# Summit Semiconductor LLC

## Summit FS848 Master Module (Wheeler)

**Report No. FOCU0081**

Report Prepared By

www.nwemc.com
1-888-EMI-CERT



EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

# Certificate of Test

## Last Date of Test: July 27, 2010

## Summit Semiconductor LLC

## Model: Summit FS848 Master Module (Wheeler)

| Emissions | | | |
|---|---|---|---|
| **Test Description** | **Specification** | **Test Method** | **Pass/Fail** |
| Occupied Bandwidth | FCC 15.247:2010 | ANSI C63.10:2009 | **Pass** |
| Output Power – Channel Power | FCC 15.247:2010 | ANSI C63.10:2009 | **Pass** |
| Band Edge Compliance | FCC 15.247:2010 | ANSI C63.10:2009 | **Pass** |
| Spurious Conducted Emissions | FCC 15.247:2010 | ANSI C63.10:2009 | **Pass** |
| Power Spectral Density | FCC 15.247:2010 | ANSI C63.10:2009 | **Pass** |
| Spurious Radiated Emissions | FCC 15.247:2010 | ANSI C63.10:2009 | **Pass** |
| AC Powerline Conducted Emissions | FCC 15.247:2010 | ANSI C63.10:2009 | **Pass** |

| **Modifications made to the product** |
|---|
| **See the Modifications section of this report** |

***Test Facility***

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834D-1).

**Approved By:**

*Don Facteau, IS Manager*

**NVLAP Lab Code: 200630-0**

***This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.***

***Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.***

| Revision Number | Description | Date | Page Number |
|---|---|---|---|
| 00 | None | | |

## Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

# Accreditations and Authorizations

## FCC

Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

## NVLAP

Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0
NVLAP LAB CODE 200761-0
NVLAP LAB CODE 200881-0

## Industry Canada

Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1)*

## CAB

Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

## NEMKO

Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).

# Accreditations and Authorizations

## Australia/New Zealand

The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).

## VCCI

Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071, R-1025, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-1784, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).*

## BSMI

Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement (US0017). License No.SL2-IN-E-1017.

## GOST

Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

## KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157)*

## VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

## SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/

# Northwest EMC Locations

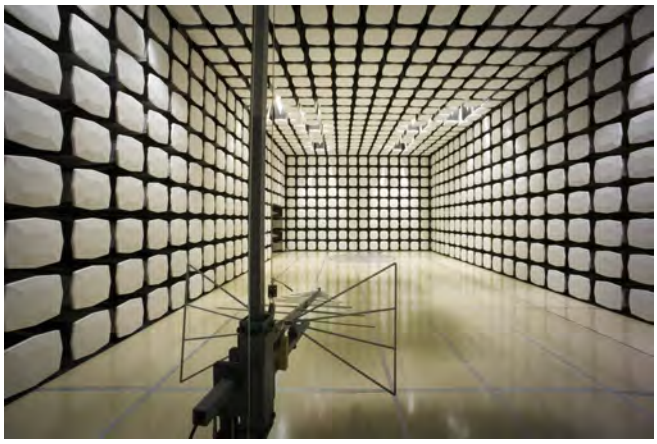
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

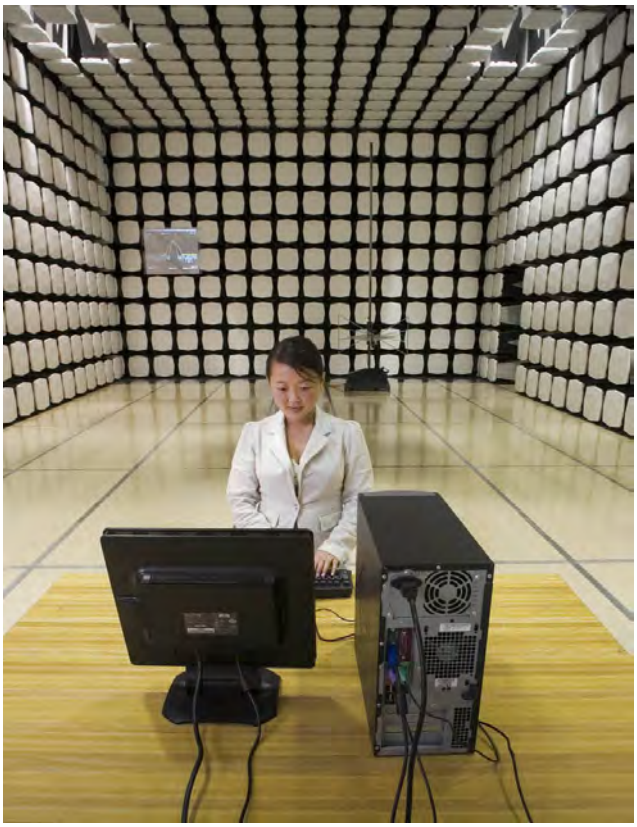
California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796





## Party Requesting the Test

| | |
|---|---|
| **Company Name:** | Summit Semiconductor LLC |
| **Address:** | 22867 NW Bennett St, Suite 200 |
| **City, State, Zip:** | Hillsboro, OR 97124 |
| **Test Requested By:** | Alex Macdonald |
| **Model:** | Summit FS848 Master Module (Wheeler) |
| **First Date of Test:** | July 15, 2010 |
| **Last Date of Test:** | July 27, 2010 |
| **Receipt Date of Samples:** | July 14, 2010 |
| **Equipment Design Stage:** | Preproduction |
| **Equipment Condition:** | No Damage |

## Information Provided by the Party Requesting the Test

| **Functional Description of the EUT (Equipment Under Test):** |
|---|
| UNII radio module |

| **Testing Objective:** |
|---|
| Seeking limited modular approval of the master under FCC 15.247 for operation in the 5.8 GHz band |

## CONFIGURATION 1 FOCU0081

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Summit FS848 Master Module (Wheeler) | Summit Semiconductor LLC | 444-2203 | 0265 |
| Antenna | Aeon Technologies | C6276-510004A | None |

| Peripherals in test setup boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Power Supply - I/O Board | Summit Semiconductor LLC | Redmond | Linear |
| AC Adapter | Cincon Electronics | TR20B120X 01E03 | 20120-0007356 |

| Remote Equipment Outside of Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Remote PC | Compaq | NX9500 | CNF4520HP6 |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Lead | PA | 1.8m | PA | AC Adapter | Power Supply - I/O Board |
| AC Power | No | 1.8m | No | AC Mains | AC Adapter |
| USB - Serial | Yes | 1.9m | No | Summit FS848 Master Module (Wheeler) | Remote PC |
| Antenna Cable | Yes | 0.1m | No | Summit FS848 Master Module (Wheeler) | Antenna |
| **PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.** | | | | | |

## CONFIGURATION 2 FOCU0081

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Summit FS848 Master Module (Wheeler) | Summit Semiconductor LLC | 444-2203 | A146 |

| Peripherals in test setup boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Power Supply - I/O Board | Summit Semiconductor LLC | Redmond | 18 |
| AC Adapter | PHIHONG | PSS--45W-120 | 0706 |

| Remote Equipment Outside of Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Remote PC | Dell | Inspiron 6000 | IS386 |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Lead | PA | 1.8m | PA | AC Adapter | Power Supply - I/O Board |
| AC Power | No | 1.8m | No | AC Mains | AC Adapter |
| USB - Serial | Yes | 1.9m | No | Summit FS848 Master Module (Wheeler) | Remote PC |
| Audio | Yes | 1.8m | No | Remote PC | Summit FS848 Master Module (Wheeler) |
| Trigger | Yes | 1.1m | No | Summit FS848 Master Module (Wheeler) | Measurement analyzer |
| **PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.** | | | | | |

## CONFIGURATION 4 FOCU0081

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Summit FS848 Master Module (Wheeler) | Summit Semiconductor LLC | 444-2203 | 0265 |
| Antenna | Aeon Technologies | C6276-510004A | None |

| Peripherals in test setup boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Power Supply - I/O Board | Summit Semiconductor LLC | Redmond | AC |

| Remote Equipment Outside of Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| DC Power Supply (Test Equipment) | Tektronix | PS280 | TPM |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Lead (4x) | No | 1.0m | No | DC Power Supply (Test Equipment) | Power Supply - I/O Board |
| AC Power | No | 1.8m | No | AC Mains | DC Power Supply |
| USB - Serial | Yes | 1.9m | No | Summit FS848 Master Module (Wheeler) | Remote PC |
| Antenna Cable | Yes | 0.1m | No | Summit FS848 Master Module (Wheeler) | Antenna |
| **PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.** | | | | | |

| Equipment modifications | | | | | |
|---|---|---|---|---|---|
| Item | Date | Test | Modification | Note | Disposition of EUT |
| 1 | 7/15/2010 | Output Power – Channel Power | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 2 | 7/16/2010 | Occupied Bandwidth | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 3 | 7/16/2010 | Band Edge Compliance | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 4 | 7/16/2010 | Power Spectral Density | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 5 | 7/20/2010 | Spurious Radiated Emissions | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 6 | 7/21/2010 | AC Powerline Conducted Emissions | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 7 | 7/27/2010 | Spurious Conducted Emissions | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | Scheduled testing was completed. |

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4440A | AFD | 6/1/2009 | 24 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/21/2009 | 13 |
| 26 GHz DC Block, SMA | Pasternack | PE8210 | AME | 10/19/2009 | 13 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |

## MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

## TEST DESCRIPTION

The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rates called out on the data sheet.

NORTHWEST EMC

# OCCUPIED BANDWIDTH

XMit 2010.01.14

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Summit FS848 Master Module (Wheeler) | | | **Work Order:** | FOCU0081 |
| **Serial Number:** | A146 | | | **Date:** | 07/16/10 |
| **Customer:** | Summit Semiconductor LLC | | | **Temperature:** | 23°C |
| **Attendees:** | Alex Macdonald | | | **Humidity:** | 45% |
| **Project:** | None | | | **Barometric Pres.:** | 30.16 in |
| **Tested by:** | Rod Peloquin | **Power:** | 120VAC/60Hz | **Job Site:** | EV06 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2010 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Transmitting random audio data

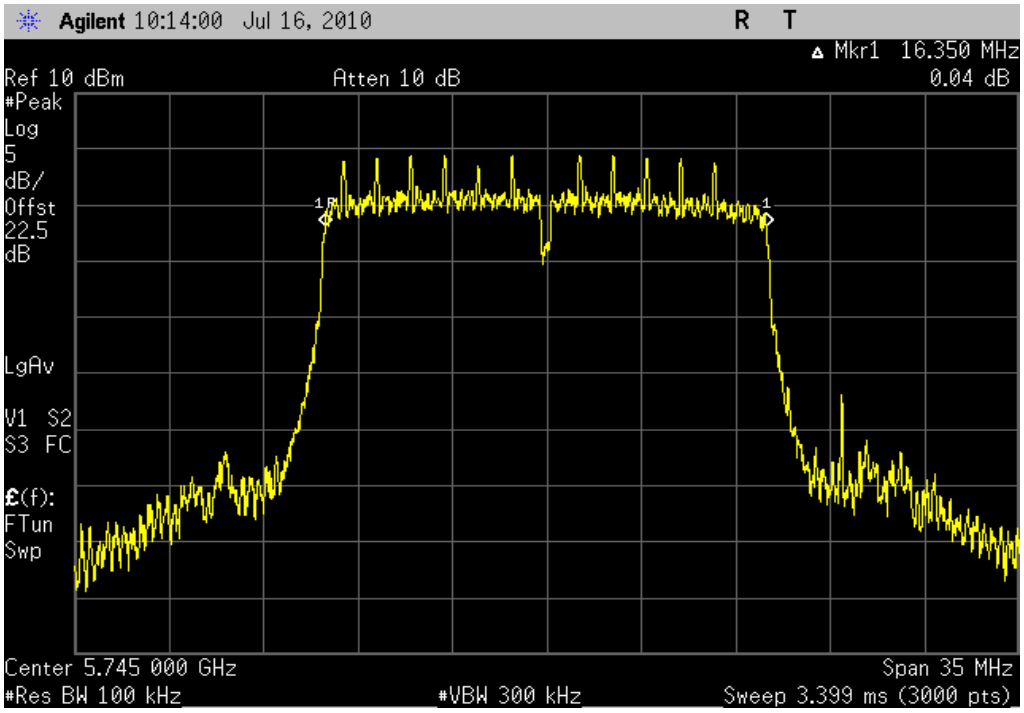
**DEVIATIONS FROM TEST STANDARD**

No Deviations

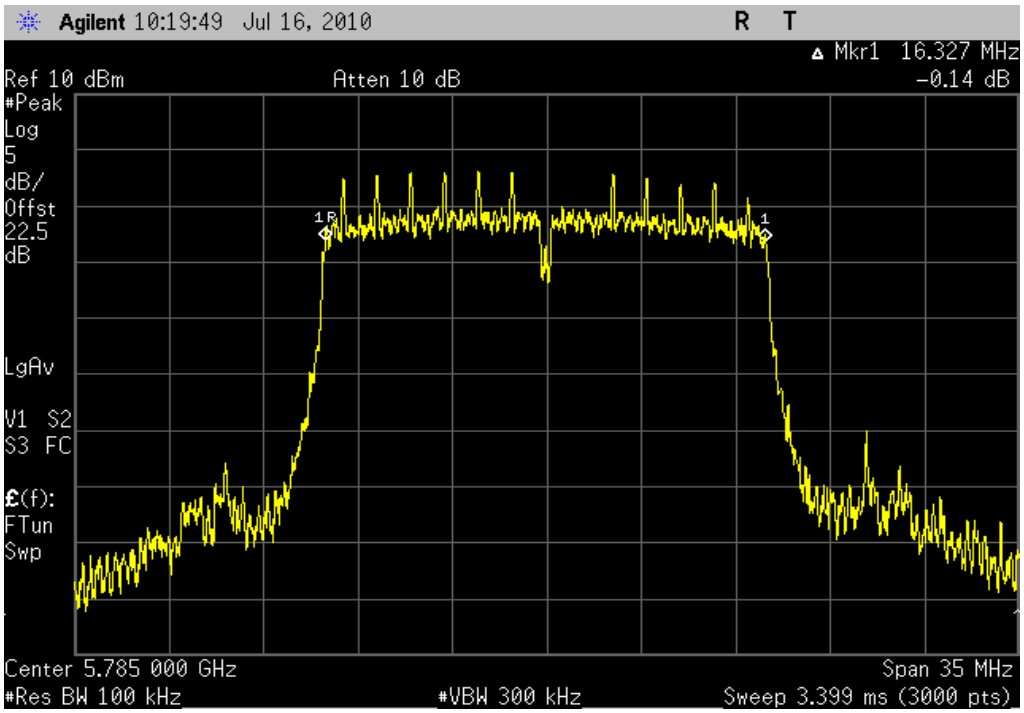
| Configuration # | 2 | Signature |
|---|---|---|

| | | Value | Limit | Results |
|---|---|---|---|---|
| 802.11(a) 6 Mbps | | | | |
| | Low Channel 149, 5745 MHz | 16.350 MHz | > 500 kHz | Pass |
| | Mid Channel 157, 5785 MHz | 16.327 MHz | > 500 kHz | Pass |
| | High Channel 165, 5825 MHz | 16.327 MHz | > 500 kHz | Pass |
| 802.11(a) 36 Mbps | | | | |
| | Low Channel 149, 5745 MHz | 16.409 MHz | > 500 kHz | Pass |
| | Mid Channel 157, 5785 MHz | 16.467 MHz | > 500 kHz | Pass |
| | High Channel 165, 5825 MHz | 16.432 MHz | > 500 kHz | Pass |

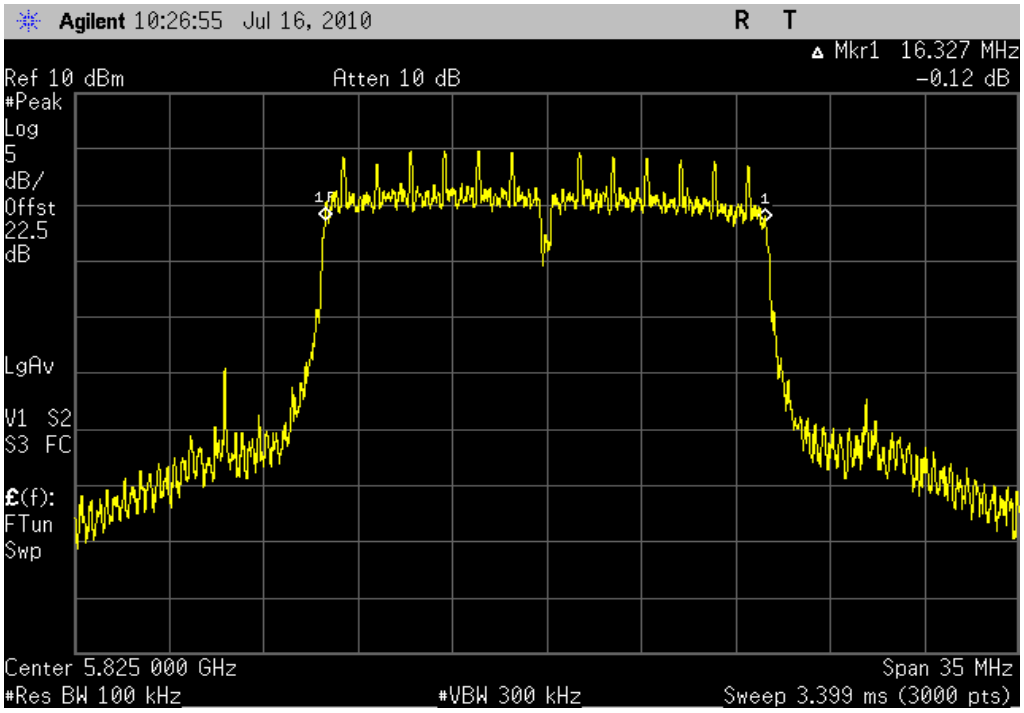
| 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 16.350 MHz | **Limit:** | > 500 kHz |



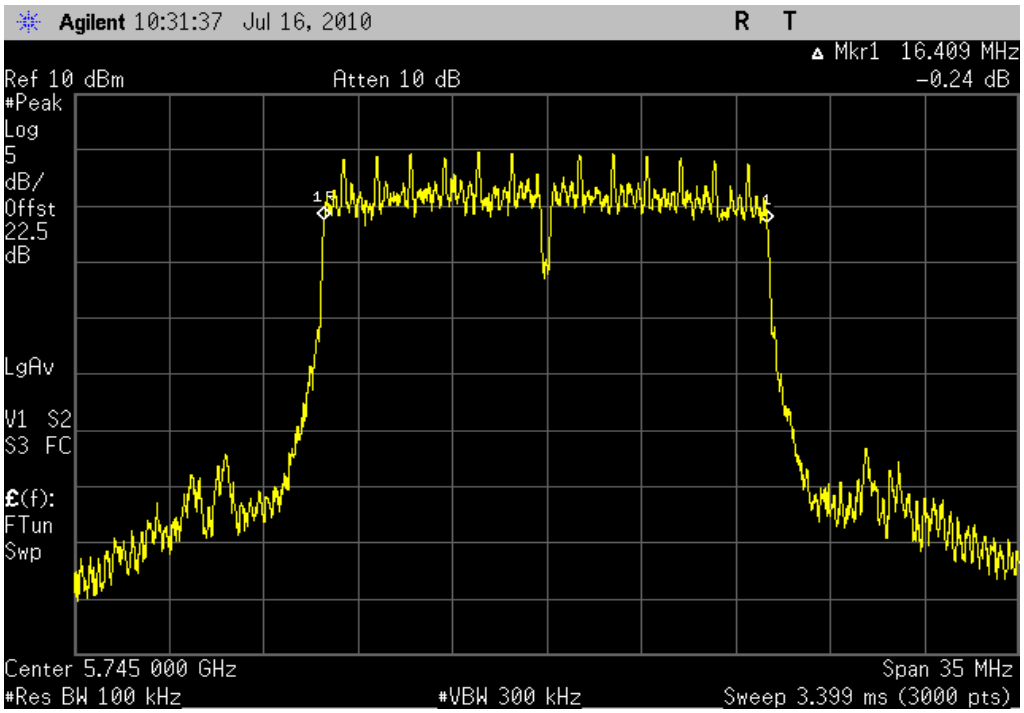

| 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 16.327 MHz | **Limit:** | > 500 kHz |



