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Report On

FCC Testing of the Sharp CDMA SHL21 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900 MHz) and Dual Band UMTS (FDD I and V) and Dual Band LTE (B11 and B18) Multi Mode Cellular Phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15C (WLAN and Bluetooth Low Energy)

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FCC ID: APYHRO00178

Document 75918726 Report 12 Issue 2

July 2013



Product Service

TÜV SÜD Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk

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REPORT ON

FCC Testing of the Sharp CDMA SHL21 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900 MHz) and Dual Band UMTS (FDD I and V) and Dual Band LTE (B11 and B18) Multi Mode Cellular Phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15C (WLAN and Bluetooth Low Energy)

Document 75918726 Report 12 Issue 2

July 2013

PREPARED FOR

Sharp Communication Compliance Ltd
Azure House
Bagshot Road
Bracknell
Berkshire
RG12 7QY

PREPARED BY

Natalie Bennett
Senior Administrator (Technical)

APPROVED BY

Mark Jenkins
Authorised Signatory

DATED

18 July 2013

This report has been up-issued to Issue 2 to include Bluetooth Low Energy testing.

ENGINEERING STATEMENT

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

Test Engineer(s);

G Lawler

M Russell

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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp CDMA SHL21 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900
MHz) and Dual Band UMTS (FDD I and V) and Dual Band LTE (B11 and B18) Multi Mode
Cellular Phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15C (WLAN and Bluetooth Low Energy)



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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sharp CDMA SHL21 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900 MHz) and Dual Band UMTS (FDD I and V) and Dual Band LTE (B11 and B18) Multi Mode Cellular Phone with Bluetooth, WLAN, NFC (FeliCa) and GPS to the requirements of FCC CFR 47 Part 15C.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Sharp Corporation
Model Number(s)	CDMA SHL21
Serial Number(s)	IMEI 004401114094770 IMEI 004401114094523 IMEI 004401114094432 IMEI 004401114094630
Number of Samples Tested	4
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2011)
Incoming Release Date	Application Form 30 July 2012
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	9290 03 August 2012
Start of Test	14 August 2012
Finish of Test	14 July 2013
Name of Engineer(s)	G Lawler M Russell
Related Document(s)	ANSI C63.10: 2009



1.2 BRIEF SUMMARY OF RESULTS

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

Section	Spec Clause	Test Description	Result	Comments/Base Standard
802.11(b)				
2.2	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.3	15.247 (b)(4)	EIRP Peak Power	Pass	
2.4	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.5	15.247 (e)	Power Spectral Density	Pass	
2.6	15.247 (2)	6dB Bandwidth	Pass	
802.11(g)				
2.1	15.207	AC Line Conducted Emissions	Pass	
2.2	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.3	15.247 (b)(4)	EIRP Peak Power	Pass	
2.4	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.5	15.247 (e)	Power Spectral Density	Pass	
2.6	15.247 (2)	6dB Bandwidth	Pass	
802.11(n) - 2.4 GHz, 20 MHz BW				
2.2	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.3	15.247 (b)(4)	EIRP Peak Power	Pass	
2.4	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.5	15.247 (e)	Power Spectral Density	Pass	
2.6	15.247 (2)	6dB Bandwidth	Pass	



Product Service

Section	Spec Clause	Test Description	Result	Comments/Base Standard
Bluetooth Low Energy				
2.1	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.2	15.247 (b)(4)	EIRP Peak Power	Pass	
2.3	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.4	15.247 (e)	Power Spectral Density	Pass	
2.5	15.247 (2)	6dB Bandwidth	Pass	



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1.3 APPLICATION FORM

APPLICANT'S DETAILS			
COMPANY NAME :	Sharp Telecommunications of Europe Ltd		
ADDRESS :	Azure House, Bagshot Road Bracknell, Berkshire RG12 7QY		
NAME FOR CONTACT PURPOSES :	Ken Newman		
TELEPHONE NO: 01344 301 883	FAX NO:	01344 300 293	
	E-MAIL:	ken.newman@sharp.eu	

EQUIPMENT INFORMATION			
<u>Equipment designator:</u>			
Model name/number	CDMA SHL21	Identification number	APYHRO00178
<u>Supply Voltage:</u>			
☐	AC mains	State AC voltage V	and AC frequency Hz
☐	DC (external)	State DC voltage V	and DC current A
☒	DC (internal)	State DC voltage ...3.7 V	and Battery type...Li-Ion.
<u>Frequency characteristics:</u>			
Frequency range	2412MHz to 2462MHz	Channel spacing	(if channelized)
Designated test frequencies:			
Bottom: 2412 MHz	Middle: 2437 MHz	Top: 2462MHz	
<u>Power characteristics:</u>			
Maximum transmitter power	0.055W(17.4dBm[av])	Minimum transmitter power	 W
☒	Continuous transmission	(if variable)	
☐	Intermittent transmission	State duty cycle	
If intermittent, can transmitter be set to continuous transmit test mode? Y/N			
<u>Antenna characteristics:</u>			
☐	Antenna connector	State impedance	ohm
☒	Temporary antenna connector	State impedance	50 ohm
☐	Integral antenna	State gain	
<u>Modulation characteristics:</u>			
☐	Amplitude	☐	Other
☐	Frequency	Details:	
☒	Phase		
Can the transmitter operate un-modulated?		N	
ITU Class of emission:			
<u>Extreme conditions:</u>			
Maximum temperature	55 °C	Minimum temperature	-10 °C
Maximum supply voltage	4.0 V	Minimum supply voltage	3.7 V

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

Signature :

Name : Masahiko Kishino

Position held : Manager

Date : 30 July 2012



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp CDMA SHL21 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900 MHz) and Dual Band UMTS (FDD I and V) and Dual Band LTE (B11 and B18) Multi Mode Cellular Phone with Bluetooth, WLAN, NFC (FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

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

The EUT was powered from a 4.0 V DC supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

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



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SECTION 2

TEST DETAILS

FCC Testing of the
Sharp CDMA SHL21 Dual Band CDMA (BC0 and BC6) and Tri Band GSM (900, 1800 and 1900
MHz) and Dual Band UMTS (FDD I and V) and Dual Band LTE (B11 and B18) Multi Mode
Cellular Phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15C (WLAN and Bluetooth Low Energy)



2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.207

2.1.2 Equipment Under Test and Modification State

CDMA SHL21 S/N: IMEI 004401114094770 - Modification State 0

2.1.3 Date of Test

18 September 2012

2.1.4 Test Equipment Used

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

2.1.5 Test Procedure

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

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

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

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

2.1.6 Environmental Conditions

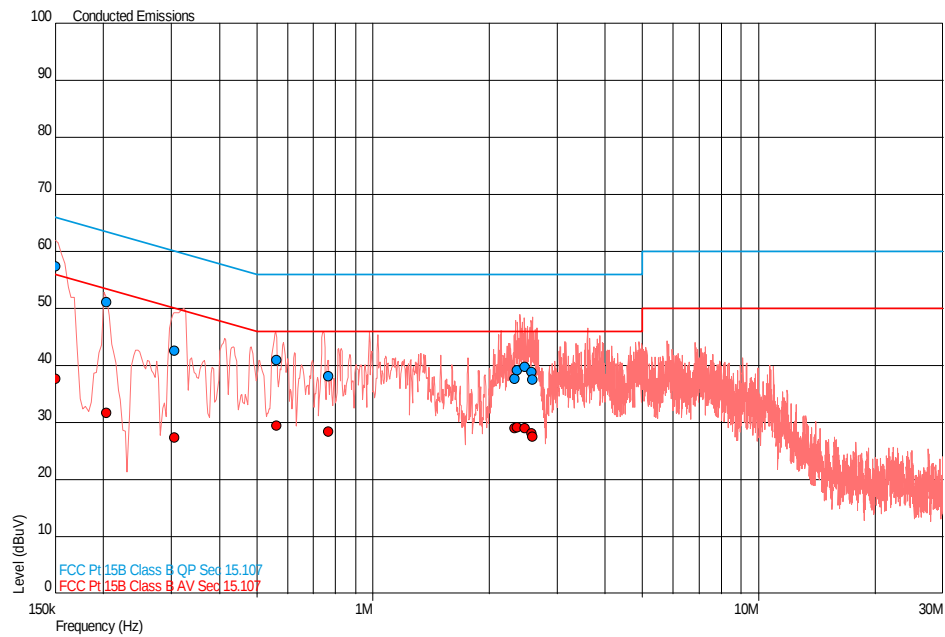
Ambient Temperature	19.3°C
Relative Humidity	40.0%



2.1.7 Test Results

802.11(g)

Live Line

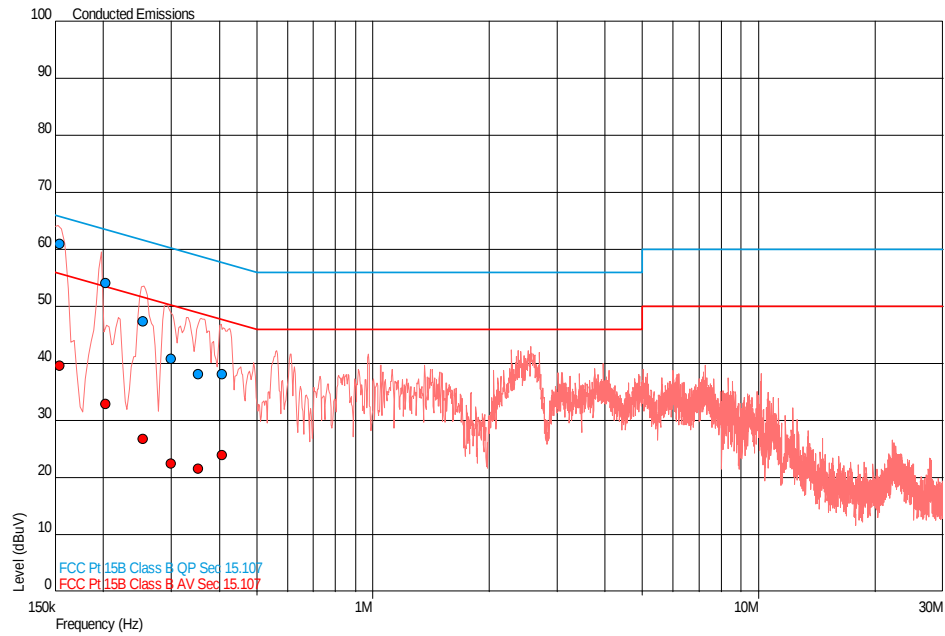


Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)	
0.150	57.4	66.0	-8.6	37.7	56.0	-18.3	
0.204	51.2	63.5	-12.3	31.8	53.5	-21.7	
0.305	42.6	60.1	-17.5	27.4	50.1	-22.7	
0.563	40.9	56.0	-15.1	29.4	46.0	-16.6	
0.765	38.1	56.0	-17.9	28.4	46.0	-17.6	
2.329	37.7	56.0	-18.3	29.1	46.0	-16.9	
2.364	39.2	56.0	-16.8	29.3	46.0	-16.7	
2.471	39.7	56.0	-16.3	29.0	46.0	-17.0	
2.581	38.9	56.0	-17.1	28.2	46.0	-17.8	
2.595	37.5	56.0	-18.5	27.6	46.0	-18.4	



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Neutral Line



Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)	
0.154	61.0	65.8	-4.8	39.7	55.8	-16.1	
0.203	54.1	63.5	-9.4	32.9	53.5	-20.6	
0.253	47.4	61.7	-14.3	26.8	51.7	-24.9	
0.300	40.8	60.2	-19.4	22.4	50.2	-27.8	
0.352	38.1	58.9	-20.8	21.5	48.9	-27.4	
0.406	38.1	57.7	-19.6	24.0	47.7	-23.7	



Product Service

2.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

CDMA SHL21 S/N: IMEI 004401114094523 - Modification State 0

CDMA SHL21 S/N: IMEI 004401114094432 - Modification State 0

2.2.3 Date of Test

16 August 2012 and 11 July 2013

2.2.4 Test Equipment Used

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

2.2.5 Test Procedure

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

2.2.6 Environmental Conditions

Ambient Temperature 22.0 - 24.8°C

Relative Humidity 47.6 - 53.2%



2.2.7 Test Results

802.11(b)

4.0 V DC Supply

Modulation Data Rate (Mbps)	Maximum Peak Conducted Output Power					
	dBm			mW		
	2412 MHz	2437 MHz	2462 MHz	2412 MHz	2437 MHz	2462 MHz
1	17.32	17.87	17.80	53.913	61.196	60.214
2	17.29	17.81	17.81	53.523	60.436	60.436
5.5	17.22	17.77	17.88	52.744	59.816	61.441
11	17.38	18.00	17.32	54.728	63.030	53.913

Limit Clause

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

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

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

802.11(g)

4.0 V DC Supply

Modulation Data Rate (Mbps)	Maximum Peak Conducted Output Power					
	dBm			mW		
	2412 MHz	2437 MHz	2462 MHz	2412 MHz	2437 MHz	2462 MHz
6	22.10	22.42	21.85	162.120	174.639	153.088
9	22.07	22.44	21.91	160.988	175.198	155.337
12	22.14	22.23	21.79	163.595	163.595	167.097
18	22.01	22.23	21.81	158.823	167.229	151.535
24	22.21	22.27	21.77	166.191	168.747	150.457
36	22.18	22.30	21.93	165.154	169.786	156.011
48	22.15	22.29	21.86	163.919	169.373	153.427
54	22.16	22.36	21.80	164.412	172.140	151.514

Limit Clause

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

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

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

802.11(n) - 2.4 GHz, 20 MHz BW

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	20.34	21.79	21.24	108.197	151.005	132.921
13	20.28	21.45	21.44	106.665	139.732	139.333
19.5	20.08	21.83	21.45	101.850	152.451	139.551
26	20.21	21.46	21.26	104.985	139.937	133.705
39	20.51	21.57	21.37	112.458	143.574	136.9445
52	20.57	21.83	20.96	114.088	152.249	124.681
58.5	20.76	21.59	21.36	119.241	144.144	136.889
65	20.27	21.51	21.43	106.365	141.701	138.985

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.



Bluetooth Low Energy

4.0 V DC Supply

Packet Type	Maximum Peak Conducted Output Power					
	dBm			mW		
	2402 MHz	2441 MHz	2480 MHz	2402 MHz	2441 MHz	2480 MHz
37 oct/prbs9	-1.87	-2.45	-2.68	0.651	0.569	0.539

Limit Clause

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

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

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



Product Service

2.3 EIRP PEAK POWER

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test and Modification State

CDMA SHL21 S/N: IMEI 004401114094770 - Modification State 0

CMDA SHL21 S/N: IMEI 004401114094630 - Modification State 0

2.3.3 Date of Test

26 August 2012, 27 August 2012 and 13 July 2013

2.3.4 Test Equipment Used

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

2.3.5 Test Procedure

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

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

A calculation was then performed to obtain the final figure.

2.3.6 Environmental Conditions

Ambient Temperature	18.9 - 19.2°C
Relative Humidity	40.0 - 57.0%



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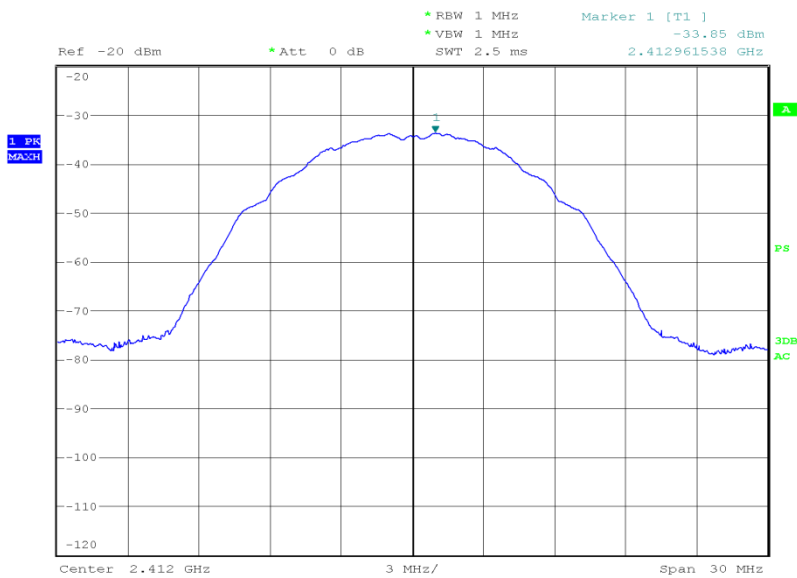
2.3.7 Test Results

802.11(b)

4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
15.57	36.06



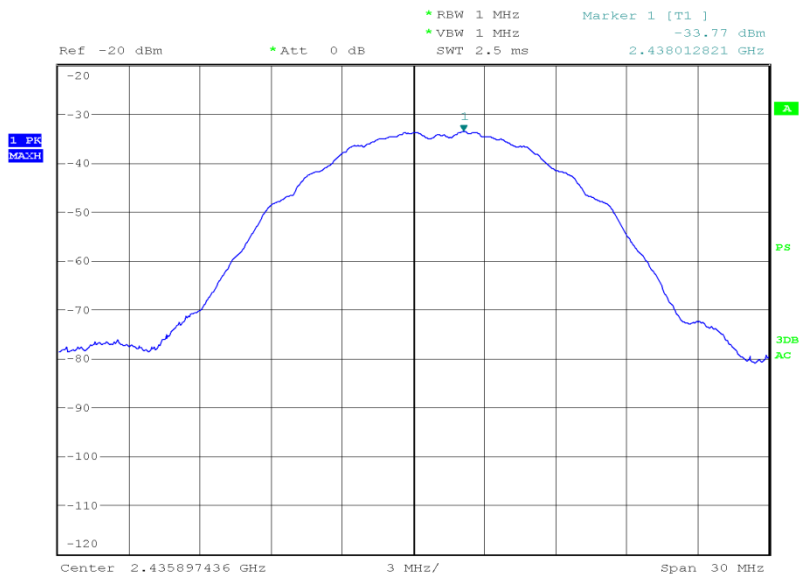
Date: 26.AUG.2012 15:19:10



Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
15.92	39.08



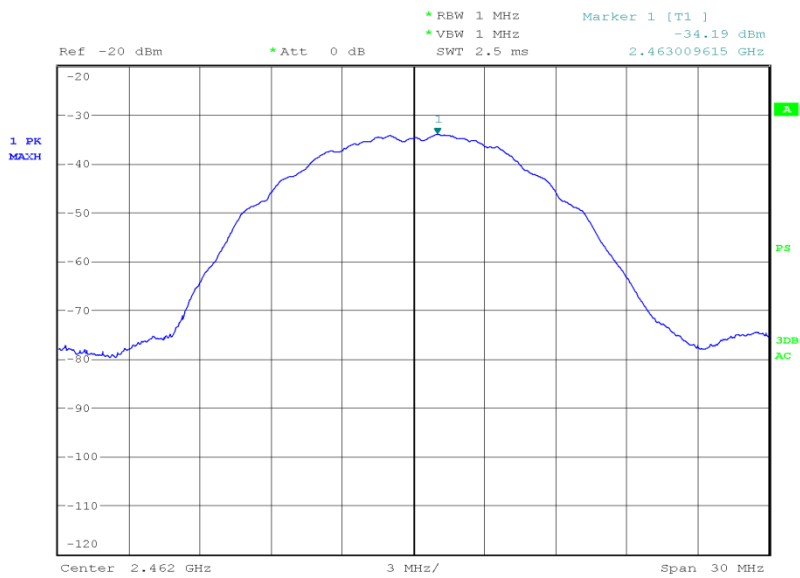
Date: 26.AUG.2012 15:44:31



Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
14.29	26.85



Date: 26.AUG.2012 15:55:08

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



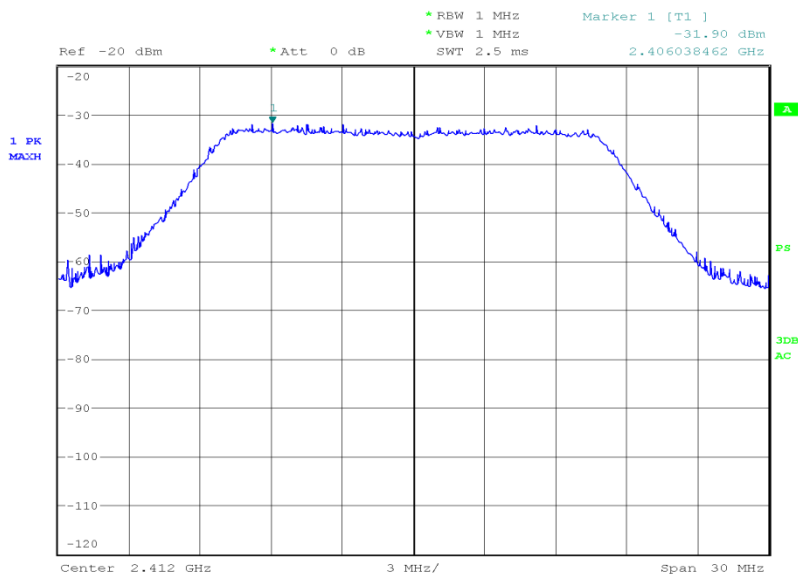
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802.11(g)

4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
19.88	97.27



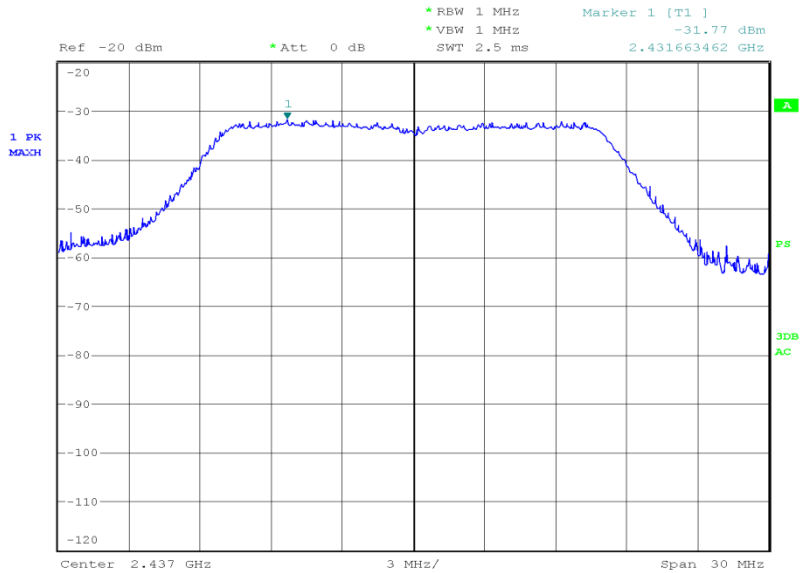
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Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
20.28	106.66



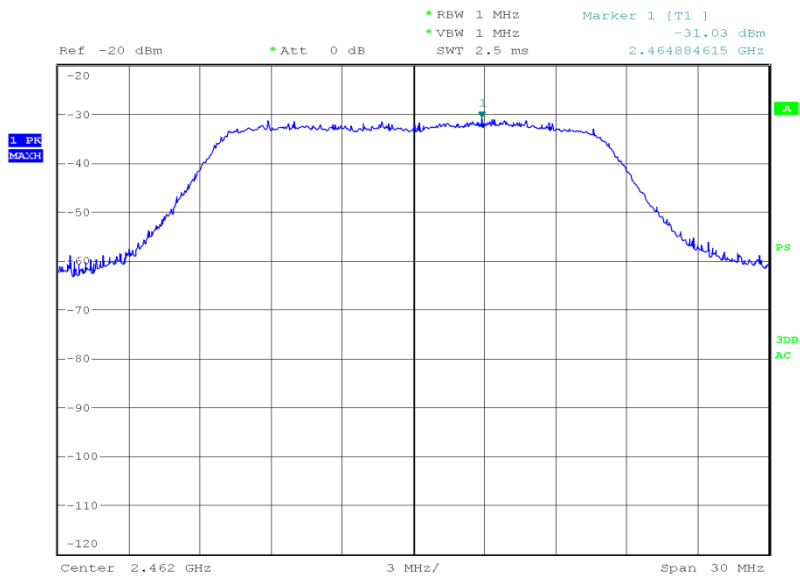
Date: 27.AUG.2012 08:08:45



Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
19.81	95.72



Date: 27.AUG.2012 08:59:59

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



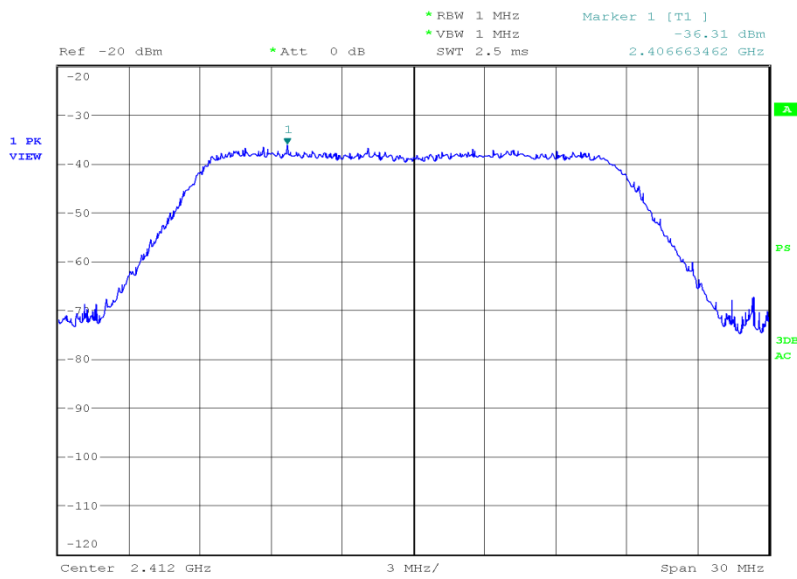
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802.11(n) - 2.4 GHz, 20 MHz BW

4.0 V DC Supply

2412 MHz

EIRP (dBm)	EIRP (mW)
16.59	45.60



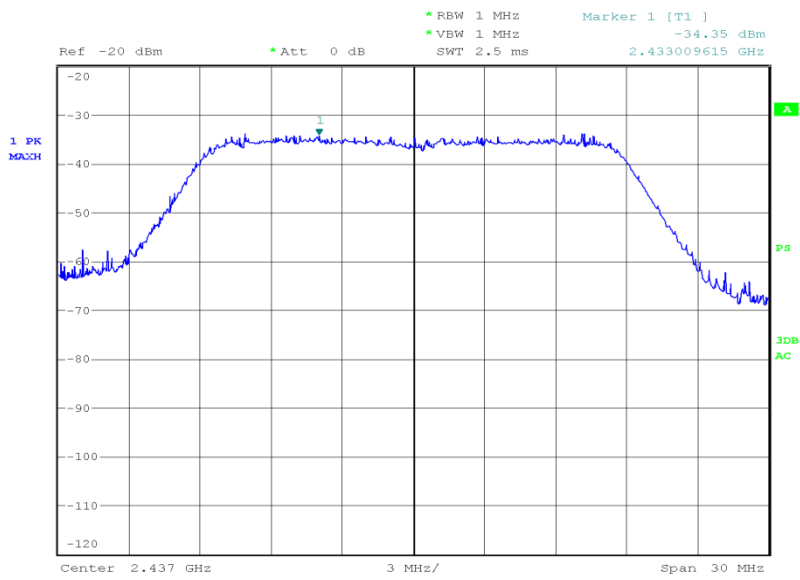
Date: 27.AUG.2012 09:32:56



Product Service

2437 MHz

EIRP (dBm)	EIRP (mW)
18.82	76.21



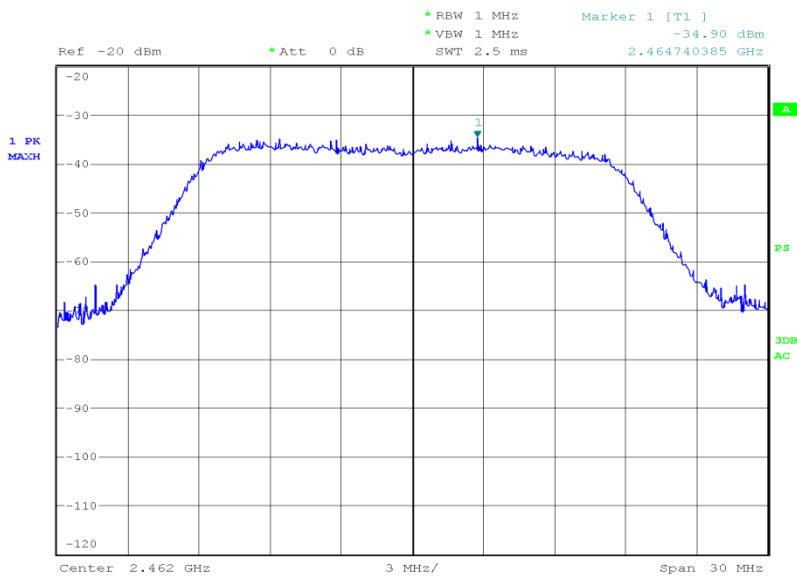
Date: 27.AUG.2012 10:35:07



Product Service

2462 MHz

EIRP (dBm)	EIRP (mW)
17.06	50.82



Date: 27.AUG.2012 10:40:16

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000

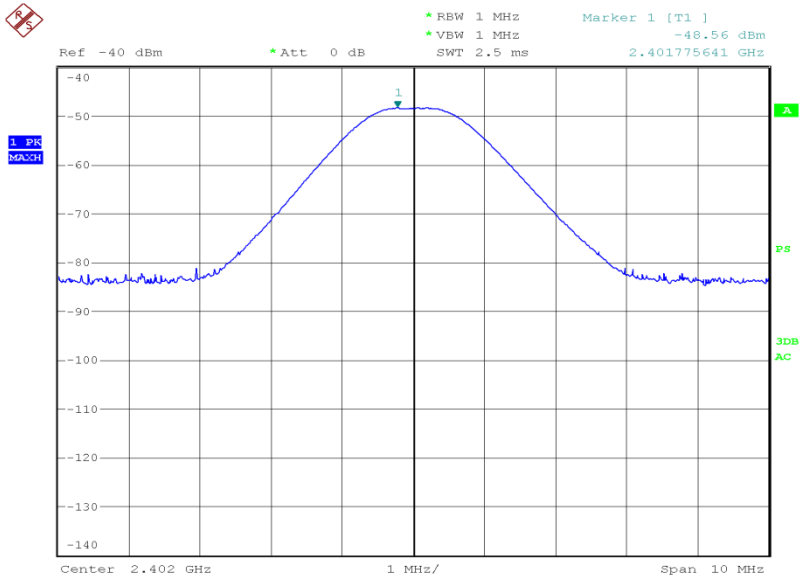


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Bluetooth Low Energy

2402 MHz

EIRP (dBm)	EIRP (mW)
-7.24	0.189



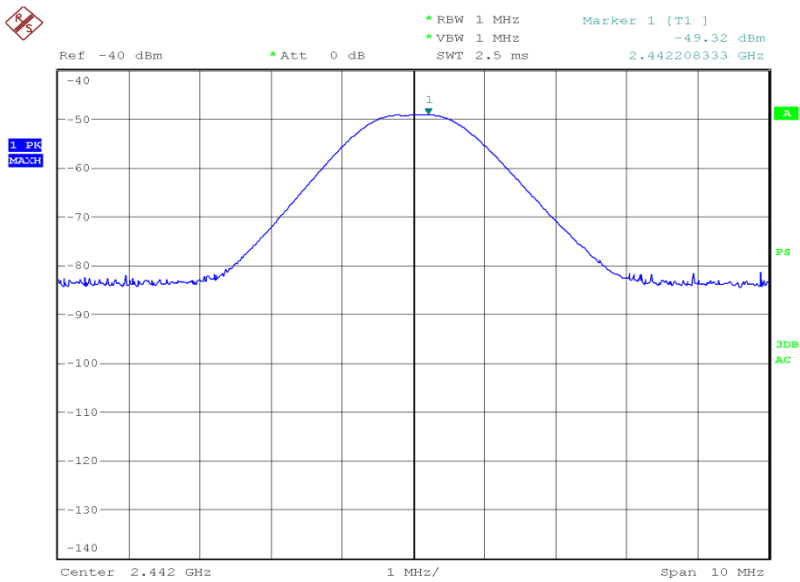
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Product Service

2441 MHz

EIRP (dBm)	EIRP (mW)
-7.98	0.159



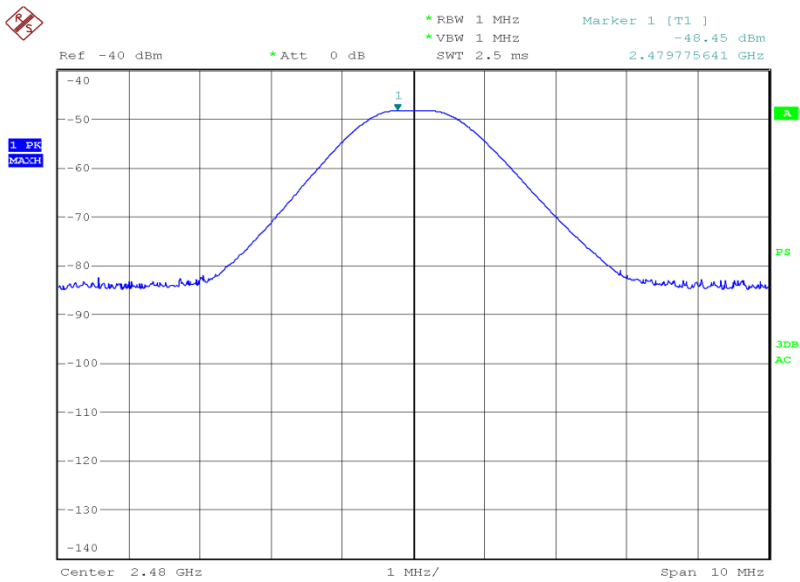
Date: 13.JUL.2013 09:23:34



Product Service

2480 MHz

EIRP (dBm)	EIRP (mW)
-6.61	0.218



Date: 13.JUL.2013 08:57:36

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000



Product Service

2.4 SPURIOUS AND BAND EDGE EMISSIONS

2.4.1 Specification Reference

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

2.4.2 Equipment Under Test and Modification State

CDMA SHL21 S/N: IMEI 004401114094770 - Modification State 0

CDMA SHL21 S/N: IMEI 004401114094630 - Modification State 0

2.4.3 Date of Test

20 August 2012, 26 August 2012, 27 August 2012, 2 September 2012, 3 September 2012, 16 September 2012, 11 July 2013 and 14 July 2013

2.4.4 Test Equipment Used

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

2.4.5 Test Procedure

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

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

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

2.4.6 Environmental Conditions

Ambient Temperature	18.1 - 25.9°C
Relative Humidity	46.0 - 53.2%

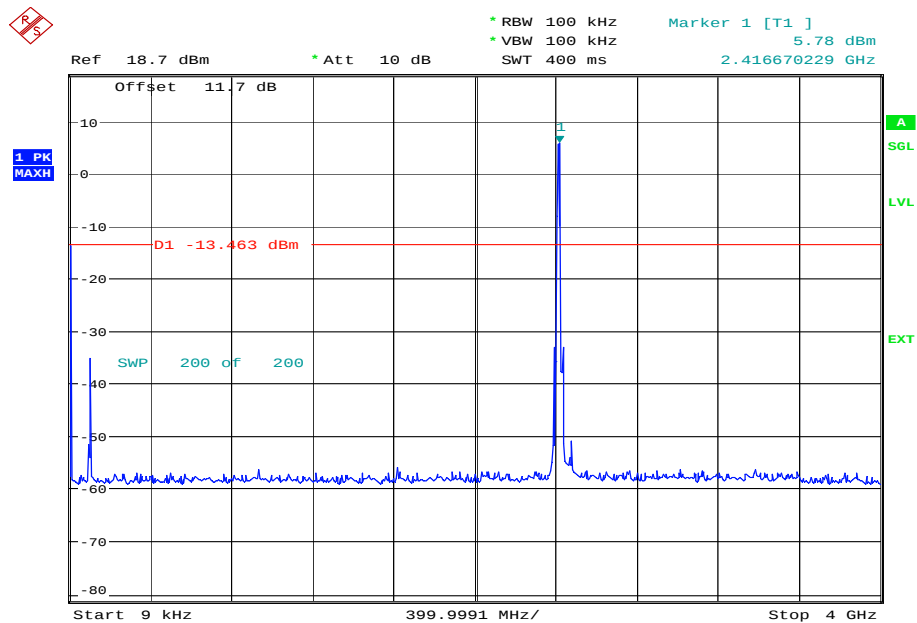


Product Service

2.4.7 Test Results

802.11(b)

4.0 V DC Supply

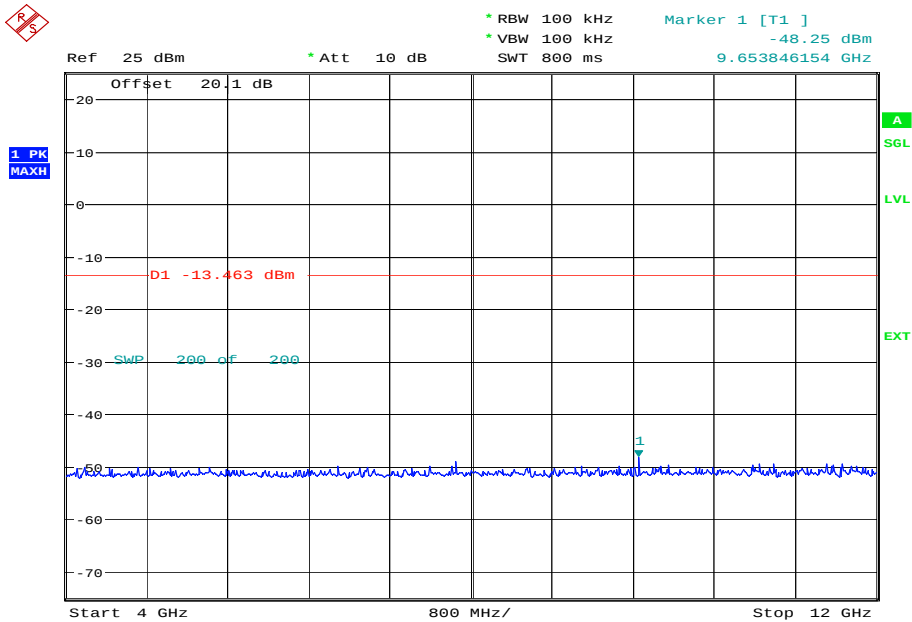
Spurious Conducted Emissions1 Mbps2412 MHz9 kHz to 4 GHz

Date: 20.AUG.2012 09:43:57



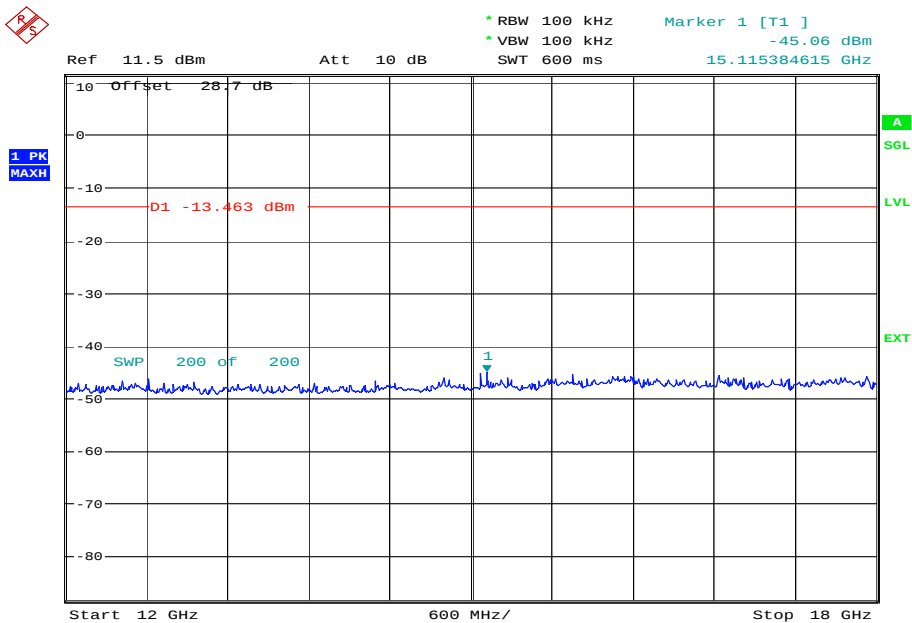
Product Service

4 GHz to 12 GHz



Date: 20.AUG.2012 10:46:21

12 GHz to 18 GHz

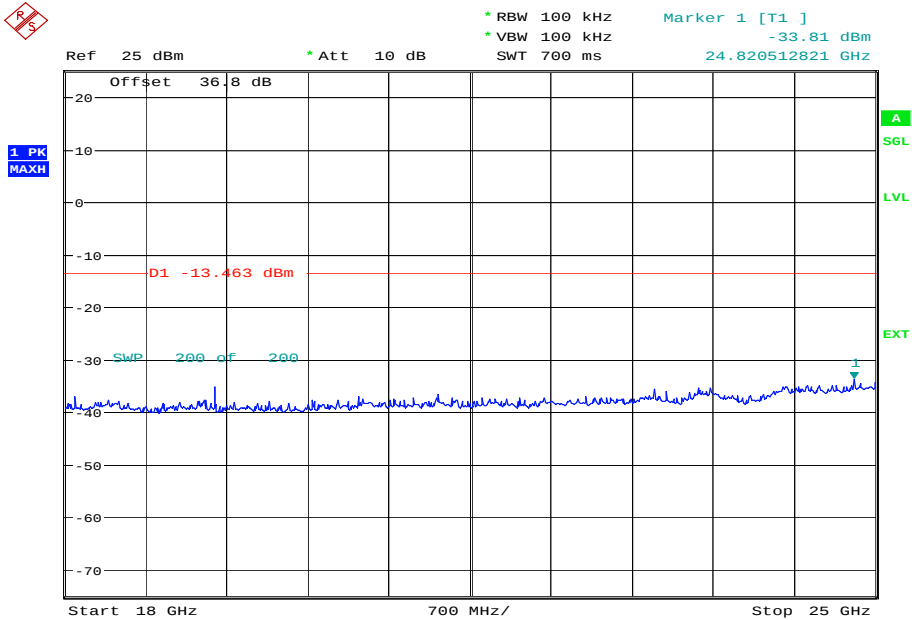


Date: 20.AUG.2012 10:49:24



Product Service

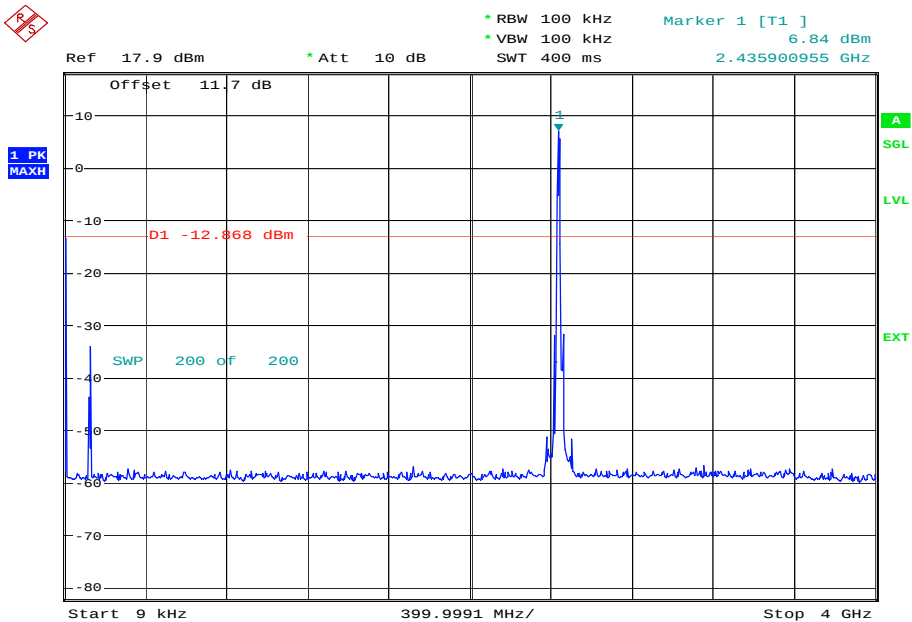
18 GHz to 25 GHz



Date: 20.AUG.2012 11:31:46

2437 MHz

9 kHz to 4 GHz

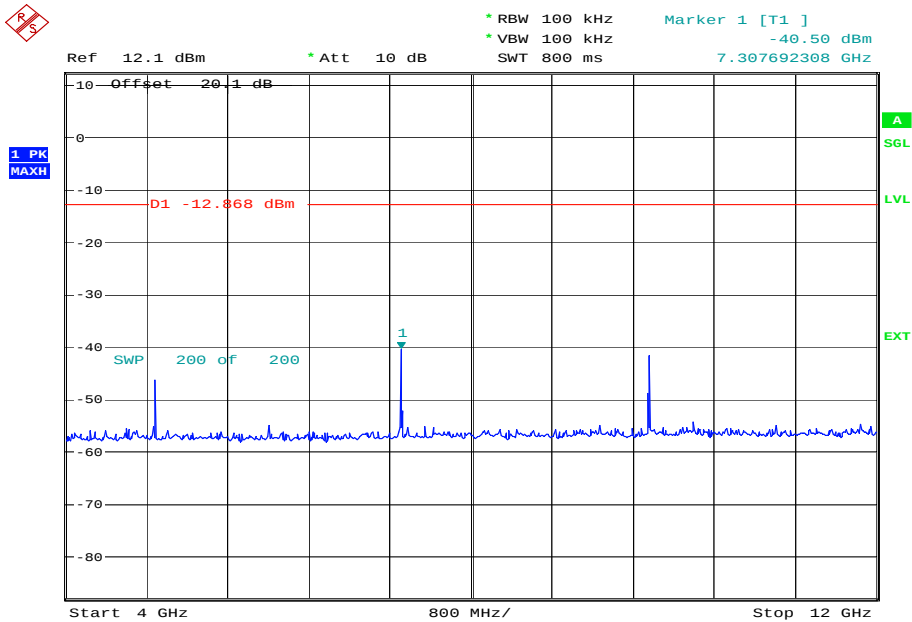


Date: 20.AUG.2012 09:46:49



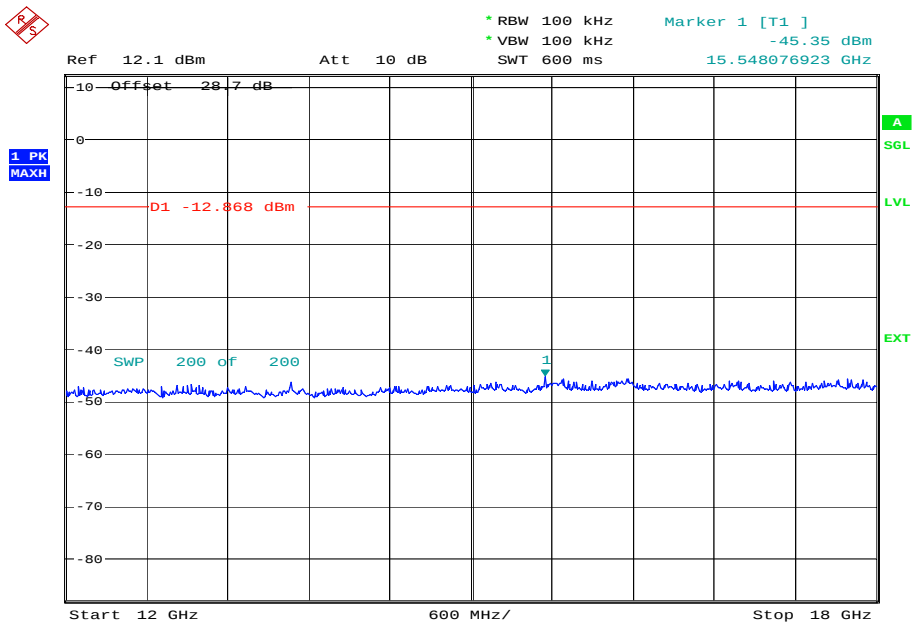
Product Service

4 GHz to 12 GHz



Date: 20.AUG.2012 10:53:44

12 GHz to 18 GHz

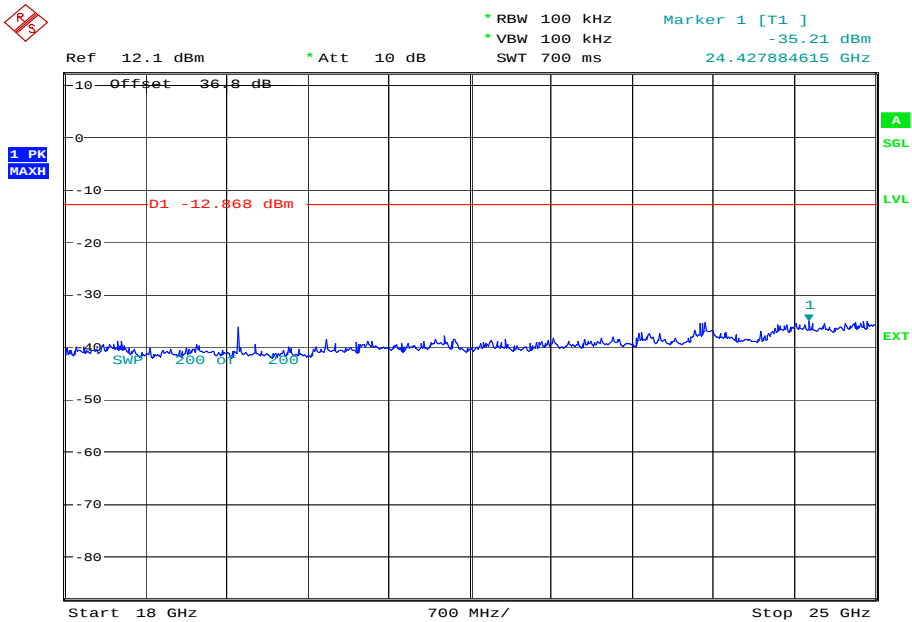


Date: 20.AUG.2012 10:56:11



Product Service

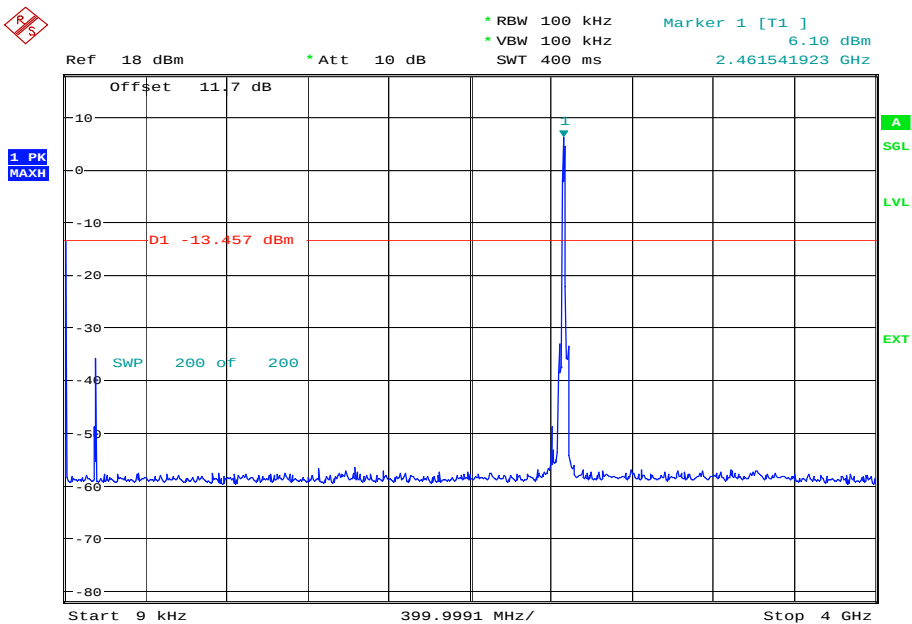
18 GHz to 25 GHz



Date: 20.AUG.2012 11:34:47

2462 MHz

9 kHz to 4 GHz

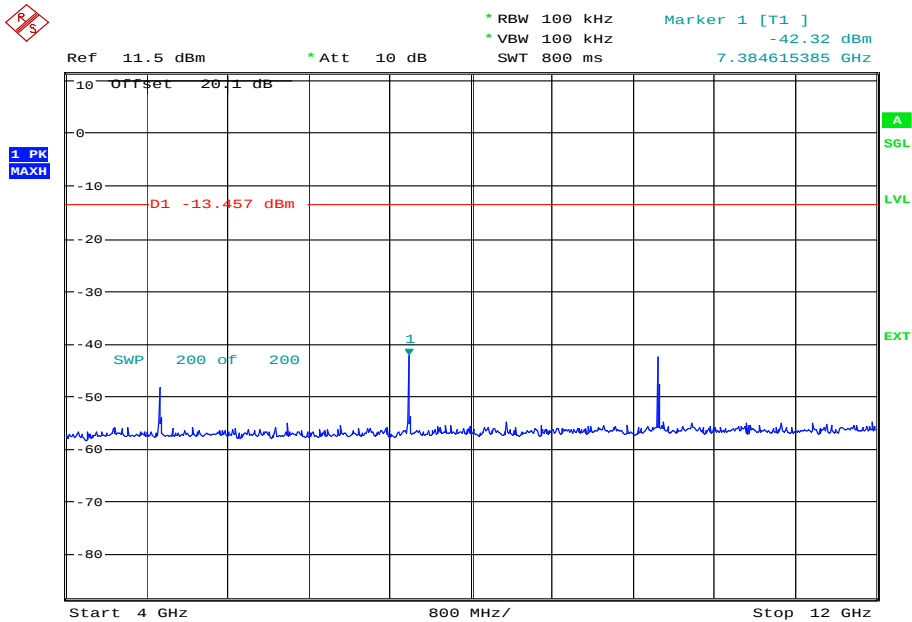


Date: 20.AUG.2012 09:49:57



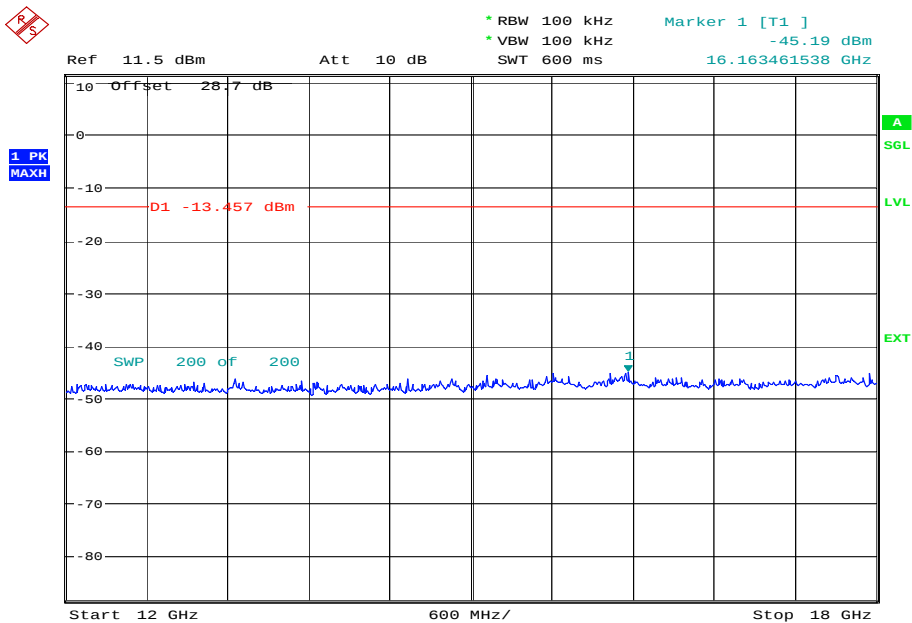
Product Service

4 GHz to 12 GHz



Date: 20.AUG.2012 10:59:44

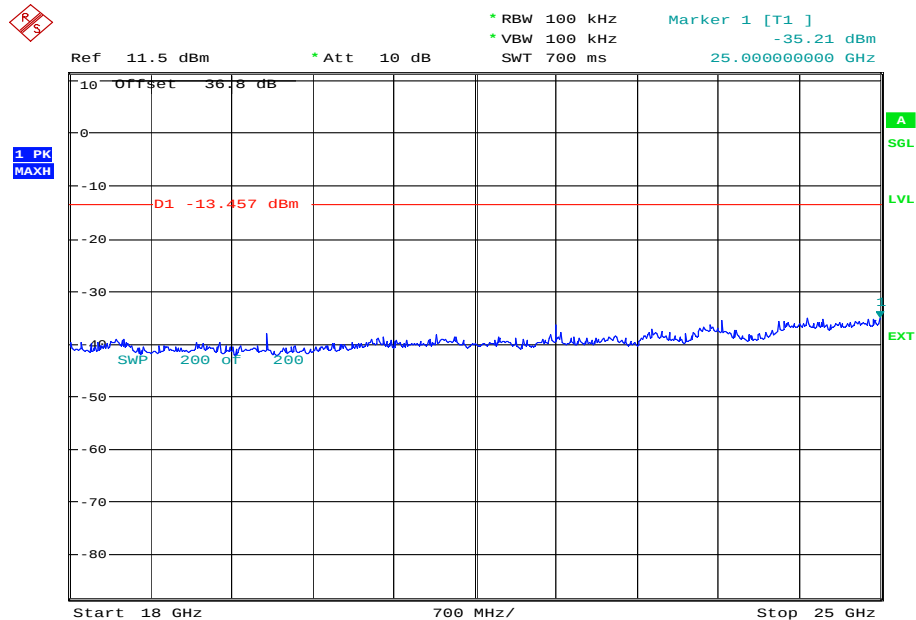
12 GHz to 18 GHz



Date: 20.AUG.2012 11:02:41



Product Service

18 GHz to 25 GHz

Date: 20.AUG.2012 11:38:11

Limit Clause

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

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

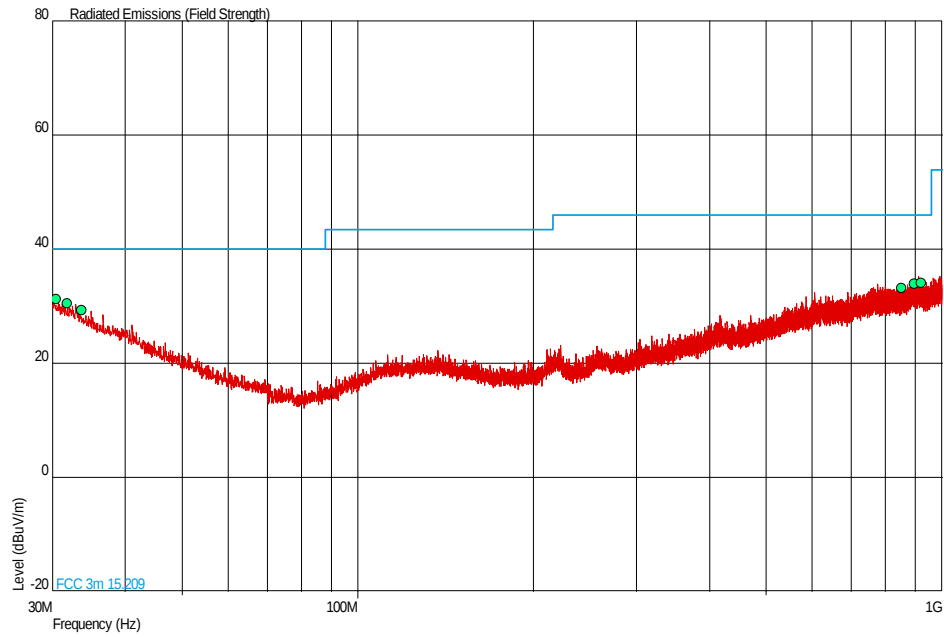


Product Service

Spurious Radiated Emissions

2412 MHz

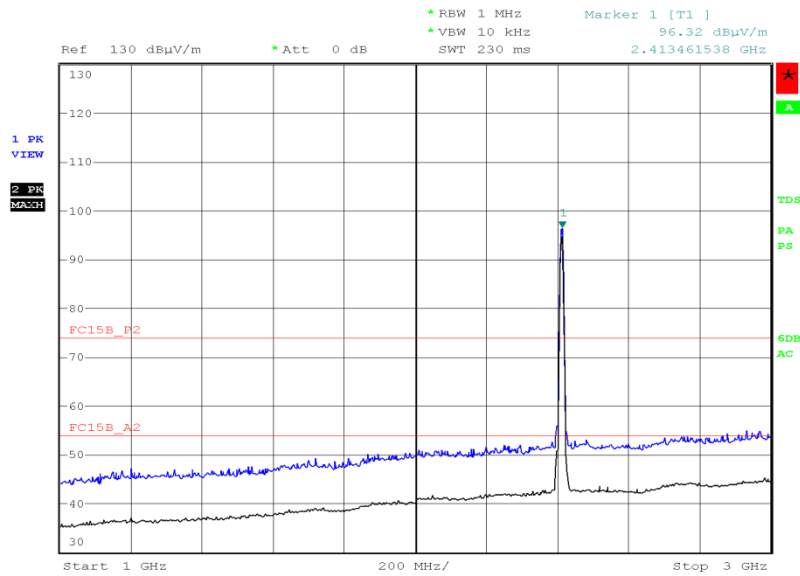
30 MHz to 1 GHz



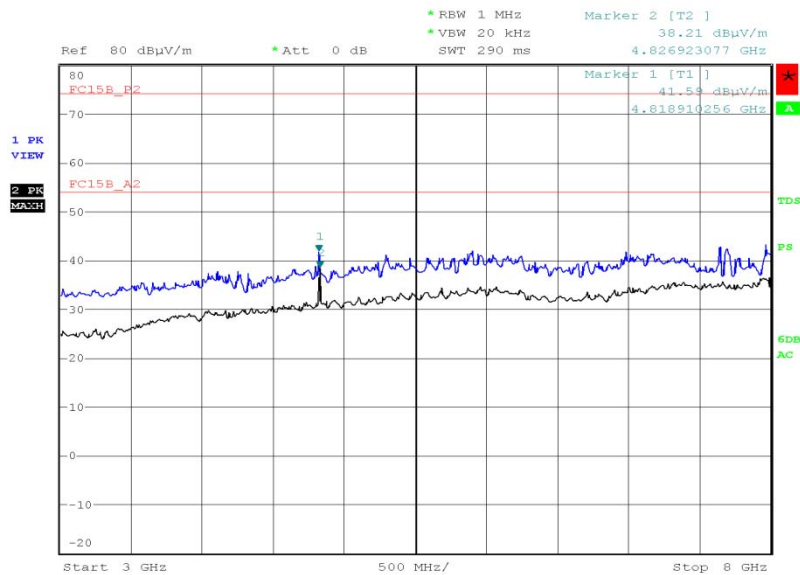
Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
30.485	31.3	36.7	40.0	100	-8.7	63.3	90	1.00	Vertical
31.795	30.5	33.5	40.0	100	-9.5	66.5	0	1.00	Vertical
33.686	29.3	29.2	40.0	100	-10.7	70.8	180	1.00	Vertical
853.530	33.2	45.7	46.0	200	-12.8	154.3	0	1.00	Vertical
897.326	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Vertical
920.654	34.1	50.7	46.0	200	-11.9	149.3	90	1.00	Vertical



