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# Report On

Limited FCC Testing of the  
Sharp CDMA SHI15 Dual Band CDMA (BC0 and BC6) and Tri Band  
GSM (900, 1800 and 1900 MHz) Dual Mode Cellular Phone with  
Bluetooth, FeliCa, WLAN and GPS  
In accordance with FCC CFR 47 Part 15C (WLAN)

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FCC ID: APYHRO00171

Document 75917027 Report 08 Issue 1

June 2012



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Document 75917027 Report 08 Issue 1

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**APPROVED BY**

**Mark Jenkins**  
Authorised Signatory

**DATED**

21 June 2012

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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);

G Lawler

B Airs





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**CONTENTS**

<b>Section</b>	<b>Page No</b>
<b>1</b>	<b>REPORT SUMMARY ..... 3</b>
1.1	Introduction ..... 4
1.2	Brief Summary of Results ..... 5
1.3	Application Form ..... 6
1.4	Product Information ..... 11
1.5	Test Conditions ..... 11
1.6	Deviations from the Standard ..... 11
1.7	Modification Record ..... 11
<b>2</b>	<b>TEST DETAILS ..... 12</b>
2.1	AC Line Conducted Emissions ..... 13
2.2	Maximum Peak Conducted Output Power ..... 16
2.3	EIRP Peak Power ..... 20
2.4	Power Spectral Density ..... 30
2.5	Spurious and Band Edge Emissions ..... 64
2.6	6dB Bandwidth ..... 102
<b>3</b>	<b>TEST EQUIPMENT USED ..... 136</b>
3.1	Test Equipment Used ..... 137
3.2	Measurement Uncertainty ..... 140
<b>4</b>	<b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT ..... 141</b>
4.1	Accreditation, Disclaimers and Copyright ..... 142



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## **SECTION 1**

### **REPORT SUMMARY**

Limited FCC Testing of the  
Sharp CDMA SHI15 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900  
MHz) Dual Mode Cellular Phone with Bluetooth, FeliCa, WLAN and GPS  
In accordance with FCC CFR 47 Part 15C (WLAN)



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## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Limited FCC Testing of the Sharp CDMA SHI15 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900 MHz) Dual Mode Cellular Phone with Bluetooth, FeliCa, WLAN and GPS to the requirements of FCC CFR 47 Part 15C.

Objective	To perform Limited 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)	CDMA SHI15
Serial Number(s)	IMEI 004401114000165 IMEI 004401114000322 IMEI 004401114000249
Number of Samples Tested	3
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2011)
Incoming Release Date	Application Form 02 May 2012
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	9100 02 April 2012
Start of Test	16 May 2012
Finish of Test	28 May 2012
Name of Engineer(s)	G Lawler B Airs
Related Document(s)	ANSI C63.10: 2009



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**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 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.3	15.247 (b)(4)	EIRP Peak Power	Pass	
2.4	15.247 (e)	Power Spectral Density	Pass	
2.5	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.6	15.247 (2)	6dB Bandwidth	Pass	
802.11(g)				
2.2	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.3	15.247 (b)(4)	EIRP Peak Power	Pass	
2.4	15.247 (e)	Power Spectral Density	Pass	
2.5	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.6	15.247 (2)	6dB Bandwidth	Pass	
802.11(n)				
2.2	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.3	15.247 (b)(4)	EIRP Peak Power	Pass	
2.4	15.247 (e)	Power Spectral Density	Pass	
2.5	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.6	15.247 (2)	6dB Bandwidth	Pass	



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1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION	
Model Name/Number	CDMA SHI15
Part Number	
FCC ID (if applicable)	APYHRO00171
Industry Canada ID (if applicable)	
Technical Description (Please provide a brief description of the intended use of the equipment)	Dual-Band CDMA(800MHz_BC0, 1900MHz_BC6) and Tri-Band GSM (GSM900MHz, DCS1800MHz, PCS1900MHz) Dual- Mode Cellular Phone with Bluetooth, W-LAN, SRD(FeliCa) and GPS receiver enabled.

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):	-20C to +60C

- (2) The equipment shall be tested over the following temperature ranges :
- a) 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.
  - b) 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	
0 dBi for assembly identified as WLAN	
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 1401.6 MHz		



SPREAD SPECTRUM PARAMETERS		
<input checked="" type="checkbox"/> <b>Bluetooth</b>		
FHSS: Channel <input checked="" type="checkbox"/> 79 Other <input type="checkbox"/>	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)	Yes	(No: Japan only)
Receiver (Rx)	Yes	(No: Japan only)
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		
<input type="checkbox"/> <b>Other Technology</b>		
Direct Sequence <input type="checkbox"/> Frequency Hopping <input type="checkbox"/> Combined <input type="checkbox"/> Other <input type="checkbox"/>		
DSSS	Chip Sequence Length	48 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 IEEE 802.11 (b/g/n) protocol which satisfies the medium access protocol requirement of EN 300 328".		



<b>TRANSMITTER POWER CHARACTERISTICS</b>				
<b>Bluetooth</b>				
Maximum Rated Transmitter Output				
Effective radiated power (for equipment with antenna connector)	0.004	W		
Effective radiated power (for equipment with integral antenna)	0.004	W		
Minimum Rated Transmitter Output				
Effective radiated power (for equipment with antenna connector)	0.0004	W		
Effective radiated power (for equipment with integral antenna)	0.0004	W		
Is transmitter intended for :				
Continuous duty	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
Intermittent duty	<input type="checkbox"/>	Yes	<input checked="" 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 type="checkbox"/>	Yes	<input checked="" 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)	0.08 (b/0.04(g.n)	W		
Effective radiated power (for equipment with integral antenna)	0.08 (b/0.04(g/n)	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 type="checkbox"/>	Yes	<input checked="" 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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<b>TRANSMITTER POWER SOURCE (3)</b>			
<input checked="" type="checkbox"/> Common power source for transmitter and receiver			
<input type="checkbox"/> AC mains			
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 checked="" type="checkbox"/> Lithium			
<input type="checkbox"/> Other Details :			
4.0 Volts nominal.			
End point voltage as quoted by equipment manufacturer		3.7 V	

(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.

<b>AUTOMATIC EQUIPMENT SWITCH OFF</b>	
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	3.4 V cut-off voltage
<input type="checkbox"/> Does not apply	



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<b>RECEIVER POWER SOURCE (4)</b>				
<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.

<b>AUTOMATIC EQUIPMENT SWITCH OFF</b>	
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: *Satomi Amaki* Name: Satomi Amaki  
 Position held: Manager Date: 2<sup>nd</sup> May,2012



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## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was a Sharp CDMA SHI15 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900 MHz) Dual Mode Cellular Phone with Bluetooth, FeliCa, WLAN 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 Accreditation  
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**

Limited FCC Testing of the  
Sharp CDMA SHI15 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900  
MHz) Dual Mode Cellular Phone with Bluetooth, FeliCa, WLAN and GPS  
In accordance with FCC CFR 47 Part 15C (WLAN)



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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

CDMA SHI15 S/N: IMEI 004401114000165 - Modification State 0

### 2.1.3 Date of Test

22 May 2012

### 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

The EUT is set up on a test table 800mm above a horizontal ground plane. A vertical ground plane is also required and is placed 400mm from the EUT. Where a EUT is floor standing it will be stood on but insulated from the ground plane by up to 12mm.

The EUT is powered through a Line Impedance Stabilisation Network (LISN) which is bonded to the ground plane. The EUT is located so that the distance between the EUT and the LISN is no less than 800mm. Where possible the cable between the mains input of the EUT and the LISN is 1m. Where this is not possible the cable is non inductively bundled with the bundle not exceeding 400mm in length.

A preliminary profile of the Conducted Emissions is obtained over the frequency range 150kHz to 30MHz. Any points of interest are noted for formal measurements.

During formal measurements, the measuring receiver is tuned to the emission of interest where Quasi – Peak and Average measurements are performed in a 9kHz Video and Resolution Bandwidth.

### 2.1.6 Environmental Conditions

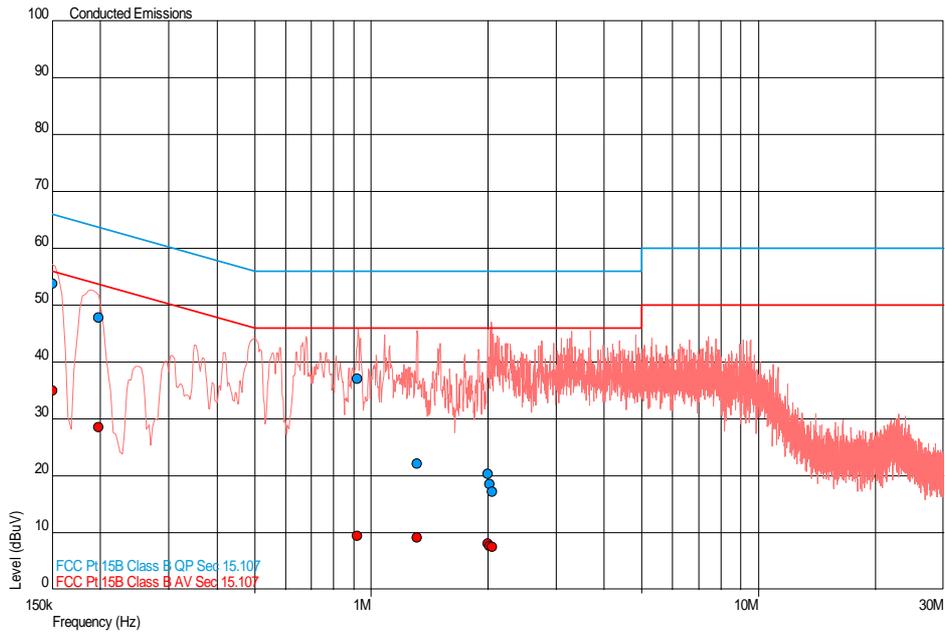
Ambient Temperature	18.9°C
Relative Humidity	47.0%



2.1.7 Test Results

802.11(b)

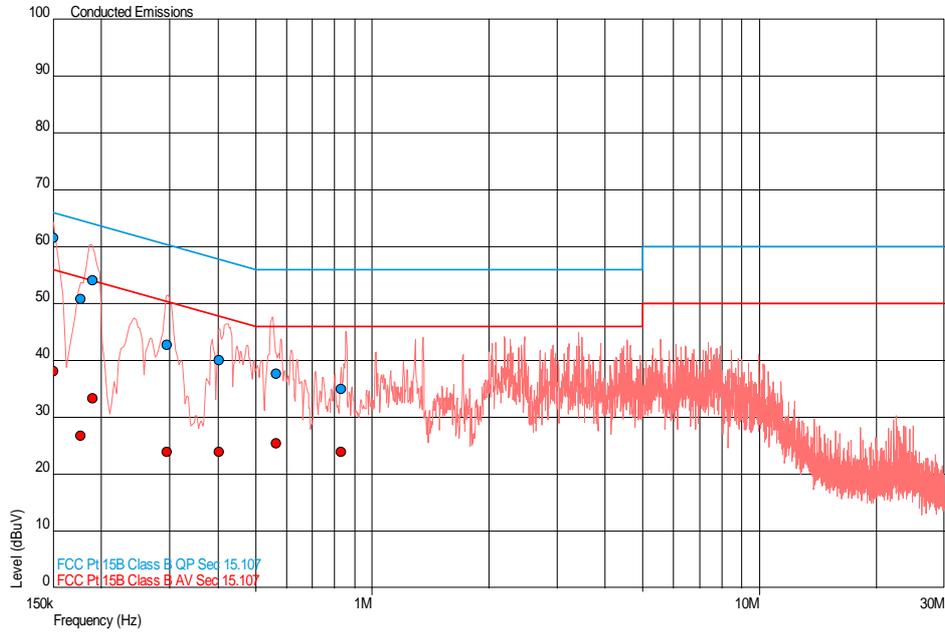
Live Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.150	53.9	66.0	-12.1	34.9	56.0	-21.1
0.198	47.8	63.7	-15.9	28.6	53.7	-25.1
0.922	37.0	56.0	-19.0	9.4	46.0	-36.6
1.312	22.1	56.0	-33.9	9.2	46.0	-36.8
1.998	20.4	56.0	-35.6	8.2	46.0	-37.8
2.026	18.5	56.0	-37.5	7.7	46.0	-38.3
2.048	17.2	56.0	-38.8	7.6	46.0	-38.4



Neutral Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.150	61.6	66.0	-4.4	38.1	56.0	-17.9
0.177	50.8	64.6	-13.8	26.8	54.6	-27.8
0.190	54.1	64.0	-9.9	33.4	54.0	-20.6
0.295	42.8	60.4	-17.6	24.0	50.4	-26.4
0.403	40.1	57.8	-17.7	23.9	47.8	-23.9
0.566	37.6	56.0	-18.4	25.4	46.0	-20.6
0.833	35.0	56.0	-21.0	24.0	46.0	-22.0



## **2.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER**

### **2.2.1 Specification Reference**

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

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

CDMA SHI15 S/N: IMEI 004401114000322 - Modification State 0

### **2.2.3 Date of Test**

22 May 2012 & 23 May 2012

### **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 EUT was transmitted at maximum power via a cable to the Peak Power Analyser. The Analyser settings were adjusted to display the resultant trace on screen and a reference level offset was entered to account for the measurement path loss. The measurement bandwidth was set according to the signal being measured and the peak and average levels were recorded.

### **2.2.6 Environmental Conditions**

Ambient Temperature	23.8°C
Relative Humidity	35.6 - 44.5%



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## 2.2.7 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	18.05	17.86	17.86	63.826	61.094	61.094
2	18.11	18.04	17.84	64.714	63.680	60.814
5.5	18.35	18.03	17.91	68.391	63.533	61.802
11	18.38	18.00	17.93	68.865	63.096	62.087

### 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	22.08	22.04	21.91	161.436	159.956	155.239
9	22.37	21.95	21.91	172.584	156.675	155.239
12	21.88	21.65	21.57	154.170	154.170	146.218
18	21.91	21.66	21.63	155.239	146.555	145.555
24	21.99	21.83	21.65	158.125	152.405	146.218
36	22.09	22.03	21.84	161.808	159.588	152.757
48	21.93	21.78	21.73	155.955	150.661	148.936
54	22.22	21.80	21.73	166.725	151.356	148.936

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.



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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	22.04	21.57	21.55	159.956	143.549	142.889
13	22.47	21.85	21.99	176.604	153.109	158.125
19.5	21.73	21.25	21.24	148.936	133.352	133.045
26	21.79	21.22	21.00	151.008	132.434	125.893
39	21.42	21.21	21.09	138.676	132.130	128.529
52	21.38	21.26	21.21	134.276	133.660	132.130
58.5	21.98	21.59	21.33	157.761	144.211	135.831
65	21.80	21.40	21.25	151.356	138.038	133.352

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.



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## **2.3 EIRP PEAK POWER**

### **2.3.1 Specification Reference**

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

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

CDMA SHI15 S/N: IMEI 004401114000249 - Modification State 0

### **2.3.3 Date of Test**

16 May 2012

### **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 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 360° and a height search of the measuring antenna. A substitution was then performed using a substitution 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. If applicable, a peak power analyser was also used to obtain a correction factor for wideband signals such as WLAN.

A calculation was then performed to obtain the final figure.

### **2.3.6 Environmental Conditions**

Ambient Temperature	20.3°C
Relative Humidity	33.0%



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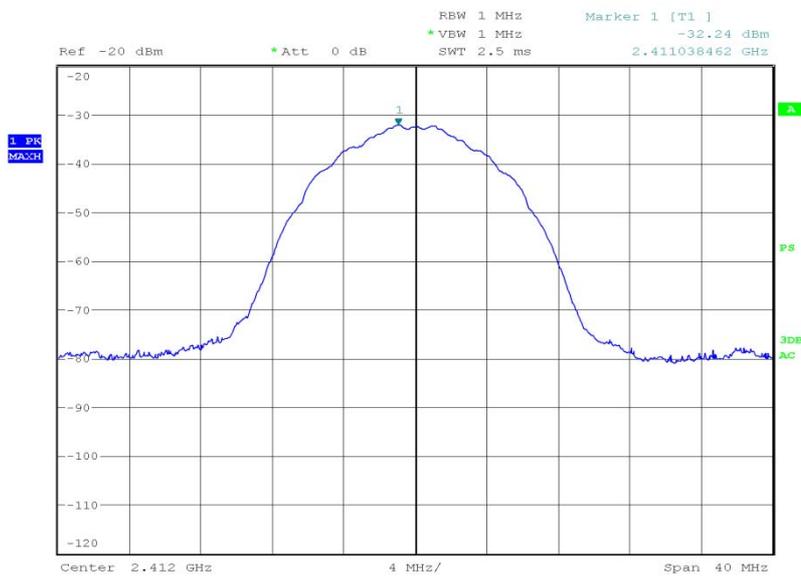
**2.3.7 Test Results**

802.11(b)

4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
17.39	54.83



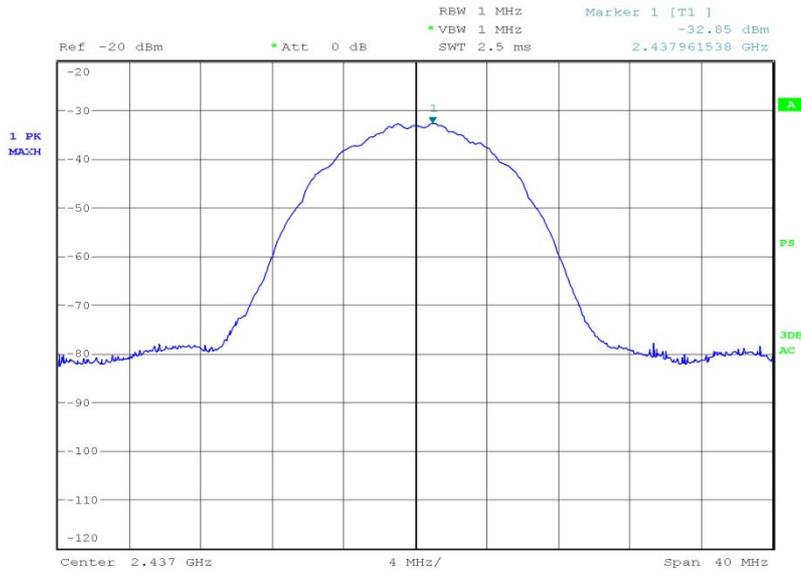
Date: 16.MAY.2012 18:22:44



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2437 MHz

EIRP (dBm)	EIRP (mW)
16.47	44.36



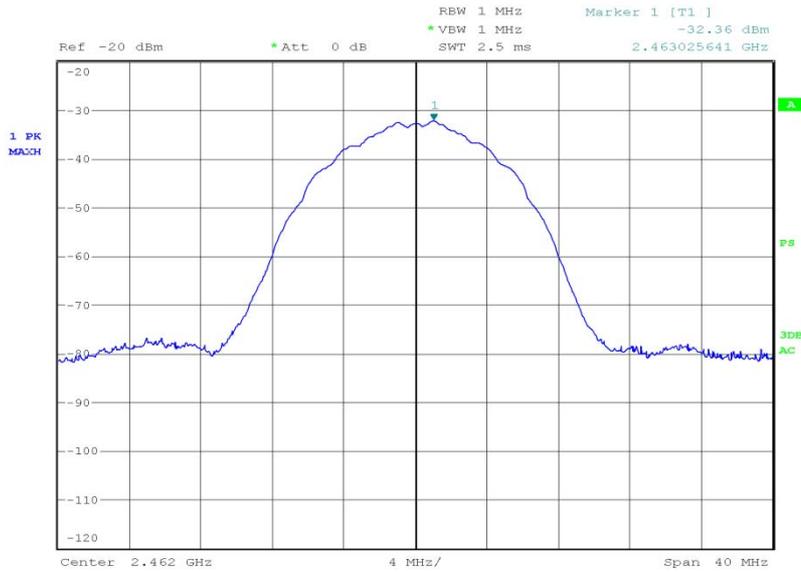
Date: 16.MAY.2012 18:32:51



Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
16.59	45.60



Date: 16.MAY.2012 18:46:24

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



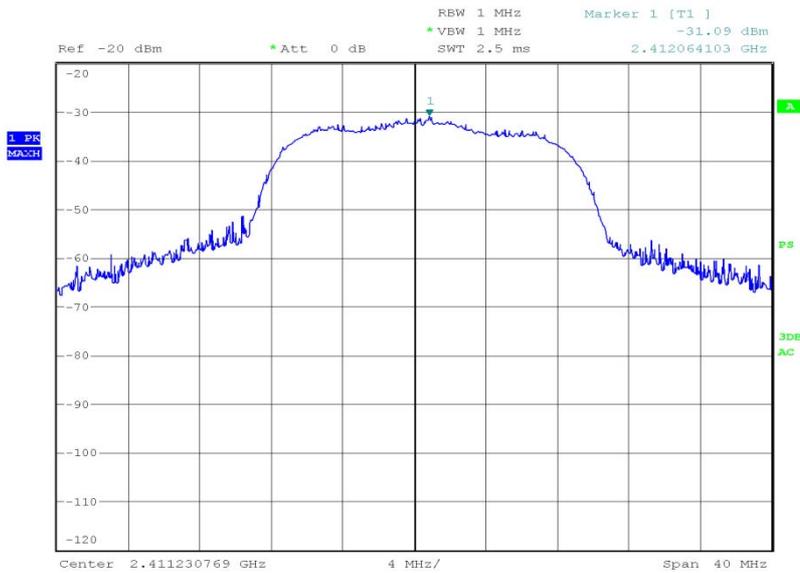
Product Service

802.11(g)

4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
19.99	99.77



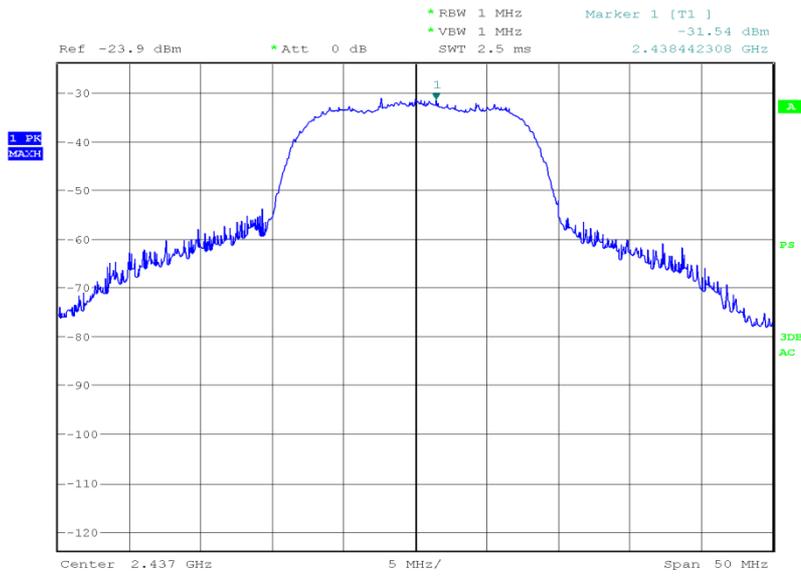
Date: 16.MAY.2012 19:13:38



Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
19.25	84.14



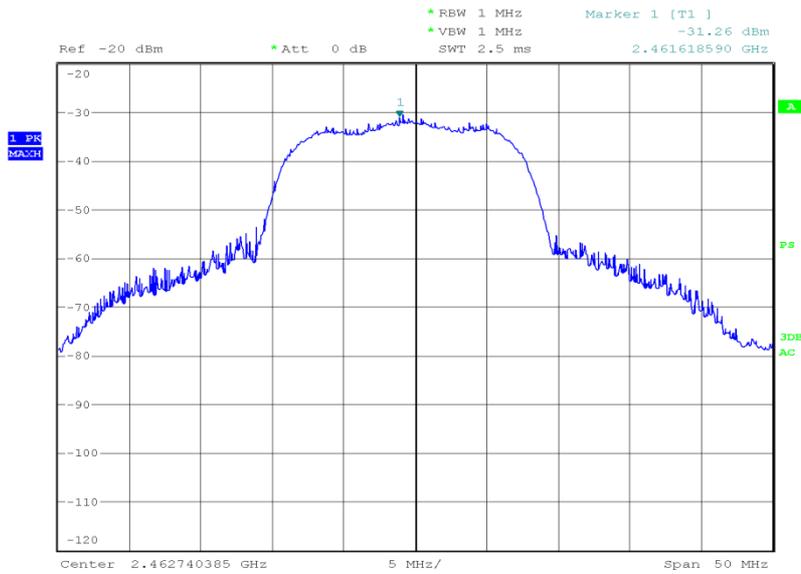
Date: 16.MAY.2012 20:01:15



Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
19.66	92.47



Date: 16.MAY.2012 20:30:31

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



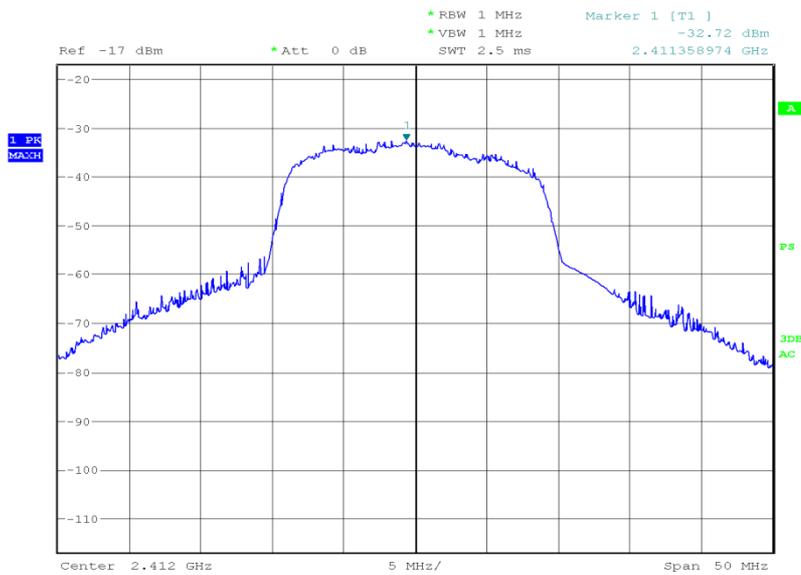
Product Service

802.11(n)

4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
19.72	93.77



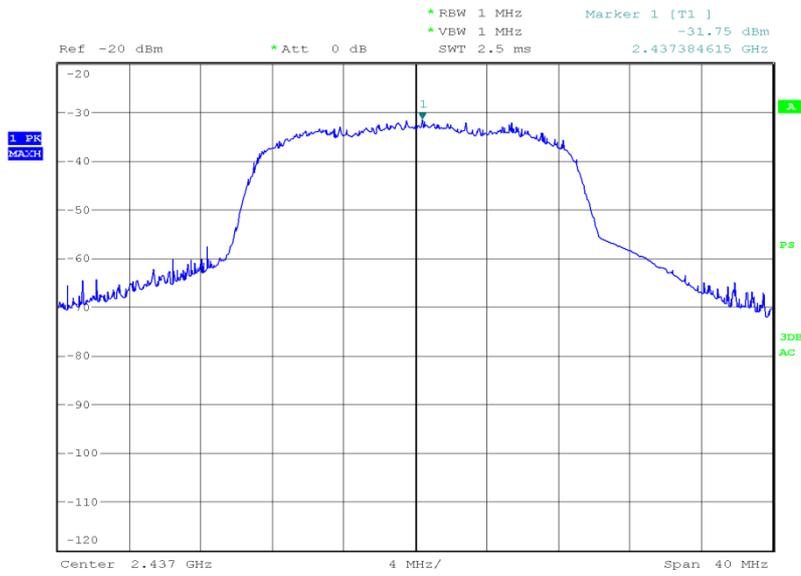
Date: 16.MAY.2012 20:53:55



Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
20.40	109.65

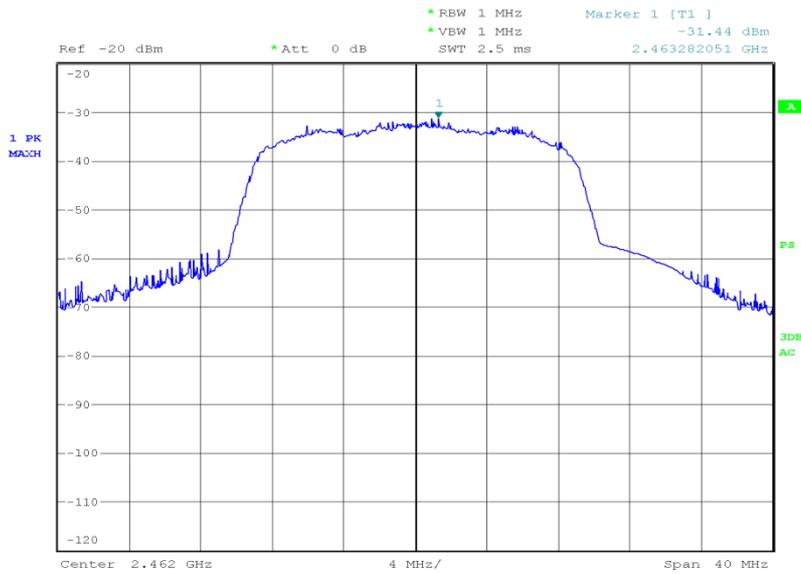


Date: 16.MAY.2012 21:19:16



2462 MHz

EIRP (dBm)	EIRP (mW)
20.12	102.80



Date: 16.MAY.2012 21:48:21

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



Product Service

## 2.4 POWER SPECTRAL DENSITY

### 2.4.1 Specification Reference

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

### 2.4.2 Equipment Under Test and Modification State

CDMA SHI15 S/N: IMEI 004401114000322 - Modification State 0

### 2.4.3 Date of Test

22 May 2012 & 23 May 2012

### 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 connected to a spectrum analyser via a 10 dB attenuator. 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.

### 2.4.6 Environmental Conditions

Ambient Temperature	23.8°C
Relative Humidity	35.6 - 44.5%



Product Service

**2.4.7 Test Results**802.11(b)

4.0 V DC Supply

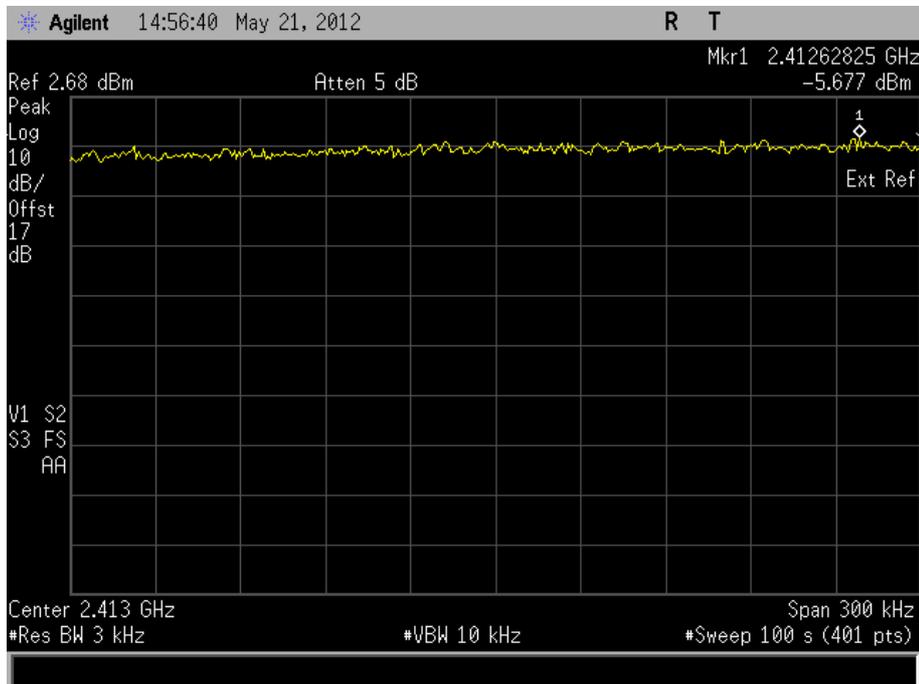
Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	1	-5.68
	2	-5.63
	5	-6.37
	11	-6.64
2437 MHz	1	-5.69
	2	-5.34
	5	-6.08
	11	-6.61
2462 MHz	1	-5.96
	2	-5.56
	5	-5.02
	11	-6.48



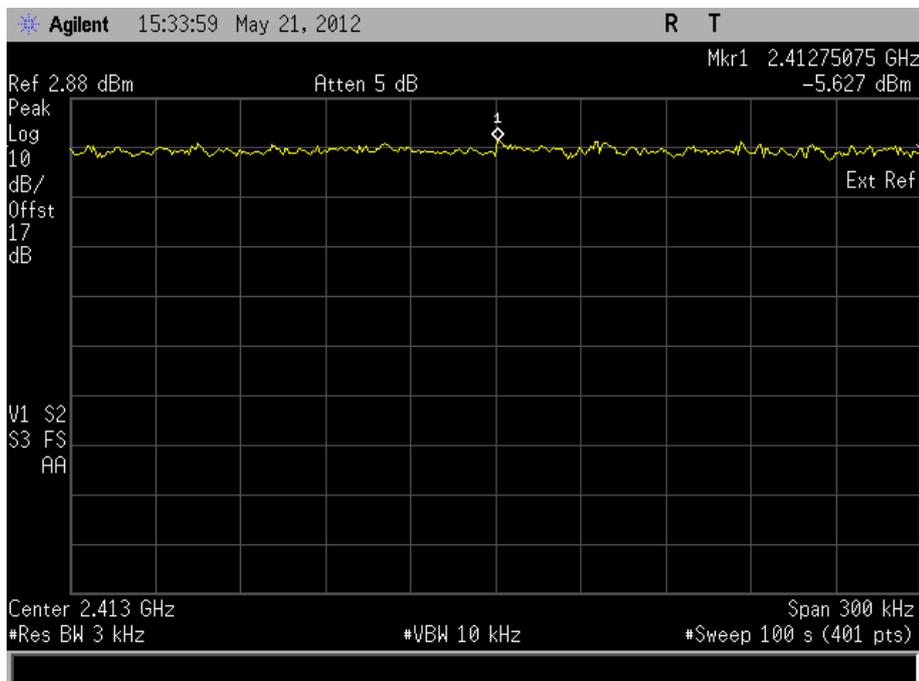
Product Service

2412 MHz

1 Mbps



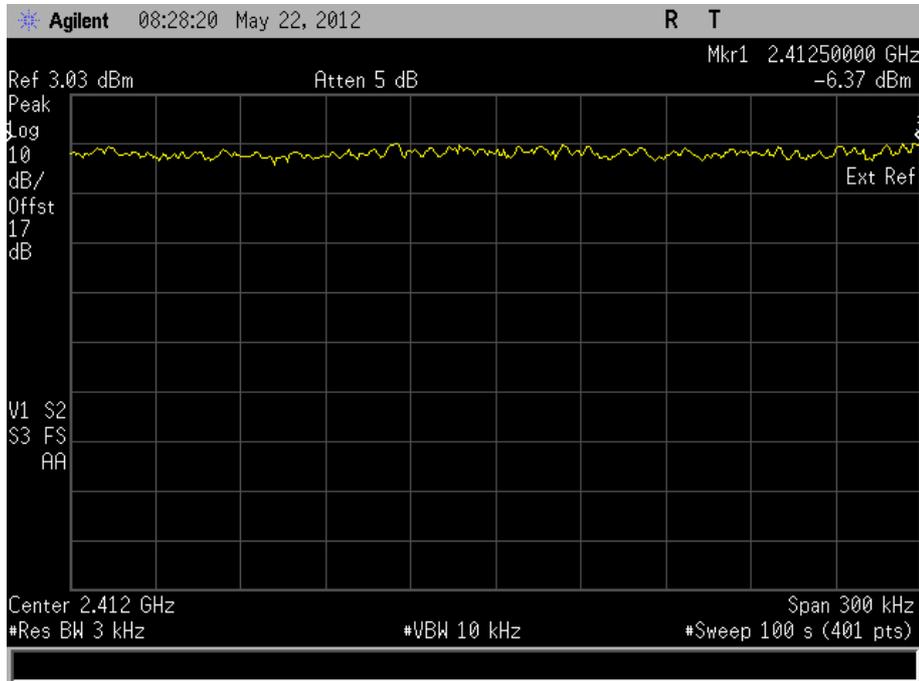
2 Mbps



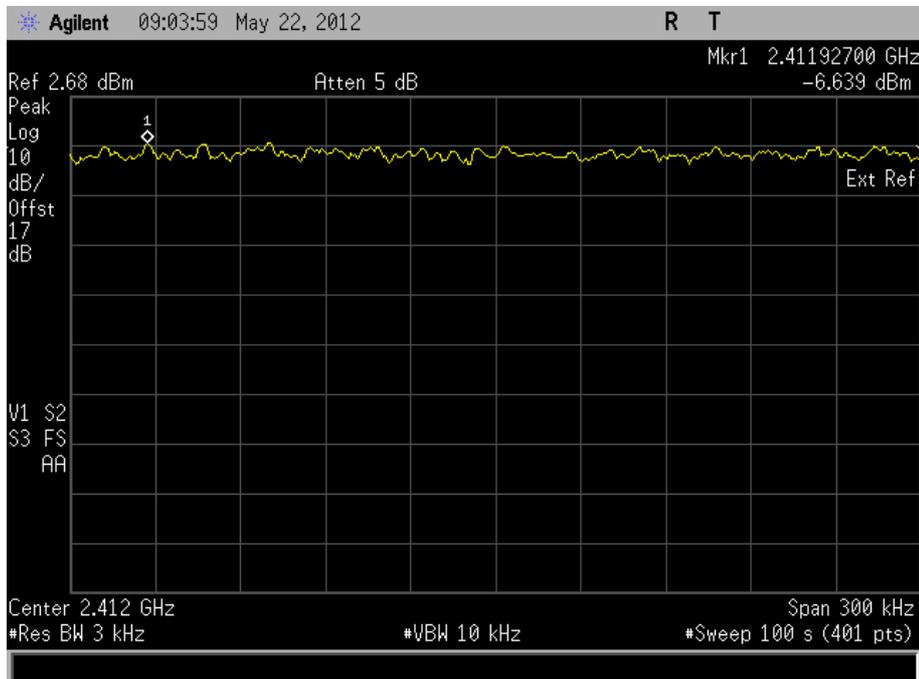


Product Service

5.5 Mbps



11 Mbps

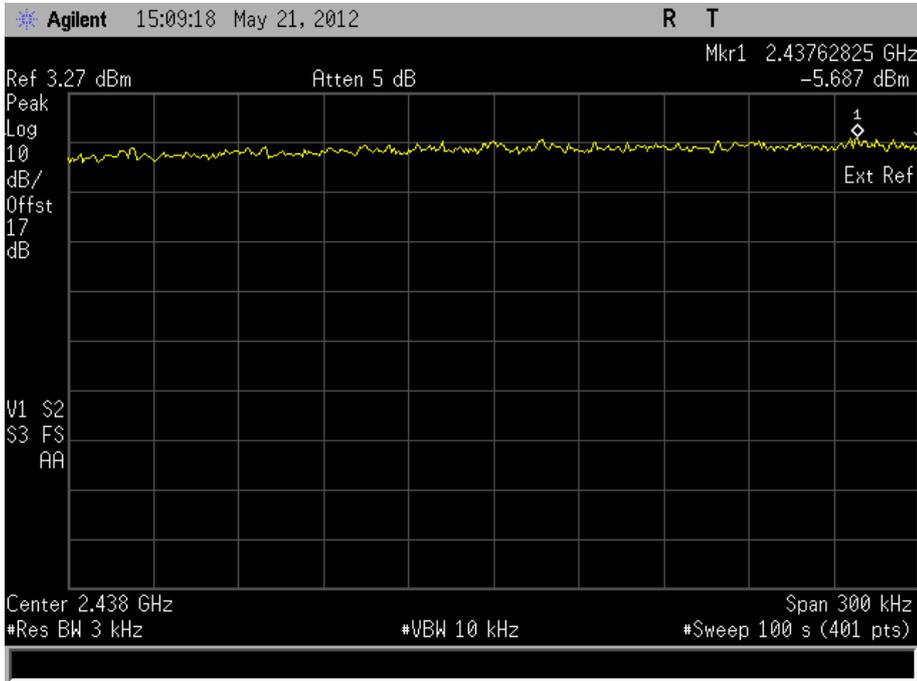




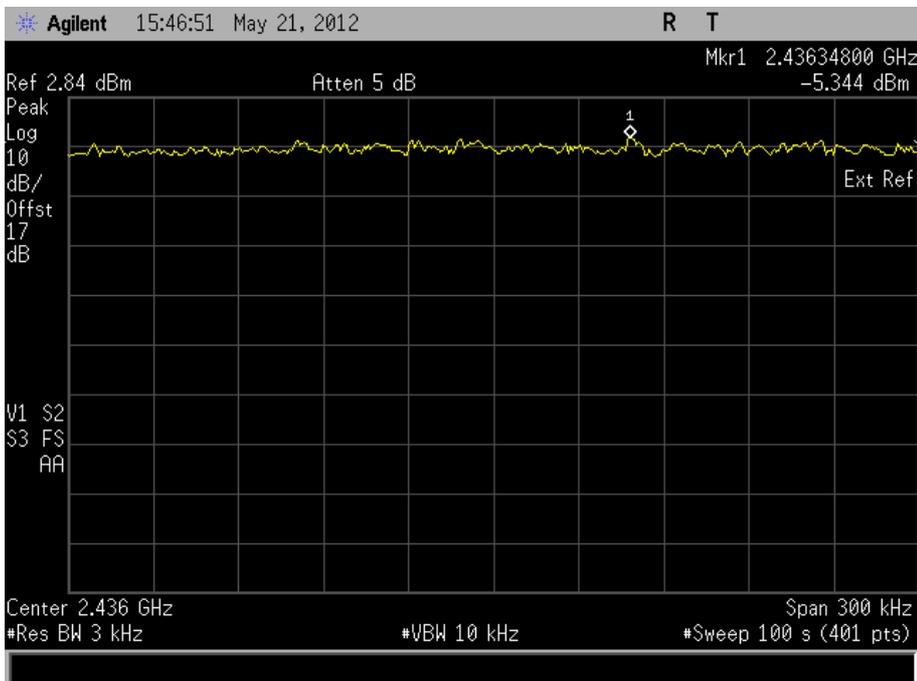
Product Service

2437 MHz

1 Mbps



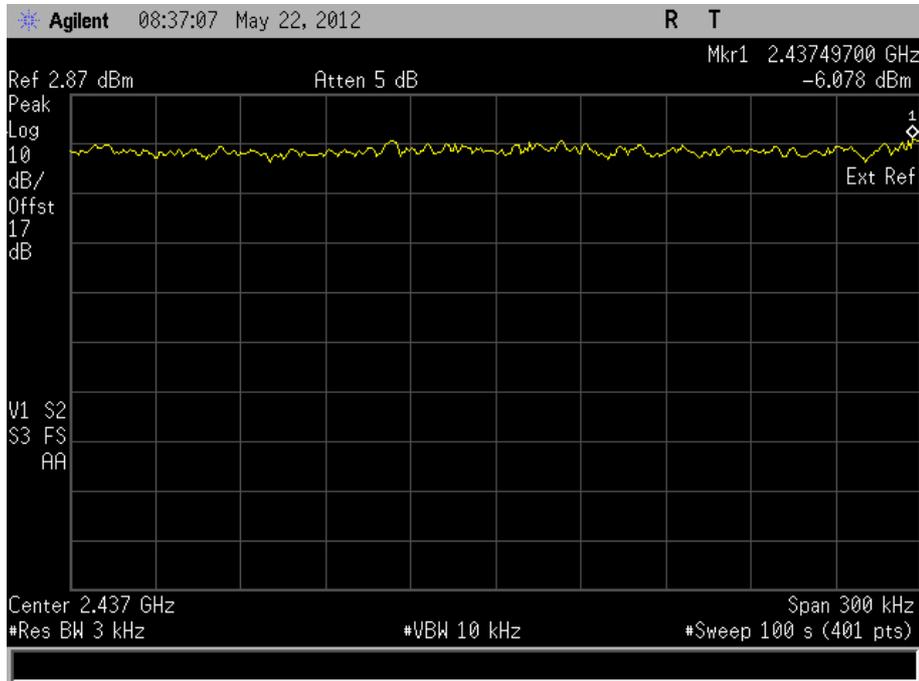
2 Mbps



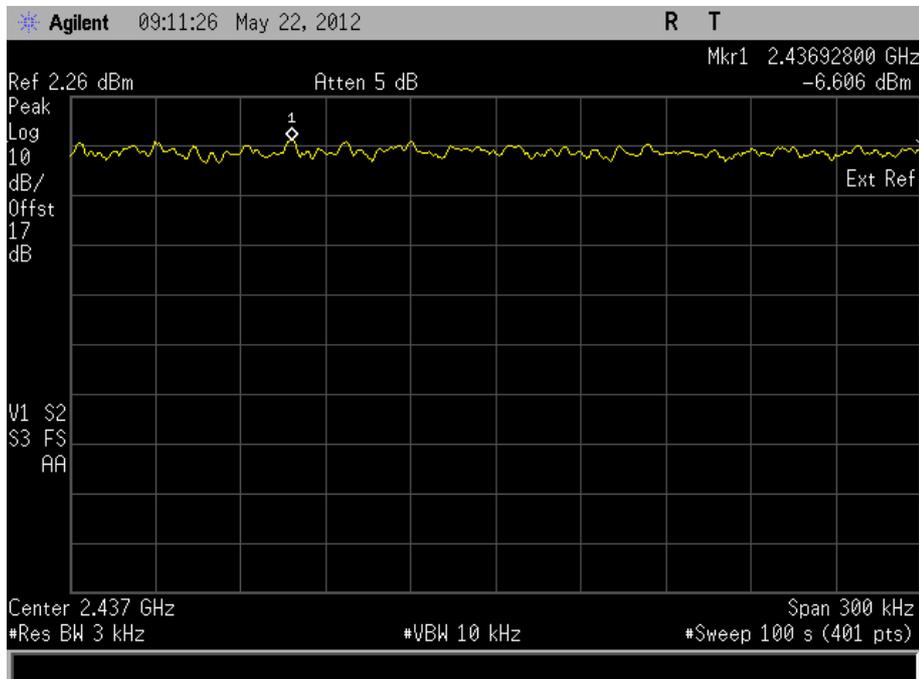


Product Service

5.5 Mbps



11 Mbps

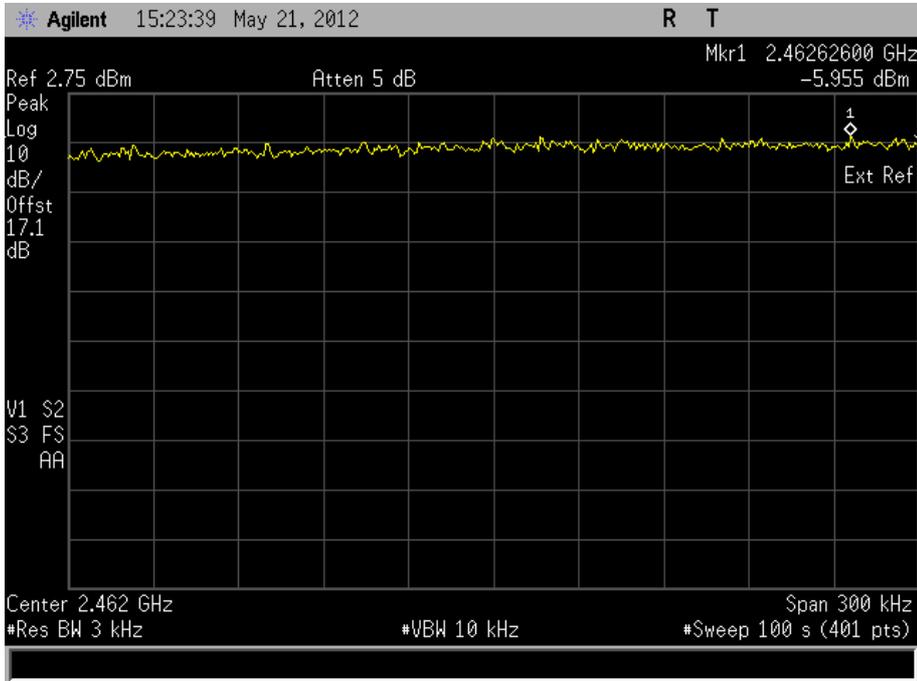




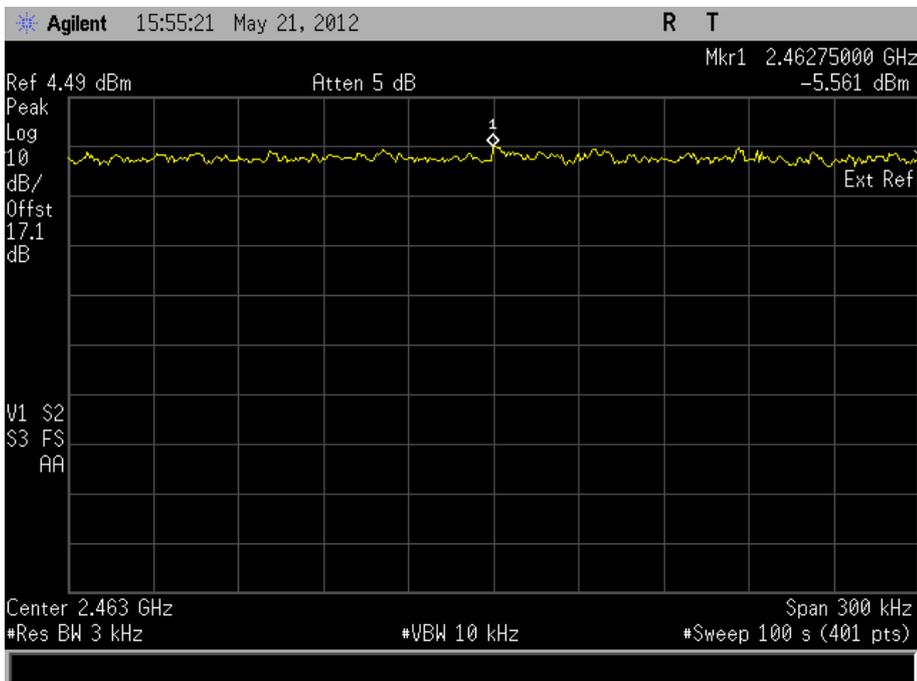
Product Service

2462 MHz

1 Mbps



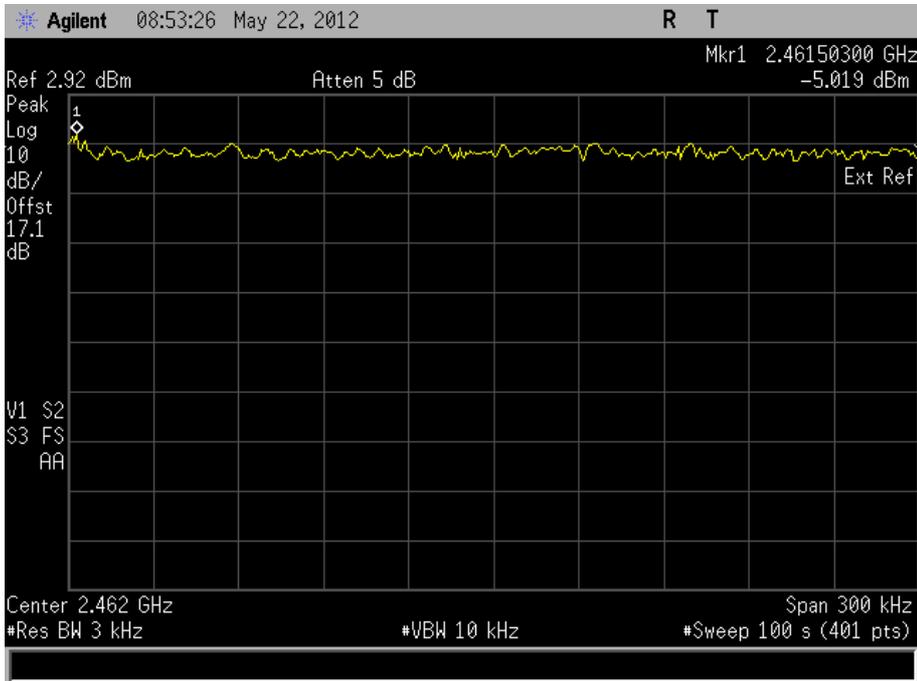
2 Mbps



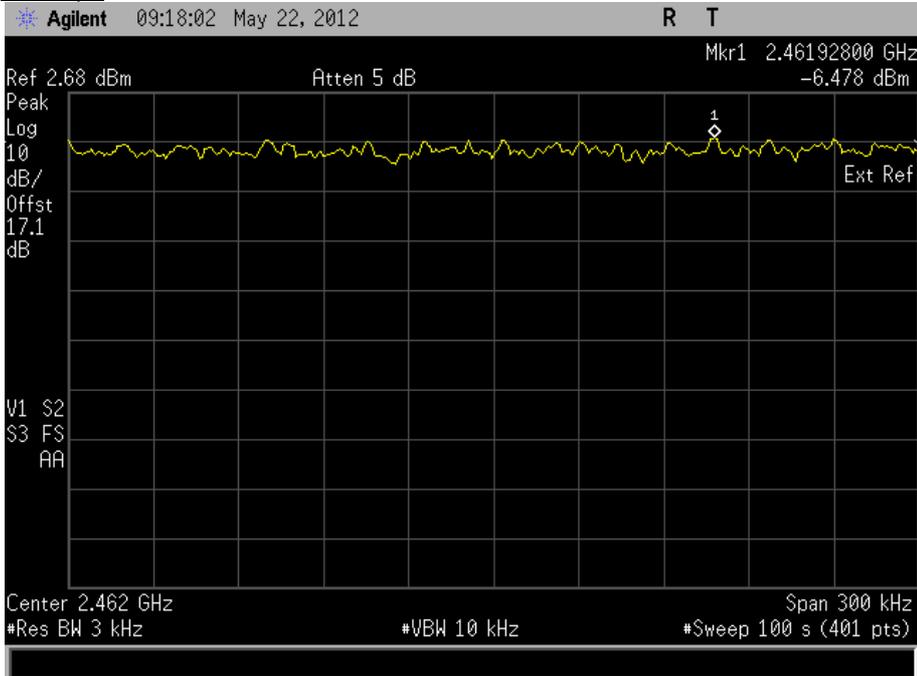


Product Service

5.5 Mbps



11 Mbps





Product Service

Limit Clause

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

802.11(g)

