EMC
TEST REPORT

Report No. : TS08100102-EME
Model No. : H3C DNMA-83
Issued Date : Dec. 15, 2008

Applicant:	**3Com Corporation** **350 Campus Drive Marlborough, MA 01752-3064, U.S.A.**
Test Method/ Standard:	**FCC Part 15 Subpart E Section §15.207、§15.209 、§15.407 and ANSI C63.4/2003.**
Test By:	**Intertek Testing Services Taiwan Ltd.** **No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,** **Shiang-Shan District, Hsinchu City, Taiwan**

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Summary of Tests

Wireless mini PCI Card
FCC ID: O9CDNMA83

Test	Reference	Results
Peak output power test	15.407 (a)(1)/(2)/(3) DA 02-2138	Pass
Power Spectrum Density test	15.407 (a)(1)/(2)/(3) DA 02-2138	Pass
Peak excursion to average ratio test	15.407(a)(6) DA 02-2138	Pass
Radiated spurious emission test	15.407(b)(1)/(2)/(3)/(6), 15.209	Pass
Dynamic Frequency Selection (DFS) test	15.407(h), FCC 06-96	No required due to this device was only used UNII band of 5150-5250MHz
Additional provisions	15.215(c)	Pass
AC line conducted emission test	15.407(b)(6) 15.207	Pass

1. General information

1.1 Identification of the EUT

Applicant:	3Com Corporation
Product:	Wireless mini PCI Card
Model No.:	H3C DNMA-83
Operating Frequency:	5180 MHz to 5240 MHz for 802.11a/n HT20 5190 MHz to 5230 MHz for 802.11n HT40
Channel Number:	4 channels for 802.11a/n HT20 2 channels for 802.11n HT40
Type of Modulation:	OFDM
Rated Power:	3.3 V from Notebook PC
Power Cord:	N/A
Data Cable:	N/A
Sample Received:	Sep. 26, 2008
Test Date(s):	Nov. 27, 2008 ~ Dec. 03, 2008
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Additional information about the EUT

The EUT is a Wireless mini PCI Card, it supports three transmitted and three received MIMO functions, and was defined as information technology equipment.

For more detail features, please refer to User's manual as file name “Installation guide.pdf”.

1.3 Antenna description

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna No.	: C5060-510002-A
Antenna Gain	: 3 dBi
Antenna Type	: Omni Antenna Kit
Connector Type	: RSMA female

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook PC	DELL	Latitude D610	5YWZK1S	FCC DoC Approved

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart E Section § 15.207、§15.209、§15.407、DA 02-2138 and ANSI C63.4/2003.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

The AC power conducted emissions was invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz (15.207 paragraph).

Radiated emissions were invested cover the frequency range from 30 MHz to 1000 MHz using a receiver RBW of 120 kHz record QP reading, and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz and 10 Hz VBW record Average reading (15.209 paragraph), the Peak reading recorded also on the report.

The EUT setup configurations please refer to the photo of test configuration in item.

2.2 Operation mode

The EUT was supplied with DC 3 V from Notebook PC and it was running in operating mode.

The EUT was transmitted continuously during the test.

With individual verifying, the maximum output power was found out 6 Mbps data rate for 802.11a mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13.5 Mbps data rate for 802.11n HT40 mode. The final tests were executed under these conditions and recorded in this report individually.

802.11a ch40 Chain A	
Data rate (Mbps)	PK(dBm)
6	13.16
9	12.89
12	12.37
18	12.07
24	11.97
36	11.42
48	11.07
54	10.98

802.11n HT20 ch40 Chain A	
Data rate (Mbps)	PK(dBm)
6.5	13.16
13	12.89
19.5	12.67
26	12.44
39	12.07
52	11.87
58.5	11.56
65	11.07

802.11n HT40 ch38 Chain A	
Data rate (Mbps)	PK(dBm)
13.5	12.85
27	12.09
40.5	11.87
54	11.57
81	11.37
108	11.09
121.5	10.97
135	10.89

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.
EMI Test Receiver	Rohde & Schwarz	9 kHz~2.75 GHz	ESCS 30
Spectrum Analyzer	Rohde & Schwarz	9 kHz~30 GHz	FSP 30
Spectrum Analyzer	Rohde & Schwarz	20 Hz~40 GHz	FSEK 30
Horn Antenna	EMCO	1 GHz~18 GHz	3115
Horn Antenna	SCHWARZBECK	14 GHz~40 GHz	BBHA 9170
Bilog Antenna	SCHWARZBECK	25 MHz~1.7 GHz	VULB 9160
Pre-Amplifier	MITEQ	100 MHz~26.5 GHz	919981
Pre-Amplifier	MITEQ	26 GHz~40 GHz	828825
Peak Power Meter/ Sensor	Anritsu	0.3~40 GHz	ML2495A/ MA2411B
Controller	HDGmbH	N/A	HD 100
Antenna Tower	HDGmbH	N/A	MA 240
Turn Table	HDGmbH	N/A	DS 420S
LISN	Rohde & Schwarz	9 kHz~30 MHz	ESH3-Z5

Note: The above equipments are within the valid calibration period.

3. Peak Output Power test (FCC 15.407)

3.1 Operating environment

Temperature: 25 ℃
Relative Humidity: 50 %
Atmospheric Pressure: 1023 hPa

3.2 Test setup & procedure

The power output per FCC §15.407(a) was measured on the EUT using a 50 ohm SMA cable connected to power meter via power sensor. Power was read directly and cable loss correction (2.0dB) was added to the reading to obtain power at the EUT antenna terminals.

3.3 Limit

Operating Frequency (MHz)	Output power limit
5150~5250	< 50 mW (17 dBm) or 4 dBm+10 log B
5250~5350, 5470~5725	< 250 mW (24 dBm) or 11 dBm+10 log B
5725~5825	< 1 W (30 dBm) or 17 dBm+10 log B

Remark: where B is the –26 dB emission bandwidth in MHz.

3.4 Measured data of Maximum Output Power test results

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Output Power (dBm)			Total Power (PK)		Limit (dBm)
				Chain A	Chain B	Chain C			
				PK	PK	PK	mW	dBm	
802.11a	36	5180	6	13.14	10.73	11.18	45.56	16.59	17
	40	5200		13.16	10.59	11.35	45.80	16.61	17
	48	5240		13.16	10.67	11.35	46.02	16.63	17
802.11n HT20	36	5180	6.5	13.03	10.69	11.21	45.03	16.53	17
	40	5200		13.16	10.76	11.48	46.67	16.69	17
	48	5240		12.99	10.63	11.42	45.34	16.56	17
802.11n HT40	38	5190	13.5	12.85	10.39	11.17	43.31	16.37	17
	46	5230		12.73	10.89	11.28	44.45	16.48	17

4. Power Spectrum Density test (FCC 15.407)

4.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1023	hPa

4.2 Test setup & procedure

The power spectrum density per FCC §15.407(a) was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set at 1MHz, the video bandwidth set at 3 MHz. Power spectrum density was read directly and cable loss (2.0 dB)/external attenuator (20 dB) correction was added to the reading to obtain power at the EUT antenna terminals.

4.3 Limitation

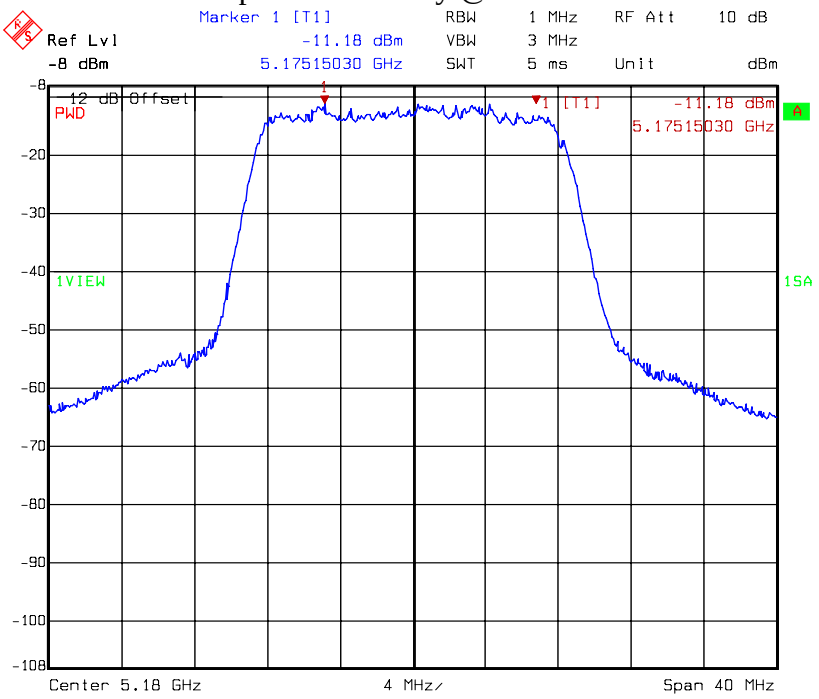
Operating Frequency (MHz)	Power density limit
5150~5250	< 4 dBm/MHz
5250~5350, 5470~5725	< 11 dBm/MHz
5725~5825	< 17 dBm/MHz

4.4 Measured data of Power Spectrum Density test results

Mode	Channel	Frequency (MHz)	Data rate Mbps	PPSD (dBm)			Total PPSD		Limit (dBm)
				Chain A	Chain B	Chain C	mW	dBm	
802.11a	36	5180	6	-11.18	-13.03	-12.89	0.21	-6.87	4
	40	5200		-11.10	-13.13	-12.84	0.18	-7.49	4
	48	5240		-10.98	-12.93	-11.71	0.20	-7.03	4
802.11n HT20	36	5180	6.5	-11.57	-13.03	-13.55	0.16	-7.86	4
	40	5200		-11.75	-13.51	-12.44	0.17	-7.74	4
	48	5240		-10.38	-13.04	-12.24	0.20	-6.97	4
802.11n HT40	38	5190	13.5	-18.23	-20.13	-19.97	0.03	-14.58	4
	46	5230		-17.85	-18.78	-18.95	0.04	-13.73	4

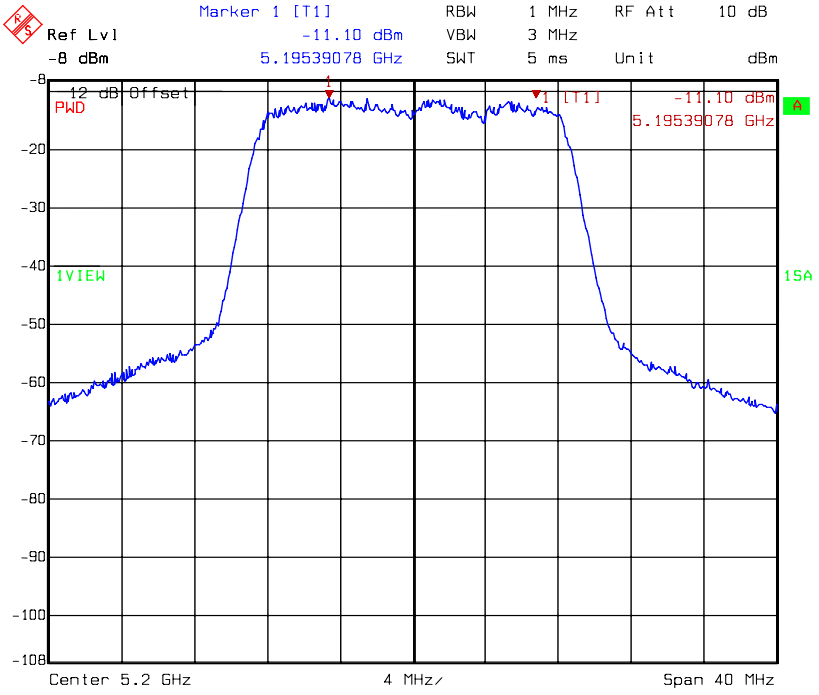
Please see the plot below.

Chain A: Power Spectrum Density @ 802.11a mode channel 36



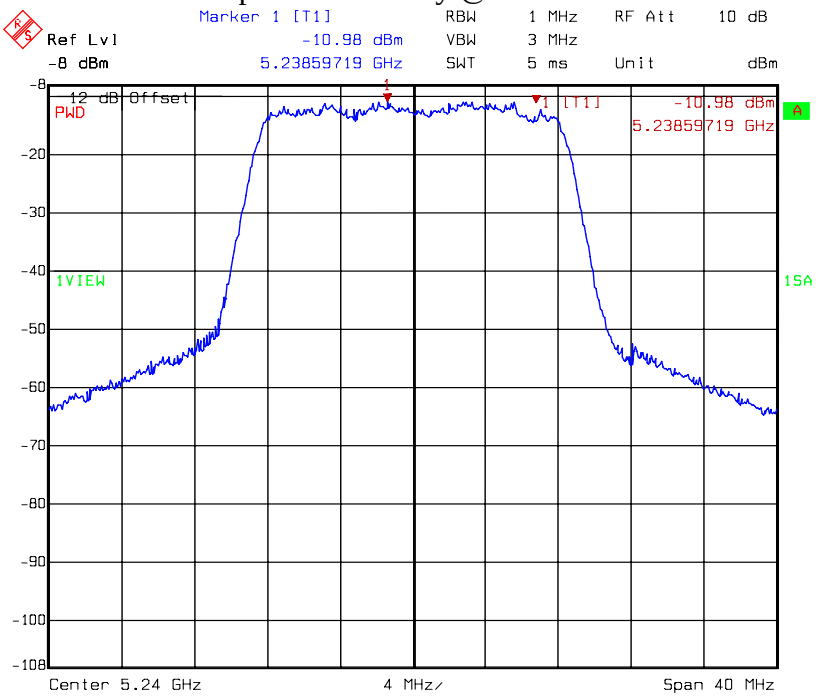
Title: Power Density
Comment A: CH 36 at 802.11a mode chainA
Date: 04.DEC.2008 10:50:42

