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Report On

FCC Testing of the
Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI,
FDDV) & Tri-band LTE (B1, B11, B18) multi mode cellular phone with
Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15C (Bluetooth Low Energy)

COMMERCIAL-IN-CONFIDENCE
FCC ID: APYHRO00192

Document 75920802 Report 16 Issue 2

July 2013



Product Service

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COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC Testing of the
Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI,
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Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15C (Bluetooth Low Energy)

Document 75920802 Report 16 Issue 2

July 2013

PREPARED FOR

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DATED

07 July 2013

This report has been up-issued to Issue 2 to include additional test results.

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

M Russell





CONTENTS

Section	Page No
1	REPORT SUMMARY 3
1.1	Introduction 4
1.2	Brief Summary of Results 5
1.3	Application Form 7
1.4	Product Information 12
1.5	Test Conditions 12
1.6	Deviations from the Standard 12
1.7	Modification Record 12
2	TEST DETAILS 13
2.1	AC Line Conducted Emissions 14
2.2	Maximum Peak Conducted Output Power 17
2.3	EIRP Peak Power 22
2.4	Power Spectral Density 35
2.5	Spurious and Band Edge Emissions 71
2.6	6dB Bandwidth 144
3	TEST EQUIPMENT USED 180
3.1	Test Equipment Used 181
3.2	Measurement Uncertainty 183
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 184
4.1	Accreditation, Disclaimers and Copyright 185



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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE
(B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15C (Bluetooth Low Energy)



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE (B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS to the requirements of FCC CFR 47 Part 15C.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Sharp Corporation
Model Number(s)	SHL22
Serial Number(s)	IMEI 004401114764687 IMEI 004401114765106
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2012)
Incoming Release Date	Application Form 14 May 2013
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	9676 30 April 2013
Start of Test	21 May 2013
Finish of Test	07 July 2013
Name of Engineer(s)	G Lawler M Russell
Related Document(s)	ANSI C63.10: 2009



1.2 BRIEF SUMMARY OF RESULTS

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

Section	Spec Clause	Test Description	Result	Comments/Base Standard
802.11(b)				
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)				
2.1	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	



Product Service

Section	Spec Clause	Test Description	Result	Comments/Base Standard
GFSK				
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	



Product Service

1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION	
Model Name/Number	SHL22
Part Number	
FCC ID (if applicable)	APYHRO00192
Industry Canada ID (if applicable)	
Technical Description (Please provide a brief description of the intended use of the equipment)	Dual-Band CDMA(BC0, BC6) and Quad-Band GSM(GSM850/900MHz, DCS1800MHz, PCS1900MHz) and Dual-band UMTS (FDDI, FDDV) and Tri-Band LTE(B1, B11, B18) Multi Mode Cellular Phone with Bluetooth, WLAN, NFC/ FeliCa and GPS receiver enabled

EXTREME TEMPERATURE RANGE over which the equipment is to be type tested	
☐	-20°C to +55°C
☒	Other (2)
☐	Not applicable (no extreme temperature testing required)
Extreme temperature range for the host(s): 10C to 55C	

(2) The equipment shall be tested over the following temperature ranges :

- 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	
☒	Integral
Temporary RF connector provided: ☒ Yes ☐ No	
☐	Antenna connector
☐	Number of antenna assembly(ies) submitted
Gain of the antenna intended for normal use:	
2	dBi for assembly identified as Bluetooth/WLAN
	dBi for assembly identified as
	dBi for assembly identified as
	dBi for assembly identified as
	dBi for assembly identified as

TRANSMITTER TECHNICAL CHARACTERISTICS		
TRANSMITTER OPERATING FREQUENCY RANGE(S)		
	FCC and/or Industry Canada	EU
Bluetooth	2402 to 2480 MHz	2402 to 2480 MHz
WLAN	2412 to 2462 MHz	2412 to 2472 MHz
FCC and/or Industry Canada (only)		
Highest Internally Generated Frequency 1728.0 MHz		



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



TRANSMITTER POWER CHARACTERISTICS					
Bluetooth					
Maximum Rated Transmitter Output					
Effective radiated power (for equipment with antenna connector)				W	
Effective radiated power (for equipment with integral antenna)		2.5m		W	
Minimum Rated Transmitter Output					
Effective radiated power (for equipment with antenna connector)				W	
Effective radiated power (for equipment with integral antenna)		0.25m		W	
Is transmitter intended for :					
Continuous duty		☒	Yes	☐	No
Intermittent duty		☐	Yes	☐	No
If intermittent state DUTY CYCLE					
Transmitter ON	seconds		Transmitter OFF	minutes	
Is continuous operation possible for testing purposes?		☒	Yes	☐	No
Is transmitter output power variable:		☒	Yes	☐	No
State during the test:					
Transmitter duty cycle	Tx on	Seconds	Tx Off	Seconds	
Duty cycle (Tx on / (Tx on + Tx off))		%			
☐ Continuously variable			☐ Stepped		
dB per step					
WLAN					
Maximum Rated Transmitter Output					
Effective radiated power (for equipment with antenna connector)				W	
Effective radiated power (for equipment with integral antenna)		0.1		W	
Minimum Rated Transmitter Output					
Effective radiated power (for equipment with antenna connector)				W	
Effective radiated power (for equipment with integral antenna)				W	
Is transmitter intended for :					
Continuous duty		☒	Yes	☐	No
Intermittent duty		☐	Yes	☐	No
If intermittent state DUTY CYCLE					
Transmitter ON	seconds		Transmitter OFF	minutes	
Is continuous operation possible for testing purposes?		☒	Yes	☐	No
Is transmitter output power variable:		☒	Yes	☐	No
State during the test:					
Transmitter duty cycle	Tx on	Seconds	Tx Off	Seconds	
Duty cycle (Tx on / (Tx on + Tx off))		%			
☐ Continuously variable			☐ Stepped		
dB per step					



Product Service

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

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

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

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

Signature:

Name: Hachiro Hidaka

Position held: Ass. Manager

Date: 14th May, 2013



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE (B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

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

The EUT was powered from a 4.0 V DC supply.

FCC 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.



Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE
(B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15C (Bluetooth Low Energy)



Product Service

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

SHL22 S/N: IMEI 004401114764687 - Modification State 0

2.1.3 Date of Test

10 June 2013

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	20.9°C
Relative Humidity	35.0%

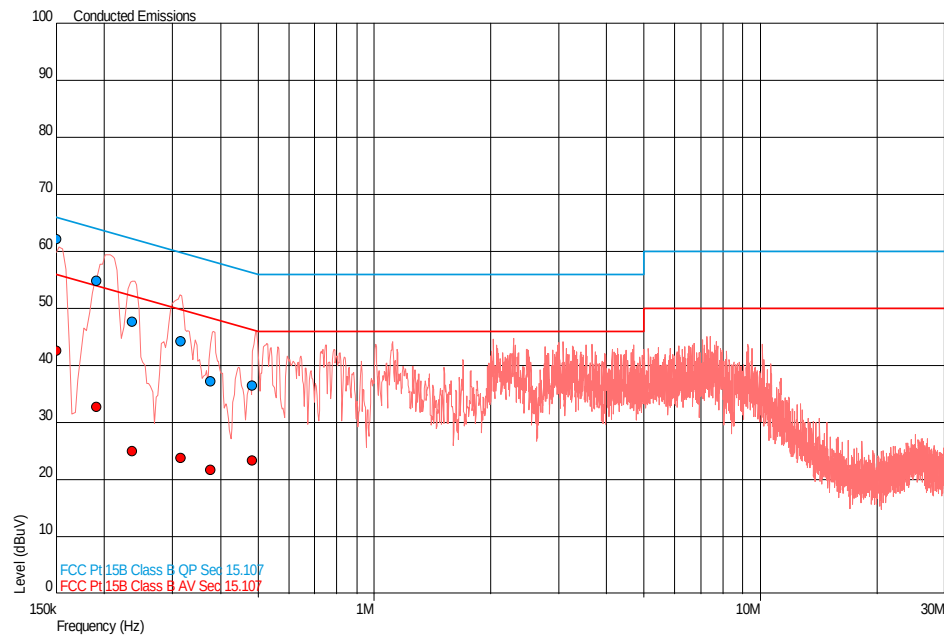


Product Service

2.1.7 Test Results

802.11(n)

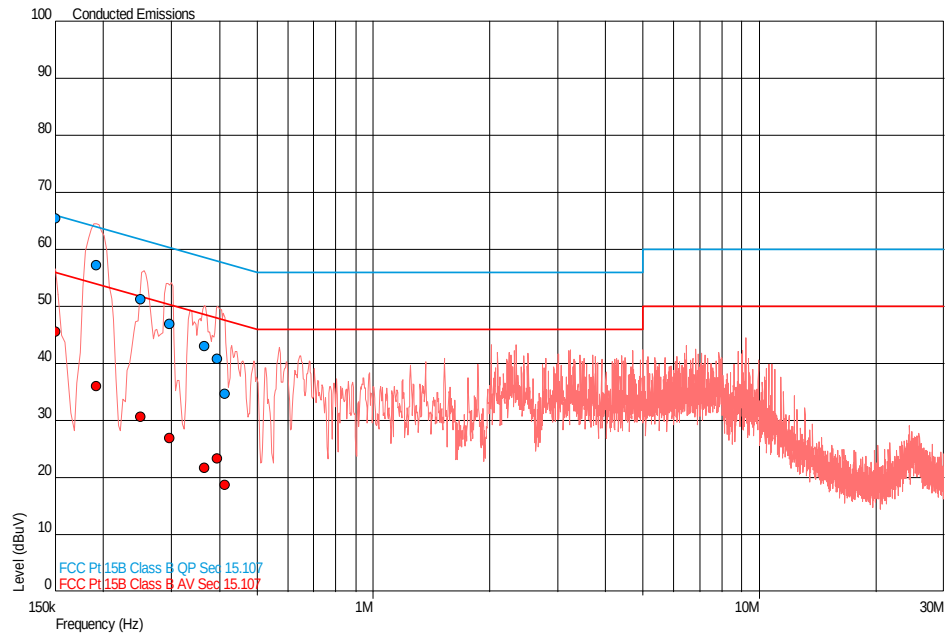
Live Line



Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	62.2	66.0	-3.8	42.6	56.0	-13.4
0.191	54.9	64.0	-9.1	32.7	54.0	-21.3
0.236	47.8	62.2	-14.5	25.0	52.2	-27.2
0.315	44.2	59.8	-15.7	23.8	49.8	-26.0
0.377	37.2	58.4	-21.2	21.7	48.4	-26.6
0.484	36.6	56.3	-19.7	23.4	46.3	-22.9



Product Service

Neutral Line

Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	65.5	66.0	-0.5	45.6	56.0	-10.4
0.192	57.2	64.0	-6.8	36.1	54.0	-17.9
0.249	51.2	61.8	-10.6	30.7	51.8	-21.0
0.297	46.9	60.3	-13.4	27.0	50.3	-23.3
0.365	43.1	58.6	-15.5	21.7	48.6	-26.9
0.394	40.9	58.0	-17.1	23.4	48.0	-24.6
0.412	34.7	57.6	-23.0	18.8	47.6	-28.8



Product Service

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

SHL22 S/N: IMEI 004401114765106 - Modification State 0

2.2.3 Date of Test

22 May 2013 and 05 July 2013

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 Power Meter. The Power Meter settings were adjusted to measure the signal and a reference level offset was entered to account for the measurement path loss. The peak levels were recorded.

2.2.6 Environmental Conditions

Ambient Temperature 23.7 - 25.2°C

Relative Humidity 37.9 - 49.4%



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	15.68	16.77	16.73	36.97	47.54	47.08
2	15.72	16.95	16.69	37.29	49.58	46.70
5.5	15.79	16.89	16.71	37.90	48.84	46.86
11	15.84	17.02	15.39	38.33	50.33	34.56

Limit Clause

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

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

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



Product Service

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	22.32	22.81	23.91	170.78	191.13	246.30
9	22.15	22.79	23.38	163.97	190.01	217.70
12	21.97	23.12	23.89	157.56	157.56	205.25
18	22.12	23.10	23.23	162.82	203.99	210.49
24	21.72	22.75	22.69	148.57	188.23	185.97
36	21.50	22.70	22.77	141.13	186.03	189.36
48	23.04	23.64	24.05	201.29	231.41	254.30
54	21.41	22.15	22.61	138.49	163.95	182.46

Limit Clause

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

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

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

802.11(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	22.41	23.22	24.10	174.08	209.69	256.99
13	23.31	24.55	25.06	214.45	285.27	321.39
19.5	23.44	24.16	24.90	220.71	260.91	308.87
26	22.79	23.72	24.08	190.03	235.41	255.94
39	22.81	23.76	23.82	190.93	237.87	241.21
52	22.63	24.00	23.99	183.05	251.00	250.32
58.5	22.87	23.84	24.05	193.70	241.97	253.88
65	22.40	23.22	23.89	173.89	210.02	244.87

Limit Clause

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

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

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



Product Service

GFSK

4.0 V DC Supply

Modulation Data Rate (Mbps)	Maximum Peak Conducted Output Power					
	dBm			mW		
	2402 MHz	2440 MHz	2480 MHz	2402 MHz	2440 MHz	2480 MHz
1	-1.24	-0.79	0.55	0.75	0.83	1.13

Limit Clause

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

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

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



Product Service

2.3 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

SHL22 S/N: IMEI 004401114764687 - Modification State 0

2.3.3 Date of Test

2 June 2013, 17 June 2013, 18 June 2013 and 07 July 2013

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

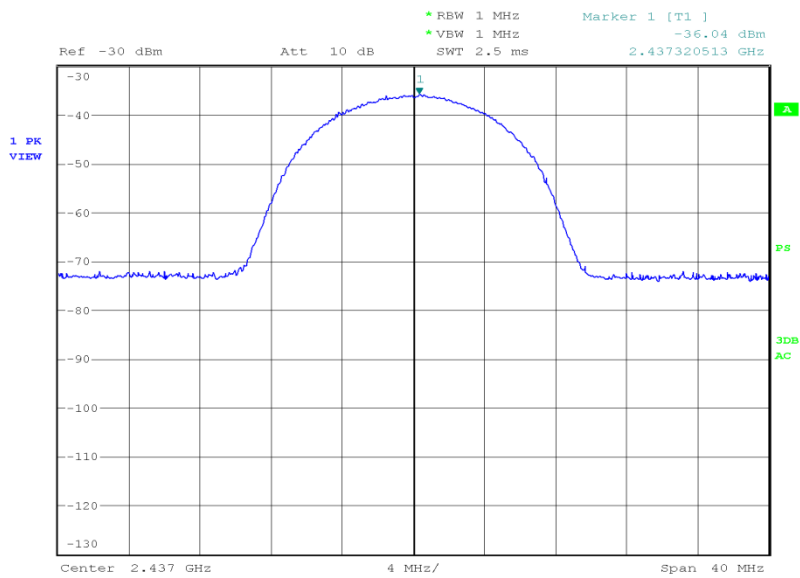
Ambient Temperature	18.9 - 23.3°C
Relative Humidity	35.1 - 45.4%



Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
13.87	24.38



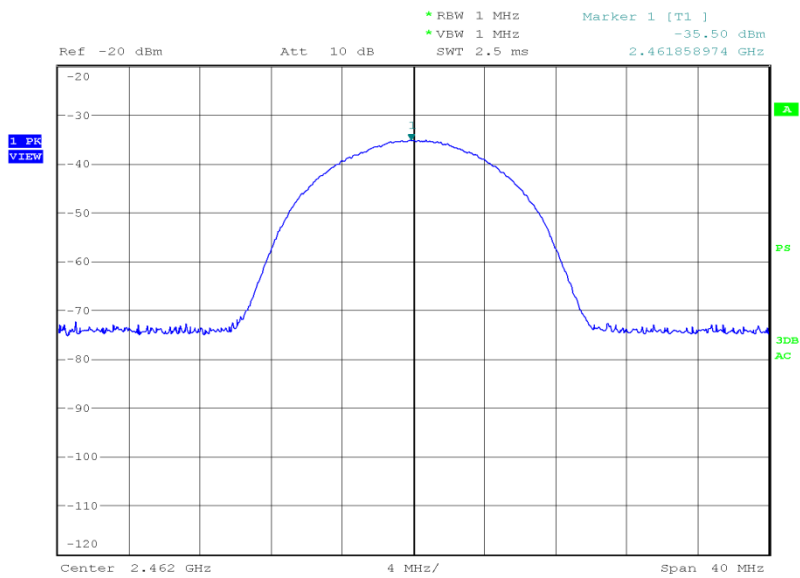
Date: 2.JUN.2013 13:47:54



Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
14.10	25.70



Date: 2.JUN.2013 14:03:03

Limit

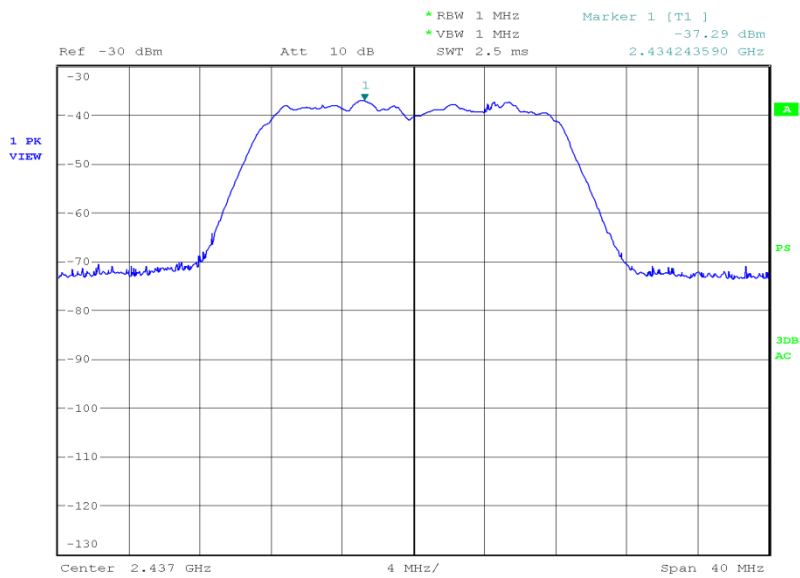
EIRP (dBm)	EIRP (mW)
36.0	4000



Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
19.20	83.18



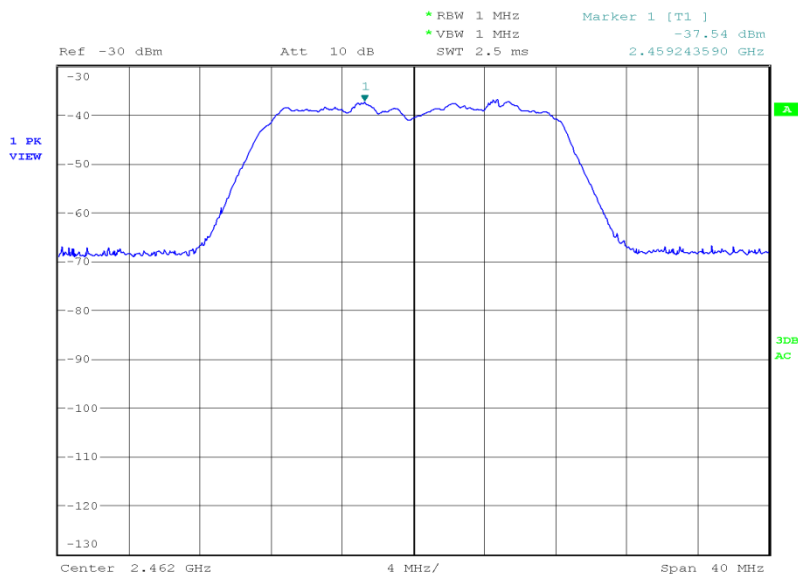
Date: 2.JUN.2013 11:26:36



Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
18.78	75.51



Date: 2.JUN.2013 11:42:42

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



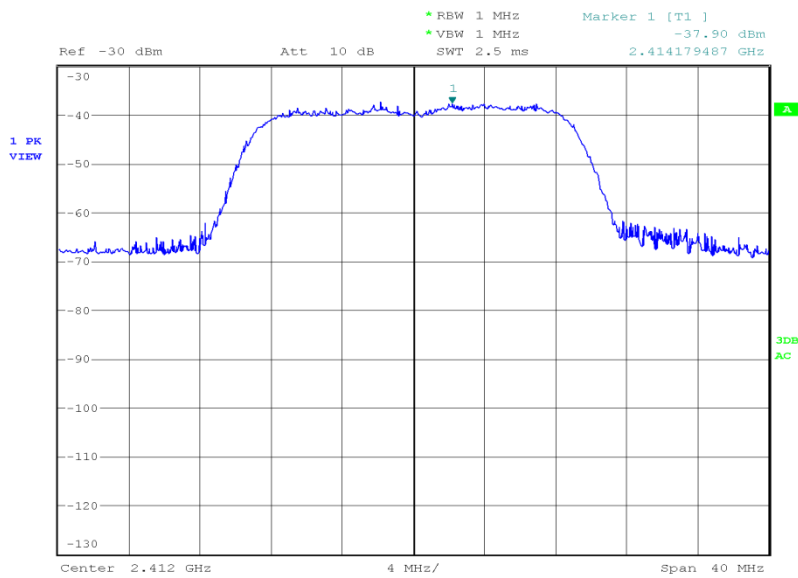
Product Service

802.11(n)

4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
18.33	68.08



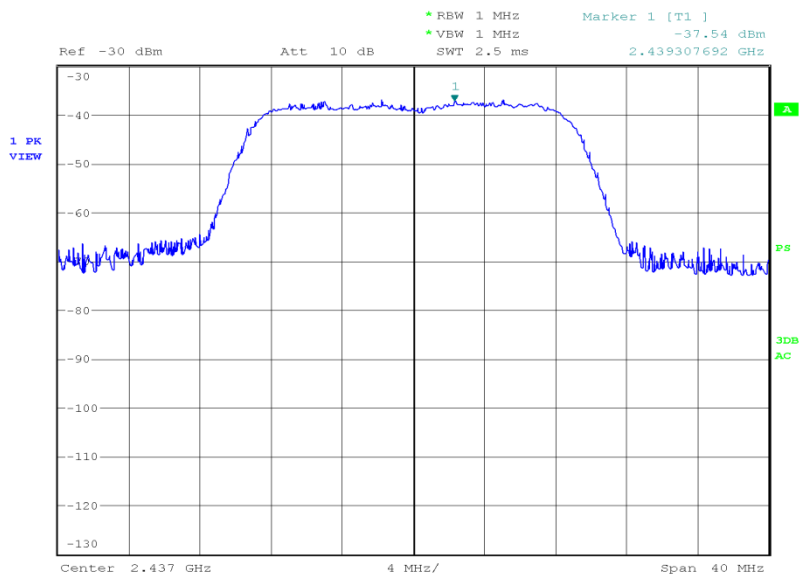
Date: 2.JUN.2013 10:48:39



Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
18.11	64.71



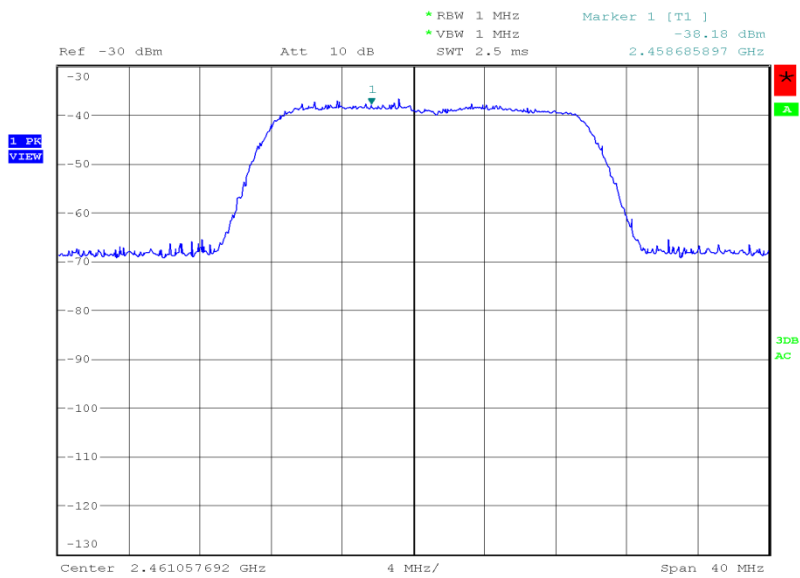
Date: 2.JUN.2013 10:01:55



Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
17.30	53.70



Date: 2.JUN.2013 10:27:12

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



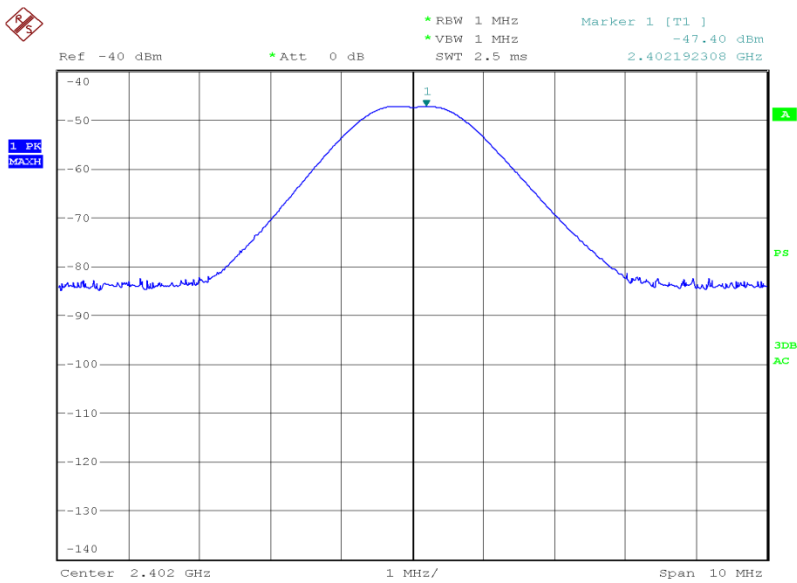
Product Service

GFSK

4.0 V DC Supply

2402 MHz

EIRP (dBm)	EIRP (mW)
-6.27	0.24



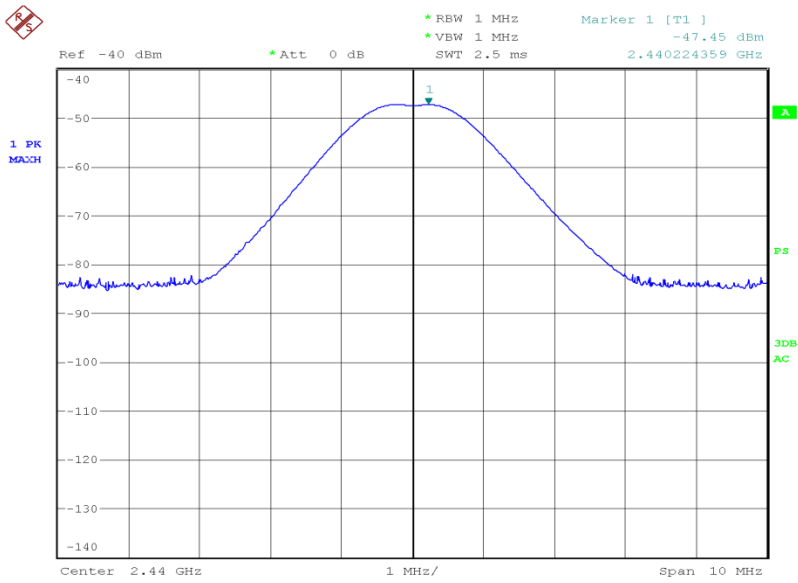
Date: 6.JUL.2013 15:39:42



Product Service

2440 MHz

EIRP (dBm)	EIRP (mW)
-6.12	0.24



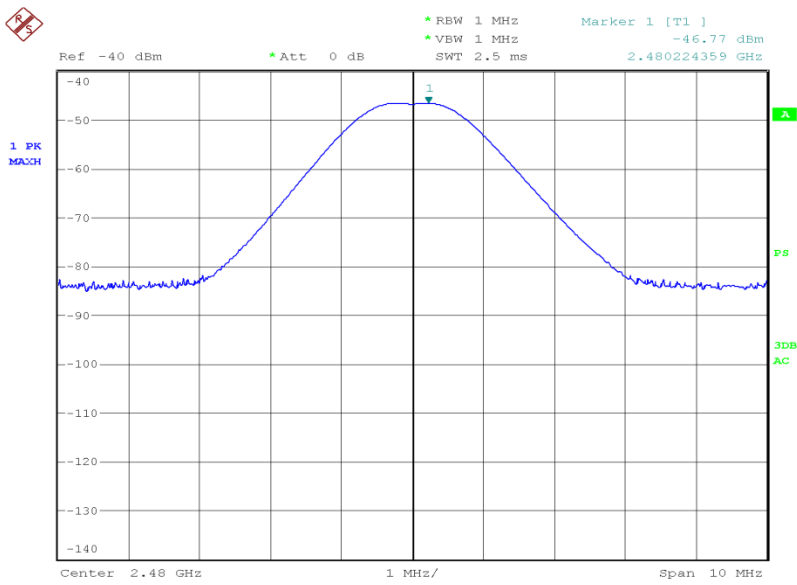
Date: 6.JUL.2013 16:03:36



Product Service

2480 MHz

EIRP (dBm)	EIRP (mW)
-5.66	0.27



Date: 6.JUL.2013 16:20:31

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

SHL22 S/N: IMEI 004401114765106 - Modification State 0

2.4.3 Date of Test

21 May 2013, 22 May 2013 and 05 July 2013

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	23.4 - 25.2°C
Relative Humidity	37.9 - 47.4%



Product Service

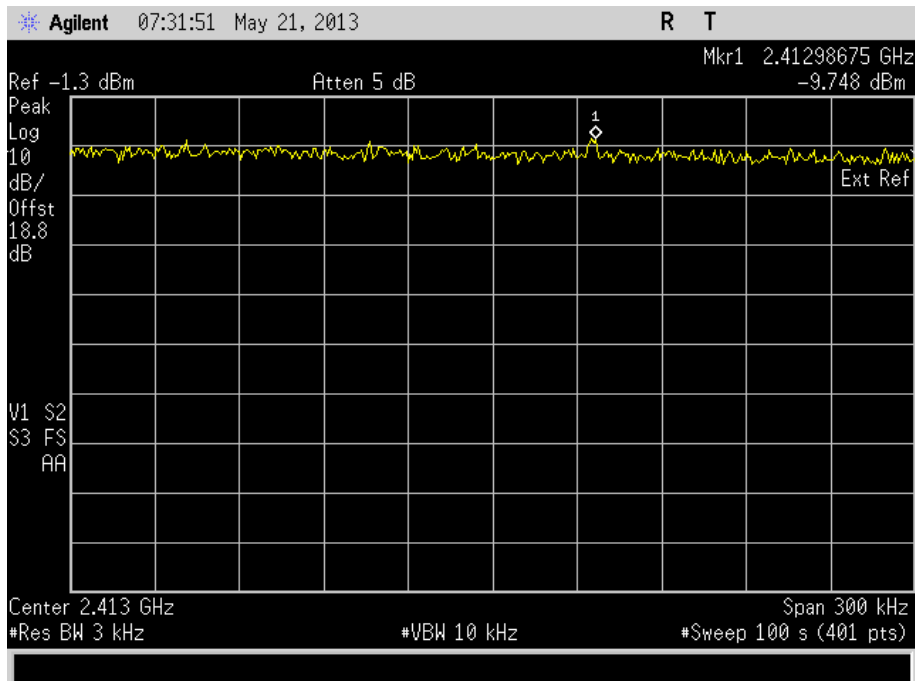
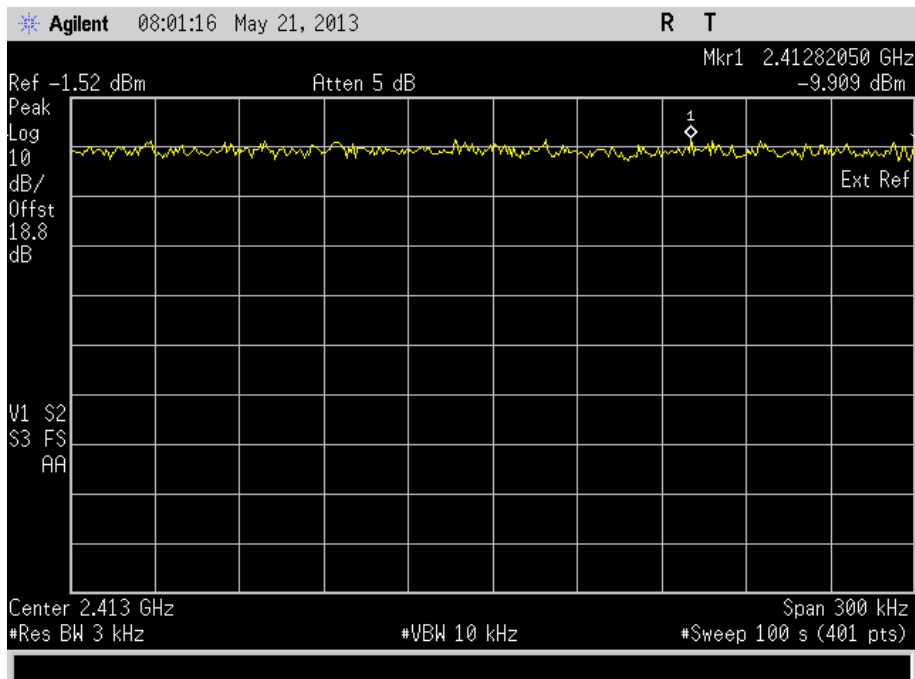
2.4.7 Test Results802.11(b)

4.0 V DC Supply

Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	1	-9.75
	2	-9.91
	5.5	-10.73
	11	-10.40
2437 MHz	1	-9.63
	2	-9.31
	5.5	-10.63
	11	-9.77
2462 MHz	1	-10.41
	2	-9.98
	5.5	-10.87
	11	-12.93



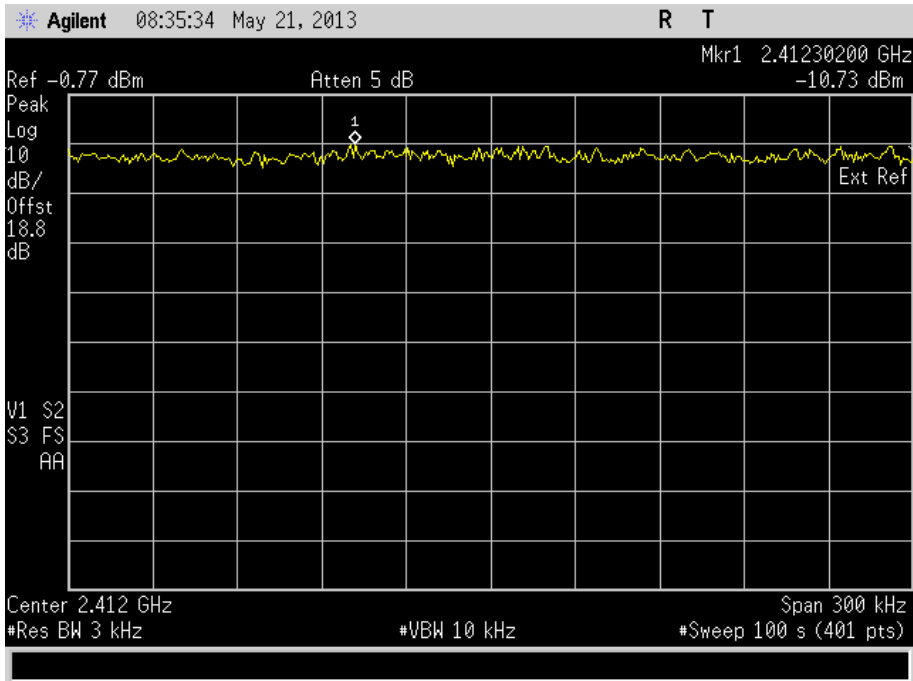
Product Service

2412 MHz1 Mbps2 Mbps

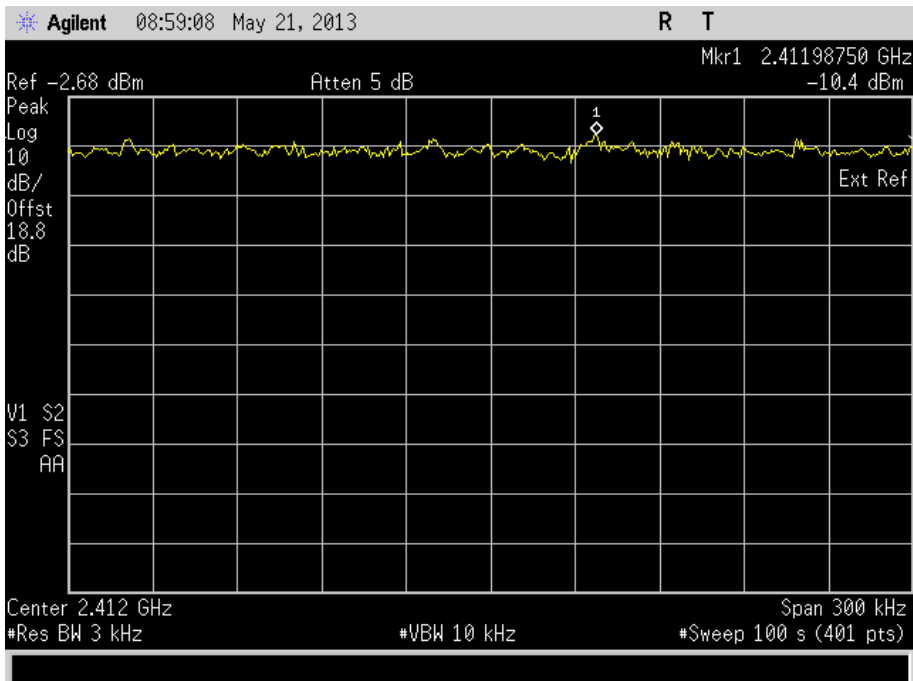


Product Service

5.5 Mbps

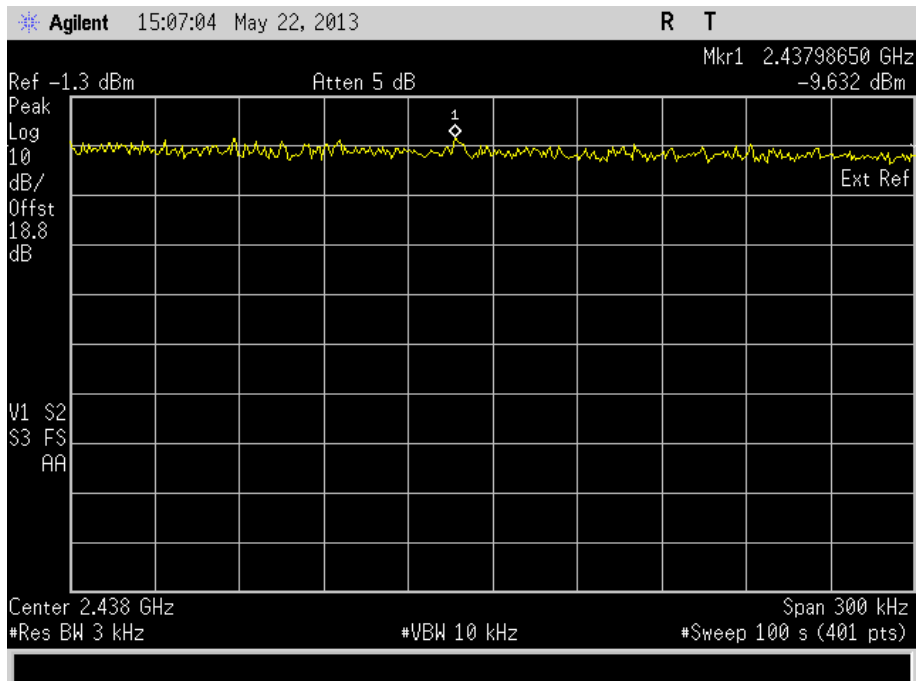
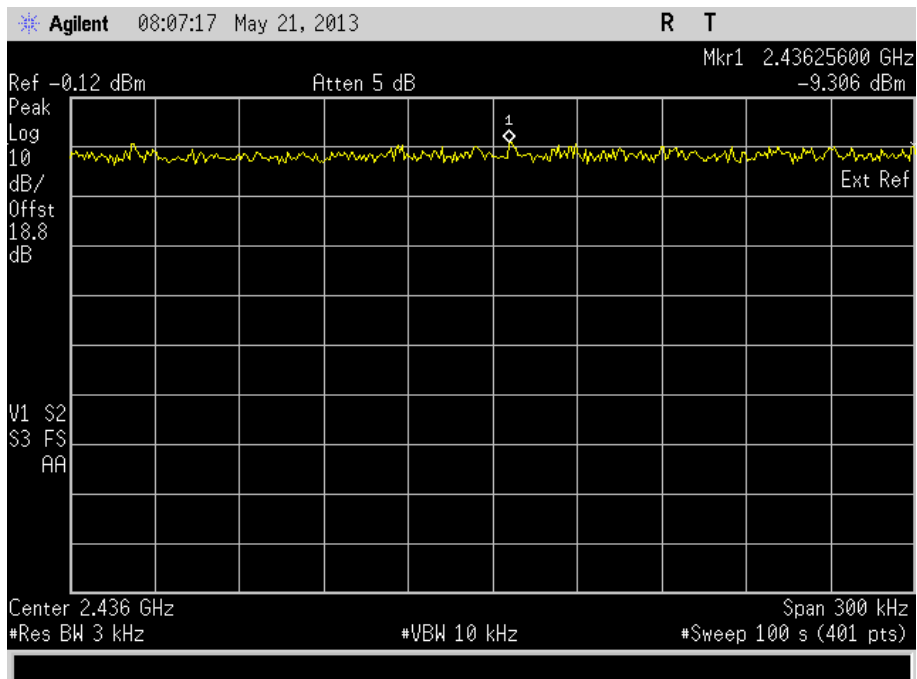


11 Mbps





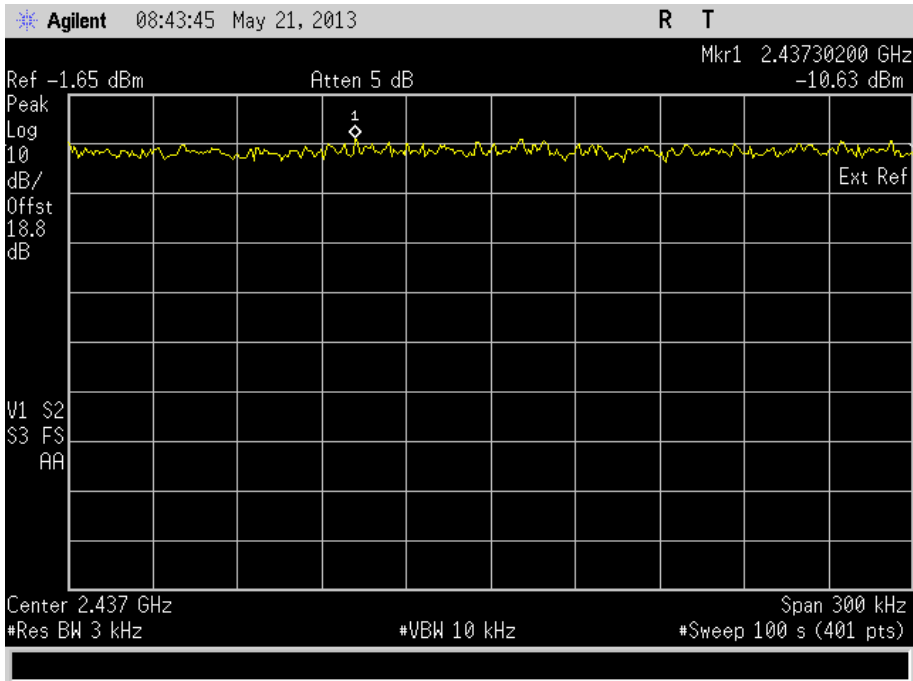
Product Service

2437 MHz1 Mbps2 Mbps

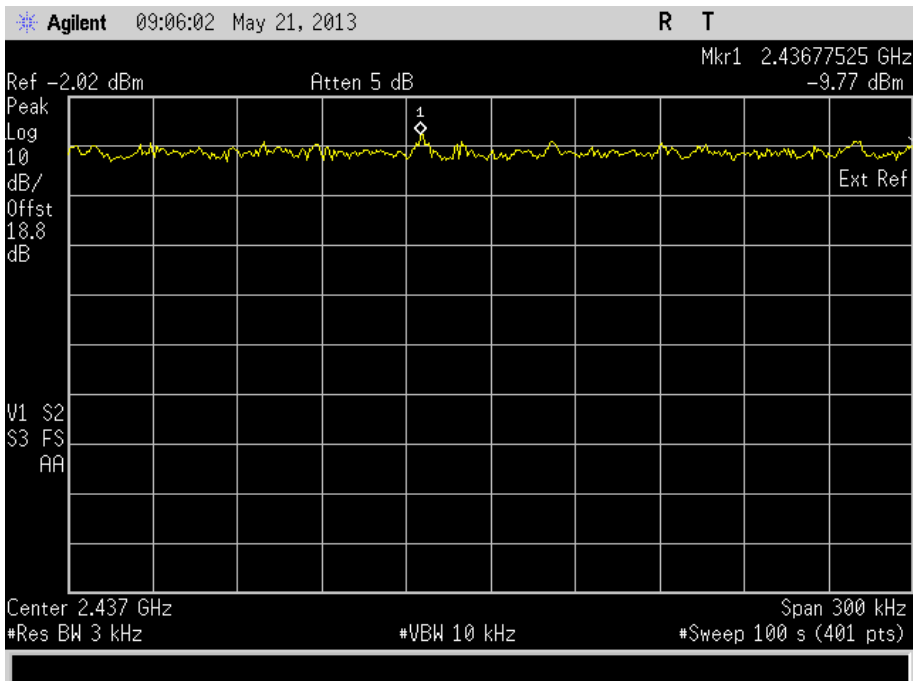


Product Service

5.5 Mbps

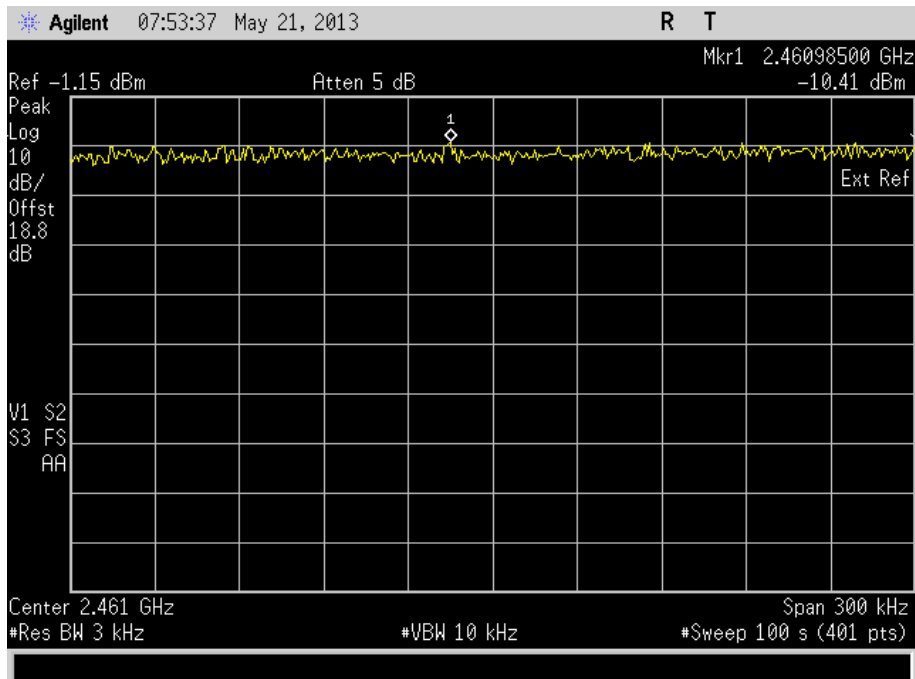
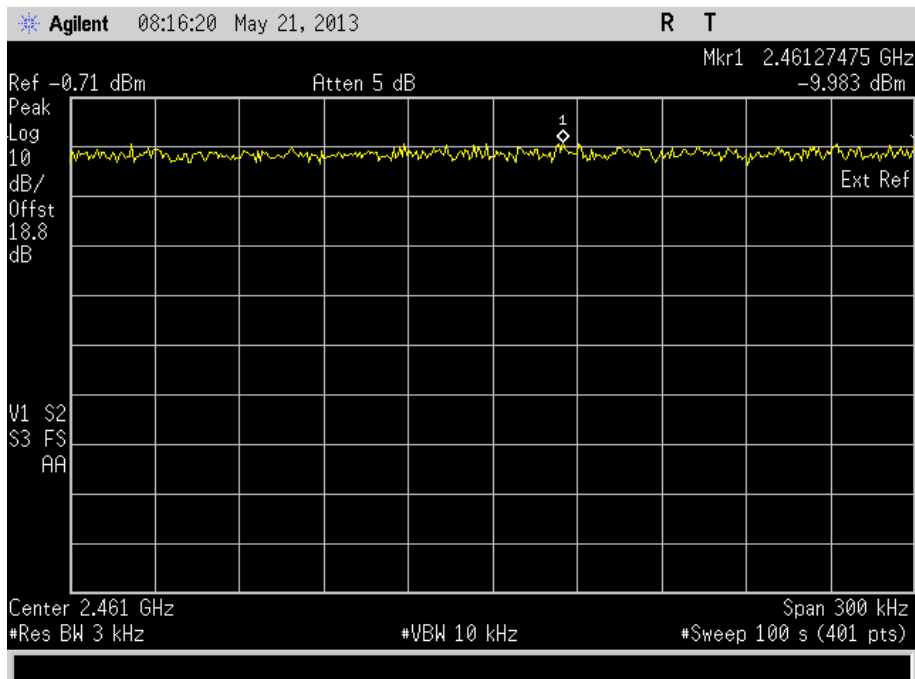


11 Mbps





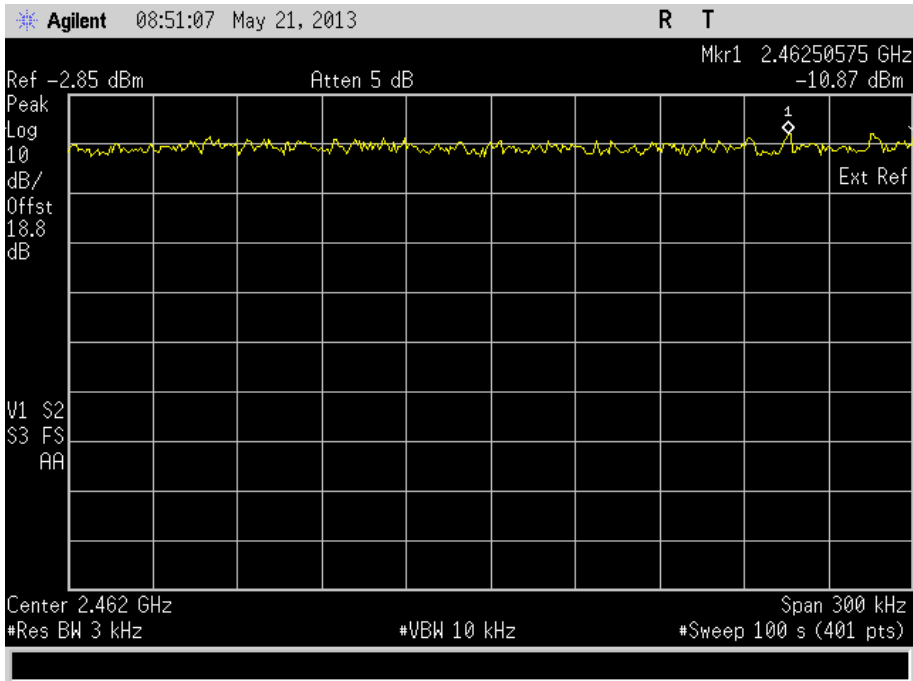
Product Service

2462 MHz1 Mbps2 Mbps

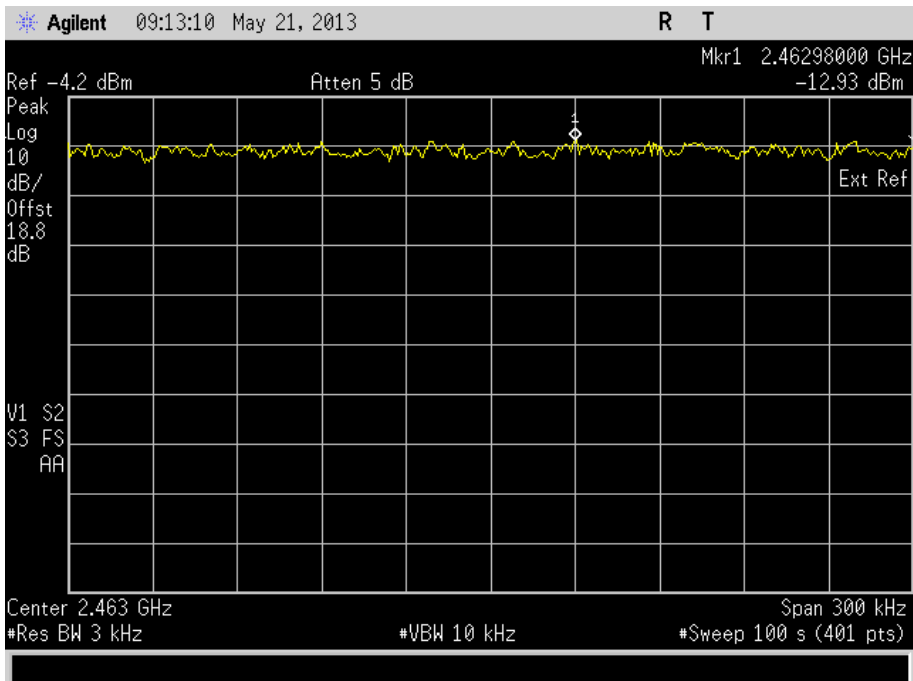


Product Service

5.5 Mbps



11 Mbps



Limit Clause

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

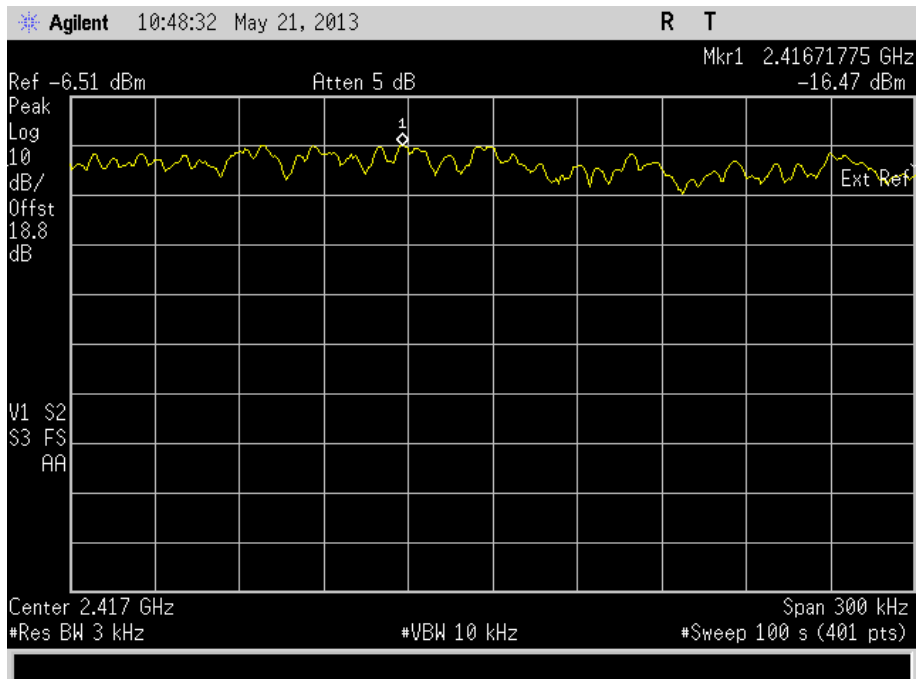
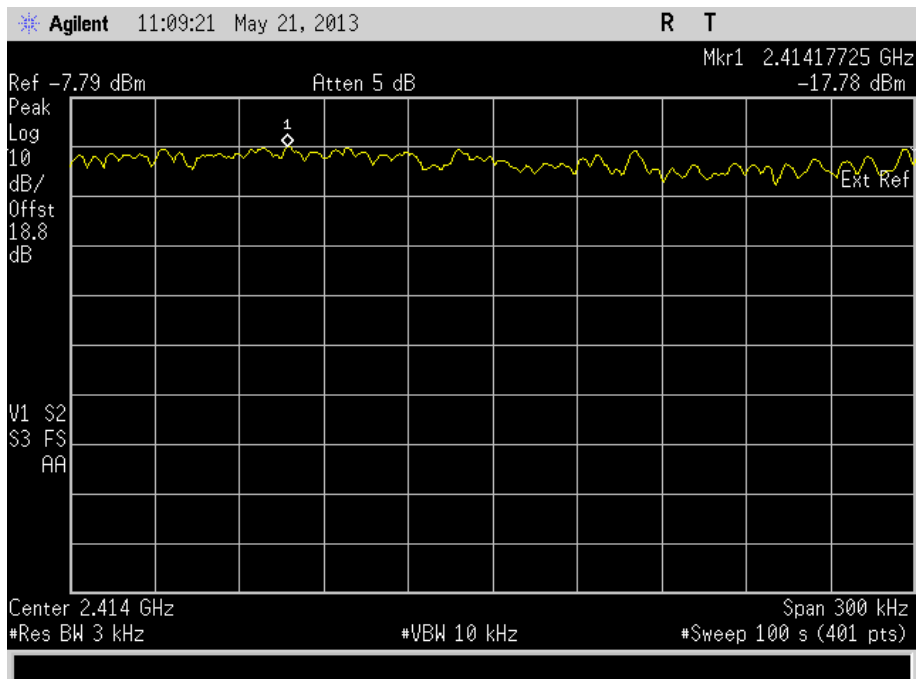
802.11(g)

4.0 V DC Supply

Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	6	-16.47
	9	-17.78
	12	-16.37
	18	-15.81
	24	-15.20
	36	-14.86
	48	-13.99
	54	-16.82
2437 MHz	6	-15.67
	9	-17.70
	12	-14.59
	18	-16.28
	24	-14.76
	36	-15.08
	48	-14.88
	54	-16.64
2462 MHz	6	-15.71
	9	-15.48
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	18	-16.26
	24	-15.34
	36	-14.71
	48	-14.85
	54	-15.29

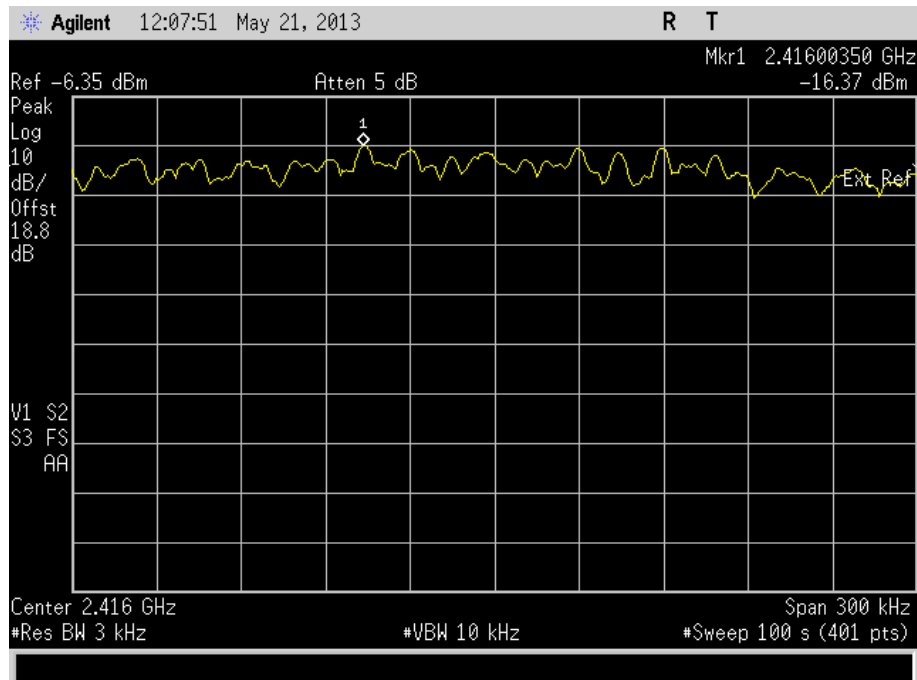
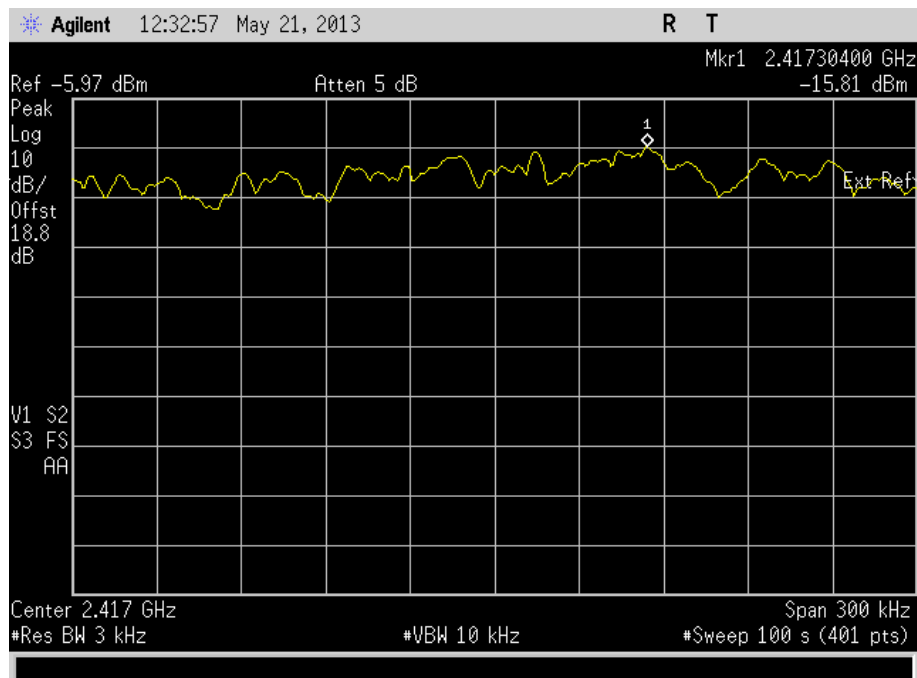