4.0 V DC Supply

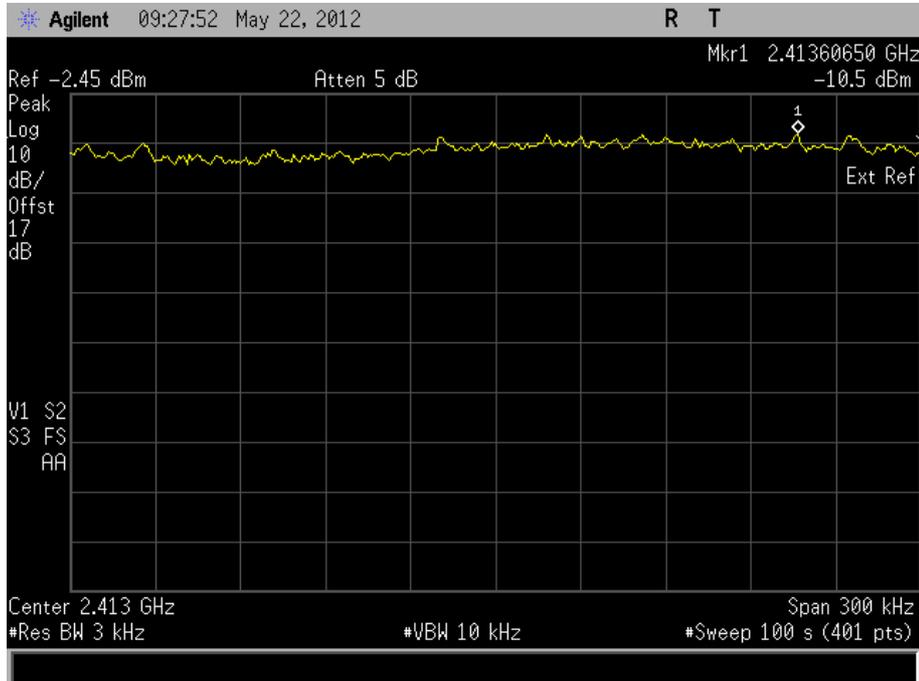
Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	6	-10.50
	9	-9.76
	12	-8.50
	18	-9.82
	24	-9.67
	36	-10.85
	48	-8.90
	54	-9.62
2437 MHz	6	-10.62
	9	-9.48
	12	-8.99
	18	-8.93
	24	-9.79
	36	-9.05
	48	-8.55
	54	-10.20
2462 MHz	6	-9.58
	9	-10.09
	12	-8.85
	18	-8.93
	24	-10.42
	36	-9.46
	48	-9.17
	54	-9.71