Chain A: Power Spectrum Density @ 802.11a mode channel 40



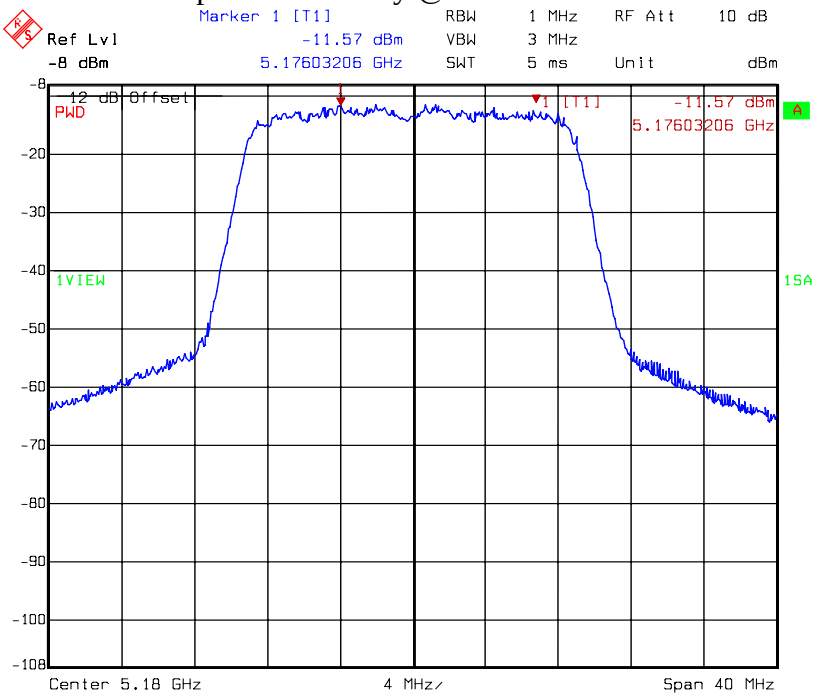
Title: Power Density
Comment A: CH 40 at 802.11a mode chainA
Date: 04.DEC.2008 10:57:31

Chain A: Power Spectrum Density @ 802.11a mode channel 48



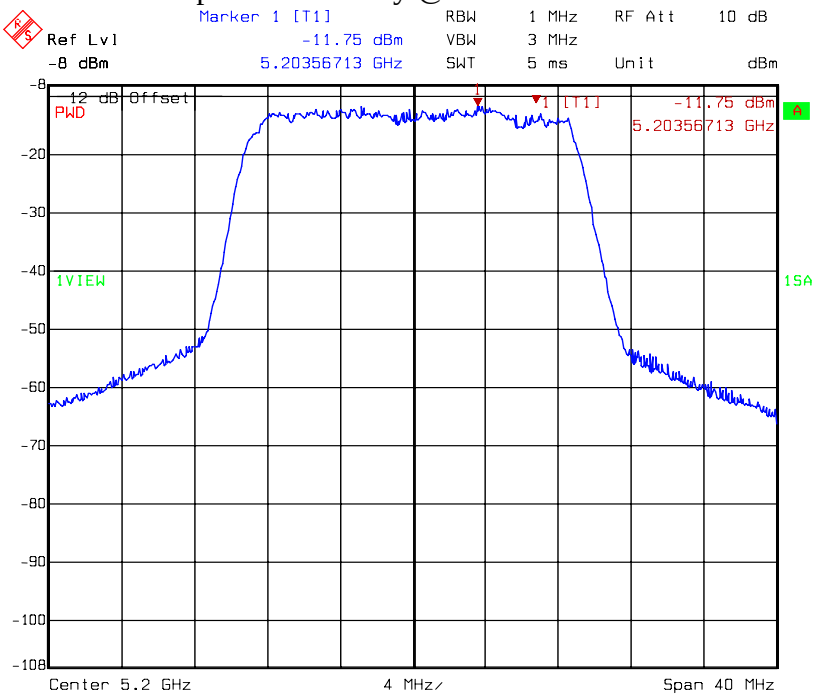
Title: Power Density
Comment A: CH 48 at 802.11a mode chainA
Date: 04.DEC.2008 10:59:47

Chain A: Power Spectrum Density @ 802.11n mode HT20 channel 36



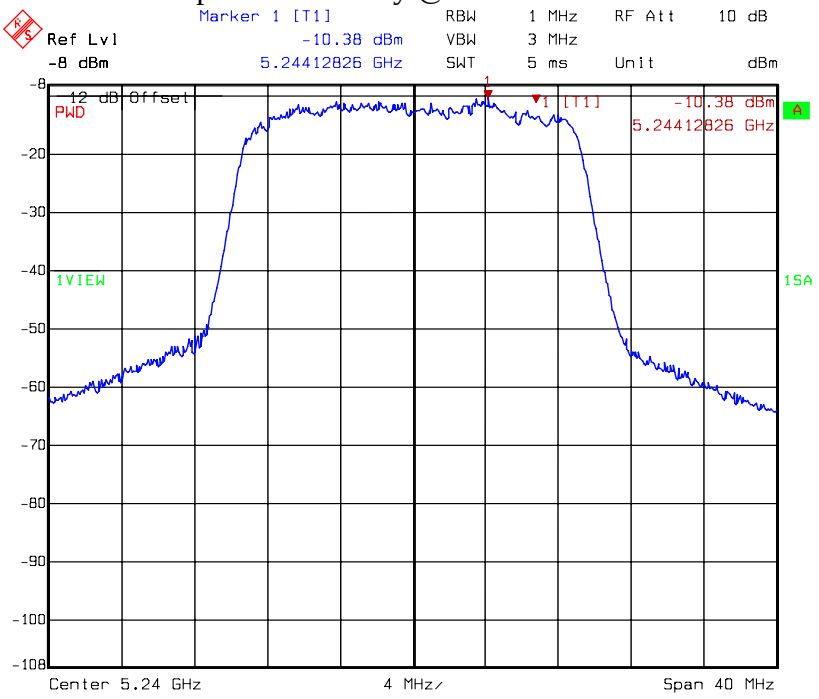
Title: Power Density
Comment A: 5.180G at 802.11n mode HT20 chainA
Date: 04.DEC.2008 11:21:59

Chain A: Power Spectrum Density @ 802.11n mode HT20 channel 40



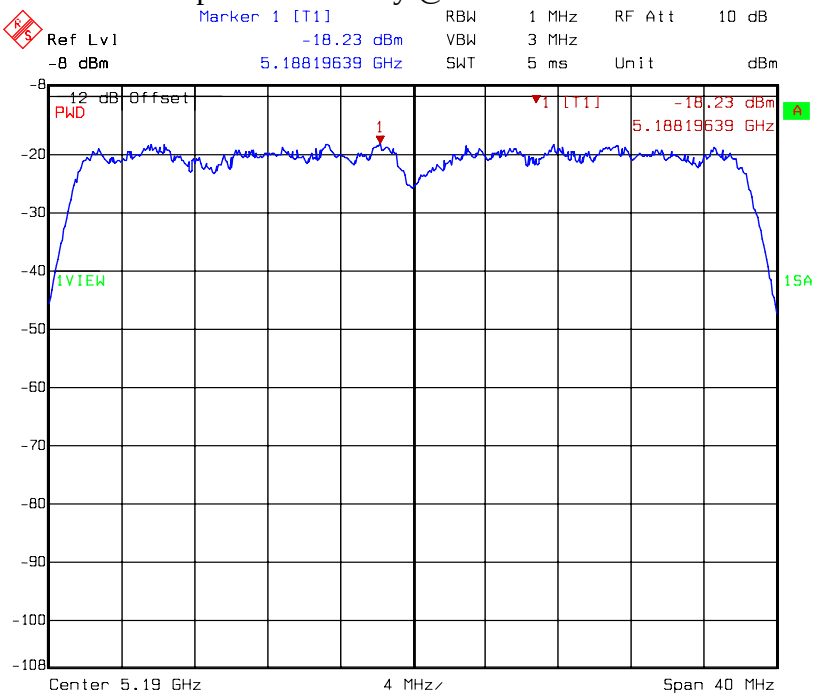
Title: Power Density
Comment A: 5.200G at 802.11n mode HT20 chainA
Date: 04.DEC.2008 11:26:58

Chain A: Power Spectrum Density @ 802.11n mode HT20 channel 48



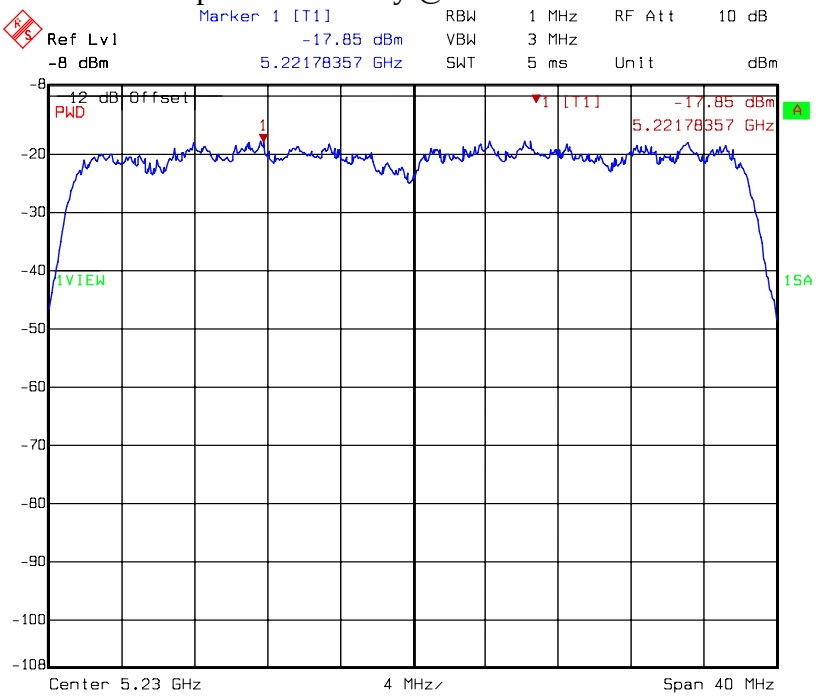
Title: Power Density
Comment A: 5.240G at 802.11n mode HT20 chainA
Date: 04.DEC.2008 11:32:58

Chain A: Power Spectrum Density @ 802.11n mode HT40 channel 38



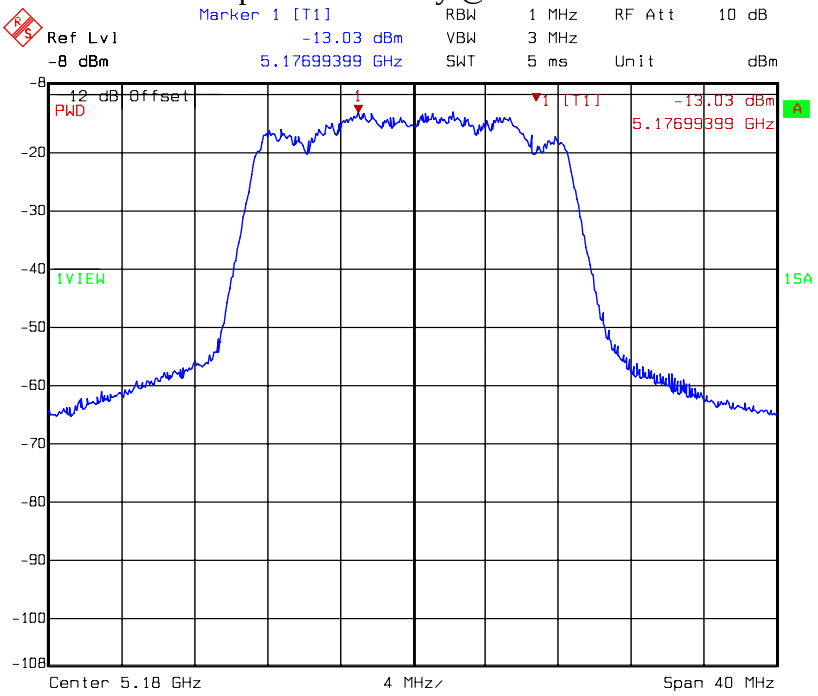
Title: Power Density
Comment A: 5.190G at 802.11n mode HT40 chainA
Date: 04.DEC.2008 11:39:02

Chain A: Power Spectrum Density @ 802.11n mode HT40 channel 46



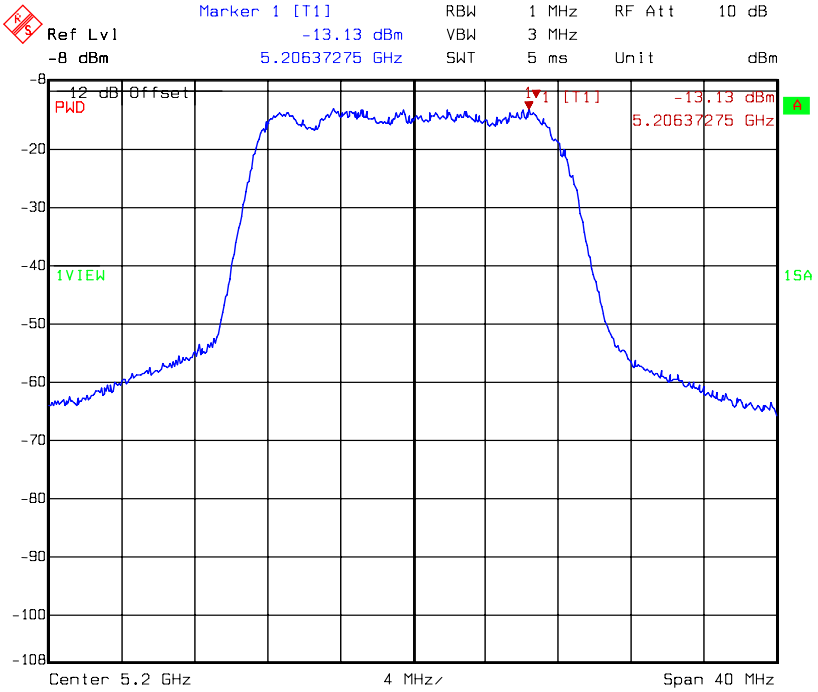
Title: Power Density
Comment A: 5.230G at 802.11n mode HT40 chainA
Date: 04.DEC.2008 11:44:46

Chain B: Power Spectrum Density @ 802.11a mode channel 36



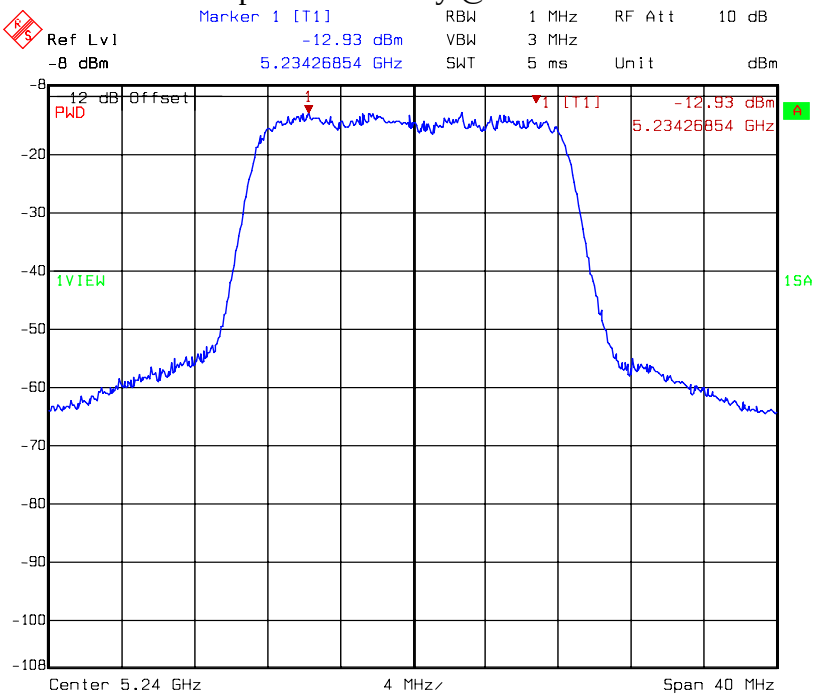
Title: Power Density
Comment A: CH 36 at 802.11a mode chainB
Date: 04.DEC.2008 12:11:46

