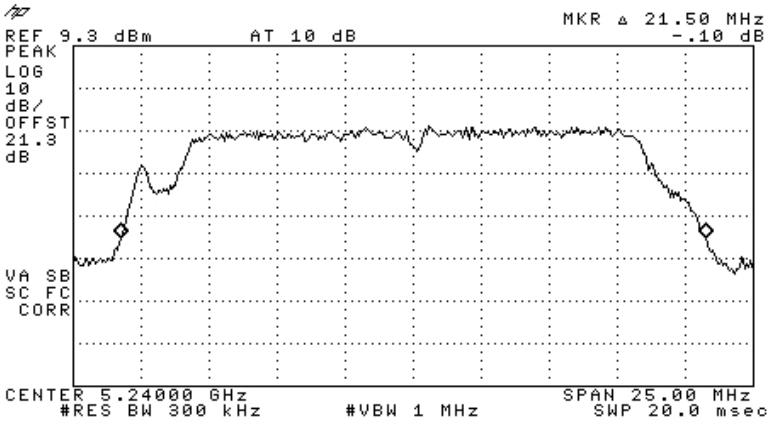



Figure 14 —5240 MHZ 64QAM

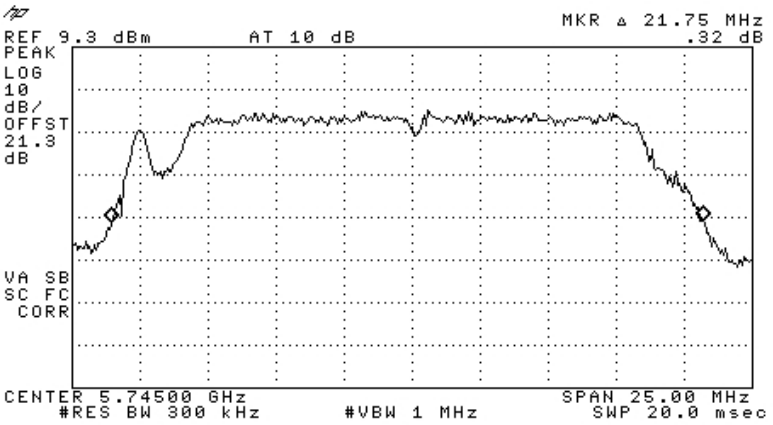



Figure 15 —5745 MHz 64QAM

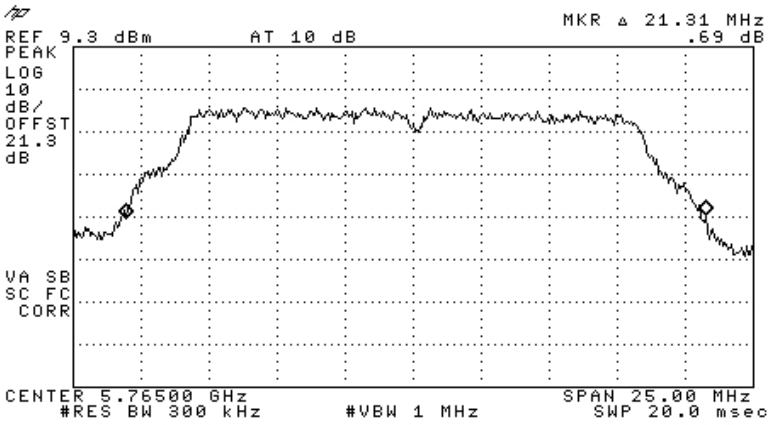



Figure 16 —5765 MHz 64QAM

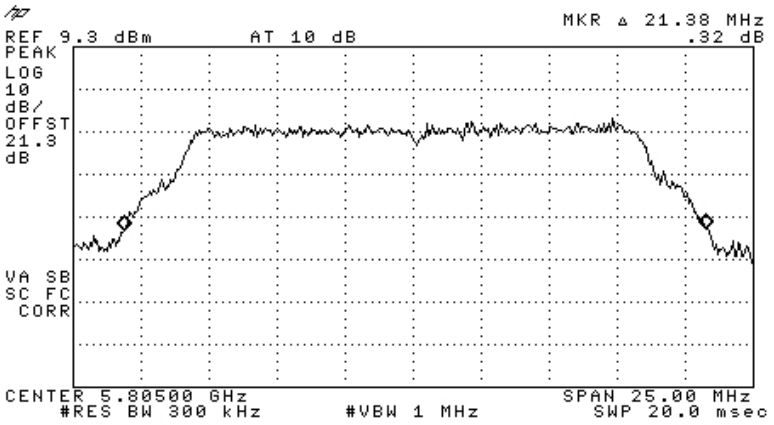



Figure 17 —5805 MHZ 64QAM

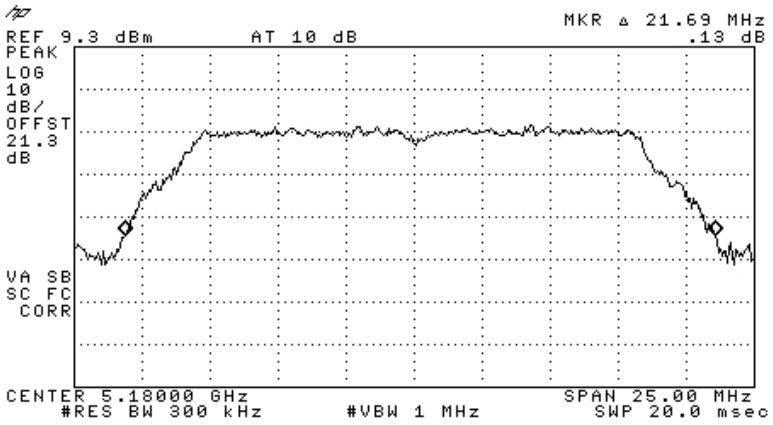



Figure 18 —5180 MHz BPSK

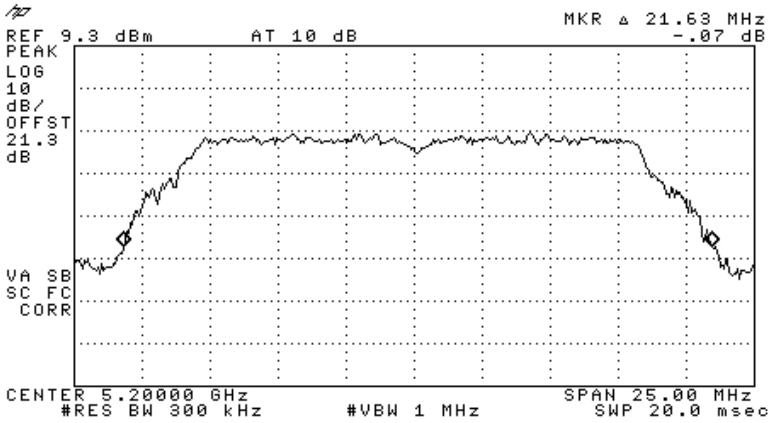



Figure 19 —5200 MHZ BPSK

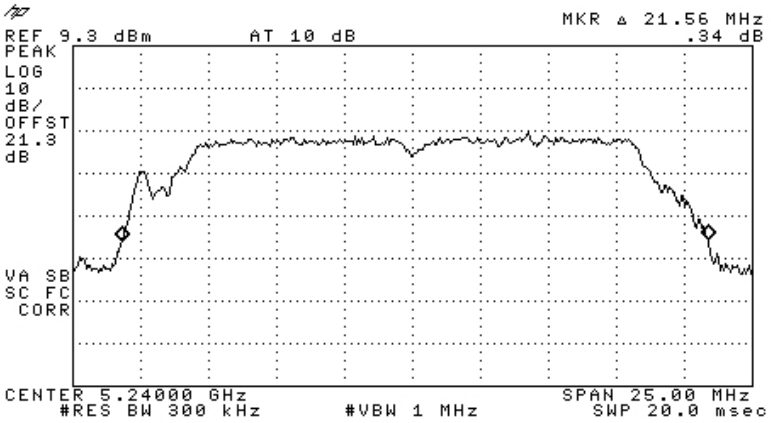



Figure 20 —5240 MHZ BPSK

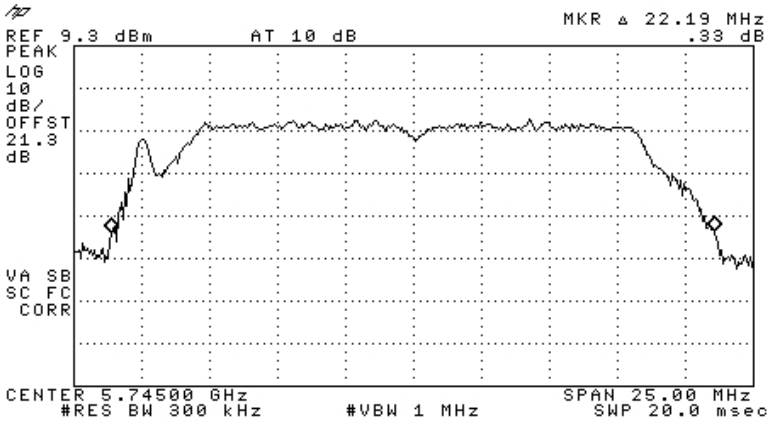



Figure 21 —5745 MHz BPSK

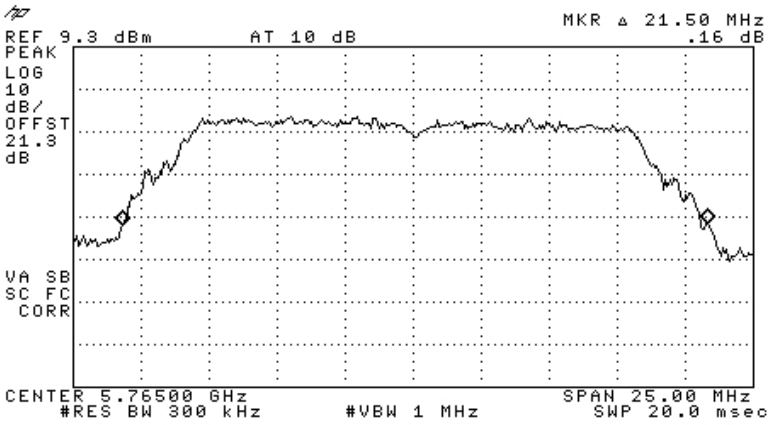



Figure 22 —5765 MHz BPSK

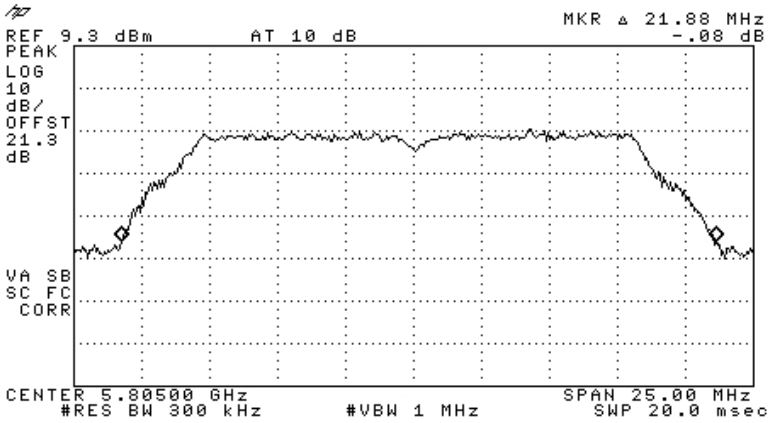



Figure 23 —5805 MHZ BPSK

| Operation Frequency (MHz) | Modulation | 26 dB Bandwidth (MHz) |
|---|---|---|
| 5180 | 64QAM | 21.3 |
| | BPSK | 21.7 |
| 5200 | 64QAM | 21.5 |
| | BPSK | 21.6 |
| 5240 | 64QAM | 21.5 |
| | BPSK | 21.6 |
| 5745 | 64QAM | 21.8 |
| | BPSK | 21.2 |
| 5765 | 64QAM | 21.3 |
| | BPSK | 21.5 |
| 5805 | 64QAM | 21.4 |
| | BPSK | 21.9 |

TEST PERSONNEL:

Tester Signature: _____ Date: 28.10.09

Typed/Printed Name: A. Sharabi

## *7.2 Test Equipment Used.*

26 dB Minimum Bandwidth

| Instrument | Manufacturer | Model | Serial/Part Number | Calibration | |
|---|---|---|---|---|---|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | March 17, 2009 | 1 year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G2W20 | October 19, 2009 | 1 year |
| Cable | Rhophase | KPS-5000-KPS | A1674 | October 19, 2009 | 1 year |
| Cable | Rhophase | KPS-1501-1000 | A1675 | October 19, 2009 | 1 year |

**Figure 24 Test Equipment Used**

# 8. Maximum Conducted Output Power 802.11b/g+802.11a + WMTS + AWS Signals

## *8.1 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 = 1.3dB). 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).

