Report On

FCC Testing of the Sharp CDMA SHI11
Tri Band CDMA (BC0/BC3, BC6) and Cellular Phone with Bluetooth, WLAN & FeliCa and GPS
In accordance with FCC CFR 47 Part 15C (WLAN)

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00149

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REPORT ON

FCC Testing of the Sharp CDMA SHI11 Tri Band CDMA (BC0/BC3, BC6) and Cellular Phone with Bluetooth, WLAN & FeliCa and GPS
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Document 75913699 Report 08 Issue 1

June 2011

PREPARED FOR

Sharp Communication Compliance Limited
Azure House
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Bracknell
Berkshire
RG12 7QY

PREPARED BY

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Senior Administrator

APPROVED BY

M Jenkins
Authorised Signatory

DATED 11 June 2011

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);

S Bennett G Lawler

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SECTION 1

REPORT SUMMARY

FCC Testing of the Sharp CDMA SHI11
Tri Band CDMA (BC0/BC3, BC6) and Cellular Phone with Bluetooth, WLAN & FeliCa and GPS
In accordance with FCC CFR 47 Part 15C (WLAN)

1.1 INTRODUCTION

The information contained in this report is intended to show verification of Sharp CDMA SHI11 Tri Band CDMA (BC0/BC3, BC6) and Cellular Phone with Bluetooth, WLAN & 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
Manufacturing Description	Tri Band CDMA (BC0/BC3, BC6) and Cellular Phone with Bluetooth, WLAN & FeliCa and GPS
Model Number(s)	CDMA SHI11
Serial Number(s)	1 - SSHFL000930 2 - SSHFC001122 3 - SSHFA001008
Software Version	1 - A4010 2 - A4010 3 - A4010
Hardware Version	1 - PP1 2 - PP2 3 - PP1
Number of Samples Tested	Three
Test Specification/Issue/Date	FCC CFR 47 Part 15C: 2010
Incoming Release Date	Application Form 10 June 2011
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	8528 10 May 2011
Start of Test	09 May 2011
Finish of Test	10 June 2011
Name of Engineer(s)	S Bennett G Lawler R Henley
Related Document(s)	ANSI C63.4: 2003

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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 15C is shown below.

Configuration 1: 802.11(b)						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	15.247 (2)	6dB Bandwidth	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.2	15.247(a)(2)	Radiated Emissions (Enclosure Port)	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.3	15.247 (b)(3)	Maximum Peak Conducted Output Power	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.4	15.247 (b)(4)	EIRP Peak Power	2412 MHz Tx	0 and 1	Pass	ANSI C63.4
			2437 MHz Tx	0 and 1	Pass	
			246 2MHz Tx	0 and 1	Pass	
2.5	15.247(d)	Spurious Emissions	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.6	15.247 (e)	Peak Spectral Power	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.7	15.247 (e)	Band Edge Measurements	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	-	N/A	
			246 2MHz Tx	0	Pass	

Configuration 1: 802.11(g)						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	15.247 (2)	6dB Bandwidth	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.2	15.247(a)(2)	Radiated Emissions (Enclosure Port)	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.3	15.247 (b)(3)	Maximum Peak Conducted Output Power	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.4	15.247 (b)(4)	EIRP Peak Power	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.5	15.247(d)	Spurious Emissions	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.6	15.247 (e)	Peak Spectral Power	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.7	15.247 (e)	Band Edge Measurements	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	-	N/A	
			246 2MHz Tx	0	Pass	

Configuration 1: 802.11(n)						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	15.247 (2)	6dB Bandwidth	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.2	15.247(a)(2)	Radiated Emissions (Enclosure Port)	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.3	15.247 (b)(3)	Maximum Peak Conducted Output Power	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.4	15.247 (b)(4)	EIRP Peak Power	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.5	15.247(d)	Spurious Emissions	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.6	15.247 (e)	Peak Spectral Power	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	0	Pass	
			246 2MHz Tx	0	Pass	
2.7	15.247 (e)	Band Edge Measurements	2412 MHz Tx	0	Pass	ANSI C63.4
			2437 MHz Tx	-	N/A	
			246 2MHz Tx	0	Pass	

N/A – Not Applicable

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1.3 APPLICATION FORM

EQUIPMENT INFORMATION			
Equipment designator:			
Model name/number	CDMA SHI11	Identification number	APYHRO00149
Supply Voltage:			
[ ]	AC mains	State AC voltage …… V	and AC frequency …… Hz
[ ]	DC (external)	State DC voltage …… V	and DC current …… A
[X]	DC (internal)	State DC voltage 3.7 V	and Battery type Li-ion
Frequency characteristics:			
Frequency range	2412 MHz to 2462 MHz	Channel spacing (if channelized)	
Designated test frequencies: Bottom: 2412 MHz	Middle: 2437 MHz	Top: 2462 MHz	
Power characteristics:			
Maximum transmitter power	17.3 dBm	Minimum transmitter power (if variable)	…… W
[X]	Continuous transmission		
[ ]	Intermittent transmission	State duty cycle ……	
If intermittent, can transmitter be set to continuous transmit test mode? Y/N			
Antenna characteristics:			
[ ]	Antenna connector	State impedance …… ohm	
[X]	Temporary antenna connector	State impedance 50 ohm	
[ ]	Integral antenna	State gain 2.14 dBi	
Modulation characteristics:			
[ ]	Amplitude	[ ] Other	
[ ]	Frequency	Details: ……..	
[X]	Phase		
Can the transmitter operate un-modulated?		N	
ITU Class of emission: ……			
Extreme conditions:			
Maximum temperature	+60 ºC	Minimum temperature	-20 ºC
Maximum supply voltage	4.0 V	Minimum supply voltage	3.7 V

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp CDMA SHI11 Tri Band CDMA (BC0/BC3, BC6) and Cellular Phone with Bluetooth, WLAN & FeliCa and GPS. A full technical description can be found in the manufacturer's documentation.

1.4.2 Test Configuration

Configuration 1: 802.11(b)

The EUT was configured in accordance with FCC CFR 47 Part 15C.

Configuration 2: 802.11(g)

The EUT was configured in accordance with FCC CFR 47 Part 15C.

Configuration 3: 802.11(n)

The EUT was configured in accordance with FCC CFR 47 Part 15C.

1.4.3 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 – 2412 MHz Tx

Mode 2 – 2437 MHz Tx

Mode 3 – 2462 MHz Tx

Information on the specific test modes utilised are detailed in the test procedure for each individual test.

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 or test laboratories as appropriate.

The EUT was powered from a 3.7 V DC Supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

SSHFL000930

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

SSHFC001122

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the Sharp CDMA SHI11
Tri Band CDMA (BC0/BC3, BC6) and Cellular Phone with Bluetooth, WLAN & FeliCa and GPS
In accordance with FCC CFR 47 Part 15C (WLAN)

2.1 6dB BANDWIDTH

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test

CDMA SHI11, S/N: SSHFA001008

2.1.3 Date of Test and Modification State

09 May 2011 - Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.

The EUT was transmitted at maximum power via a cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen. The peak point of the trace was measured and the markers positioned to give the -6dBc points of the displayed spectrum.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1	- Mode 1
	- Mode 2
	- Mode 3
Configuration 2	- Mode 1
	- Mode 2
	- Mode 3
Configuration 3	- Mode 1
	- Mode 2
	- Mode 3

2.1.6 Environmental Conditions

	09 May 2011
Ambient Temperature	21.7°C
Relative Humidity	47.9%

2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C for 6dB Bandwidth.

The test results are shown below.

4.0 V DC Supply

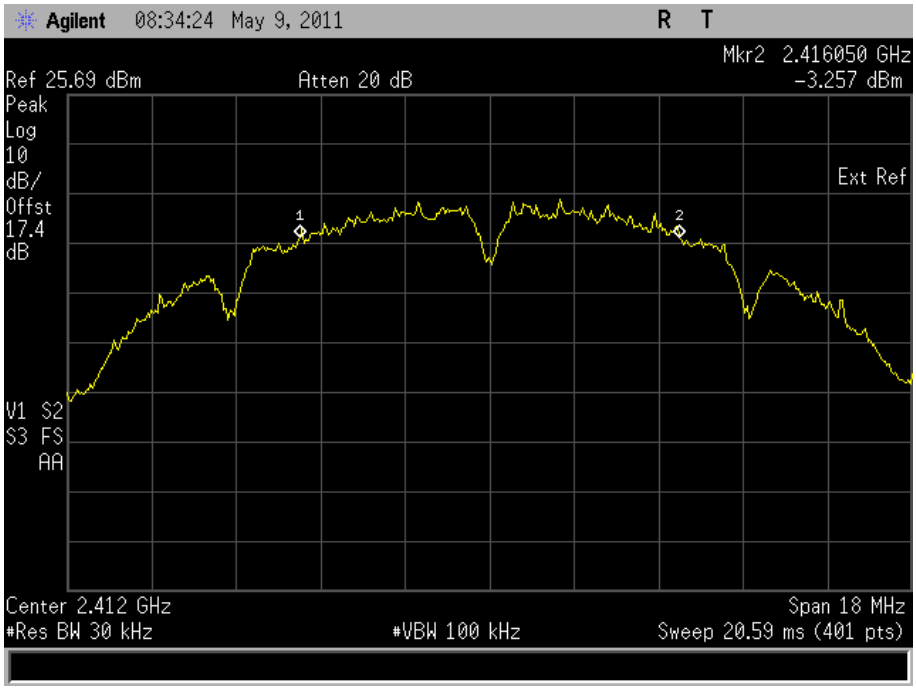
Configuration 1 – Modes 1, 2 and 3

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412	1	8100
	2	7650
	5	7325
	11	7650
2437	1	7605
	2	7605
	5	8415
	11	8010
2462	1	7740
	2	7650
	5	7515
	11	8190

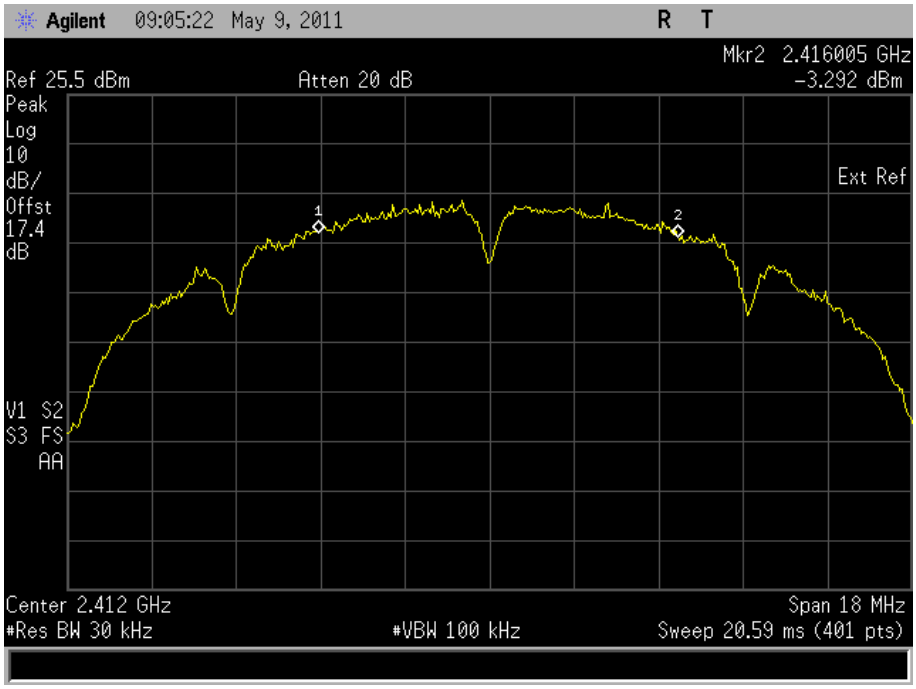
Product Service

2412 MHz

1 Mbps

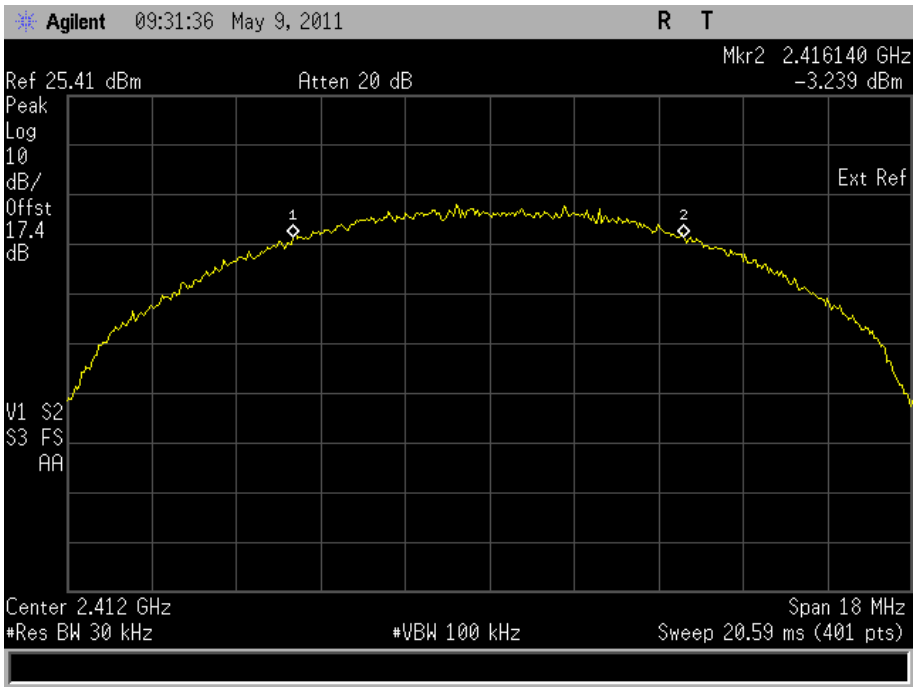


2 Mbps

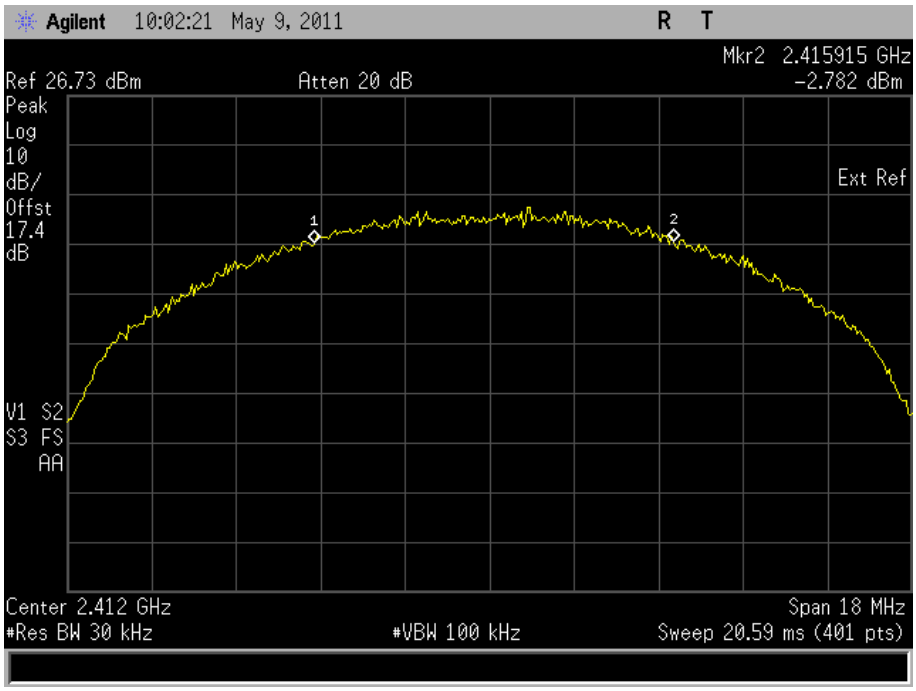


Product Service

5.5 Mbps



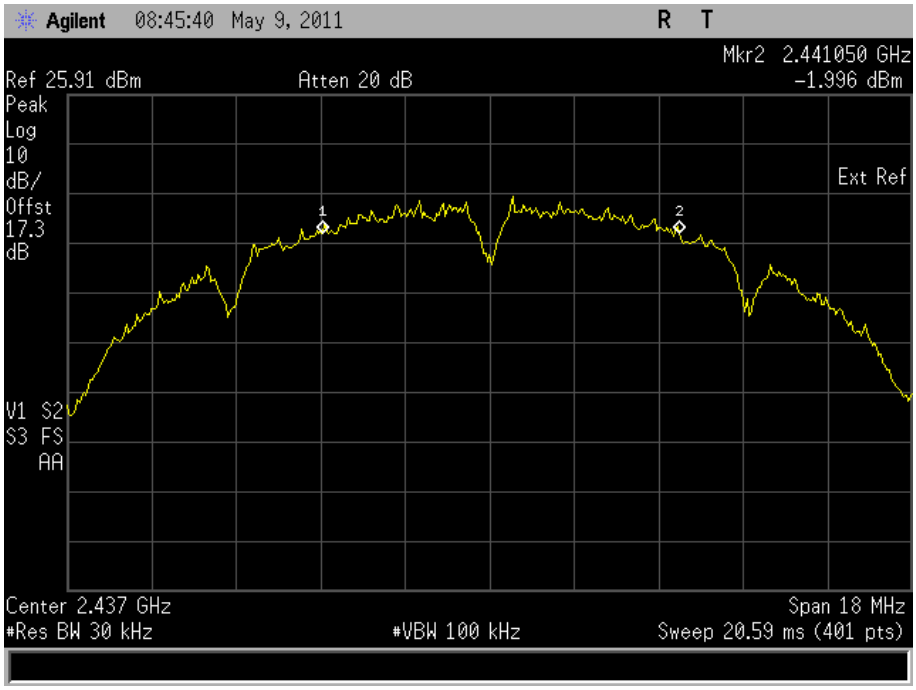
11 Mbps



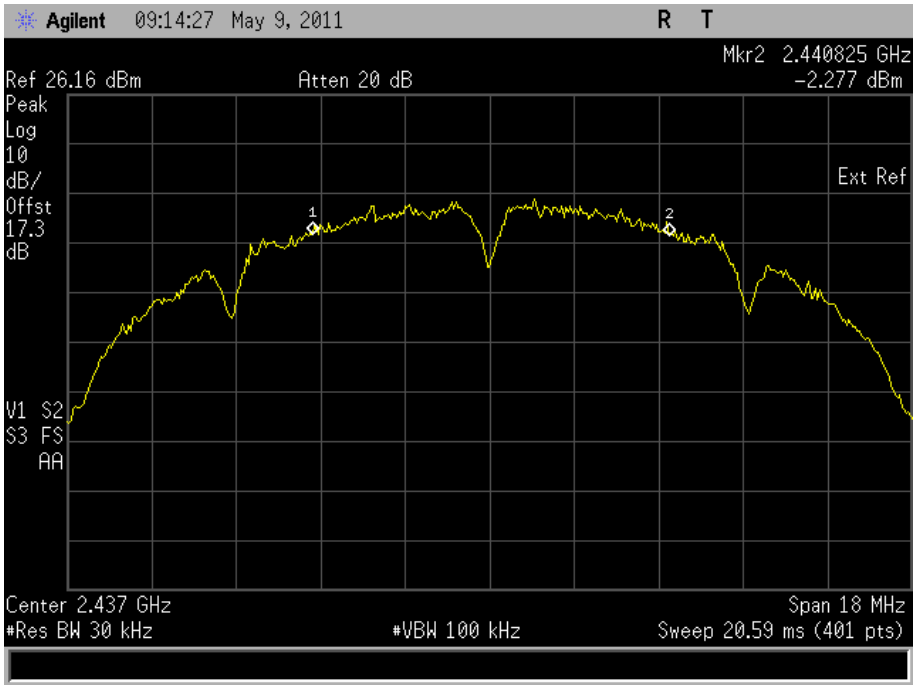
Product Service

2437 MHz

1 Mbps

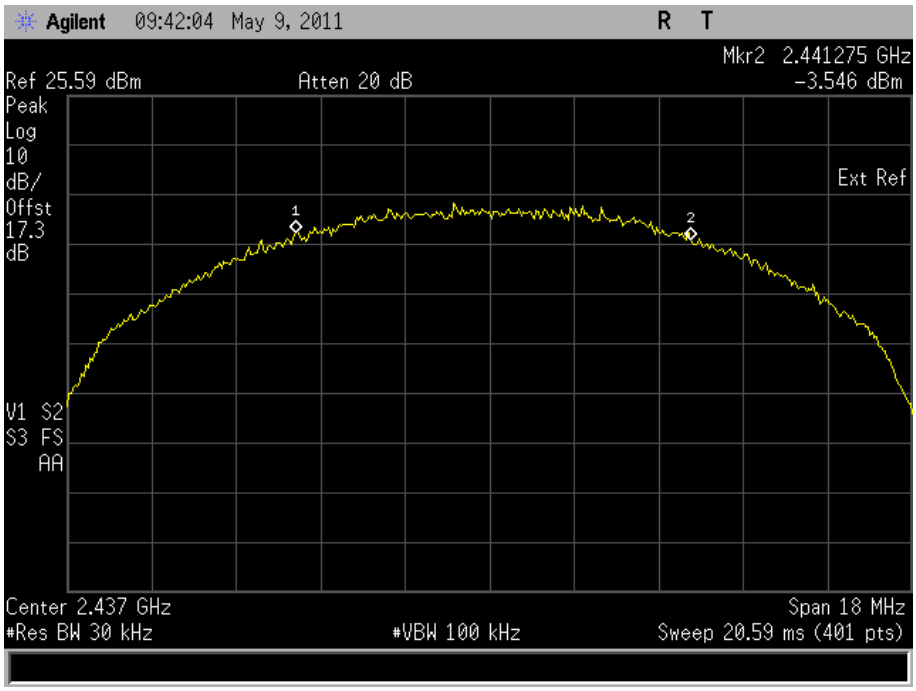


2 Mbps

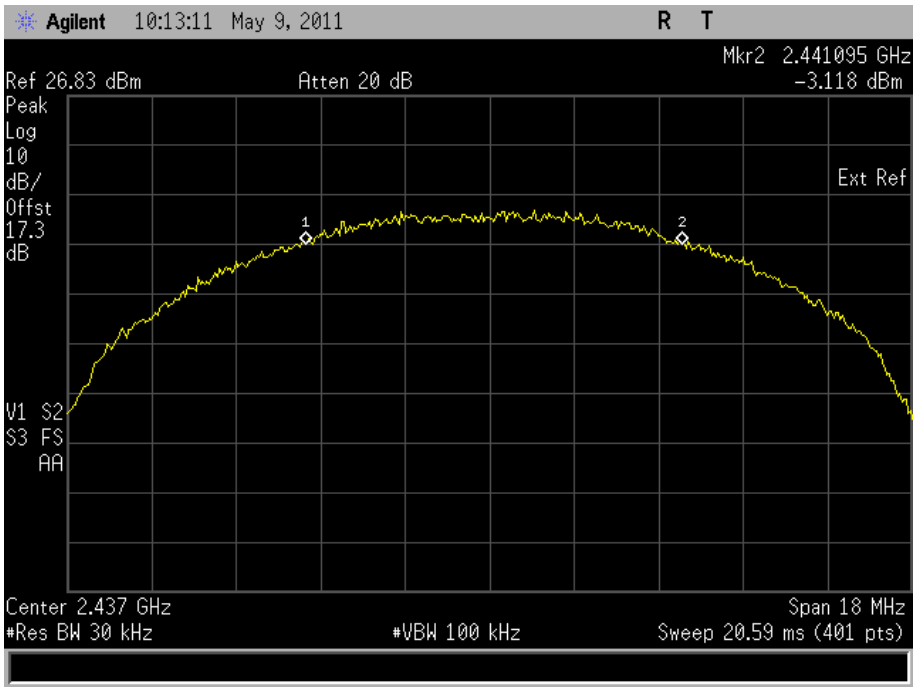


Product Service

5.5 Mbps



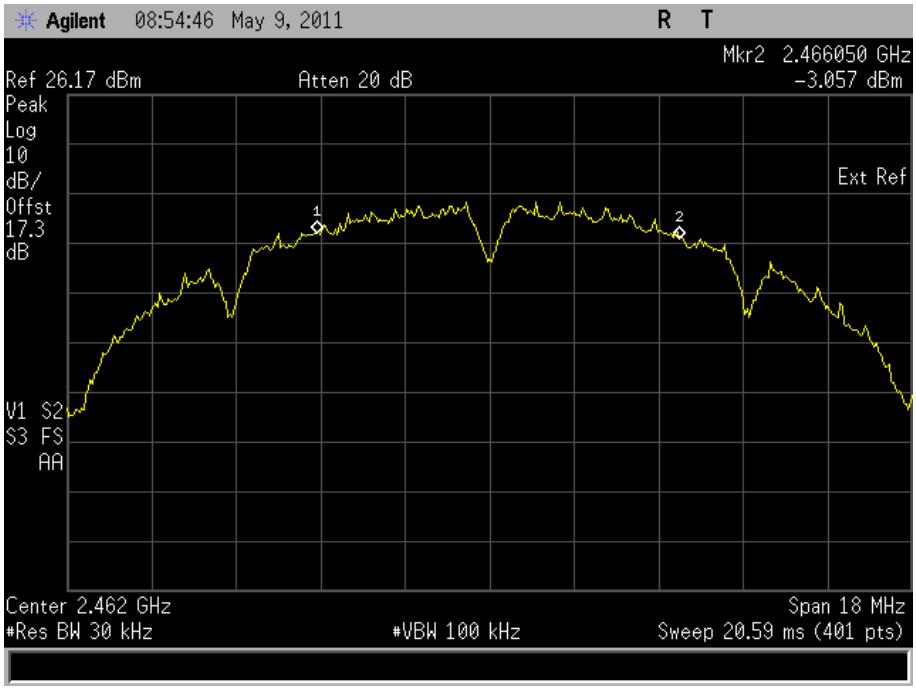
11 Mbps



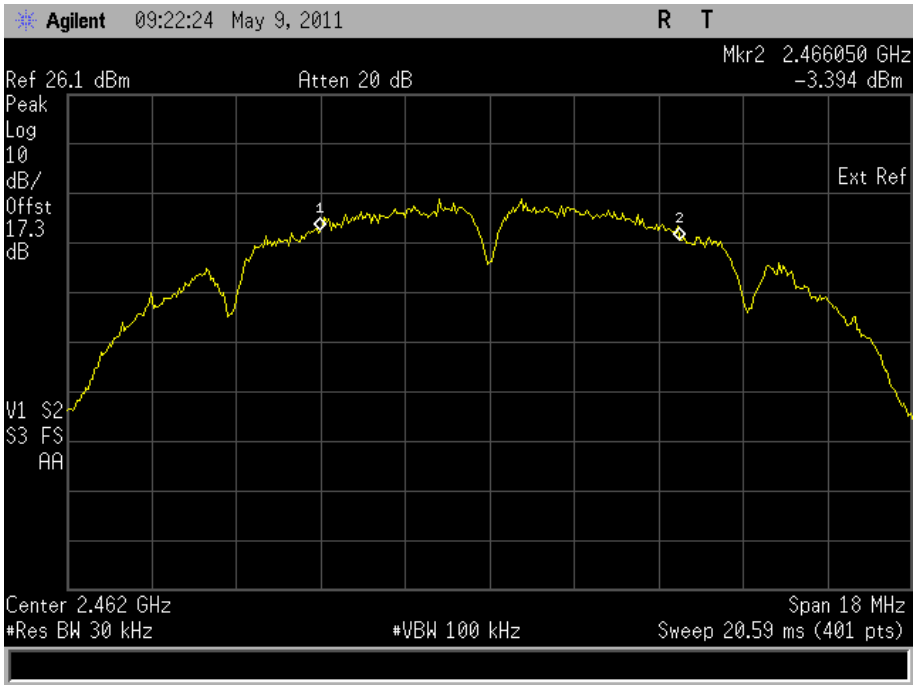
Product Service

2462 MHz

1 Mbps

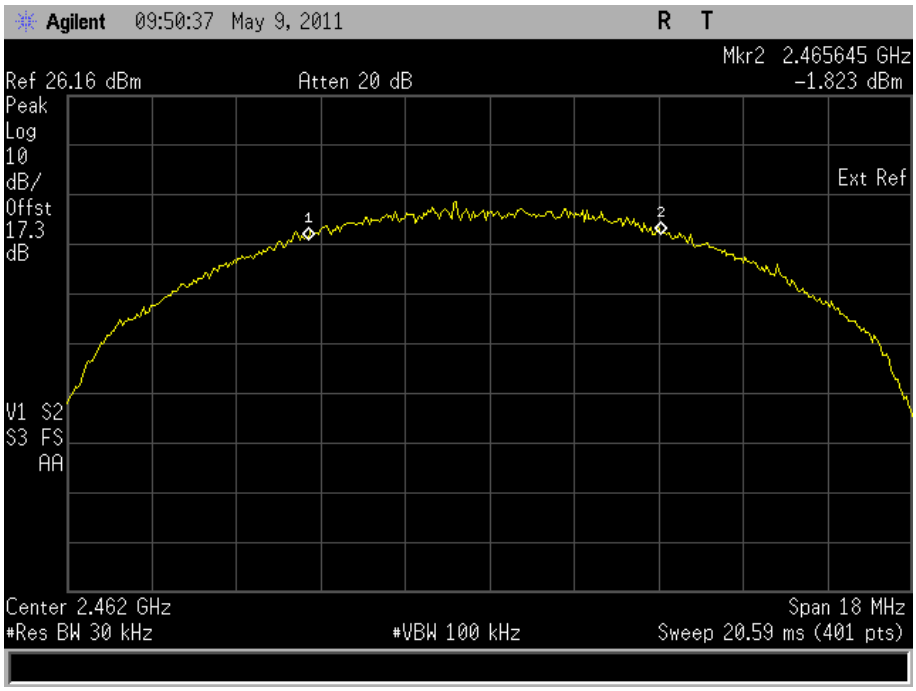


2 Mbps

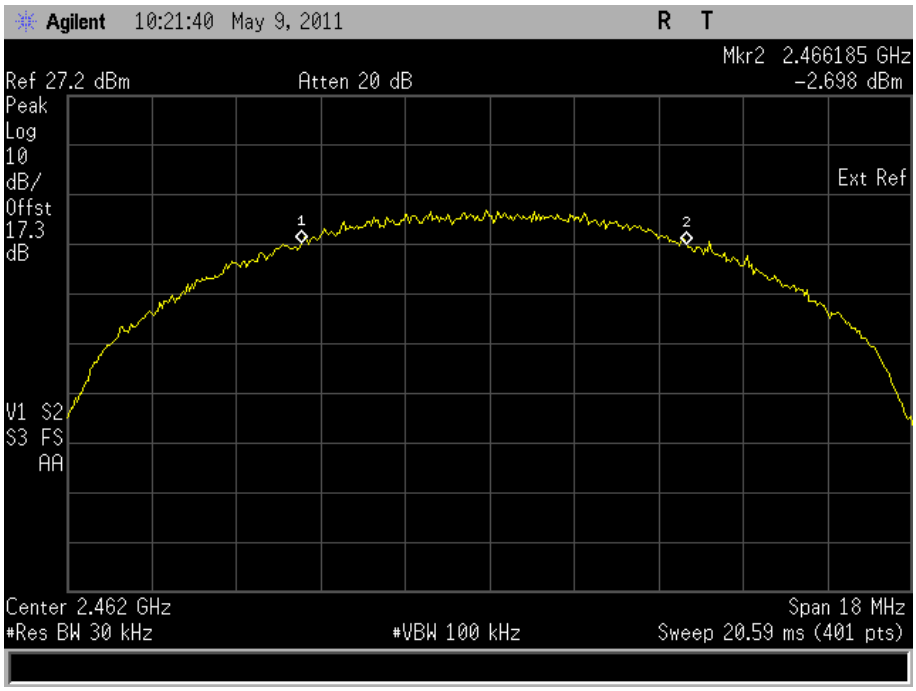


Product Service

5.5 Mbps



11 Mbps



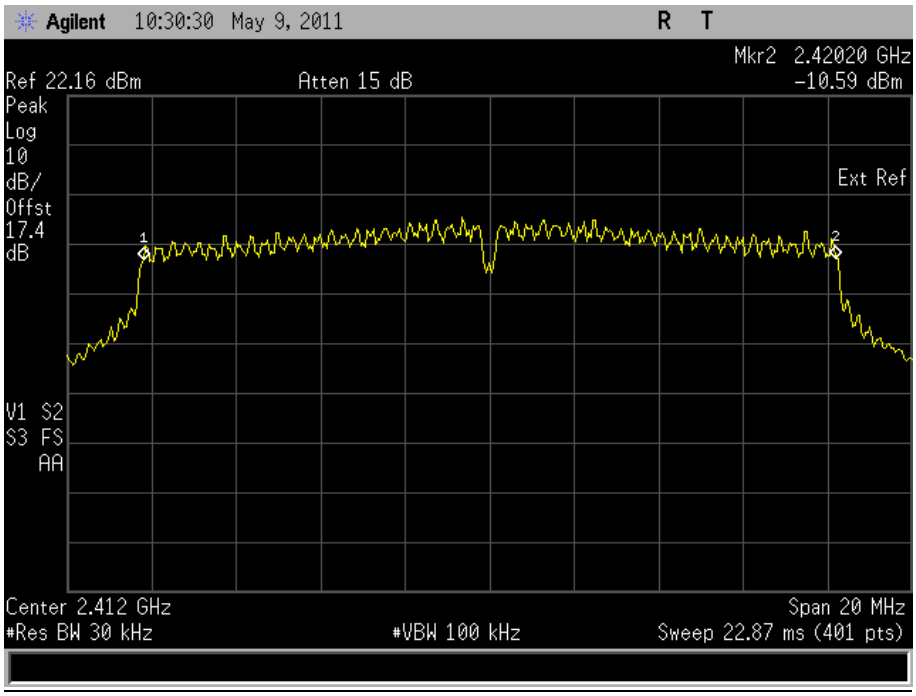
Configuration 2 – Modes 1, 2 and 3

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412	6	16400
	9	16400
	12	16050
	18	16050
	36	15150
	48	16450
	54	16500
2437	6	16400
	9	16350
	12	16400
	18	16050
	36	15150
	48	16400
	54	15750
2462	6	16000
	9	16400
	12	16100
	18	16150
	36	16500
	48	16450
	54	16450

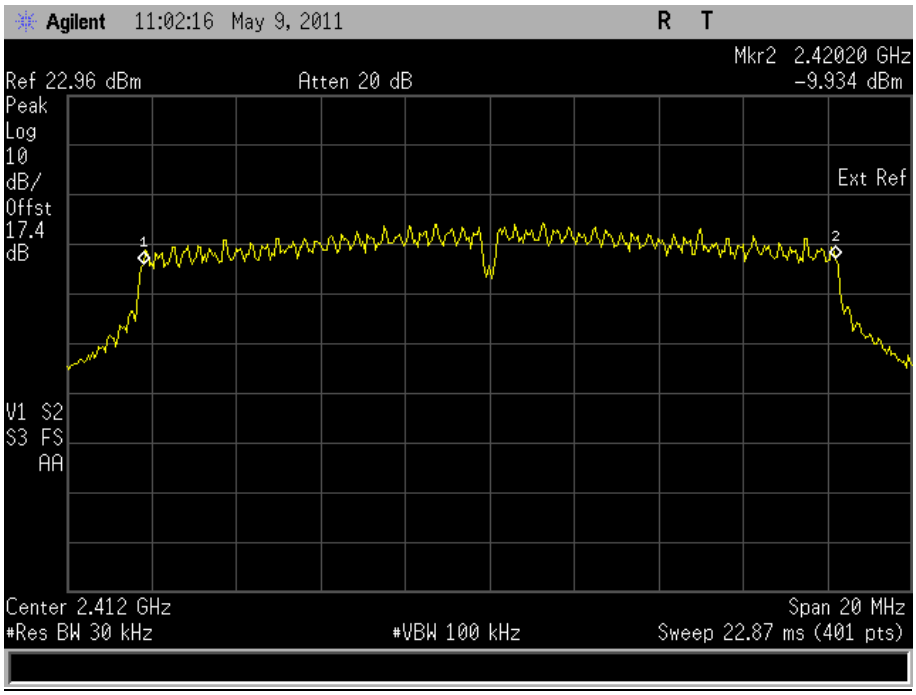
Product Service

2412 MHz

6 Mbps

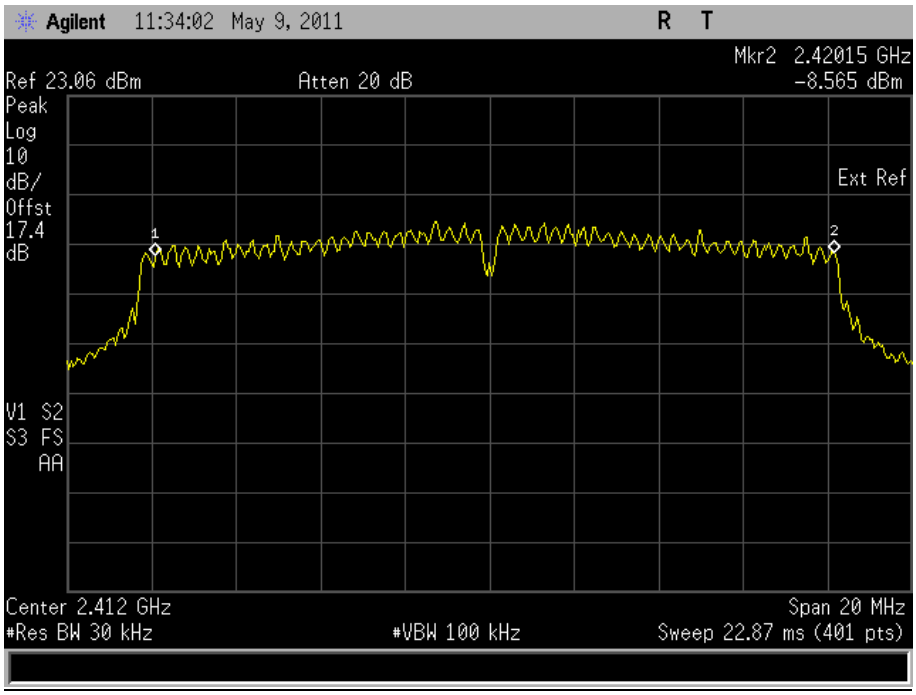


9 Mbps

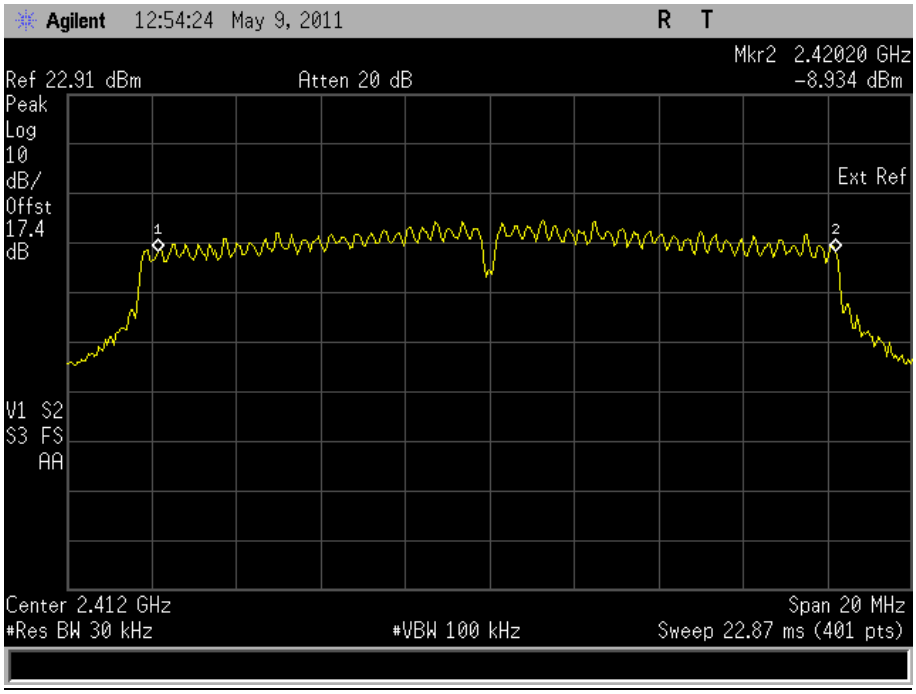


Product Service

12 Mbps

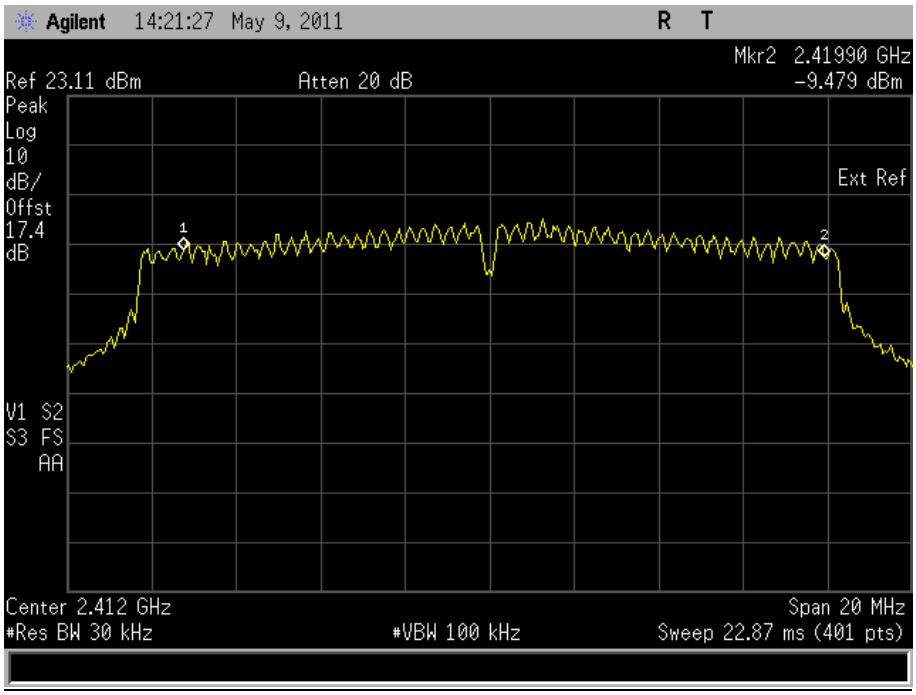


18 Mbps

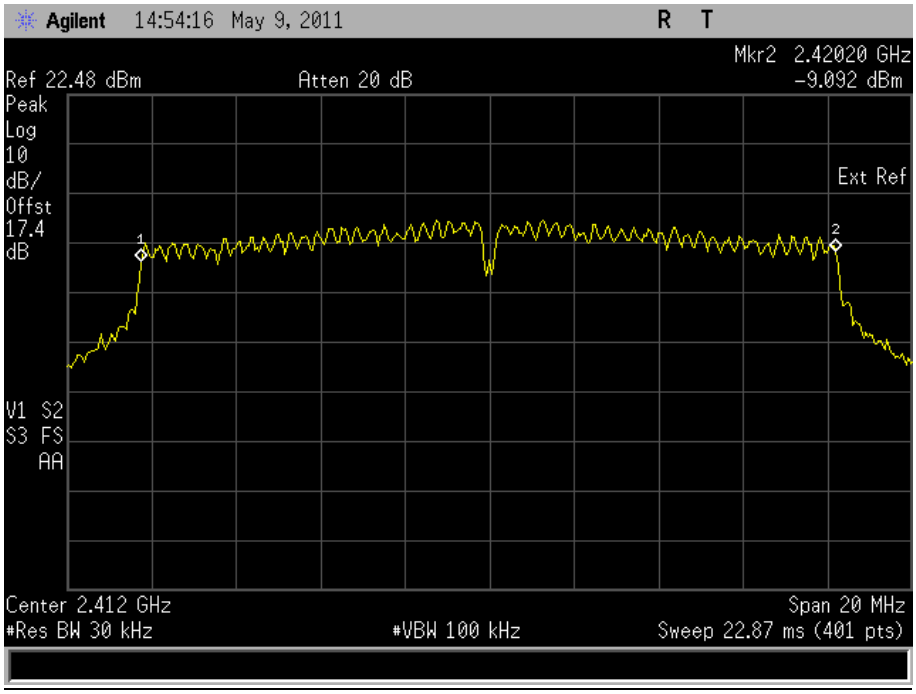


Product Service

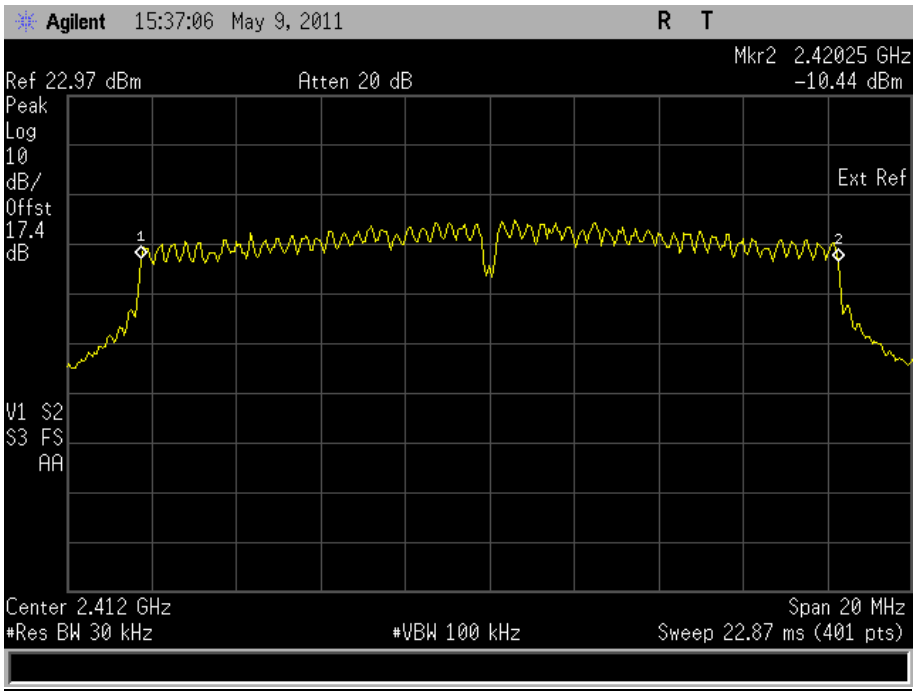
36 Mbps



48 Mbps



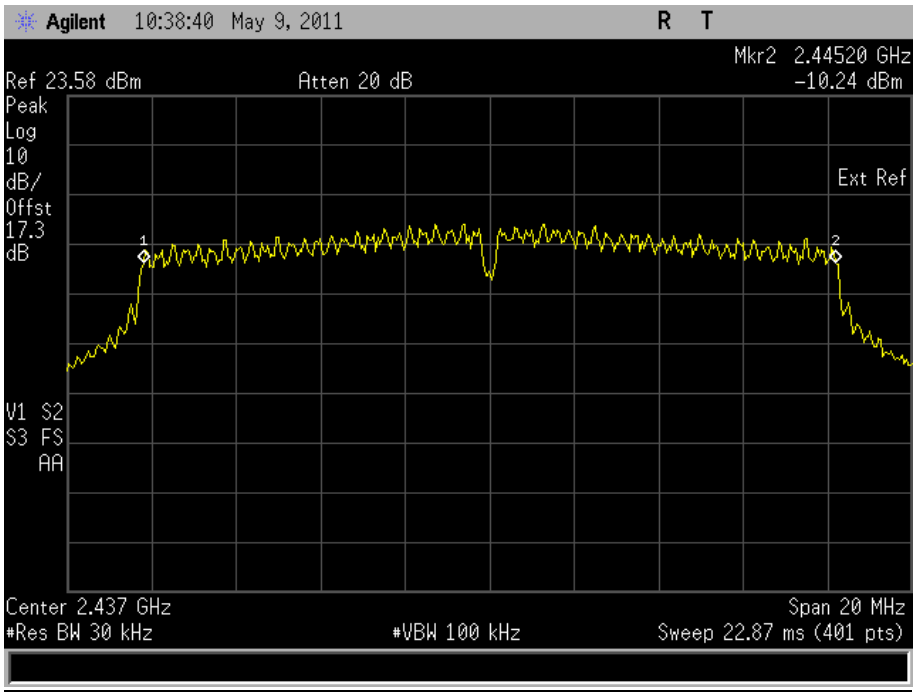
54 Mbps


Agilent 15:37:06 May 9, 2011
R T
Mkr2 2.42025 GHz
-10.44 dBm
Ref 22.97 dBm
Atten 20 dB
Peak
Log
10
dB/
Offst
17.4
dB
Ext Ref
1
2
V1 S2
S3 FS
AA
Center 2.412 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 20 MHz
Sweep 22.87 ms (401 pts)