Chain B: Power Spectrum Density @ 802.11a mode channel 40



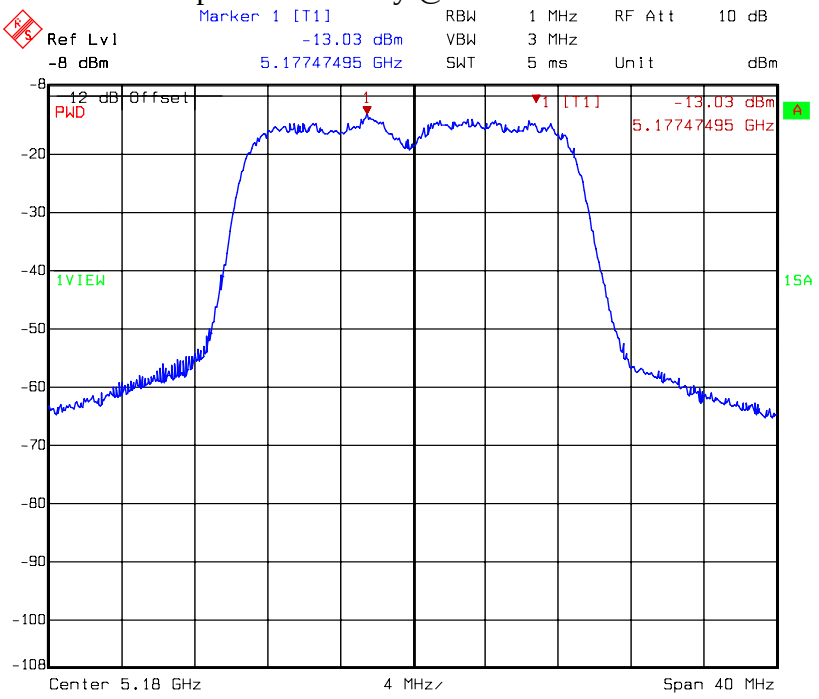
Title: Power Density
Comment A: CH 40 at 802.11a mode chainB
Date: 04.DEC.2008 12:16:21

Chain B: Power Spectrum Density @ 802.11a mode channel 48



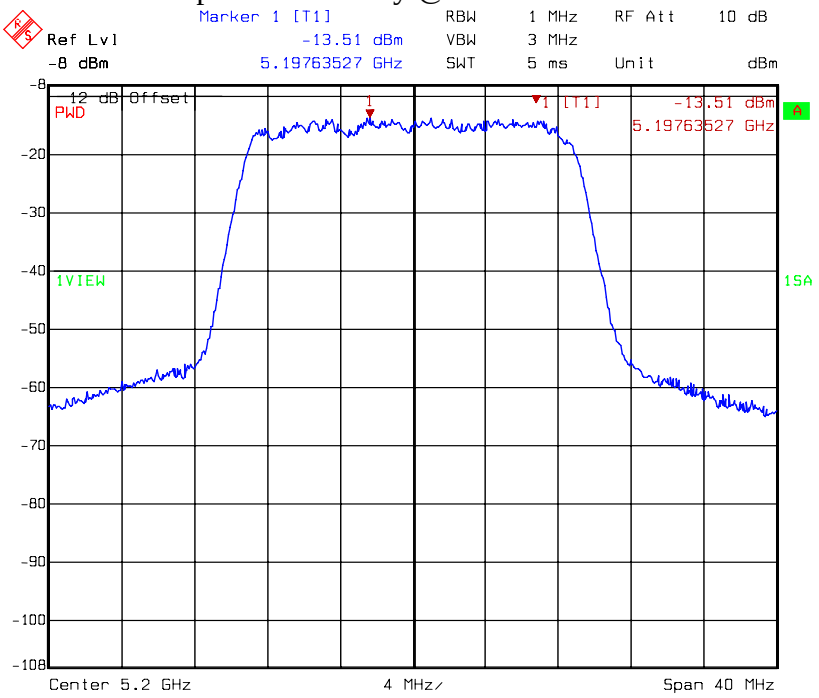
Title: Power Density
Comment A: CH 48 at 802.11a mode chainB
Date: 04.DEC.2008 12:19:27

Chain B: Power Spectrum Density @ 802.11n mode HT20 channel 36



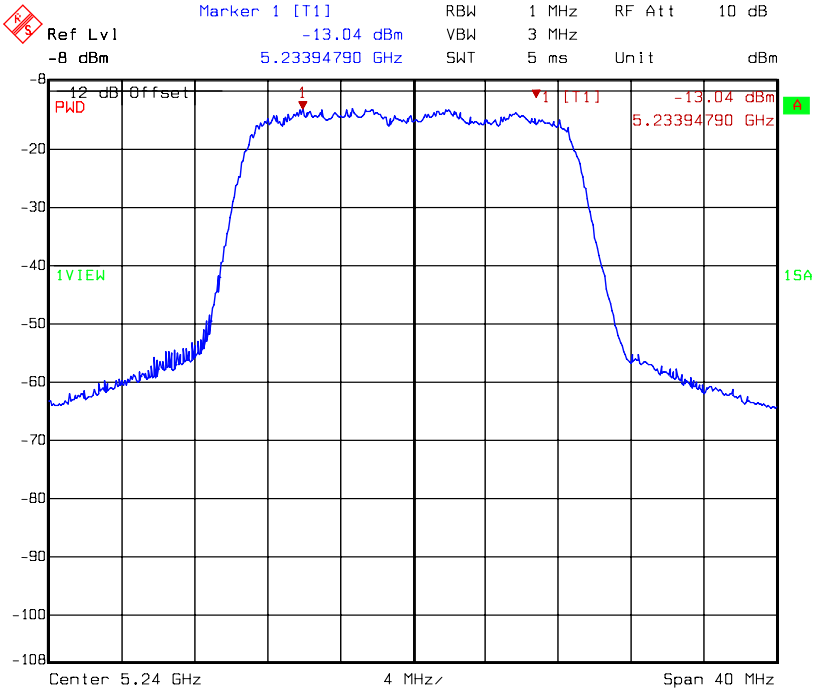
Title: Power Density
Comment A: 5.180G at 802.11n mode HT20 chainB
Date: 04.DEC.2008 11:58:12

Chain B: Power Spectrum Density @ 802.11n mode HT20 channel 40



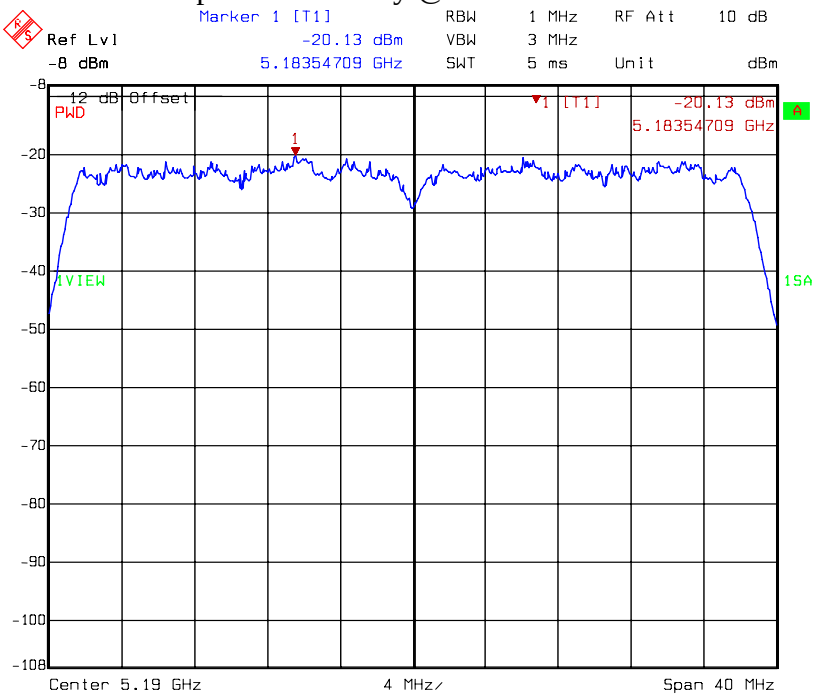
Title: Power Density
Comment A: 5.200G at 802.11n mode HT20 chainB
Date: 04.DEC.2008 12:02:58

Chain B: Power Spectrum Density @ 802.11n mode HT20 channel 48

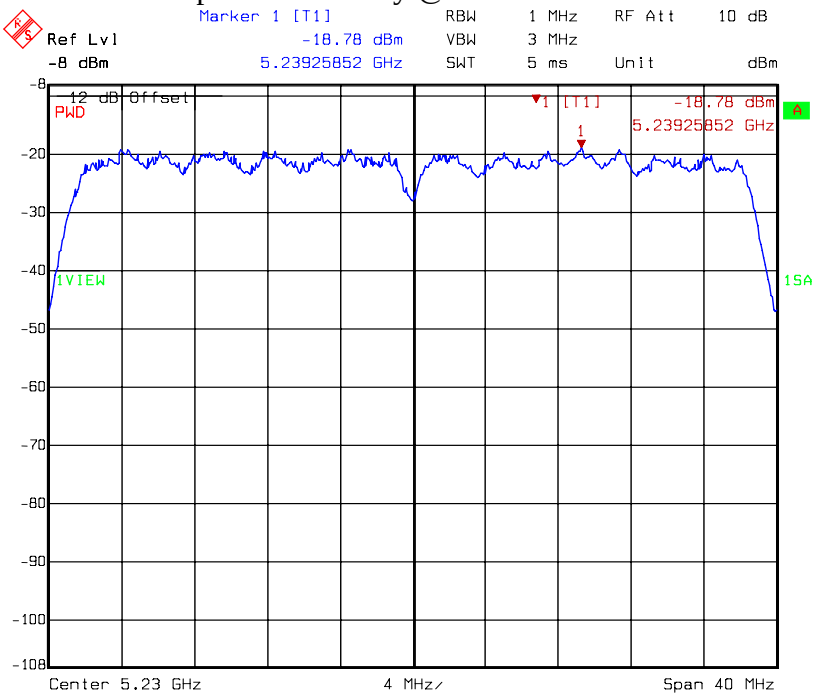


Title: Power Density
Comment A: 5.240G at 802.11n mode HT20 chainB
Date: 04.DEC.2008 12:06:09

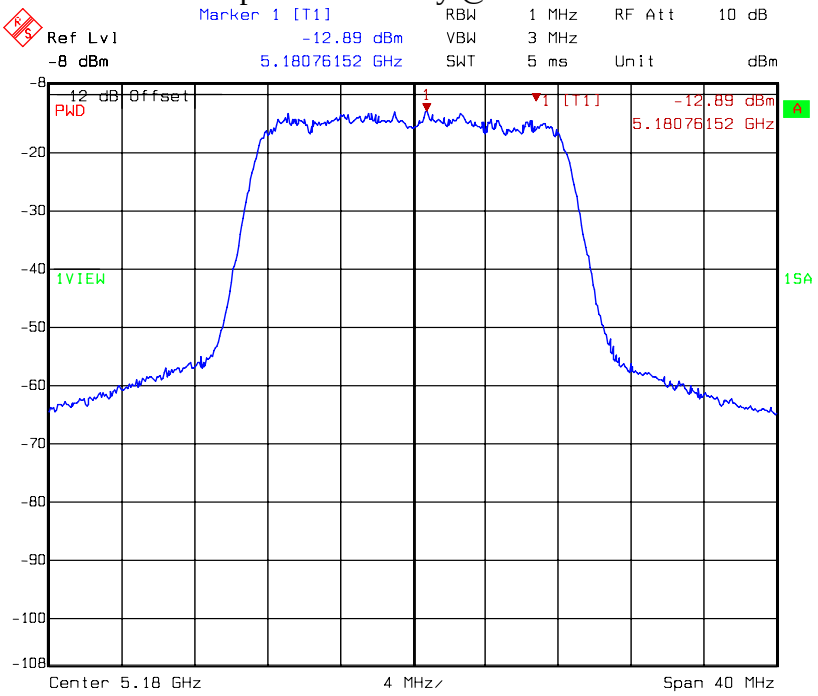
Chain B: Power Spectrum Density @ 802.11n mode HT40 channel 38



