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Report On

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

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FCC ID: APYHRO00206

Document 75925936 Report 12 Issue 1

May 2014



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COMMERCIAL-IN-CONFIDENCE

REPORT ON

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

Document 75925936 Report 12 Issue 1

May 2014

PREPARED FOR

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DATED

12 May 2014

ENGINEERING STATEMENT

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

Test Engineer(s);

T Guy

S Milliken



G Lawler

A Galpin

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SECTION 1

REPORT SUMMARY

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



Product Service

1.1 INTRODUCTION

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

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



1.2 BRIEF SUMMARY OF RESULTS

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

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



Product Service

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



Product Service

1.3 APPLICATION FORM

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

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

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

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

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



SPREAD SPECTRUM PARAMETERS		
<input checked="" type="checkbox"/> Bluetooth	Version: 4.0	
FHSS: Channel <input checked="" type="checkbox"/> 79 Other	EDR <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Medium Access Protocol (Customer Declaration)		
"We have implemented Bluetooth protocol which satisfies the medium access protocol requirement of EN 300 328".		
<input checked="" type="checkbox"/> WLAN		
IEEE 802.11(b) – DSSS	<input checked="" type="checkbox"/>	
IEEE 802.11(g) – OFDM	<input checked="" type="checkbox"/>	
IEEE 802.11(n) – OFDM	<input checked="" type="checkbox"/>	
Supported Spatial Streams	2.4 GHz	5GHz
Transmitter (Tx)	1	1
Receiver (Rx)	1	1
GI (Guard Interval)	<input checked="" type="checkbox"/> 800 ns	<input type="checkbox"/> 400 ns
Band Width	<input checked="" type="checkbox"/> 20 MHz	<input type="checkbox"/> 40 MHz
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".		
<input type="checkbox"/> Other Technology		
<input type="checkbox"/> Direct Sequence	<input type="checkbox"/> Frequency Hopping	<input type="checkbox"/> Combined <input type="checkbox"/> Other
DSSS	Chip Sequence Length	bit
	Spectrum Width	MHz
FHSS	Total Number of Hops	
	Dwell Time	ms
	Bandwidth Per Hop	MHz
	Maximum Separation of Hops	MHz for ETSI EN 300 328
Other		
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)		5.0m		W
Minimum Rated Transmitter Output				
Effective radiated power (for equipment with antenna connector)				W
Effective radiated power (for equipment with integral antenna)		1.0m		W
Is transmitter intended for :				
Continuous duty			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Intermittent duty			<input type="checkbox"/> Yes <input type="checkbox"/> No	
If intermittent state DUTY CYCLE				
Transmitter ON	seconds	Transmitter OFF	minutes	
Is continuous operation possible for testing purposes?				
			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Is transmitter output power variable:				
			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
State during the test:				
Transmitter duty cycle	Tx on	Seconds	Tx Off	Seconds
Duty cycle (Tx on / (Tx on + Tx off))				
		%		
<input type="checkbox"/> Continuously variable			<input type="checkbox"/> Stepped	
	dB per step			
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			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Intermittent duty			<input type="checkbox"/> Yes <input type="checkbox"/> No	
If intermittent state DUTY CYCLE				
Transmitter ON	seconds	Transmitter OFF	minutes	
Is continuous operation possible for testing purposes?				
			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Is transmitter output power variable:				
			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
State during the test:				
Transmitter duty cycle	Tx on	Seconds	Tx Off	Seconds
Duty cycle (Tx on / (Tx on + Tx off))				
		%		
<input type="checkbox"/> Continuously variable			<input type="checkbox"/> Stepped	
	dB per step			



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

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

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



Product Service

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

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

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

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

Signature: *H Murakami* Name: Hiroyuki Murakami
 Position held: Supervisor Date: 24th March, 2014



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

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

1.5 TEST CONDITIONS

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

The EUT was powered from a 4.0 V DC supply.

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

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

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



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SECTION 2

TEST DETAILS

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



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

SHL25 S/N: IMEI 004401115170249 - Modification State 0

2.1.3 Date of Test

19 April 2014

2.1.4 Test Equipment Used

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

2.1.5 Test Procedure

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

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

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

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

2.1.6 Environmental Conditions

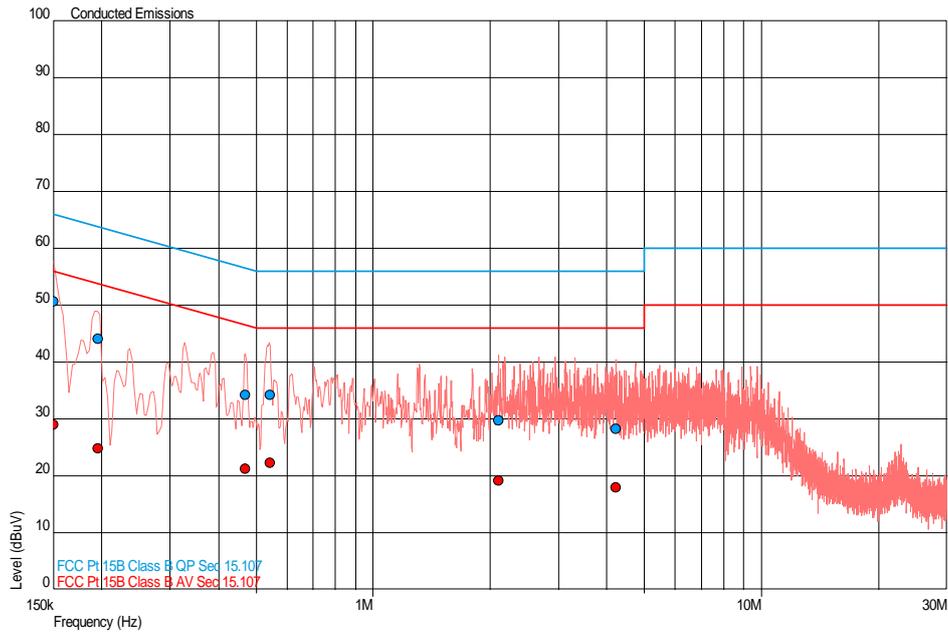
Ambient Temperature	19.7°C
Relative Humidity	27.0%



2.1.7 Test Results

802.11(b)

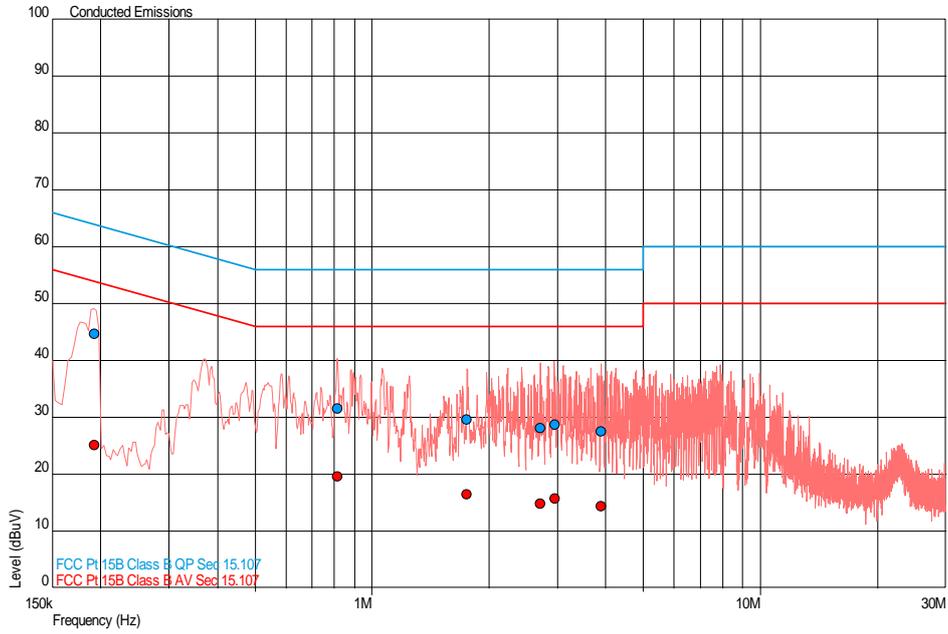
Live Line



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



Neutral Line



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



Product Service

2.2 6dB BANDWIDTH

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

SHL25 S/N: IMEI 004401115170488 - Modification State 0

SHL25 S/N: IMEI 004401115170645 - Modification State 0

2.2.3 Date of Test

31 March 2014, 24 April 2014 & 25 April 2014

2.2.4 Test Equipment Used

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

2.2.5 Test Procedure

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

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

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

2.2.6 Environmental Conditions

Ambient Temperature 23.1 - 23.5°C

Relative Humidity 39.3 - 40.5%



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2.2.7 Test Results

802.11(b)

4.0 V DC Supply

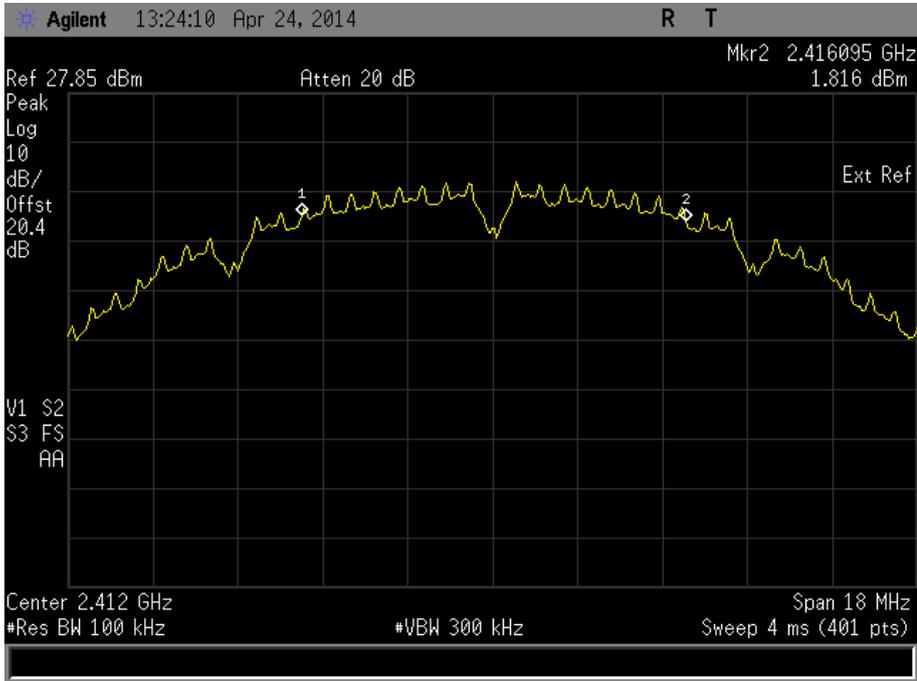
Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	1	8145
	2	8190
	5.5	8685
	11	8460
2437 MHz	1	8640
	2	8055
	5.5	8685
	11	8550
2462 MHz	1	8145
	2	8100
	5.5	8640
	11	8550



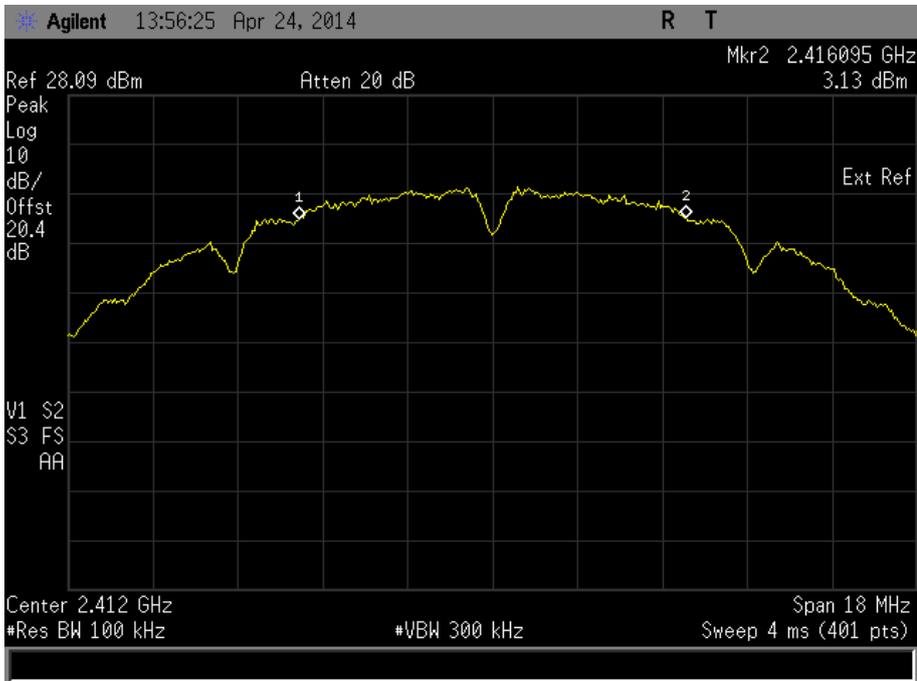
Product Service

2412 MHz

1 Mbps



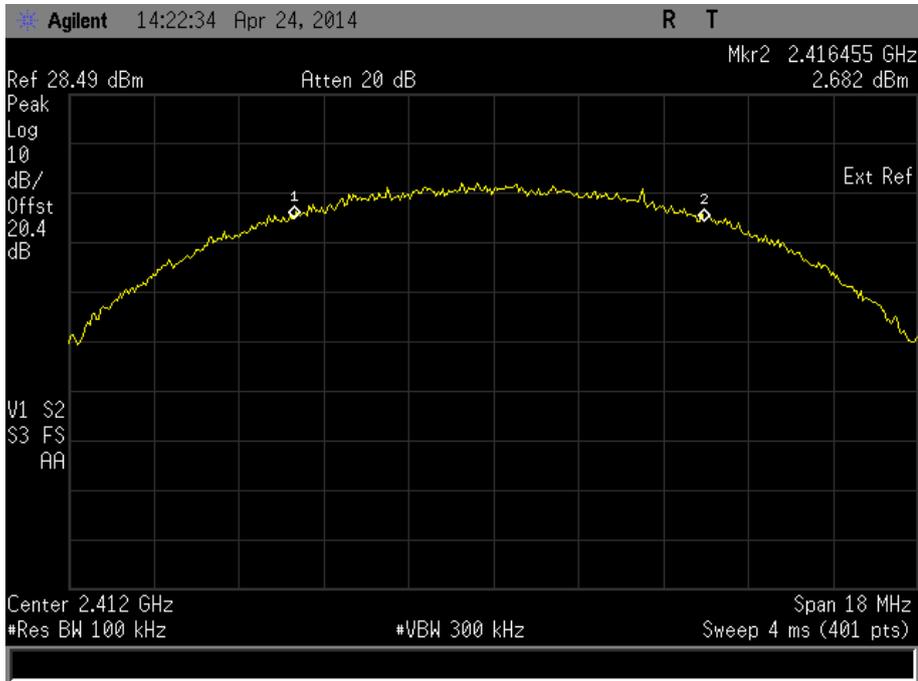
2 Mbps



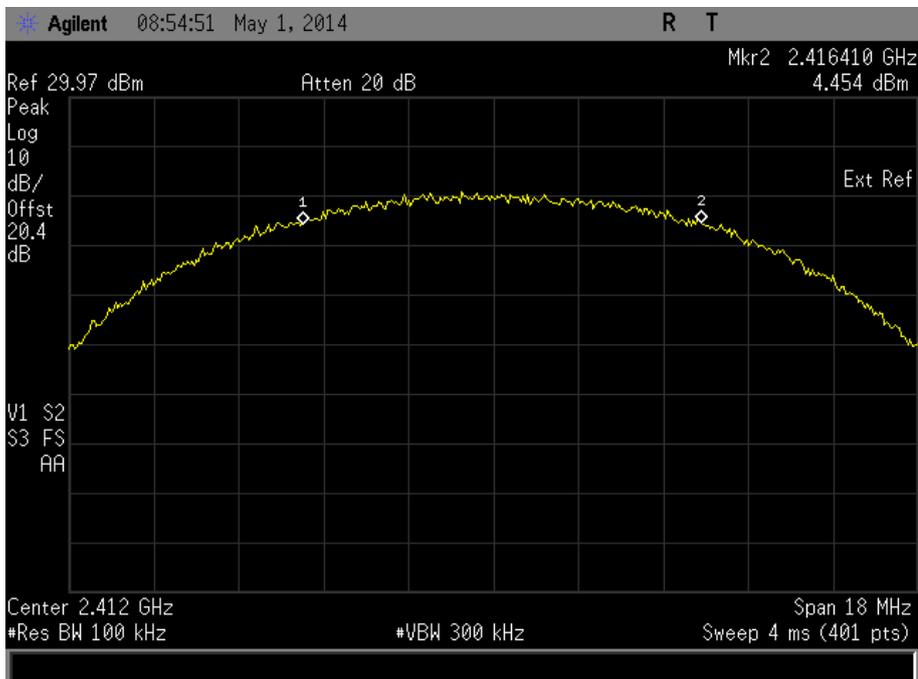


Product Service

5.5 Mbps



11 Mbps

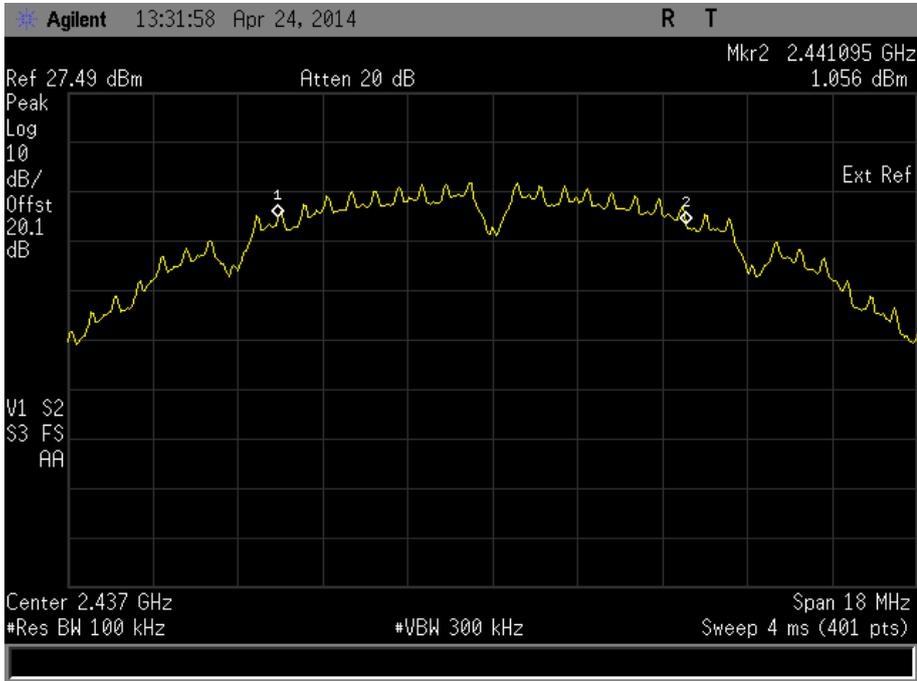




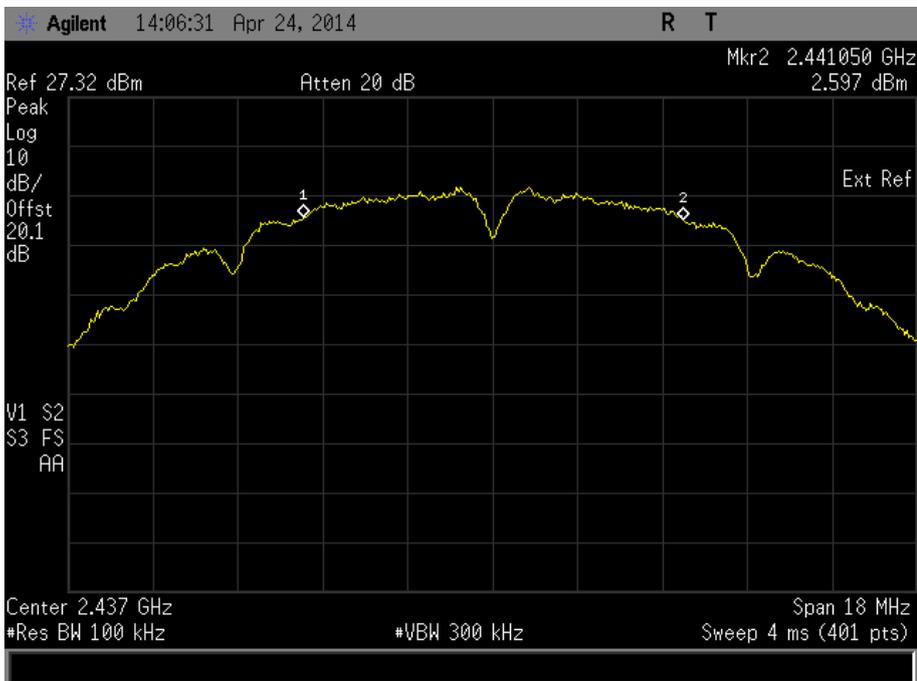
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2437 MHz

1 Mbps



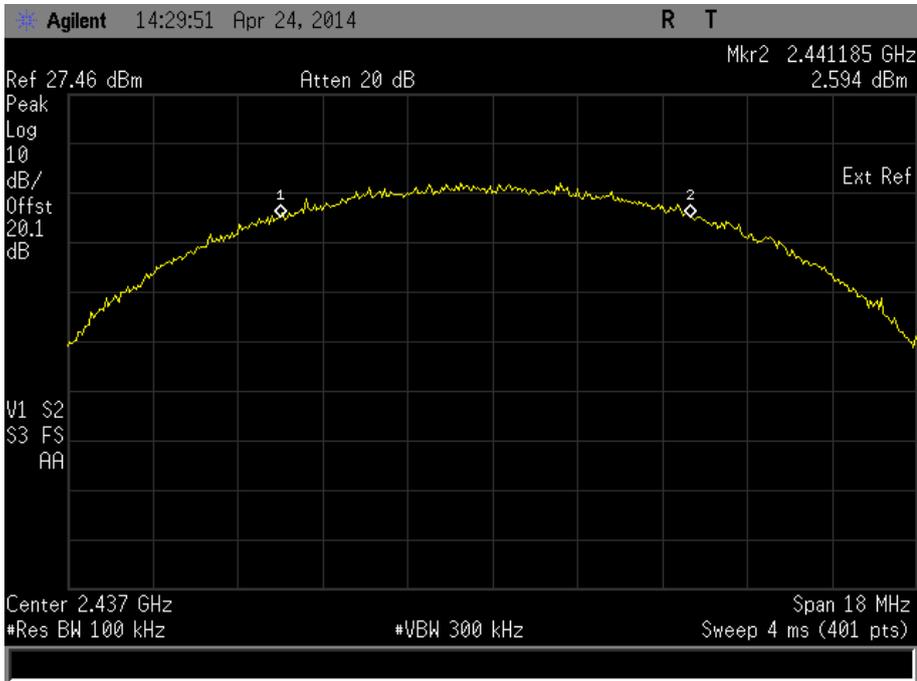
2 Mbps



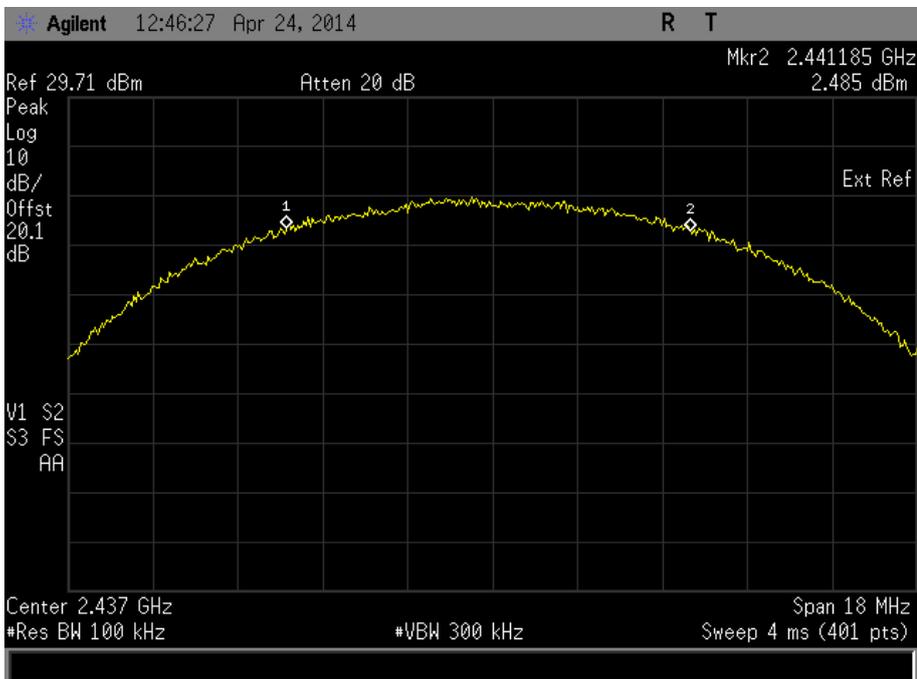


Product Service

5.5 Mbps



11 Mbps

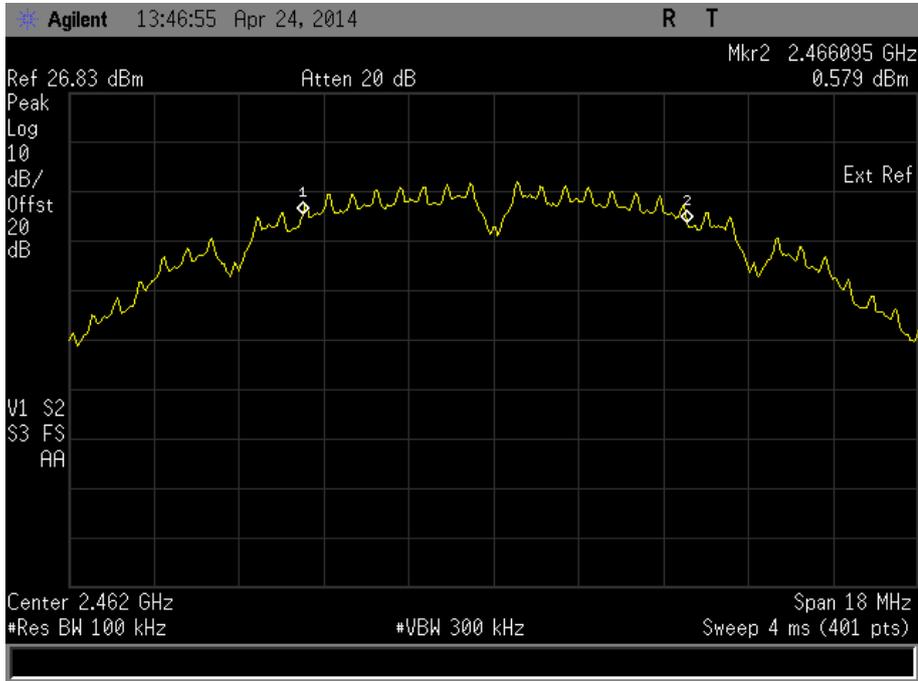




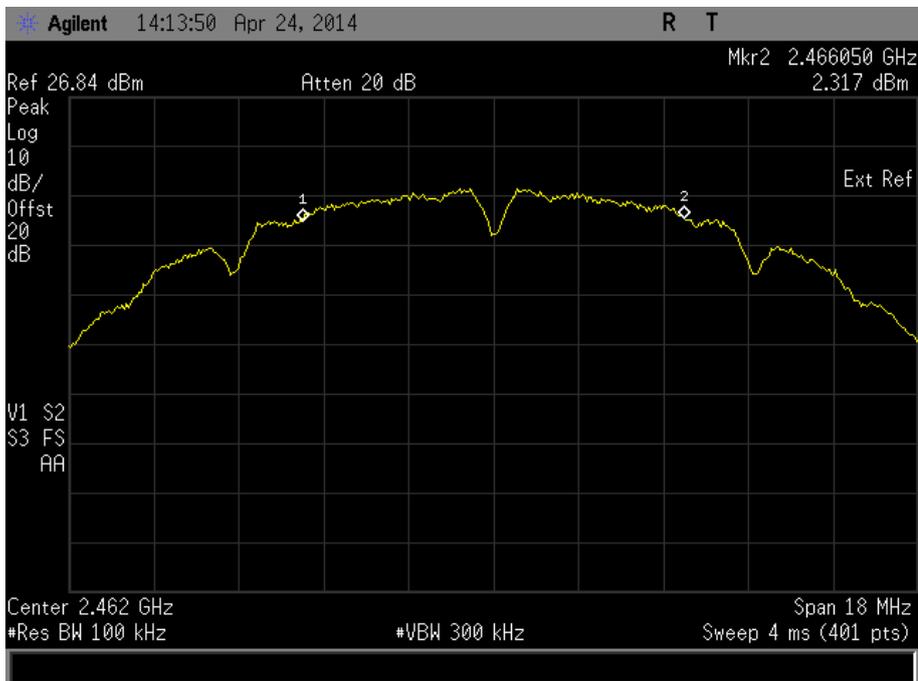
Product Service

2462 MHz

1 Mbps



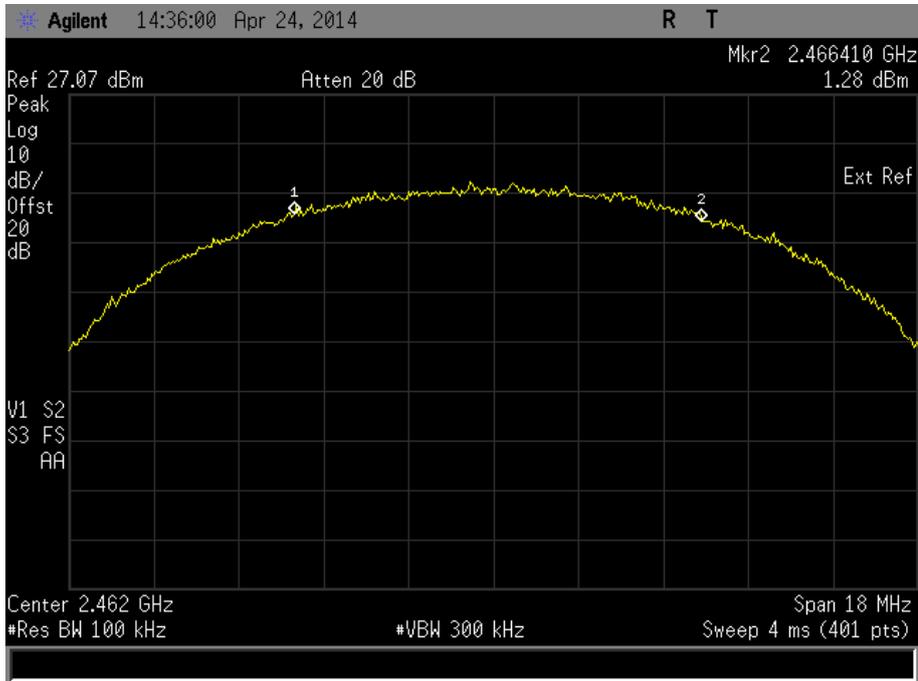
2 Mbps



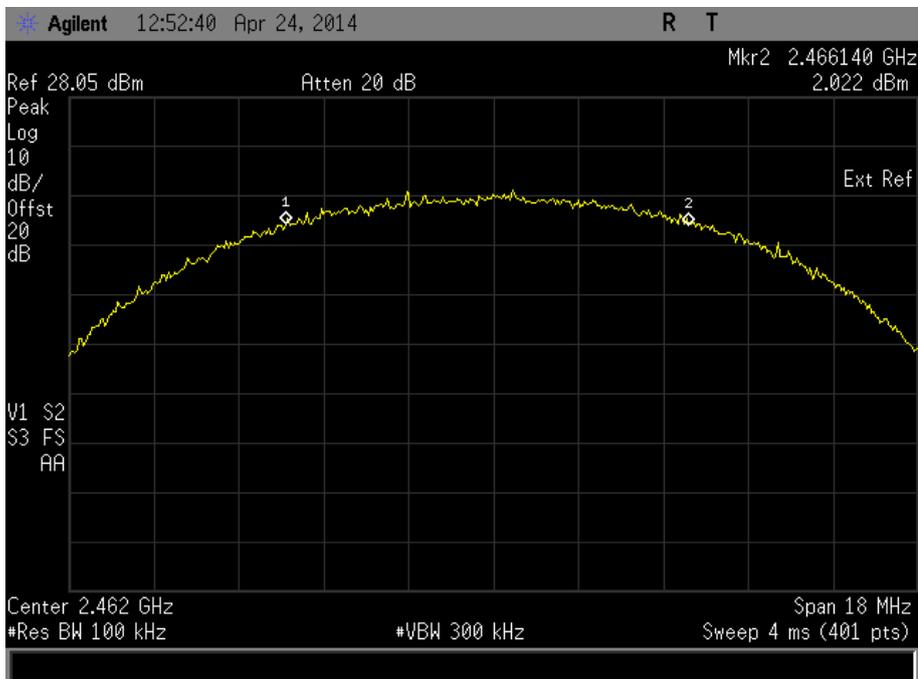


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5.5 Mbps



11 Mbps



Limit Clause

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



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802.11(g)

4.0 V DC Supply

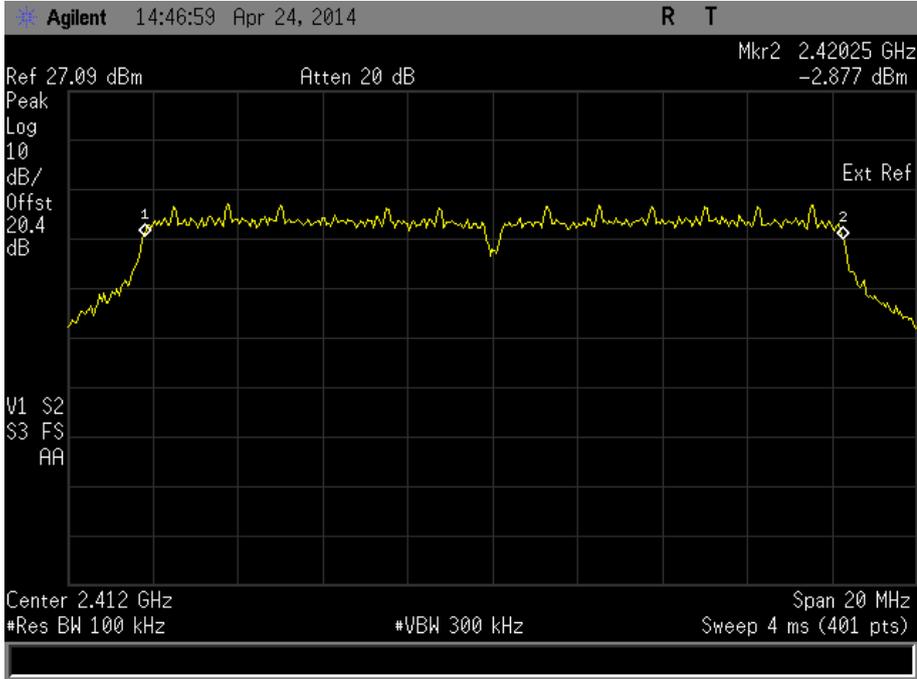
Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	6	16450
	9	16500
	12	16550
	18	16550
	24	16550
	36	16550
	48	16600
	54	16600
2437 MHz	6	16400
	9	16400
	12	16500
	18	16500
	24	16550
	36	16600
	48	16600
	54	16600
2462 MHz	6	16450
	9	16450
	12	16550
	18	16550
	24	16600
	36	16550
	48	16600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