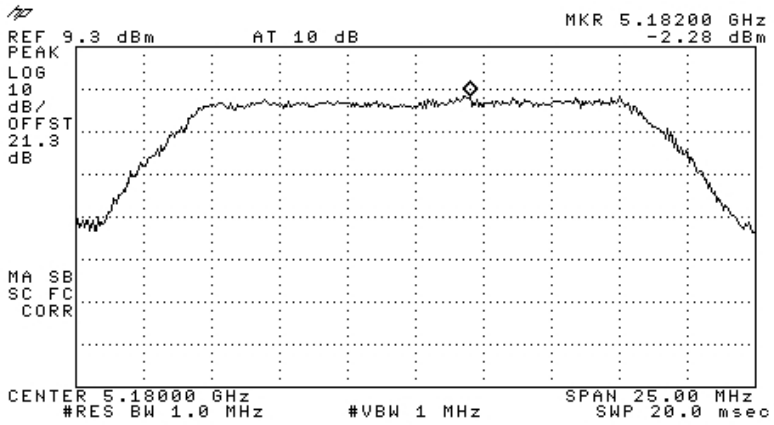



**Figure 25 5180 MHz 64QAM**

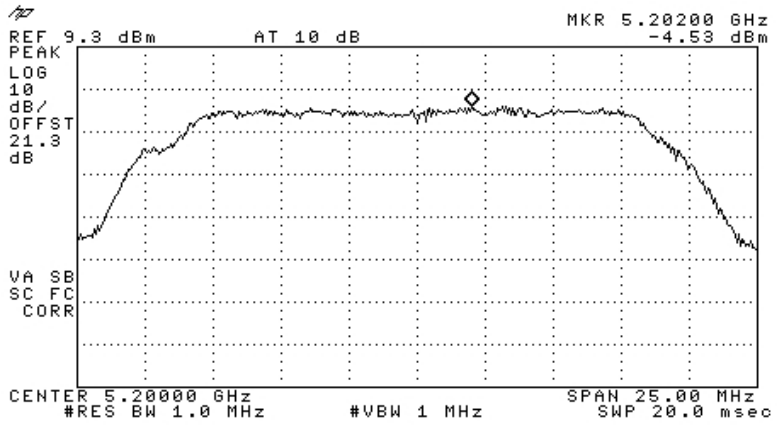



**Figure 26 5200 MHz 64QAM**

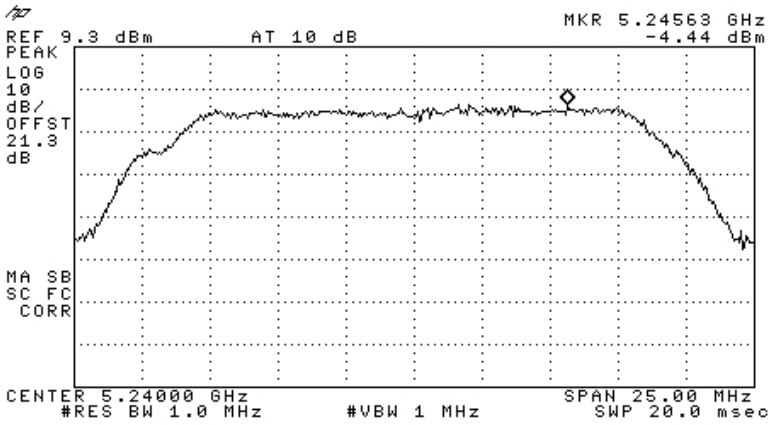



**Figure 27 5240 MHz 64QAM**

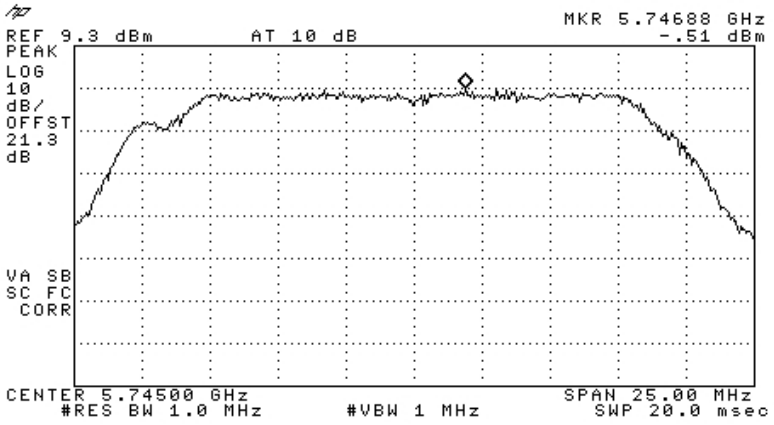



**Figure 28  5745 MHz 64QAM**

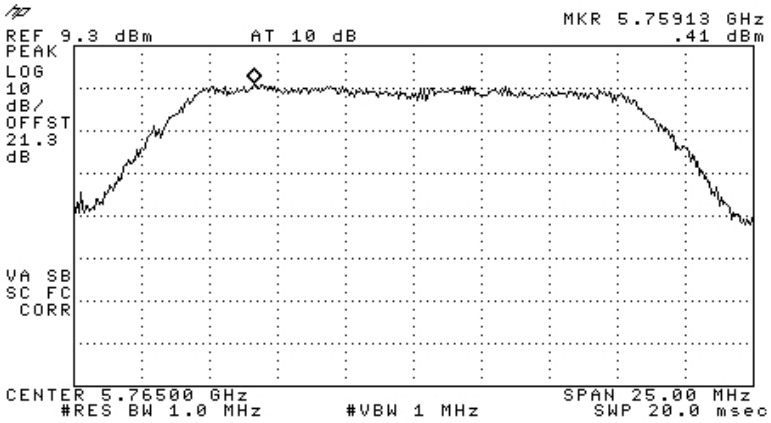



**Figure 29  5765 MHz 64QAM**

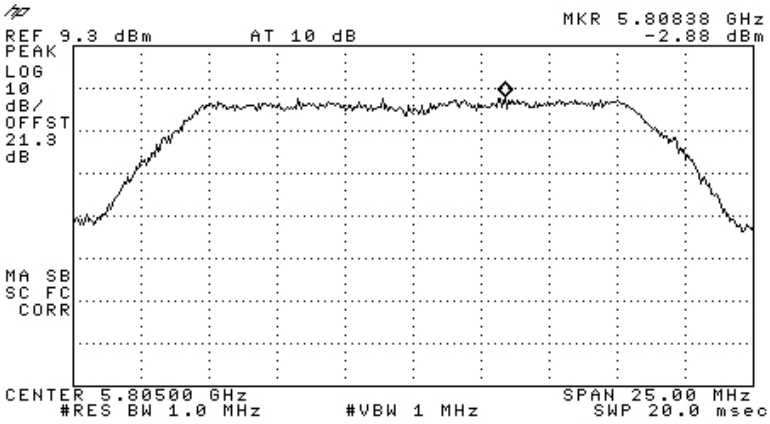



**Figure 30  5805 MHz 64QAM**

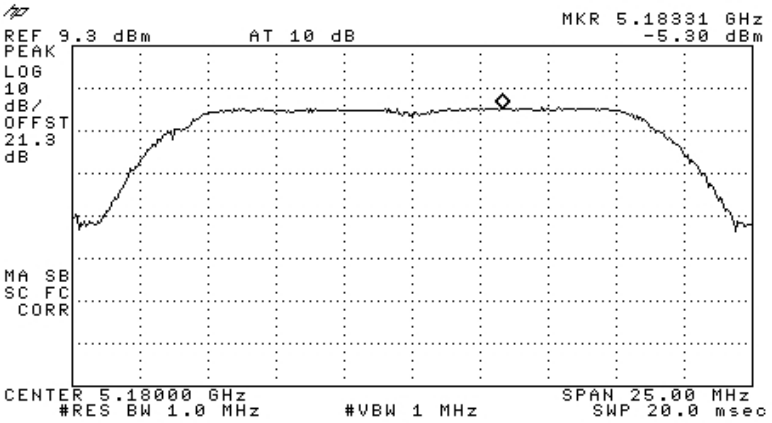



**Figure 31  5180 MHz BPSK**

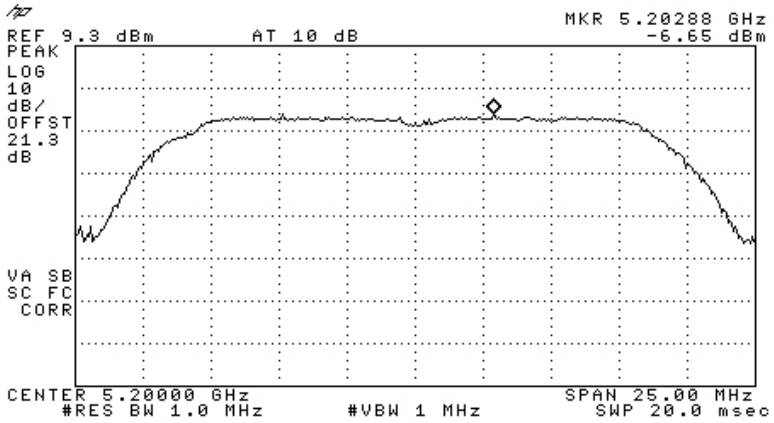



**Figure 32  5200 MHz BPSK**

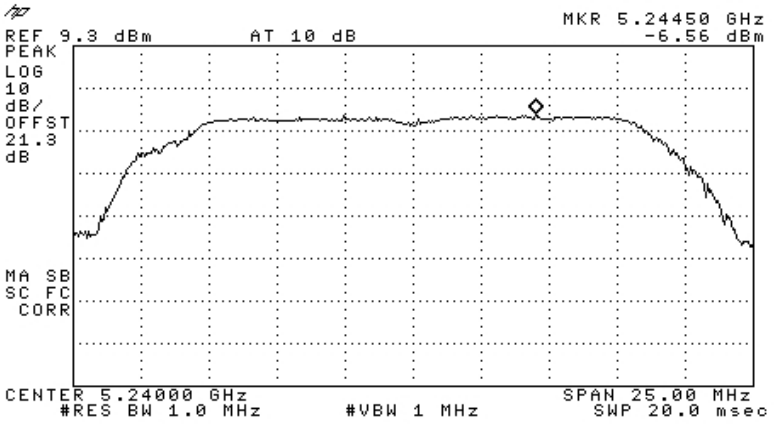



**Figure 33  5240 MHz BPSK**

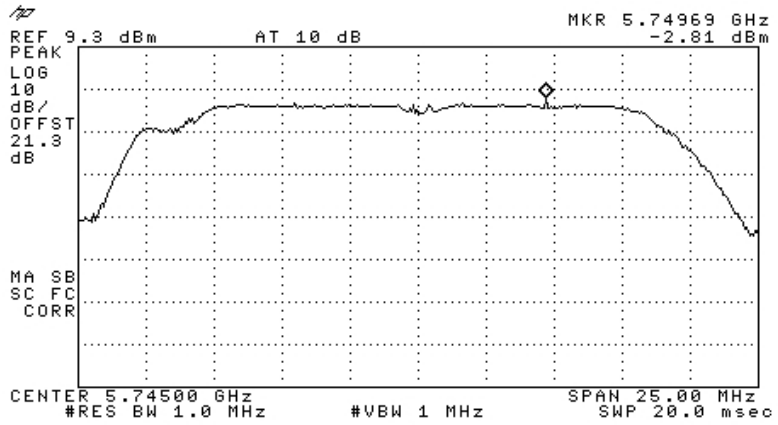



**Figure 34 5745 MHz BPSK**

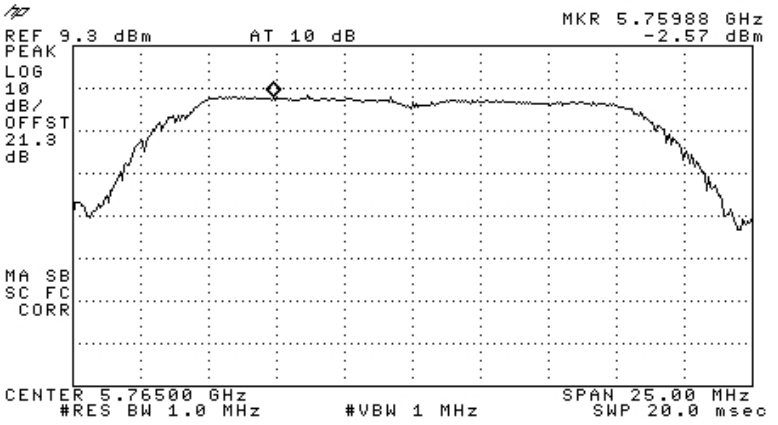



**Figure 35 5765 MHz BPSK**

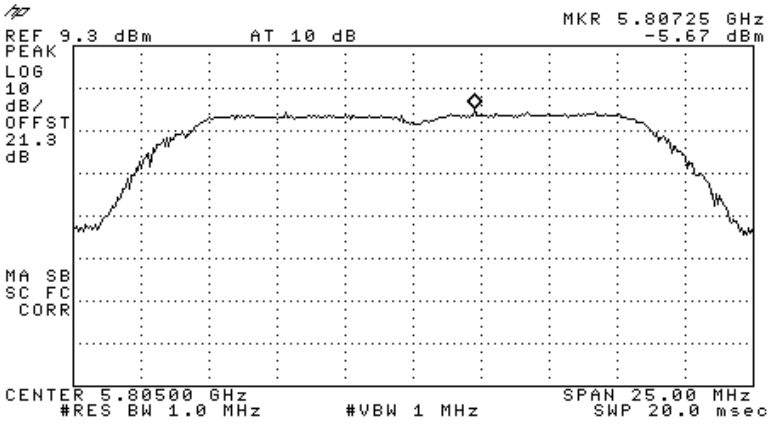



**Figure 36  5805 MHz BPSK**

## 8.2 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points
Model No.: 860M-AU With WCE-AU
Serial Number: 860M-AU: 0837451; WCE-AU: 08366A9
Specification: F.C.C. Part 15, Subpart E

| Operation Frequency (MHz) | Modulation | Power (dBm) | Specification (dBm) | Margin (dB) |
|---|---|---|---|---|
| 5180 | 64QAM | 11.0038 | 17.2838 | -6.28 |
| | BPSK | 8.064597 | 17.3646 | -9.30 |
| 5200 | 64QAM | 8.794385 | 17.32438 | -8.53 |
| | BPSK | 6.694538 | 17.34454 | -10.65 |
| 5240 | 64QAM | 8.884385 | 17.32438 | -8.44 |
| | BPSK | 6.784538 | 17.34454 | -10.56 |
| 5745 | 64QAM | 12.87456 | 30.38456 | -17.51 |
| | BPSK | 10.45336 | 30.26336 | -19.81 |
| 5765 | 64QAM | 13.6938 | 30.2838 | -16.59 |
| | BPSK | 10.75438 | 30.32438 | -19.57 |
| 5805 | 64QAM | 10.42414 | 30.30414 | -19.88 |
| | BPSK | 7.734441 | 30.40444 | -22.67 |

**Figure 37 Maximum Peak Power Output**

Note: Antenna Gain is 7 dBi

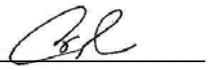
Peak Output Power = Reading + 10log EBW

For 5.18; 5.20, 5.24 GHz Peak Output Power Limit = 4 + 10log EBW – (Antenna Gain –6)

For 5.745; 5.765, 5.805 GHz Peak Output Power Limit = 17 + 10log EBW – (Antenna Gain –6)

JUDGEMENT: Passed by -6.28 dB

TEST PERSONNEL:

Tester Signature:  Date: 28.10.09

Typed/Printed Name: A. Sharabi

### *8.3 Test Equipment Used.*

Peak Power Output

| Instrument | Manufacturer | Model | Serial/Part Number | Calibration | |
|---|---|---|---|---|---|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | March 17, 2009 | 1 year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G2W20 | October 19, 2009 | 1 year |
| Cable | Rhophase | KPS-5000-KPS | A1674 | October 19, 2009 | 1 year |

**Figure 38 Test Equipment Used**

# 9. Peak Power Spectral Density 802.11b/g+802.11a + WMTS + AWS Signals

[In accordance with section 15.407(a)]

## *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. 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).

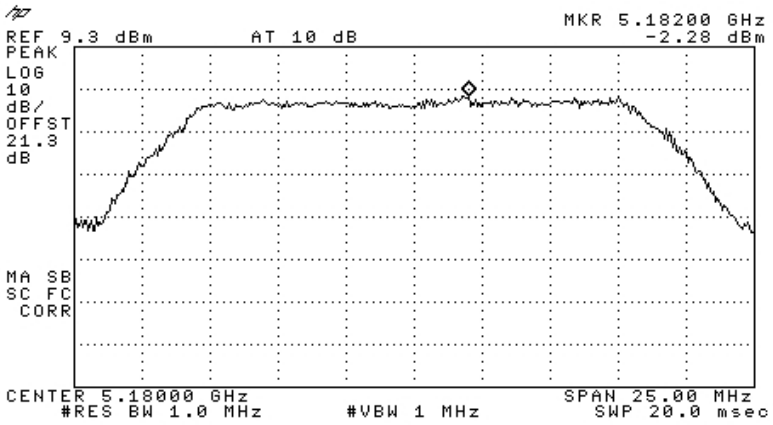



Figure 39 —5180 MHz 64QAM

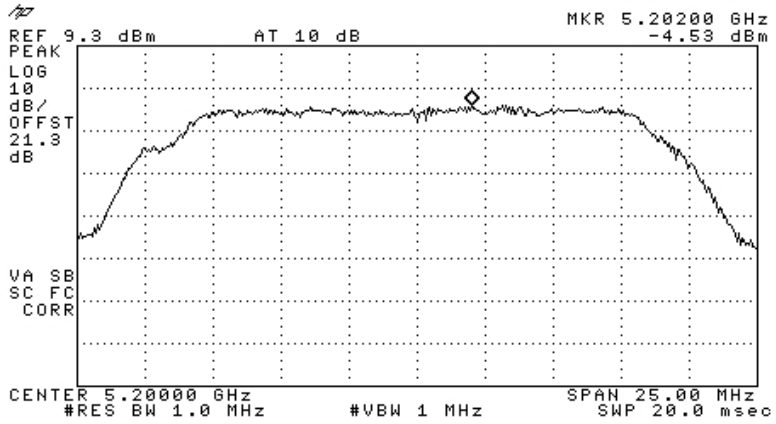



Figure 40 —5200 MHz 64QAM

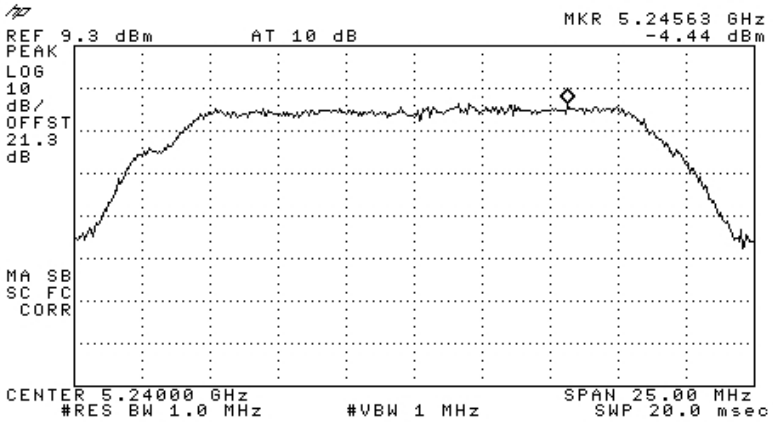



Figure 41 —5240 MHz 64QAM

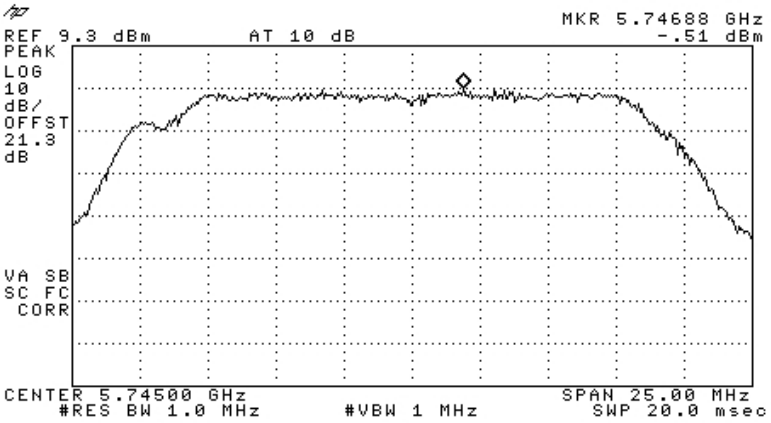



Figure 42 —5745 MHz 64QAM

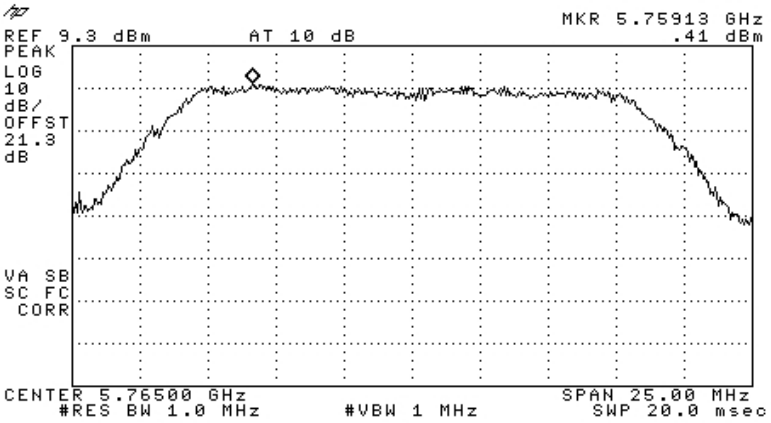



Figure 43 —5765 MHz 64QAM

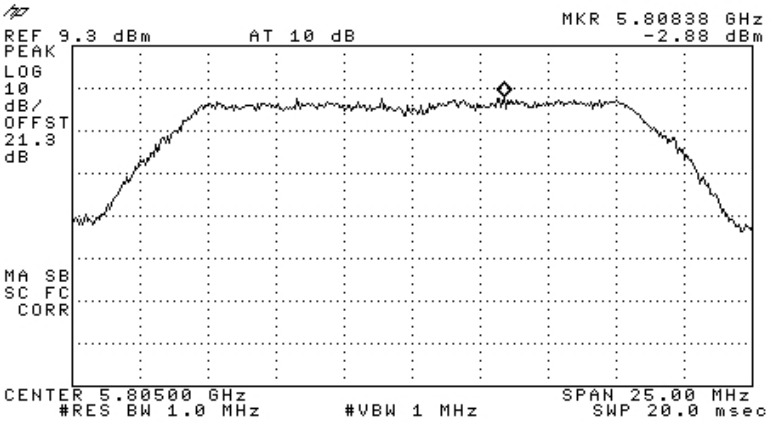



Figure 44 —5805 MHz 64QAM

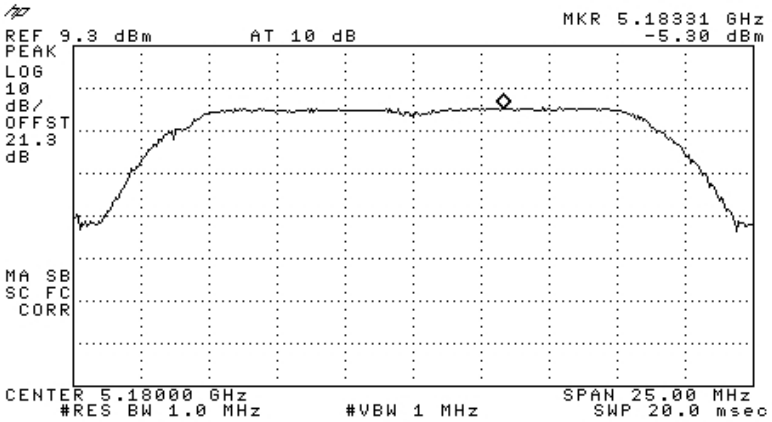



Figure 45 —5180 MHz BPSK

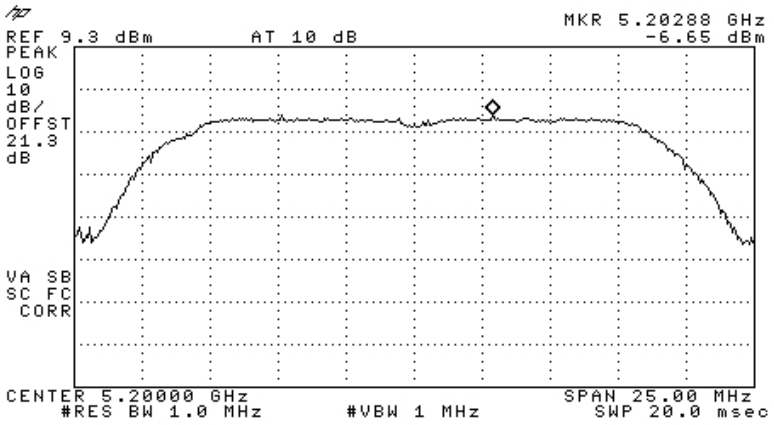



Figure 46 —5200 MHz BPSK

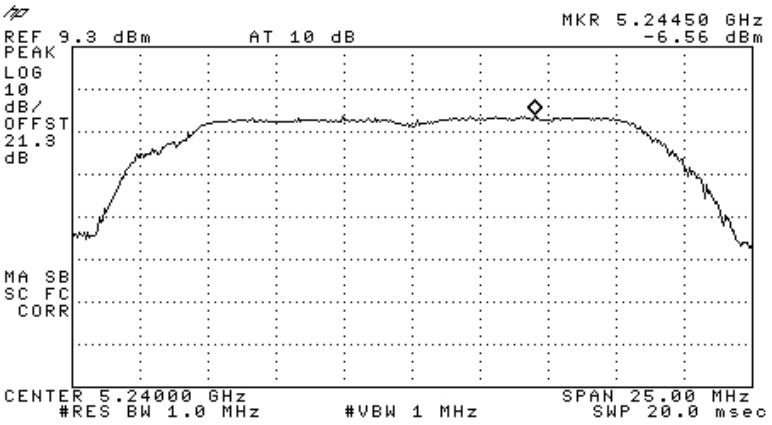



Figure 47 —5240 MHz BPSK

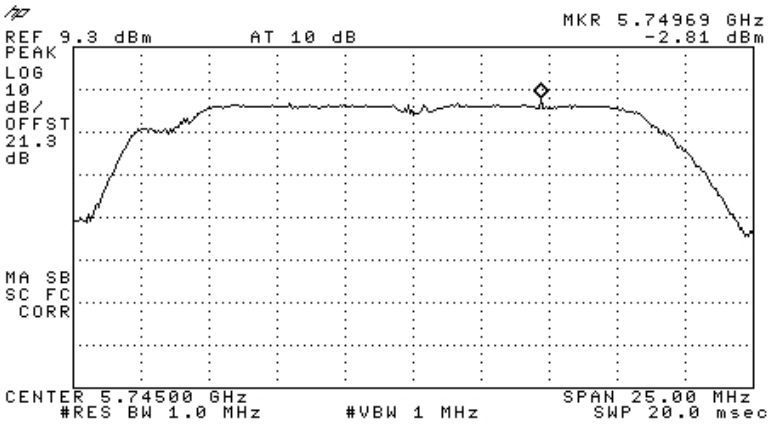



Figure 48 —5745 MHz BPSK

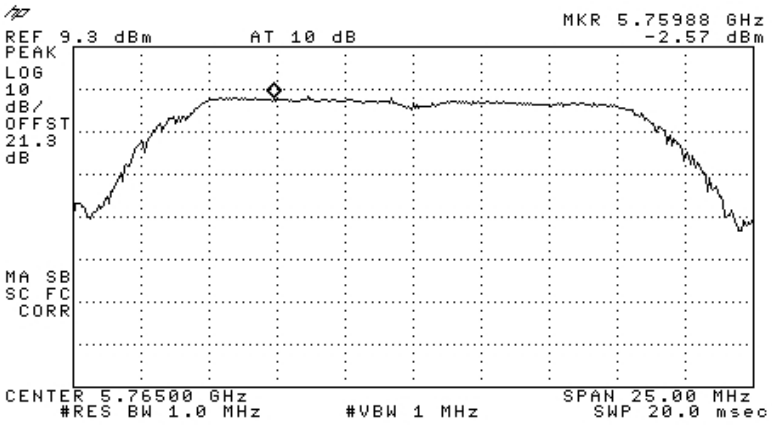



Figure 49 —5765 MHz BPSK

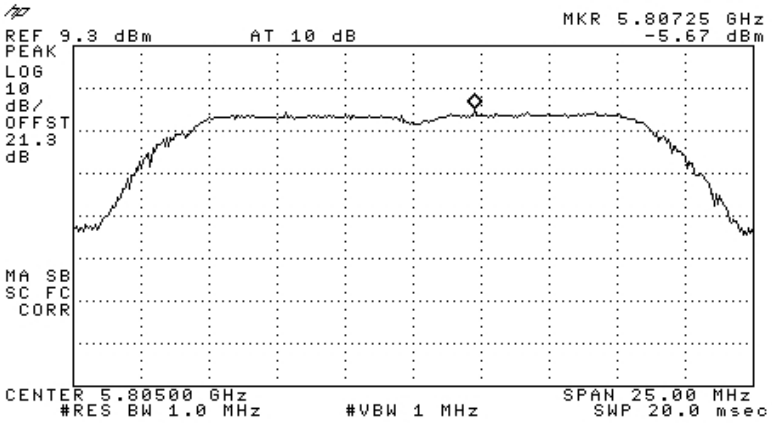



Figure 50 —5805 MHz BPSK

### *9.2 Results table*

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points
Model No.: 860M-AU With WCE-AU
Serial Number: 860M-AU: 0837451; WCE-AU: 08366A9
Specification: F.C.C. Part 15, Subpart E (15.407(a))

