Test Report

FCC Part 15.407
Industry Canada RSS210

UNII Devices

Elektrobit Wireless Communications, Ltd.
Automaatiotie 1
FI-90460 OULUNSALO
FINLAND

Product Name: Integrated Service Access Point

FCC: V27-DT40ISAP
IC: 3282B-DT40ISAP

TEST REPORT #: EMC_CETEC_029_15.407n_5.1G_rev1
DATE: 2008-3-31

Certificate # 2135.01

Bluetooth Qualification Test Facility (BQTF)

FCC listed: A2LA accredited

IC recognized # 3462B

***CETECOM* Inc.**
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Phone: + 1 (408) 586 6200 ◆ Fax: + 1 (408) 586 6299 ◆ E-mail: info@cetecomusa.com ◆ http://www.cetecom.com
CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686
Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

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1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.407 of the Code of Federal Regulations.

Company	Product Name
Elektrobit Wireless Communications, Ltd.	**Integrated Service Access Point**

This report is reviewed by:

Date	Section	Name	Signature
2008-3-31	**EMC & Radio**	**Ivaylo Tankov (EMC Project Engineer)**	Ivaylo Tankov I am approving this document

This report is prepared by:

Date	Section	Name	Signature
2008-3-31	**EMC & Radio**	**Peter Mu (EMC Project Engineer)**	 I am the author of this document

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	**CETECOM Inc.**
Department:	**EMC**
Address:	**411 Dixon Landing Road Milpitas, CA 95035 U.S.A.**
Telephone:	**+1 (408) 586 6200**
Fax:	**+1 (408) 586 6299**
Responsible Test Lab Manager:	**Lothar Schmidt**
Responsible Project Leader:	**Peter Mu**
Date of test:	**2008-3-4 to 2008-3-25**

2.2 Identification of the Client

APPLICANT	
Applicant (Company Name)	**Elektrobit Wireless Communications, Ltd.**
Street Address	**Automaatiotie 1**
City/Zip Code	**FI-90460 OULUNSALO**
Country	**FINLAND**
Contact Person	**Jussi Harju**
Telephone	**+41 55 253 2055**
Fax	**+41 55 253 2070**
e-mail	**jussi.harju@elektrobit.com**

2.3 Identification of the Manufacturer

Same as above applicant.

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

EUT	
Marketing Name of EUT (if not same as Model No.):	**Integrated Service Access Point**
Description:	Wireless LAN Access Point
Model No:	ISAP
FCC ID:	V27-DT40ISAP
IC ID:	3282B-DT40ISAP

Frequency Range:	5180-5250MHz Channel 36, 44, 48 in HT20 mode Channel 38, 46 in HT40 mode
Type(s) of Modulation:	OFDM
Antenna Type:	Whip 2.6dBi
Max Output Power:	EIRP: 20.5dBm (0.112W) HT20 mode. 20.5dBm (0.112W) HT40 mode. Conducted Output power: 14.9dBm (0.0309W) HT20 mode, 14.9dBm (0.0309W) HT40 mode.
Specified Operating Temperature Range:	-10C to +50C

3.2 Identification of the Equipment under Test (EUT)

EUT #	TYPE	MANF.	MODEL	SERIAL #
1	EUT	Elektrobit	ISAP	026
2	EUT	Elektrobit	ISAP	027

3.3 Identification of Accessory equipment

None

4 Subject Of Investigation

All testing was performed on the product referred to in Section 3 as EUT. EUT operates in the band 5150-5250MHz in 802.11na 20MHz (HT20) and 802.11na 40MHz (HT40) mode. Although the EUT has three antenna ports only two will be used in actual operation. All three ports are measured during testing and ports with worse case performance are reported here to show compliance to applicable standards.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT operating under 802.11n (20MHz) mode and 802.11na(40MHz) mode in the 5150-5250MHz range as specified by requirements listed in FCC rules Part 15.407 of Title 47 of the Code of Federal Regulations. The maximization of portable equipment is conducted in accordance with ANSI C63.4

5 Radiated Measurements

5.1 Maximum Peak Output Power § 15.407 (Radiated)

EIRP is calculated from conducted peak power with the following formula:

EIRP = Conducted Peak Power + Directional Antenna Gain (G)

Directional Antenna Gain = Max Stated Antenna Gain + 10*log(N)

N is the number of active transmitting ports. For this EUT N=2 under normal operation mode and all antennae have stated gain of 2.6dBi. G = 2.6dBi + 10*log(2) = 5.6dBi.

5.1.1 EIRP 802.11na HT20 MODE:

TEST CONDITIONS			MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)			5180	5220	5240
Chain AB	T_{nom}(23)°C	V_{nom}VDC	20.5	20.3	20.2
Measurement uncertainty			±0.5dBm		

5.1.2 EIRP 802.11na HT40 MODE:

TEST CONDITIONS			MAXIMUM PEAK OUTPUT POWER (dBm)	
Frequency (MHz)			5190	5230
Chain AB	T_{nom}(23)°C	V_{nom}VDC	20.5	17.3
Measurement uncertainty			±0.5dBm	

5.2 Restricted Band Edge Compliance §15.407(b)/15.205

5.2.1 Limits

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

***PEAK LIMIT= 74dBuV/m**
***AVG. LIMIT= 54dBuV/m**

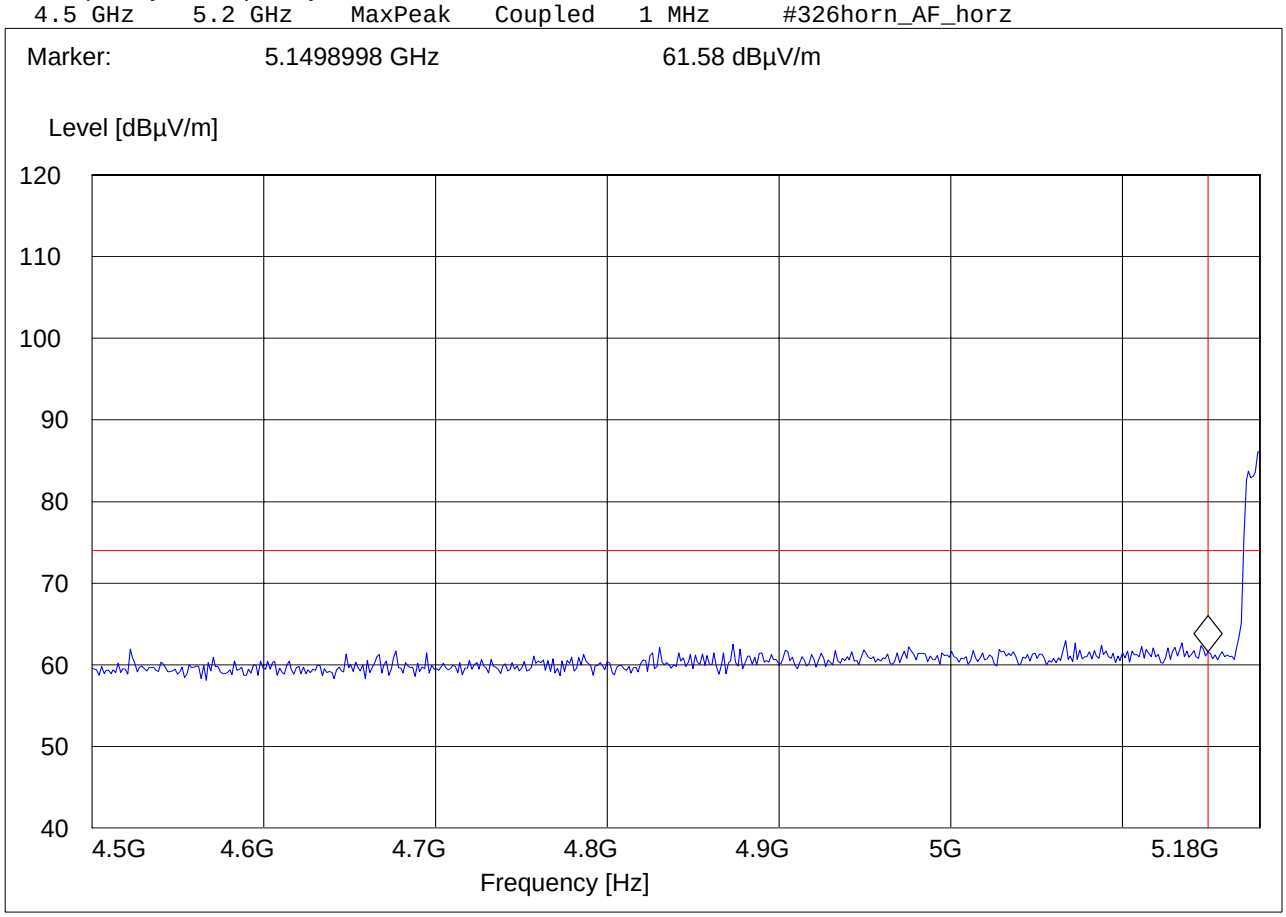
5.2.2 802.11 (na) HT20 MODE

5180MHz Chain AB, Lower band edge PEAK

```
EUT:              026
Customer::        Elektrobit
Test Mode:        802.11na, HT20
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Peter
Voltage:          AC
Comments:
```

SWEEP TABLE: "FCC15.407 A_LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
4.5 GHz	5.2 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

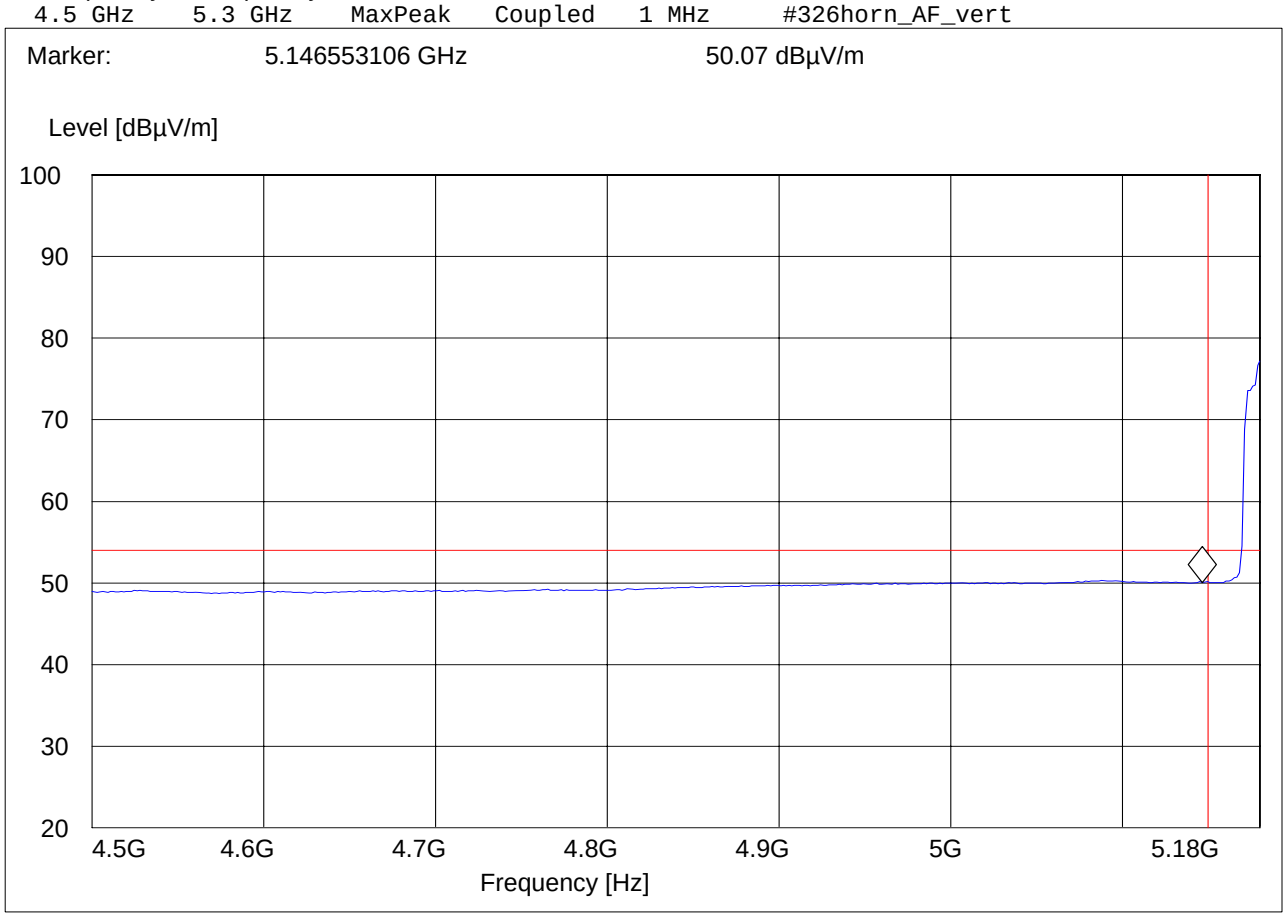


5180MHz Chain AB, Lower band edge AVG

```
EUT:              026
Customer::        Elektrobit
Test Mode:        802.11na, HT20
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Peter
Voltage:          AC
Comments:
```

SWEEP TABLE: "FCC15.407 A_LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
4.5 GHz	5.3 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



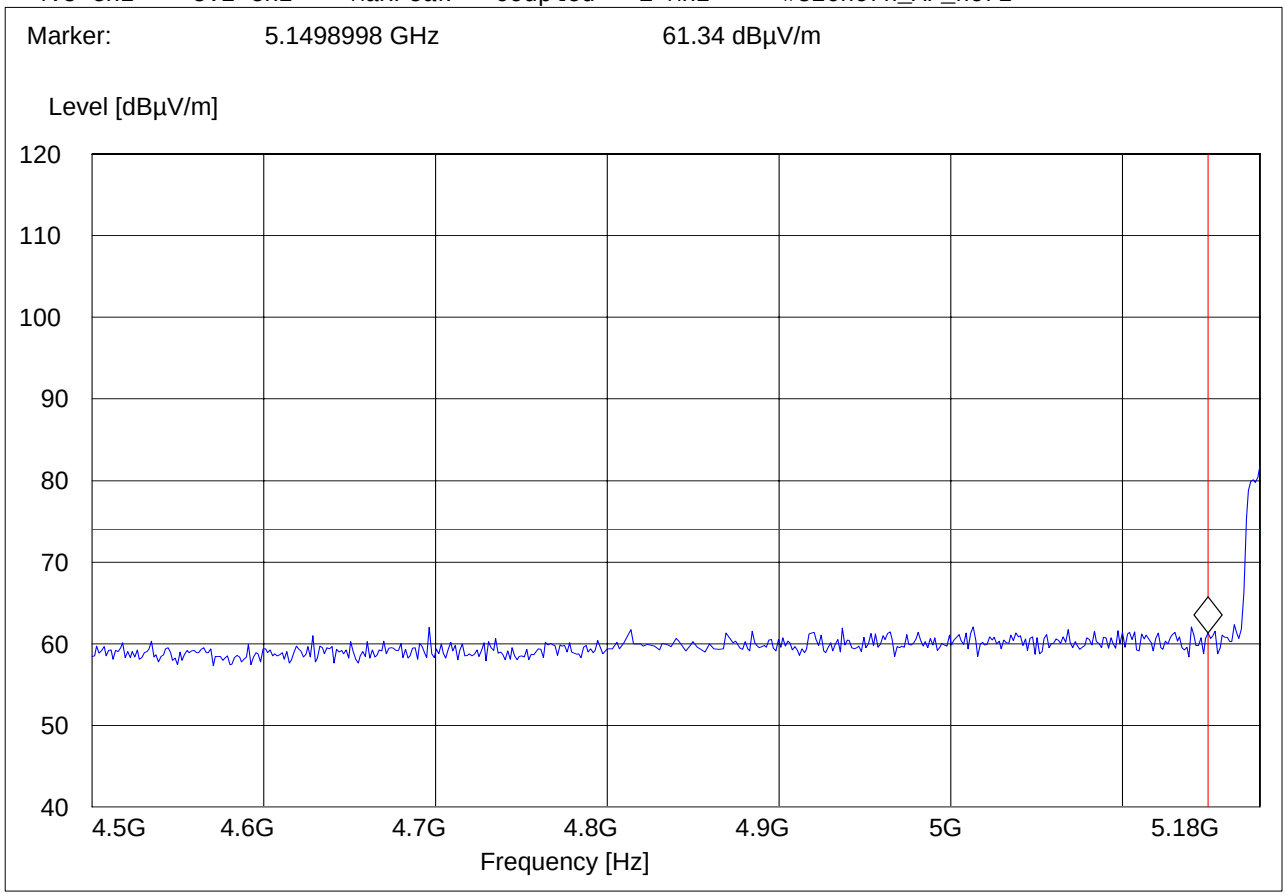
5.2.3 802.11 (na) HT40 MODE

5190MHz Chain AB, Lower band edge PEAK

```
EUT:              026
Customer::        Elektrobit
Test Mode:        802.11na, HT40
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Peter
Voltage:          AC
Comments:
```

SWEEP TABLE: "FCC15.407 A_LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
4.5 GHz	5.2 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

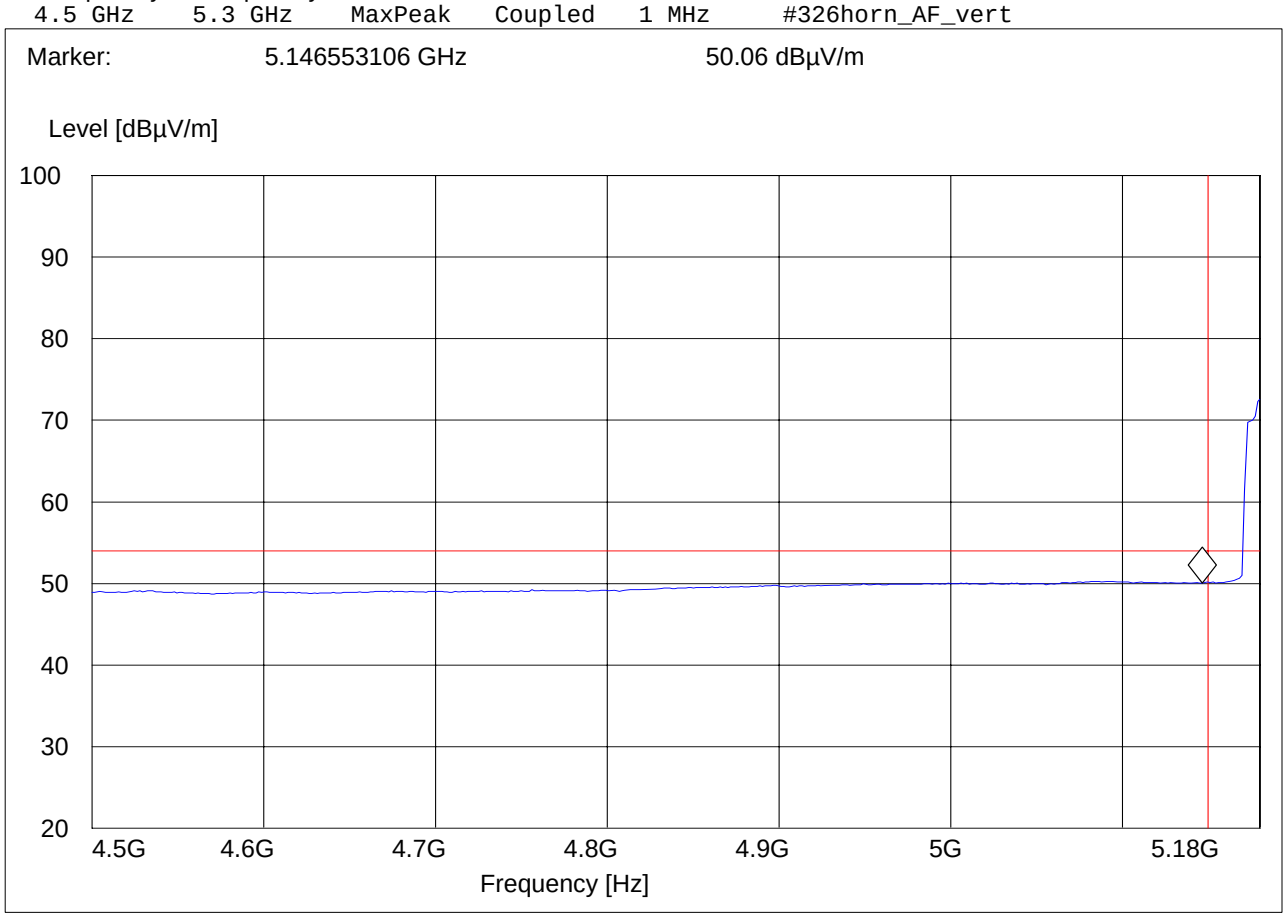


5190MHz Chain AB, Lower band edge AVG

```
EUT:              026
Customer::        Elektrobit
Test Mode:        802.11na, HT40
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Peter
Voltage:          AC
Comments:
```

SWEEP TABLE: "FCC15.407 A_LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
4.5 GHz	5.3 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



5.3 Transmiter Spurious Emission § 15.407(b)/15.205/15.209

5.3.1 Limits

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

***PEAK LIMIT= 74dBuV/m for spurious in restricted bands**
***AVG. LIMIT= 54dBuV/m for spurious in restricted bands**
***PEAK LIMIT= 68.2dBuV/m for spurious NOT in restricted bands**

NOTE:
1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit, unless specified with the plots.

Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels

5.3.2 RESULTS 802.11 (na) HT20 MODE Chain AB

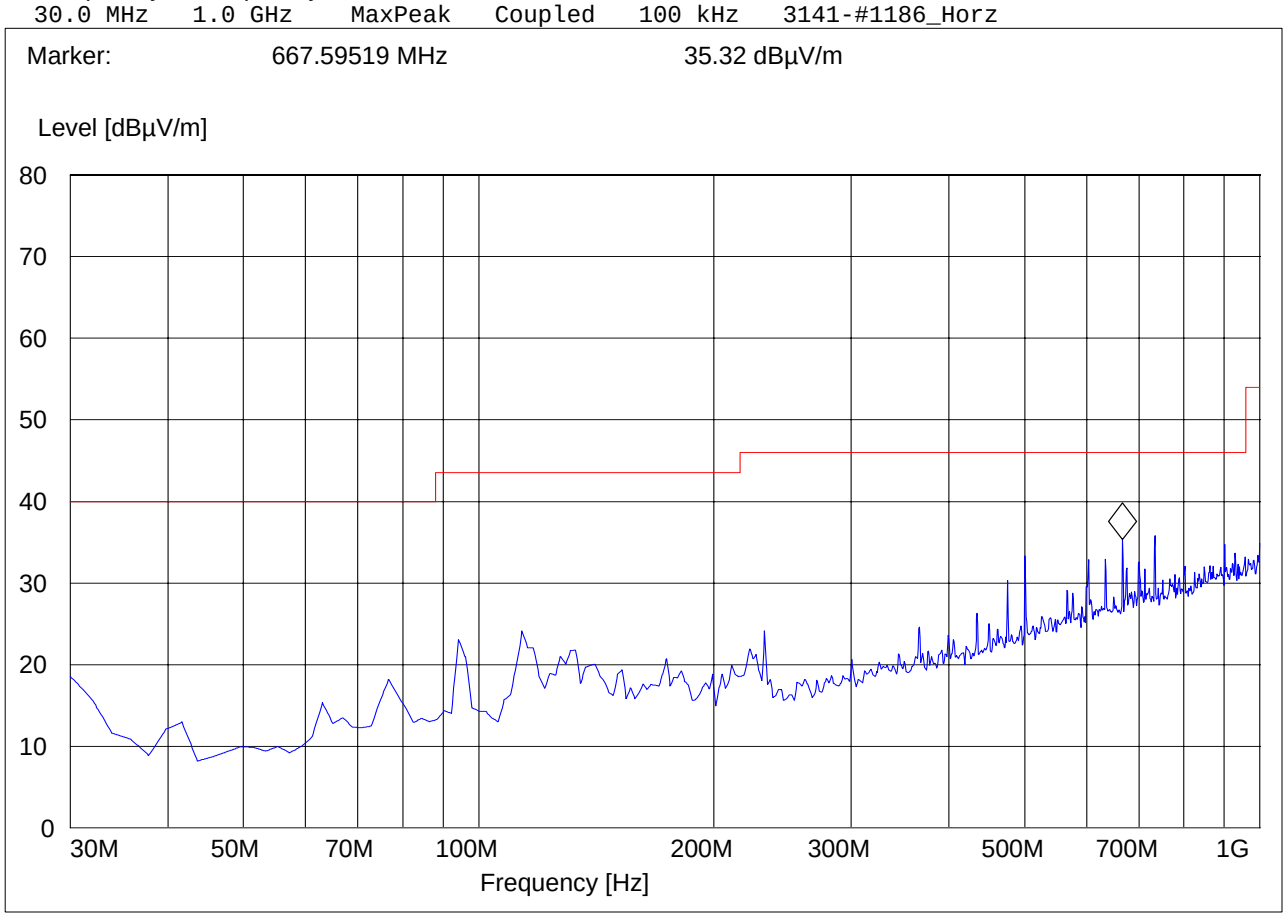
30MHz – 1GHz, Antenna: Horizontal

Note: This plot is valid for low, mid, high channels (worst-case plot).

```
EUT:              026
Customer::        Elektrobit
Test Mode:        Ch. 5220
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          Power Cable
Comments:
```

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



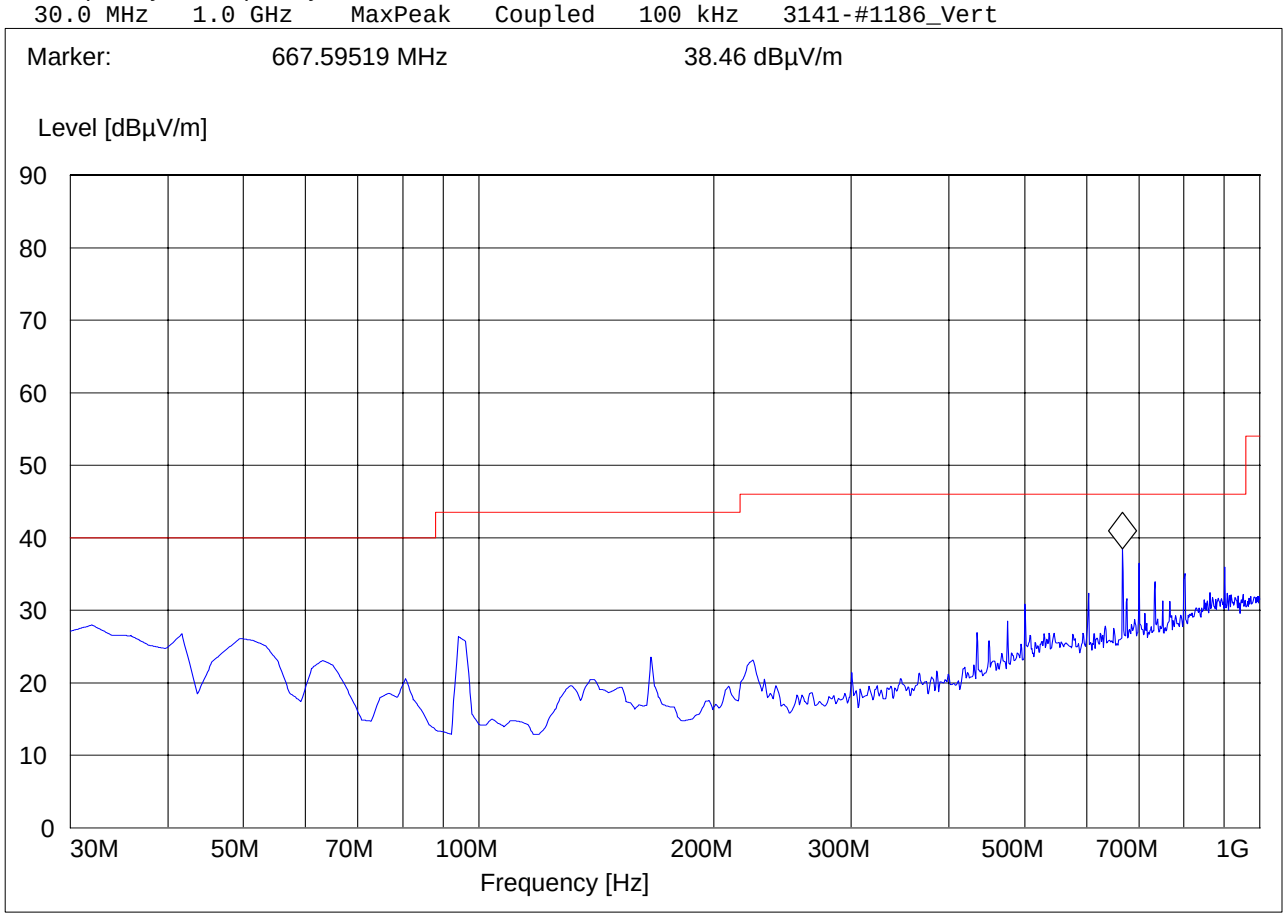
30MHz – 1GHz, Antenna: Vertical

Note: This plot is valid for low, mid, high channels (worst-case plot).

```
EUT:              026
Customer::        Elektrobit
Test Mode:        Ch. 5220
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          Power Cable
Comments:
```

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



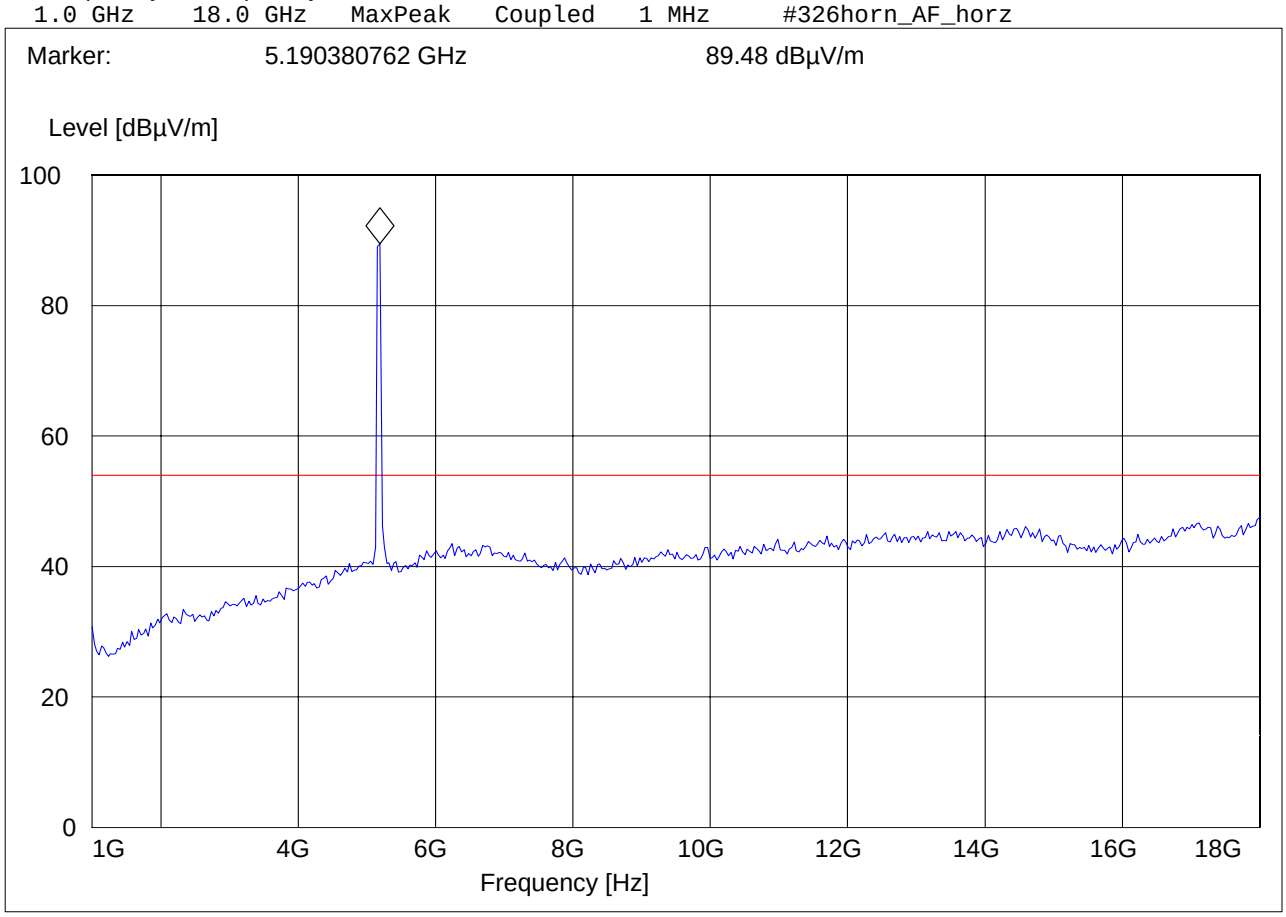
1-18GHz (5180MHz) Chain AB

Note: The peak above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

EUT / Description: 026
Manufacturer: Elektrobit
Operation Mode: Ch. 5180
ANT Orientation: : H
EUT Orientation:: H
Test Engineer: Chris
Voltage: Power cable
Comments::