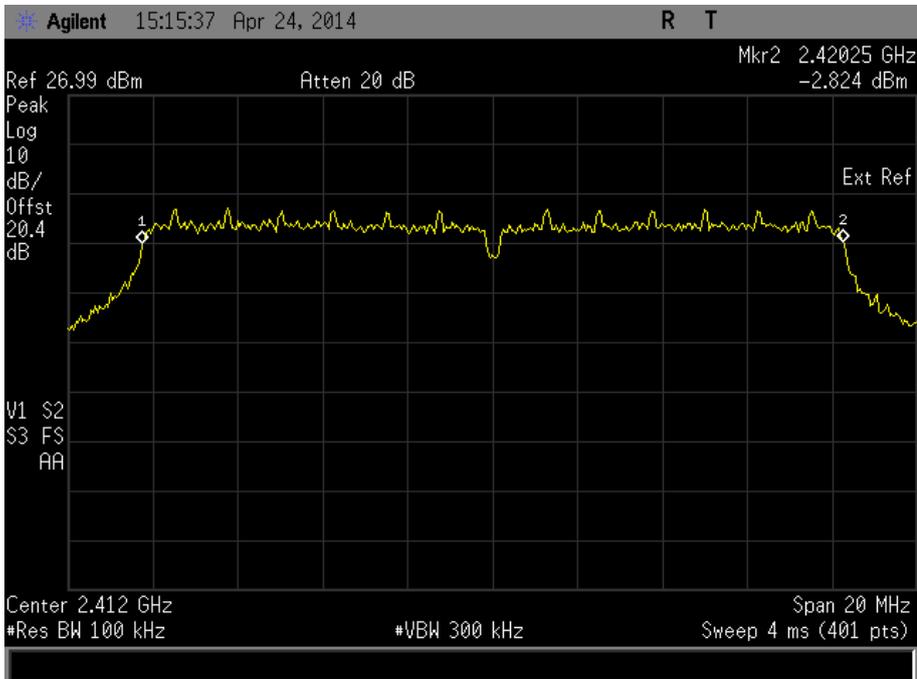
Product Service

2412 MHz

6 Mbps



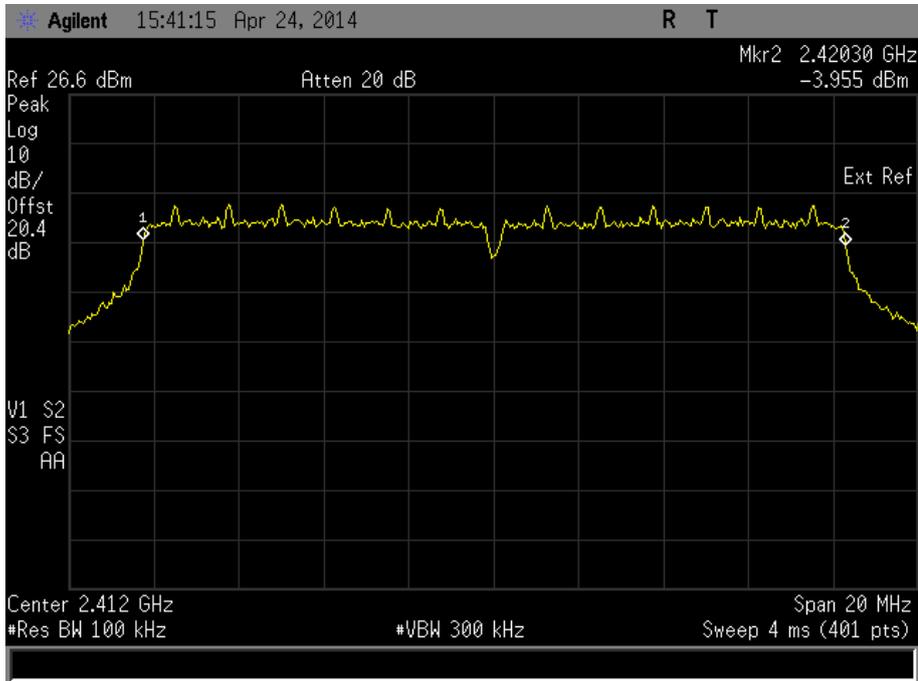
9 Mbps



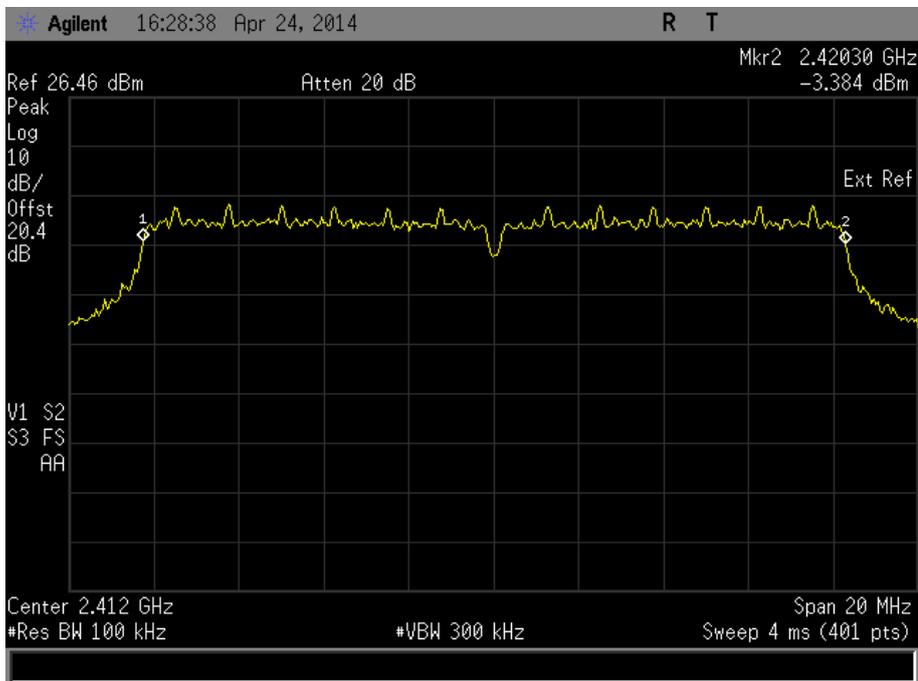


Product Service

12 Mbps



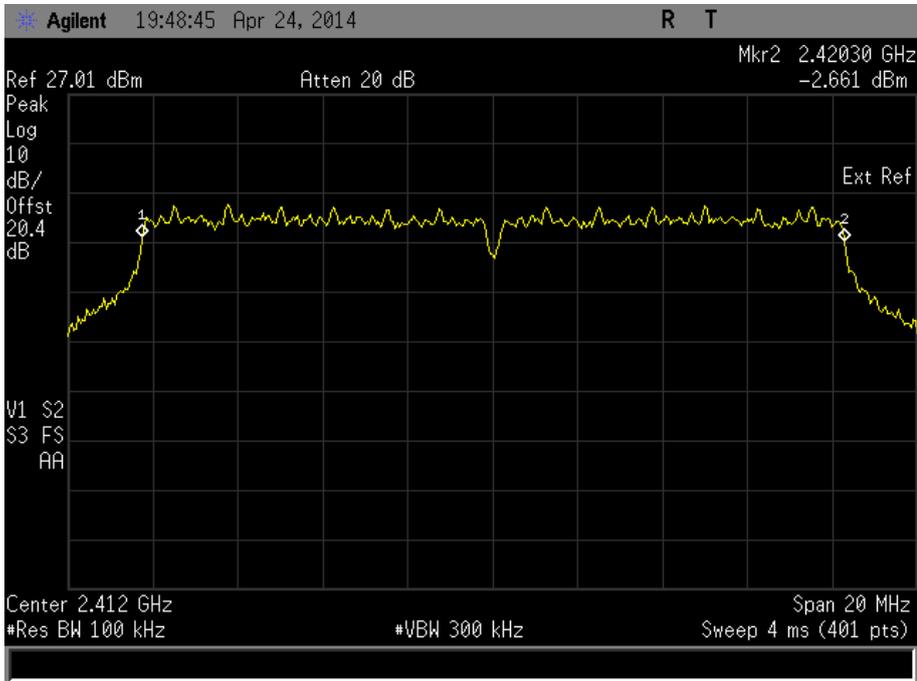
18 Mbps



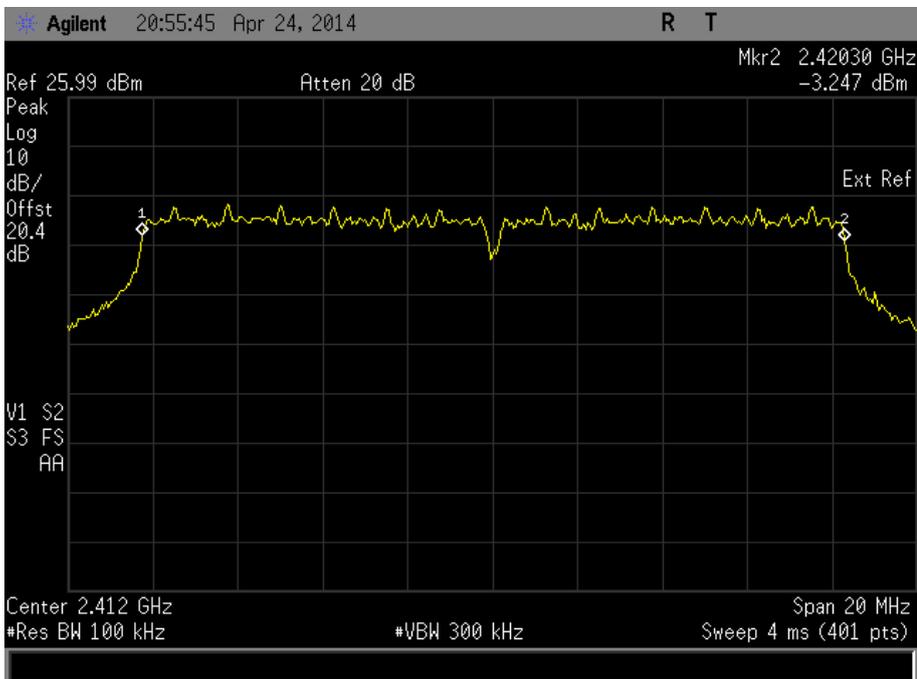


Product Service

24 Mbps



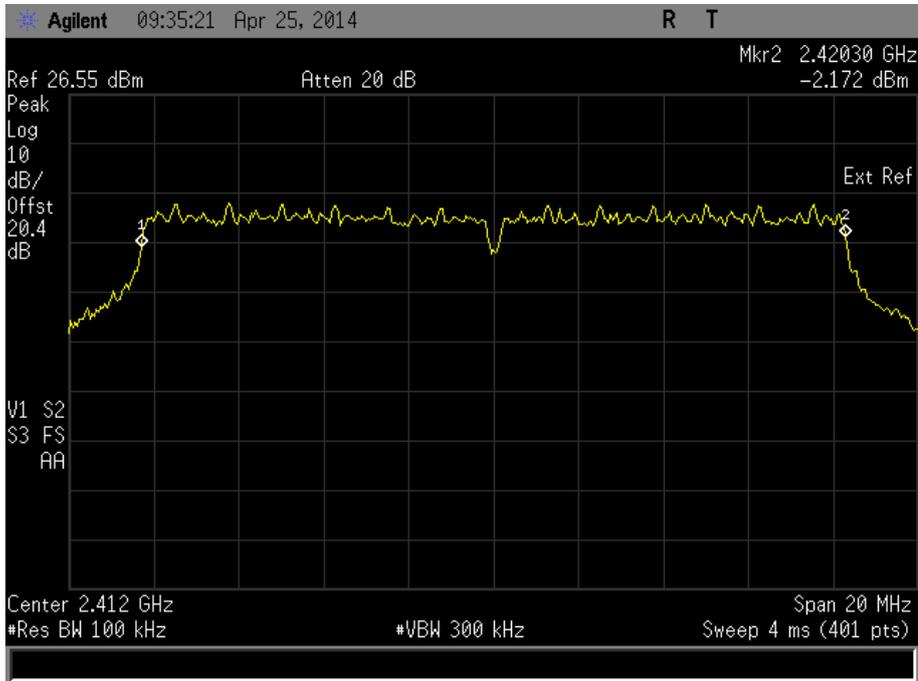
36 Mbps



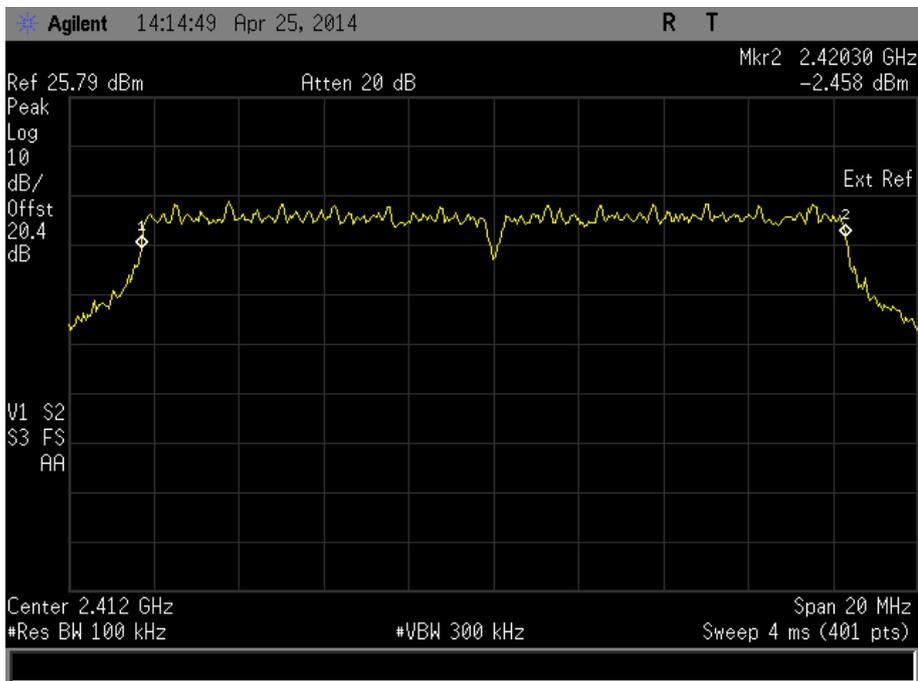


Product Service

48 Mbps



54 Mbps

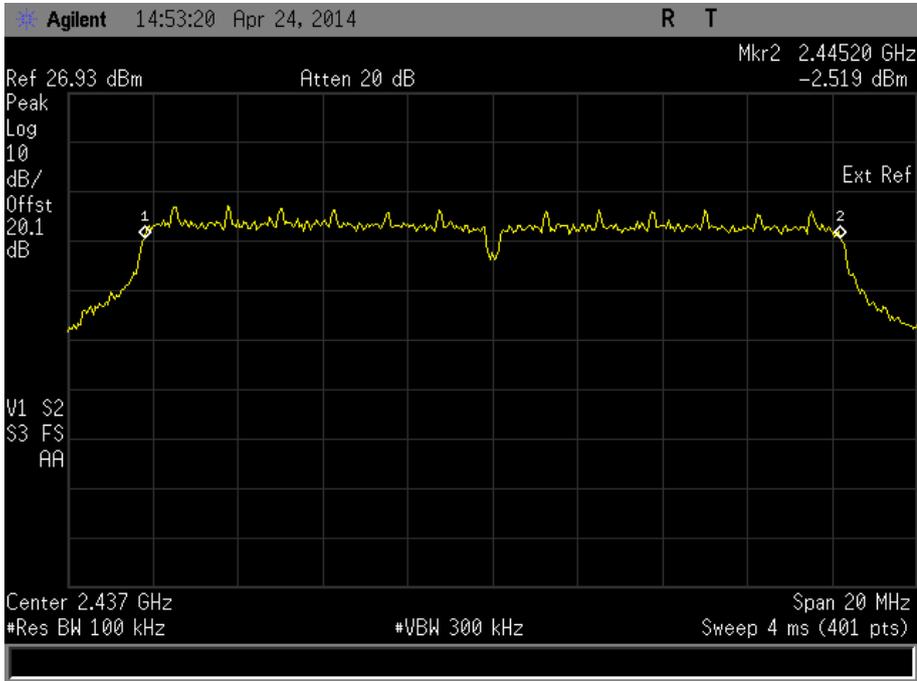




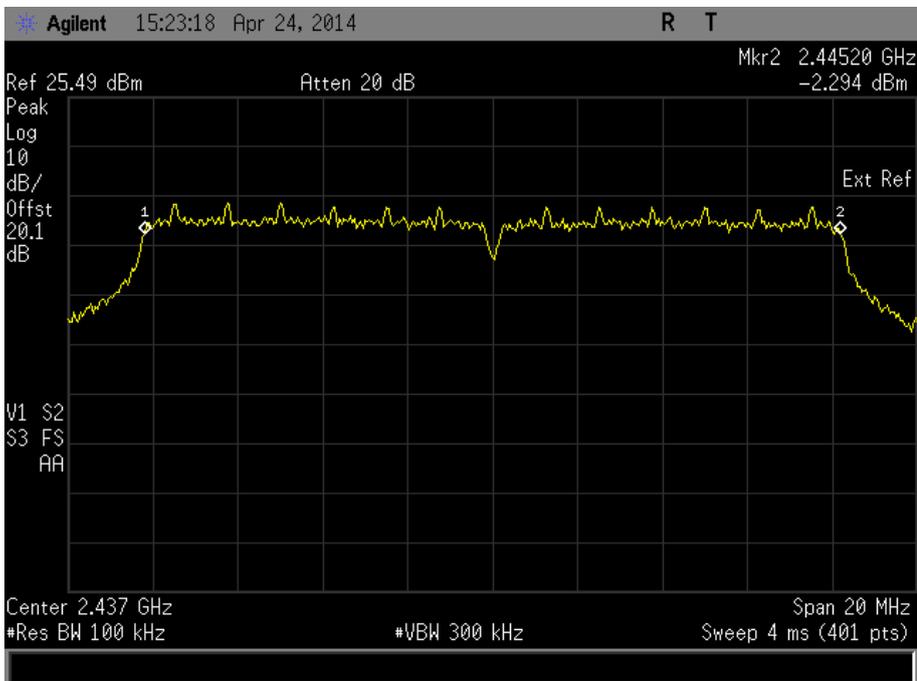
Product Service

2437 MHz

6 Mbps



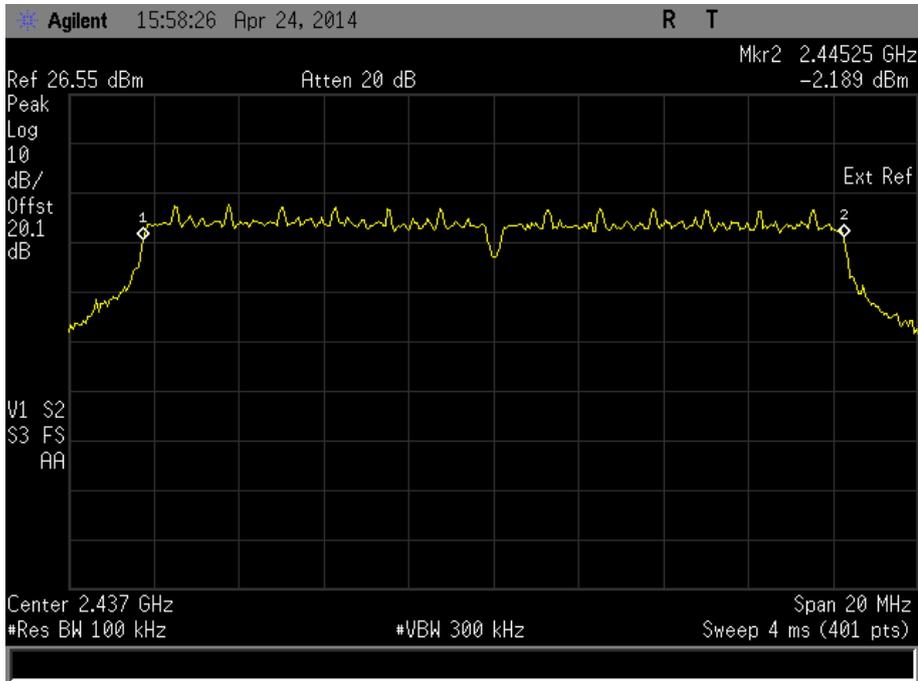
9 Mbps



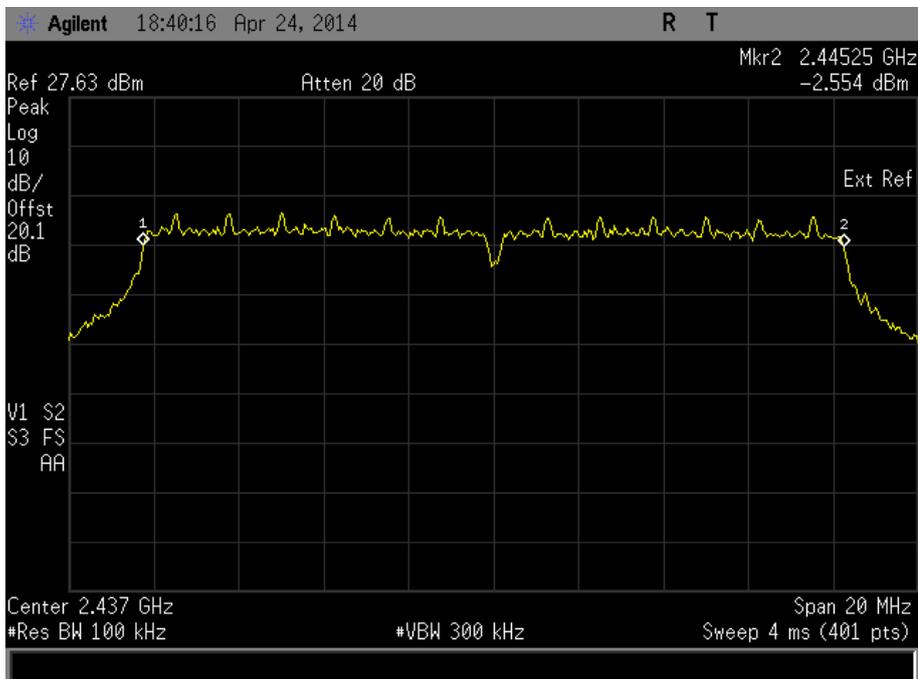


Product Service

12 Mbps



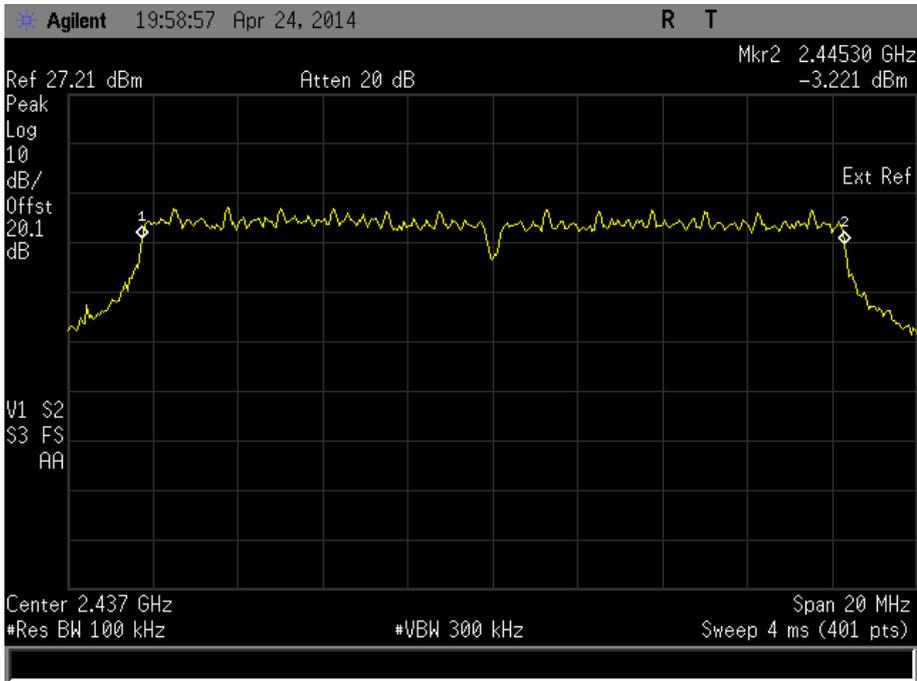
18 Mbps



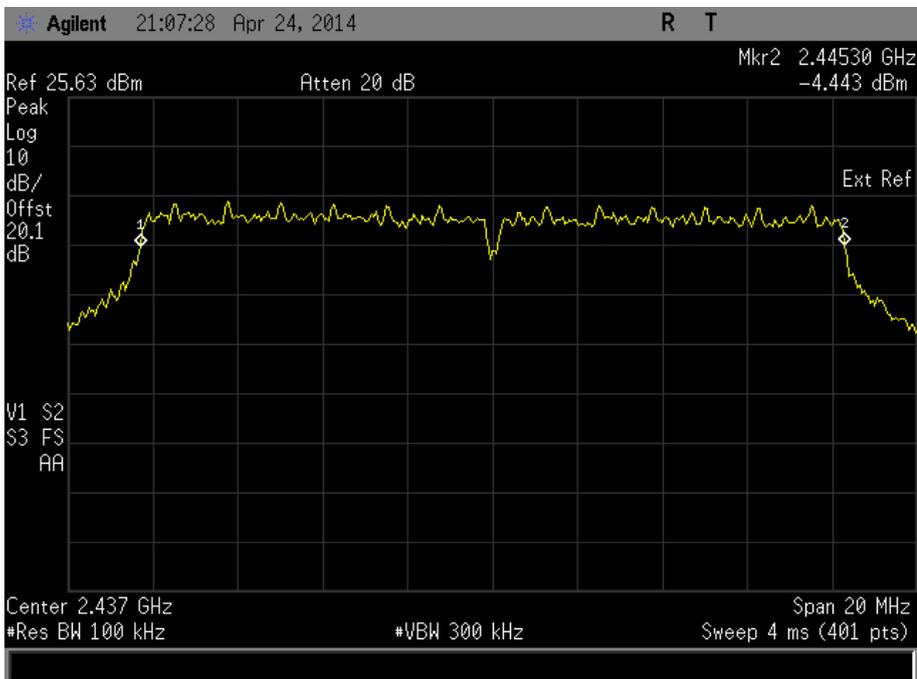


Product Service

24 Mbps



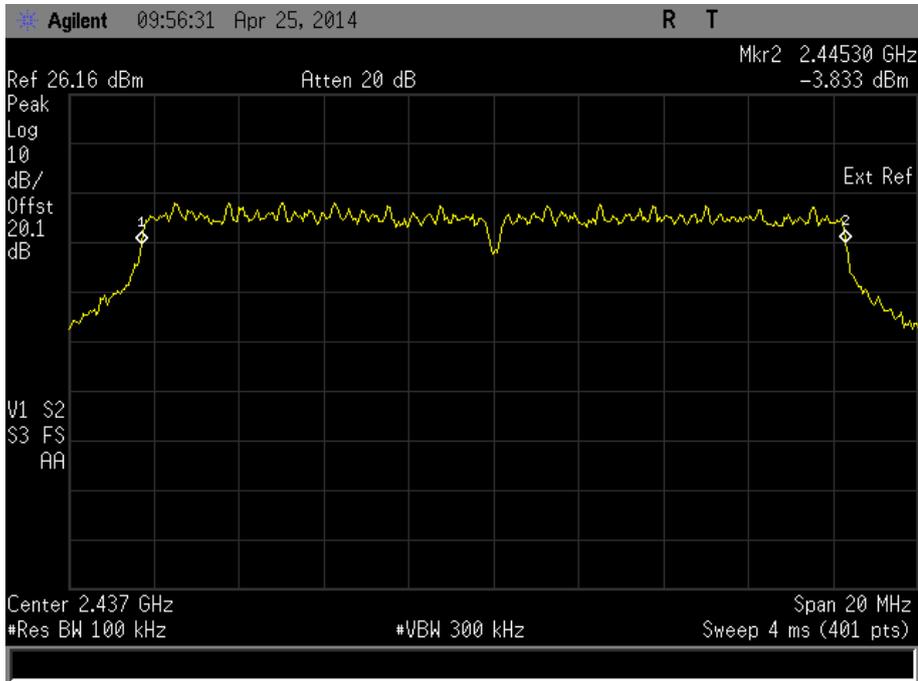
36 Mbps



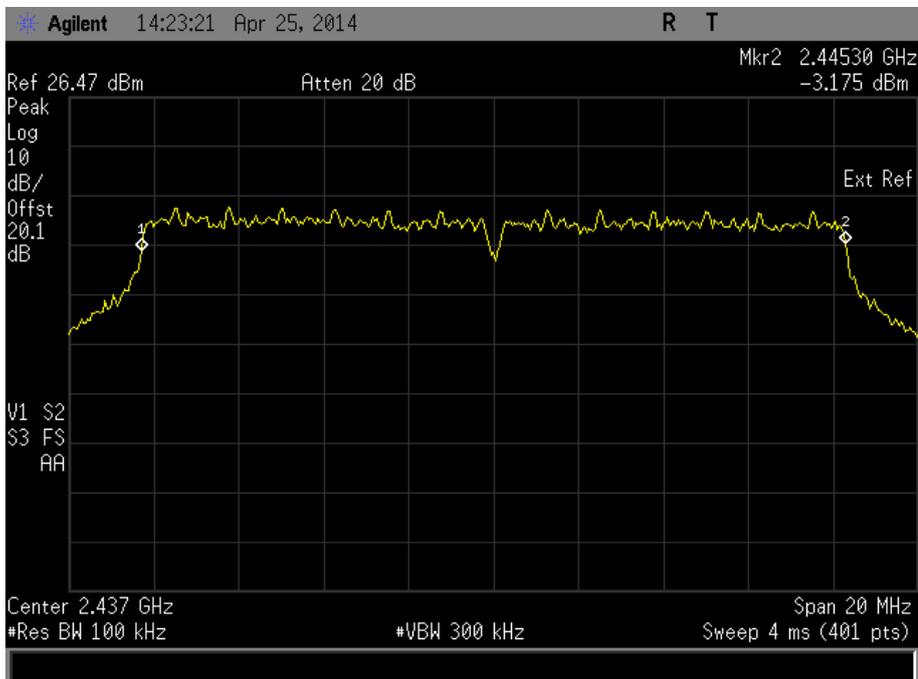


Product Service

48 Mbps



54 Mbps

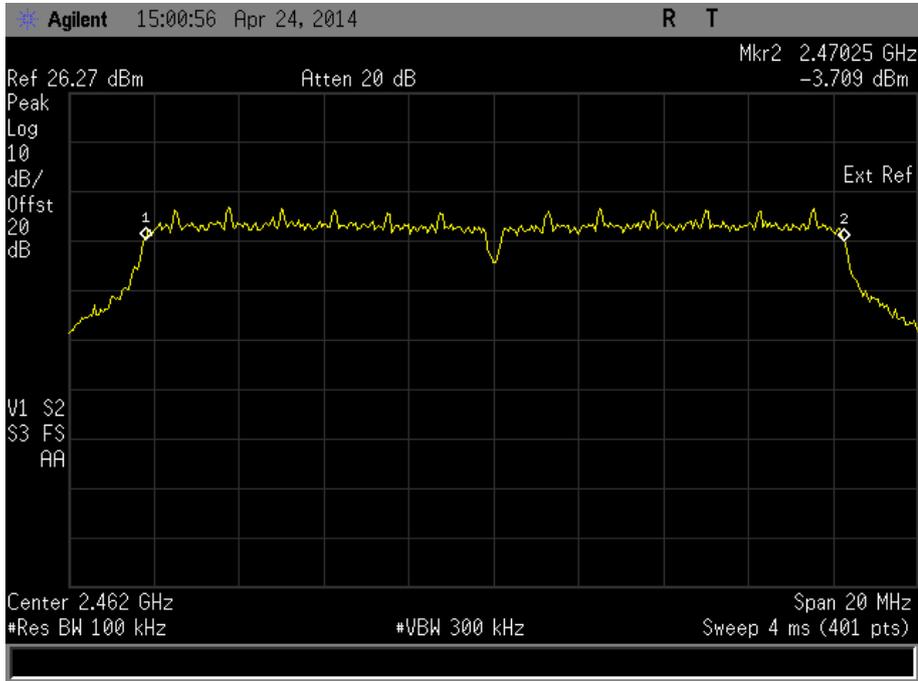




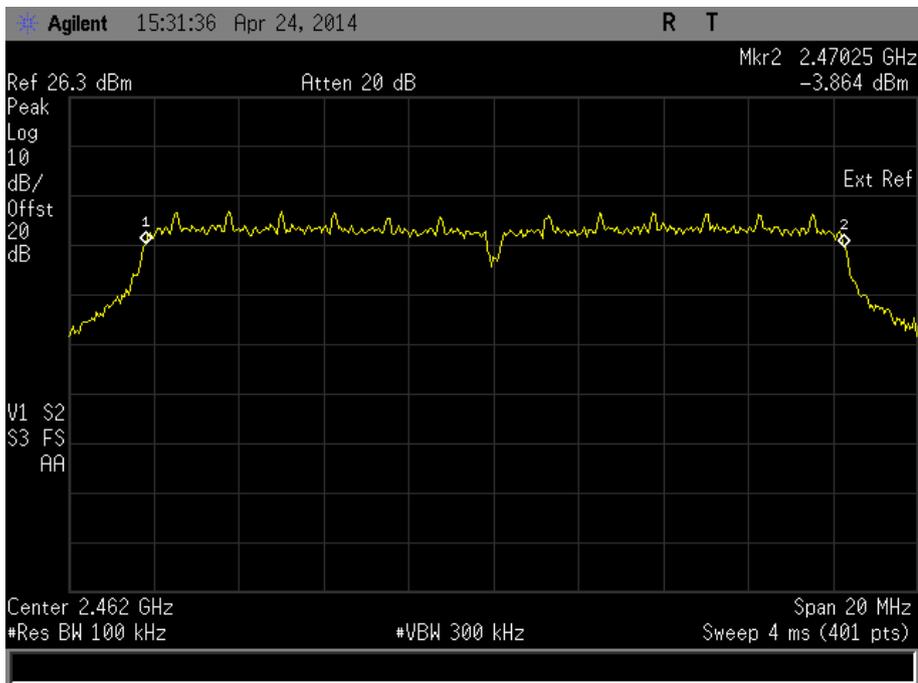
Product Service

2462 MHz

6 Mbps



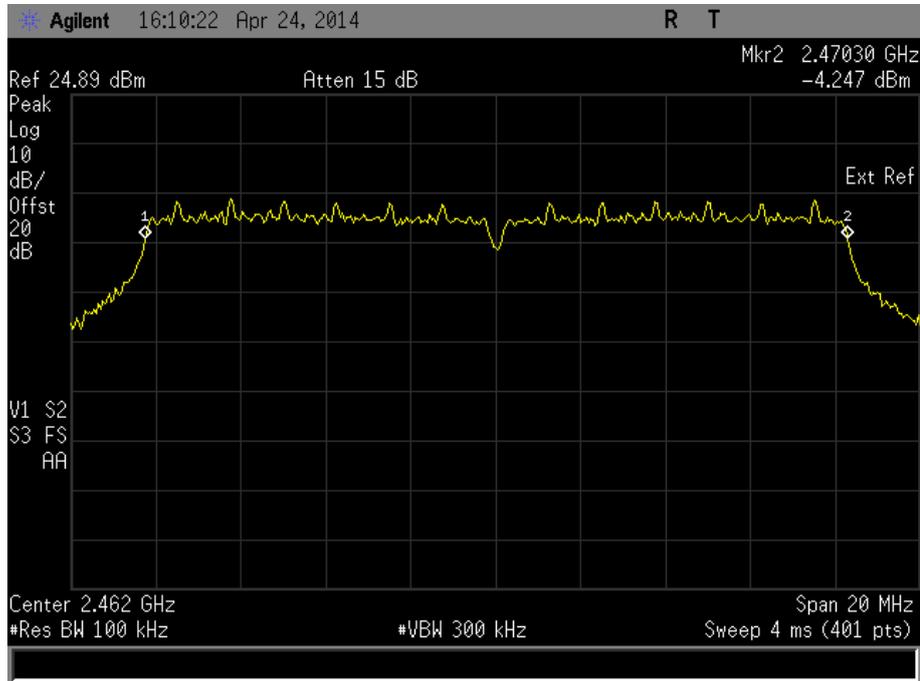
9 Mbps



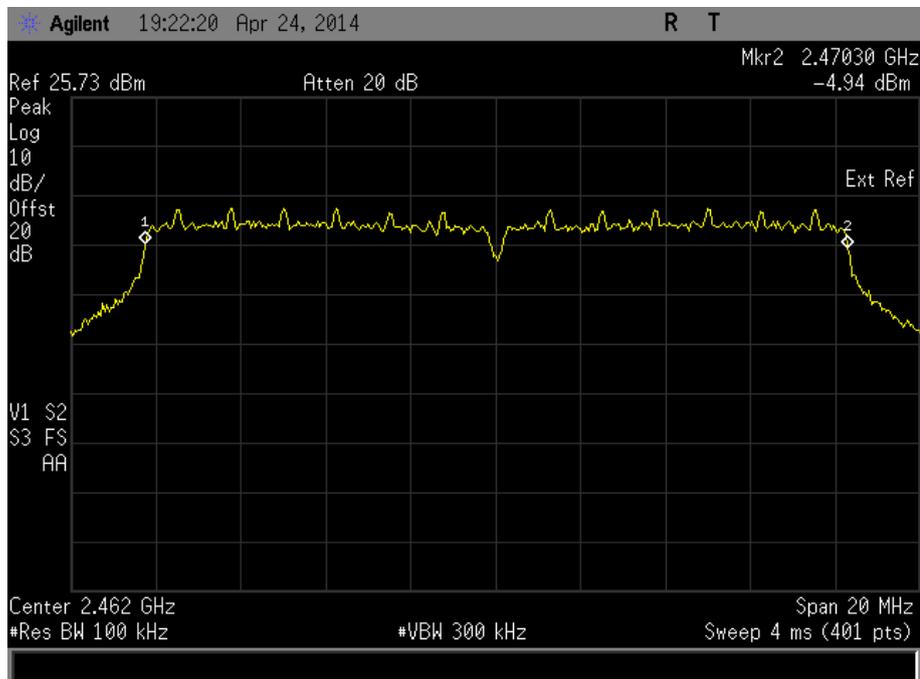


Product Service

12 Mbps



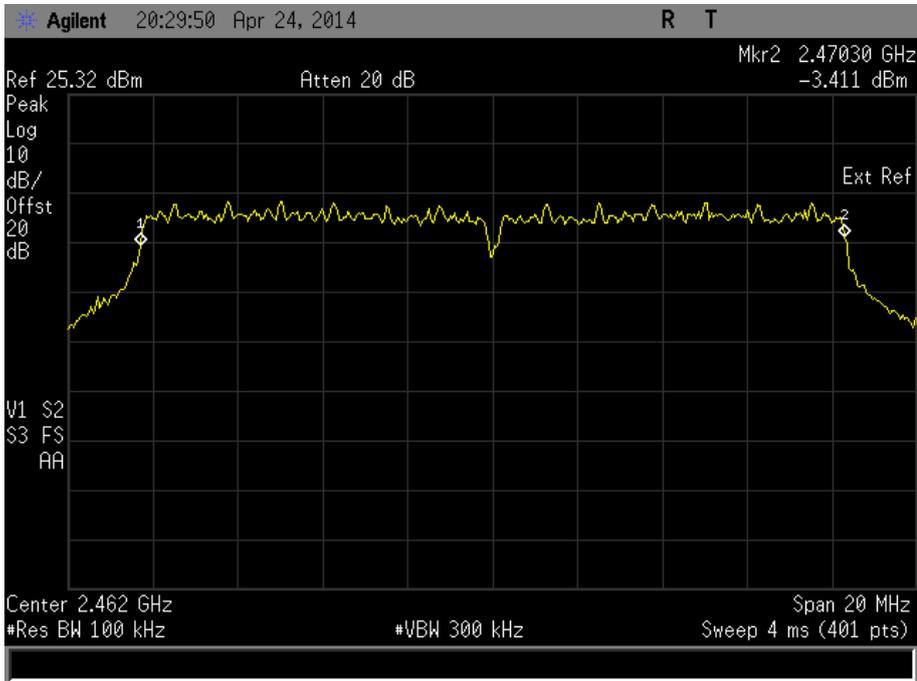
18 Mbps



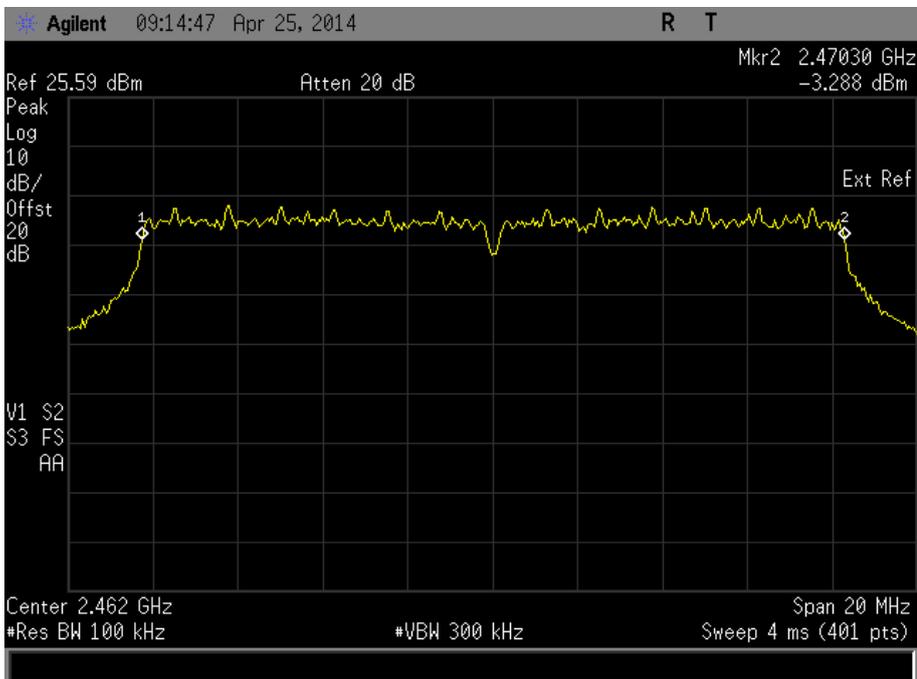


Product Service

24 Mbps



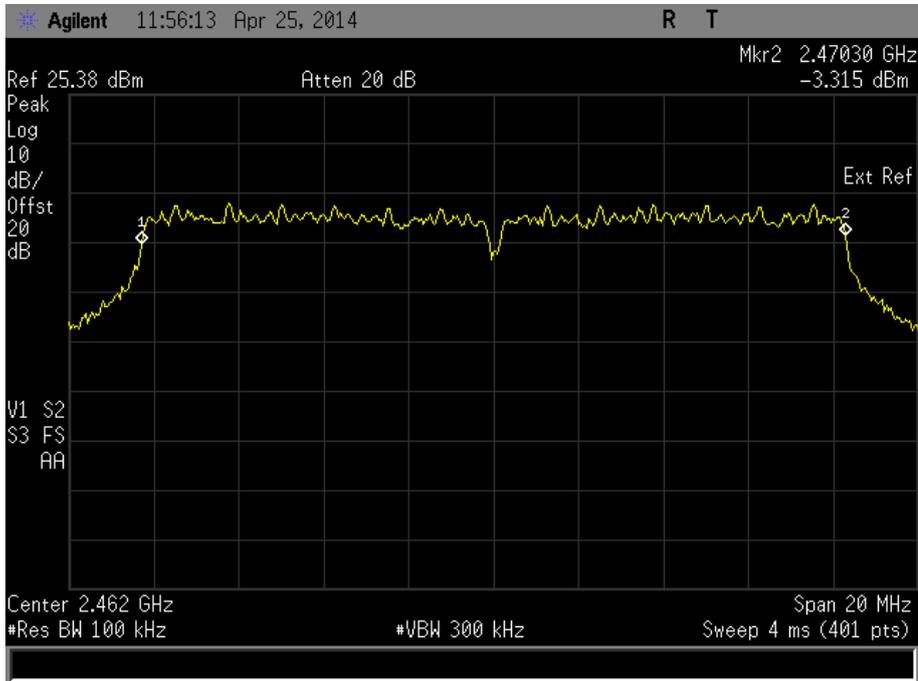
36 Mbps



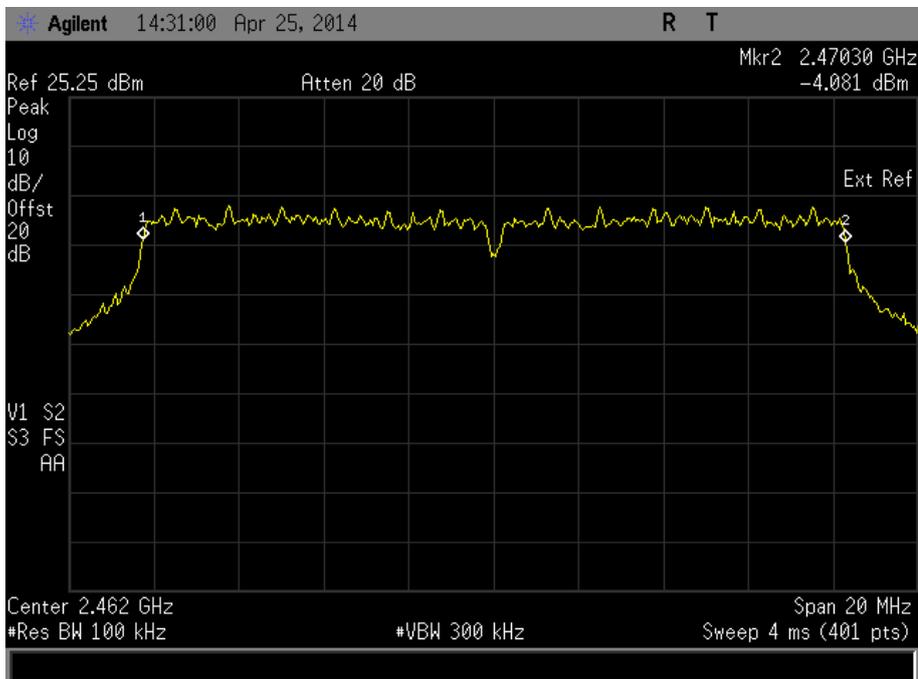


Product Service

48 Mbps



54 Mbps



Limit Clause

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



Product Service

802.11(n)

4.0 V DC Supply

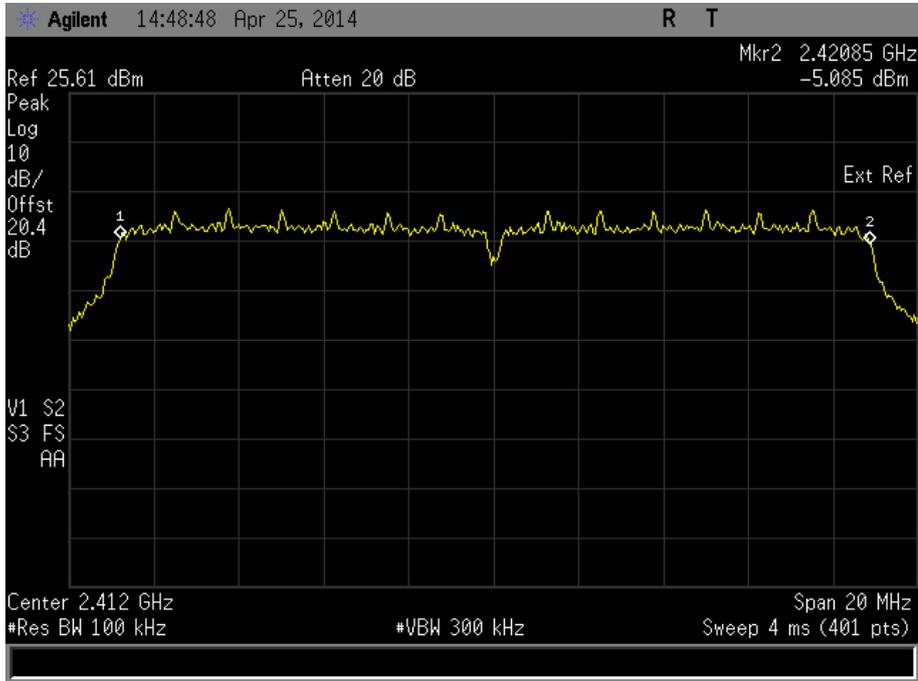
Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	6.5	17650
	13	17700
	19.5	17750
	26	17800
	39	17800
	52	17800
	58.5	17750
	65	17800
2437 MHz	6.5	17650
	13	17750
	19.5	17700
	26	17800
	39	17750
	52	17800
	58.5	17800
	65	17800
2462 MHz	6.5	17650
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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