Product Service

1 GHz to 3 GHz

Date: 26.AUG.2012 15:31:17

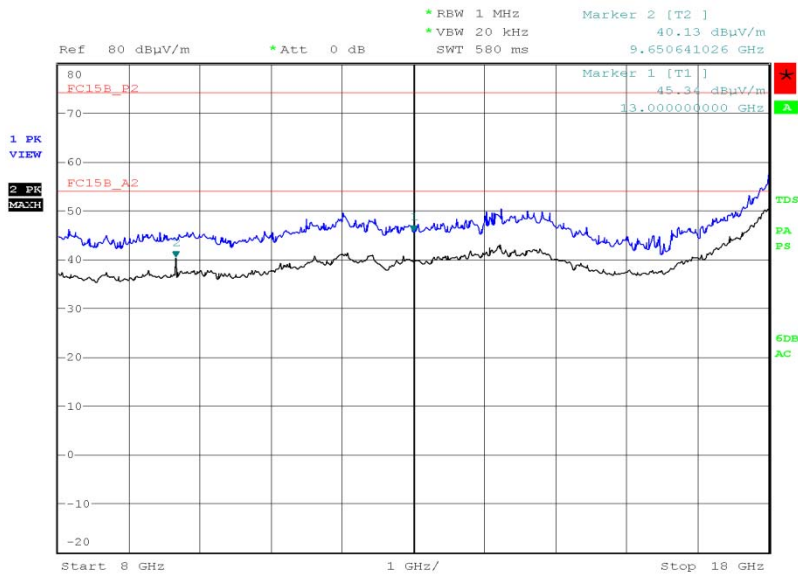
3 GHz to 8 GHz

Date: 2.SEP.2012 11:53:13



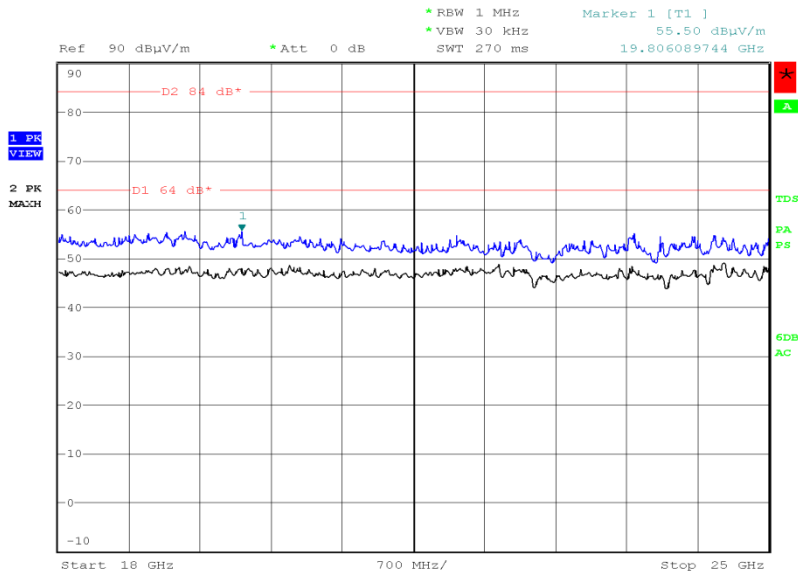
Product Service

8 GHz to 18 GHz



Date: 2.SEP.2012 14:17:50

18 GHz to 25 GHz



Date: 16.SEP.2012 15:41:02

Limit

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

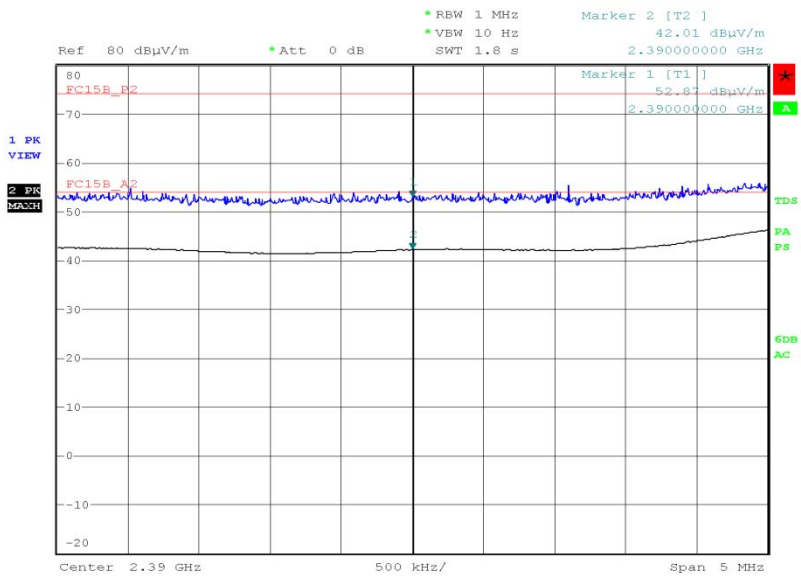


Product Service

Band Edge Emissions

2412 MHz

Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Horizontal	52.87	42.01



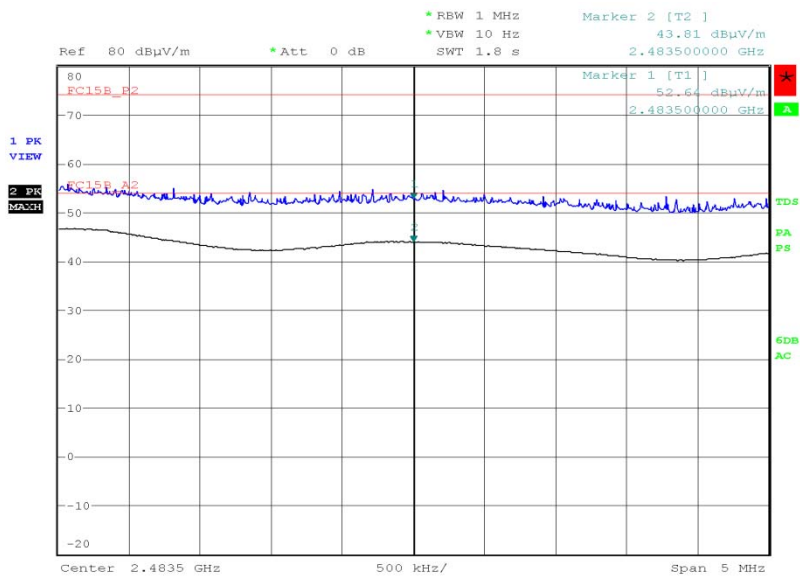
Date: 26.AUG.2012 15:21:29



Product Service

2462 MHz

Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Horizontal	52.64	43.81



Date: 26.AUG.2012 15:59:18

Limit

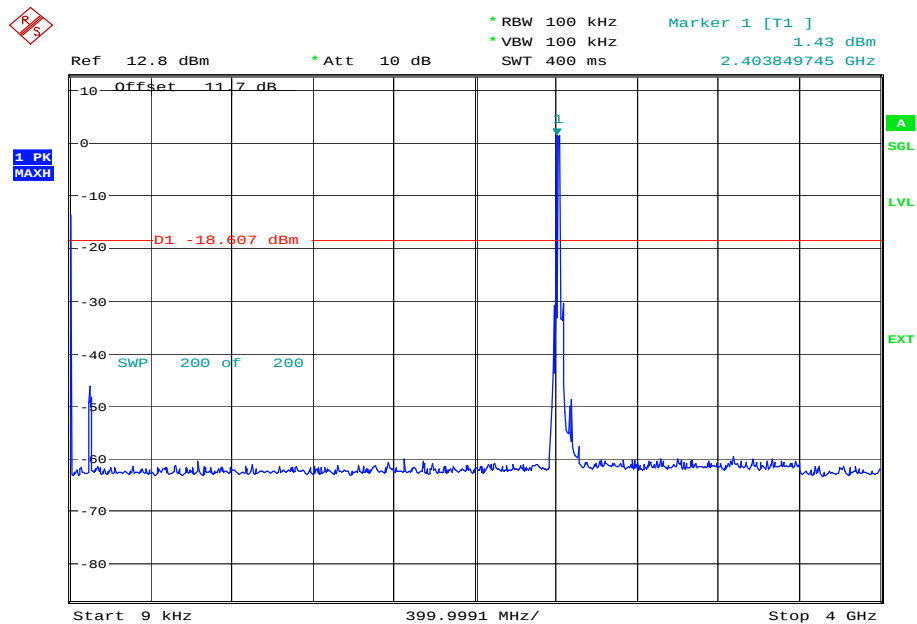
Peak (dBμV/m)	Average (dBμV/m)
74.0	54.0



Product Service

802.11(g)

4.0 V DC Supply

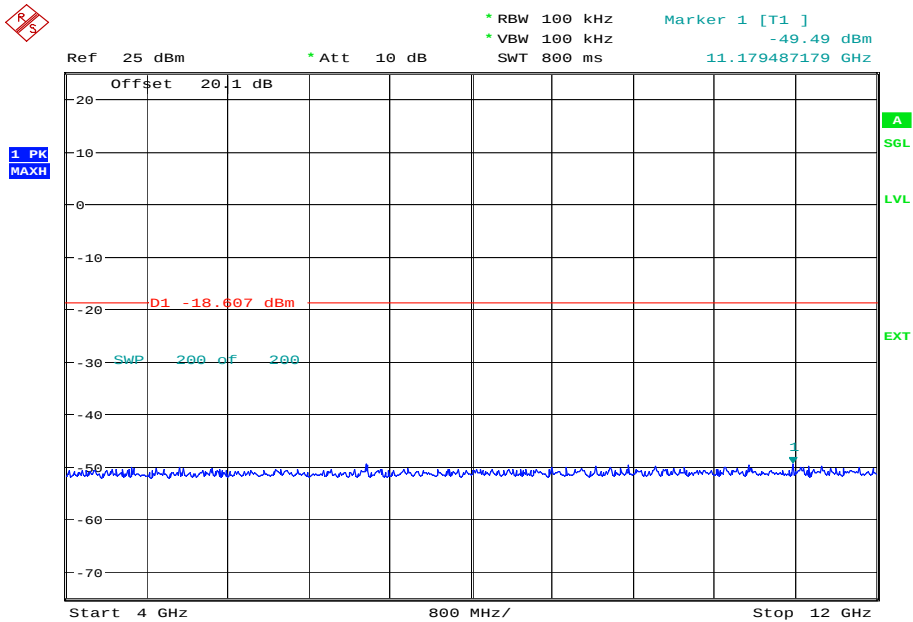
Spurious Conducted Emissions48 Mbps2412 MHz9 kHz to 4 GHz

Date: 20.AUG.2012 09:53:56



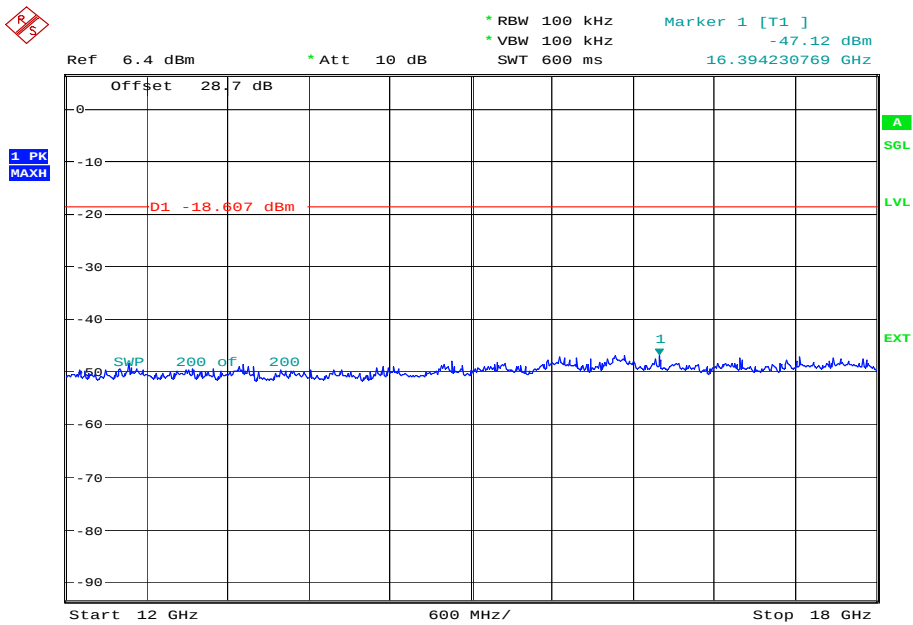
Product Service

4 GHz to 12 GHz



Date: 20.AUG.2012 11:07:31

12 GHz to 18 GHz

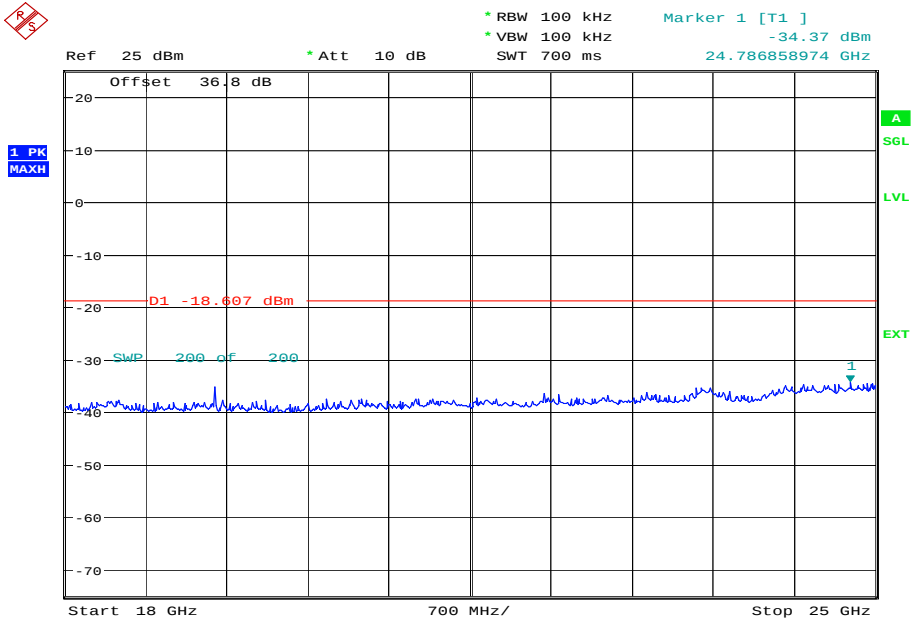


Date: 20.AUG.2012 11:10:00



Product Service

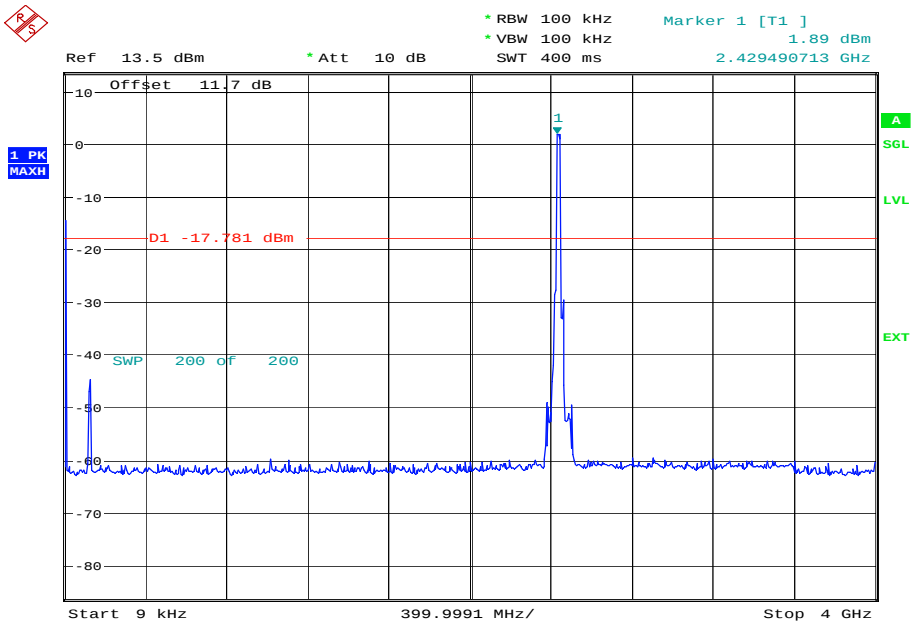
18 GHz to 25 GHz



Date: 20.AUG.2012 11:41:46

2437 MHz

9 kHz to 4 GHz

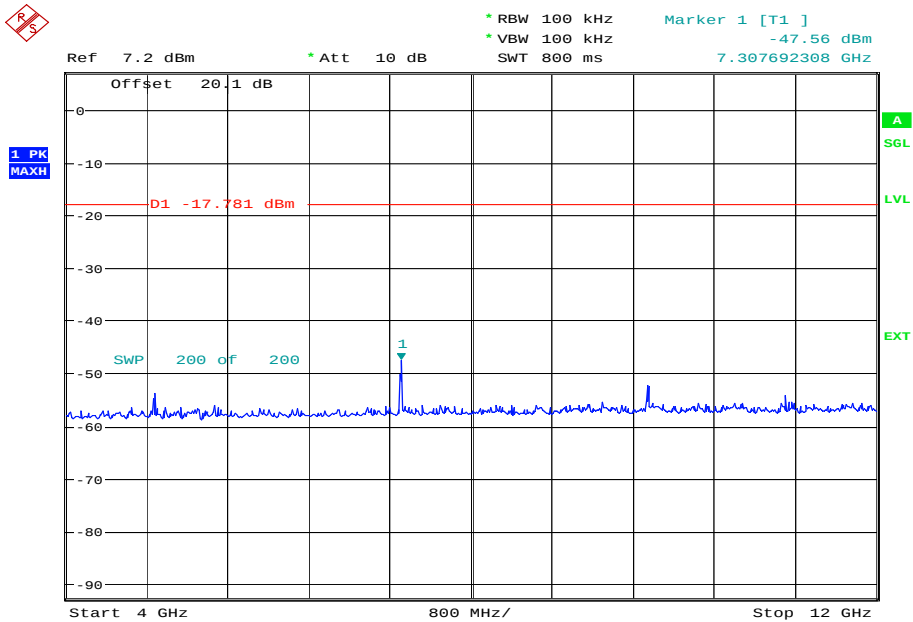


Date: 20.AUG.2012 10:06:58



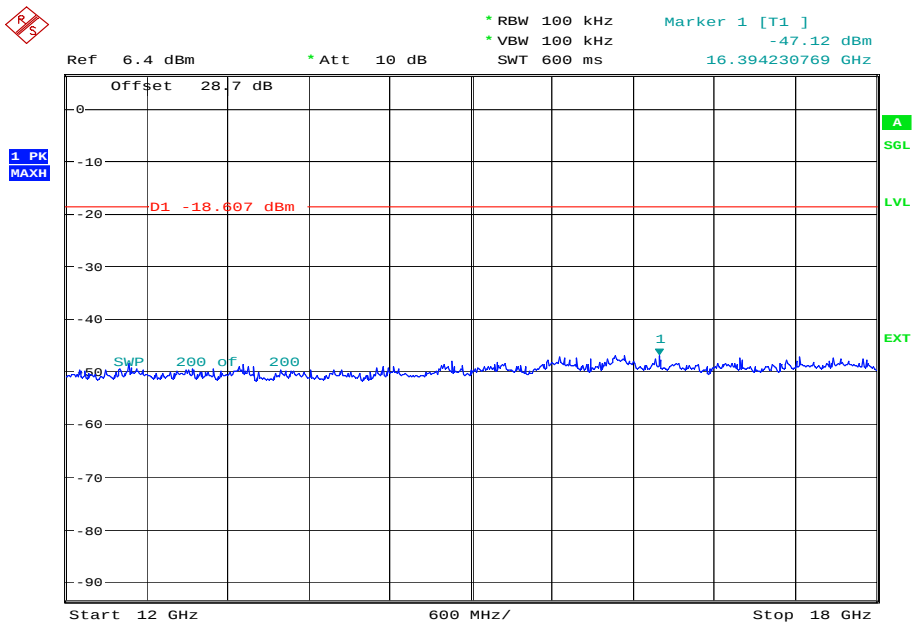
Product Service

4 GHz to 12 GHz



Date: 20.AUG.2012 11:14:04

12 GHz to 18 GHz

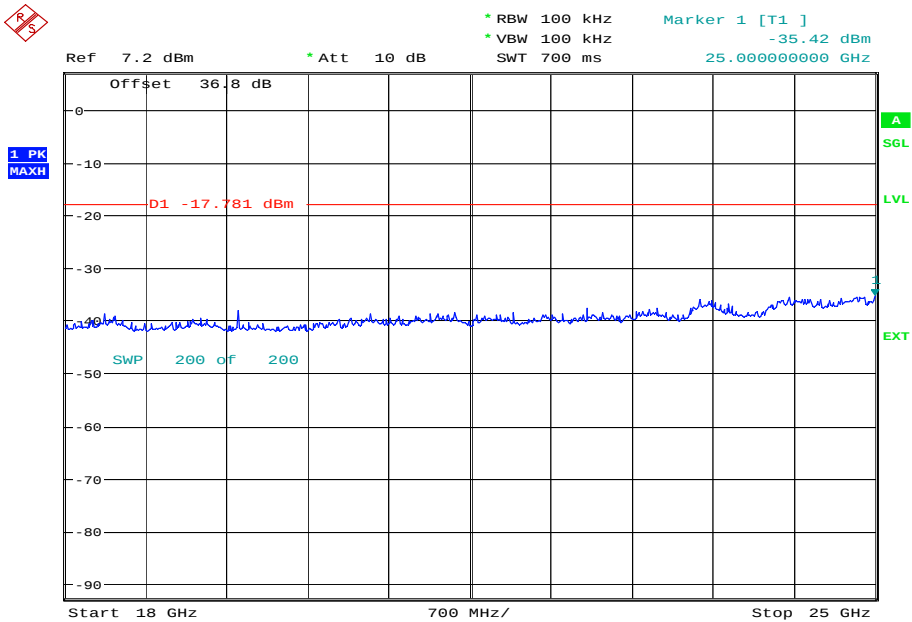


Date: 20.AUG.2012 11:10:00



Product Service

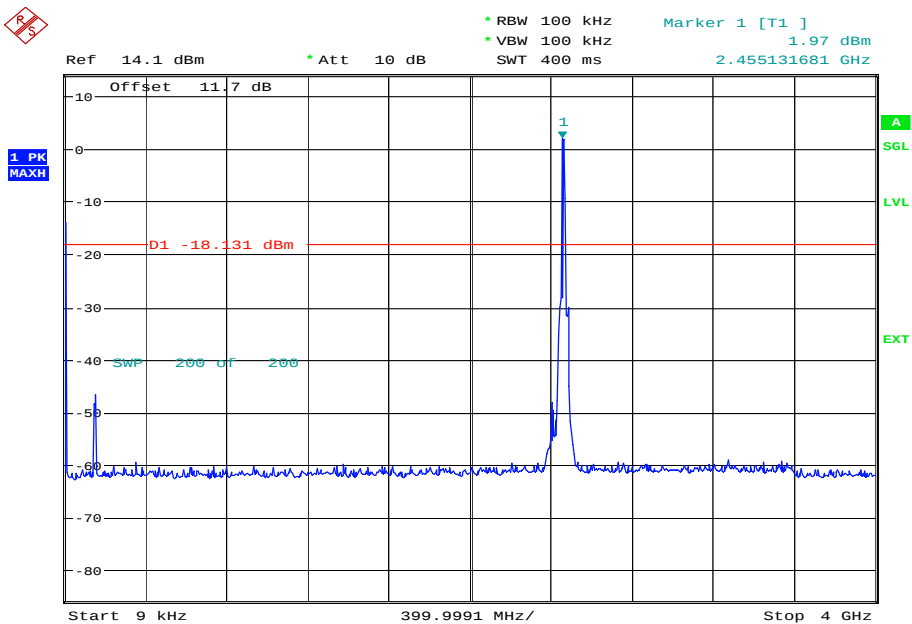
18 GHz to 25 GHz



Date: 20.AUG.2012 11:45:00

2462 MHz

9 kHz to 4 GHz

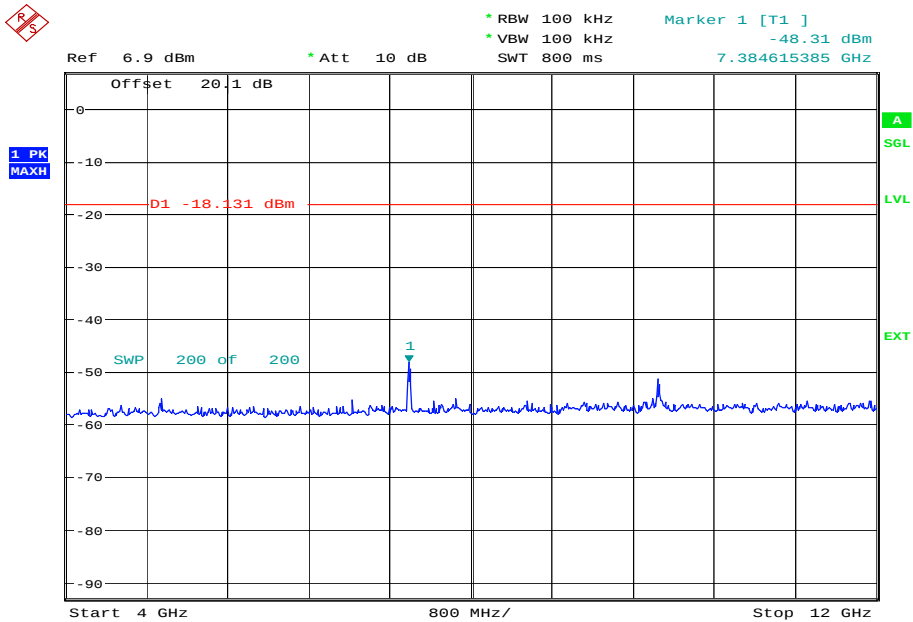


Date: 20.AUG.2012 10:10:01



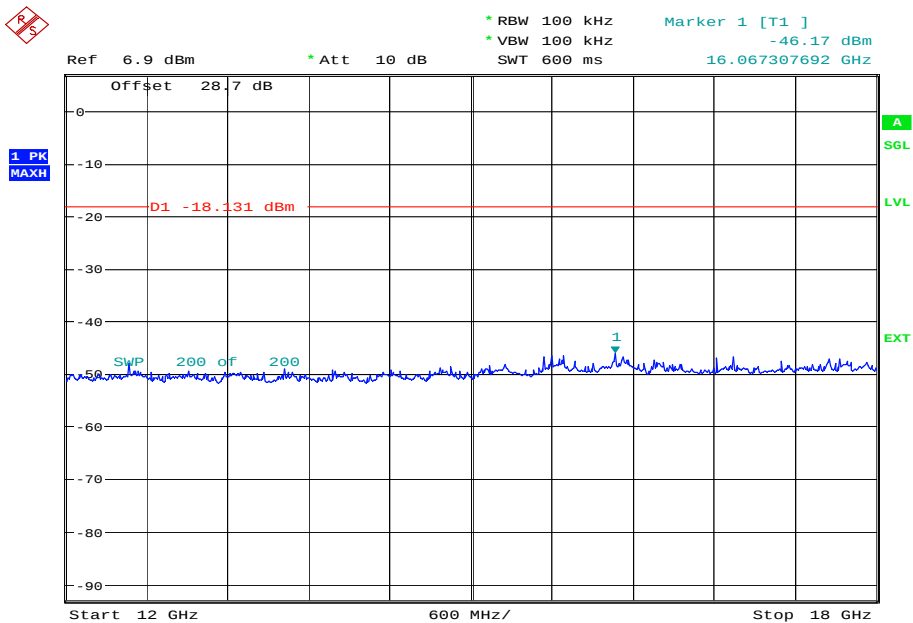
Product Service

4 GHz to 12 GHz



Date: 20.AUG.2012 11:20:33

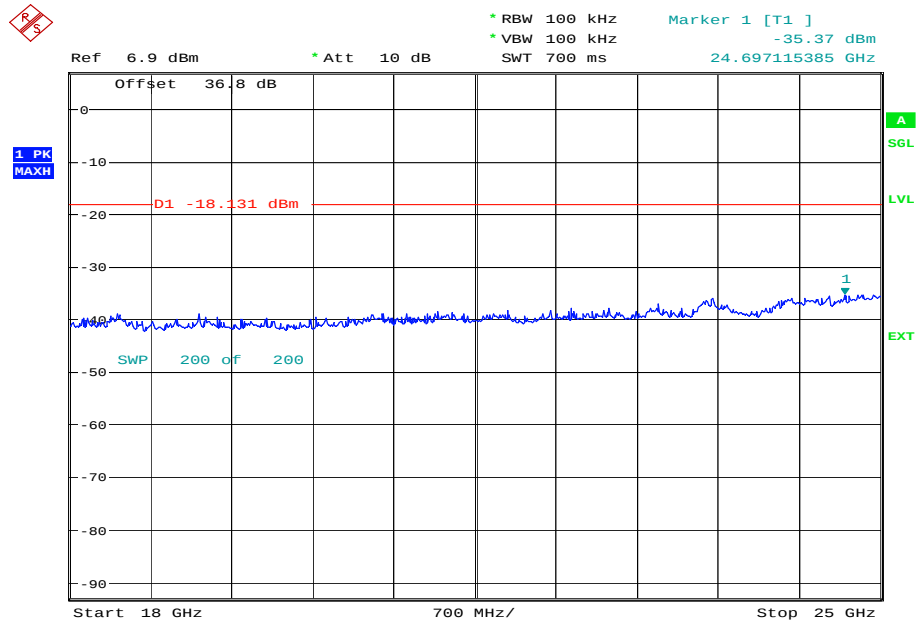
12 GHz to 18 GHz



Date: 20.AUG.2012 11:23:00



Product Service

18 GHz to 25 GHz

Date: 20.AUG.2012 11:48:52

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.

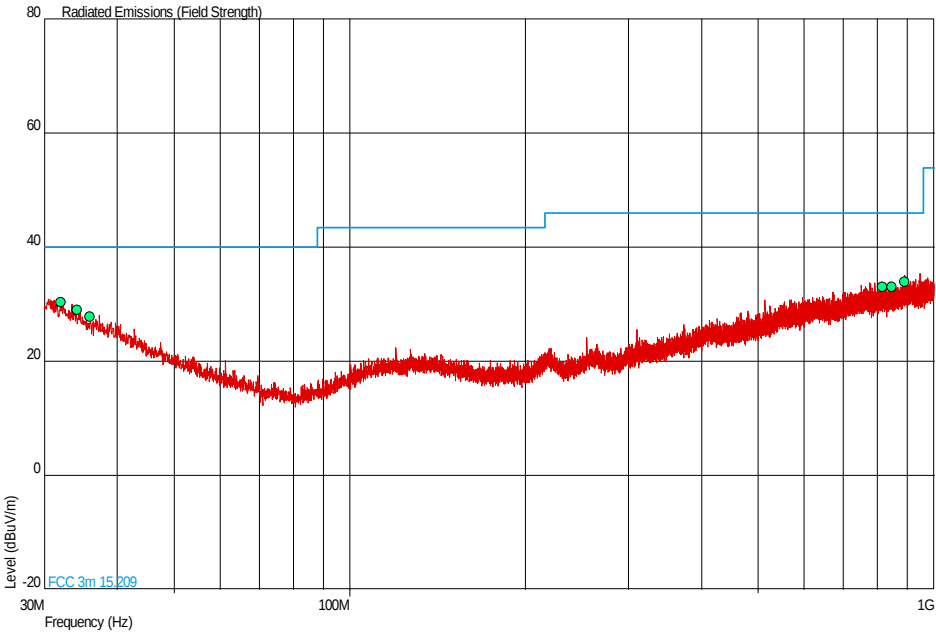


Product Service

Spurious Radiated Emissions

2412 MHz

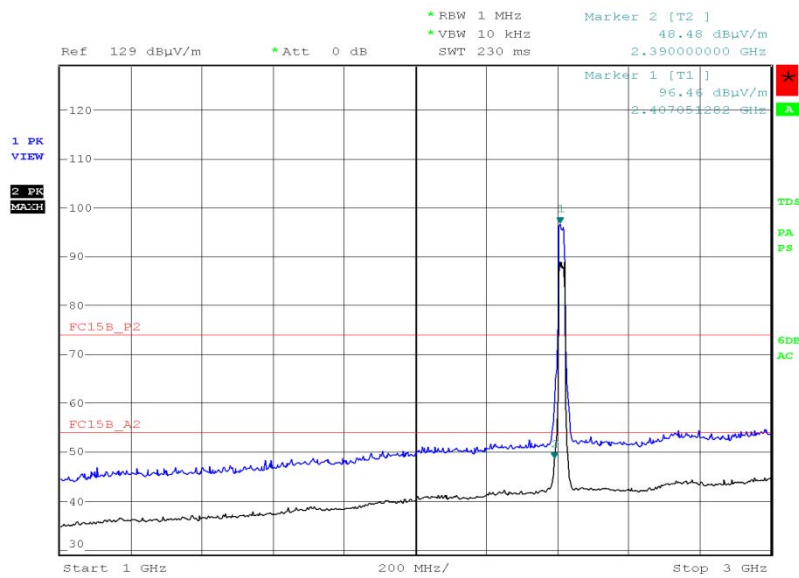
30 MHz to 1 GHz



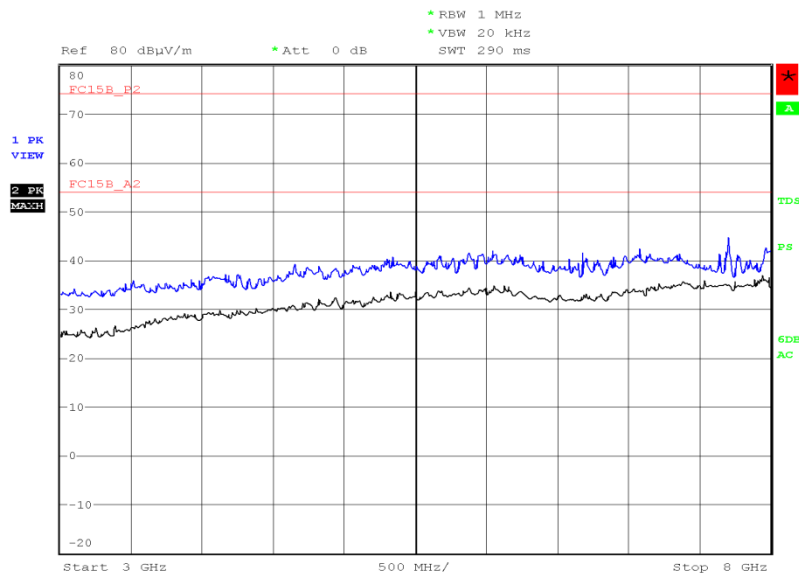
Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
32.037	30.4	33.1	40.0	100	-9.6	66.9	180	1.00	Vertical
34.123	29.0	28.2	40.0	100	-11.0	71.8	180	1.00	Vertical
35.917	27.8	24.5	40.0	100	-12.2	75.5	0	1.00	Vertical
815.652	33.0	44.7	46.0	200	-13.0	155.3	180	1.00	Vertical
847.759	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Vertical
891.894	34.0	50.1	46.0	200	-12.0	149.9	180	1.00	Vertical



Product Service

1 GHz to 3 GHz

Date: 27.AUG.2012 07:56:11

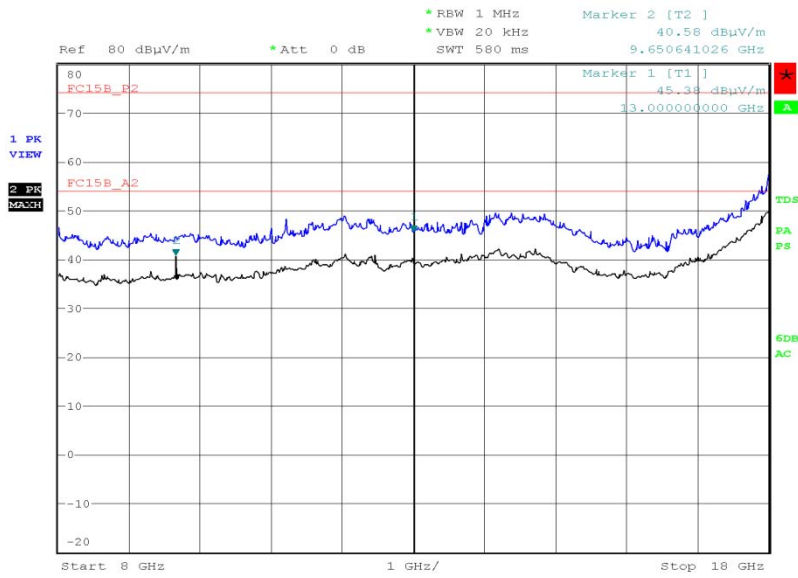
3 GHz to 8 GHz

Date: 2.SEP.2012 12:13:00



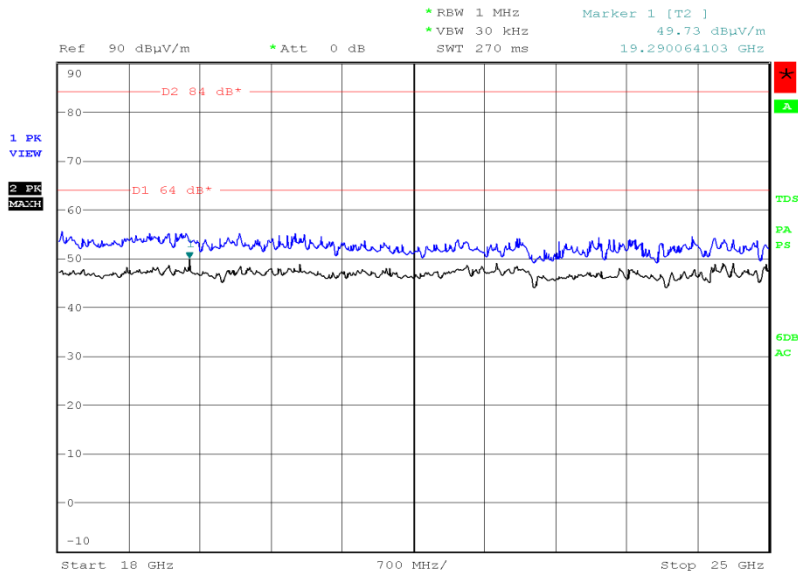
Product Service

8 GHz to 18 GHz



Date: 2.SEP.2012 13:42:17

18 GHz to 25 GHz



Date: 16.SEP.2012 15:51:12

Limit

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

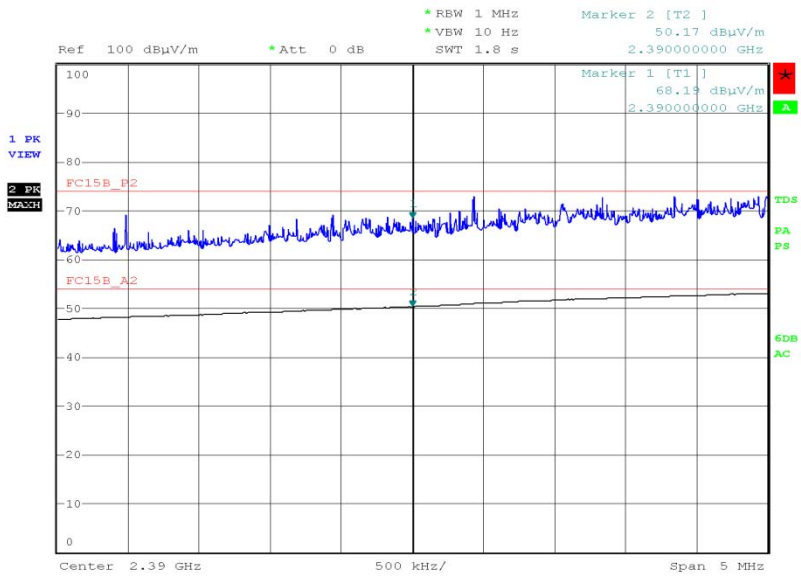


Product Service

Band Edge Emissions

2412 MHz

Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Horizontal	68.19	50.17



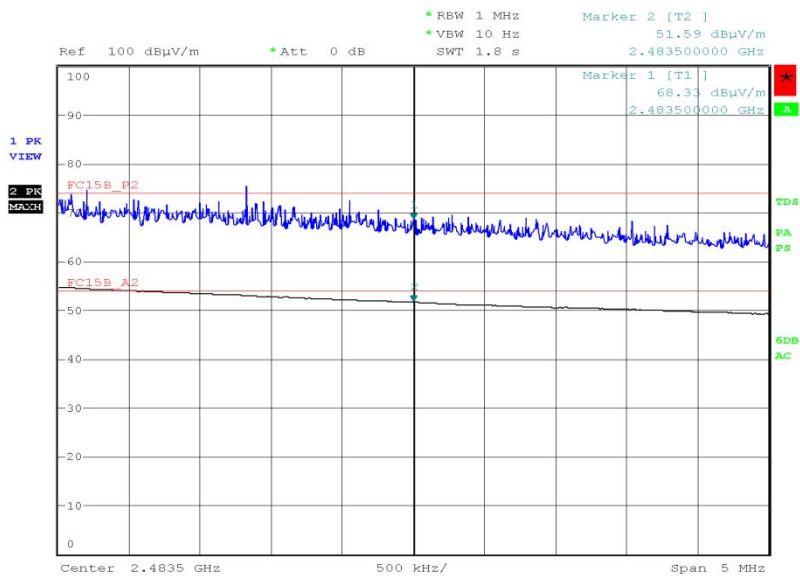
Date: 27.AUG.2012 07:44:43



Product Service

2462 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	68.33	51.59



Date: 27.AUG.2012 08:47:13

Limit

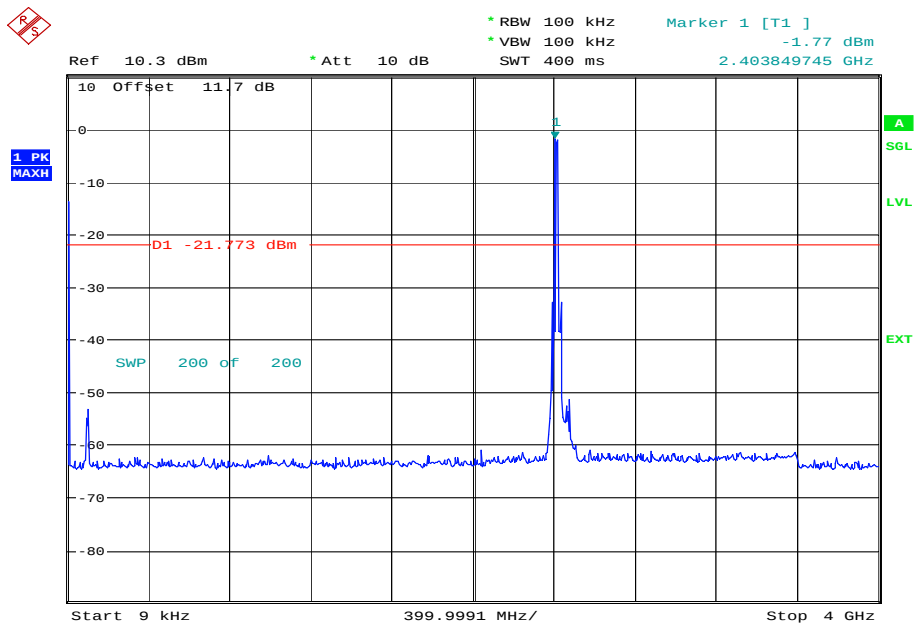
Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0