SWEEP TABLE: "FCC 15.407 1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



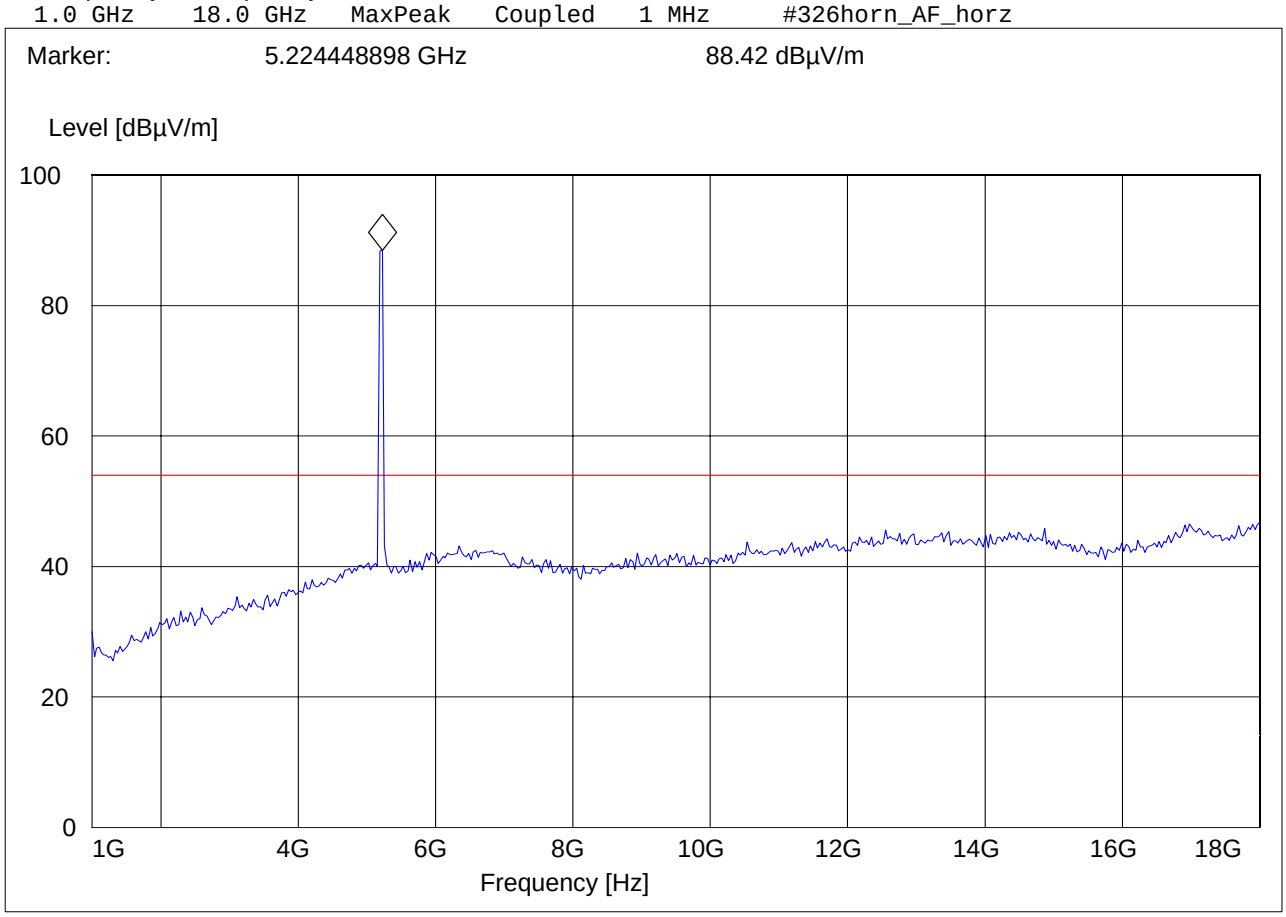
1-18GHz (5220MHz) Chain AB

Note: The peak above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

EUT / Description: 026
Manufacturer: Elektrobit
Operation Mode: Ch. 5220
ANT Orientation: : H
EUT Orientation:: H
Test Engineer: Chris
Voltage: Power cable
Comments::

SWEEP TABLE: "FCC 15.407 1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



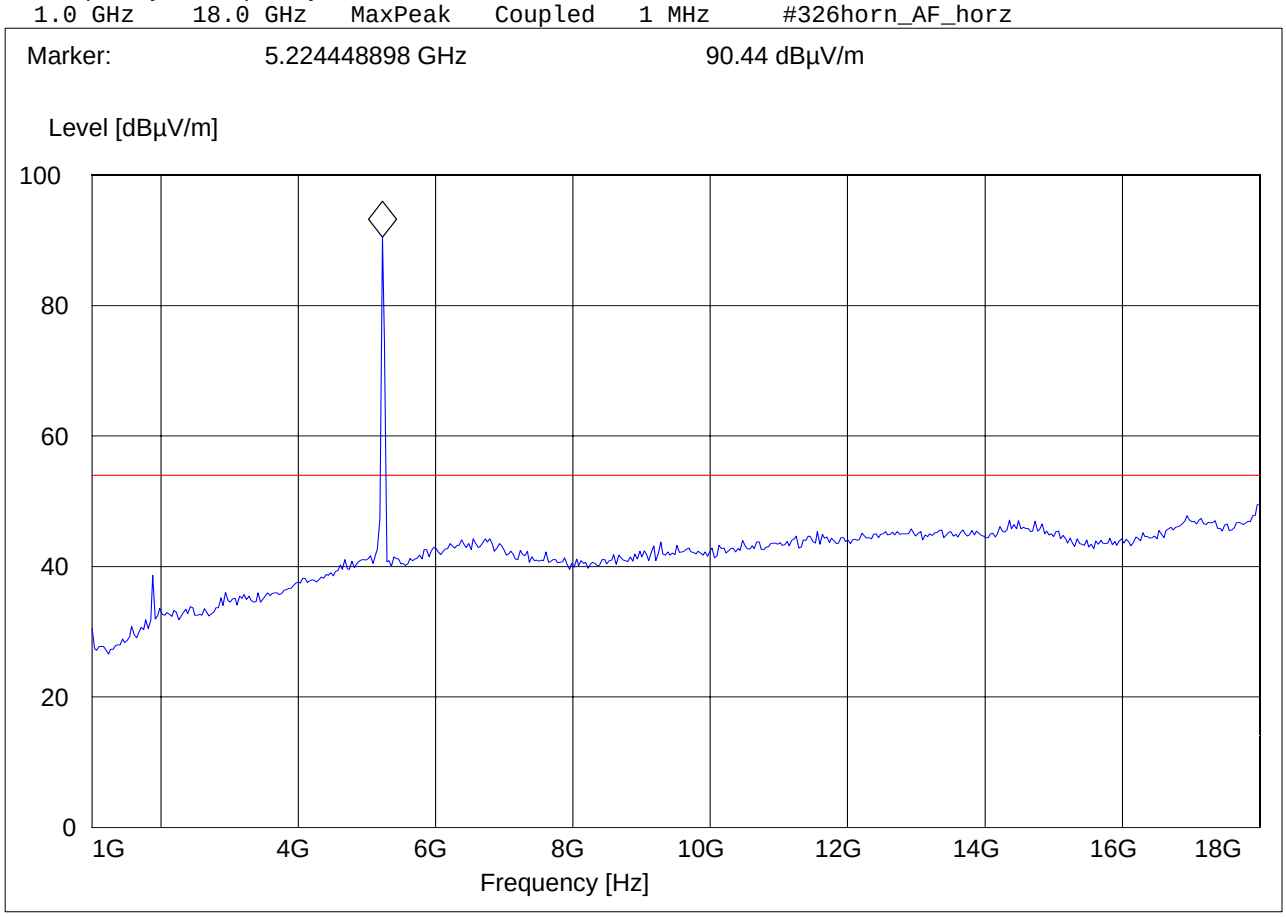
1-18GHz (5240MHz) Chain AB

Note: The peak above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

EUT / Description: 026
Manufacturer: Elektrobit
Operation Mode: Ch. 5240
ANT Orientation: : H
EUT Orientation:: H
Test Engineer: Chris
Voltage: Power cable
Comments::

SWEEP TABLE: "FCC 15.407 1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



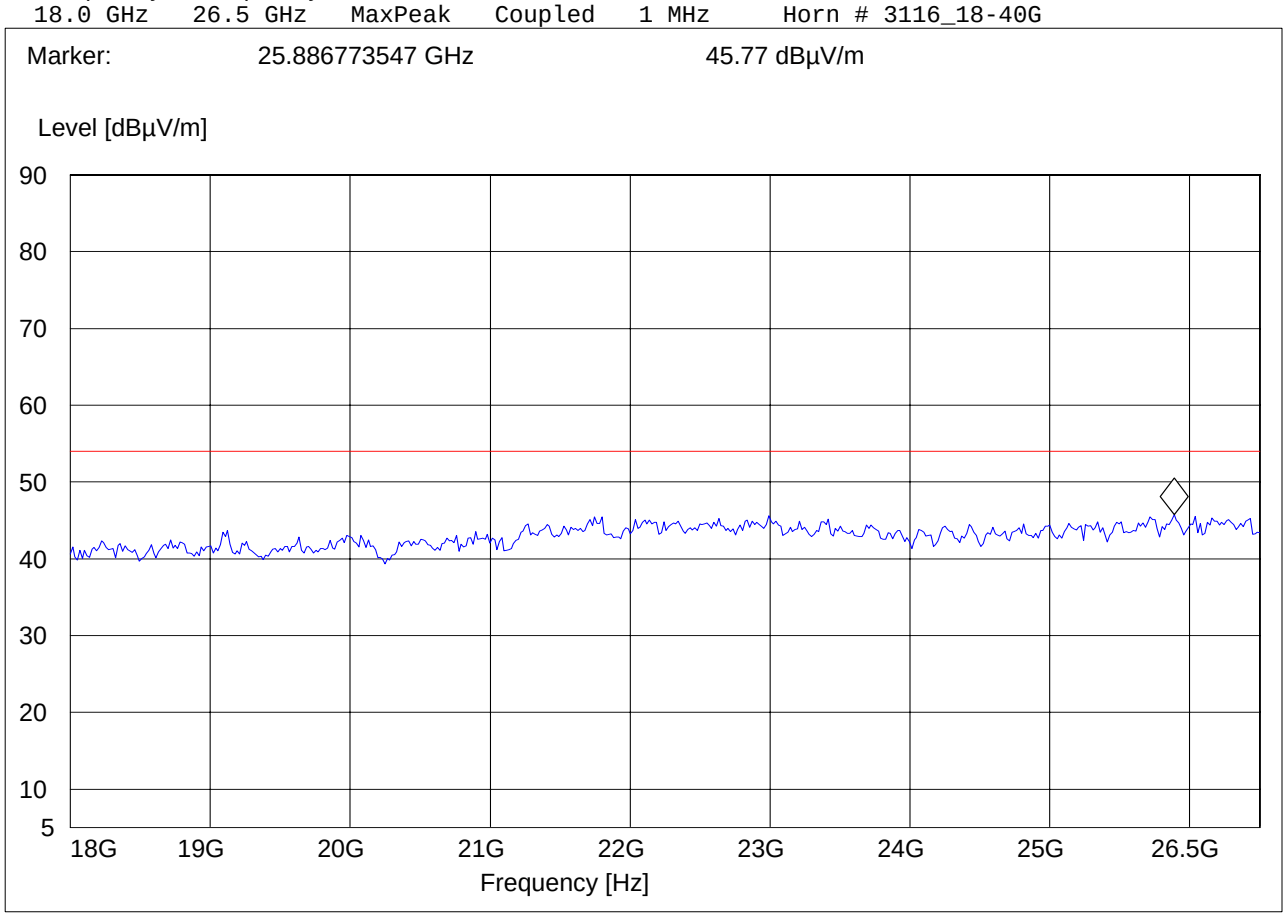
18-26.5GHz Chain AB

Note: Peak Reading vs. Average limit
Note: This plot is valid for low, mid, high channels (worst-case plot).

EUT: 026
Customer:: Elektrobit
Test Mode: Ch. 5220
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: Power Cable
Comments:

SWEEP TABLE: "FCC 15.407 18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	Horn # 3116_18-40G



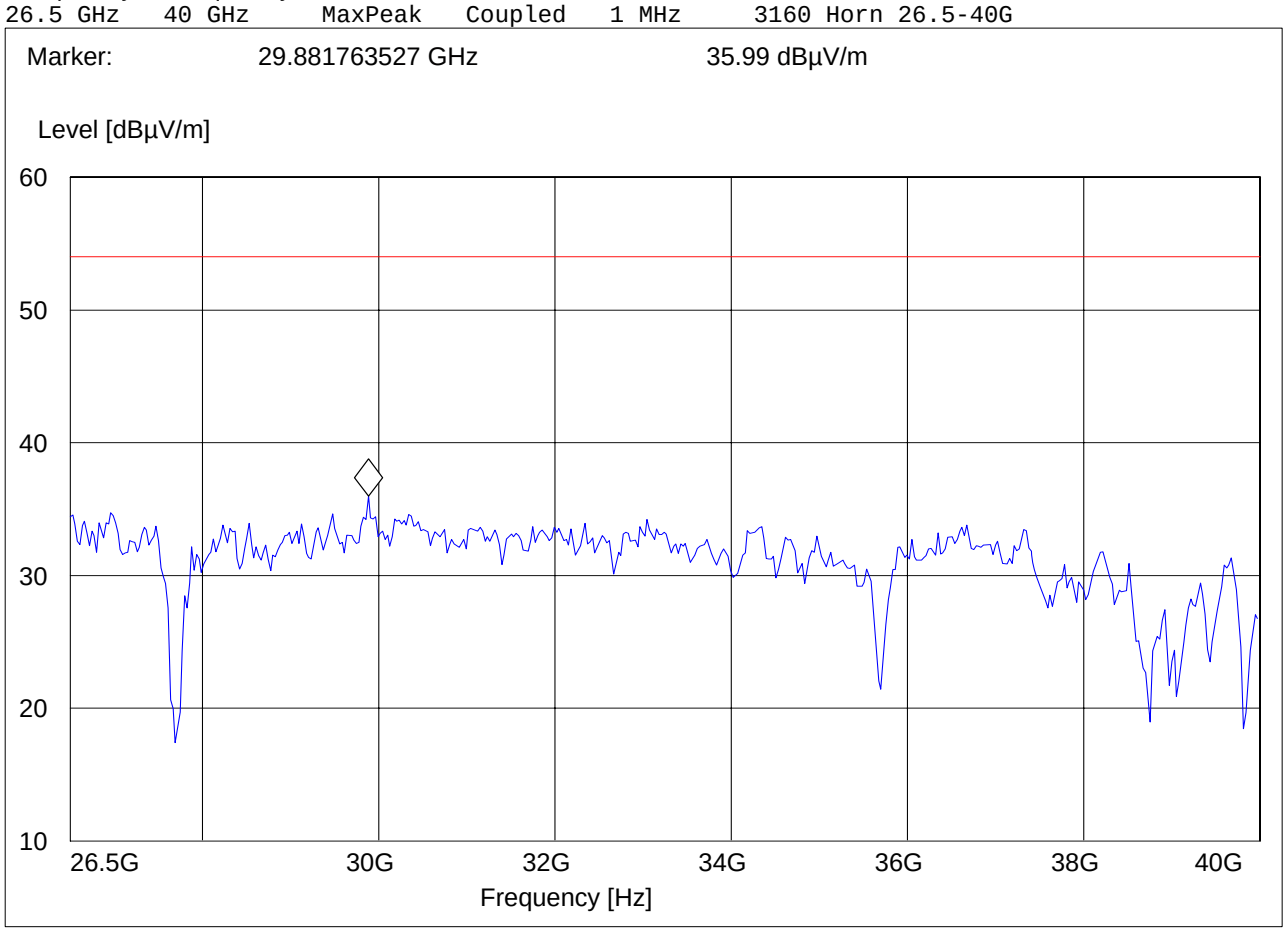
26.5-40GHz Chain AB

Note: This plot is valid for low, mid, high channels (worst-case plot)
Note: Peak Reading vs. Average limit

```
EUT:              026
Customer::        Elektrobit
Test Mode:        Ch. 5220
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          Power Cable
Comments:
```

SWEEP TABLE: "FCC 15.407 26.5-40G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
26.5 GHz	40 GHz	MaxPeak	Coupled	1 MHz	3160 Horn 26.5-40G



5.3.3 RESULTS 802.11 (na) HT40 MODE Chain AB

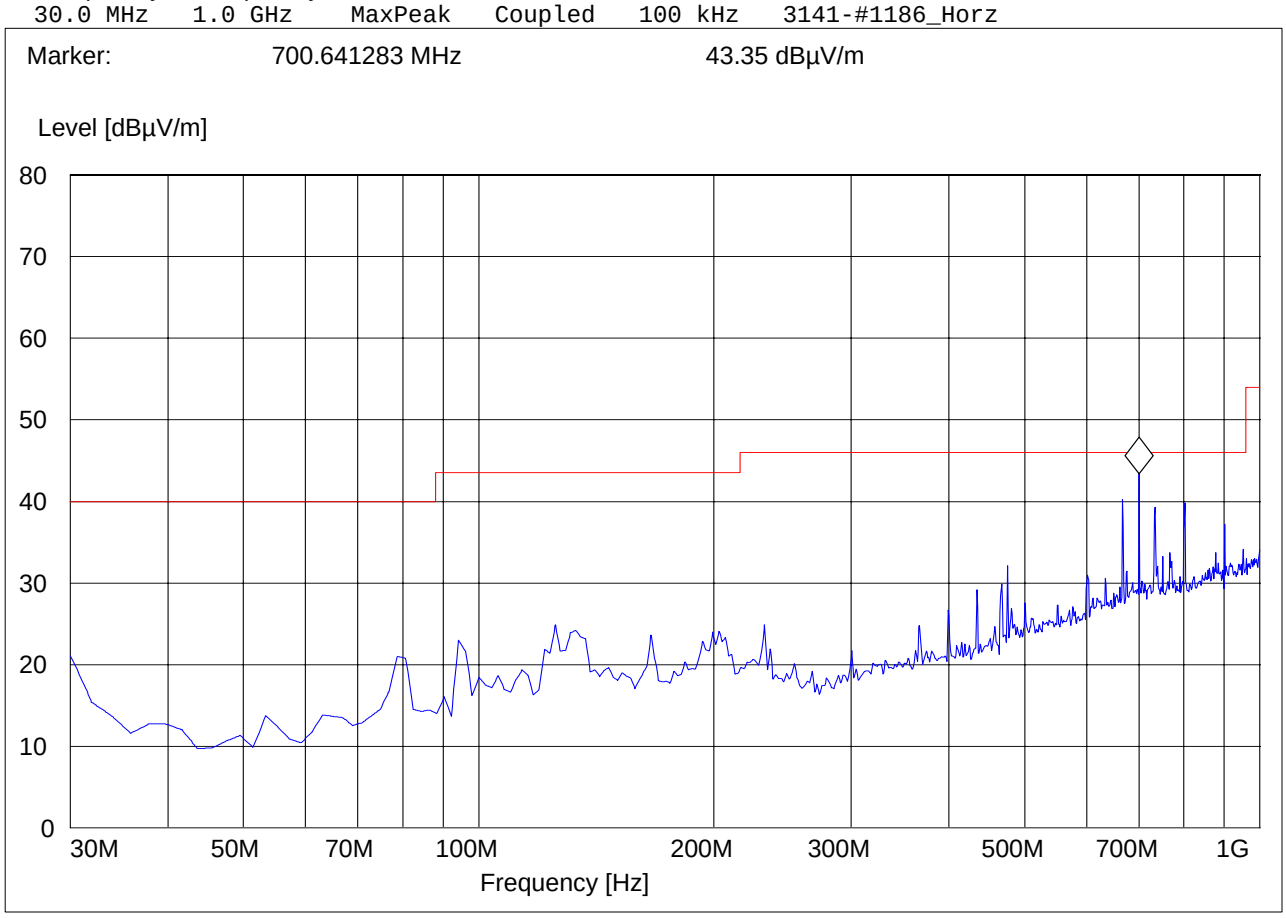
30MHz – 1GHz, Antenna: Horizontal

Note: This plot is valid for low, mid, high channels (worst-case plot).

```
EUT:              026
Customer::        Elektrobit
Test Mode:        5230 MHz; 40 MHz BW
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Satya
Voltage:          Power Cable
Comments:
```

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



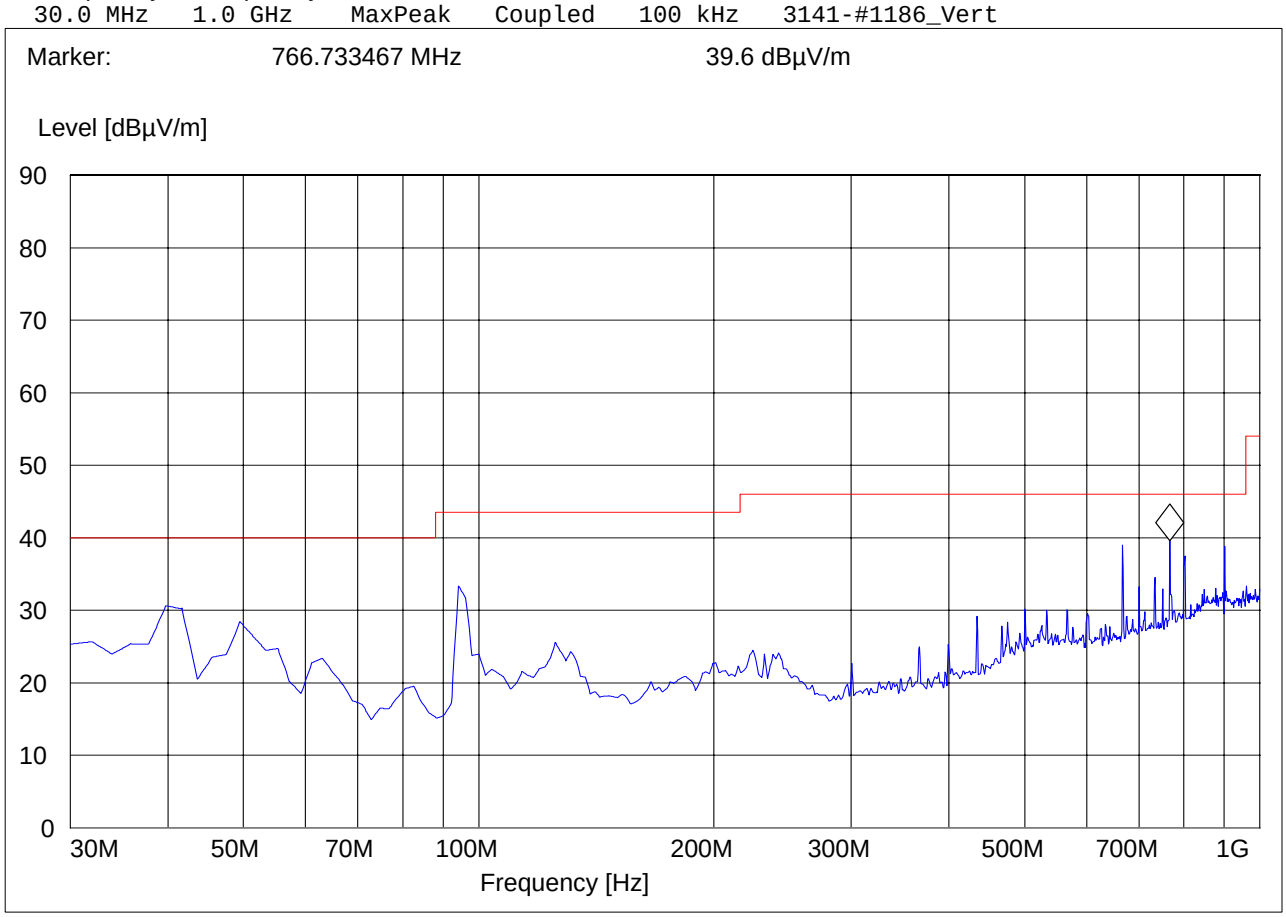
30MHz – 1GHz, Antenna: Vertical

Note: This plot is valid for low, mid, high channels (worst-case plot).

EUT: 026
Customer:: Elektrobit
Test Mode: 5230 MHz; 40 MHz BW
ANT Orientation: V
EUT Orientation: H
Test Engineer: Satya
Voltage: Power Cable
Comments:

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



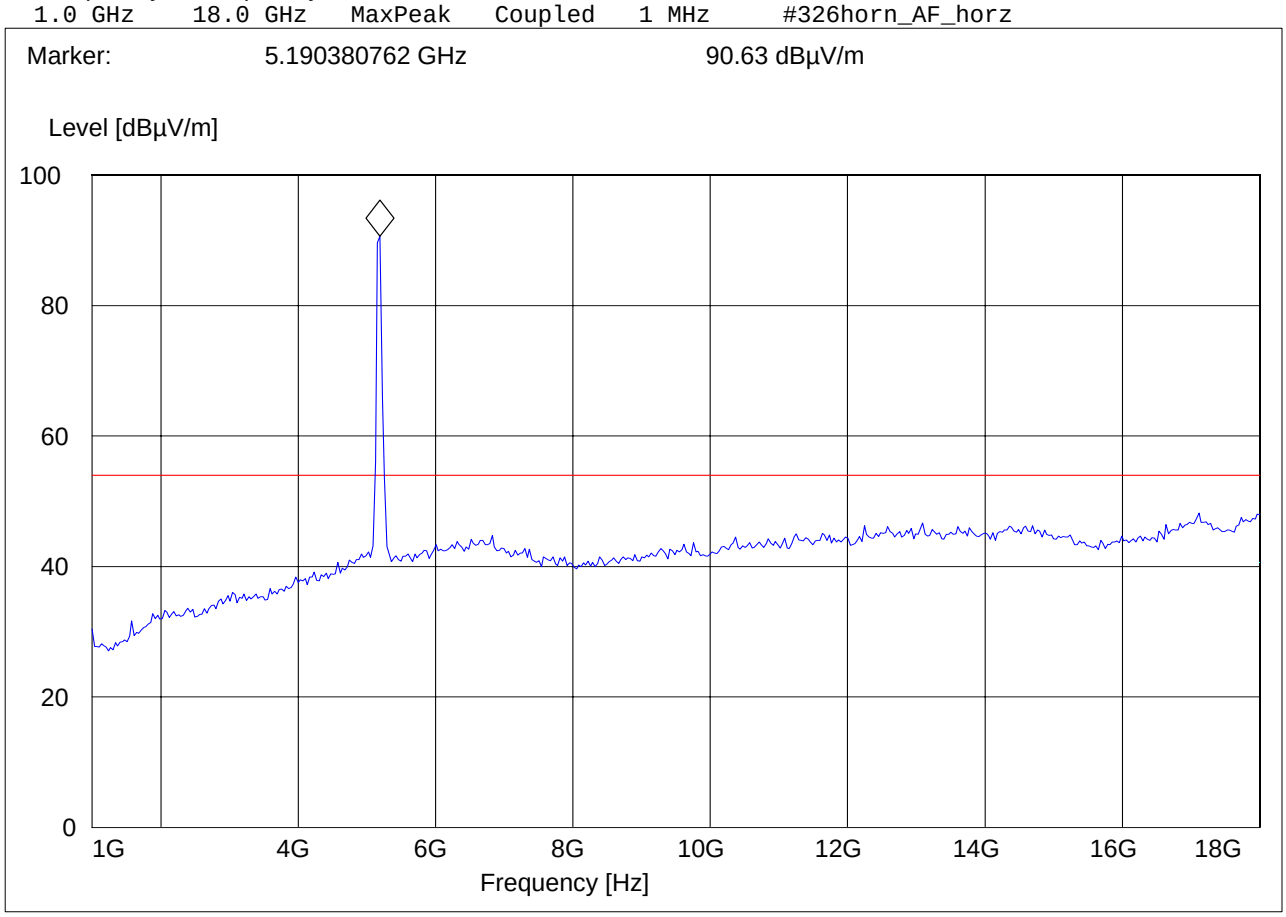
1-18GHz (5190MHz) Chain AB

Note: The peak above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

EUT / Description: 026
Manufacturer: Elektrobit
Operation Mode: 5190 MHz, 40 MHz
ANT Orientation: : H
EUT Orientation:: H
Test Engineer: Satya
Voltage: Power cable
Comments::