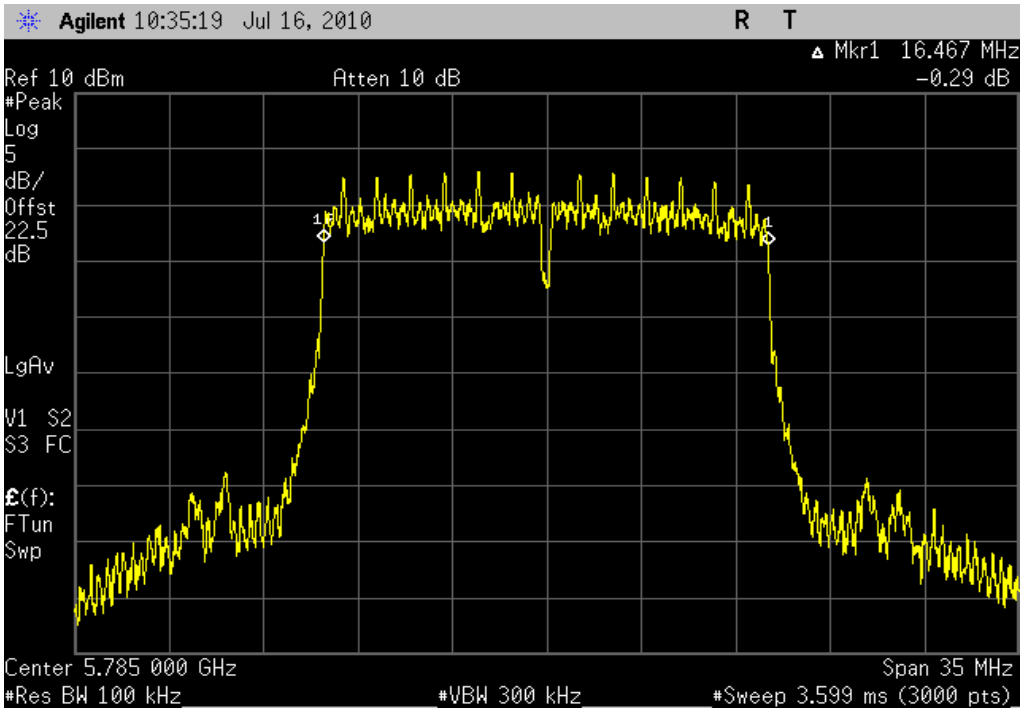
| 802.11(a) 6 Mbps, High Channel 165, 5825 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 16.327 MHz | **Limit:** | > 500 kHz |



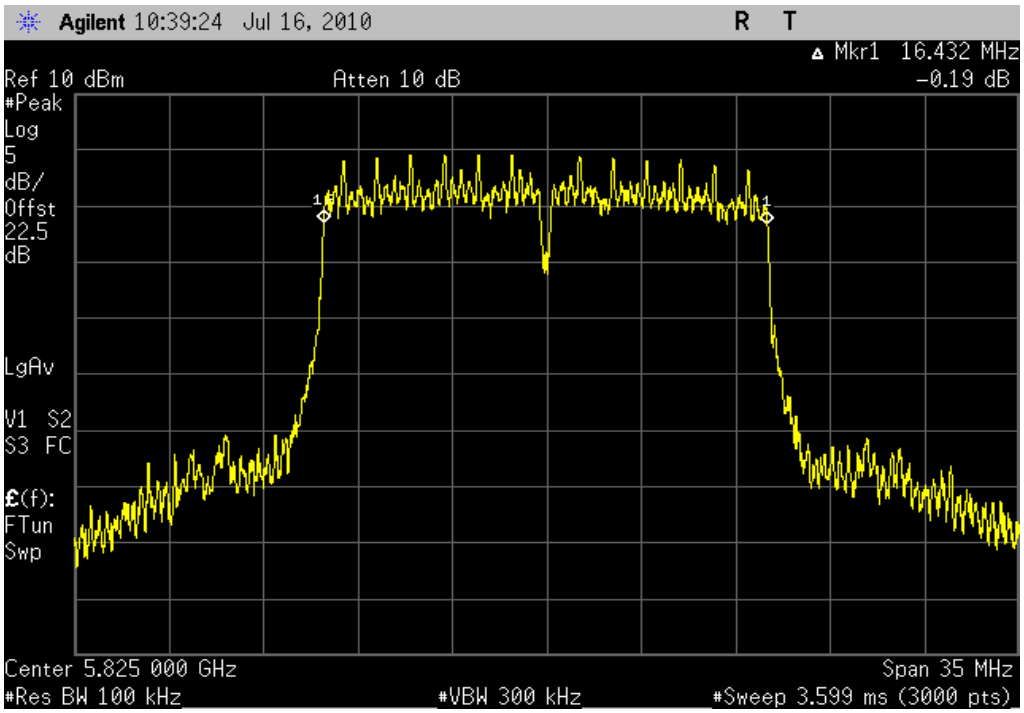

| 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 16.409 MHz | **Limit:** | > 500 kHz |



| 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 16.467 MHz | **Limit:** | > 500 kHz |




| 802.11(a) 36 Mbps, High Channel 165, 5825 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 16.432 MHz | **Limit:** | > 500 kHz |



# OUTPUT POWER - CHANNEL POWER

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4440A | AFD | 6/1/2009 | 24 |
| 26 GHz DC Block, SMA | Pasternack | PE8210 | AME | 10/19/2009 | 13 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/21/2009 | 13 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |
| Attenuator, 6 dB, 'SMA' | N/A | 93459 3330A-6 | AUF | 4/1/2010 | 13 |
| Power Meter | Gigatronics | 8651A | SPM | 1/7/2010 | 13 |
| Power Sensor | Gigatronics | 80701A | SPL | 1/7/2010 | 13 |
| Signal Generator | Agilent | E8257D | TGX | 12/10/2008 | 24 |

## MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

## TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input. The amplitude accuracy of the spectrum analyzer was further enhanced by calibrating the setup using the power meter and synthesized signal generator.

Prior to measuring peak transmit power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

Method #3 found in ANSI C63.10 section 6.10.2.2 was used because the analyzer sweep time was greater than T for the operating mode which has the shortest transmission pulse duration and the Emission Bandwidth was greater than the largest RBW on the analyzer.

An external trigger from the EUT was used to ensure the measurement was only made during the pulse high time. Additionally, the gating function was used during 36 Mbps operation.

The spectrum analyzer settings were as follows:

- The span was set to encompass entire emission bandwidth (B), centered on the transmit channel.
- The RBW = 1 MHz, VBW = Autocoupled by analyzer firmware
- Sample detector mode because the bin width (span / number of spectral points) < 0.5 RBW.
- Power was integrated across “B”, by using the channel power function of the analyzer.

NORTHWEST EMC

# OUTPUT POWER - CHANNEL POWER

XMit 2010.01.14

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Summit FS848 Master Module (Wheeler) | | | **Work Order:** | FOCU0081 |
| **Serial Number:** | A146 | | | **Date:** | 07/15/10 |
| **Customer:** | Summit Semiconductor LLC | | | **Temperature:** | 23°C |
| **Attendees:** | Alex Macdonald | | | **Humidity:** | 45% |
| **Project:** | None | | | **Barometric Pres.:** | 30.16 in |
| **Tested by:** | Rod Peloquin | **Power:** | 120VAC/60Hz | **Job Site:** | EV06 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2010 | ANSI C63.10:2009 |

**COMMENTS**

Transmitting random audio data. External trigger from EUT, and gating on analyzer

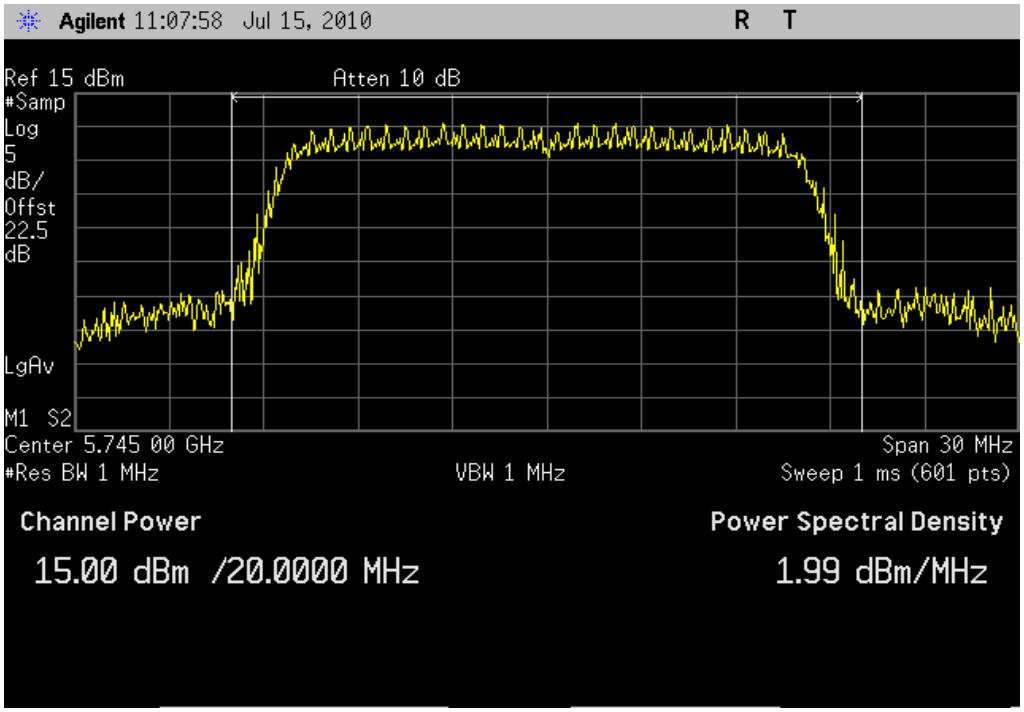
**DEVIATIONS FROM TEST STANDARD**

No Deviations

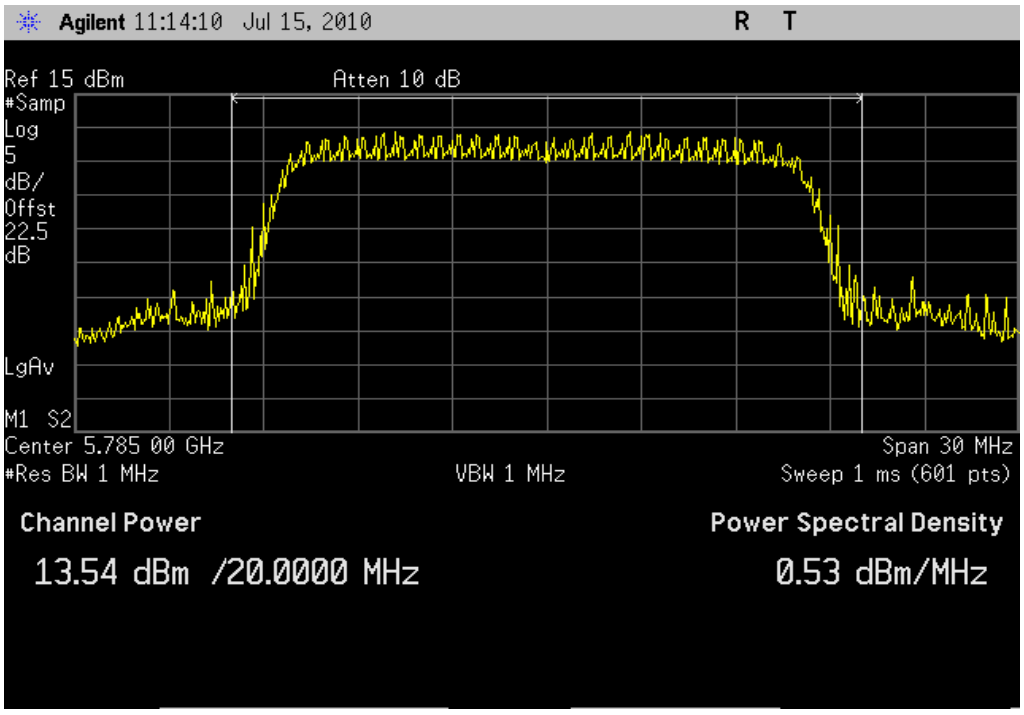
| Configuration # | 2 | Signature |
|---|---|---|

| | | Value | Limit | Results |
|---|---|---|---|---|
| 802.11(g) 6 Mbps | | | | |
| | Low Channel 149, 5745 MHz | 15.0 dBm | 30 dBm | Pass |
| | Mid Channel 157, 5785 MHz | 13.5 dBm | 30 dBm | Pass |
| | High Channel 165, 5825 MHz | 15.2 dBm | 30 dBm | Pass |
| 802.11(g) 36 Mbps | | | | |
| | Low Channel 149, 5745 MHz | 14.7 dBm | 30 dBm | Pass |
| | Mid Channel 157, 5785 MHz | 13.4 dBm | 30 dBm | Pass |
| | High Channel 165, 5825 MHz | 14.8 dBm | 30 dBm | Pass |

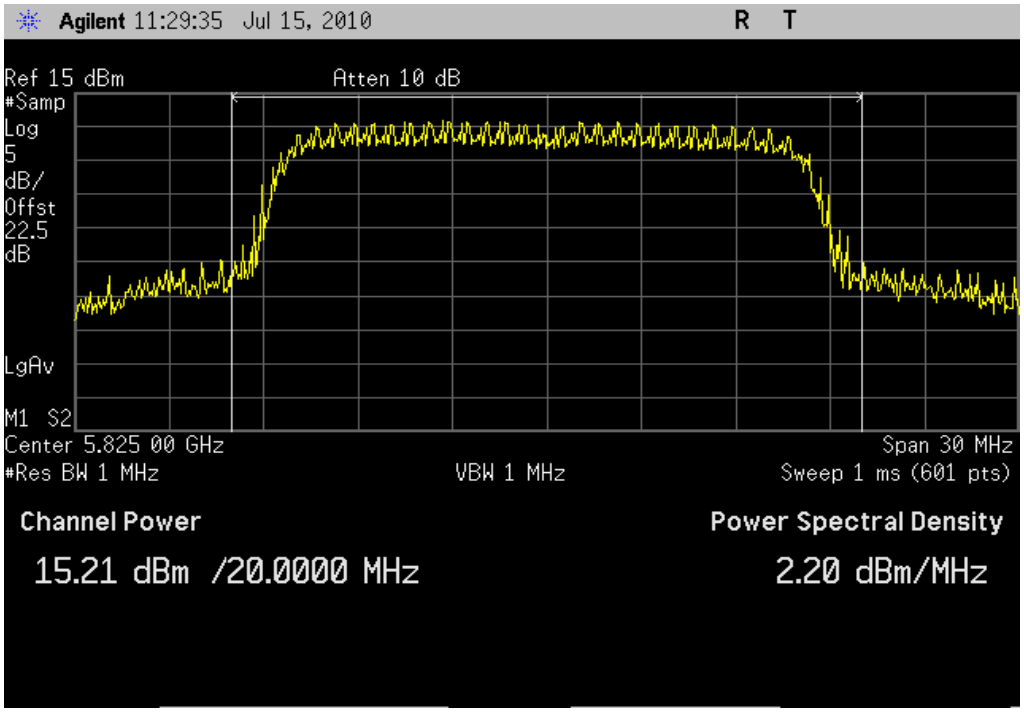
| 802.11(g) 6 Mbps, Low Channel 149, 5745 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 15.0 dBm | **Limit:** | 30 dBm |



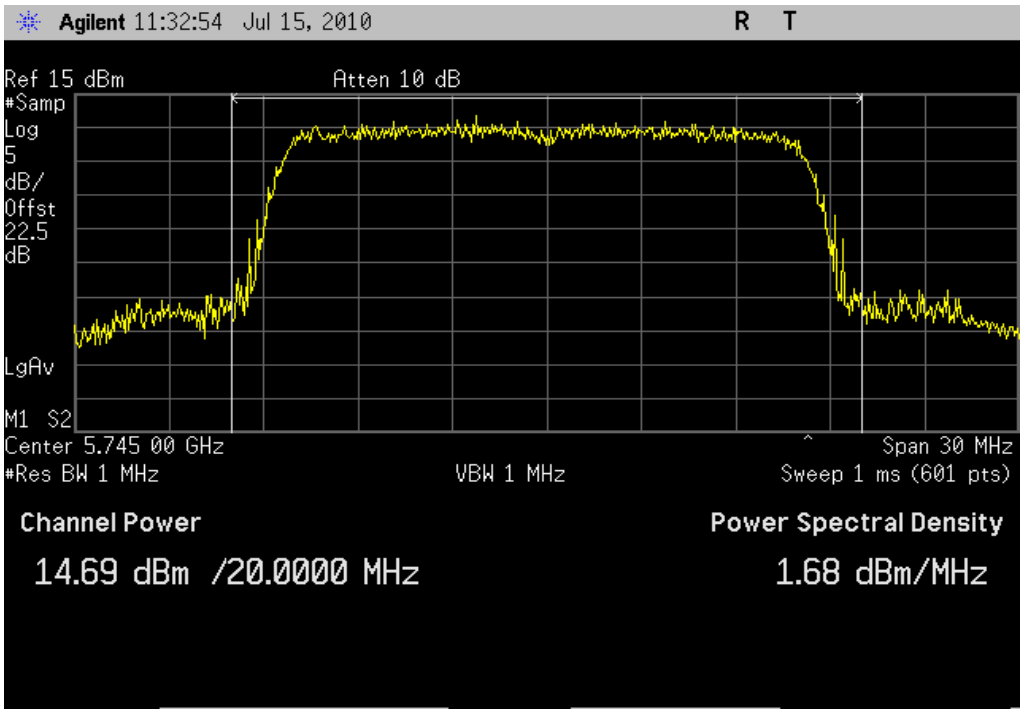

| 802.11(g) 6 Mbps, Mid Channel 157, 5785 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 13.5 dBm | **Limit:** | 30 dBm |



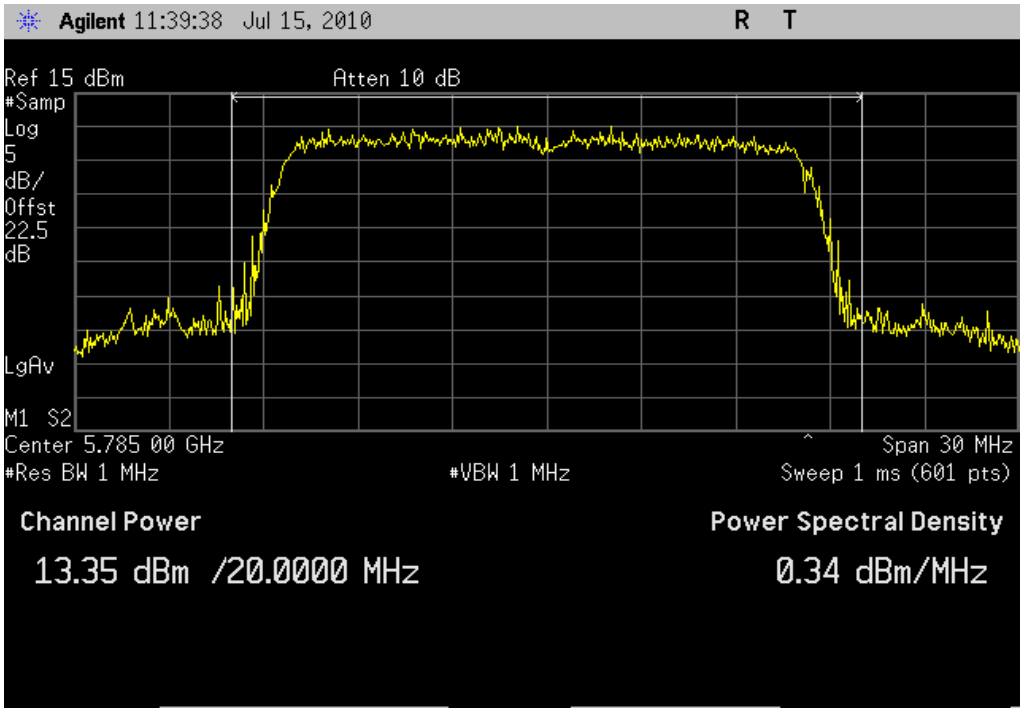
| 802.11(g) 6 Mbps, High Channel 165, 5825 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 15.2 dBm | **Limit:** | 30 dBm |



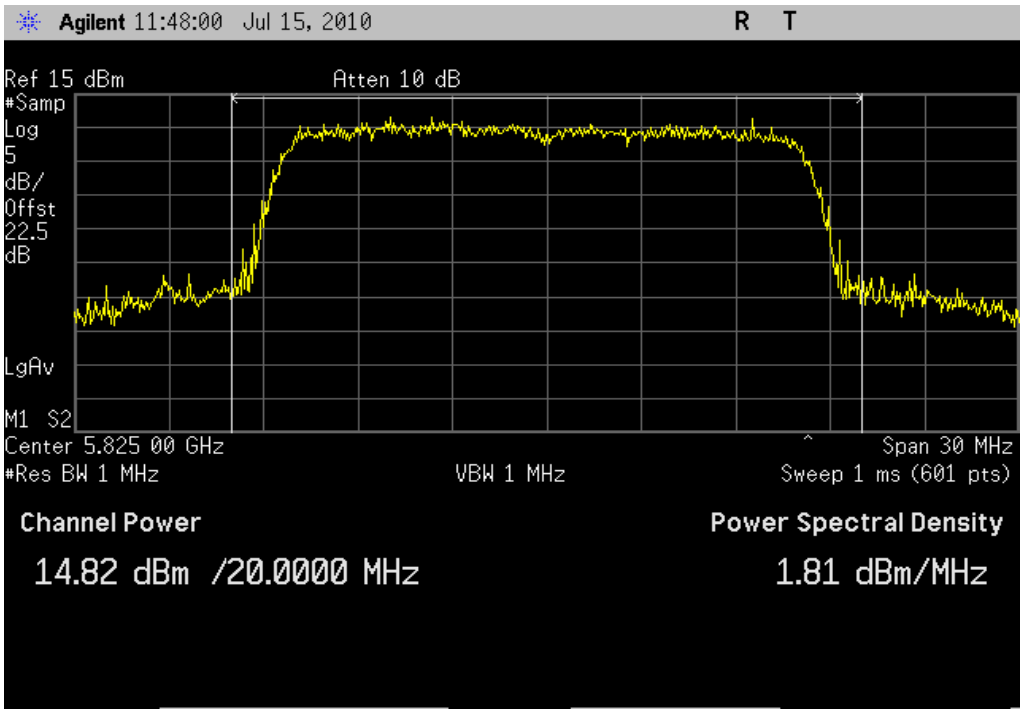

| 802.11(g) 36 Mbps, Low Channel 149, 5745 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 14.7 dBm | **Limit:** | 30 dBm |



| 802.11(g) 36 Mbps, Mid Channel 157, 5785 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 13.4 dBm | **Limit:** | 30 dBm |




| 802.11(g) 36 Mbps, High Channel 165, 5825 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | 14.8 dBm | **Limit:** | 30 dBm |



# BAND EDGE COMPLIANCE

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4440A | AFD | 6/1/2009 | 24 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/21/2009 | 13 |
| 26 GHz DC Block, SMA | Pasternack | PE8210 | AME | 10/19/2009 | 13 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |

## MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

## TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit channels. The channels closest to the band edges were selected. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the required data rates available.