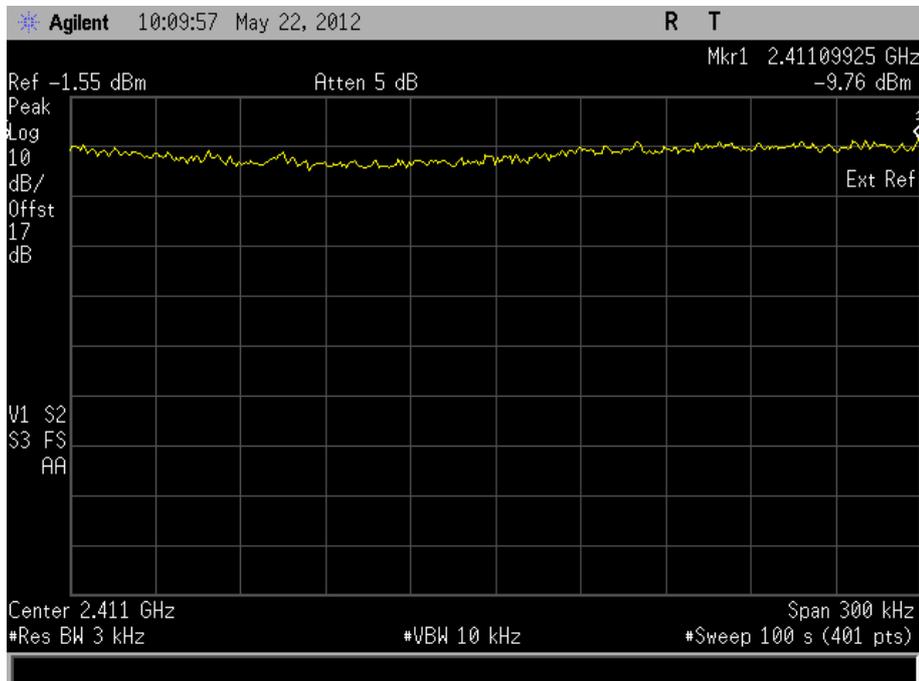
Product Service

2412 MHz

6 Mbps



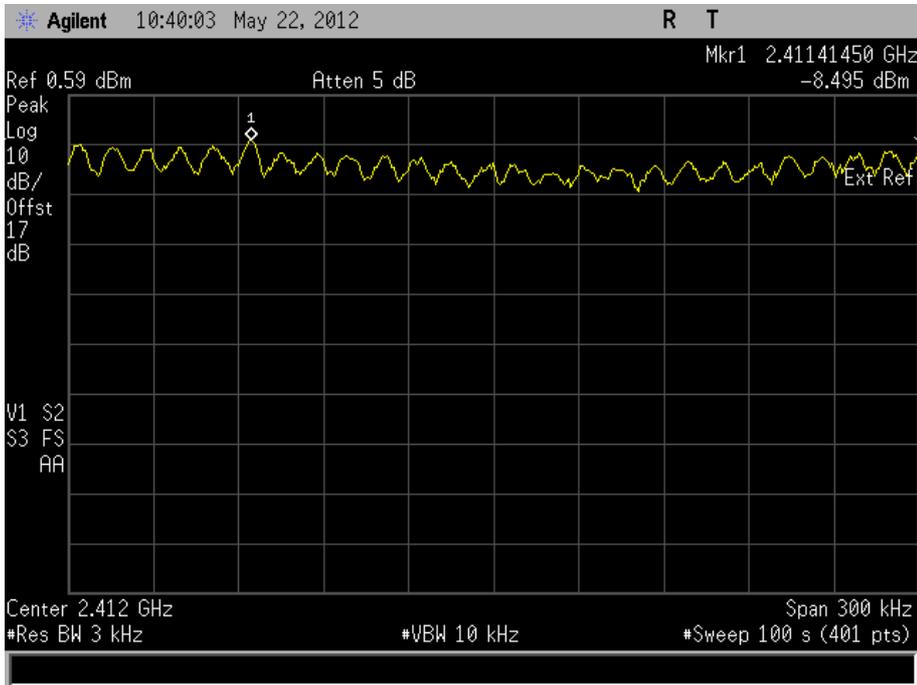
9 Mbps



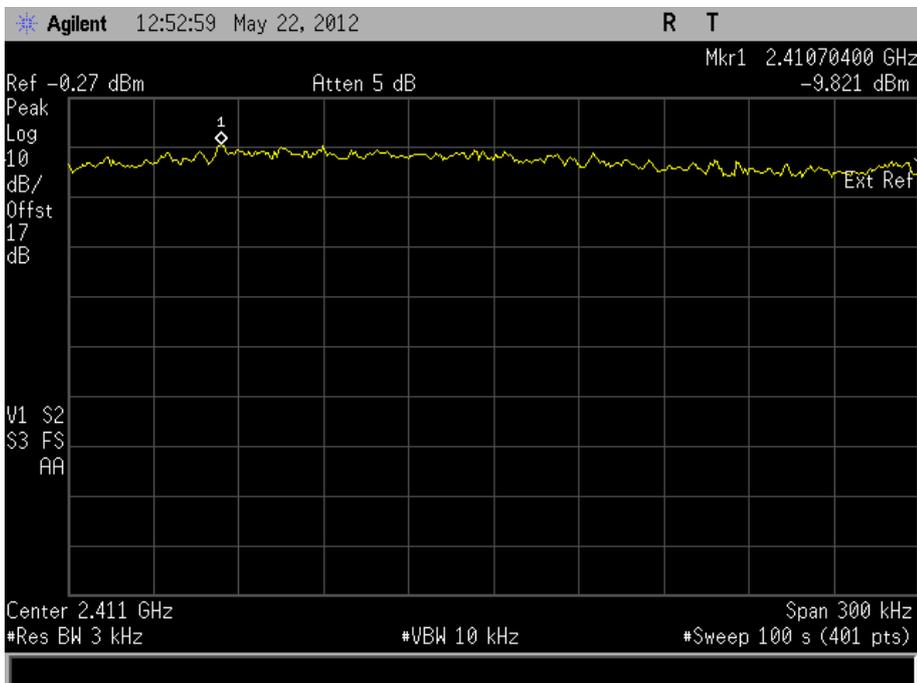


Product Service

12 Mbps



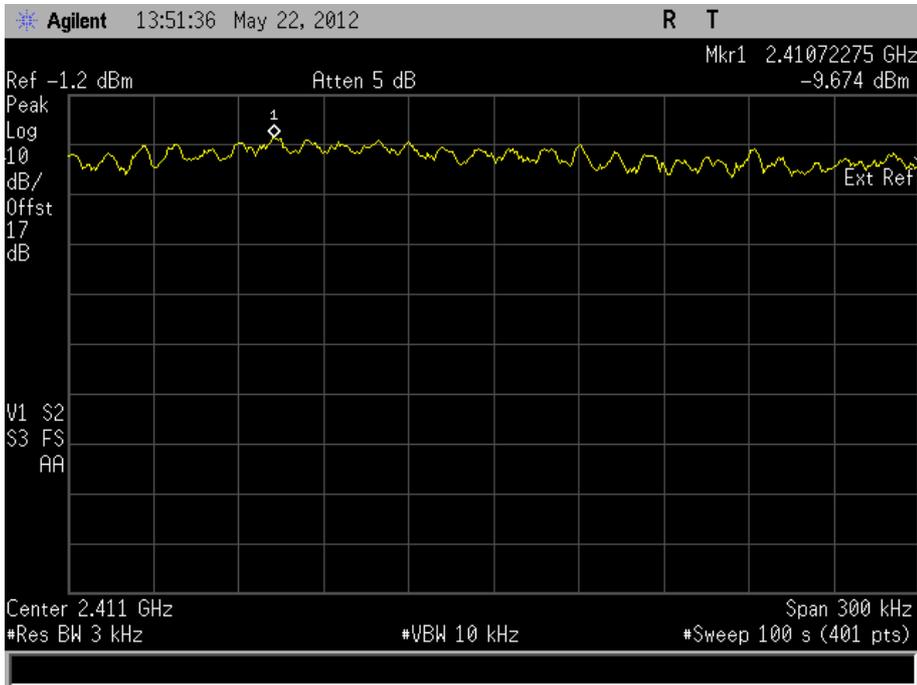
18 Mbps



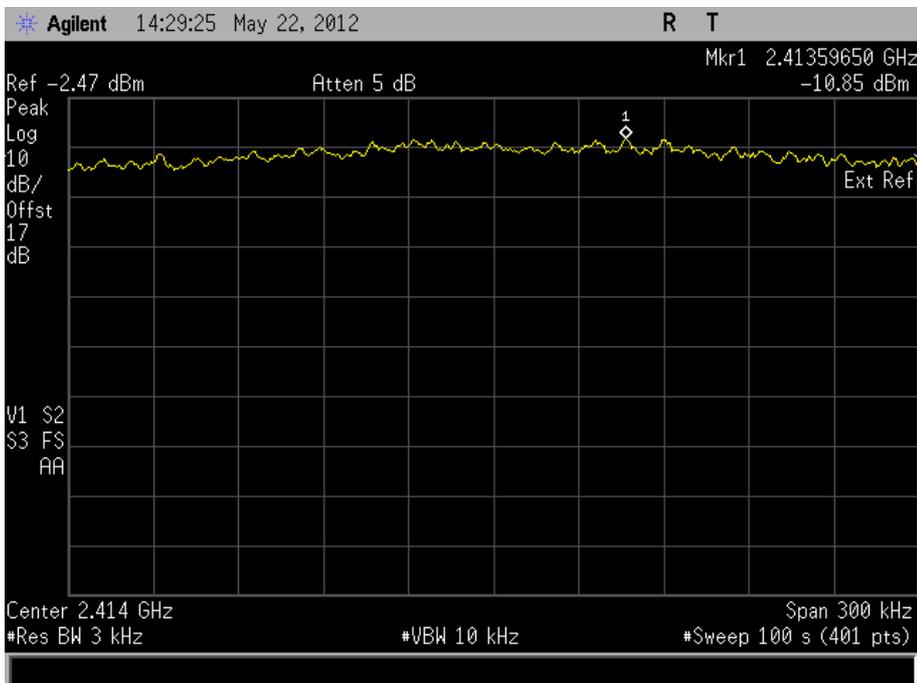


Product Service

24 Mbps



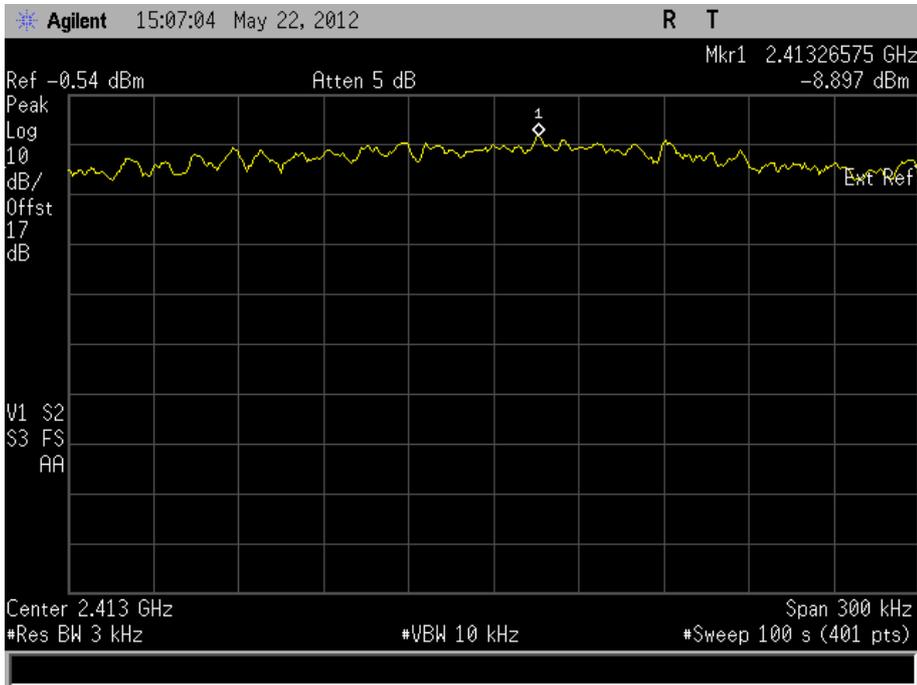
36 Mbps



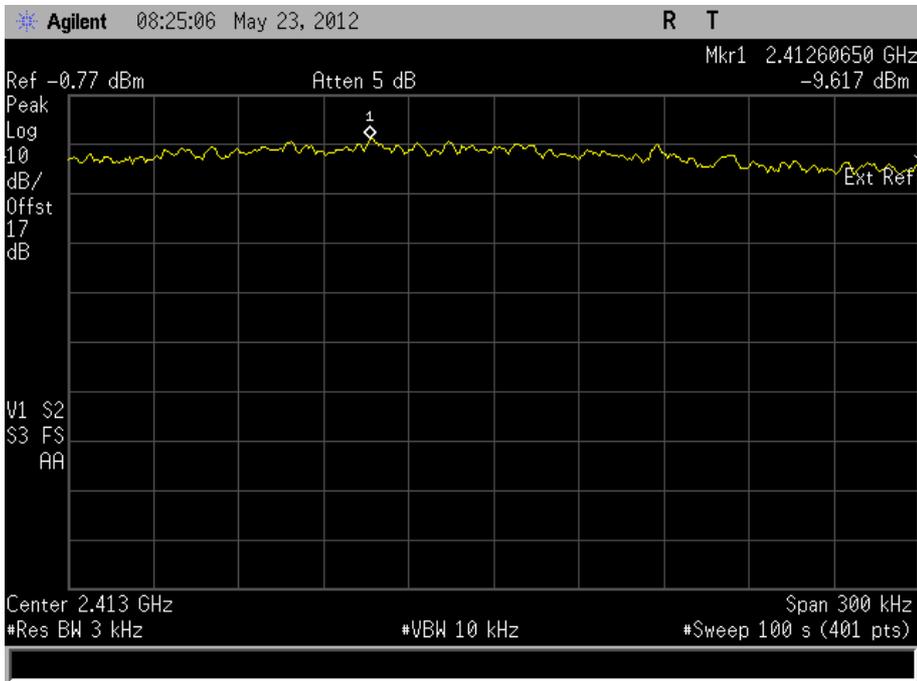


Product Service

48 Mbps



54 Mbps

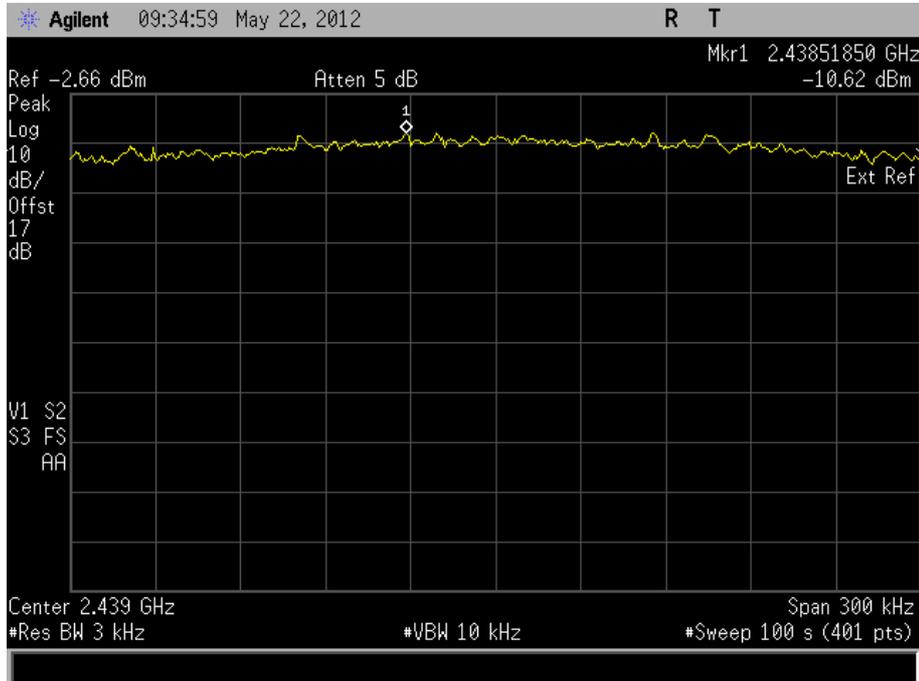




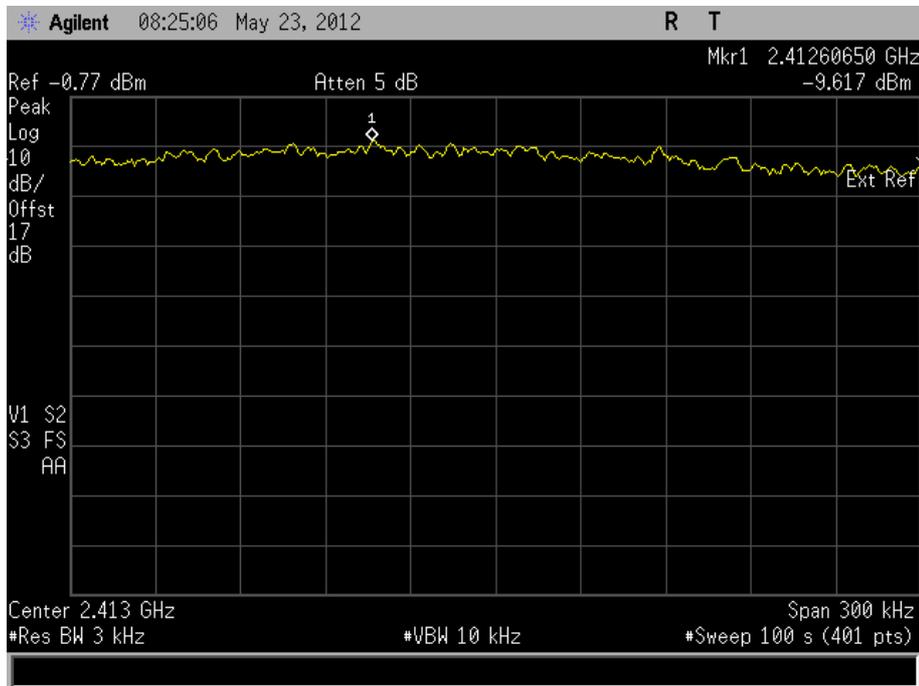
Product Service

2437 MHz

6 Mbps



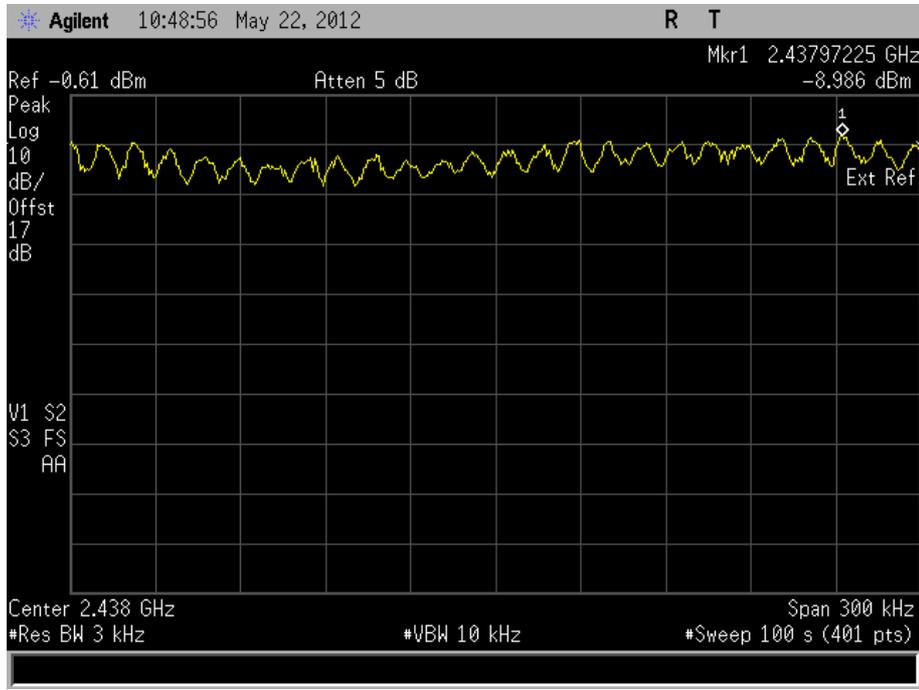
9 Mbps



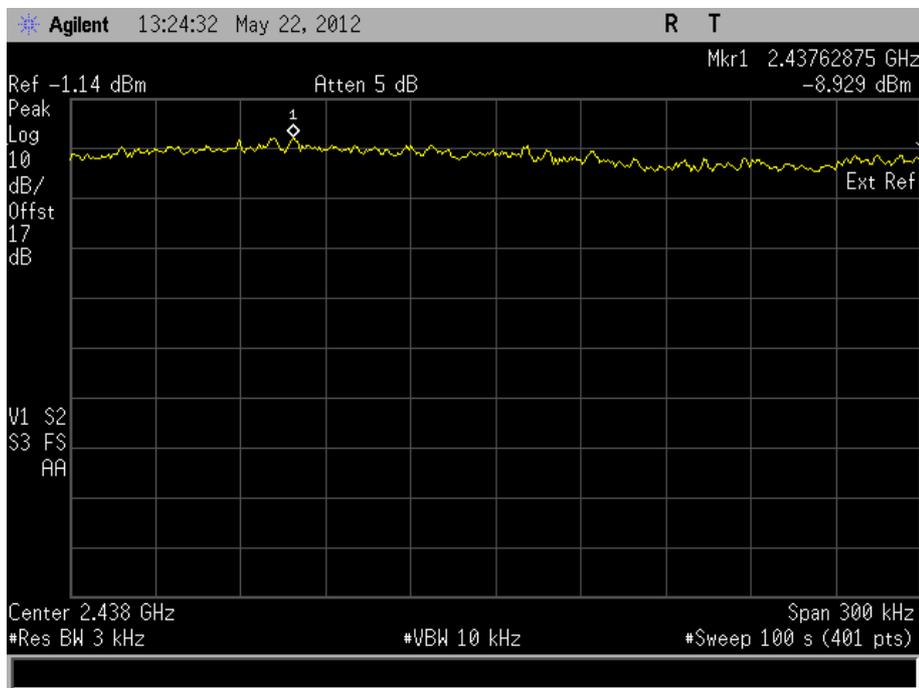


Product Service

12 Mbps



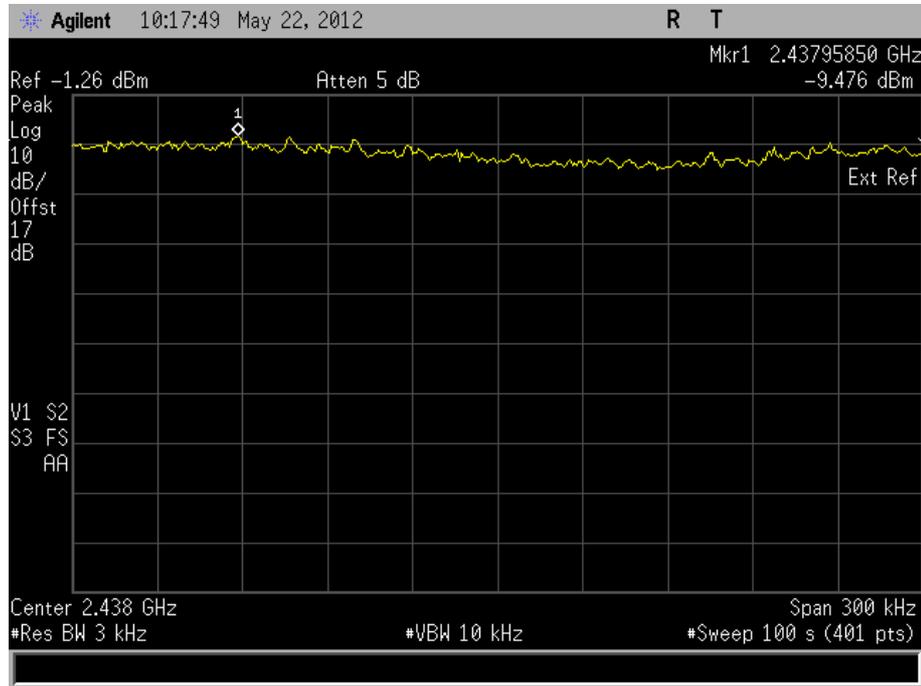
18 Mbps



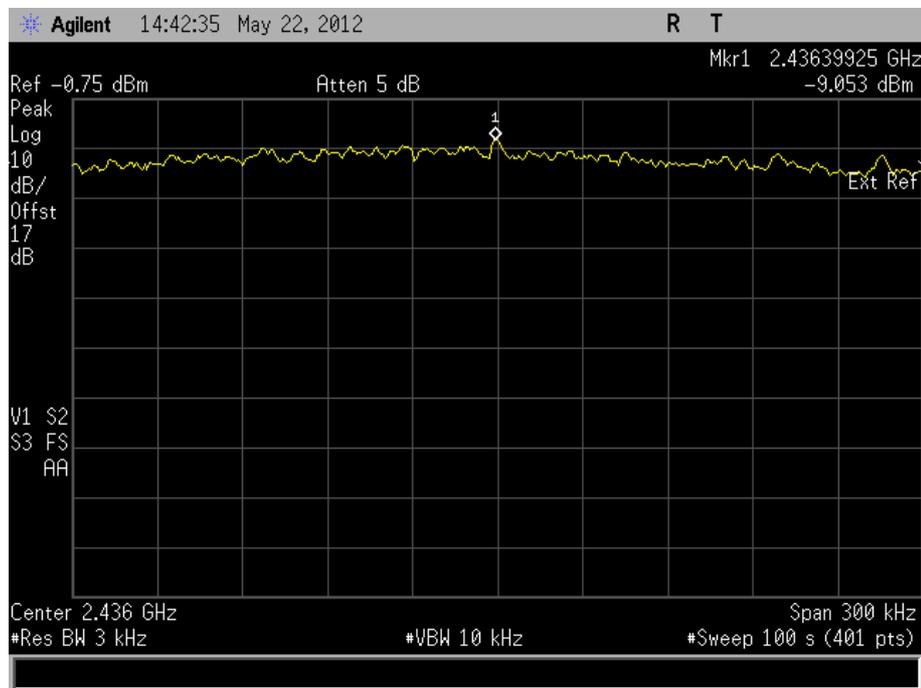


Product Service

24 Mbps



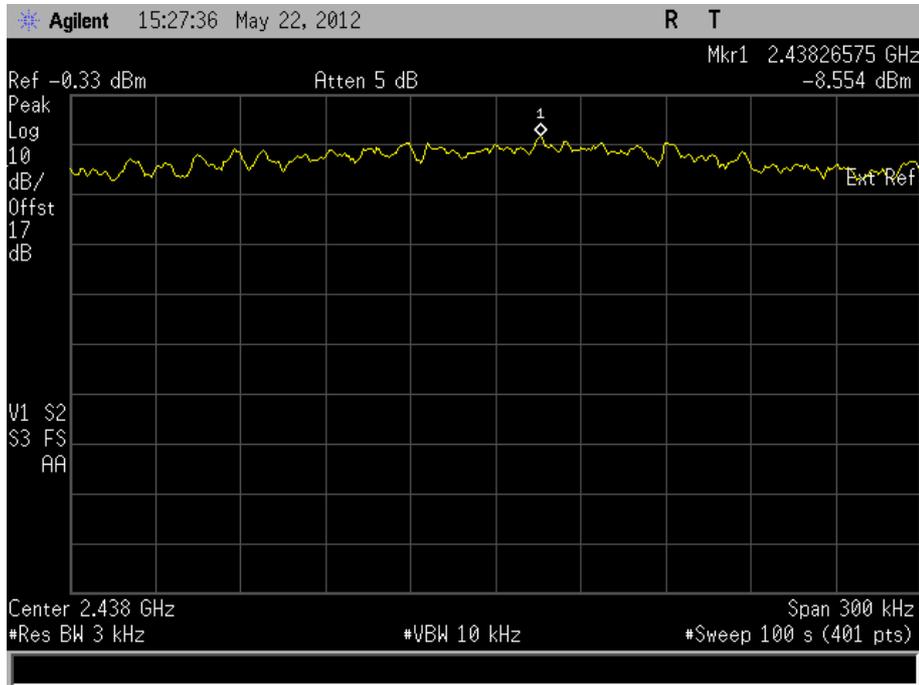
36 Mbps



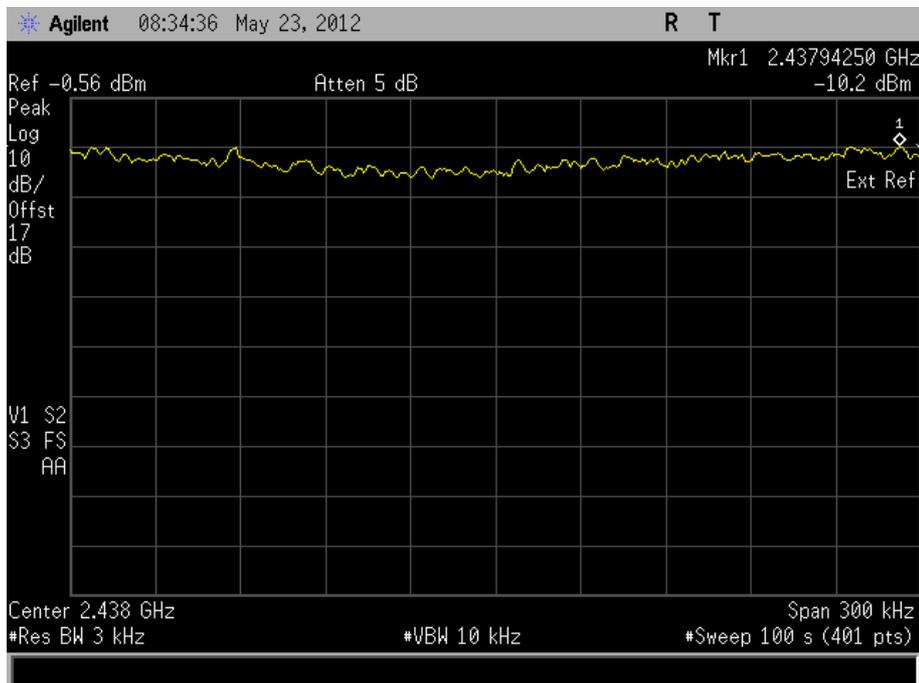


Product Service

48 Mbps



54 Mbps

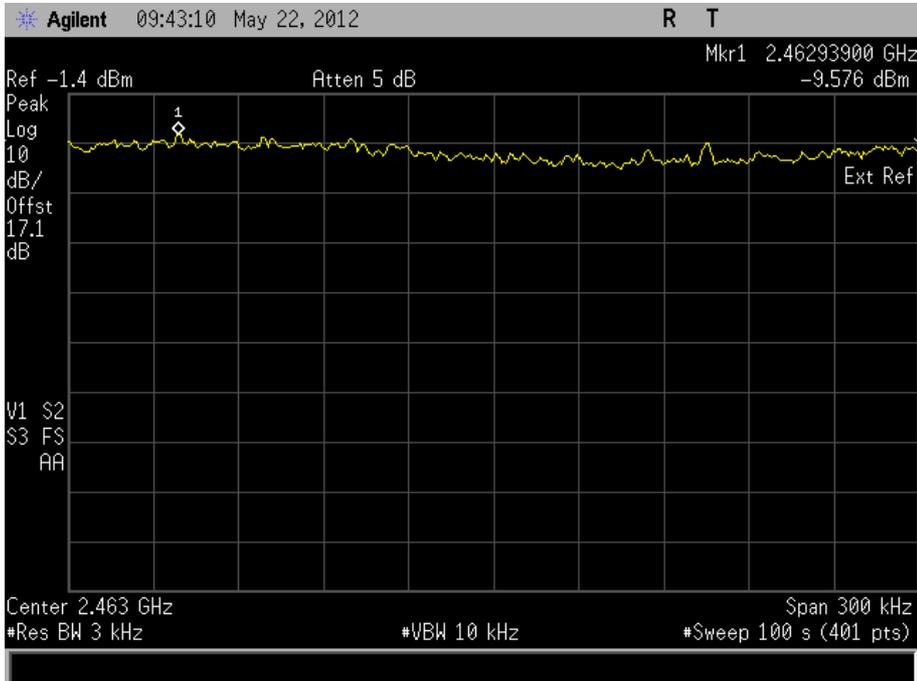




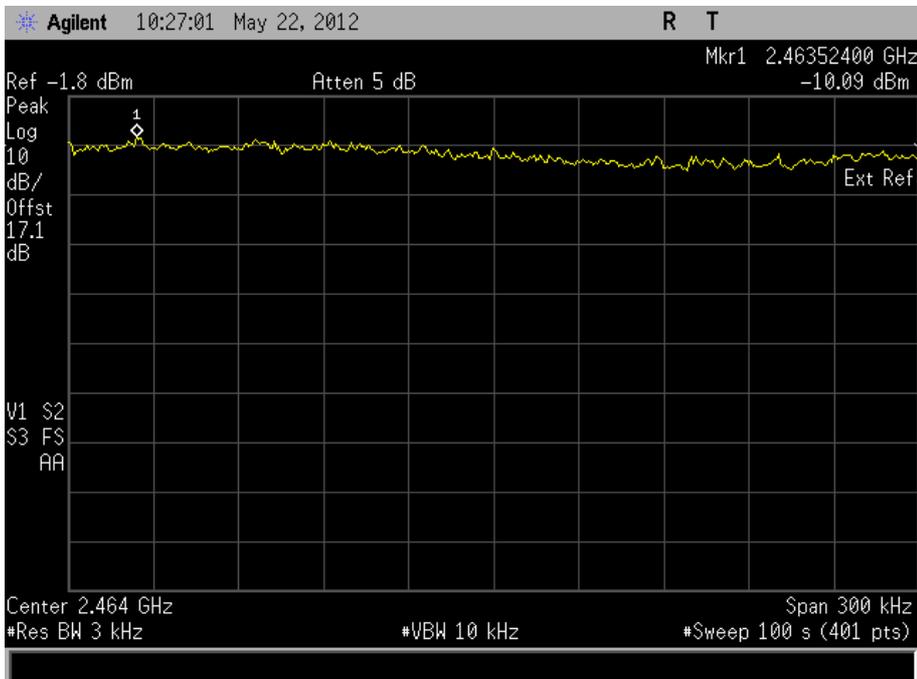
Product Service

2462 MHz

6 Mbps



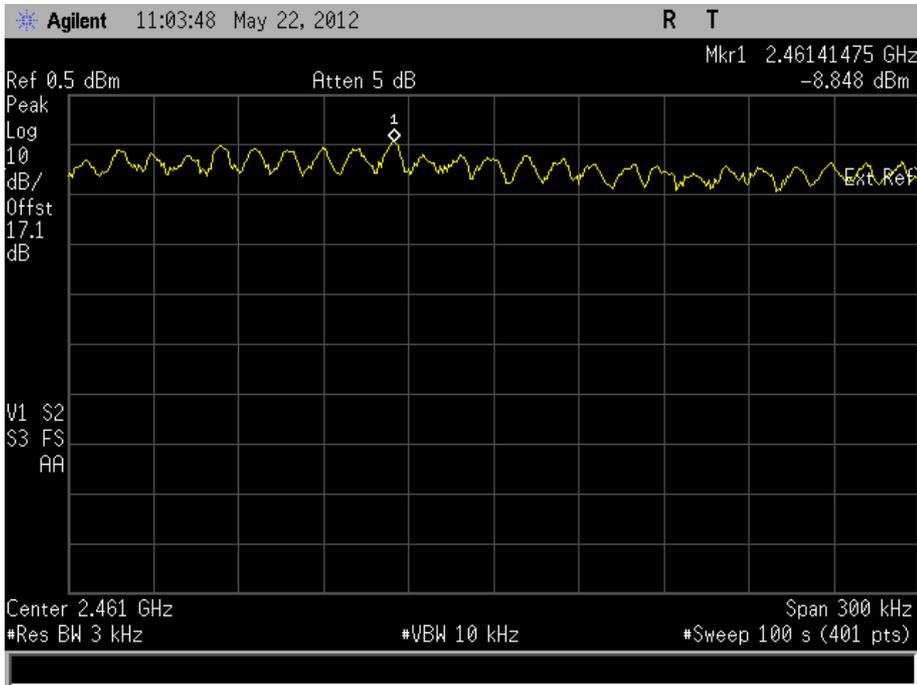
9 Mbps



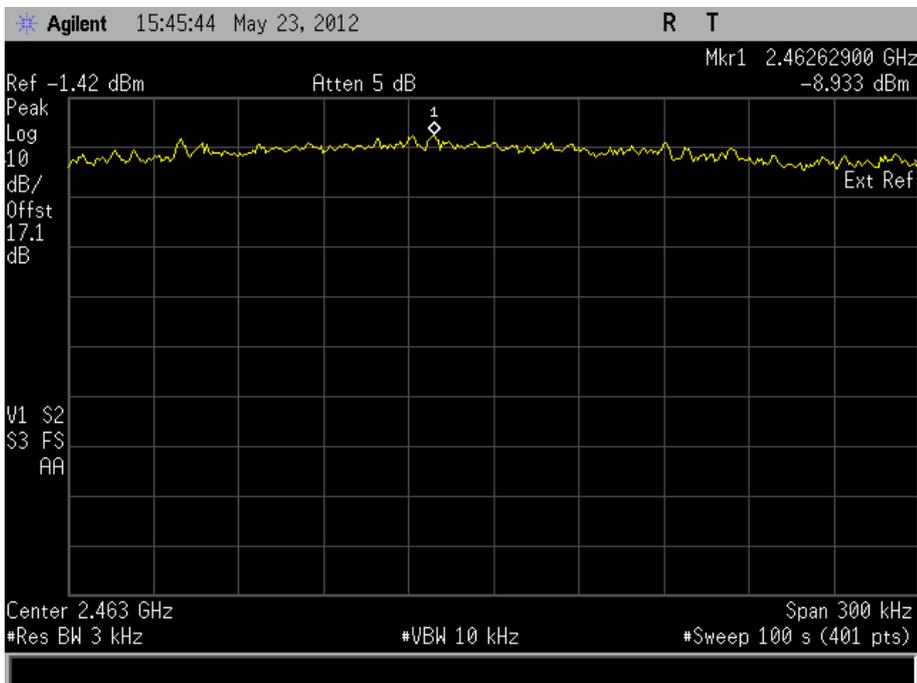


Product Service

12 Mbps



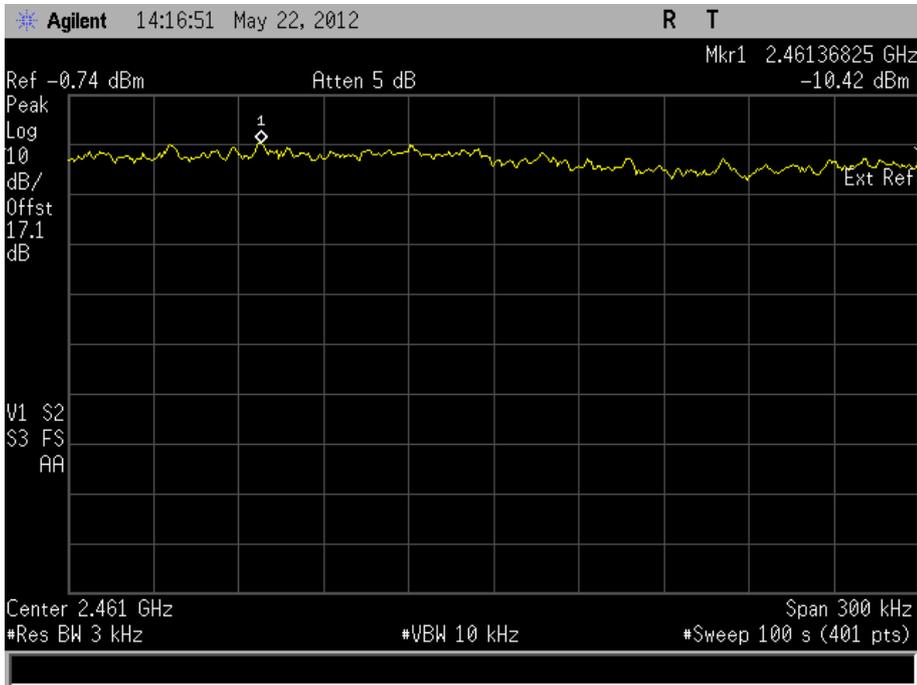
18 Mbps



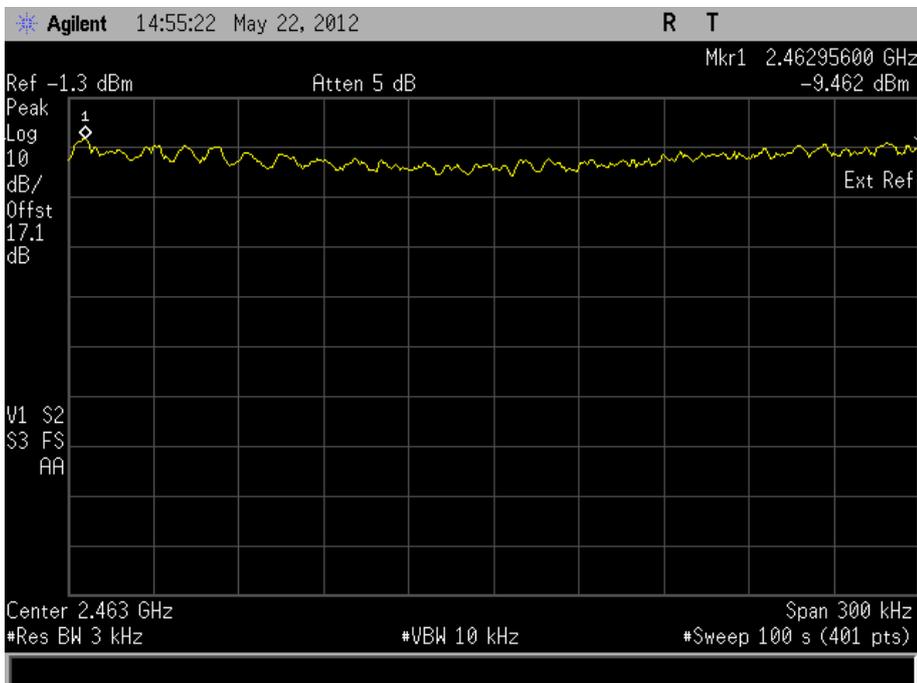


Product Service

24 Mbps



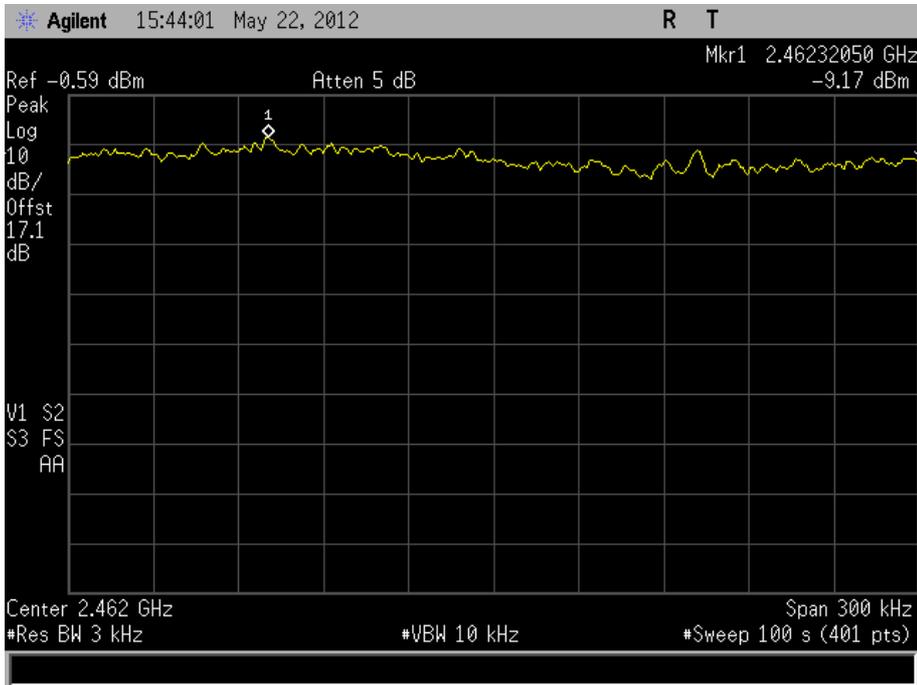
36 Mbps



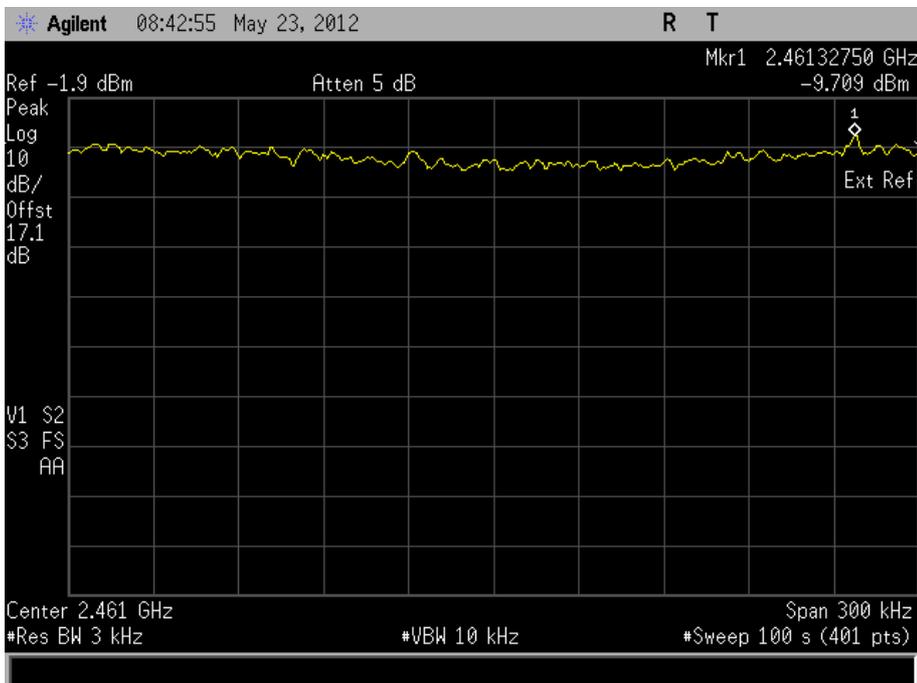


Product Service

48 Mbps



54 Mbps



Limit Clause

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



Product Service

802.11(n)

4.0 V DC Supply

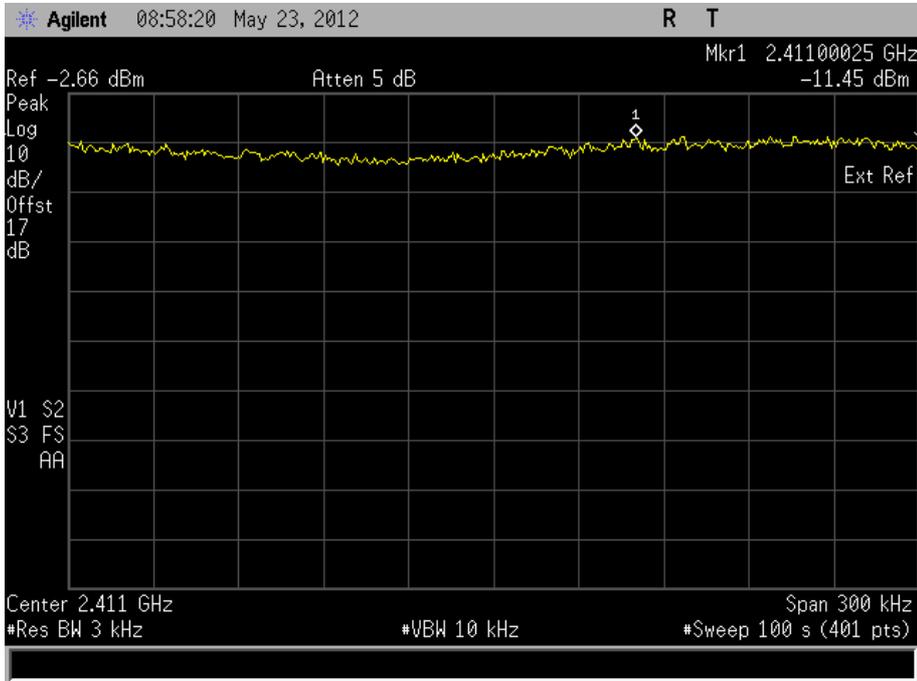
Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	6.5	11.45
	13	-11.33
	19.5	-10.14
	26	-11.20
	39	-10.51
	52	-11.31
	58.5	-11.68
	65	-11.39
2437 MHz	6.5	-11.41
	13	-10.45
	19.5	-12.08
	26	-10.29
	39	-11.66
	52	-11.40
	58.5	-11.33
	65	-11.70
2462 MHz	6.5	-11.78
	13	-11.63
	19.5	-11.59
	26	-11.97
	39	-12.68
	52	-11.47
	58.5	-11.75
	65	-11.86