SWEEP TABLE: "FCC 15.407 1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



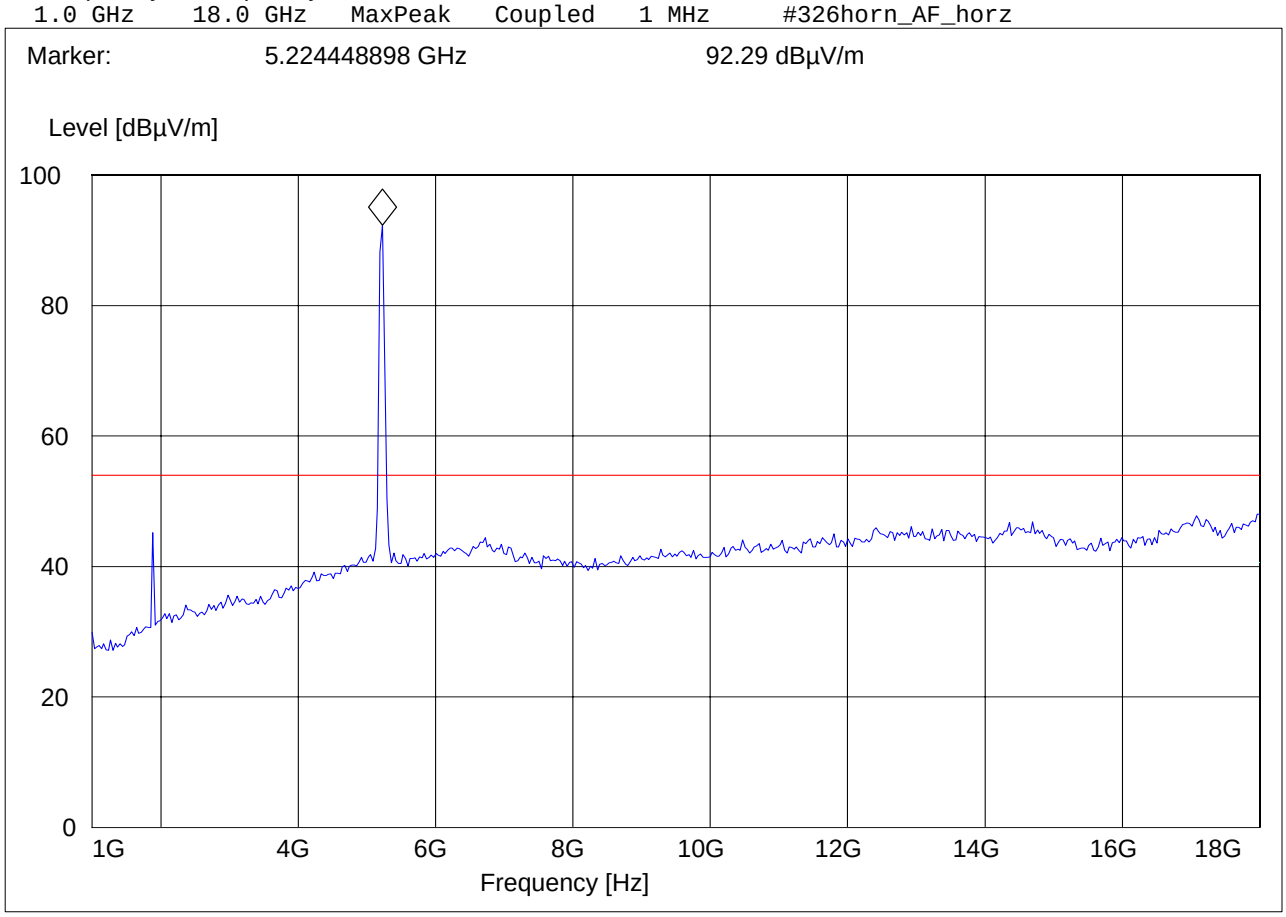
1-18GHz (5230MHz) Chain AB

Note: The peak above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

EUT / Description: 026
Manufacturer: Elektrobit
Operation Mode: 5230 MHz, 40 MHz
ANT Orientation: : H
EUT Orientation:: H
Test Engineer: Satya
Voltage: Power cable
Comments::

SWEEP TABLE: "FCC 15.407 1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



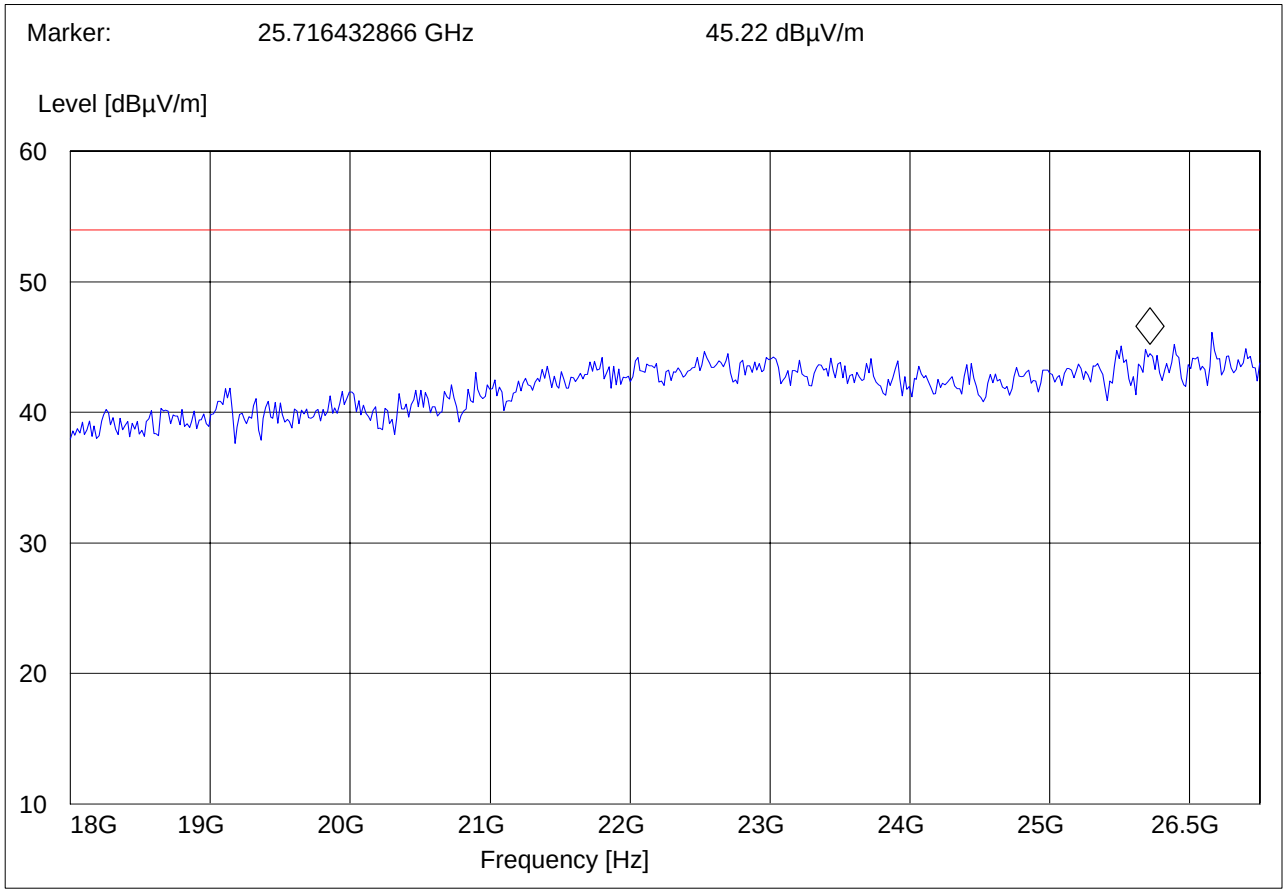
18-26.5GHz Chain AB

Note: Peak Reading vs. Average limit
Note: This plot is valid for low, mid, high channels (worst-case plot).

```
EUT:             026
Customer::       Elektrobit
Test Mode:       5230 MHz; 40 MHz BW
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Satya
Voltage:         Power Cable
Comments:
```

SWEEP TABLE: "FCC15.247_18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak MaxPeak	Coupled	100 kHz	Horn # 3116_18-40G



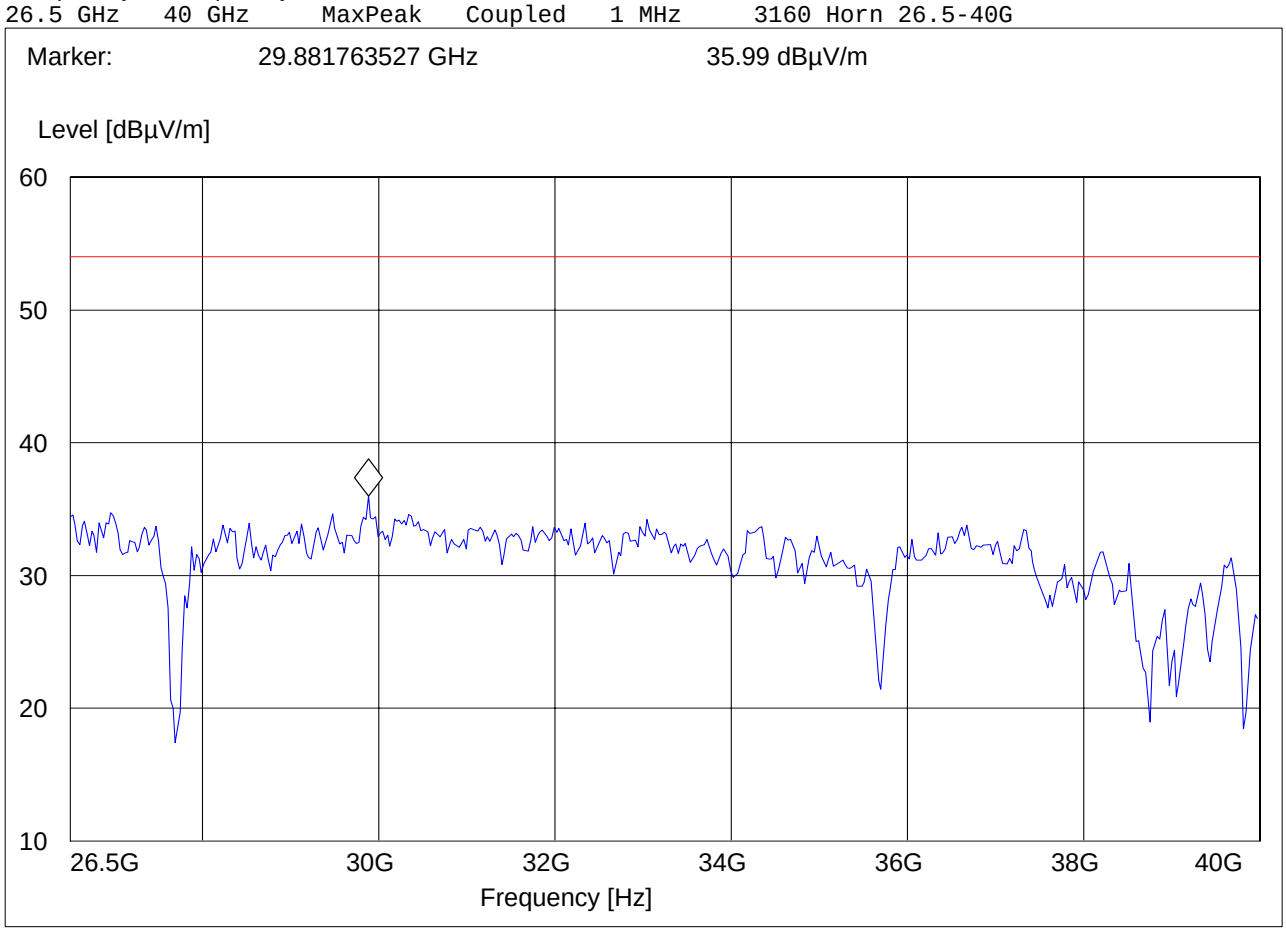
26.5-40GHz Chain AB

Note: This plot is valid for low, mid, high channels (worst-case plot)
Note: Peak Reading vs. Average limit

```
EUT:             026
Customer::       Elektrobit
Test Mode:       5230 MHz; 40 MHz BW
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Satya
Voltage:         Power Cable
Comments:
```

SWEEP TABLE: "FCC 15.407 26.5-40G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
26.5 GHz	40 GHz	MaxPeak	Coupled	1 MHz	3160 Horn 26.5-40G



5.4 Receiver Spurious Emission § 15.209/RSS210

5.4.1 Limits

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

NOTE:
1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit unless specified with the plots.

3. There are no measurable emissions up to 18GHz in Rx mode.

5.4.2 RESULTS 802.11 (na) HT20 MODE Chain AB

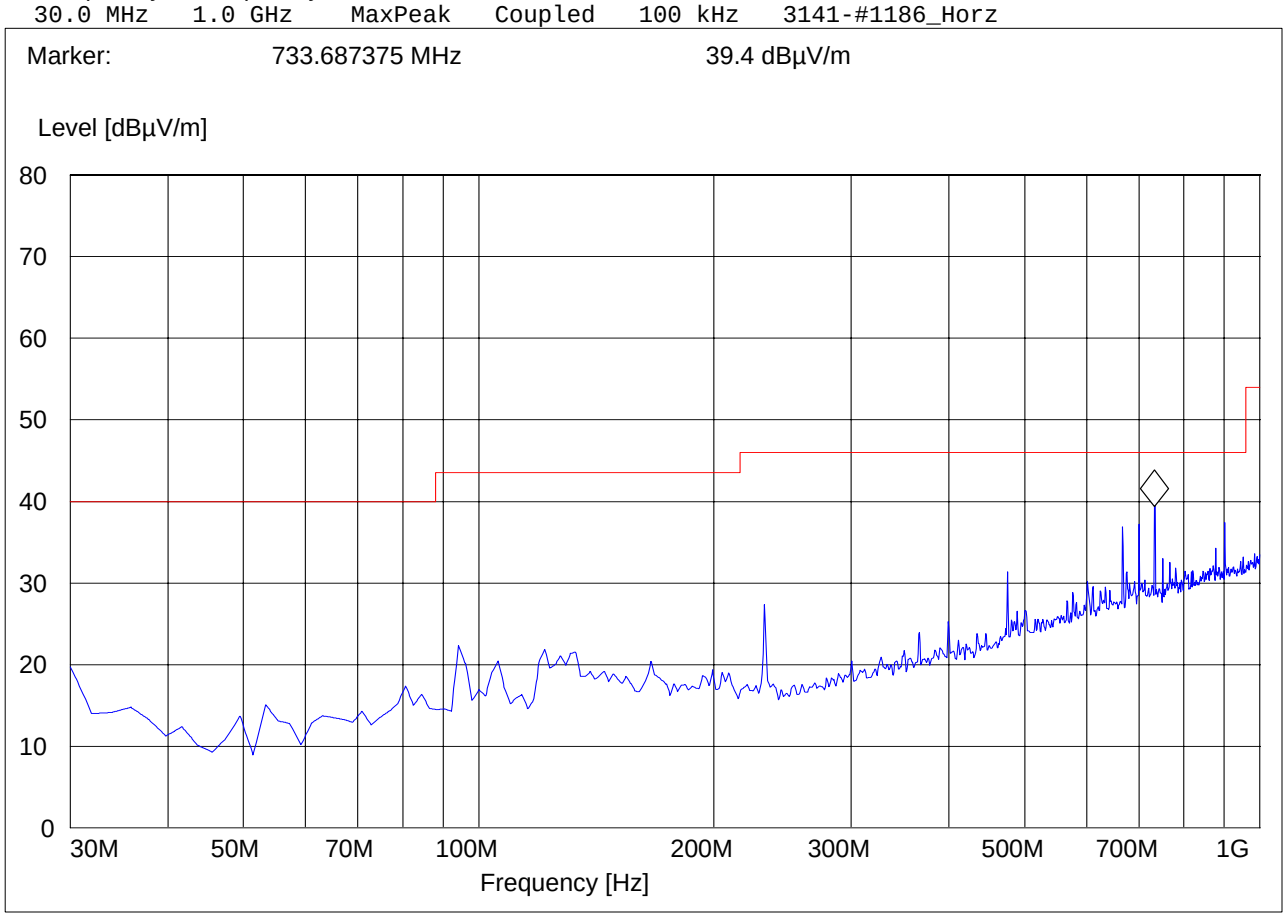
30MHz – 1GHz, Antenna: Horizontal

Note: This plot is valid for low, mid, high channels (worst-case plot).

```
EUT:              026
Customer::        Elektrobit
Test Mode:        RX mode; 20 MHz BW
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Satya
Voltage:          Power Cable
Comments:
```

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



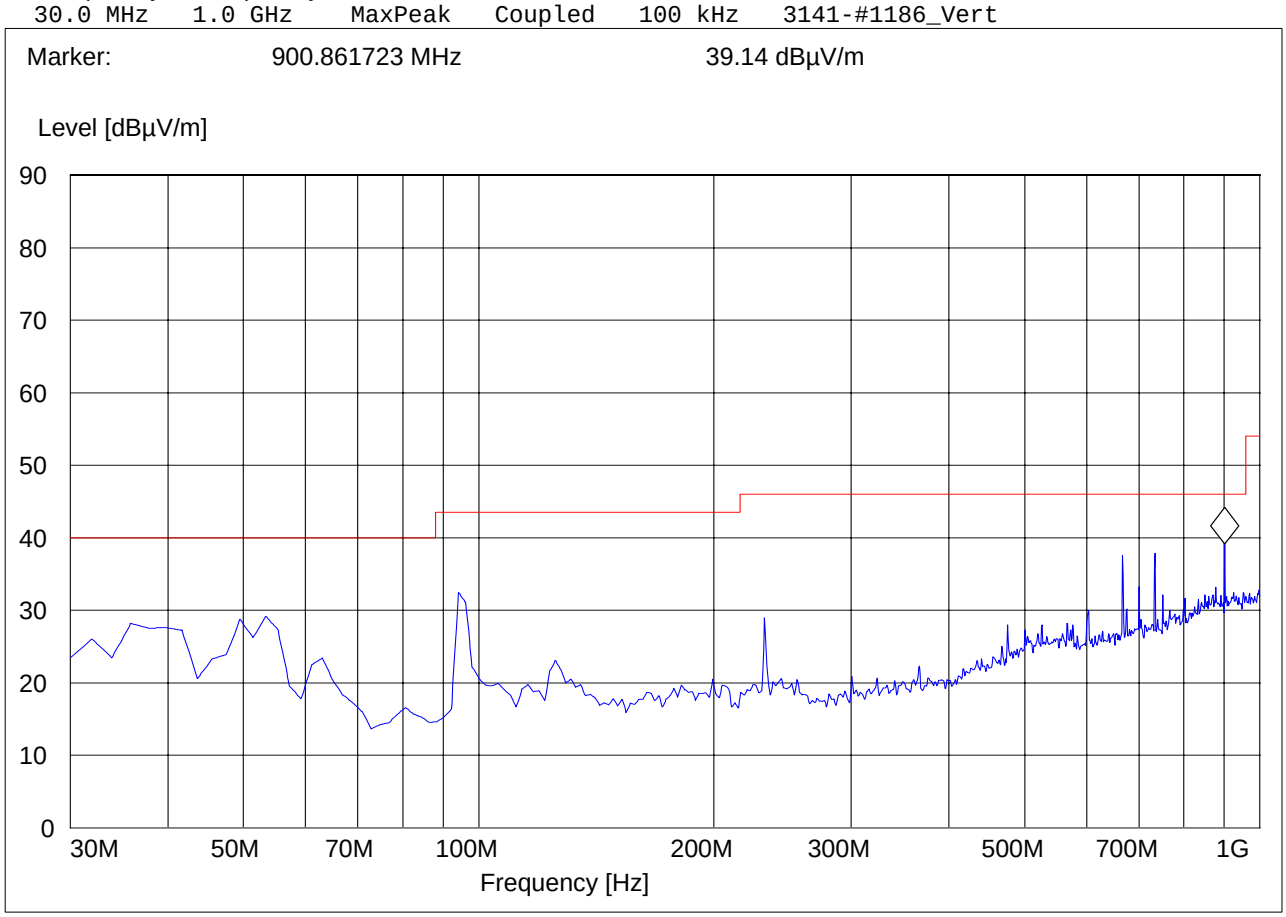
30MHz – 1GHz, Antenna: Vertical

Note: This plot is valid for low, mid, high channels (worst-case plot).

EUT: 026
Customer:: Elektrobit
Test Mode: RX mode; 20 MHz BW
ANT Orientation: V
EUT Orientation: H
Test Engineer: Satya
Voltage: Power Cable
Comments:

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



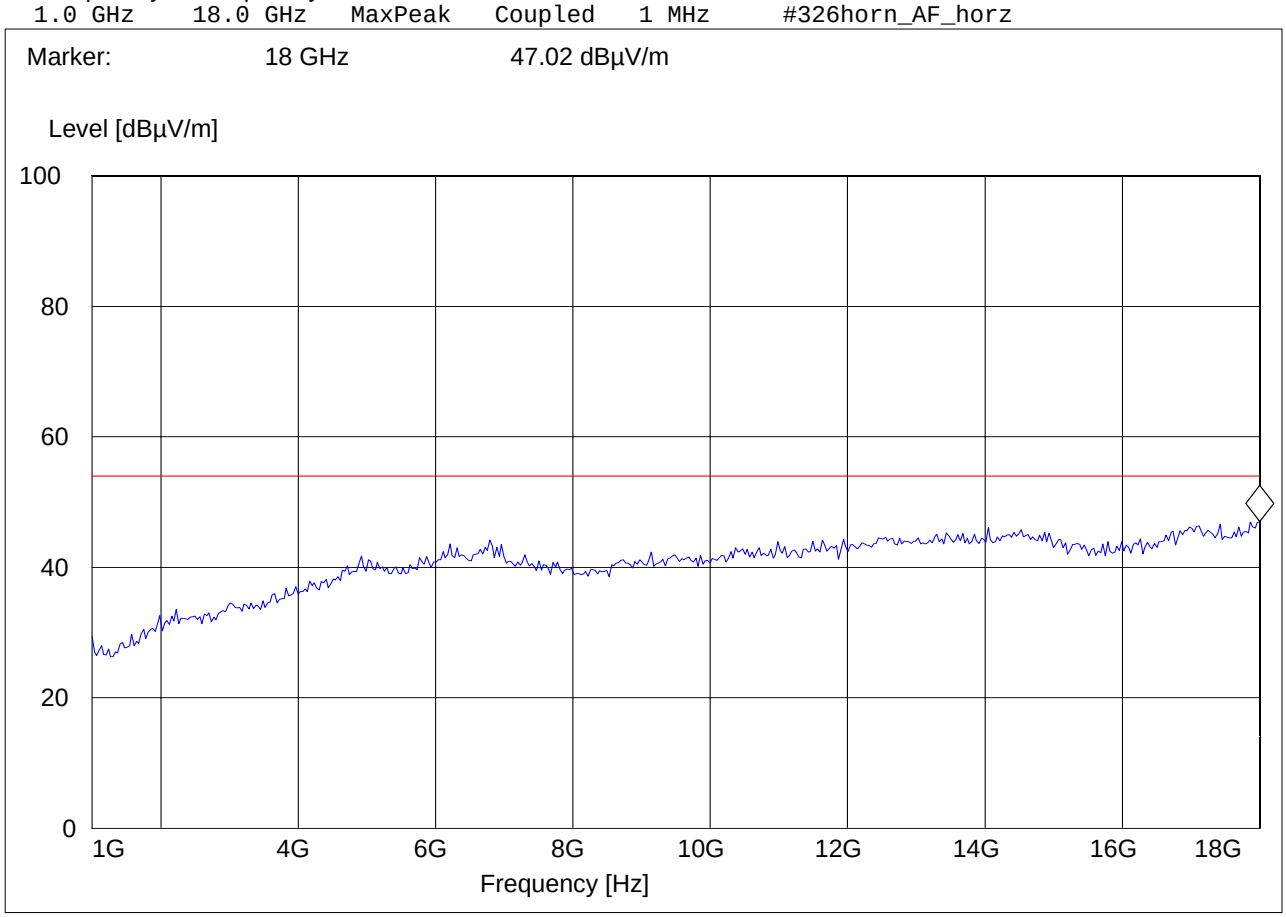
1-18GHz Chain AB

Note: Peak Reading vs. Average limit

```
EUT / Description: 026
Manufacturer:      Elektrobit
Operation Mode:    Ch. 5220, Rx
ANT Orientation: : H
EUT Orientation::  H
Test Engineer:     Chris
Voltage:           Power cable
Comments::
```

SWEEP TABLE: "FCC 15.407 1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



5.4.3 RESULTS 802.11 (na) HT40 MODE Chain AB

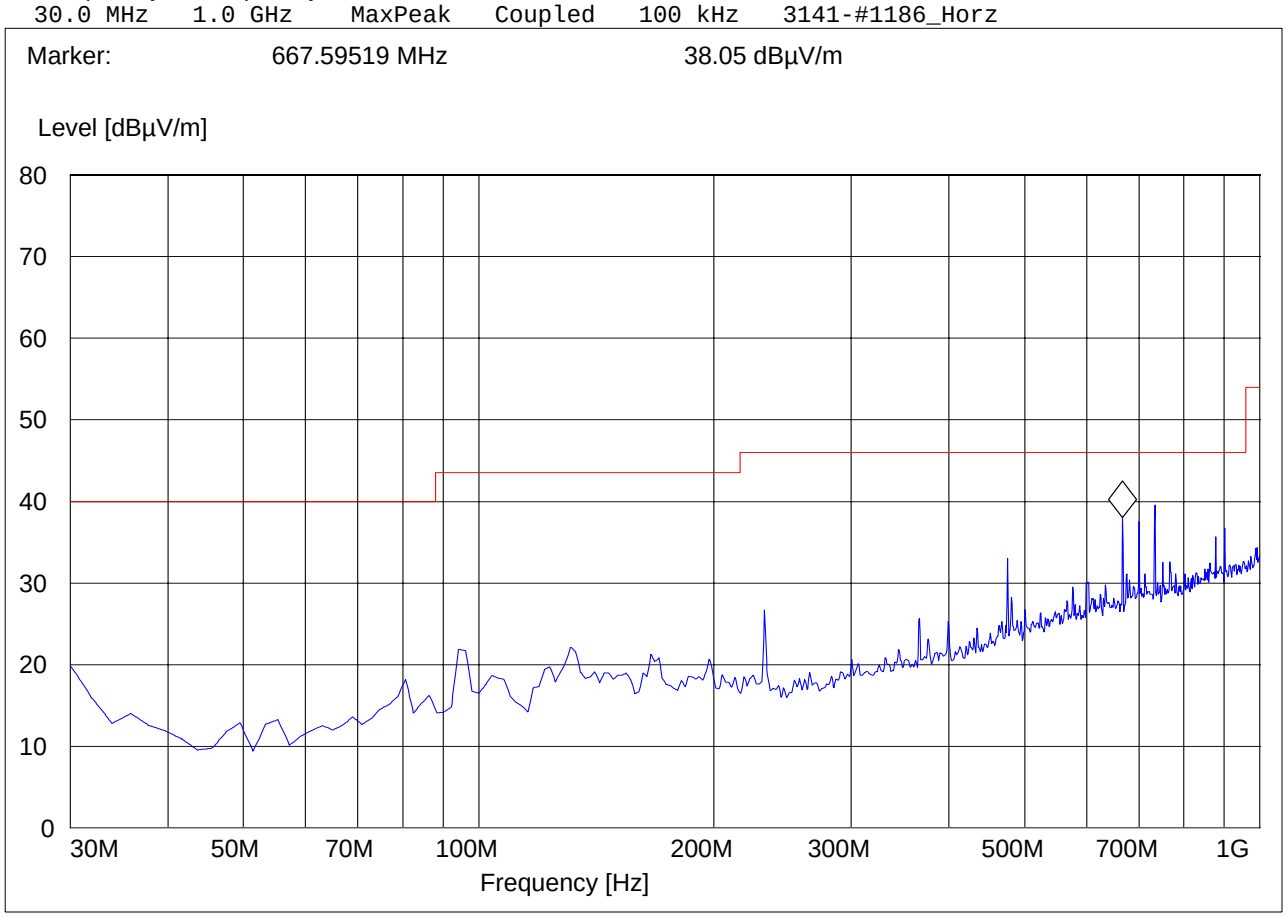
30MHz – 1GHz, Antenna: Horizontal

Note: This plot is valid for low, mid, high channels (worst-case plot).

```
EUT:              026
Customer::        Elektrobit
Test Mode:        RX mode
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Satya
Voltage:          Power Cable
Comments:
```

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



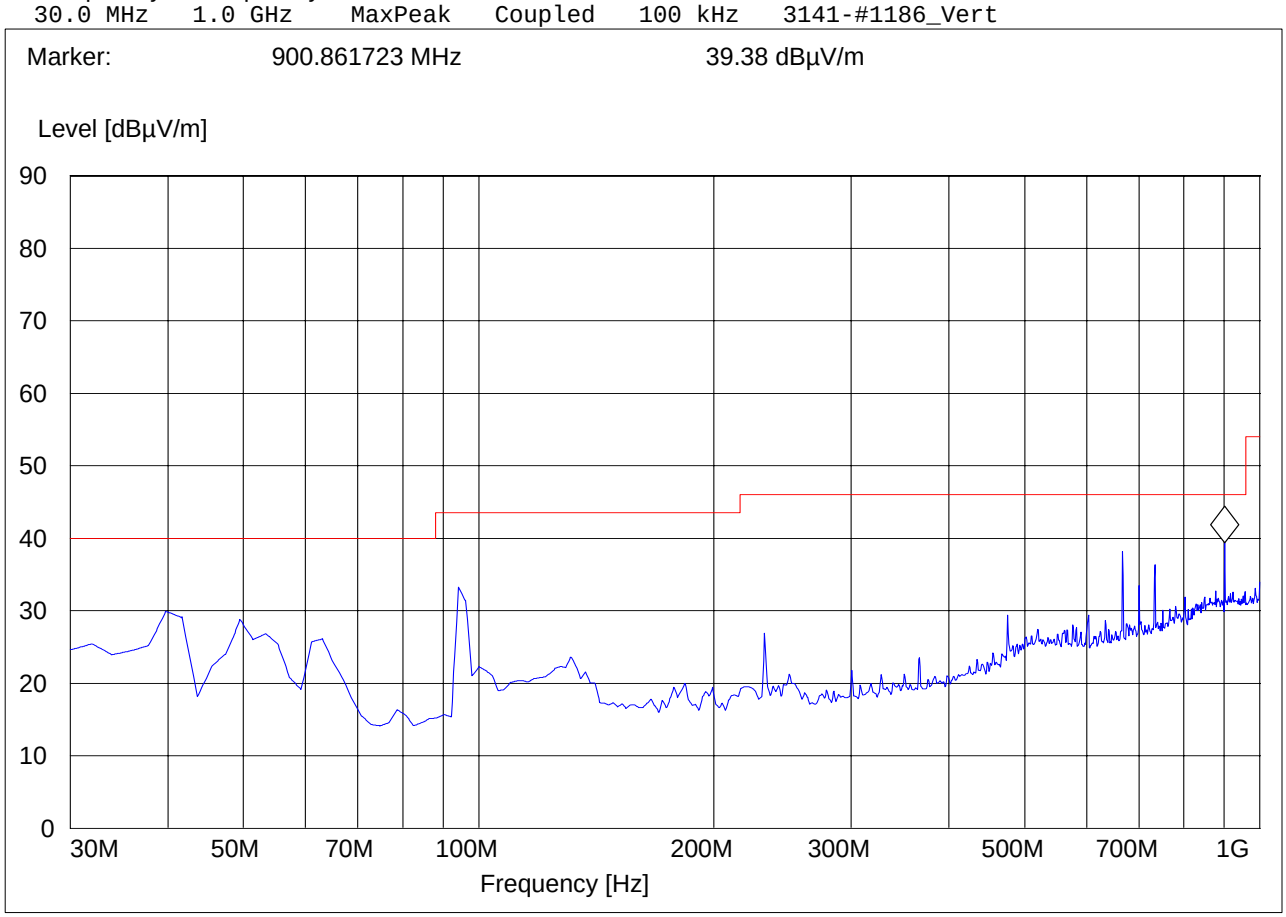
30MHz – 1GHz, Antenna: Vertical

Note: This plot is valid for low, mid, high channels (worst-case plot).

```
EUT:             026
Customer::       Elektrobit
Test Mode:       RX mode
ANT Orientation: V
EUT Orientation: H
Test Engineer:   Satya
Voltage:         Power Cable
Comments:
```

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



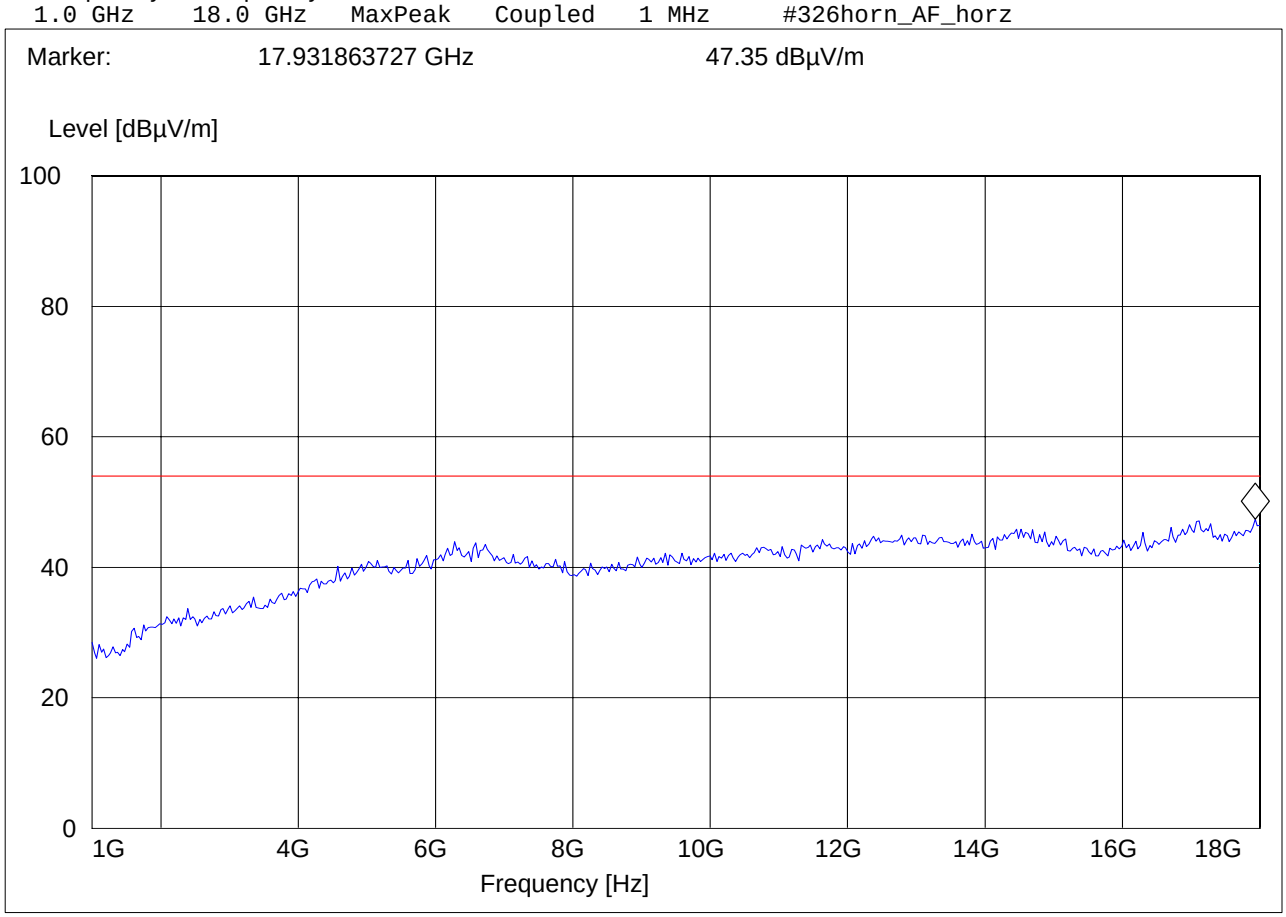
1-18GHz Chain AB

Note: Peak Reading vs. Average limit

```
EUT / Description: 026
Manufacturer:      Elektrobit
Operation Mode:    Rx Mode
ANT Orientation: : H
EUT Orientation::  H
Test Engineer:     Satya
Voltage:           Power cable
Comments::
```

SWEEP TABLE: "FCC 15.407 1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



6 Conducted Measurements

6.1 26dB bandwidth and 99% bandwidth.