Chain B: Power Spectrum Density @ 802.11n mode HT40 channel 46

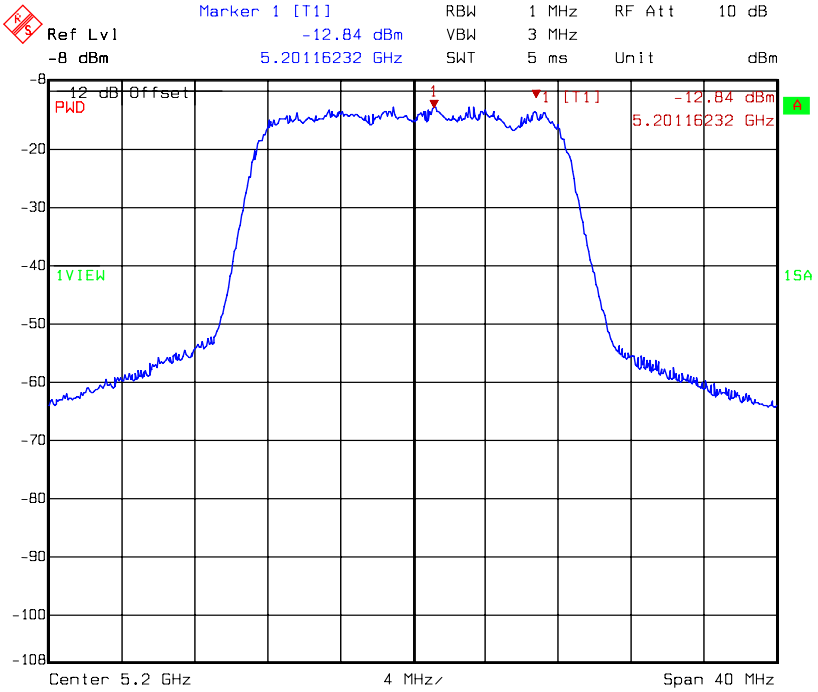


Chain C: Power Spectrum Density @ 802.11a mode channel 36



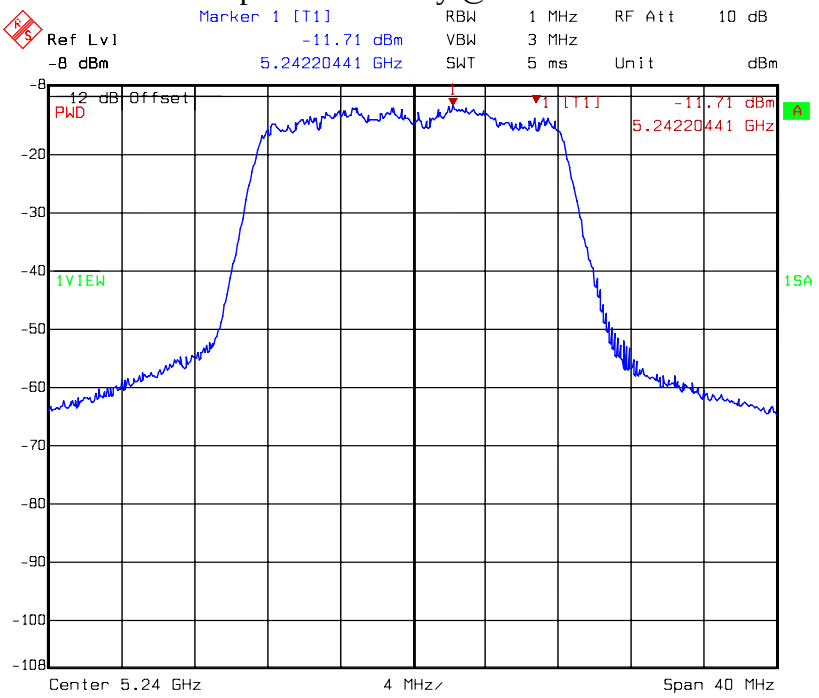
Title: Power Density
Comment A: CH 36 at 802.11a mode chainC
Date: 04.DEC.2008 13:31:06

Chain C: Power Spectrum Density @ 802.11a mode channel 40



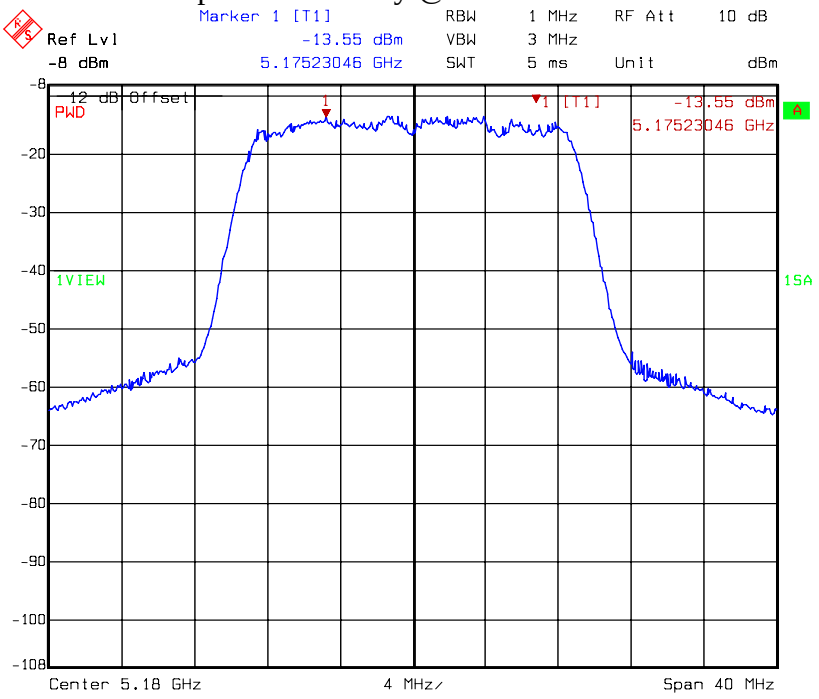
Title: Power Density
Comment A: CH 40 at 802.11a mode chainC
Date: 04.DEC.2008 13:35:27

Chain C: Power Spectrum Density @ 802.11a mode channel 48



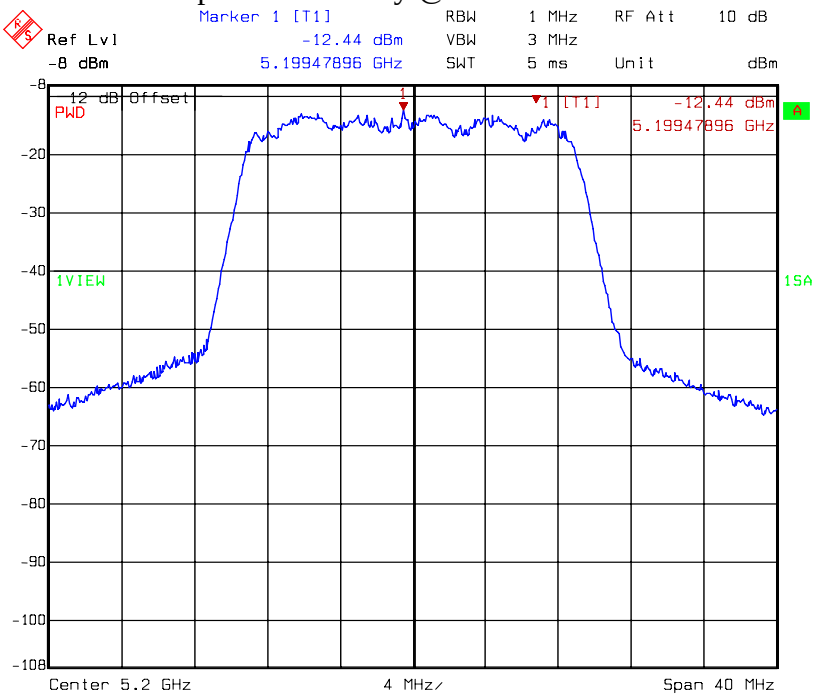
Title: Power Density
Comment A: CH 48 at 802.11a mode chainC
Date: 04.DEC.2008 13:41:20

Chain C: Power Spectrum Density @ 802.11n mode HT20 channel 36



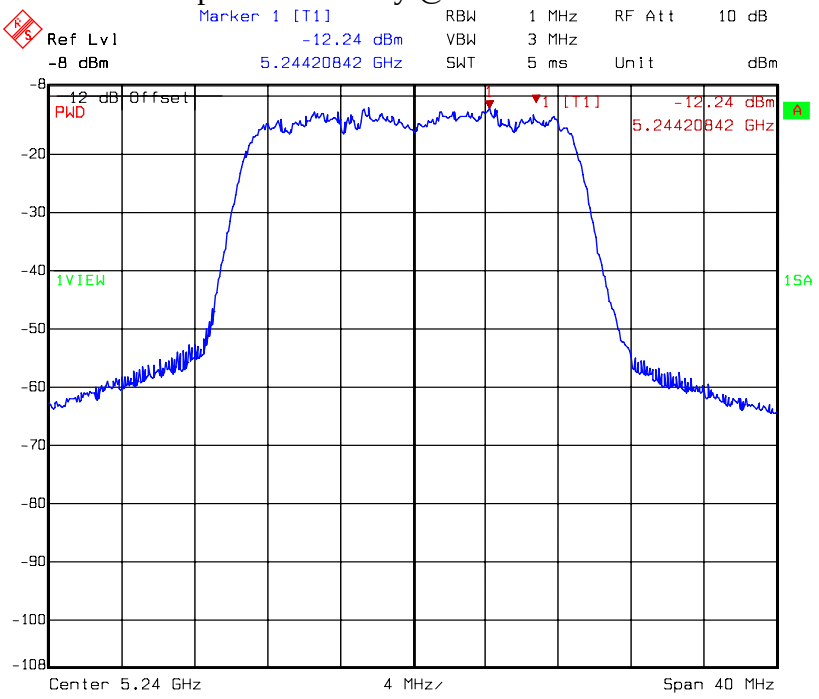
Title: Power Density
Comment A: 5.180G at 802.11n mode HT20 chainC
Date: 04.DEC.2008 13:47:29

Chain C: Power Spectrum Density @ 802.11n mode HT20 channel 40



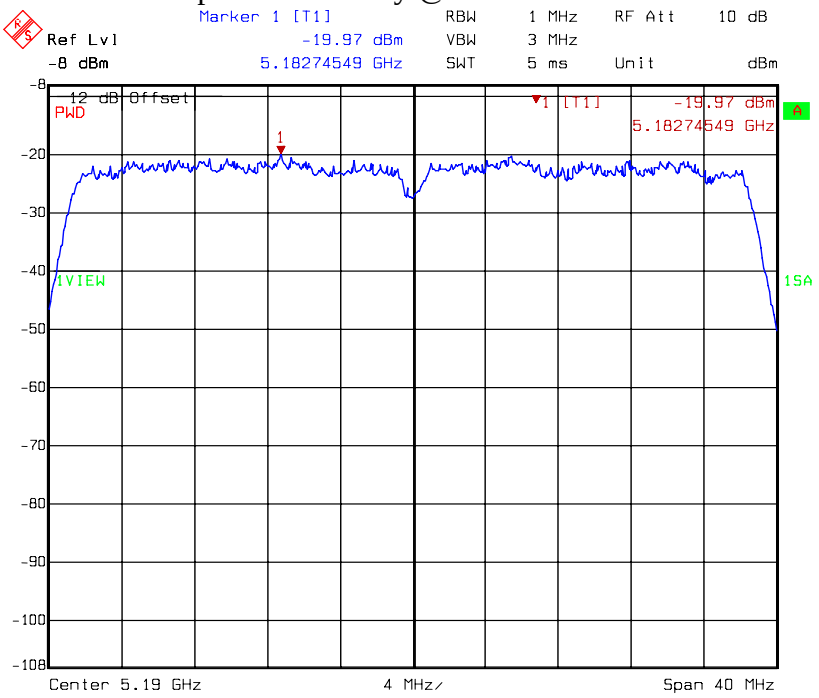
Title: Power Density
Comment A: 5.200G at 802.11n mode HT20 chainC
Date: 04.DEC.2008 13:51:55

Chain C: Power Spectrum Density @ 802.11n mode HT20 channel 48



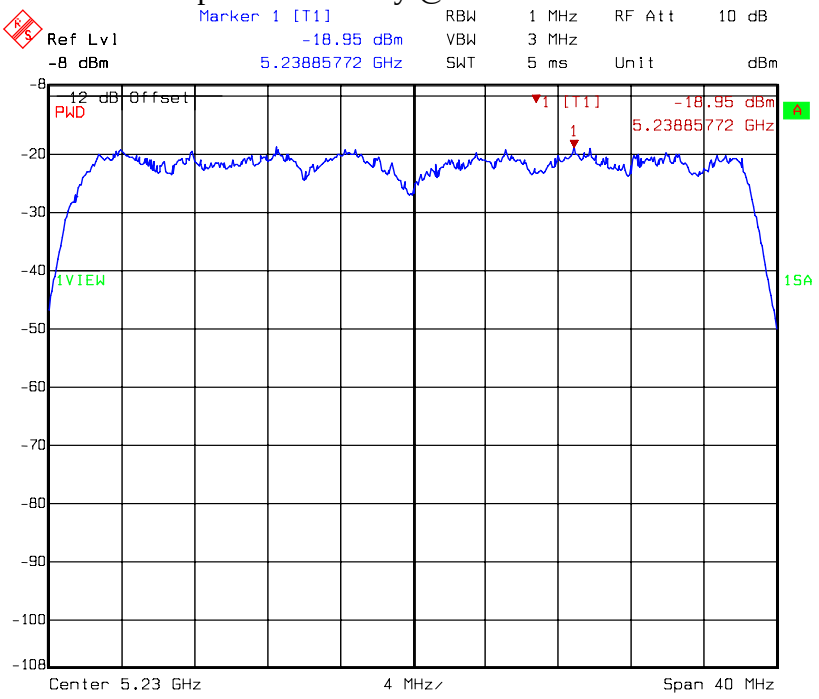
Title: Power Density
Comment A: 5.240G at 802.11n mode HT20 chainC
Date: 04.DEC.2008 13:56:12

Chain C: Power Spectrum Density @ 802.11n mode HT40 channel 38



Title: Power Density
Comment A: 5.190G at 802.11n mode HT40 chainC
Date: 04.DEC.2008 14:01:14

Chain C: Power Spectrum Density @ 802.11n mode HT40 channel 46



Title: Power Density
Comment A: 5.230G at 802.11n mode HT40 chainC
Date: 04.DEC.2008 14:07:10

5. Additional provisions test (FCC 15.215)

5.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1023	hPa

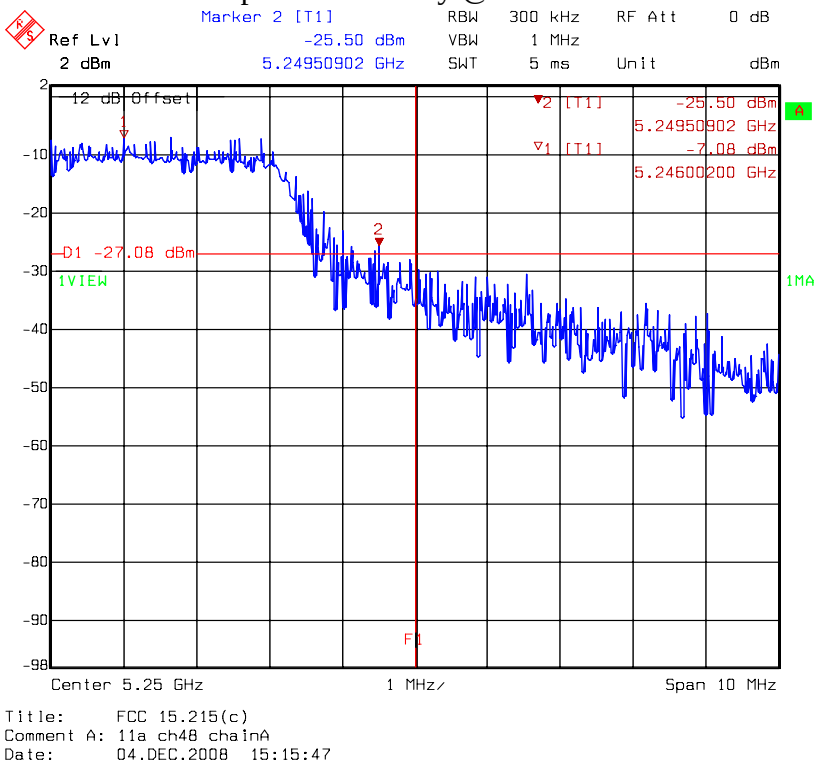
5.2 Procedure of test setup & limitation