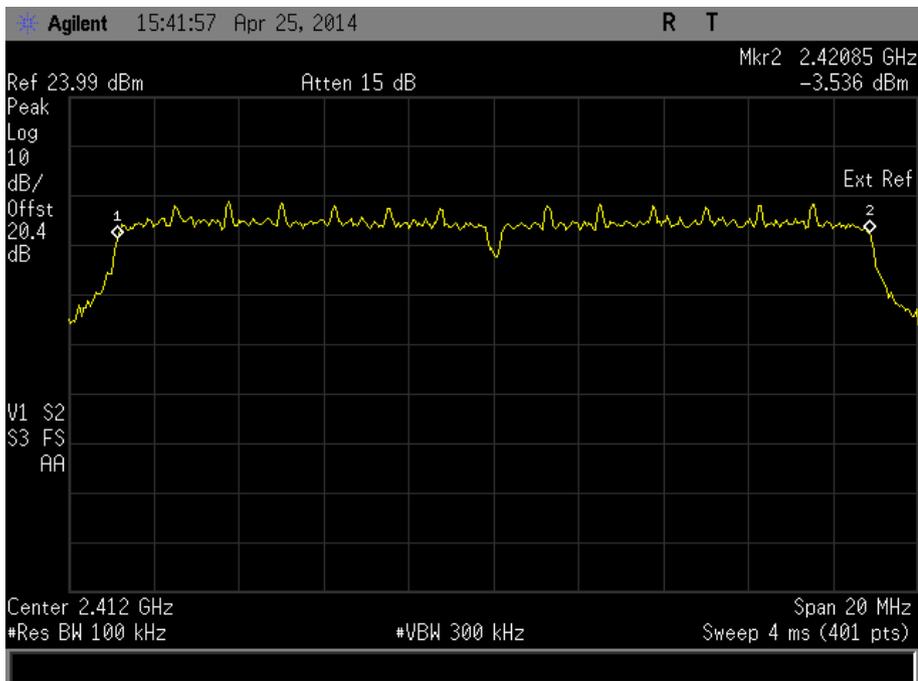
Product Service

2412 MHz

6.5 Mbps



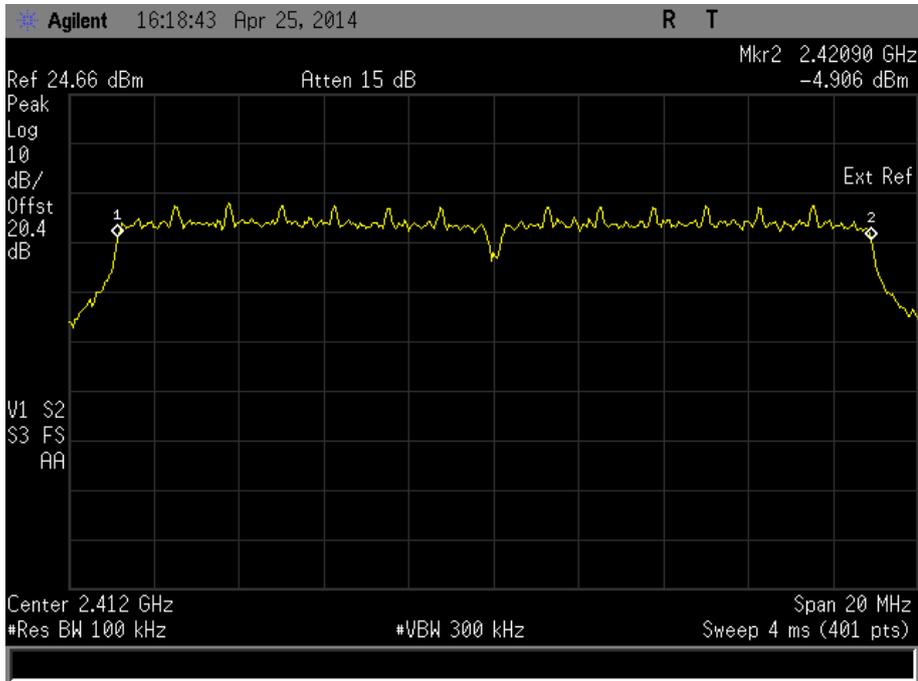
13 Mbps



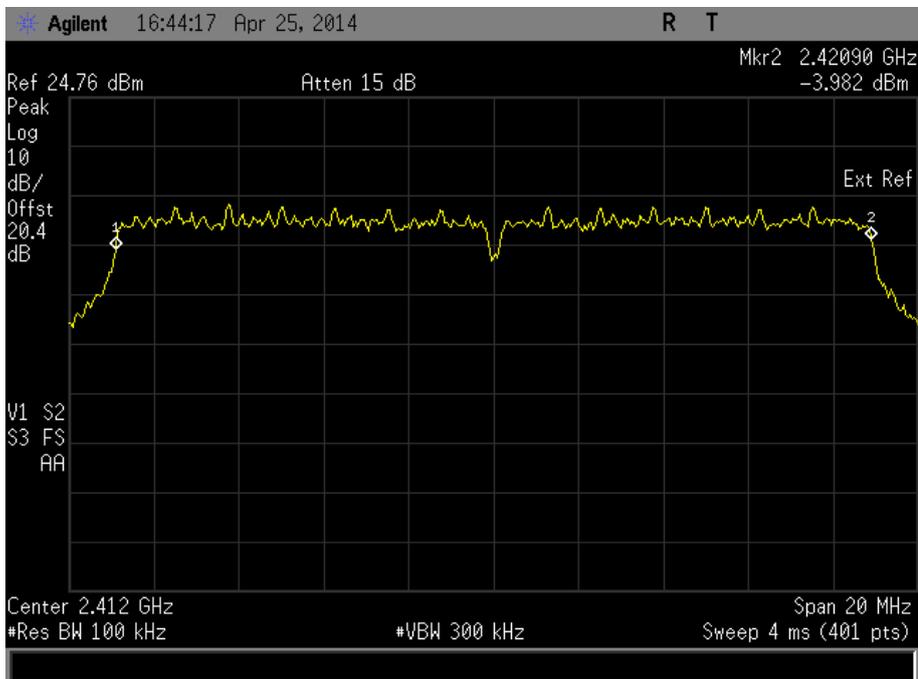


Product Service

19.5 Mbps



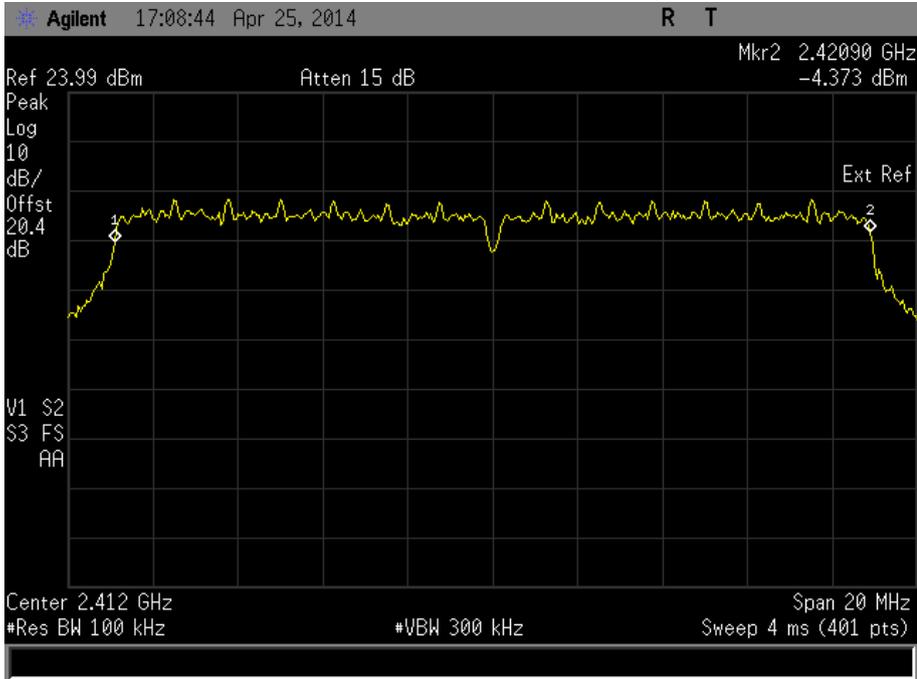
26 Mbps



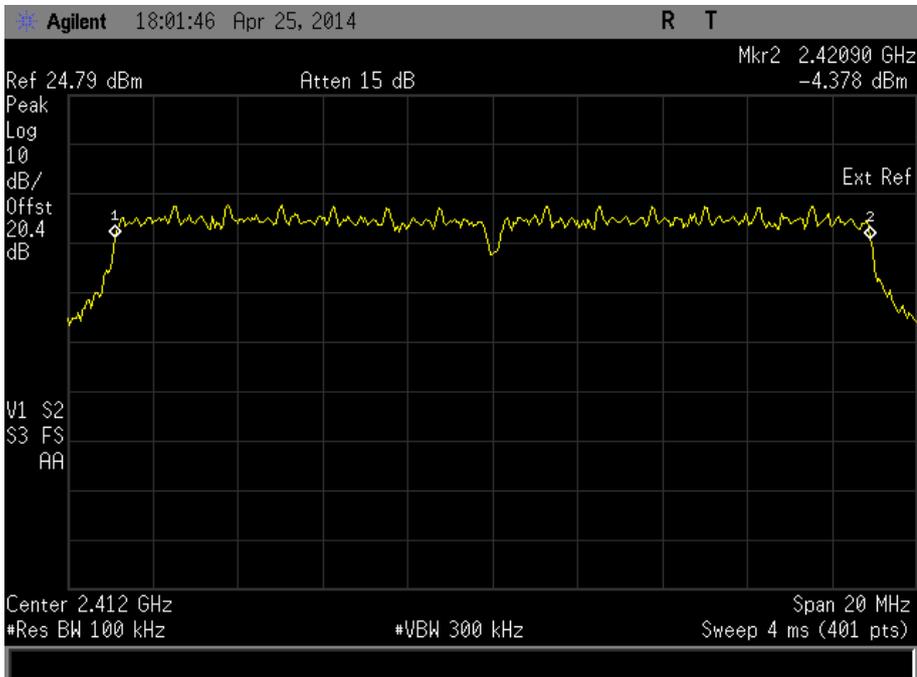


Product Service

39 Mbps



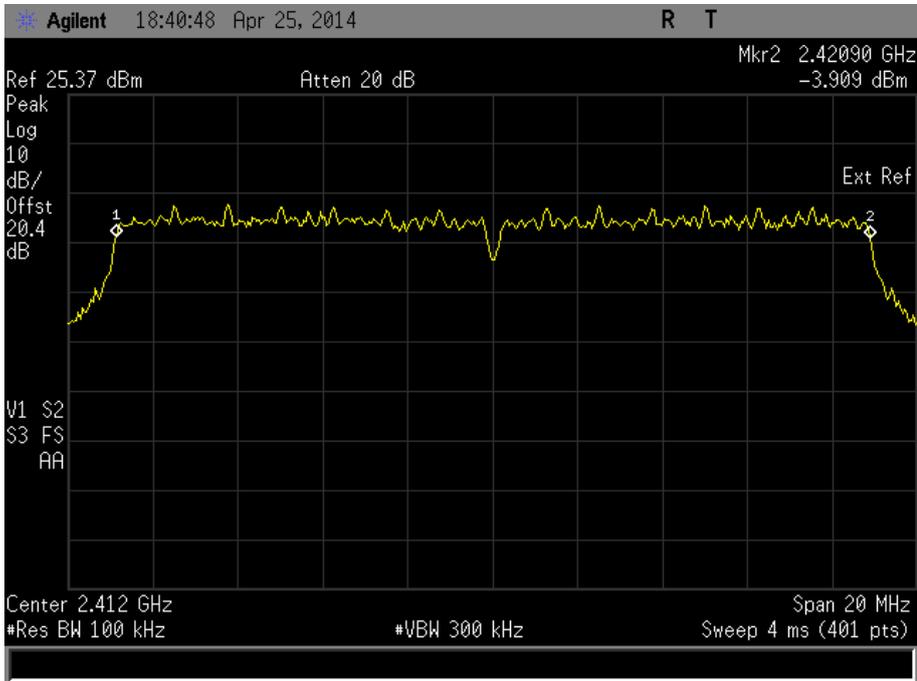
52 Mbps



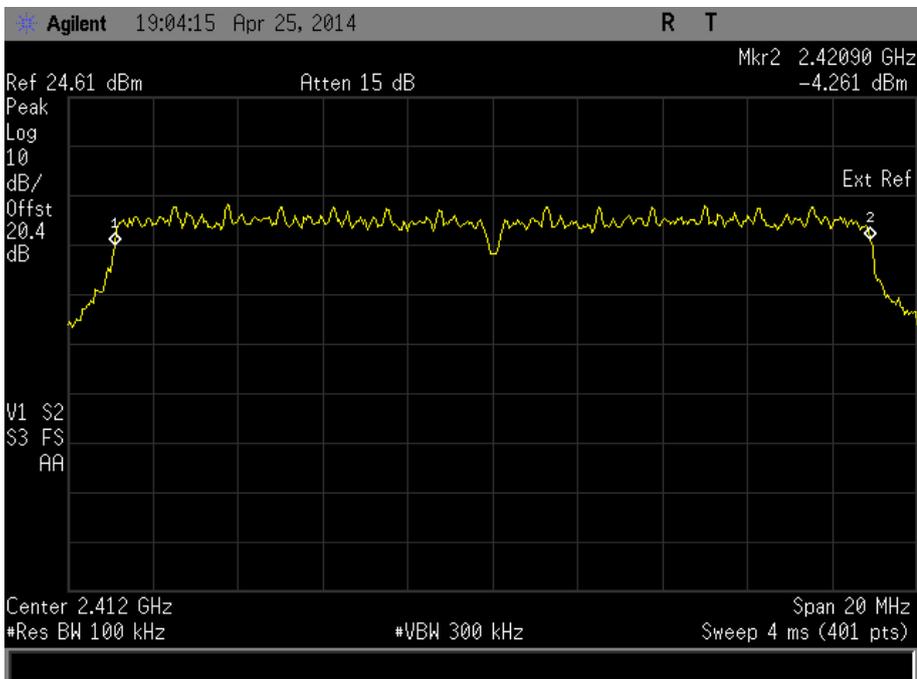


Product Service

58.5 Mbps



65 Mbps

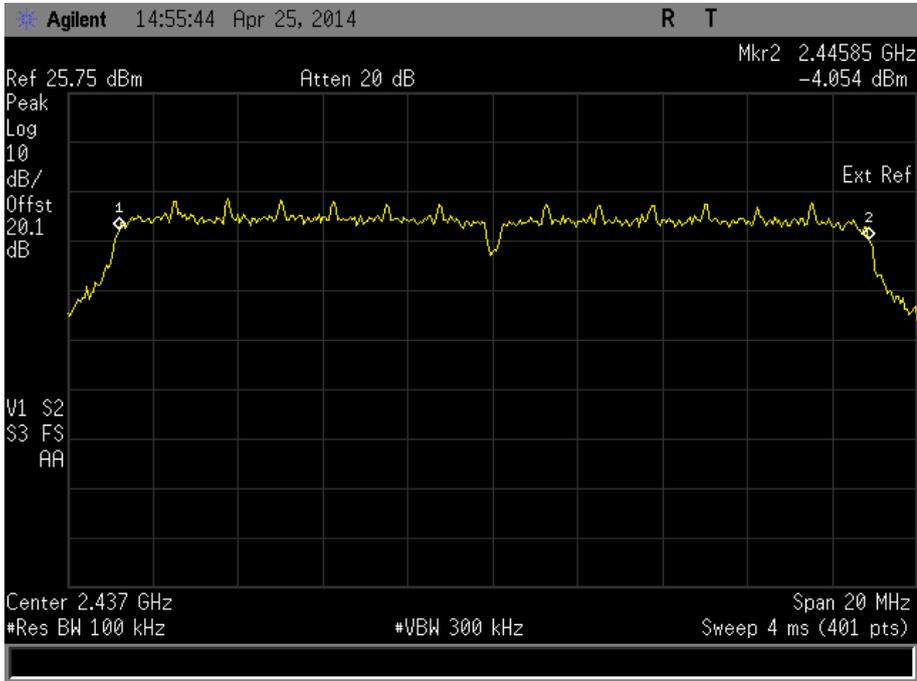




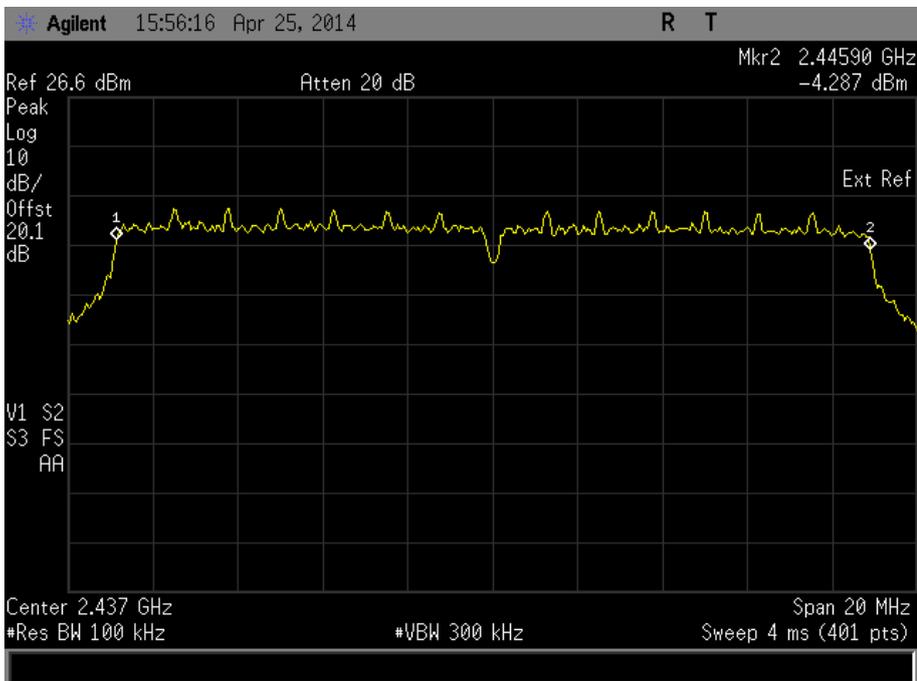
Product Service

2437 MHz

6.5 Mbps



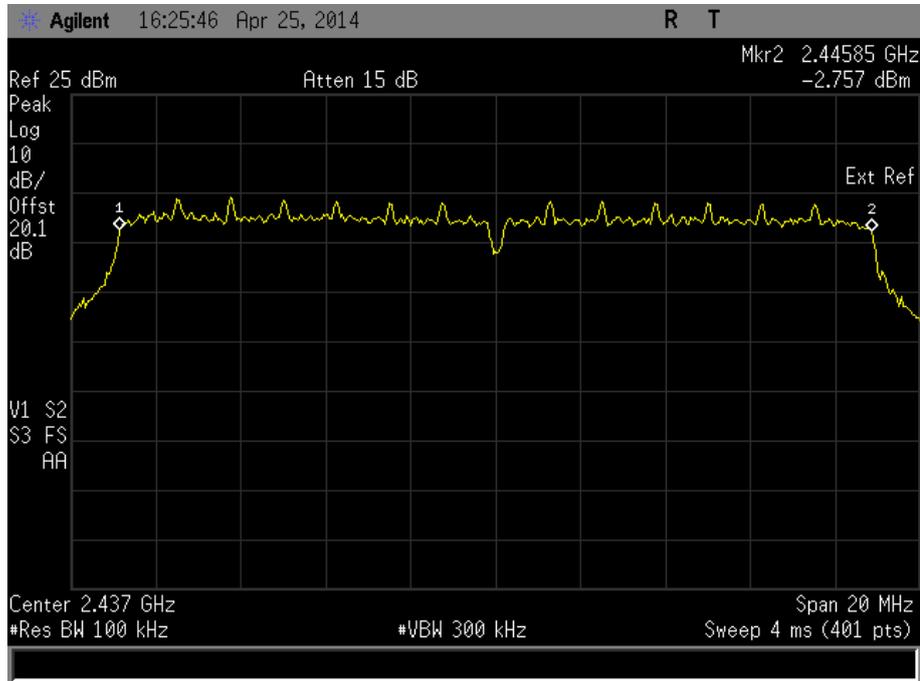
13 Mbps



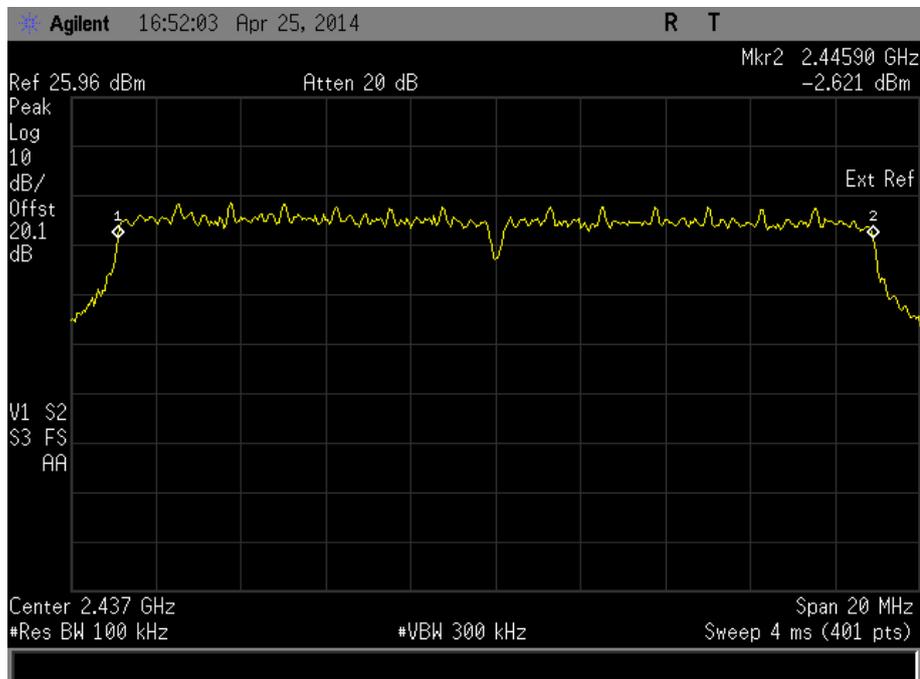


Product Service

19.5 Mbps



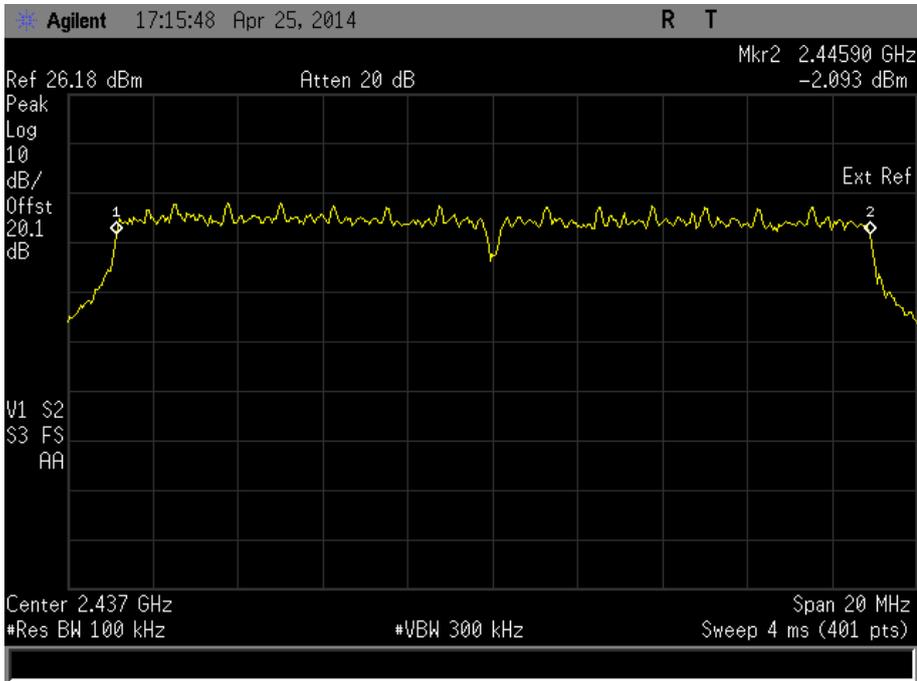
26 Mbps



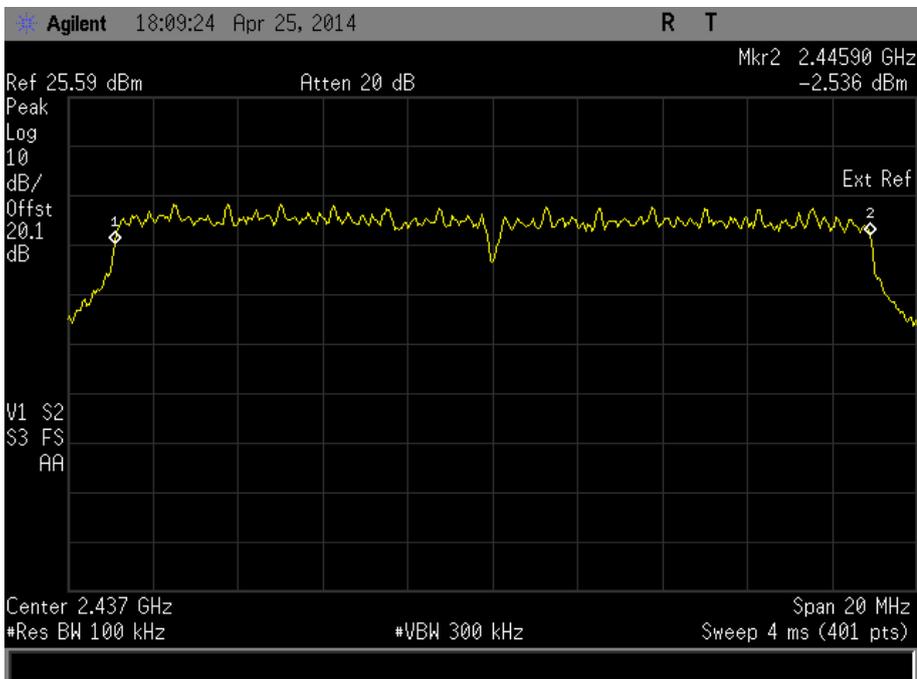


Product Service

39 Mbps



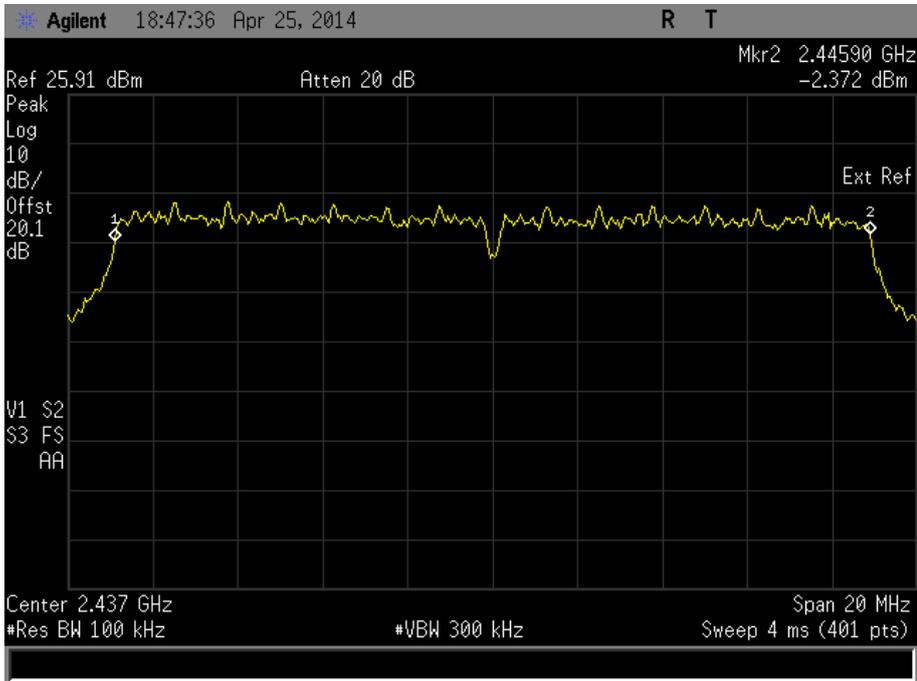
52 Mbps



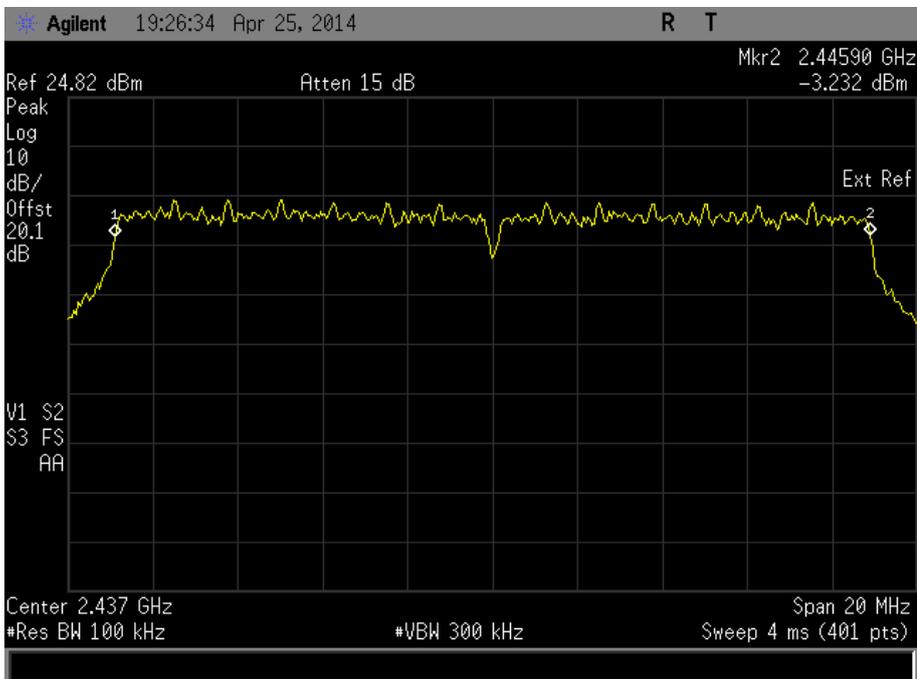


Product Service

58.5 Mbps



65 Mbps

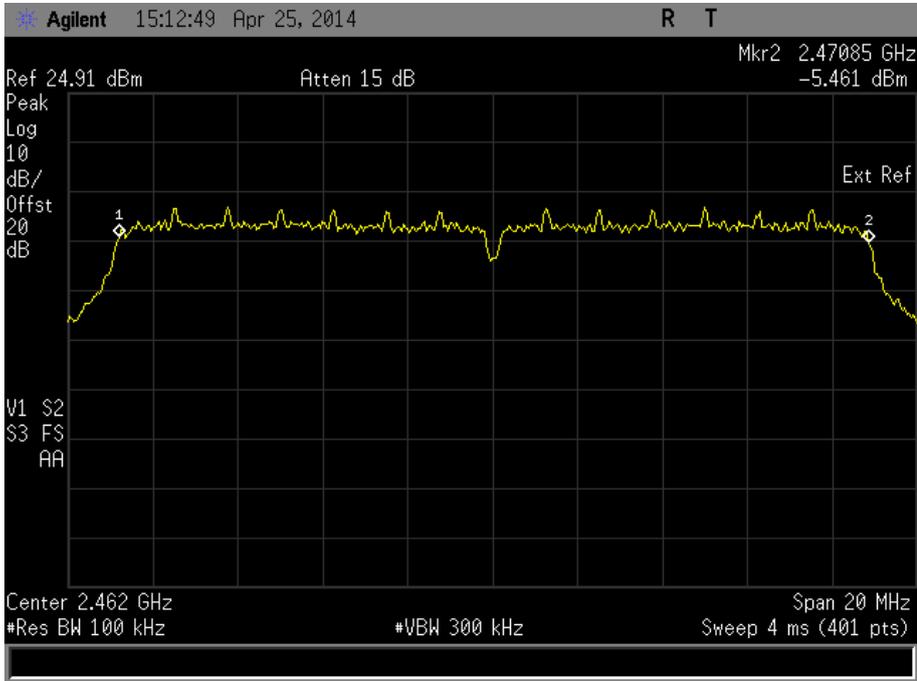




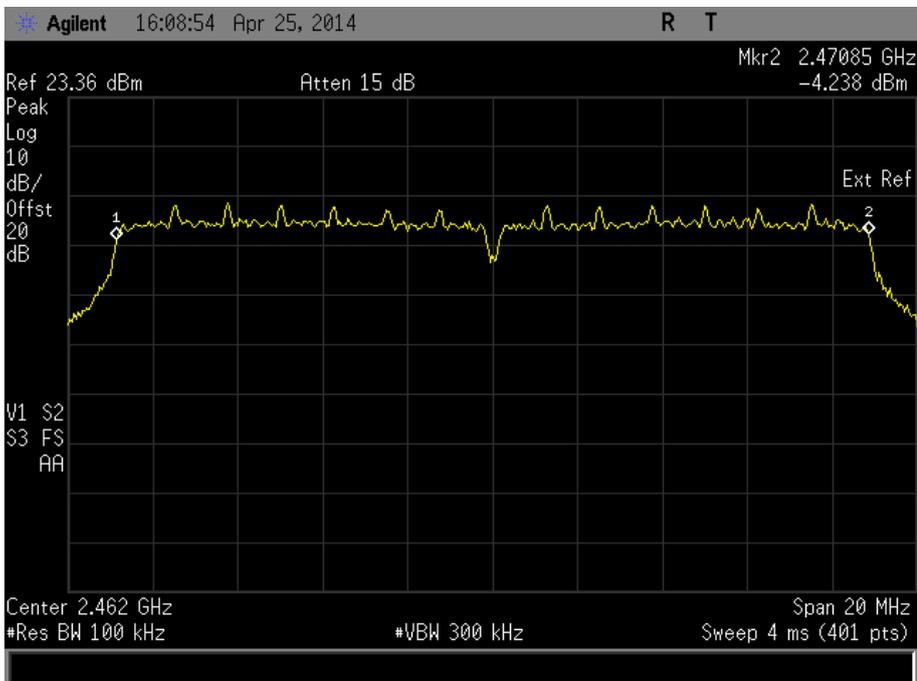
Product Service

2462 MHz

6.5 Mbps



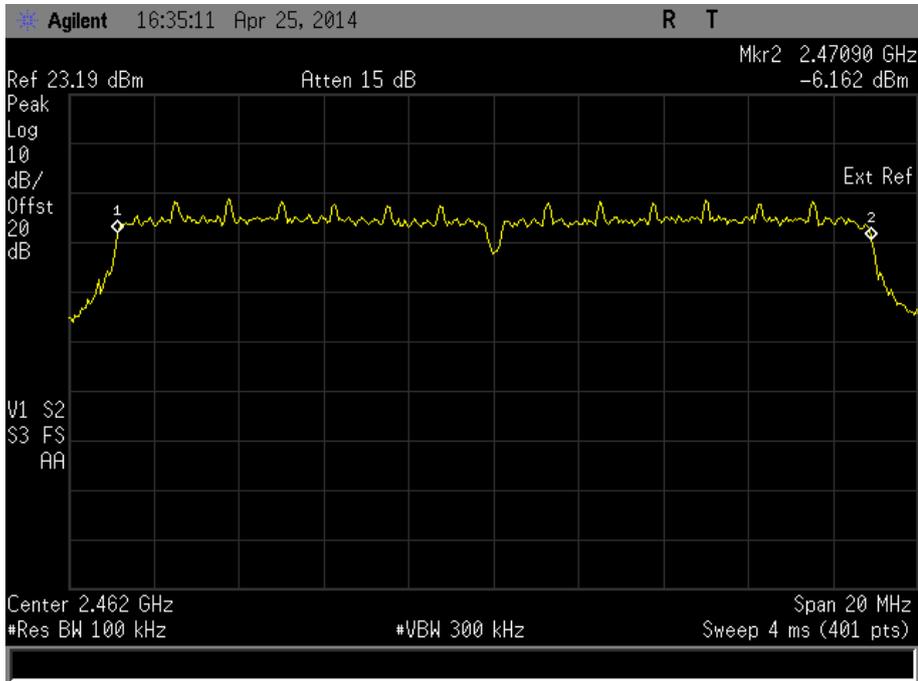
13 Mbps



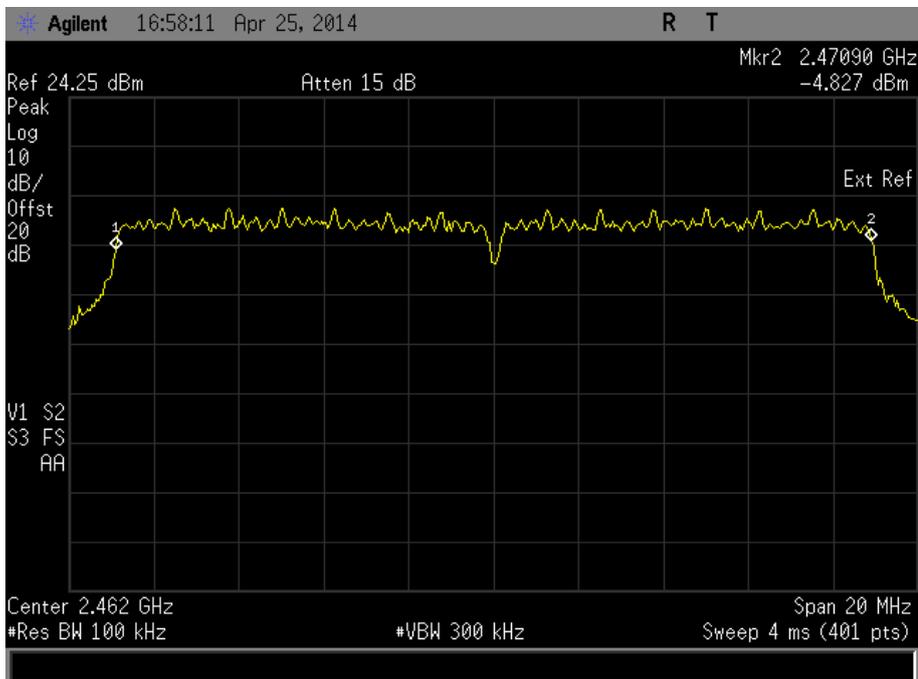


Product Service

19.5 Mbps



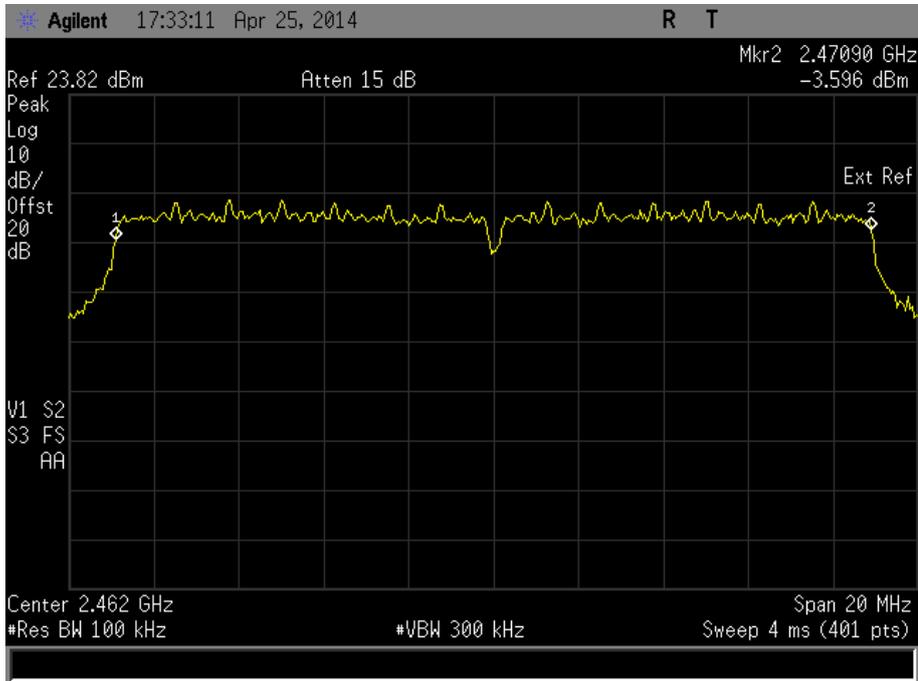
26 Mbps



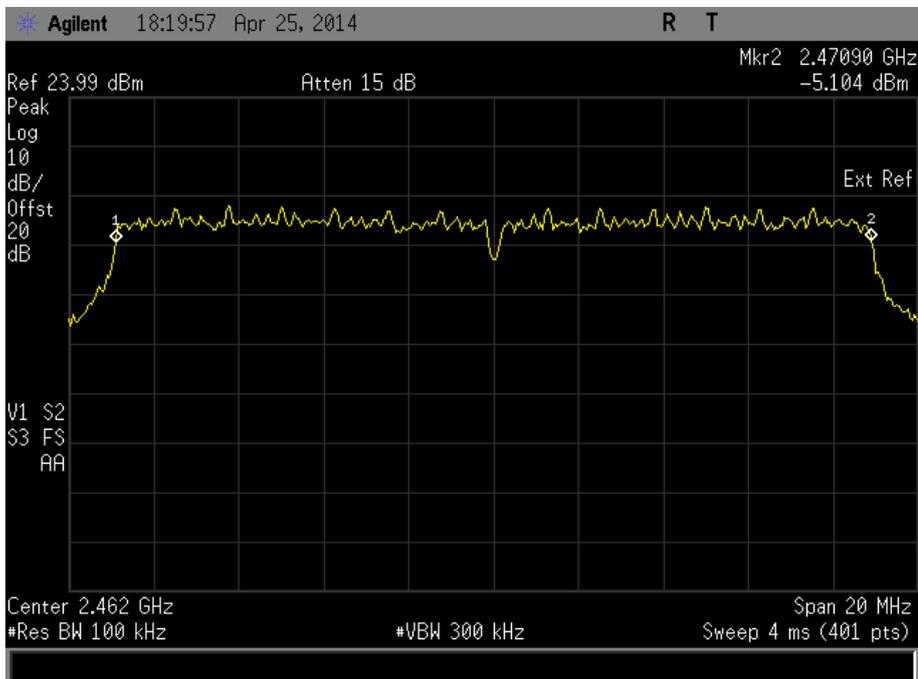


Product Service

39 Mbps



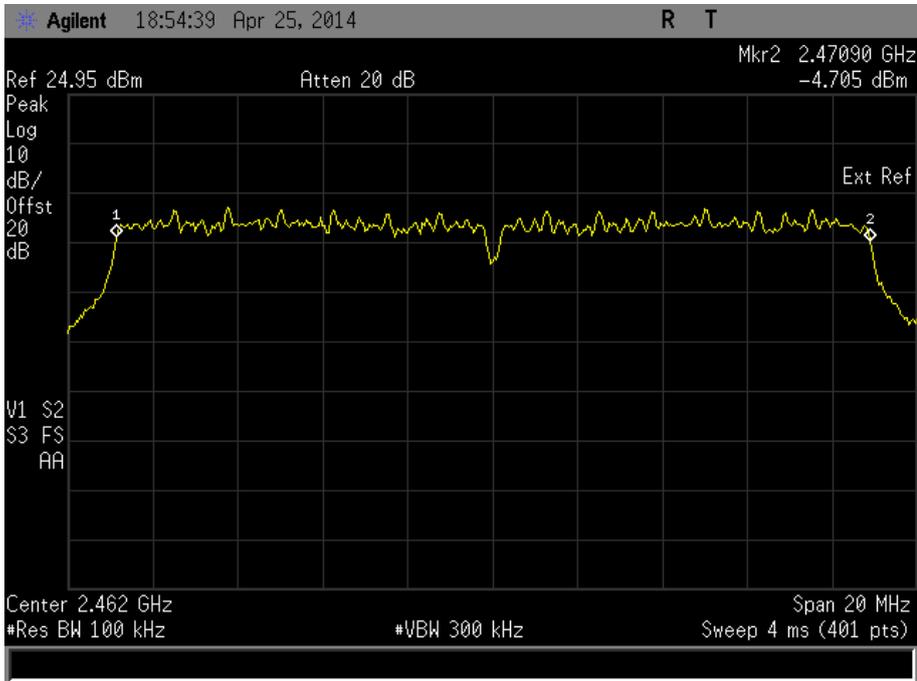
52 Mbps



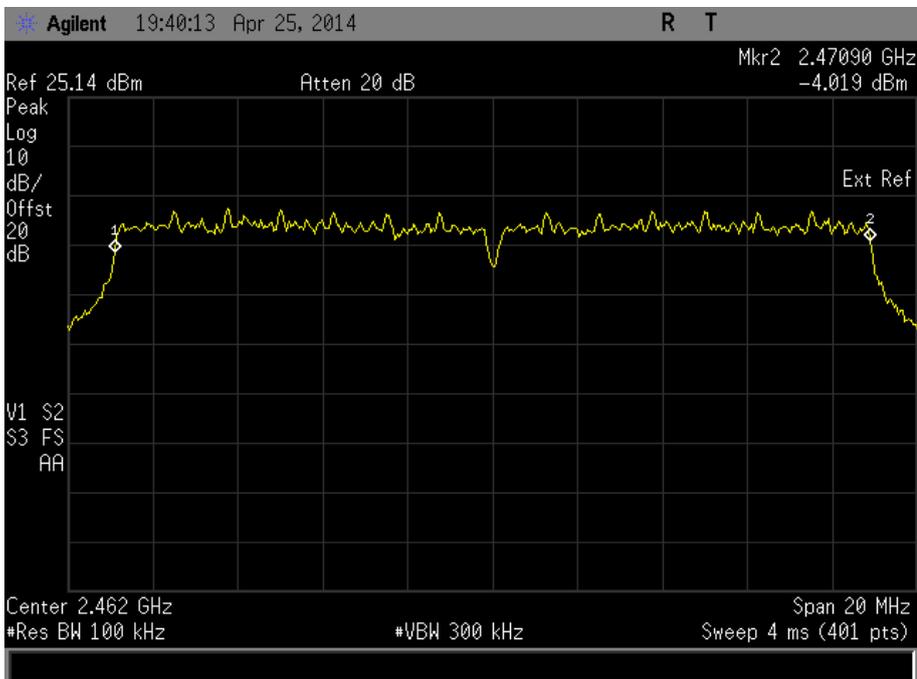


Product Service

58.5 Mbps



65 Mbps



Limit Clause

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



Product Service

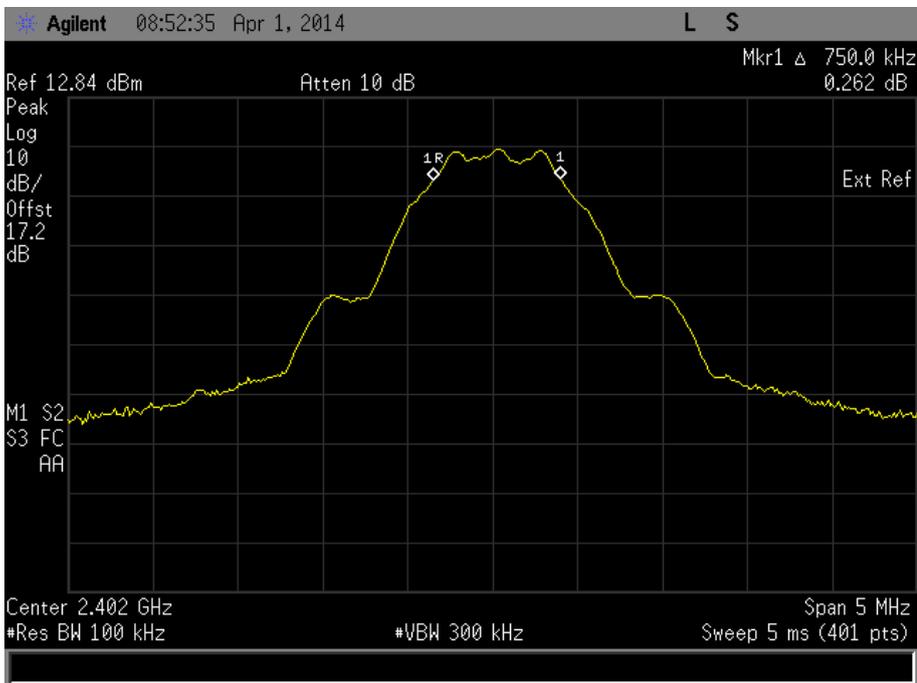
Bluetooth Low Energy

4.0 V DC Supply

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

2402 MHz

1 Mbps

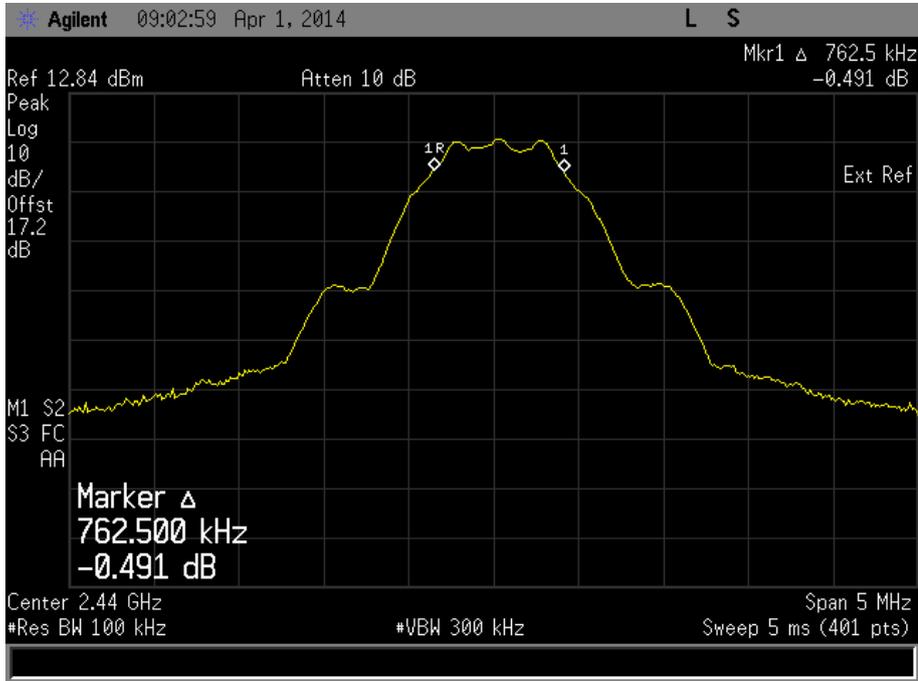




Product Service

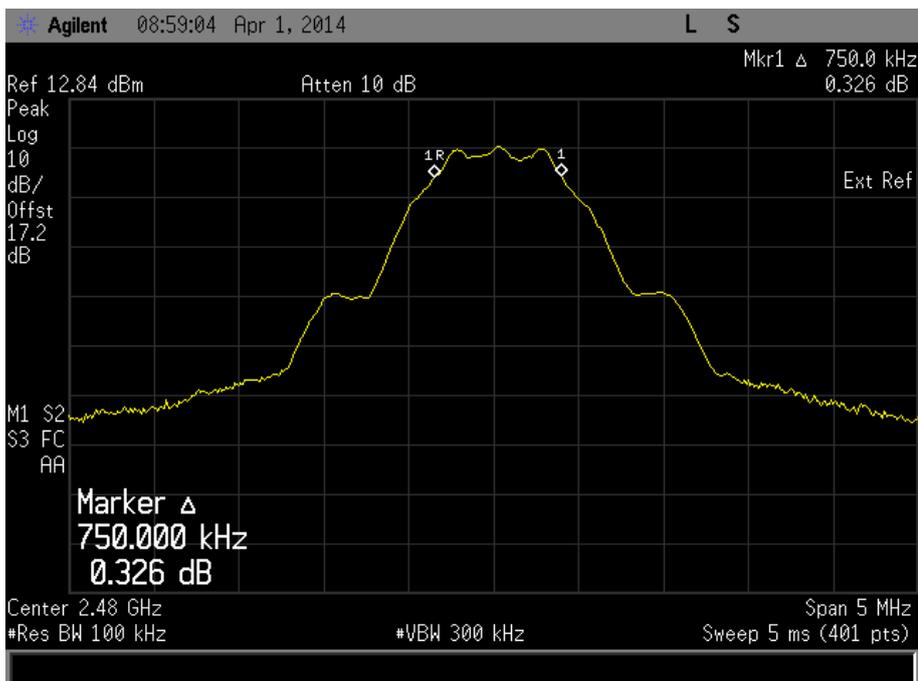
2440 MHz

1 Mbps



2480 MHz

1 Mbps



Limit Clause

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



Product Service

2.3 MAXIMUM PEAK CONDUCTED OUTPUT POWER

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test and Modification State

SHL25 S/N: IMEI 004401115170488 - Modification State 0

SHL25 S/N: IMEI 004401115170645 - Modification State 0

2.3.3 Date of Test

31 March 2014, 24 April 2014 & 25 April 2014

2.3.4 Test Equipment Used

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

2.3.5 Test Procedure

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

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

2.3.6 Environmental Conditions

Ambient Temperature 22.9 - 23.5°C

Relative Humidity 39.3 - 42.9%



Product Service

2.3.7 Test Results

802.11(b)

4.0 V DC Supply

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

Limit Clause

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

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

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



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	25.53	26.18	25.73	357.27	414.95	374.11
9	25.45	26.14	25.55	350.75	411.15	358.92
12	25.51	26.31	25.49	355.63	427.56	354.00
18	25.49	26.28	25.48	354.00	424.62	353.18
24	25.69	26.40	25.75	370.68	436.52	375.84
36	25.43	26.24	25.80	349.14	420.73	380.19
48	25.62	26.17	25.58	364.75	414.00	361.41
54	25.51	26.43	25.39	355.63	439.54	345.94

Limit Clause

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

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

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



Product Service

802.11(n)

4.0 V DC Supply

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

Limit Clause

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

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

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



Product Service

Bluetooth Low Energy

4.0 V DC Supply

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

Limit Clause

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

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

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



Product Service

2.4 EIRP PEAK POWER

2.4.1 Specification Reference

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

2.4.2 Equipment Under Test and Modification State

SHL25 S/N: IMEI 004401115170249 - Modification State 0

SHL25 S/N: IMEI 004401115170256 - Modification State 0

2.4.3 Date of Test

8 April 2014, 9 April 2014 & 17 April 2014

2.4.4 Test Equipment Used

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

2.4.5 Test Procedure

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

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

A calculation was then performed to obtain the final figure.

2.4.6 Environmental Conditions

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



Product Service

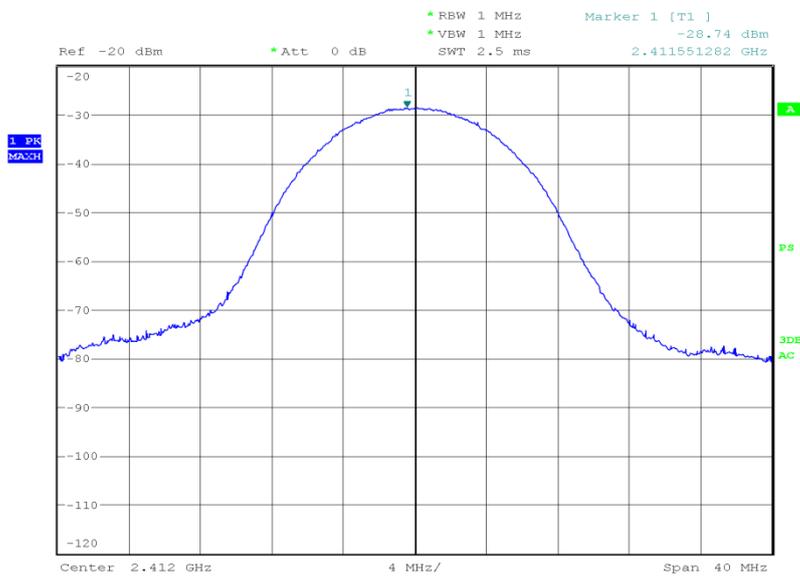
2.4.7 Test Results

802.11(b)

4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
16.74	47.21



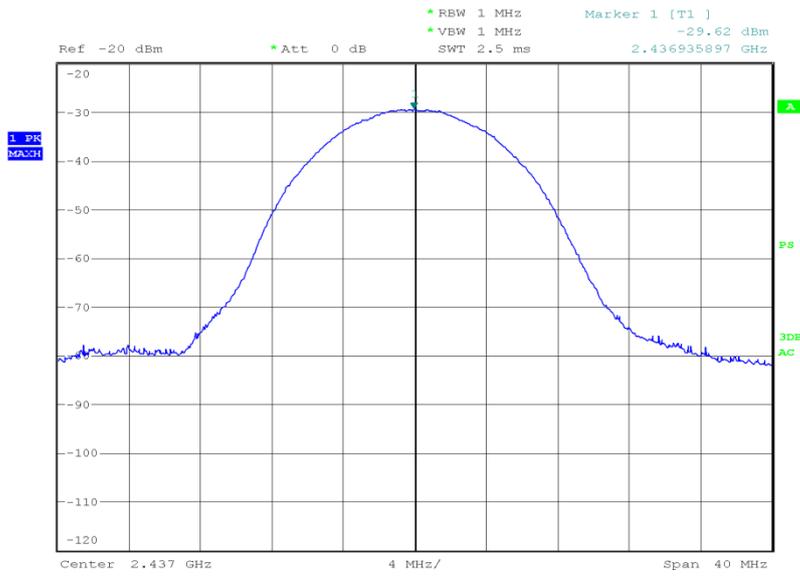
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Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
15.41	34.75



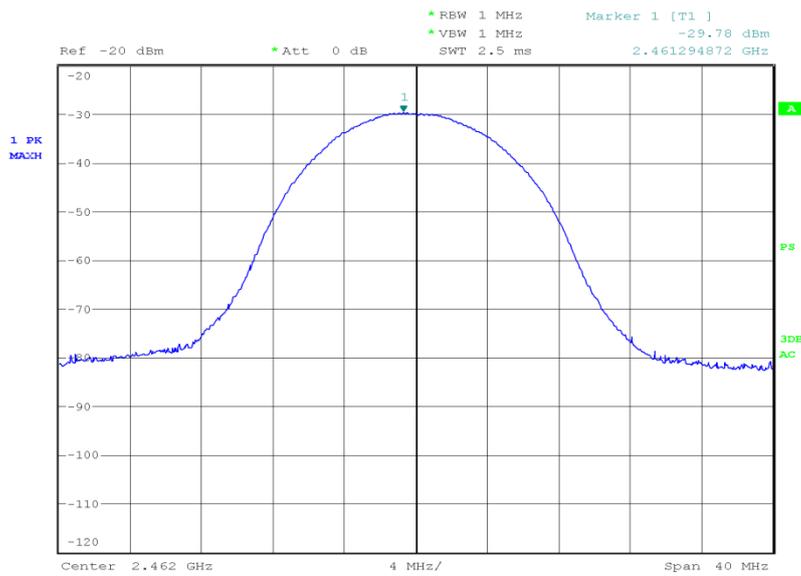
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Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
15.63	36.56



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

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000

802.11(g)

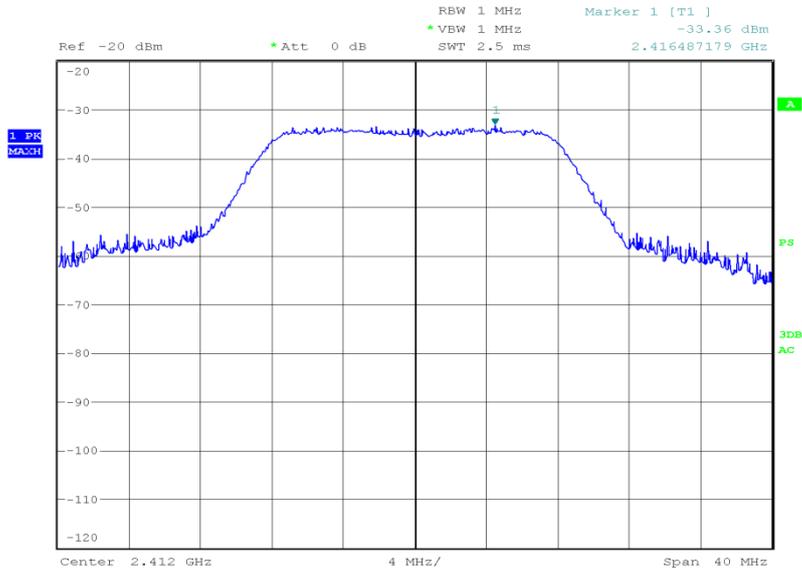
4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
19.44	87.90



Product Service



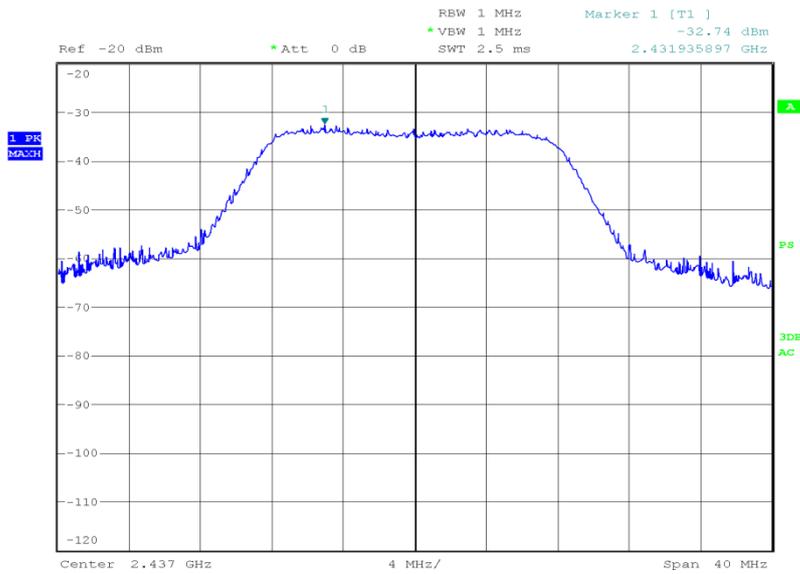
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Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
19.61	91.41



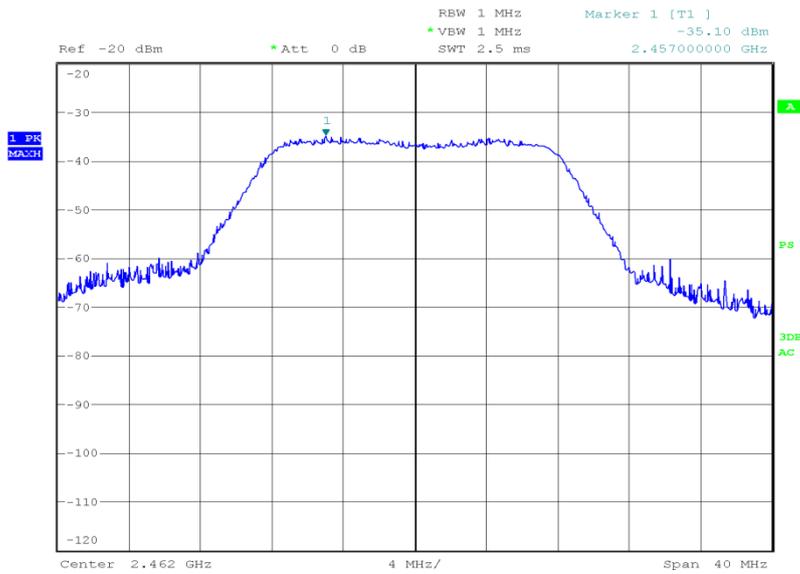
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Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
17.63	57.94



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

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



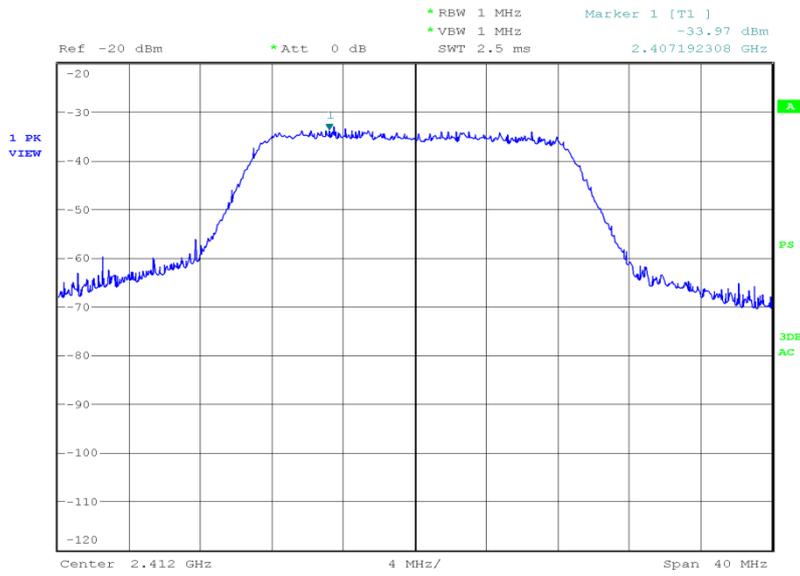
Product Service

802.11(n)

4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
19.43	87.70



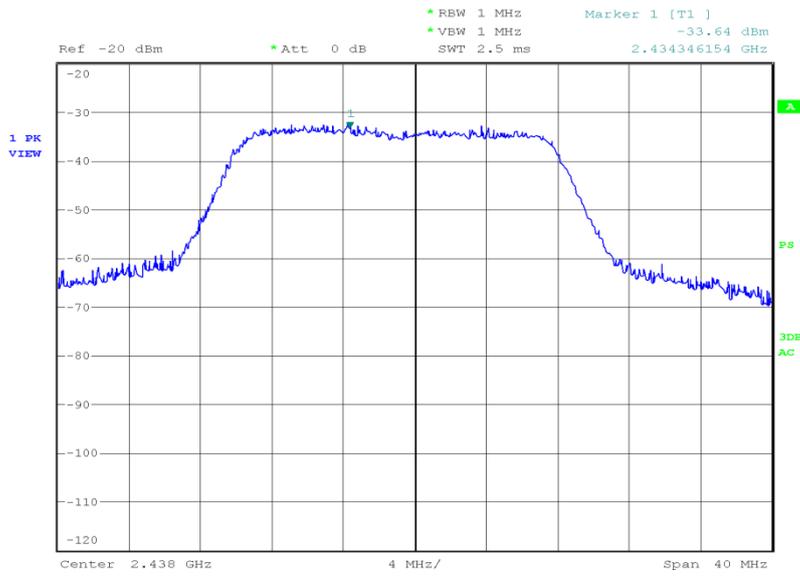
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Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
19.31	85.31



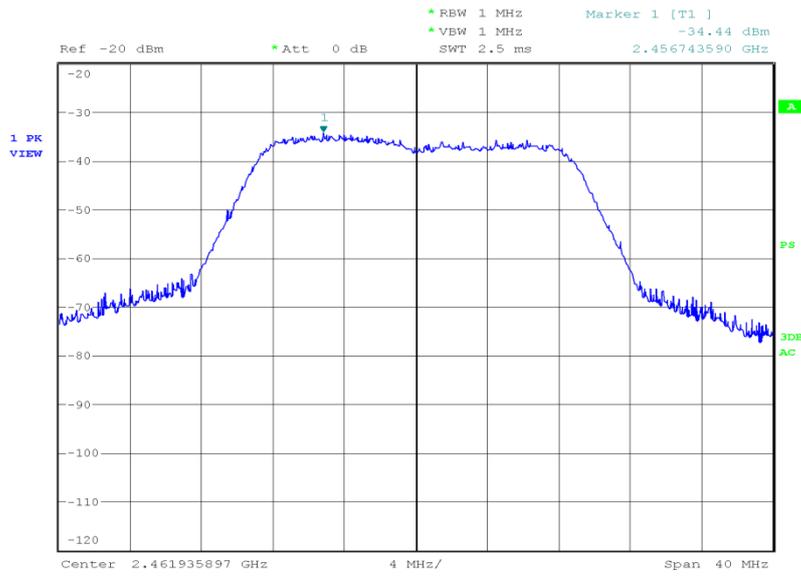
Date: 17.APR.2014 00:28:33



Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
19.03	79.98



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

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



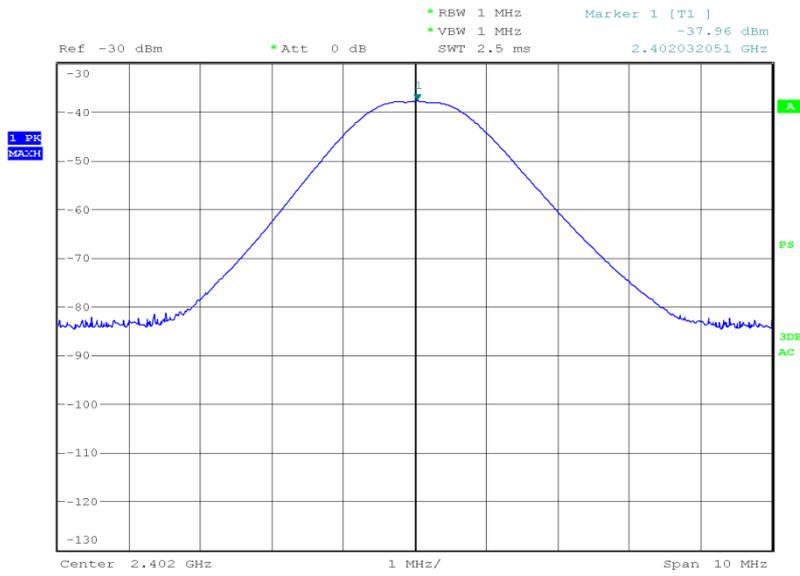
Product Service

Bluetooth Low Energy

4.0 V DC Supply

2402 MHz

EIRP (dBm)	EIRP (mW)
3.56	2.27



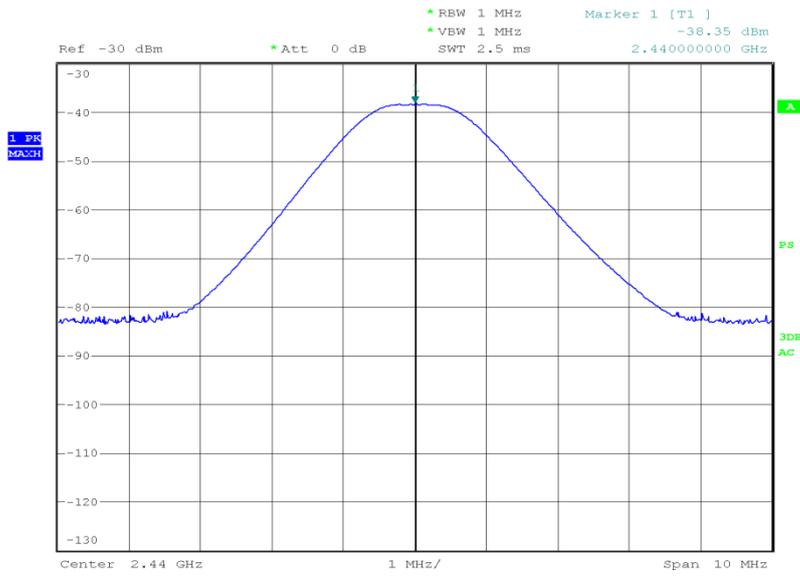
Date: 8.APR.2014 17:09:58



Product Service

2440 MHz

EIRP (dBm)	EIRP (mW)
3.42	2.20



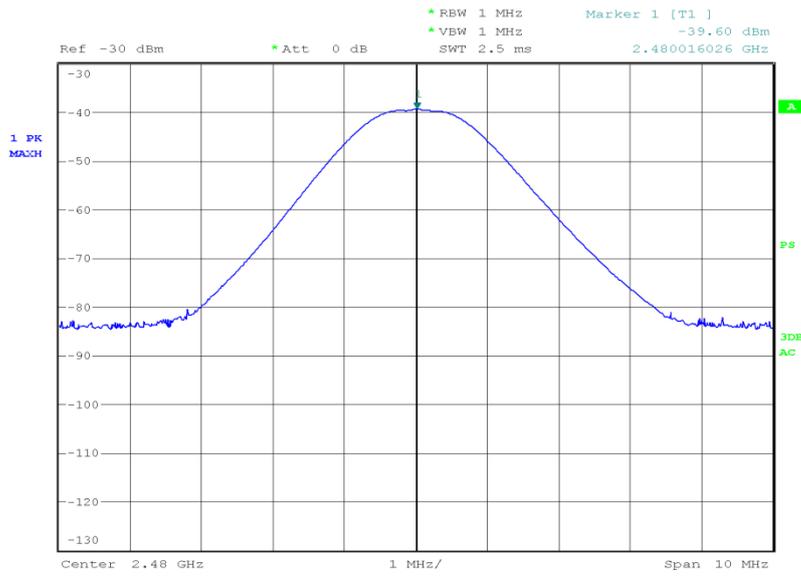
Date: 8.APR.2014 17:42:43



Product Service

2480 MHz

EIRP (dBm)	EIRP (mW)
2.49	1.77



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

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



2.5 SPURIOUS AND BAND EDGE EMISSIONS

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test and Modification State

SHL25 S/N: IMEI 004401115170488 - Modification State 0

SHL25 S/N: IMEI 004401115170256 - Modification State 0

2.5.3 Date of Test

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

2.5.4 Test Equipment Used

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

2.5.5 Test Procedure

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

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

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

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

2.5.6 Environmental Conditions

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



Product Service

2.5.7 Test Results

802.11(b)

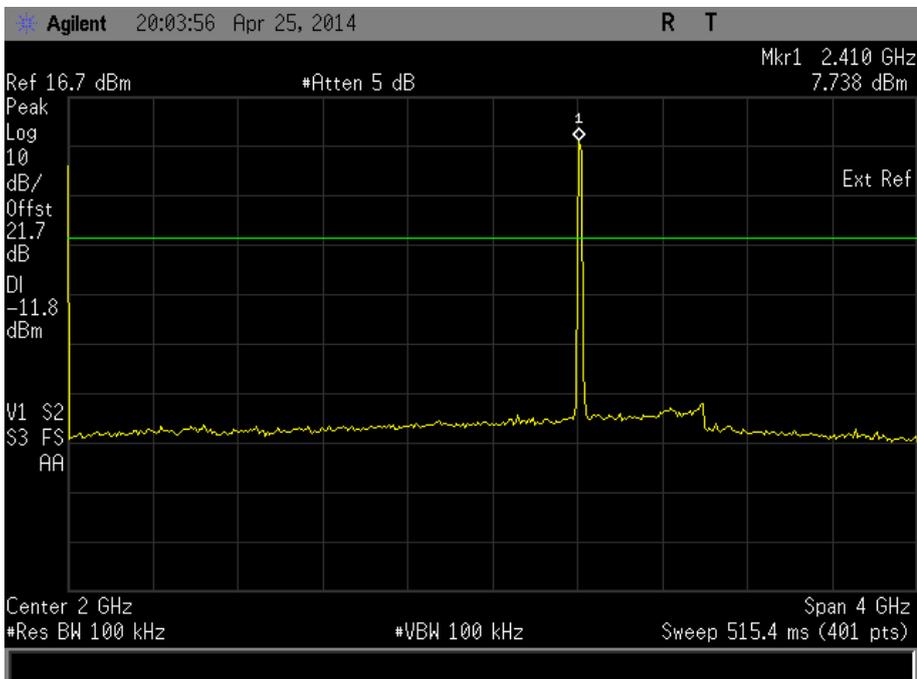
4.0 V DC Supply

Spurious Conducted Emissions

11 Mbps

2412 MHz

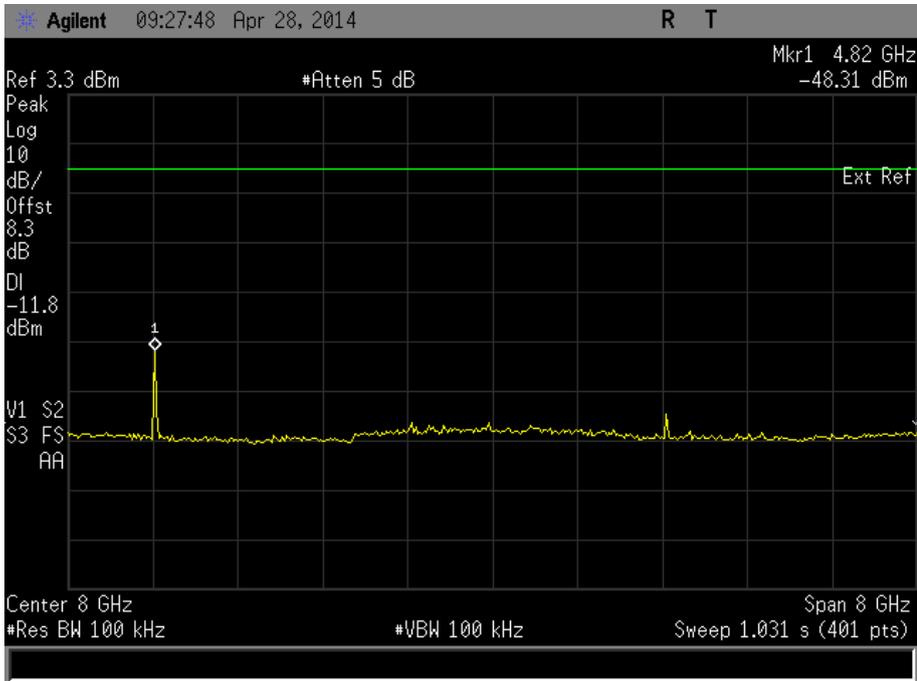
9 kHz to 4 GHz



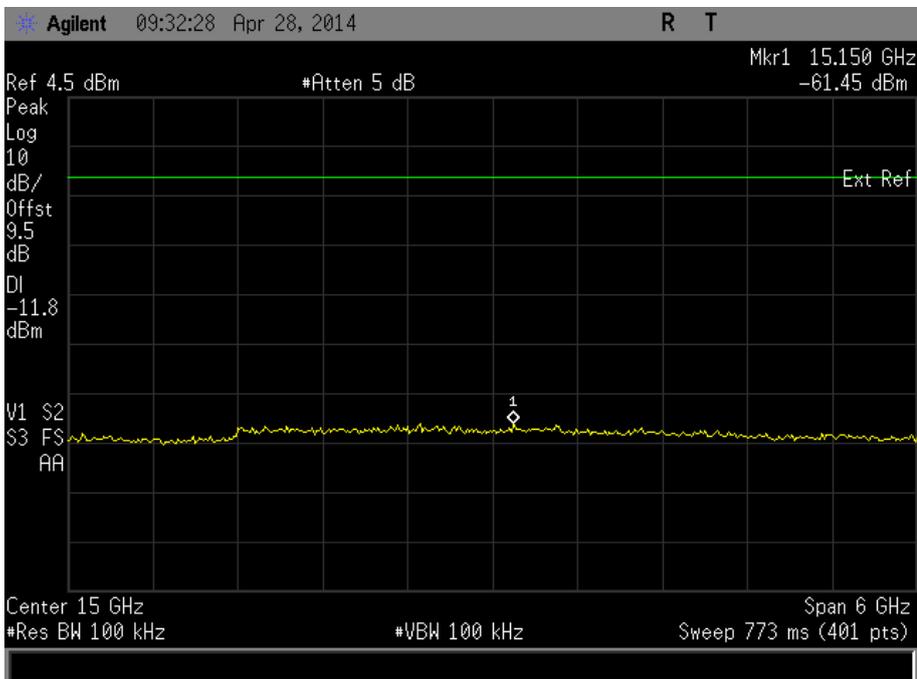


Product Service

4 GHz to 12 GHz



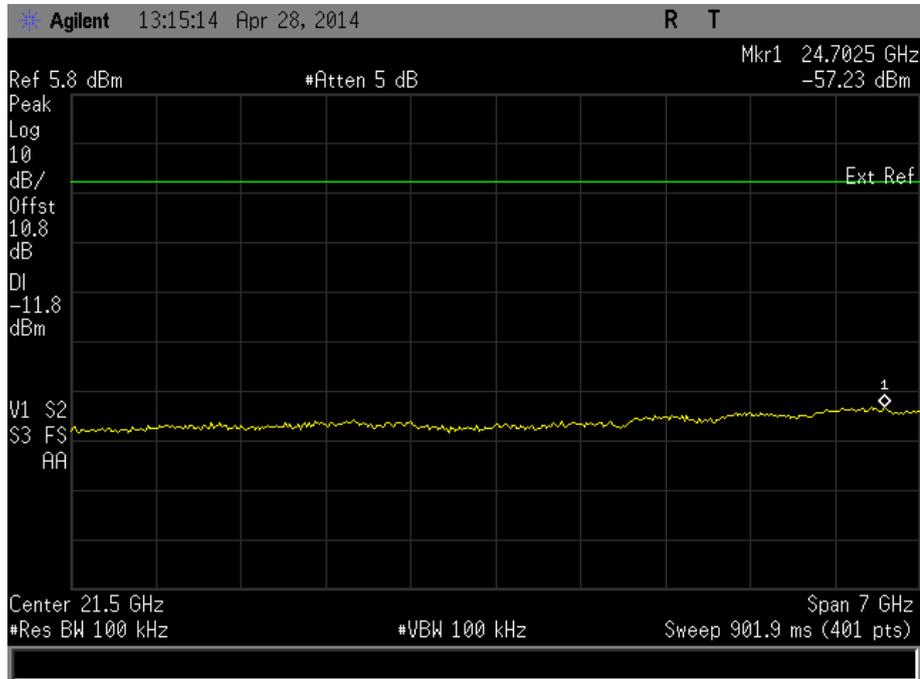
12 GHz to 18 GHz





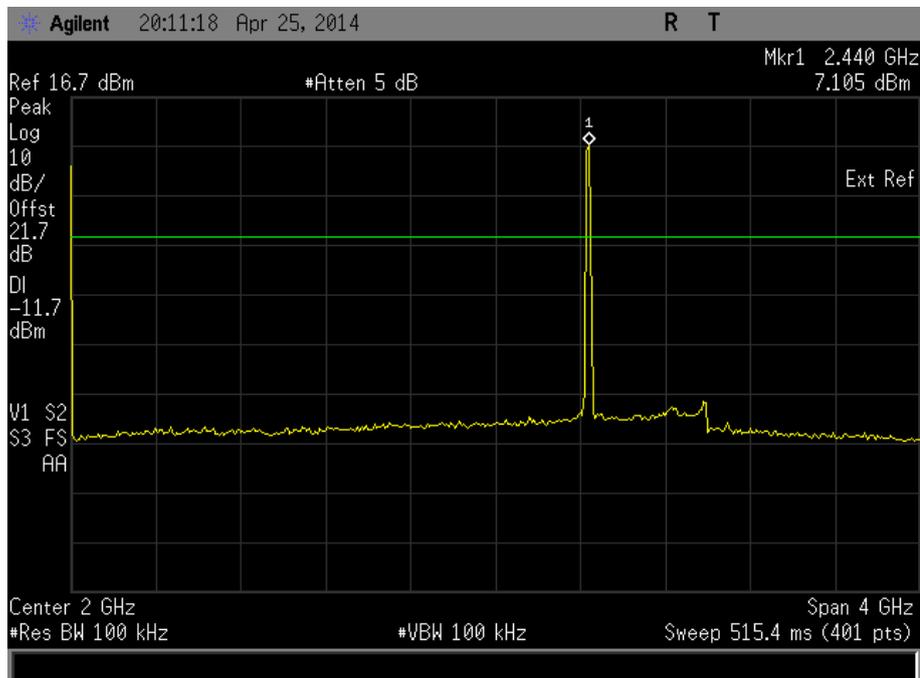
Product Service

18 GHz to 25 GHz



2437 MHz

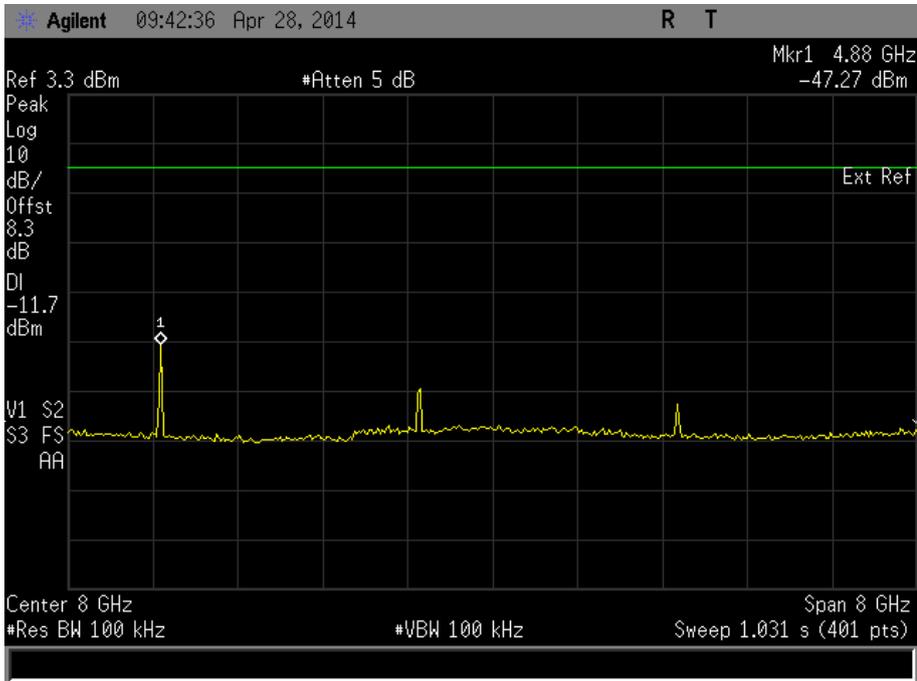
9 kHz to 4 GHz



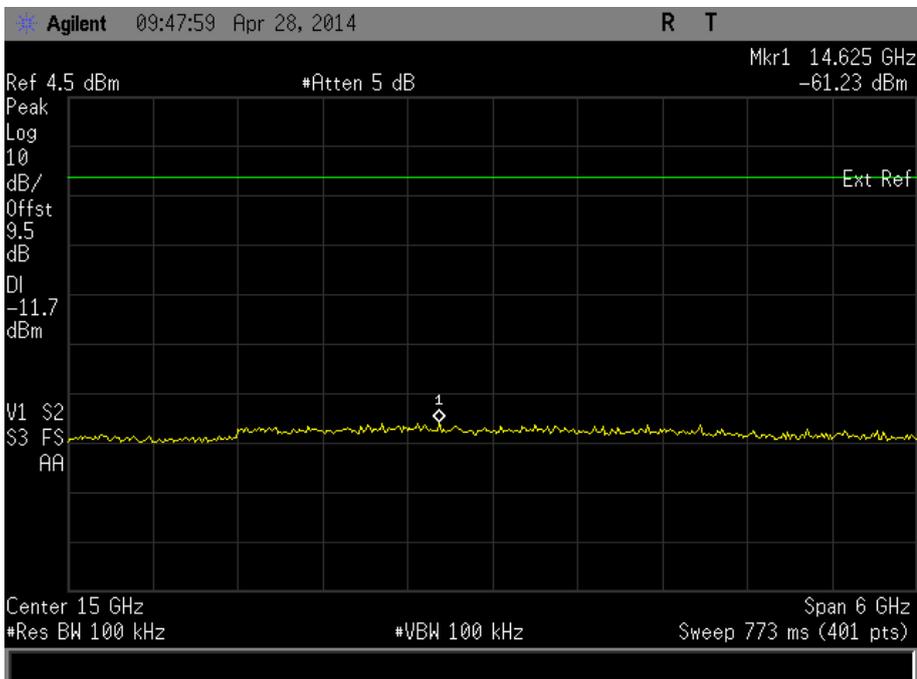


Product Service

4 GHz to 12 GHz



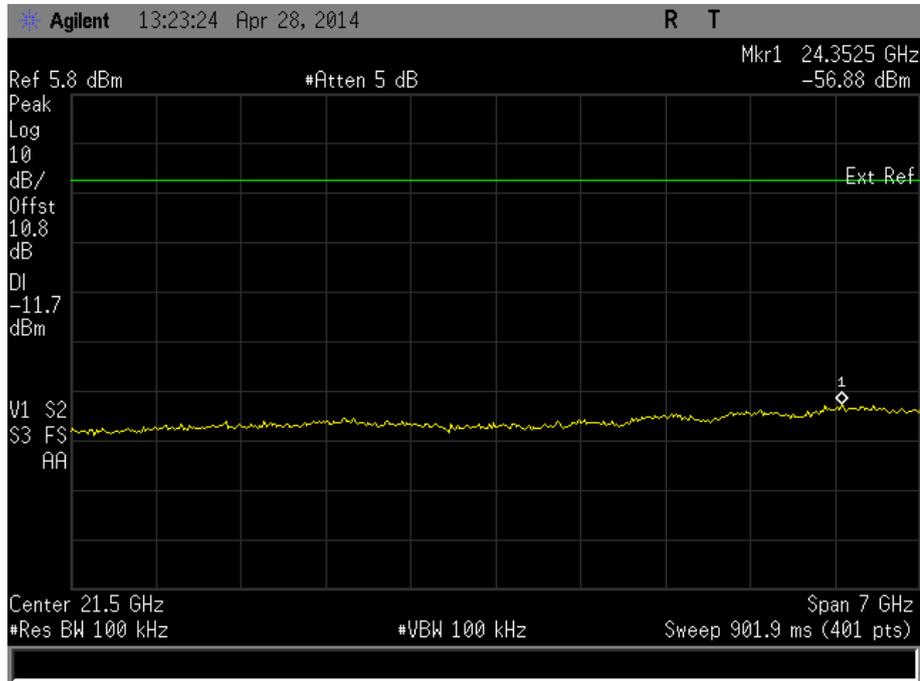
12 GHz to 18 GHz





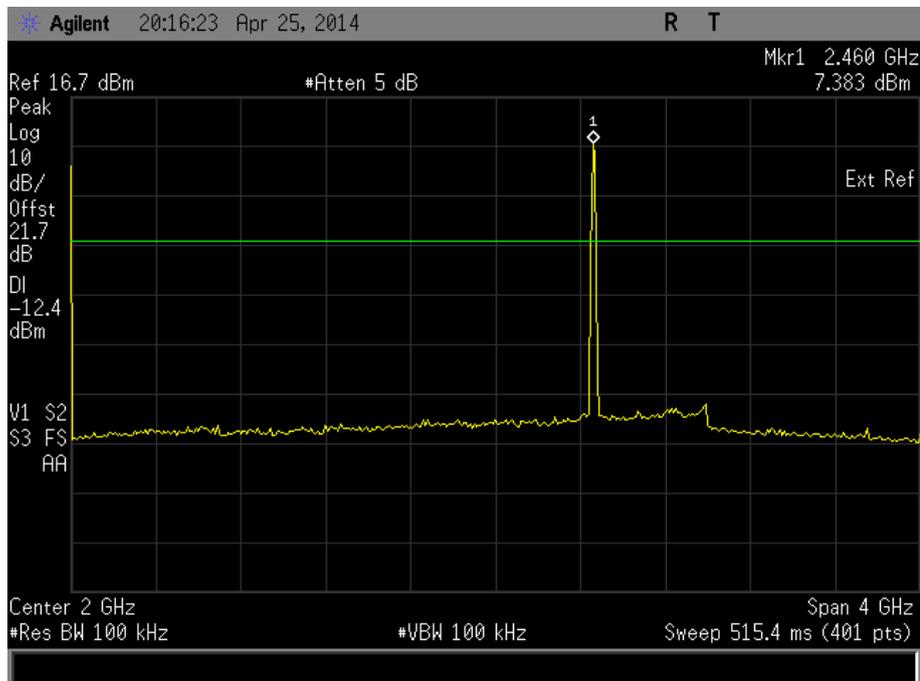
Product Service

18 GHz to 25 GHz



2462 MHz

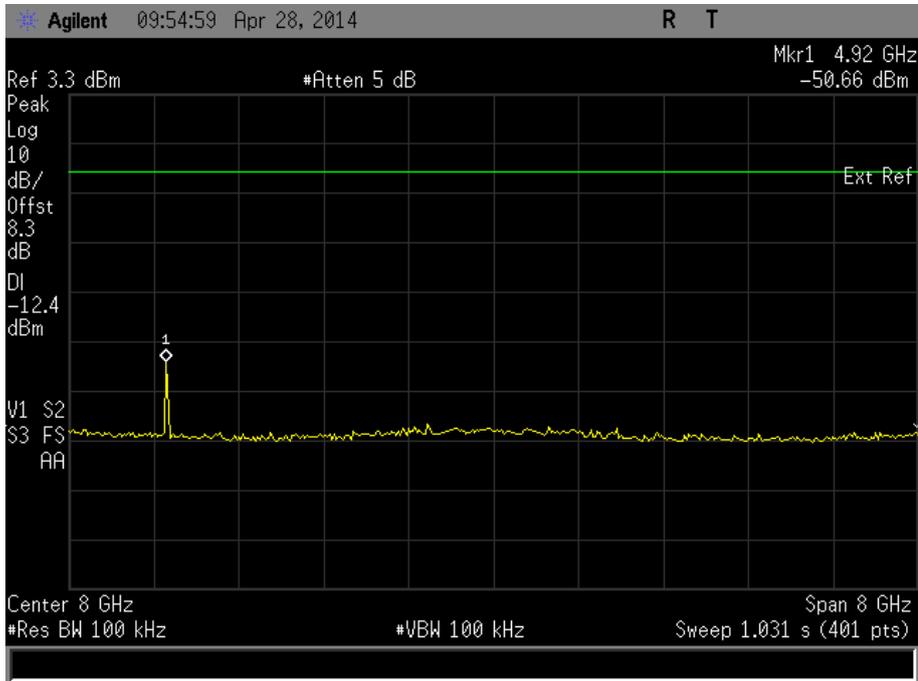
9 kHz to 4 GHz



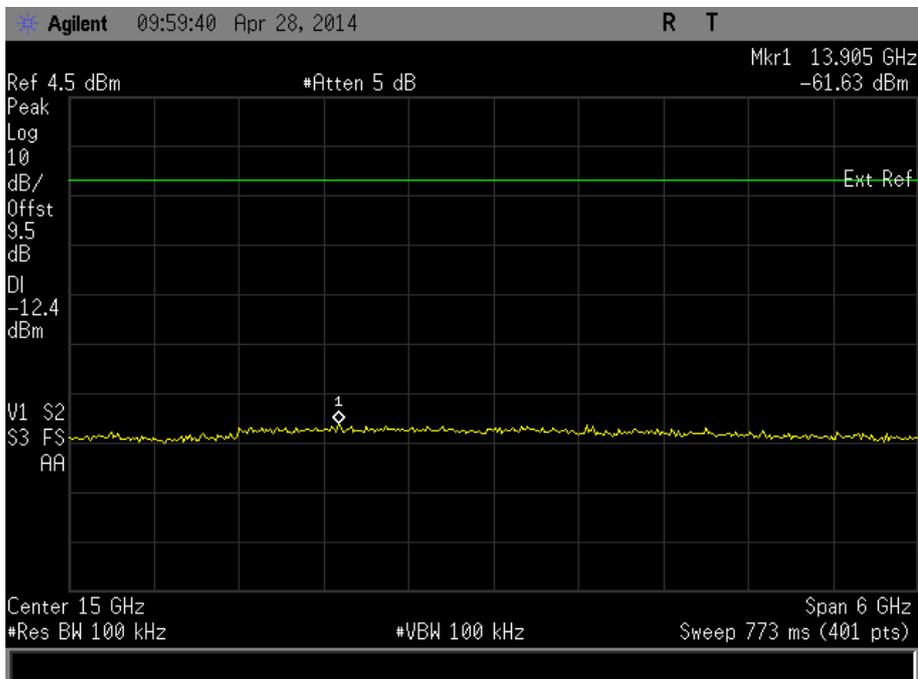


Product Service

4 GHz to 12 GHz



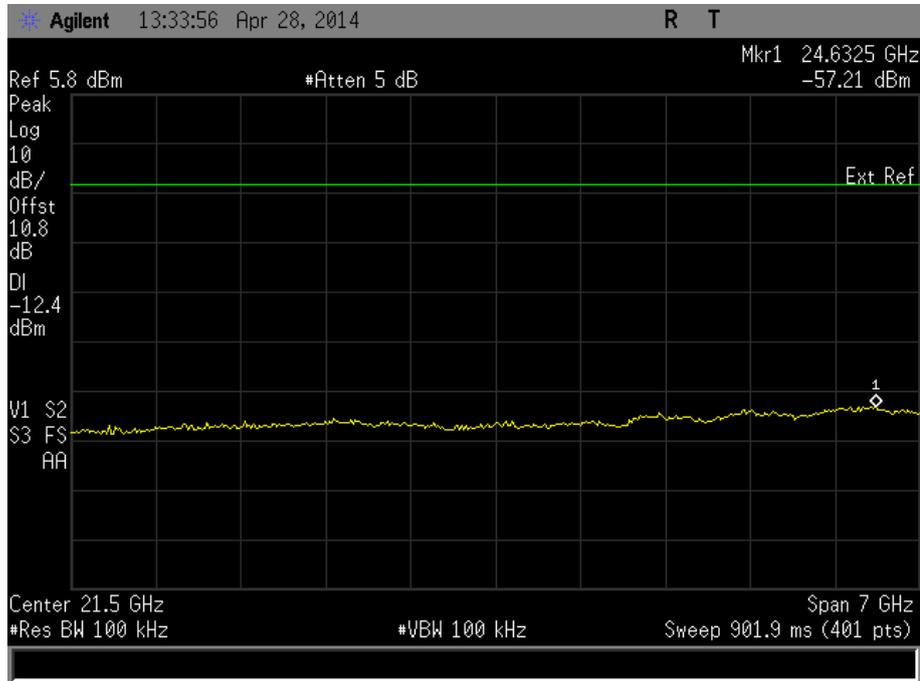
12 GHz to 18 GHz





Product Service

18 GHz to 25 GHz



Limit Clause

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

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

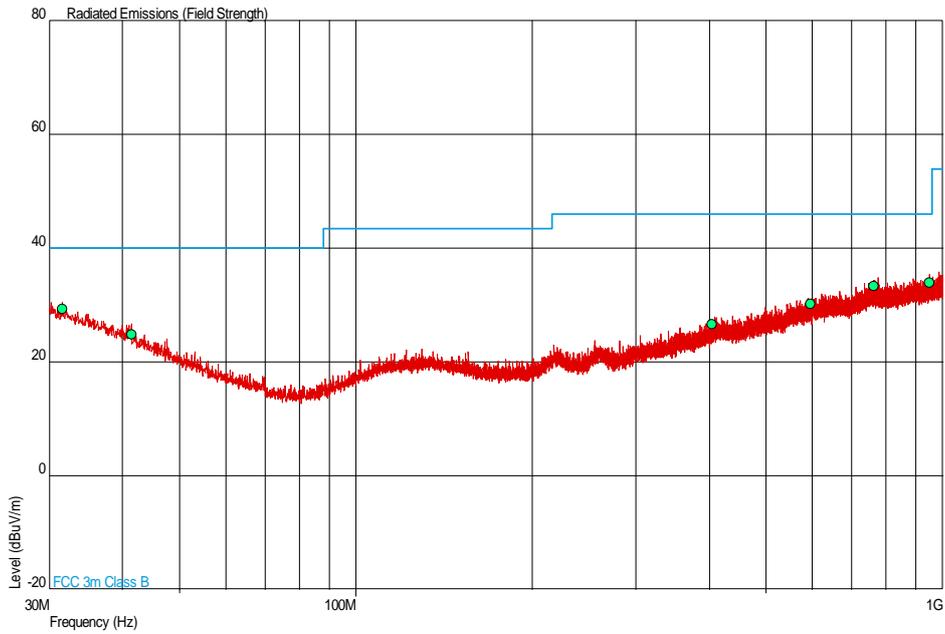


Product Service

Spurious Radiated Emissions

2412 MHz

30 MHz to 1 GHz

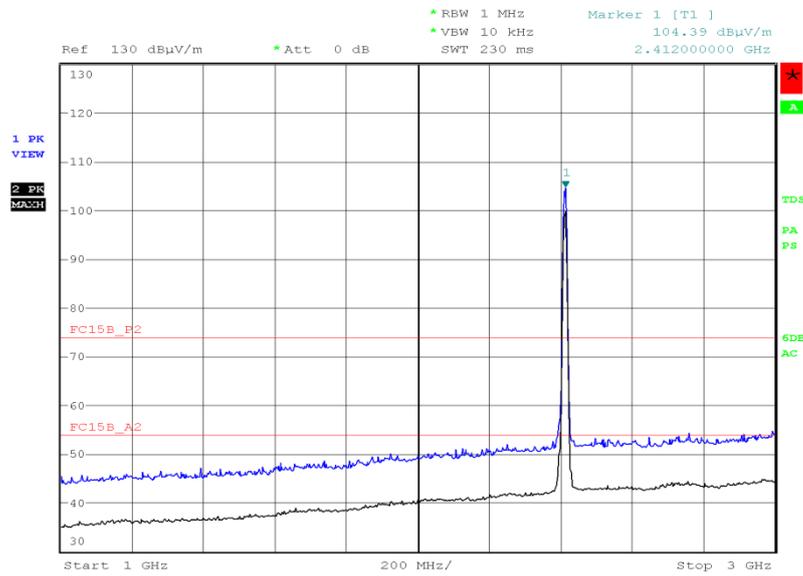


Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
31.603	29.3	29.2	40.0	100	-10.7	-70.8	125	2.11	Vertical
41.453	24.9	17.6	40.0	100	-15.1	-82.4	31	1.00	Vertical
404.860	26.7	21.6	46.0	200	-19.3	-178.4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