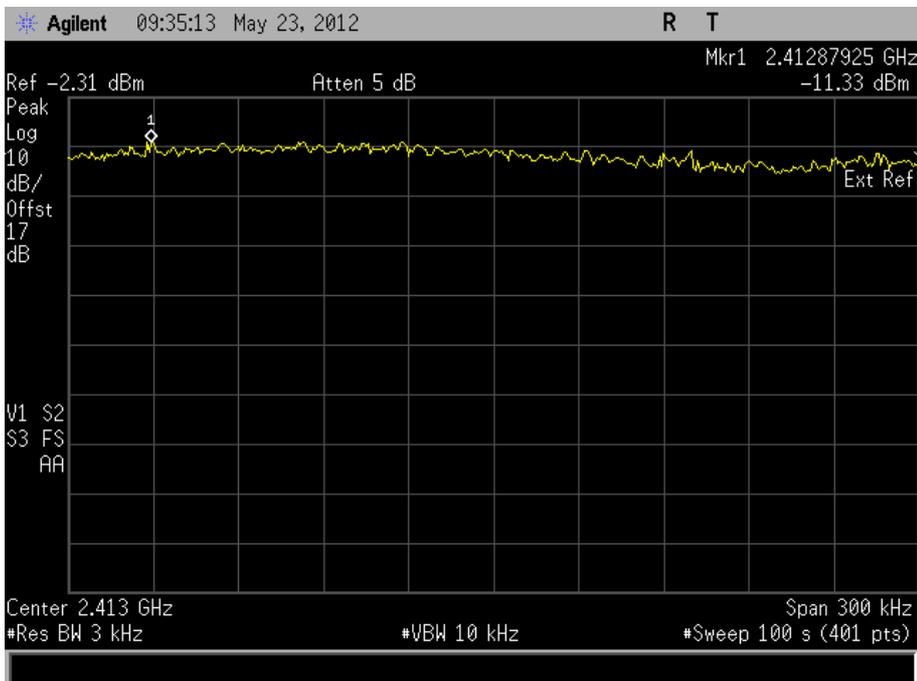
Product Service

2412 MHz

6.5 Mbps



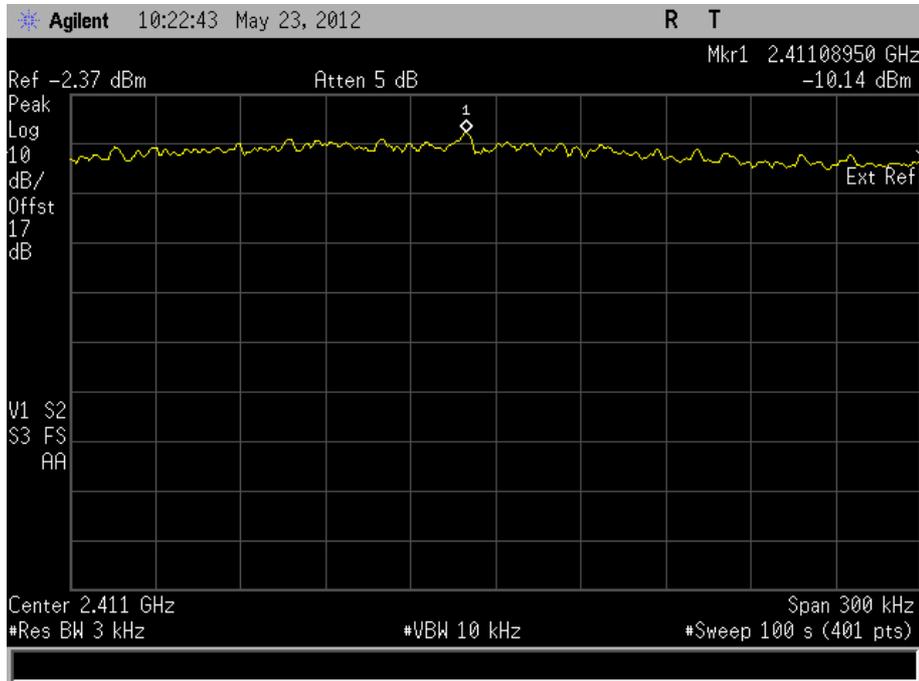
13 Mbps



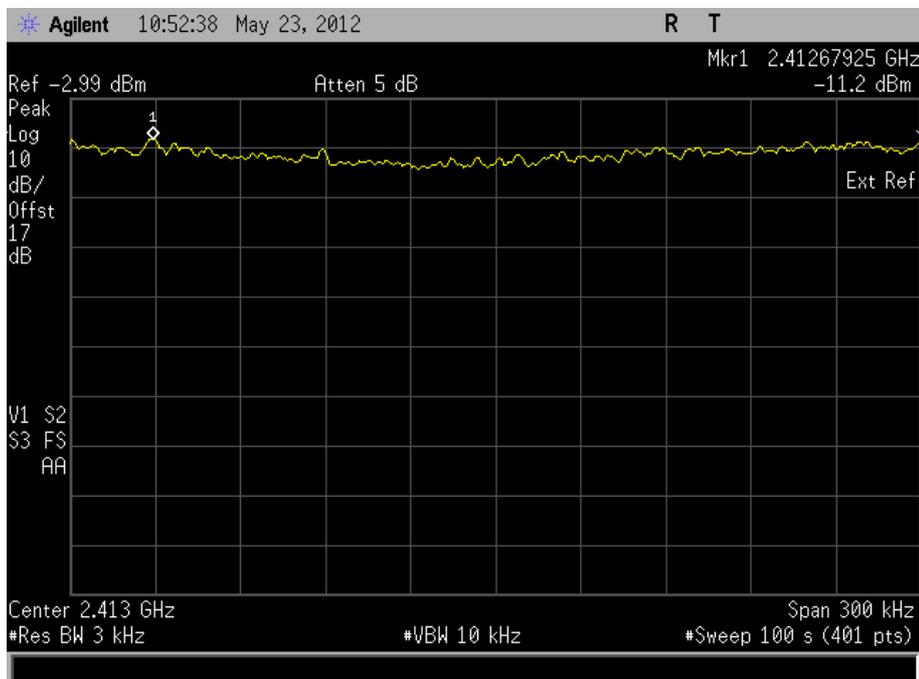


Product Service

19.5 Mbps



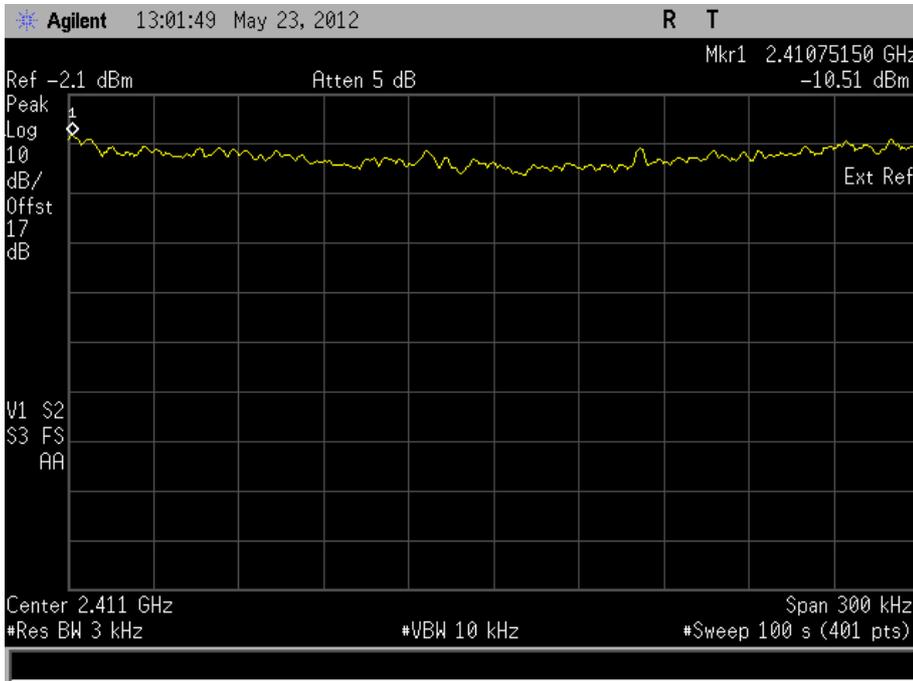
26 Mbps



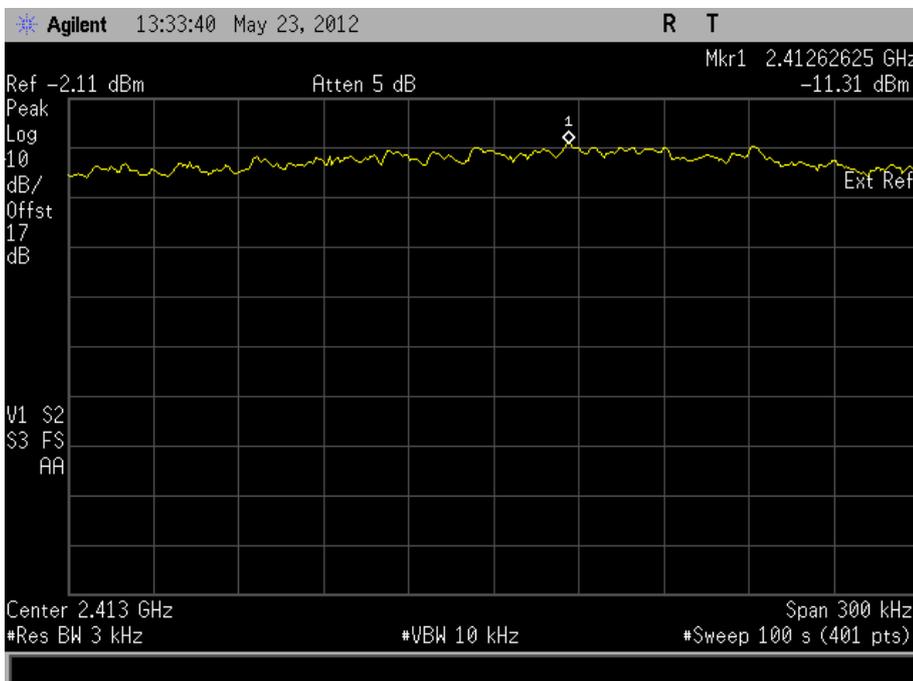


Product Service

39 Mbps



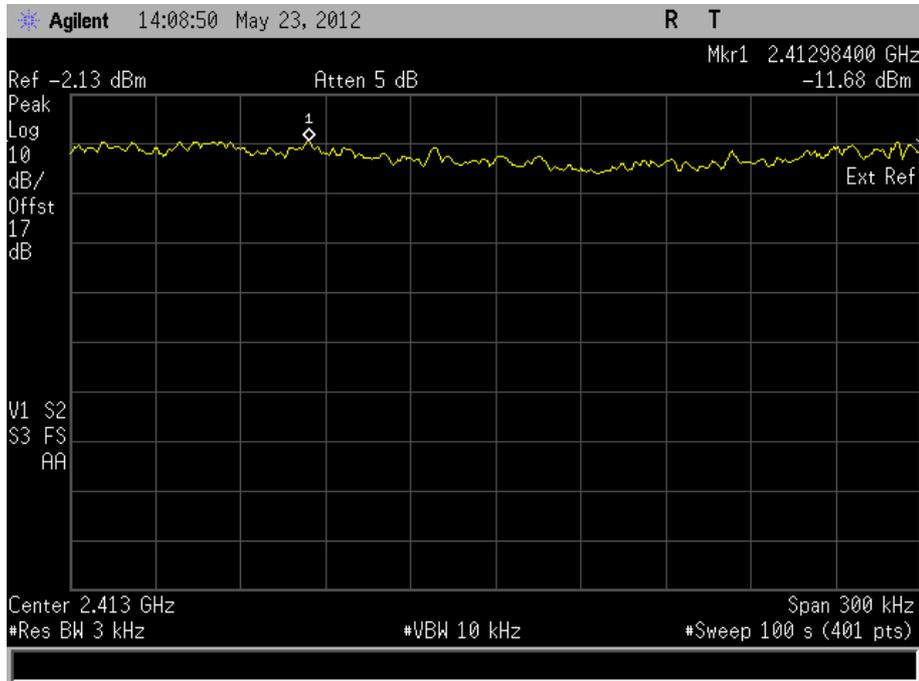
52 Mbps



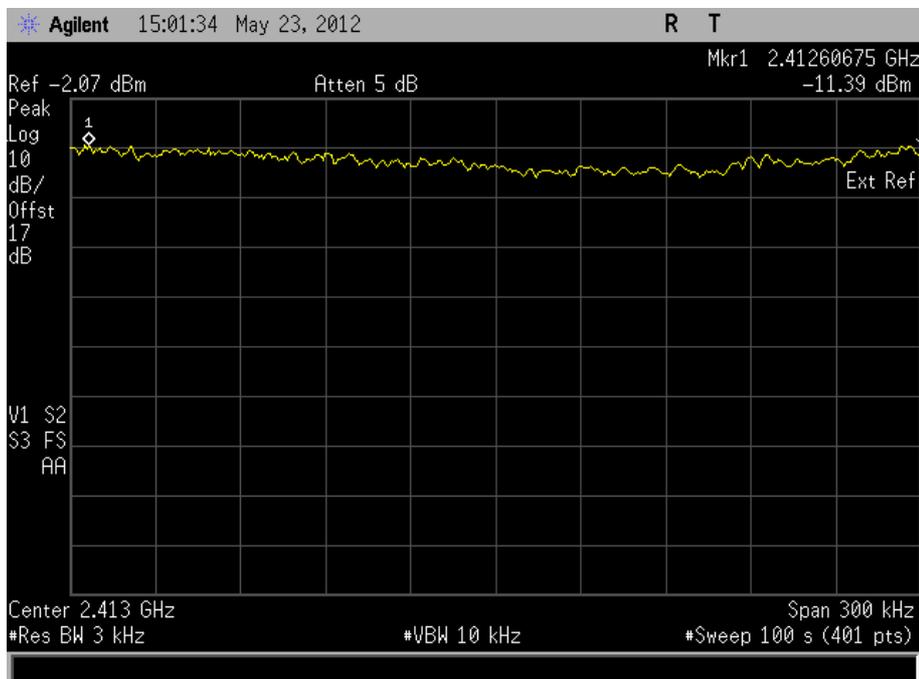


Product Service

58.5 Mbps



65 Mbps

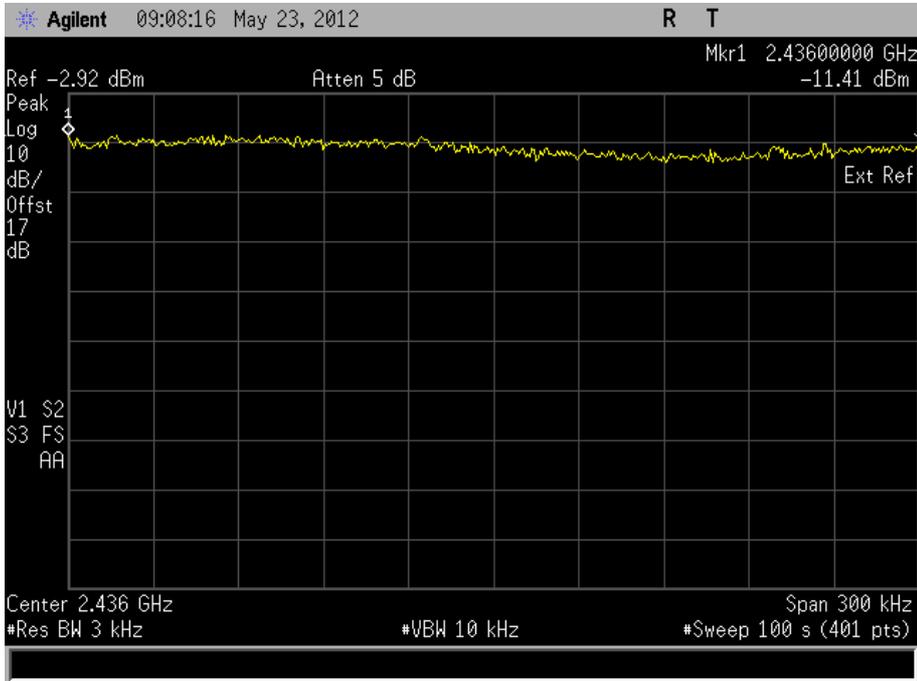




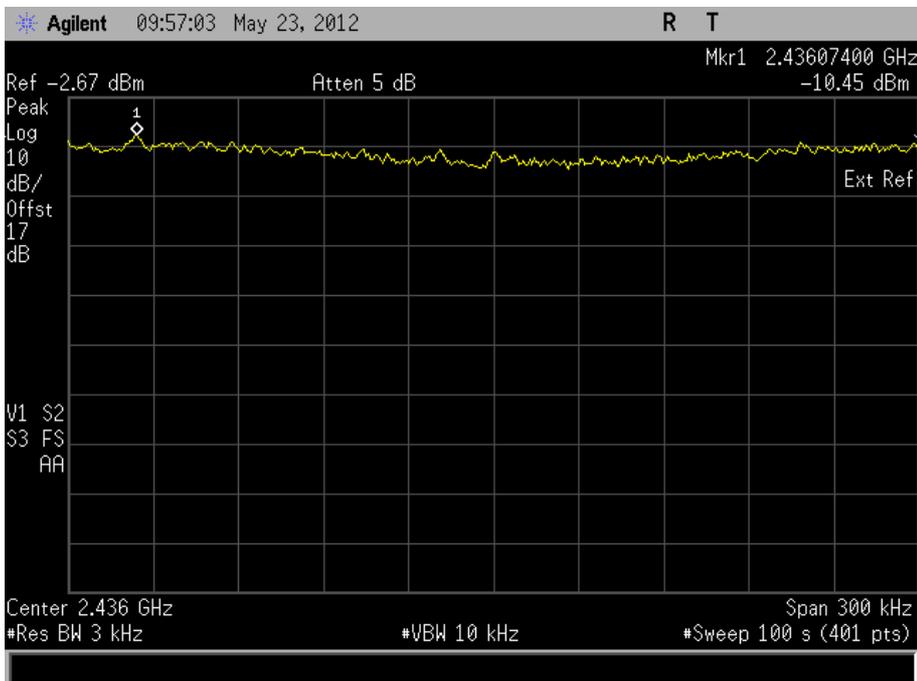
Product Service

2437 MHz

6.5 Mbps



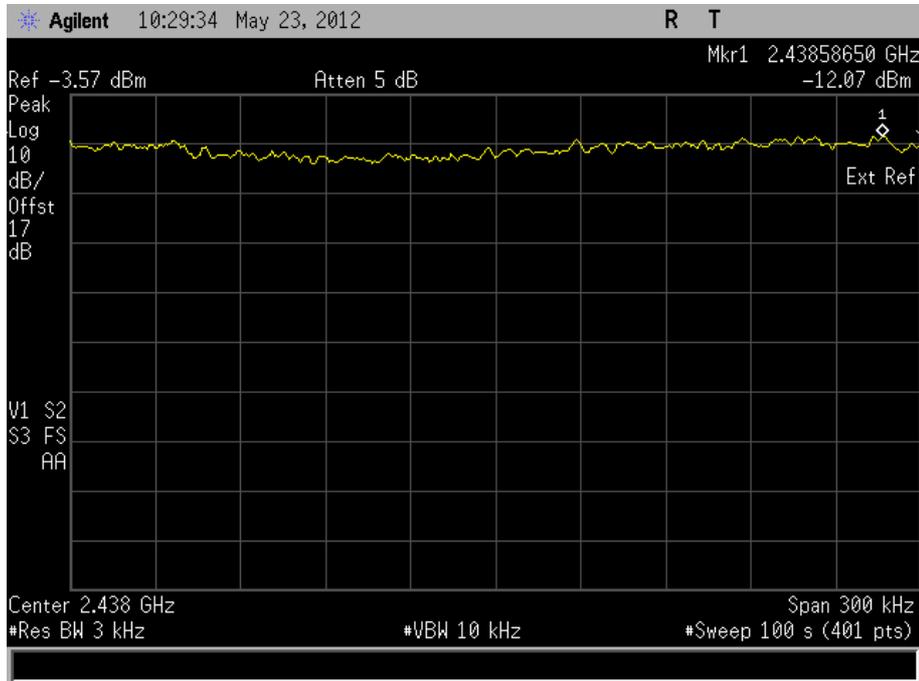
13 Mbps



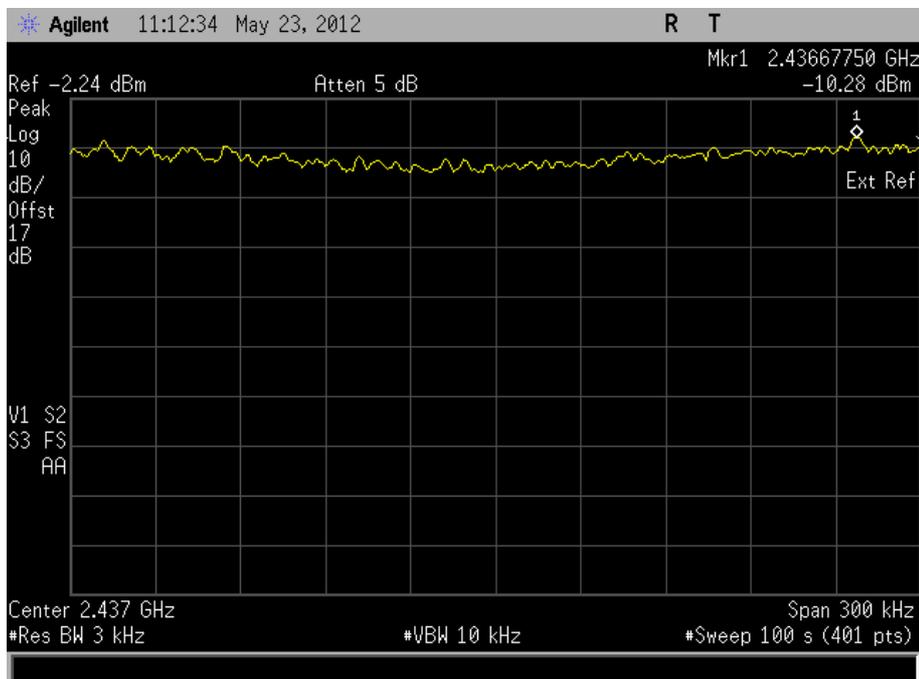


Product Service

19.5 Mbps



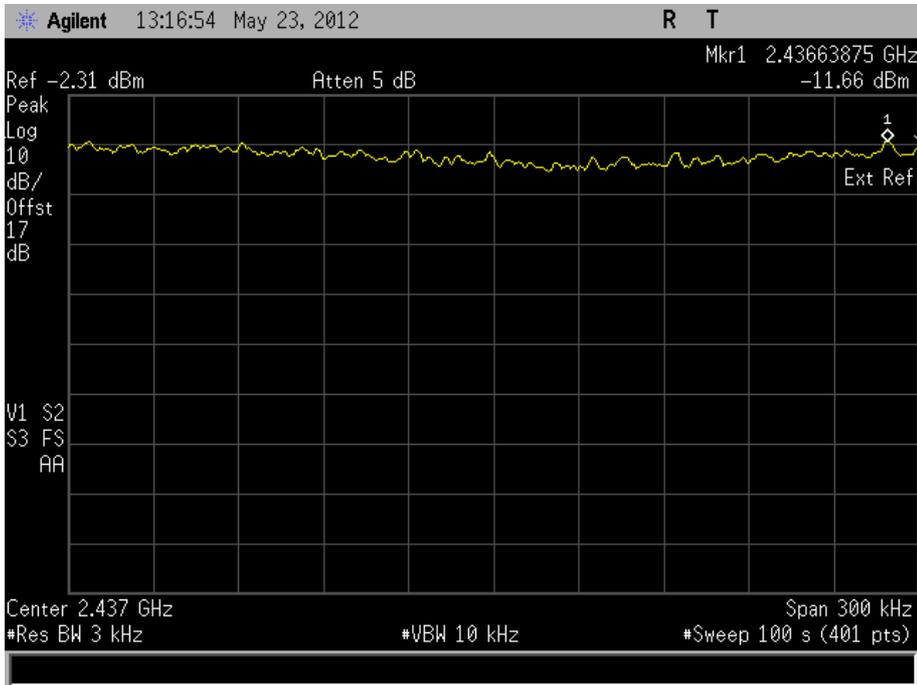
26 Mbps



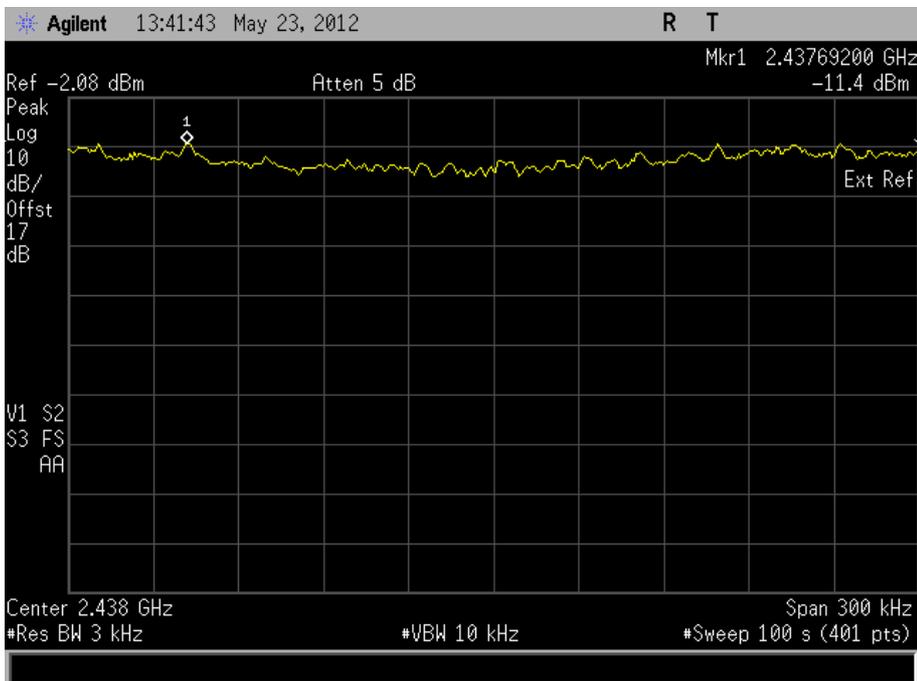


Product Service

39 Mbps



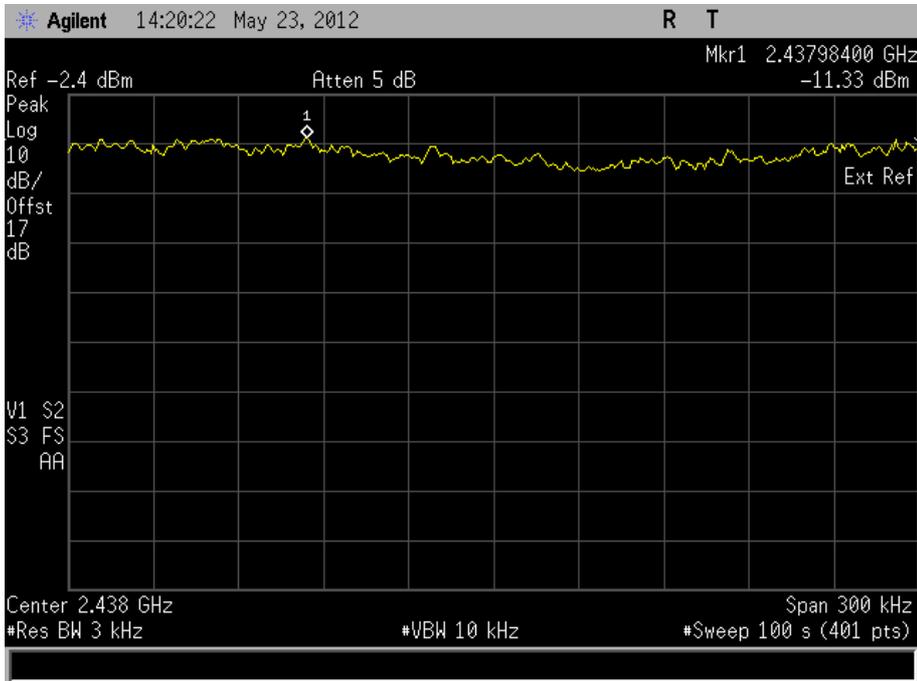
52 Mbps



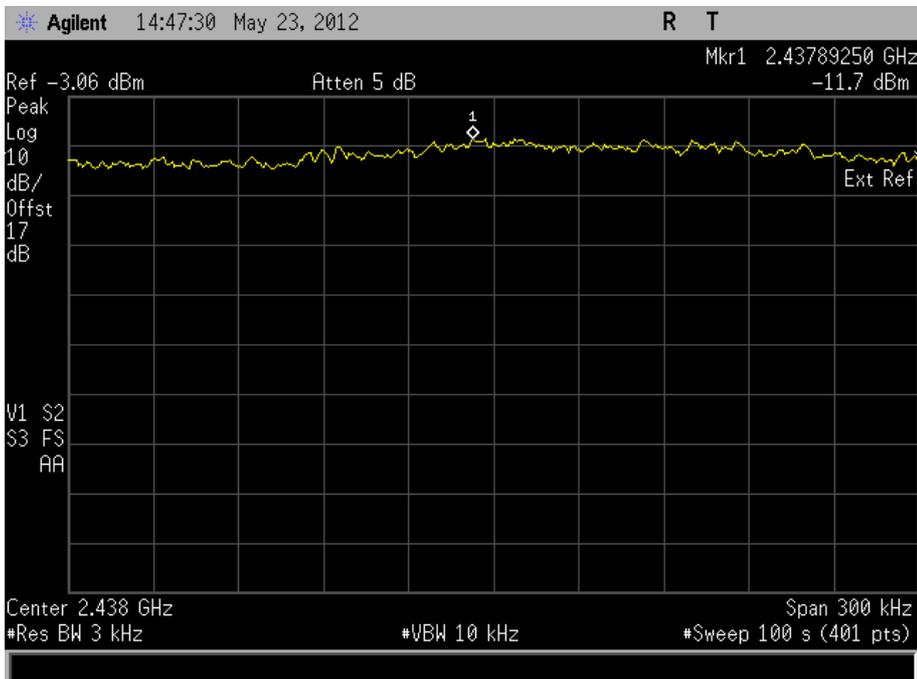


Product Service

58.5 Mbps



65 Mbps

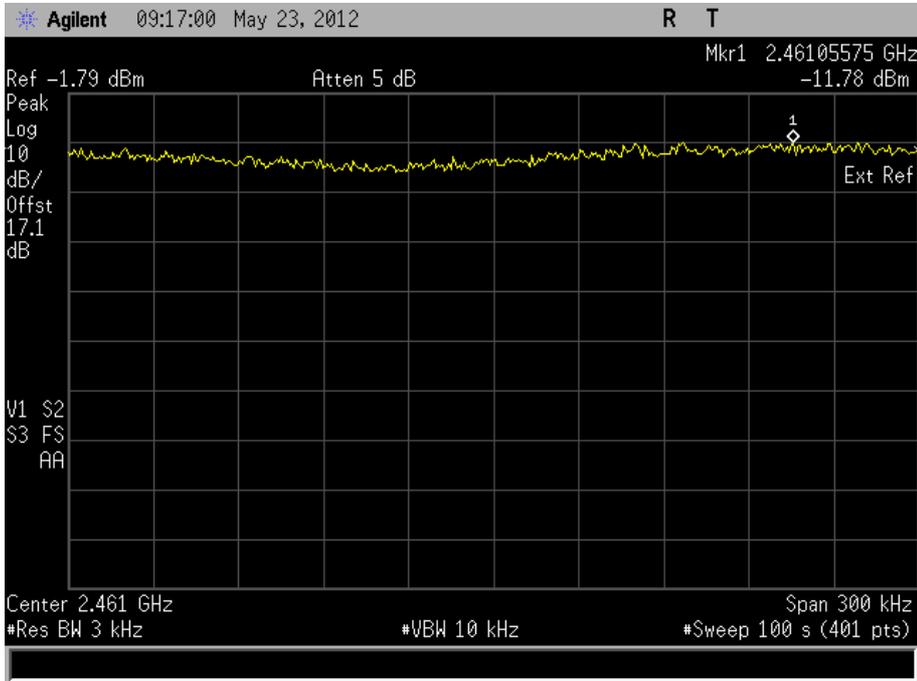




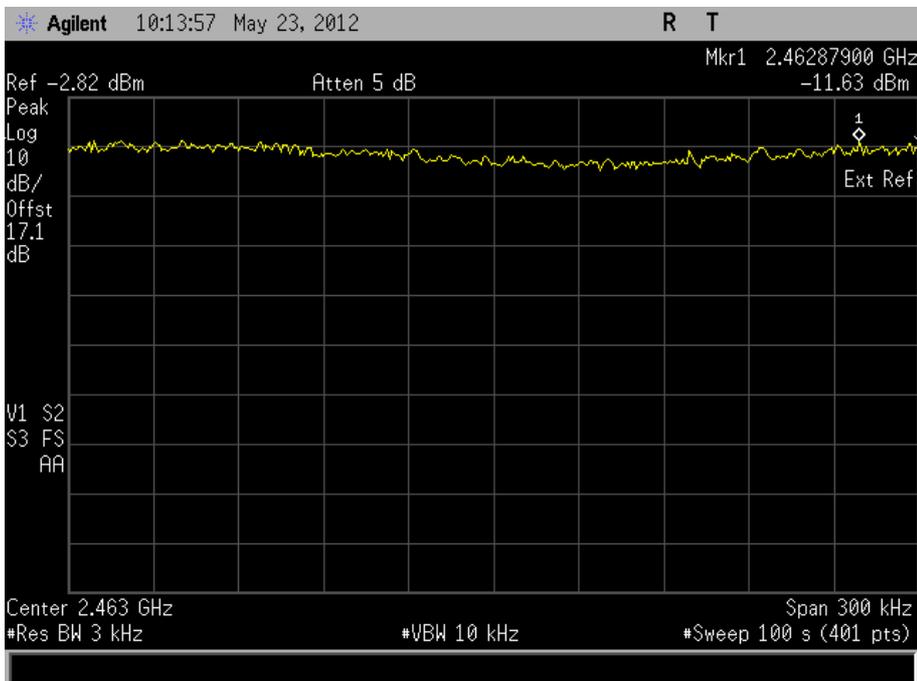
Product Service

2462 MHz

6.5 Mbps



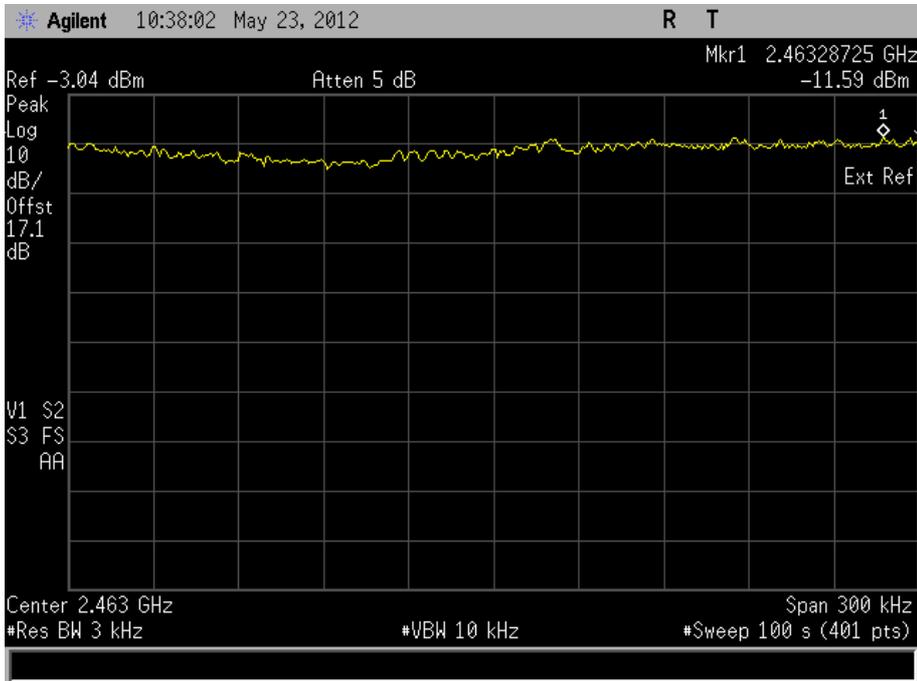
13 Mbps



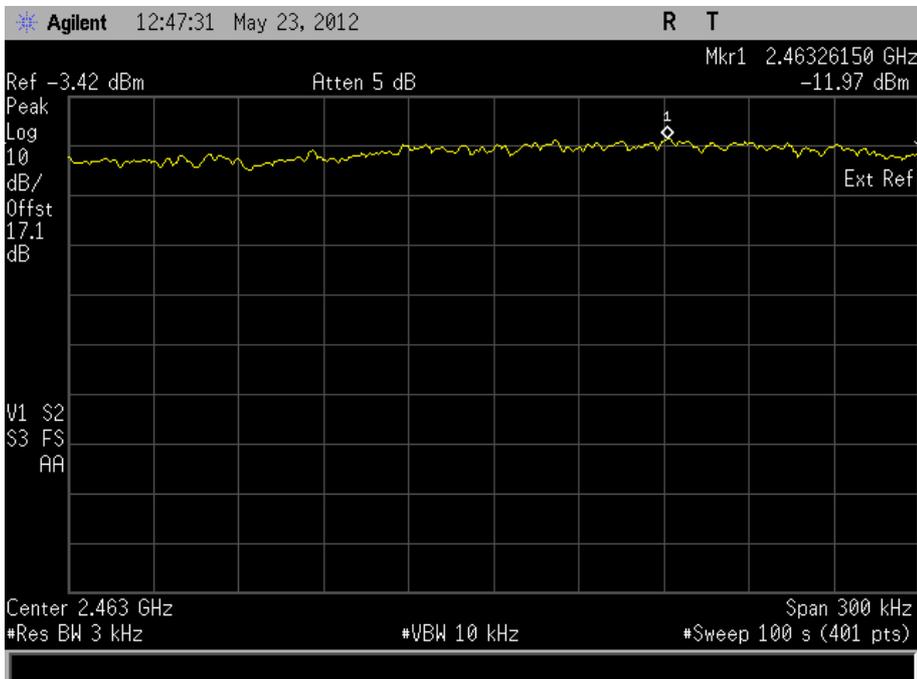


Product Service

19.5 Mbps



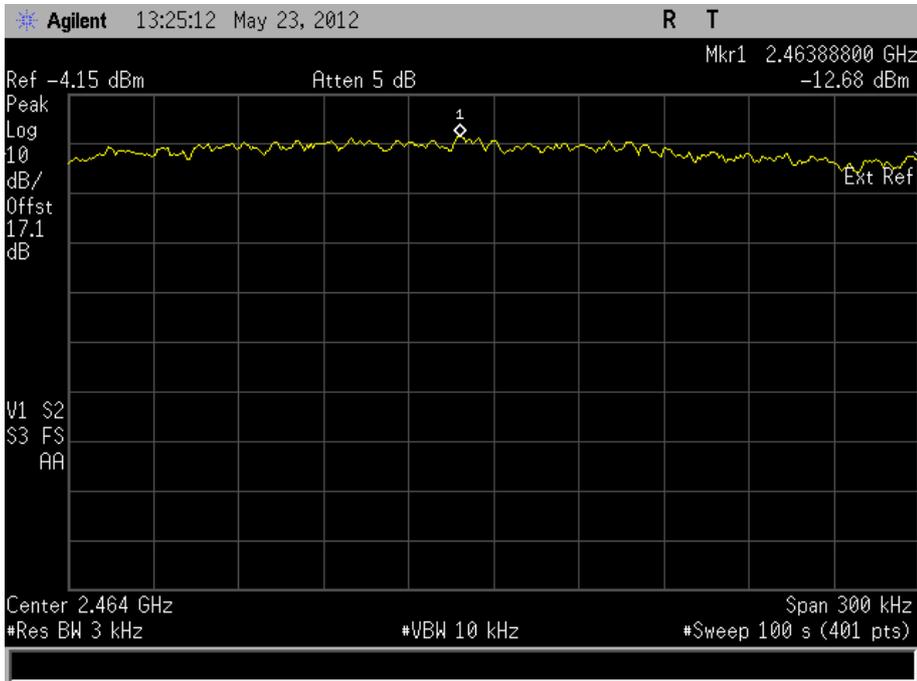
26 Mbps



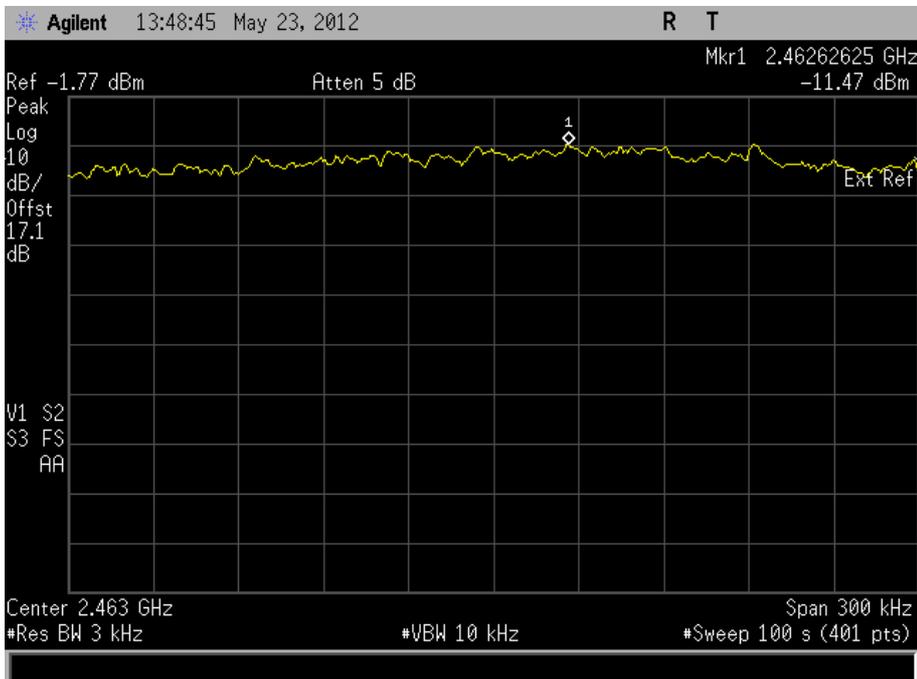


Product Service

39 Mbps



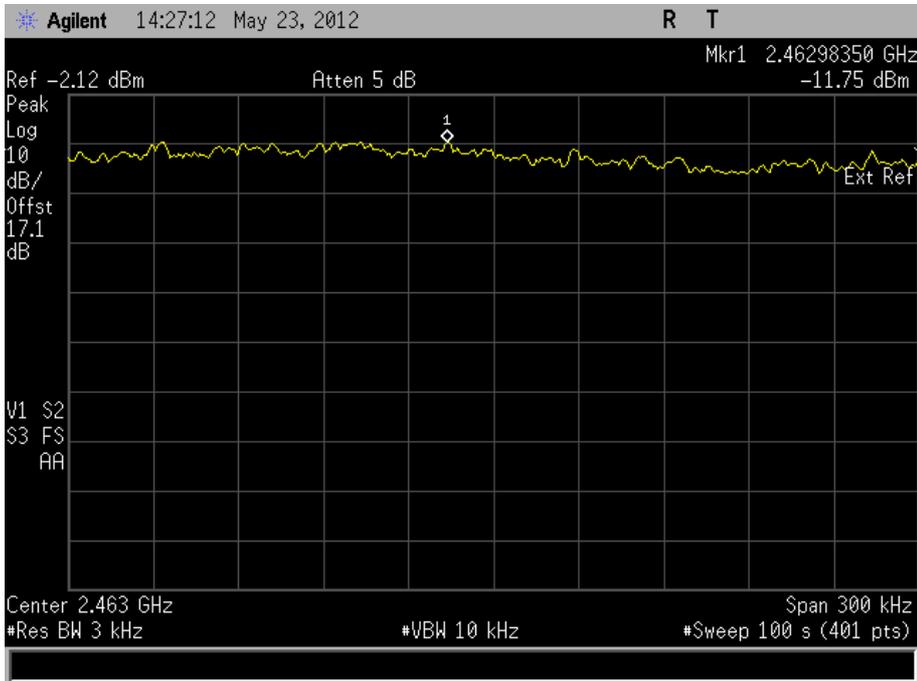
52 Mbps



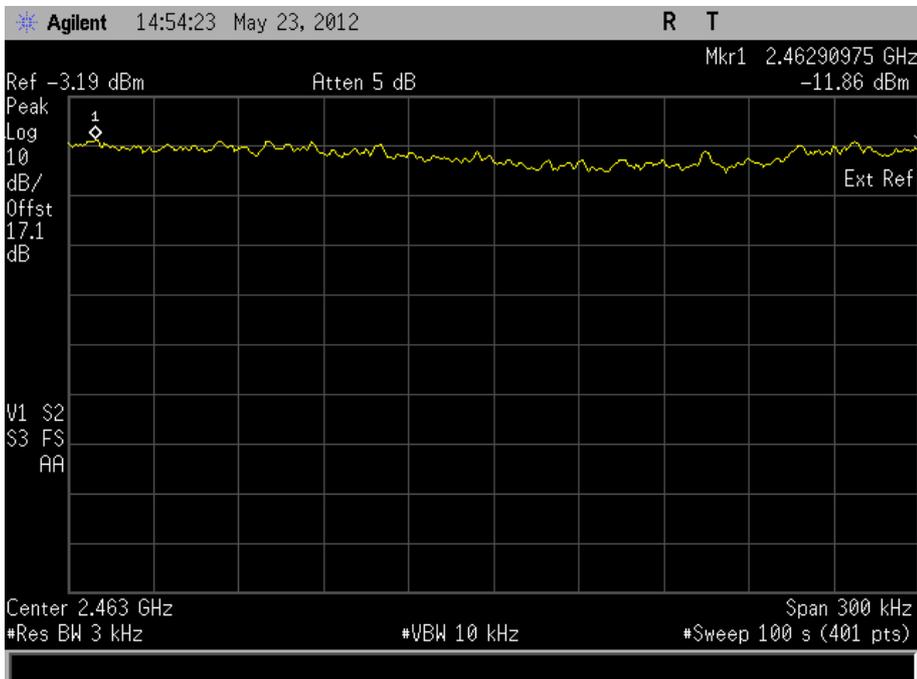


Product Service

58.5 Mbps



65 Mbps



Limit Clause

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



## 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

CDMA SHI15 S/N: IMEI 004401114000165 - Modification State 0

### 2.5.3 Date of Test

20 May 2012, 21 May 2012 & 28 May 2012

### 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

For conducted emissions, the EUT was set to operate at maximum power on the worst case data rate. The test was performed on the bottom, middle and top channels. The test was performed from 9 kHz to 25 GHz. Firstly, the power of each fundamental frequency was measured in 100 kHz bandwidth and this was used to show a -20 dBc limit line on the trace. The measurement path loss in each relevant frequency band was measured and entered as a reference level offset.

For radiated emissions, the test method described above was also used. However, the measurement was performed from 30 MHz to 25 GHz and the path loss is incorporated as a transducer factor and entered into the spectrum analyser.

The band edge measurements were performed in accordance with ANSI C63.10, Clause 6.9.3. 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	20.0 - 24.8°C
Relative Humidity	39.0 - 46.5%



Product Service

**2.5.7 Test Results**

802.11(b)

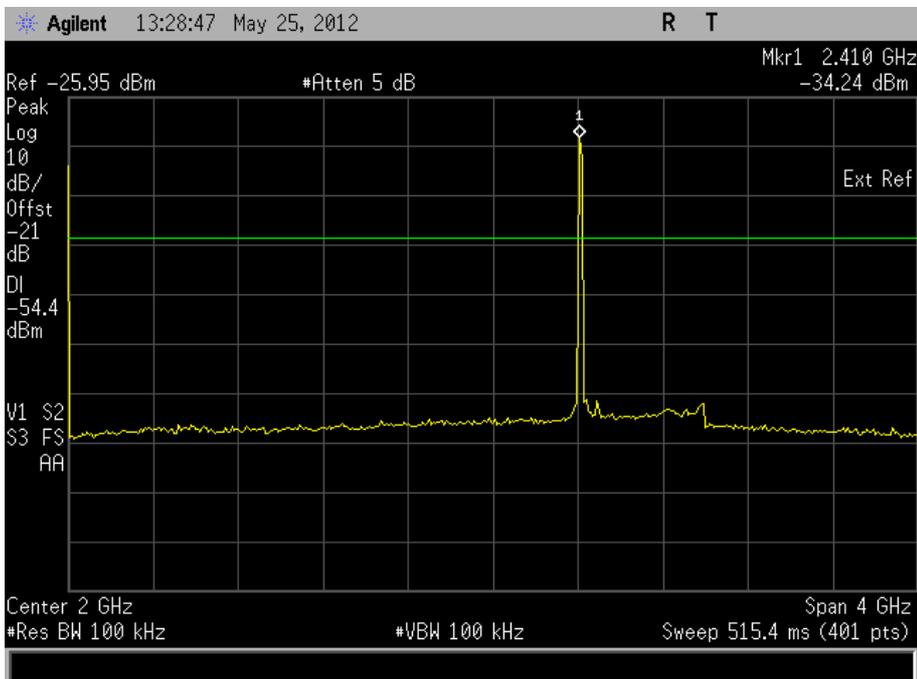
4.0 V DC Supply

Spurious Conducted Emissions

1 Mbps

2412 MHz

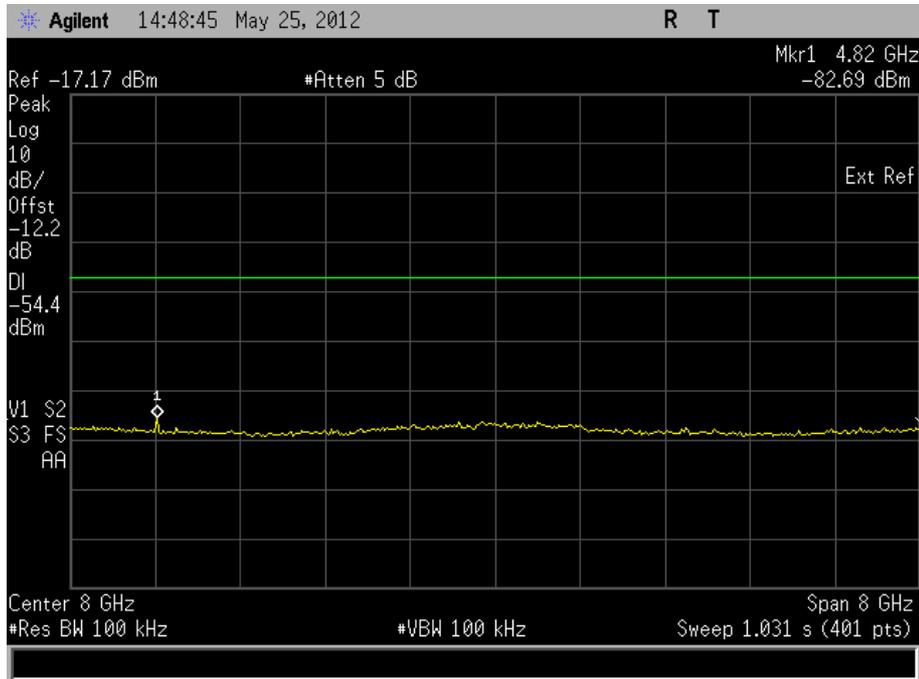
9 kHz to 4 GHz



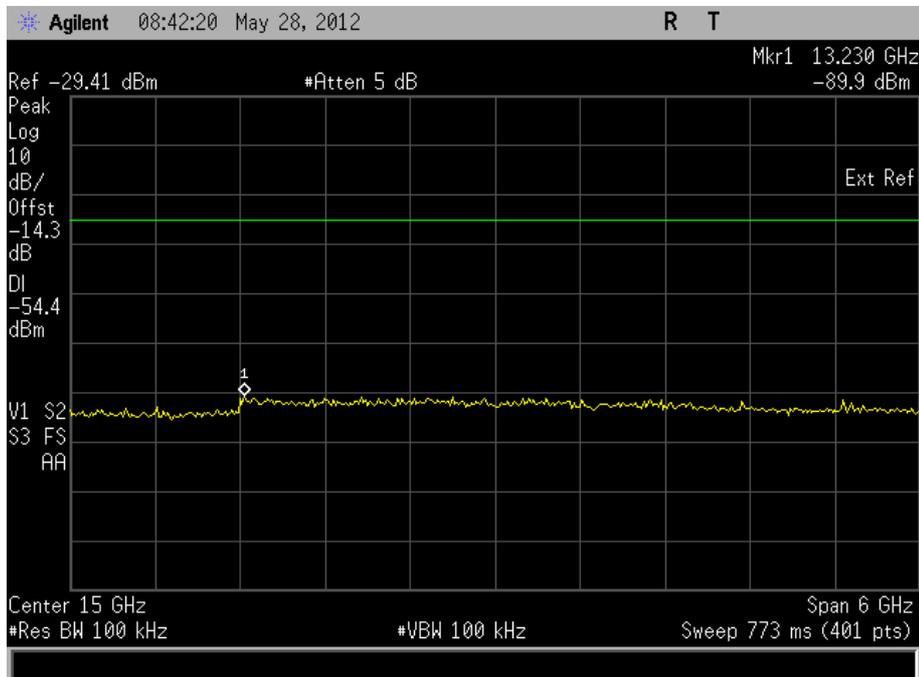


Product Service

4 GHz to 12 GHz



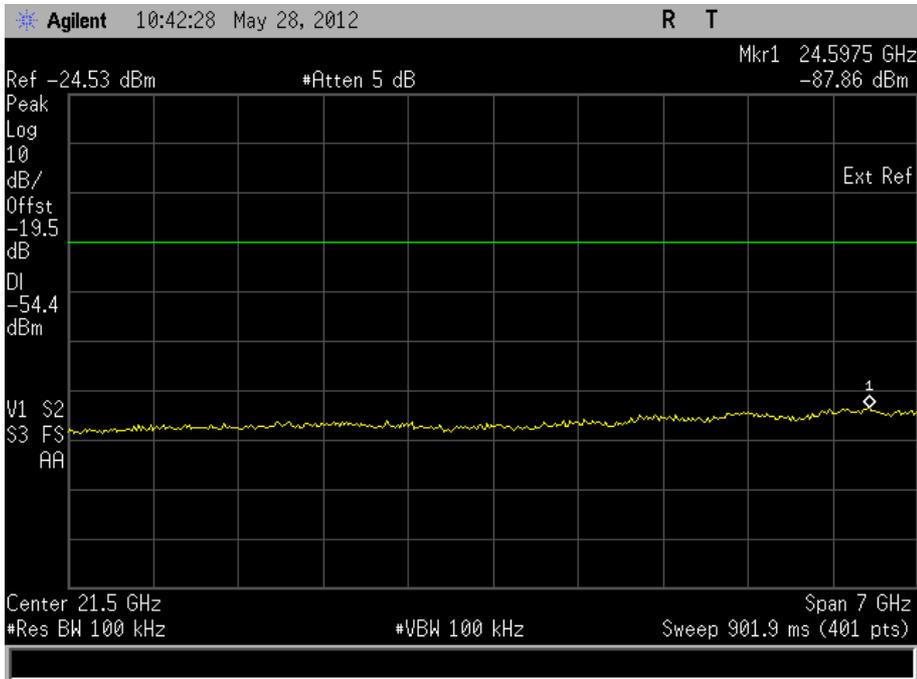
12 GHz to 18 GHz





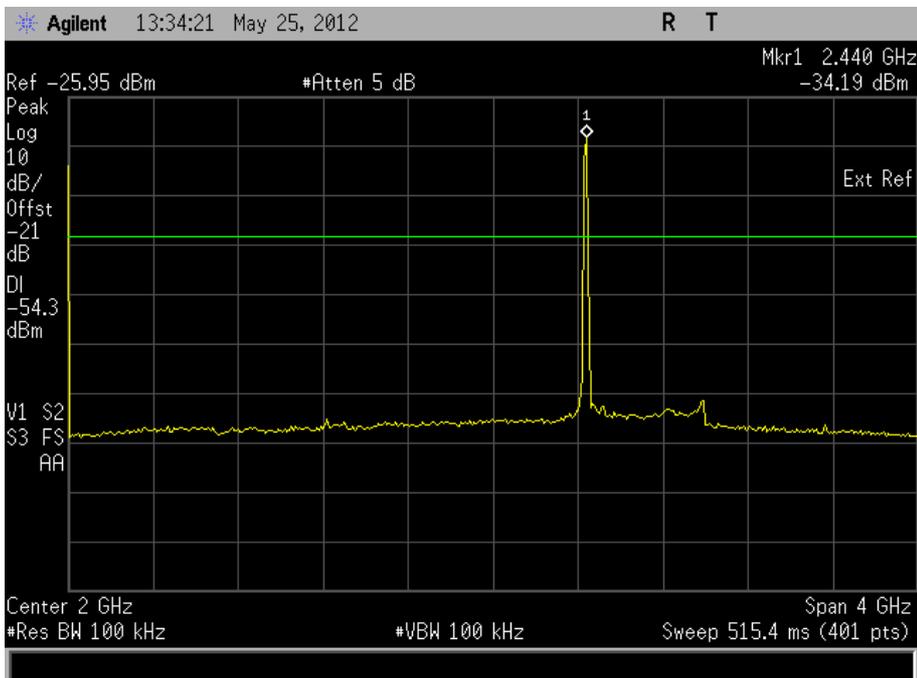
Product Service

18 GHz to 25 GHz



2437 MHz

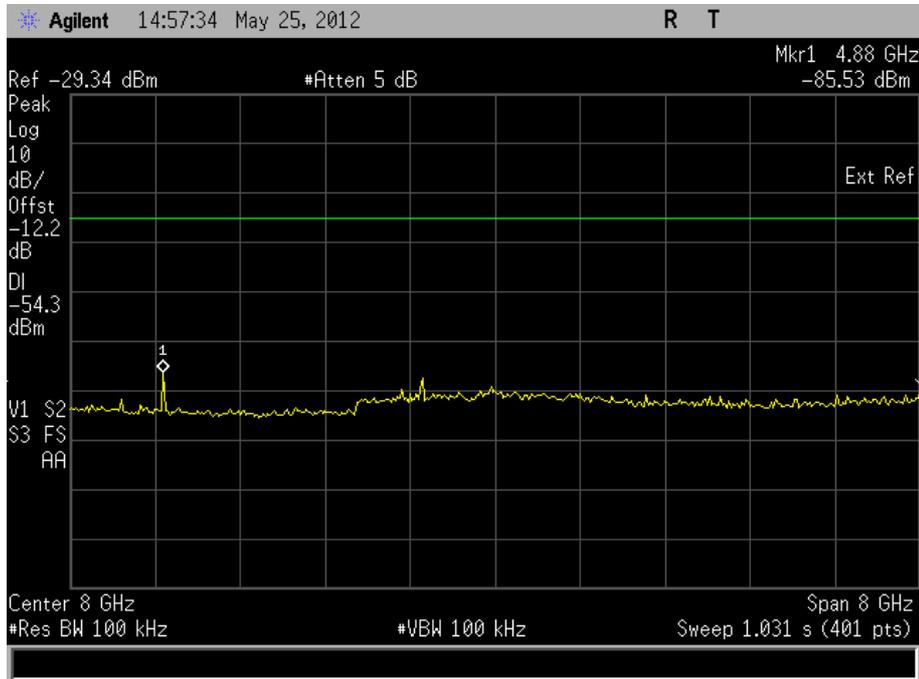
9 kHz to 4 GHz



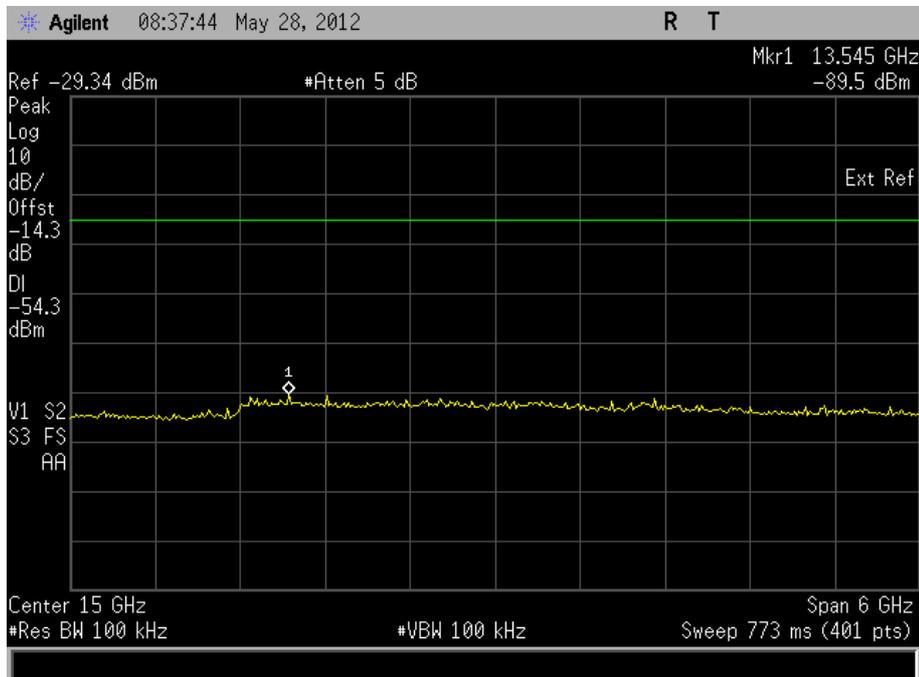


Product Service

4 GHz to 12 GHz



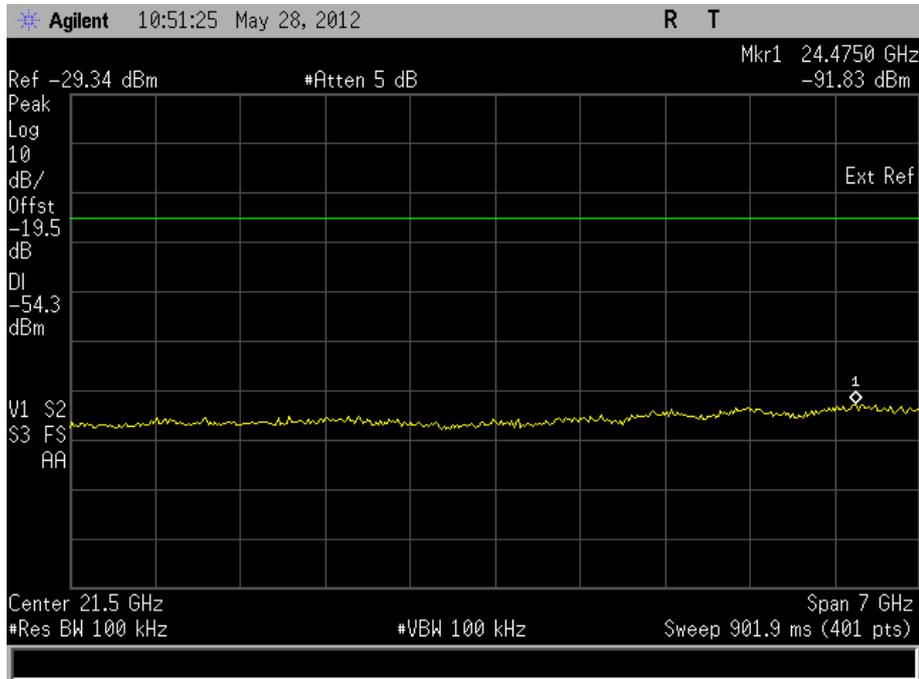
12 GHz to 18 GHz





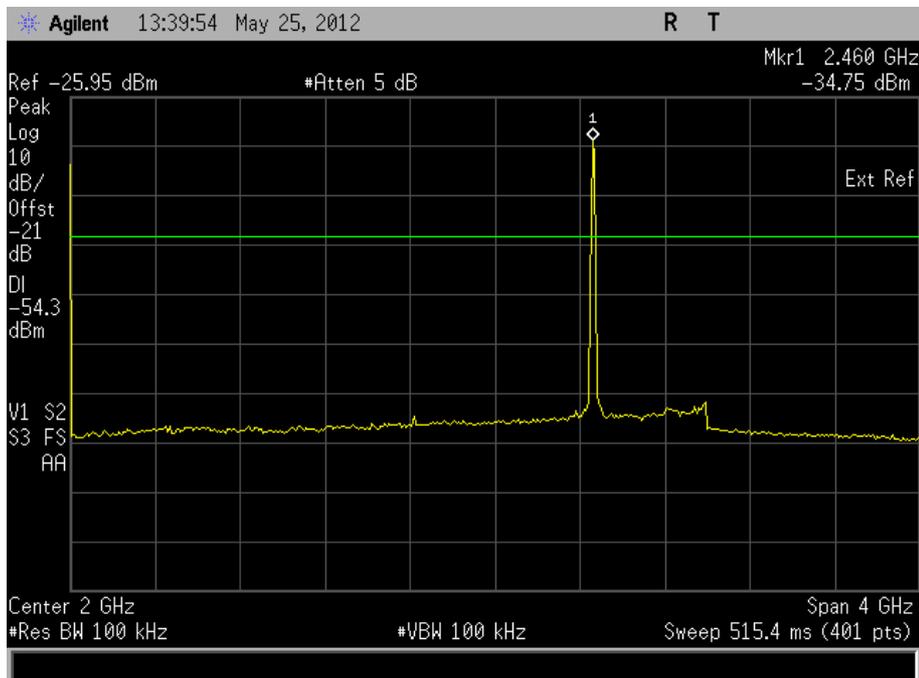
Product Service

18 GHz to 25 GHz



2462 MHz

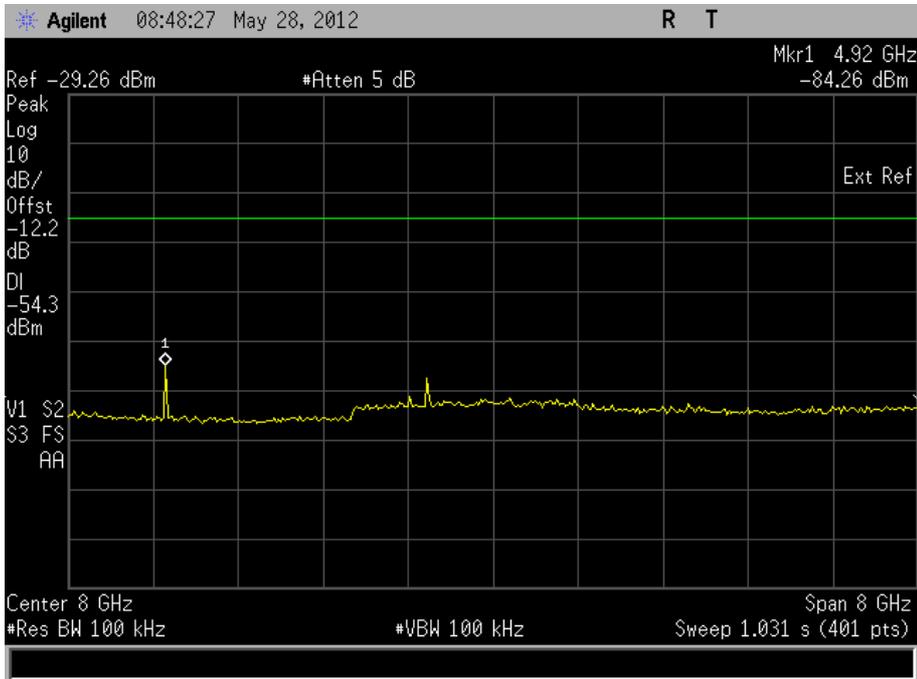
9 kHz to 4 GHz



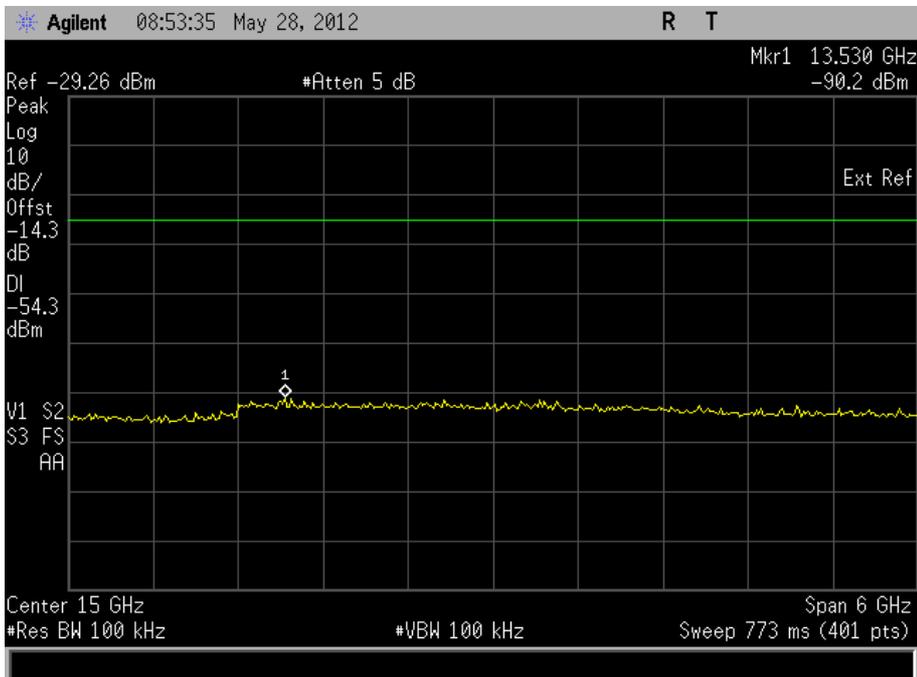


Product Service

4 GHz to 12 GHz



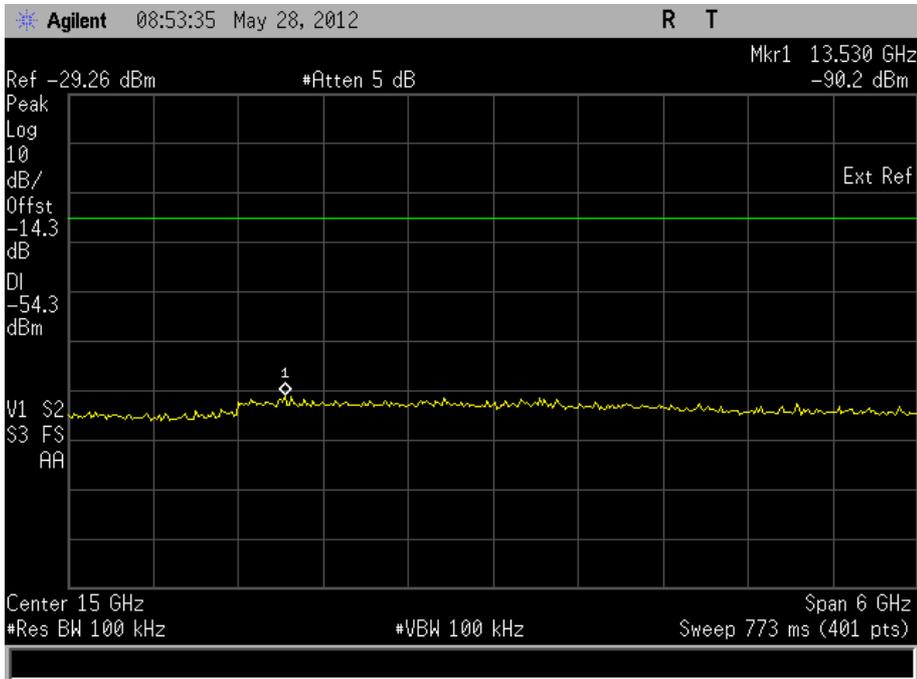
12 GHz to 18 GHz





Product Service

18 GHz to 25 GHz



Limit 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.

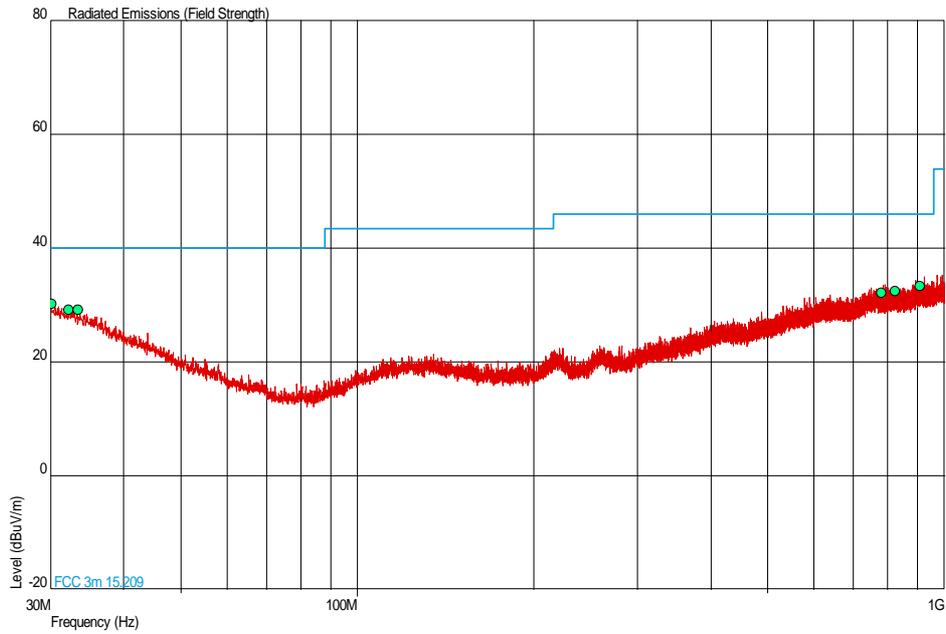
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.



Spurious Radiated Emissions

2412 MHz

30 MHz to 1 GHz



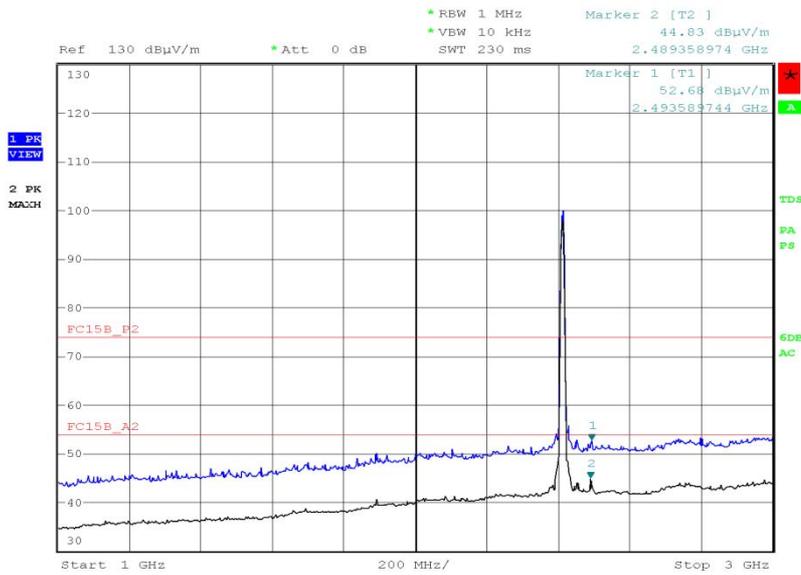
Frequency (MHz)	QP Level (dB $\mu$ V/m)	QP Level ( $\mu$ V/m)	QP Limit (dB $\mu$ V/m)	QP Limit ( $\mu$ V/m)	QP Margin (dB $\mu$ V/m)	QP Margin ( $\mu$ V/m)	Angle (Deg)	Height (m)	Polarity
30.194	30.2	32.4	40.0	100	-9.8	67.6	180	1.00	Horizontal
32.231	29.2	28.8	40.0	100	-10.8	71.2	180	1.00	Vertical
33.444	29.3	29.2	40.0	100	-10.7	70.8	90	1.00	Horizontal
780.683	32.1	40.3	46.0	200	-13.9	159.7	180	1.00	Horizontal
825.012	32.5	42.2	46.0	200	-13.5	157.8	0	1.00	Horizontal
909.257	33.4	46.8	46.0	200	-12.6	153.2	180	1.00	Horizontal



1GHz to 25GHz

Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
2.490	Horizontal	125	197	55.44	45.88
2.389	Horizontal	125	197	54.02	44.16
9.648	Vertical	147	073	50.75	44.8

1 GHz to 3 GHz

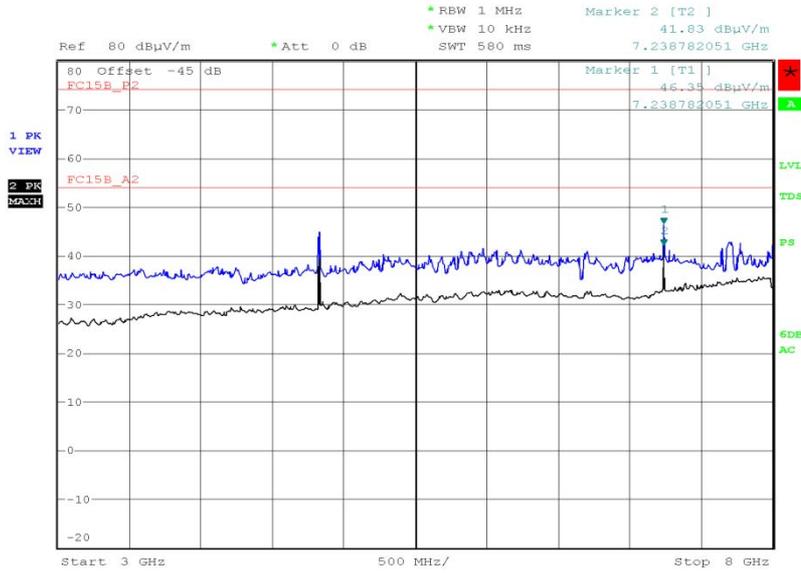


Date: 20.MAY.2012 14:20:44



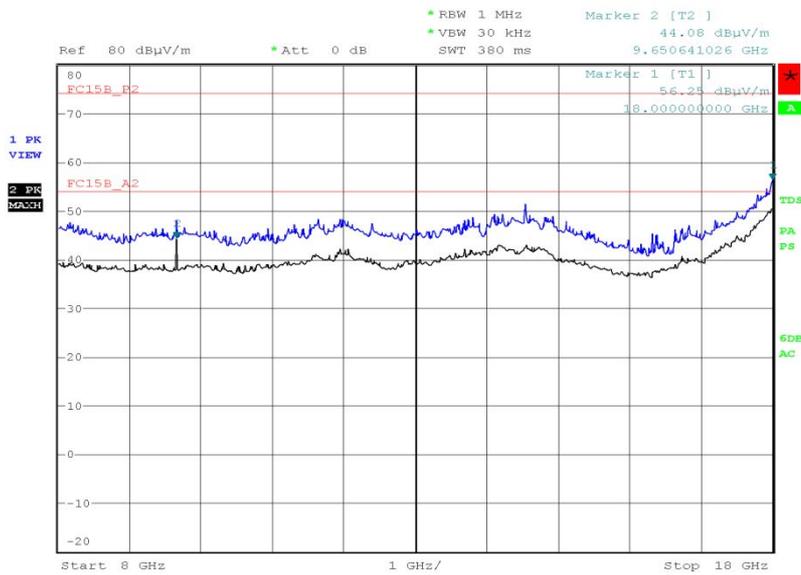
Product Service

3 GHz to 8 GHz



Date: 20.MAY.2012 18:26:35

8 GHz to 18 GHz

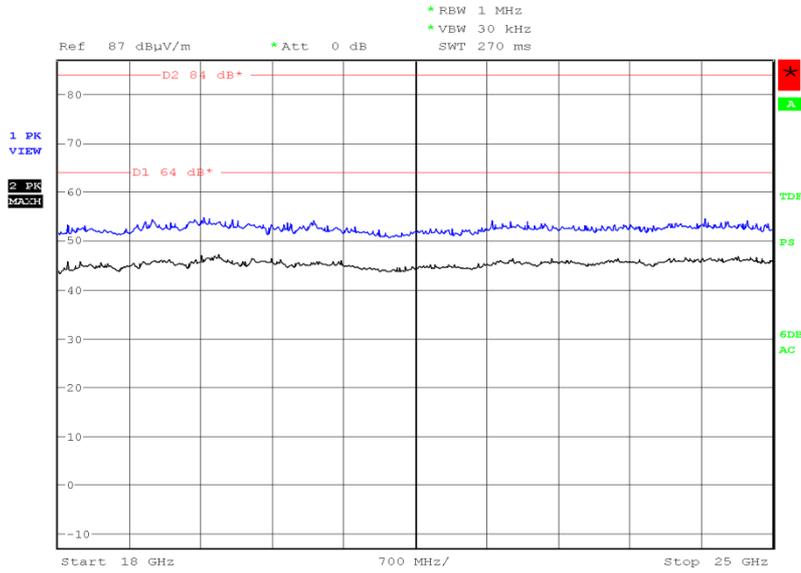


Date: 20.MAY.2012 21:12:20



Product Service

18 GHz to 25 GHz



Date: 21.MAY.2012 21:08:07

Limit

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

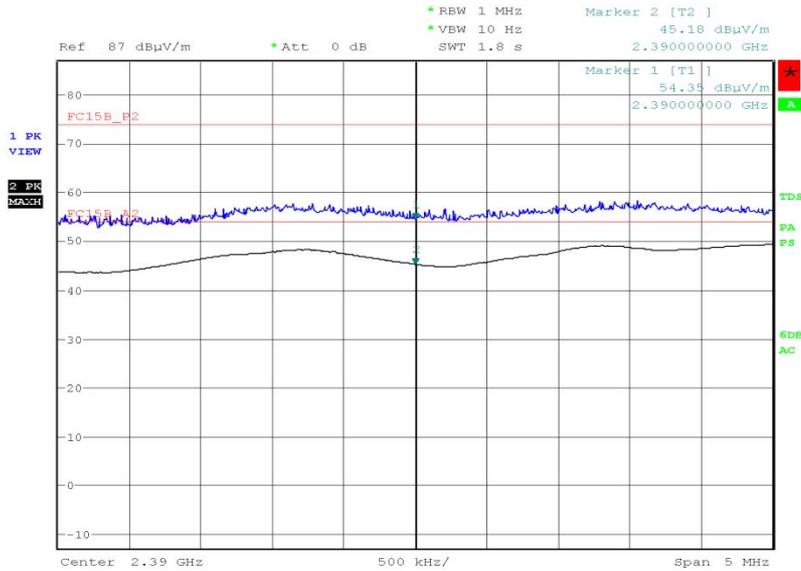


Product Service

Band Edge Emissions

2412 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	54.35	45.18



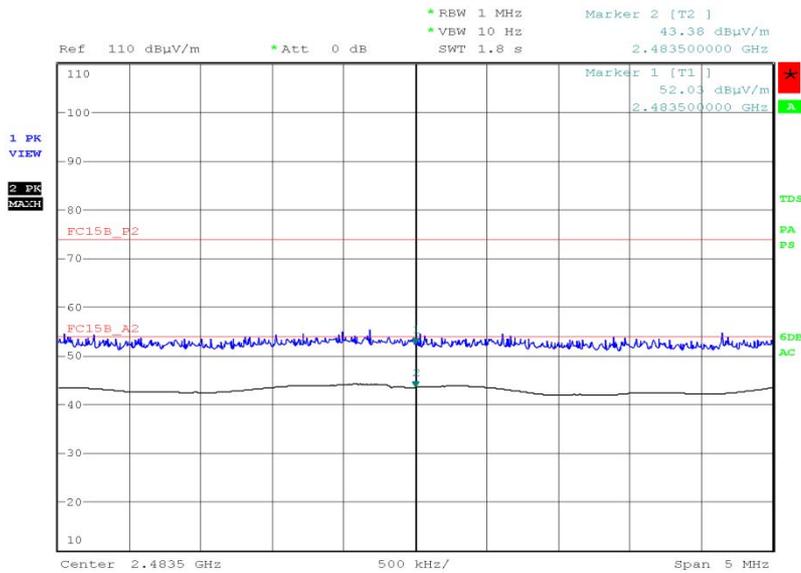
Date: 20.MAY.2012 14:13:52



Product Service

2462 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	52.03	43.38



Date: 20.MAY.2012 15:13:13

Limit

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



Product Service

802.11(g)

