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## Report On

FCC Testing of the Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS in accordance with FCC CFR 47 Part 15C (WLAN and Bluetooth Low Energy)

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FCC ID: APYHRO00206

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May 2014



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COMMERCIAL-IN-CONFIDENCE

**REPORT ON**

FCC Testing of the Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS in accordance with FCC CFR 47 Part 15C (WLAN and Bluetooth Low Energy)

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May 2014

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**DATED**

12 May 2014

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**ENGINEERING STATEMENT**

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15C. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

T Guy

S Milliken



G Lawler

A Galpin

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## **SECTION 1**

### **REPORT SUMMARY**

FCC Testing of the  
Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM  
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE  
(B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN,  
SRD (NFC, FeliCa) and GPS  
In accordance with FCC CFR 47 Part 15C (WLAN and Bluetooth Low Energy)



## 1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS to the requirements of FCC CFR 47 Part 15C.

|                                |                                                                                                                                                     |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective                      | To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out. |
| Manufacturer                   | Sharp Corporation                                                                                                                                   |
| Model Number(s)                | SHL25                                                                                                                                               |
| Serial Number(s)               | IMEI 004401115170249<br>IMEI 004401115170488<br>IMEI 004401115170645<br>IMEI 004401115170256                                                        |
| Number of Samples Tested       | 4                                                                                                                                                   |
| Test Specification/Issue/Date  | FCC CFR 47 Part 15C (2013)                                                                                                                          |
| Incoming Release Date          | Application Form<br>24 March 2014                                                                                                                   |
| Disposal Reference Number Date | Held Pending Disposal<br>Not Applicable<br>Not Applicable                                                                                           |
| Order Number Date              | 10070<br>10 March 2014                                                                                                                              |
| Start of Test                  | 31 March 2014                                                                                                                                       |
| Finish of Test                 | 28 April 2014                                                                                                                                       |
| Name of Engineer(s)            | T Guy<br>S Milliken<br>G Lawler<br>A Galpin                                                                                                         |
| Related Document(s)            | ANSI C63.10: 2009                                                                                                                                   |



## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15C is shown below.

| Section   | Spec Clause   | Test Description                    | Result | Comments/Base Standard |
|-----------|---------------|-------------------------------------|--------|------------------------|
| 802.11(b) |               |                                     |        |                        |
| 2.1       | 15.207        | AC Line Conducted Emissions         | Pass   |                        |
| 2.2       | 15.247 (a)(2) | 6dB Bandwidth                       | Pass   |                        |
| 2.3       | 15.247 (b)(3) | Maximum Peak Conducted Output Power | Pass   |                        |
| 2.4       | 15.247 (b)(4) | EIRP Peak Power                     | Pass   |                        |
| 2.5       | 15.247 (d)    | Spurious and Band Edge Emissions    | Pass   |                        |
| 2.6       | 15.247 (e)    | Power Spectral Density              | Pass   |                        |
| 802.11(g) |               |                                     |        |                        |
| 2.2       | 15.247 (a)(2) | 6dB Bandwidth                       | Pass   |                        |
| 2.3       | 15.247 (b)(3) | Maximum Peak Conducted Output Power | Pass   |                        |
| 2.4       | 15.247 (b)(4) | EIRP Peak Power                     | Pass   |                        |
| 2.5       | 15.247 (d)    | Spurious and Band Edge Emissions    | Pass   |                        |
| 2.6       | 15.247 (e)    | Power Spectral Density              | Pass   |                        |
| 802.11(n) |               |                                     |        |                        |
| 2.2       | 15.247 (a)(2) | 6dB Bandwidth                       | Pass   |                        |
| 2.3       | 15.247 (b)(3) | Maximum Peak Conducted Output Power | Pass   |                        |
| 2.4       | 15.247 (b)(4) | EIRP Peak Power                     | Pass   |                        |
| 2.5       | 15.247 (d)    | Spurious and Band Edge Emissions    | Pass   |                        |
| 2.6       | 15.247 (e)    | Power Spectral Density              | Pass   |                        |



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| Section              | Spec Clause   | Test Description                    | Result | Comments/Base Standard |
|----------------------|---------------|-------------------------------------|--------|------------------------|
| Bluetooth Low Energy |               |                                     |        |                        |
| 2.2                  | 15.247 (a)(2) | 6dB Bandwidth                       | Pass   |                        |
| 2.3                  | 15.247 (b)(3) | Maximum Peak Conducted Output Power | Pass   |                        |
| 2.4                  | 15.247 (b)(4) | EIRP Peak Power                     | Pass   |                        |
| 2.5                  | 15.247 (d)    | Spurious and Band Edge Emissions    | Pass   |                        |
| 2.6                  | 15.247 (e)    | Power Spectral Density              | Pass   |                        |



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### 1.3 APPLICATION FORM

| EQUIPMENT DESCRIPTION                                                                           |                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model Name/Number                                                                               | SHL25                                                                                                                                                                                        |
| Part Number                                                                                     | CA268                                                                                                                                                                                        |
| FCC ID (if applicable)                                                                          | APYHRO00206                                                                                                                                                                                  |
| Industry Canada ID (if applicable)                                                              | N/A                                                                                                                                                                                          |
| Technical Description (Please provide a brief description of the intended use of the equipment) | Quad-band LTE(B1/B3/B17/B18), Dual-band WCDMA(FDD-I/V), Quad-band GSM(850/900/1800/1900), Dual-band CDMA2000(800MHz_BC0, 1900MHz_BC6), Multimode Smartphone with BT, ANT+, WLAN, SRD and GPS |

| EXTREME TEMPERATURE RANGE over which the equipment is to be type tested |                                                          |
|-------------------------------------------------------------------------|----------------------------------------------------------|
| <input type="checkbox"/>                                                | -20°C to +55°C                                           |
| <input checked="" type="checkbox"/>                                     | Other (2)                                                |
| <input type="checkbox"/>                                                | Not applicable (no extreme temperature testing required) |
| Extreme temperature range for the host(s): -10C to 55C                  |                                                          |

- (2) The equipment shall be tested over the following temperature ranges :
- 0°C to +35°C for equipment for indoor use only, or intended for used in areas where the temperature is controlled within this range.
  - Over the extremes of the temperature range(s) of the declared host equipment(s) in case of plug-in radio devices.

| TYPE OF ANTENNA                                                                                      |                                               |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <input checked="" type="checkbox"/>                                                                  | Integral                                      |
| Temporary RF connector provided: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |                                               |
| <input type="checkbox"/>                                                                             | Antenna connector                             |
| <input type="checkbox"/>                                                                             | Number of antenna assembly(ies) submitted     |
| Gain of the antenna intended for normal use:                                                         |                                               |
| 0                                                                                                    | dBi for assembly identified as Bluetooth/WLAN |
|                                                                                                      | dBi for assembly identified as                |
|                                                                                                      | dBi for assembly identified as                |
|                                                                                                      | dBi for assembly identified as                |
|                                                                                                      | dBi for assembly identified as                |

| TRANSMITTER TECHNICAL CHARACTERISTICS             |                            |                  |
|---------------------------------------------------|----------------------------|------------------|
| TRANSMITTER OPERATING FREQUENCY RANGE(S)          |                            |                  |
|                                                   | FCC and/or Industry Canada | EU               |
| Bluetooth                                         | 2402 to 2480 MHz           | 2402 to 2480 MHz |
| WLAN                                              | 2412 to 2462 MHz           | 2412 to 2472 MHz |
| FCC and/or Industry Canada (only)                 |                            |                  |
| Highest Internally Generated Frequency 2150.4 MHz |                            |                  |



| SPREAD SPECTRUM PARAMETERS                                                                                                                           |                                                                         |                         |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------|------|
| <input checked="" type="checkbox"/> <b>Bluetooth</b>                                                                                                 | Version: 4.0                                                            |                         |      |
| FHSS: Channel <input checked="" type="checkbox"/> 79 Other                                                                                           | EDR <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |                         |      |
| <b>Medium Access Protocol (Customer Declaration)</b>                                                                                                 |                                                                         |                         |      |
| "We have implemented Bluetooth protocol which satisfies the medium access protocol requirement of EN 300 328".                                       |                                                                         |                         |      |
| <input checked="" type="checkbox"/> <b>WLAN</b>                                                                                                      |                                                                         |                         |      |
| IEEE 802.11(b) – DSSS <input checked="" type="checkbox"/>                                                                                            |                                                                         |                         |      |
| IEEE 802.11(g) – OFDM <input checked="" type="checkbox"/>                                                                                            |                                                                         |                         |      |
| IEEE 802.11(n) – OFDM <input checked="" type="checkbox"/>                                                                                            |                                                                         |                         |      |
| Supported Spatial Streams                                                                                                                            |                                                                         | 2.4 GHz                 | 5GHz |
|                                                                                                                                                      | Transmitter (Tx)                                                        | 1                       | 1    |
|                                                                                                                                                      | Receiver (Rx)                                                           | 1                       | 1    |
| GI (Guard Interval) <input checked="" type="checkbox"/> 800 ns <input type="checkbox"/> 400 ns                                                       |                                                                         |                         |      |
| Band Width <input checked="" type="checkbox"/> 20 MHz <input type="checkbox"/> 40 MHz                                                                |                                                                         |                         |      |
| <b>Medium Access Protocol (Customer Declaration)</b>                                                                                                 |                                                                         |                         |      |
| "We have implemented IEEE 802.11 (b/g/n) protocol which satisfies the medium access protocol requirement of EN 300 328".                             |                                                                         |                         |      |
| <input type="checkbox"/> <b>Other Technology</b>                                                                                                     |                                                                         |                         |      |
| <input type="checkbox"/> Direct Sequence <input type="checkbox"/> Frequency Hopping <input type="checkbox"/> Combined <input type="checkbox"/> Other |                                                                         |                         |      |
| DSSS                                                                                                                                                 | Chip Sequence Length                                                    | bit                     |      |
|                                                                                                                                                      | Spectrum Width                                                          | MHz                     |      |
| FHSS                                                                                                                                                 | Total Number of Hops                                                    |                         |      |
|                                                                                                                                                      | Dwell Time                                                              | ms                      |      |
|                                                                                                                                                      | Bandwidth Per Hop                                                       | MHz                     |      |
|                                                                                                                                                      | Maximum Separation of Hops                                              | MHz for ETSI EN 300 328 |      |
| Other                                                                                                                                                |                                                                         |                         |      |
| <b>Medium Access Protocol (Customer Declaration)</b>                                                                                                 |                                                                         |                         |      |
| "We have implemented a protocol which satisfies the medium access protocol requirement of EN 300 328".                                               |                                                                         |                         |      |



| TRANSMITTER POWER CHARACTERISTICS                               |                                     |                                     |                                  |                             |
|-----------------------------------------------------------------|-------------------------------------|-------------------------------------|----------------------------------|-----------------------------|
| <b>Bluetooth</b>                                                |                                     |                                     |                                  |                             |
| Maximum Rated Transmitter Output                                |                                     |                                     |                                  |                             |
| Effective radiated power (for equipment with antenna connector) |                                     | W                                   |                                  |                             |
| Effective radiated power (for equipment with integral antenna)  |                                     | 5.0m W                              |                                  |                             |
| Minimum Rated Transmitter Output                                |                                     |                                     |                                  |                             |
| Effective radiated power (for equipment with antenna connector) |                                     | W                                   |                                  |                             |
| Effective radiated power (for equipment with integral antenna)  |                                     | 1.0m W                              |                                  |                             |
| Is transmitter intended for :                                   |                                     |                                     |                                  |                             |
| Continuous duty                                                 | <input checked="" type="checkbox"/> | Yes                                 | <input type="checkbox"/>         | No                          |
| Intermittent duty                                               | <input type="checkbox"/>            | Yes                                 | <input type="checkbox"/>         | No                          |
| If intermittent state DUTY CYCLE                                |                                     |                                     |                                  |                             |
| Transmitter ON                                                  | seconds                             | Transmitter OFF                     | minutes                          |                             |
| Is continuous operation possible for testing purposes?          |                                     | <input checked="" type="checkbox"/> | Yes                              | <input type="checkbox"/> No |
| Is transmitter output power variable:                           |                                     | <input checked="" type="checkbox"/> | Yes                              | <input type="checkbox"/> No |
| State during the test:                                          |                                     |                                     |                                  |                             |
| Transmitter duty cycle                                          | Tx on                               | Seconds                             | Tx Off                           | Seconds                     |
| Duty cycle (Tx on / (Tx on + Tx off))                           |                                     | %                                   |                                  |                             |
| <input type="checkbox"/> Continuously variable                  |                                     |                                     | <input type="checkbox"/> Stepped |                             |
| dB per step                                                     |                                     |                                     |                                  |                             |
| <b>WLAN</b>                                                     |                                     |                                     |                                  |                             |
| Maximum Rated Transmitter Output                                |                                     |                                     |                                  |                             |
| Effective radiated power (for equipment with antenna connector) |                                     | W                                   |                                  |                             |
| Effective radiated power (for equipment with integral antenna)  |                                     | 0.1 W                               |                                  |                             |
| Minimum Rated Transmitter Output                                |                                     |                                     |                                  |                             |
| Effective radiated power (for equipment with antenna connector) |                                     | W                                   |                                  |                             |
| Effective radiated power (for equipment with integral antenna)  |                                     | W                                   |                                  |                             |
| Is transmitter intended for :                                   |                                     |                                     |                                  |                             |
| Continuous duty                                                 | <input checked="" type="checkbox"/> | Yes                                 | <input type="checkbox"/>         | No                          |
| Intermittent duty                                               | <input type="checkbox"/>            | Yes                                 | <input type="checkbox"/>         | No                          |
| If intermittent state DUTY CYCLE                                |                                     |                                     |                                  |                             |
| Transmitter ON                                                  | seconds                             | Transmitter OFF                     | minutes                          |                             |
| Is continuous operation possible for testing purposes?          |                                     | <input checked="" type="checkbox"/> | Yes                              | <input type="checkbox"/> No |
| Is transmitter output power variable:                           |                                     | <input checked="" type="checkbox"/> | Yes                              | <input type="checkbox"/> No |
| State during the test:                                          |                                     |                                     |                                  |                             |
| Transmitter duty cycle                                          | Tx on                               | Seconds                             | Tx Off                           | Seconds                     |
| Duty cycle (Tx on / (Tx on + Tx off))                           |                                     | %                                   |                                  |                             |
| <input type="checkbox"/> Continuously variable                  |                                     |                                     | <input type="checkbox"/> Stepped |                             |
| dB per step                                                     |                                     |                                     |                                  |                             |



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| TRANSMITTER POWER SOURCE (3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| <input checked="" type="checkbox"/> Common power source for transmitter and receiver                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |  |  |
| <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> AC mains<br/>           AC supply frequency (Hz)<br/> <input type="checkbox"/> Single phase<br/>           And / Or<br/> <input type="checkbox"/> External DC supply<br/>           Nominal voltage<br/>           Extreme upper voltage<br/>           Battery<br/> <input type="checkbox"/> Nickel Cadmium<br/> <input type="checkbox"/> Lead acid (Vehicle regulated)<br/> <input type="checkbox"/> Alkaline<br/> <input checked="" type="checkbox"/> Lithium<br/> <input type="checkbox"/> Other Details :<br/>           4.0 Volts nominal.<br/>           End point voltage as quoted by equipment manufacturer         </div> <div>           State voltage<br/>           VAC<br/> <br/>           Max Current<br/> <br/>           Max Current<br/>           Extreme lower voltage<br/> <br/>           3.7 V         </div> <div> <br/>           Hz<br/> <input type="checkbox"/> Three phase<br/> <br/>           A         </div> </div> |  |  |  |  |

(3) If a transmitter and receiver use the same power source, this should be declared. In such cases only the box for the transmitter power source should be filled in.

| AUTOMATIC EQUIPMENT SWITCH OFF                                                                                                                                                                                   |                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated. |                        |
| <input checked="" type="checkbox"/> Applies                                                                                                                                                                      | 3.35 V cut-off voltage |
| <input type="checkbox"/> Does not apply                                                                                                                                                                          |                        |



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| RECEIVER POWER SOURCE (4)                              |                |                                      |             |    |
|--------------------------------------------------------|----------------|--------------------------------------|-------------|----|
| <input type="checkbox"/> AC mains                      | State voltage  |                                      |             |    |
| AC supply frequency                                    | (Hz)           | VAC                                  | Max Current | Hz |
| <input type="checkbox"/> Single phase                  |                | <input type="checkbox"/> Three phase |             |    |
| And / Or                                               |                |                                      |             |    |
| <input type="checkbox"/> External DC supply            |                |                                      |             |    |
| Nominal voltage                                        |                | Max Current                          |             | A  |
| Extreme upper voltage                                  |                | Extreme lower voltage                |             |    |
| Battery                                                |                |                                      |             |    |
| <input type="checkbox"/> Nickel Cadmium                |                |                                      |             |    |
| <input type="checkbox"/> Lead acid (Vehicle regulated) |                |                                      |             |    |
| <input type="checkbox"/> Alkaline                      |                |                                      |             |    |
| <input type="checkbox"/> Lithium                       |                |                                      |             |    |
| <input type="checkbox"/> Other Details :               |                |                                      |             |    |
|                                                        | Volts nominal. |                                      |             |    |
| End point voltage as quoted by equipment manufacturer  |                |                                      |             | V  |

(4) If a transmitter and receiver use the same power source, this should be declared. In such cases only the box for the transmitter power source should be filled in.

| AUTOMATIC EQUIPMENT SWITCH OFF                                                                                                                                                                                   |                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated. |                   |
| <input type="checkbox"/> Applies                                                                                                                                                                                 | V cut-off voltage |
| <input type="checkbox"/> Does not apply                                                                                                                                                                          |                   |

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature:

Name: Hiroyuki Murakami

Position held:

Supervisor

Date: 24<sup>th</sup> March, 2014



Product Service

## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was a Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

## **1.5 TEST CONDITIONS**

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 4.0 V DC supply.

FCC Measurement Facility Registration Number  
90987 Octagon House, Fareham Test Laboratory

## **1.6 DEVIATIONS FROM THE STANDARD**

No deviations from the applicable test standard or test plan were made during testing.

## **1.7 MODIFICATION RECORD**

Modification 0 - No modifications were made to the test sample during testing.



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## **SECTION 2**

### **TEST DETAILS**

FCC Testing of the  
Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM  
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE  
(B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN,  
SRD (NFC, FeliCa) and GPS  
In accordance with FCC CFR 47 Part 15C (WLAN and Bluetooth Low Energy)



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## **2.1 AC LINE CONDUCTED EMISSIONS**

### **2.1.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.207

### **2.1.2 Equipment Under Test and Modification State**

SHL25 S/N: IMEI 004401115170249 - Modification State 0

### **2.1.3 Date of Test**

19 April 2014

### **2.1.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.1.5 Test Procedure**

A test environment and testing arrangement meeting the specification of ANSI C63.4 was used during all testing. The Equipment Under Test (EUT) was set upon a non-conducting platform at an elevation of 80 cm above a horizontal reference ground plane. A vertical reference ground plane was situated 40 cm from the EUT and bonded to the horizontal reference ground plane.

The EUT was powered by a Line Impedance Stabilization Network (LISN), whereby emissions measurements of the current-carrying conductors were made through this LISN. The LISN was bonded to the horizontal reference ground plane with a separation distance greater than 80 cm from the EUT. A mains supply cable of 1 m length was used to supply mains power to the EUT from the LISN.

A preliminary emissions scan was conducted for each current-carrying conductor of the EUT, using a peak detector over a frequency range of 150 kHz to 30 MHz. At least six of the greatest peak emissions, frequency positions were selected from each preliminary emissions scan for further evaluation as final measuring points.

Final measurement points were measured using quasi-peak and average detectors. All final measurements were assessed against the emission limits in Clause 15.207 of FCC CFR 47 FCC Part 15.

### **2.1.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 19.7°C |
| Relative Humidity   | 27.0%  |

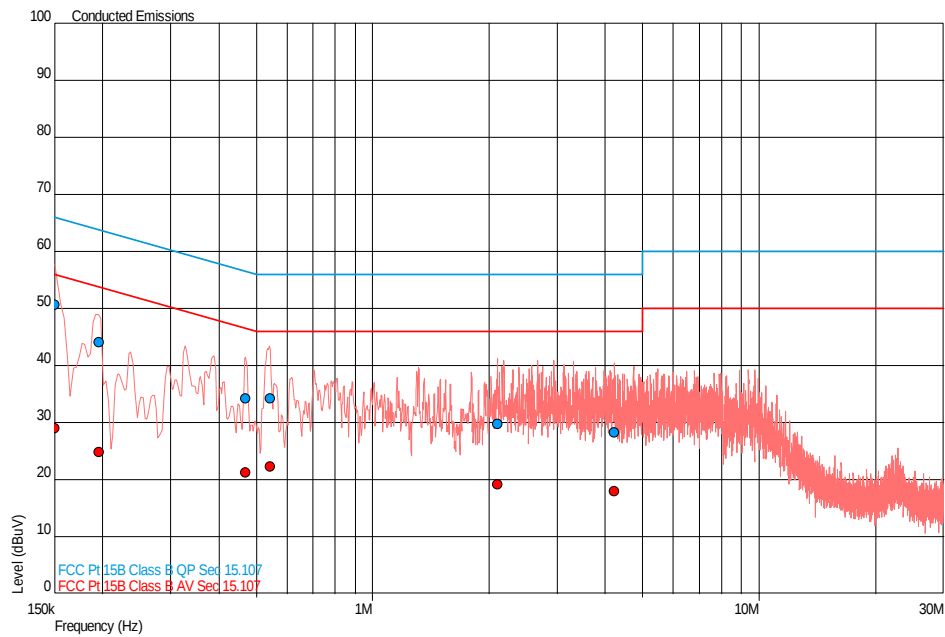


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## 2.1.7 Test Results

### 802.11(b)

#### Live Line

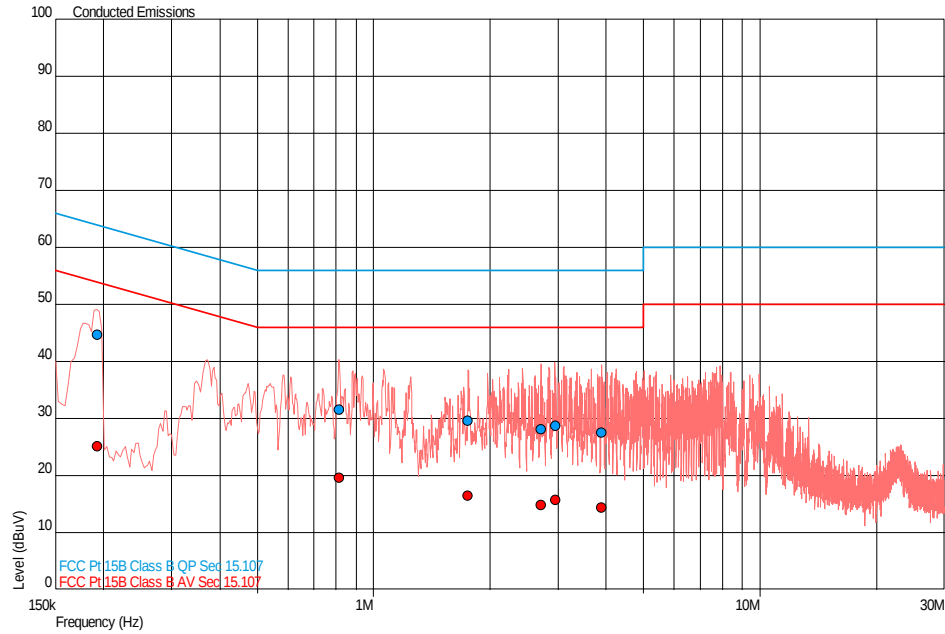


| Frequency (MHz) | QP Level (dBμV) | QP Limit (dBμV) | QP Margin (dBμV) | AV Level (dBμV) | AV Limit (dBμV) | AV Margin (dBμV) |
|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
| 0.150           | 50.7            | 66.0            | -15.3            | 29.1            | 56.0            | -26.9            |
| 0.196           | 44.2            | 63.8            | -19.6            | 24.9            | 53.8            | -28.9            |
| 0.470           | 34.3            | 56.5            | -22.2            | 21.3            | 46.5            | -25.3            |
| 0.544           | 34.3            | 56.0            | -21.7            | 22.3            | 46.0            | -23.7            |
| 2.102           | 29.7            | 56.0            | -26.3            | 19.2            | 46.0            | -26.8            |
| 4.225           | 28.3            | 56.0            | -27.7            | 18.1            | 46.0            | -27.9            |



Product Service

Neutral Line



| Frequency (MHz) | QP Level (dBµV) | QP Limit (dBµV) | QP Margin (dBµV) | AV Level (dBµV) | AV Limit (dBµV) | AV Margin (dBµV) |
|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
| 0.193           | 44.7            | 63.9            | -19.2            | 25.2            | 53.9            | -28.7            |
| 0.815           | 31.6            | 56.0            | -24.4            | 19.7            | 46.0            | -26.3            |
| 1.755           | 29.6            | 56.0            | -26.4            | 16.5            | 46.0            | -29.5            |
| 2.712           | 28.1            | 56.0            | -27.9            | 14.9            | 46.0            | -31.1            |
| 2.953           | 28.8            | 56.0            | -27.2            | 15.7            | 46.0            | -30.3            |
| 3.896           | 27.5            | 56.0            | -28.5            | 14.4            | 46.0            | -31.6            |



Product Service

## **2.2 6dB BANDWIDTH**

### **2.2.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.247 (a)(2)

### **2.2.2 Equipment Under Test and Modification State**

SHL25 S/N: IMEI 004401115170488 - Modification State 0

SHL25 S/N: IMEI 004401115170645 - Modification State 0

### **2.2.3 Date of Test**

31 March 2014, 24 April 2014 & 25 April 2014

### **2.2.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.2.5 Test Procedure**

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (a) and KDB 558074.

The EUT was transmitting at maximum power, for bottom, middle and top channels on all supported data rates. The EUT was connected to a spectrum analyser via a cable and attenuator. The Analyser settings were adjusted to an RBW of 100 kHz, video bandwidth of 3 x RBW with peak detector and trace set to max hold. The peak point of the trace was measured and the markers positioned to give the -6 dBc points of the displayed spectrum.

The plots on the following pages show the resultant display from the Spectrum Analyser.

### **2.2.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 23.1 - 23.5°C |
| Relative Humidity   | 39.3 - 40.5%  |

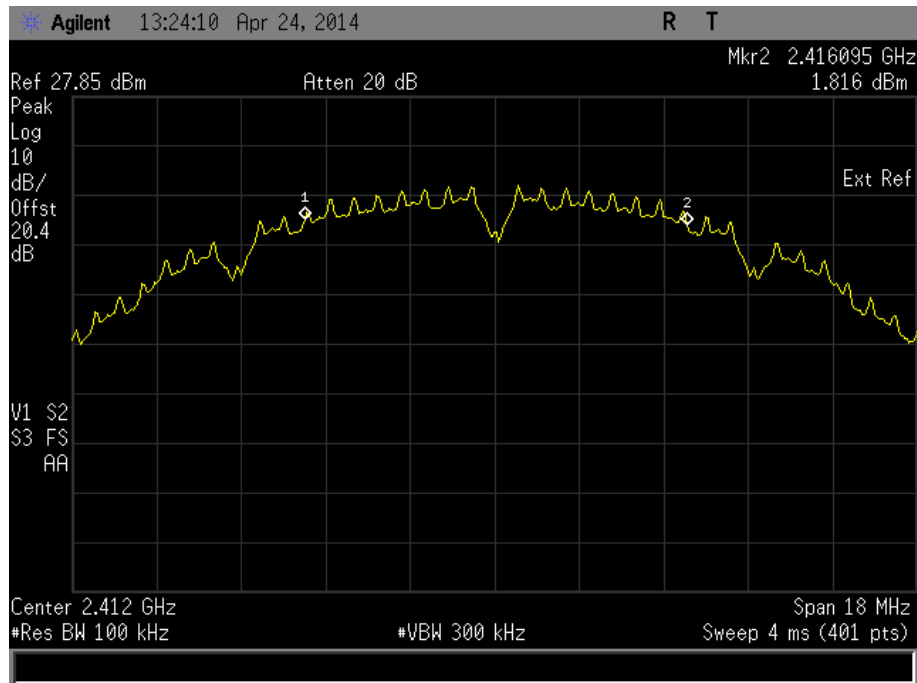
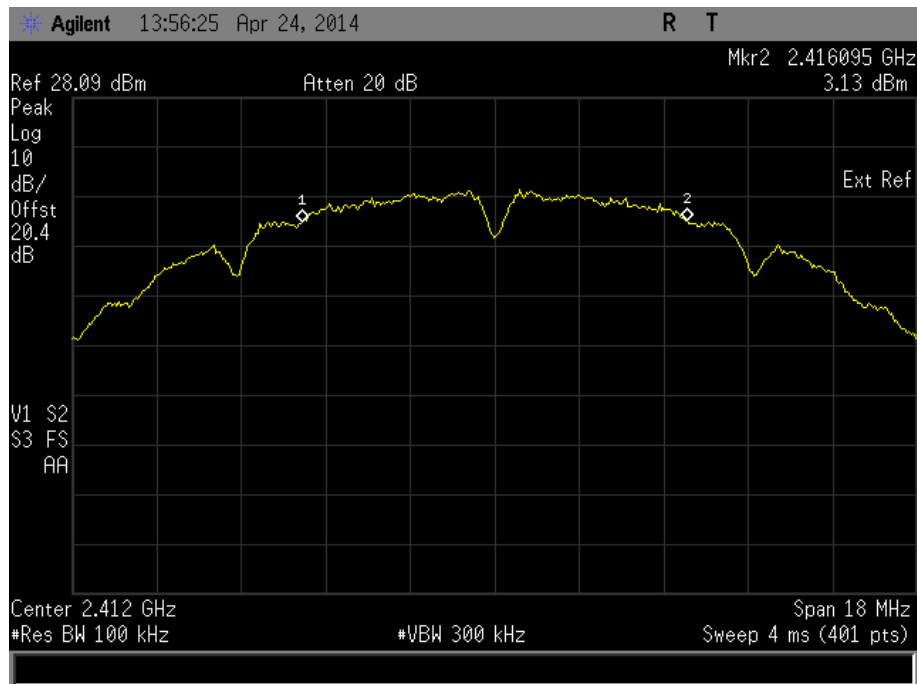
**2.2.7 Test Results**802.11(b)

4.0 V DC Supply

| Frequency (MHz) | Data Rate (Mbps) | 6dB Bandwidth (kHz) |
|-----------------|------------------|---------------------|
| 2412 MHz        | 1                | 8145                |
|                 | 2                | 8190                |
|                 | 5.5              | 8685                |
|                 | 11               | 8460                |
| 2437 MHz        | 1                | 8640                |
|                 | 2                | 8055                |
|                 | 5.5              | 8685                |
|                 | 11               | 8550                |
| 2462 MHz        | 1                | 8145                |
|                 | 2                | 8100                |
|                 | 5.5              | 8640                |
|                 | 11               | 8550                |

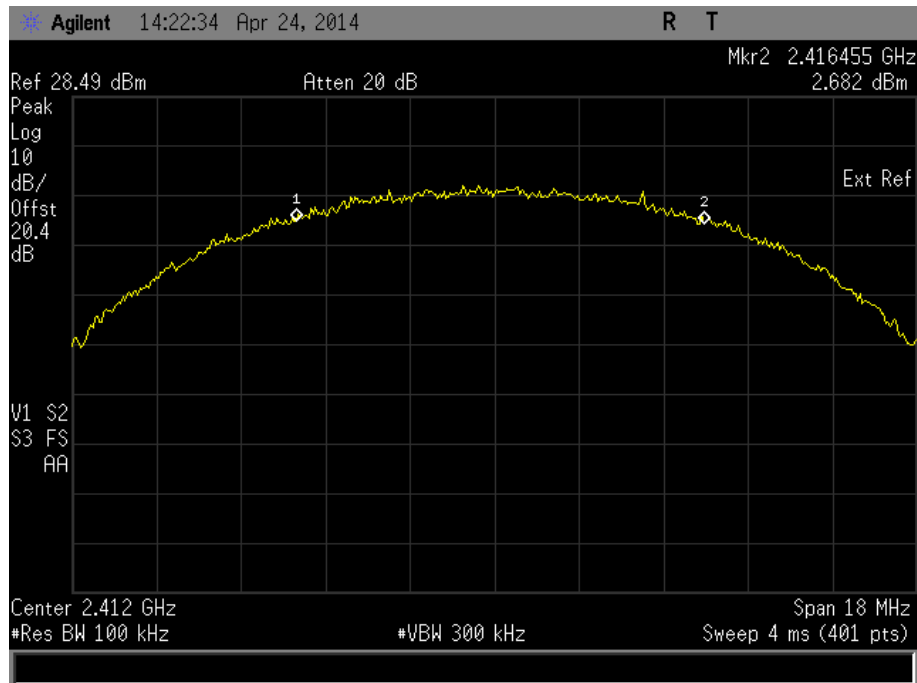
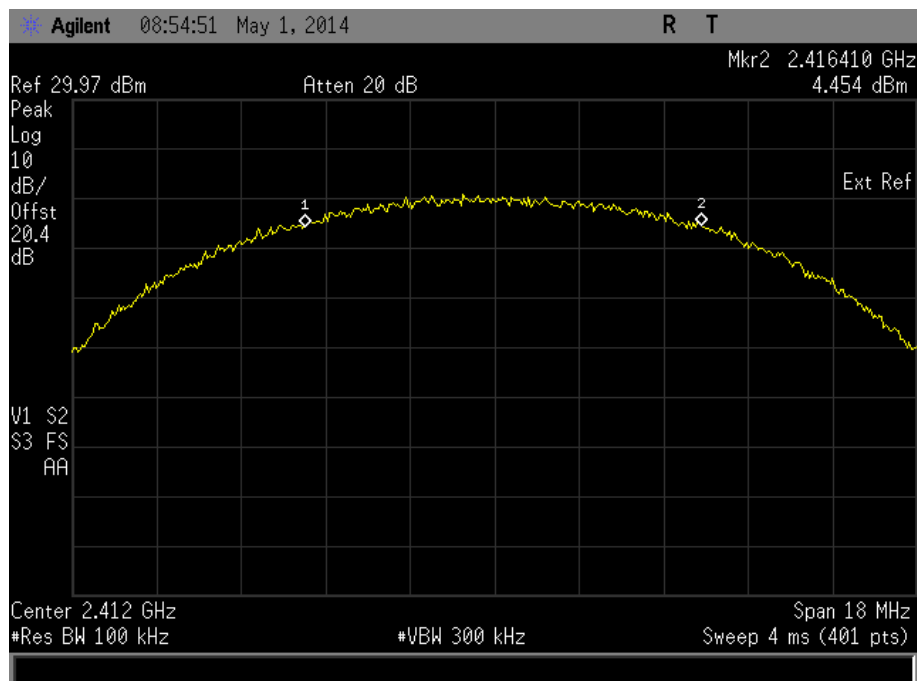


Product Service

2412 MHz1 Mbps2 Mbps

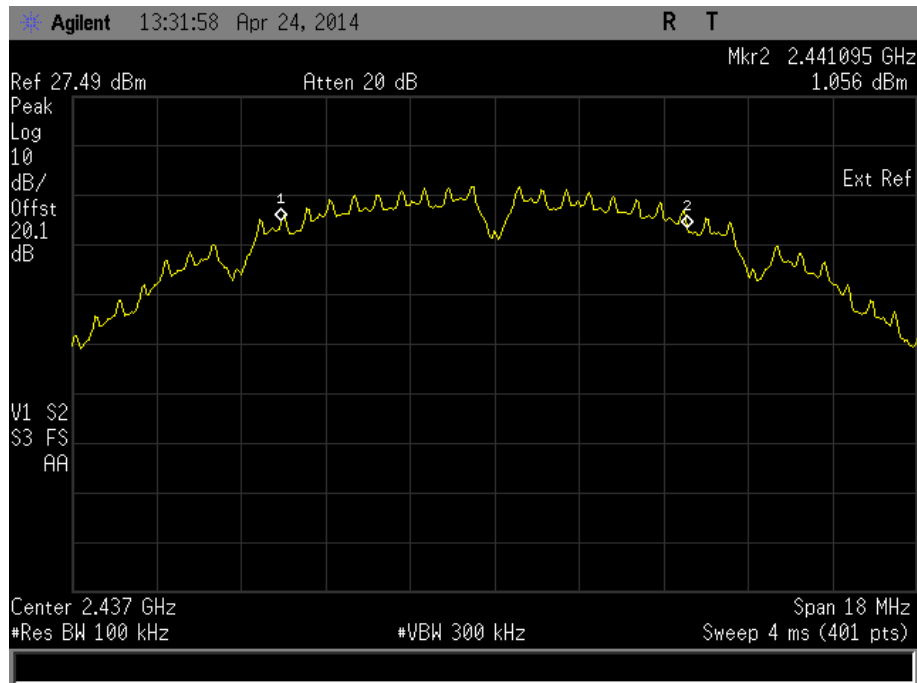
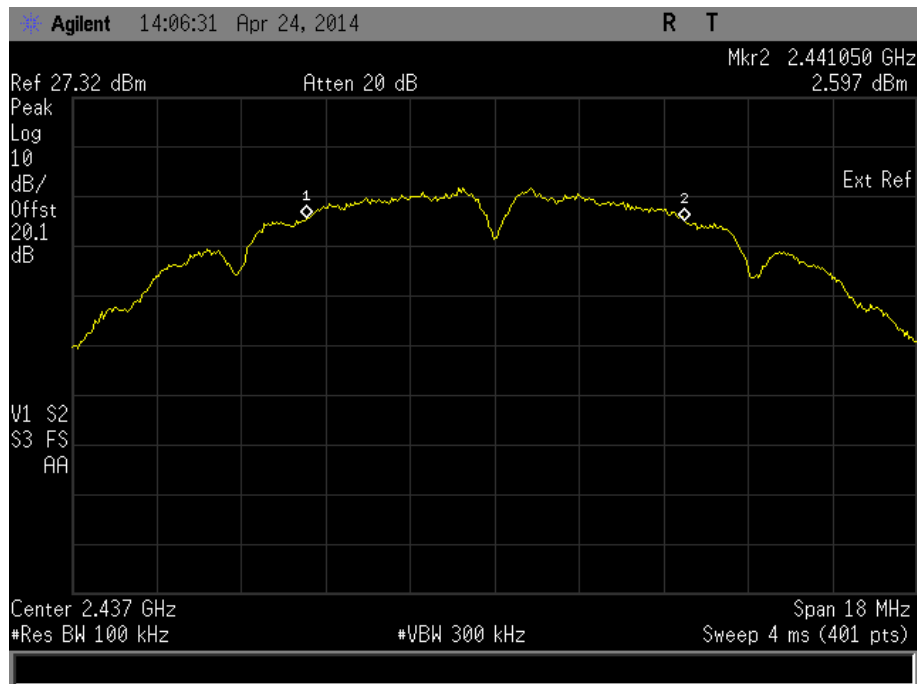


Product Service

5.5 Mbps11 Mbps

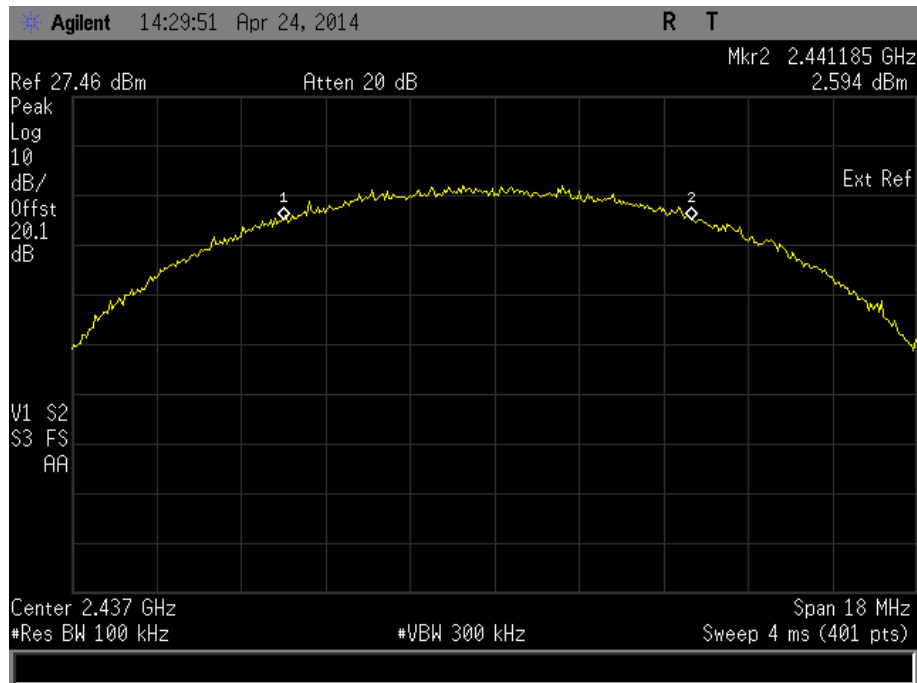
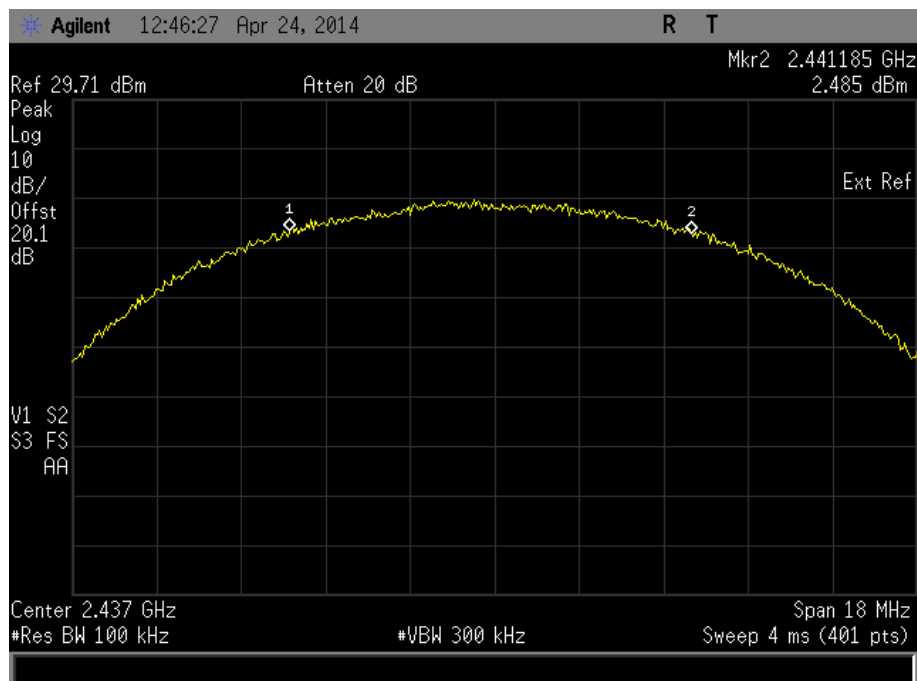


Product Service

2437 MHz1 Mbps2 Mbps

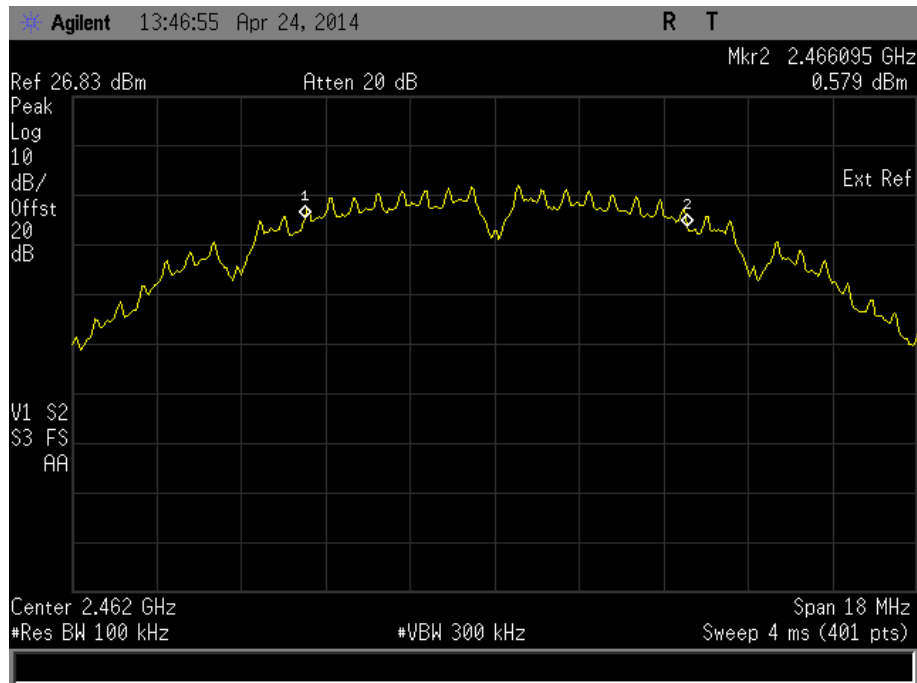
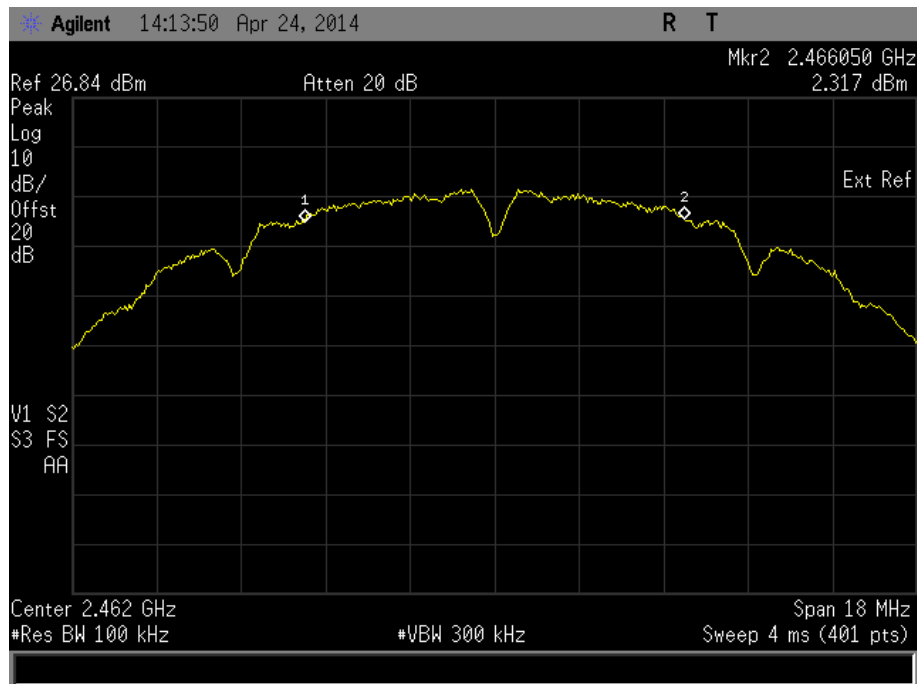


Product Service

5.5 Mbps11 Mbps

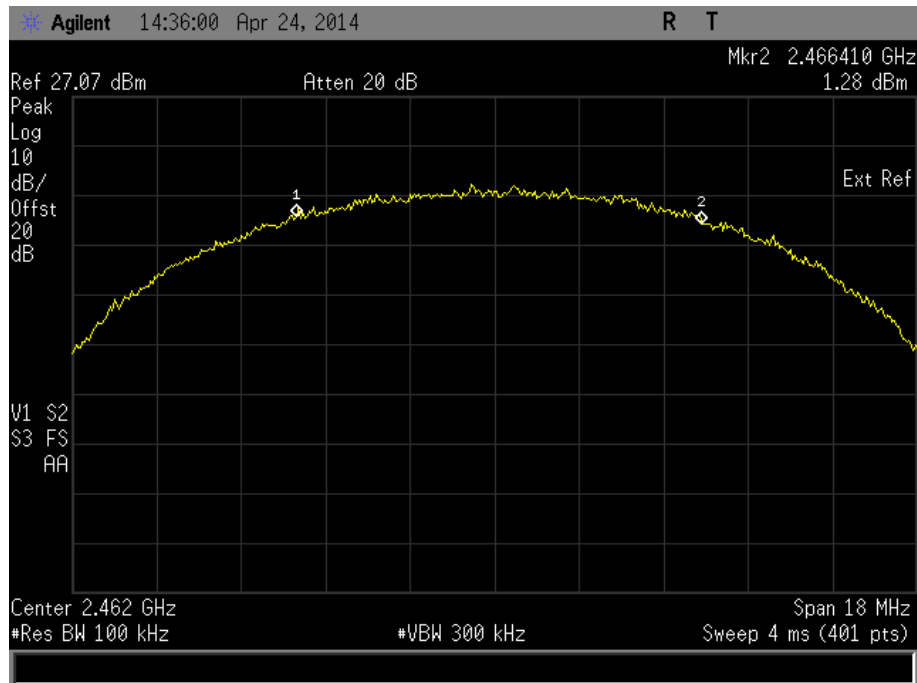
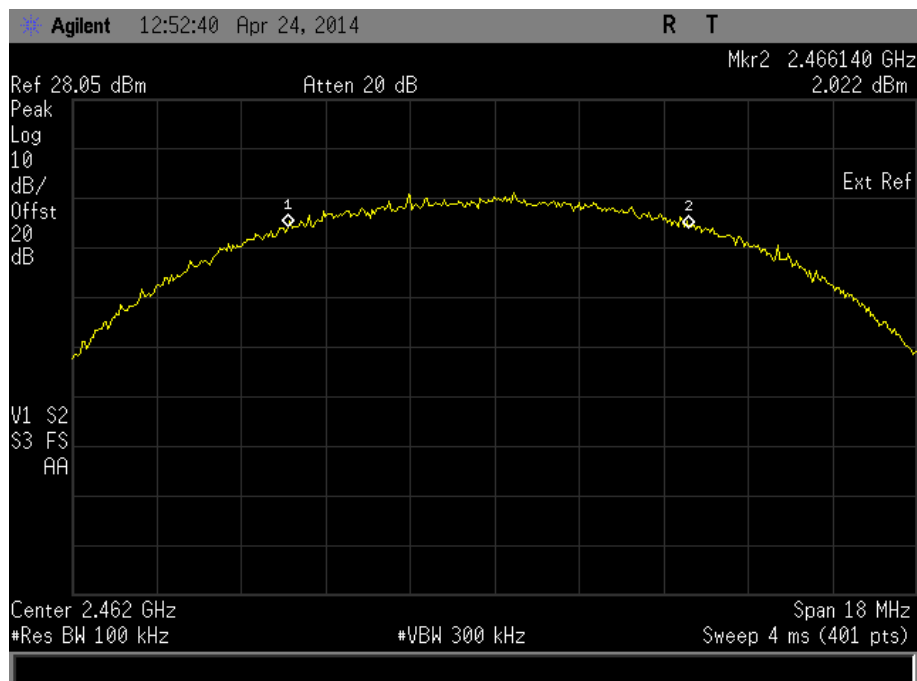


Product Service

2462 MHz1 Mbps2 Mbps



Product Service

5.5 Mbps11 MbpsLimit Clause

The minimum 6 dB Bandwidth shall be at least 500 kHz.

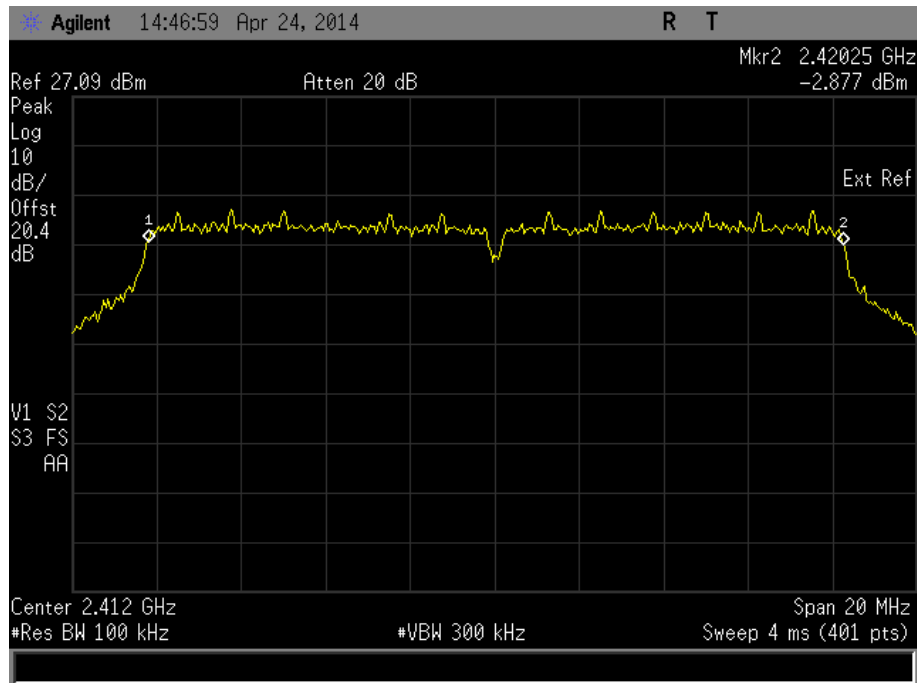
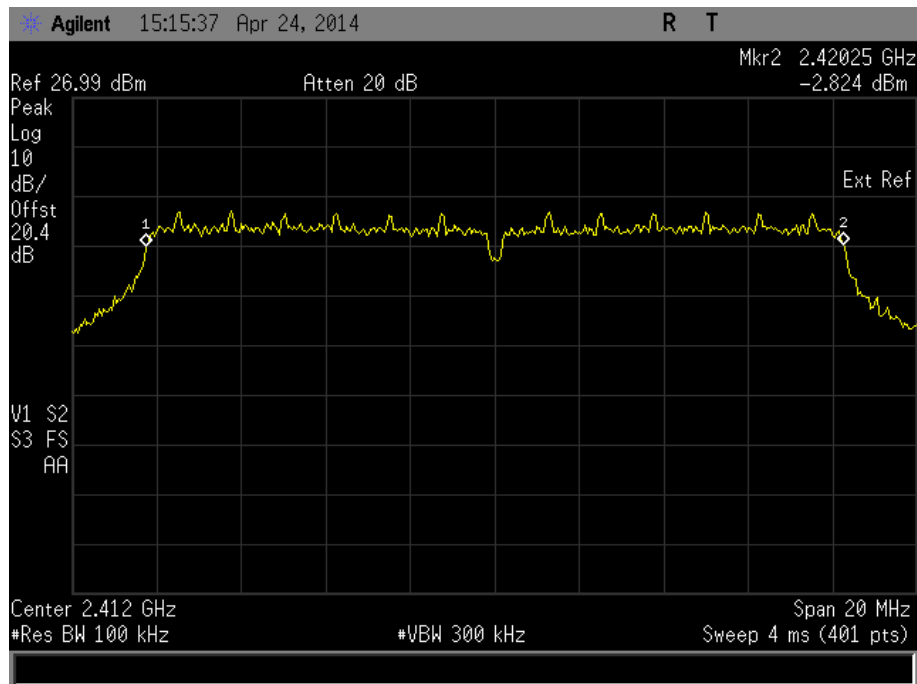
802.11(g)

## 4.0 V DC Supply

| Frequency (MHz) | Data Rate (Mbps) | 6dB Bandwidth (kHz) |
|-----------------|------------------|---------------------|
| 2412 MHz        | 6                | 16450               |
|                 | 9                | 16500               |
|                 | 12               | 16550               |
|                 | 18               | 16550               |
|                 | 24               | 16550               |
|                 | 36               | 16550               |
|                 | 48               | 16600               |
|                 | 54               | 16600               |
| 2437 MHz        | 6                | 16400               |
|                 | 9                | 16400               |
|                 | 12               | 16500               |
|                 | 18               | 16500               |
|                 | 24               | 16550               |
|                 | 36               | 16600               |
|                 | 48               | 16600               |
|                 | 54               | 16600               |
| 2462 MHz        | 6                | 16450               |
|                 | 9                | 16450               |
|                 | 12               | 16550               |
|                 | 18               | 16550               |
|                 | 24               | 16600               |
|                 | 36               | 16550               |
|                 | 48               | 16600               |
|                 | 54               | 16550               |

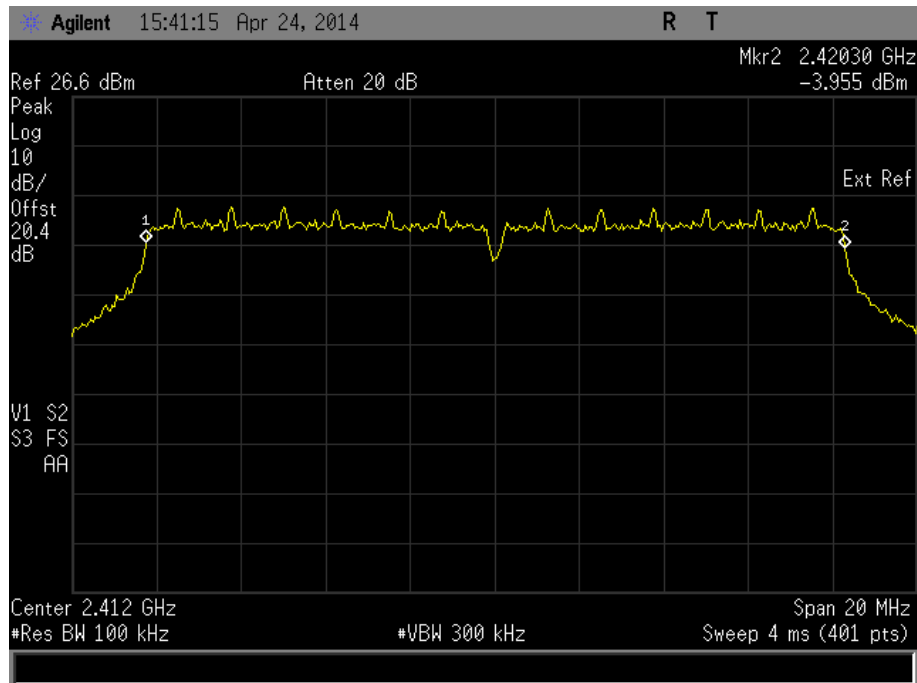
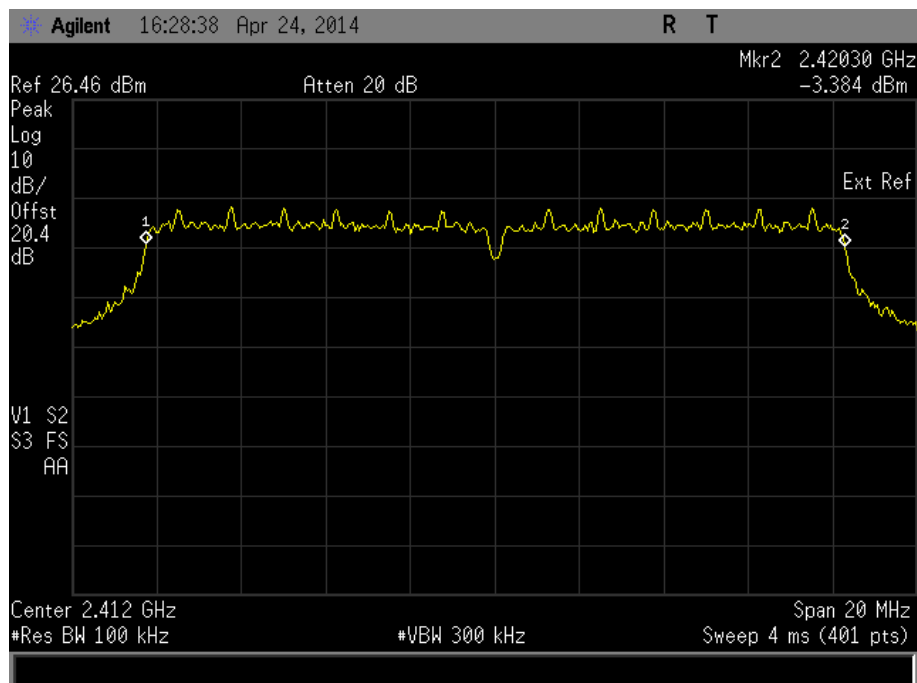


Product Service

2412 MHz6 Mbps9 Mbps

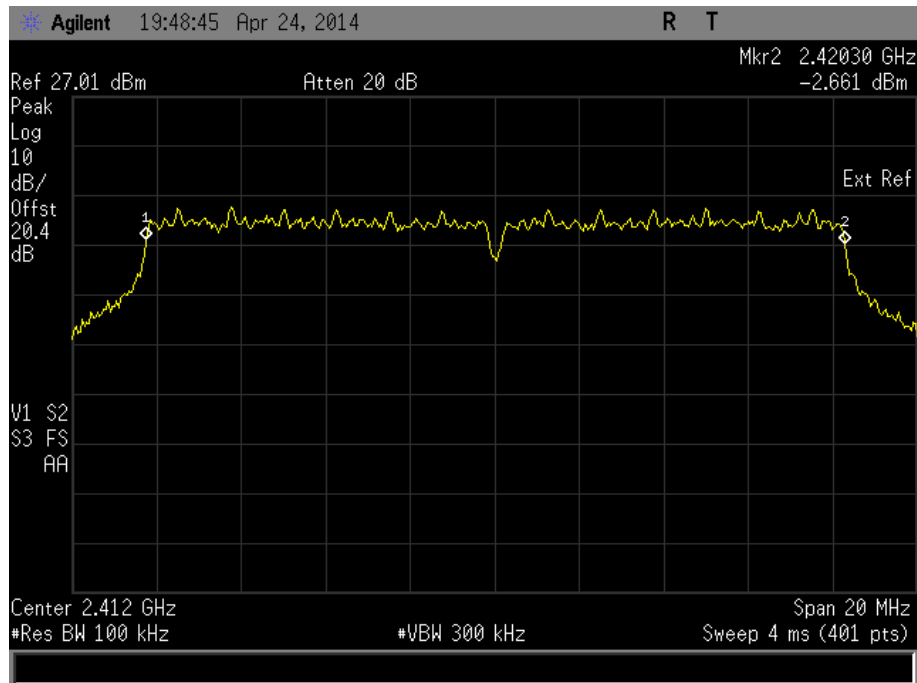
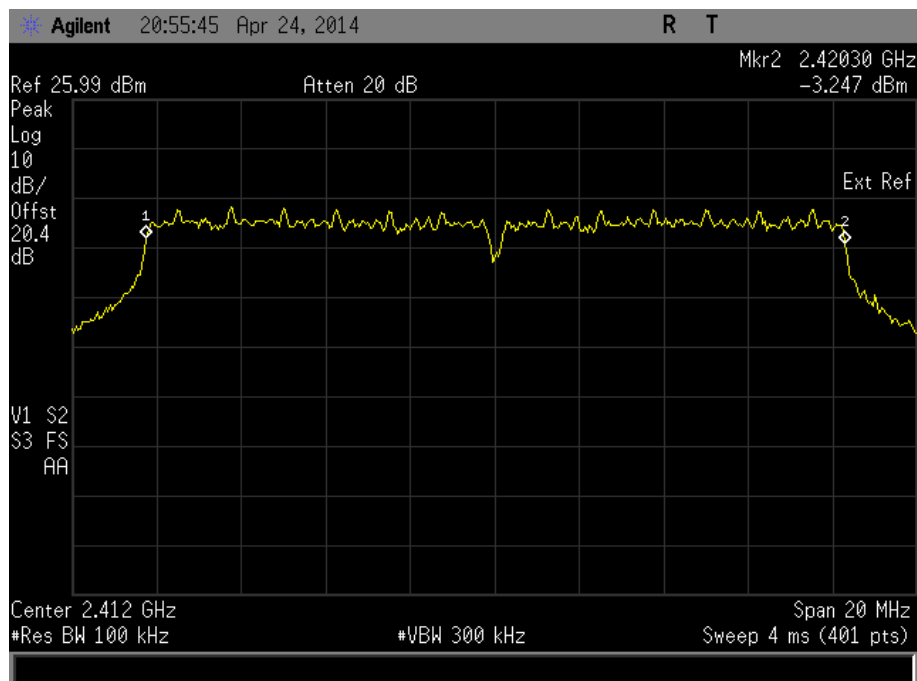


Product Service

12 Mbps18 Mbps

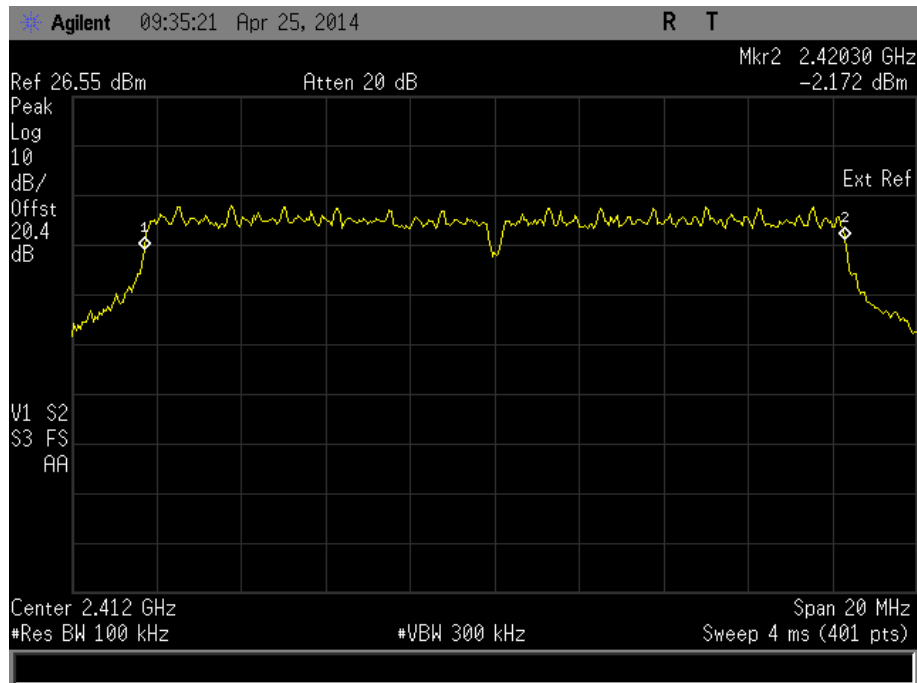
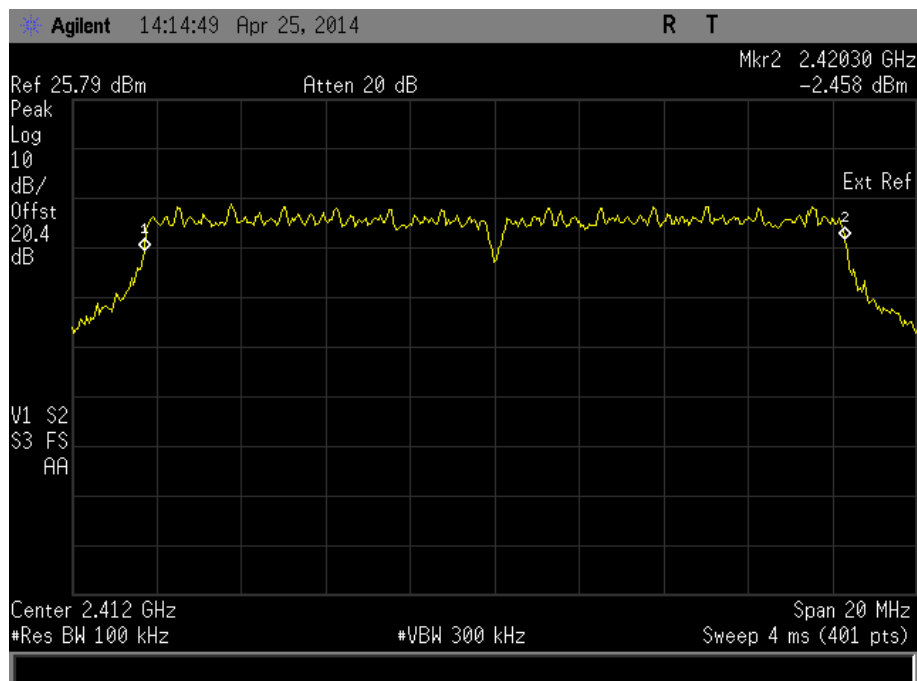