Product Service

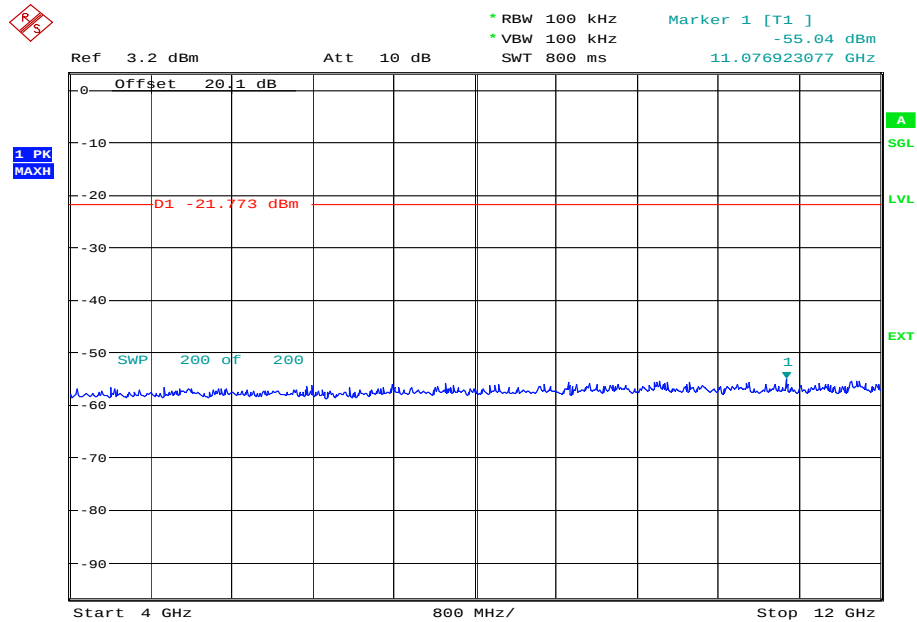
802.11(n) - 2.4 GHz, 20 MHz BW

4.0 V DC Supply

Spurious Conducted Emissions19.5 Mbps2412 MHz9 kHz to 4 GHz

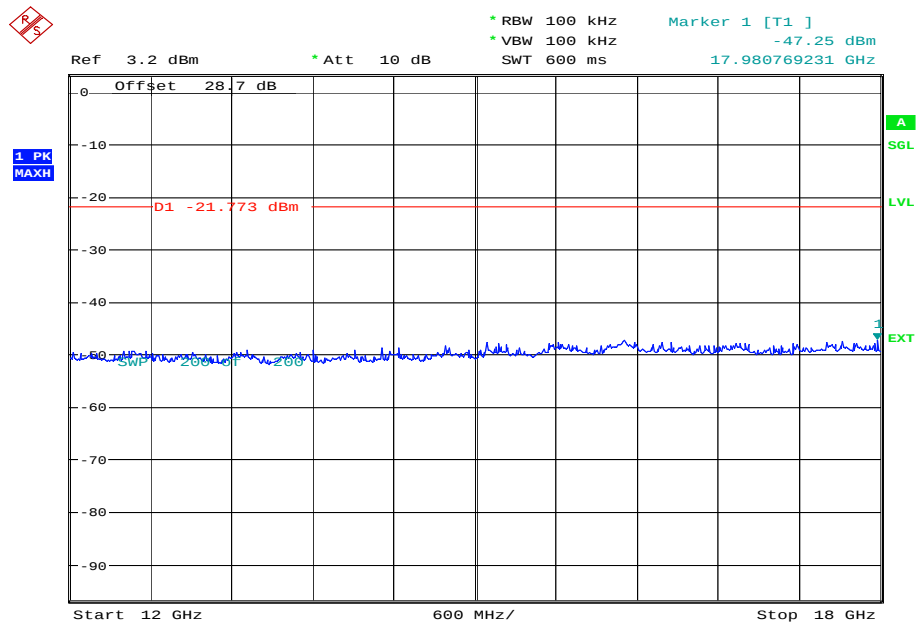
Date: 20.AUG.2012 10:13:35

4 GHz to 12 GHz



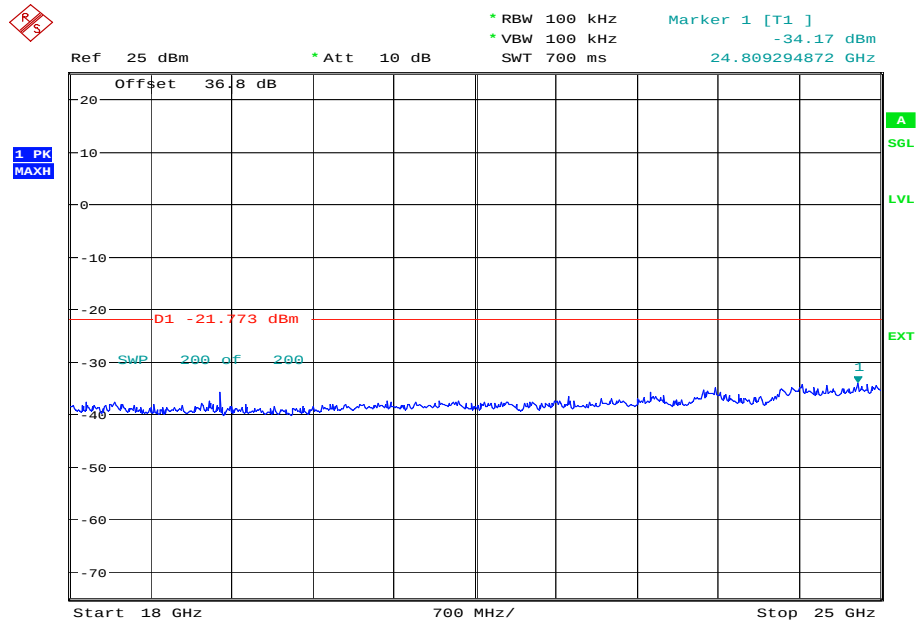
Date: 20.AUG.2012 10:26:14

12 GHz to 18 GHz



Date: 20.AUG.2012 10:29:10

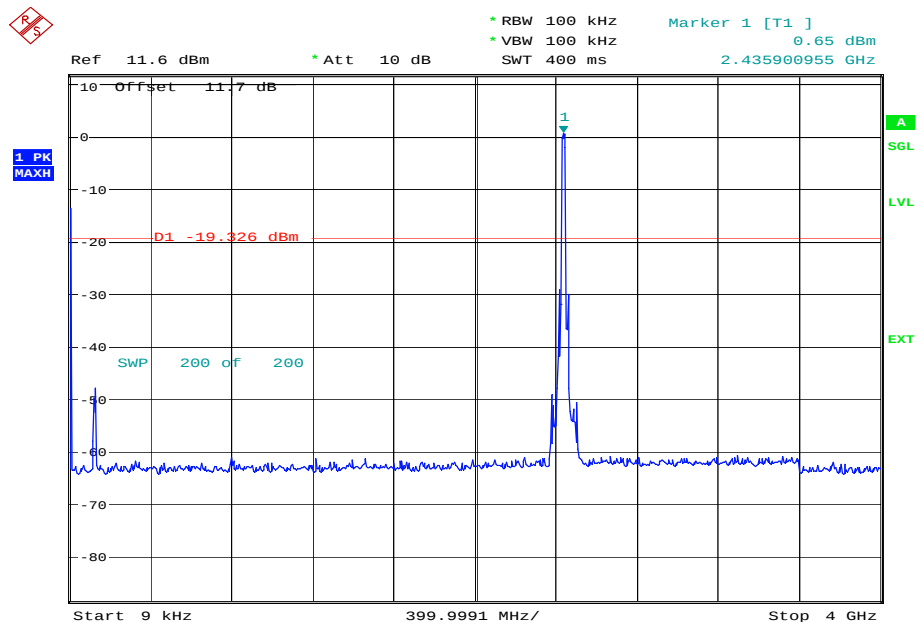
18 GHz to 25 GHz



Date: 20.AUG.2012 11:53:50

2437 MHz

9 kHz to 4 GHz

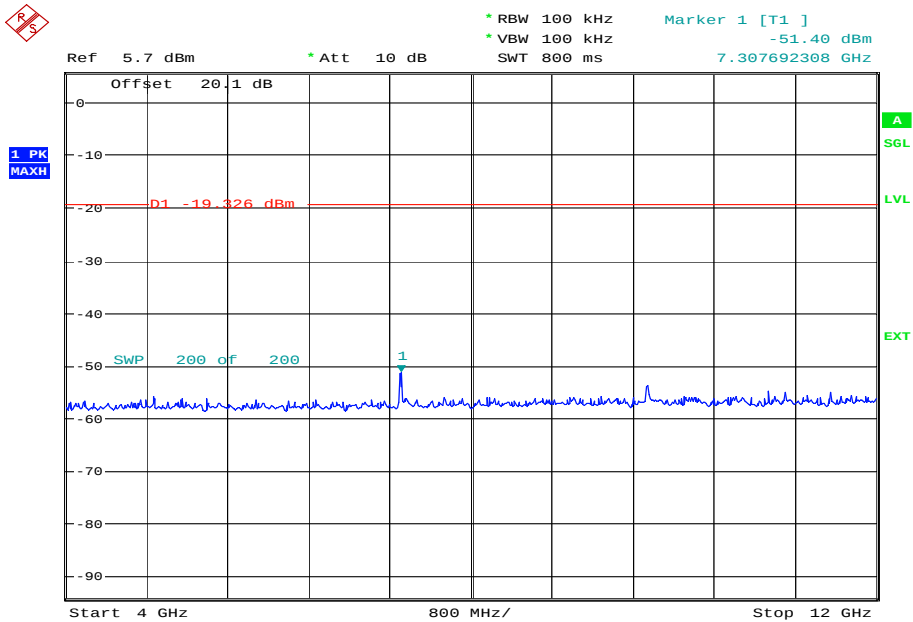


Date: 20.AUG.2012 10:17:32



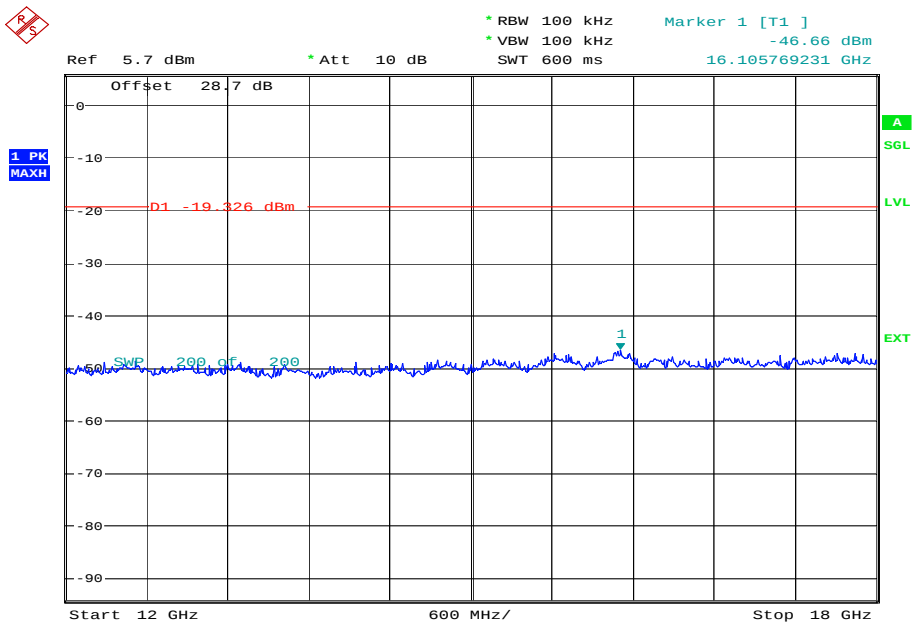
Product Service

4 GHz to 12 GHz



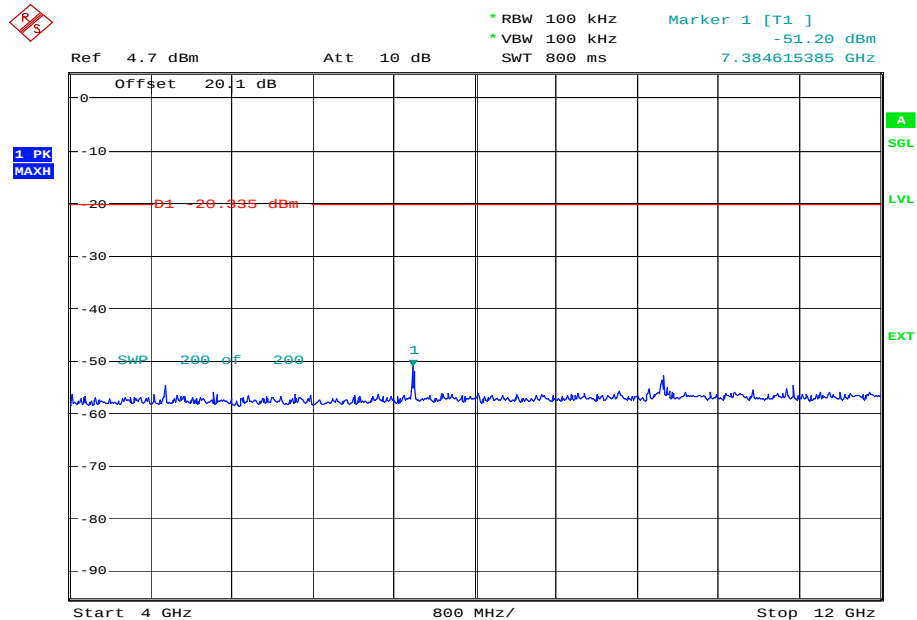
Date: 20.AUG.2012 10:32:56

12 GHz to 18 GHz



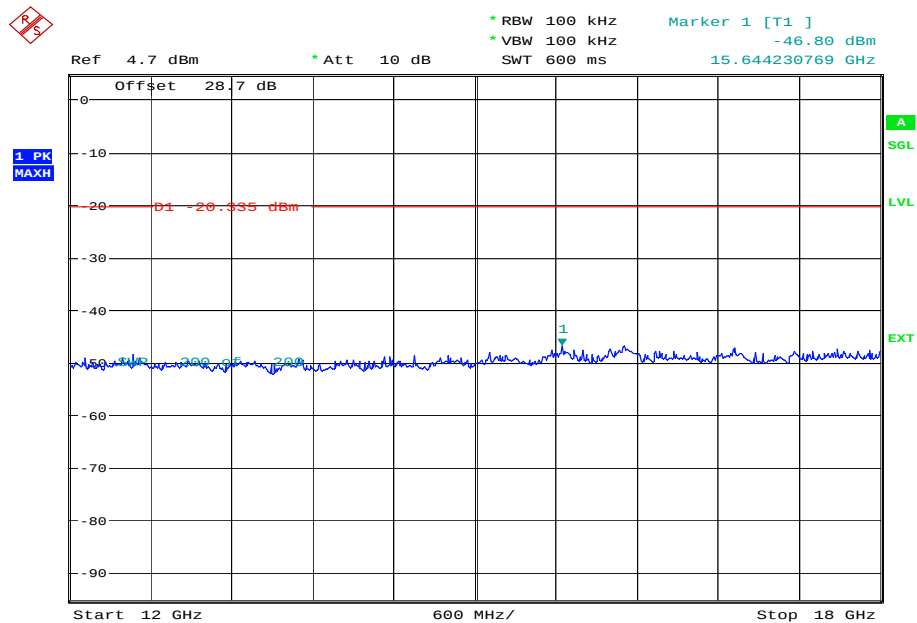
Date: 20.AUG.2012 10:35:30

4 GHz to 12 GHz



Date: 20.AUG.2012 10:39:30

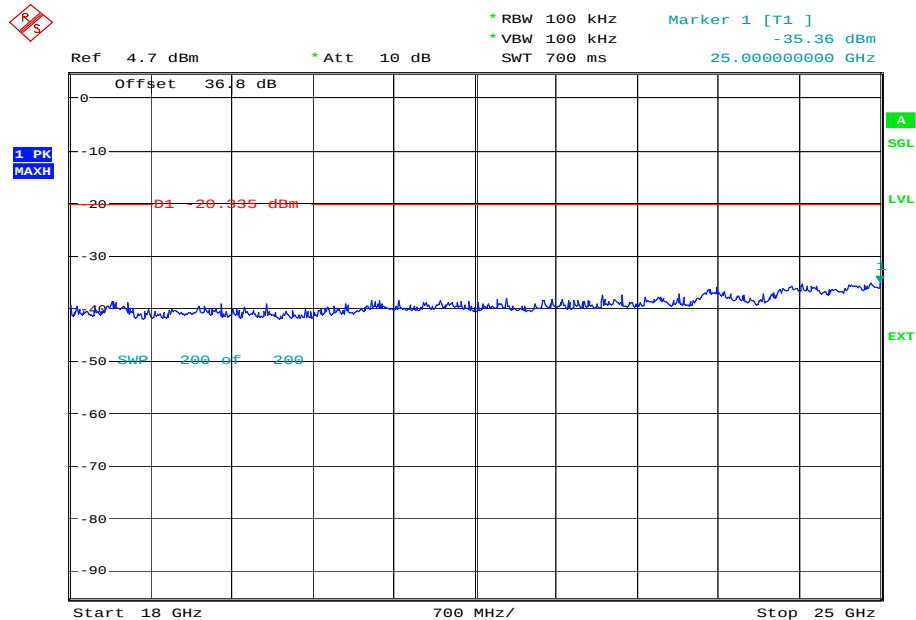
12 GHz to 18 GHz



Date: 20.AUG.2012 10:41:59



Product Service

18 GHz to 25 GHz

Date: 20.AUG.2012 12:03:08

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.

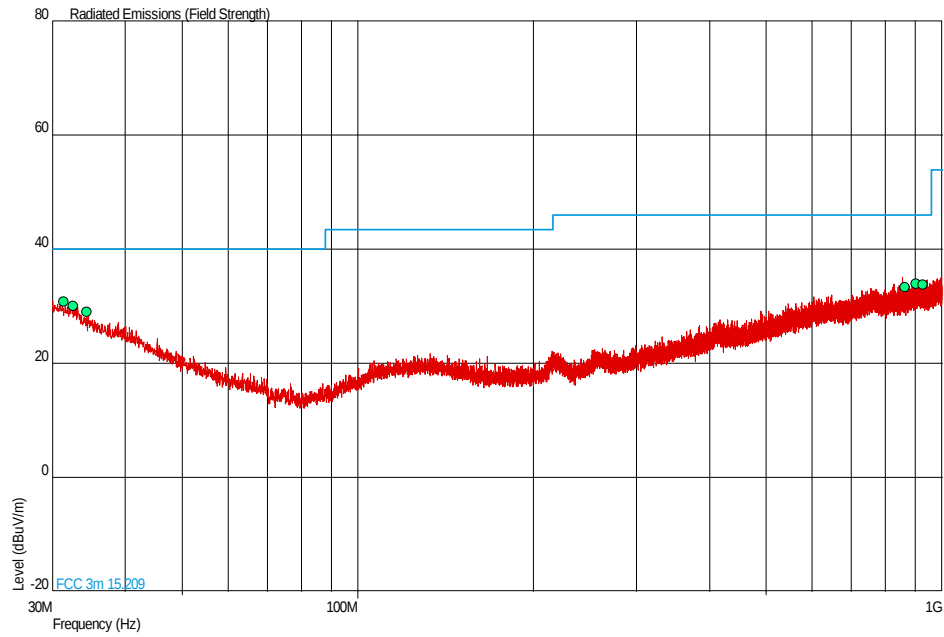


Product Service

Spurious Radiated Emissions

2412 MHz

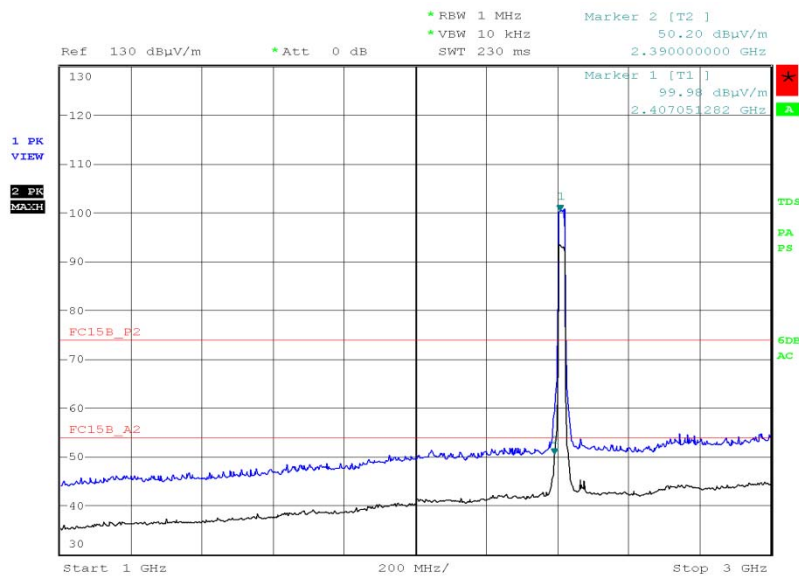
30 MHz to 1 GHz



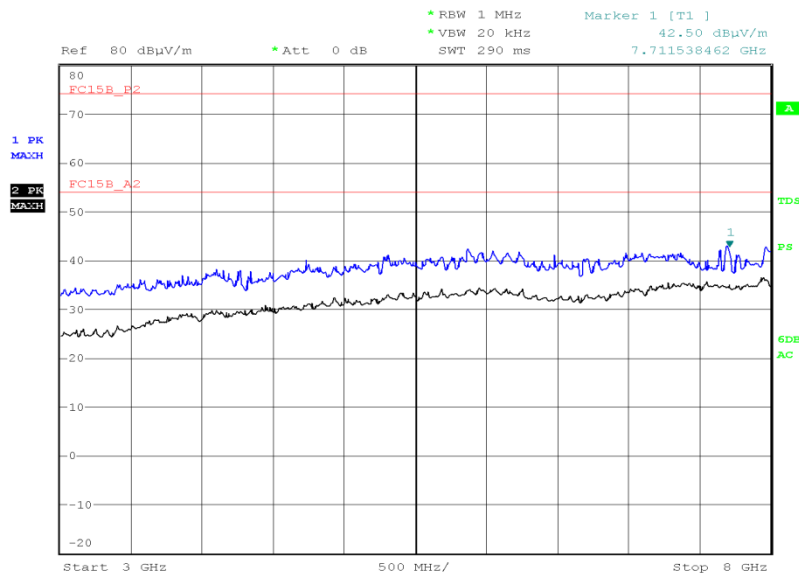
Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
31.358	30.8	34.7	40.0	100	-9.2	65.3	180	1.00	Vertical
32.571	30.1	32.0	40.0	100	-9.9	68.0	180	1.00	Vertical
34.317	29.0	28.2	40.0	100	-11.0	71.8	0	1.00	Vertical
864.200	33.3	46.2	46.0	200	-12.7	153.8	180	1.00	Vertical
903.097	34.0	50.1	46.0	200	-12.0	149.9	180	1.00	Vertical
926.959	33.8	49.0	46.0	200	-12.2	151.0	0	1.00	Vertical



Product Service

1 GHz to 3 GHz

Date: 27.AUG.2012 09:40:22

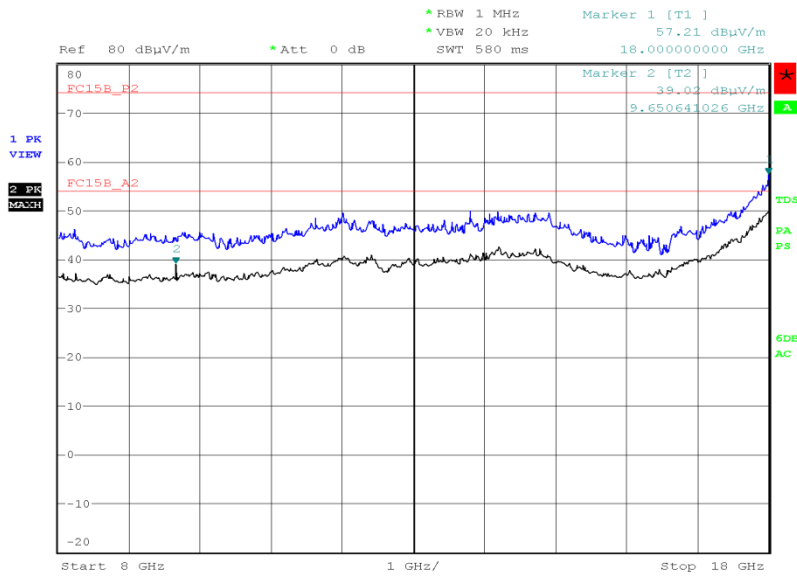
3 GHz to 8 GHz

Date: 2.SEP.2012 12:34:17



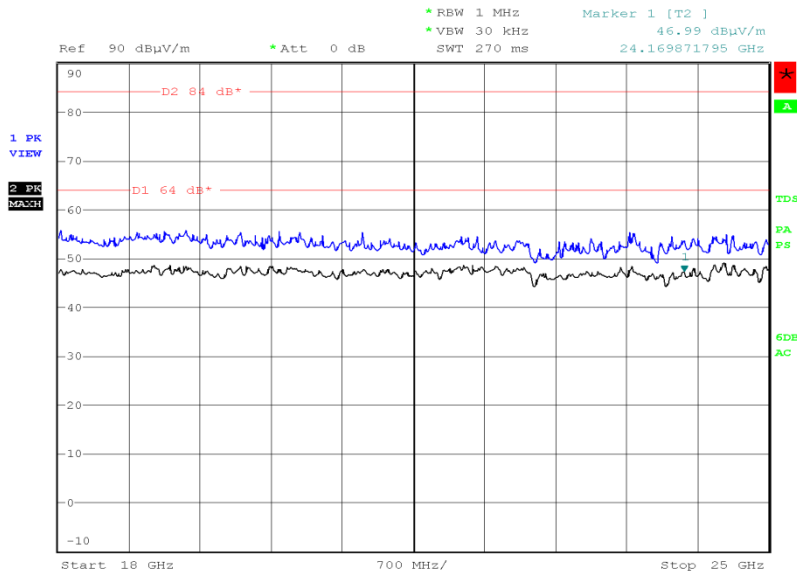
Product Service

8GHz to 18 GHz



Date: 2.SEP.2012 14:30:15

18 GHz to 25 GHz



Date: 16.SEP.2012 16:05:41

Limit

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

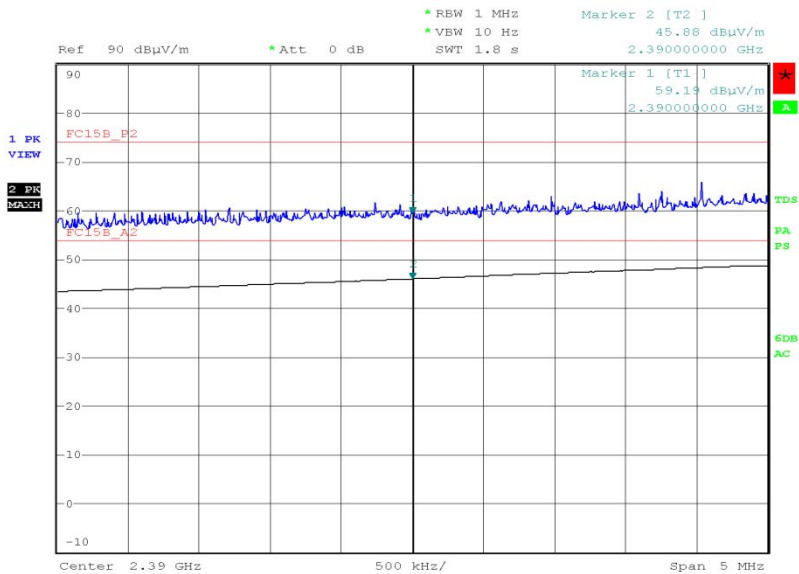


Product Service

Band Edge Emissions

2412 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	59.19	45.88



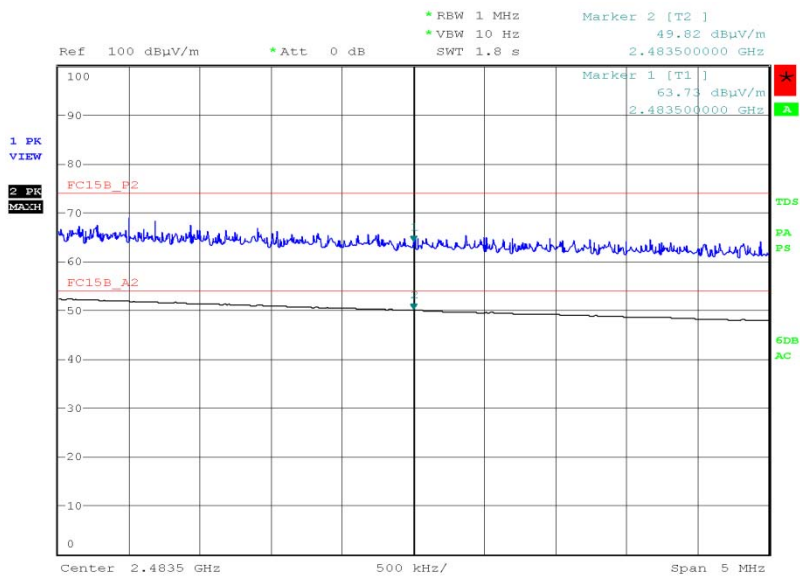
Date: 27.AUG.2012 09:36:26



Product Service

2462 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	63.73	49.82



Date: 27.AUG.2012 10:47:52

Limit

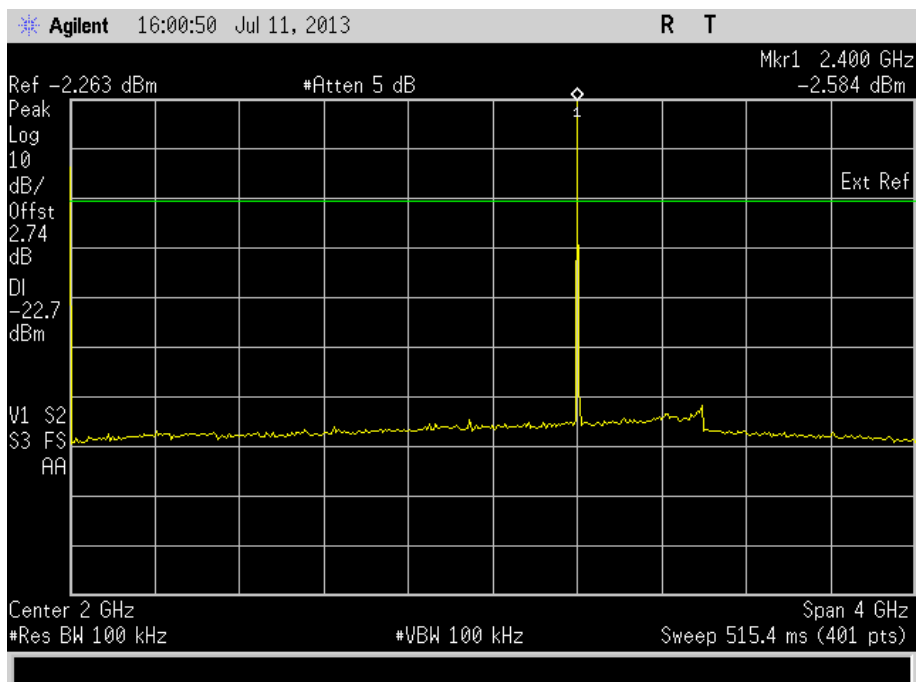
Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0



Product Service

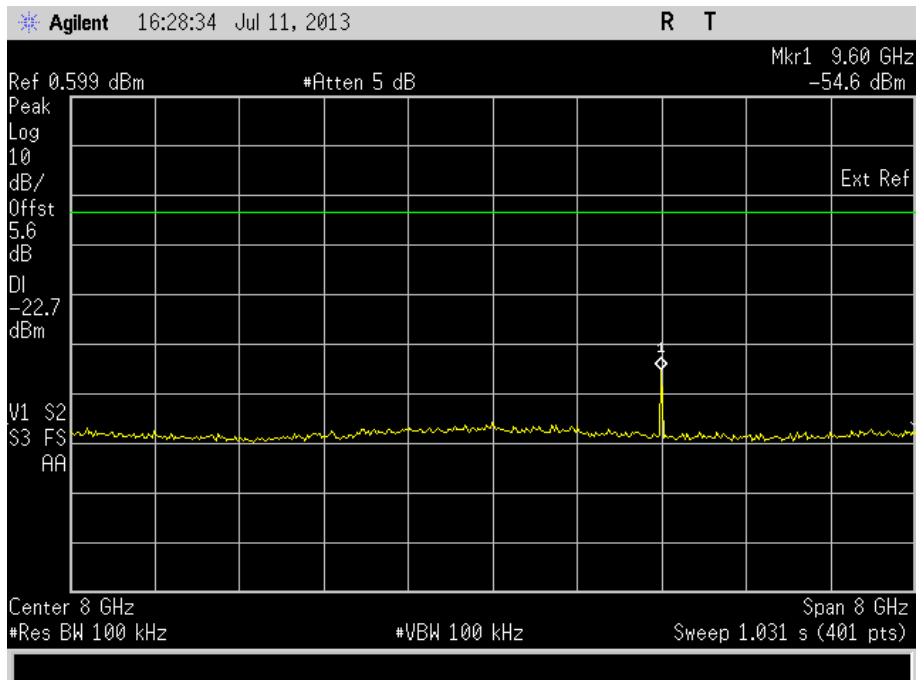
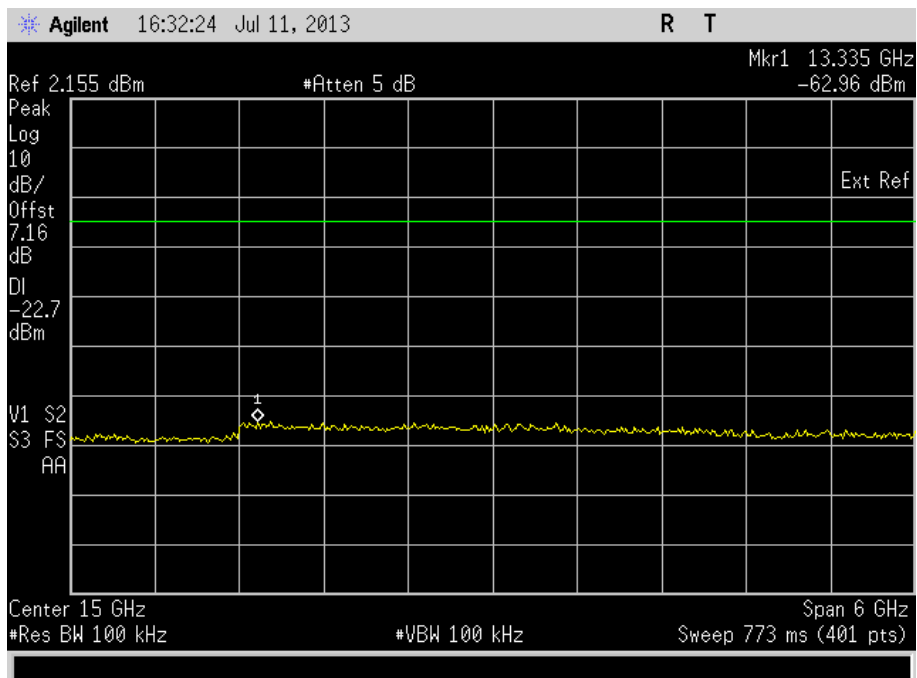
Bluetooth Low Energy

4.0 V DC Supply

Spurious Conducted Emissions37 oct / prbs92402 MHz9 kHz to 4 GHz

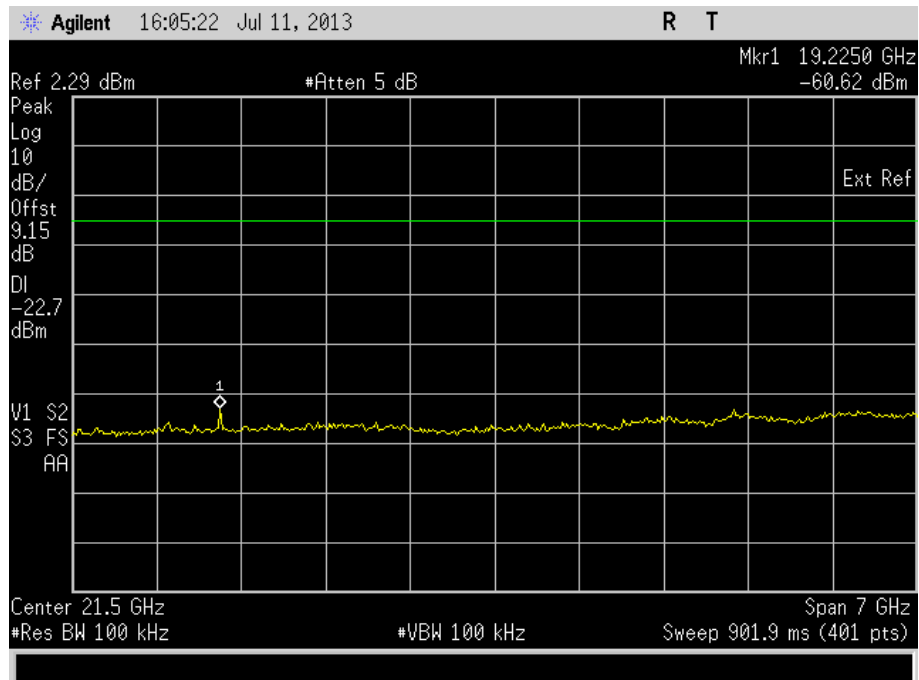
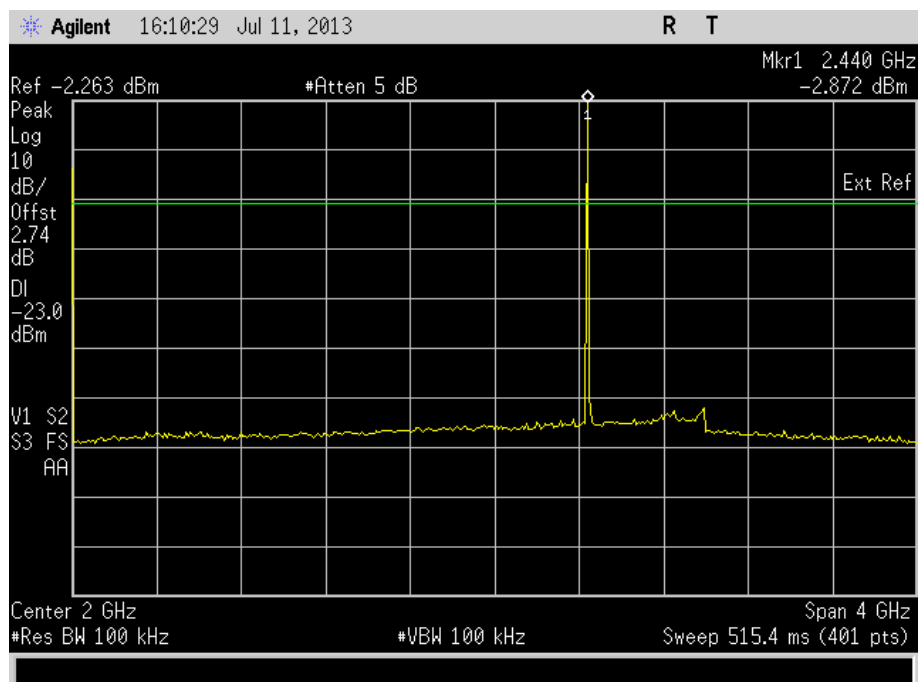


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

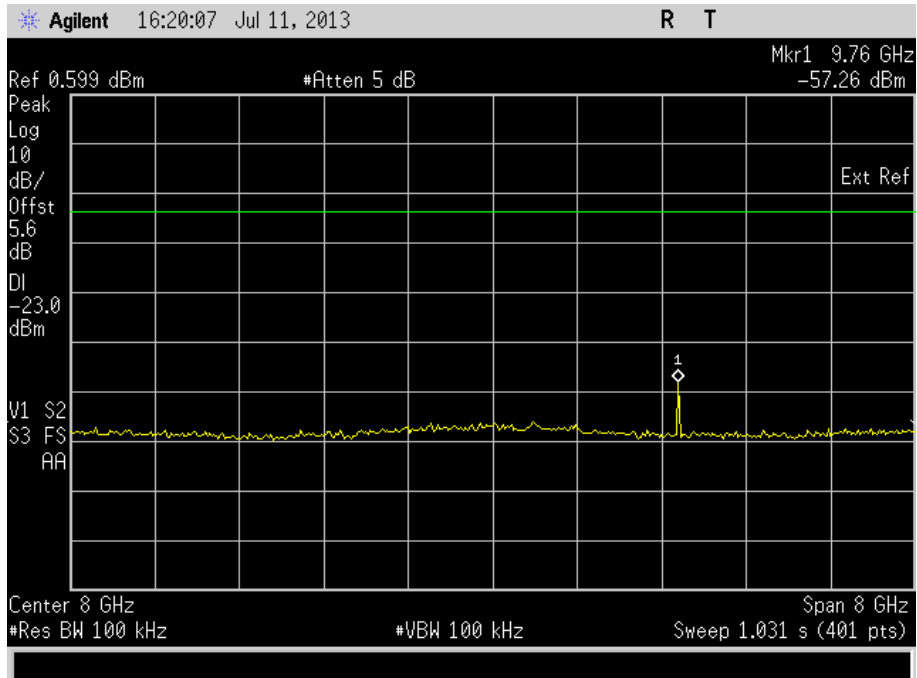
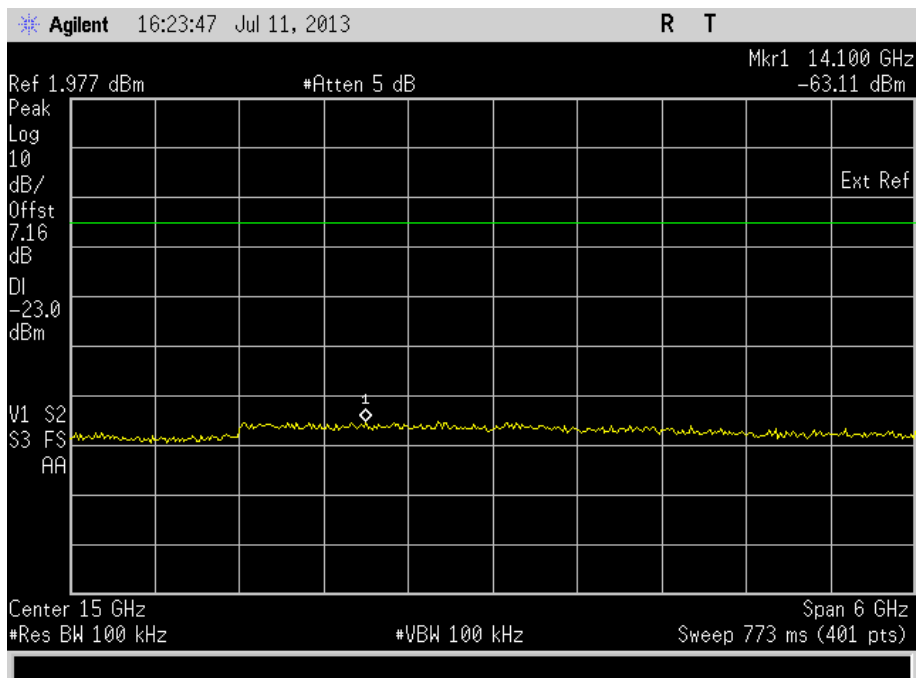


Product Service

18 GHz to 25 GHz2441 MHz9 kHz to 4 GHz

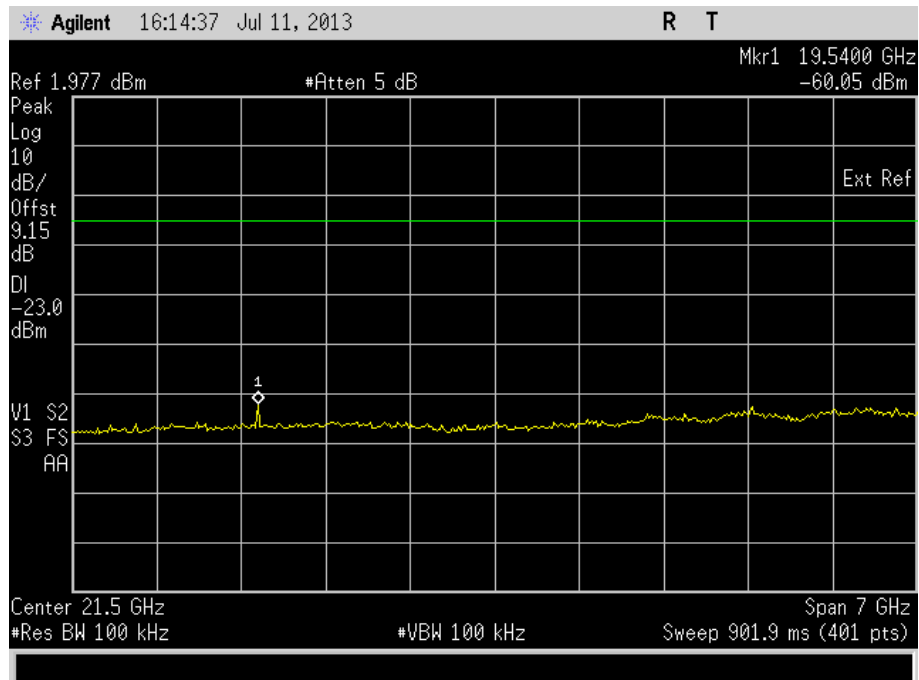
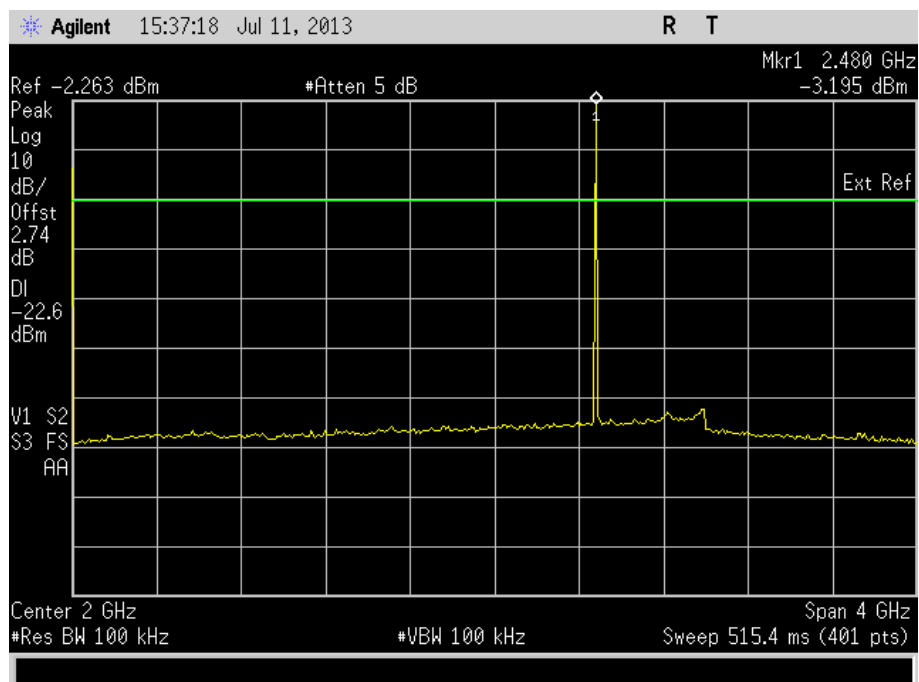


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

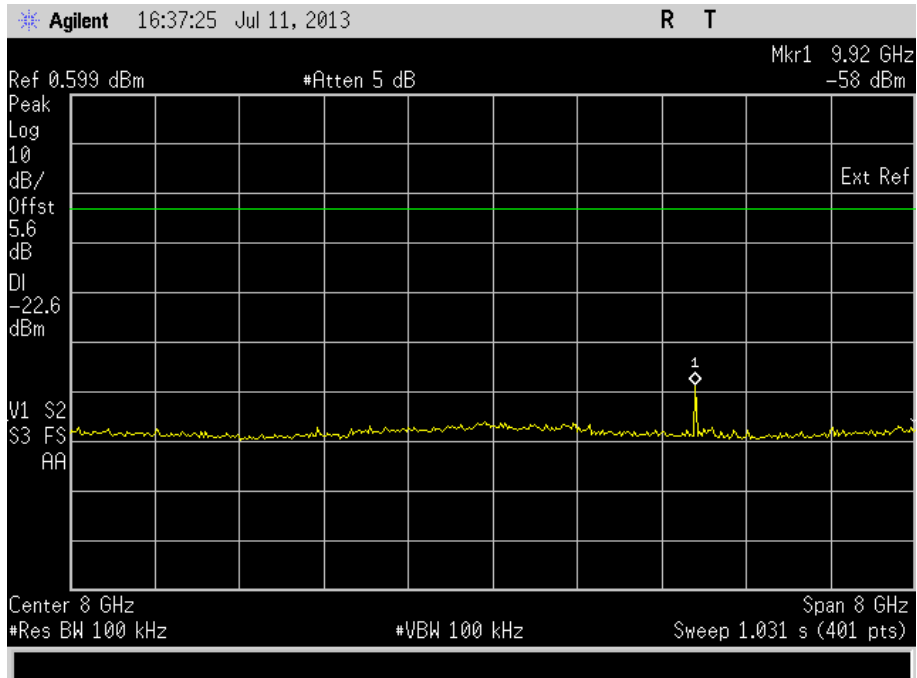
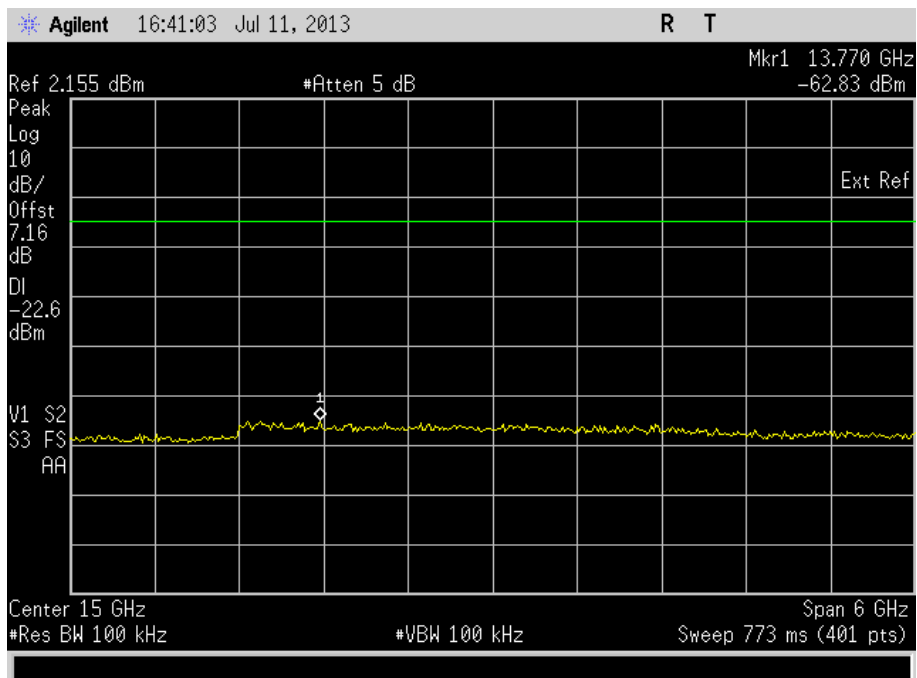


Product Service

18 GHz to 25 GHz2480 MHz9 kHz to 4 GHz

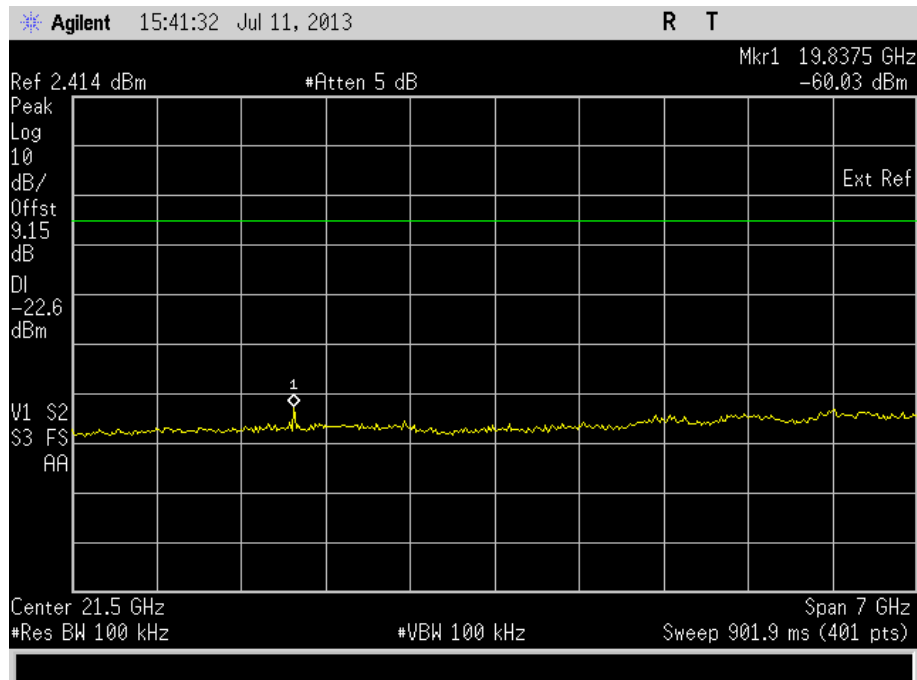


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

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

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

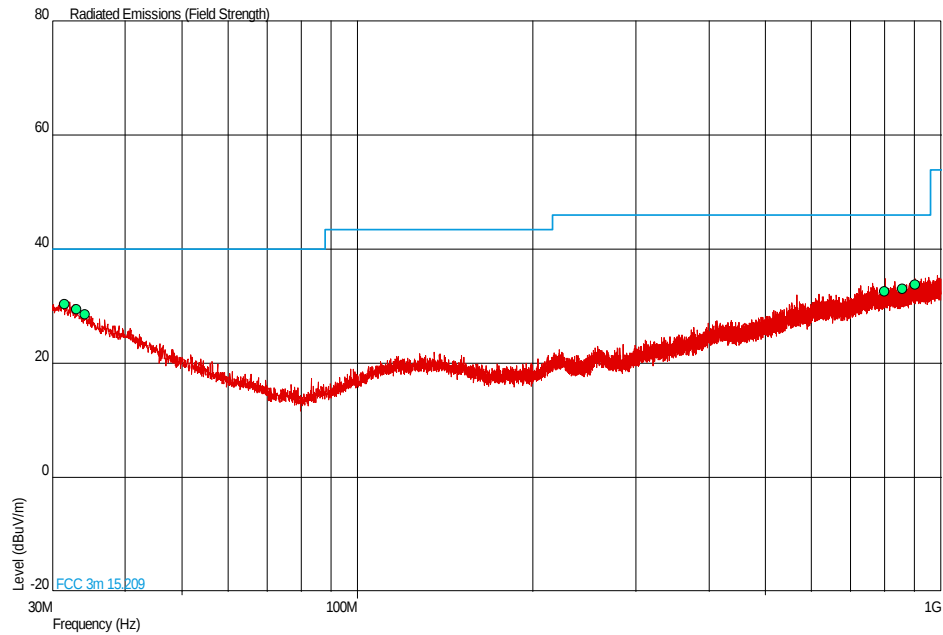


Product Service

Spurious Radiated Emissions

2402 MHz

30 MHz to 1 GHz

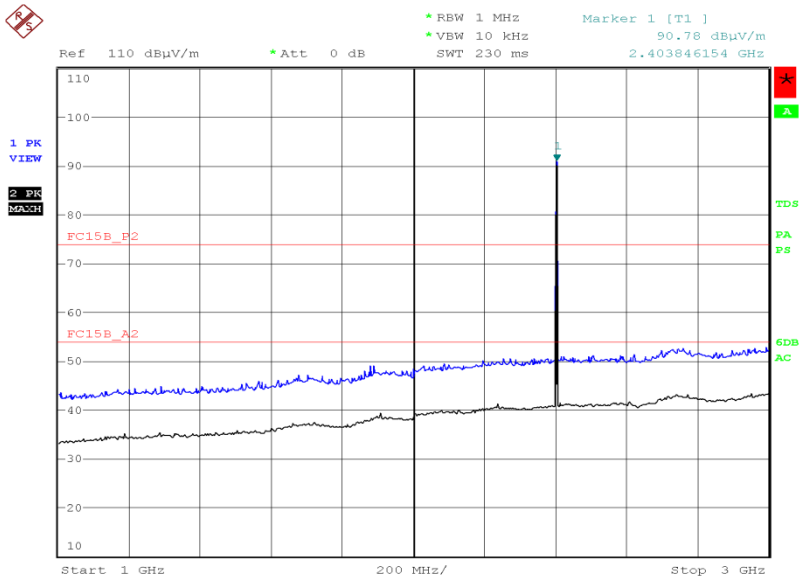


Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
31.504	30.3	32.7	40.0	100	-9.7	67.3	180	1.00	Vertical
33.056	29.4	29.5	40.0	100	-10.6	70.5	270	1.00	Vertical
34.171	28.5	26.6	40.0	100	-11.5	73.4	90	1.00	Vertical
800.035	32.5	42.2	46.0	200	-13.5	157.8	90	1.00	Horizontal
858.186	33.0	44.7	46.0	200	-13.0	155.3	90	1.00	Horizontal
903.097	33.8	49.0	46.0	200	-12.2	151.0	0	1.00	Vertical