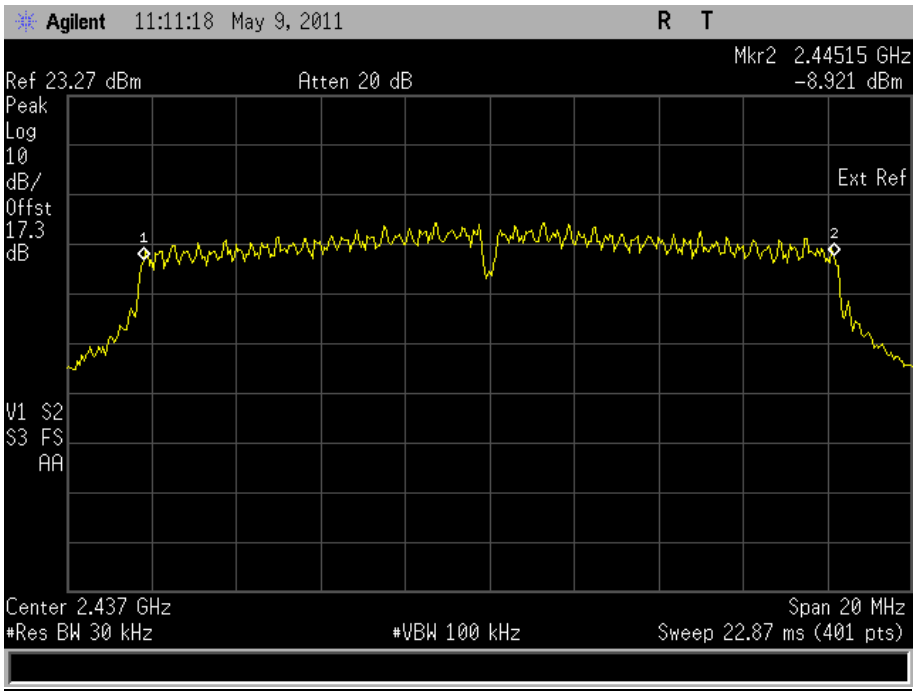
Product Service

2437 MHz

6 Mbps

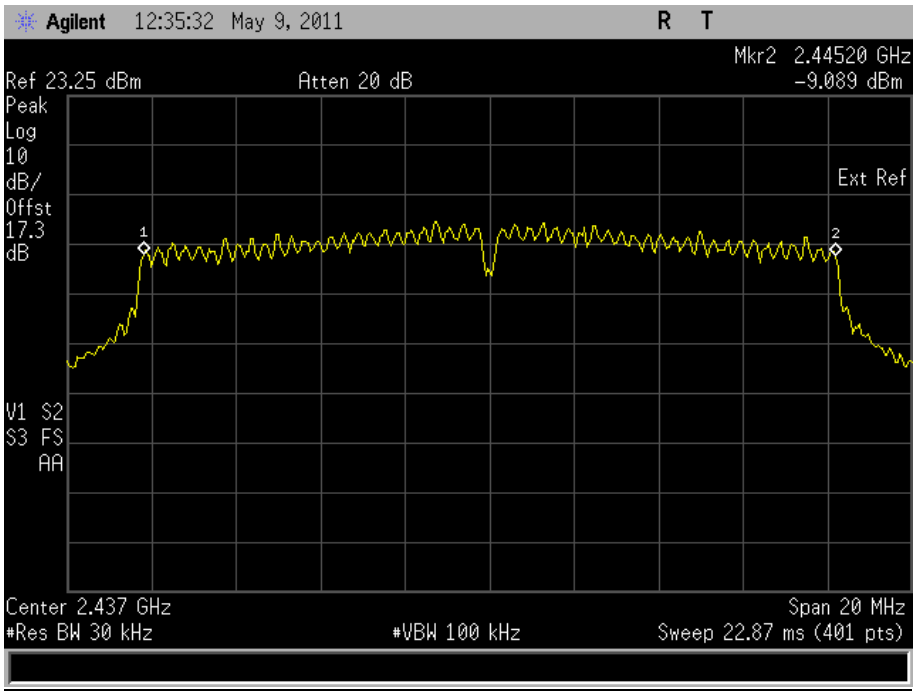


9 Mbps

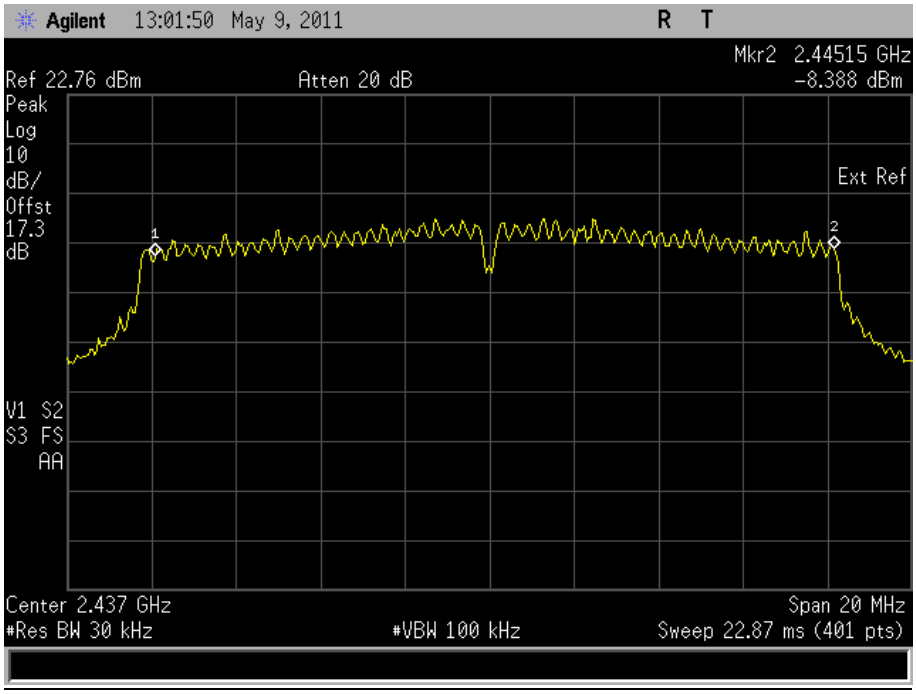


Product Service

12 Mbps

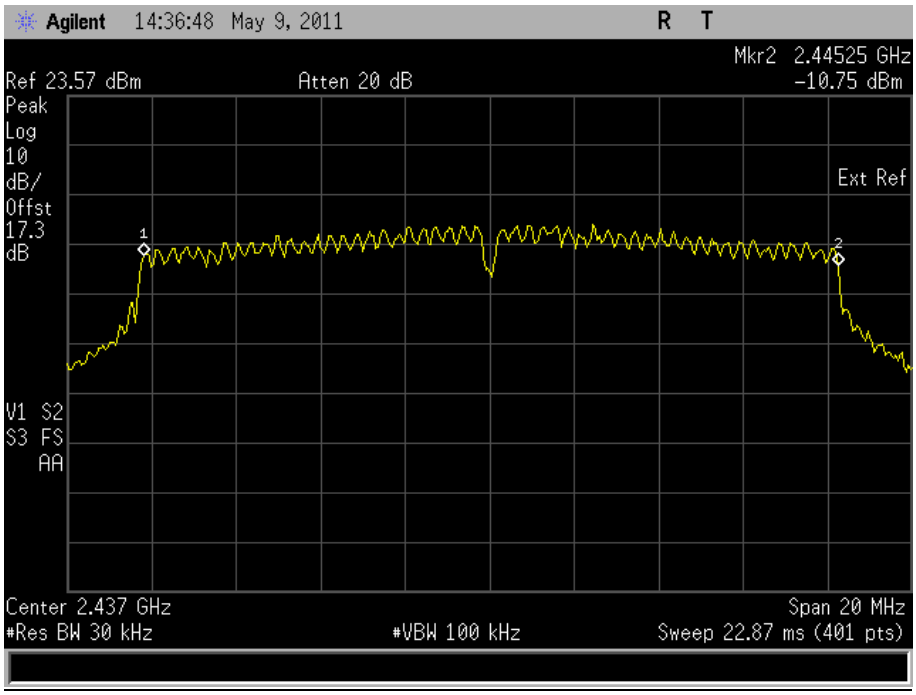


18 Mbps

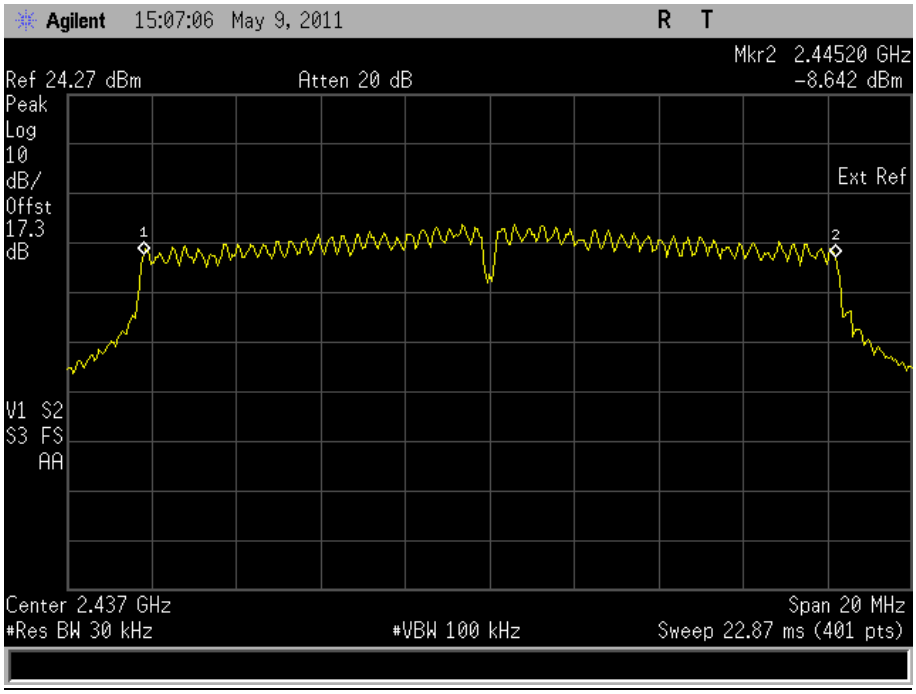


Product Service

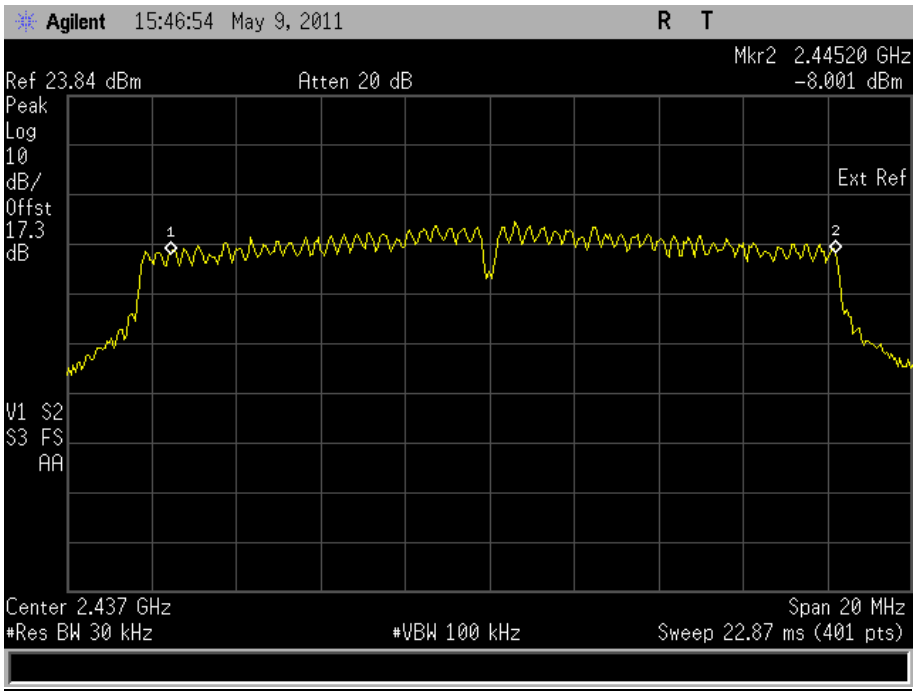
36 Mbps



48 Mbps



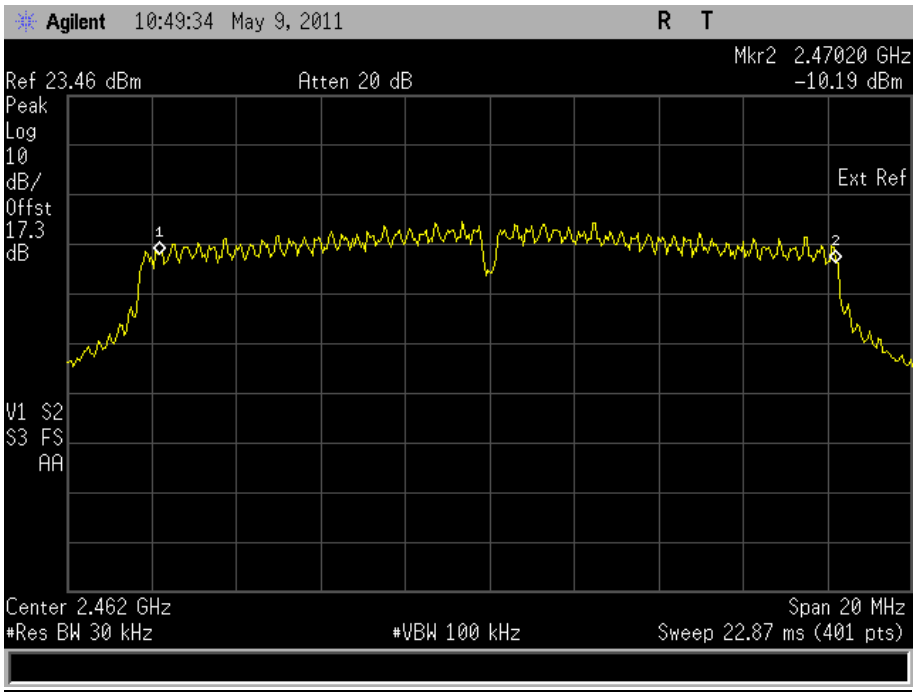
54 Mbps


Agilent 15:46:54 May 9, 2011
R T
Mkr2 2.44520 GHz
Ref 23.84 dBm
Atten 20 dB
-8.001 dBm
Peak
Log
10
dB/
Offst
17.3
dB
Ext Ref
1
2
V1 S2
S3 FS
AA
Center 2.437 GHz
Span 20 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 22.87 ms (401 pts)

Product Service

2462 MHz

6 Mbps



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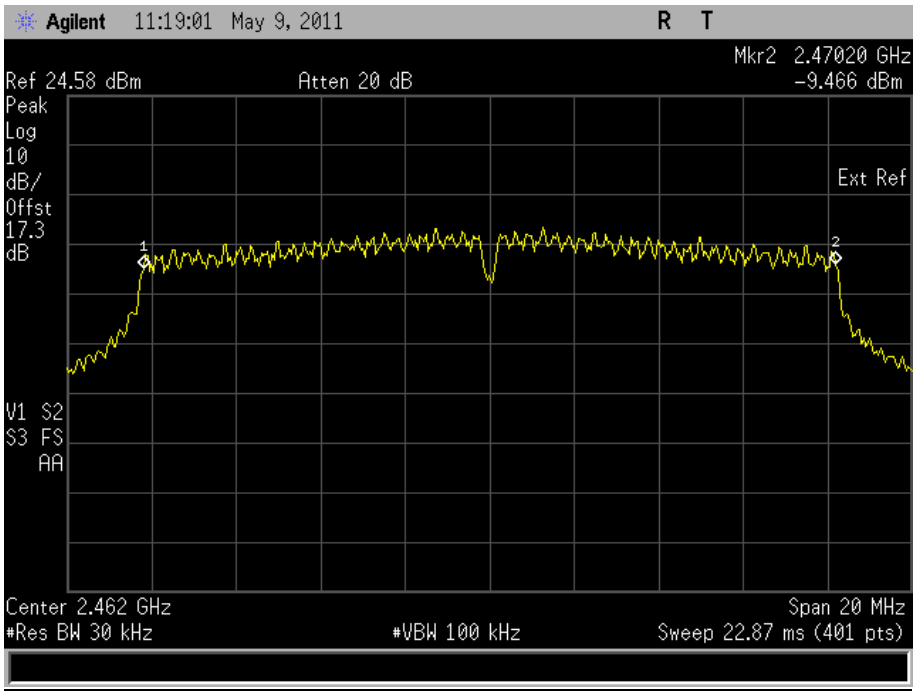
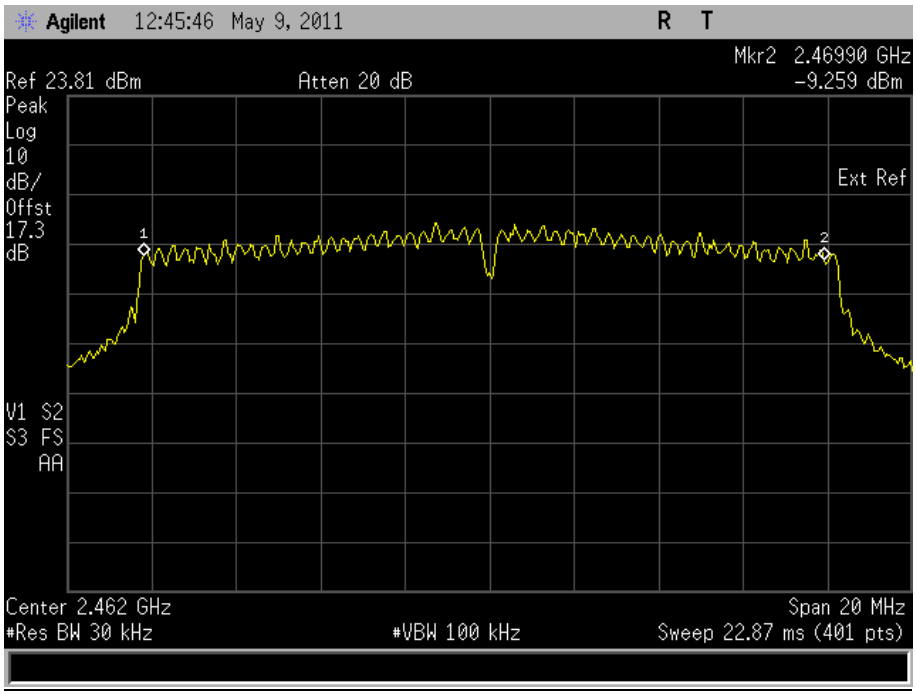
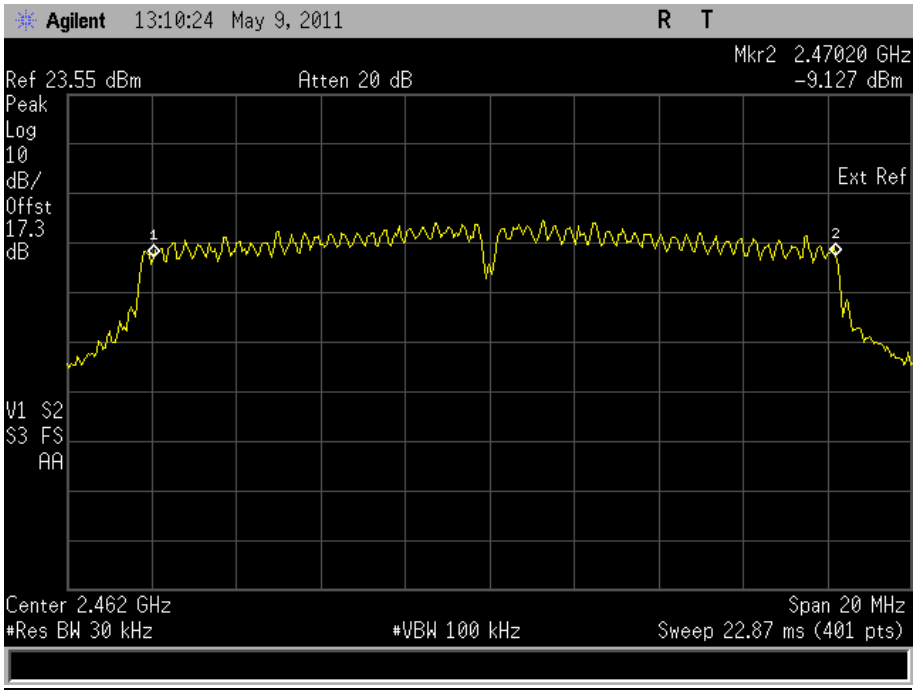


Product Service

12 Mbps

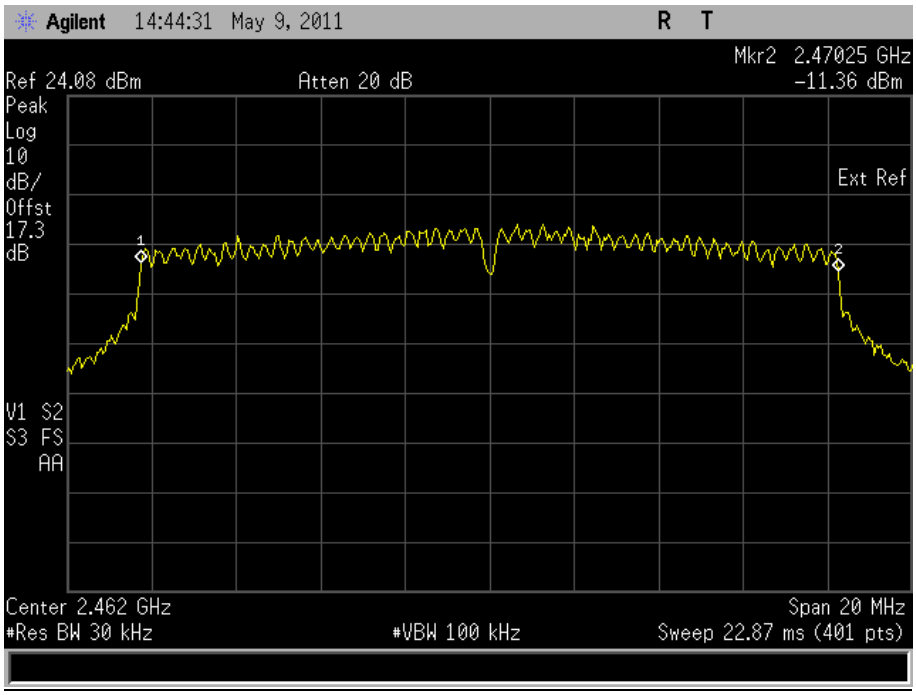


18 Mbps

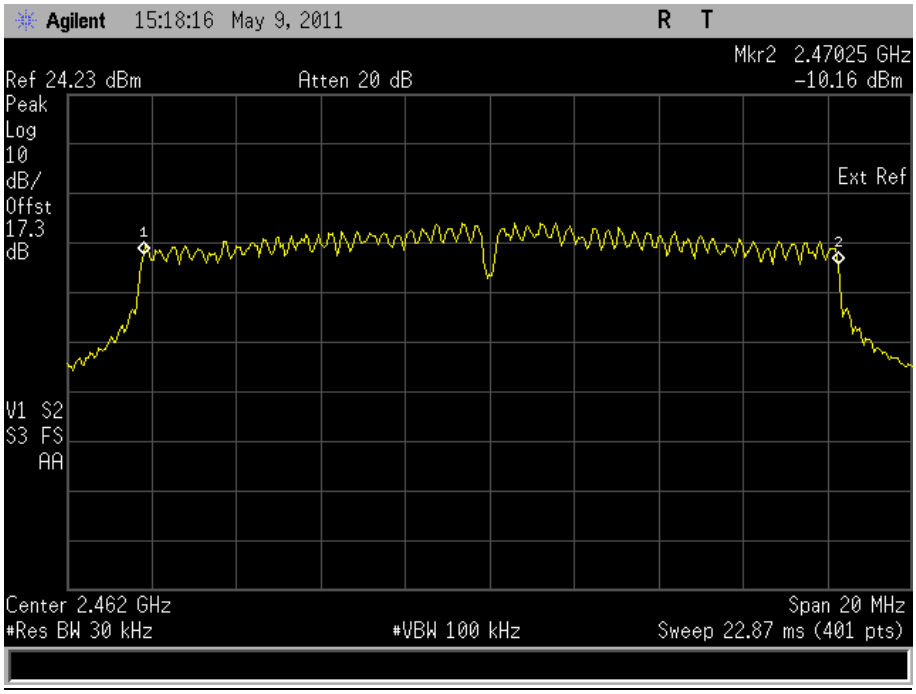


Product Service

36 Mbps

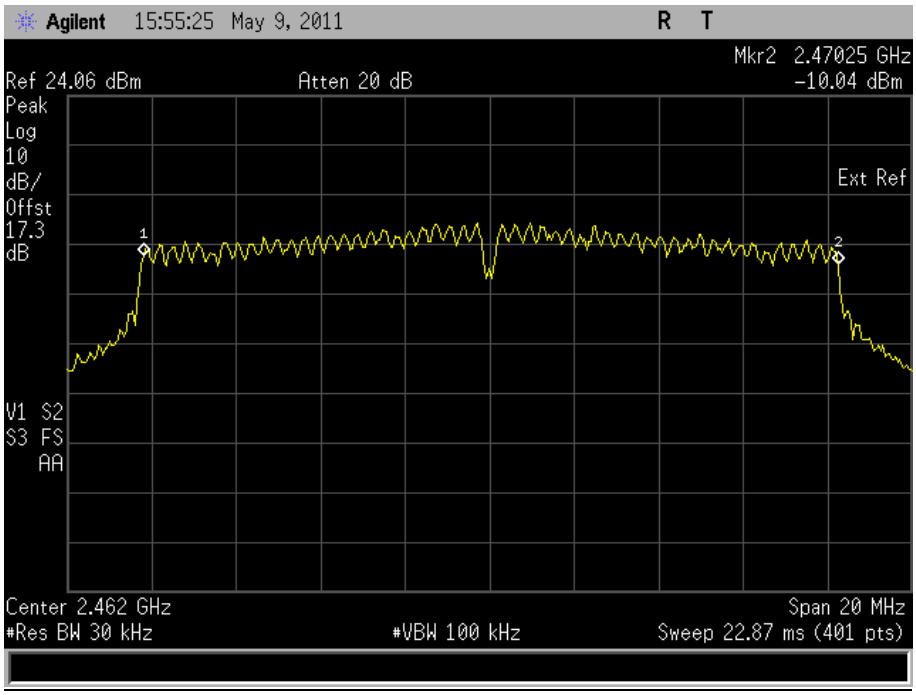


48 Mbps



Product Service

54 Mbps



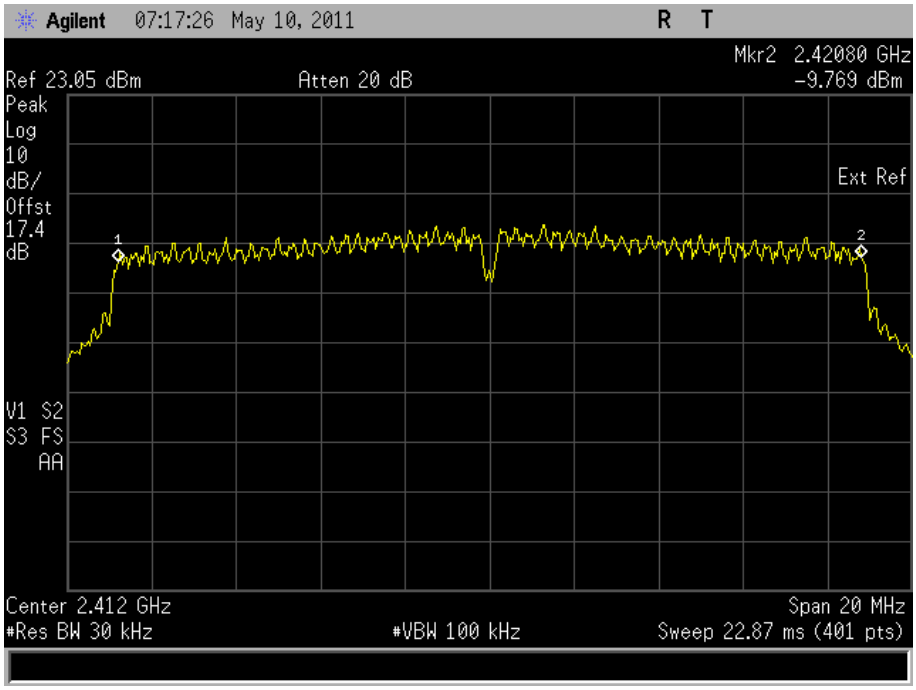
Configuration 3 – Modes 1, 2 and 3

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412	6.5	17600
	13	16750
	19.5	17350
	26	17650
	39	17700
	52	17600
	58.5	17600
	65	17450
2437	6.5	17600
	13	17300
	19.5	17650
	26	17700
	39	17700
	52	17600
	58.5	17700
	65	17650
2462	6.5	17600
	13	17550
	19.5	16750
	26	17600
	39	16650
	52	17650
	58.5	17700
	65	17650