Product Service

24 Mbps36 Mbps

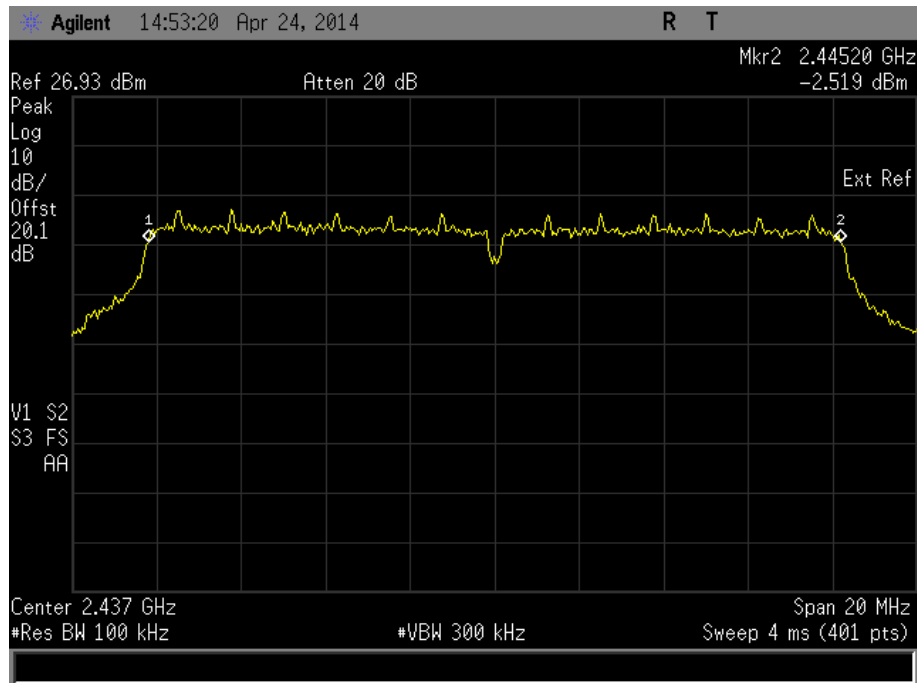
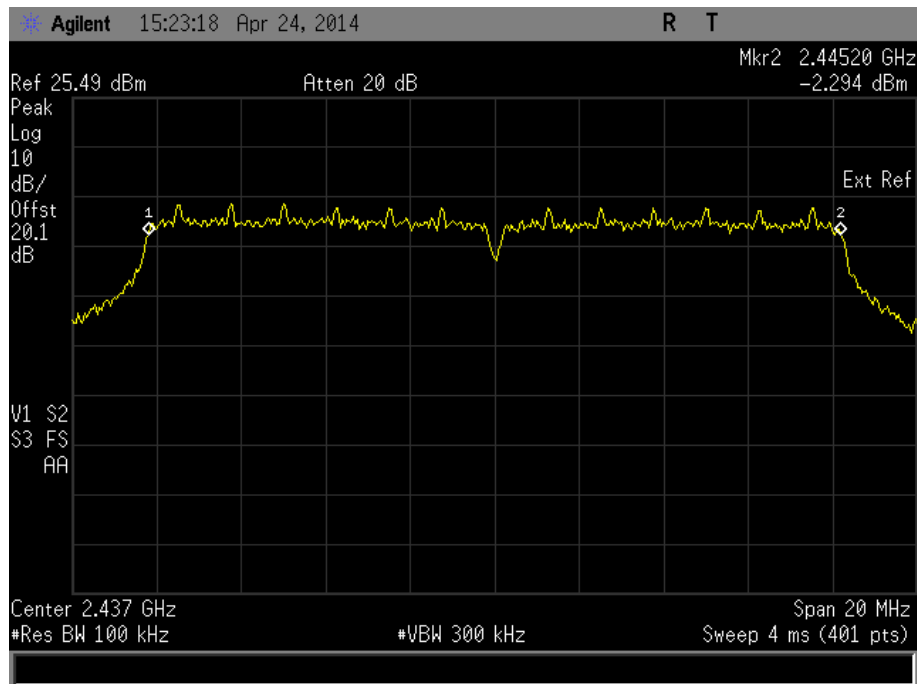


Product Service

48 Mbps54 Mbps

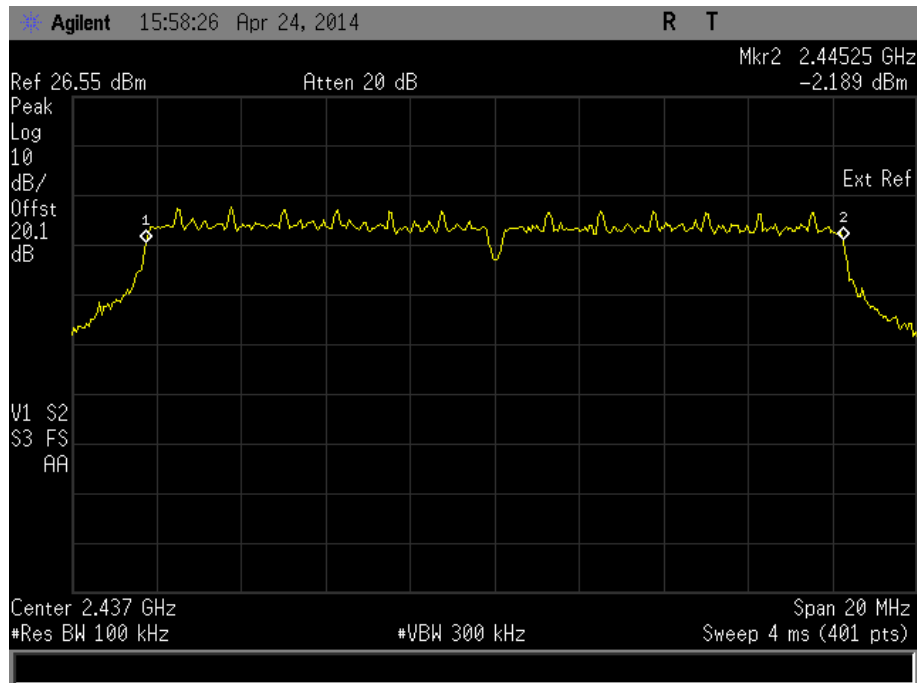
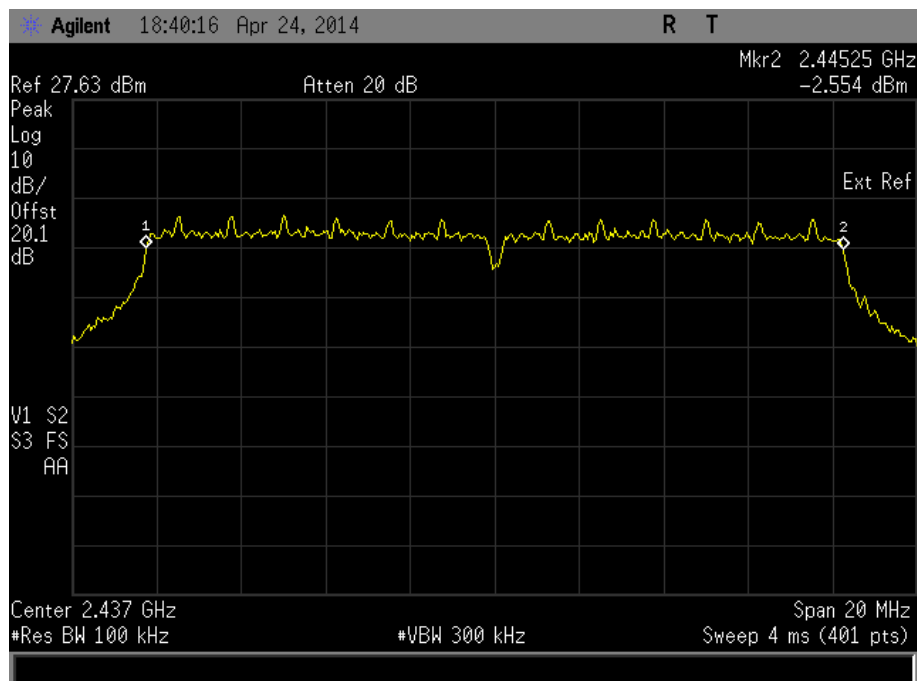


Product Service

2437 MHz6 Mbps9 Mbps

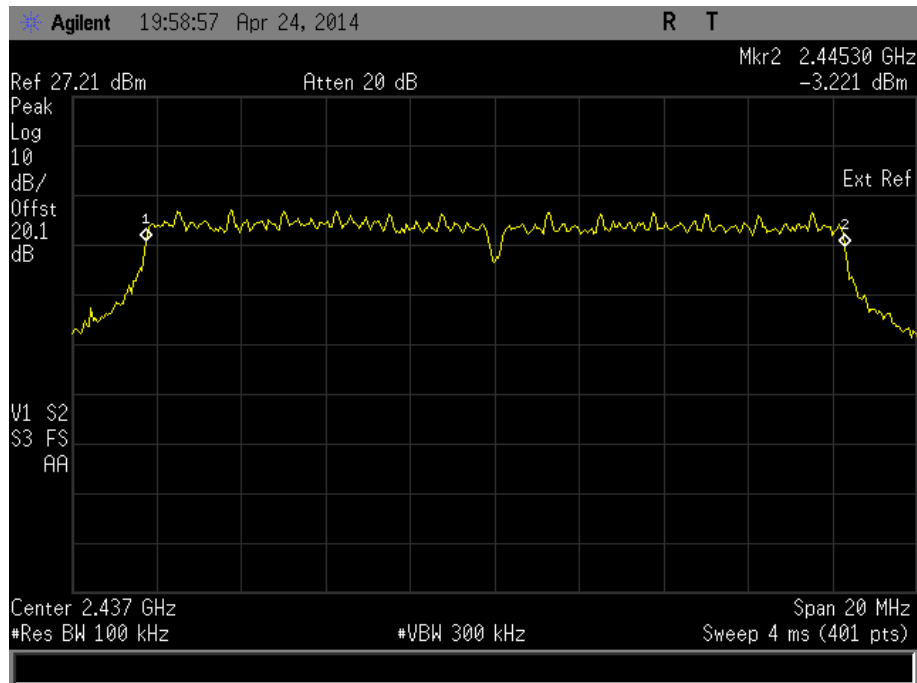
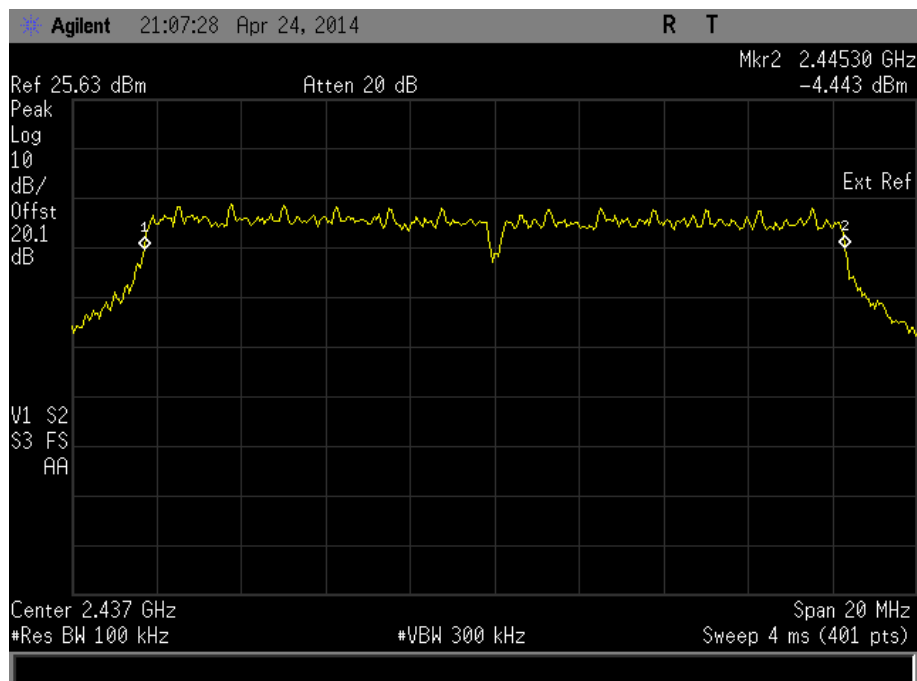


Product Service

12 Mbps18 Mbps

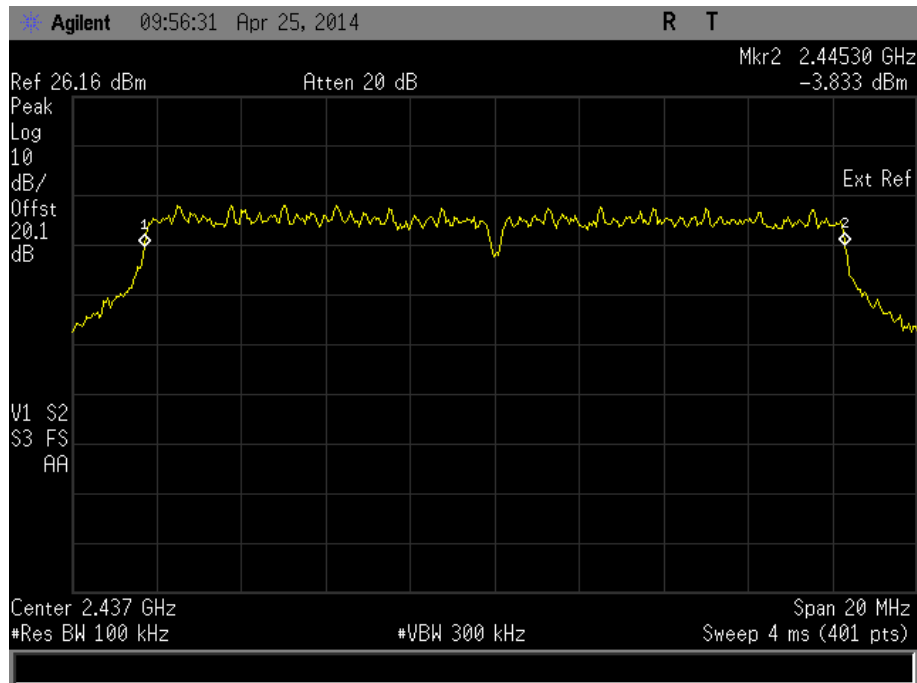
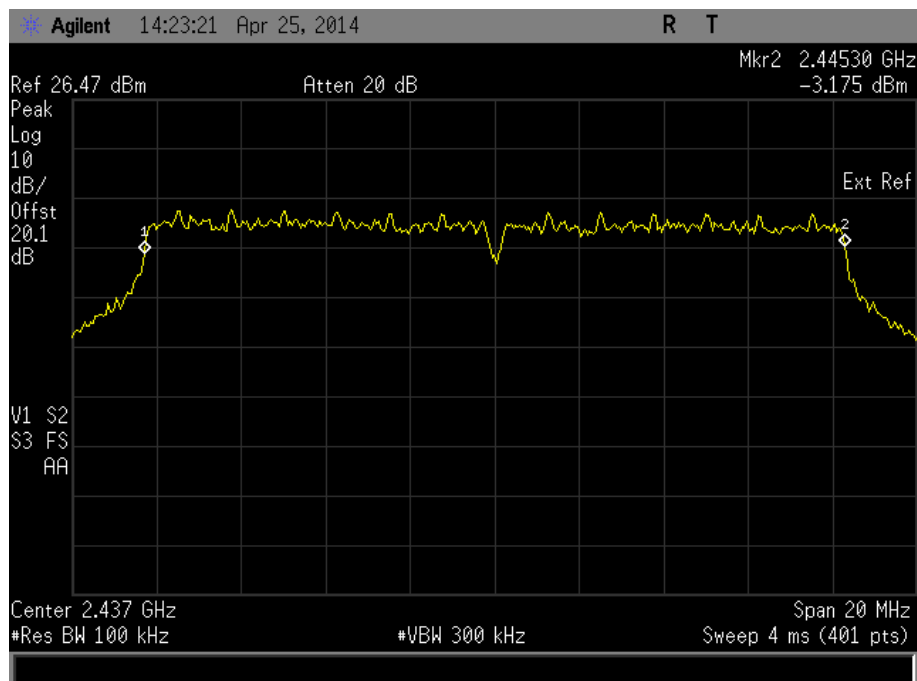


Product Service

24 Mbps36 Mbps

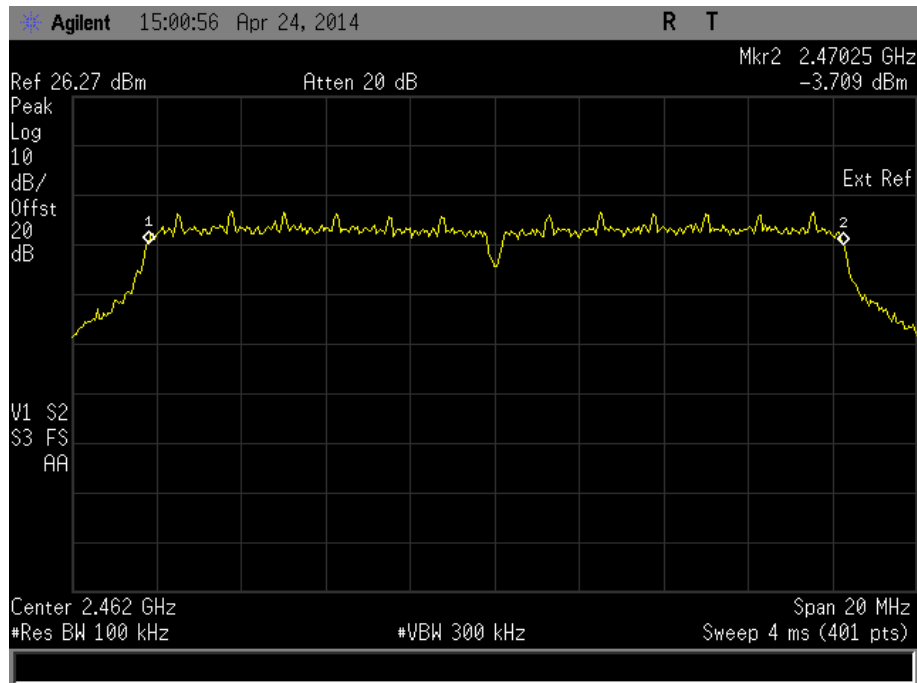
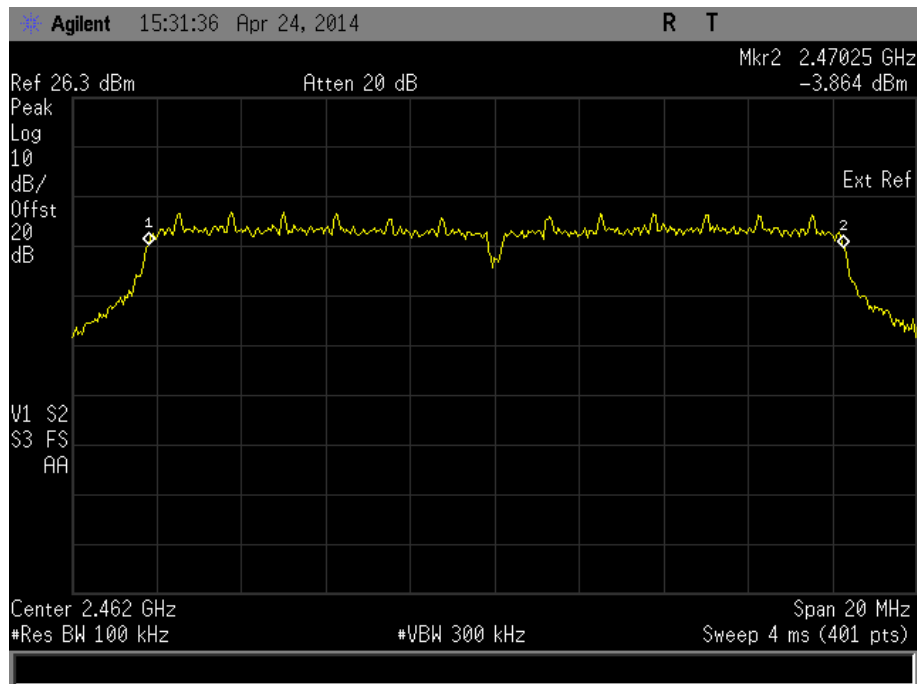


Product Service

48 Mbps54 Mbps

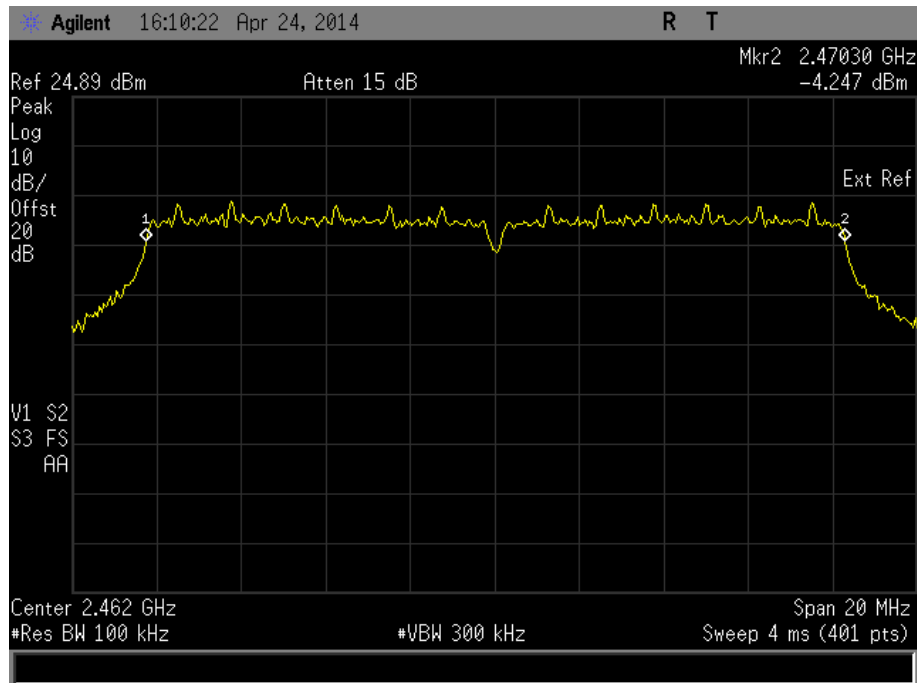
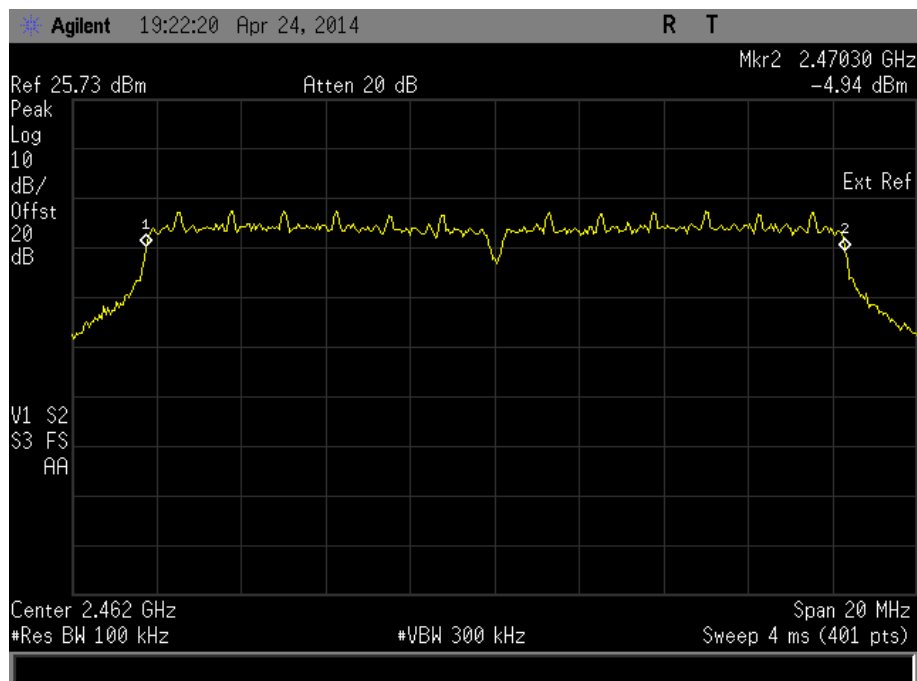


Product Service

2462 MHz6 Mbps9 Mbps

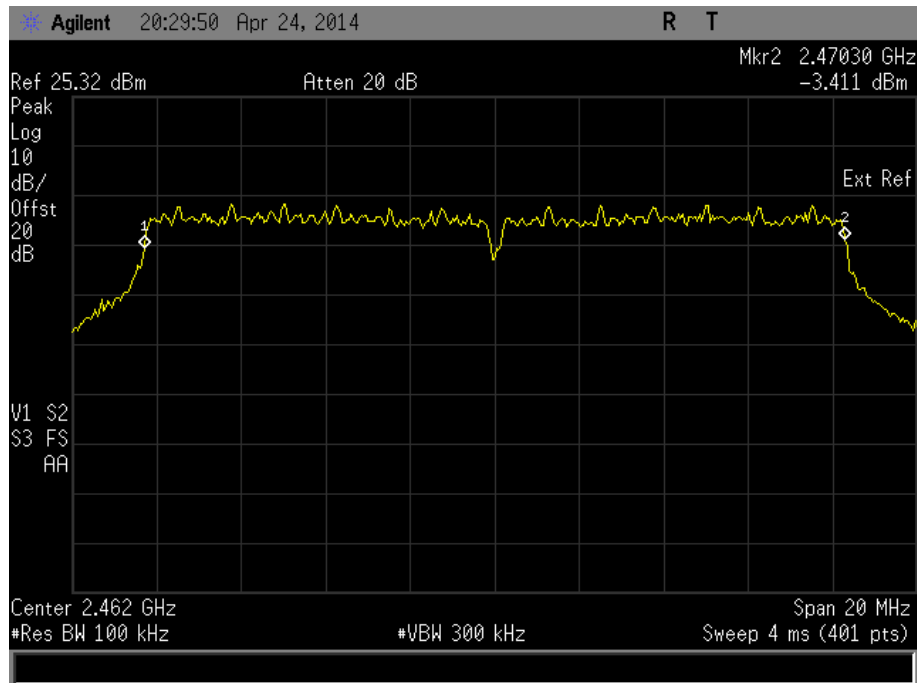
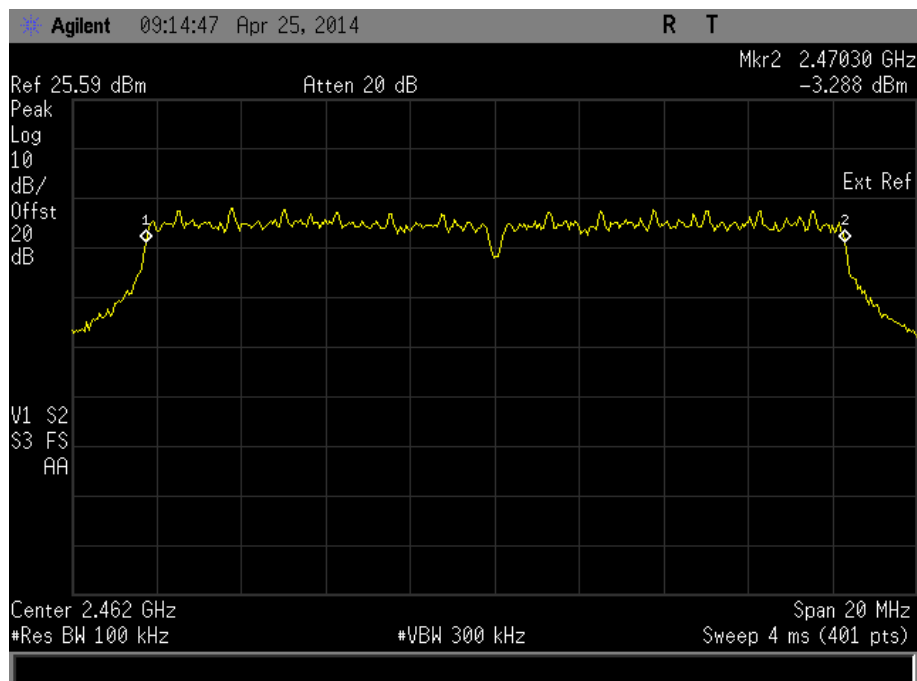


Product Service

12 Mbps18 Mbps

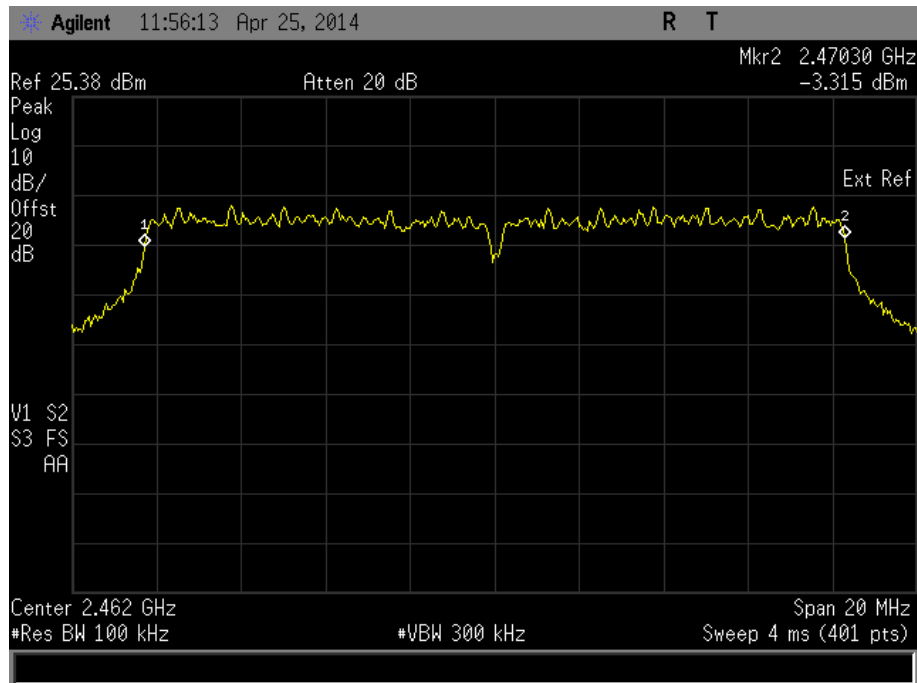
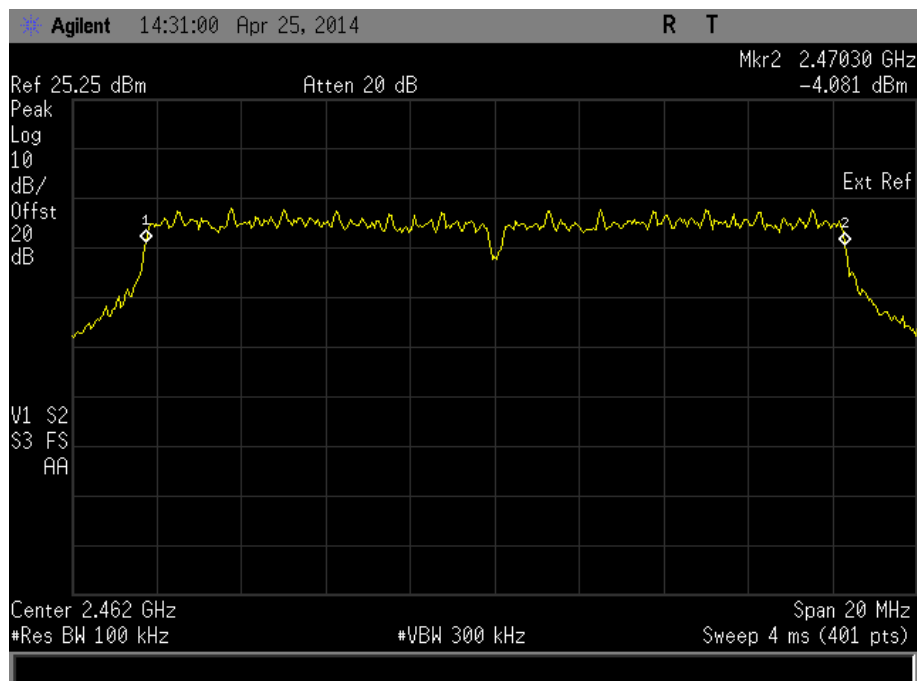


Product Service

24 Mbps36 Mbps



Product Service

48 Mbps54 MbpsLimit Clause

The minimum 6 dB Bandwidth shall be at least 500 kHz.

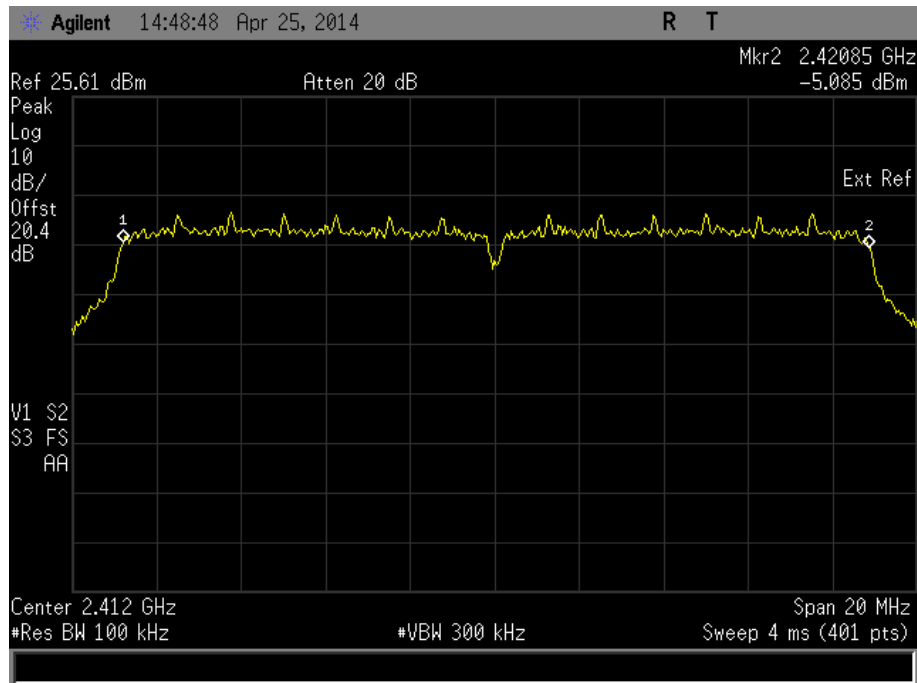
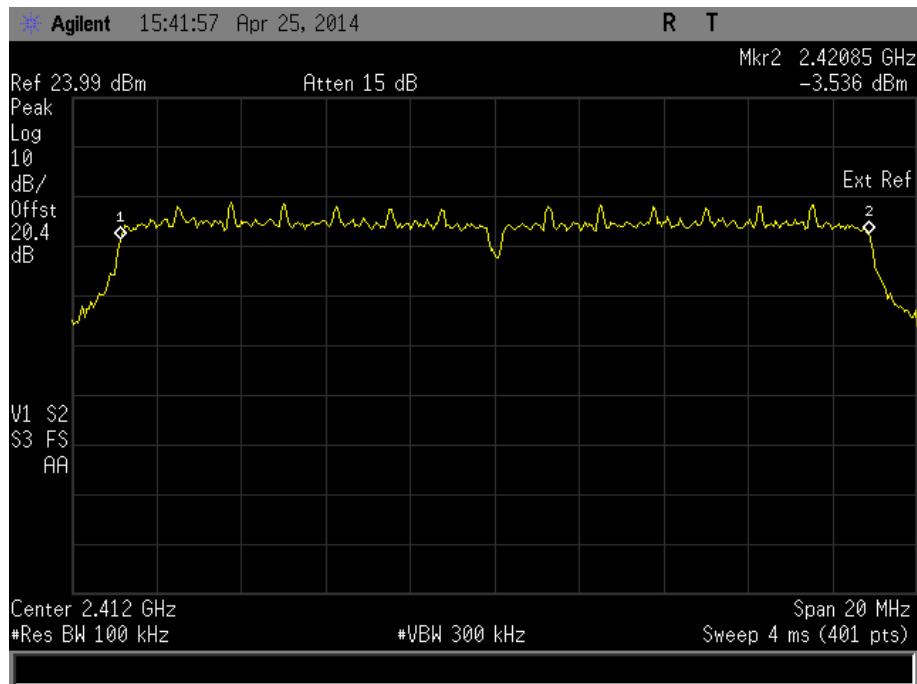
802.11(n)

## 4.0 V DC Supply

| Frequency (MHz) | Data Rate (Mbps) | 6dB Bandwidth (kHz) |
|-----------------|------------------|---------------------|
| 2412 MHz        | 6.5              | 17650               |
|                 | 13               | 17700               |
|                 | 19.5             | 17750               |
|                 | 26               | 17800               |
|                 | 39               | 17800               |
|                 | 52               | 17800               |
|                 | 58.5             | 17750               |
|                 | 65               | 17800               |
| 2437 MHz        | 6.5              | 17650               |
|                 | 13               | 17750               |
|                 | 19.5             | 17700               |
|                 | 26               | 17800               |
|                 | 39               | 17750               |
|                 | 52               | 17800               |
|                 | 58.5             | 17800               |
|                 | 65               | 17800               |
| 2462 MHz        | 6.5              | 17650               |
|                 | 13               | 17700               |
|                 | 19.5             | 17750               |
|                 | 26               | 17800               |
|                 | 39               | 17800               |
|                 | 52               | 17800               |
|                 | 58.5             | 17750               |
|                 | 65               | 17800               |

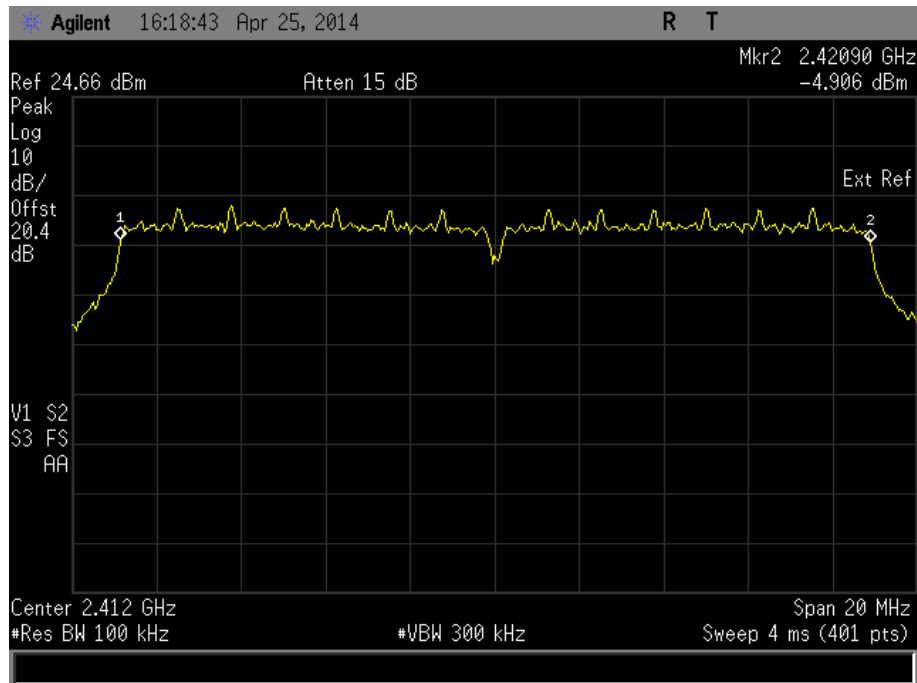
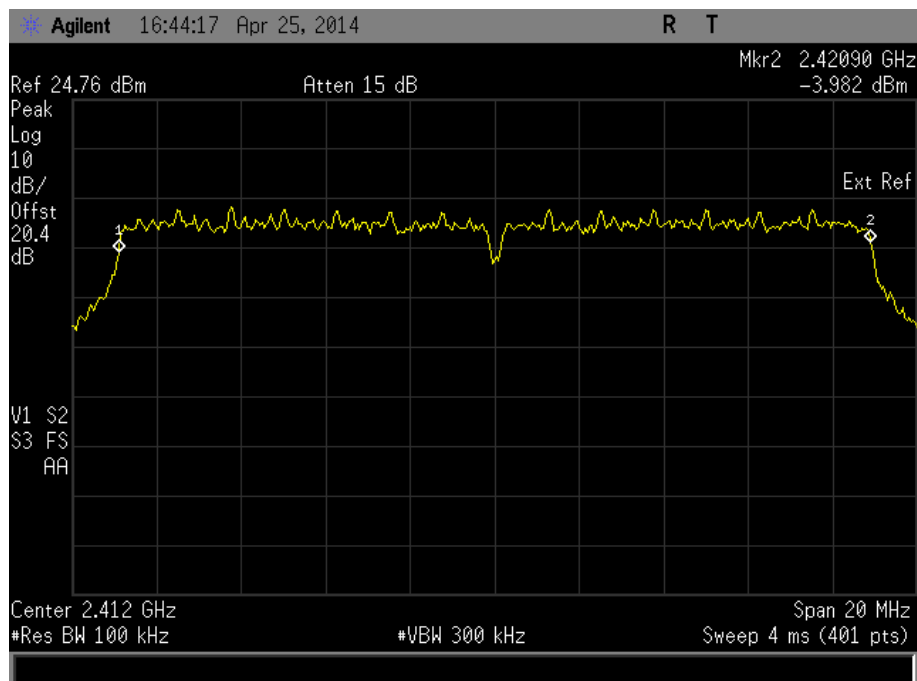


Product Service

2412 MHz6.5 Mbps13 Mbps

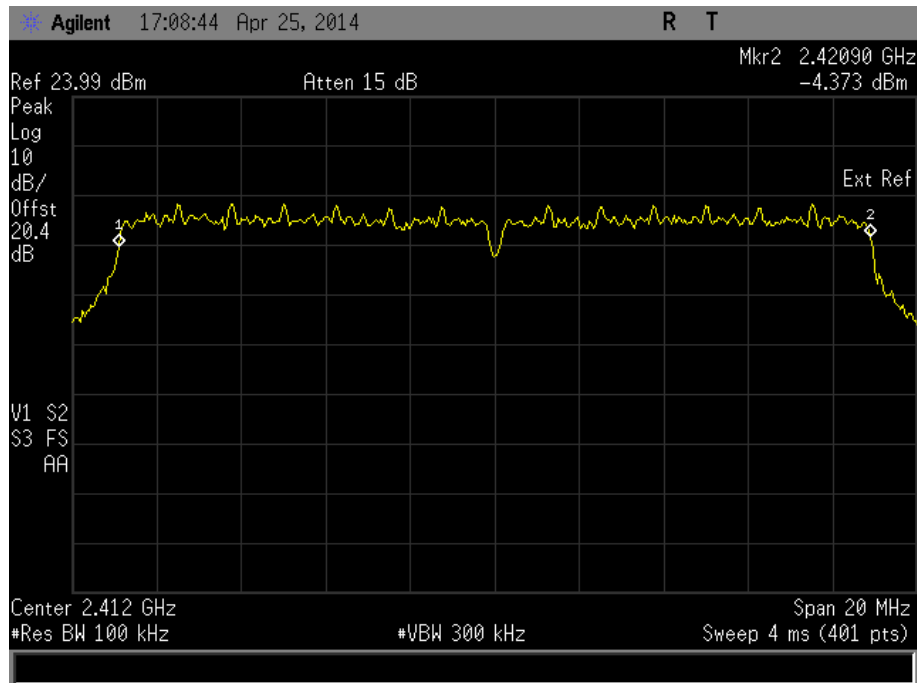
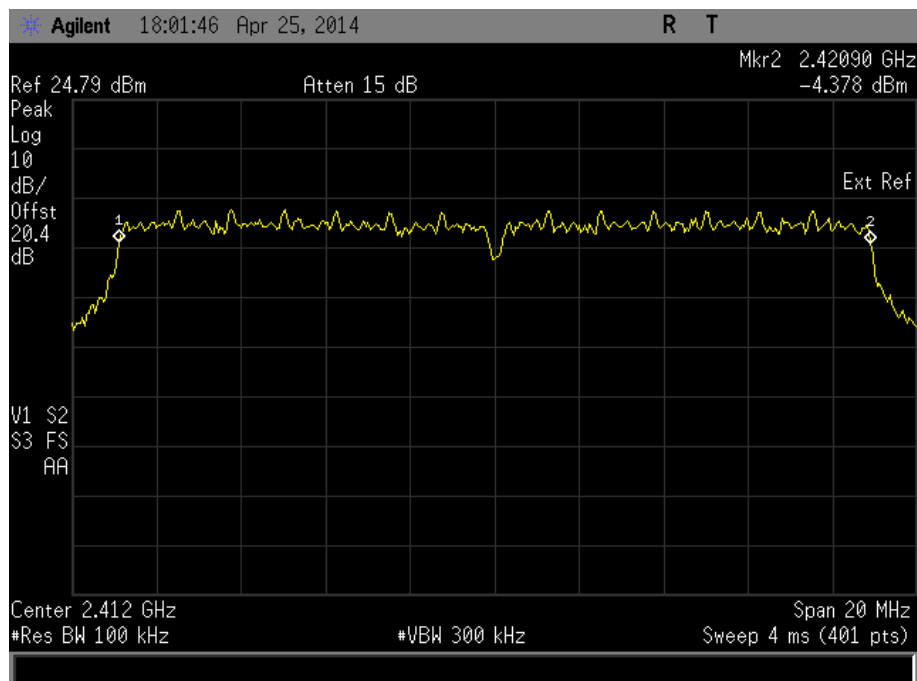


Product Service

19.5 Mbps26 Mbps

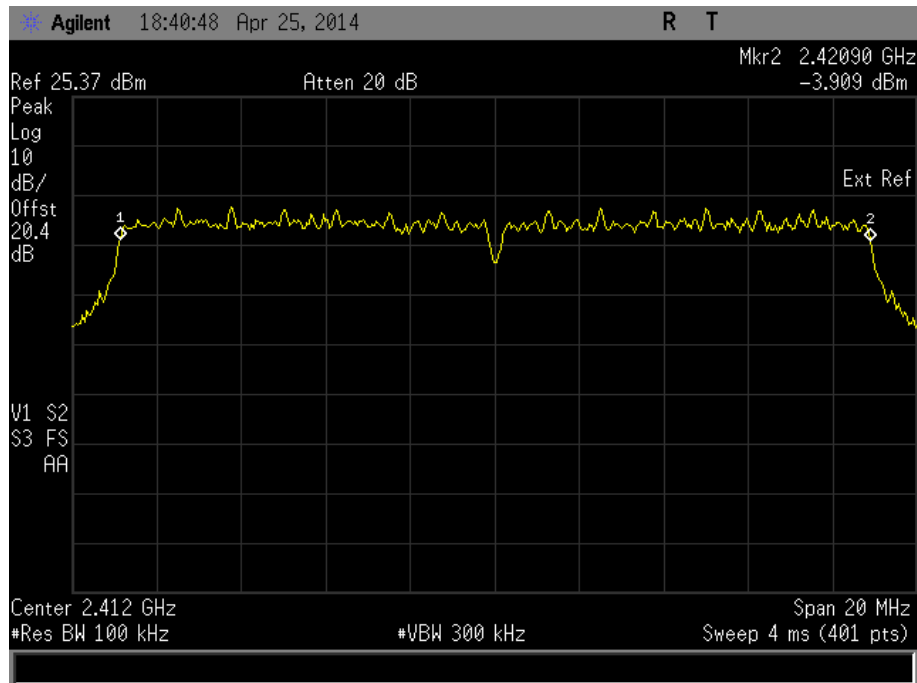
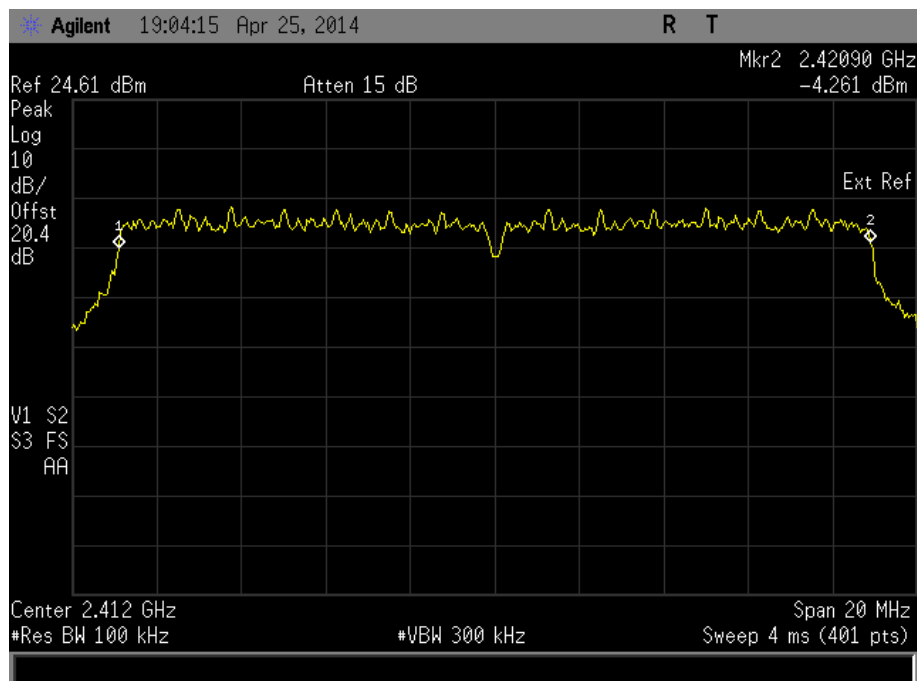


Product Service

39 Mbps52 Mbps

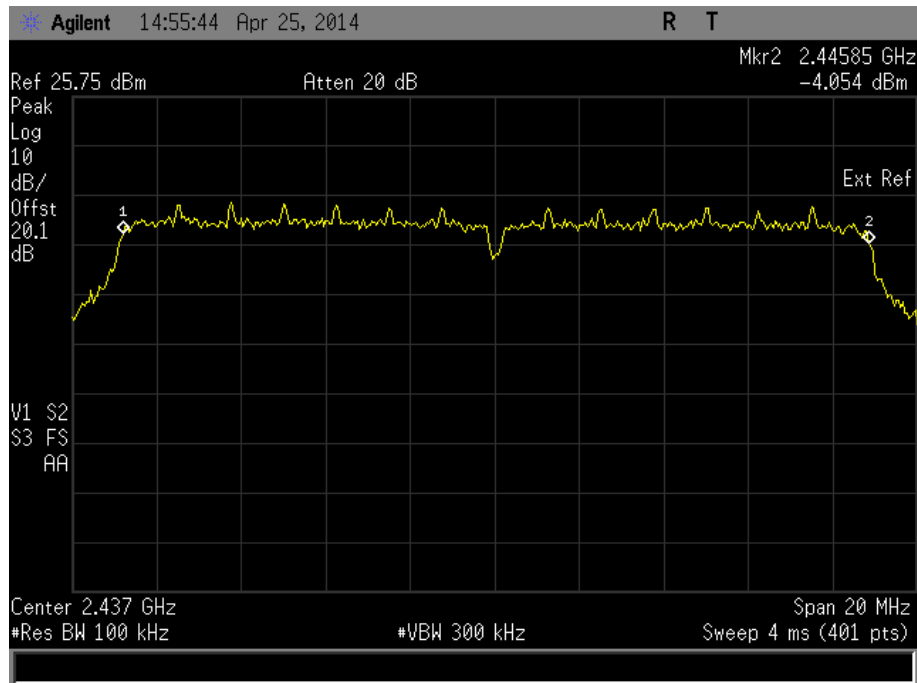
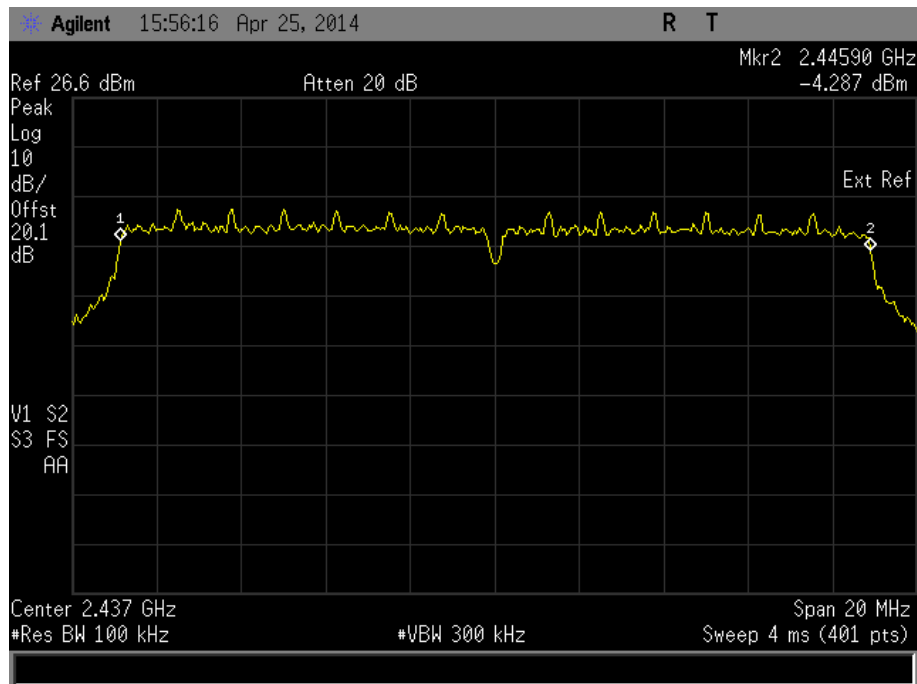


Product Service

58.5 Mbps65 Mbps

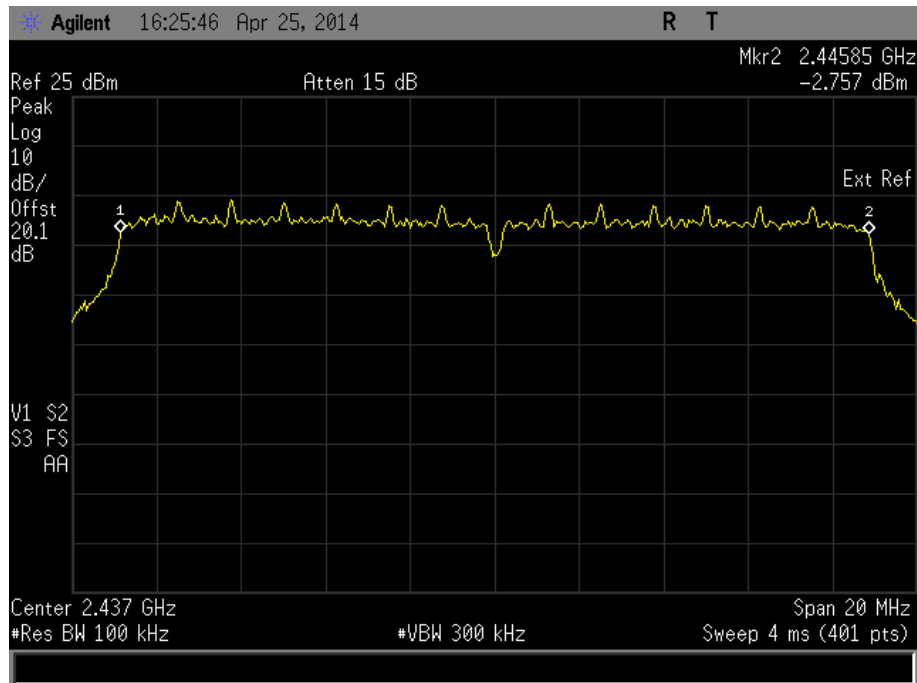
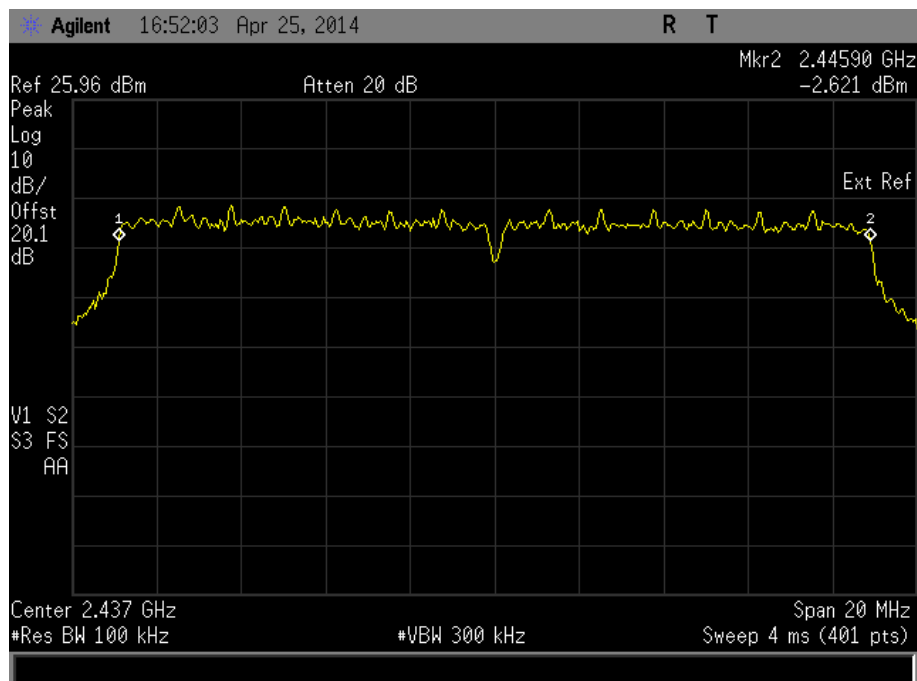


Product Service

2437 MHz6.5 Mbps13 Mbps

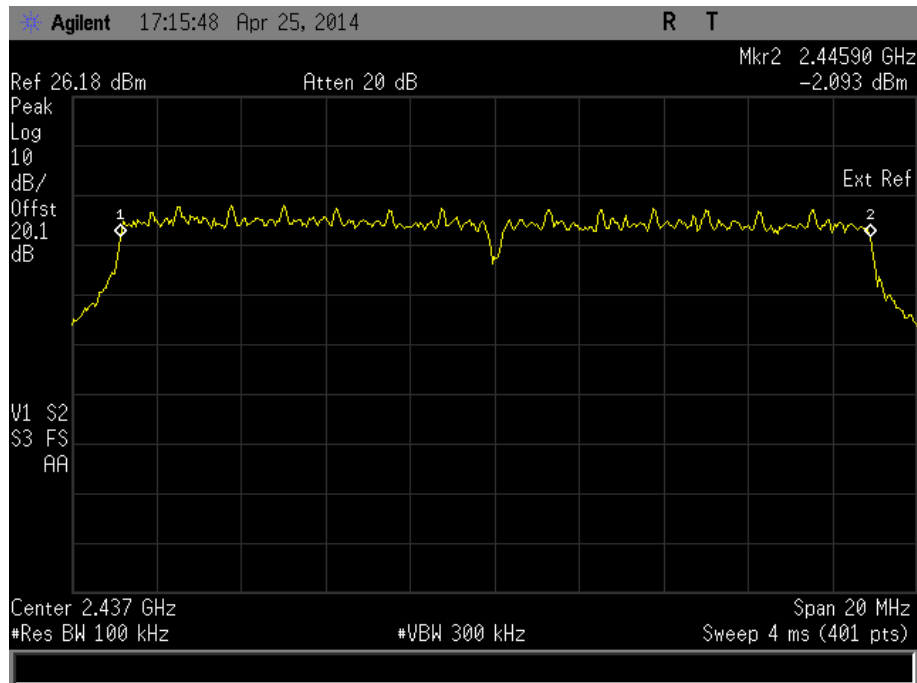
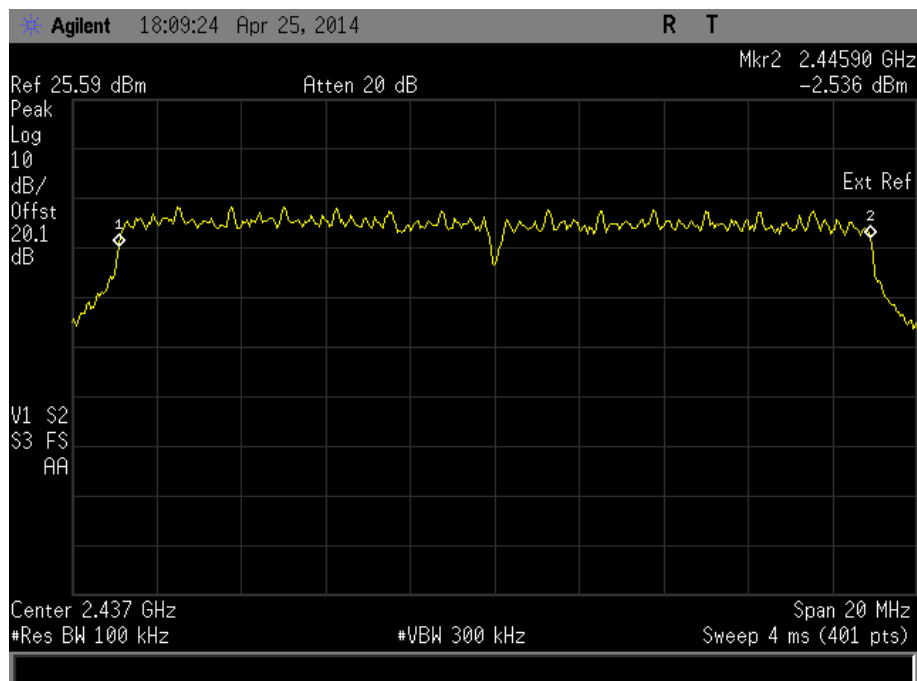


Product Service

19.5 Mbps26 Mbps

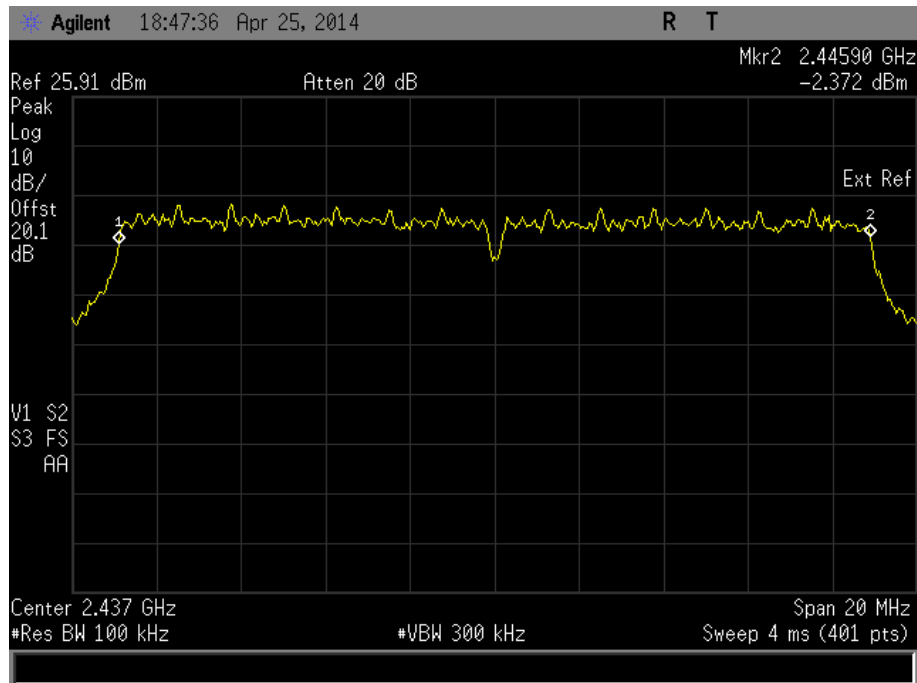
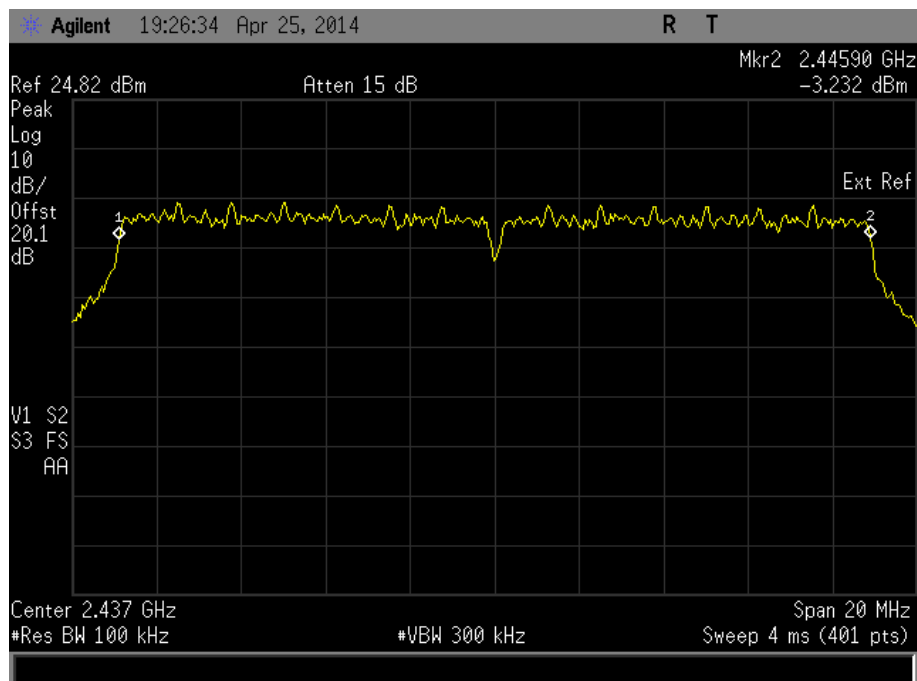


Product Service

39 Mbps52 Mbps

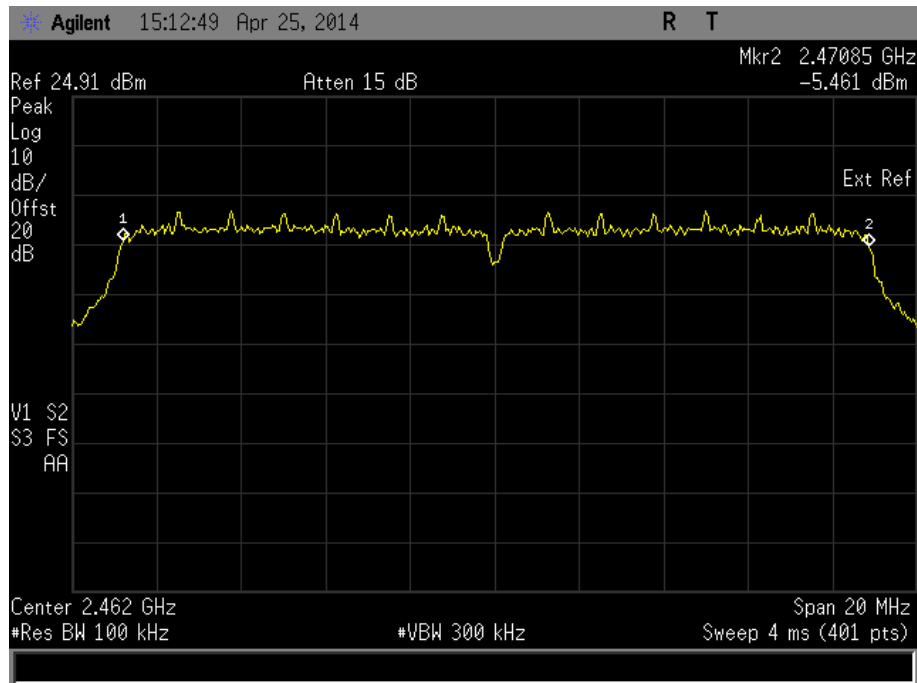
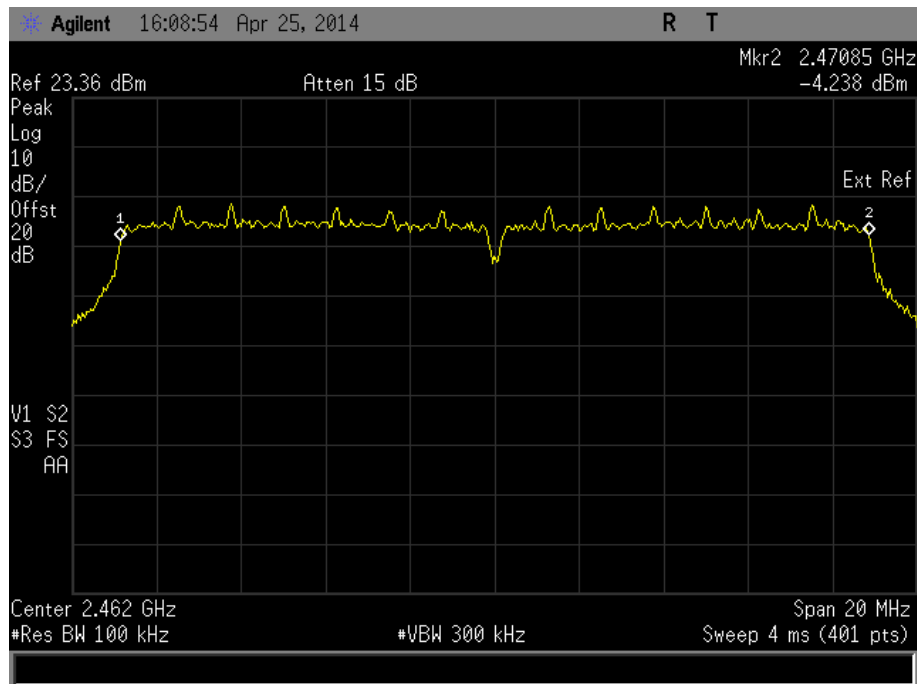