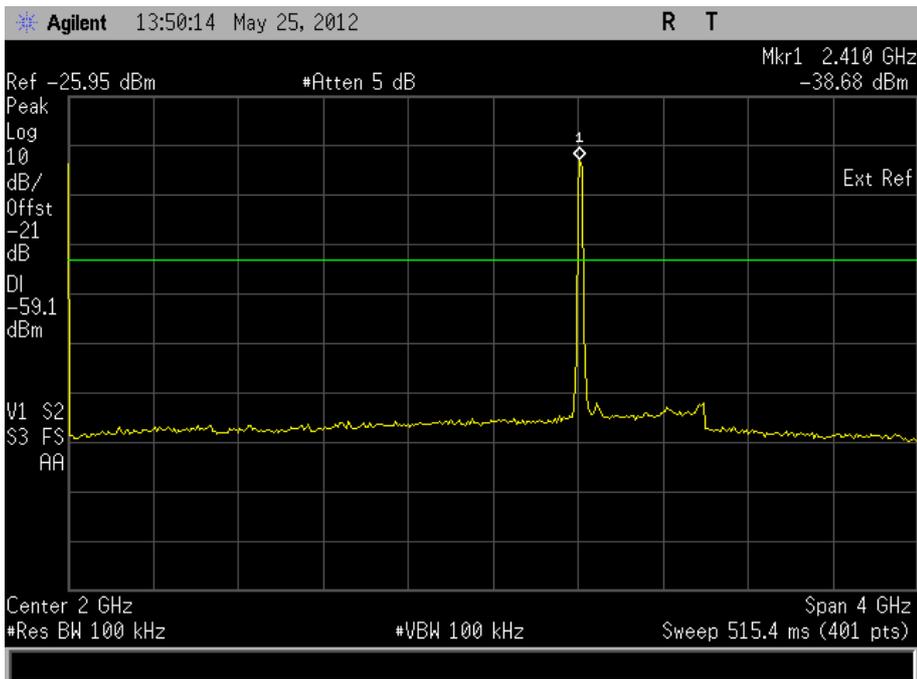
4.0 V DC Supply

Spurious Conducted Emissions

6 Mbps

2412 MHz

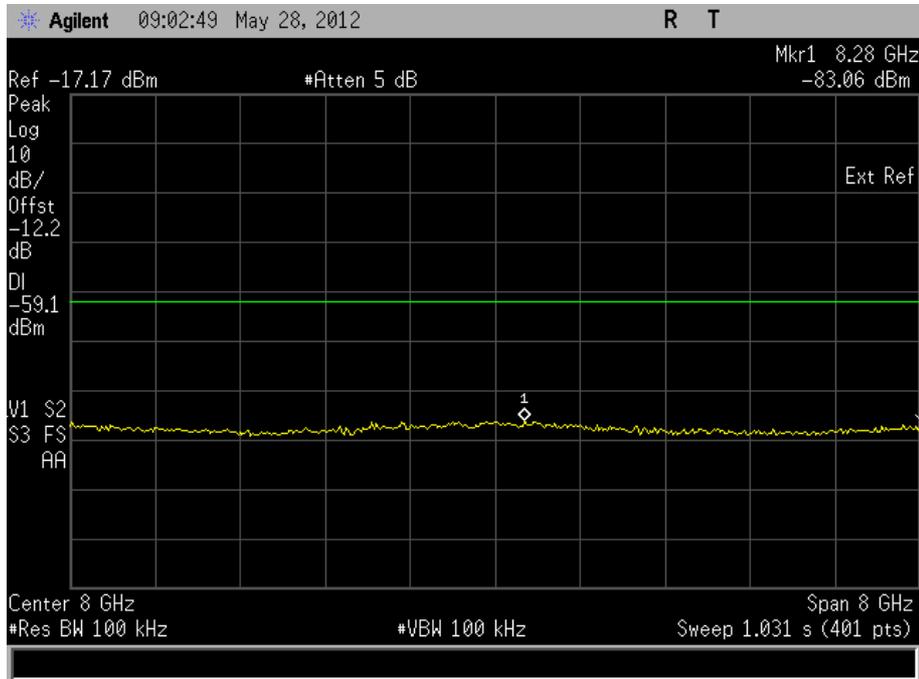
9 kHz to 4 GHz



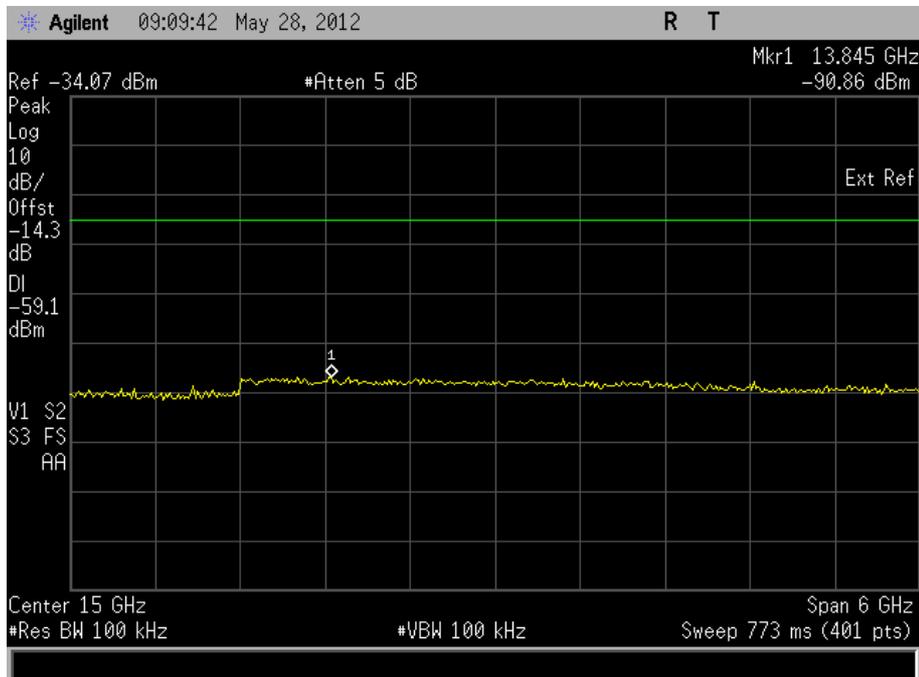


Product Service

4 GHz to 12 GHz



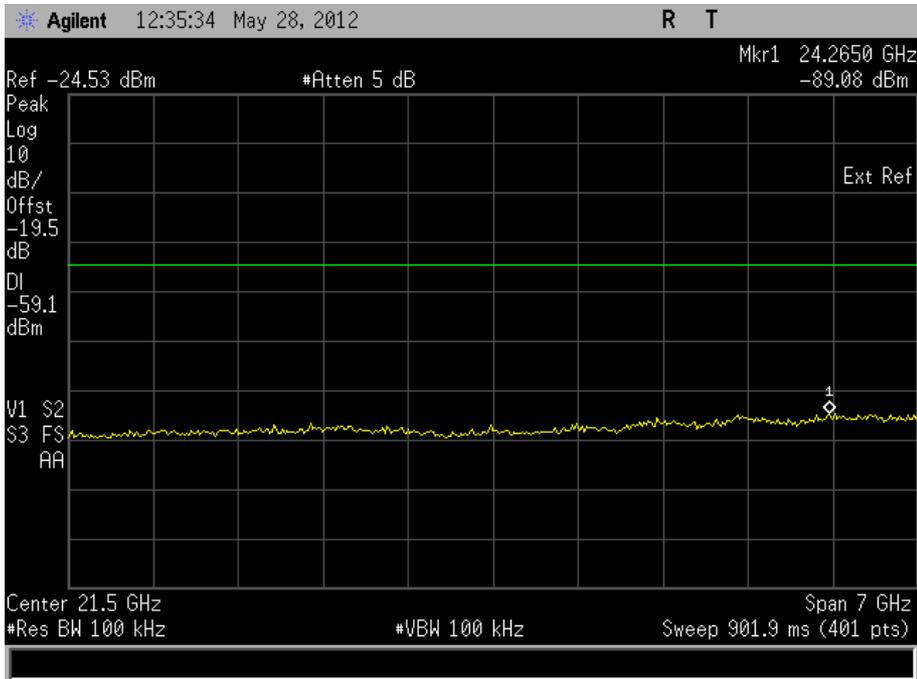
12 GHz to 18 GHz





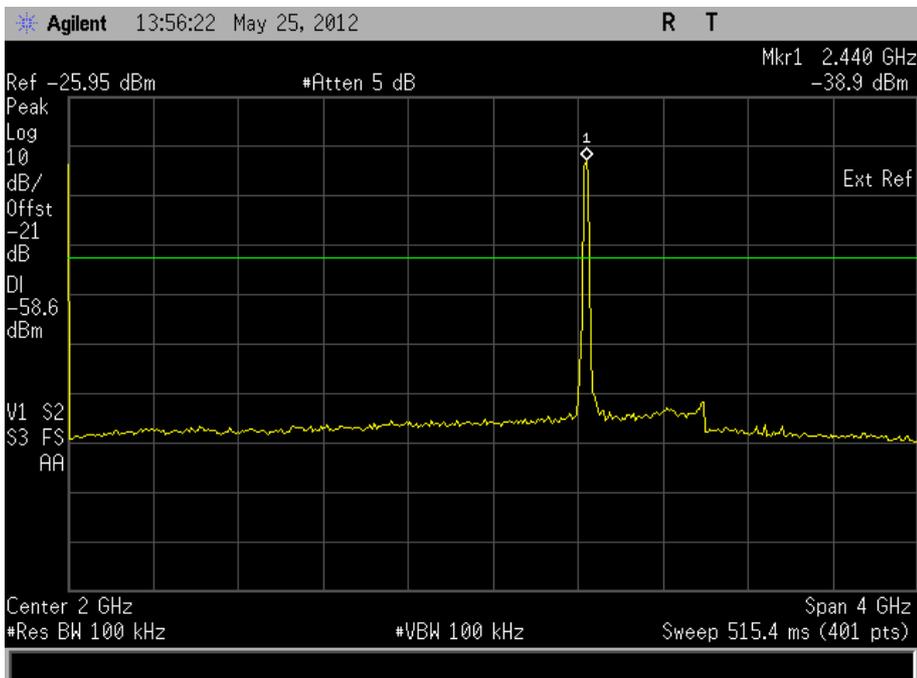
Product Service

18 GHz to 25 GHz



2437 MHz

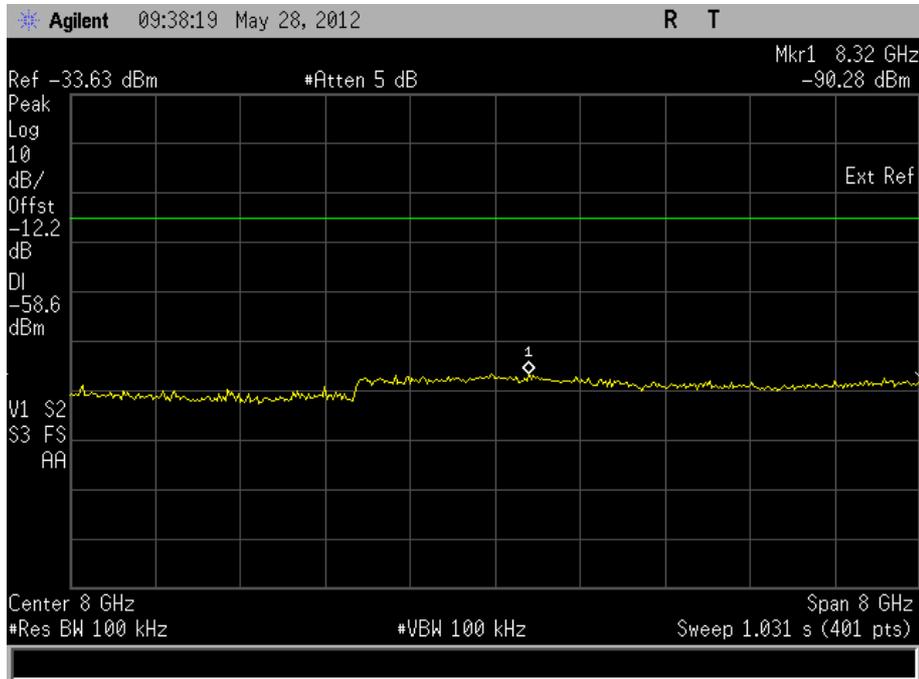
9 kHz to 4 GHz



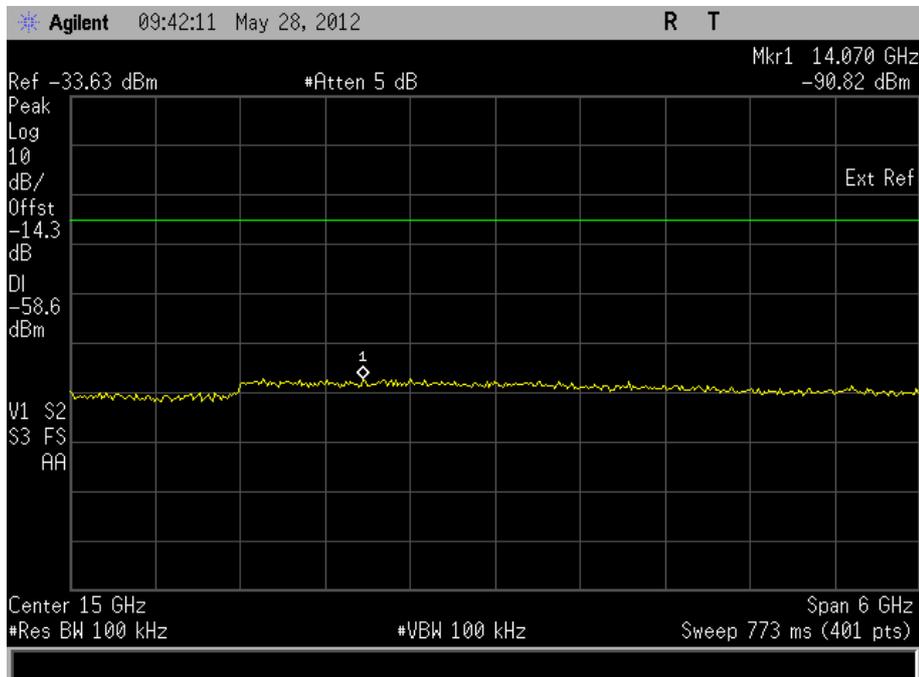


Product Service

4 GHz to 12 GHz



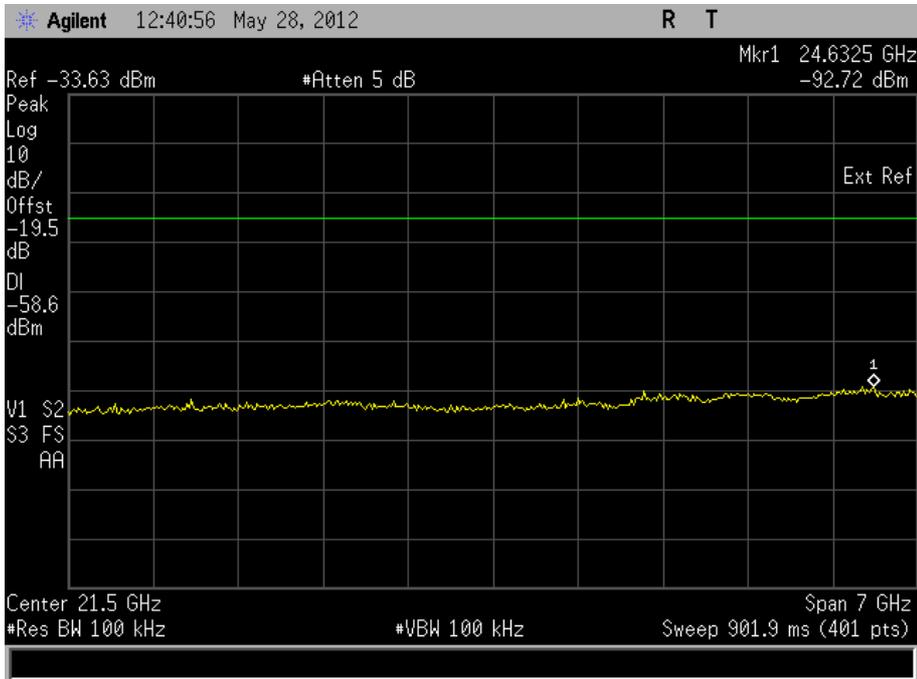
12 GHz to 18 GHz





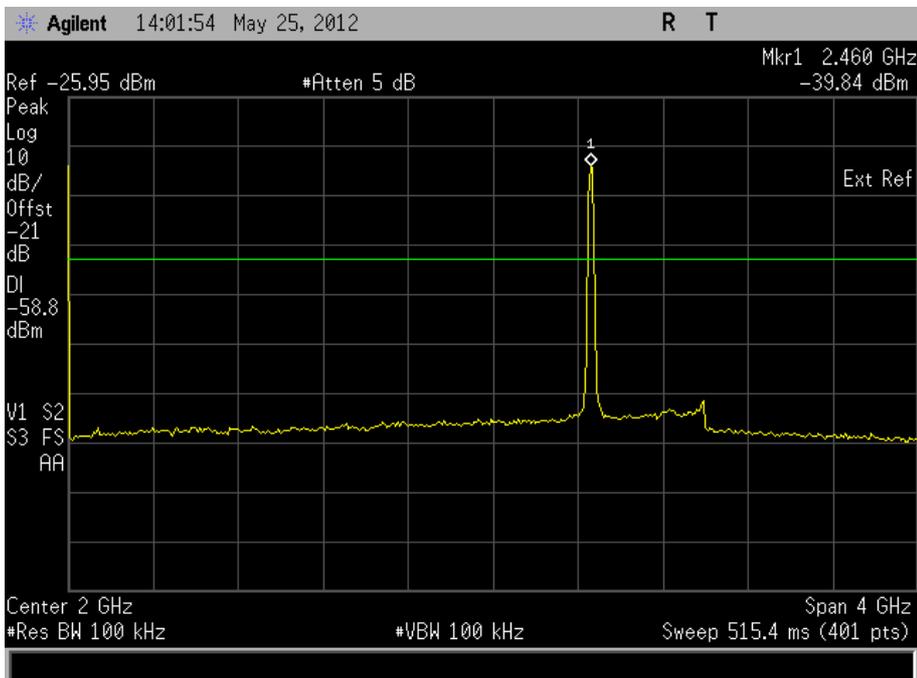
Product Service

18 GHz to 25 GHz



2462 MHz

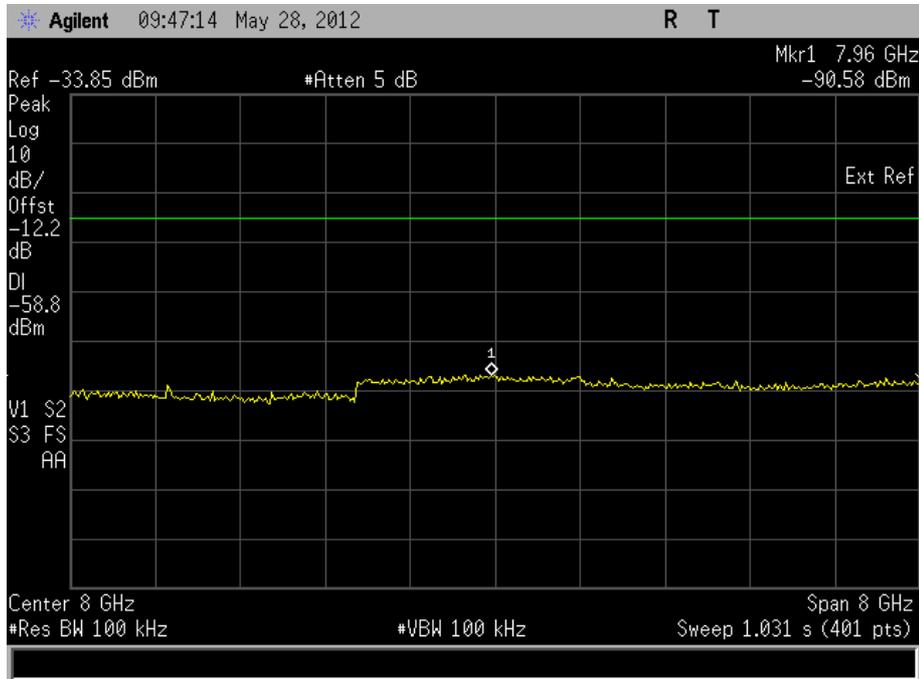
9 kHz to 4 GHz



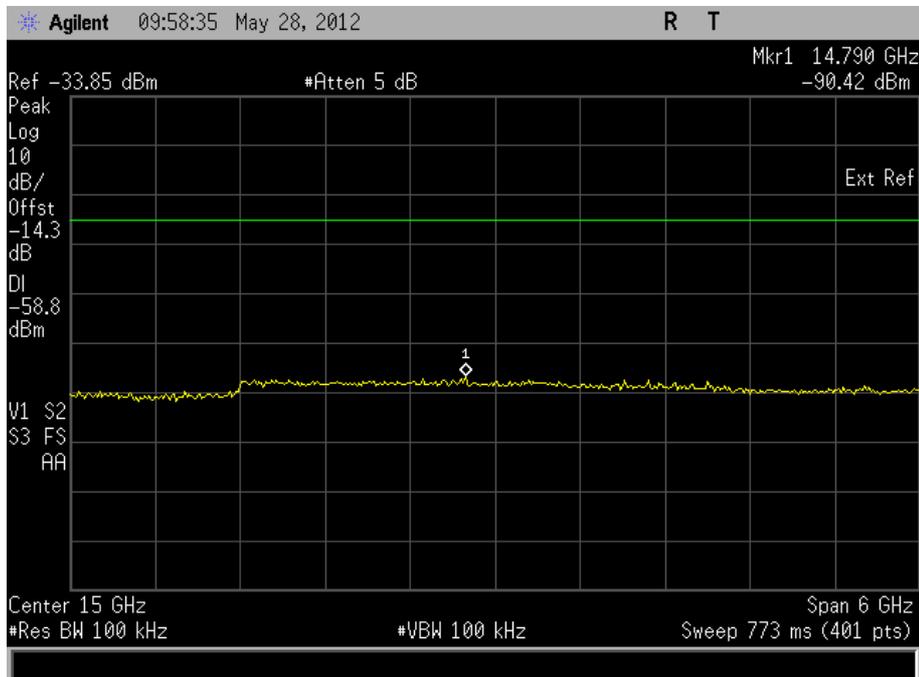


Product Service

4 GHz to 12 GHz



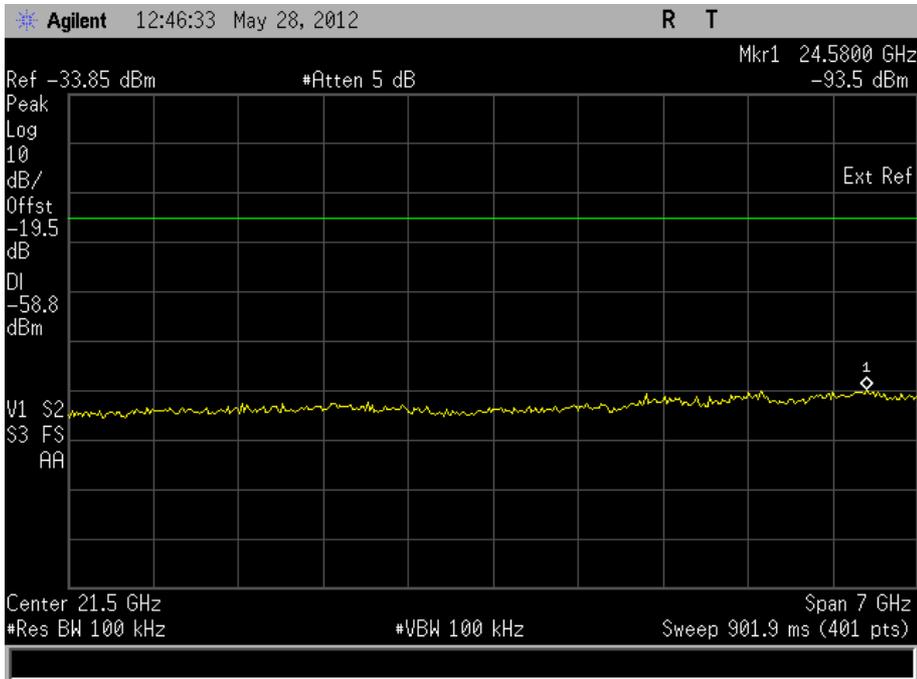
12 GHz to 18 GHz





Product Service

18 GHz to 25 GHz



Limit 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.

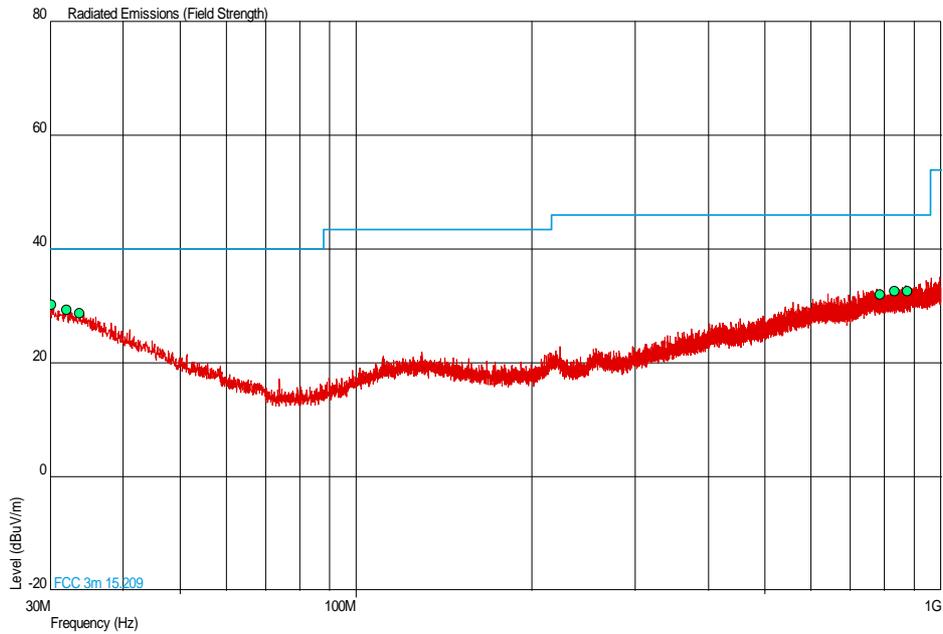


Product Service

Spurious Radiated Emissions

2412 MHz

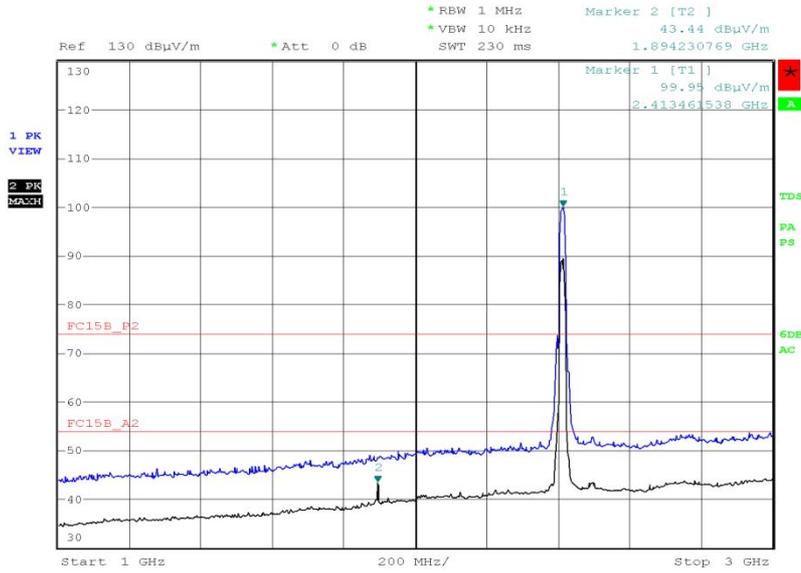
30 MHz to 1 GHz



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
30.146	30.2	32.4	40.0	100	-9.8	67.6	90	1.00	Vertical
31.989	29.3	29.2	40.0	100	-10.7	70.8	180	1.00	Vertical
33.686	28.7	27.2	40.0	100	-11.3	72.8	90	1.00	Vertical
785.242	32.1	40.3	46.0	200	-13.9	159.7	180	1.00	Vertical
831.366	32.6	42.7	46.0	200	-13.4	157.3	180	1.00	Horizontal
875.695	32.6	42.7	46.0	200	-13.4	157.3	90	1.00	Vertical

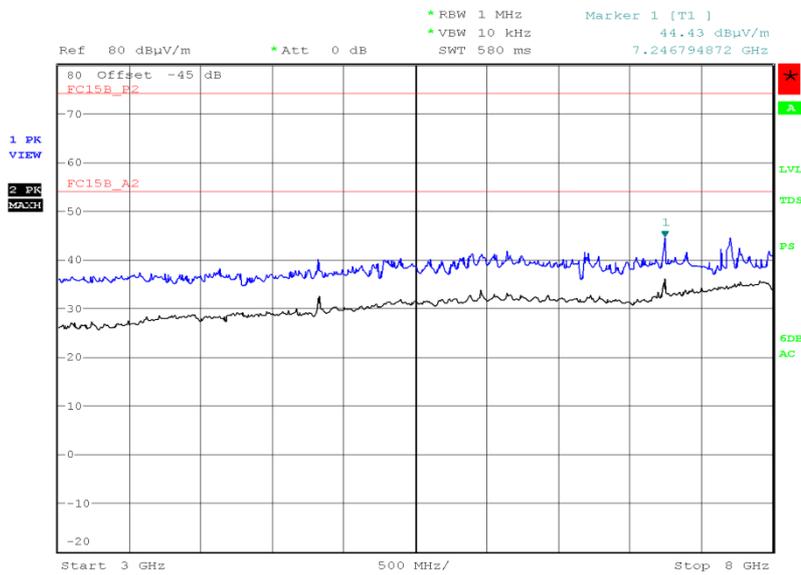


1 GHz to 3 GHz



Date: 16.MAY.2012 19:36:31

3 GHz to 8 GHz

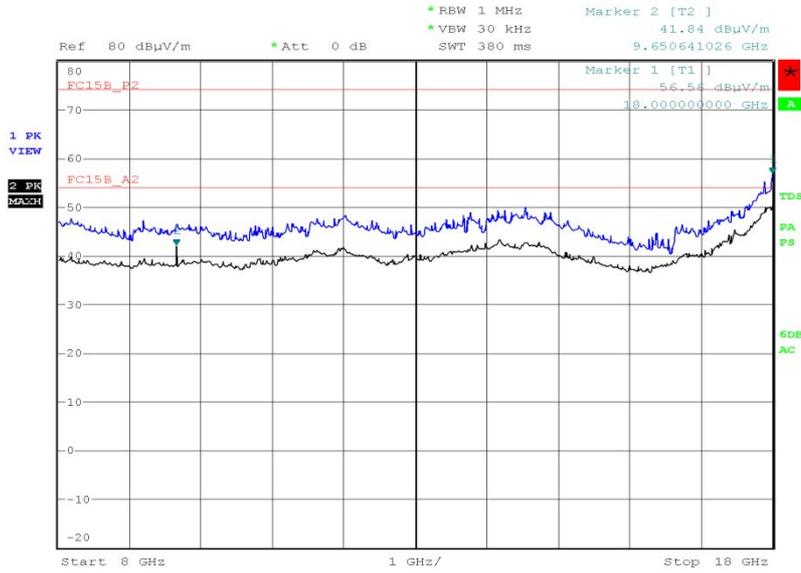


Date: 20.MAY.2012 20:00:12



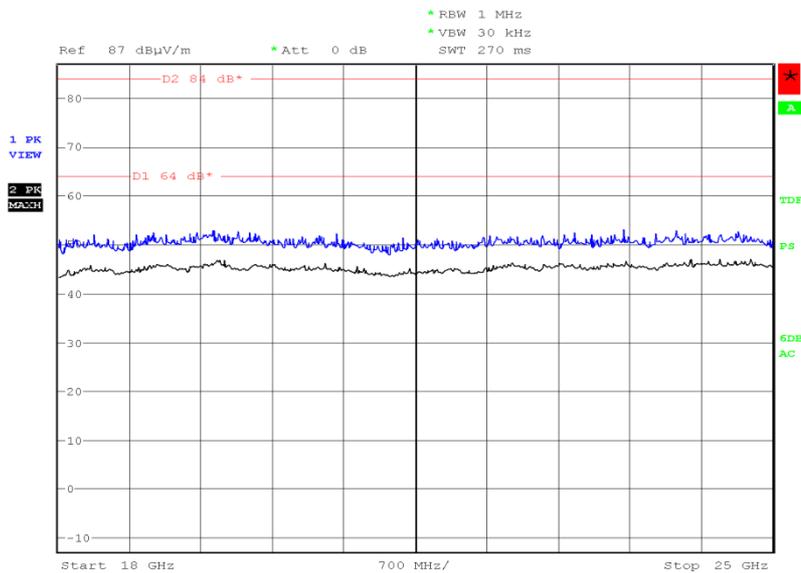
Product Service

8 GHz to 18 GHz



Date: 20.MAY.2012 20:52:55

18 GHz to 25 GHz



Date: 21.MAY.2012 21:29:57

Limit

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

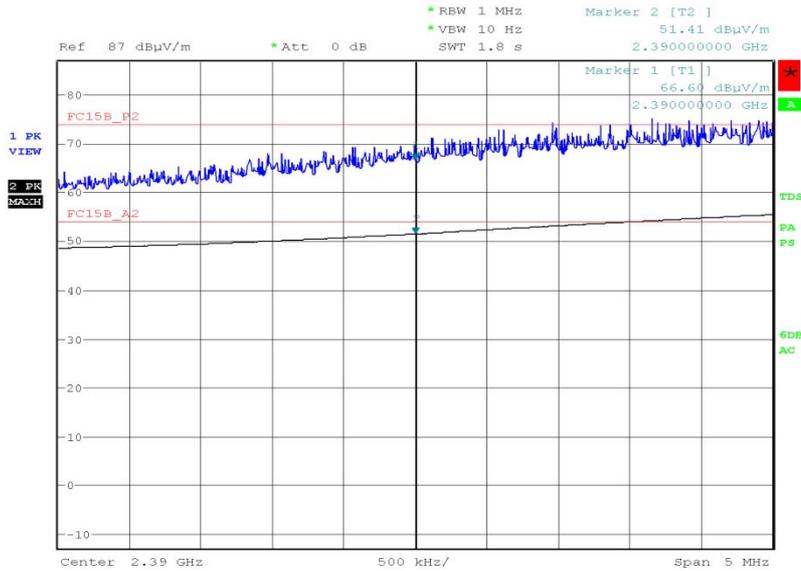


Product Service

Band Edge Emissions

2412 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	66.60	51.41



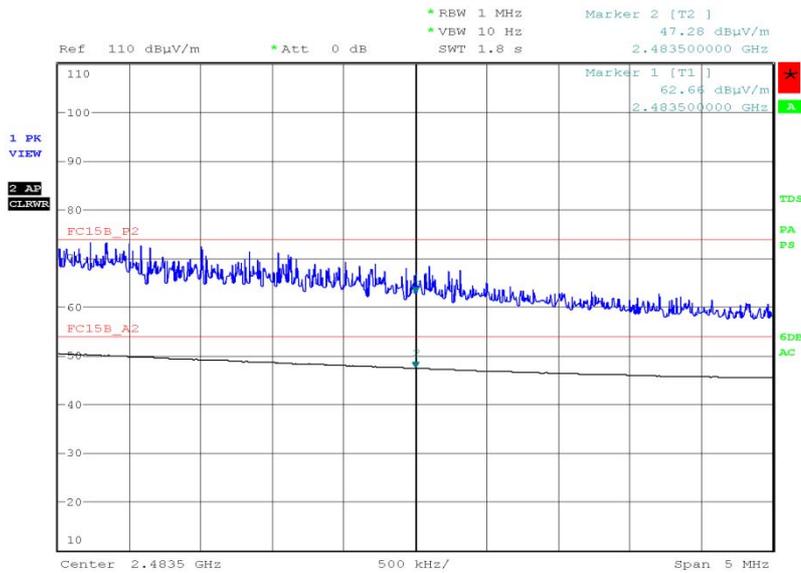
Date: 16.MAY.2012 19:19:47



Product Service

2462 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	62.66	47.28



Date: 16.MAY.2012 22:21:53

Limit

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



Product Service

802.11(n)