Product Service

2412 MHz6 Mbps9 Mbps

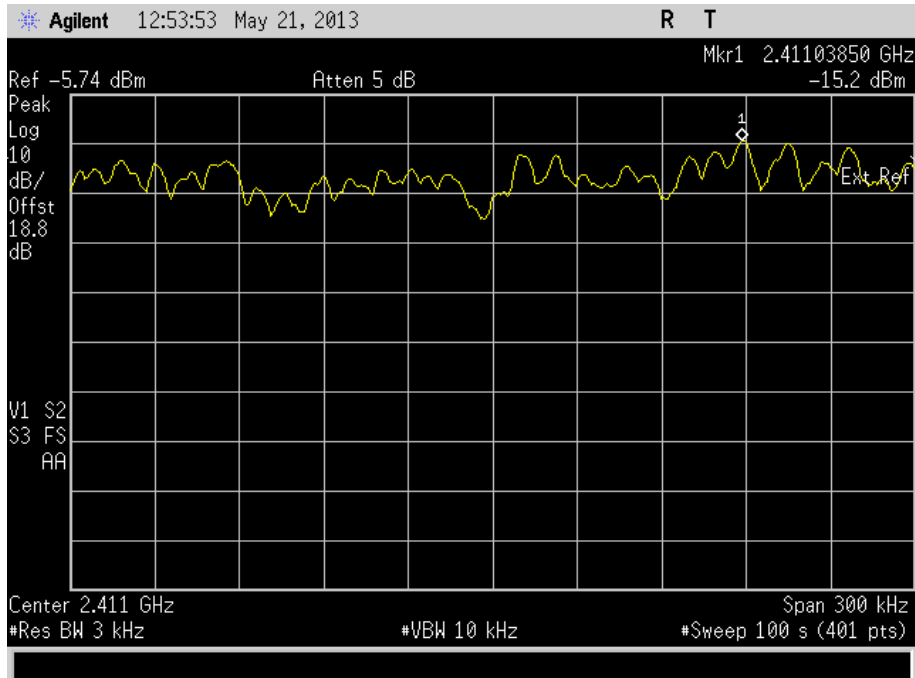
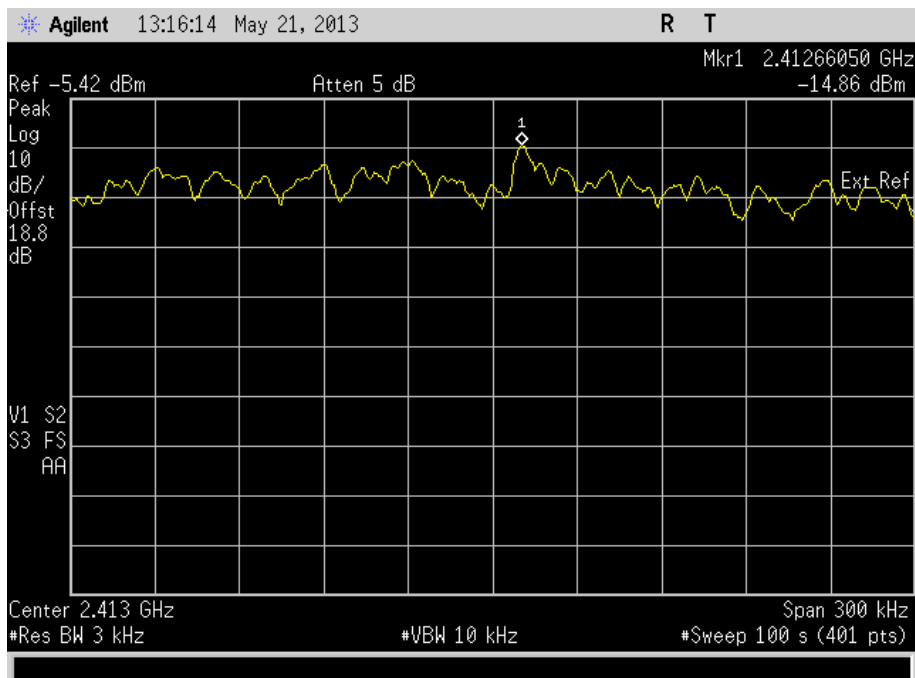


Product Service

12 Mbps18 Mbps

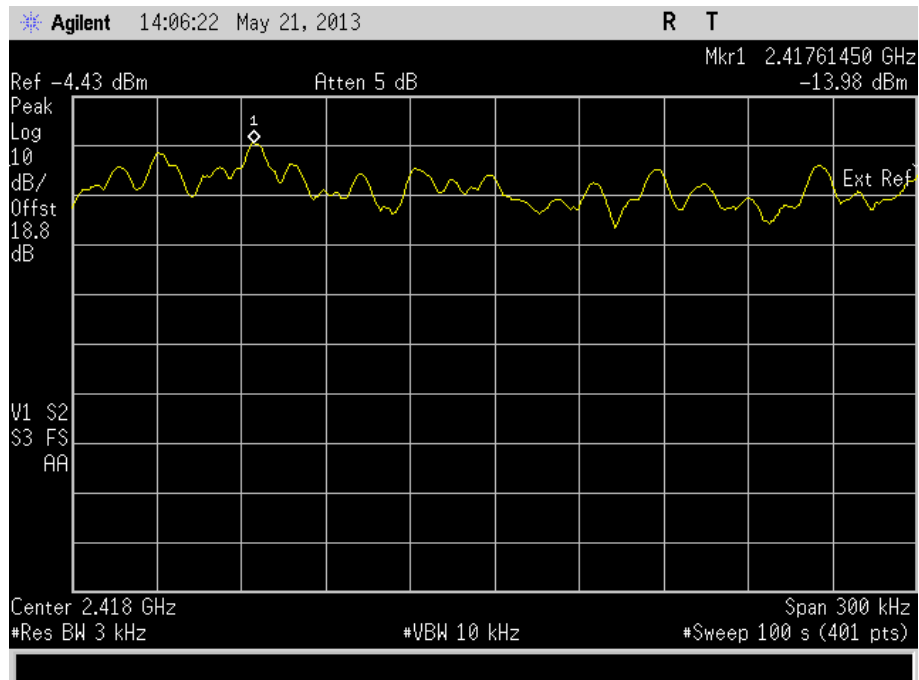
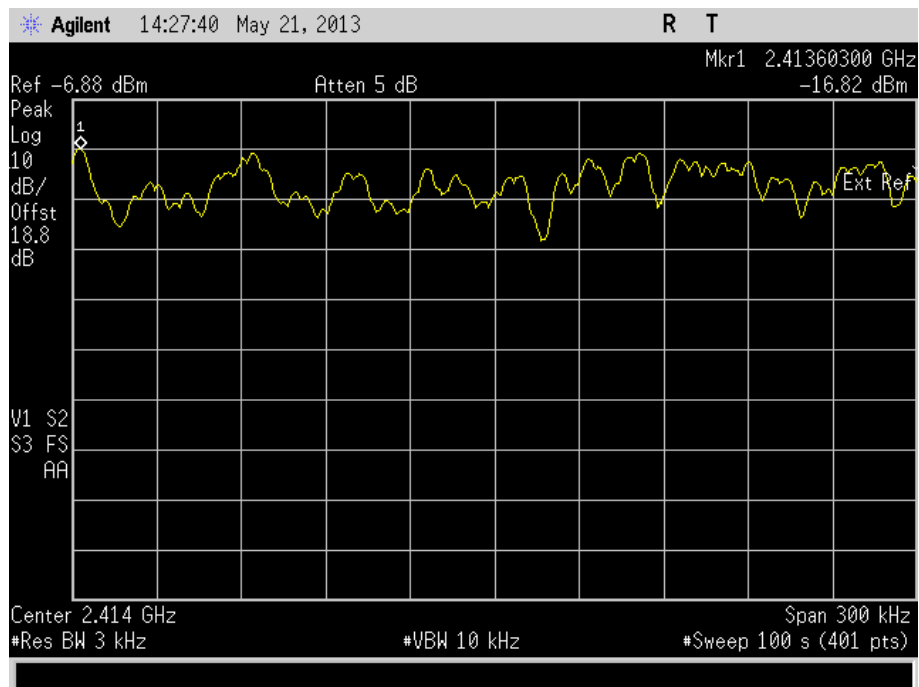


Product Service

24 Mbps36 Mbps

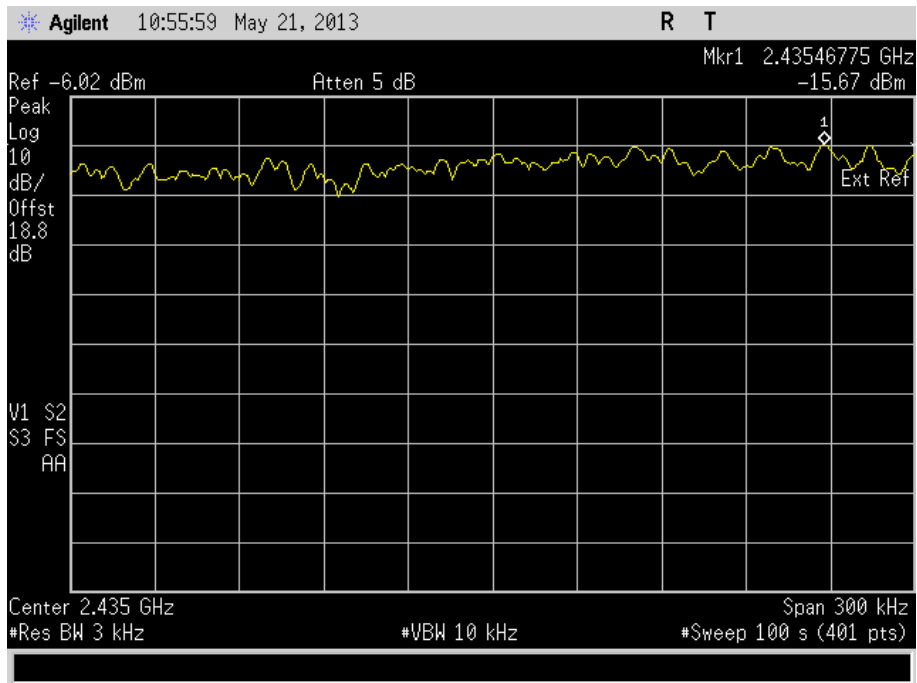
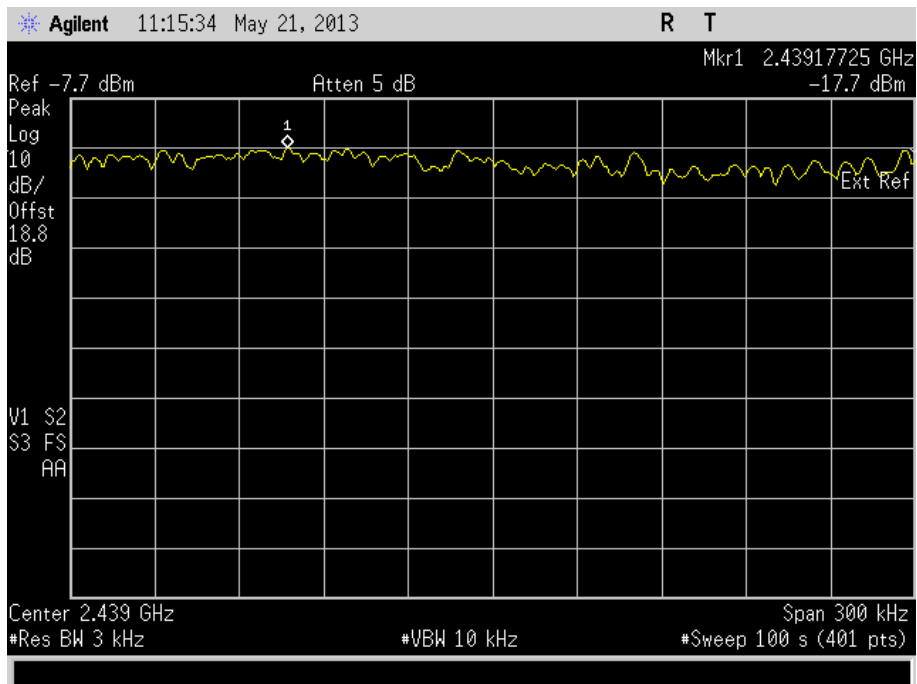


Product Service

48 Mbps54 Mbps

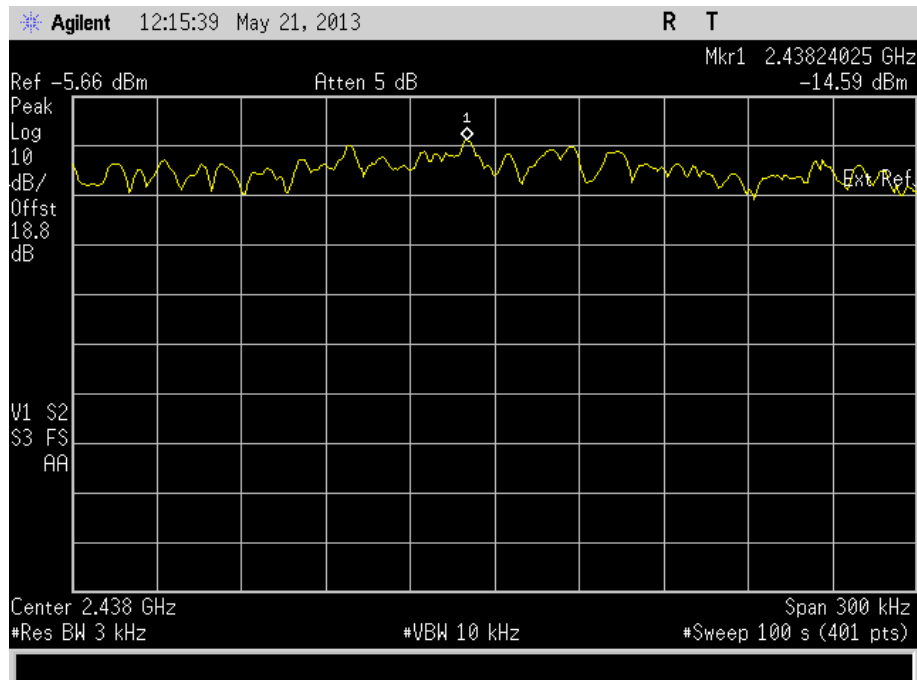
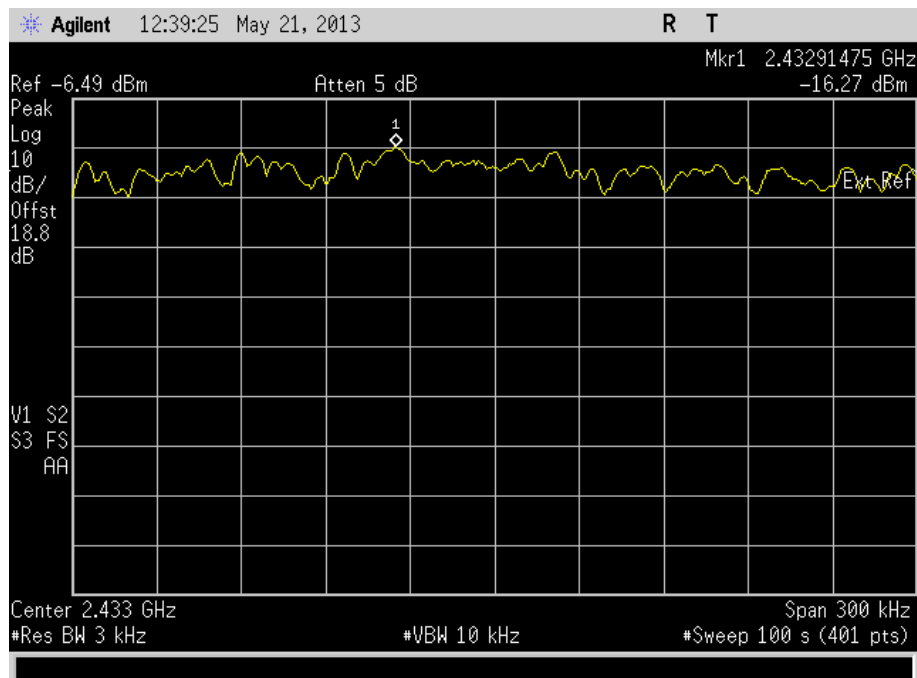


Product Service

2437 MHz6 Mbps9 Mbps

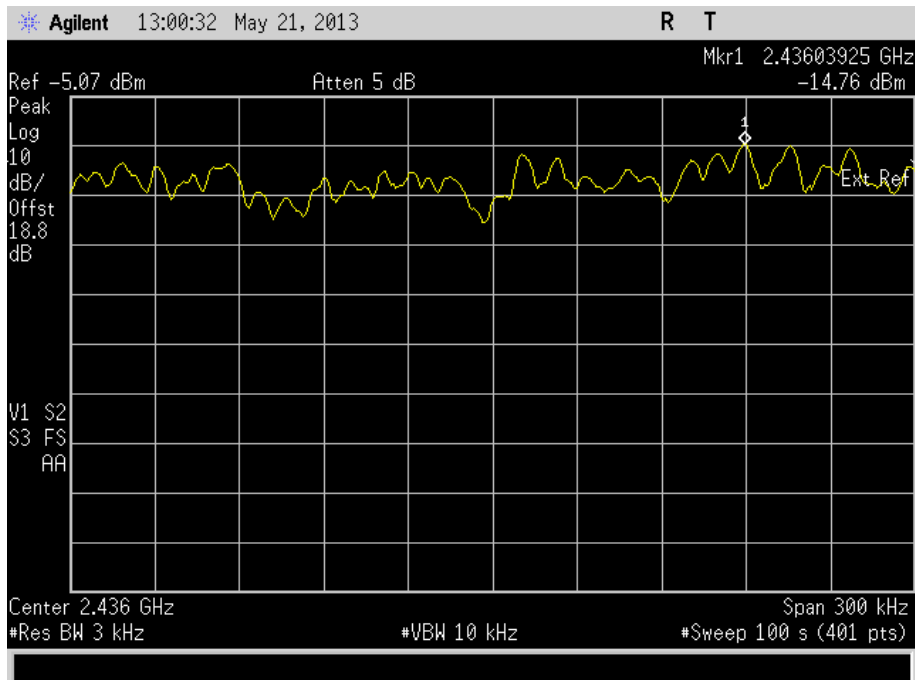
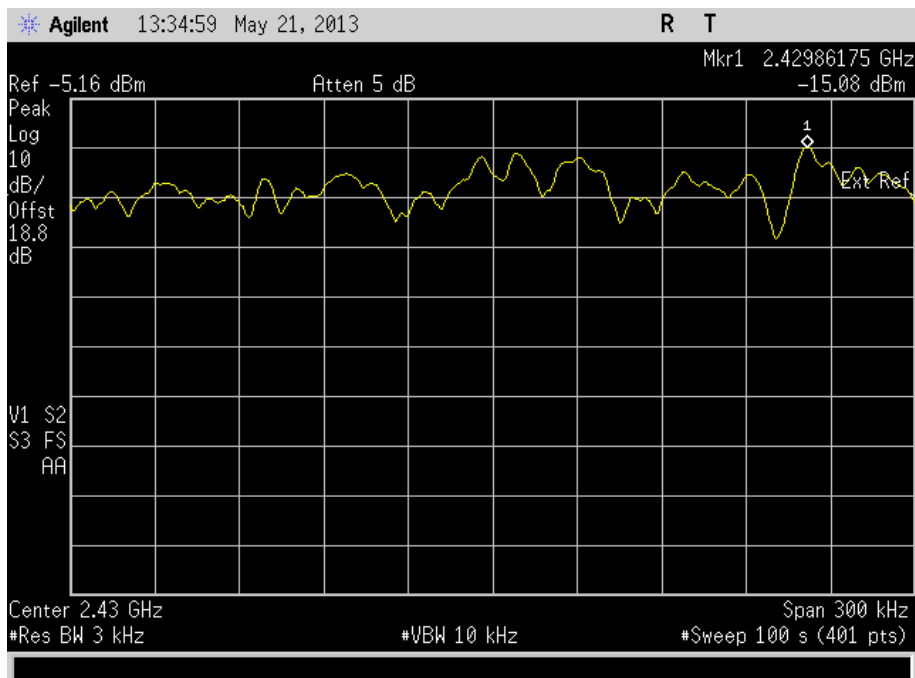


Product Service

12 Mbps18 Mbps

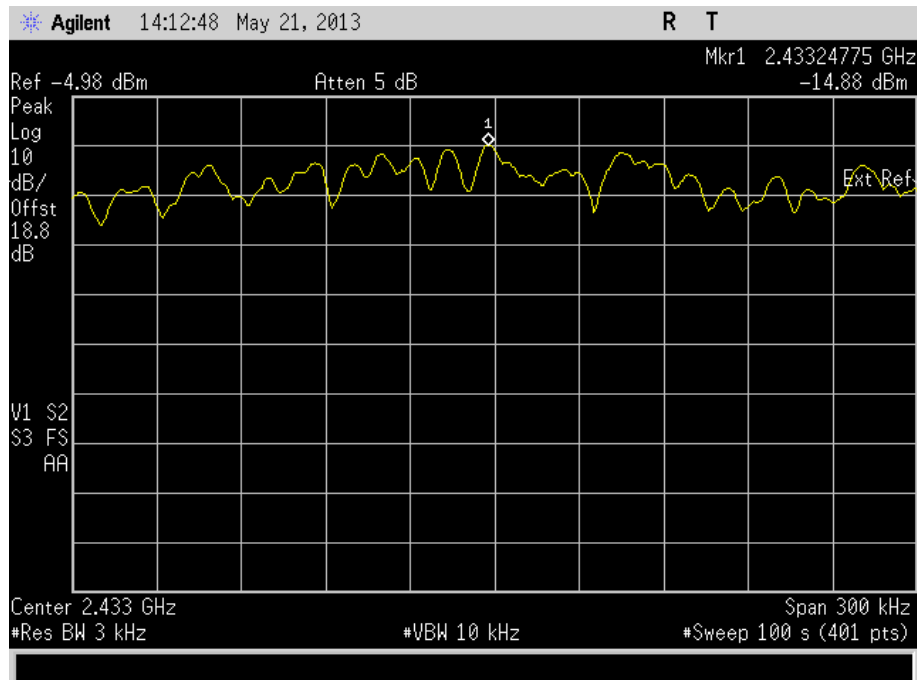
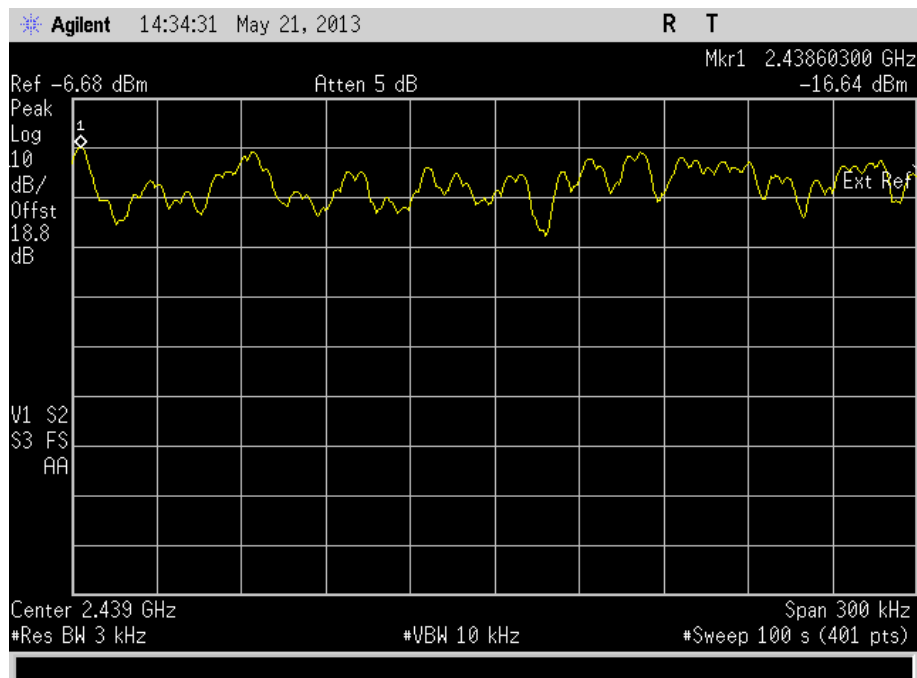


Product Service

24 Mbps36 Mbps

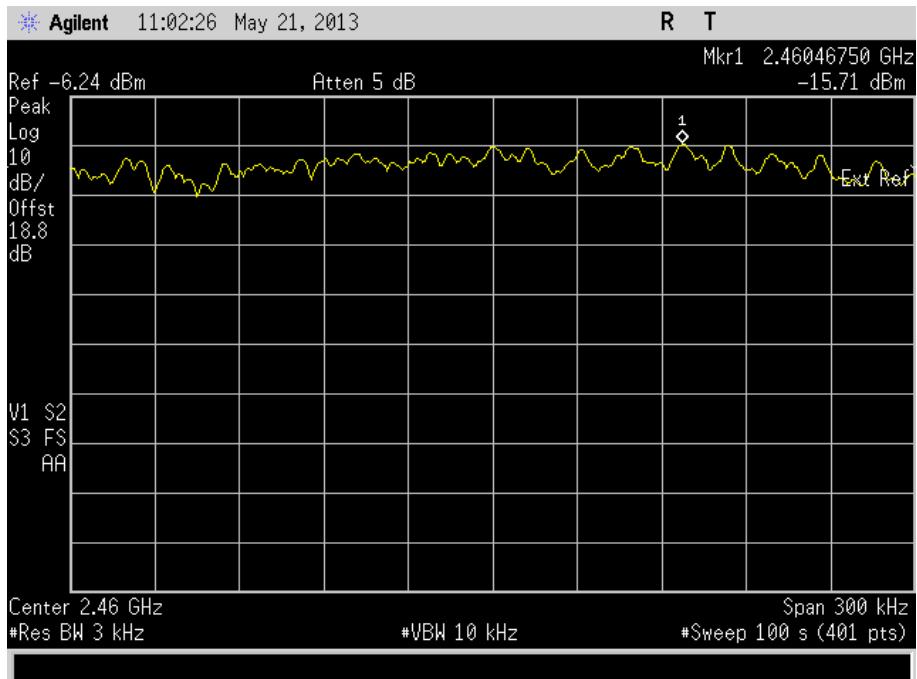
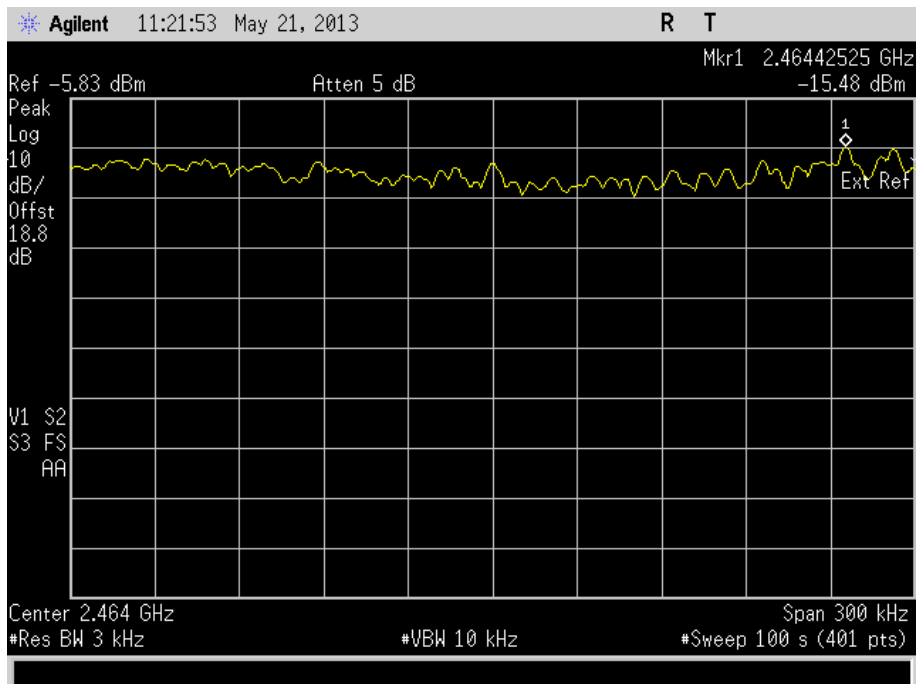


Product Service

48 Mbps54 Mbps

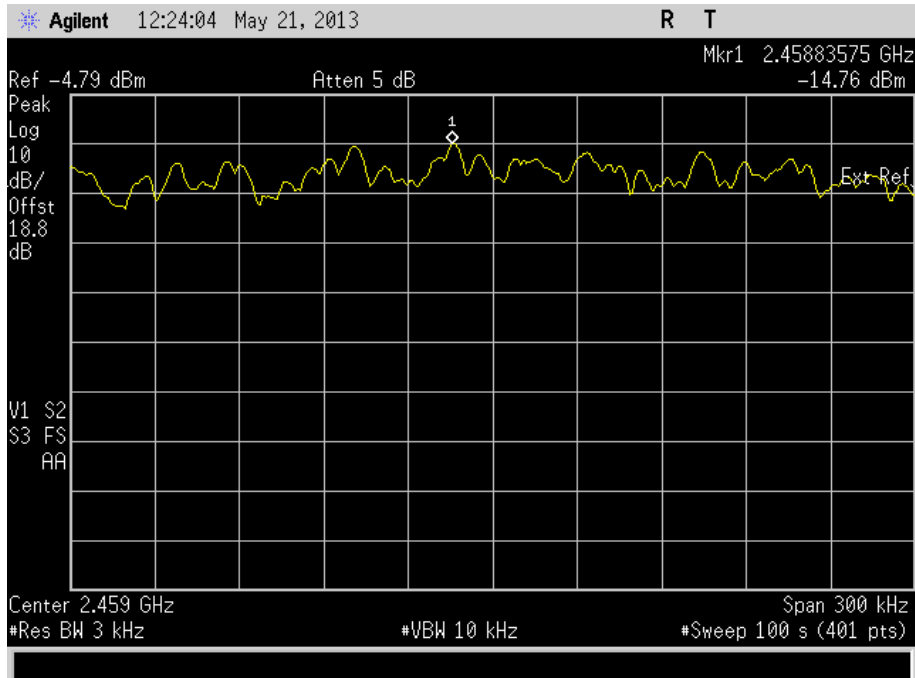
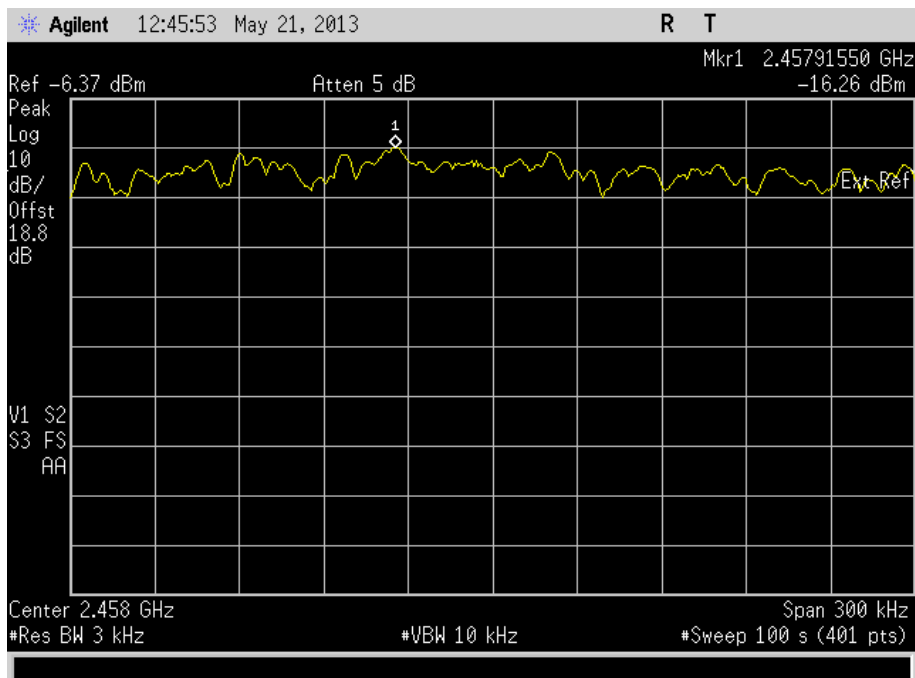


Product Service

2462 MHz6 Mbps9 Mbps

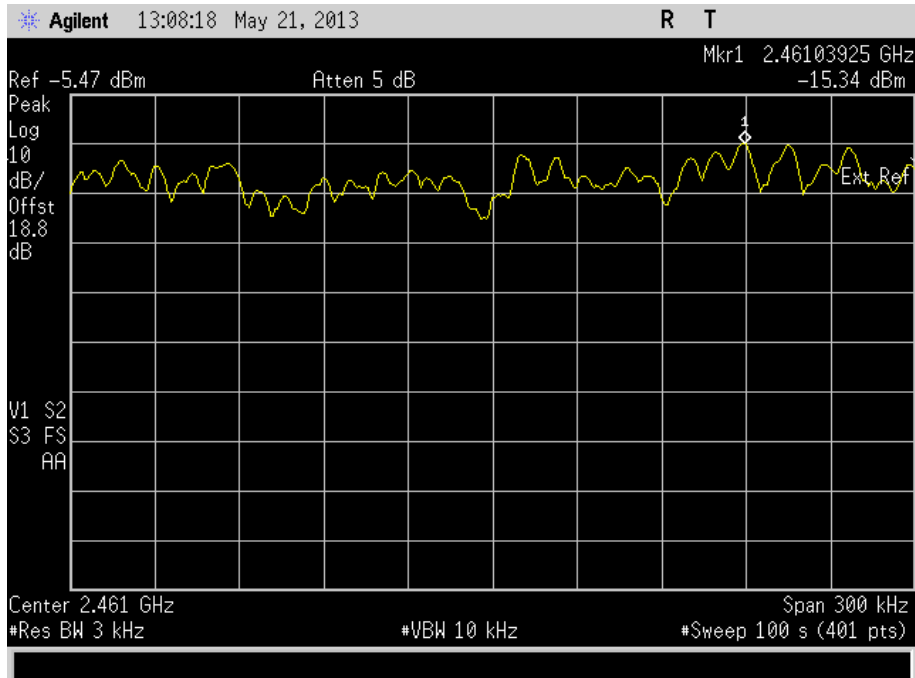
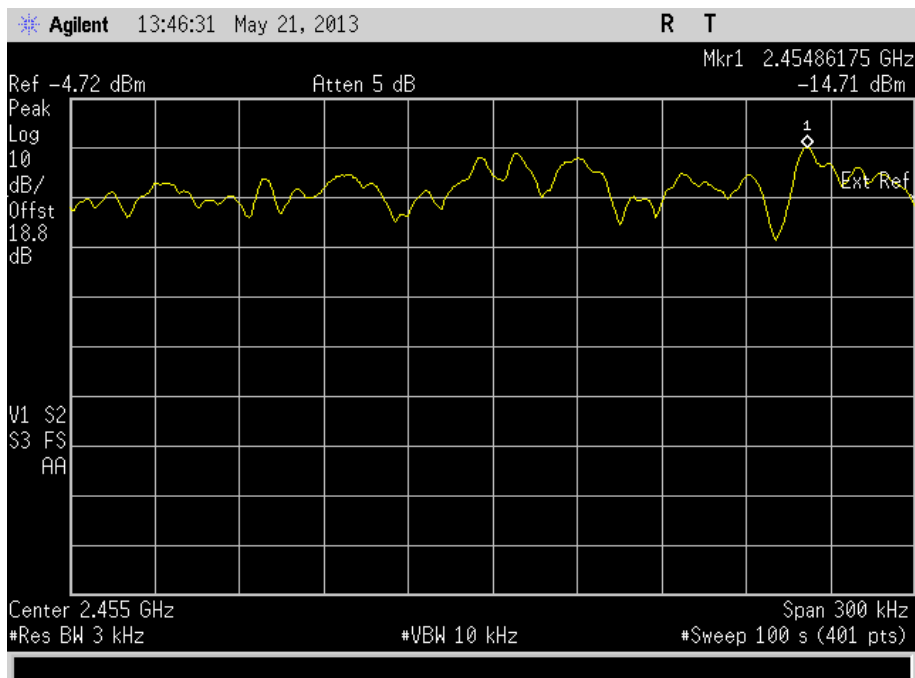


Product Service

12 Mbps18 Mbps

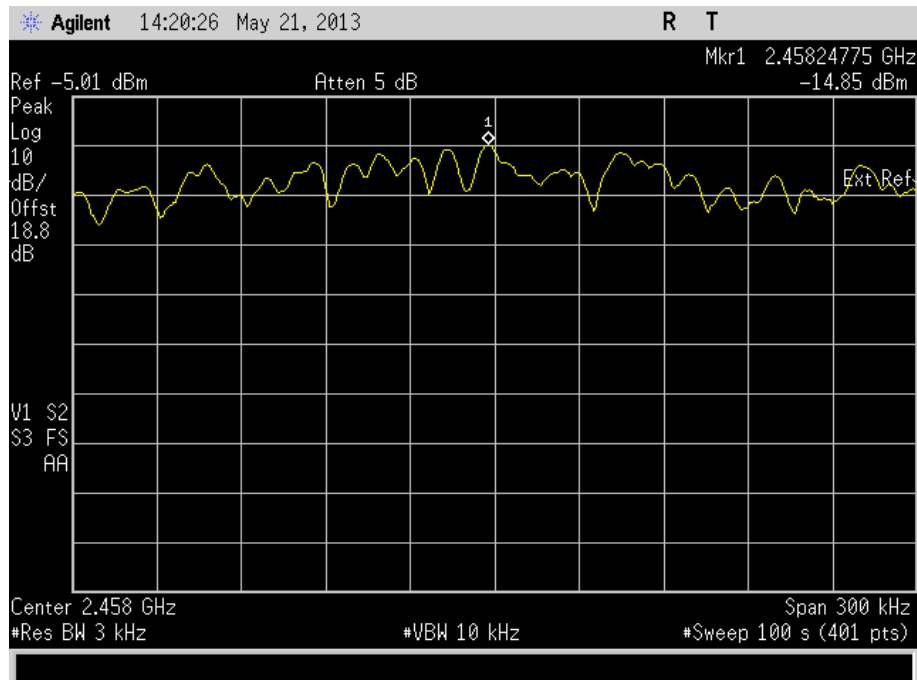
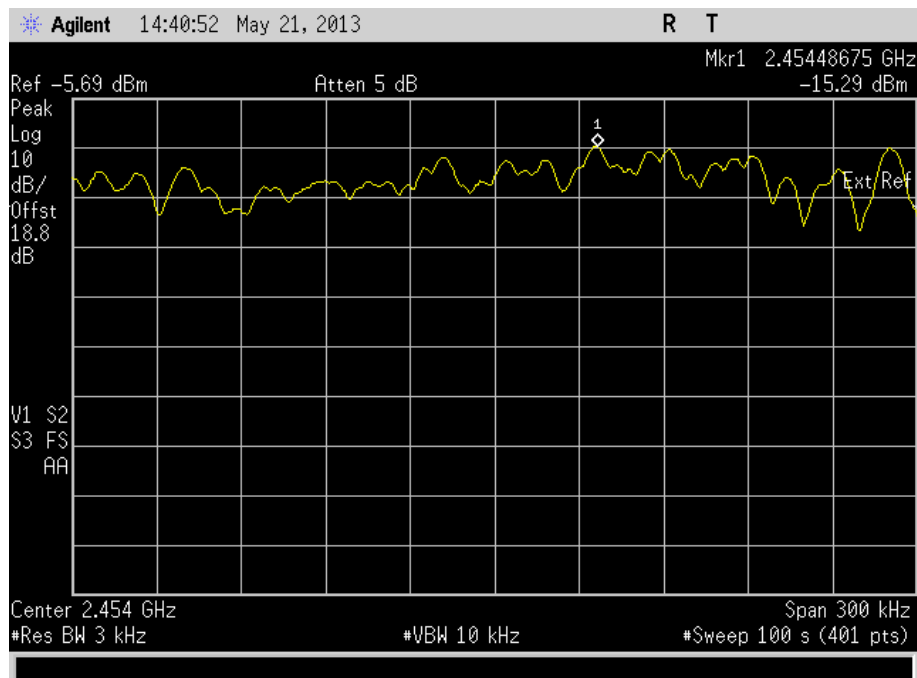


Product Service

24 Mbps36 Mbps



Product Service

48 Mbps54 MbpsLimit Clause

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

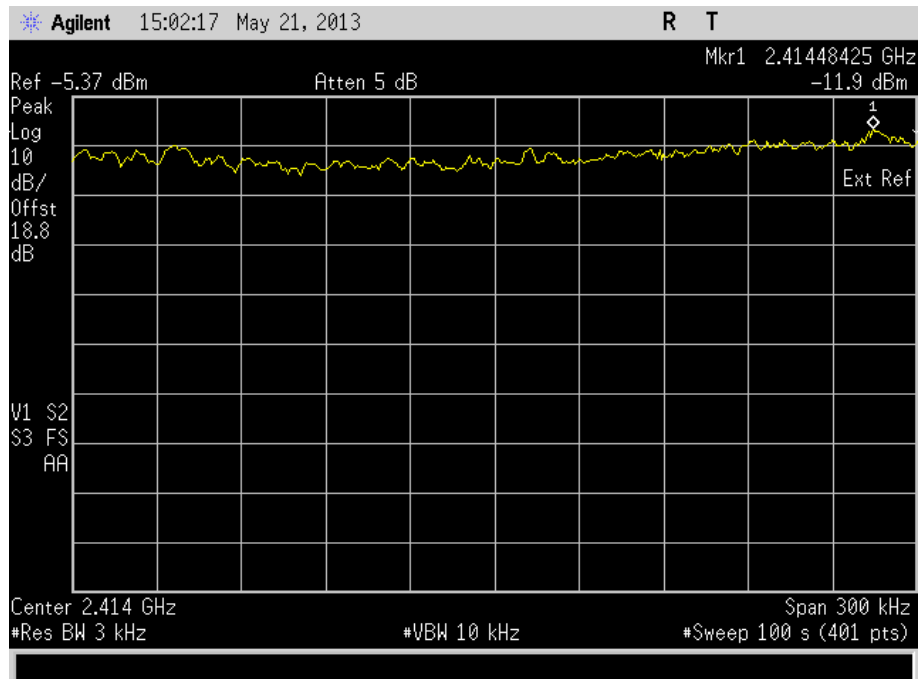
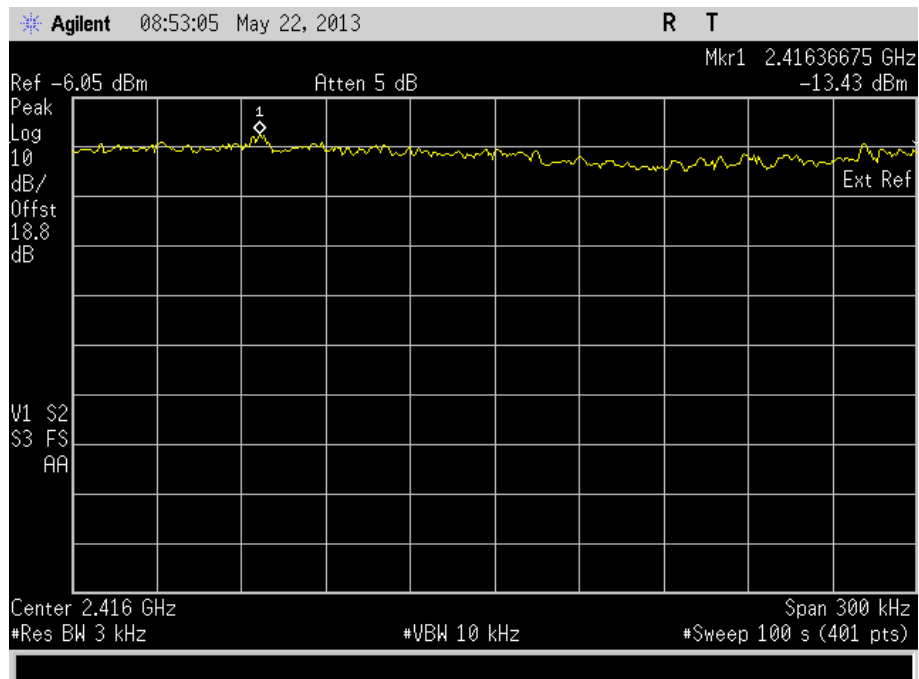
802.11(n)

4.0 V DC Supply

Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	6.5	-11.90
	13	-13.43
	19.5	-14.71
	26	-12.94
	39	-13.96
	52	-13.89
	58.5	-14.55
	65	-15.06
2437 MHz	6.5	-13.63
	13	-15.00
	19.5	-14.22
	26	-14.20
	39	-13.48
	52	-14.88
	58.5	-14.52
	65	-14.07
2462 MHz	6.5	-13.00
	13	-12.95
	19.5	-15.71
	26	-14.39
	39	-13.17
	52	-14.26
	58.5	-14.59
	65	-14.21



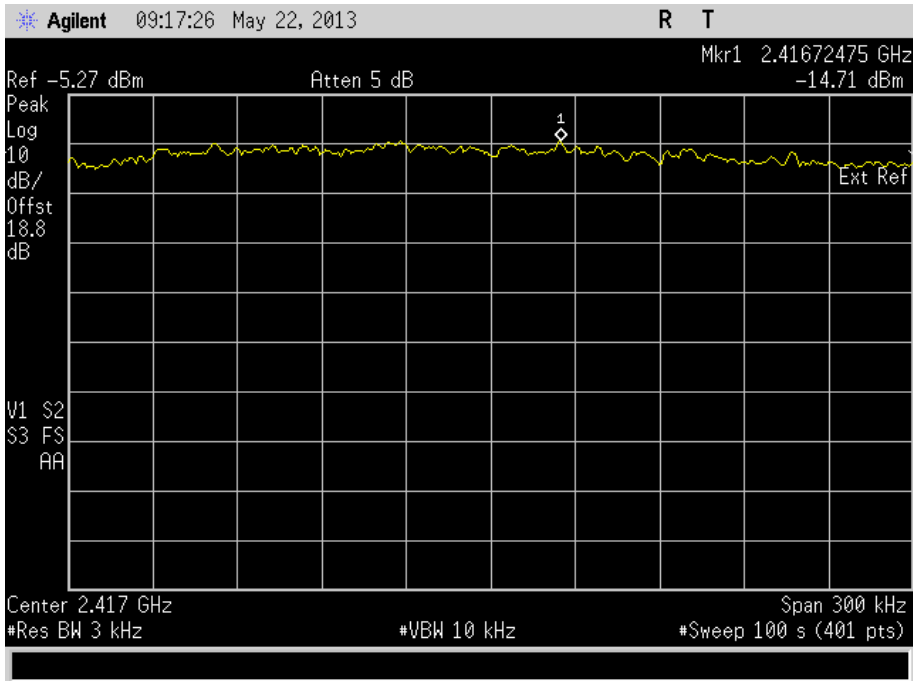
Product Service

2412 MHz6.5 Mbps13 Mbps

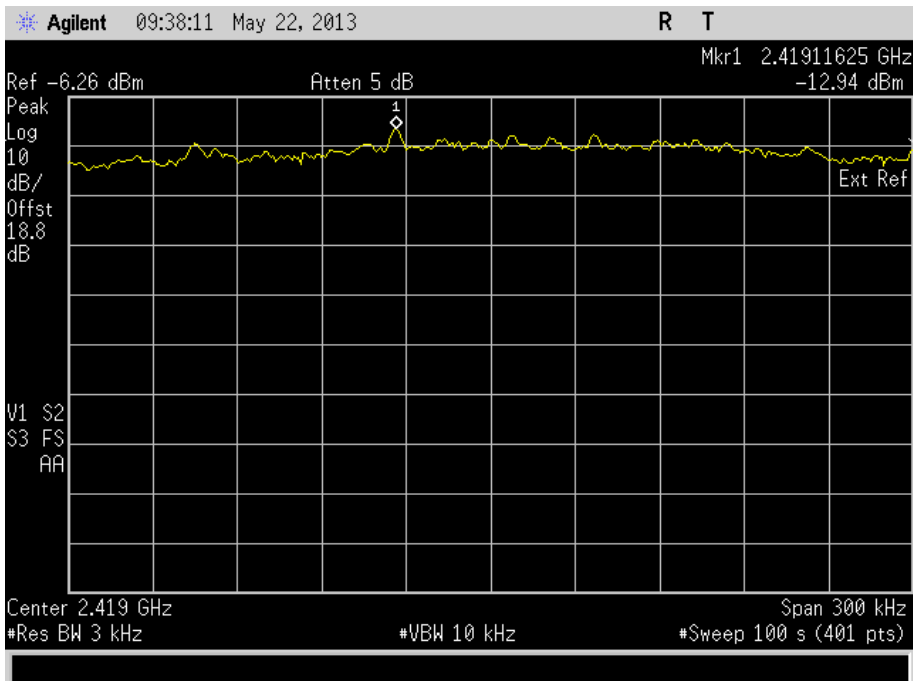


Product Service

19.5 Mbps

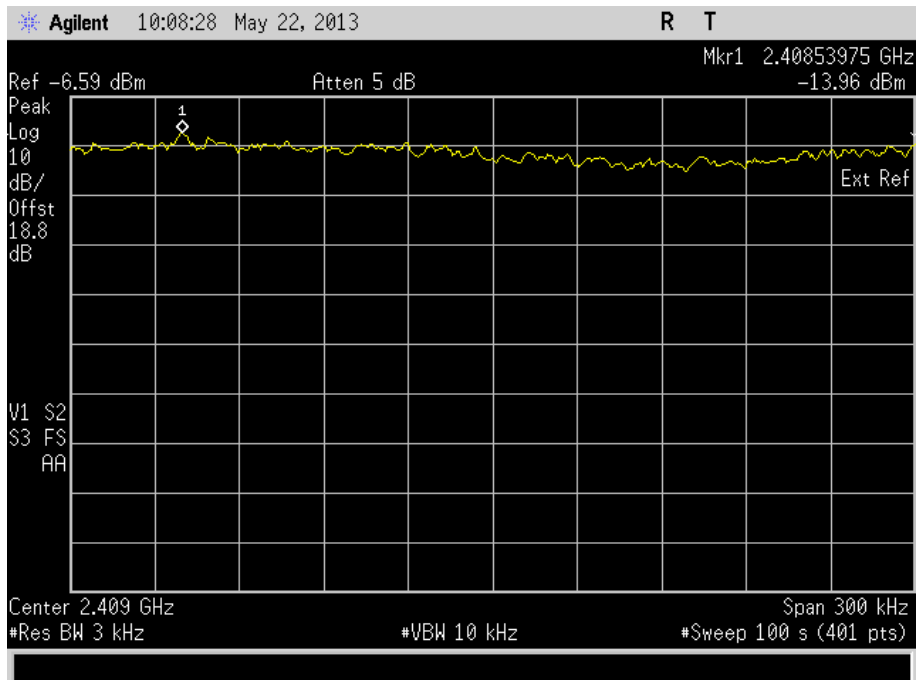
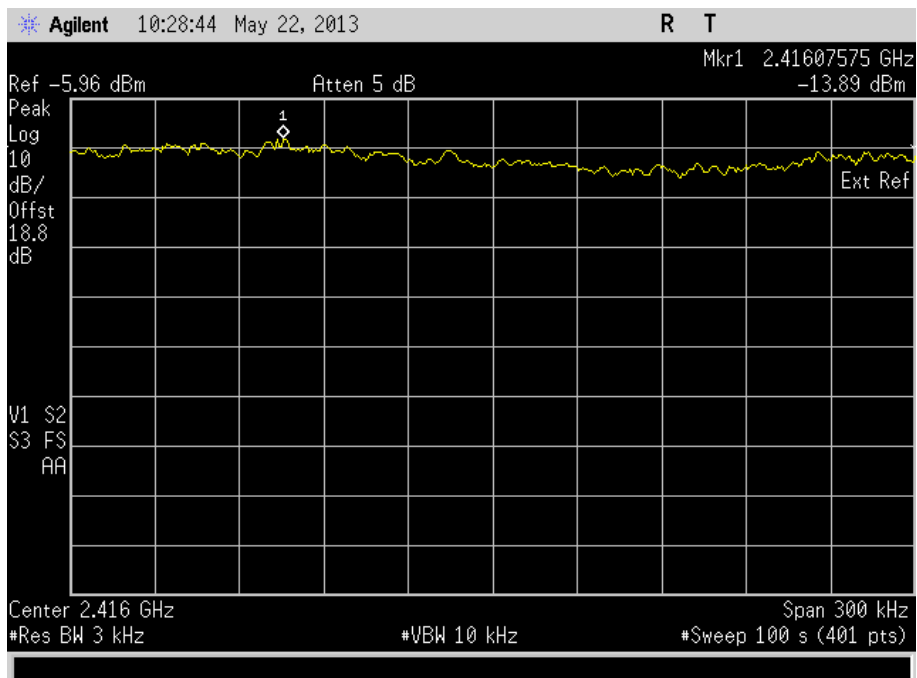


26 Mbps





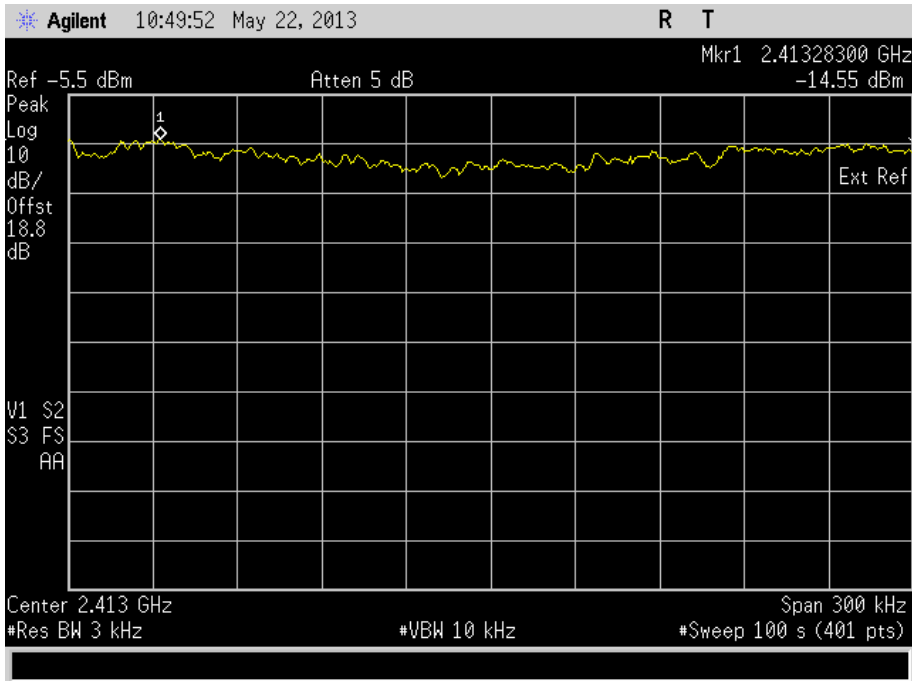
Product Service

39 Mbps52 Mbps

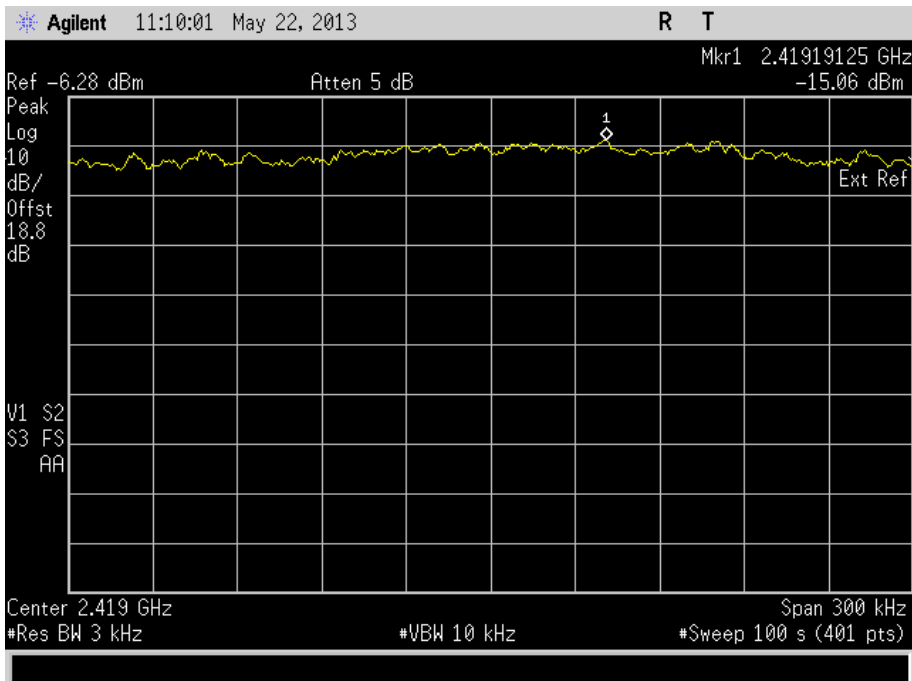


Product Service

58.5 Mbps

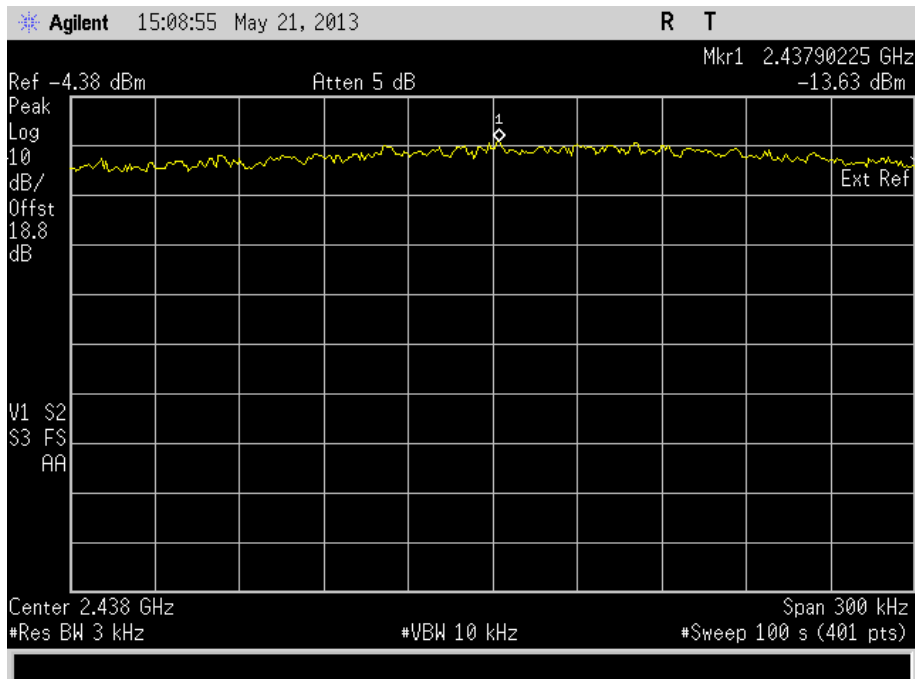
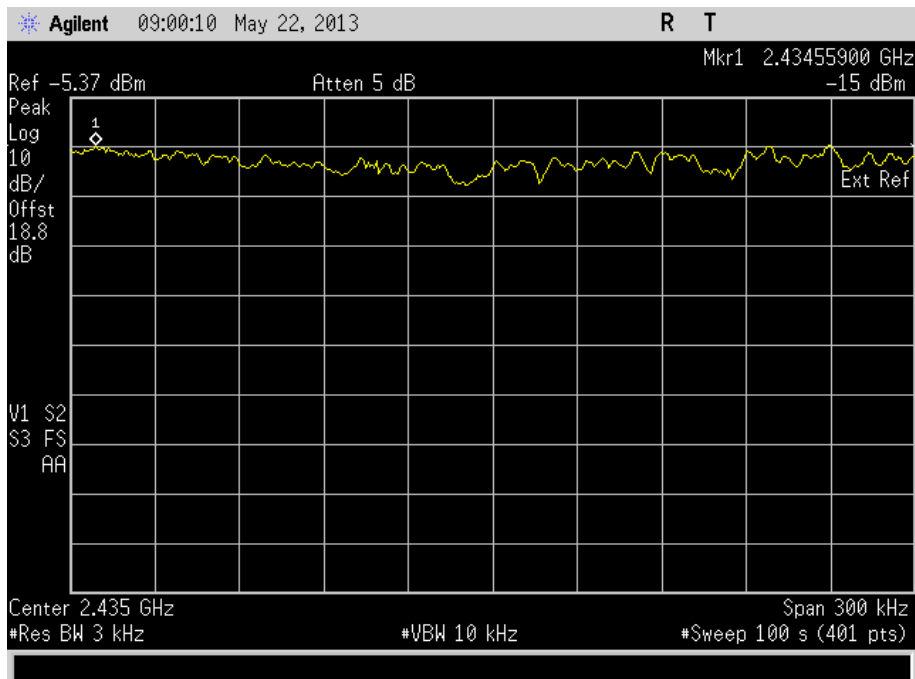