Product Service

58.5 Mbps65 Mbps

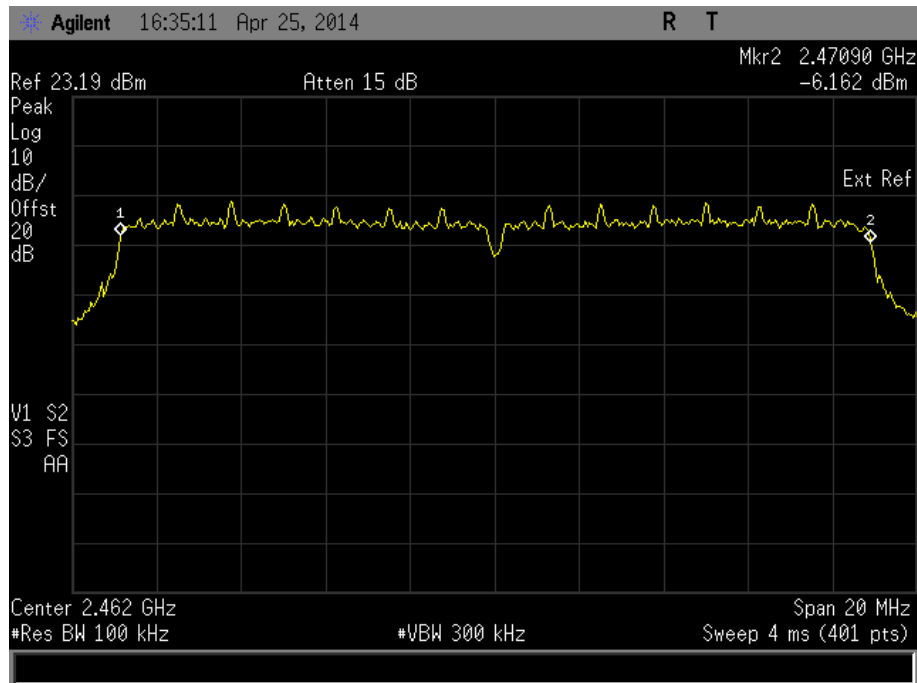
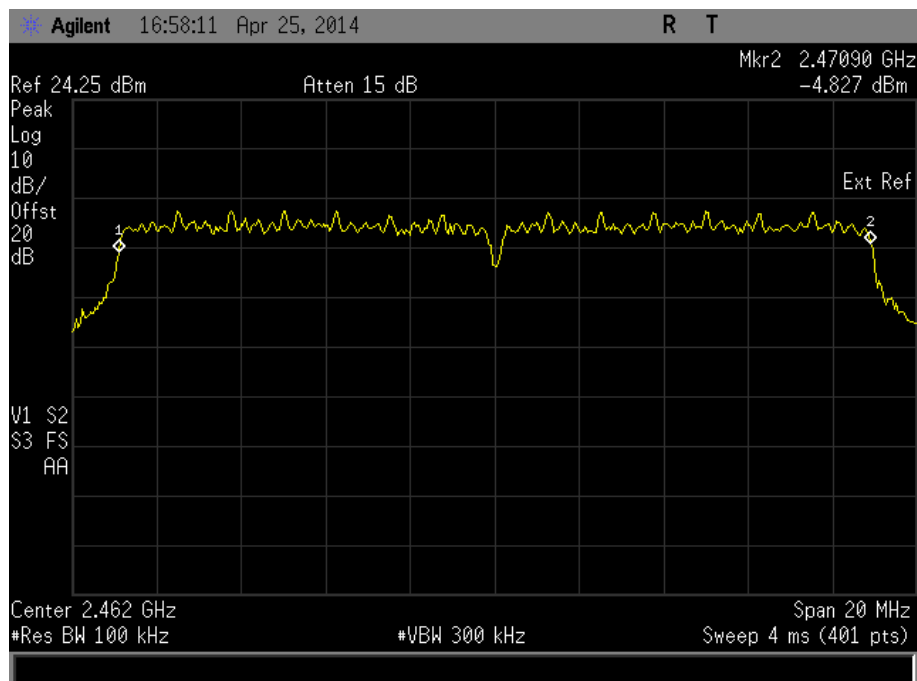


Product Service

2462 MHz6.5 Mbps13 Mbps

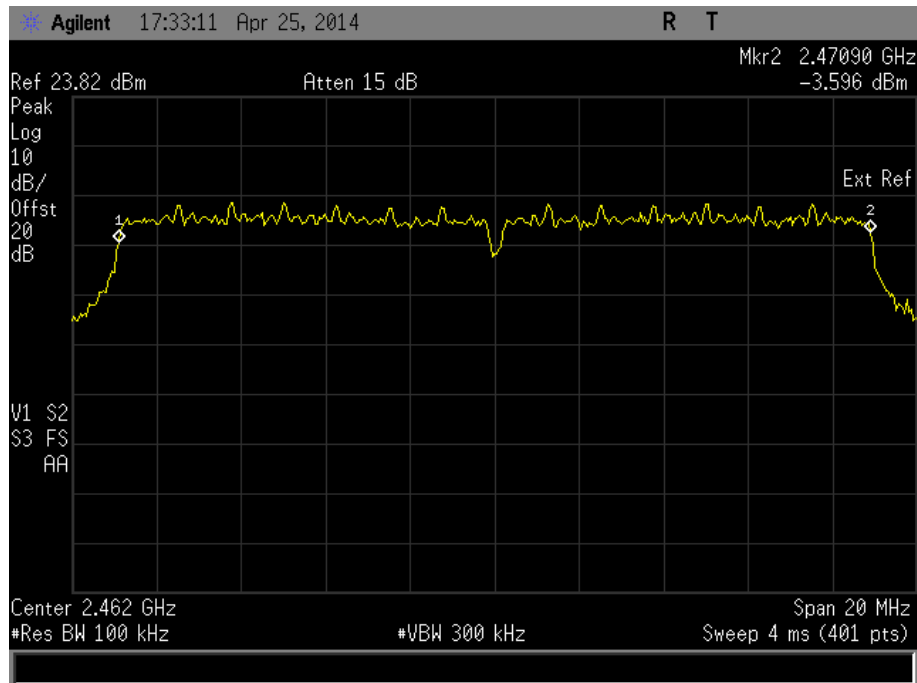
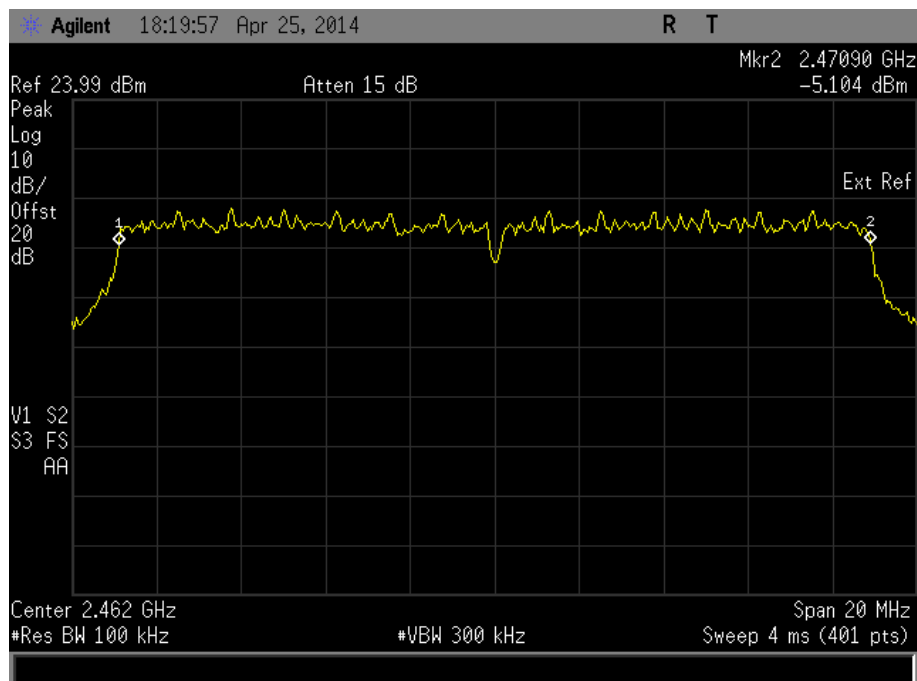


Product Service

19.5 Mbps26 Mbps

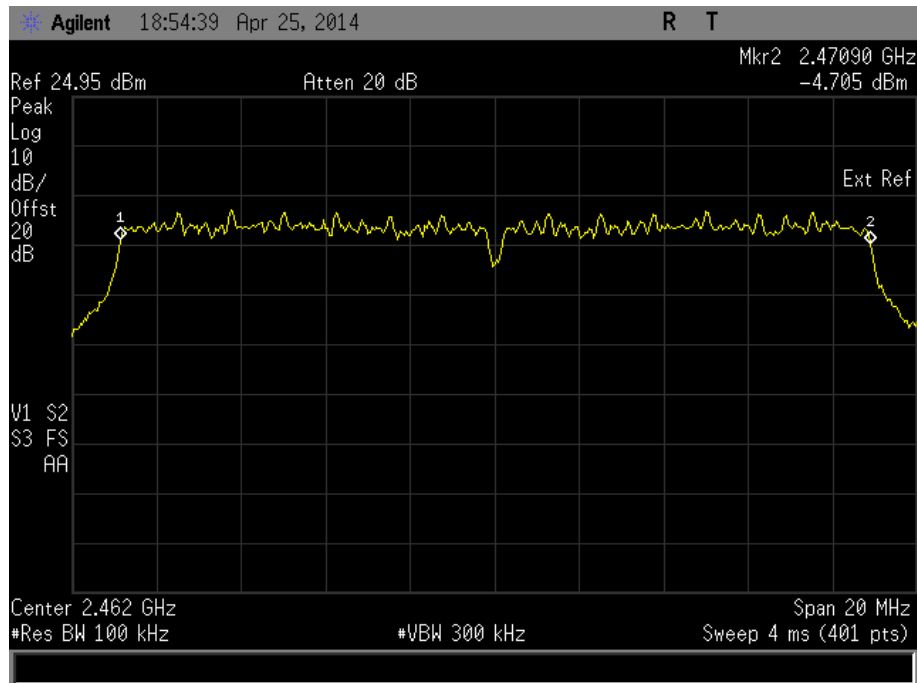
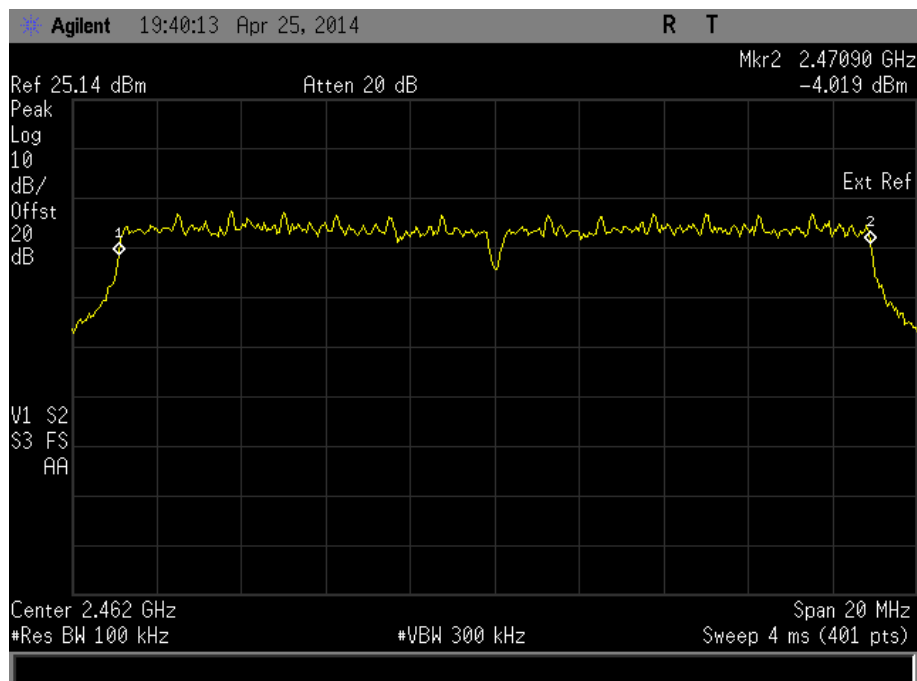


Product Service

39 Mbps52 Mbps



Product Service

58.5 Mbps65 MbpsLimit Clause

The minimum 6 dB Bandwidth shall be at least 500 kHz.

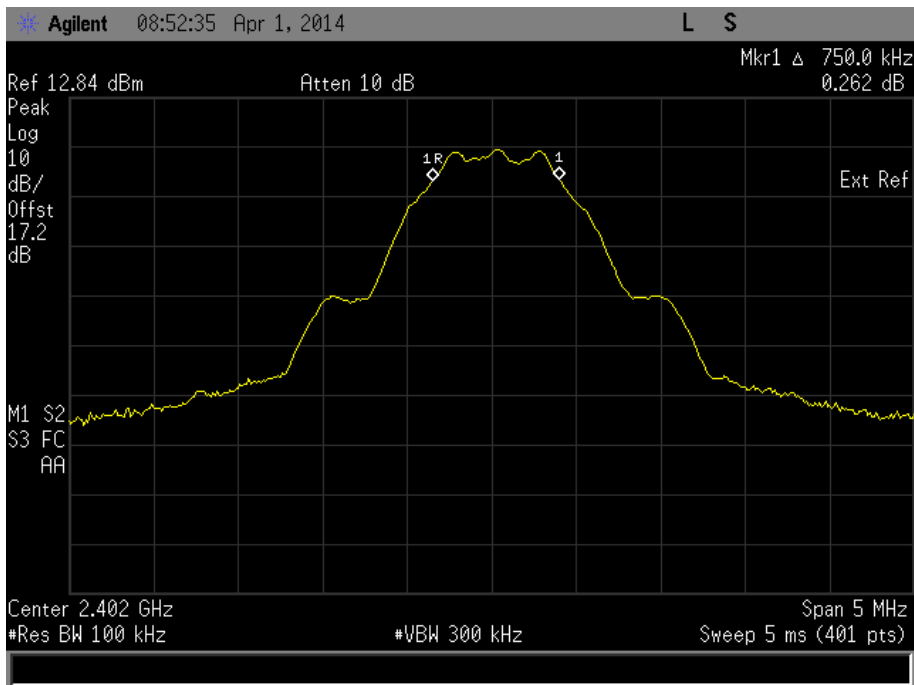


Product Service

Bluetooth Low Energy

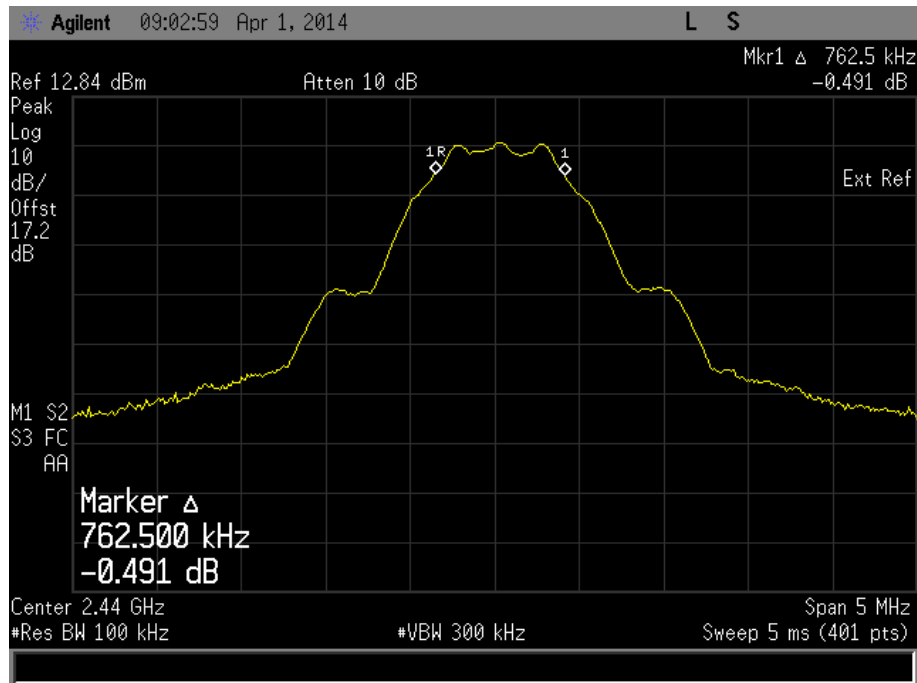
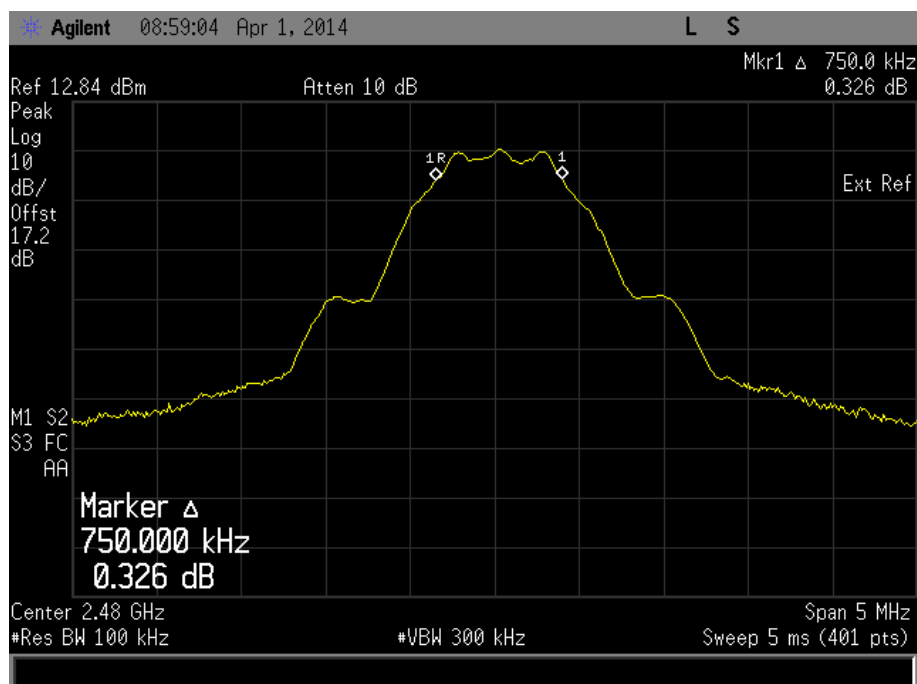
4.0 V DC Supply

| Frequency (MHz) | Packet Type   | 6dB Bandwidth (kHz) |
|-----------------|---------------|---------------------|
| 2402 MHz        | 37octet/prbs9 | 750.0               |
| 2440 MHz        | 37octet/prbs9 | 762.5               |
| 2480 MHz        | 37octet/prbs9 | 750.0               |

2402 MHz1 Mbps



Product Service

2440 MHz1 Mbps2480 MHz1 MbpsLimit Clause

The minimum 6 dB Bandwidth shall be at least 500 kHz.



Product Service

**2.3 MAXIMUM PEAK CONDUCTED OUTPUT POWER****2.3.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.247 (b)(3)

**2.3.2 Equipment Under Test and Modification State**

SHL25 S/N: IMEI 004401115170488 - Modification State 0

SHL25 S/N: IMEI 004401115170645 - Modification State 0

**2.3.3 Date of Test**

31 March 2014, 24 April 2014 & 25 April 2014

**2.3.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

**2.3.5 Test Procedure**

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (b) and KDB 558074.

The EUT was connected to a broadband peak RF power meter via a cable and attenuator. The EUT was transmitting at maximum power, for bottom, middle and top channels on all supported data rates. The path loss between the EUT and sensor was measured and entered as a reference level offset. The peak power was recorded for measurements on the bottom, middle and top channels on all supported data rates.

**2.3.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 22.9 - 23.5°C |
| Relative Humidity   | 39.3 - 42.9%  |



Product Service

### 2.3.7 Test Results

#### 802.11(b)

4.0 V DC Supply

| Modulation Data Rate (Mbps) | Maximum Peak Conducted Output Power |          |          |          |          |          |
|-----------------------------|-------------------------------------|----------|----------|----------|----------|----------|
|                             | dBm                                 |          |          | mW       |          |          |
|                             | 2412 MHz                            | 2437 MHz | 2462 MHz | 2412 MHz | 2437 MHz | 2462 MHz |
| 1                           | 22.50                               | 22.66    | 21.88    | 177.83   | 184.50   | 154.17   |
| 2                           | 22.69                               | 22.65    | 21.83    | 185.78   | 184.08   | 152.41   |
| 5.5                         | 22.74                               | 22.56    | 21.75    | 187.93   | 180.30   | 149.62   |
| 11                          | 22.74                               | 22.54    | 21.86    | 187.93   | 179.47   | 153.46   |

#### Limit Clause

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

802.11(g)

## 4.0 V DC Supply

| Modulation Data Rate (Mbps) | Maximum Peak Conducted Output Power |          |          |          |          |          |
|-----------------------------|-------------------------------------|----------|----------|----------|----------|----------|
|                             | dBm                                 |          |          | mW       |          |          |
|                             | 2412 MHz                            | 2437 MHz | 2462 MHz | 2412 MHz | 2437 MHz | 2462 MHz |
| 6                           | 25.53                               | 26.18    | 25.73    | 357.27   | 414.95   | 374.11   |
| 9                           | 25.45                               | 26.14    | 25.55    | 350.75   | 411.15   | 358.92   |
| 12                          | 25.51                               | 26.31    | 25.49    | 355.63   | 427.56   | 354.00   |
| 18                          | 25.49                               | 26.28    | 25.48    | 354.00   | 424.62   | 353.18   |
| 24                          | 25.69                               | 26.40    | 25.75    | 370.68   | 436.52   | 375.84   |
| 36                          | 25.43                               | 26.24    | 25.80    | 349.14   | 420.73   | 380.19   |
| 48                          | 25.62                               | 26.17    | 25.58    | 364.75   | 414.00   | 361.41   |
| 54                          | 25.51                               | 26.43    | 25.39    | 355.63   | 439.54   | 345.94   |

Limit Clause

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

802.11(n)

## 4.0 V DC Supply

| Modulation Data Rate (Mbps) | Maximum Peak Conducted Output Power |          |          |          |          |          |
|-----------------------------|-------------------------------------|----------|----------|----------|----------|----------|
|                             | dBm                                 |          |          | mW       |          |          |
|                             | 2412 MHz                            | 2437 MHz | 2462 MHz | 2412 MHz | 2437 MHz | 2462 MHz |
| 6.5                         | 24.92                               | 26.09    | 24.86    | 310.46   | 406.44   | 306.20   |
| 13                          | 25.02                               | 26.18    | 24.67    | 317.69   | 414.95   | 293.09   |
| 19.5                        | 25.12                               | 26.15    | 25.01    | 325.09   | 412.10   | 316.96   |
| 26                          | 25.08                               | 26.28    | 25.07    | 322.11   | 424.62   | 321.37   |
| 39                          | 24.90                               | 26.33    | 25.58    | 309.03   | 429.54   | 361.41   |
| 52                          | 25.01                               | 26.16    | 24.59    | 316.96   | 413.05   | 287.74   |
| 58.5                        | 25.06                               | 26.21    | 24.79    | 320.63   | 417.83   | 301.30   |
| 65                          | 25.03                               | 26.30    | 25.10    | 318.42   | 426.58   | 323.59   |

Limit Clause

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.



Product Service

Bluetooth Low Energy

## 4.0 V DC Supply

| Packet Type   | Maximum Peak Conducted Output Power |          |          |          |          |          |
|---------------|-------------------------------------|----------|----------|----------|----------|----------|
|               | dBm                                 |          |          | mW       |          |          |
|               | 2402 MHz                            | 2440 MHz | 2480 MHz | 2402 MHz | 2440 MHz | 2480 MHz |
| 37octet/prbs9 | 2.41                                | 3.93     | 3.46     | 1.74     | 2.47     | 2.22     |

Limit Clause

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.



Product Service

## **2.4 EIRP PEAK POWER**

### **2.4.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.247 (b)(4)

### **2.4.2 Equipment Under Test and Modification State**

SHL25 S/N: IMEI 004401115170249 - Modification State 0

SHL25 S/N: IMEI 004401115170256 - Modification State 0

### **2.4.3 Date of Test**

8 April 2014, 9 April 2014 & 17 April 2014

### **2.4.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.4.5 Test Procedure**

The EUT was transmitted at maximum power via a cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen and a resolution bandwidth and video bandwidth of 1 MHz were used to perform the measurement. The level on the spectrum analyser was maximised by rotating the EUT through 360° and a height search of the measuring antenna. A substitution was then performed using a suitable calibrated antenna and signal generator.

This level was maximised by adjusting the height of the measuring antenna once more. The level from the signal generator was then adjusted to achieve the same raw result as with the EUT. This level was then corrected to account for cable loss and antenna factor. A peak power analyser was also used to obtain a correction factor for the wideband signal.

A calculation was then performed to obtain the final figure.

### **2.4.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 19.5 - 20.9°C |
| Relative Humidity   | 28.0 - 39.0%  |



Product Service

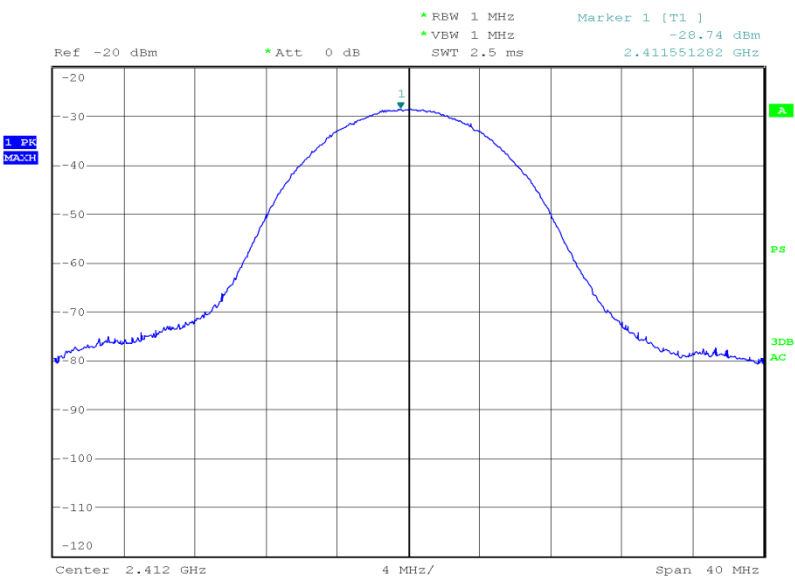
2.4.7 Test Results

802.11(b)

4.0 V DC Supply

2412 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 16.74      | 47.21     |



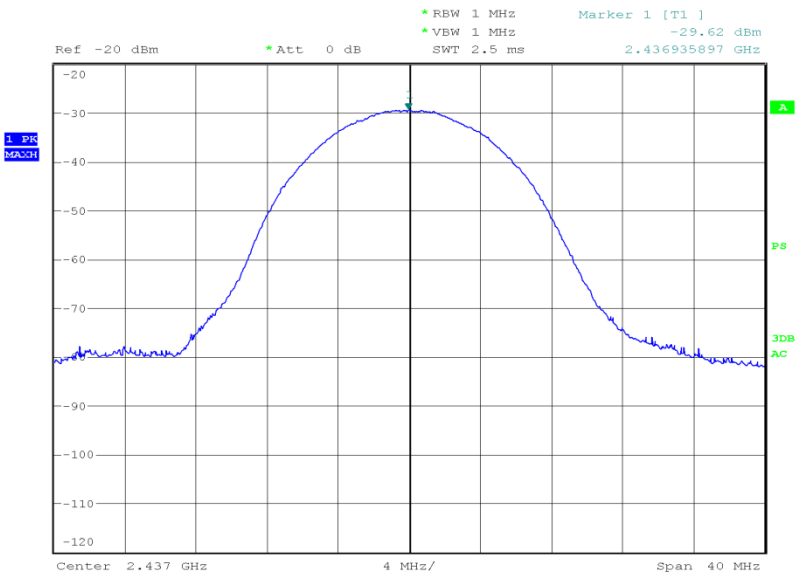
Date: 9.APR.2014 17:47:09



Product Service

2437 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 15.41      | 34.75     |



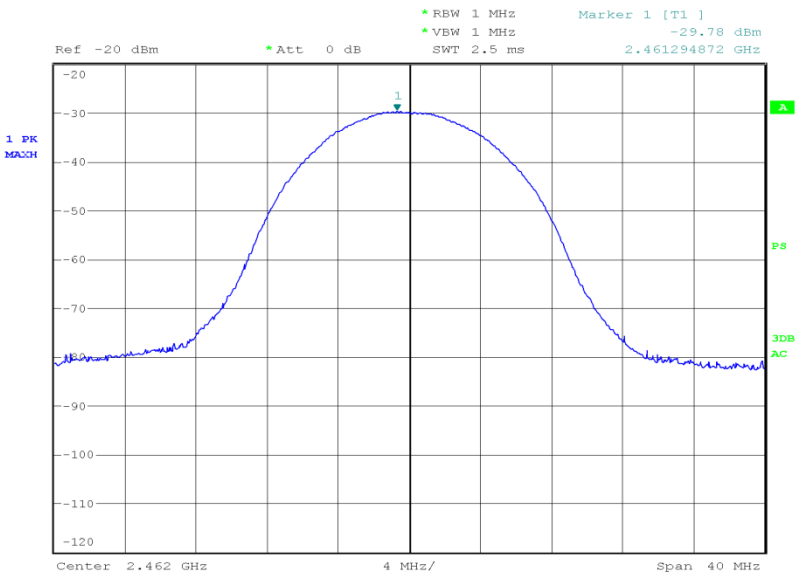
Date: 9.APR.2014 17:44:23



Product Service

2462 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 15.63      | 36.56     |



Date: 9.APR.2014 17:52:15

Limit

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 36.0       | 4000      |

802.11(g)

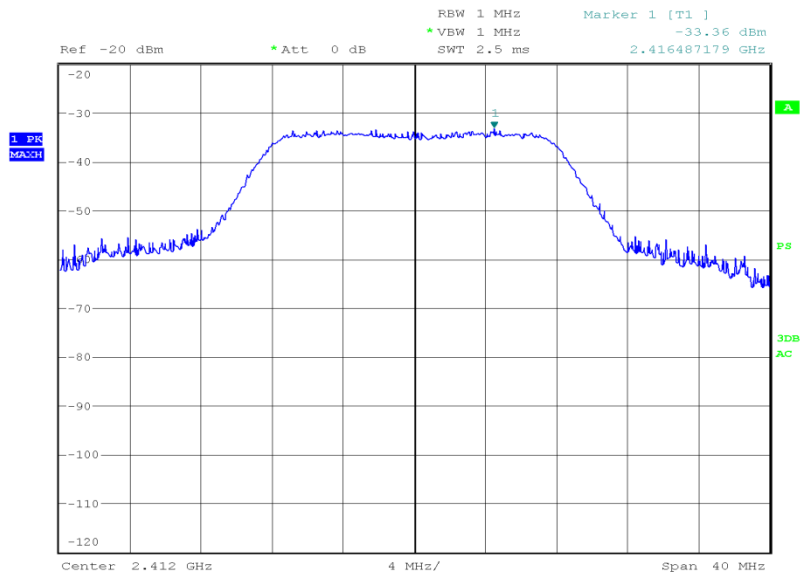
4.0 V DC Supply

2412 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 19.44      | 87.90     |



Product Service



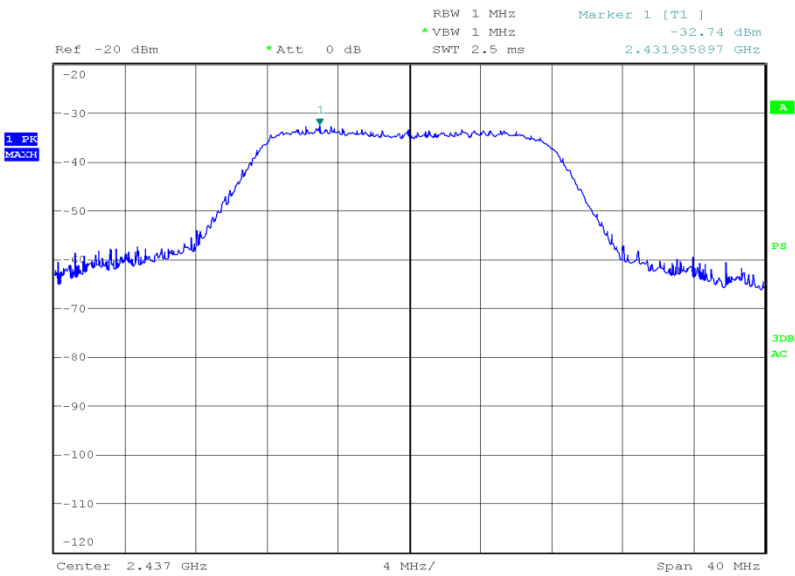
Date: 9.APR.2014 19:09:26



Product Service

2437 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 19.61      | 91.41     |



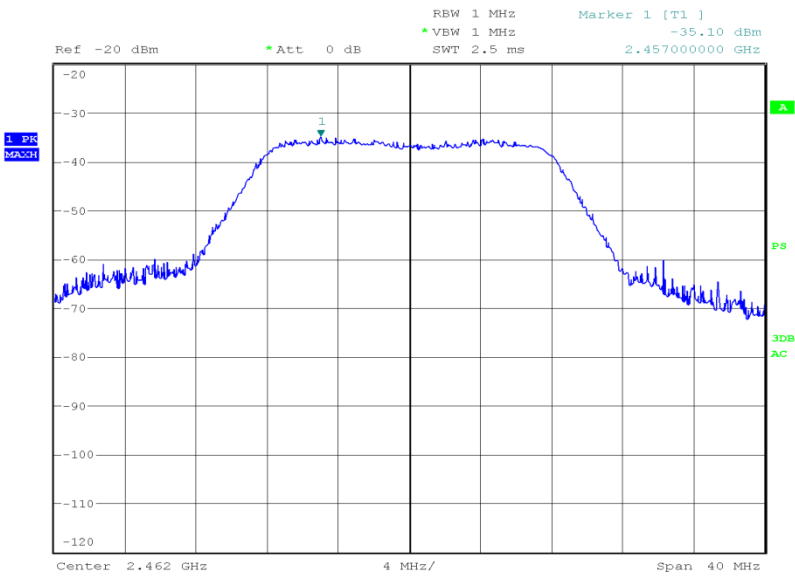
Date: 9.APR.2014 19:06:50



Product Service

2462 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 17.63      | 57.94     |



Date: 9.APR.2014 19:43:40

Limit

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 36.0       | 4000      |



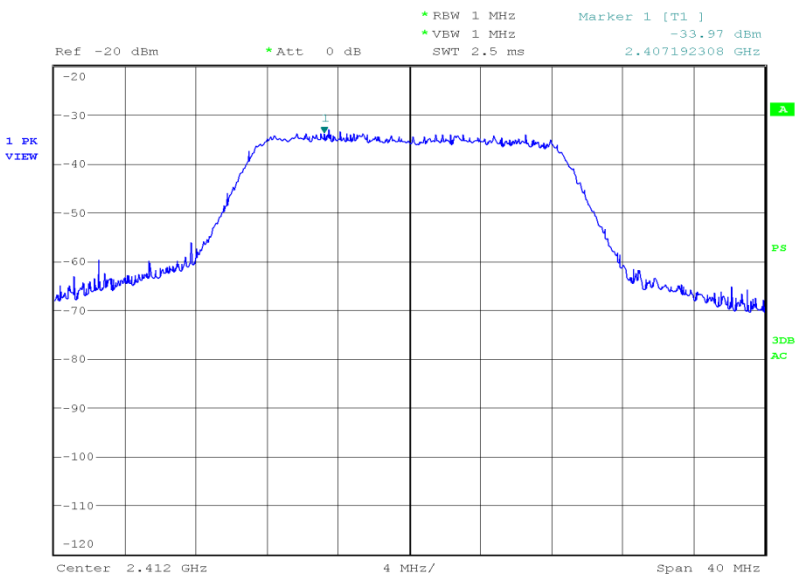
Product Service

802.11(n)

4.0 V DC Supply

2412 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 19.43      | 87.70     |



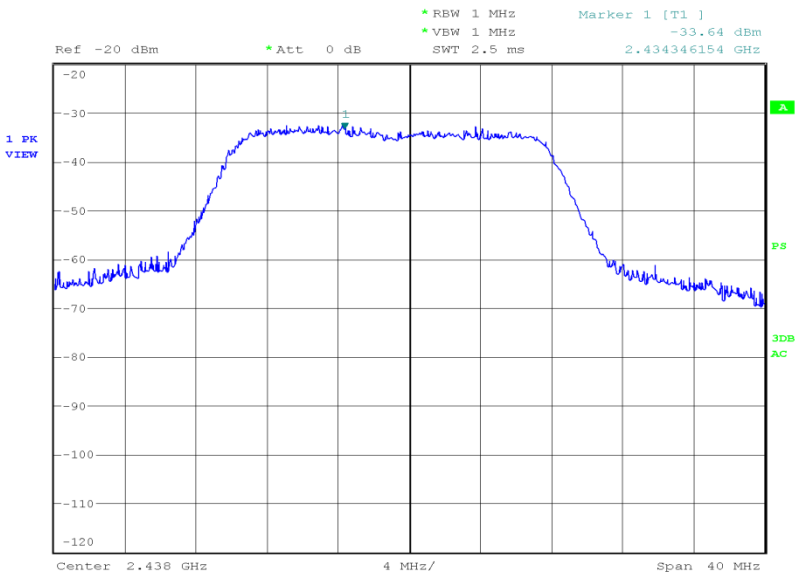
Date: 17.APR.2014 00:14:56



Product Service

2437 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 19.31      | 85.31     |



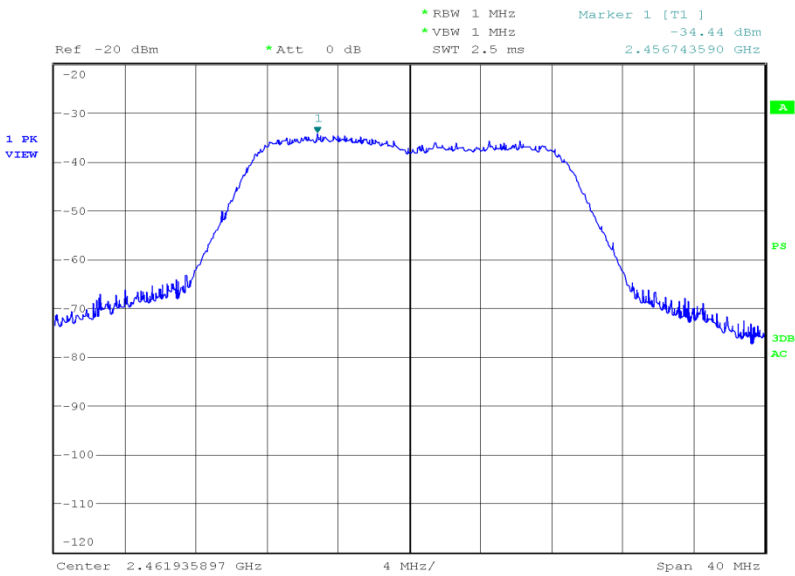
Date: 17.APR.2014 00:28:33



Product Service

2462 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 19.03      | 79.98     |



Date: 17.APR.2014 00:39:44

Limit

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 36.0       | 4000      |



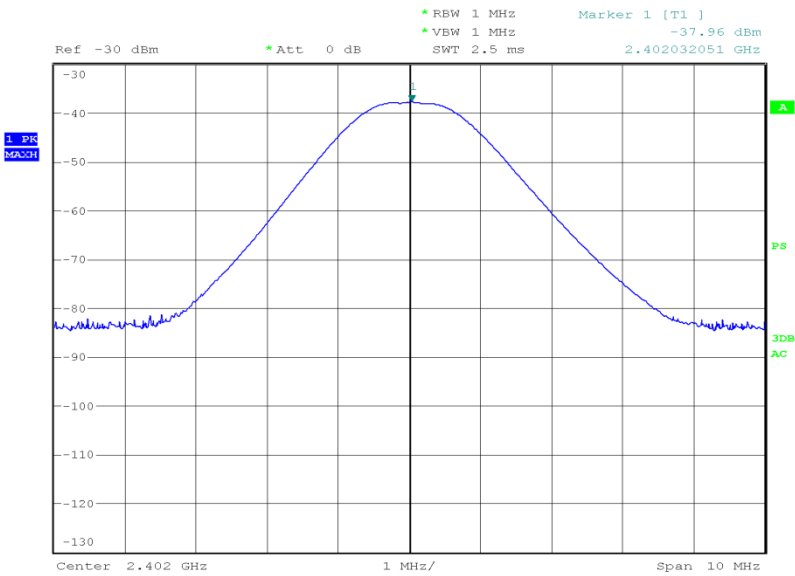
Product Service

Bluetooth Low Energy

4.0 V DC Supply

2402 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 3.56       | 2.27      |



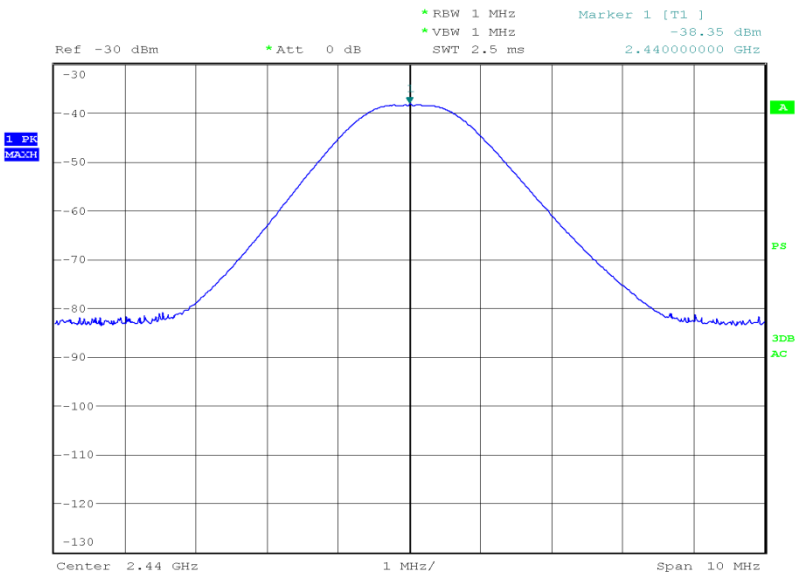
Date: 8.APR.2014 17:09:58



Product Service

2440 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 3.42       | 2.20      |



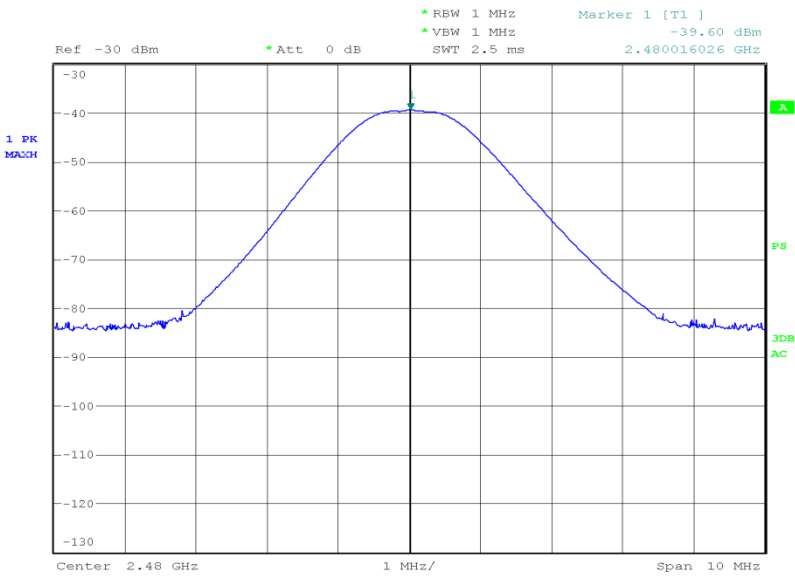
Date: 8.APR.2014 17:42:43



Product Service

2480 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 2.49       | 1.77      |



Date: 8.APR.2014 17:49:24

Limit

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 36.0       | 4000      |



Product Service

## **2.5 SPURIOUS AND BAND EDGE EMISSIONS**

### **2.5.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.247 (d)

### **2.5.2 Equipment Under Test and Modification State**

SHL25 S/N: IMEI 004401115170488 - Modification State 0

SHL25 S/N: IMEI 004401115170256 - Modification State 0

### **2.5.3 Date of Test**

3 April 2014, 8 April 2014, 9 April 2014, 15 April 2014, 17 April 2014, 18 April 2014, 24 April 2014 & 28 April 2014

### **2.5.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.5.5 Test Procedure**

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (d) and KDB 558074.

For conducted emissions, the EUT was set to operate at maximum power on the bottom, middle and top channels for the data rate which resulted in the highest peak output power. The power of each fundamental frequency was measured in 100 kHz RBW, the resultant limit line on the trace was set at -20 dBc of this value. The measurement path loss in each relevant frequency band was measured and entered as a reference level offset. The test was performed from 9 kHz to 25 GHz.

For radiated emissions, the test method described above was also used in addition to the guidelines specified for measurements in restricted bands as specified in KDB 558074. Measurements were performed from 30 MHz to 25 GHz and the path loss is incorporated as a transducer factor and entered into the spectrum analyser.

Band edge measurements were performed in accordance with the marker-delta method specified in ANSI C63.10, Clause 6.9.2. The results were analysed to ensure compliance with restricted bands. The EUT was set to the lowest and highest operating frequencies.

### **2.5.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 19.2 - 24.6°C |
| Relative Humidity   | 28.0 - 42.9%  |



Product Service

## 2.5.7 Test Results

802.11(b)

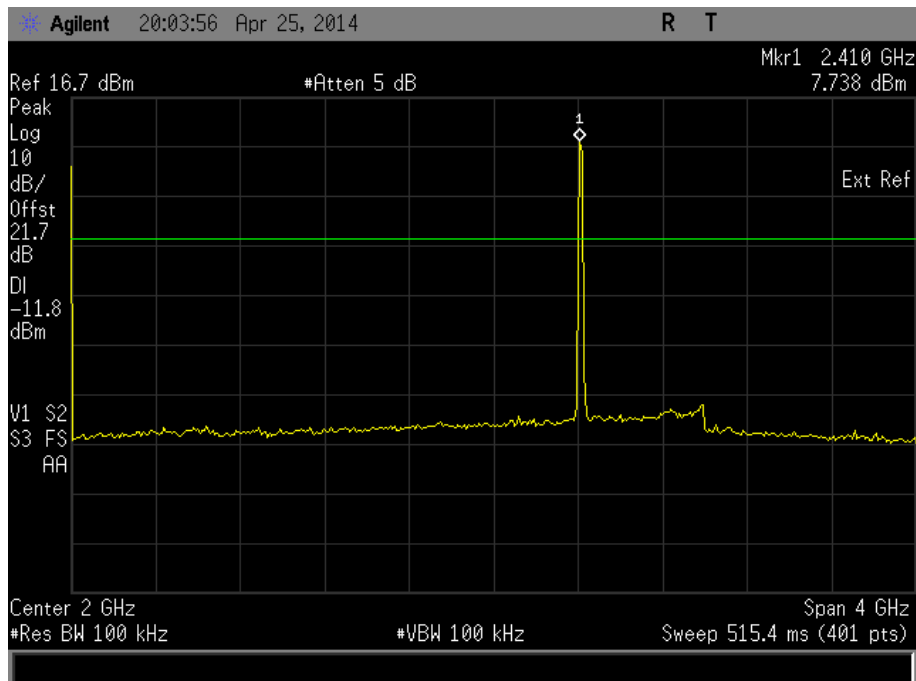
4.0 V DC Supply

Spurious Conducted Emissions

11 Mbps

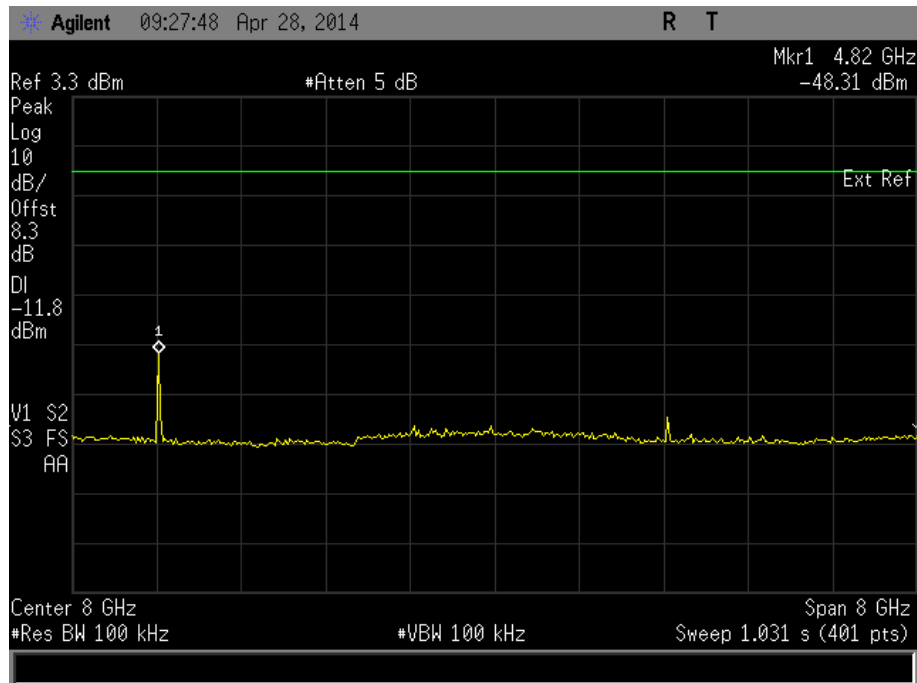
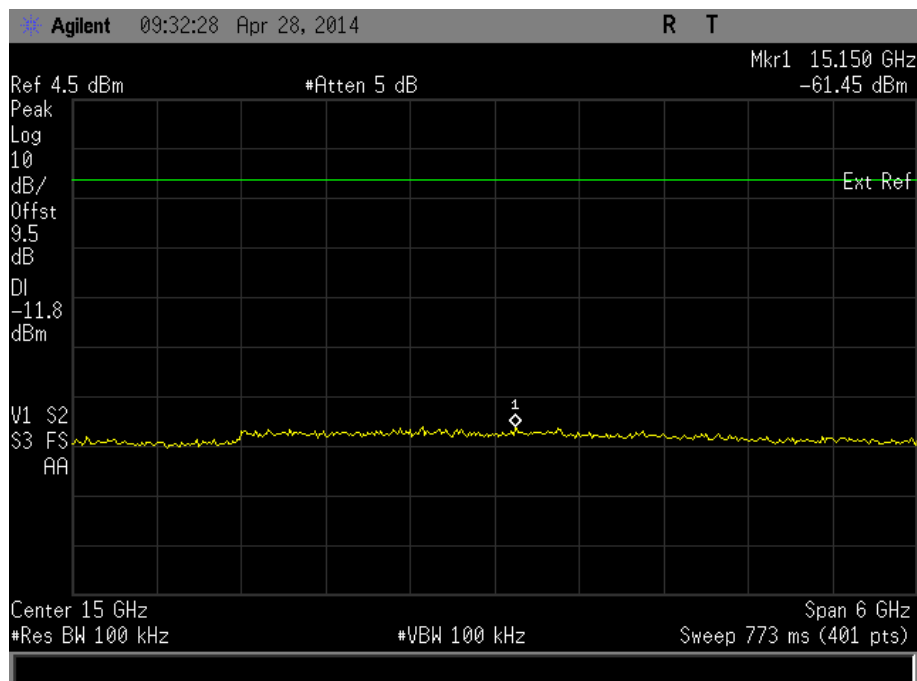
2412 MHz

9 kHz to 4 GHz



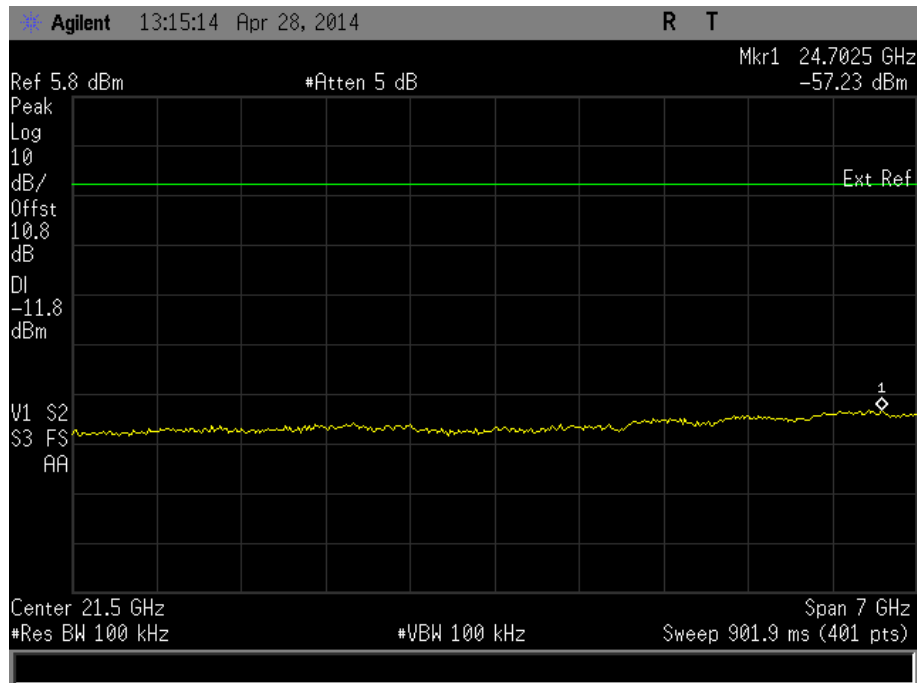
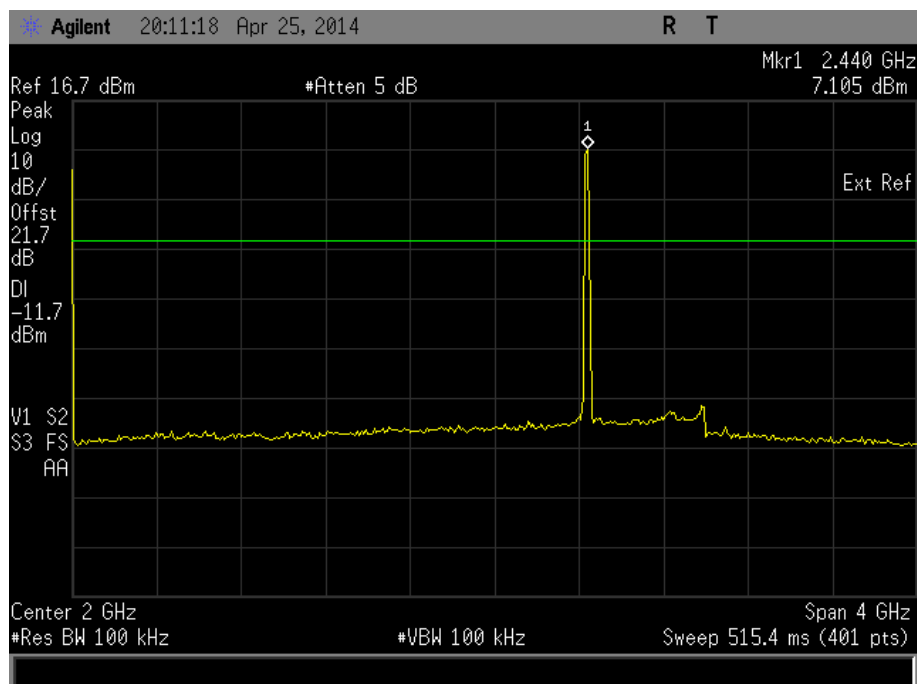


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

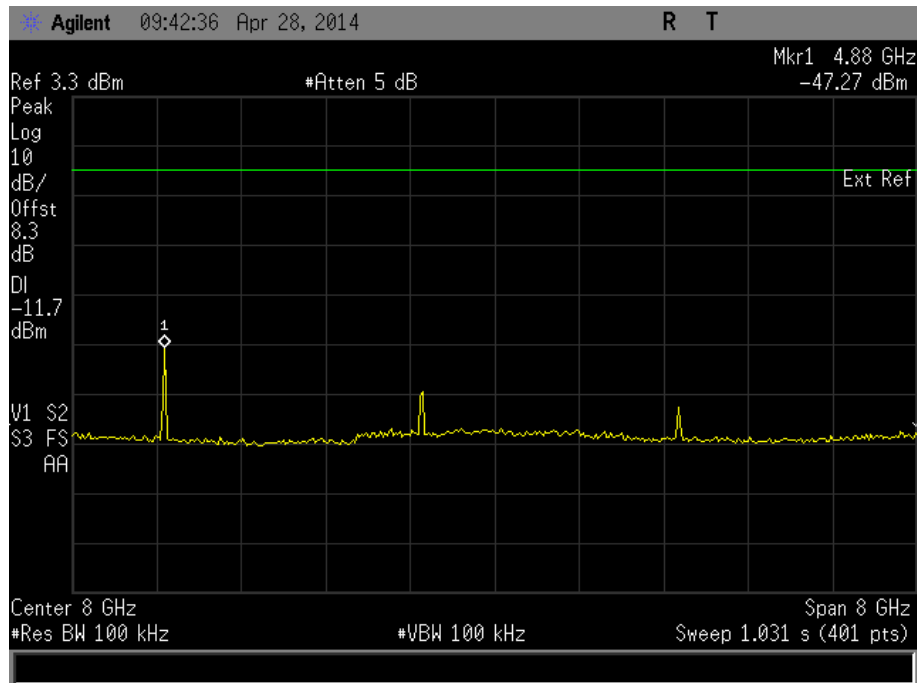
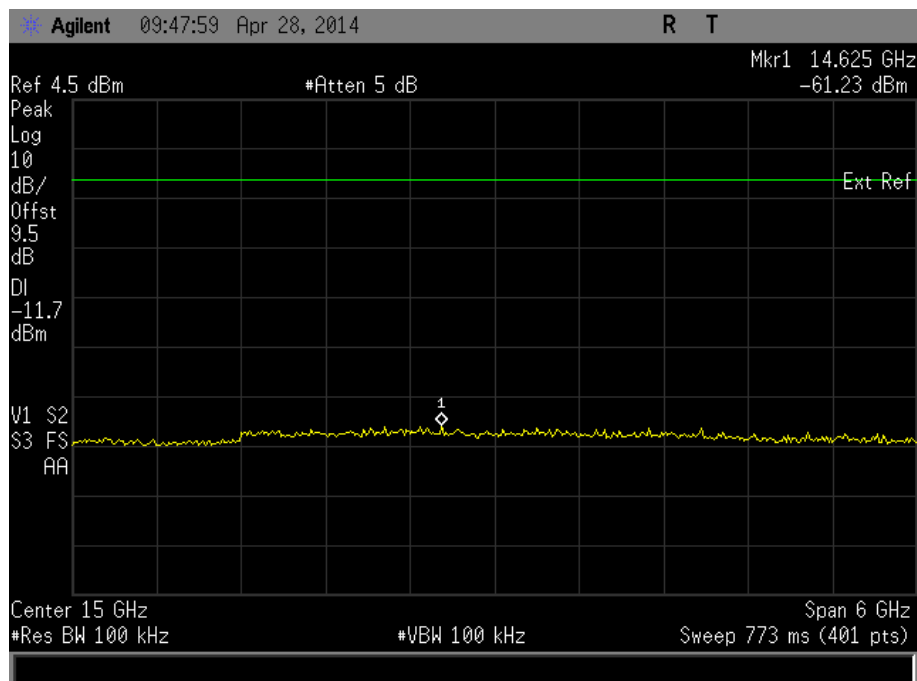


Product Service

18 GHz to 25 GHz2437 MHz9 kHz to 4 GHz

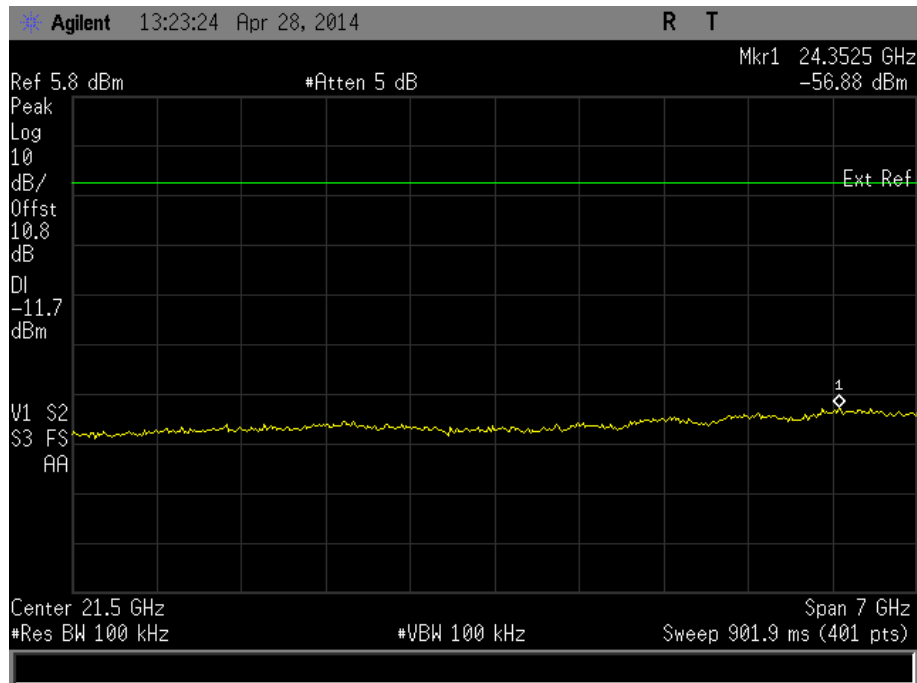
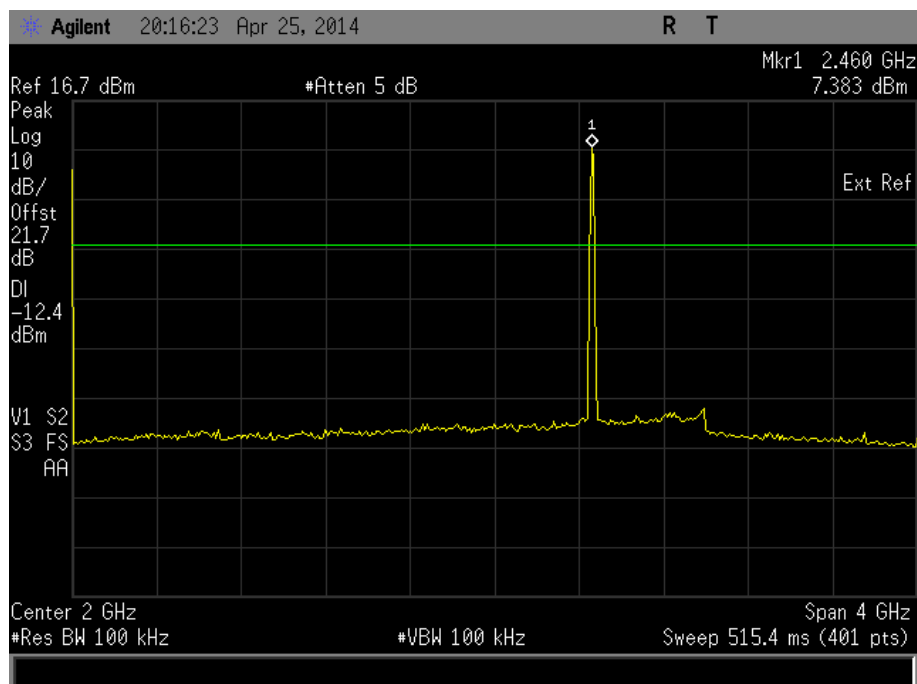


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

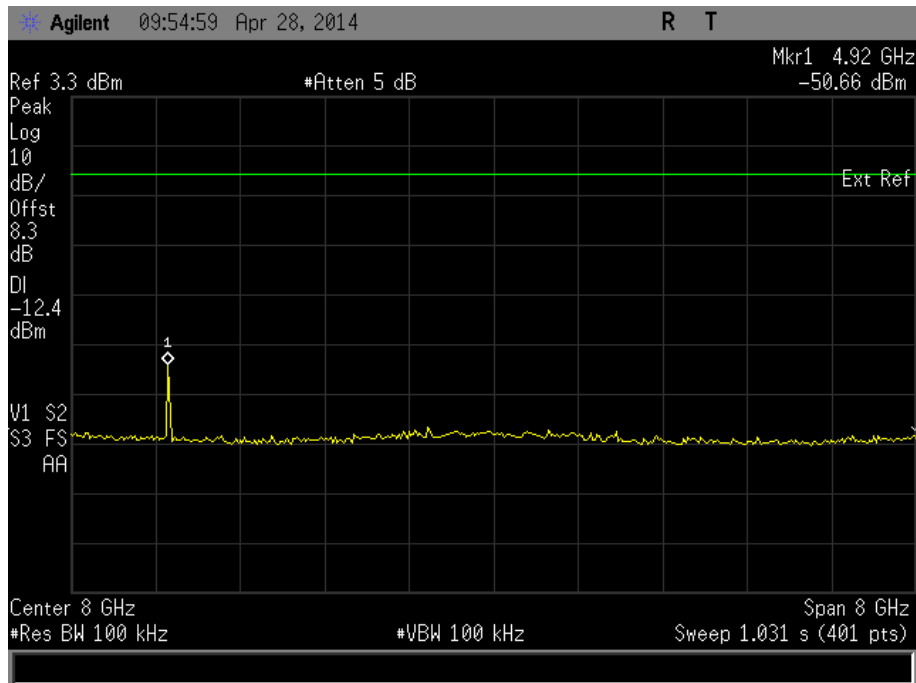
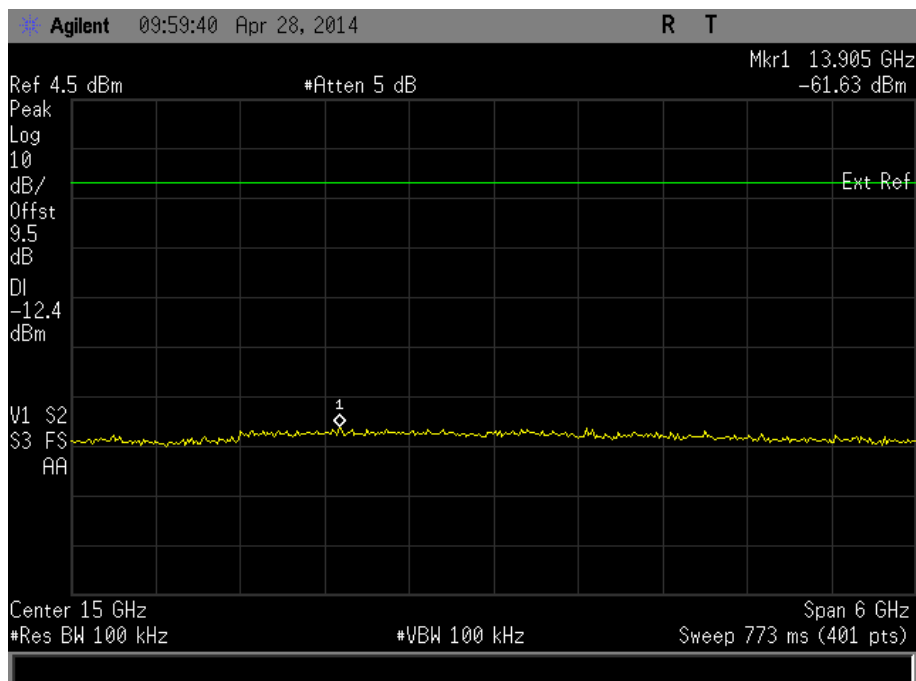


Product Service

18 GHz to 25 GHz2462 MHz9 kHz to 4 GHz

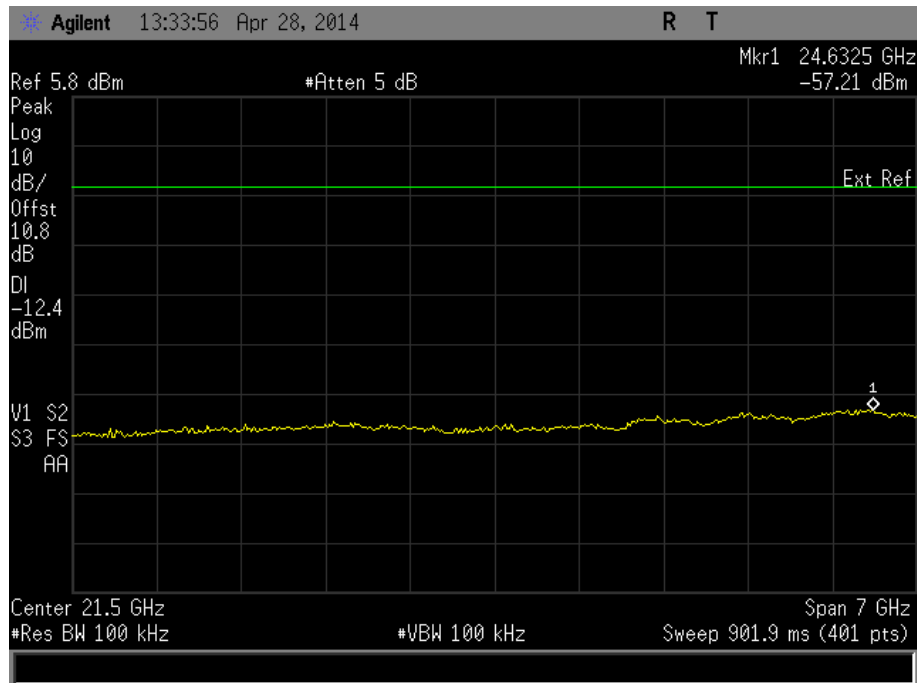


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.