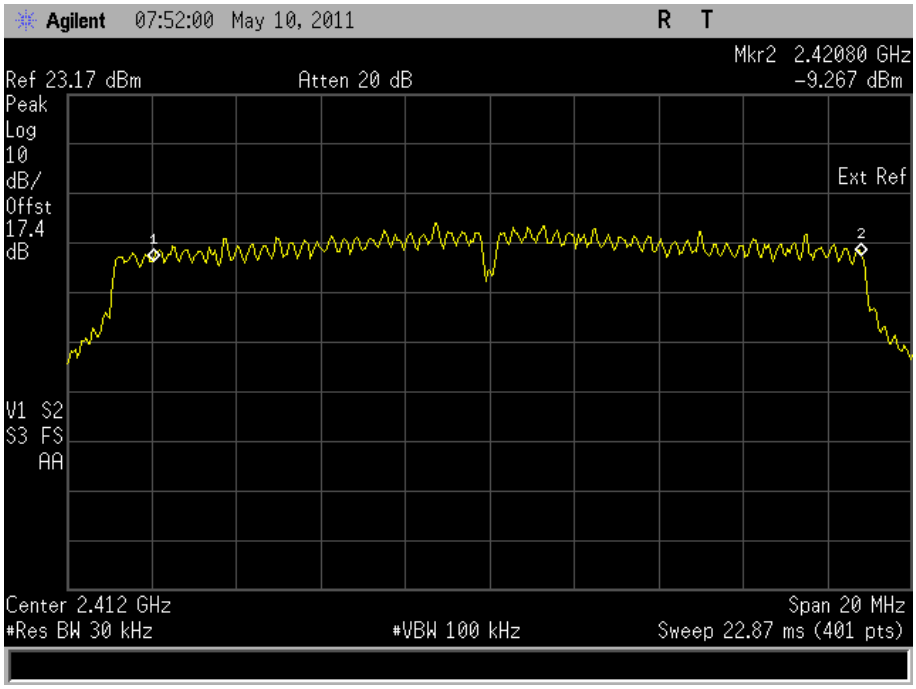
Product Service

2412 MHz

6.5 Mbps

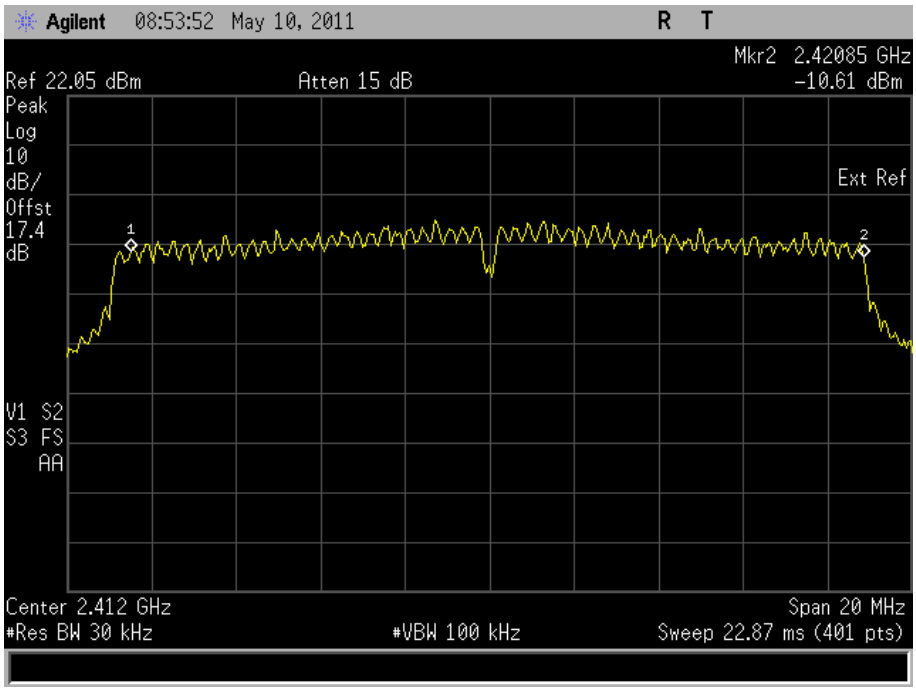


13 Mbps

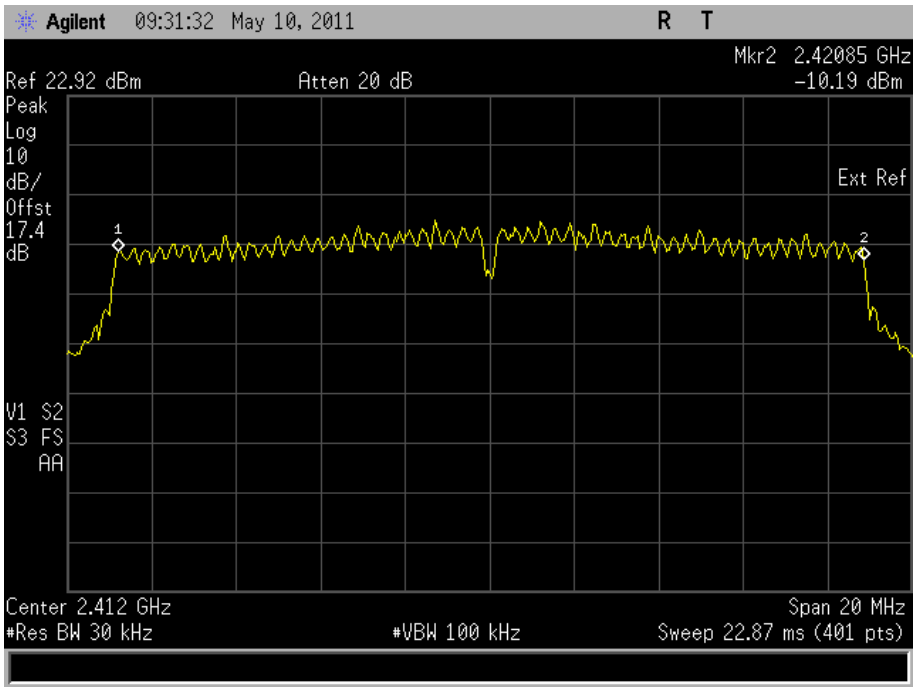


Product Service

19.5 Mbps

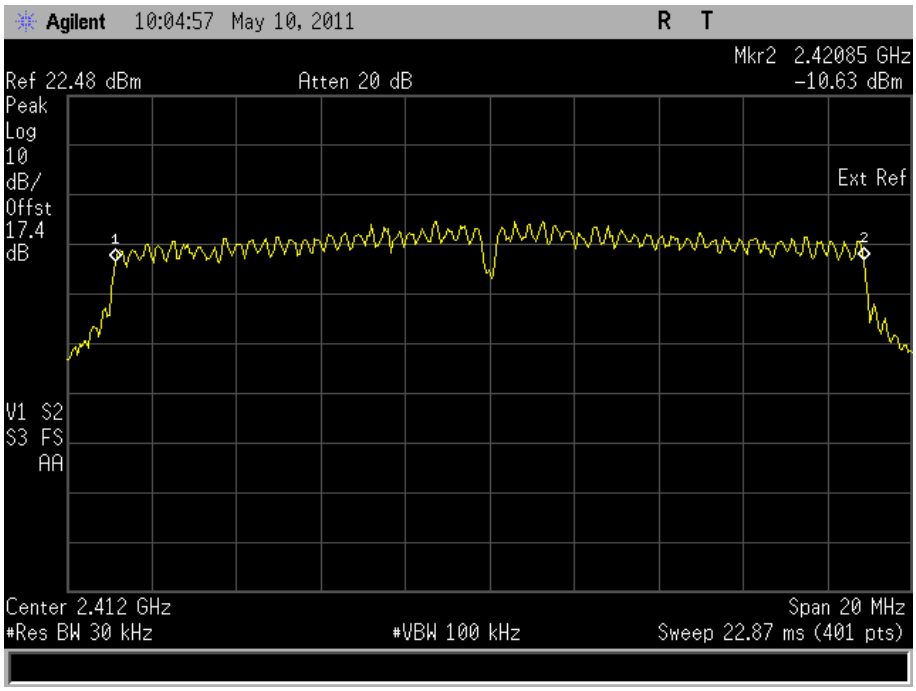


26 Mbps

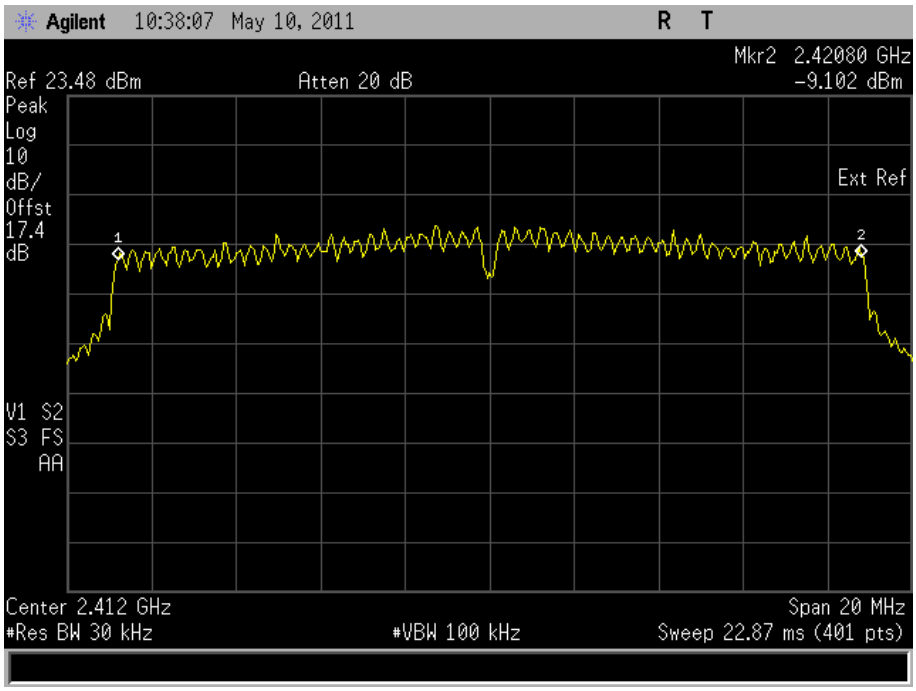


Product Service

39 Mbps

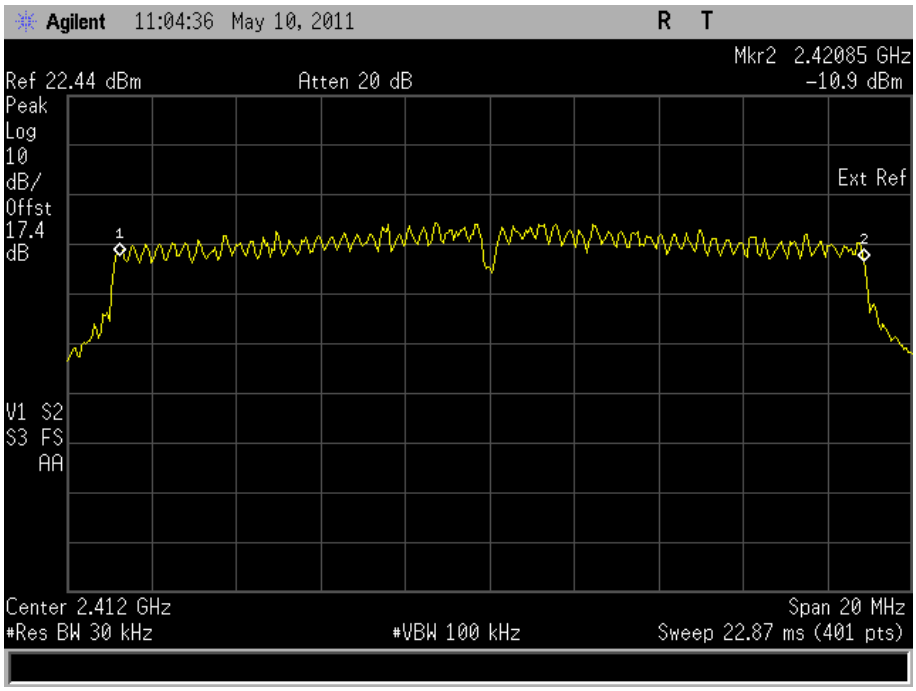


52 Mbps

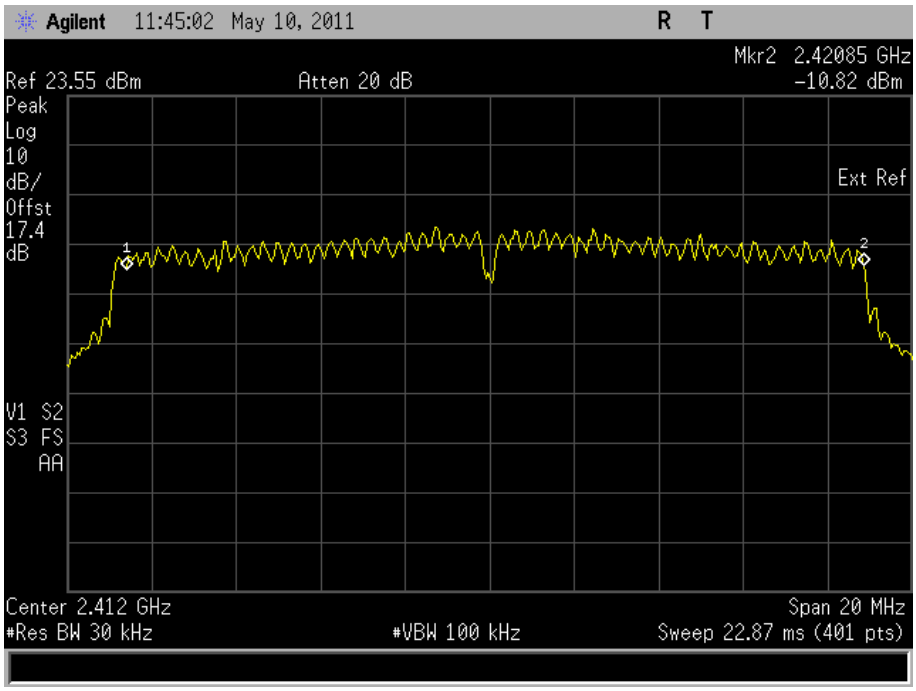


Product Service

58.5 Mbps



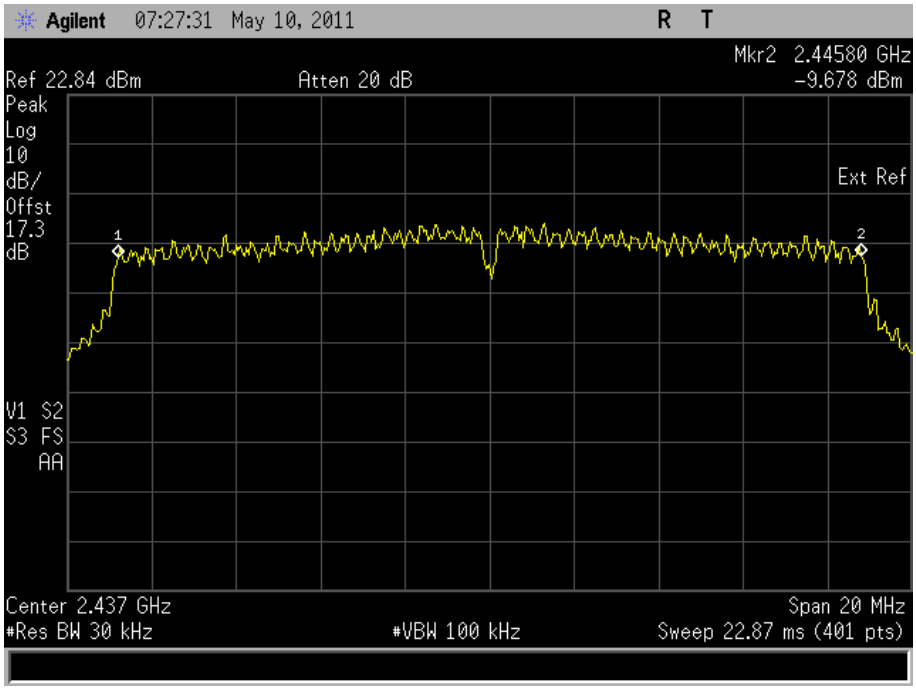
65 Mbps



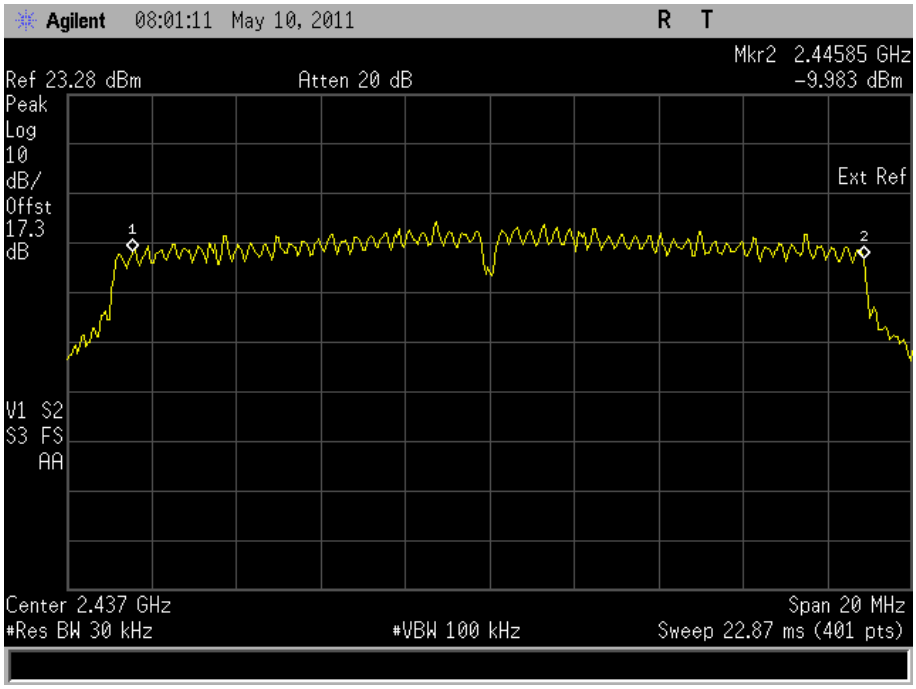
Product Service

2437 MHz

6.5 Mbps

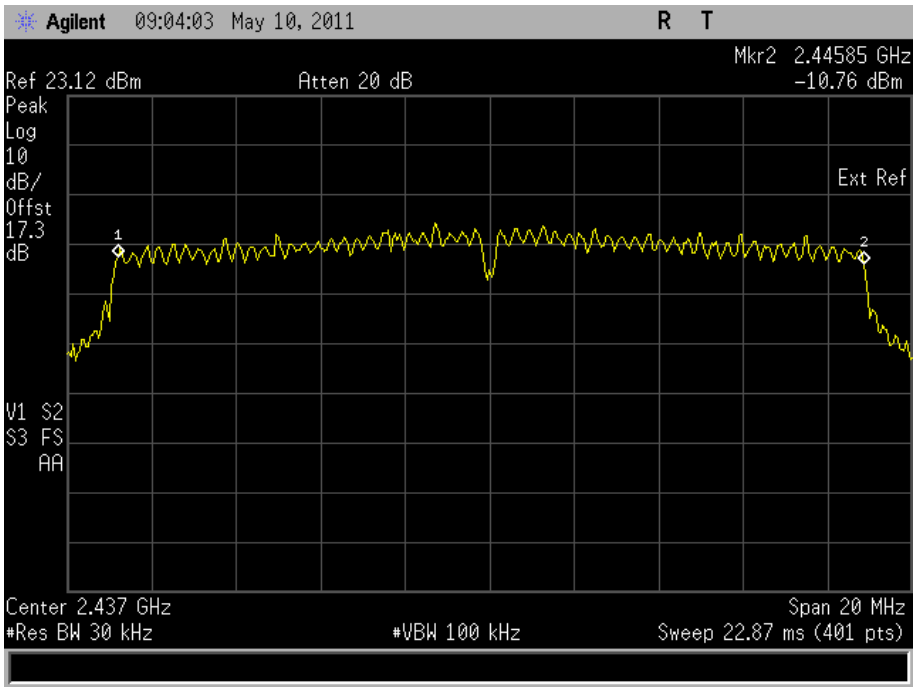


13 Mbps

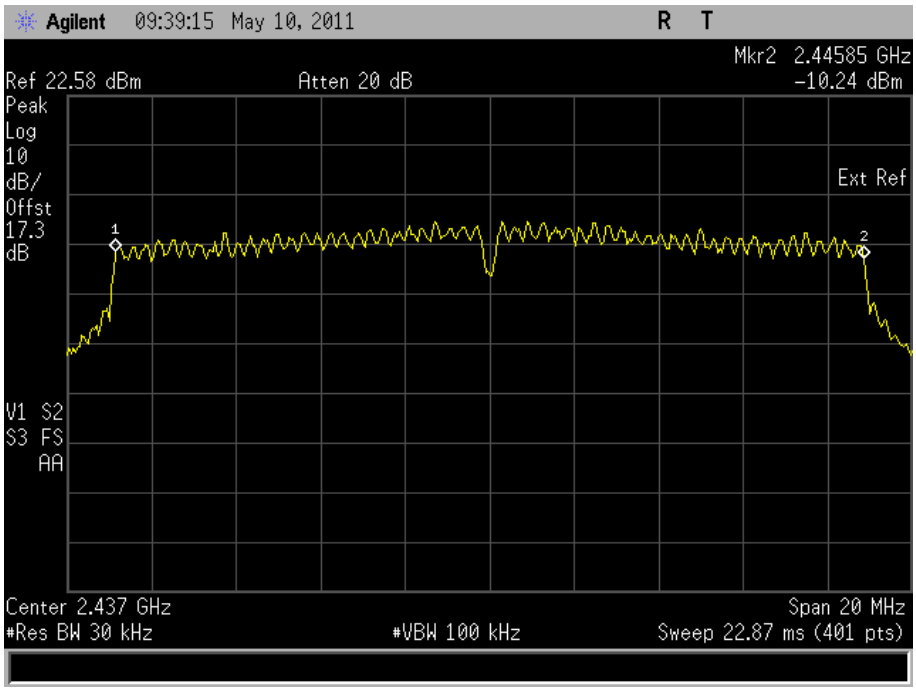


Product Service

19.5 Mbps

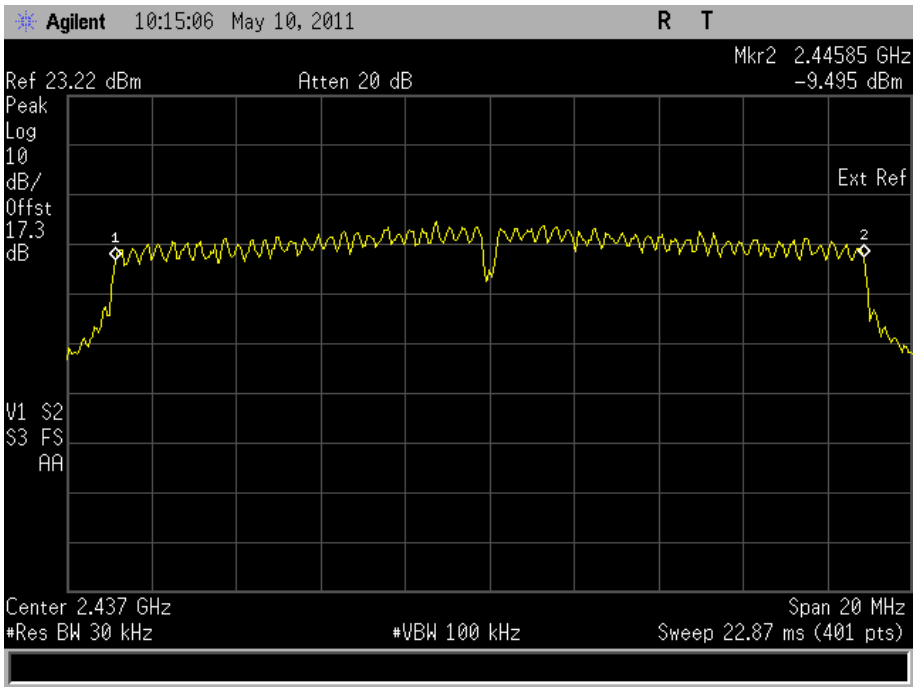


26 Mbps

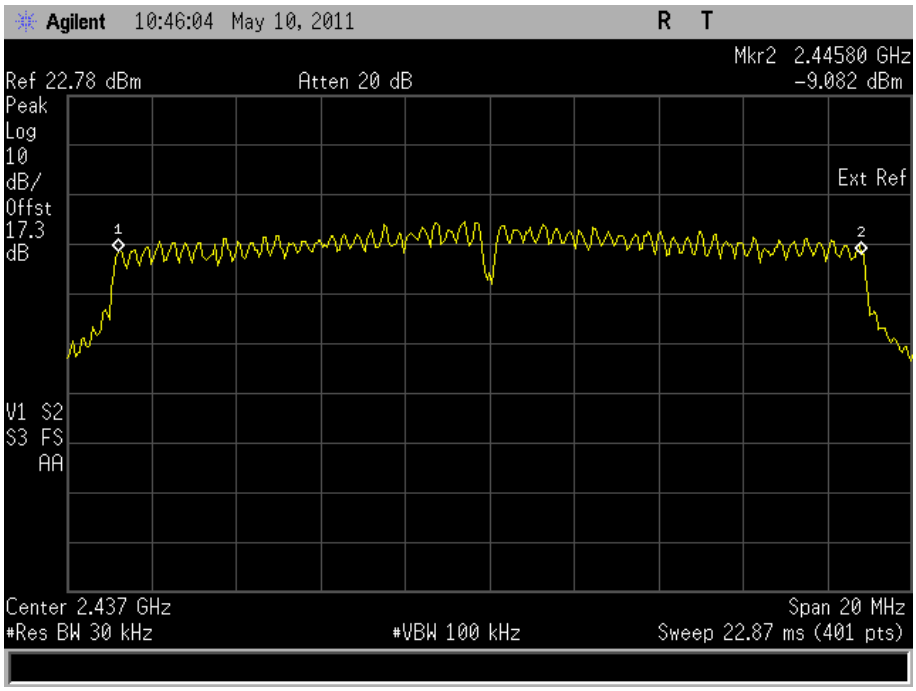


Product Service

39 Mbps

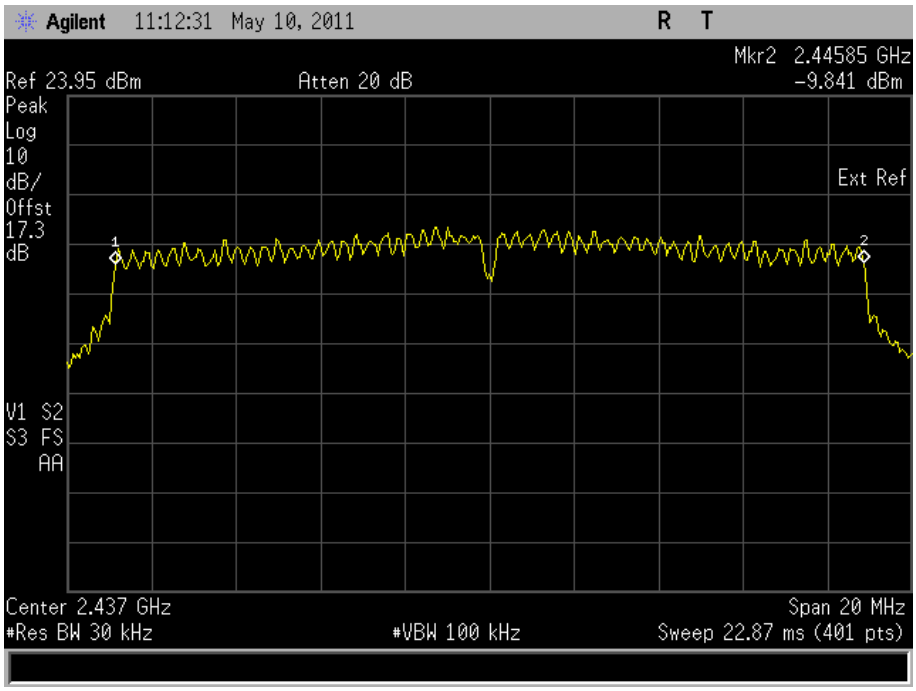


52 Mbps

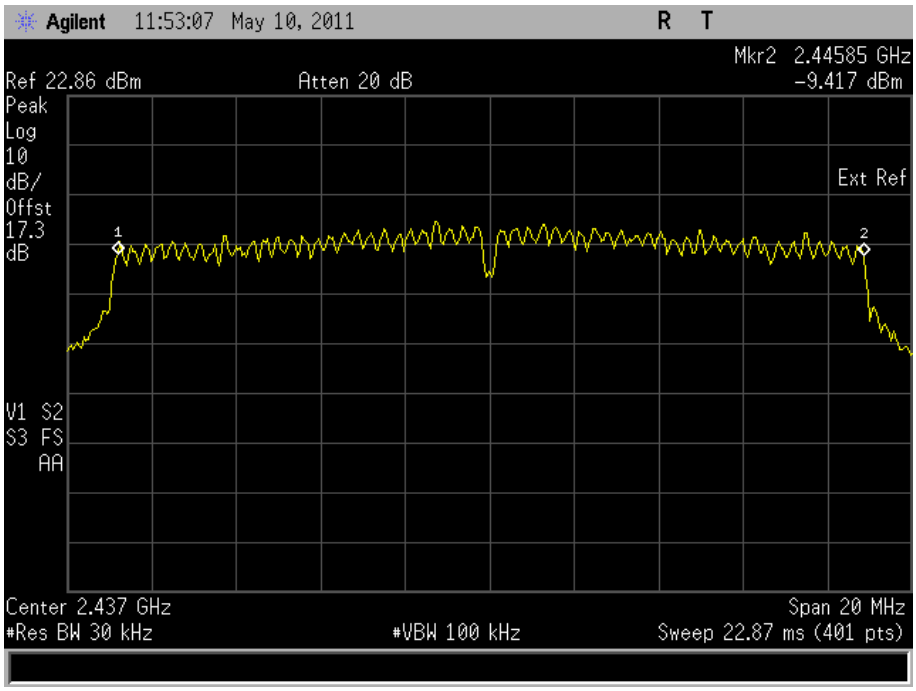


Product Service

58.5 Mbps



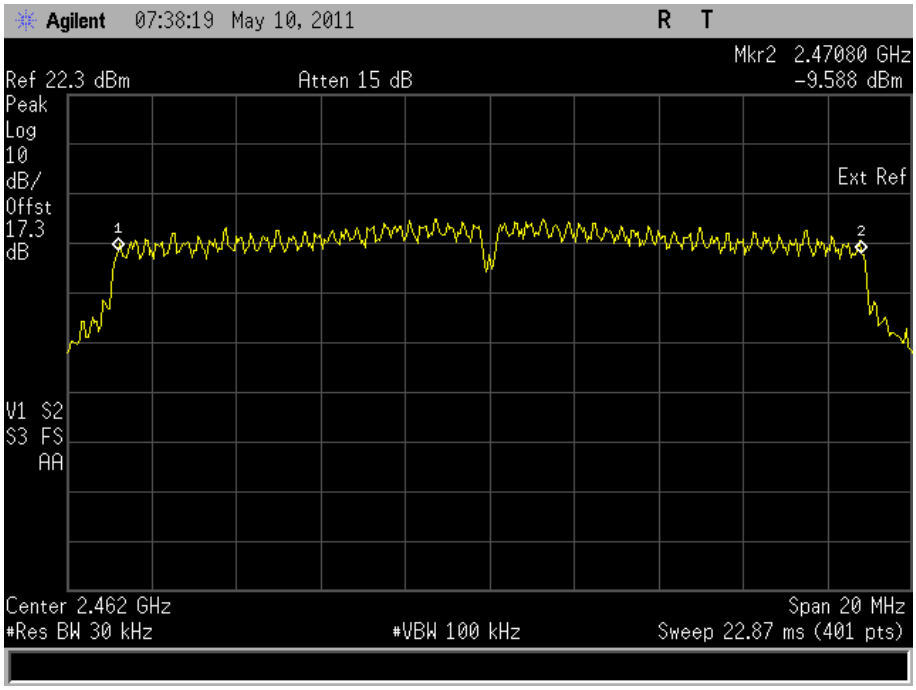
65 Mbps



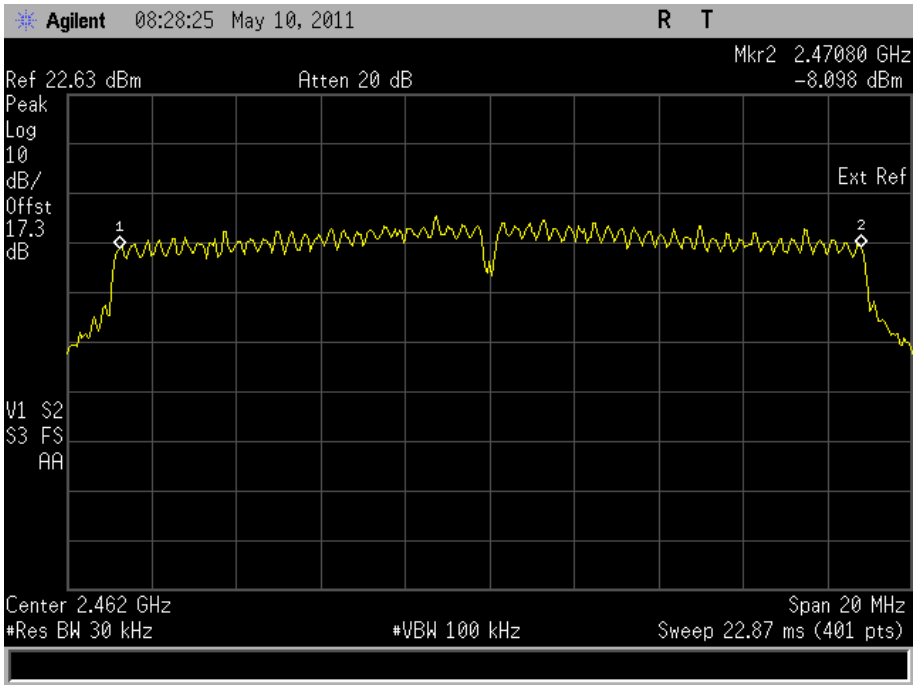
Product Service

2462 MHz

6.5 Mbps

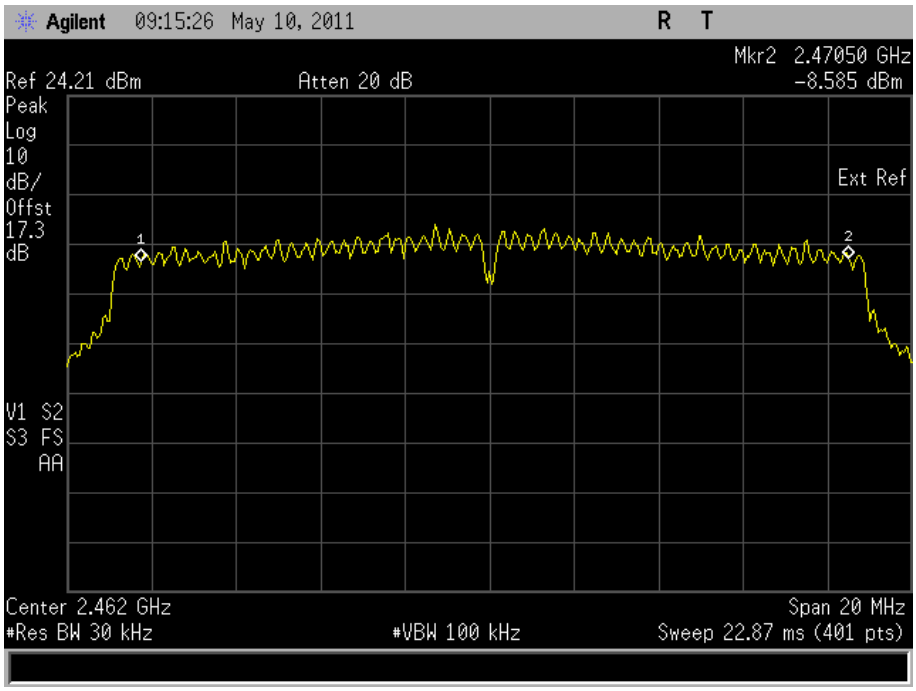


13 Mbps

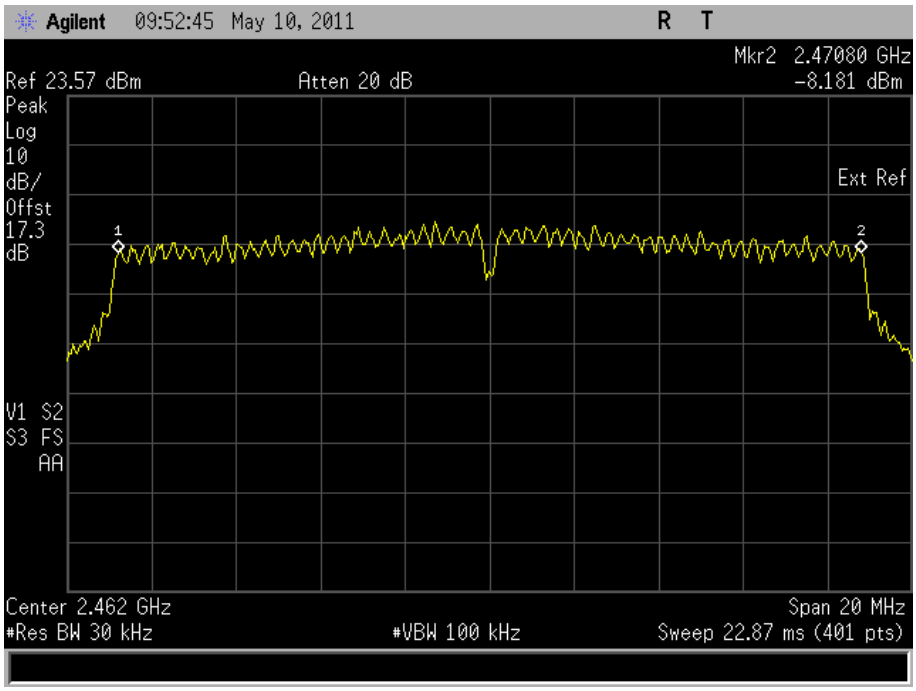


Product Service

19.5 Mbps

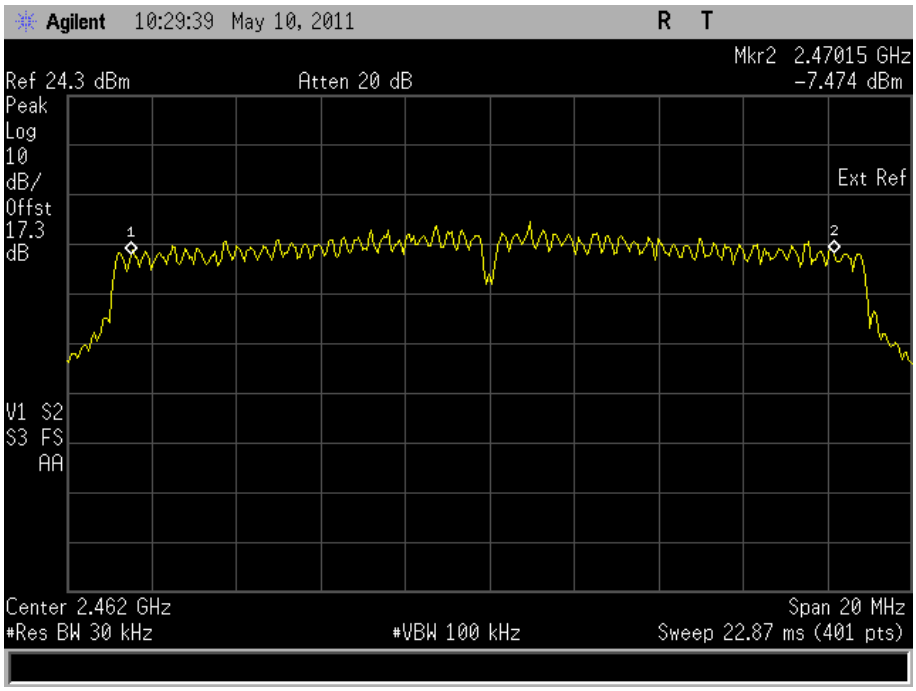


26 Mbps

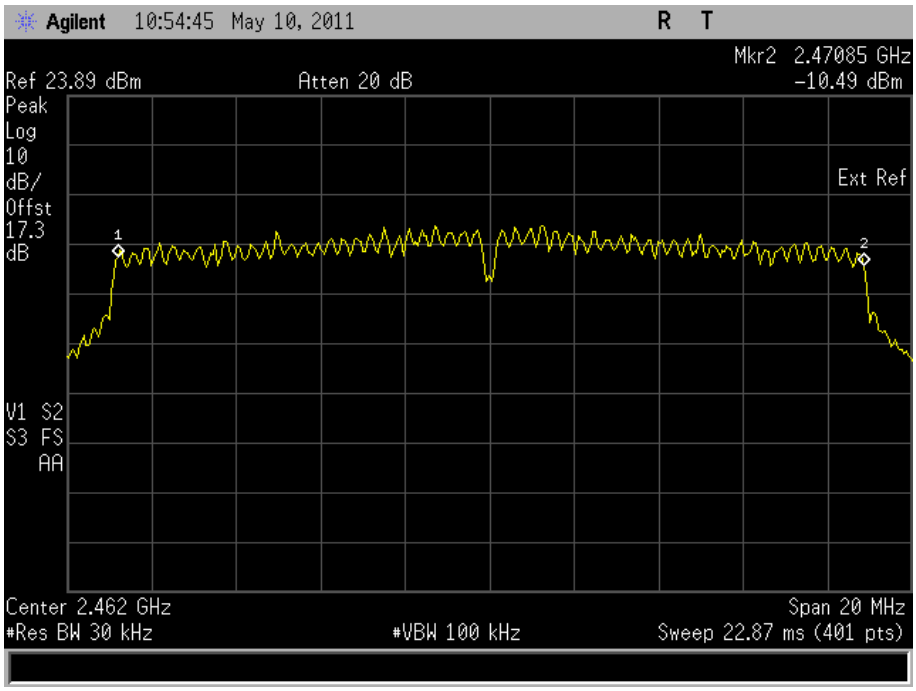


Product Service

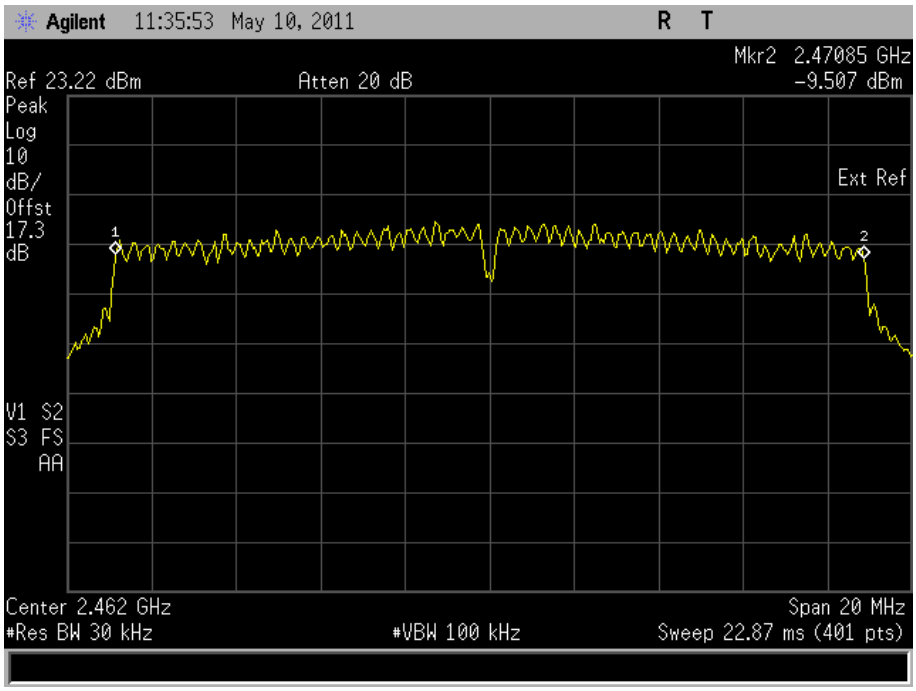
39 Mbps



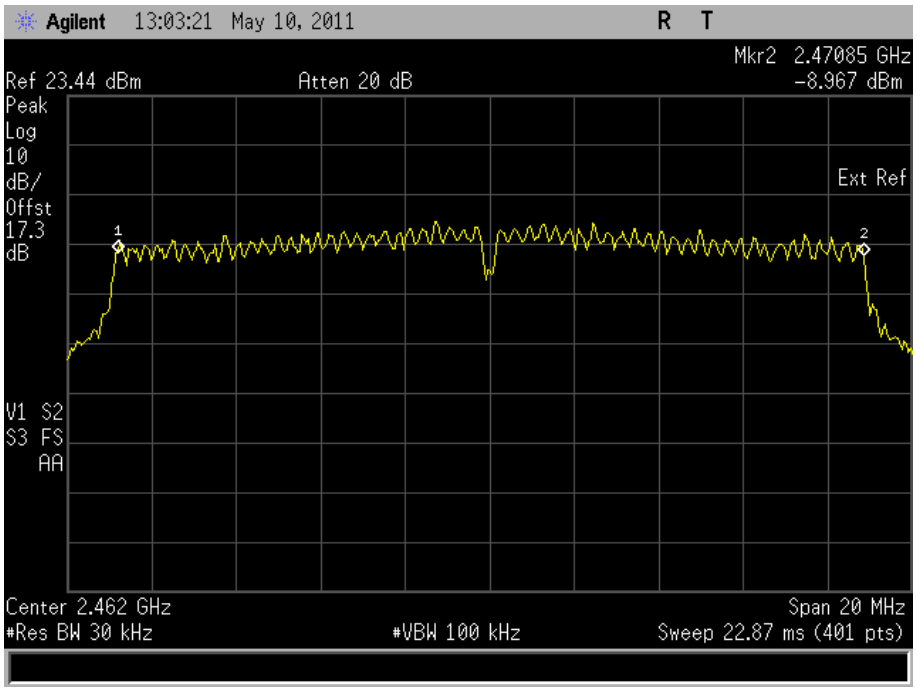
52 Mbps



58.5 Mbps



65 Mbps



Limit Clause

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

2.2 RADIATED EMISSIONS (ENCLOSURE PORT)

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test

CDMA SHI11, S/N: SSHFL000930

2.2.3 Date of Test and Modification State

11, 15 and 29 May and 01 June 2011 - Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of ANSI C63.4.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions within the restricted bands defined in 15.205 were measured in accordance with 15.209. Emissions measured below 1GHz employed a quasi peak detector, in accordance with 15.35(a). Emissions measured above 1GHz employed an average detector as defined in 15.35(b). The peak level of the emission was also measured to ensure that a difference of 20dB from the average level was not exceeded, as defined in 15.35(b). Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector. Other emissions from 30MHz to 25GHz excluding the restricted bands were measured using a peak detector.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

Configuration 2 - Mode 1
- Mode 2
- Mode 3

Configuration 3 - Mode 1
- Mode 2
- Mode 3

Product Service

2.2.6 Environmental Conditions

	11 May 2011	15 May 2011	29 May 2011	01 June 2011
Ambient Temperature	20.0°C	19.5°C	20.8°C	19.7°C
Relative Humidity	47.0%	35.0%	44.0%	47.0%

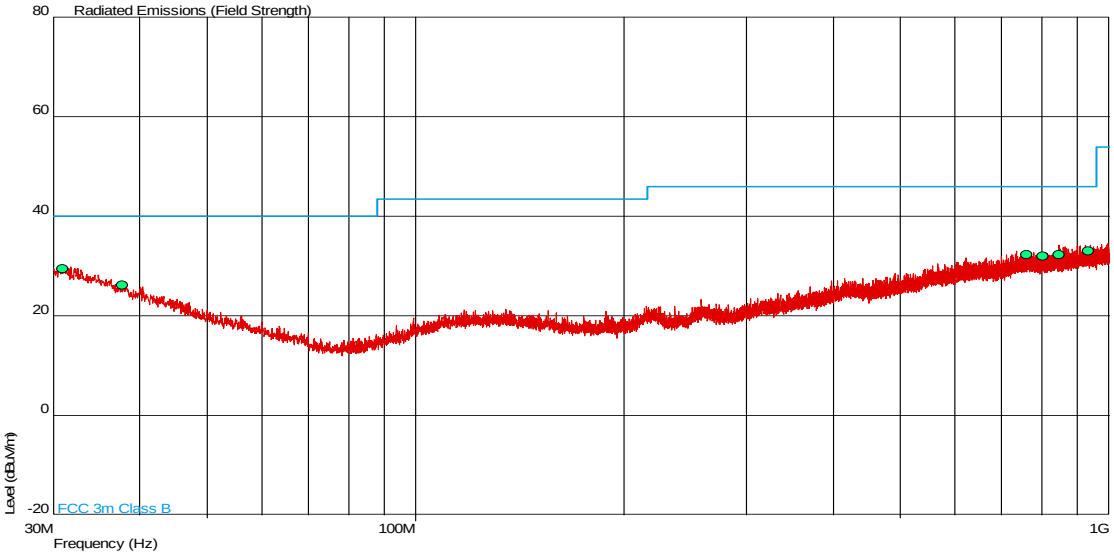
2.2.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 1 - Mode 1

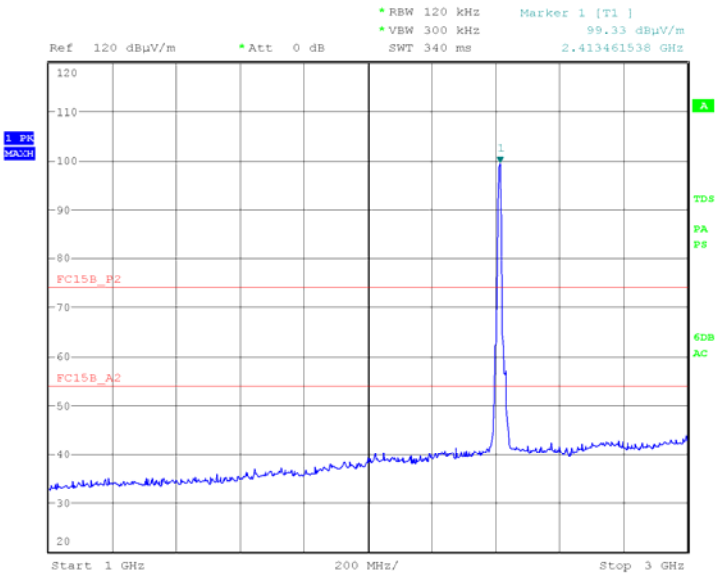
30 MHz to 1 GHz



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
31.019	29.5	29.9	40.0	100	-10.5	70.1	0	1.00	Vertical
37.760	26.2	20.4	40.0	100	-13.8	79.6	0	1.00	Vertical
760.847	32.3	41.2	46.0	200	-13.7	158.8	270	1.00	Horizontal
801.781	32.0	39.8	46.0	200	-14.0	160.2	90	1.00	Vertical
846.207	32.3	41.2	46.0	200	-13.7	158.8	90	1.00	Horizontal
933.458	33.1	45.2	46.0	200	-12.9	154.8	90	1.00	Horizontal

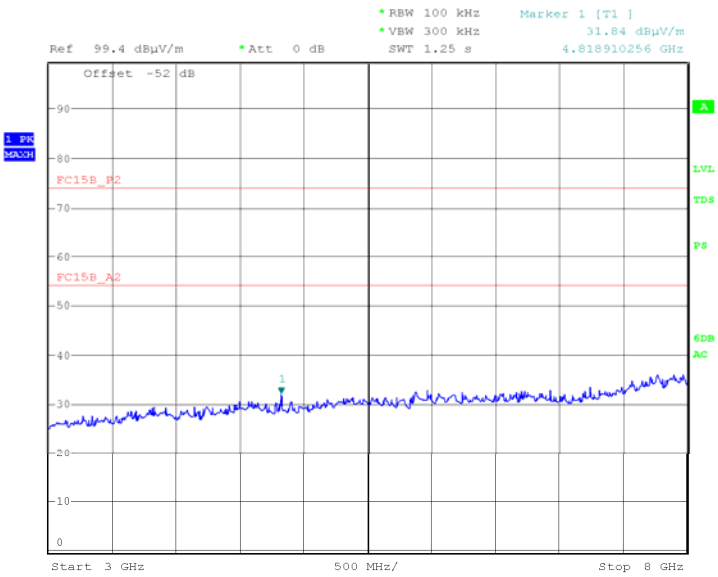
Product Service

1GHz to 3GHz



Date: 11.MAY.2011 17:37:21

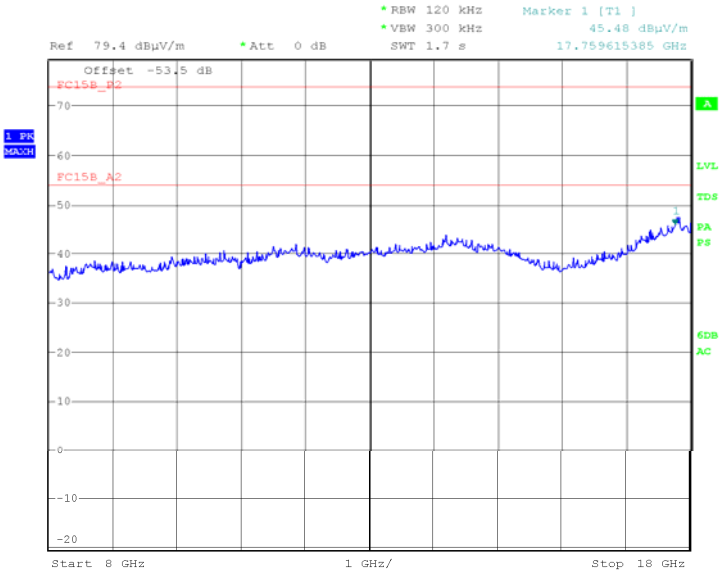
3GHz to 8GHz



Date: 29.MAY.2011 08:38:27

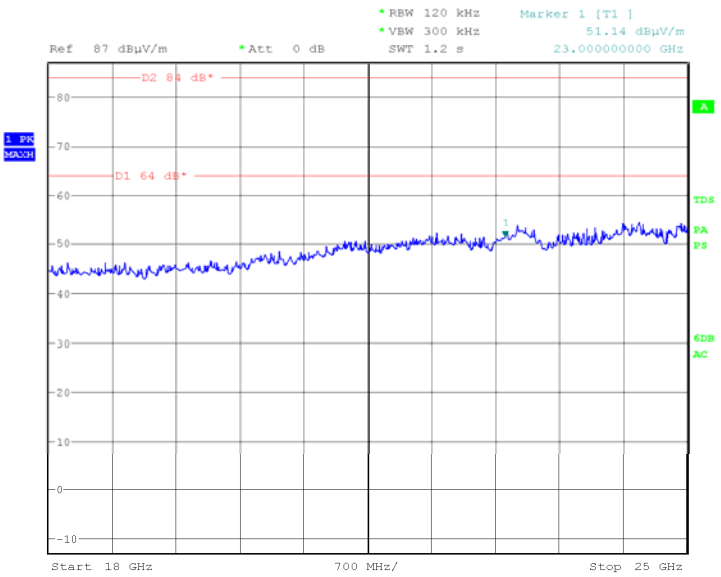
Product Service

8GHz to 18GHz



Date: 29.MAY.2011 10:29:21

18GHz to 25GHz

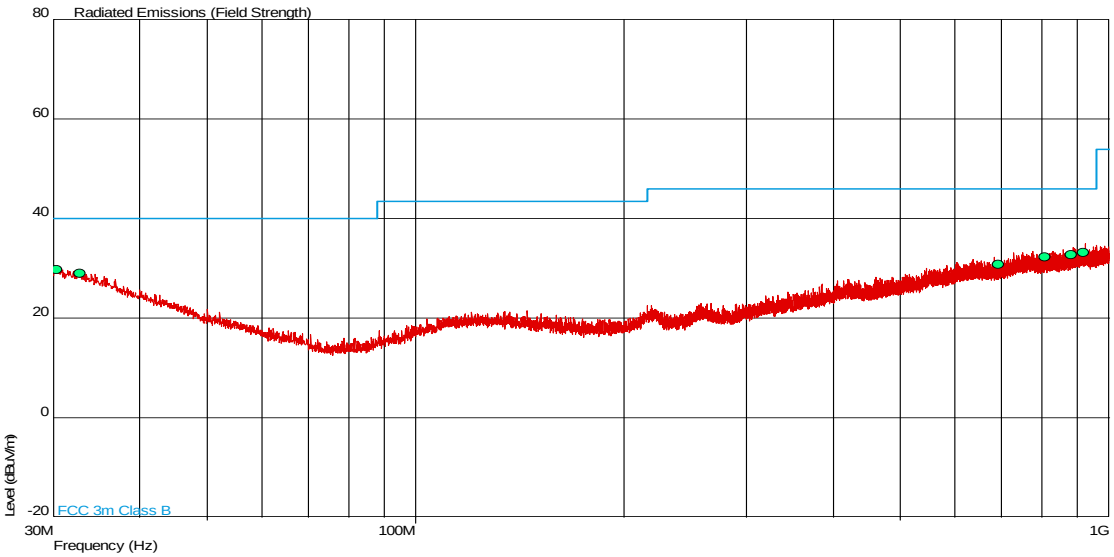


Date: 1.JUN.2011 19:12:06

Product Service

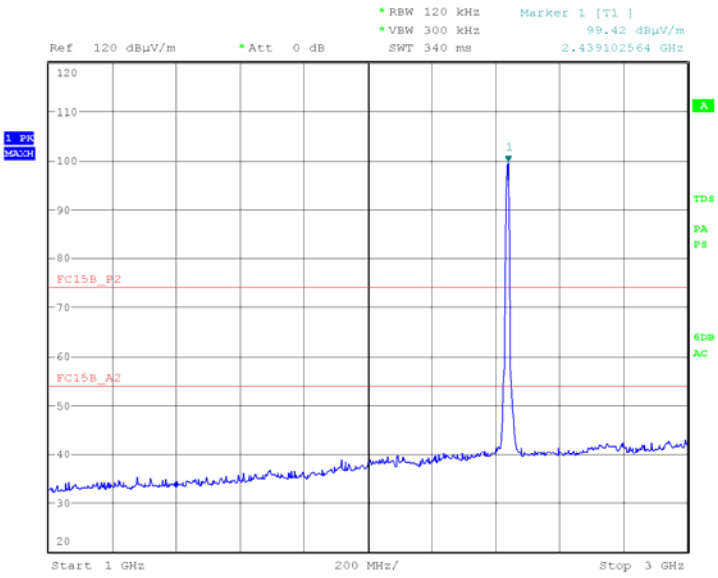
Configuration 1 - Mode 2

30 MHz to 1 GHz



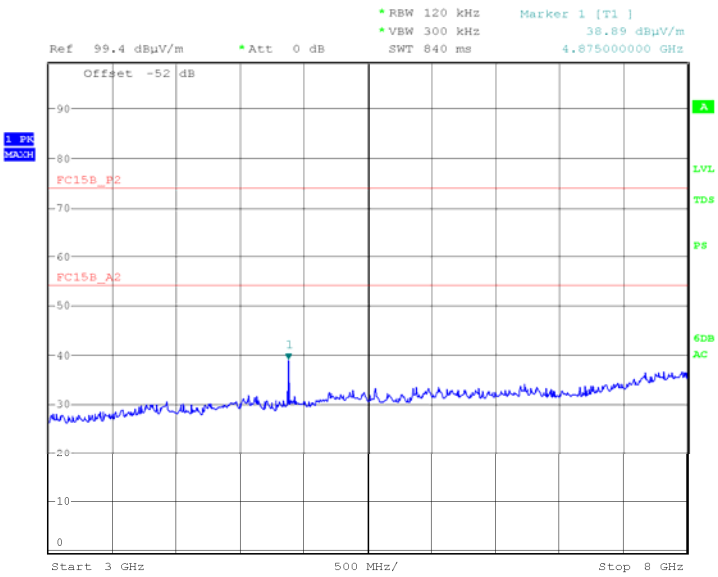
Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (deg)	Height (m)	Polarity
30.388	29.8	30.9	40.0	100	-10.2	69.1	45	1.00	Horizontal
32.813	29.0	28.2	40.0	100	-11.0	71.8	180	1.00	Vertical
693.383	30.8	34.7	46.0	200	-15.2	165.3	135	1.00	Horizontal
809.153	32.3	41.2	46.0	200	-13.7	158.8	225	1.00	Vertical
882.291	32.8	43.7	46.0	200	-13.2	156.3	135	1.00	Horizontal
918.375	33.2	45.7	46.0	200	-12.8	154.3	270	1.00	Vertical