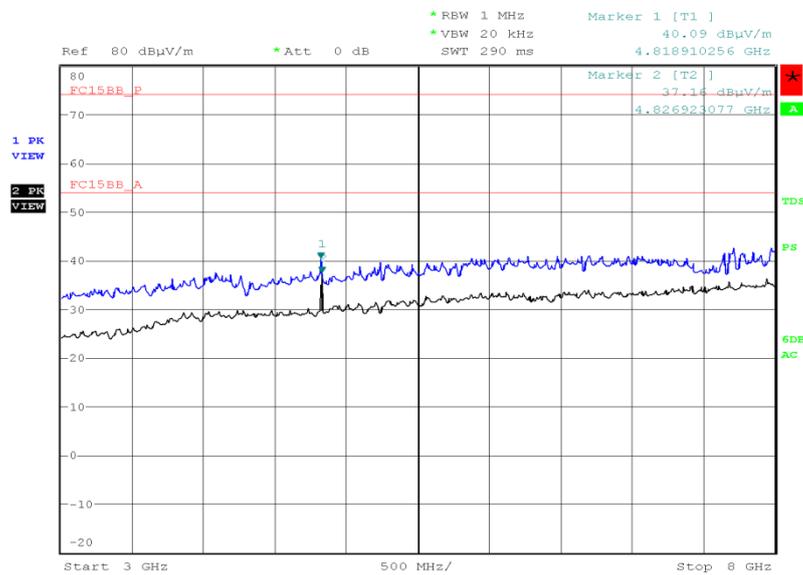
Product Service

1 GHz to 3 GHz



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

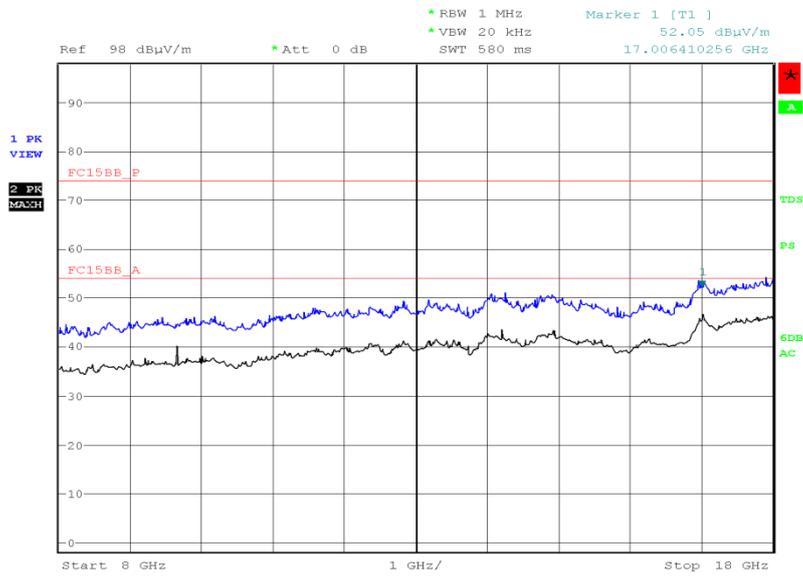
3 GHz to 8 GHz



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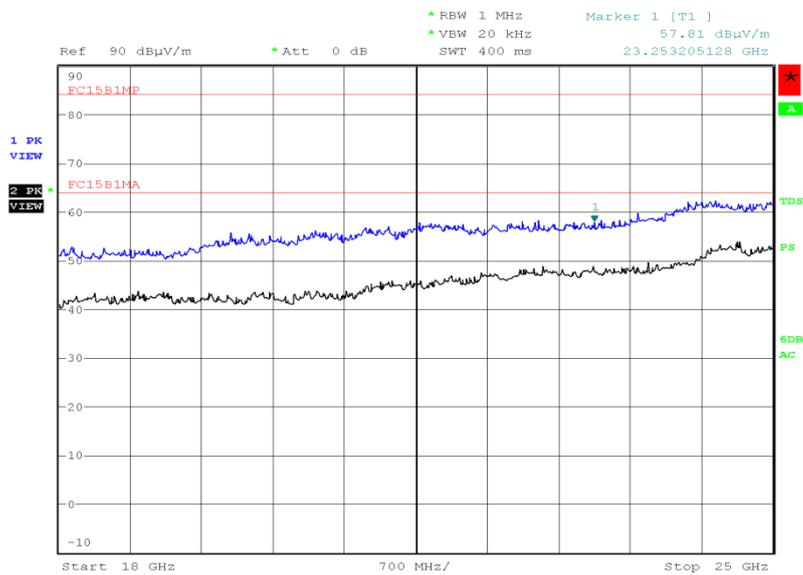


8 GHz to 18 GHz



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

18 GHz to 25 GHz

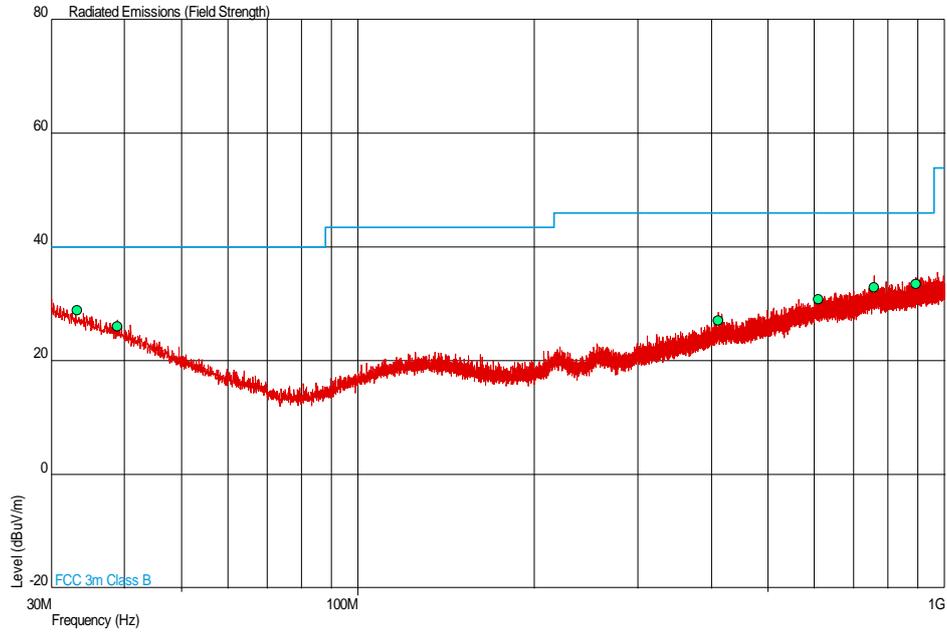


Date: 17.APR.2014 04:27:08



2437 MHz

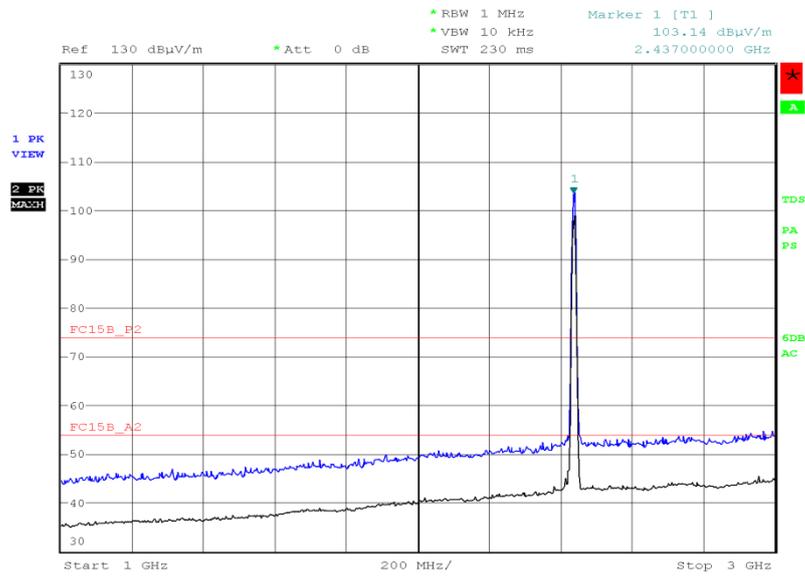
30 MHz to 1 GHz



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
33.228	28.9	27.9	40.0	100	-11.1	-72.1	322	1.00	Horizontal
38.960	26.1	20.2	40.0	100	-13.9	-79.8	193	1.00	Horizontal
411.241	27.1	22.6	46.0	200	-18.9	-177.4	241	1.00	Horizontal
609.234	30.8	34.7	46.0	200	-15.2	-165.3	342	1.30	Horizontal
757.597	32.9	44.2	46.0	200	-13.1	-155.8	0	1.00	Vertical
892.739	33.6	47.9	46.0	200	-12.4	-152.1	176	1.81	Horizontal

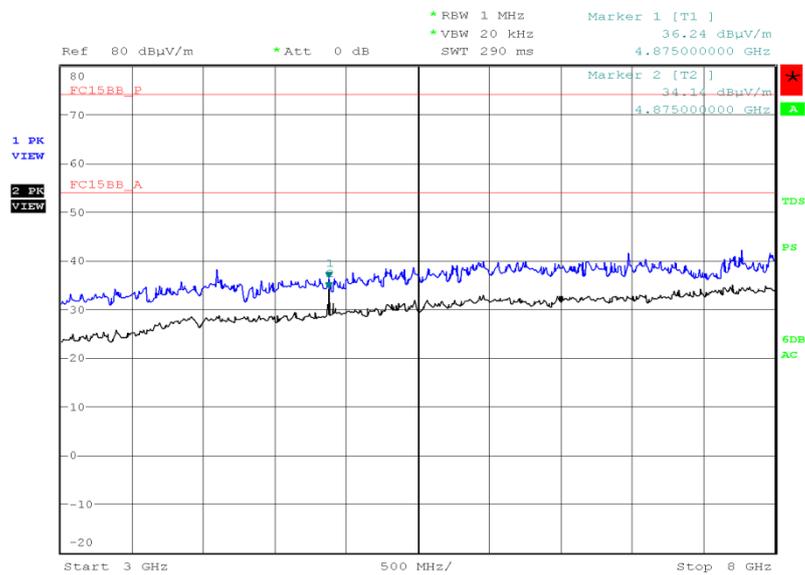


1 GHz to 3 GHz



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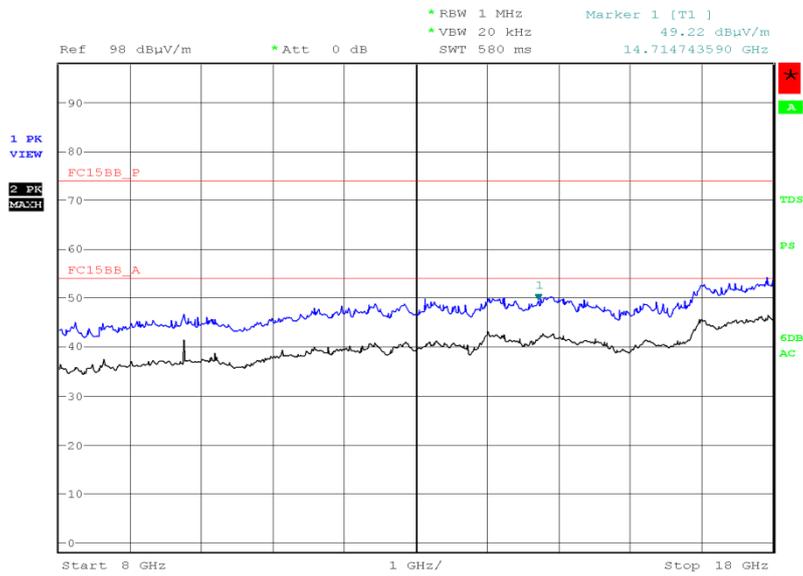
3 GHz to 8 GHz



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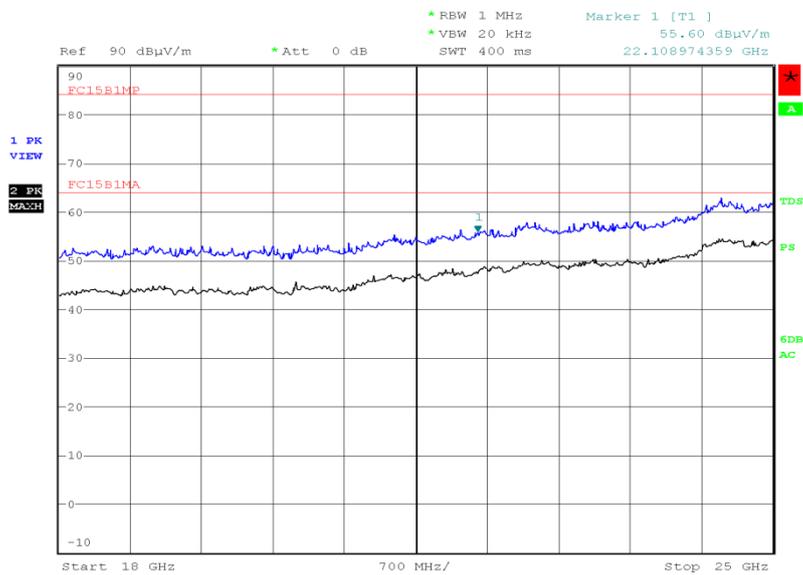


8 GHz to 18 GHz



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

18 GHz to 25 GHz

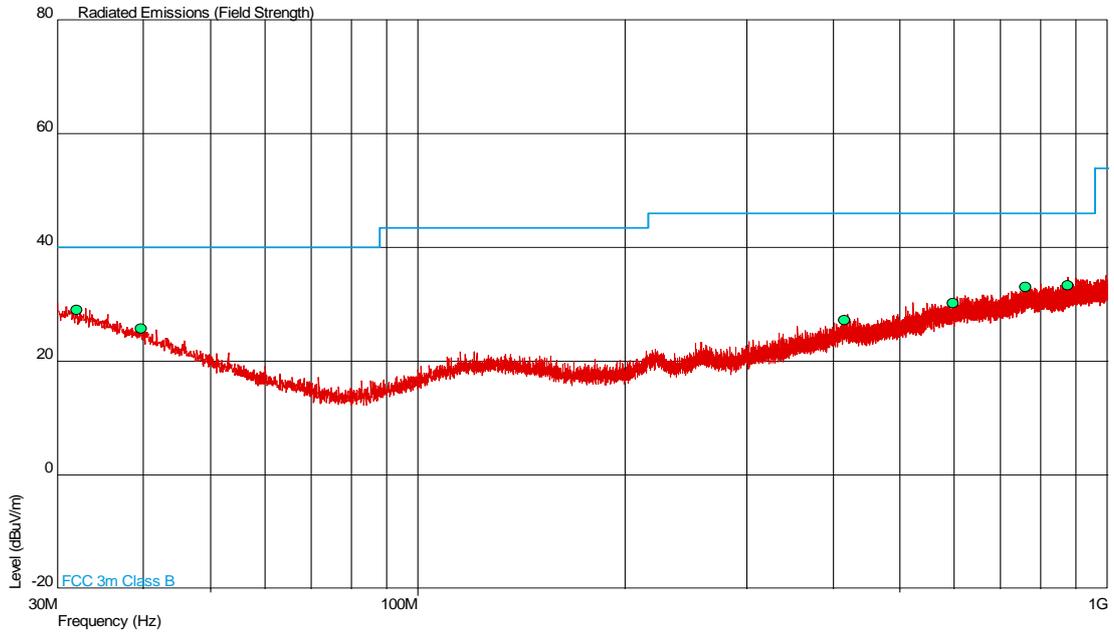


Date: 17.APR.2014 04:33:09



2462 MHz

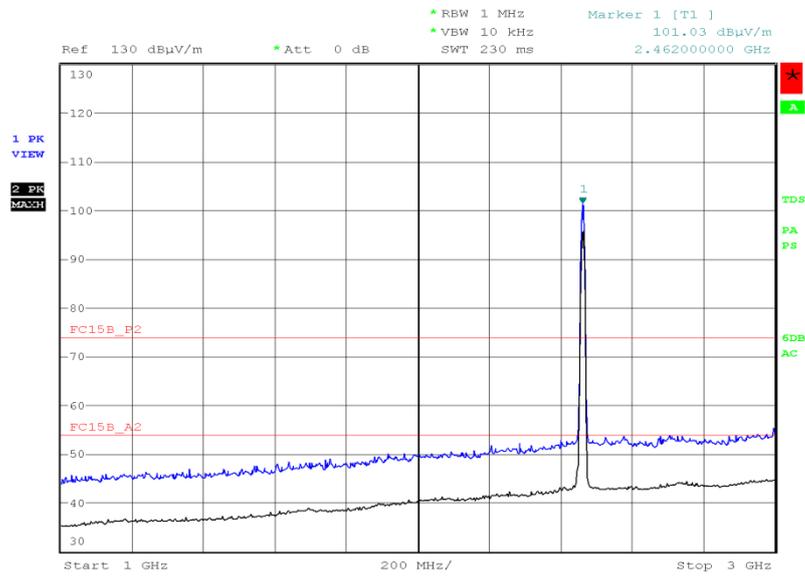
30 MHz to 1 GHz



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

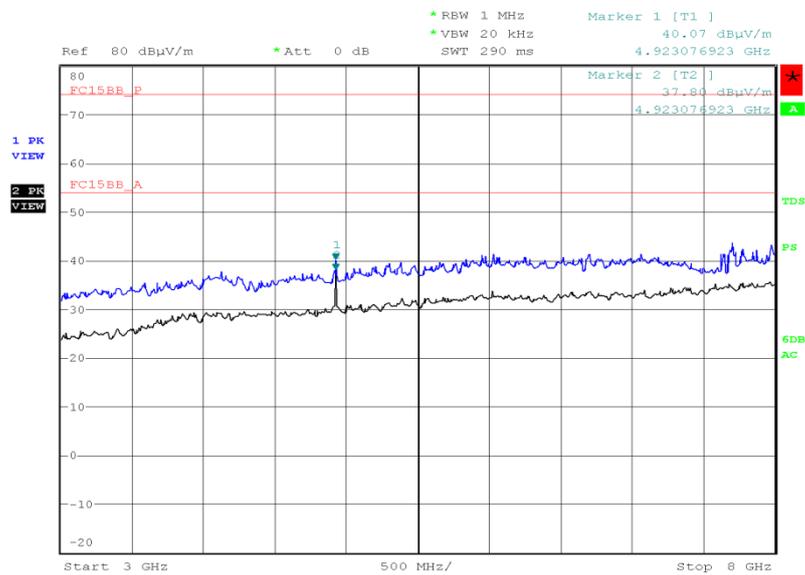


1 GHz to 3 GHz



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

3 GHz to 8 GHz

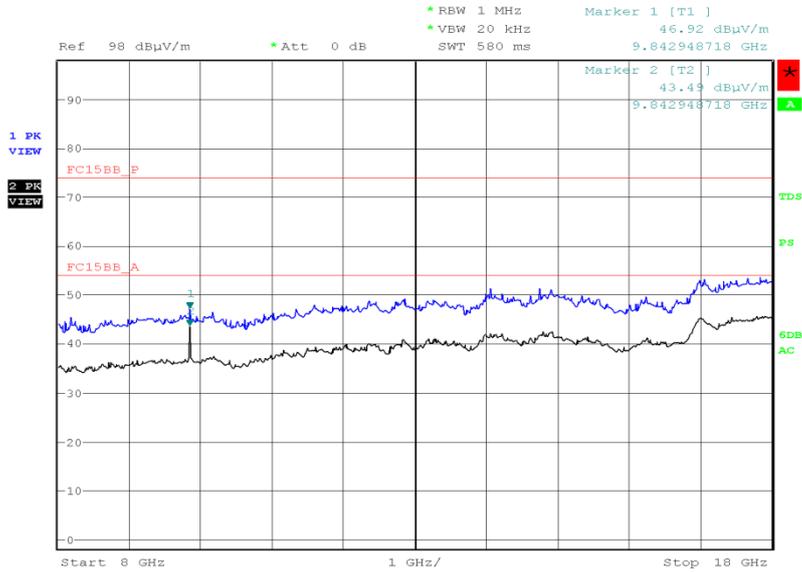


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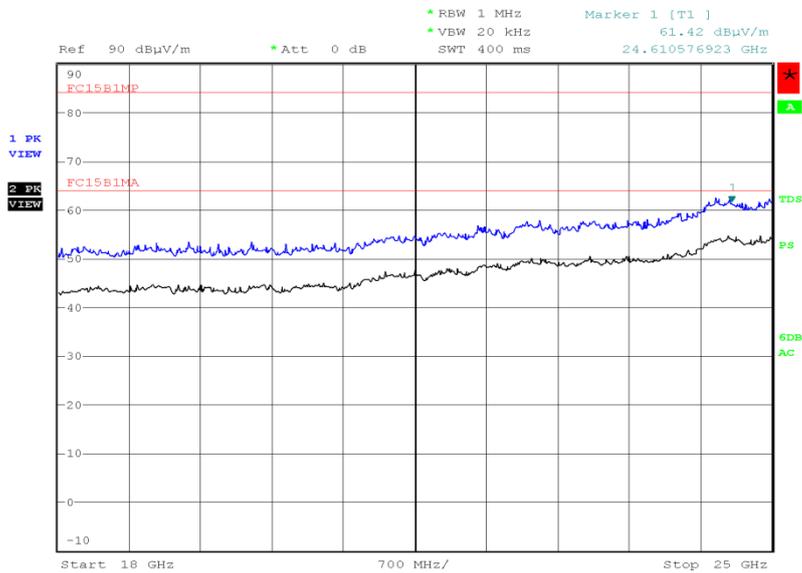
Product Service

8 GHz to 18 GHz



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

18 GHz to 25 GHz



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

Limit

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

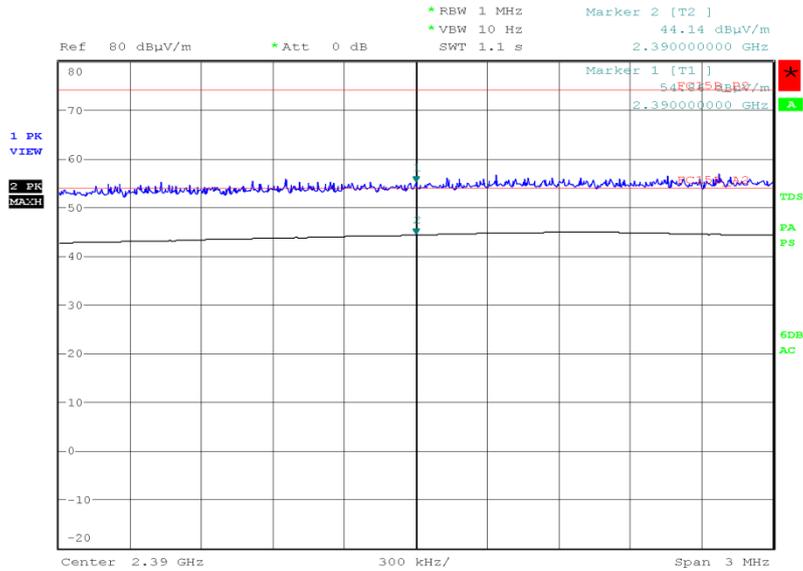


Product Service

Band Edge Emissions

2412 MHz

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



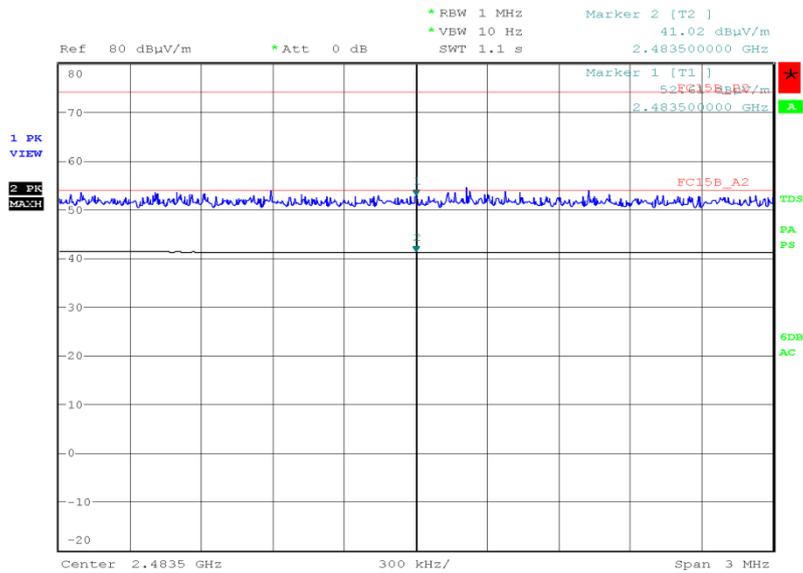
Date: 9.APR.2014 17:28:43



Product Service

2462 MHz

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



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

Limit

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



Product Service

802.11(g)

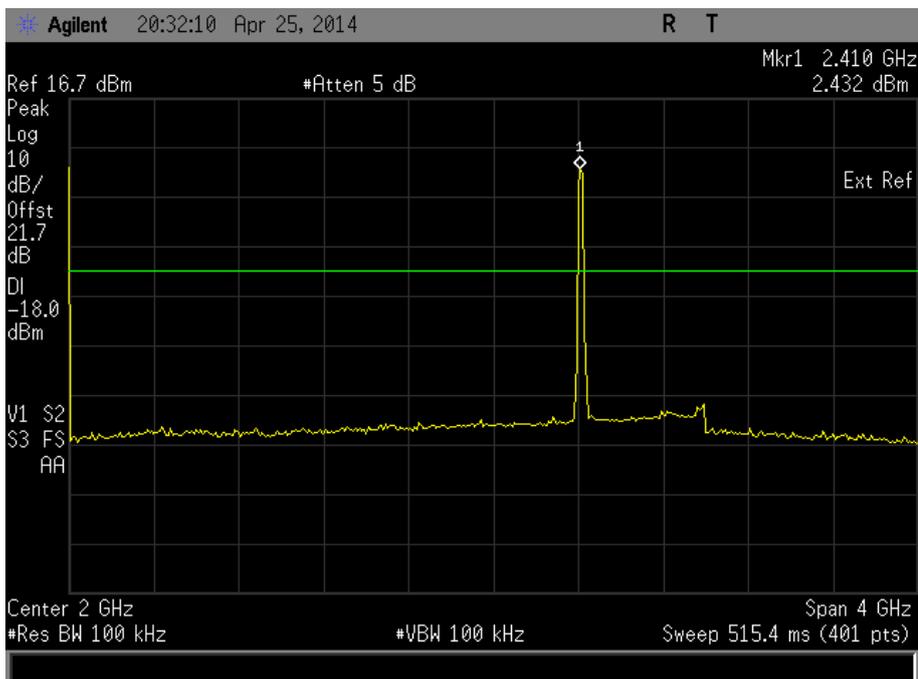
4.0 V DC Supply

Spurious Conducted Emissions

6 Mbps

2412 MHz

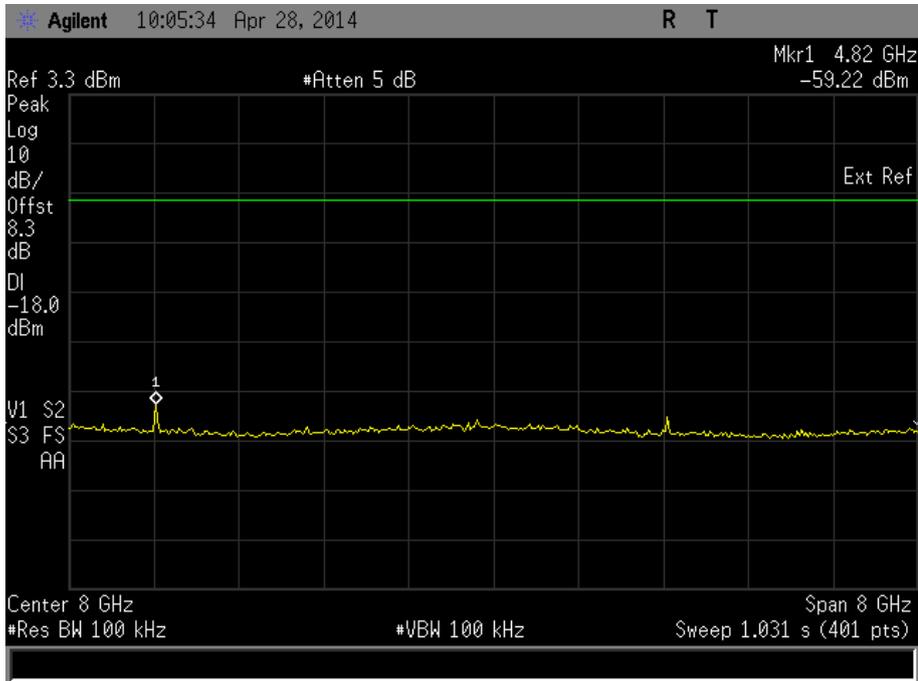
9 kHz to 4 GHz



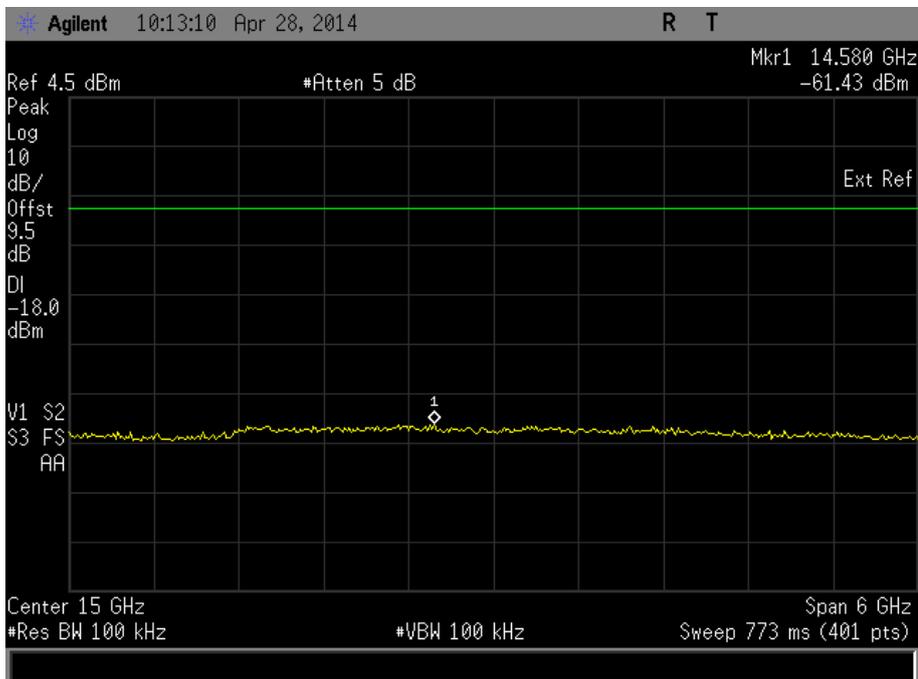


Product Service

4 GHz to 12 GHz



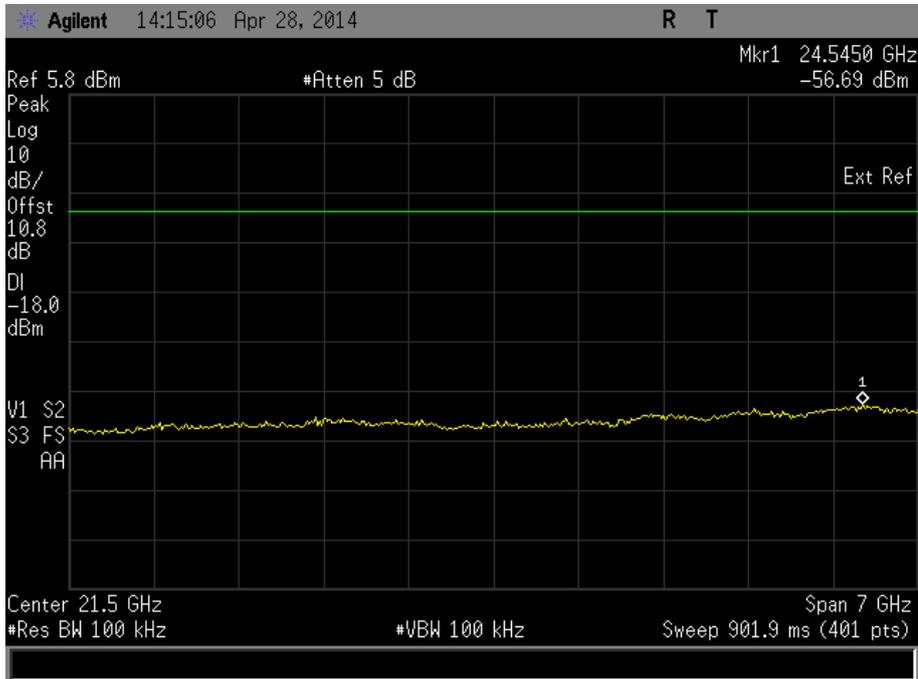
12 GHz to 18 GHz





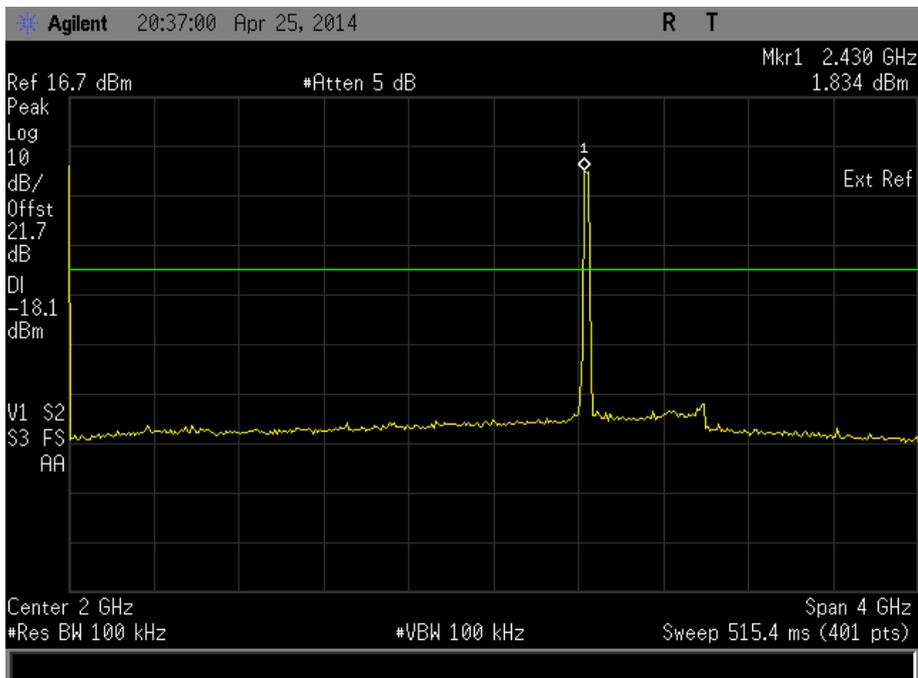
Product Service

18 GHz to 25 GHz



2437 MHz

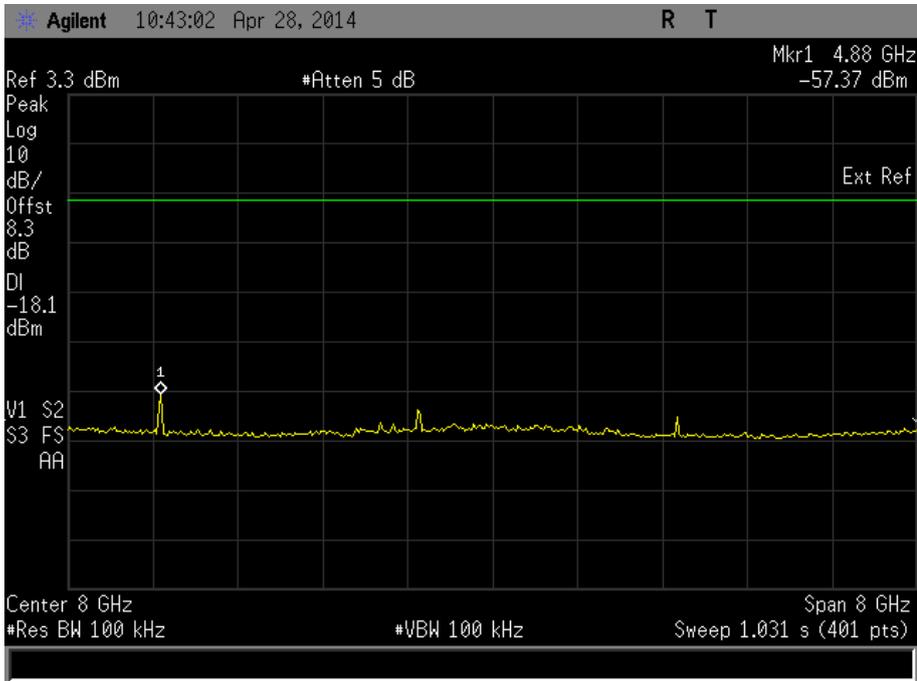
9 kHz to 4 GHz



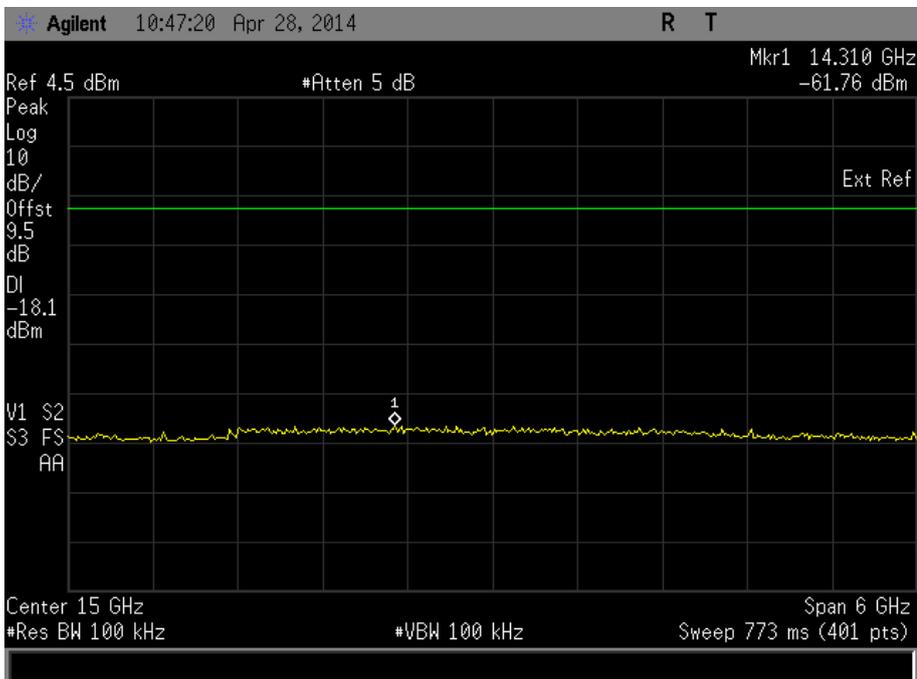


Product Service

4 GHz to 12 GHz



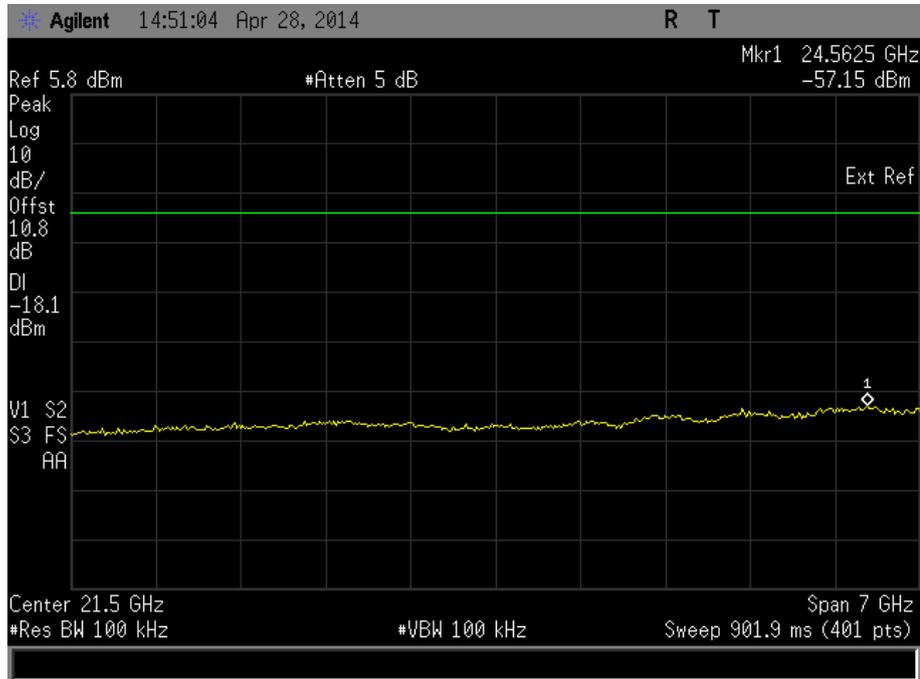
12 GHz to 18 GHz





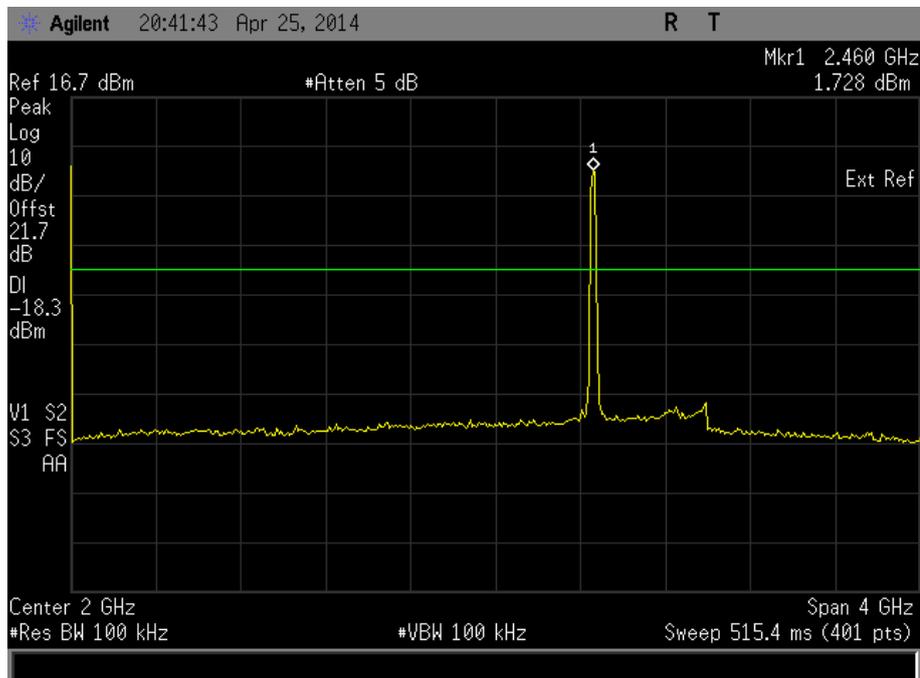
Product Service

18 GHz to 25 GHz



2462 MHz

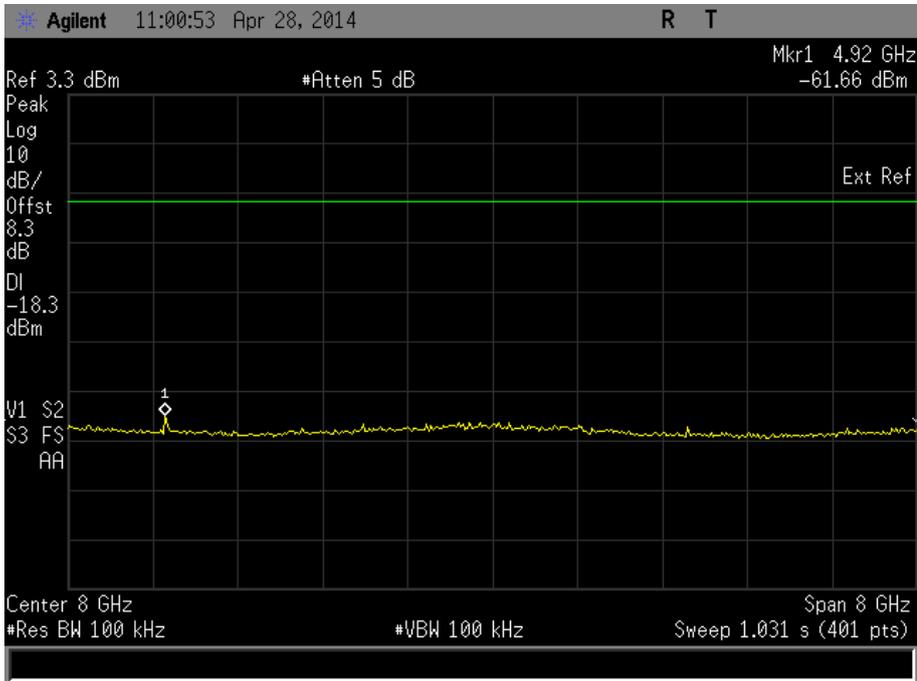
9 kHz to 4 GHz



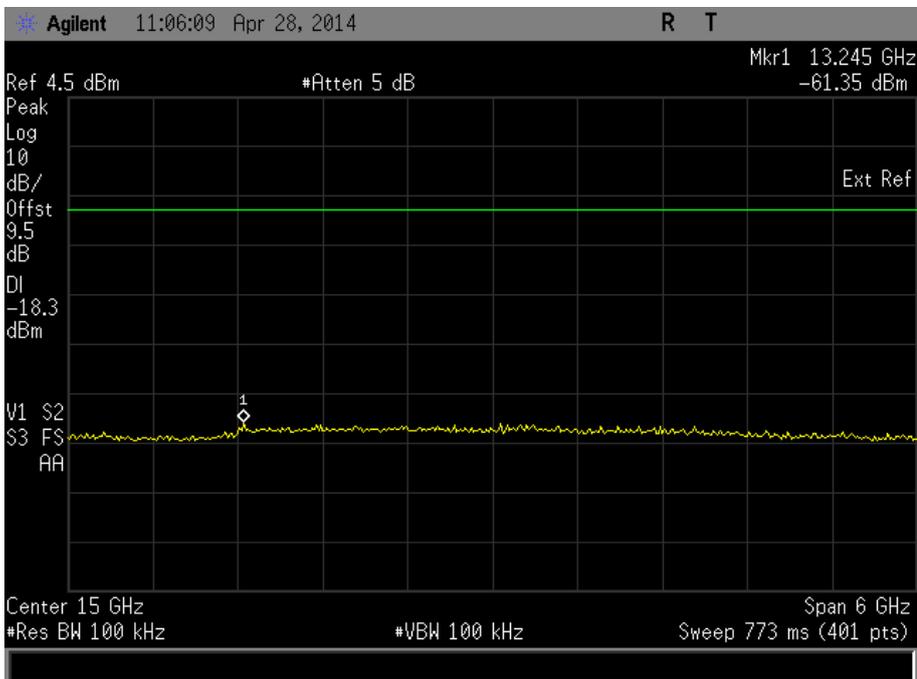


Product Service

4 GHz to 12 GHz



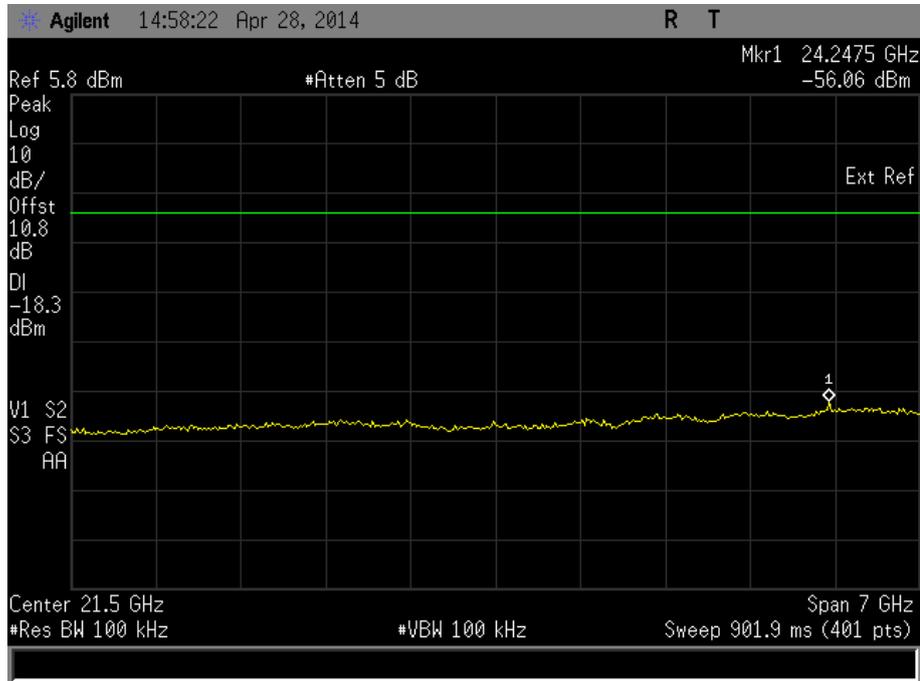
12 GHz to 18 GHz





Product Service

18 GHz to 25 GHz



Limit Clause

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

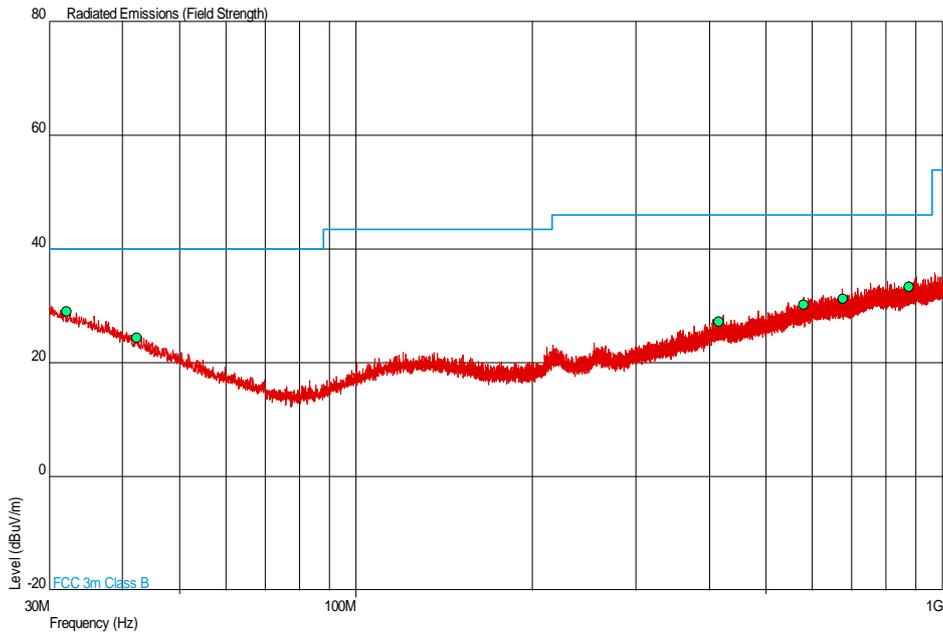
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.



Spurious Radiated Emissions

2412 MHz

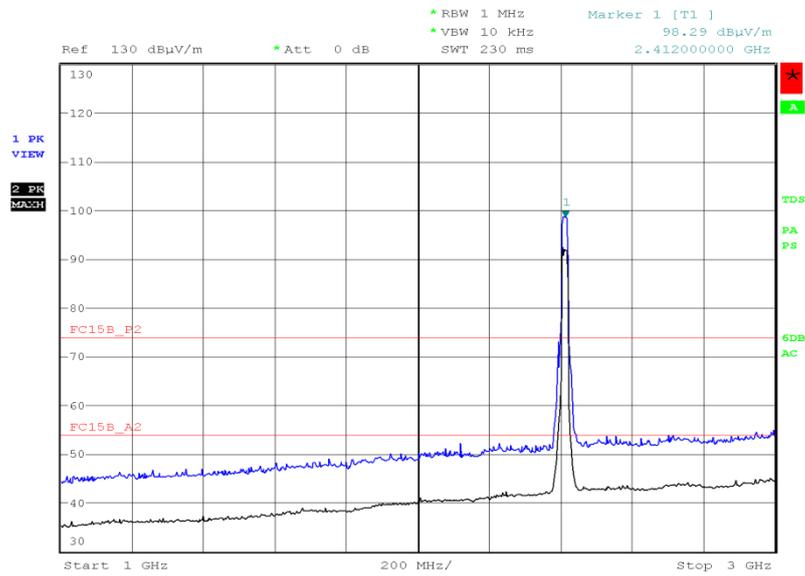
30 MHz to 1 GHz



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

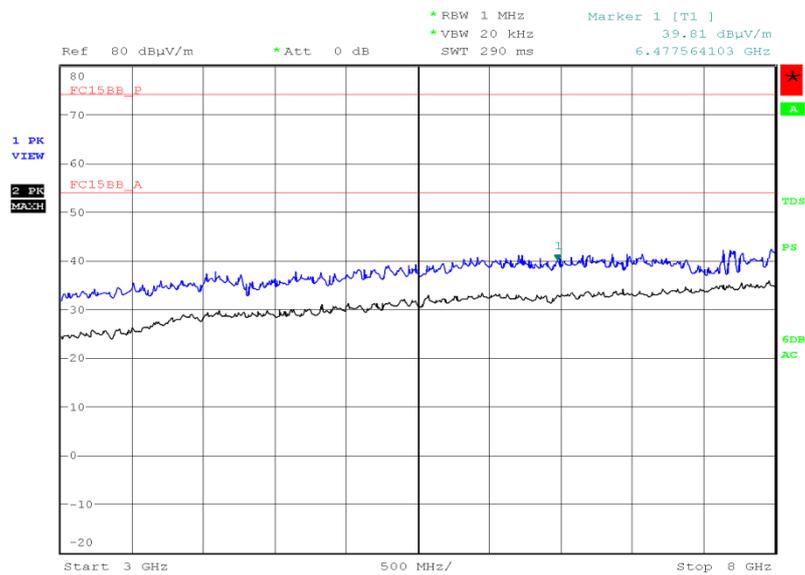


1 GHz to 3 GHz



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

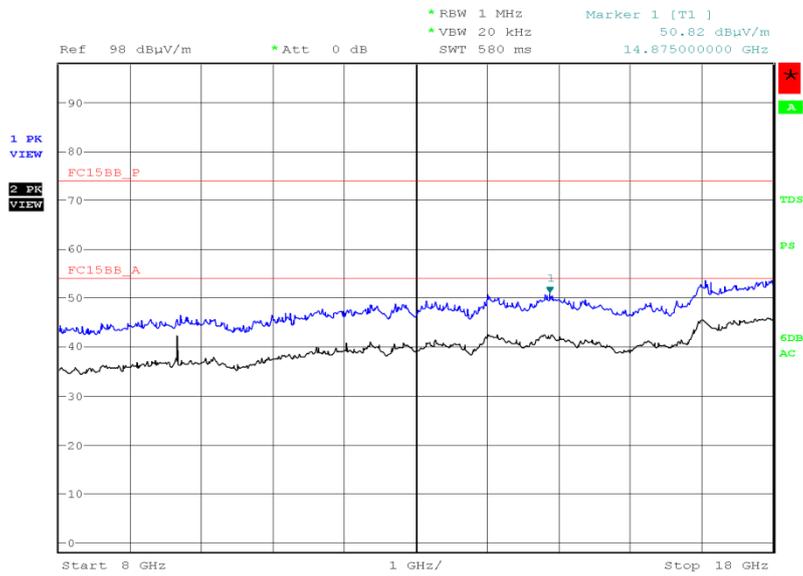
3 GHz to 8 GHz



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

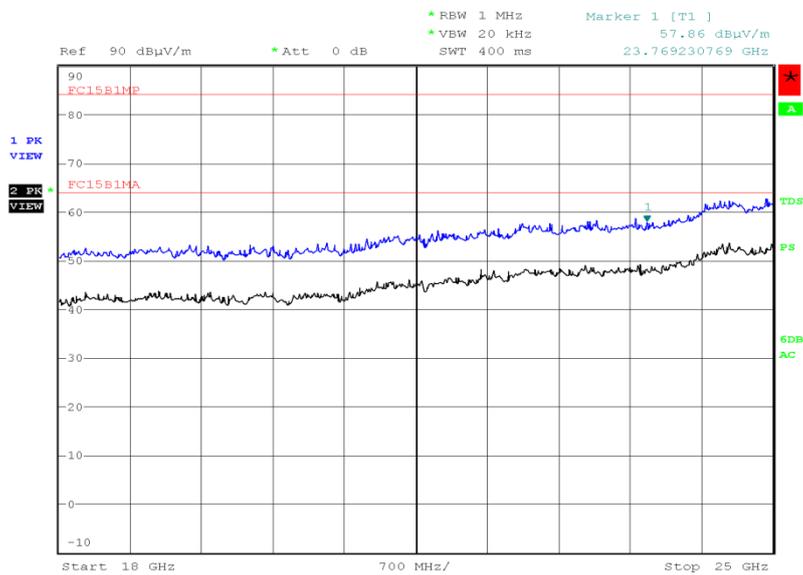


8 GHz to 18 GHz



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

18 GHz to 25 GHz

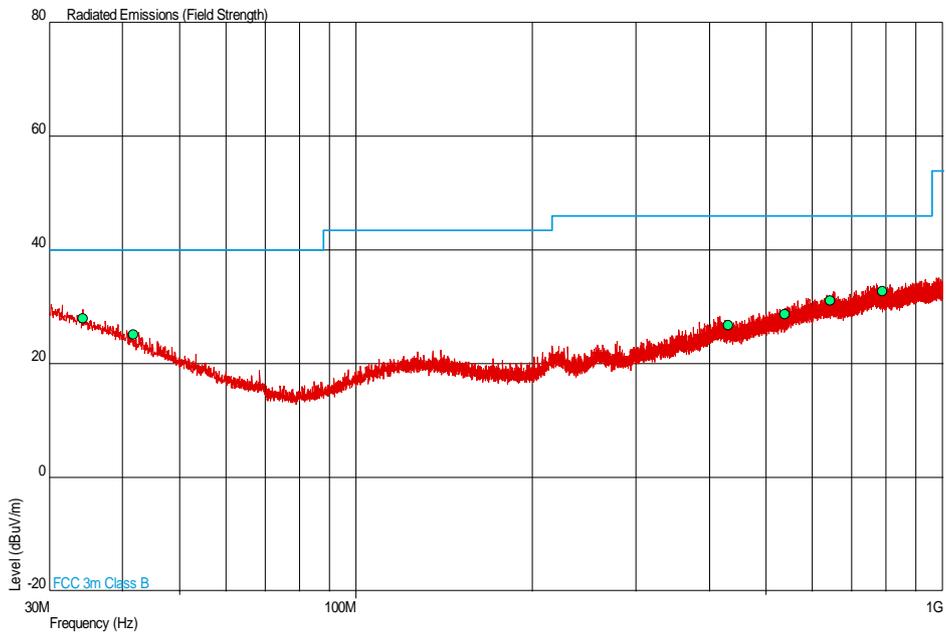


Date: 17.APR.2014 04:44:15



2437 MHz

30 MHz to 1 GHz

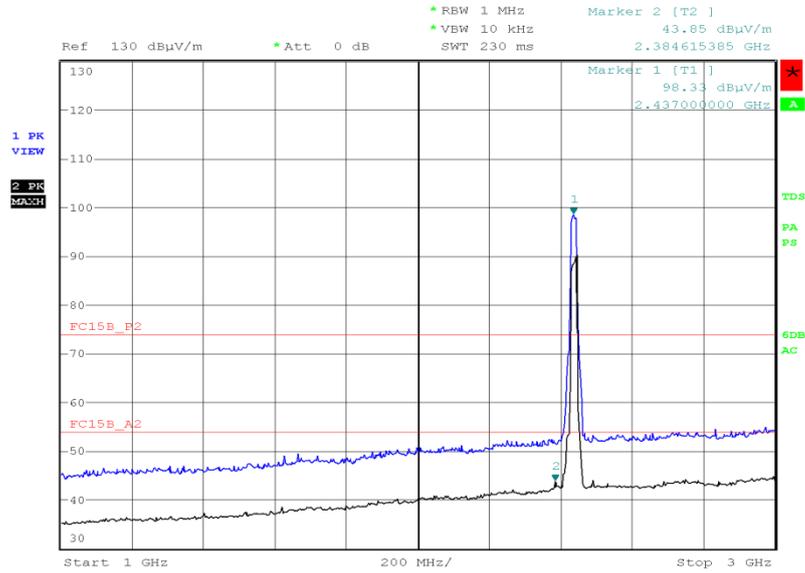


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
34.224	28.0	25.1	40.0	100	-12.0	-74.9	360	2.49	Horizontal
41.802	25.1	18.0	40.0	100	-14.9	-82.0	340	1.00	Horizontal
431.149	26.8	21.9	46.0	200	-19.2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