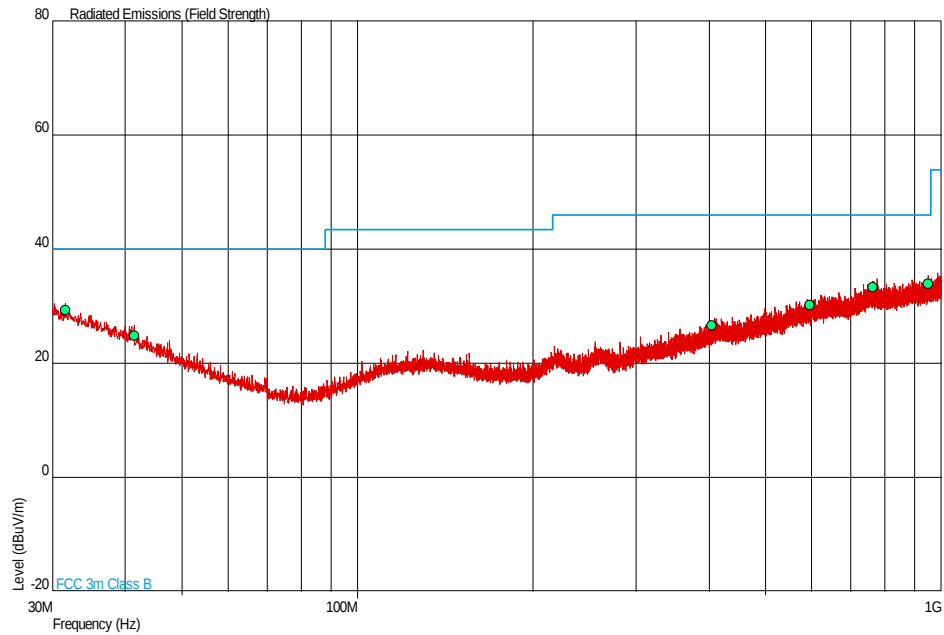


Product Service

## Spurious Radiated Emissions

2412 MHz

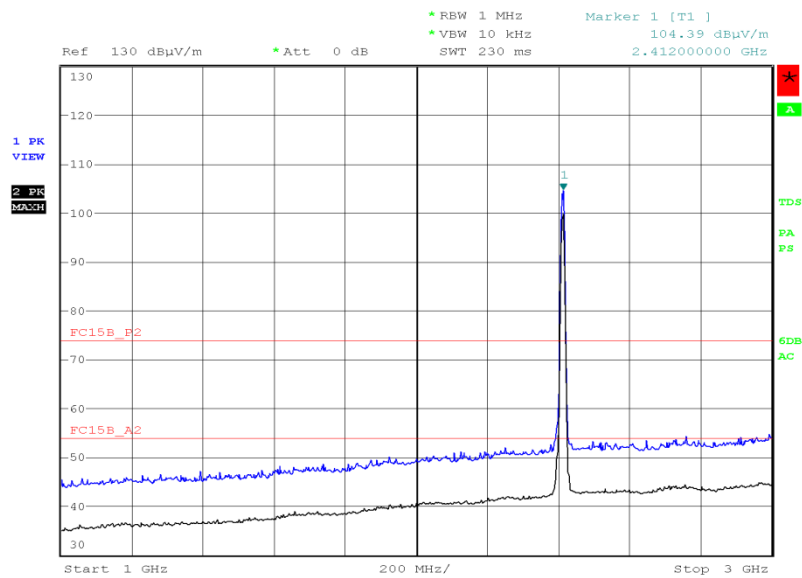
30 MHz to 1 GHz



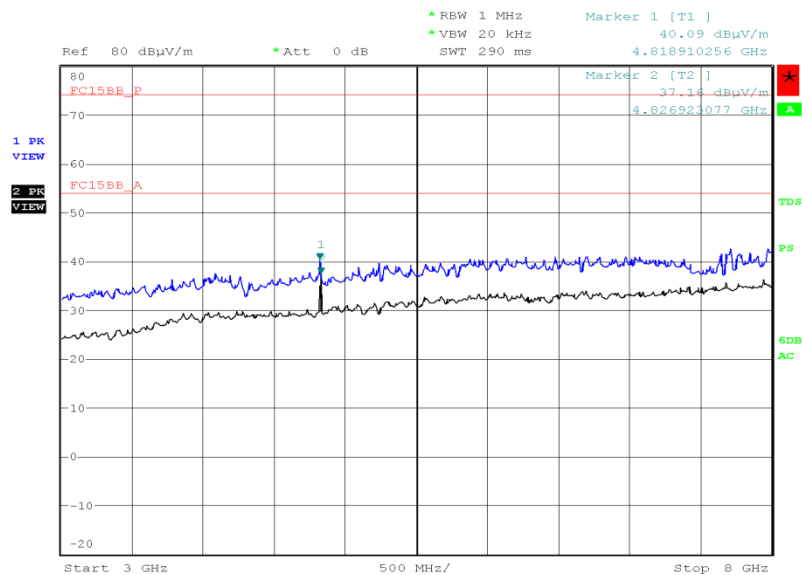
| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 31.603          | 29.3              | 29.2            | 40.0              | 100             | -10.7              | -70.8            | 125         | 2.11       | Vertical   |
| 41.453          | 24.9              | 17.6            | 40.0              | 100             | -15.1              | -82.4            | 31          | 1.00       | Vertical   |
| 404.860         | 26.7              | 21.6            | 46.0              | 200             | -19.3              | -178.4           | 291         | 1.00       | Horizontal |
| 595.326         | 30.3              | 32.7            | 46.0              | 200             | -15.7              | -167.3           | 205         | 1.73       | Horizontal |
| 763.404         | 33.3              | 46.2            | 46.0              | 200             | -12.7              | -153.8           | 347         | 1.00       | Vertical   |
| 949.042         | 33.9              | 49.5            | 46.0              | 200             | -12.1              | -150.5           | 1           | 1.12       | Vertical   |



Product Service

1 GHz to 3 GHz

Date: 9.APR.2014 17:33:34

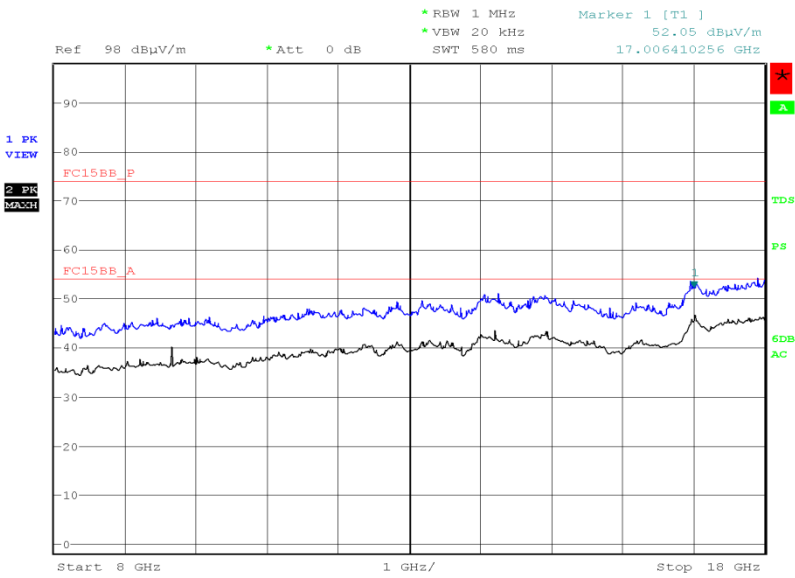
3 GHz to 8 GHz

Date: 17.APR.2014 02:20:48



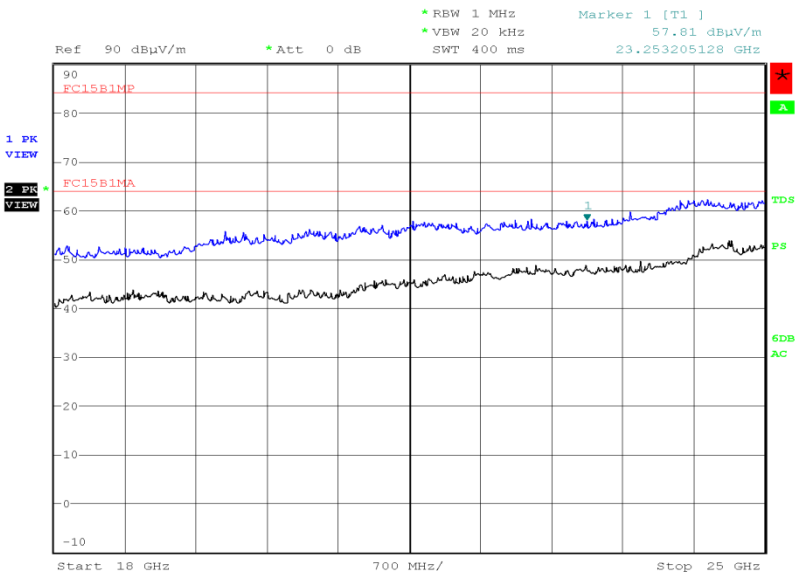
Product Service

8 GHz to 18 GHz



Date: 17.APR.2014 02:58:02

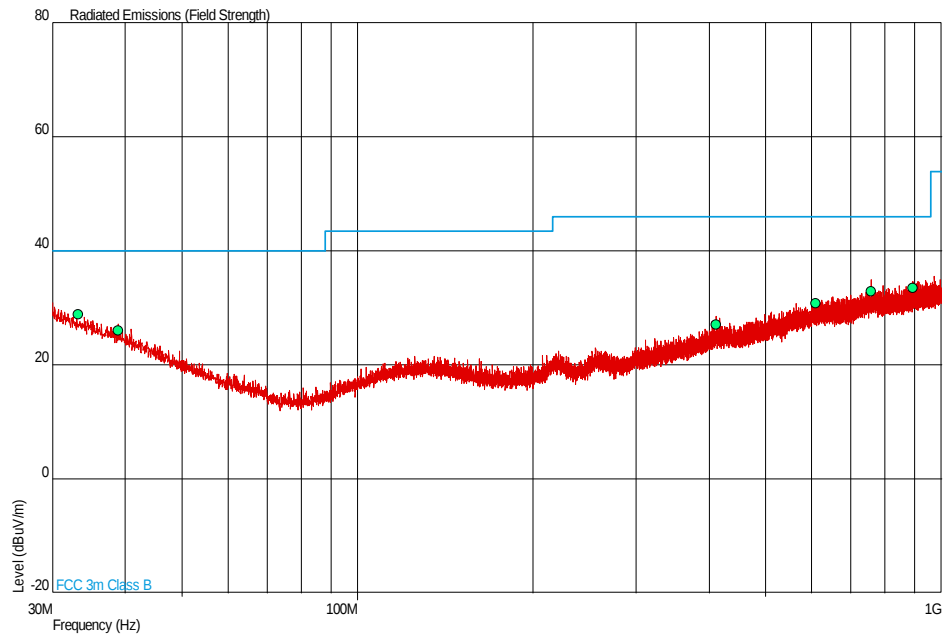
18 GHz to 25 GHz



Date: 17.APR.2014 04:27:08



Product Service

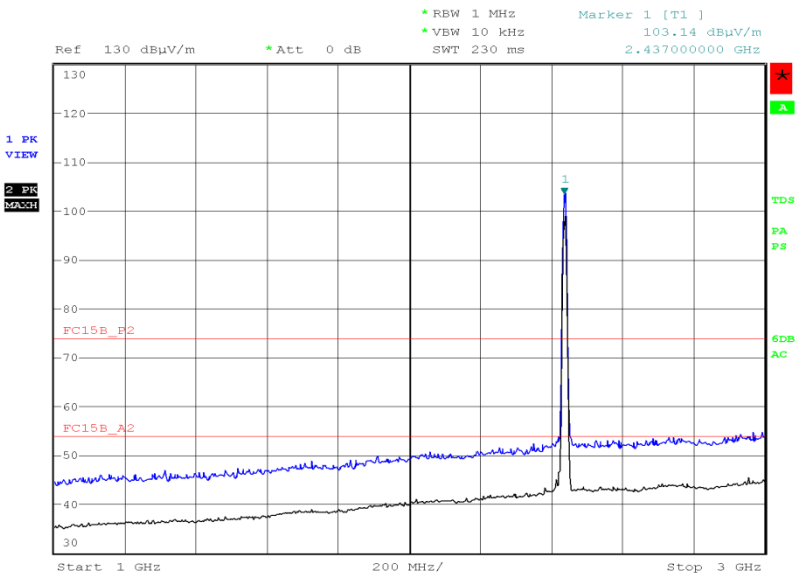
2437 MHz30 MHz to 1 GHz

| Frequency (MHz) | QP Level (dBµV/m) | QP Level (µV/m) | QP Limit (dBµV/m) | QP Limit (µV/m) | QP Margin (dBµV/m) | QP Margin (µV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 33.228          | 28.9              | 27.9            | 40.0              | 100             | -11.1              | -72.1            | 322         | 1.00       | Horizontal |
| 38.960          | 26.1              | 20.2            | 40.0              | 100             | -13.9              | -79.8            | 193         | 1.00       | Horizontal |
| 411.241         | 27.1              | 22.6            | 46.0              | 200             | -18.9              | -177.4           | 241         | 1.00       | Horizontal |
| 609.234         | 30.8              | 34.7            | 46.0              | 200             | -15.2              | -165.3           | 342         | 1.30       | Horizontal |
| 757.597         | 32.9              | 44.2            | 46.0              | 200             | -13.1              | -155.8           | 0           | 1.00       | Vertical   |
| 892.739         | 33.6              | 47.9            | 46.0              | 200             | -12.4              | -152.1           | 176         | 1.81       | Horizontal |



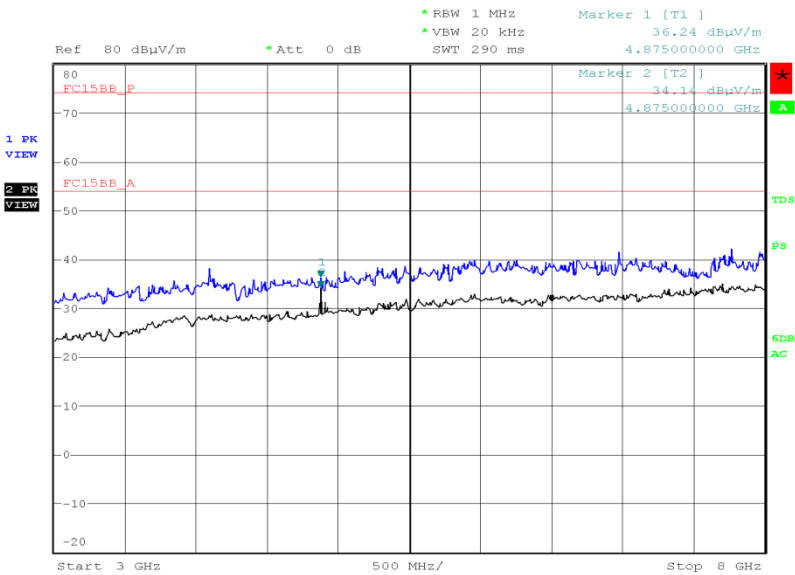
Product Service

1 GHz to 3 GHz



Date: 9.APR.2014 17:37:01

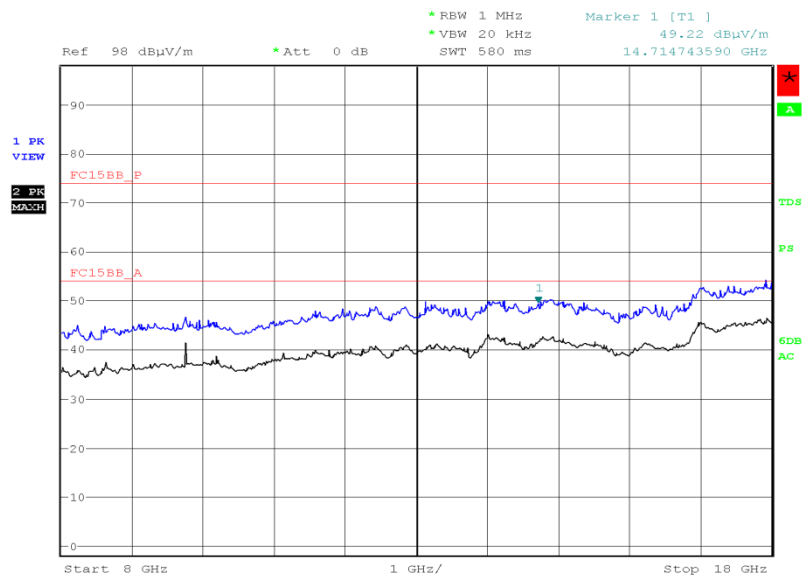
3 GHz to 8 GHz



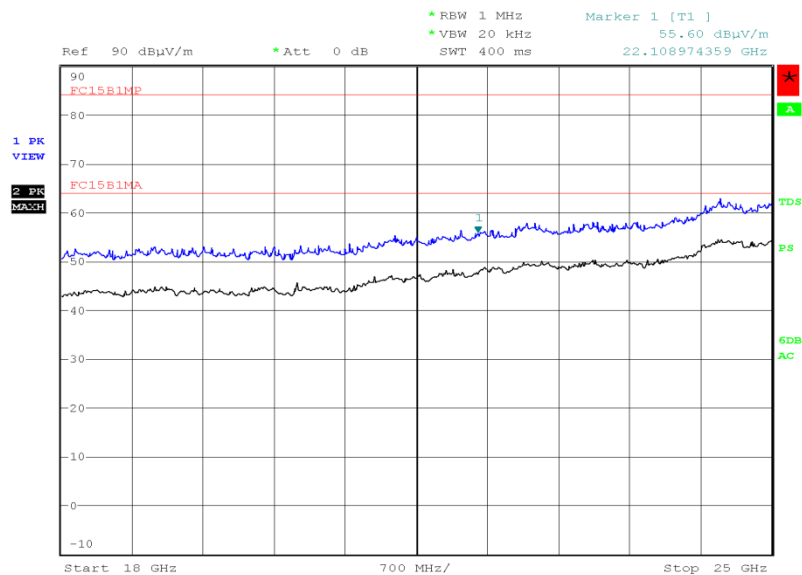
Date: 17.APR.2014 02:13:50



Product Service

8 GHz to 18 GHz

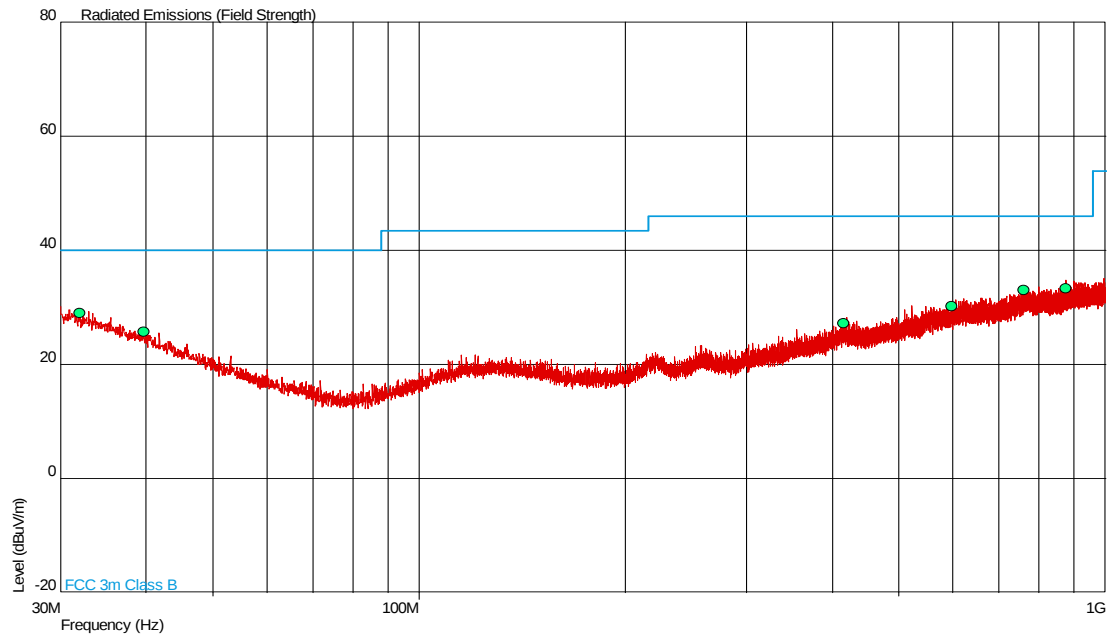
Date: 17.APR.2014 03:04:16

18 GHz to 25 GHz

Date: 17.APR.2014 04:33:09



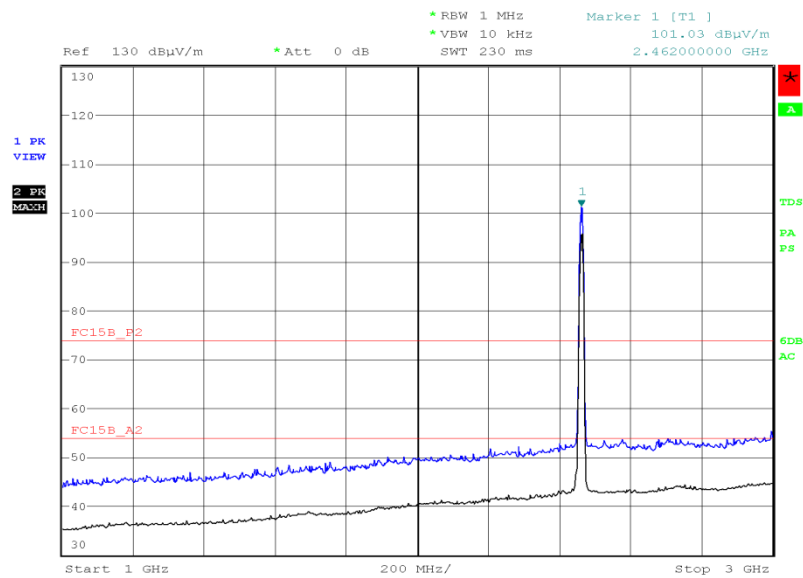
Product Service

2462 MHz30 MHz to 1 GHz

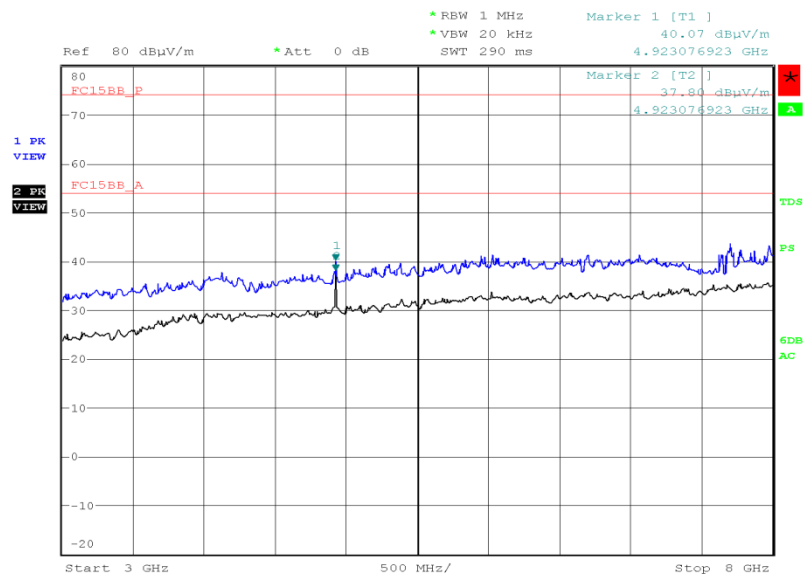
| Frequency (MHz) | QP Level (dBμV/m) | QP Level (μV/m) | QP Limit (dBμV/m) | QP Limit (μV/m) | QP Margin (dBμV/m) | QP Margin (μV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 32.028          | 29.0              | 28.2            | 40.0              | 100             | -11.0              | -71.8            | 129         | 1.00       | Vertical   |
| 39.702          | 25.8              | 19.5            | 40.0              | 100             | -14.2              | -80.5            | 354         | 1.00       | Vertical   |
| 415.584         | 27.3              | 23.2            | 46.0              | 200             | -18.7              | -176.8           | 84          | 1.00       | Horizontal |
| 596.792         | 30.2              | 32.4            | 46.0              | 200             | -15.8              | -167.6           | 262         | 1.00       | Vertical   |
| 761.174         | 33.1              | 45.2            | 46.0              | 200             | -12.9              | -154.8           | 172         | 1.00       | Vertical   |
| 876.316         | 33.3              | 46.2            | 46.0              | 200             | -12.7              | -153.8           | 283         | 1.00       | Vertical   |



Product Service

1 GHz to 3 GHz

Date: 9.APR.2014 17:59:31

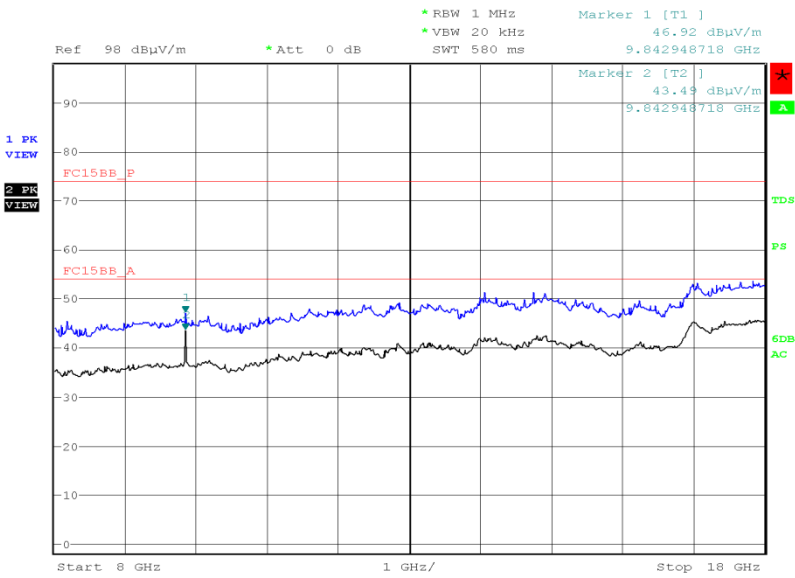
3 GHz to 8 GHz

Date: 17.APR.2014 02:08:20



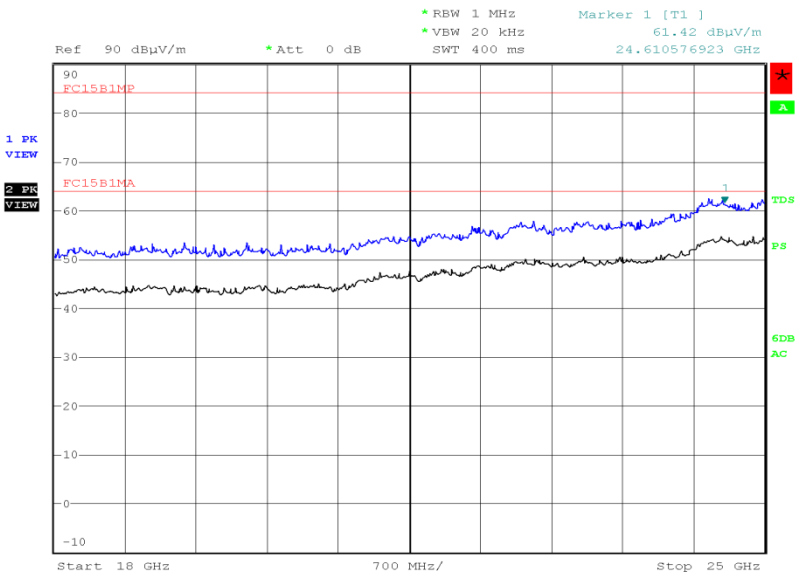
Product Service

8 GHz to 18 GHz



Date: 17.APR.2014 03:12:12

18 GHz to 25 GHz



Date: 17.APR.2014 04:39:13

Limit

| Peak (dBμV/m) | Average (dBμV/m) |
|---------------|------------------|
| 74.0          | 54.0             |

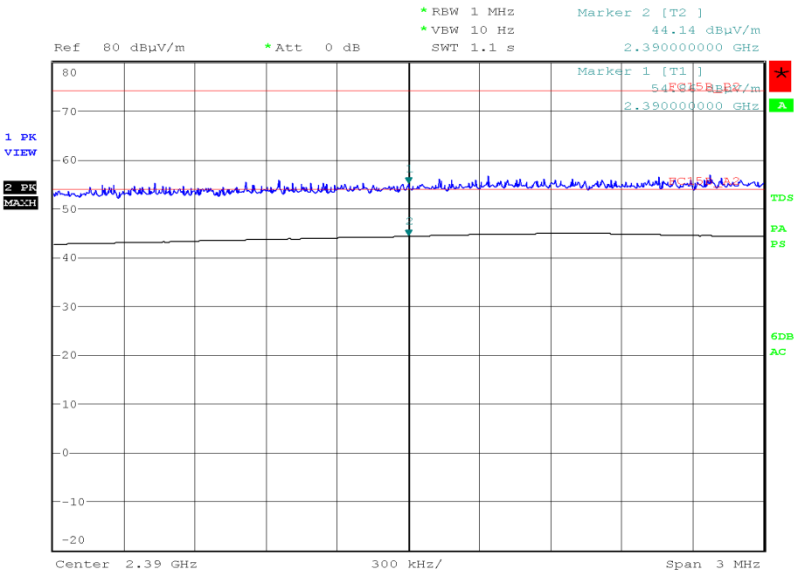


Product Service

Band Edge Emissions

2412 MHz

| Polarisation | Final Peak (dBμV/m) | Final Average (dBμV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 54.86               | 44.14                  |



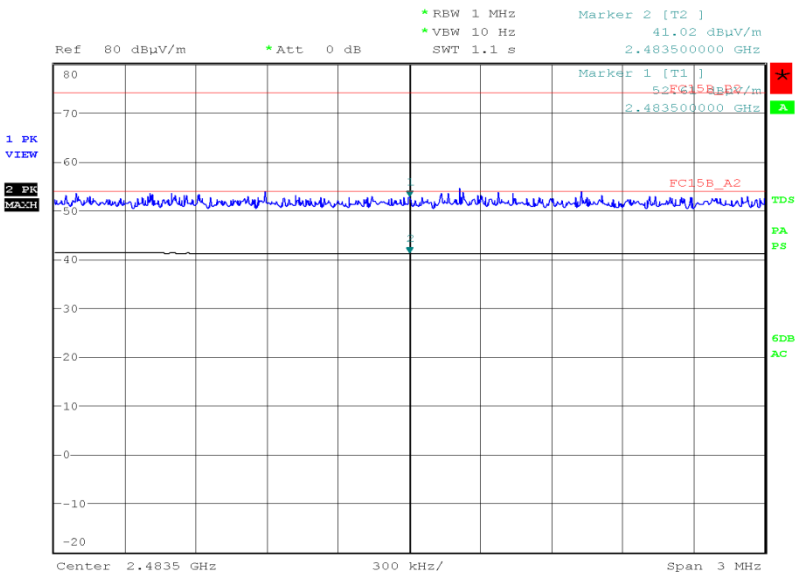
Date: 9.APR.2014 17:28:43



Product Service

2462 MHz

| Polarisation | Final Peak (dBµV/m) | Final Average (dBµV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 52.61               | 41.02                  |



Date: 9.APR.2014 17:55:13

Limit

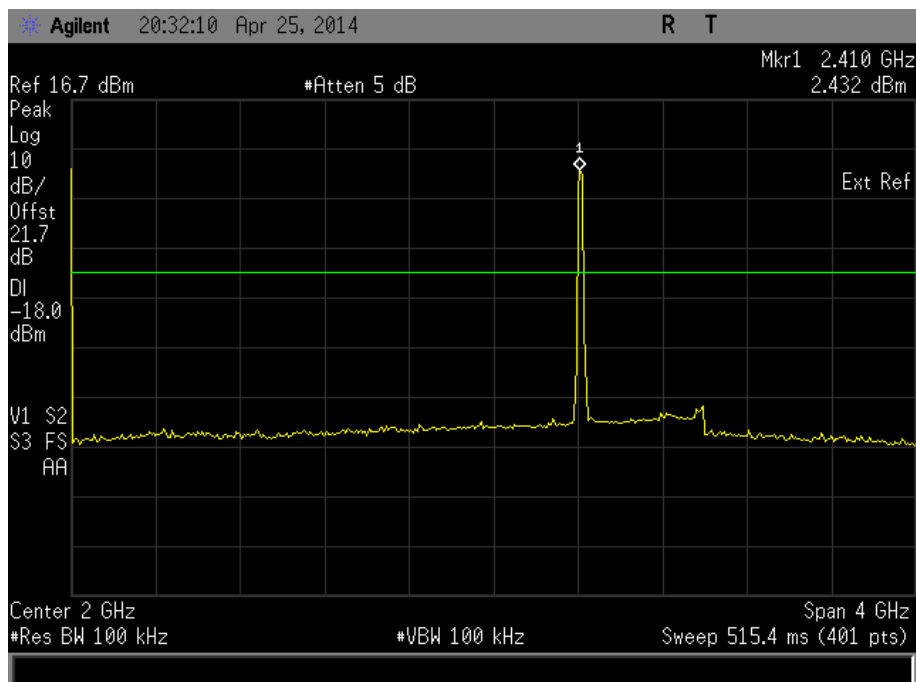
| Peak (dBµV/m) | Average (dBµV/m) |
|---------------|------------------|
| 74.0          | 54.0             |



Product Service

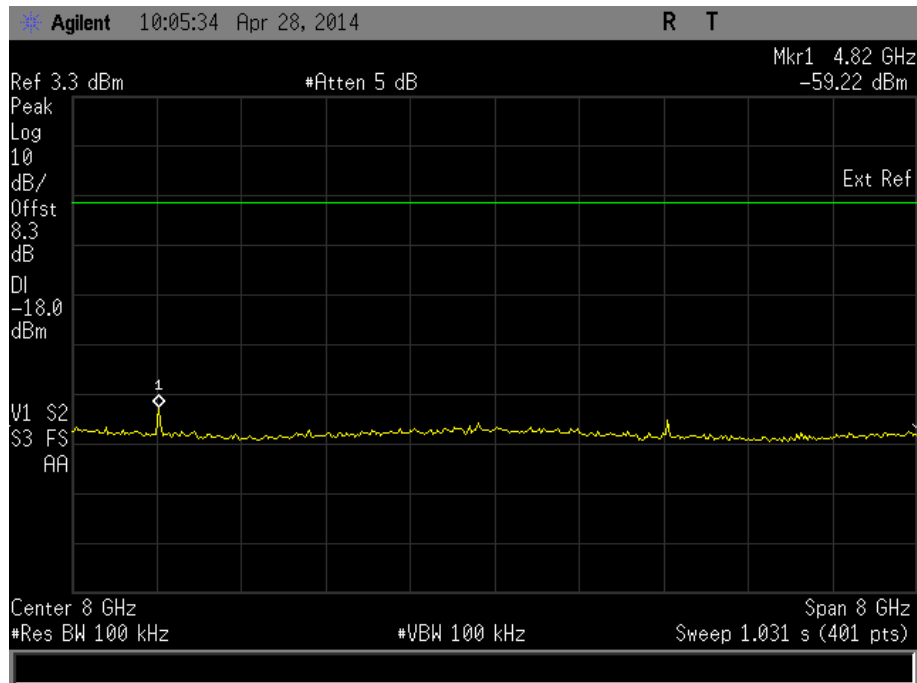
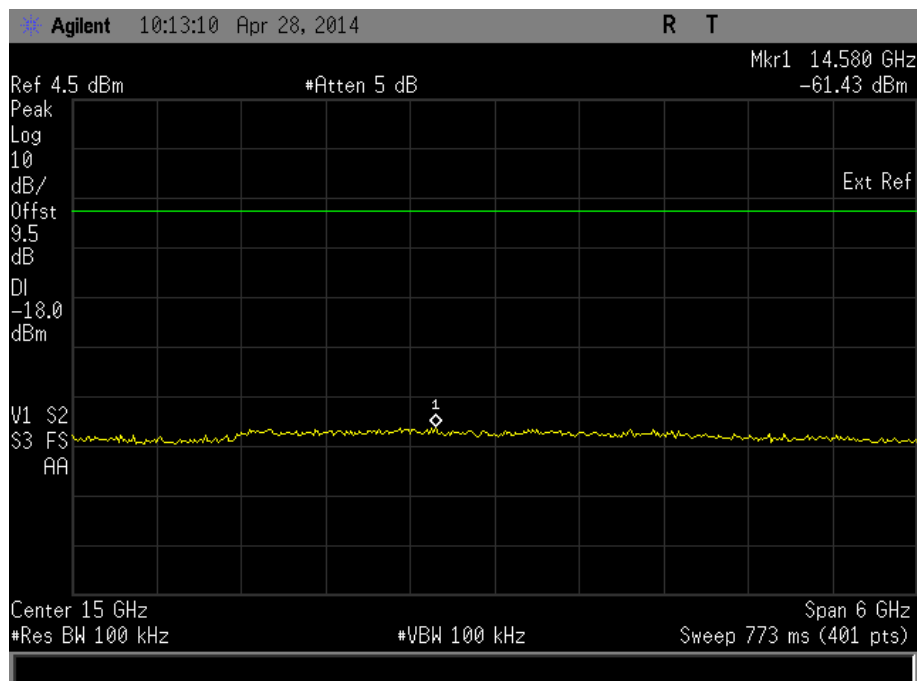
802.11(g)

4.0 V DC Supply

Spurious Conducted Emissions6 Mbps2412 MHz9 kHz to 4 GHz

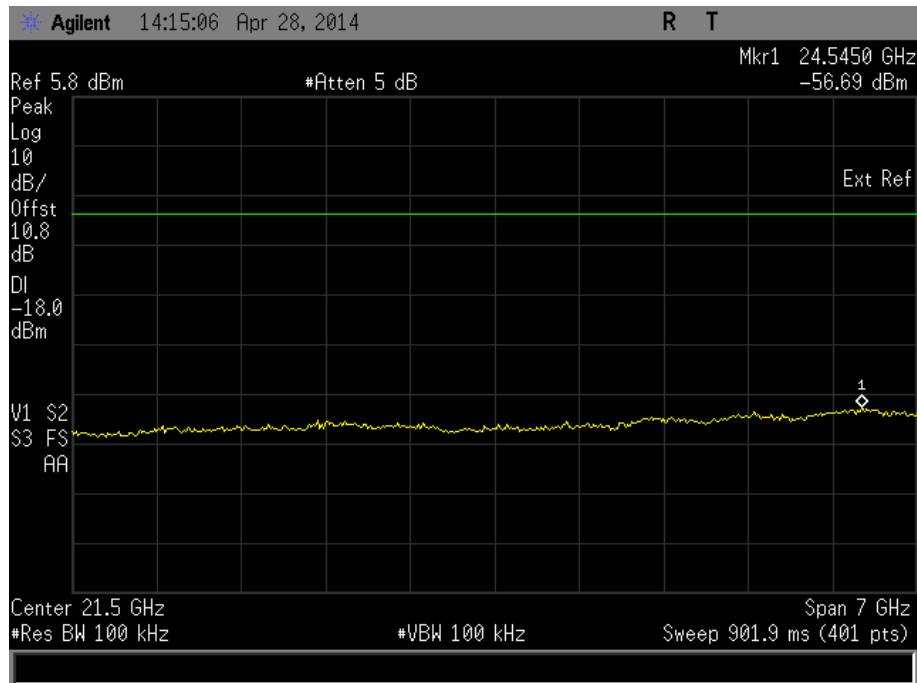
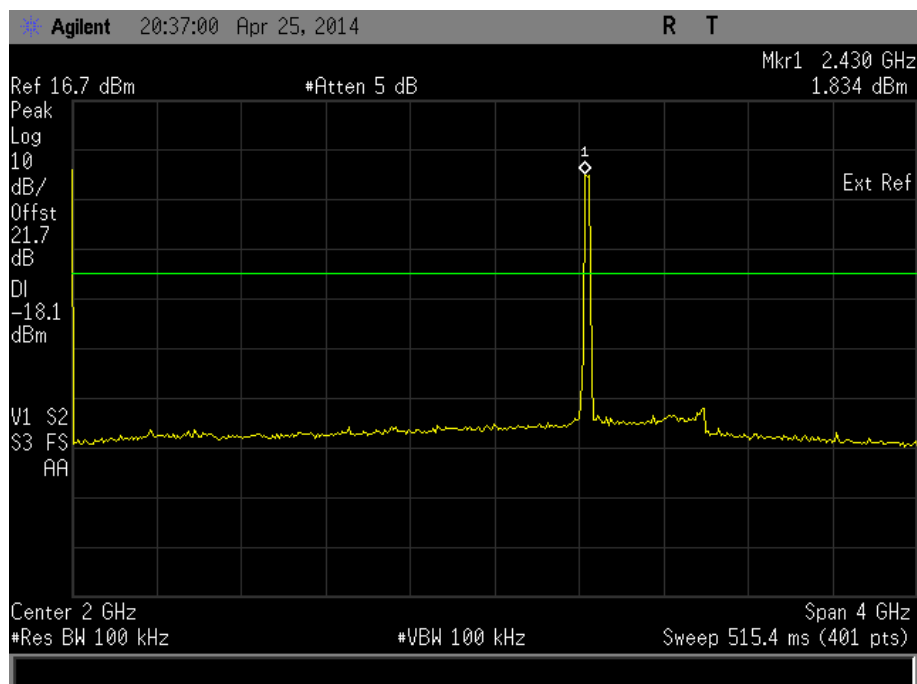


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

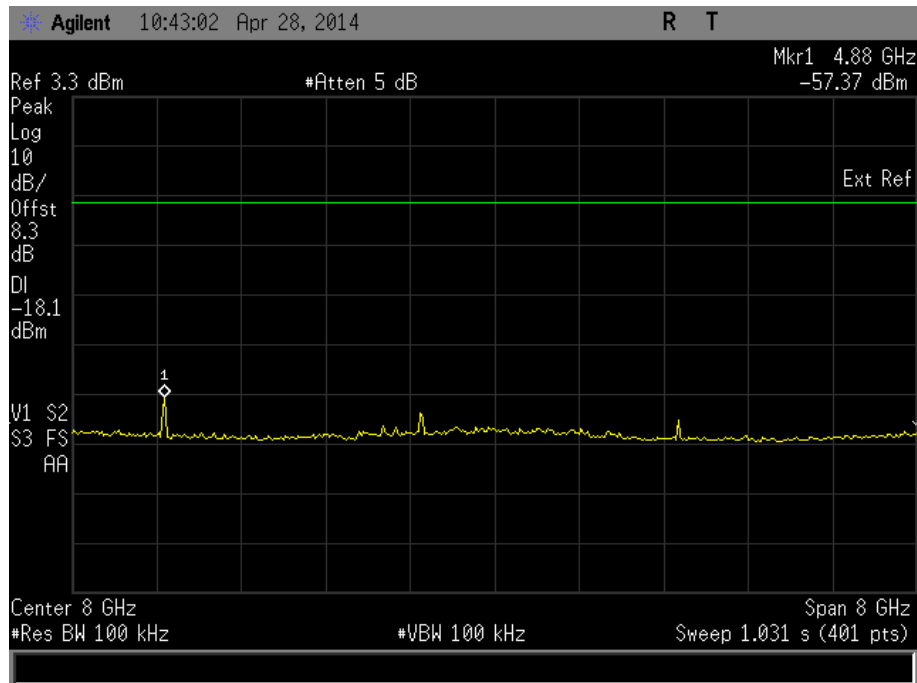
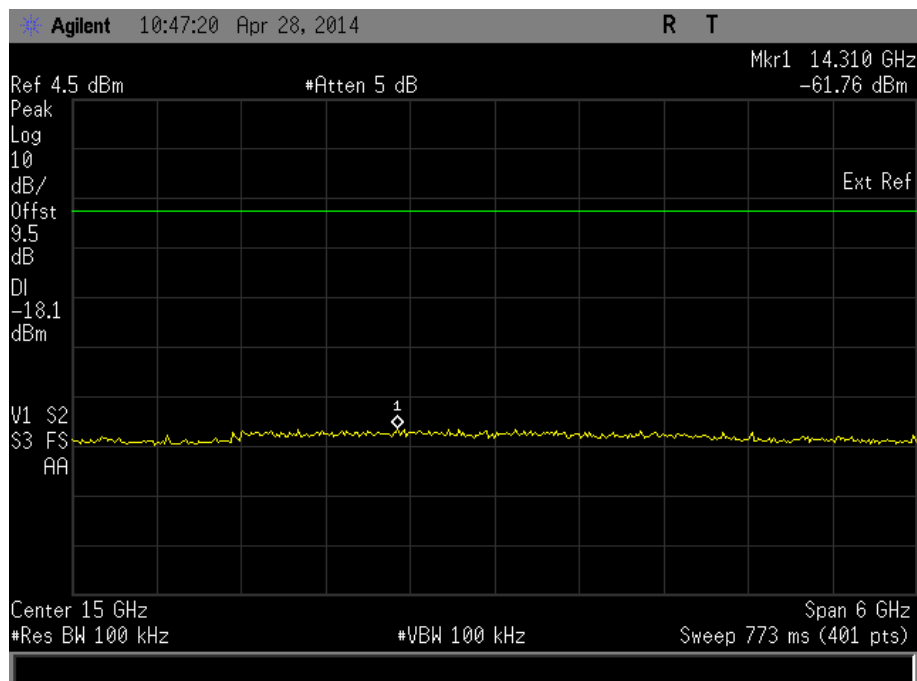


Product Service

18 GHz to 25 GHz2437 MHz9 kHz to 4 GHz

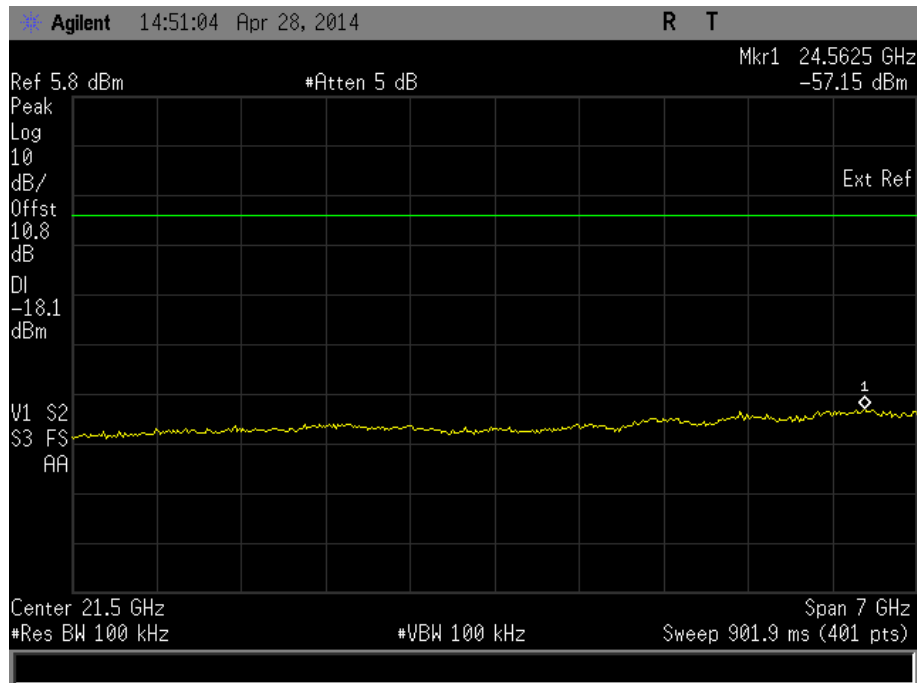
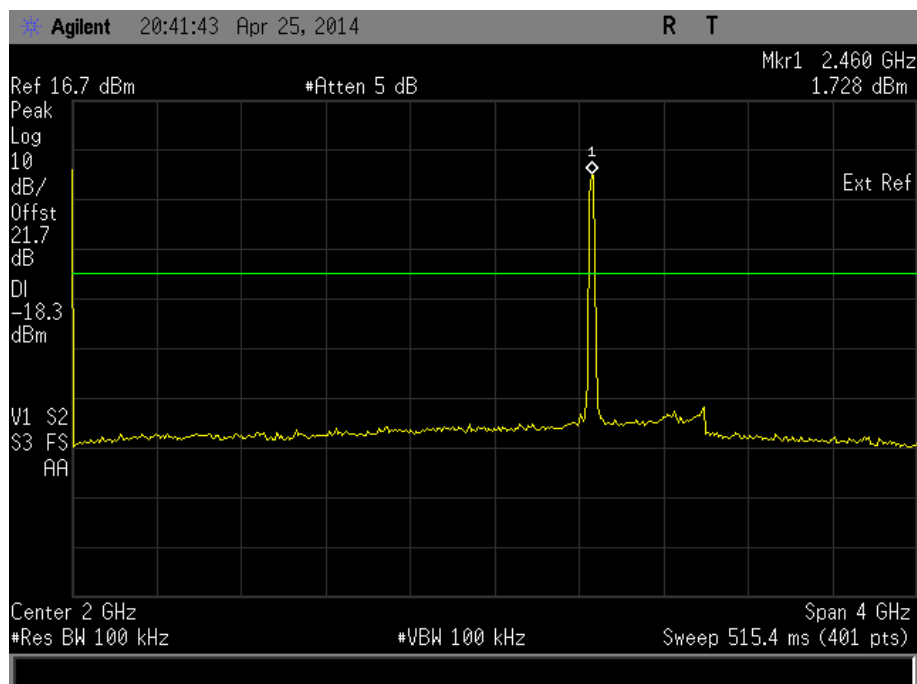


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

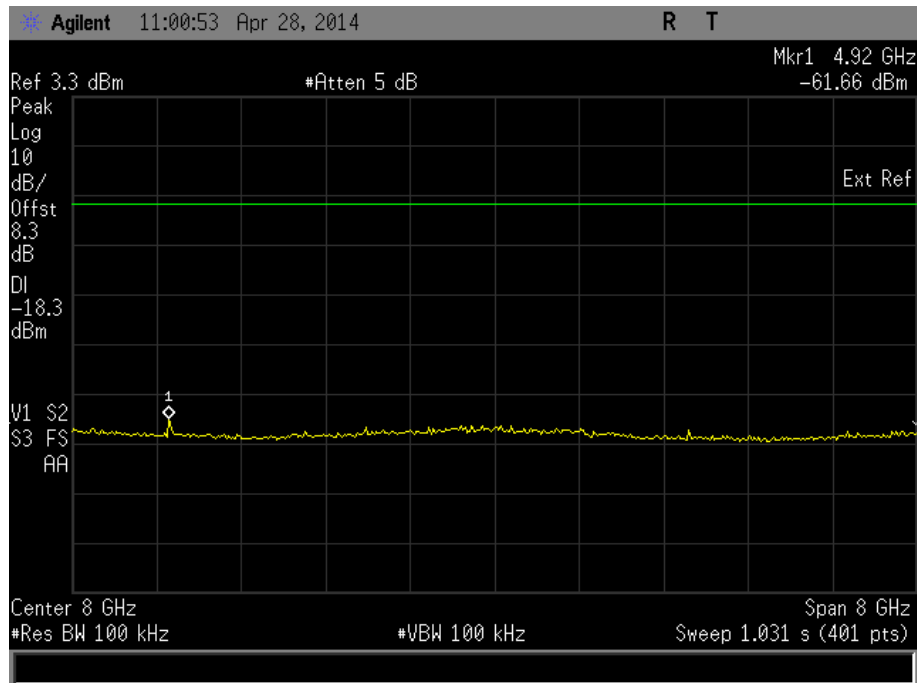
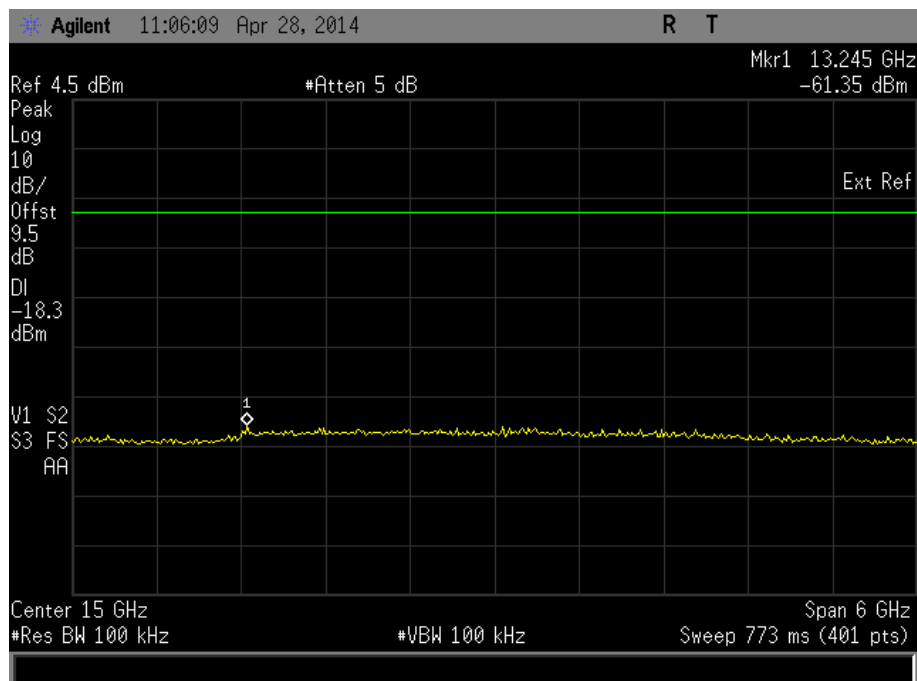


Product Service

18 GHz to 25 GHz2462 MHz9 kHz to 4 GHz

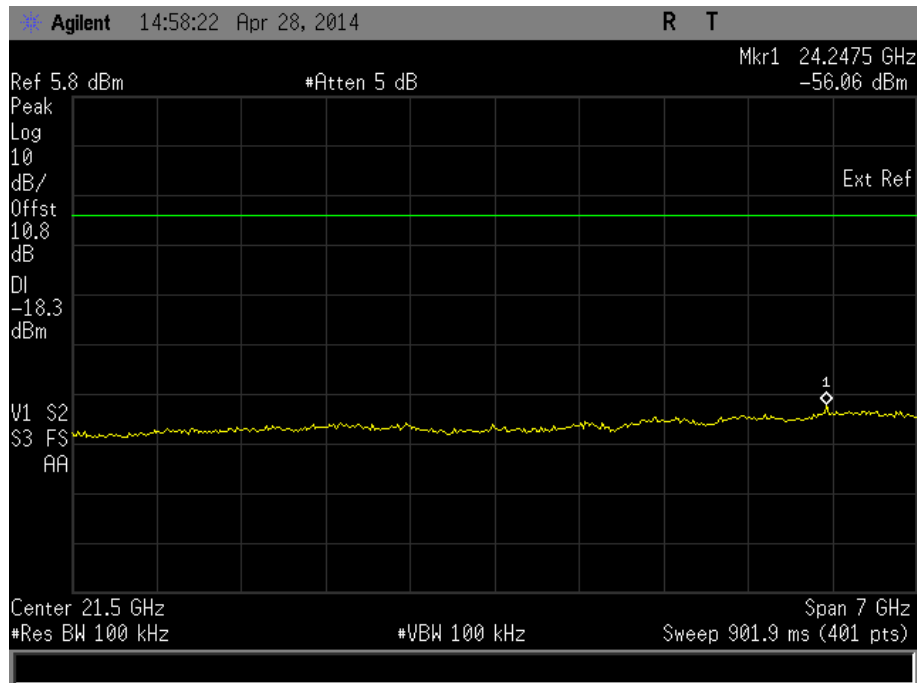


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.

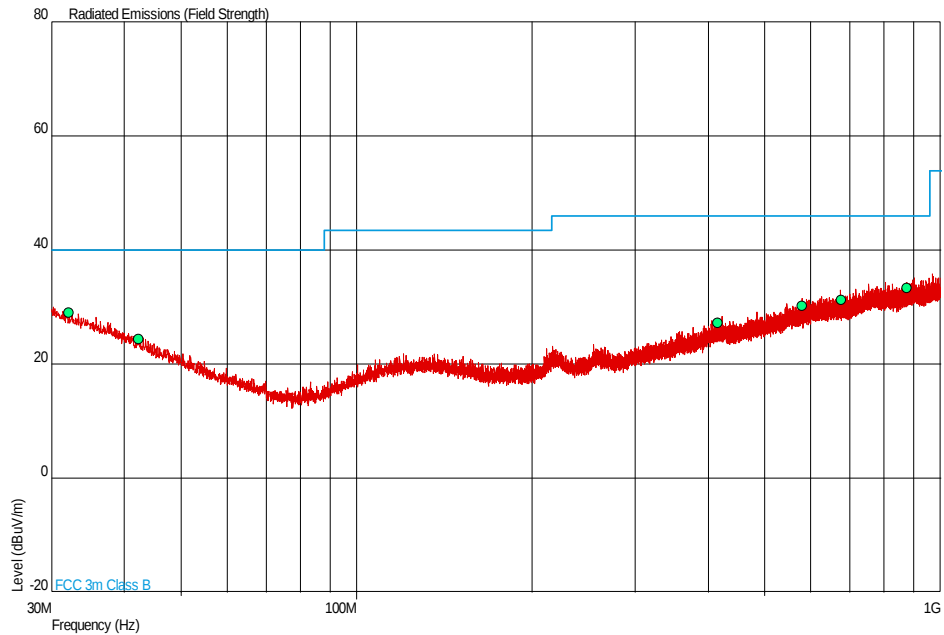


Product Service

## Spurious Radiated Emissions

2412 MHz

30 MHz to 1 GHz

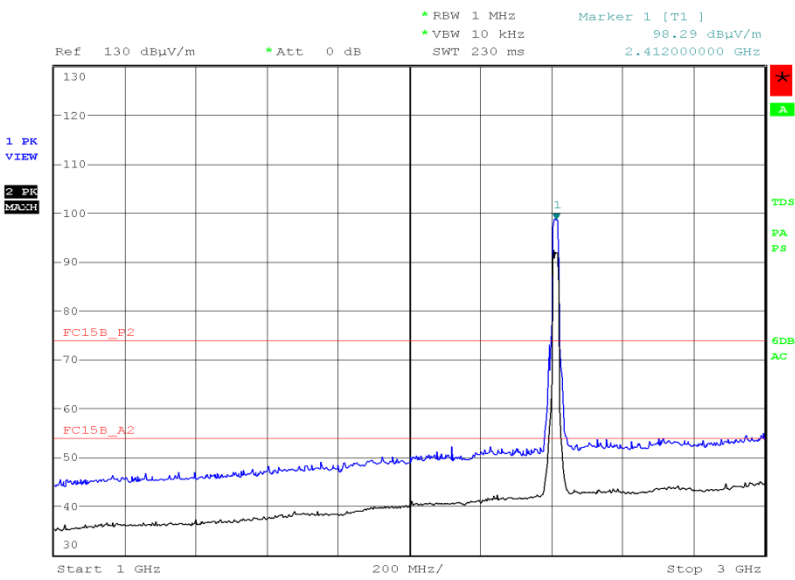


| Frequency (MHz) | QP Level (dBμV/m) | QP Level (μV/m) | QP Limit (dBμV/m) | QP Limit (μV/m) | QP Margin (dBμV/m) | QP Margin (μV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 32.138          | 29.0              | 28.2            | 40.0              | 100             | -11.0              | -71.8            | 310         | 1.00       | Horizontal |
| 42.320          | 24.4              | 16.6            | 40.0              | 100             | -15.6              | -83.4            | 117         | 1.00       | Horizontal |
| 414.885         | 27.3              | 23.2            | 46.0              | 200             | -18.7              | -176.8           | 349         | 1.12       | Vertical   |
| 578.598         | 30.2              | 32.4            | 46.0              | 200             | -15.8              | -167.6           | 0           | 1.30       | Vertical   |
| 675.072         | 31.2              | 36.3            | 46.0              | 200             | -14.8              | -163.7           | 191         | 1.00       | Vertical   |
| 875.381         | 33.4              | 46.8            | 46.0              | 200             | -12.6              | -153.2           | 194         | 1.00       | Horizontal |



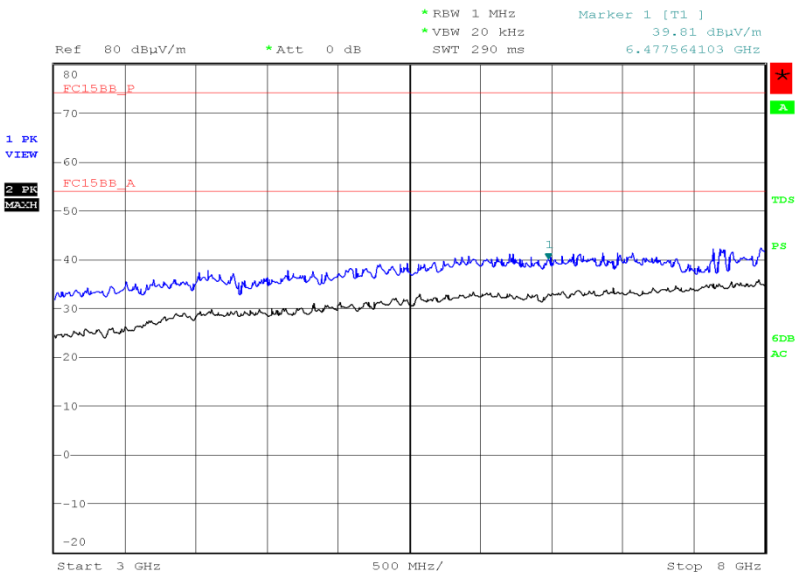
Product Service

1 GHz to 3 GHz



Date: 9.APR.2014 18:57:48

3 GHz to 8 GHz

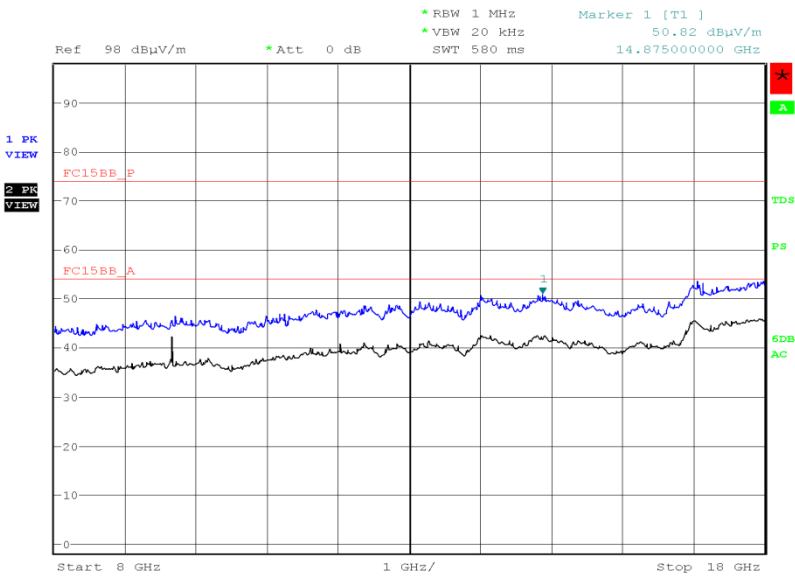


Date: 17.APR.2014 02:00:54



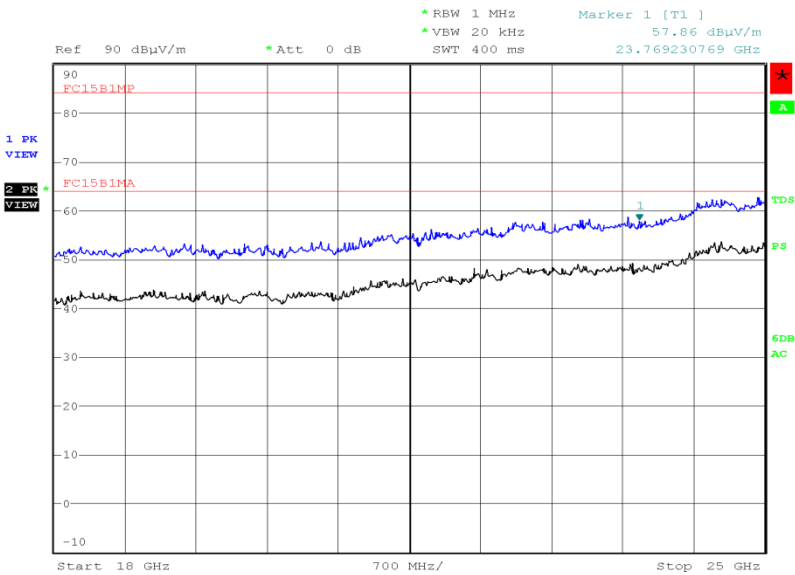
Product Service

8 GHz to 18 GHz



Date: 17.APR.2014 03:18:35

18 GHz to 25 GHz

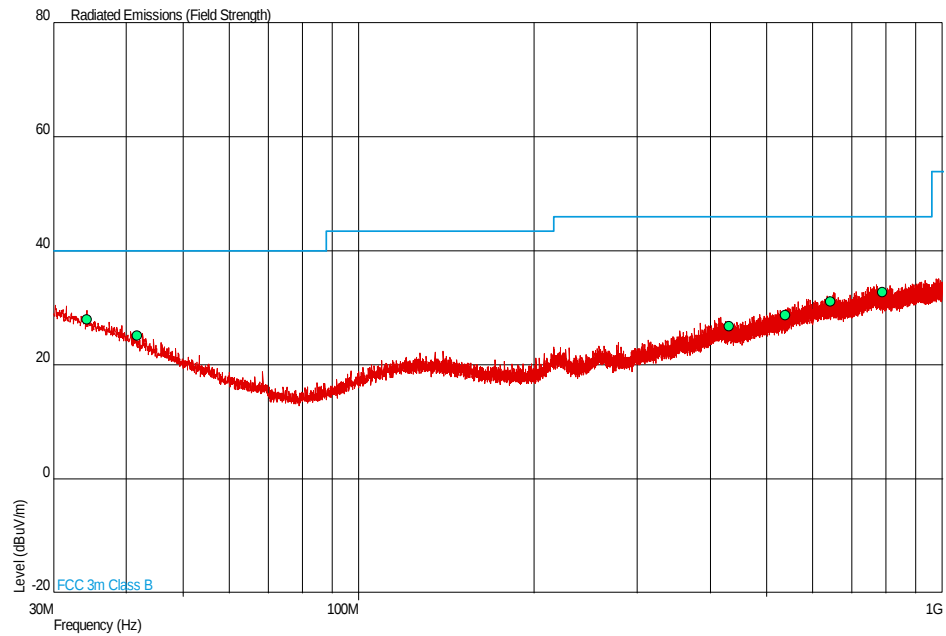


Date: 17.APR.2014 04:44:15



2437 MHz

30 MHz to 1 GHz

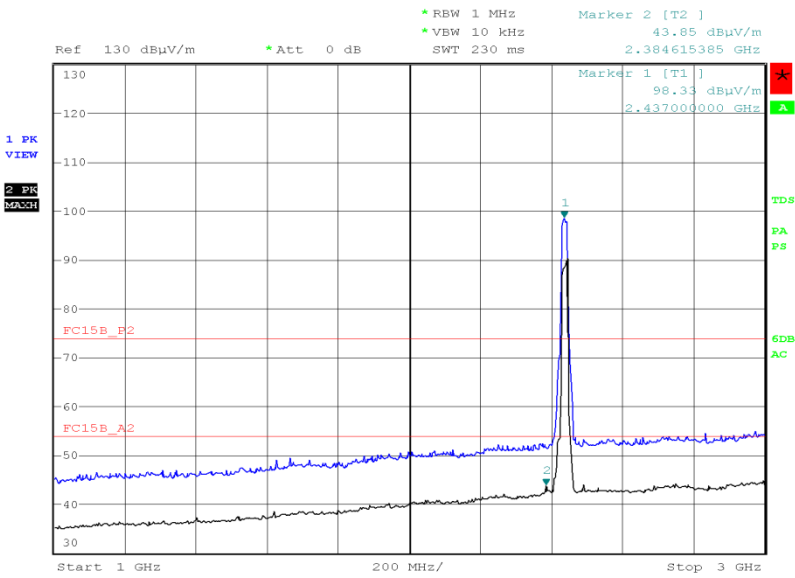


| Frequency (MHz) | QP Level (dBμV/m) | QP Level (μV/m) | QP Limit (dBμV/m) | QP Limit (μV/m) | QP Margin (dBμV/m) | QP Margin (μV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 34.224          | 28.0              | 25.1            | 40.0              | 100             | -12.0              | -74.9            | 360         | 2.49       | Horizontal |
| 41.802          | 25.1              | 18.0            | 40.0              | 100             | -14.9              | -82.0            | 340         | 1.00       | Horizontal |
| 431.149         | 26.8              | 21.9            | 46.0              | 200             | -19.2              | -178.1           | 129         | 1.00       | Horizontal |
| 538.730         | 28.8              | 27.5            | 46.0              | 200             | -17.2              | -172.5           | 90          | 1.00       | Horizontal |
| 642.113         | 31.1              | 35.9            | 46.0              | 200             | -14.9              | -164.1           | 360         | 2.46       | Horizontal |
| 789.158         | 32.7              | 43.2            | 46.0              | 200             | -13.3              | -156.8           | 172         | 1.00       | Horizontal |