1GHz to 3GHz



Date: 11.MAY.2011 17:41:26

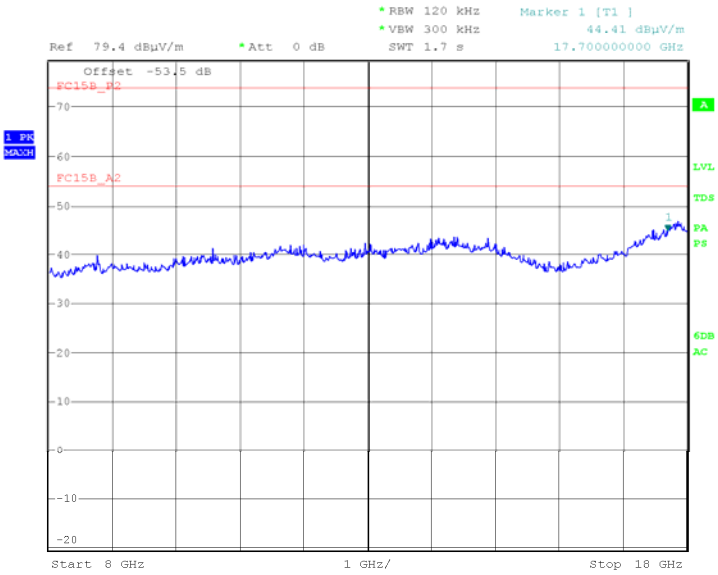
3GHz to 8GHz



Date: 29.MAY.2011 08:41:14

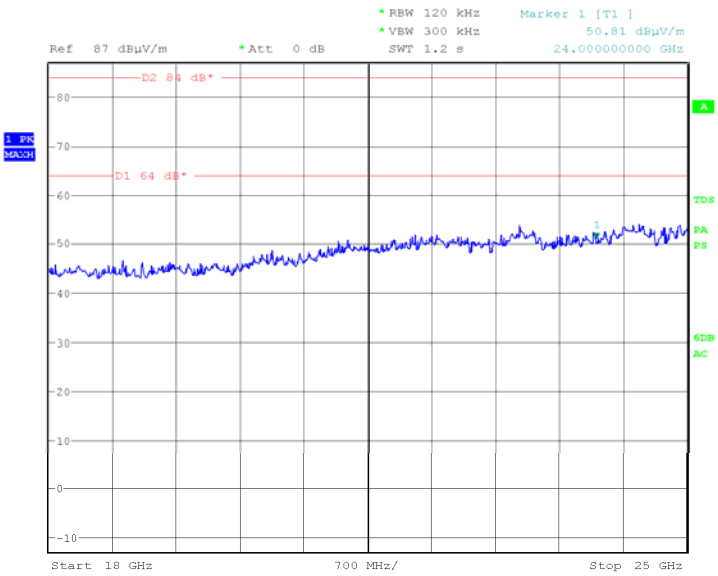
Product Service

8GHz to 18GHz



Date: 29.MAY.2011 10:47:32

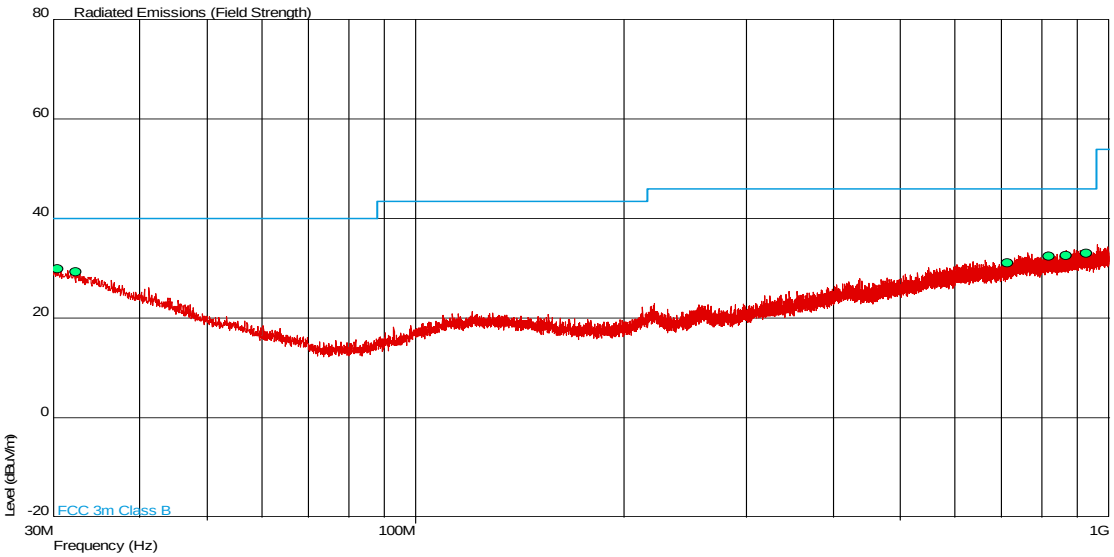
18GHz to 25GHz



Date: 1.JUN.2011 19:00:50

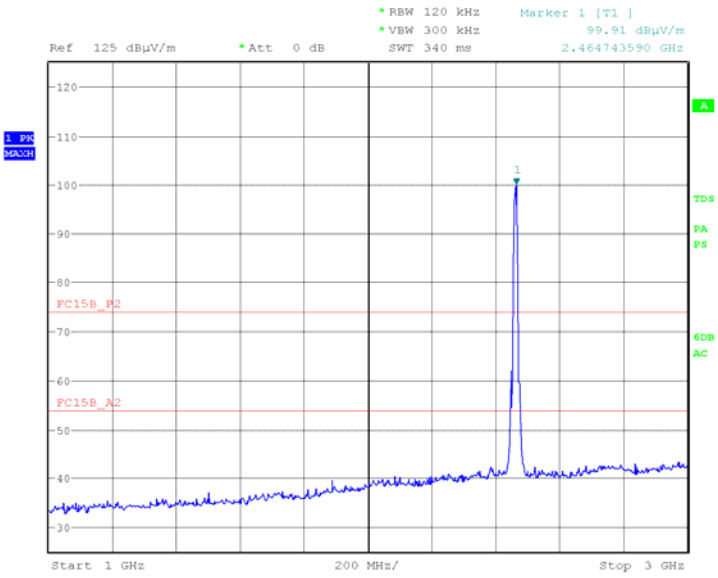
Configuration 1 - Mode 3

30 MHz to 1 GHz



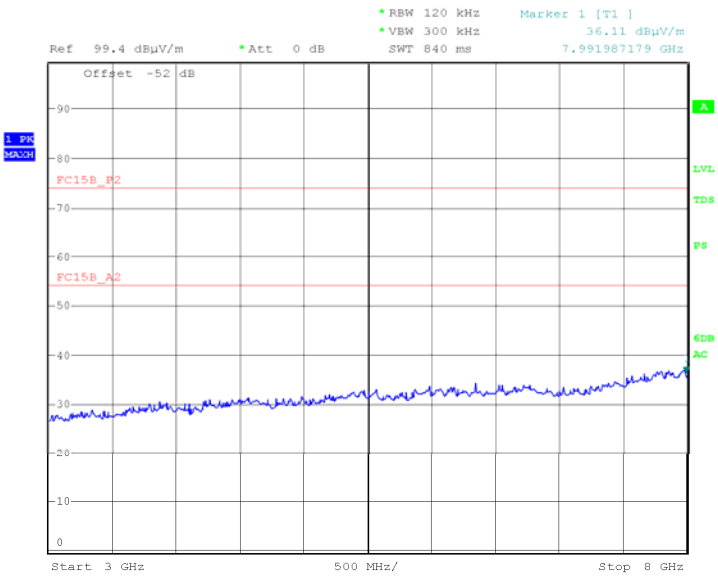
Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (deg)	Height (m)	Polarity
30.437	29.9	31.3	40.0	100	-10.1	68.7	180	1.00	Vertical
32.328	29.3	29.2	40.0	100	-10.7	70.8	90	1.00	Vertical
713.317	31.1	35.9	46.0	200	-14.9	164.1	270	1.00	Vertical
818.077	32.4	41.7	46.0	200	-13.6	158.3	180	1.00	Vertical
866.528	32.7	43.2	46.0	200	-13.3	156.8	0	1.00	Vertical
928.269	33.0	44.7	46.0	200	-13.0	155.3	180	1.00	Horizontal

1GHz to 3GHz



Date: 15.MAY.2011 08:04:36

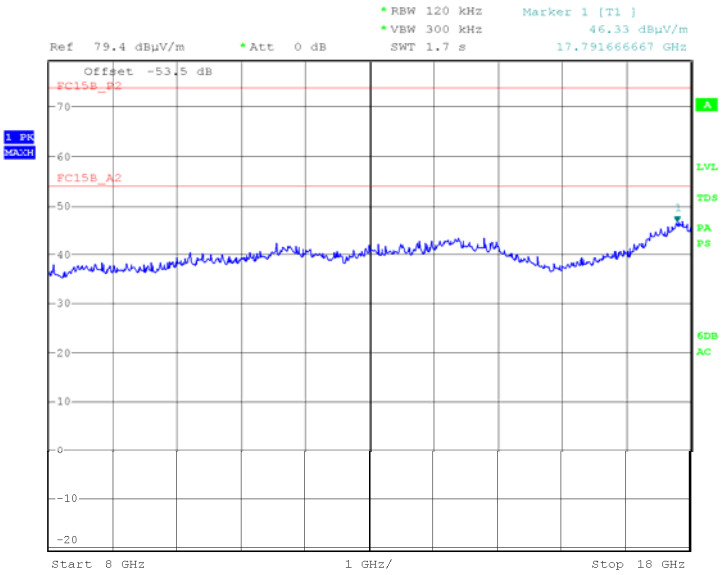
3GHz to 8GHz



Date: 29.MAY.2011 08:45:35

Product Service

8GHz to 18GHz



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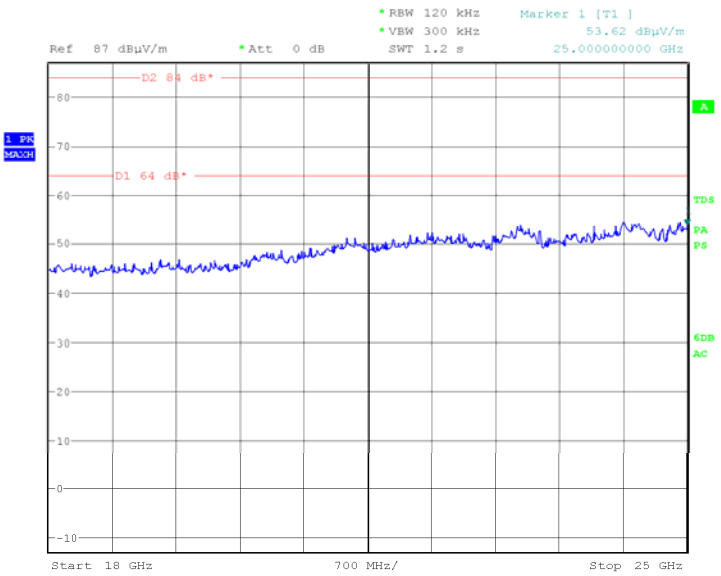
18GHz to 25GHz

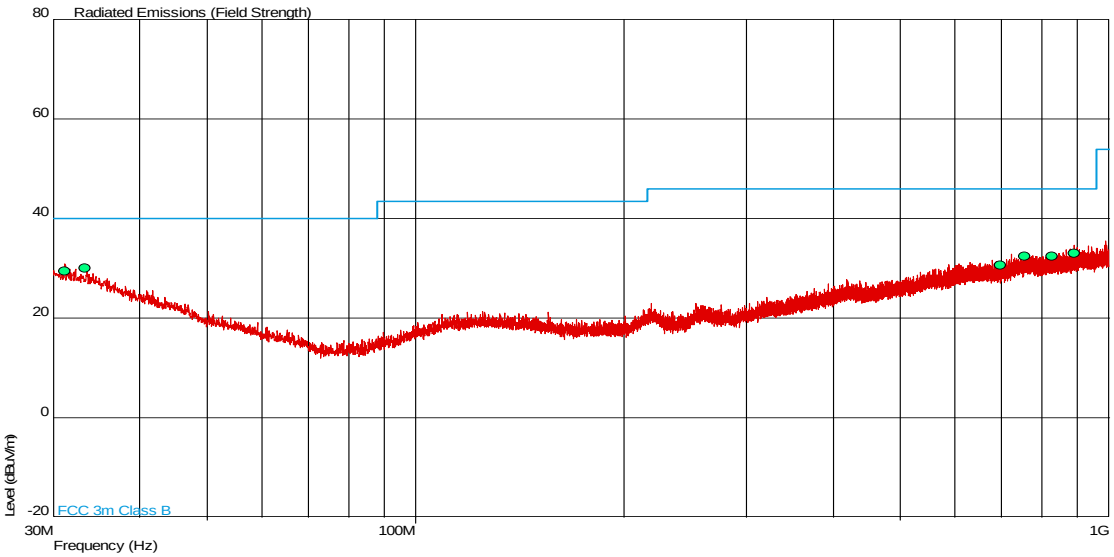


Date: 1.JUN.2011 18:46:56

Product Service

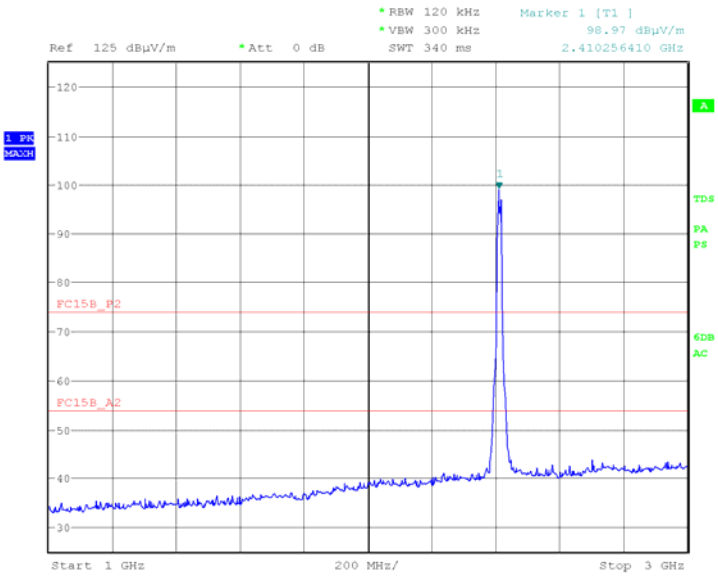
Configuration 2 - Mode 1

30 MHz to 1 GHz



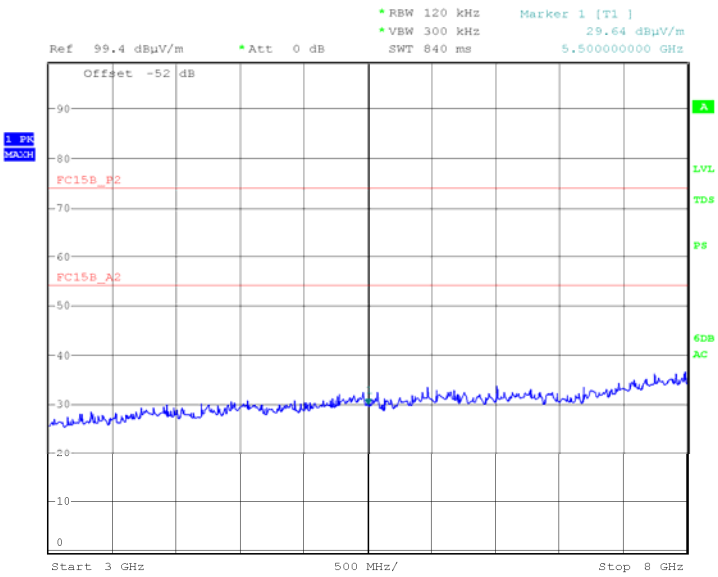
Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
31.213	29.5	29.9	40.0	100	-10.5	70.1	180	1.00	Vertical
33.298	30.0	31.6	40.0	100	-10.0	68.4	180	1.00	Horizontal
696.972	30.7	34.3	46.0	200	-15.3	165.7	270	1.00	Horizontal
755.609	32.4	41.7	46.0	200	-13.6	158.3	270	1.00	Horizontal
827.825	32.5	42.2	46.0	200	-13.5	157.8	270	1.00	Horizontal
889.566	33.1	45.2	46.0	200	-12.9	154.8	180	1.00	Vertical

1GHz to 3GHz



Date: 15.MAY.2011 08:36:06

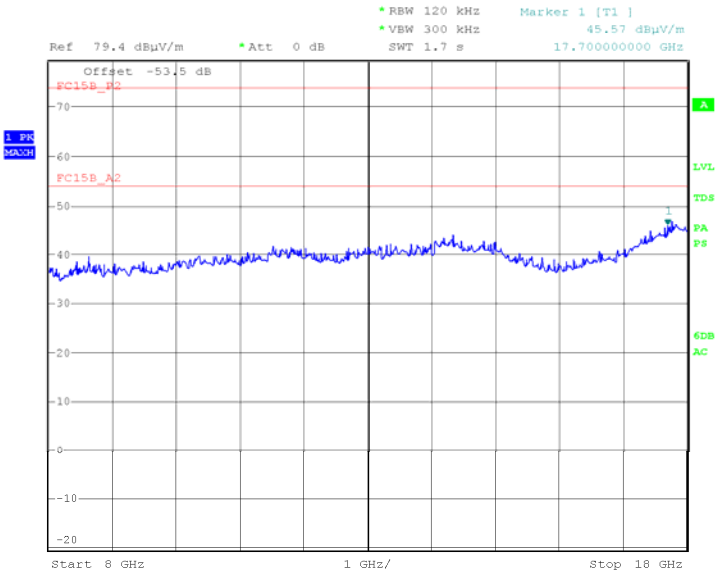
3GHz to 8GHz



Date: 29.MAY.2011 09:07:00

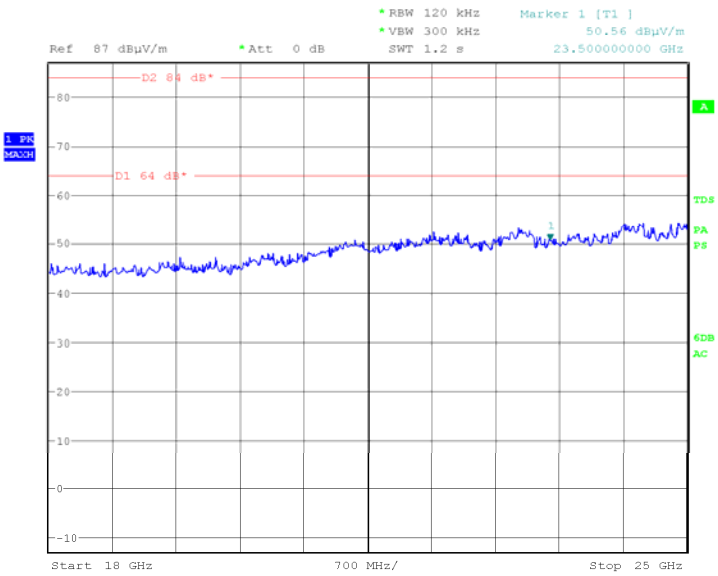
Product Service

8GHz to 18GHz



Date: 29.MAY.2011 10:07:00

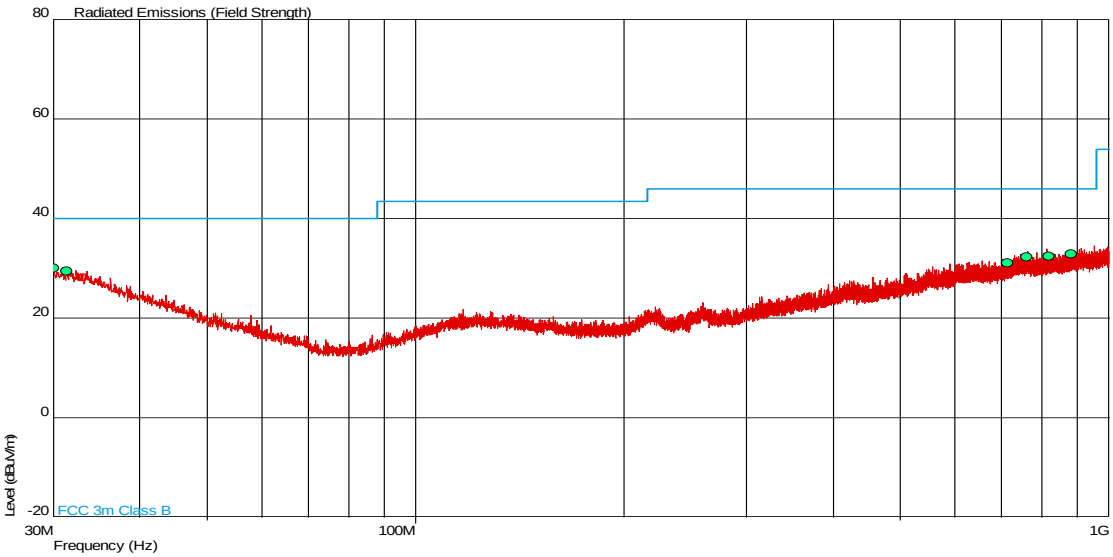
18GHz to 25GHz



Date: 1.JUN.2011 20:02:39

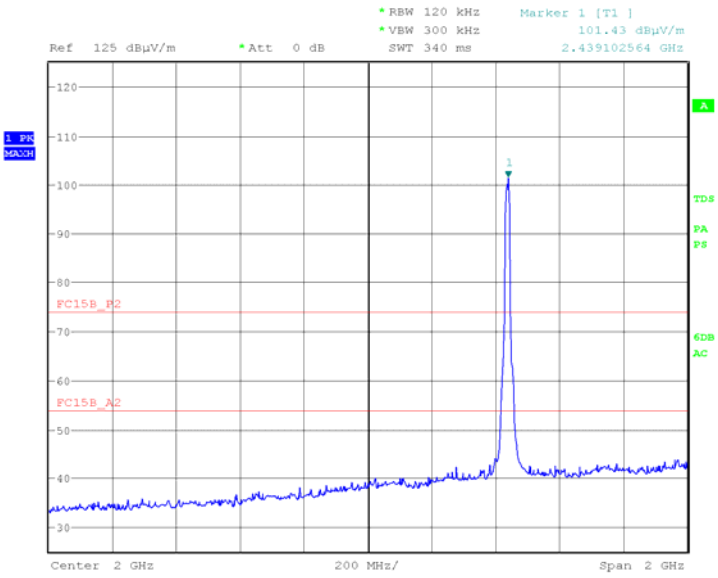
Configuration 2 - Mode 2

30 MHz to 1 GHz



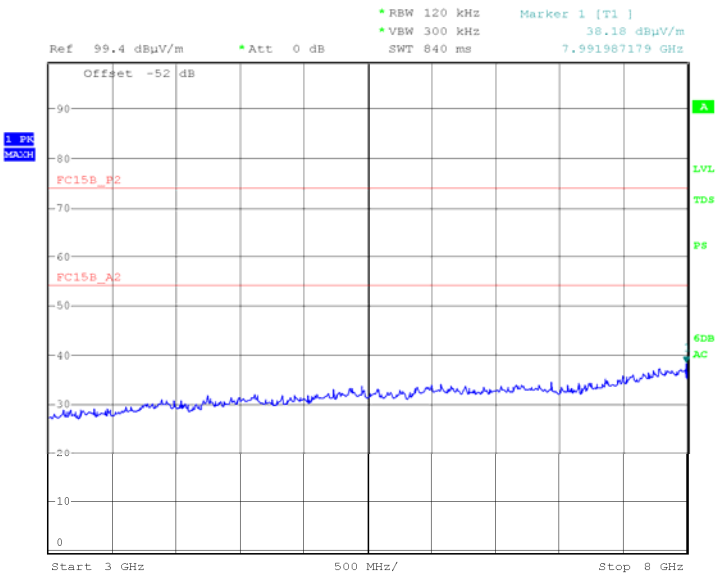
Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (deg)	Height (m)	Polarity
30.097	30.0	31.6	40.0	100	-10.0	68.4	90	1.00	Horizontal
31.407	29.4	29.5	40.0	100	-10.6	70.5	180	1.00	Horizontal
712.783	31.1	35.9	46.0	200	-14.9	164.1	0	1.00	Vertical
759.586	32.3	41.2	46.0	200	-13.7	158.8	270	1.00	Horizontal
818.562	32.4	41.7	46.0	200	-13.6	158.3	0	1.00	Horizontal
881.854	32.8	43.7	46.0	200	-13.2	156.3	0	1.00	Vertical

1GHz to 3GHz



Date: 15.MAY.2011 10:38:53

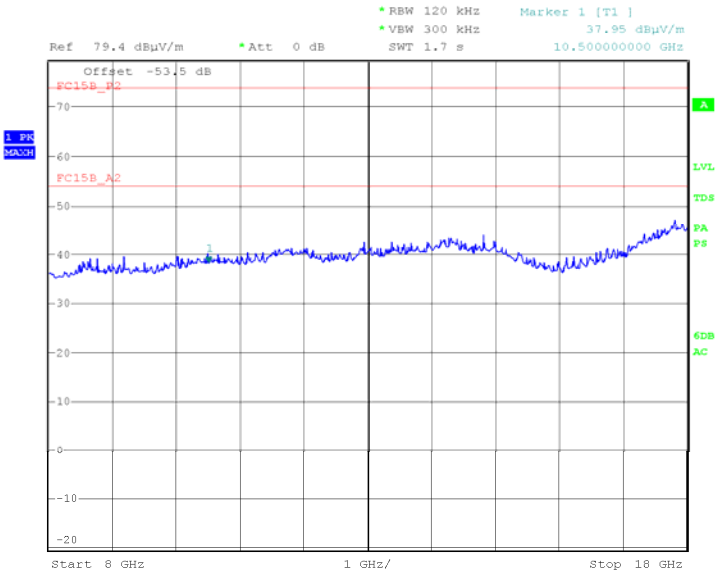
3GHz to 8GHz



Date: 29.MAY.2011 08:56:19

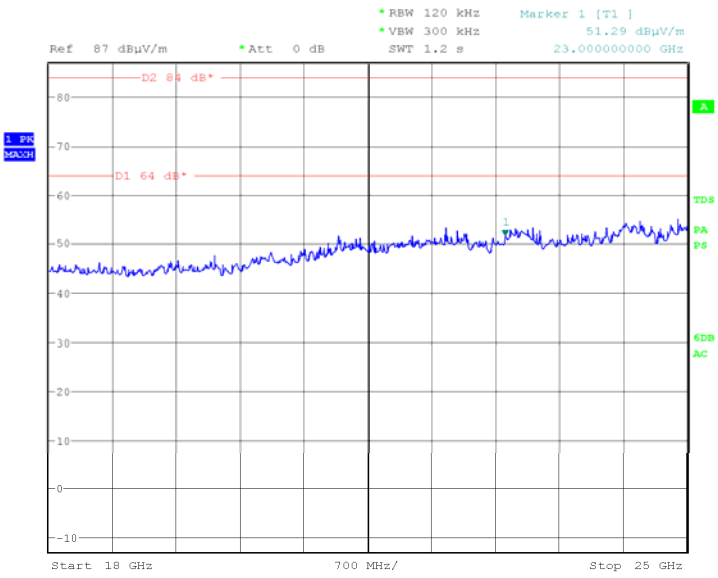
Product Service

8GHz to 18GHz



Date: 29.MAY.2011 09:48:01

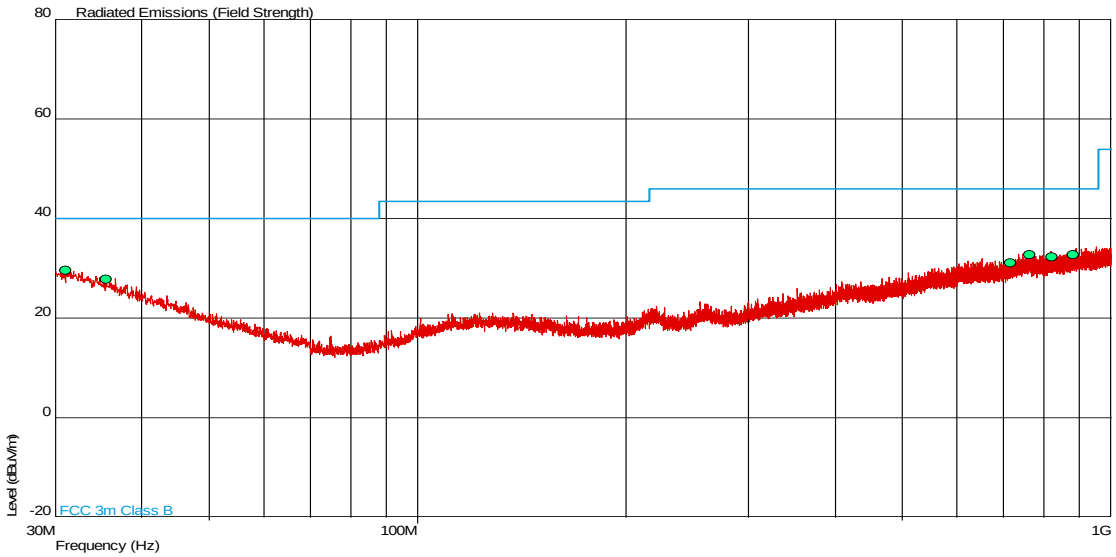
18GHz to 25GHz



Date: 1.JUN.2011 19:50:10

Configuration 2 - Mode 3

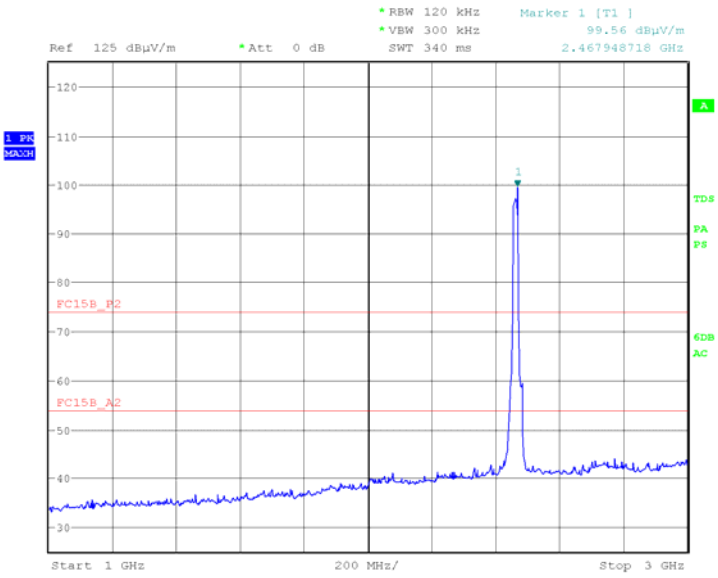
30 MHz to 1 GHz



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
31.116	29.6	30.2	40.0	100	-10.4	69.8	90	1.00	Vertical
35.529	27.8	24.5	40.0	100	-12.2	75.5	0	1.00	Vertical
716.954	31.2	36.3	46.0	200	-14.8	163.7	90	1.00	Horizontal
763.708	32.7	43.2	46.0	200	-13.3	156.8	270	1.00	Horizontal
822.733	32.4	41.7	46.0	200	-13.6	158.3	90	1.00	Horizontal
881.515	32.8	43.7	46.0	200	-13.2	156.3	180	1.00	Vertical

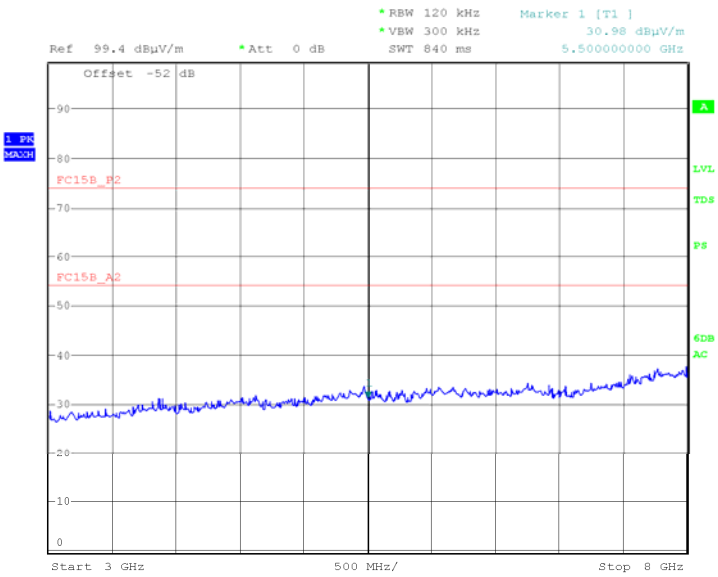
Product Service

1GHz to 3GHz



Date: 15.MAY.2011 09:46:43

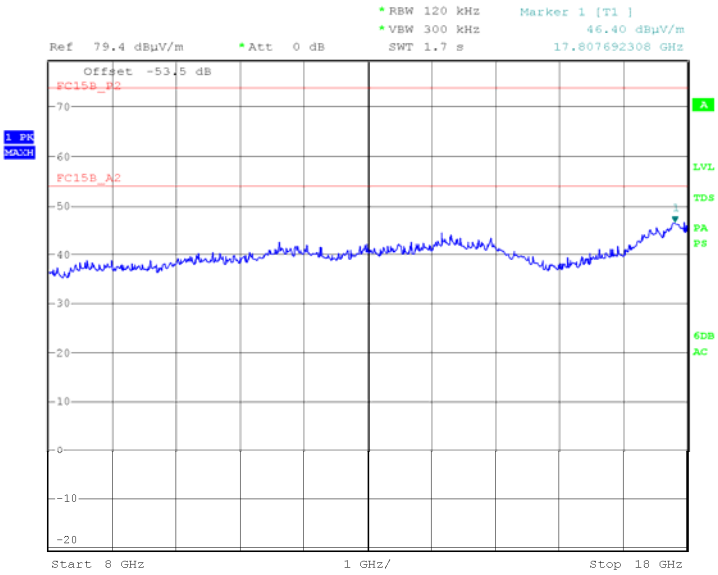
3GHz to 8GHz



Date: 29.MAY.2011 09:04:53

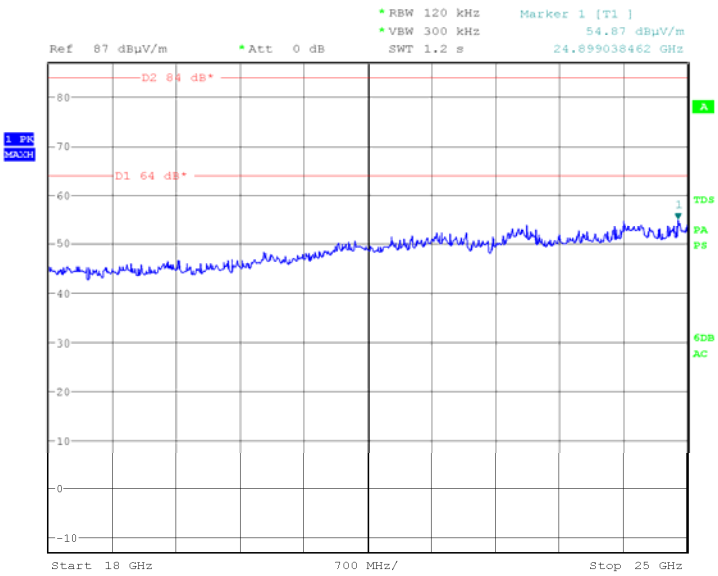
Product Service

8GHz to 18GHz



Date: 29.MAY.2011 09:29:18

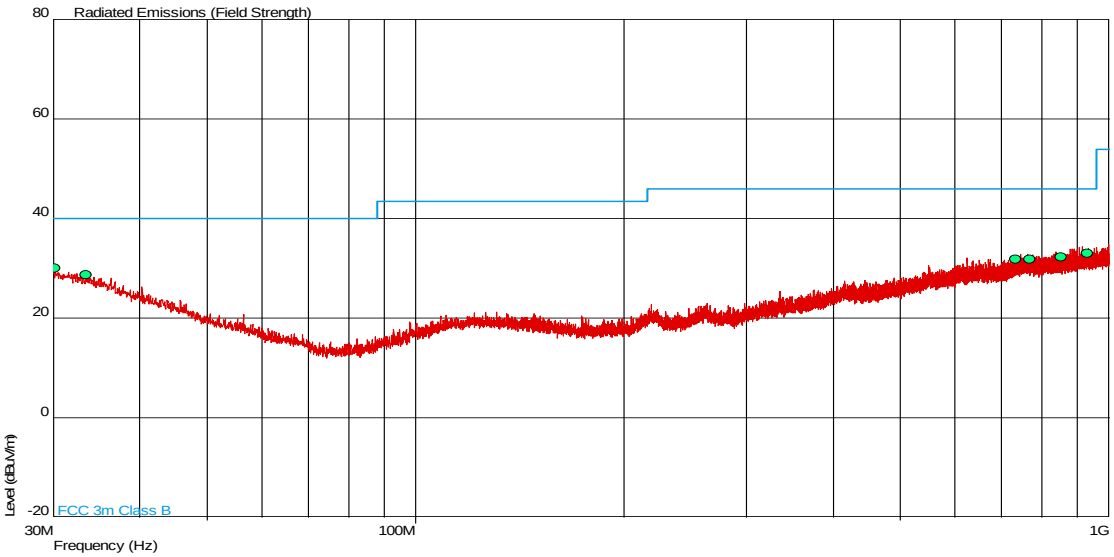
18GHz to 25GHz



Date: 1.JUN.2011 19:32:14

Configuration 3 - Mode 1

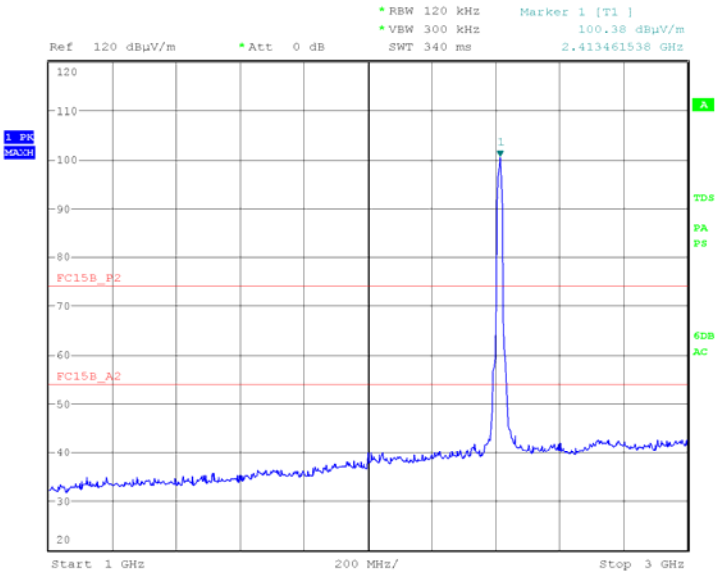
30 MHz to 1 GHz



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
30.194	30.1	32.0	40.0	100	-9.9	68.0	270	1.00	Horizontal
33.492	28.8	27.5	40.0	100	-11.2	72.5	180	1.00	Vertical
733.638	31.8	38.9	46.0	200	-14.2	161.1	180	1.00	Horizontal
768.461	31.9	39.4	46.0	200	-14.1	160.6	180	1.00	Vertical
851.639	32.4	41.7	46.0	200	-13.6	158.3	270	1.00	Vertical
929.045	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Horizontal

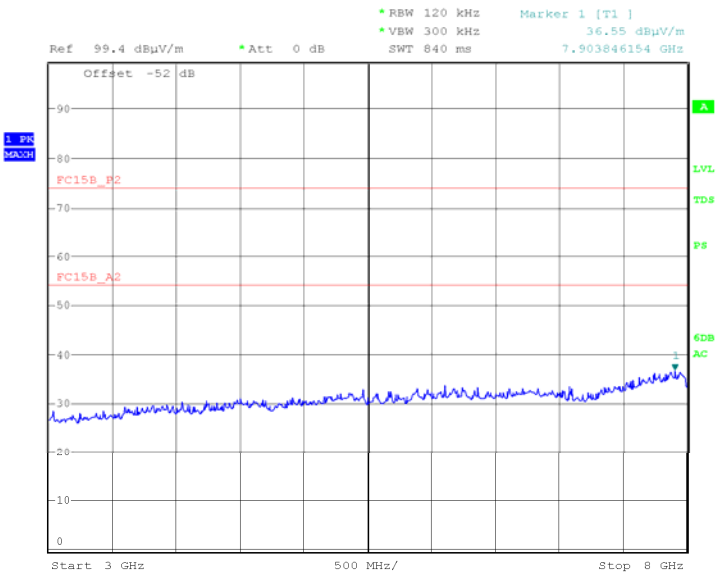
Product Service

1GHz to 3GHz



Date: 25.MAY.2011 19:24:36

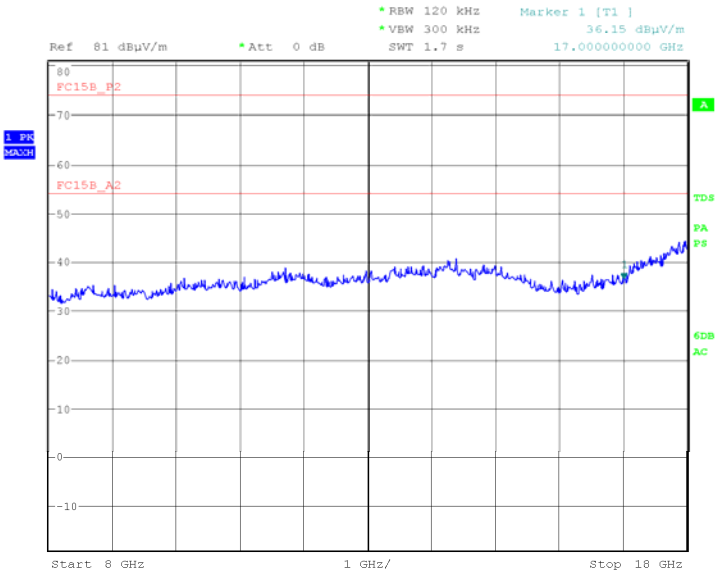
3GHz to 8GHz



Date: 25.MAY.2011 22:15:47

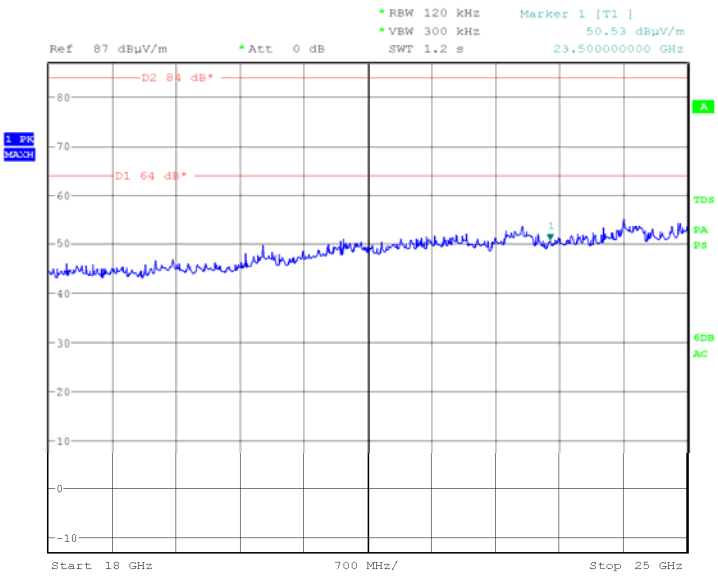
Product Service

8GHz to 18GHz



Date: 25.MAY.2011 23:36:08

18GHz to 25GHz

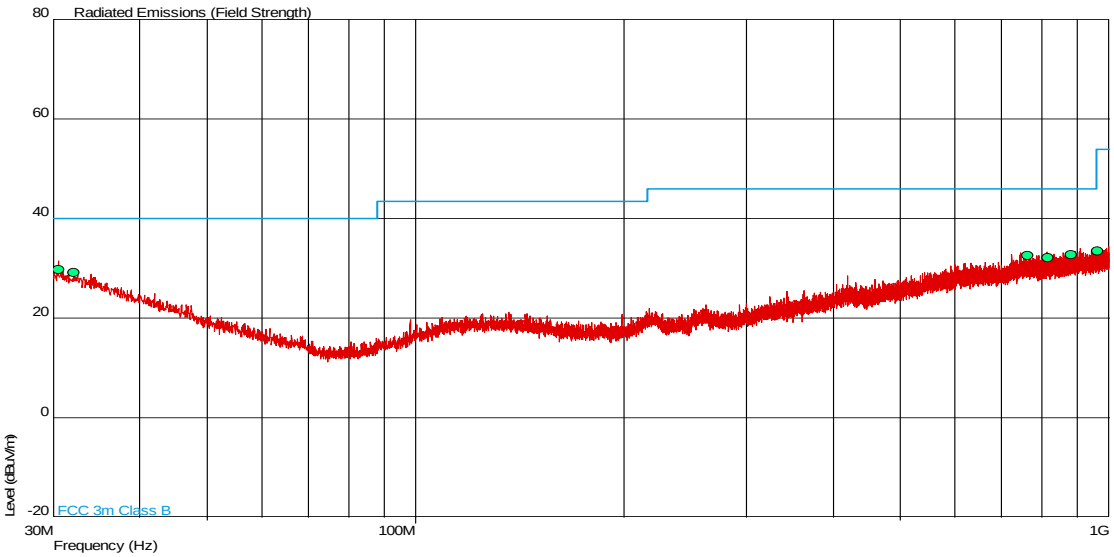


Date: 1.JUN.2011 20:55:57

Product Service

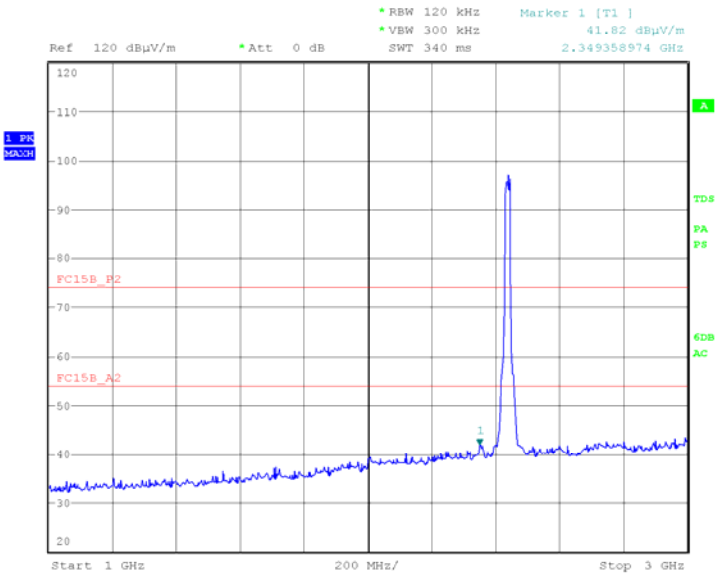
Configuration 3 - Mode 2

30 MHz to 1 GHz



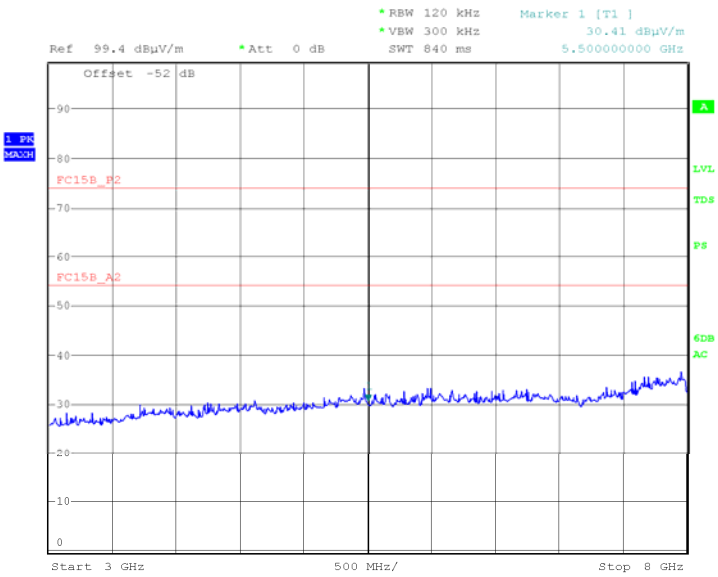
Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (deg)	Height (m)	Polarity
30.534	29.7	30.5	40.0	100	-10.3	69.5	180	1.00	Vertical
32.183	29.1	28.5	40.0	100	-10.9	71.5	0	1.00	Vertical
763.611	32.6	42.7	46.0	200	-13.4	157.3	0	1.00	Horizontal
815.070	32.2	40.7	46.0	200	-13.8	159.3	180	1.00	Horizontal
880.593	32.8	43.7	46.0	200	-13.2	156.3	0	1.00	Vertical
961.734	33.4	46.8	54.0	500	-20.6	453.2	180	1.00	Vertical