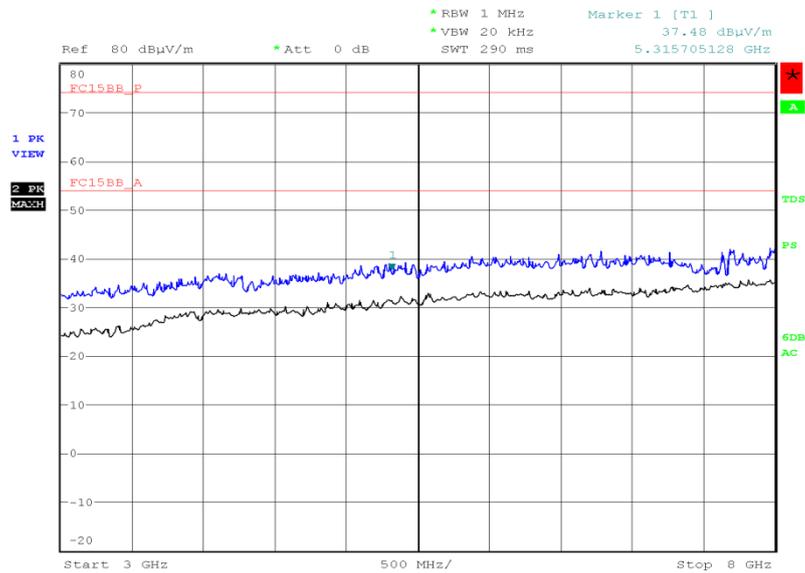
Product Service

1 GHz to 3 GHz



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

3 GHz to 8 GHz

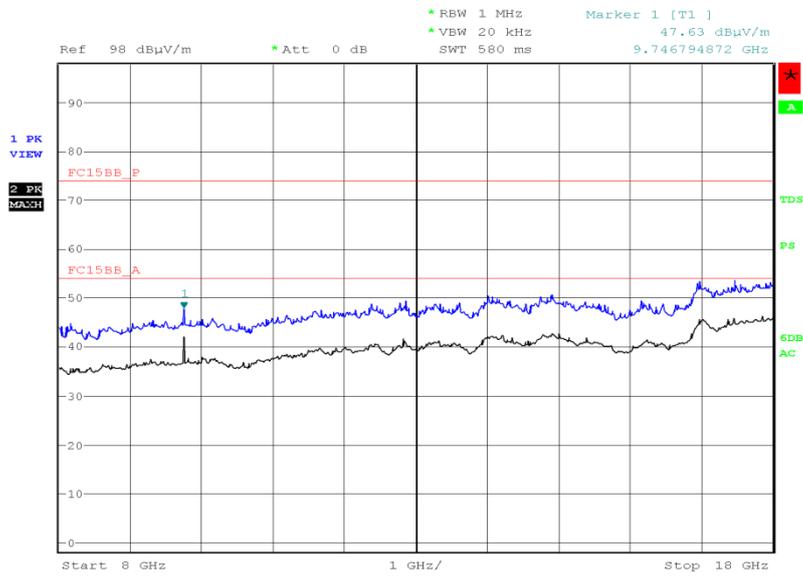


Date: 17.APR.2014 01:53:54



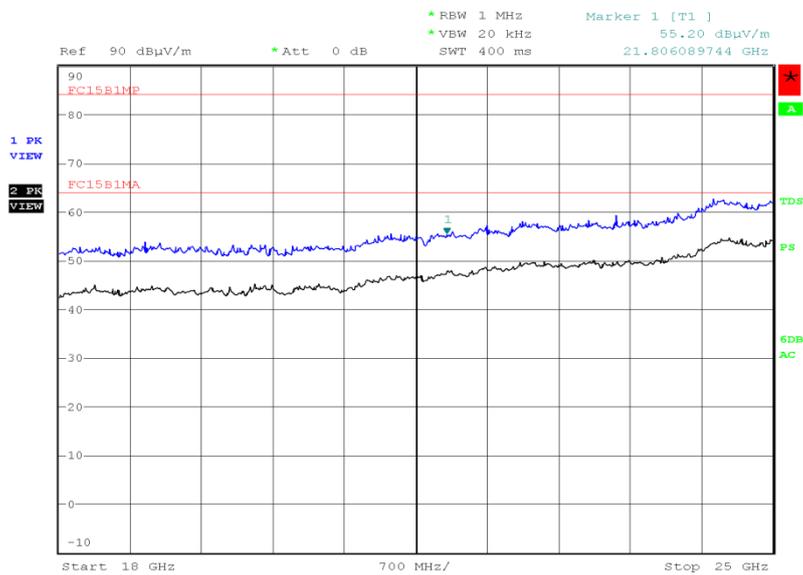
Product Service

8 GHz to 18 GHz



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

18 GHz to 25 GHz

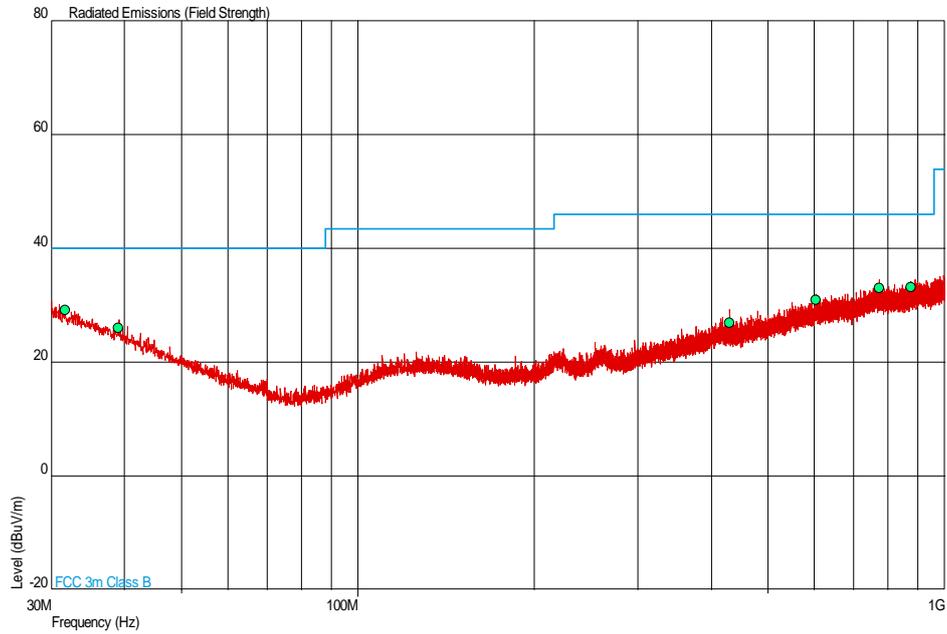


Date: 17.APR.2014 04:59:56



2462 MHz

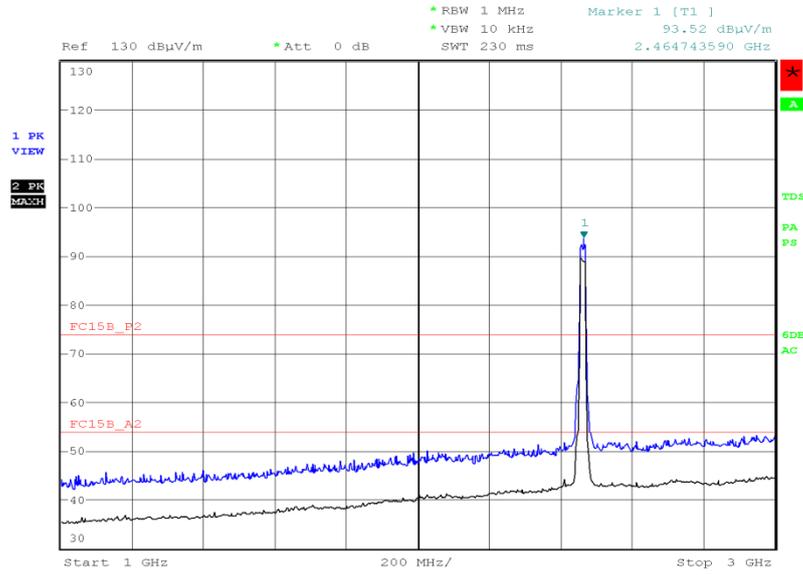
30 MHz to 1 GHz



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
31.699	29.2	28.8	40.0	100	-10.8	-71.2	360	1.12	Vertical
39.113	26.0	20.0	40.0	100	-14.0	-80.0	32	1.00	Horizontal
429.791	27.0	22.4	46.0	200	-19.0	-177.6	96	1.00	Horizontal
603.066	30.9	35.1	46.0	200	-15.1	-164.9	322	1.00	Horizontal
774.637	33.1	45.2	46.0	200	-12.9	-154.8	306	1.00	Horizontal
875.543	33.3	46.2	46.0	200	-12.7	-153.8	347	1.00	Horizontal

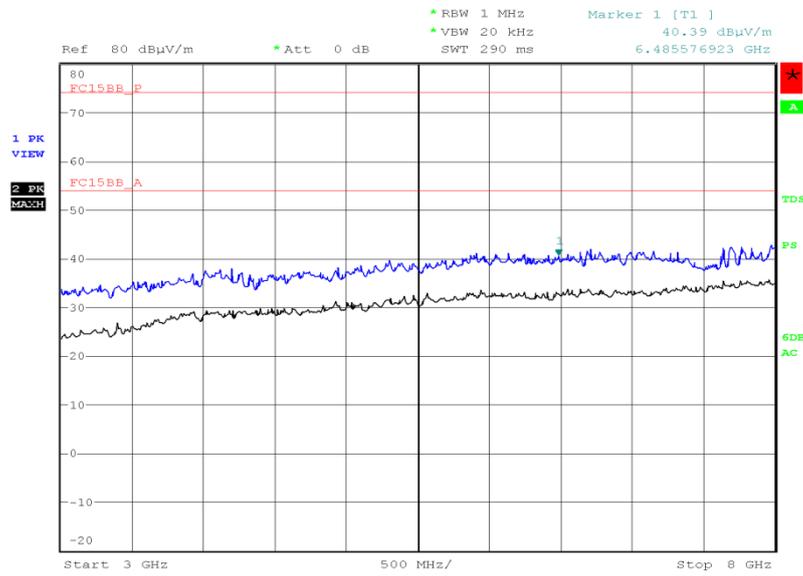


1 GHz to 3 GHz



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

3 GHz to 8 GHz

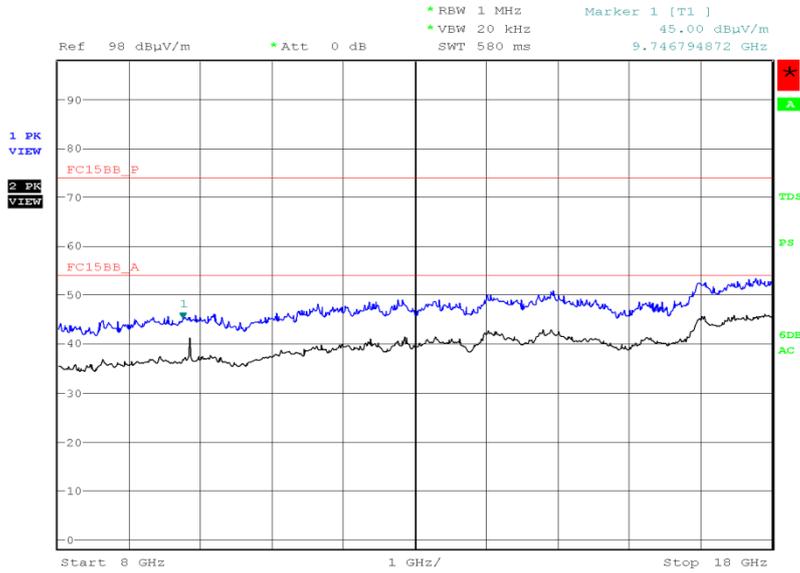


Date: 17.APR.2014 01:48:47



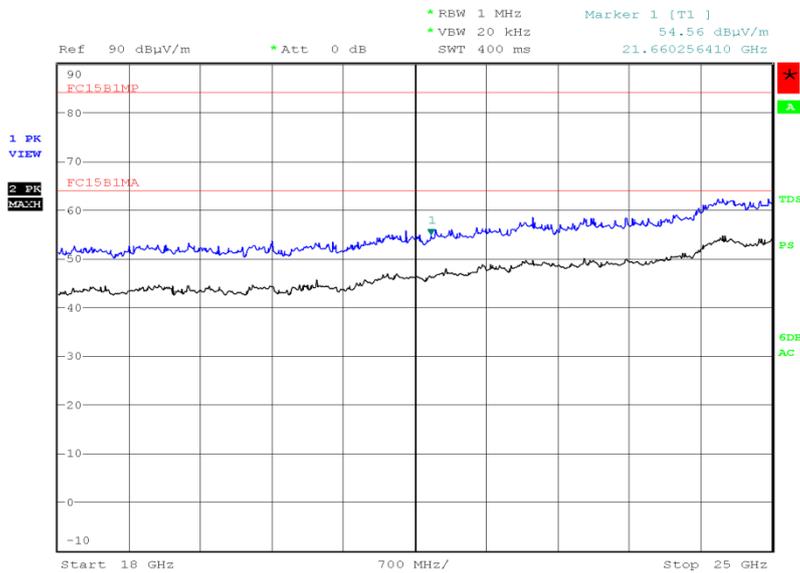
Product Service

8 GHz to 18 GHz



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

18 GHz to 25 GHz



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

Limit

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

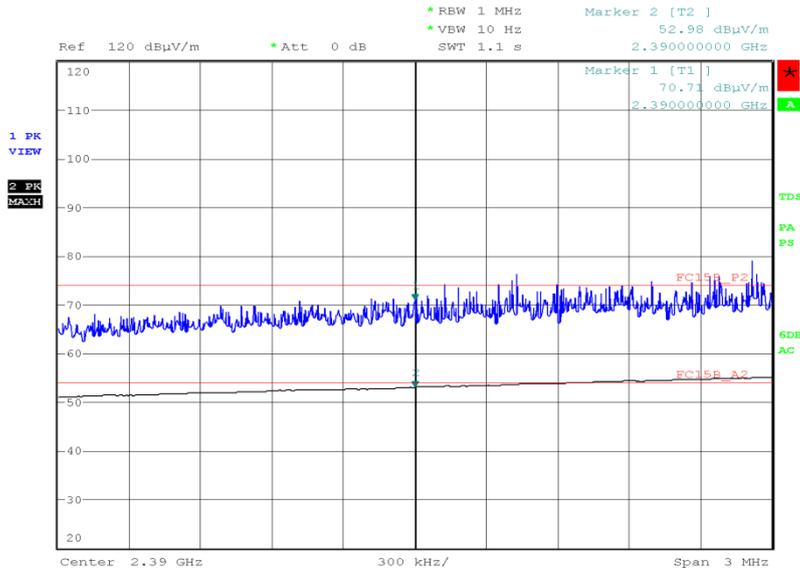


Product Service

Band Edge Emissions

2412 MHz

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

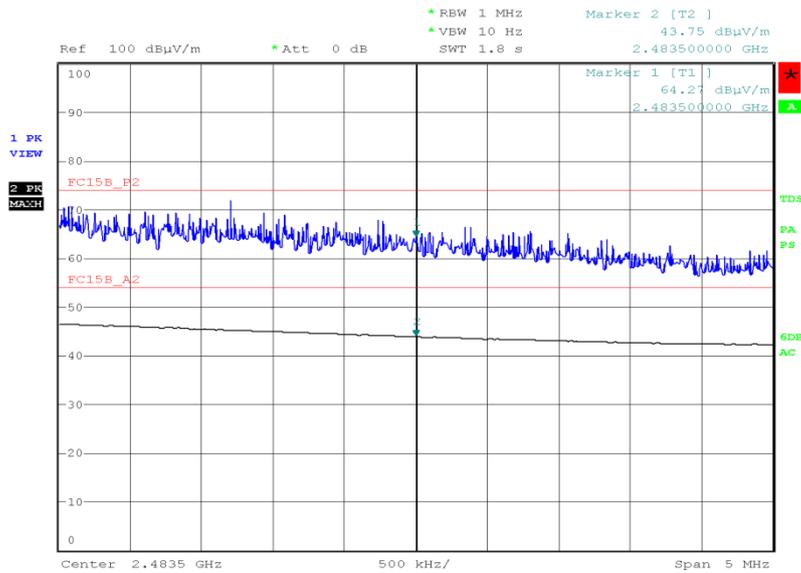


Date: 9.APR.2014 18:41:14



2462 MHz

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



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

Limit

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



Product Service

802.11(n)

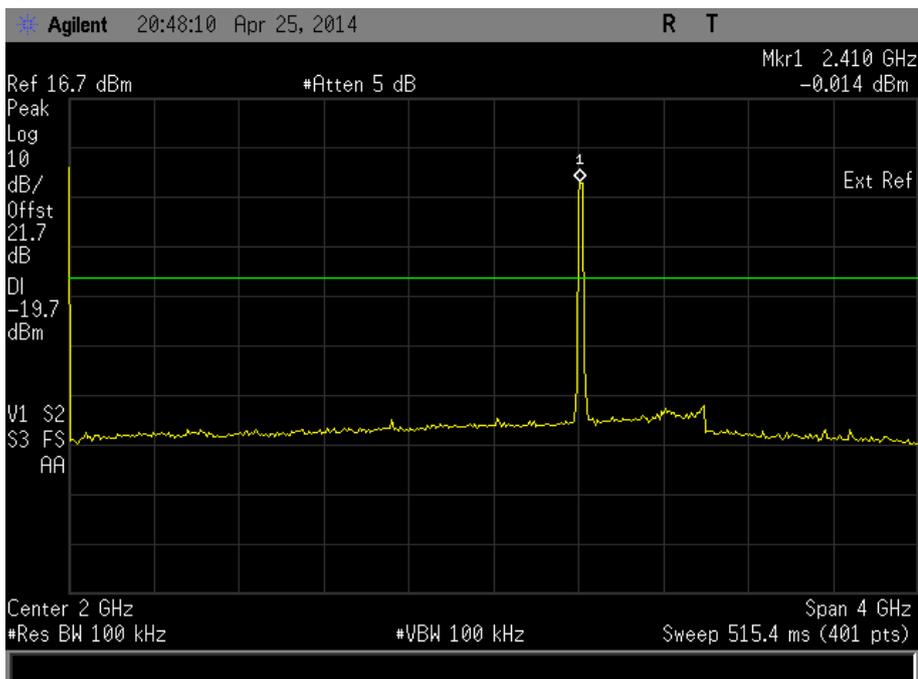
4.0 V DC Supply

Spurious Conducted Emissions

6.5 Mbps

2412 MHz

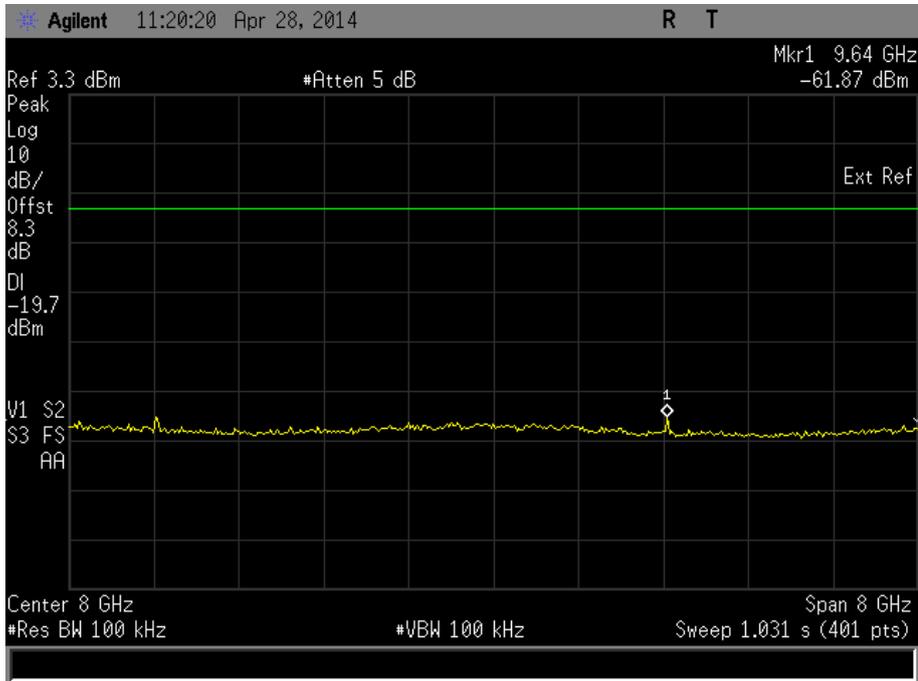
9 kHz to 4 GHz



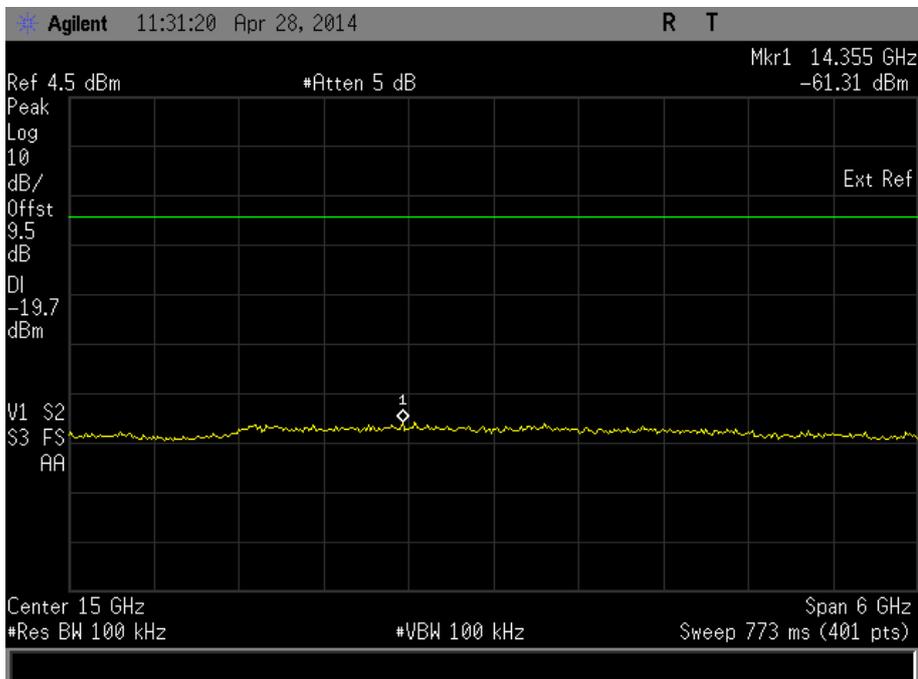


Product Service

4 GHz to 12 GHz



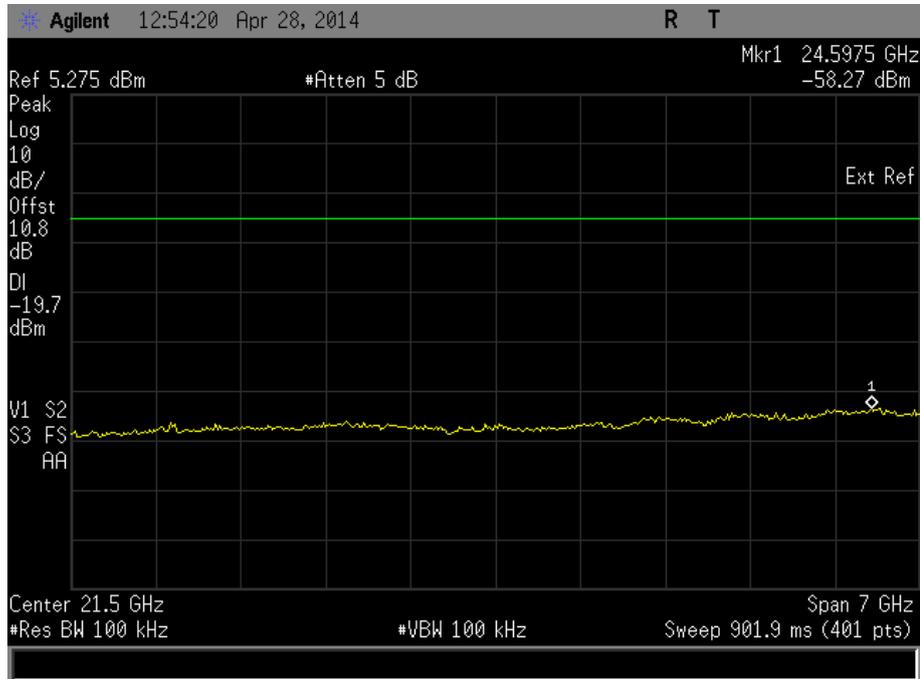
12 GHz to 18 GHz





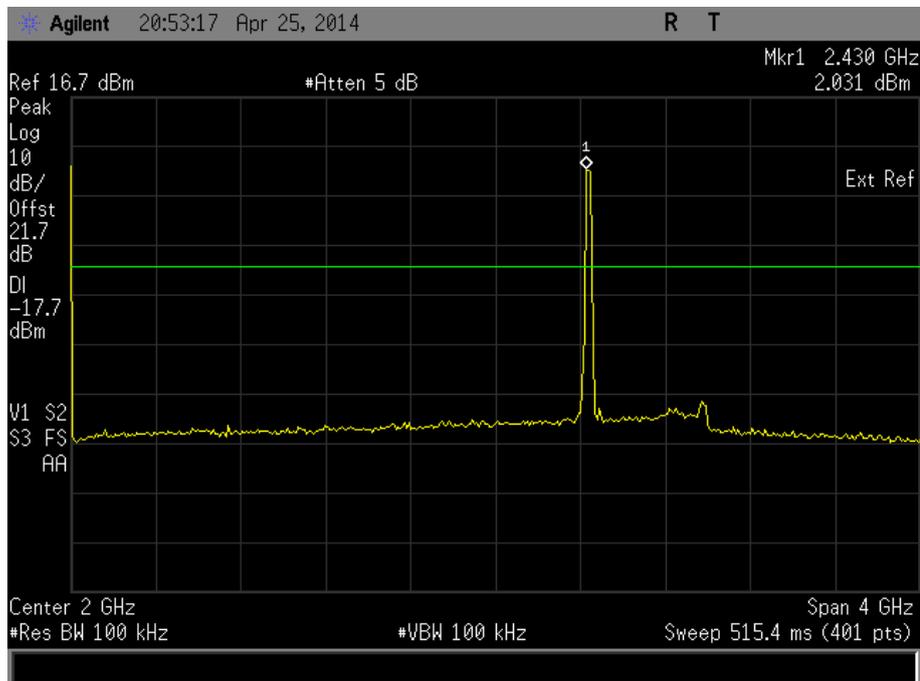
Product Service

18 GHz to 25 GHz



2437 MHz

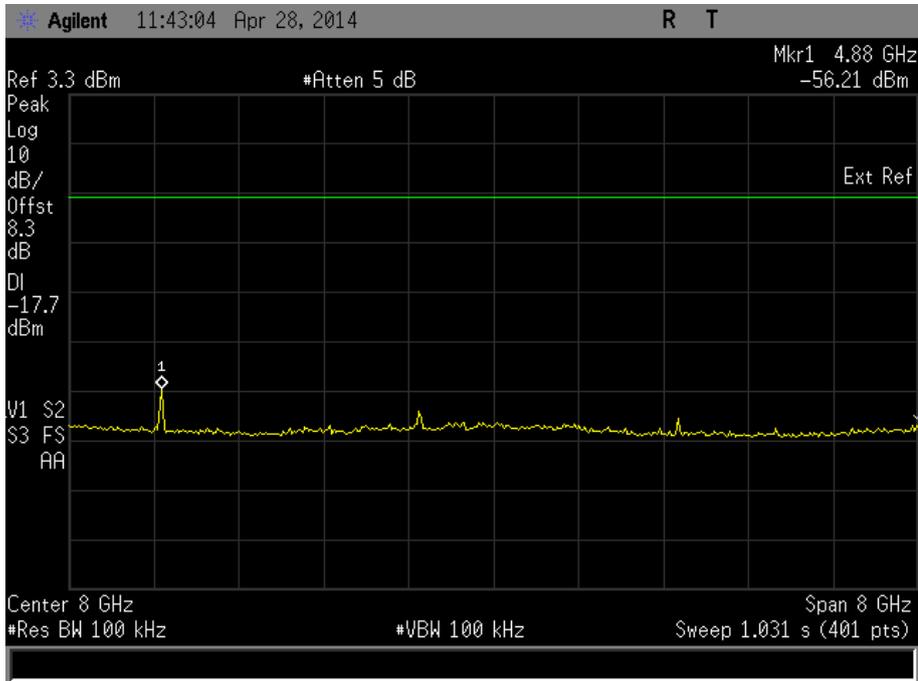
9 kHz to 4 GHz



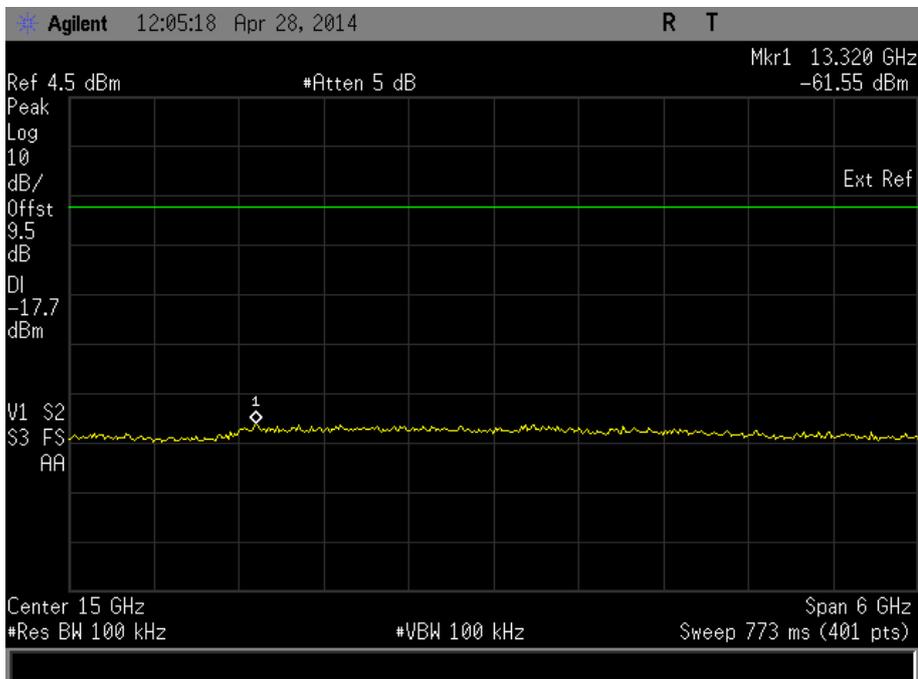


Product Service

4 GHz to 12 GHz



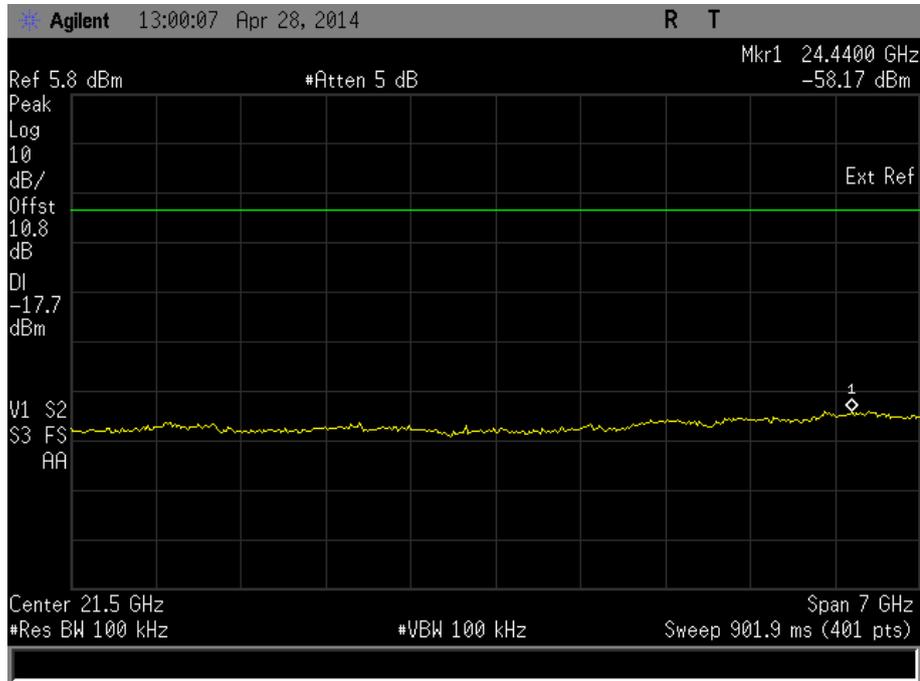
12 GHz to 18 GHz





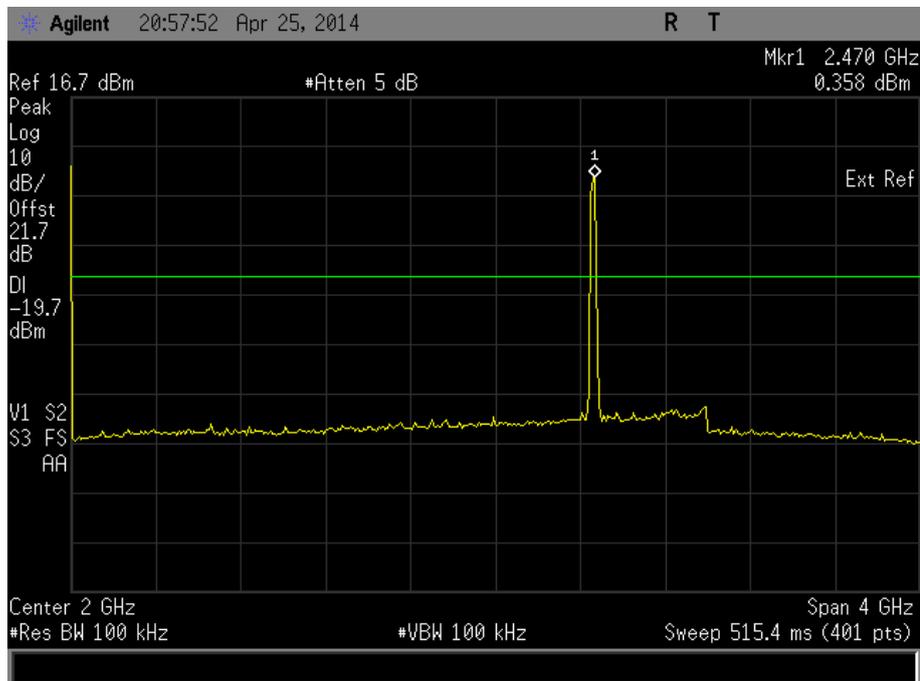
Product Service

18 GHz to 25 GHz



2462 MHz

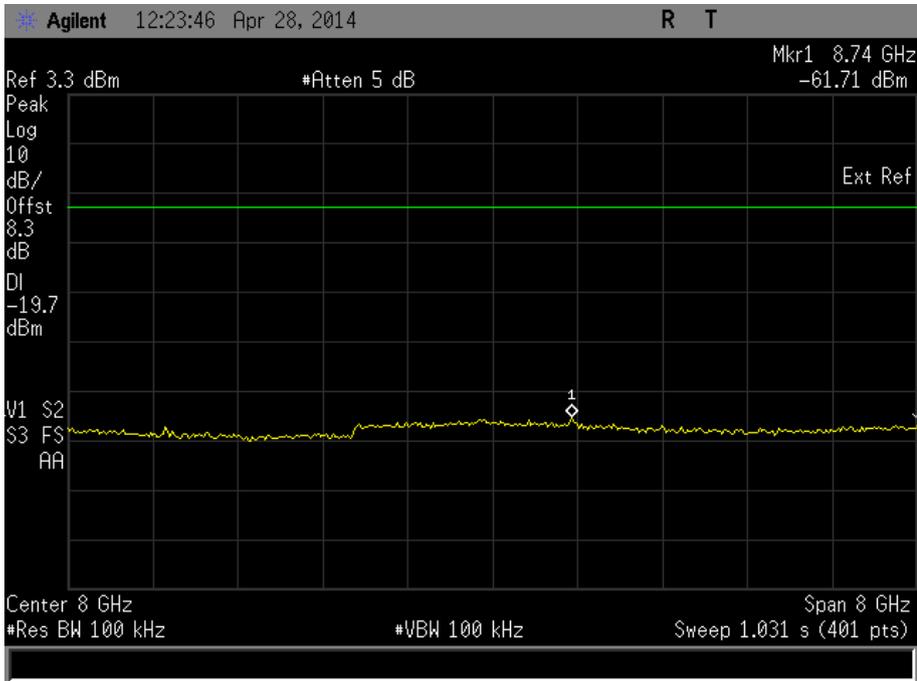
9 kHz to 4 GHz



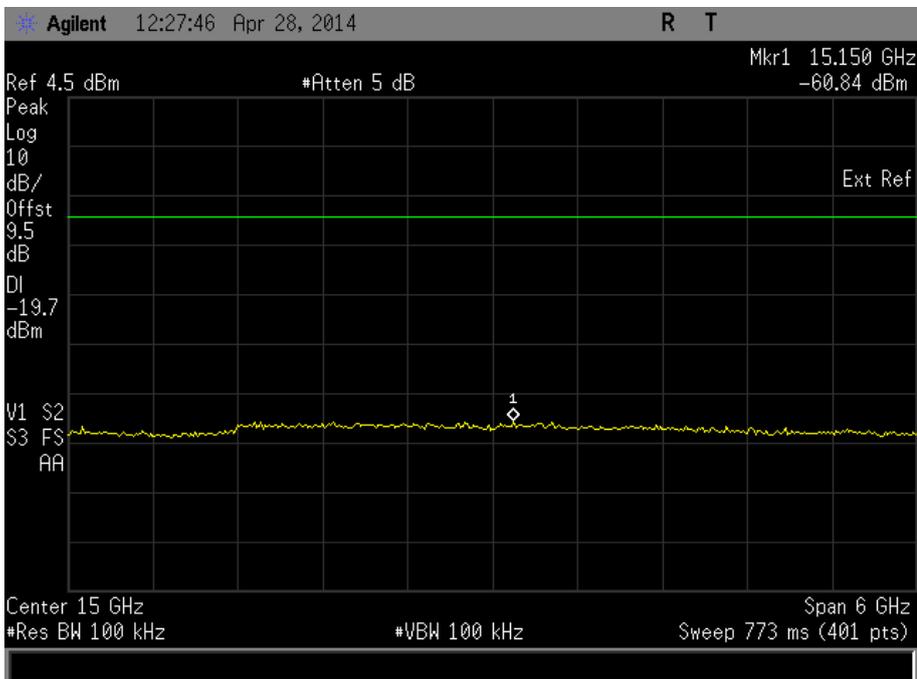


Product Service

4 GHz to 12 GHz



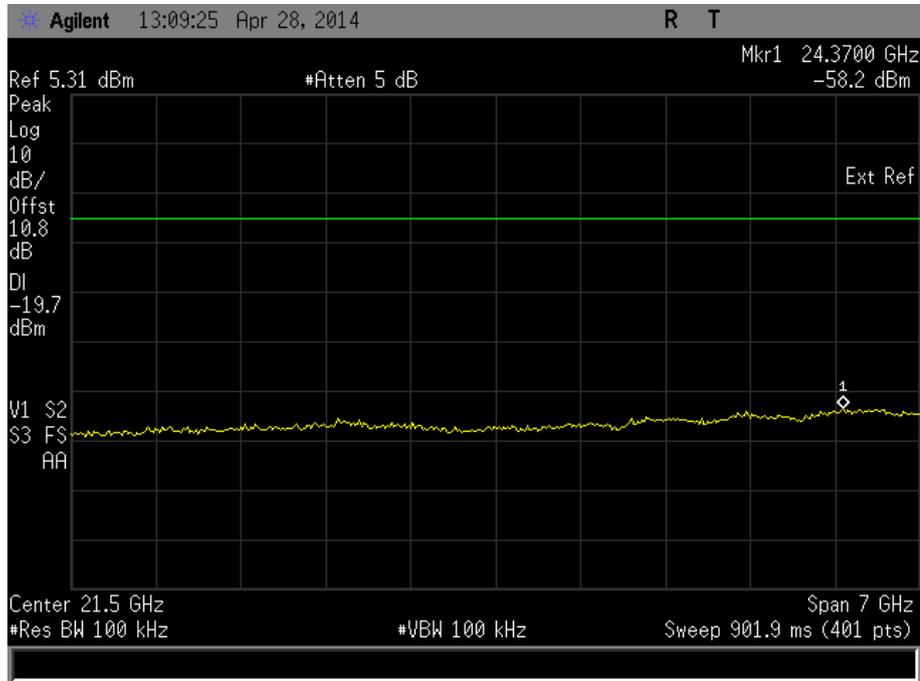
12 GHz to 18 GHz





Product Service

18 GHz to 25 GHz



Limit Clause

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

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

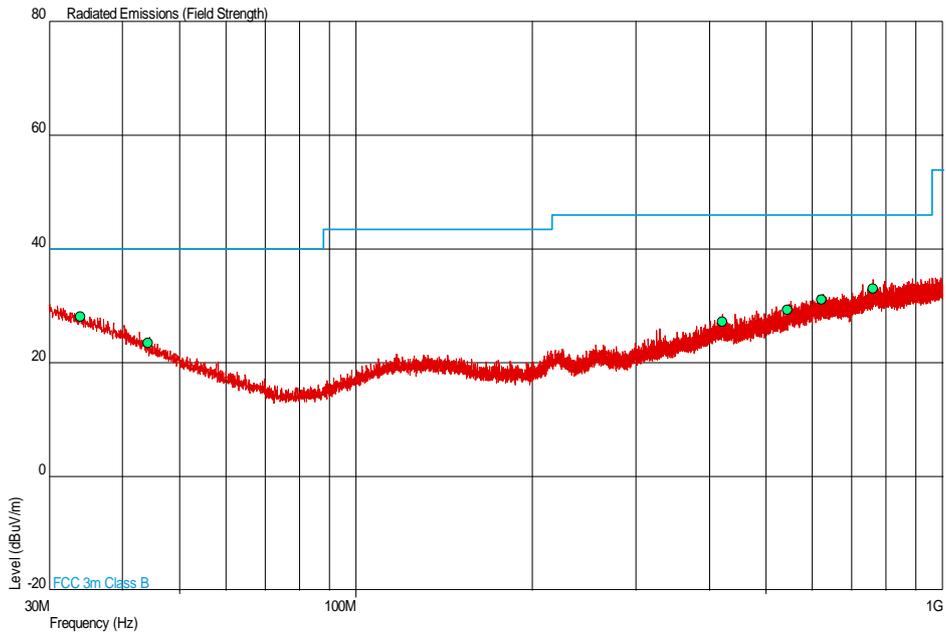


Product Service

Spurious Radiated Emissions

2412 MHz

30 MHz to 1 GHz

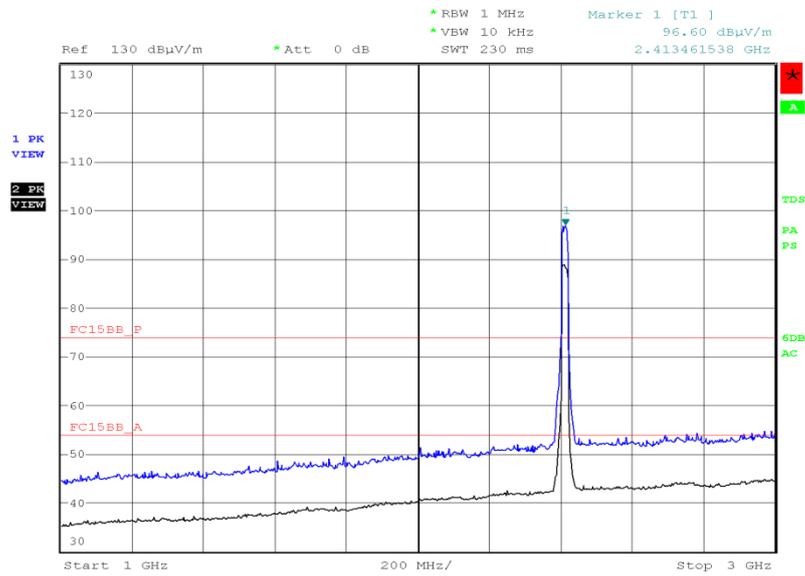


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
33.927	28.1	25.4	40.0	100	-11.9	-74.6	299	1.00	Horizontal
44.248	23.5	15.0	40.0	100	-16.5	-85.0	324	1.00	Horizontal
420.913	27.2	22.9	46.0	200	-18.8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



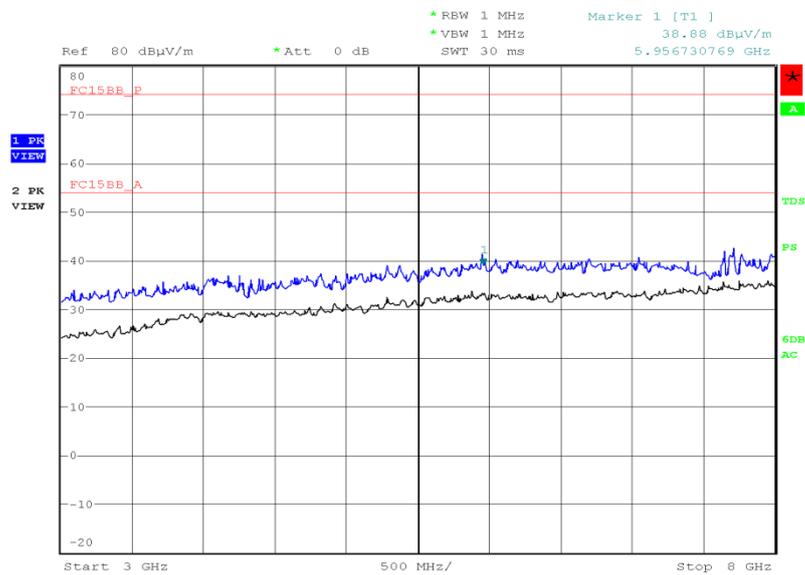
Product Service

1 GHz to 3 GHz



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

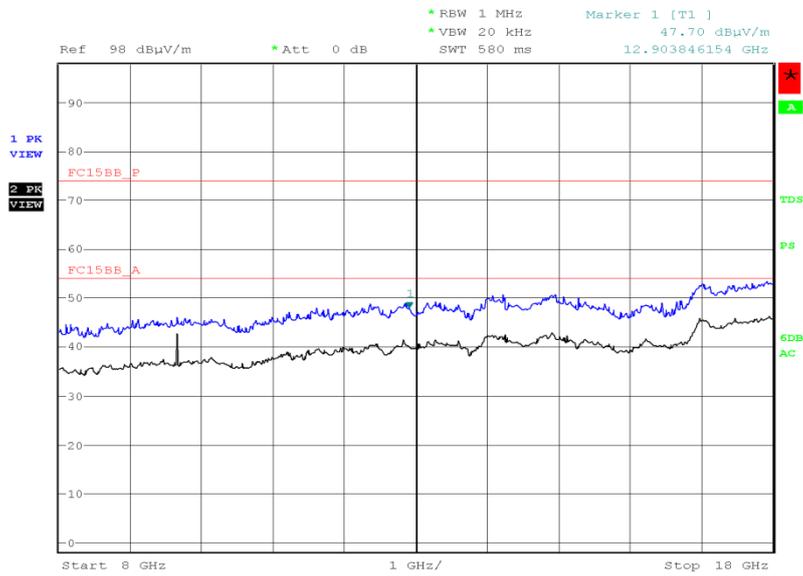
3 GHz to 8 GHz



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

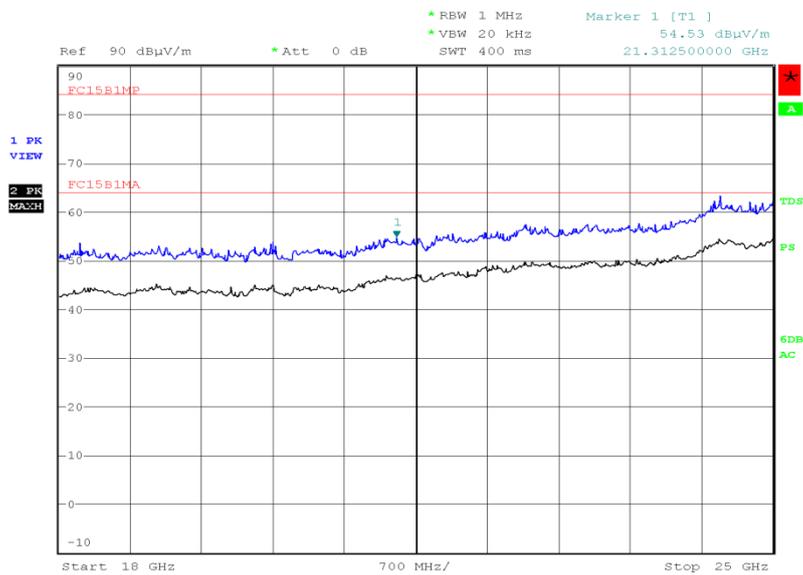


8 GHz to 18 GHz



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

18 GHz to 25 GHz

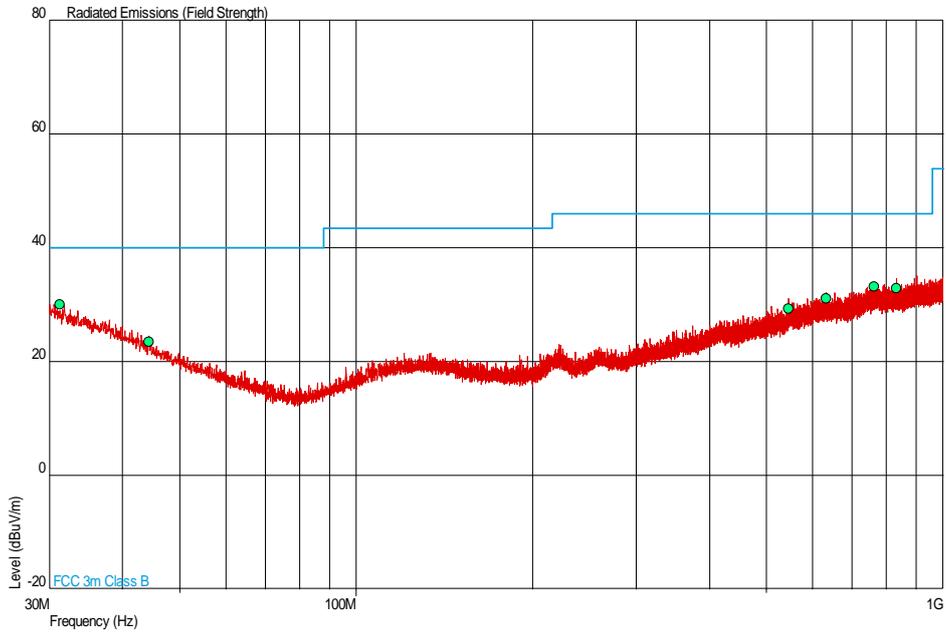


Date: 17.APR.2014 05:13:09



2437 MHz

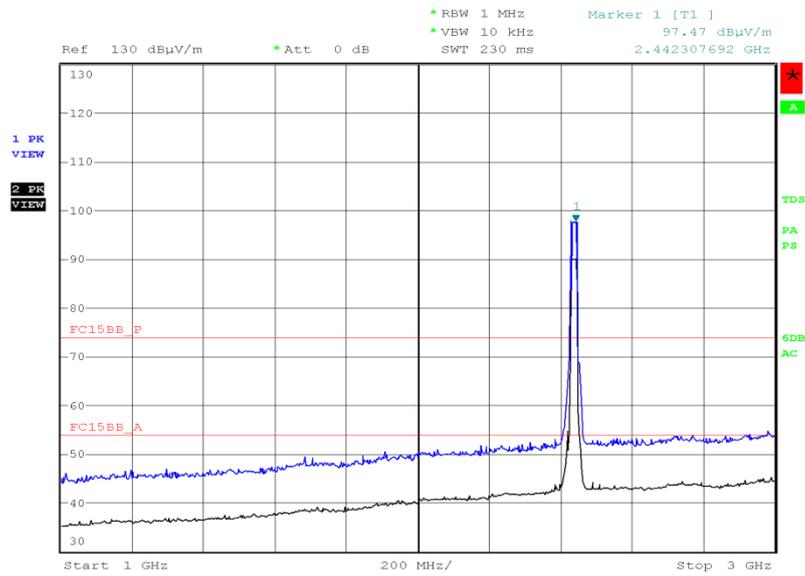
30 MHz to 1 GHz



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

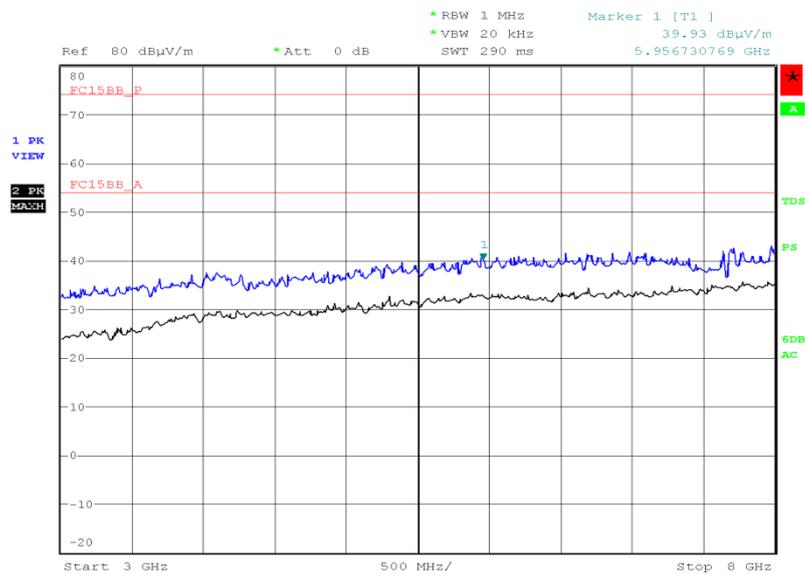


1 GHz to 3 GHz



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

3 GHz to 8 GHz

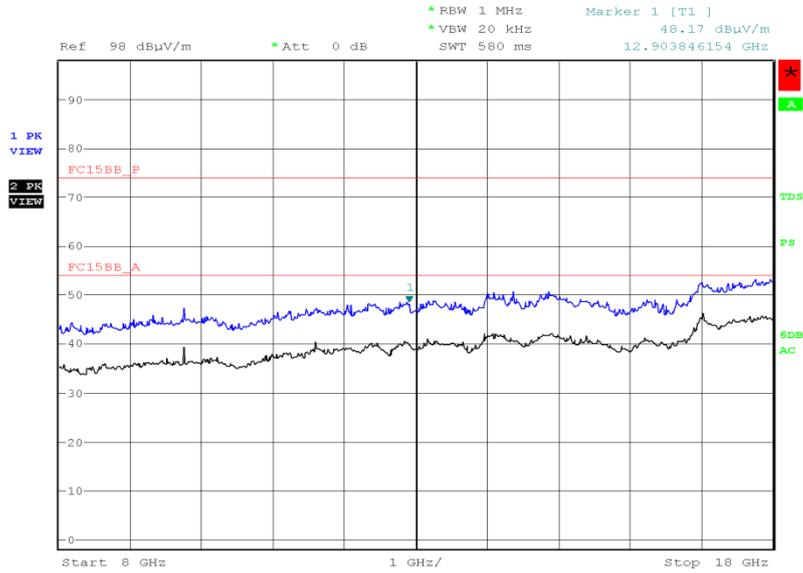


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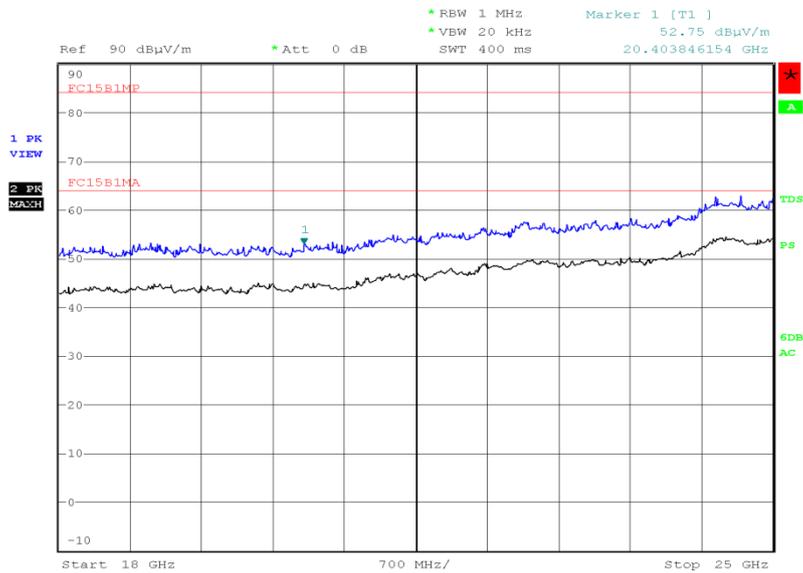
Product Service

8 GHz to 18 GHz



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

18 GHz to 25 GHz

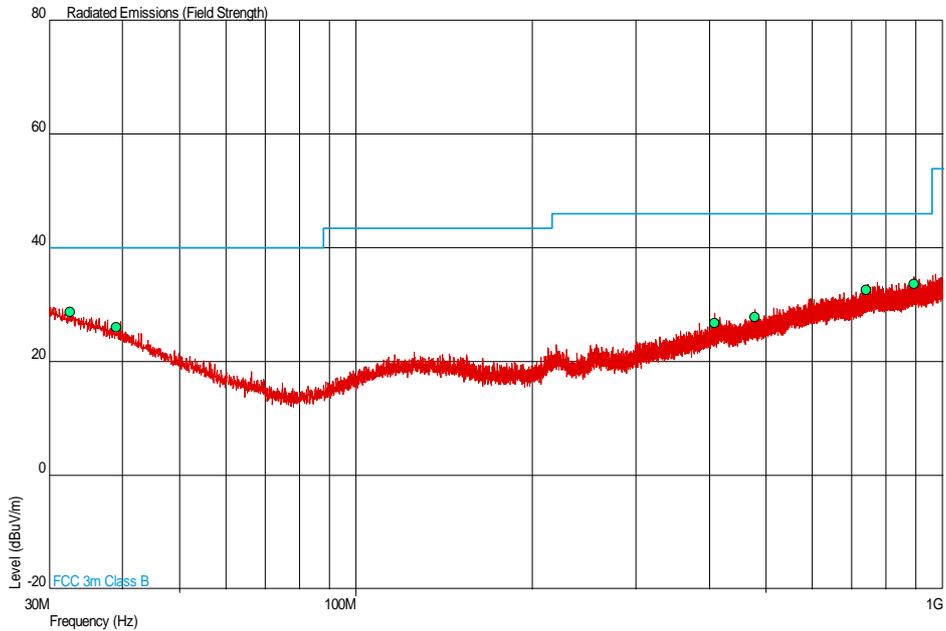


Date: 17.APR.2014 05:18:27



2462 MHz

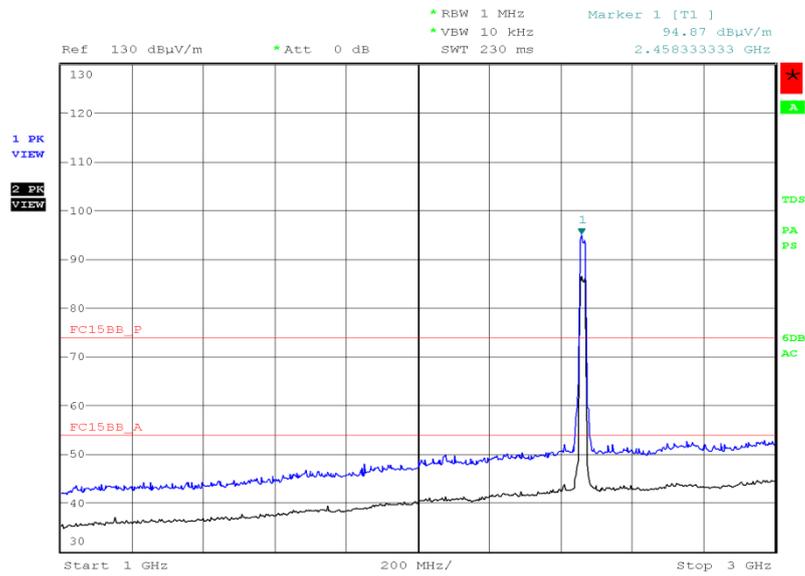
30 MHz to 1 GHz



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

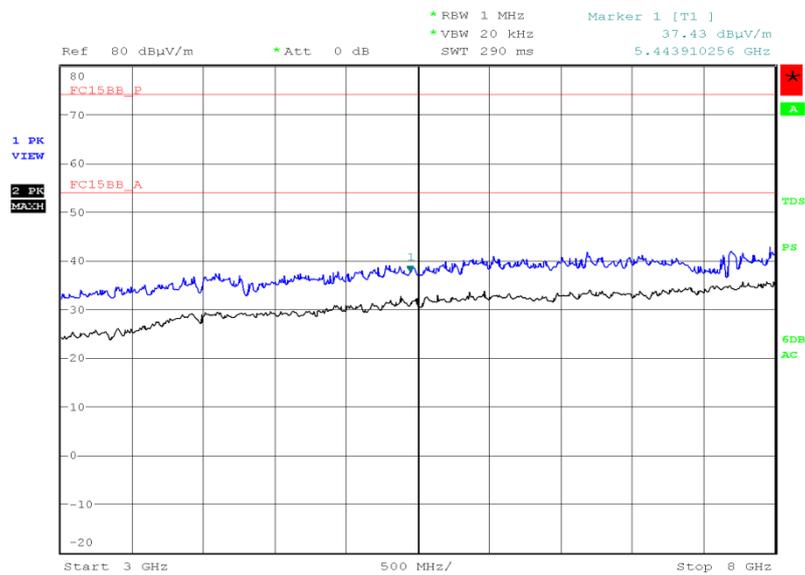


1 GHz to 3 GHz



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

3 GHz to 8 GHz

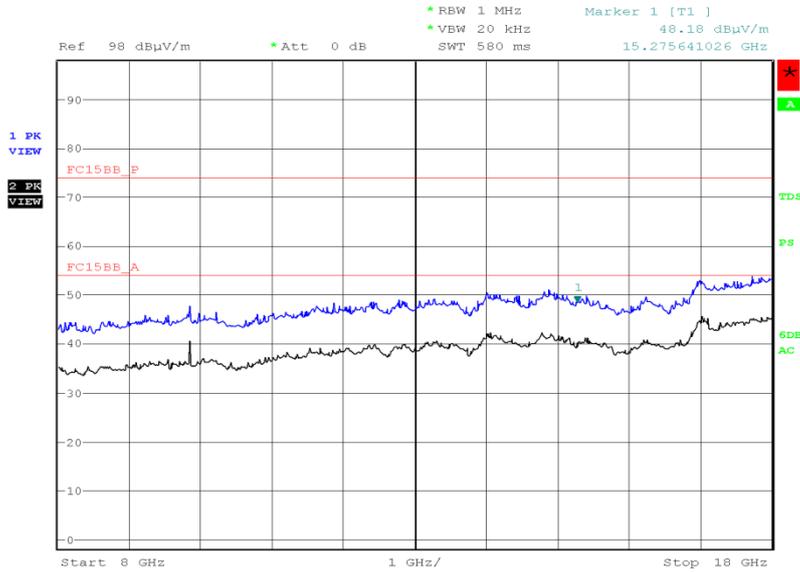


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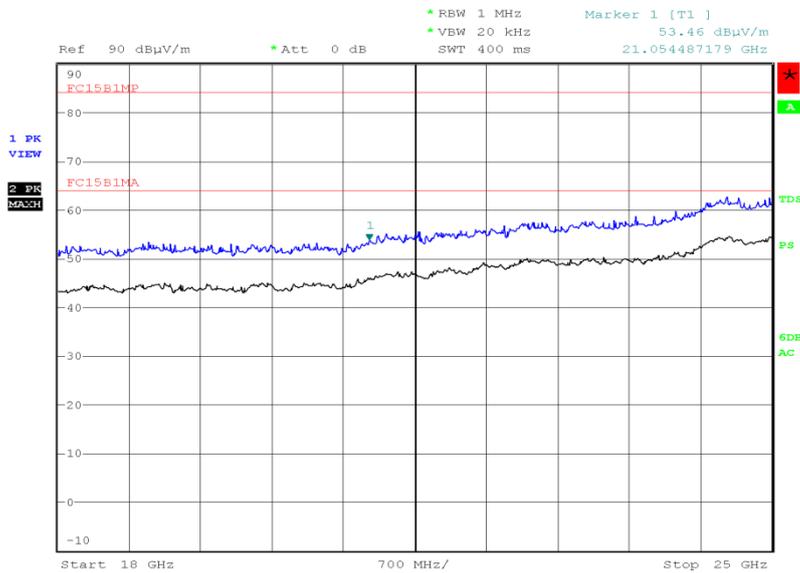
Product Service