The spectrum was scanned across each band edge from 35 MHz below the band edge to 35 MHz above the band edge.

NORTHWEST EMC

# BAND EDGE COMPLIANCE

XMit 2010.01.14

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Summit FS848 Master Module (Wheeler) | | | Work Order: | FOCU0081 |
| Serial Number: | A146 | | | Date: | 07/16/10 |
| Customer: | Summit Semiconductor LLC | | | Temperature: | 23°C |
| Attendees: | Alex Macdonald | | | Humidity: | 45% |
| Project: | None | | | Barometric Pres.: | 30.16 in |
| Tested by: | Rod Peloquin | Power: | 120VAC/60Hz | Job Site: | EV06 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2010 | ANSI C63.10:2009 |

**COMMENTS**

Transmitting random audio data

**DEVIATIONS FROM TEST STANDARD**

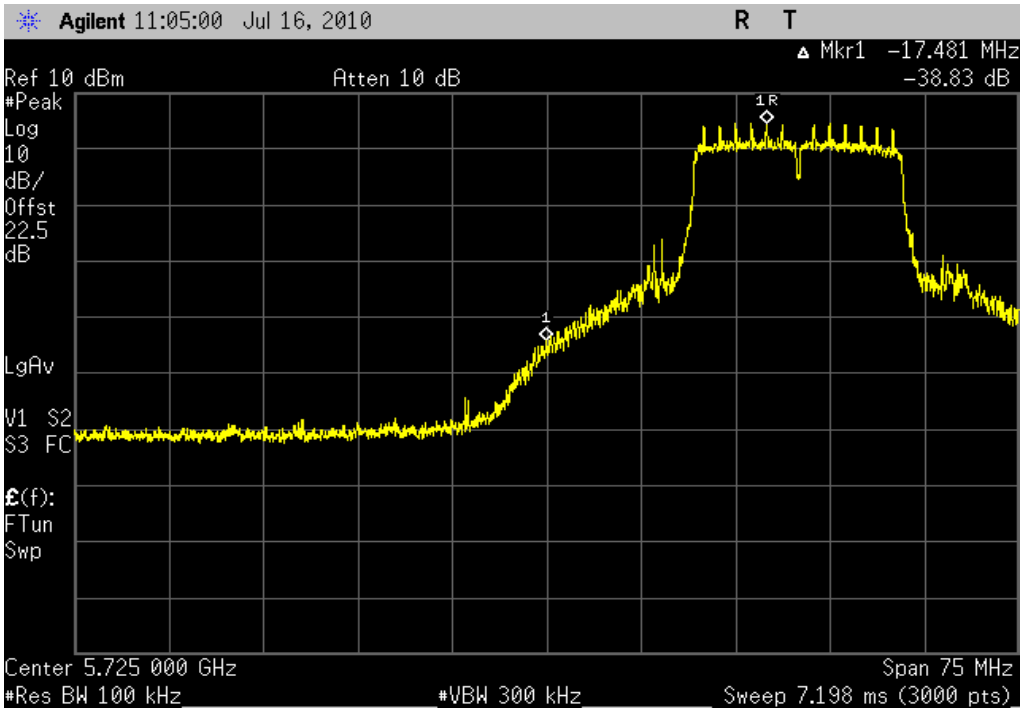
No Deviations

| Configuration # | 2 | Signature |
|---|---|---|

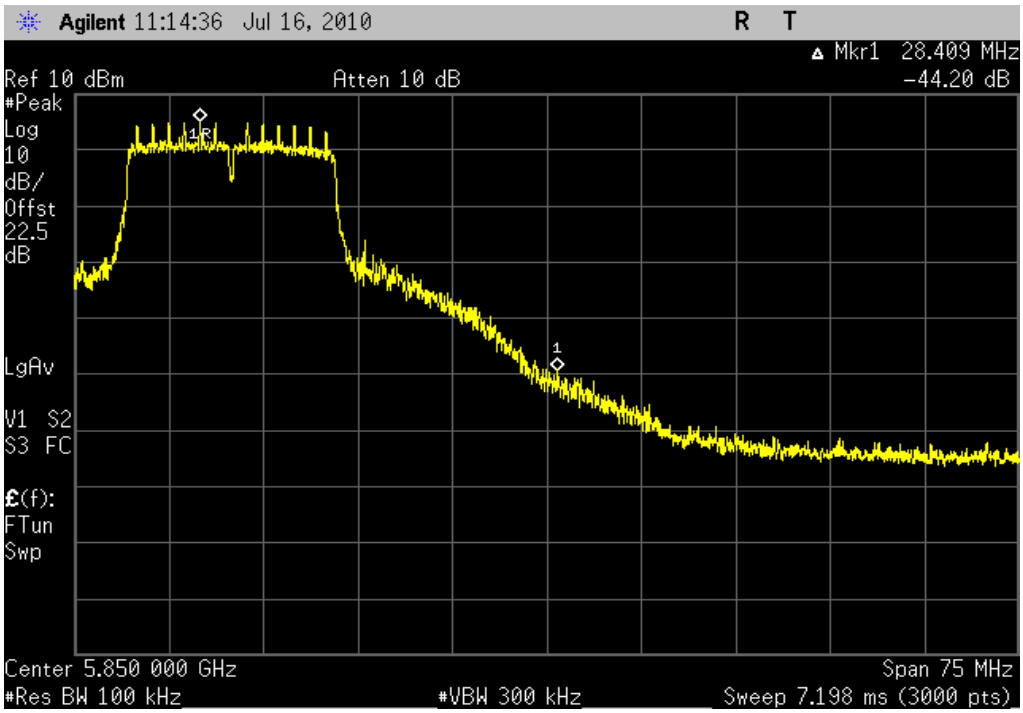
| | | Value | Limit | Results |
|---|---|---|---|---|
| 802.11(a) 6 Mbps | | | | |
| | Low Channel 149, 5745 MHz | -38.8 dBc | ≤ -20 dBc | Pass |
| | High Channel 165, 5825 MHz | -44.2 dBc | ≤ -20 dBc | Pass |
| 802.11(a) 36 Mbps | | | | |
| | Low Channel 149, 5745 MHz | -40.8 dBc | ≤ -20 dBc | Pass |
| | High Channel 165, 5825 MHz | -44.8 dBc | ≤ -20 dBc | Pass |

# BAND EDGE COMPLIANCE

| 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -38.8 dBc | **Limit:** | ≤ -20 dBc |

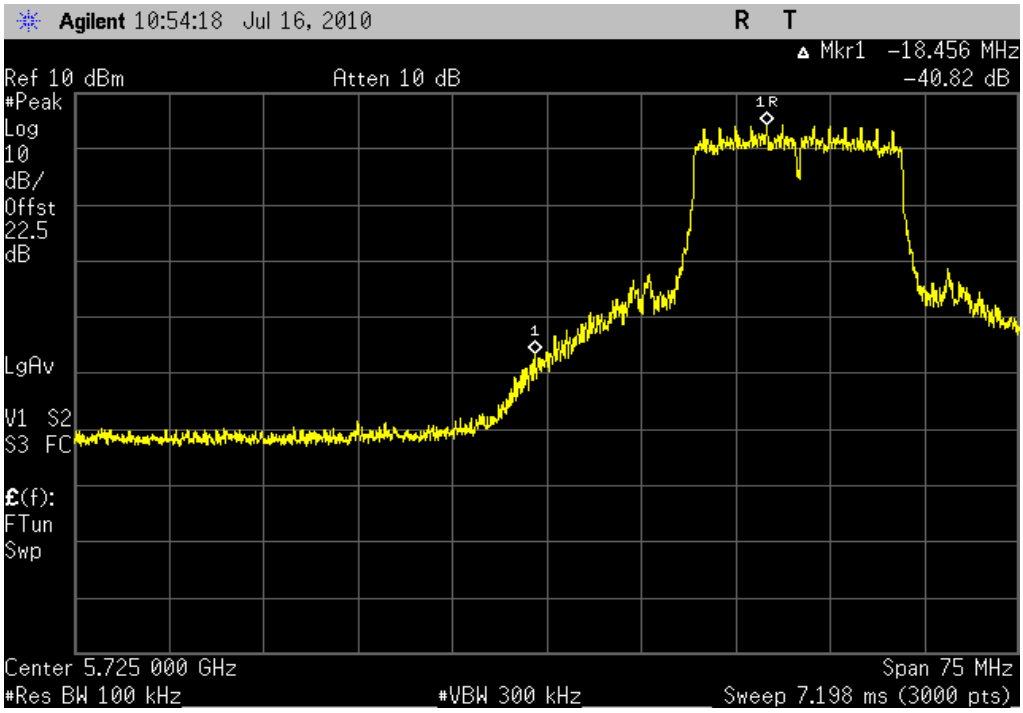



| 802.11(a) 6 Mbps, High Channel 165, 5825 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -44.2 dBc | **Limit:** | ≤ -20 dBc |

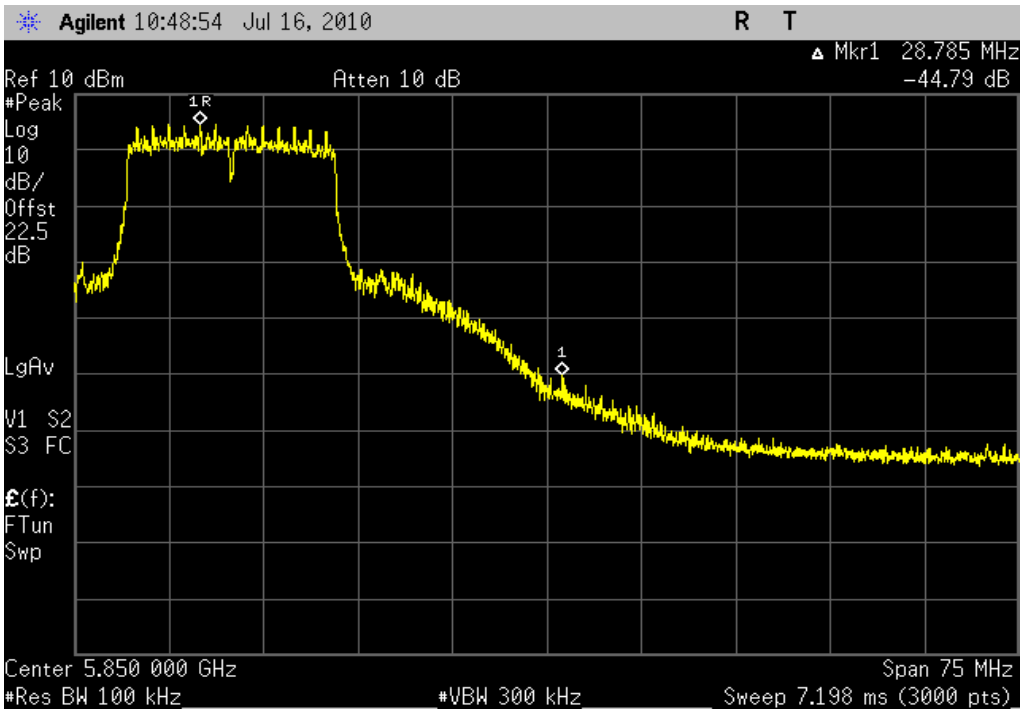


# BAND EDGE COMPLIANCE

| 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -40.8 dBc | **Limit:** | ≤ -20 dBc |




| 802.11(a) 36 Mbps, High Channel 165, 5825 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -44.8 dBc | **Limit:** | ≤ -20 dBc |



# SPURIOUS CONDUCTED EMISSIONS

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4446A | AAQ | 1/6/2010 | 12 |
| Spectrum Analyzer | Agilent | E4440A | AFD | 6/1/2009 | 24 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/21/2009 | 13 |
| 26 GHz DC Block, SMA | Pasternack | PE8210 | AME | 10/19/2009 | 13 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECC | NCR | 0 |

## MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

## TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

NORTHWEST EMC

# SPURIOUS CONDUCTED EMISSIONS

XMit 2010.01.14

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Summit FS848 Master Module (Wheeler) | | | **Work Order:** | FOCU0081 |
| **Serial Number:** | A146 & 0265 | | | **Date:** | 07/27/10 |
| **Customer:** | Summit Semiconductor LLC | | | **Temperature:** | 23°C |
| **Attendees:** | Alex Macdonald | | | **Humidity:** | 45% |
| **Project:** | None | | | **Barometric Pres.:** | 30.16 in |
| **Tested by:** | Rod Peloquin | **Power:** | 120VAC/60Hz | **Job Site:** | EV06 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2010 | ANSI C63.10:2009 |

**COMMENTS**

Transmitting random audio data. A146 used for 30 MHz - 26.5 GHz, 0265 used from 26.5 GHz - 40 GHz.

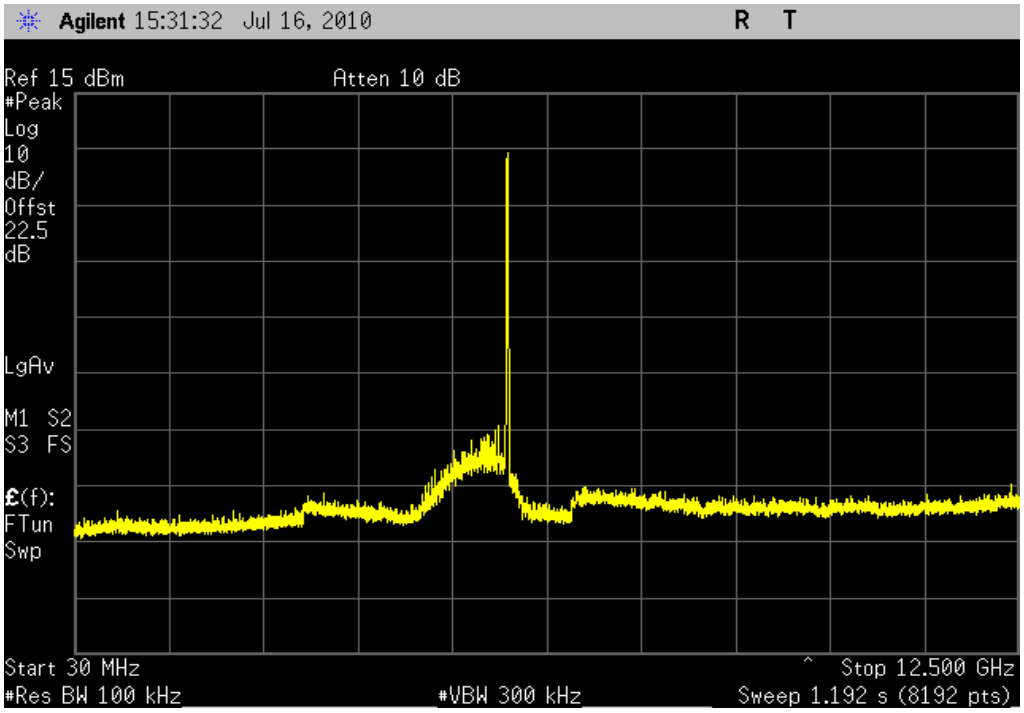
**DEVIATIONS FROM TEST STANDARD**

No Deviations

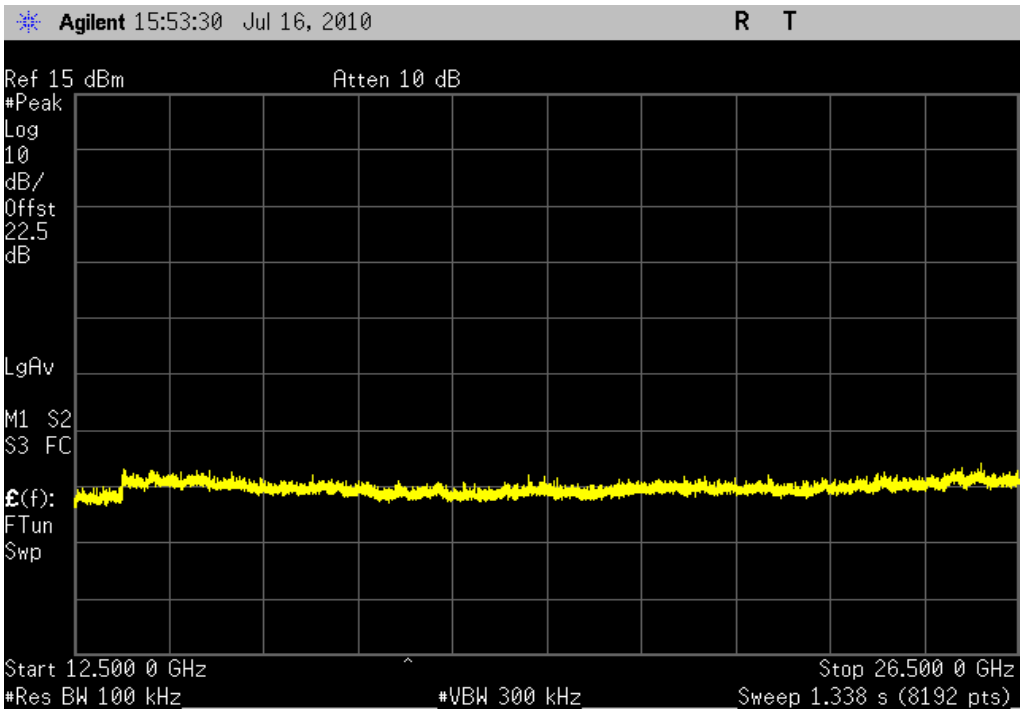
| Configuration # | 2 | Signature |
|---|---|---|

| | | Value | Limit | Results |
|---|---|---|---|---|
| 6 Mbps | | | | |
| | Low Channel 149, 5745 MHz | | | |
| | 30 MHz - 12.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 12.5 GHz - 26.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 26.5 GHz - 31 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 31 GHz - 40 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | Mid Channel 157, 5785 MHz | | | |
| | 30 MHz - 12.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 12.5 GHz - 26.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 26.5 GHz - 31 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 31 GHz - 40 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | High Channel 165, 5825 MHz | | | |
| | 30 MHz - 12.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 12.5 GHz - 26.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 26.5 GHz - 31 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 31 GHz - 40 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| 36 Mbps | | | | |
| | Low Channel 149, 5745 MHz | | | |
| | 30 MHz - 12.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 12.5 GHz - 26.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 26.5 GHz - 31 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 31 GHz - 40 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | Mid Channel 157, 5785 MHz | | | |
| | 30 MHz - 12.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 12.5 GHz - 26.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 26.5 GHz - 31 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 31 GHz - 40 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | High Channel 165, 5825 MHz | | | |
| | 30 MHz - 12.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 12.5 GHz - 26.5 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 26.5 GHz - 31 GHz | < -40 dBc | ≤ -20 dBc | Pass |
| | 31 GHz - 40 GHz | < -40 dBc | ≤ -20 dBc | Pass |

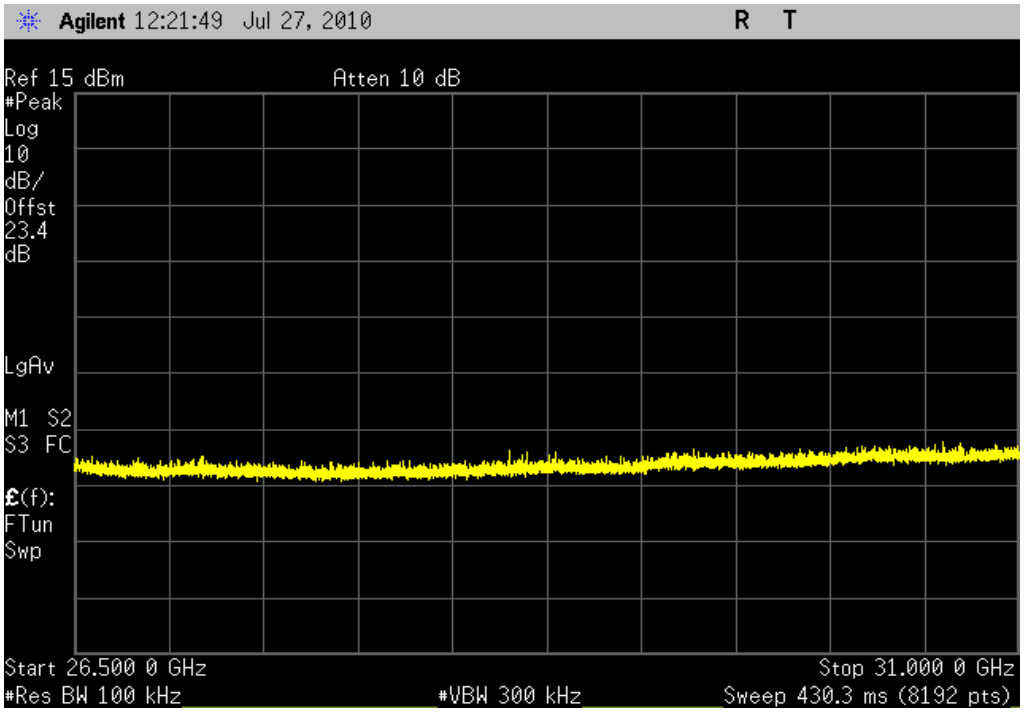
| 6 Mbps, Low Channel 149, 5745 MHz, 30 MHz - 12.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