The additional provisions mean the device must be designed to ensure that the 20dB bandwidth of the emission or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

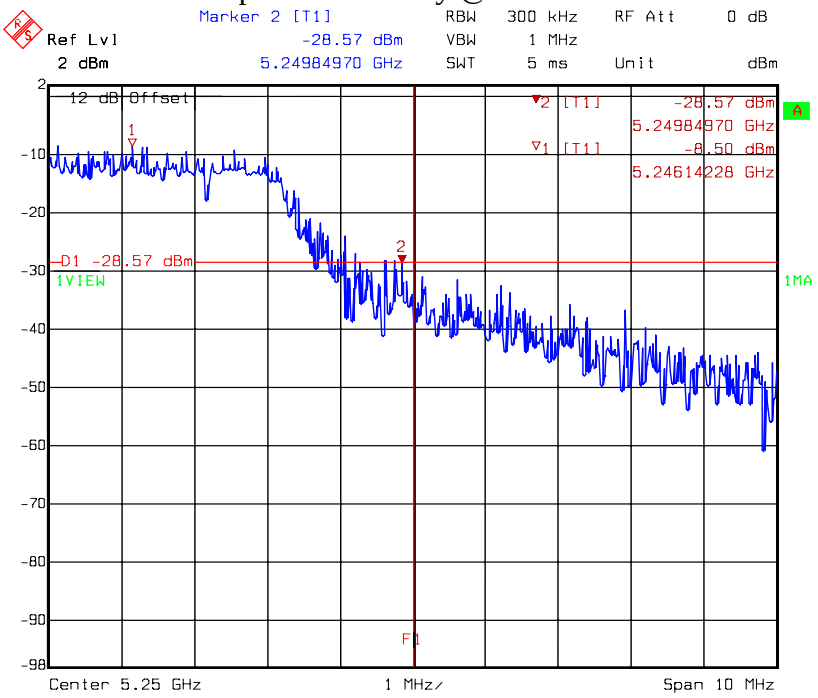
This requirement per FCC §15.215 (c) was measured from the antenna port of the EUT using a 50ohm spectrum analyzer with the resolution bandwidth set at 300kHz (approximately 1% of the emission bandwidth), the video bandwidth set at 1MHz (VBW > RBW).

5.3 Measured data of Power Spectrum Density test results

Chain A: Power Spectrum Density @ 802.11a mode channel 48

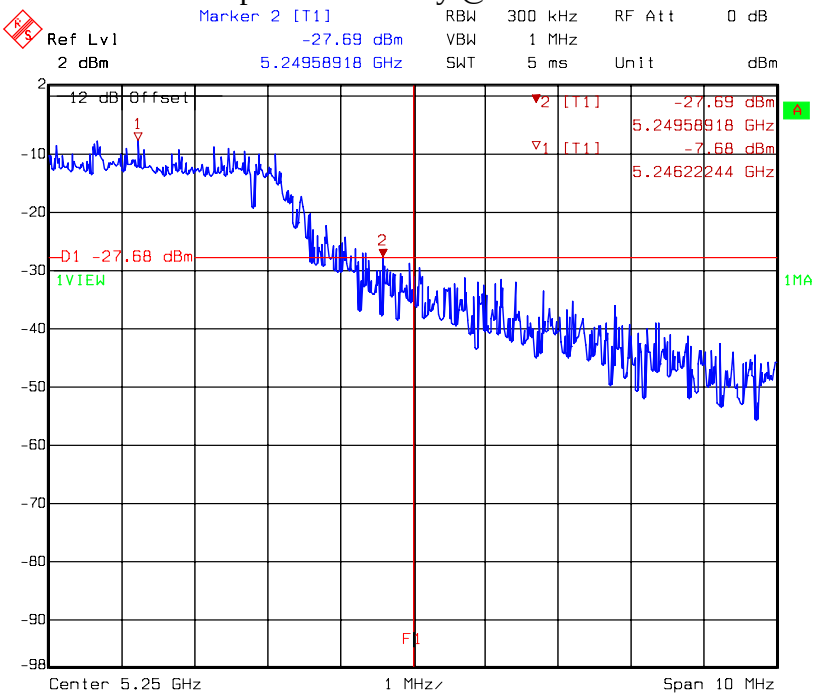


Chain B: Power Spectrum Density @ 802.11a mode channel 48



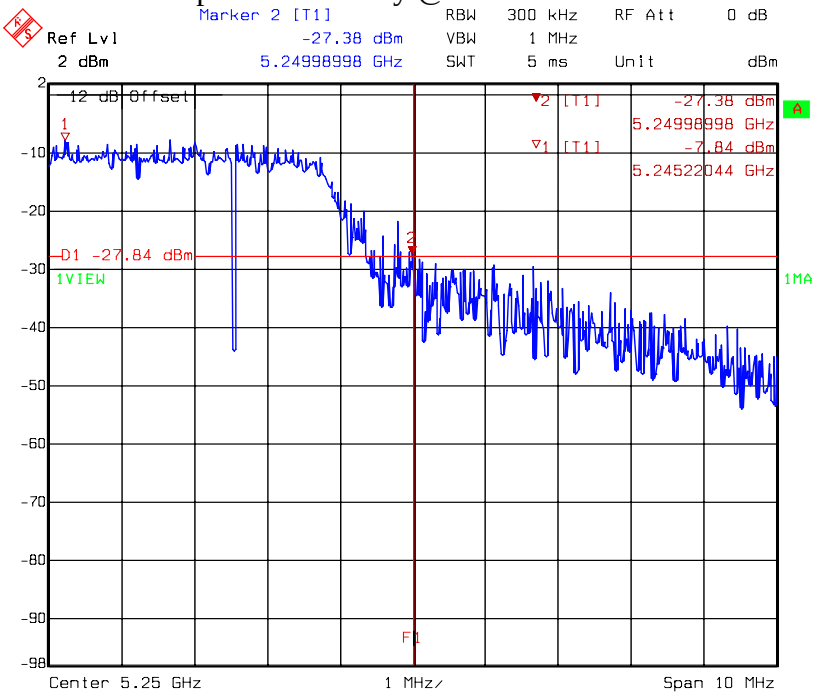
Title: FCC 15.215(c)
Comment A: 11a ch48 chainB
Date: 04.DEC.2008 15:50:41

Chain C: Power Spectrum Density @ 802.11a mode channel 48



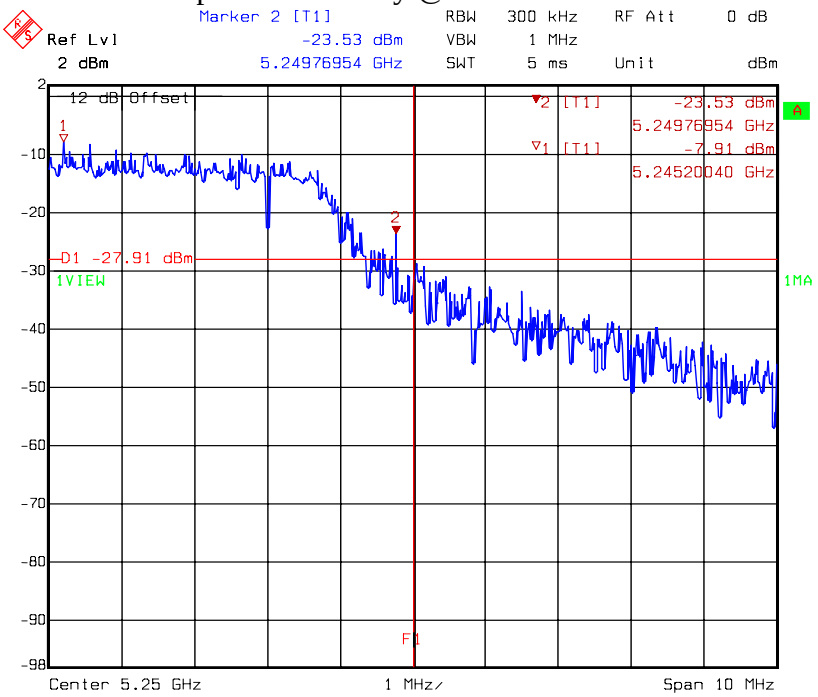
Title: FCC 15.215(c)
Comment A: 11a ch48 chainC
Date: 04.DEC.2008 15:58:58

Chain A: Power Spectrum Density @ 802.11n mode HT20 channel 48



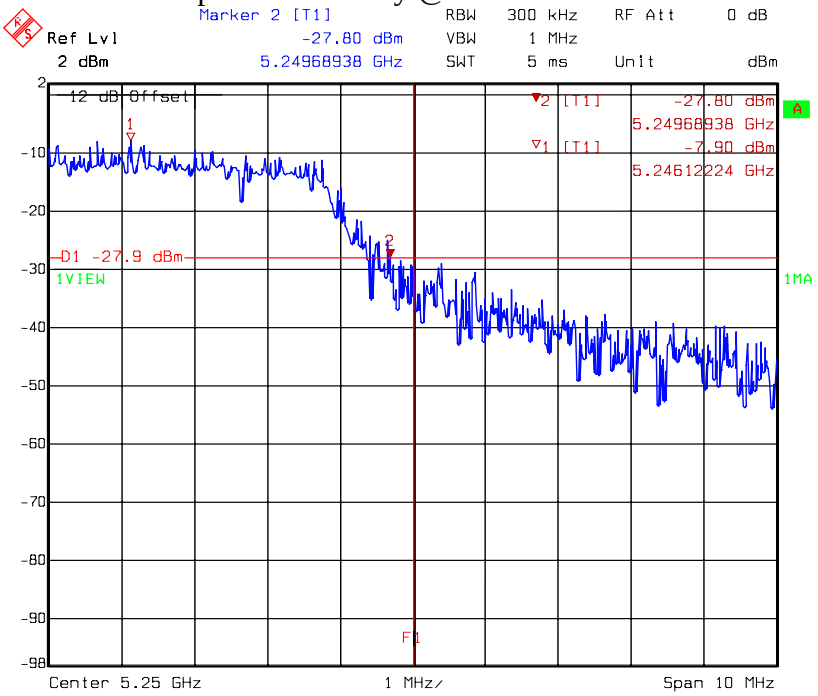
Title: FCC 15.215(c)
Comment A: 11n HT20 ch48 chainA
Date: 04.DEC.2008 15:42:35

Chain B: Power Spectrum Density @ 802.11n mode HT20 channel 48



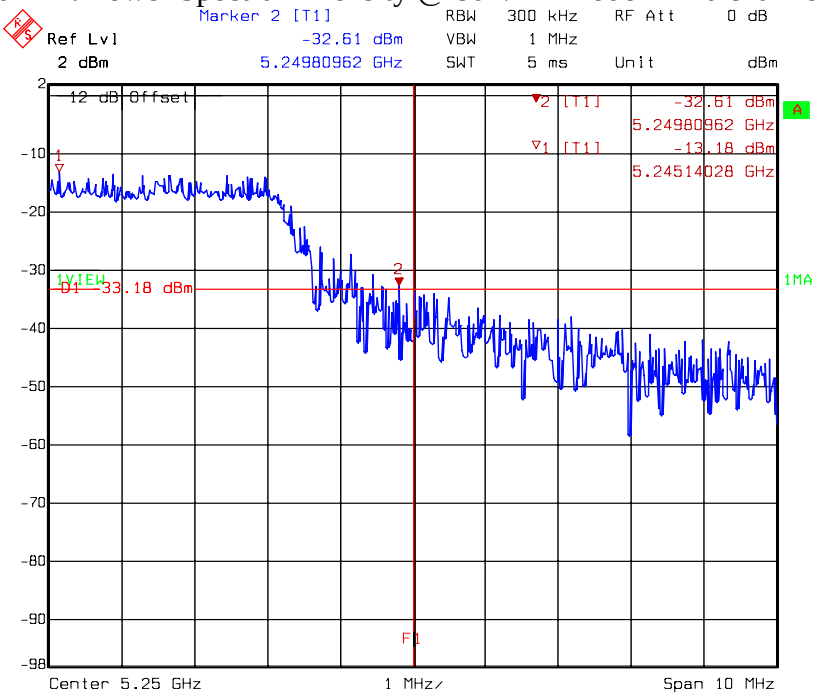
Title: FCC 15.215(c)
Comment A: 11n HT20 ch48 chainB
Date: 04.DEC.2008 15:49:17

Chain C: Power Spectrum Density @ 802.11n mode HT20 channel 48



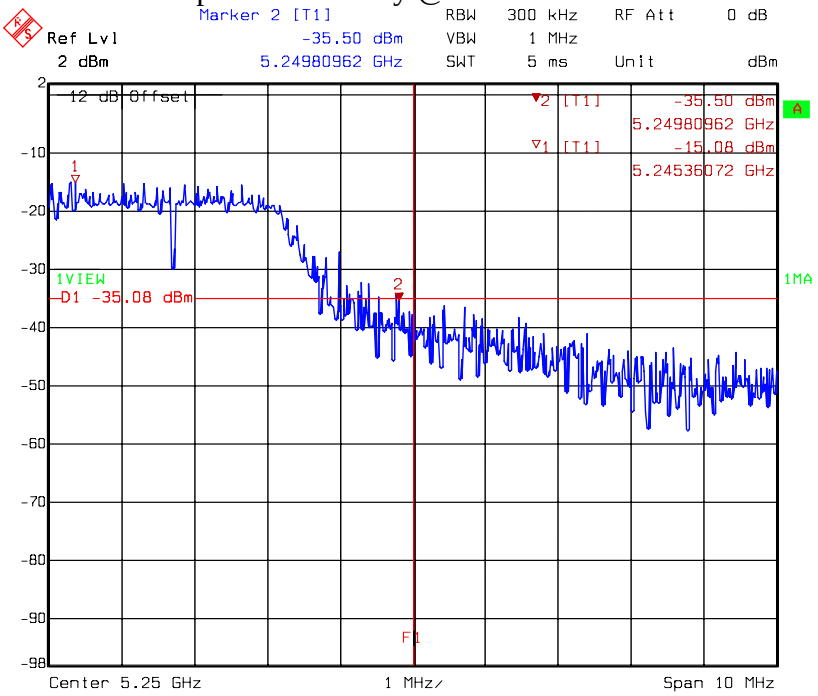
Title: FCC 15.215(c)
Comment A: 11n HT20 ch48 chainC
Date: 04.DEC.2008 16:02:23