65 Mbps





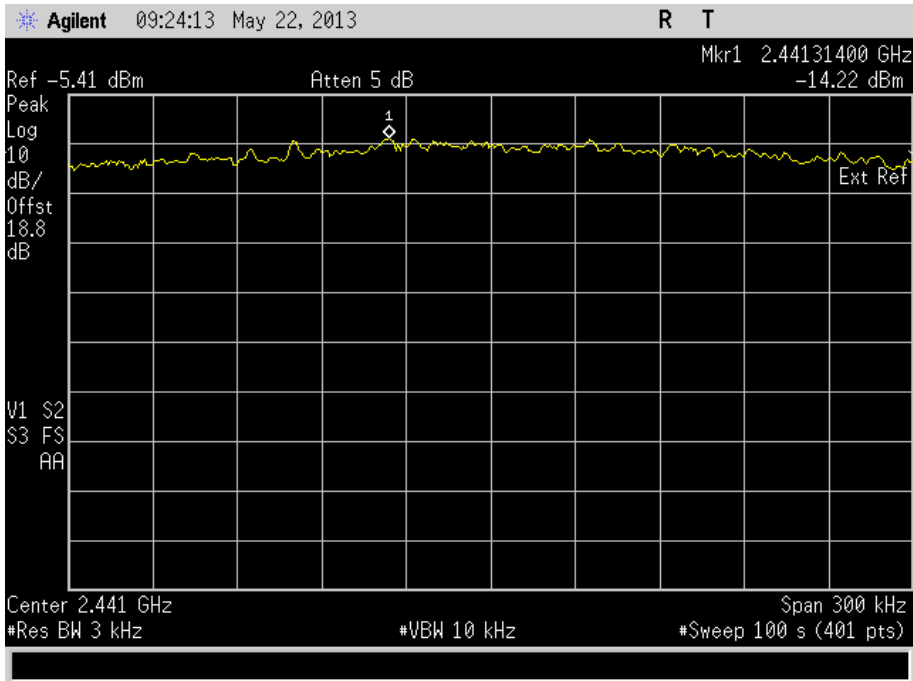
Product Service

2437 MHz6.5 Mbps13 Mbps

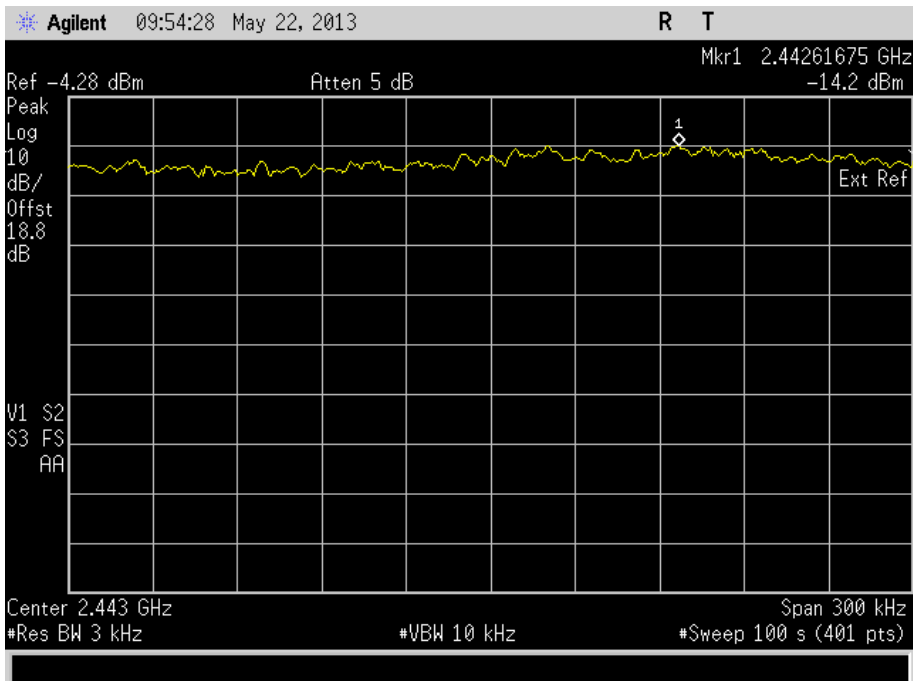


Product Service

19.5 Mbps

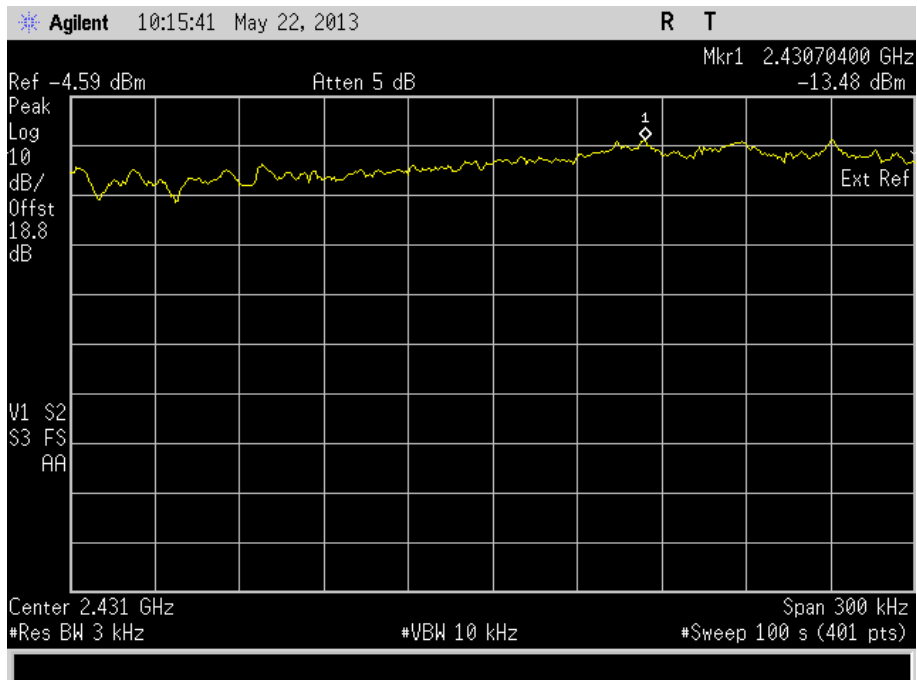
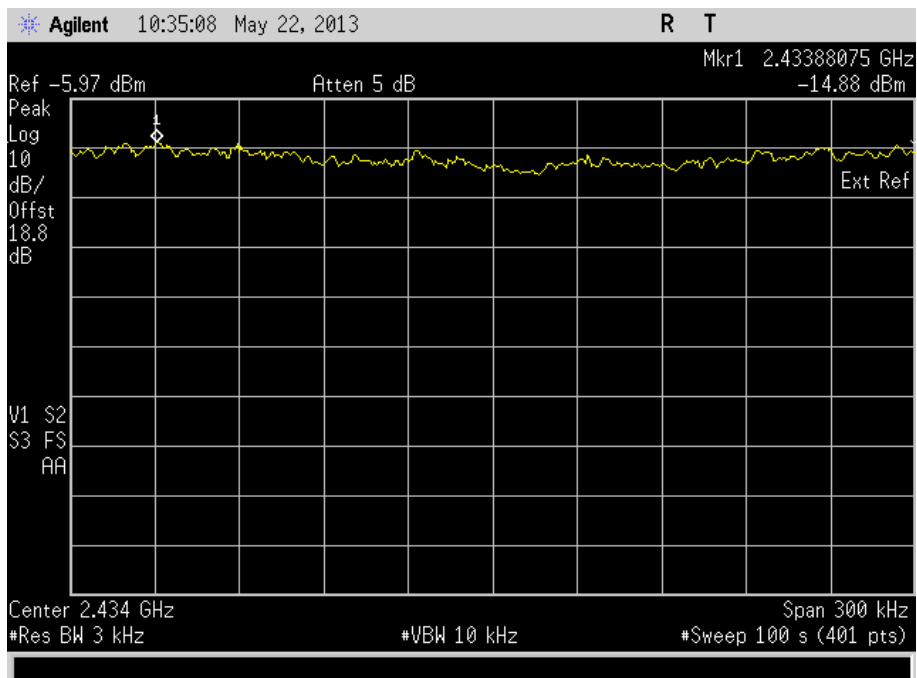


26 Mbps





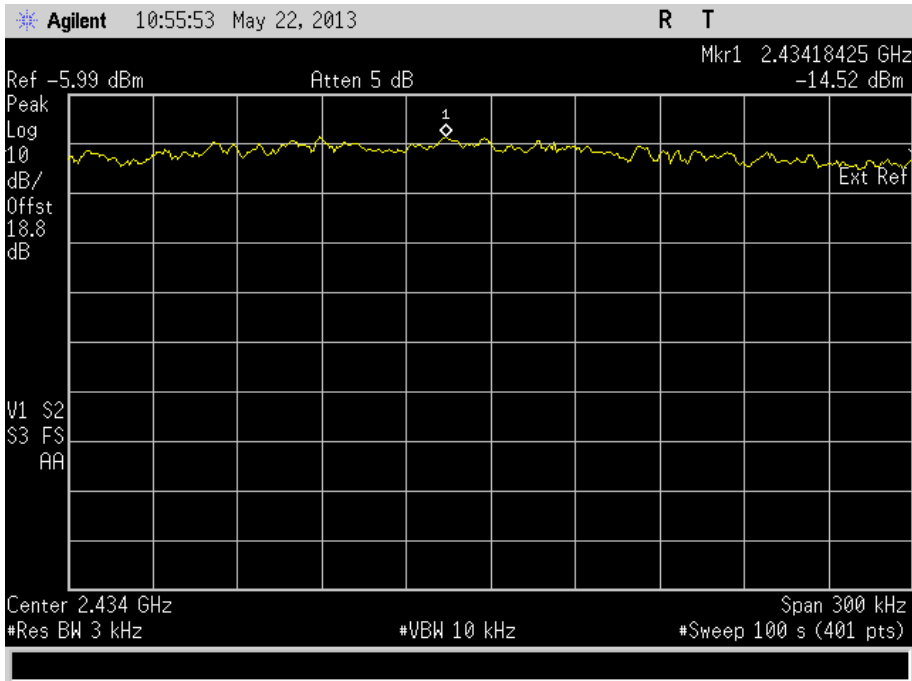
Product Service

39 Mbps52 Mbps

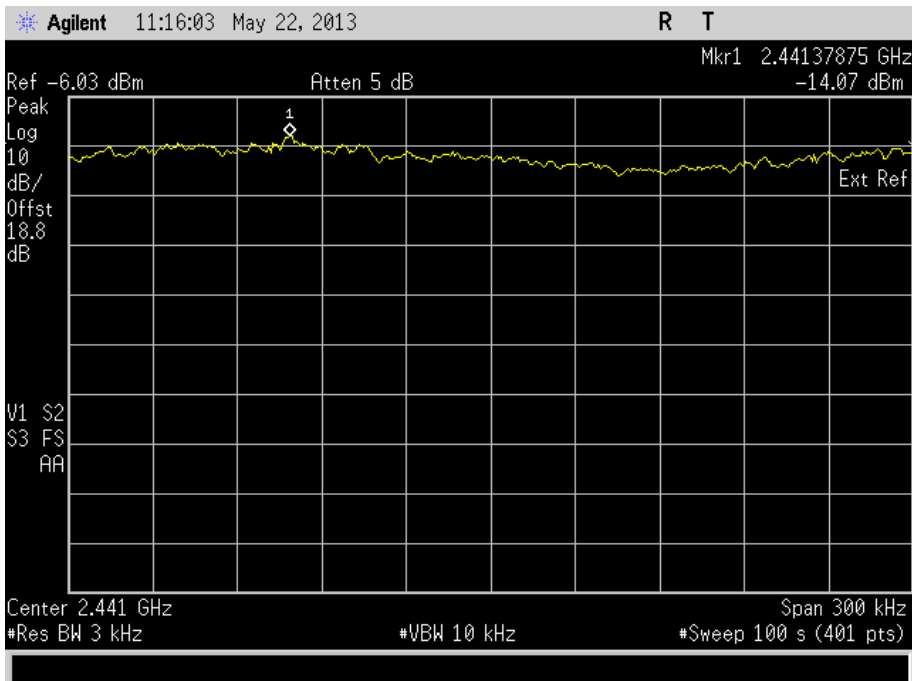


Product Service

58.5 Mbps

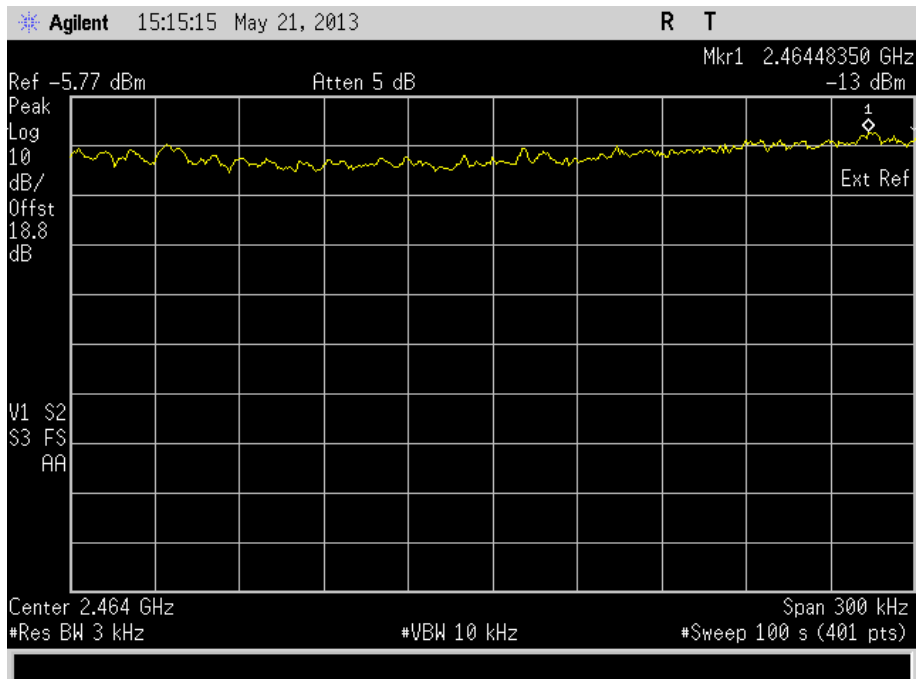
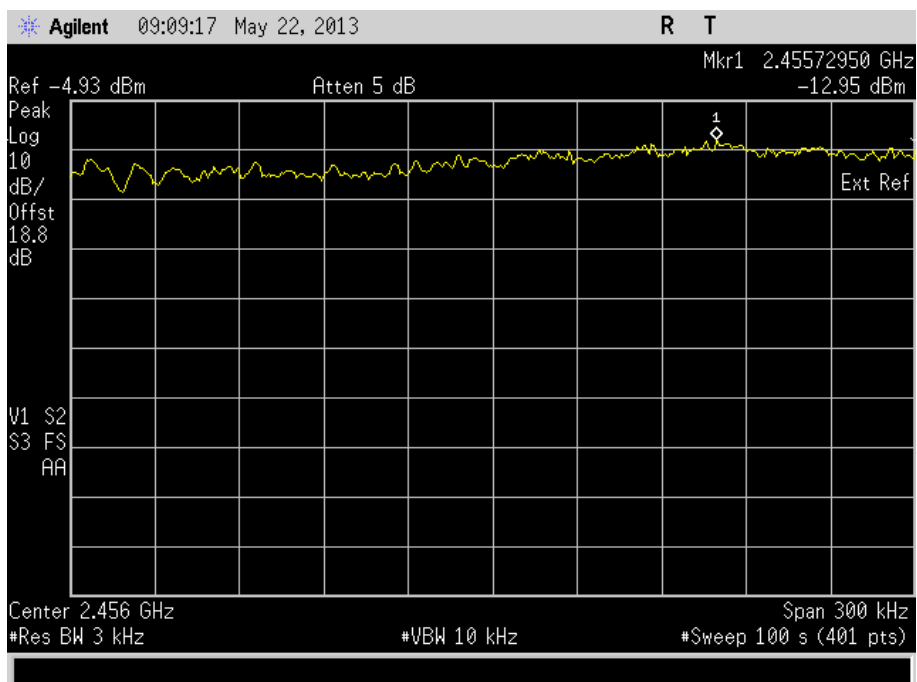


65 Mbps





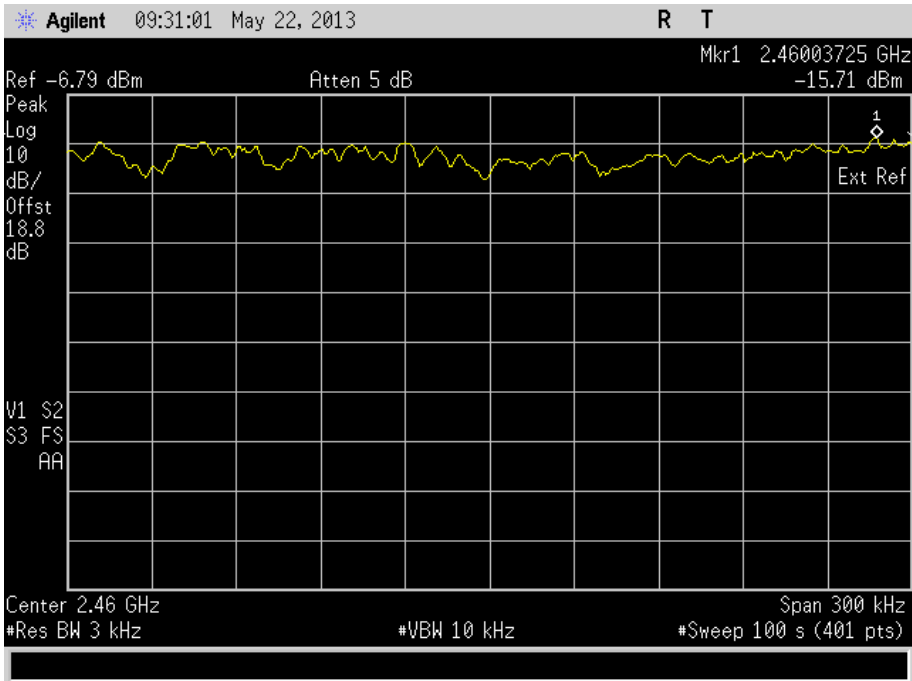
Product Service

2462 MHz6.5 Mbps13 Mbps

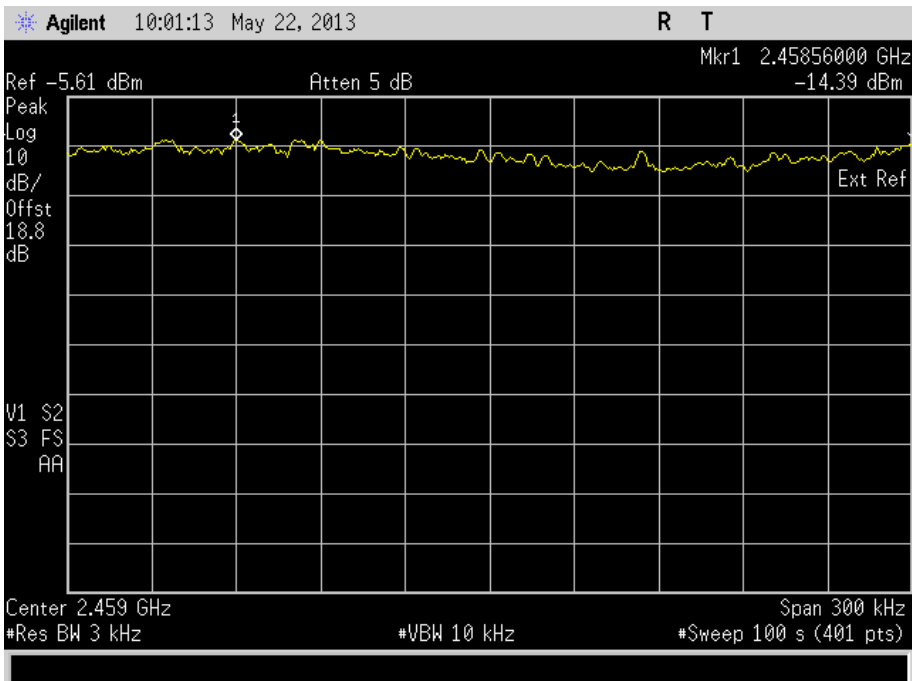


Product Service

19.5 Mbps



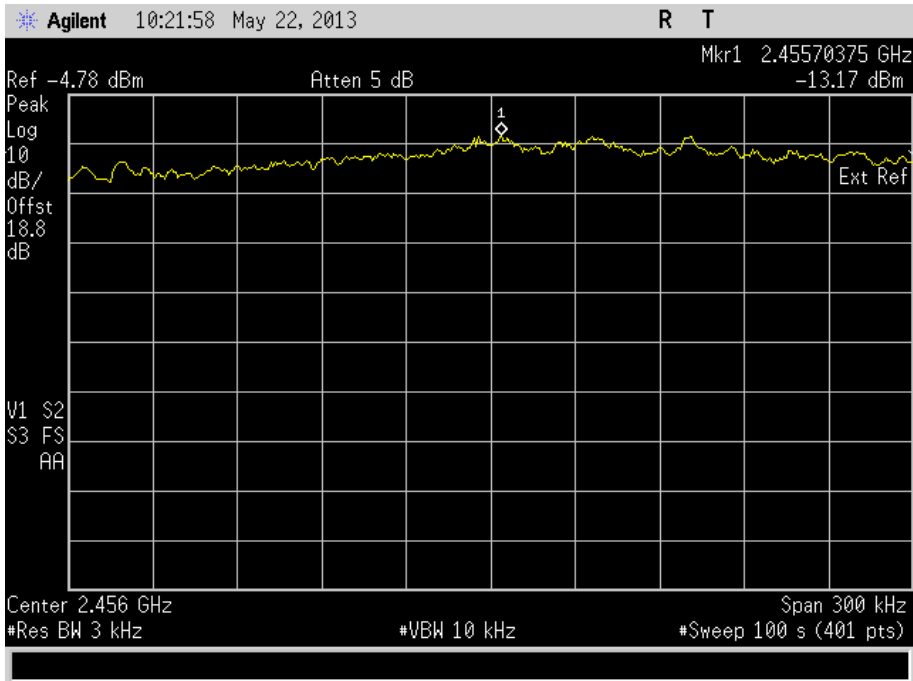
26 Mbps



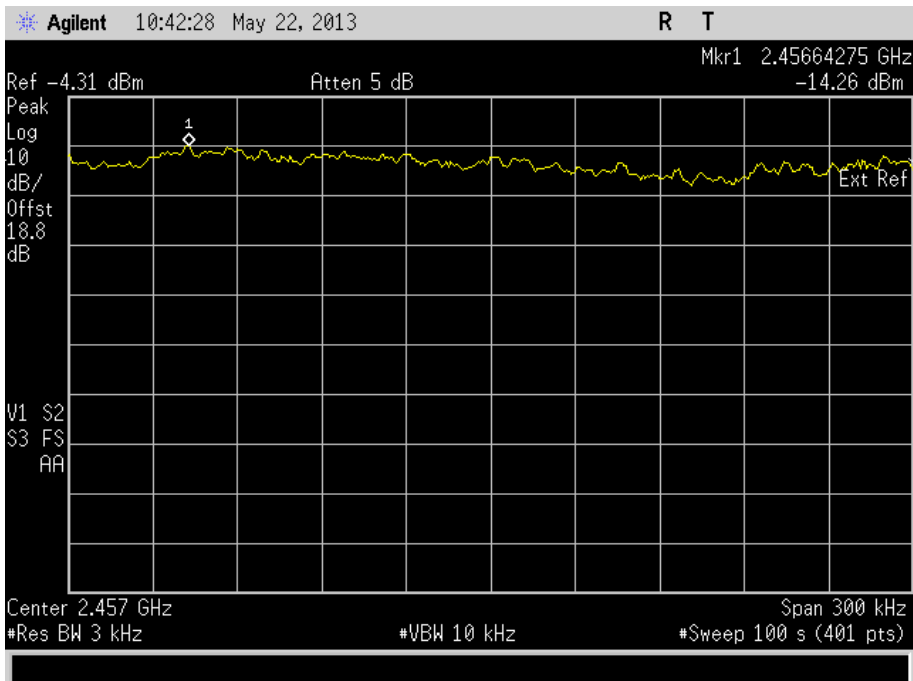


Product Service

39 Mbps

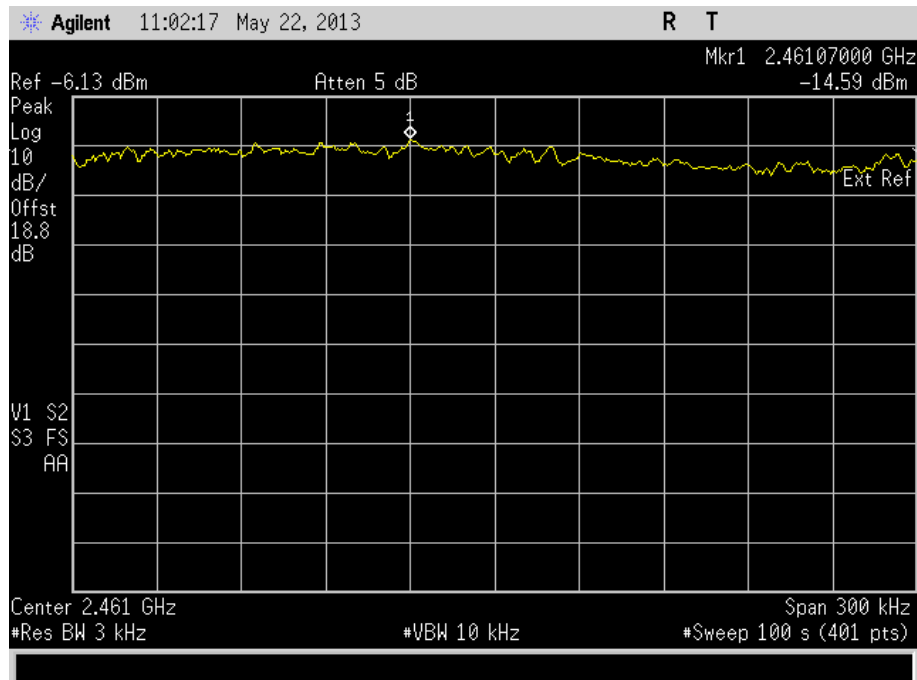
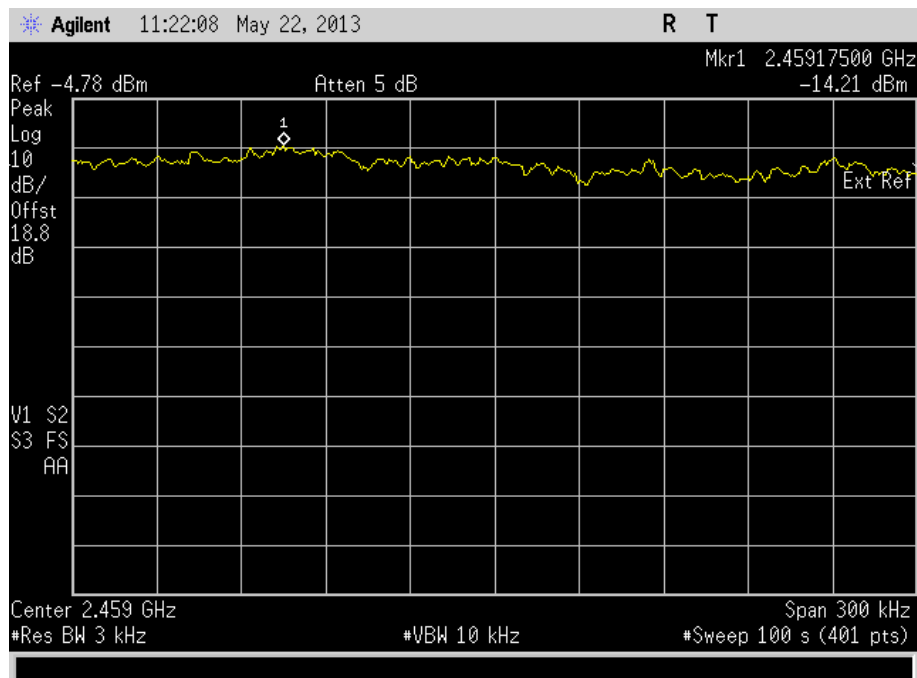


52 Mbps





Product Service

58.5 Mbps65 MbpsLimit Clause

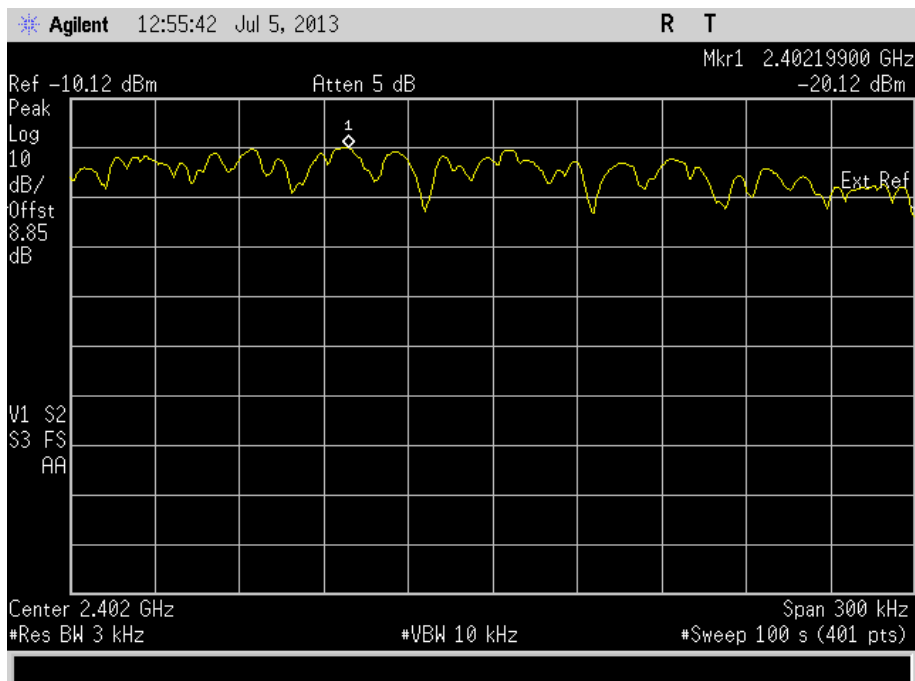
The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.



Product Service

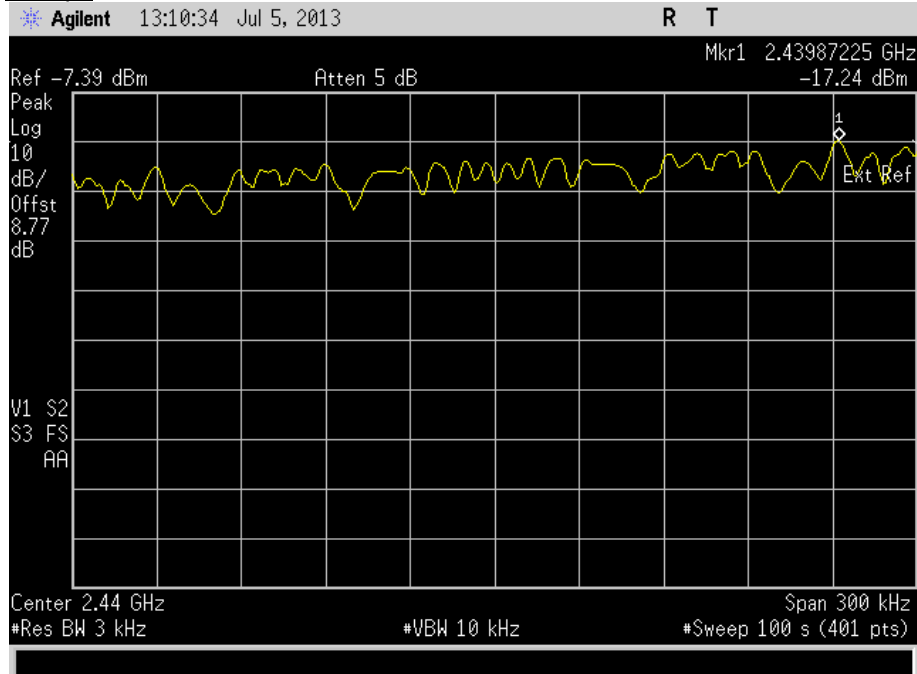
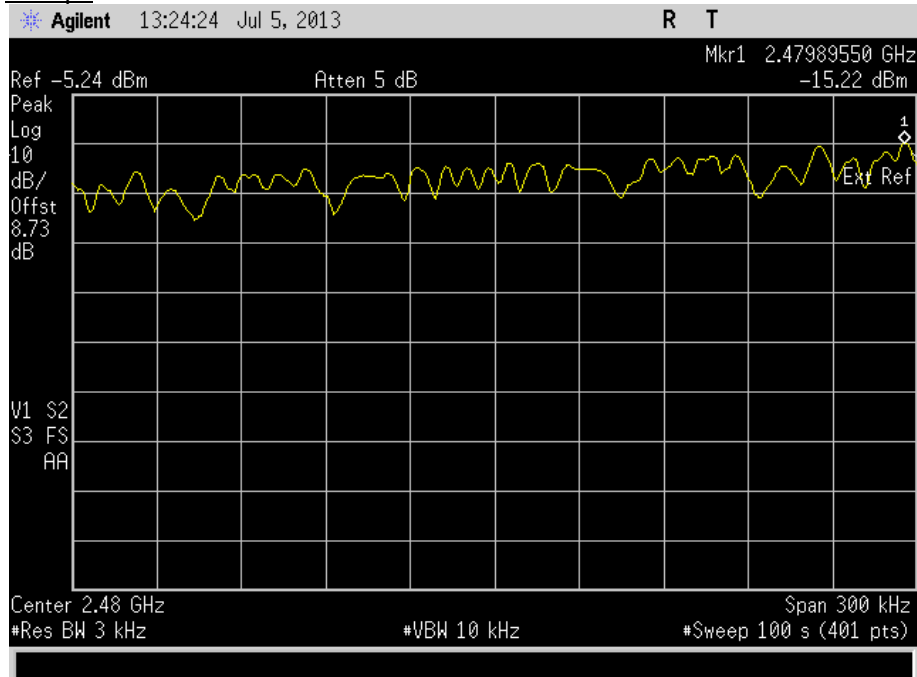
GFSK4.0 V DC Supply

Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2402 MHz	1	-20.12
2440 MHz	1	-17.24
2480 MHz	1	-15.22

2402 MHz1 Mbps



Product Service

2440 MHz1 Mbps2480 MHz1 MbpsLimit Clause

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



Product Service

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

SHL22 S/N: IMEI 004401114764687 - Modification State 0

2.5.3 Date of Test

1 June 2013, 2 June 2013, 7 June 2013, 13 June 2013, 14 June 2013, 17 June 2013, 5 July 2013 & 7 July 2013

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	18.9 - 23.0°C
Relative Humidity	35.1 - 51.7%

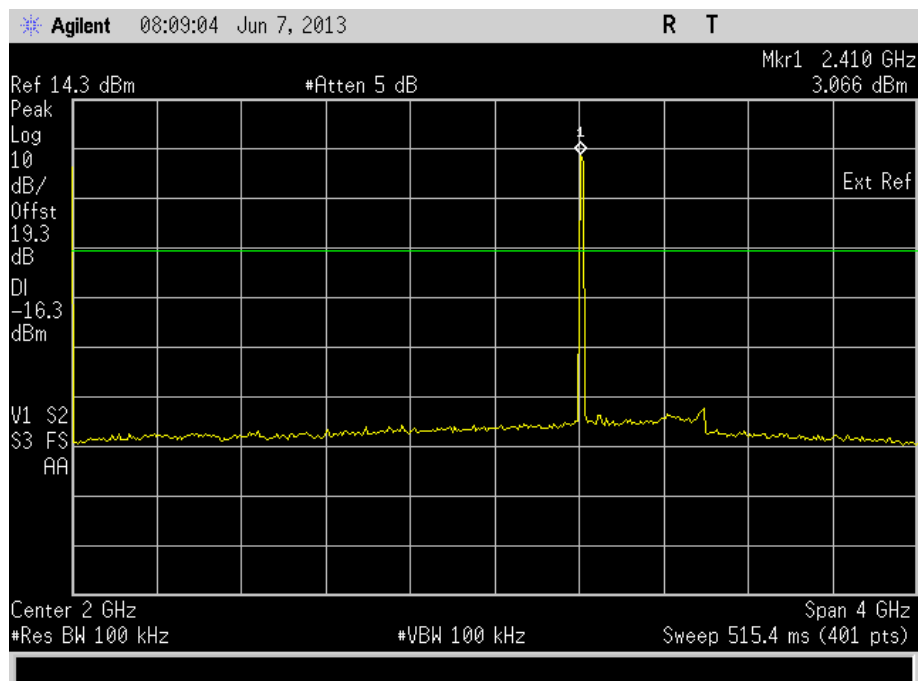


Product Service

2.5.7 Test Results

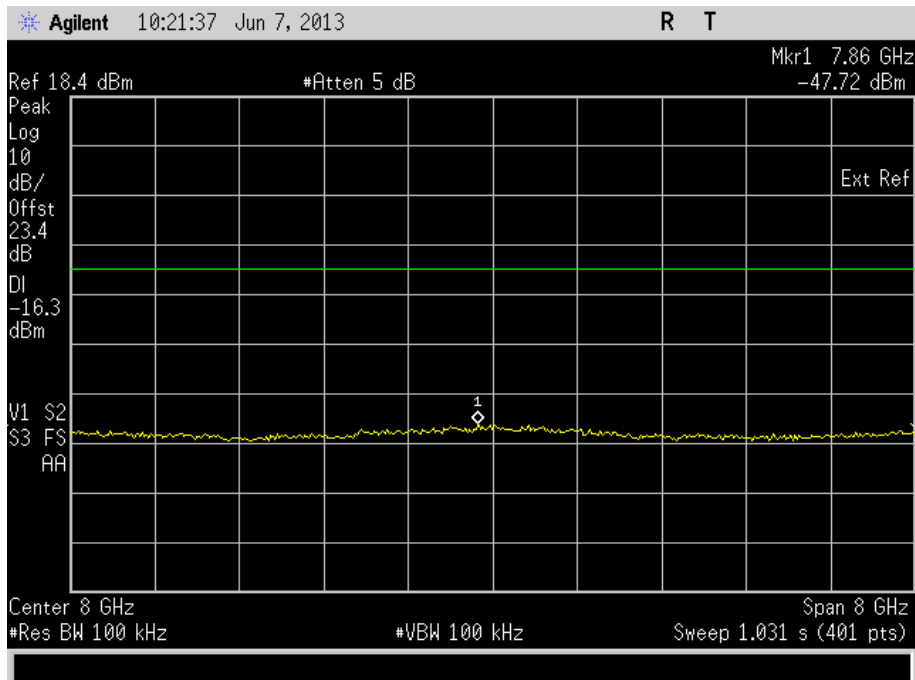
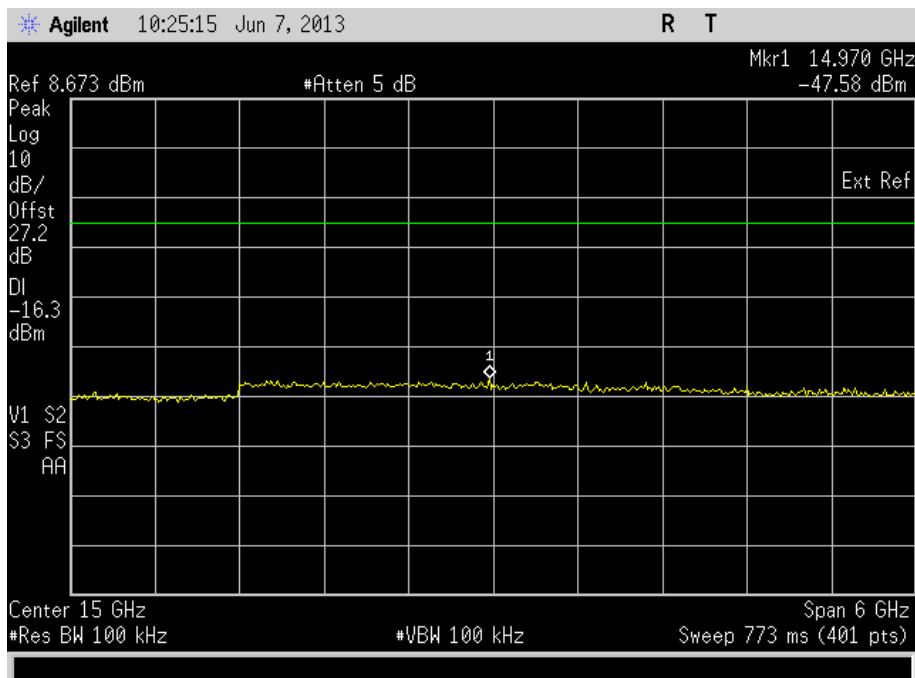
802.11(b)

4.0 V DC Supply

Spurious Conducted Emissions11 Mbps2412 MHz9 kHz to 4 GHz

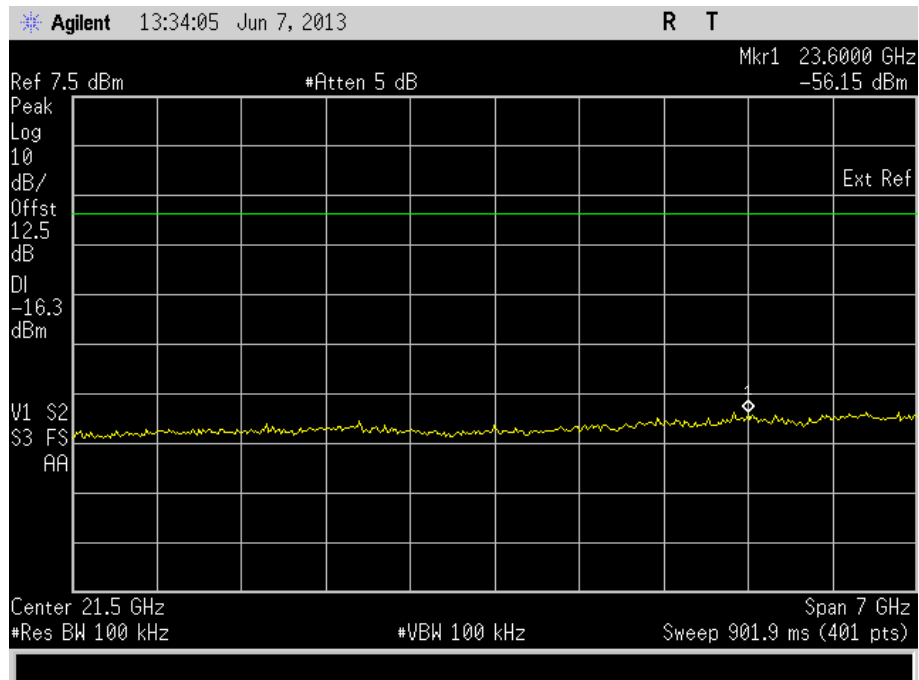
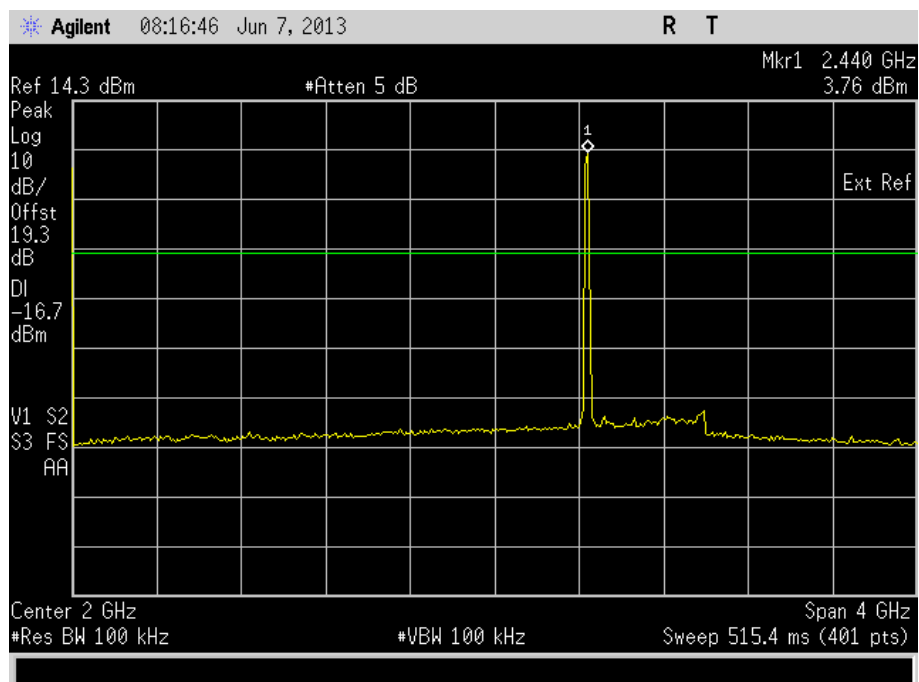


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

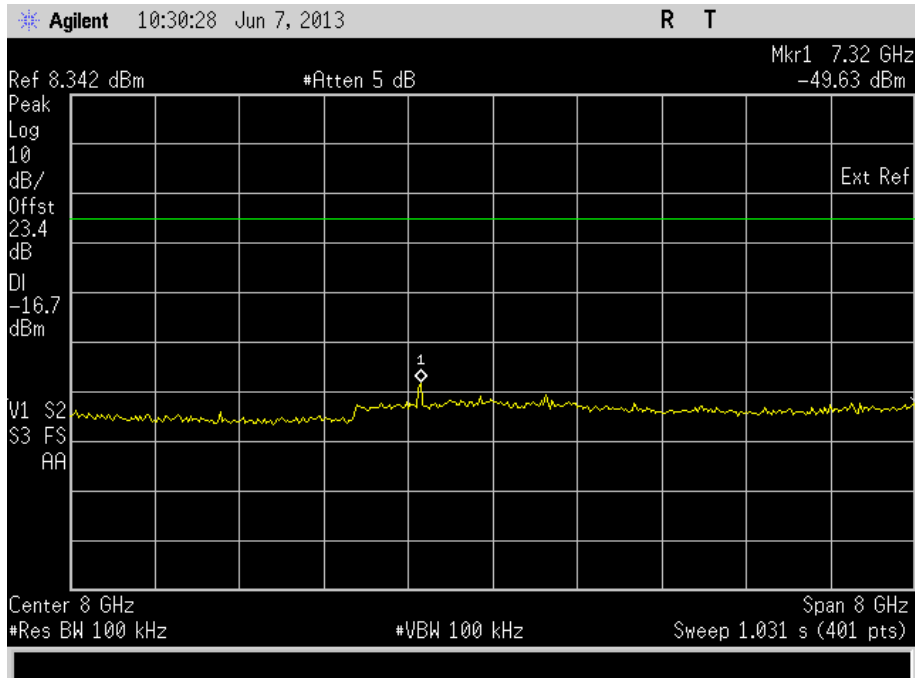
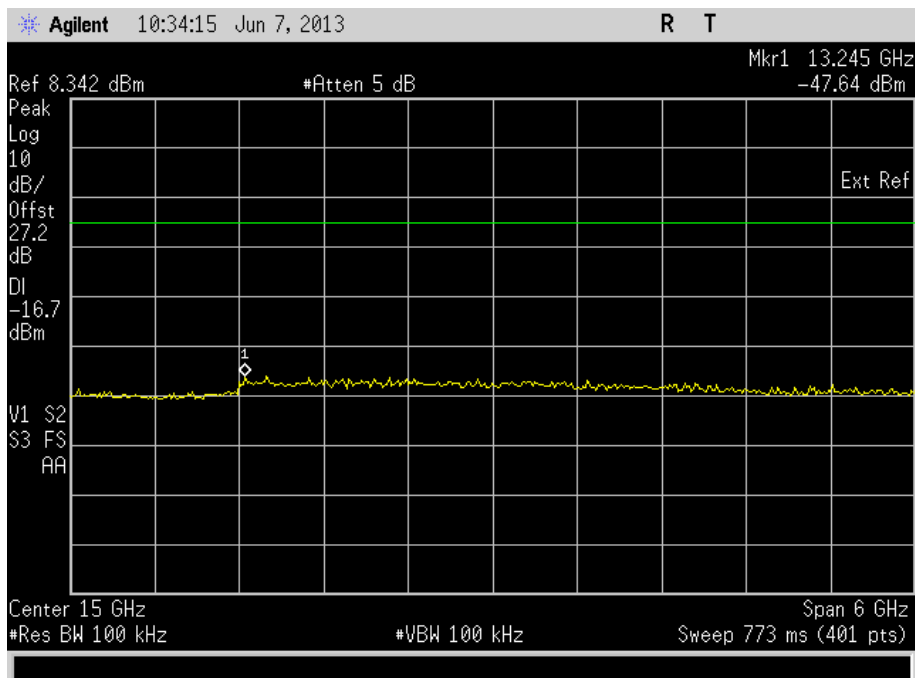


Product Service

18 GHz to 25 GHz2437 MHz9 kHz to 4 GHz

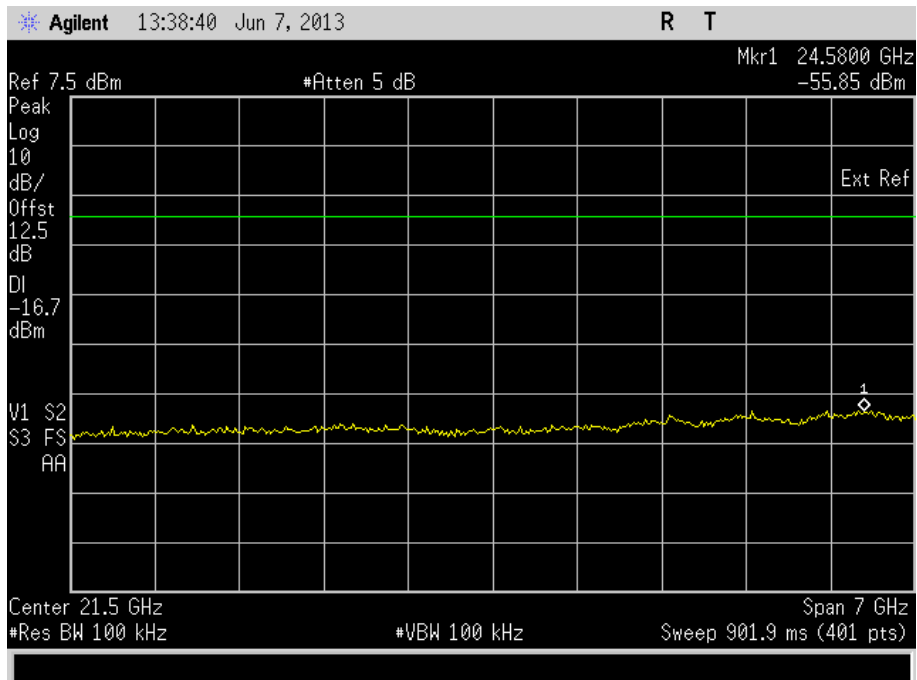
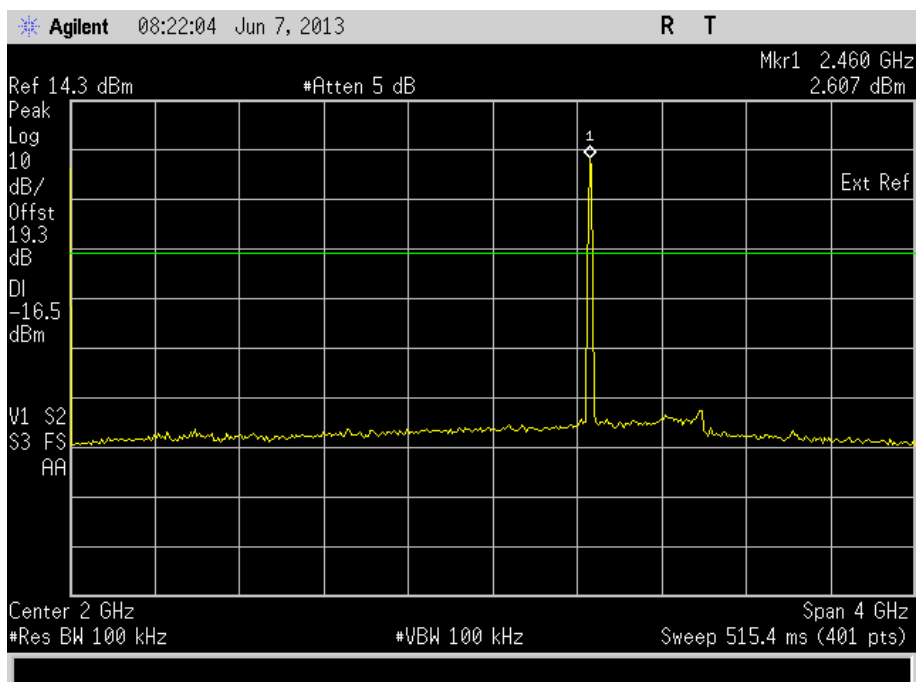


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

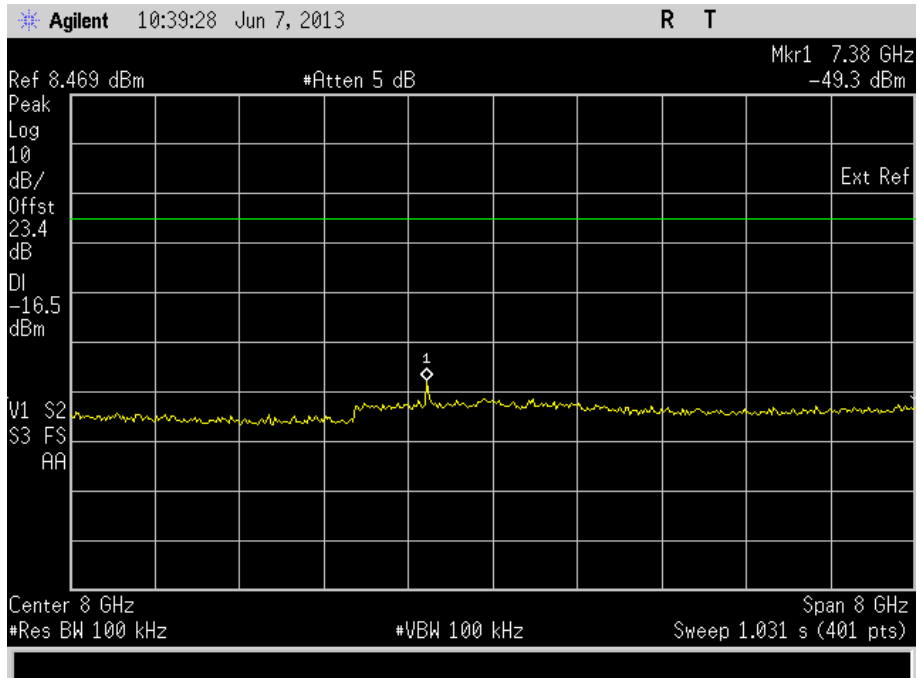
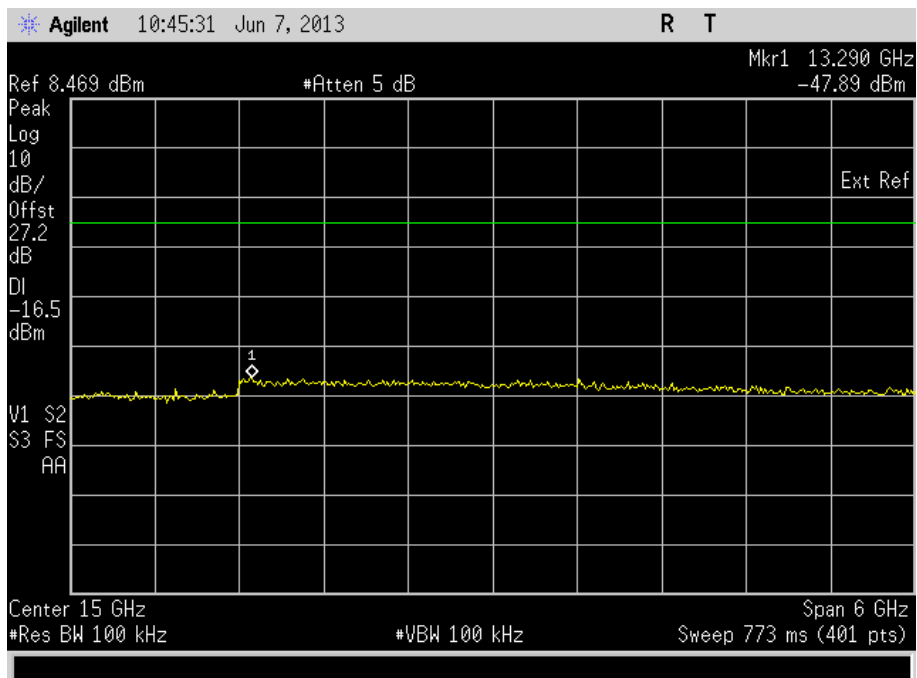


Product Service

18 GHz to 25 GHz2462 MHz9 kHz to 4 GHz

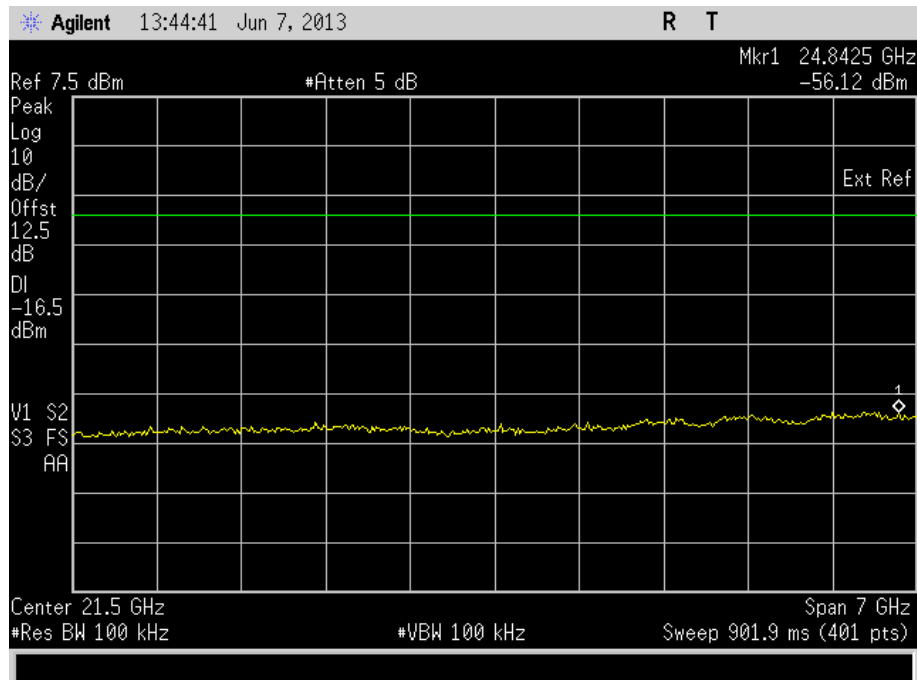


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

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

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

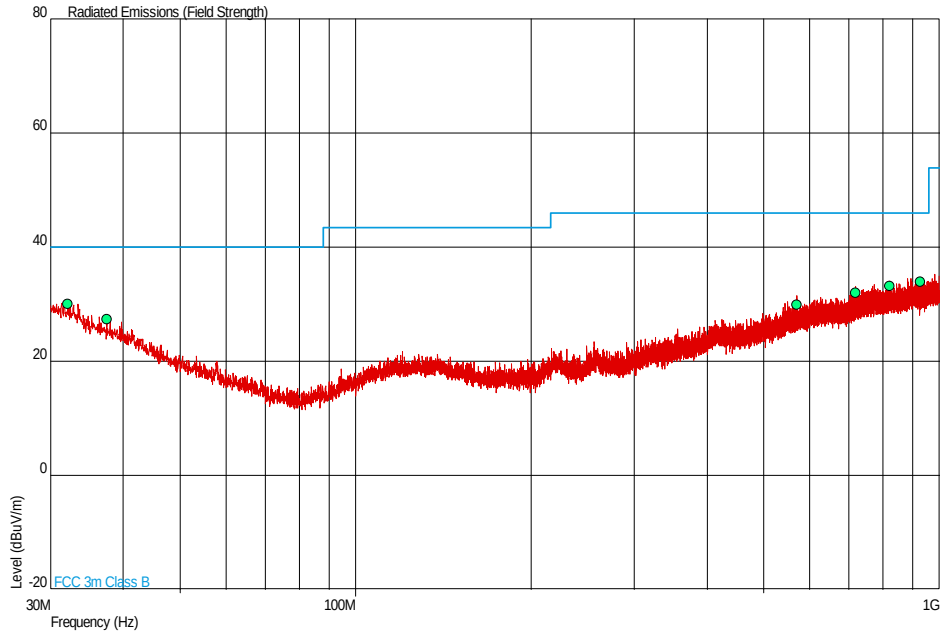


Product Service

Spurious Radiated Emissions

2412 MHz

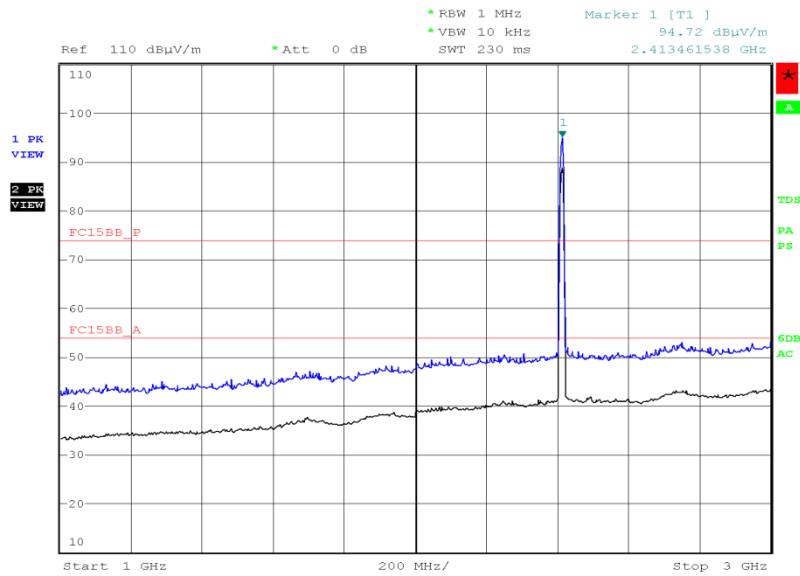
30 MHz to 1 GHz



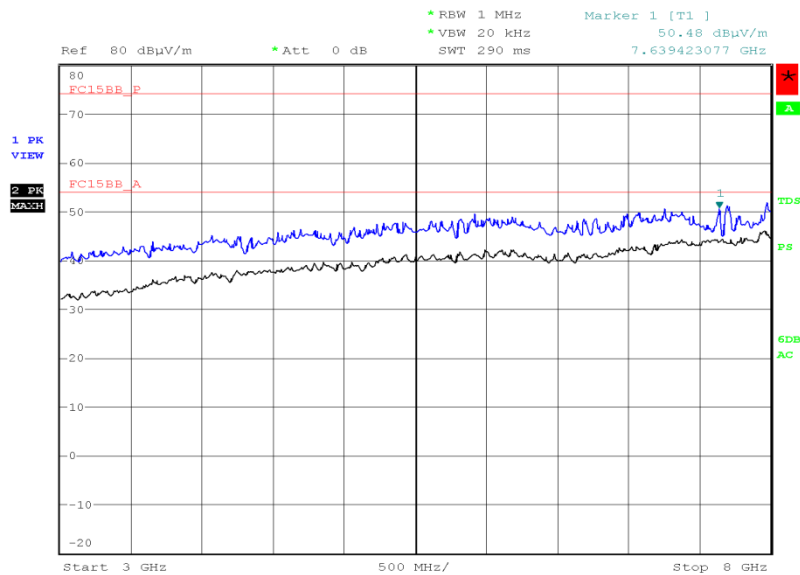
Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
32.134	30.1	32.0	40.0	100	-9.9	68.0	0	1.00	Vertical
37.468	27.4	23.4	40.0	100	-12.6	76.6	0	1.00	Horizontal
570.205	29.9	31.3	46.0	200	-16.1	168.7	0	1.00	Horizontal
719.451	32.0	39.8	46.0	200	-14.0	160.2	0	1.00	Horizontal
822.199	33.3	46.2	46.0	200	-12.7	153.8	0	1.00	Horizontal
928.742	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Horizontal