1GHz to 3GHz



Date: 25.MAY.2011 20:50:45

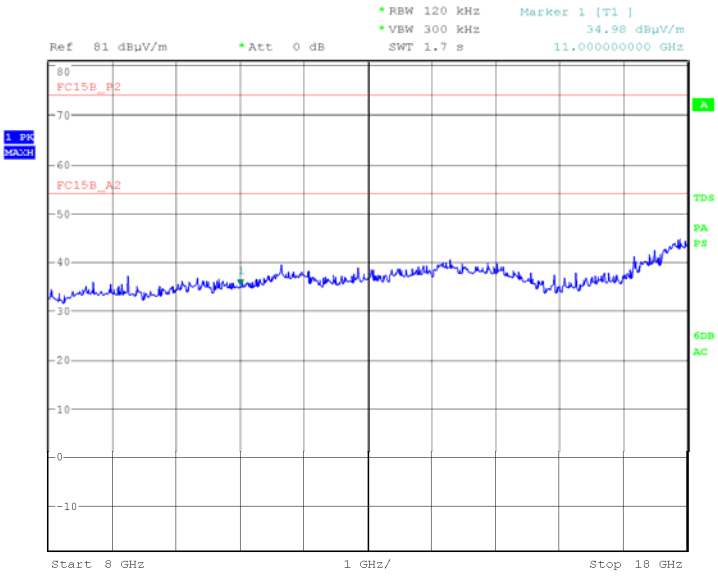
3GHz to 8GHz



Date: 25.MAY.2011 22:04:20

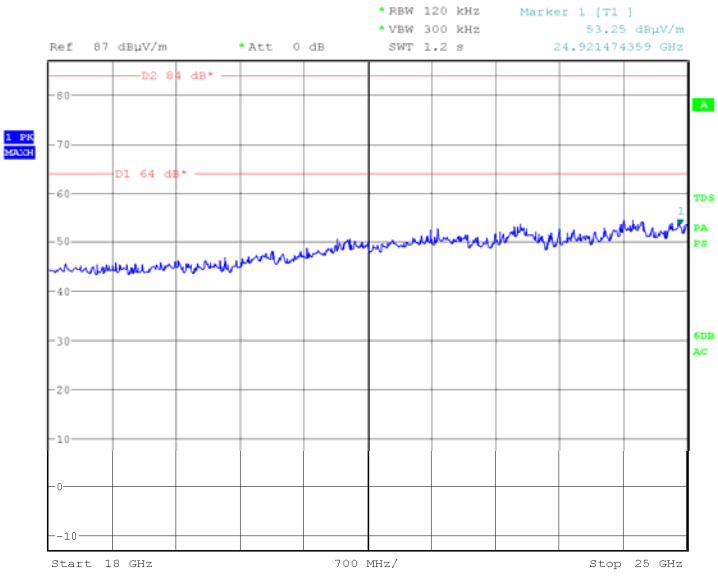
Product Service

8GHz to 18GHz



Date: 25.MAY.2011 23:23:54

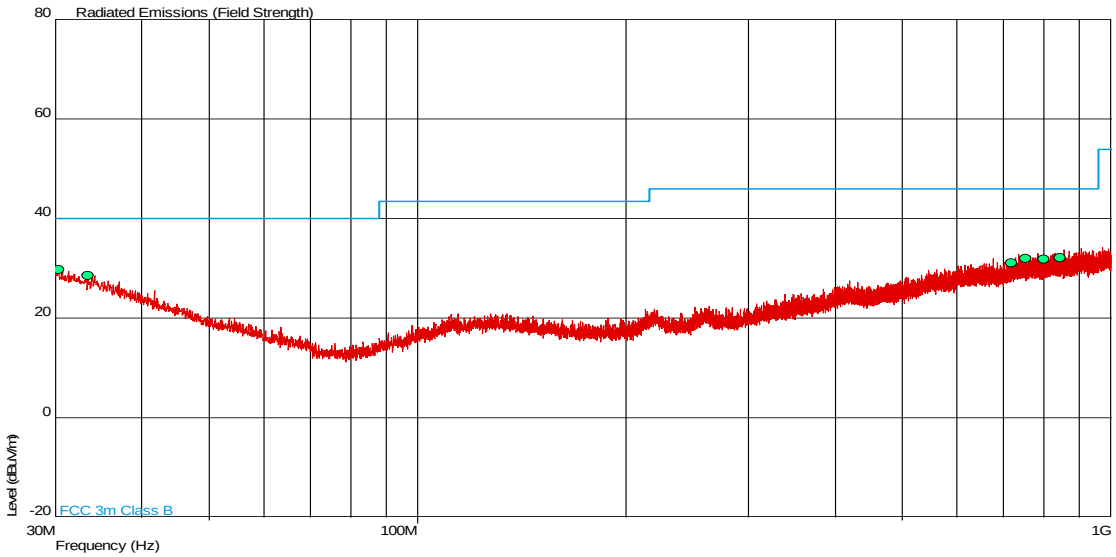
18GHz to 25GHz



Date: 1.JUN.2011 20:37:01

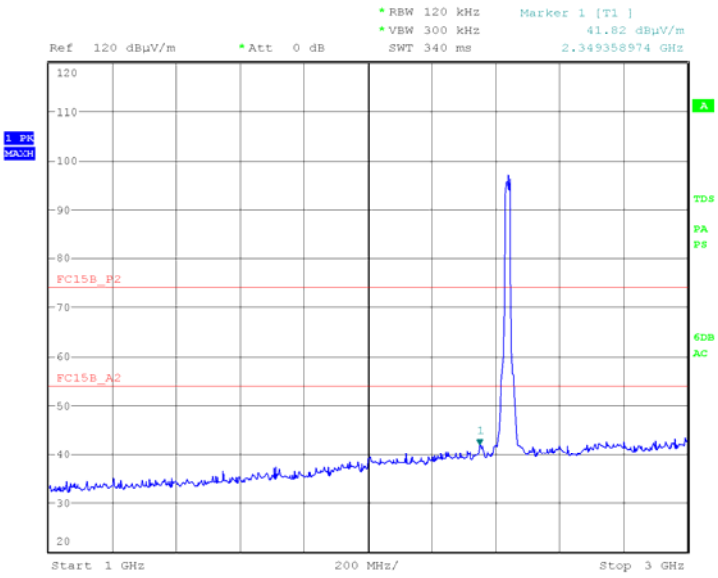
Configuration 3 - Mode 3

30 MHz to 1 GHz



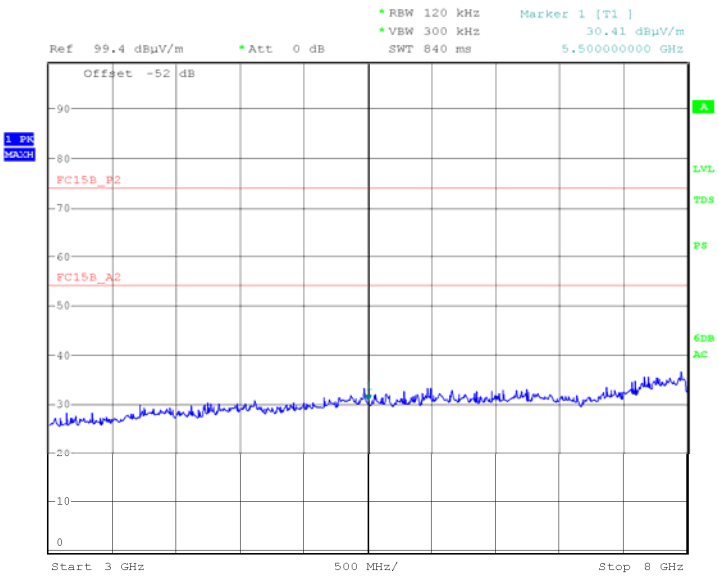
Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (deg)	Height (m)	Polarity
30.340	29.8	30.9	40.0	100	-10.2	69.1	0	1.00	Vertical
33.492	28.6	26.9	40.0	100	-11.4	73.1	180	1.00	Horizontal
718.506	31.1	35.9	46.0	200	-14.9	164.1	180	1.00	Vertical
751.777	32.0	39.8	46.0	200	-14.0	160.2	180	1.00	Vertical
799.889	31.8	38.9	46.0	200	-14.2	161.1	0	1.00	Horizontal
843.297	32.2	40.7	46.0	200	-13.8	159.3	180	1.00	Vertical

1GHz to 3GHz



Date: 25.MAY.2011 20:50:45

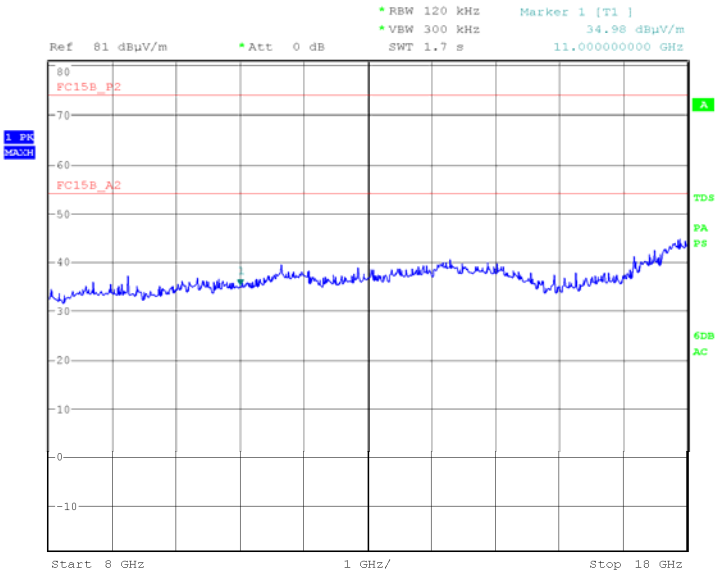
3GHz to 8GHz



Date: 25.MAY.2011 22:04:20

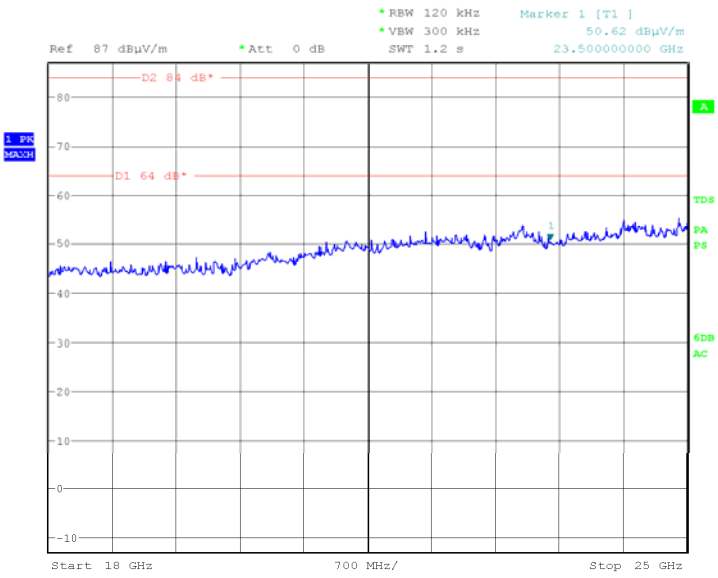
Product Service

8GHz to 18GHz



Date: 25.MAY.2011 23:23:54

18GHz to 25GHz



Date: 1.JUN.2011 20:21:22

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

CDMA SHI11, S/N: SSHFA001008

2.3.3 Date of Test and Modification State

11 May 2011 - Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.

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

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1	- Mode 1
	- Mode 2
	- Mode 3
Configuration 2	- Mode 1
	- Mode 2
	- Mode 3
Configuration 3	- Mode 1
	- Mode 2
	- Mode 3

2.3.6 Environmental Conditions

	11 May 2011
Ambient Temperature	21.4°C
Relative Humidity	51.1%

Product Service

2.3.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C for Maximum Peak Conducted Output Power.

The test results are shown below.

4.0 V DC Supply

Configuration 1 - Modes 1, 2 & 3

Modulation Data Rate (Mbps)	Maximum Peak Conducted Output Power					
	mW			dBm		
	2412 MHz	2437 MHz	2462 MHz	2412 MHz	2437 MHz	2462 MHz
1	80.16	66.41	76.54	19.04	18.22	18.83
2	67.39	69.81	82.42	18.29	18.43	19.16
5.5	66.38	75.41	84.51	18.22	18.77	19.31
11	68.69	73.64	85.69	18.37	18.67	19.33

Configuration 2 - Modes 1, 2 & 3

Modulation Data Rate (Mbps)	Maximum Peak Conducted Output Power					
	mW			dBm		
	2412 MHz	2437 MHz	2462 MHz	2412 MHz	2437 MHz	2462 MHz
6	111.90	123.91	137.21	20.49	20.92	21.37
9	113.02	122.65	138.01	20.53	20.89	21.39
12	106.07	121.79	138.15	20.26	20.86	21.40
18	110.13	120.07	128.95	20.42	20.79	21.10
24	115.73	125.20	144.80	20.63	20.98	21.61
36	114.91	127.84	144.81	20.60	21.00	21.16
48	112.20	126.16	130.66	20.50	21.10	21.61
54	114.54	126.79	143.14	20.59	21.03	21.56

Configuration 3 - Modes 1, 2 & 3

Modulation Data Rate (Mbps)	Maximum Peak Conducted Output Power					
	mW			dBm		
	2412 MHz	2437 MHz	2462 MHz	2412 MHz	2437 MHz	2462 MHz
6.5	112.75	119.99	141.02	20.52	20.79	21.49
13	114.06	123.10	137.82	20.57	20.90	21.39
19.5	106.18	120.59	139.03	20.26	20.81	21.43
26	104.36	117.07	131.24	20.19	20.68	21.18
39	105.97	118.94	128.23	20.25	20.75	21.08
52	109.62	123.33	134.34	20.44	20.91	21.28
58.5	108.17	121.48	130.94	20.34	20.84	21.17
65	107.88	11.23	124.28	20.33	20.76	21.53

Limit Clause

<1 watt.

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

CDMA SHI11, S/N: SSHFL000930 and SSHFC001122

2.4.3 Date of Test and Modification State

11 and 15 May 2011 - Modification State 0
25 May 2011 - Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of ANSI C63.4.

The EUT was placed on a remotely controlled turntable within a semi-anechoic chamber. Measurements of the carrier frequency from the EUT were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

The measurement was performed with a peak detector and the trace set to max hold using a Resolution and Video bandwidth of 1 MHz.

A substitution was then performed by replacing the EUT with a substitution antenna and signal generator. The signal generator level was increased to achieve the same raw result as the EUT. Cable loss and antenna gain was included to obtain the result.

A wideband power metre was then used to apply a correction factor to achieve the final result.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

Configuration 2 - Mode 1
- Mode 2
- Mode 3

Configuration 3 - Mode 1
- Mode 2
- Mode 3

Product Service

2.4.6 Environmental Conditions

	11 May 2011	15 May 2011	25 May 2011
Ambient Temperature	20.0°C	19.3°C	19.4°C
Relative Humidity	47.0%	35.0%	39.0%

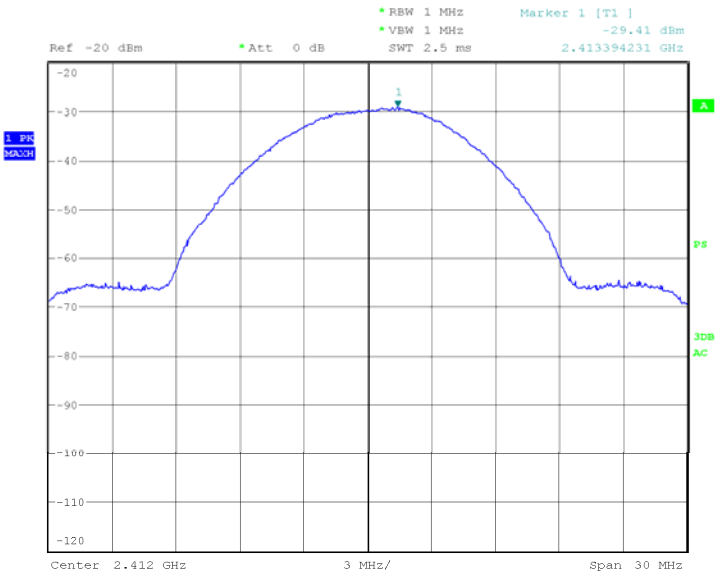
2.4.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C for EIRP Peak Power.

The test results are shown below.

Configuration 1 - Mode 1

Freq GHz	Result EIRP dBm	Limit EIRP dBm	Result EIRP mW	Limit EIRP mW
2.412	17.7	36.0	58.884	4000

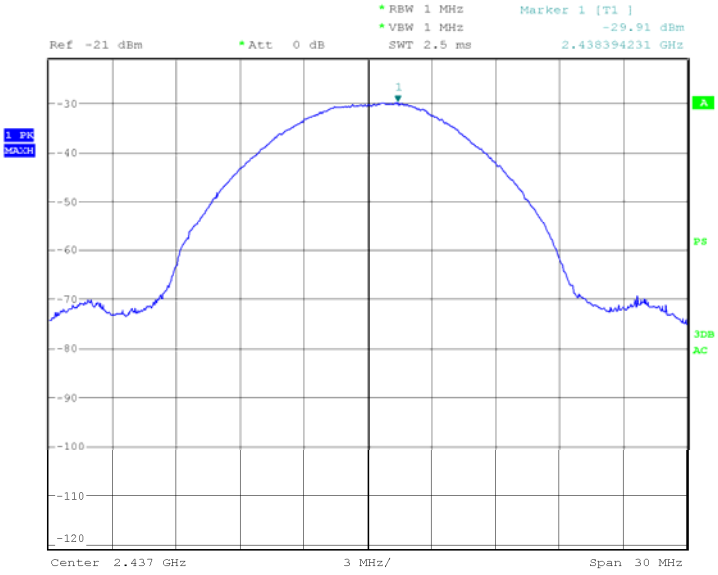


Date: 11.MAY.2011 17:21:23

Product Service

Configuration 1 - Mode 2

Freq GHz	Result EIRP dBm	Limit EIRP dBm	Result EIRP mW	Limit EIRP mW
2.437	16.4	36.0	43.652	4000

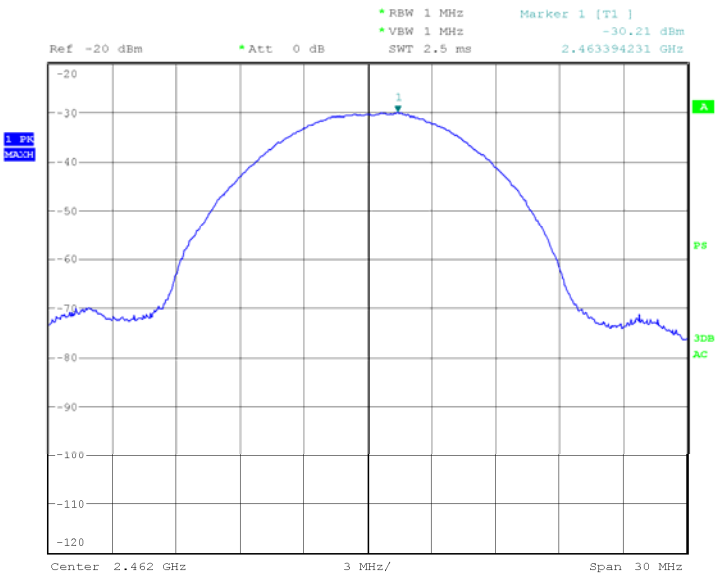


Date: 11.MAY.2011 17:46:39

Product Service

Configuration 1 - Mode 3

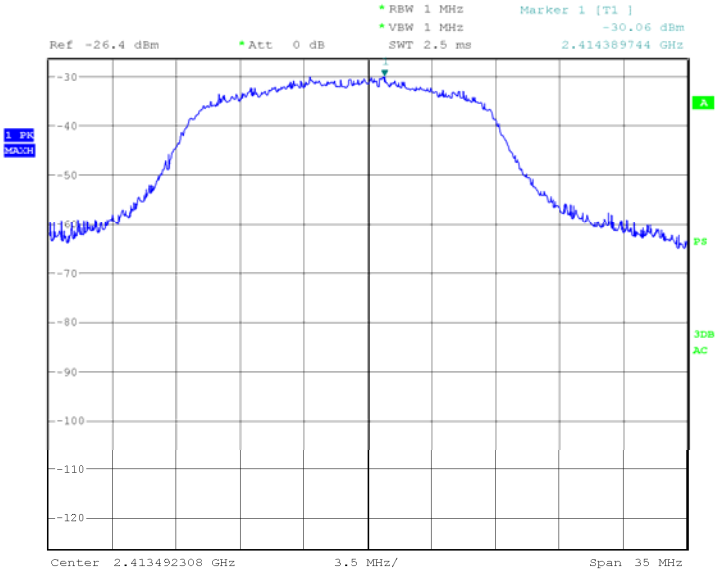
Freq GHz	Result EIRP dBm	Limit EIRP dBm	Result EIRP mW	Limit EIRP mW
2.462	16.3	36.0	42.658	4000



Date: 15.MAY.2011 07:42:16

Configuration 2 - Mode 1

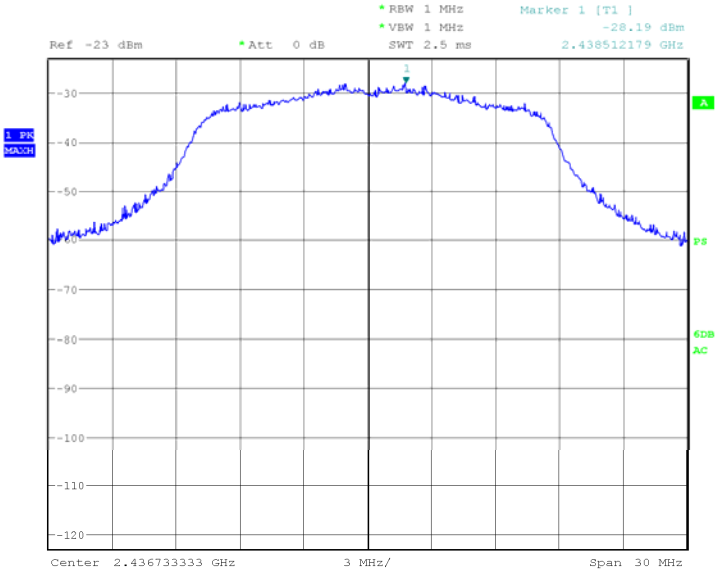
Freq GHz	Result EIRP dBm	Limit EIRP dBm	Result EIRP mW	Limit EIRP mW
2.412	21.6	36.0	144.544	4000



Product Service

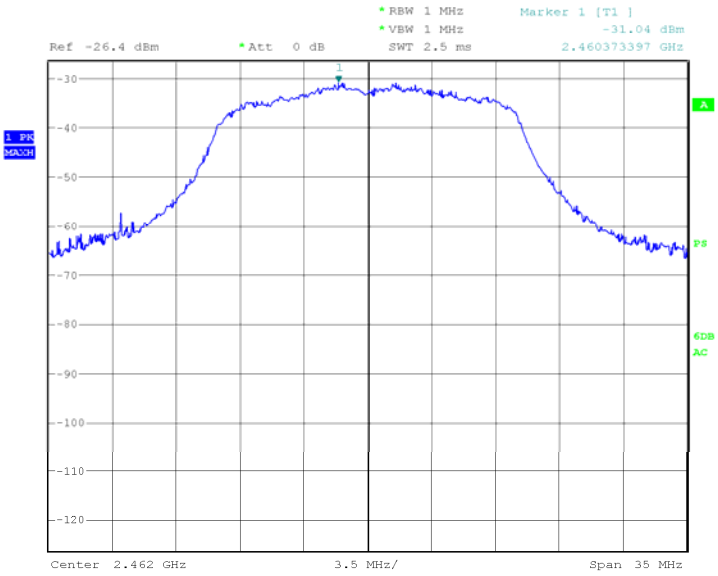
Configuration 2 - Mode 2

Freq GHz	Result EIRP dBm	Limit EIRP dBm	Result EIRP mW	Limit EIRP mW
2.437	22.7	36.0	186.209	4000



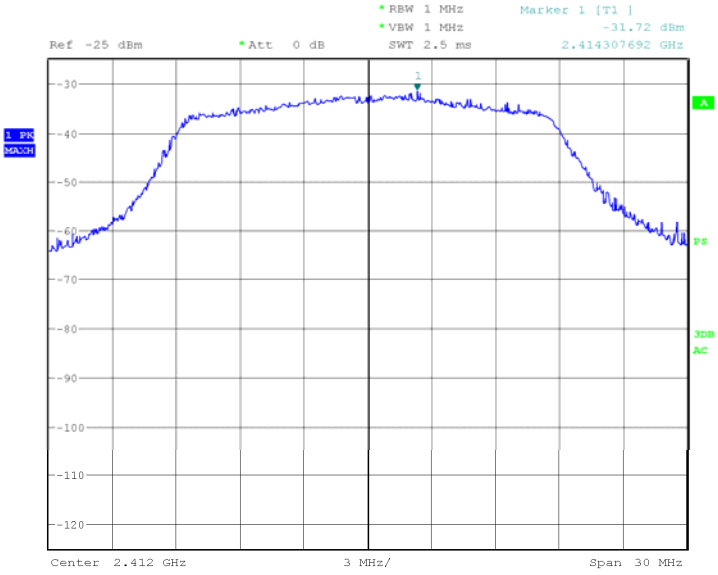
Configuration 2 - Mode 3

Freq GHz	Result EIRP dBm	Limit EIRP dBm	Result EIRP mW	Limit EIRP mW
2.462	20.1	36.0	102.329	4000



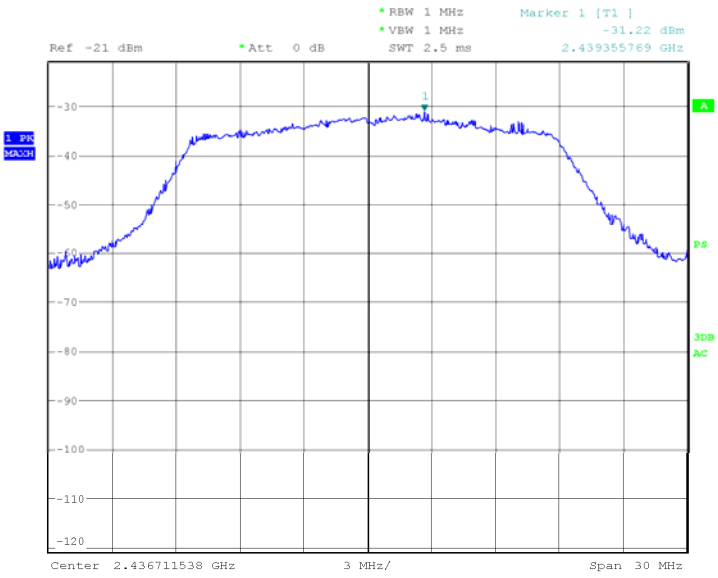
Configuration 3 - Mode 1

Freq GHz	Result EIRP dBm	Limit EIRP dBm	Result EIRP mW	Limit EIRP mW
2.412	16.2	36.0	41.687	4000



Configuration 3 - Mode 2

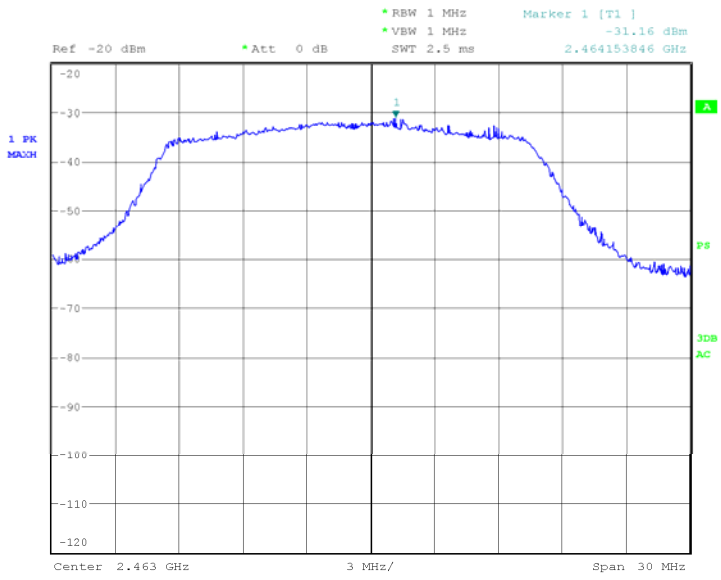
Freq GHz	Result EIRP dBm	Limit EIRP dBm	Result EIRP mW	Limit EIRP mW
2.437	7.3	36.0	5.370	4000



Date: 25.MAY.2011 20:38:48

Configuration 3 - Mode 3

Freq GHz	Result EIRP dBm	Limit EIRP dBm	Result EIRP mW	Limit EIRP mW
2.462	17.5	36.0	56.234	4000



Date: 25.MAY.2011 18:48:54

2.5 SPURIOUS EMISSIONS

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test

CDMA SHI11, S/N: SSHFA00108

2.5.3 Date of Test and Modification State

10 June 2011 - Modification State 0

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 Method and Operating Modes

The test was applied in accordance with FCC CFR 47 Part 15.

In accordance with Part 15.247(d), the Spurious Conducted Emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9 kHz to 25 GHz. The EUT was set to transmit on full power. The resolution and video bandwidths were set to 100 kHz in accordance with Part 15.247. The spectrum analyser detector was set to Max Hold.

With the EUT transmitting at maximum power, the Spectrum Analyser was set to Max Hold and the fundamental peak measured in a RBW and VBW of 100 kHz. This level was used to determine the limit line as displayed on the plots of -20dBc.

The maximum path loss across each measurement band was used as the reference level offset to ensure worst case results.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1	- Mode 1
	- Mode 2
	- Mode 3
Configuration 2	- Mode 1
	- Mode 2
	- Mode 3
Configuration 3	- Mode 1
	- Mode 2
	- Mode 3

2.5.6 Environmental Conditions

	10 June 2011
Ambient Temperature	20.4°C
Relative Humidity	39.6%

Product Service

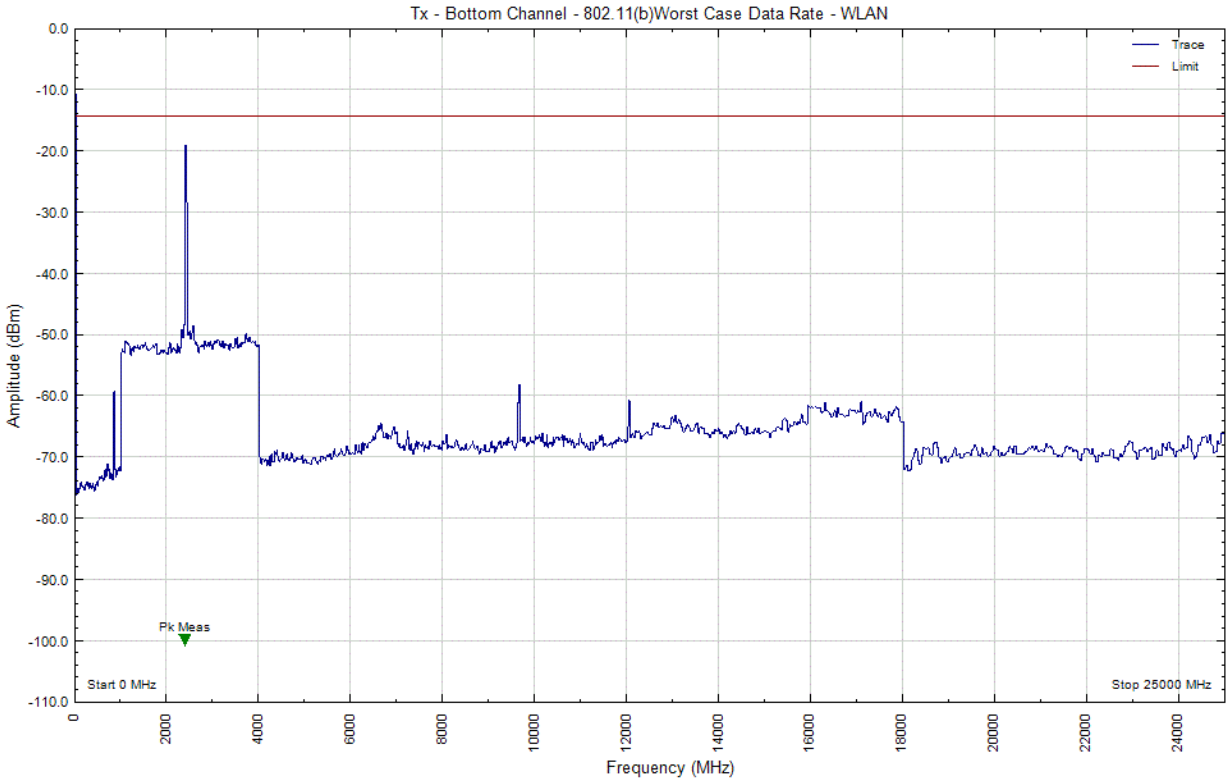
2.5.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C for Spurious Emissions.

The test results are shown below.