| Operation Frequency (MHz) | Modulation | Reading (dBm) | Specification (dBm) | Margin (dB) |
|---|---|---|---|---|
| 5180 | 64QAM | -2.28 | 3 | -5.28 |
| | BPSK | -5.30 | 3 | -8.30 |
| 5200 | 64QAM | -4.53 | 3 | -7.53 |
| | BPSK | -6.65 | 3 | -9.65 |
| 5240 | 64QAM | -4.44 | 3 | -7.44 |
| | BPSK | -6.56 | 3 | -9.56 |
| 5745 | 64QAM | -0.51 | 16 | -16.51 |
| | BPSK | -2.81 | 16 | -18.81 |
| 5765 | 64QAM | 0.41 | 16 | -15.59 |
| | BPSK | -2.57 | 16 | -18.57 |
| 5805 | 64QAM | -2.88 | 16 | -18.88 |
| | BPSK | -5.67 | 16 | -21.67 |

**Figure 51 Test Results**

JUDGEMENT: Passed by 5.28 dB

Tester Signature: _____ Date: 28.10.09

Typed/Printed Name: A. Sharabi

### *9.3 Test Equipment Used.*

Peak Power Spectral Density

| Instrument | Manufacturer | Model | Serial/Part Number | Calibration | |
|---|---|---|---|---|---|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | March 17, 2009 | 1 year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G2W20 | October 19, 2009 | 1 year |
| Cable | Rhophase | KPS-5000-KPS | A1674 | October 19, 2009 | 1 year |

**Figure 52 Test Equipment Used**

# 10. Ratio of Peak Excursion of Modulation Envelope to Maximum Conducted Output Power 802.11b/g+802.11a + WMTS + AWS Signals

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

## *10.1 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 = 1.3 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).

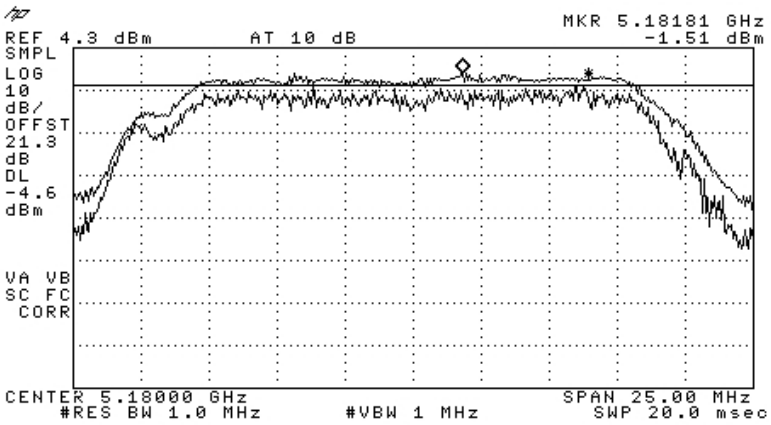



Figure 53 —5180 MHz 64QAM

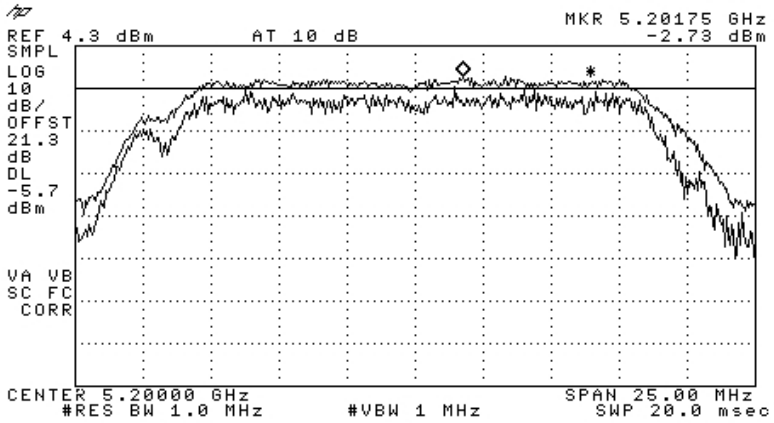



Figure 54 —5200 MHz 64QAM

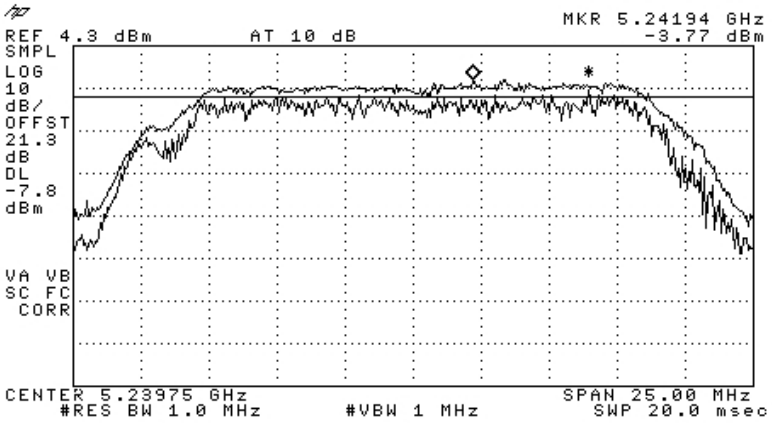



Figure 55 —5240 MHz 64QAM

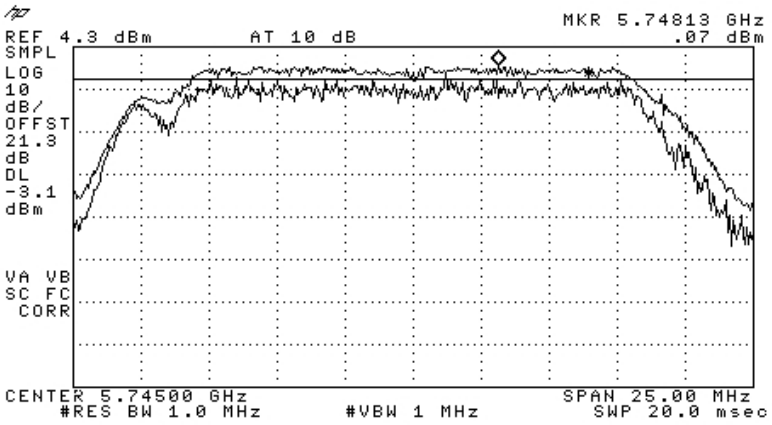



Figure 56 —5745 MHz 64QAM

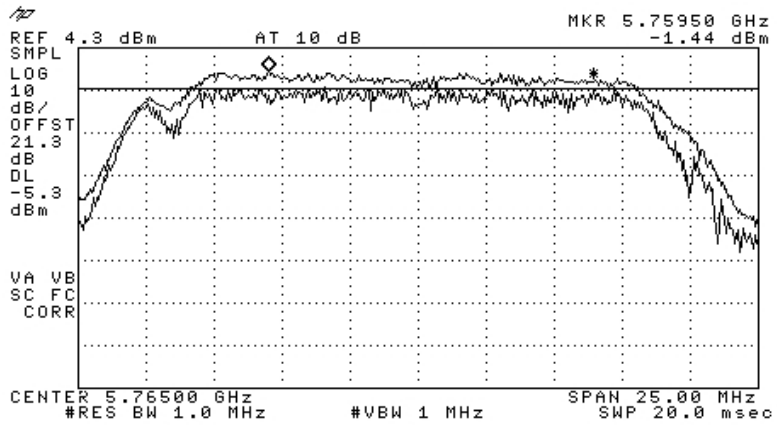



Figure 57 —5765 MHz 64QAM

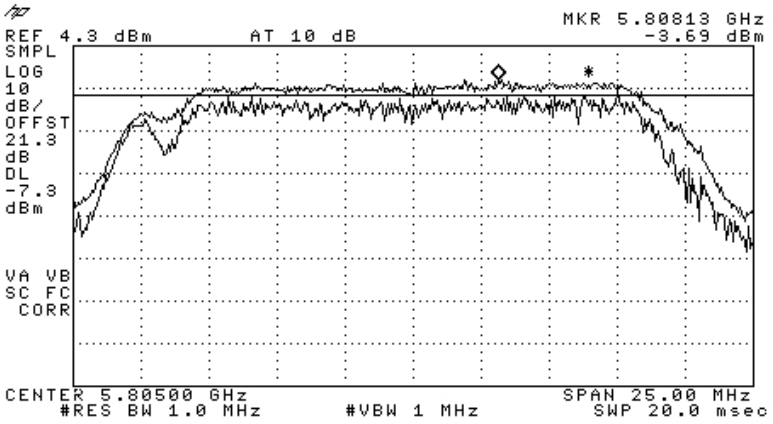



Figure 58 —5805 MHz 64QAM

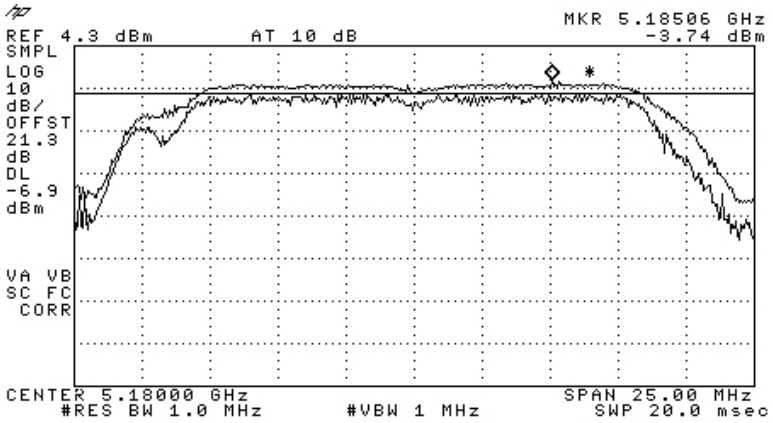



Figure 59 —5180 MHz BPSK

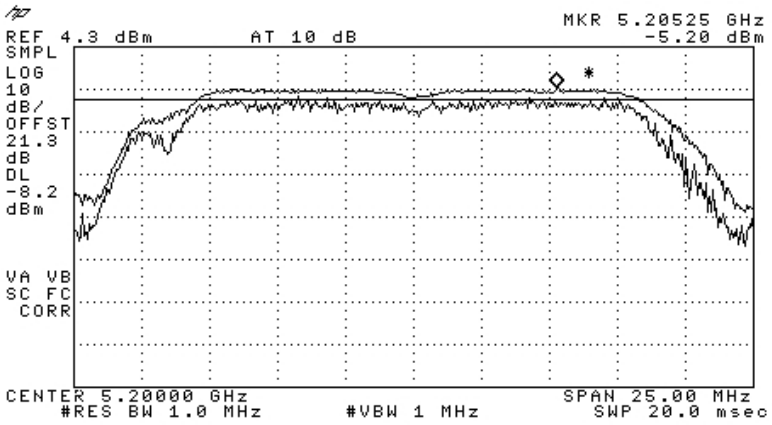



Figure 60 —5200 MHz BPSK

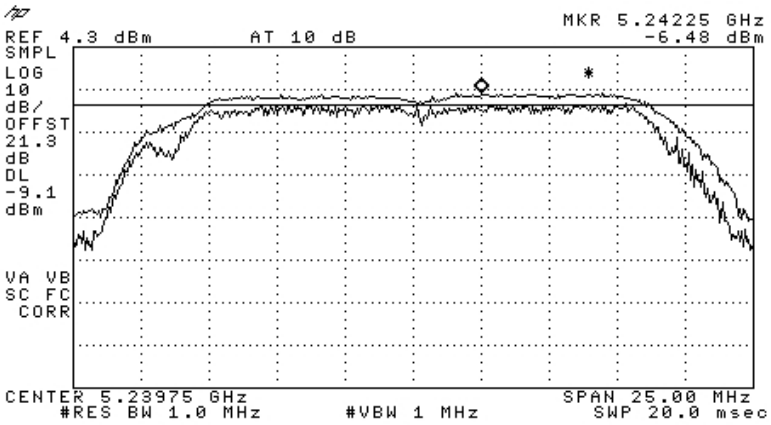



Figure 61 —5240 MHz BPSK

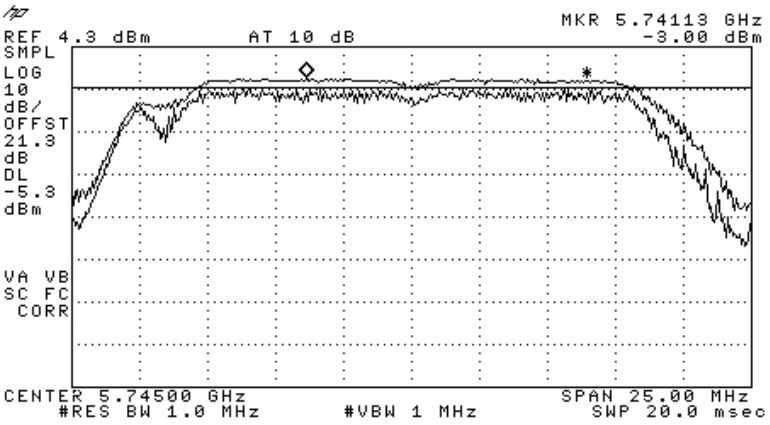



Figure 62 —5745 MHz BPSK

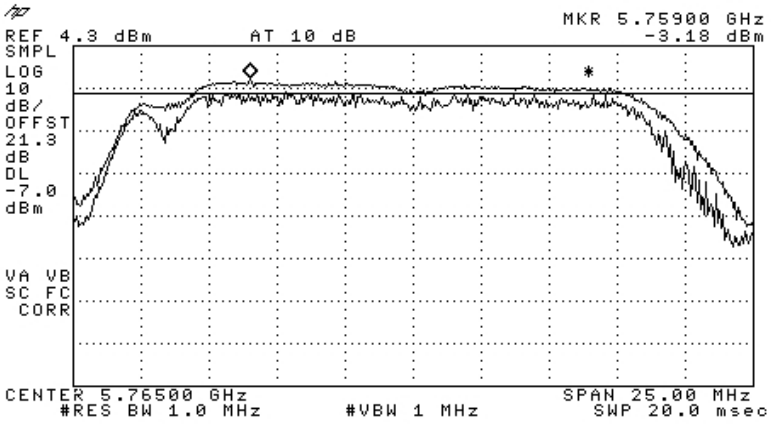



Figure 63 —5765 MHz BPSK

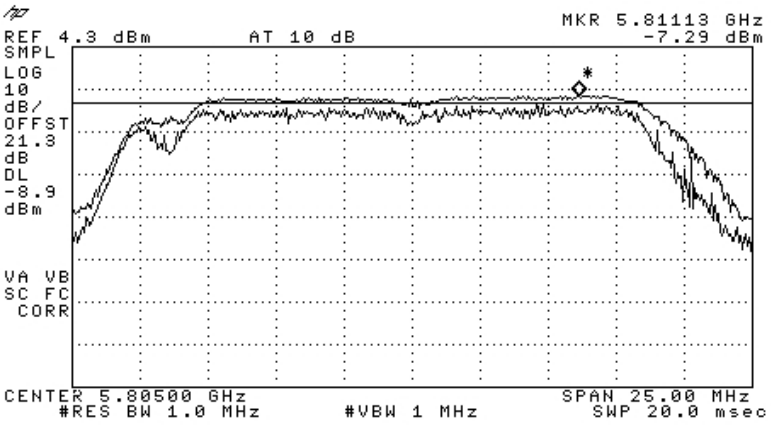



Figure 64 —5805 MHz BPSK

### *10.2 Results table*

E.U.T Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points

Model No.: 860M-AU With WCE-AU

Serial Number: 860M-AU: 0837451; WCE-AU: 08366A9

Specification: F.C.C. Part 15, Subpart E (15.407(a)(6))

| Operation Frequency (MHz) | Modulation | Delta (dB) | Specification (dB) | Margin (dB) |
|---|---|---|---|---|
| 5180 | 64QAM | 3.09 | 13 | -9.91 |
| | BPSK | 3.16 | 13 | -9.84 |
| 5200 | 64QAM | 2.97 | 13 | -10.03 |
| | BPSK | 3.00 | 13 | -10.00 |
| 5240 | 64QAM | 4.03 | 13 | -8.97 |
| | BPSK | 2.62 | 13 | -10.38 |
| 5745 | 64QAM | 3.03 | 13 | -9.97 |
| | BPSK | 2.30 | 13 | -10.7 |
| 5765 | 64QAM | 3.86 | 13 | -9.14 |
| | BPSK | 3.82 | 13 | -9.18 |
| 5805 | 64QAM | 3.61 | 13 | -9.39 |
| | BPSK | 1.61 | 13 | -11.84 |

**Figure 65 Test Results**

JUDGEMENT: Passed by 8.97 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 28.10.09

Typed/Printed Name: A. Sharabi

### *10.3 Test Equipment Used.*

Peak Power Spectral Density

| Instrument | Manufacturer | Model | Serial/Part Number | Calibration | |
|---|---|---|---|---|---|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | March 17, 2009 | 1 year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G2W20 | October 19, 2009 | 1 year |
| Cable | Rhophase | KPS-5000-KPS | A1674 | October 19, 2009 | 1 year |