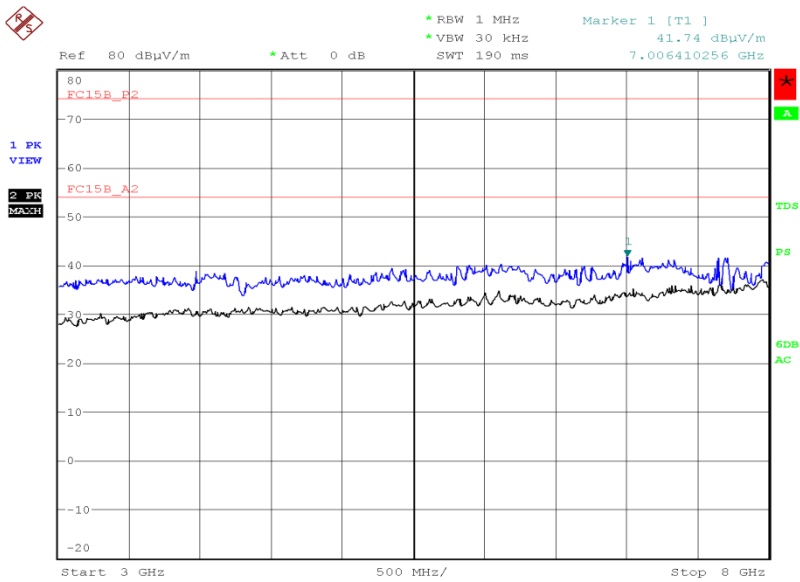
Product Service

1 GHz to 3 GHz



Date: 13.JUL.2013 08:37:11

3 GHz to 8 GHz

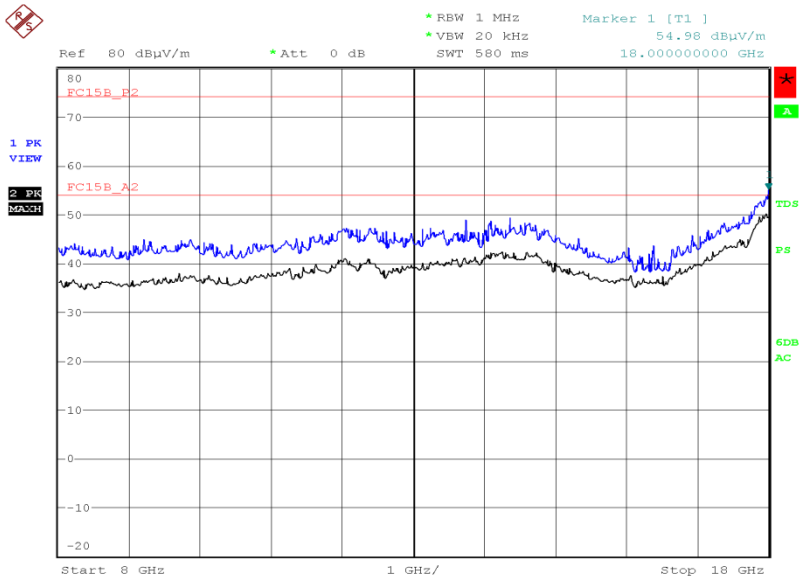


Date: 13.JUL.2013 12:41:03



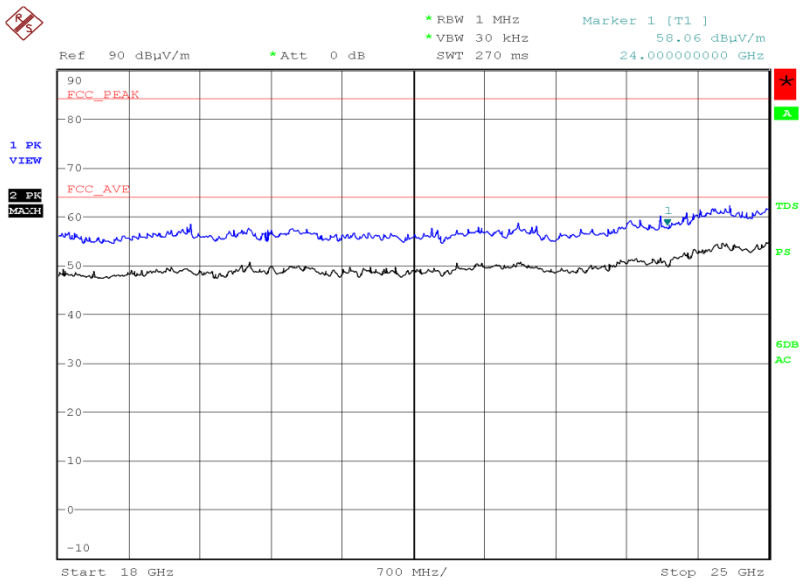
Product Service

8 GHz to 18 GHz



Date: 13.JUL.2013 13:02:26

18 GHz to 25 GHz

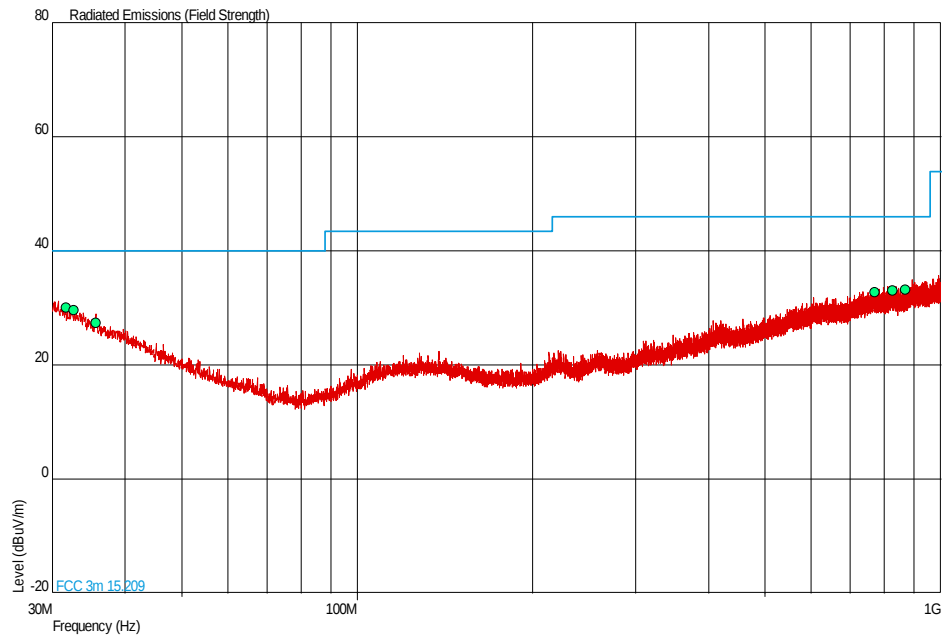


Date: 14.JUL.2013 07:30:41



2441 MHz

30 MHz to 1 GHz

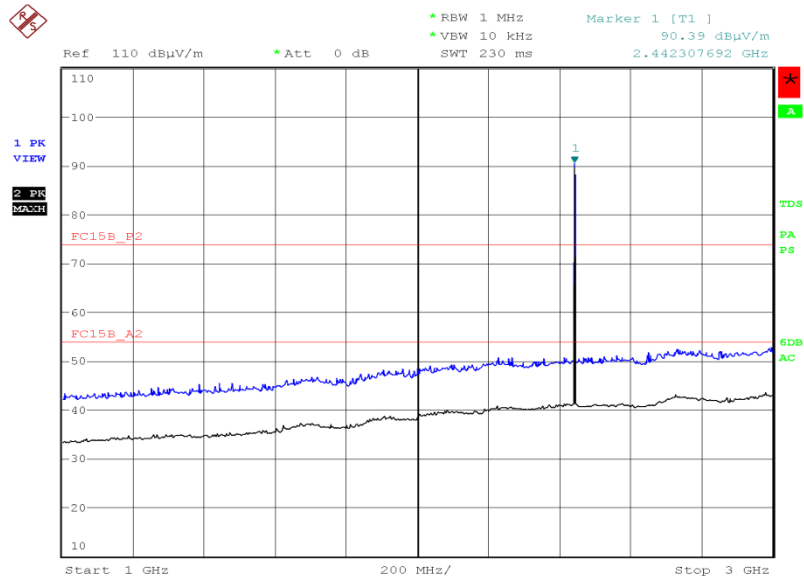


Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
31.746	30.1	32.0	40.0	100	-9.9	68.0	0	1.00	Vertical
32.668	29.6	30.2	40.0	100	-10.4	69.8	180	1.00	Vertical
35.675	27.4	23.4	40.0	100	-12.6	76.6	0	1.00	Horizontal
770.013	32.7	43.2	46.0	200	-13.3	156.8	180	1.00	Horizontal
826.079	33.1	45.2	46.0	200	-12.9	154.8	180	1.00	Horizontal
869.147	33.1	45.2	46.0	200	-12.9	154.8	180	1.00	Vertical



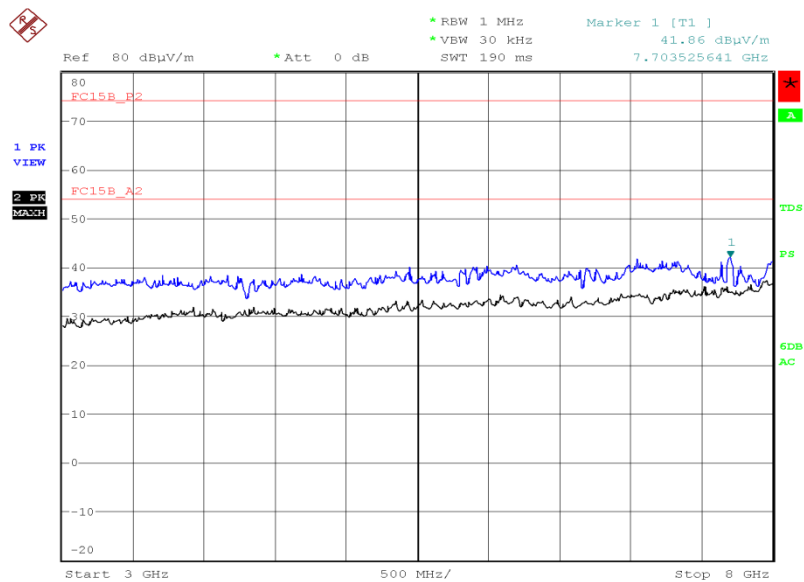
Product Service

1 GHz to 3 GHz



Date: 13.JUL.2013 08:41:17

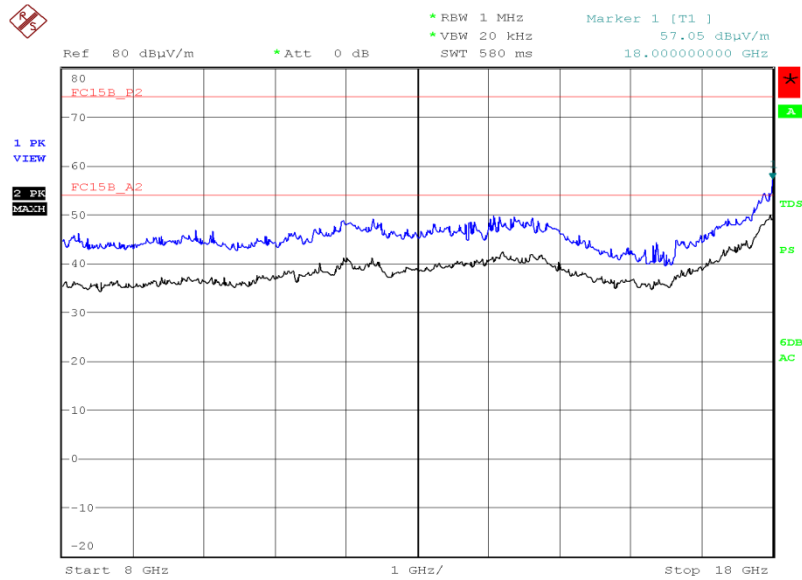
3 GHz to 8 GHz



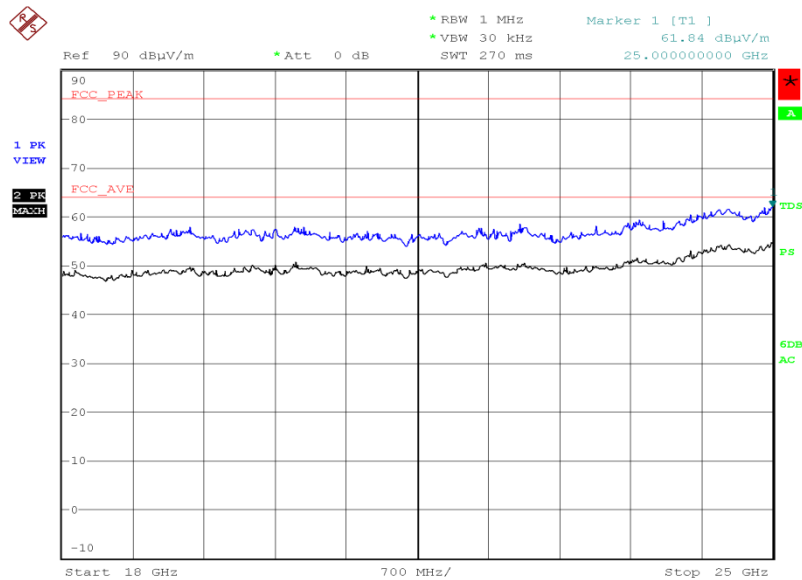
Date: 13.JUL.2013 12:45:52



Product Service

8 GHz to 18 GHz

Date: 13.JUL.2013 13:11:40

18 GHz to 25 GHz

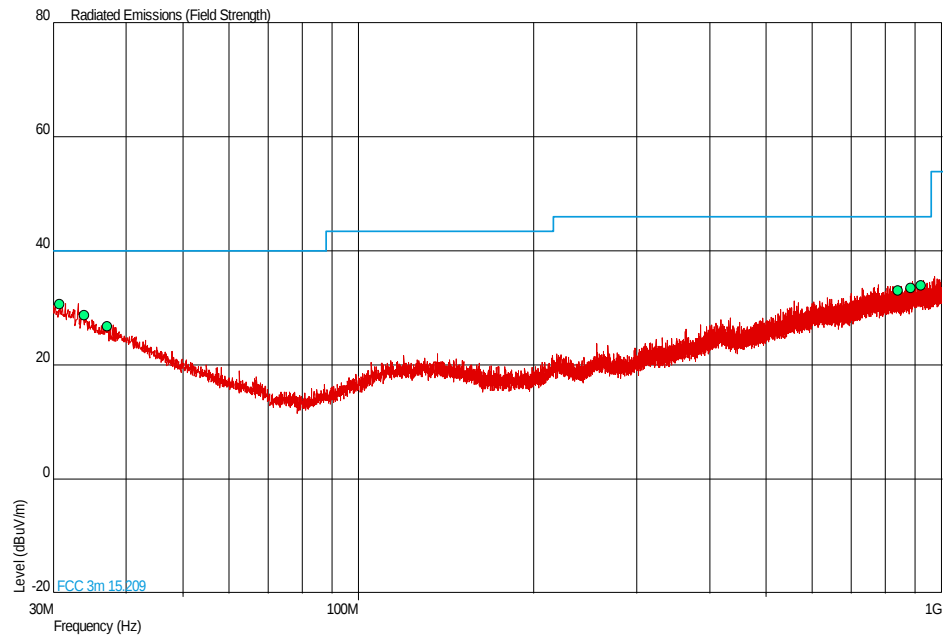
Date: 14.JUL.2013 07:39:46



Product Service

2480 MHz

30 MHz to 1 GHz

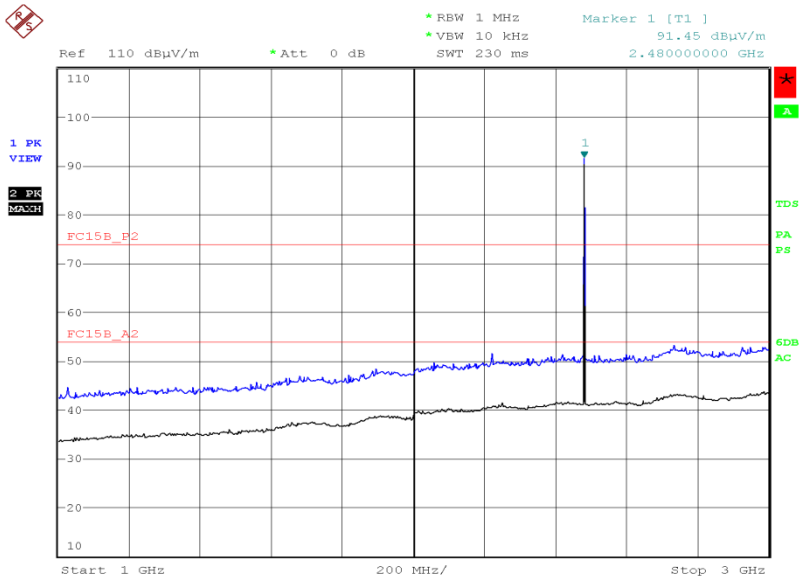


Frequency (MHz)	QP Level dBµV/m	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.775	30.7	34.3	40.0	100	-9.3	65.7	0	0.00	Horizontal
33.880	28.8	27.5	40.0	100	-11.2	72.5	180	1.00	Horizontal
37.081	26.8	21.9	40.0	100	-13.2	78.1	180	1.00	Horizontal
841.987	33.1	45.2	46.0	200	-12.9	154.8	180	1.00	Vertical
885.928	33.6	47.9	46.0	200	-12.4	152.1	0	1.00	Horizontal
920.460	33.9	49.5	46.0	200	-12.1	150.5	180	1.00	Horizontal



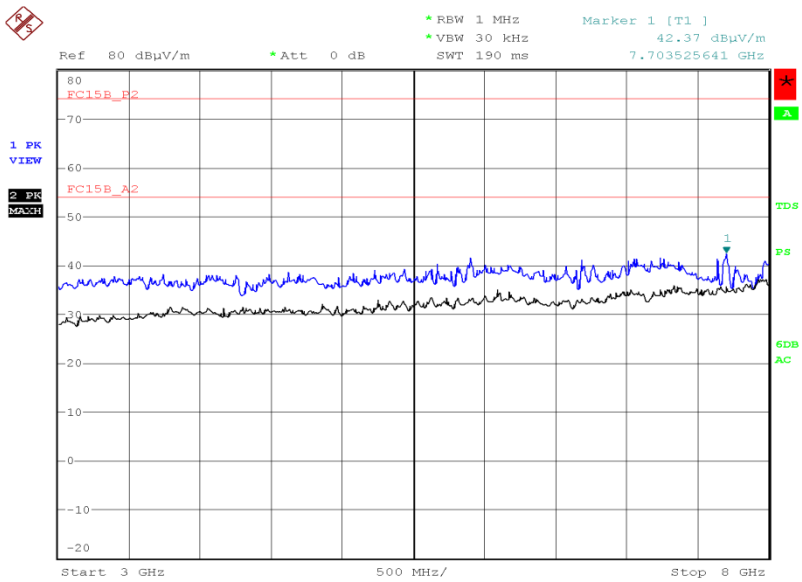
Product Service

1 GHz to 3 GHz



Date: 13.JUL.2013 09:18:52

3 GHz to 8 GHz

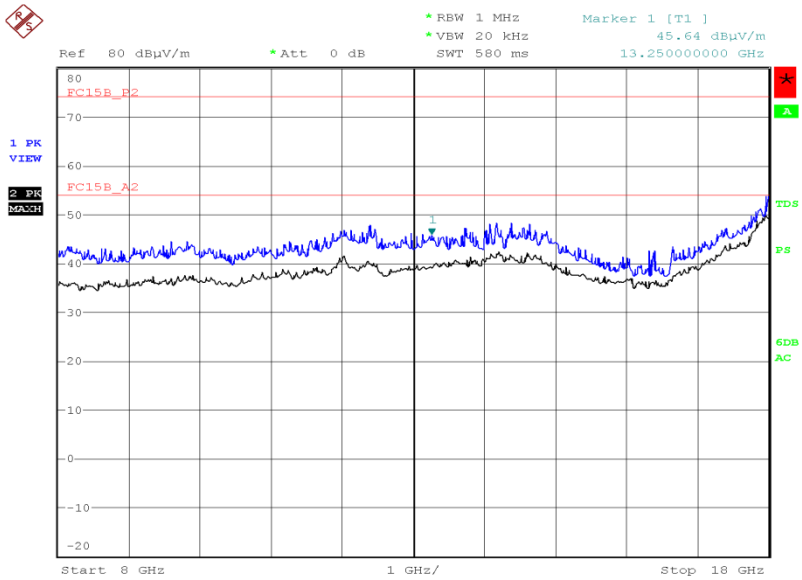


Date: 13.JUL.2013 12:49:10



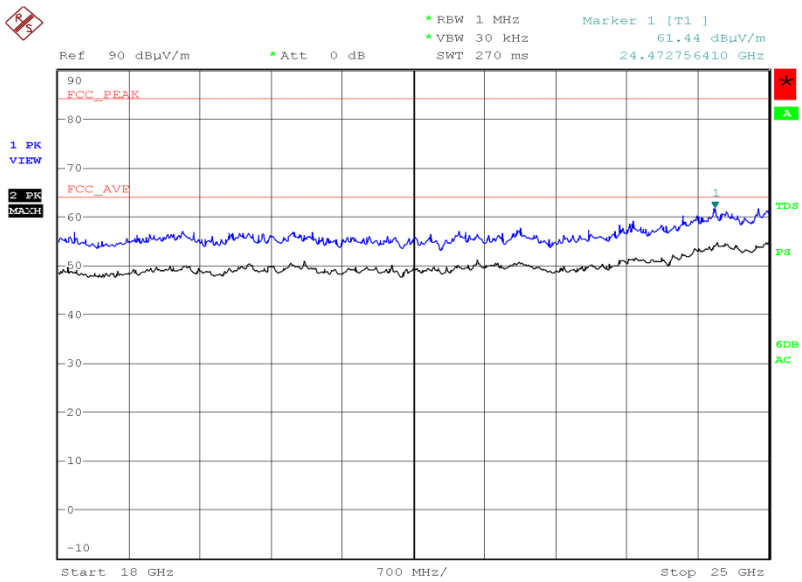
Product Service

8 GHz to 18 GHz



Date: 13.JUL.2013 13:21:39

18 GHz to 25 GHz



Date: 14.JUL.2013 07:49:24

Limit

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

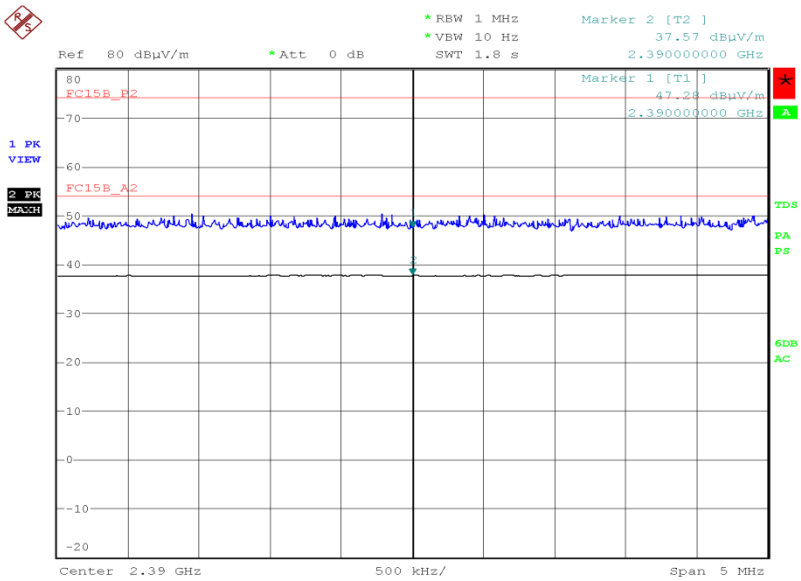


Product Service

Band Edge Emissions

2402 MHz

Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Horizontal	47.28	37.53



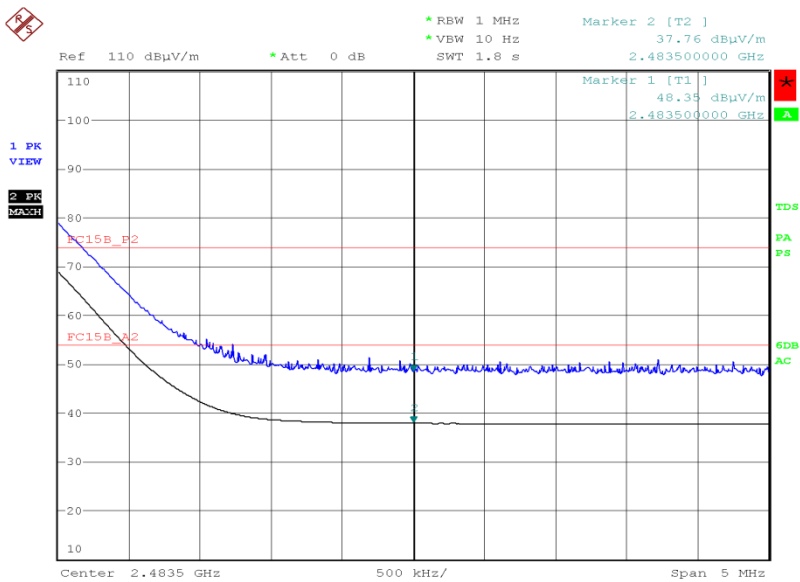
Date: 13.JUL.2013 08:29:32



Product Service

2480 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	48.35	37.75



Date: 13.JUL.2013 09:01:23

Limit

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



Product Service

2.5 POWER SPECTRAL DENSITY**2.5.1 Specification Reference**

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

2.5.2 Equipment Under Test and Modification State

CDMA SHL21 S/N: IMEI 004401114094523 - Modification State 0

CDMA SHL21 S/N: IMEI 004401114094432 - Modification State 0

2.5.3 Date of Test

16 August 2012 and 11 July 2013

2.5.4 Test Equipment Used

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

2.5.5 Test Procedure

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

2.5.6 Environmental Conditions

Ambient Temperature 22.0 - 24.8°C

Relative Humidity 47.6 - 53.2%



Product Service

2.5.7 Test Results802.11(b)

4.0 V DC Supply

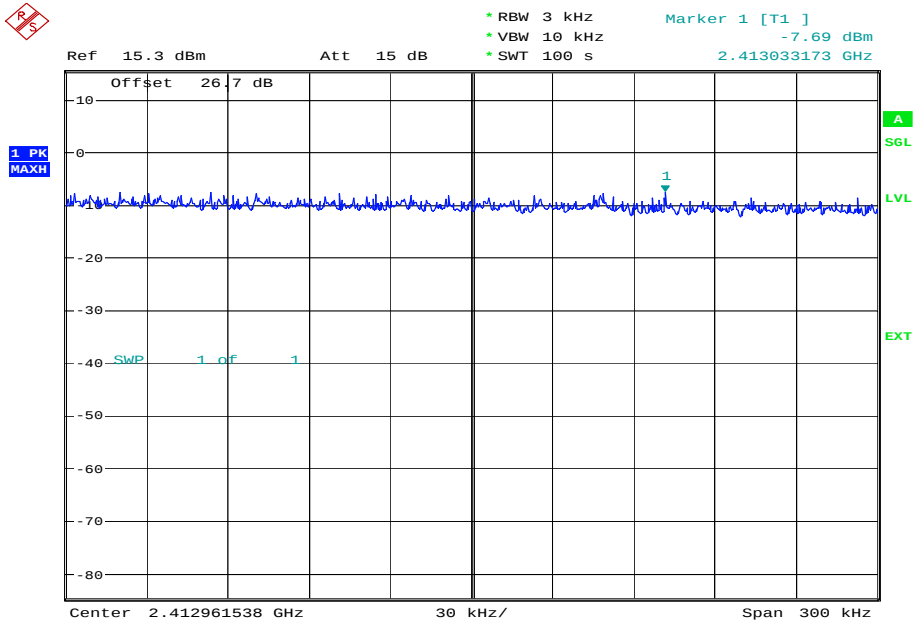
Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	1	-7.69
	2	-6.98
	5	-7.70
	11	-7.37
2437 MHz	1	-7.48
	2	-6.79
	5	-7.45
	11	-7.76
2462 MHz	1	-7.08
	2	-7.00
	5	-7.07
	11	-7.15



Product Service

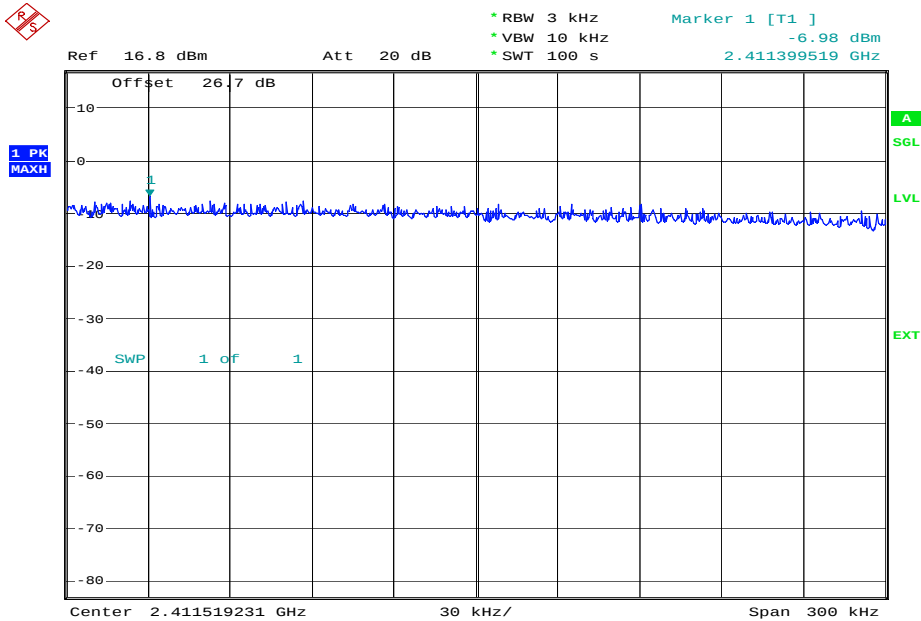
2412 MHz

1 Mbps



Date: 15.AUG.2012 14:53:59

2 Mbps

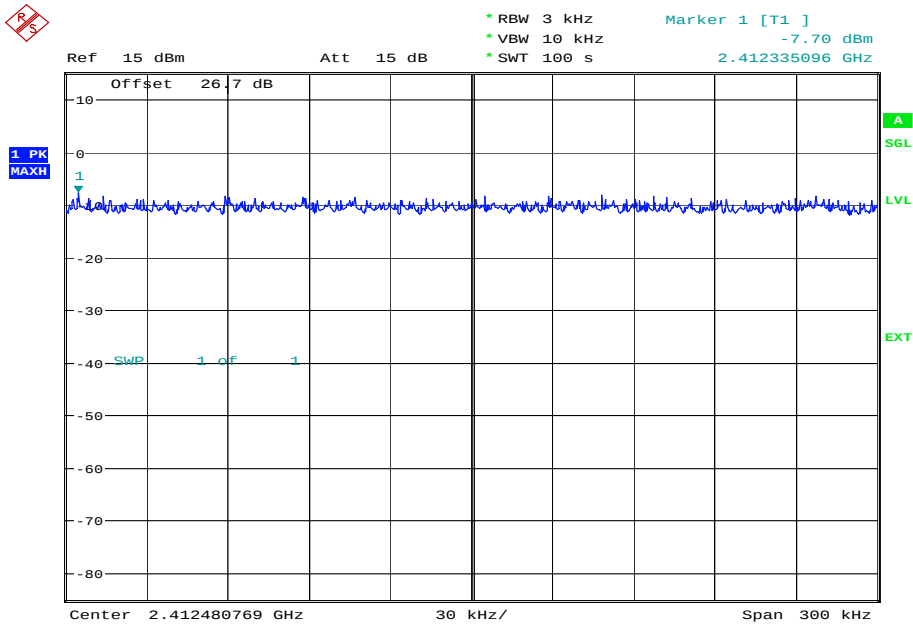


Date: 15.AUG.2012 15:10:53



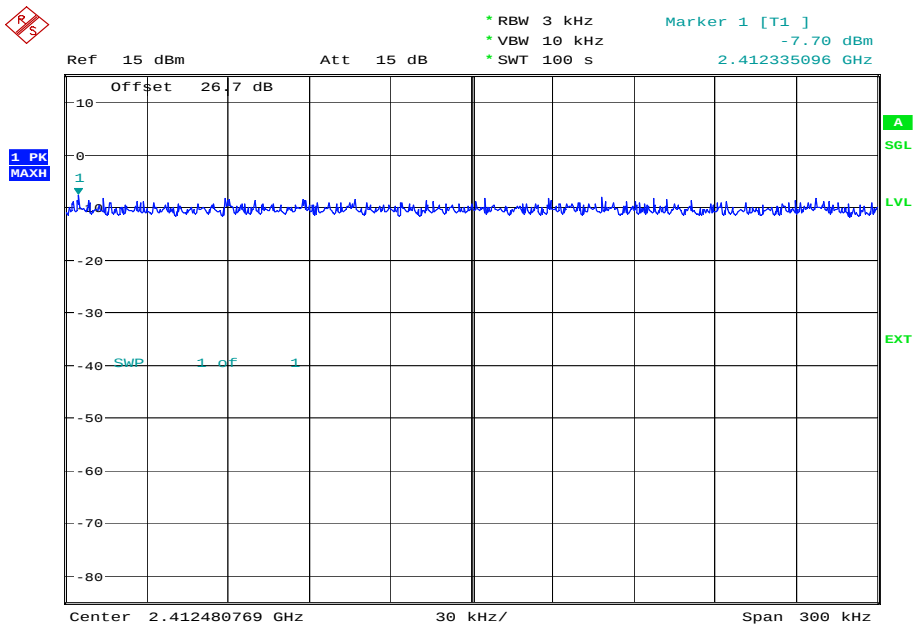
Product Service

5.5 Mbps



Date: 15.AUG.2012 15:25:48

11 Mbps



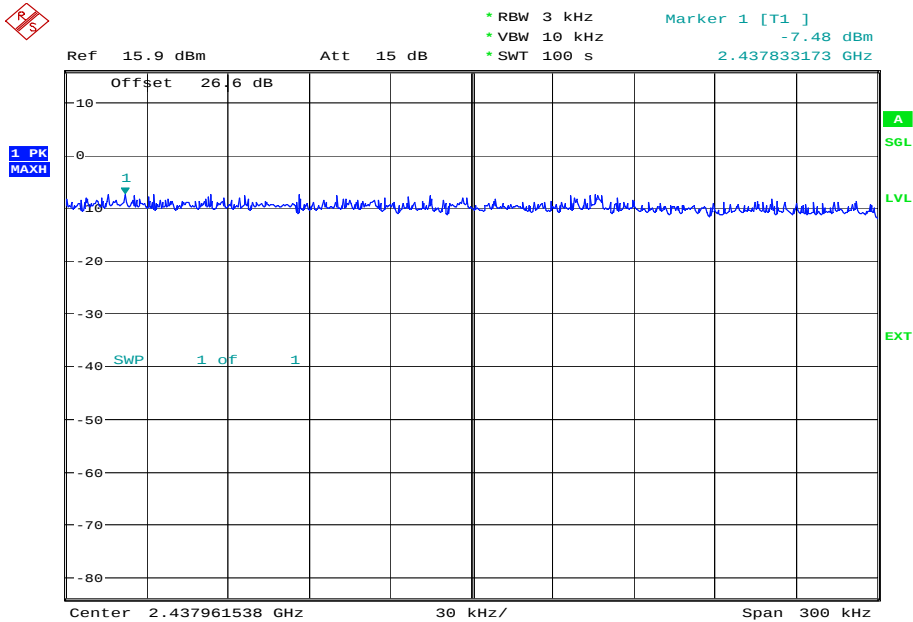
Date: 15.AUG.2012 15:25:48



Product Service

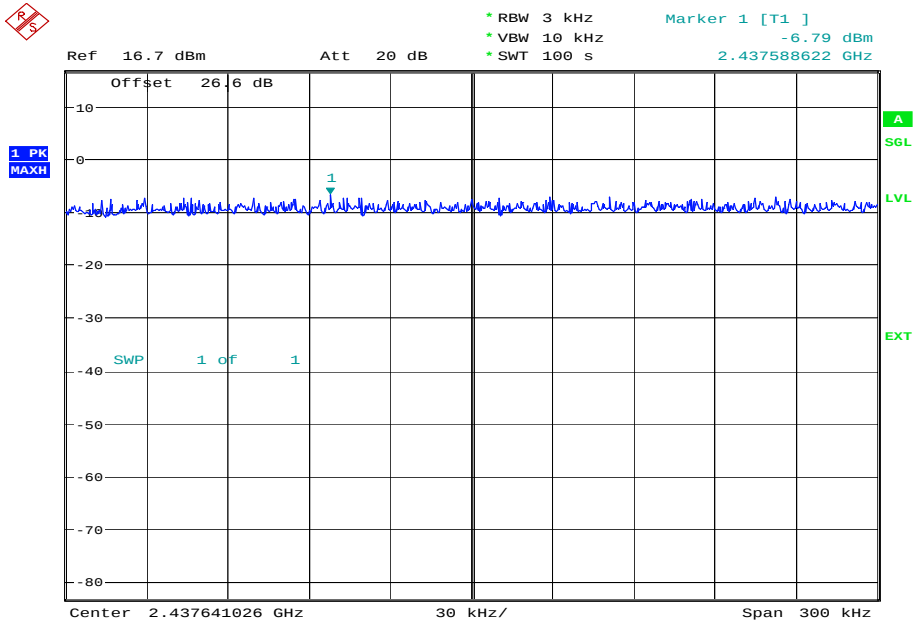
2437 MHz

1 Mbps



Date: 15.AUG.2012 15:00:52

2 Mbps

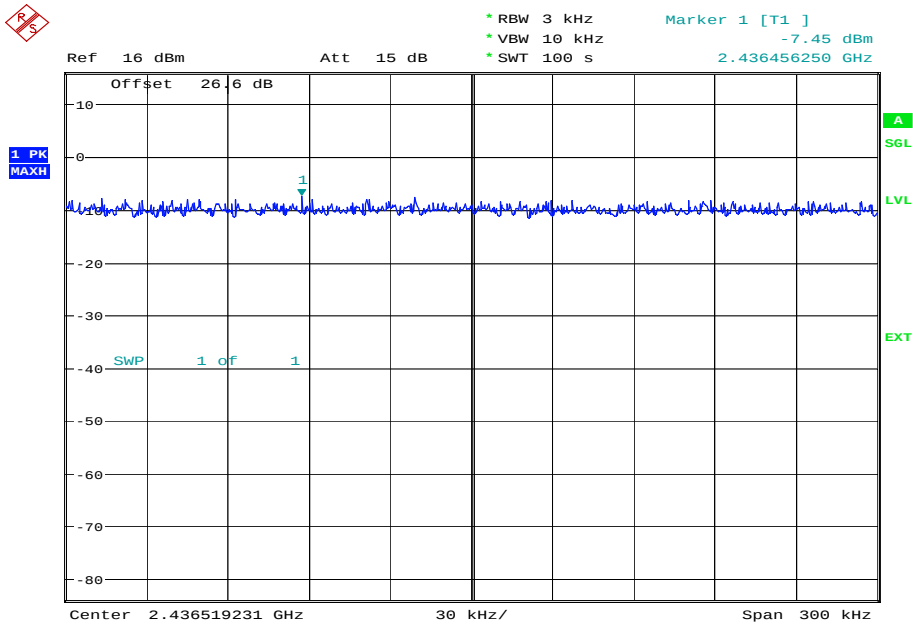


Date: 15.AUG.2012 15:15:23



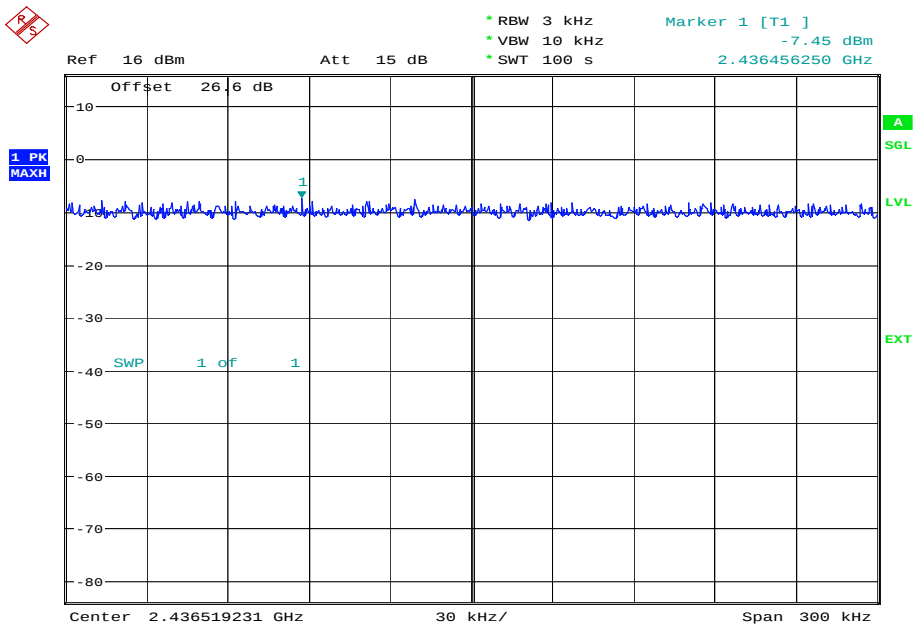
Product Service

5.5 Mbps



Date: 15.AUG.2012 15:30:47

11 Mbps



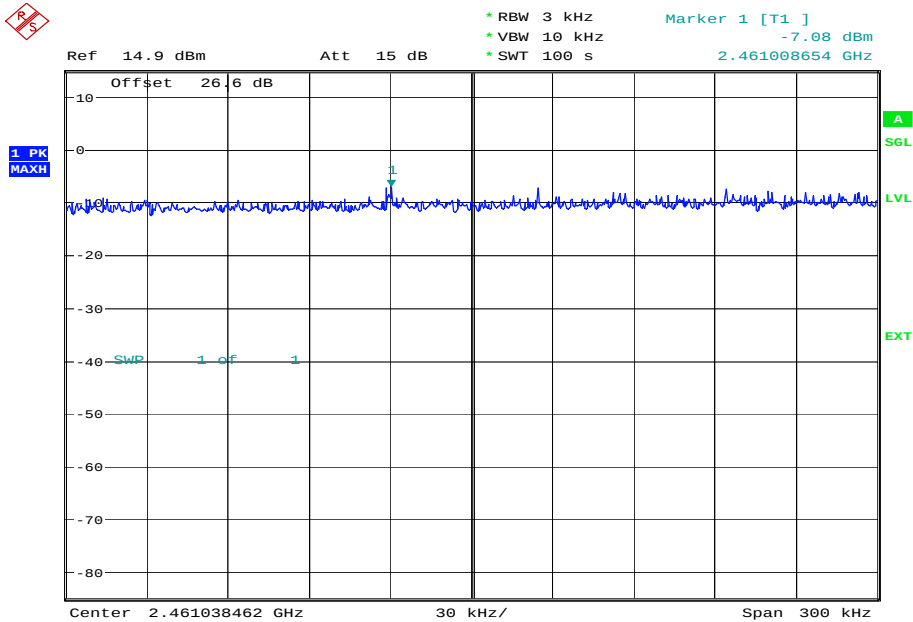
Date: 15.AUG.2012 15:30:47



Product Service

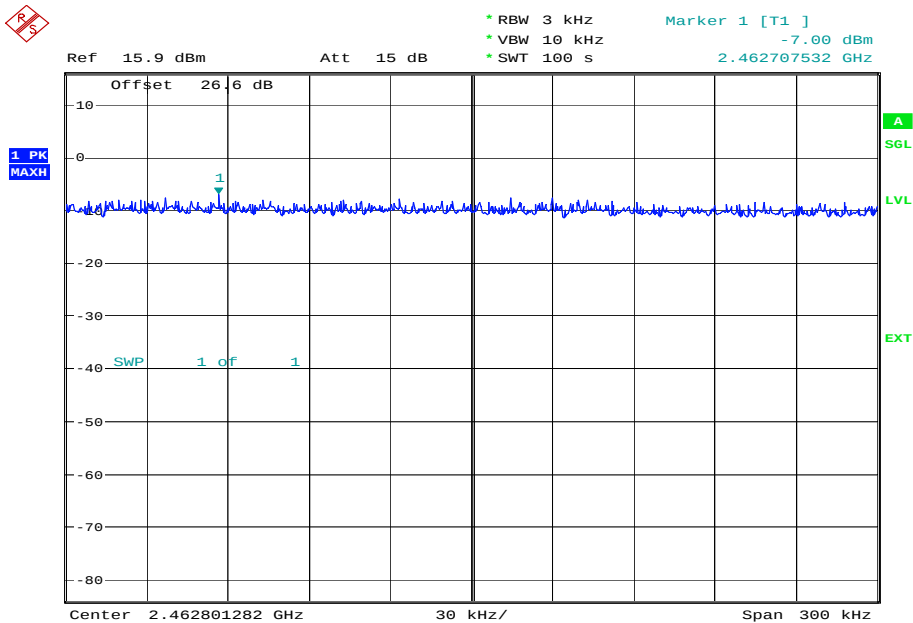
2462 MHz

1 Mbps



Date: 15.AUG.2012 15:05:24

2 Mbps

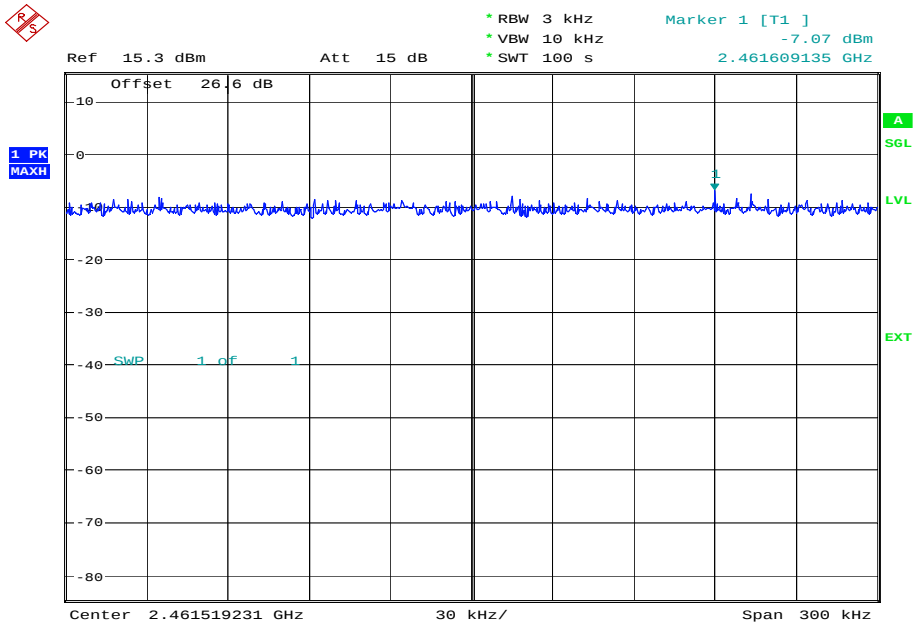


Date: 15.AUG.2012 15:20:10



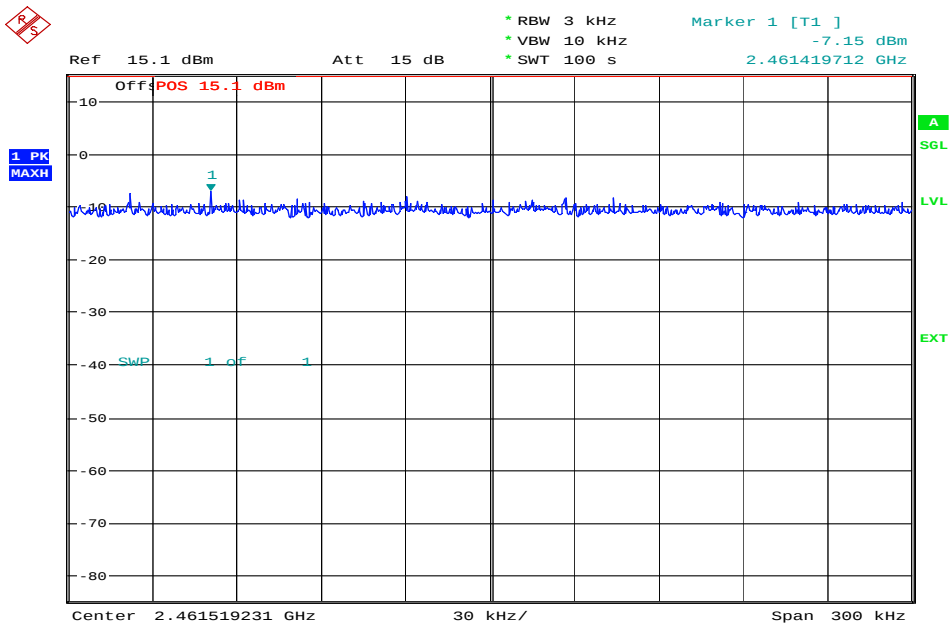
Product Service

5.5 Mbps



Date: 15.AUG.2012 15:35:21

11 Mbps



Date: 15.AUG.2012 17:18:09

Limit Clause

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

802.11(g)

4.0 V DC Supply

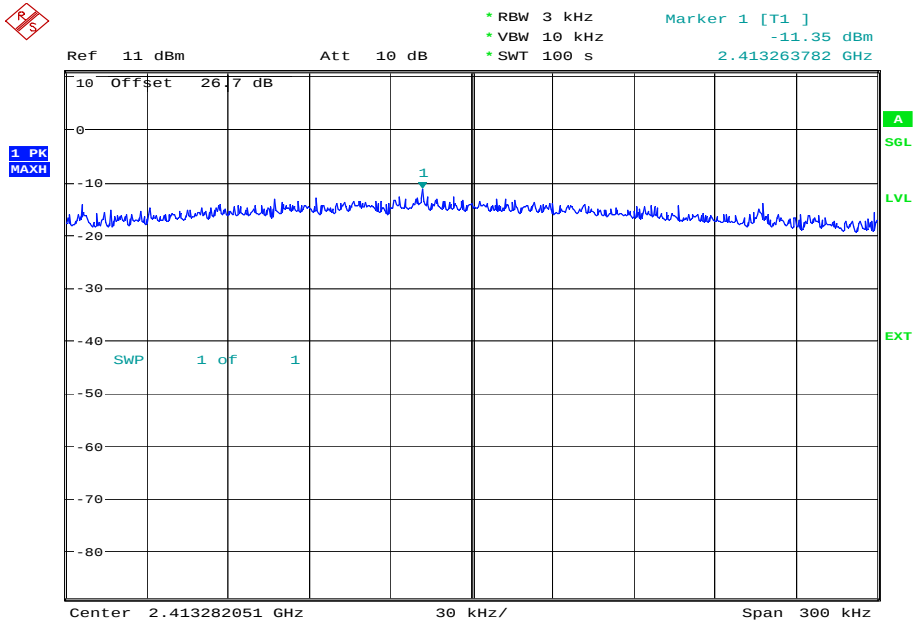
Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	6	-11.35
	9	-11.27
	12	-11.89
	18	-11.90
	24	-11.35
	36	-11.88
	48	-11.35
	54	-12.29
2437 MHz	6	-11.40
	9	-11.70
	12	-12.63
	18	-12.18
	24	-11.78
	36	-11.90
	48	-11.65
	54	-11.56
2462 MHz	6	-11.31
	9	-10.90
	12	-11.49
	18	-11.69
	24	-13.21
	36	-12.12
	48	-11.78
	54	-12.23