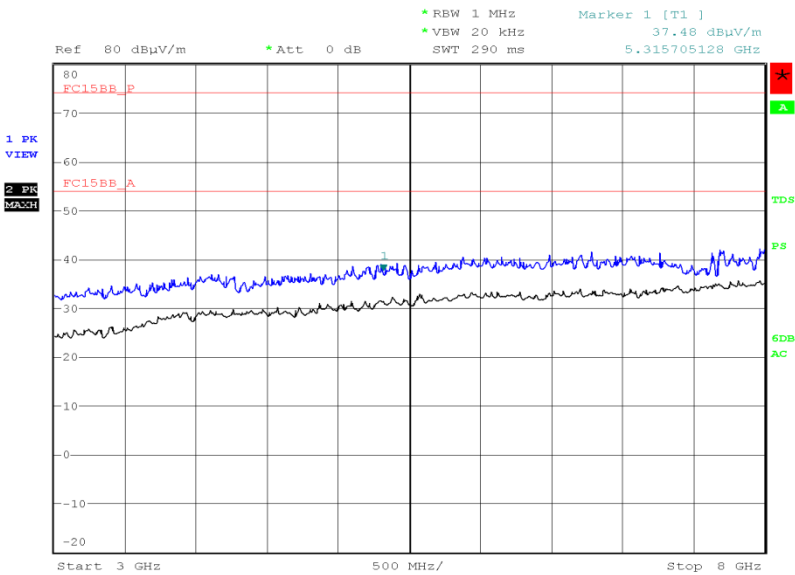
Product Service

1 GHz to 3 GHz



Date: 9.APR.2014 19:22:38

3 GHz to 8 GHz

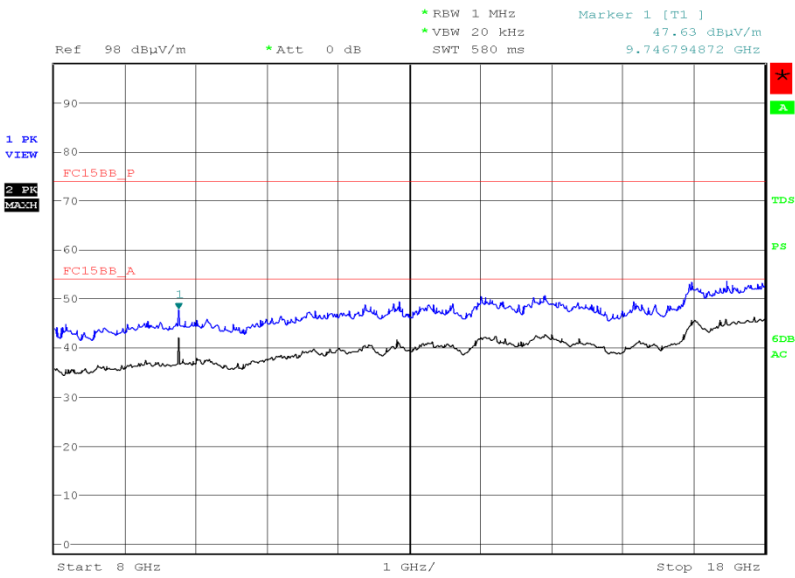


Date: 17.APR.2014 01:53:54



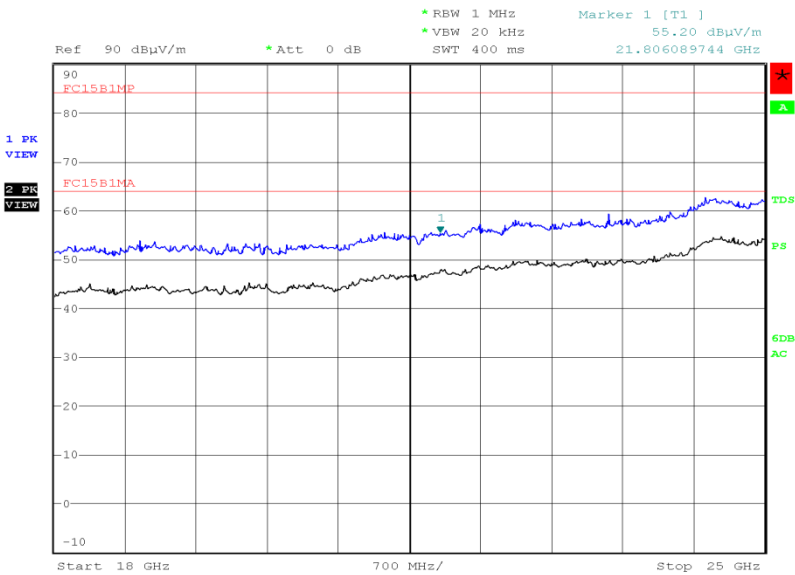
Product Service

8 GHz to 18 GHz

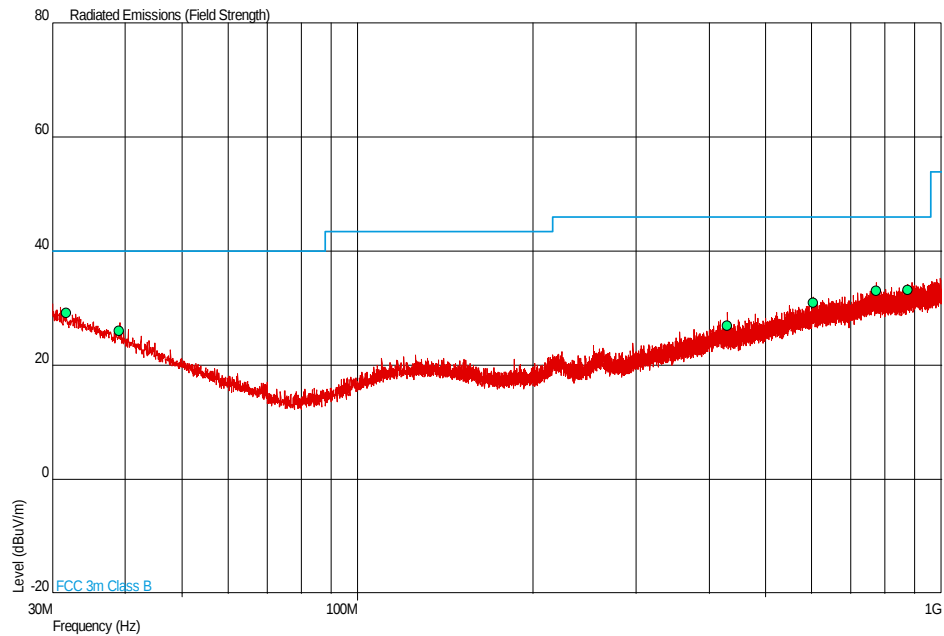


Date: 17.APR.2014 03:23:14

18 GHz to 25 GHz



Date: 17.APR.2014 04:59:56

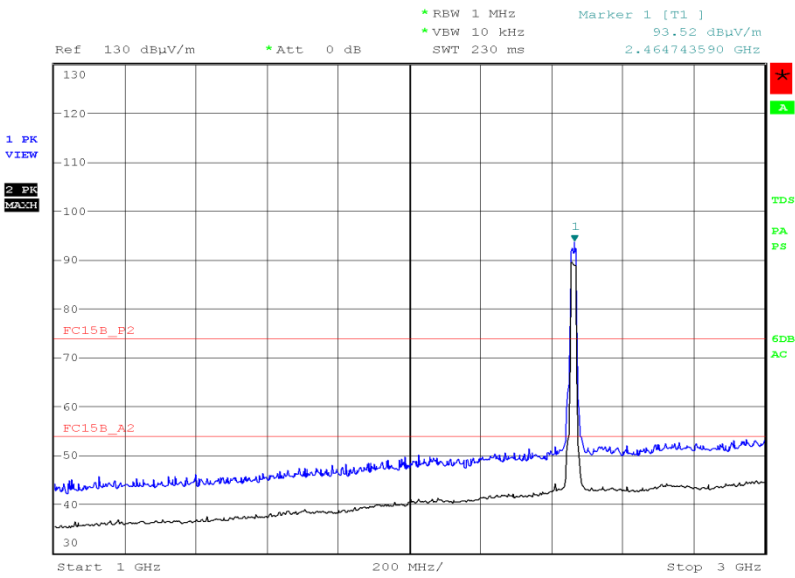
2462 MHz30 MHz to 1 GHz

| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 31.699          | 29.2              | 28.8            | 40.0              | 100             | -10.8              | -71.2            | 360         | 1.12       | Vertical   |
| 39.113          | 26.0              | 20.0            | 40.0              | 100             | -14.0              | -80.0            | 32          | 1.00       | Horizontal |
| 429.791         | 27.0              | 22.4            | 46.0              | 200             | -19.0              | -177.6           | 96          | 1.00       | Horizontal |
| 603.066         | 30.9              | 35.1            | 46.0              | 200             | -15.1              | -164.9           | 322         | 1.00       | Horizontal |
| 774.637         | 33.1              | 45.2            | 46.0              | 200             | -12.9              | -154.8           | 306         | 1.00       | Horizontal |
| 875.543         | 33.3              | 46.2            | 46.0              | 200             | -12.7              | -153.8           | 347         | 1.00       | Horizontal |



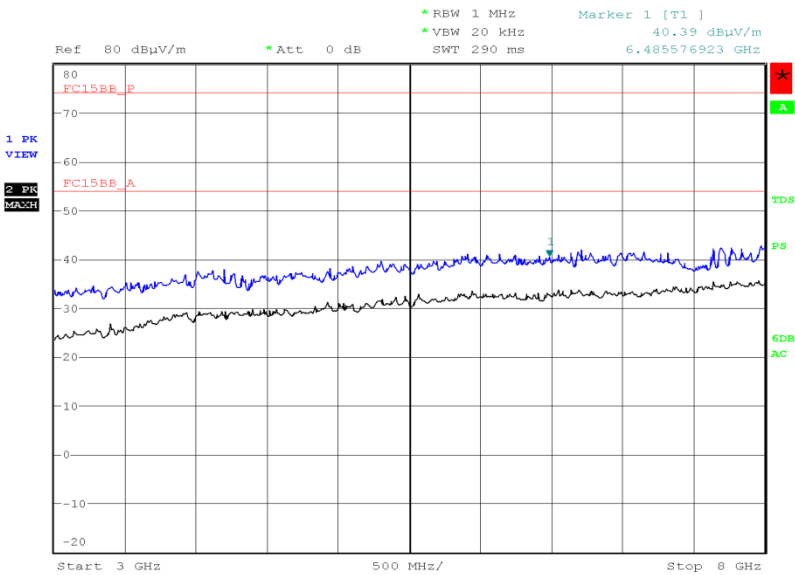
Product Service

1 GHz to 3 GHz



Date: 9.APR.2014 19:26:42

3 GHz to 8 GHz

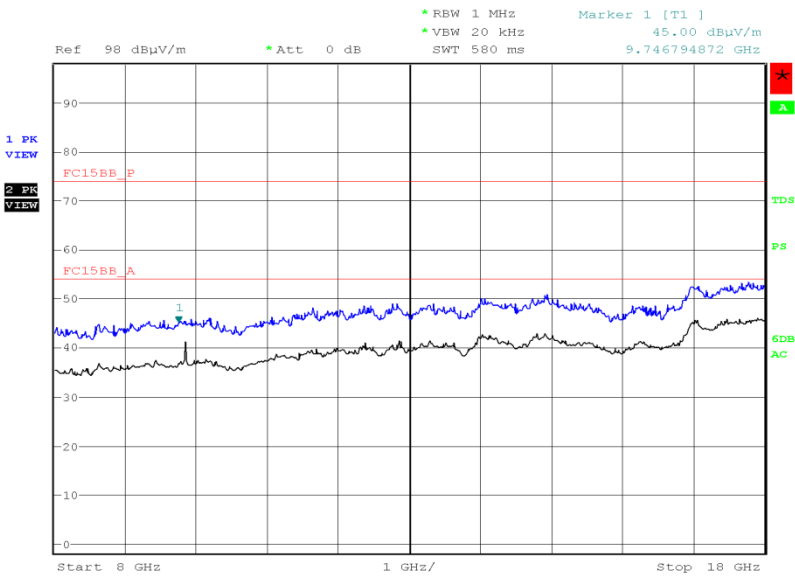


Date: 17.APR.2014 01:48:47



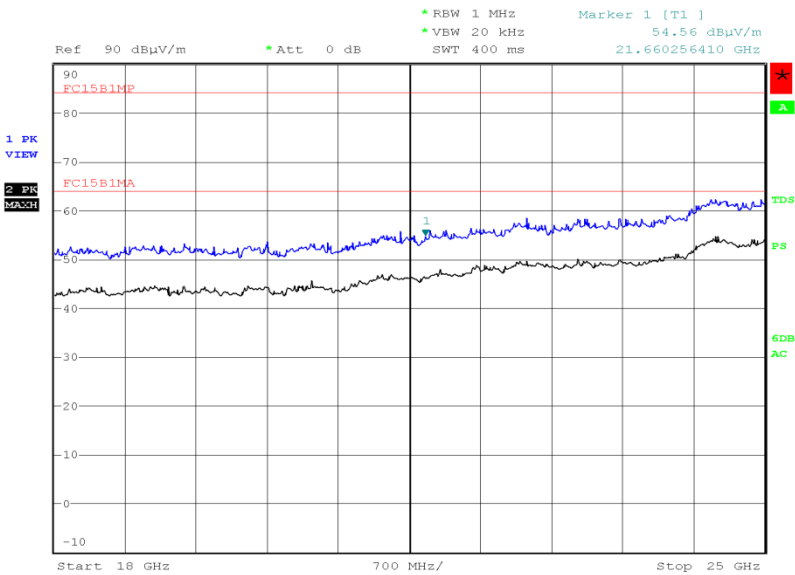
Product Service

8 GHz to 18 GHz



Date: 17.APR.2014 03:32:27

18 GHz to 25 GHz



Date: 17.APR.2014 05:09:52

Limit

| Peak (dBμV/m) | Average (dBμV/m) |
|---------------|------------------|
| 74.0          | 54.0             |

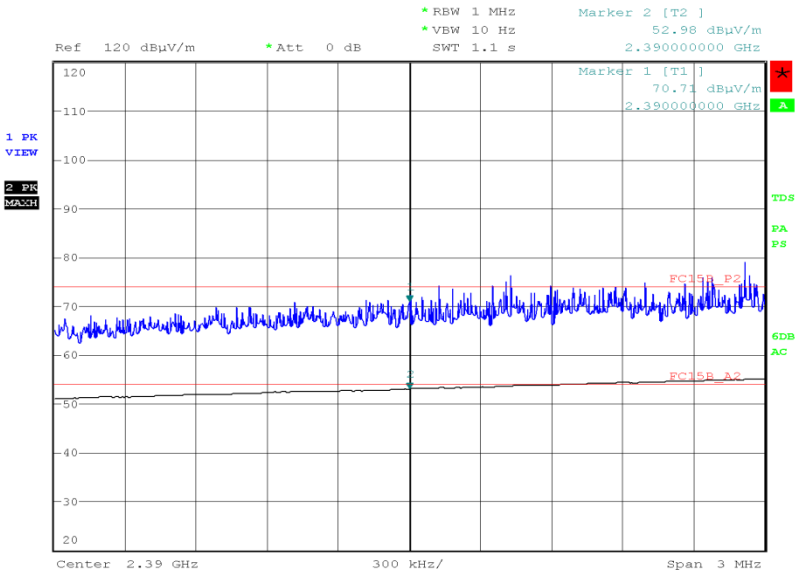


Product Service

Band Edge Emissions

2412 MHz

| Polarisation | Final Peak (dBμV/m) | Final Average (dBμV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 70.71               | 52.98                  |



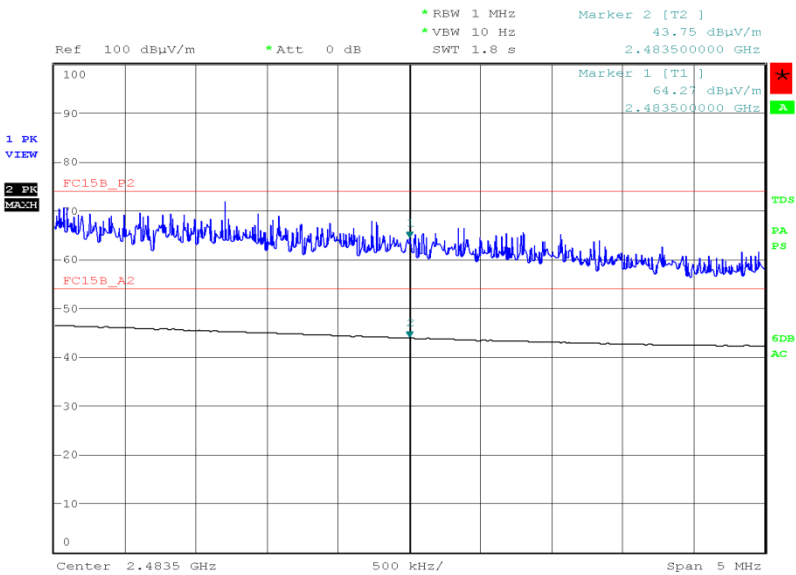
Date: 9.APR.2014 18:41:14



Product Service

2462 MHz

| Polarisation | Final Peak (dBµV/m) | Final Average (dBµV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 64.27               | 43.74                  |



Date: 9.APR.2014 19:41:42

Limit

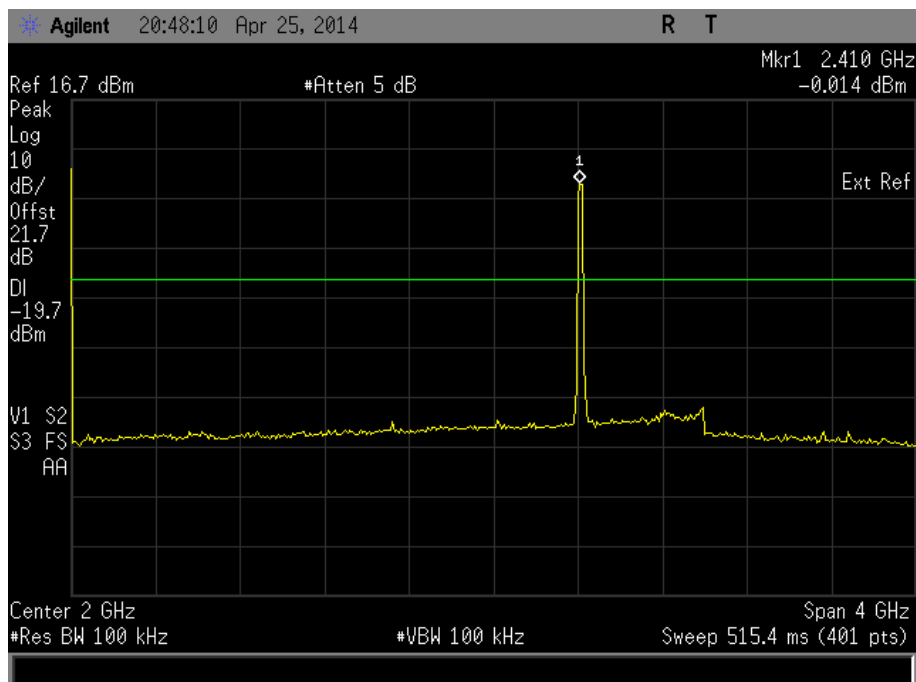
| Peak (dBµV/m) | Average (dBµV/m) |
|---------------|------------------|
| 74.0          | 54.0             |



Product Service

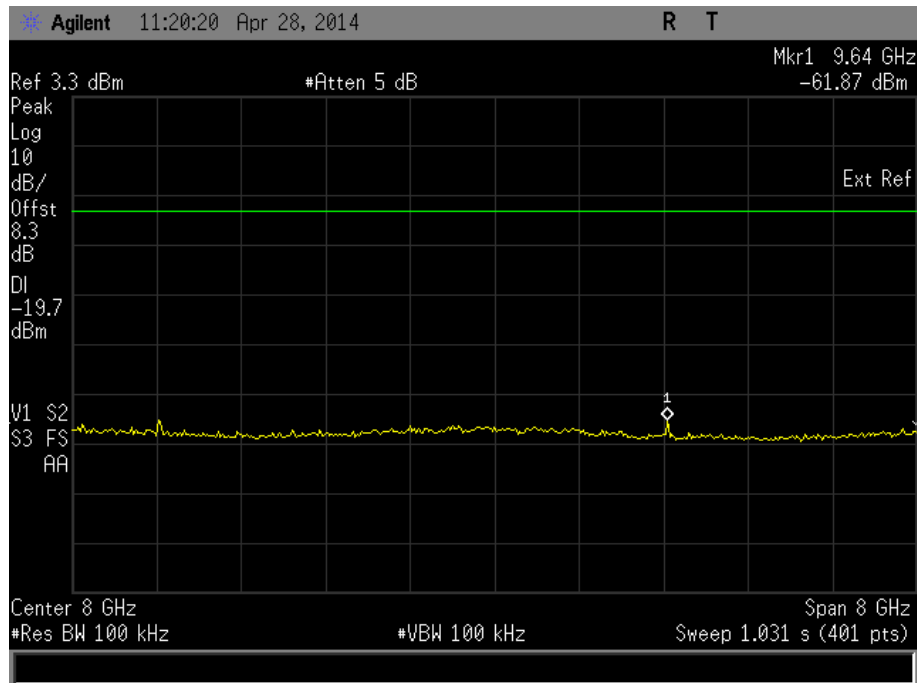
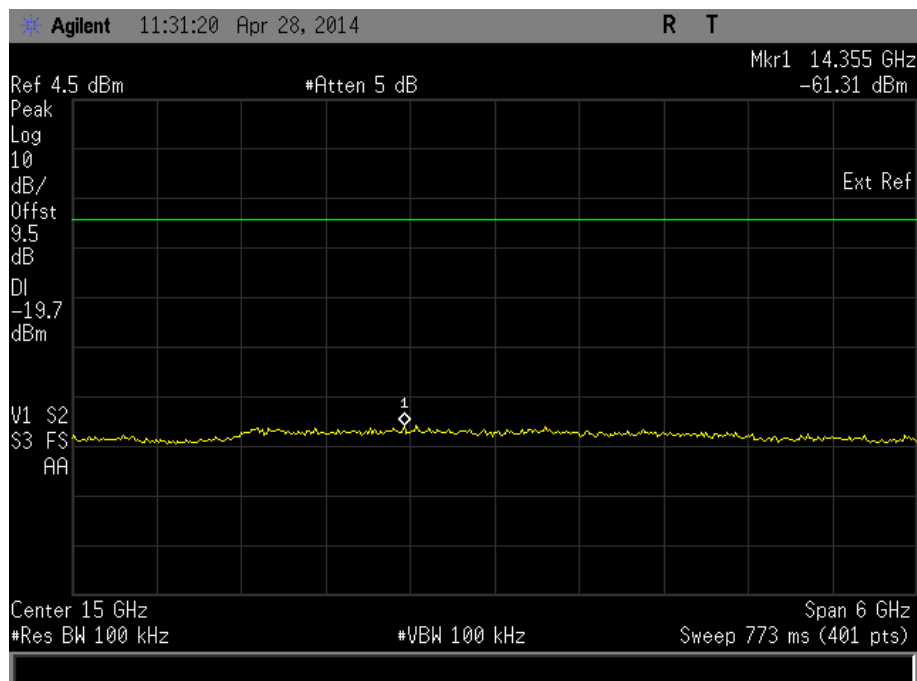
802.11(n)

4.0 V DC Supply

Spurious Conducted Emissions6.5 Mbps2412 MHz9 kHz to 4 GHz

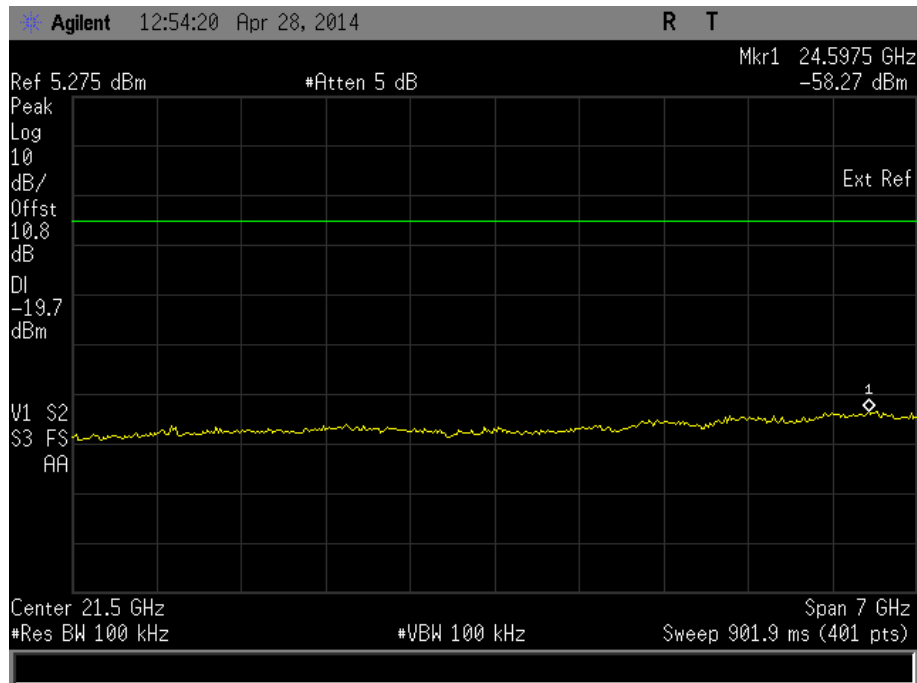
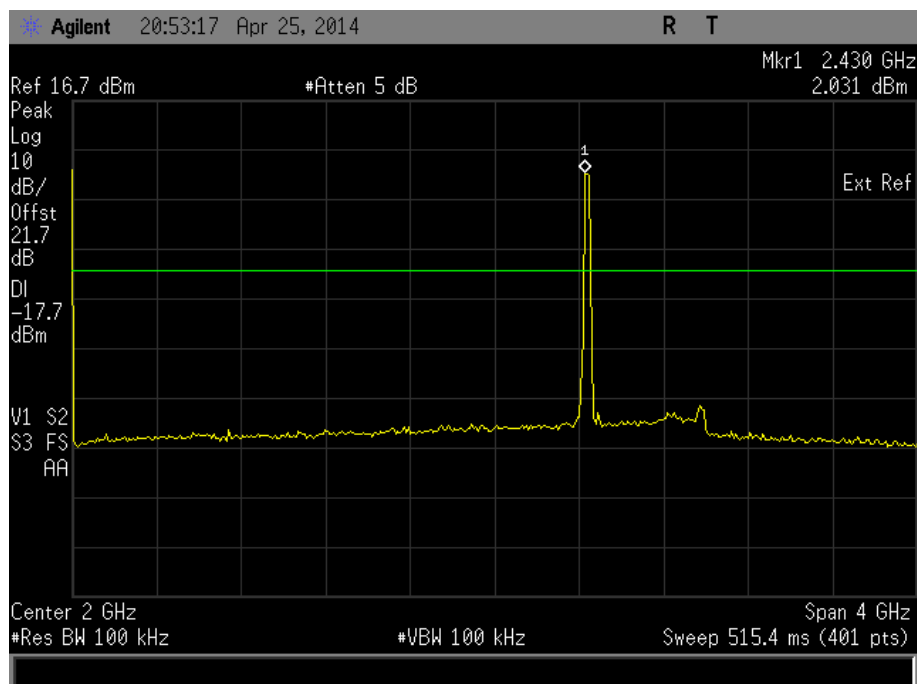


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

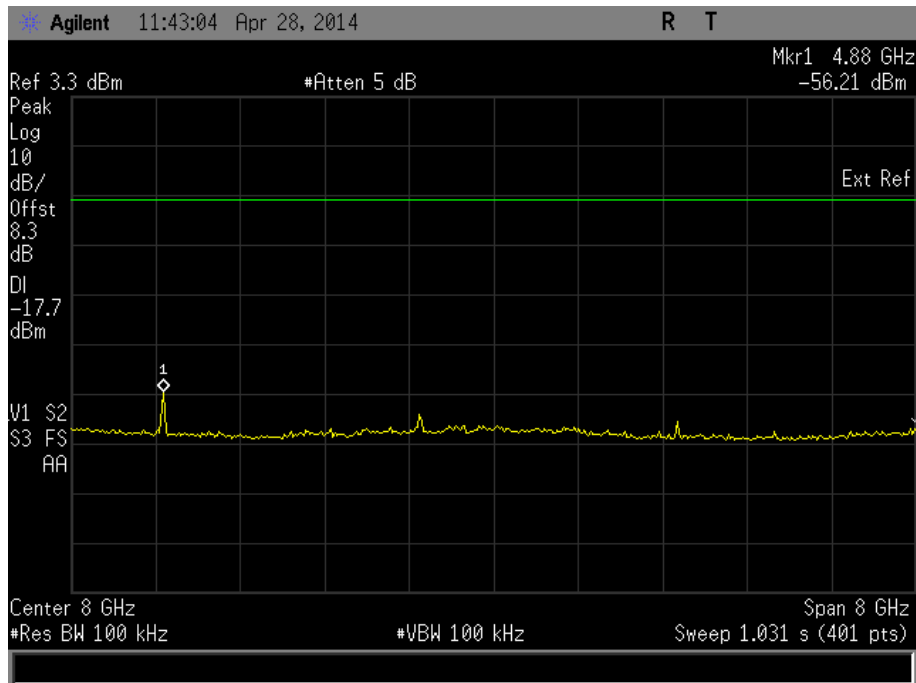
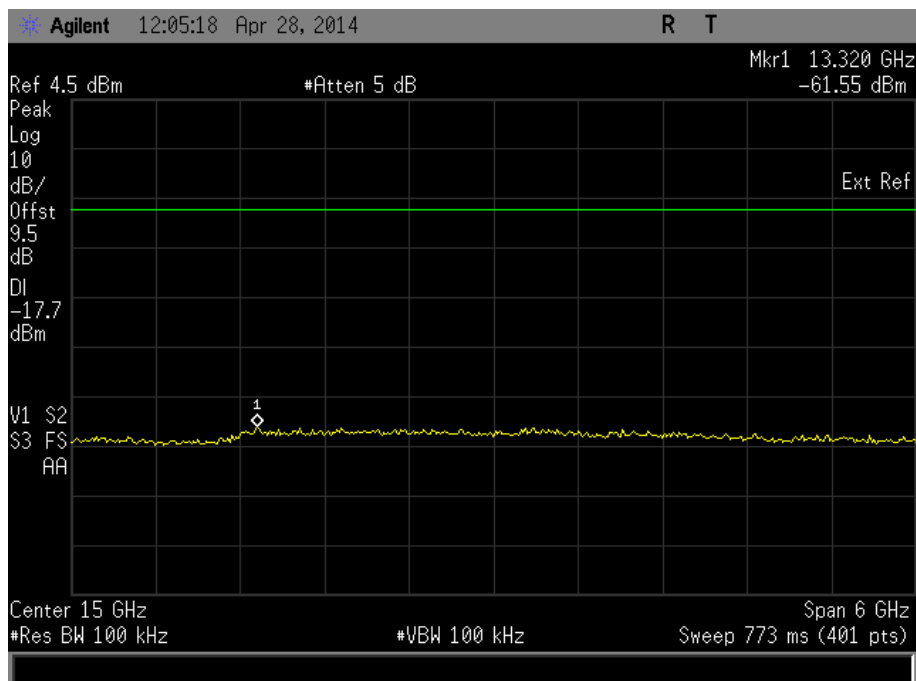


Product Service

18 GHz to 25 GHz2437 MHz9 kHz to 4 GHz

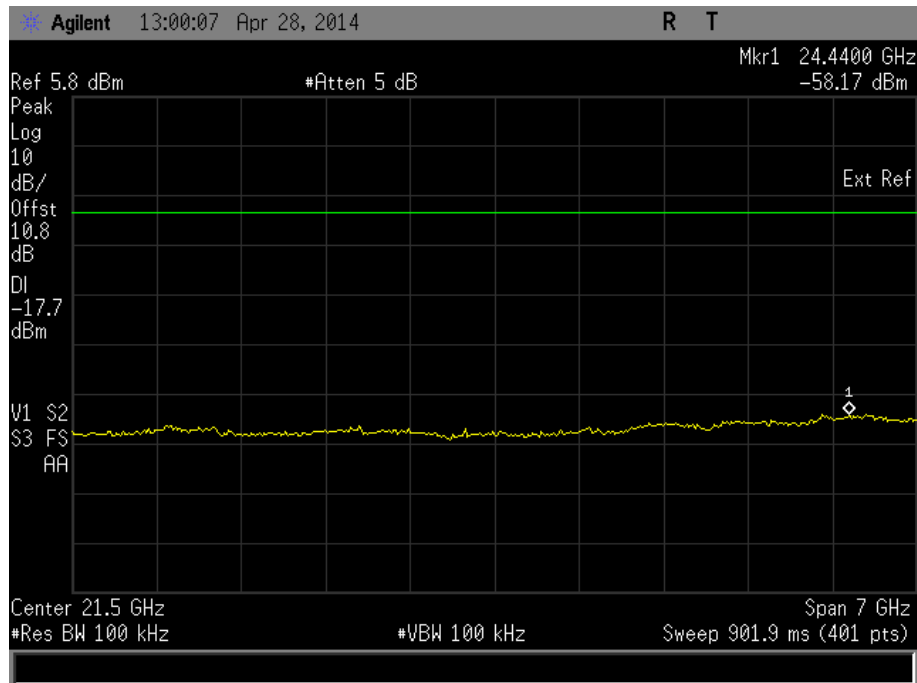
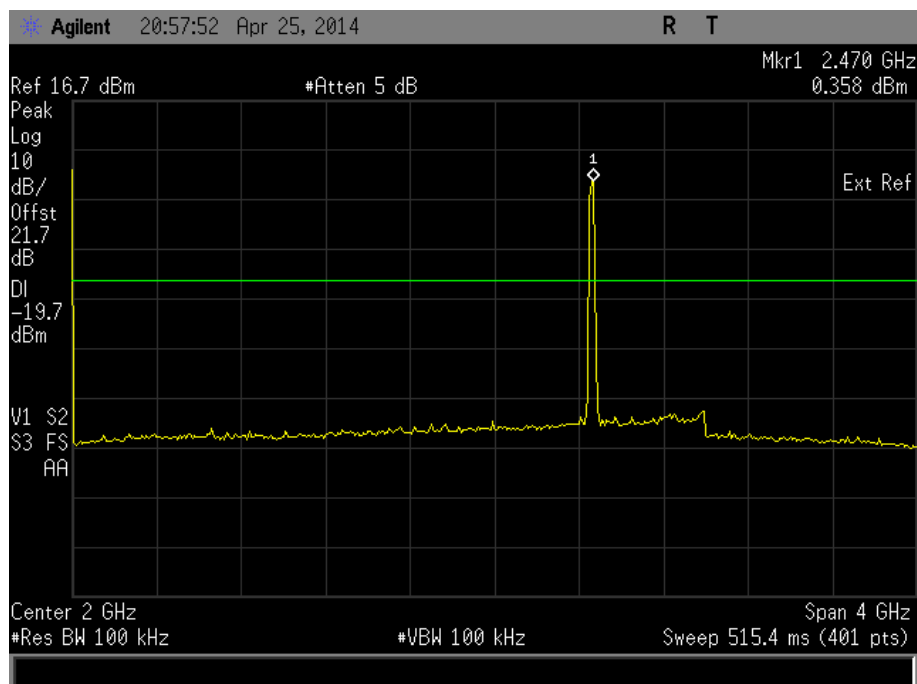


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

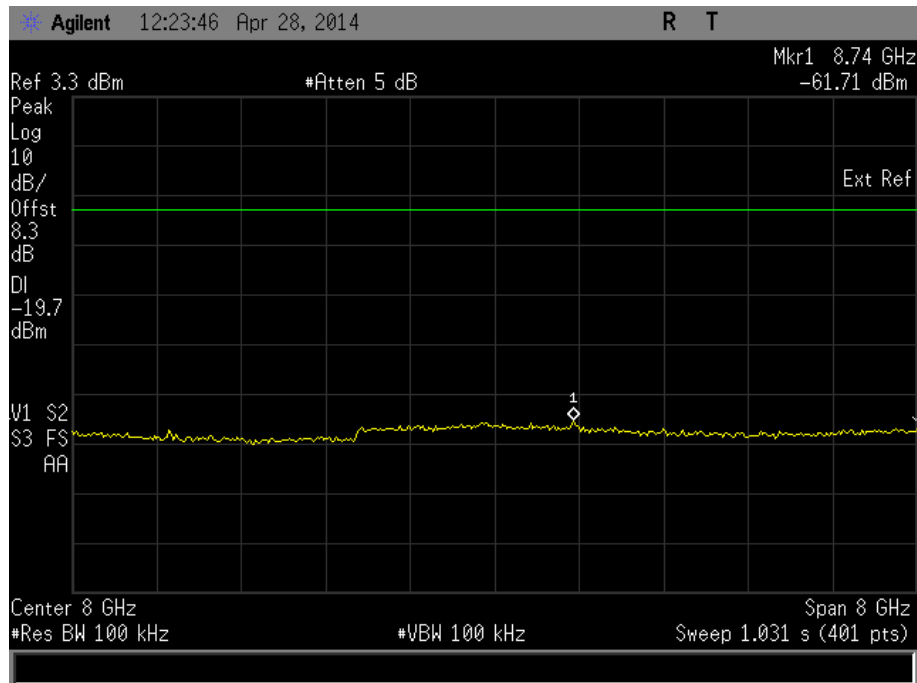
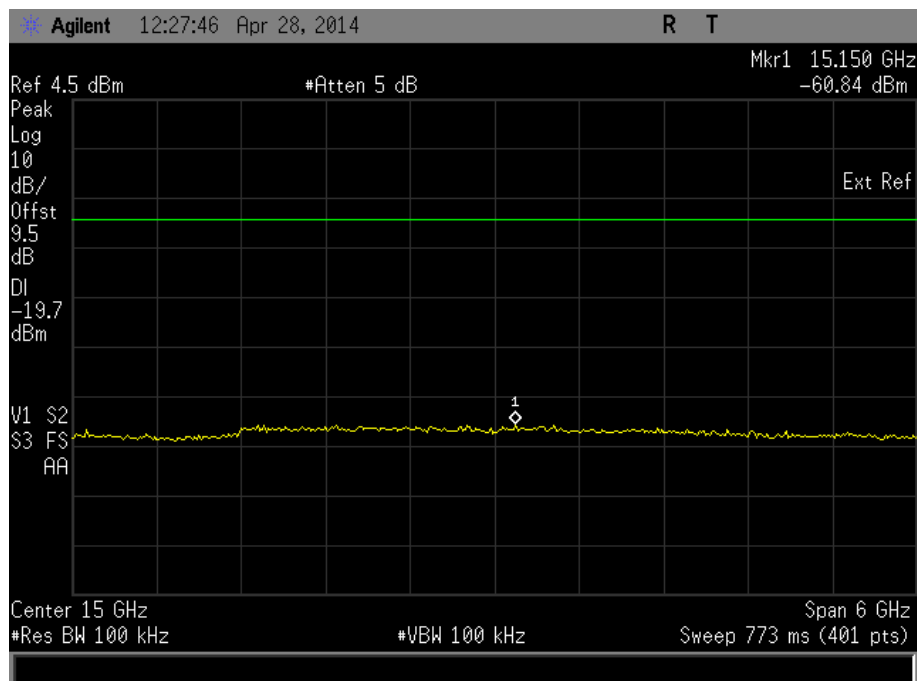


Product Service

18 GHz to 25 GHz2462 MHz9 kHz to 4 GHz

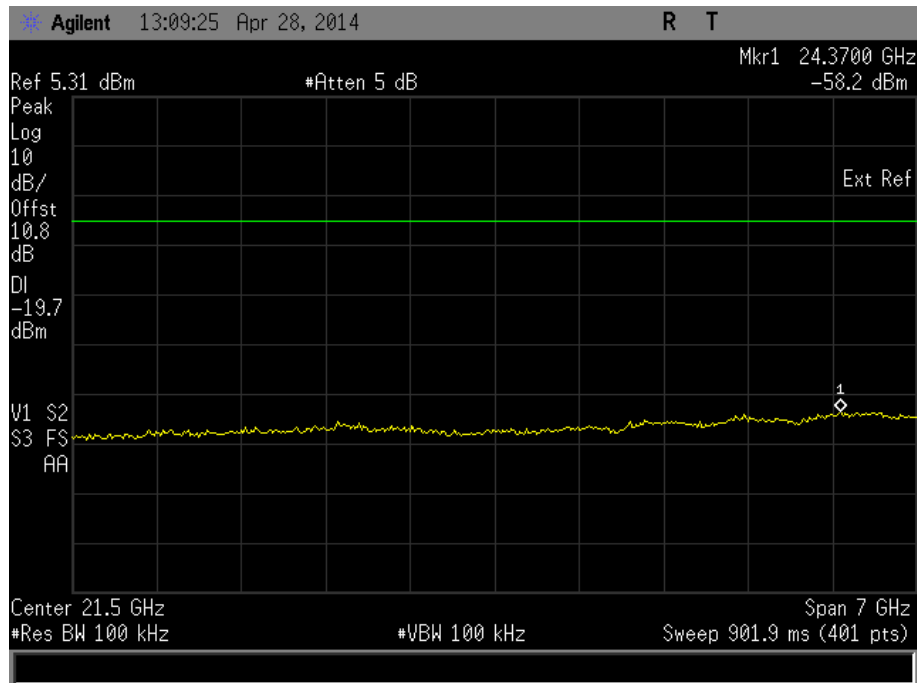


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.

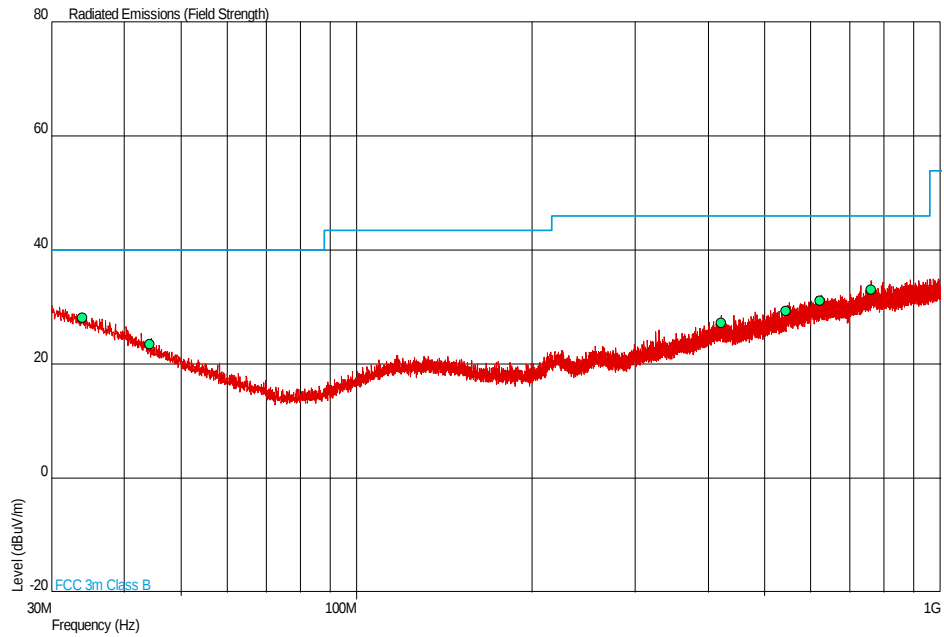


Product Service

## Spurious Radiated Emissions

2412 MHz

30 MHz to 1 GHz

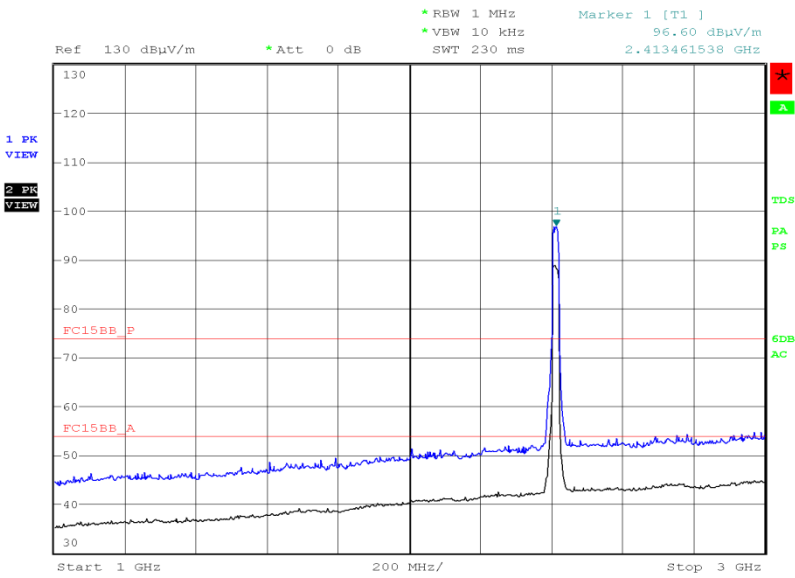


| Frequency (MHz) | QP Level (dBμV/m) | QP Level (μV/m) | QP Limit (dBμV/m) | QP Limit (μV/m) | QP Margin (dBμV/m) | QP Margin (μV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 33.927          | 28.1              | 25.4            | 40.0              | 100             | -11.9              | -74.6            | 299         | 1.00       | Horizontal |
| 44.248          | 23.5              | 15.0            | 40.0              | 100             | -16.5              | -85.0            | 324         | 1.00       | Horizontal |
| 420.913         | 27.2              | 22.9            | 46.0              | 200             | -18.8              | -177.1           | 101         | 1.42       | Horizontal |
| 543.460         | 29.3              | 29.2            | 46.0              | 200             | -16.7              | -170.8           | 243         | 2.83       | Vertical   |
| 621.021         | 31.1              | 35.9            | 46.0              | 200             | -14.9              | -164.1           | 1           | 1.00       | Horizontal |
| 761.284         | 33.1              | 45.2            | 46.0              | 200             | -12.9              | -154.8           | 360         | 1.00       | Horizontal |



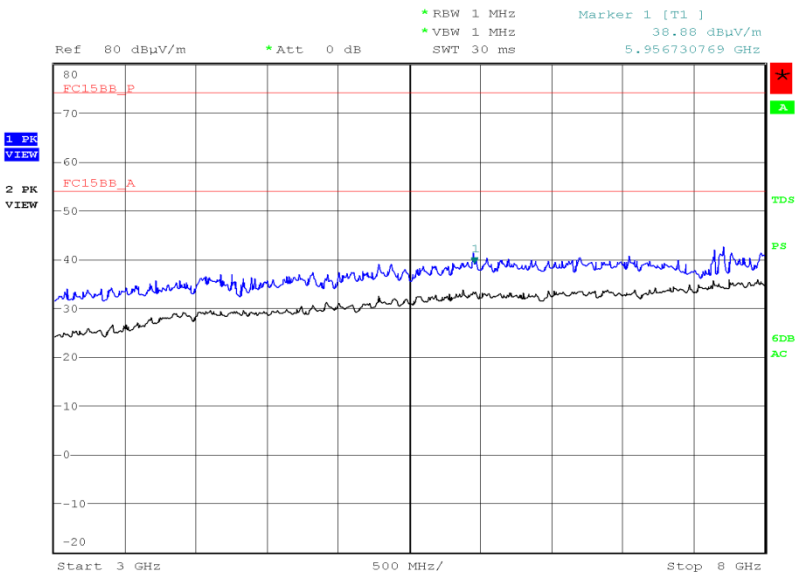
Product Service

1 GHz to 3 GHz



Date: 17.APR.2014 01:06:21

3 GHz to 8 GHz

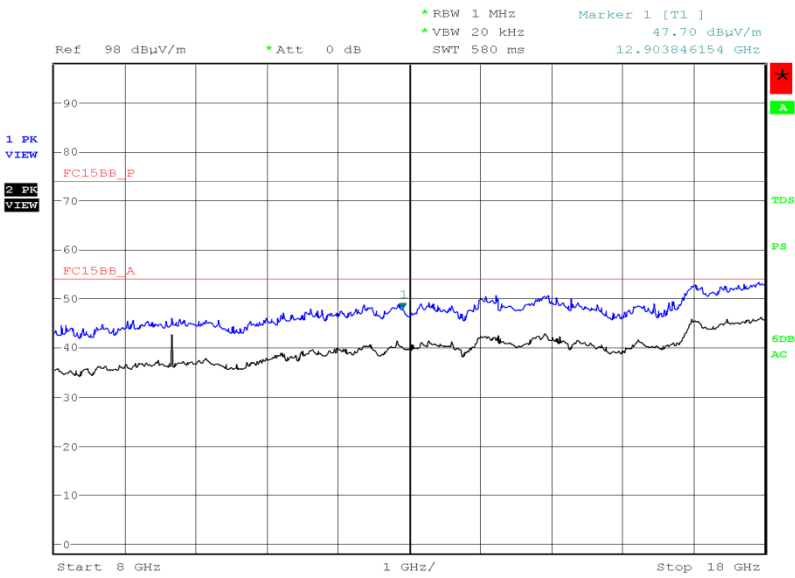


Date: 17.APR.2014 01:27:23



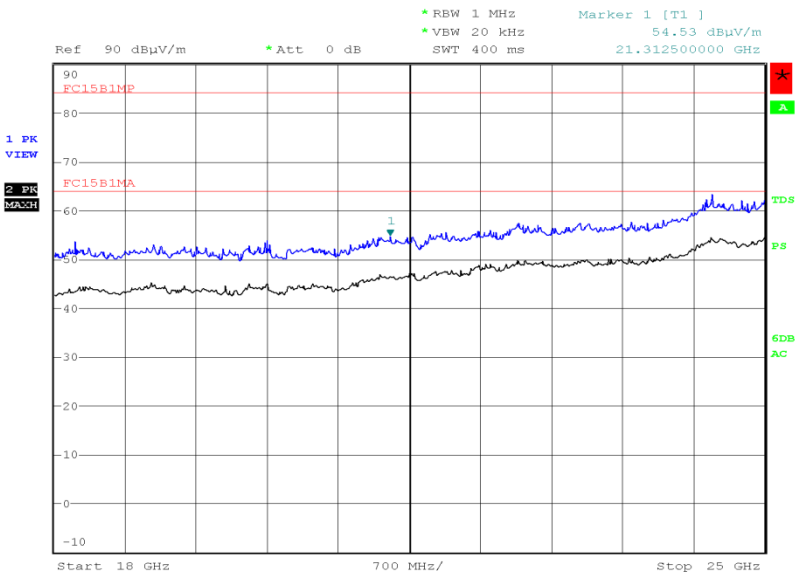
Product Service

8 GHz to 18 GHz



Date: 17.APR.2014 03:38:37

18 GHz to 25 GHz

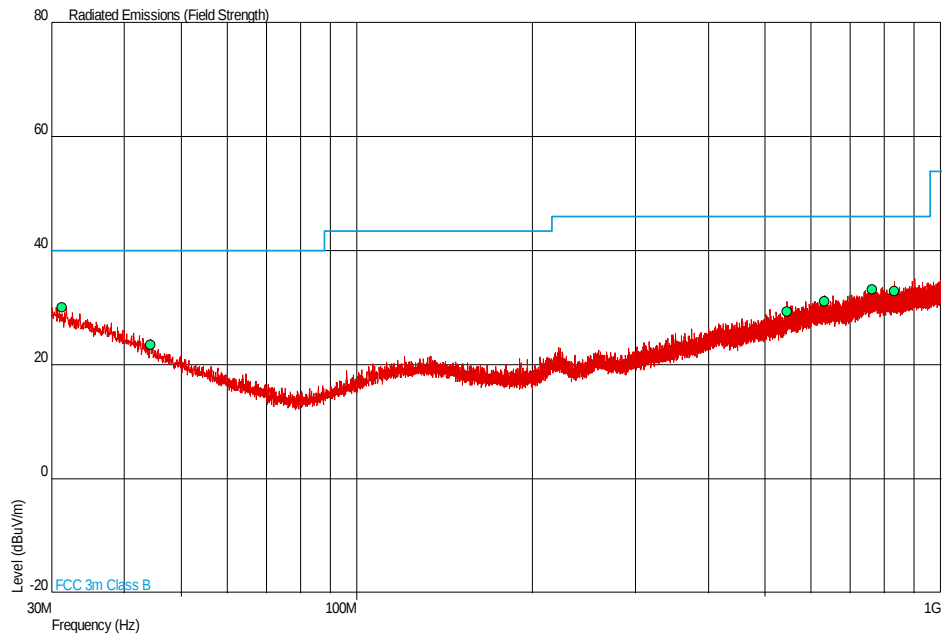


Date: 17.APR.2014 05:13:09



2437 MHz

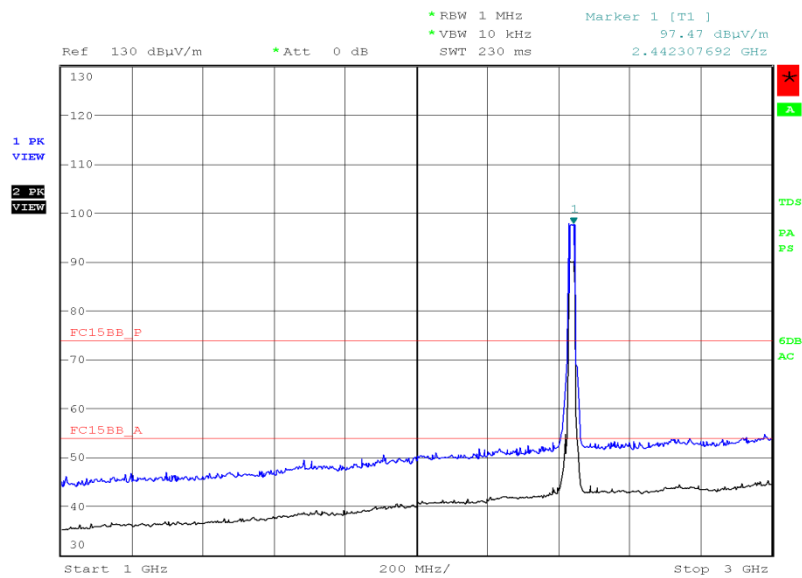
30 MHz to 1 GHz



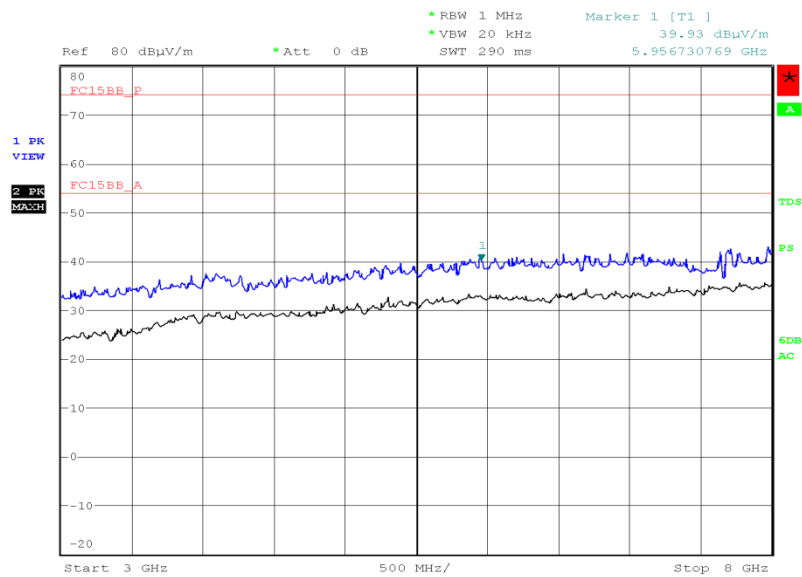
| Frequency (MHz) | QP Level (dBμV/m) | QP Level (μV/m) | QP Limit (dBμV/m) | QP Limit (μV/m) | QP Margin (dBμV/m) | QP Margin (μV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 31.258          | 30.1              | 32.0            | 40.0              | 100             | -9.9               | -68.0            | 71          | 1.20       | Vertical   |
| 44.411          | 23.5              | 15.0            | 40.0              | 100             | -16.5              | -85.0            | 360         | 1.00       | Vertical   |
| 544.545         | 29.4              | 29.5            | 46.0              | 200             | -16.6              | -170.5           | 0           | 1.00       | Horizontal |
| 633.047         | 31.1              | 35.9            | 46.0              | 200             | -14.9              | -164.1           | 360         | 2.50       | Vertical   |
| 762.991         | 33.3              | 46.2            | 46.0              | 200             | -12.7              | -153.8           | 66          | 2.33       | Vertical   |
| 832.471         | 32.9              | 44.2            | 46.0              | 200             | -13.1              | -155.8           | 352         | 1.02       | Horizontal |



Product Service

1 GHz to 3 GHz

Date: 17.APR.2014 01:00:24

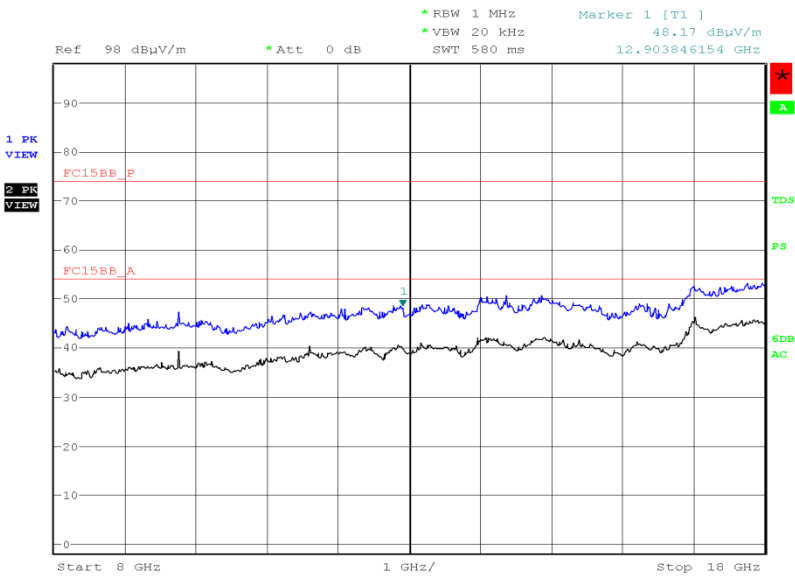
3 GHz to 8 GHz

Date: 17.APR.2014 01:34:32



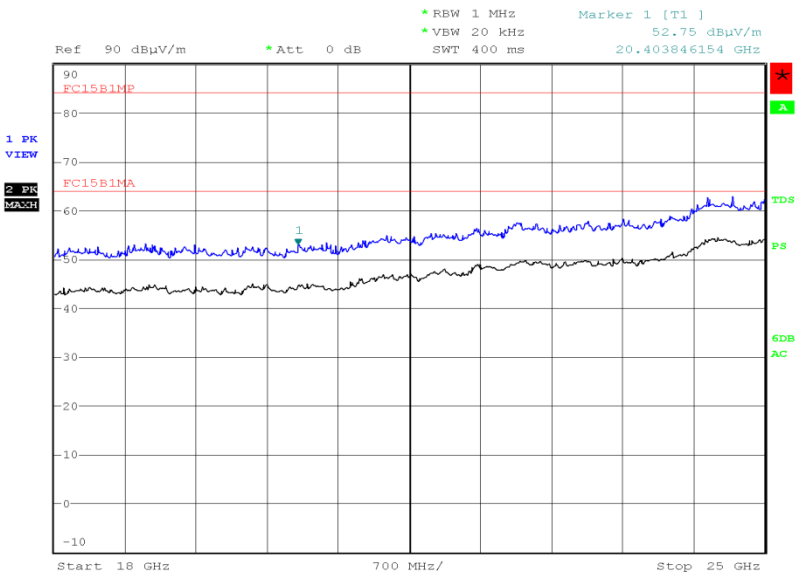
Product Service

8 GHz to 18 GHz



Date: 17.APR.2014 03:43:58

18 GHz to 25 GHz

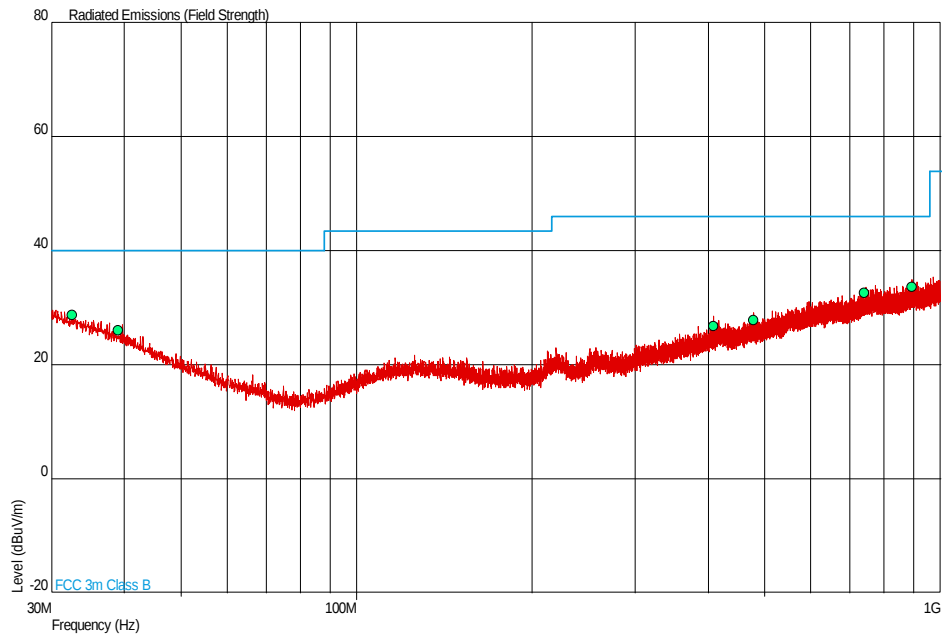


Date: 17.APR.2014 05:18:27



2462 MHz

30 MHz to 1 GHz

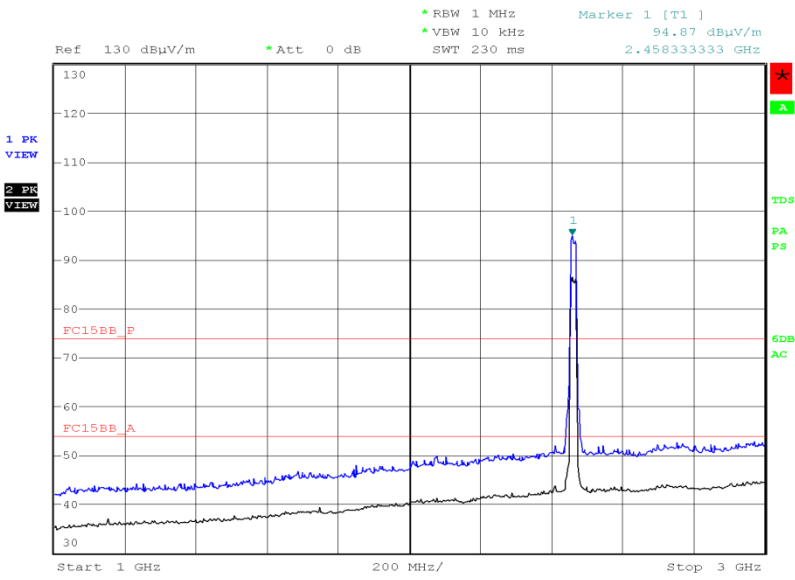


| Frequency (MHz) | QP Level (dBμV/m) | QP Level (μV/m) | QP Limit (dBμV/m) | QP Limit (μV/m) | QP Margin (dBμV/m) | QP Margin (μV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 32.617          | 28.8              | 27.5            | 40.0              | 100             | -11.2              | -72.5            | 189         | 1.00       | Vertical   |
| 39.071          | 26.0              | 20.0            | 40.0              | 100             | -14.0              | -80.0            | 9           | 1.00       | Horizontal |
| 408.064         | 26.8              | 21.9            | 46.0              | 200             | -19.2              | -178.1           | 360         | 1.00       | Horizontal |
| 479.199         | 27.9              | 24.8            | 46.0              | 200             | -18.1              | -175.2           | 83          | 1.00       | Horizontal |
| 741.438         | 32.6              | 42.7            | 46.0              | 200             | -13.4              | -157.3           | 19          | 2.18       | Horizontal |
| 894.909         | 33.7              | 48.4            | 46.0              | 200             | -12.3              | -151.6           | 319         | 1.00       | Horizontal |