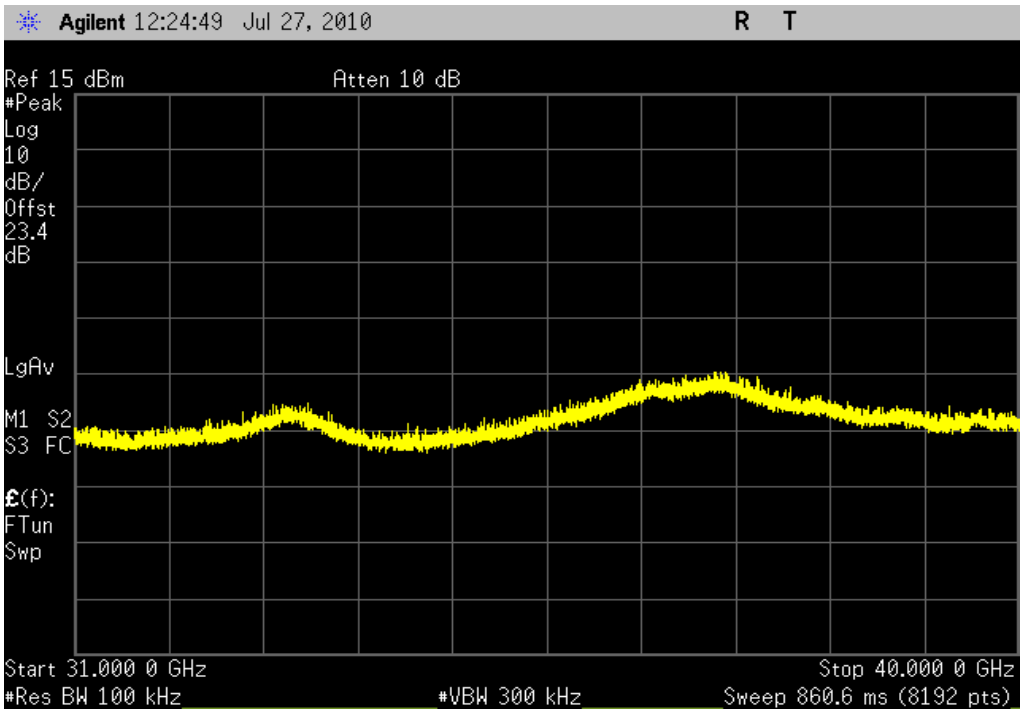

| 6 Mbps, Low Channel 149, 5745 MHz, 12.5 GHz - 26.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



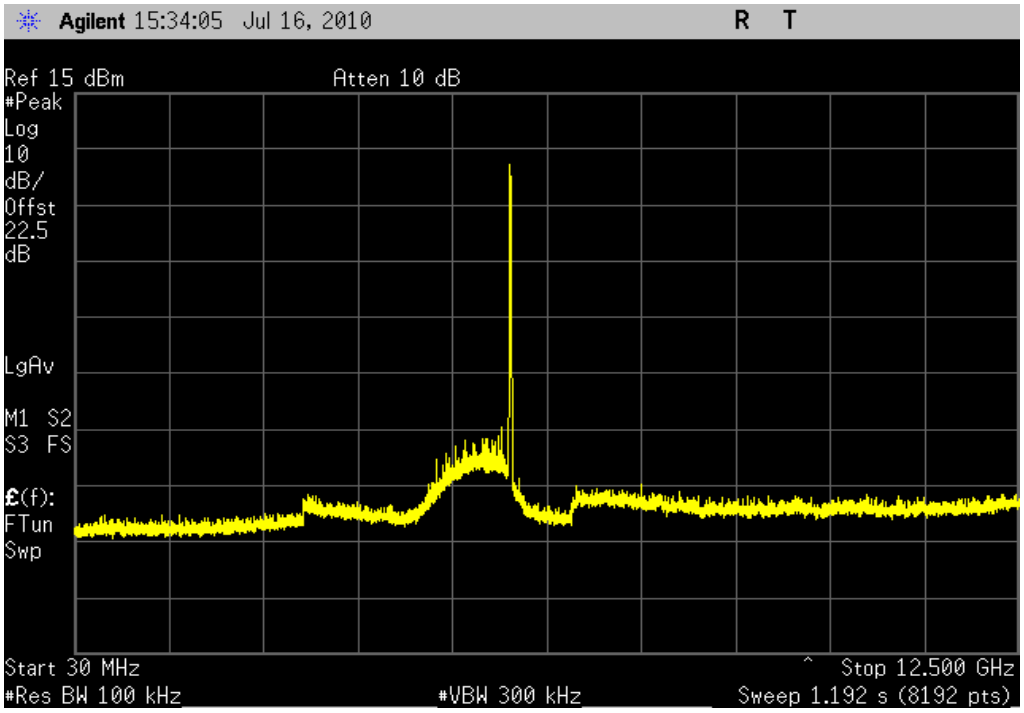
| 6 Mbps, Low Channel 149, 5745 MHz, 26.5 GHz - 31 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



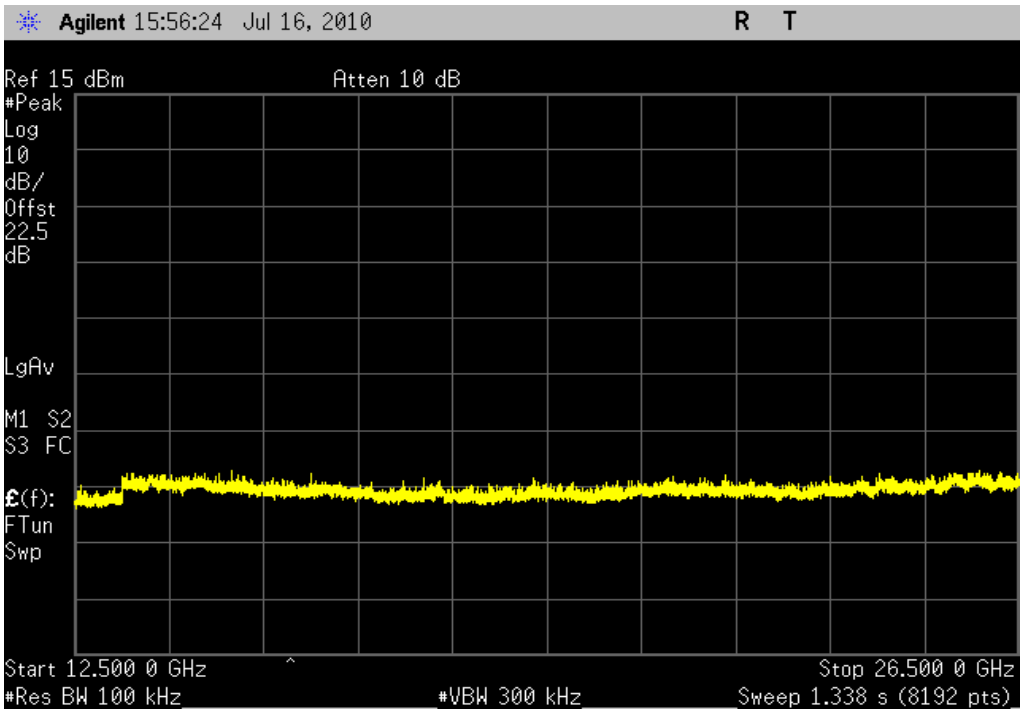

| 6 Mbps, Low Channel 149, 5745 MHz, 31 GHz - 40 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



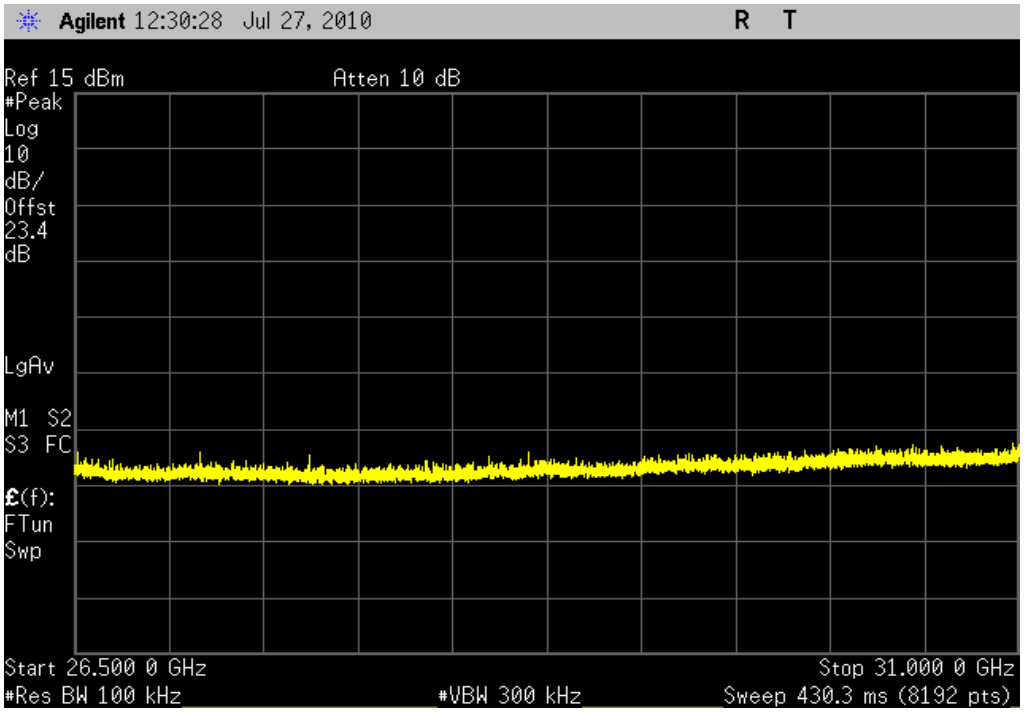
| 6 Mbps, Mid Channel 157, 5785 MHz, 30 MHz - 12.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



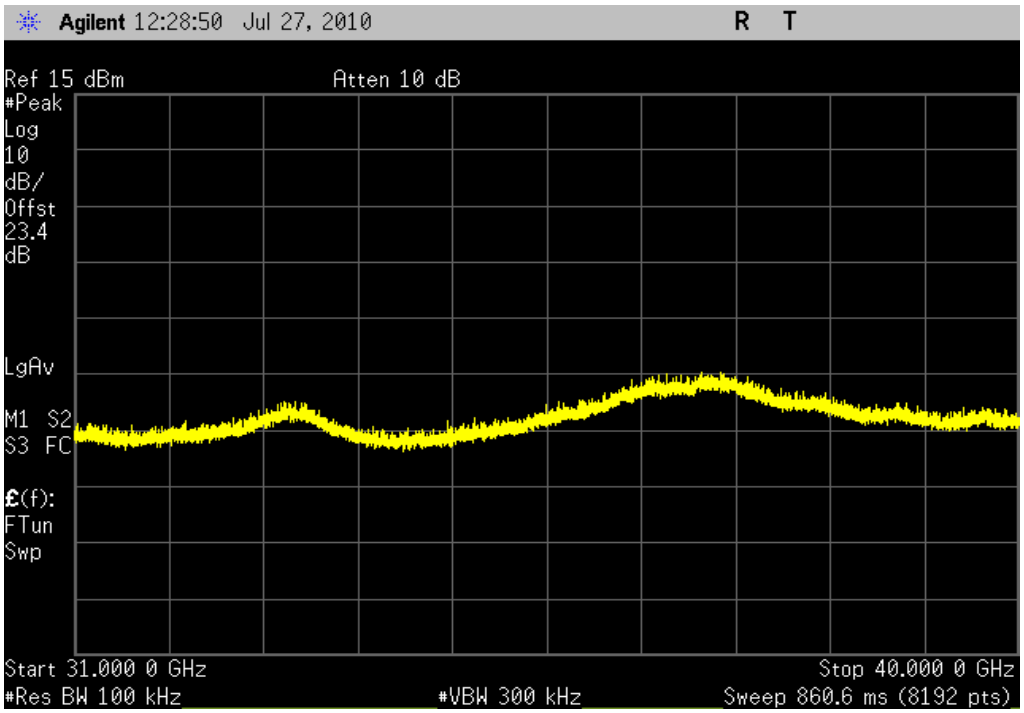

| 6 Mbps, Mid Channel 157, 5785 MHz, 12.5 GHz - 26.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



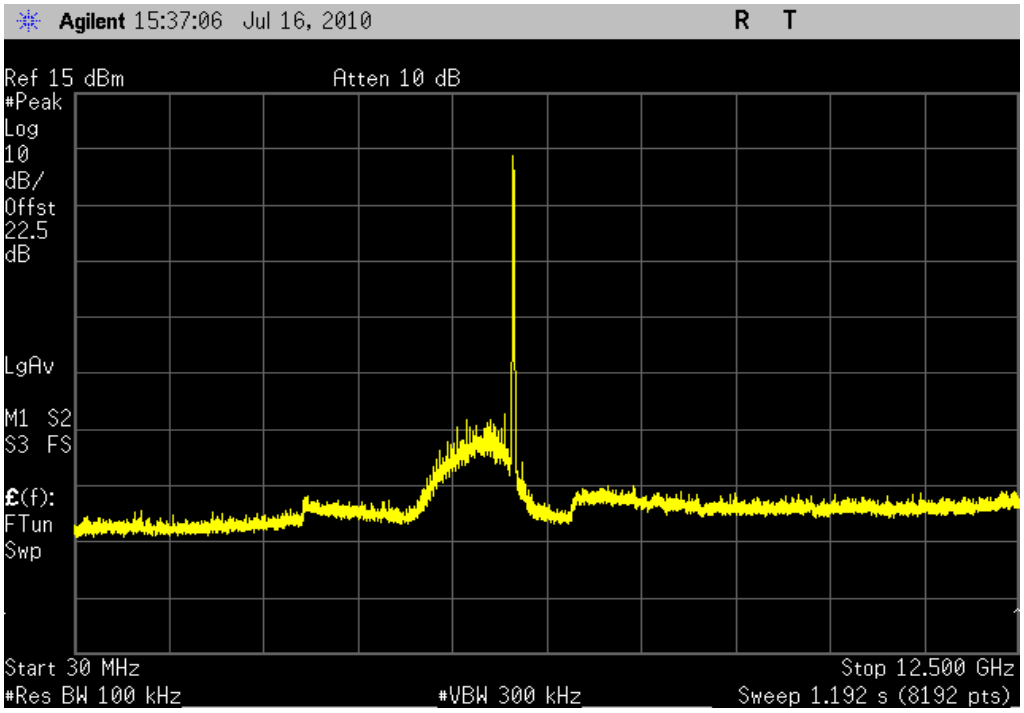
| 6 Mbps, Mid Channel 157, 5785 MHz, 26.5 GHz - 31 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



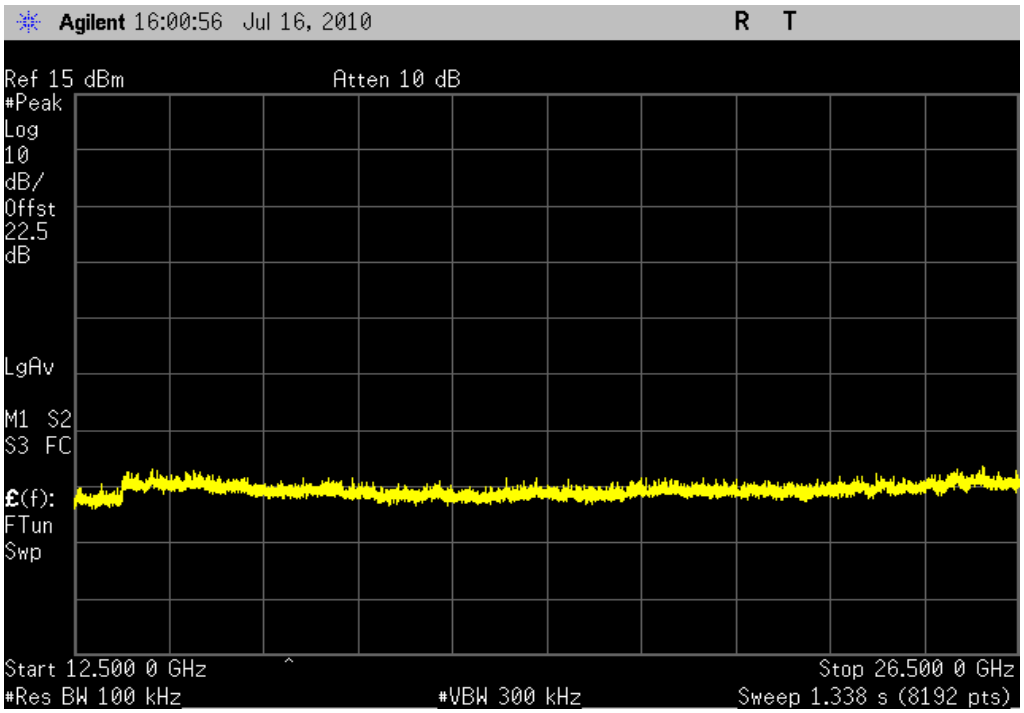

| 6 Mbps, Mid Channel 157, 5785 MHz, 31 GHz - 40 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



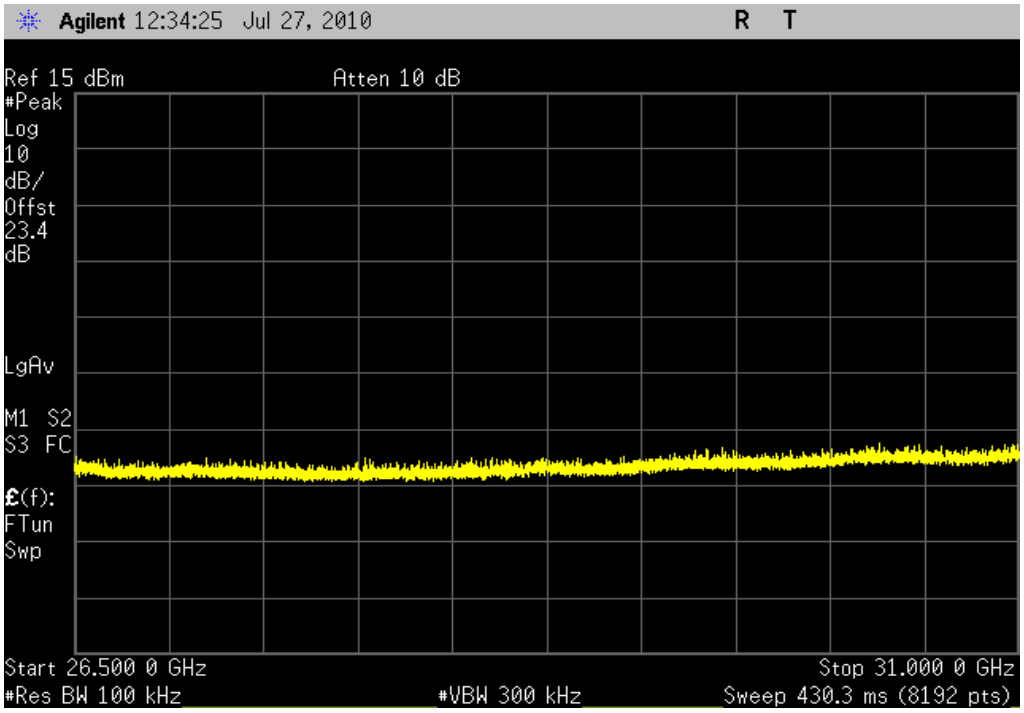
| 6 Mbps, High Channel 165, 5825 MHz, 30 MHz - 12.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



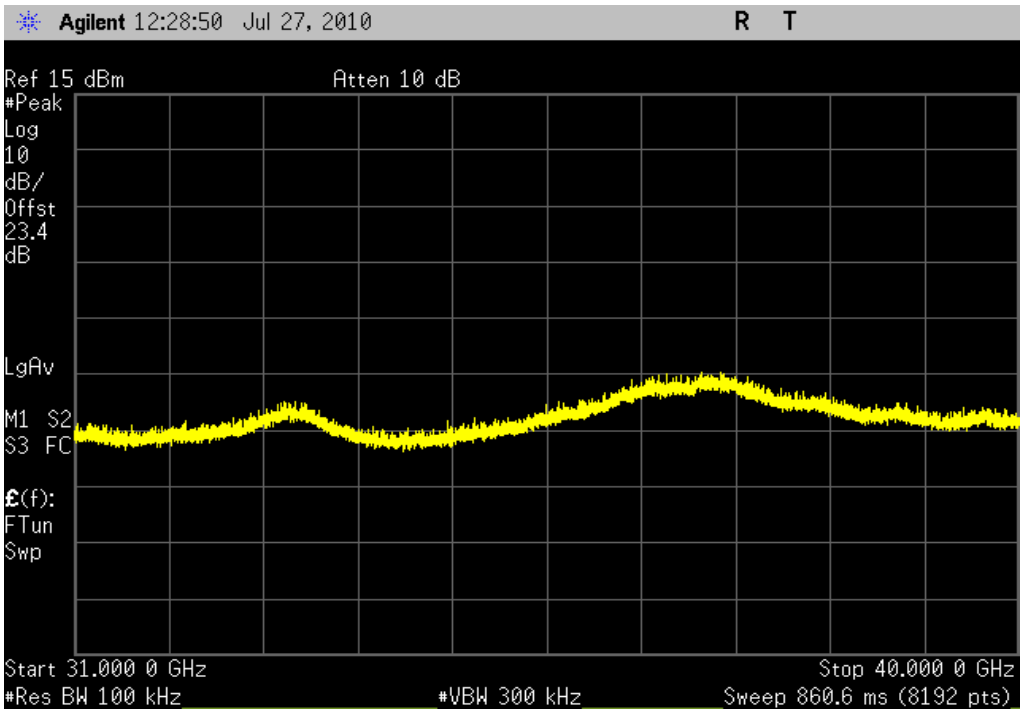

| 6 Mbps, High Channel 165, 5825 MHz, 12.5 GHz - 26.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