8 GHz to 18 GHz



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

18 GHz to 25 GHz



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

Limit

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

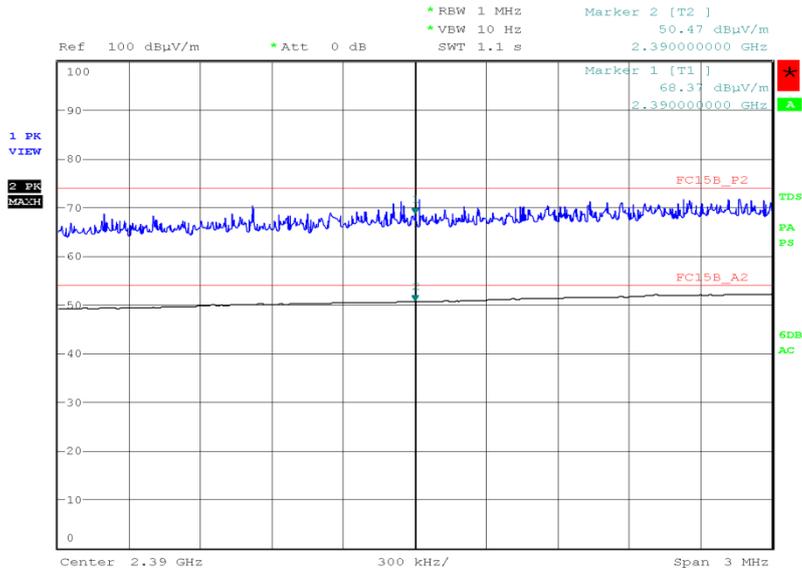


Product Service

Band Edge Emissions

2412 MHz

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



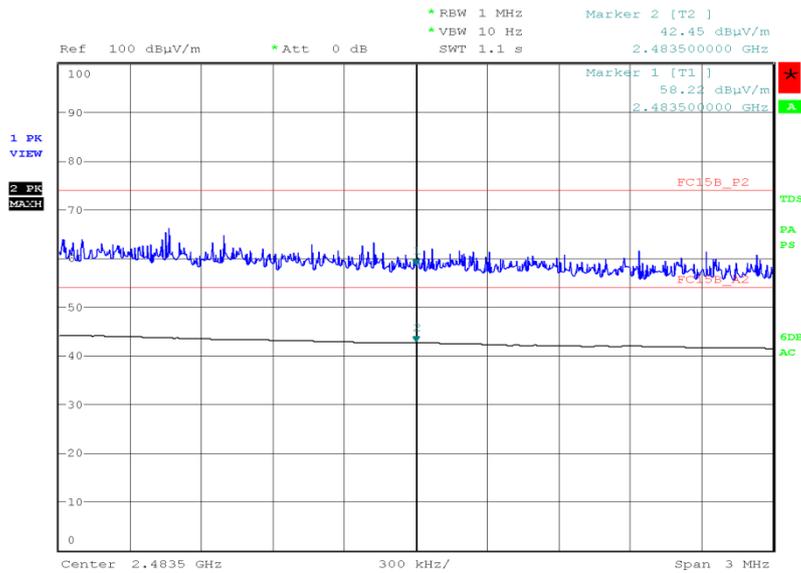
Date: 15.APR.2014 16:44:12



Product Service

2462 MHz

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



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

Limit

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



Product Service

Bluetooth Low Energy

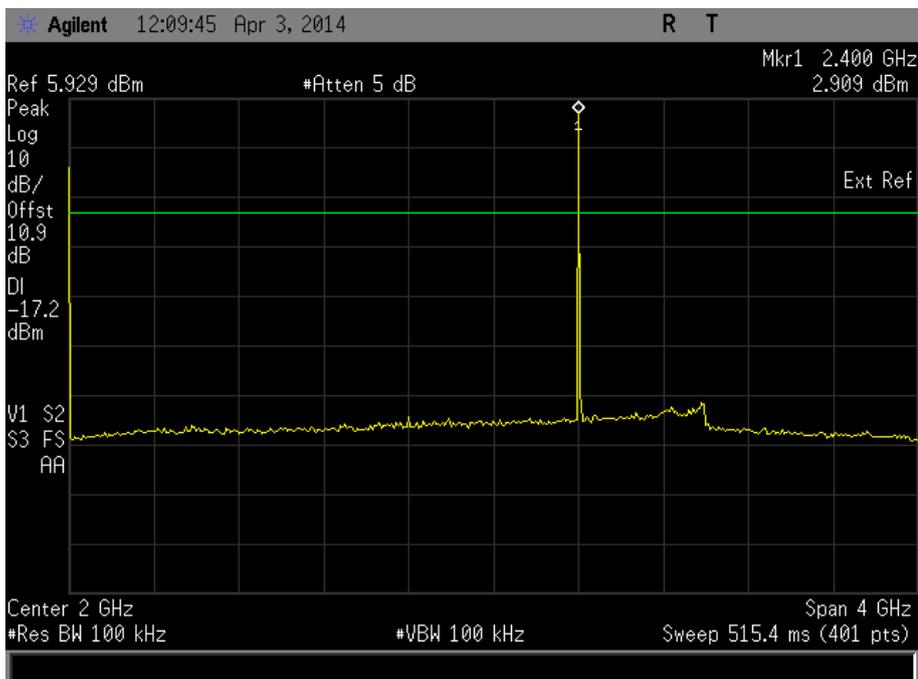
4.0 V DC Supply

Spurious Conducted Emissions

1 Mbps

2402 MHz

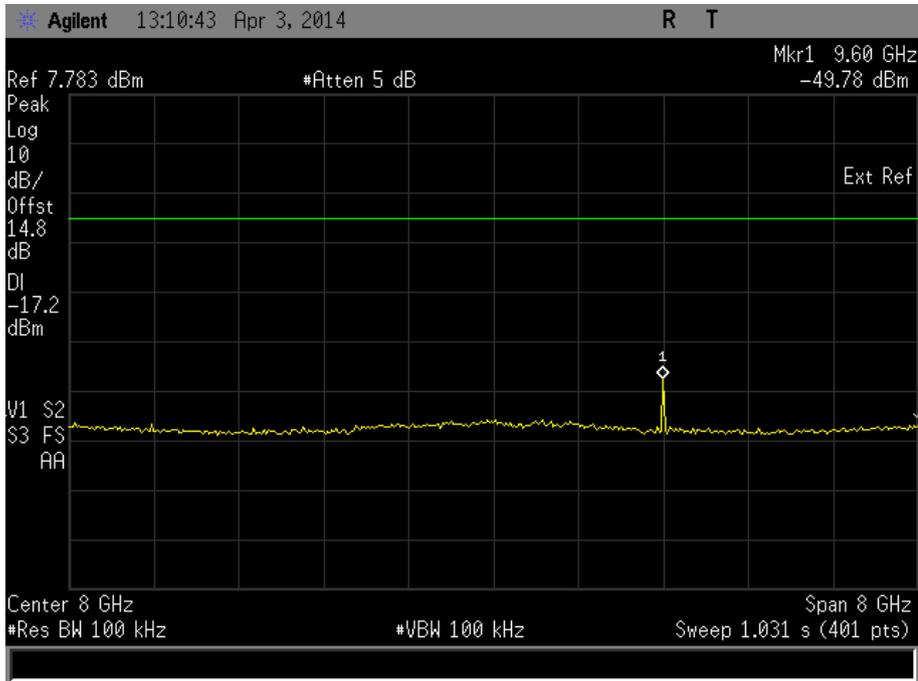
9 kHz to 4 GHz



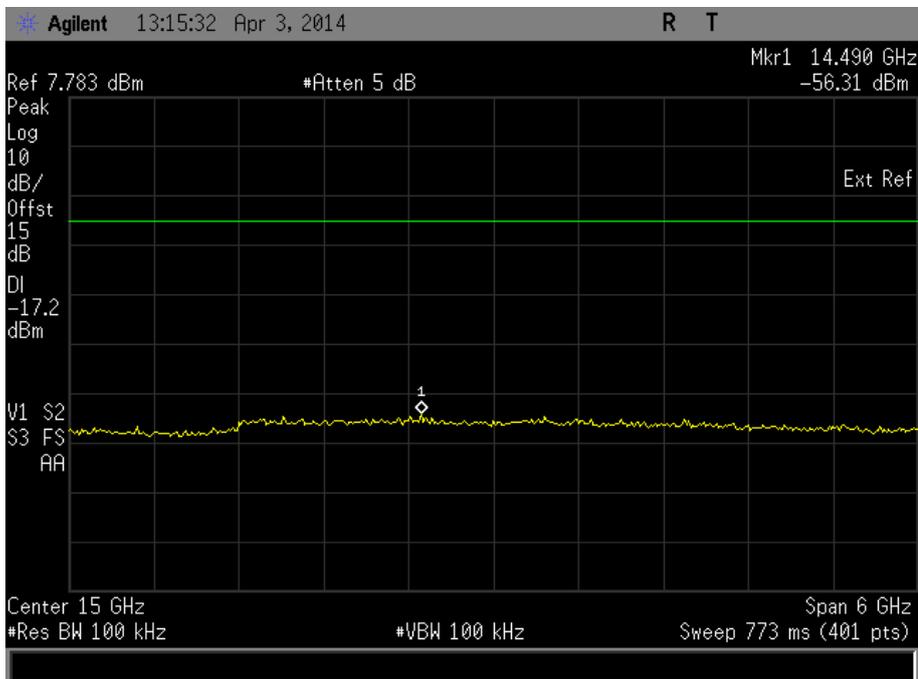


Product Service

4 GHz to 12 GHz



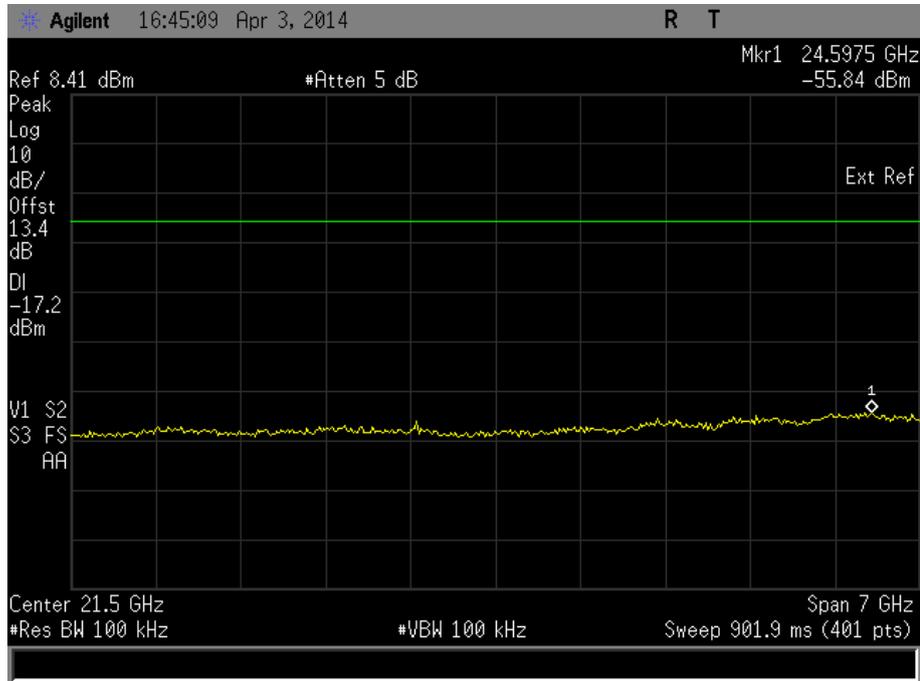
12 GHz to 18 GHz





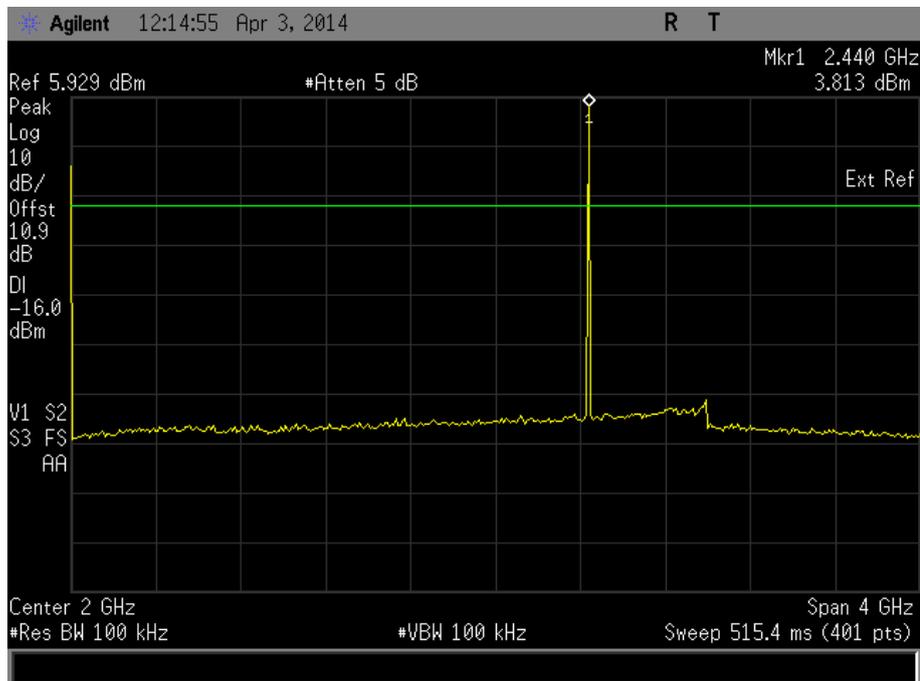
Product Service

18 GHz to 25 GHz



2440 MHz

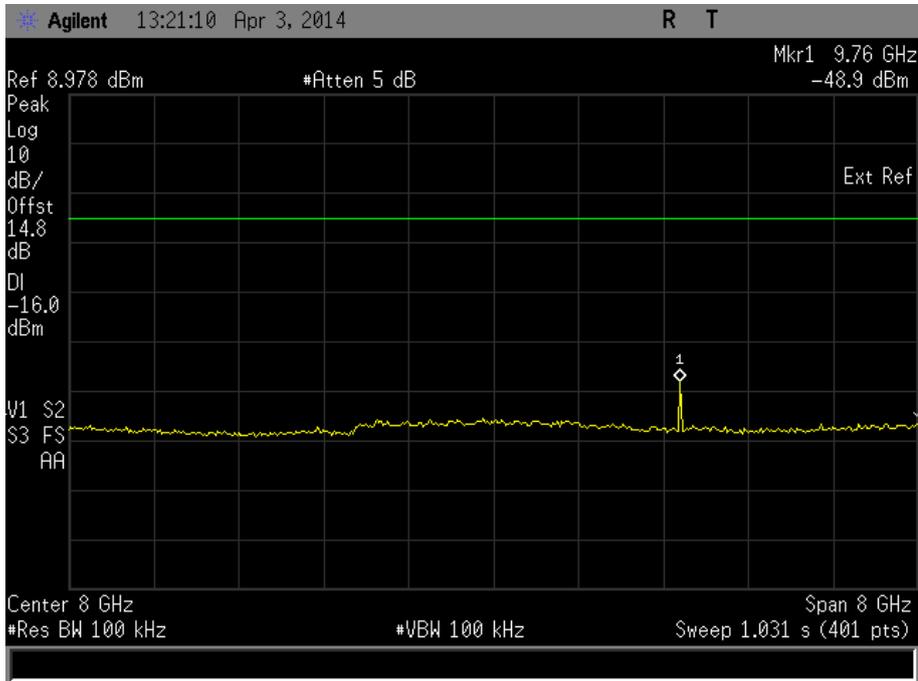
9 kHz to 4 GHz



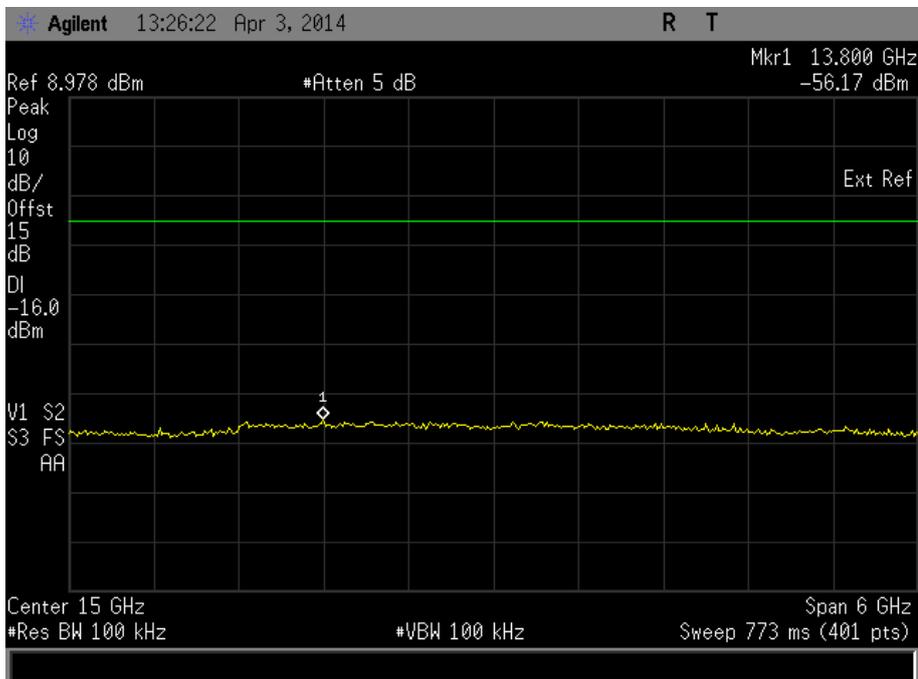


Product Service

4 GHz to 12 GHz



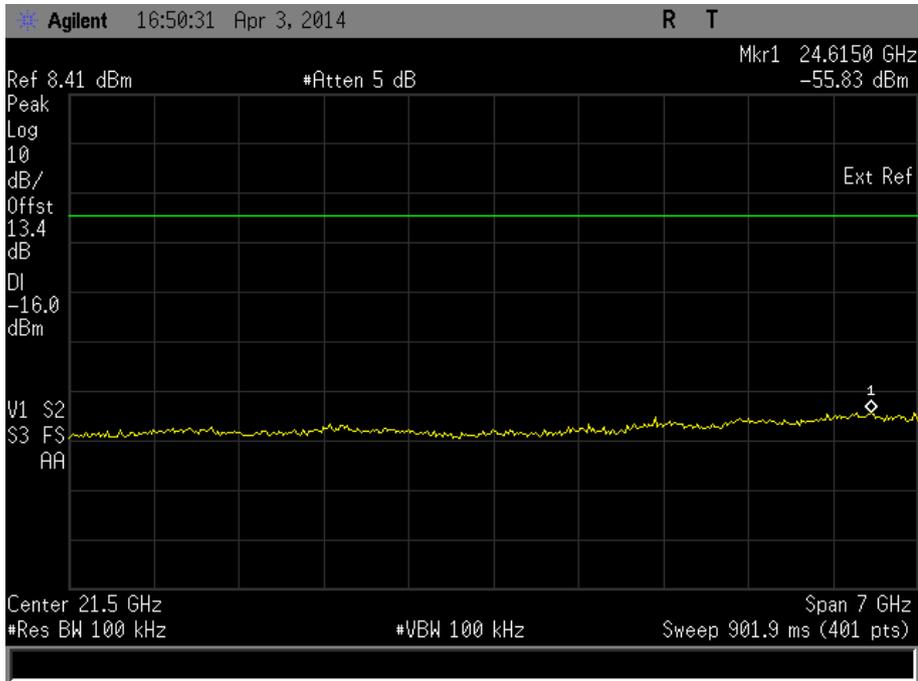
12 GHz to 18 GHz





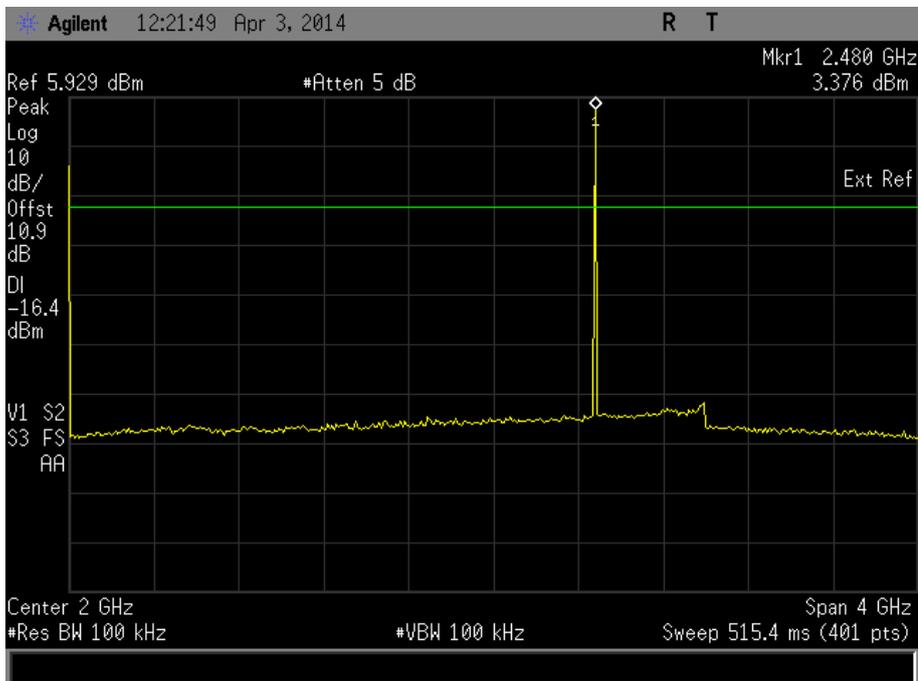
Product Service

18 GHz to 25 GHz



2480 MHz

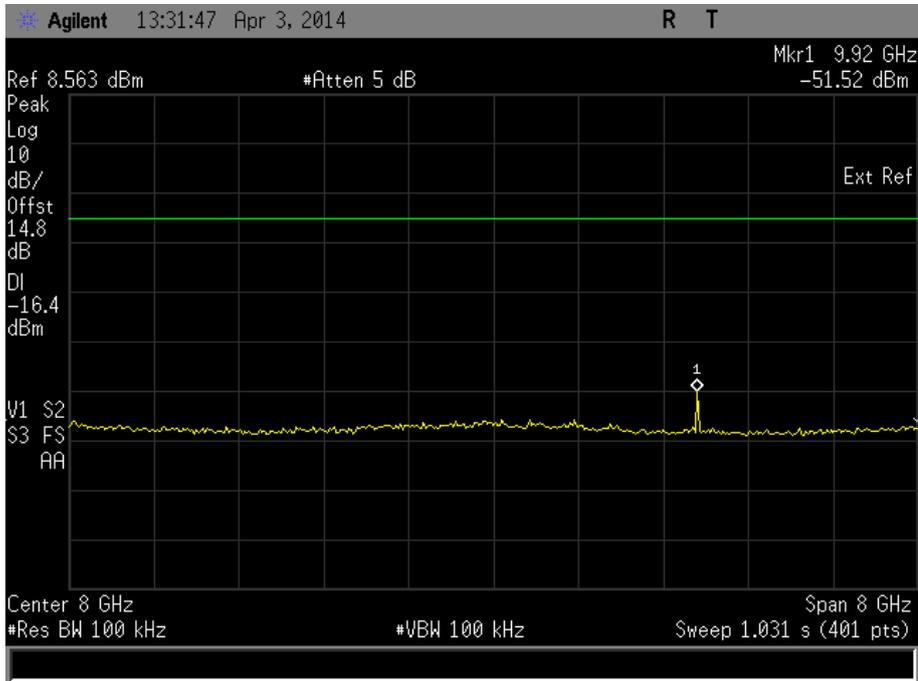
9 kHz to 4 GHz



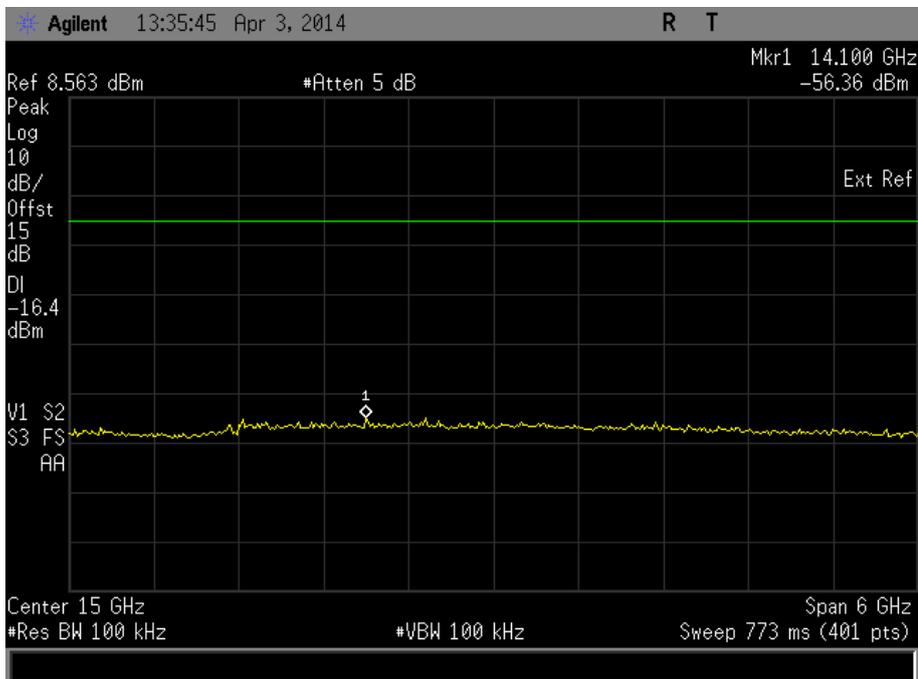


Product Service

4 GHz to 12 GHz



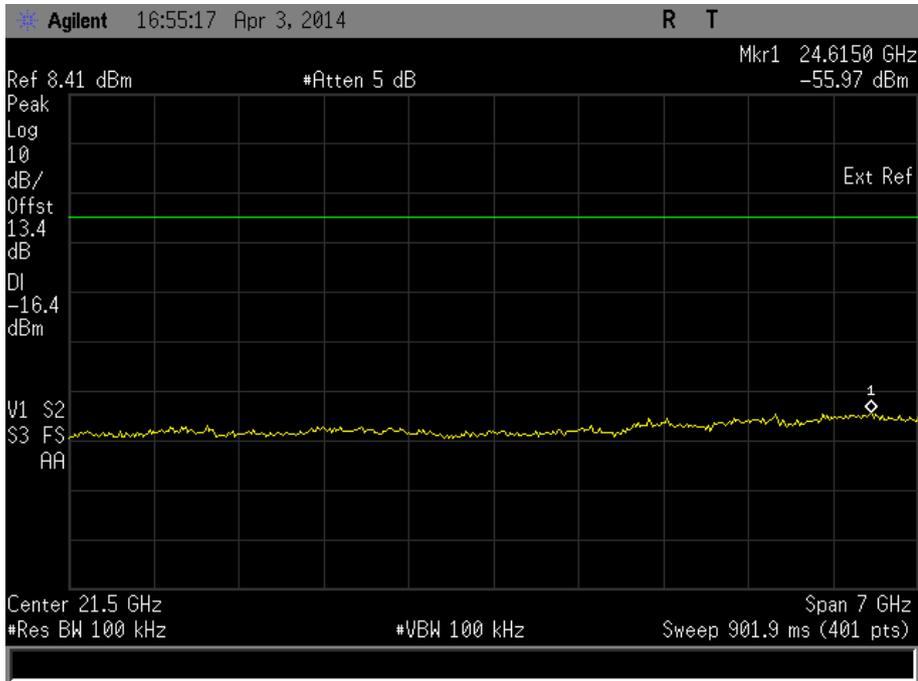
12 GHz to 18 GHz





Product Service

18 GHz to 25 GHz



Limit Clause

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

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

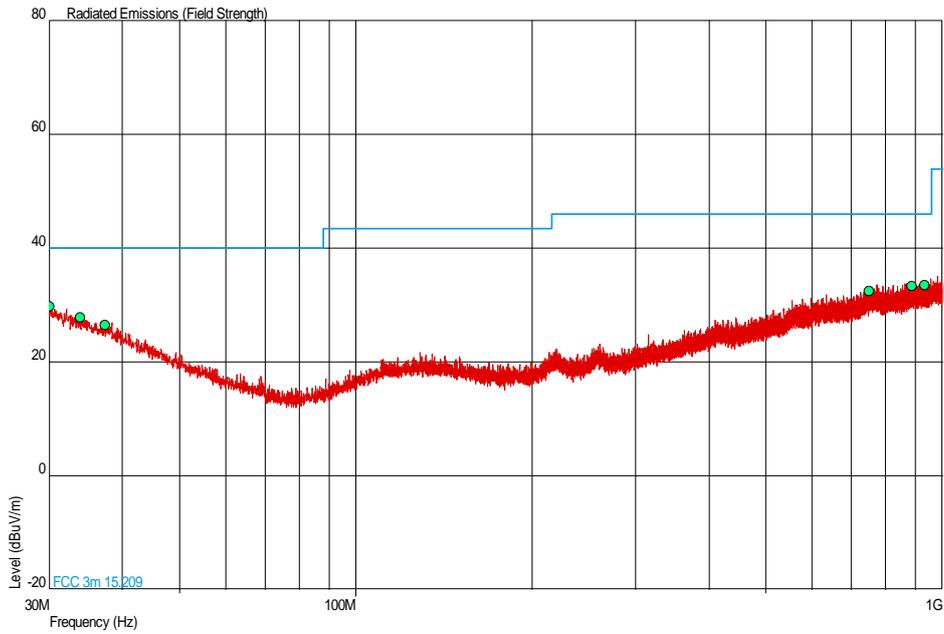


Product Service

Spurious Radiated Emissions

2402 MHz

30 MHz to 1 GHz

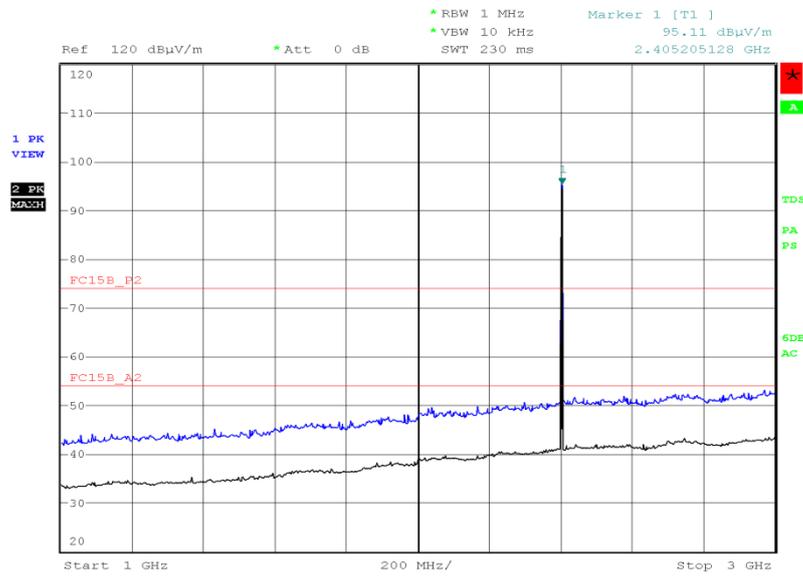


Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
30.049	29.8	30.9	40.0	100	-10.2	-69.1	0	1.00	Horizontal
33.880	27.9	24.8	40.0	100	-12.1	-75.2	45	1.00	Vertical
37.324	26.6	21.4	40.0	100	-13.4	-78.6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



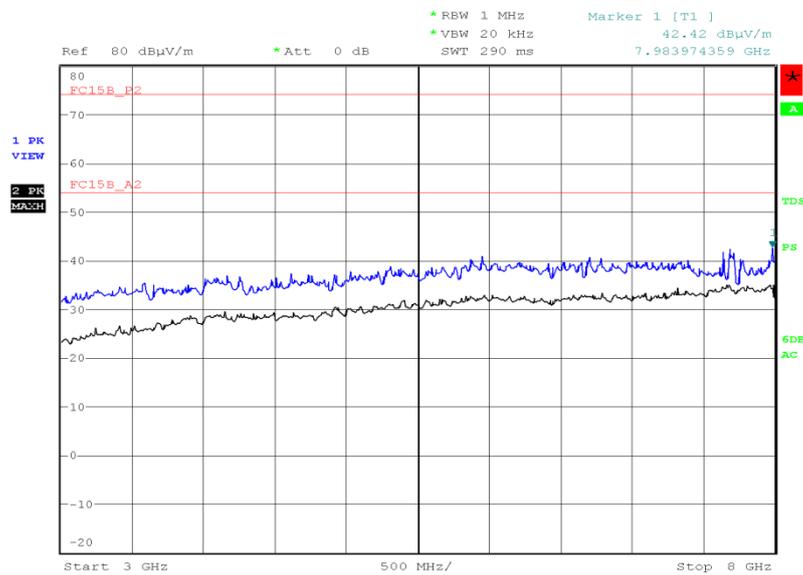
Product Service

1 GHz to 3 GHz



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

3 GHz to 8 GHz

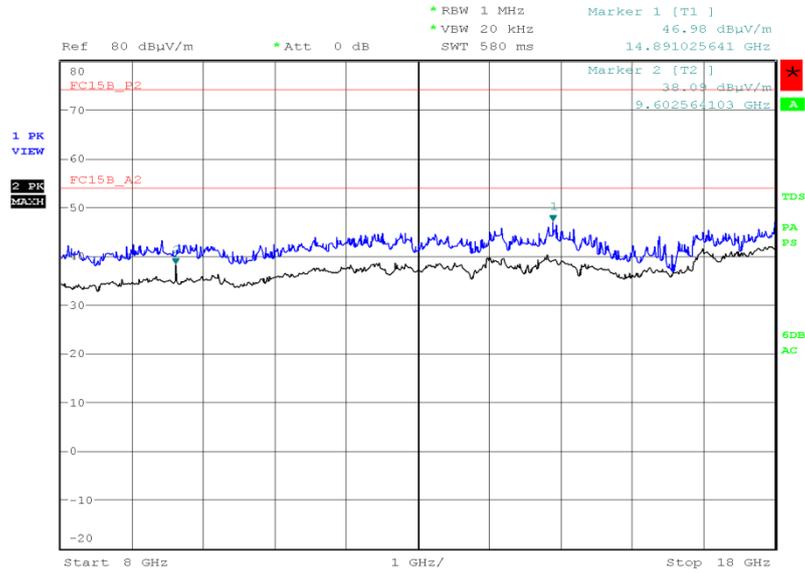


Date: 8.APR.2014 20:22:16



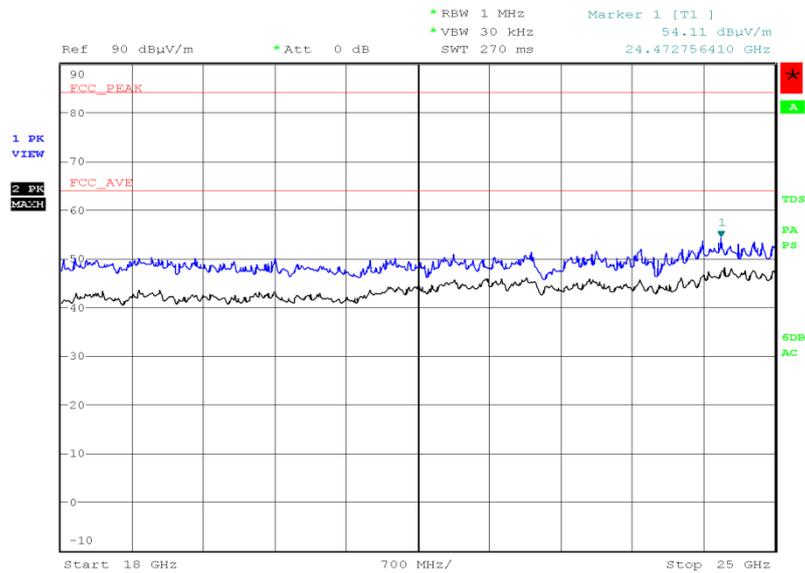
Product Service

8 GHz to 18 GHz



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

18 GHz to 25 GHz

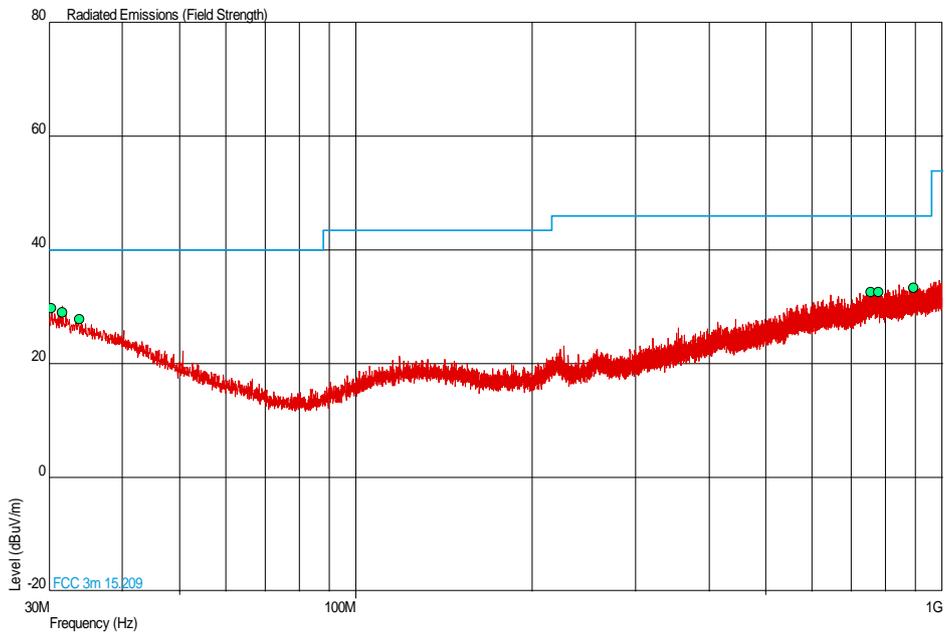


Date: 9.APR.2014 22:15:21



2440 MHz

30 MHz to 1 GHz

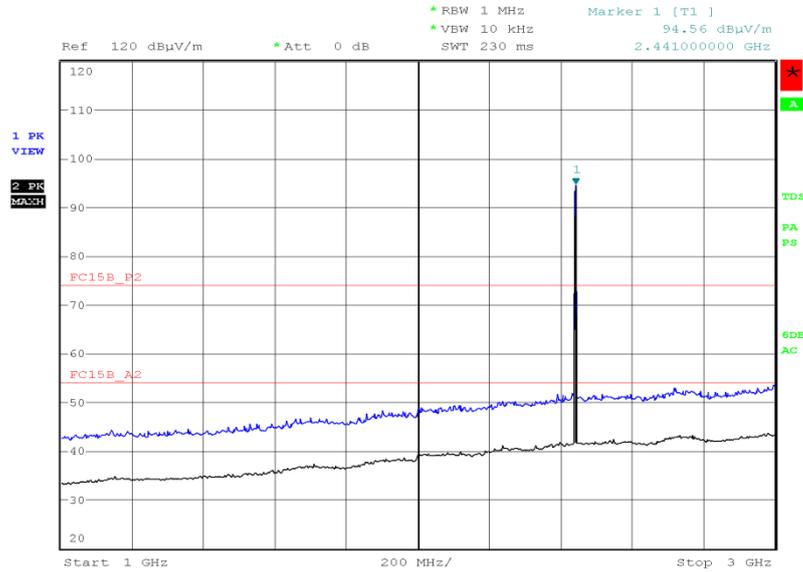


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.243	29.8	30.9	40.0	100	-10.2	-69.1	45	1.00	Vertical
31.552	29.1	28.5	40.0	100	-10.9	-71.5	45	1.00	Vertical
33.783	27.9	24.8	40.0	100	-12.1	-75.2	45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



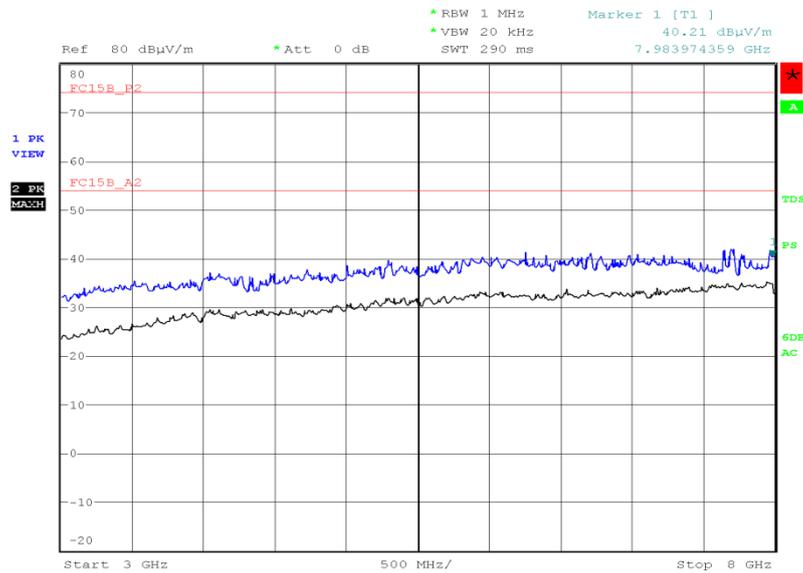
Product Service

1 GHz to 3 GHz



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

3 GHz to 8 GHz

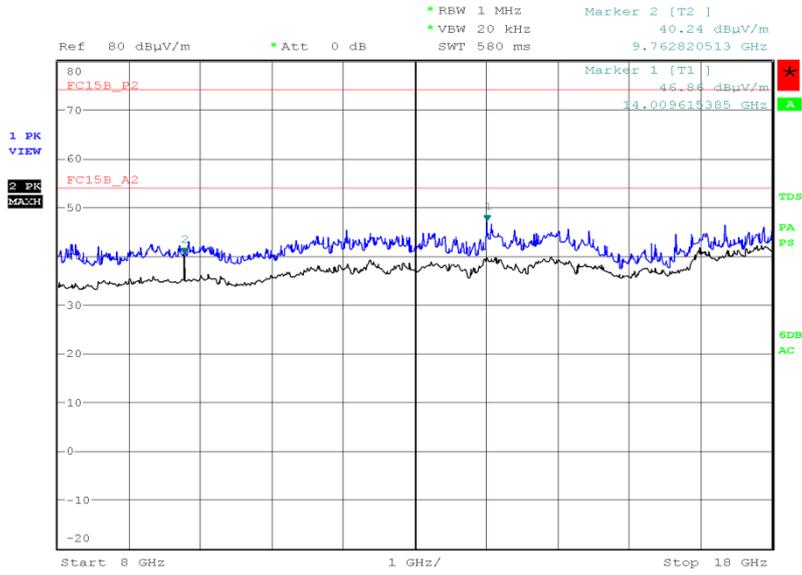


Date: 8.APR.2014 20:33:48



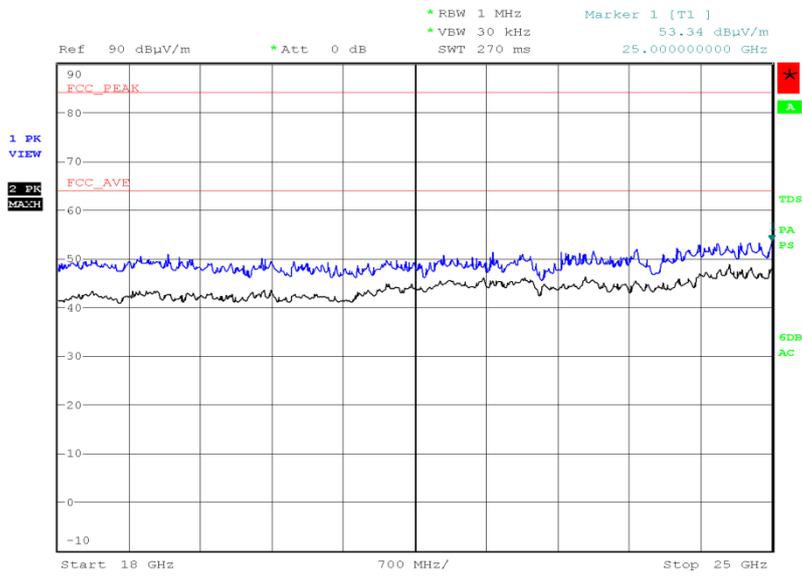
Product Service

8 GHz to 18 GHz



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

18 GHz to 25 GHz

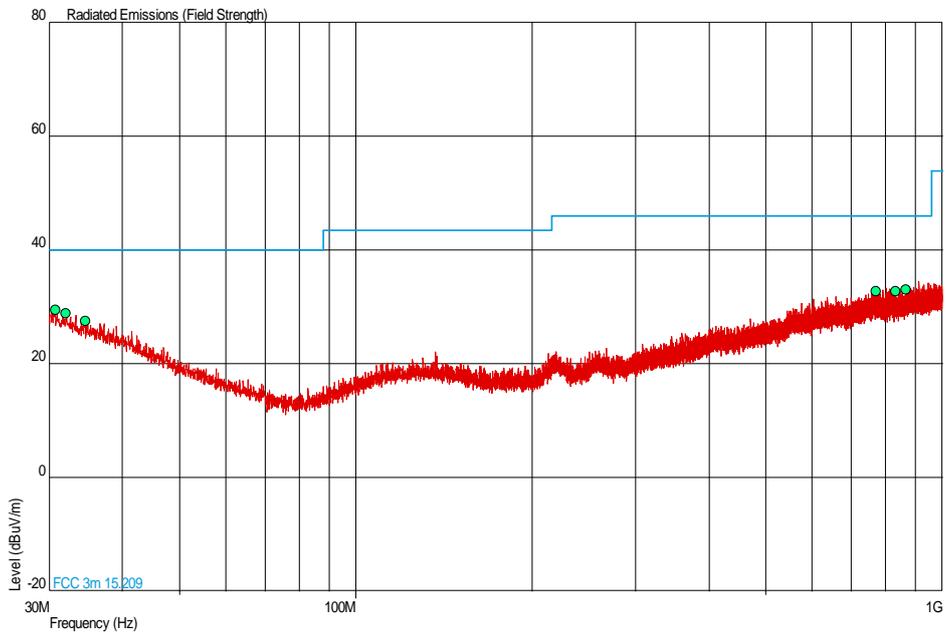


Date: 9.APR.2014 22:24:41



2480 MHz

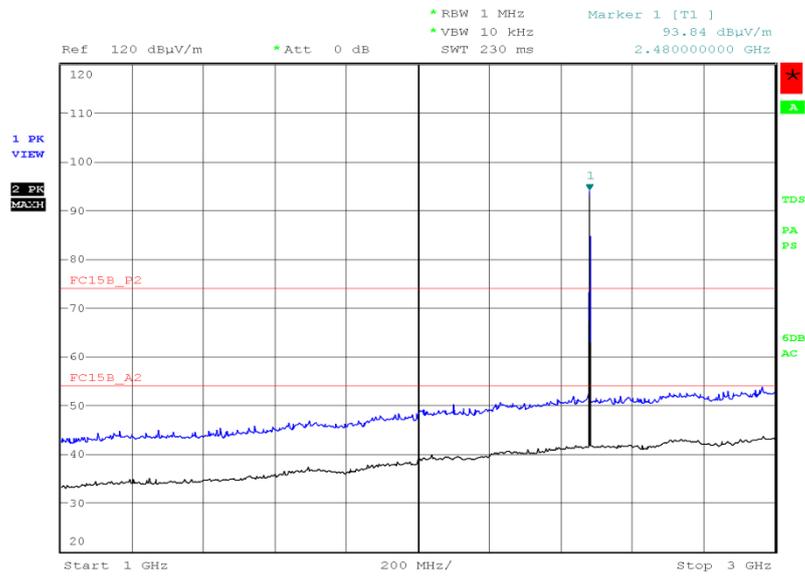
30 MHz to 1 GHz



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

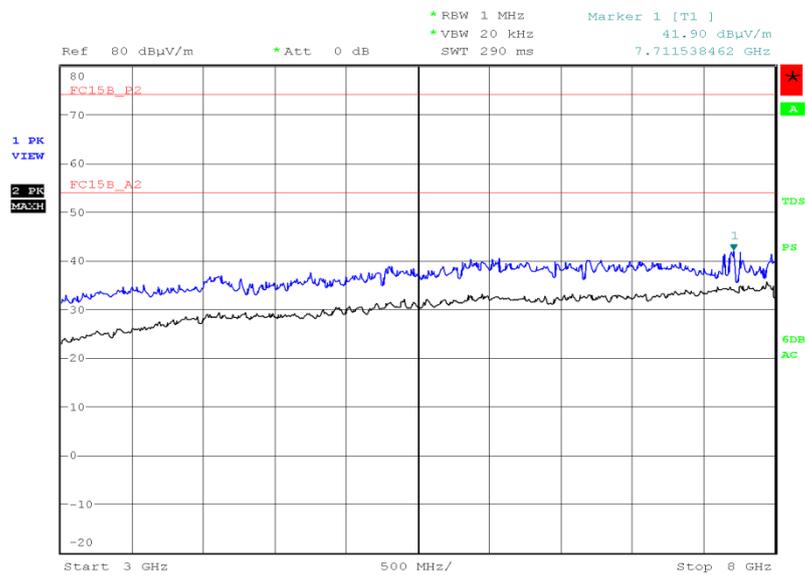


1 GHz to 3 GHz



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

3 GHz to 8 GHz

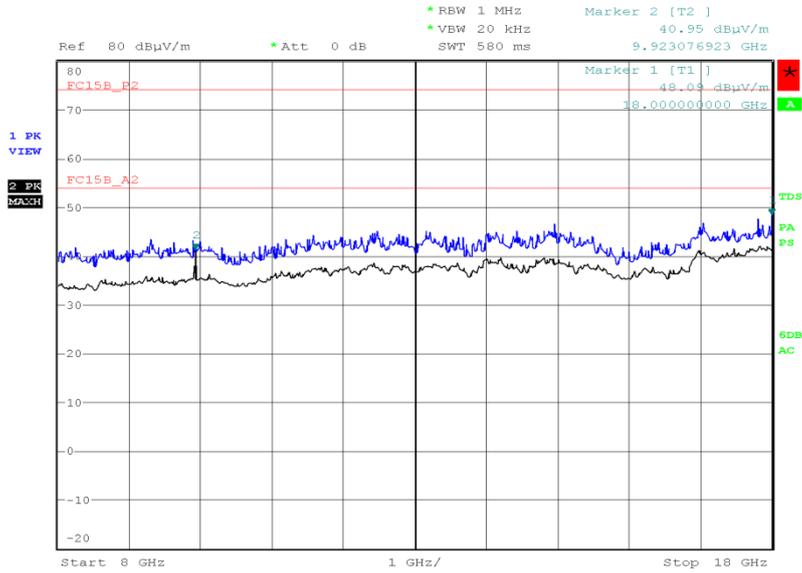


Date: 8.APR.2014 20:39:55



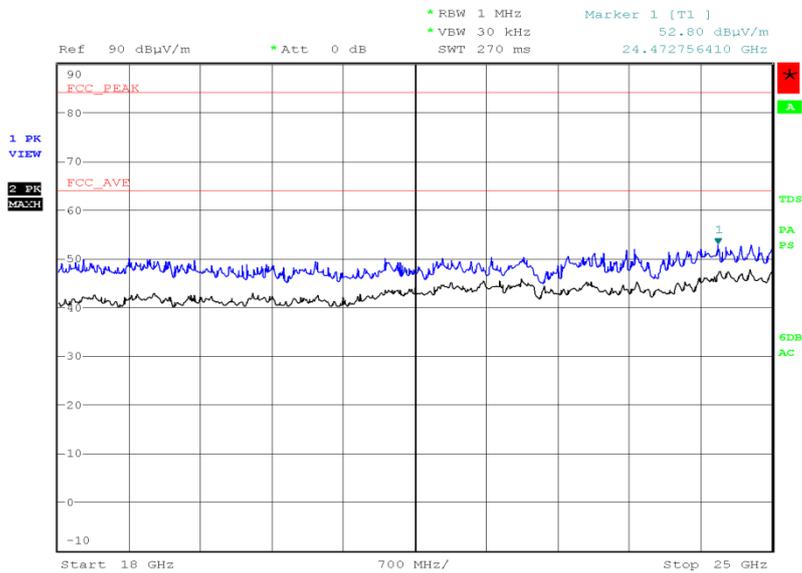
Product Service

8 GHz to 18 GHz



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

18 GHz to 25 GHz



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

Limit

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

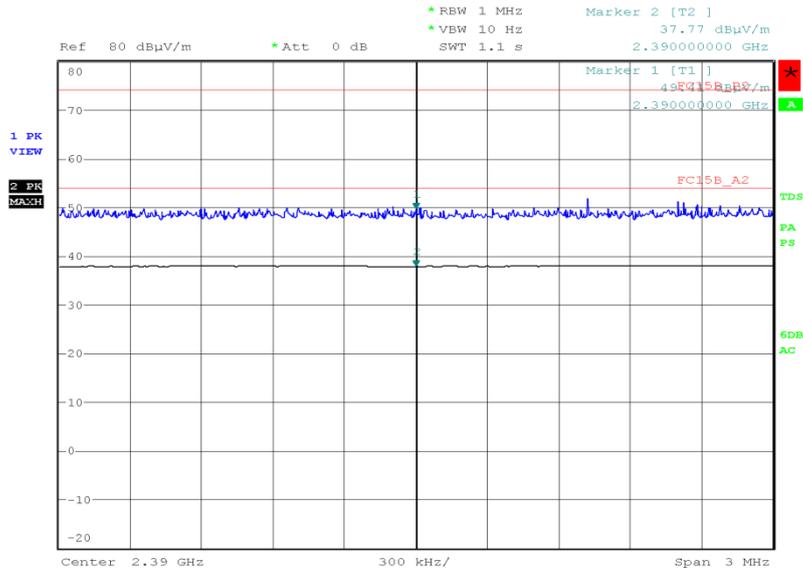


Product Service

Band Edge Emissions

2402 MHz

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

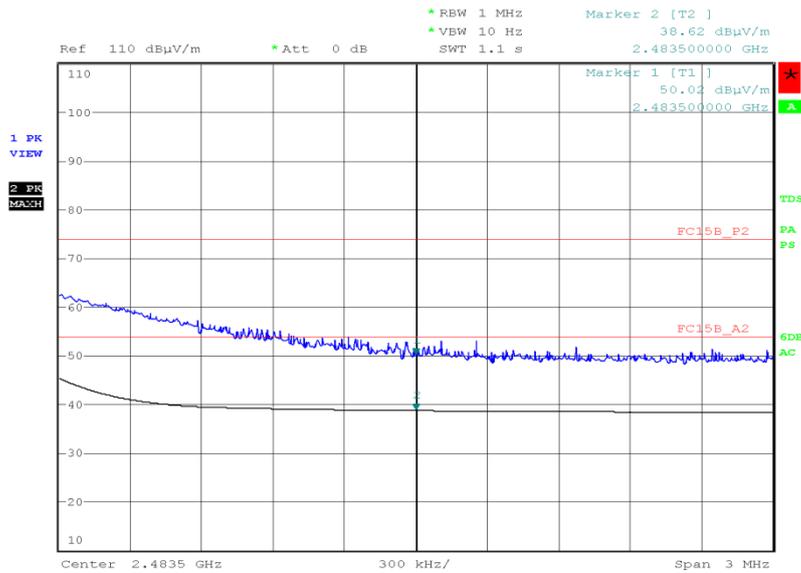


Date: 8.APR.2014 17:14:42



2480 MHz

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



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

Limit

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



Product Service

2.6 POWER SPECTRAL DENSITY

2.6.1 Specification Reference

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

2.6.2 Equipment Under Test and Modification State

SHL25 S/N: IMEI 004401115170488 - Modification State 0

SHL25 S/N: IMEI 004401115170645 - Modification State 0

2.6.3 Date of Test

31 March 2014, 24 April 2014 & 25 April 2014

2.6.4 Test Equipment Used

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

2.6.5 Test Procedure

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

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

2.6.6 Environmental Conditions

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



Product Service

2.6.7 Test Results

802.11(b)

4.0 V DC Supply

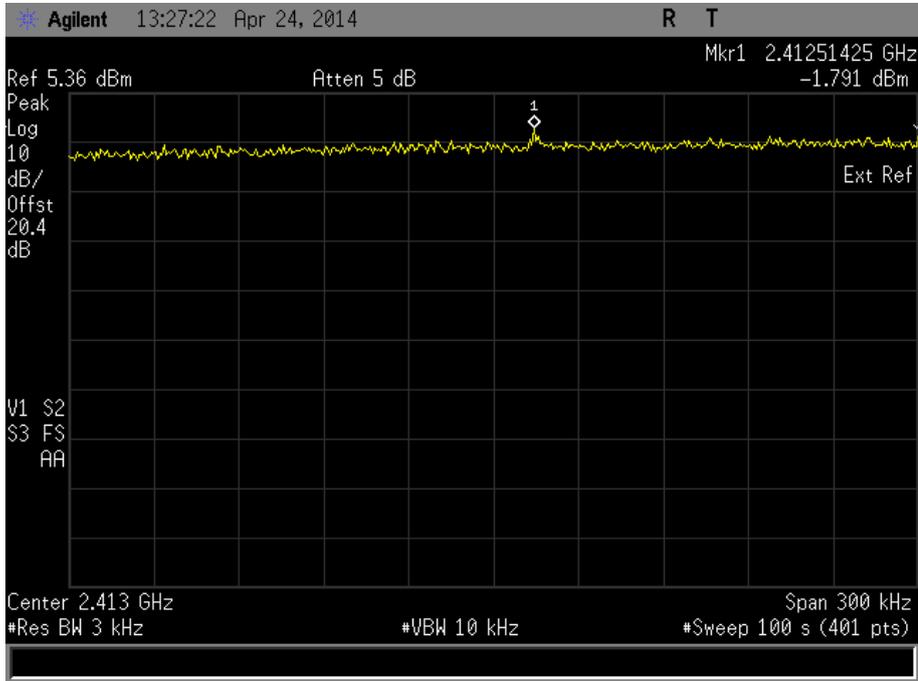
Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	1	-1.79
	2	-2.08
	5.5	-3.02
	11	-3.15
2437 MHz	1	-3.33
	2	-3.20
	5.5	-4.04
	11	-4.66
2462 MHz	1	-4.56
	2	-3.08
	5.5	-4.30
	11	-4.97