Product Service

1 GHz to 3 GHz

Date: 12.JUN.2013 21:38:03

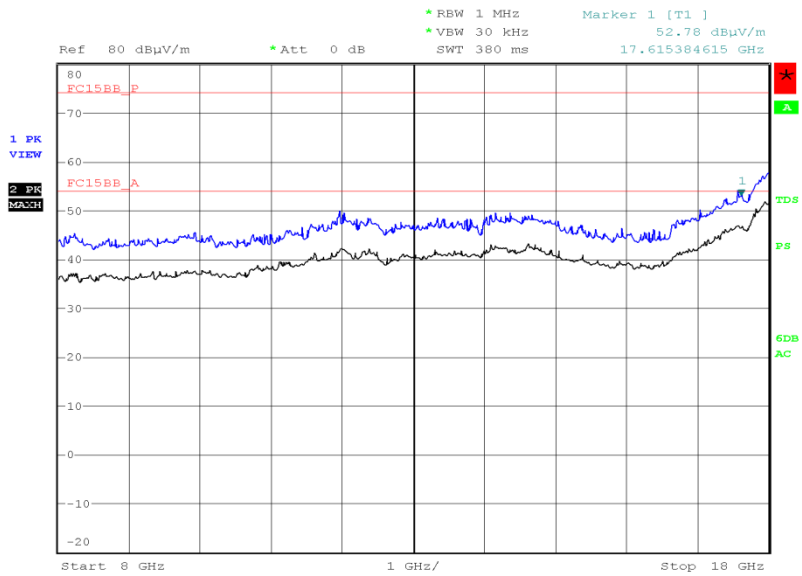
3 GHz to 8 GHz

Date: 13.JUN.2013 01:31:21



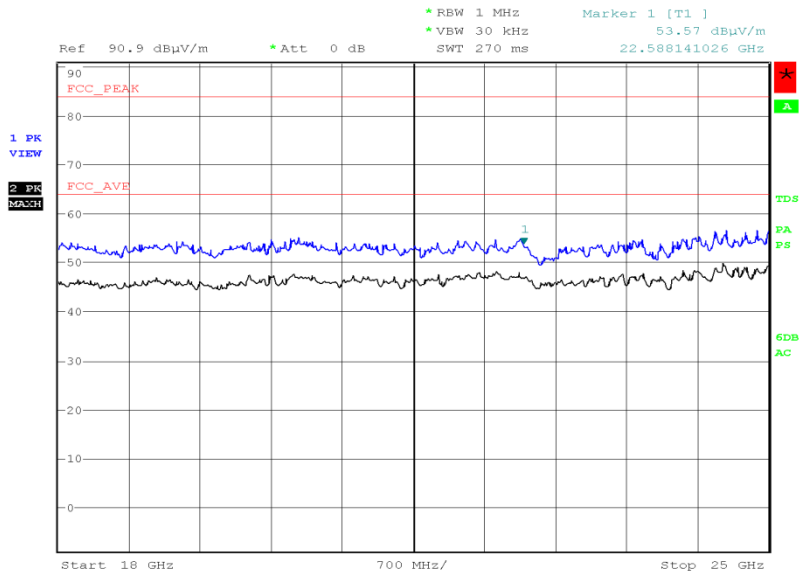
Product Service

8 GHz to 18 GHz



Date: 13.JUN.2013 04:12:09

18 GHz to 25 GHz



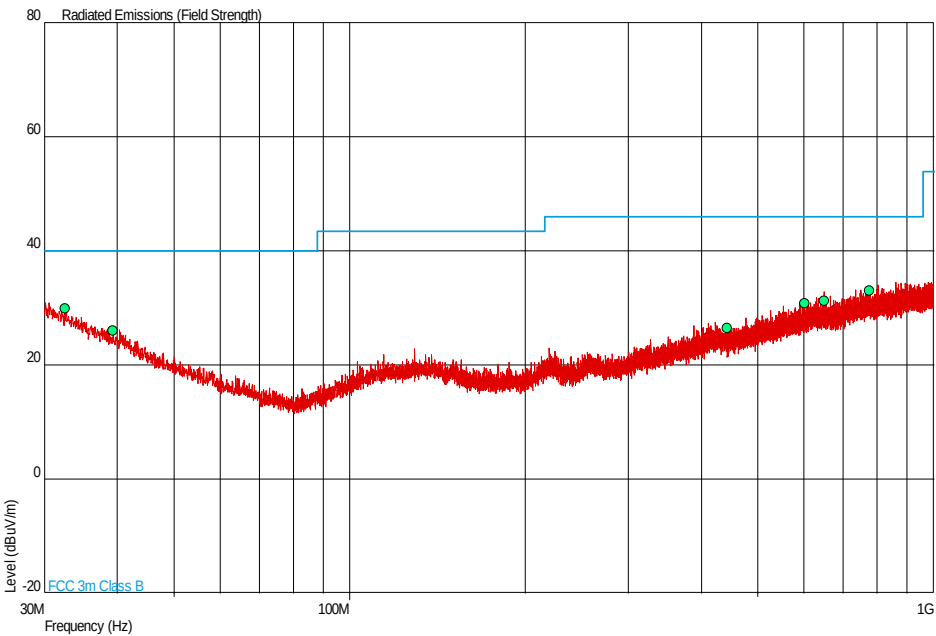
Date: 13.JUN.2013 23:58:42



Product Service

2437 MHz

30 MHz to 1 GHz

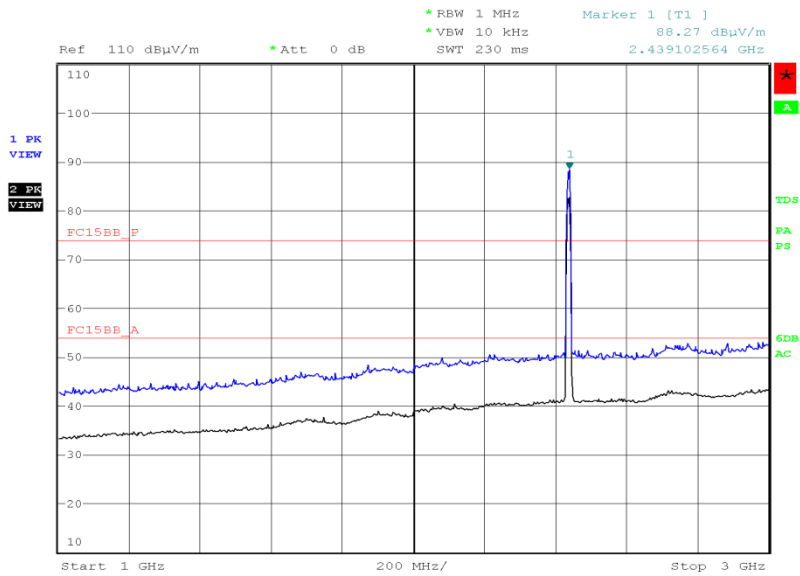


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
32.522	29.9	31.3	40.0	100	-10.1	68.7	0	1.00	Horizontal
39.361	26.1	20.2	40.0	100	-13.9	79.8	0	1.00	Horizontal
442.165	26.5	21.1	46.0	200	-19.5	178.9	0	1.00	Horizontal
600.469	30.9	35.1	46.0	200	-15.1	164.9	0	1.00	Horizontal
648.424	31.3	36.7	46.0	200	-14.7	163.3	0	1.00	Horizontal
775.251	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical



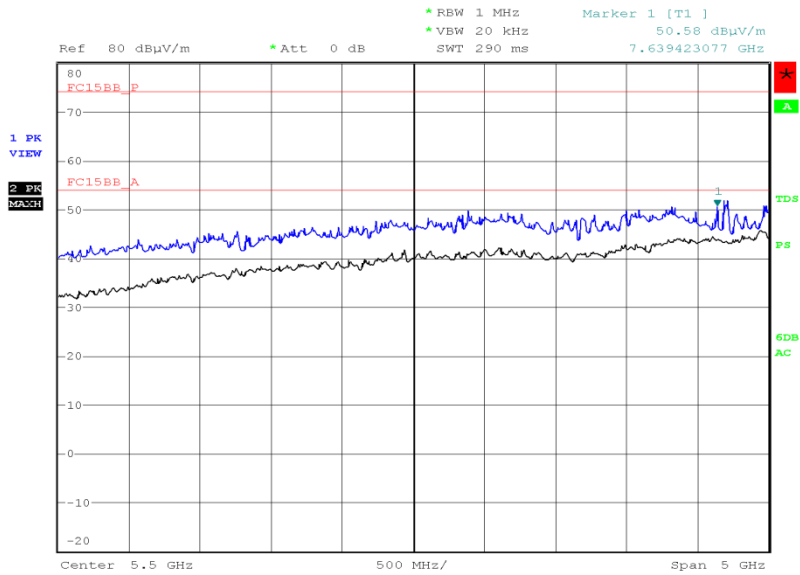
Product Service

1 GHz to 3 GHz



Date: 12.JUN.2013 21:46:31

3 GHz to 8 GHz

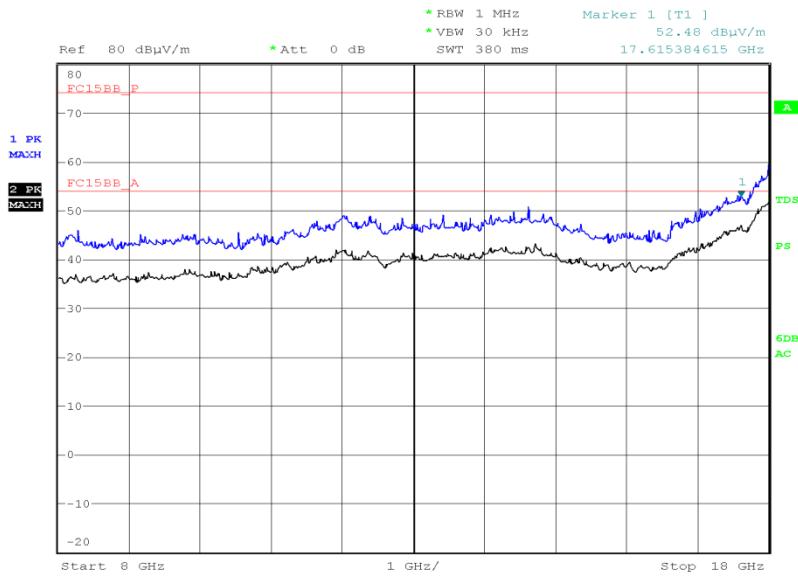


Date: 13.JUN.2013 01:42:22



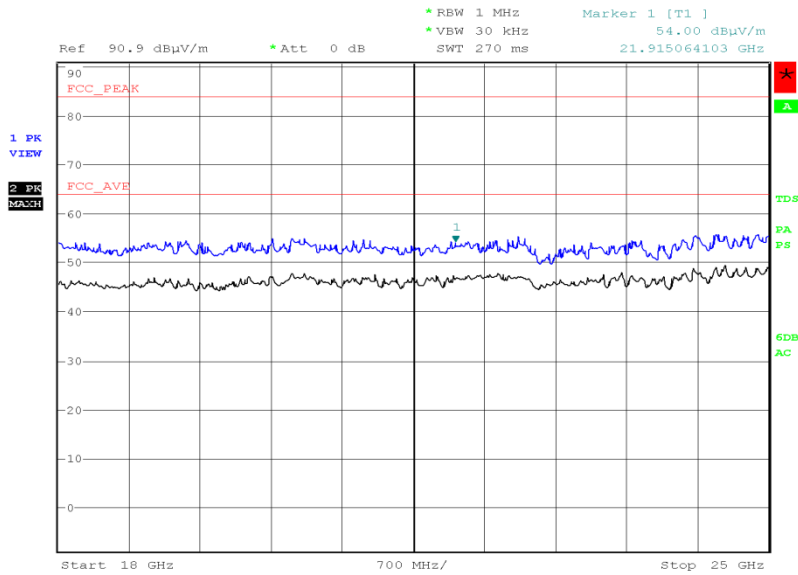
Product Service

8 GHz to 18 GHz



Date: 13.JUN.2013 04:16:37

18 GHz to 25 GHz



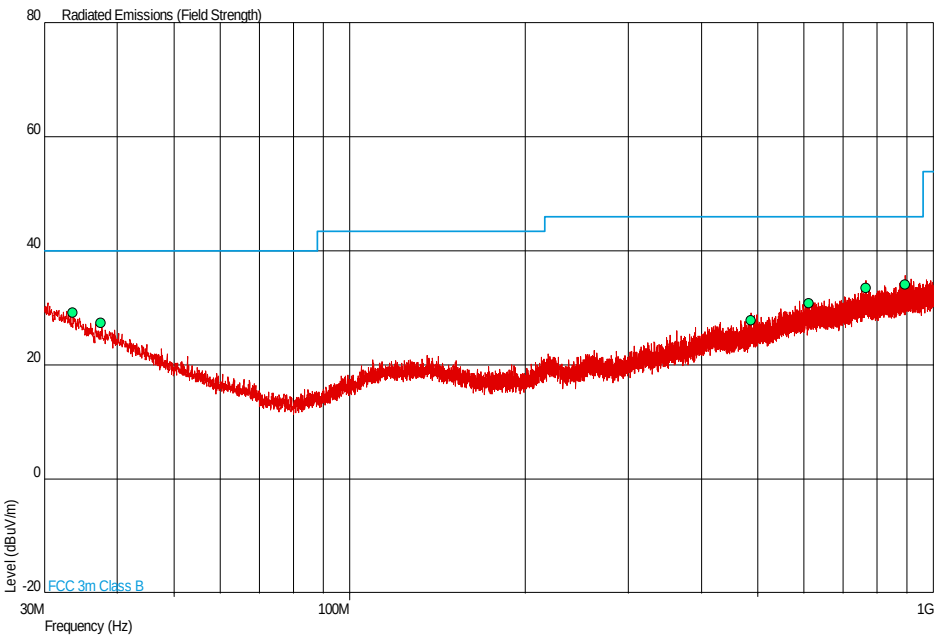
Date: 14.JUN.2013 00:08:59



Product Service

2462 MHz

30 MHz to 1 GHz

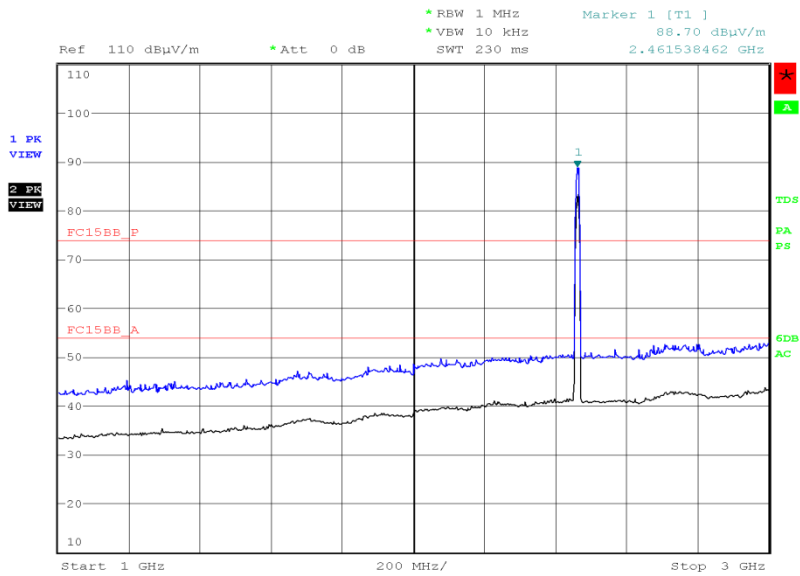


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
33.589	29.2	28.8	40.0	100	-10.8	71.2	0	1.00	Horizontal
37.518	27.4	23.4	40.0	100	-12.6	76.6	0	1.00	Vertical
487.161	27.8	24.5	46.0	200	-18.2	175.5	0	1.00	Horizontal
612.064	30.8	34.7	46.0	200	-15.2	165.3	0	1.00	Horizontal
764.872	33.5	47.3	46.0	200	-12.5	152.7	0	1.00	Horizontal
894.852	34.1	50.7	46.0	200	-11.9	149.3	0	1.00	Vertical



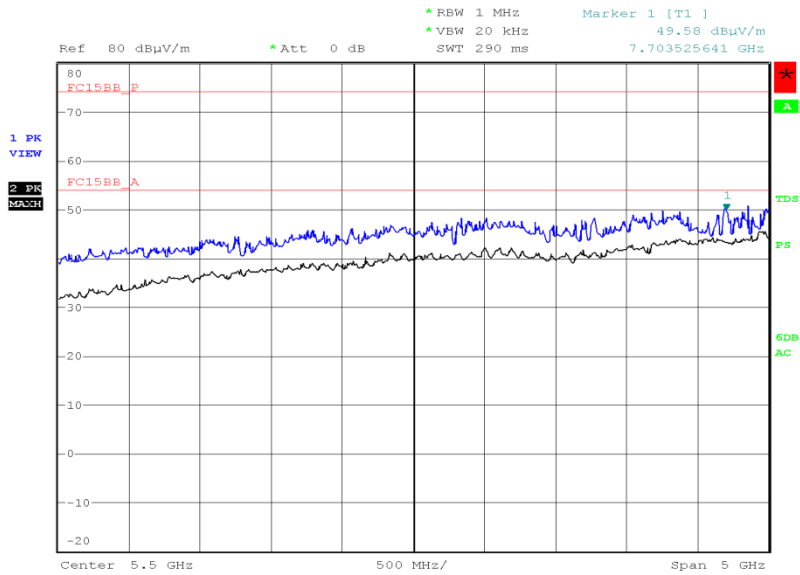
Product Service

1 GHz to 3 GHz



Date: 12.JUN.2013 21:53:39

3 GHz to 8 GHz

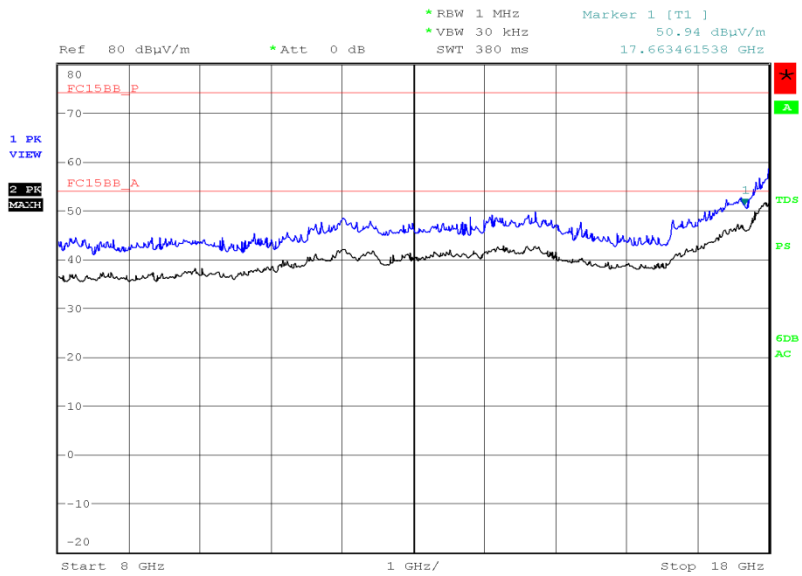


Date: 13.JUN.2013 01:46:44



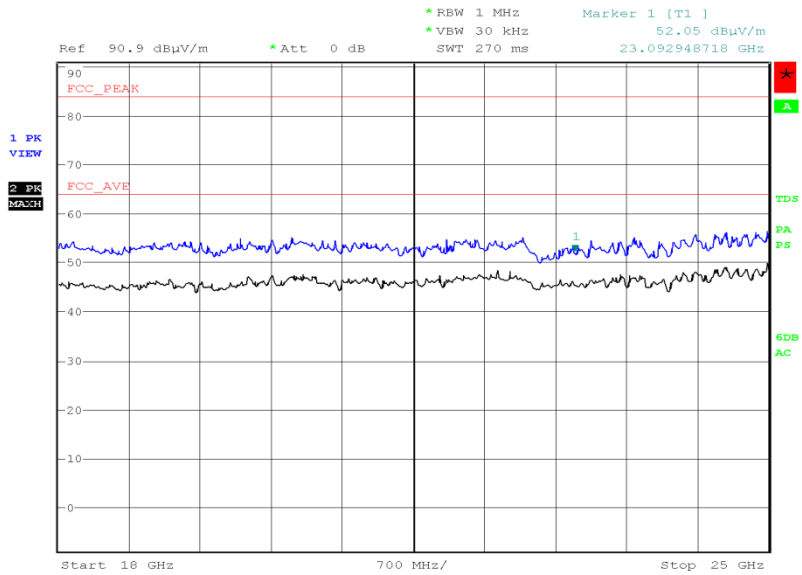
Product Service

8 GHz to 18 GHz



Date: 13.JUN.2013 04:21:21

18 GHz to 25 GHz



Date: 14.JUN.2013 00:17:59

Limit

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

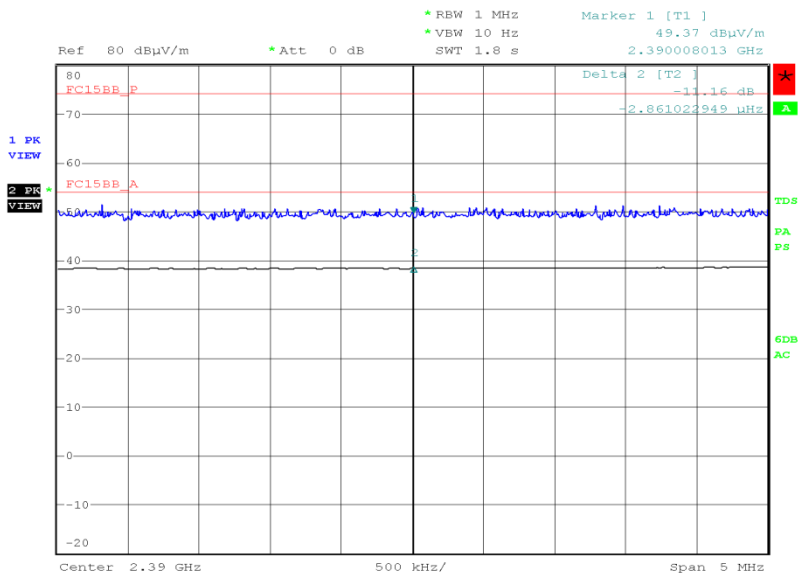


Product Service

Band Edge Emissions

2412 MHz

Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Horizontal	49.37	38.21



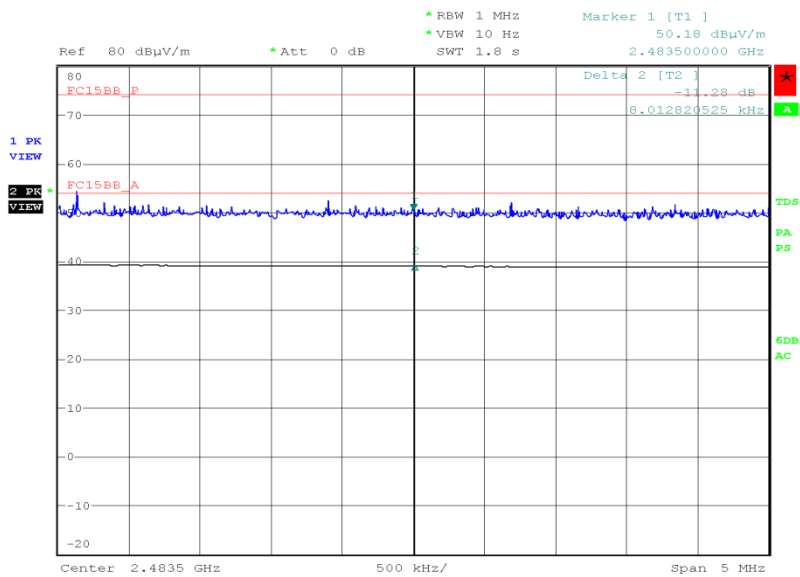
Date: 2.JUN.2013 14:13:15



Product Service

2462 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	50.18	38.90



Date: 2.JUN.2013 14:00:11

Limit

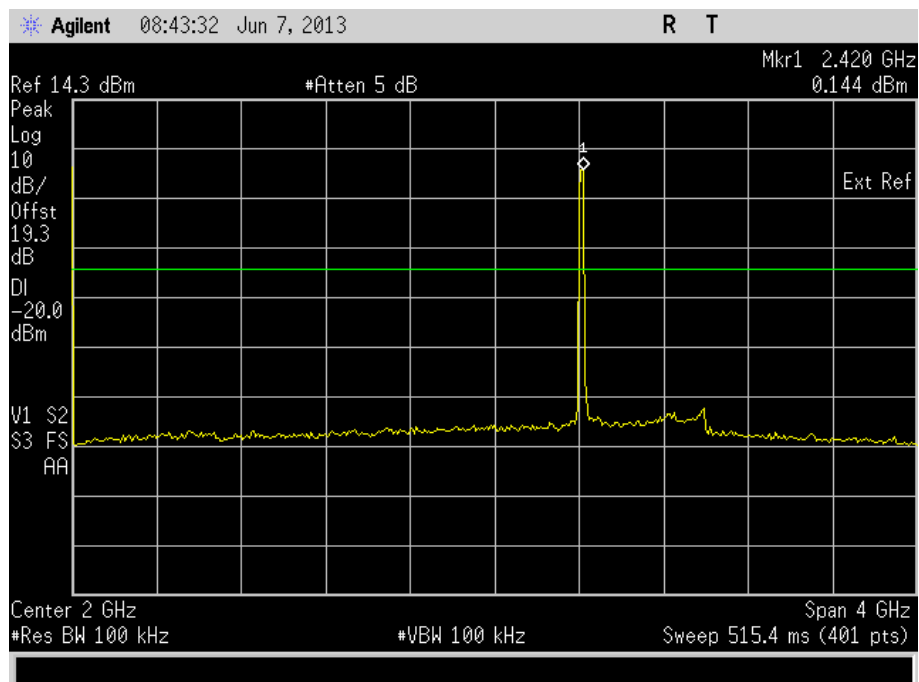
Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0



Product Service

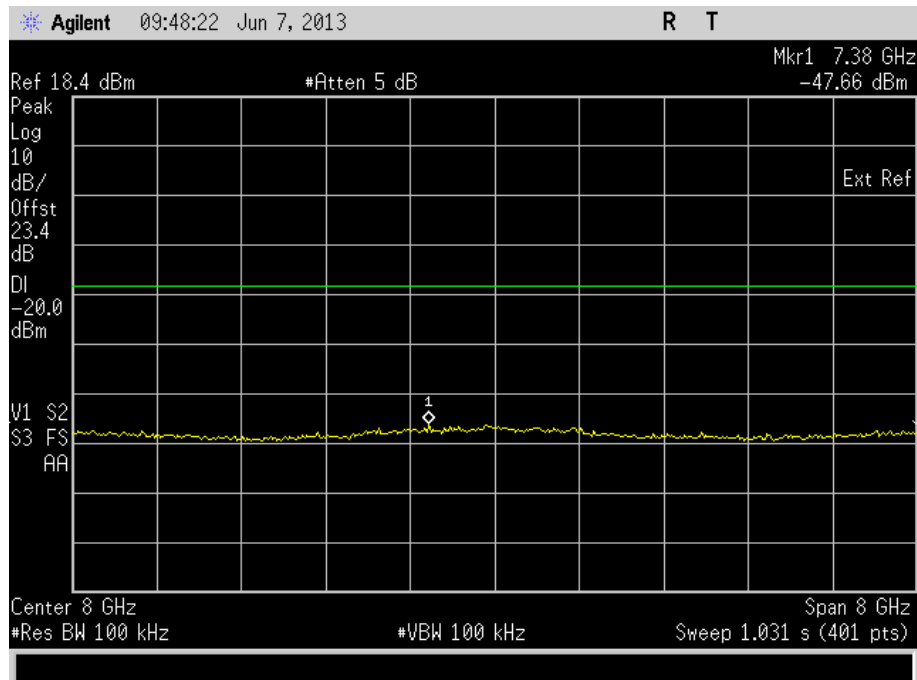
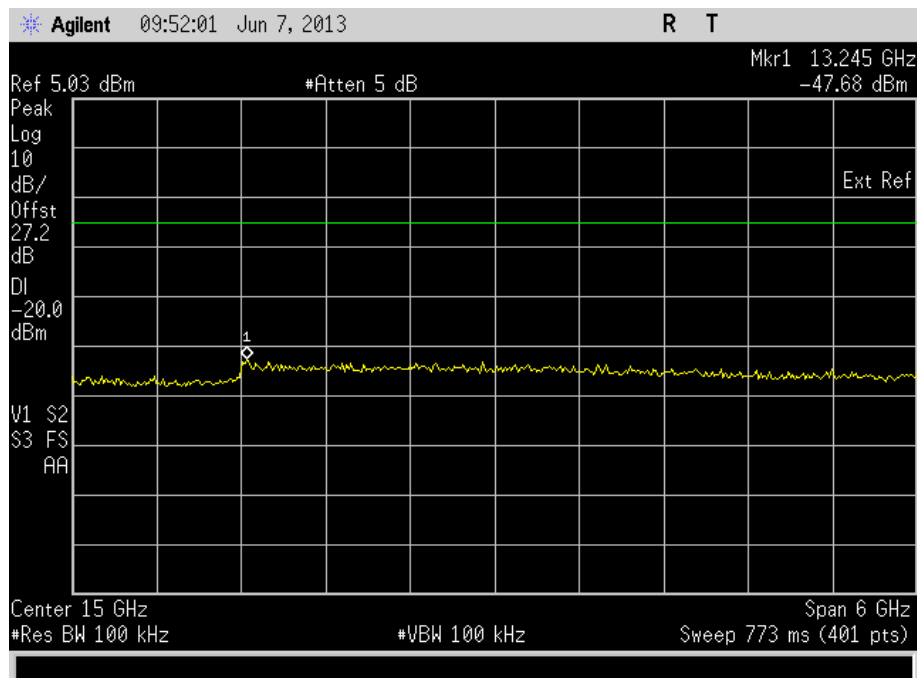
802.11(g)

4.0 V DC Supply

Spurious Conducted Emissions18 Mbps2412 MHz9 kHz to 4 GHz

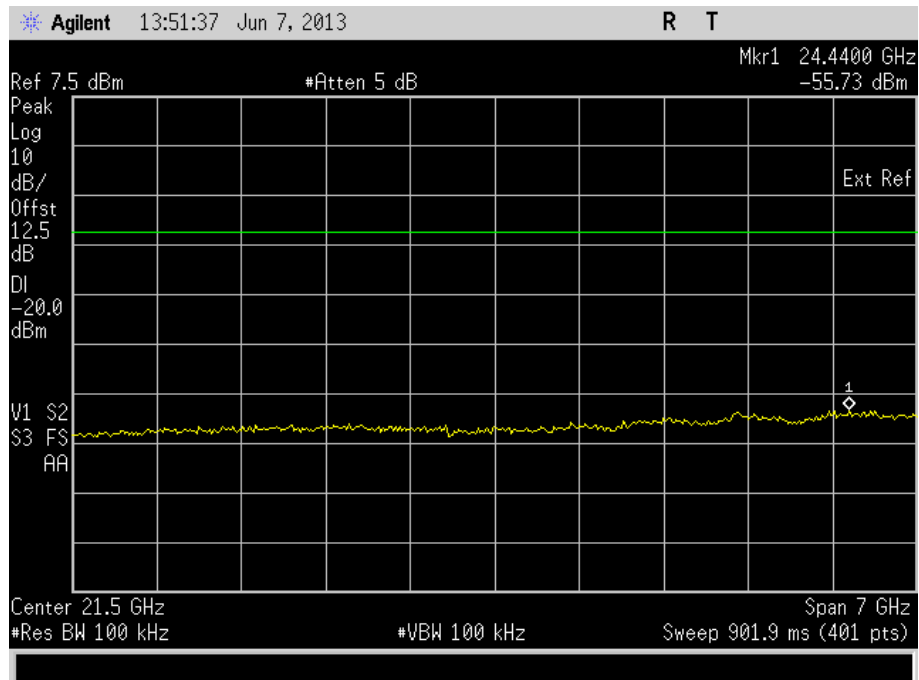
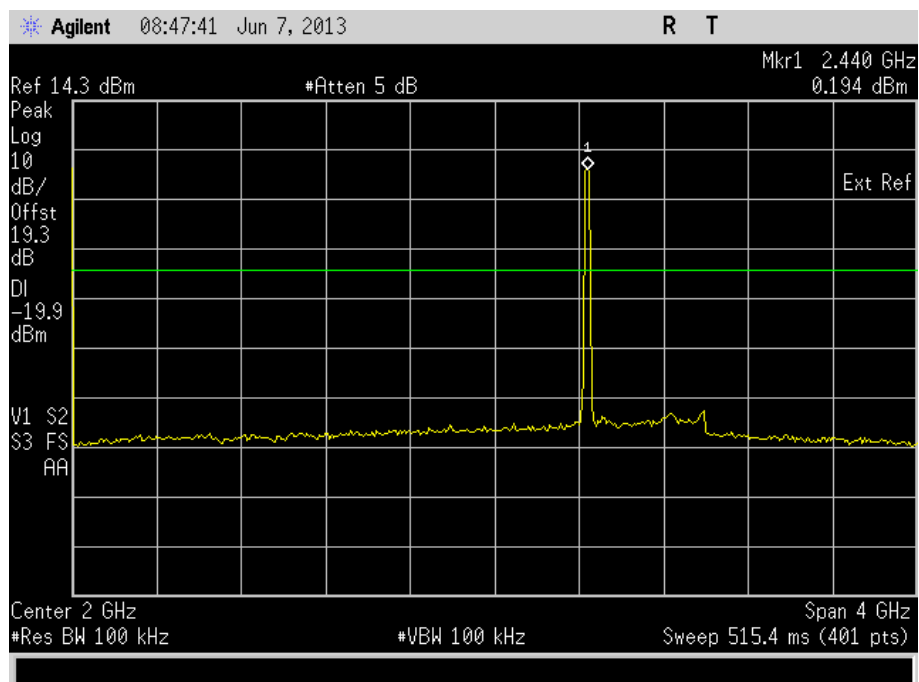


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

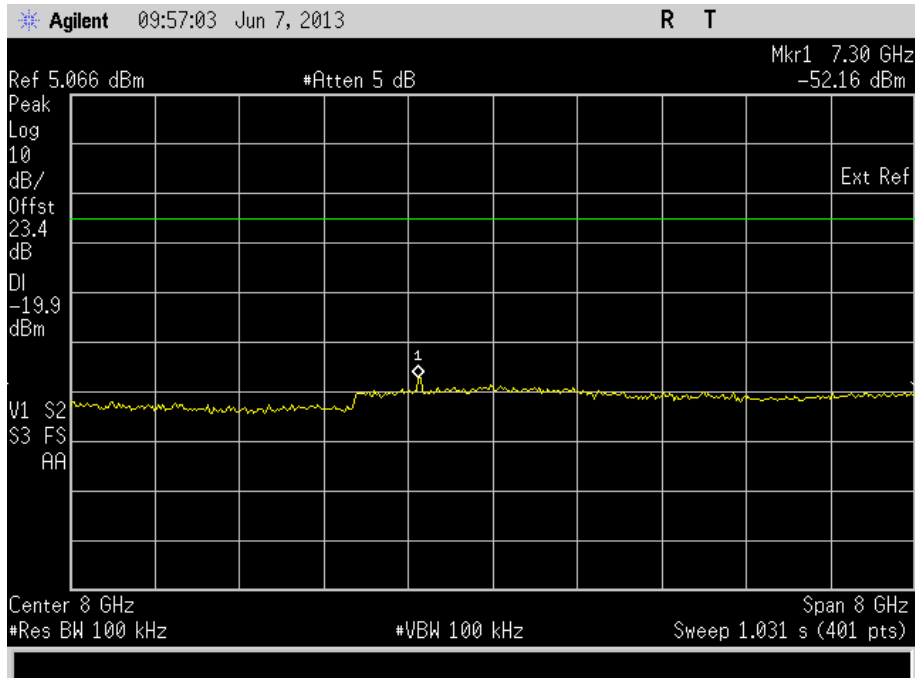
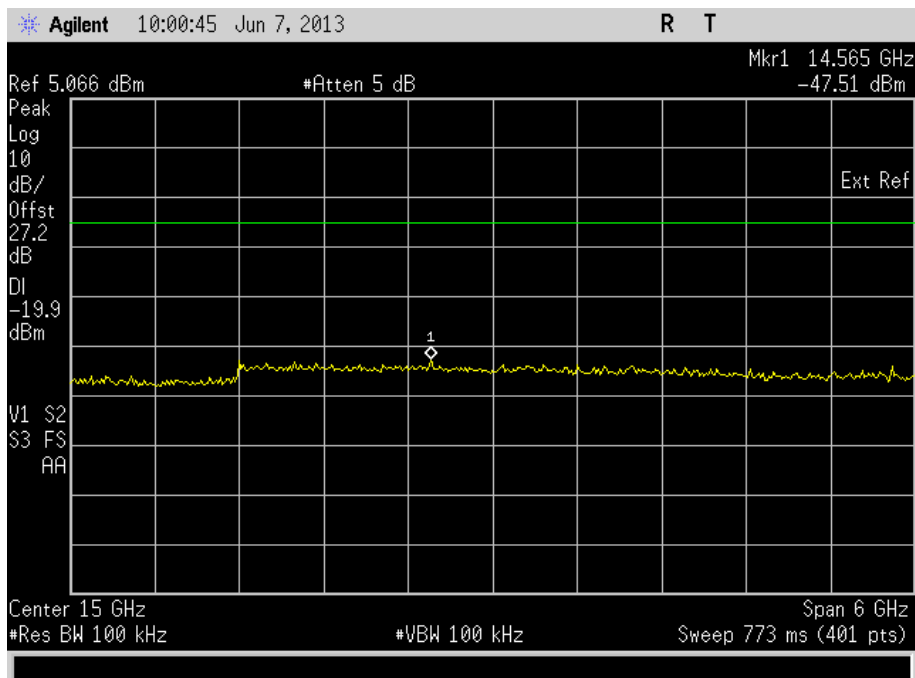


Product Service

18 GHz to 25 GHz2437 MHz9 kHz to 4 GHz

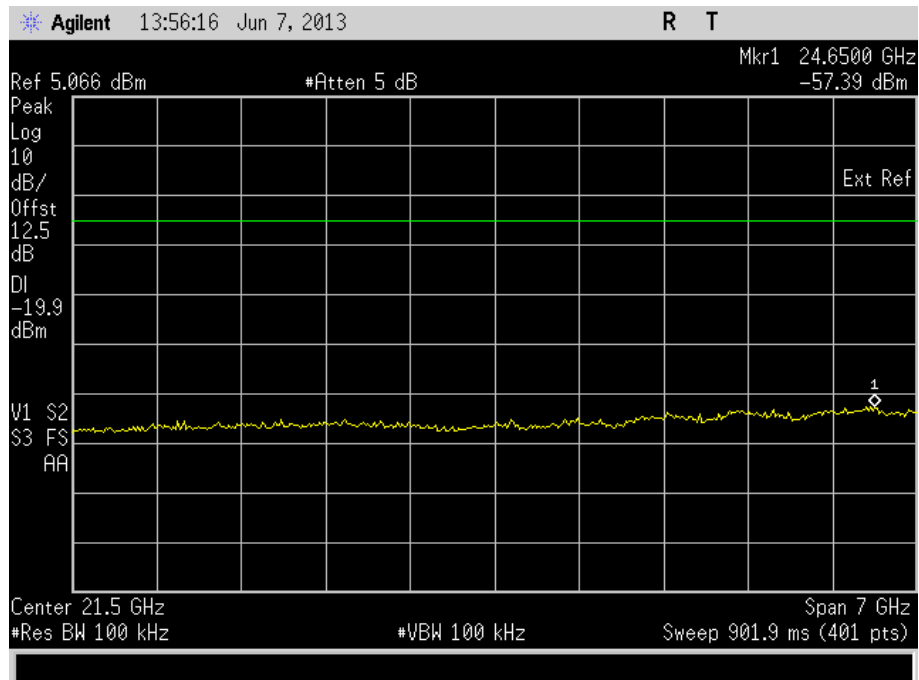
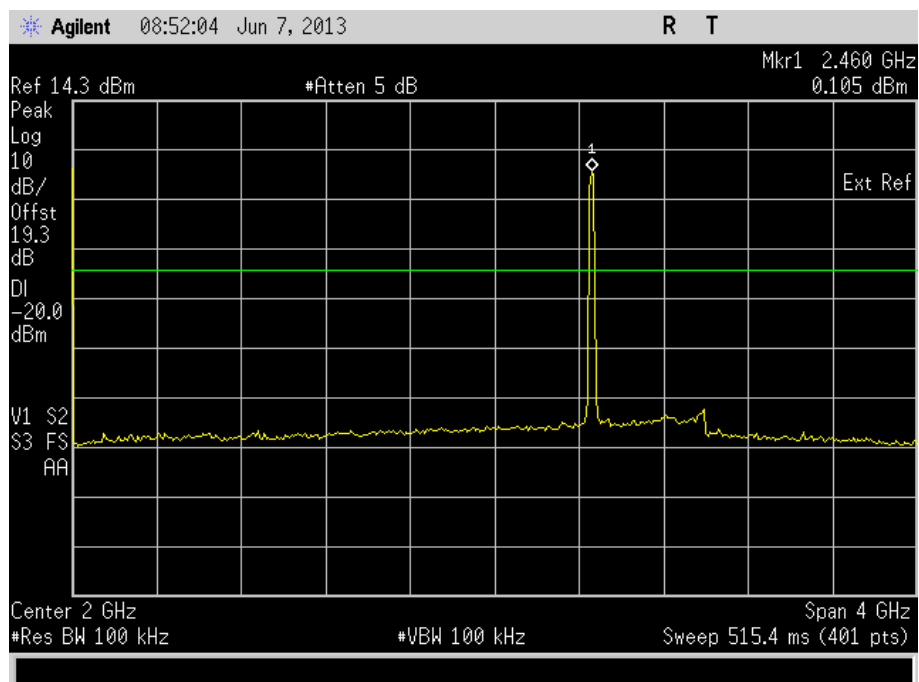


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

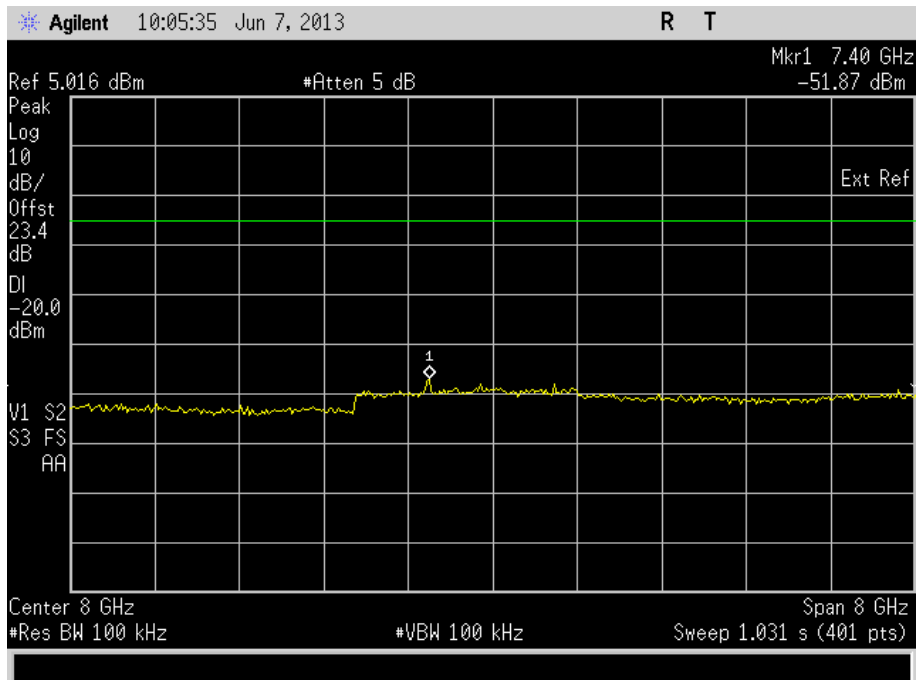
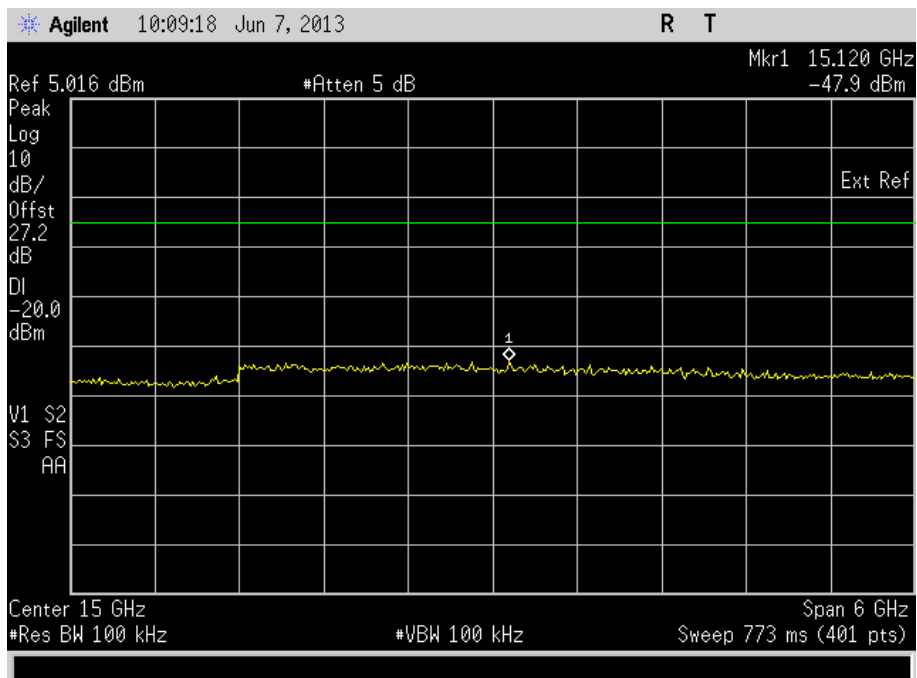


Product Service

18 GHz to 25 GHz2462 MHz9 kHz to 4 GHz

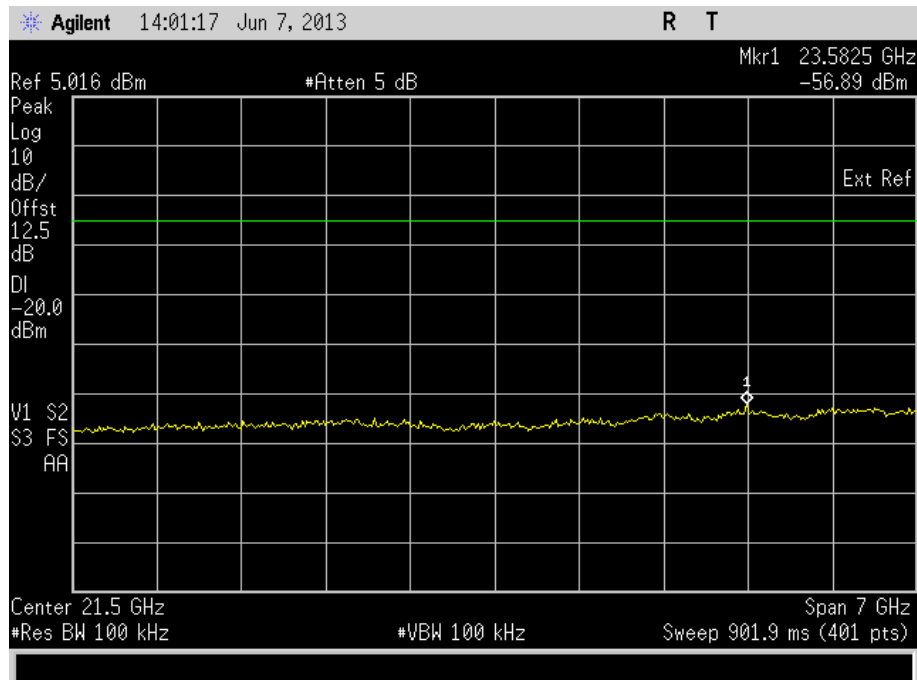


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

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

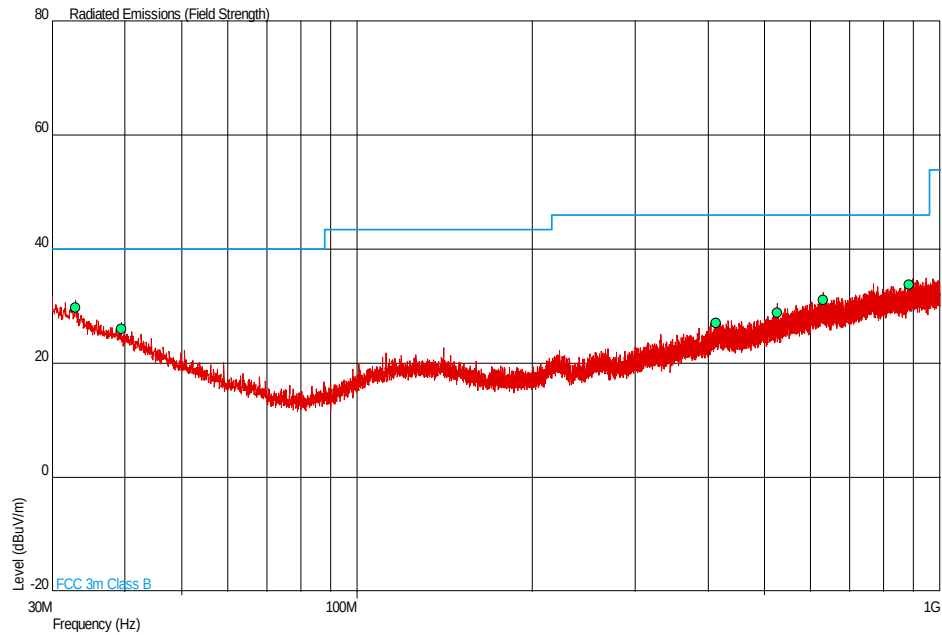
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.



Spurious Radiated Emissions

2412 MHz

30 MHz to 1 GHz

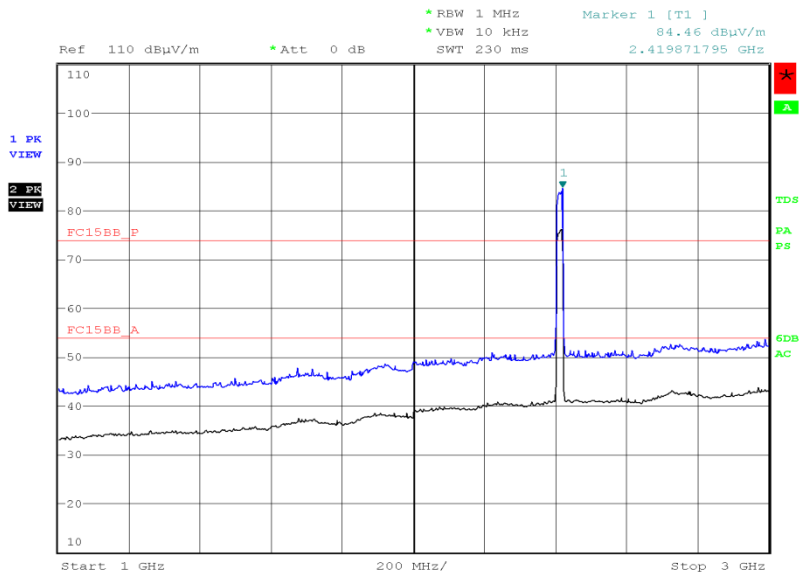


Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
32.910	29.7	30.5	40.0	100	-10.3	69.5	0	1.00	Horizontal
39.409	26.1	20.2	40.0	100	-13.9	79.8	0	1.00	Horizontal
412.374	27.1	22.6	46.0	200	-18.9	177.4	0	1.00	Vertical
525.913	28.9	27.9	46.0	200	-17.1	172.1	0	1.00	Vertical
629.654	31.1	35.9	46.0	200	-14.9	164.1	0	1.00	Vertical
884.667	33.8	49.0	46.0	200	-12.2	151.0	0	1.00	Vertical



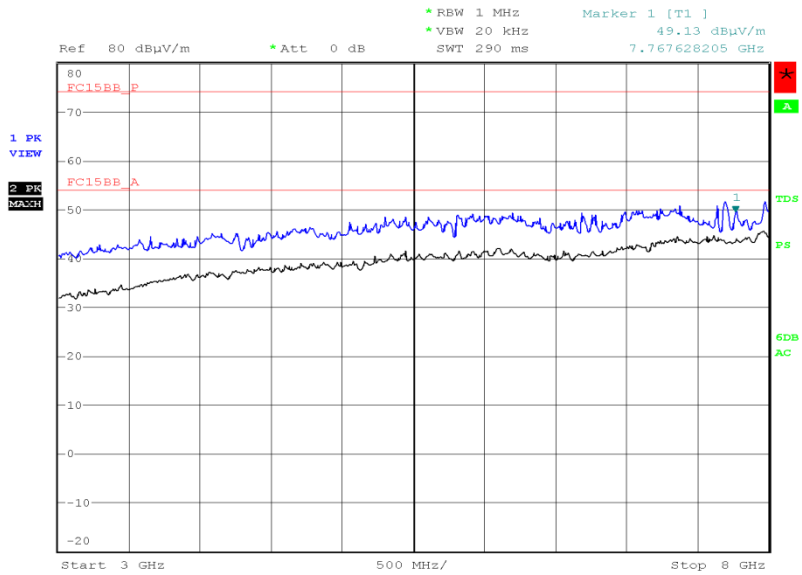
Product Service

1 GHz to 3 GHz



Date: 12.JUN.2013 22:03:16

3 GHz to 8 GHz

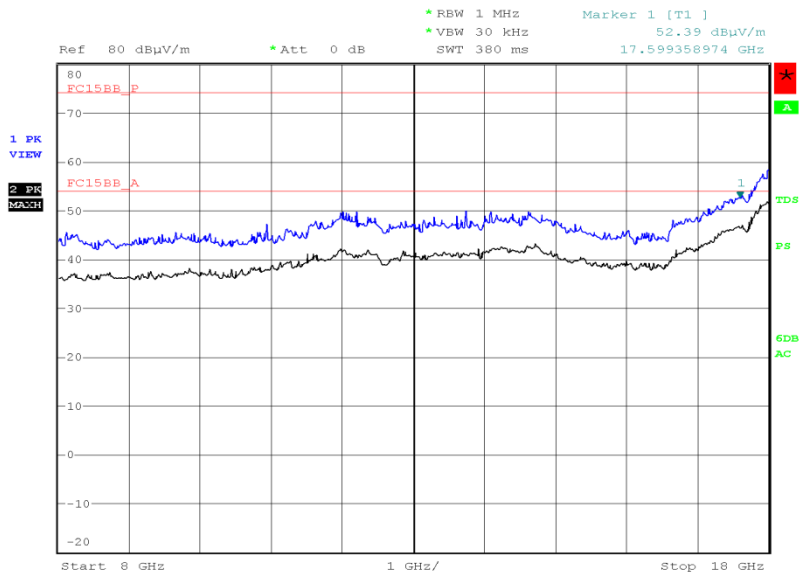


Date: 13.JUN.2013 00:44:33



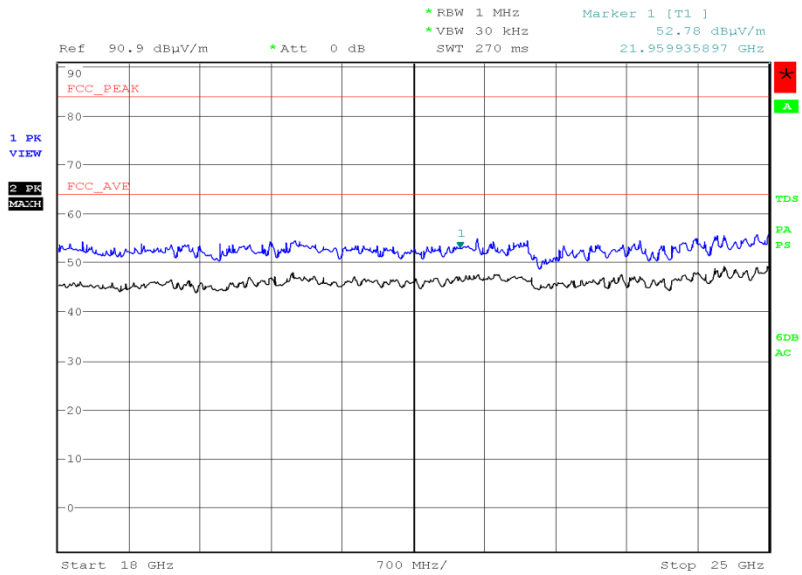
Product Service

8 GHz to 18 GHz



Date: 13.JUN.2013 04:27:36

18 GHz to 25 GHz



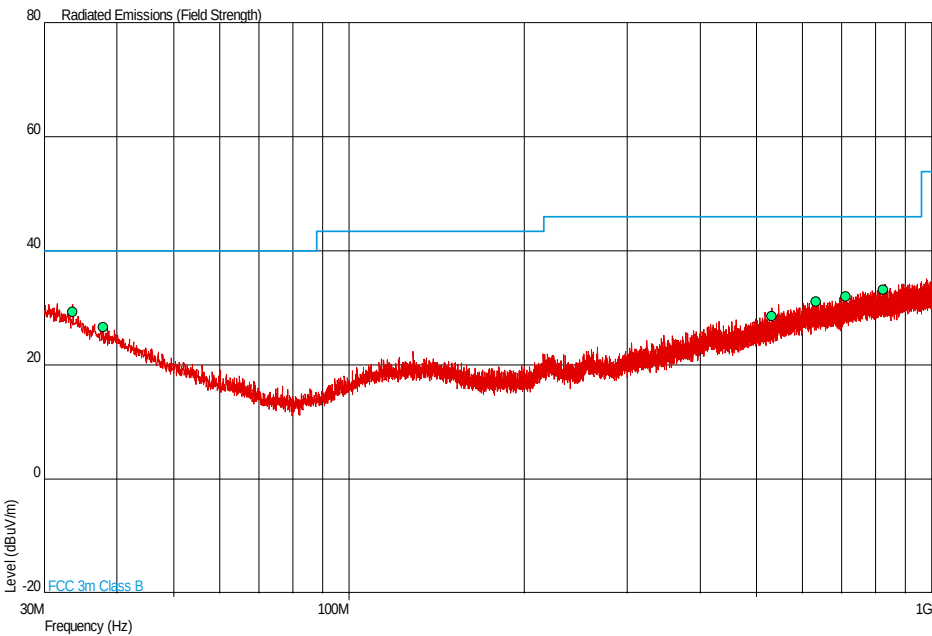
Date: 14.JUN.2013 00:25:24



Product Service

2437 MHz

30 MHz to 1 GHz

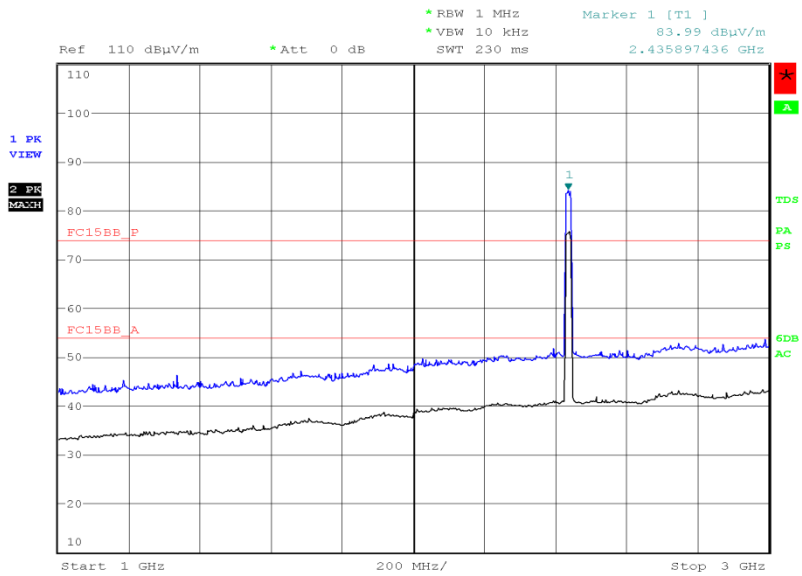


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
33.589	29.3	29.2	40.0	100	-10.7	70.8	0	1.00	Vertical
37.906	26.7	21.6	40.0	100	-13.3	78.4	0	1.00	Horizontal
530.617	28.6	26.9	46.0	200	-17.4	173.1	0	1.00	Vertical
633.098	31.1	35.9	46.0	200	-14.9	164.1	0	1.00	Vertical
710.310	32.0	39.8	46.0	200	-14.0	160.2	0	1.00	Horizontal
824.673	33.3	46.2	46.0	200	-12.7	153.8	0	1.00	Vertical