Product Service

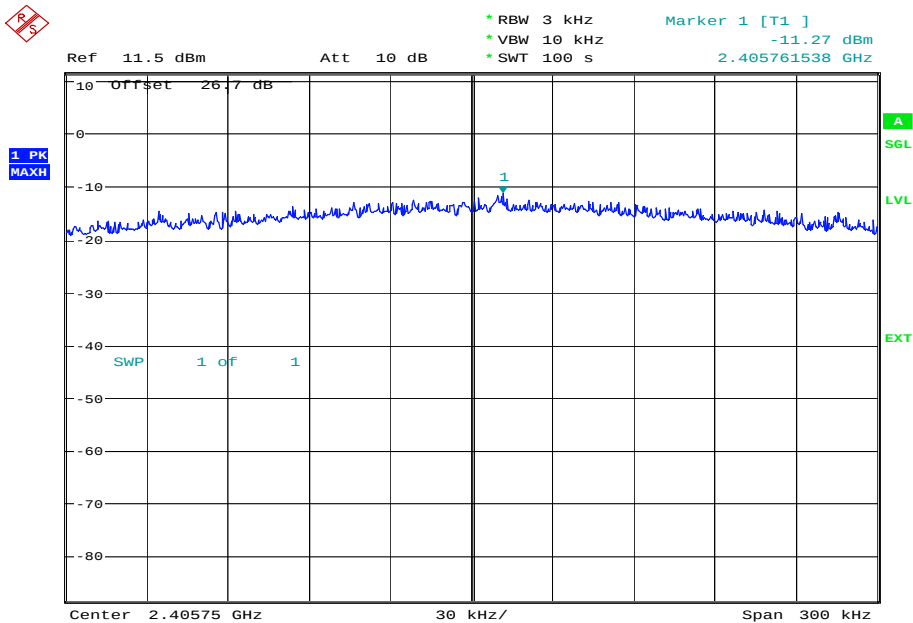
2412 MHz

6 Mbps



Date: 16.AUG.2012 09:07:49

9 Mbps

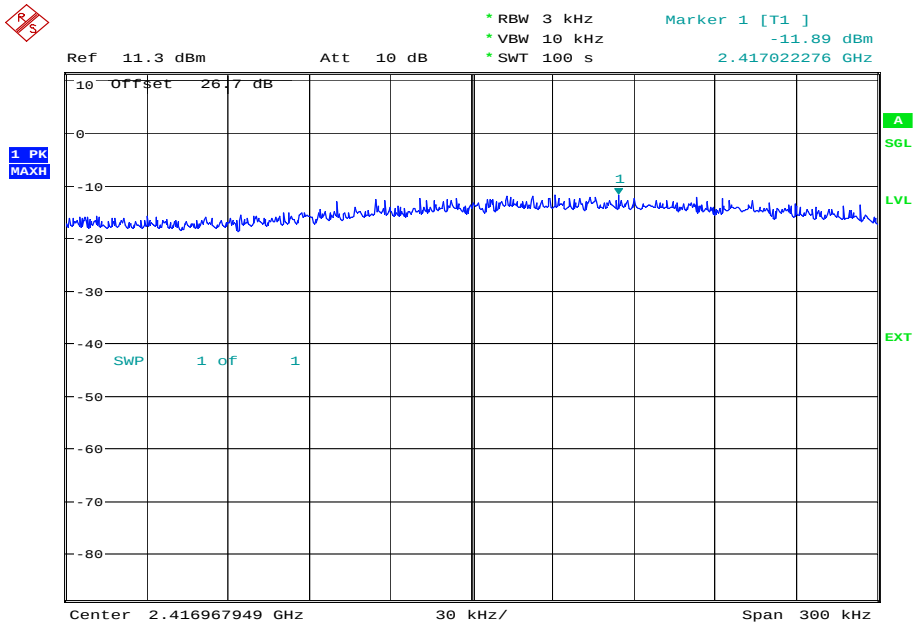


Date: 16.AUG.2012 09:24:02



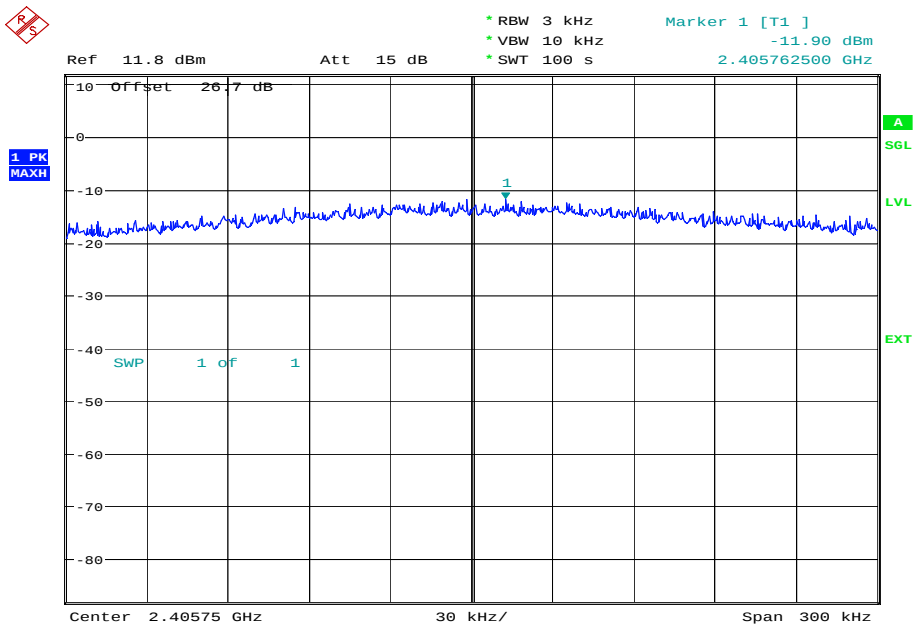
Product Service

12 Mbps



Date: 16.AUG.2012 09:39:19

18 Mbps

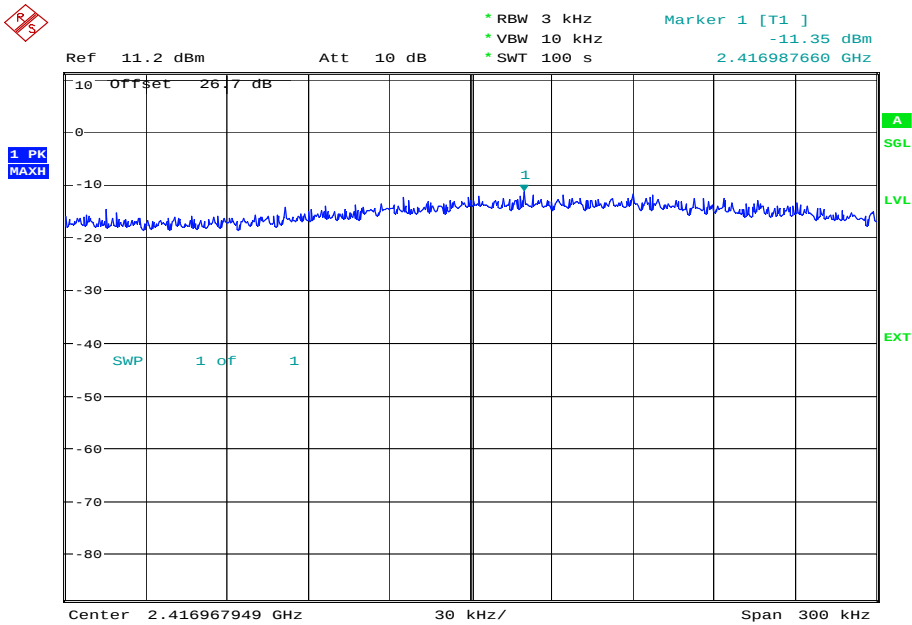


Date: 16.AUG.2012 09:54:39



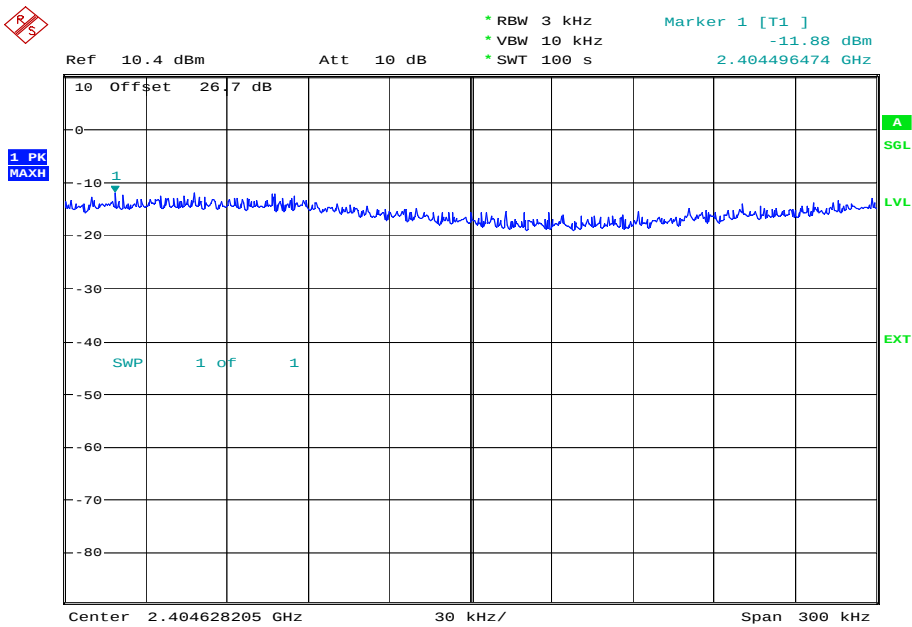
Product Service

24 Mbps



Date: 16.AUG.2012 10:09:38

36 Mbps

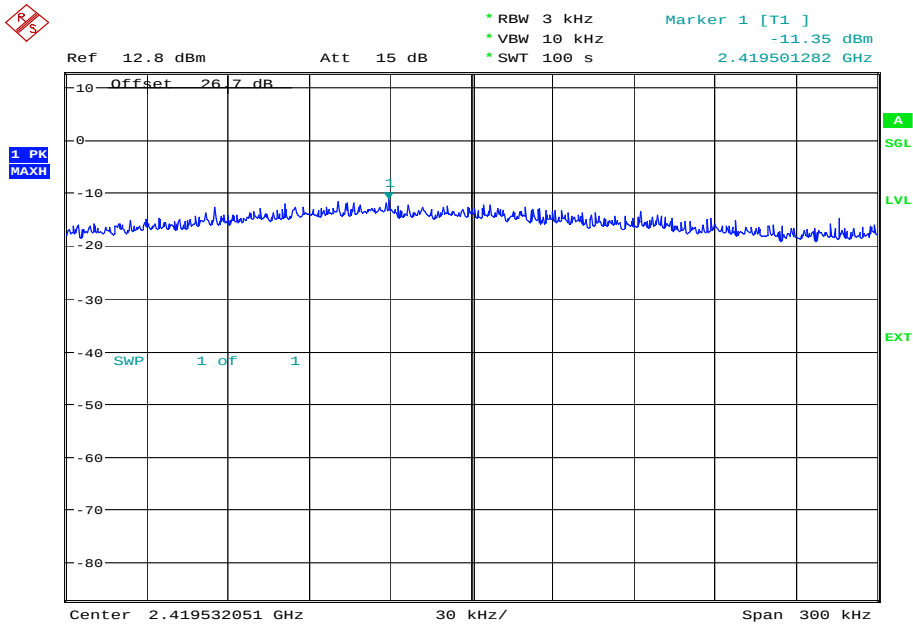


Date: 16.AUG.2012 12:04:25



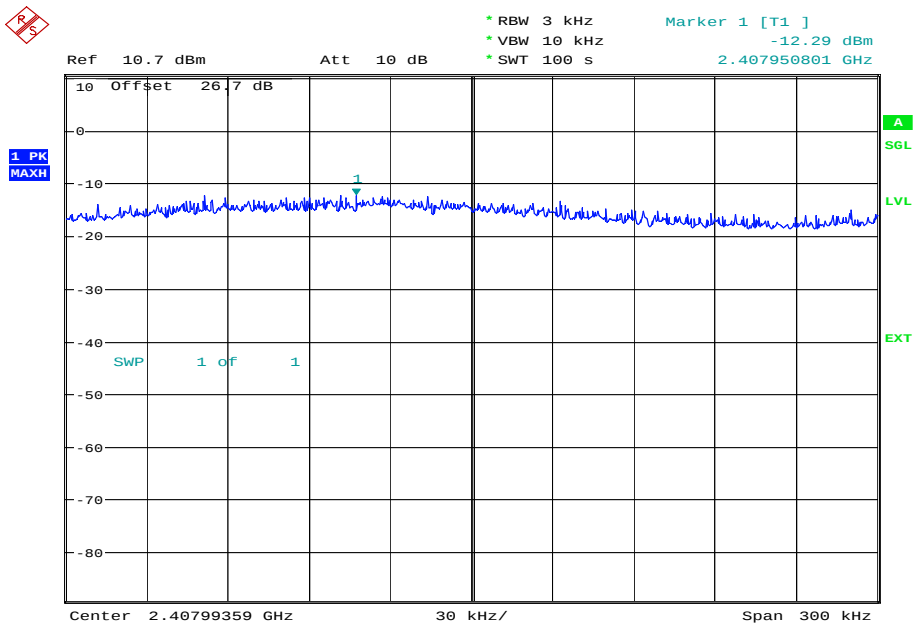
Product Service

48 Mbps



Date: 16.AUG.2012 12:18:16

54 Mbps



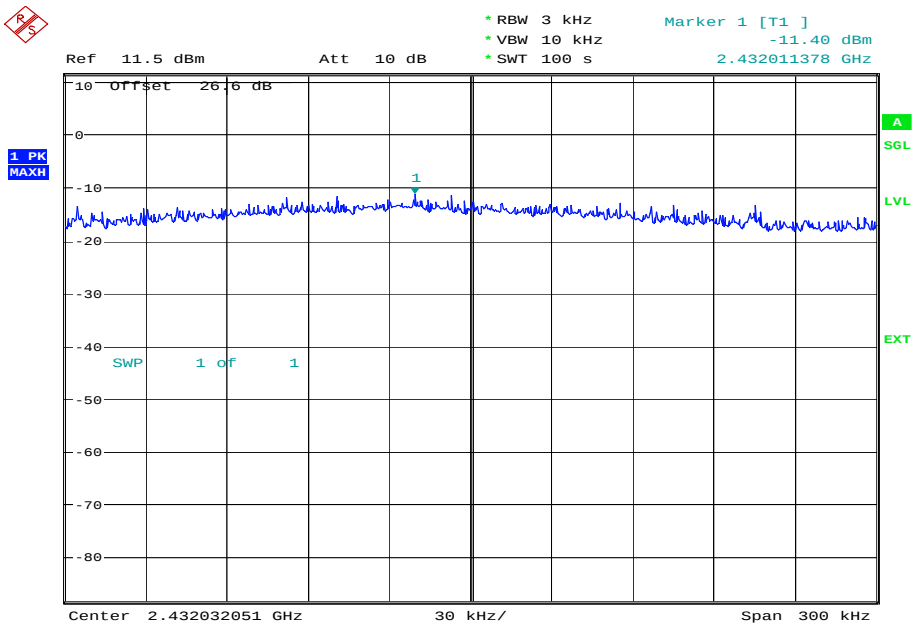
Date: 16.AUG.2012 12:33:31



Product Service

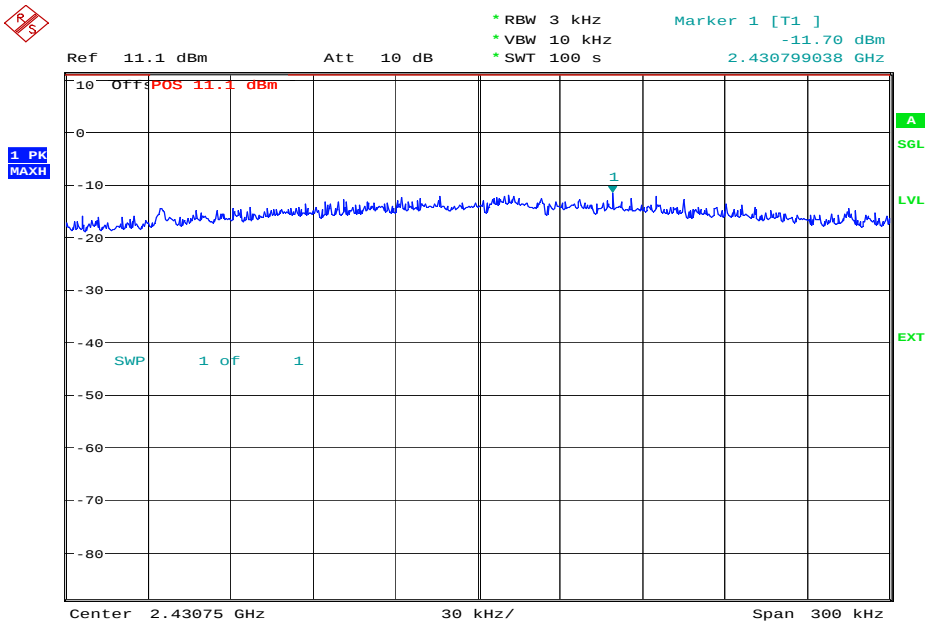
2437 MHz

6 Mbps



Date: 16.AUG.2012 09:12:22

9 Mbps

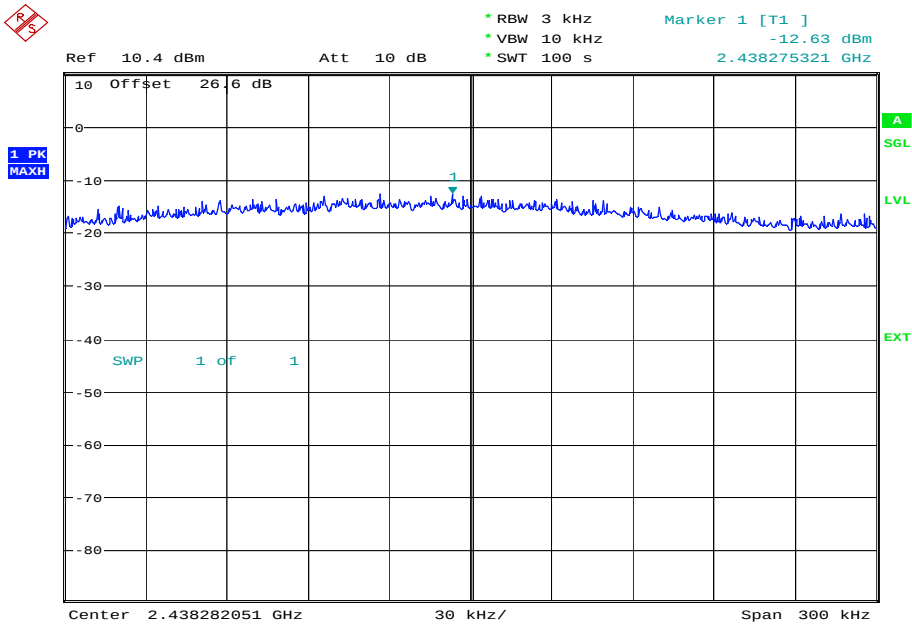


Date: 16.AUG.2012 09:29:30



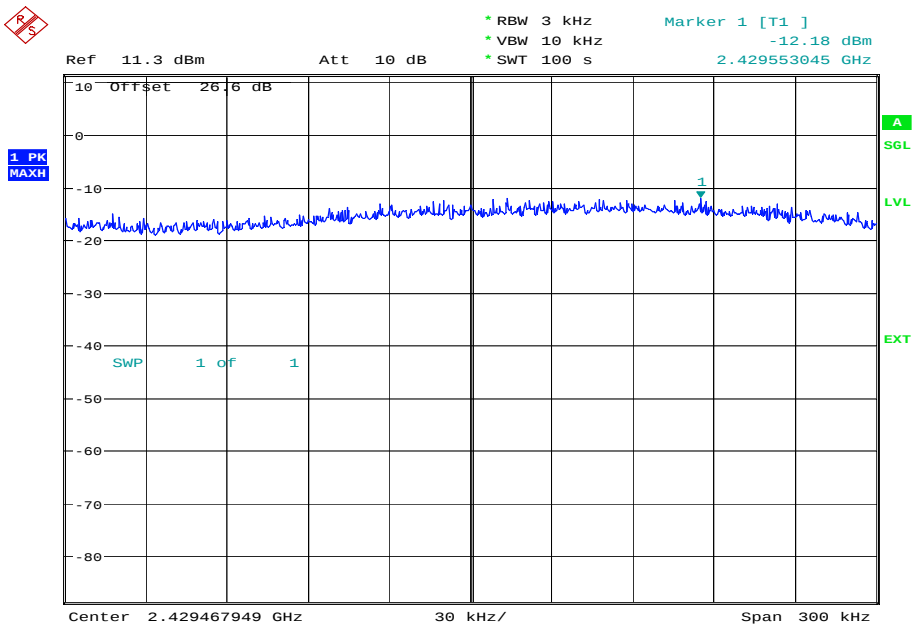
Product Service

12 Mbps



Date: 16.AUG.2012 09:43:51

18 Mbps

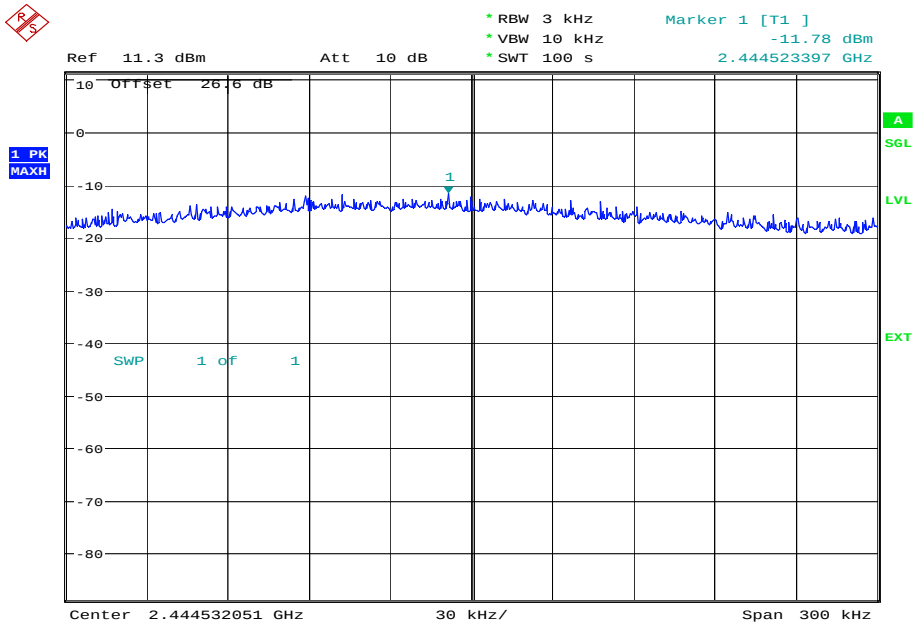


Date: 16.AUG.2012 09:59:25



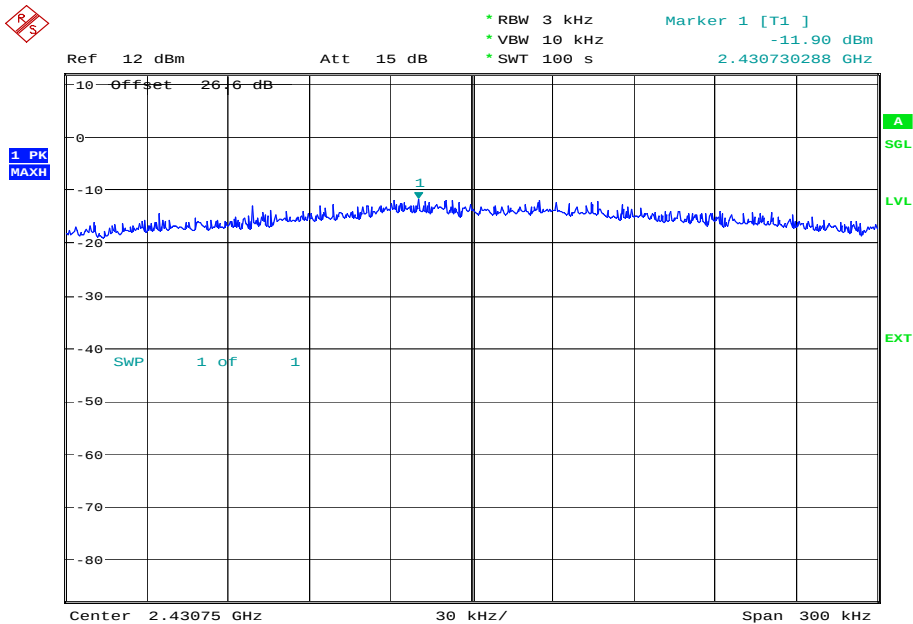
Product Service

24 Mbps



Date: 16.AUG.2012 10:14:27

36 Mbps

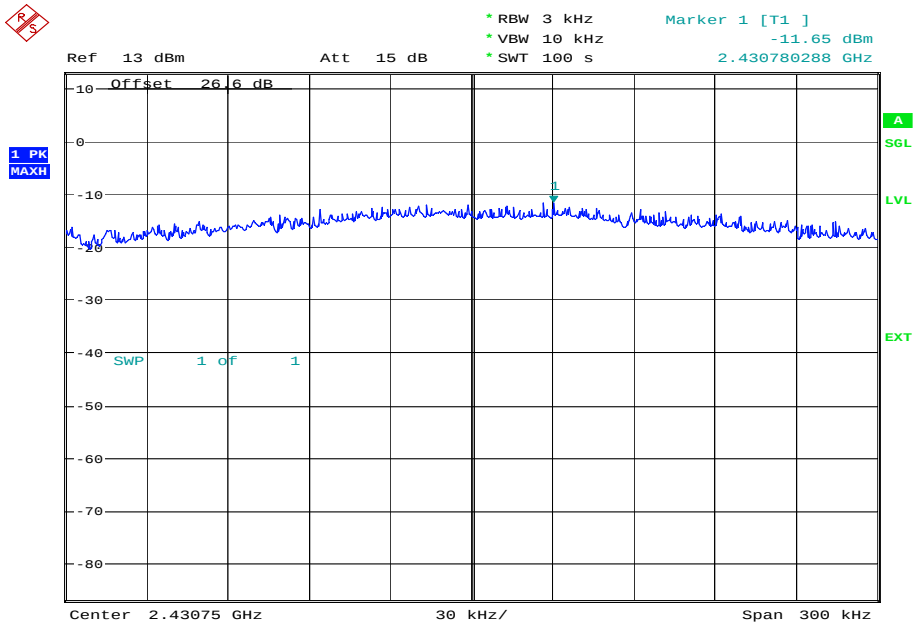


Date: 16.AUG.2012 12:08:43



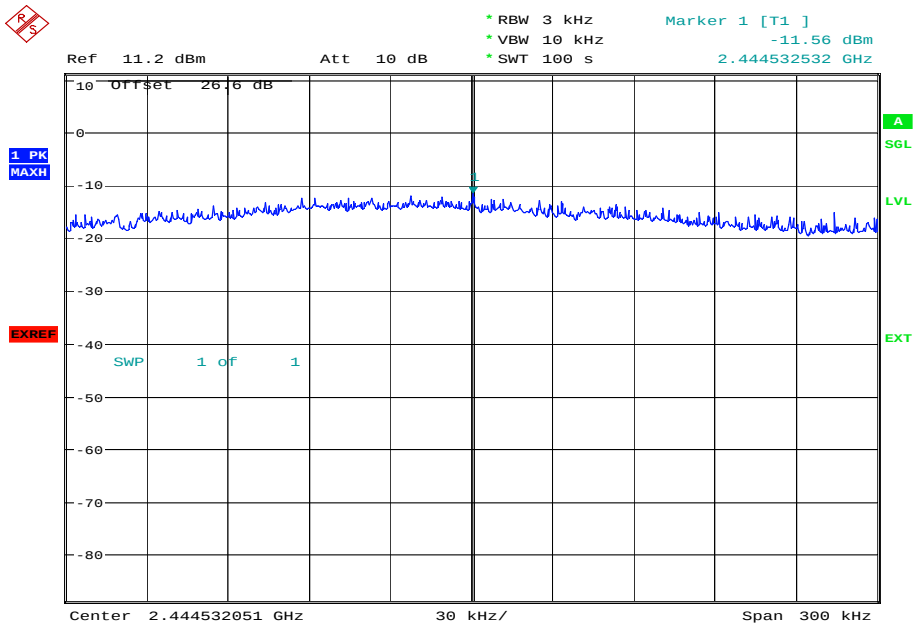
Product Service

48 Mbps



Date: 16.AUG.2012 12:23:12

54 Mbps



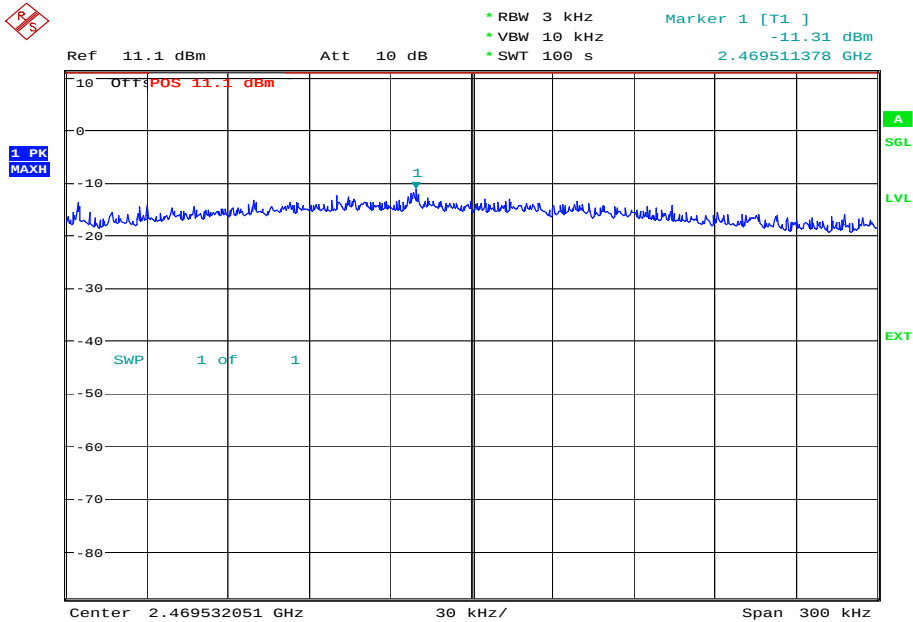
Date: 16.AUG.2012 13:22:47



Product Service

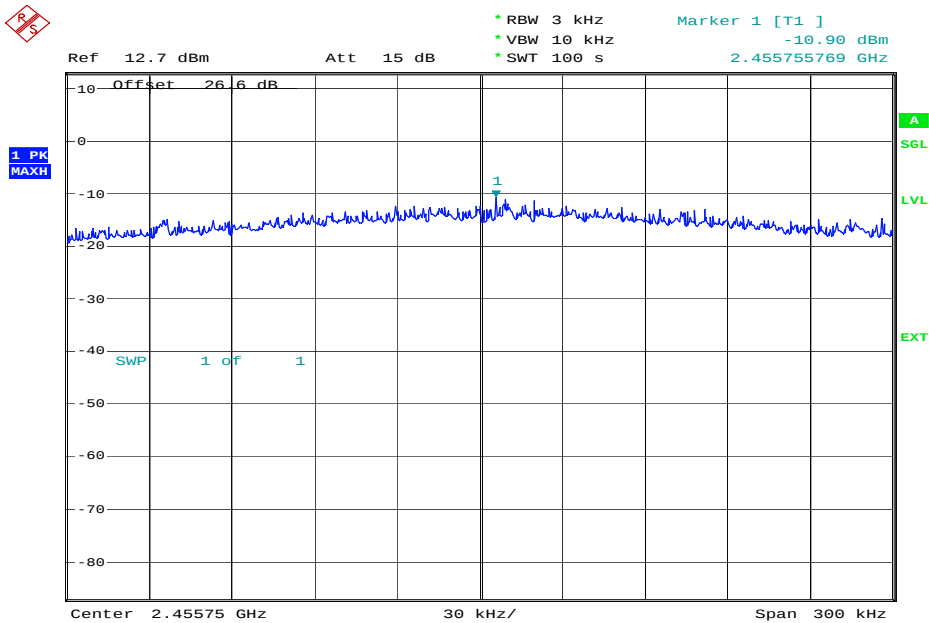
2462 MHz

6 Mbps



Date: 16.AUG.2012 09:17:42

9 Mbps

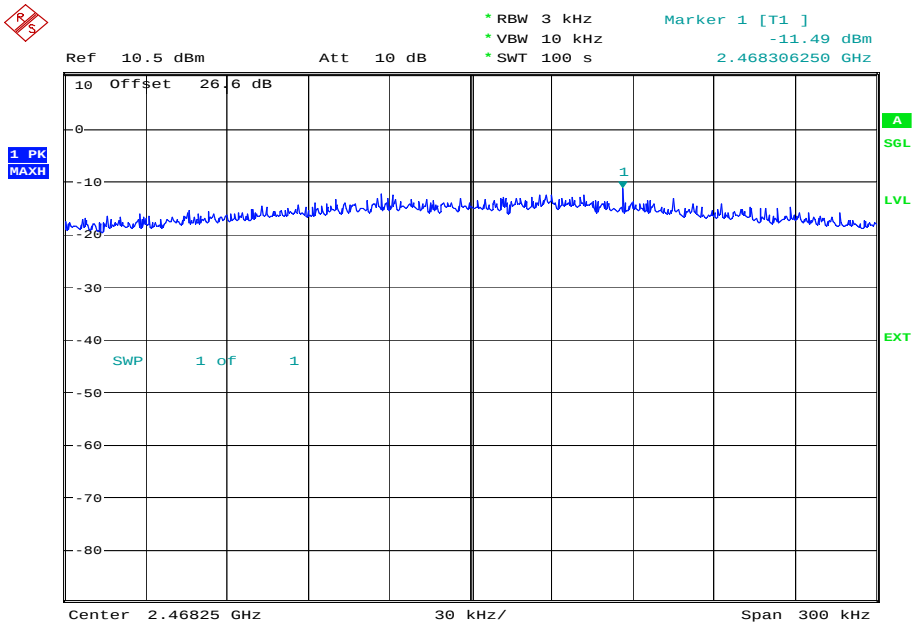


Date: 16.AUG.2012 09:34:10



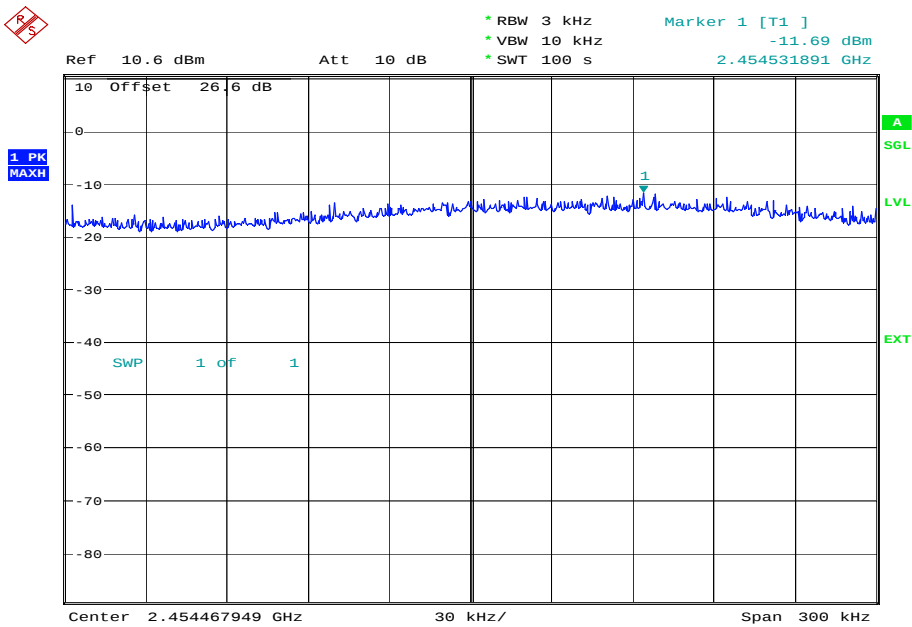
Product Service

12 Mbps



Date: 16.AUG.2012 09:49:21

18 Mbps

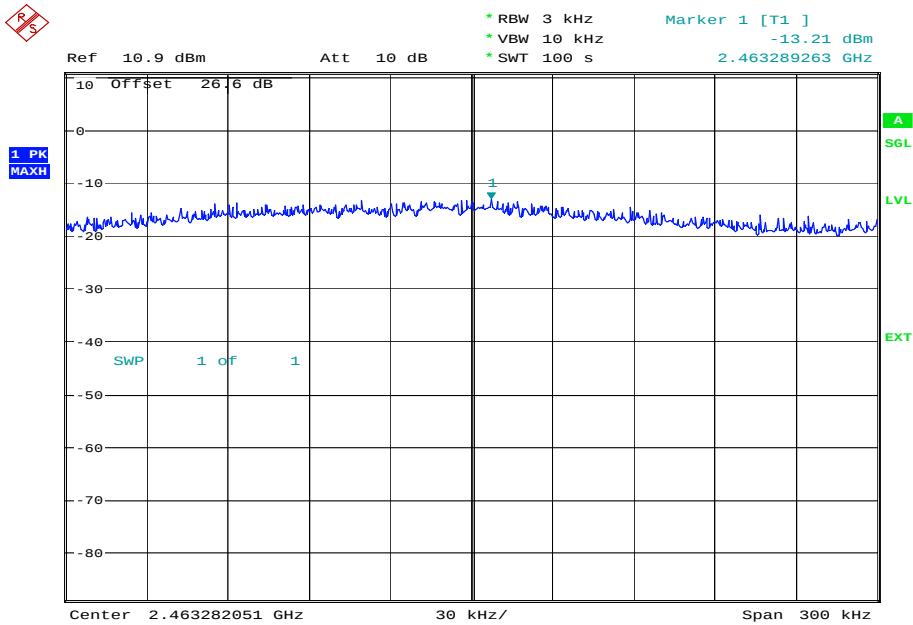


Date: 16.AUG.2012 10:04:08



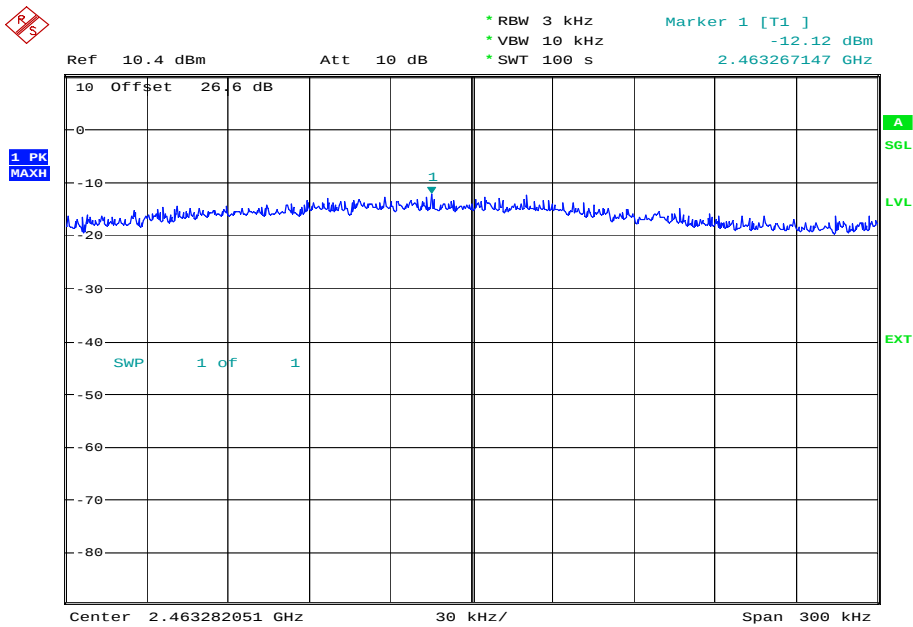
Product Service

24 Mbps



Date: 16.AUG.2012 10:19:07

36 Mbps

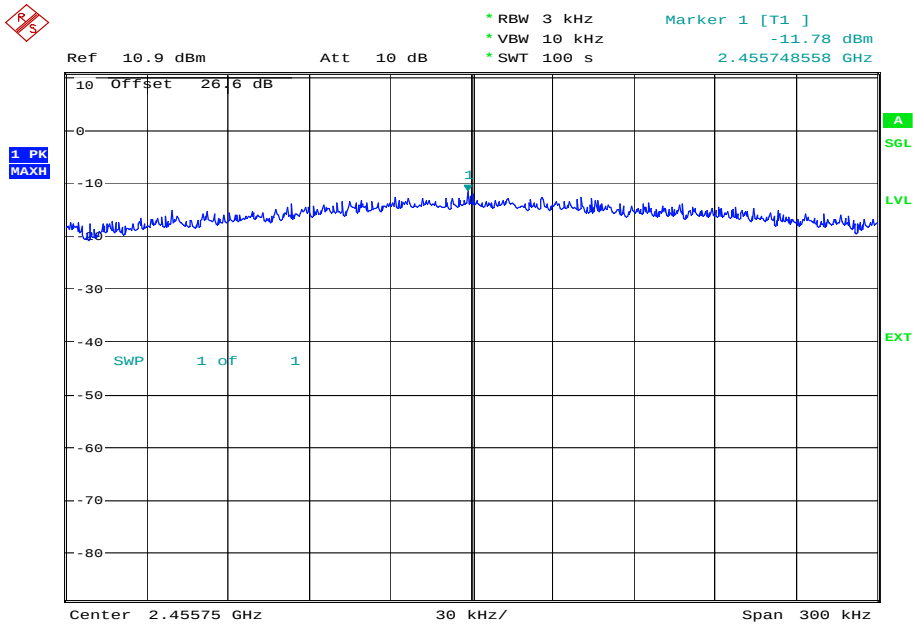


Date: 16.AUG.2012 12:13:25



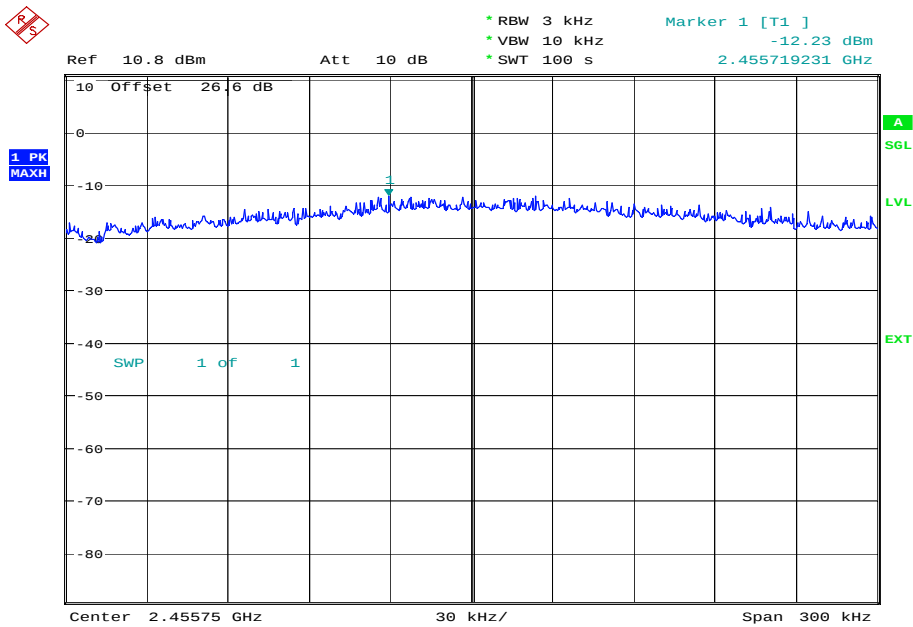
Product Service

48 Mbps



Date: 16.AUG.2012 12:27:42

54 Mbps



Date: 16.AUG.2012 13:27:21

Limit Clause

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

802.11(n) - 2.4 GHz, 20 MHz BW

4.0 V DC Supply

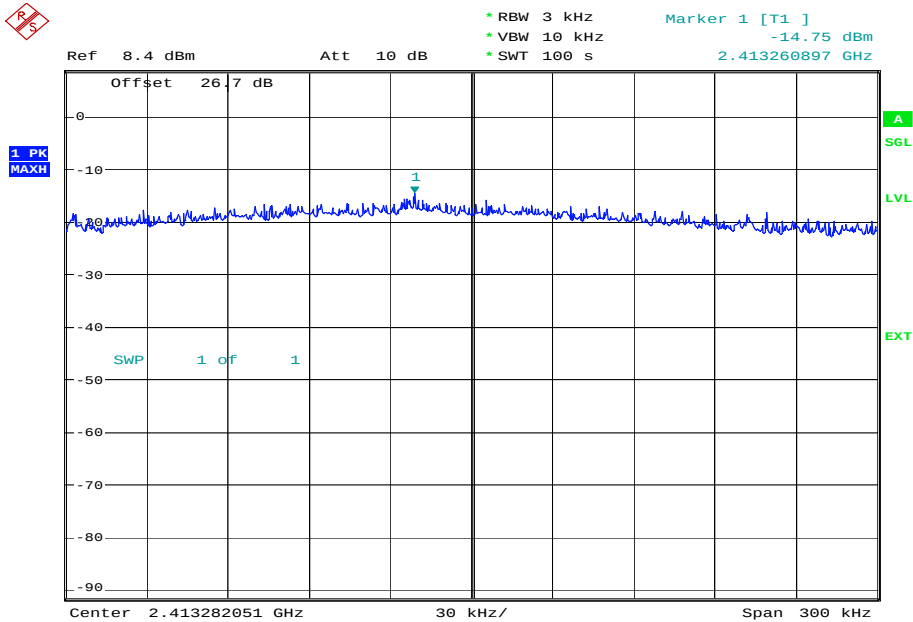
Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2412 MHz	6.5	-14.75
	13	-14.90
	19.5	-15.19
	26	-15.64
	39	-14.92
	52	-15.45
	58.5	-14.60
	65	-14.43
2437 MHz	6.5	-12.01
	13	-13.56
	19.5	-13.51
	26	-14.02
	39	-13.27
	52	-13.14
	58.5	-13.57
	65	-13.85
2462 MHz	6.5	-13.90
	13	-12.67
	19.5	-13.13
	26	-14.46
	39	-13.24
	52	-13.87
	58.5	-13.71
	65	-14.03