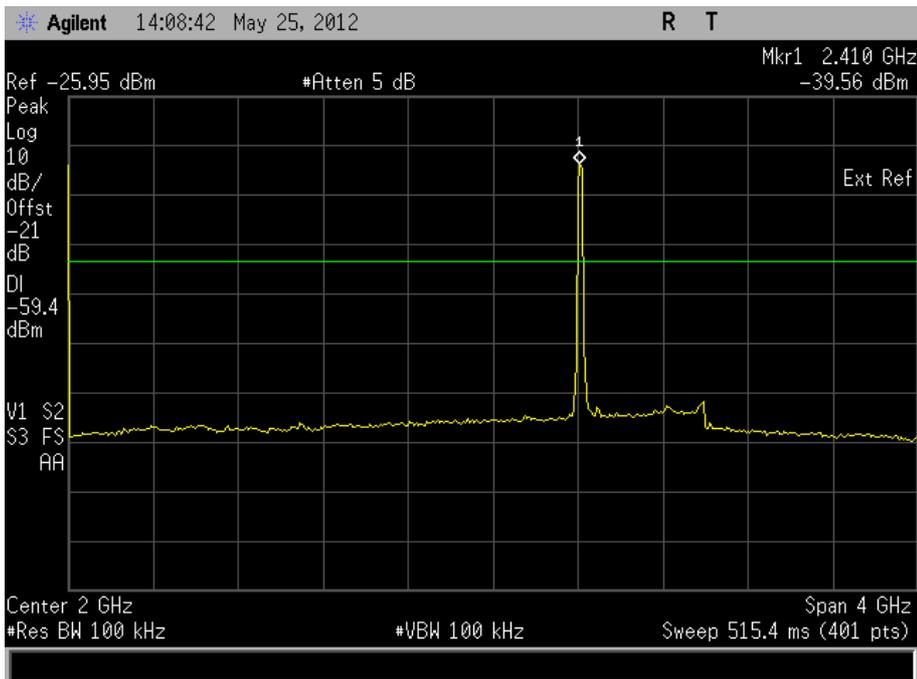
4.0 V DC Supply

Spurious Conducted Emissions

26 Mbps

2412 MHz

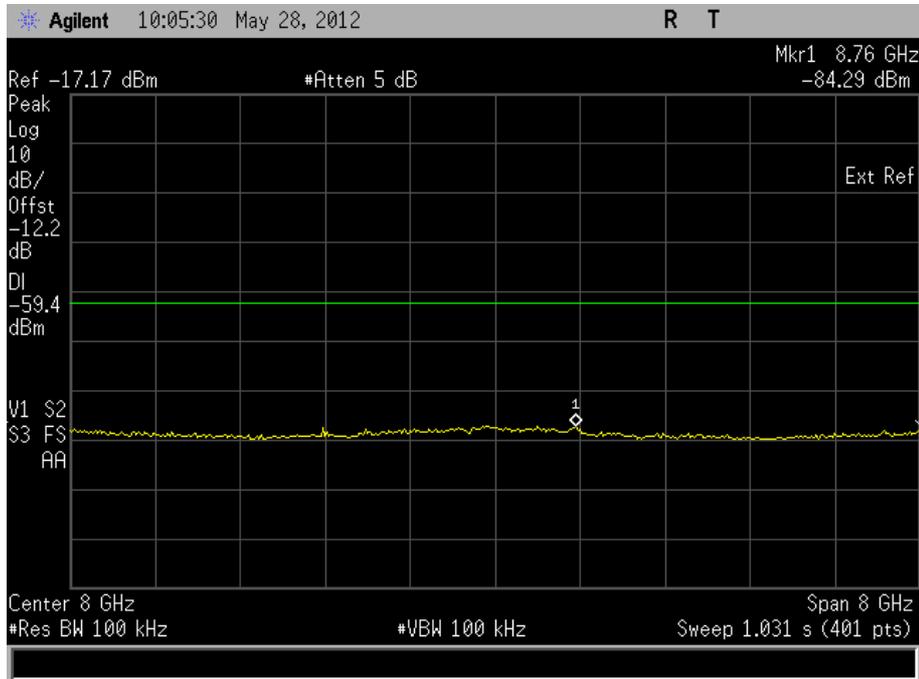
9 kHz to 4 GHz



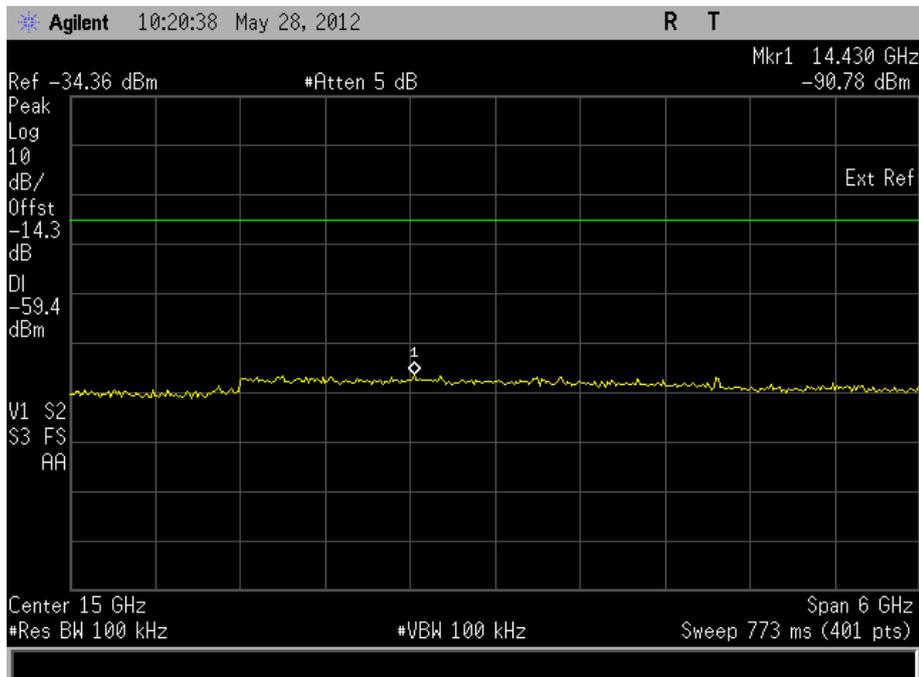


Product Service

4 GHz to 12 GHz



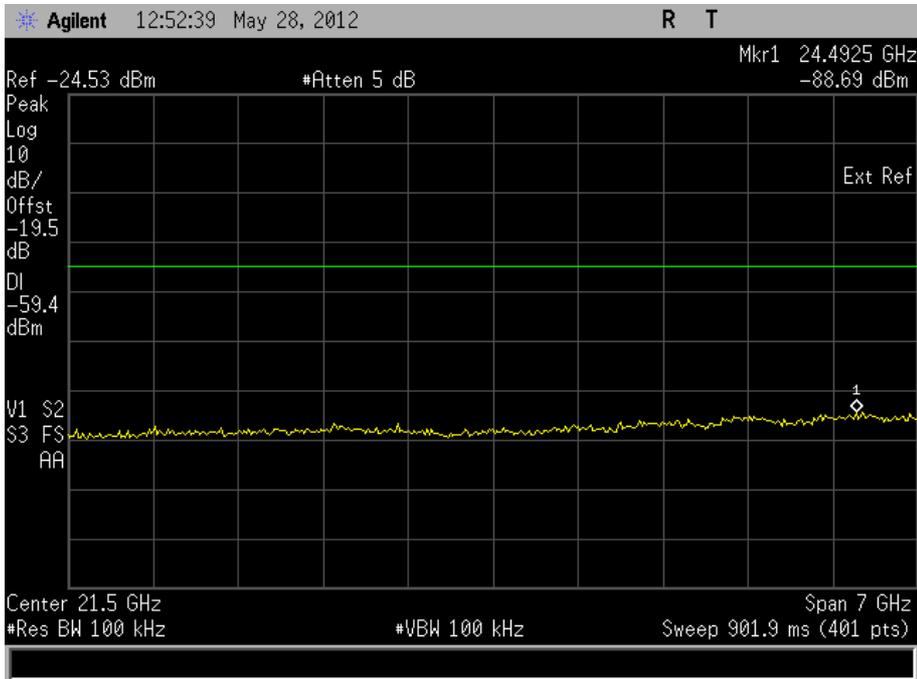
12 GHz to 18 GHz





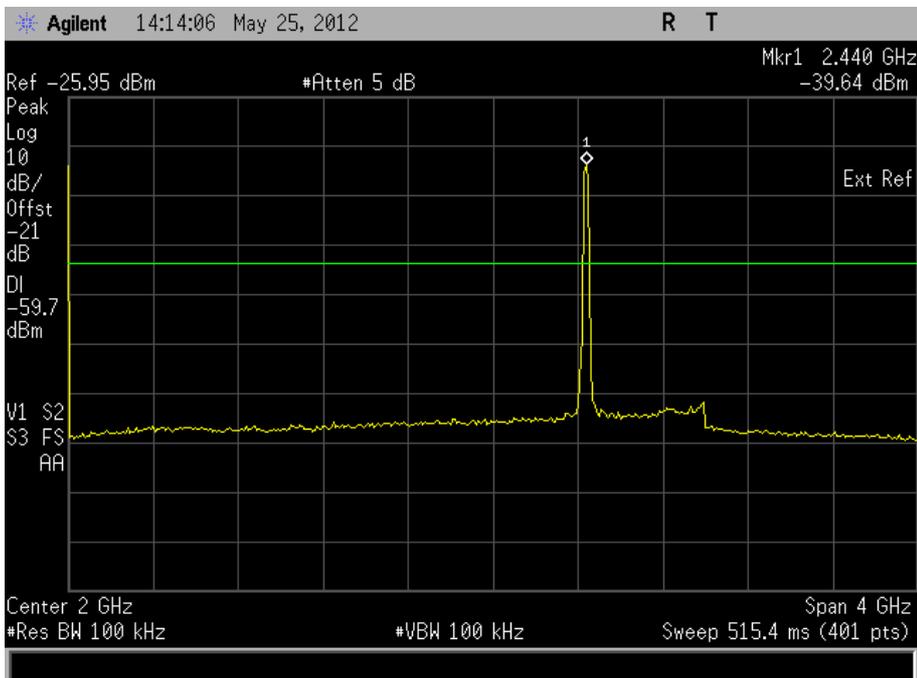
Product Service

18 GHz to 25 GHz



2437 MHz

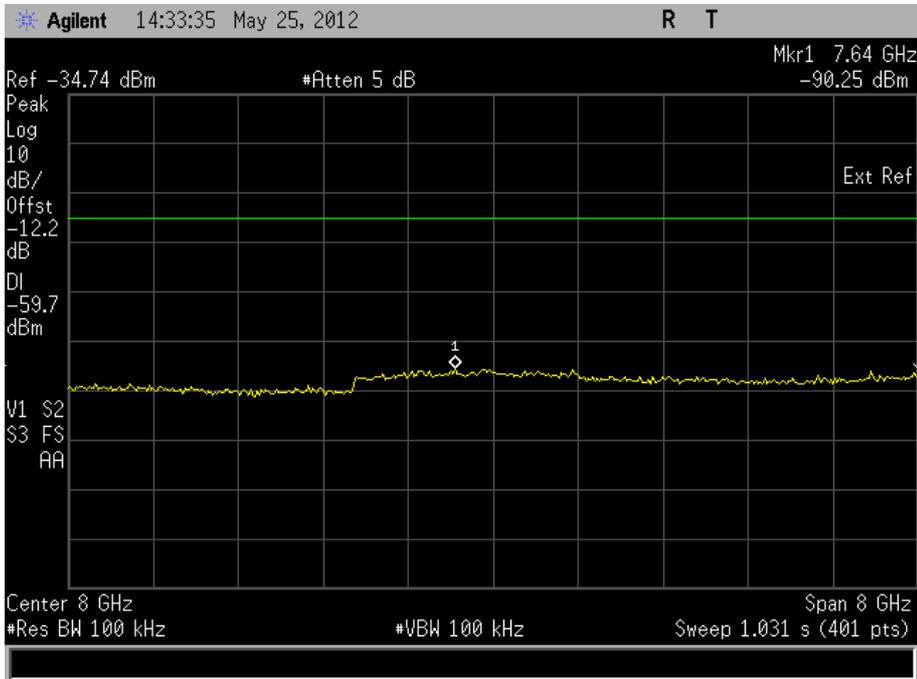
9 kHz to 4 GHz



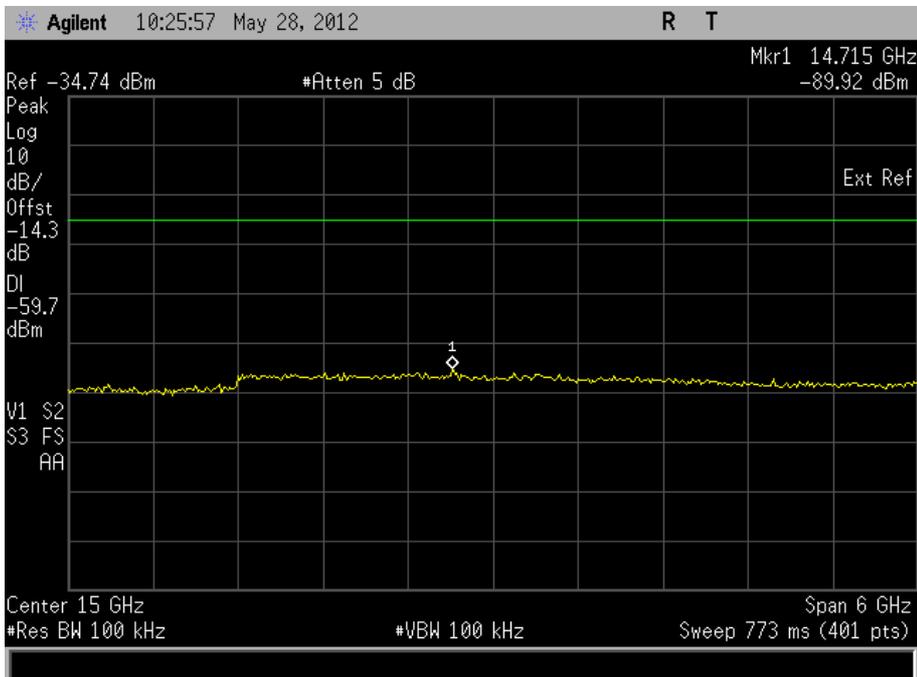


Product Service

4 GHz to 12 GHz



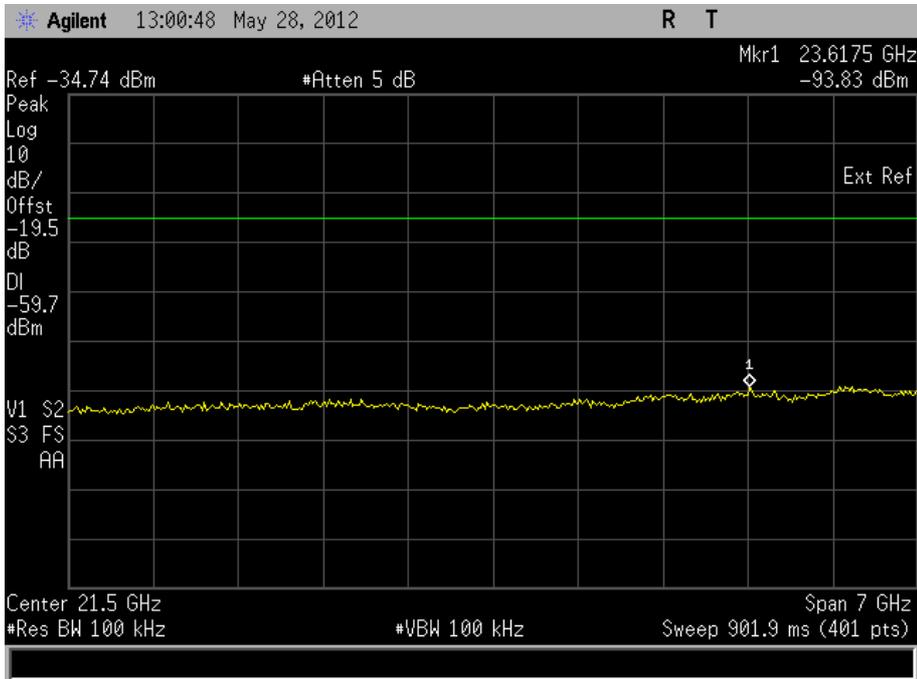
12 GHz to 18 GHz





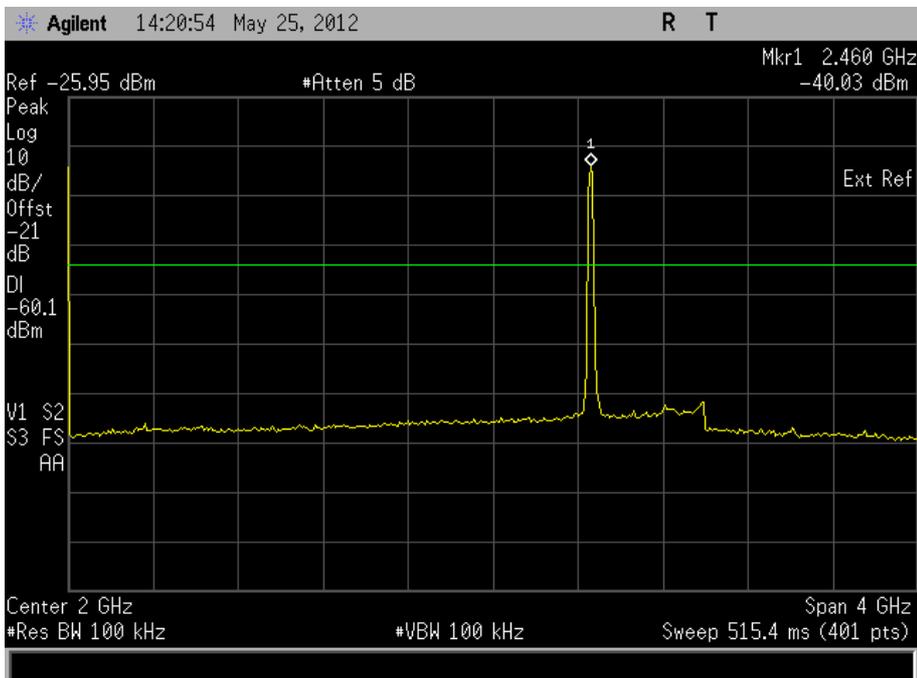
Product Service

18 GHz to 25 GHz



2462 MHz

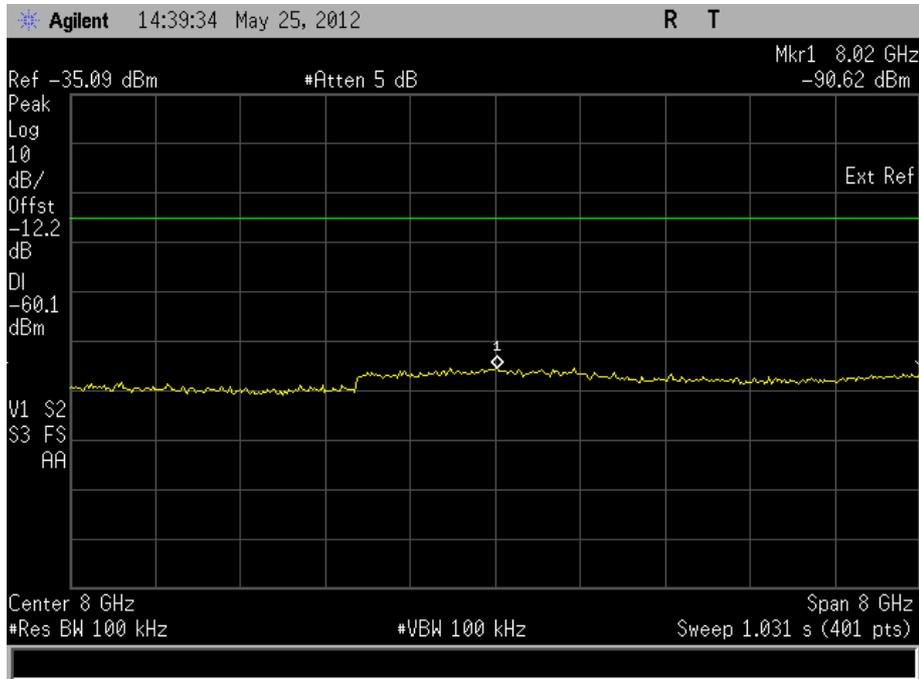
9 kHz to 4 GHz



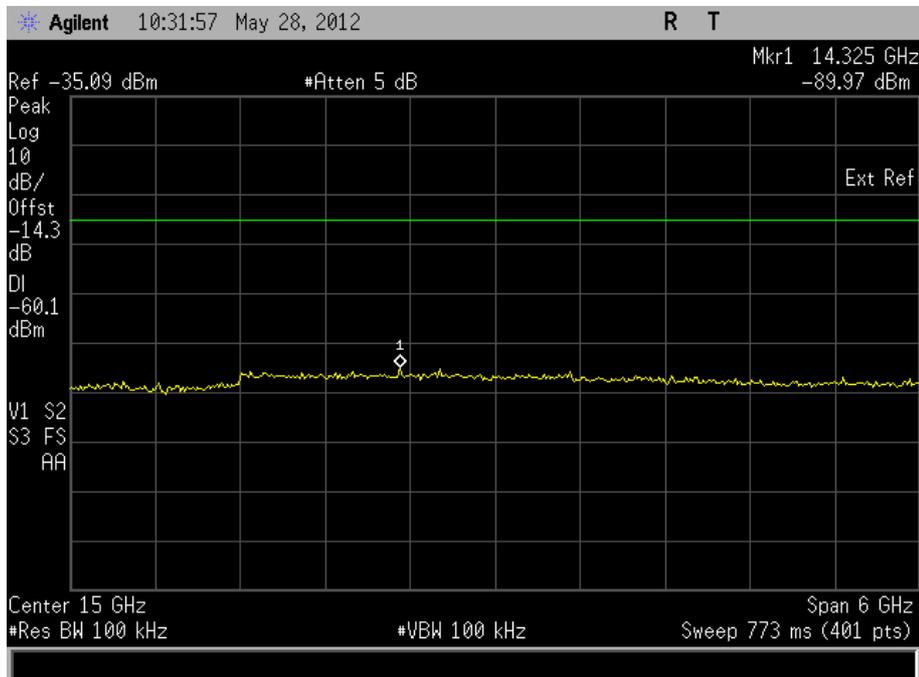


Product Service

4 GHz to 12 GHz



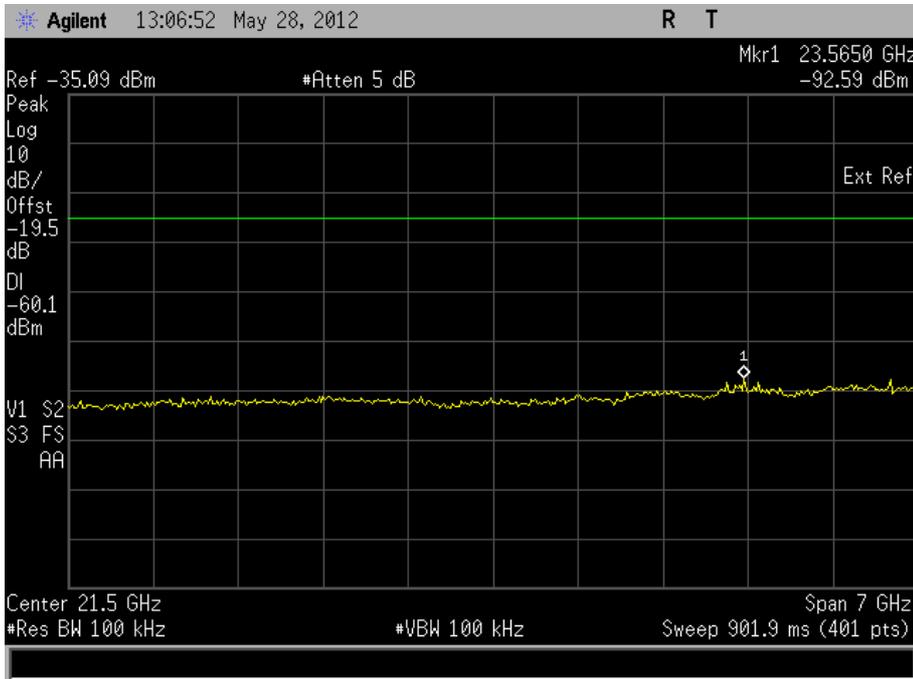
12 GHz to 18 GHz





Product Service

18 GHz to 25 GHz



Limit 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.

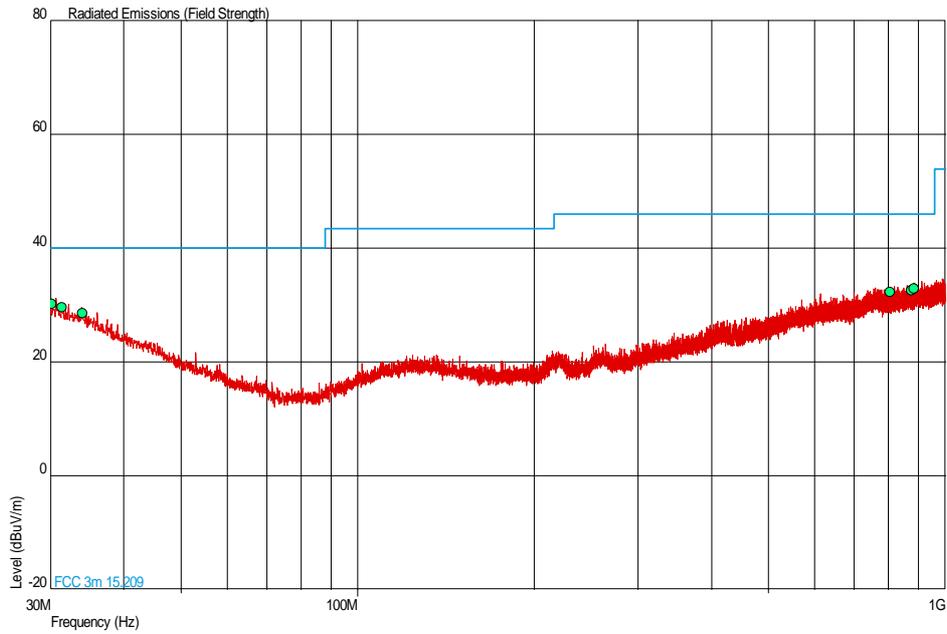
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.



Spurious Radiated Emissions

2412 MHz

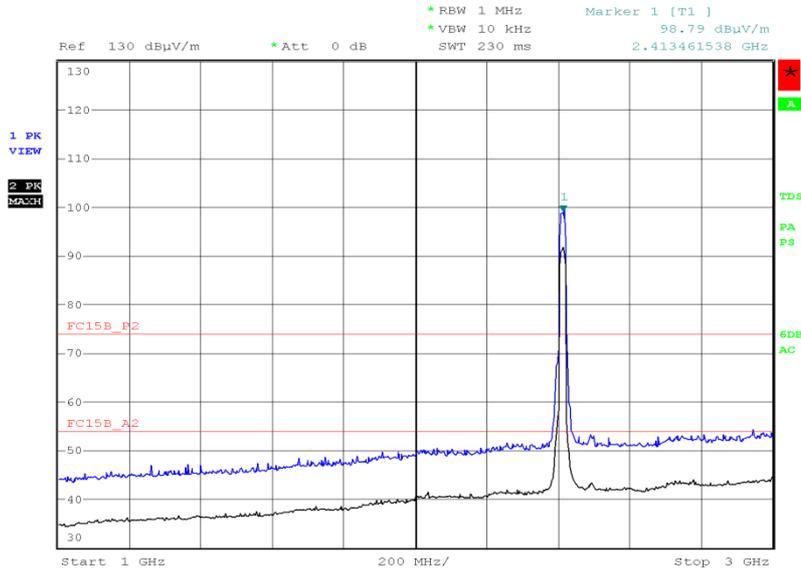
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dB $\mu$ V/m)	QP Level ( $\mu$ V/m)	QP Limit (dB $\mu$ V/m)	QP Limit ( $\mu$ V/m)	QP Margin (dB $\mu$ V/m)	QP Margin ( $\mu$ V/m)	Angle (Deg)	Height (m)	Polarity
30.194	30.2	32.4	40.0	100	-9.8	67.6	90	1.00	Horizontal
31.407	29.6	30.2	40.0	100	-10.4	69.8	90	1.00	Vertical
33.977	28.6	26.9	40.0	100	-11.4	73.1	90	1.00	Horizontal
805.176	32.3	41.2	46.0	200	-13.7	158.8	180	1.00	Vertical
874.822	32.6	42.7	46.0	200	-13.4	157.3	180	1.00	Horizontal
885.977	32.9	44.2	46.0	200	-13.1	155.8	90	1.00	Horizontal

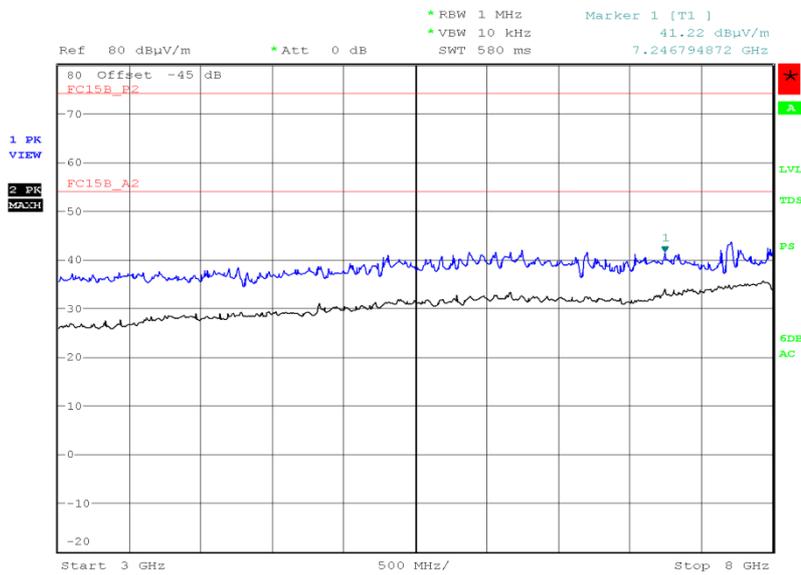


1 GHz to 3 GHz



Date: 16.MAY.2012 21:03:12

3 GHz to 8 GHz

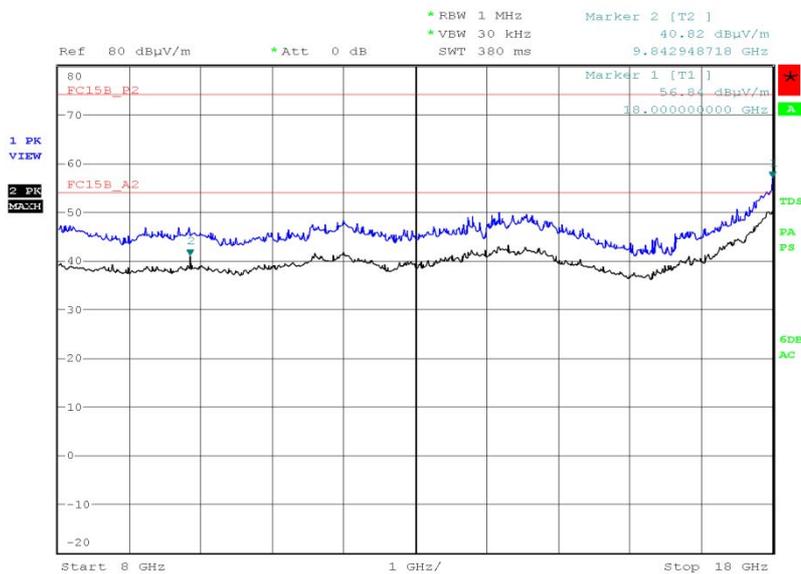


Date: 20.MAY.2012 20:07:10



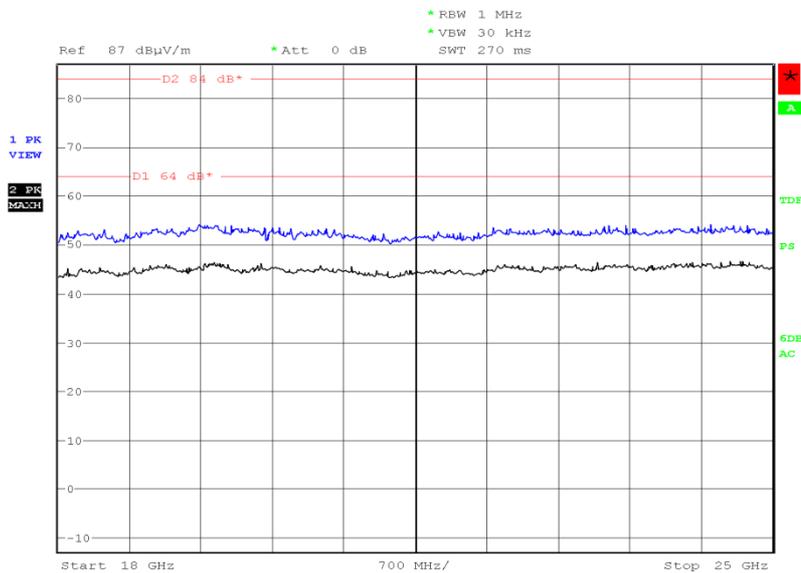
Product Service

8 GHz to 18 GHz



Date: 20.MAY.2012 20:46:09

18 GHz to 25 GHz



Date: 21.MAY.2012 21:51:16

Limit

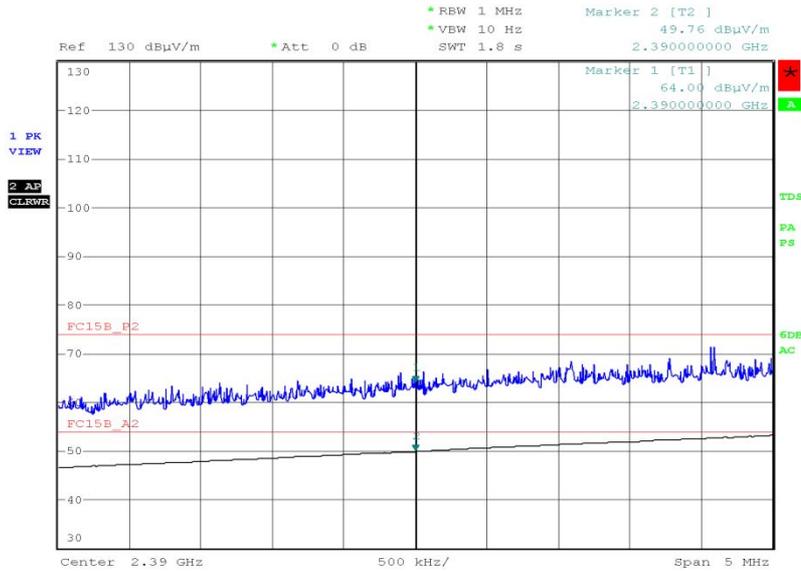
Peak (dBμV/m)	Average (dBμV/m)
74.0	54.0



Band Edge Emissions

2412 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	64.00	49.76



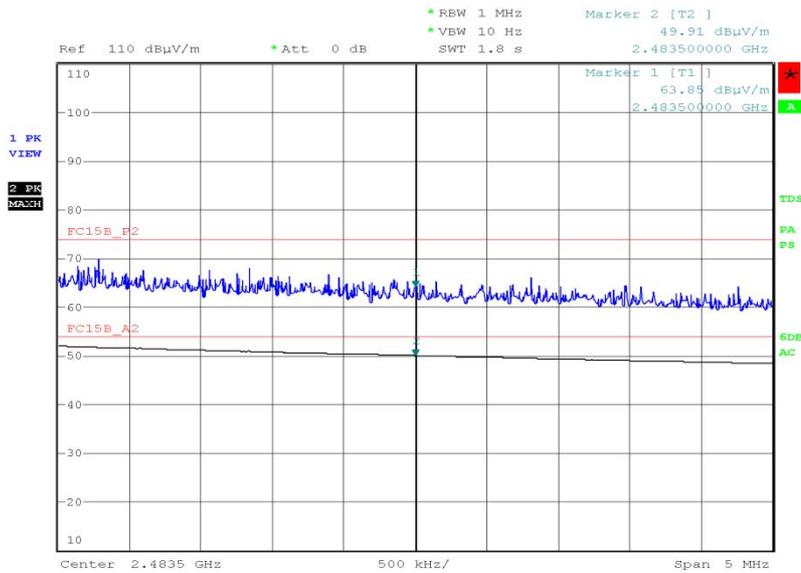
Date: 16.MAY.2012 20:57:41



Product Service

2462 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	63.85	49.91



Date: 16.MAY.2012 21:52:15

Limit

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



Product Service

## **2.6 6dB BANDWIDTH**

### **2.6.1 Specification Reference**

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

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

CDMA SHI15 S/N: IMEI 004401114000322 - Modification State 0

### **2.6.3 Date of Test**

22 May 2012 & 23 May 2012

### **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 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. The peak point of the trace was measured and the markers positioned to give the -6dBc points of the displayed spectrum.

### **2.6.6 Environmental Conditions**

Ambient Temperature	23.8°C
Relative Humidity	35.6 - 44.5%



Product Service

**2.6.7 Test Results**

802.11(b)

4.0 V DC Supply

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	1	6120
	2	7380
	5	6705
	11	7065
2437 MHz	1	7110
	2	7875
	5	7335
	11	7650
2462 MHz	1	8100
	2	7335
	5	6930
	11	6660



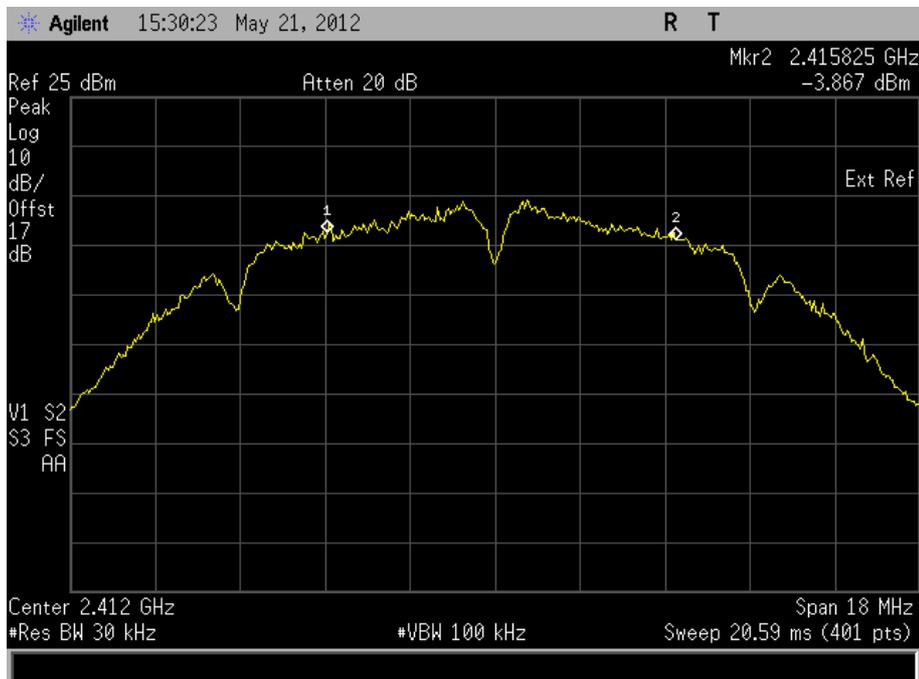
Product Service

2412 MHz

1 Mbps



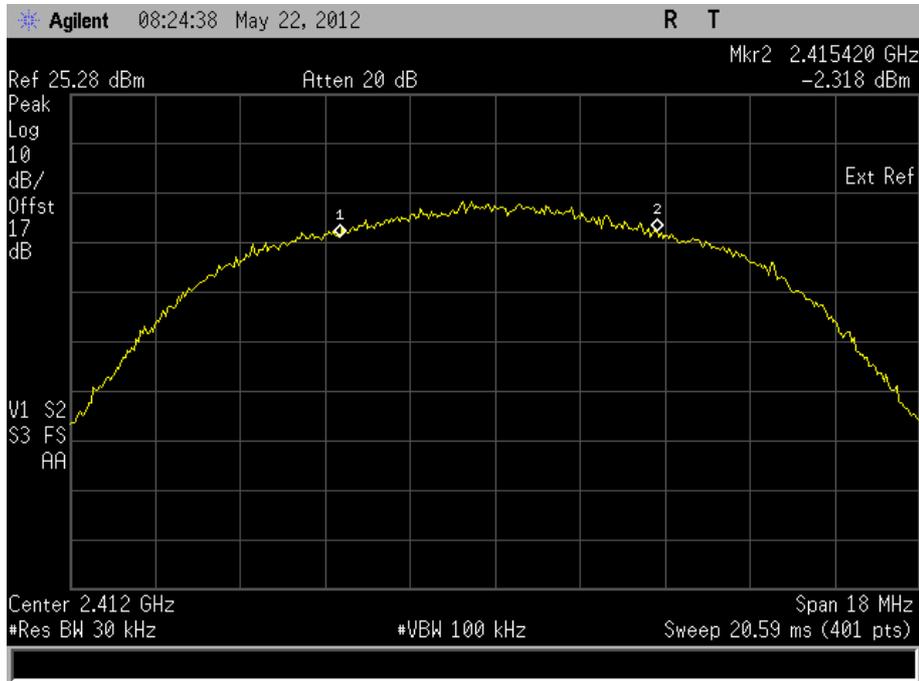
2 Mbps



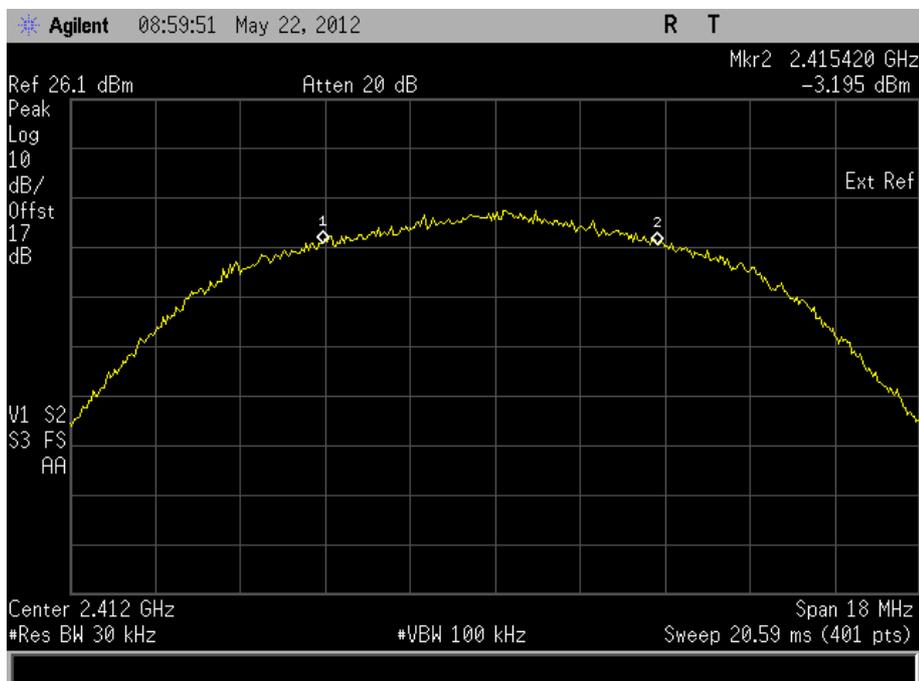


Product Service

5.5 Mbps



11 Mbps





Product Service

2437 MHz

1 Mbps



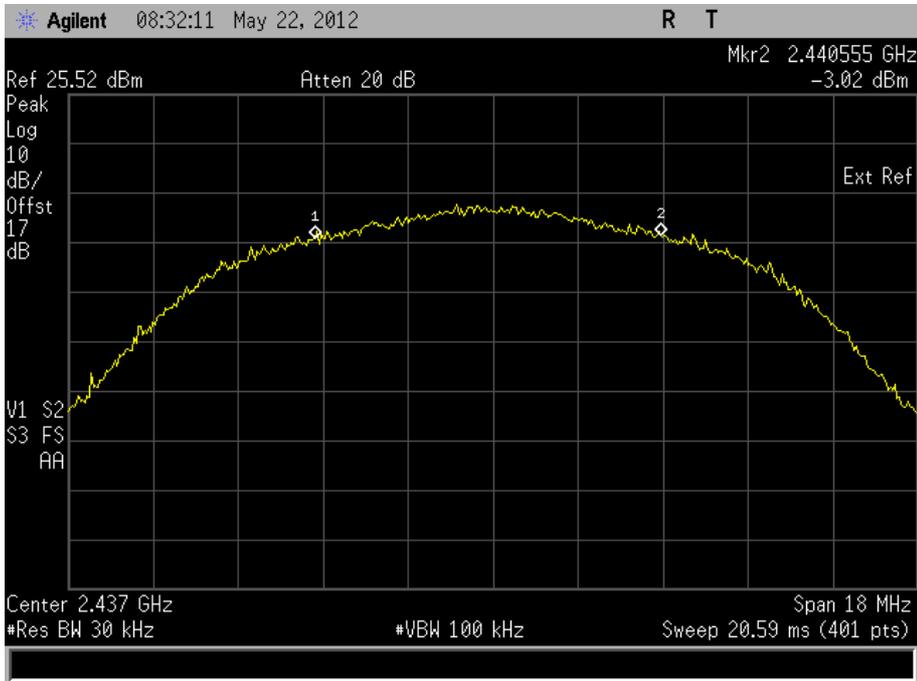
2 Mbps



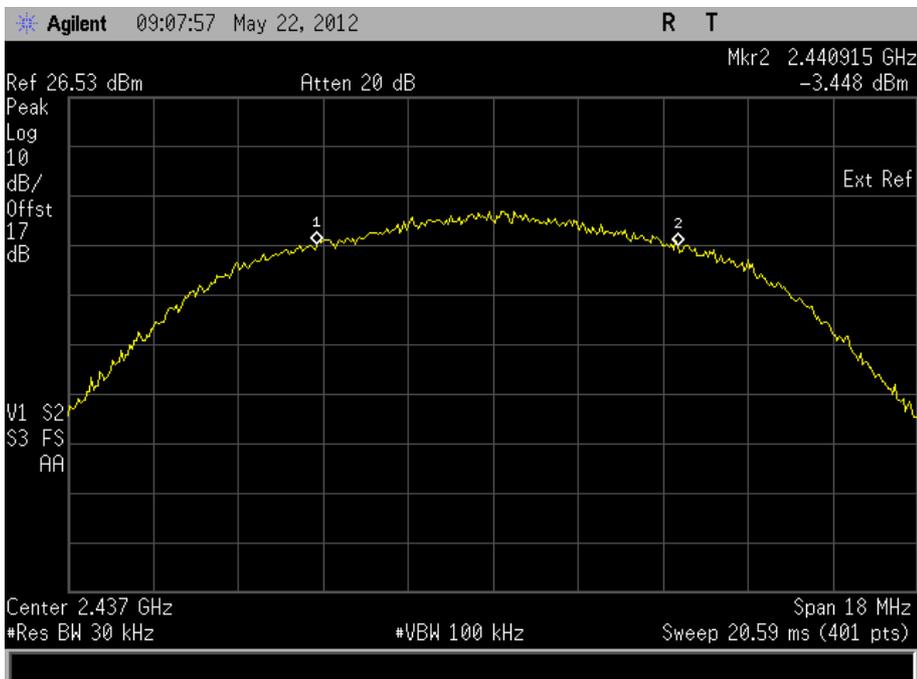


Product Service

5.5 Mbps



11 Mbps





Product Service

2462 MHz

1 Mbps

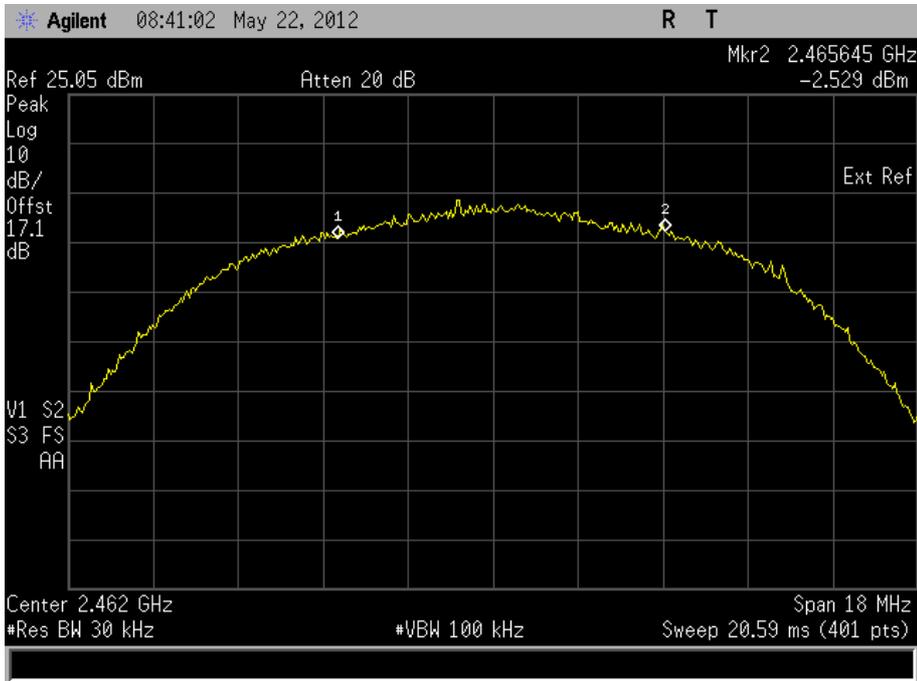


2 Mbps

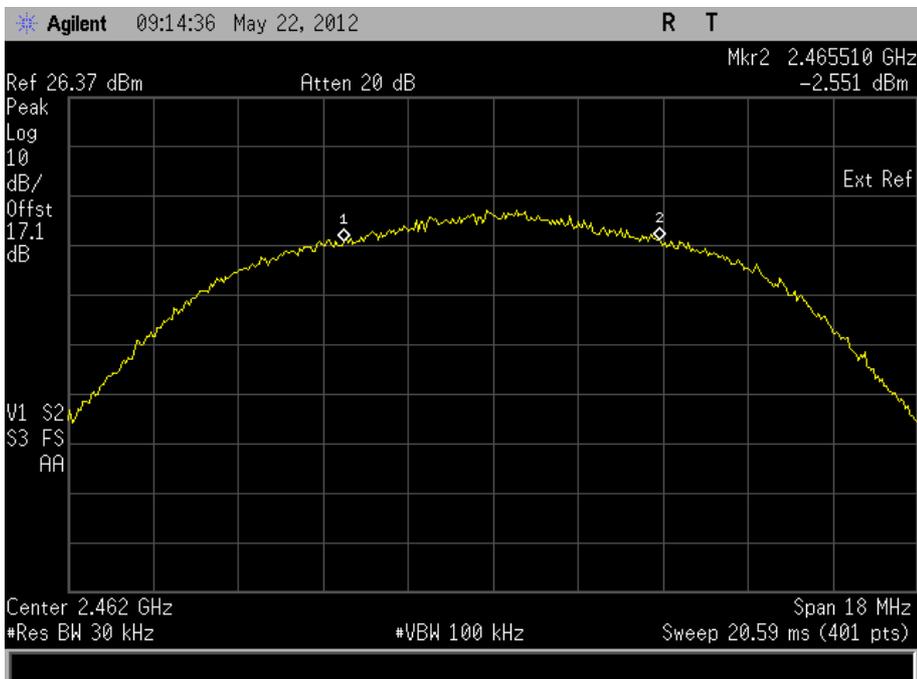




5.5 Mbps



11 Mbps



Limit Clause

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



Product Service

802.11(g)

4.0 V DC Supply

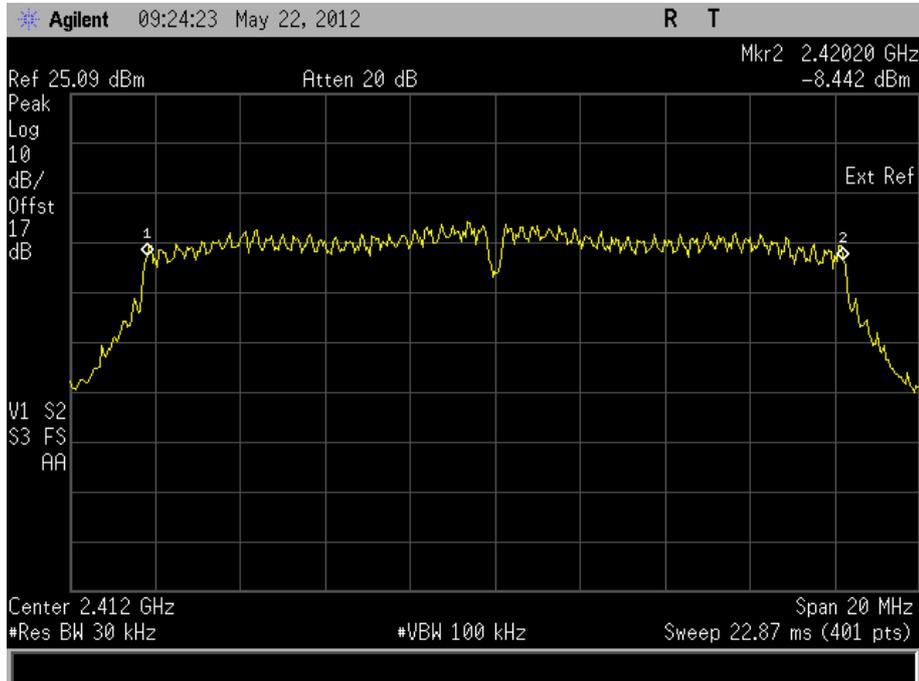
Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	6	16400
	9	16400
	12	16450
	18	16450
	24	16400
	36	15700
	48	16450
	54	16050
2437 MHz	6	16400
	9	16400
	12	16400
	18	16450
	24	16450
	36	16350
	48	16450
	54	16400
2462 MHz	6	16000
	9	16400
	12	16450
	18	16450
	24	16400
	36	15450
	48	15800
	54	16400