Chain A: Power Spectrum Density @ 802.11n mode HT40 channel 40



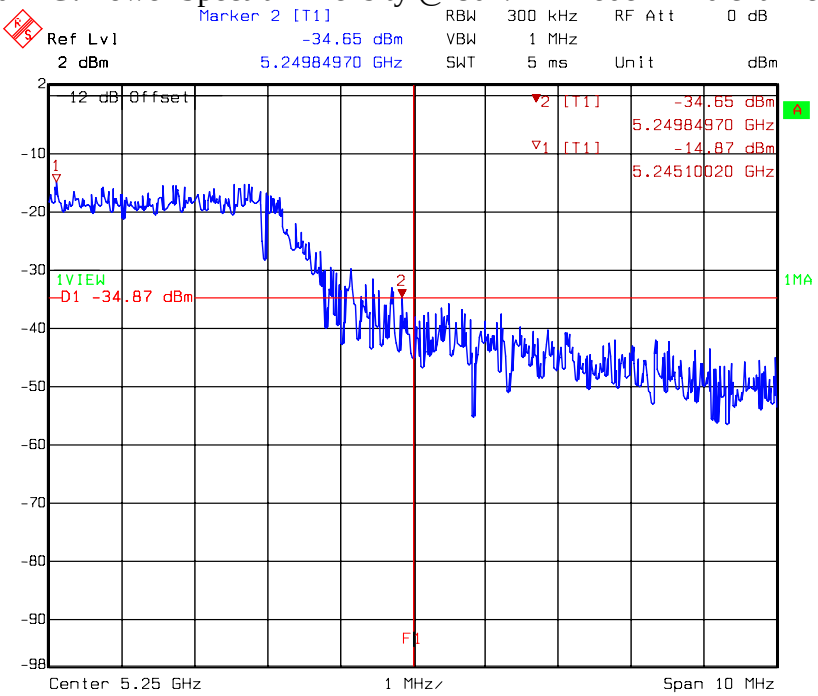
Title: FCC 15.215(c)
Comment A: 11n HT40 ch46 chainA
Date: 04.DEC.2008 15:44:22

Chain B: Power Spectrum Density @ 802.11n mode HT40 channel 40



Title: FCC 15.215(c)
Comment A: 11n HT40 ch46 chainB
Date: 04.DEC.2008 16:07:38

Chain C: Power Spectrum Density @ 802.11n mode HT40 channel 40



Title: FCC 15.215(c)
Comment A: 11n HT40 ch46 chainC
Date: 04.DEC.2008 16:03:43

6. Peak excursion to average ratio test (FCC 15.407)

6.1 Operating environment

Temperature: 25 ℃
Relative Humidity: 50 %
Atmospheric Pressure: 1023 hPa

6.2 Test setup & procedure

The power spectrum density per FCC §15.407(a)(6) was measured from the antenna port of the EUT. Using a 50ohm spectrum analyzer with the RBW=1MHz, VBW=3MHz for peak measurement and RBW=1MHz, VBW=10kHz for average measurement. Peak excursion to average ratio was read directly.

6.3 Limitation

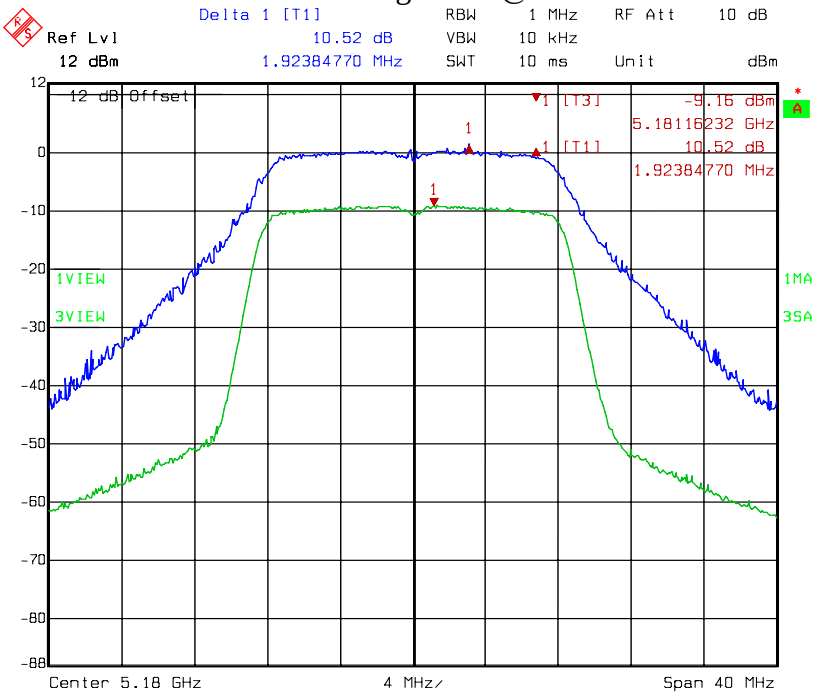
Operating Frequency (MHz)	Peak excursion to average ratio limit
5150~5250	<13dB
5250~5350, 5470~5725	<13dB
5725~5825	<13dB

6.4 Measured data of Peak excursion to average ratio test results

Mode	Channel	Frequency (MHz)	Data rate Mbps	PPSD (dBm)			Limit (dBm)
				Chain A	Chain B	Chain C	
802.11a	36	5180	6	10.52	10.29	11.11	13
	40	5200		10.38	10.41	10.90	13
	48	5240		10.72	10.21	11.07	13
802.11n HT20	36	5180	6.5	10.18	9.37	10.54	13
	40	5200		10.07	10.13	10.71	13
	48	5240		9.90	10.38	10.58	13
802.11n HT40	38	5190	13.5	10.14	10.10	10.57	13
	46	5230		9.67	10.47	10.42	13

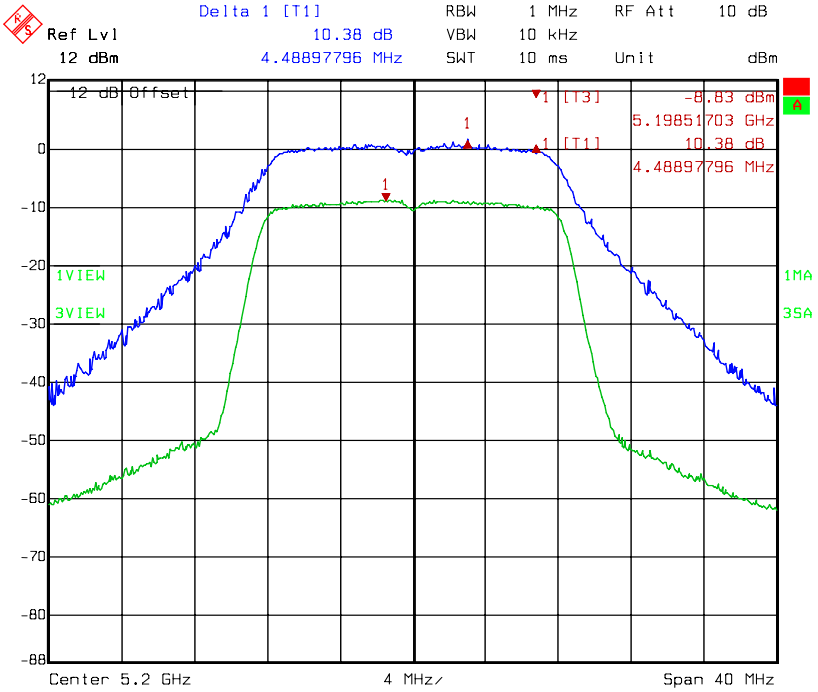
Please see the plot below.

Chain A: Peak excursion to average ratio @ 802.11a mode channel 36



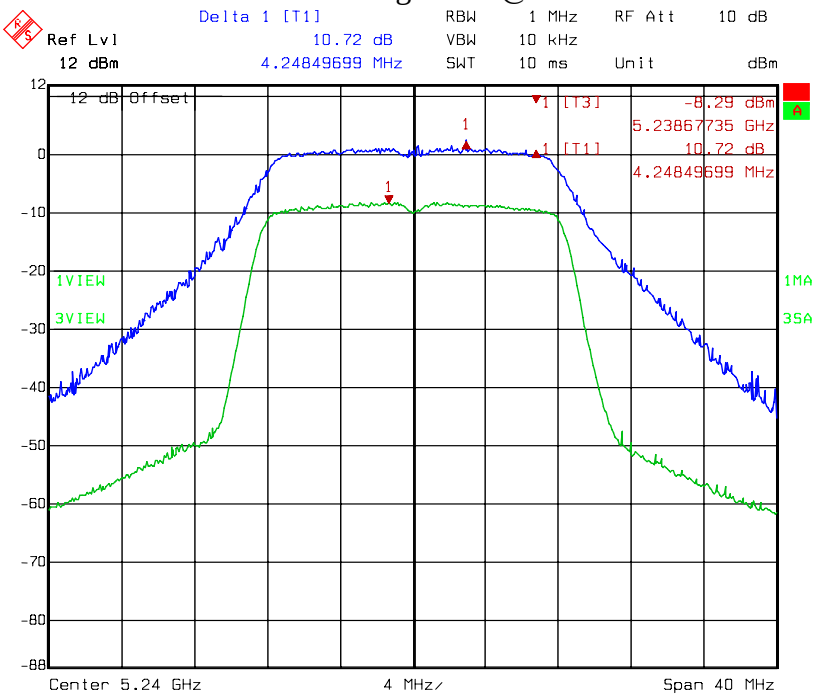
Title: PK Excursion AV
Comment A: CH 36 at 802.11a mode chainA
Date: 04.DEC.2008 10:50:18

Chain A: Peak excursion to average ratio @ 802.11a mode channel 40



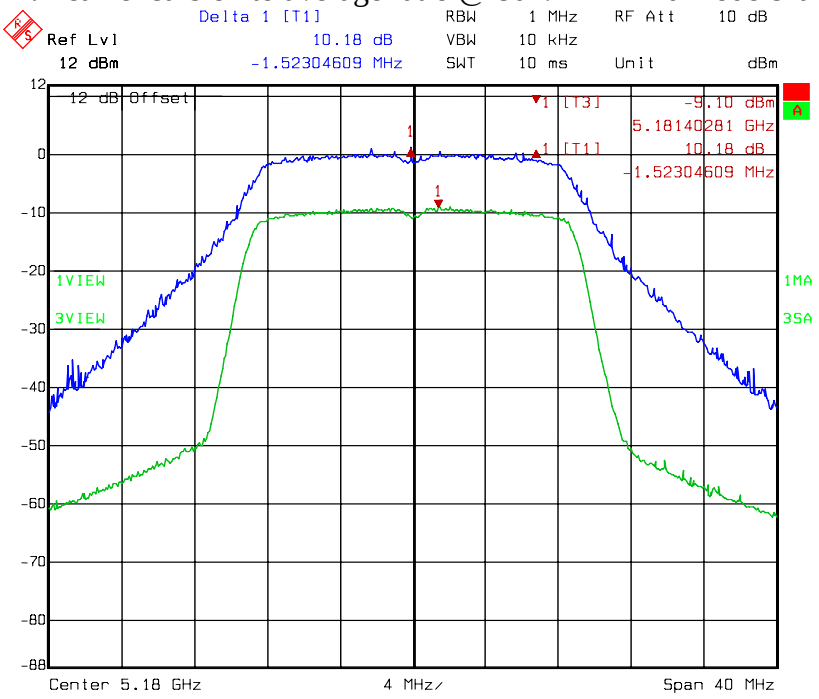
Title: PK Excursion AV
Comment A: CH 40 at 802.11a mode chainA
Date: 04.DEC.2008 10:57:07

Chain A: Peak excursion to average ratio @ 802.11a mode channel 48



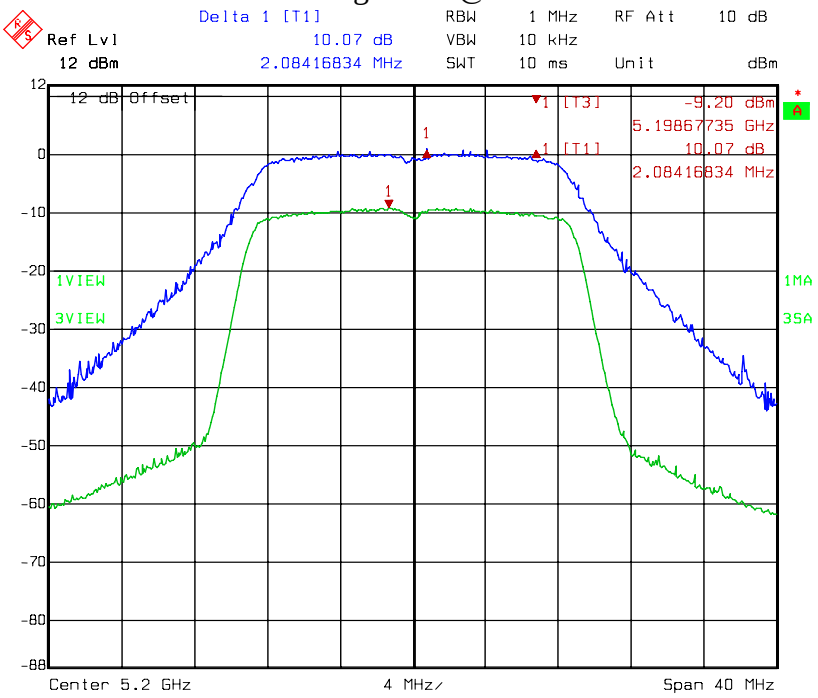
Title: PK Excursion AV
Comment A: CH 48 at 802.11a mode chainA
Date: 04.DEC.2008 10:59:23

Chain A: Peak excursion to average ratio @ 802.11n HT20 mode channel 36



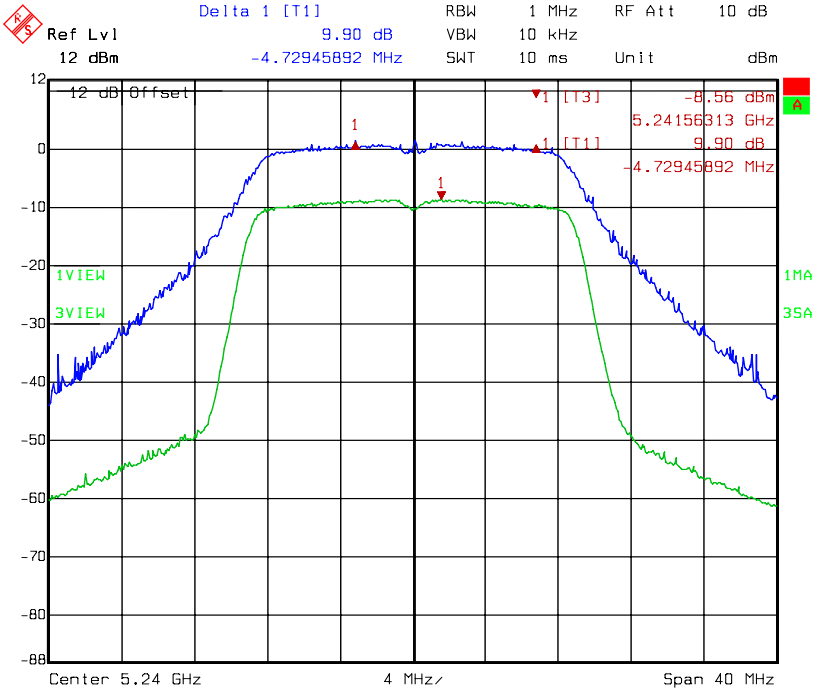
Title: PK Excursion AV
Comment A: 5.180G at 802.11n mode HT20 chainA
Date: 04.DEC.2008 11:21:35