Product Service

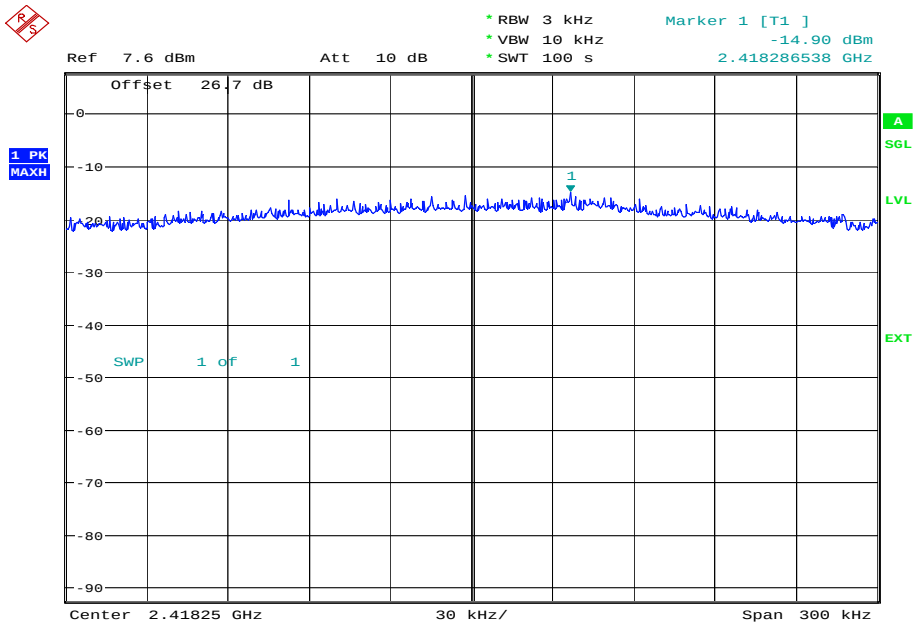
2412 MHz

6.5 Mbps



Date: 16.AUG.2012 13:36:29

13 Mbps

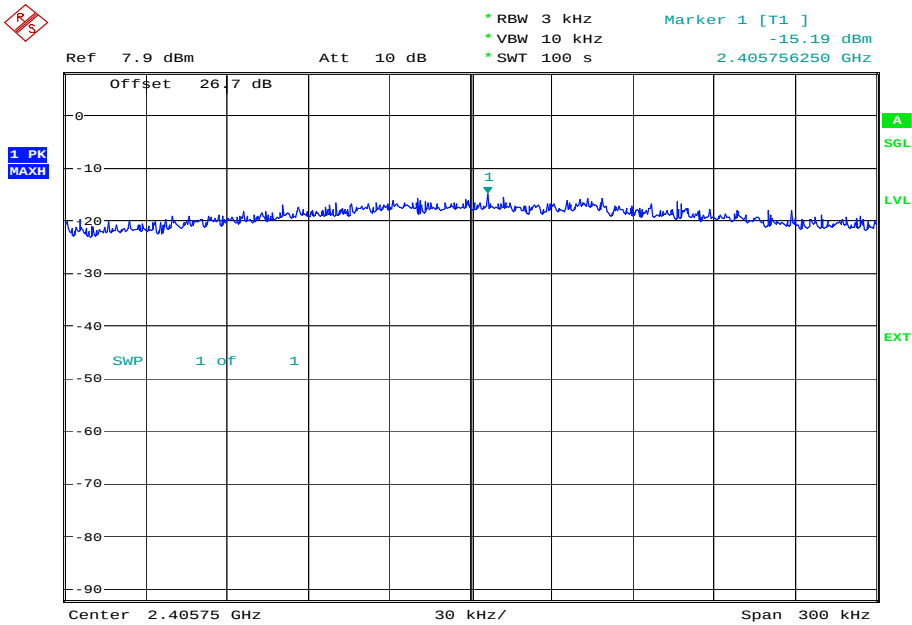


Date: 16.AUG.2012 13:51:38



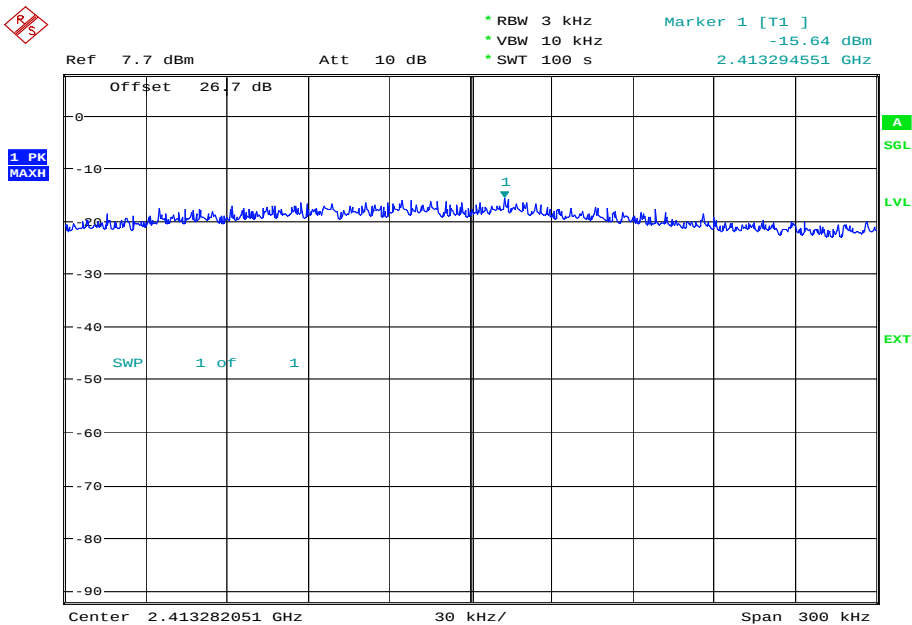
Product Service

19.5 Mbps



Date: 16.AUG.2012 14:15:46

26 Mbps

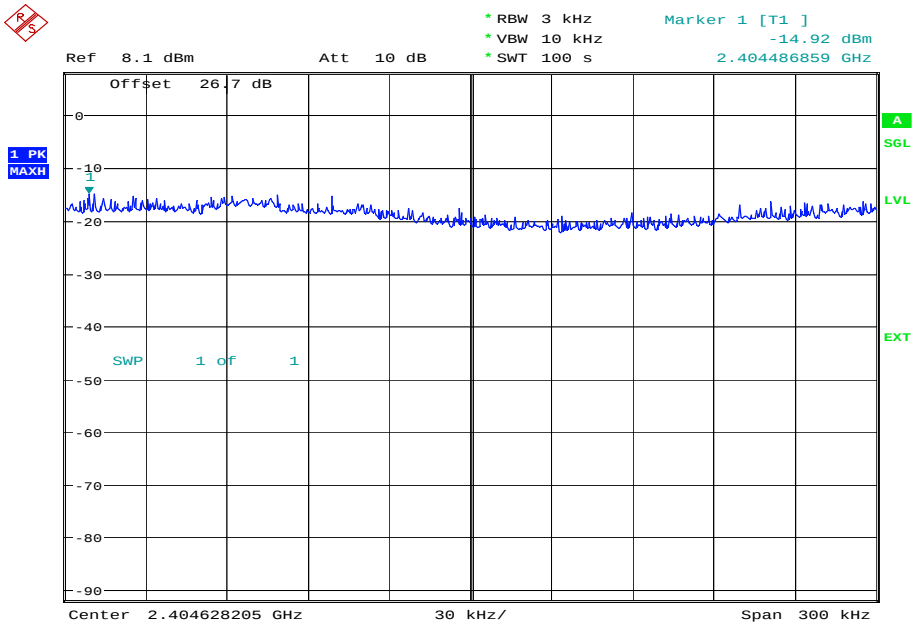


Date: 16.AUG.2012 14:30:44



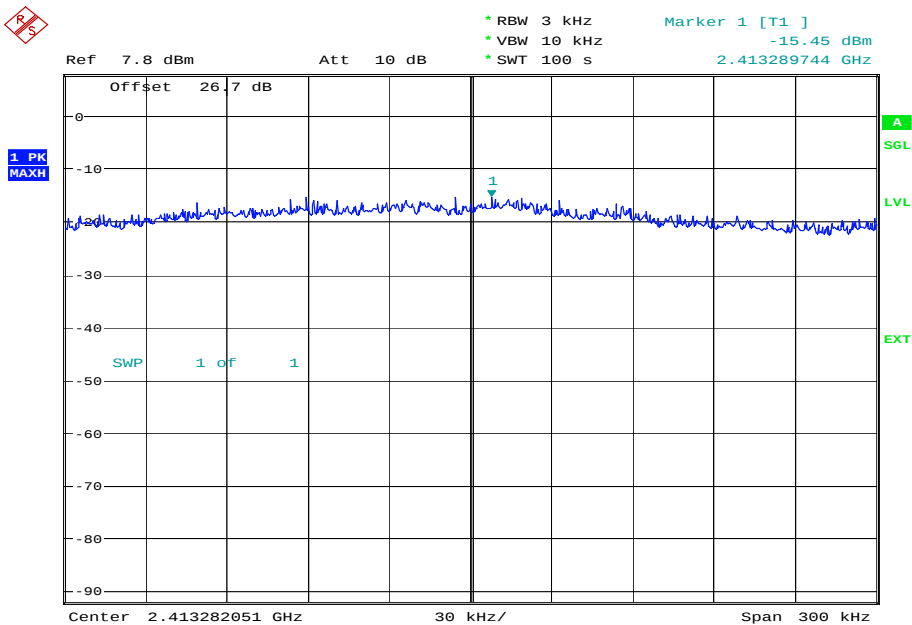
Product Service

39 Mbps



Date: 16.AUG.2012 14:45:02

52 Mbps

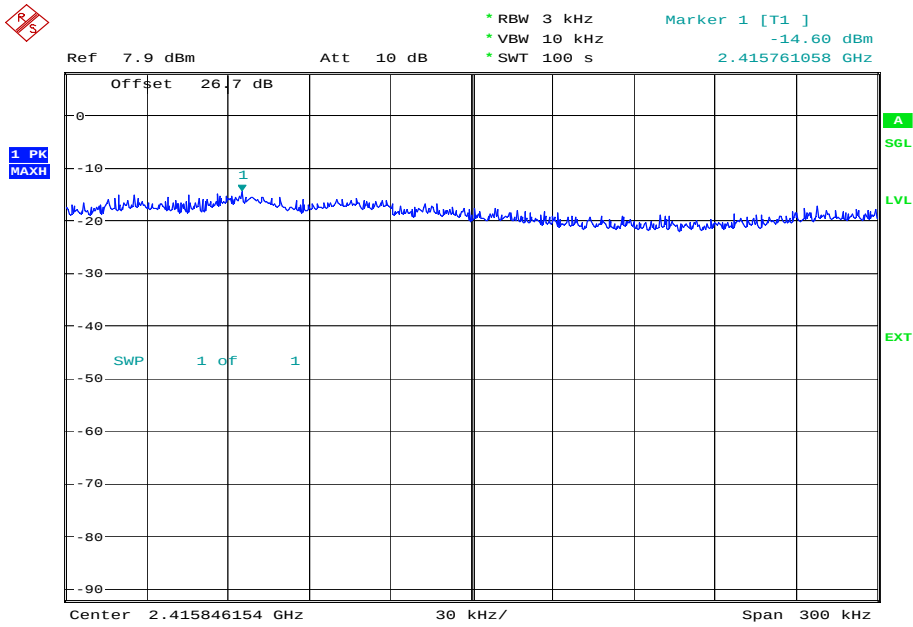


Date: 16.AUG.2012 14:59:49



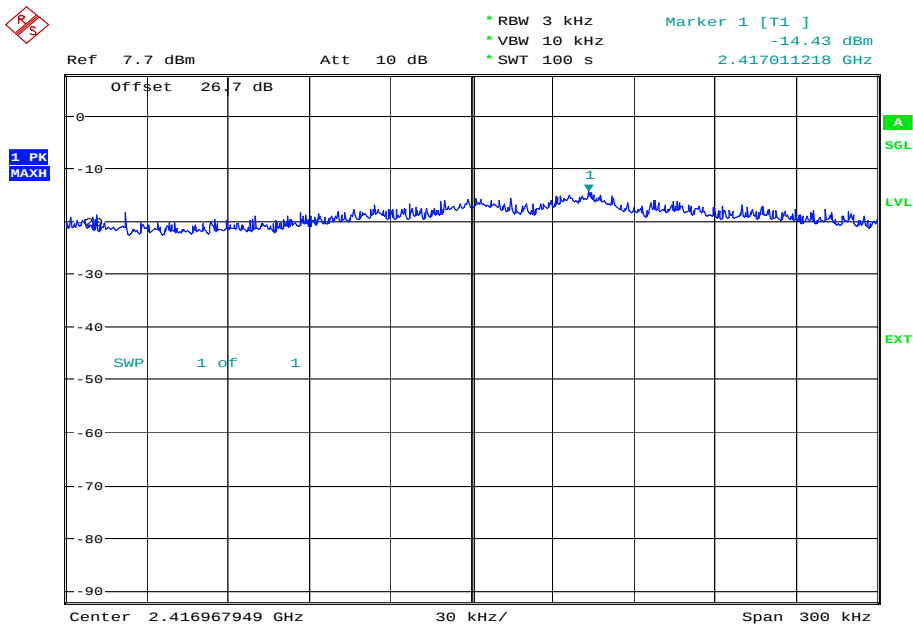
Product Service

58.5 Mbps



Date: 16.AUG.2012 15:13:23

65 Mbps



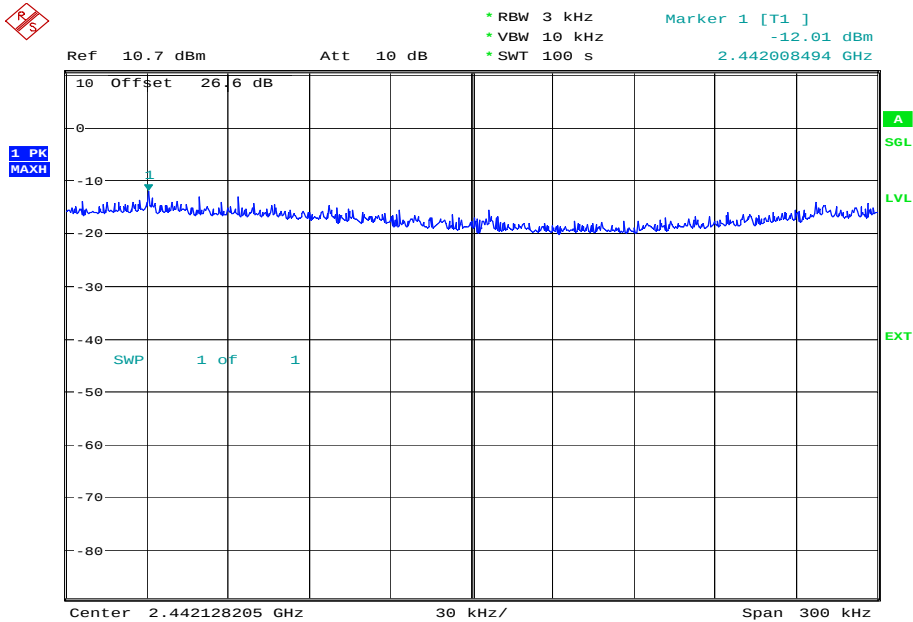
Date: 16.AUG.2012 15:31:35



Product Service

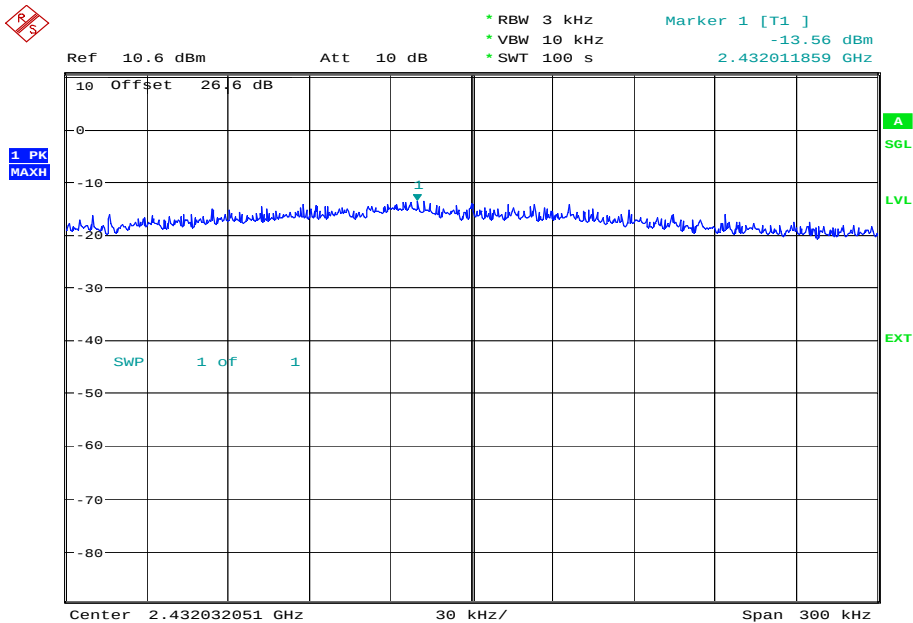
2437 MHz

6.5 Mbps



Date: 16.AUG.2012 13:41:36

13 Mbps

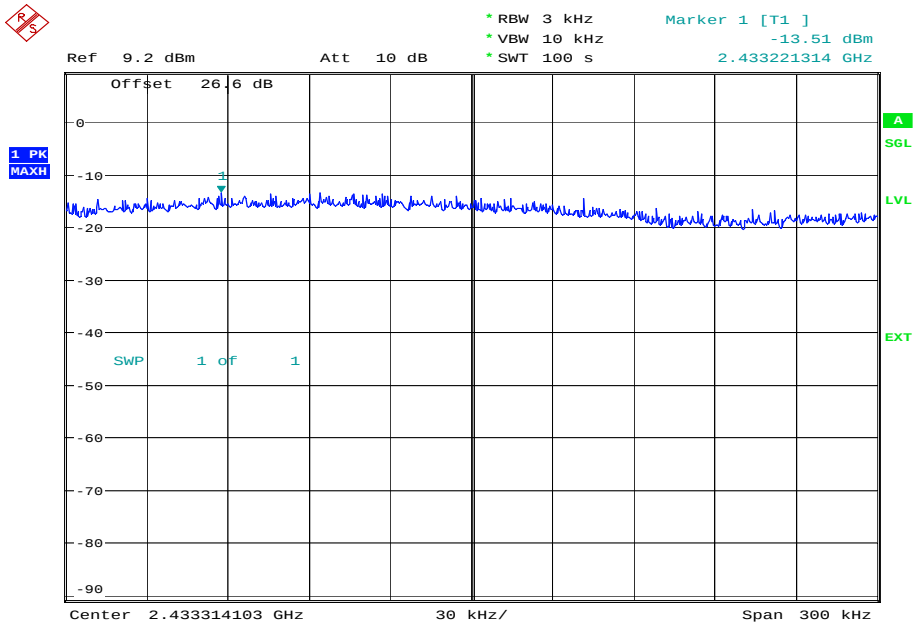


Date: 16.AUG.2012 13:56:13



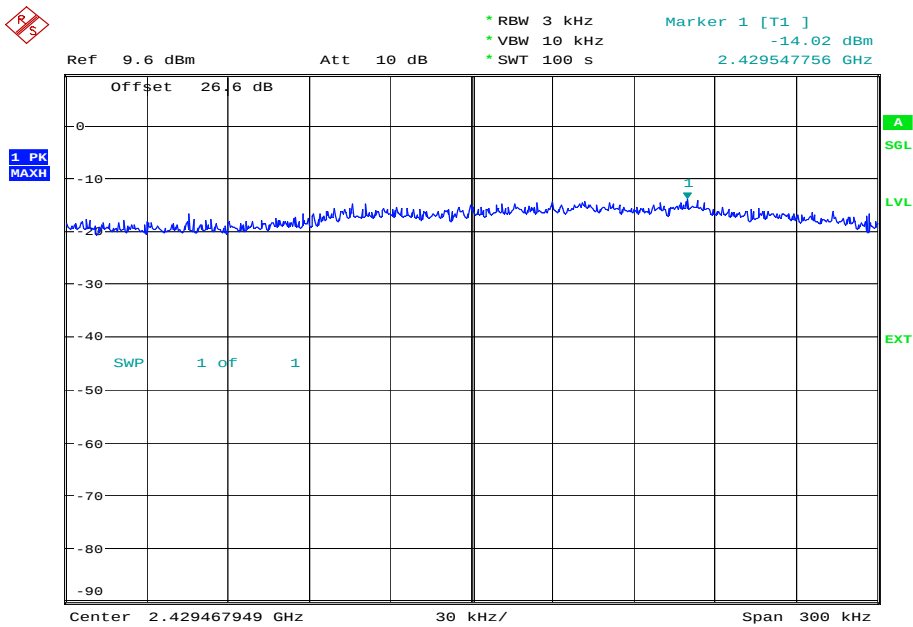
Product Service

19.5 Mbps



Date: 16.AUG.2012 14:20:35

26 Mbps

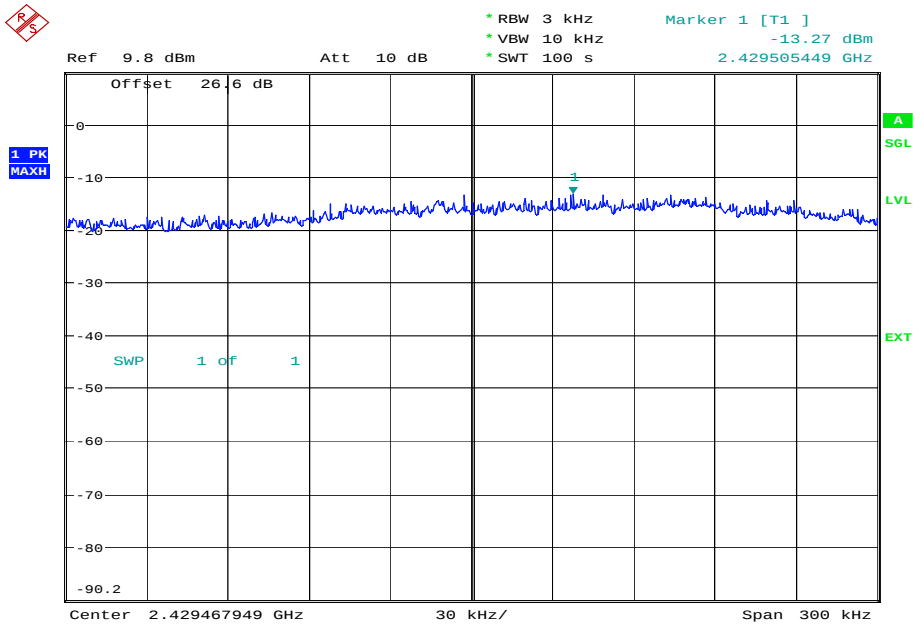


Date: 16.AUG.2012 14:35:26



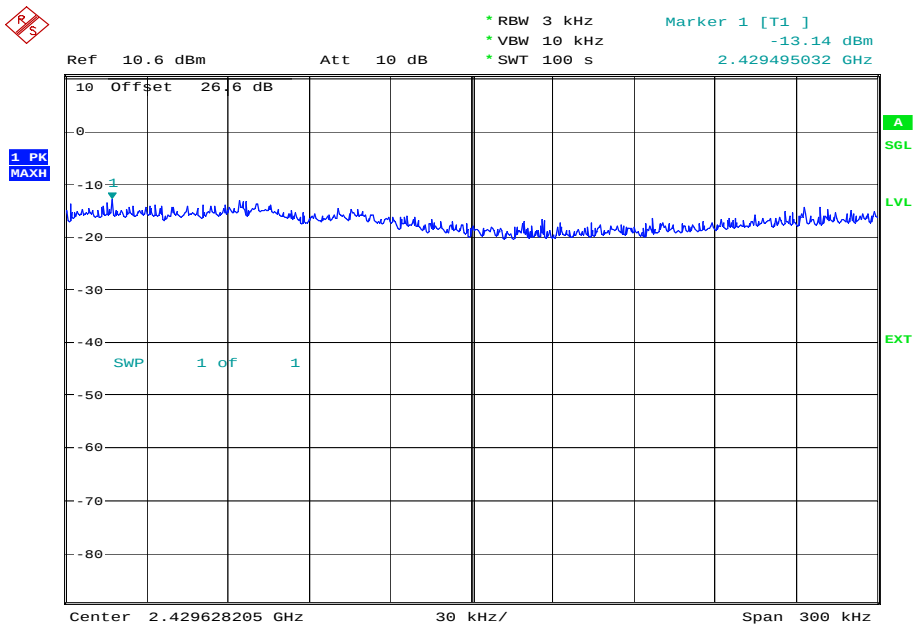
Product Service

39 Mbps



Date: 16.AUG.2012 14:49:45

52 Mbps

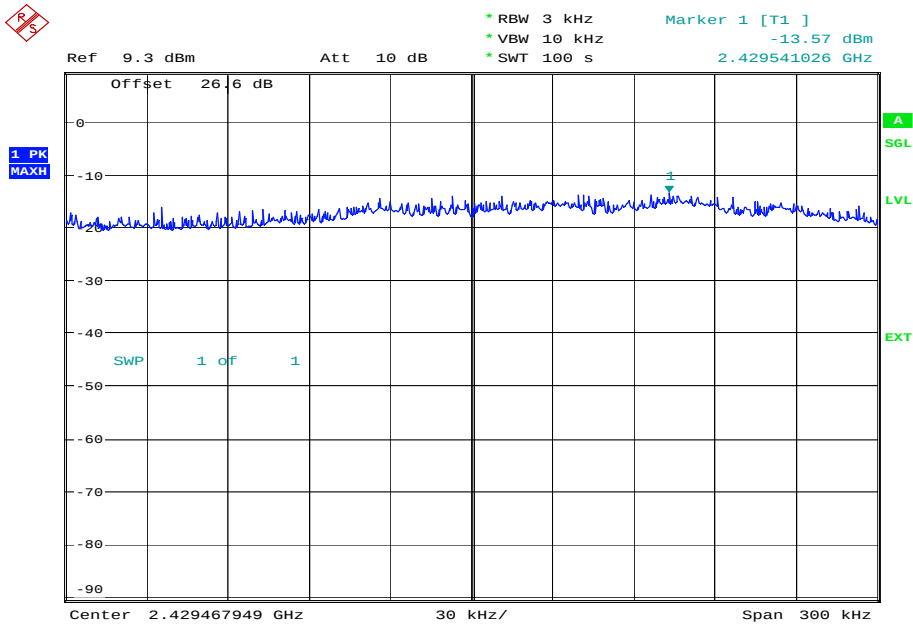


Date: 16.AUG.2012 15:04:12



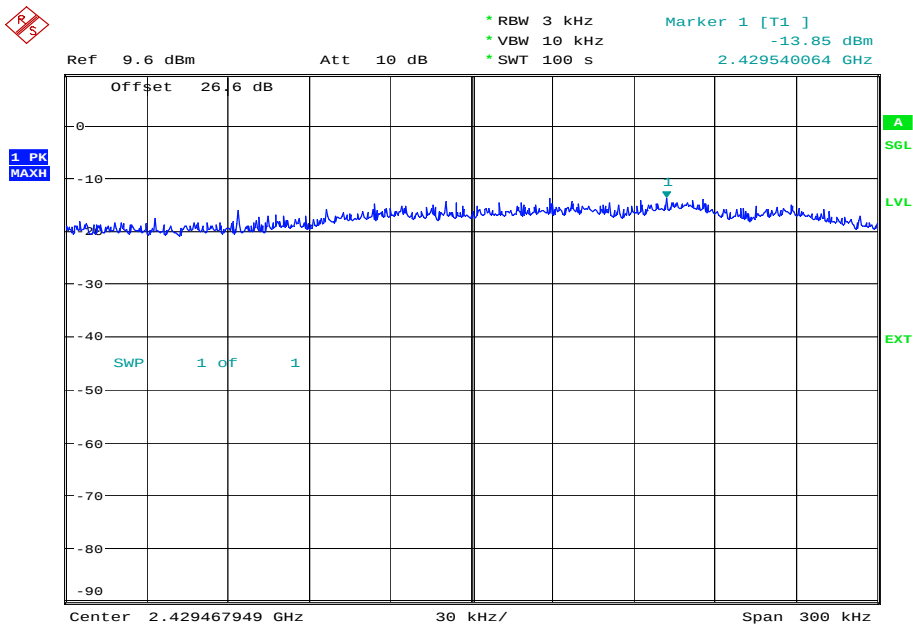
Product Service

58.5 Mbps



Date: 16.AUG.2012 15:17:49

65 Mbps



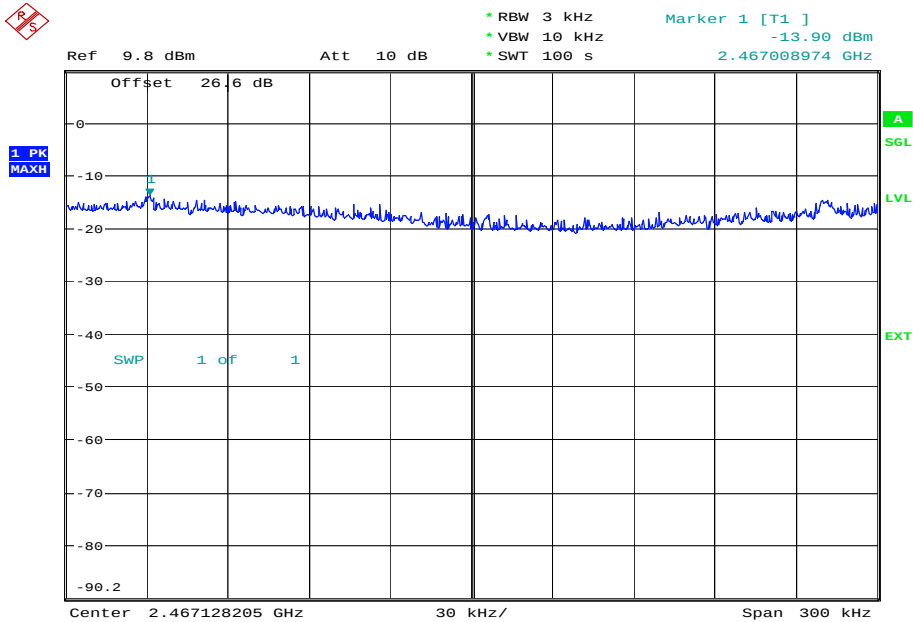
Date: 16.AUG.2012 15:38:19



Product Service

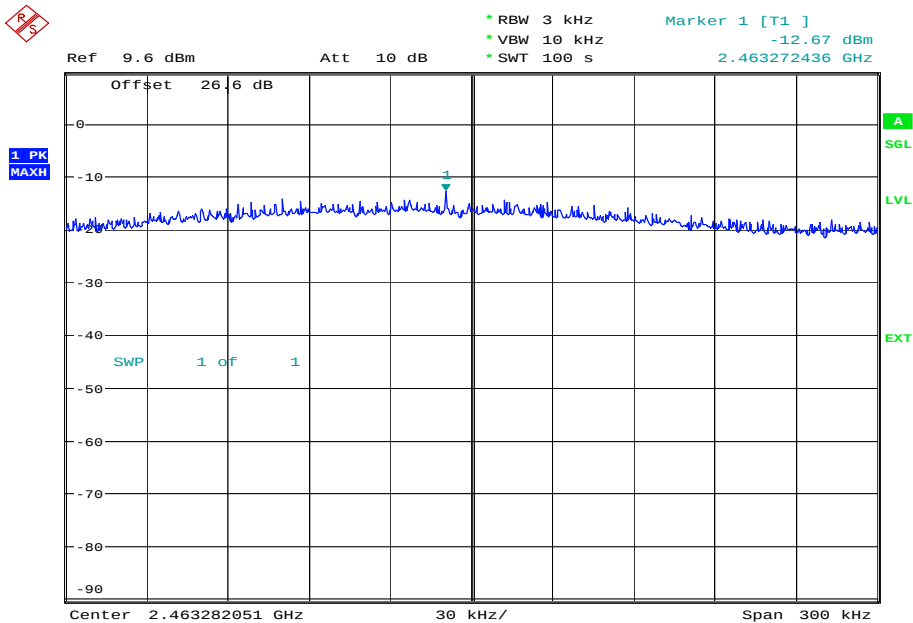
2462 MHz

6.5 Mbps



Date: 16.AUG.2012 13:46:01

13 Mbps

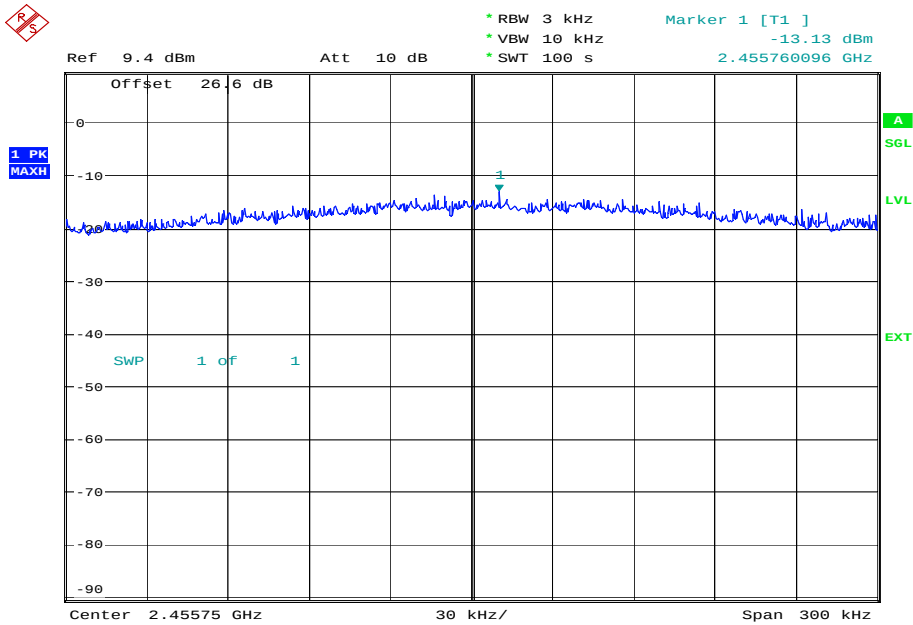


Date: 16.AUG.2012 14:01:03



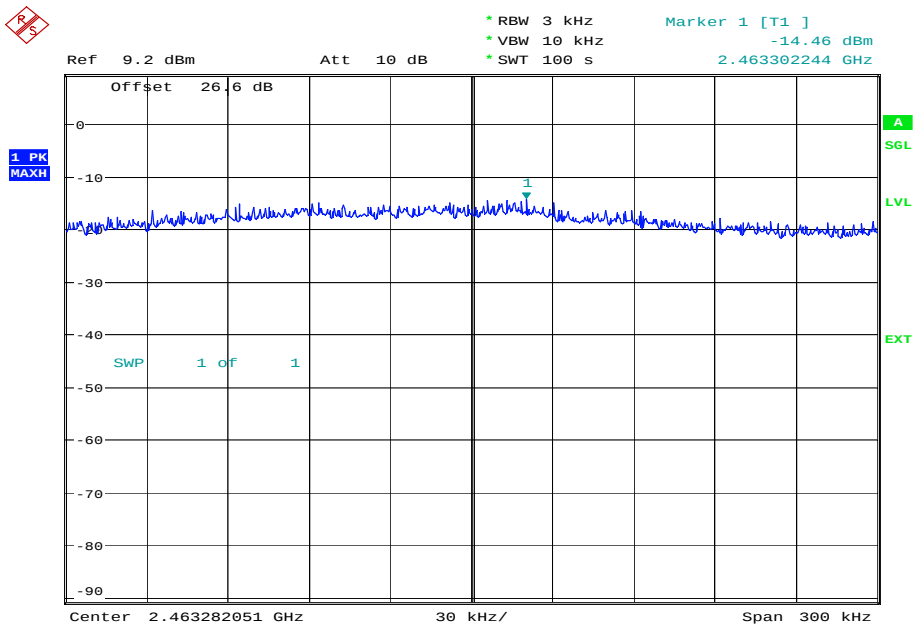
Product Service

19.5 Mbps



Date: 16.AUG.2012 14:25:35

26 Mbps

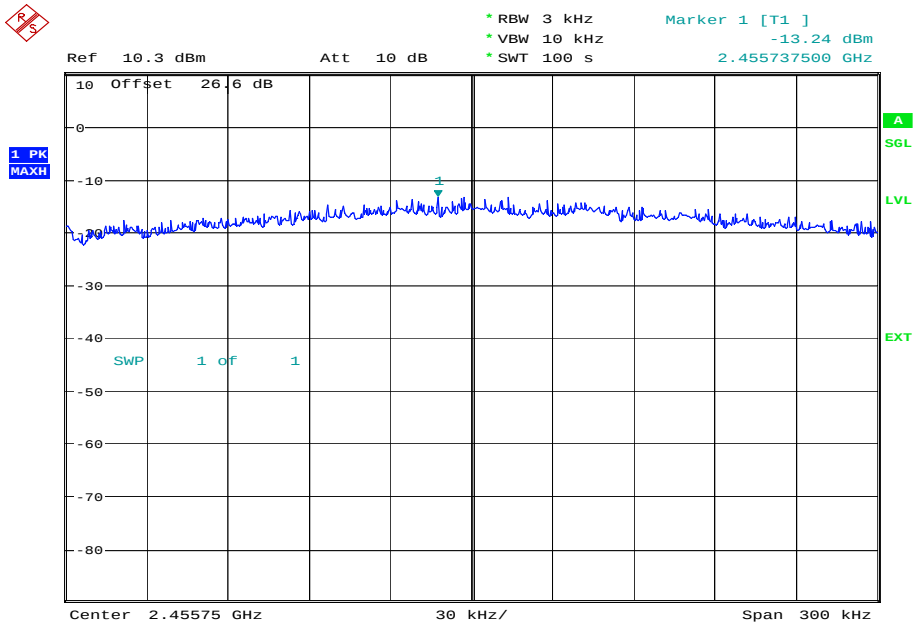


Date: 16.AUG.2012 14:40:02



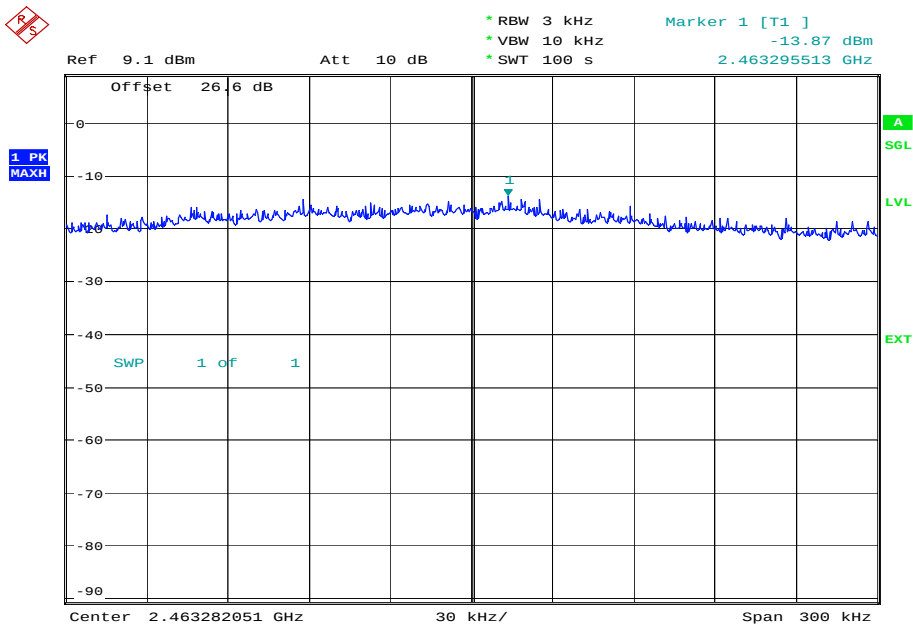
Product Service

39 Mbps



Date: 16.AUG.2012 14:54:29

52 Mbps

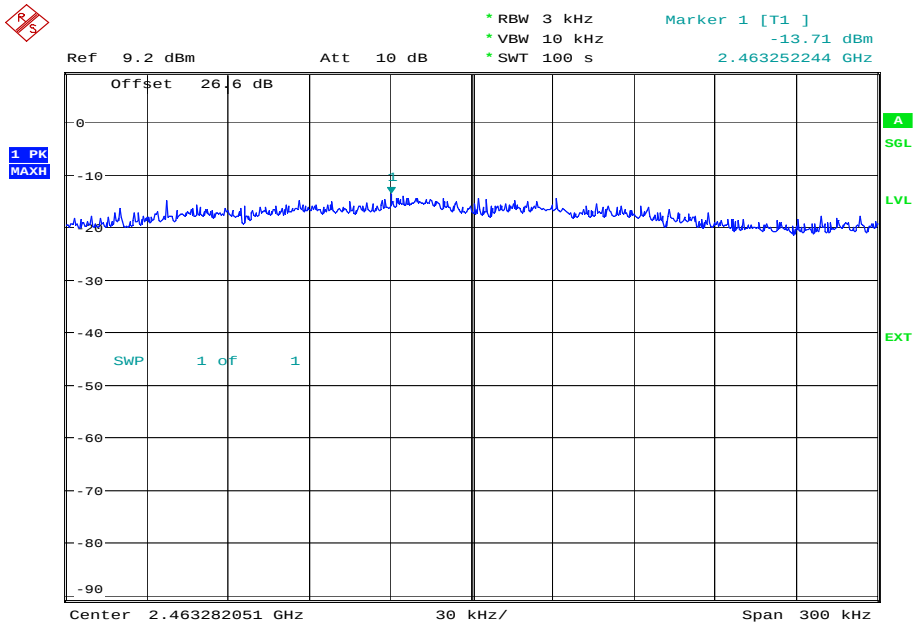


Date: 16.AUG.2012 15:08:31



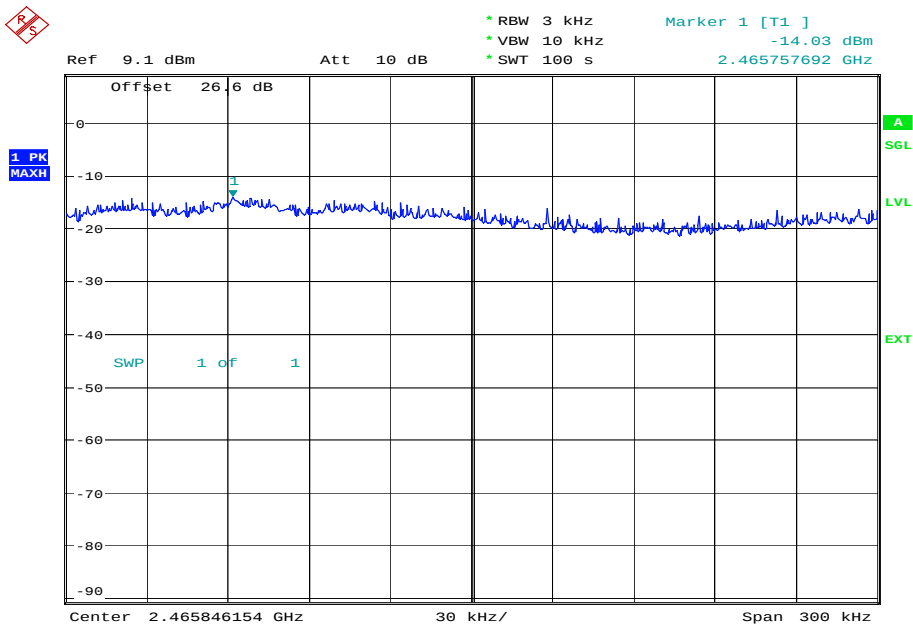
Product Service

58.5 Mbps



Date: 16.AUG.2012 15:26:20

65 Mbps



Date: 16.AUG.2012 16:00:14

Limit Clause

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



Product Service

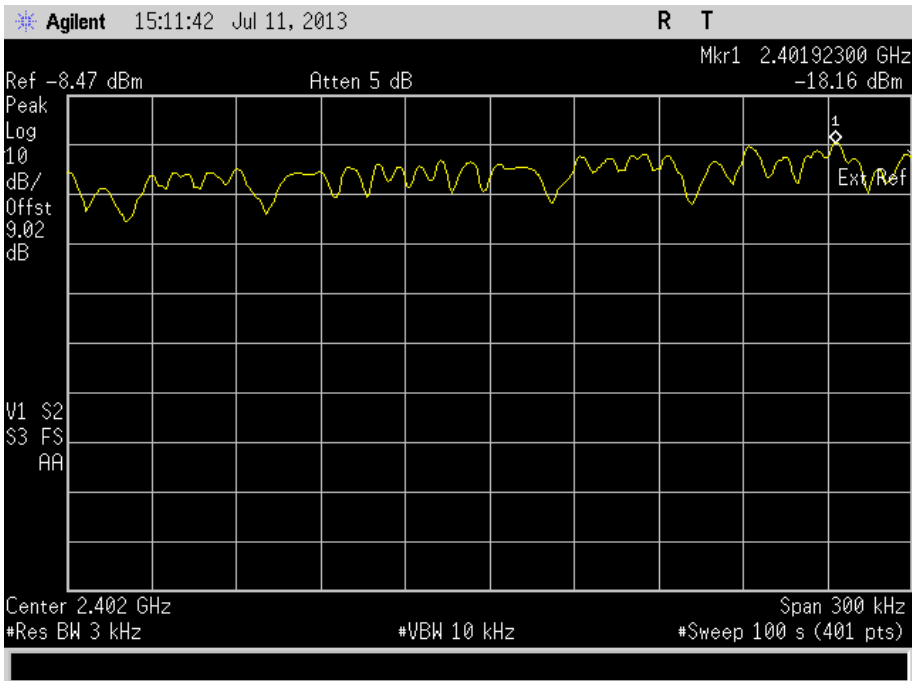
Bluetooth Low Energy

4.0 V DC Supply

Frequency	Packet Type	Power Spectral Density in 3 kHz Bands (dBm)
2402 MHz	37 oct/prbs9	-18.16
2441 MHz	37 oct/prbs9	-19.23
2480 MHz	37 oct/prbs9	-18.22

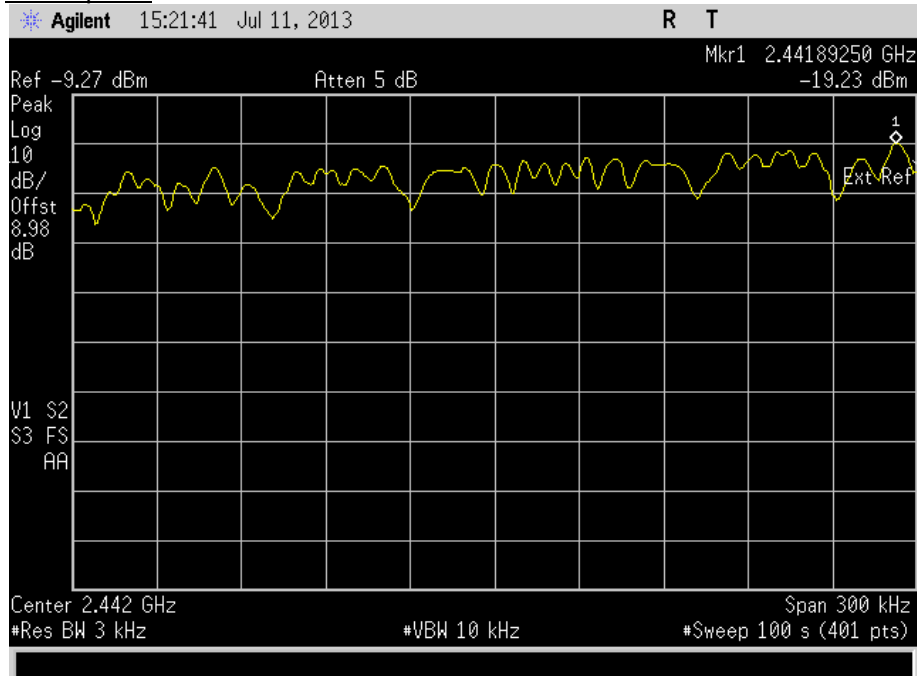
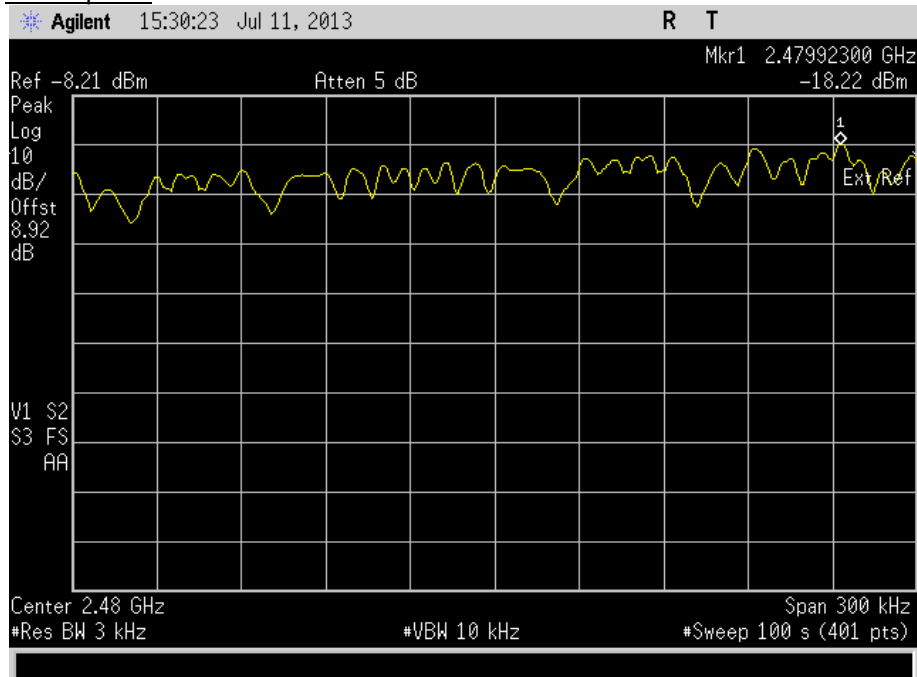
2402 MHz

37 oct/prbs9





Product Service

2441 MHz37 oct/prbs92480 MHz37 oct/prbs9Limit Clause

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



Product Service

2.6 6dB BANDWIDTH**2.6.1 Specification Reference**

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

2.6.2 Equipment Under Test and Modification State

CDMA SHL21 S/N: IMEI 004401114094523 - Modification State 0

CDMA SHL21 S/N: IMEI 004401114094432 - Modification State 0

2.6.3 Date of Test

16 August 2012 and 11 July 2013

2.6.4 Test Equipment Used

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

2.6.5 Test Procedure

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

2.6.6 Environmental Conditions

Ambient Temperature	22.0 - 24.8°C
Relative Humidity	47.6 - 53.2%



Product Service

2.6.7 Test Results802.11(b)

4.0 V DC Supply

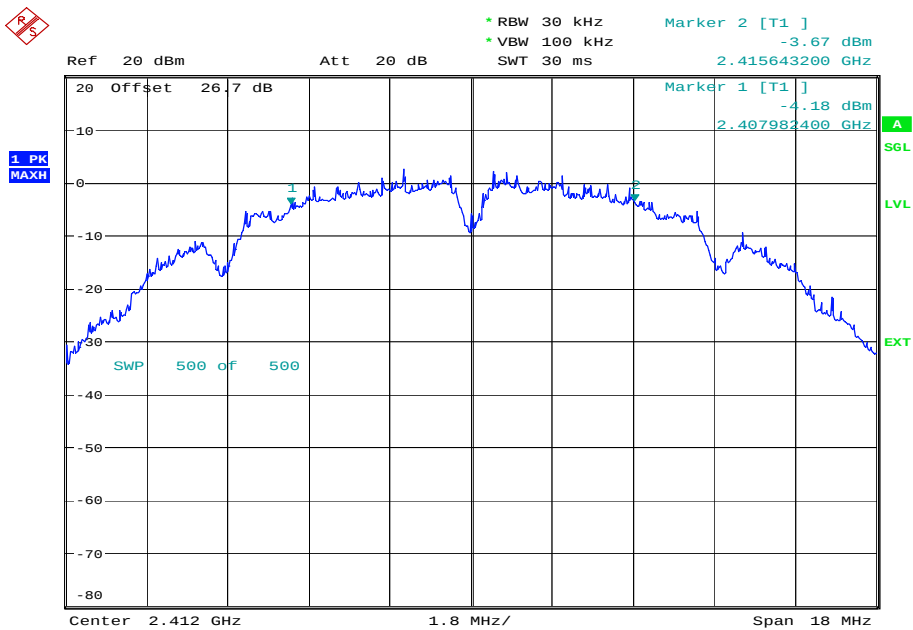
Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	1	7660.8
	2	8841.6
	5	8841.6
	11	8208.0
2437 MHz	1	8640
	2	8236.8
	5	9072.0
	11	8496.0
2462 MHz	1	8121.6
	2	8236.8
	5	8726.4
	11	7920.0



Product Service

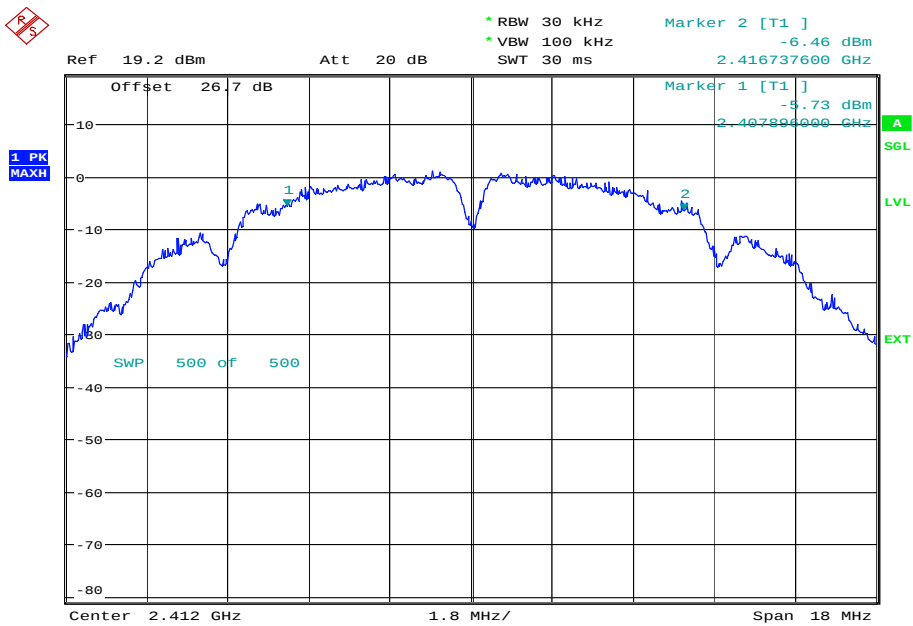
2412 MHz

1 Mbps



Date: 15.AUG.2012 14:51:36

2 Mbps

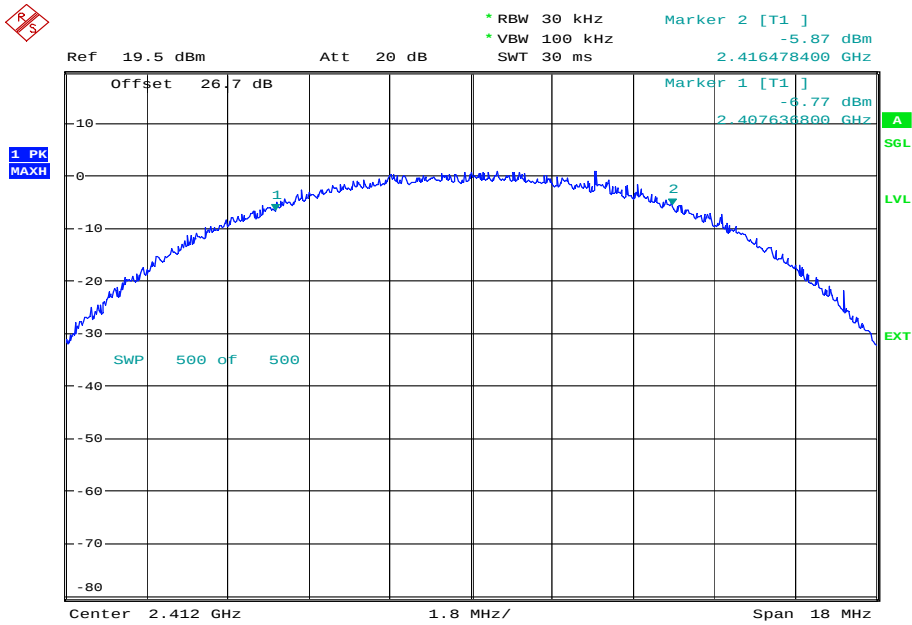


Date: 15.AUG.2012 15:08:37



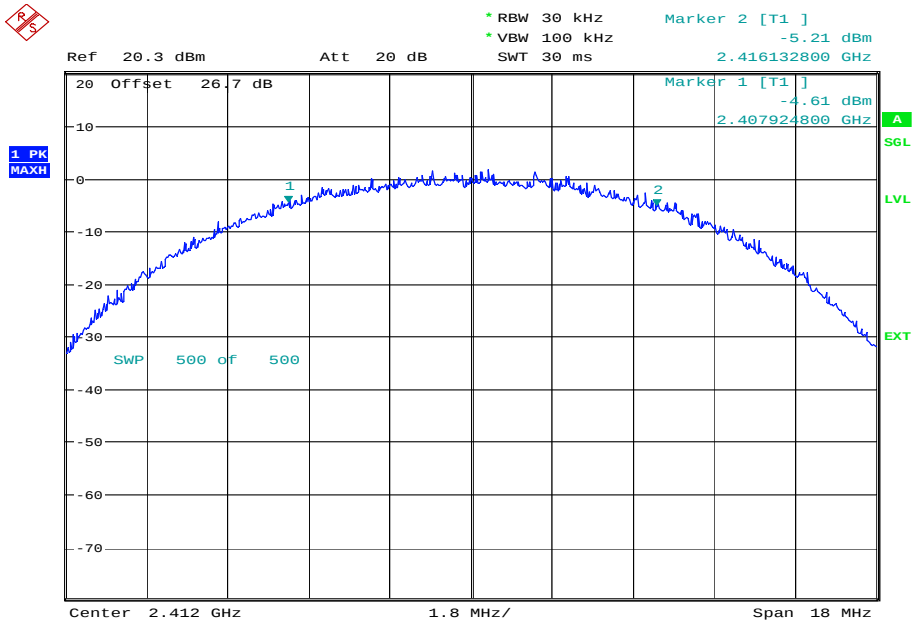
Product Service

5.5 Mbps



Date: 15.AUG.2012 15:23:31

11 Mbps



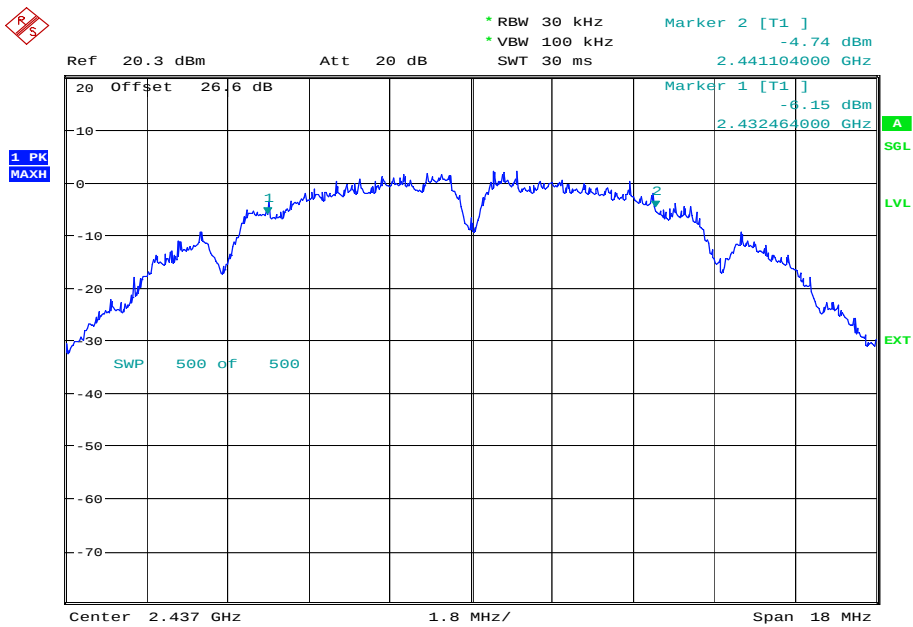
Date: 15.AUG.2012 15:38:20



Product Service

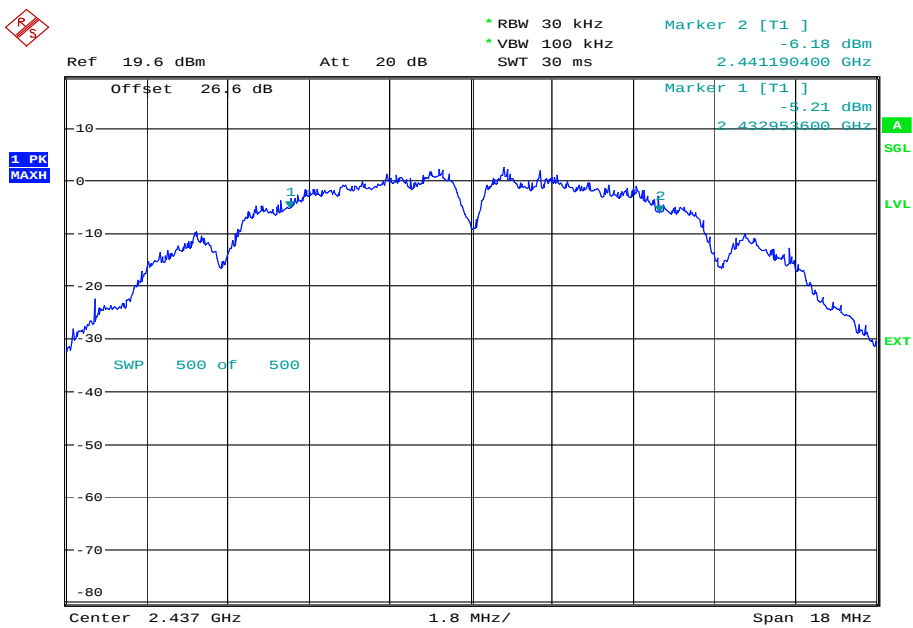
2437 MHz

1 Mbps



Date: 15.AUG.2012 14:58:36

2 Mbps

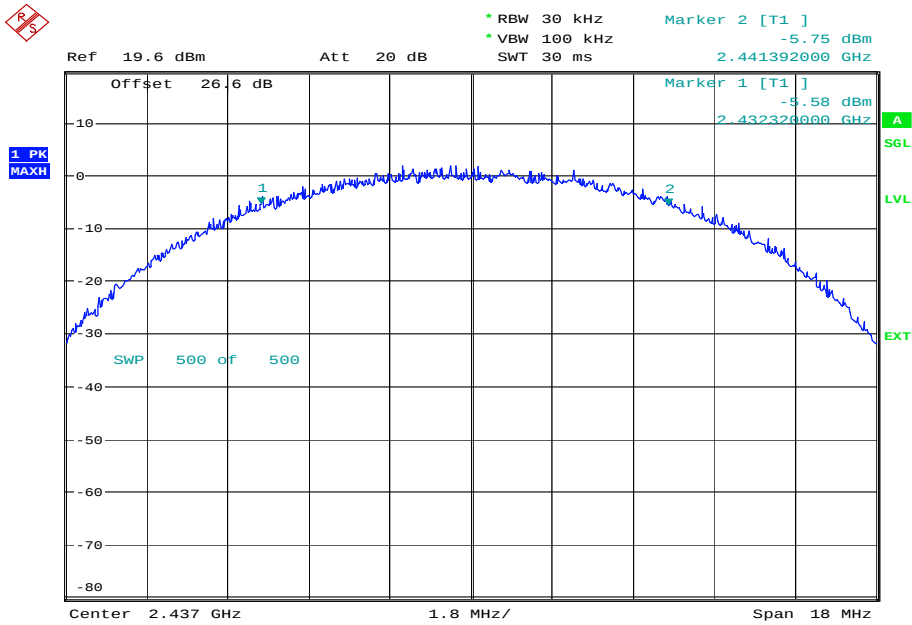


Date: 15.AUG.2012 15:13:07



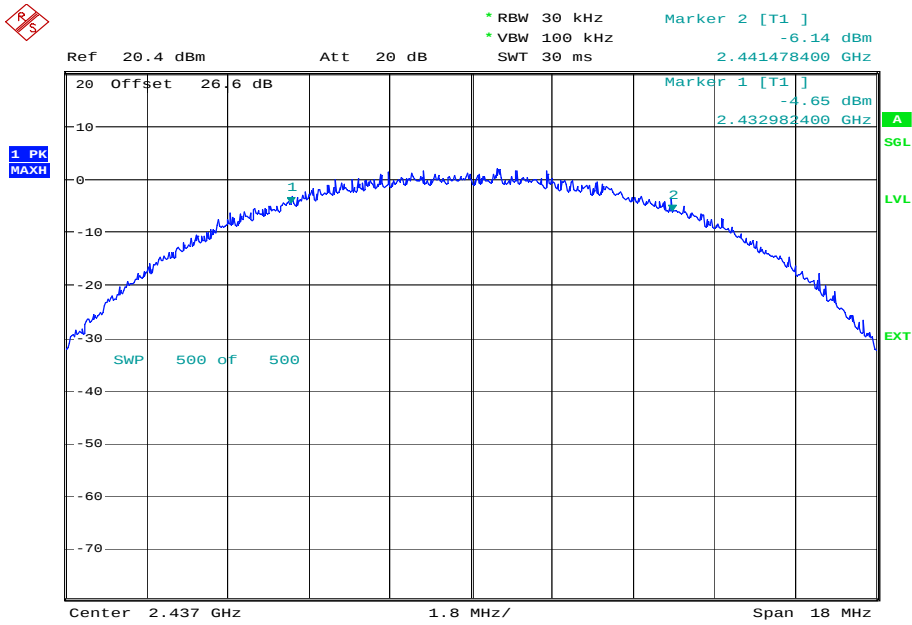
Product Service

5.5 Mbps



Date: 15.AUG.2012 15:28:32

11 Mbps



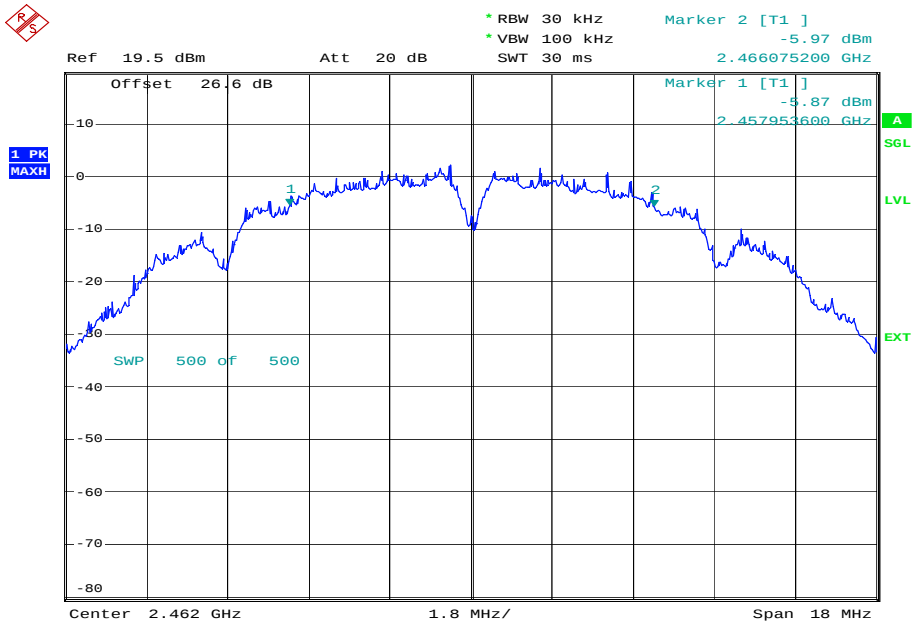
Date: 15.AUG.2012 15:42:50



Product Service

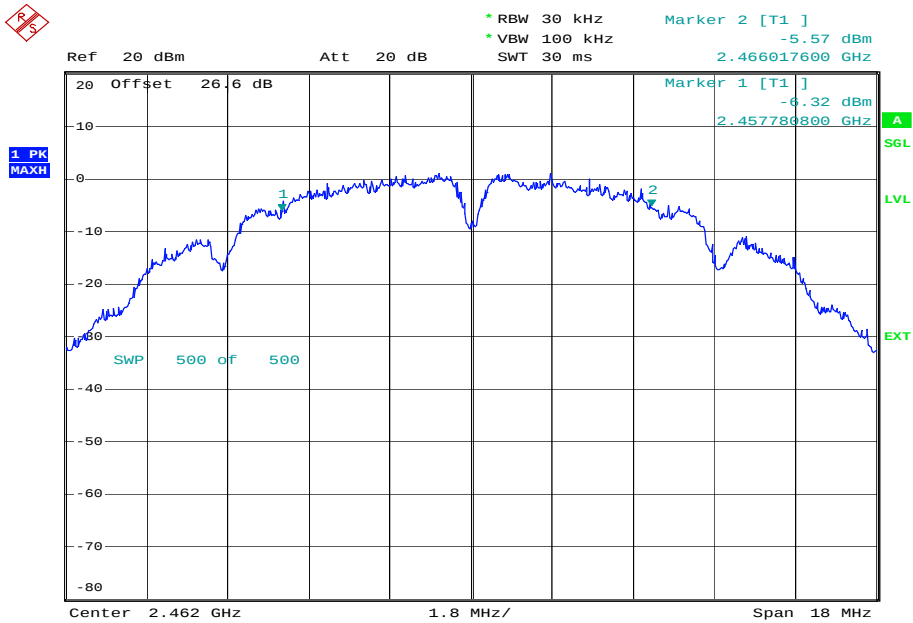
2462 MHz

1 Mbps



Date: 15.AUG.2012 15:03:10

2 Mbps

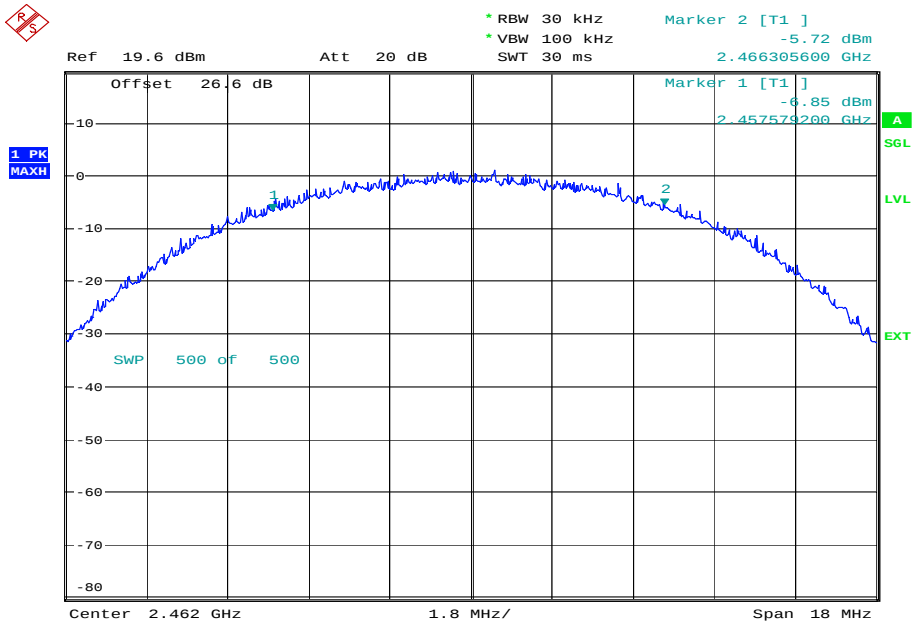


Date: 15.AUG.2012 15:17:55



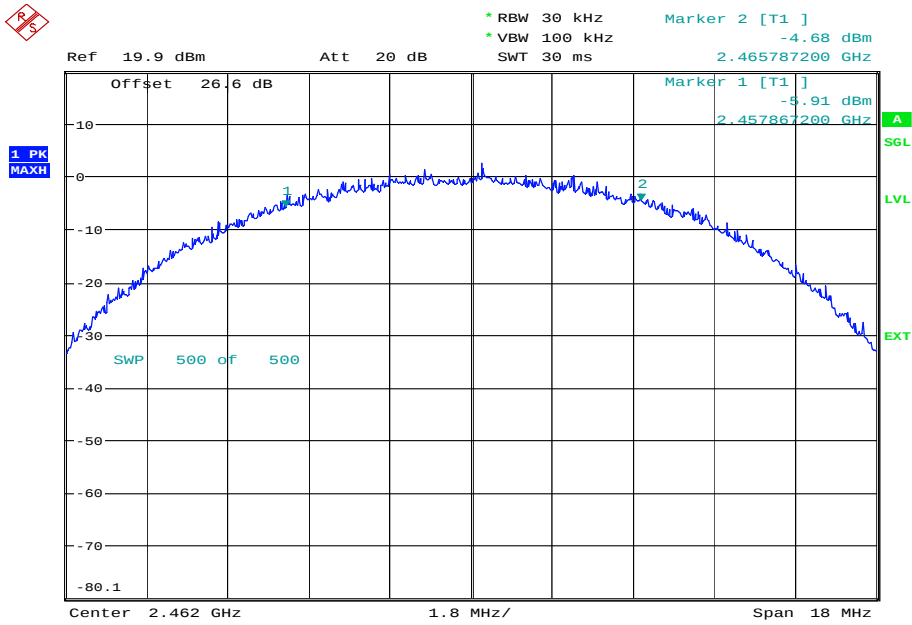
Product Service

5.5 Mbps



Date: 15.AUG.2012 15:33:06

11 Mbps



Date: 15.AUG.2012 17:15:54

Limit Clause

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

802.11(g)