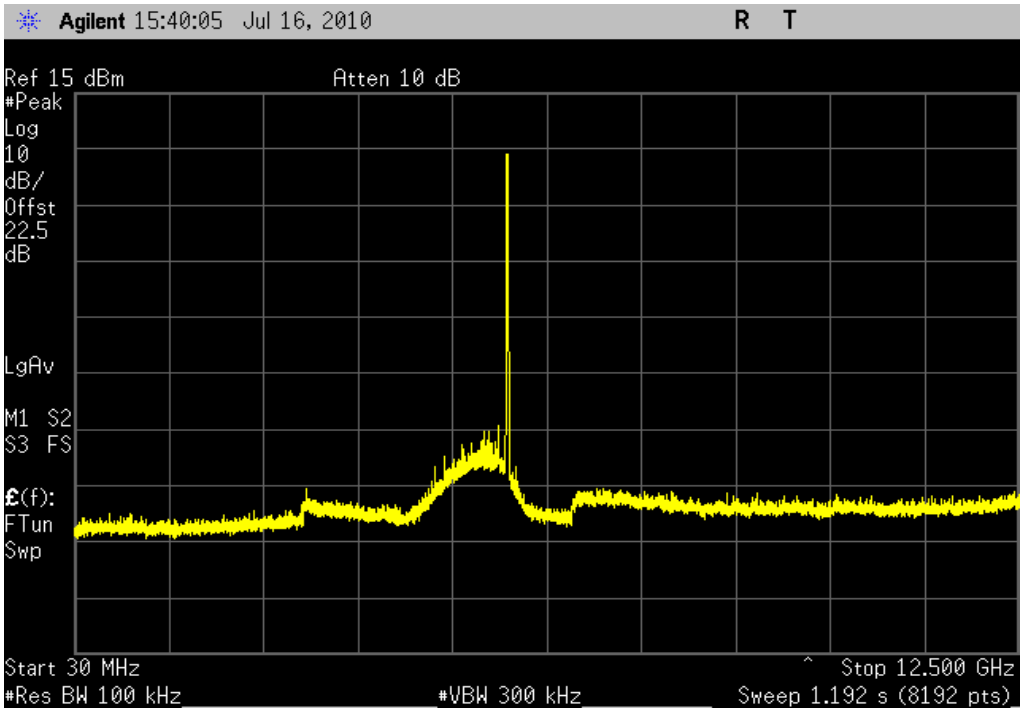
| 6 Mbps, High Channel 165, 5825 MHz, 26.5 GHz - 31 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



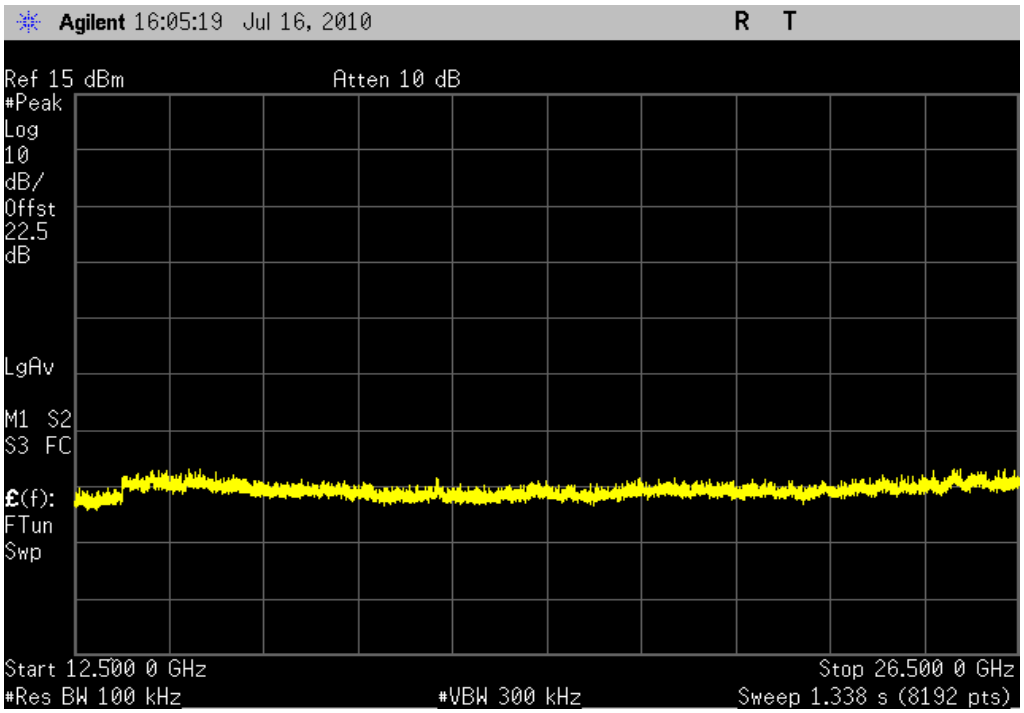

| 6 Mbps, High Channel 165, 5825 MHz, 31 GHz - 40 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



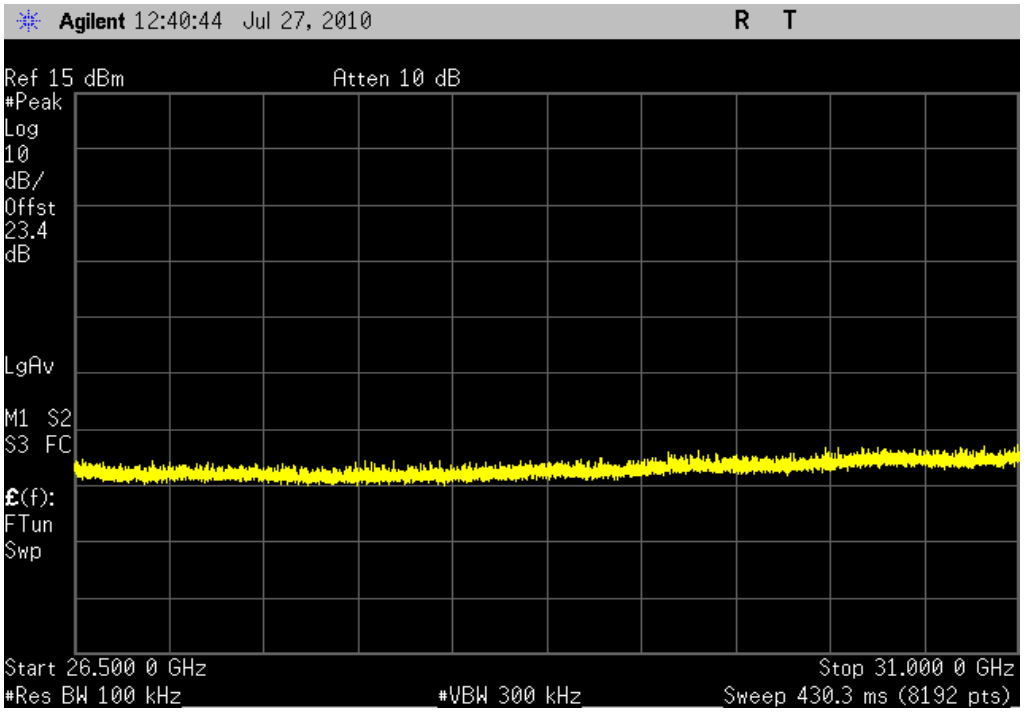
| 36 Mbps, Low Channel 149, 5745 MHz, 30 MHz - 12.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



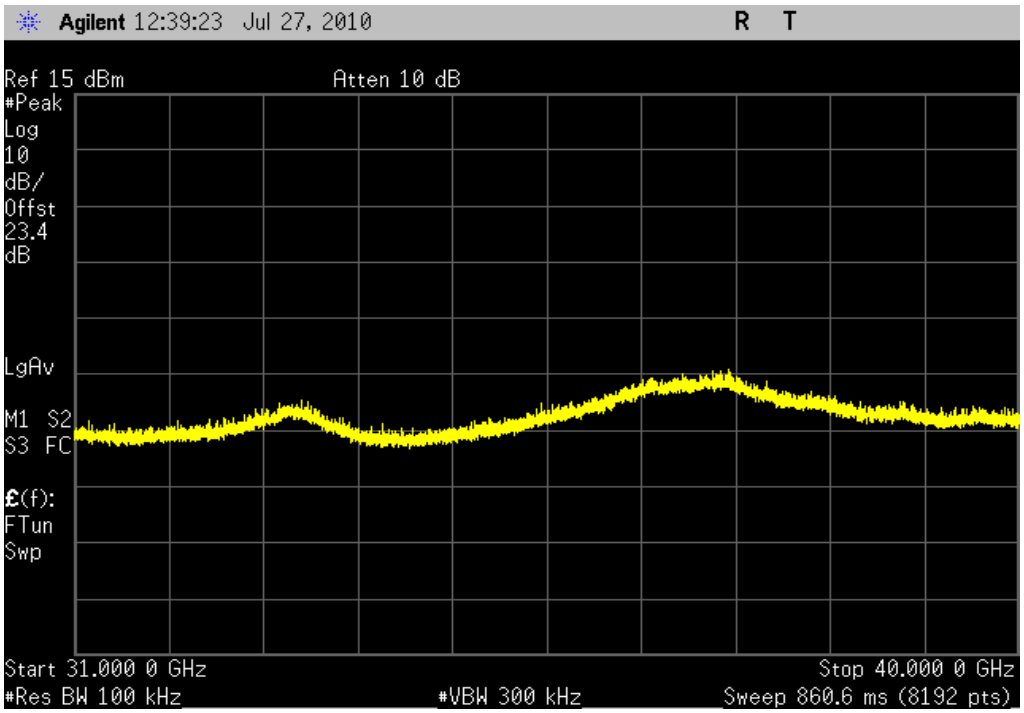

| 36 Mbps, Low Channel 149, 5745 MHz, 12.5 GHz - 26.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



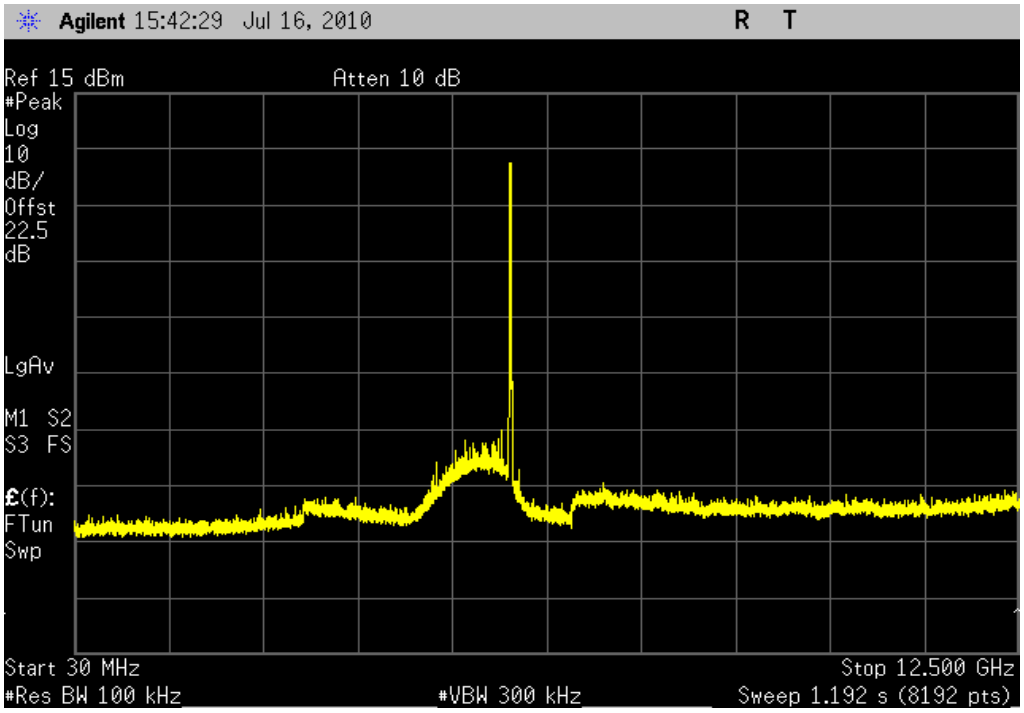
| 36 Mbps, Low Channel 149, 5745 MHz, 26.5 GHz - 31 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



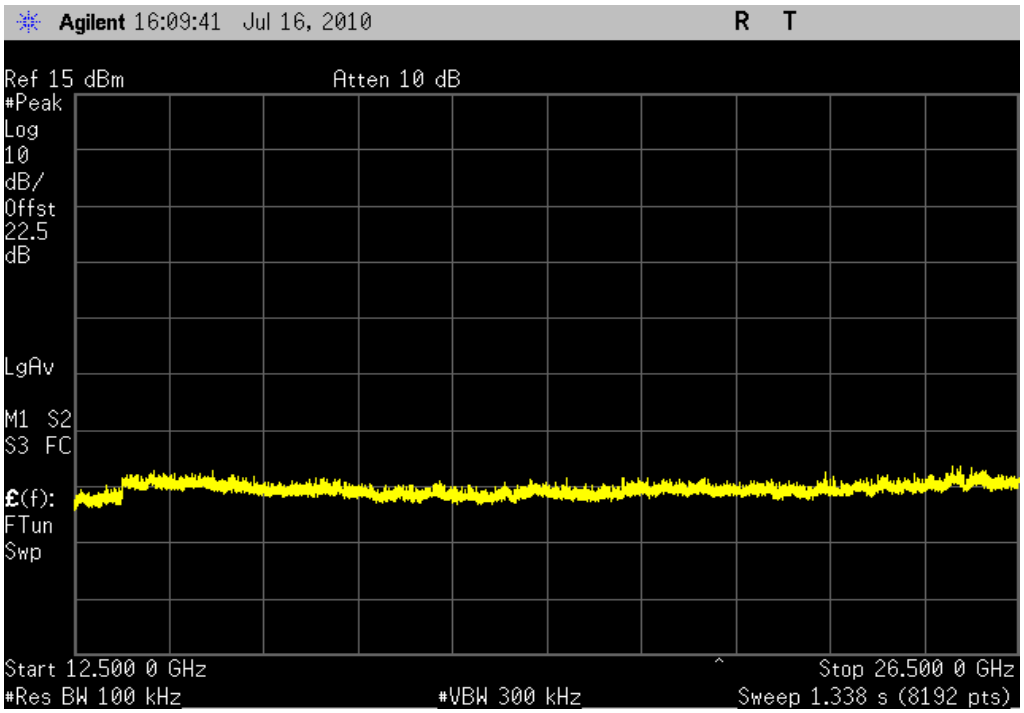

| 36 Mbps, Low Channel 149, 5745 MHz, 31 GHz - 40 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



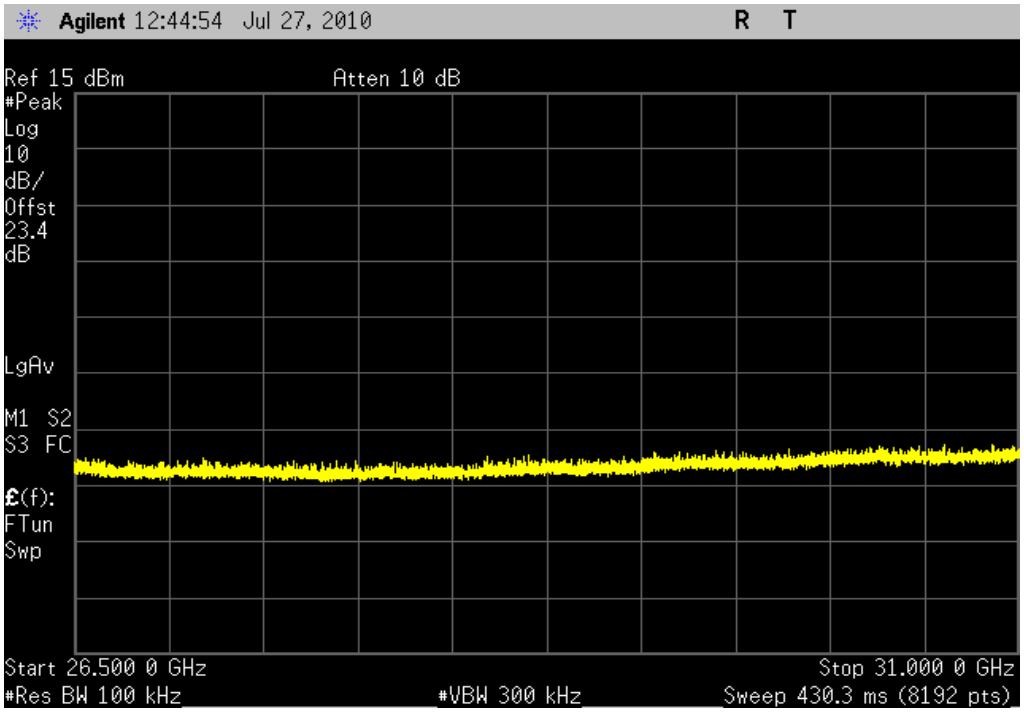
| 36 Mbps, Mid Channel 157, 5785 MHz, 30 MHz - 12.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



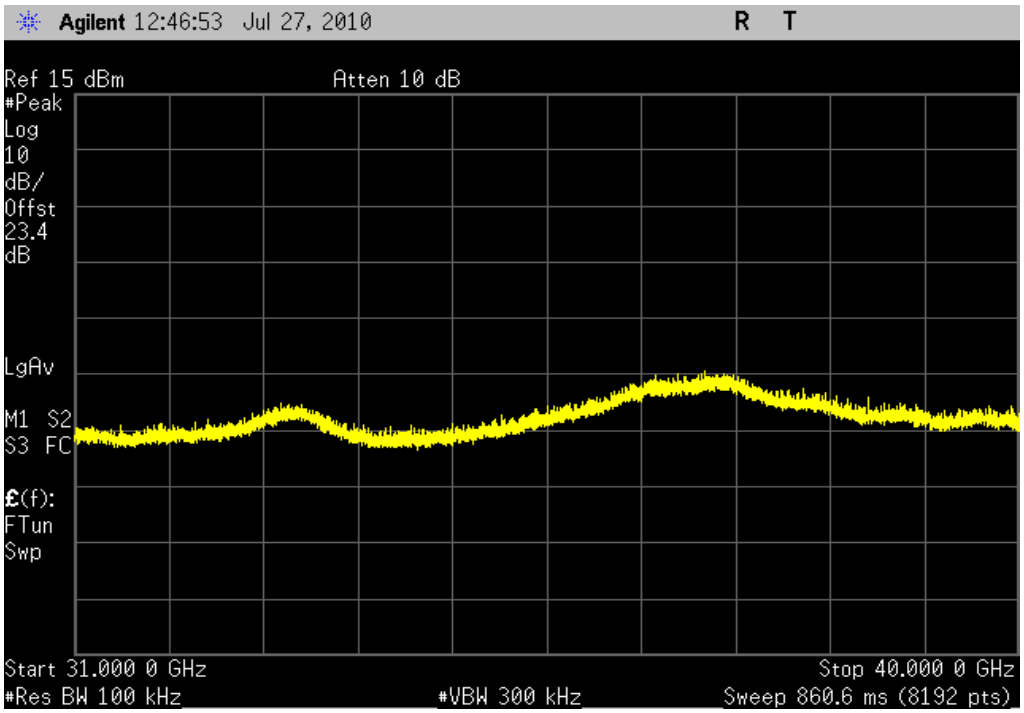

| 36 Mbps, Mid Channel 157, 5785 MHz, 12.5 GHz - 26.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