Chain A: Peak excursion to average ratio @ 802.11n HT20 mode channel 40



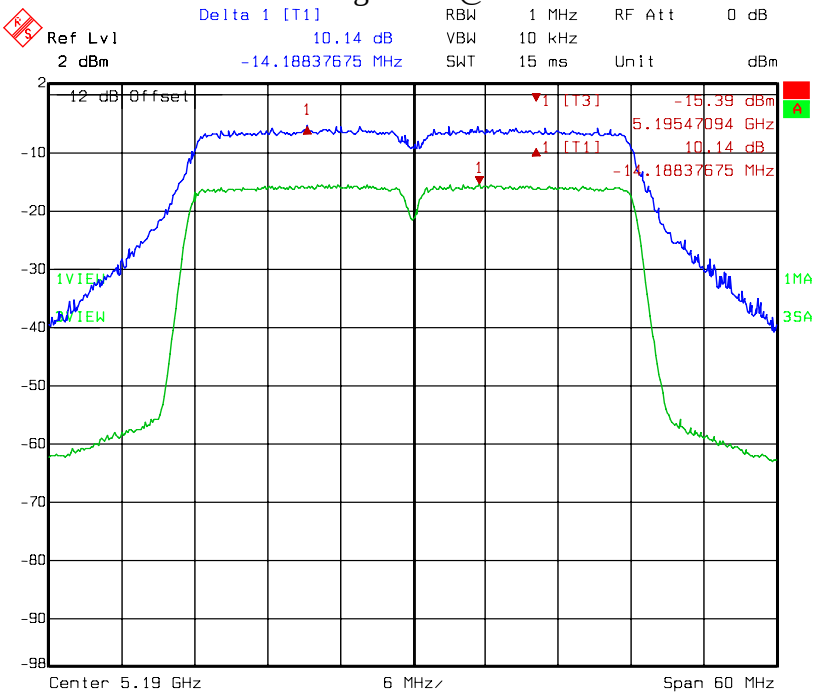
Title: PK Excursion AV
Comment A: 5.200G at 802.11n mode HT20 chainA
Date: 04.DEC.2008 11:26:34

Chain A: Peak excursion to average ratio @ 802.11n HT20 mode channel 48



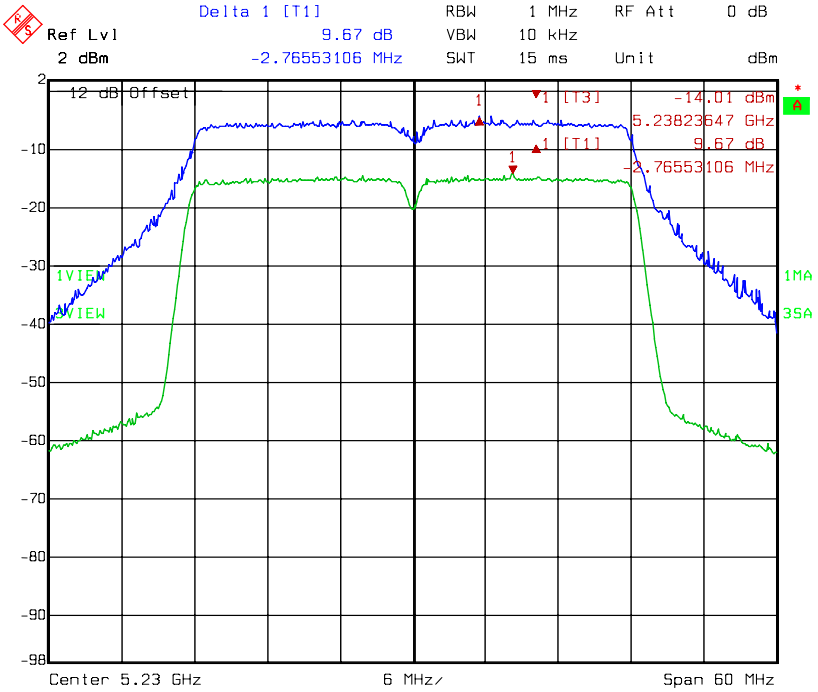
Title: PK Excursion AV
Comment A: 5.240G at 802.11n mode HT20 chainA
Date: 04.DEC.2008 11:32:34

Chain A: Peak excursion to average ratio @ 802.11n HT40 mode channel 38



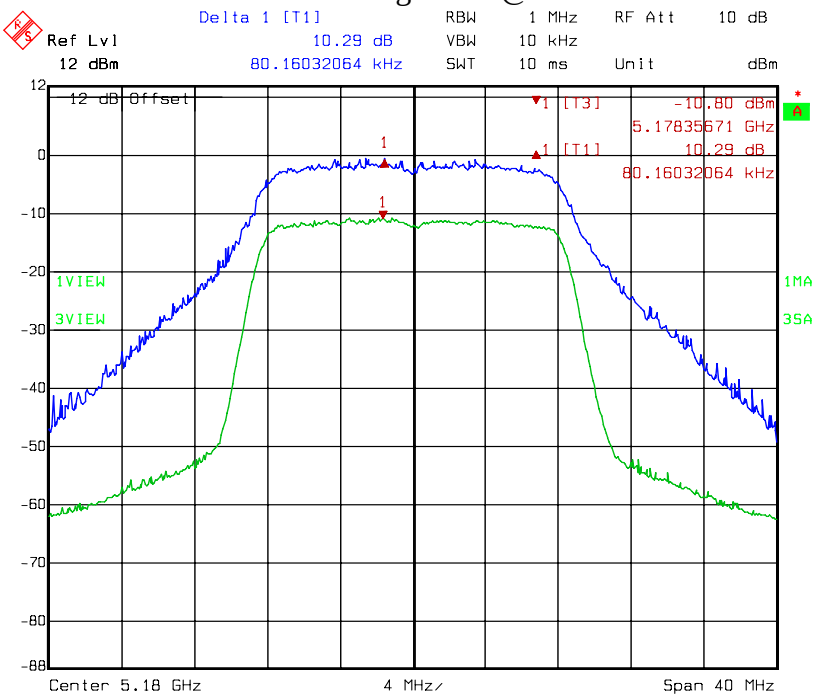
Title: PK Excursion AV
Comment A: 5.190G at 802.11n mode HT40 chainA
Date: 04.DEC.2008 11:38:38

Chain A: Peak excursion to average ratio @ 802.11n HT40 mode channel 46



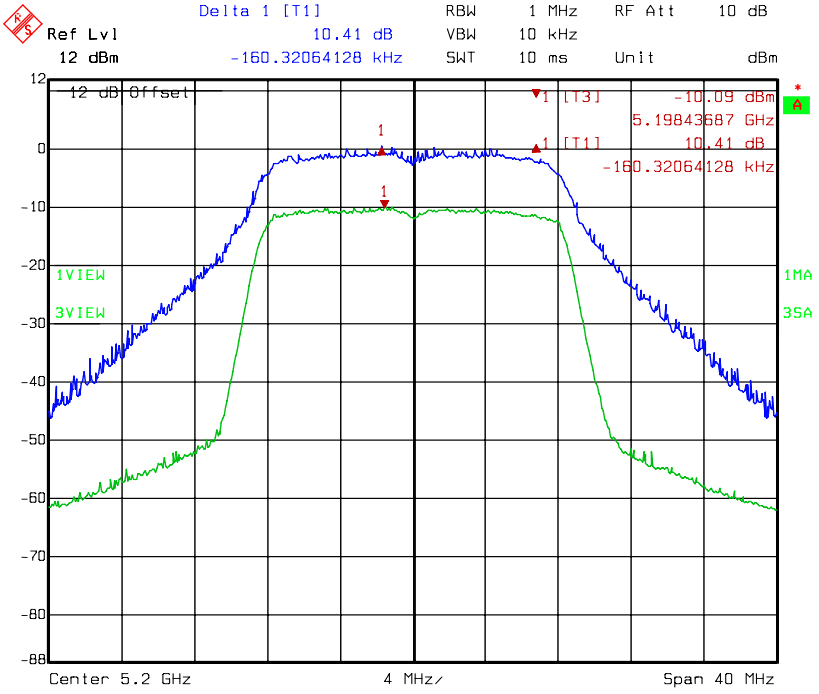
Title: PK Excursion AV
Comment A: 5.230G at 802.11n mode HT40 chainA
Date: 04.DEC.2008 11:44:23

Chain B: Peak excursion to average ratio @ 802.11a mode channel 36



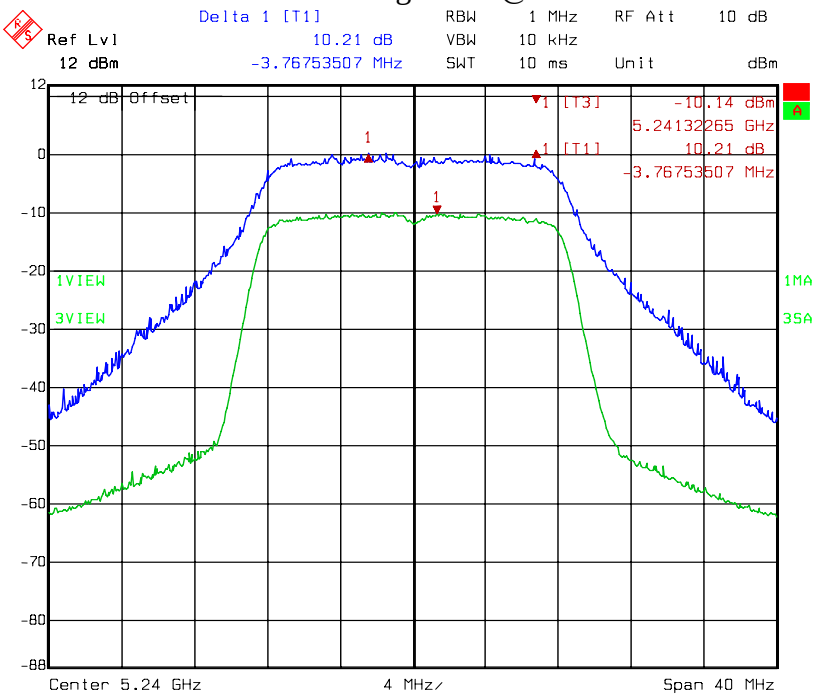
Title: PK Excursion AV
Comment A: CH 36 at 802.11a mode chainB
Date: 04.DEC.2008 12:11:22

Chain B: Peak excursion to average ratio @ 802.11a mode channel 40



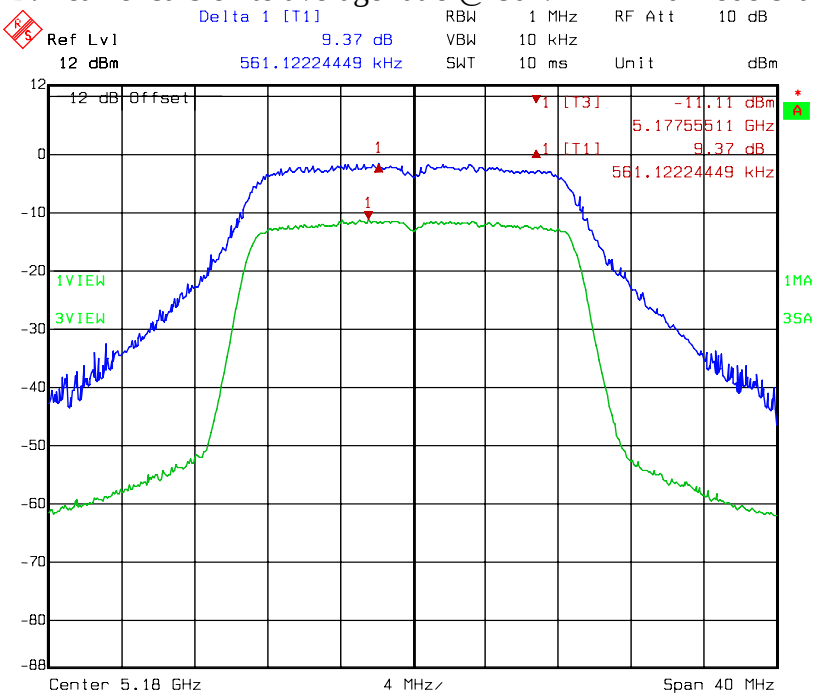
Title: PK Excursion AV
Comment A: CH 40 at 802.11a mode chainB
Date: 04.DEC.2008 12:15:57

Chain B: Peak excursion to average ratio @ 802.11a mode channel 48



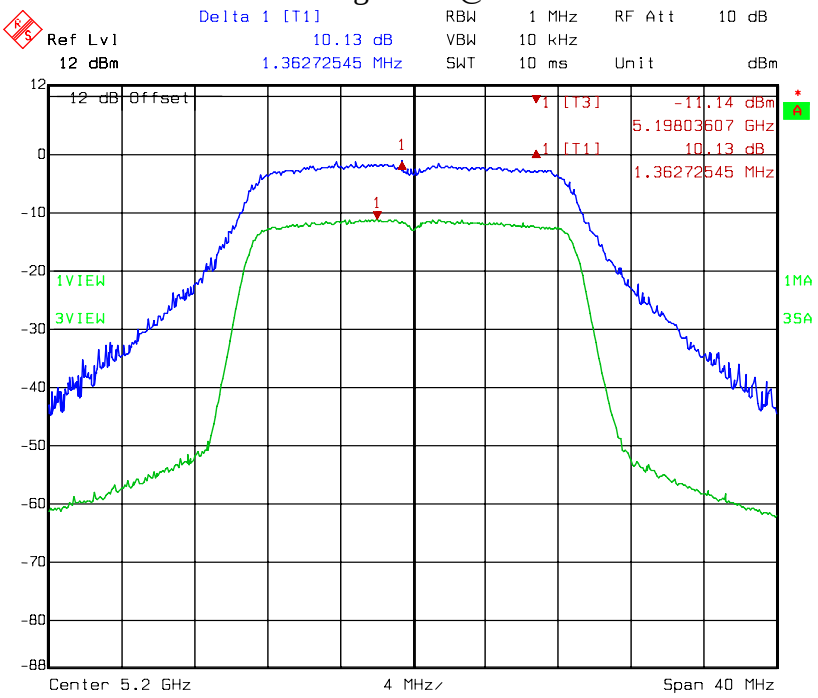
Title: PK Excursion AV
Comment A: CH 48 at 802.11a mode chainB
Date: 04.DEC.2008 12:19:04