4.0 V DC Supply

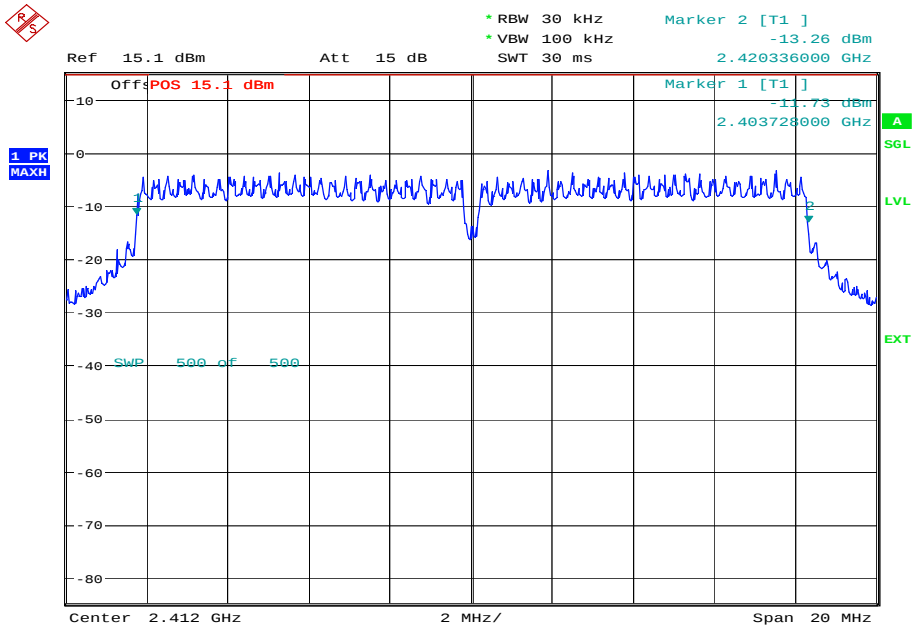
Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	6	16608
	9	16608
	12	16544
	18	16544
	24	16.576
	36	16544
	48	16576
	54	16544
2437 MHz	6	16576
	9	16608
	12	16576
	18	16576
	24	16576
	36	16608
	48	16576
	54	16576
2462 MHz	6	16608
	9	16608
	12	16576
	18	16576
	24	16608
	36	16608
	48	16544
	54	16608



Product Service

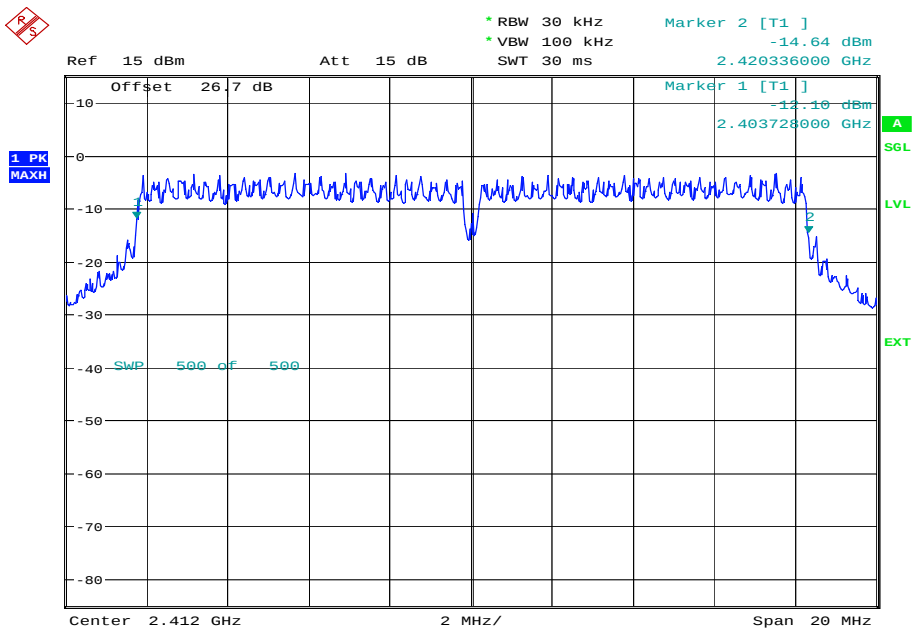
2412 MHz

6 Mbps



Date: 16.AUG.2012 09:05:32

9 Mbps

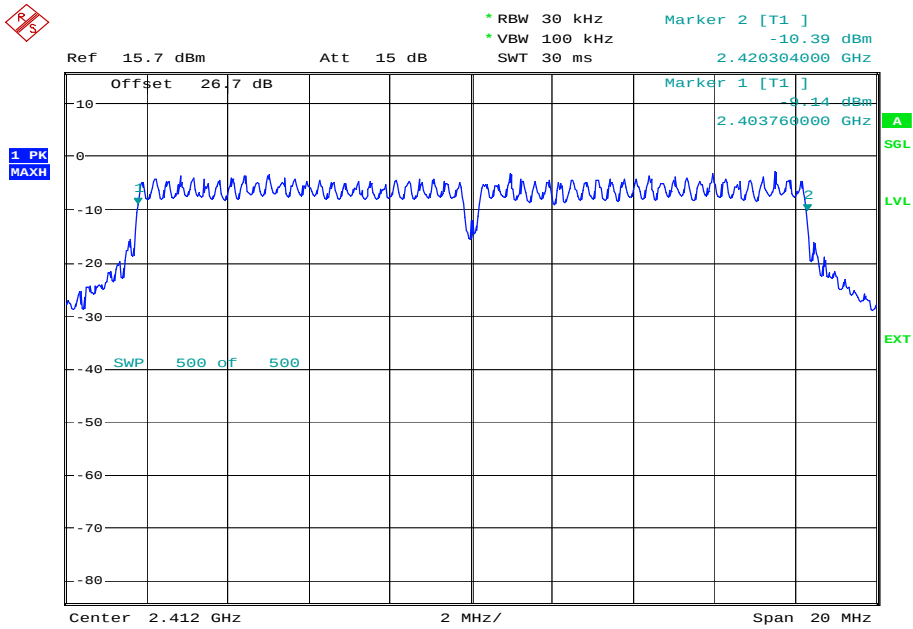


Date: 16.AUG.2012 09:21:45



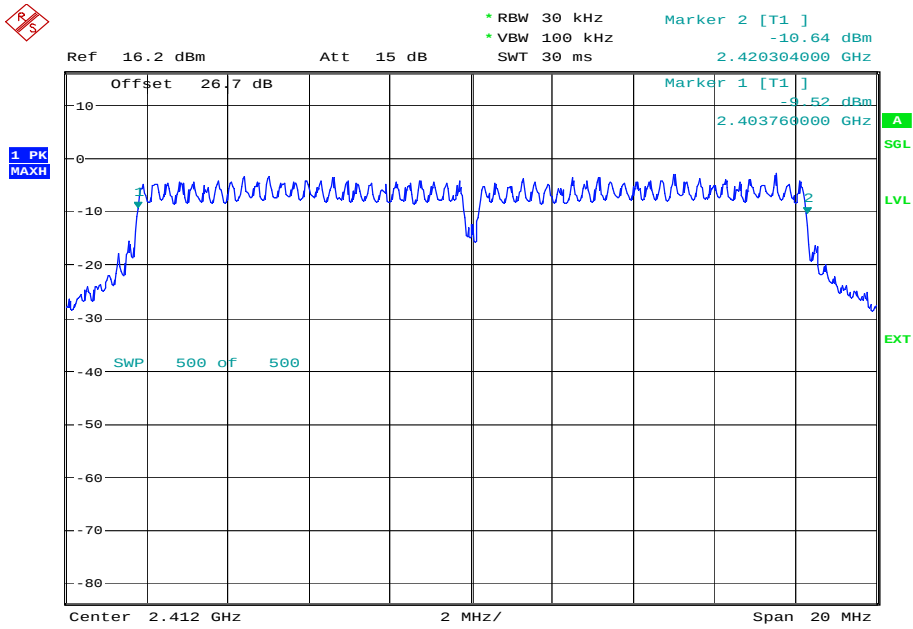
Product Service

12 Mbps



Date: 16.AUG.2012 09:37:03

18 Mbps

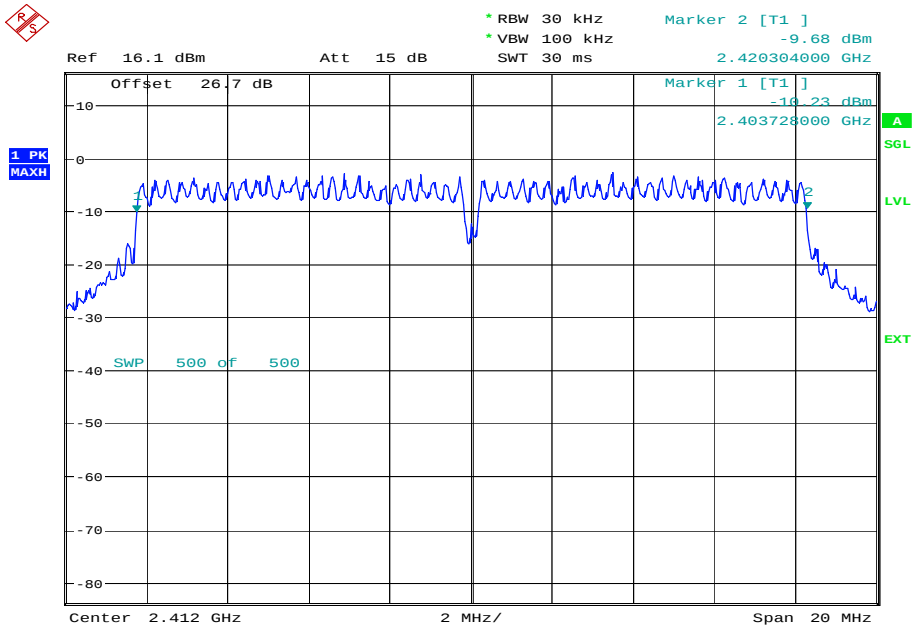


Date: 16.AUG.2012 09:52:20



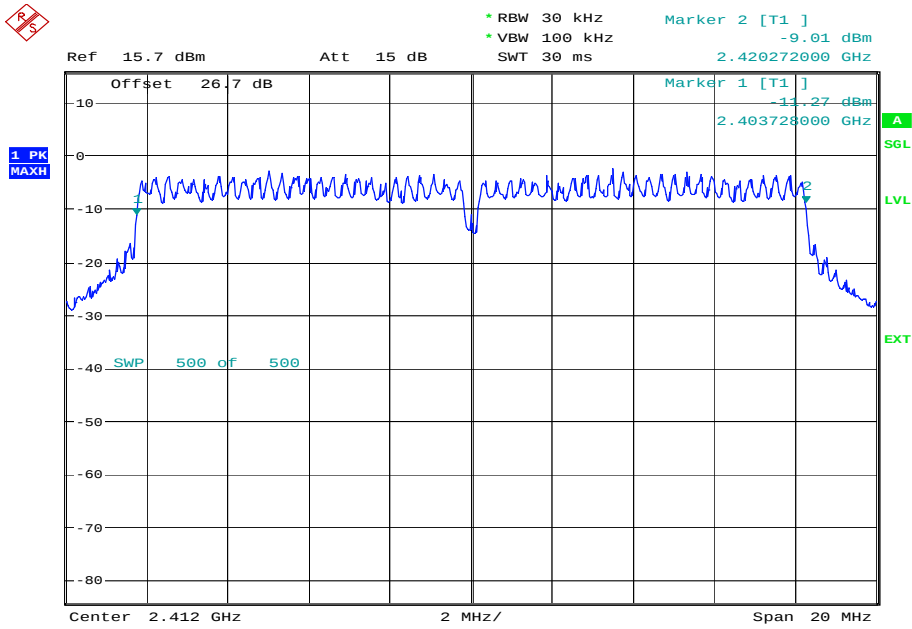
Product Service

24 Mbps



Date: 16.AUG.2012 10:07:21

36 Mbps

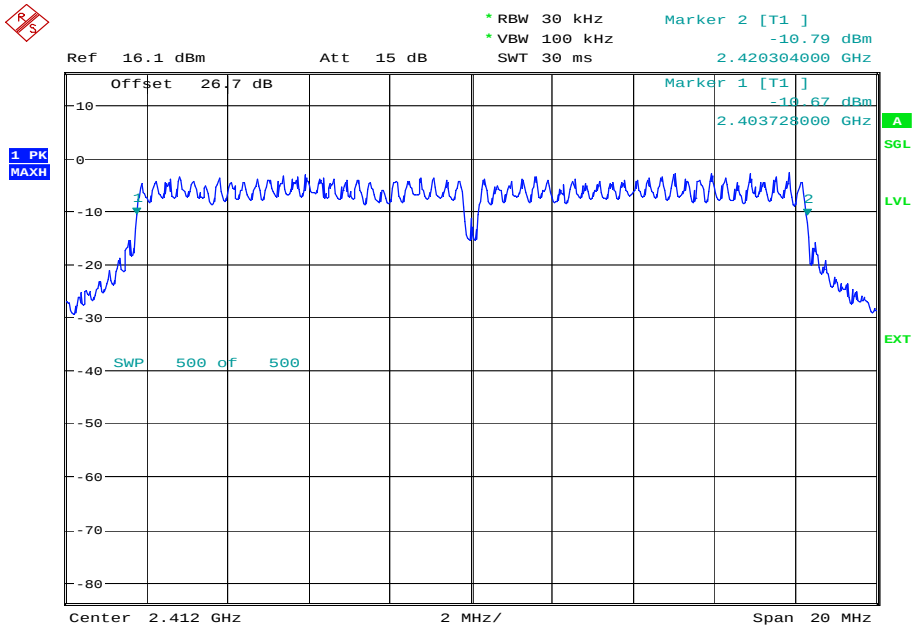


Date: 16.AUG.2012 12:02:07



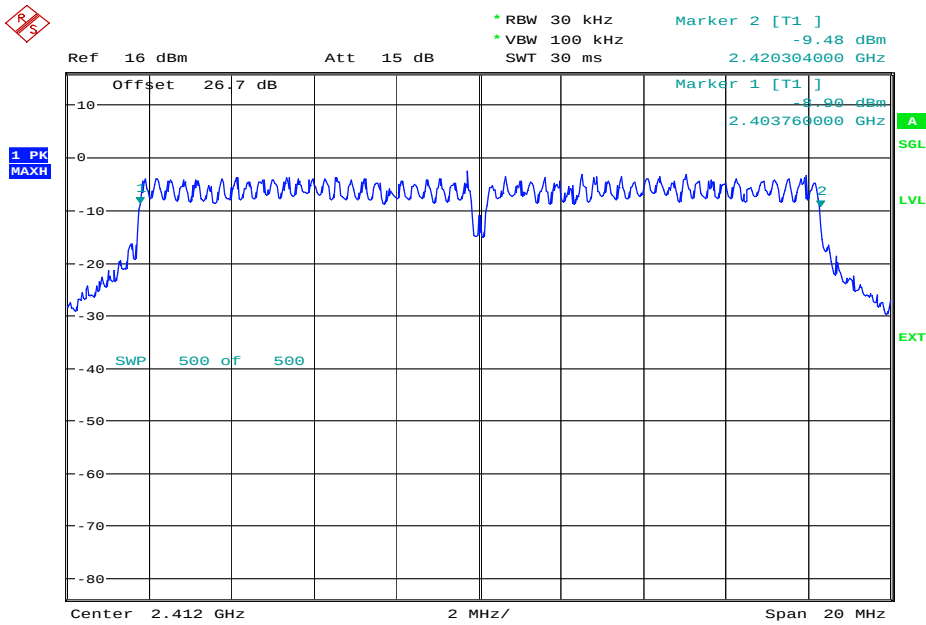
Product Service

48 Mbps



Date: 16.AUG.2012 12:16:00

54 Mbps



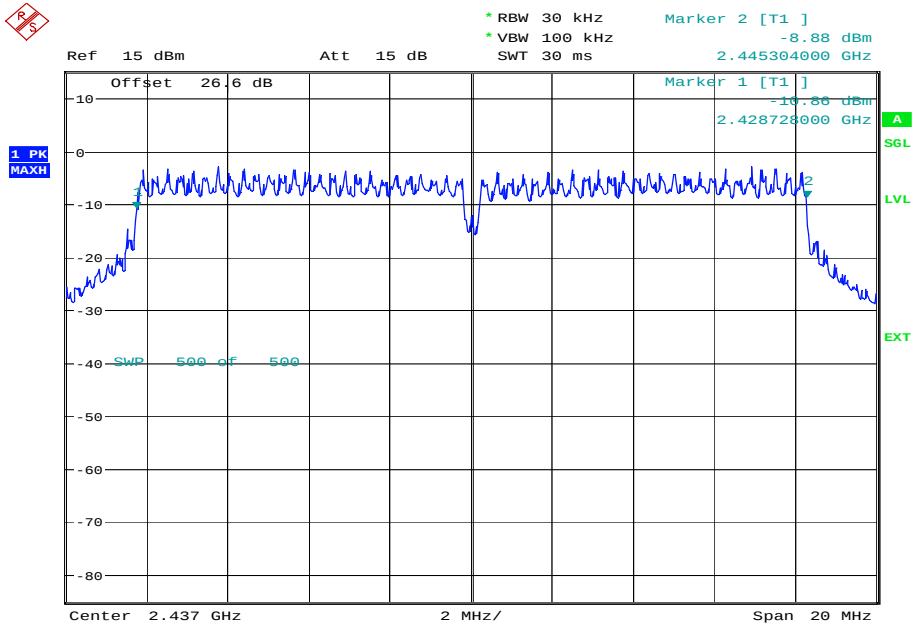
Date: 16.AUG.2012 12:31:14



Product Service

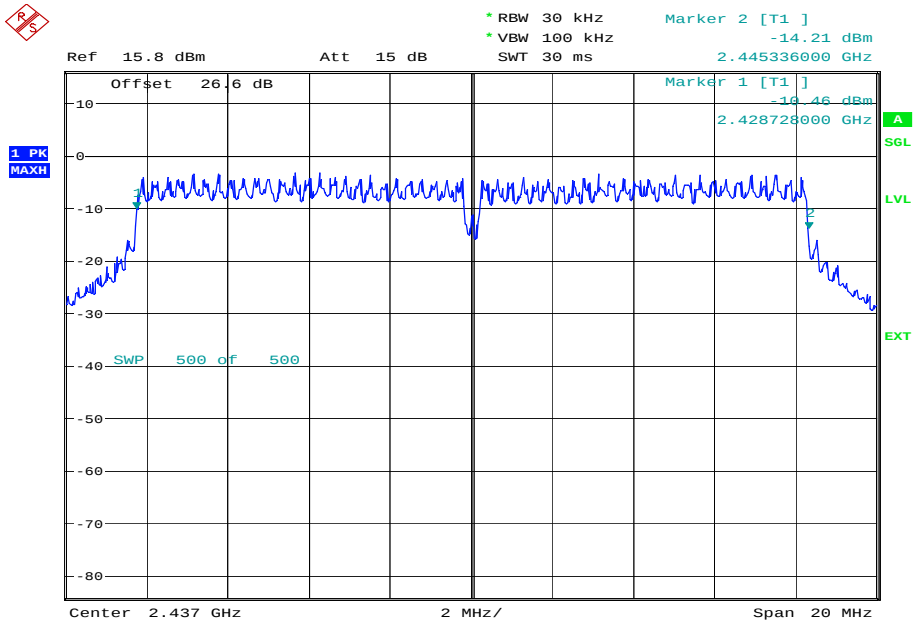
2437 MHz

6 Mbps



Date: 16.AUG.2012 09:10:07

9 Mbps

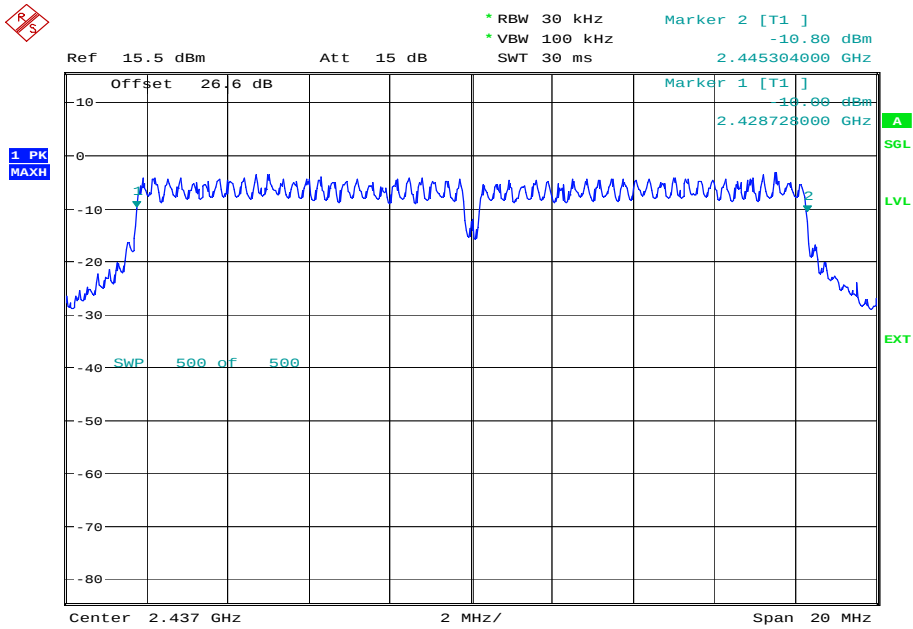


Date: 16.AUG.2012 09:27:15



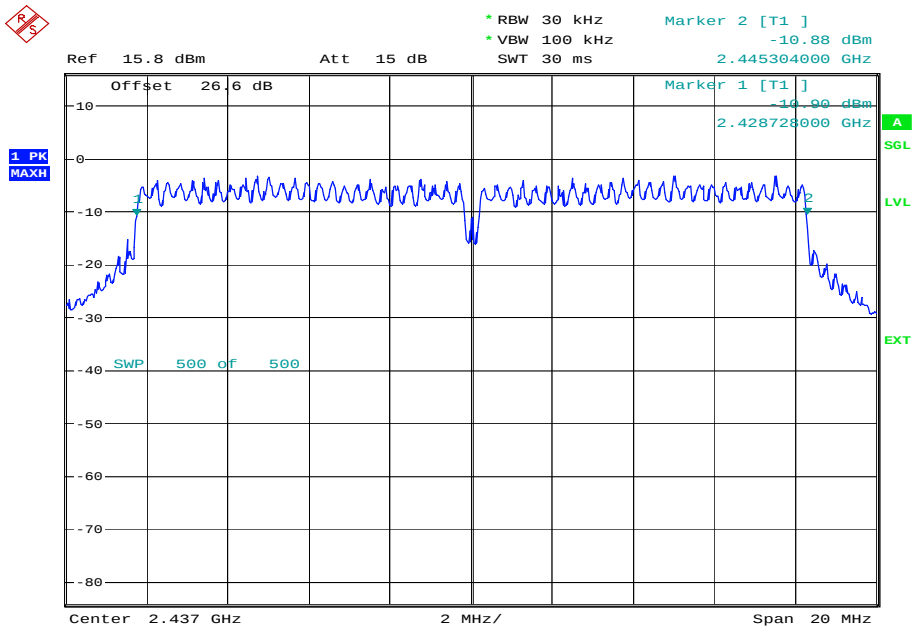
Product Service

12 Mbps



Date: 16.AUG.2012 09:41:35

18 Mbps

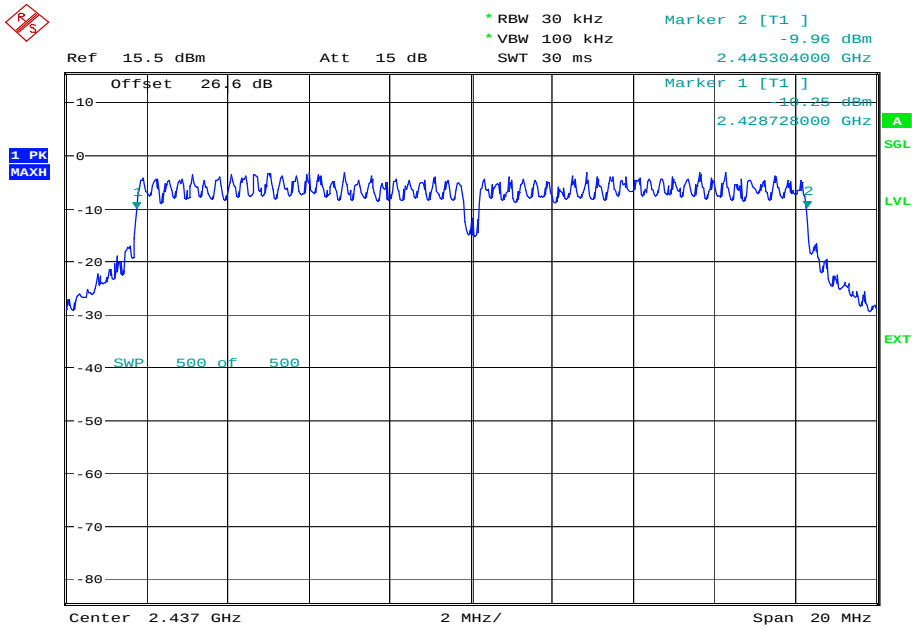


Date: 16.AUG.2012 09:57:10



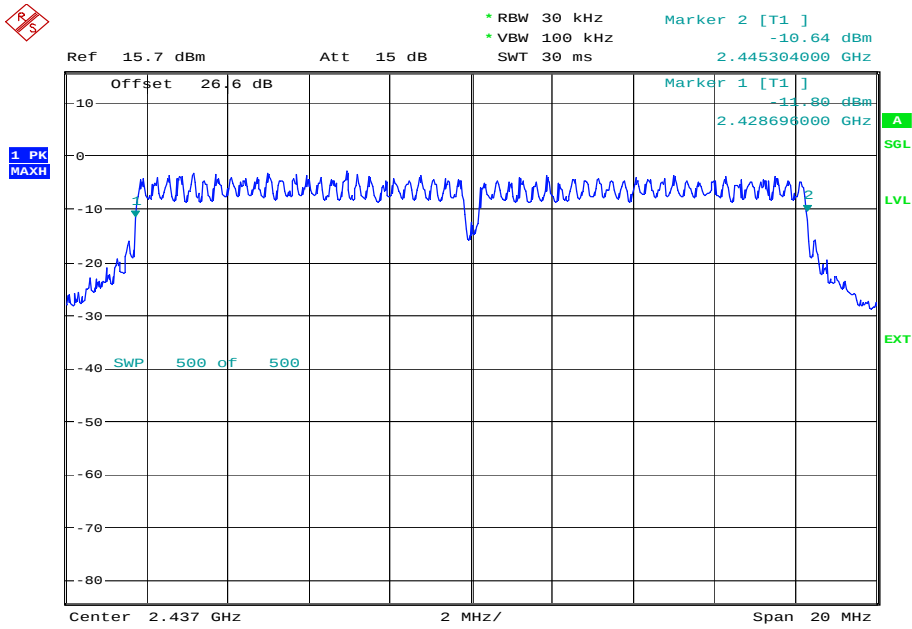
Product Service

24 Mbps



Date: 16.AUG.2012 10:12:10

36 Mbps

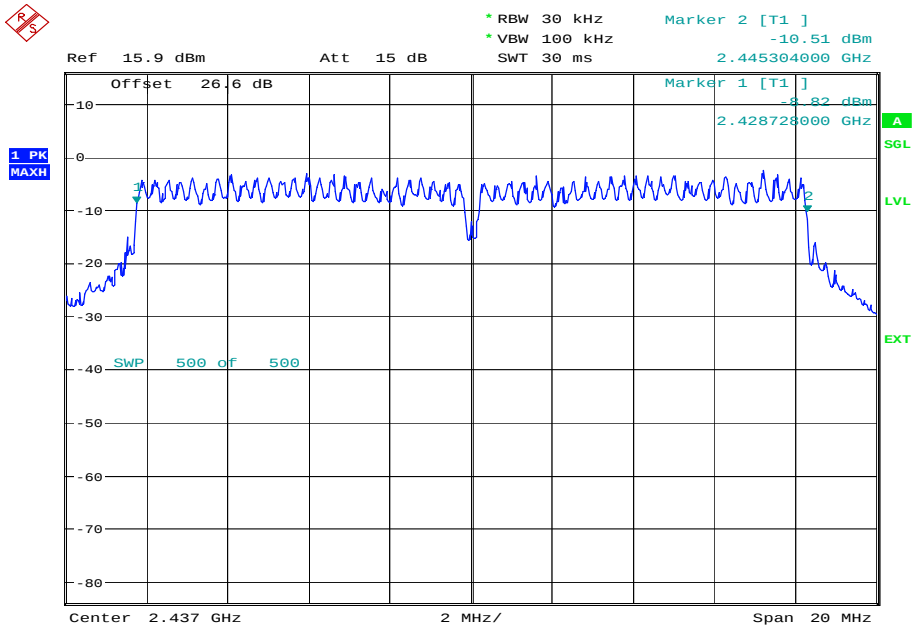


Date: 16.AUG.2012 12:06:27



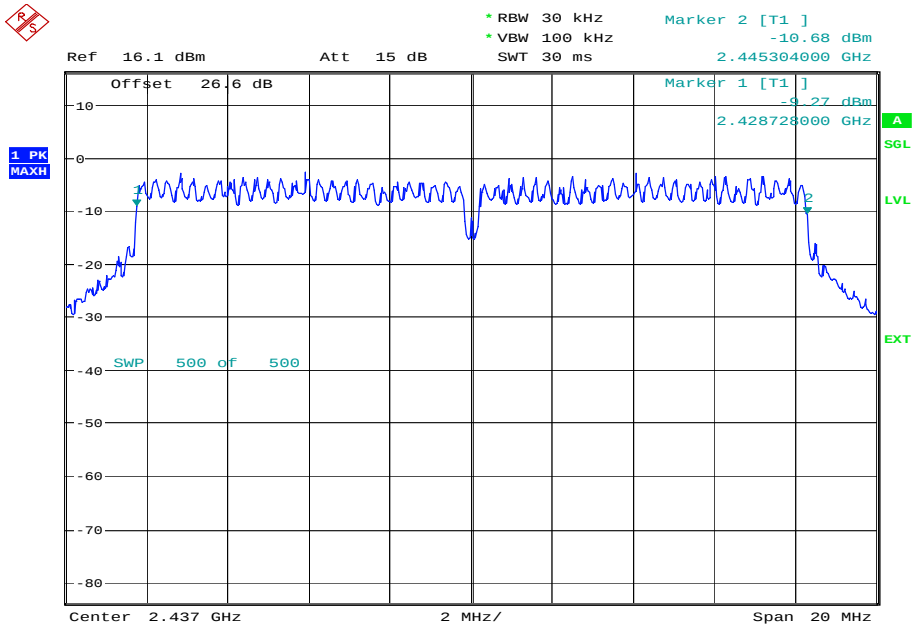
Product Service

48 Mbps



Date: 16.AUG.2012 12:20:57

54 Mbps



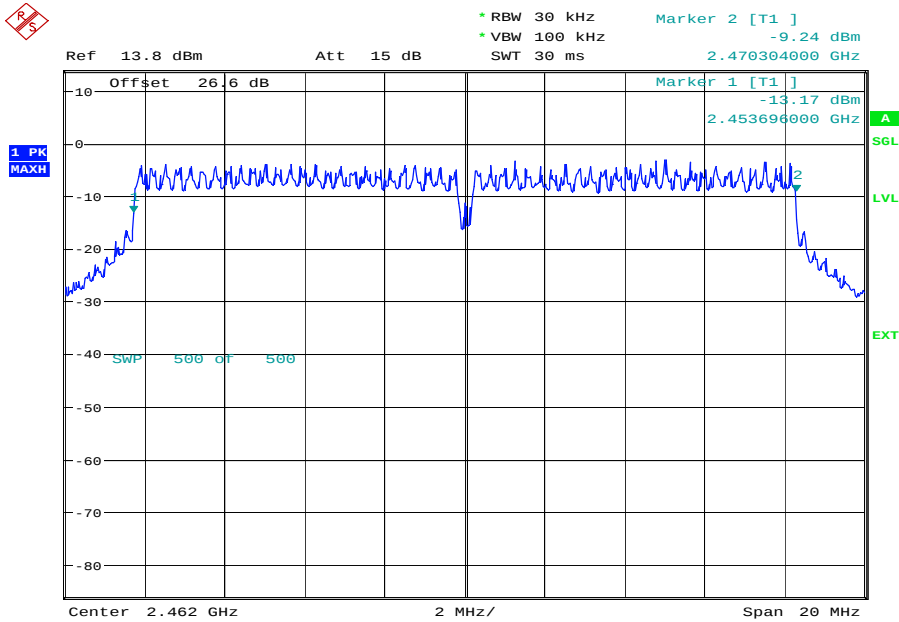
Date: 16.AUG.2012 13:20:30



Product Service

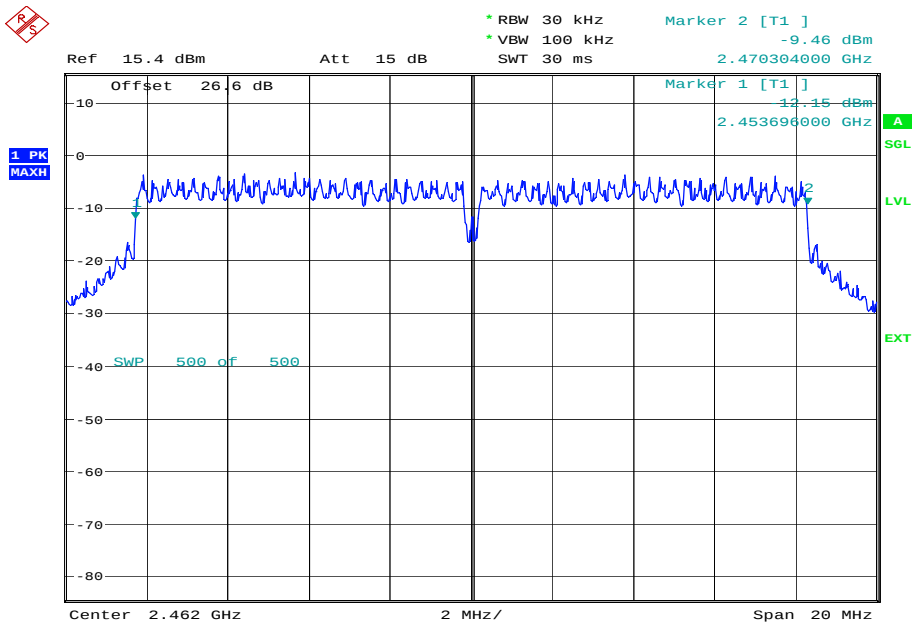
2462 MHz

6 Mbps



Date: 16.AUG.2012 09:15:27

9 Mbps

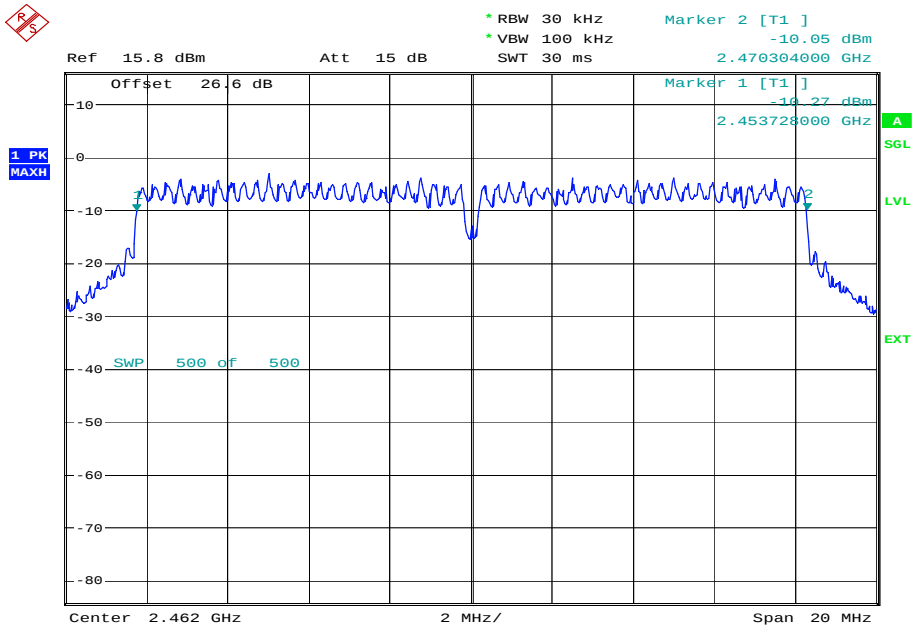


Date: 16.AUG.2012 09:31:56



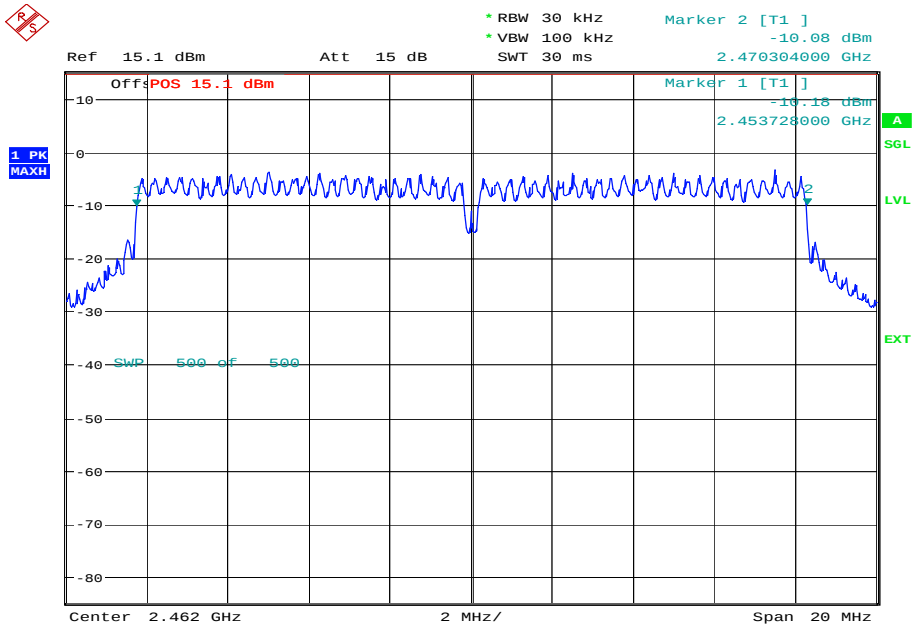
Product Service

12 Mbps



Date: 16.AUG.2012 09:47:06

18 Mbps

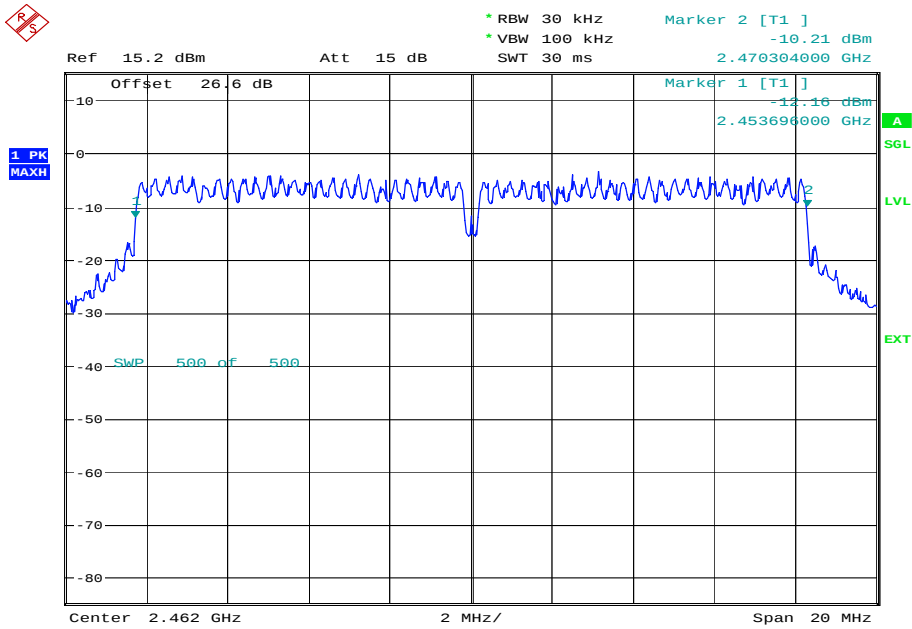


Date: 16.AUG.2012 10:01:53



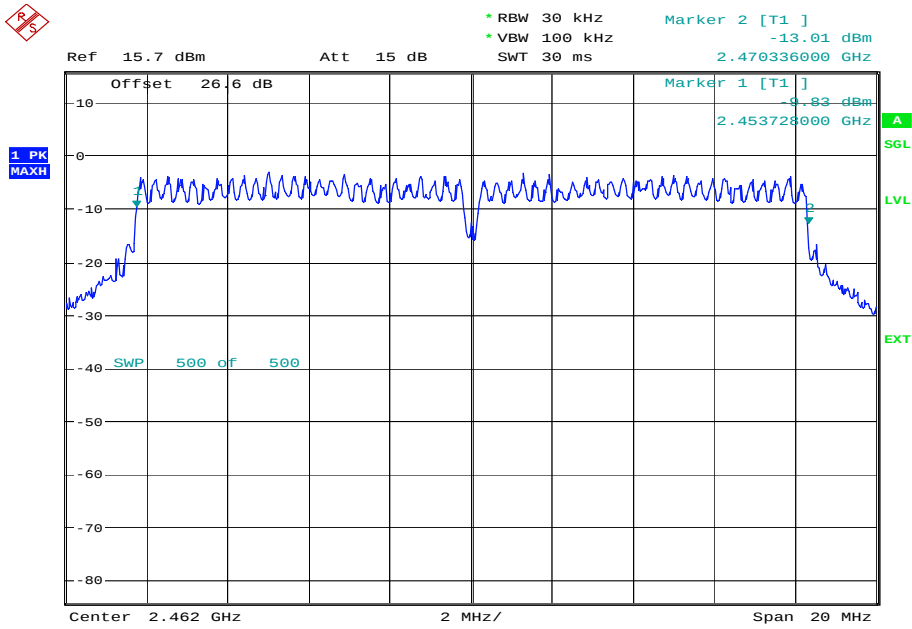
Product Service

24 Mbps



Date: 16.AUG.2012 10:16:52

36 Mbps

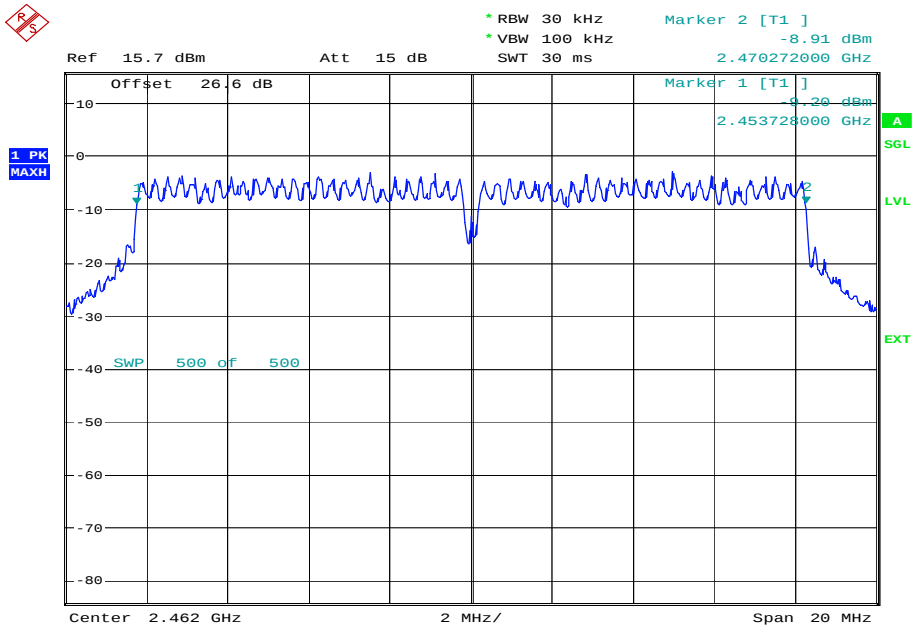


Date: 16.AUG.2012 12:11:10



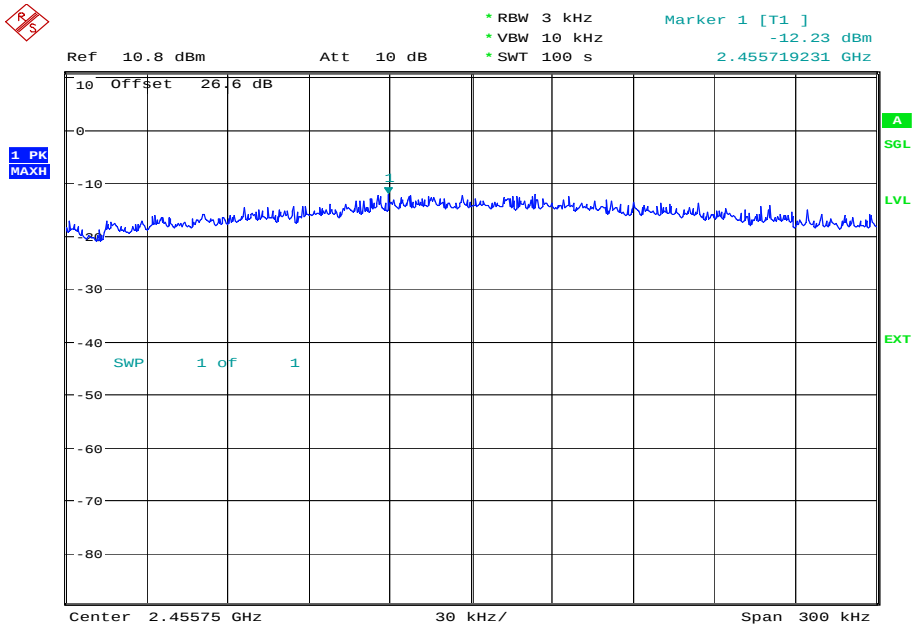
Product Service

48 Mbps



Date: 16.AUG.2012 12:25:28

54 Mbps



Date: 16.AUG.2012 13:27:21

Limit Clause

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

802.11(n) - 2.4 GHz, 20 MHz BW

4.0 V DC Supply

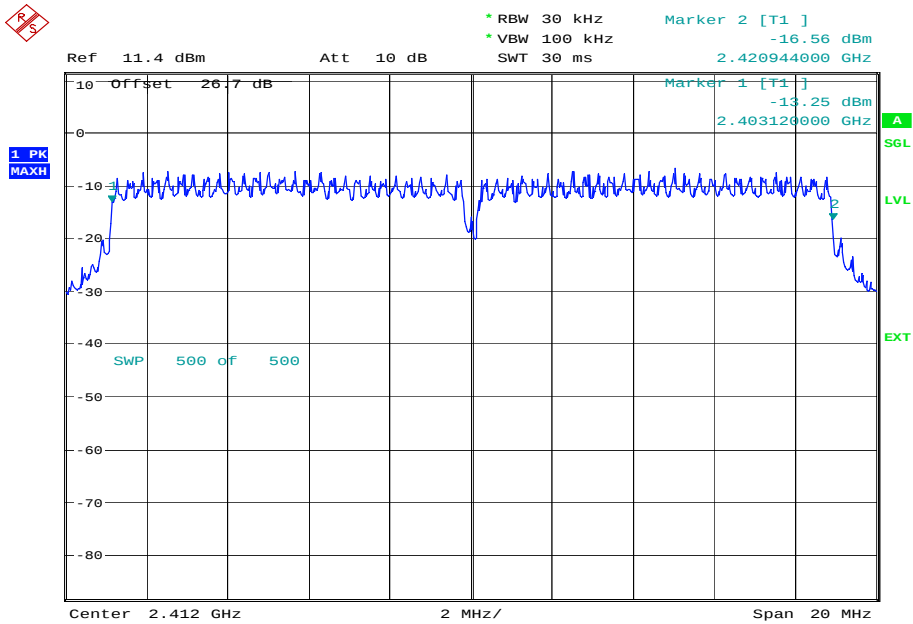
Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2412 MHz	6.5	17824
	13	17792
	19.5	17792
	26	17824
	39	17792
	52	17792
	58.5	17792
	65	17728
2437 MHz	6.5	17856
	13	17792
	19.5	17856
	26	17824
	39	17824
	52	17824
	58.5	17856
	65	17792
2462 MHz	6.5	17856
	13	17792
	19.5	17824
	26	17824
	39	17856
	52	17856
	58.5	17824
	65	17824