6.1.1 Limit

None. Measurement procedure per FCC Public Notice DA02-2138

6.1.2 Measurement Result:

HT20 Mode:

Channel Frequency (MHz)		26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	Chain A	21.76	18.56
	Chain B	22.18	18.01
5220	Chain A	20.40	18.48
	Chain B	21.47	18.33
5240	Chain A	23.28	18.32
	Chain B	20.90	18.46
Min:		**20.40**	**18.01**

HT40 Mode:

Channel Frequency (MHz)		26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5190	Chain A	43.04	36.67
	Chain B	46.79	36.79
5230	Chain A	40.64	36.67
	Chain B	46.79	36.79
Min:		**40.64**	**36.67**

6.2 Conducted Power Measurement

6.2.1 Limit

FCC15.407 (A)(1): maximum conducted power must not exceed the lesser of 50mW (17dBm) or 4dBm+10*log(B), where B is the 26-dB emission bandwidth in MHz.

HT20 Mode: 4dBm + 10*log(20.40) = 17.096dBm > 17dBm. Limit = 17dBm.
HT40 mode: 4dBm + 10*log(40.64) = 20.09dBm > 17dBm. Limit = 17dBm.

RSS-210 (A9.2)(1): maximum conducted power must not exceed the lesser of 200mW (23dBm) or 10dBm+10*log(B), where B is the 99% emission bandwidth in MHz.

HT20 Mode: 10dBm + 10*log(18.01) = 22.56dBm < 23dBm. Limit = 22.56dBm.
HT40 mode: 10dBm + 10*log(36.67) = 25.64dBm > 23dBm. Limit = 23dBm.

6.2.2 Results

The peak conducted power is measured with a power sensor with thermal detector. The EUT is set to transmit at 100% duty cycle and powers from all three transmit ports are measured. The two highest powers measured are reported here. Calculated directional gain of the two transmit port is 5.6dBi and the EUT does not support TPC.

HT20 Mode

Frequency (MHz)	Chain A (dBm)	Chain B (dBm)	Total (dBm)	Margin (dBm)
5180	12.2	11.5	14.9	2.13
5220	12.0	11.4	14.7	2.28
5240	11.8	11.3	14.6	2.44

HT40 Mode

Frequency (MHz)	Chain A (dBm)	Chain B (dBm)	Total (dBm)	Margin (dBm)
5190	12.2	11.5	14.9	2.11
5230	12.1	11.3	14.7	2.26

6.3 Power Spectral Density

6.3.1 Limit

FCC 15.407 (A)(1): peak power spectral density shall not exceed 4 dBm in any 1–MHz band.

Industry Canada: RSS-210 (A9.2)(1) & (A9.5)(2): peak power spectral density shall not exceed 10 dBm in any 1–MHz band.

6.3.2 Results

The peak conducted power is measured with a combiner, spectrum analyzer and method 1 specified in FCC public knowledge DA-02-2138A1. The EUT is set to transmit at 100% duty cycle and powers from the two ports with highest transmit power are measured and reported here. The EUT does not support TPC.

HT20 Mode

Frequency (MHz)	Power Spectral Density (dBm)	Margin (dBm)
5180	3.45	0.55
5220	0.97	3.03
5240	1.97	2.03

HT40 Mode

Frequency (MHz)	Power Spectral Density (dBm)	Margin (dBm)
5190	0.39	3.61
5230	-0.83	4.83

6.4 Peak Excursion

6.4.1 Limit

FCC15.407 (A)(6): The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

6.4.2 Results

The peak conducted power is measured with a spectrum analyzer and method 1 specified in FCC public knowledge DA-02-2138A1. The EUT is set to transmit at 100% duty cycle and powers from all three transmit ports are measured. The two highest powers measured are reported here. The EUT does not support TPC.

HT20 Mode

Frequency (MHz)	Chain A (dBm)	Chain B (dBm)	Margin (dBm)
5180	9.47	10.94	2.06
5220	9.80	9.77	3.20
5240	9.88	9.75	3.12

HT40 Mode

Frequency (MHz)	Chain A (dBm)	Chain B (dBm)	Margin (dBm)
5190	10.35	10.74	2.26
5230	10.26	10.65	2.35

6.5 Conducted Spurious Emission

6.5.1 Limit

As specified in 15.407 (b)(1)(2)(3)(4) and RSS-210 (A9.3)(1)(2)(3)(4).

6.5.2 Results:

Measurement conducted on Chain A with worse case power output. 30M-1GHz emissions are measured in HT20 mode which has worse case power output comparing with HT40 mode.

No measurable emission over the limit. See plots for details.

6.6 AC Power Line Conducted Emissions § 15.107/207

6.6.1 LIMITS

Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)

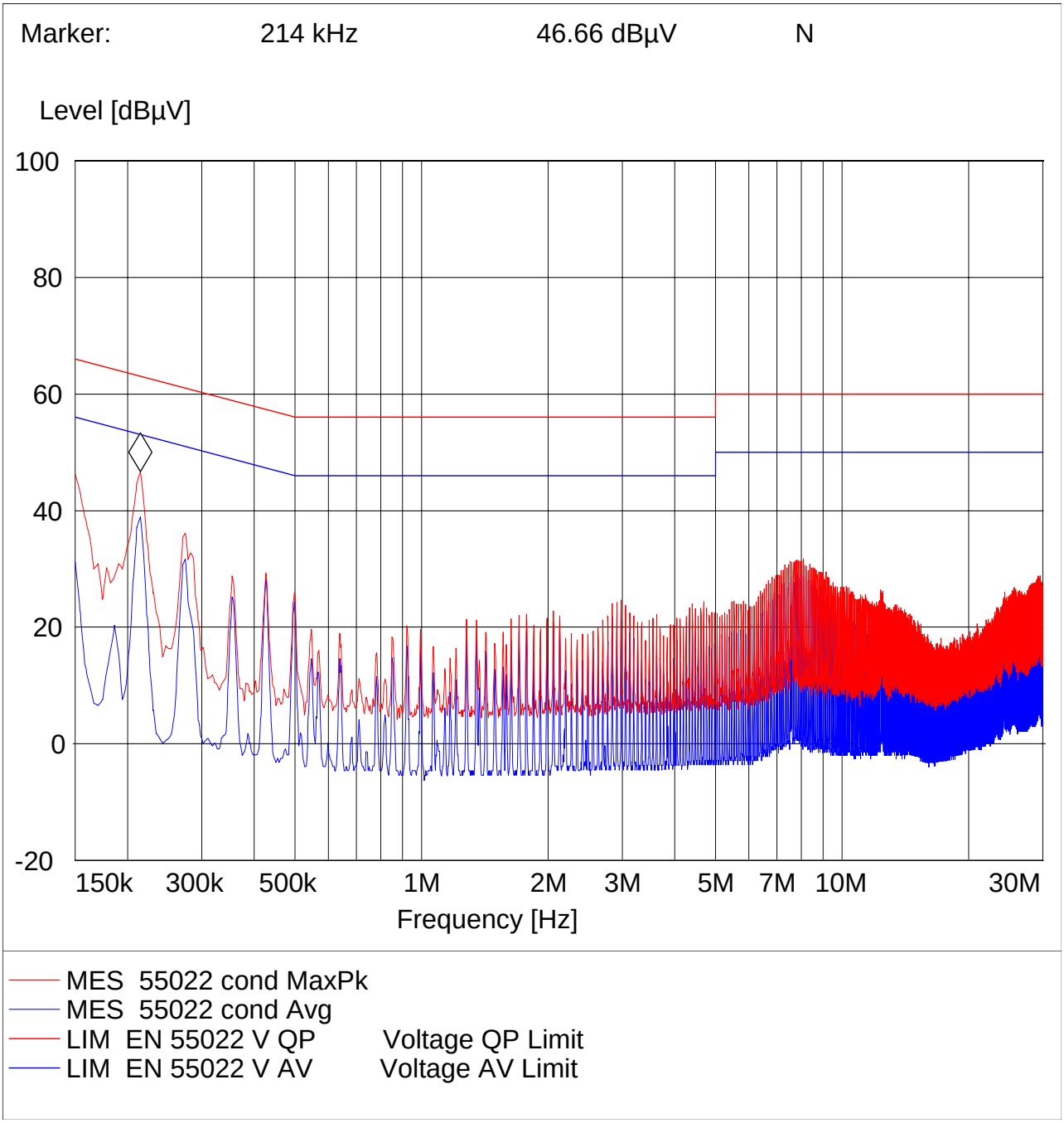
Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz

6.6.2 RESULTS 802.11na HT20 Mode

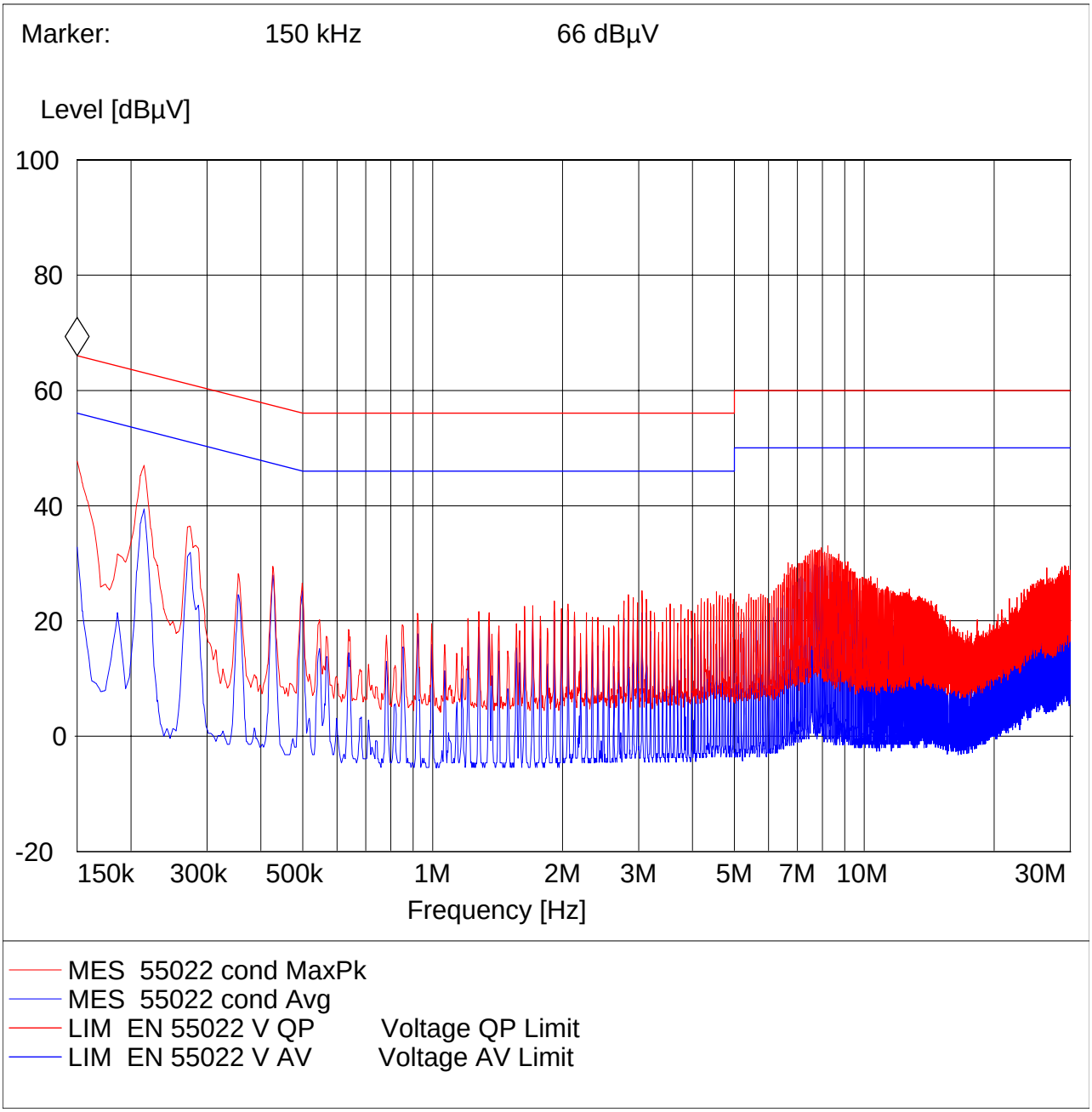
Line:

```
EUT:               026
Manufacturer:      Elektrobit
Test Mode:         Ch. 5220
ANT Orientation:: Conducted
EUT Orientation:: H
Test Engineer::    Chris
Power Supply: :    Power Cable
Comments:  :       LINE
```



Neutral:

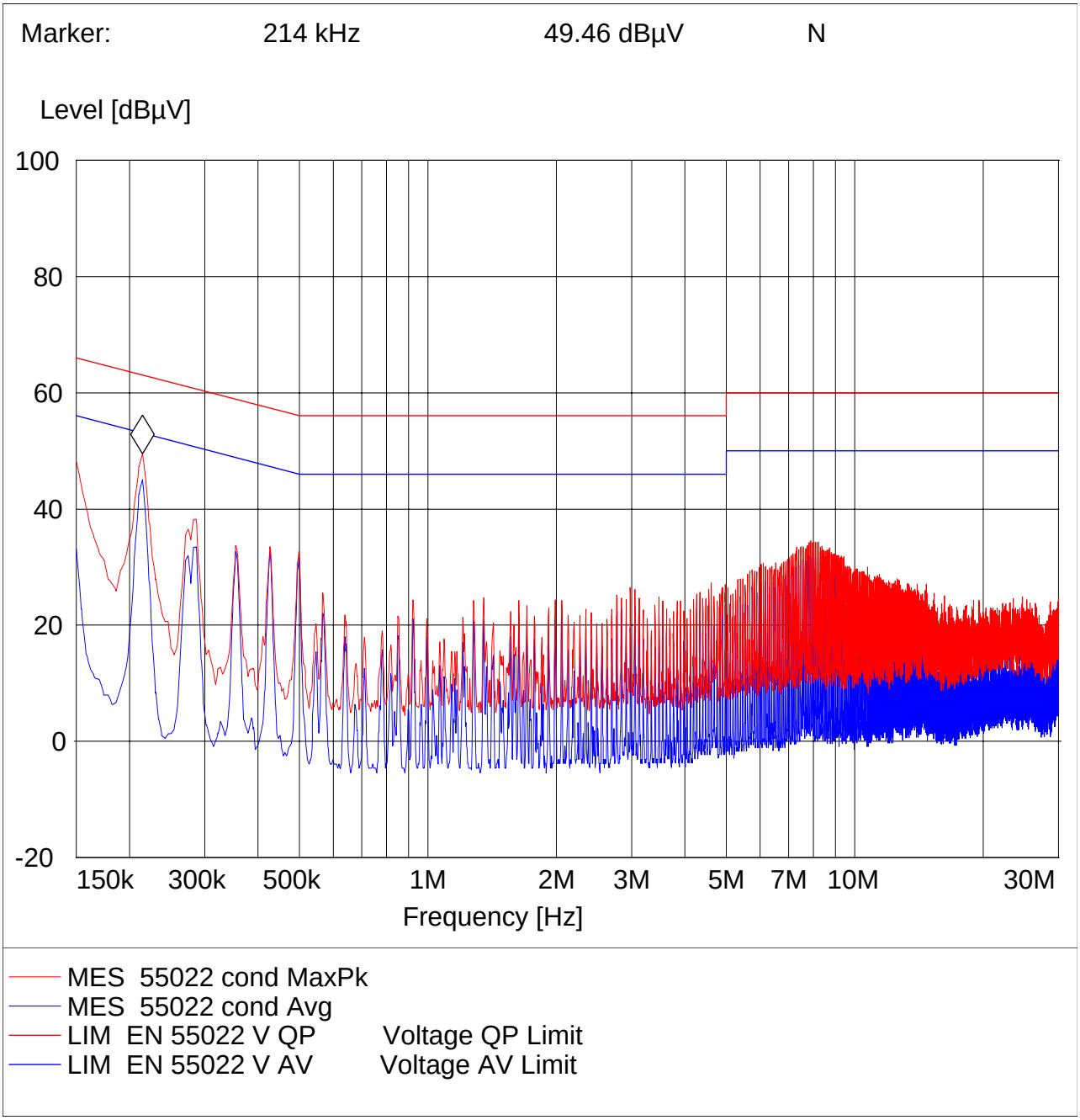
```
EUT:               026
Manufacturer:      Elektrobit
Test Mode:         Ch. 5220
ANT Orientation:: Conducted
EUT Orientation:: H
Test Engineer::    Chris
Power Supply: :    Power Cable
Comments:  :       NEUTRAL
```



6.6.3 RESULTS 802.11na HT20 Mode

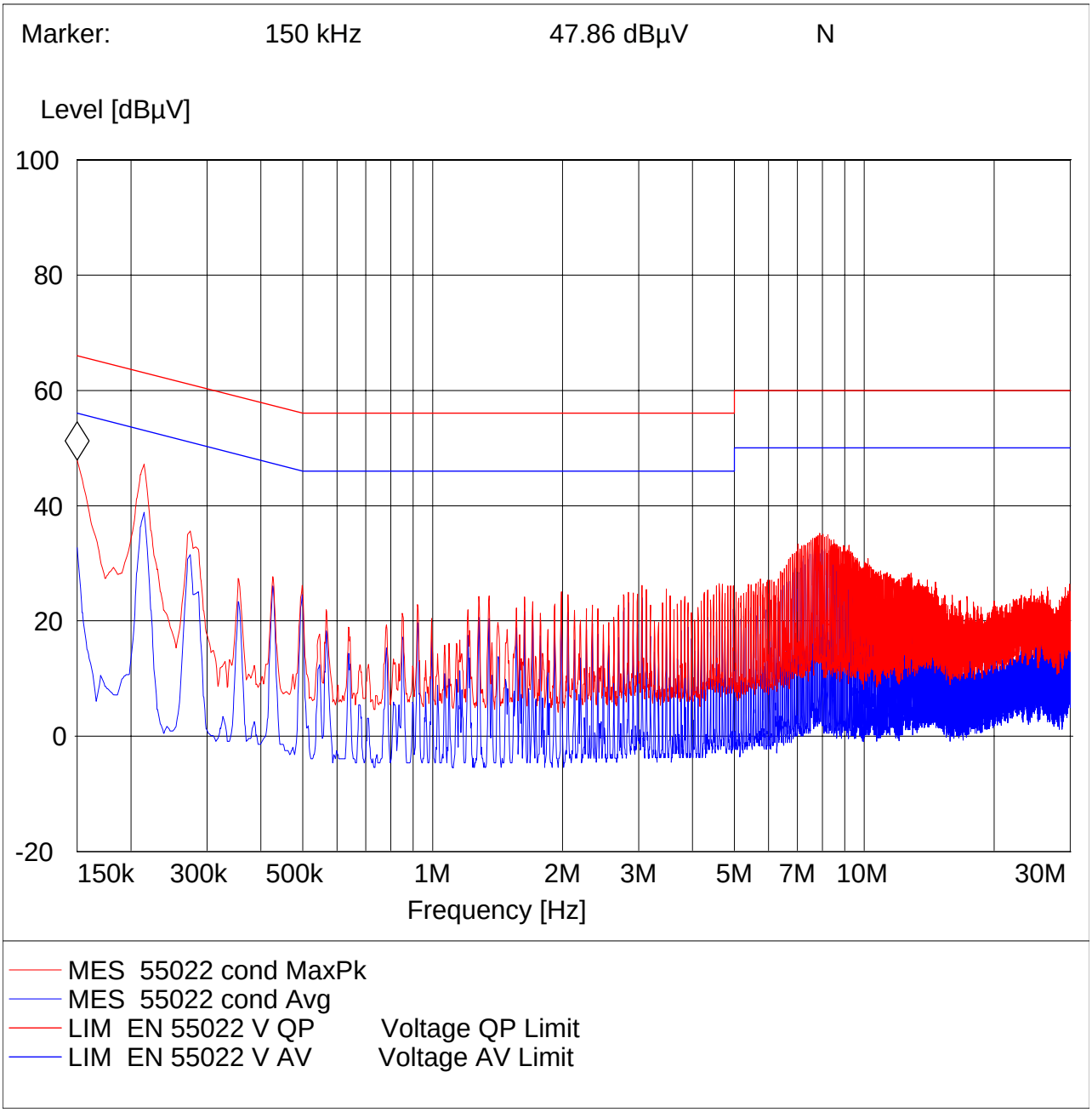
Line:

```
EUT:               026
Manufacturer:      Elektrobit
Test Mode:         5190 MHz; 40 MHz Bandwidth
ANT Orientation:: Conducted
EUT Orientation:: H
Test Engineer::    Satya
Power Supply: :    Power Cable
Comments:  :       Line
```



Neutral:

```
EUT:               026
Manufacturer:      Elektrobit
Test Mode:         40 MHz Bandwidth; 5190 MHz
ANT Orientation:: Conducted
EUT Orientation:: H
Test Engineer::    Satya
Power Supply: :    Power Cable
Comments:  :       Neutral
```