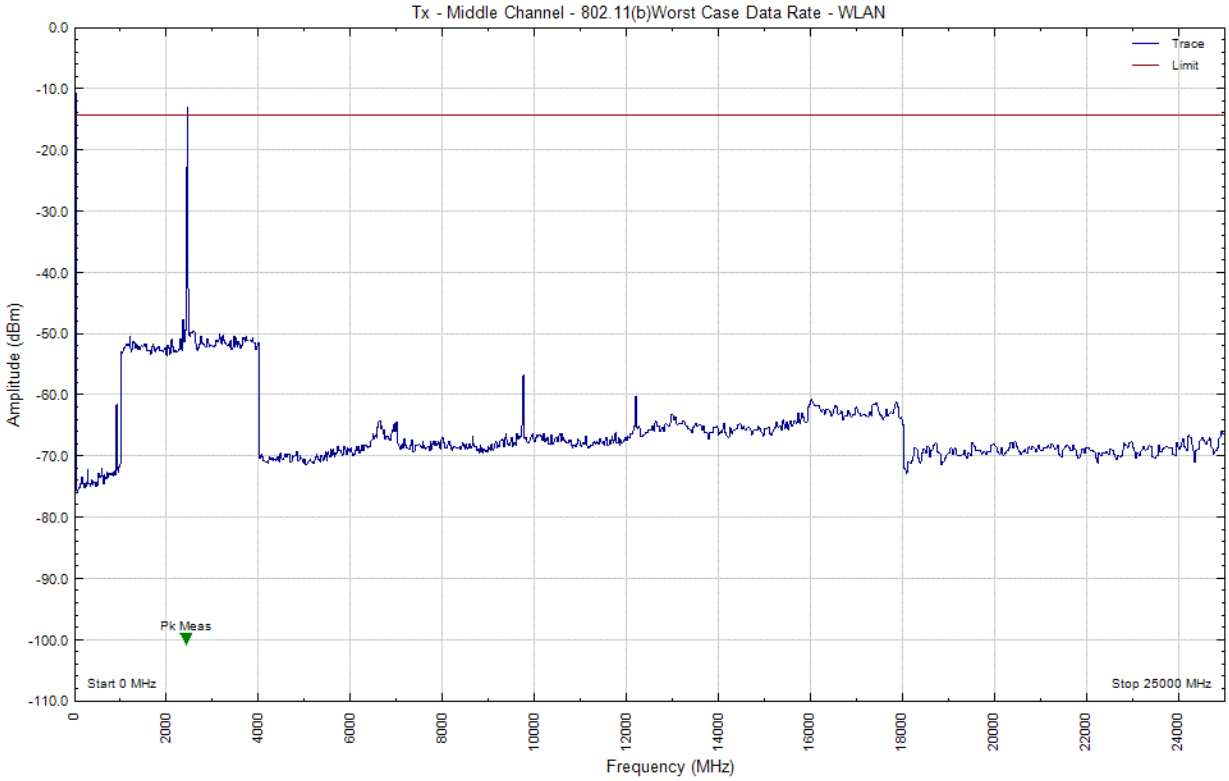
4.0 V DC Supply

Configuration 1 – Mode 1
802.11 (b)11 Mbps

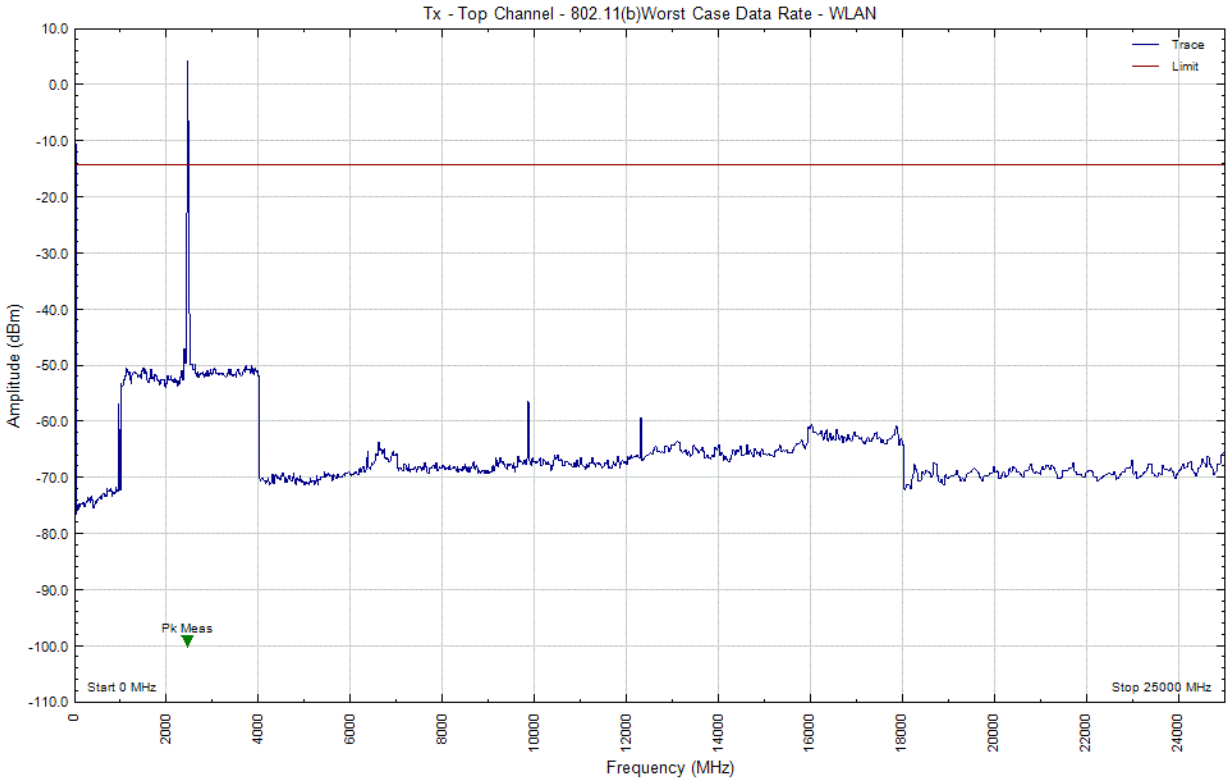


Product Service

Configuration 1 – Mode 2
802.11 (b)11 Mbps

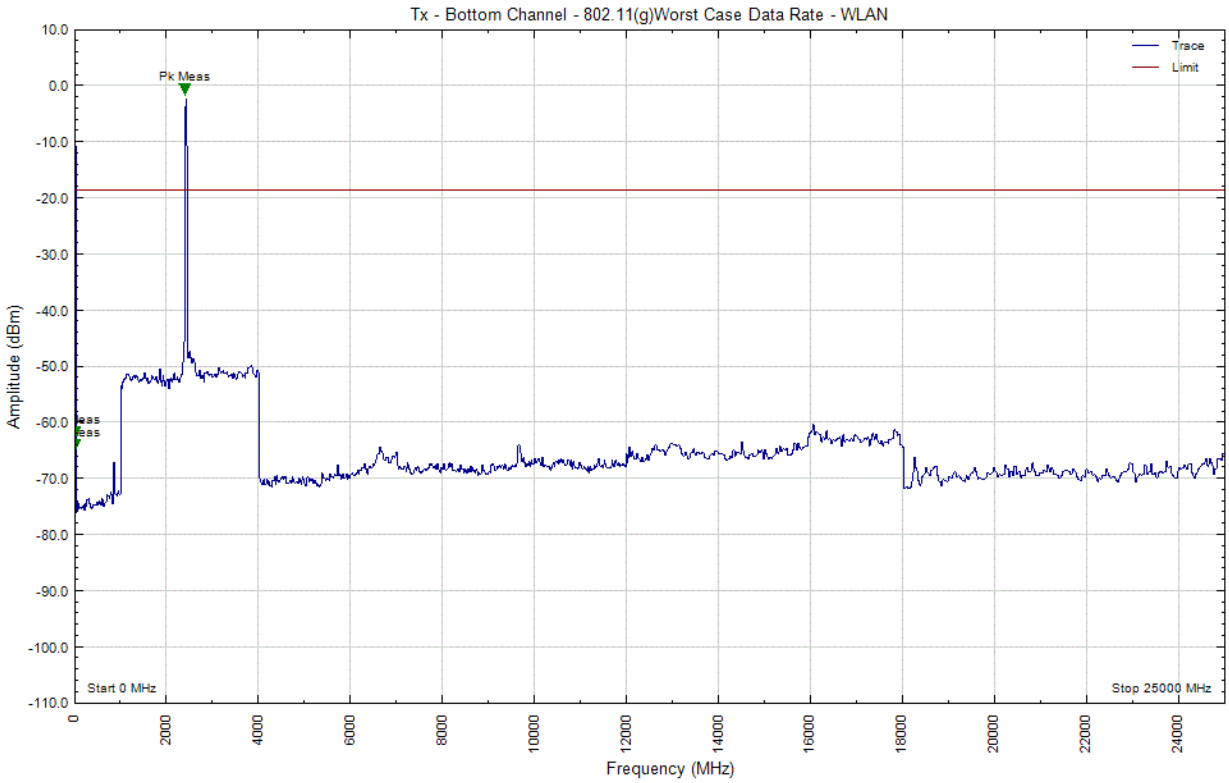


Configuration 1 – Mode 3
802.11 (b)11 Mbps

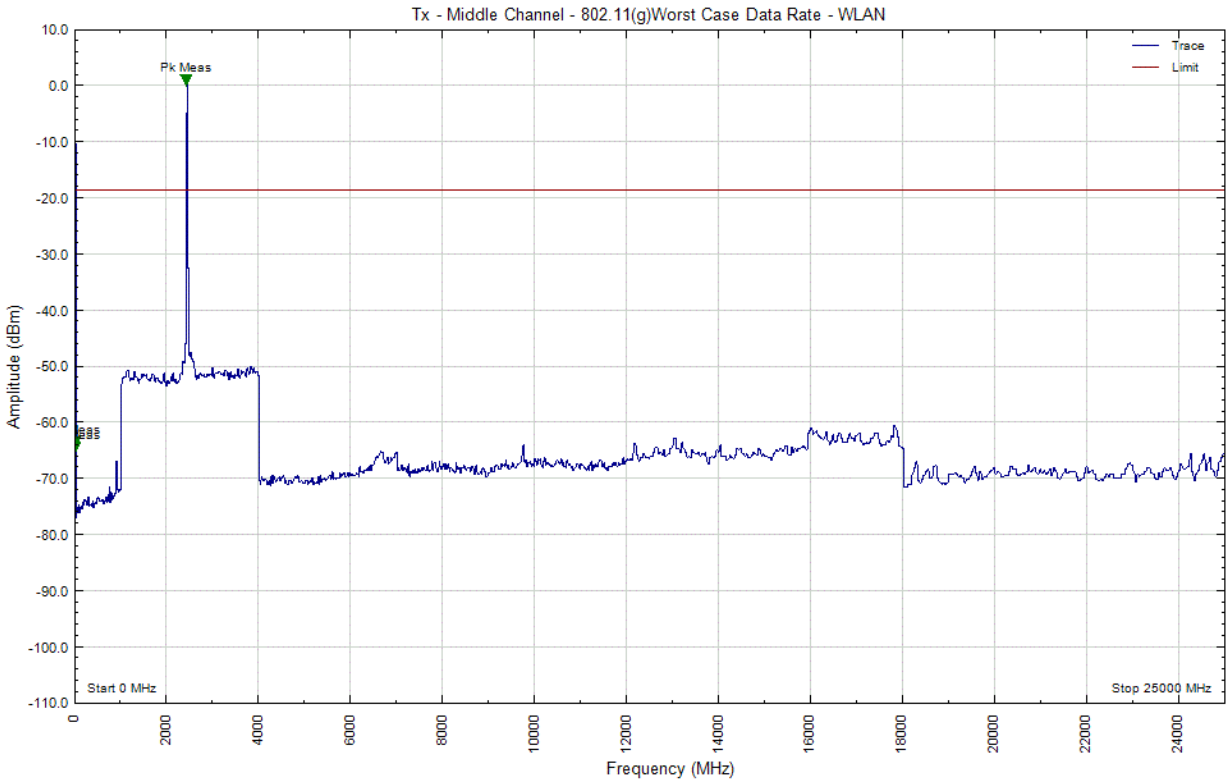


Product Service

Configuration 1 – Mode 1
802.11 (g)12 Mbps

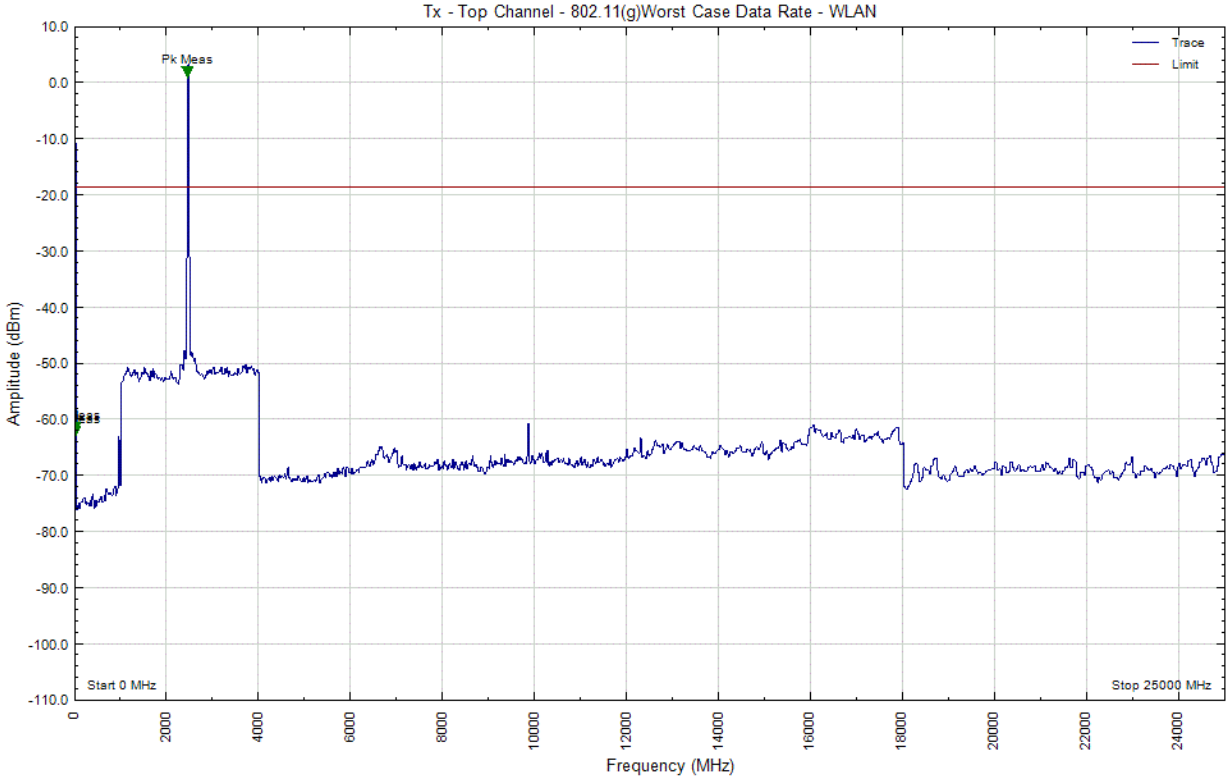


Configuration 1 – Mode 2
802.11 (g)12 Mbps

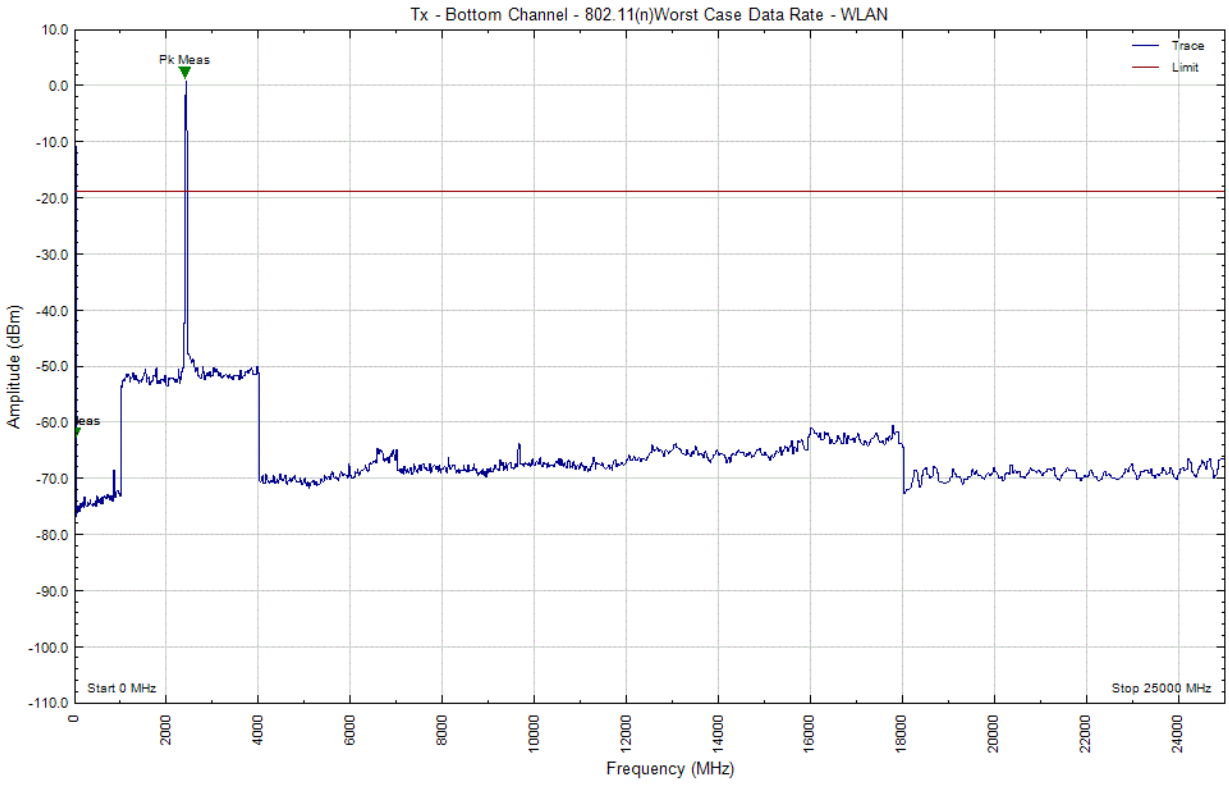


Product Service

Configuration 1 – Mode 3
802.11 (g)12 Mbps

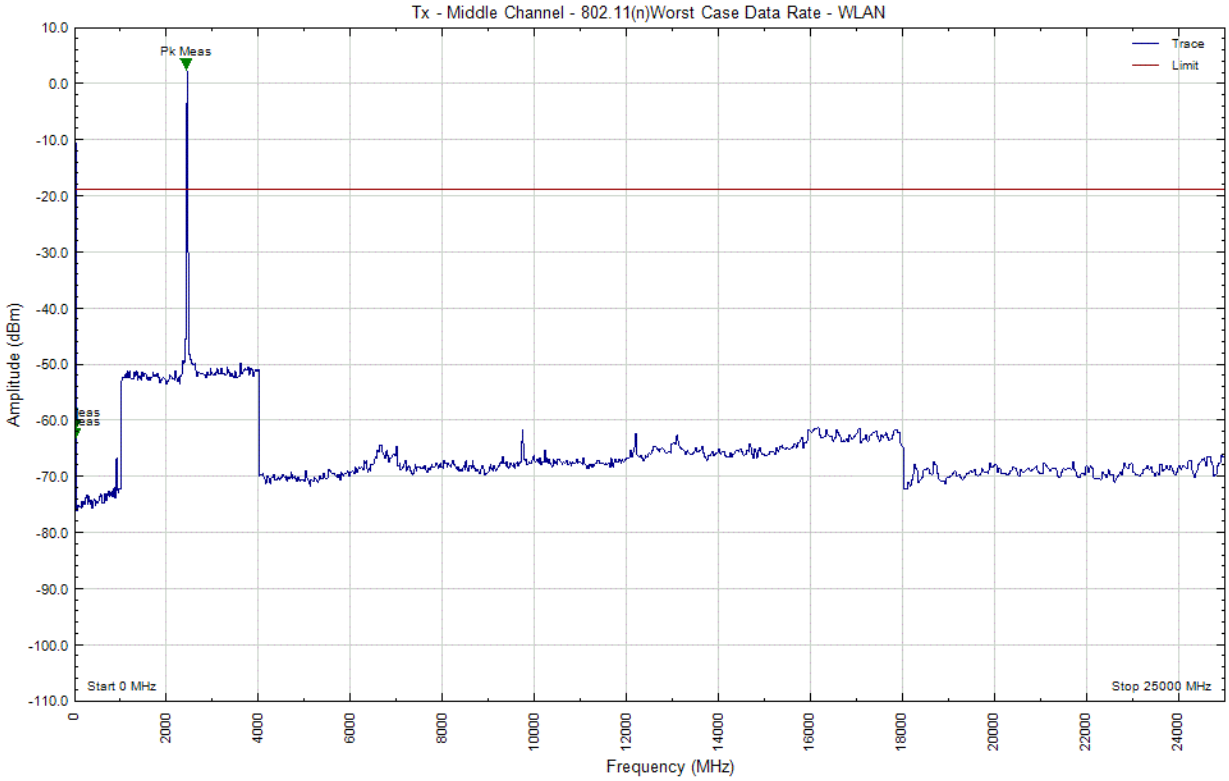


Configuration 1 – Mode 1
802.11 (n) 52 Mbps

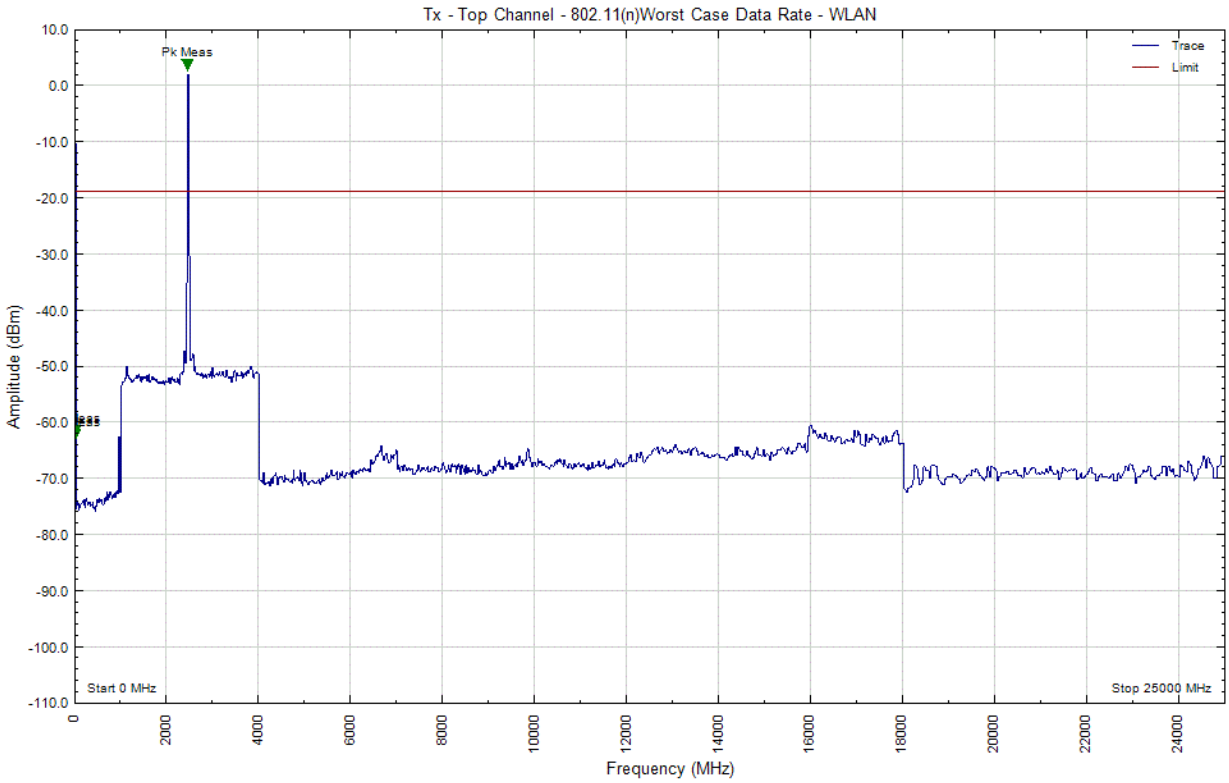


Product Service

Configuration 1 – Mode 1
802.11 (n) 52 Mbps



Configuration 1 – Mode 1
802.11 (n) 52 Mbps



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.

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

CDMA SHI11, S/N: SSHFA001008

2.6.3 Date of Test and Modification State

09 May 2011 - Modification State 0

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 Method and Operating Modes

The test was applied in accordance with FCC CFR 47 Part 15.

The EUT was connected to a spectrum analyser via a 10 dB attenuator. The path loss was measured between the EUT and the spectrum analyser and entered as a reference level offset. The trace was set to max hold and using a peak detector the maximum response was established. With the spectrum analyser RBW at 3 kHz and VBW at 10 kHz, the power spectral density in a 3 kHz bandwidth was measured.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1	- Mode 1
	- Mode 2
	- Mode 3
Configuration 2	- Mode 1
	- Mode 2
	- Mode 3
Configuration 3	- Mode 1
	- Mode 2
	- Mode 3

2.6.6 Environmental Conditions

	09 May 2011
Ambient Temperature	21.7°C
Relative Humidity	47.9%

2.6.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C for Power Spectral Density.

The test results are shown below.

4.0 V DC Supply

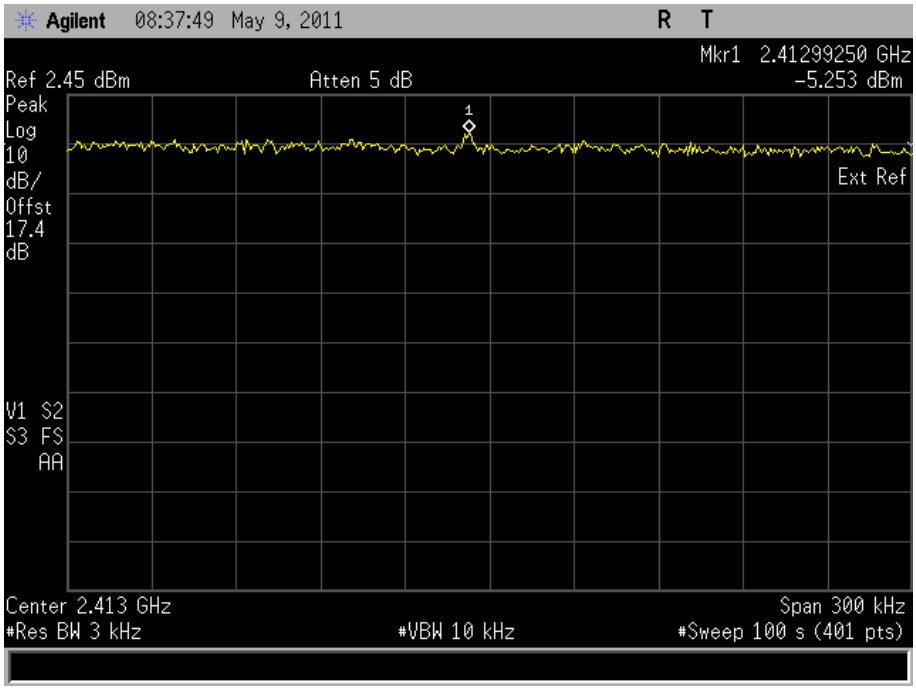
Configuration 1 – Modes 1, 2 and 3

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412	1	-5.25
	2	-5.61
	5	-7.44
	11	-7.36
2437	1	-4.53
	2	-5.61
	5	-7.40
	11	-6.50
2462	1	-4.61
	2	-5.26
	5	-5.61
	11	-6.06

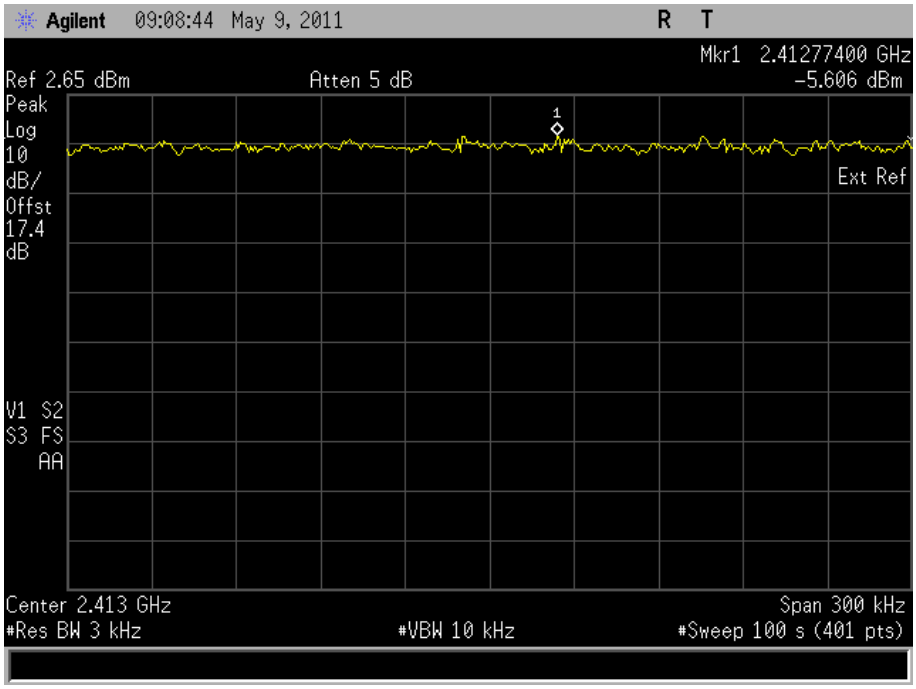
Product Service

2412 MHz

1 Mbps

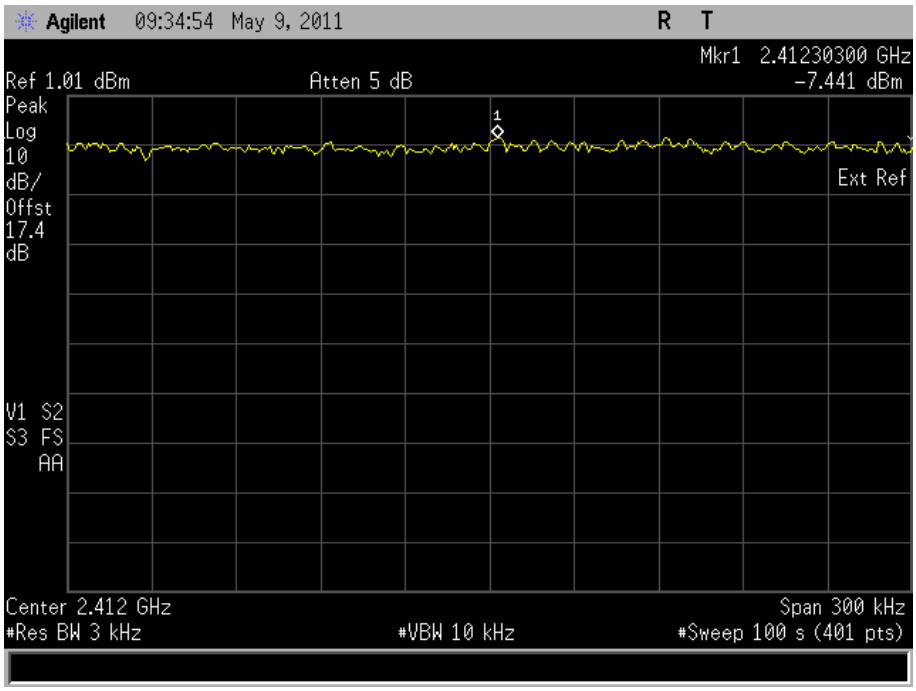


2 Mbps

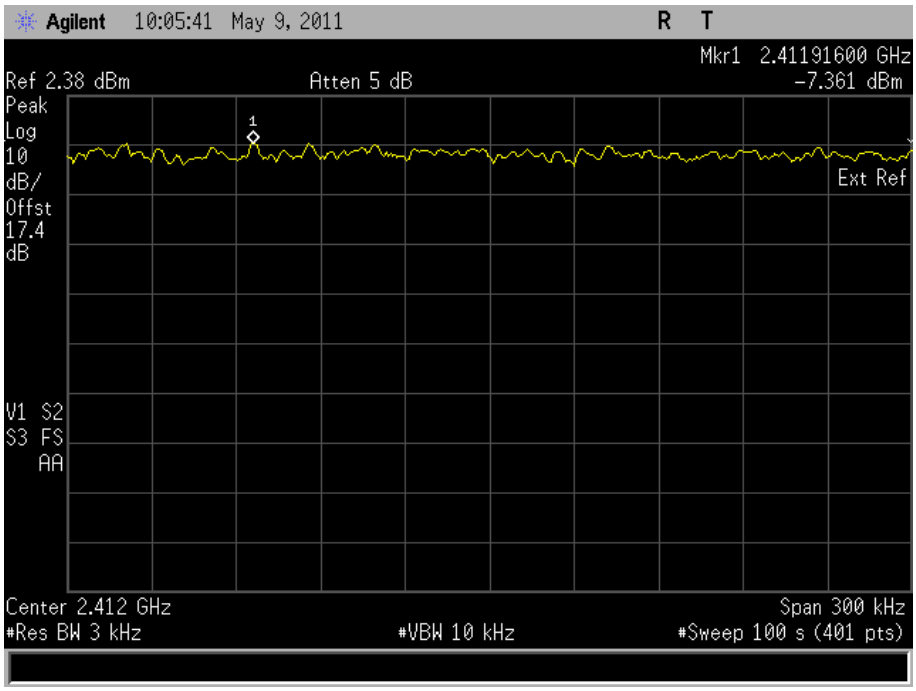


Product Service

5.5 Mbps



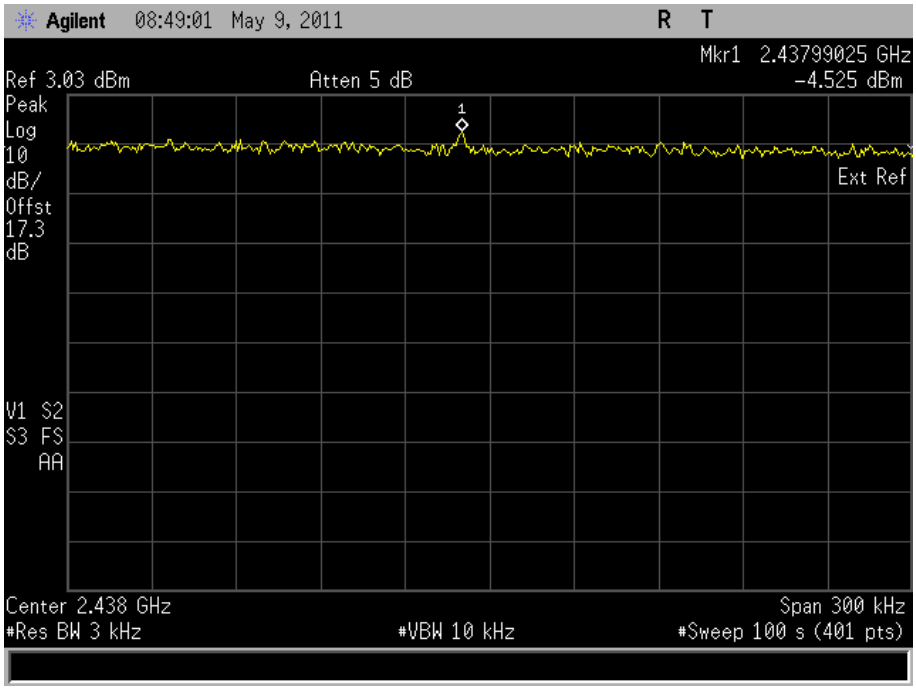
11 Mbps



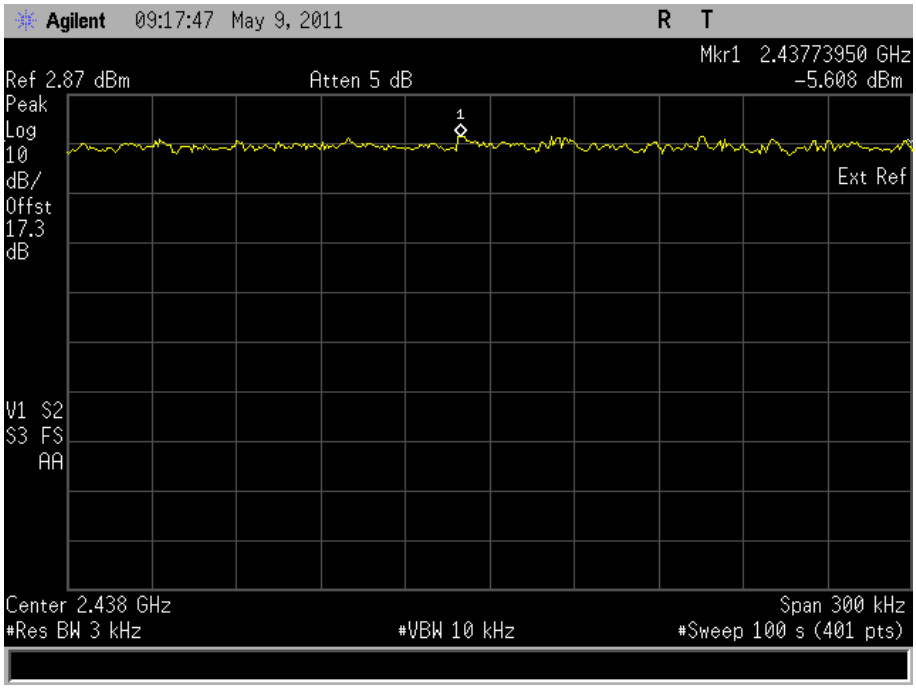
Product Service

2437 MHz

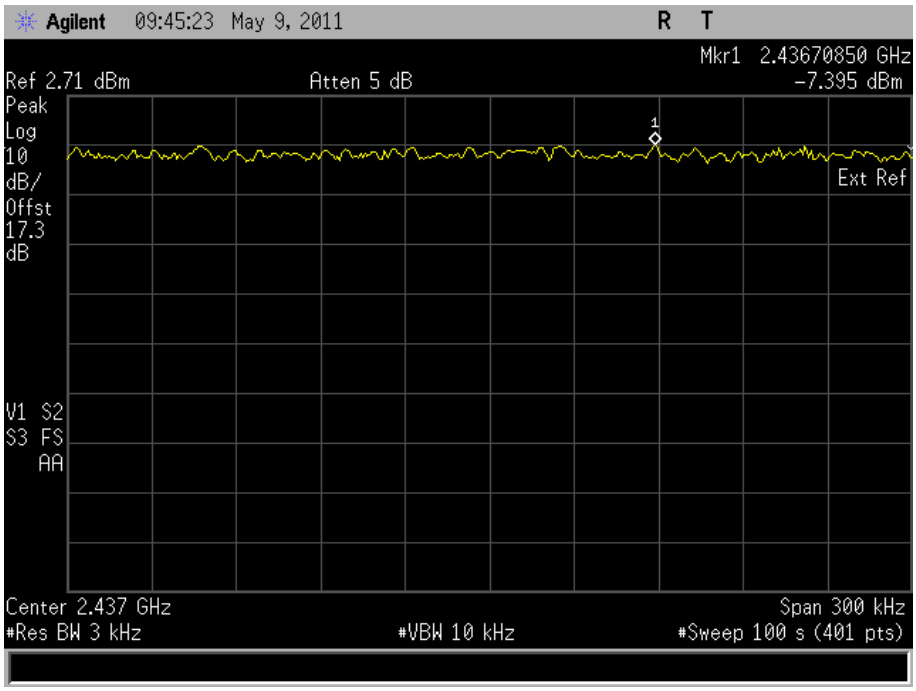
1 Mbps



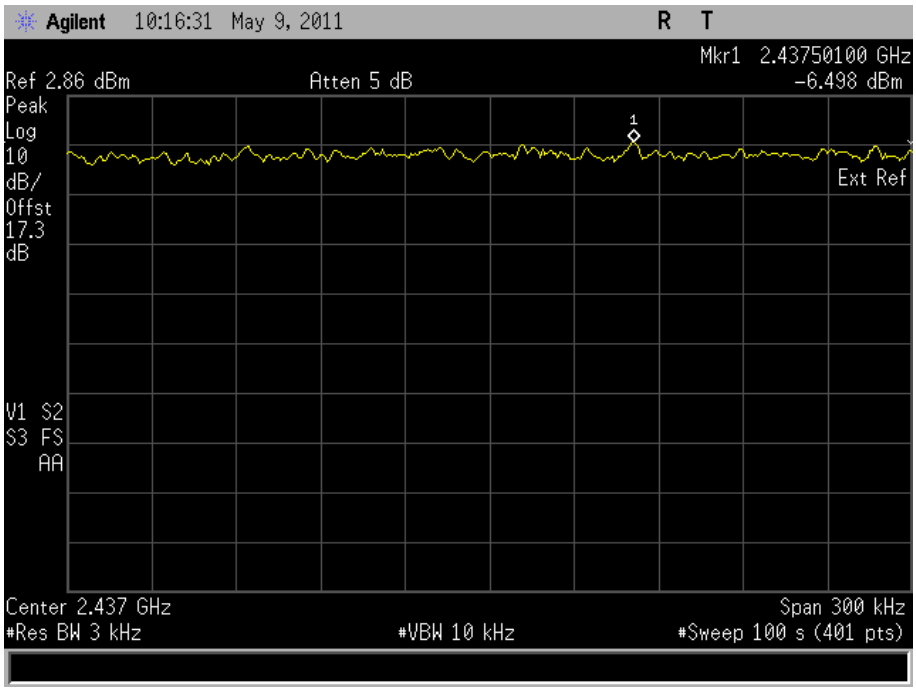
2 Mbps



5.5 Mbps



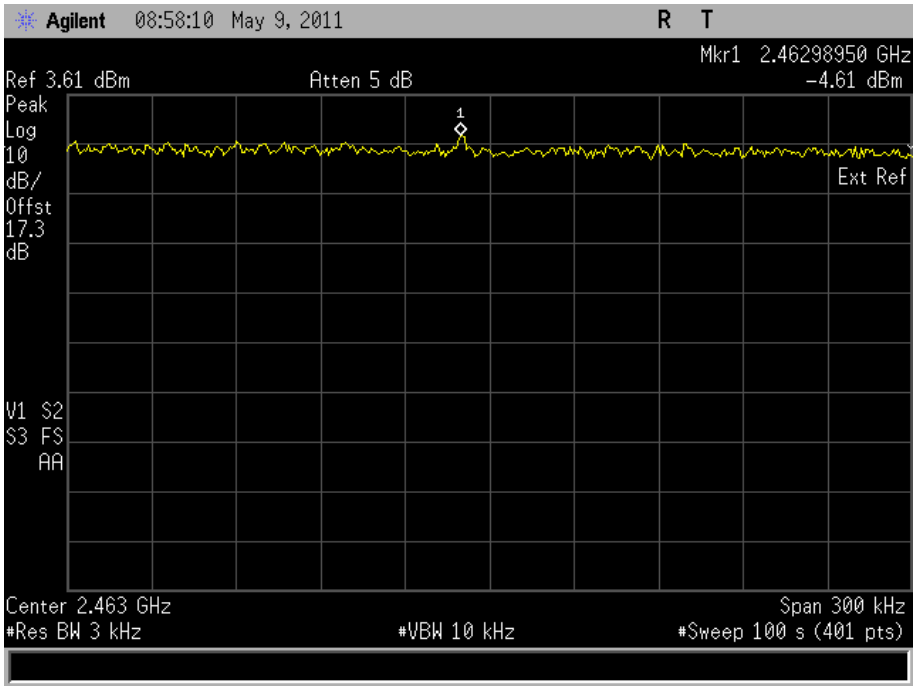
11 Mbps



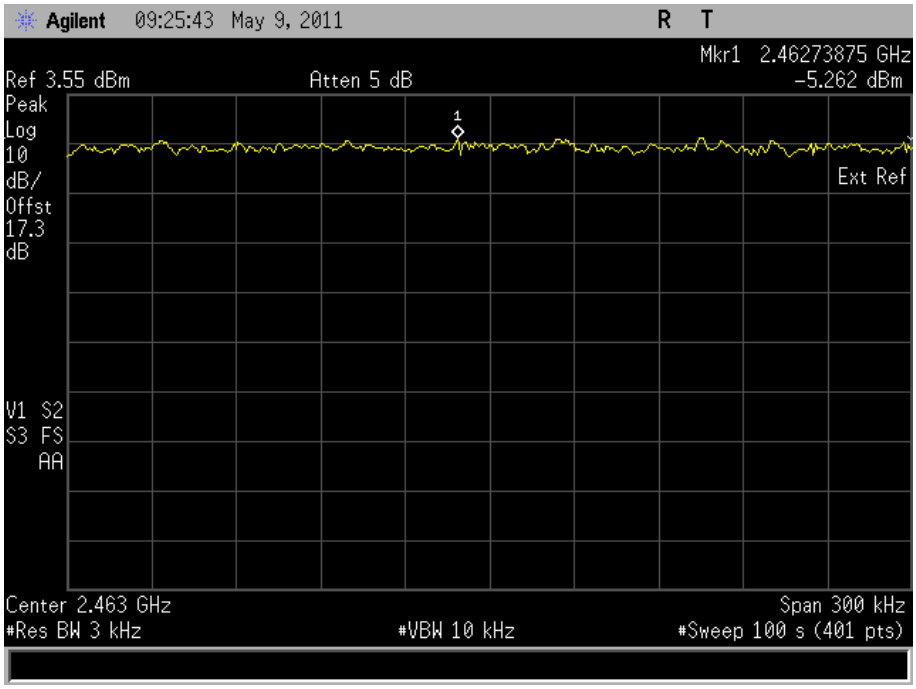
Product Service

2462 MHz

1 Mbps

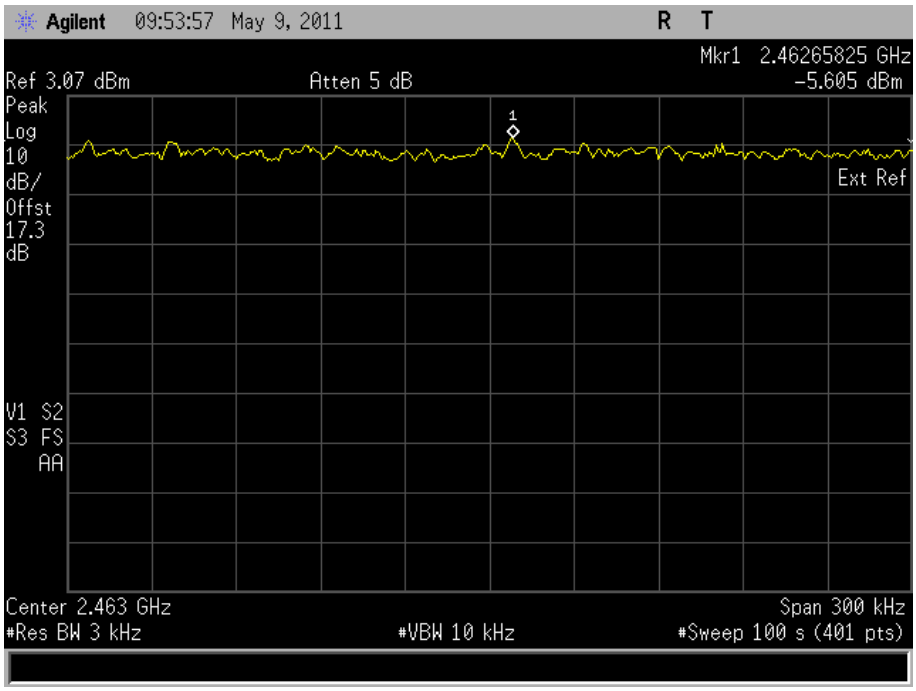


2 Mbps

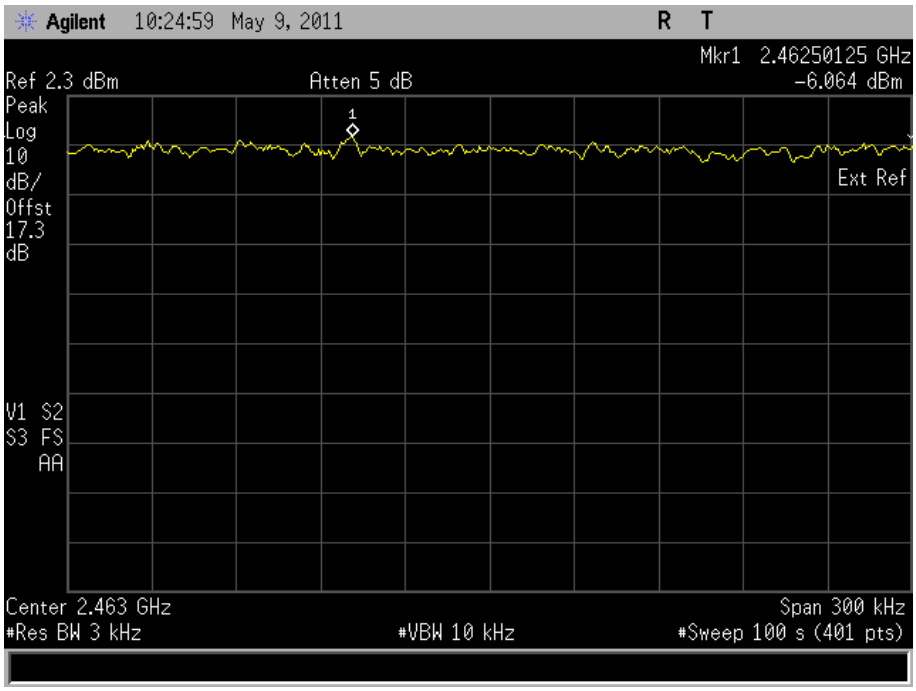


Product Service

5.5 Mbps



11 Mbps



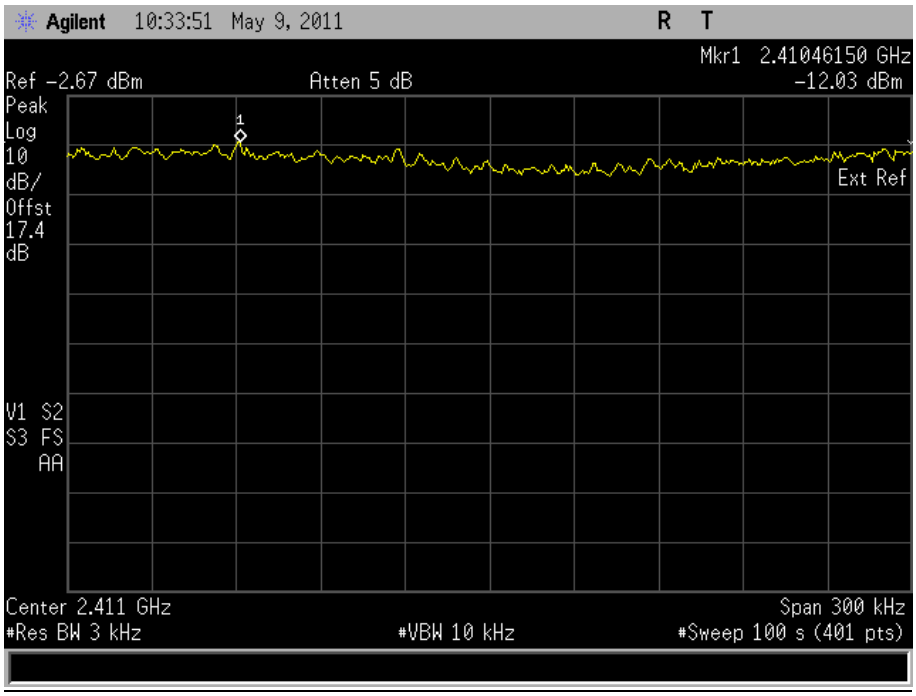
Configuration 2 – Modes 1, 2 and 3

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412	6	-12.04
	9	-11.80
	12	-13.97
	18	-11.46
	36	-12.47
	48	-11.16
	54	-11.24
2437	6	-11.19
	9	-11.07
	12	-10.64
	18	-11.26
	36	-11.97
	48	-10.83
	54	-10.80
2462	6	-11.16
	9	-11.78
	12	-13.68
	18	-10.84
	36	-11.28
	48	-10.49
	54	-10.78

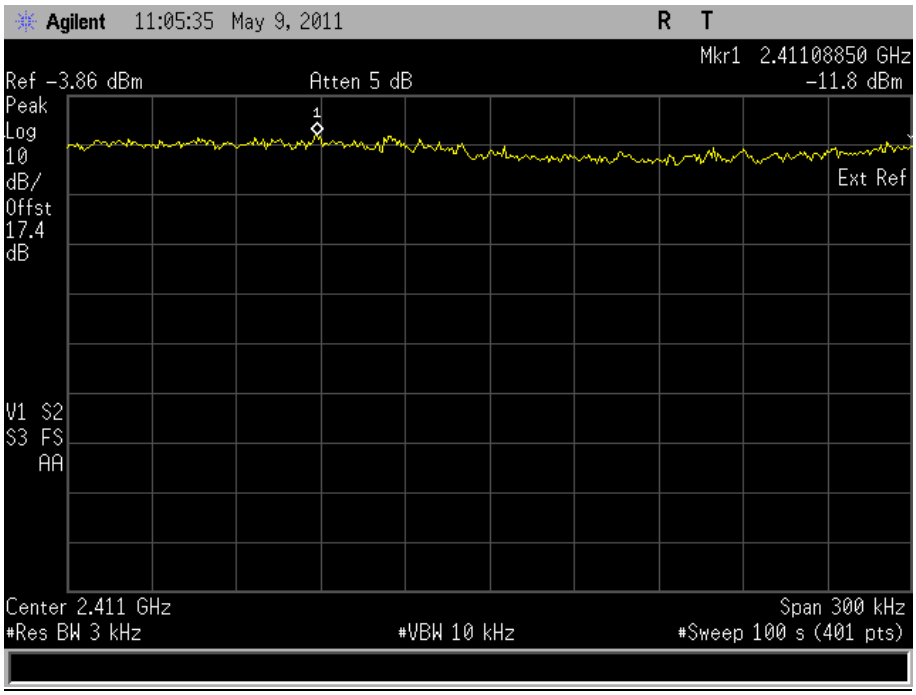
Product Service

2412 MHz

6 Mbps

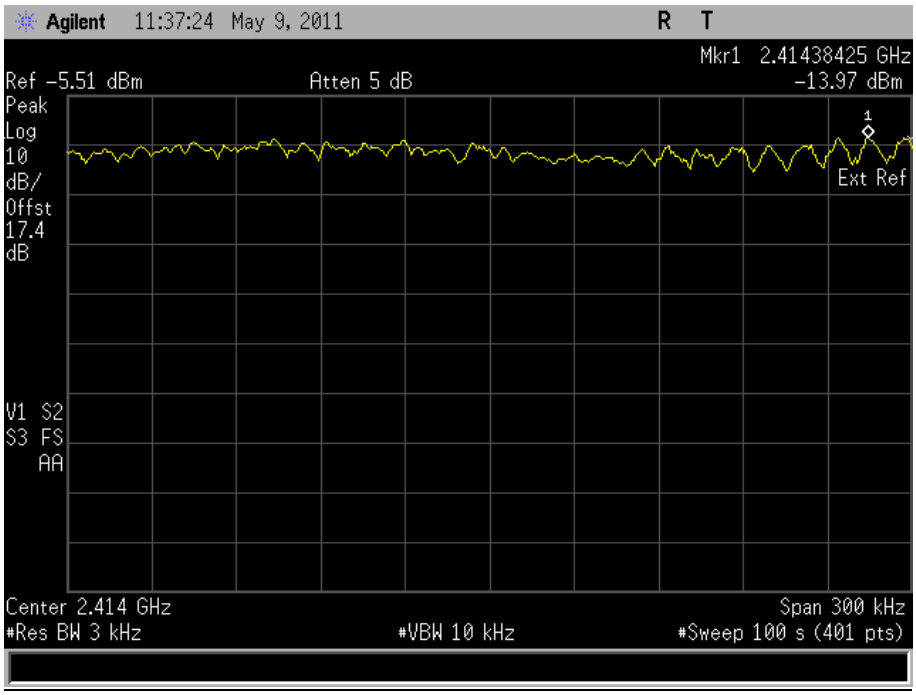


9 Mbps

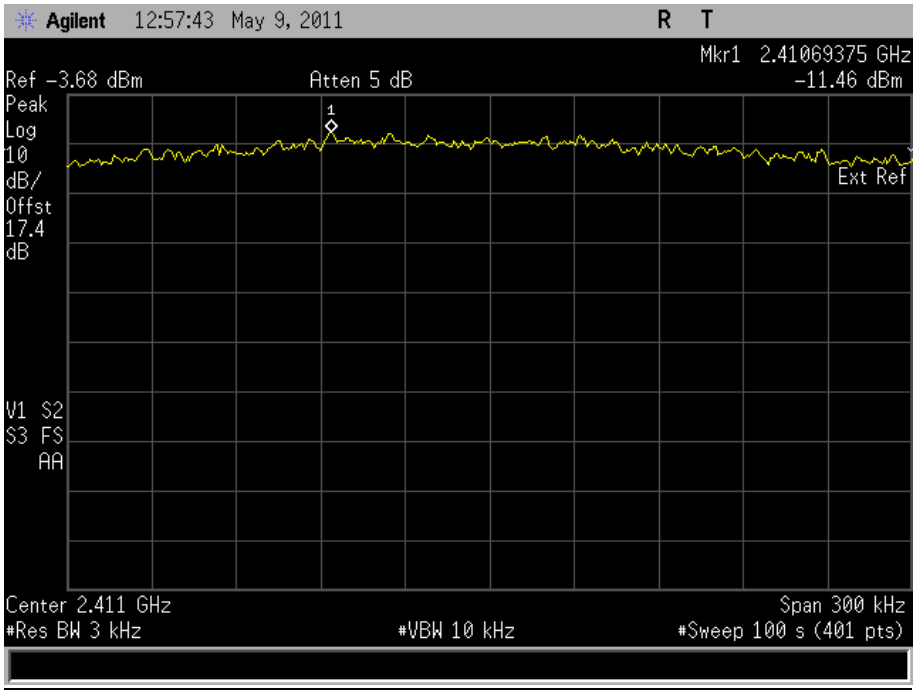


Product Service

12 Mbps

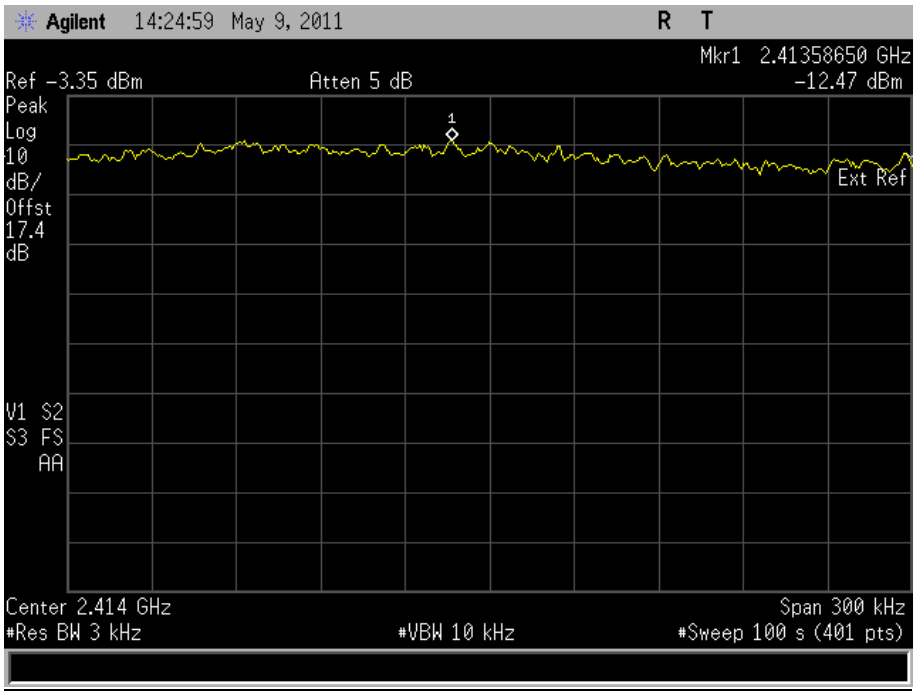


18 Mbps

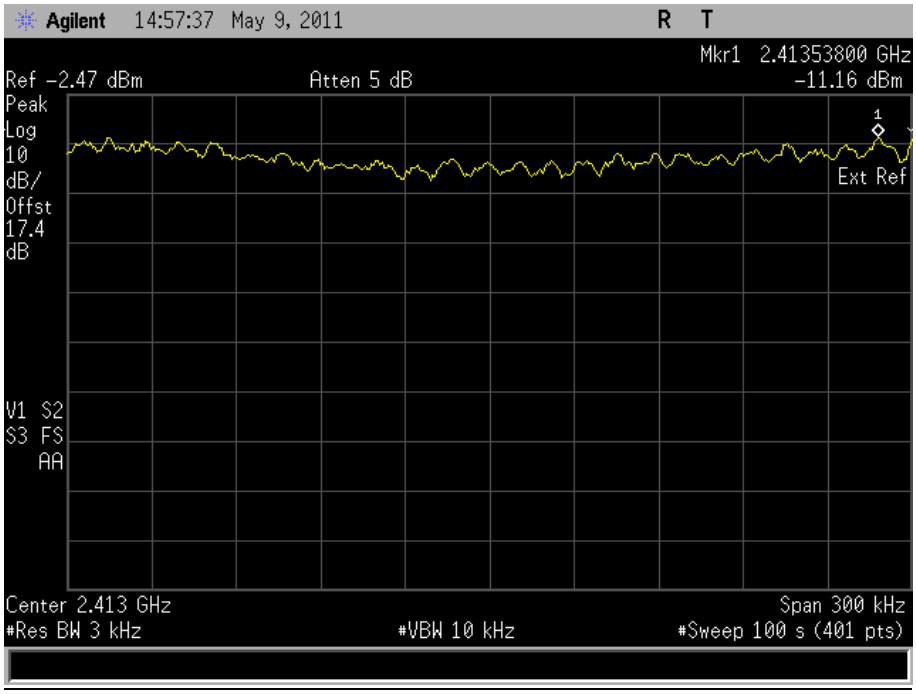


Product Service

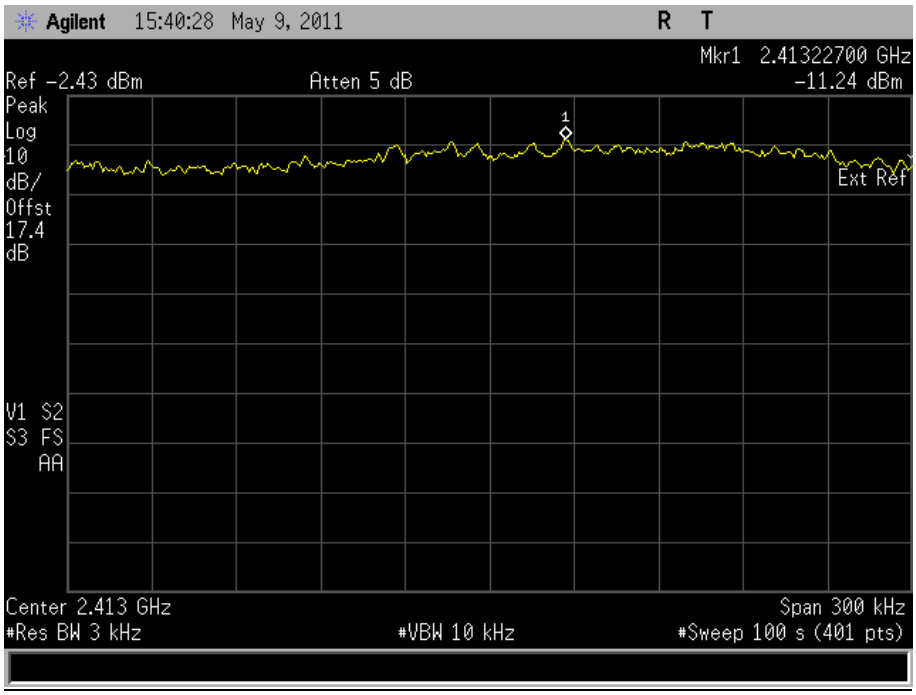
36 Mbps



48 Mbps



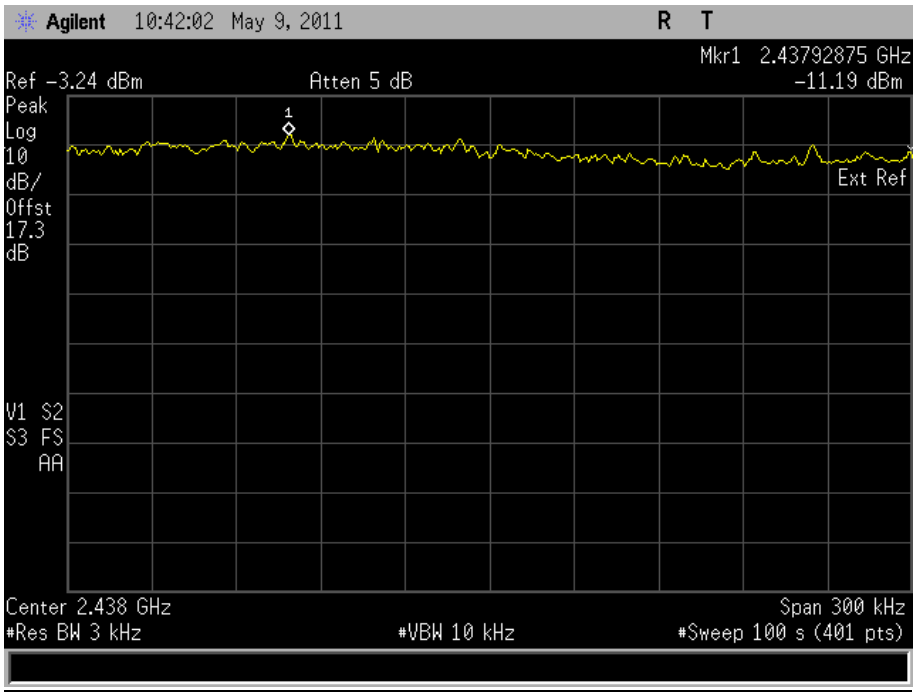
54 Mbps


Agilent 15:40:28 May 9, 2011
R T
Mkr1 2.41322700 GHz
Ref -2.43 dBm
Atten 5 dB
-11.24 dBm
Peak
Log
10
dB/
Offst
17.4
dB
1
Ext Ref
V1 S2
S3 FS
AA
Center 2.413 GHz
Span 300 kHz
#Res BW 3 kHz
#VBW 10 kHz
#Sweep 100 s (401 pts)