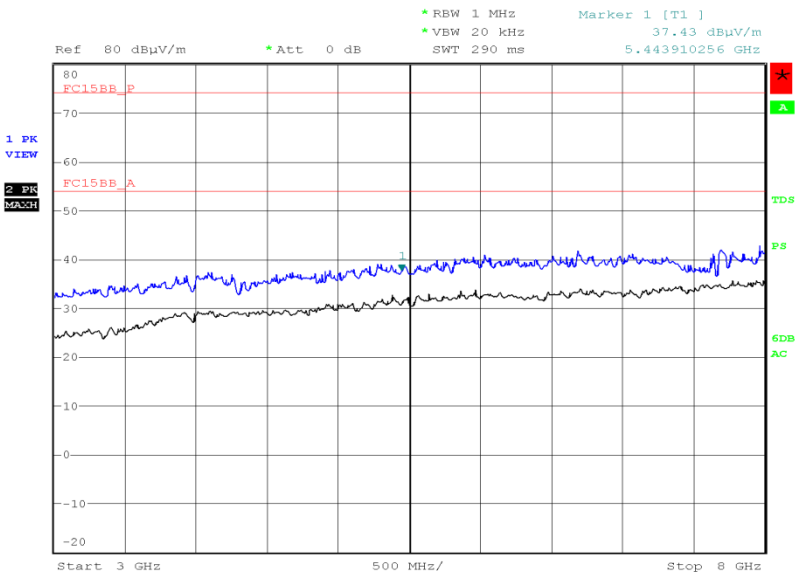
Product Service

1 GHz to 3 GHz



Date: 17.APR.2014 00:54:15

3 GHz to 8 GHz

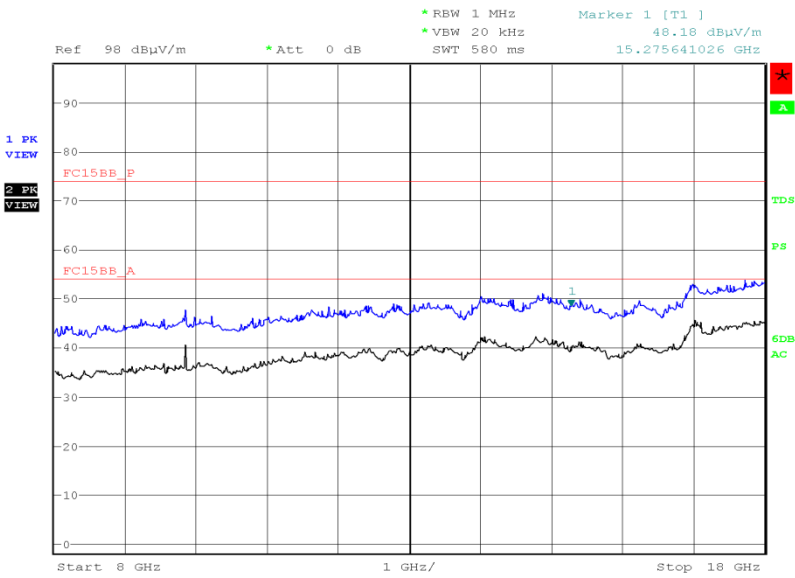


Date: 17.APR.2014 01:40:19



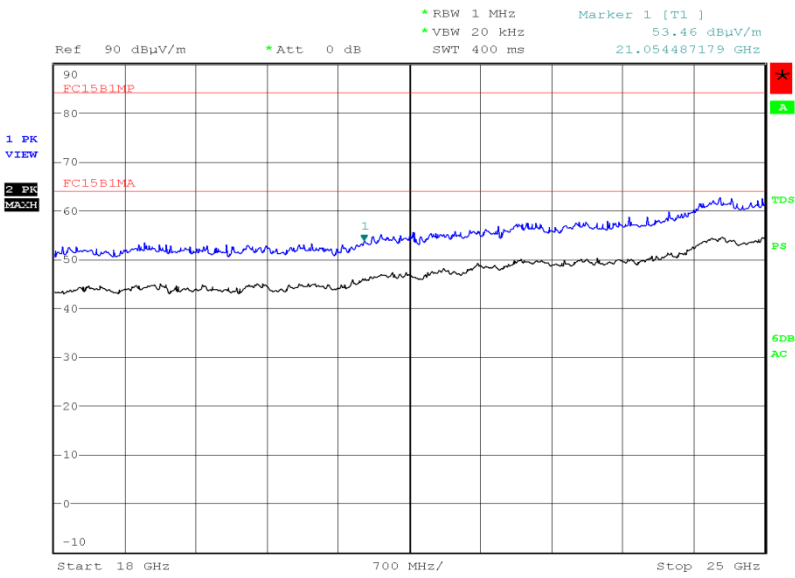
Product Service

8 GHz to 18 GHz



Date: 17.APR.2014 03:50:00

18 GHz to 25 GHz



Date: 17.APR.2014 05:27:54

Limit

| Peak (dB $\mu$ V/m) | Average (dB $\mu$ V/m) |
|---------------------|------------------------|
| 74.0                | 54.0                   |

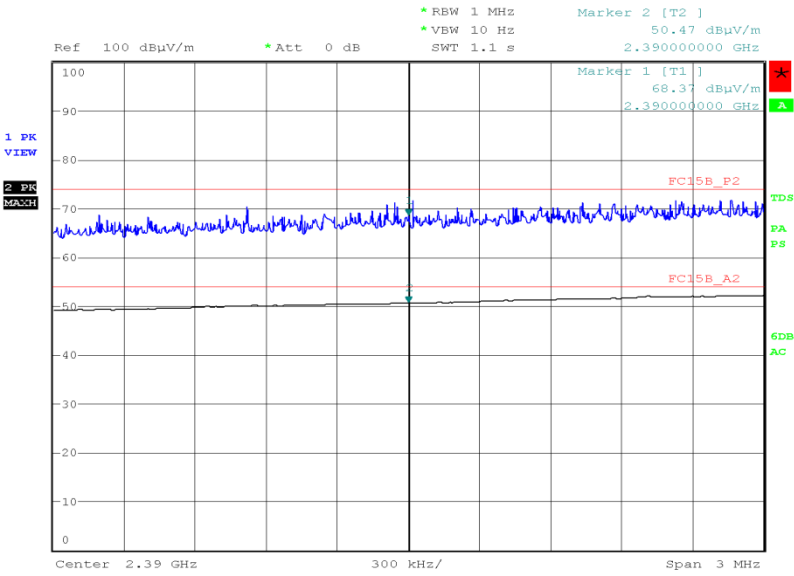


Product Service

Band Edge Emissions

2412 MHz

| Polarisation | Final Peak (dBμV/m) | Final Average (dBμV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 68.37               | 50.47                  |



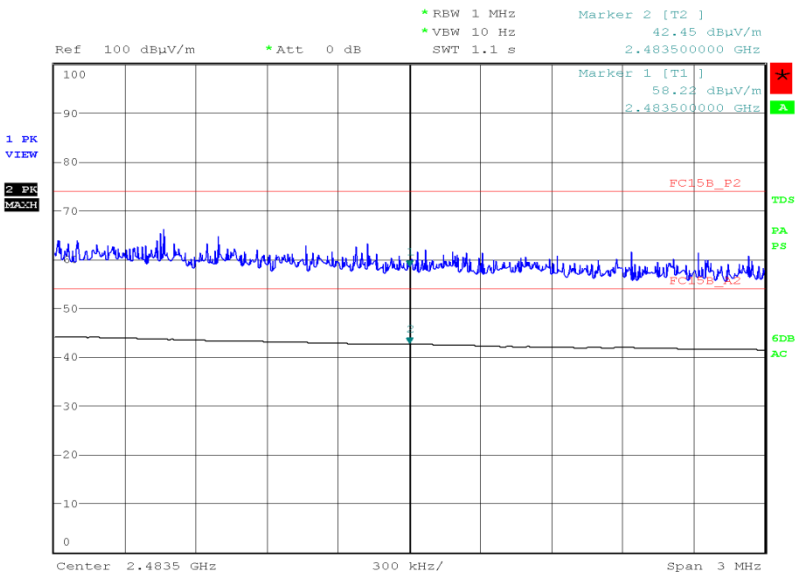
Date: 15.APR.2014 16:44:12



Product Service

2462 MHz

| Polarisation | Final Peak (dBµV/m) | Final Average (dBµV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 58.22               | 42.45                  |



Date: 15.APR.2014 16:33:11

Limit

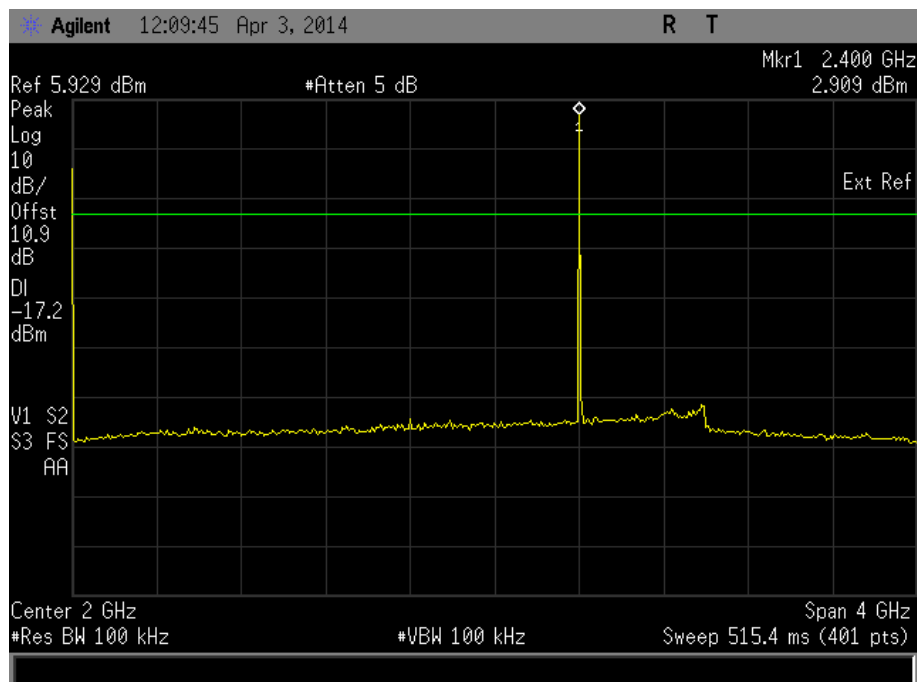
| Peak (dBµV/m) | Average (dBµV/m) |
|---------------|------------------|
| 74.0          | 54.0             |



Product Service

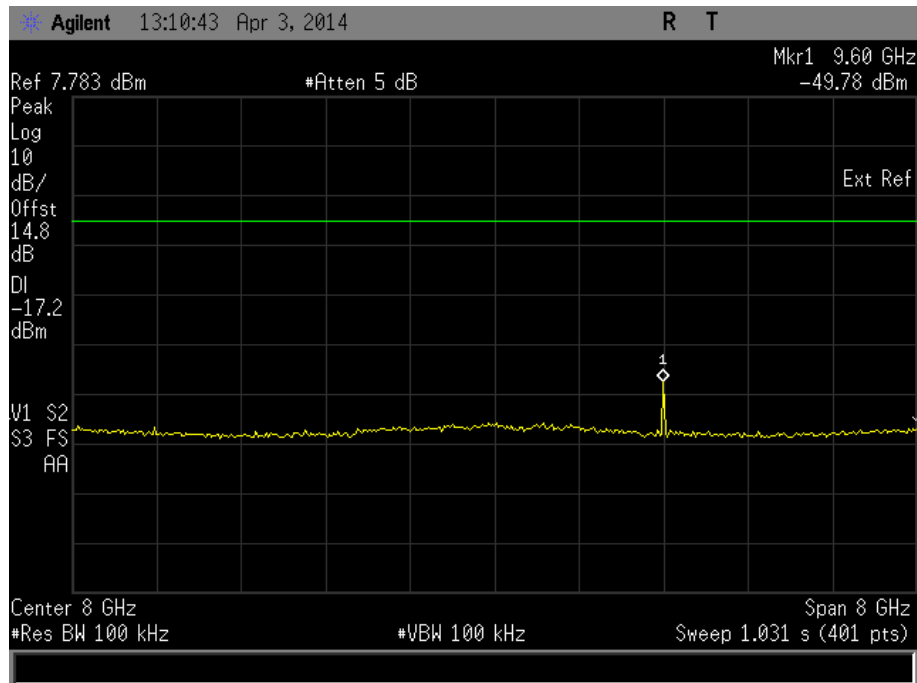
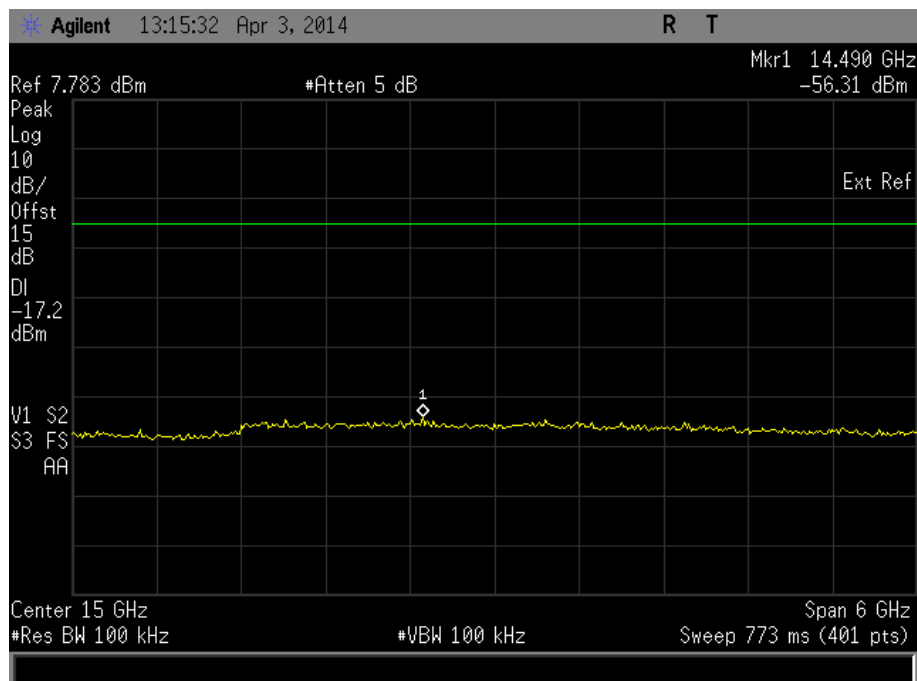
Bluetooth Low Energy

4.0 V DC Supply

Spurious Conducted Emissions1 Mbps2402 MHz9 kHz to 4 GHz

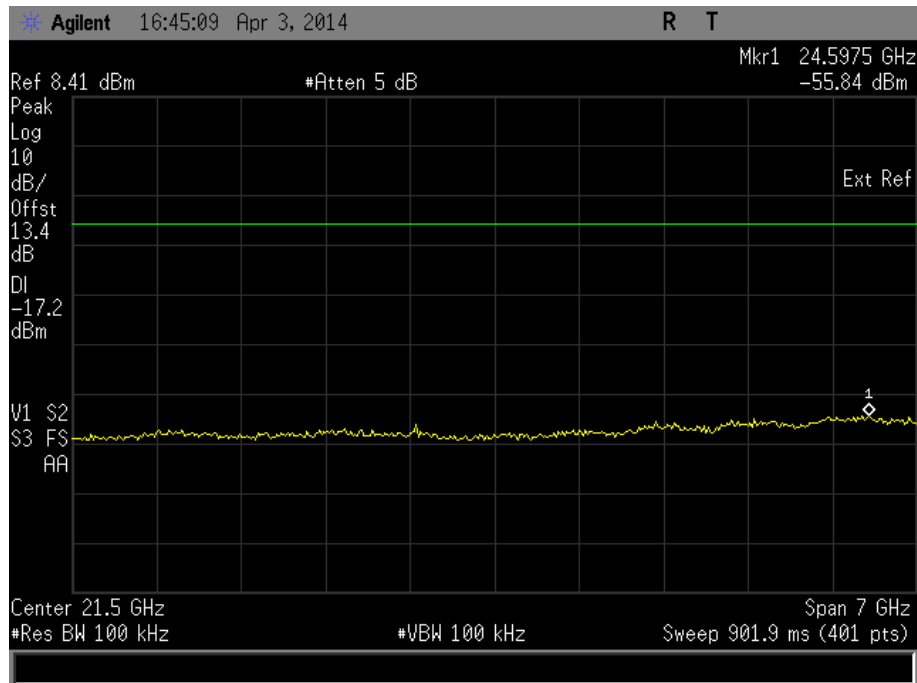
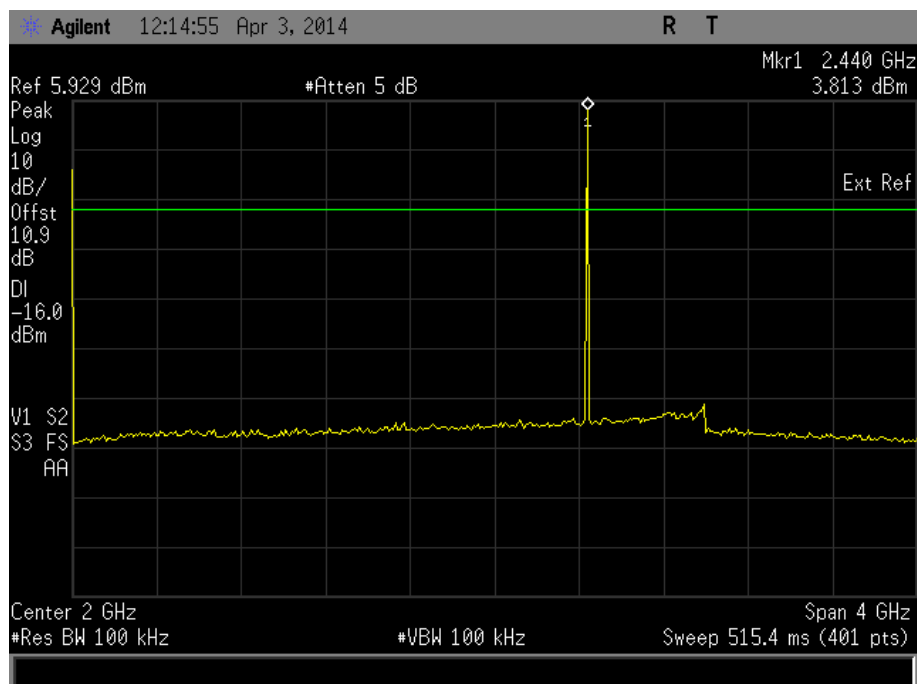


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

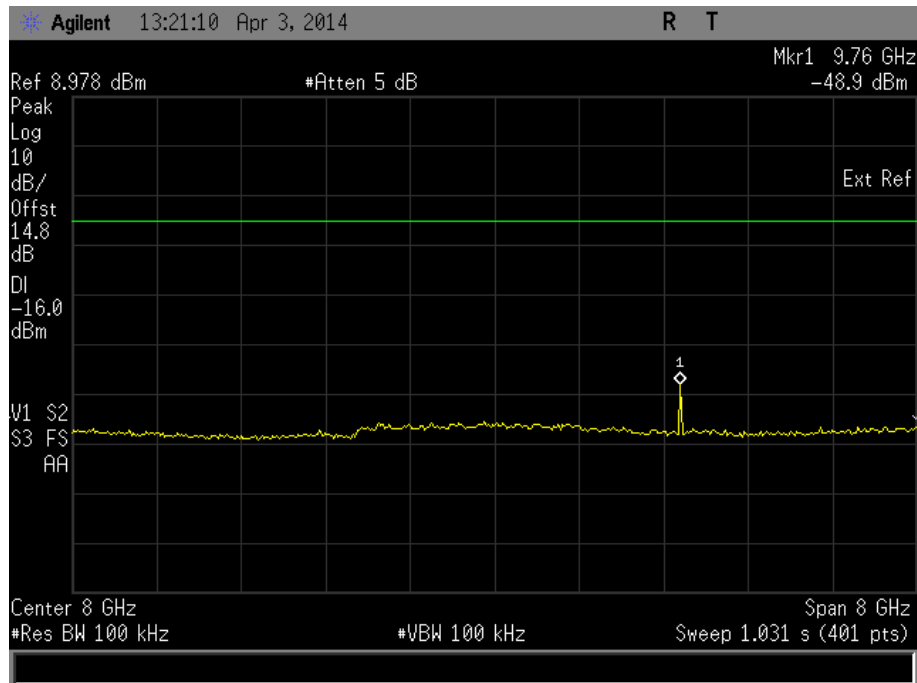
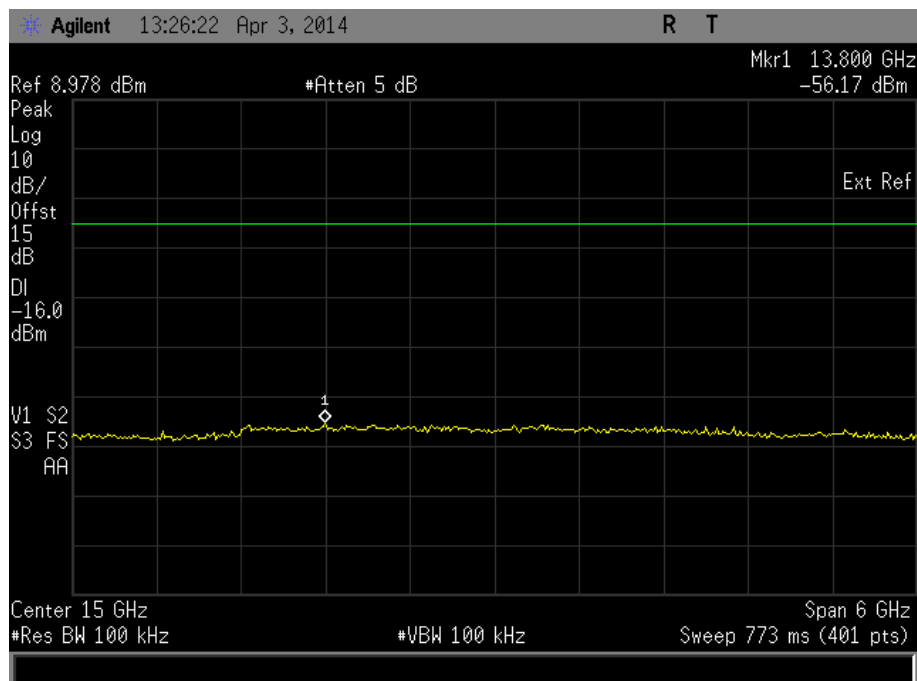


Product Service

18 GHz to 25 GHz2440 MHz9 kHz to 4 GHz

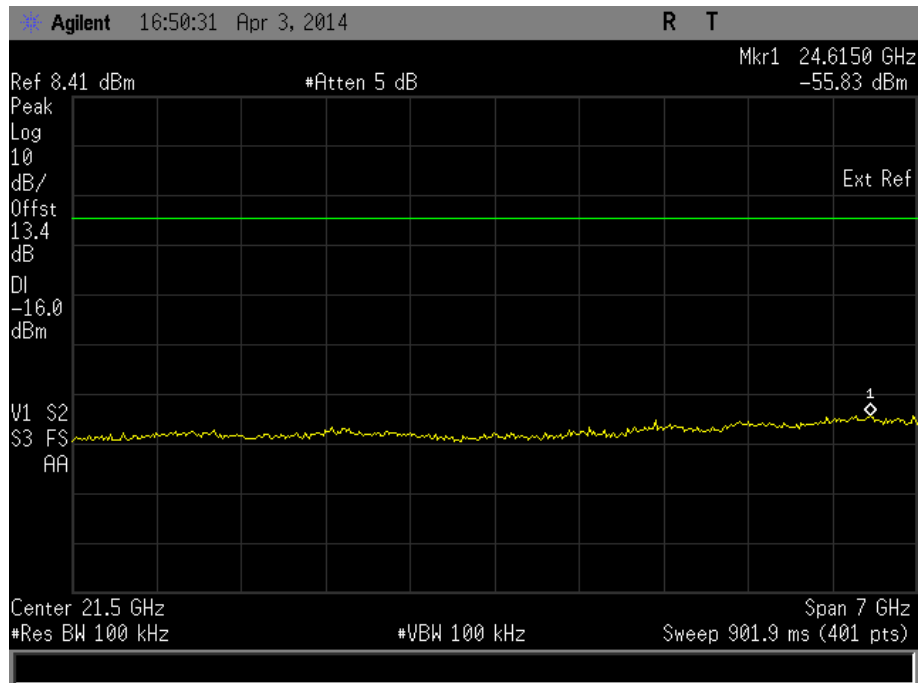
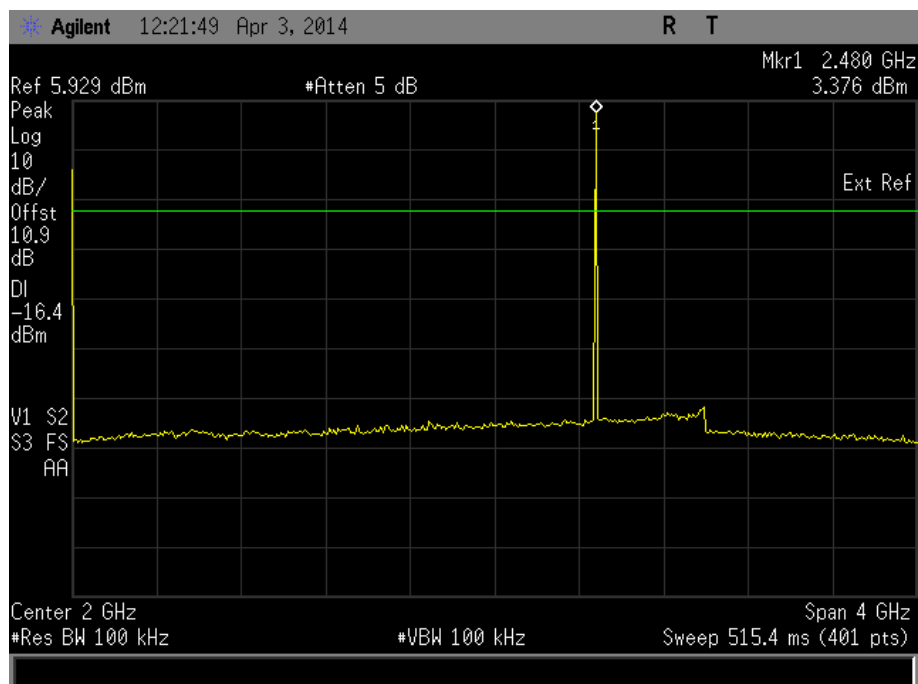


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

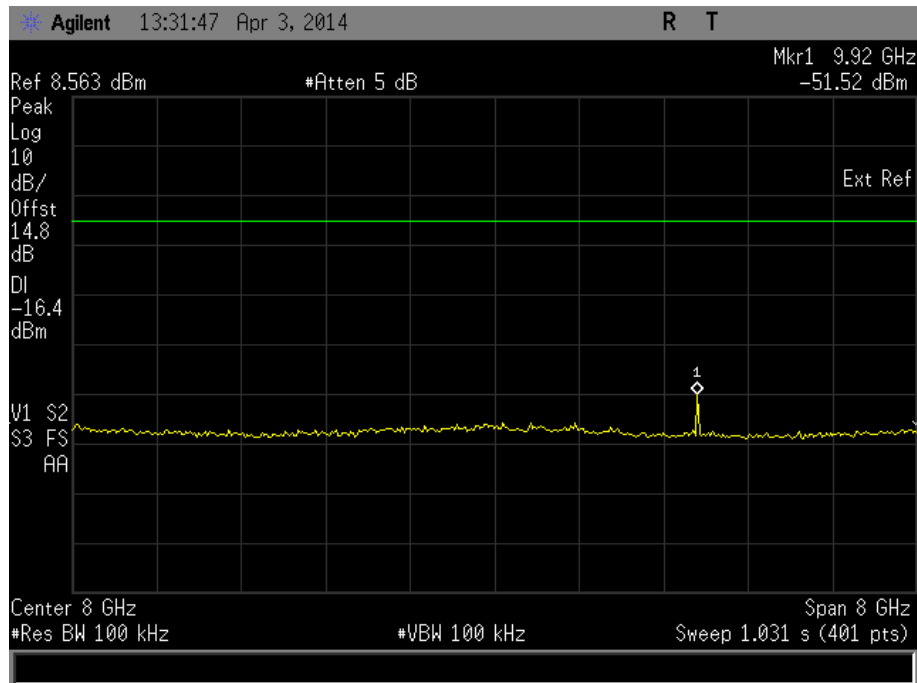
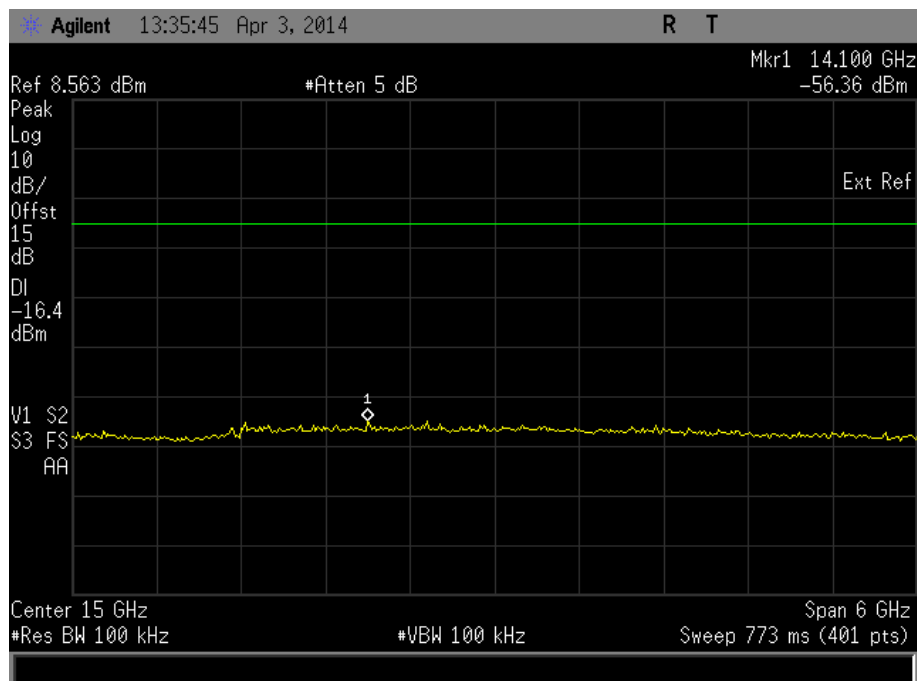


Product Service

18 GHz to 25 GHz2480 MHz9 kHz to 4 GHz

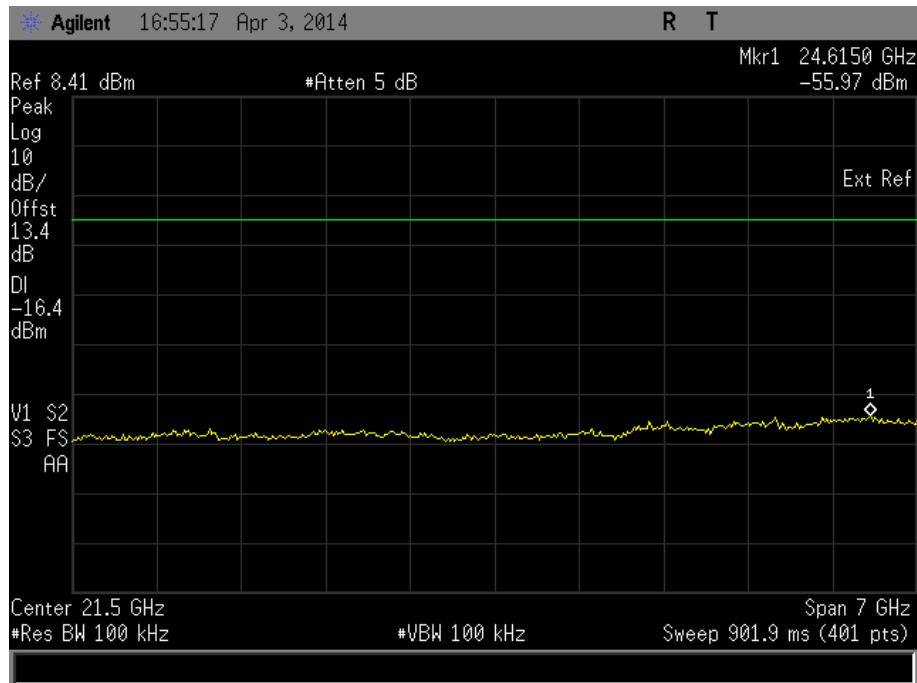


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

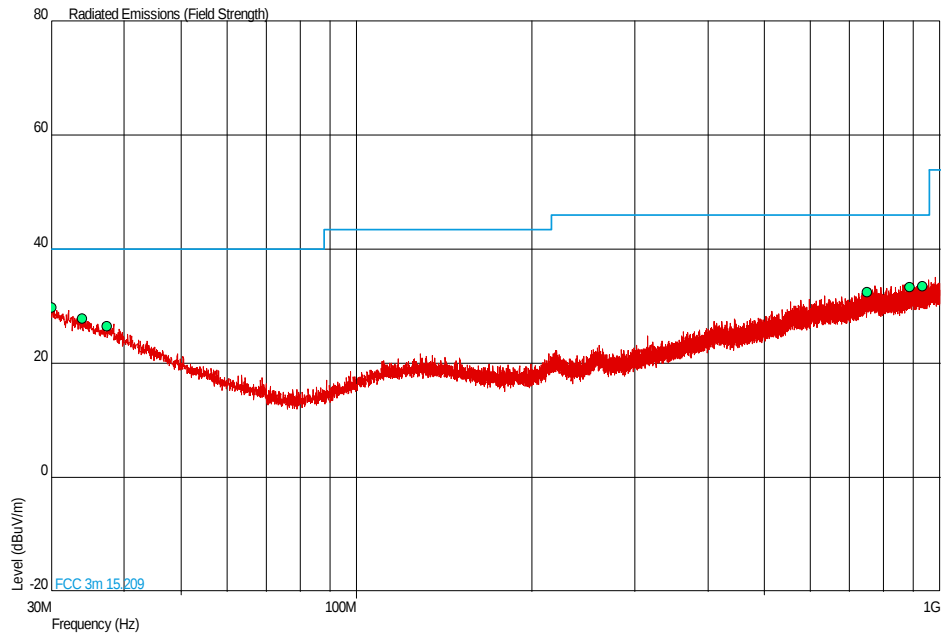
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.



## Spurious Radiated Emissions

2402 MHz

30 MHz to 1 GHz

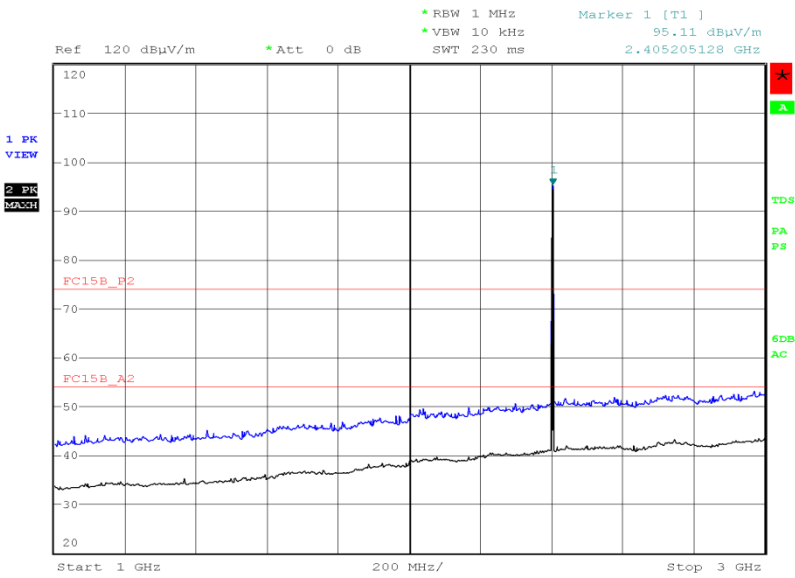


| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 30.049          | 29.8              | 30.9            | 40.0              | 100             | -10.2              | -69.1            | 0           | 1.00       | Horizontal |
| 33.880          | 27.9              | 24.8            | 40.0              | 100             | -12.1              | -75.2            | 45          | 1.00       | Vertical   |
| 37.324          | 26.6              | 21.4            | 40.0              | 100             | -13.4              | -78.6            | 0           | 1.00       | Horizontal |
| 750.662         | 32.5              | 42.2            | 46.0              | 200             | -13.5              | -157.8           | 0           | 1.00       | Horizontal |
| 886.753         | 33.4              | 46.8            | 46.0              | 200             | -12.6              | -153.2           | 45          | 1.00       | Vertical   |
| 934.040         | 33.5              | 47.3            | 46.0              | 200             | -12.5              | -152.7           | 45          | 1.00       | Horizontal |



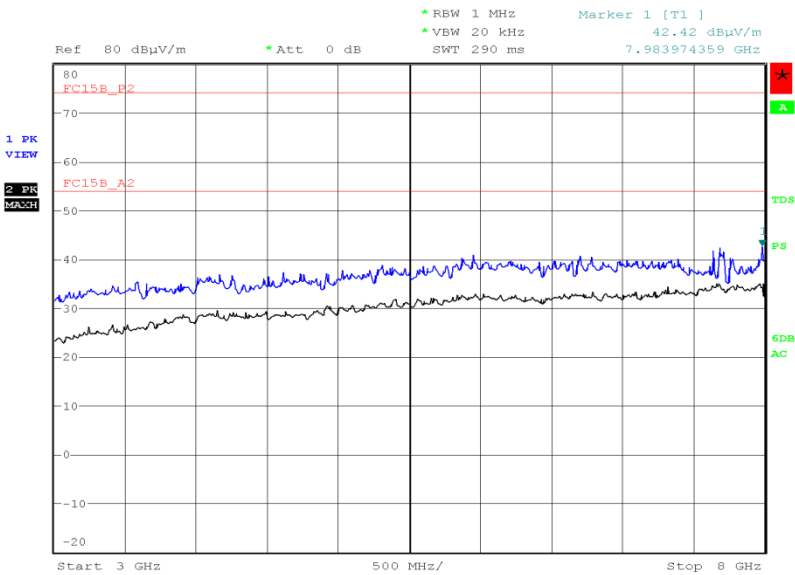
Product Service

1 GHz to 3 GHz



Date: 8.APR.2014 17:19:19

3 GHz to 8 GHz

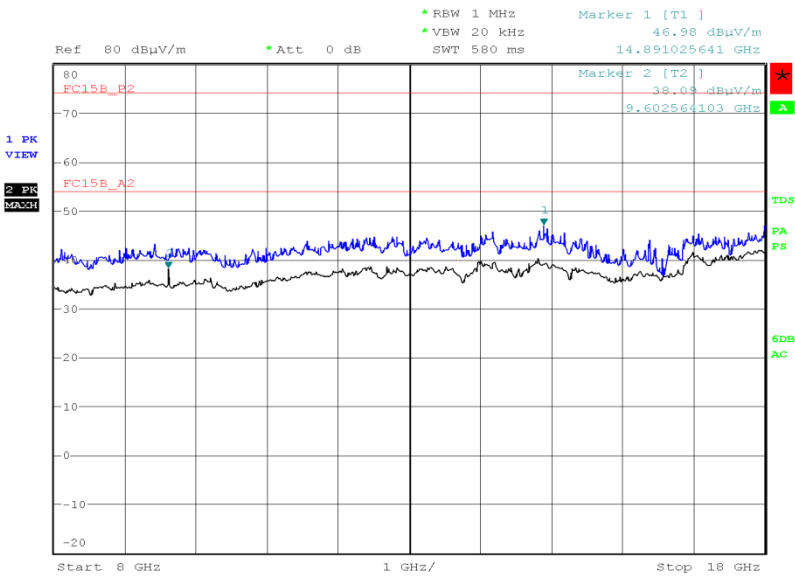


Date: 8.APR.2014 20:22:16



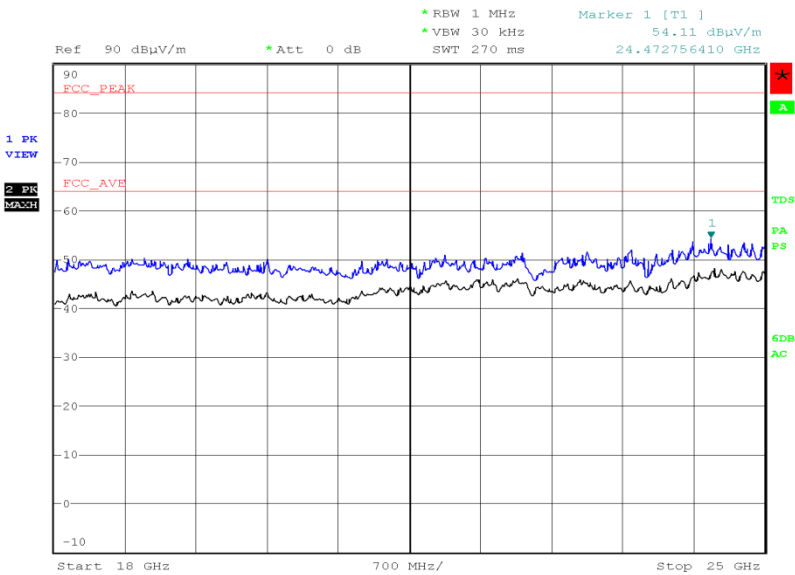
Product Service

8 GHz to 18 GHz



Date: 8.APR.2014 21:33:49

18 GHz to 25 GHz



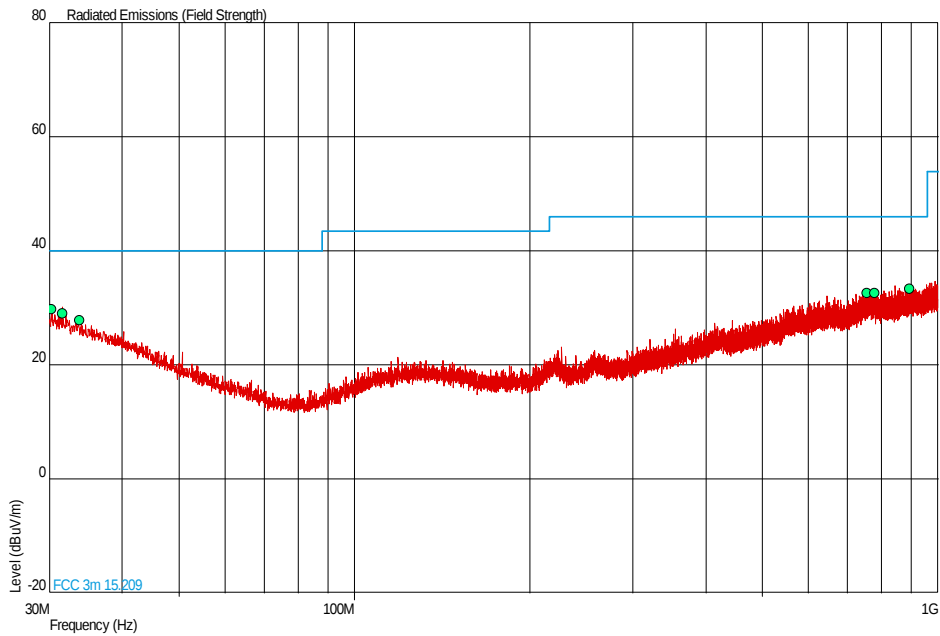
Date: 9.APR.2014 22:15:21



Product Service

2440 MHz

30 MHz to 1 GHz

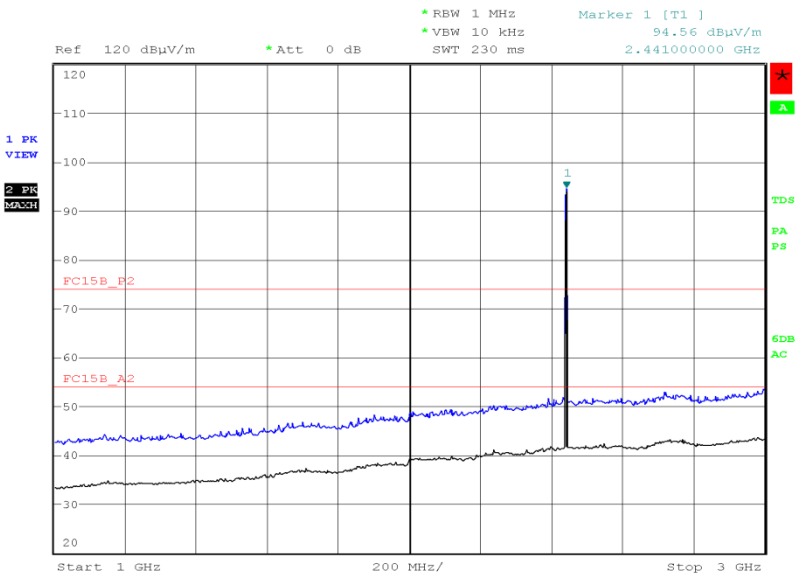


| Frequency (MHz) | QP Level (dBµV/m) | QP Level (µV/m) | QP Limit (dBµV/m) | QP Limit (µV/m) | QP Margin (dBµV/m) | QP Margin (µV/m) | Angle (Deg) | Height (m) | Polarity |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|----------|
| 30.243          | 29.8              | 30.9            | 40.0              | 100             | -10.2              | -69.1            | 45          | 1.00       | Vertical |
| 31.552          | 29.1              | 28.5            | 40.0              | 100             | -10.9              | -71.5            | 45          | 1.00       | Vertical |
| 33.783          | 27.9              | 24.8            | 40.0              | 100             | -12.1              | -75.2            | 45          | 1.00       | Vertical |
| 755.463         | 32.6              | 42.7            | 46.0              | 200             | -13.4              | -157.3           | 45          | 1.00       | Vertical |
| 779.907         | 32.7              | 43.2            | 46.0              | 200             | -13.3              | -156.8           | 0           | 1.00       | Vertical |
| 893.737         | 33.4              | 46.8            | 46.0              | 200             | -12.6              | -153.2           | 0           | 1.00       | Vertical |



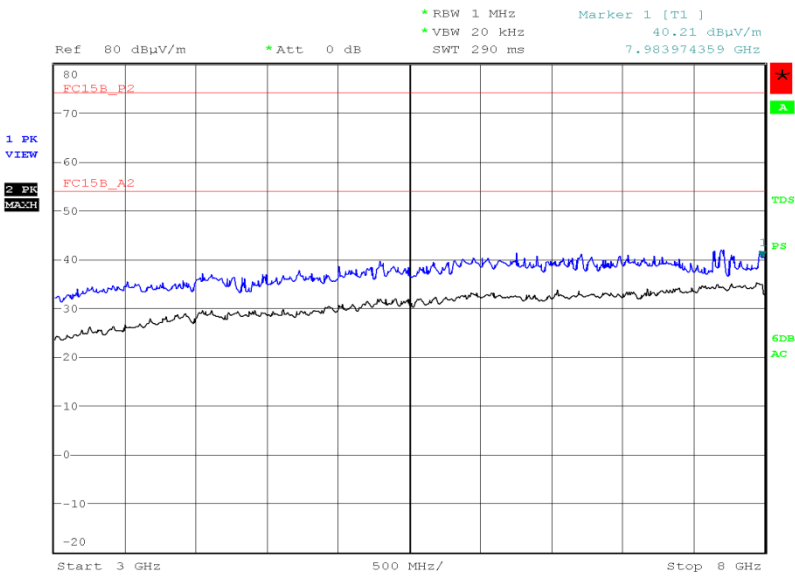
Product Service

1 GHz to 3 GHz



Date: 8.APR.2014 17:29:48

3 GHz to 8 GHz

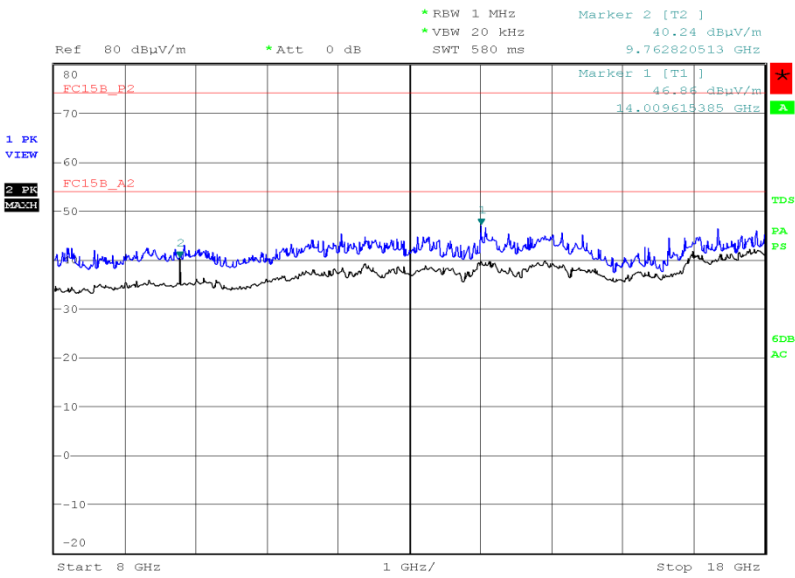


Date: 8.APR.2014 20:33:48



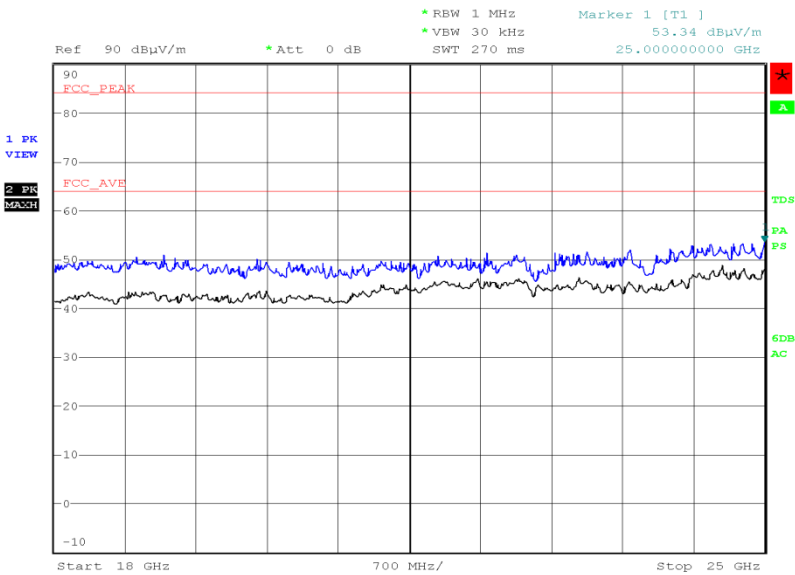
Product Service

8 GHz to 18 GHz



Date: 8.APR.2014 21:12:45

18 GHz to 25 GHz



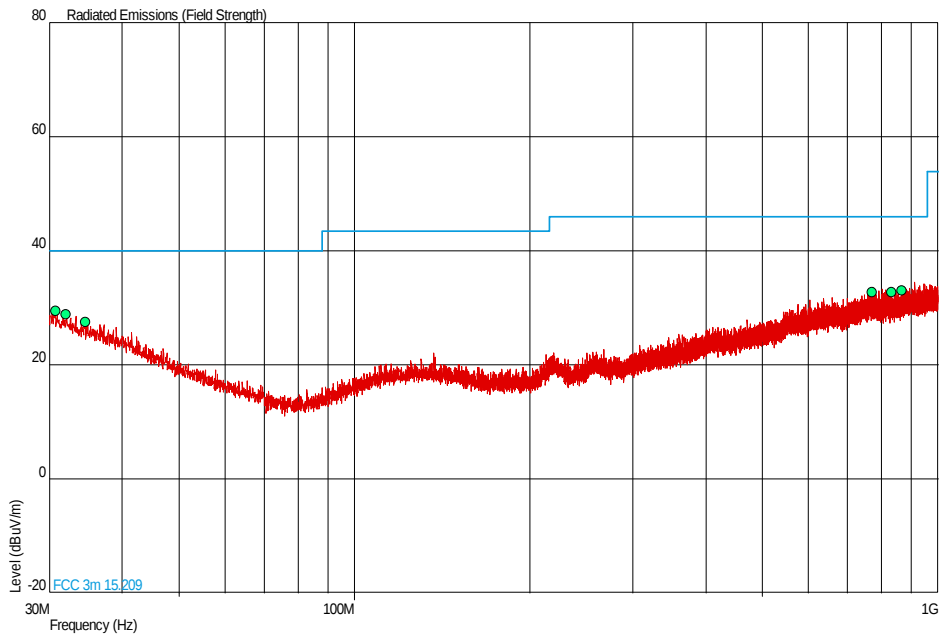
Date: 9.APR.2014 22:24:41



Product Service

2480 MHz

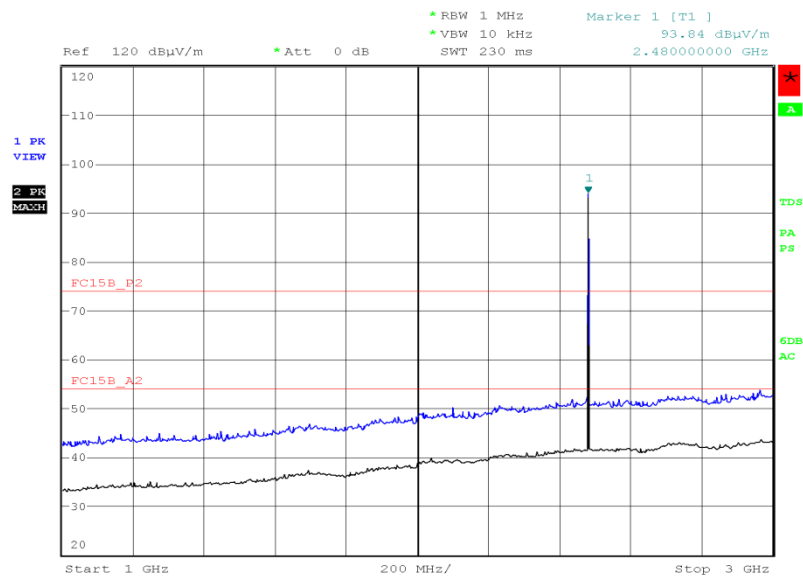
30 MHz to 1 GHz



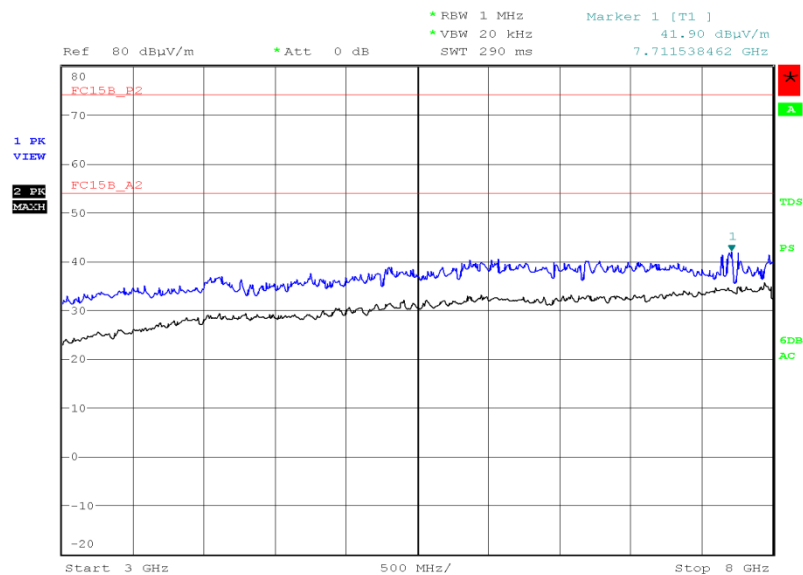
| Frequency (MHz) | QP Level (dBµV/m) | QP Level (µV/m) | QP Limit (dBµV/m) | QP Limit (µV/m) | QP Margin (dBµV/m) | QP Margin (µV/m) | Angle (Deg) | Height (m) | Polarity |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|----------|
| 30.776          | 29.5              | 29.9            | 40.0              | 100             | -10.5              | -70.1            | 0           | 1.00       | Vertical |
| 31.989          | 28.8              | 27.5            | 40.0              | 100             | -11.2              | -72.5            | 0           | 1.00       | Vertical |
| 34.559          | 27.6              | 24.0            | 40.0              | 100             | -12.4              | -76.0            | 0           | 1.00       | Vertical |
| 771.662         | 32.8              | 43.7            | 46.0              | 200             | -13.2              | -156.3           | 45          | 1.00       | Vertical |
| 831.948         | 32.7              | 43.2            | 46.0              | 200             | -13.3              | -156.8           | 0           | 1.00       | Vertical |
| 868.032         | 33.0              | 44.7            | 46.0              | 200             | -13.0              | -155.3           | 0           | 1.00       | Vertical |



Product Service

1 GHz to 3 GHz

Date: 8.APR.2014 18:01:21

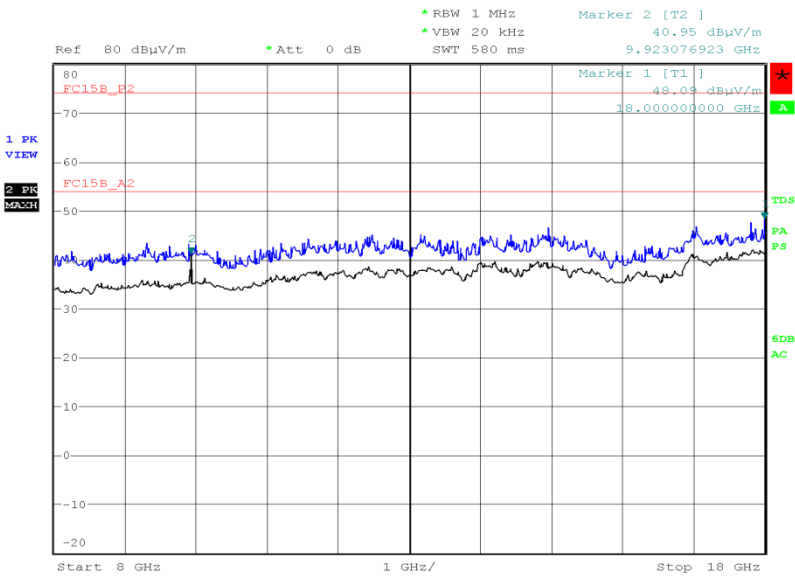
3 GHz to 8 GHz

Date: 8.APR.2014 20:39:55



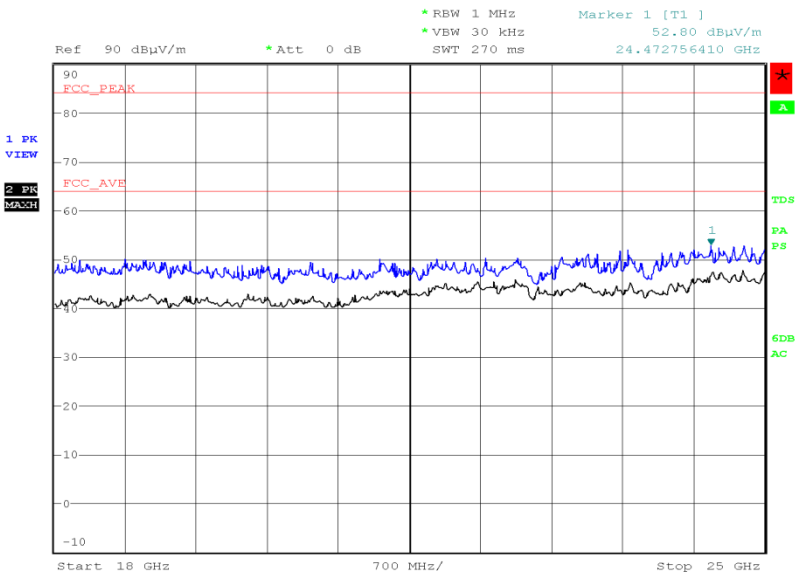
Product Service

8 GHz to 18 GHz



Date: 8.APR.2014 21:01:44

18 GHz to 25 GHz



Date: 9.APR.2014 22:37:08

Limit

| Peak (dBμV/m) | Average (dBμV/m) |
|---------------|------------------|
| 74.0          | 54.0             |

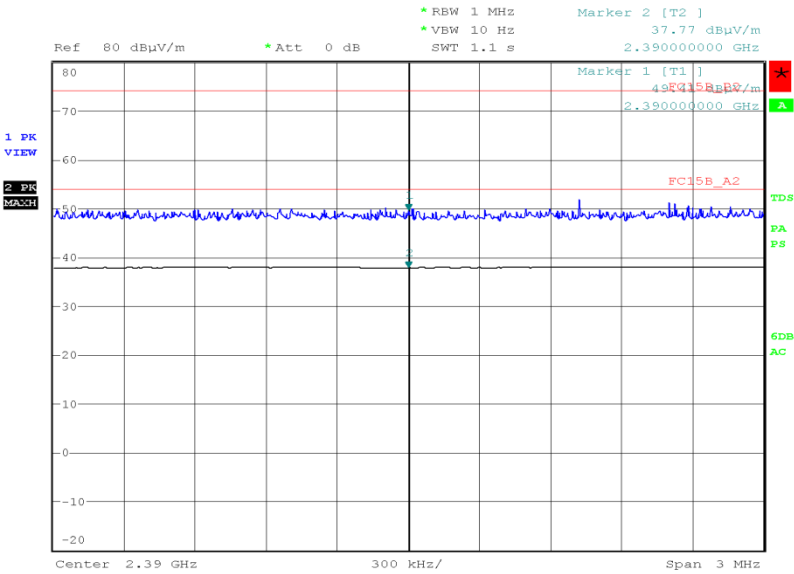


Product Service

Band Edge Emissions

2402 MHz

| Polarisation | Final Peak (dBμV/m) | Final Average (dBμV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 49.41               | 37.77                  |



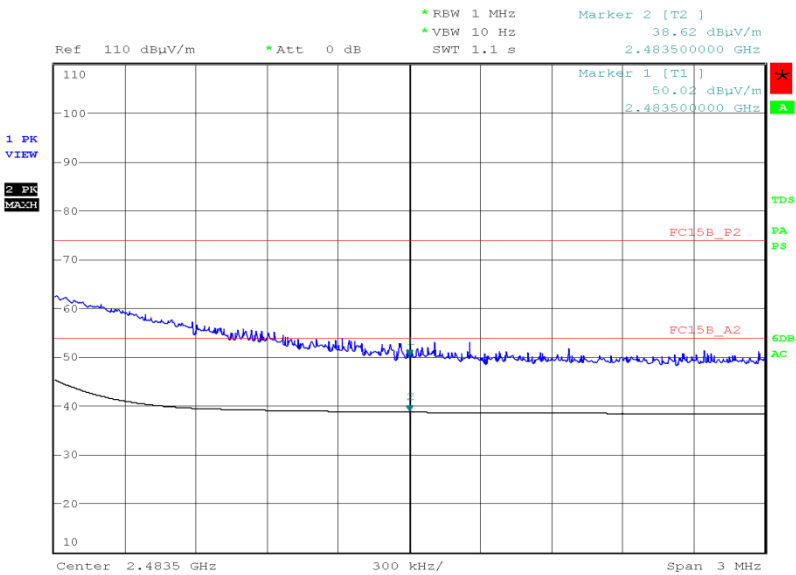
Date: 8.APR.2014 17:14:42



Product Service

2480 MHz

| Polarisation | Final Peak (dBμV/m) | Final Average (dBμV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 50.02               | 38.62                  |



Date: 8.APR.2014 17:53:34

Limit

| Peak (dBμV/m) | Average (dBμV/m) |
|---------------|------------------|
| 74.0          | 54.0             |



Product Service

## **2.6 POWER SPECTRAL DENSITY**

### **2.6.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.247 (e)

### **2.6.2 Equipment Under Test and Modification State**

SHL25 S/N: IMEI 004401115170488 - Modification State 0

SHL25 S/N: IMEI 004401115170645 - Modification State 0

### **2.6.3 Date of Test**

31 March 2014, 24 April 2014 & 25 April 2014

### **2.6.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.6.5 Test Procedure**

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (e) and KDB 558074.

The EUT was connected to a spectrum analyser via a cable and attenuator. The EUT was transmitting at maximum power, for bottom, middle and top channels on all supported data rates. The path loss was measured between the EUT and the spectrum analyser and entered as a reference level offset. The trace was set to max hold and using a peak detector the maximum response was established with the spectrum analyser RBW at 3 kHz and VBW at 10 kHz, the power spectral density in a 3 kHz bandwidth was measured.