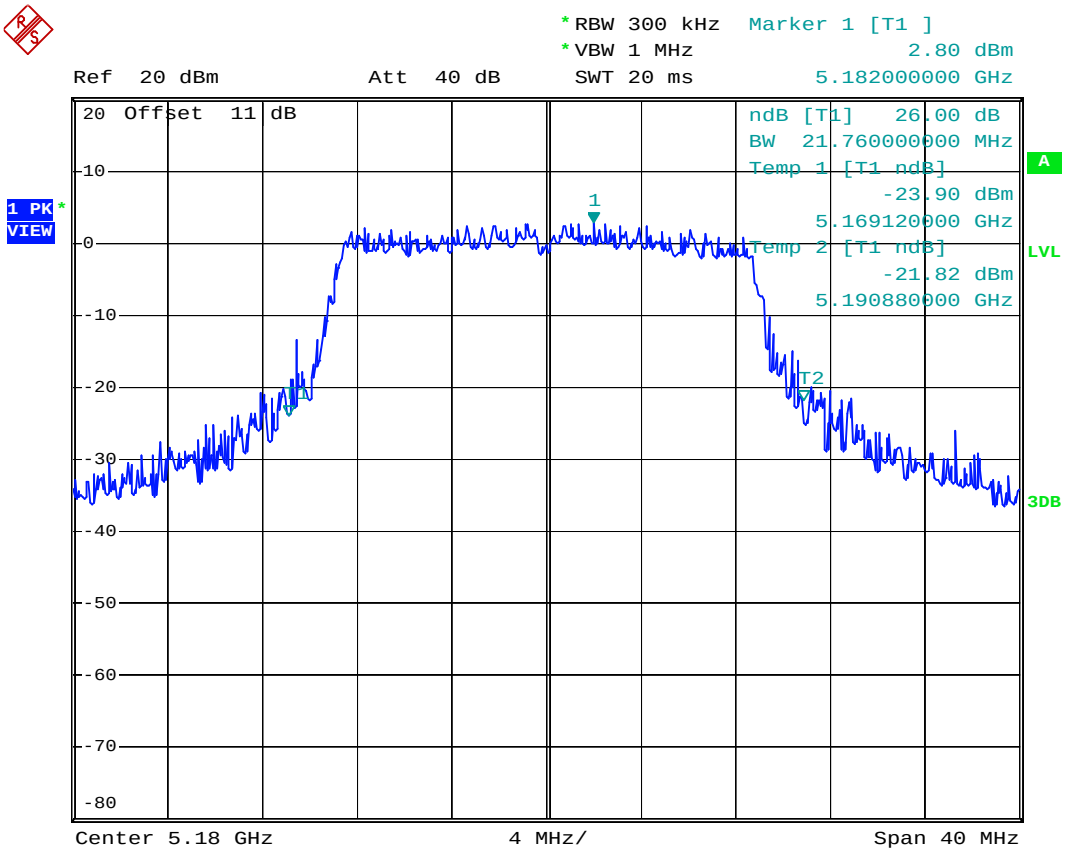


6.7 Conducted Measurement Plots

6.7.1 26dB Bandwidth

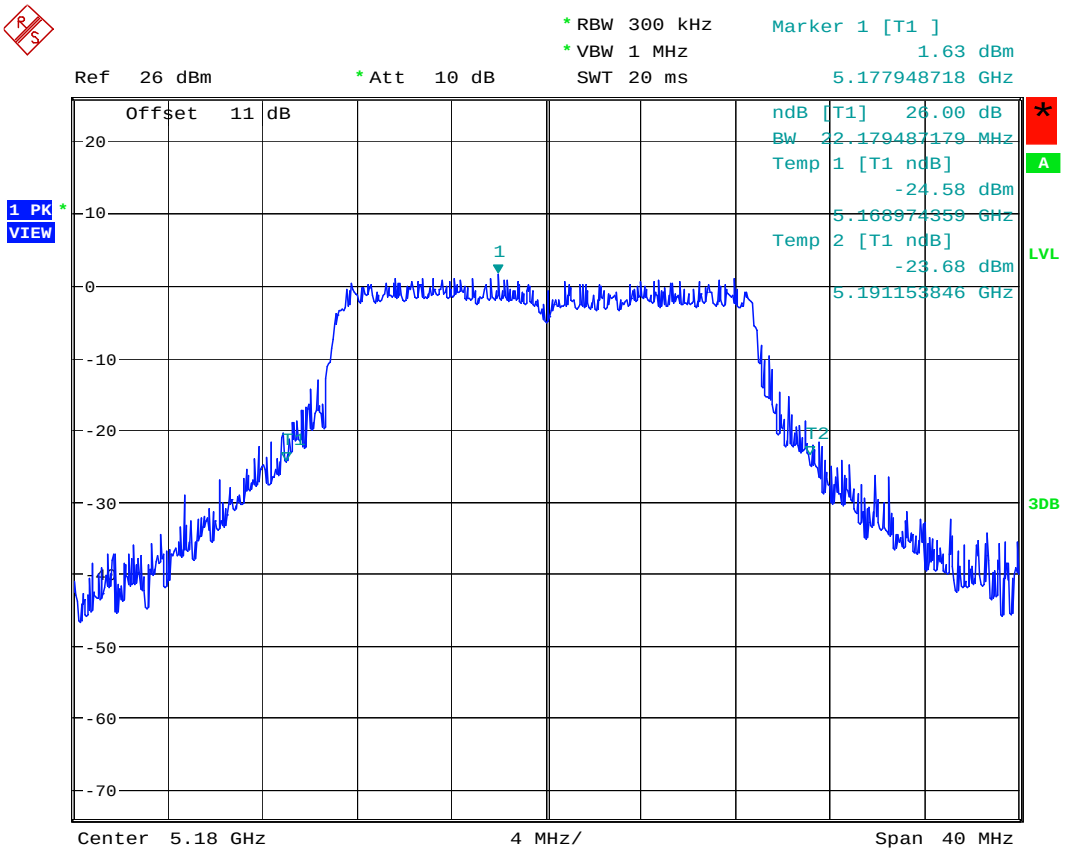
6.7.1.1 802.11na HT20 Mode

5180MHz Chain A



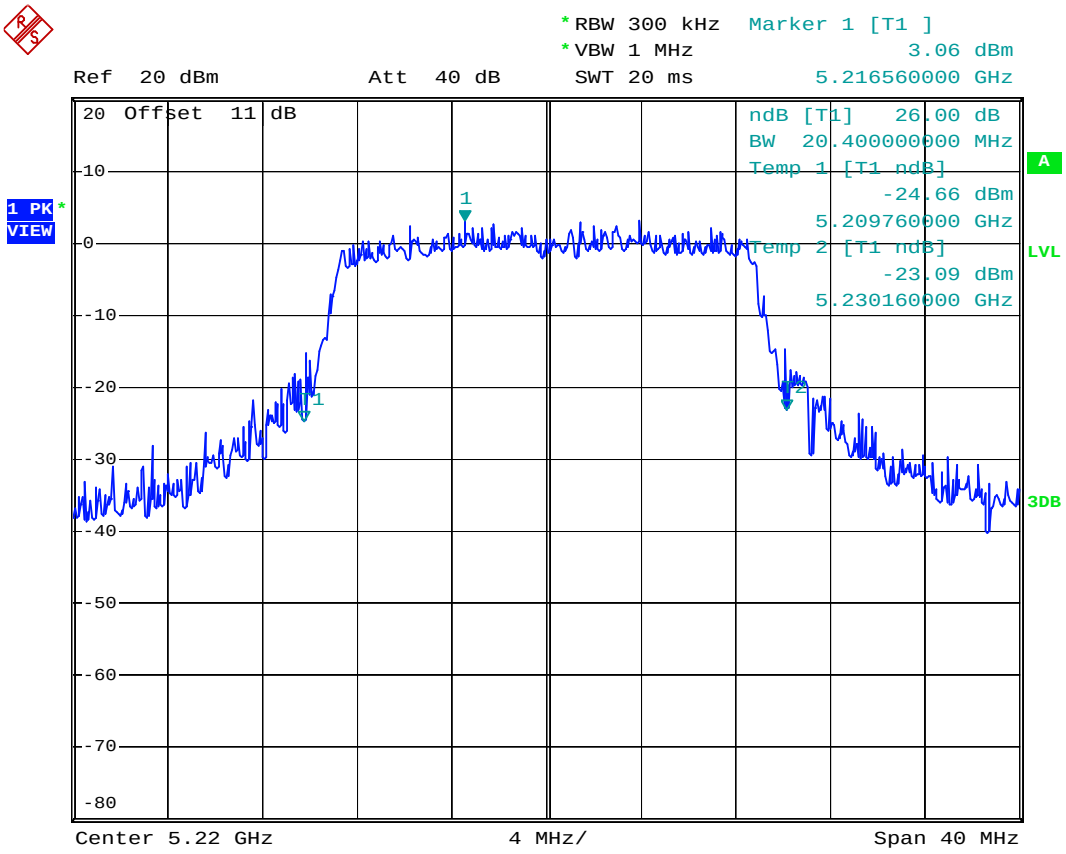
Date: 13.MAR.2008 23:27:27

5180MHz Chain B



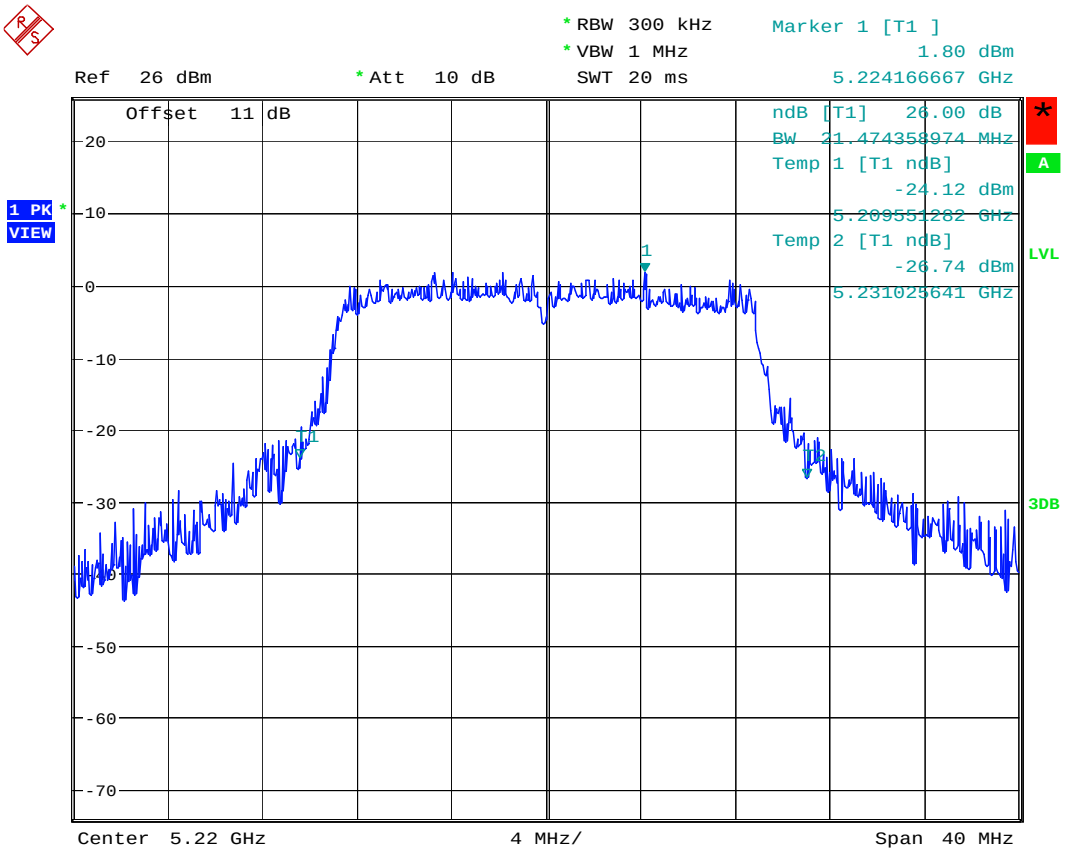
Date: 13.MAR.2008 14:29:18

5220MHz Chain A



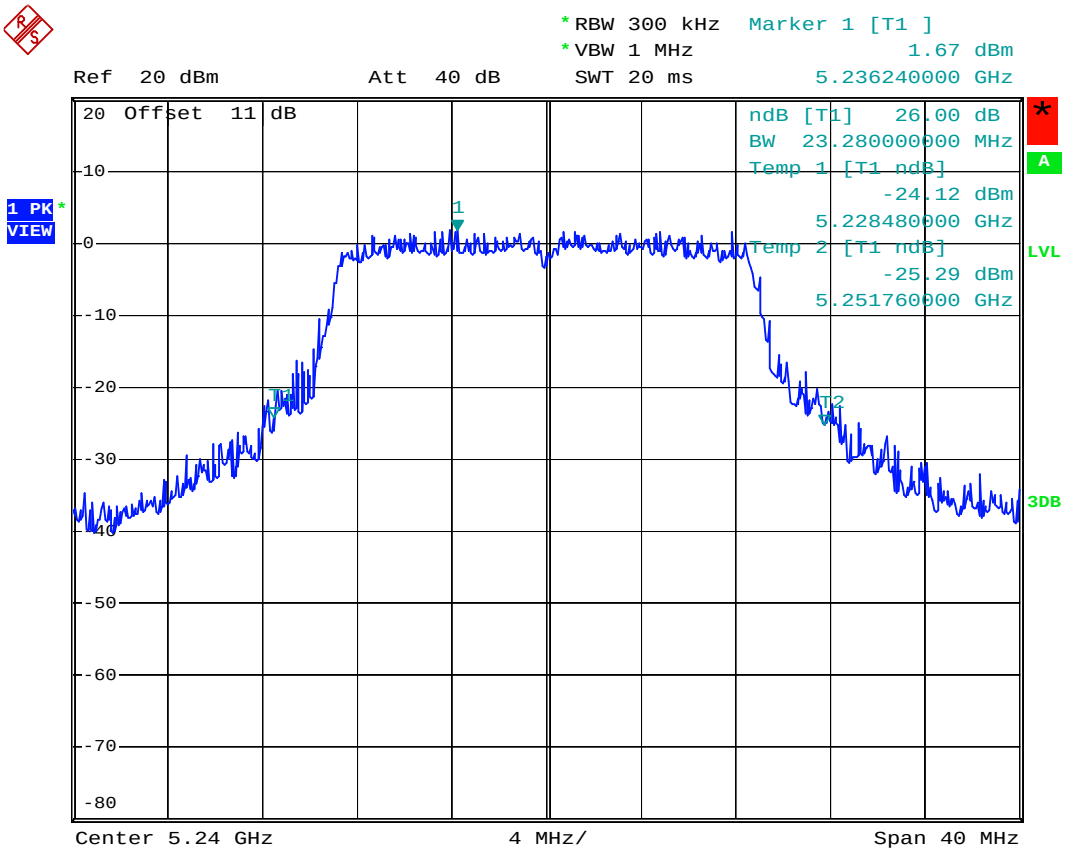
Date: 13.MAR.2008 23:28:23

5220MHz Chain B



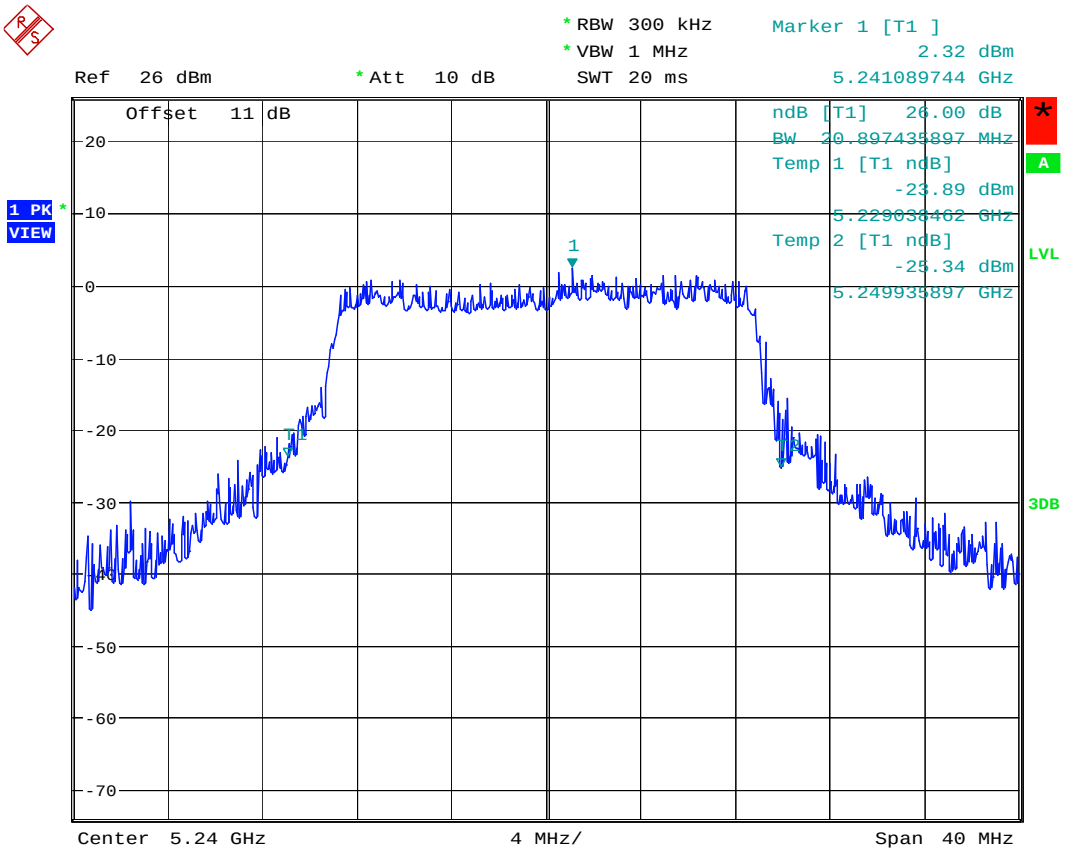
Date: 13.MAR.2008 14:28:35

5240MHz Chain A



Date: 13.MAR.2008 23:29:12

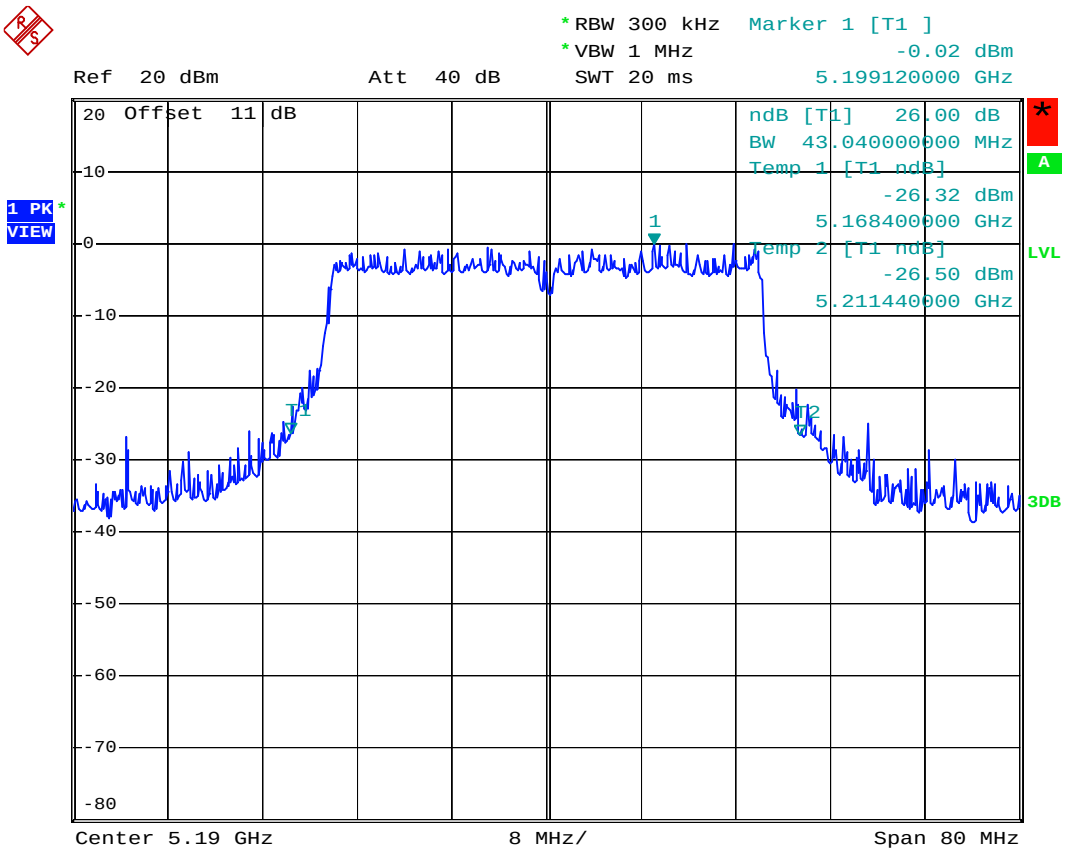
5240MHz Chain B



Date: 13.MAR.2008 14:27:53

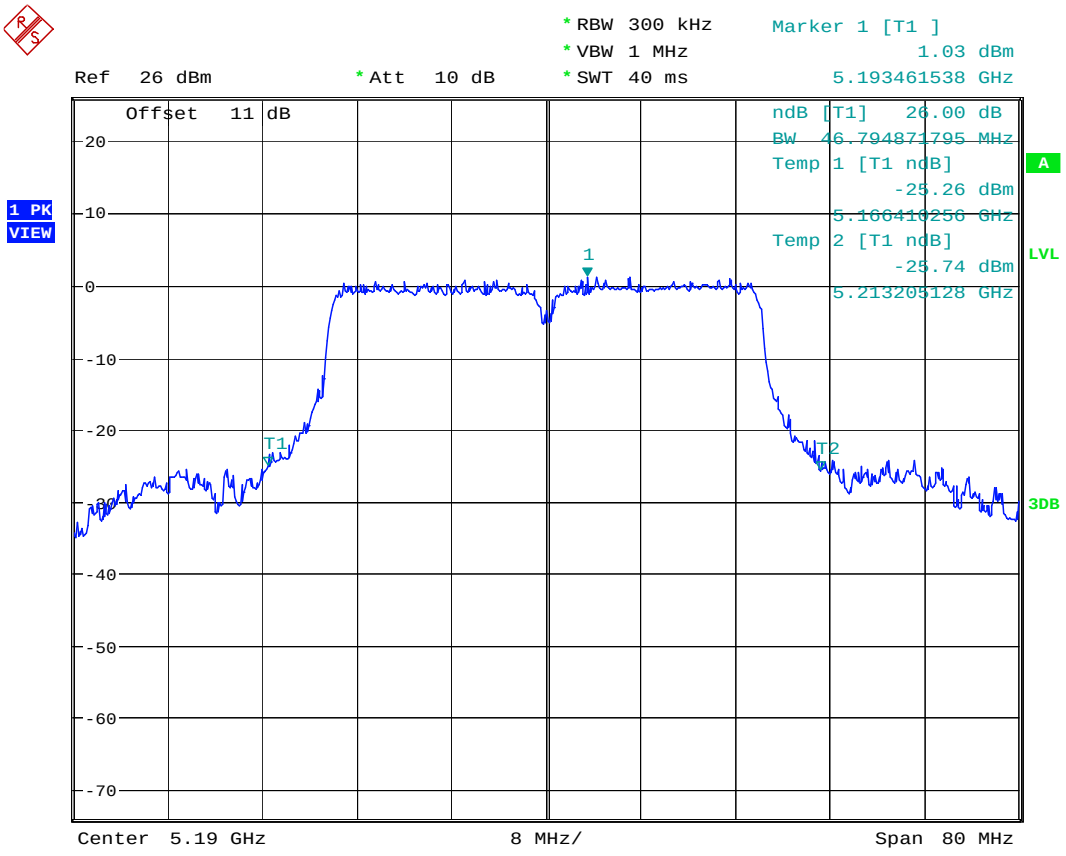
6.7.1.2 802.11na HT40 Mode

5190MHz Chain A



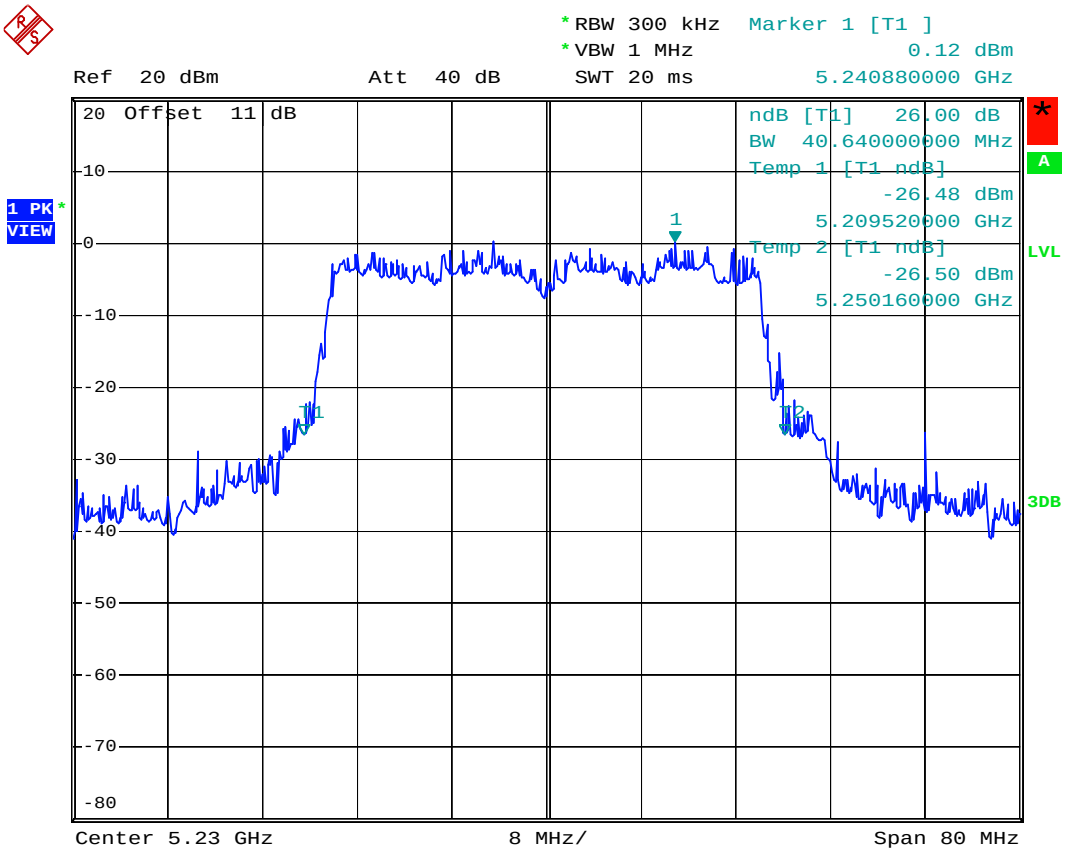
Date: 13.MAR.2008 23:33:50

5190MHz Chain B



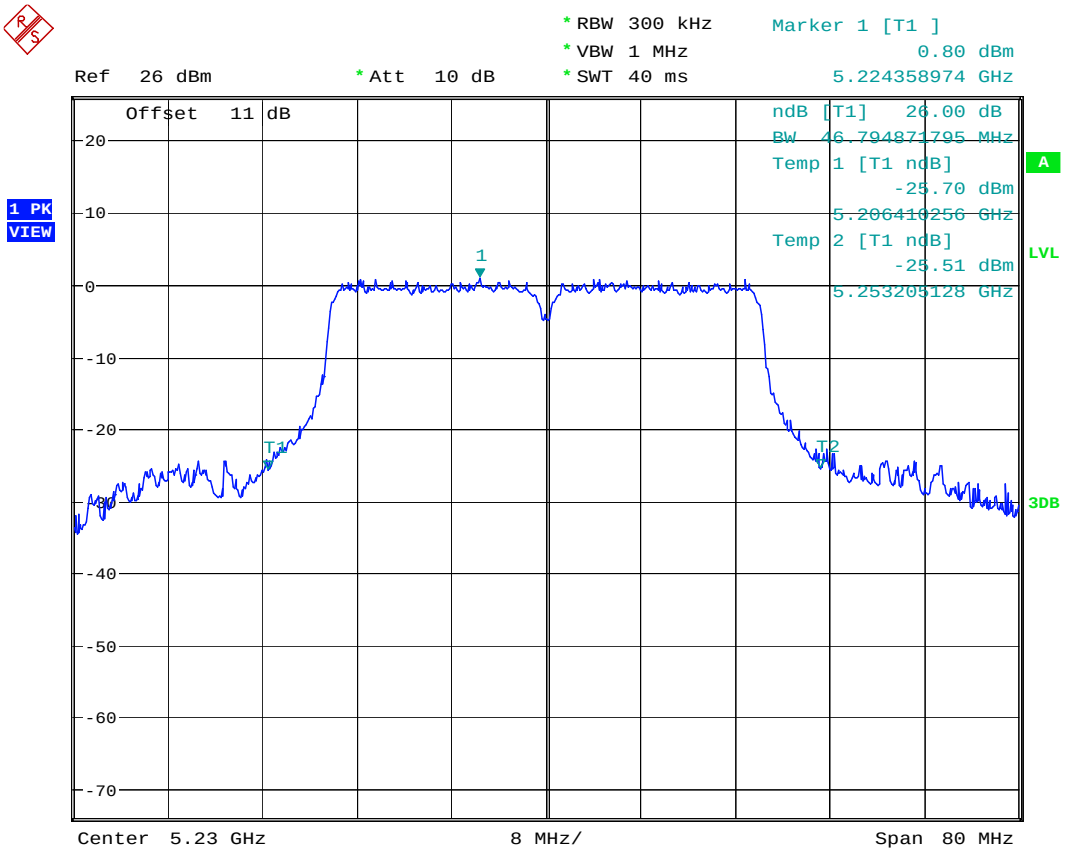
Date: 24.MAR.2008 13:26:08

5230MHz Chain A



Date: 13.MAR.2008 23:34:55

5230MHz Chain B

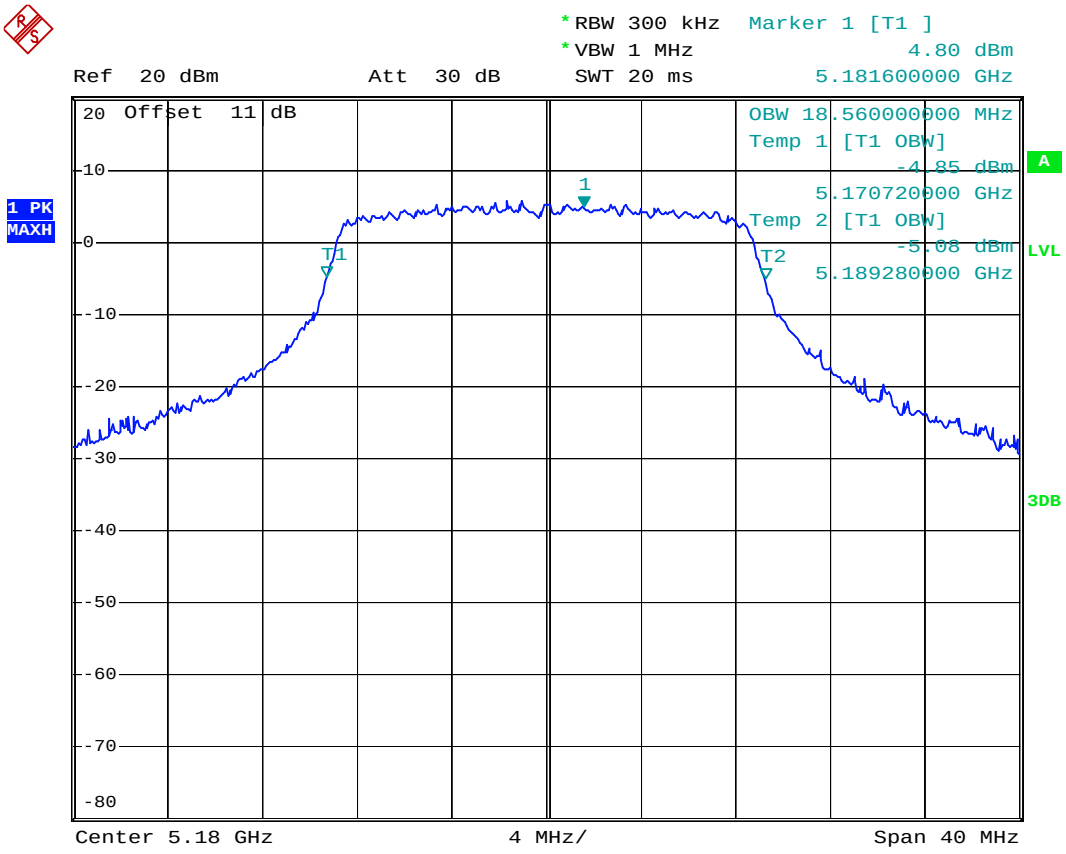


Date: 24.MAR.2008 13:24:06

6.7.2 99% Bandwidth

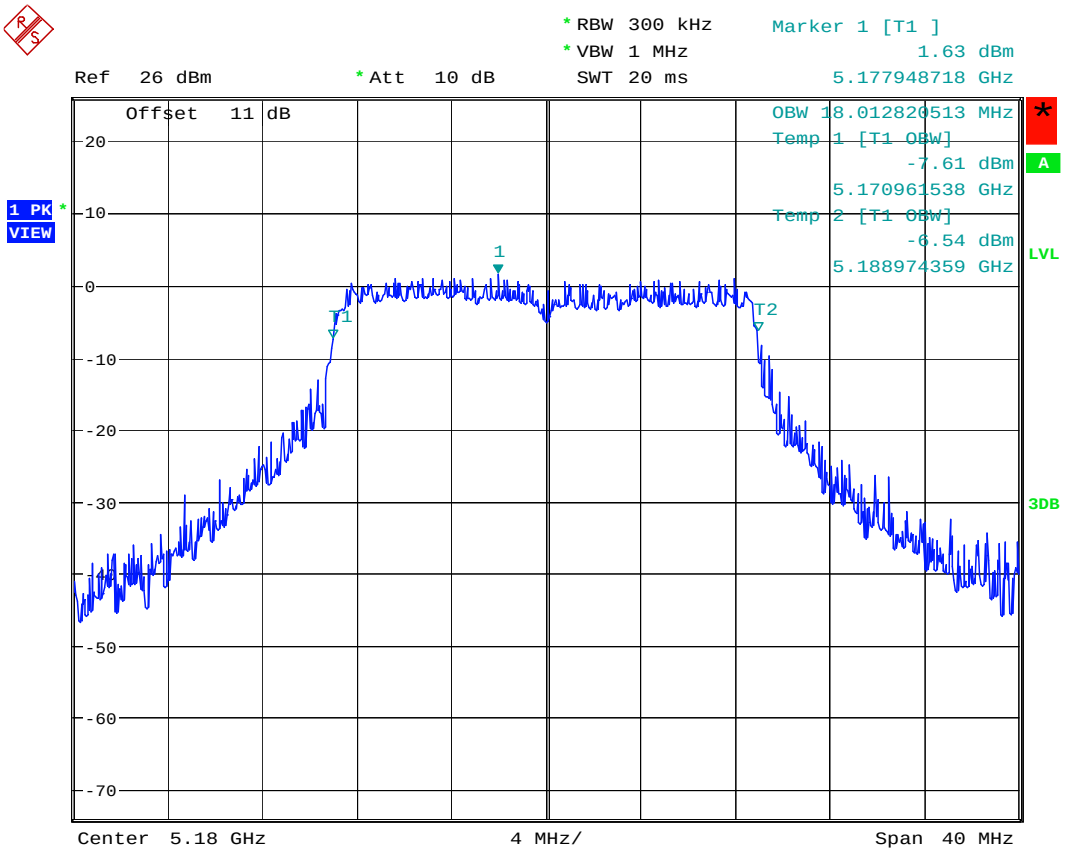
6.7.2.1 802.11na HT20 mode

5180MHz Chain A



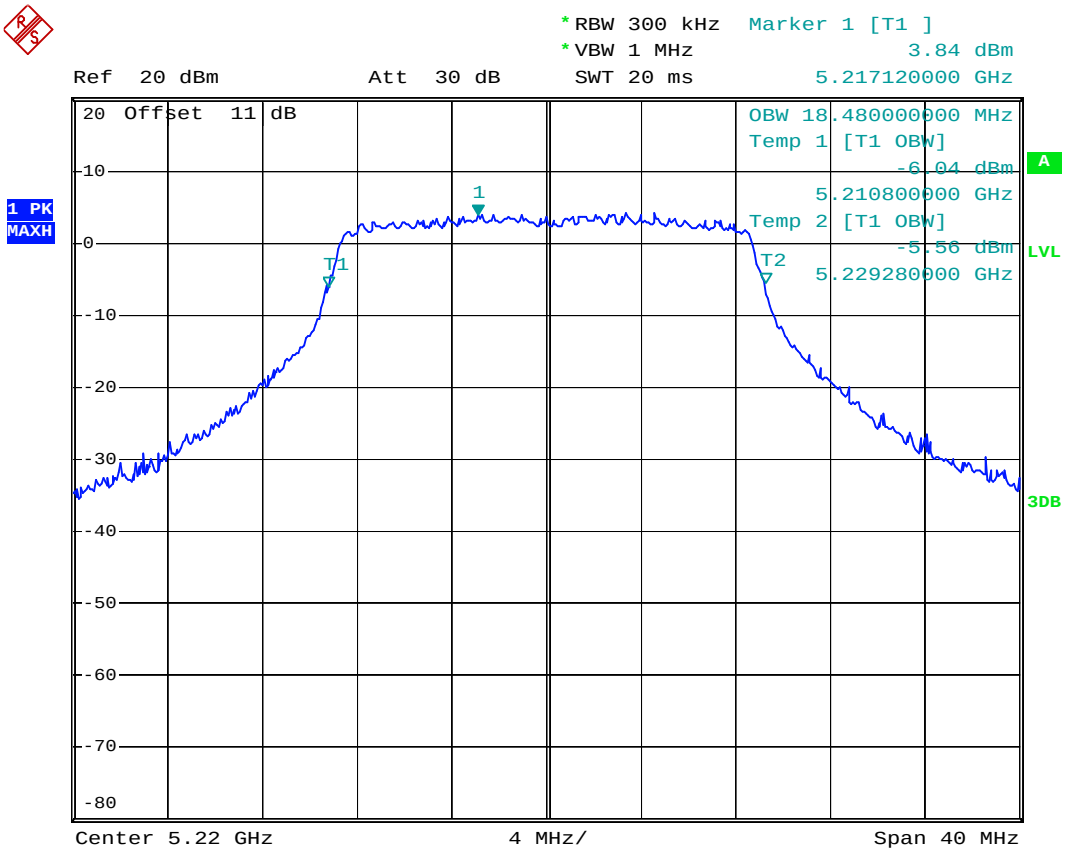
Date: 13.MAR.2008 23:19:03

5180MHz Chain B



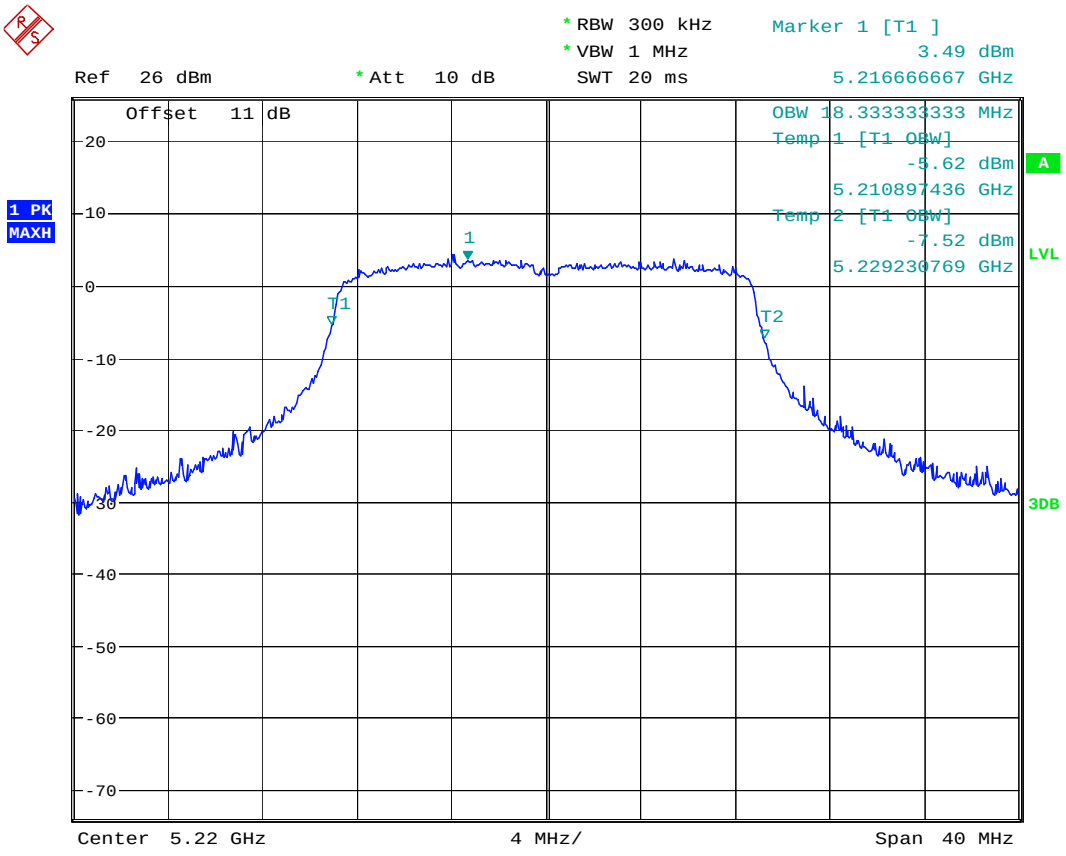
Date: 13.MAR.2008 14:31:19

5220MHz Chain A



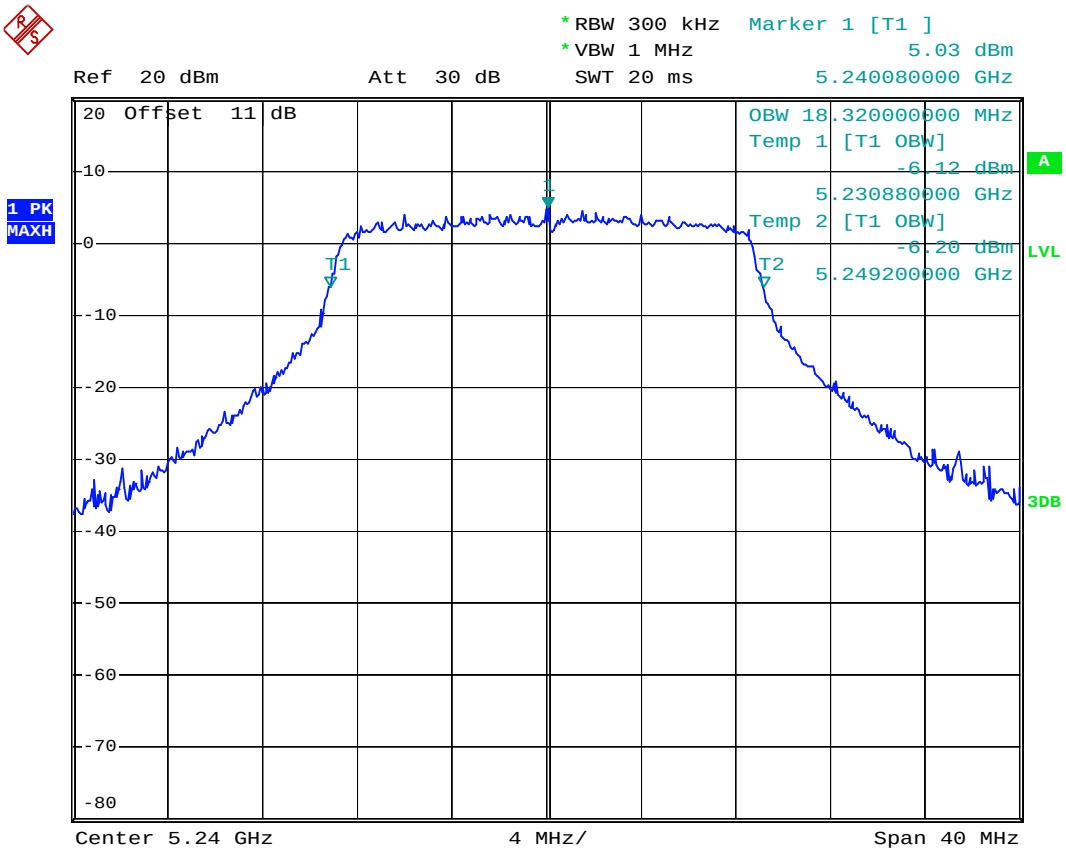