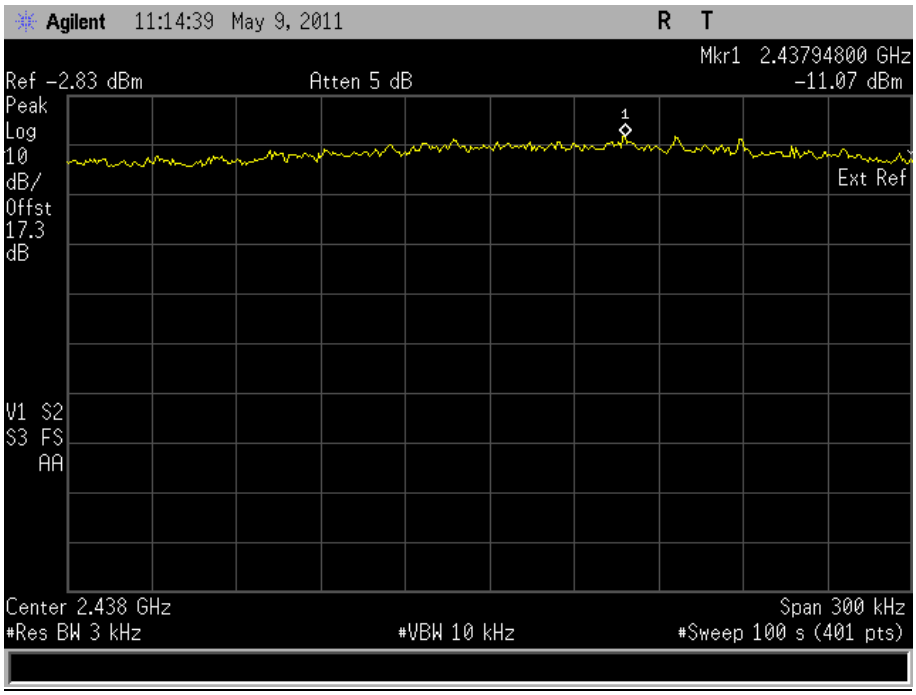
Product Service

2437 MHz

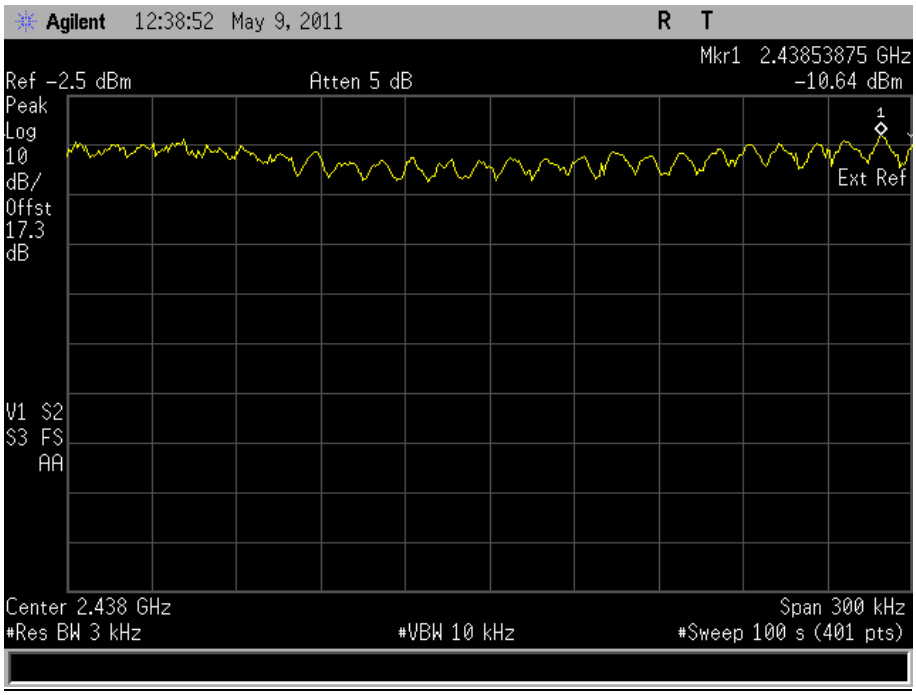
6 Mbps



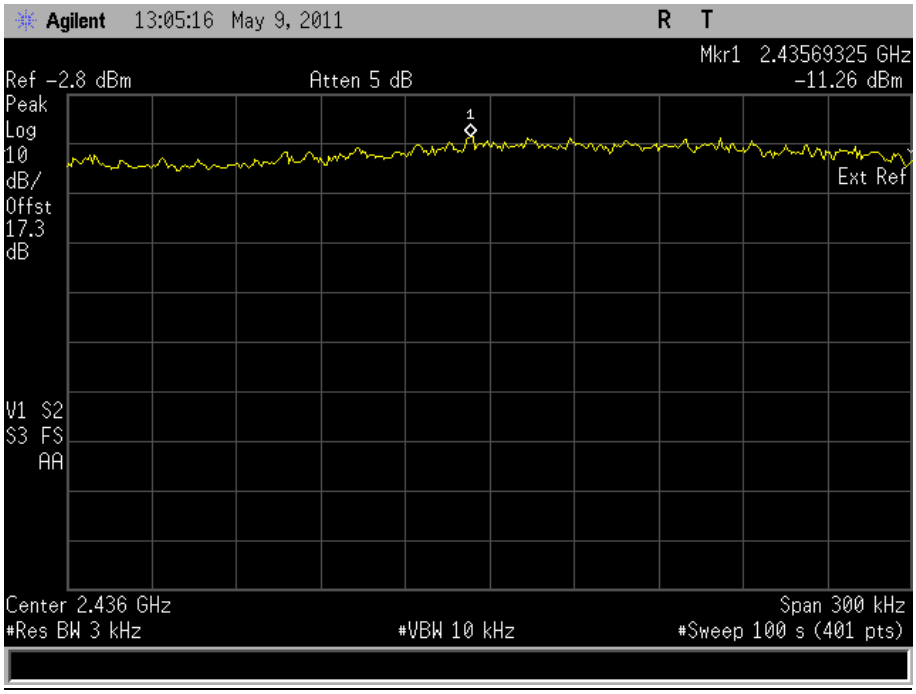
9 Mbps



12 Mbps

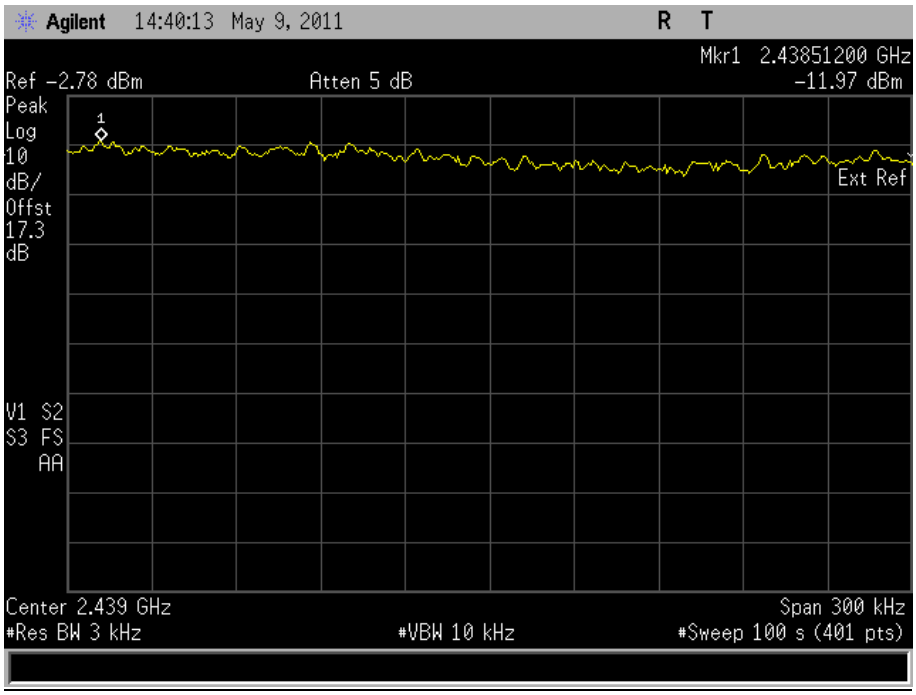


18 Mbps

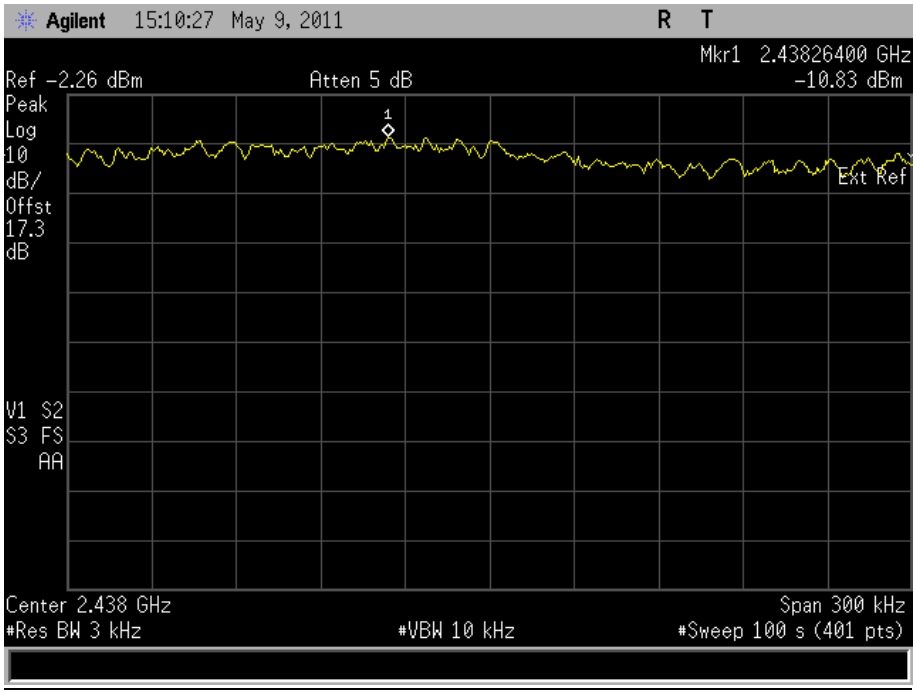


Product Service

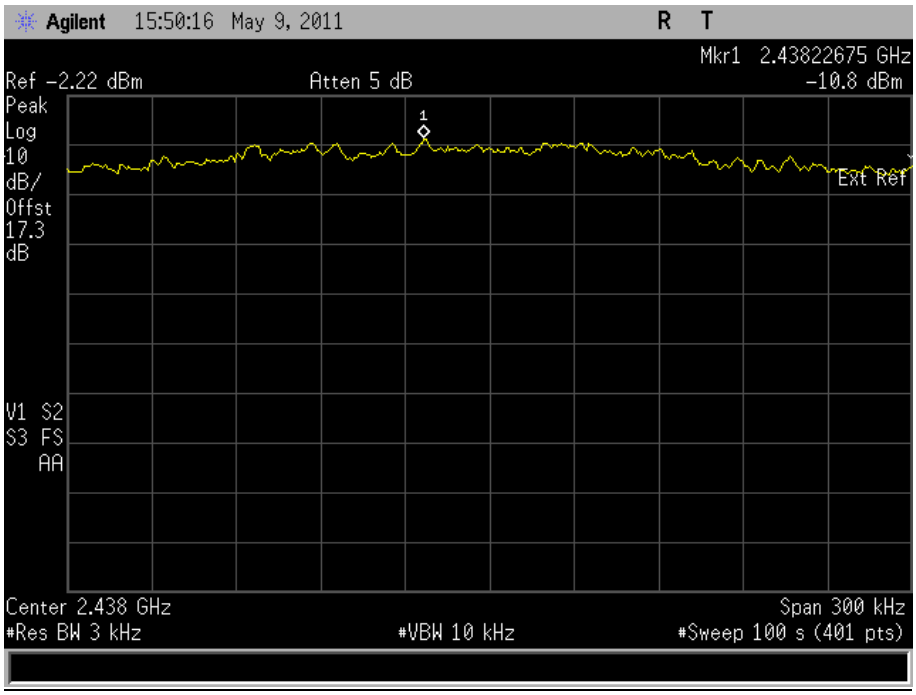
36 Mbps



48 Mbps



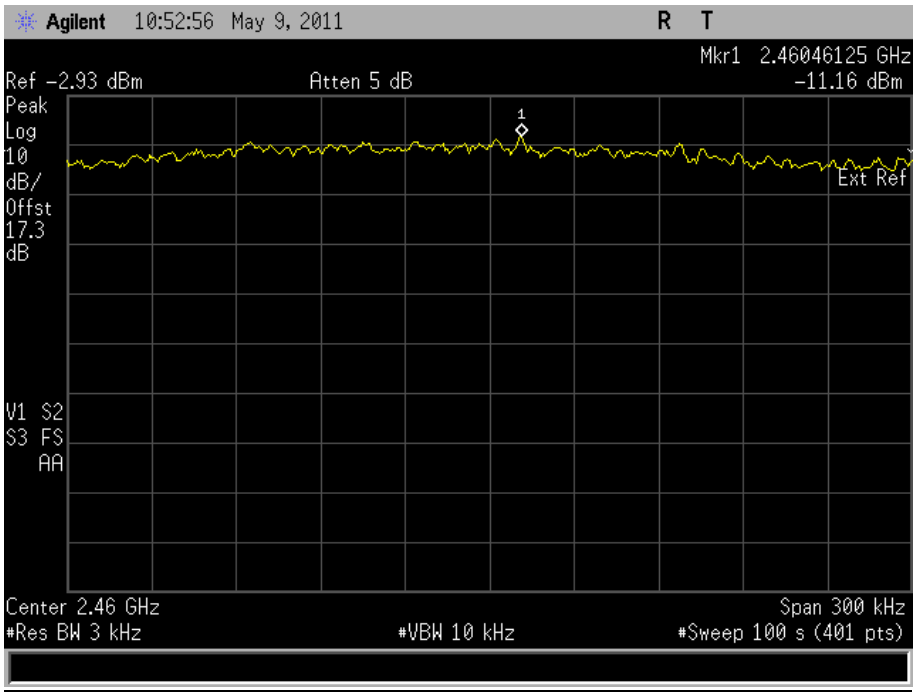
54 Mbps


Agilent 15:50:16 May 9, 2011
R T
Mkr1 2.43822675 GHz
Ref -2.22 dBm
Atten 5 dB
-10.8 dBm
Peak
Log
10
dB/
Offst
17.3
dB
1
Ext Ref
V1 S2
S3 FS
AA
Center 2.438 GHz
Span 300 kHz
#Res BW 3 kHz
#VBW 10 kHz
#Sweep 100 s (401 pts)

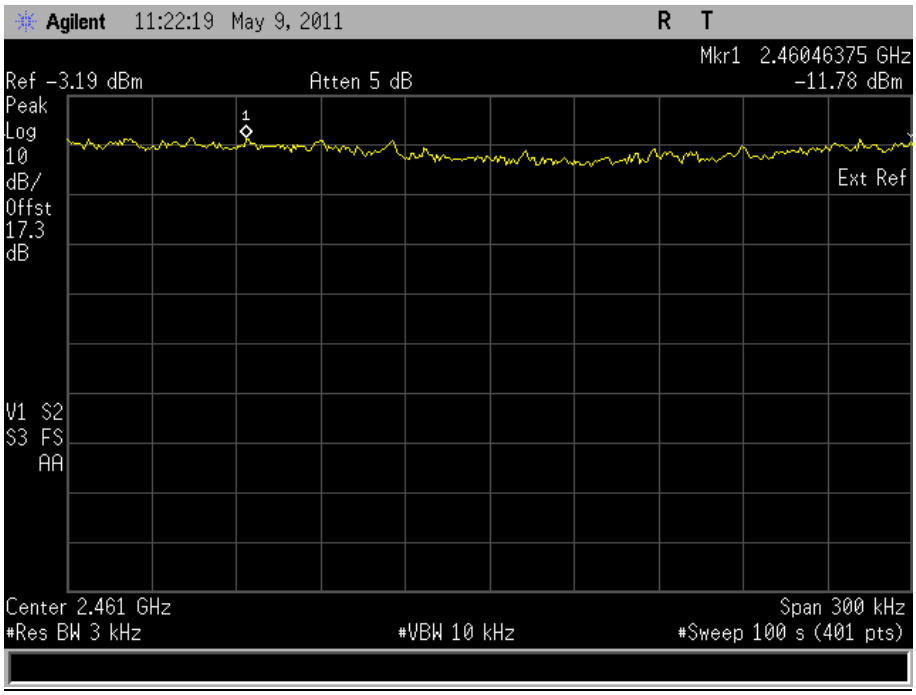
Product Service

2462 MHz

6 Mbps

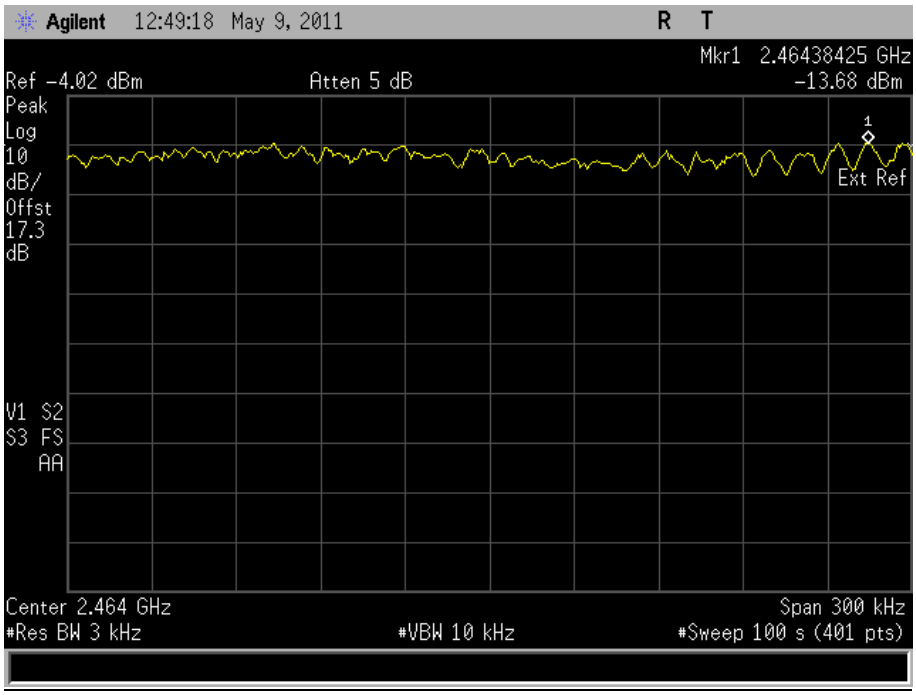


9 Mbps

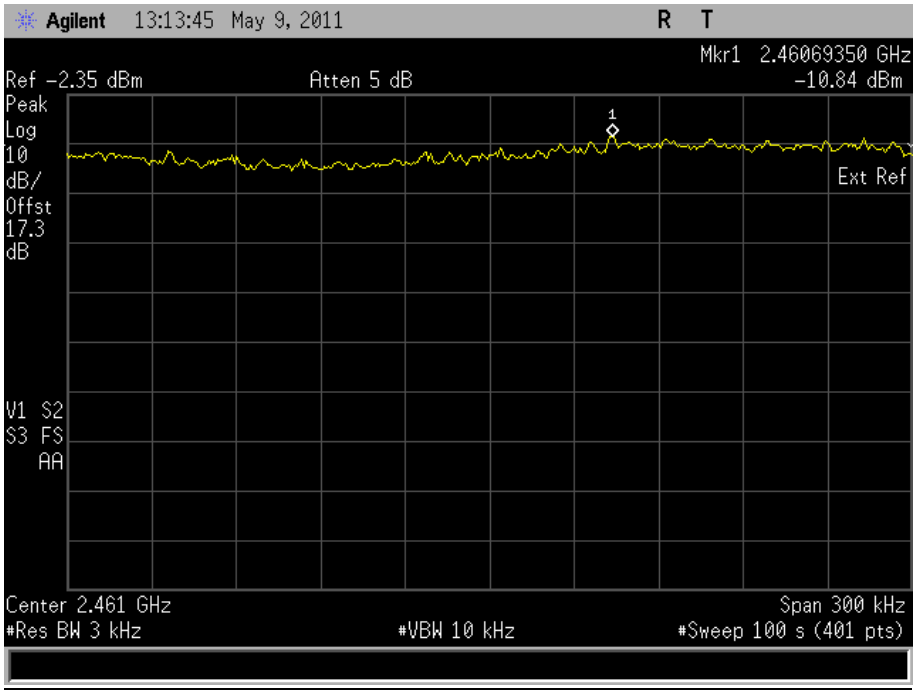


Product Service

12 Mbps

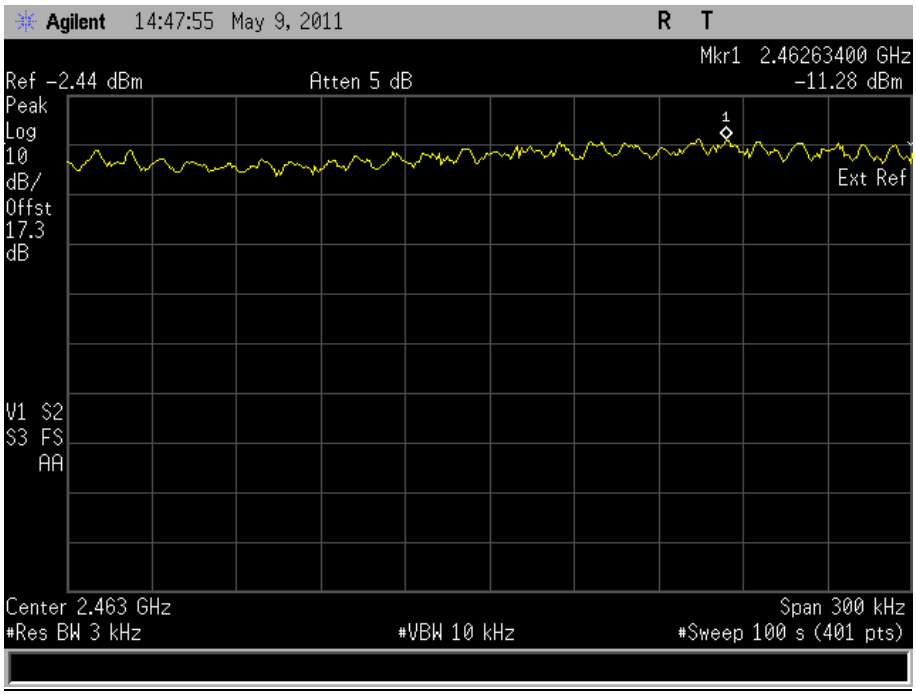


18 Mbps

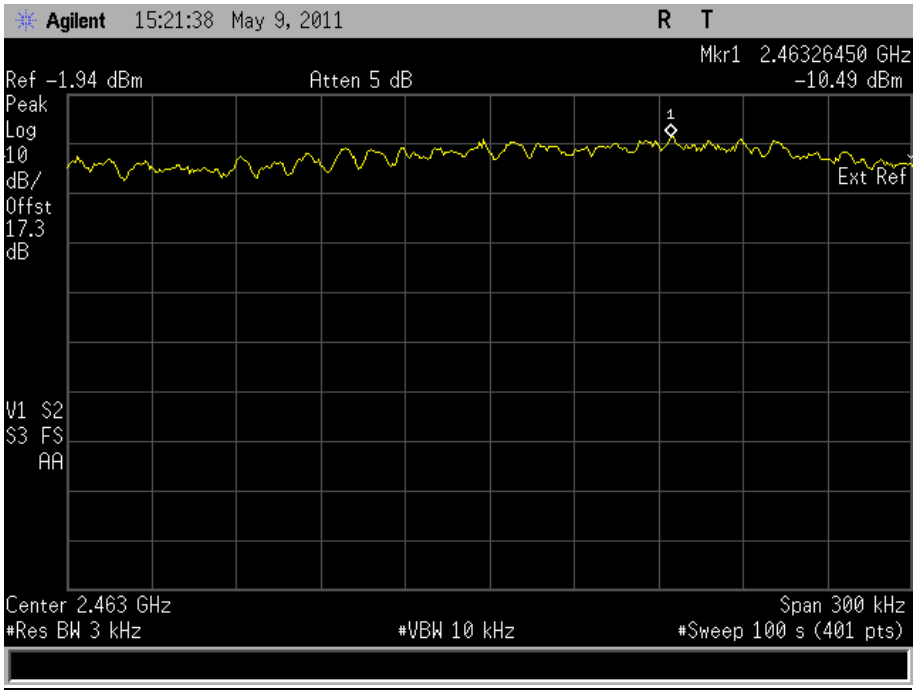


Product Service

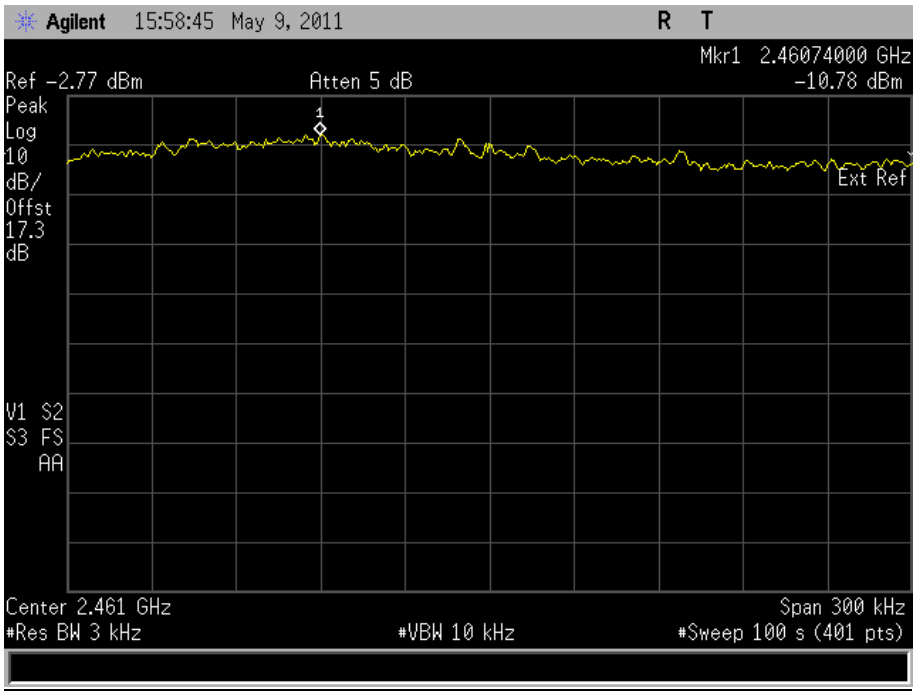
36 Mbps



48 Mbps



54 Mbps


Agilent 15:58:45 May 9, 2011
R T
Mkr1 2.46074000 GHz
Ref -2.77 dBm
Atten 5 dB
-10.78 dBm
Peak
Log
10
dB/
Offst
17.3
dB
1
Ext Ref
V1 S2
S3 FS
AA
Center 2.461 GHz
Span 300 kHz
#Res BW 3 kHz
#VBW 10 kHz
#Sweep 100 s (401 pts)

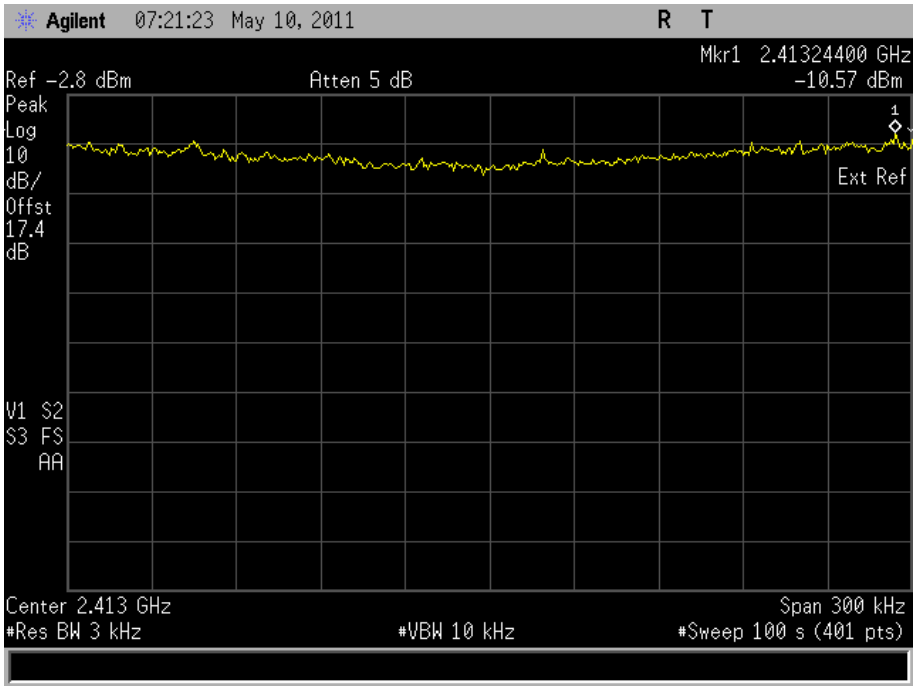
Configuration 3 – Modes 1, 2 and 3

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412	6.5	-10.57
	13	-12.79
	19.5	-11.35
	26	-12.44
	39	-13.08
	52	-13.16
	58.5	-12.33
	65	-11.09
2437	6.5	-12.06
	13	-11.00
	19.5	-12.74
	26	-11.67
	39	-10.72
	52	-12.83
	58.5	-12.73
	65	-12.83
2462	6.5	-11.33
	13	-12.03
	19.5	-12.06
	26	-11.81
	39	-11.70
	52	-12.52
	58.5	-11.94
	65	-11.95