**Figure 66 Test Equipment Used**

# 11. Peak Power Output Out of 5150-5250; 5725-5825 MHz Bands 802.11b/g+802.11a + WMTS + AWS Signals

## *11.1 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. 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).

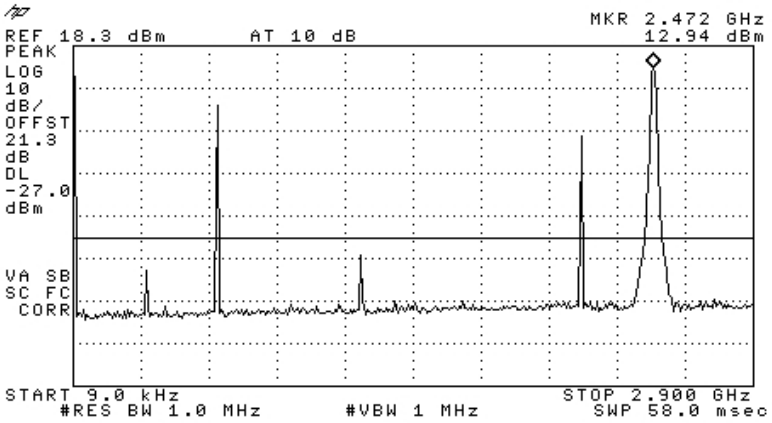



Figure 67 —5180 MHz 64QAM

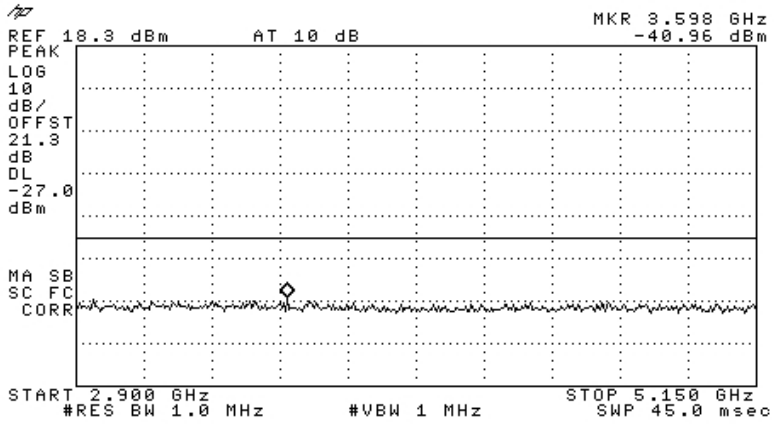



Figure 68 —5180 MHz 64QAM

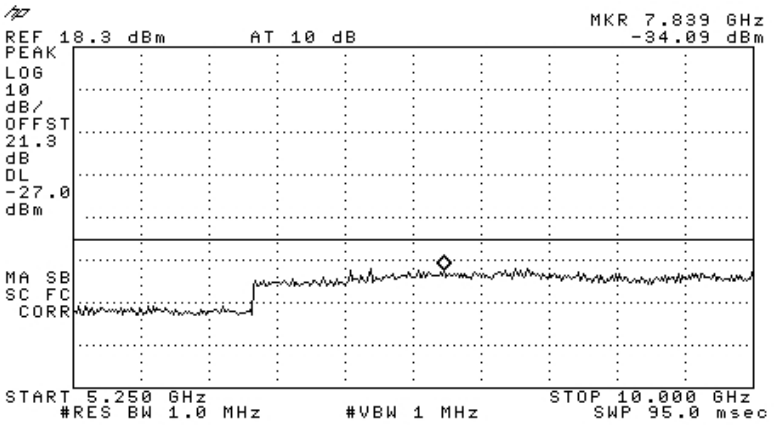



Figure 69 —5180 MHz 64QAM

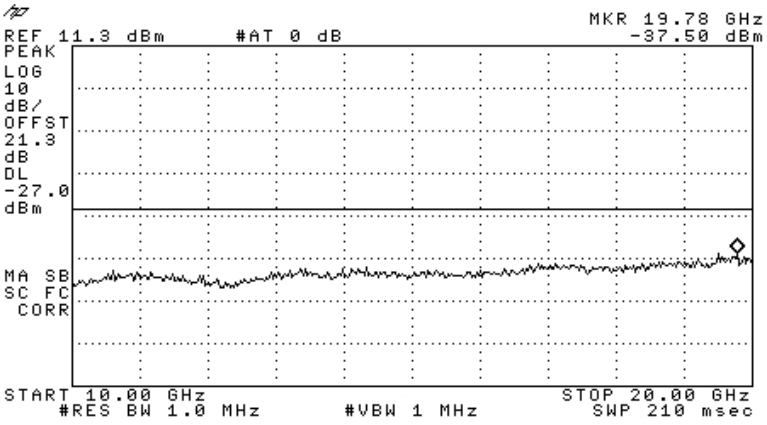



Figure 70 —5180 MHz 64QAM

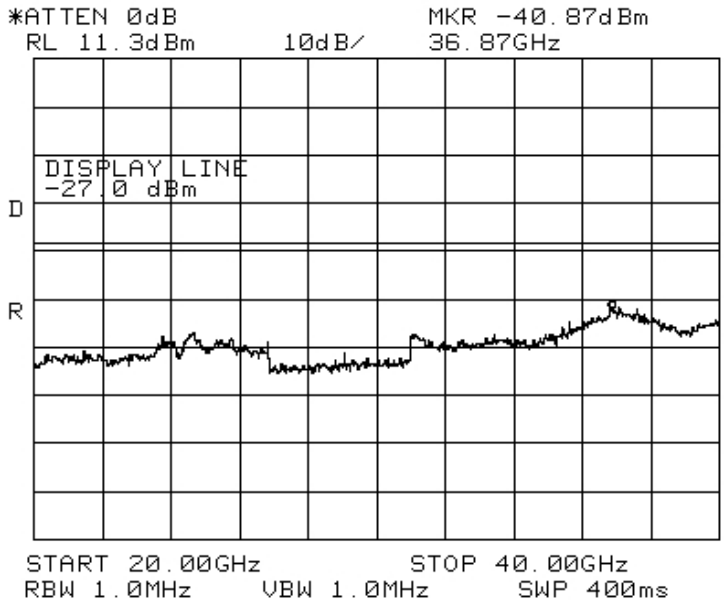



Figure 71 —5180 MHz 64QAM

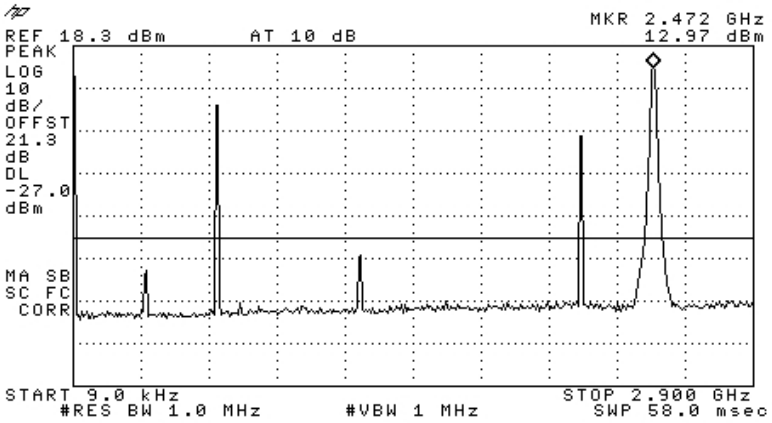



Figure 72 —5200 MHz 64QAM

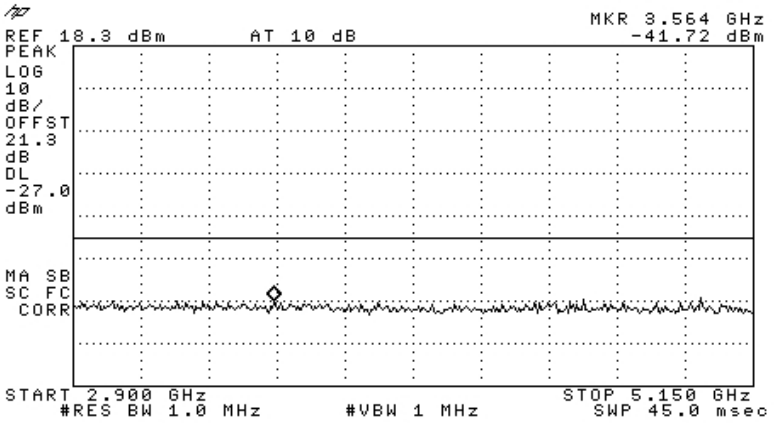



Figure 73 —5200 MHz 64QAM

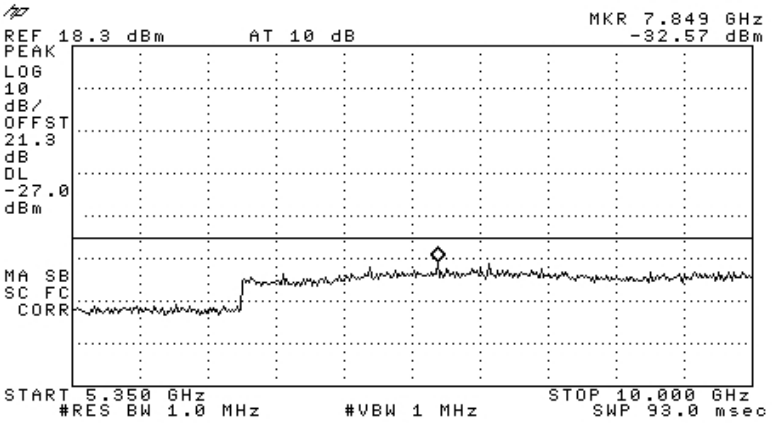



Figure 74 —5200 MHz 64QAM

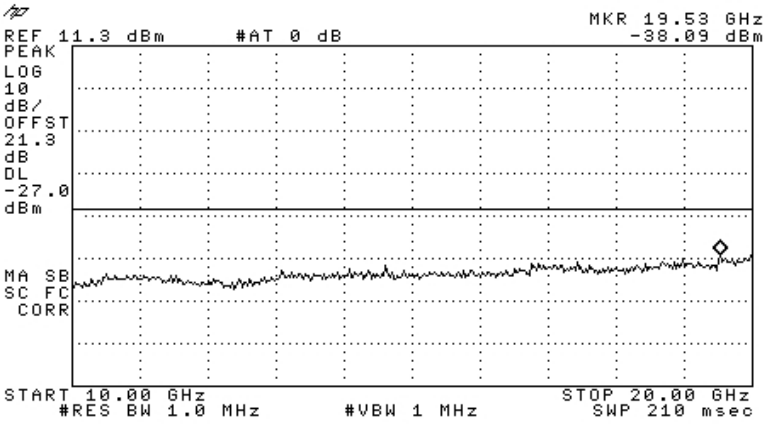



Figure 75 —5200 MHz 64QAM

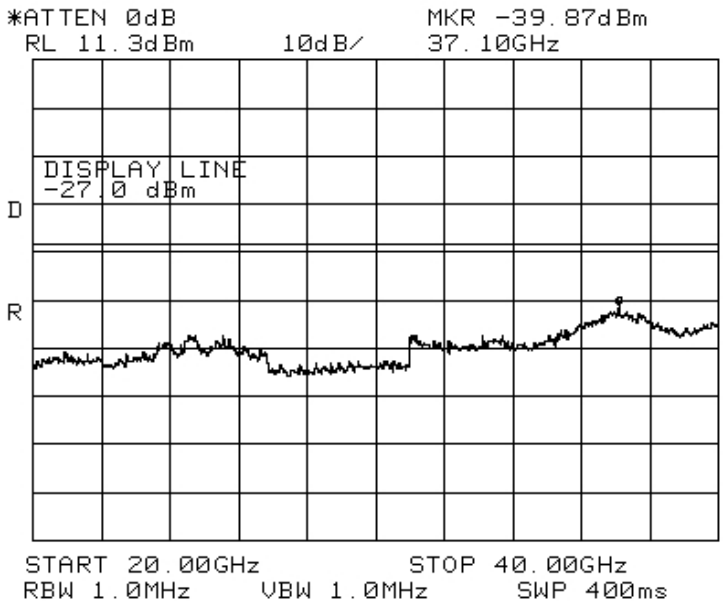



Figure 76 —5200 MHz 64QAM

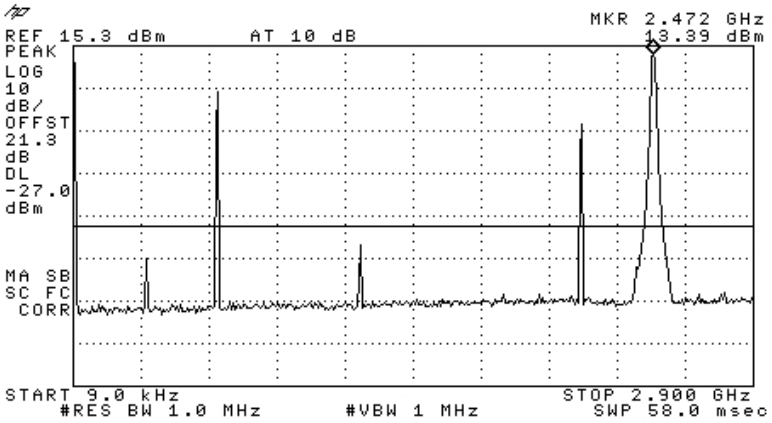



Figure 77 —5240 MHz 64QAM

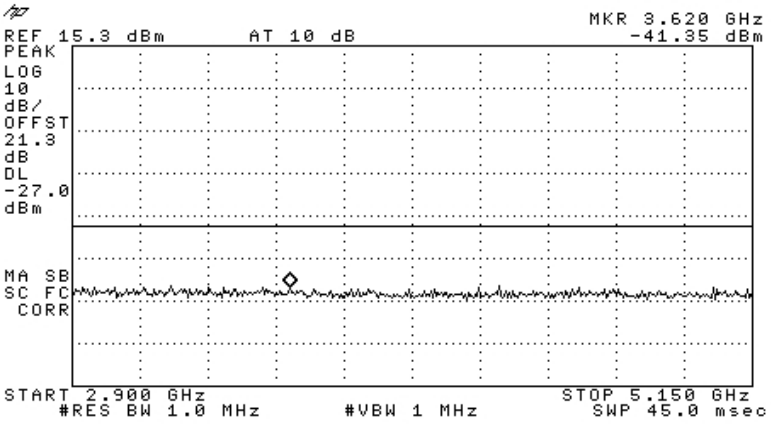



Figure 78 —5240 MHz 64QAM

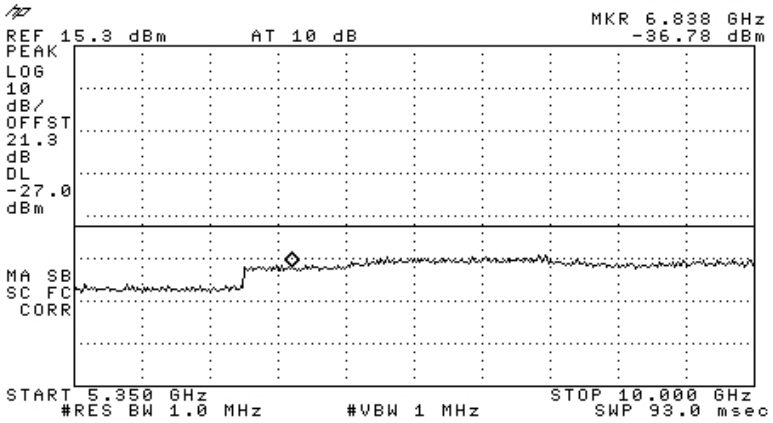



Figure 79 —5240 MHz 64QAM

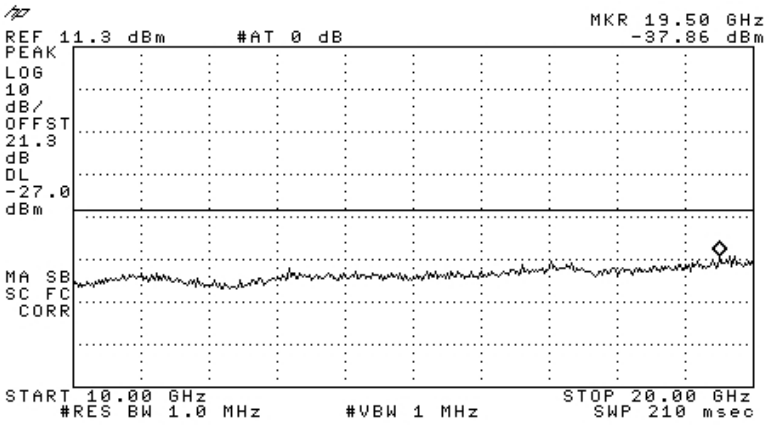



Figure 80 —5240 MHz 64QAM

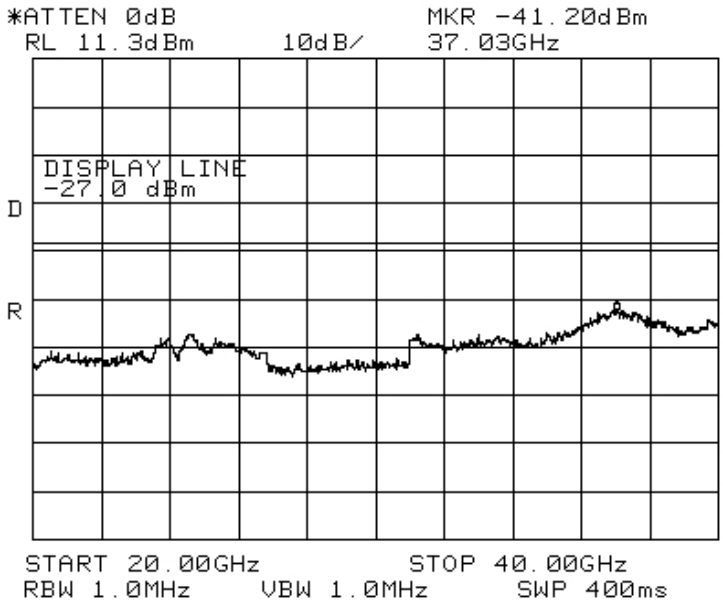



Figure 81 —5240 MHz 64QAM

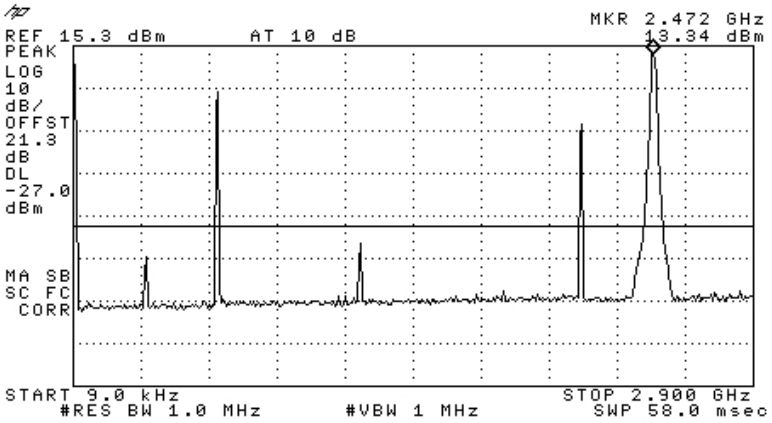



Figure 82 —5745 MHz 64QAM

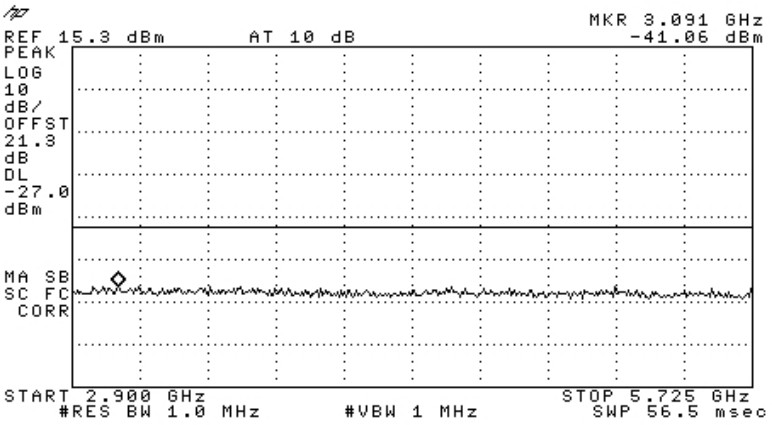



Figure 83 —5745 MHz 64QAM

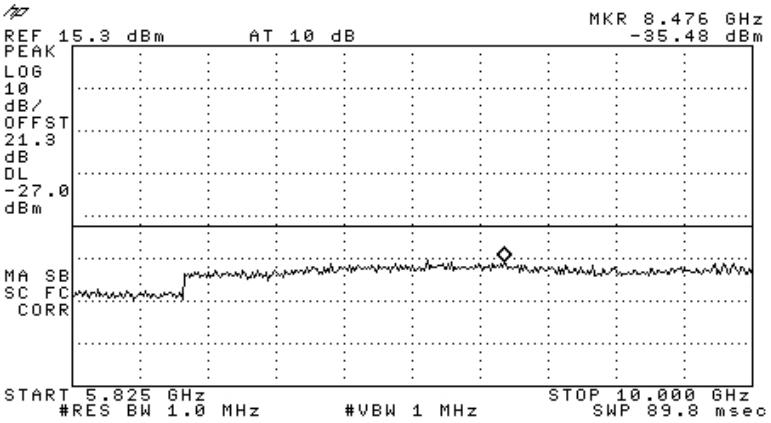



Figure 84 —5745 MHz 64QAM

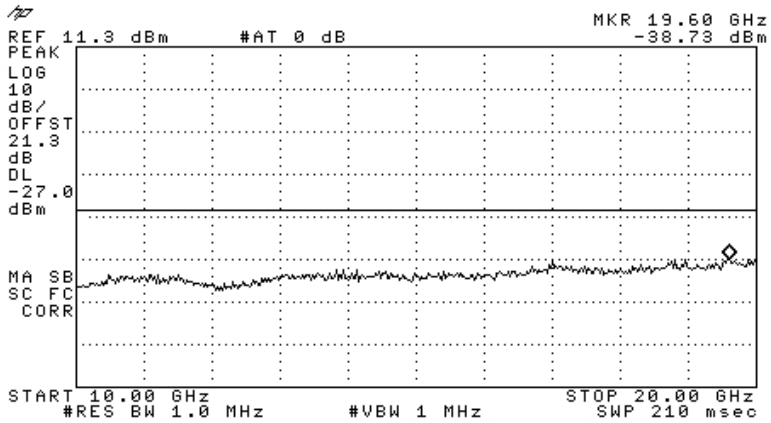



Figure 85 —5745 MHz 64QAM

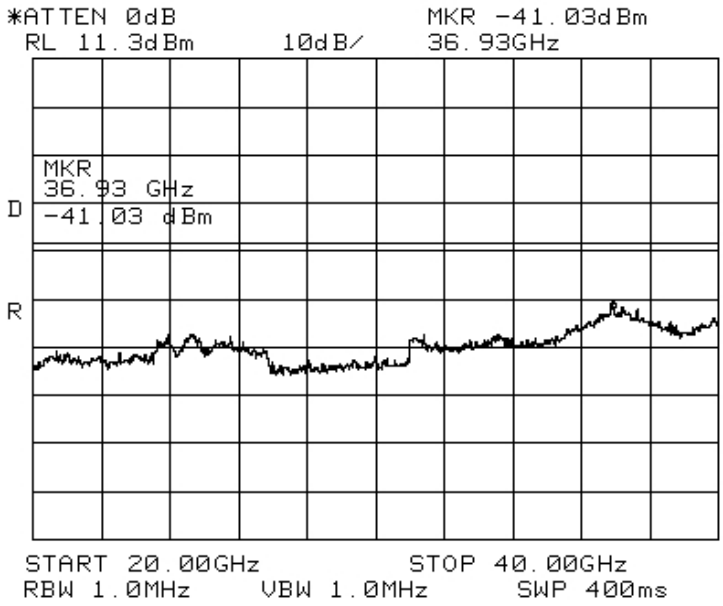



Figure 86 —5745 MHz 64QAM