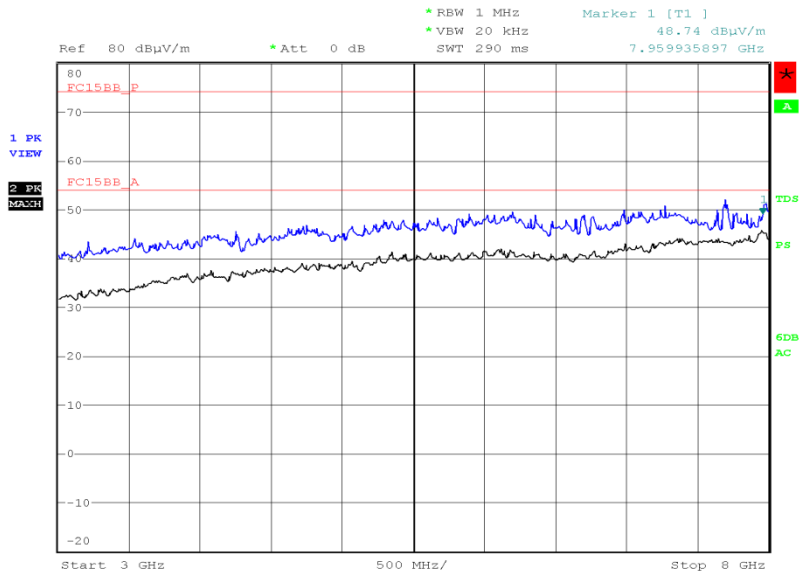
Product Service

1 GHz to 3 GHz



Date: 12.JUN.2013 22:10:29

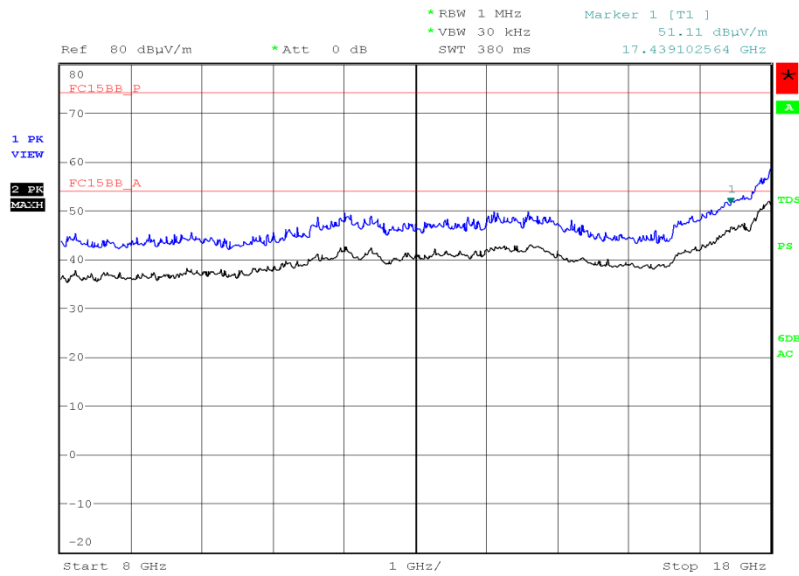
3 GHz to 8 GHz



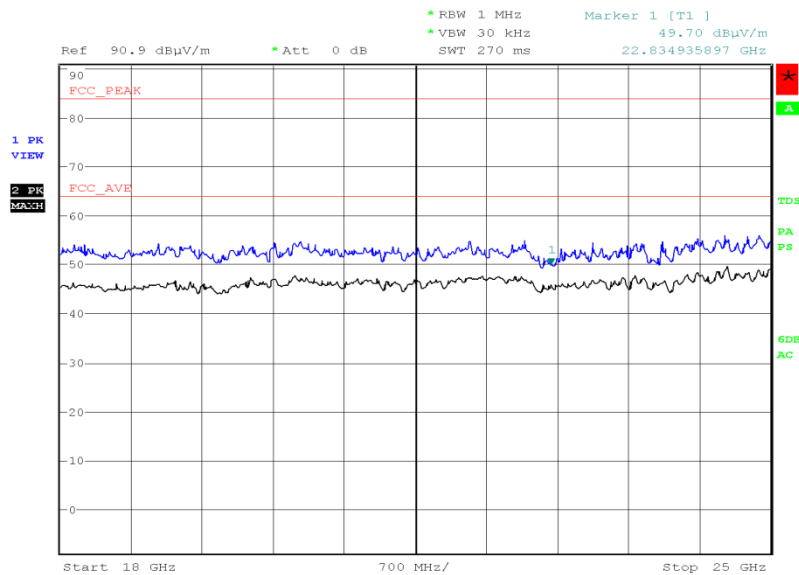
Date: 13.JUN.2013 00:52:56



Product Service

8 GHz to 18 GHz

Date: 13.JUN.2013 04:33:12

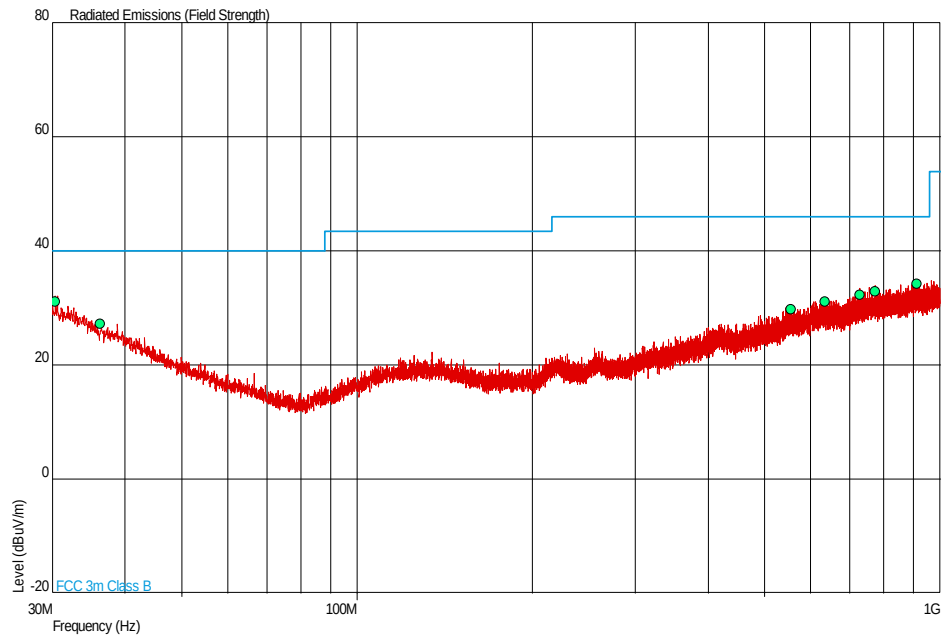
18 GHz to 25 GHz

Date: 14.JUN.2013 00:32:45



2462 MHz

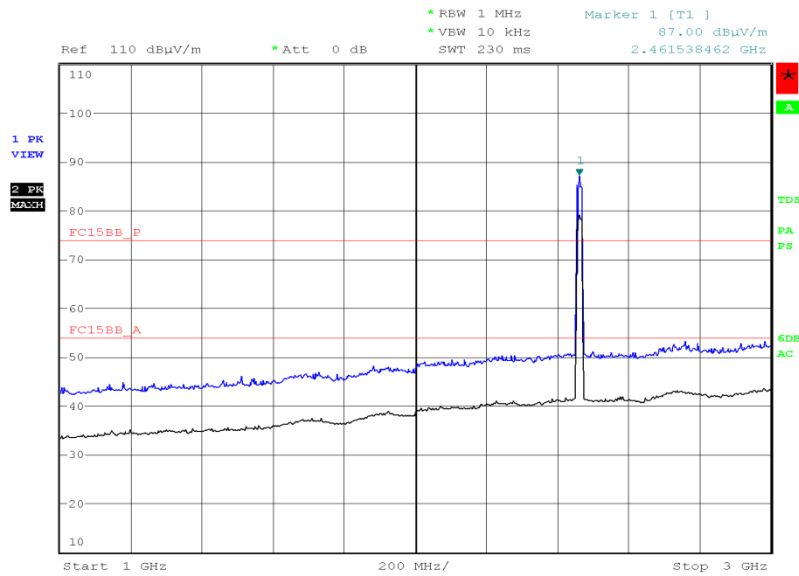
30 MHz to 1 GHz



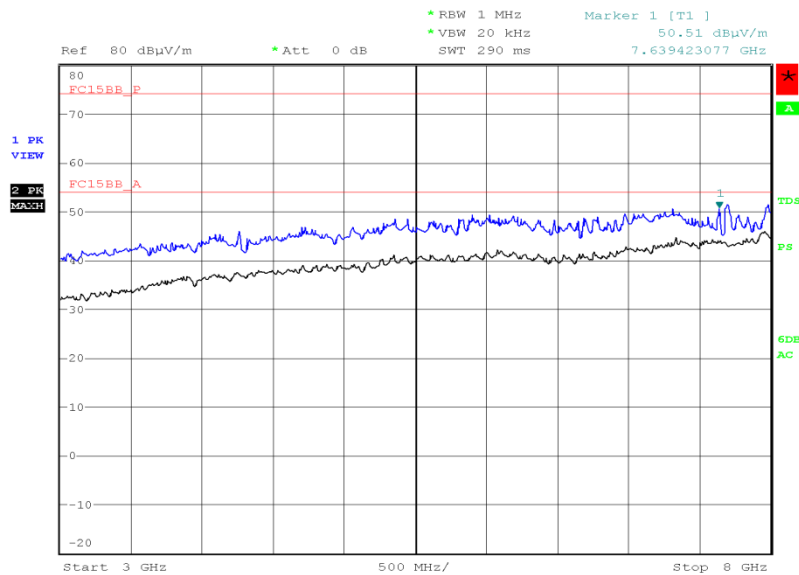
Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
30.388	31.1	35.9	40.0	100	-8.9	64.1	0	1.00	Vertical
36.323	27.3	23.2	40.0	100	-12.7	76.8	0	1.00	Vertical
554.237	29.8	30.9	46.0	200	-16.2	169.1	0	1.00	Horizontal
635.377	31.1	35.9	46.0	200	-14.9	164.1	0	1.00	Horizontal
727.673	32.3	41.2	46.0	200	-13.7	158.8	0	1.00	Horizontal
772.923	32.9	44.2	46.0	200	-13.1	155.8	0	1.00	Vertical
912.167	34.3	51.9	46.0	200	-11.7	148.1	0	100	Horizontal



Product Service

1 GHz to 3 GHz

Date: 12.JUN.2013 22:22:28

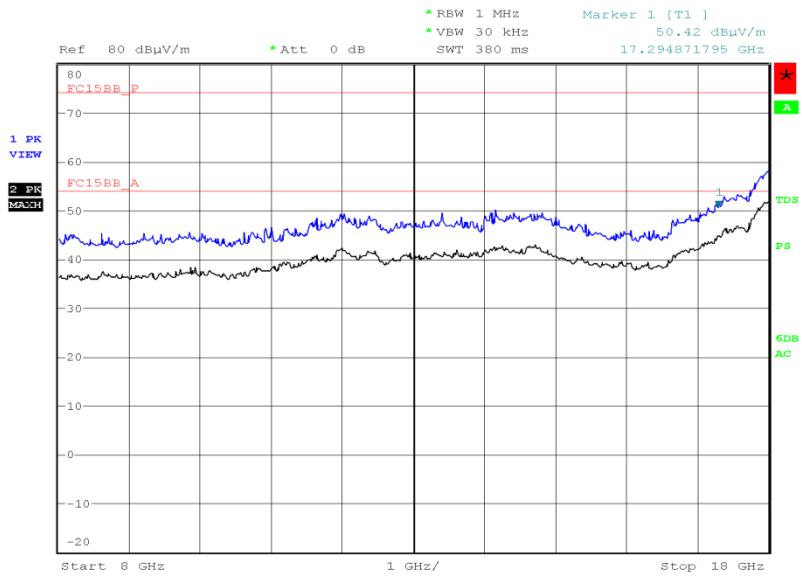
3 GHz to 8 GHz

Date: 13.JUN.2013 01:03:41



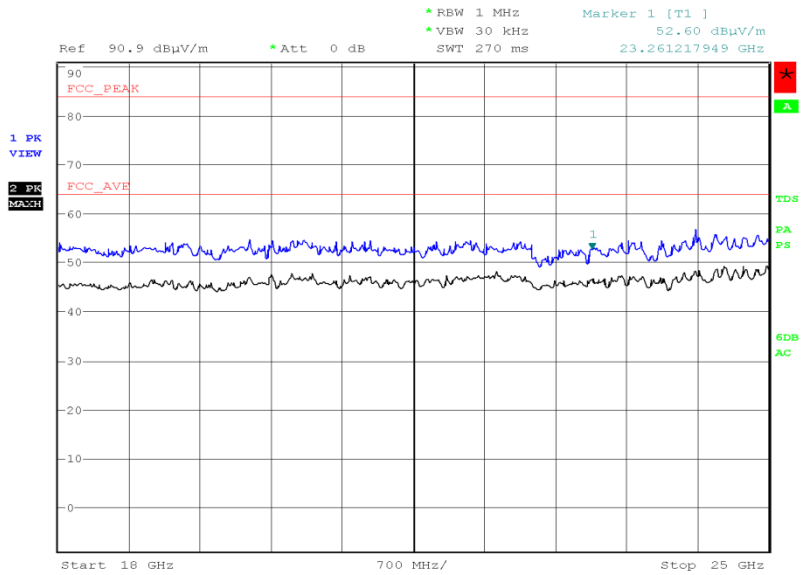
Product Service

8 GHz to 18 GHz



Date: 13.JUN.2013 04:39:43

18 GHz to 25 GHz



Date: 14.JUN.2013 00:38:42

Limit

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

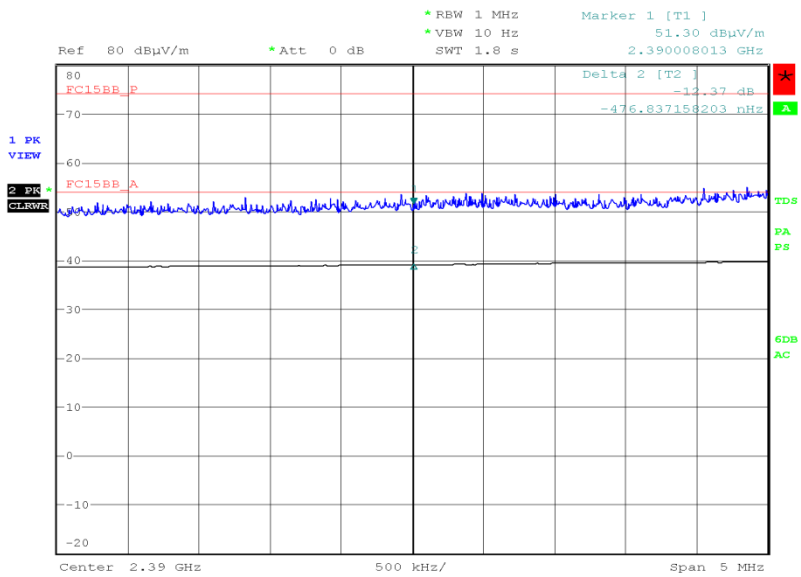


Product Service

Band Edge Emissions

2412 MHz

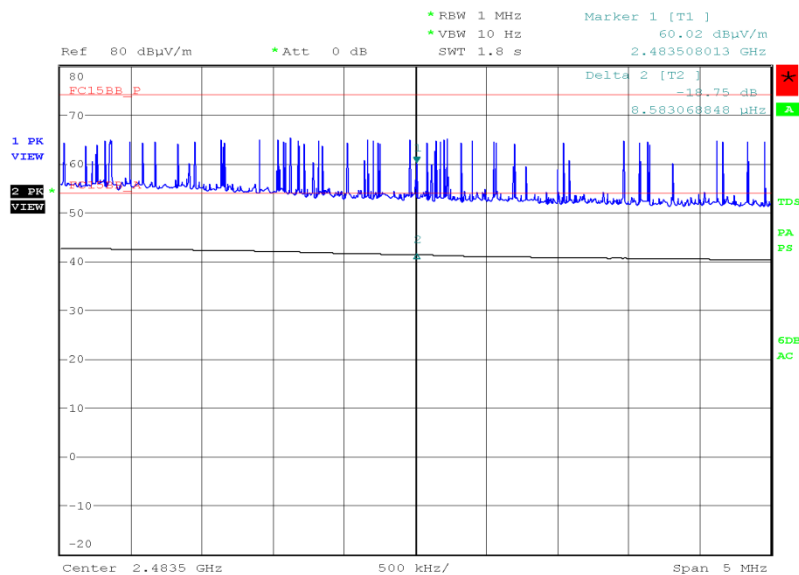
Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Horizontal	51.30	38.93



Date: 2.JUN.2013 12:35:58

2462 MHz

Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Horizontal	60.02	41.27



Date: 2.JUN.2013 11:50:06

Limit

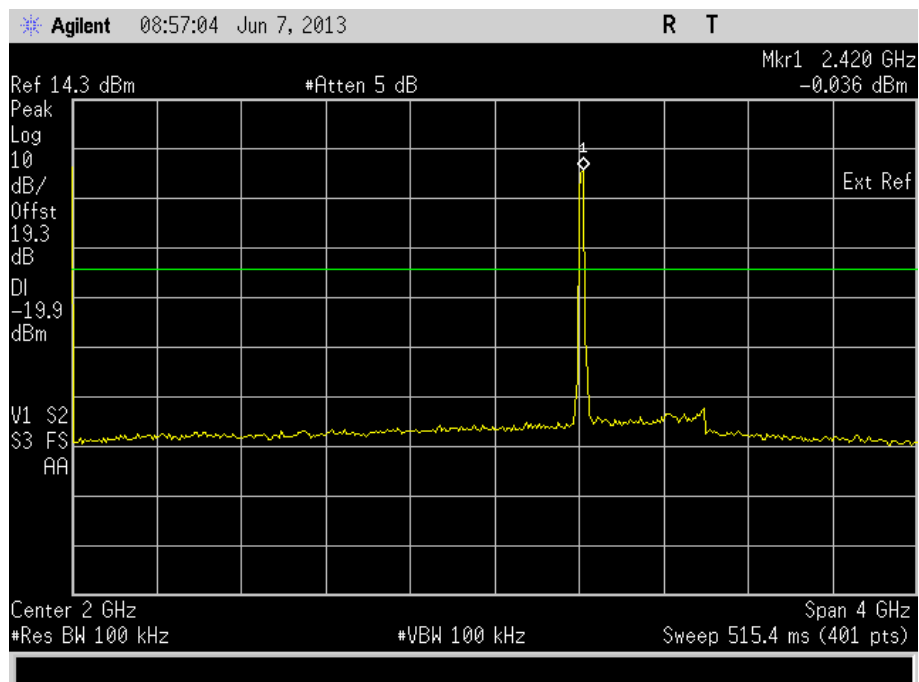
Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0



Product Service

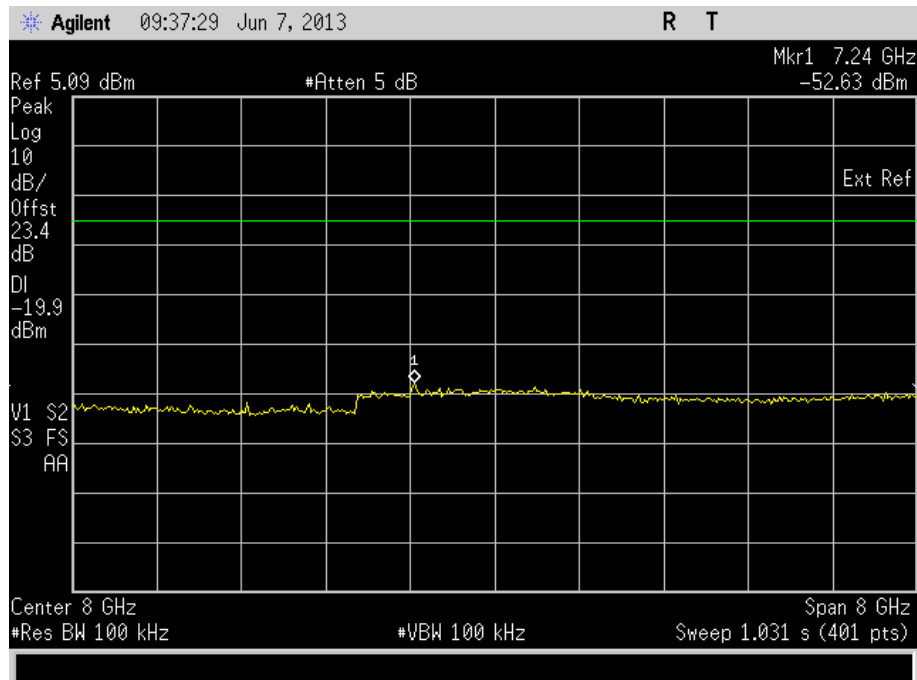
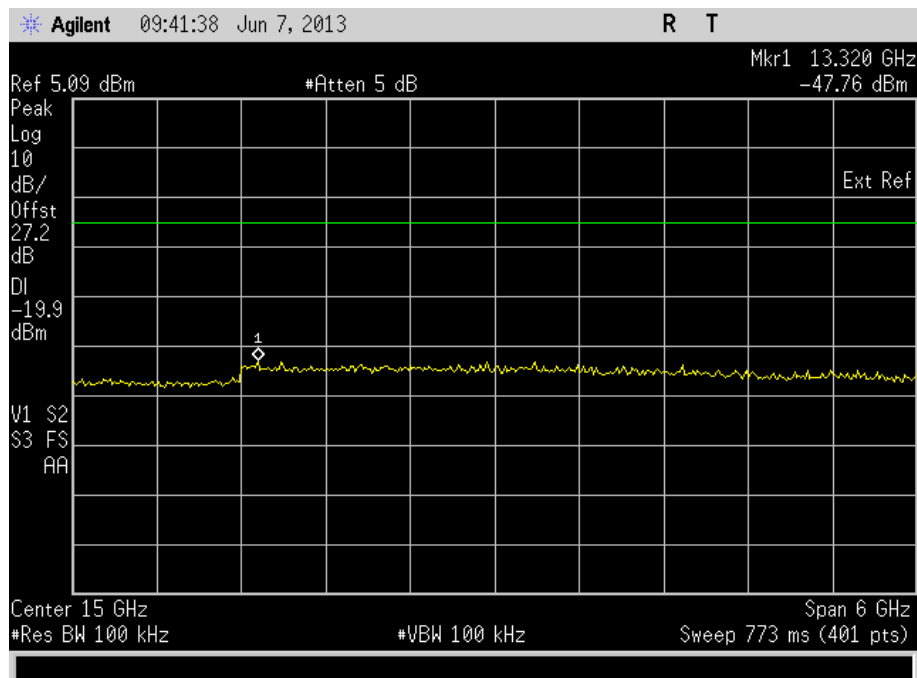
802.11(n)

4.0 V DC Supply

Spurious Conducted Emissions6.5 Mbps2412 MHz9 kHz to 4 GHz

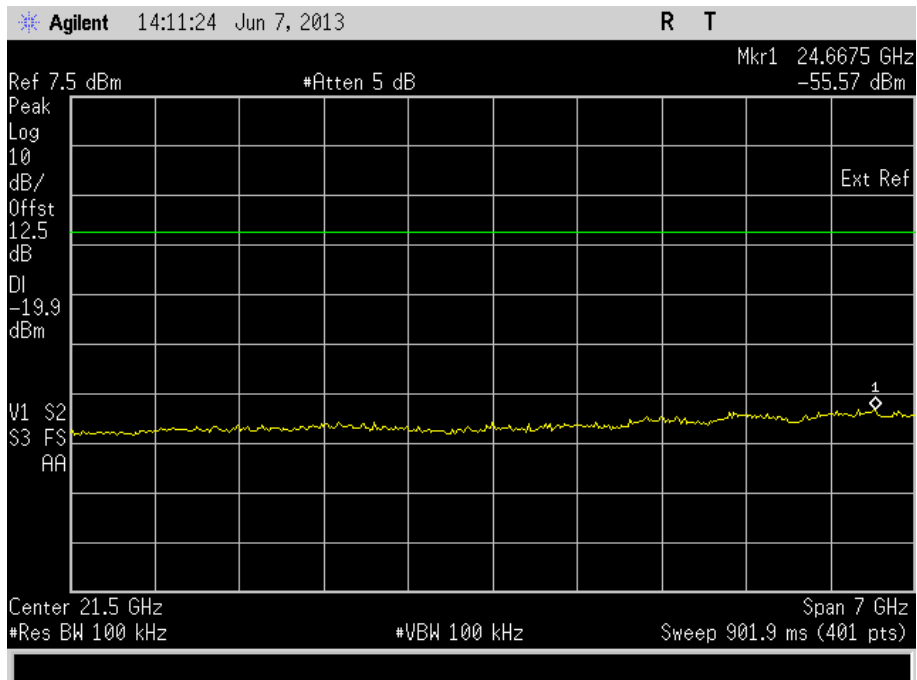
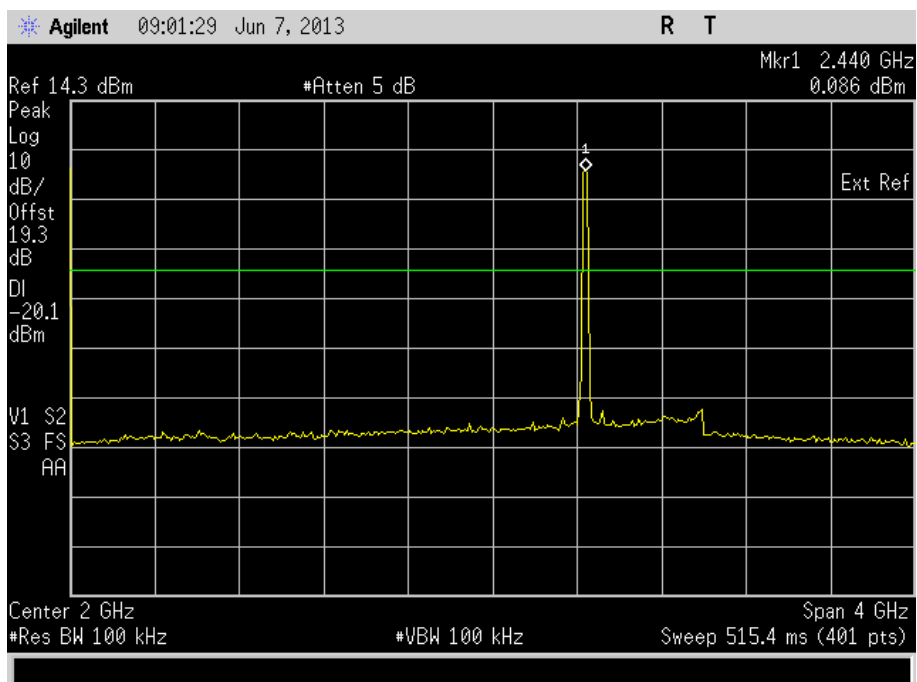


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

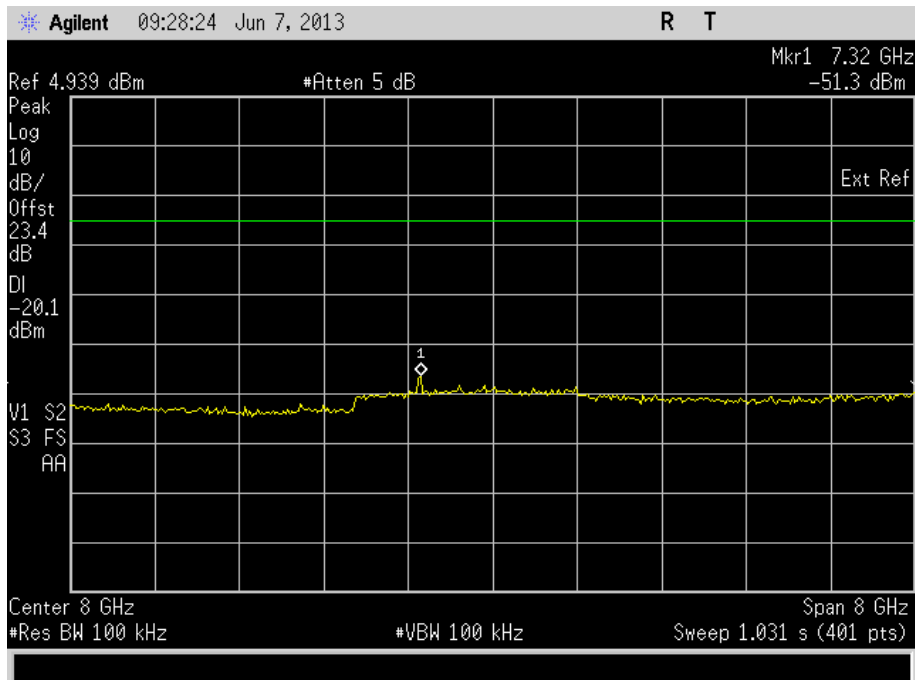
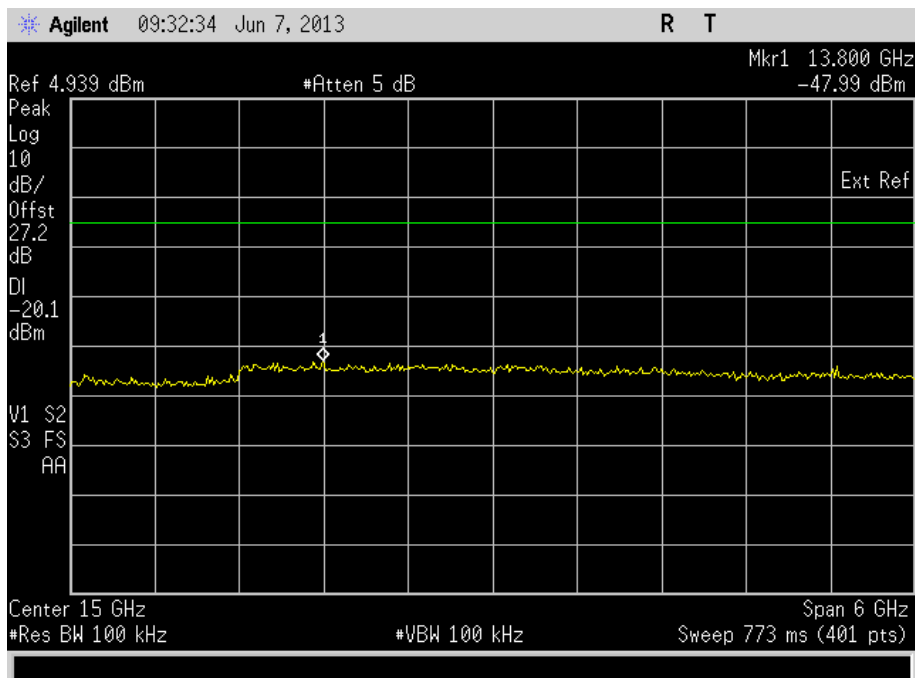


Product Service

18 GHz to 25 GHz2437 MHz9 kHz to 4 GHz

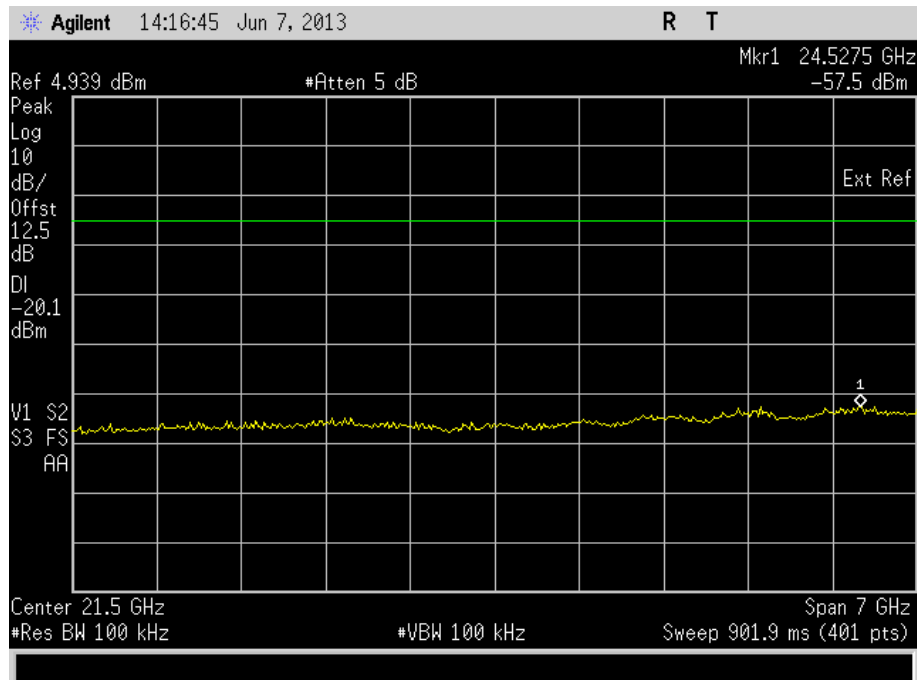
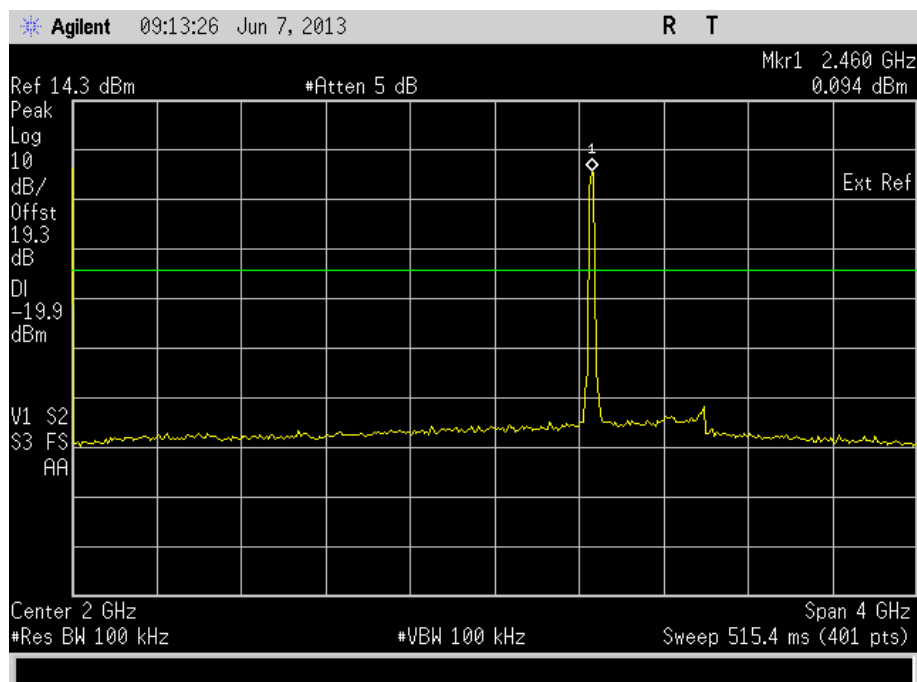


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

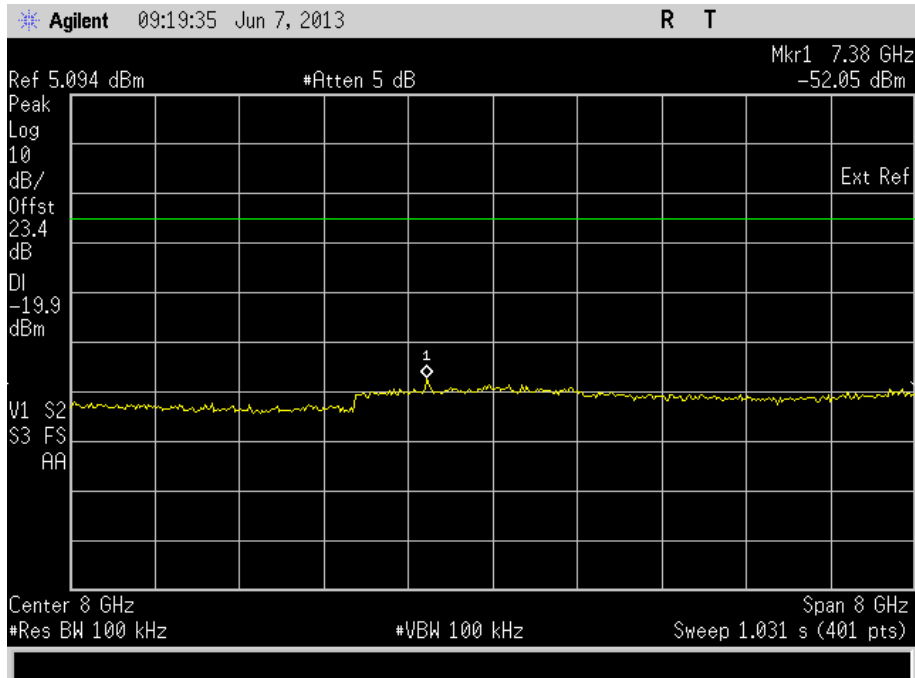
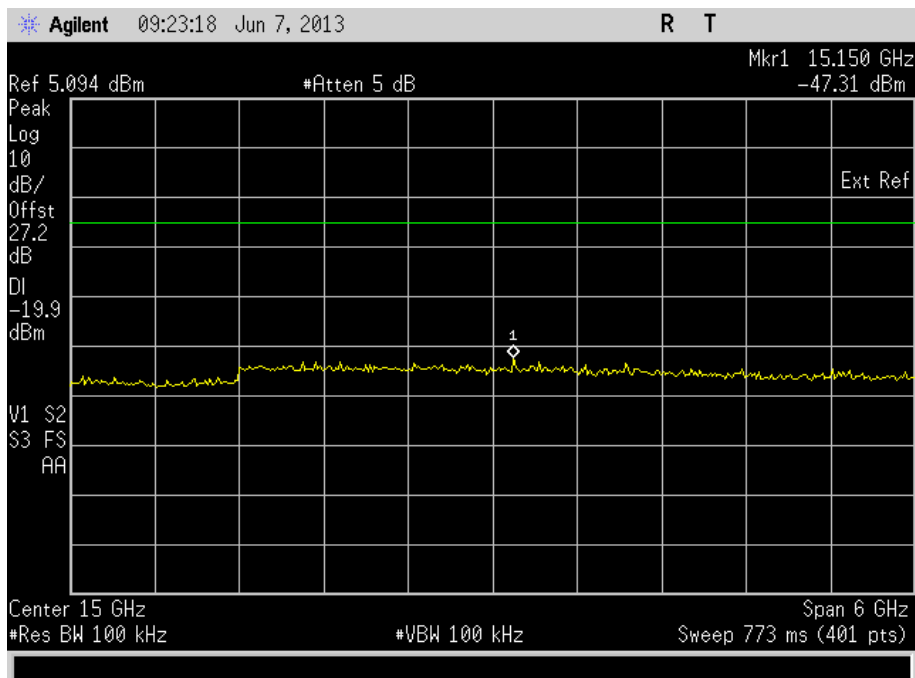


Product Service

18 GHz to 25 GHz2462 MHz9 kHz to 4 GHz

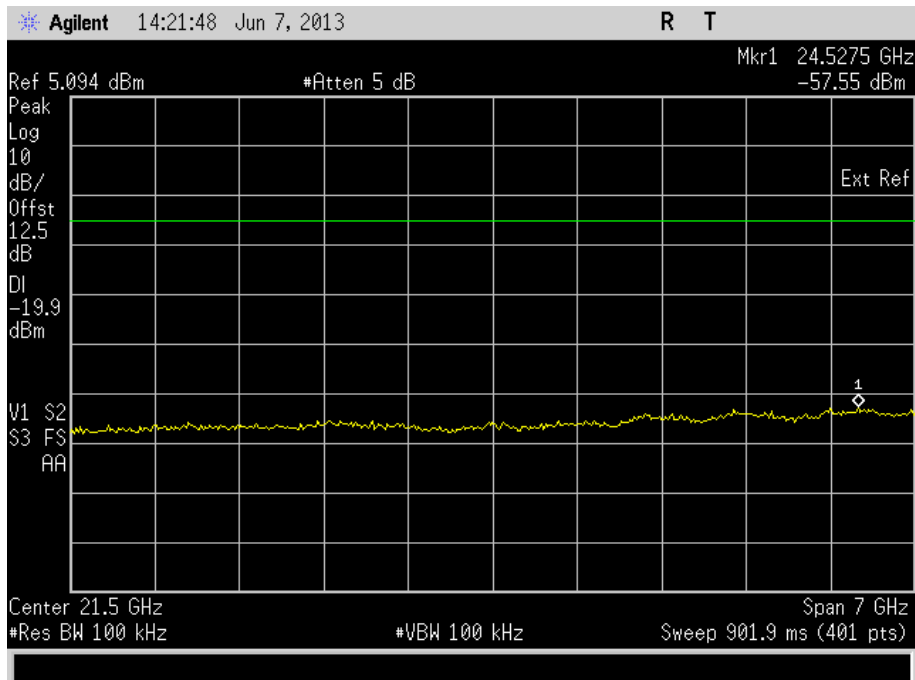


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

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

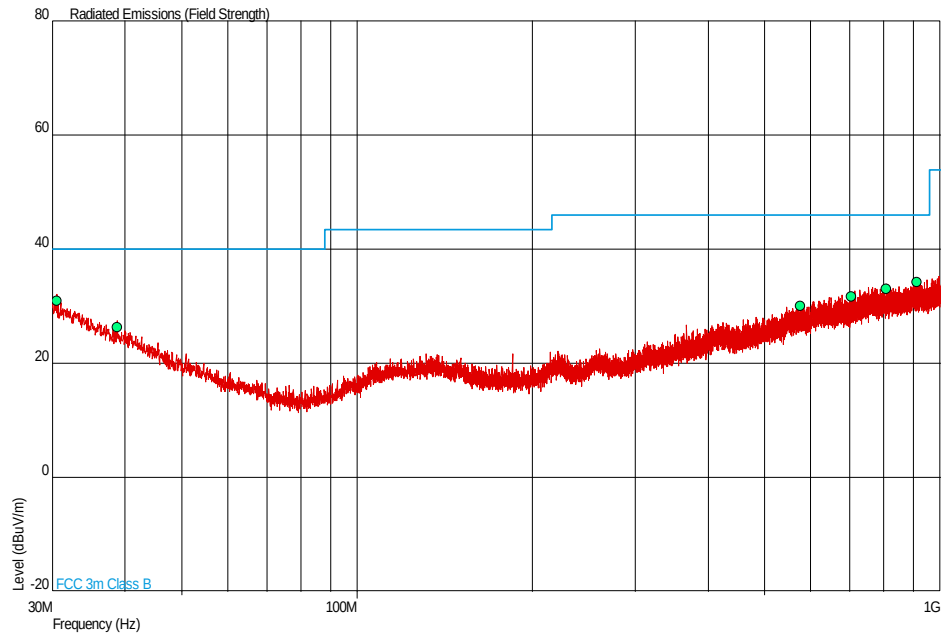
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.



Spurious Radiated Emissions

2412 MHz

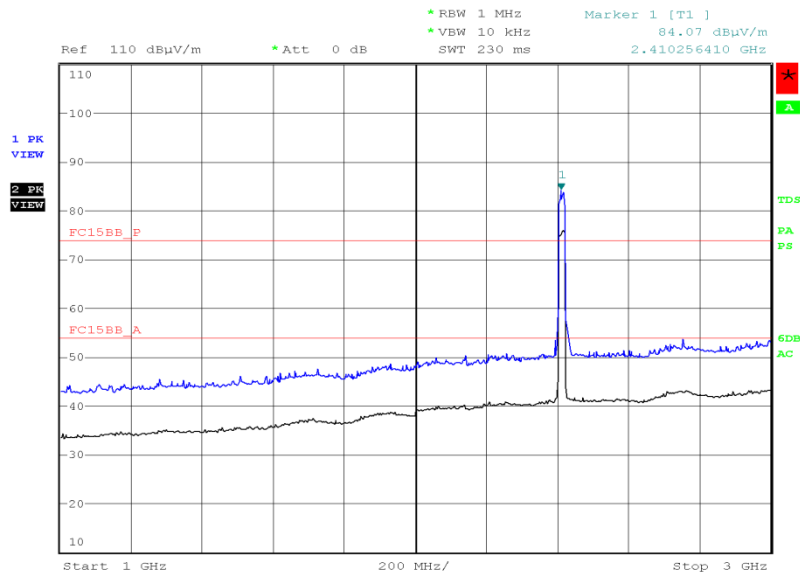
30 MHz to 1 GHz



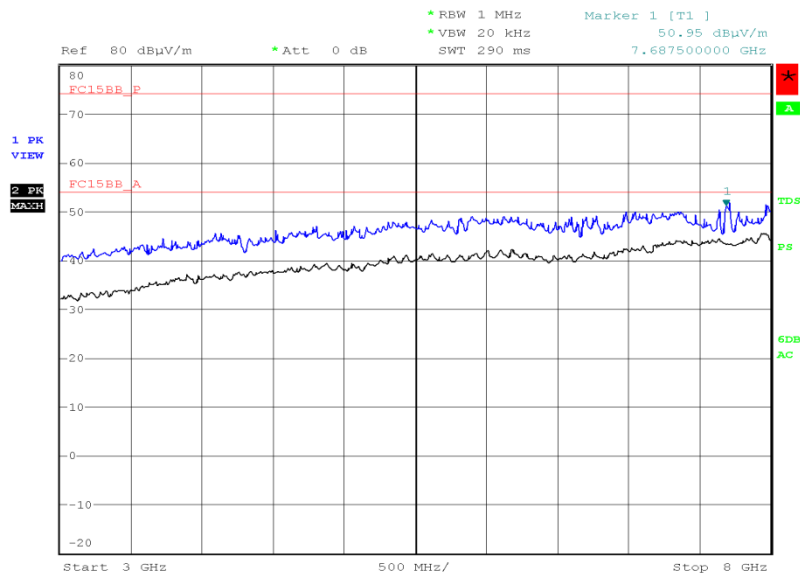
Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
30.582	31.0	35.5	40.0	100	-9.0	64.5	0	1.00	Vertical
38.779	26.3	20.7	40.0	100	-13.7	79.3	0	1.00	Horizontal
574.752	30.1	32.0	46.0	200	-15.9	168.0	0	1.00	Vertical
703.374	31.6	38.0	46.0	200	-14.4	162.0	0	1.00	Horizontal
807.940	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical
912.991	34.3	51.9	46.0	200	-11.7	148.1	0	1.00	Horizontal



Product Service

1 GHz to 3 GHz

Date: 12.JUN.2013 22:40:34

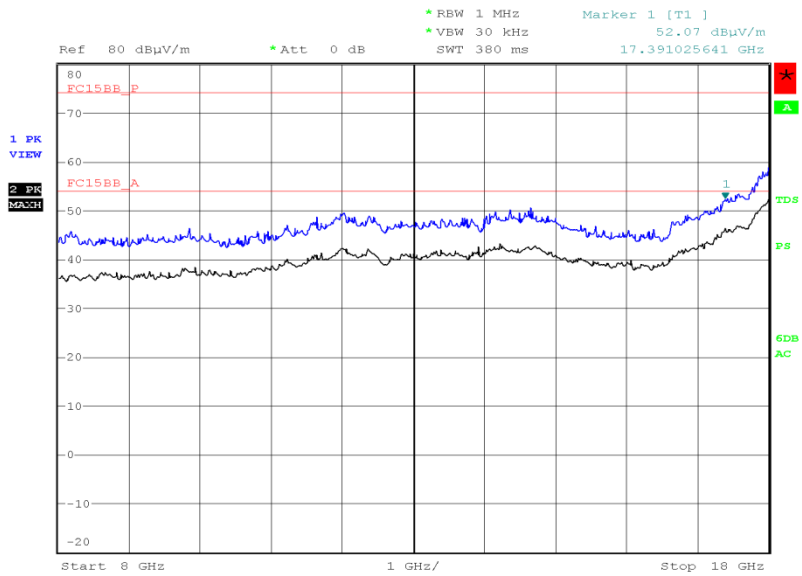
3 GHz to 8 GHz

Date: 13.JUN.2013 00:03:20



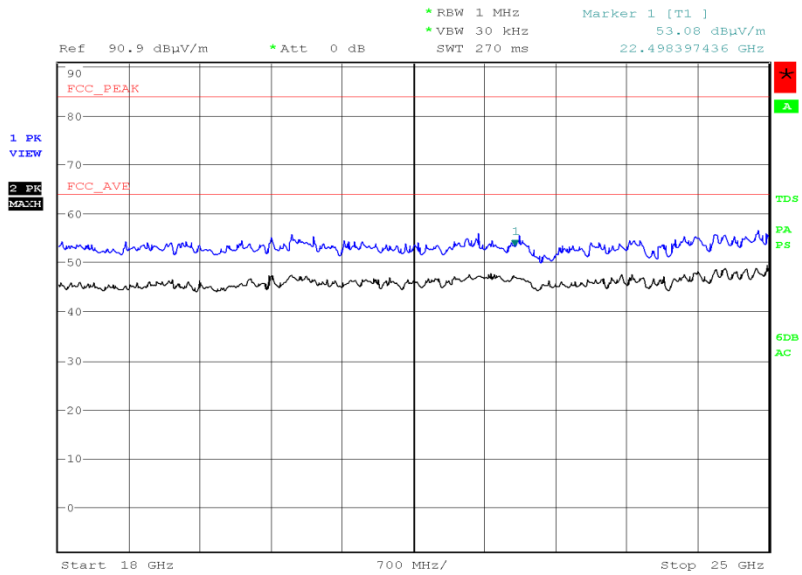
Product Service

8 GHz to 18 GHz



Date: 13.JUN.2013 04:46:49

18 GHz to 25 GHz



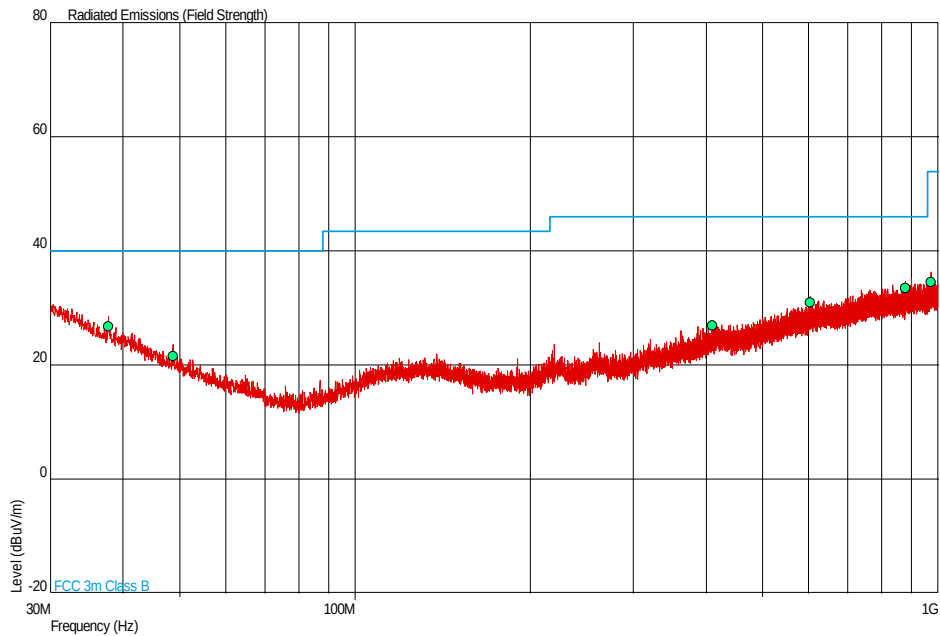
Date: 14.JUN.2013 00:49:14



Product Service

2437 MHz

30 MHz to 1 GHz

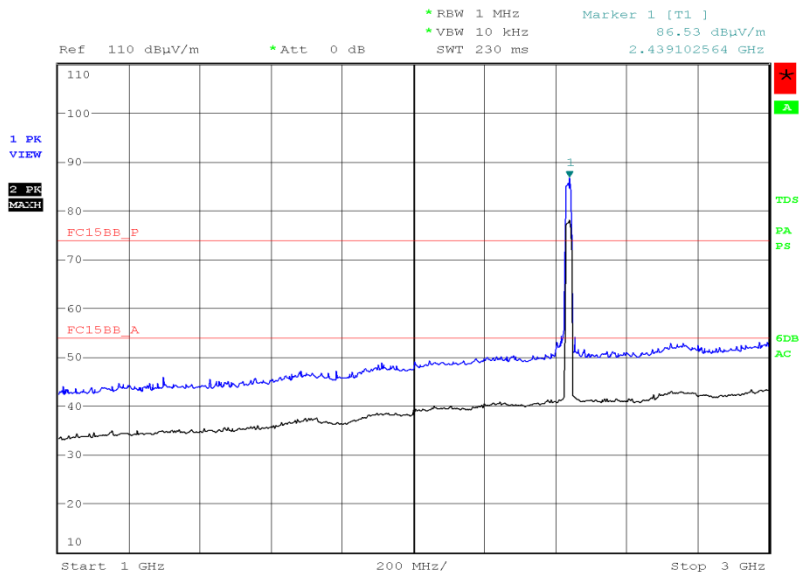


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
37.712	26.8	21.9	40.0	100	-13.2	78.1	0	1.00	Vertical
48.673	21.6	12.0	40.0	100	-18.4	88.0	0	1.00	Vertical
410.434	26.9	22.1	46.0	200	-19.1	177.9	0	1.00	Horizontal
603.319	31.0	35.5	46.0	200	-15.0	164.5	0	1.00	Vertical
879.138	33.5	47.3	46.0	200	-12.5	152.7	0	1.00	Vertical
970.415	34.6	53.7	54.0	501	-19.4	446.3	0	1.00	Vertical



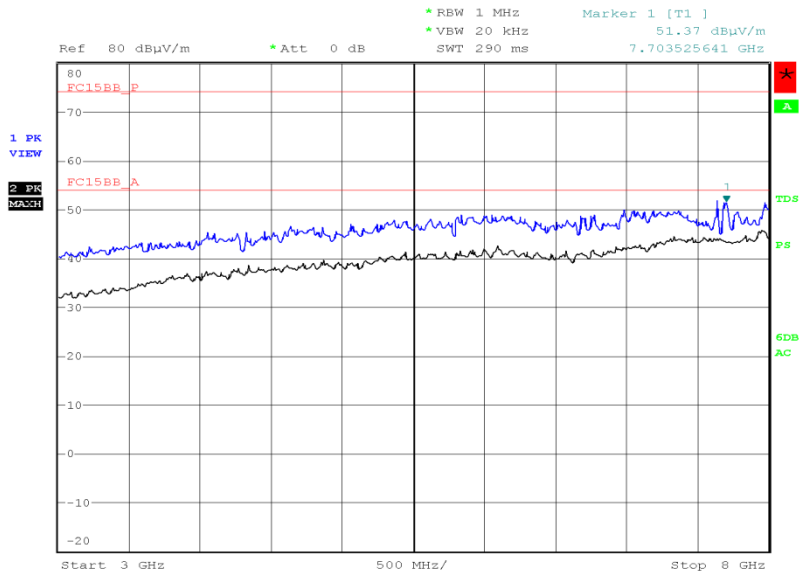
Product Service

1 GHz to 3 GHz



Date: 12.JUN.2013 23:07:27

3 GHz to 8 GHz

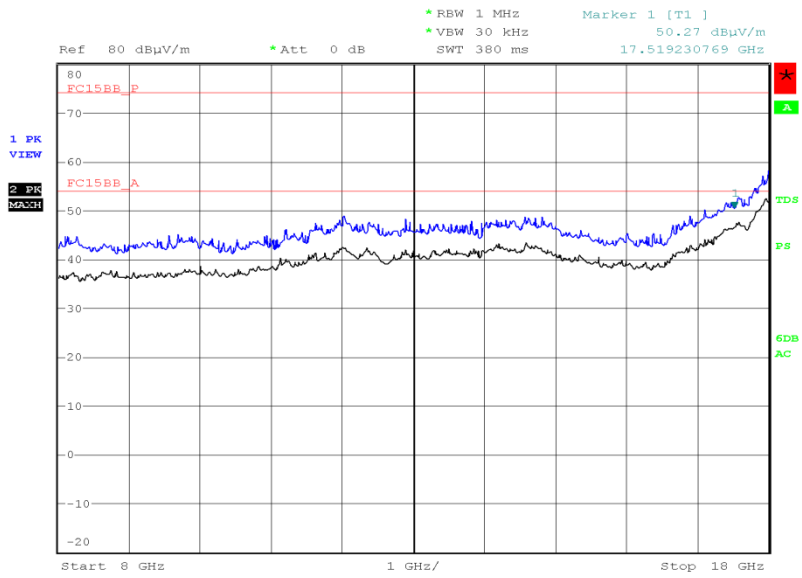


Date: 13.JUN.2013 00:15:04



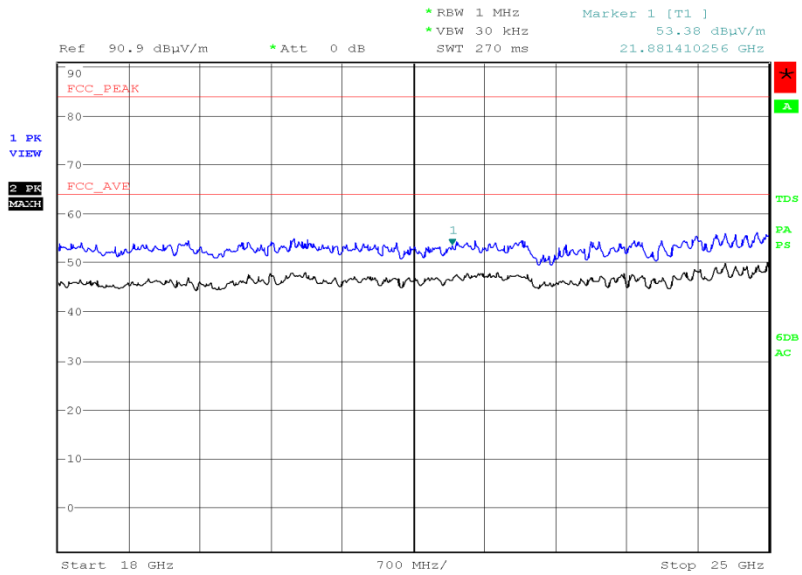
Product Service

8 GHz to 18 GHz



Date: 13.JUN.2013 04:59:26

18 GHz to 25 GHz



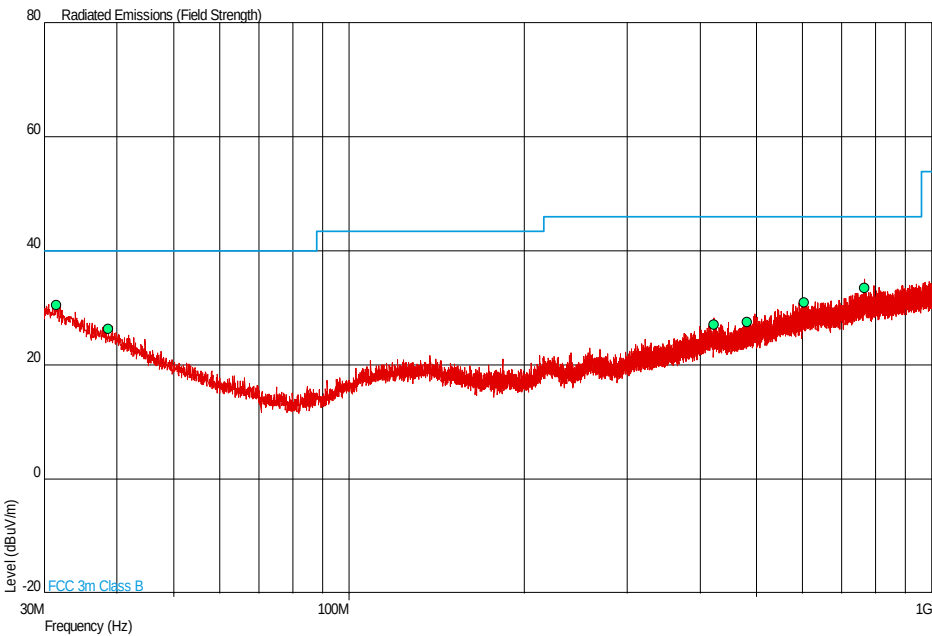
Date: 14.JUN.2013 00:59:37



Product Service

2462 MHz

30 MHz to 1 GHz

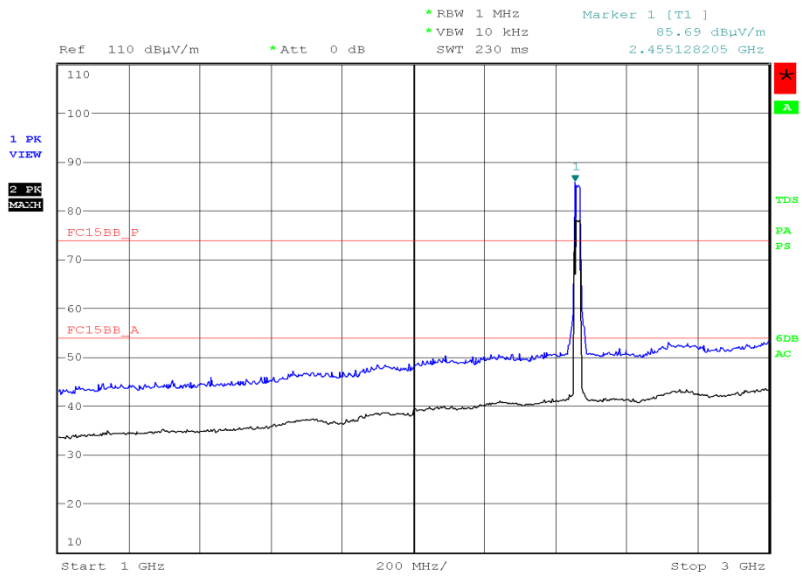


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
31.455	30.6	33.9	40.0	100	-9.4	66.1	0	1.00	Horizontal
38.715	26.3	20.7	40.0	100	-13.7	79.3	0	1.00	Horizontal
422.074	27.1	22.6	46.0	200	-18.9	177.4	0	1.00	Vertical
481.050	27.6	24.0	46.0	200	-18.4	176.0	0	1.00	Horizontal
602.252	31.0	35.5	46.0	200	-15.0	164.5	0	1.00	Horizontal
765.891	33.5	47.3	46.0	200	-12.5	152.7	0	1.00	Vertical