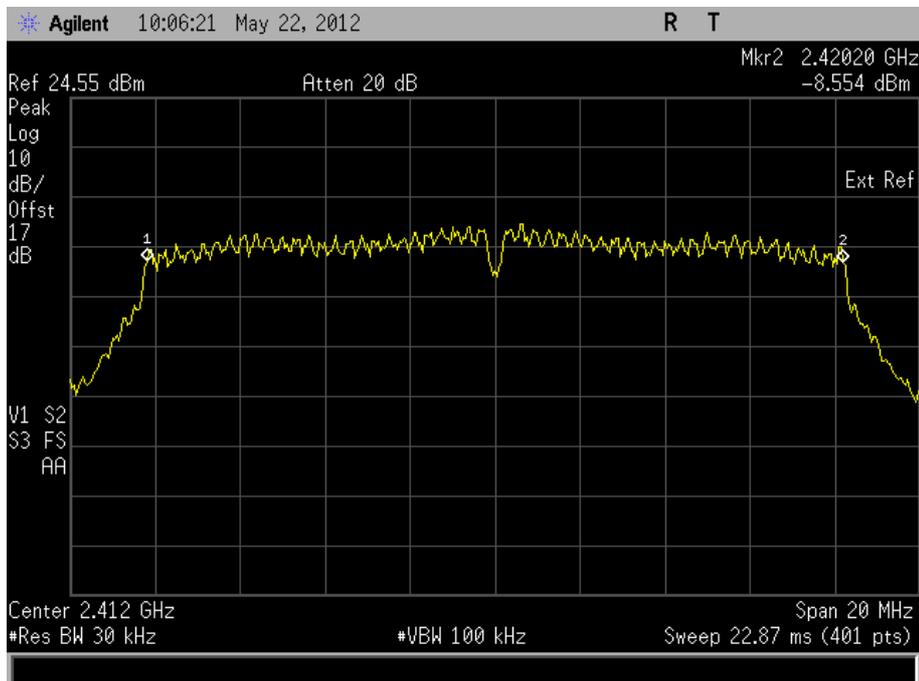
Product Service

2412 MHz

6 Mbps



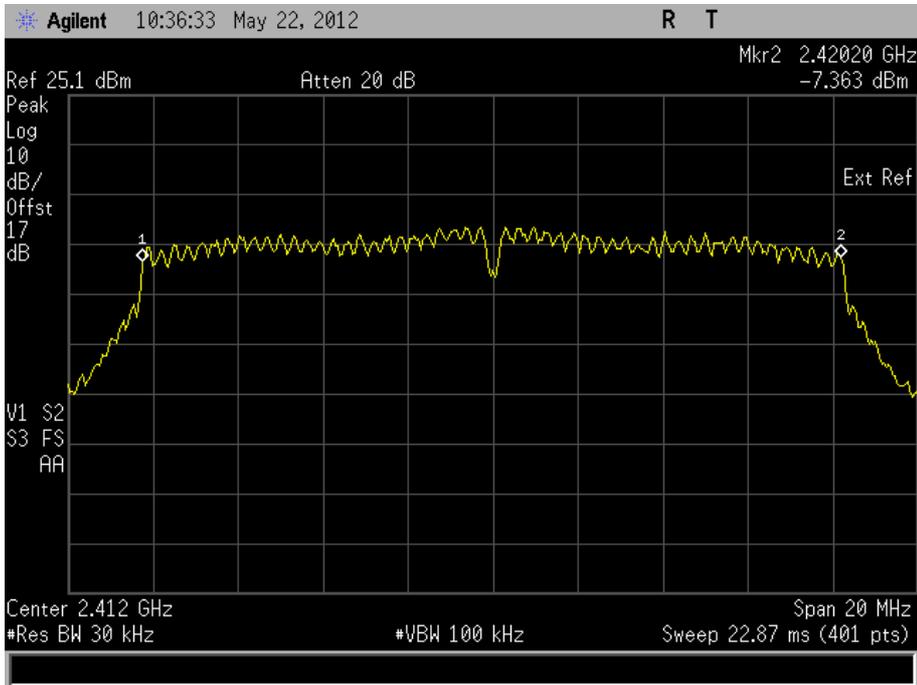
9 Mbps



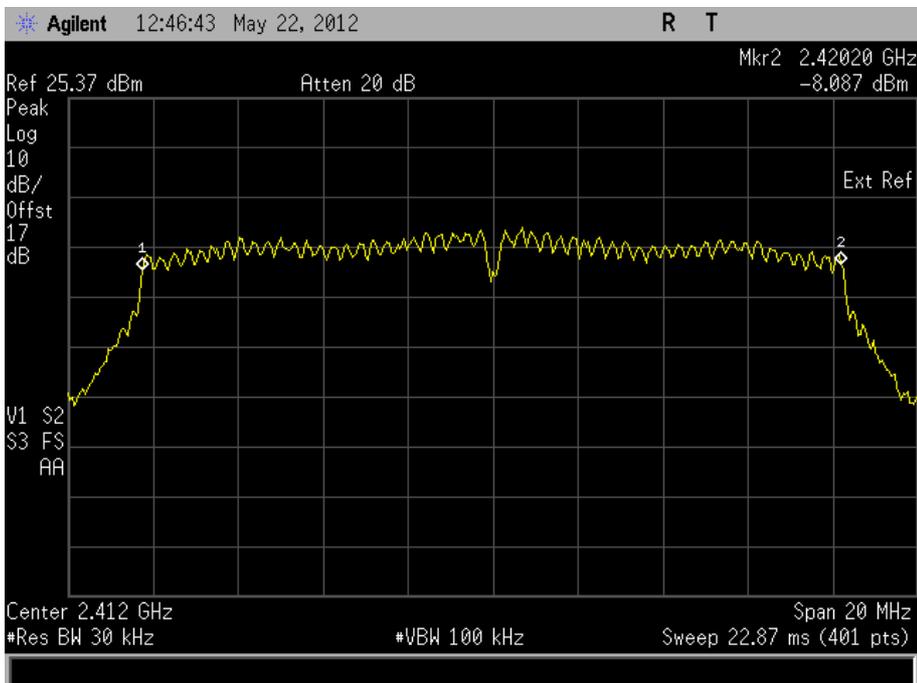


Product Service

12 Mbps



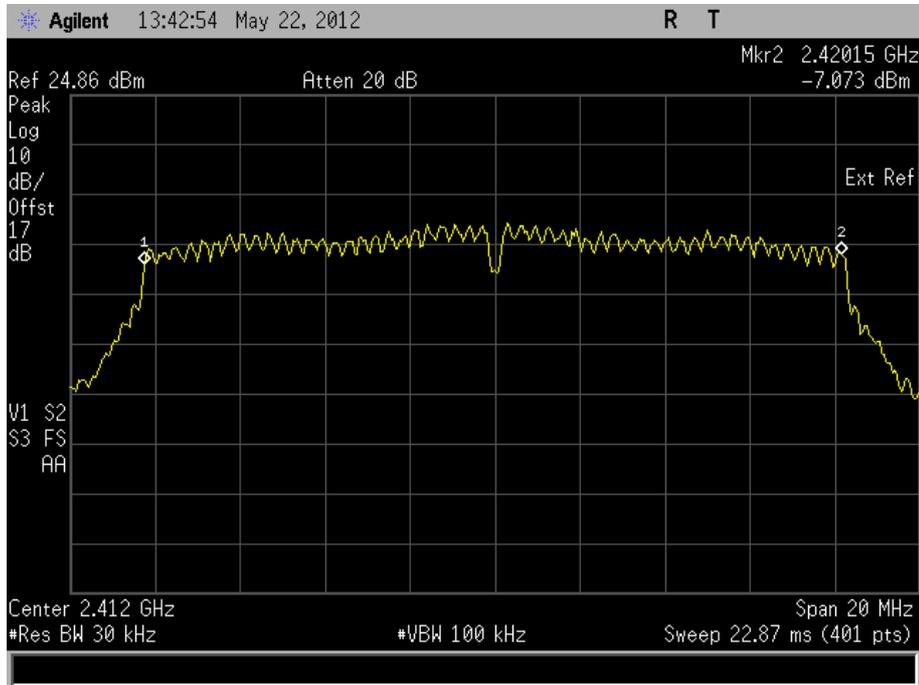
18 Mbps



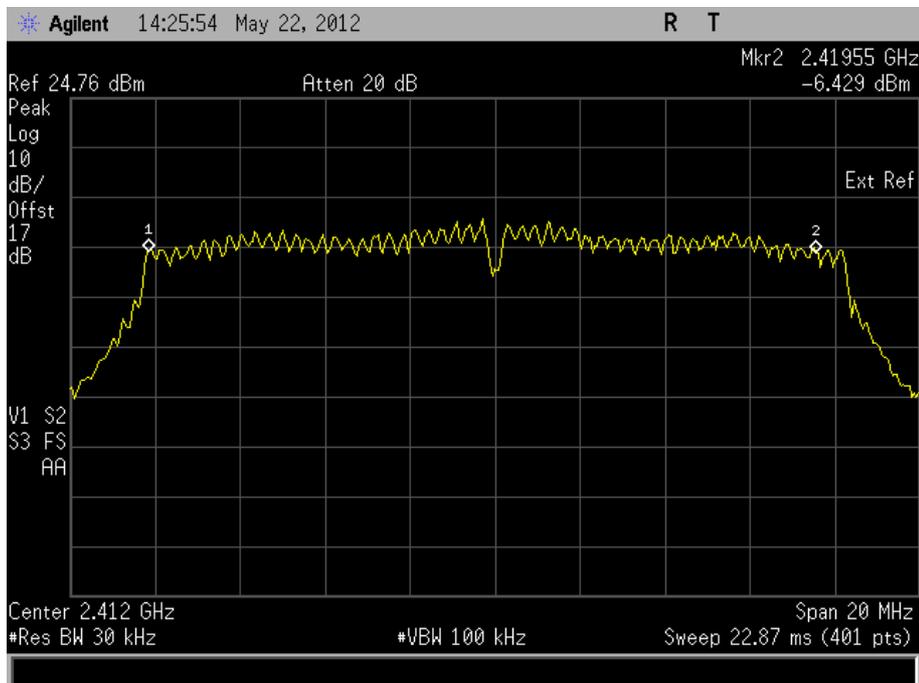


Product Service

24 Mbps



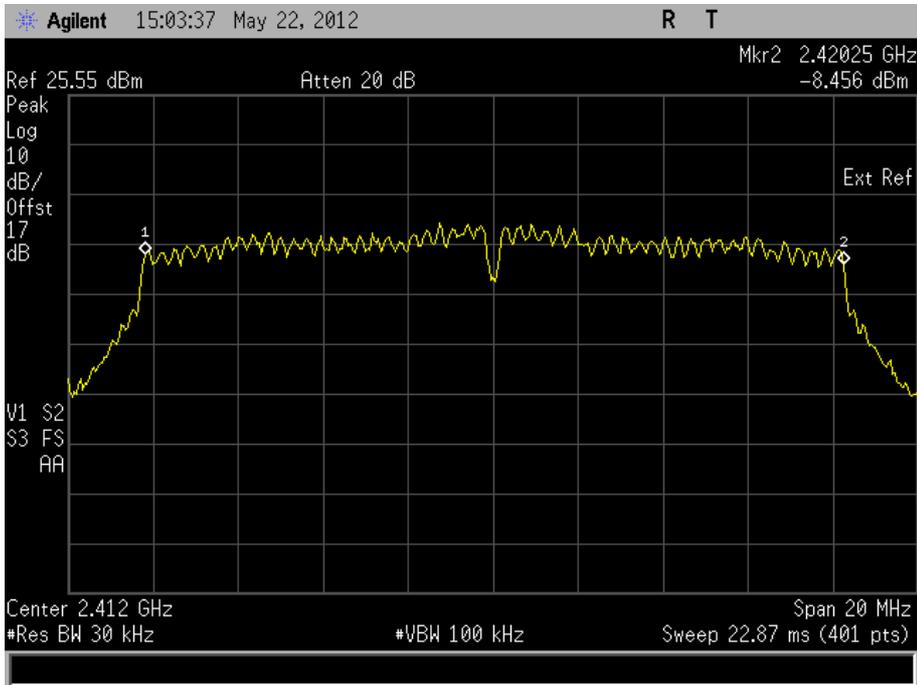
36 Mbps



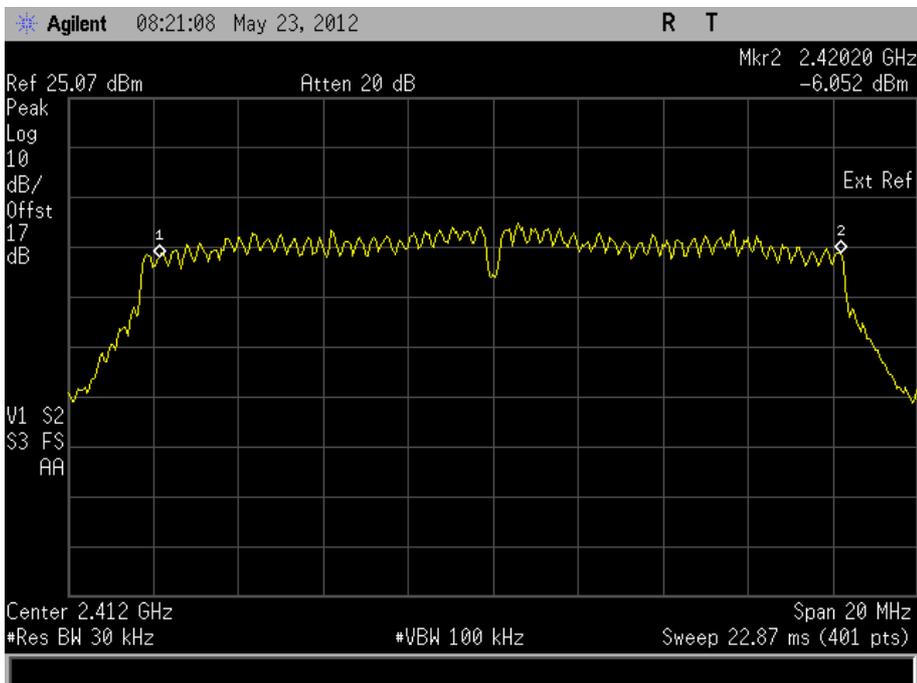


Product Service

48 Mbps



54 Mbps

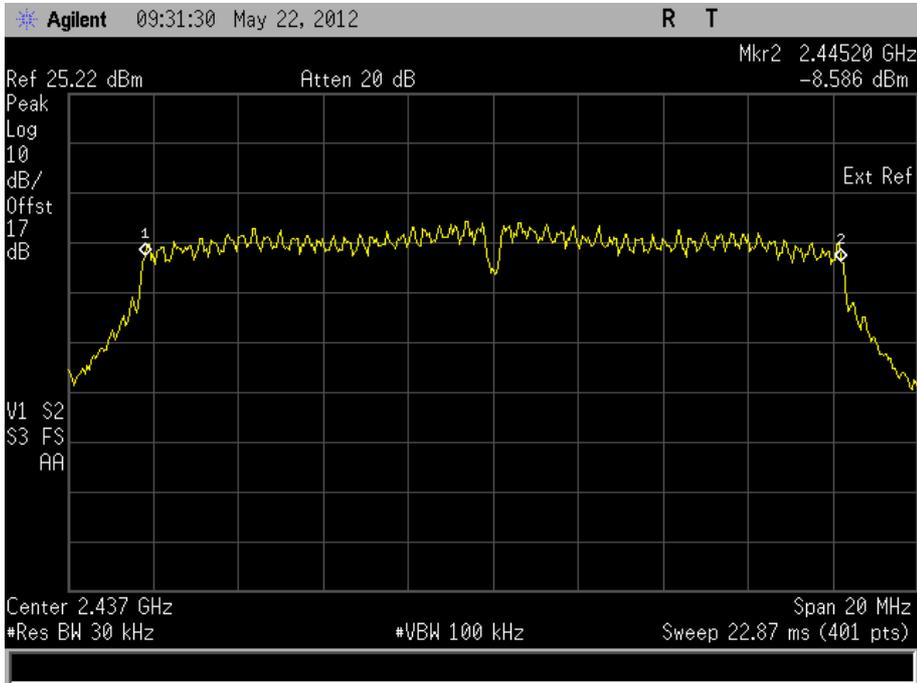




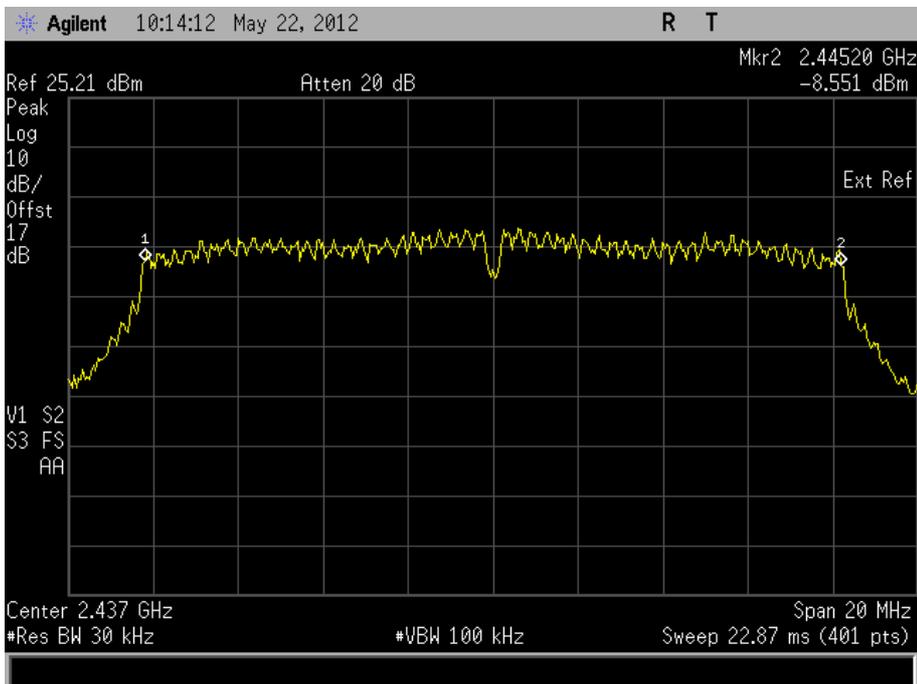
Product Service

2437 MHz

6 Mbps



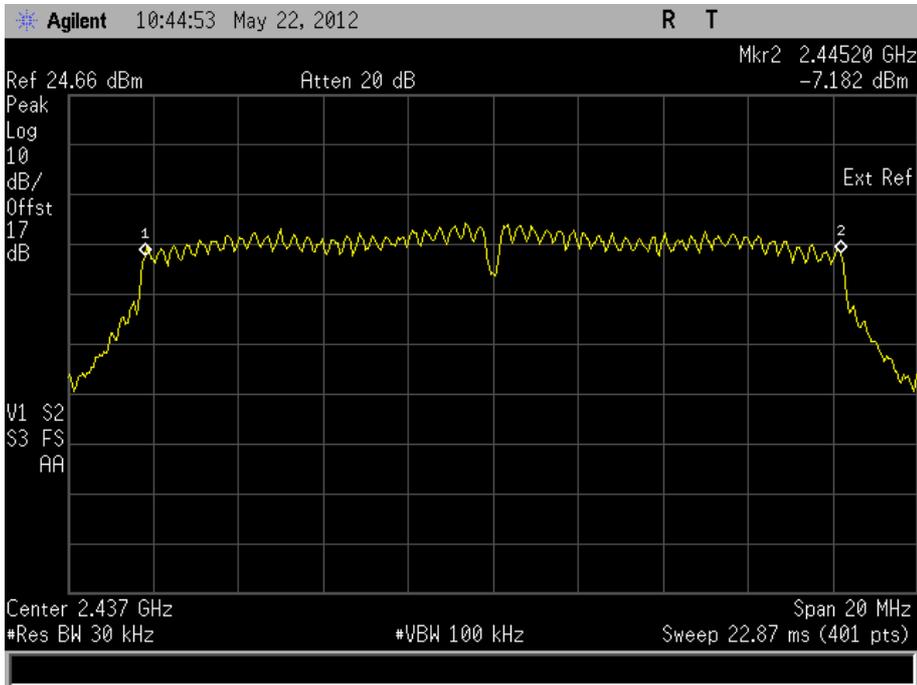
9 Mbps



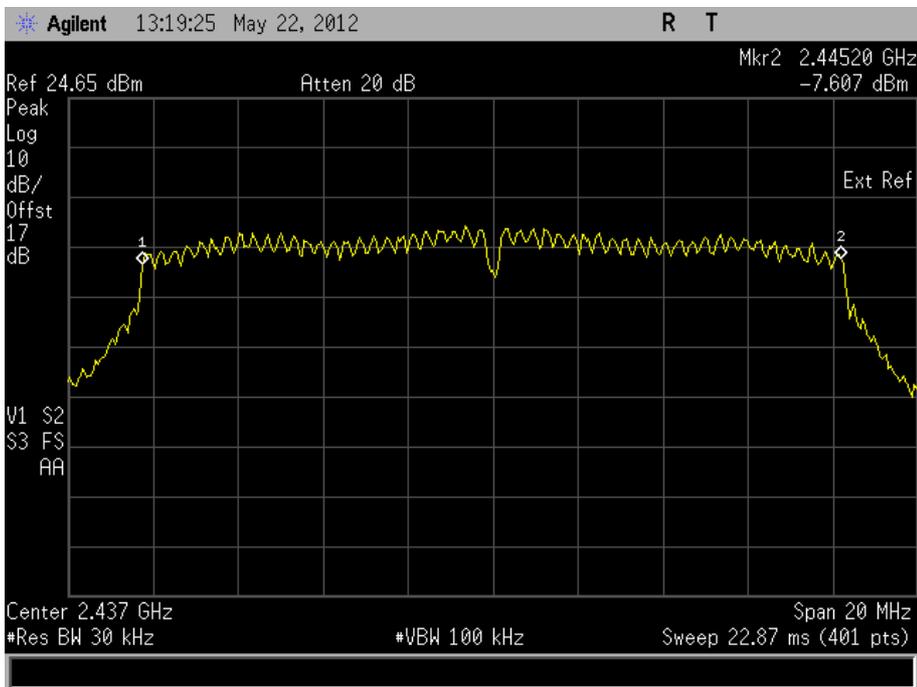


Product Service

12 Mbps



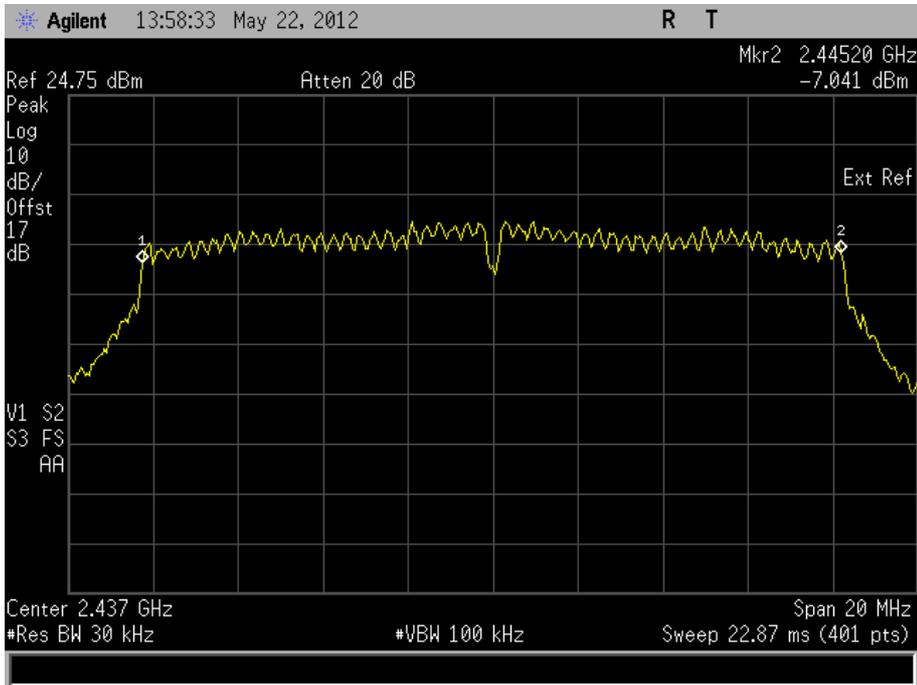
18 Mbps



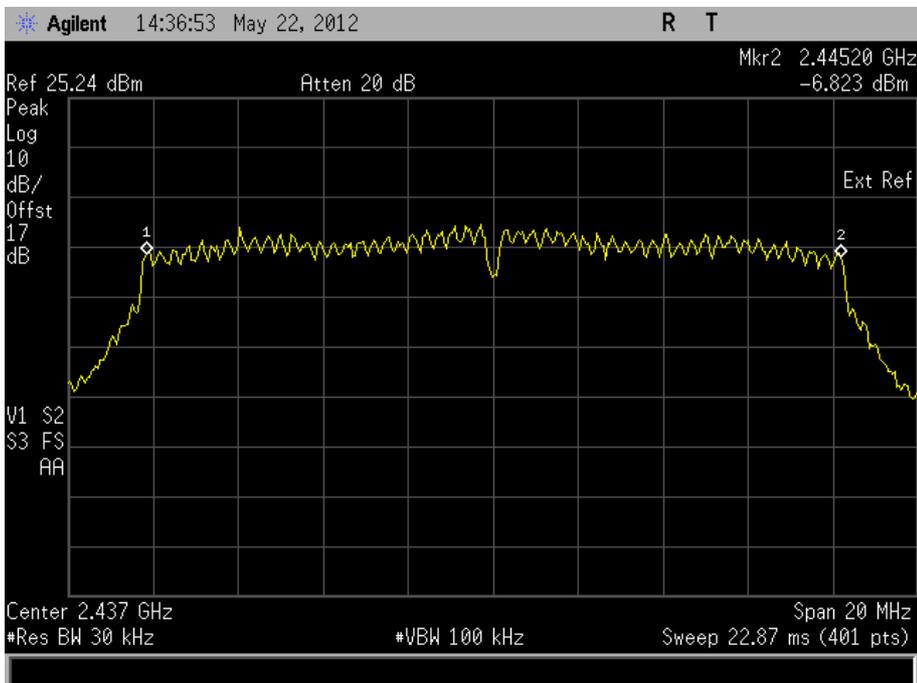


Product Service

24 Mbps



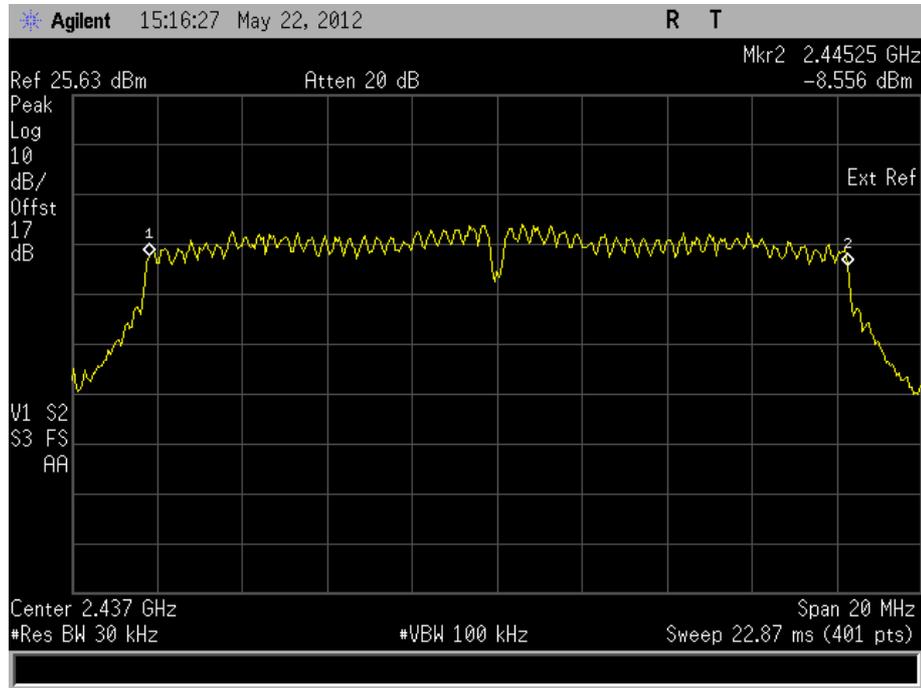
36 Mbps



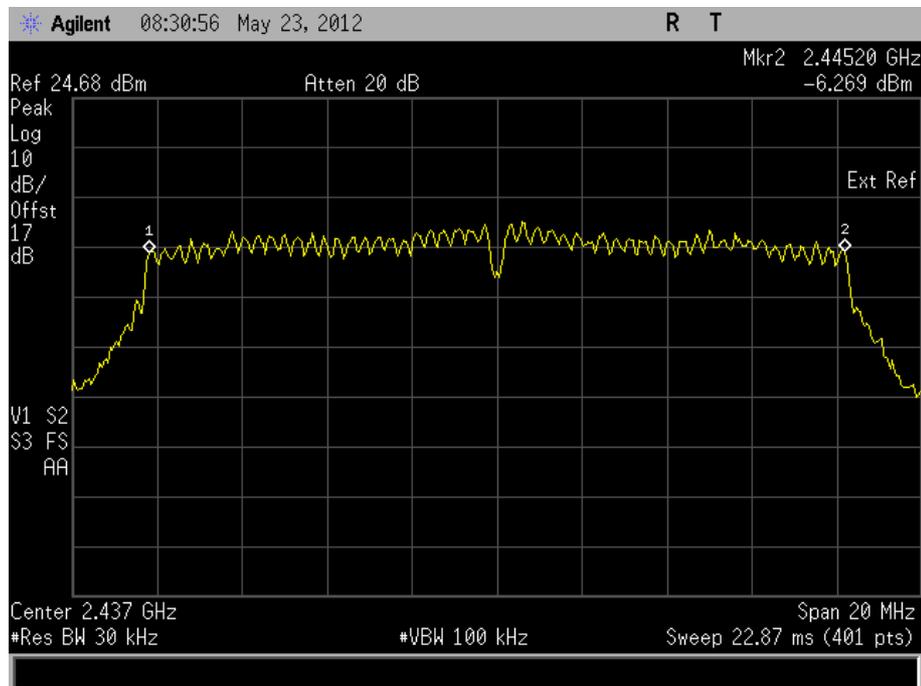


Product Service

48 Mbps



54 Mbps

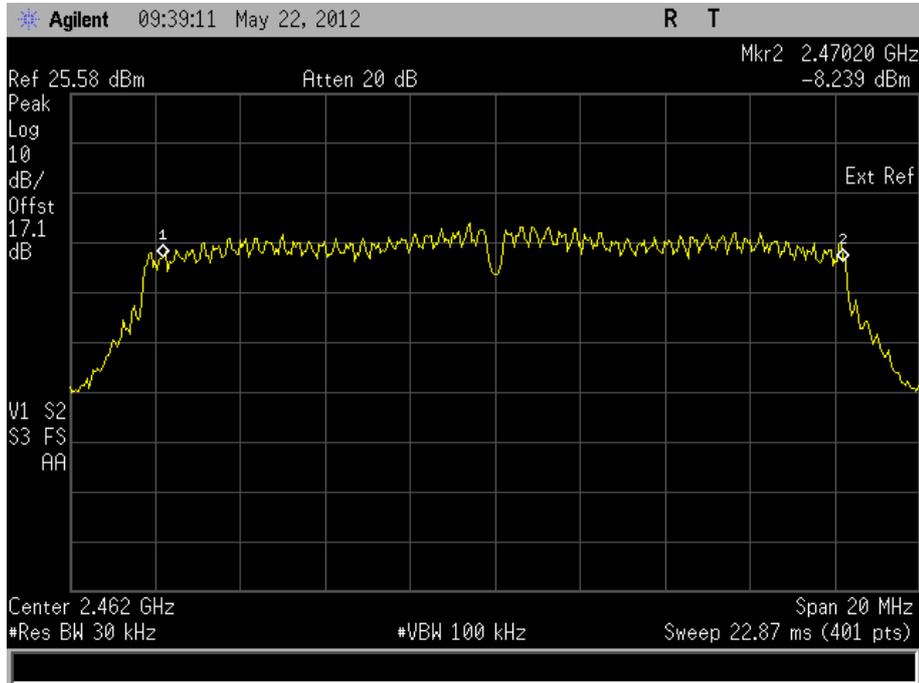




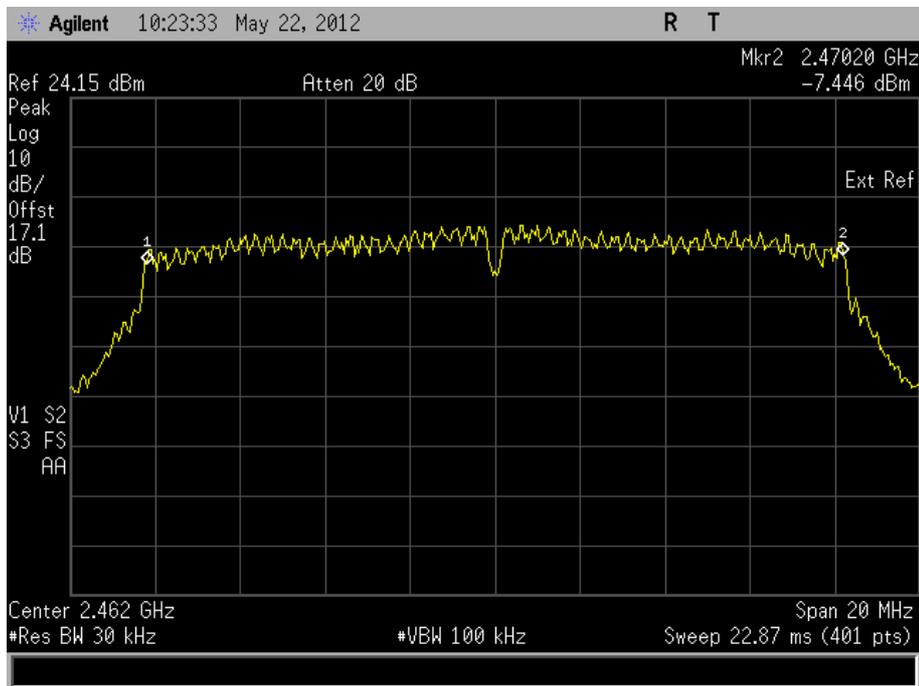
Product Service

2462 MHz

6 Mbps



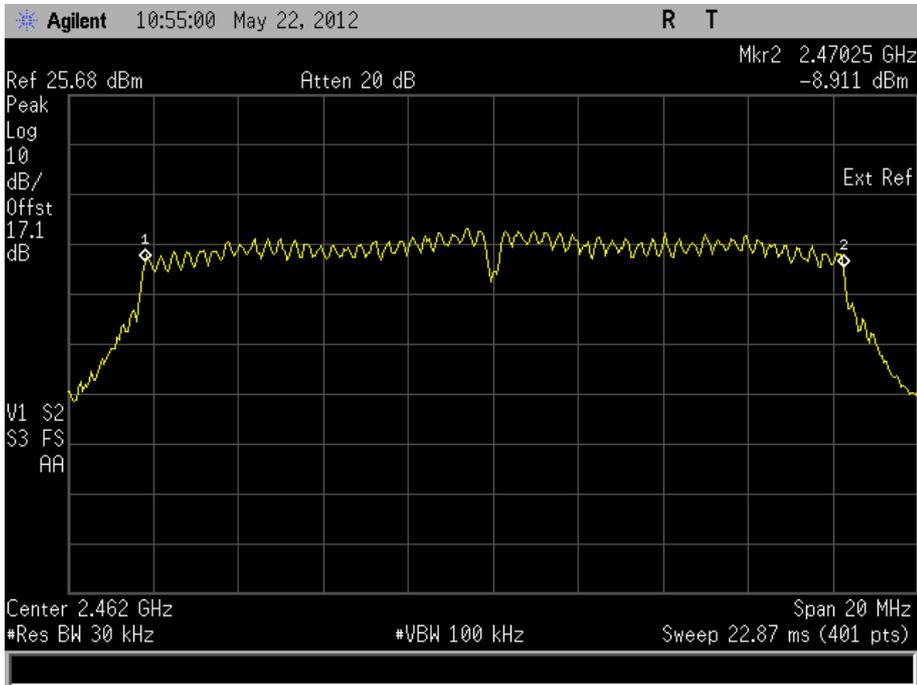
9 Mbps



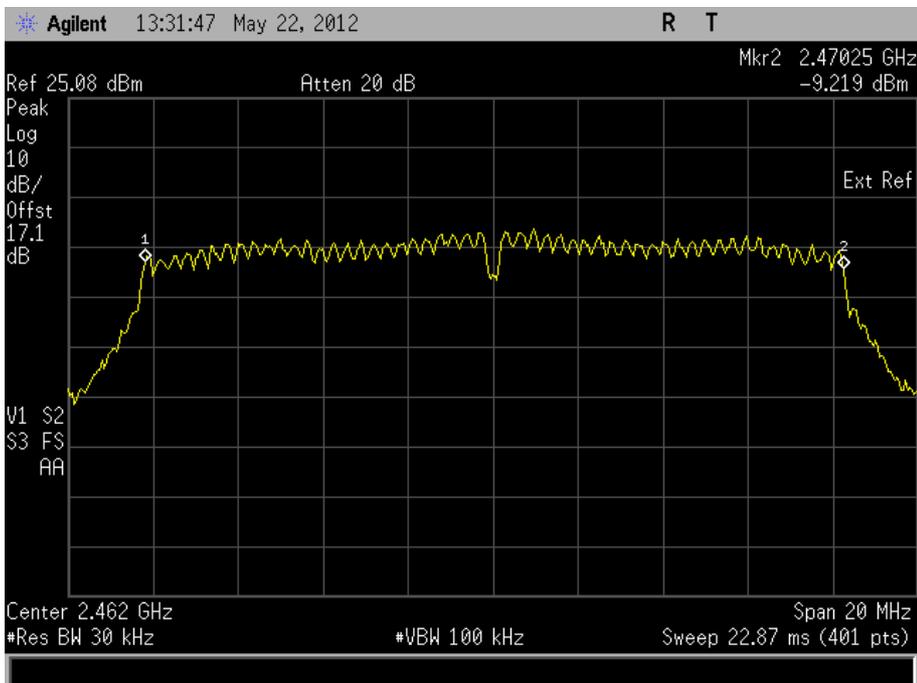


Product Service

12 Mbps



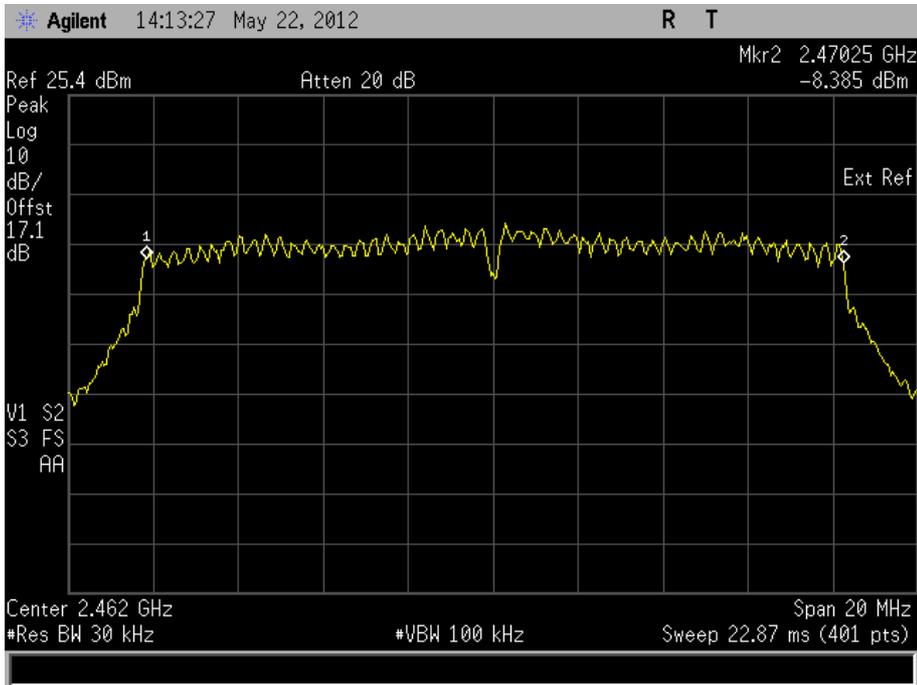
18 Mbps



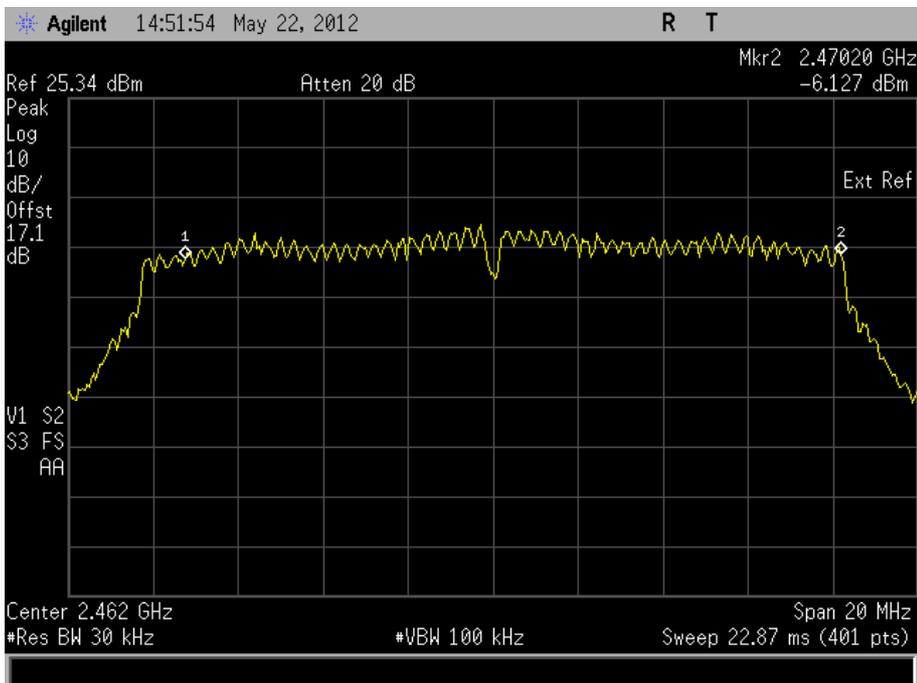


Product Service

24 Mbps



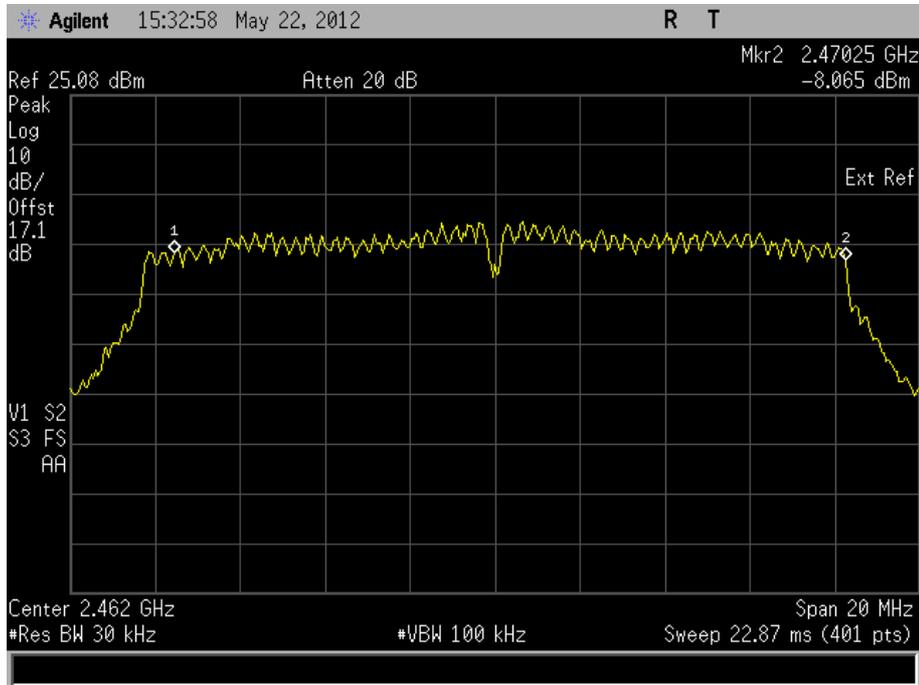
36 Mbps



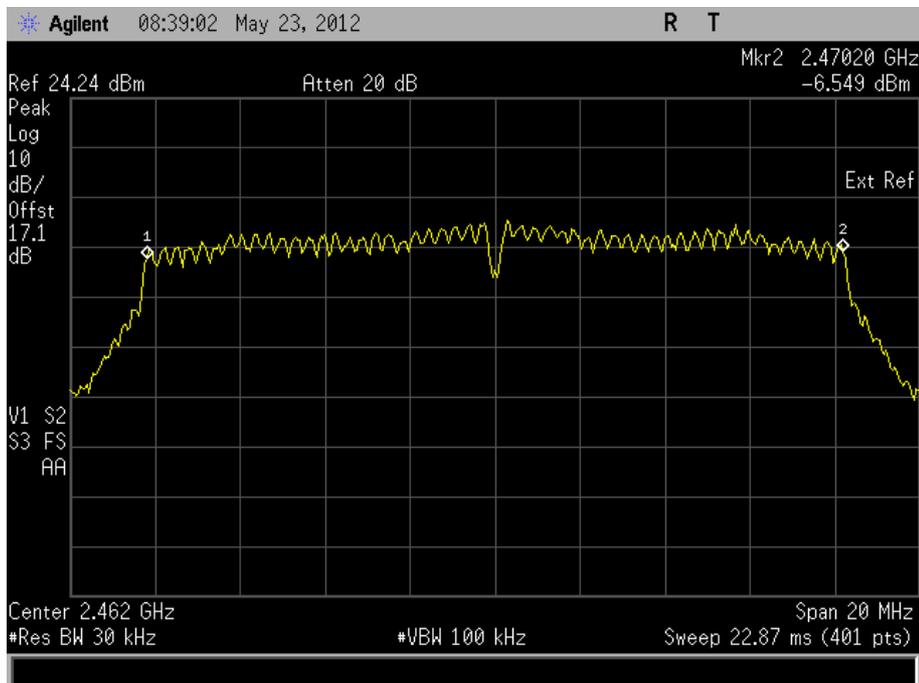


Product Service

48 Mbps



54 Mbps



Limit Clause

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



Product Service

802.11(n)

4.0 V DC Supply

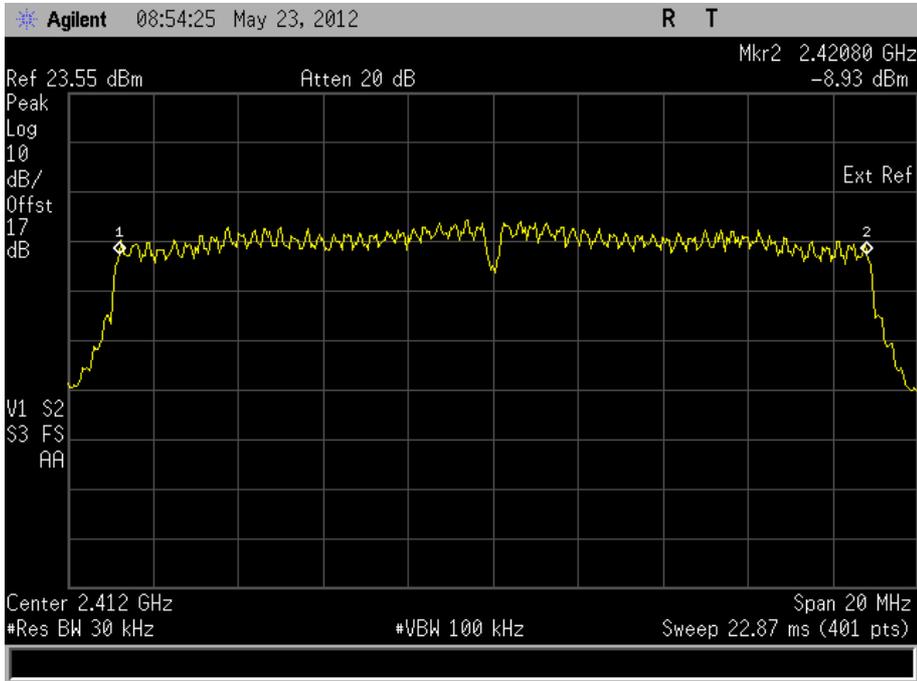
Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	6.5	17600
	13	17700
	19.5	17750
	26	17650
	39	17000
	52	17600
	58.5	17700
	65	17650
2437 MHz	6.5	17600
	13	17700
	19.5	17700
	26	17700
	39	17700
	52	17650
	58.5	17700
	65	17700
2462 MHz	6.5	17600
	13	17650
	19.5	17700
	26	17650
	39	17600
	52	17700
	58.5	17700
	65	17700