Product Service

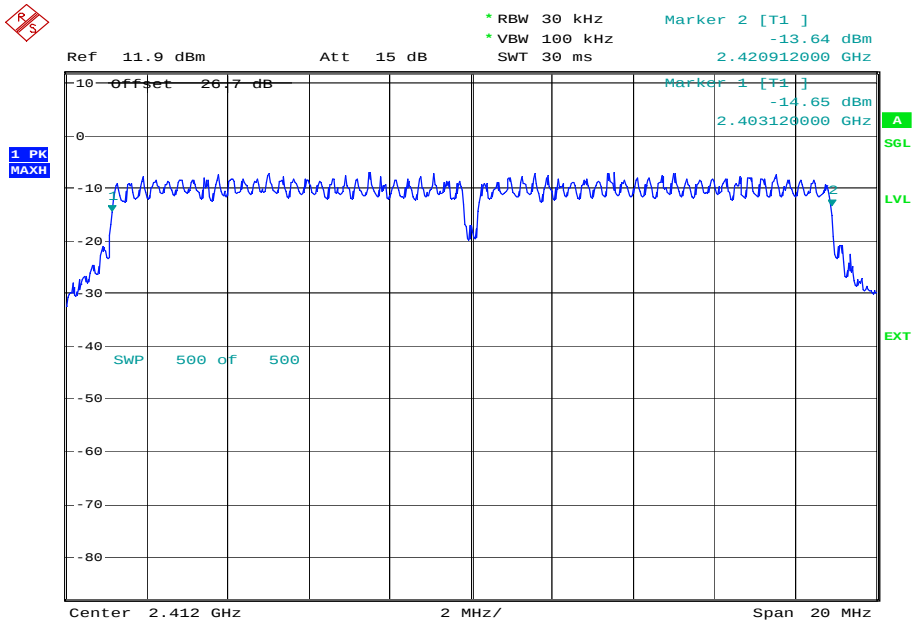
2412 MHz

6.5 Mbps



Date: 16.AUG.2012 13:34:12

13 Mbps

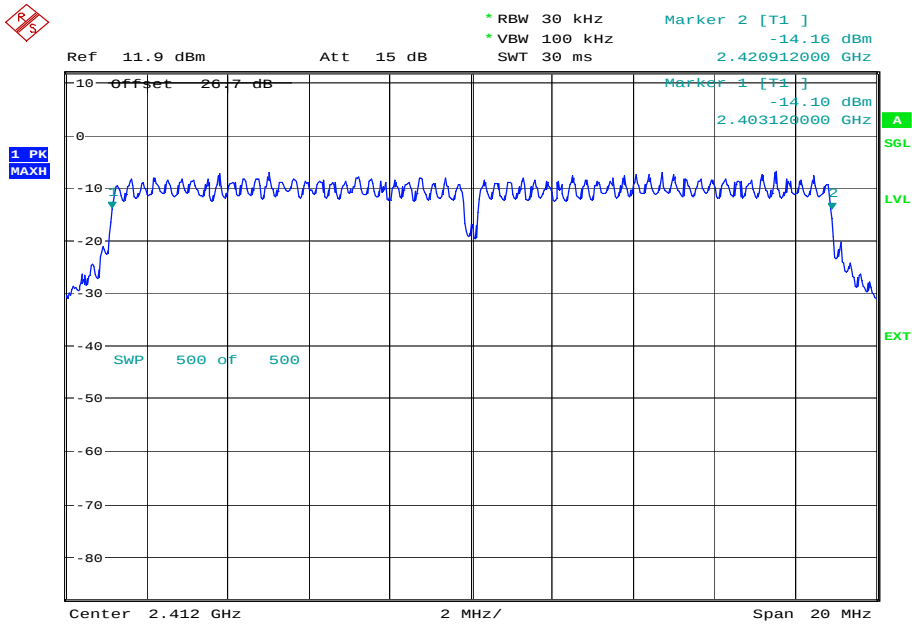


Date: 16.AUG.2012 13:49:22



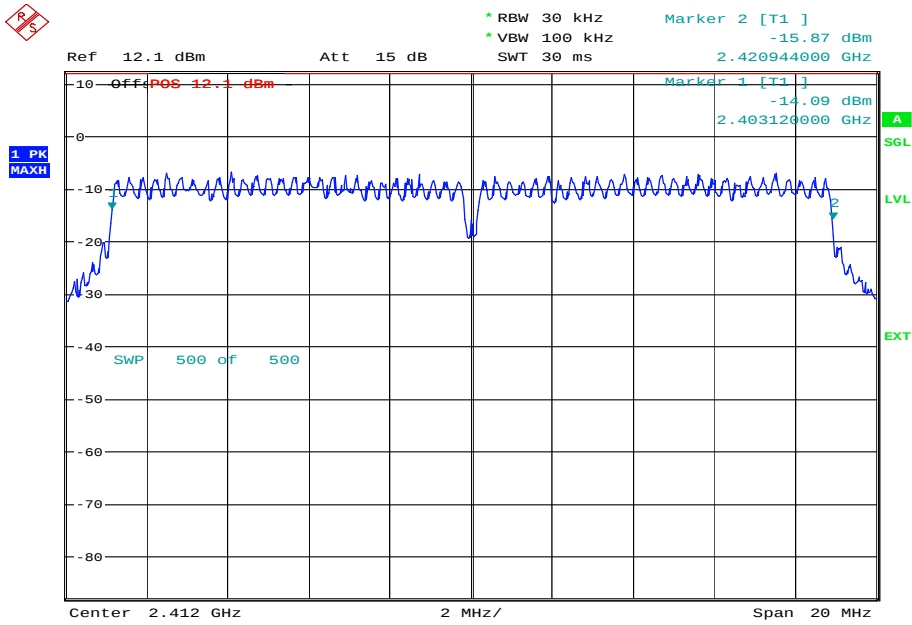
Product Service

19.5 Mbps

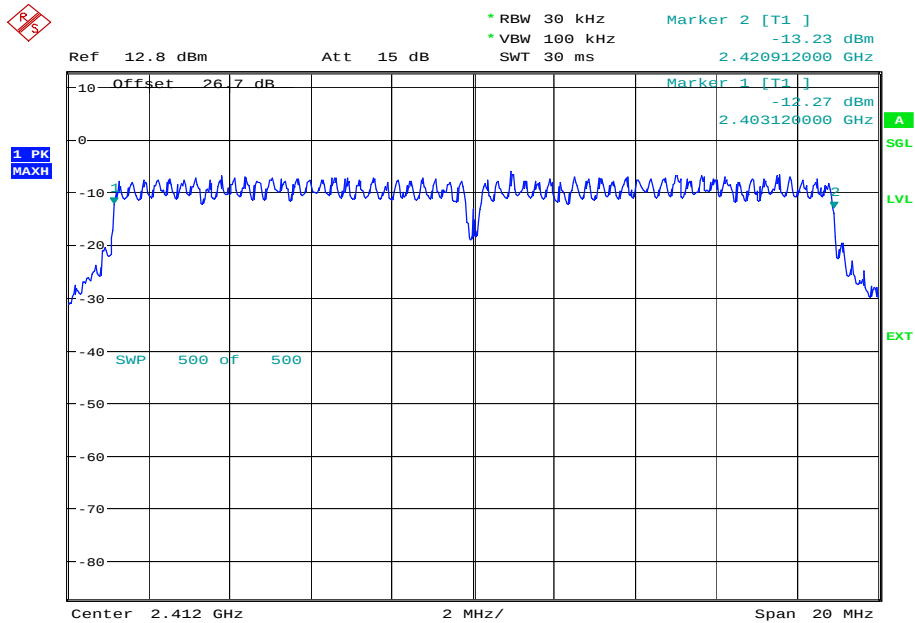


Date: 16.AUG.2012 14:13:27

26 Mbps

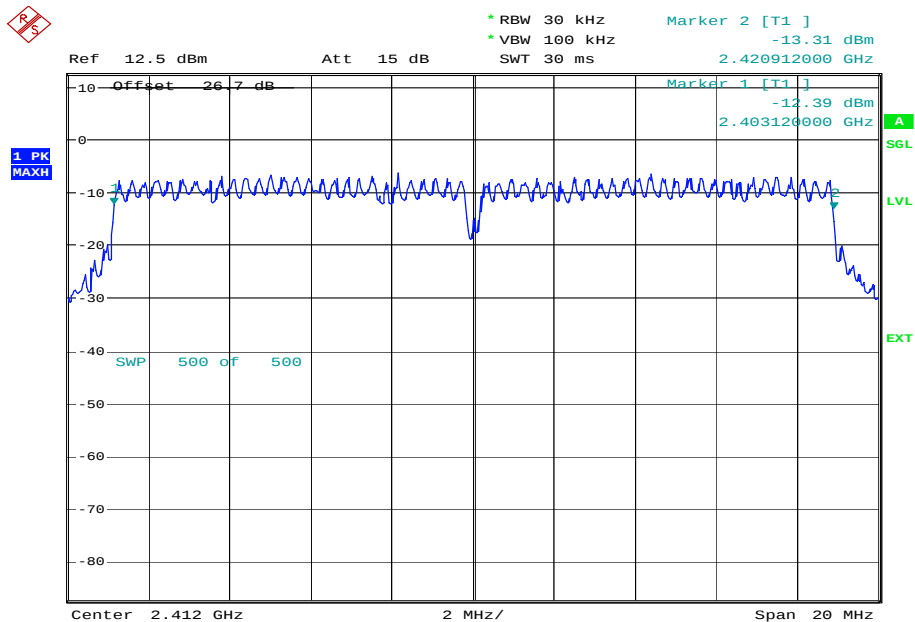


Date: 16.AUG.2012 14:28:27

39 Mbps

Date: 16.AUG.2012 14:42:44

52 Mbps

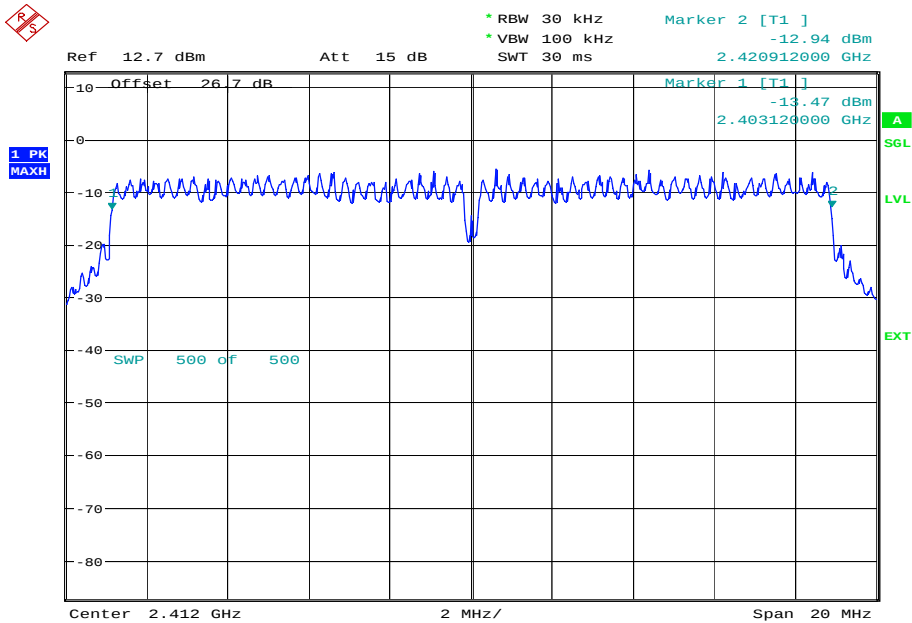


Date: 16.AUG.2012 14:57:33



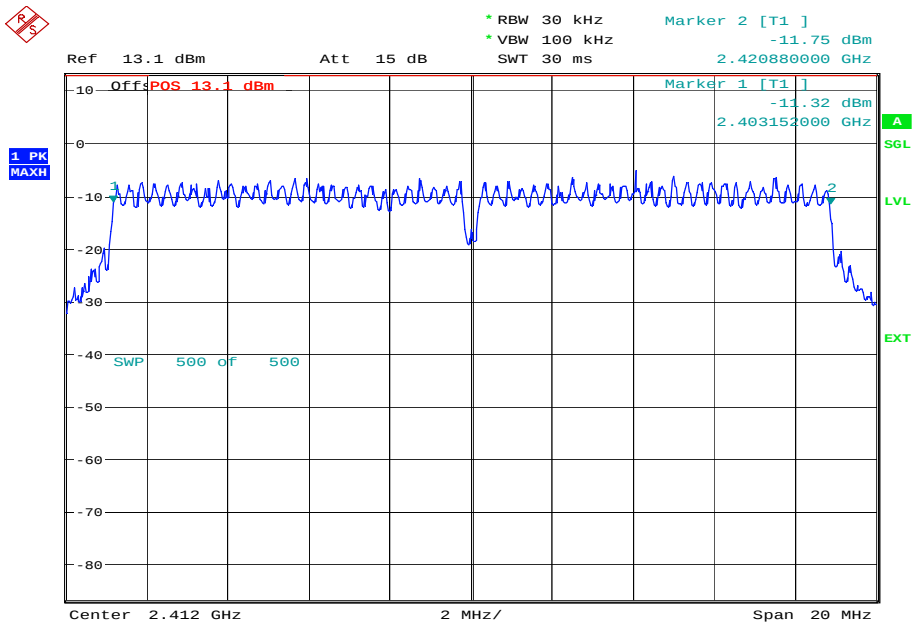
Product Service

58.5 Mbps



Date: 16.AUG.2012 15:11:05

65 Mbps



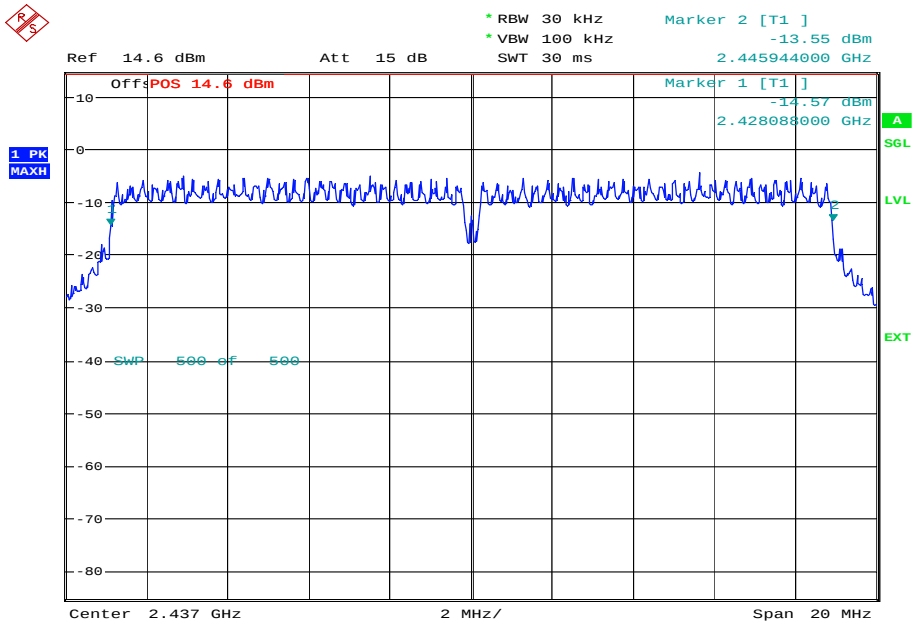
Date: 16.AUG.2012 15:29:18



Product Service

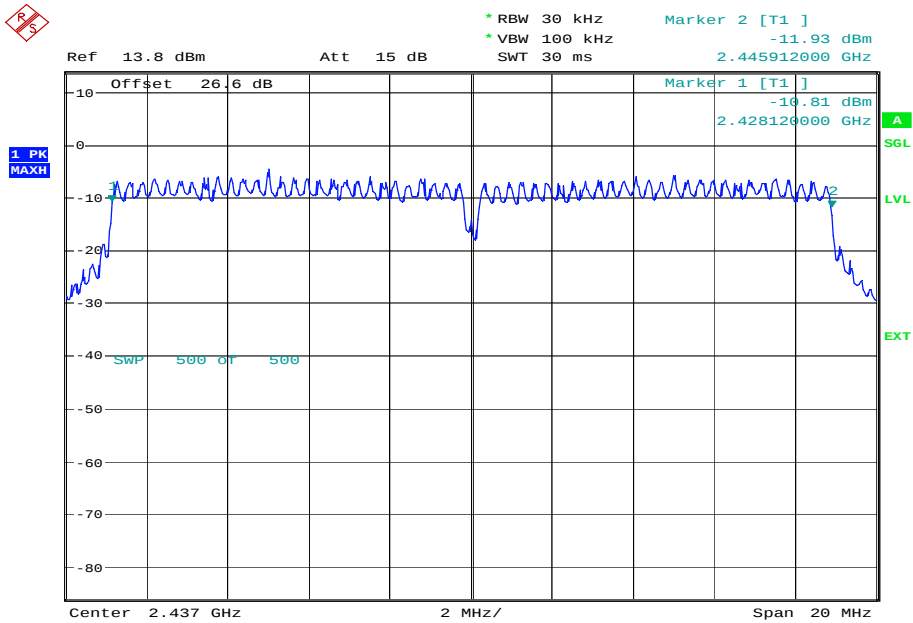
2437 MHz

6.5 Mbps



Date: 16.AUG.2012 13:39:19

13 Mbps

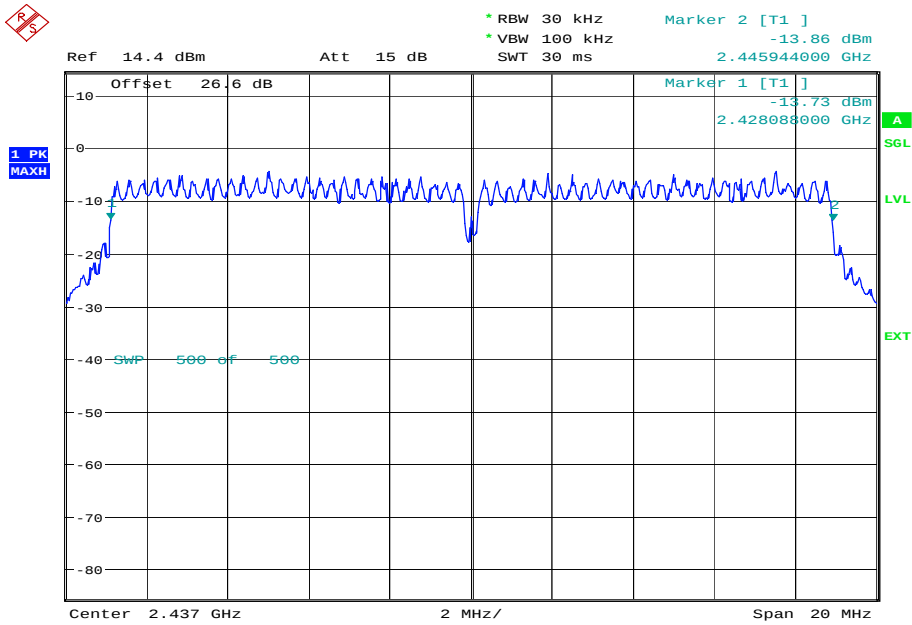


Date: 16.AUG.2012 13:53:57



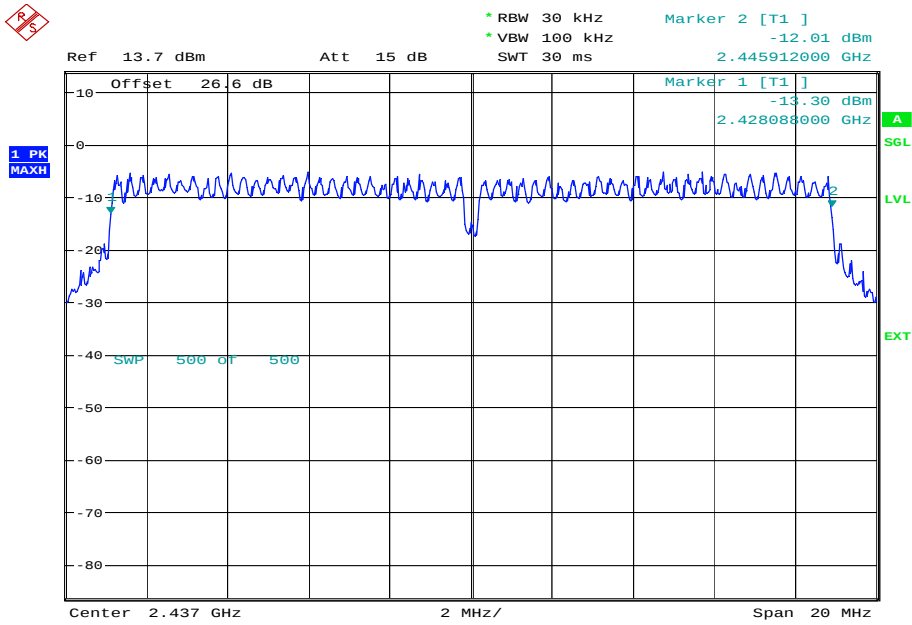
Product Service

19.5 Mbps



Date: 16.AUG.2012 14:18:19

26 Mbps

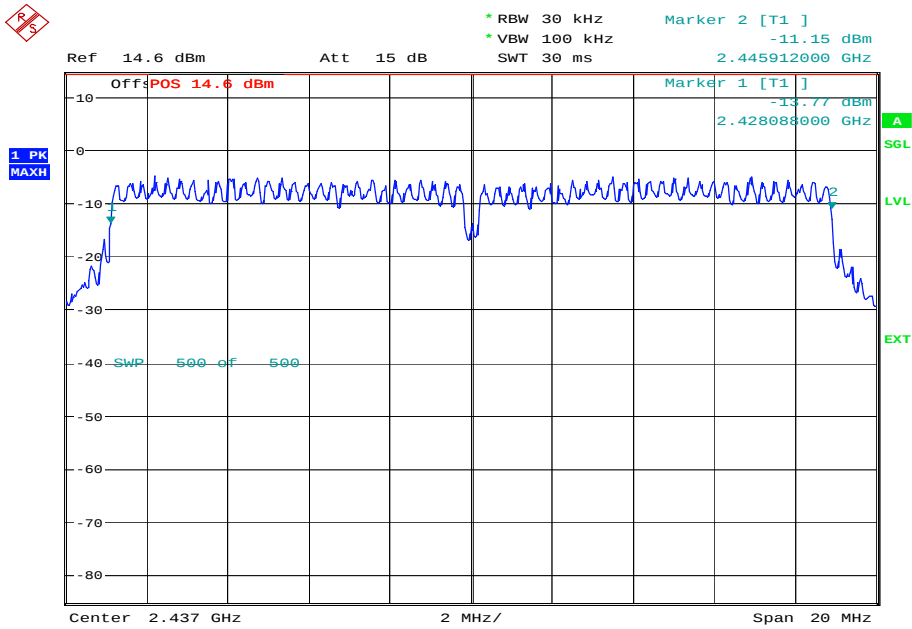


Date: 16.AUG.2012 14:33:11



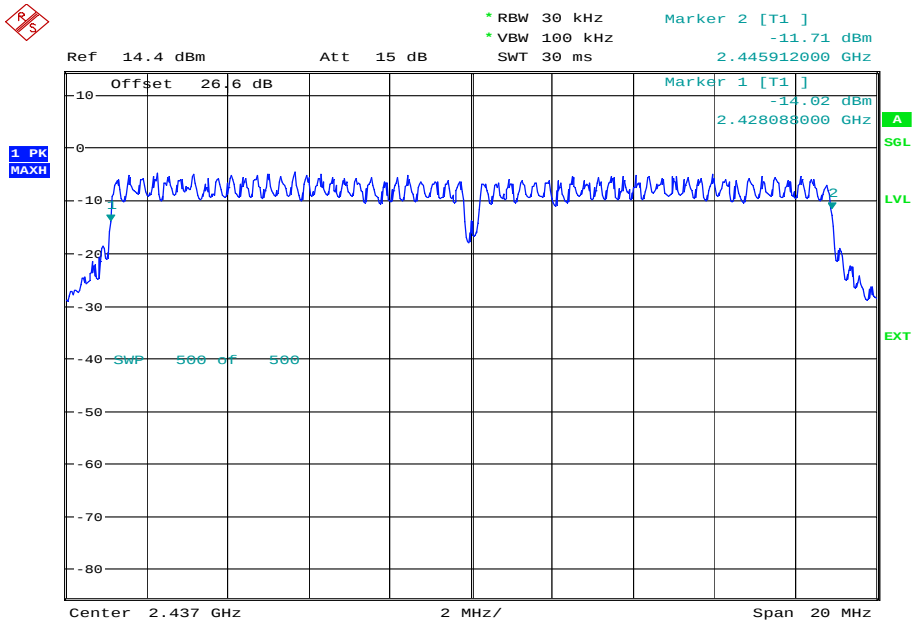
Product Service

39 Mbps



Date: 16.AUG.2012 14:47:30

52 Mbps

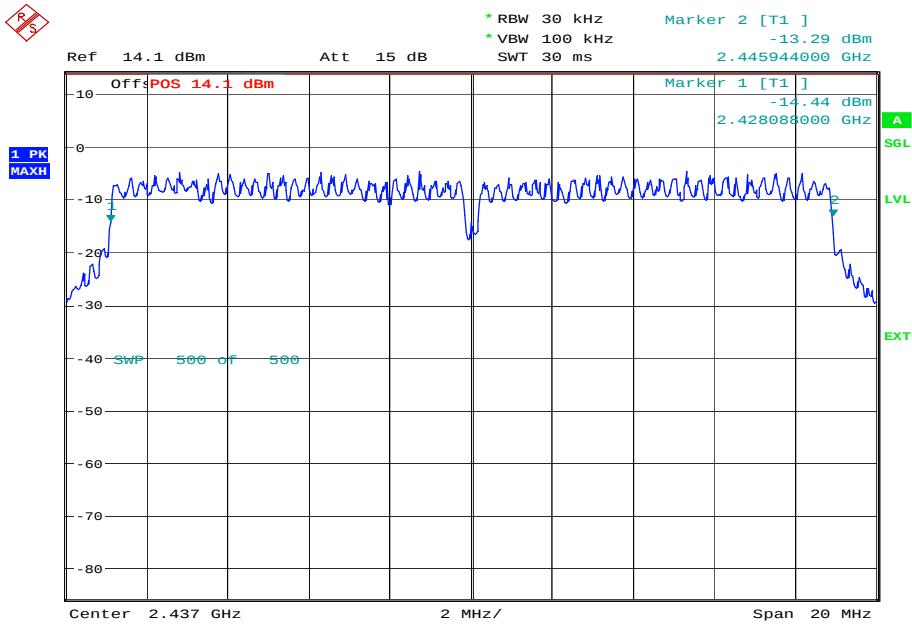


Date: 16.AUG.2012 15:01:57



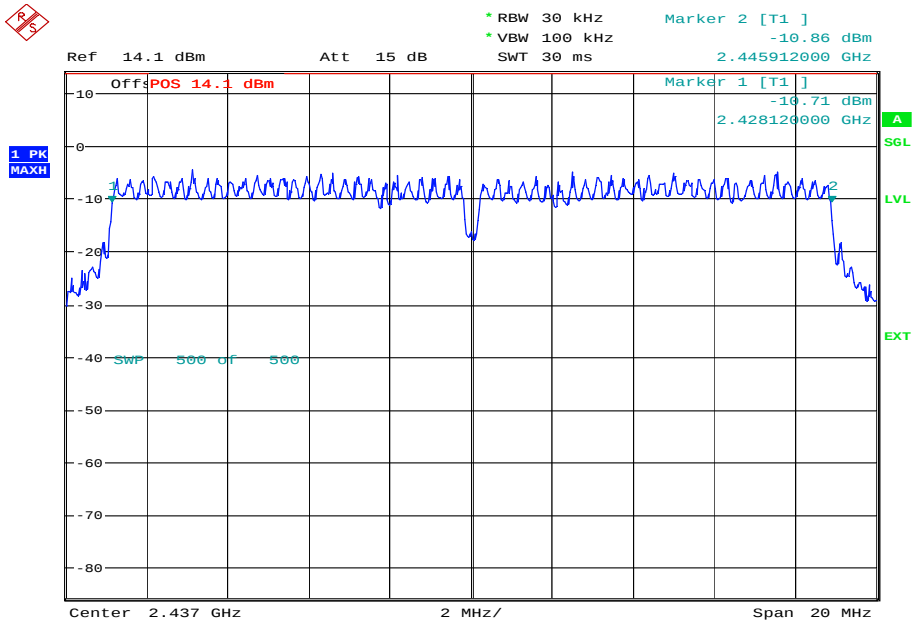
Product Service

58.5 Mbps



Date: 16.AUG.2012 15:15:34

65 Mbps



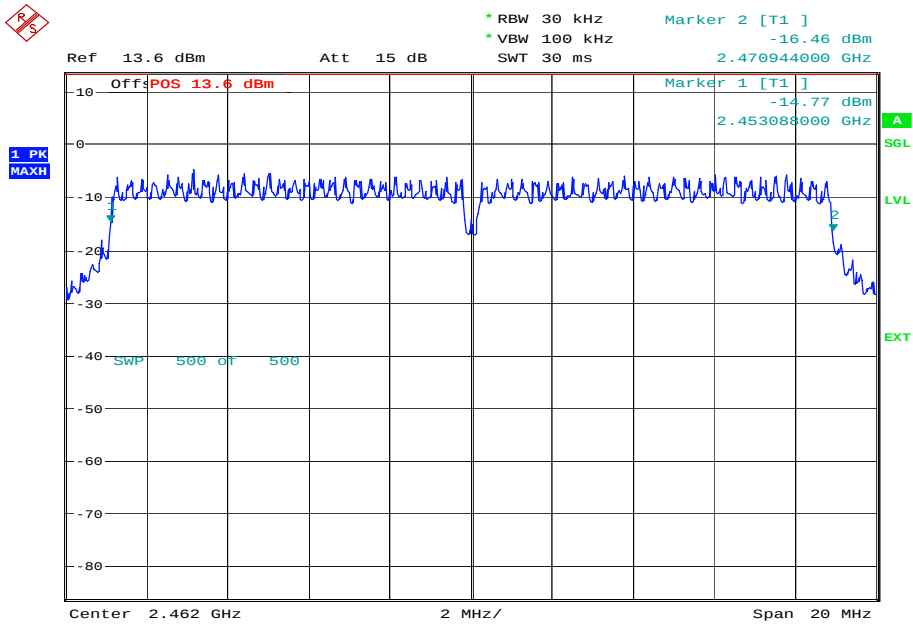
Date: 16.AUG.2012 15:36:04



Product Service

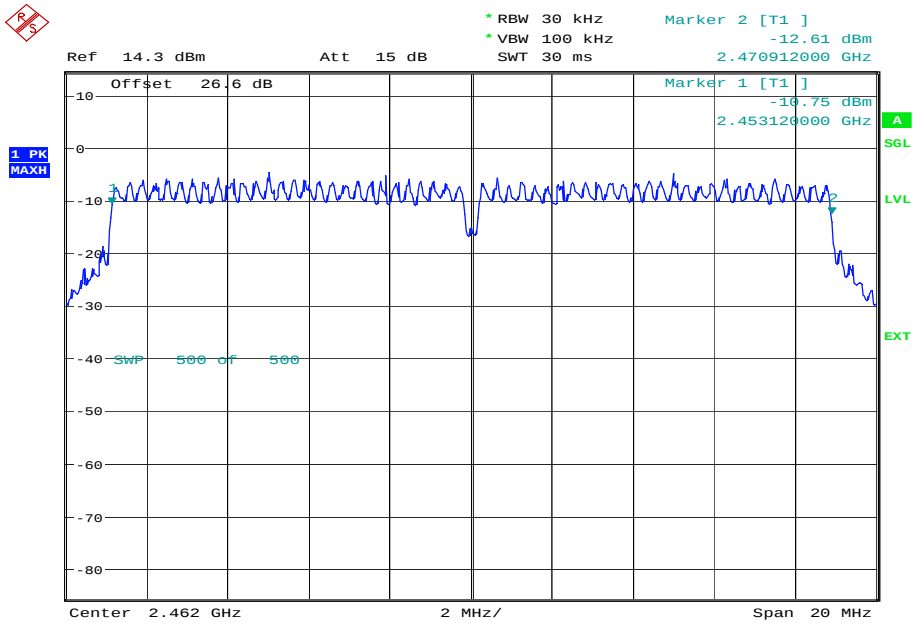
2462 MHz

6.5 Mbps



Date: 16.AUG.2012 13:43:45

13 Mbps

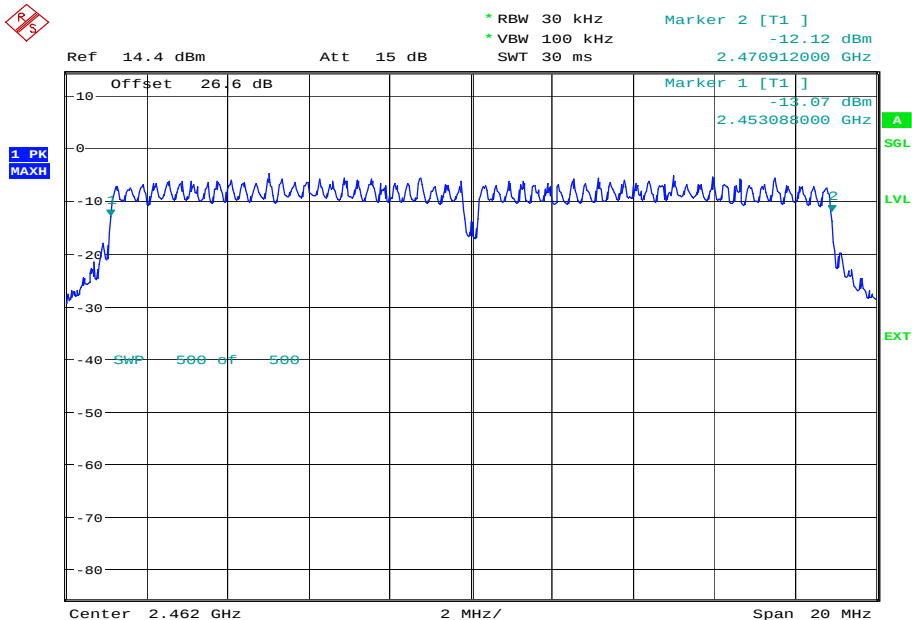


Date: 16.AUG.2012 13:58:48



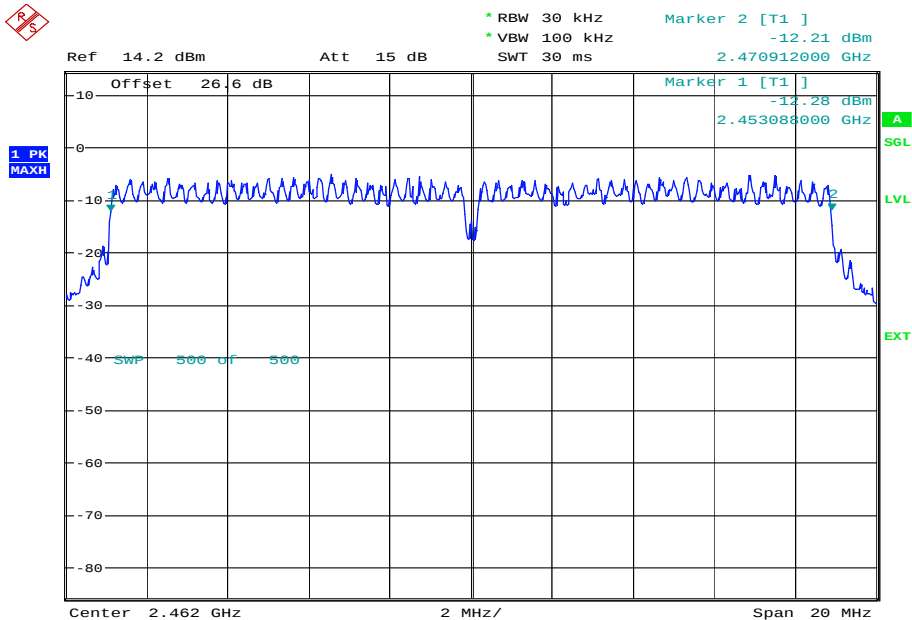
Product Service

19.5 Mbps



Date: 16.AUG.2012 14:23:21

26 Mbps

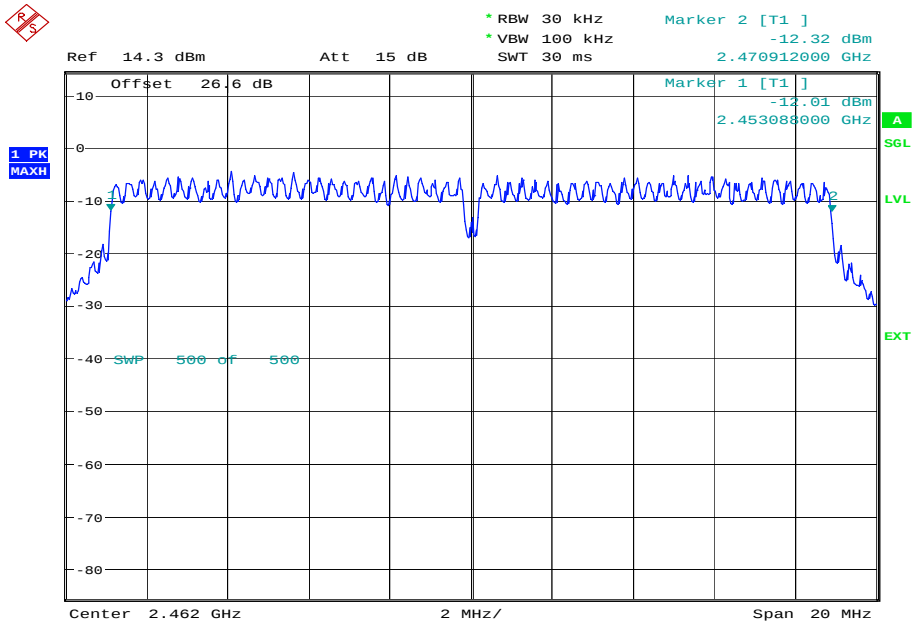


Date: 16.AUG.2012 14:37:47



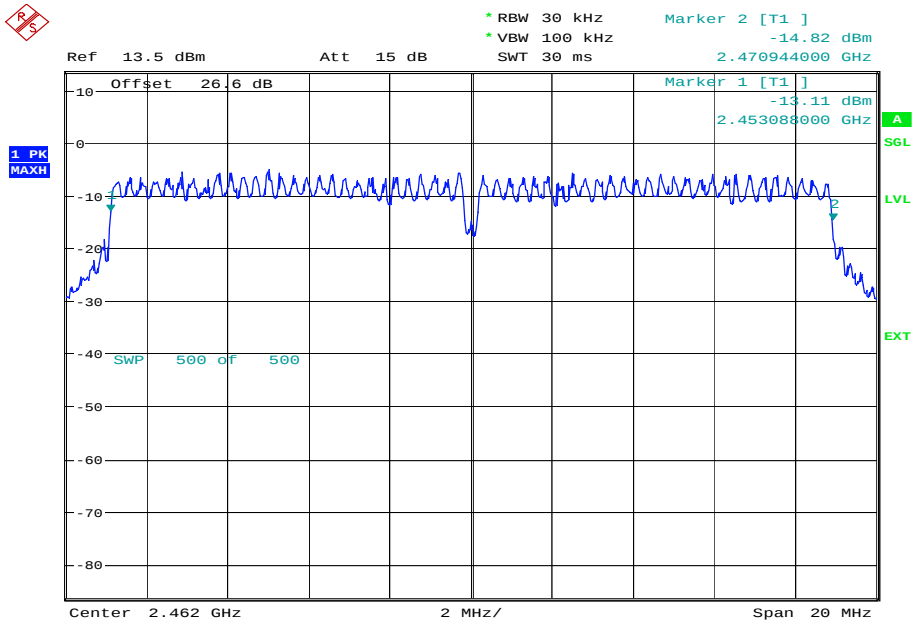
Product Service

39 Mbps



Date: 16.AUG.2012 14:52:14

52 Mbps

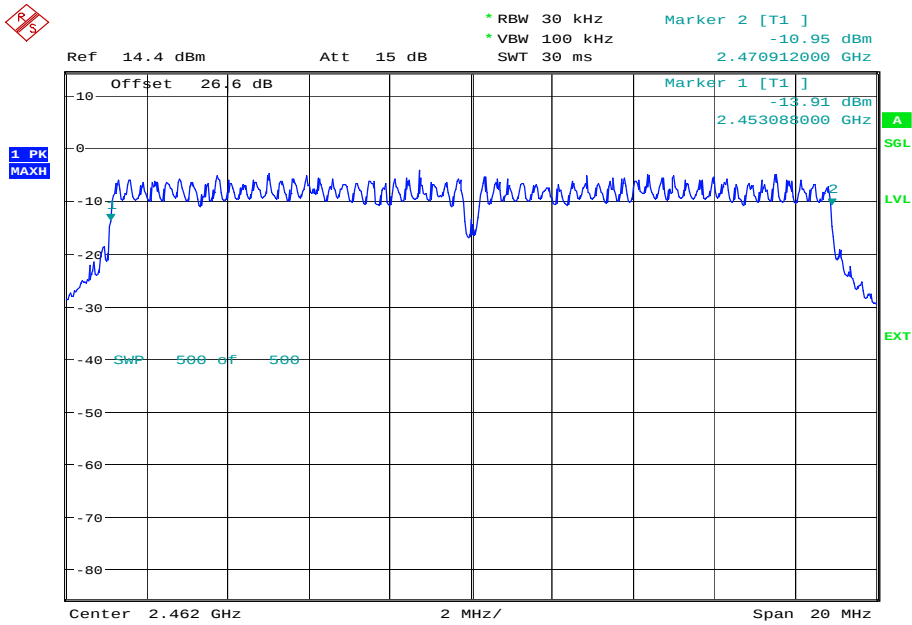


Date: 16.AUG.2012 15:06:15



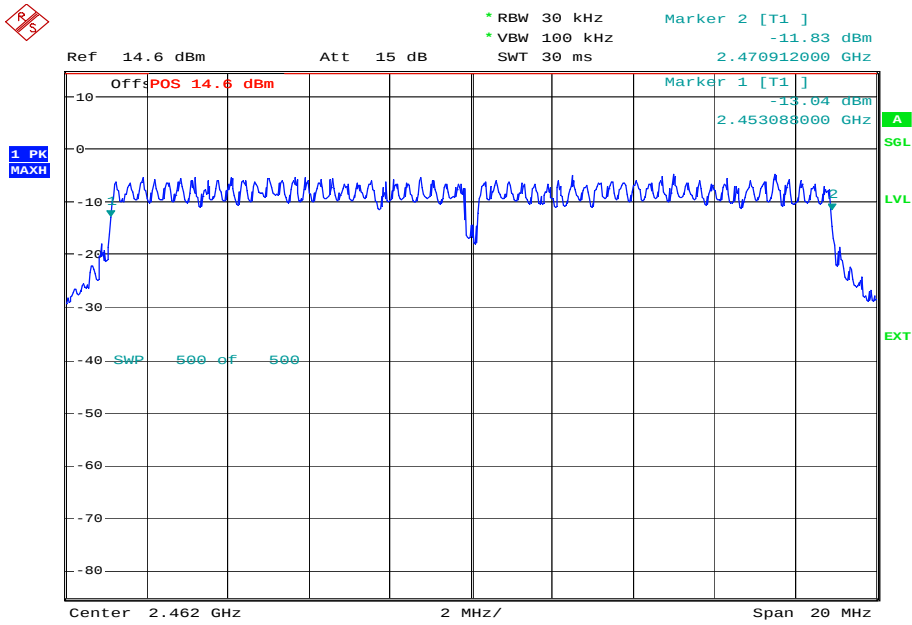
Product Service

58.5 Mbps



Date: 16.AUG.2012 15:24:04

65 Mbps



Date: 16.AUG.2012 15:58:00

Limit Clause

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



Product Service

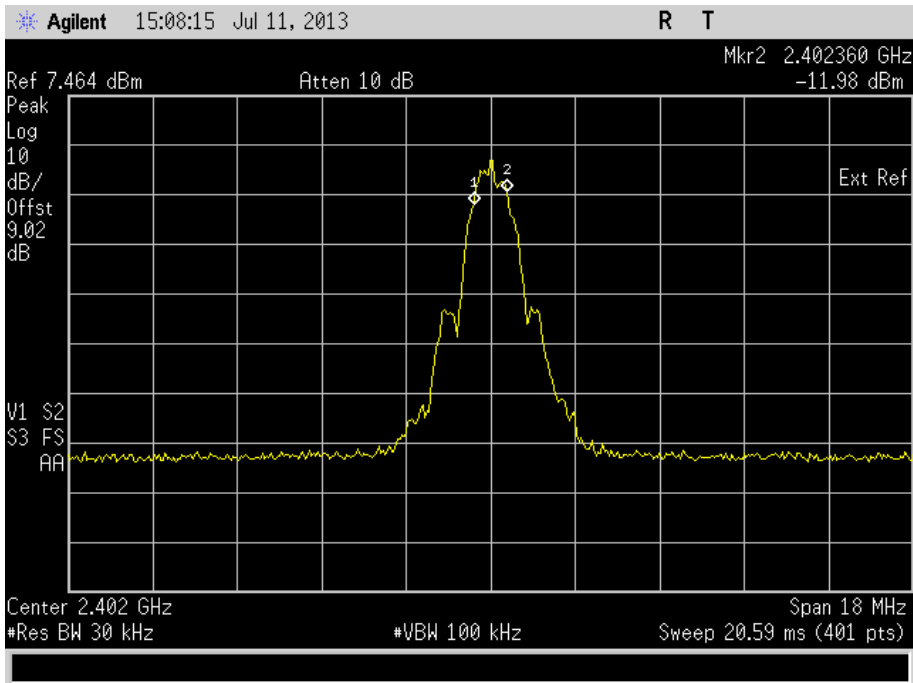
Bluetooth Low Energy

4.0 V DC Supply

Frequency (MHz)	Packet Type	6dB Bandwidth (kHz)
2402 MHz	37 oct/prbs9	720
2441 MHz	37 oct/prbs9	720
2480 MHz	37 oct/prbs9	720

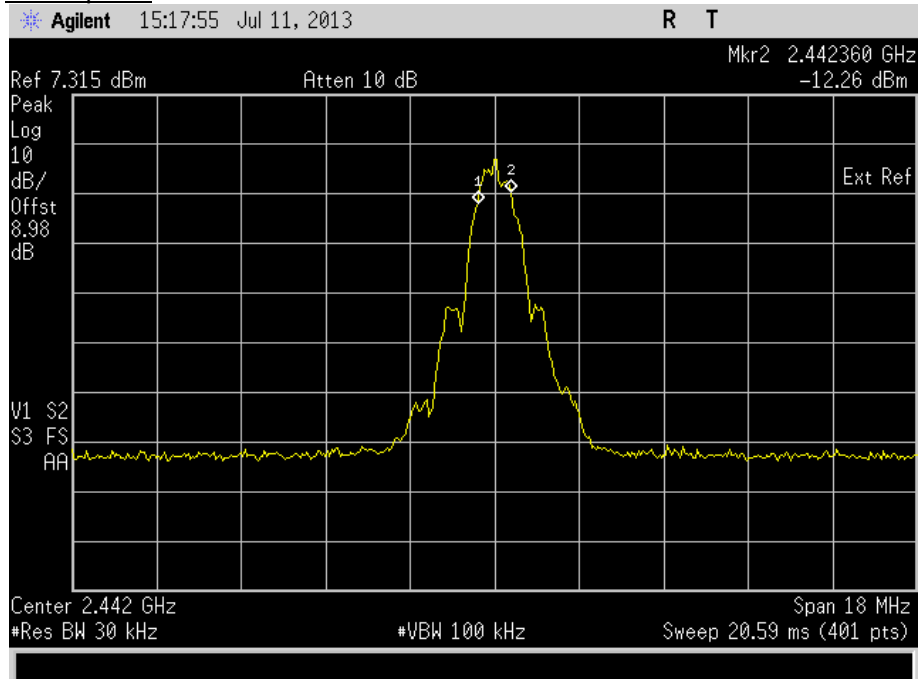
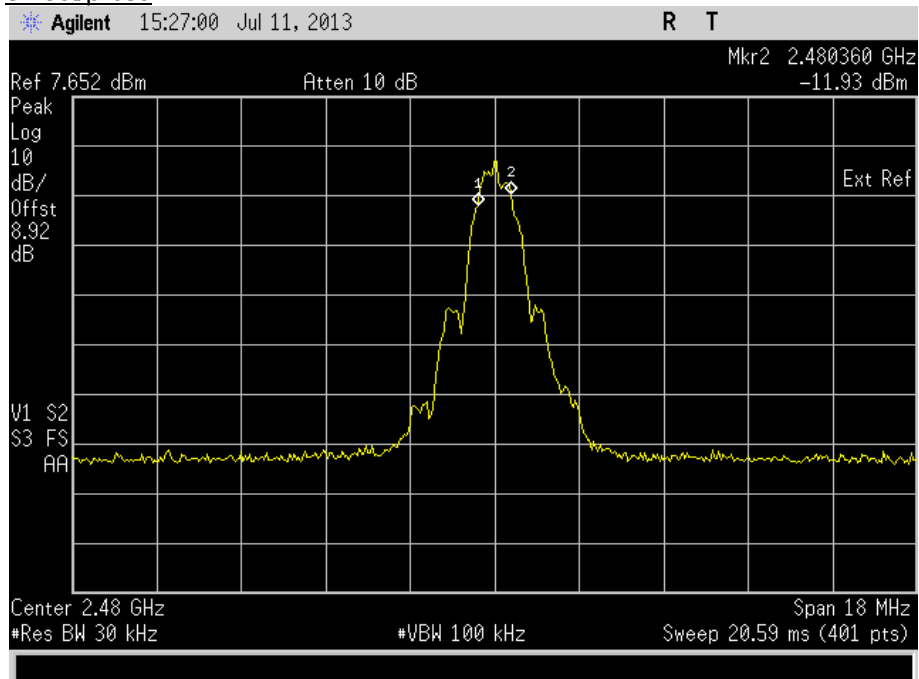
2402 MHz

37 oct/prbs9





Product Service

2441 MHz37 oct/prbs92480 MHz37 oct/prbs9Limit Clause

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



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 – AC Line Conducted Emissions					
Transient Limiter	Hewlett Packard	11947A	15	12	1-Dec-2012
3 phase LISN	Rohde & Schwarz	ESH2-Z5	323	12	13-Jan-2013
LISN (1 Phase)	Chase	MN 2050	336	12	23-Mar-2013
Transient Limiter	Hewlett Packard	11947A	1032	12	28-Jun-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 - Maximum Peak Conducted Output Power					
Signal Generator	Marconi	2031	53	-	O/P Mon
True RMS Multimeter	Fluke	79 Series III	411	12	25-Jul-2013
Multimeter	Fluke	75 Mk3	455	12	16-Jan-2013
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	27-Jun-2013
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	21-Sep-2012
Power Splitter	Weinschel	1506A	606	12	19-Dec-2012
Power Supply Unit	Farnell	D302T	609	-	O/P Mon
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Programmable Power Supply	Iso-tech	IPS 2010	2438	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	18-Nov-2012
Hygrometer	Rotronic	I-1000	2891	12	21-May-2013
Power Divider (N) 1W	Weinschel	1506A	3344	12	28-Jun-2014
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	14-Jun-2013
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
Signal Generator, 9kHz - 3GHz	Rohde & Schwarz	SMA 100A	3504	12	19-Aug-2012
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3697	12	27-Jan-2013
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	12-Jan-2013
Combiner/Splitter	Weinschel	1506A	3879	12	19-Mar-2013
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	27-Jun-2013
P-Series Power Meter	Agilent	N1911A	3980	12	12-Sep-2012
P-Series Power Meter	Agilent	N1911A	3981	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3983	12	12-Sep-2012
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4105	12	25-Oct-2013



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.3 – EIRP Peak Power					
Peak Power Analyser	Hewlett Packard	8990A	107	12	10-Feb-2013
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	8-Dec-2012
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	09-Nov-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Signal Generator (1GHz to 40GHz)	Rohde & Schwarz	SMR40	1589	12	22-Nov-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Power Sensor	Hewlett Packard	84812A	2743	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	18-Nov-2012
Antenna (DRG Horn)	ETS-LINDGREN		3125	12	13-Jul-2013
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3159	12	13-Jun-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	30-Aug-2013
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3702	12	27-Jan-2013
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	-	01-May-2013



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 - Spurious and Band Edge Emissions					
Signal Generator	Rohde & Schwarz	SMX	185	-	O/P Mon
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	13-Sep-2013
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	14-Nov-2012
True RMS Multimeter	Fluke	79 Series III	411	12	25-Jul-2013
Multimeter	Fluke	75 Mk3	455	12	16-Jan-2013
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	27-Jun-2013
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	20-Feb-2013
Broadband Resistive Power Divider	Weinschel	1506A	605	12	6-Sep-2012
Power Splitter	Weinschel	1506A	606	12	19-Dec-2012
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	19-Jan-2013
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	-	TU
Pre-Amplifier	Phase One	PS04-0086	1533	12	20-Sep-2012
Pre-Amplifier	Phase One	PS04-0087	1534	12	26-Sep-2012
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Signal Generator (1GHz to 40GHz)	Rohde & Schwarz	SMR40	1589	12	11-Nov-2012
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Programmable Power Supply	Iso-tech	IPS 2010	2438	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	18-Nov-2012
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	20-Sep-2012
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	21-Dec-2012
Hygrometer	Rotronic	I-1000	2891	12	21-May-2013
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Attenuator (10dB, 2W)	Weinschel	1	3030	-	TU
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	27-Jun-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	30-Aug-2013
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	14-Jun-2013
High Pass Filter (3GHz)	RLC Electronics	F-100-3000-5-R	3349	12	29-May-2013
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
Signal Generator, 9kHz - 3GHz	Rohde & Schwarz	SMA 100A	3504	12	19-Aug-2012
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	16-Apr-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3694	-	TU
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3697	12	27-Jan-2013



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 - Spurious and Band Edge Emissions					
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	-	TU
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	12-Jan-2013
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3702	12	27-Jan-2013
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Combiner/Splitter	Weinschel	1506A	3879	12	19-Mar-2013
P-Series Power Meter	Agilent	N1911A	3980	12	12-Sep-2012
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
P-Series Power Meter	Agilent	N1911A	3981	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3983	12	12-Sep-2012
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Low Noise Amplifier	Wright Technologies	APS04-0085	3969	-	TU
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	-	01-May-2012
Section 2.5 - Power Spectral Density					
Signal Generator	Marconi	2031	53	-	O/P Mon
True RMS Multimeter	Fluke	79 Series III	411	12	25-Jul-2013
Multimeter	Fluke	75 Mk3	455	12	16-Jan-2013
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	21-Sep-2012
Broadband Resistive Power Divider	Weinschel	1506A	605	12	6-Sep-2012
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	19-Jan-2013
Signal Generator (1GHz to 40GHz)	Rohde & Schwarz	SMR40	1589	12	11-Nov-2012
Programmable Power Supply	Iso-tech	IPS 2010	2438	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	18-Nov-2012
Hygrometer	Rotronic	I-1000	2891	12	21-May-2013
Attenuator (10dB, 2W)	Weinschel	1	3030	-	TU
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3702	12	27-Jan-2013
Combiner/Splitter	Weinschel	1506A	3879	12	19-Mar-2013
P-Series Power Meter	Agilent	N1911A	3980	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	12-Sep-2012



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.6 – 6dB Bandwidth					
Power Meter	Rohde & Schwarz	NRV	52	-	TU
True RMS Multimeter	Fluke	79 Series III	411	12	25-Jul-2013
RF Coupler	TUV SUD Product Service	TÜV	415	-	TU
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	21-Sep-2012
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	19-Jan-2013
Programmable Power Supply	Iso-tech	IPS 2010	2438	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	18-Nov-2012
Hygrometer	Rotronic	I-1000	2891	12	21-May-2013
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
Combiner/Splitter	Weinschel	1506A	3879	12	19-Mar-2013
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	27-Jun-2013
P-Series Power Meter	Agilent	N1911A	3980	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	12-Sep-2012

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
6dB Bandwidth	± 212.114 kHz
EIRP Peak Power	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Maximum Peak Conducted Output Power	± 0.70 dB
Spurious and Band Edge Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Power Spectral Density	± 3.0 dB
AC Line Conducted Emissions	± 3.2 dB



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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

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

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