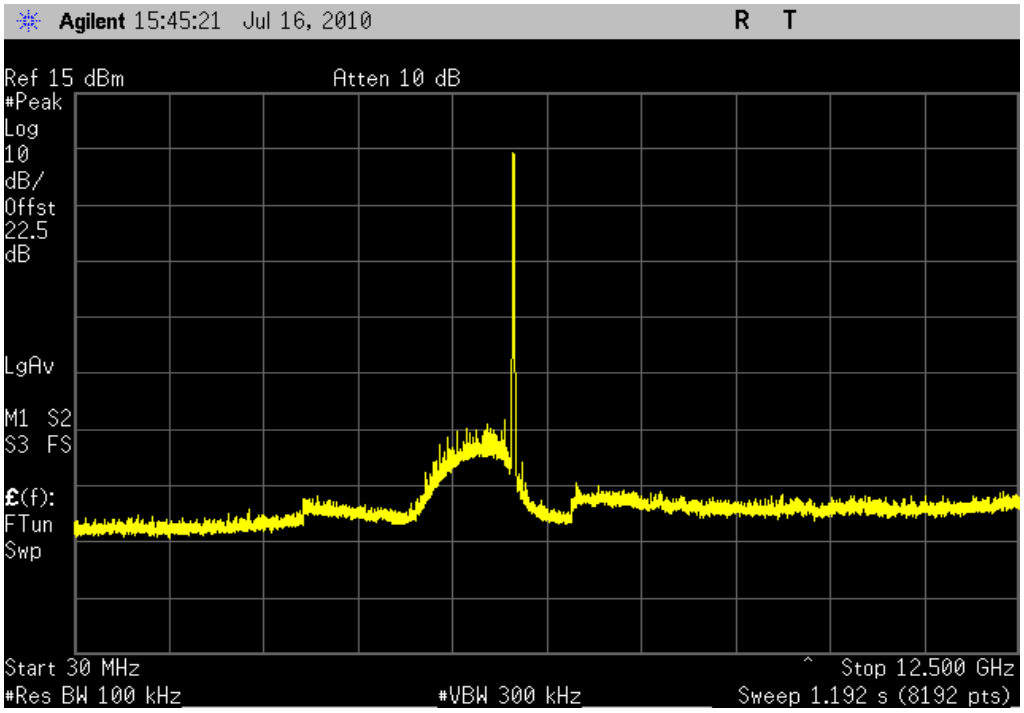
| 36 Mbps, Mid Channel 157, 5785 MHz, 26.5 GHz - 31 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



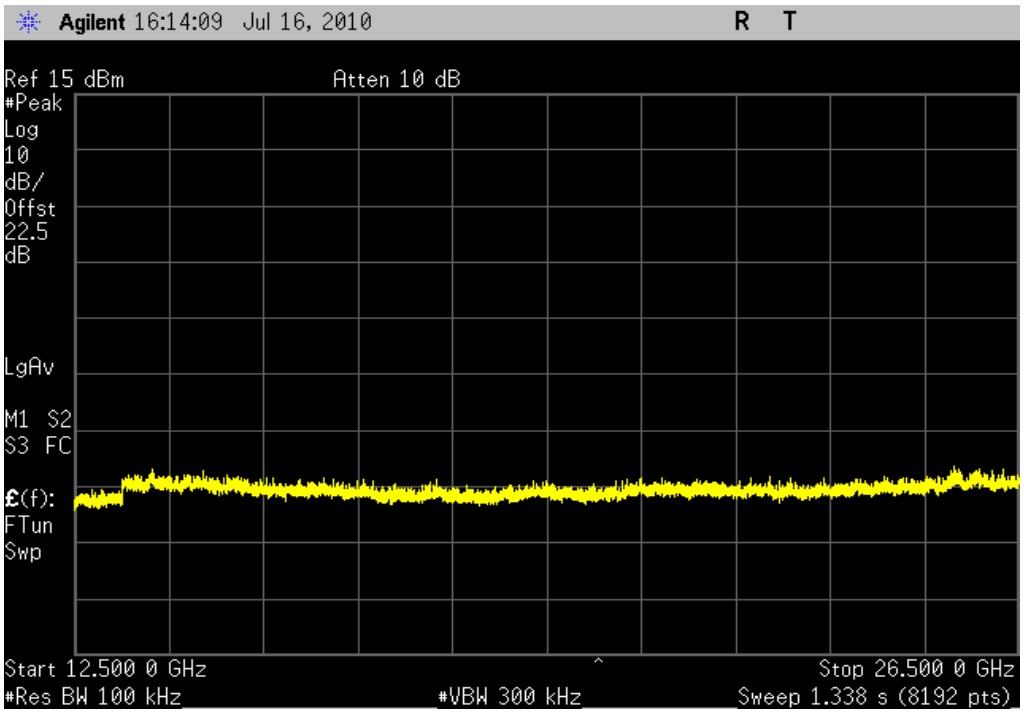

| 36 Mbps, Mid Channel 157, 5785 MHz, 31 GHz - 40 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



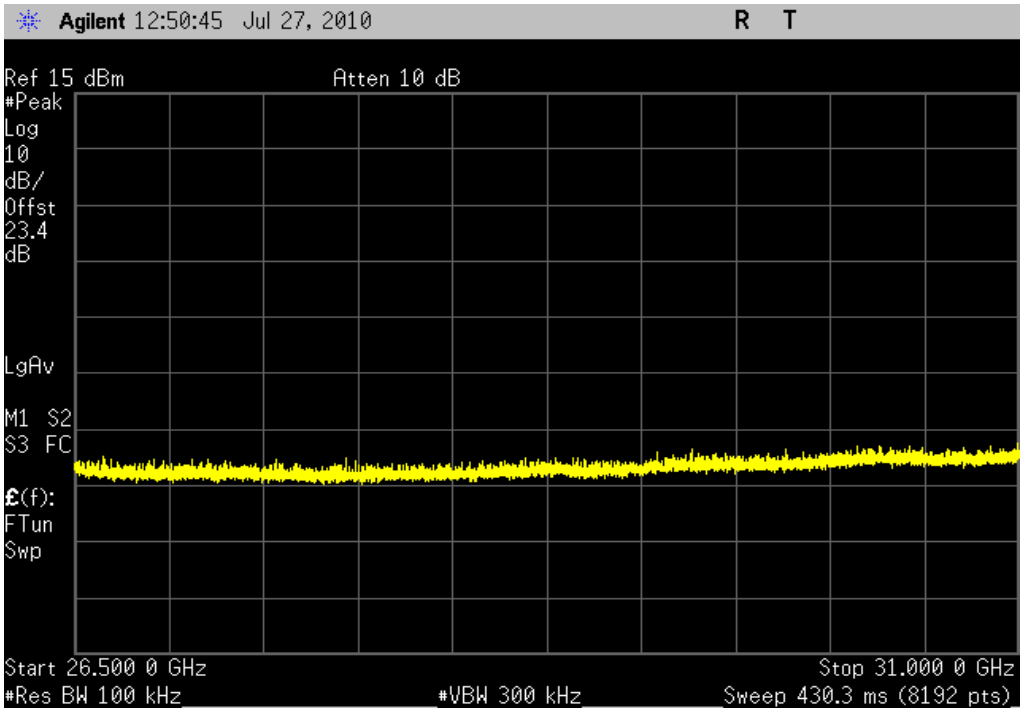
| 36 Mbps, High Channel 165, 5825 MHz, 30 MHz - 12.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



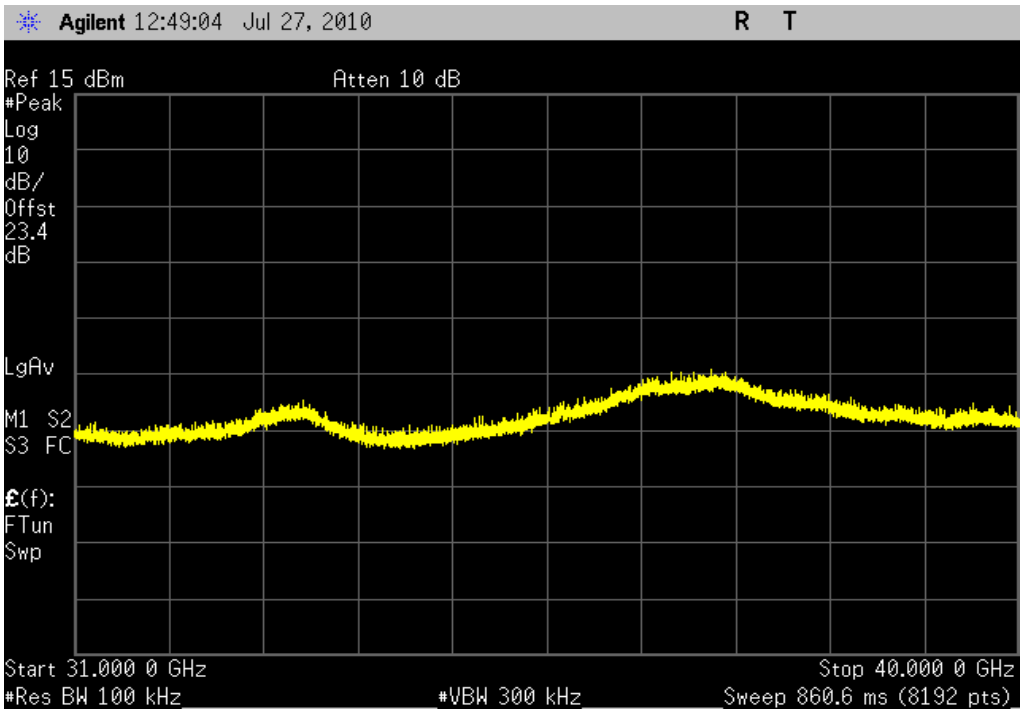

| 36 Mbps, High Channel 165, 5825 MHz, 12.5 GHz - 26.5 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



| 36 Mbps, High Channel 165, 5825 MHz, 26.5 GHz - 31 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |




| 36 Mbps, High Channel 165, 5825 MHz, 31 GHz - 40 GHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | < -40 dBc | **Limit:** | ≤ -20 dBc |



# POWER SPECTRAL DENSITY

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4440A | AFD | 6/1/2009 | 24 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/21/2009 | 13 |
| 26 GHz DC Block, SMA | Pasternack | PE8210 | AME | 10/19/2009 | 13 |
| Attenuator, 6 dB, 'SMA' | N/A | 93459 3330A-6 | AUF | 4/1/2010 | 13 |
| Power Meter | Gigatronics | 8651A | SPM | 1/7/2010 | 13 |
| Power Sensor | Gigatronics | 80701A | SPL | 1/7/2010 | 13 |
| Signal Generator | Agilent | E8257D | TGX | 12/10/2008 | 24 |

## MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

## TEST DESCRIPTION

The power spectral density measurements were measured with the EUT set to low, mid, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate for each modulation type available. While the average output power was measured as defined in section ANSI C63.10:2009, Section 6.11.2.3 was followed.

The spectrum analyzer was set as follows:

The emission peak was located and zoomed in on within the passband.

a) RBW = 3 kHz

b) VBW = 10 kHz

c) Span = 300 kHz

d) Sweep time = 100s

e) Trace set to MAX

f) The 1 hz Marker Noise function on the analyzer was used. The data was corrected to 3 kHz by adding 34.8 dB to the reading.

NORTHWEST EMC

# POWER SPECTRAL DENSITY

XMit 2010.01.14

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Summit FS848 Master Module (Wheeler) | | | Work Order: | FOCU0081 |
| Serial Number: | A146 | | | Date: | 07/16/10 |
| Customer: | Summit Semiconductor LLC | | | Temperature: | 23°C |
| Attendees: | Alex Macdonald | | | Humidity: | 45% |
| Project: | None | | | Barometric Pres.: | 30.16 in |
| Tested by: | Rod Peloquin | Power: | 120VAC/60Hz | Job Site: | EV06 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2010 | ANSI C63.10:2009 |

**COMMENTS**

Transmitting random audio data. External trigger from EUT, and gating on analyzer

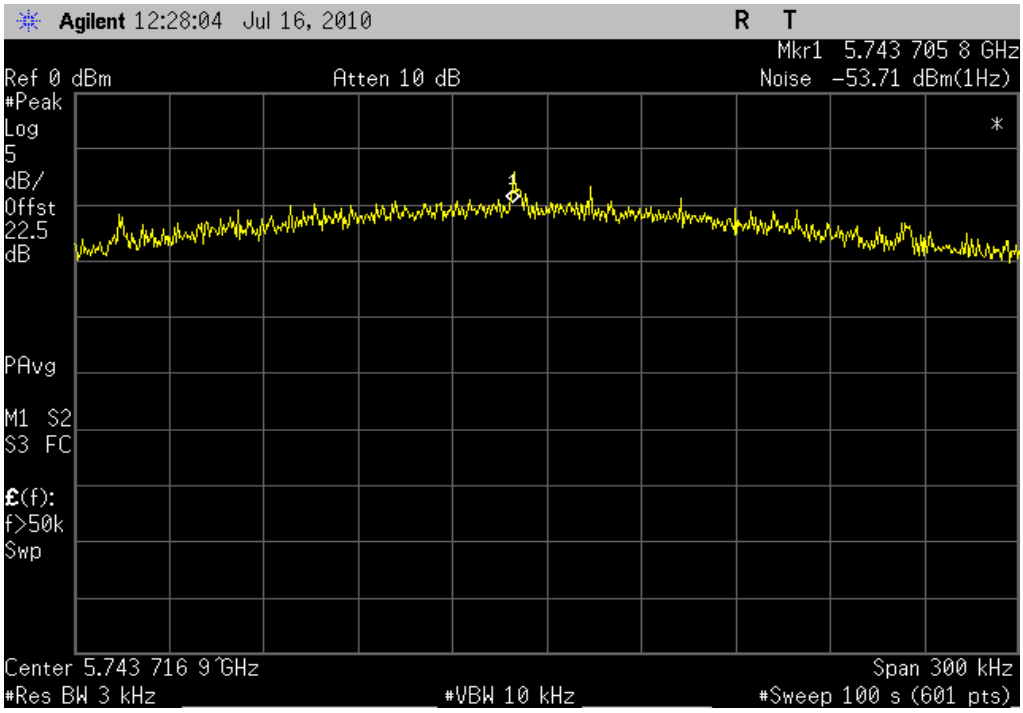
**DEVIATIONS FROM TEST STANDARD**

No Deviations

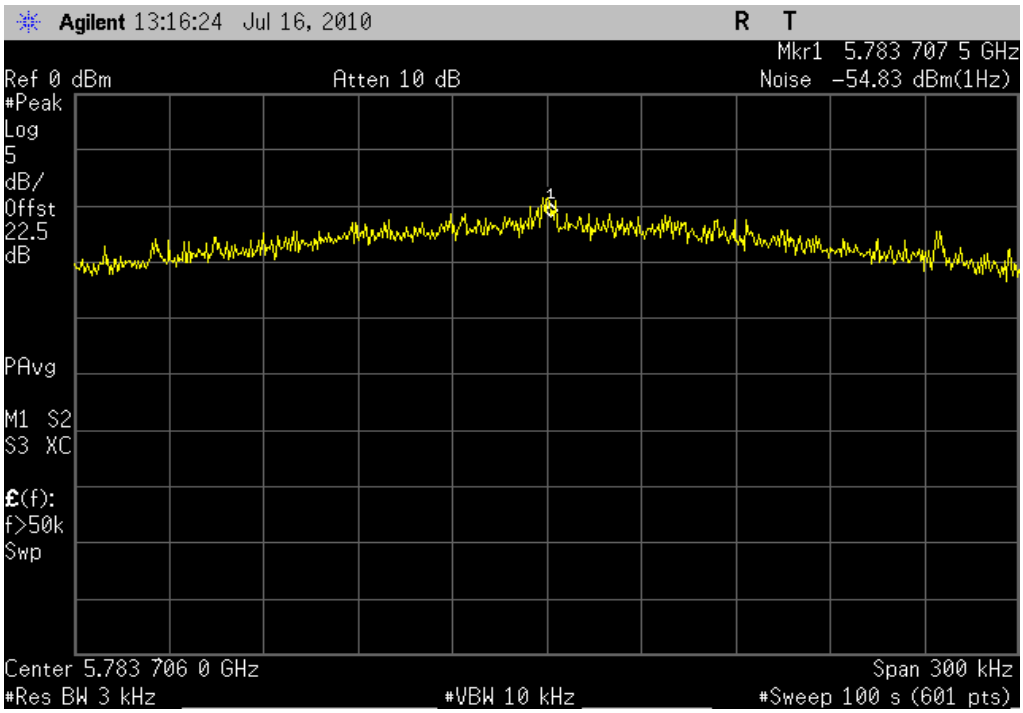
| Configuration # | 2 | Signature |
|---|---|---|

| | | Value | Limit | Results |
|---|---|---|---|---|
| 6 Mbps | | | | |
| | Low Channel 149, 5745 MHz | -18.9 dBm / 3 kHz | 8 dBm / 3 kHz | Pass |
| | Mid Channel 157, 5785 MHz | -20.0 dBm / 3 kHz | 8 dBm / 3 kHz | Pass |
| | High Channel 165, 5825 MHz | -18.5 dBm / 3 kHz | 8 dBm / 3 kHz | Pass |
| 36 Mbps | | | | |
| | Low Channel 149, 5745 MHz | -20.2 dBm / 3 kHz | 8 dBm / 3 kHz | Pass |
| | Mid Channel 157, 5785 MHz | -21.3 dBm / 3 kHz | 8 dBm / 3 kHz | Pass |
| | High Channel 165, 5825 MHz | -20.1 dBm / 3 kHz | 8 dBm / 3 kHz | Pass |

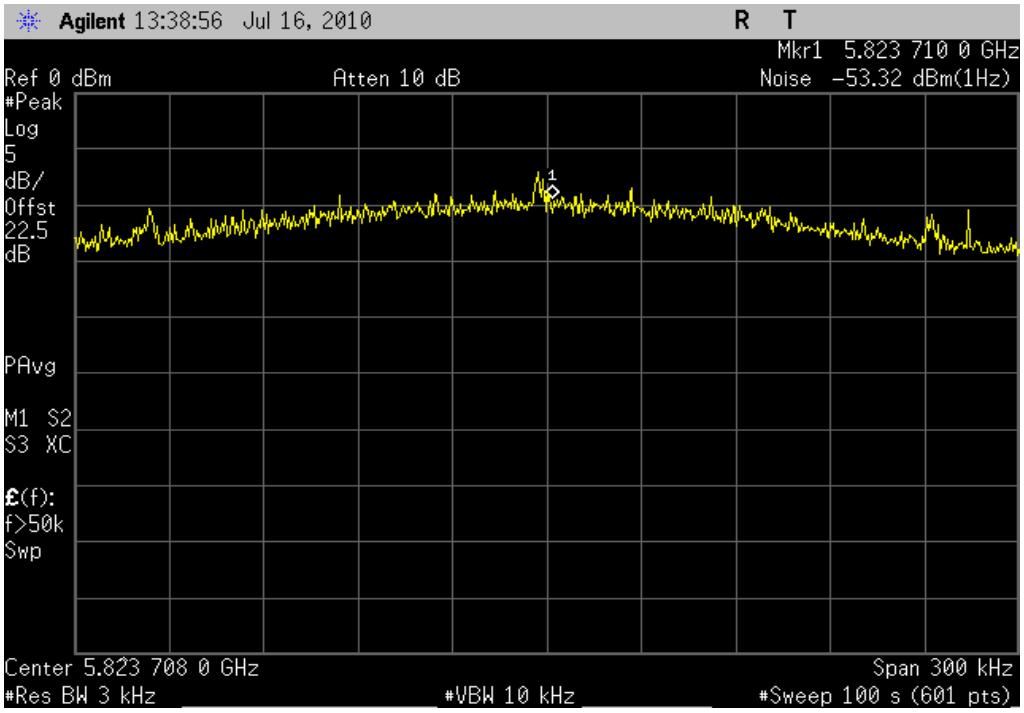
| 6 Mbps, Low Channel 149, 5745 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -18.9 dBm / 3 kHz | **Limit:** | 8 dBm / 3 kHz |



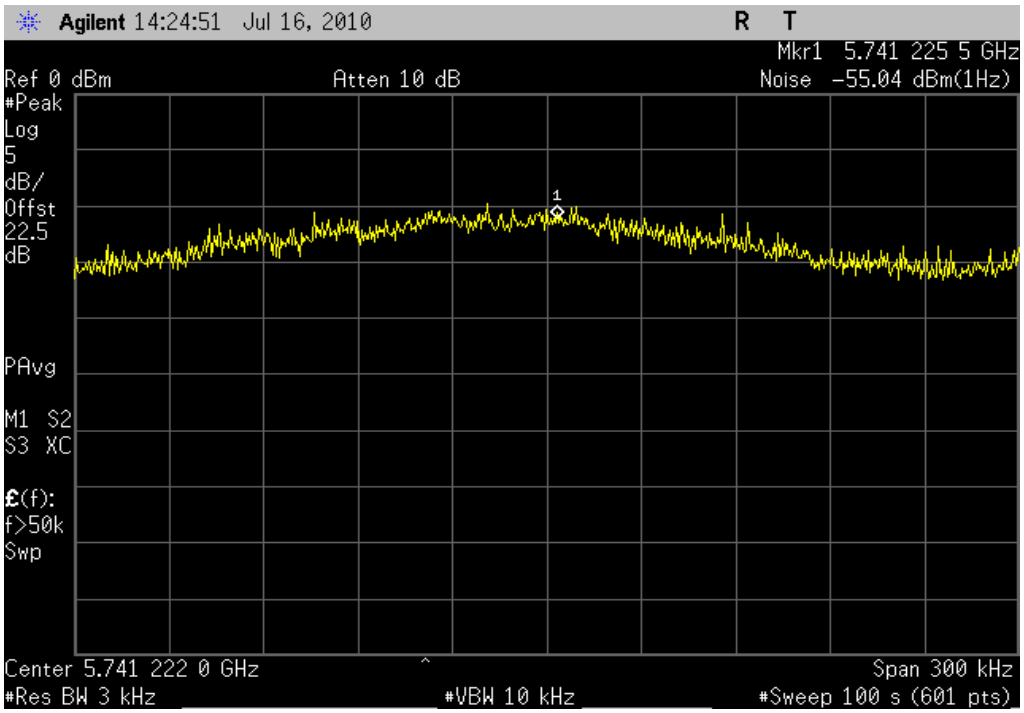

| 6 Mbps, Mid Channel 157, 5785 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -20.0 dBm / 3 kHz | **Limit:** | 8 dBm / 3 kHz |