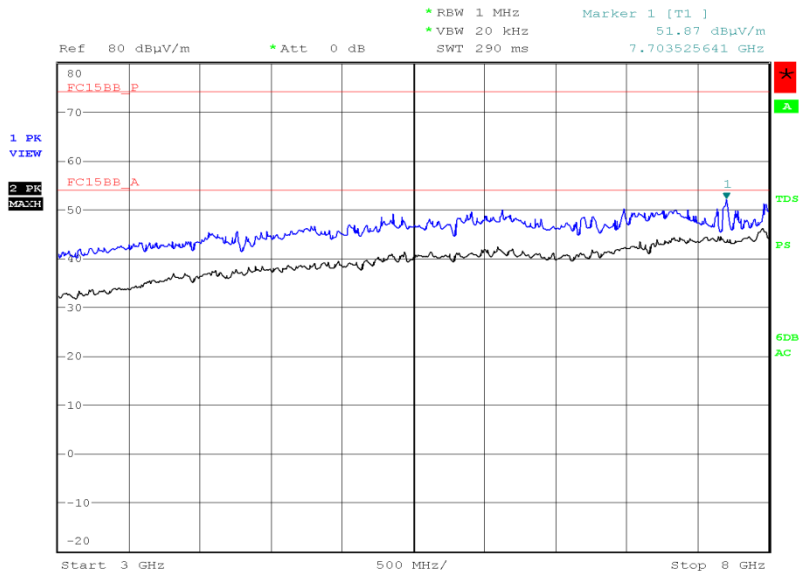
Product Service

1 GHz to 3 GHz



Date: 12.JUN.2013 23:26:31

3 GHz to 8 GHz

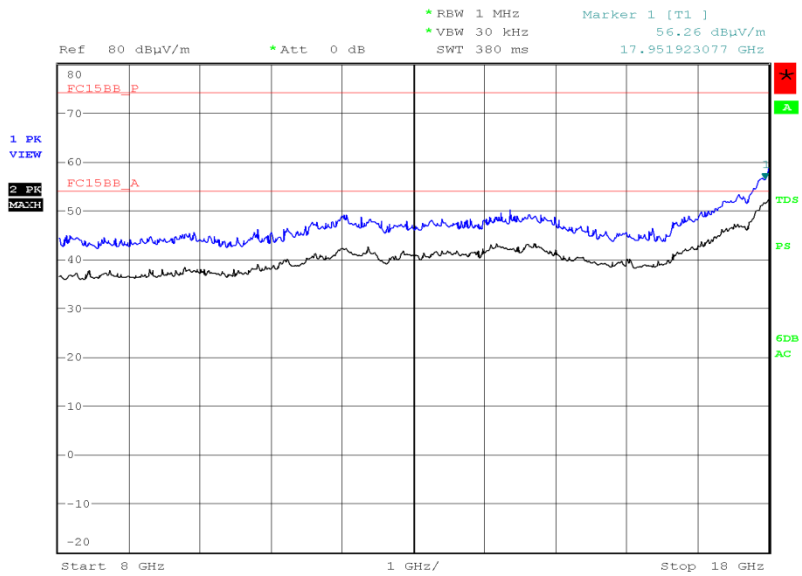


Date: 13.JUN.2013 00:29:17



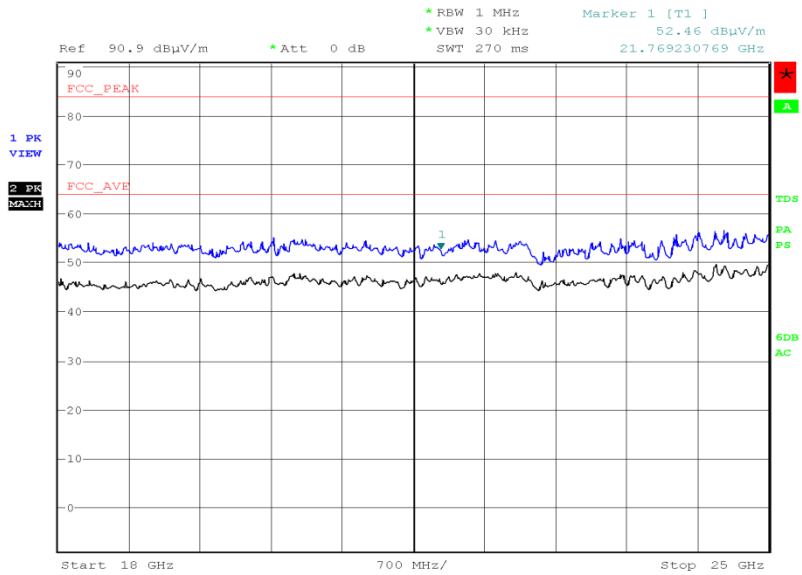
Product Service

8 GHz to 18 GHz



Date: 13.JUN.2013 04:55:45

18 GHz to 25 GHz



Date: 14.JUN.2013 01:06:56

Limit

Peak (dB μ V/m)	Average (dB μ V/m)
74.0	54.0

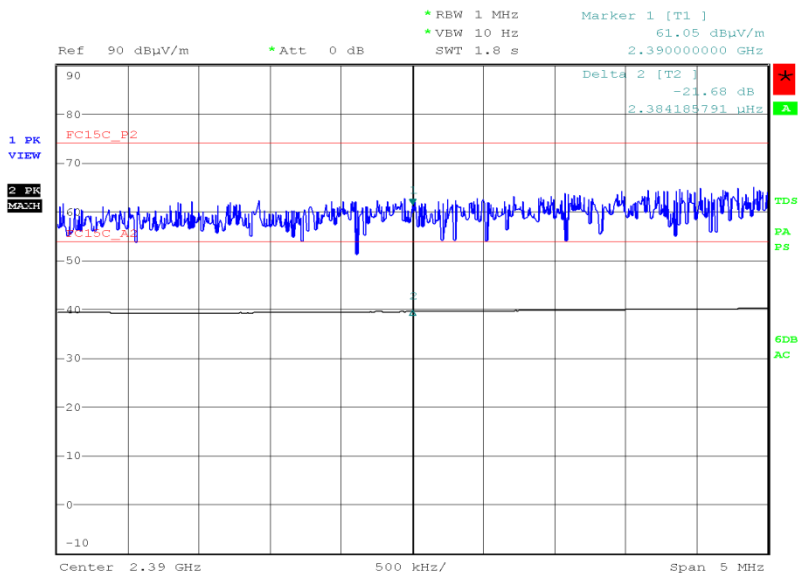


Product Service

Band Edge Emissions

2412 MHz

Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Horizontal	61.05	39.37



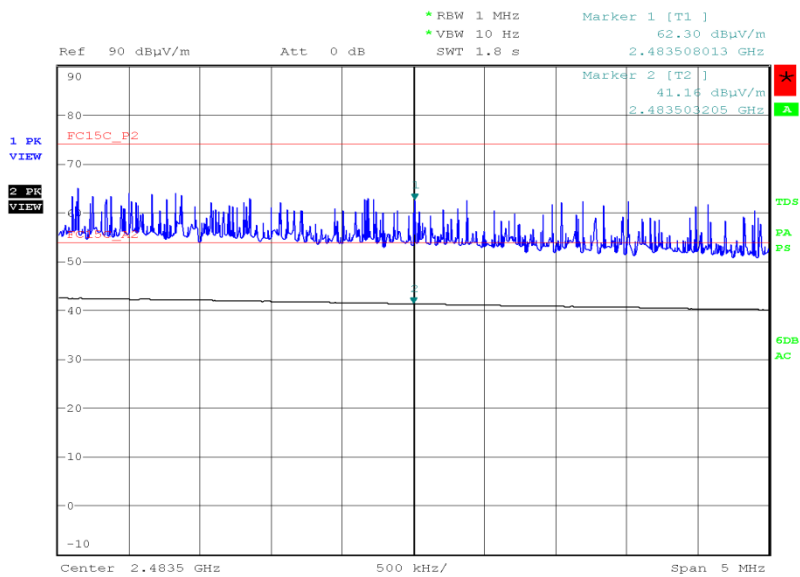
Date: 2.JUN.2013 10:56:38



Product Service

2462 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	62.30	41.16



Date: 2.JUN.2013 10:23:10

Limit

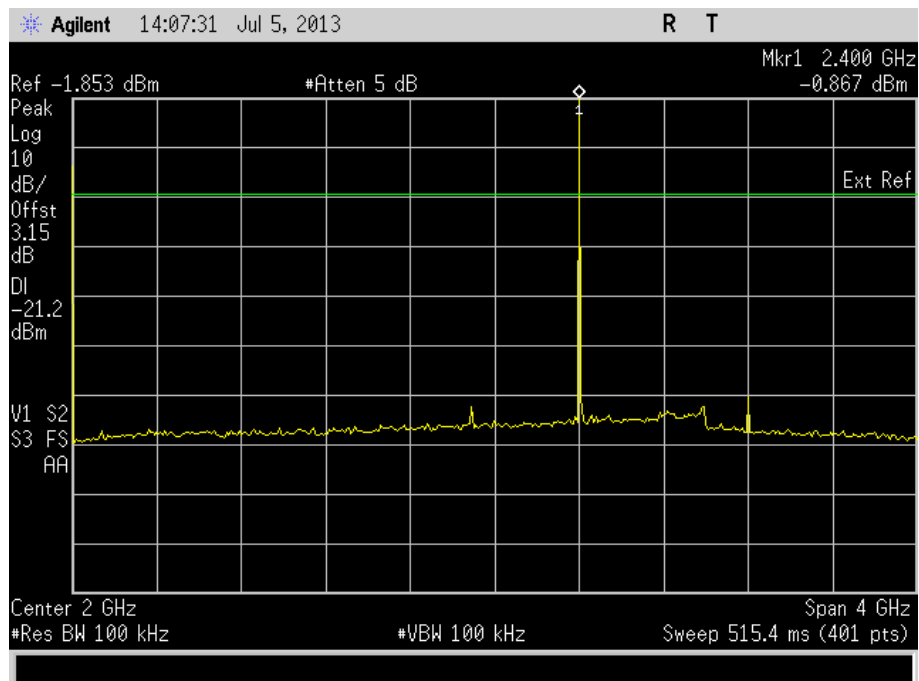
Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0



Product Service

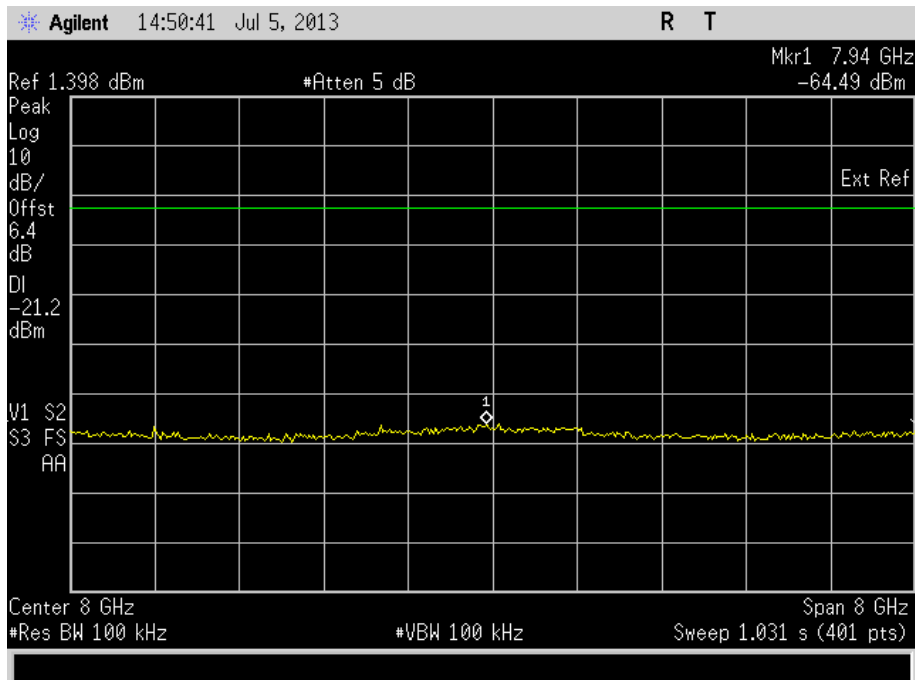
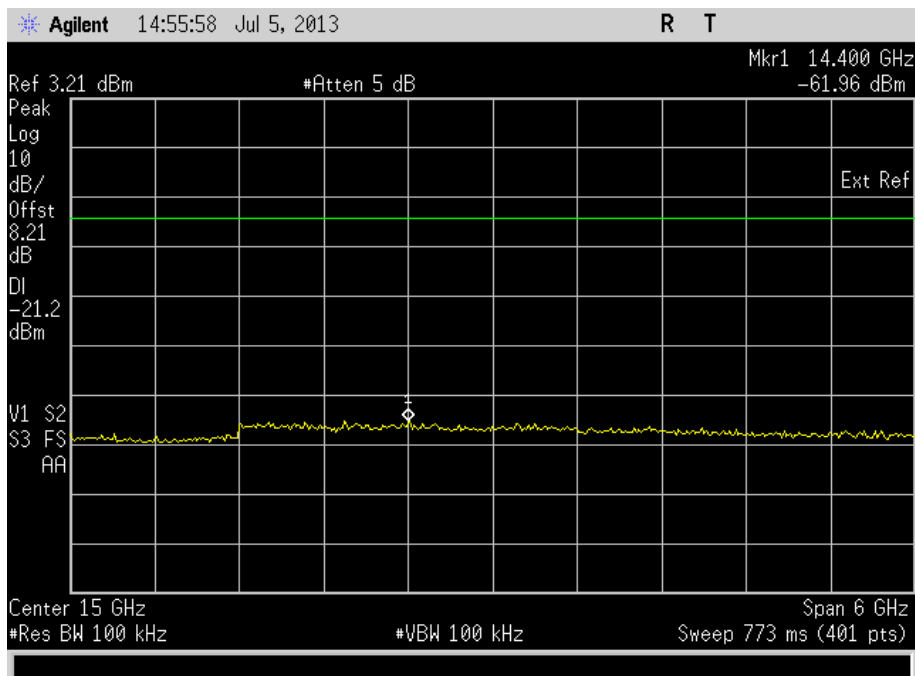
GFSK

4.0 V DC Supply

Spurious Conducted Emissions2402 MHz9 kHz to 4 GHz

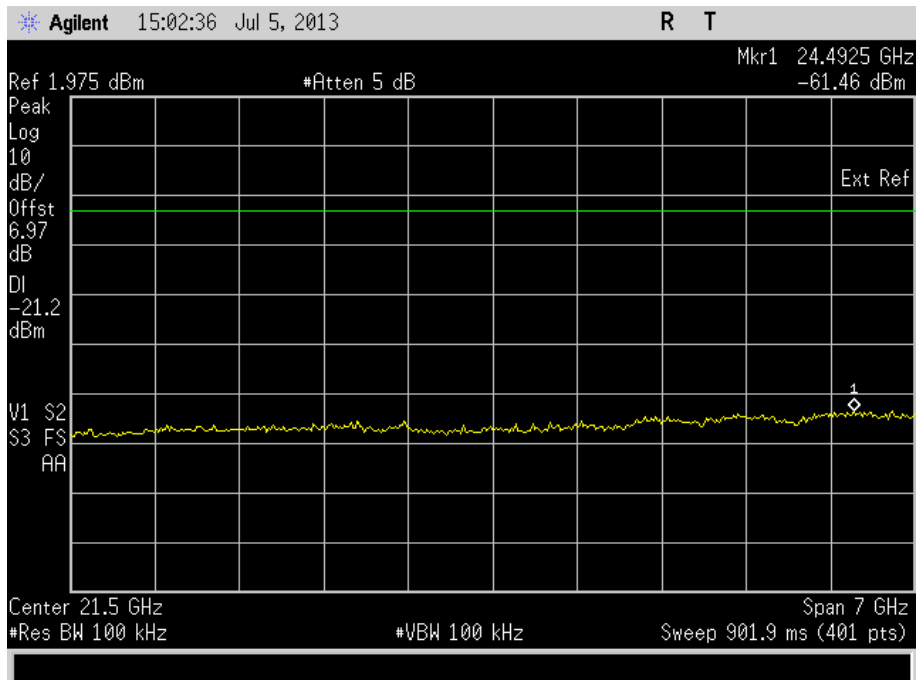
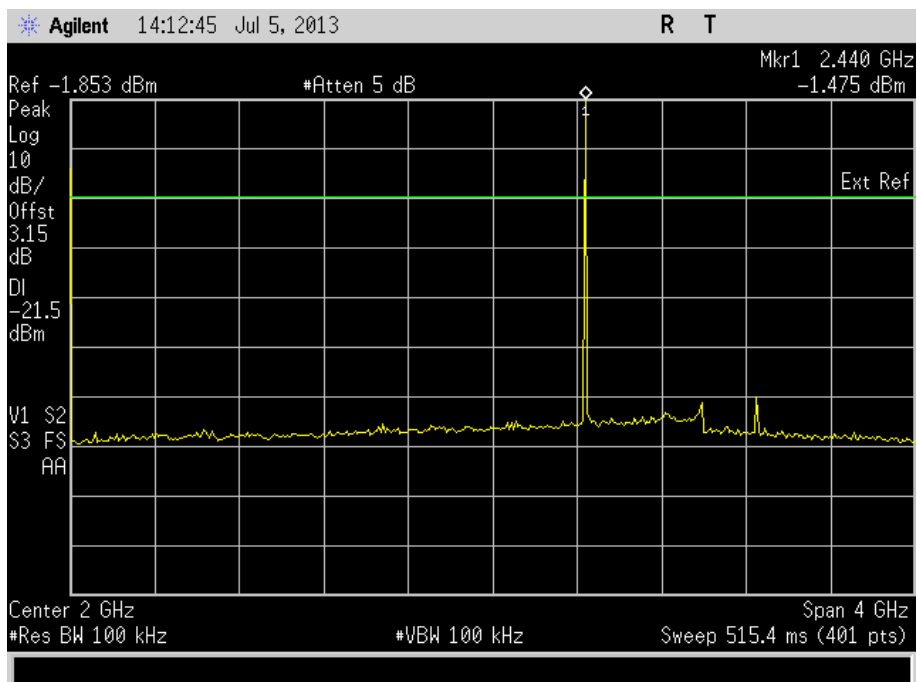


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

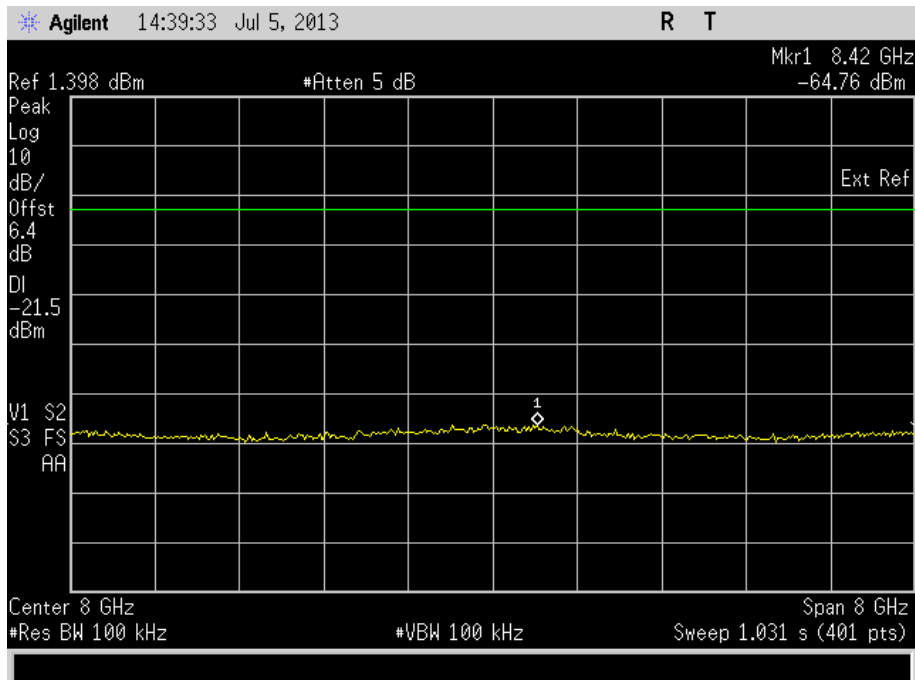
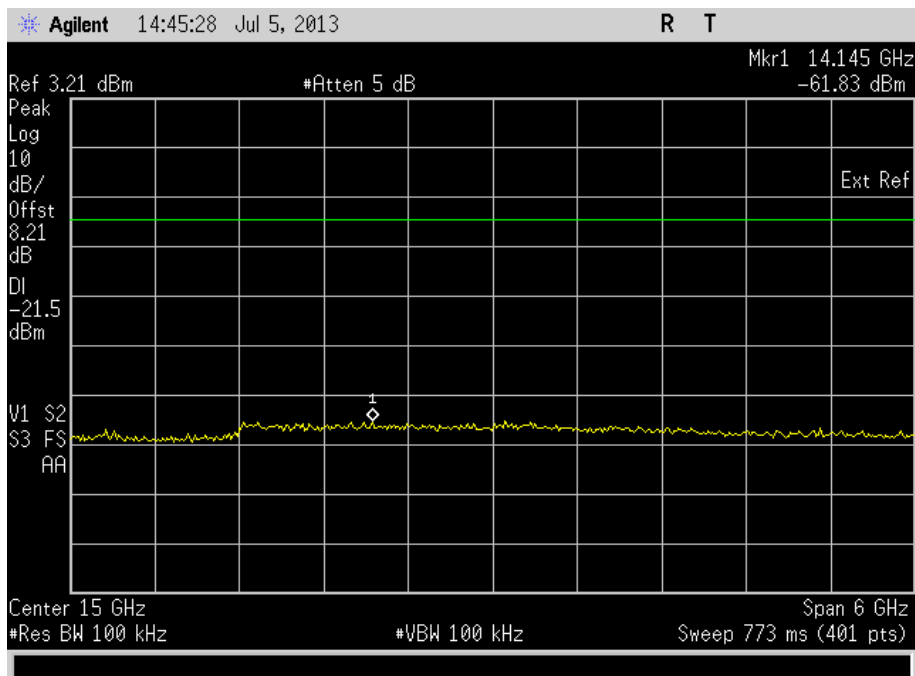


Product Service

18 GHz to 25 GHz2440 MHz9 kHz to 4 GHz

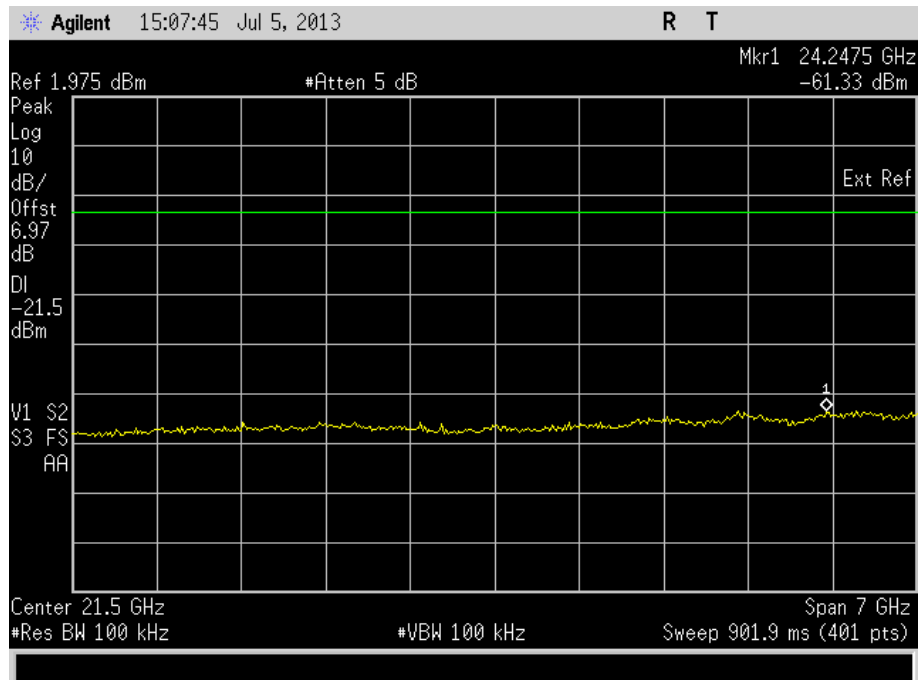
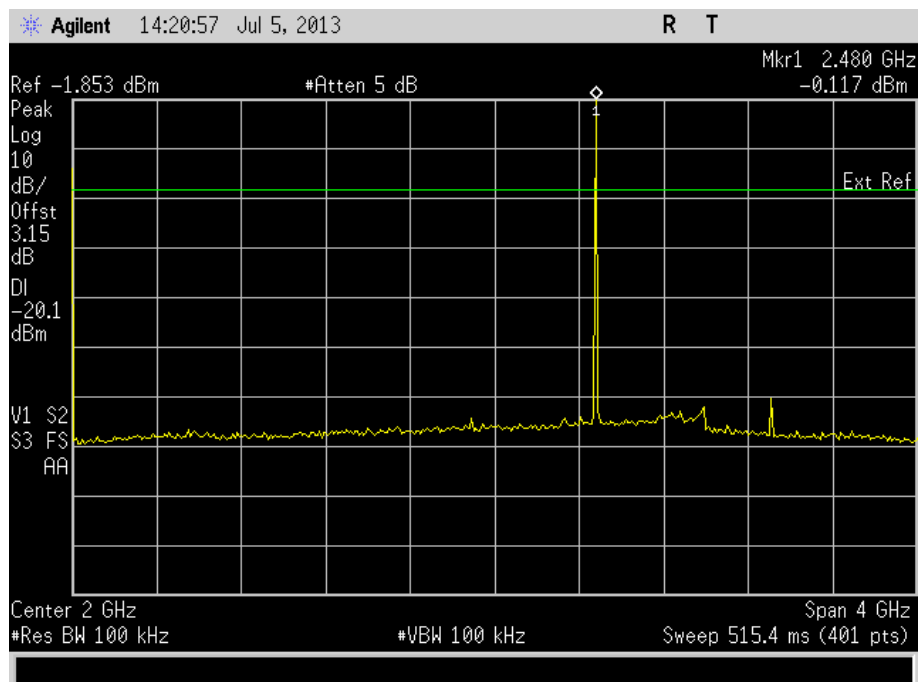


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

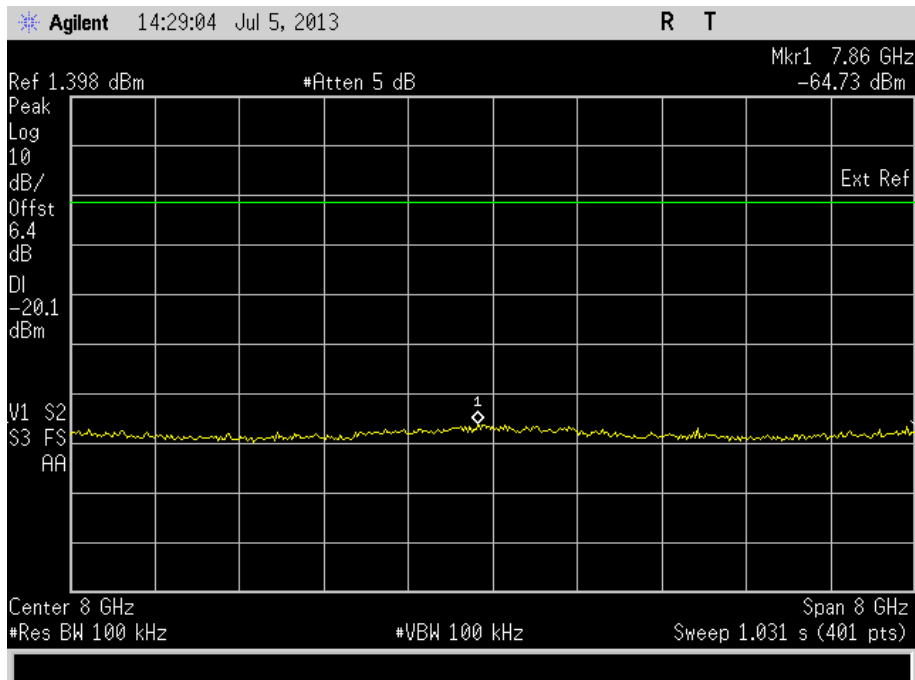
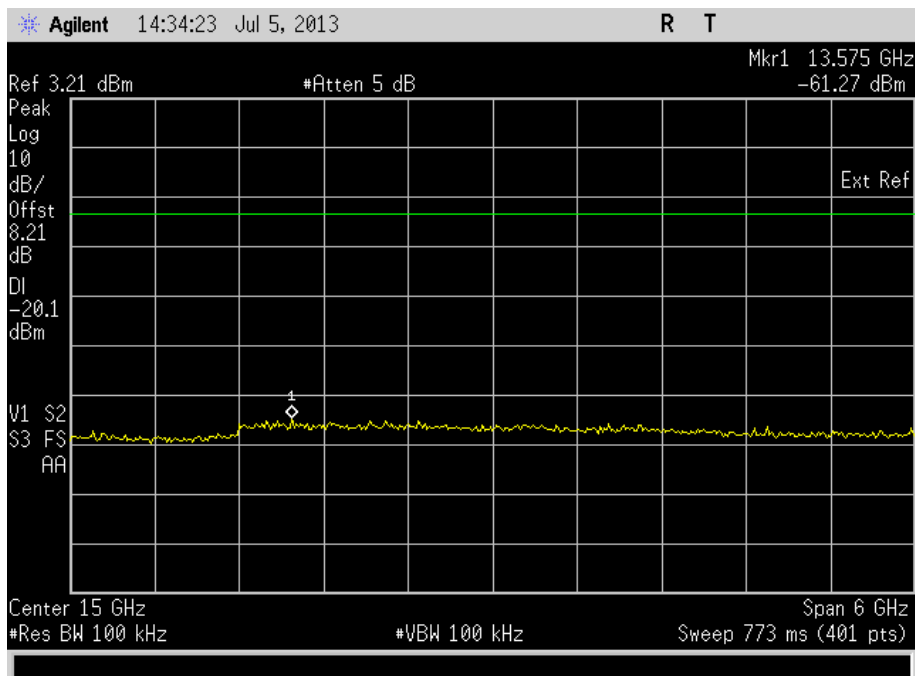


Product Service

18 GHz to 25 GHz2480 MHz9 kHz to 4 GHz

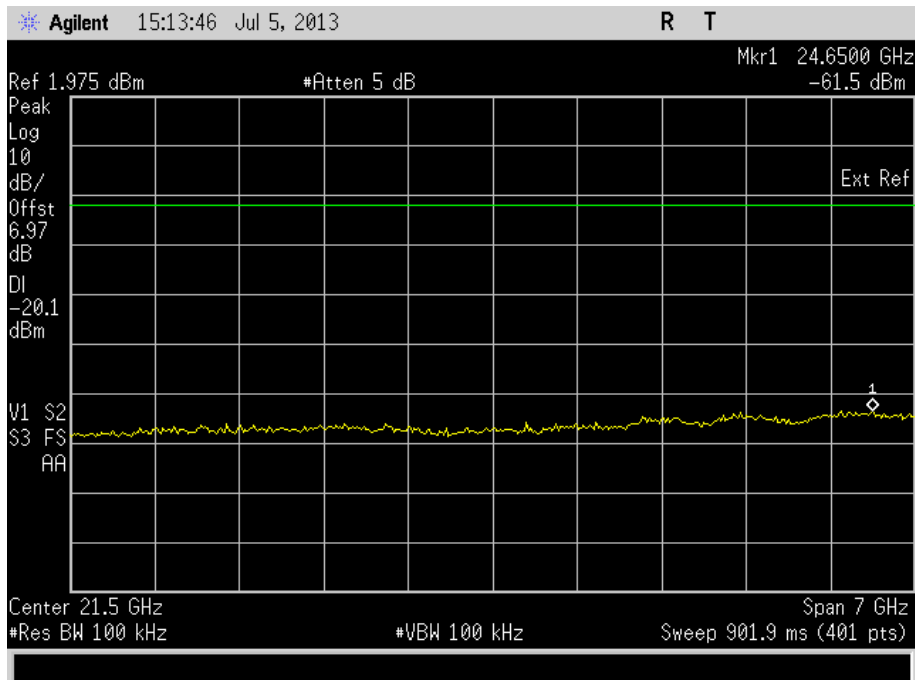


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

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

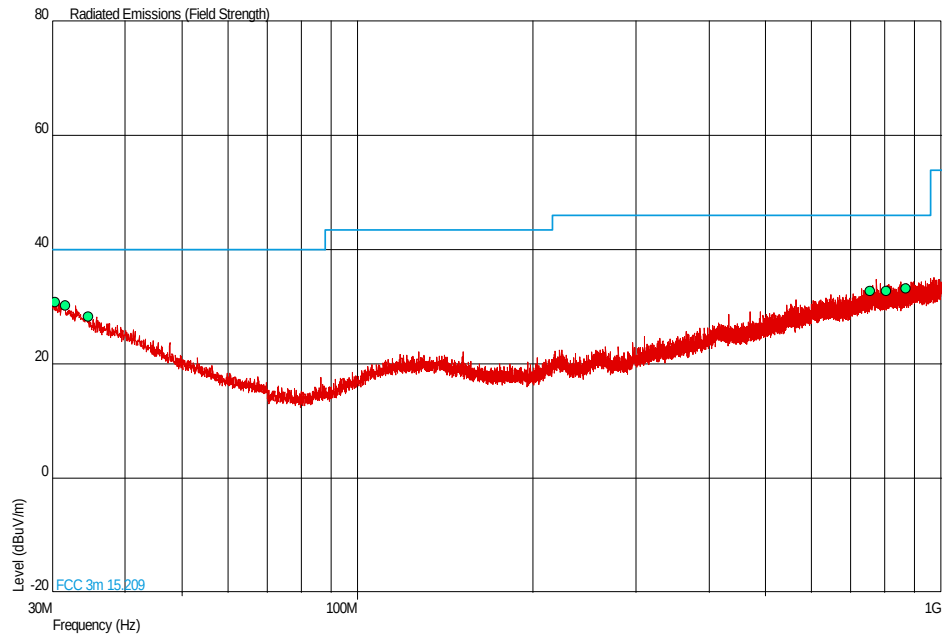
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.



Spurious Radiated Emissions

2402 MHz

30 MHz to 1 GHz

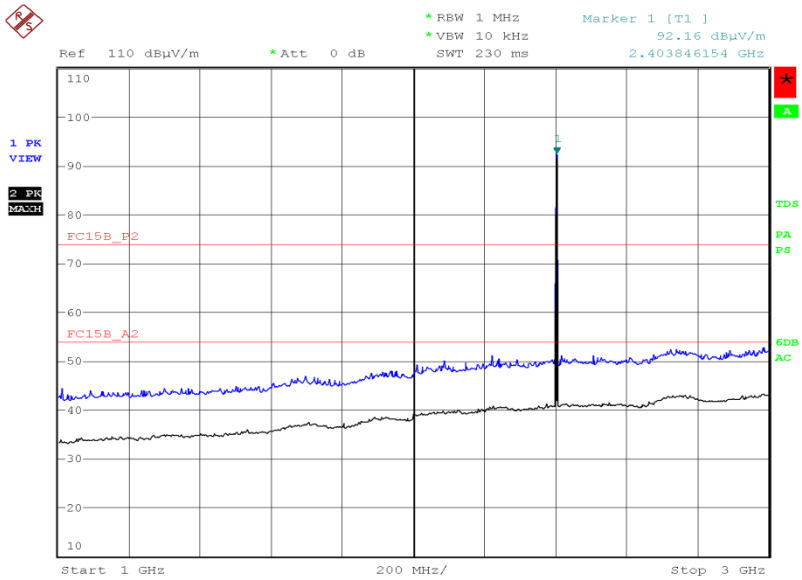


Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
30.385	30.8	34.7	40.0	100	-9.2	65.3	0	0.00	Horizontal
31.601	30.2	32.4	40.0	100	-9.8	67.6	180	1.00	Vertical
34.559	28.2	25.7	46.0	200	-11.8	74.3	0	1.00	Horizontal
755.512	32.8	43.7	46.0	200	-13.2	156.3	270	1.00	Vertical
804.448	32.8	43.7	46.0	200	-13.2	156.3	0	1.00	Vertical
870.069	33.2	45.7	46.0	200	-12.8	154.3	0	1.00	Horizontal



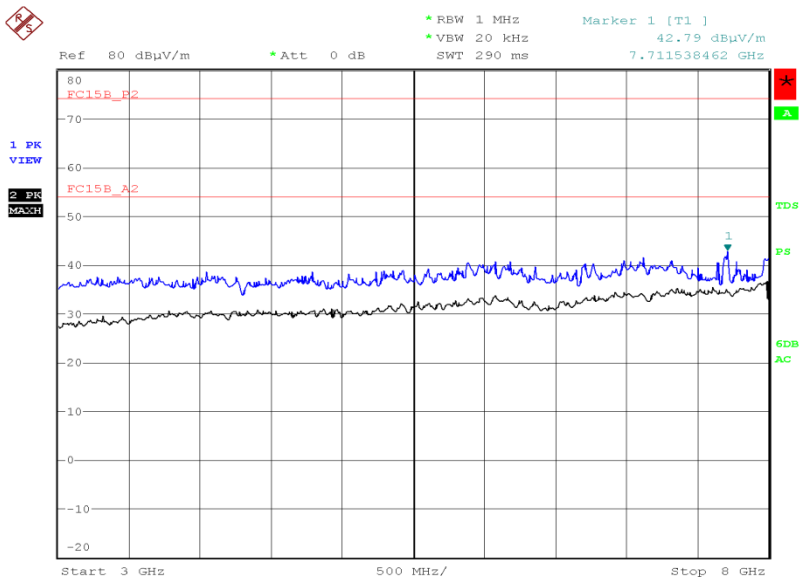
Product Service

1 GHz to 3 GHz



Date: 6.JUL.2013 15:54:18

3 GHz to 8 GHz

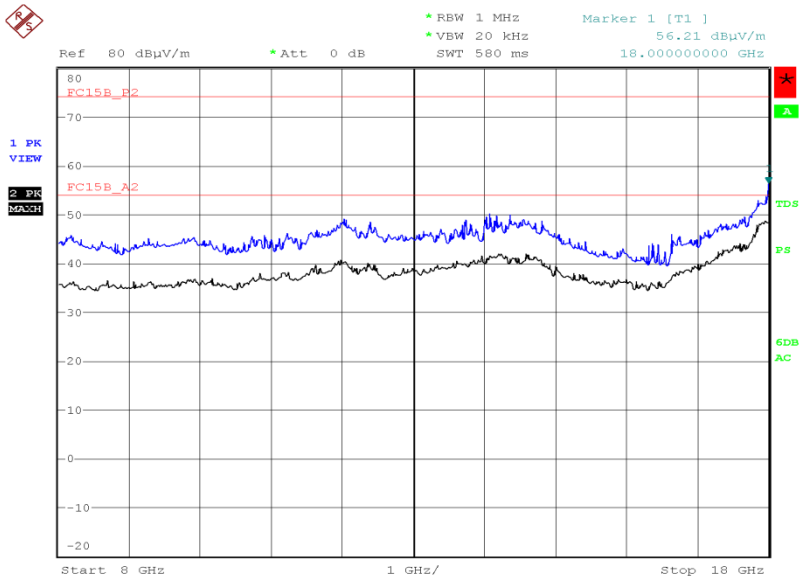


Date: 6.JUL.2013 17:35:09



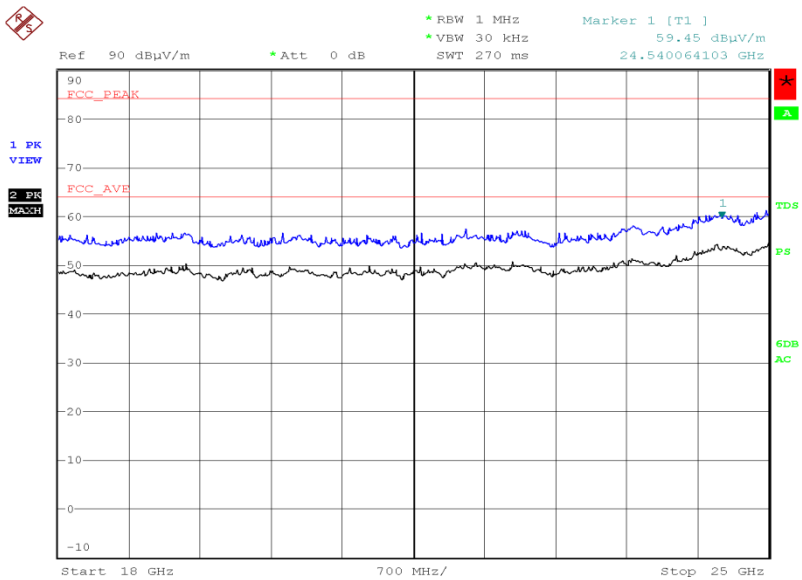
Product Service

8 GHz to 18 GHz



Date: 6.JUL.2013 18:48:44

18 GHz to 25 GHz

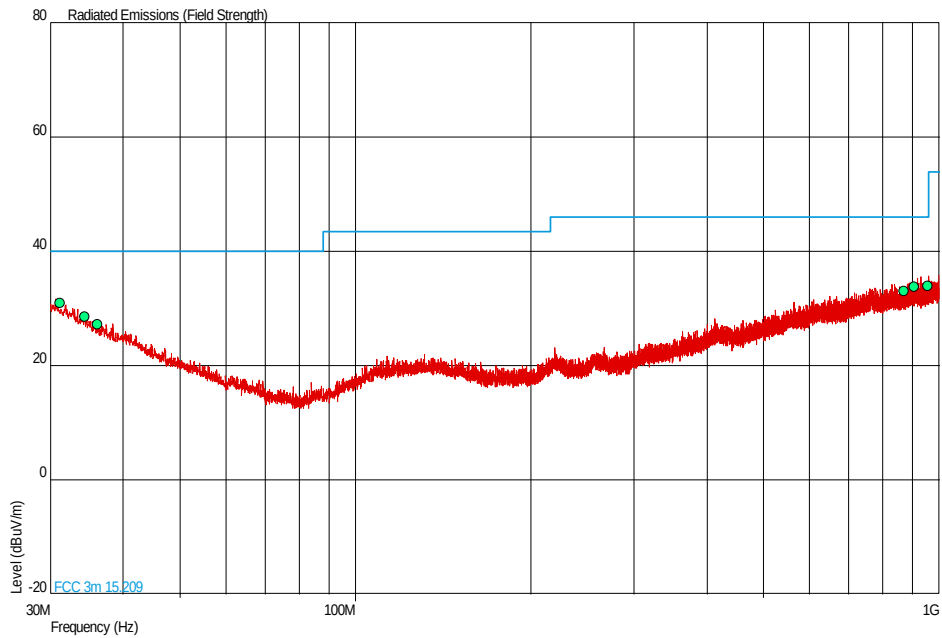


Date: 6.JUL.2013 19:37:57



2440 MHz

30 MHz to 1 GHz

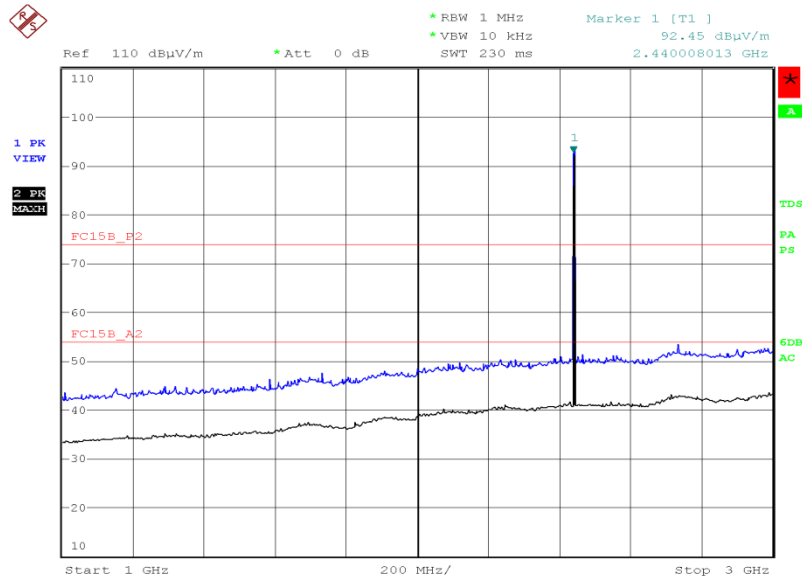


Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
31.213	30.9	35.1	40.0	100	-9.1	64.9	180	0.00	Vertical
34.317	28.5	26.6	40.0	100	-11.5	73.4	270	1.00	Horizontal
36.208	27.2	22.9	46.0	200	-12.8	77.1	180	1.00	Horizontal
869.244	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Horizontal
904.795	33.9	49.5	46.0	200	-12.1	150.5	0	1.00	Vertical
956.981	34.0	50.1	46.0	200	-12.0	149.9	90	1.00	Vertical



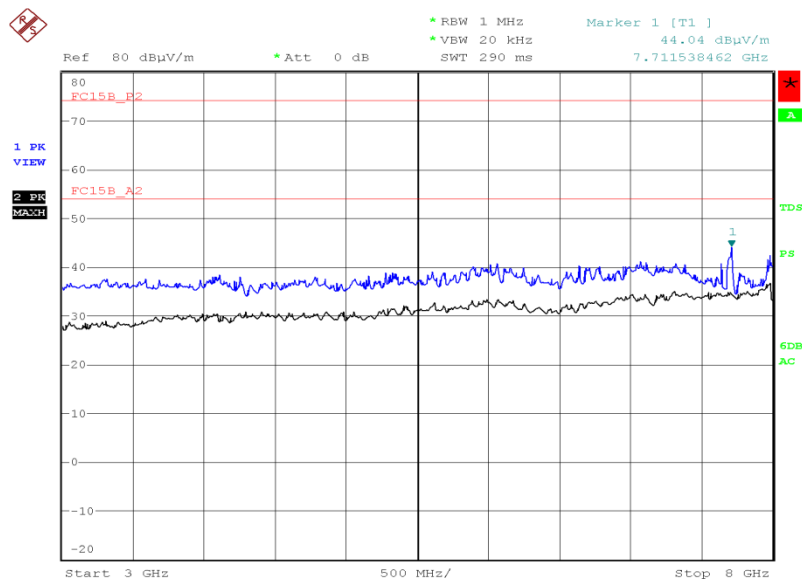
Product Service

1 GHz to 3 GHz



Date: 6.JUL.2013 16:11:05

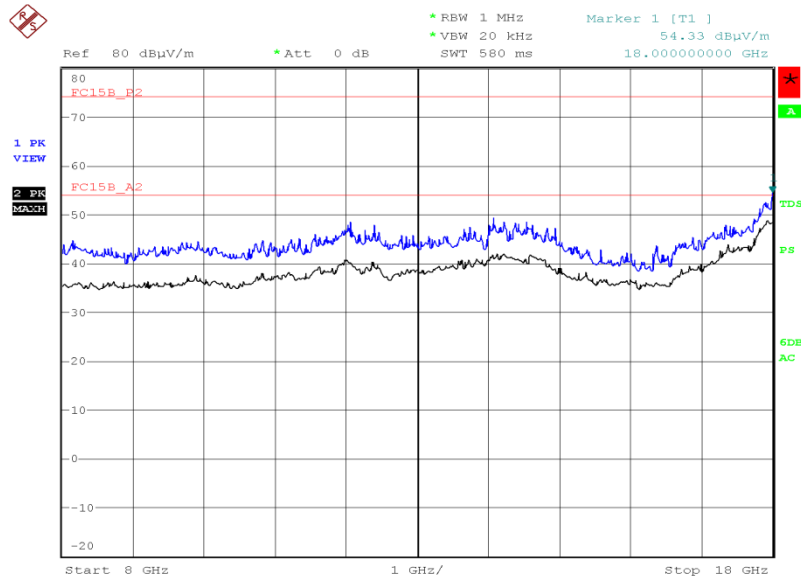
3 GHz to 8 GHz



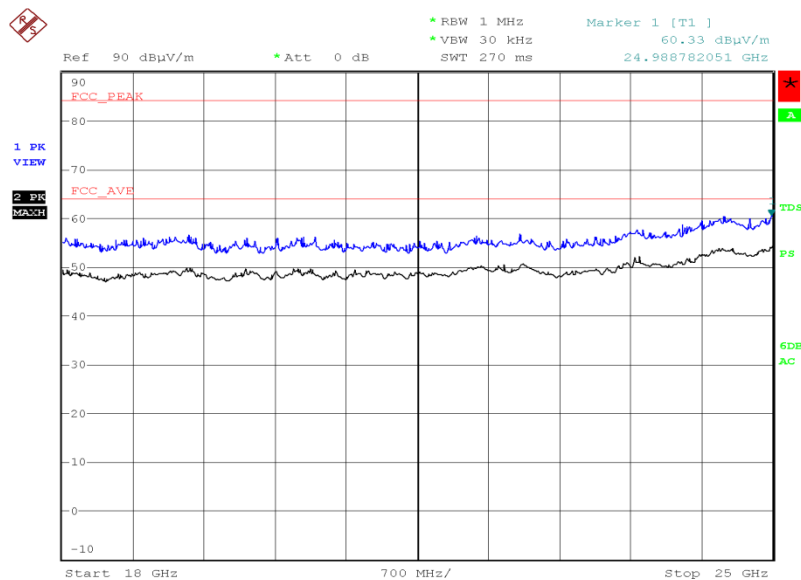
Date: 6.JUL.2013 17:38:25



Product Service

8 GHz to 18 GHz

Date: 6.JUL.2013 18:22:04

18 GHz to 25 GHz

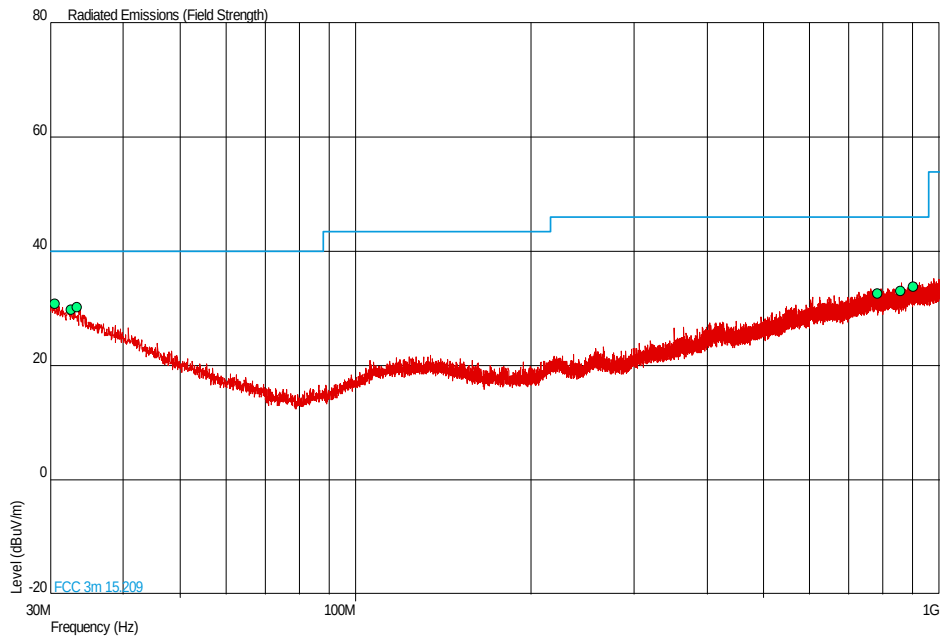
Date: 6.JUL.2013 19:48:09



Product Service

2480 MHz

30 MHz to 1 GHz

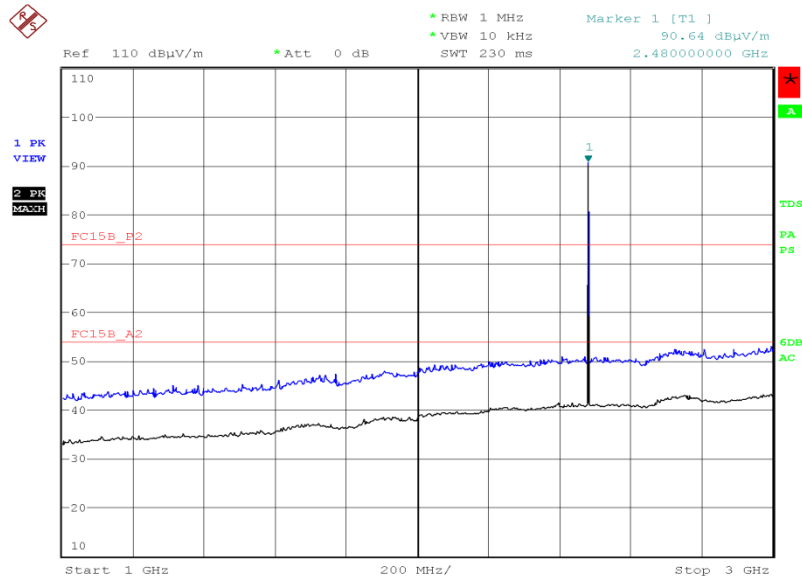


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.579	30.8	34.7	40.0	100	-9.2	65.3	0	0.00	Horizontal
32.592	29.7	30.5	40.0	100	-10.3	69.5	0	0.00	Horizontal
33.347	30.3	32.7	46.0	200	-9.7	167.3	90	1.00	Horizontal
784.951	32.7	43.2	46.0	200	-13.3	156.8	90	1.00	Horizontal
858.623	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Horizontal
903.243	33.8	49.0	46.0	200	-12.2	151.0	90	1.00	Vertical



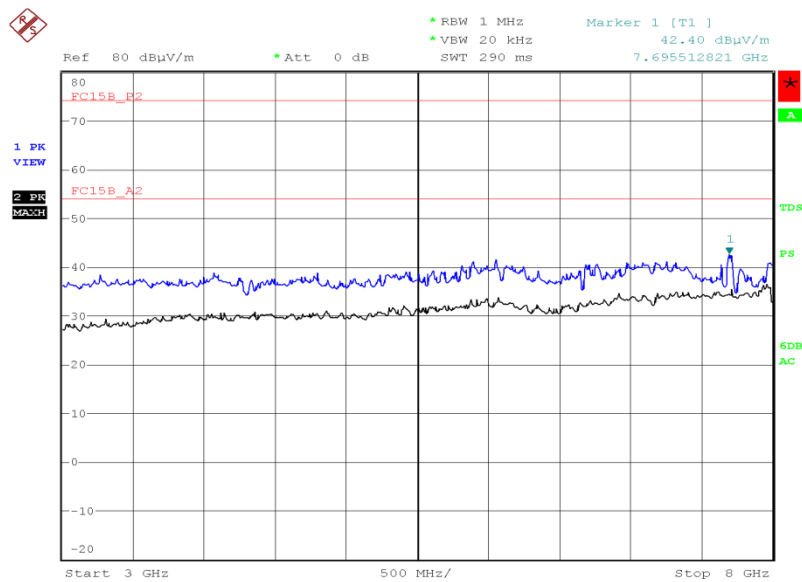
Product Service

1 GHz to 3 GHz



Date: 6.JUL.2013 16:16:04

3 GHz to 8 GHz

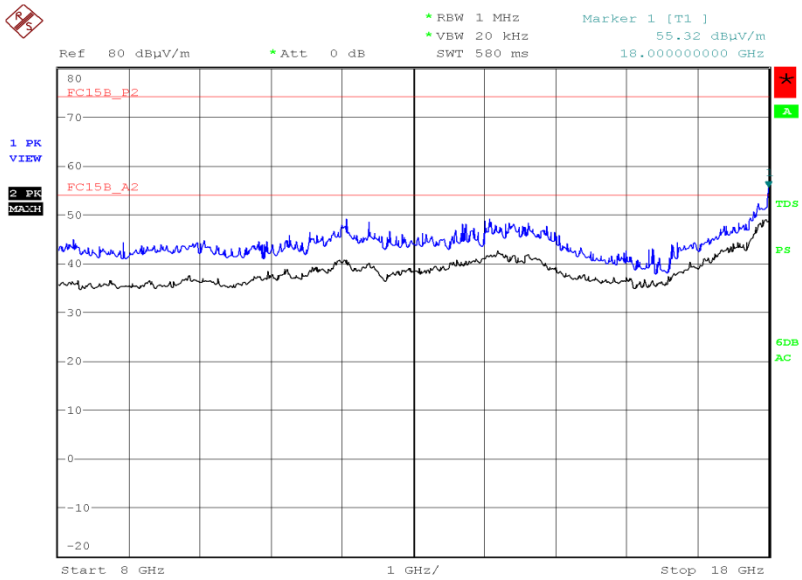


Date: 6.JUL.2013 17:45:11



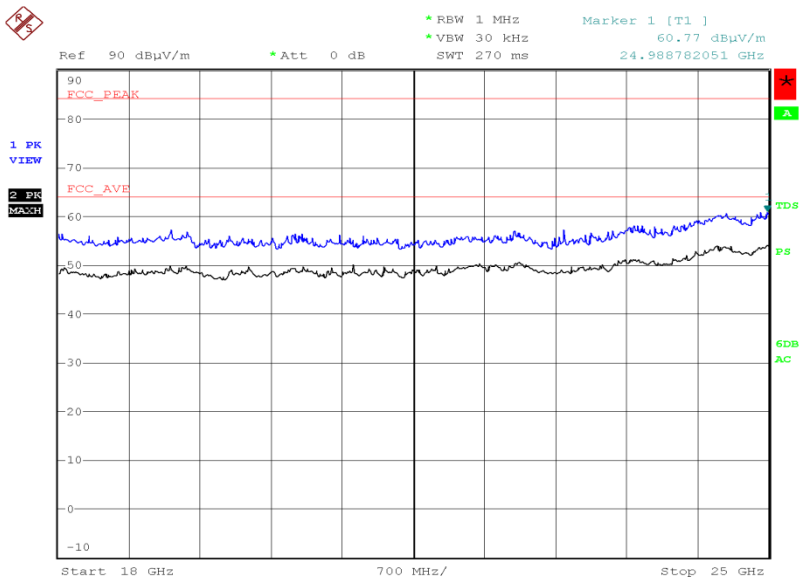
Product Service

8 GHz to 18 GHz



Date: 6.JUL.2013 18:07:40

18 GHz to 25 GHz



Date: 6.JUL.2013 19:43:27

Limit

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

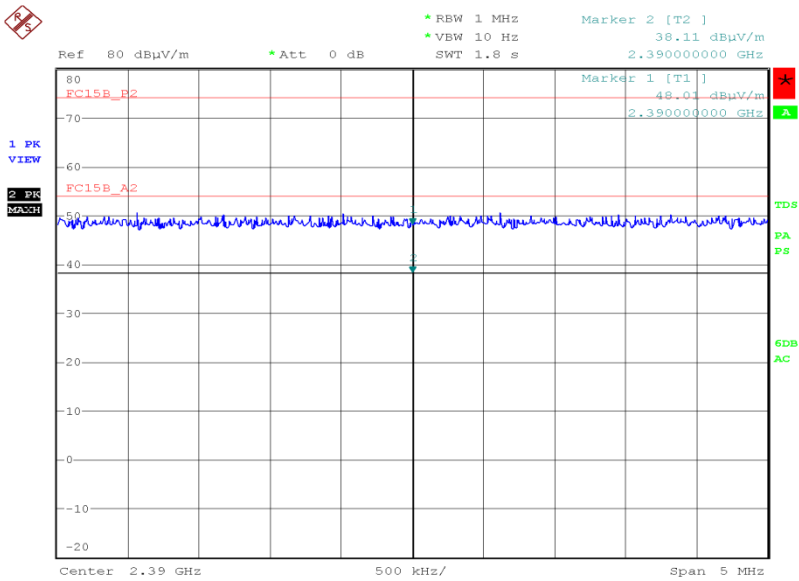


Product Service

Band Edge Emissions

2402 MHz

Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Horizontal	48.01	38.11



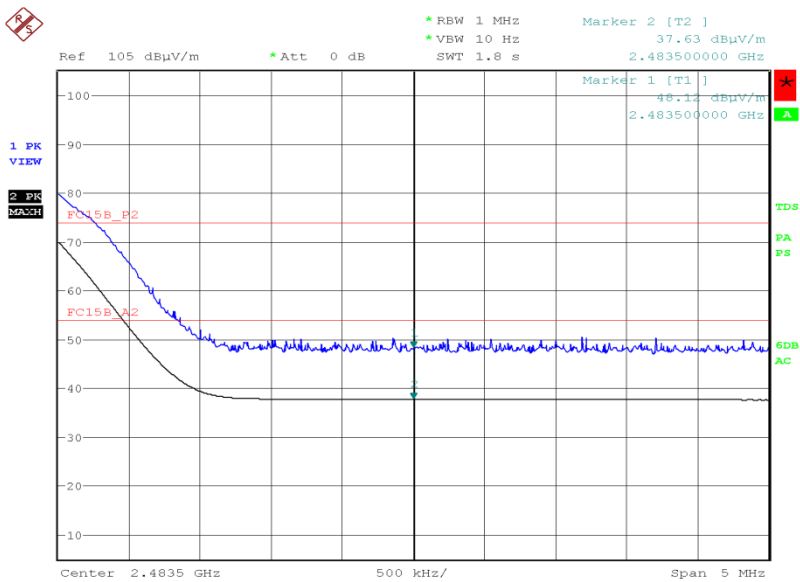
Date: 6.JUL.2013 15:49:14



Product Service

2480 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	48.12	37.63



Date: 6.JUL.2013 16:25:11

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

SHL22 S/N: IMEI 004401114765106 - Modification State 0

2.6.3 Date of Test

22 May 2013 and 05 July 2013

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	23.1 - 25.2°C
Relative Humidity	37.9 - 46.9%

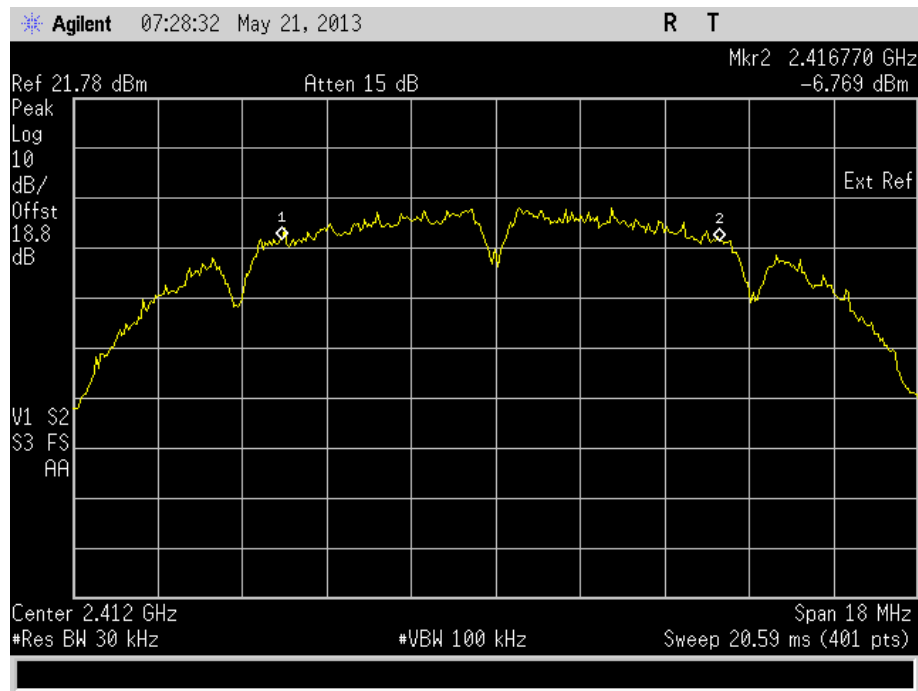
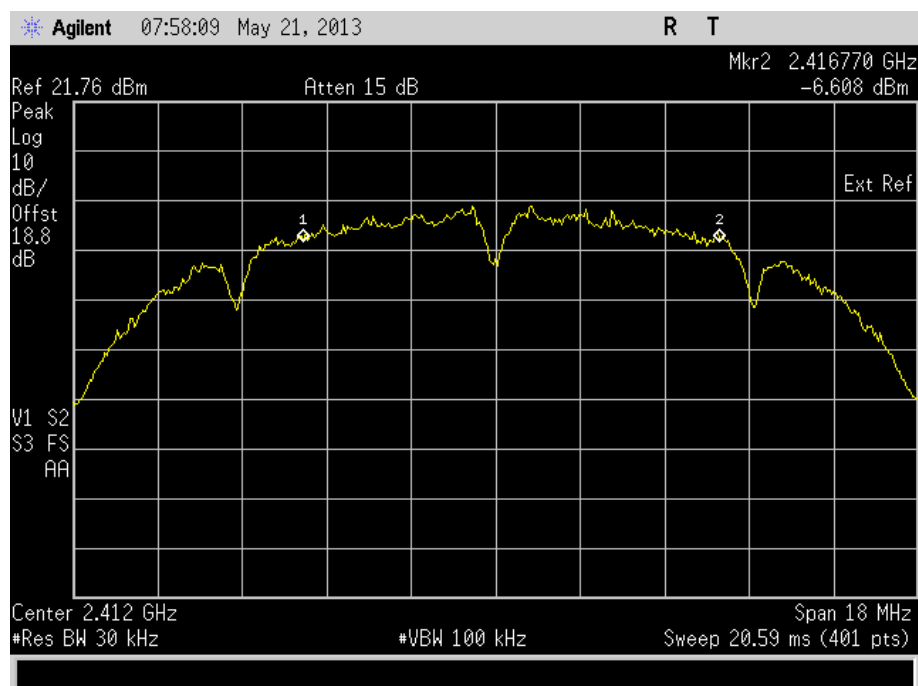
**2.6.7 Test Results**802.11(b)

4.0 V DC Supply

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	1	9180
	2	8865
	5.5	9404
	11	9180
2437 MHz	1	8145
	2	9585
	5.5	9225
	11	8055
2462 MHz	1	9900
	2	8820
	5.5	9315
	11	9315