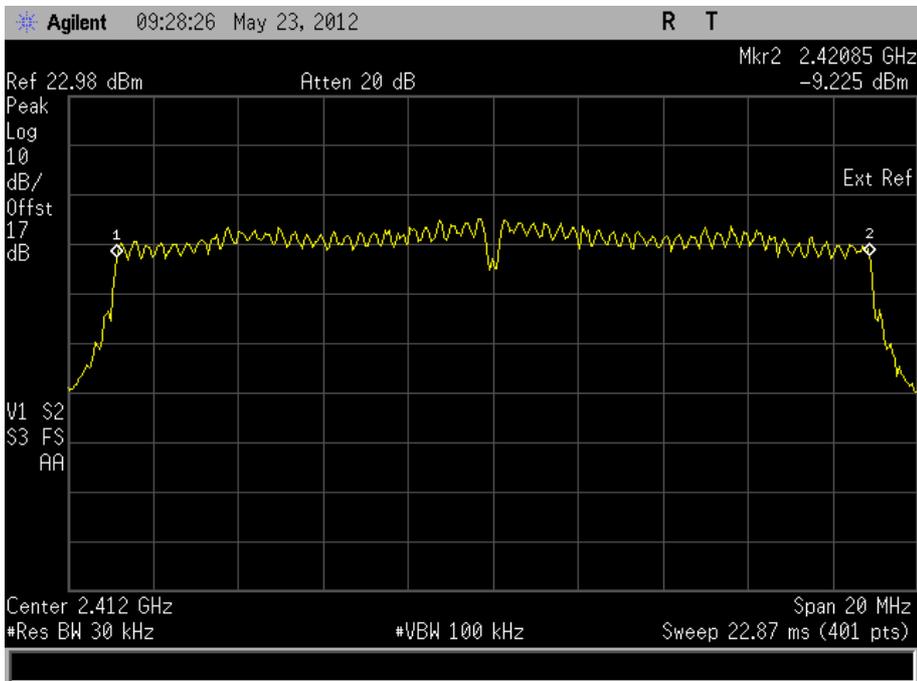
Product Service

2412 MHz

6.5 Mbps



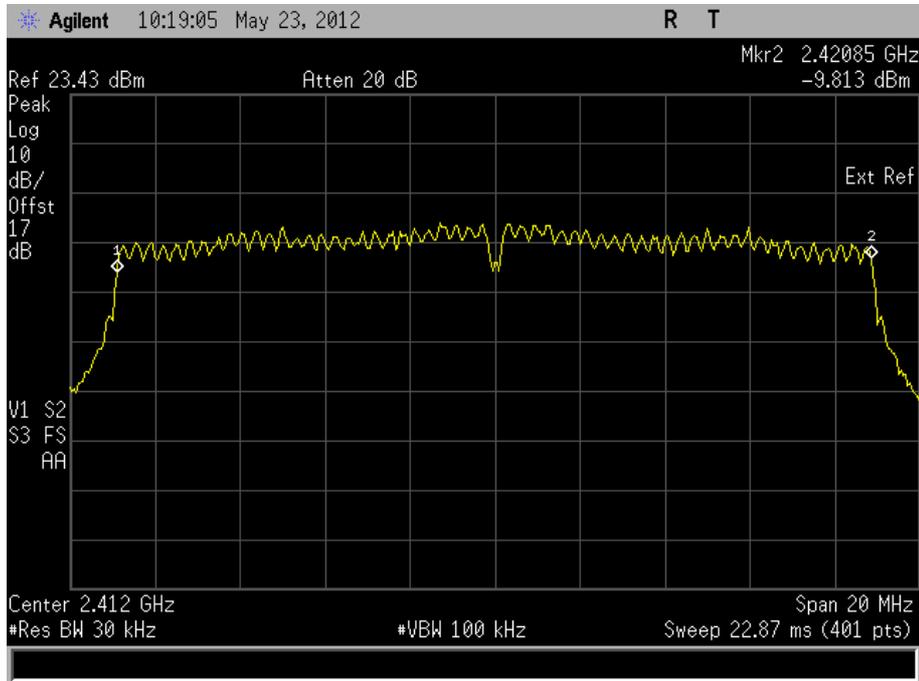
13 Mbps



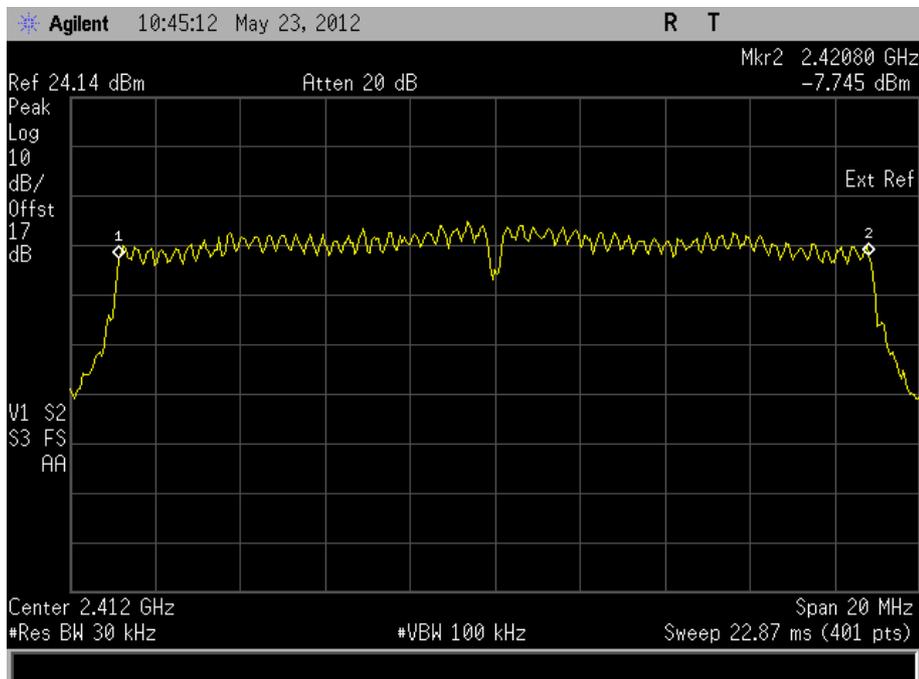


Product Service

19.5 Mbps



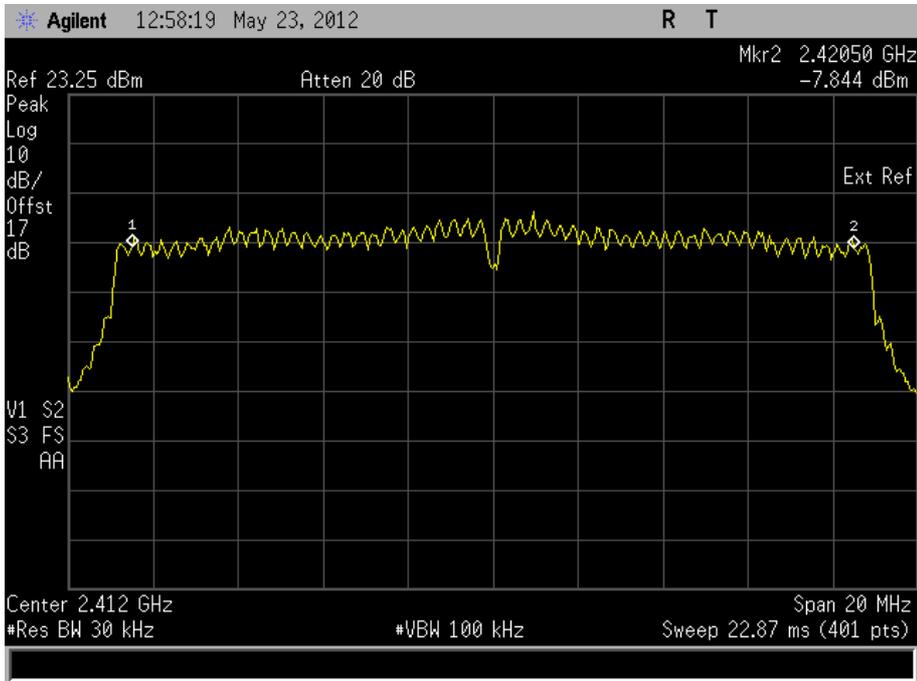
26 Mbps



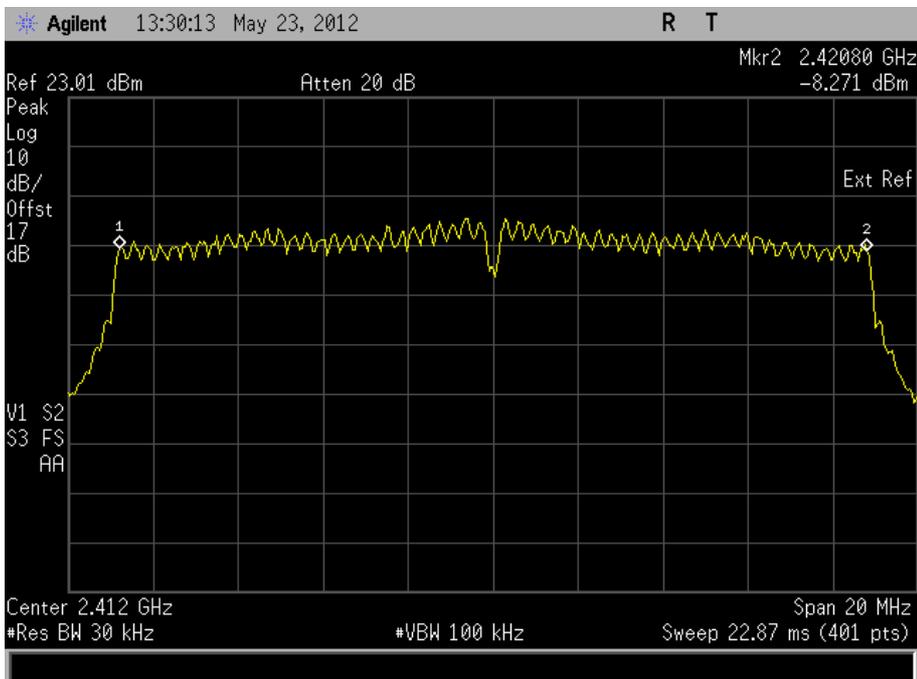


Product Service

39 Mbps



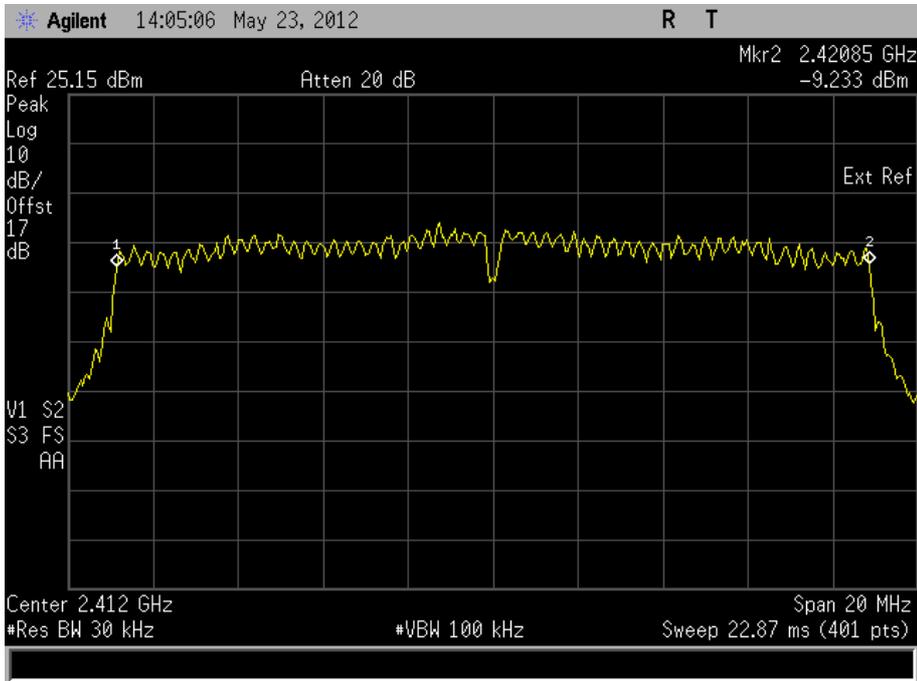
52 Mbps



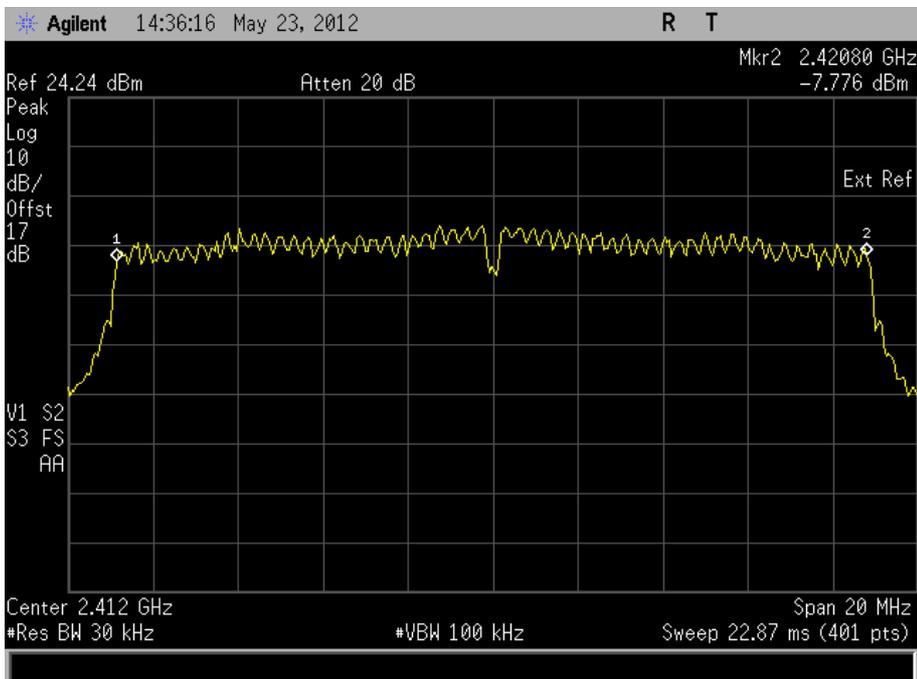


Product Service

58.5 Mbps



65 Mbps

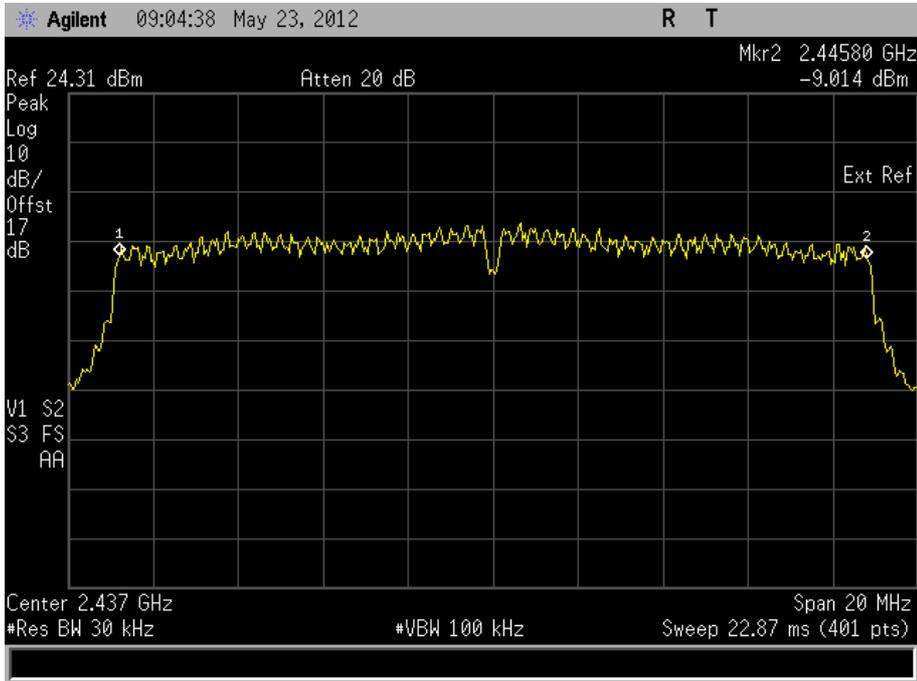




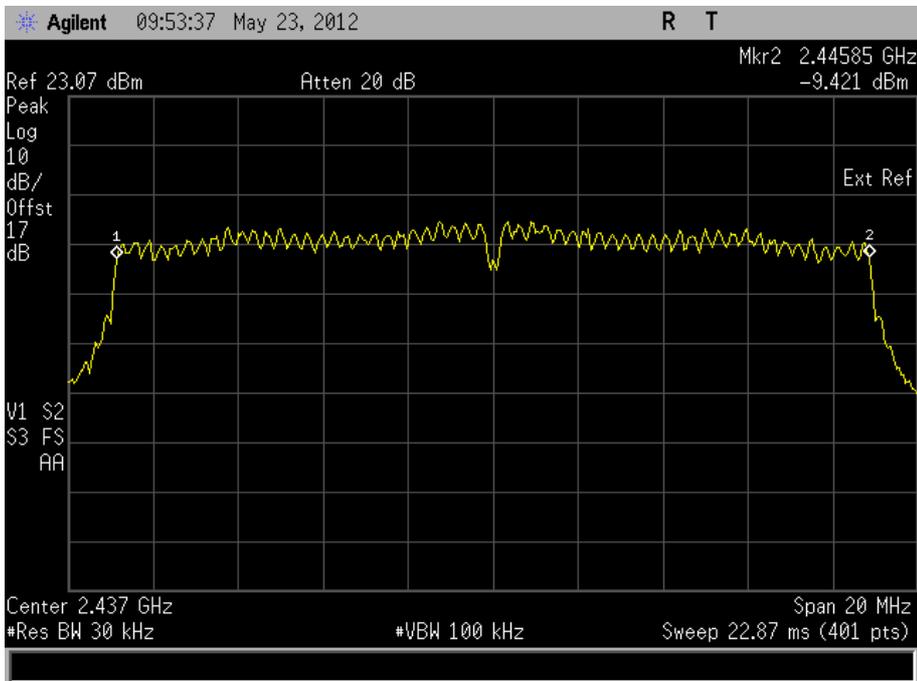
Product Service

2437 MHz

6.5 Mbps



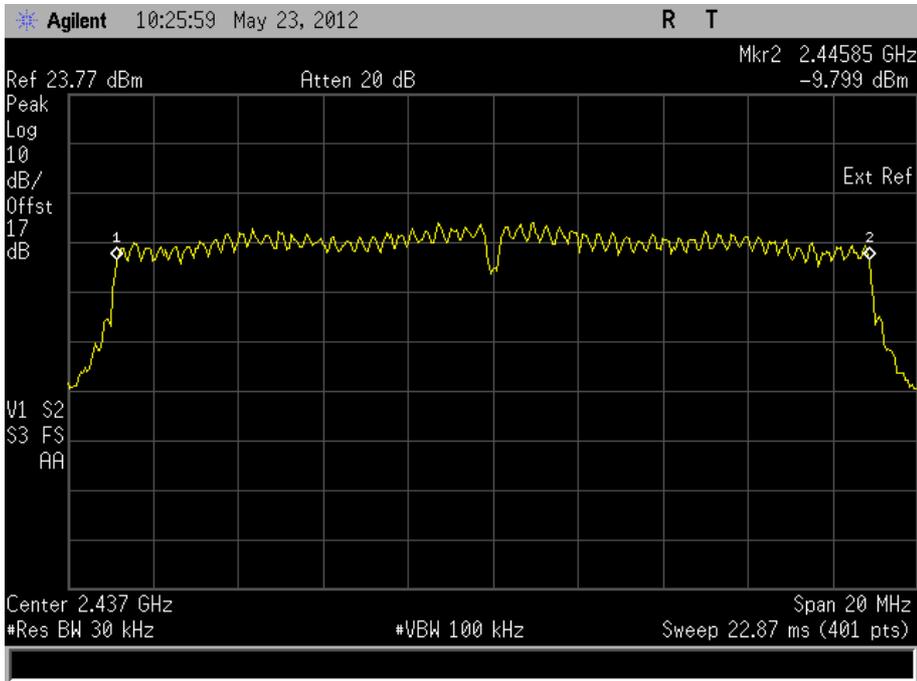
13 Mbps



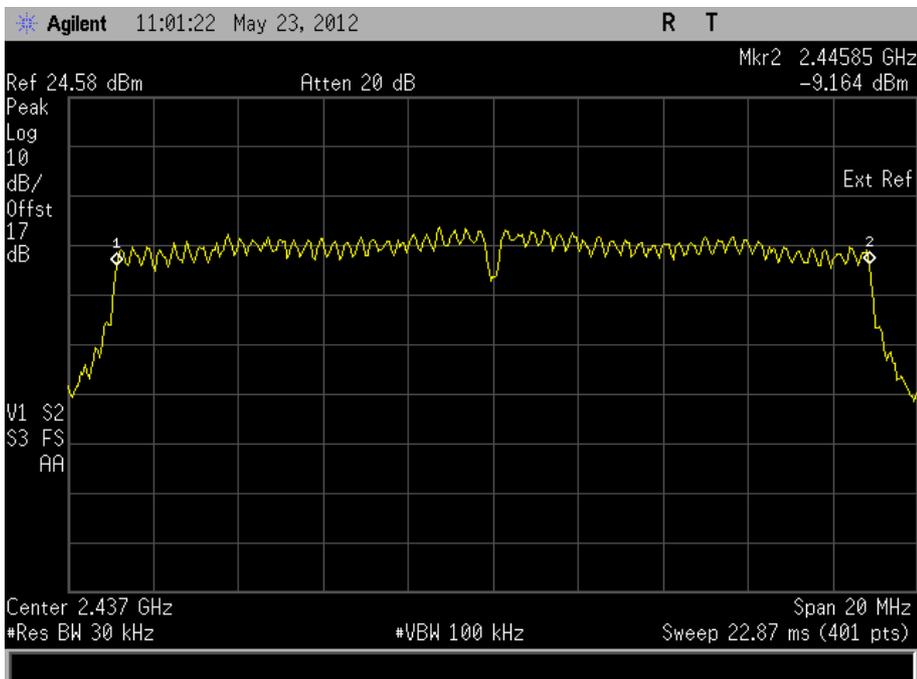


Product Service

19.5 Mbps



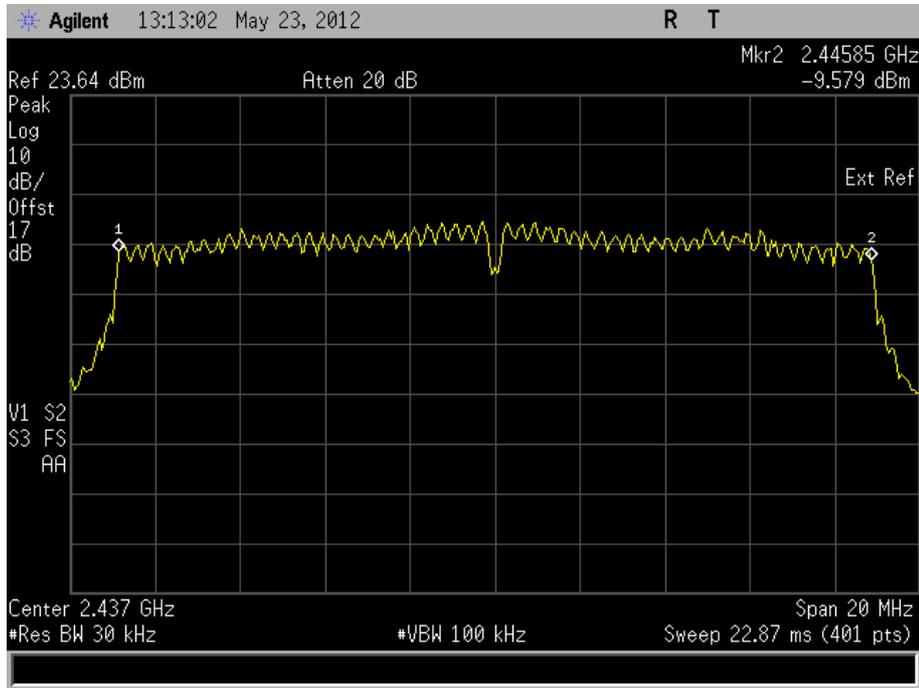
26 Mbps



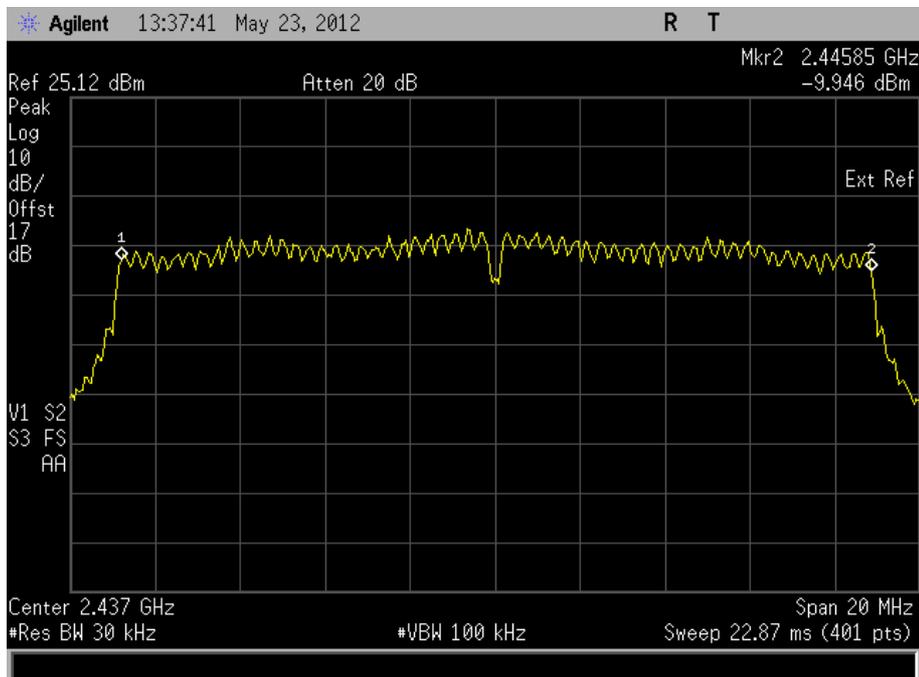


Product Service

39 Mbps



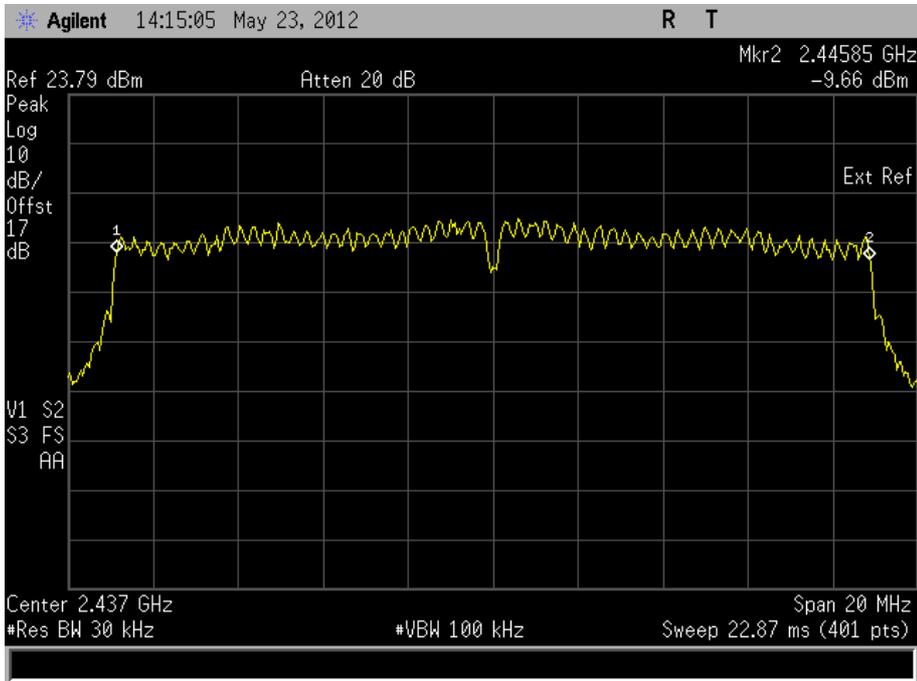
52 Mbps



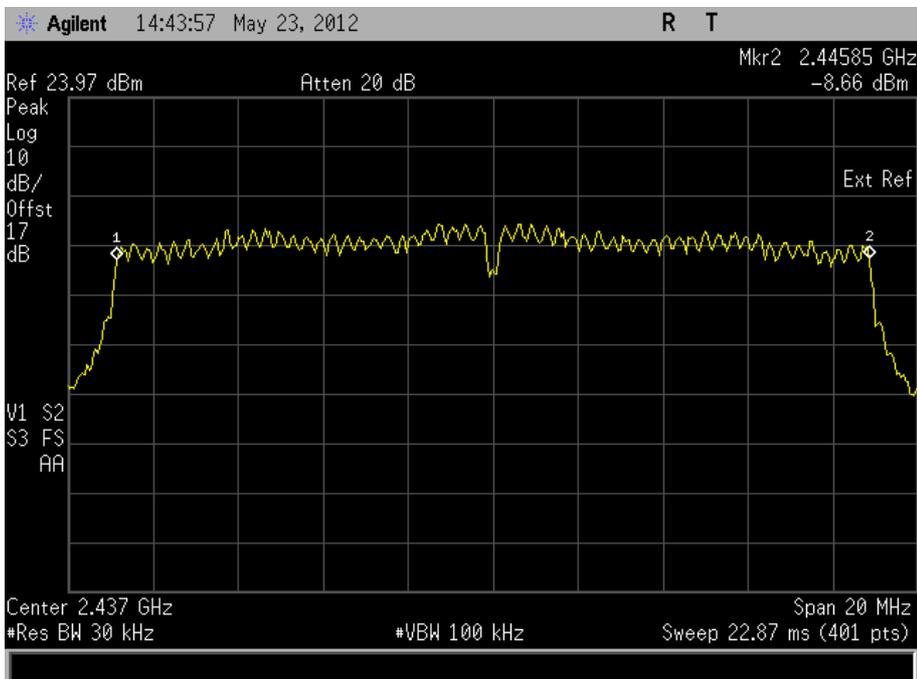


Product Service

58.5 Mbps



65 Mbps

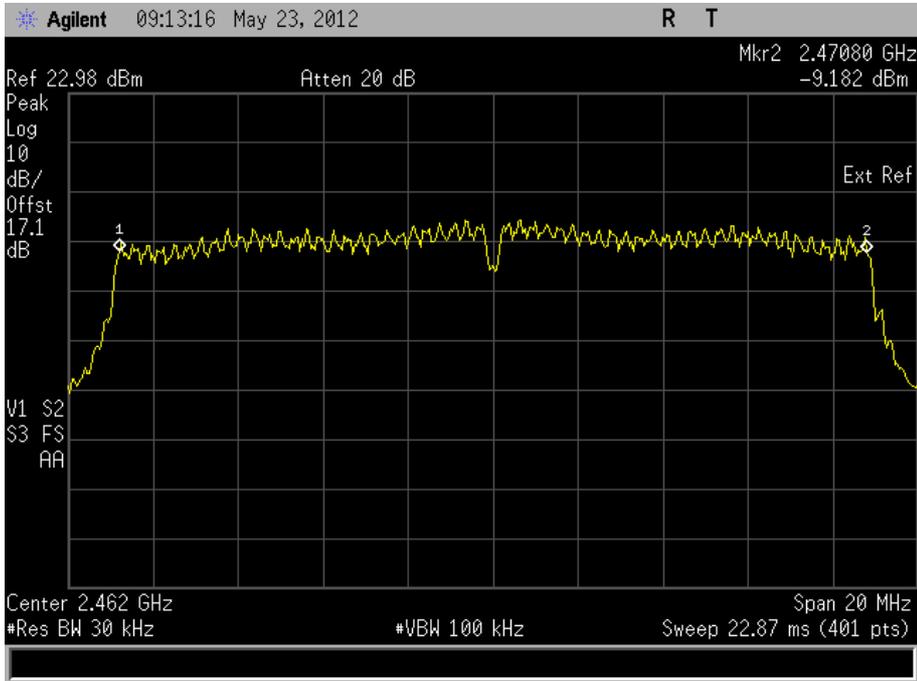




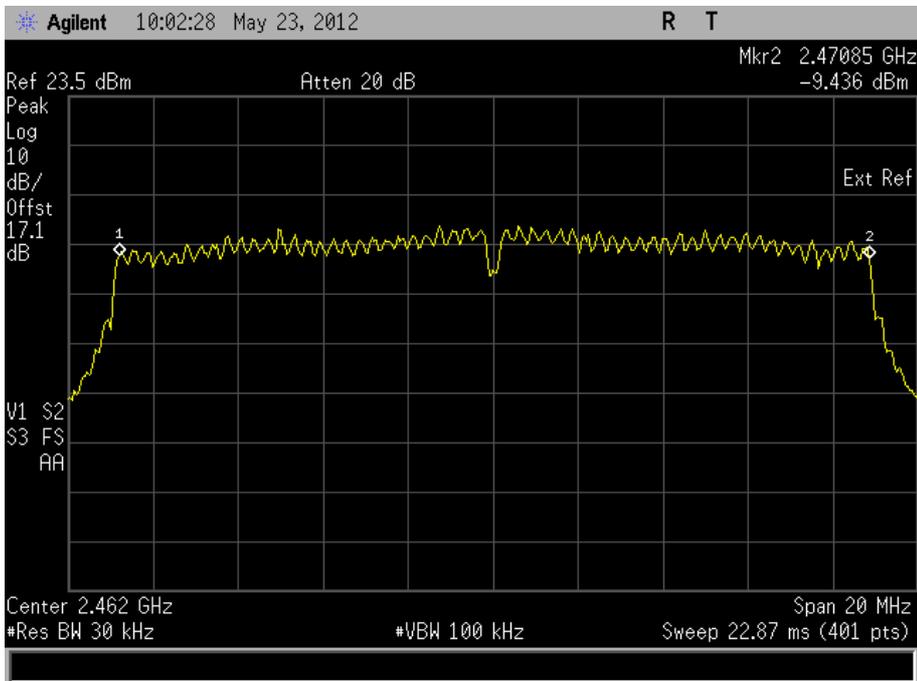
Product Service

2462 MHz

6.5 Mbps



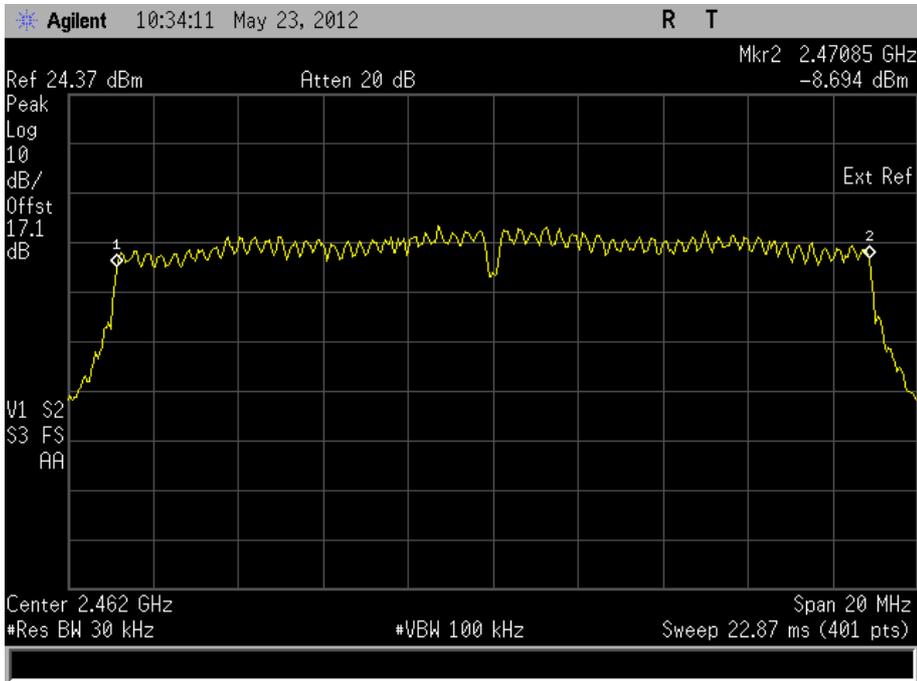
13 Mbps



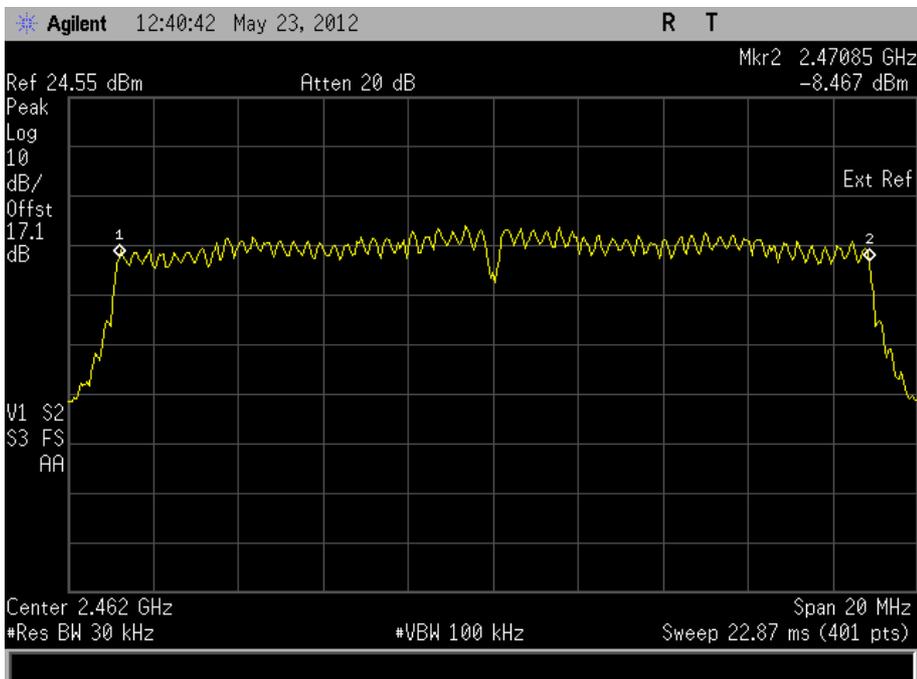


Product Service

19.5 Mbps



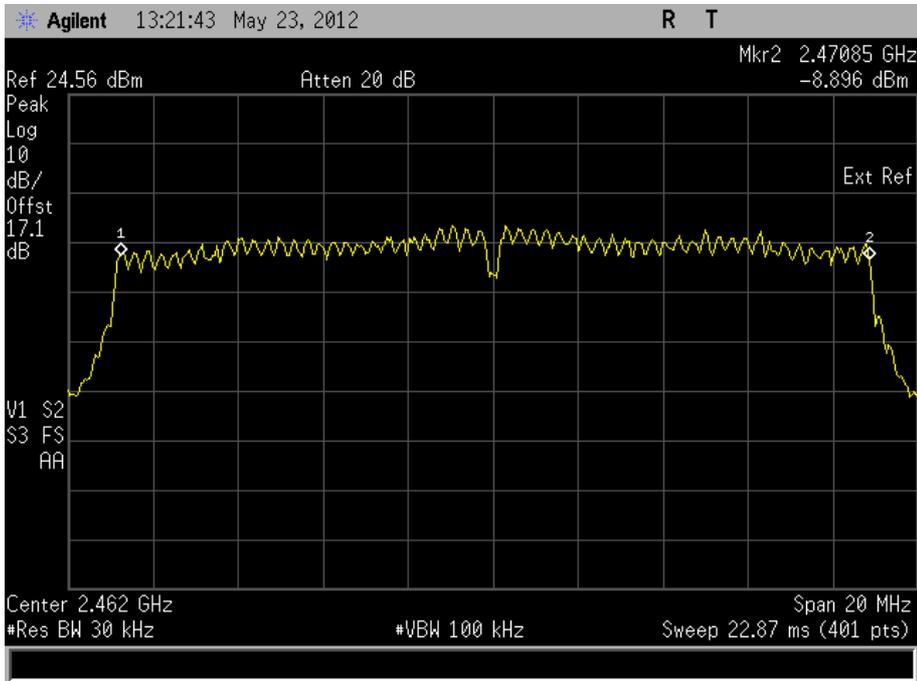
26 Mbps



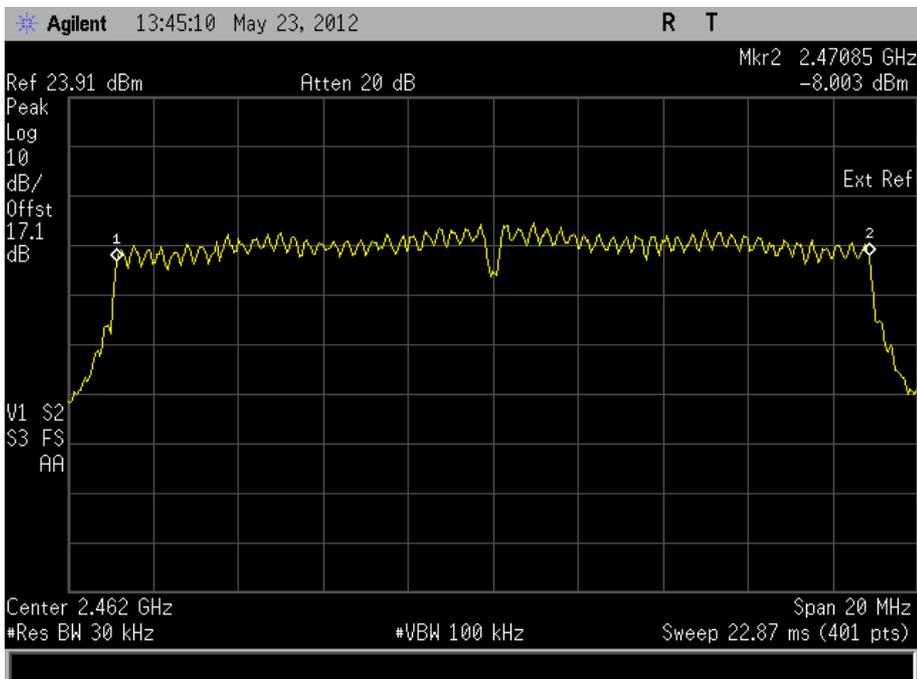


Product Service

39 Mbps



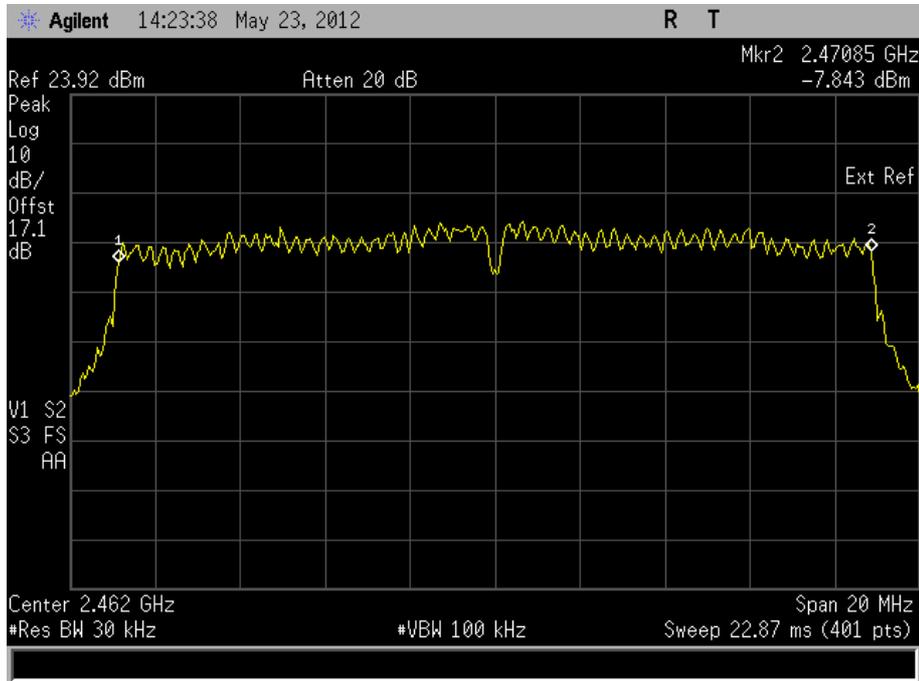
52 Mbps



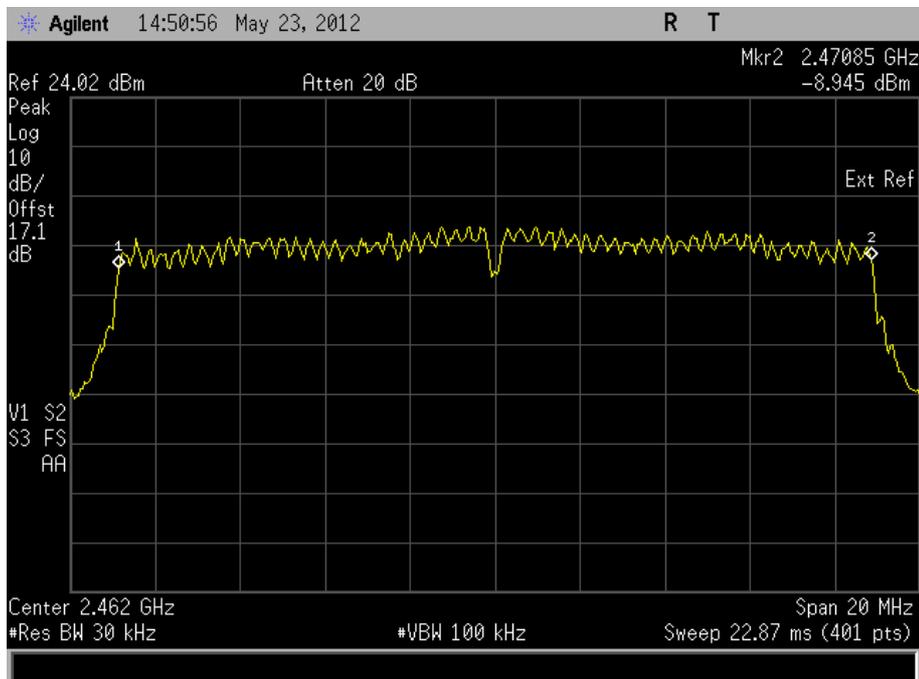


Product Service

58.5 Mbps



65 Mbps



Limit Clause

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



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>					
LISN (1 Phase)	Chase	MN 2050	336	12	23-Mar-2013
Transient Limiter	Hewlett Packard	11947A	1032	12	22-Jun-2012
Screened Room (5)	Rainford	Rainford	1545	36	3-Feb-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
<b>Section 2.2 – Maximum Peak Conducted Output Power</b>					
Dual programable power supply	Thurlby	T-1000	418	-	TU
Power Splitter	Weinschel	1506A	606	12	19-Dec-2012
Rubidium Standard	Rohde & Schwarz	XRSM	1316	12	13-Sep-2012
Hygromer	Rotronic	A1	2677	12	7-Feb-2013
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3696	12	27-Jan-2013
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	24-Jun-2012
P-Series Power Meter	Agilent	N1911A	3981	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3983	12	12-Sep-2012
True RMS Multimeter	Fluke	179	4007	12	16-Feb-2013
<b>Section 2.3 - EIRP Peak Power</b>					
Peak Power Analyser	Hewlett Packard	8990A	107	12	10-Feb-2013
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	8-Dec-2012
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	14-Nov-2012
Screened Room (5)	Rainford	Rainford	1545	36	3-Feb-2014
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Power Sensor	Hewlett Packard	84812A	2743	-	TU
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3702	12	27-Jan-2013
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3703	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	26-Aug-2012
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
<b>Section 2.4 - Power Spectral Density</b>					
Dual programable power supply	Thurlby	T-1000	418	-	TU
Power Splitter	Weinschel	1506A	606	12	19-Dec-2012
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	28-Jun-2012
Rubidium Standard	Rohde & Schwarz	XRSM	1316	12	13-Sep-2012
Hygrometer	Rotronic	A1	2677	12	7-Feb-2013
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3696	12	27-Jan-2013
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	24-Jun-2012
P-Series Power Meter	Agilent	N1911A	3981	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3983	12	12-Sep-2012
True RMS Multimeter	Fluke	179	4007	12	16-Feb-2013
<b>Section 2.5 – Spurious and Band Edge Emissions</b>					
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	13-Sep-2013
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	8-Dec-2012
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	14-Nov-2012
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	2-Aug-2012
Pre-Amplifier	Phase One	PS04-0086	1533	12	20-Sep-2012
Pre-Amplifier	Phase One	PS04-0087	1534	12	26-Sep-2012
Screened Room (5)	Rainford	Rainford	1545	36	3-Feb-2014
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	16-Apr-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3694	12	TU
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	12	TU
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3702	12	27-Jan-2013
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3703	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	26-Aug-2012
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
Low Noise Amplifier	Wright Technologies	APS04-0085	3969	12	8-Jul-2012



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
<b>Section 2.6 - 6dB Bandwidth</b>					
Dual programable power supply	Thurlby	T-1000	418	-	TU
Power Splitter	Weinschel	1506A	606	12	19-Dec-2012
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	28-Jun-2012
Rubidium Standard	Rohde & Schwarz	XRSM	1316	12	13-Sep-2012
Hygrometer	Rotronic	A1	2677	12	7-Feb-2013
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3696	12	27-Jan-2013
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	24-Jun-2012
P-Series Power Meter	Agilent	N1911A	3981	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3983	12	12-Sep-2012
True RMS Multimeter	Fluke	179	4007	12	16-Feb-2013

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 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 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.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA  
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