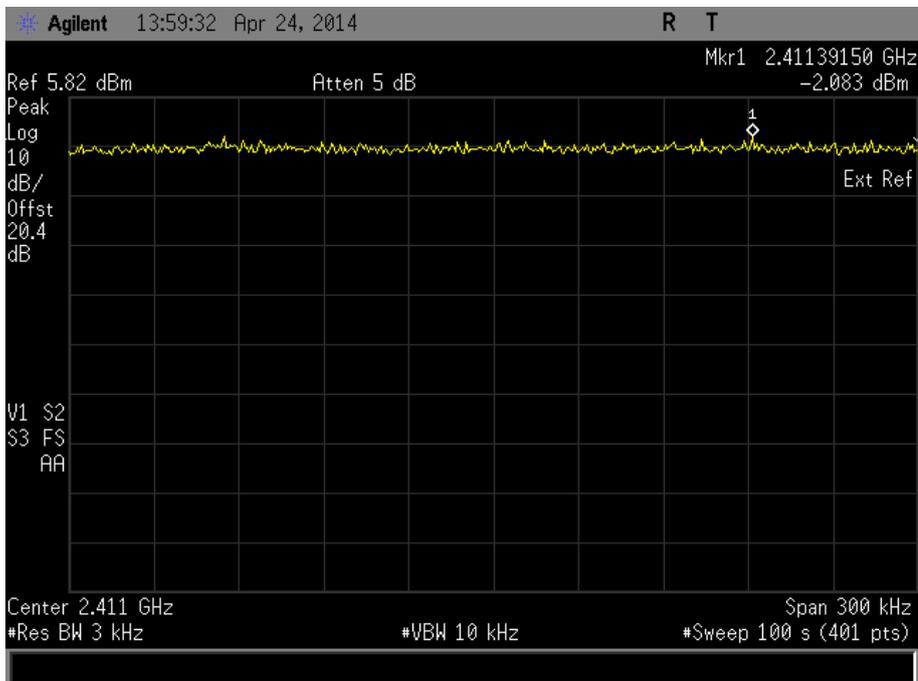
Product Service

2412 MHz

1 Mbps



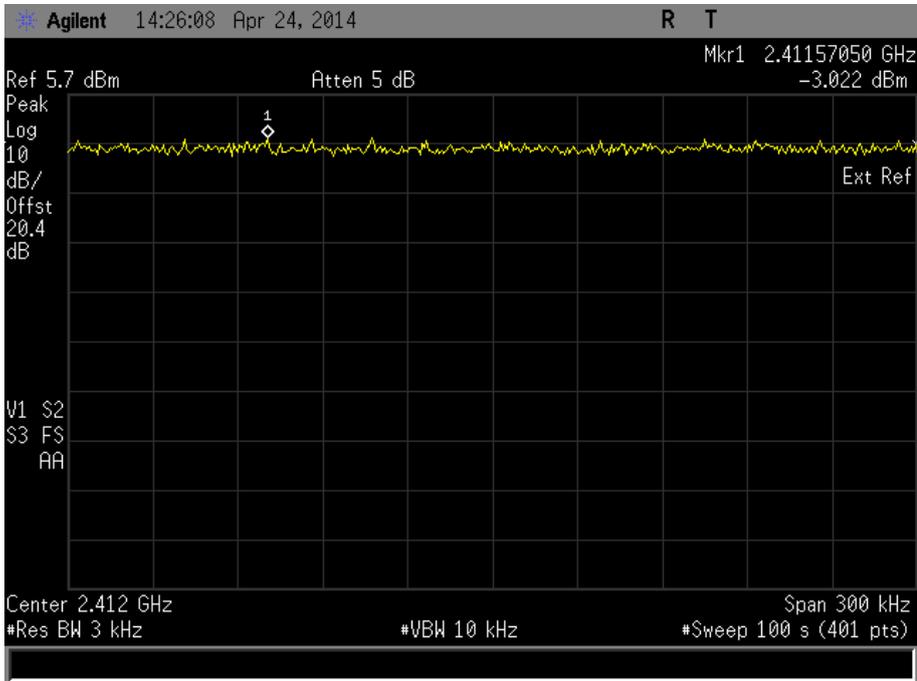
2 Mbps



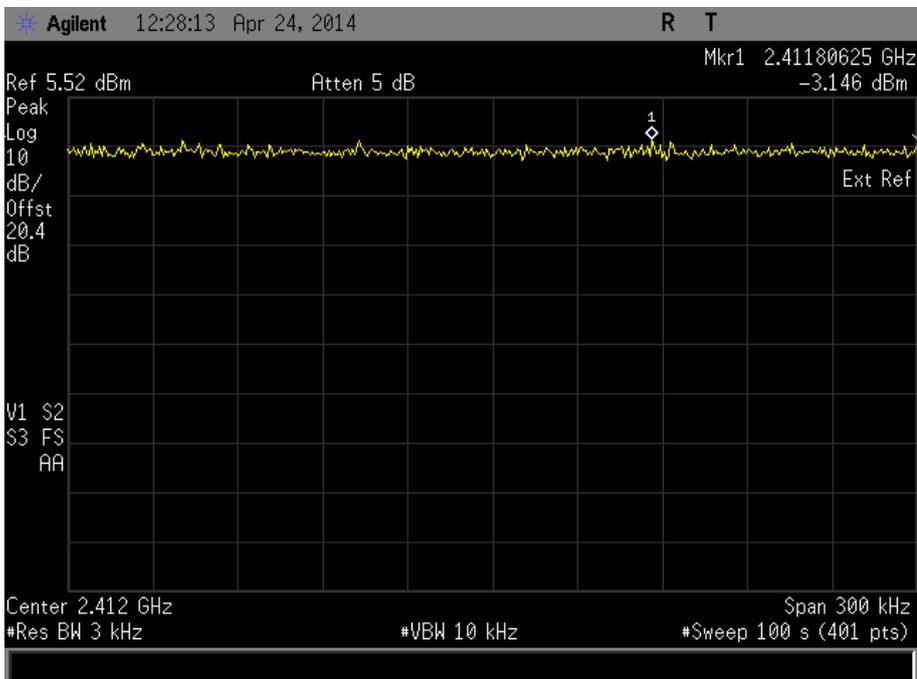


Product Service

5.5 Mbps



11 Mbps

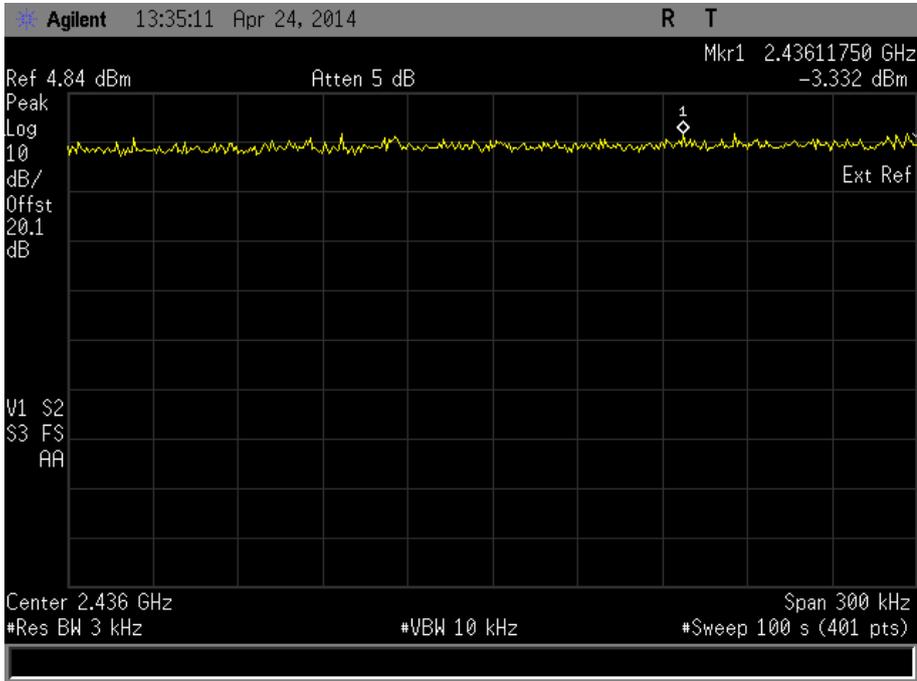




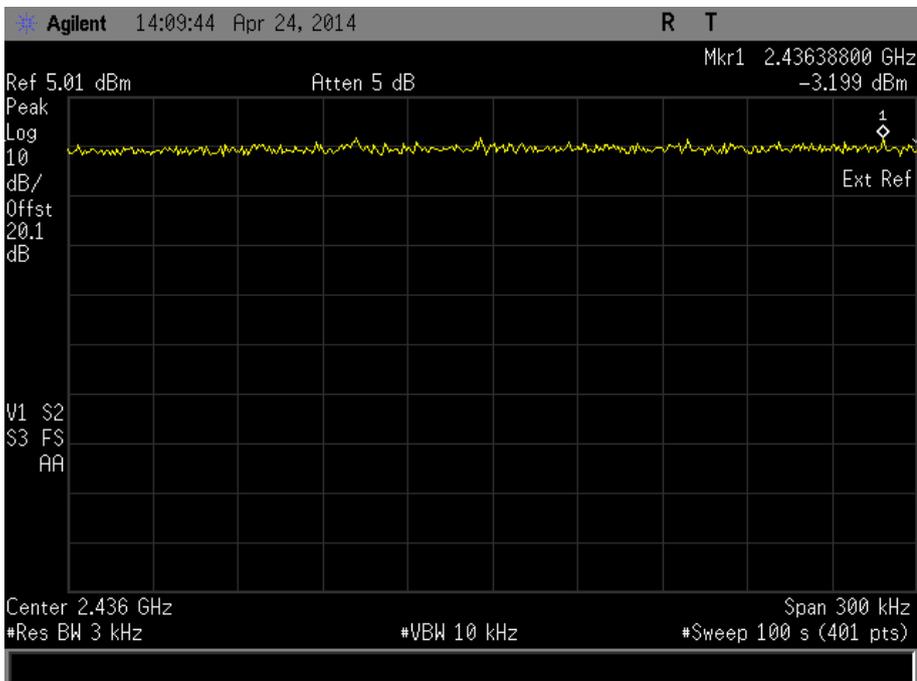
Product Service

2437 MHz

1 Mbps



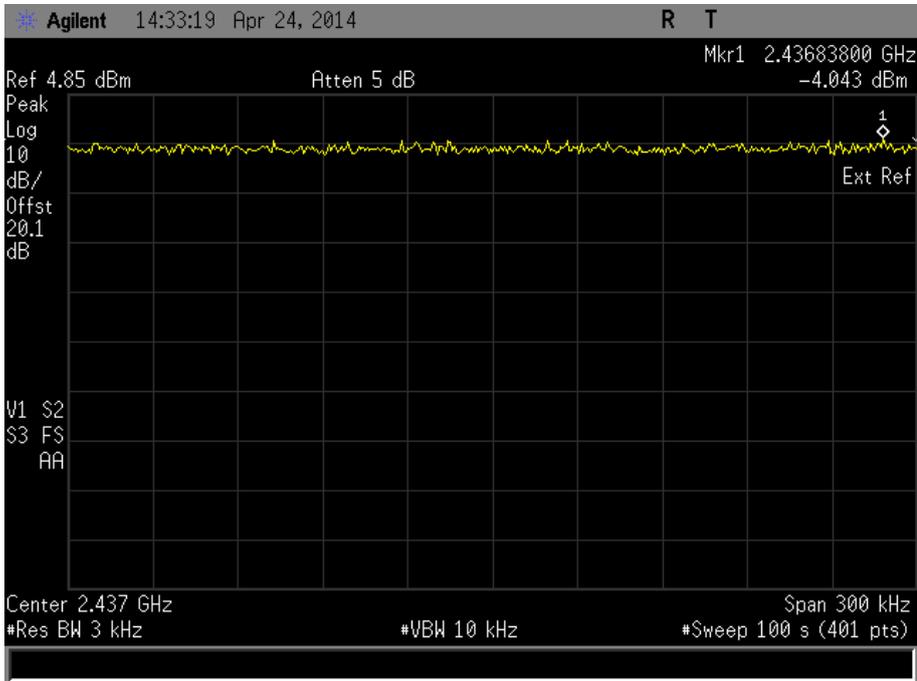
2 Mbps



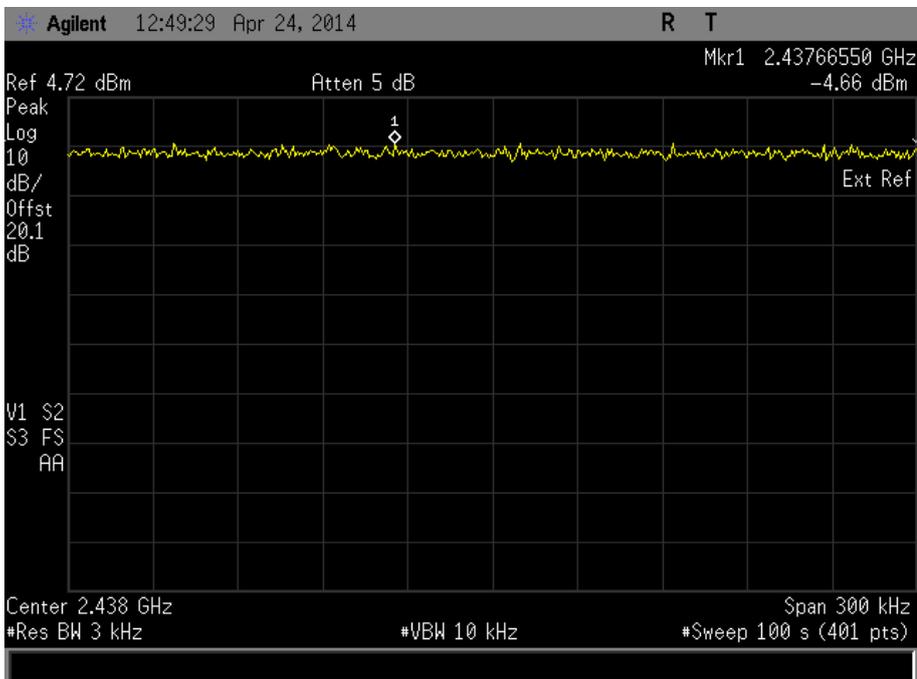


Product Service

5.5 Mbps



11 Mbps

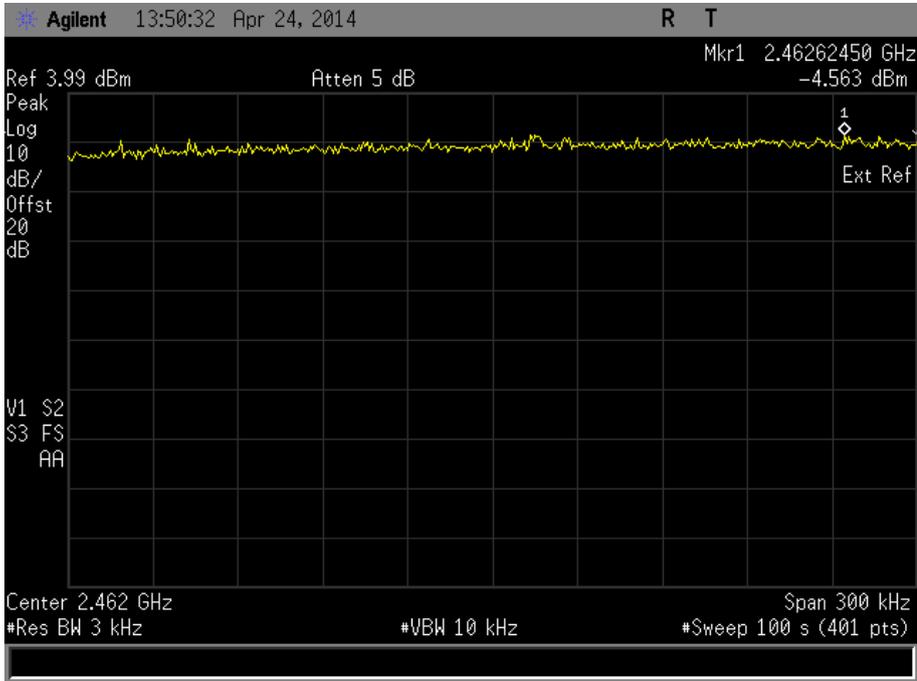




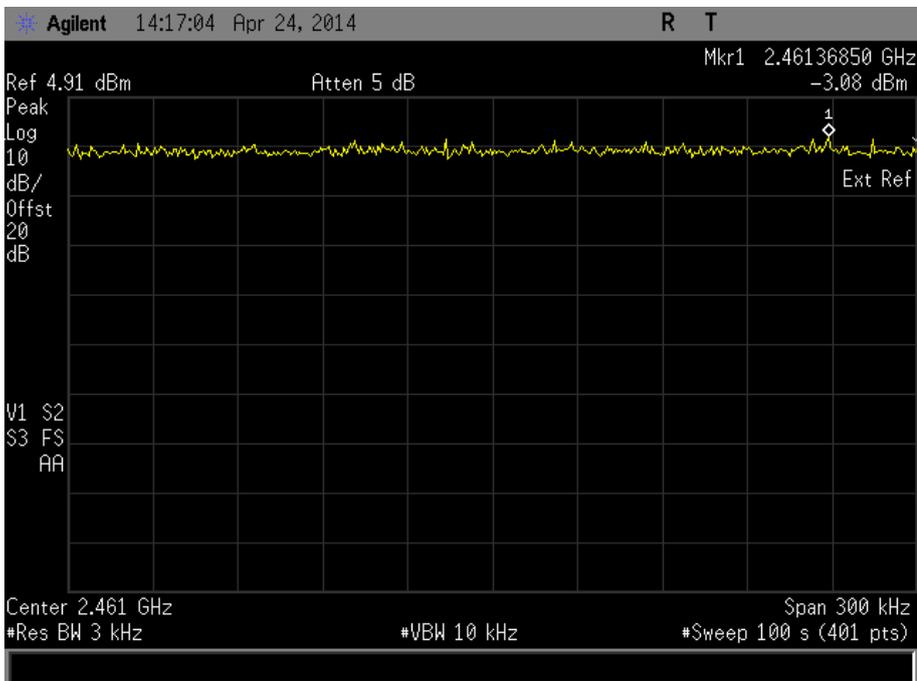
Product Service

2462 MHz

1 Mbps



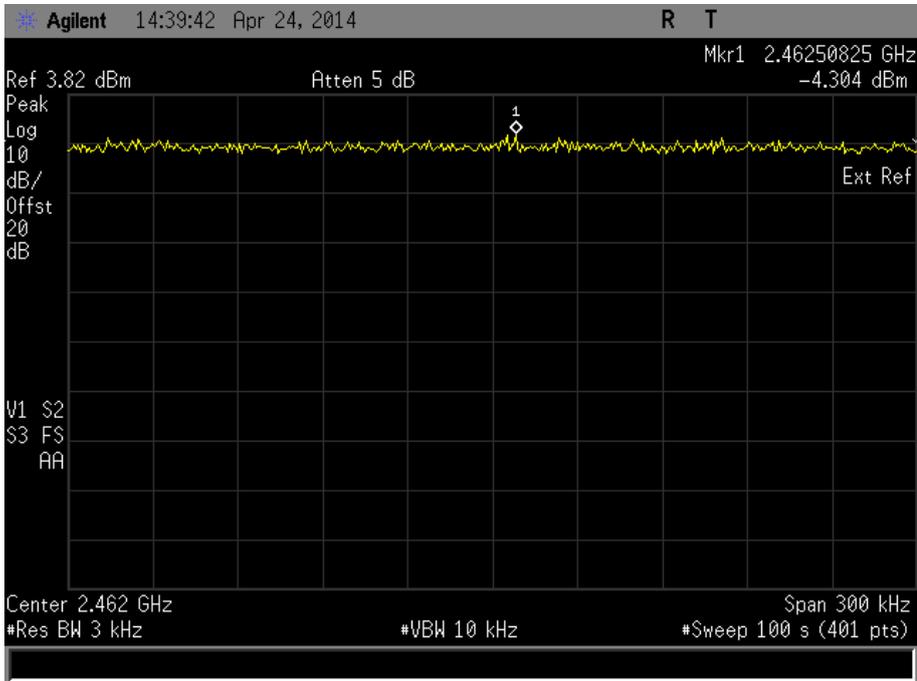
2 Mbps



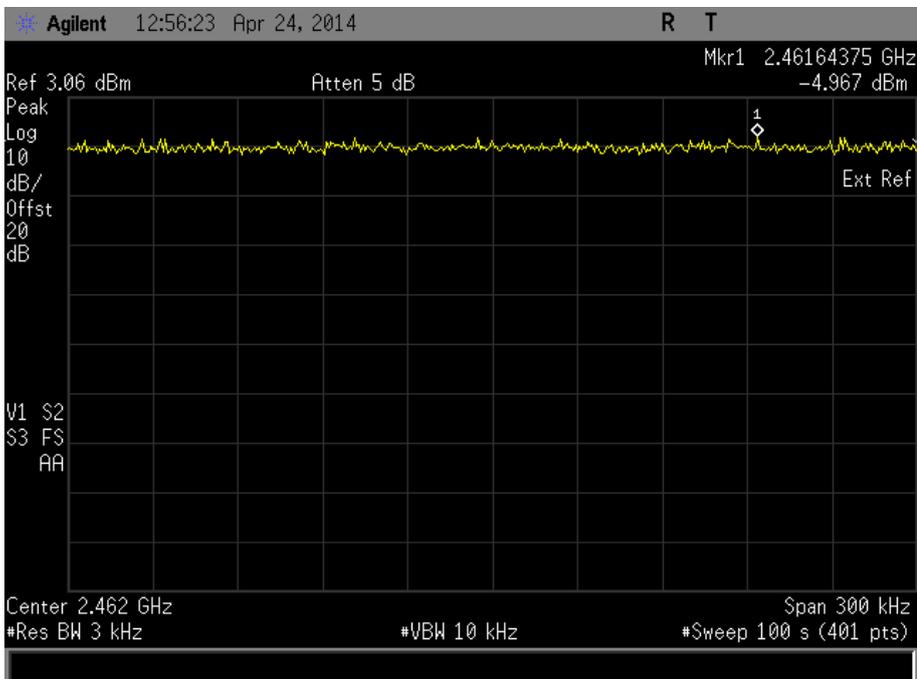


Product Service

5.5 Mbps



11 Mbps



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.



Product Service

802.11(g)

4.0 V DC Supply

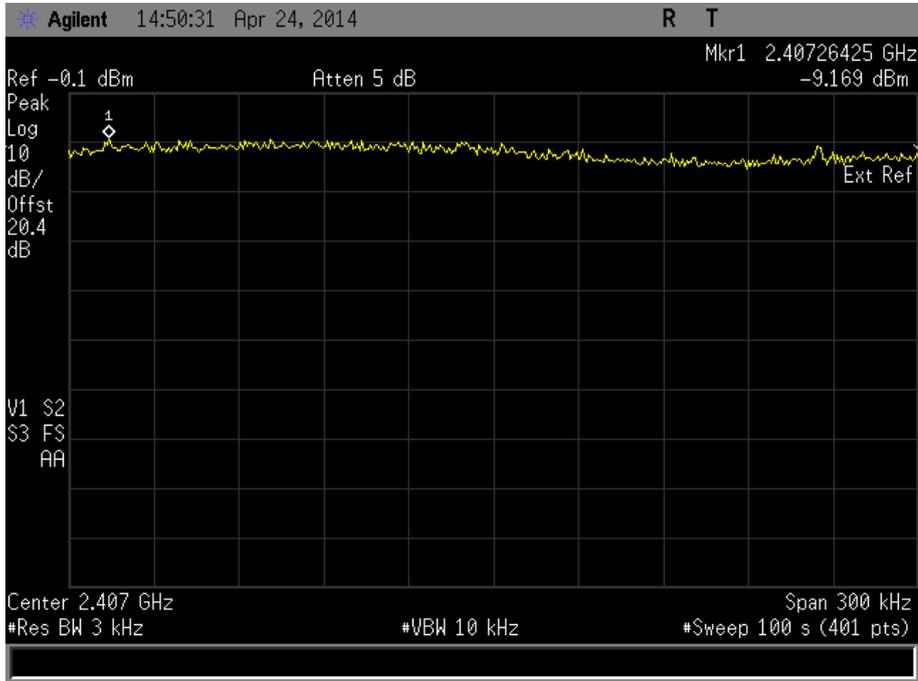
Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	6	-9.17
	9	-11.39
	12	-9.76
	18	-8.87
	24	-8.87
	36	-9.64
	48	-8.40
	54	-9.40
2437 MHz	6	-8.95
	9	-8.22
	12	-9.54
	18	-8.65
	24	-9.39
	36	-9.68
	48	-9.79
	54	-9.02
2462 MHz	6	-12.44
	9	-10.27
	12	-10.61
	18	-9.80
	24	-9.14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



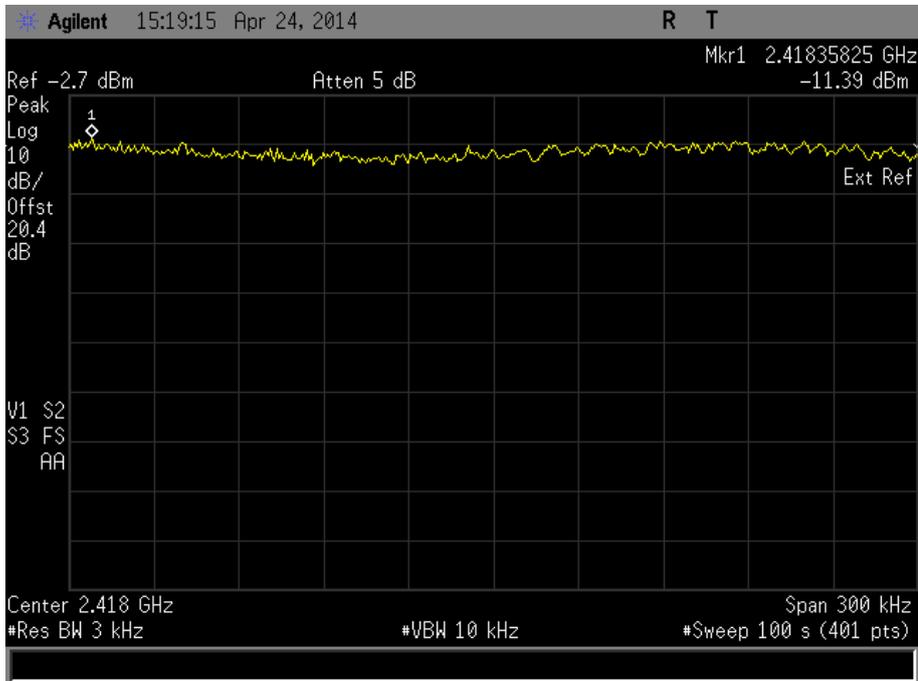
Product Service

2412 MHz

6 Mbps



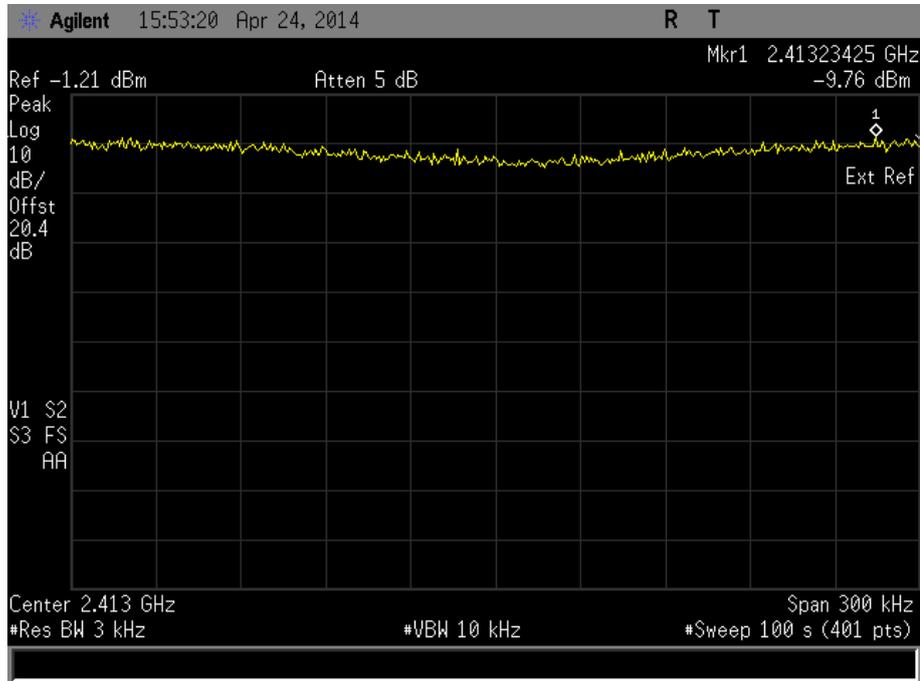
9 Mbps



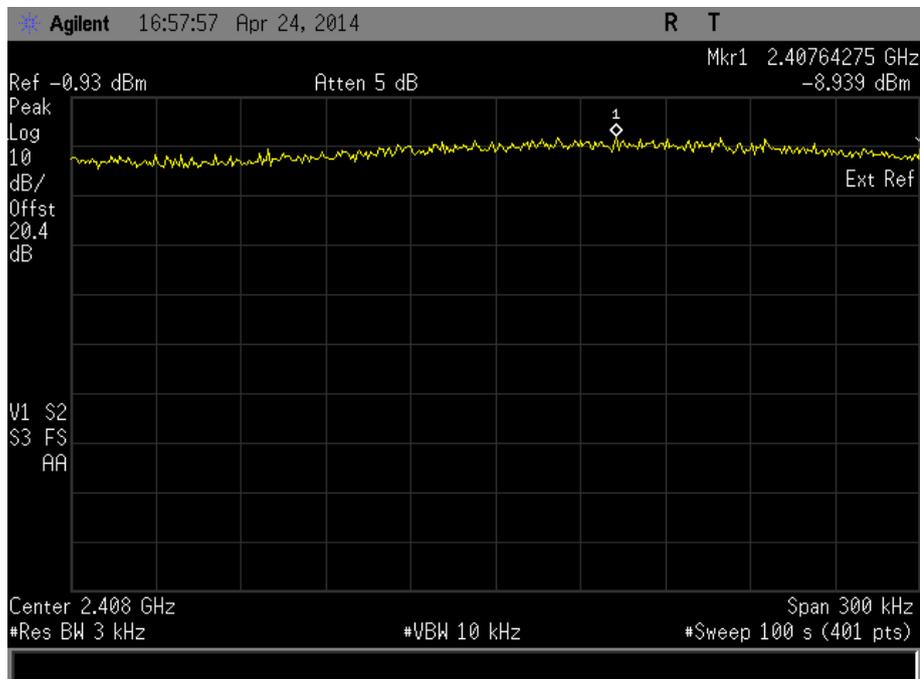


Product Service

12 Mbps



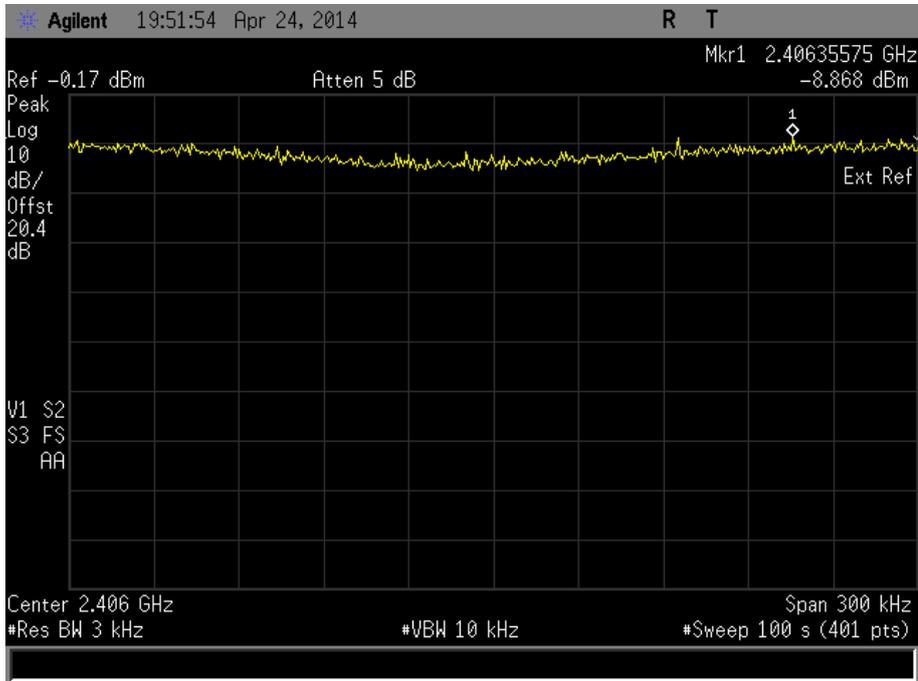
18 Mbps



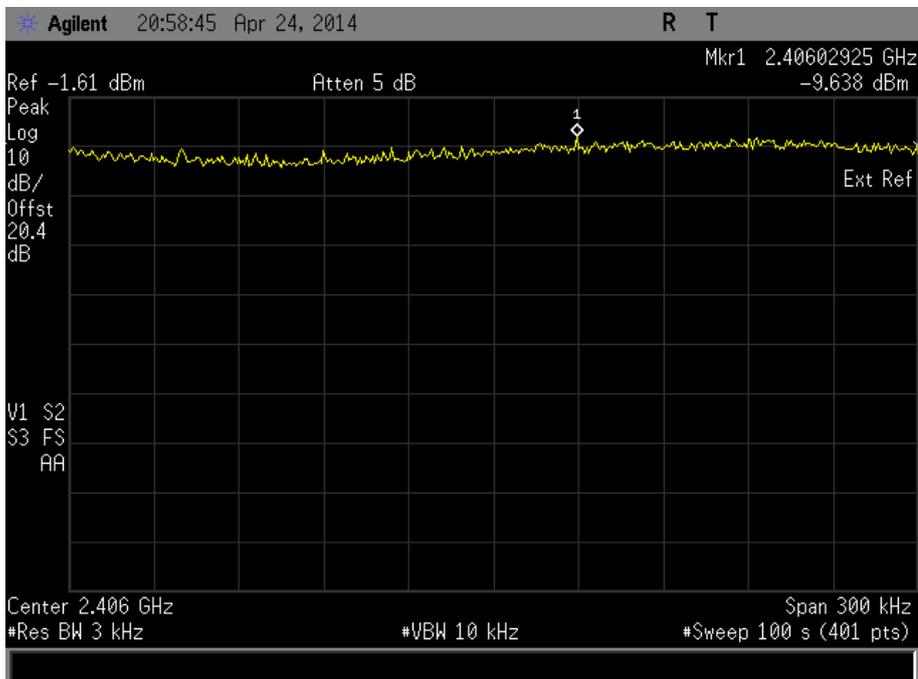


Product Service

24 Mbps



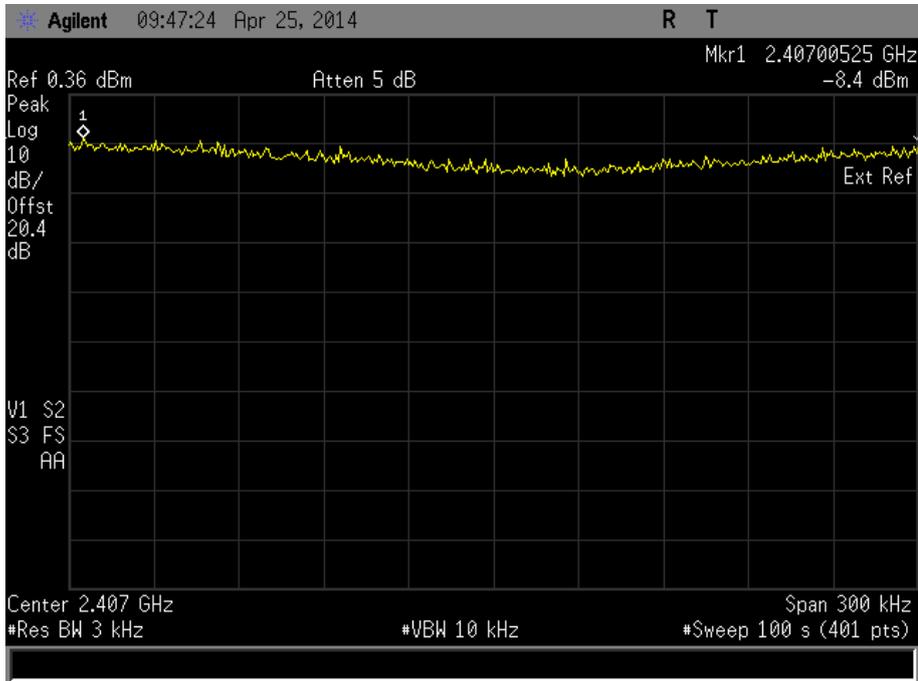
36 Mbps



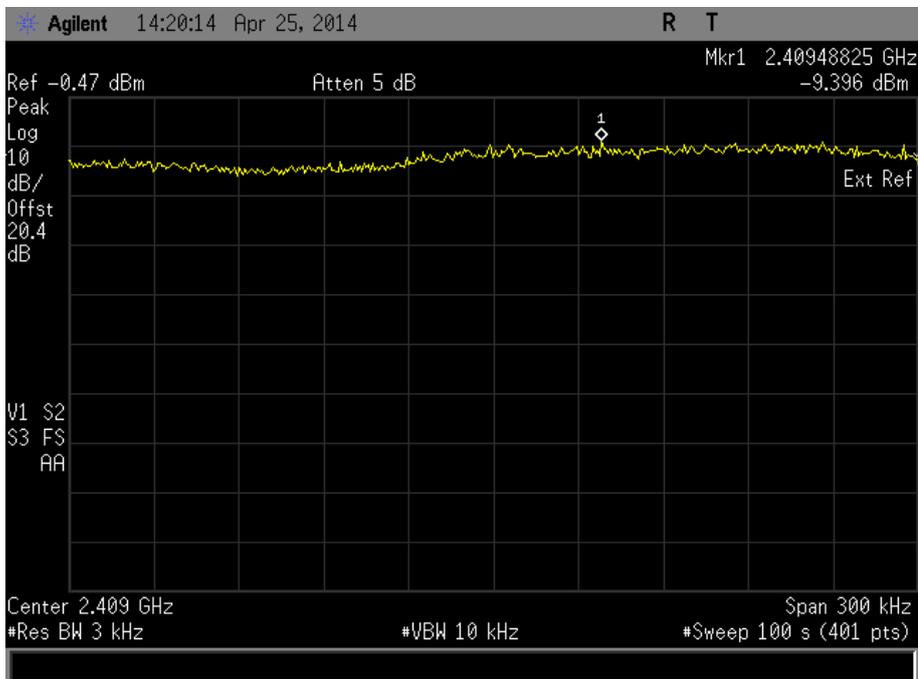


Product Service

48 Mbps



54 Mbps

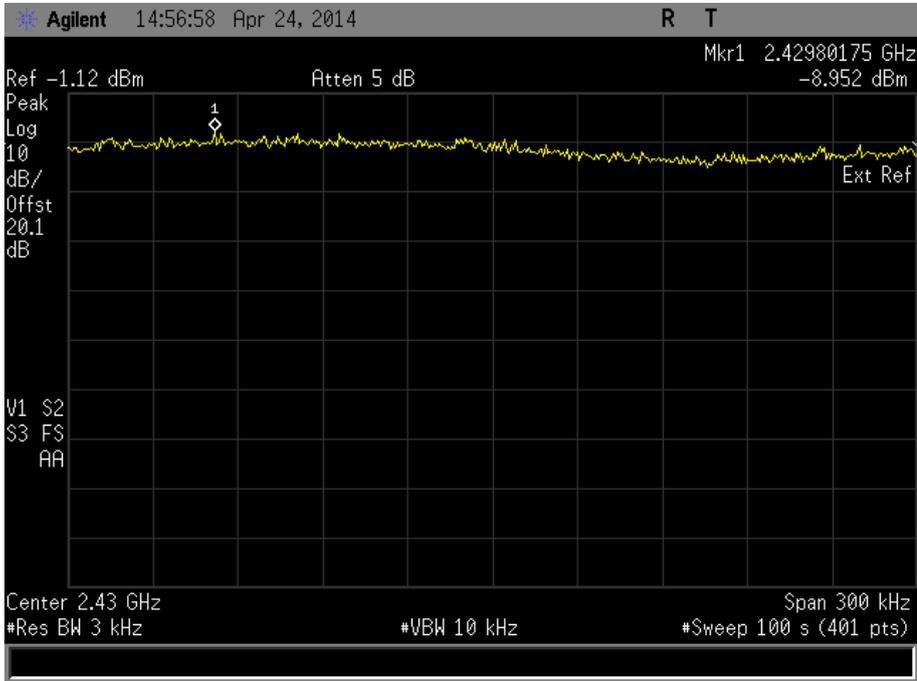




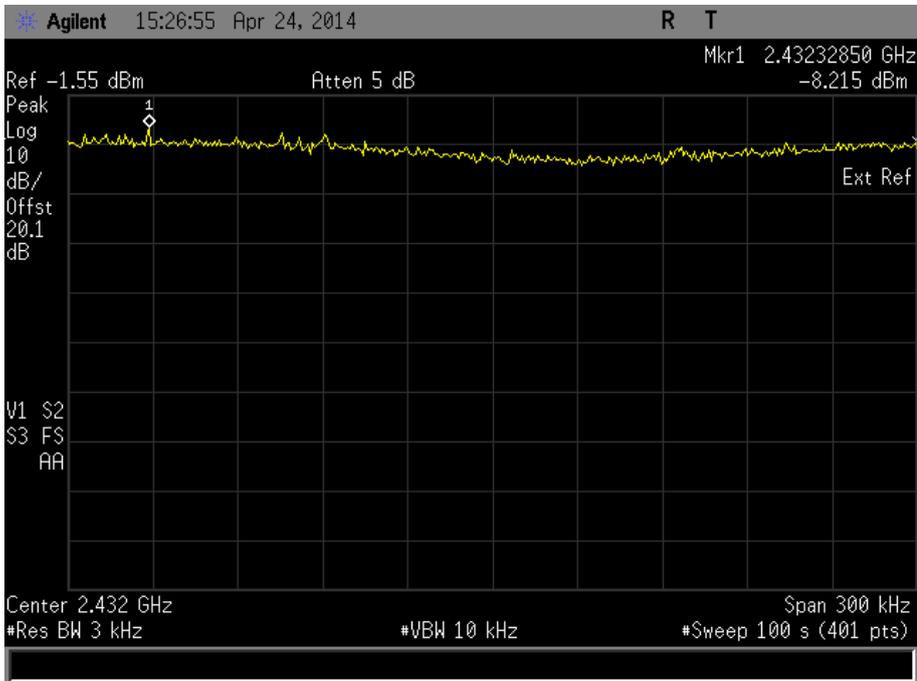
Product Service

2437 MHz

6 Mbps



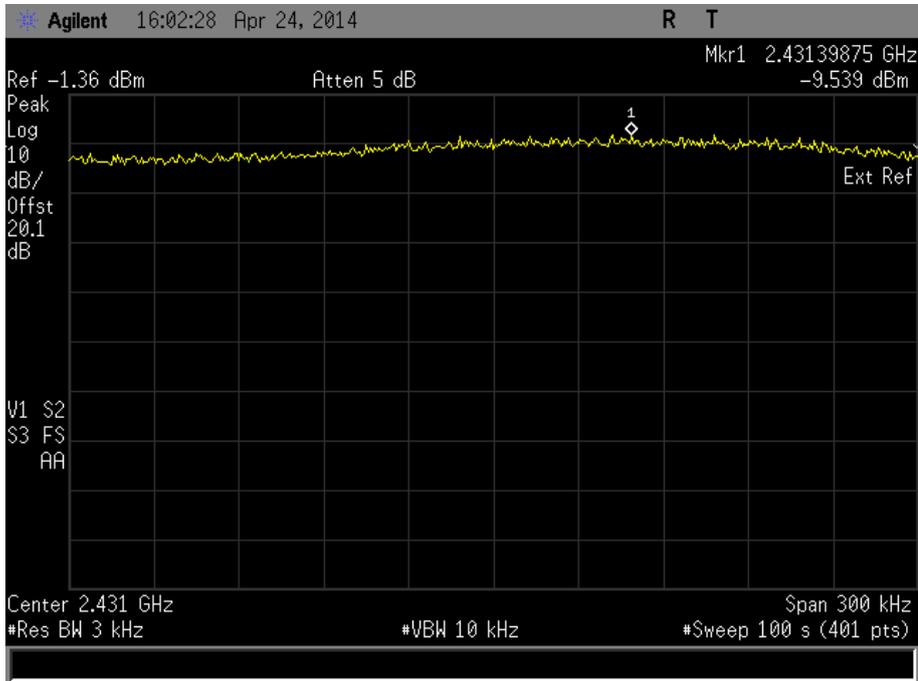
9 Mbps



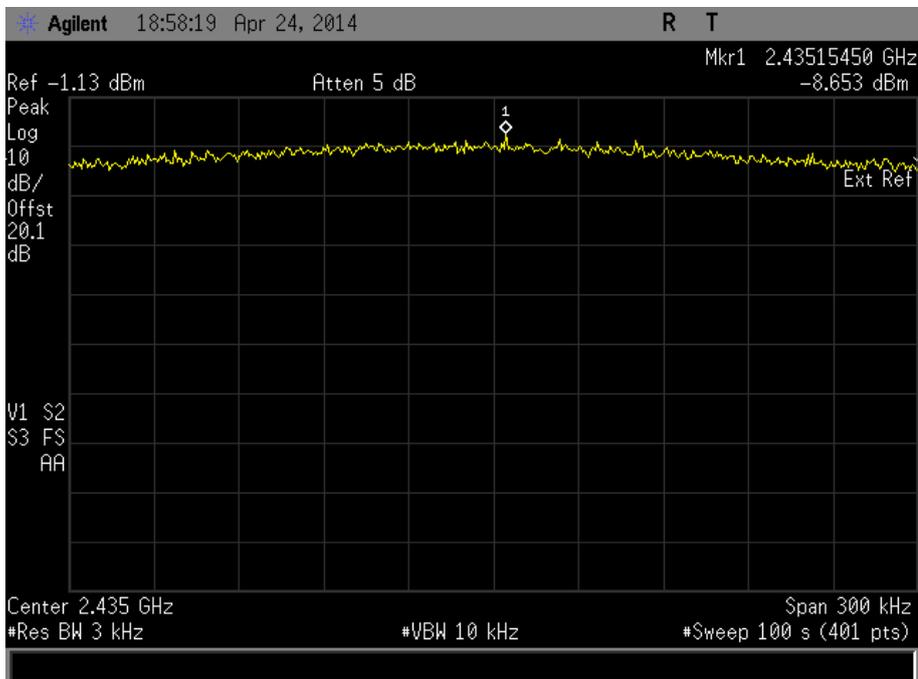


Product Service

12 Mbps



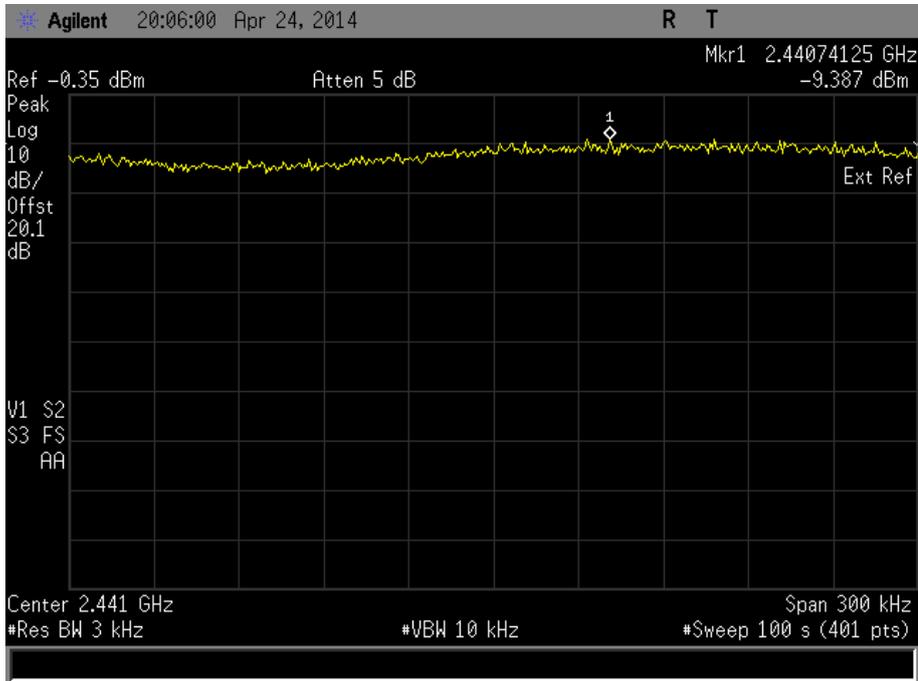
18 Mbps



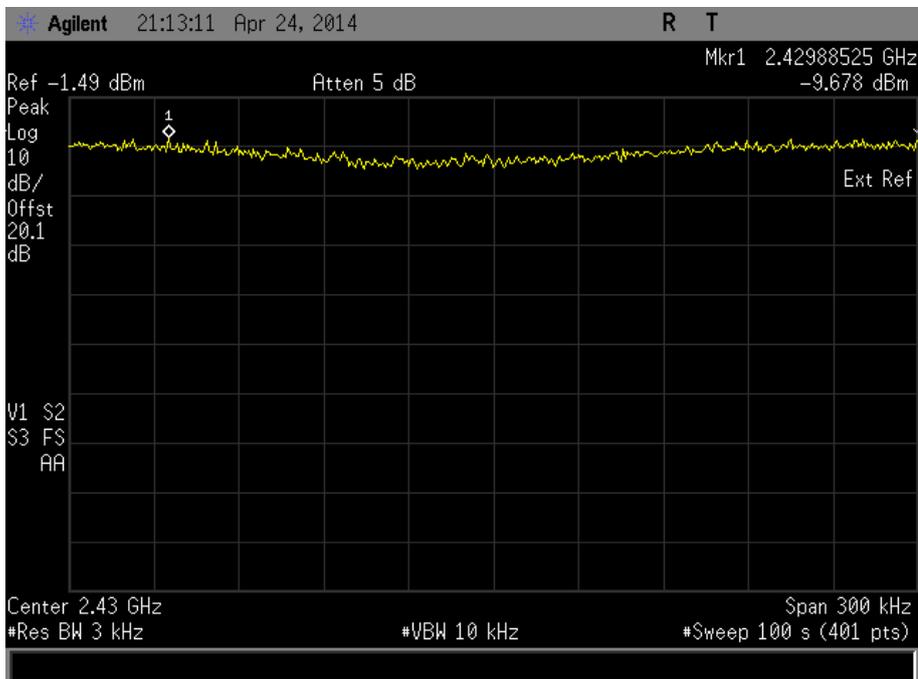


Product Service

24 Mbps



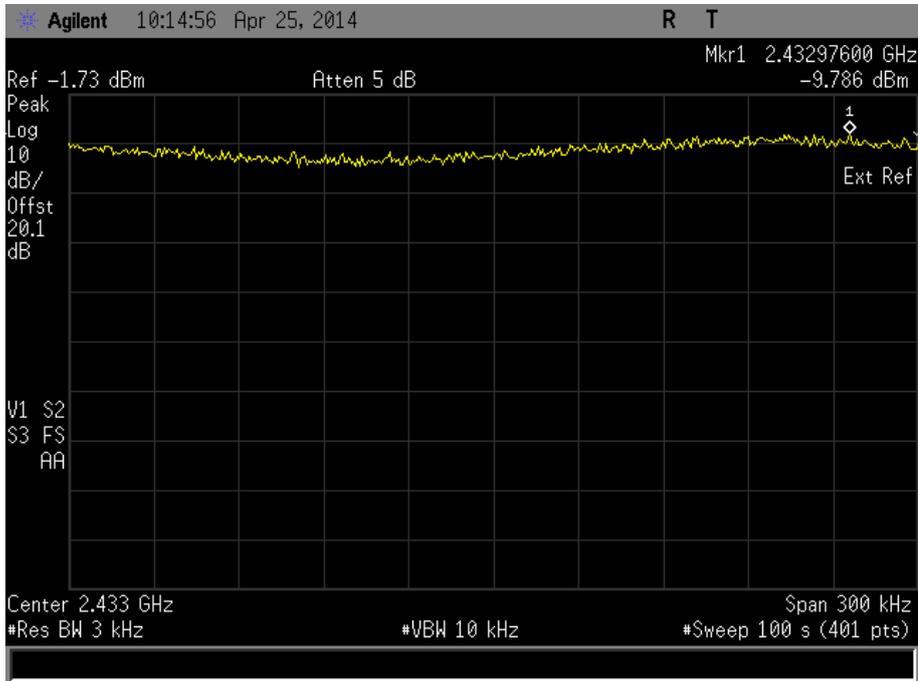
36 Mbps



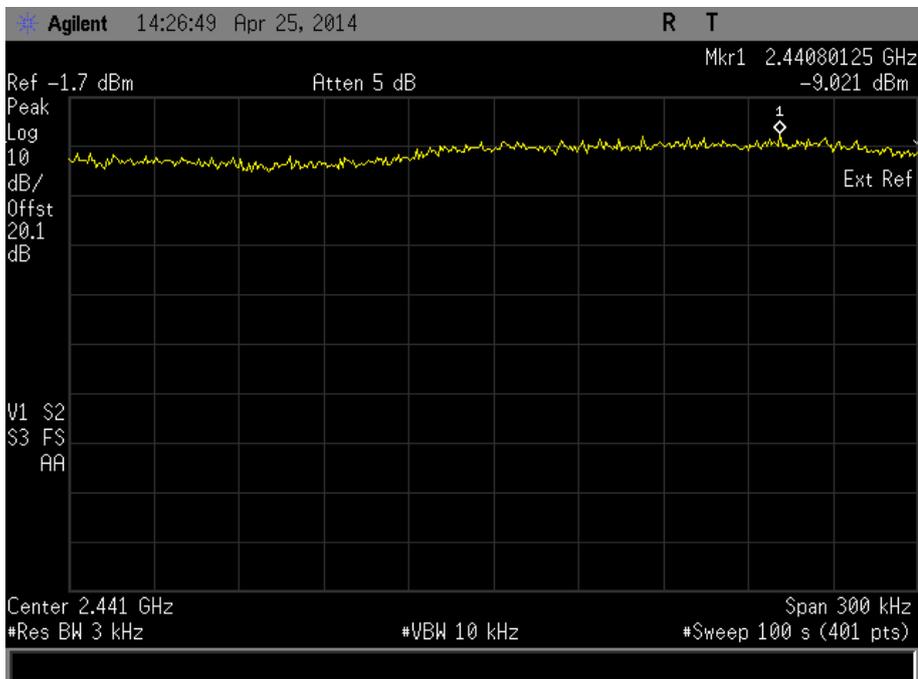


Product Service

48 Mbps



54 Mbps

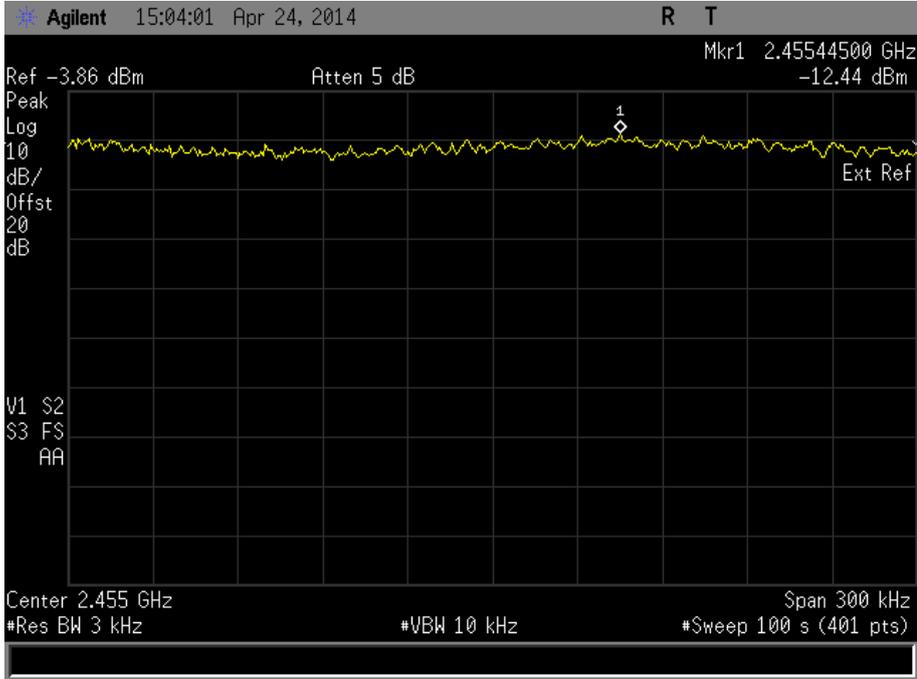




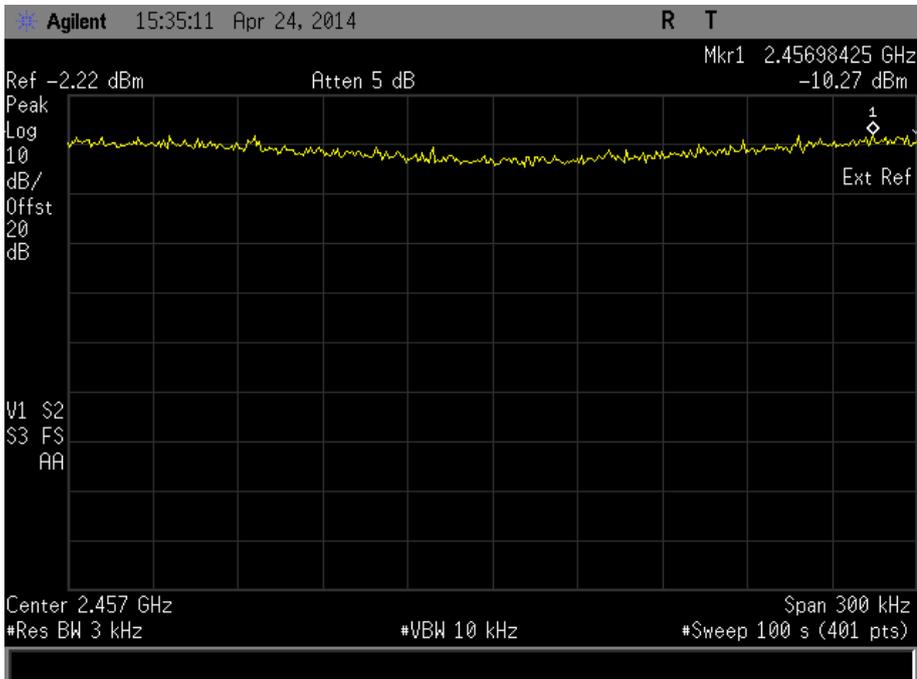
Product Service

2462 MHz

6 Mbps



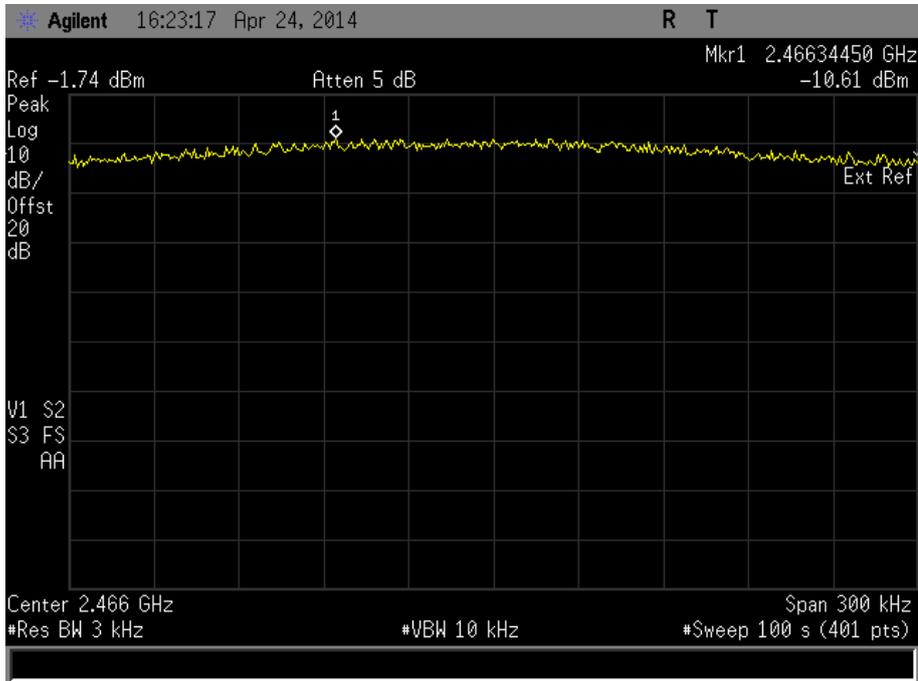
9 Mbps



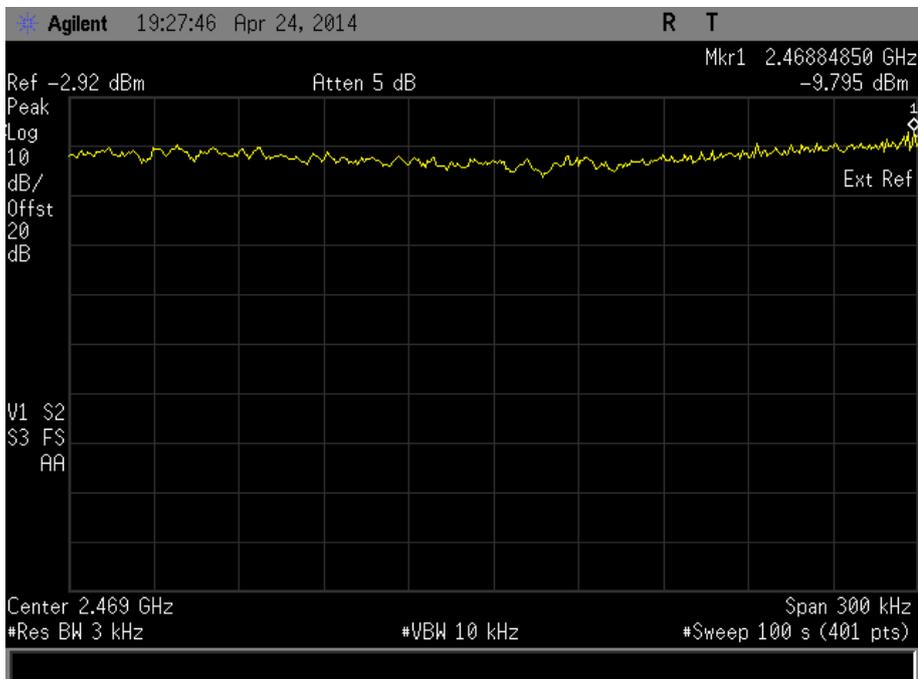


Product Service

12 Mbps



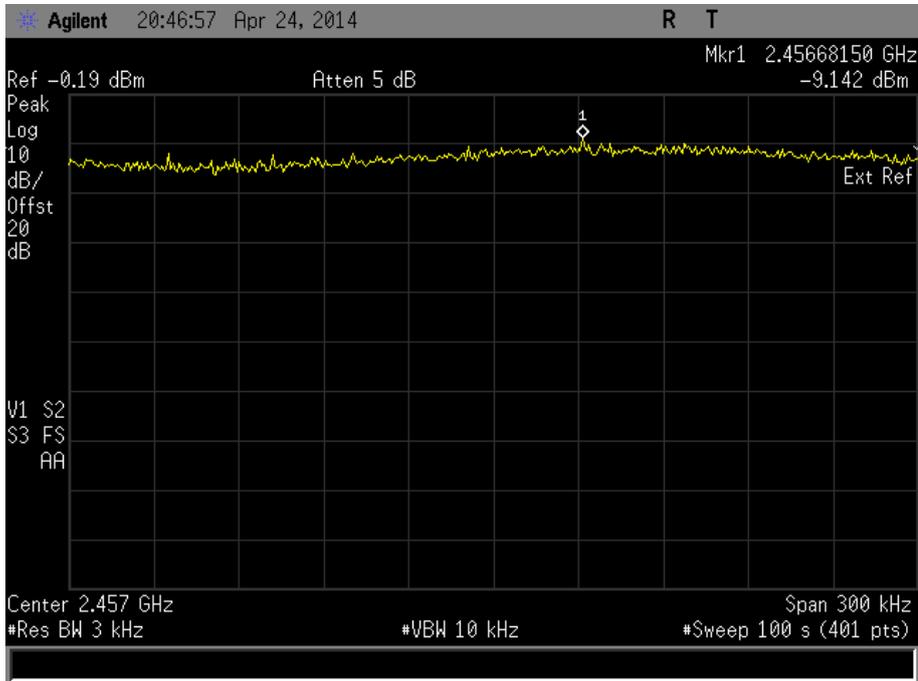
18 Mbps



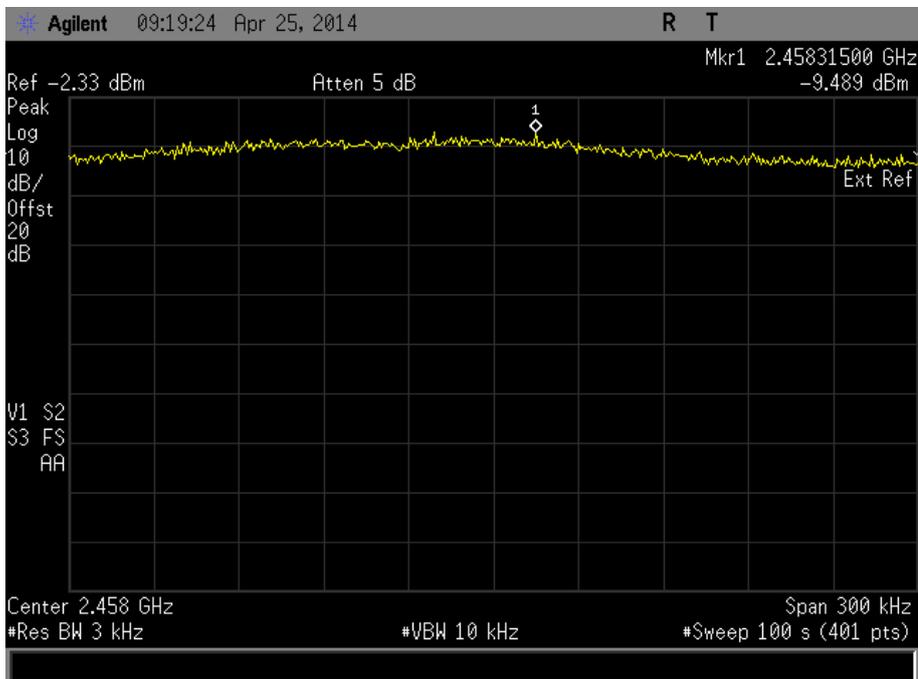


Product Service

24 Mbps



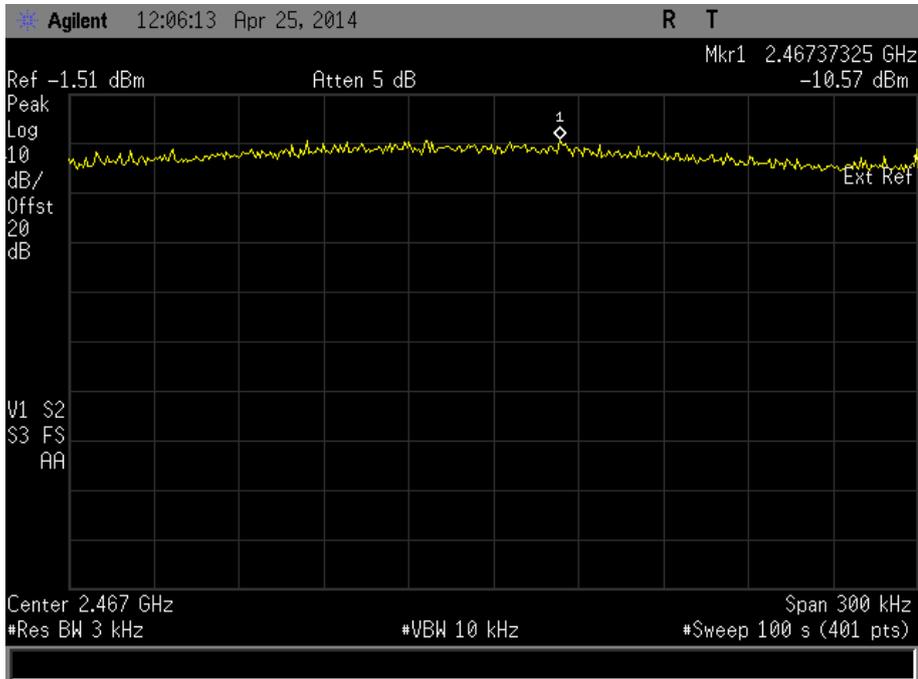
36 Mbps



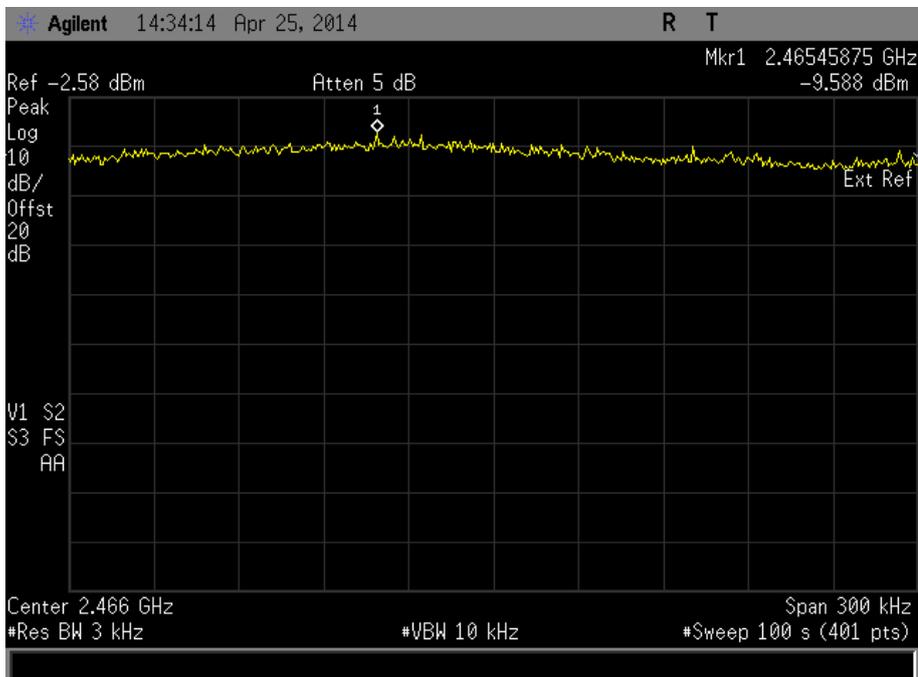


Product Service

48 Mbps



54 Mbps



Limit Clause

The 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

802.11(n)