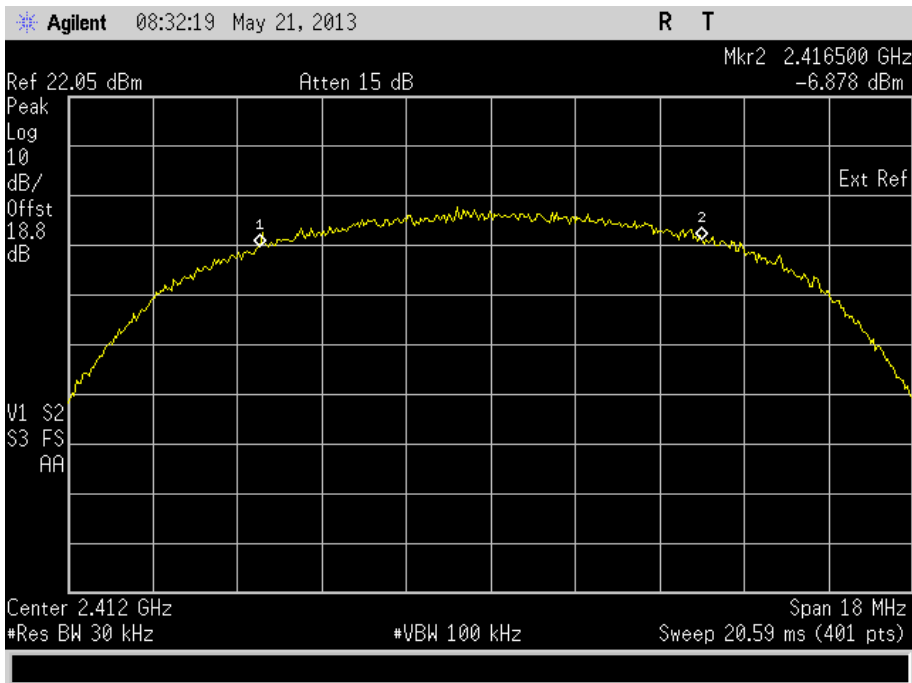
Product Service

2412 MHz1 Mbps2 Mbps

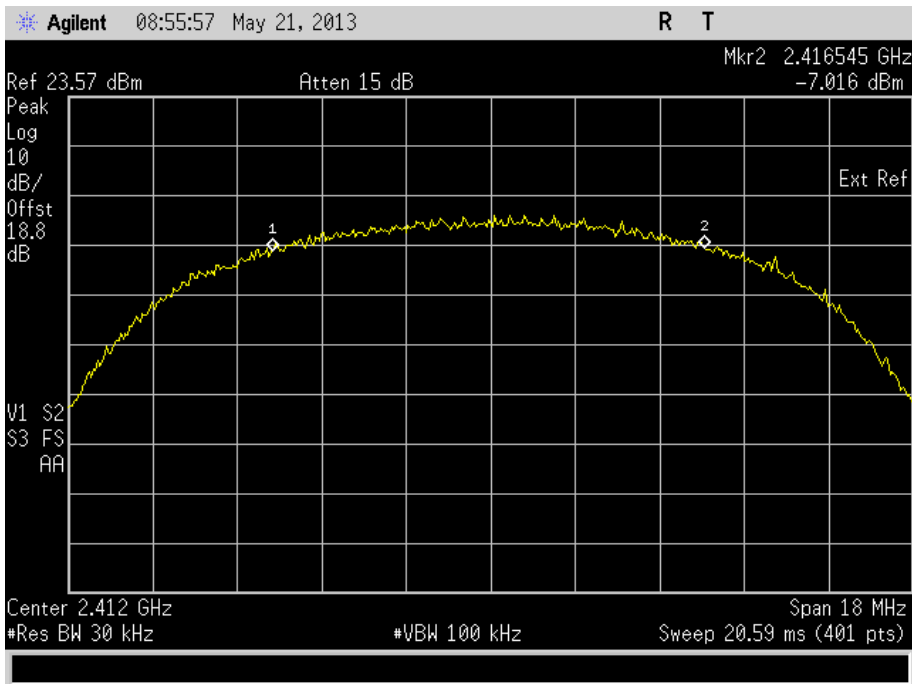


Product Service

5.5 Mbps

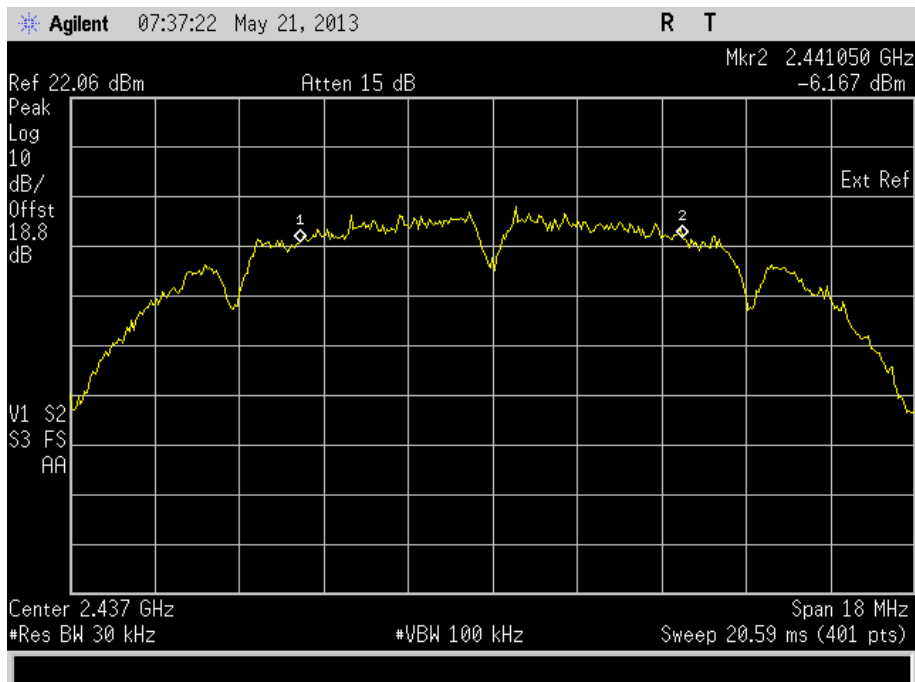
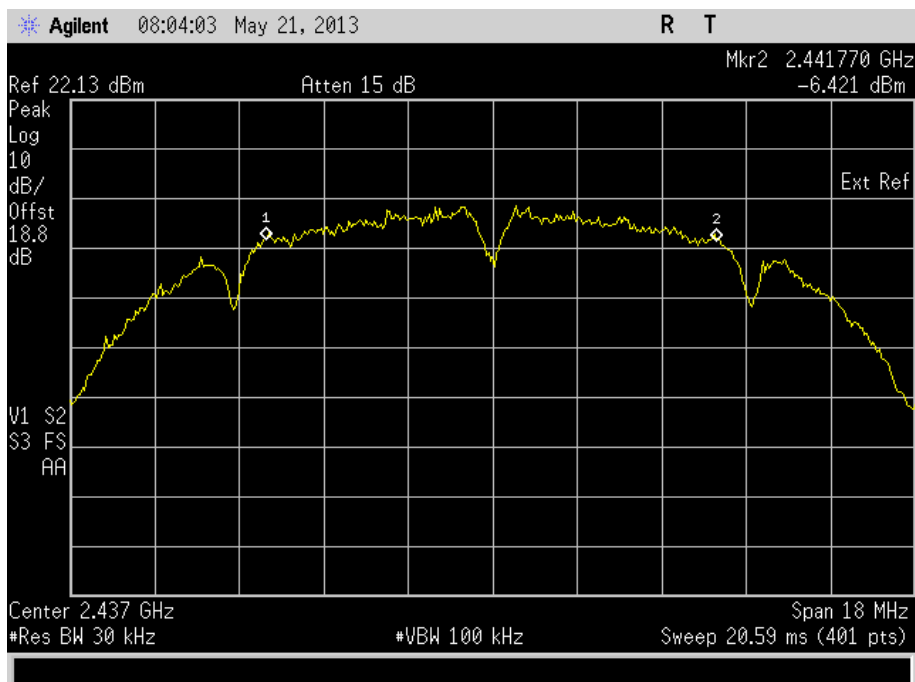


11 Mbps



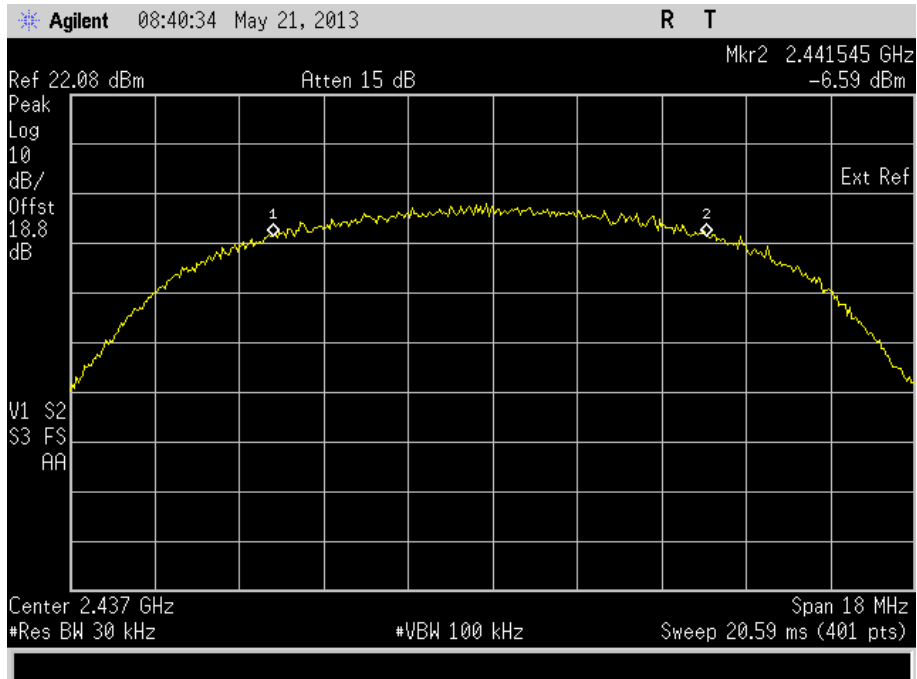
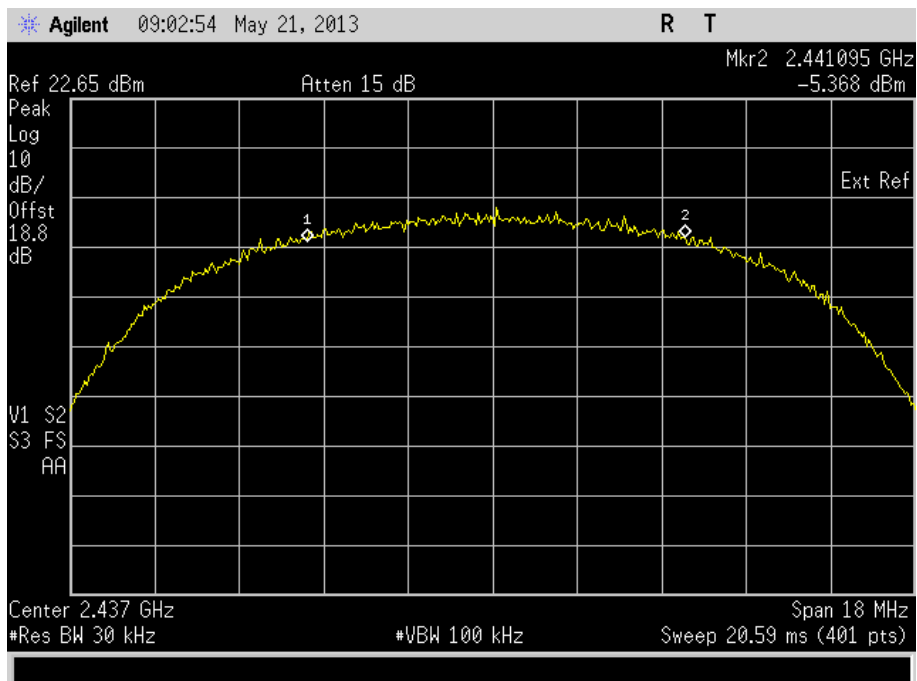


Product Service

2437 MHz1 Mbps2 Mbps

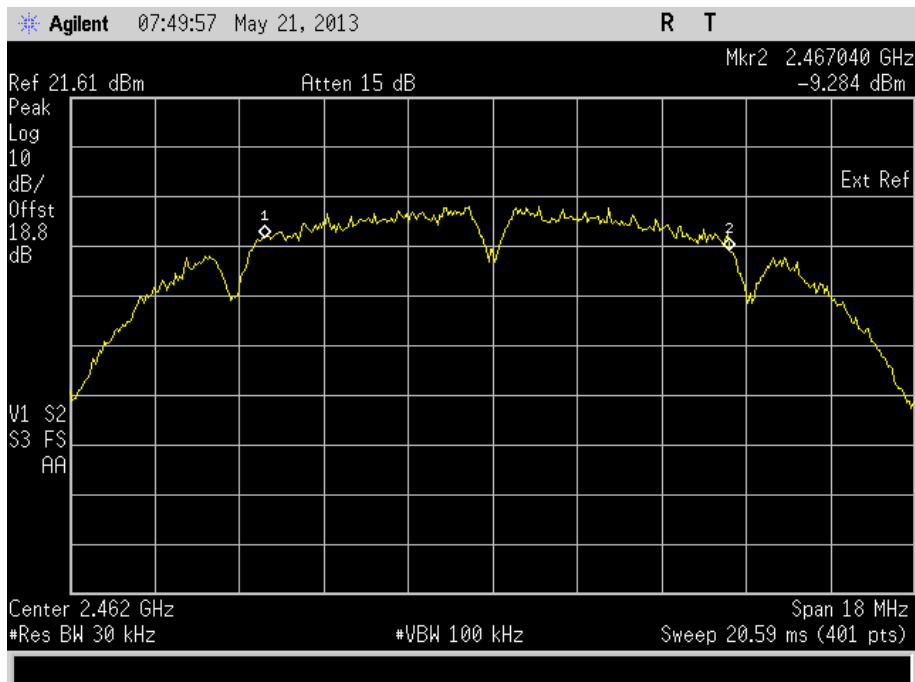
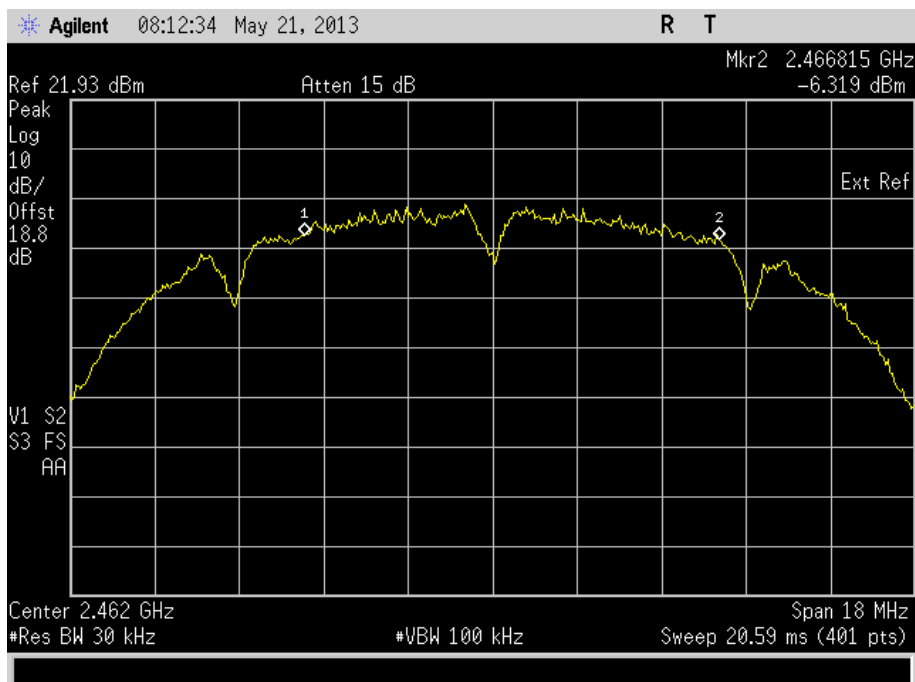


Product Service

5.5 Mbps11 Mbps

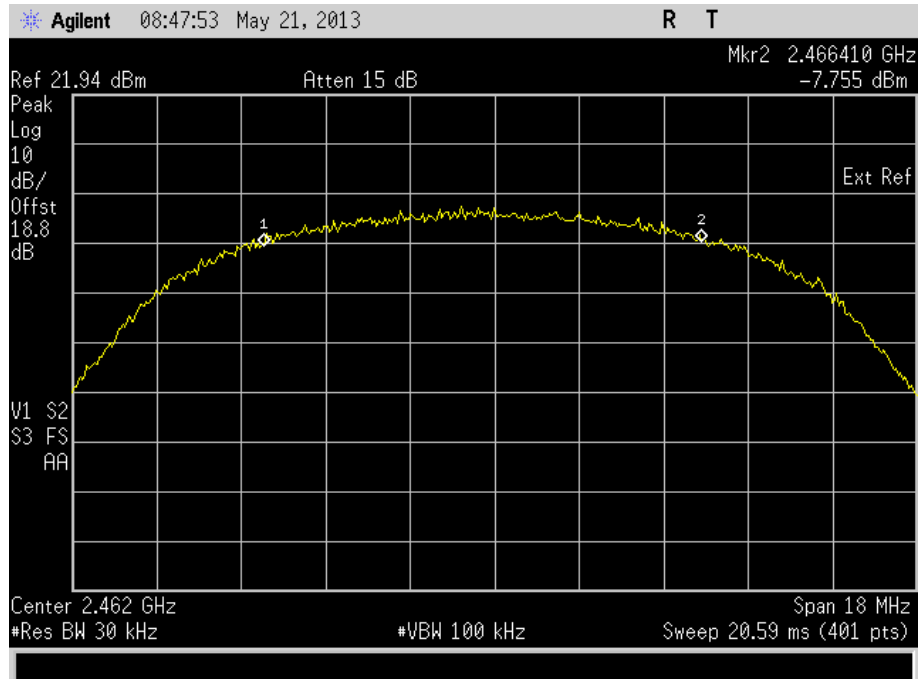
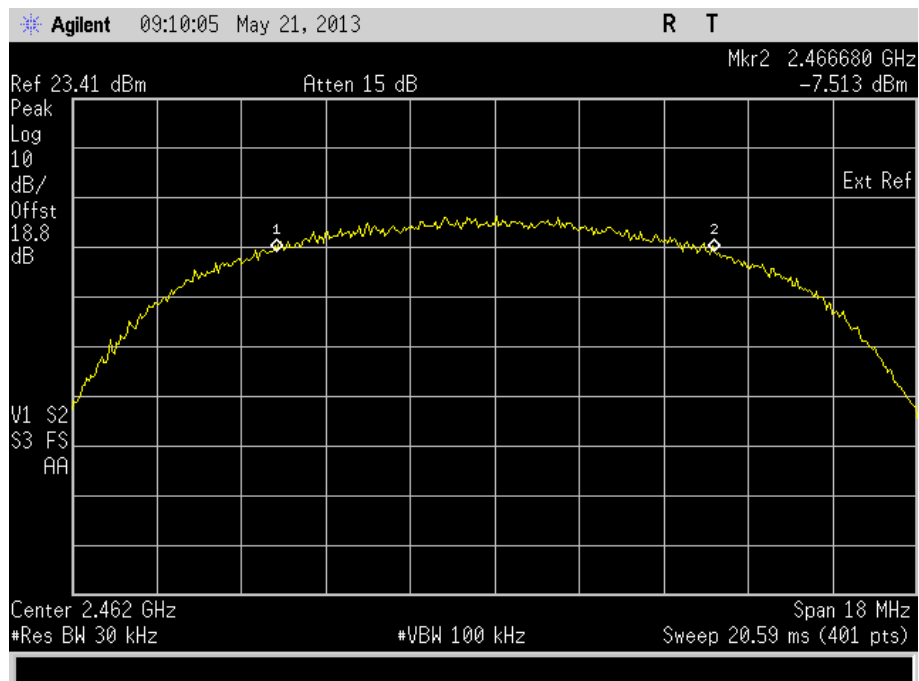


Product Service

2462 MHz1 Mbps2 Mbps



Product Service

5.5 Mbps11 MbpsLimit Clause

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

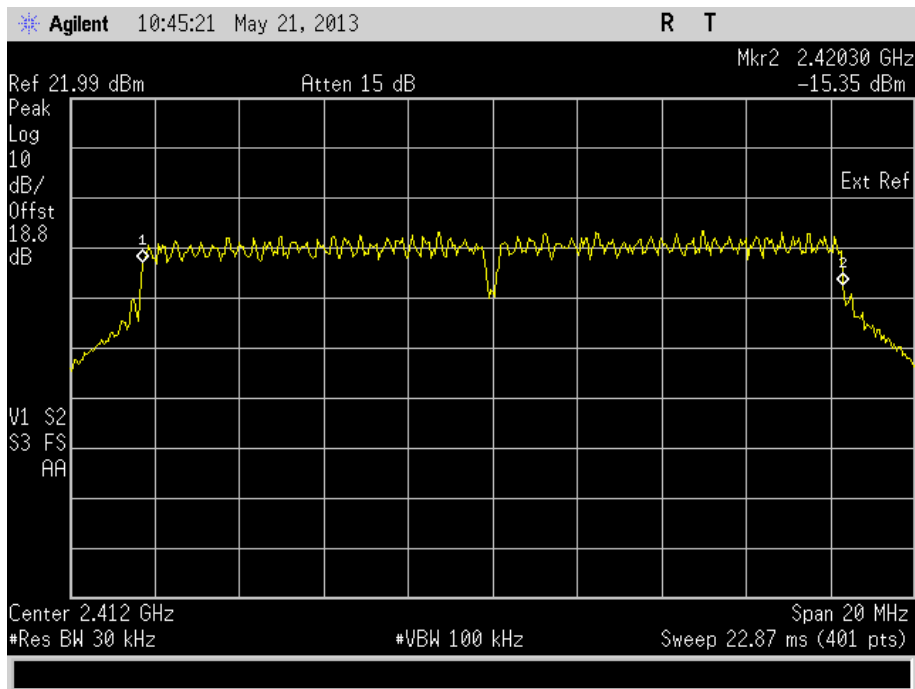
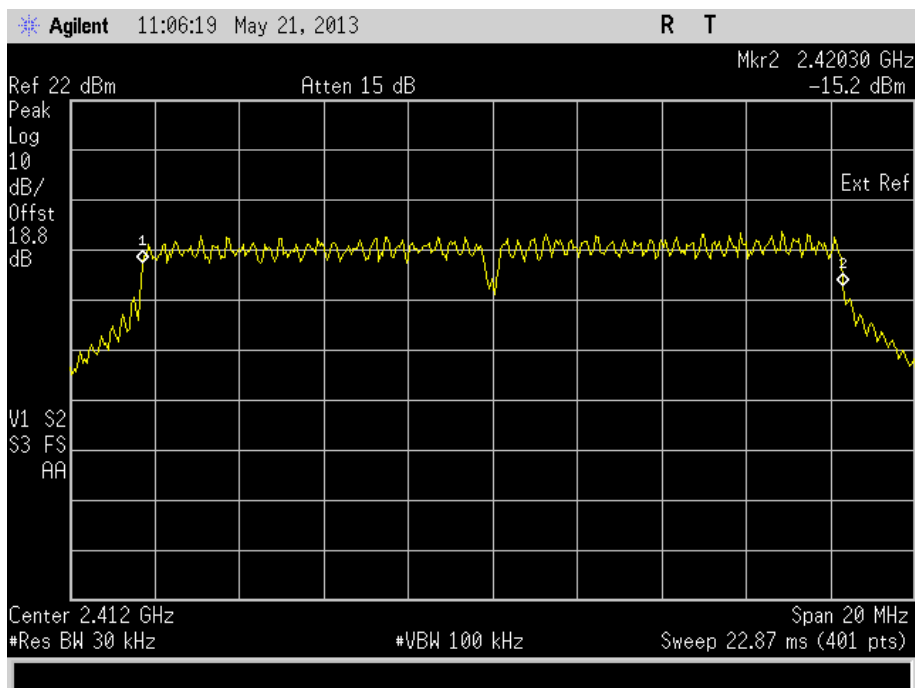
802.11(g)

4.0 V DC Supply

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	6	16600
	9	16600
	12	16600
	18	16500
	24	16500
	36	16450
	48	16500
	54	16500
2437 MHz	6	16650
	9	16650
	12	16550
	18	16550
	24	16500
	36	16450
	48	16500
	54	16500
2462 MHz	6	16650
	9	16650
	12	16550
	18	16550
	24	16500
	36	16450
	48	16500
	54	16500

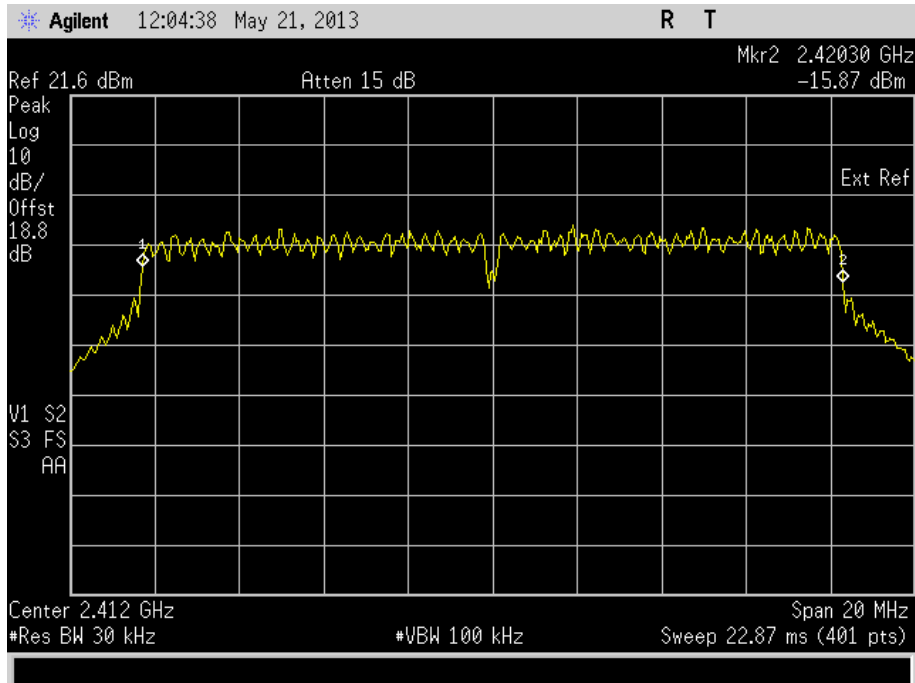
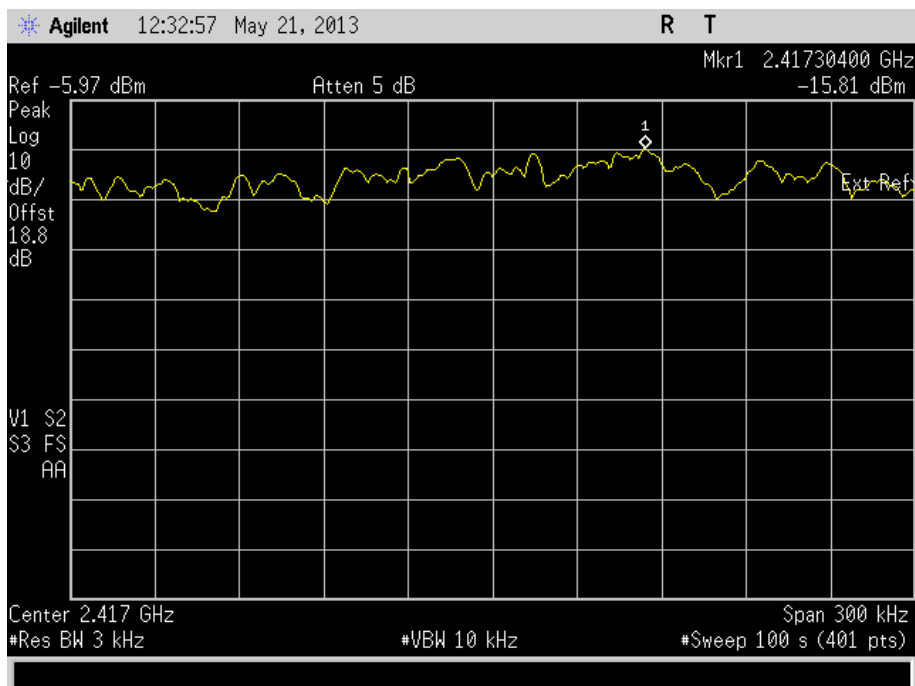


Product Service

2412 MHz6 Mbps9 Mbps

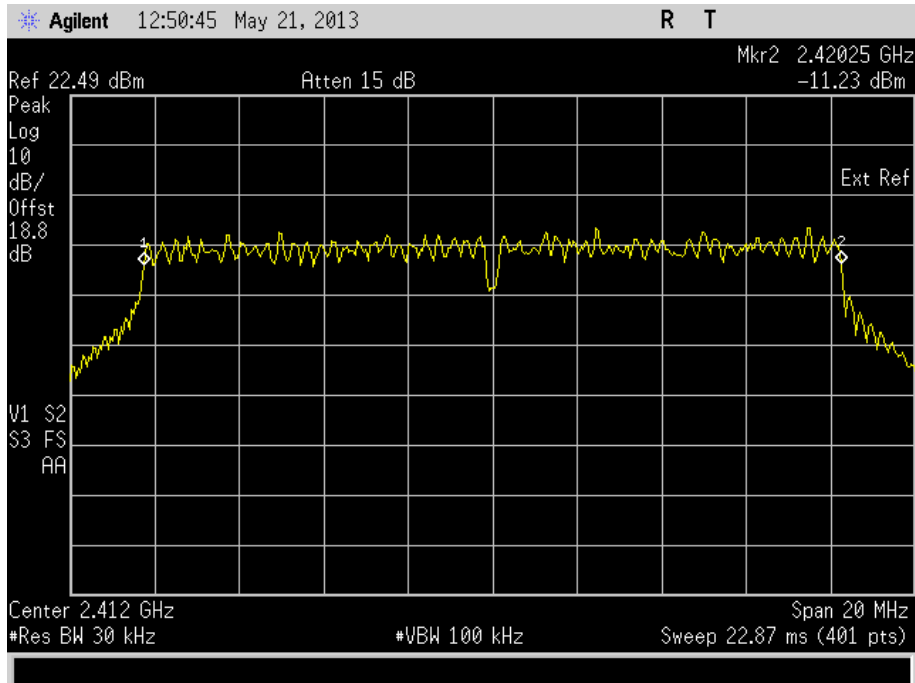
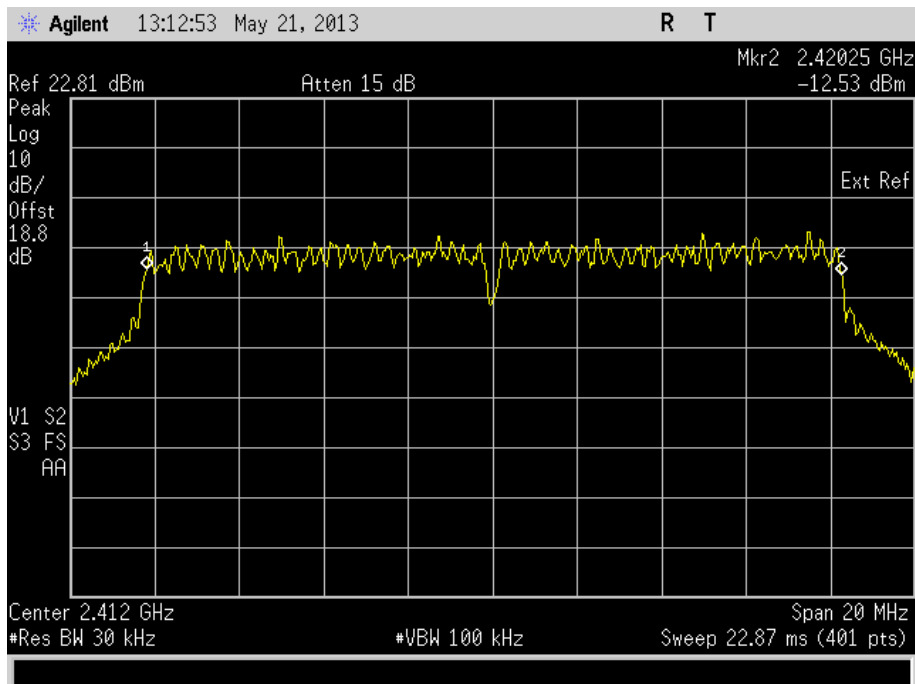


Product Service

12 Mbps18 Mbps

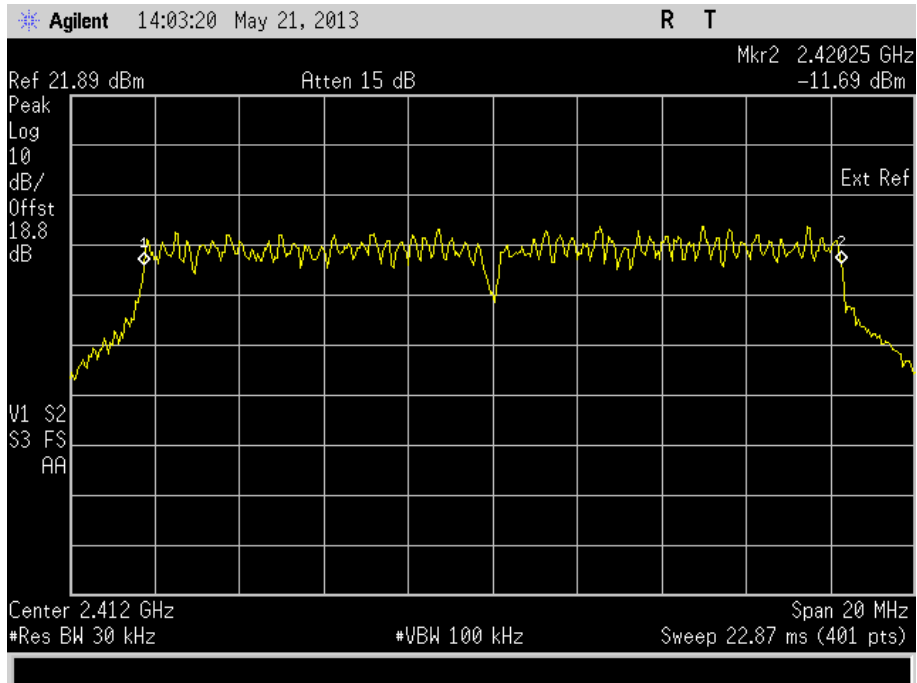
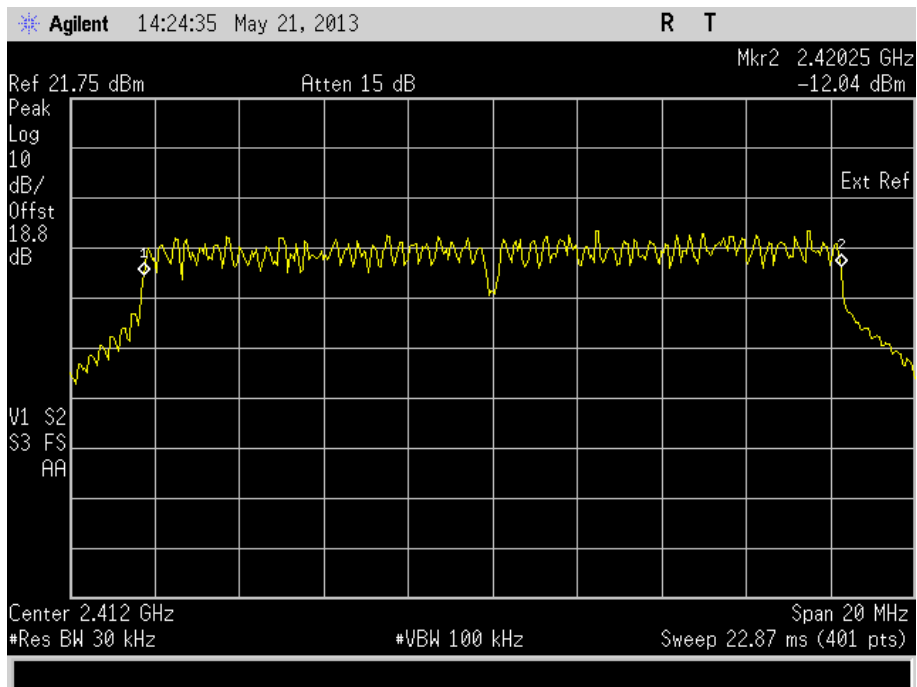


Product Service

24 Mbps36 Mbps

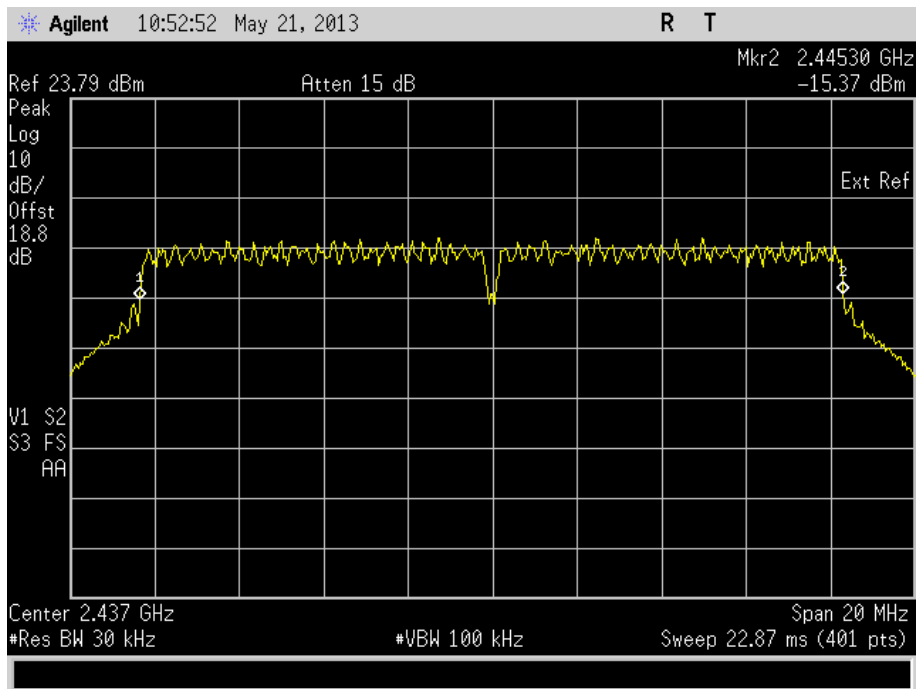
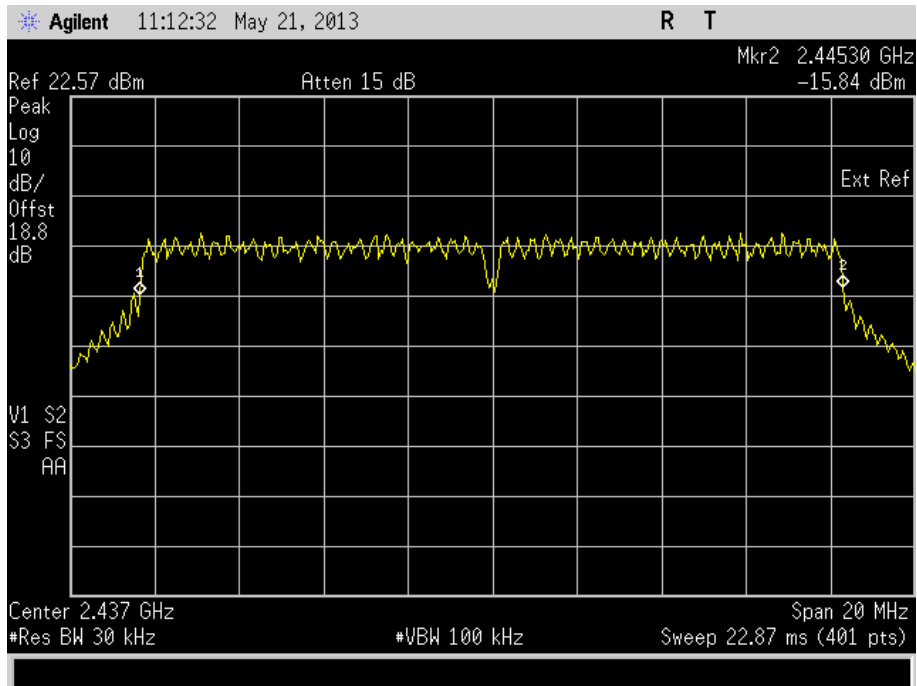


Product Service

48 Mbps54 Mbps

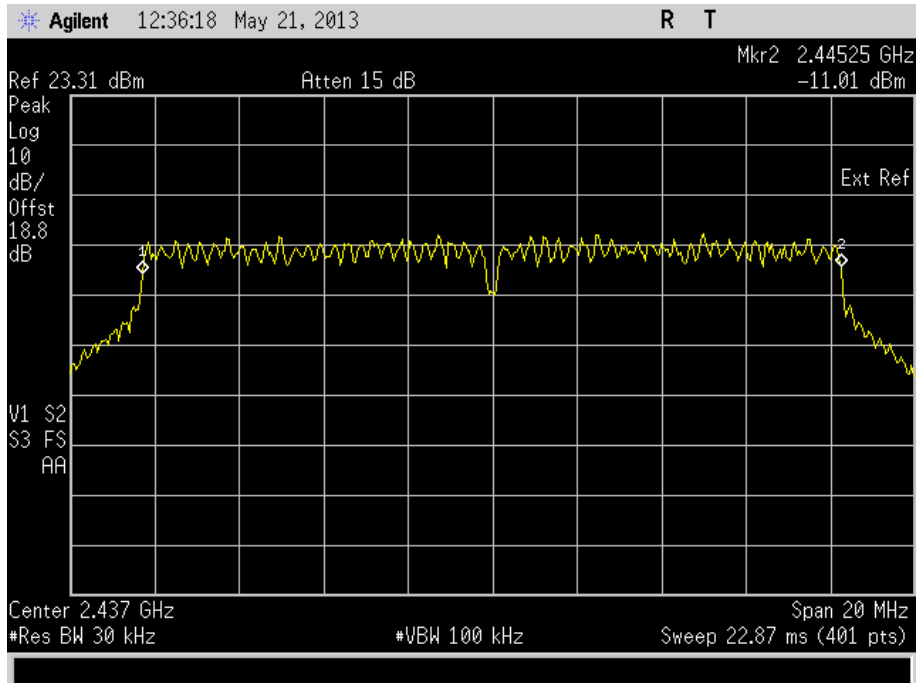
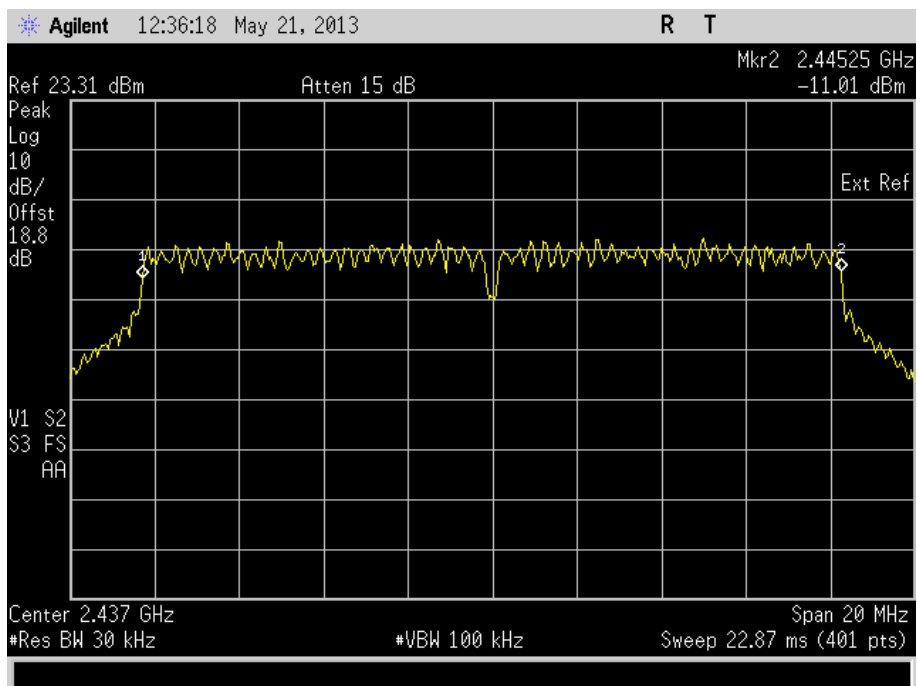


Product Service

2437 MHz6 Mbps9 Mbps

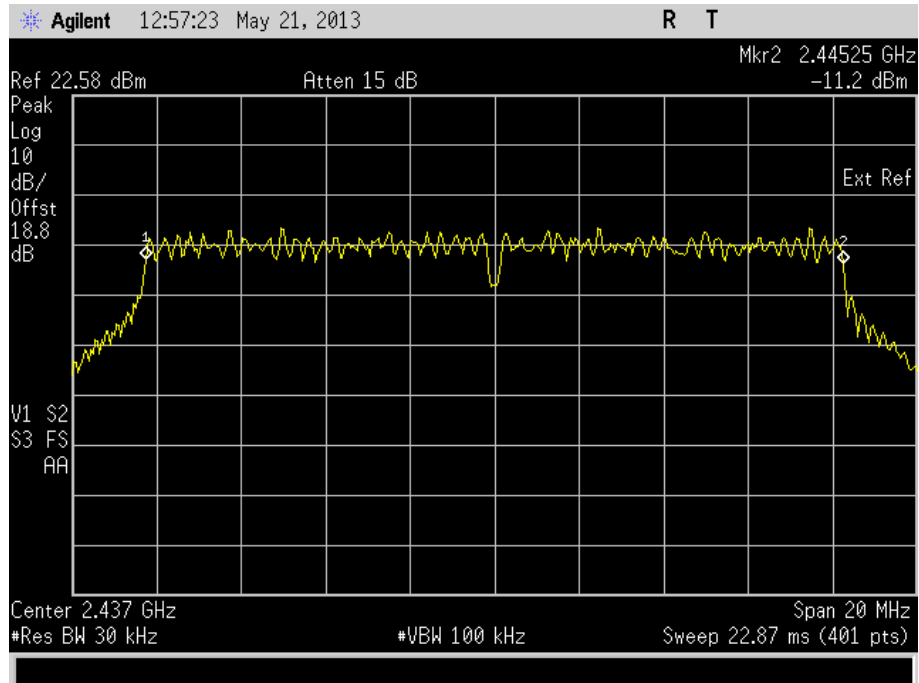
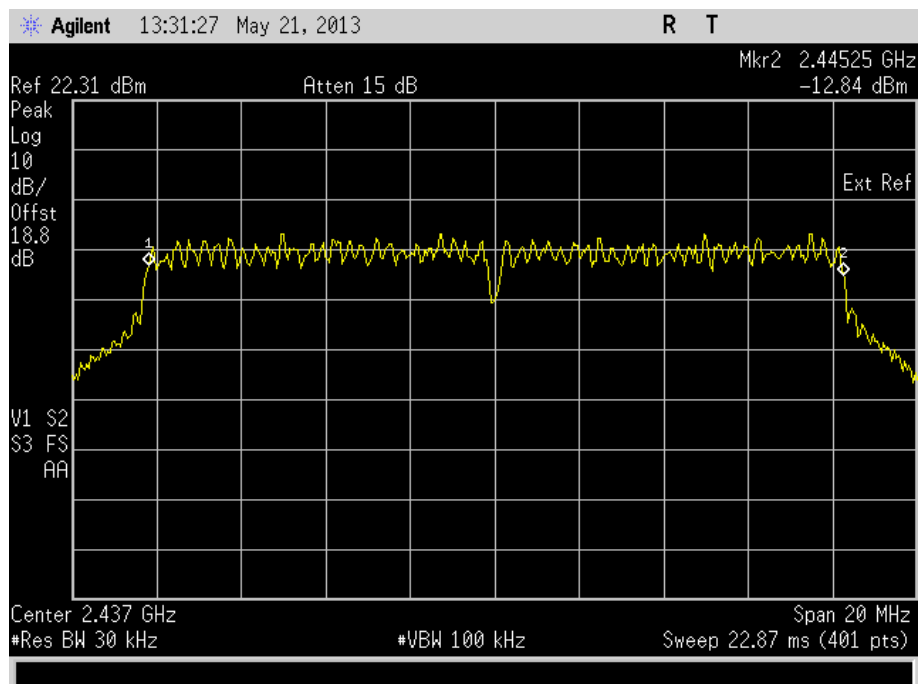


Product Service

12 Mbps18 Mbps

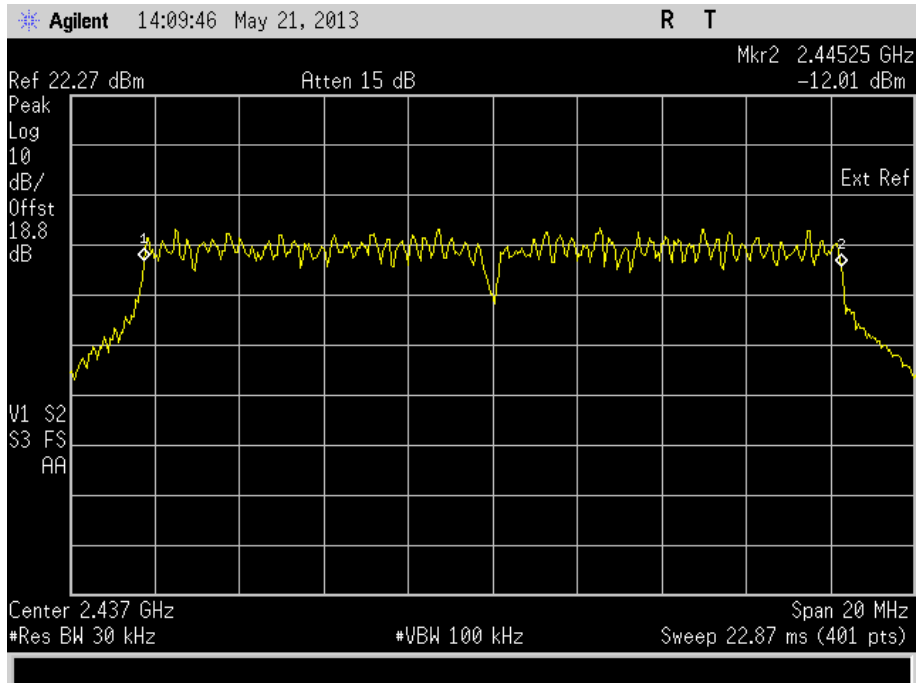
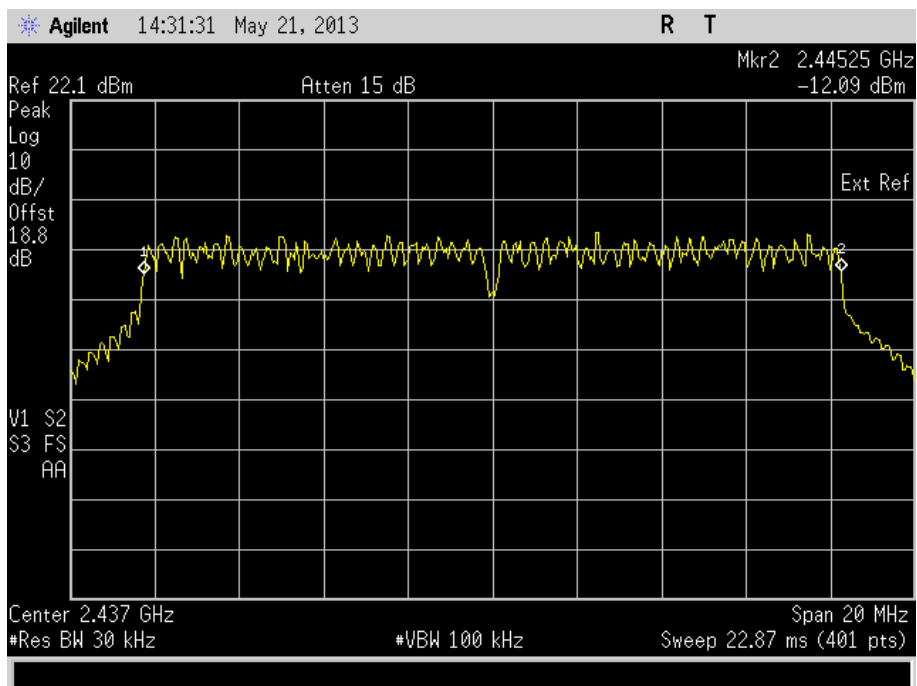


Product Service

24 Mbps36 Mbps

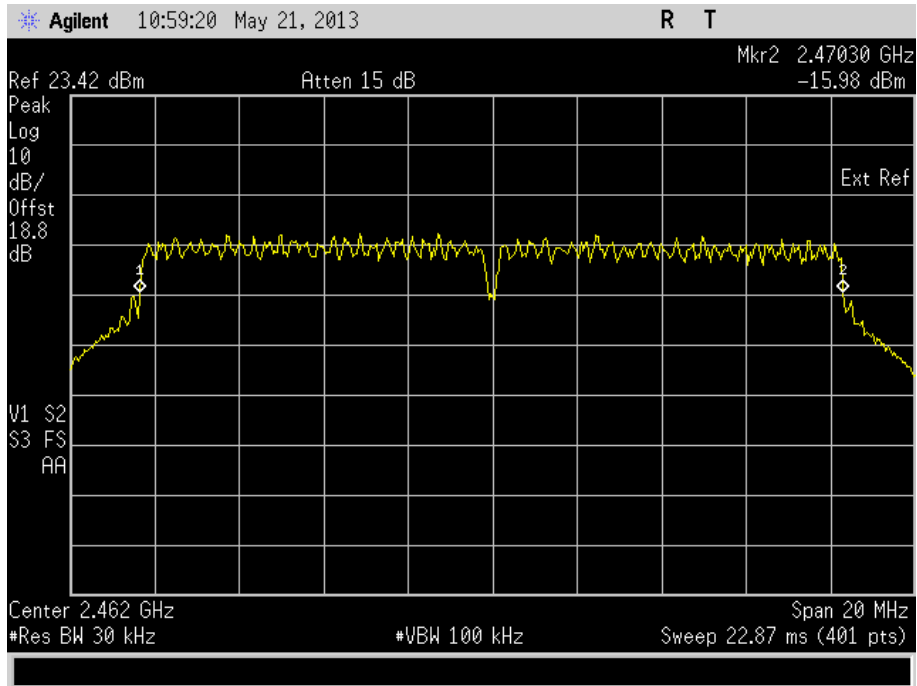
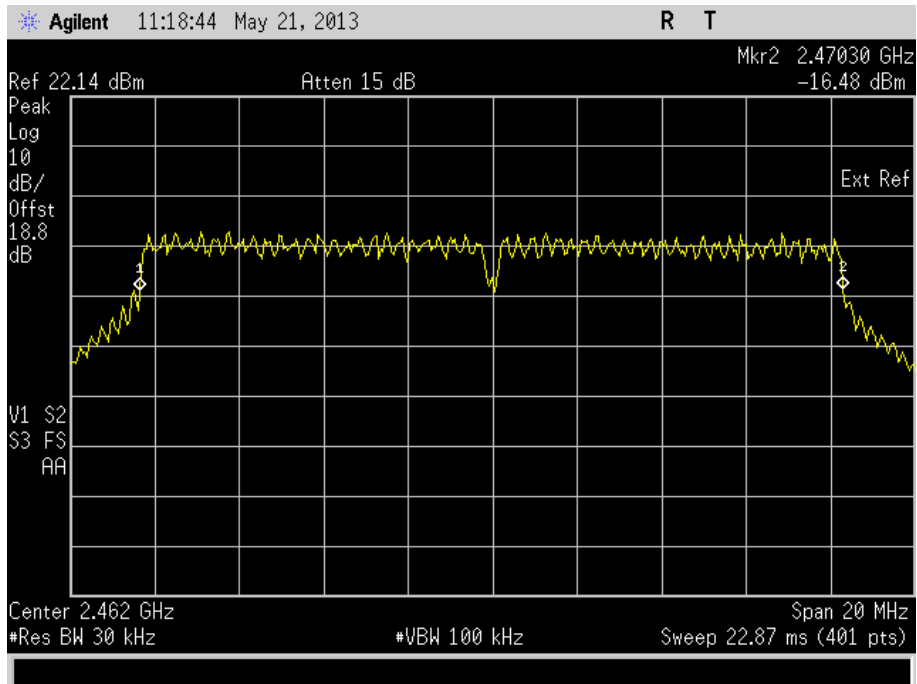


Product Service

48 Mbps54 Mbps

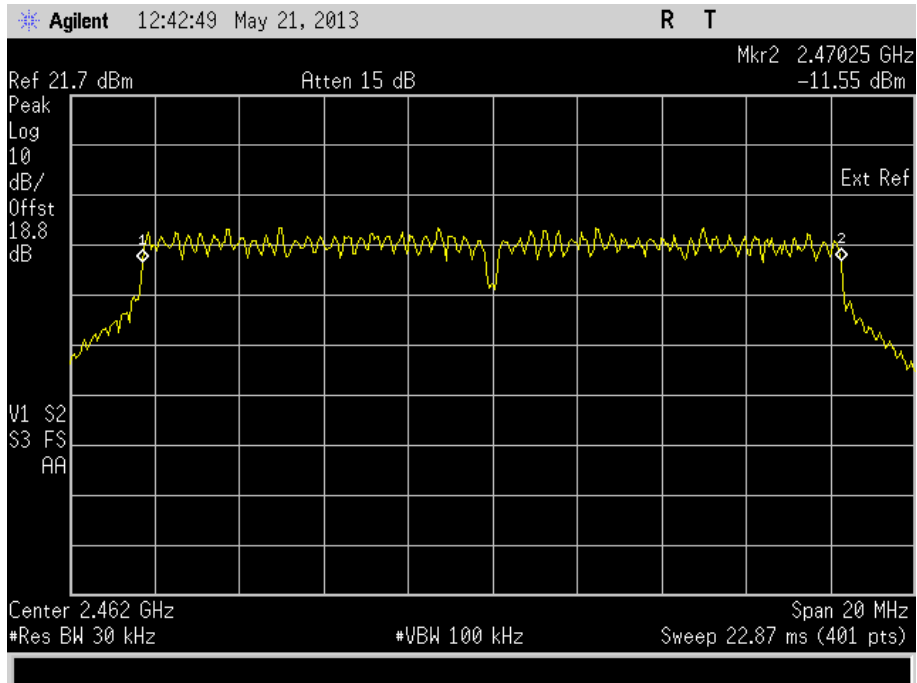
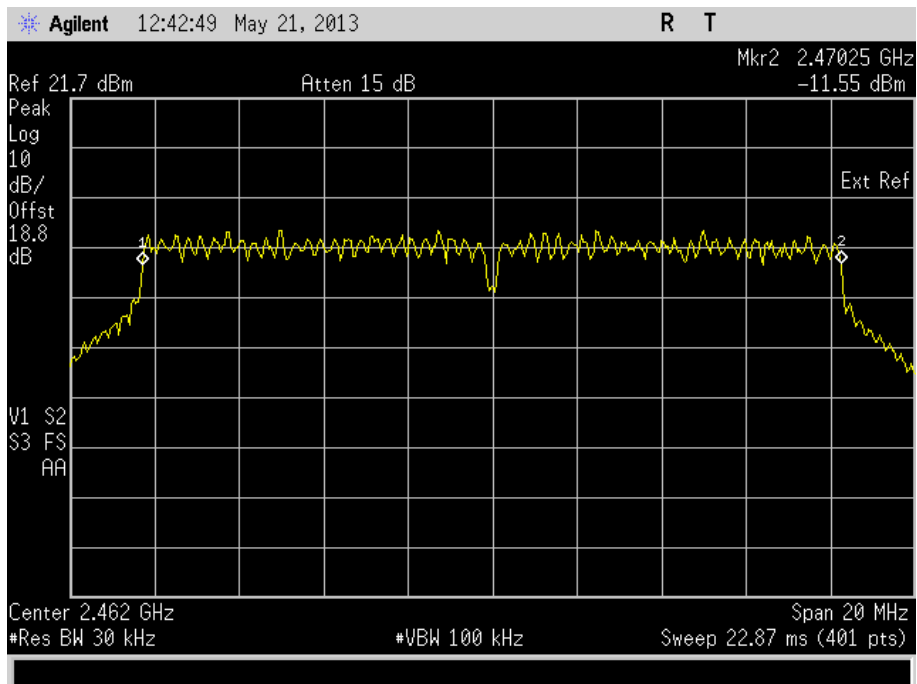


Product Service

2462 MHz6 Mbps9 Mbps

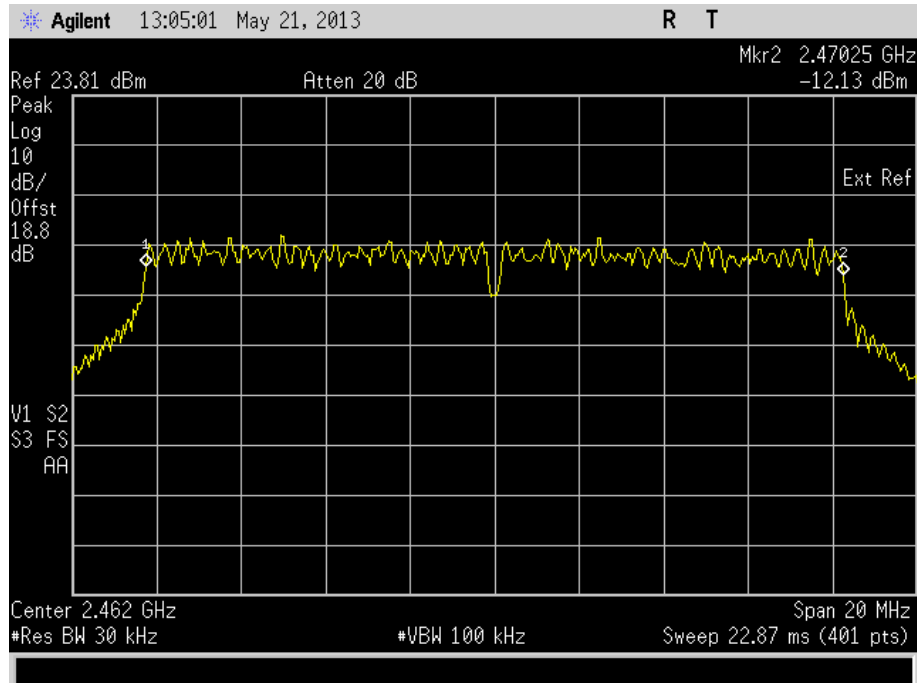
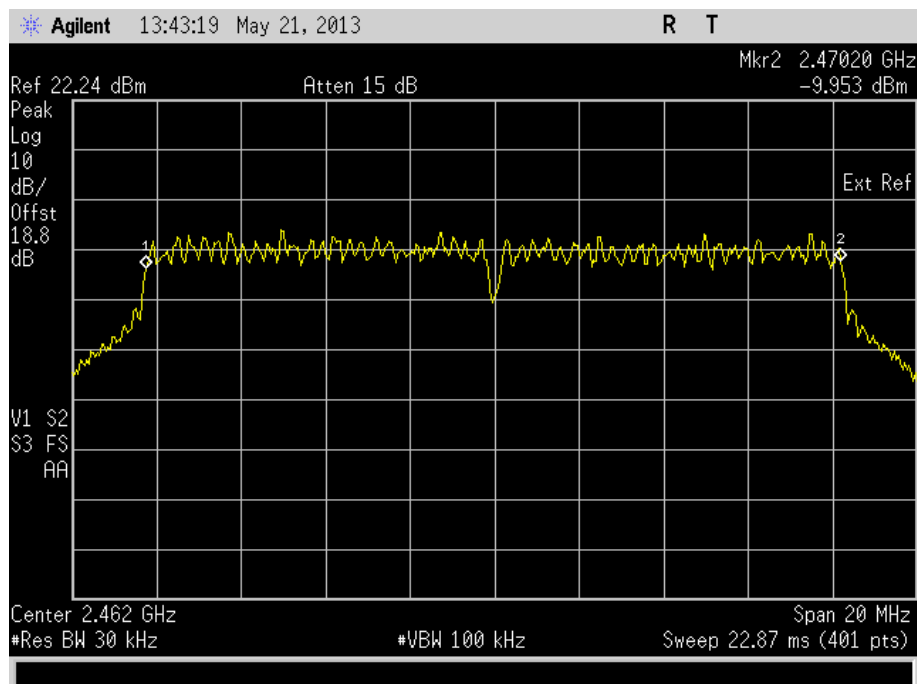