### **2.6.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 23.1 - 23.5°C |
| Relative Humidity   | 39.0 - 40.5%  |



Product Service

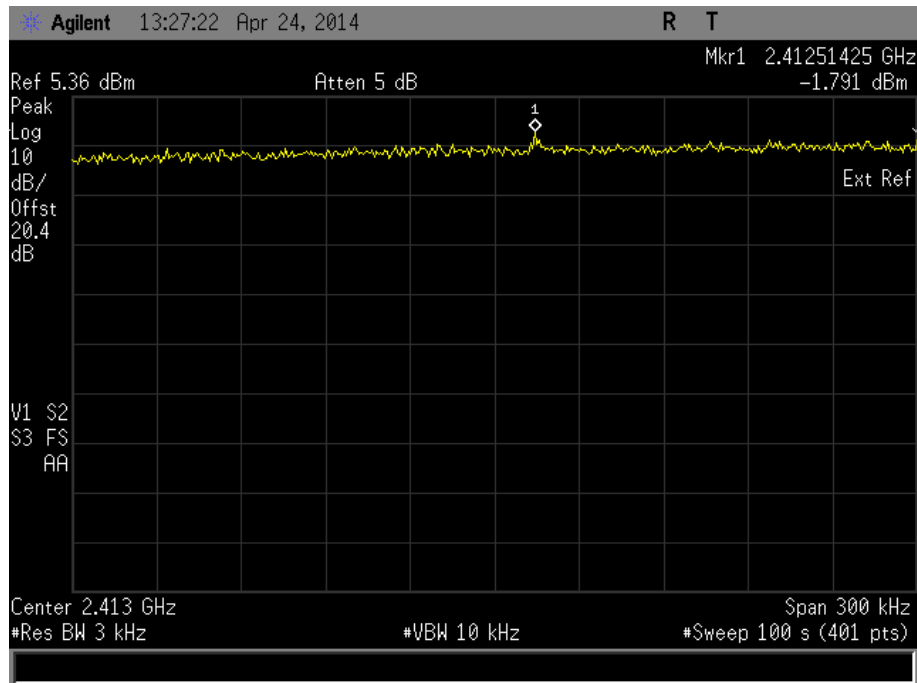
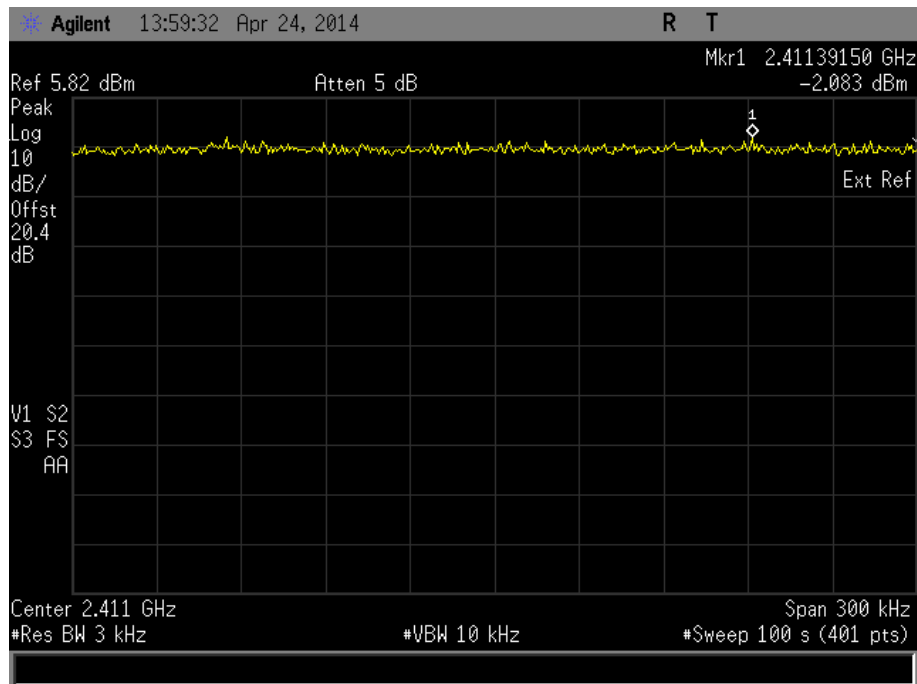
**2.6.7 Test Results**802.11(b)

4.0 V DC Supply

| Frequency | Data Rate (Mbps) | Power Spectral Density in 3 kHz Bands (dBm) |
|-----------|------------------|---------------------------------------------|
| 2412 MHz  | 1                | -1.79                                       |
|           | 2                | -2.08                                       |
|           | 5.5              | -3.02                                       |
|           | 11               | -3.15                                       |
| 2437 MHz  | 1                | -3.33                                       |
|           | 2                | -3.20                                       |
|           | 5.5              | -4.04                                       |
|           | 11               | -4.66                                       |
| 2462 MHz  | 1                | -4.56                                       |
|           | 2                | -3.08                                       |
|           | 5.5              | -4.30                                       |
|           | 11               | -4.97                                       |

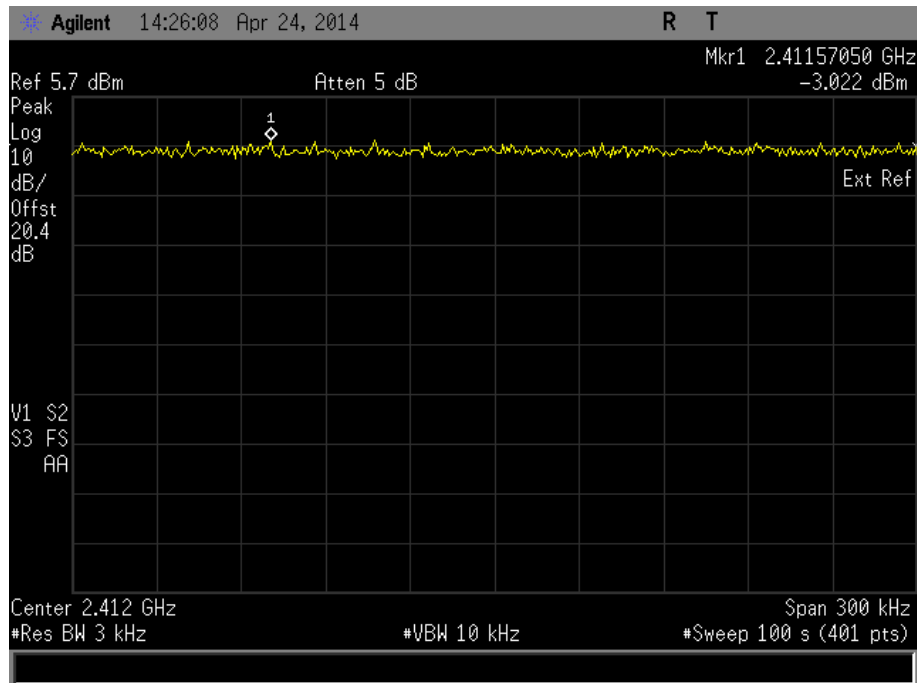
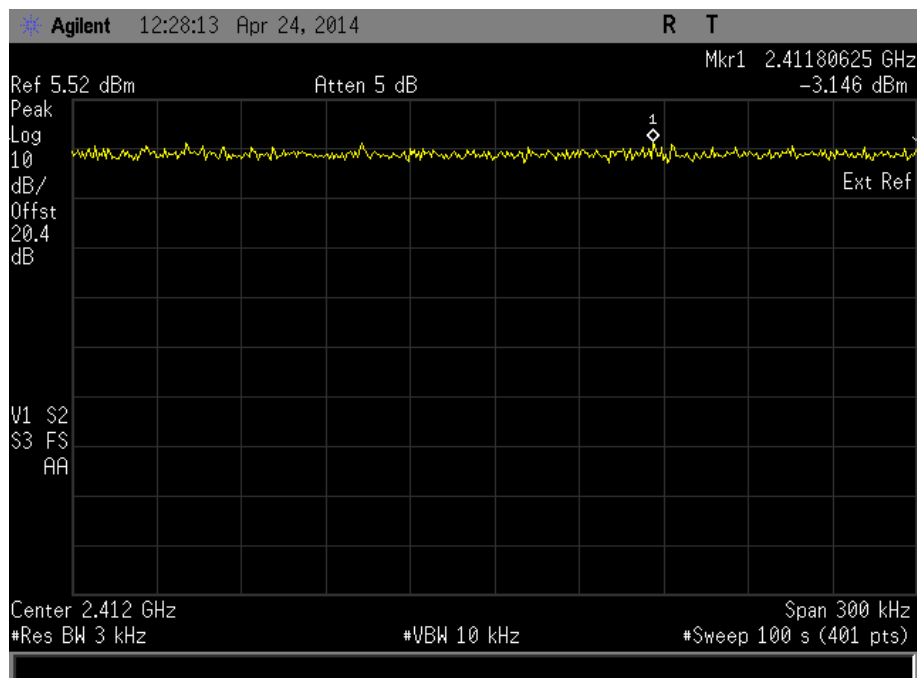


Product Service

2412 MHz1 Mbps2 Mbps

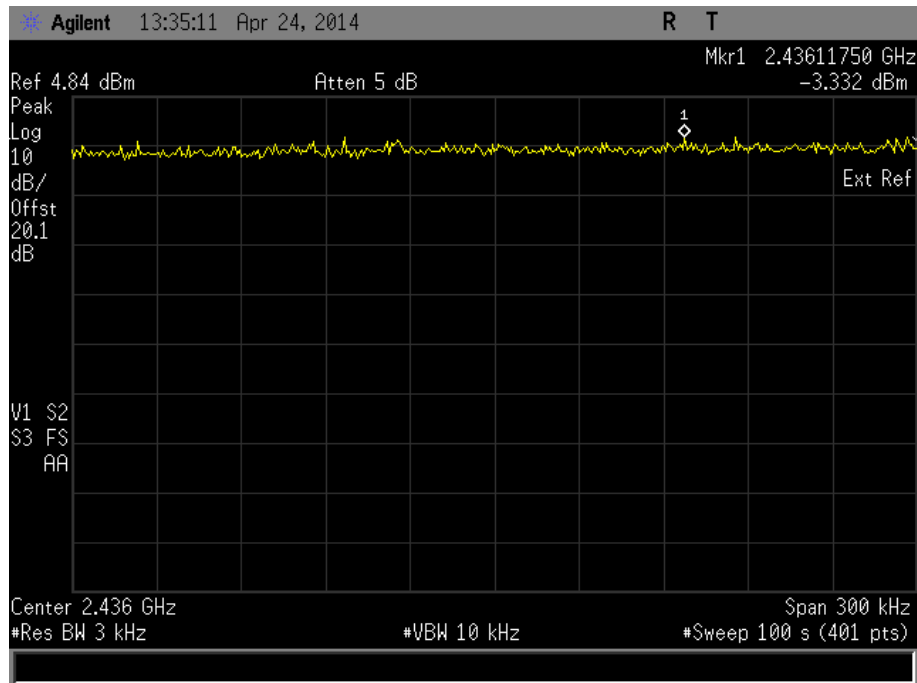
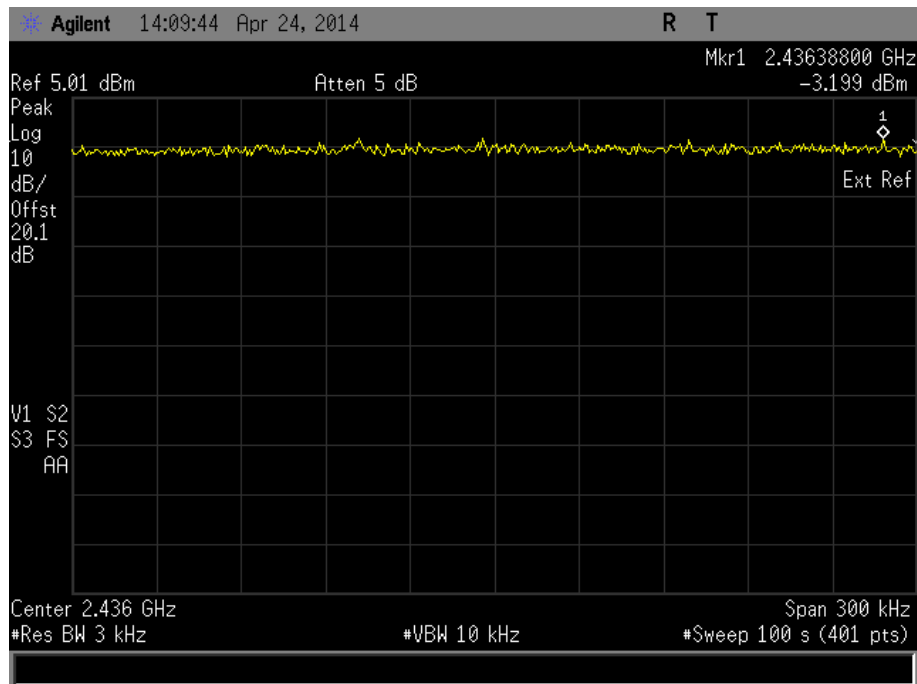


Product Service

5.5 Mbps11 Mbps

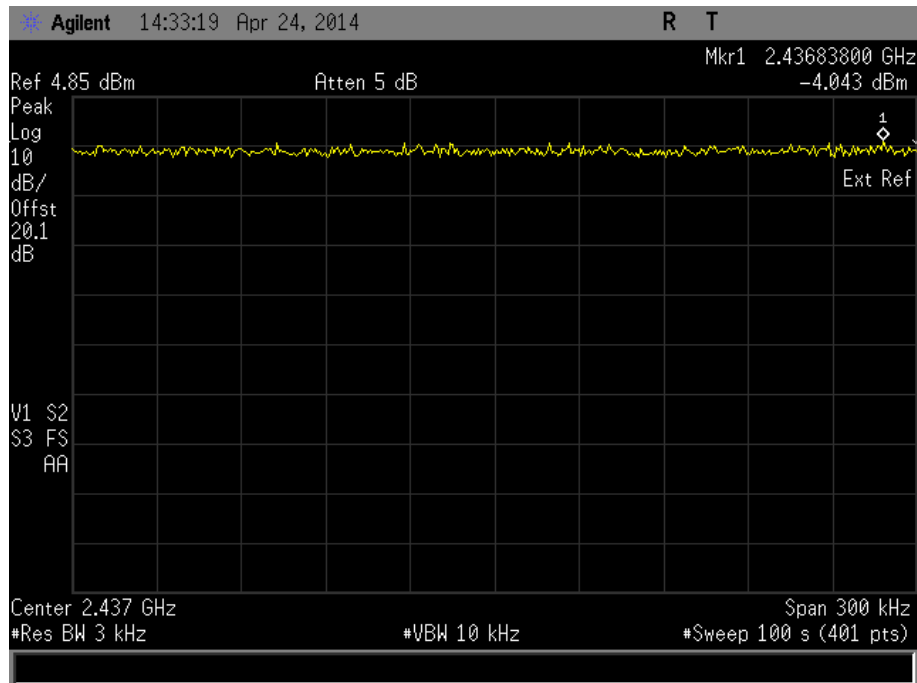
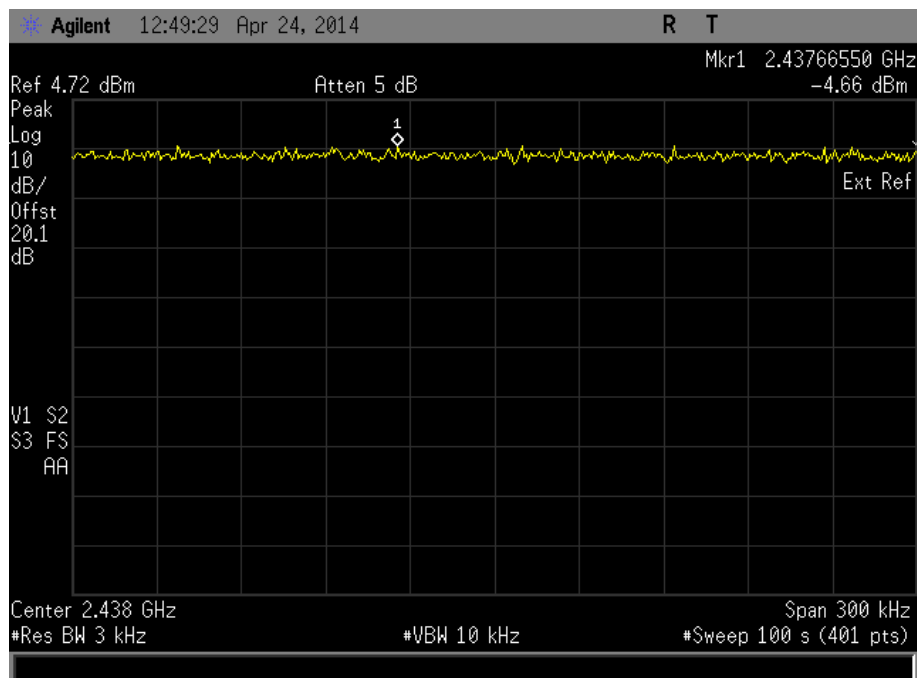


Product Service

2437 MHz1 Mbps2 Mbps

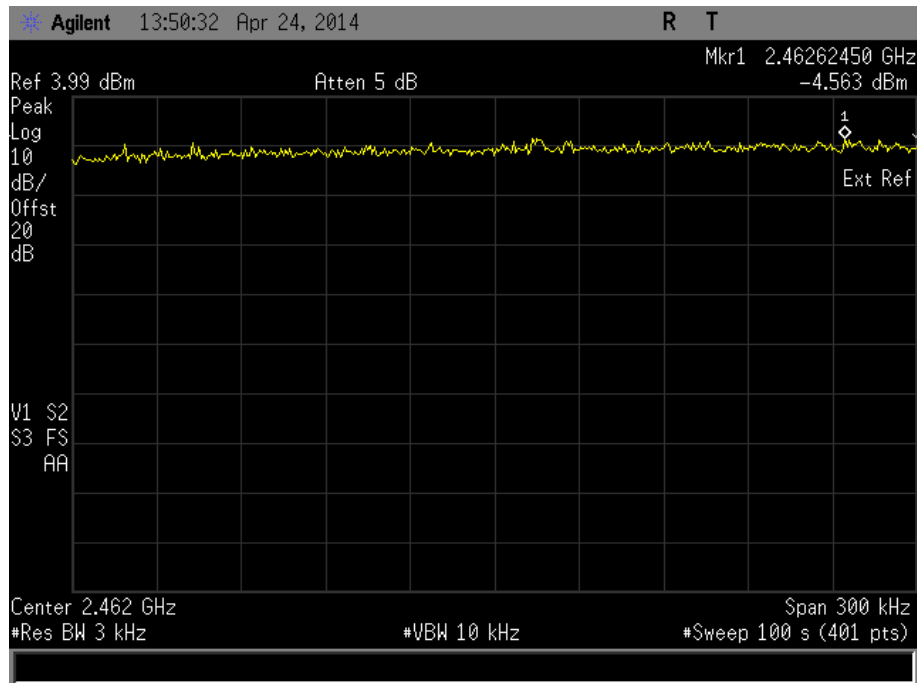
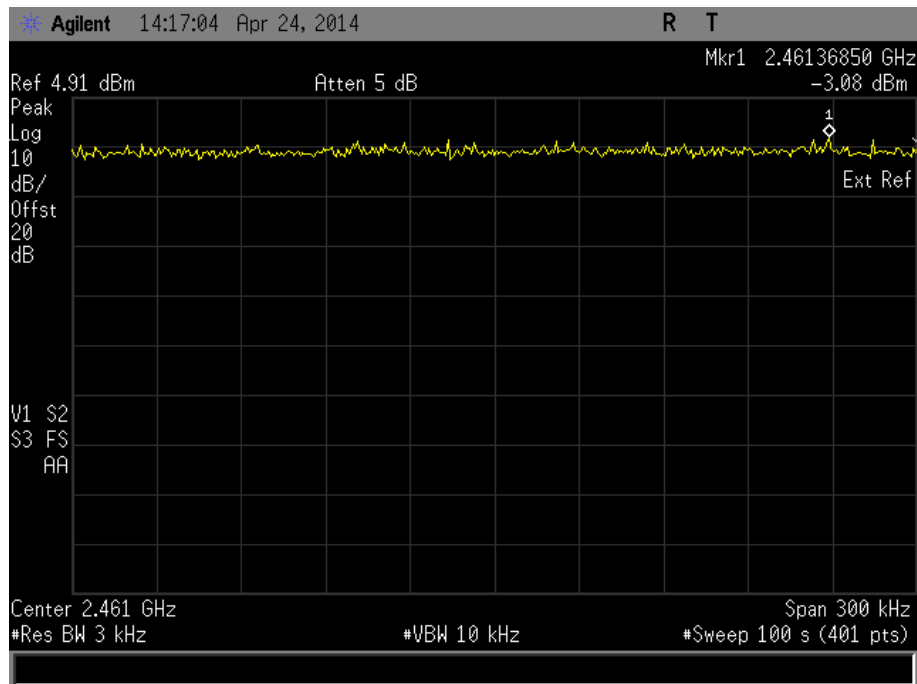


Product Service

5.5 Mbps11 Mbps

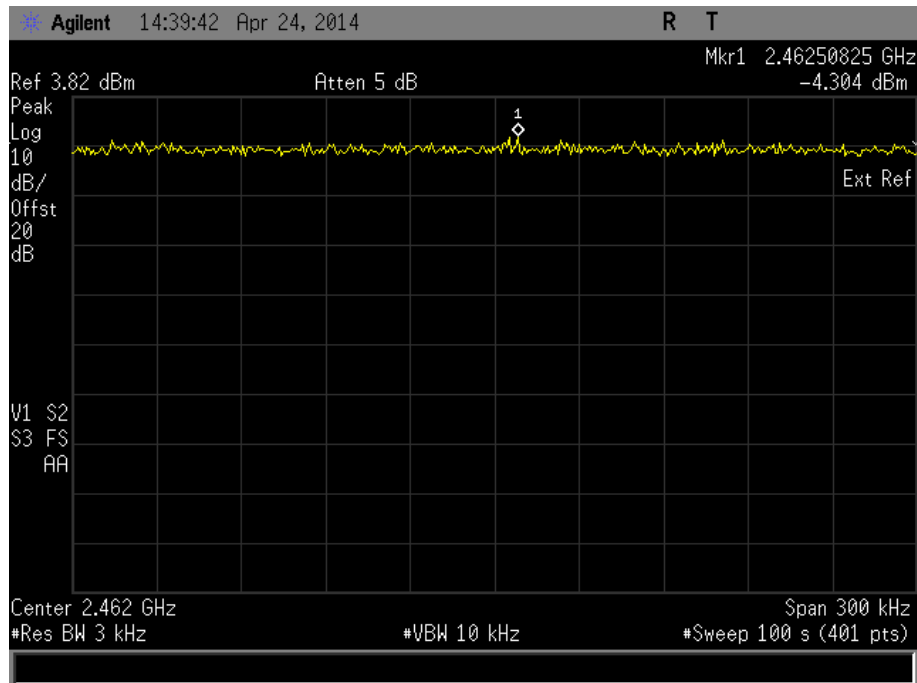
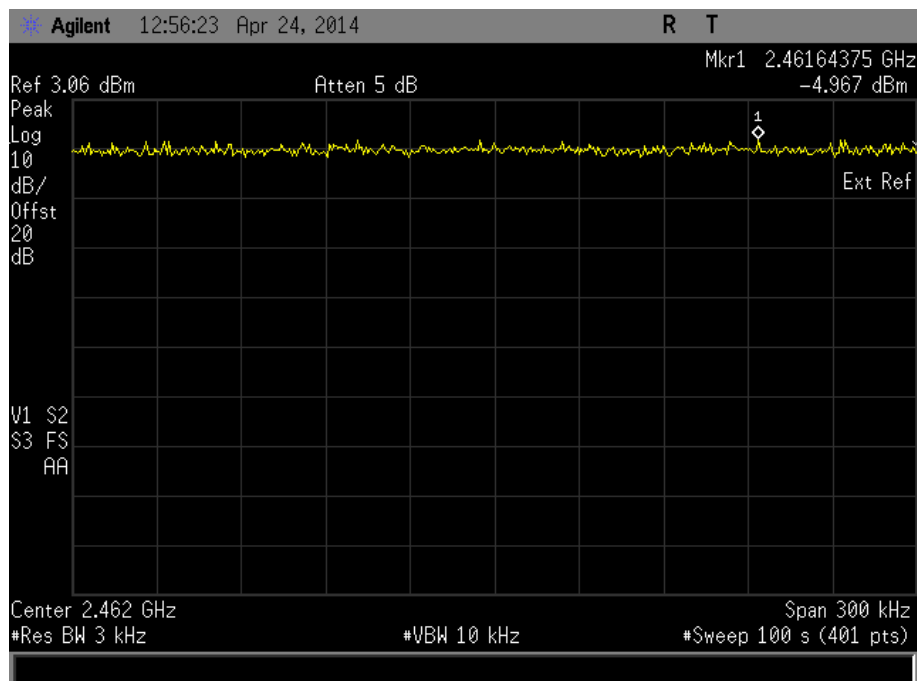


Product Service

2462 MHz1 Mbps2 Mbps



Product Service

5.5 Mbps11 MbpsLimit Clause

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

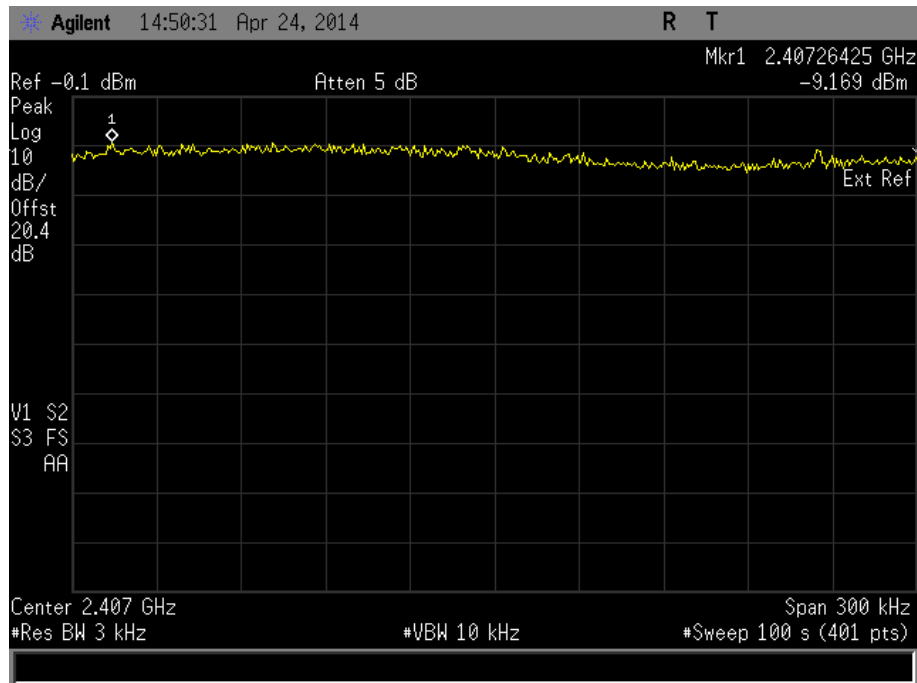
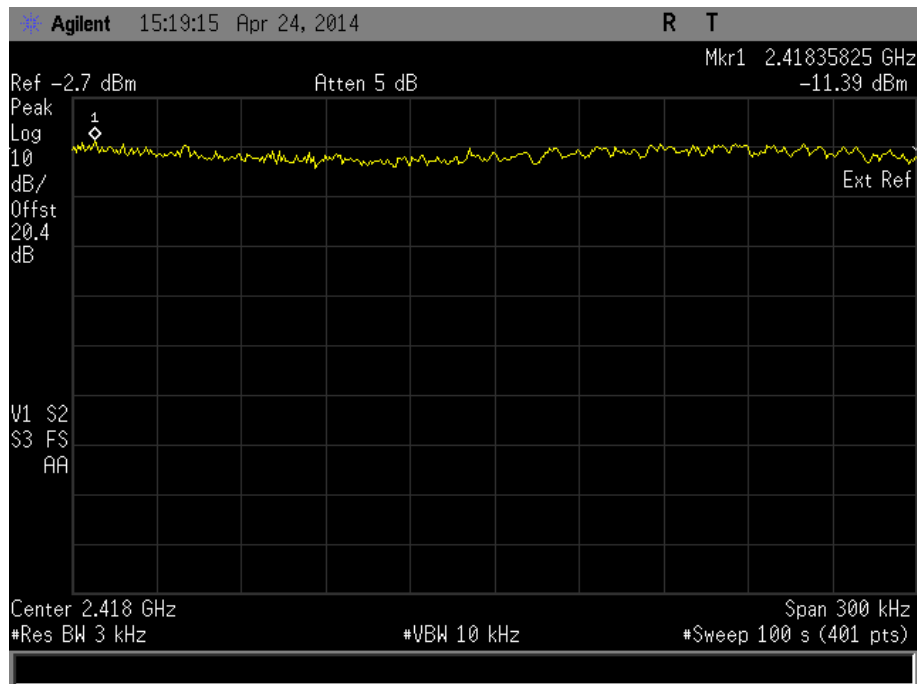
802.11(g)

4.0 V DC Supply

| Frequency | Data Rate (Mbps) | Power Spectral Density in 3 kHz Bands (dBm) |
|-----------|------------------|---------------------------------------------|
| 2412 MHz  | 6                | -9.17                                       |
|           | 9                | -11.39                                      |
|           | 12               | -9.76                                       |
|           | 18               | -8.87                                       |
|           | 24               | -8.87                                       |
|           | 36               | -9.64                                       |
|           | 48               | -8.40                                       |
|           | 54               | -9.40                                       |
| 2437 MHz  | 6                | -8.95                                       |
|           | 9                | -8.22                                       |
|           | 12               | -9.54                                       |
|           | 18               | -8.65                                       |
|           | 24               | -9.39                                       |
|           | 36               | -9.68                                       |
|           | 48               | -9.79                                       |
|           | 54               | -9.02                                       |
| 2462 MHz  | 6                | -12.44                                      |
|           | 9                | -10.27                                      |
|           | 12               | -10.61                                      |
|           | 18               | -9.80                                       |
|           | 24               | -9.14                                       |
|           | 36               | -9.49                                       |
|           | 48               | -10.57                                      |
|           | 54               | -9.59                                       |

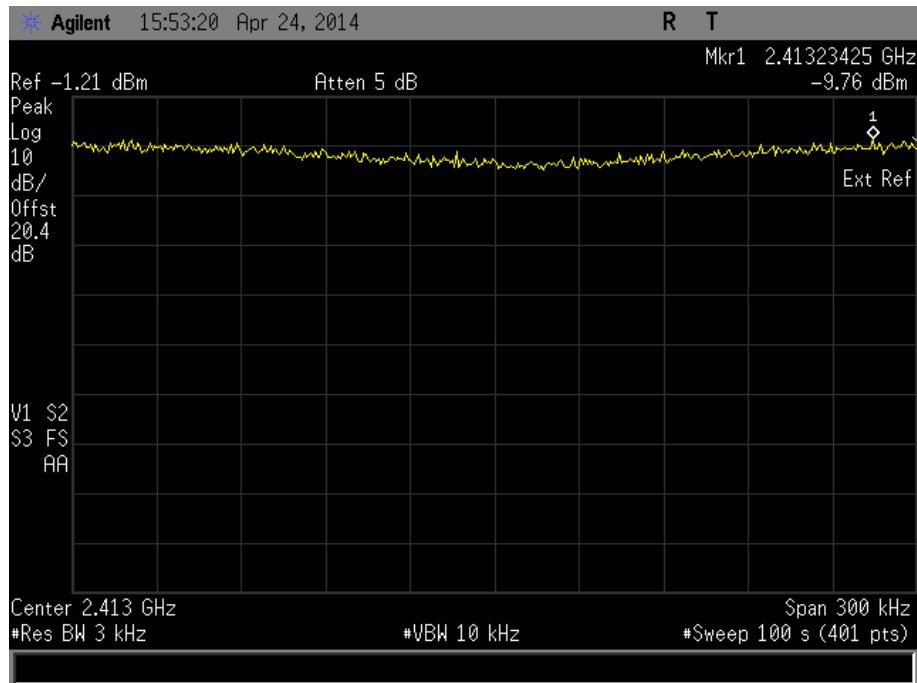
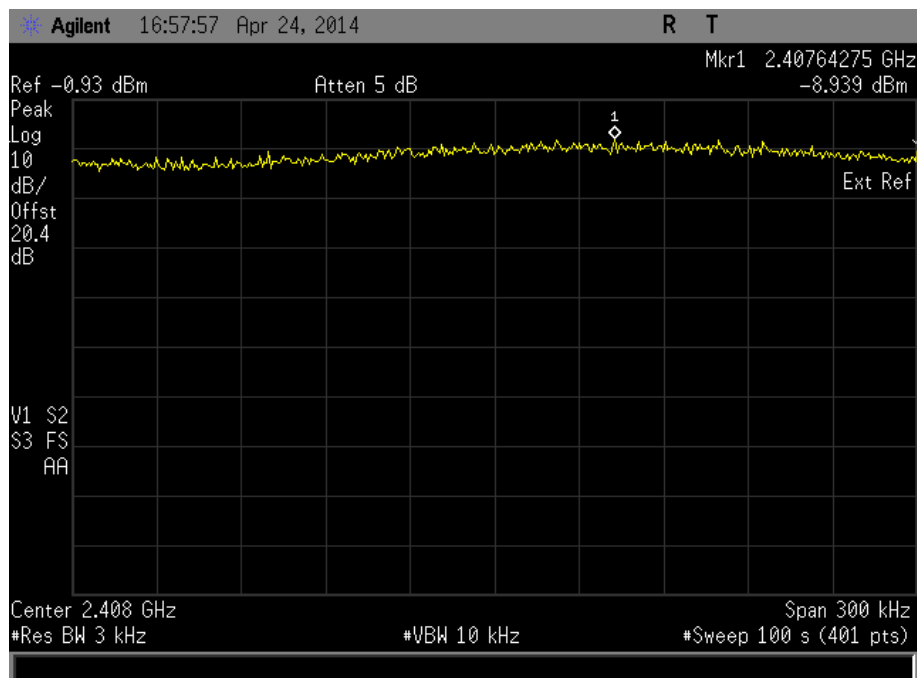


Product Service

2412 MHz6 Mbps9 Mbps

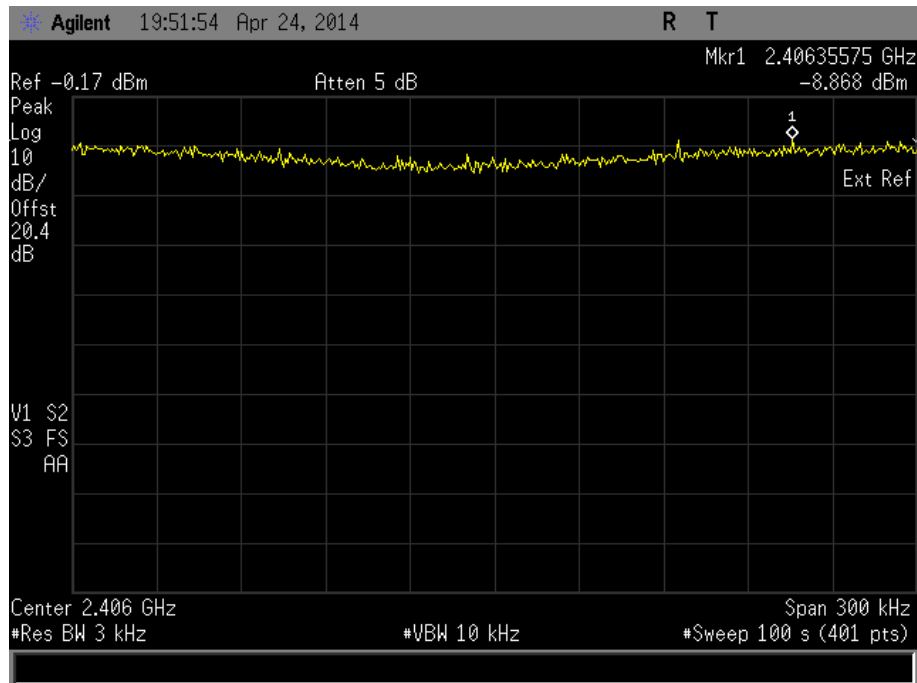
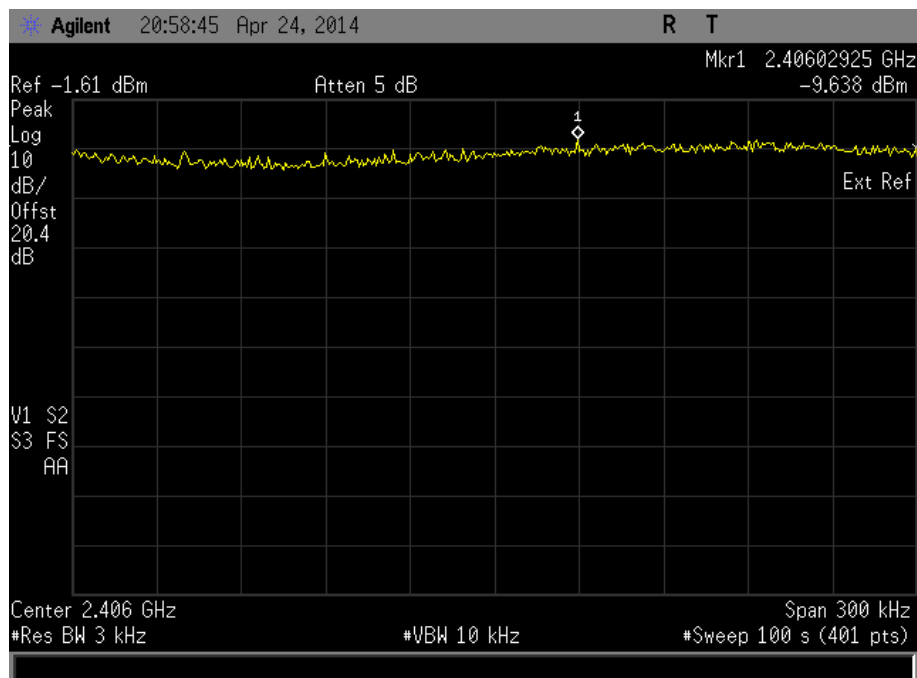


Product Service

12 Mbps18 Mbps

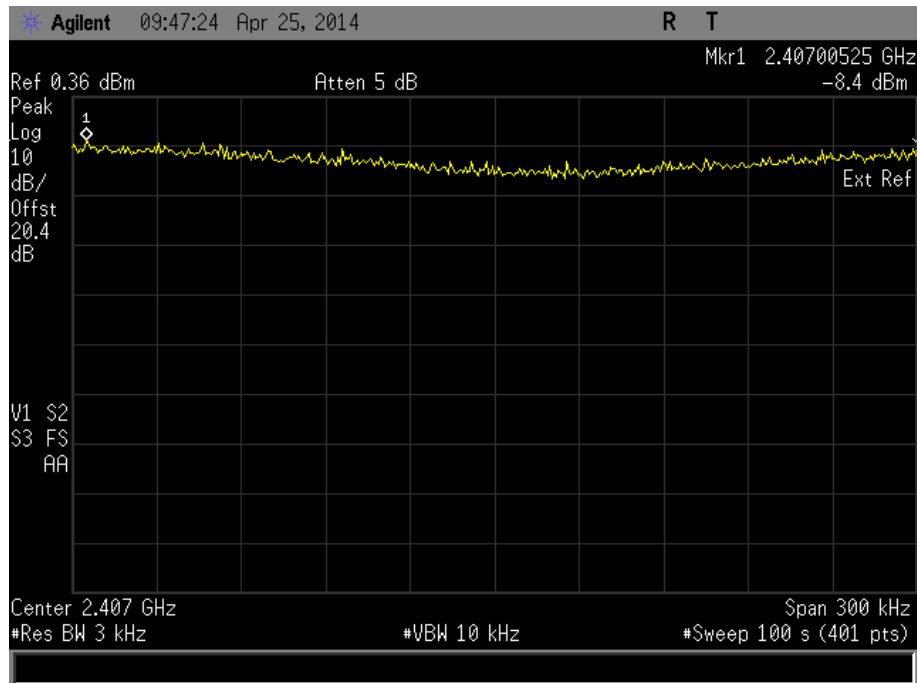
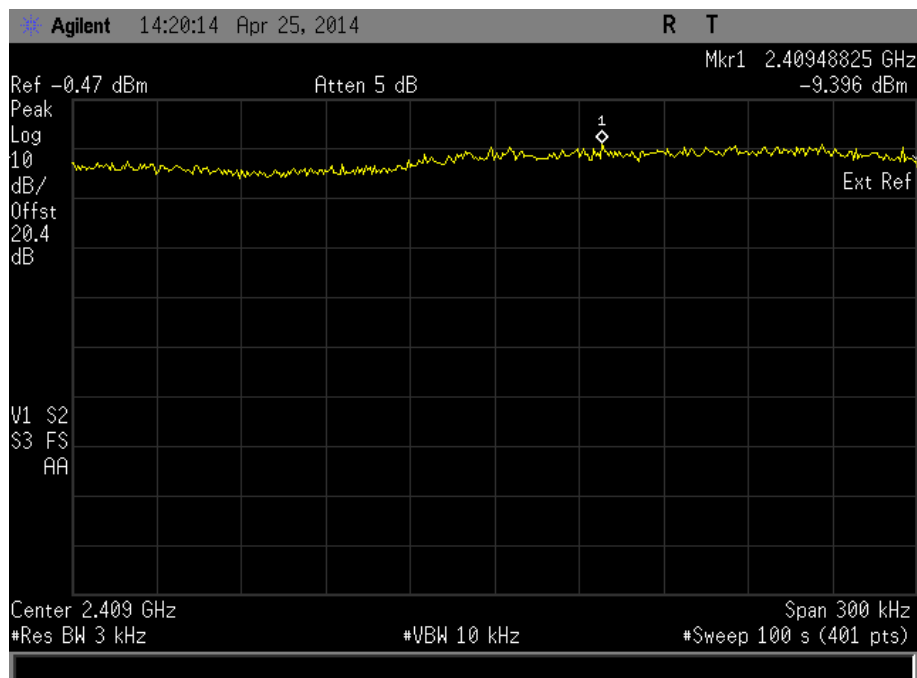


Product Service

24 Mbps36 Mbps

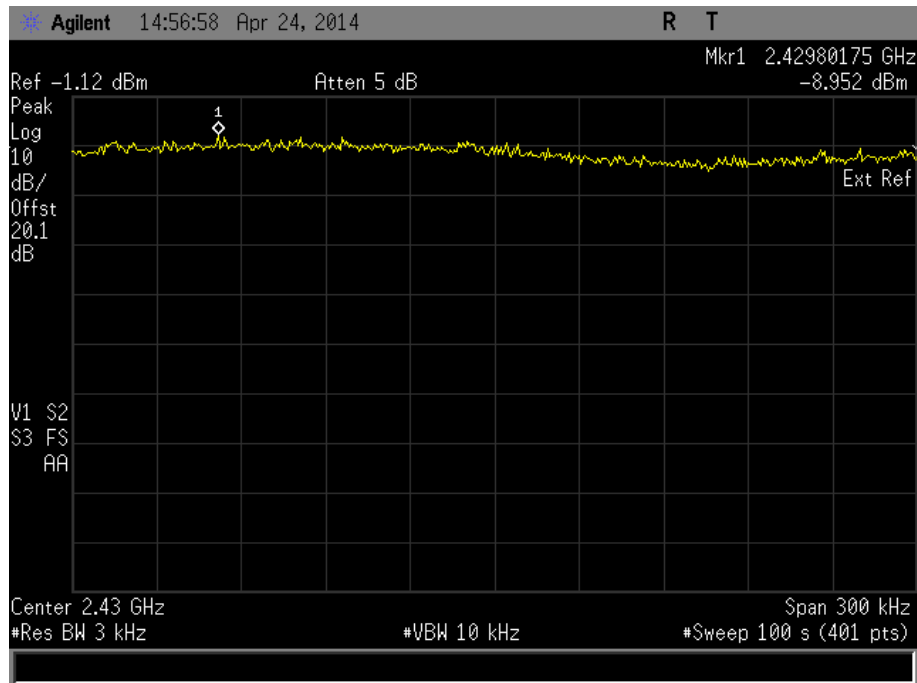
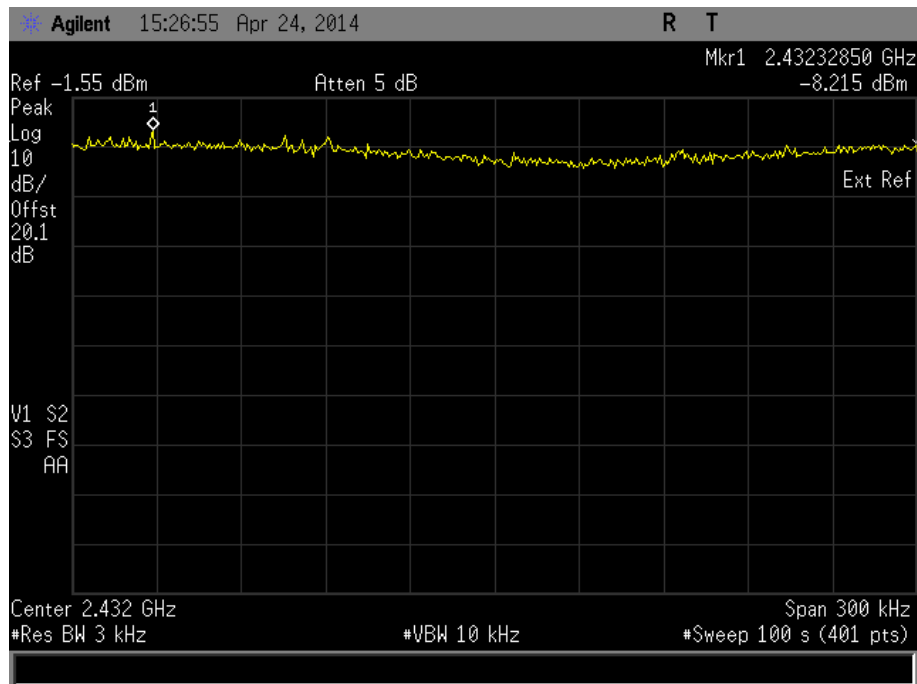


Product Service

48 Mbps54 Mbps

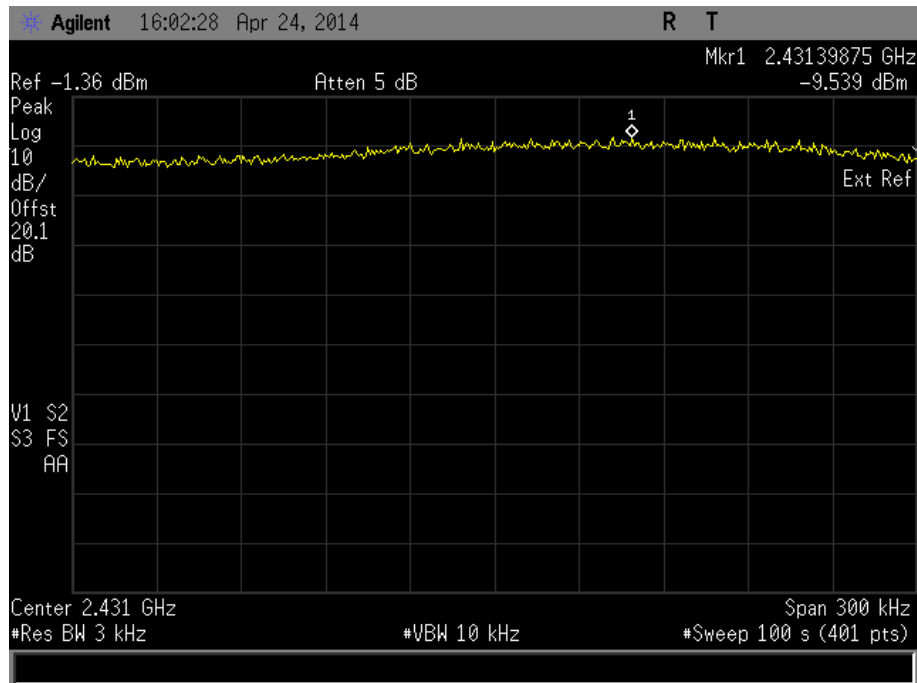
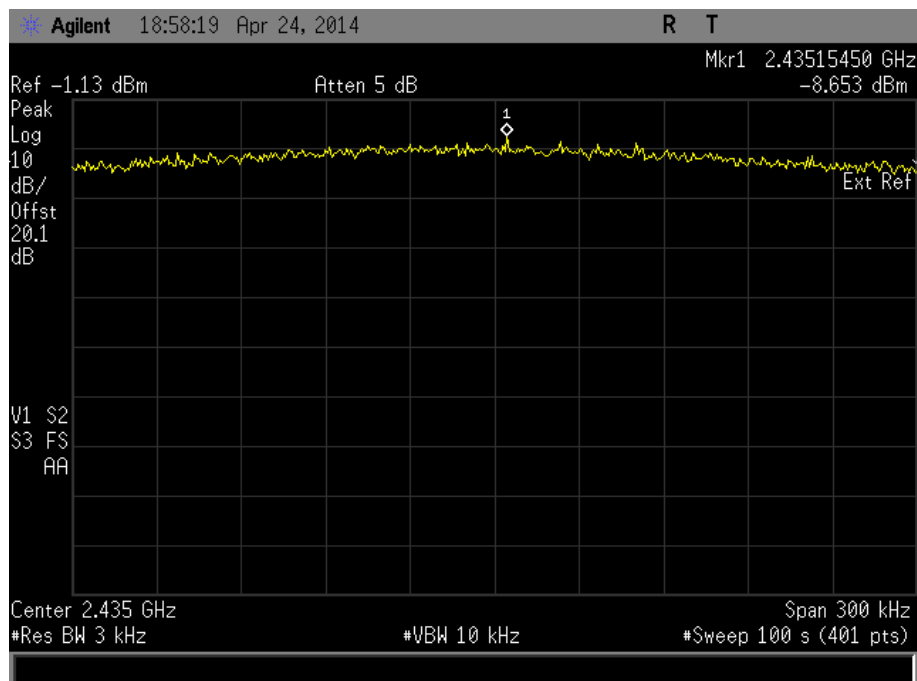


Product Service

2437 MHz6 Mbps9 Mbps

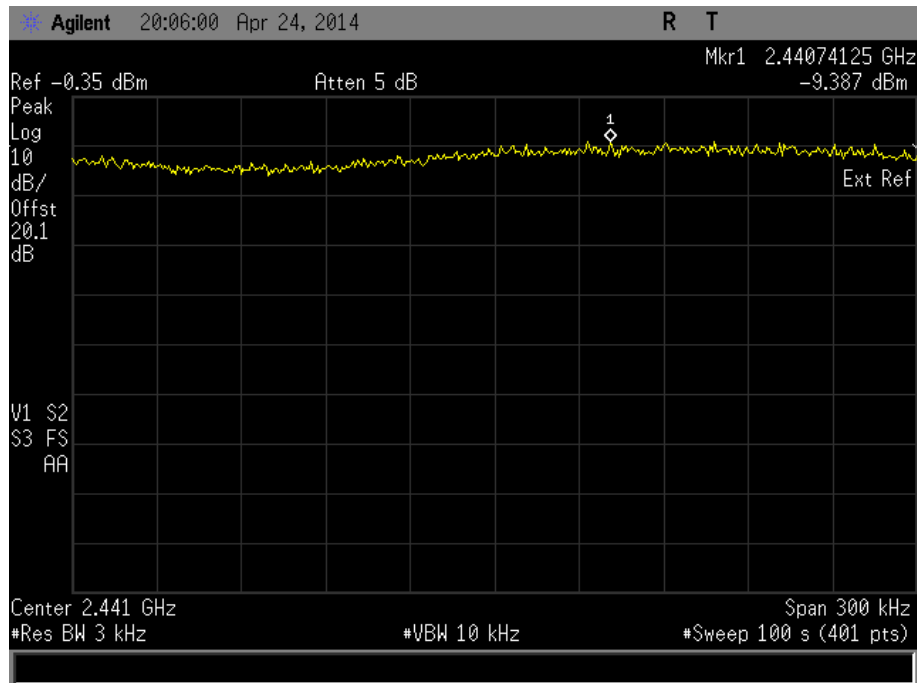
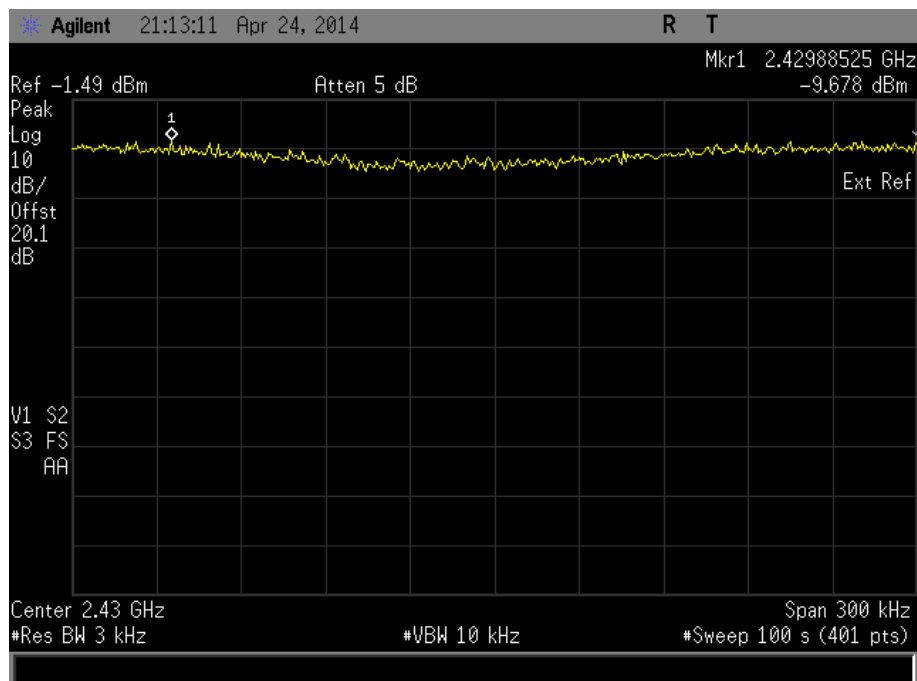


Product Service

12 Mbps18 Mbps

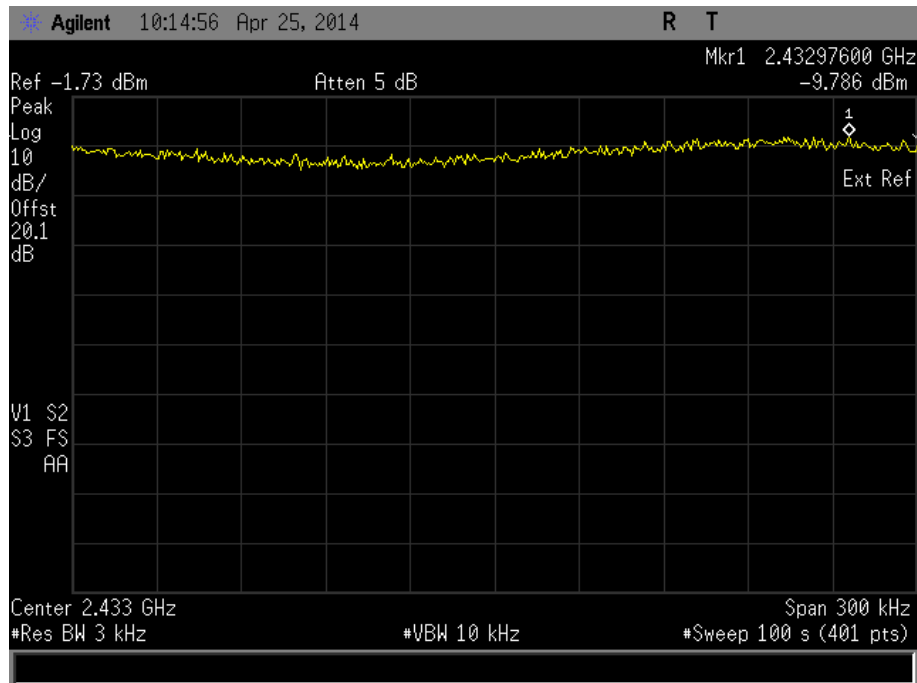
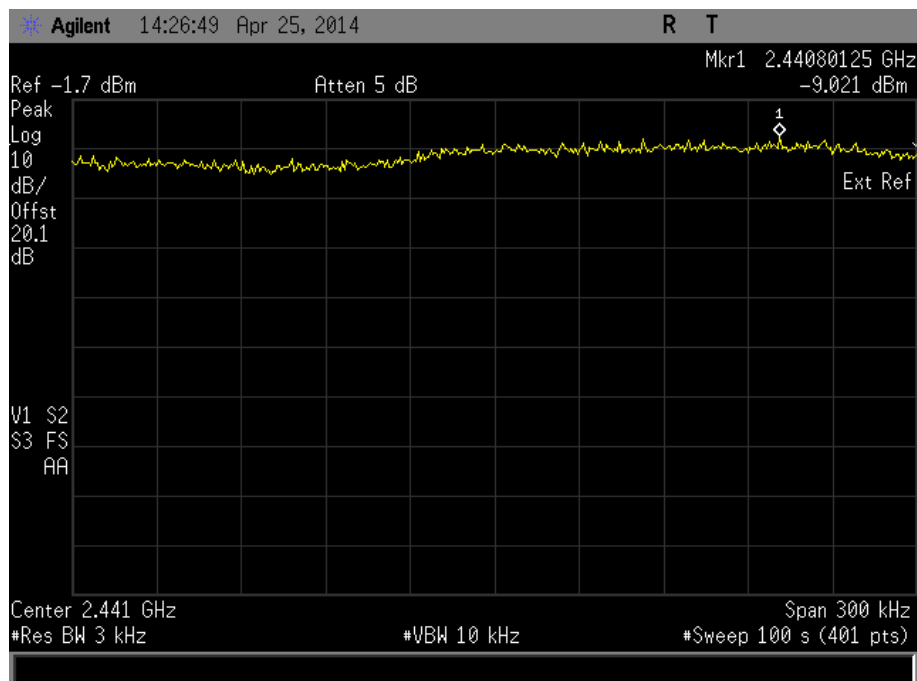


Product Service

24 Mbps36 Mbps

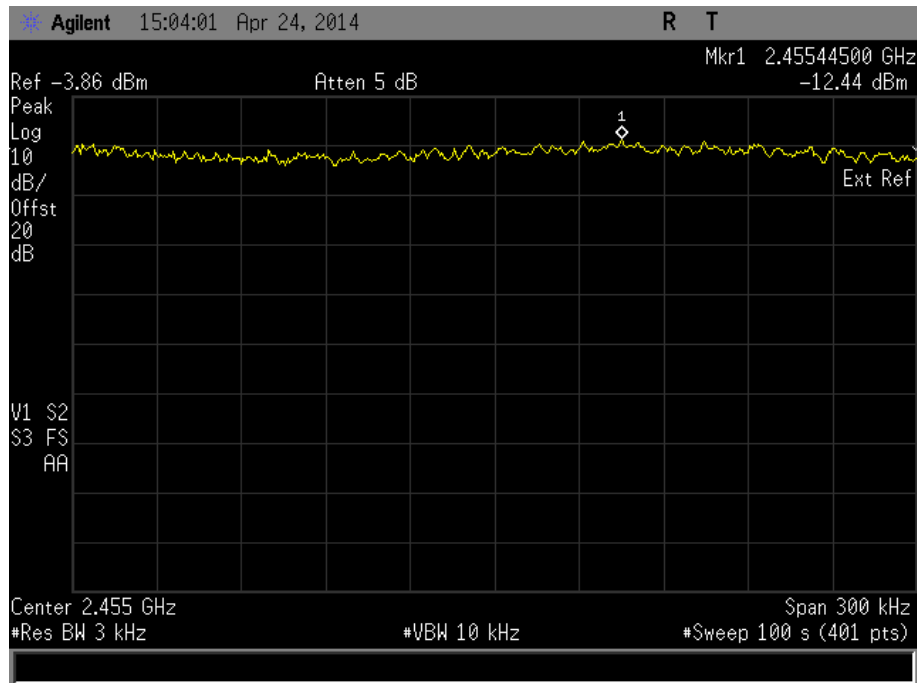
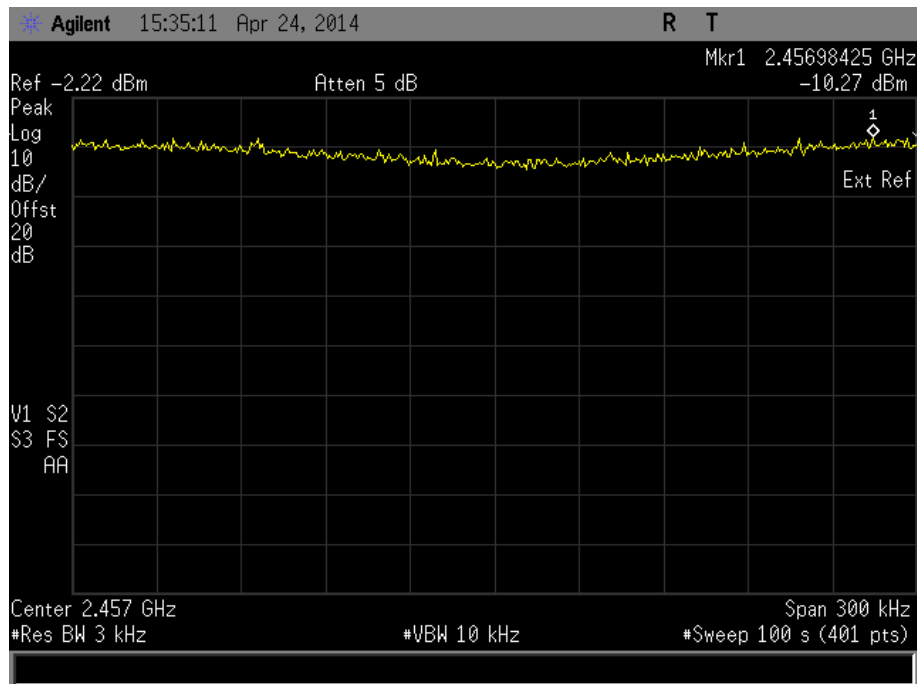


Product Service

48 Mbps54 Mbps

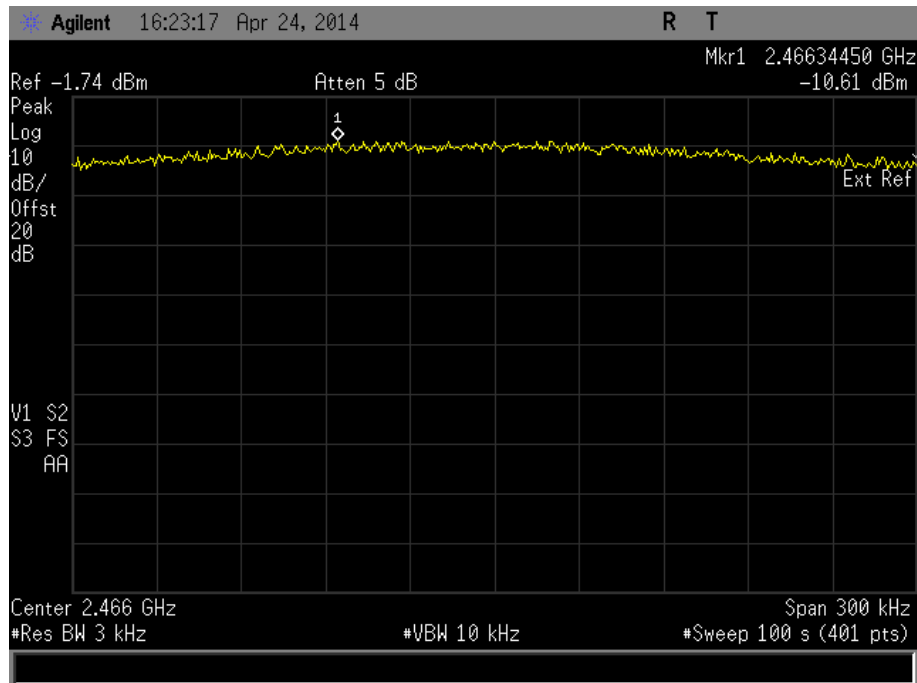
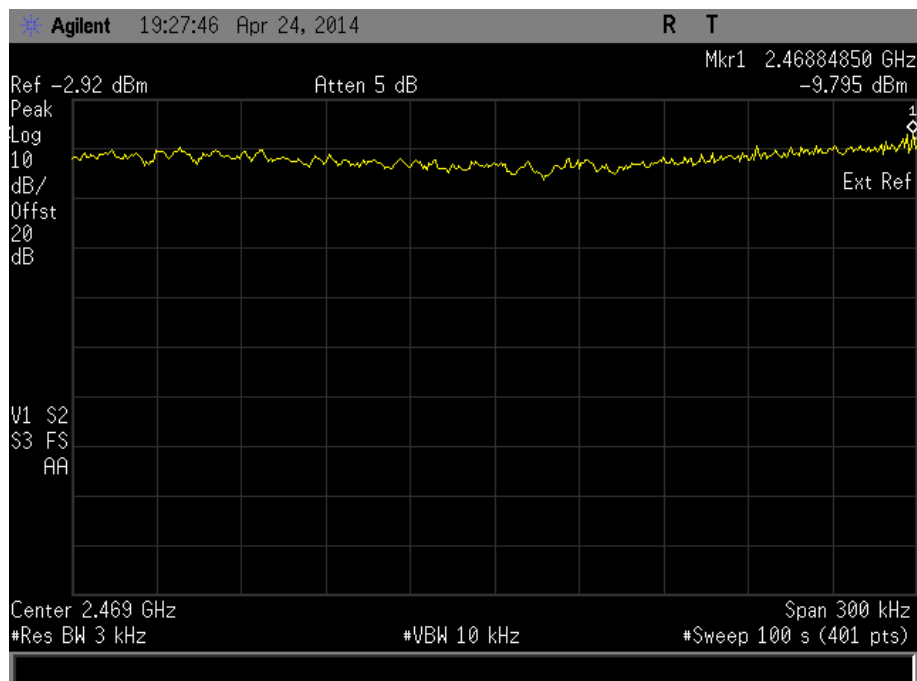


Product Service

2462 MHz6 Mbps9 Mbps

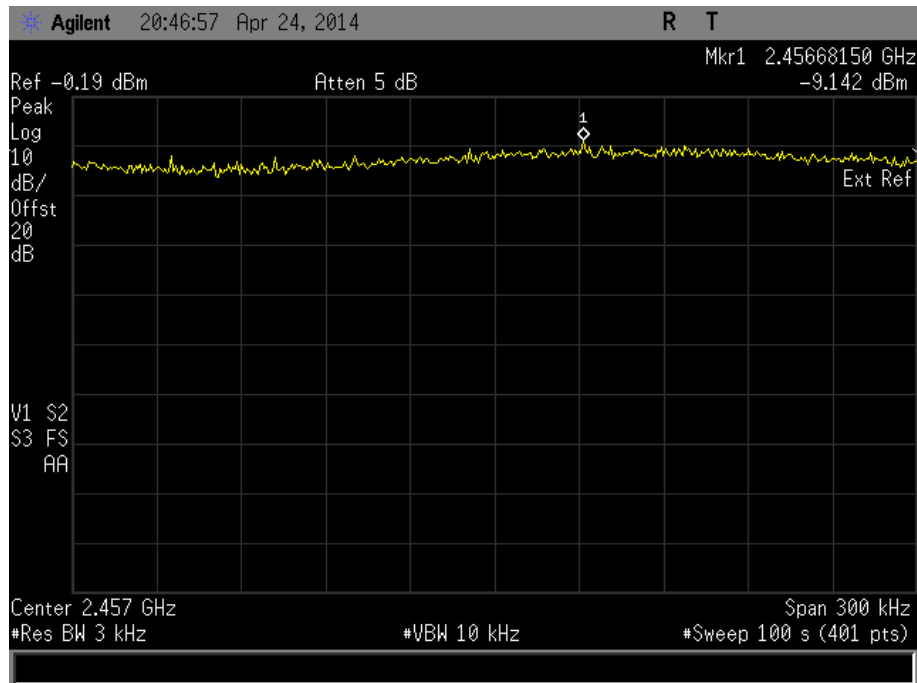
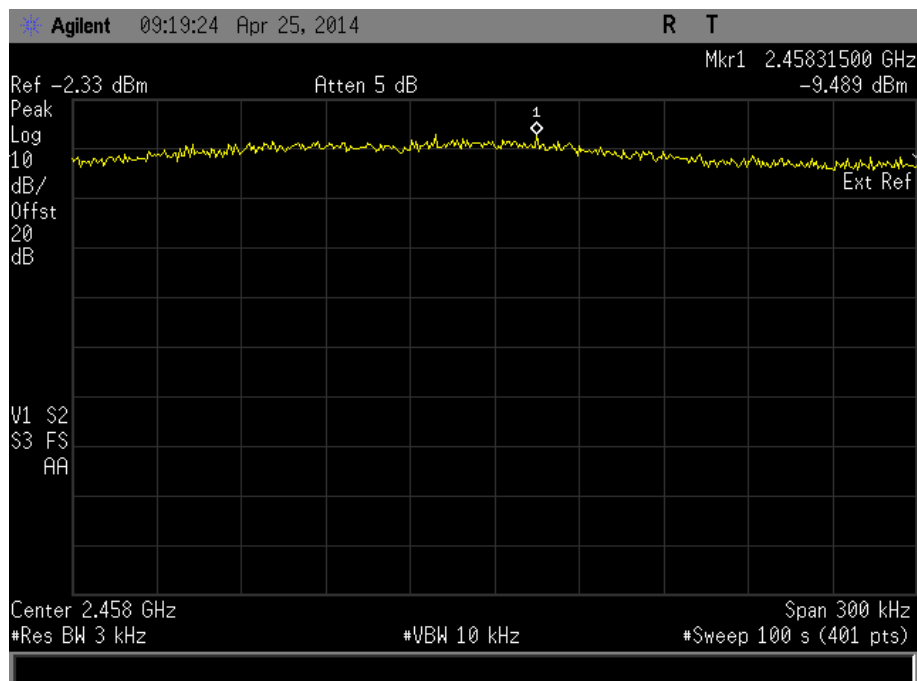


Product Service

12 Mbps18 Mbps

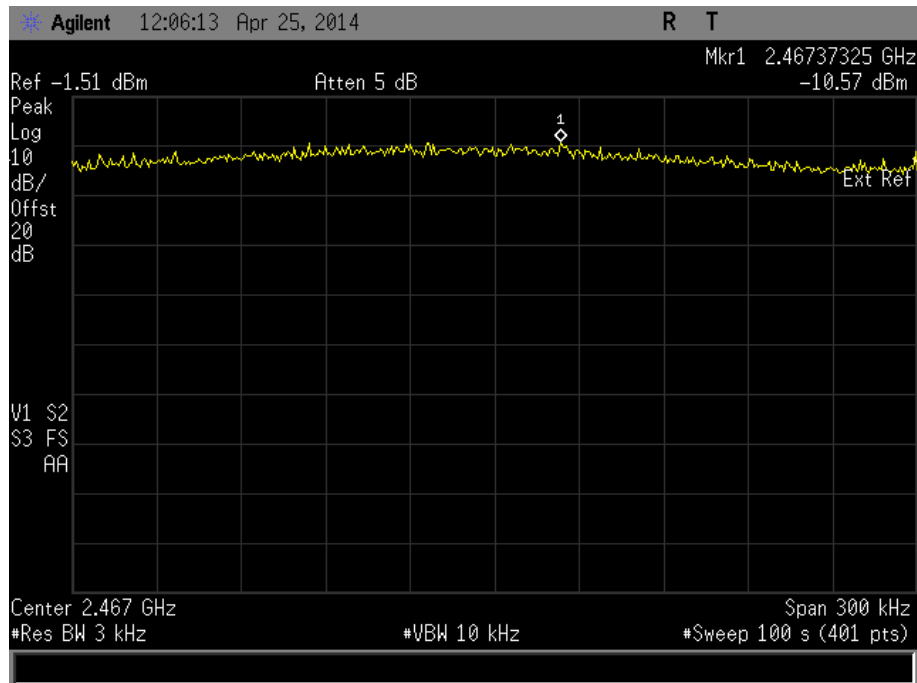
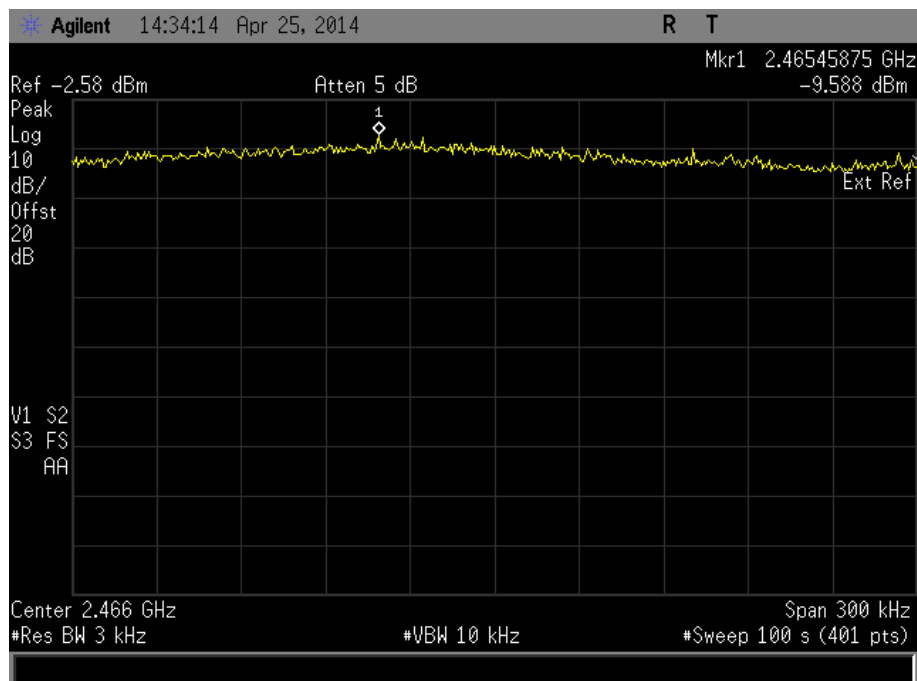