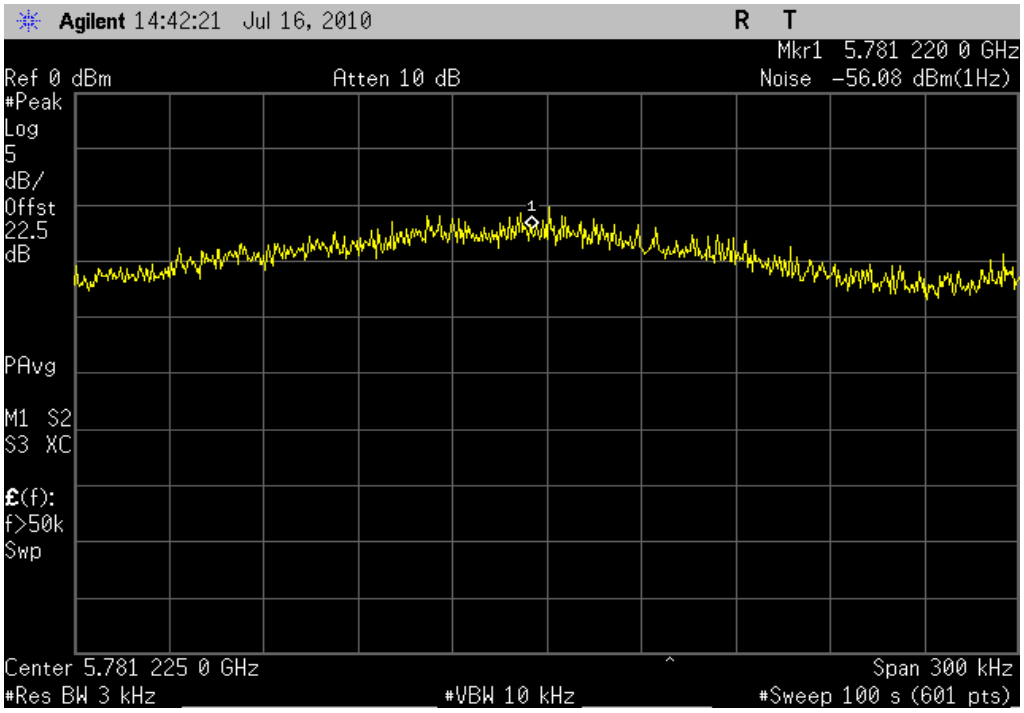
| 6 Mbps, High Channel 165, 5825 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -18.5 dBm / 3 kHz | **Limit:** | 8 dBm / 3 kHz |



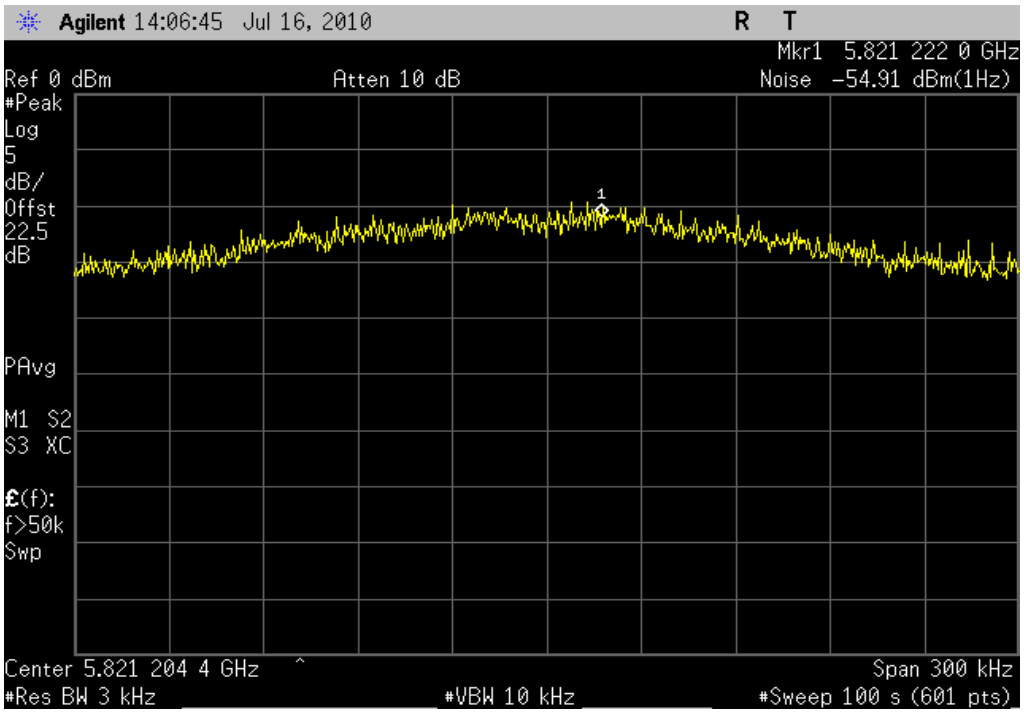

| 36 Mbps, Low Channel 149, 5745 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -20.2 dBm / 3 kHz | **Limit:** | 8 dBm / 3 kHz |



| 36 Mbps, Mid Channel 157, 5785 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -21.3 dBm / 3 kHz | **Limit:** | 8 dBm / 3 kHz |




| 36 Mbps, High Channel 165, 5825 MHz | | | | | |
|---|---|---|---|---|---|
| **Result:** | Pass | **Value:** | -20.1 dBm / 3 kHz | **Limit:** | 8 dBm / 3 kHz |



# SPURIOUS RADIATED EMISSIONS



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

| MODES OF OPERATION |
|---|
| Continuous Transmitting at 6 Mbps |
| Continuous Transmitting at 36 Mbps |

| CHANNELS TESTED |
|---|
| Channel 149, 5745 MHz |
| Channel 157, 5785 MHz |
| Channel 165, 5825 MHz |

| POWER SETTINGS INVESTIGATED |
|---|
| 120VAC/60Hz |

| FREQUENCY RANGE INVESTIGATED | | | |
|---|---|---|---|
| Start Frequency | 30 MHz | Stop Frequency | 40 GHz |

| SAMPLE CALCULATIONS |
|---|
| Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation |

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| 5.725-5.875 Notch Filter | Micro-Tronics | BRC50705 | HGJ | 7/31/2009 | 13 |
| Spectrum Analyzer | Agilent | E4446A | AAQ | 1/6/2010 | 12 |
| EV01 Cables | N/A | Bilog Cables | EVA | 7/9/2010 | 13 |
| Pre-Amplifier | Miteq | AM-1616-1000 | AOL | 7/9/2010 | 13 |
| Antenna, Biconilog | EMCO | 3141 | AXE | 1/14/2010 | 13 |
| EV01 Cables | N/A | Double Ridge Horn Cables | EVB | 7/9/2010 | 13 |
| Pre-Amplifier | Miteq | AMF-4D-010100-24-10P | APW | 7/9/2010 | 13 |
| Antenna, Horn | EMCO | 3115 | AHC | 7/8/2010 | 24 |
| EV01 Cables | N/A | Standard Gain Horns Cables | EVF | 4/2/2010 | 13 |
| Pre-Amplifier | Miteq | AMF-6F-08001200-30-10P | AVC | 7/10/2009 | 13 |
| Antenna, Horn | ETS | 3160-07 | AHU | NCR | 0 |
| EV01 Cables | N/A | Standard Gain Horns Cables | EVF | 4/2/2010 | 13 |
| Pre-Amplifier | Miteq | AMF-6F-12001800-30-10P | AVD | 7/10/2009 | 13 |
| Antenna, Horn | ETS | 3160-08 | AHV | NCR | 0 |
| Cable | ESM Cable Corp. | KMKM-72 | EVY | 11/3/2009 | 13 |
| Pre-Amplifier | Miteq | AMF-6F-18002650-25-10P | AVU | 5/19/2009 | 16 |
| Antenna, Horn | ETS Lindgren | 3160-09 | AIV | NCR | 0 |
| OC Cable | ESM Cable Corp. | KMKM-72 | OCV | 11/3/2009 | 13 |
| Pre-Amplifier | Miteq | JSW45-26004000-40-5P | AVR | 6/22/2010 | 13 |
| Antenna, Horn | ETS | 3160-10 | AIC | NCR | 0 |

**MEASUREMENT BANDWIDTHS**

| Frequency Range (MHz) | Peak Data (kHz) | Quasi-Peak Data (kHz) | Average Data (kHz) |
|---|---|---|---|
| 0.01 - 0.15 | 1.0 | 0.2 | 0.2 |
| 0.15 - 30.0 | 10.0 | 9.0 | 9.0 |
| 30.0 - 1000 | 100.0 | 120.0 | 120.0 |
| Above 1000 | 1000.0 | N/A | 1000.0 |

Measurements were made using the bandwidths and detectors specified. No video filter was used.

## MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. The measurement uncertainty estimation is available upon request.

## TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

NORTHWEST EMC

# SPURIOUS RADIATED EMISSIONS

PSA 2008.07.21
EMI 2008.1.9

| | | | |
|---|---|---|---|
| EUT: | Summit FS848 Master Module (Wheeler) | Work Order: | FOCU0081 |
| Serial Number: | 0265 | Date: | 07/20/10 |
| Customer: | Summit Semiconductor LLC | Temperature: | 22.9 °C |
| Attendees: | None | Humidity: | 45% |
| Project: | None | Barometric Pres.: | 1018.1 mb |
| Tested by: | Dan Haas | Power: 120VAC/60Hz | Job Site: EV01 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2010 | ANSI C63.10:2009 |

| TEST PARAMETERS | | | |
|---|---|---|---|
| Antenna Height(s) (m) | 1 - 4 | Test Distance (m) | 3 |

**COMMENTS**

Aeon C627-510004A antennas with 4 inch antenna cables. 12 inch ribbon cable: small donut ferrites on Antenna cables with two turns:

**EUT OPERATING MODES**

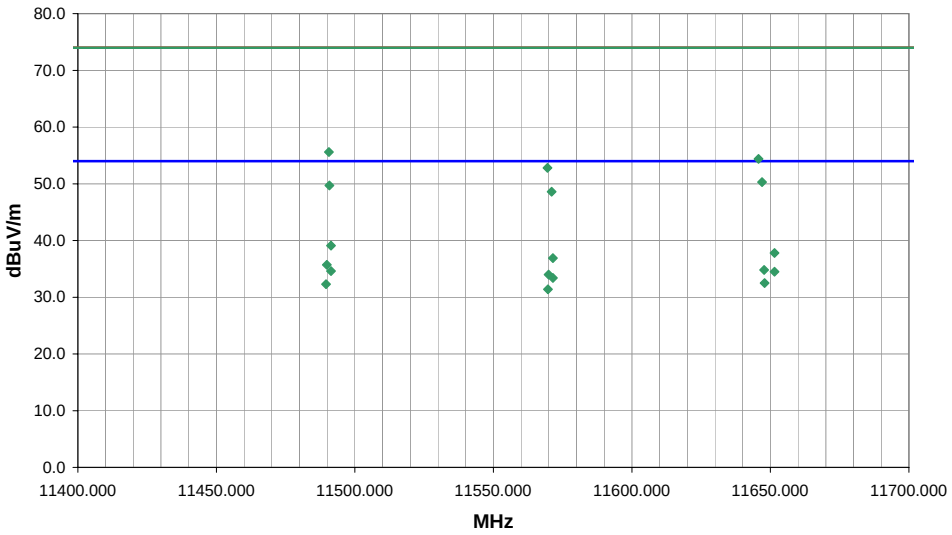
Continuous Transmitting.

**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| Run # | 6 |
| Configuration # | 1 |
| Results | Pass |

*Signature*




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Distance (meters) | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11491.400 | 45.8 | -6.7 | 205.0 | 1.1 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 39.1 | 54.0 | -14.9 | CH:149, 36Mbps, EUT Vertical. |
| 11651.500 | 43.6 | -5.8 | 207.0 | 1.3 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 37.8 | 54.0 | -16.2 | CH:165, 36Mbps, EUT Vertical. |
| 11571.500 | 43.2 | -6.3 | 324.0 | 1.1 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 36.9 | 54.0 | -17.1 | CH:157, 36Mbps, EUT Vertical. |
| 11489.900 | 42.4 | -6.7 | 205.0 | 1.1 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 35.7 | 54.0 | -18.3 | CH:149, 6Mbps, EUT Vertical. |
| 11490.650 | 62.3 | -6.7 | 205.0 | 1.1 | 3.0 | 0.0 | H-Horn | PK | 0.0 | 55.6 | 74.0 | -18.4 | CH:149, 6Mbps, EUT Vertical. |
| 11647.700 | 40.6 | -5.8 | 207.0 | 1.3 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 34.8 | 54.0 | -19.2 | CH:165, 6Mbps, EUT Vertical. |
| 11491.400 | 41.3 | -6.7 | 219.0 | 1.1 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 34.6 | 54.0 | -19.4 | CH:149, 36Mbps, EUT Horizontal. |
| 11651.500 | 40.3 | -5.8 | 36.0 | 1.1 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 34.5 | 54.0 | -19.5 | CH:165, 36Mbps, EUT Horizontal. |
| 11645.700 | 60.2 | -5.8 | 207.0 | 1.3 | 3.0 | 0.0 | H-Horn | PK | 0.0 | 54.4 | 74.0 | -19.6 | CH:165, 6Mbps, EUT Vertical. |
| 11569.950 | 40.3 | -6.3 | 324.0 | 1.1 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 34.0 | 54.0 | -20.0 | CH:157, 6Mbps, EUT Vertical. |
| 11571.500 | 39.7 | -6.3 | 216.0 | 1.1 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 33.4 | 54.0 | -20.6 | CH:157, 36Mbps, EUT Horizontal. |
| 11569.550 | 59.1 | -6.3 | 324.0 | 1.1 | 3.0 | 0.0 | H-Horn | PK | 0.0 | 52.8 | 74.0 | -21.2 | CH:157, 6Mbps, EUT Vertical. |
| 11647.900 | 38.3 | -5.8 | 36.0 | 1.1 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 32.5 | 54.0 | -21.5 | CH:165, 6Mbps, EUT Horizontal. |
| 11489.600 | 39.0 | -6.7 | 219.0 | 1.1 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 32.3 | 54.0 | -21.7 | CH:149, 6Mbps, EUT Horizontal. |
| 11569.700 | 37.7 | -6.3 | 216.0 | 1.1 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 31.4 | 54.0 | -22.6 | CH:157, 6Mbps, EUT Horizontal. |
| 11647.000 | 56.1 | -5.8 | 36.0 | 1.1 | 3.0 | 0.0 | V-Horn | PK | 0.0 | 50.3 | 74.0 | -23.7 | CH:165, 6Mbps, EUT Horizontal. |
| 11490.800 | 56.4 | -6.7 | 219.0 | 1.1 | 3.0 | 0.0 | V-Horn | PK | 0.0 | 49.7 | 74.0 | -24.3 | CH:149, 6Mbps, EUT Horizontal. |
| 11571.000 | 54.9 | -6.3 | 216.0 | 1.1 | 3.0 | 0.0 | V-Horn | PK | 0.0 | 48.6 | 74.0 | -25.4 | CH:157, 6Mbps, EUT Horizontal. |

# AC POWERLINE CONDUCTED EMISSIONS

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

| MODES OF OPERATION |
|---|
| Continuous Tx 5825MHz, (Ch.165) |
| Continuous Tx 5785MHz, (Ch.157) |
| Continuous Tx 5745MHz, (Ch.149) |

| POWER SETTINGS INVESTIGATED |
|---|
| 120VAC/60Hz |

| CONFIGURATIONS INVESTIGATED |
|---|
| FOCU0081 - 4 |

| SAMPLE CALCULATIONS |
|---|
| Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator |

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Receiver | Rohde & Schwarz | ESCI | ARE | 4/29/2010 | 12 mo |
| EV07 Cables | N/A | Conducted Cables | EVG | 6/21/2010 | 13 mo |
| High Pass Filter | TTE | H97-100K-50-720B | HFX | 2/16/2010 | 13 mo |
| Attenuator | Coaxicom | 66702 2910-20 | ATO | 7/21/2009 | 13 mo |
| LISN | Solar | 9252-50-R-24-BNC | LIN | 5/27/2010 | 12 mo |

**MEASUREMENT BANDWIDTHS**

| | Frequency Range (MHz) | Peak Data (kHz) | Quasi-Peak Data (kHz) | Average Data (kHz) |
|---|---|---|---|---|
| | 0.01 - 0.15 | 1.0 | 0.2 | 0.2 |
| | 0.15 - 30.0 | 10.0 | 9.0 | 9.0 |
| | 30.0 - 1000 | 100.0 | 120.0 | 120.0 |
| | Above 1000 | 1000.0 | N/A | 1000.0 |

Measurements were made using the bandwidths and detectors specified. No video filter was used.

## MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

## TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm.

NORTHWEST

# EMC

## AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2010.04.06
Version 2010.3.17

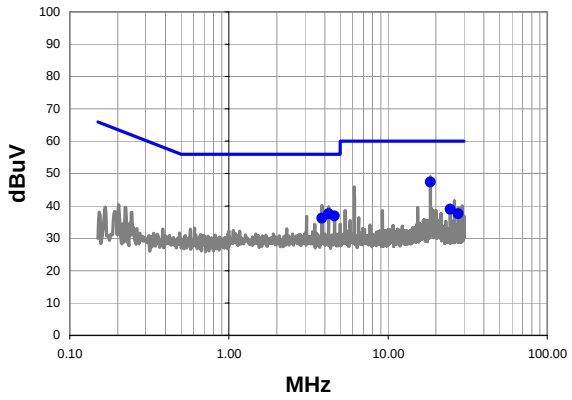
| | | | | | |
|---|---|---|---|---|---|
| **Work Order:** | FOCU0081 | **Date:** | 07/21/10 | | |
| **Project:** | None | **Temperature:** | 24.4 °C | | |
| **Job Site:** | EV07 | **Humidity:** | 44.7 | | |
| **Serial Number:** | 0265 | **Barometric Pres.:** | 1015.9 mb | **Tested by:** | Dan Haas |

| | |
|---|---|
| **EUT:** | Summit FS848 Master Module (Wheeler) |
| **Configuration:** | 4 - AC powerline conducted emissions |
| **Customer:** | Summit Semiconductor LLC |
| **Attendees:** | None |
| **EUT Power:** | 120VAC/60Hz |
| **Operating Mode:** | Continuous Tx 5745MHz, (Ch.149) |
| **Deviations:** | No deviations. |
| **Comments:** | Aeon C627-510004A antennas with 4 inch antenna cables. 12 inch ribbon cable: small donut ferrites on Antenna cables with two turns: |

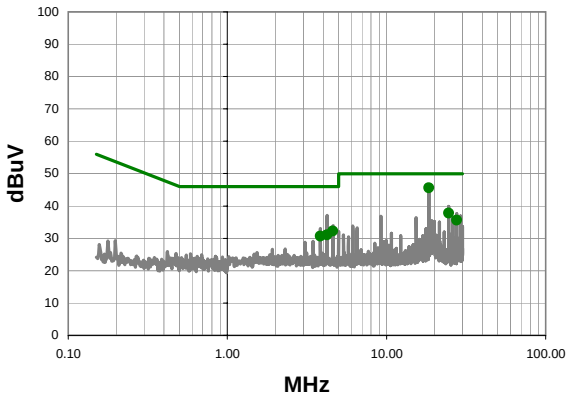
| **Test Specifications** | **Test Method** |
|---|---|
| FCC 15.207:2010 | ANSI C63.10:2009 |

| **Run #** | 19 | **Line:** | High Line | **Ext. Attenuation:** | 20 | **Results** | Pass |
|---|---|---|---|---|---|---|---|

**Quasi Peak Data - vs - Quasi Peak Limit**




**Average Data - vs - Average Limit**




Quasi Peak Data - vs - Quasi Peak Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.432 | 26.6 | 20.8 | 47.4 | 60.0 | -12.6 |
| 4.224 | 17.3 | 20.2 | 37.5 | 56.0 | -18.5 |
| 4.608 | 16.6 | 20.3 | 36.9 | 56.0 | -19.2 |
| 3.840 | 16.0 | 20.2 | 36.2 | 56.0 | -19.8 |
| 24.576 | 17.8 | 21.1 | 38.9 | 60.0 | -21.1 |
| 27.650 | 16.3 | 21.3 | 37.6 | 60.0 | -22.4 |

Average Data - vs - Average Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.432 | 24.8 | 20.8 | 45.6 | 50.0 | -4.4 |
| 24.576 | 16.6 | 21.1 | 37.7 | 50.0 | -12.3 |
| 4.608 | 12.0 | 20.3 | 32.3 | 46.0 | -13.8 |
| 27.650 | 14.3 | 21.3 | 35.6 | 50.0 | -14.4 |
| 4.224 | 10.8 | 20.2 | 31.0 | 46.0 | -15.0 |
| 3.840 | 10.4 | 20.2 | 30.6 | 46.0 | -15.4 |