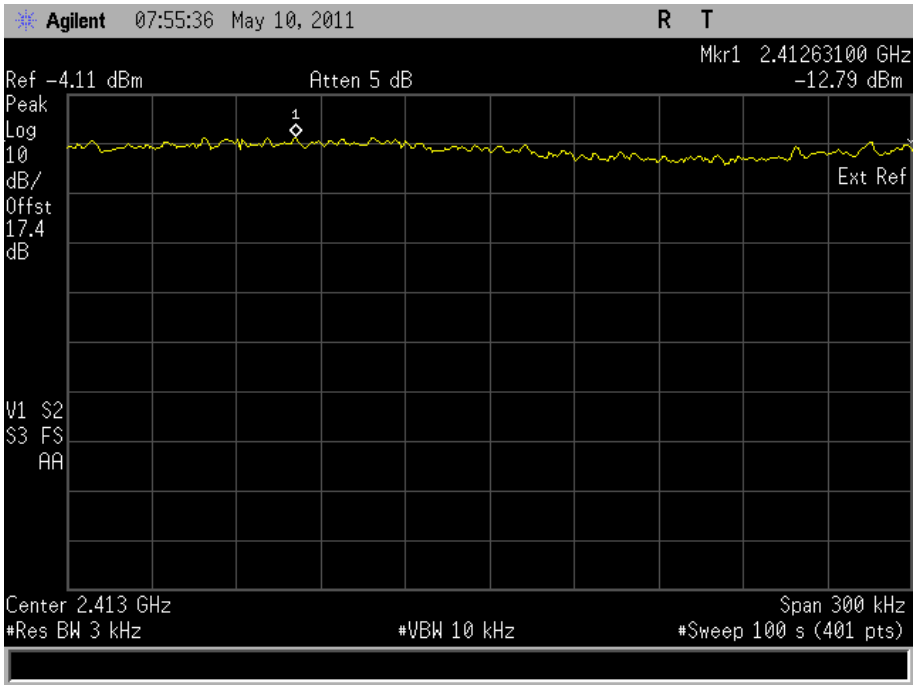
Product Service

2412 MHz

6.5 Mbps

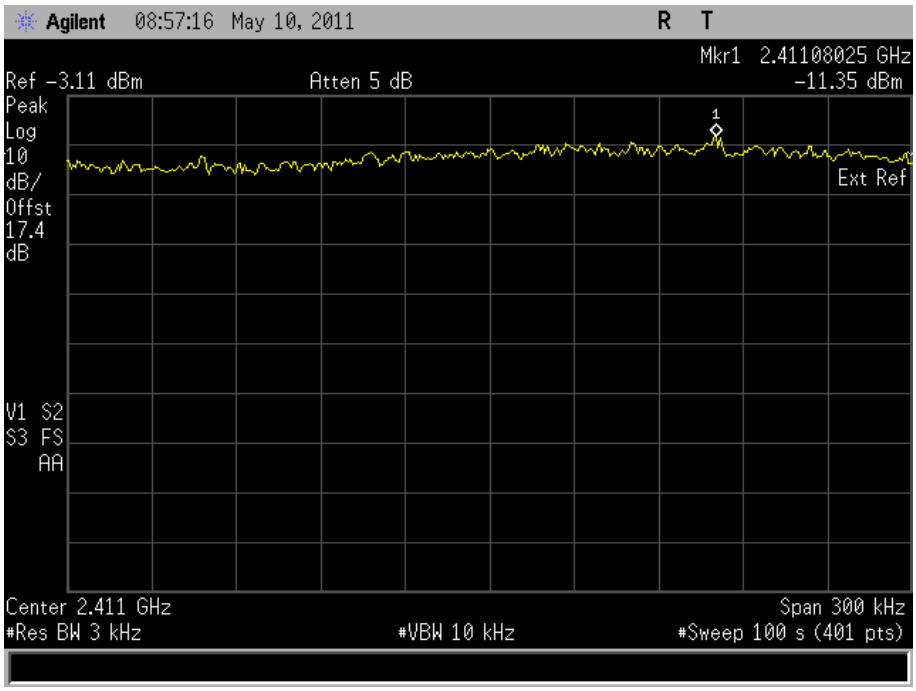


13 Mbps

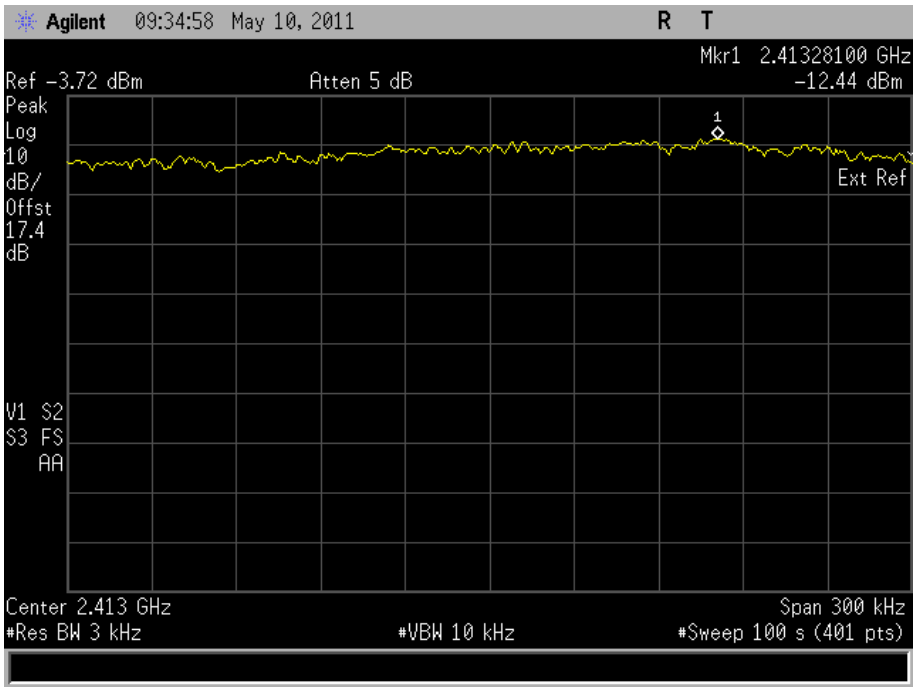


Product Service

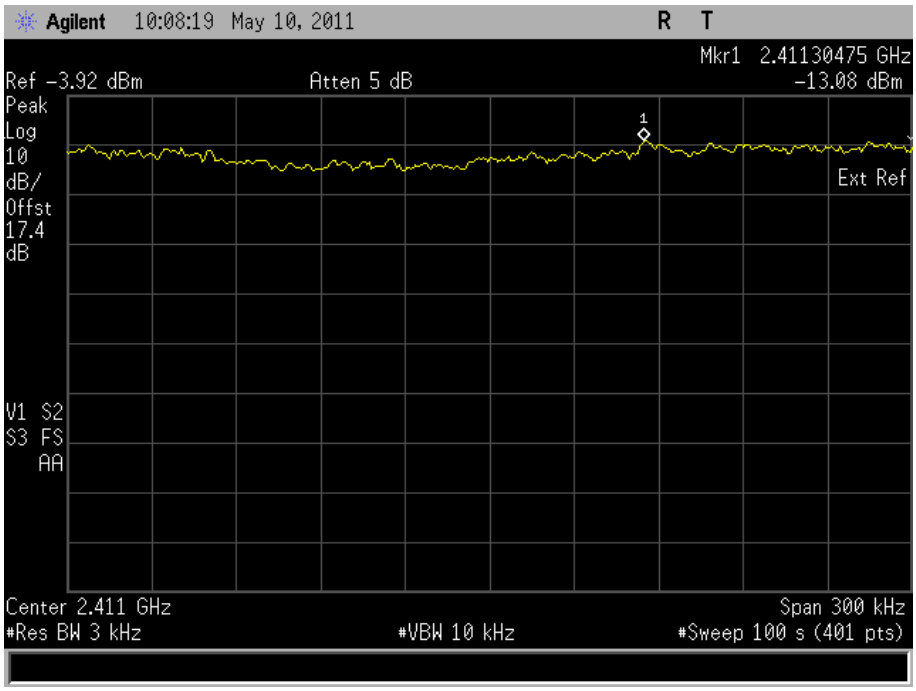
19.5 Mbps



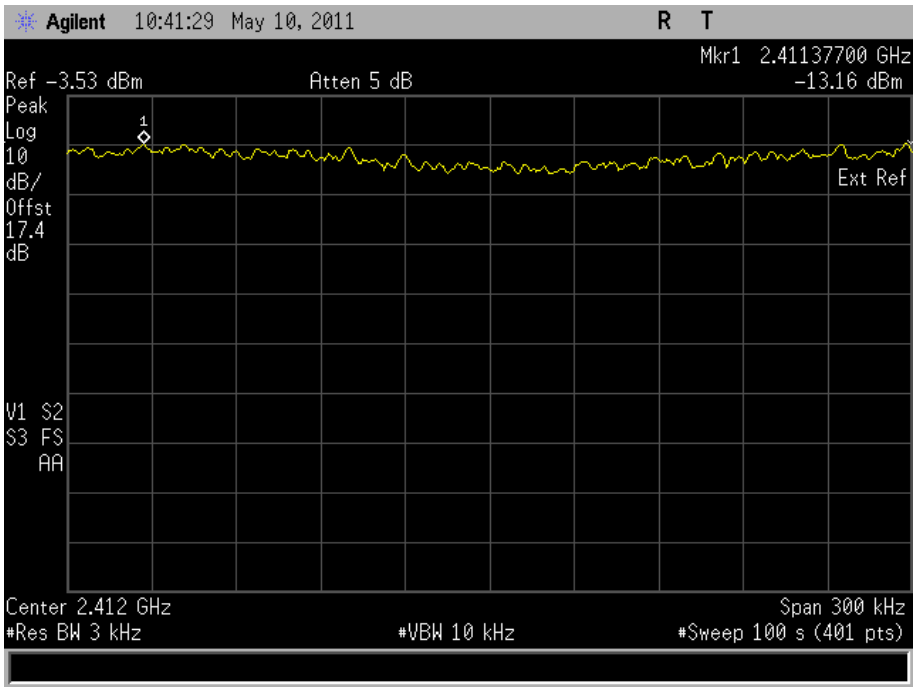
26 Mbps



39 Mbps

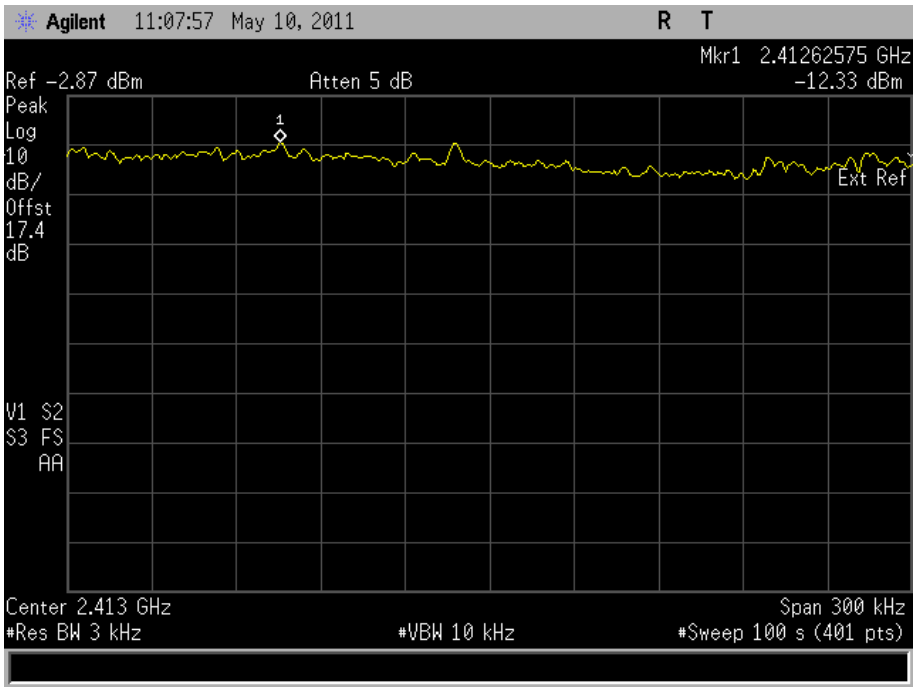


52 Mbps

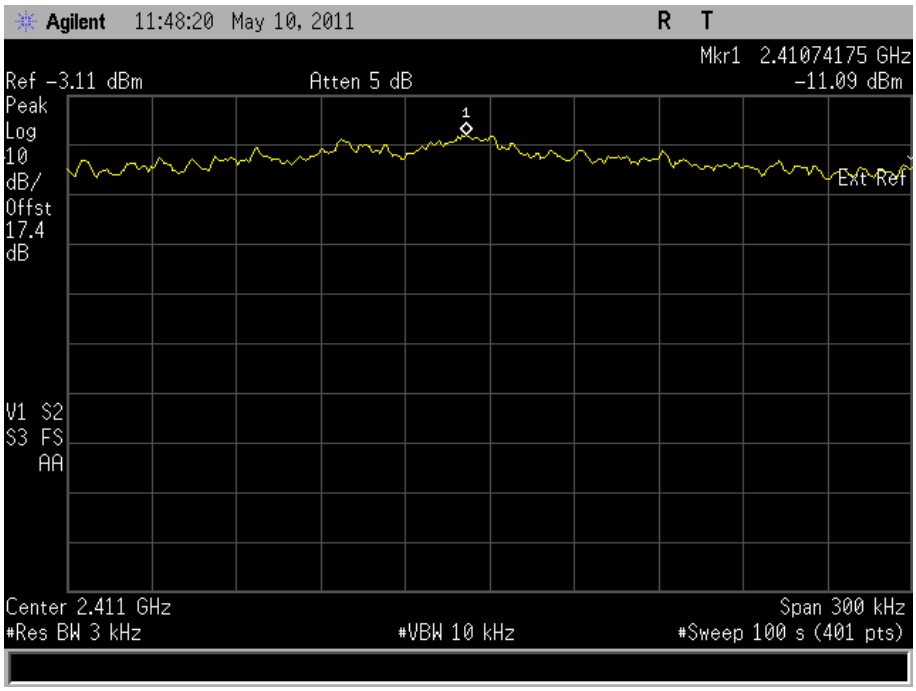


Product Service

58.5 Mbps



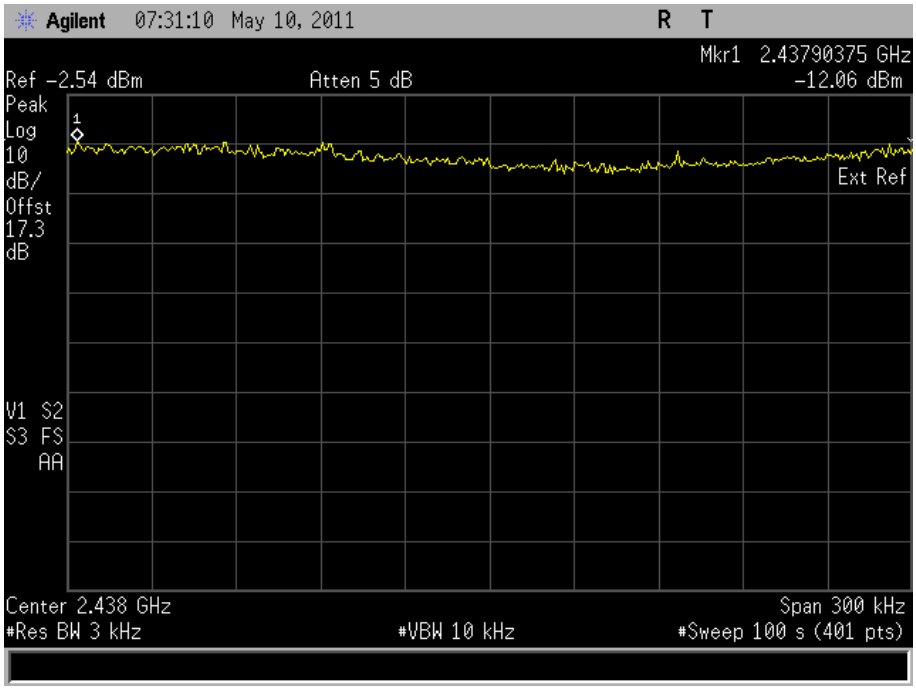
65 Mbps



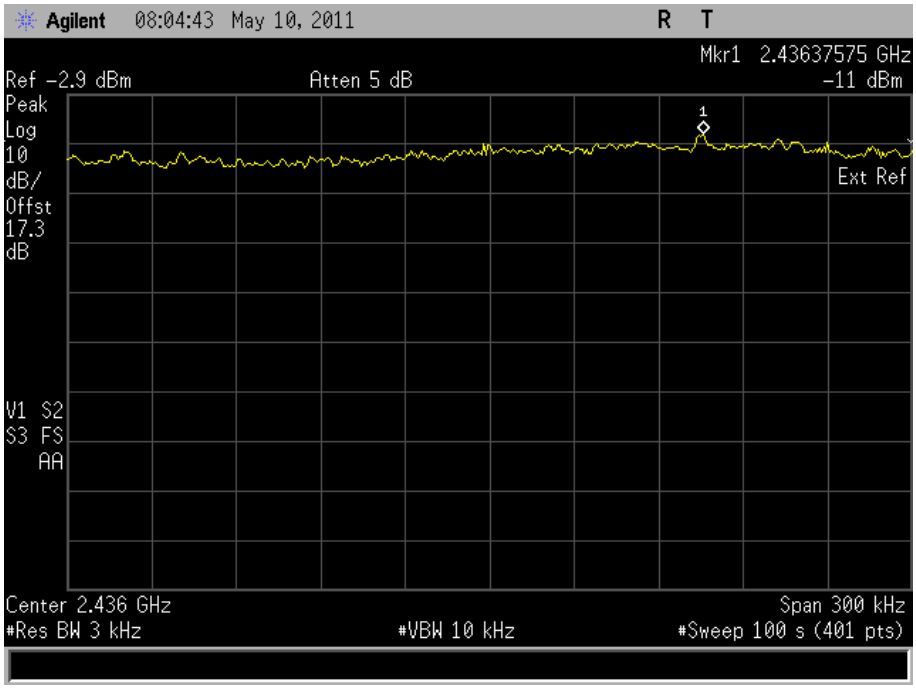
Product Service

2437 MHz

6.5 Mbps

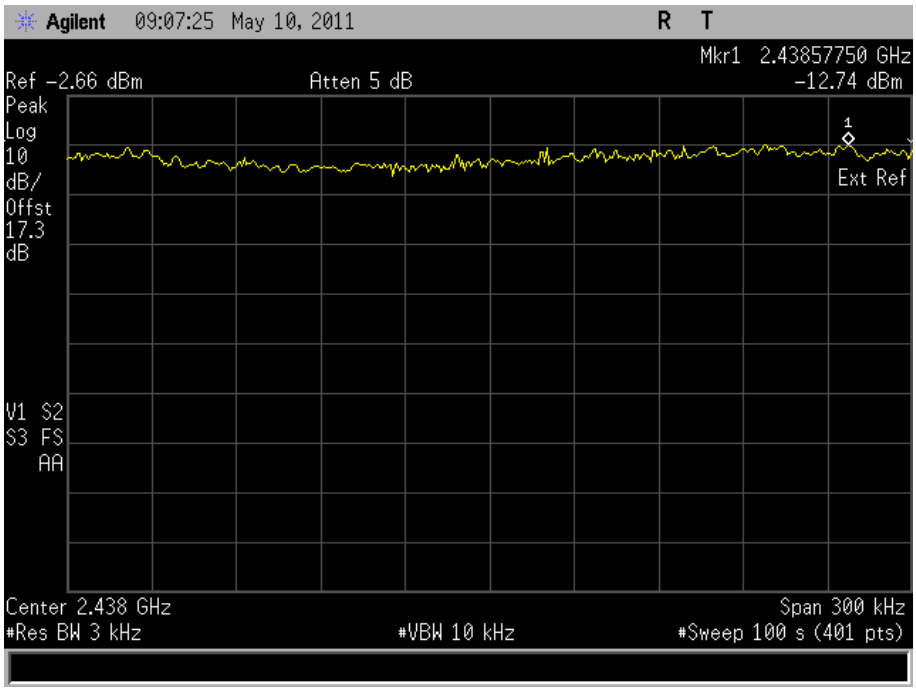


13 Mbps

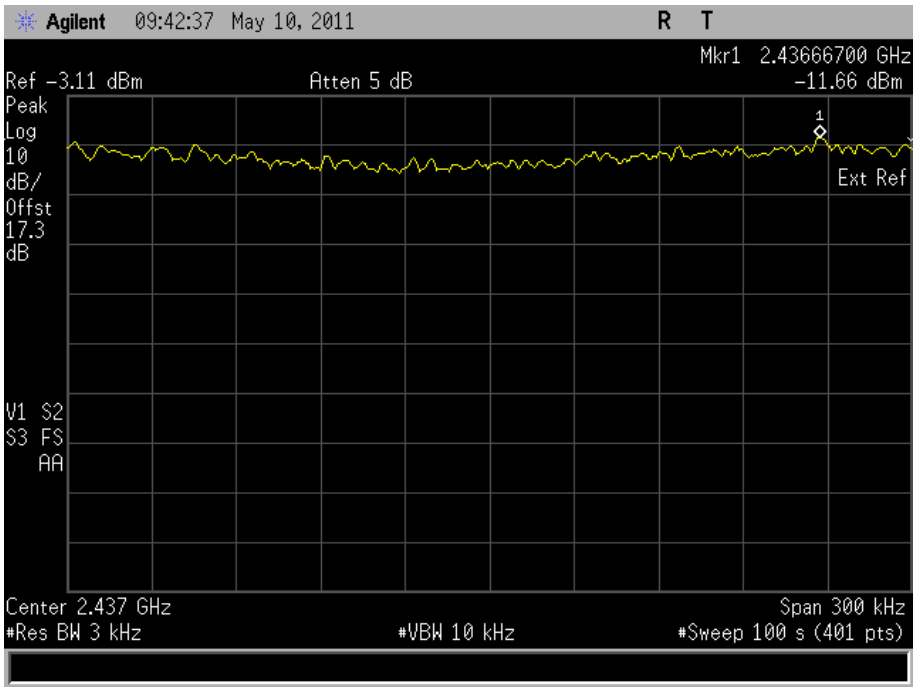


Product Service

19.5 Mbps

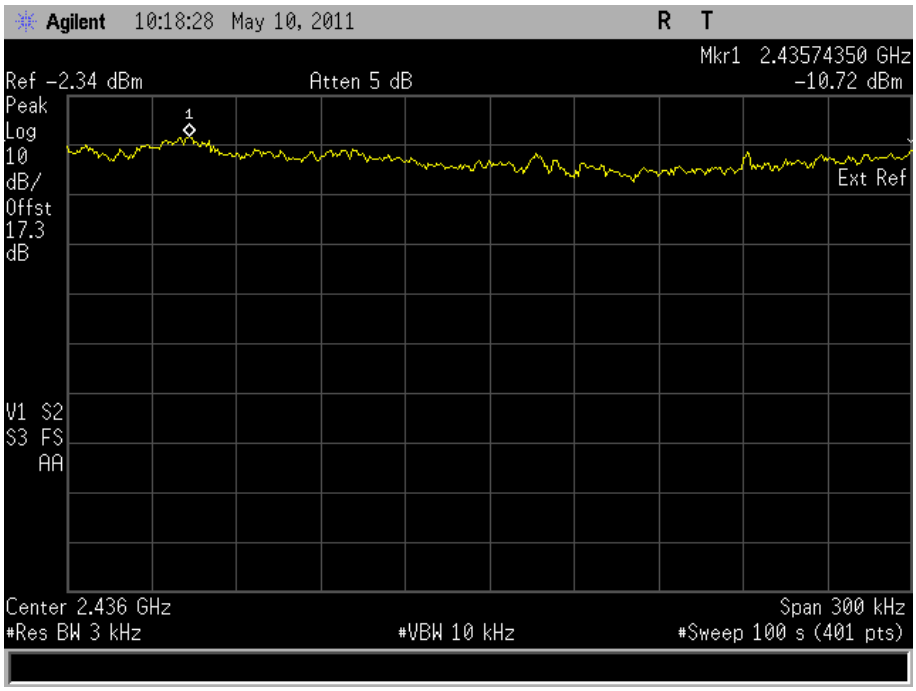


26 Mbps

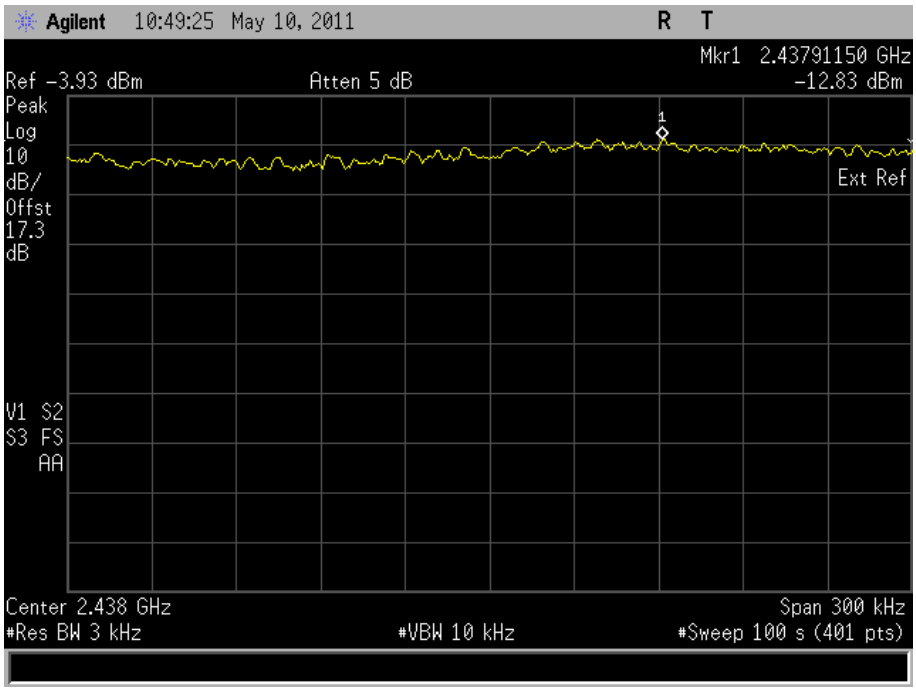


Product Service

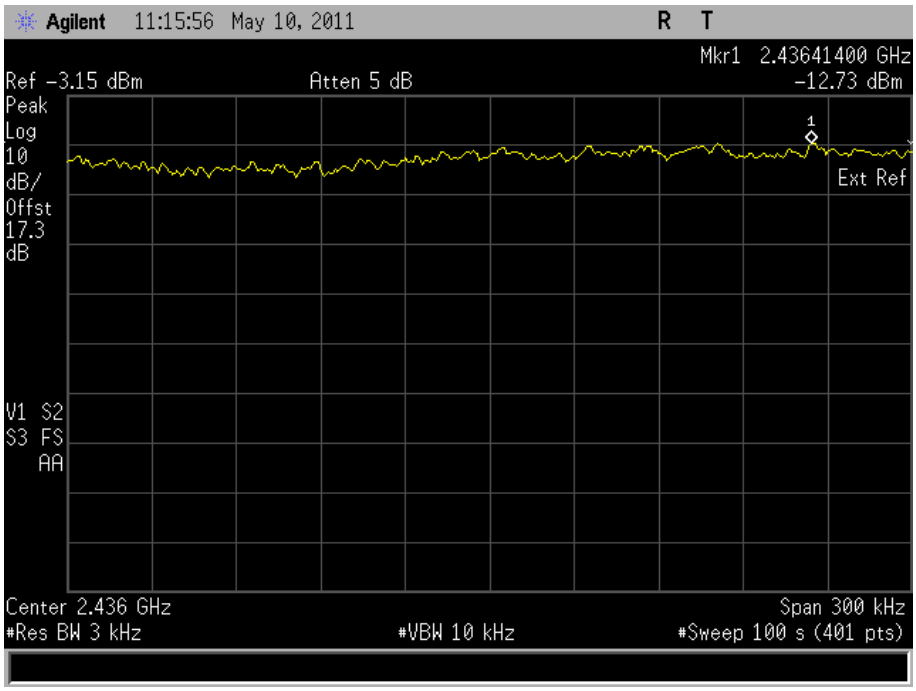
39 Mbps



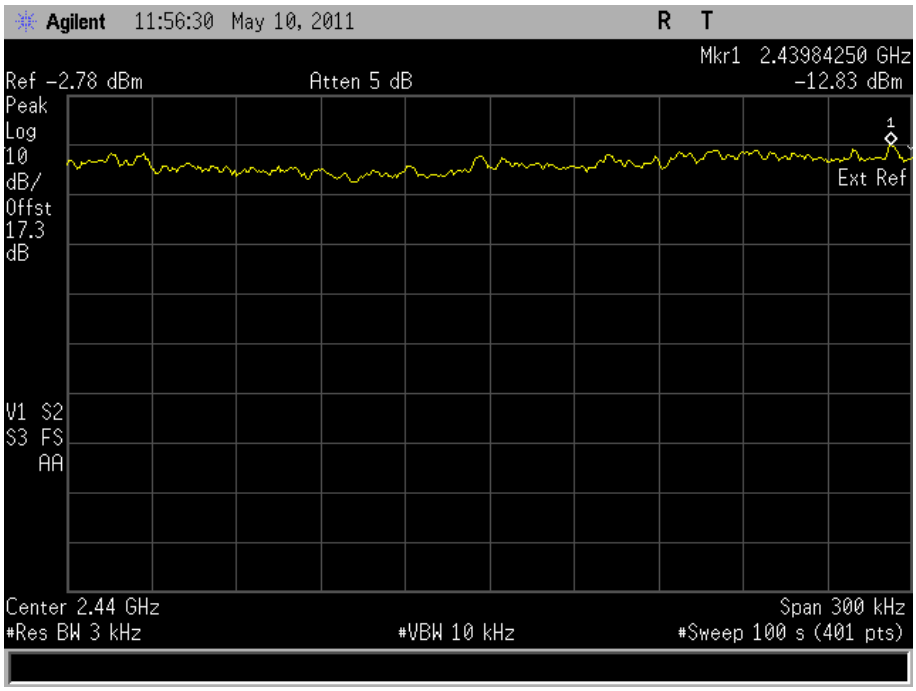
52 Mbps



58.5 Mbps

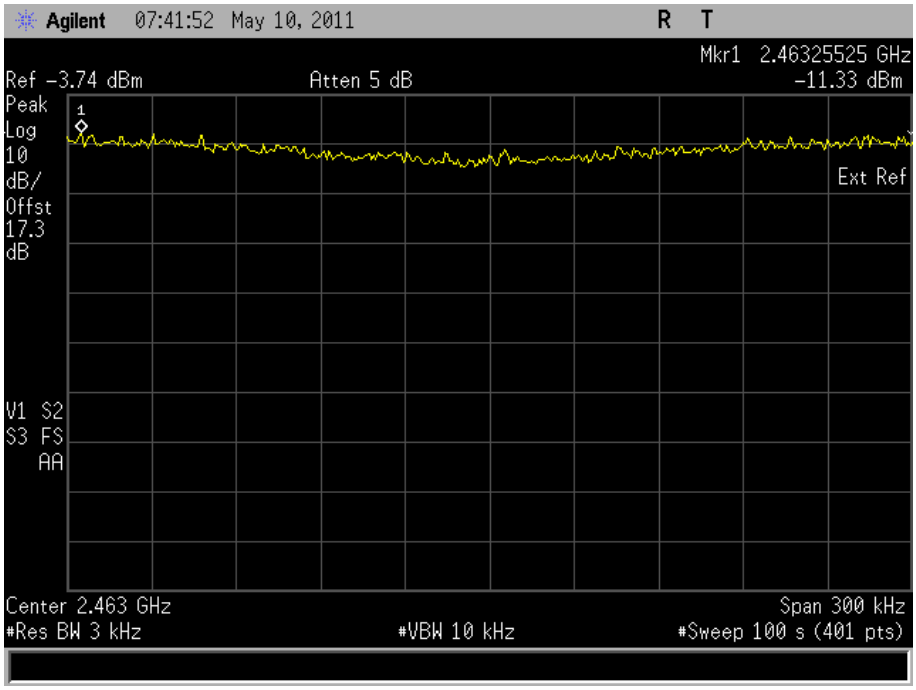


65 Mbps

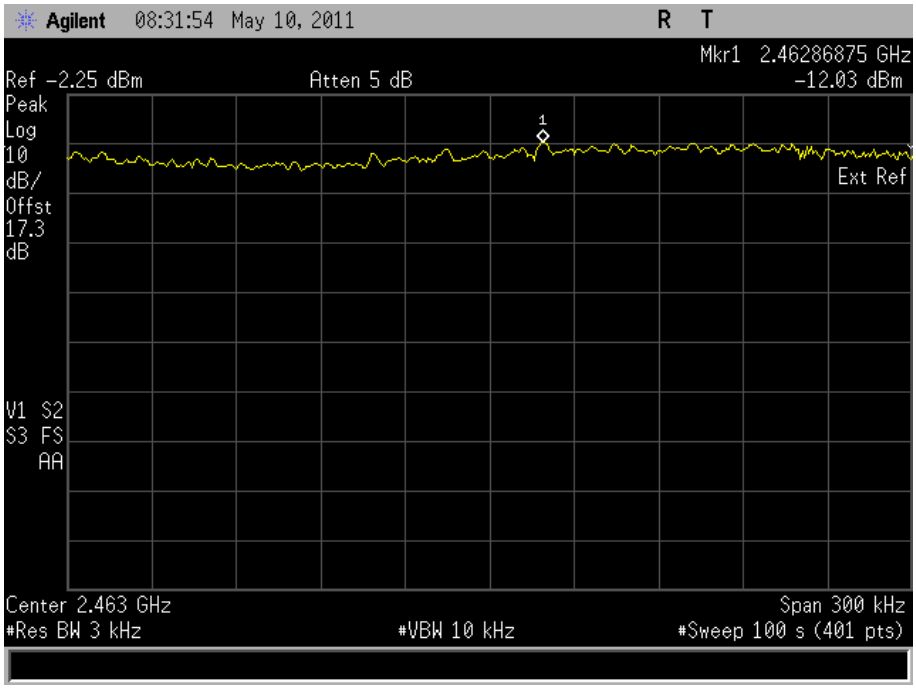


2462 MHz

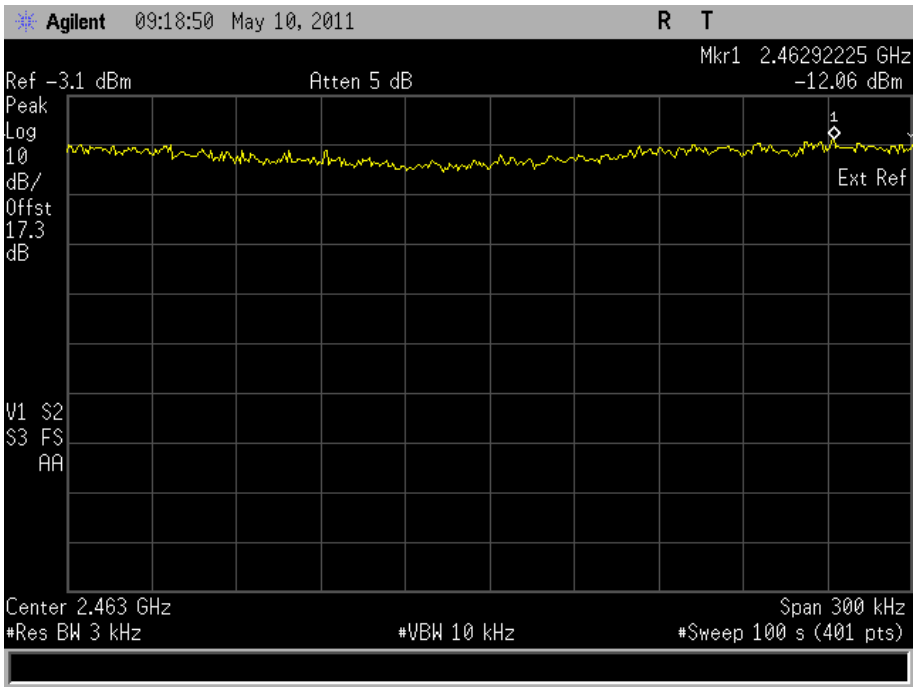
6.5 Mbps



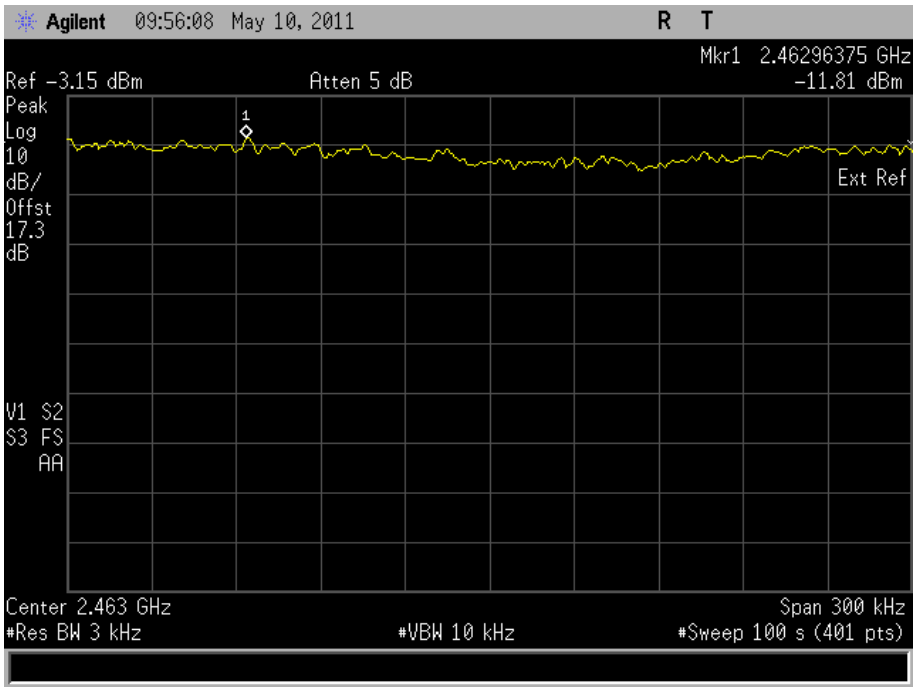
13 Mbps



19.5 Mbps

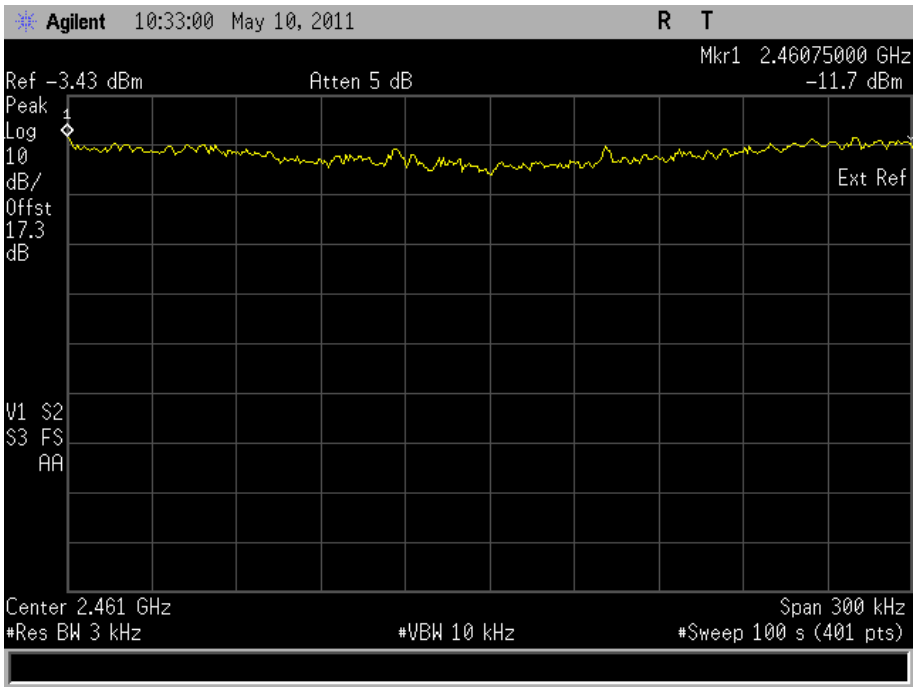


26 Mbps

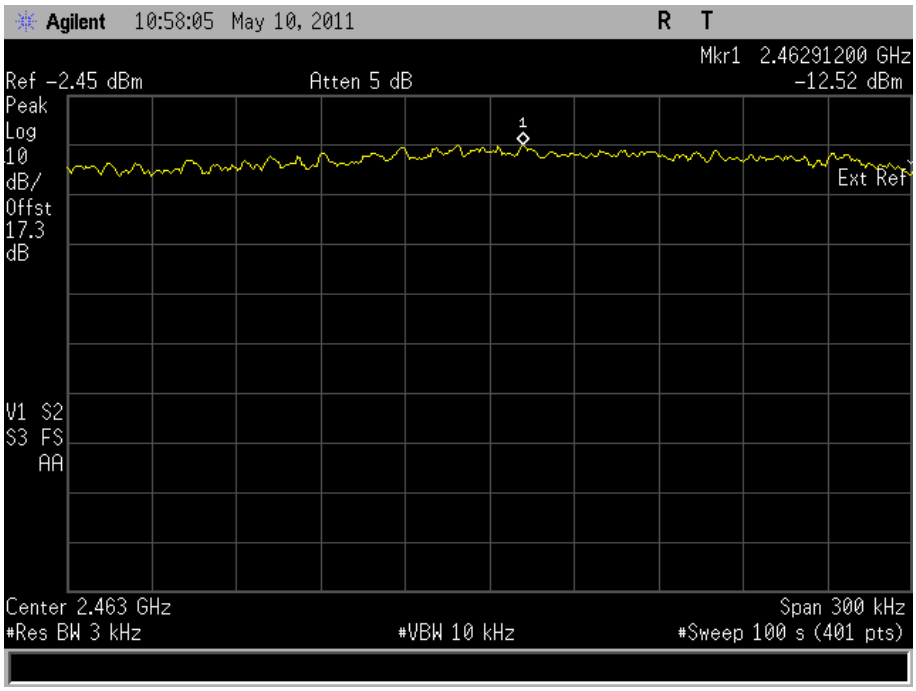


Product Service

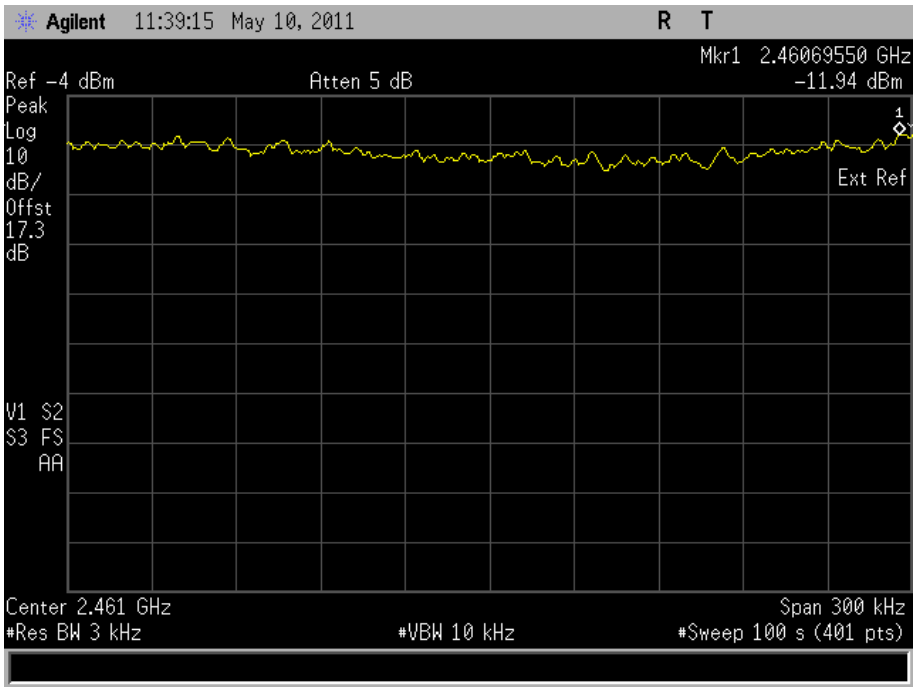
39 Mbps



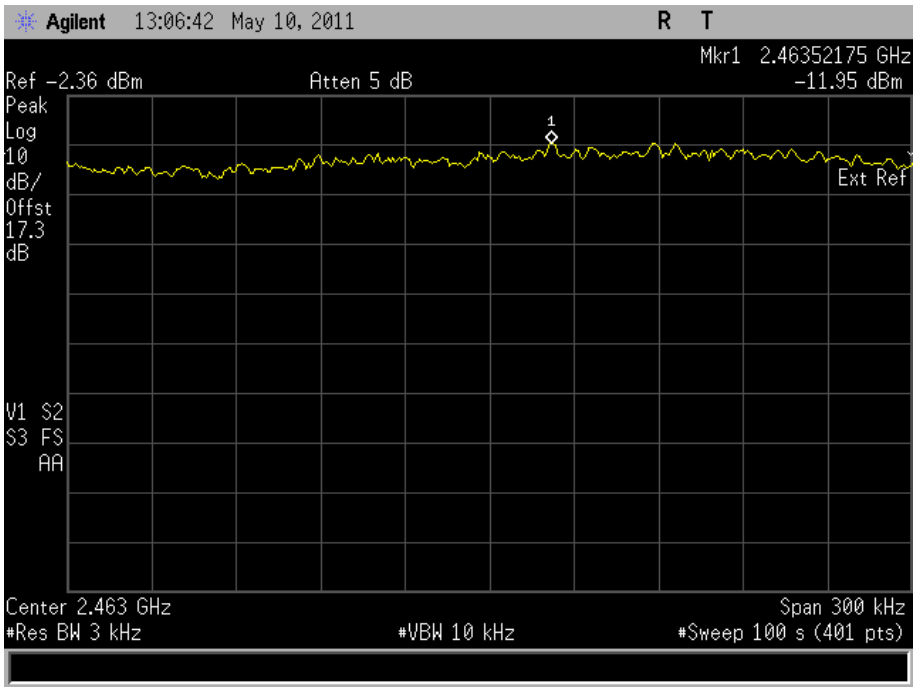
52 Mbps



58.5 Mbps



65 Mbps



Limit Clause

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

2.7 BAND EDGE EMISSIONS

2.7.1 Specification Reference

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

2.7.2 Equipment Under Test

CDMA SHI11, S/N: SSHFL000930 and SSHFC001122

2.7.3 Date of Test and Modification State

11 and 15 May 2011 - Modification State 0
25 May 2011 - Modification State 0

2.7.4 Test Equipment Used

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

2.7.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of ANSI C63.4.

The band edge measurements were performed in accordance with ANSI C63.10, Clause 6.9.3. The results were analysed to ensure compliance with restriced bands. The EUT was set to the lowest and highest operating frequencies.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1	- Mode 1
	- Mode 3
Configuration 2	- Mode 1
	- Mode 3
Configuration 3	- Mode 1
	- Mode 3

2.7.6 Environmental Conditions

	11 May 2011	15 May 2011	25 May 2011
Ambient Temperature	20.0°C	19.3°C	19.4°C
Relative Humidity	47.0%	35.0%	39.0%

Product Service

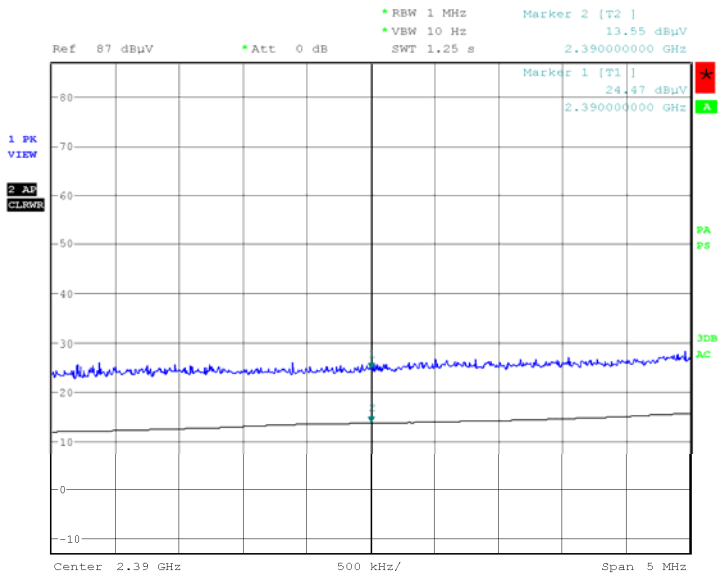
2.7.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C for Band Edge Emissions.

The test results are shown below.

Configuration 1 - Mode 1

Freq in GHz	Polarisation	Final Peak dBµV/m	Peak Limit dBµV/m	Final Average dBµV/m	Average Limit dBµV/m
2.412	Horizontal	54.8	74.0	46.1	54.0

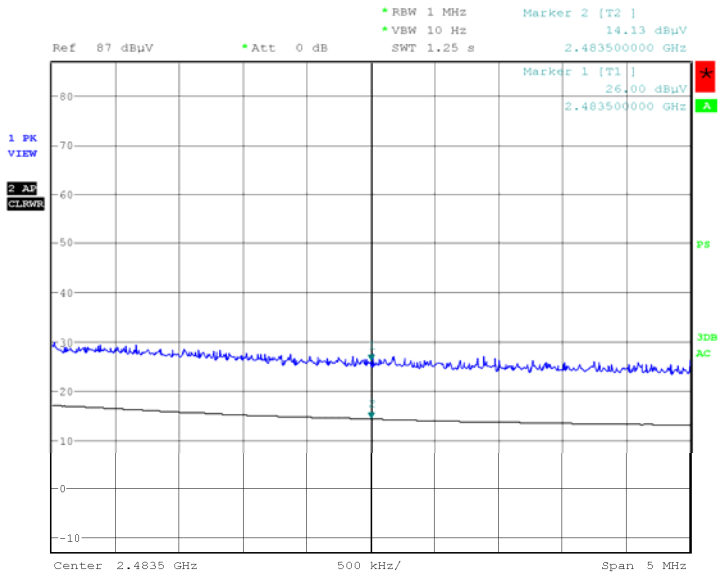


Date: 11.MAY.2011 17:29:35

Product Service

Configuration 1 - Mode 3

Freq in GHz	Polarisation	Final Peak dBµV/m	Peak Limit dBµV/m	Final Average dBµV/m	Average Limit dBµV/m
2.462	Horizontal	56.9	74.0	48.1	54.0

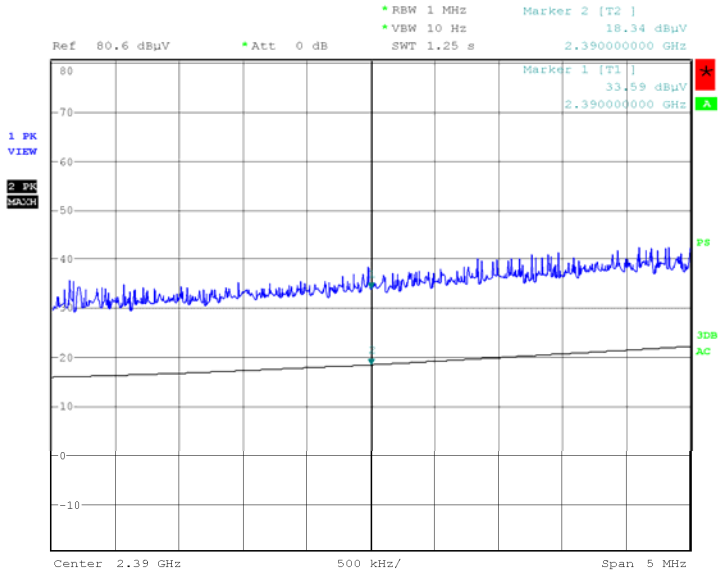


Date: 15.MAY.2011 07:55:41

Product Service

Configuration 2 - Mode 1

Freq in GHz	Polarisation	Final Peak dBµV/m	Peak Limit dBµV/m	Final Average dBµV/m	Average Limit dBµV/m
2.412	Horizontal	65.7	74.0	50.4	54.0

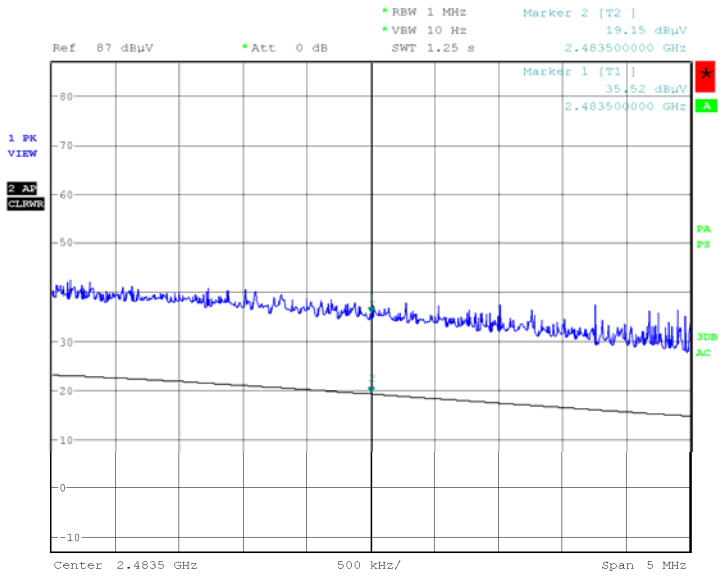


Date: 15.MAY.2011 08:31:53

Product Service

Configuration 2 - Mode 3

Freq in GHz	Polarisation	Final Peak dBµV/m	Peak Limit dBµV/m	Final Average dBµV/m	Average Limit dBµV/m
2.462	Horizontal	67.9	74.0	51.6	54.0

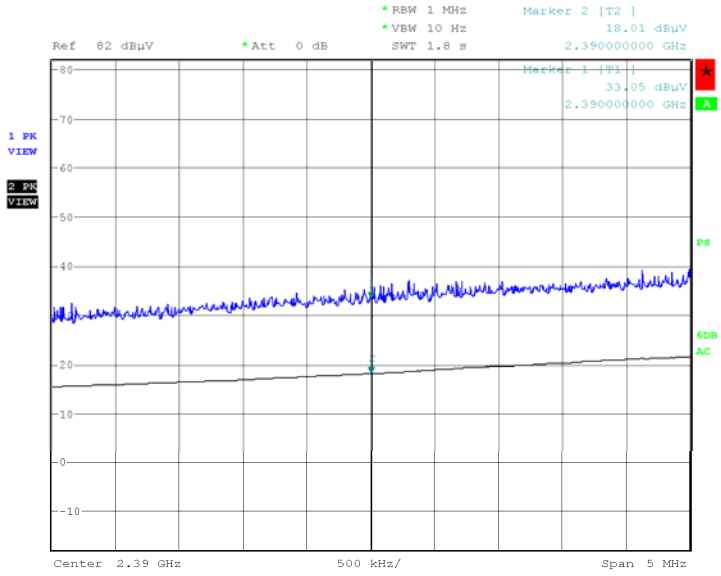


Date: 15.MAY.2011 09:38:12

Product Service

Configuration 3 - Mode 1

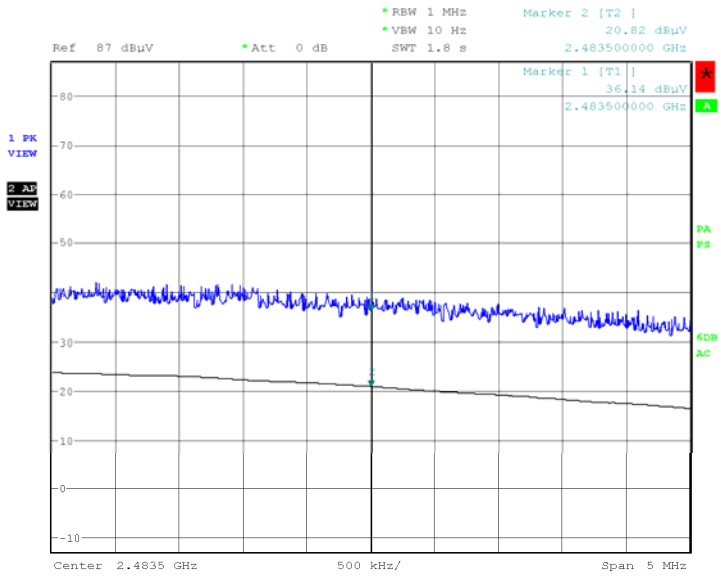
Freq in GHz	Polarisation	Final Peak dBµV/m	Peak Limit dBµV/m	Final Average dBµV/m	Average Limit dBµV/m
2.412	Horizontal	65.2	74.0	50.1	54.0



Date: 25.MAY.2011 19:20:13

Configuration 3 - Mode 3

Freq in GHz	Polarisation	Final Peak dBµV/m	Peak Limit dBµV/m	Final Average dBµV/m	Average Limit dBµV/m
2.462	Horizontal	68.5	74.0	53.2	54.0



Date: 25.MAY.2011 18:57:25

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 - 6dB Bandwidth					
Multimeter	Iso-tech	IDM-101	466	12	2-Mar-2012
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	23-Jun-2011
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jun-2011
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Hygromer	Rotronic	A1	2677	12	20-Jan-2012
Power Meter	Rohde & Schwarz	NRP	3491	12	19-Apr-2012
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	19-Apr-2012
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	10-Aug-2011
Combiner/Splitter	Weinschel	1506A	3877	12	22-Feb-2012
Section 2.2, 2.4 and 2.7 - Radiated Emissions (Enclosure Port), EIRP Peak Power and Band Edge Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Nov-2011
Antenna (Bilog)	Schaffner	CBL6143	287	24	19-Jan-2012
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	2-Aug-2012
Pre-Amplifier	Phase One	PS04-0086	1533	12	15-Sep-2011
Pre-Amplifier	Phase One	PSO4-0087	1534	12	22-Sep-2011
Screened Room (5)	Rainford	Rainford	1545	24	3-Feb-2014
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	2-Jul-2011
Amplifier (8 - 18GHz)	Phase One	PS06-0061	3176	12	2-Jul-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	14-Apr-2012
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	10-Aug-2011
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Section 2.3 - Maximum Peak Conducted Output Power					
Antenna (Double Ridge Guide)	EMCO	3115	34	12	17-Jul-2011
Spectrum Analyser	Rohde & Schwarz	FSEM	37	12	18-Apr-2012
Power Meter	Hewlett Packard	436A	94	12	11-Oct-2011
Peak Power Analyser	Hewlett Packard	8990A	107	12	11-Feb-2012
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	12-Nov-2011
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Nov-2011
Power Sensor	Hewlett Packard	8484A	420	12	6-Sep-2011
Attenuator	Hewlett Packard	11708A	1507	12	17-Dec-2011
Screened Room (5)	Rainford	Rainford	1545	24	3-Feb-2014
Screened Room (8)	Rainford	Rainford	1548	-	TU
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Power Sensor	Hewlett Packard	84812A	2743	-	TU
Hygrometer	Rotronic	I-1000	2882	12	10-Jul-2011
Antenna (DRG Horn)	ETS-LINDGREN	3115	3125	12	27-Apr-2012
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	12	10-Jun-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Signal Generator, 9kHz to 3GHz	Rohde & Schwarz	SMA 100A	3494	12	25-Jan-2012
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	10-Aug-2011
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 - Conducted Spurious Emissions					
Spectrum Analyser	Rohde & Schwarz	FSEM	37	12	18-Apr-2012
Multimeter	White Gold	WG022	190	12	26-Oct-2011
DC Power Supply Unit	Hewlett Packard	6267B	294	-	O/P Mon
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	23-Jun-2011
Attenuator (10dB)	Weinschel	47-10-34	481	12	24-Mar-2012
Multimeter	Iso-tech	IDM101	2419	12	3-Sep-2011
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	6-Sep-2011
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	22-Dec-2011
Hygrometer	Rotronic	I-1000	3220	12	3-May-2012
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2011
Signal Generator, 9kHz to 3GHz	Rohde & Schwarz	SMA 100A	3494	12	25-Jan-2012
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	8-Feb-2012
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	11-Jan-2012
Combiner/Splitter	Weinschel	1506A	3880	12	22-Feb-2012
Section 2.6 - Power Spectral Density					
Multimeter	Iso-tech	IDM-101	466	12	2-Mar-2012
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	23-Jun-2011
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jun-2011
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Hygromer	Rotronic	A1	2677	12	20-Jan-2012
Power Meter	Rohde & Schwarz	NRP	3491	12	19-Apr-2012
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	19-Apr-2012
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	10-Aug-2011
Combiner/Splitter	Weinschel	1506A	3877	12	22-Feb-2012

TU – Traceability Unscheduled
O/P Mon – Output monitored using calibrated equipment.

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Discontinuous Interference	150kHz to 30MHz Amplitude	3.0dB*
Interference Power	30MHz to 300MHz Amplitude	3.0dB*
Radiated E-Field Susceptibility	10MHz to 6GHz Test Amplitude	2.0dB†
Conducted Susceptibility RF	50kHz to 1000MHz Amplitude EM Clamp Method of Test CDN Method of Test BCI Clamp Method of Test Direct Injection Method of Test	 3.1dB• 1.2dB• 1.1dB• 1.2dB•
Conducted Susceptibility LF	DC to 150kHz	1.0%†
Power Frequency Magnetic Field	50Hz/60Hz Amplitude	0.45%
Magnetic Emissions	9kHz to 30MHz Amplitude	3.4dB*
Magnetic Field/Flux iaw EN 50366	10Hz to 400kHz	2.64%
Harmonics and Flicker	The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3	—
Mains Voltage Variations and Interrupts	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11	—
Fast Transient Burst	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4	—
Electrostatic Discharge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2	—
Surge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5	—
Vehicle Transients	The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2	—
Compass Safe Distance	Azimuth Accuracy	0.10°
Channel Occupancy/Separation	19.1kHz	N/A
Maximum Output Power	Not Applicable	±0.5dB
Number of Channels	Not Applicable	N/A
20dB Bandwidth	19.1kHz	±0.5dB

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4-2
† In accordance with UKAS Lab 34
• In accordance with EN61000-4-6

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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).