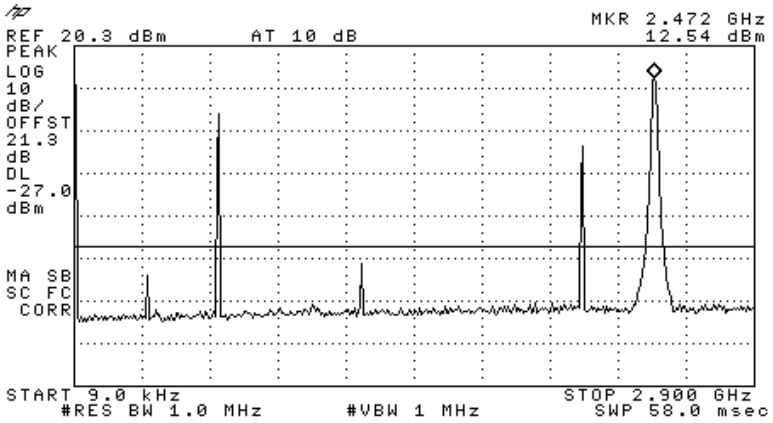



Figure 87 —5765 MHz 64QAM

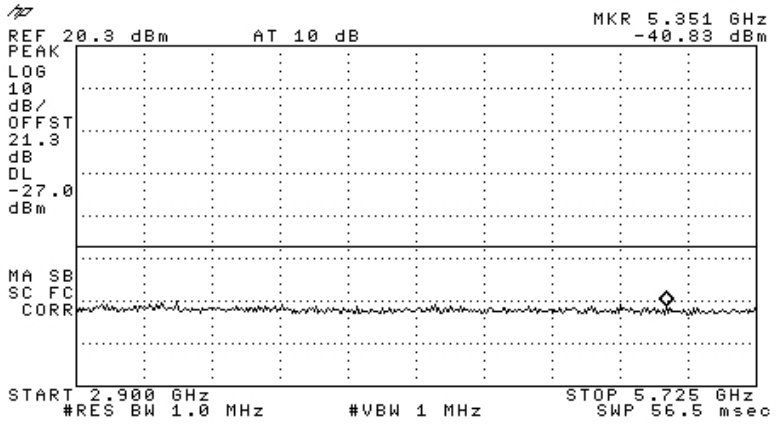



Figure 88 —5765 MHz 64QAM

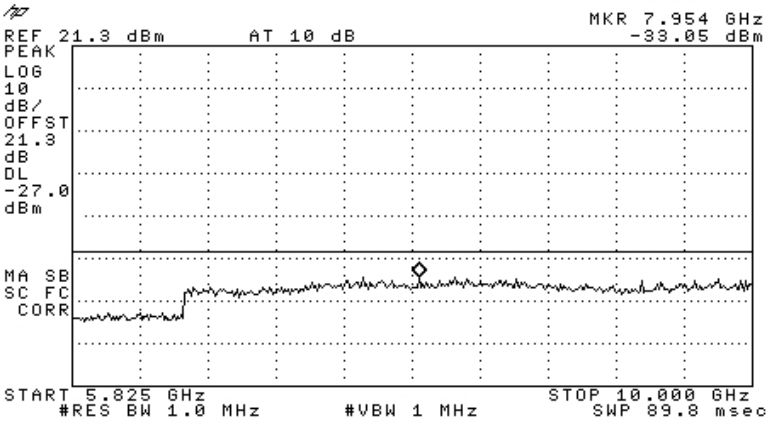



Figure 89 —5765 MHz 64QAM

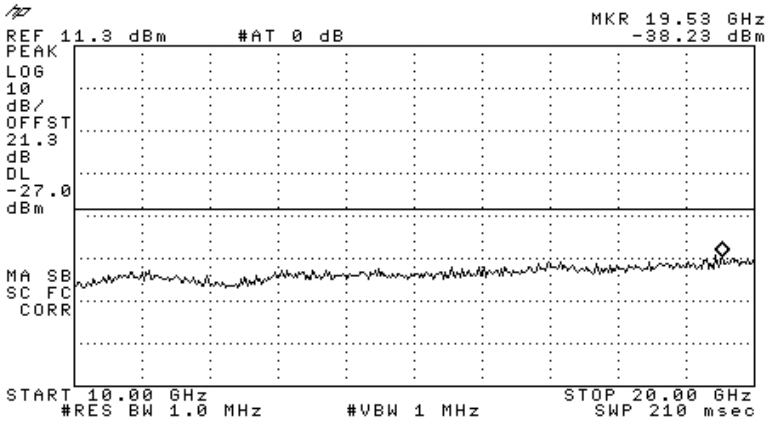



Figure 90 —5765 MHz 64QAM

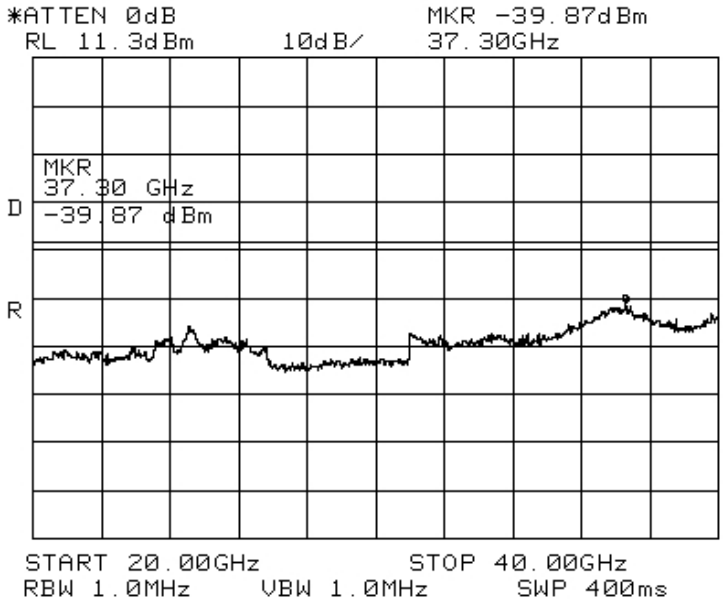



Figure 91 —5765 MHz 64QAM

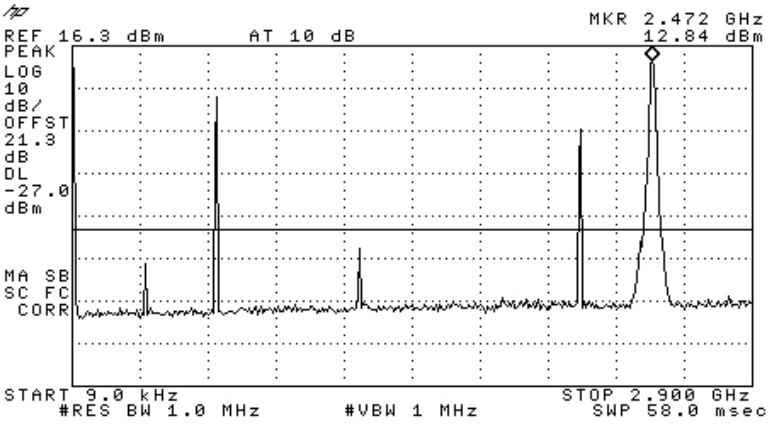



Figure 92 —5805 MHz 64QAM

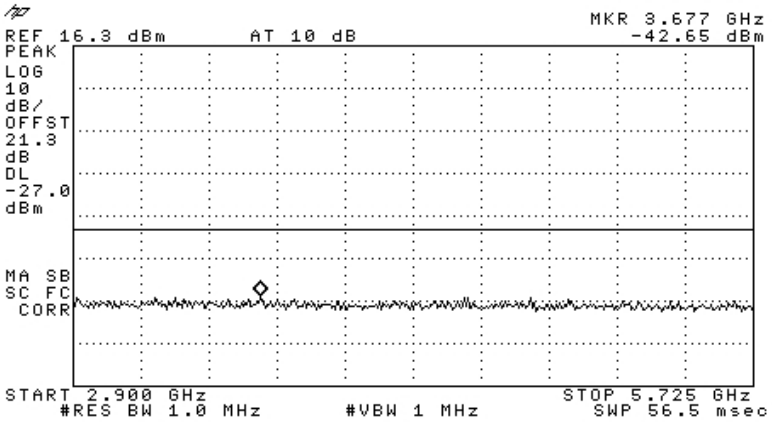



Figure 93 —5805 MHz 64QAM

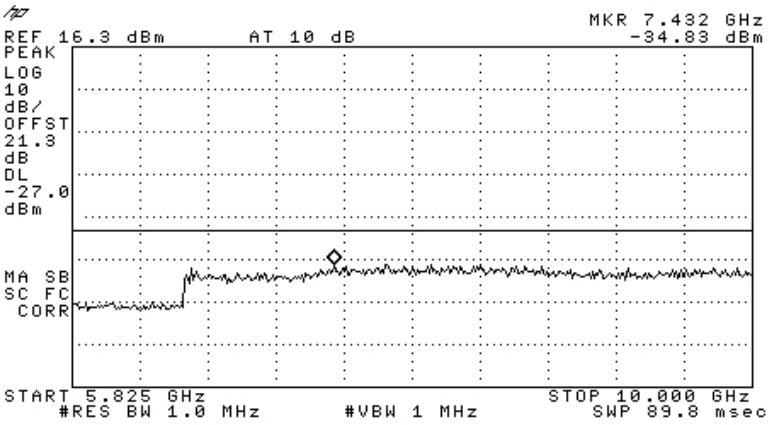



Figure 94 —5805 MHz 64QAM

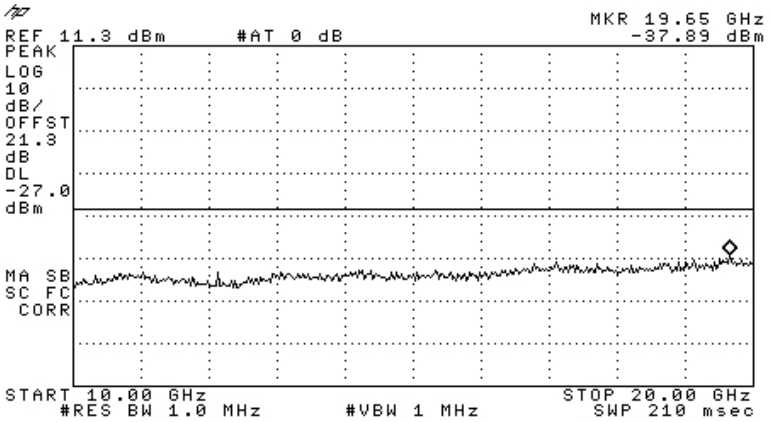



Figure 95 —5805 MHz 64QAM

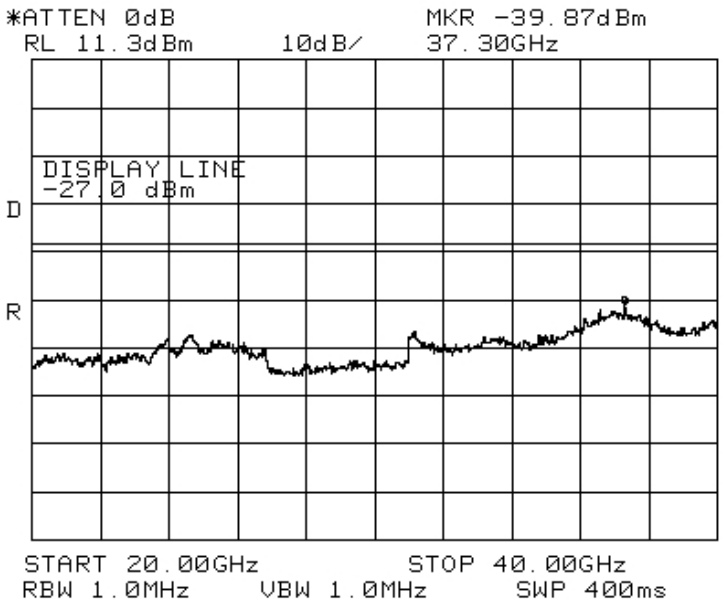



Figure 96 —5805 MHz 64QAM

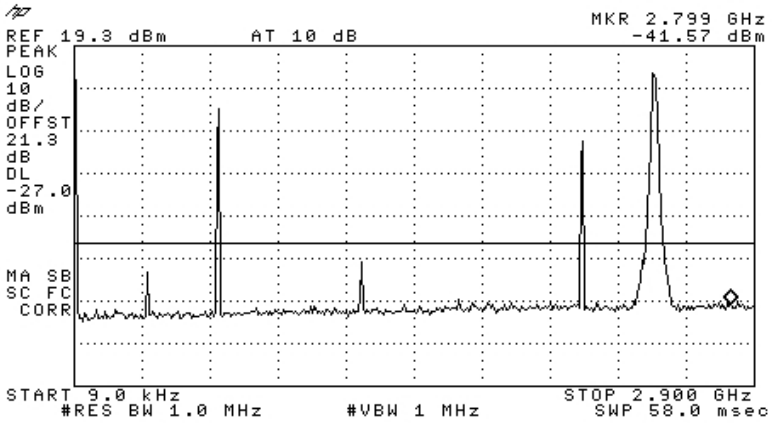



Figure 97 —5180 MHz BPSK

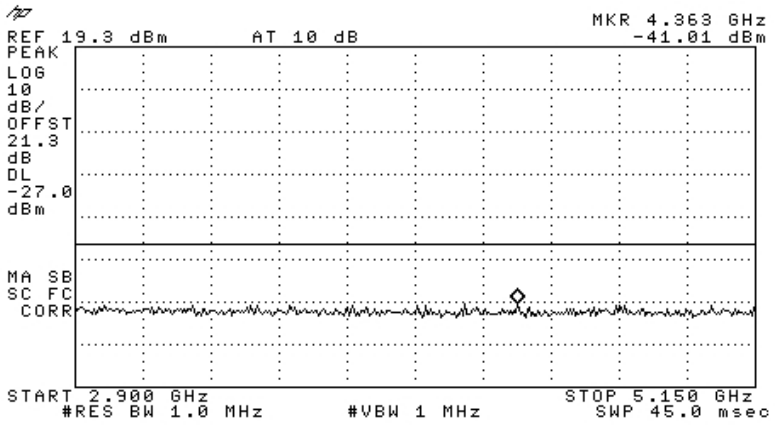



Figure 98 —5180 MHz BPSK

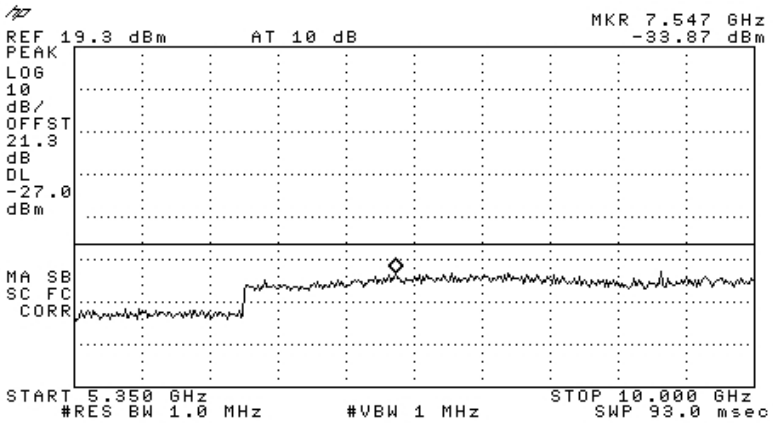



Figure 99 —5180 MHz BPSK

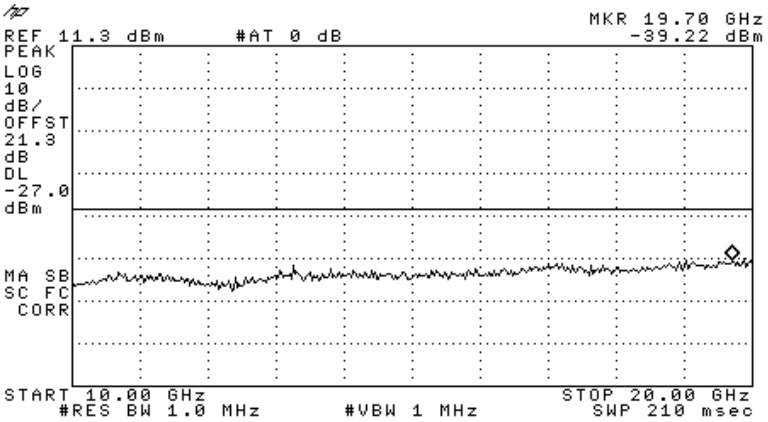



Figure 100 —5180 MHz BPSK

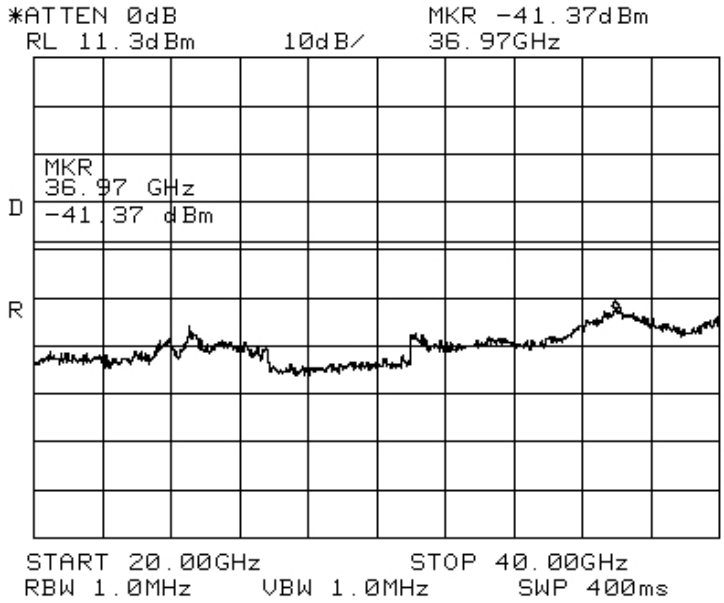



Figure 101 —5180 MHz BPSK

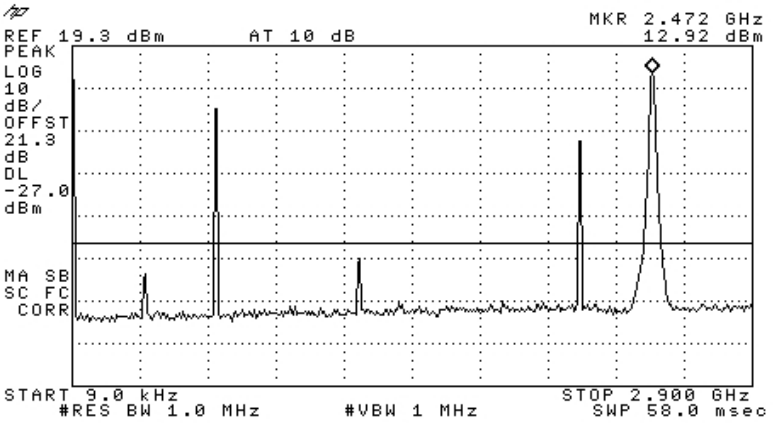



Figure 102 —5200 MHz BPSK

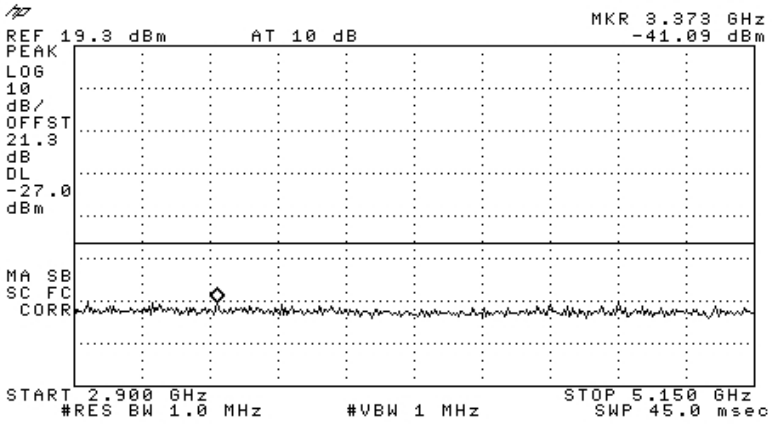



Figure 103 —5200 MHz BPSK

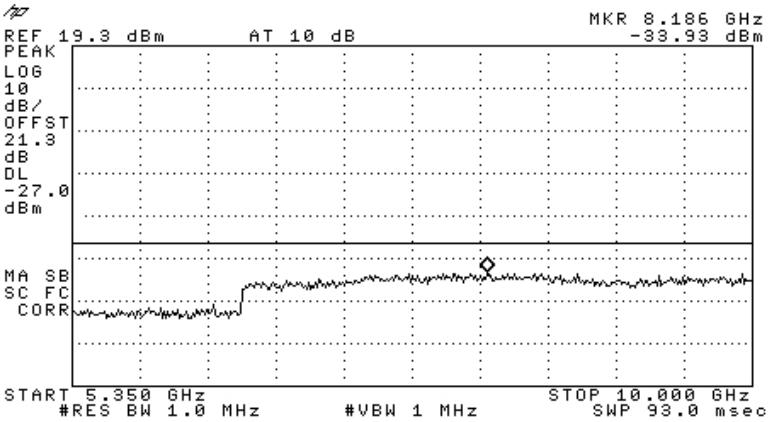



Figure 104 —5200 MHz BPSK

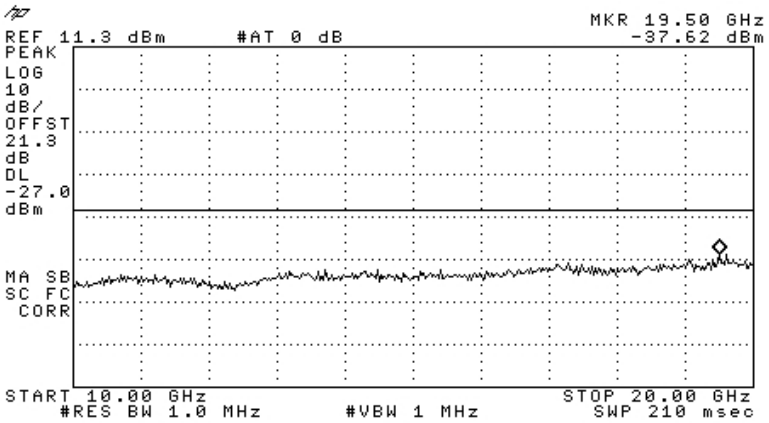



Figure 105 —5200 MHz BPSK

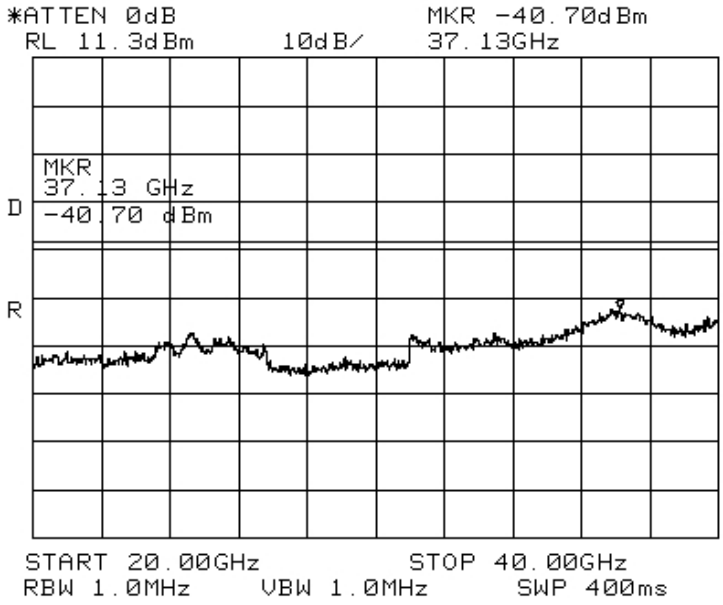



Figure 106 —5200 MHz BPSK

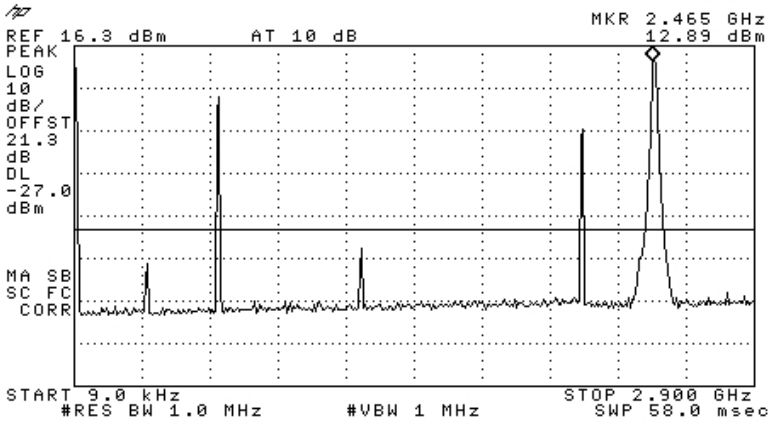



Figure 107 —5240 MHz BPSK

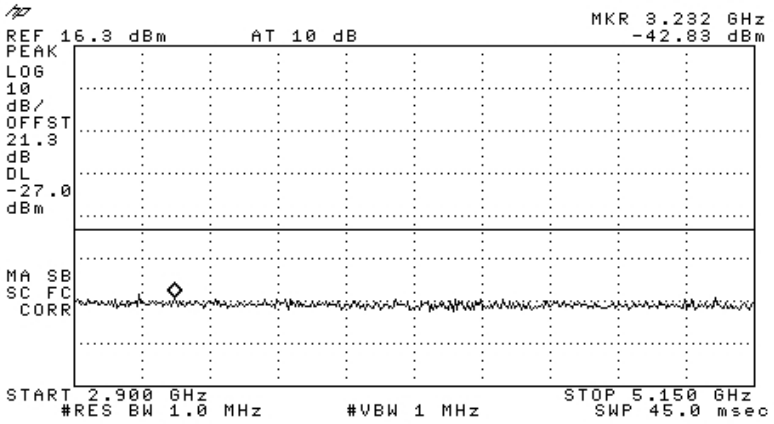



Figure 108 —5240 MHz BPSK

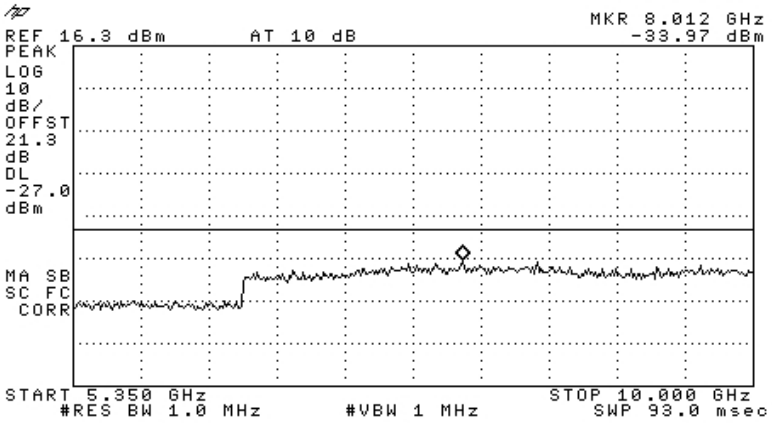



Figure 109 —5240 MHz BPSK

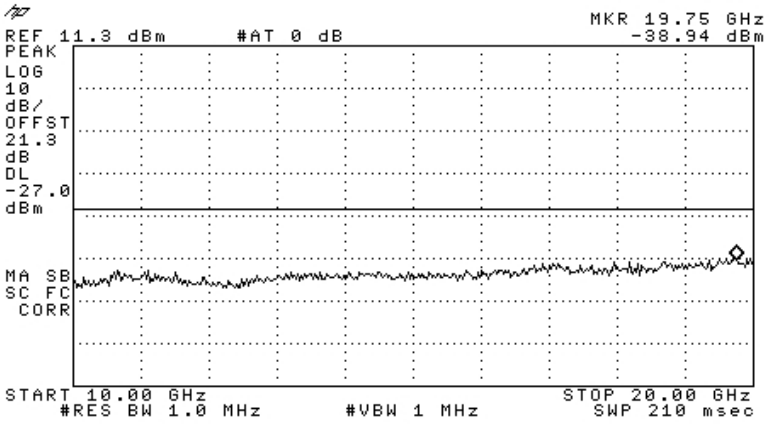



Figure 110 —5240 MHz BPSK