4.0 V DC Supply

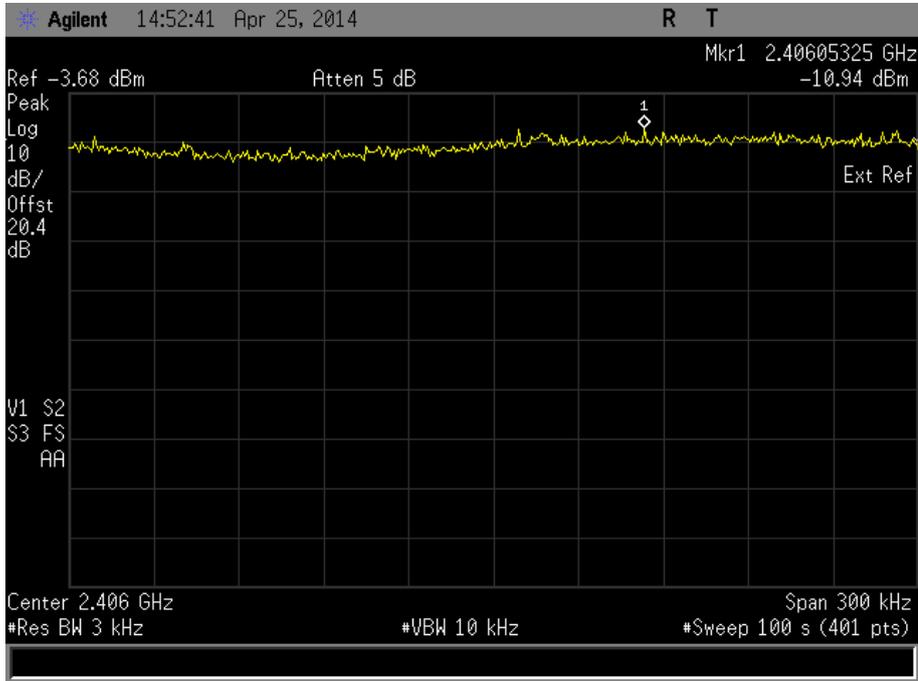
Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	6.5	-10.94
	13	-10.26
	19.5	-10.85
	26	-11.43
	39	-9.86
	52	-11.75
	58.5	-10.93
	65	-10.03
2437 MHz	6.5	-8.68
	13	-10.78
	19.5	-9.59
	26	-9.48
	39	-9.34
	52	-9.71
	58.5	-10.57
	65	-11.37
2462 MHz	6.5	-11.47
	13	-11.31
	19.5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



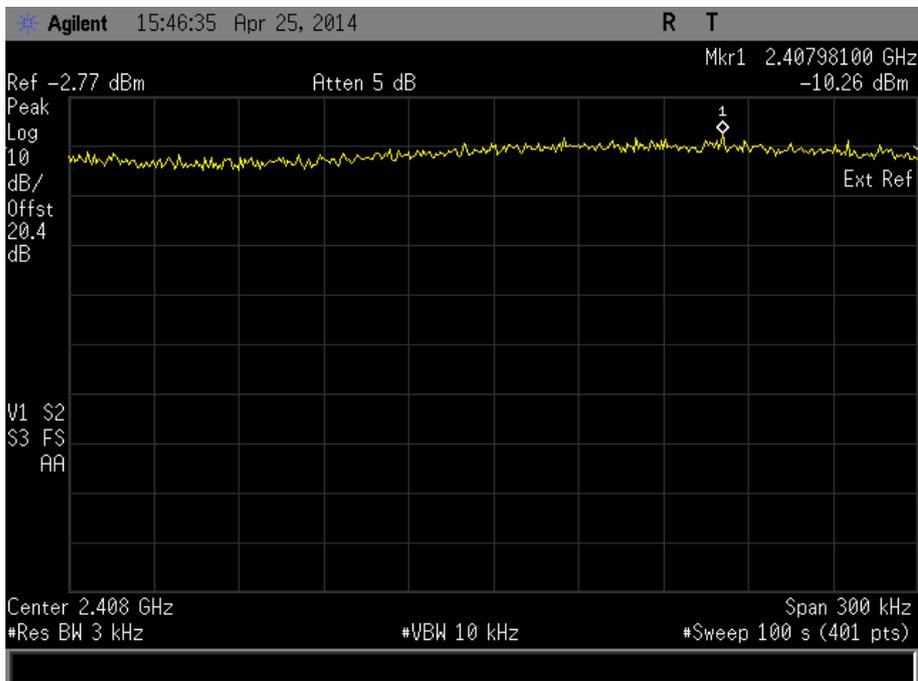
Product Service

2412 MHz

6.5 Mbps



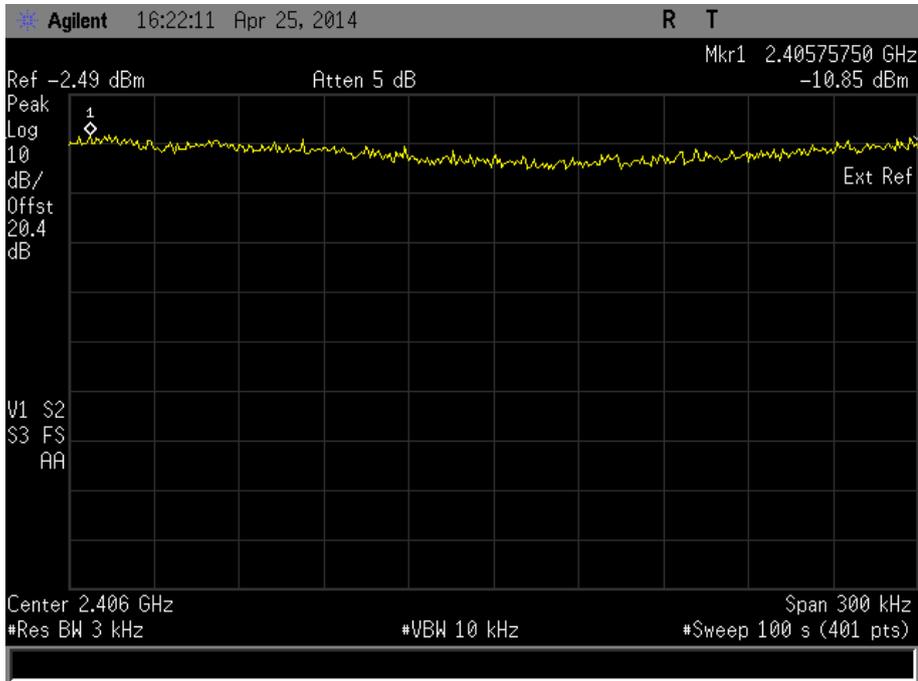
13 Mbps



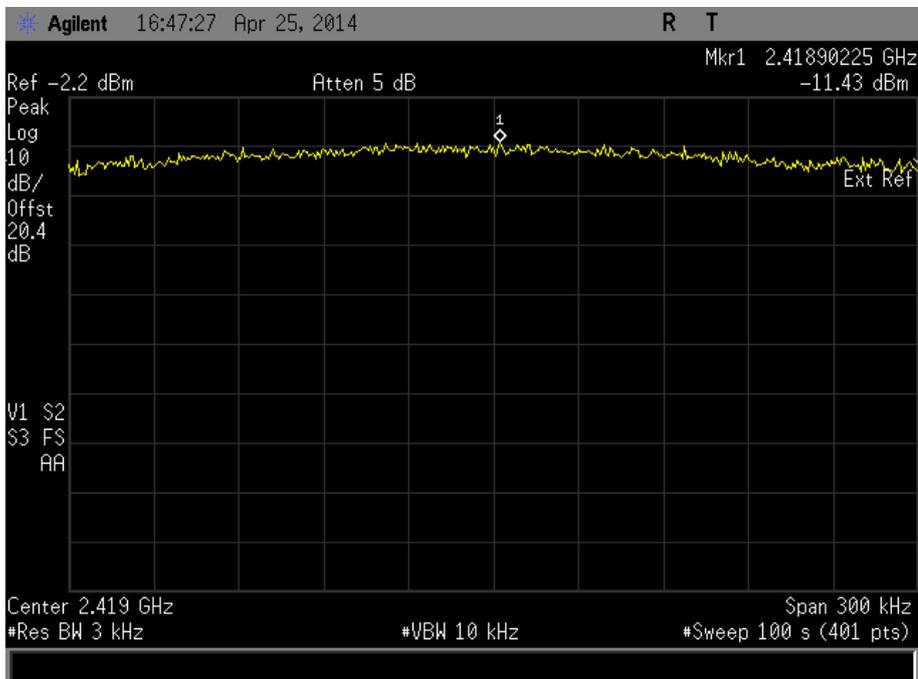


Product Service

19.5 Mbps



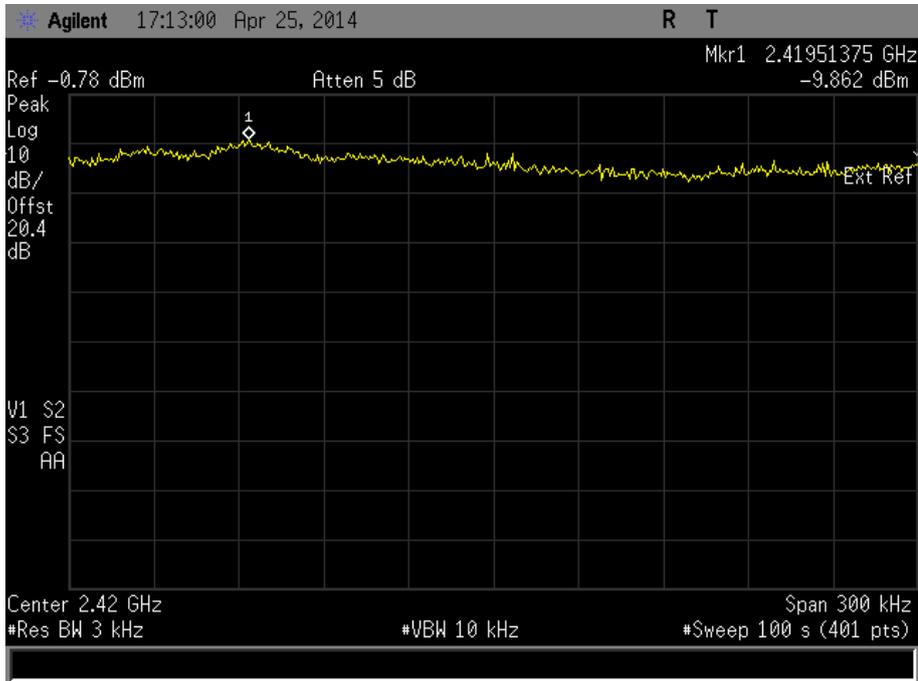
26 Mbps



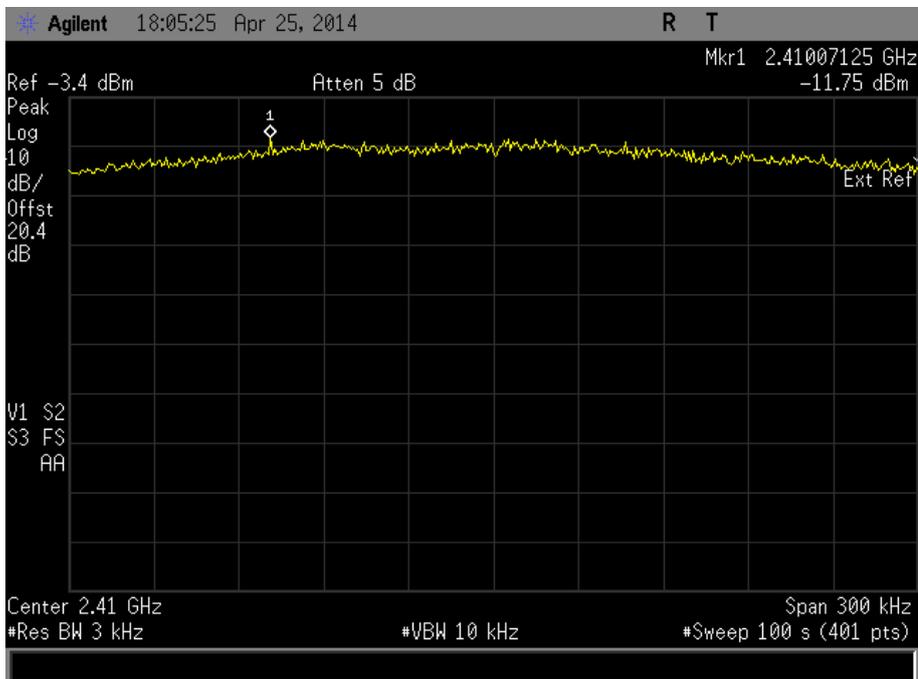


Product Service

39 Mbps



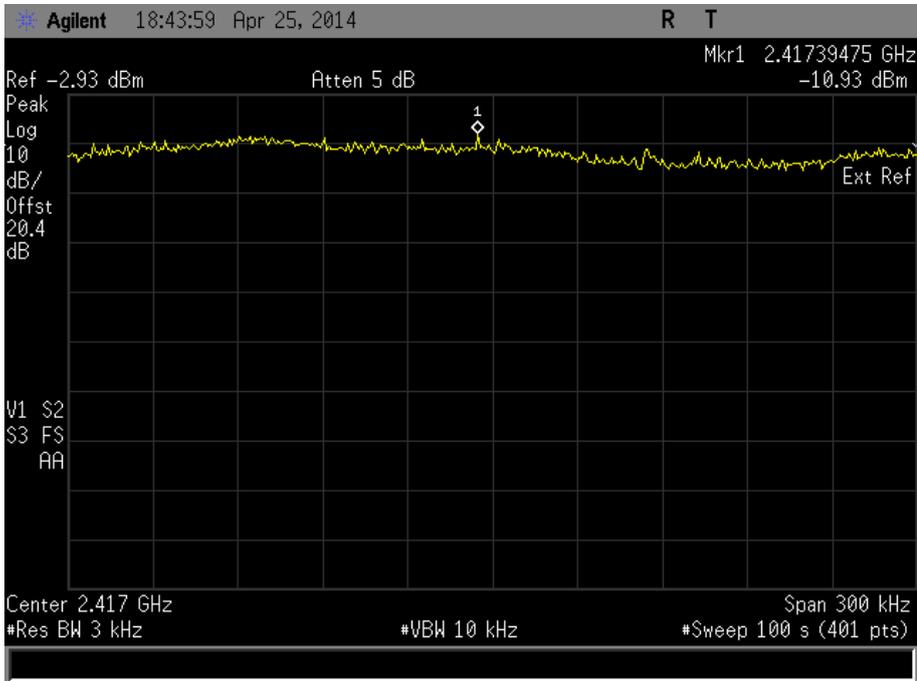
52 Mbps



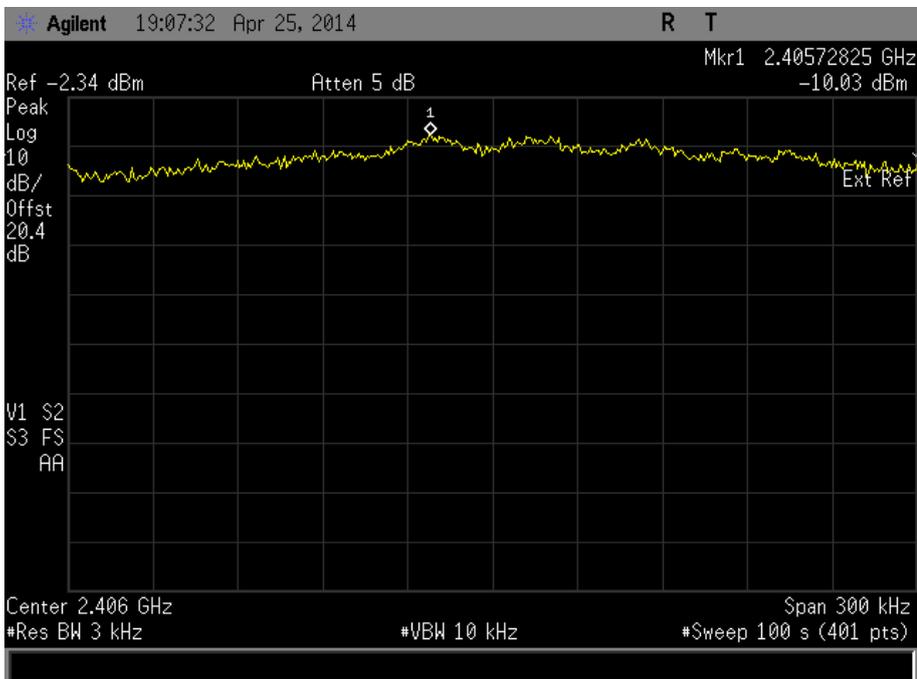


Product Service

58.5 Mbps



65 Mbps

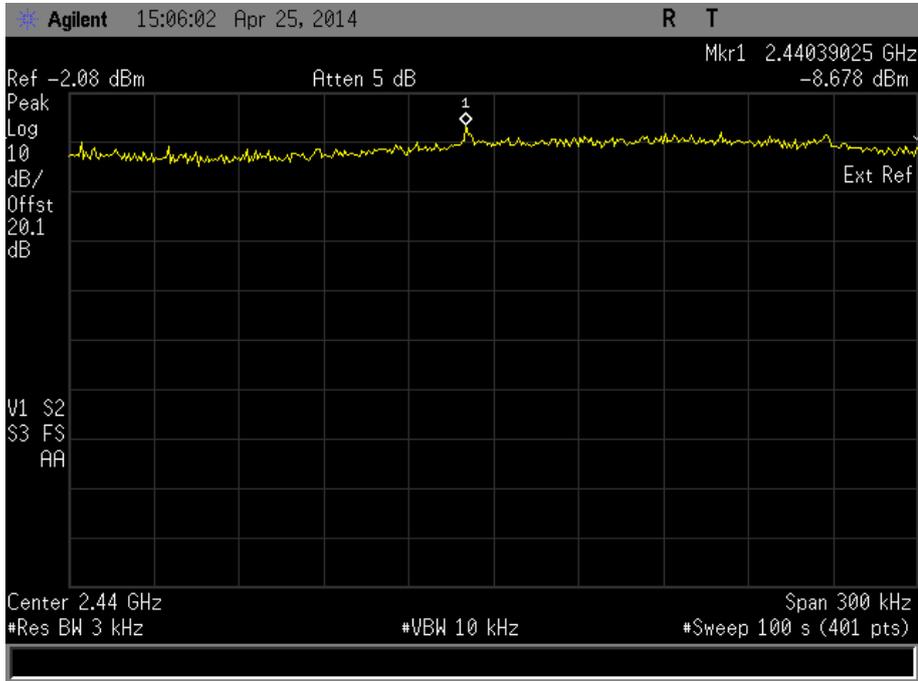




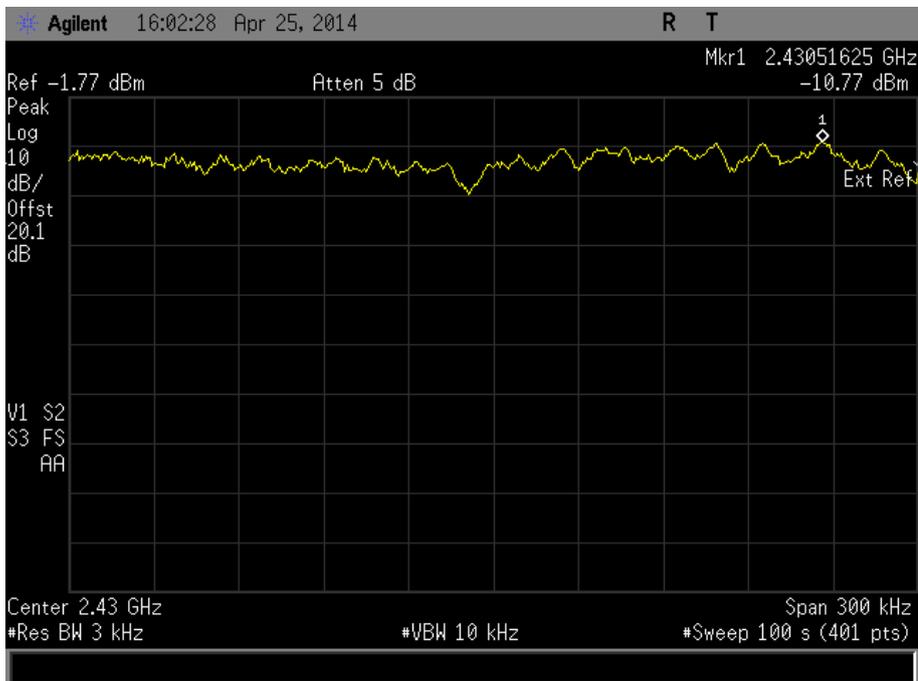
Product Service

2437 MHz

6.5 Mbps



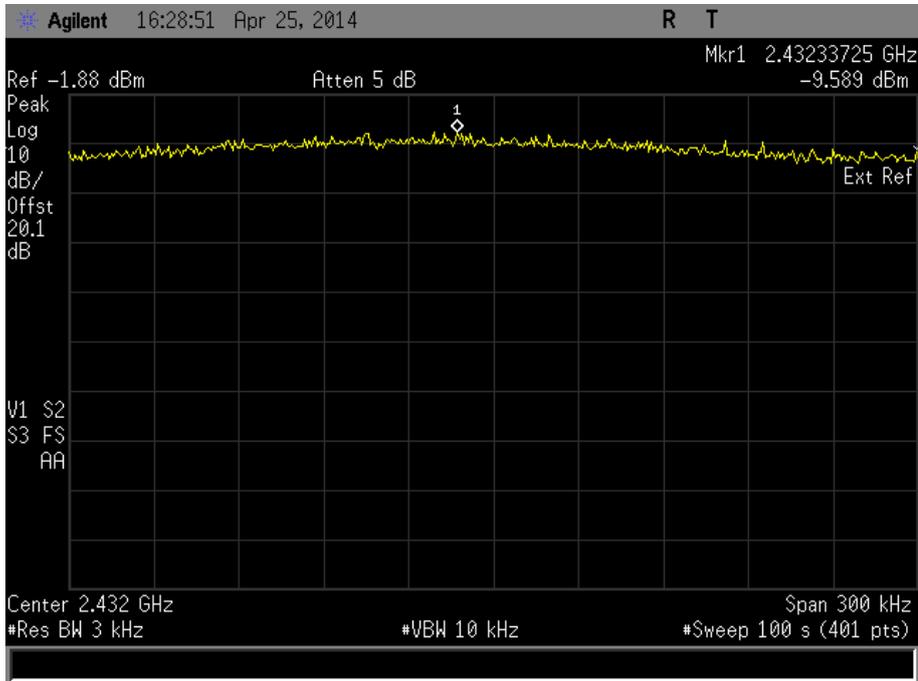
13 Mbps



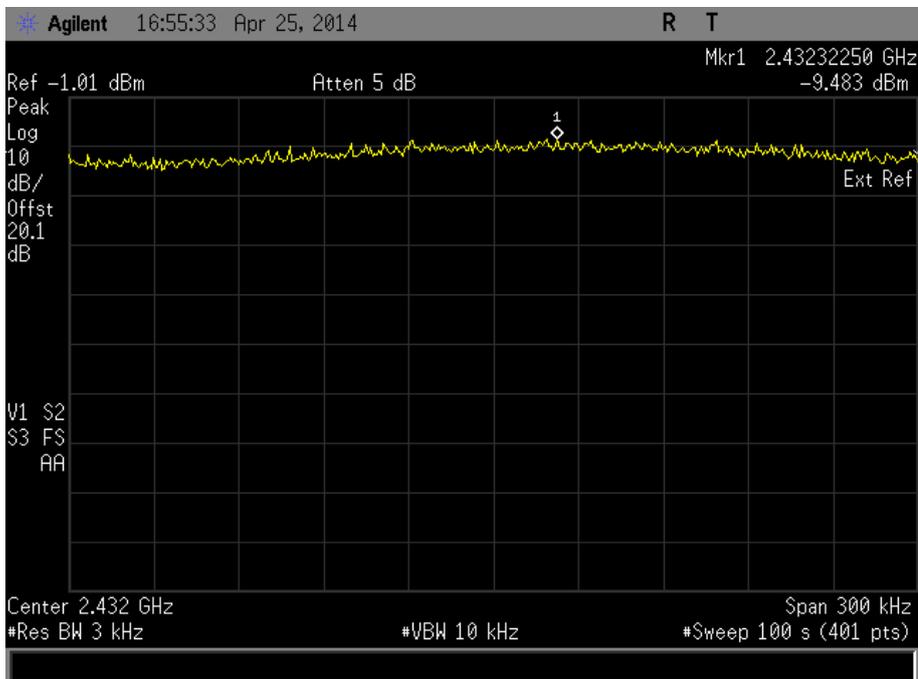


Product Service

19.5 Mbps



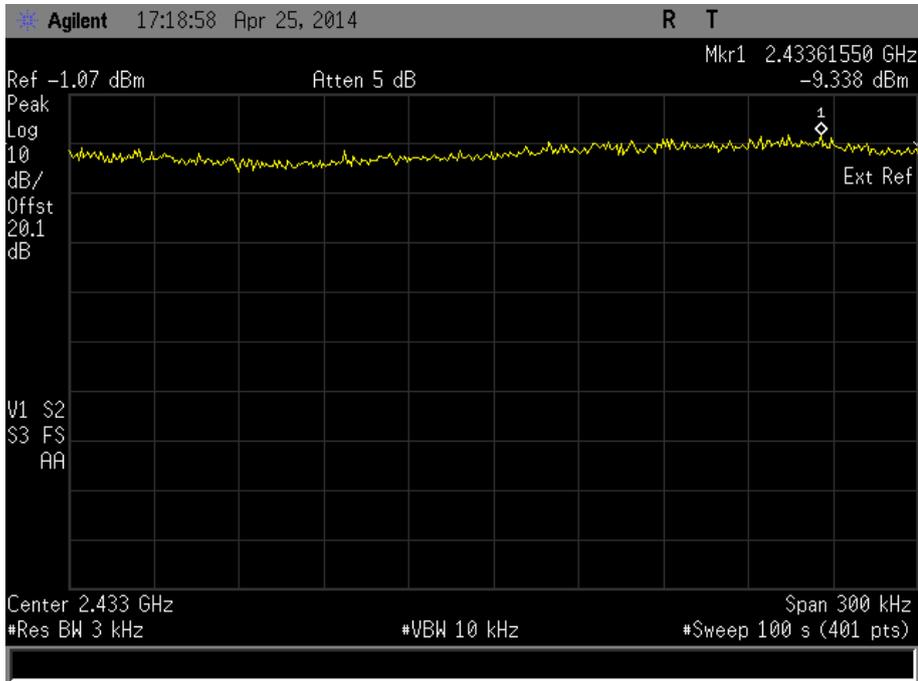
26 Mbps



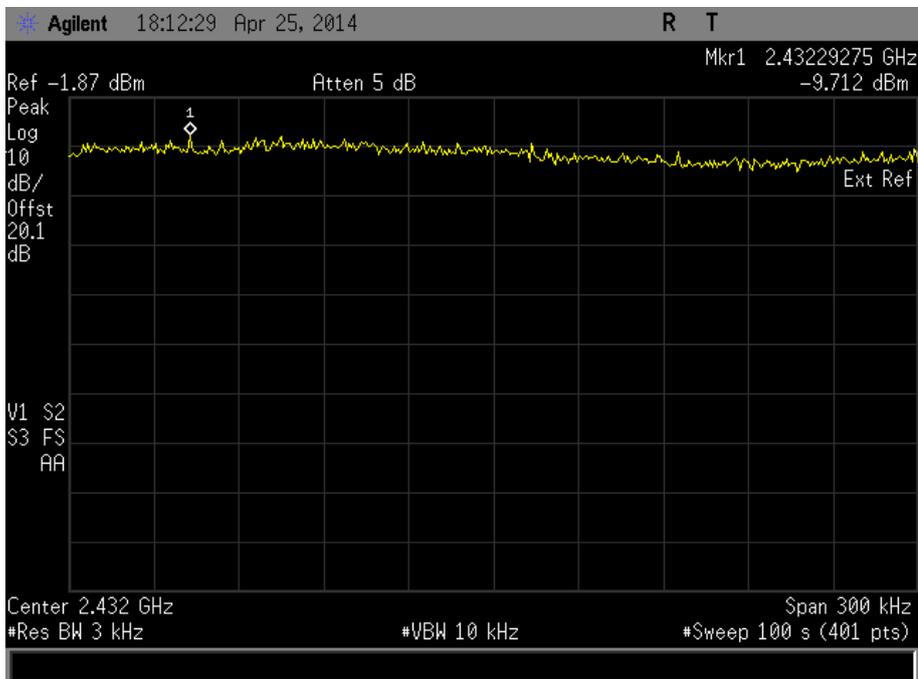


Product Service

39 Mbps



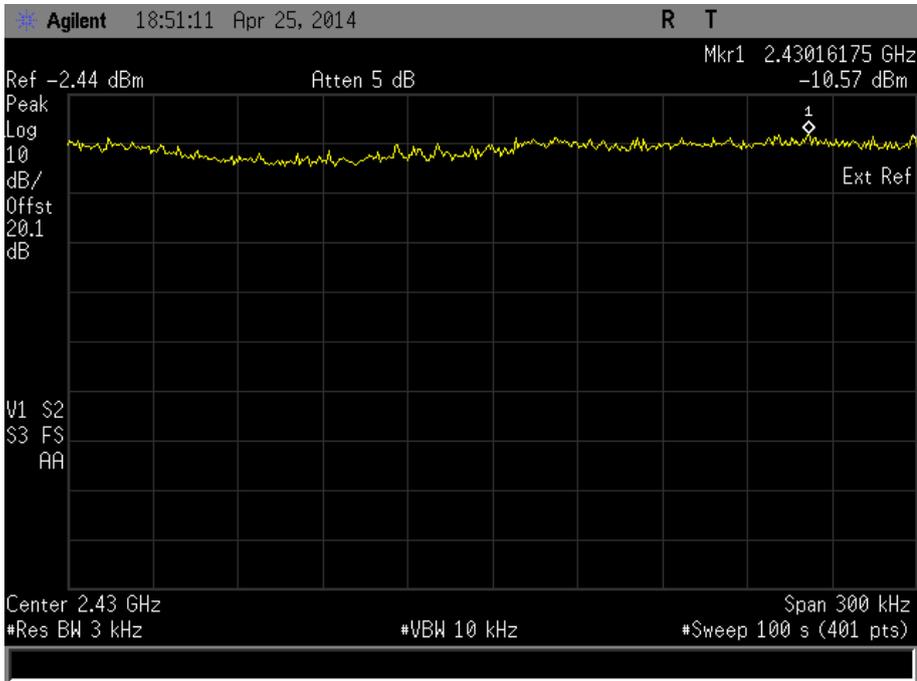
52 Mbps



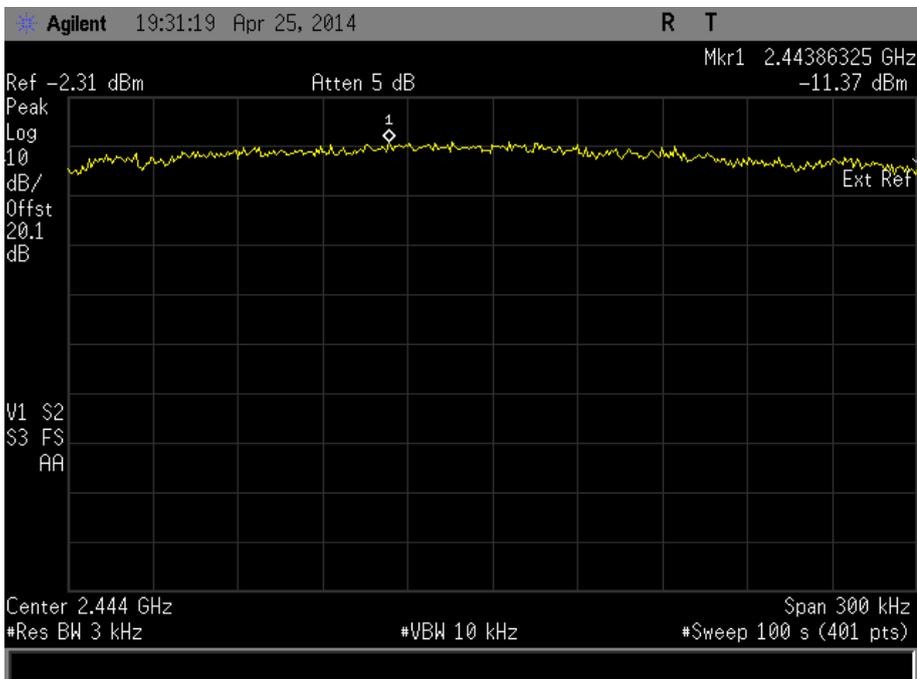


Product Service

58.5 Mbps



65 Mbps

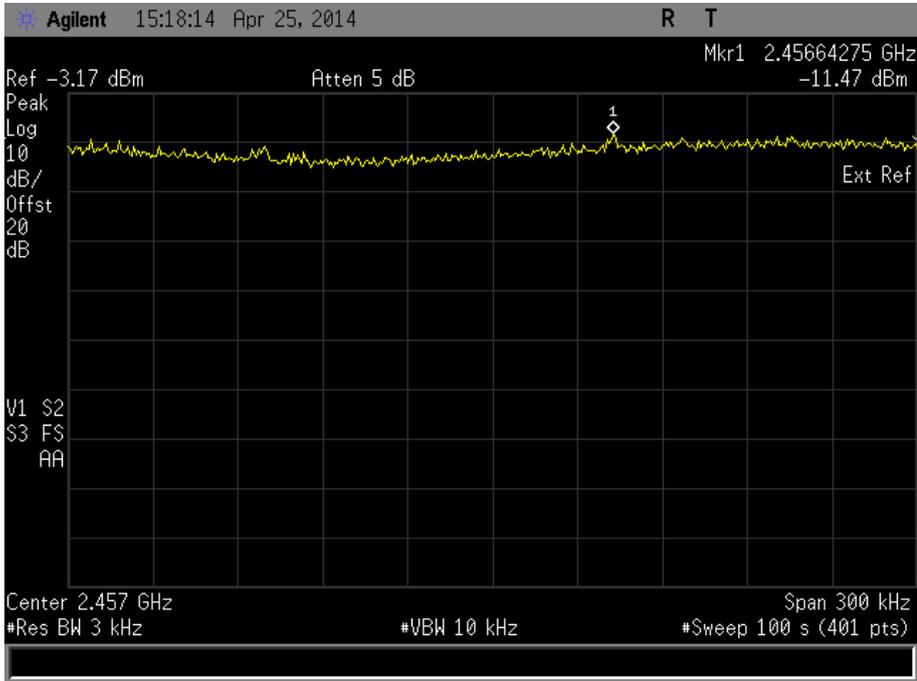




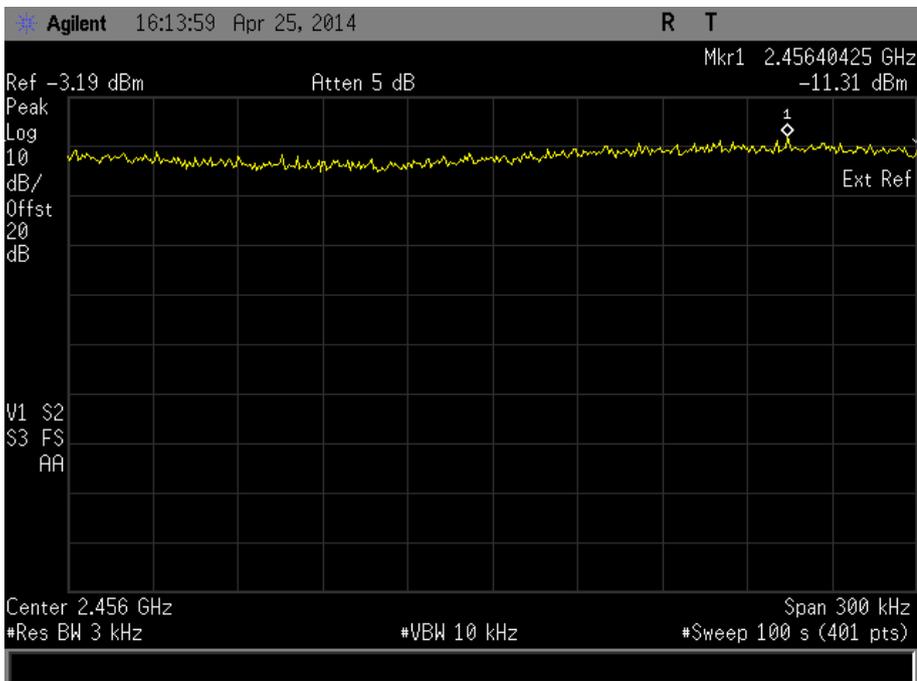
Product Service

2462 MHz

6.5 Mbps



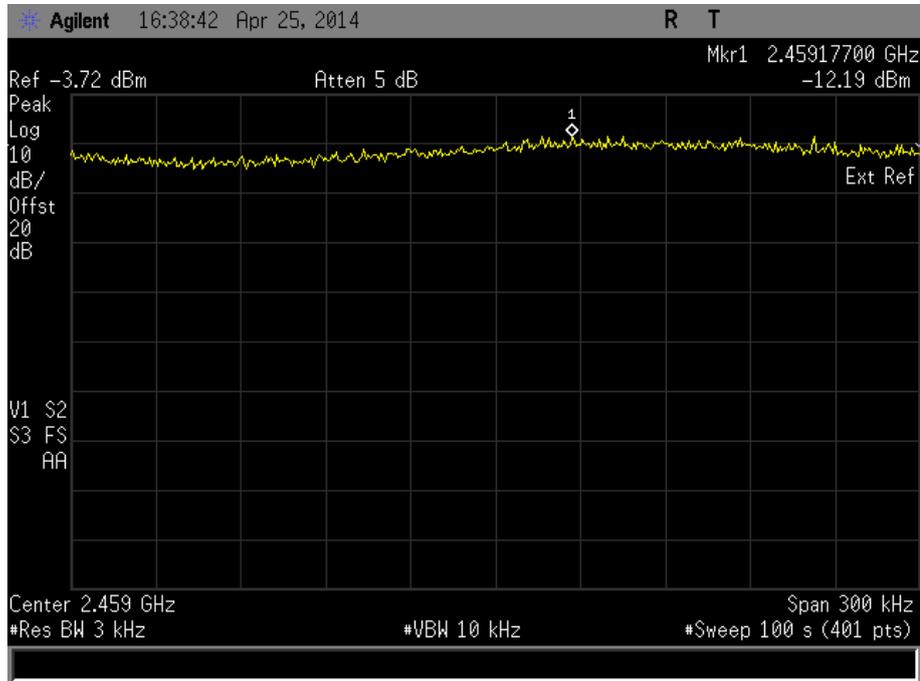
13 Mbps



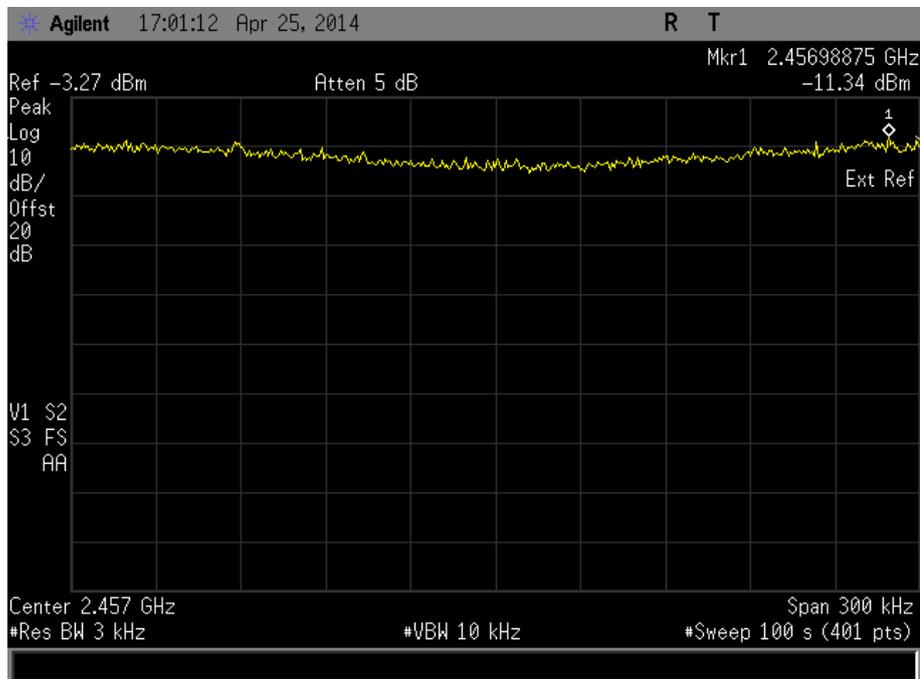


Product Service

19.5 Mbps



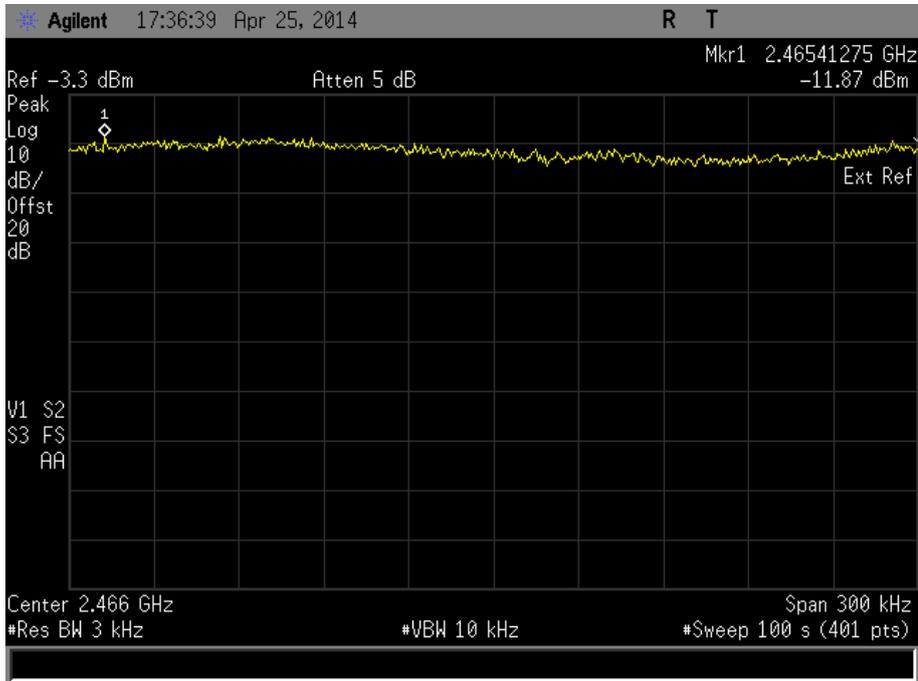
26 Mbps



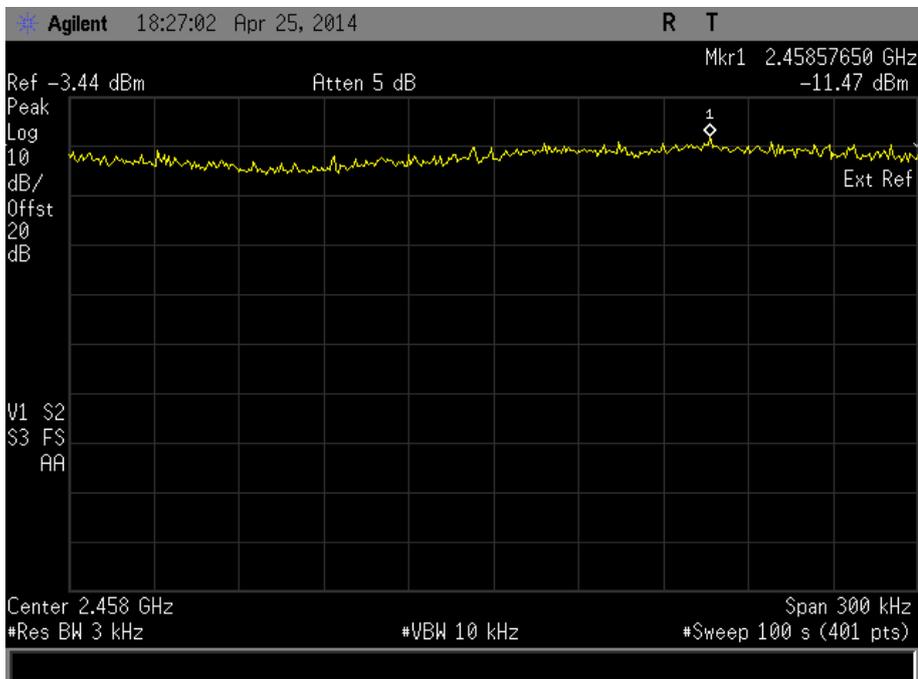


Product Service

39 Mbps



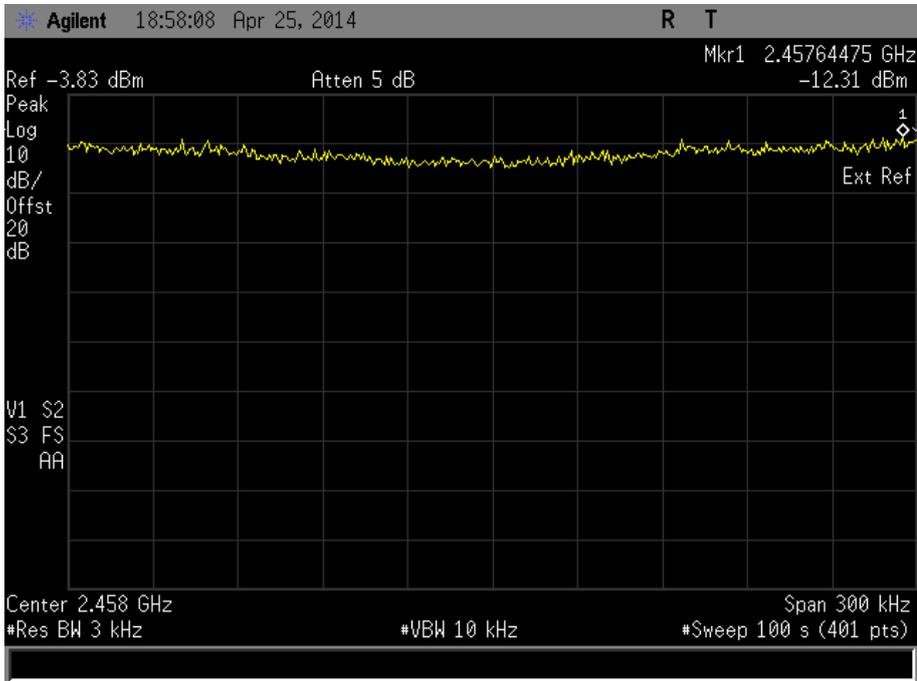
52 Mbps



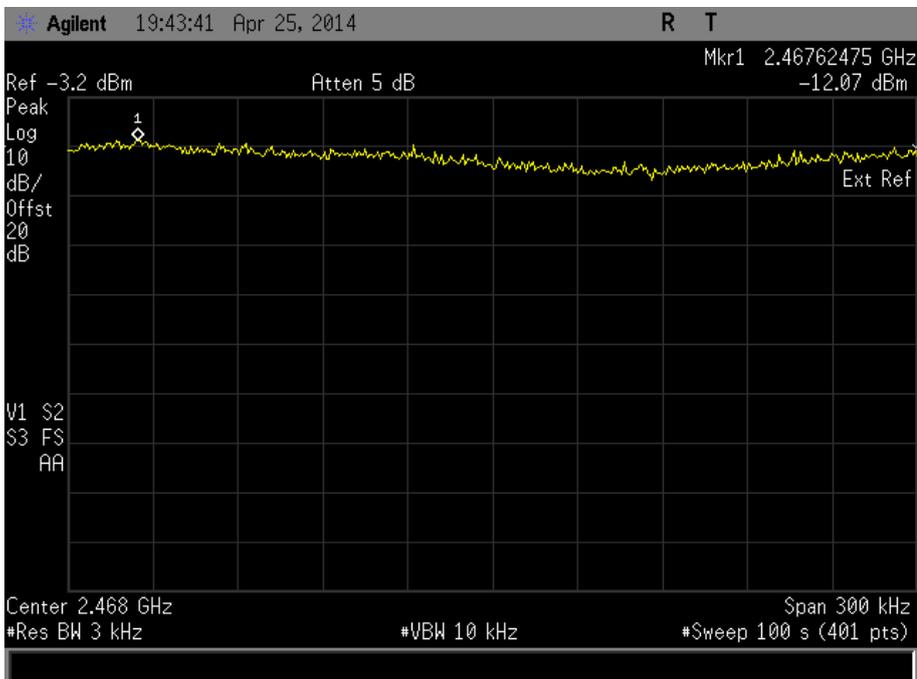


Product Service

58.5 Mbps



65 Mbps



Limit Clause

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



Product Service

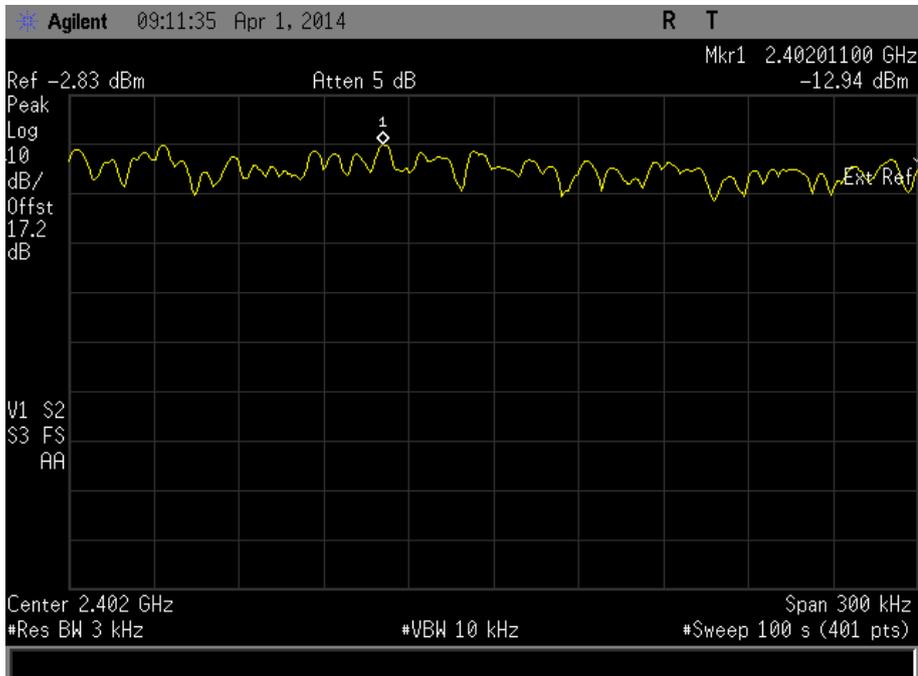
Bluetooth Low Energy

4.0 V DC Supply

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

2402 MHz

1 Mbps

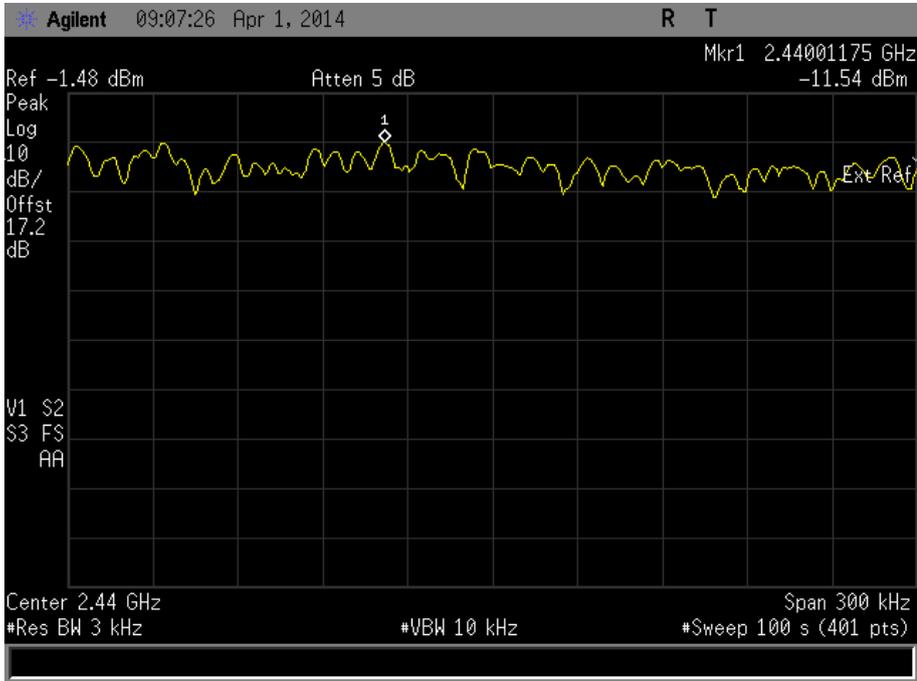




Product Service

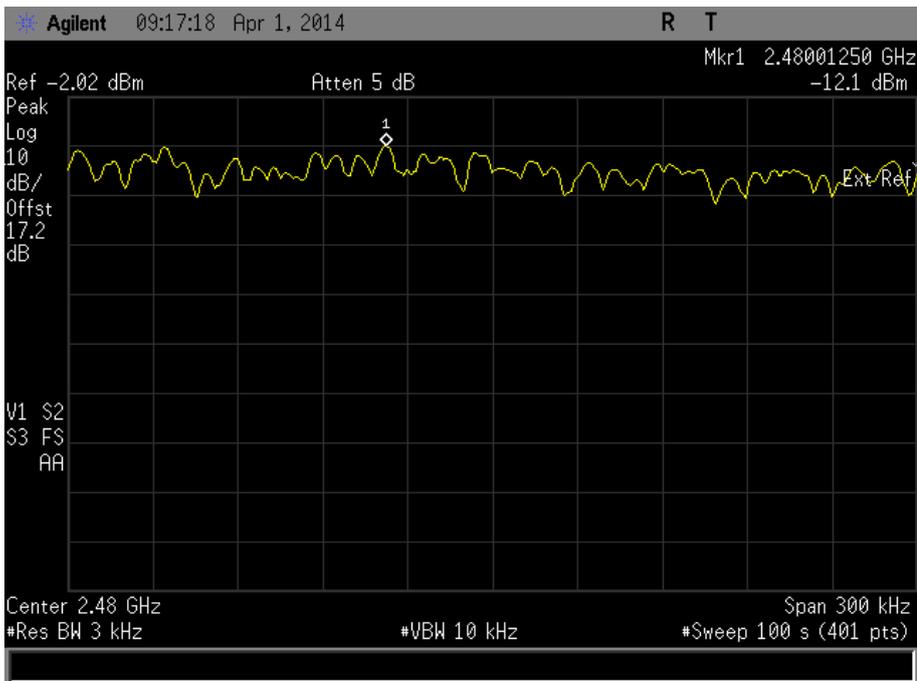
2440 MHz

1 Mbps



2480 MHz

1 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.



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					
Transient Limiter	Hewlett Packard	11947A	15	12	10-Dec-2014
LISN (1 Phase)	Chase	MN 2050	336	12	28-Mar-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
Section 2.2 - 6dB Bandwidth					
Multimeter	White Gold	WG022	190	12	28-Oct-2014
Attenuator (10dB)	Weinschel	47-10-34	481	12	28-Mar-2015
Power Splitter	Weinschel	1506A	607	12	21-Mar-2015
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	13-Aug-2014
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Hygrometer	Rotronic	I-1000	2891	12	8-Jul-2014
Power Supply	Farnell	LT30-2	2903	-	TU
Multimeter	Fluke	79 Series II	3057	12	24-Sep-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	12-Dec-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
Section 2.3- Maximum Peak Conducted Output Power					
Multimeter	White Gold	WG022	190	12	28-Oct-2014
Attenuator (10dB)	Weinschel	47-10-34	481	12	28-Mar-2015
Power Splitter	Weinschel	1506A	607	12	21-Mar-2015
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	13-Aug-2014
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Hygrometer	Rotronic	I-1000	2891	12	8-Jul-2014
Power Supply	Farnell	LT30-2	2903	-	TU
Multimeter	Fluke	79 Series II	3057	12	24-Sep-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	12-Dec-2014
Power Meter	Rohde & Schwarz	NRP	3491	12	18-Apr-2014
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	18-Apr-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
P-Series Power Meter	Agilent Technologies	N1911A	3980	12	18-Sep-2014
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3982	12	18-Sep-2014
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 - EIRP Peak Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-May-2014
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	18-Sep-2014
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (DRG Horn)	ETS-LINDGREN	3115	3125	12	17-Jul-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
Section 2.5 - Spurious and Band Edge Emissions					
Multimeter	White Gold	WG022	190	12	28-Oct-2014
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	26-Nov-2015
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-May-2014
20dB/2W Attenuator	Narda	4772-20	461	-	TU
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	13-Aug-2014
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Pre-Amplifier	Phase One	PS04-0086	1533	12	19-Dec-2014
Pre-Amplifier	Phase One	PSO4-0087	1534	12	30-Sep-2014
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	I-1000	2891	12	8-Jul-2014
Power Supply	Farnell	LT30-2	2903	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
Multimeter	Fluke	79 Series II	3057	12	24-Sep-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	12-Dec-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3694	12	5-Nov-2014
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	12	16-Oct-2014
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2014
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4411	12	21-Mar-2015
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4412	12	21-Mar-2015



Product Service

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

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



Product Service

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 (Not UKAS Accredited).

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