Date: 13.MAR.2008 23:20:44

5220MHz Chain B



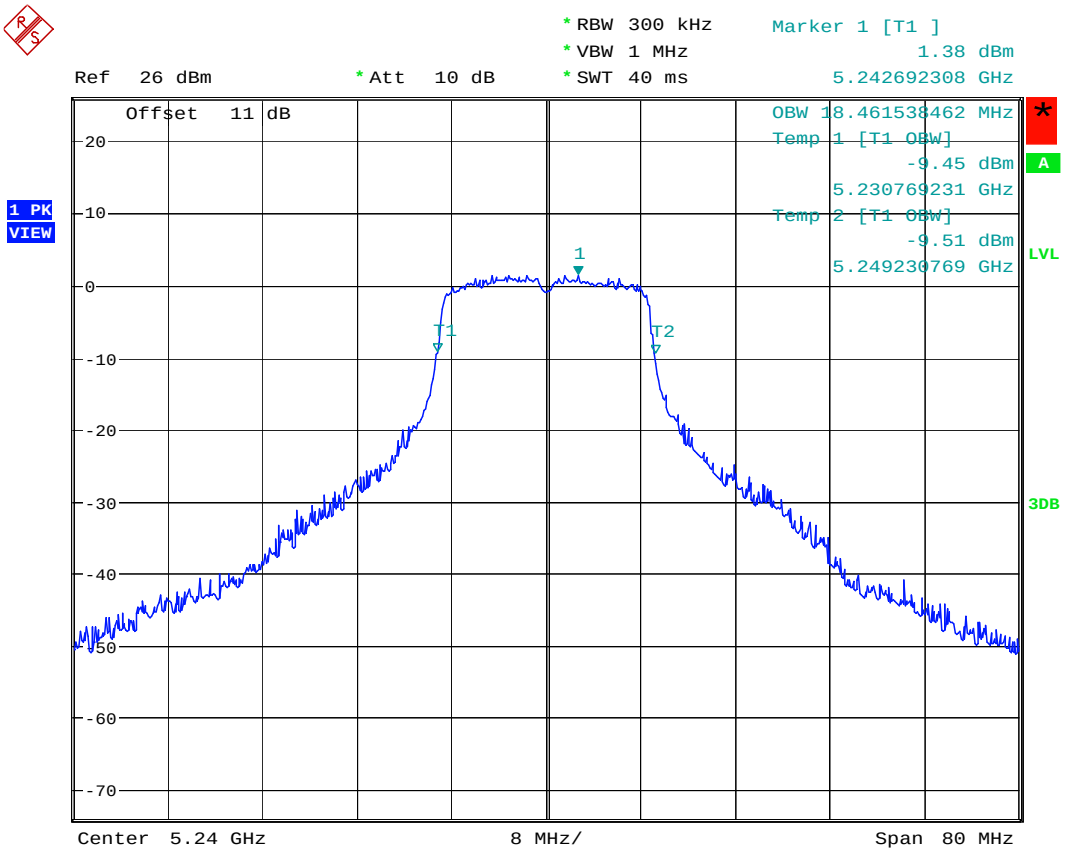
Date: 13.MAR.2008 14:33:28

5240MHz Chain A



Date: 13.MAR.2008 23:22:50

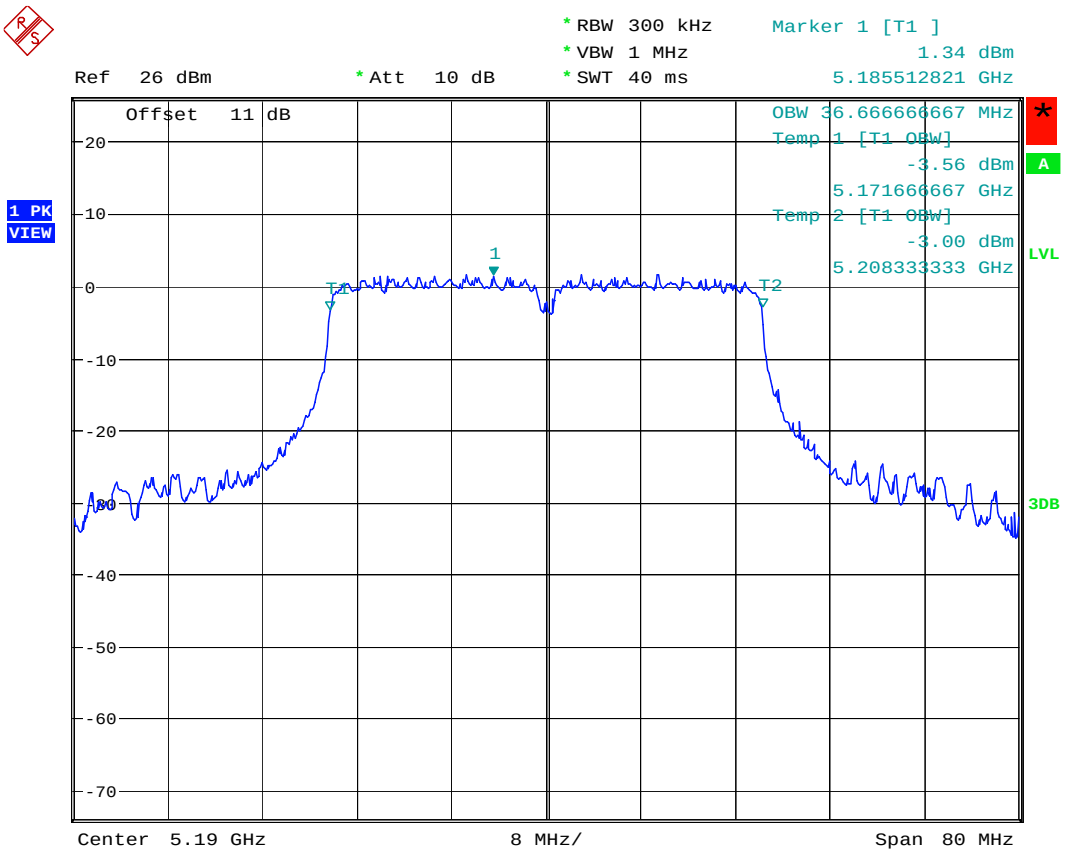
5240MHz Chain B



Date: 24.MAR.2008 12:33:25

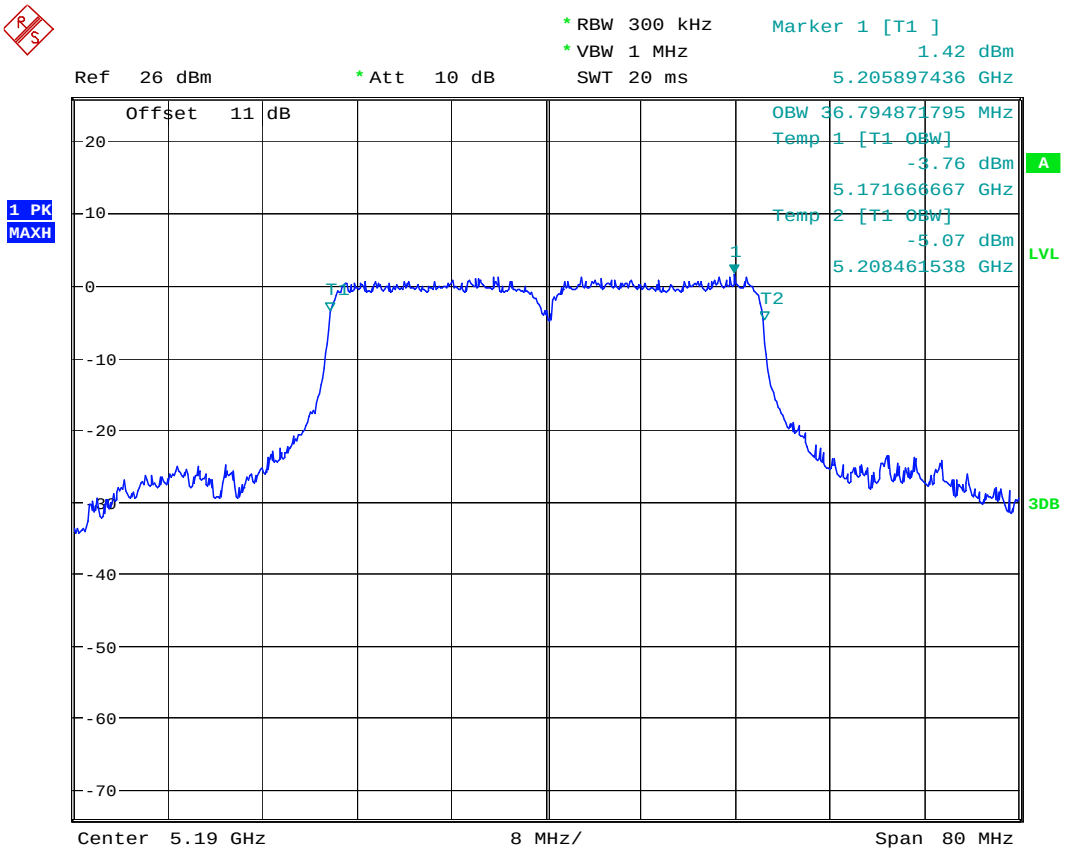
6.7.2.2 802.11na HT40 Mode

5190MHz Chain A



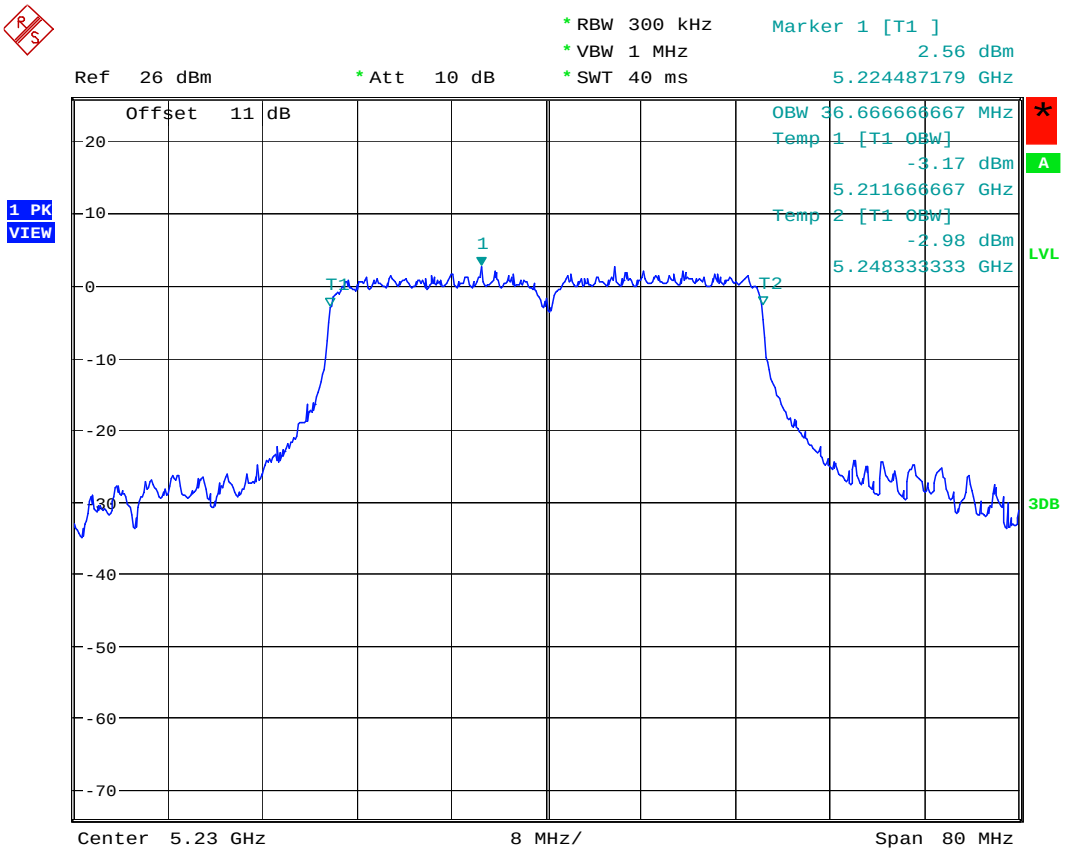
Date: 24.MAR.2008 13:39:53

5190MHz Chain B



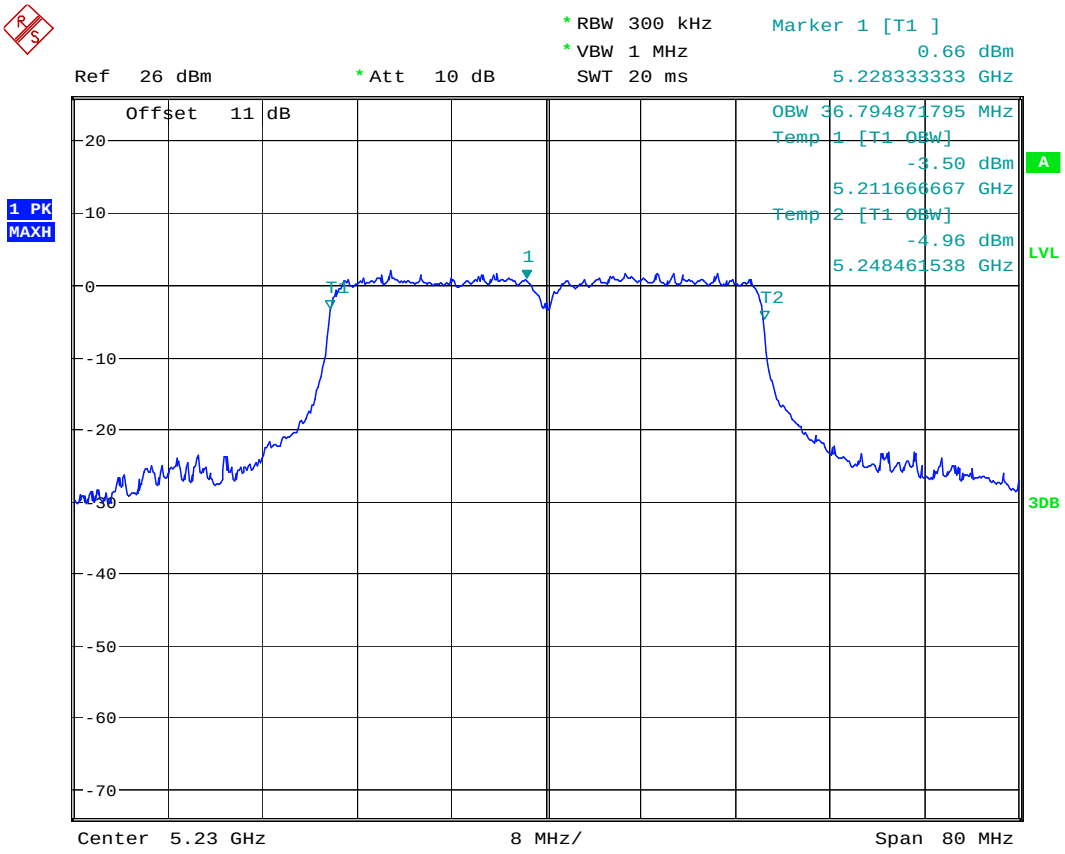
Date: 13.MAR.2008 14:36:40

5230MHz Chain A



Date: 24.MAR.2008 13:42:20

5230MHz Chain B

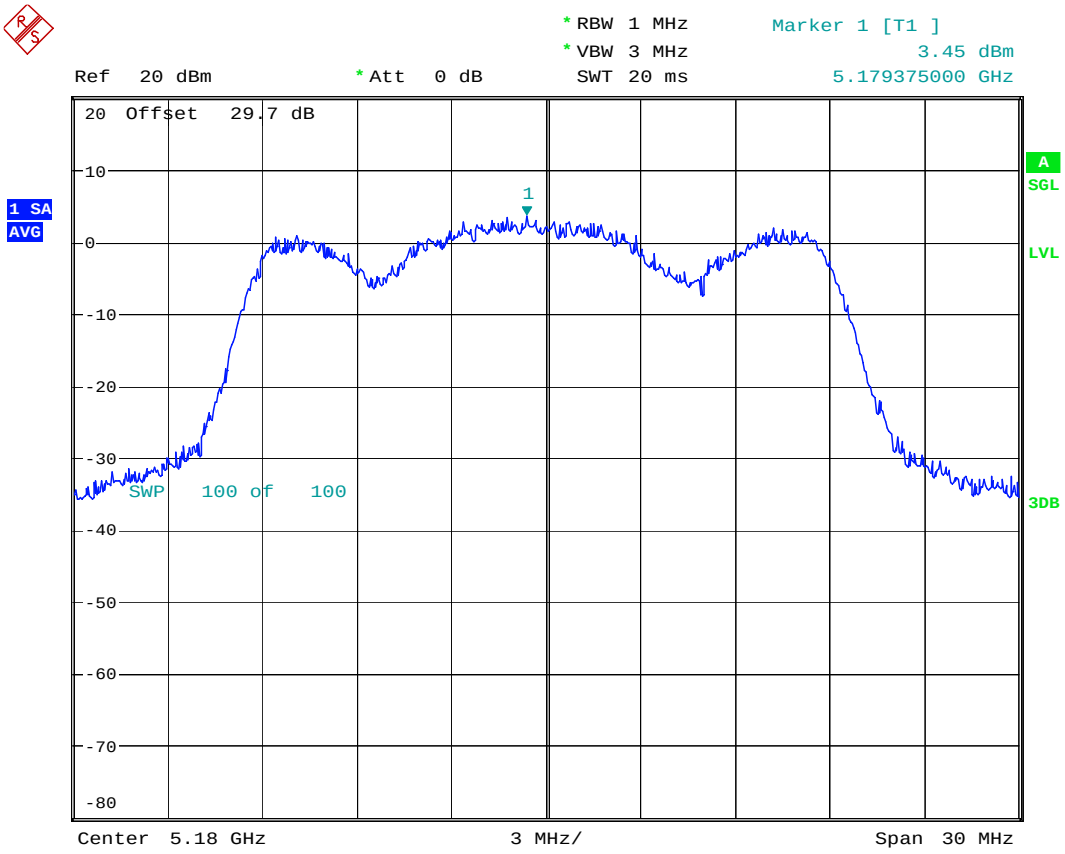


Date: 13.MAR.2008 15:08:03

6.7.3 Power Spectral Density

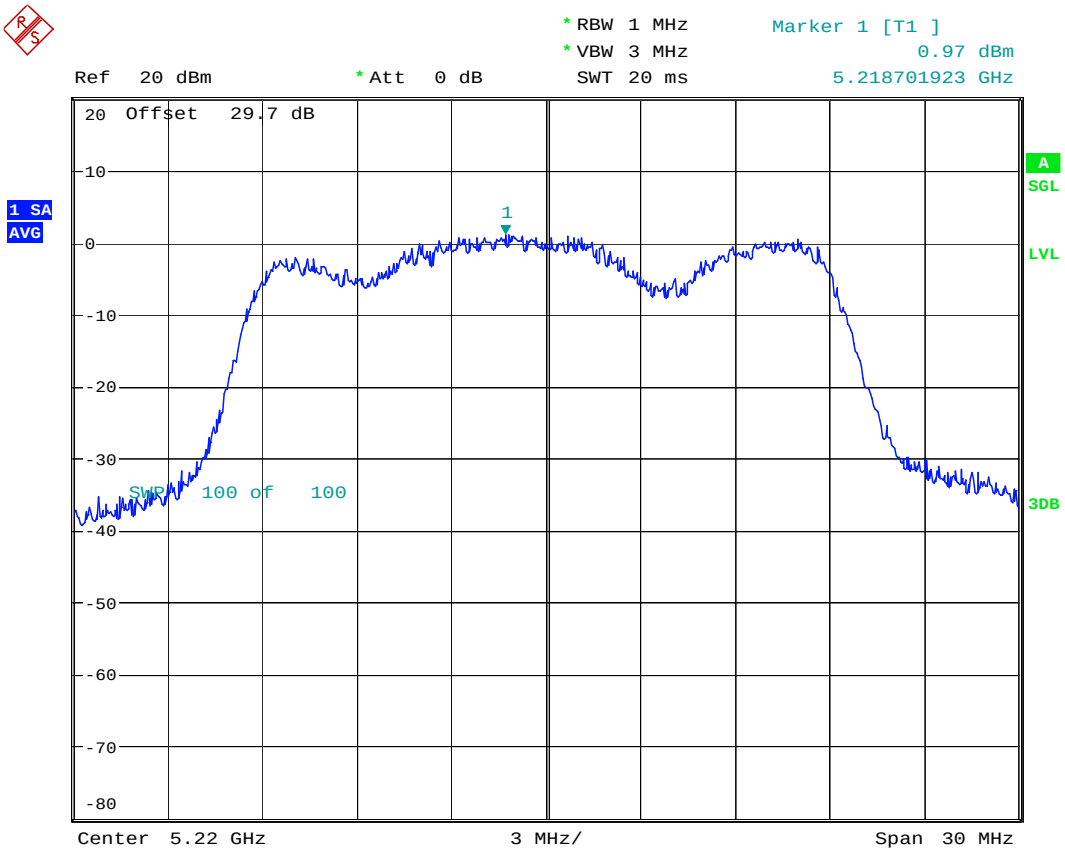
6.7.3.1 802.11na HT20 mode

5180MHz



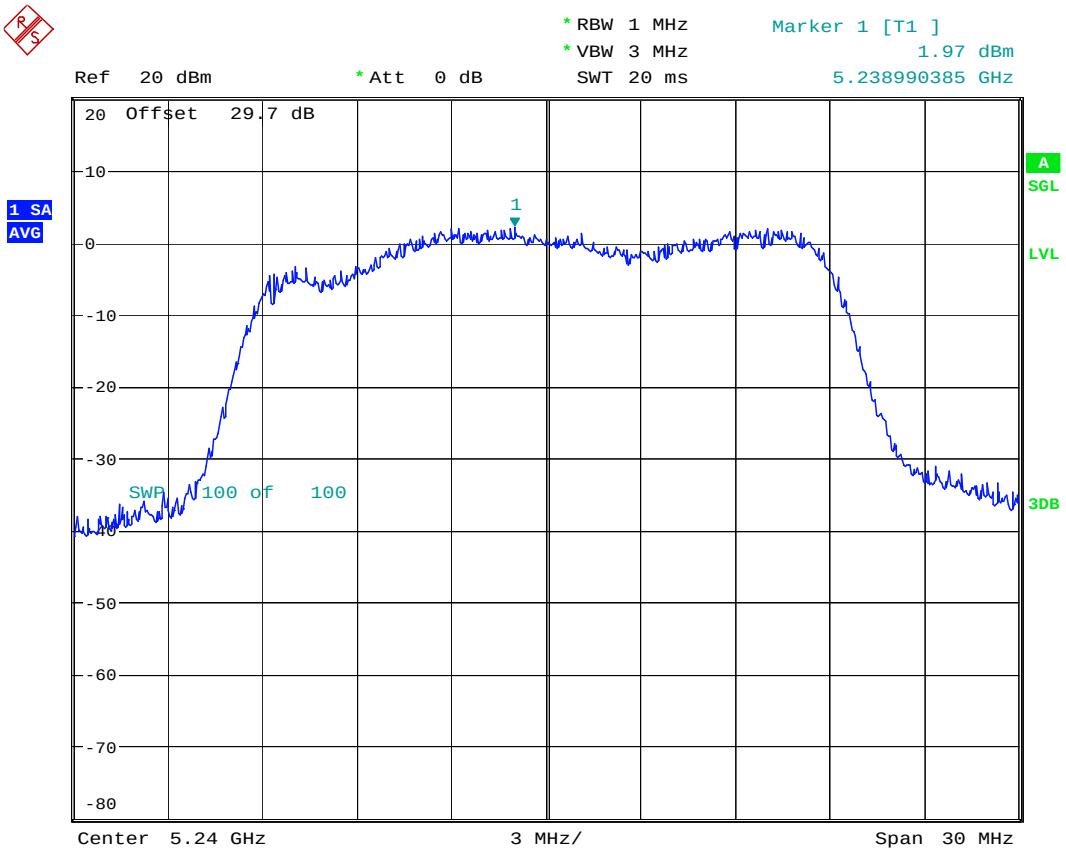
Date: 27.MAR.2008 08:59:02

5220 MHz



Date: 27.MAR.2008 08:59:44

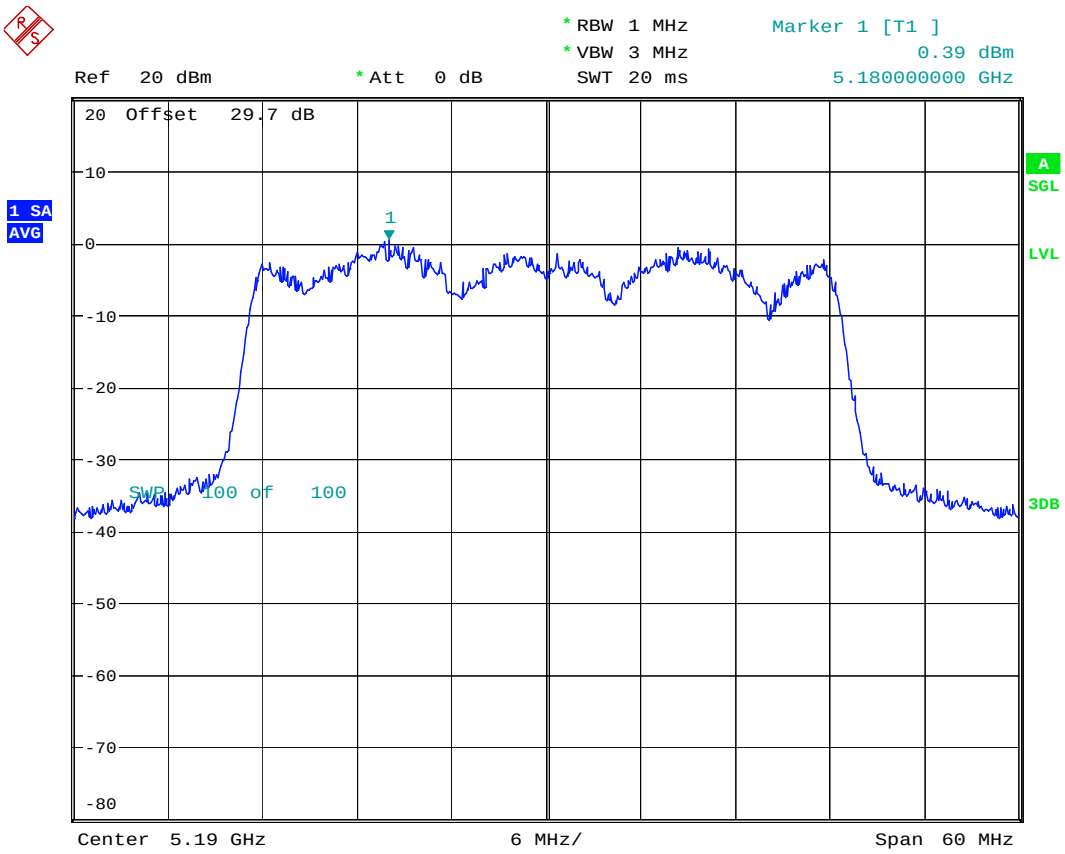
5240 MHz



Date: 27.MAR.2008 09:00:17

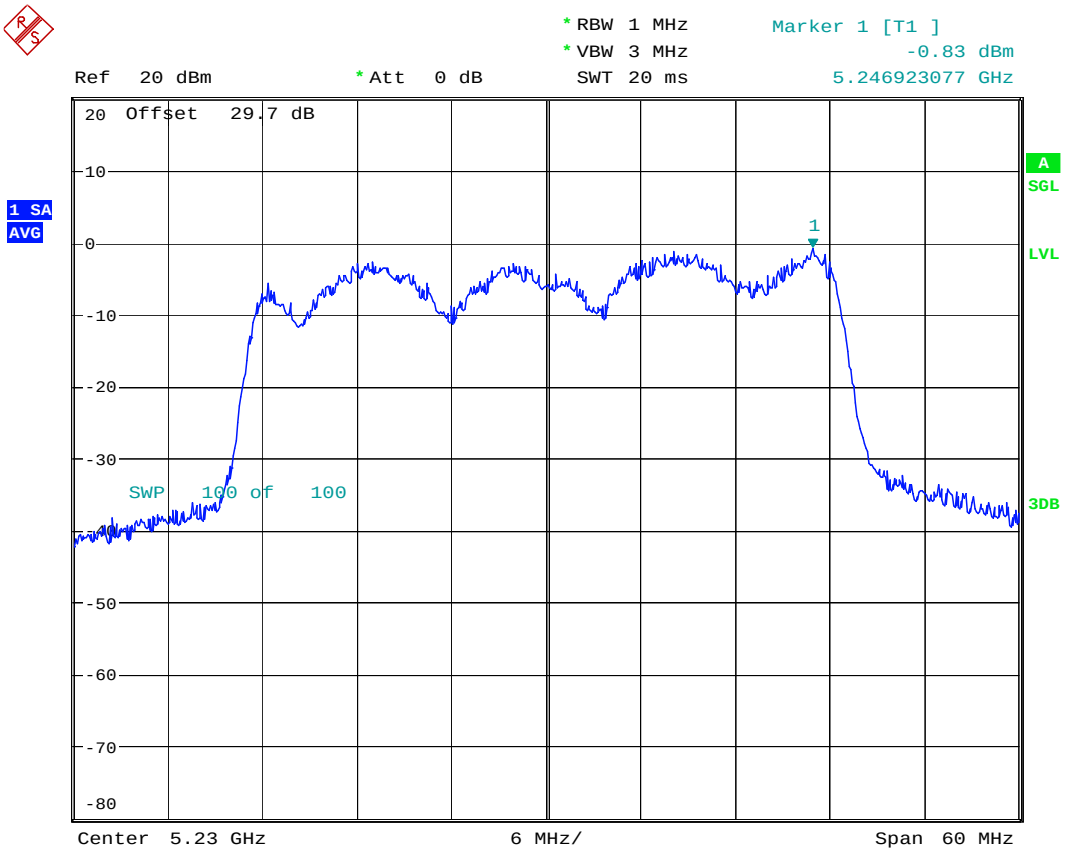
6.7.3.2 802.11na HT40 mode

5190 MHz



Date: 27.MAR.2008 09:00:58

5230MHz

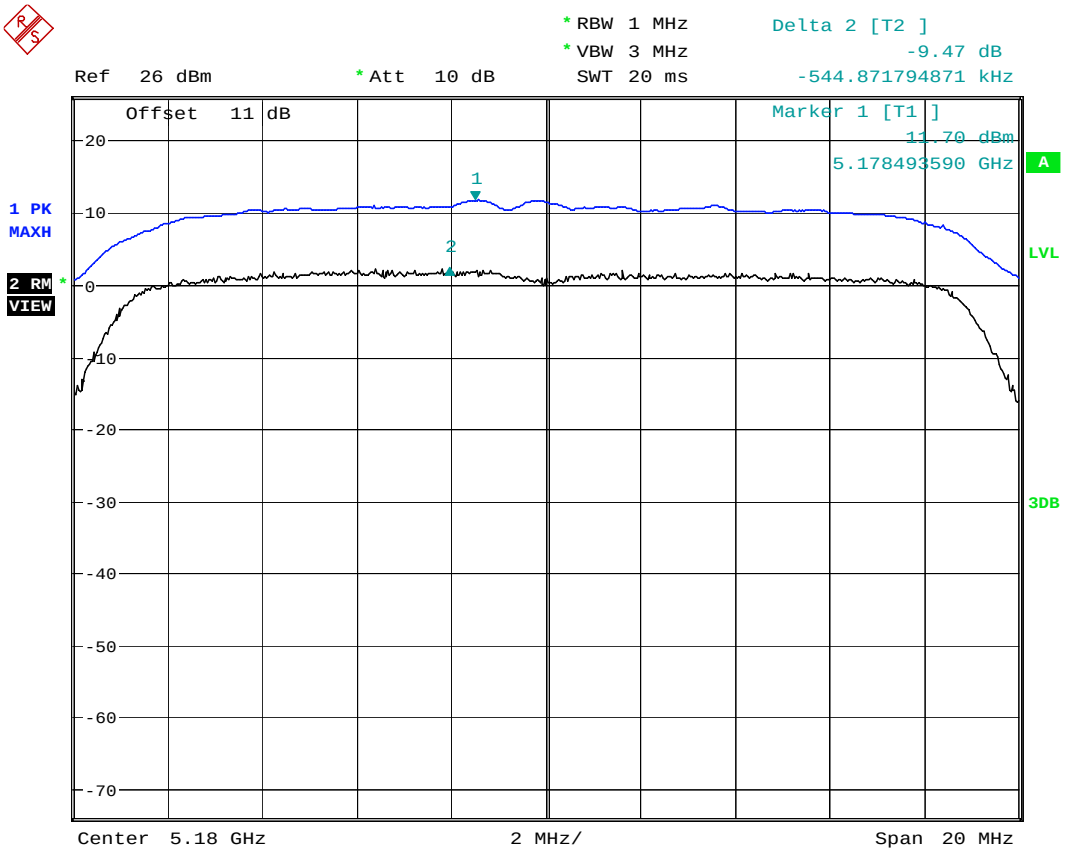


Date: 27.MAR.2008 09:01:39

6.7.4 Peak Excursion

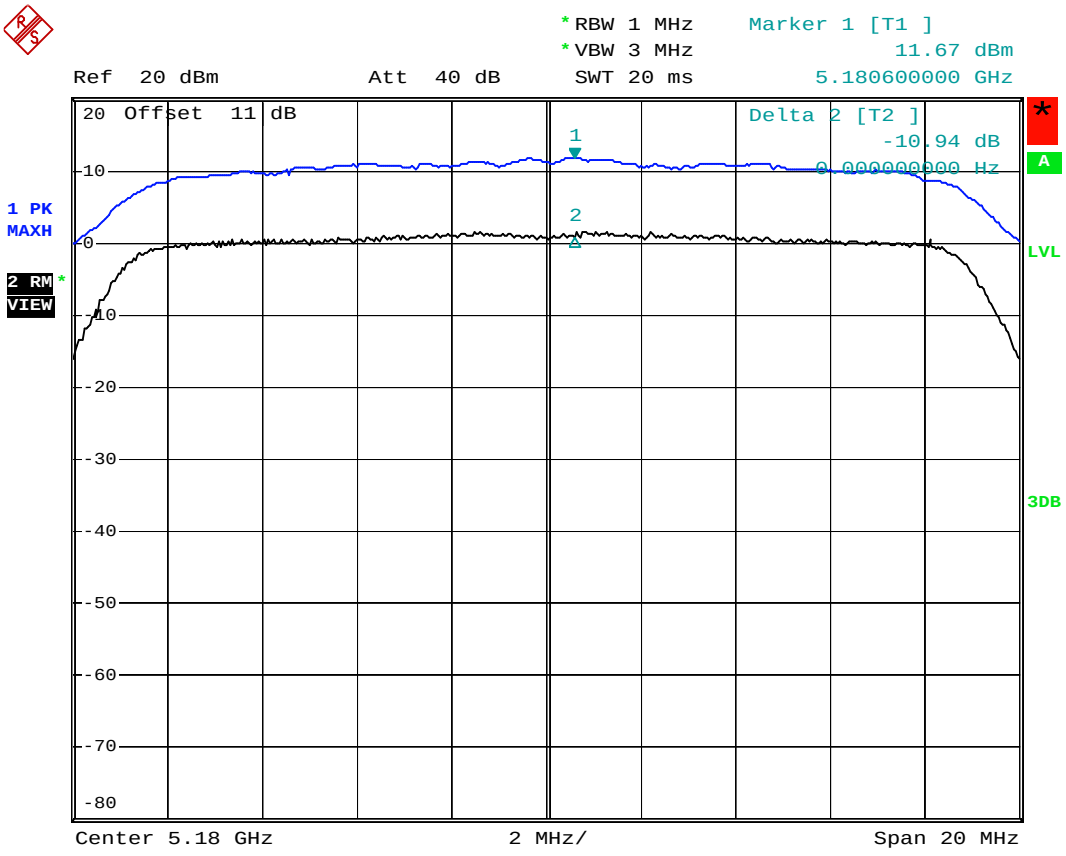
6.7.4.1 802.11na HT20 mode

5180MHz Chain A



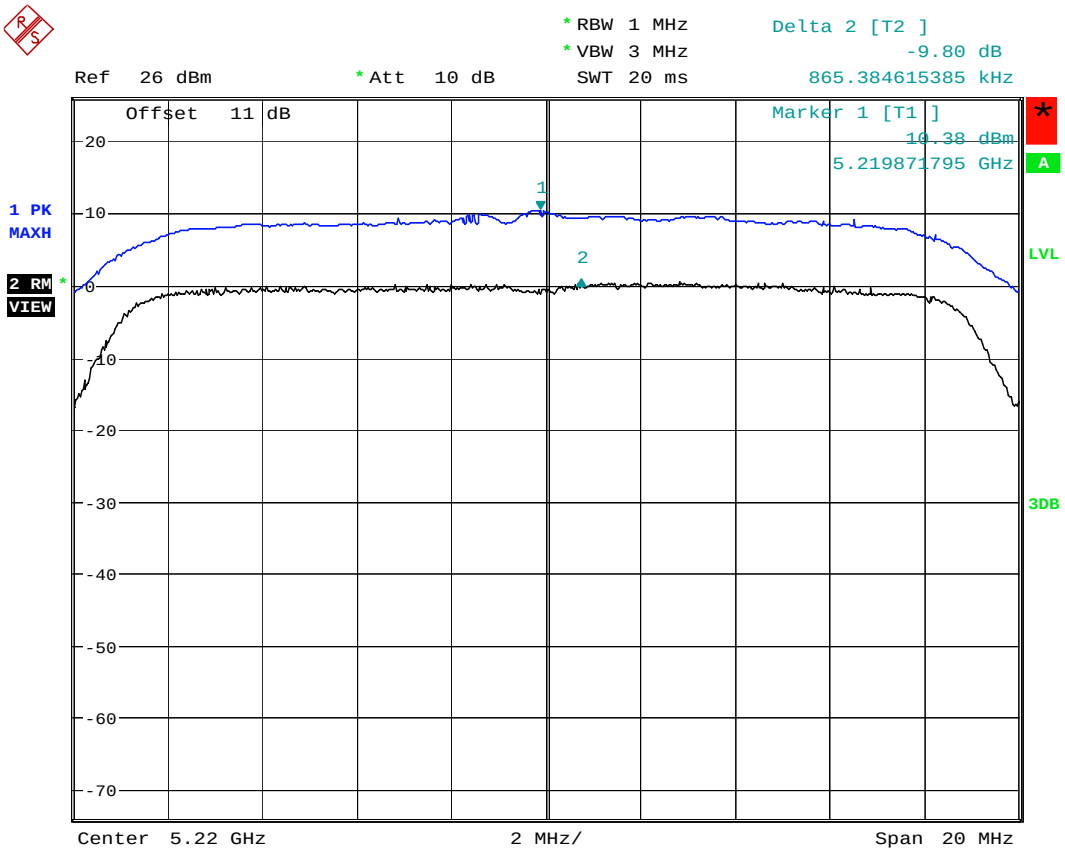
Date: 13.MAR.2008 13:31:01

5180MHz Chain B



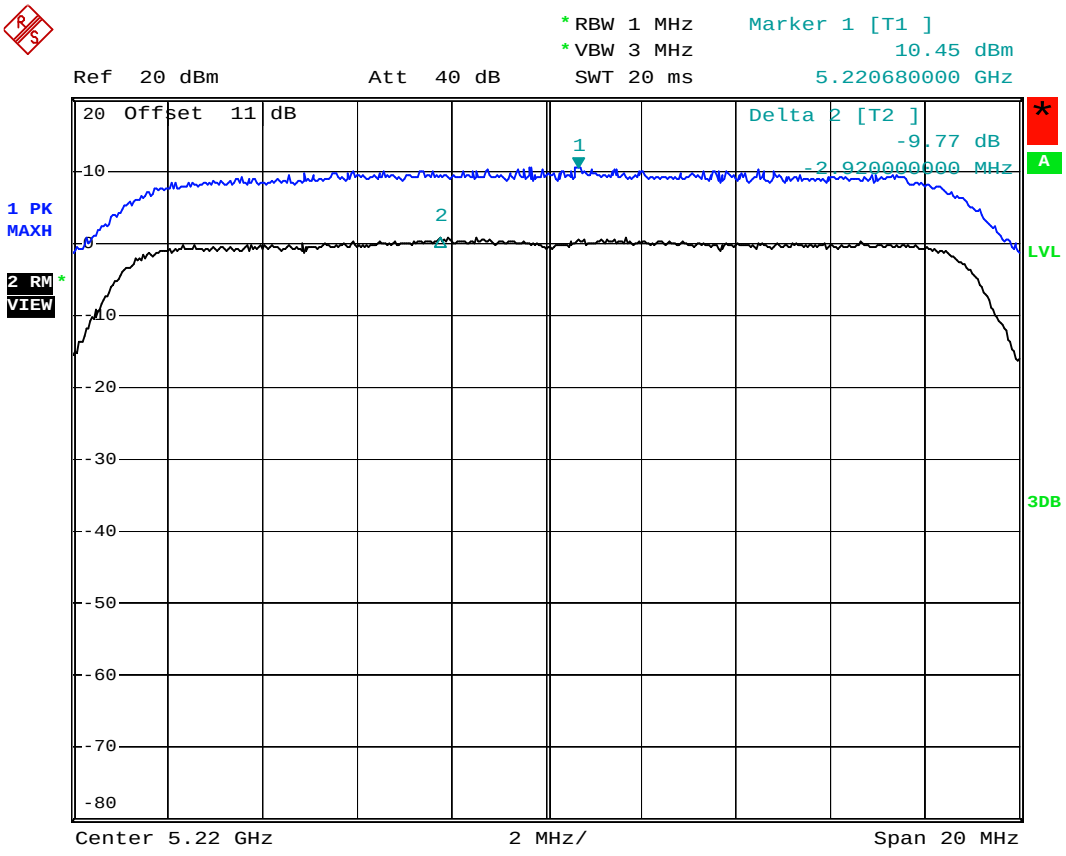
Date: 13.MAR.2008 22:27:30