NORTHWEST

# EMC

## AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2010.04.06
Version 2010.3.17

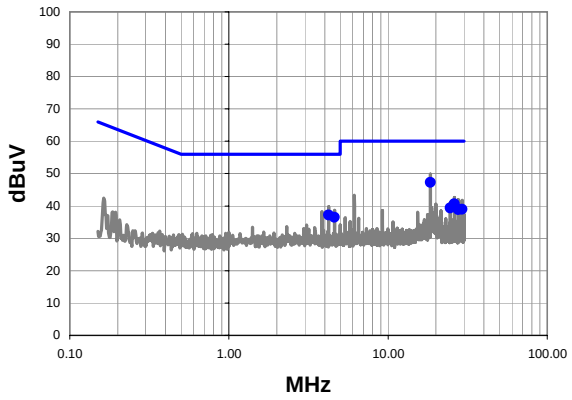
| | | | | | |
|---|---|---|---|---|---|
| **Work Order:** | FOCU0081 | **Date:** | 07/21/10 | | |
| **Project:** | None | **Temperature:** | 24.4 °C | | |
| **Job Site:** | EV07 | **Humidity:** | 44.7 | | |
| **Serial Number:** | 0265 | **Barometric Pres.:** | 1015.9 mb | **Tested by:** | Dan Haas |

| | |
|---|---|
| **EUT:** | Summit FS848 Master Module (Wheeler) |
| **Configuration:** | 4 - AC powerline conducted emissions |
| **Customer:** | Summit Semiconductor LLC |
| **Attendees:** | None |
| **EUT Power:** | 120VAC/60Hz |
| **Operating Mode:** | Continuous Tx 5745MHz, (Ch.149) |
| **Deviations:** | No deviations. |
| **Comments:** | Aeon C627-510004A antennas with 4 inch antenna cables. 12 inch ribbon cable: small donut ferrites on Antenna cables with two turns: |

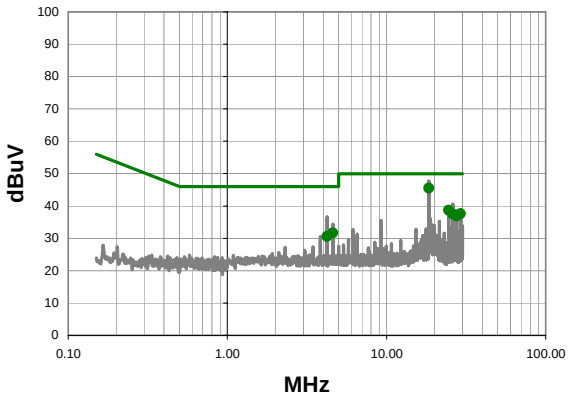
| **Test Specifications** | **Test Method** |
|---|---|
| FCC 15.207:2010 | ANSI C63.10:2009 |

| **Run #** | 20 | **Line:** | Neutral | **Ext. Attenuation:** | 20 | **Results** | Pass |
|---|---|---|---|---|---|---|---|

**Quasi Peak Data - vs - Quasi Peak Limit**




**Average Data - vs - Average Limit**




Quasi Peak Data - vs - Quasi Peak Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.434 | 26.5 | 20.8 | 47.3 | 60.0 | -12.7 |
| 4.224 | 17.0 | 20.2 | 37.2 | 56.0 | -18.8 |
| 26.114 | 19.4 | 21.2 | 40.6 | 60.0 | -19.4 |
| 4.608 | 16.2 | 20.3 | 36.5 | 56.0 | -19.6 |
| 24.576 | 18.2 | 21.1 | 39.3 | 60.0 | -20.7 |
| 29.186 | 17.5 | 21.4 | 38.9 | 60.0 | -21.1 |
| 27.650 | 17.6 | 21.3 | 38.9 | 60.0 | -21.1 |

Average Data - vs - Average Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.434 | 24.7 | 20.8 | 45.5 | 50.0 | -4.5 |
| 24.576 | 17.5 | 21.1 | 38.6 | 50.0 | -11.4 |
| 29.186 | 16.1 | 21.4 | 37.5 | 50.0 | -12.5 |
| 26.114 | 16.3 | 21.2 | 37.5 | 50.0 | -12.5 |
| 27.650 | 15.6 | 21.3 | 36.9 | 50.0 | -13.1 |
| 4.608 | 11.4 | 20.3 | 31.7 | 46.0 | -14.4 |
| 4.224 | 10.3 | 20.2 | 30.5 | 46.0 | -15.5 |

NORTHWEST

# EMC

## AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2010.04.06
Version 2010.3.17

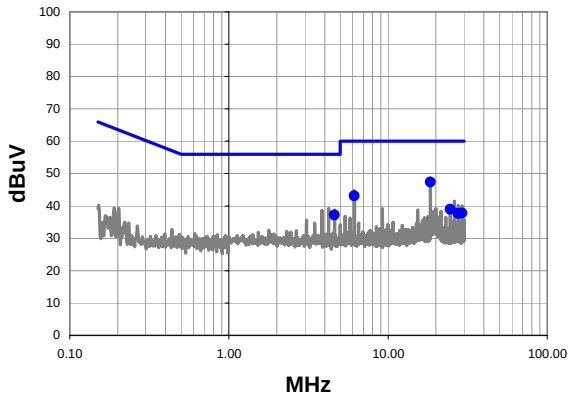
| | | | | | |
|---|---|---|---|---|---|
| **Work Order:** | FOCU0081 | **Date:** | 07/21/10 | | |
| **Project:** | None | **Temperature:** | 24.4 °C | | |
| **Job Site:** | EV07 | **Humidity:** | 44.7 | | |
| **Serial Number:** | 0265 | **Barometric Pres.:** | 1015.9 mb | **Tested by:** | Dan Haas |

| | |
|---|---|
| **EUT:** | Summit FS848 Master Module (Wheeler) |
| **Configuration:** | 4 - AC powerline conducted emissions |
| **Customer:** | Summit Semiconductor LLC |
| **Attendees:** | None |
| **EUT Power:** | 120VAC/60Hz |
| **Operating Mode:** | Continuous Tx 5785MHz, (Ch.157) |
| **Deviations:** | No deviations. |
| **Comments:** | Aeon C627-510004A antennas with 4 inch antenna cables. 12 inch ribbon cable: small donut ferrites on Antenna cables with two turns: |

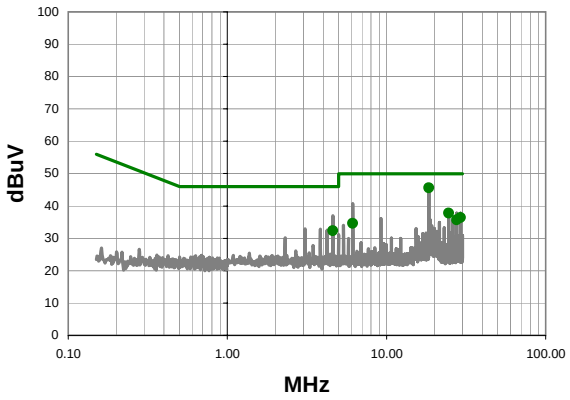
| **Test Specifications** | **Test Method** |
|---|---|
| FCC 15.207:2010 | ANSI C63.10:2009 |

| **Run #** | 21 | **Line:** | High Line | **Ext. Attenuation:** | 20 | **Results** | Pass |
|---|---|---|---|---|---|---|---|

**Quasi Peak Data - vs - Quasi Peak Limit**




**Average Data - vs - Average Limit**




Quasi Peak Data - vs - Quasi Peak Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.432 | 26.6 | 20.8 | 47.4 | 60.0 | -12.6 |
| 6.144 | 22.8 | 20.3 | 43.1 | 60.0 | -16.9 |
| 4.608 | 16.9 | 20.3 | 37.2 | 56.0 | -18.9 |
| 24.576 | 17.8 | 21.1 | 38.9 | 60.0 | -21.1 |
| 29.186 | 16.3 | 21.4 | 37.7 | 60.0 | -22.3 |
| 27.650 | 16.4 | 21.3 | 37.7 | 60.0 | -22.3 |

Average Data - vs - Average Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.432 | 24.8 | 20.8 | 45.6 | 50.0 | -4.4 |
| 24.576 | 16.6 | 21.1 | 37.7 | 50.0 | -12.3 |
| 29.186 | 15.0 | 21.4 | 36.4 | 50.0 | -13.6 |
| 4.608 | 12.1 | 20.3 | 32.4 | 46.0 | -13.7 |
| 27.650 | 14.4 | 21.3 | 35.7 | 50.0 | -14.3 |
| 6.144 | 14.3 | 20.3 | 34.6 | 50.0 | -15.4 |

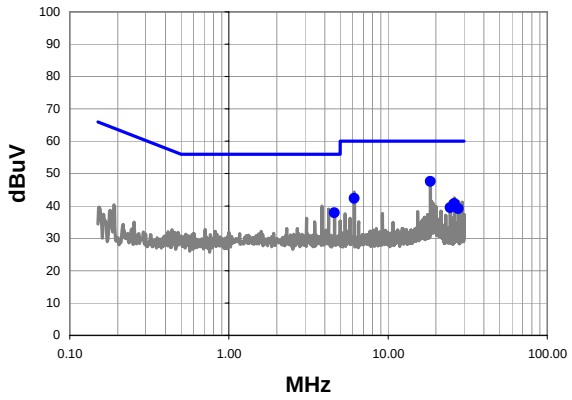
# AC POWERLINE CONDUCTED EMISSIONS

| | | | | | |
|---|---|---|---|---|---|
| **Work Order:** | FOCU0081 | **Date:** | 07/21/10 | | |
| **Project:** | None | **Temperature:** | 24.4 °C | | |
| **Job Site:** | EV07 | **Humidity:** | 44.7 | | |
| **Serial Number:** | 0265 | **Barometric Pres.:** | 1015.9 mb | **Tested by:** | Dan Haas |
| **EUT:** | Summit FS848 Master Module (Wheeler) | | | | |
| **Configuration:** | 4 - AC powerline conducted emissions | | | | |
| **Customer:** | Summit Semiconductor LLC | | | | |
| **Attendees:** | None | | | | |
| **EUT Power:** | 120VAC/60Hz | | | | |
| **Operating Mode:** | Continuous Tx 5785MHz, (Ch.157) | | | | |
| **Deviations:** | No deviations. | | | | |
| **Comments:** | Aeon C627-510004A antennas with 4 inch antenna cables. 12 inch ribbon cable: small donut ferrites on Antenna cables with two turns: | | | | |

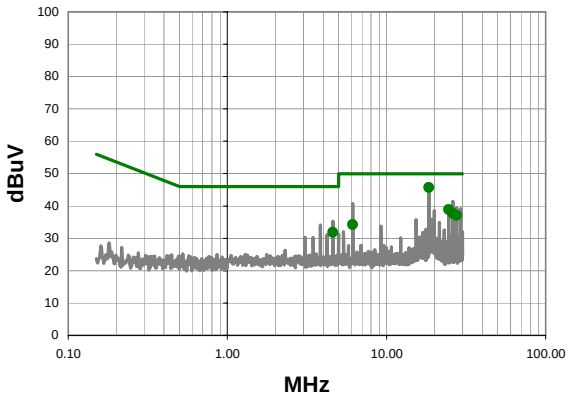
| **Test Specifications** | **Test Method** |
|---|---|
| FCC 15.207:2010 | ANSI C63.10:2009 |

| **Run #** | 22 | **Line:** | Neutral | **Ext. Attenuation:** | 20 | **Results** | Pass |
|---|---|---|---|---|---|---|---|

**Quasi Peak Data - vs - Quasi Peak Limit**




**Average Data - vs - Average Limit**




Quasi Peak Data - vs - Quasi Peak Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.432 | 26.8 | 20.8 | 47.6 | 60.0 | -12.4 |
| 6.144 | 22.1 | 20.3 | 42.4 | 60.0 | -17.6 |
| 4.608 | 17.6 | 20.3 | 37.9 | 56.0 | -18.2 |
| 26.114 | 19.5 | 21.2 | 40.7 | 60.0 | -19.3 |
| 24.576 | 18.3 | 21.1 | 39.4 | 60.0 | -20.6 |
| 27.650 | 17.9 | 21.3 | 39.2 | 60.0 | -20.8 |

Average Data - vs - Average Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.432 | 24.9 | 20.8 | 45.7 | 50.0 | -4.3 |
| 24.576 | 17.7 | 21.1 | 38.8 | 50.0 | -11.2 |
| 26.114 | 16.5 | 21.2 | 37.7 | 50.0 | -12.3 |
| 27.650 | 15.8 | 21.3 | 37.1 | 50.0 | -12.9 |
| 4.608 | 11.6 | 20.3 | 31.9 | 46.0 | -14.2 |
| 6.144 | 13.9 | 20.3 | 34.2 | 50.0 | -15.8 |

NORTHWEST

# EMC

## AC POWERLINE CONDUCTED EMISSIONS

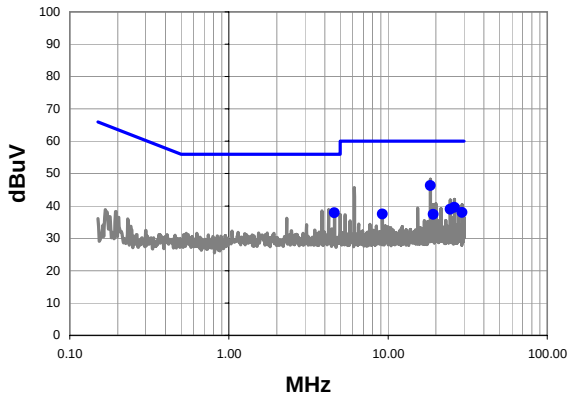
PSA-ESCI 2010.04.06
Version 2010.3.17

| | | | | | |
|---|---|---|---|---|---|
| **Work Order:** | FOCU0081 | **Date:** | 07/21/10 | | |
| **Project:** | None | **Temperature:** | 24.4 °C | | |
| **Job Site:** | EV07 | **Humidity:** | 44.7 | | |
| **Serial Number:** | 0265 | **Barometric Pres.:** | 1015.9 mb | **Tested by:** | Dan Haas |
| **EUT:** | Summit FS848 Master Module (Wheeler) | | | | |
| **Configuration:** | 4 - AC powerline conducted emissions | | | | |
| **Customer:** | Summit Semiconductor LLC | | | | |
| **Attendees:** | None | | | | |
| **EUT Power:** | 120VAC/60Hz | | | | |
| **Operating Mode:** | Continuous Tx 5825MHz, (Ch.165) | | | | |
| **Deviations:** | No deviations. | | | | |
| **Comments:** | Aeon C627-510004A antennas with 4 inch antenna cables. 12 inch ribbon cable: small donut ferrites on Antenna cables with two turns: | | | | |

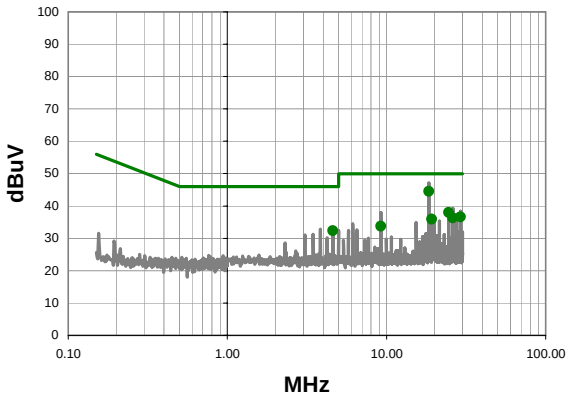
| **Test Specifications** | **Test Method** |
|---|---|
| FCC 15.207:2010 | ANSI C63.10:2009 |

| **Run #** | 23 | **Line:** | High Line | **Ext. Attenuation:** | 20 | **Results** | Pass |
|---|---|---|---|---|---|---|---|

**Quasi Peak Data - vs - Quasi Peak Limit**




**Average Data - vs - Average Limit**




Quasi Peak Data - vs - Quasi Peak Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.434 | 25.5 | 20.8 | 46.3 | 60.0 | -13.7 |
| 4.608 | 17.6 | 20.3 | 37.9 | 56.0 | -18.2 |
| 26.114 | 18.3 | 21.2 | 39.5 | 60.0 | -20.5 |
| 24.576 | 17.8 | 21.1 | 38.9 | 60.0 | -21.1 |
| 29.186 | 16.5 | 21.4 | 37.9 | 60.0 | -22.1 |
| 9.216 | 17.1 | 20.4 | 37.5 | 60.0 | -22.5 |
| 19.200 | 16.5 | 20.9 | 37.4 | 60.0 | -22.6 |

Average Data - vs - Average Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.434 | 23.7 | 20.8 | 44.5 | 50.0 | -5.5 |
| 24.576 | 16.8 | 21.1 | 37.9 | 50.0 | -12.1 |
| 29.186 | 15.2 | 21.4 | 36.6 | 50.0 | -13.4 |
| 4.608 | 12.1 | 20.3 | 32.4 | 46.0 | -13.7 |
| 26.114 | 15.1 | 21.2 | 36.3 | 50.0 | -13.7 |
| 19.200 | 15.0 | 20.9 | 35.9 | 50.0 | -14.1 |
| 9.216 | 13.3 | 20.4 | 33.7 | 50.0 | -16.3 |

NORTHWEST

# EMC

## AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2010.04.06
Version 2010.3.17

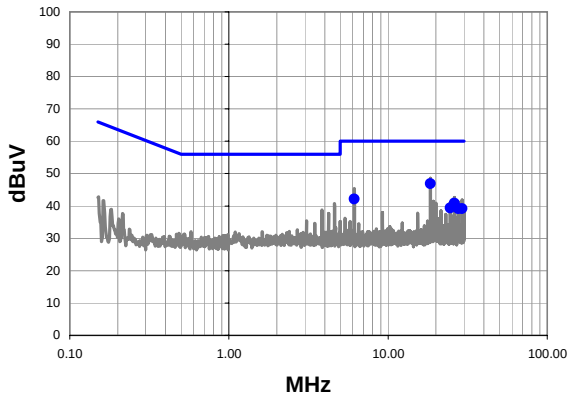
| | | | | | |
|---|---|---|---|---|---|
| **Work Order:** | FOCU0081 | **Date:** | 07/21/10 | | |
| **Project:** | None | **Temperature:** | 24.4 °C | | |
| **Job Site:** | EV07 | **Humidity:** | 44.7 | | |
| **Serial Number:** | 0265 | **Barometric Pres.:** | 1015.9 mb | **Tested by:** | Dan Haas |

| | |
|---|---|
| **EUT:** | Summit FS848 Master Module (Wheeler) |
| **Configuration:** | 4 - AC powerline conducted emissions |
| **Customer:** | Summit Semiconductor LLC |
| **Attendees:** | None |
| **EUT Power:** | 120VAC/60Hz |
| **Operating Mode:** | Continuous Tx 5825MHz, (Ch.165) |
| **Deviations:** | No deviations. |
| **Comments:** | Aeon C627-510004A antennas with 4 inch antenna cables. 12 inch ribbon cable: small donut ferrites on Antenna cables with two turns: |

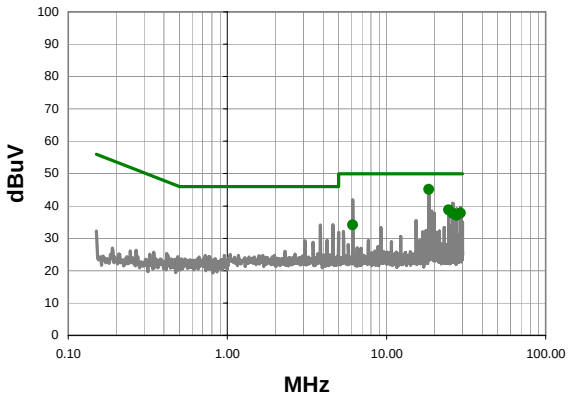
| **Test Specifications** | **Test Method** |
|---|---|
| FCC 15.207:2010 | ANSI C63.10:2009 |

| **Run #** | 24 | **Line:** | Neutral | **Ext. Attenuation:** | 20 | **Results** | Pass |
|---|---|---|---|---|---|---|---|

**Quasi Peak Data - vs - Quasi Peak Limit**




**Average Data - vs - Average Limit**




Quasi Peak Data - vs - Quasi Peak Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.434 | 26.1 | 20.8 | 46.9 | 60.0 | -13.1 |
| 6.144 | 21.9 | 20.3 | 42.2 | 60.0 | -17.8 |
| 26.114 | 19.6 | 21.2 | 40.8 | 60.0 | -19.2 |
| 24.576 | 18.2 | 21.1 | 39.3 | 60.0 | -20.7 |
| 27.650 | 17.9 | 21.3 | 39.2 | 60.0 | -20.8 |
| 29.186 | 17.7 | 21.4 | 39.1 | 60.0 | -20.9 |

Average Data - vs - Average Limit

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Compared to Spec. (dB) |
|---|---|---|---|---|---|
| 18.434 | 24.3 | 20.8 | 45.1 | 50.0 | -4.9 |
| 24.576 | 17.6 | 21.1 | 38.7 | 50.0 | -11.3 |
| 29.186 | 16.3 | 21.4 | 37.7 | 50.0 | -12.3 |
| 26.114 | 16.5 | 21.2 | 37.7 | 50.0 | -12.3 |
| 27.650 | 15.8 | 21.3 | 37.1 | 50.0 | -12.9 |
| 6.144 | 13.8 | 20.3 | 34.1 | 50.0 | -15.9 |