Product Service

12 Mbps18 Mbps

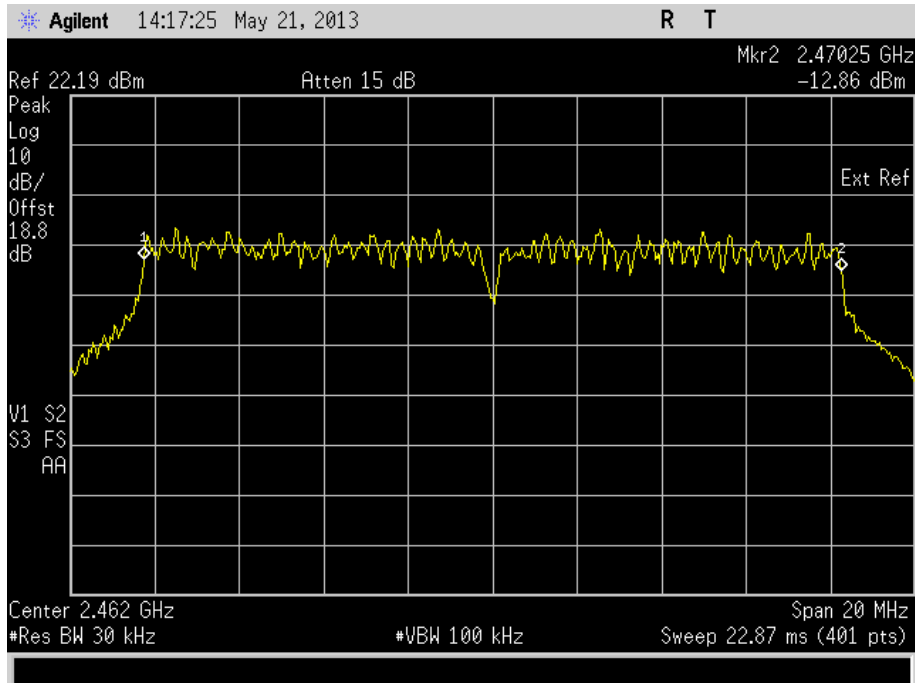
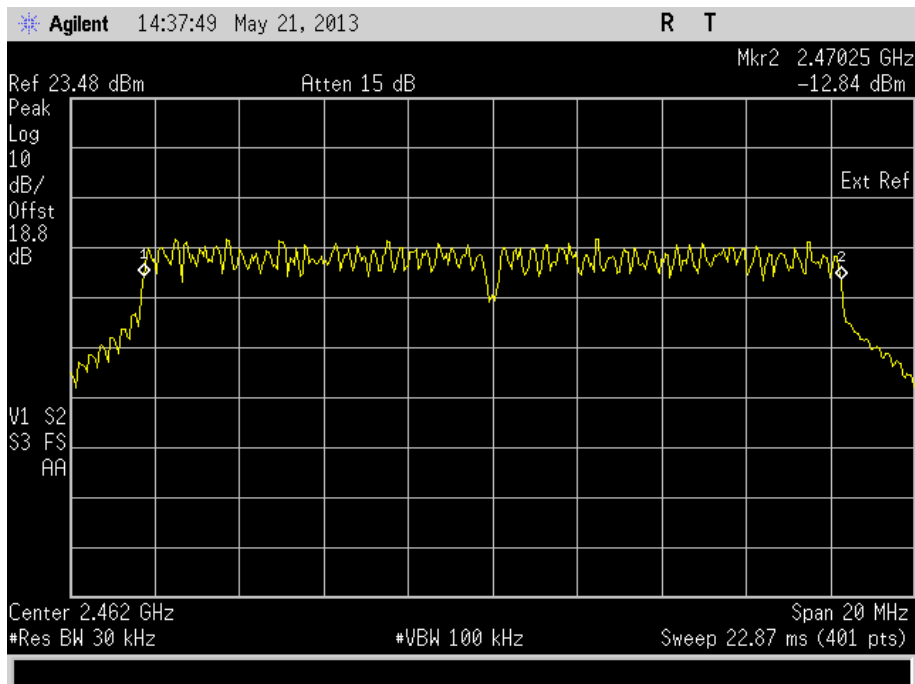


Product Service

24 Mbps36 Mbps



Product Service

48 Mbps54 MbpsLimit Clause

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

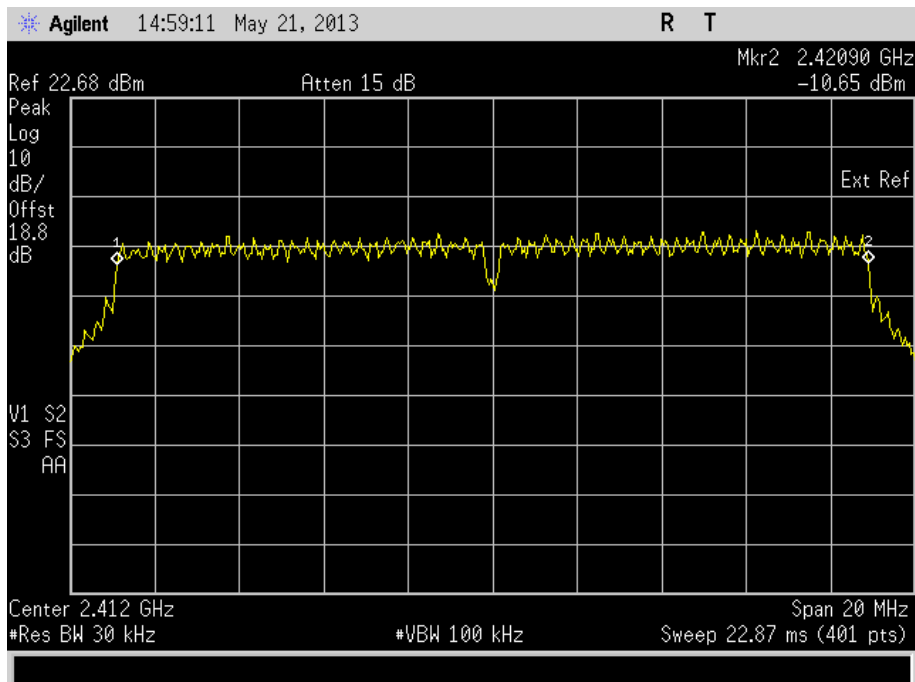
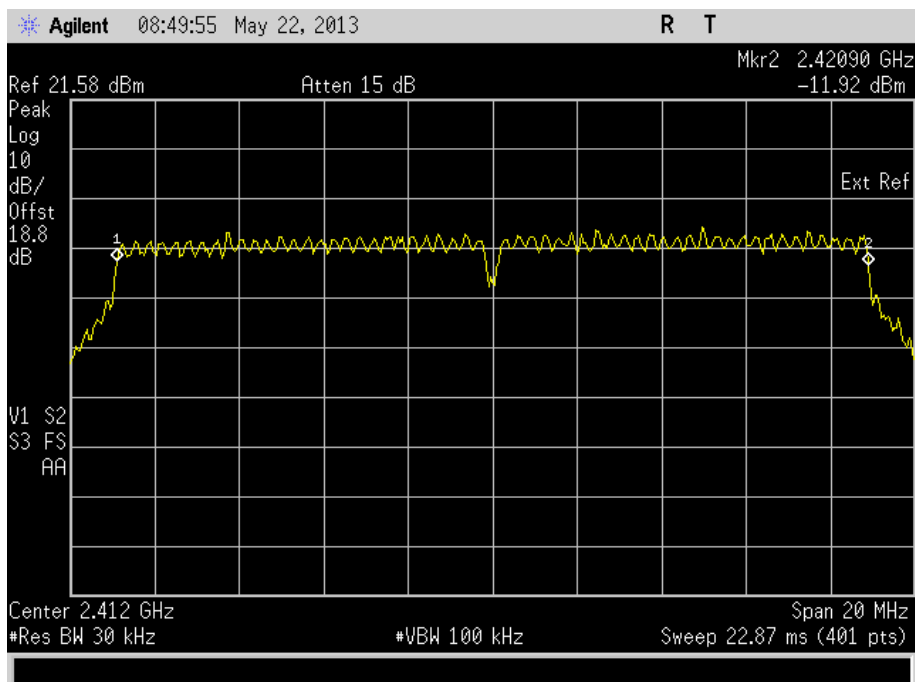
802.11(n)

4.0 V DC Supply

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	6.5	17800
	13	17800
	19.5	17800
	26	17850
	39	17800
	52	17800
	58.5	17800
	65	17800
2437 MHz	6.5	17850
	13	17850
	19.5	17850
	26	17850
	39	17800
	52	17850
	58.5	17800
	65	17800
2462 MHz	6.5	17850
	13	17850
	19.5	17850
	26	17850
	39	17750
	52	17850
	58.5	17850
	65	17850

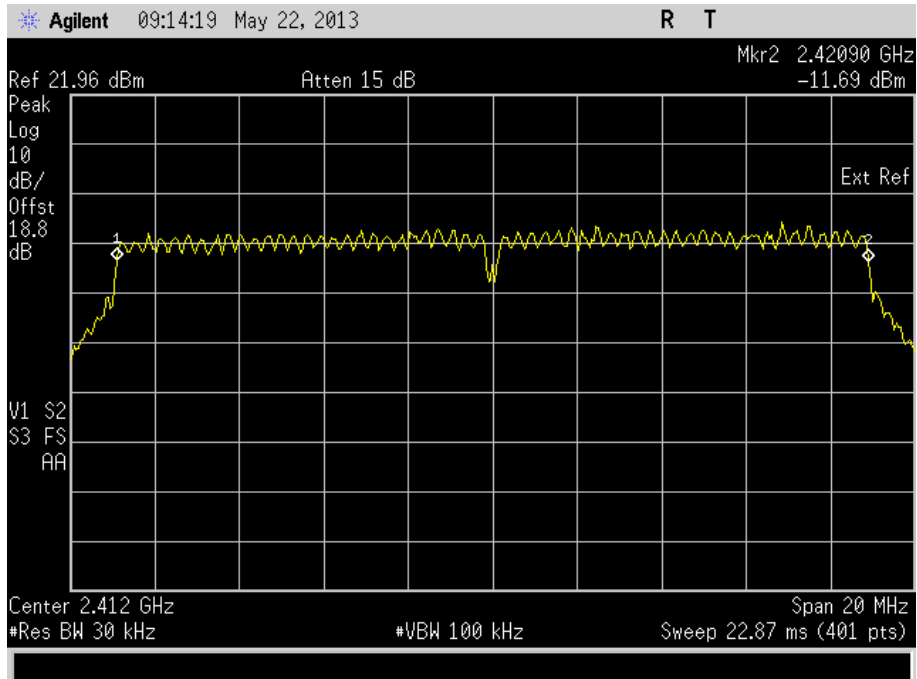
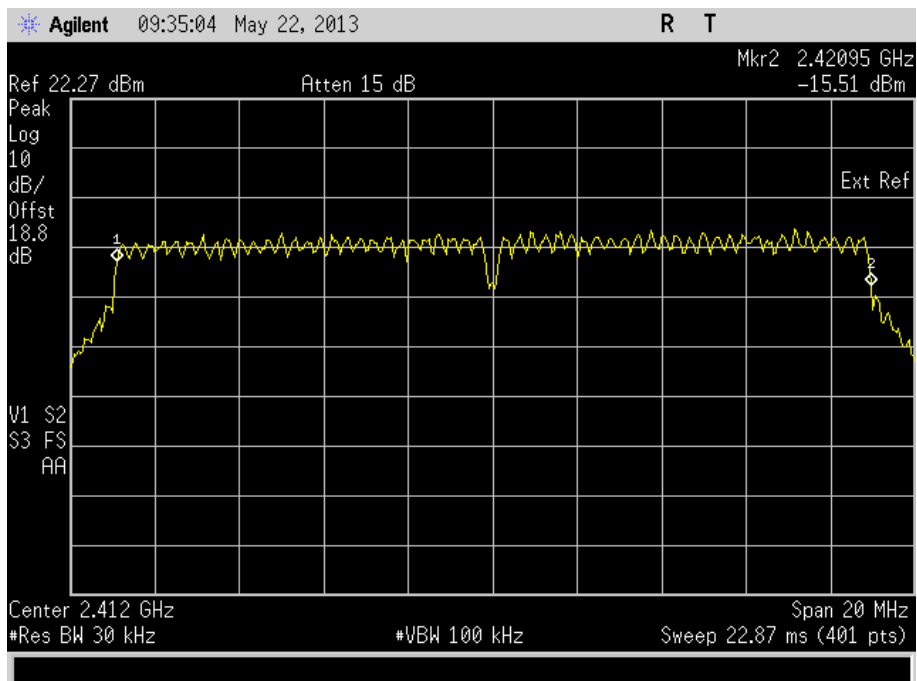


Product Service

2412 MHz6.5 Mbps13 Mbps

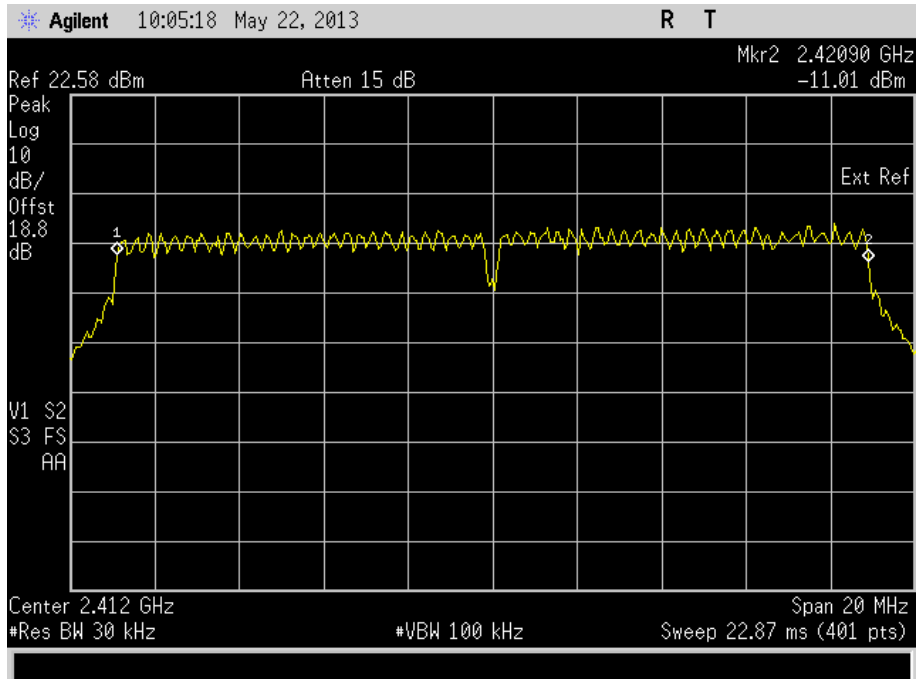
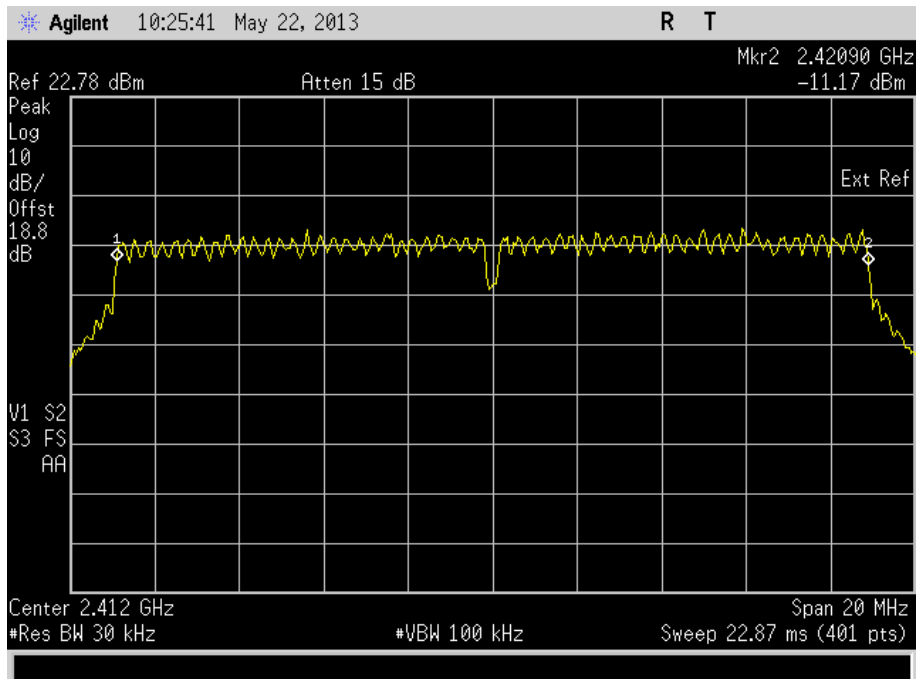


Product Service

19.5 Mbps26 Mbps

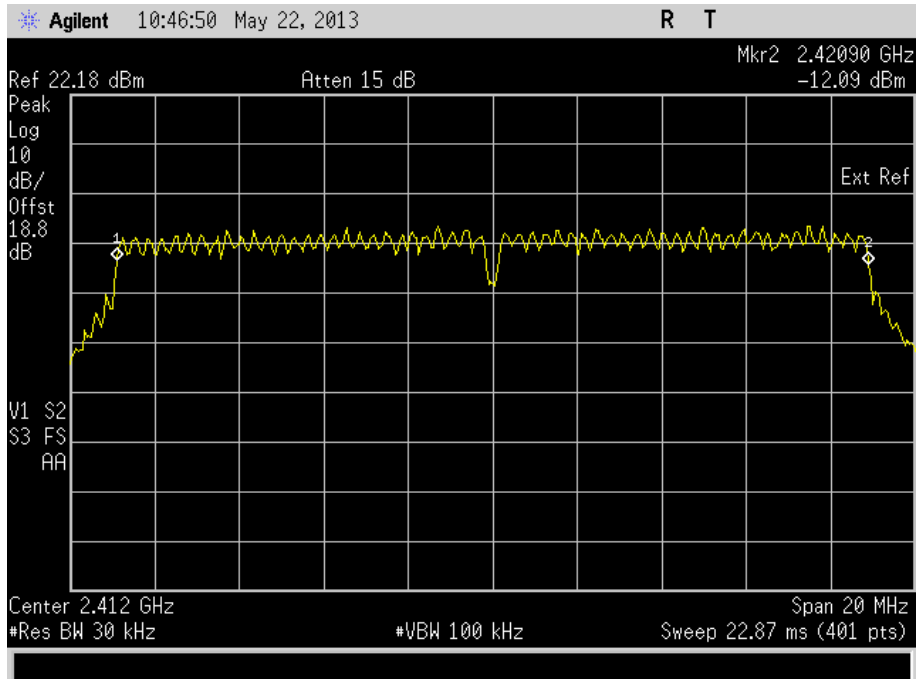
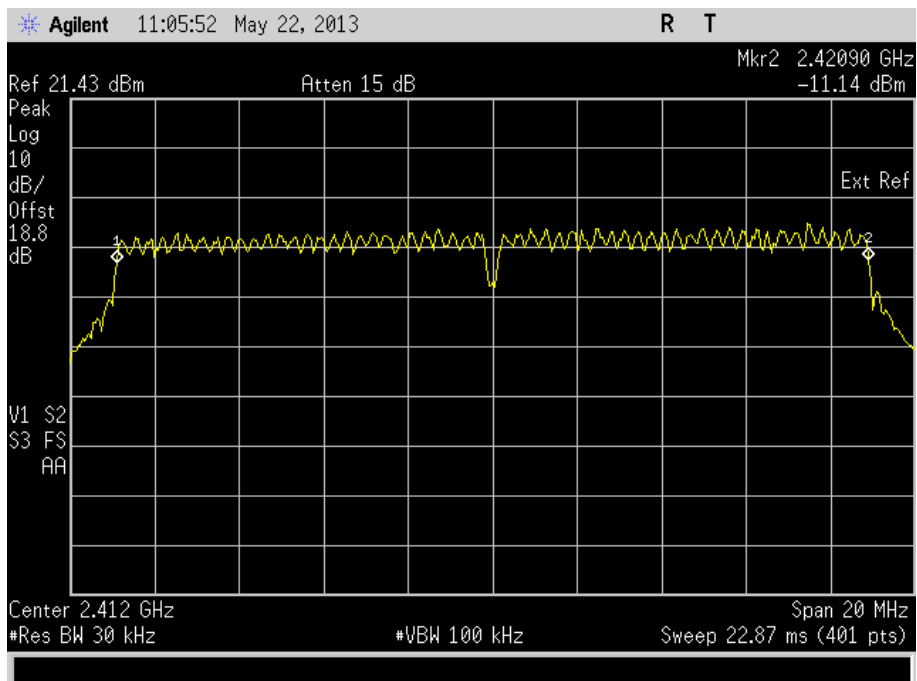


Product Service

39 Mbps52 Mbps

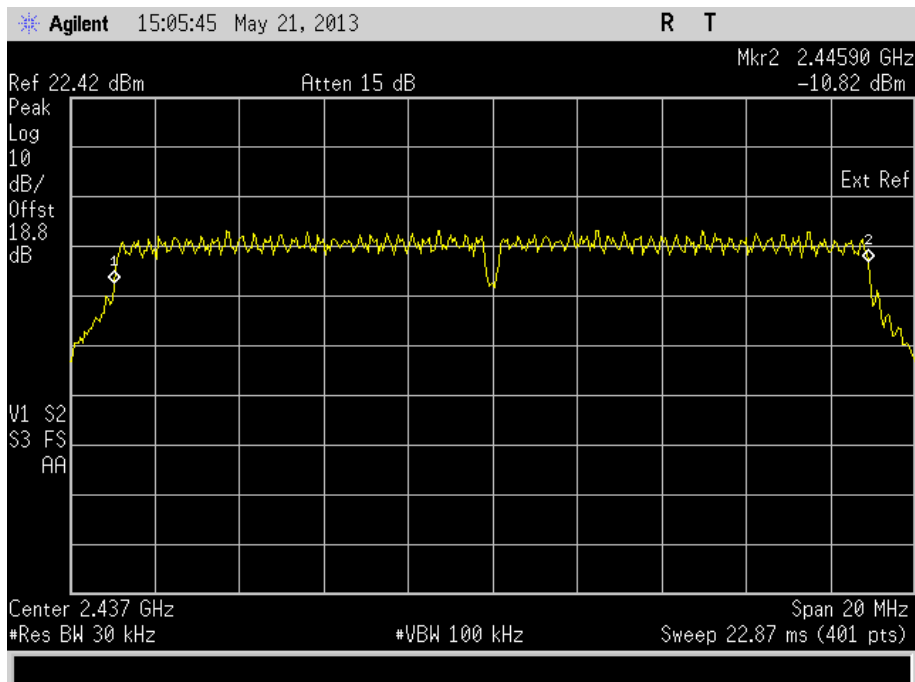
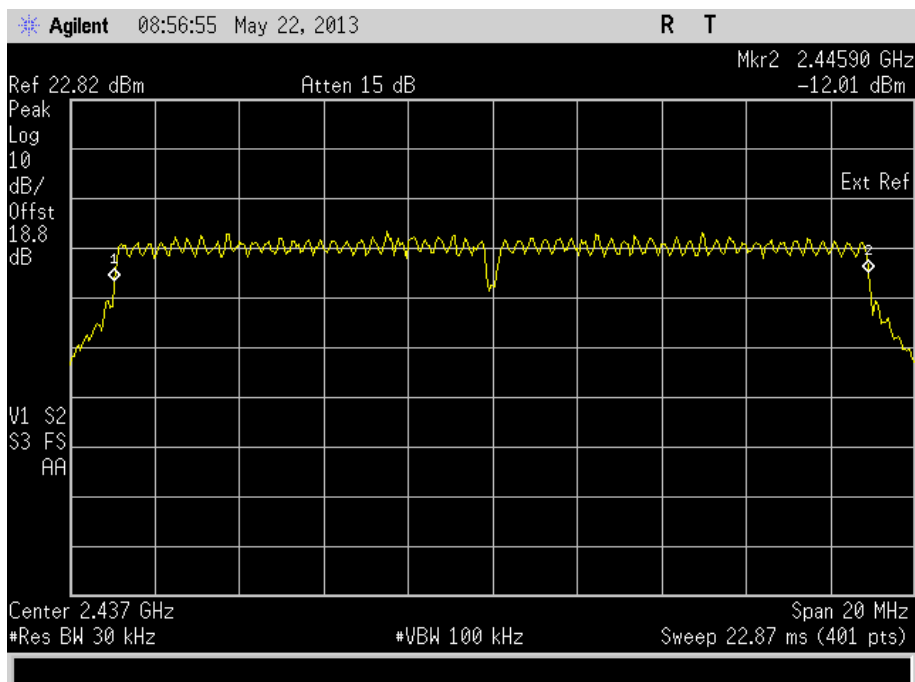


Product Service

58.5 Mbps65 Mbps

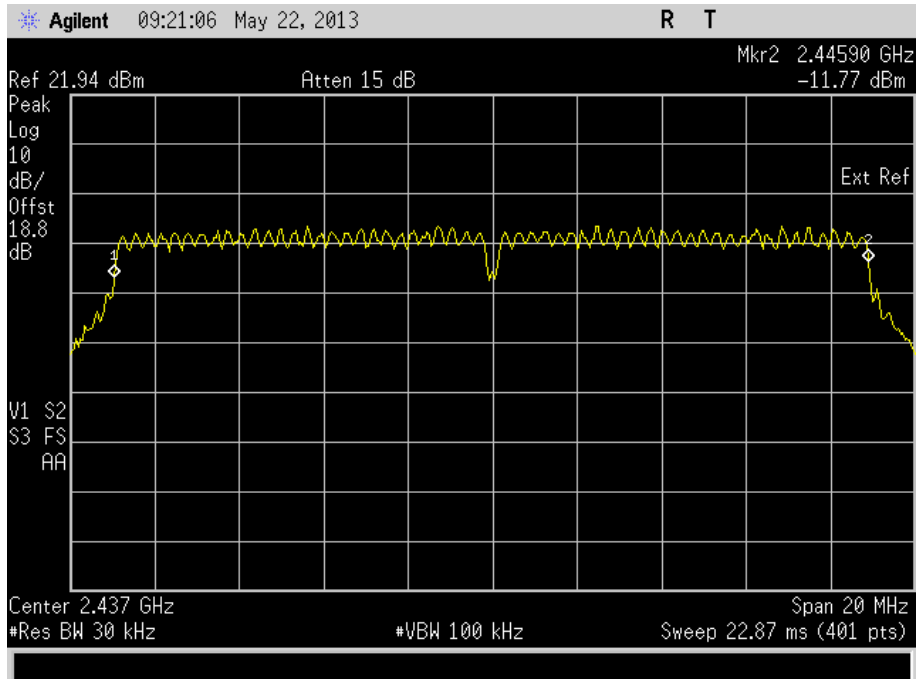
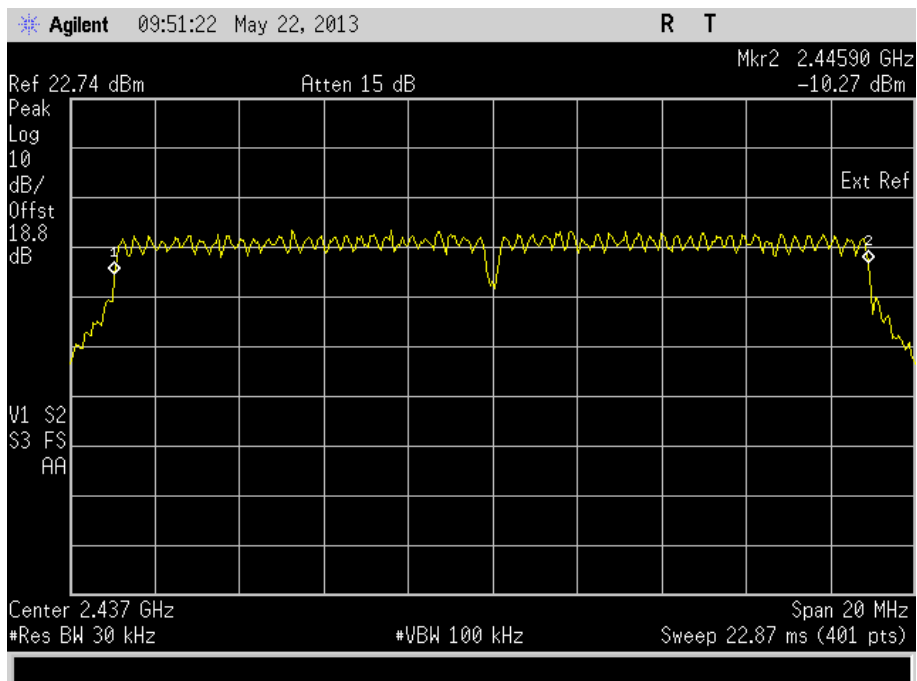


Product Service

2437 MHz6.5 Mbps13 Mbps

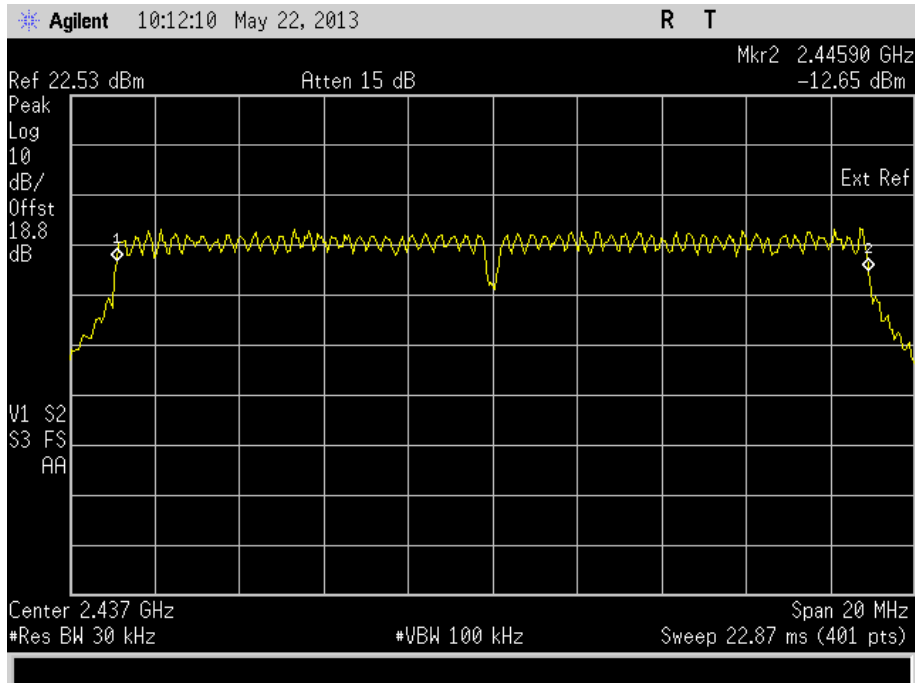
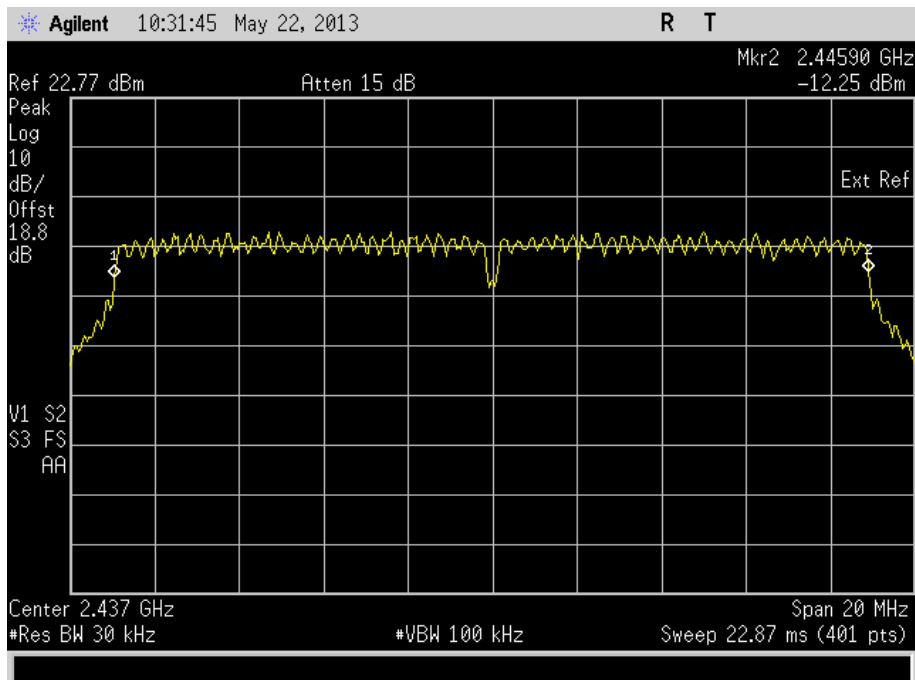


Product Service

19.5 Mbps26 Mbps

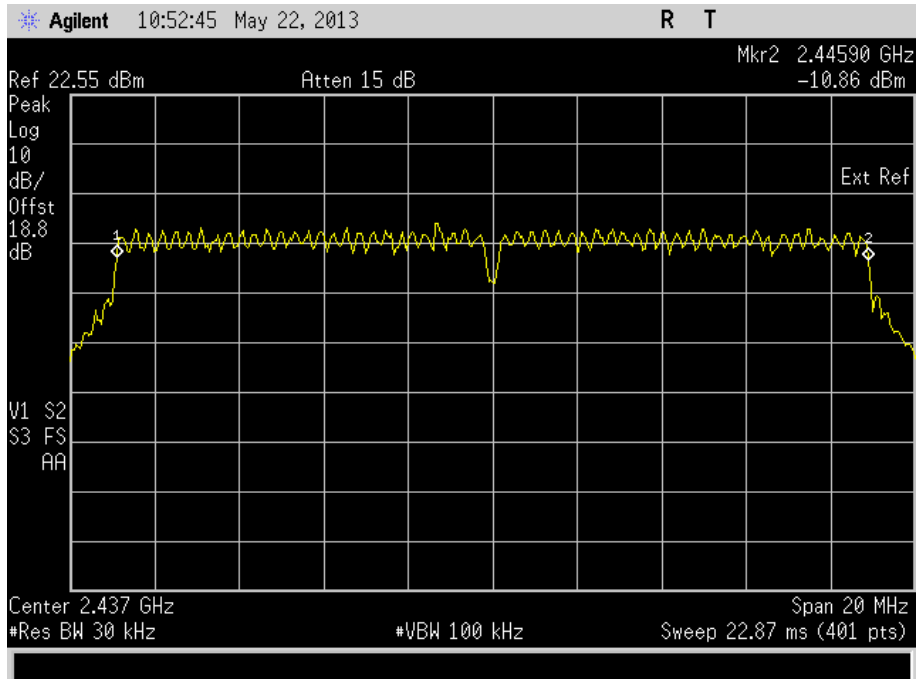
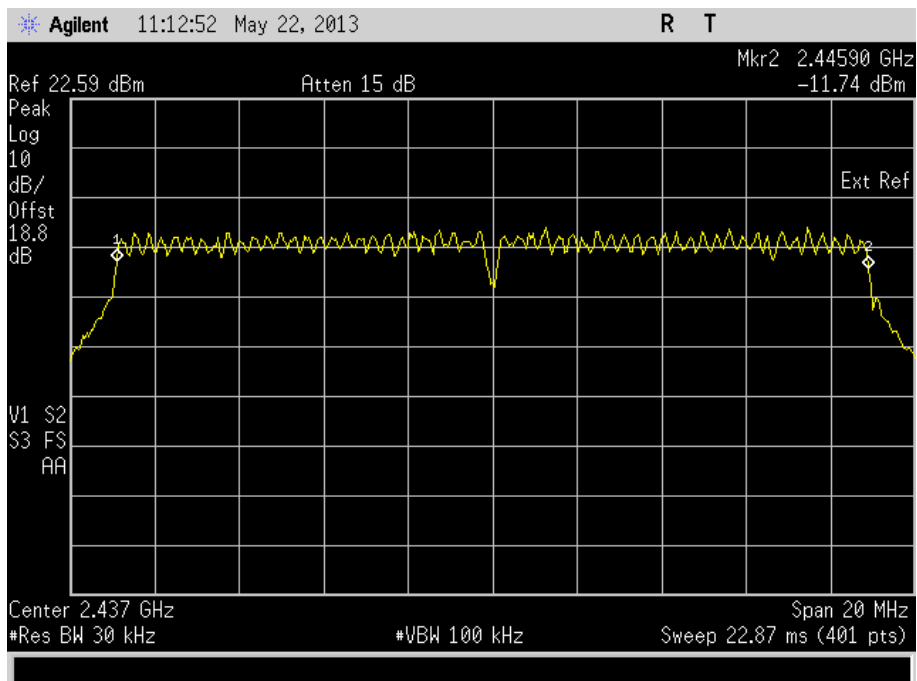


Product Service

39 Mbps52 Mbps

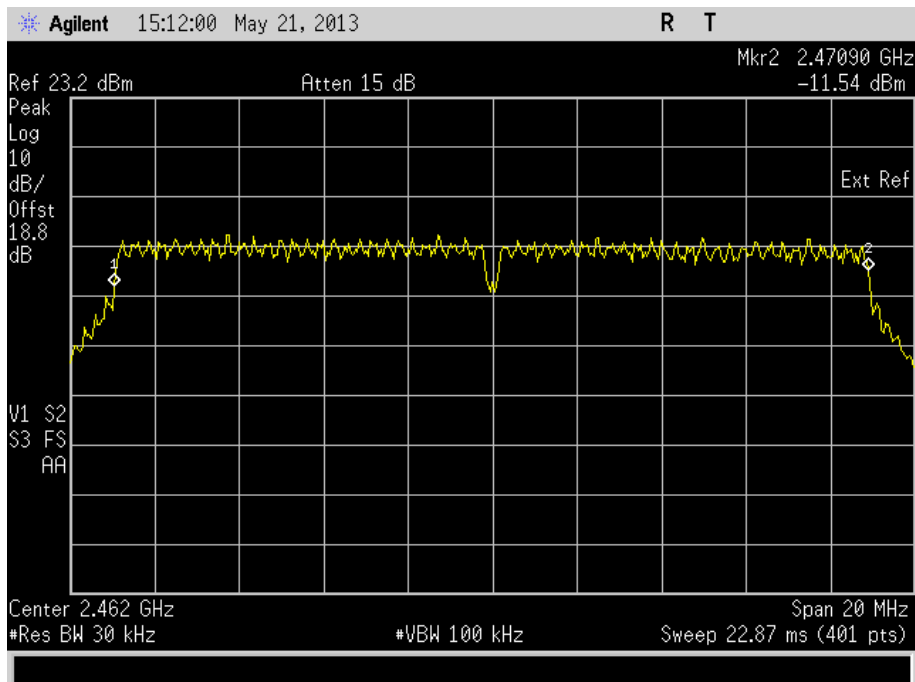
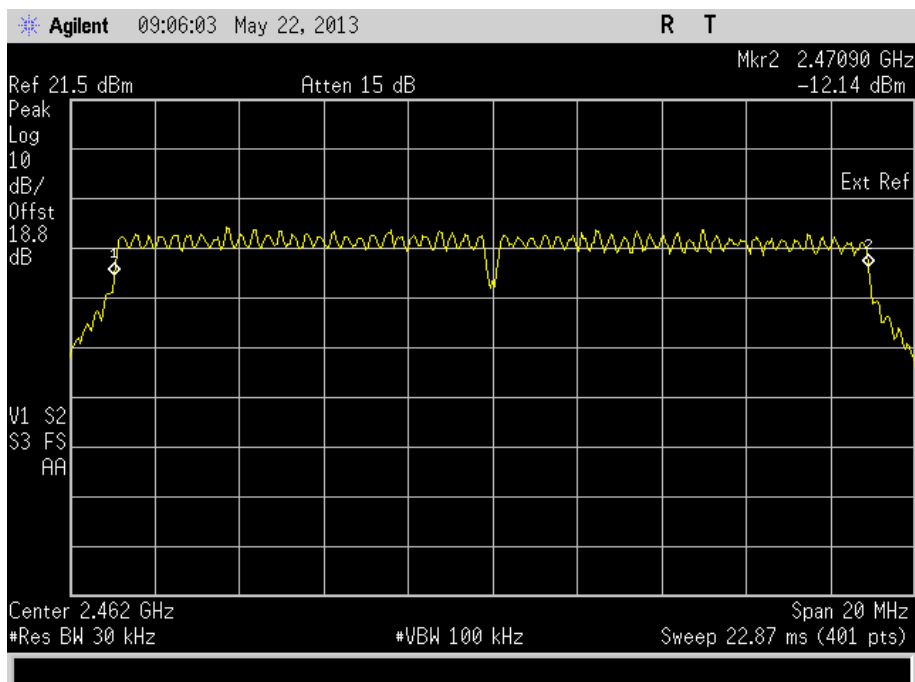


Product Service

58.5 Mbps65 Mbps

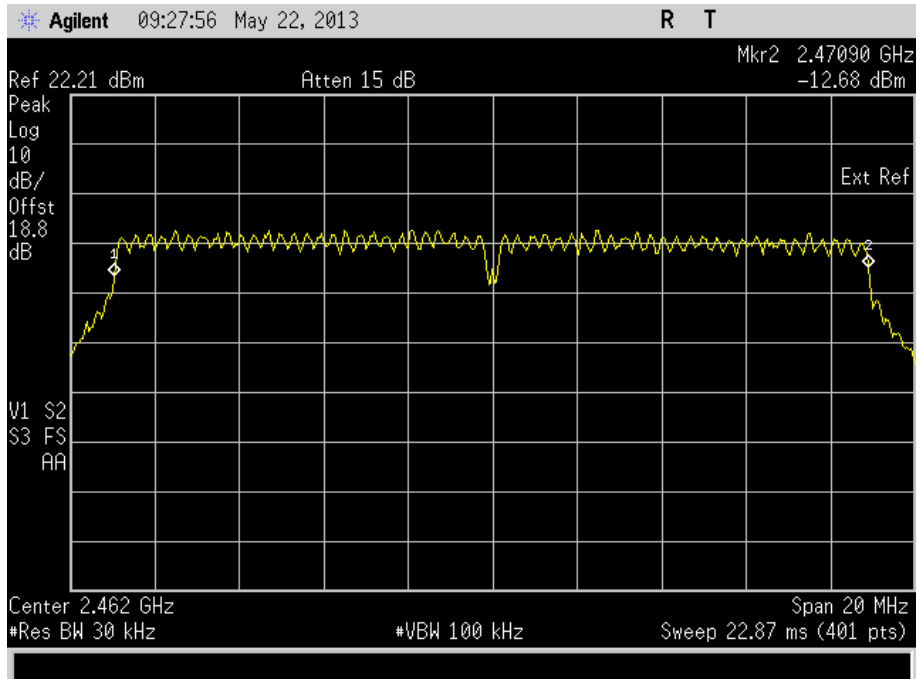
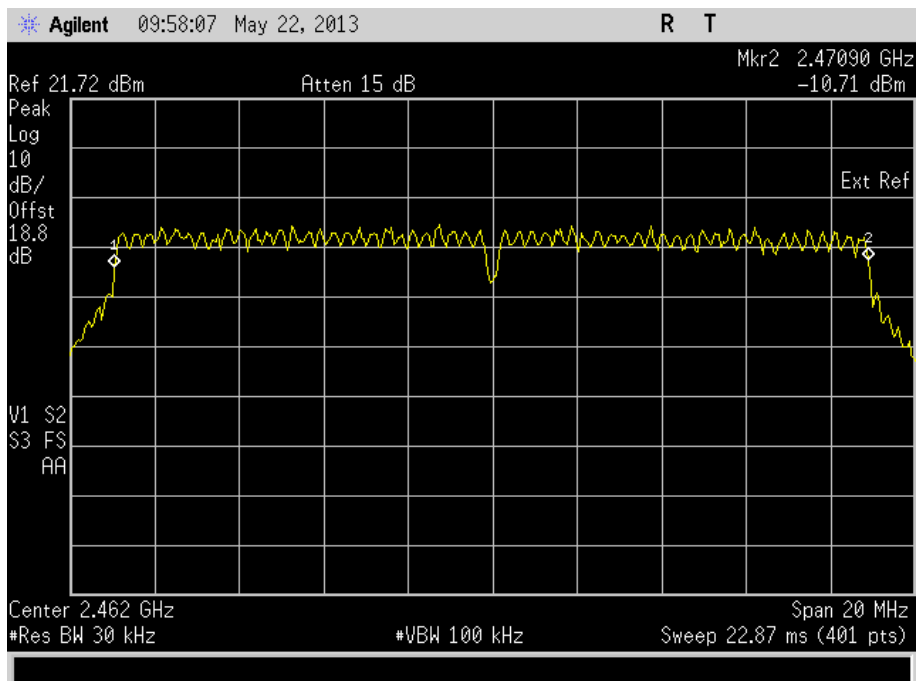


Product Service

2462 MHz6.5 Mbps13 Mbps

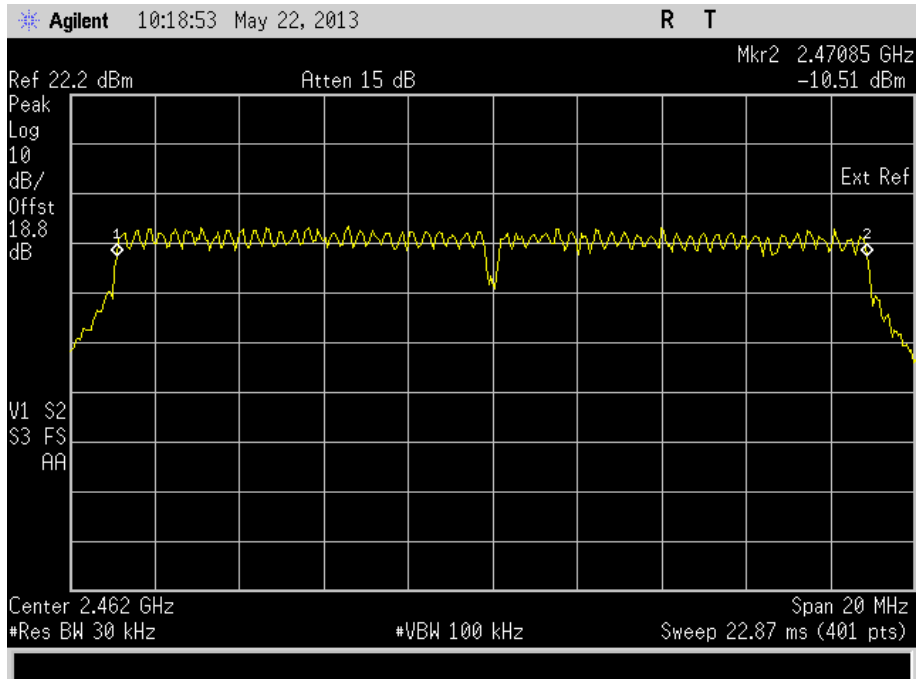
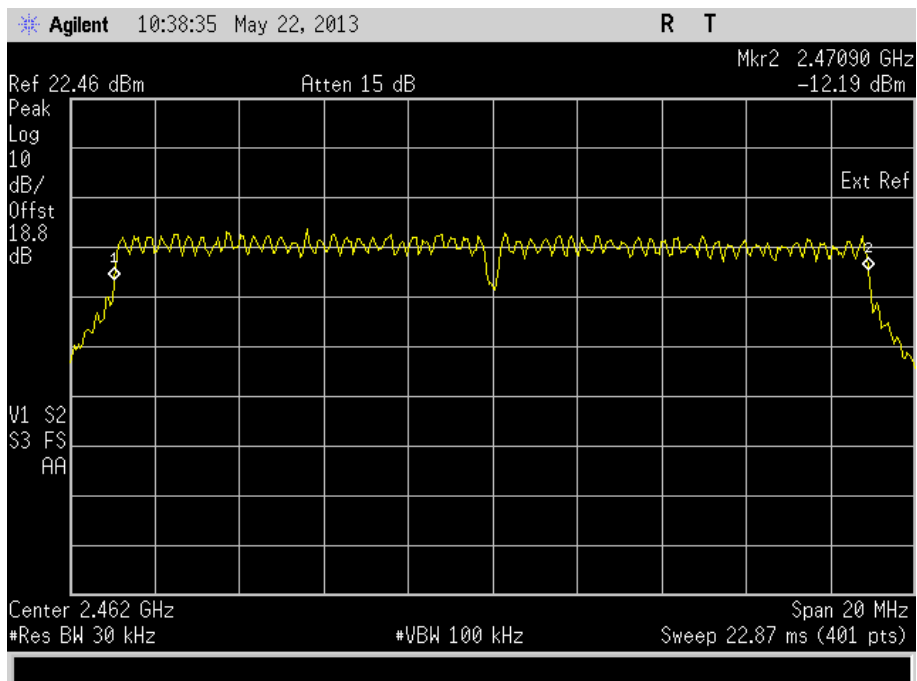


Product Service

19.5 Mbps26 Mbps

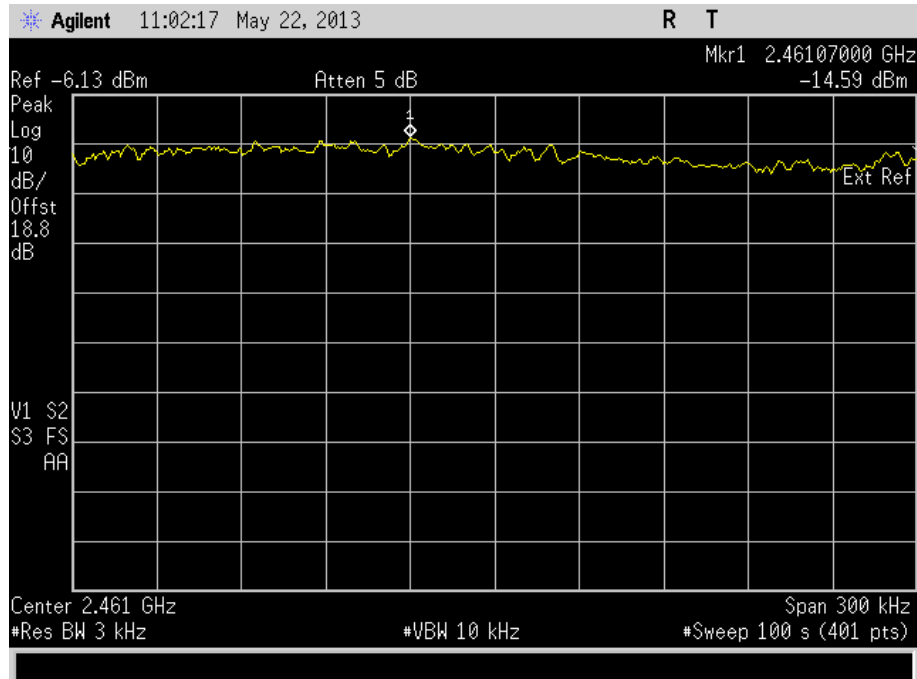
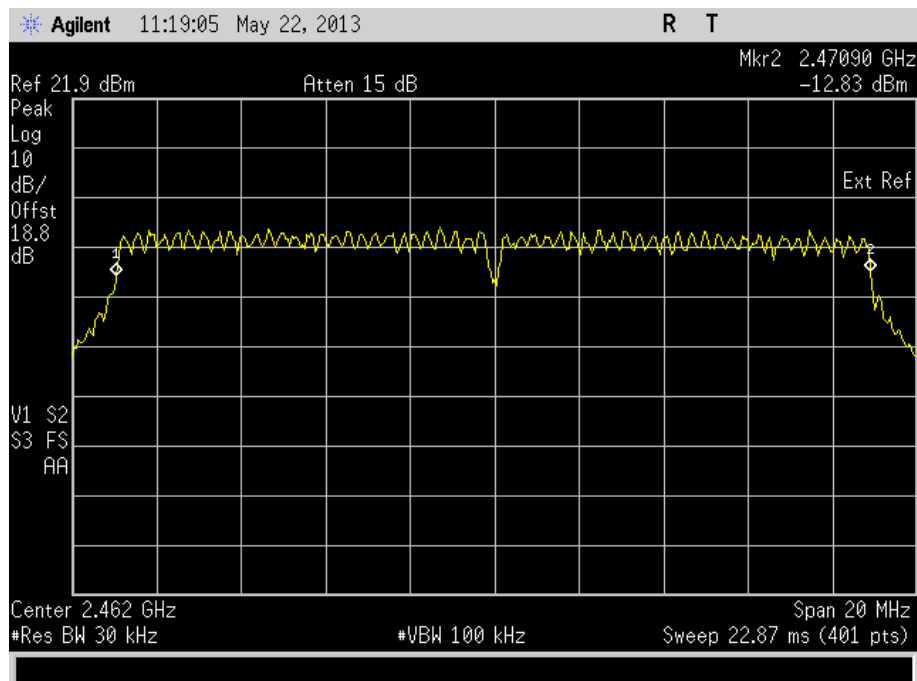


Product Service

39 Mbps52 Mbps



Product Service

58.5 Mbps65 MbpsLimit Clause

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

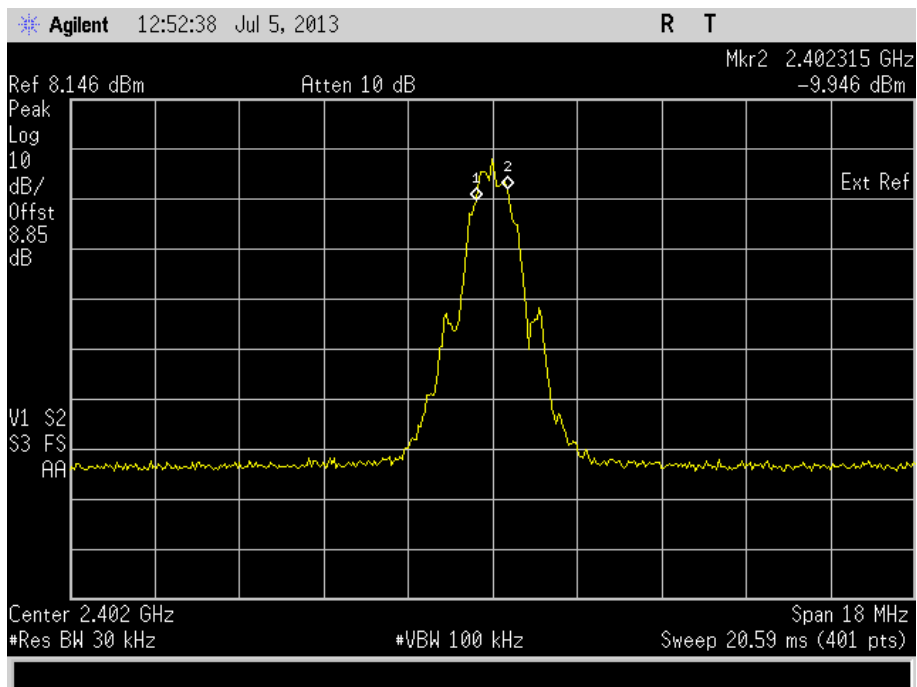


Product Service

GFSK

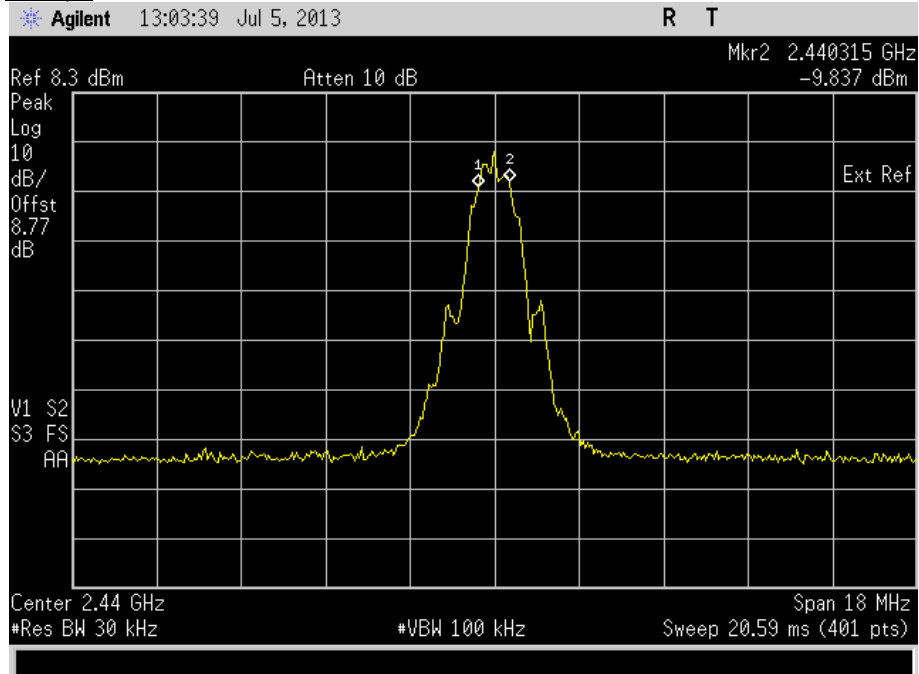
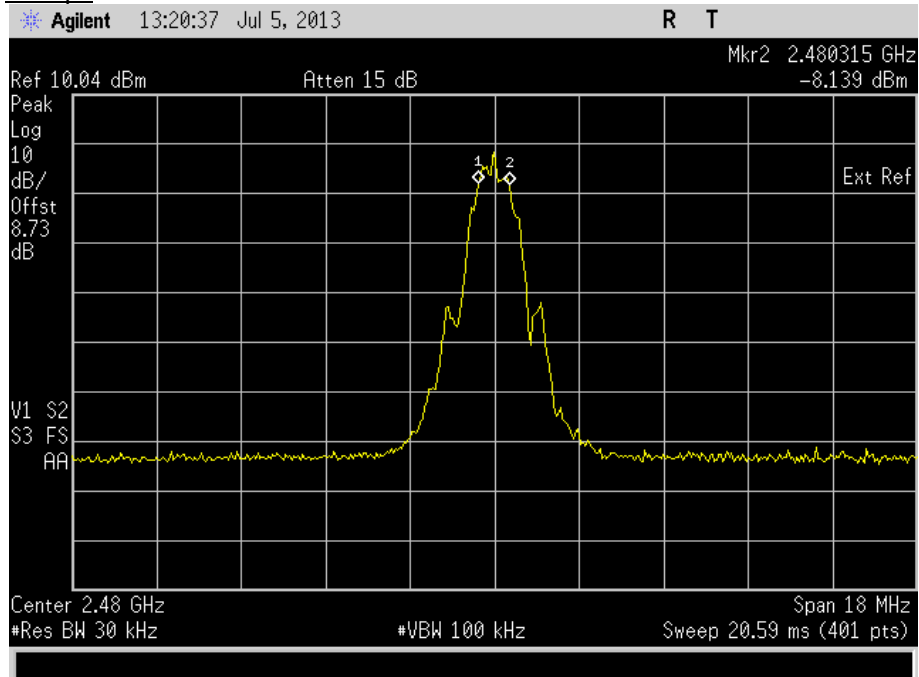
4.0 V DC Supply

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2402 MHz	1	675
2440 MHz	1	675
2480 MHz	1	675

2402 MHz1 Mbps



Product Service

2440 MHz1 Mbps2480 MHz1 MbpsLimit 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
Section 2.1 AC Line Conducted Emissions					
LISN	Rohde & Schwarz	ESH2-Z5	17	12	31-Jul-2013
3 phase LISN	Rohde & Schwarz	ESH2-Z5	323	12	15-Jan-2014
Transient Limiter	Hewlett Packard	11947A	1032	12	28-Jun-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 - Maximum Peak Conducted Output Power					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013*
Hygrometer	RS Components	1361C	3844	12	22-Mar-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	11-Dec-2013
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
P-Series Power Meter	Agilent	N1911A	3981	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013
Section 2.3 - EIRP Peak Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	7-Aug-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Log Periodic)	Schaffner	UPA6108	3108	12	5-Apr-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
Section 2.4 - Power Spectral Density					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013*
Hygrometer	RS Components	1361C	3844	12	22-Mar-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	11-Dec-2013
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
P-Series Power Meter	Agilent	N1911A	3981	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 - Spurious and Band Edge Emissions					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Communications Tester	Rohde & Schwarz	CMU 200	442	12	1-Nov-2013
Attenuator: 6dB/10W	Trilithic	HFP-50N	476	12	24-Jul-2013
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	20-Feb-2014
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Power Supply	Hewlett Packard	6104A	1948	-	TU
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Multimeter	Iso-tech	IDM101	2419	12	3-Oct-2013
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	1-Feb-2014
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	23-Oct-2013
Attenuator (20dB, 2W)	Pasternack	PE 7004-20	2943	12	27-Mar-2014
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	11-Dec-2013
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
Data Logger	Yokogawa	MV1024	3948	12	05-Jul-2014
Section 2.6 – 6dB Bandwidth					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Communications Tester	Rohde & Schwarz	CMU 200	442	12	1-Nov-2013
Attenuator 10dB/10W	Trilithic	HFP-50N	454	12	24-Jul-2013
Attenuator: 6dB/10W	Trilithic	HFP-50N	476	12	24-Jul-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Power Supply	Hewlett Packard	6104A	1948	-	TU
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Multimeter	Iso-tech	IDM101	2419	12	3-Oct-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013*
Hygrometer	RS Components	1361C	3844	12	22-Mar-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	11-Dec-2013
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	23-Jun-2013*
Spectrum Analyser	Rohde & Schwarz	FSU 26	2747	12	30-Nov-2013
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
Combiner/Splitter	Weinschel	1506A	3878	12	19-Mar-2014
P-Series Power Meter	Agilent	N1911A	3980	12	17-Sep-2013
P-Series Power Meter	Agilent	N1911A	3981	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3983	12	17-Sep-2013
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4100	12	25-Oct-2013
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4105	12	25-Oct-2013

*in calibration at the time of testing

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	± 212.114 kHz
EIRP Peak Power	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Maximum Peak Conducted Output Power	± 0.70 dB
Spurious and Band Edge Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Power Spectral Density	± 3.0 dB
AC Line Conducted Emissions	± 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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