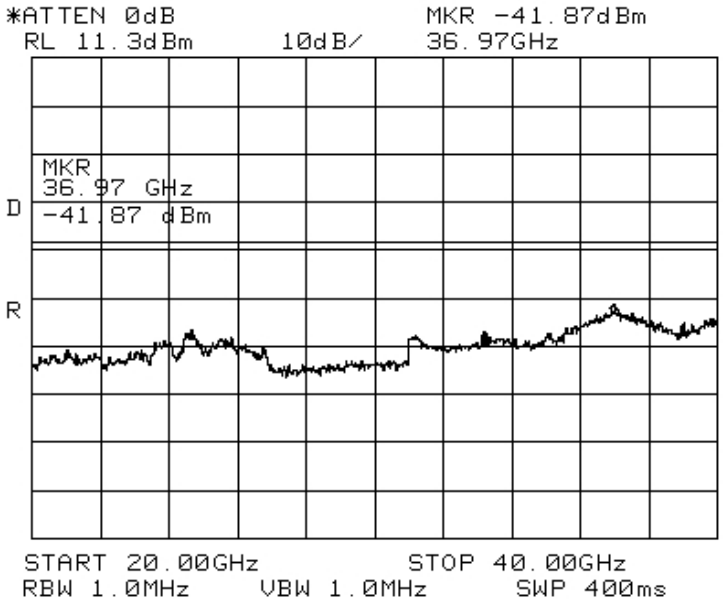



Figure 111 —5240 MHz BPSK

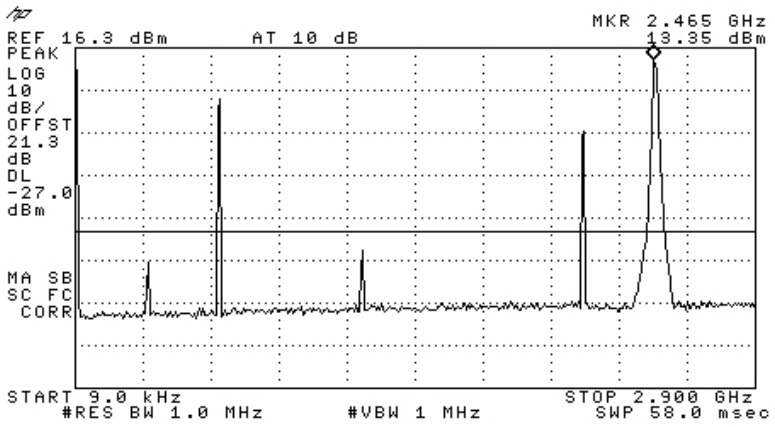



Figure 112 —5745 MHz BPSK

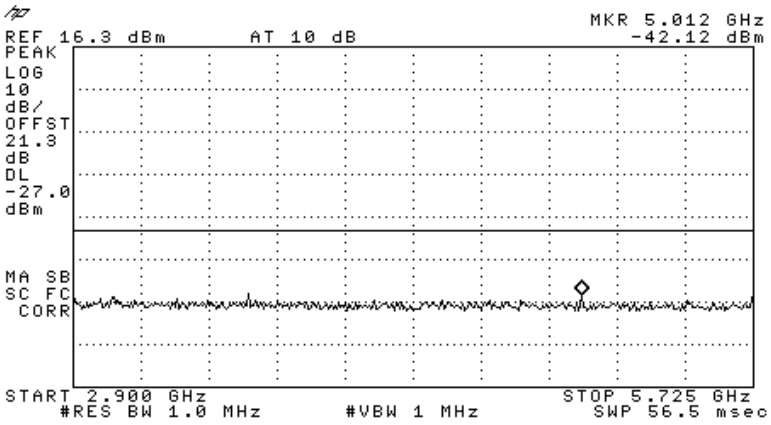



Figure 113 —5745 MHz BPSK

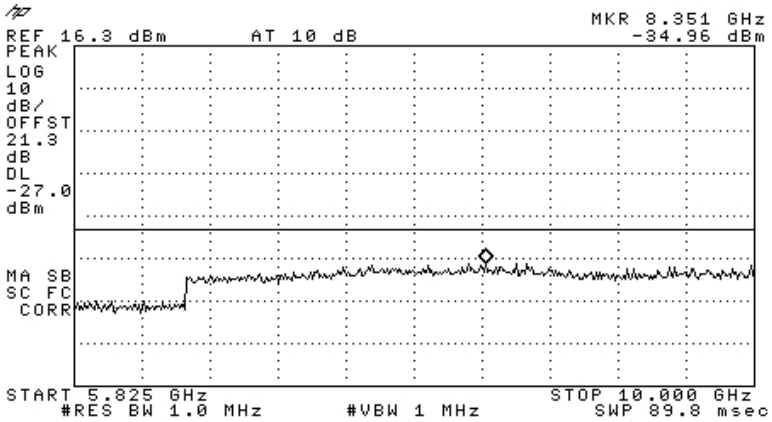



Figure 114 —5745 MHz BPSK

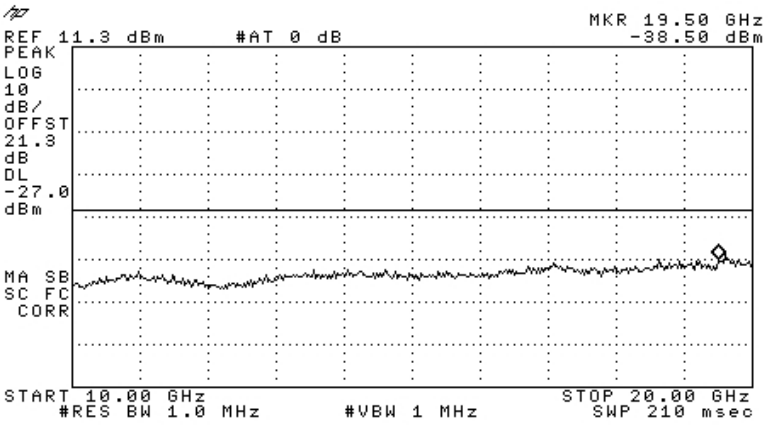



Figure 115 —5745 MHz BPSK

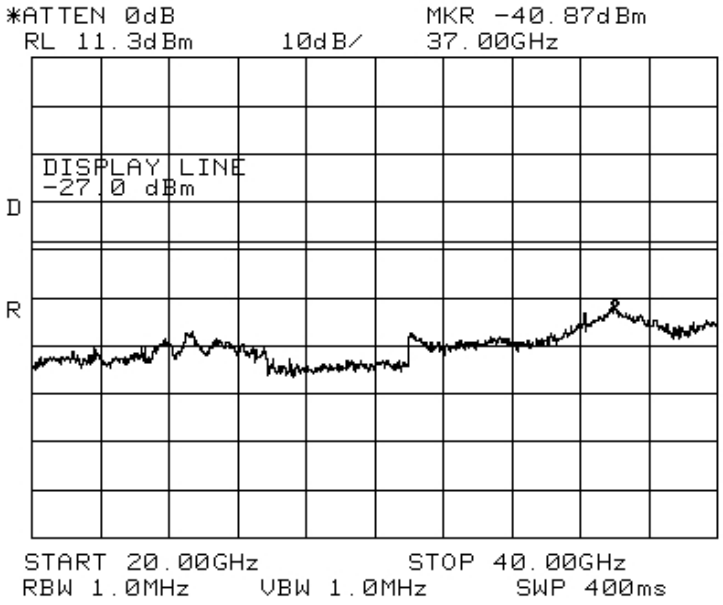



Figure 116 —5745 MHz BPSK

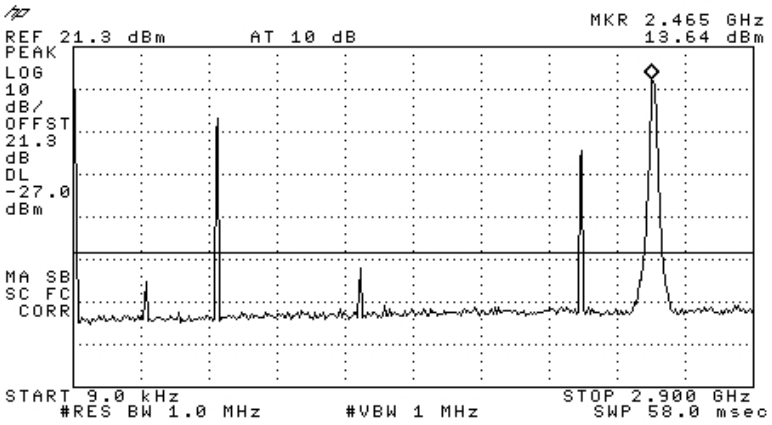



Figure 117 —5765 MHz BPSK

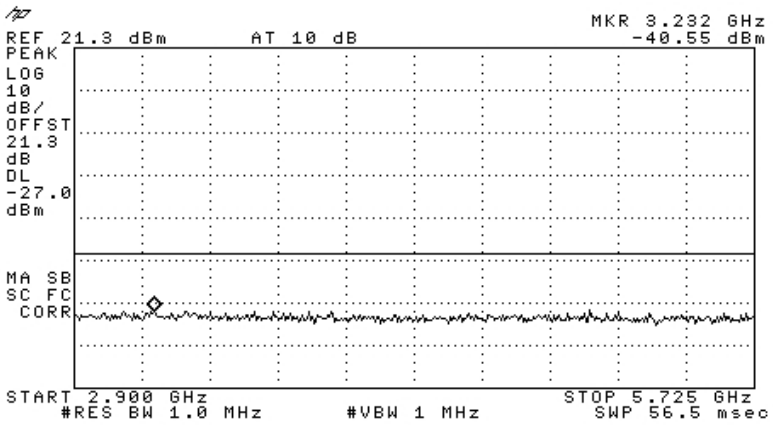



Figure 118 —5765 MHz BPSK

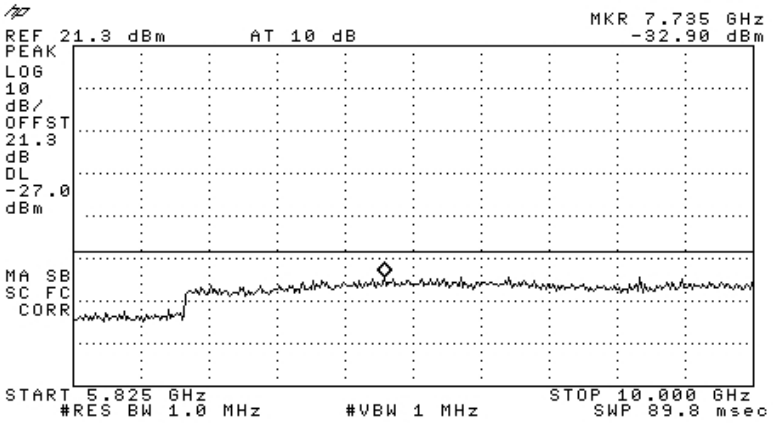



Figure 119 —5765 MHz BPSK

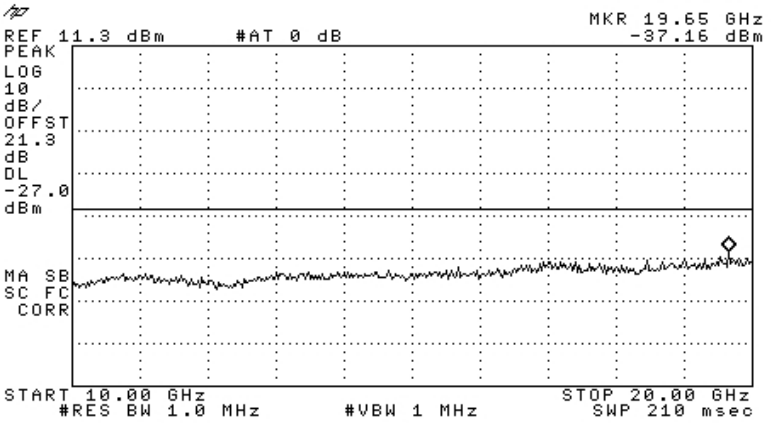



Figure 120 —5765 MHz BPSK

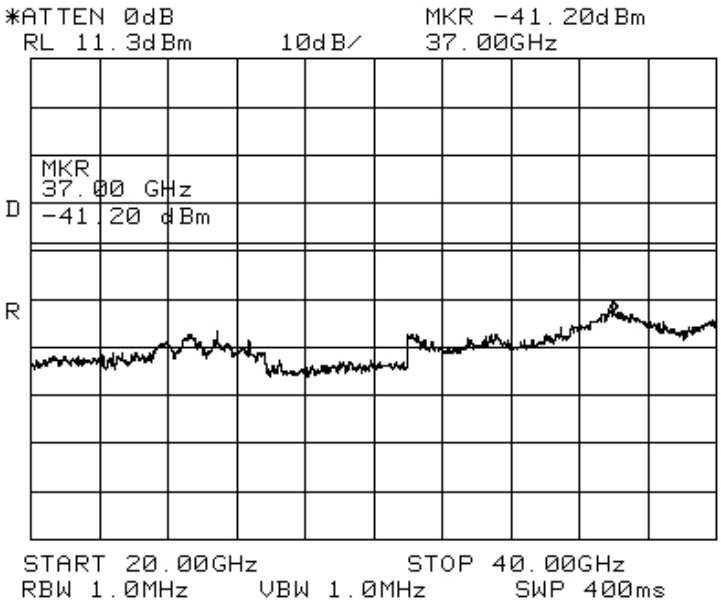



Figure 121 —5765 MHz BPSK

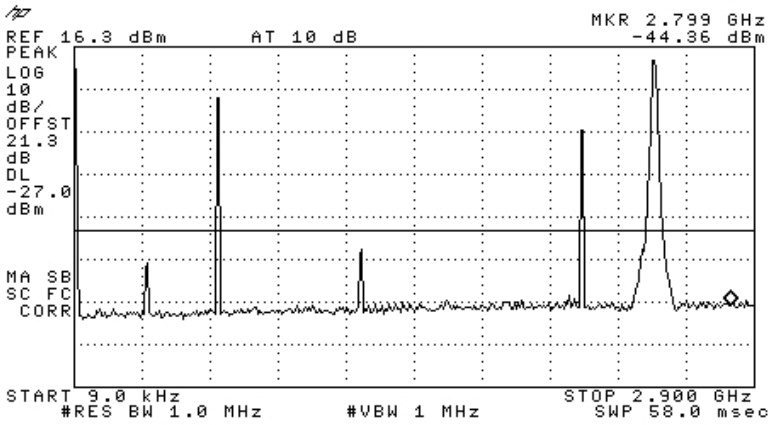



Figure 122 —5805 MHz BPSK

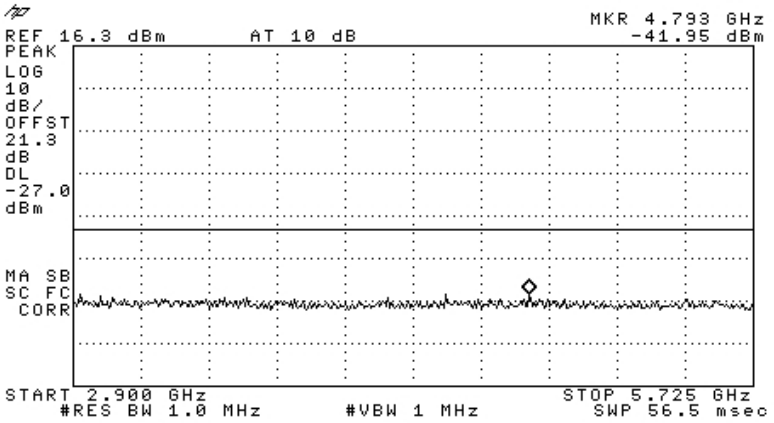



Figure 123 —5805 MHz BPSK

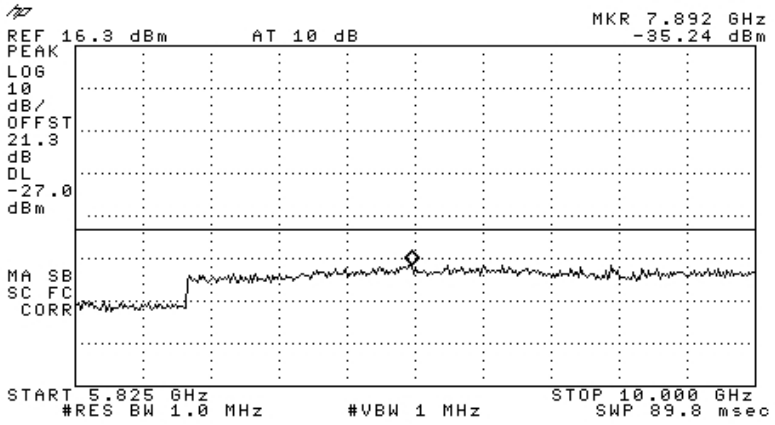



Figure 124 —5805 MHz BPSK

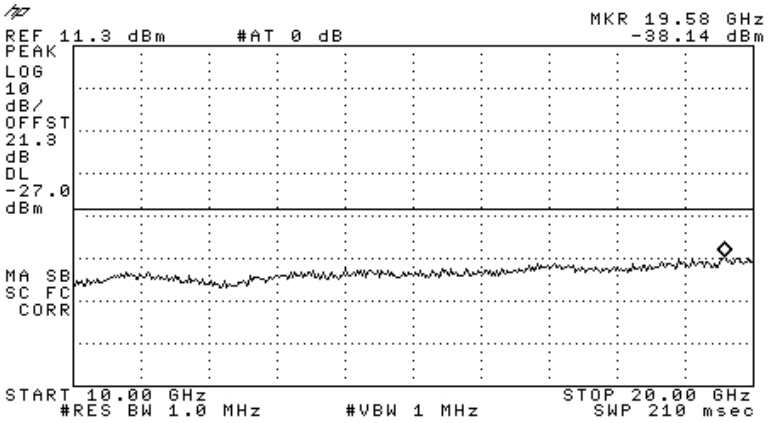



Figure 125 —5805 MHz BPSK

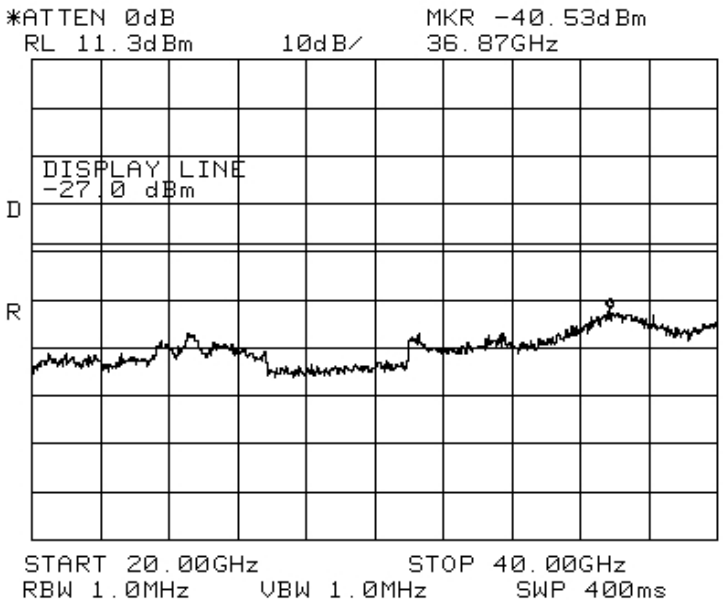



Figure 126 —5805 MHz BPSK

### *11.2 Results table*

E.U.T Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points
Model No.: 860M-AU With WCE-AU
Serial Number: 860M-AU: 0837451; WCE-AU: 08366A9
Specification: F.C.C. Part 15, Subpart E

| Operation Frequency (MHz) | Modulation | Reading (dBm) | Specification (dBm) | Margin (dB) |
|---|---|---|---|---|
| 5180 | 64QAM | -34.09 | -27.0 | -7.09 |
| | BPSK | -33.87 | -27.0 | -6.87 |
| 5200 | 64QAM | -32.57 | -27.0 | -5.57 |
| | BPSK | -33.93 | -27.0 | -6.93 |
| 5240 | 64QAM | -36.78 | -27.0 | -9.78 |
| | BPSK | -33.97 | -27.0 | -6.97 |