5220MHz Chain A



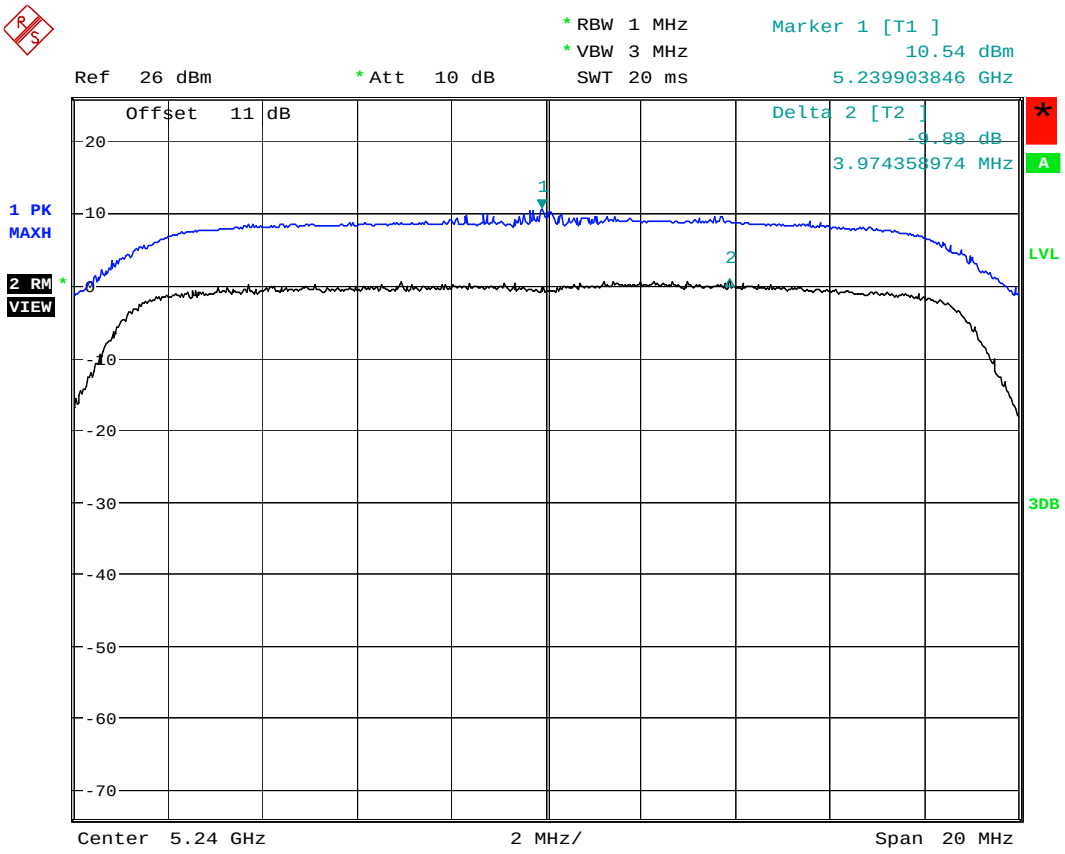
Date: 13.MAR.2008 13:39:20

5220MHz Chain B



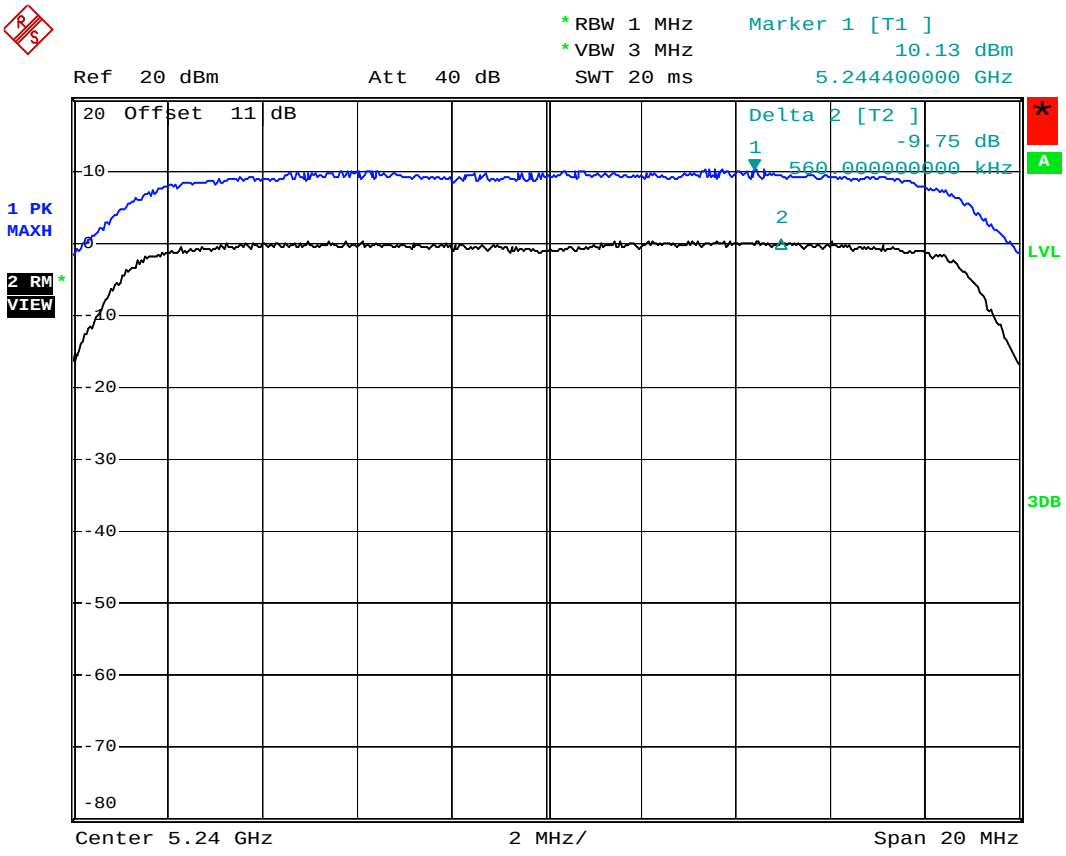
Date: 13.MAR.2008 22:36:15

5240MHz Chain A



Date: 13.MAR.2008 13:42:28

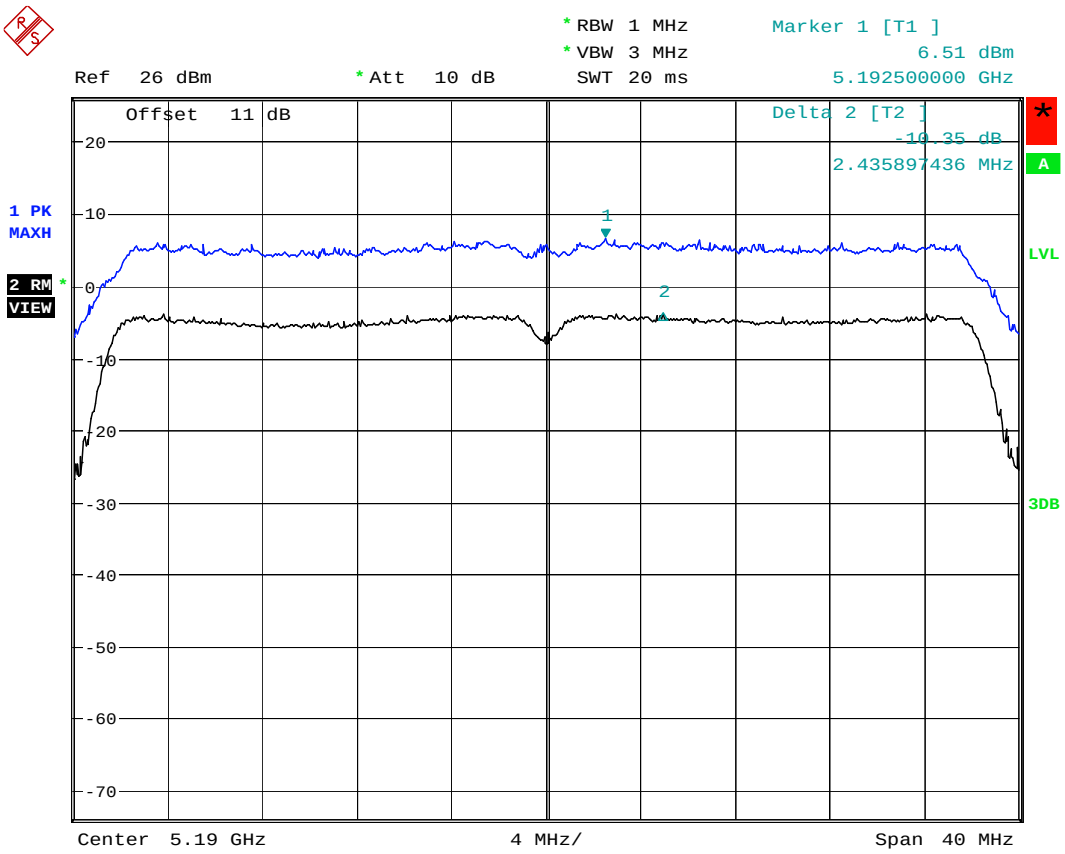
5240MHz Chain B



Date: 13.MAR.2008 22:38:08

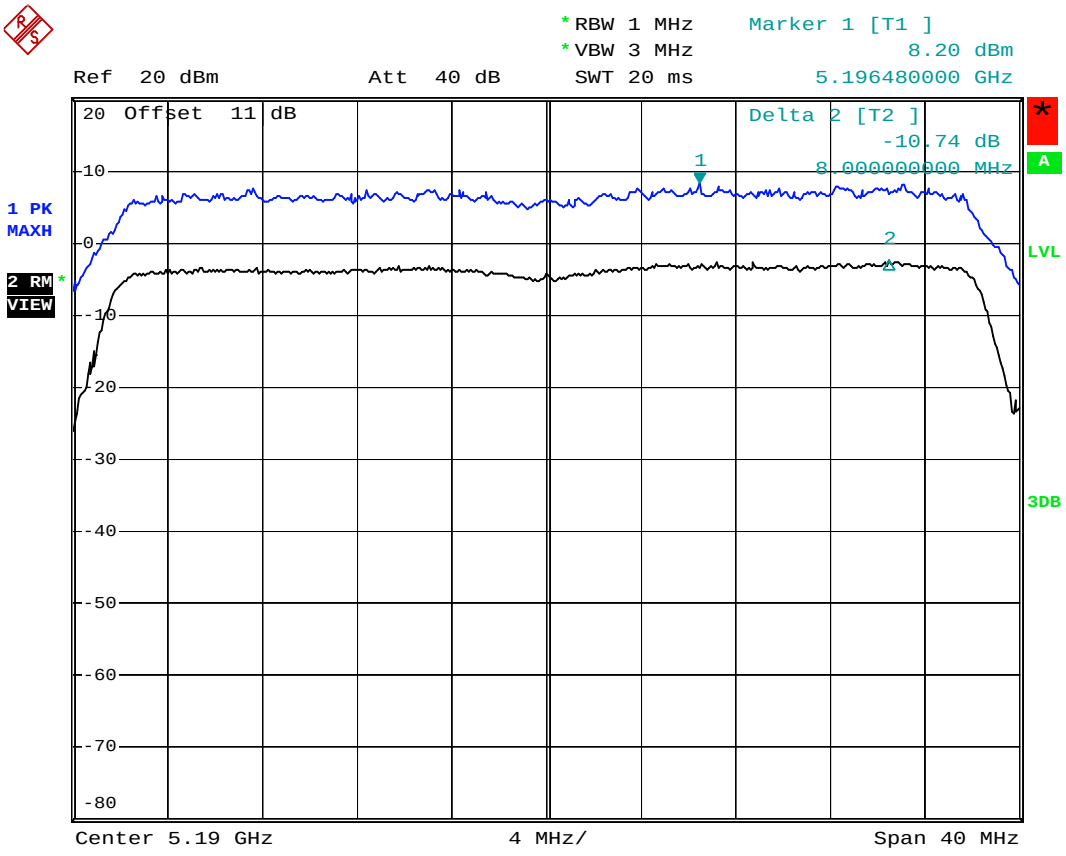
6.7.4.2 802.11na HT40 mode

5190MHz Chain A



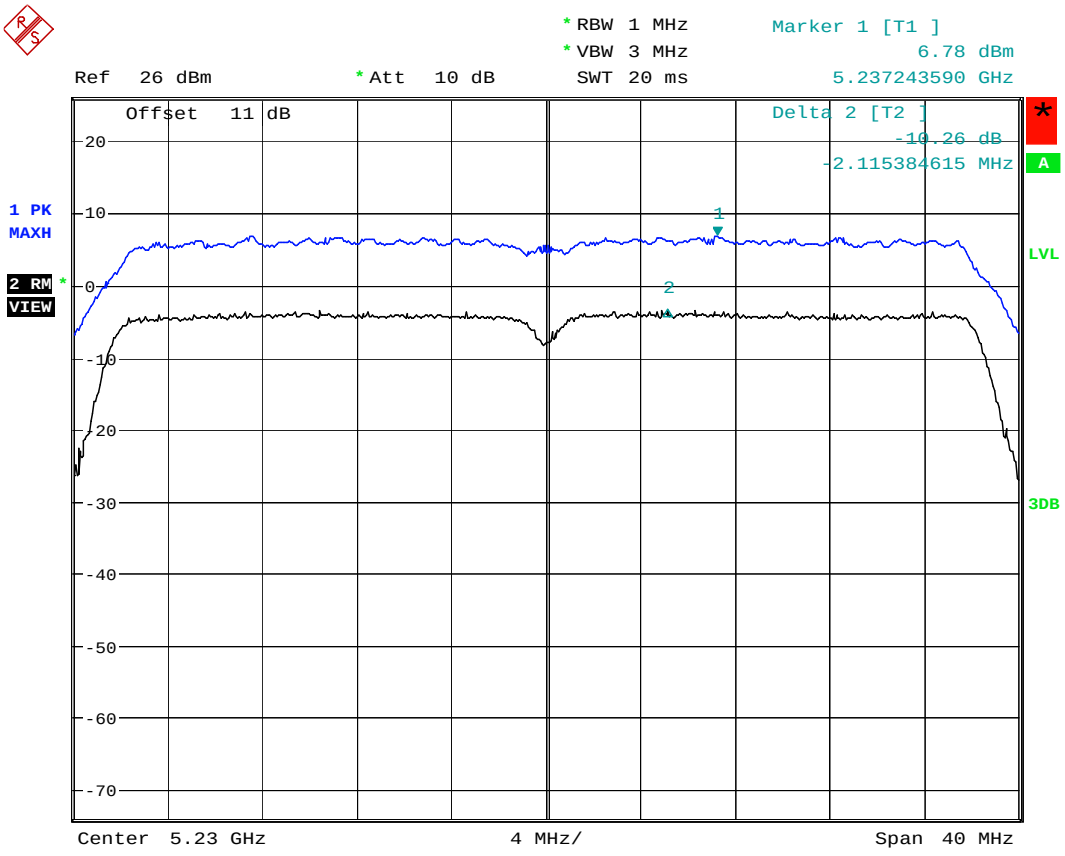
Date: 13.MAR.2008 13:54:10

5190MHz Chain B



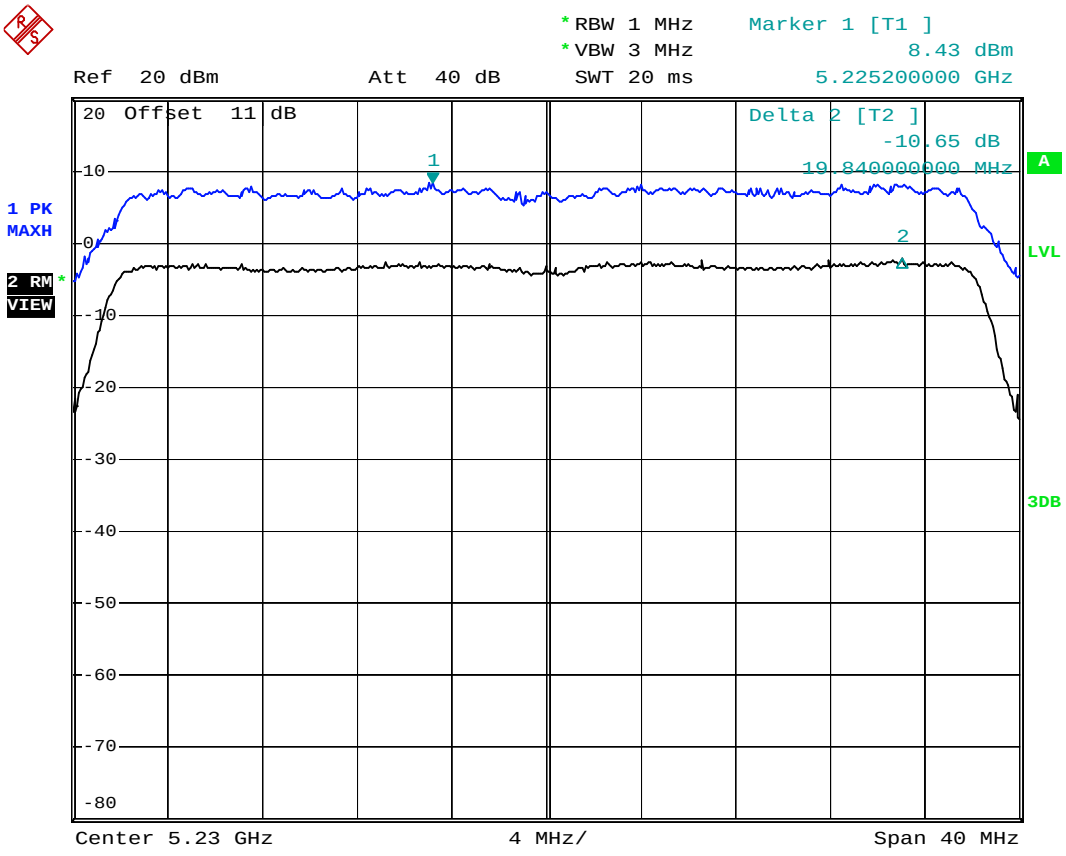
Date: 13.MAR.2008 22:46:23

5230MHz Chain A



Date: 13.MAR.2008 14:01:18

5230MHz Chain B

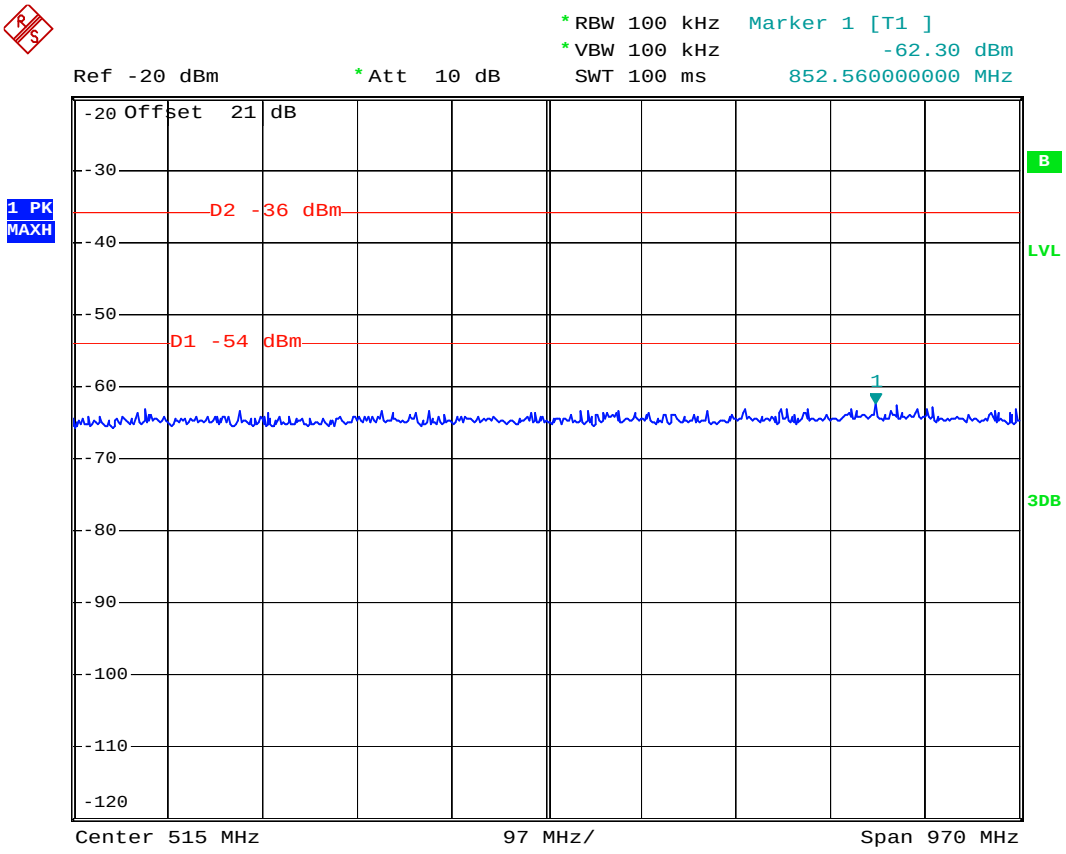


Date: 13.MAR.2008 22:42:06

6.7.5 Conducted Spurious Emissions

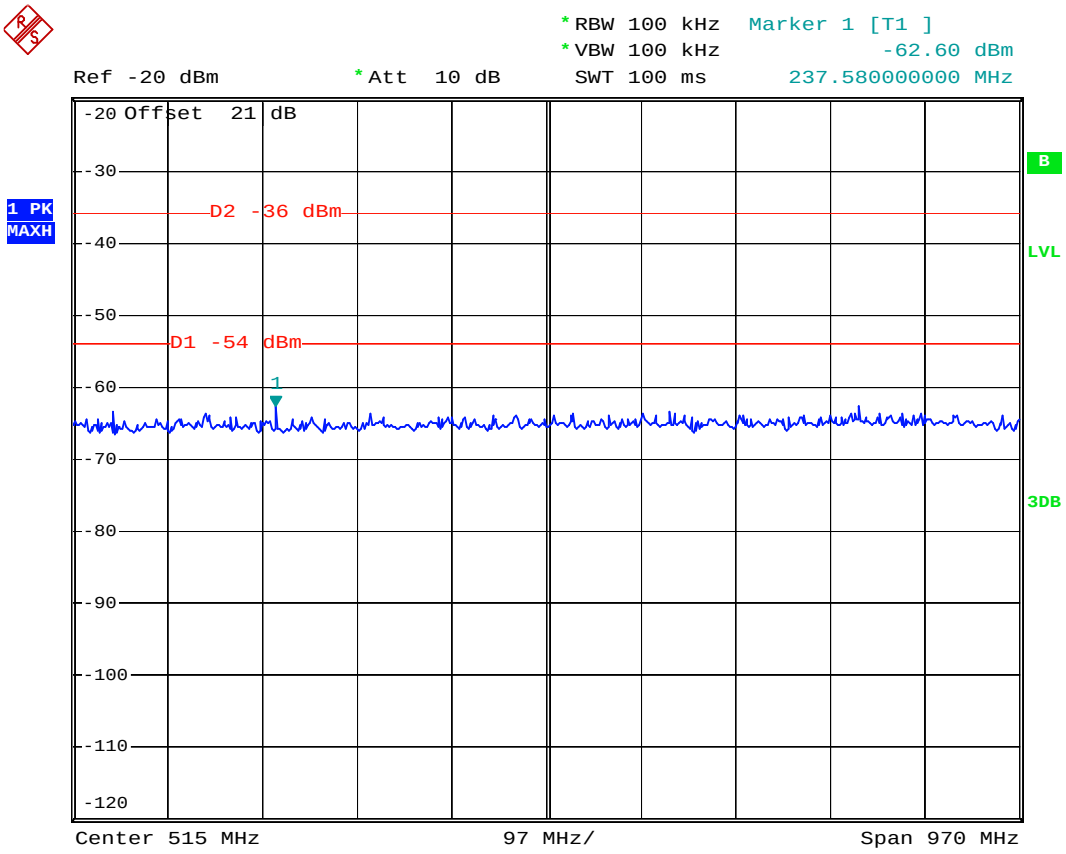
6.7.5.1 802.11na HT20 Mode

5180MHz, 30M-1GHz



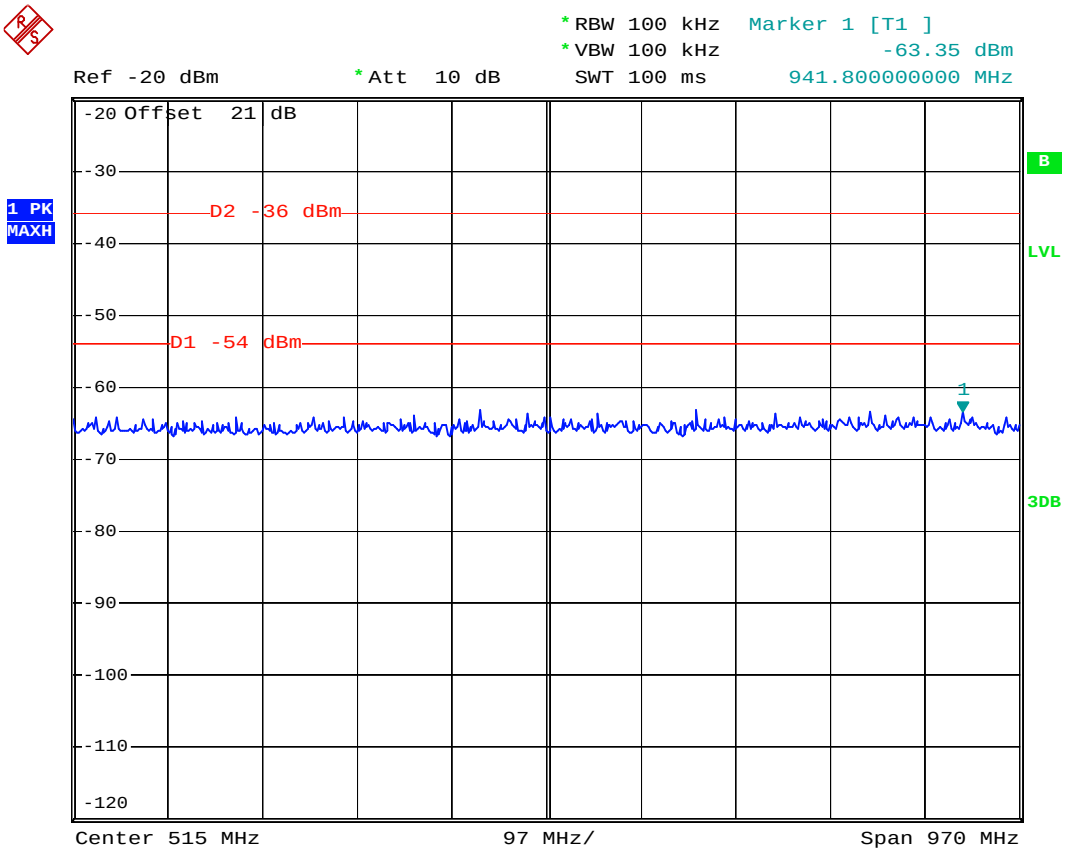
Date: 5.MAR.2008 23:03:30

5220MHz, 30M-1GHz



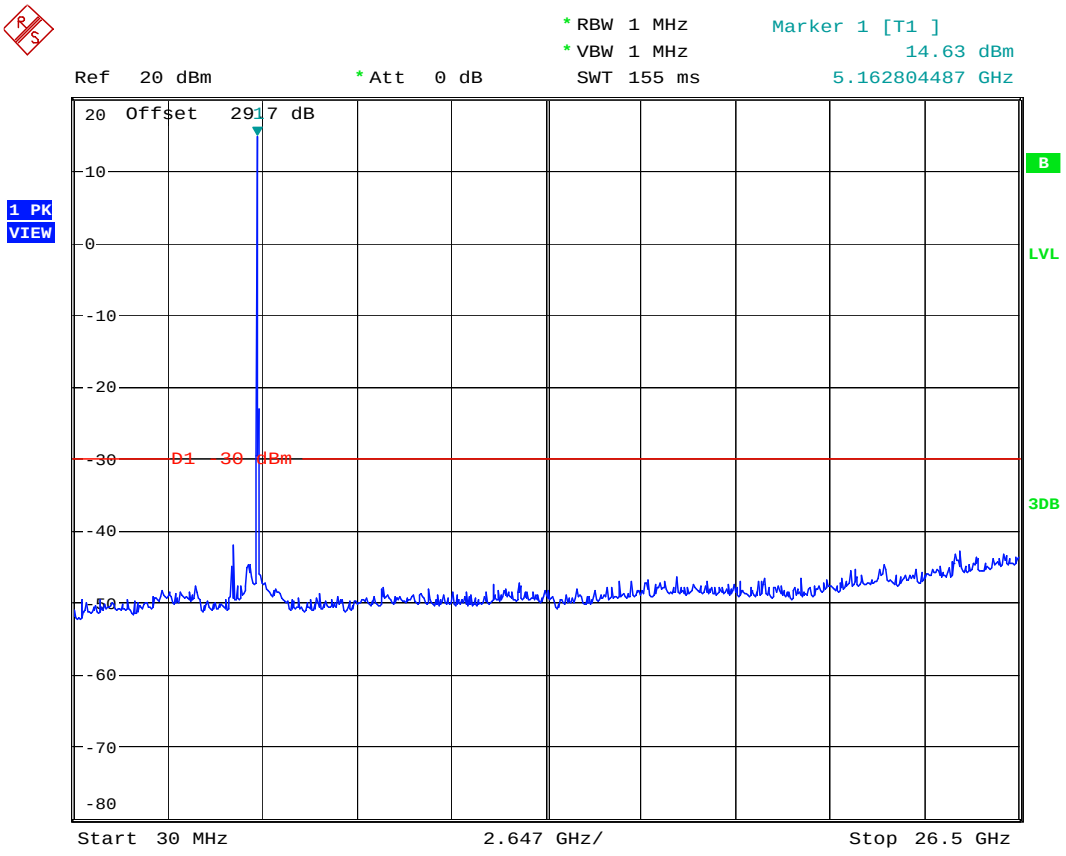
Date: 5.MAR.2008 23:05:37

5240MHz, 30M-1GHz



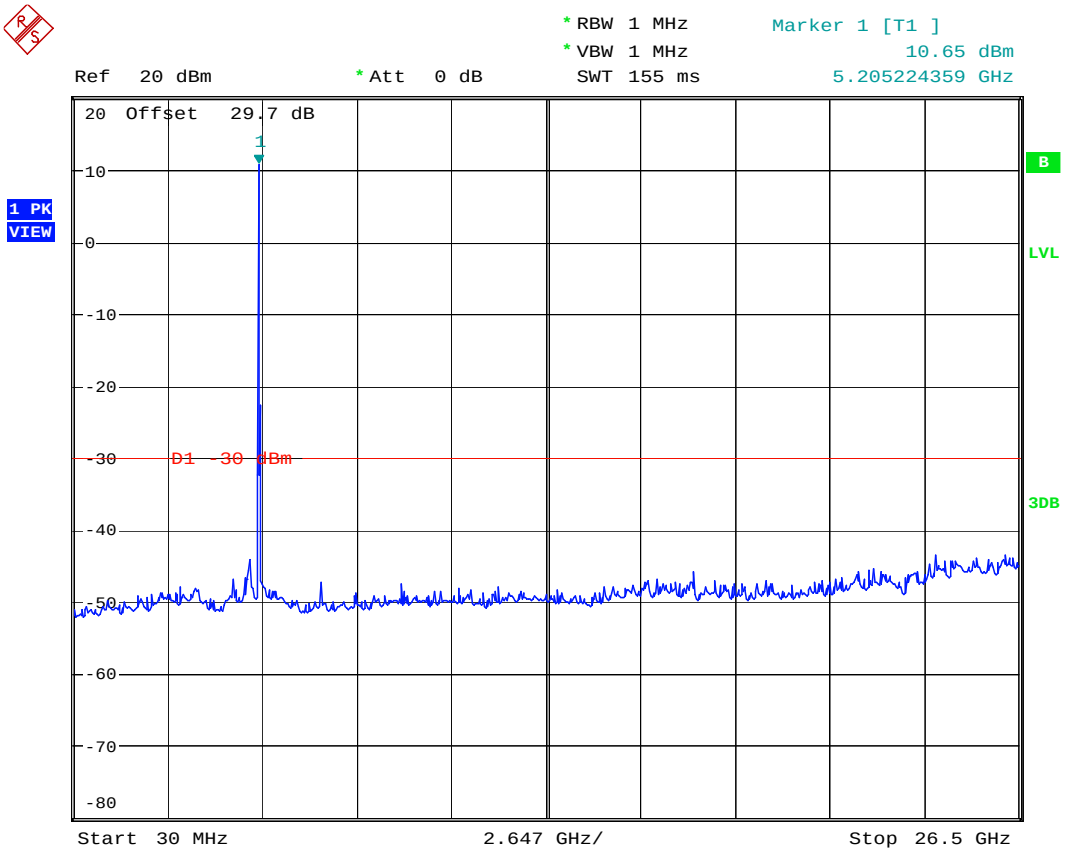
Date: 5.MAR.2008 23:06:39

5180MHz, 1-26.5GHz



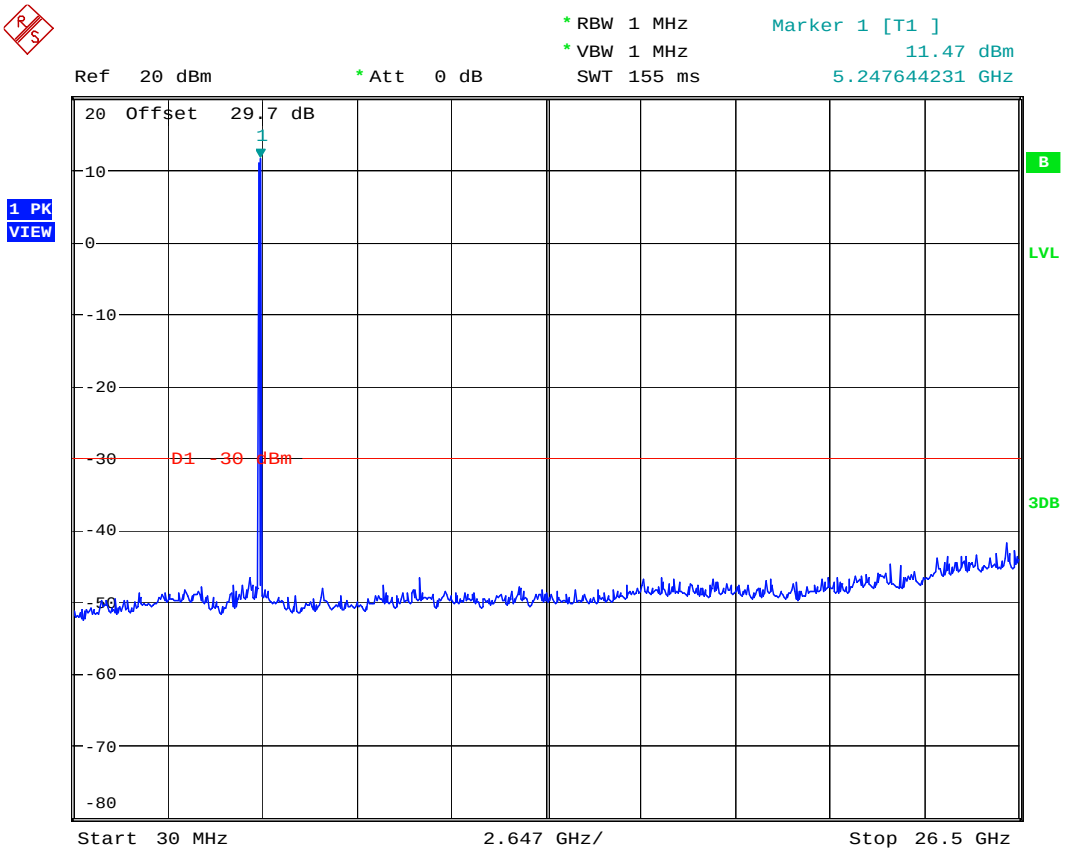
Date: 27.MAR.2008 12:25:31

5220MHz, 1-26.5GHz



Date: 27.MAR.2008 12:26:55

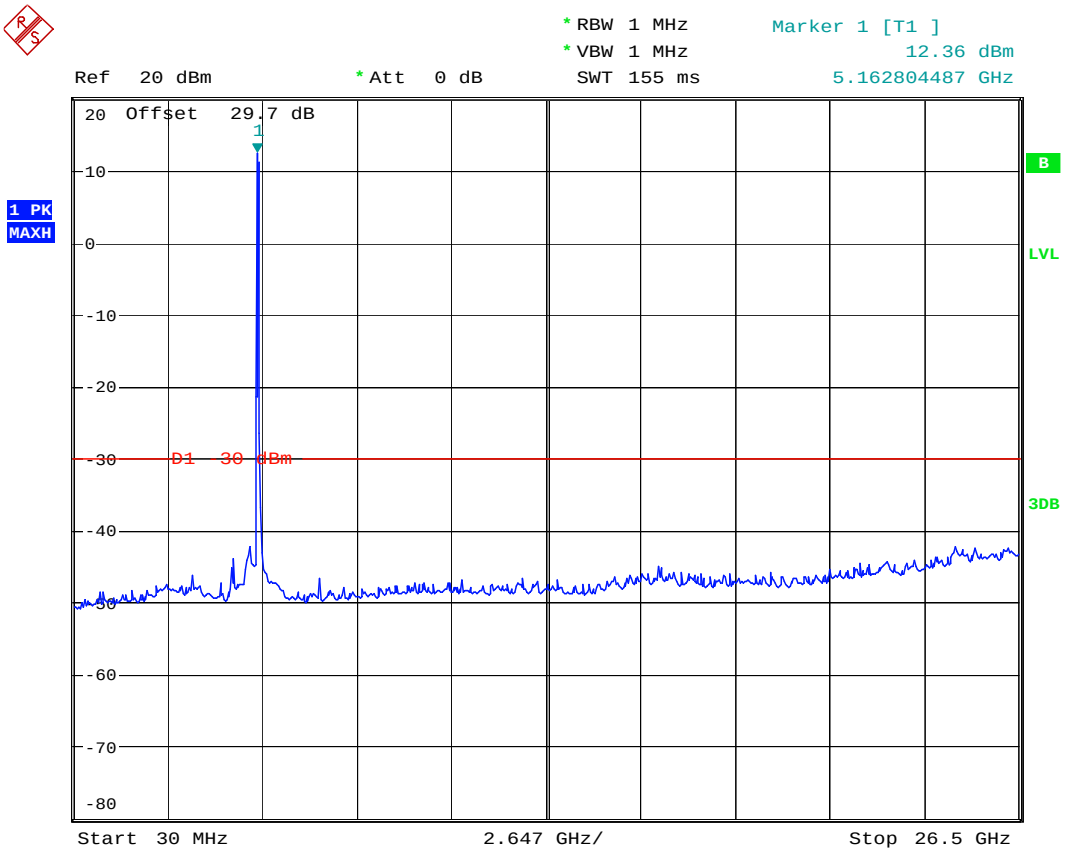
5240MHz, 1-26.5GHz



Date: 27.MAR.2008 12:27:37

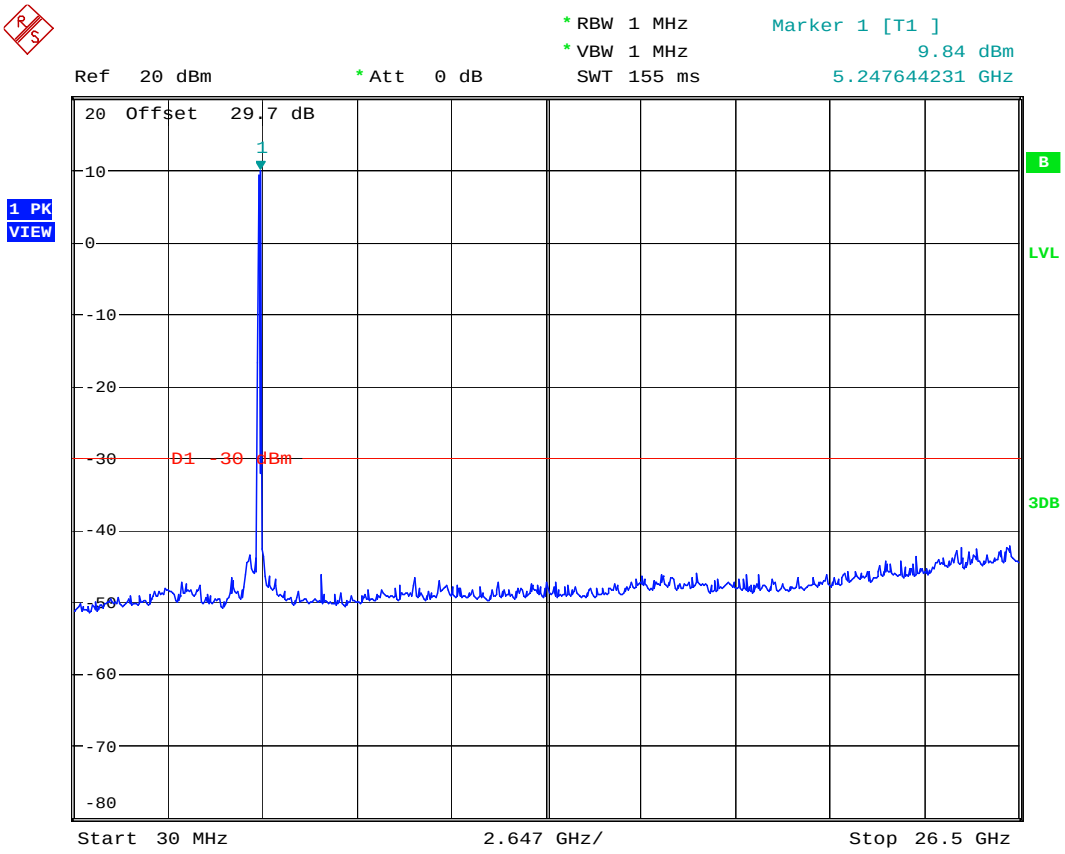
6.7.5.2 802.11na HT40 Mode