Product Service

24 Mbps36 Mbps



Product Service

48 Mbps54 MbpsLimit Clause

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

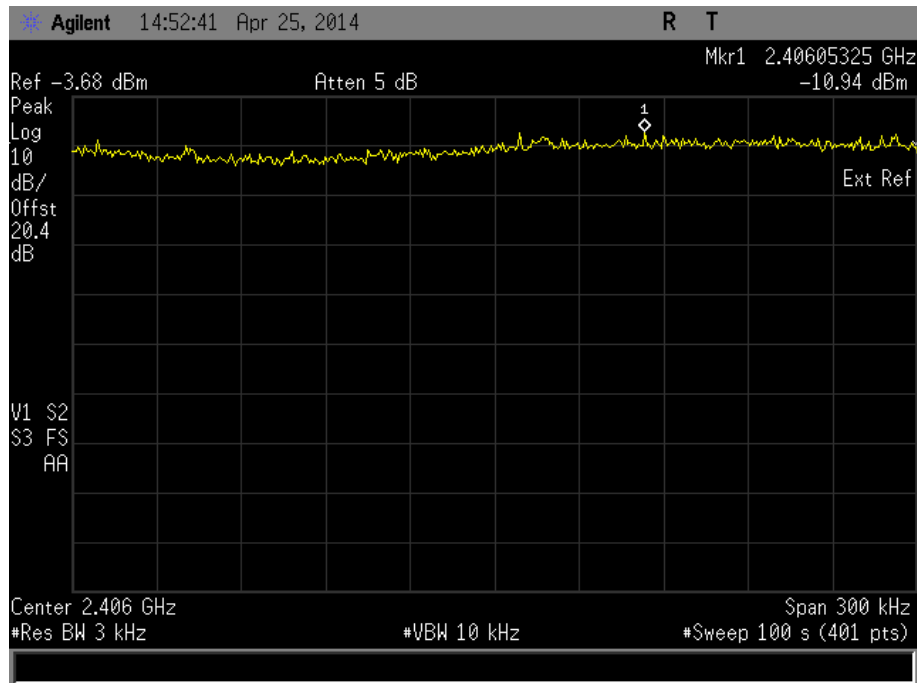
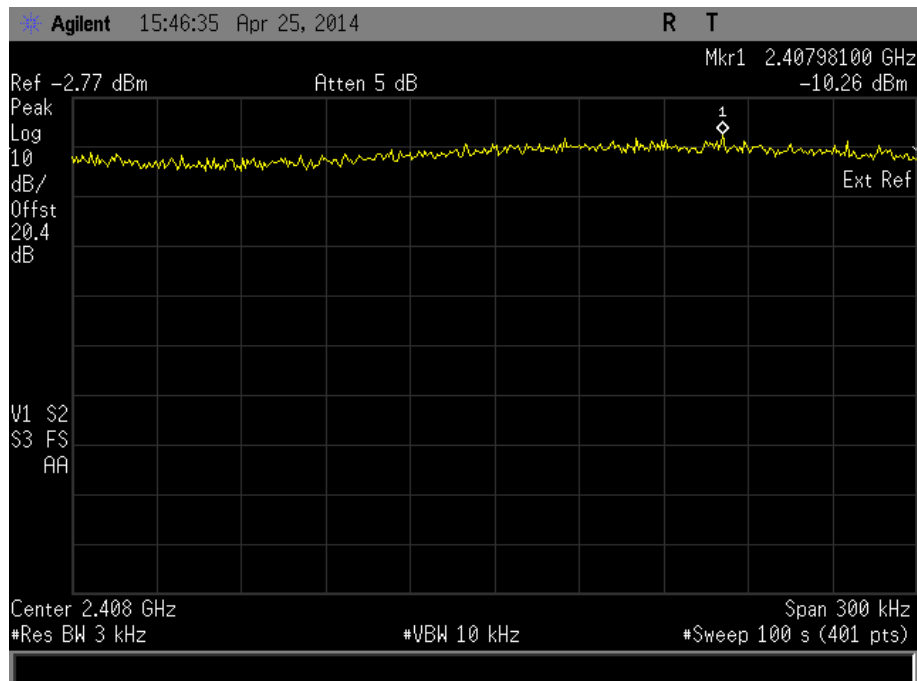
802.11(n)

4.0 V DC Supply

| Frequency | Data Rate (Mbps) | Power Spectral Density in 3 kHz Bands (dBm) |
|-----------|------------------|---------------------------------------------|
| 2412 MHz  | 6.5              | -10.94                                      |
|           | 13               | -10.26                                      |
|           | 19.5             | -10.85                                      |
|           | 26               | -11.43                                      |
|           | 39               | -9.86                                       |
|           | 52               | -11.75                                      |
|           | 58.5             | -10.93                                      |
|           | 65               | -10.03                                      |
| 2437 MHz  | 6.5              | -8.68                                       |
|           | 13               | -10.78                                      |
|           | 19.5             | -9.59                                       |
|           | 26               | -9.48                                       |
|           | 39               | -9.34                                       |
|           | 52               | -9.71                                       |
|           | 58.5             | -10.57                                      |
|           | 65               | -11.37                                      |
| 2462 MHz  | 6.5              | -11.47                                      |
|           | 13               | -11.31                                      |
|           | 19.5             | -12.19                                      |
|           | 26               | -11.34                                      |
|           | 39               | -11.87                                      |
|           | 52               | -11.47                                      |
|           | 58.5             | -12.31                                      |
|           | 65               | -12.07                                      |

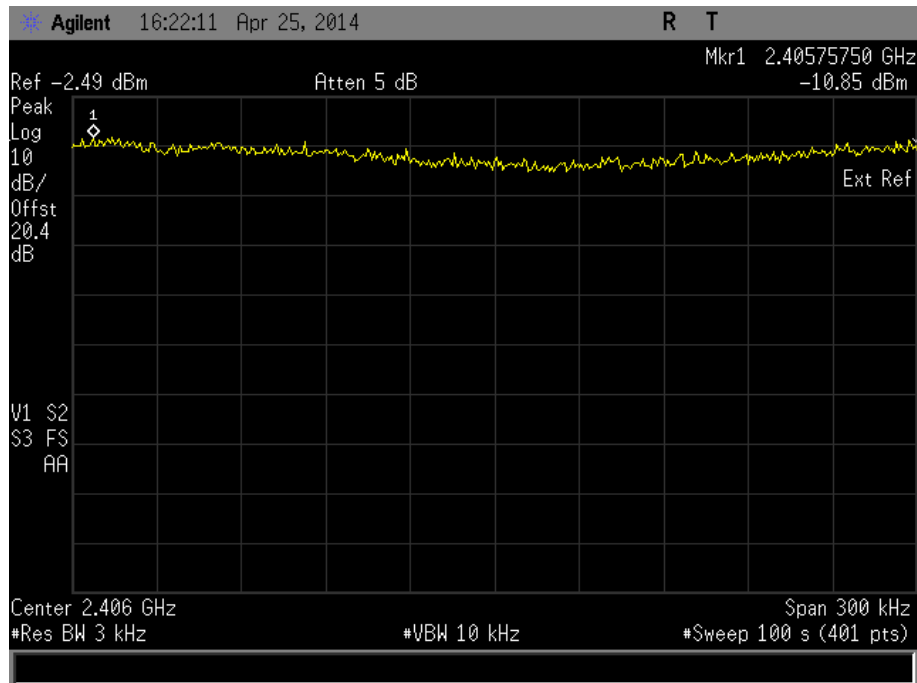
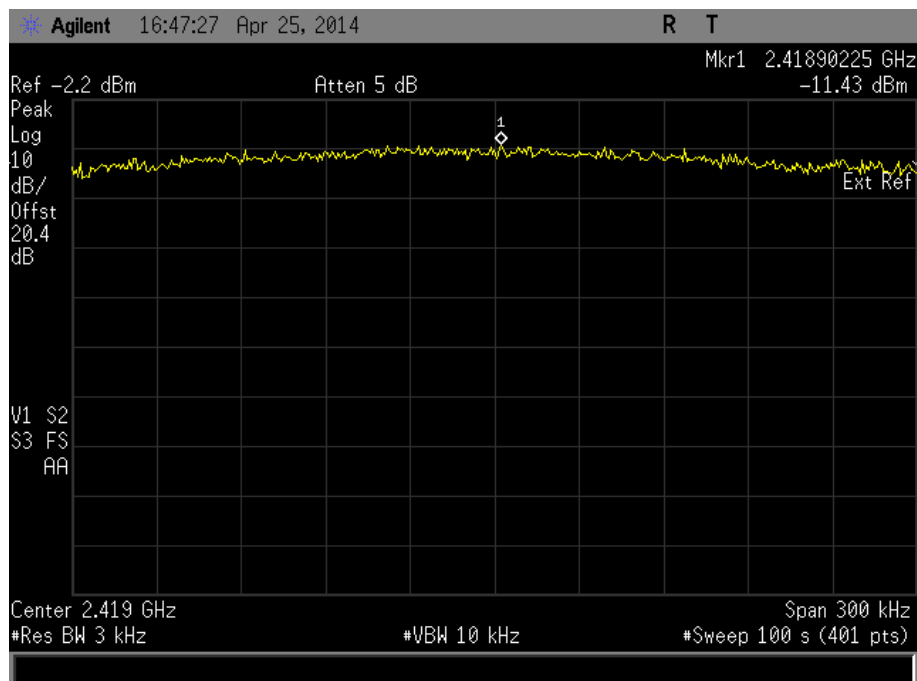


Product Service

2412 MHz6.5 Mbps13 Mbps

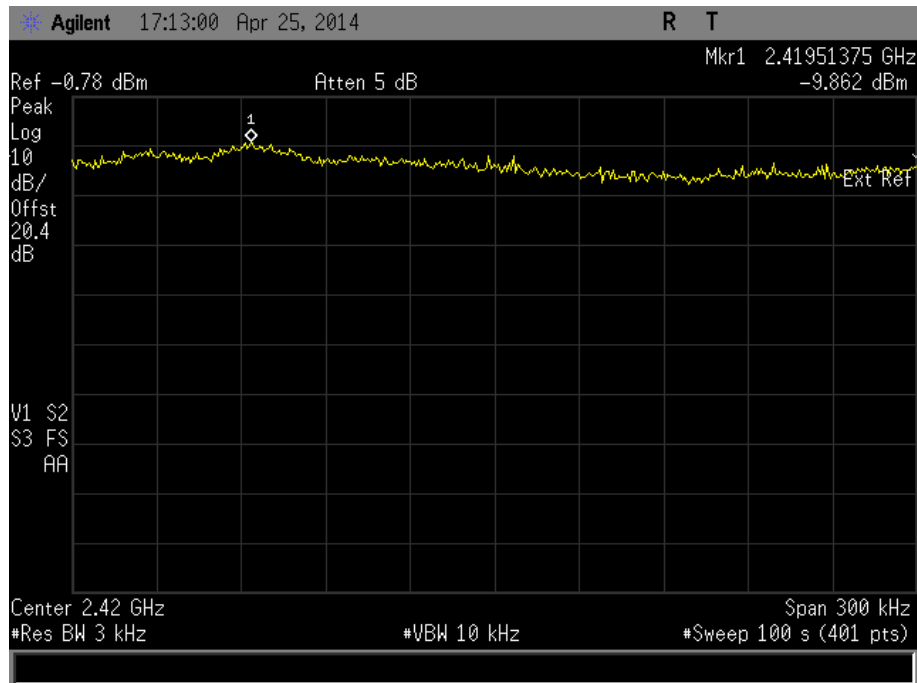
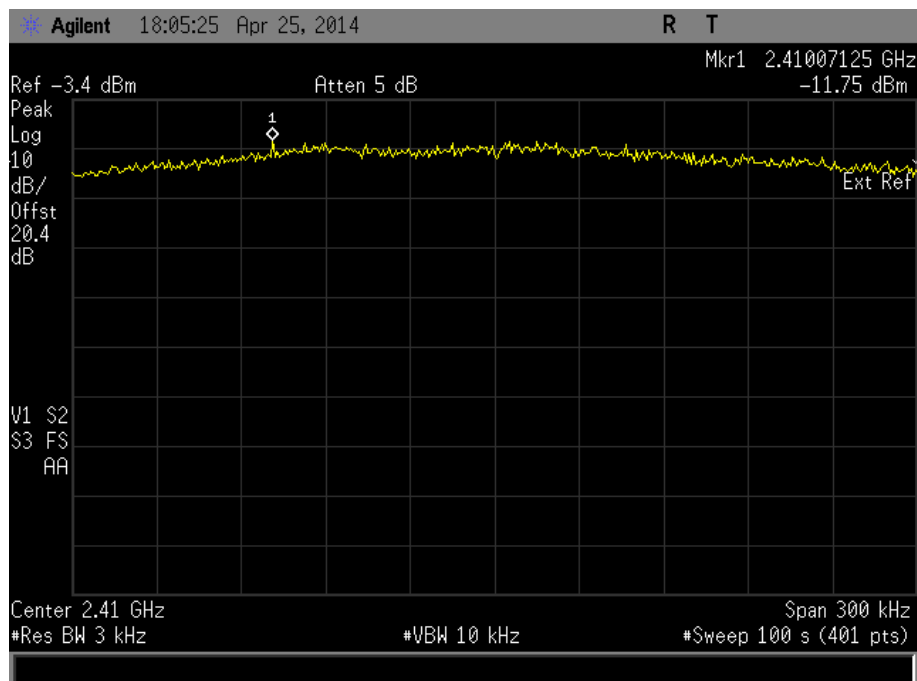


Product Service

19.5 Mbps26 Mbps

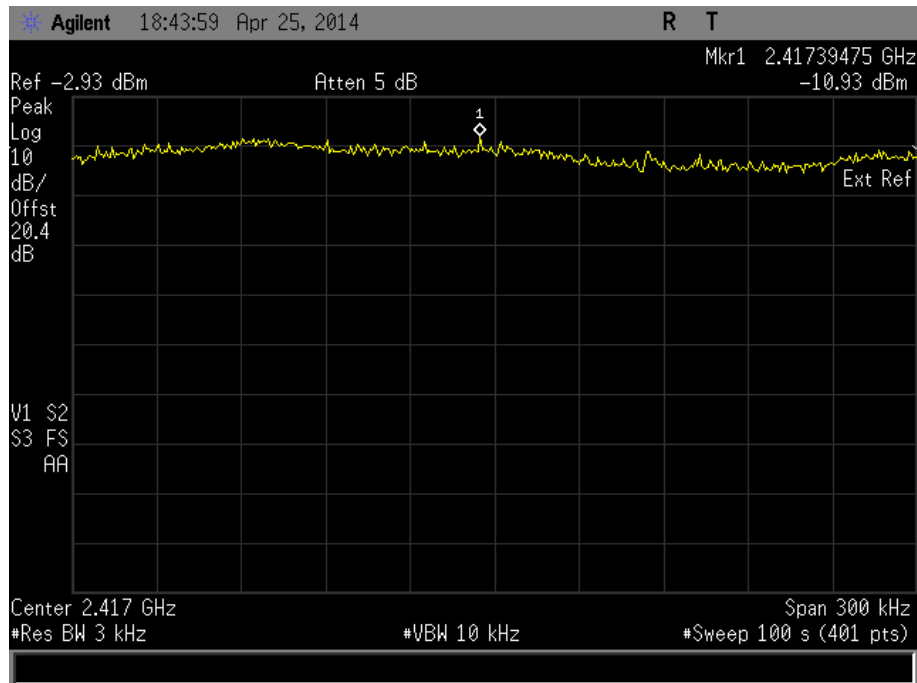
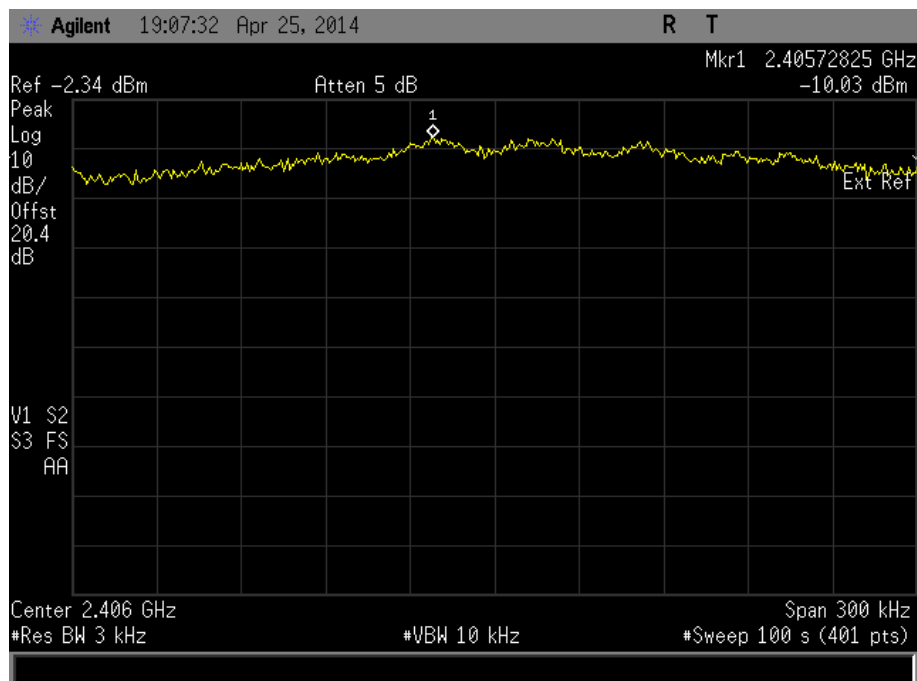


Product Service

39 Mbps52 Mbps

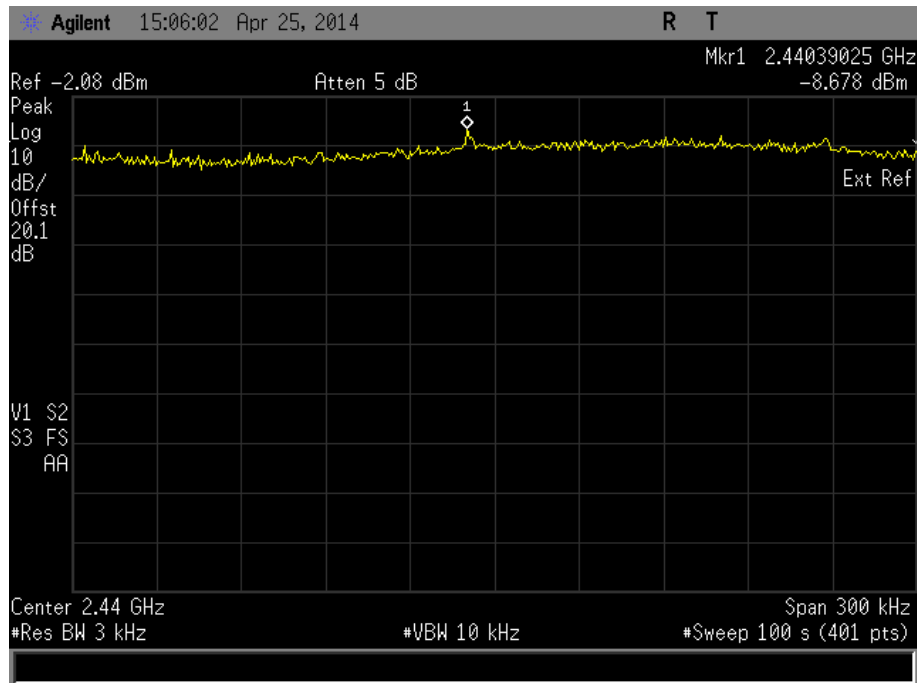
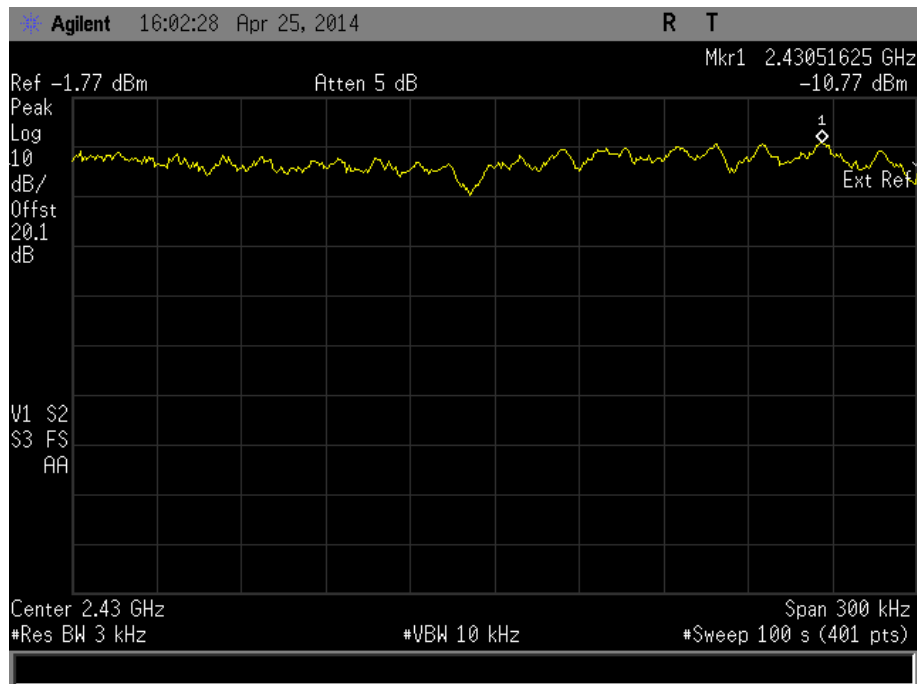


Product Service

58.5 Mbps65 Mbps

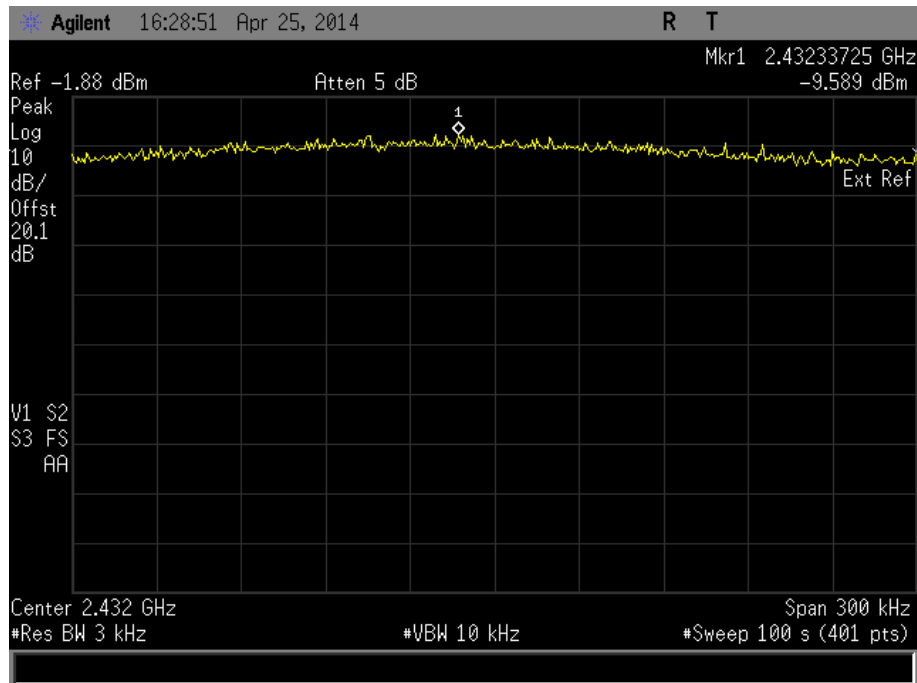
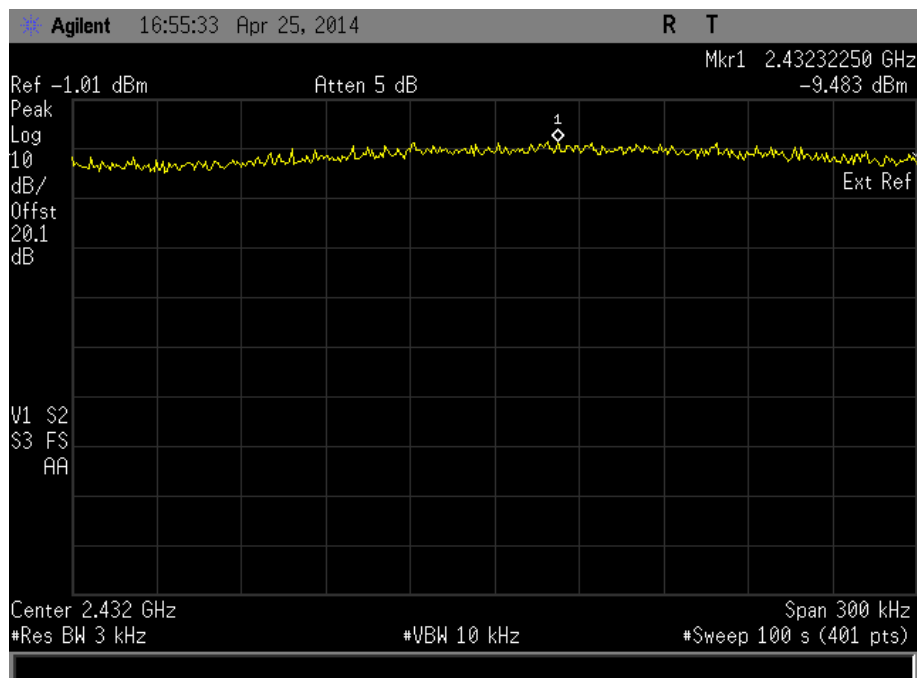


Product Service

2437 MHz6.5 Mbps13 Mbps

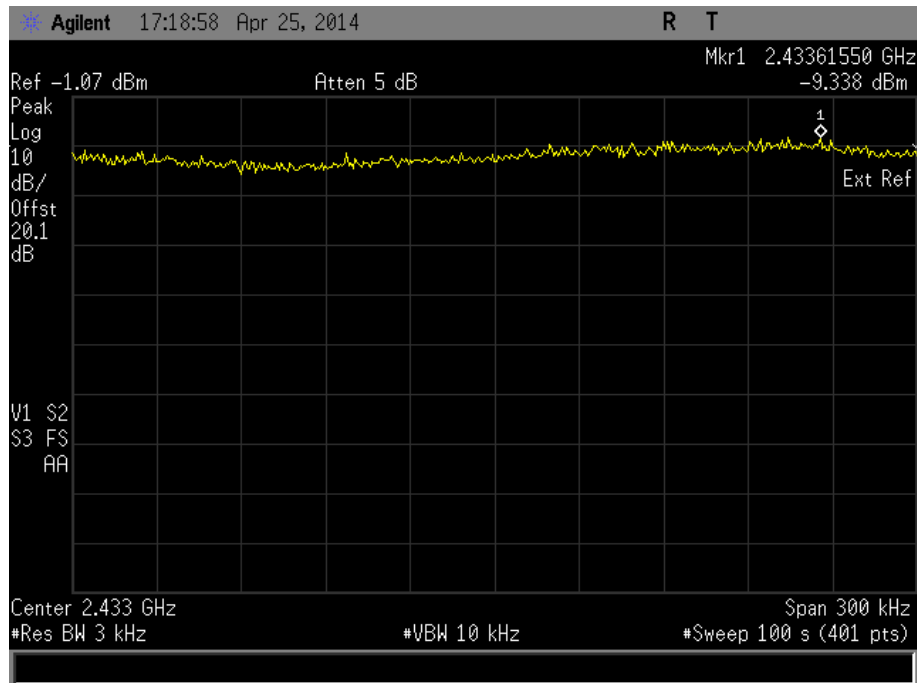
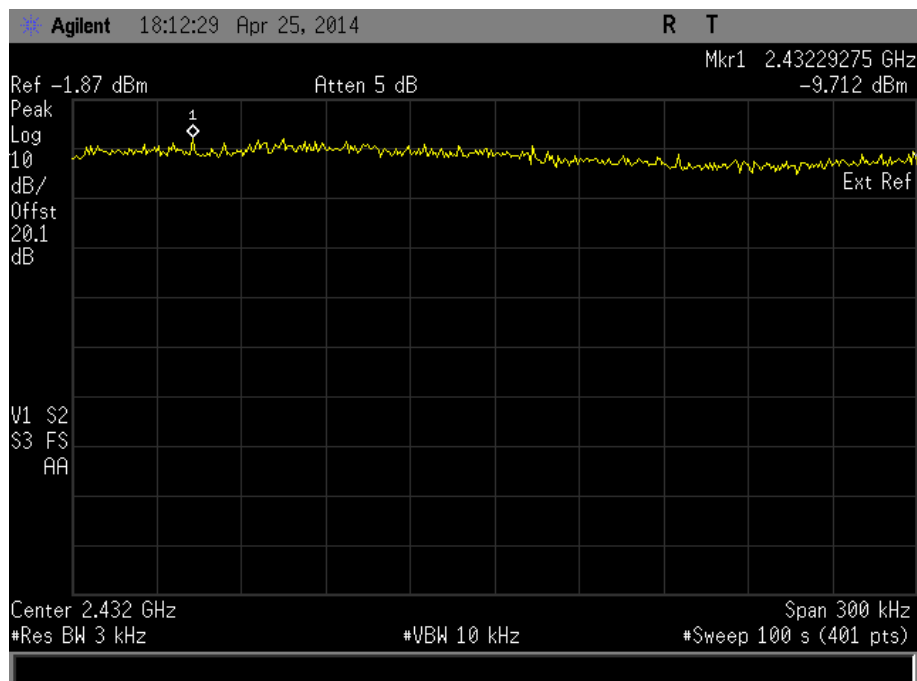


Product Service

19.5 Mbps26 Mbps

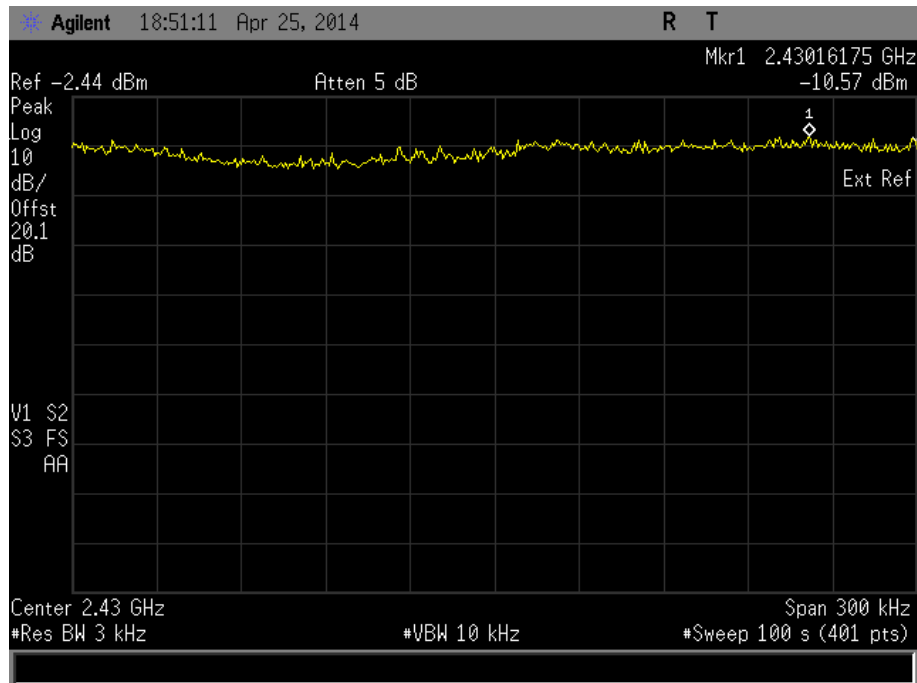
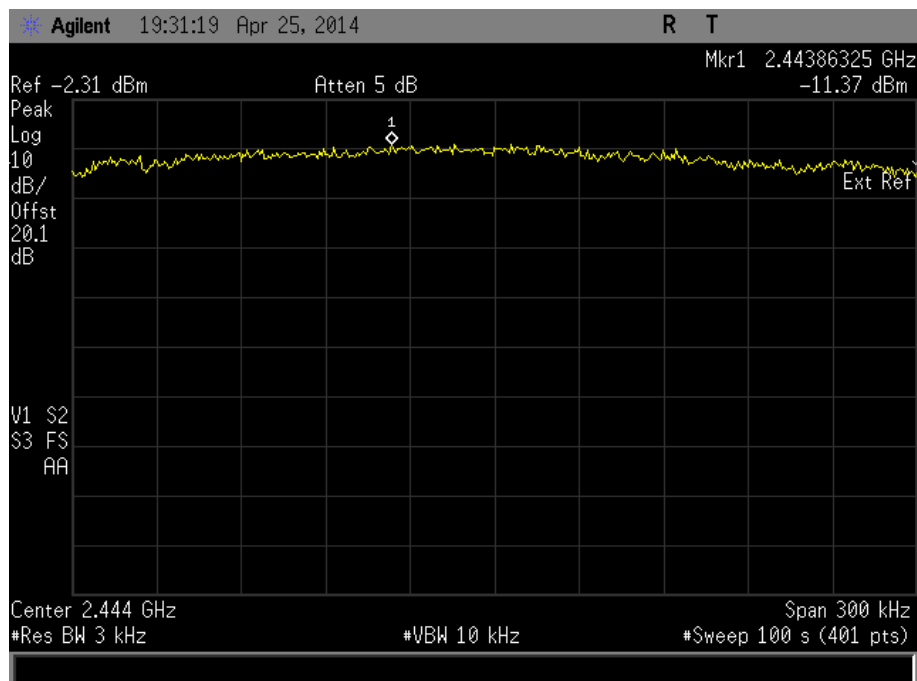


Product Service

39 Mbps52 Mbps

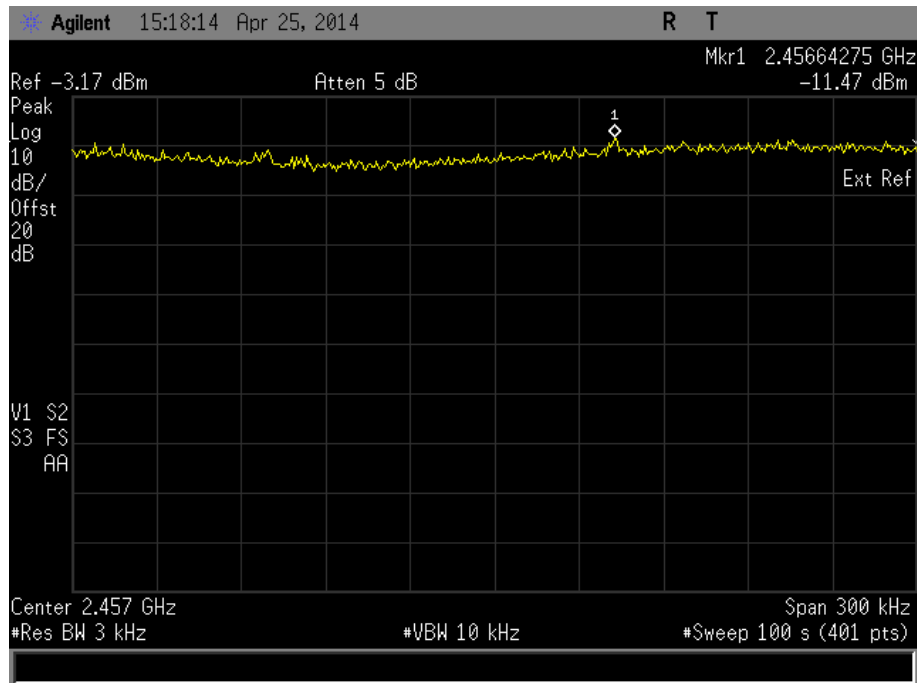
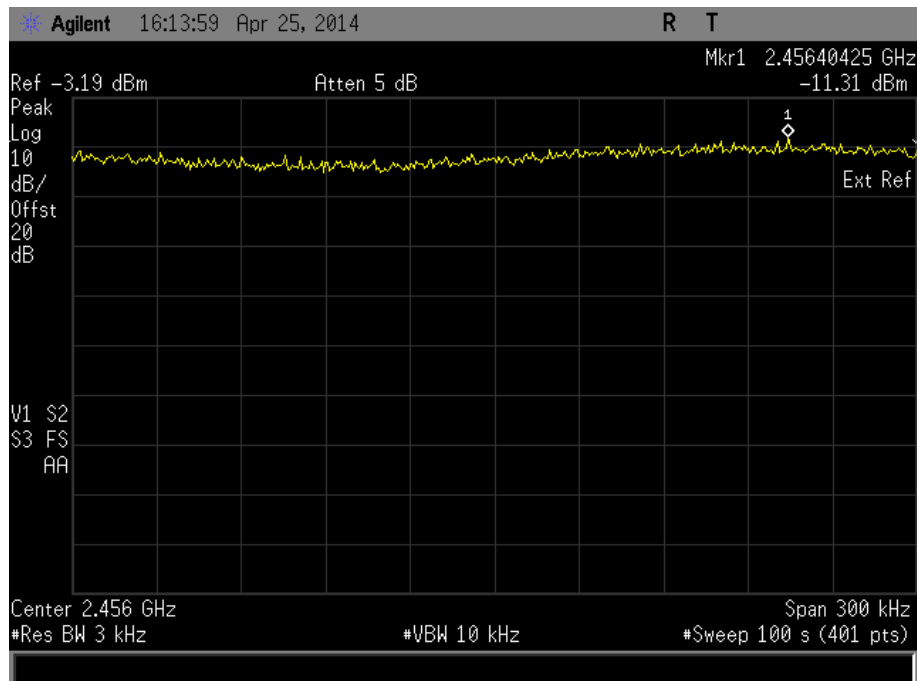


Product Service

58.5 Mbps65 Mbps

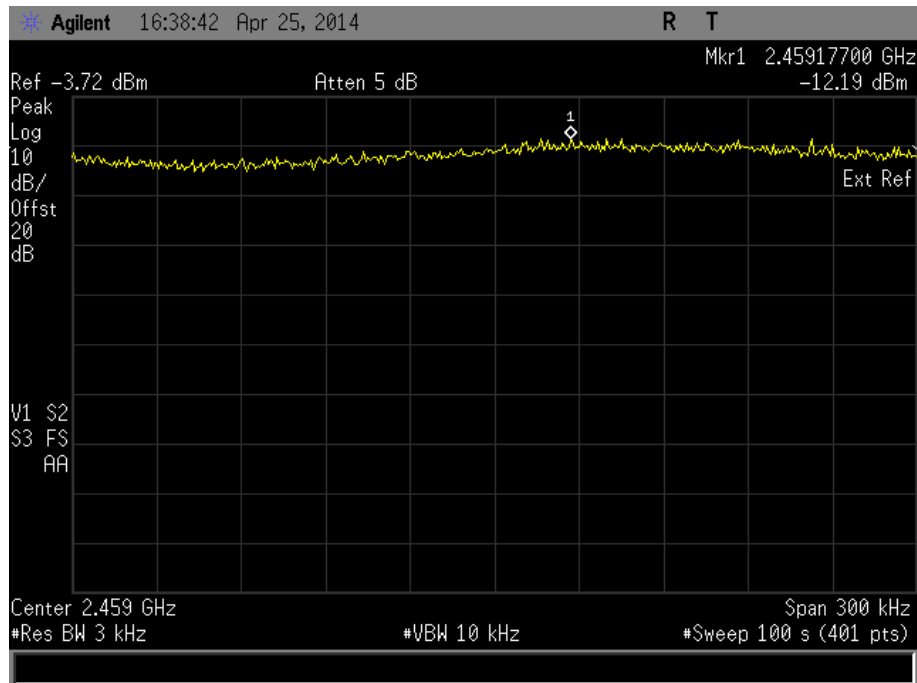
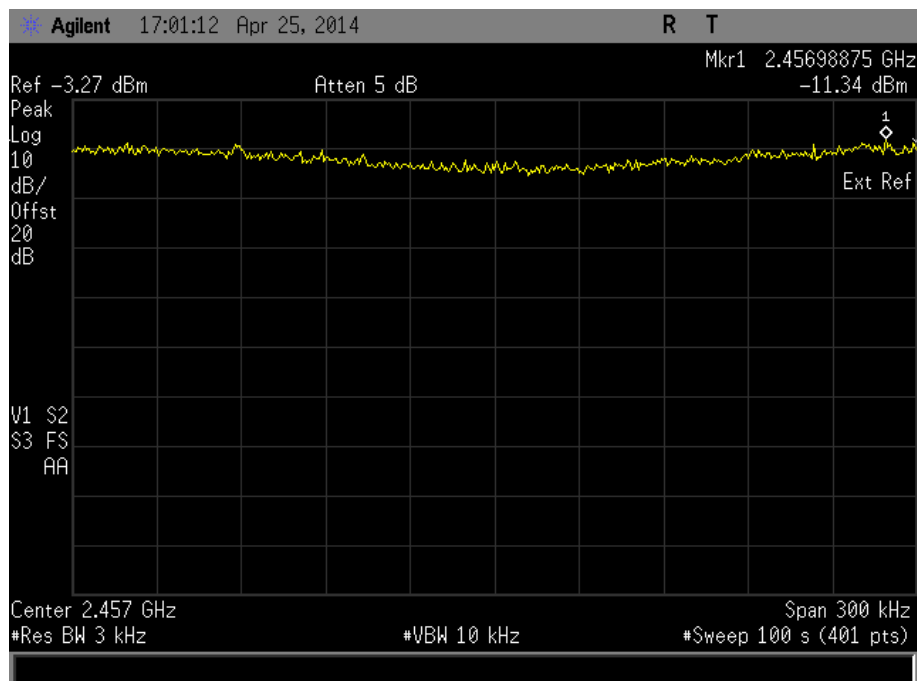


Product Service

2462 MHz6.5 Mbps13 Mbps

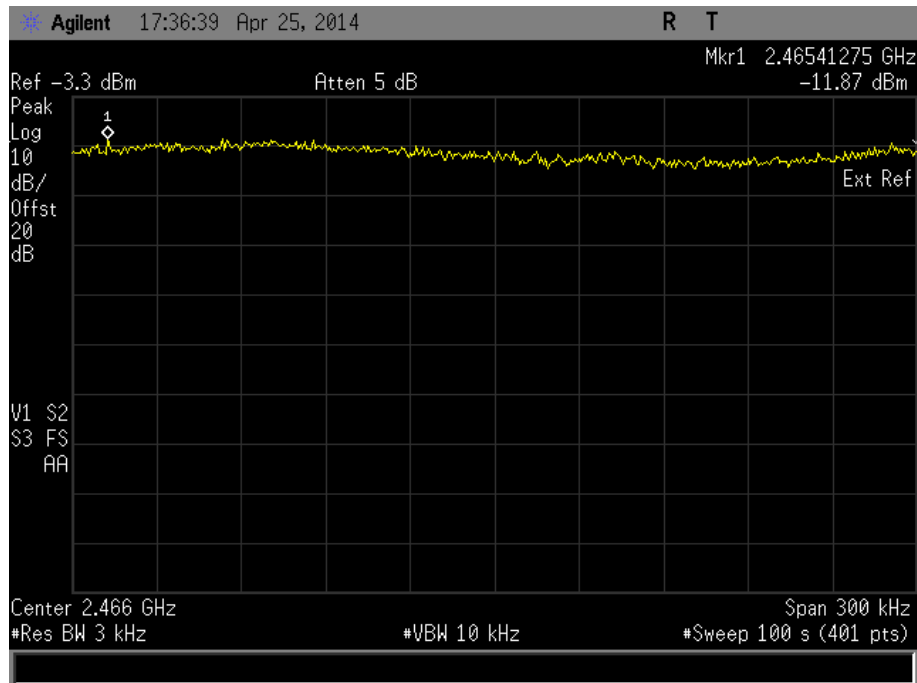
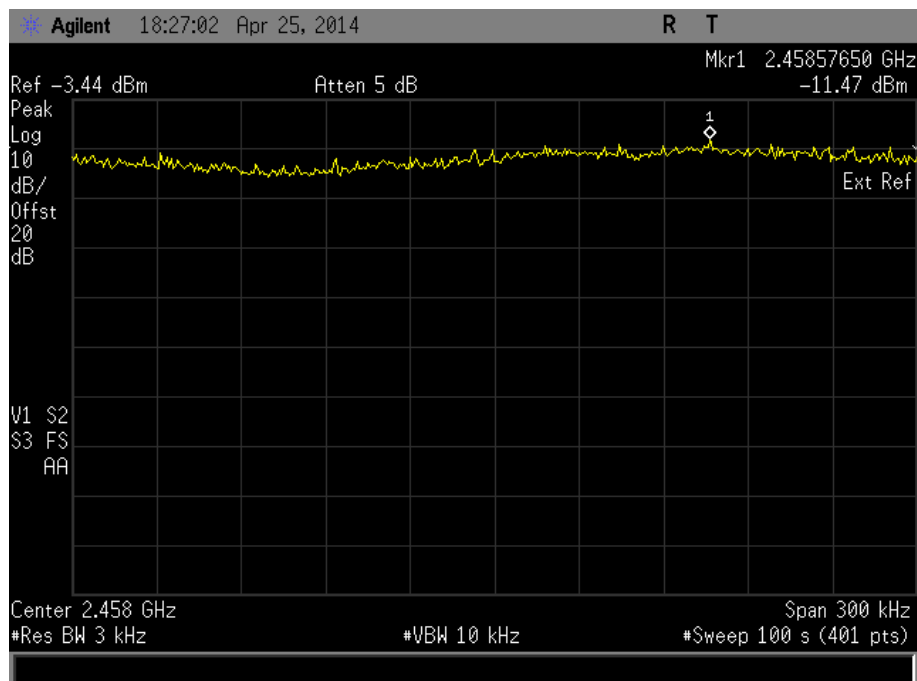


Product Service

19.5 Mbps26 Mbps

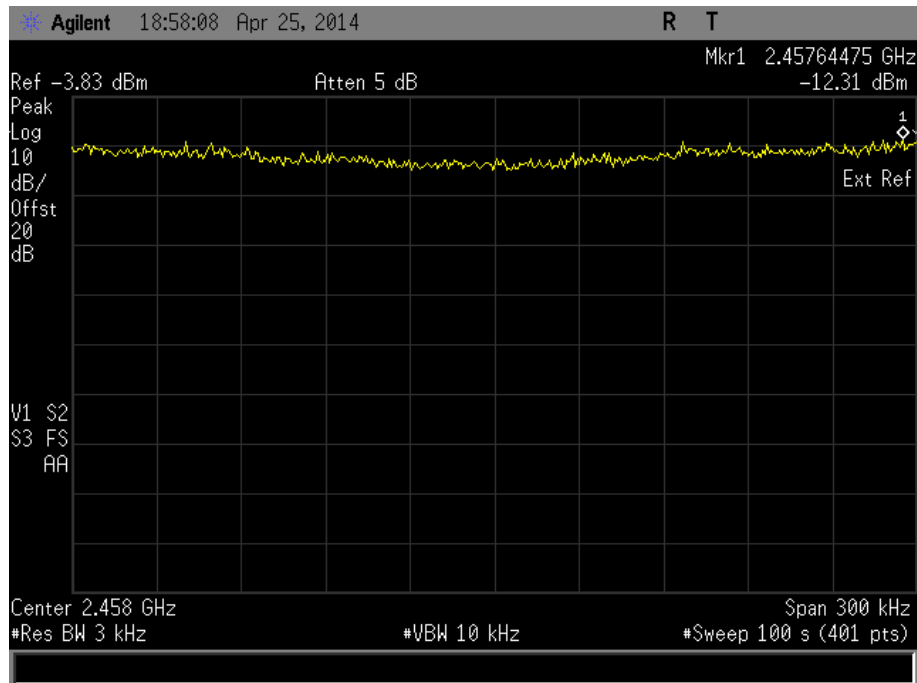
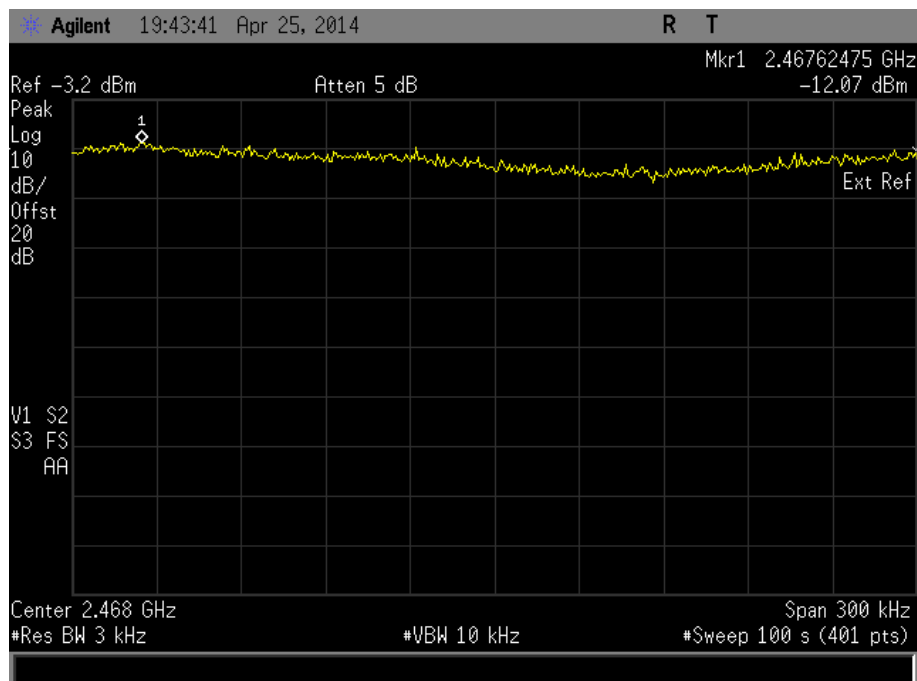


Product Service

39 Mbps52 Mbps



Product Service

58.5 Mbps65 MbpsLimit Clause

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.



Product Service

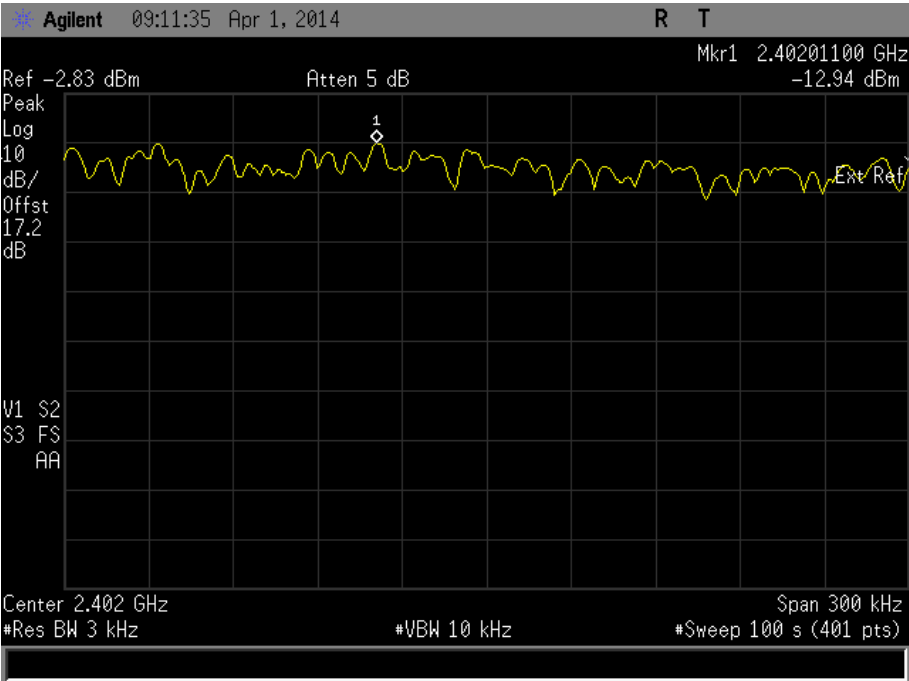
Bluetooth Low Energy

4.0 V DC Supply

| Frequency | Packet Type   | Power Spectral Density in 3 kHz Bands (dBm) |
|-----------|---------------|---------------------------------------------|
| 2402 MHz  | 37octet/prbs9 | -12.94                                      |
| 2440 MHz  | 37octet/prbs9 | -11.54                                      |
| 2480 MHz  | 37octet/prbs9 | -12.10                                      |

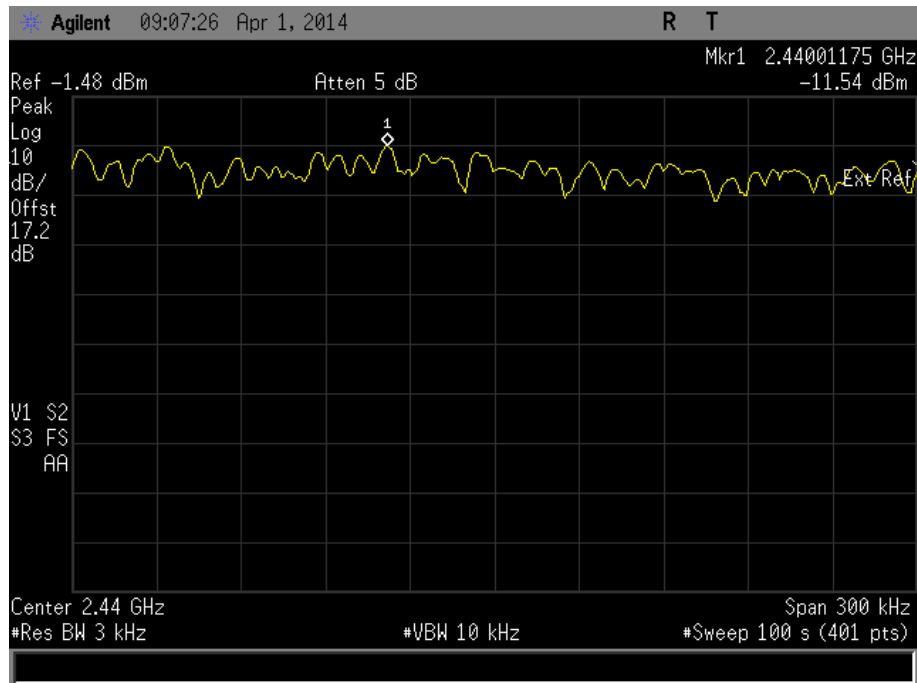
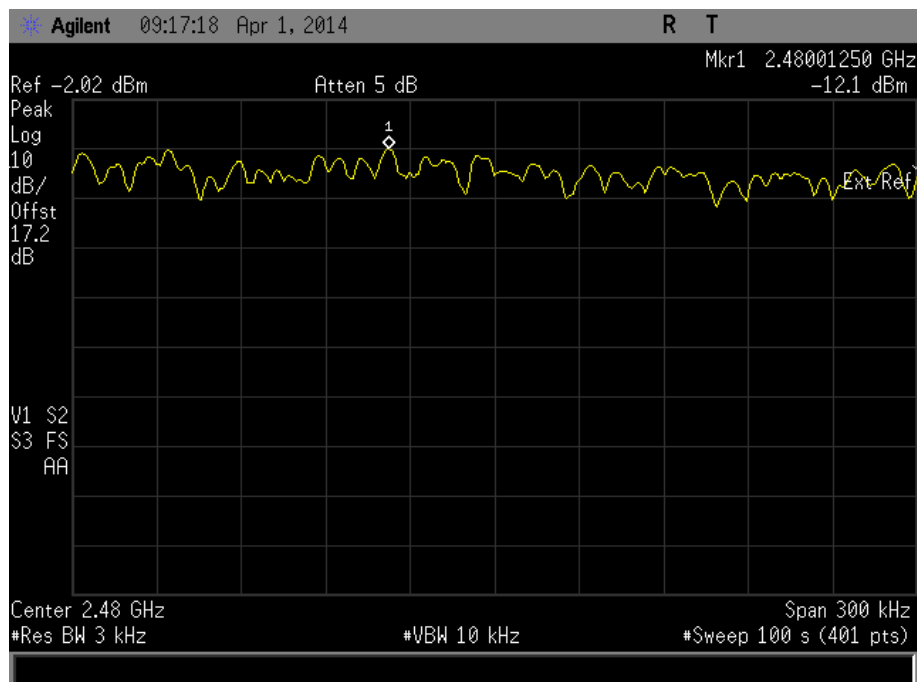
2402 MHz

1 Mbps





Product Service

2440 MHz1 Mbps2480 MHz1 MbpsLimit Clause

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.



Product Service

### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

| Instrument                                              | Manufacturer         | Type No.                   | TE No. | Calibration Period (months) | Calibration Due |
|---------------------------------------------------------|----------------------|----------------------------|--------|-----------------------------|-----------------|
| <b>Section 2.1- AC Line Conducted Emissions</b>         |                      |                            |        |                             |                 |
| Transient Limiter                                       | Hewlett Packard      | 11947A                     | 15     | 12                          | 10-Dec-2014     |
| LISN (1 Phase)                                          | Chase                | MN 2050                    | 336    | 12                          | 28-Mar-2015     |
| EMI Test Receiver                                       | Rohde & Schwarz      | ESU40                      | 3506   | 12                          | 22-Oct-2014     |
| <b>Section 2.2 - 6dB Bandwidth</b>                      |                      |                            |        |                             |                 |
| Multimeter                                              | White Gold           | WG022                      | 190    | 12                          | 28-Oct-2014     |
| Attenuator (10dB)                                       | Weinschel            | 47-10-34                   | 481    | 12                          | 28-Mar-2015     |
| Power Splitter                                          | Weinschel            | 1506A                      | 607    | 12                          | 21-Mar-2015     |
| Power Supply Unit                                       | Farnell              | H60-25                     | 1092   | -                           | O/P Mon         |
| Spectrum Analyser                                       | Agilent Technologies | E4407B                     | 1154   | 12                          | 13-Aug-2014     |
| Rubidium Standard                                       | Rohde & Schwarz      | XSRM                       | 1316   | 6                           | 22-Jul-2014     |
| Hygrometer                                              | Rotronic             | I-1000                     | 2891   | 12                          | 8-Jul-2014      |
| Power Supply                                            | Farnell              | LT30-2                     | 2903   | -                           | TU              |
| Multimeter                                              | Fluke                | 79 Series II               | 3057   | 12                          | 24-Sep-2014     |
| Hygrometer                                              | Rotronic             | I-1000                     | 3220   | 12                          | 16-Jul-2014     |
| Attenuator (10dB, 20W)                                  | Lucas Weinschel      | 1                          | 3225   | 12                          | 12-Dec-2014     |
| Network Analyser                                        | Rohde & Schwarz      | ZVA 40                     | 3548   | 12                          | 13-Sep-2014     |
| Calibration Unit                                        | Rohde & Schwarz      | ZV-Z54                     | 4368   | 12                          | 18-Sep-2014     |
| Frequency Standard                                      | Spectracom           | Secure Sync 1200-0408-0601 | 4393   | 6                           | 22-Jul-2014     |
| <b>Section 2.3- Maximum Peak Conducted Output Power</b> |                      |                            |        |                             |                 |
| Multimeter                                              | White Gold           | WG022                      | 190    | 12                          | 28-Oct-2014     |
| Attenuator (10dB)                                       | Weinschel            | 47-10-34                   | 481    | 12                          | 28-Mar-2015     |
| Power Splitter                                          | Weinschel            | 1506A                      | 607    | 12                          | 21-Mar-2015     |
| Power Supply Unit                                       | Farnell              | H60-25                     | 1092   | -                           | O/P Mon         |
| Spectrum Analyser                                       | Agilent Technologies | E4407B                     | 1154   | 12                          | 13-Aug-2014     |
| Rubidium Standard                                       | Rohde & Schwarz      | XSRM                       | 1316   | 6                           | 22-Jul-2014     |
| Hygrometer                                              | Rotronic             | I-1000                     | 2891   | 12                          | 8-Jul-2014      |
| Power Supply                                            | Farnell              | LT30-2                     | 2903   | -                           | TU              |
| Multimeter                                              | Fluke                | 79 Series II               | 3057   | 12                          | 24-Sep-2014     |
| Hygrometer                                              | Rotronic             | I-1000                     | 3220   | 12                          | 16-Jul-2014     |
| Attenuator (10dB, 20W)                                  | Lucas Weinschel      | 1                          | 3225   | 12                          | 12-Dec-2014     |
| Power Meter                                             | Rohde & Schwarz      | NRP                        | 3491   | 12                          | 18-Apr-2014     |
| Wideband Power Sensor, 50MHz - 18GHz                    | Rohde & Schwarz      | NRP-Z81                    | 3492   | 12                          | 18-Apr-2014     |
| Network Analyser                                        | Rohde & Schwarz      | ZVA 40                     | 3548   | 12                          | 13-Sep-2014     |
| P-Series Power Meter                                    | Agilent Technologies | N1911A                     | 3980   | 12                          | 18-Sep-2014     |
| 50 MHz-18 GHz Wideband Power Sensor                     | Agilent Technologies | N1921A                     | 3982   | 12                          | 18-Sep-2014     |
| Calibration Unit                                        | Rohde & Schwarz      | ZV-Z54                     | 4368   | 12                          | 18-Sep-2014     |
| Frequency Standard                                      | Spectracom           | Secure Sync 1200-0408-0601 | 4393   | 6                           | 22-Jul-2014     |



Product Service

| Instrument                                            | Manufacturer             | Type No.                   | TE No. | Calibration Period (months) | Calibration Due |
|-------------------------------------------------------|--------------------------|----------------------------|--------|-----------------------------|-----------------|
| <b>Section 2.4 - EIRP Peak Power</b>                  |                          |                            |        |                             |                 |
| Antenna (Double Ridge Guide, 1GHz-18GHz)              | EMCO                     | 3115                       | 234    | 12                          | 3-May-2014      |
| Signal Generator (10MHz to 40GHz)                     | Rohde & Schwarz          | SMR40                      | 1002   | 12                          | 18-Sep-2014     |
| Screened Room (5)                                     | Rainford                 | Rainford                   | 1545   | 24                          | 10-Jan-2015     |
| Turntable Controller                                  | Inn-Co GmbH              | CO 1000                    | 1606   | -                           | TU              |
| Antenna (DRG Horn)                                    | ETS-LINDGREN             | 3115                       | 3125   | 12                          | 17-Jul-2014     |
| EMI Test Receiver                                     | Rohde & Schwarz          | ESU40                      | 3506   | 12                          | 22-Oct-2014     |
| 7m Armoured RF Cable                                  | SSI Cable Corp.          | 1501-13-13-7m WA(-)        | 3600   | -                           | TU              |
| 9m RF Cable (N Type)                                  | Rhophase                 | NPS-2303-9000-NPS          | 3791   | -                           | TU              |
| Tilt Antenna Mast                                     | maturo GmbH              | TAM 4.0-P                  | 3916   | -                           | TU              |
| Mast Controller                                       | maturo GmbH              | NCD                        | 3917   | -                           | TU              |
| <b>Section 2.5 - Spurious and Band Edge Emissions</b> |                          |                            |        |                             |                 |
| Multimeter                                            | White Gold               | WG022                      | 190    | 12                          | 28-Oct-2014     |
| Antenna (Double Ridge Guide)                          | Link Microtek Ltd        | AM180HA-K-TU2              | 230    | 24                          | 26-Nov-2015     |
| Antenna (Double Ridge Guide, 1GHz-18GHz)              | EMCO                     | 3115                       | 234    | 12                          | 3-May-2014      |
| 20dB/2W Attenuator                                    | Narda                    | 4772-20                    | 461    | -                           | TU              |
| Power Supply Unit                                     | Farnell                  | H60-25                     | 1092   | -                           | O/P Mon         |
| Spectrum Analyser                                     | Agilent Technologies     | E4407B                     | 1154   | 12                          | 13-Aug-2014     |
| Rubidium Standard                                     | Rohde & Schwarz          | XSRM                       | 1316   | 6                           | 22-Jul-2014     |
| Pre-Amplifier                                         | Phase One                | PS04-0086                  | 1533   | 12                          | 19-Dec-2014     |
| Pre-Amplifier                                         | Phase One                | PS04-0087                  | 1534   | 12                          | 30-Sep-2014     |
| Screened Room (5)                                     | Rainford                 | Rainford                   | 1545   | 24                          | 10-Jan-2015     |
| Turntable Controller                                  | Inn-Co GmbH              | CO 1000                    | 1606   | -                           | TU              |
| Hygrometer                                            | Rotronic                 | I-1000                     | 2891   | 12                          | 8-Jul-2014      |
| Power Supply                                          | Farnell                  | LT30-2                     | 2903   | -                           | TU              |
| Antenna (Bilog)                                       | Chase                    | CBL6143                    | 2904   | 24                          | 10-Jun-2015     |
| Multimeter                                            | Fluke                    | 79 Series II               | 3057   | 12                          | 24-Sep-2014     |
| Hygrometer                                            | Rotronic                 | I-1000                     | 3220   | 12                          | 16-Jul-2014     |
| Attenuator (10dB, 20W)                                | Lucas Weinschel          | 1                          | 3225   | 12                          | 12-Dec-2014     |
| EMI Test Receiver                                     | Rohde & Schwarz          | ESU40                      | 3506   | 12                          | 22-Oct-2014     |
| Network Analyser                                      | Rohde & Schwarz          | ZVA 40                     | 3548   | 12                          | 13-Sep-2014     |
| '2.92mm' - '2.92mm' RF Cable (2m)                     | Rhophase                 | KPS-1503-2000-KPS          | 3694   | 12                          | 5-Nov-2014      |
| '2.92mm' - '2.92mm' RF Cable (2m)                     | Rhophase                 | KPS-1503-2000-KPS          | 3695   | 12                          | 16-Oct-2014     |
| 9m RF Cable (N Type)                                  | Rhophase                 | NPS-2303-9000-NPS          | 3791   | -                           | TU              |
| Tilt Antenna Mast                                     | maturo GmbH              | TAM 4.0-P                  | 3916   | -                           | TU              |
| Mast Controller                                       | maturo GmbH              | NCD                        | 3917   | -                           | TU              |
| 1GHz to 8GHz Low Noise Amplifier                      | Wright Technologies      | APS04-0085                 | 4365   | 12                          | 1-Oct-2014      |
| Calibration Unit                                      | Rohde & Schwarz          | ZV-Z54                     | 4368   | 12                          | 18-Sep-2014     |
| Frequency Standard                                    | Spectracom               | Secure Sync 1200-0408-0601 | 4393   | 6                           | 22-Jul-2014     |
| Suspended Substrate Highpass Filter                   | Advance Power Components | 11SH10-3000/X18000-O/O     | 4411   | 12                          | 21-Mar-2015     |
| Suspended Substrate Highpass Filter                   | Advance Power Components | 11SH10-3000/X18000-O/O     | 4412   | 12                          | 21-Mar-2015     |



Product Service

| Instrument                                  | Manufacturer         | Type No.                   | TE No. | Calibration Period (months) | Calibration Due |
|---------------------------------------------|----------------------|----------------------------|--------|-----------------------------|-----------------|
| <b>Section 2.6 - Power Spectral Density</b> |                      |                            |        |                             |                 |
| Multimeter                                  | White Gold           | WG022                      | 190    | 12                          | 28-Oct-2014     |
| Attenuator (10dB)                           | Weinschel            | 47-10-34                   | 481    | 12                          | 28-Mar-2015     |
| Power Splitter                              | Weinschel            | 1506A                      | 607    | 12                          | 21-Mar-2015     |
| Power Supply Unit                           | Farnell              | H60-25                     | 1092   | -                           | O/P Mon         |
| Spectrum Analyser                           | Agilent Technologies | E4407B                     | 1154   | 12                          | 13-Aug-2014     |
| Rubidium Standard                           | Rohde & Schwarz      | XSRM                       | 1316   | 6                           | 22-Jul-2014     |
| Capacitive Voltage Probe                    | Schaffner            | CVP2200                    | 1367   | 12                          | 14-May-2014     |
| Hygrometer                                  | Rotronic             | I-1000                     | 2891   | 12                          | 8-Jul-2014      |
| Power Supply                                | Farnell              | LT30-2                     | 2903   | -                           | TU              |
| Multimeter                                  | Fluke                | 79 Series II               | 3057   | 12                          | 24-Sep-2014     |
| Hygrometer                                  | Rotronic             | I-1000                     | 3220   | 12                          | 16-Jul-2014     |
| Attenuator (10dB, 20W)                      | Lucas Weinschel      | 1                          | 3225   | 12                          | 12-Dec-2014     |
| Network Analyser                            | Rohde & Schwarz      | ZVA 40                     | 3548   | 12                          | 13-Sep-2014     |
| Calibration Unit                            | Rohde & Schwarz      | ZV-Z54                     | 4368   | 12                          | 18-Sep-2014     |
| Frequency Standard                          | Spectracom           | Secure Sync 1200-0408-0601 | 4393   | 6                           | 22-Jul-2014     |

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



### 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

| Test Discipline                     | MU                                                         |
|-------------------------------------|------------------------------------------------------------|
| 6dB Bandwidth                       | $\pm 212.114$ kHz                                          |
| EIRP Peak Power                     | 30MHz to 1GHz: $\pm 5.1$ dB<br>1GHz to 40GHz: $\pm 6.3$ dB |
| Maximum Peak Conducted Output Power | $\pm 0.70$ dB                                              |
| Spurious and Band Edge Emissions    | 30MHz to 1GHz: $\pm 5.1$ dB<br>1GHz to 40GHz: $\pm 6.3$ dB |
| Power Spectral Density              | $\pm 3.0$ dB                                               |
| AC Line Conducted Emissions         | $\pm 3.2$ dB                                               |



Product Service

## **SECTION 4**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



Product Service

#### 4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

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