| 5745 | 64QAM | -35.48 | -27.0 | -8.48 |
| | BPSK | -34.96 | -27.0 | -7.96 |
| 5765 | 64QAM | -33.05 | -27.0 | -6.05 |
| | BPSK | -32.90 | -27.0 | -5.90 |
| 5805 | 64QAM | -37.89 | -27.0 | -10.89 |
| | BPSK | -35.24 | -27.0 | -8.24 |

**Figure 127 Peak Power Output of 5150-5250; 5725-5825 MHz Bands**

JUDGEMENT: Passed by 5.57 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 28.10.09
Typed/Printed Name: A. Sharabi

### *11.3 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 | March 17, 2009 | 1 year |
| Spectrum Analyzer | HP | 8564E | 3442A00275 | December 15, 2008 | 1 year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G2W20 | October 19, 2009 | 1 year |
| Cable | Rhophase | KPS-5000-KPS | A1674 | October 19, 2009 | 1 year |

**Figure 128 Test Equipment Used**

# 12. Band Edge Spectrum 802.11b/g+802.11a + WMTS + AWS Signals

[In Accordance with section 15.407)

## *12.1 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 = 1.3dB). 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).

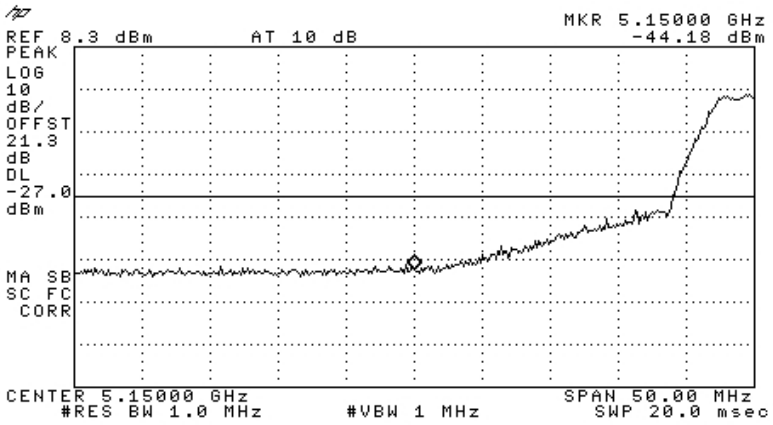



Figure 129 —5180 MHz 64QAM

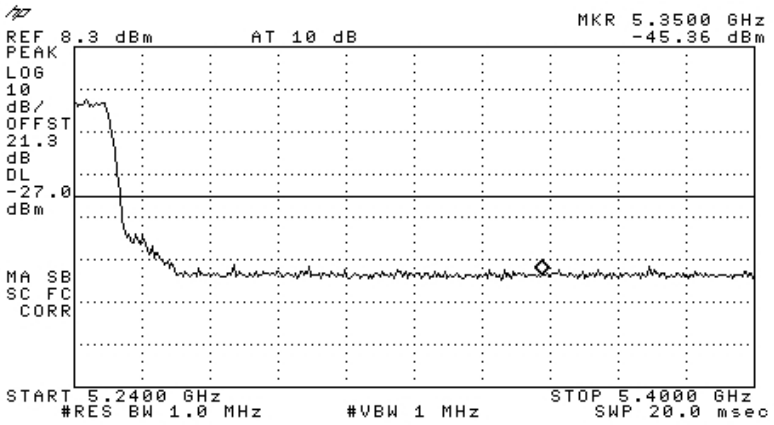



Figure 130 —5240 MHz 64QAM

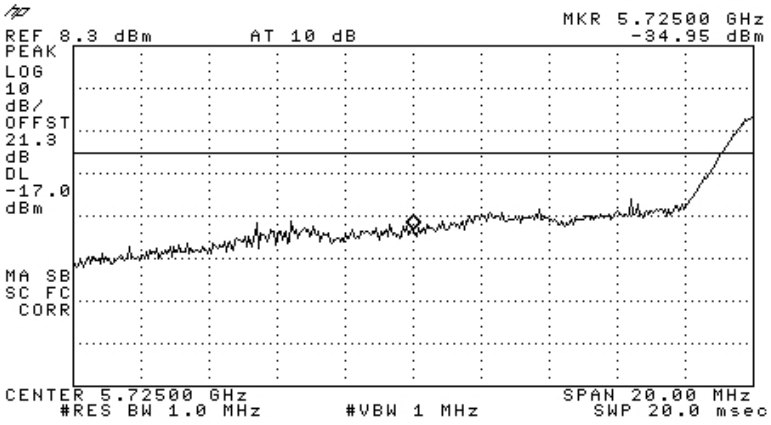



Figure 131 —5745 MHz 64QAM

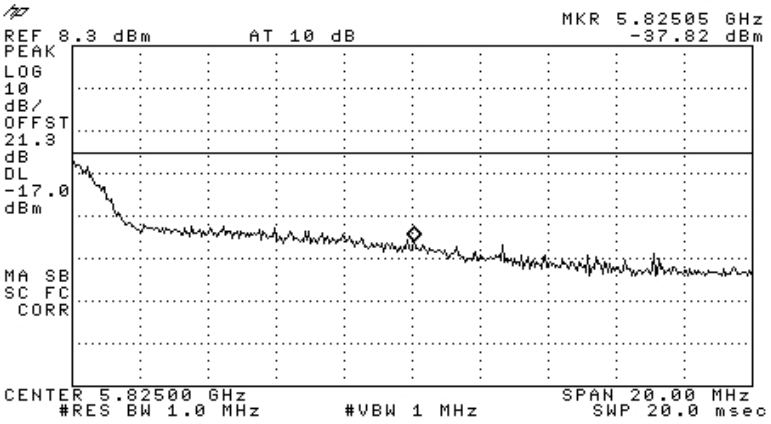



Figure 132 —5805 MHz 64QAM

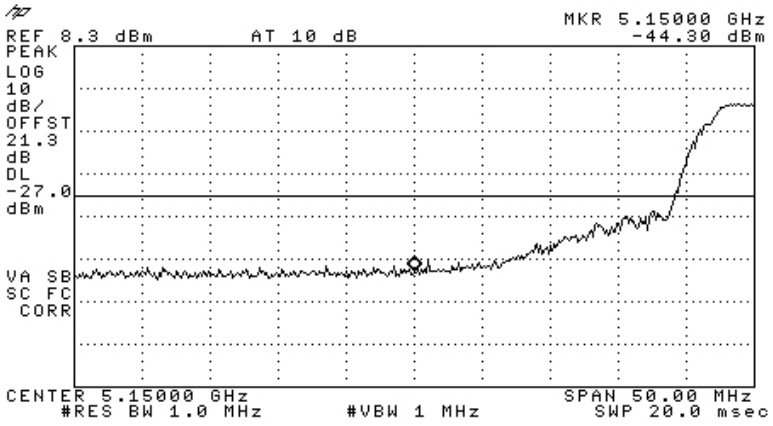



Figure 133 —5180 MHz BPSK

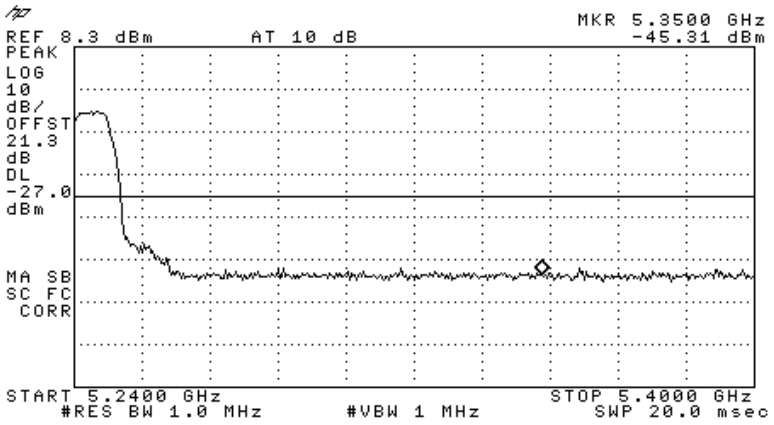



Figure 134 —5240 MHz BPSK

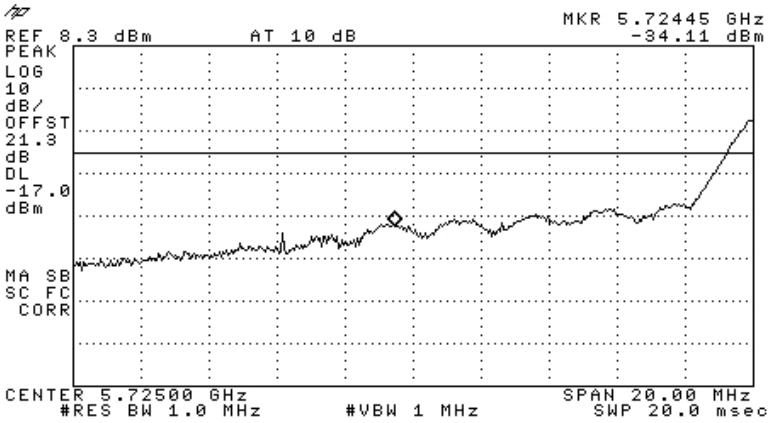



Figure 135 —5745 MHz BPSK

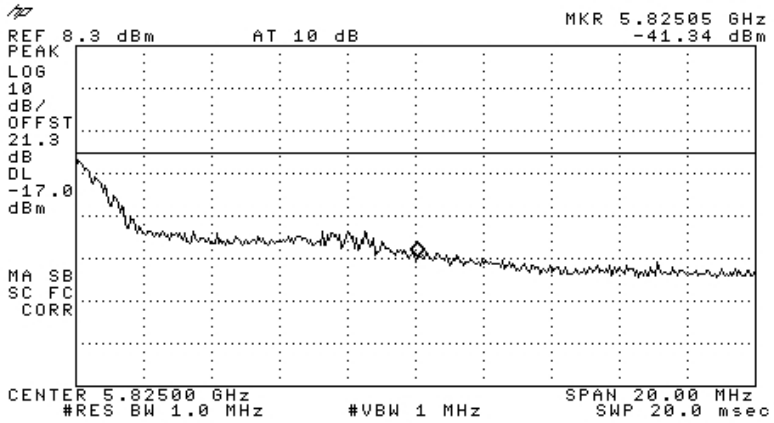



Figure 136 —5805 MHz BPSK

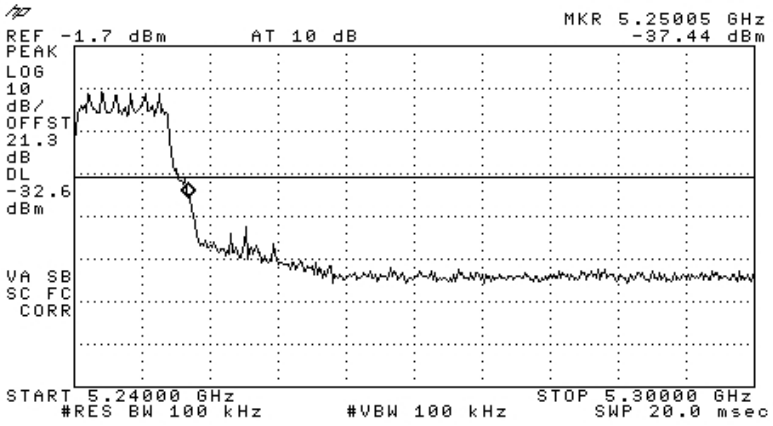



Figure 137 —Band Edge at 5.25 GHz Operation at 5.24 GHz 64QAM (Section 15.215(c))