5190MHz, 1-26.5GHz



Date: 27.MAR.2008 12:22:20

5230MHz, 1-26.5GHz



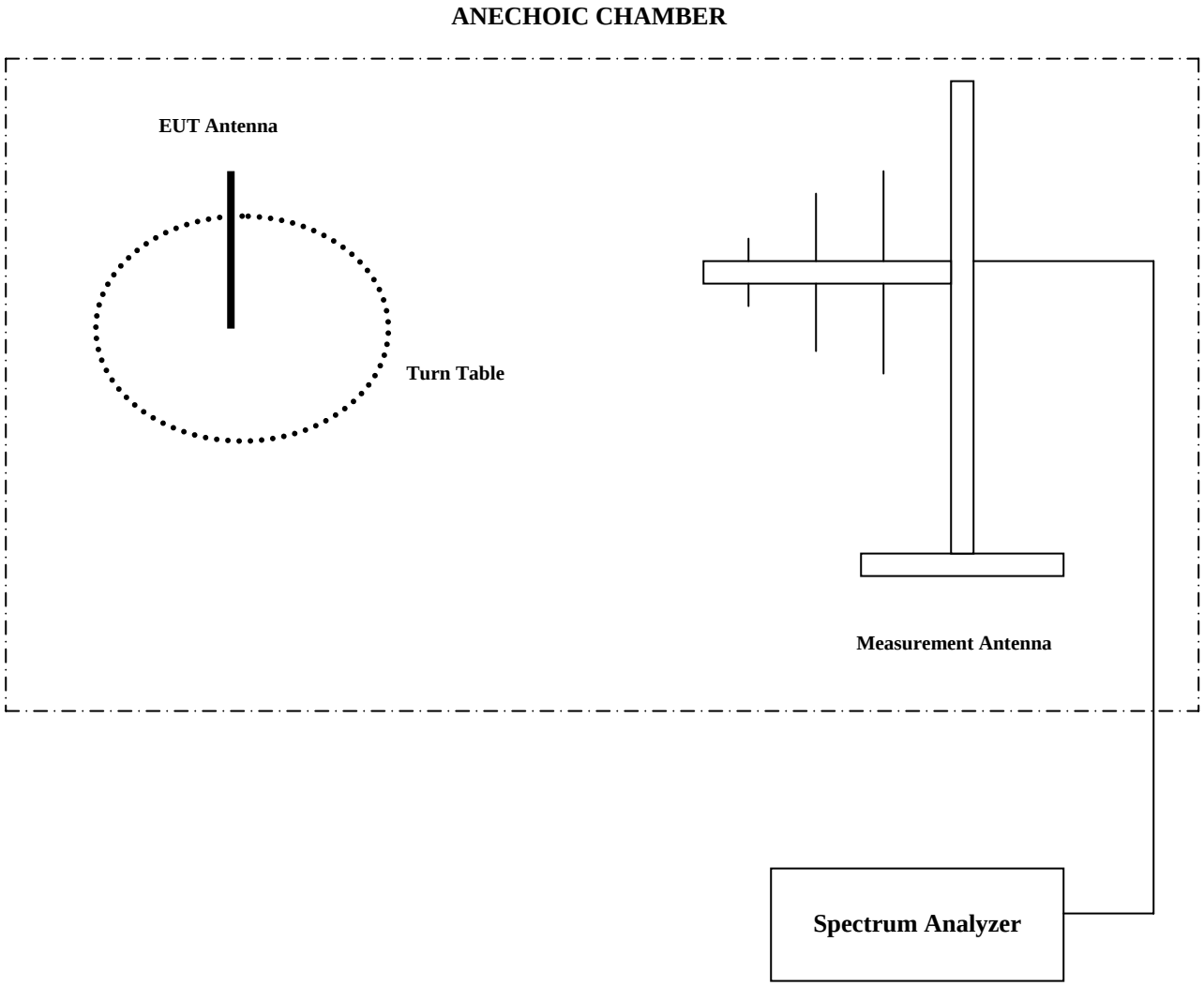
Date: 27.MAR.2008 12:24:09

7 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2008	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2008	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2008	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2008	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2008	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2008	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2008	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2008	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2008	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2008	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2008	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2008	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2008	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2008	2 years

8 BLOCK DIAGRAMS

Radiated Testing



9 Revision History

2008-3-25: First Issue

2008-3-31: Rev1, adding FCC ID, IC ID on the cover page; adding channel numbers and output power in EUT section; adding EUT number on each measurement plot; deletion of empty quasi-peak frequency list in conducted emissions measurements. Replaces original titled *EMC_CETEC_029_15.407n_5.1G* and dated 2008-3-25.