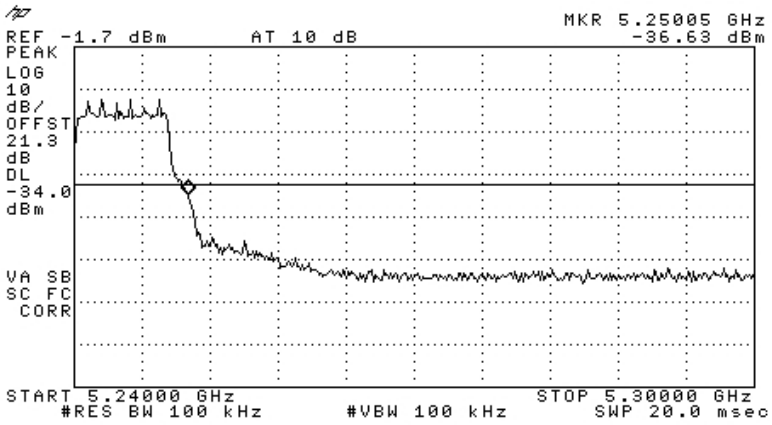



Figure 138 —Band Edge at 5.25 GHz Operation at 5.24 GHz BPSK (Section 15.215(c))

## *12.2 Results table*

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points
Model No.: 860M-AU With WCE-AU
Serial Number: 860M-AU: 0837451; WCE-AU: 08366A9
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 | 5250.00 | -24.84 | 20.0 | -4.84 |
| | BPSK | 5250.00 | -22.63 | 20.0 | -2.63 |

**Figure 139 Band Edge at 5.25 GHz operation at 5.24 GHz**

JUDGEMENT: Passed by 2.63 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 28.10.09
Typed/Printed Name: A. Sharabi

### 12.3 Results table

E.U.T. Description: WLAN Module With WCE (WiFi Coverage Extender) for DAS With Four Meru AP-208 Access Points
Model No.: 860M-AU With WCE-AU
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 | 5150.00 | -44.18 | -27.0 | -17.18 |
| | BPSK | 5148.20 | -44.30 | -27.0 | -17.30 |
| 5240 | 64QAM | 5350.00 | -45.36 | -27.0 | -18.36 |
| | BPSK | 5350.00 | -45.31 | -27.0 | -18.31 |
| 5745 | 64QAM | 5725.00 | -34.95 | -17.0 | -17.95 |
| | BPSK | 5725.00 | -34.11 | -17.0 | -17.11 |
| 5805 | 64QAM | 5825.60 | -37.82 | -17.0 | -20.82 |
| | BPSK | 5825.00 | -41.34 | -17.0 | -24.34 |

**Figure 140 Band Edge Spectrum**

JUDGEMENT: Passed by 17.18 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 28.10.09

Typed/Printed Name: A. Sharabi

### *12.4 Test Equipment Used.*

Band edge Spectrum

| Instrument | Manufacturer | Model | Serial/Part Number | Calibration | |
|---|---|---|---|---|---|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | March 17, 2009 | 1 year |
| Spectrum Analyzer | HP | 8564E | 3442A00275 | December 15, 2008 | 1 year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G2W20 | October 19, 2009 | 1 year |
| Cable | Rhophase | KPS-5000-KPS | A1674 | October 19, 2009 | 1 year |

**Figure 141 Test Equipment Used**

# 13. Antenna Gain 802.11b/g+802.11a + WMTS + AWS Signals

The antenna gain is 7 dBi.

# 14. R.F Exposure/Safety 802.11b/g+802.11a + WMTS + AWS 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)23.44 mW= 13.7 dBm

$G_T$- Antenna Gain, 7 dBi = 5

R- Distance from Transmitter using 1 m worst case

(c) The peak power density is :

$$S_p = \frac{23.44 \times 5}{4\pi(100)^2} = 9.3 \times 10^{-4} \frac{mW}{cm^2}$$

(d) This is below the FCC limit.

# 15. Intermodulation Tests

## *15.1 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 = 1 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, 2462MHz 64QAM

802.11a: in the frequency range 5150-5250 MHz, 5210MHz 64QAM

WMTS: in the frequency range 608-614 MHz, 608 MHz CW

AWS: in the frequency range 2110-2155 MHz, 2155MHz CW

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

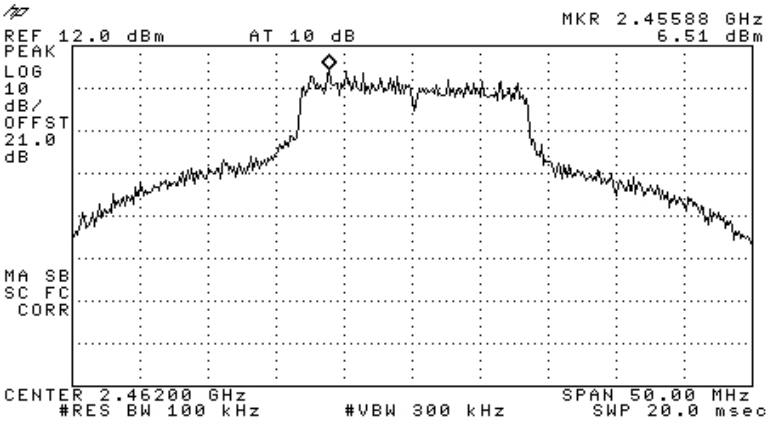



Figure 142 —2462MHz 64QAM

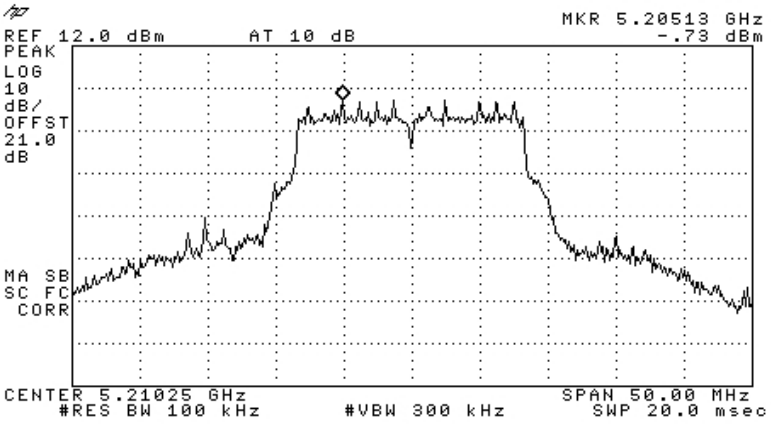



Figure 143 —5210MHz 64QAM

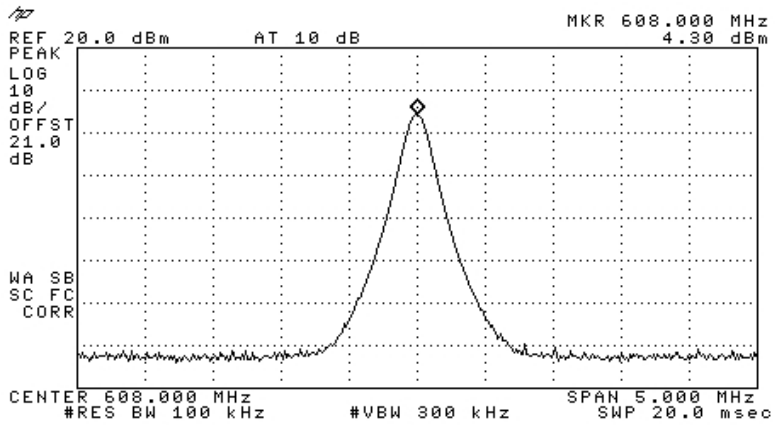



Figure 144 — 608MHz CW

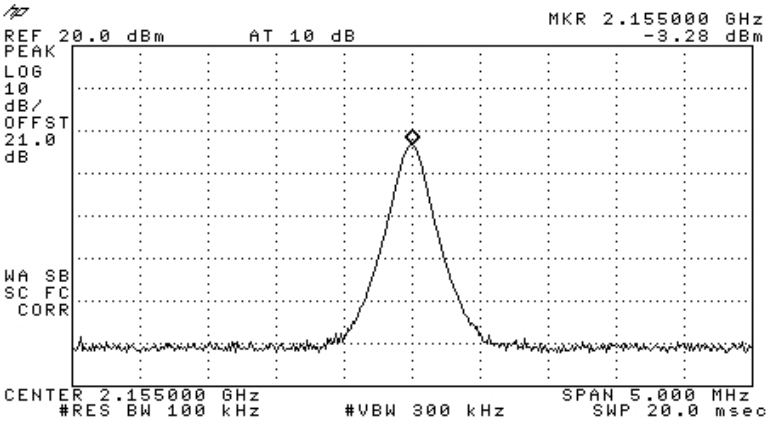



Figure 145 —2155MHz CW

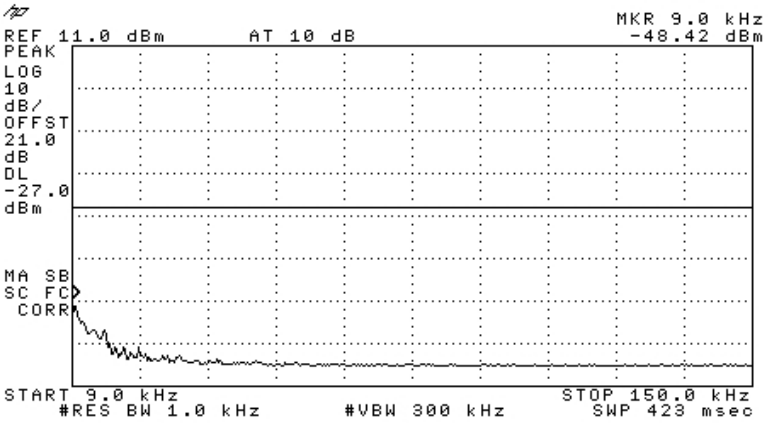



Figure 146

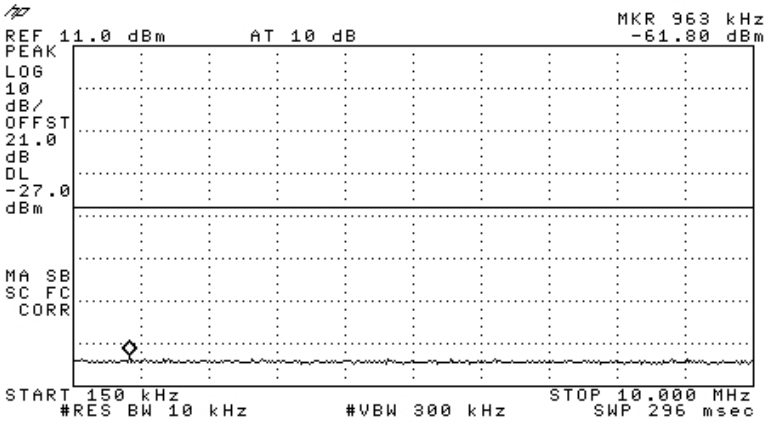



Figure 147

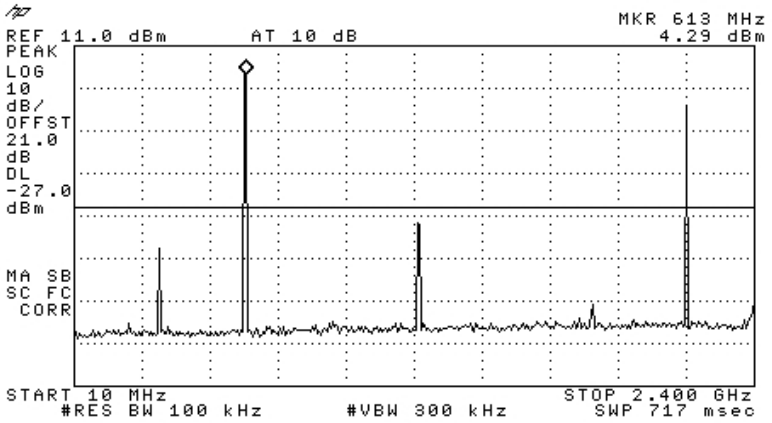



Figure 148

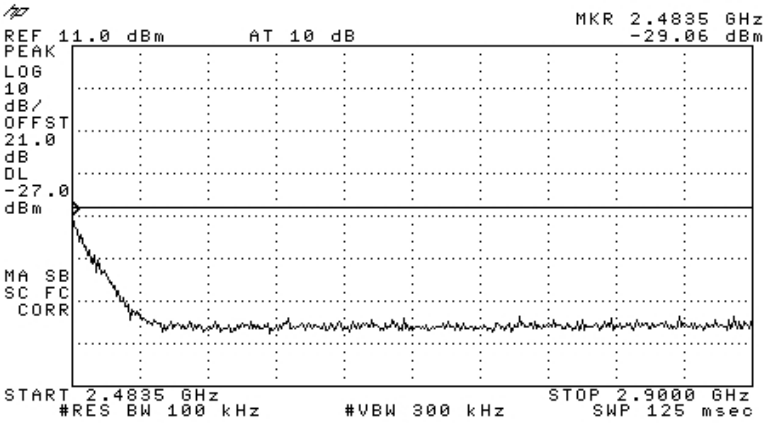



Figure 149

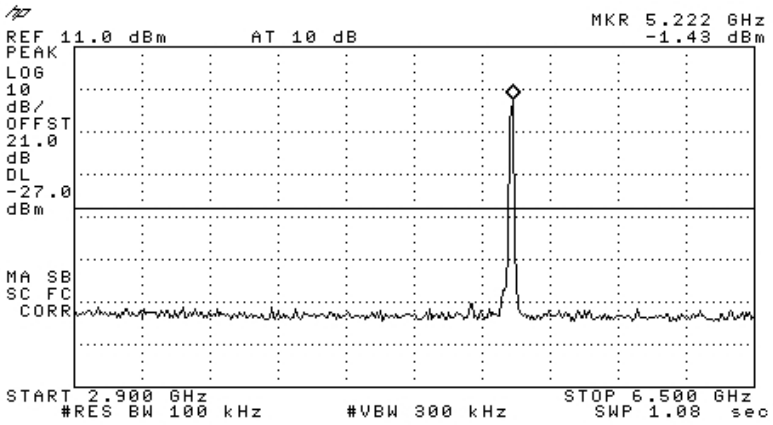



Figure 150

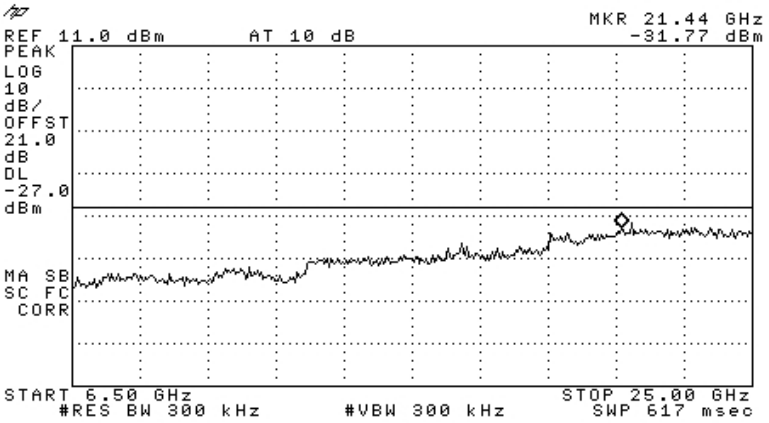



Figure 151

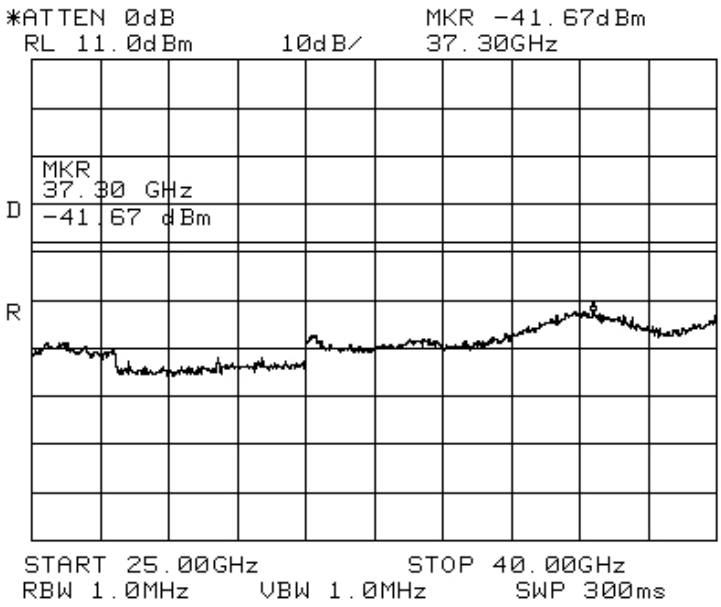

*ATTEN 0dB
RL 11.0dBm
10dB/
MKR -41.67dBm
37.30GHz
MKR
37.30 GHz
-41.67 dBm
D
R
START 25.00GHz
STOP 40.00GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 300ms

Figure 152

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 28.10.09

Typed/Printed Name: A. Sharabi

### *15.2 Test Equipment Used.*

Intermodulation

| Instrument | Manufacturer | Model | Serial/Part Number | Calibration | |
|---|---|---|---|---|---|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | March 17, 2009 | 1 year |
| Spectrum Analyzer | HP | 8564E | 3442A00275 | December 15, 2008 | 1 year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G2W20 | October 19, 2009 | 1 year |
| Cable | Rhophase | KPS-1501-1000 | A1675 | October 19, 2009 | 1 year |

**Figure 153 Test Equipment Used**

# 16. APPENDIX A - CORRECTION FACTORS

## *16.1 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".*

### *16.2 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.*

### *16.3 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.*

### *16.4 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".*

## *16.5 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".*

## *16.6 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".*

### *16.7 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 | | | |

### *16.8 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 |

### *16.9 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 |

### *16.10 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 |