Chain B: Peak excursion to average ratio @ 802.11n HT20 mode channel 36



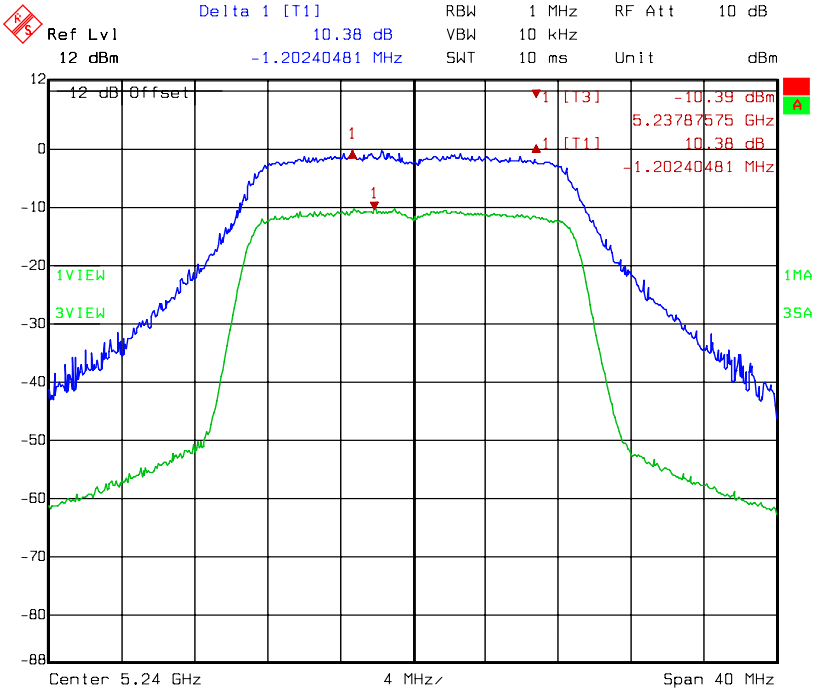
Title: PK Excursion AV
Comment A: 5.180G at 802.11n mode HT20 chainB
Date: 04.DEC.2008 11:57:49

Chain B: Peak excursion to average ratio @ 802.11n HT20 mode channel 40



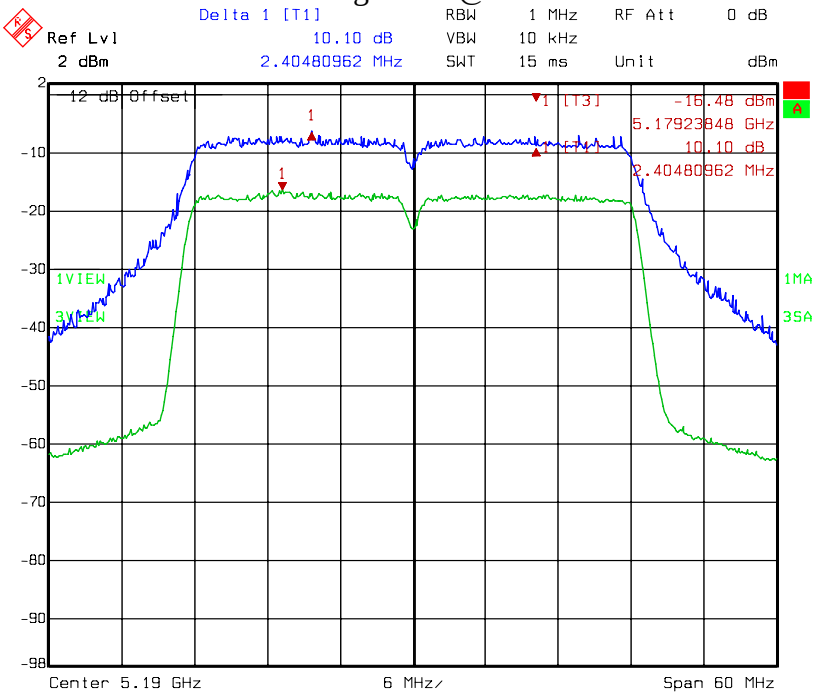
Title: PK Excursion AV
Comment A: 5.200G at 802.11n mode HT20 chainB
Date: 04.DEC.2008 12:02:35

Chain B: Peak excursion to average ratio @ 802.11n HT20 mode channel 48



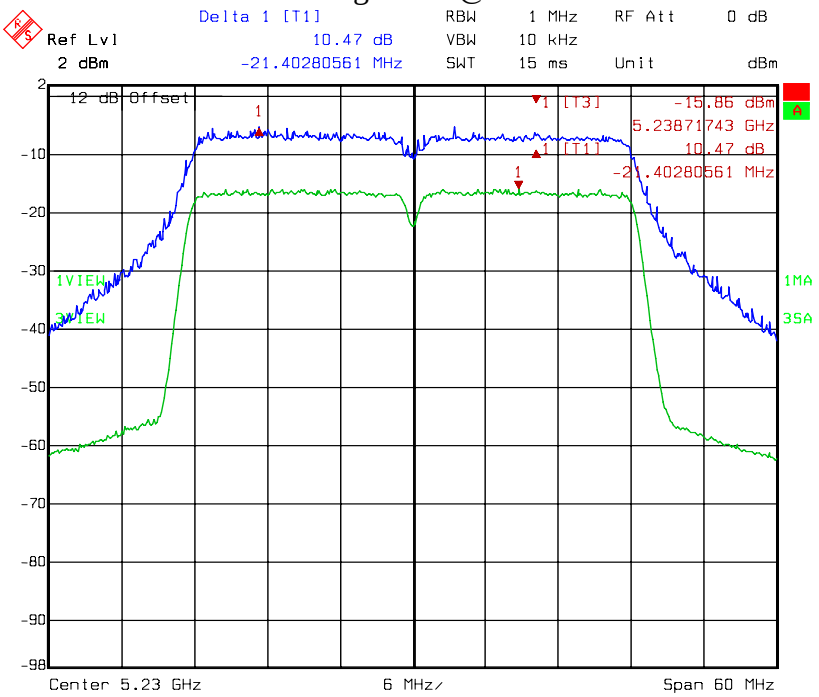
Title: PK Excursion AV
Comment A: 5.240G at 802.11n mode HT20 chainB
Date: 04.DEC.2008 12:05:45

Chain B: Peak excursion to average ratio @ 802.11n HT40 mode channel 38



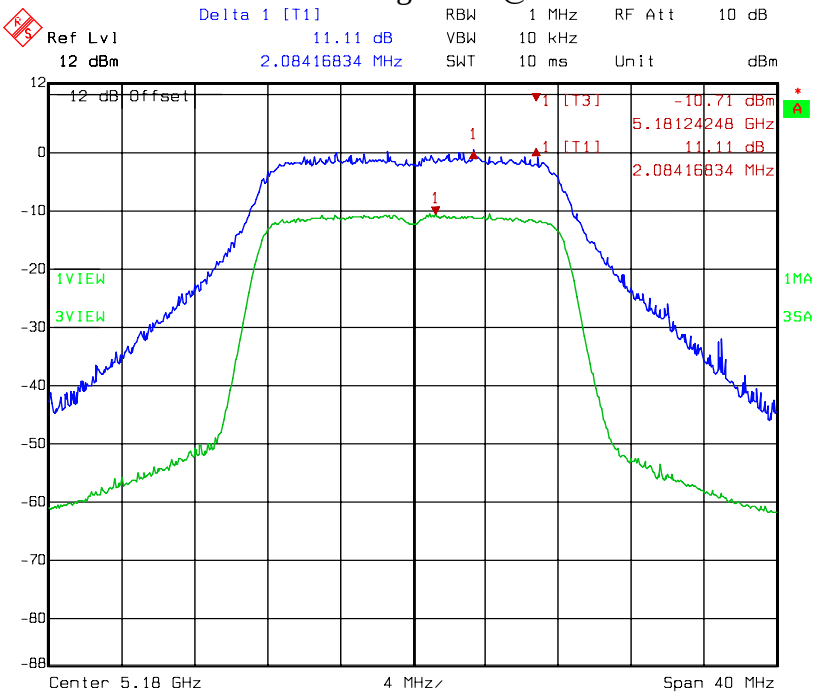
Title: PK Excursion AV
Comment A: 5.190G at 802.11n mode HT40 chainB
Date: 04.DEC.2008 11:51:39

Chain B: Peak excursion to average ratio @ 802.11n HT40 mode channel 46



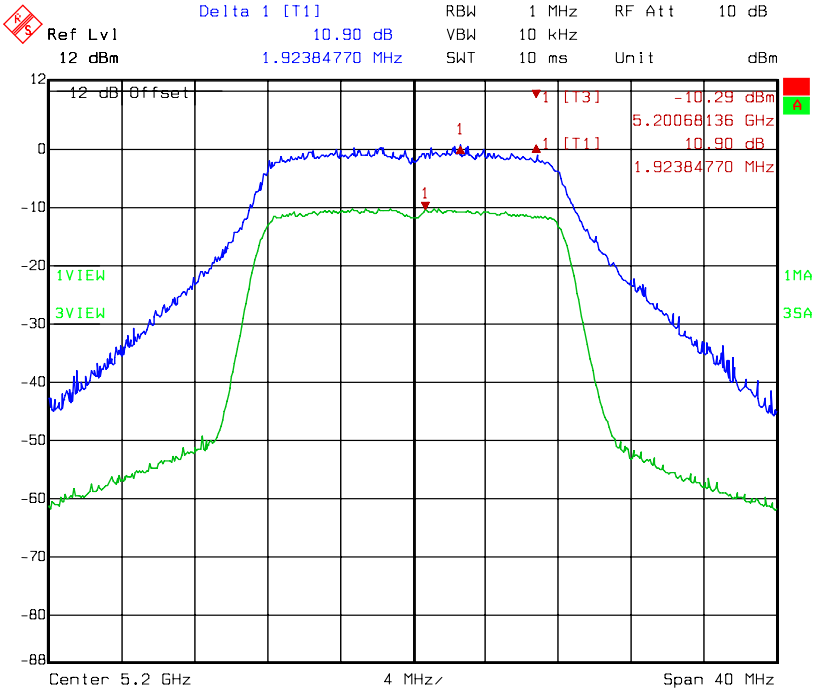
Title: PK Excursion AV
Comment A: 5.230G at 802.11n mode HT40 chainB
Date: 04.DEC.2008 11:48:53

Chain C: Peak excursion to average ratio @ 802.11a mode channel 36



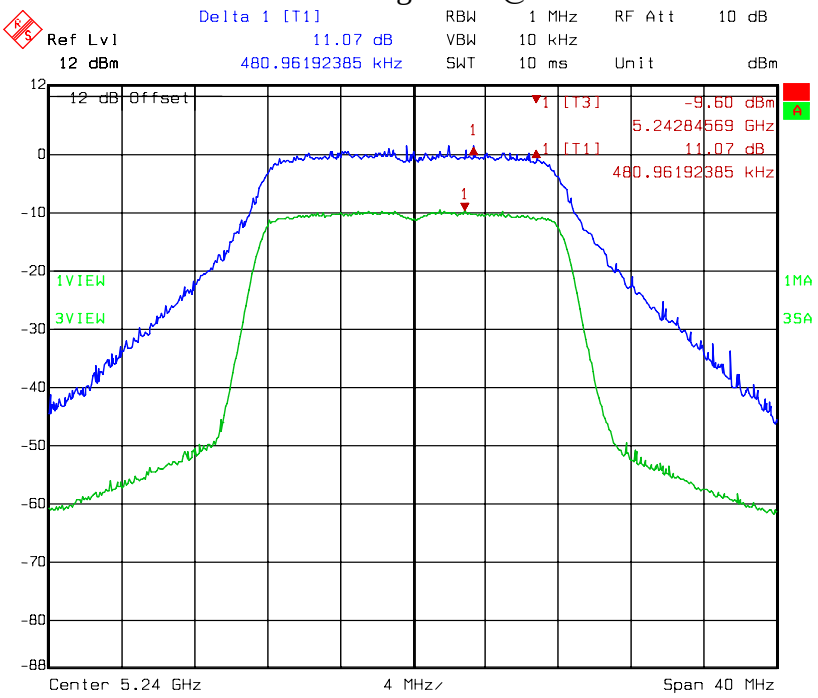
Title: PK Excursion AV
Comment A: CH 36 at 802.11a mode chainC
Date: 04.DEC.2008 13:30:43

Chain C: Peak excursion to average ratio @ 802.11a mode channel 40



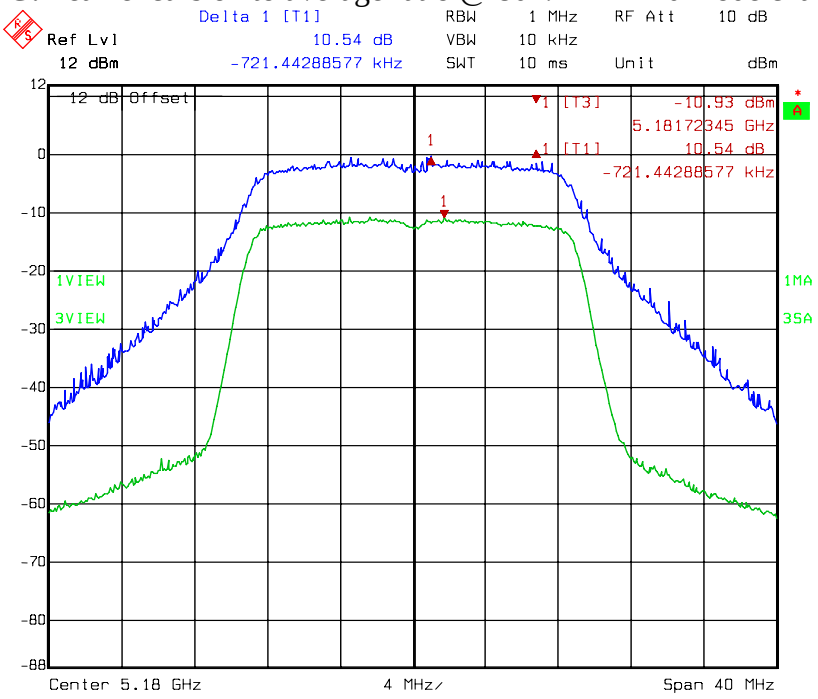
Title: PK Excursion AV
Comment A: CH 40 at 802.11a mode chainC
Date: 04.DEC.2008 13:35:03

Chain C: Peak excursion to average ratio @ 802.11a mode channel 48



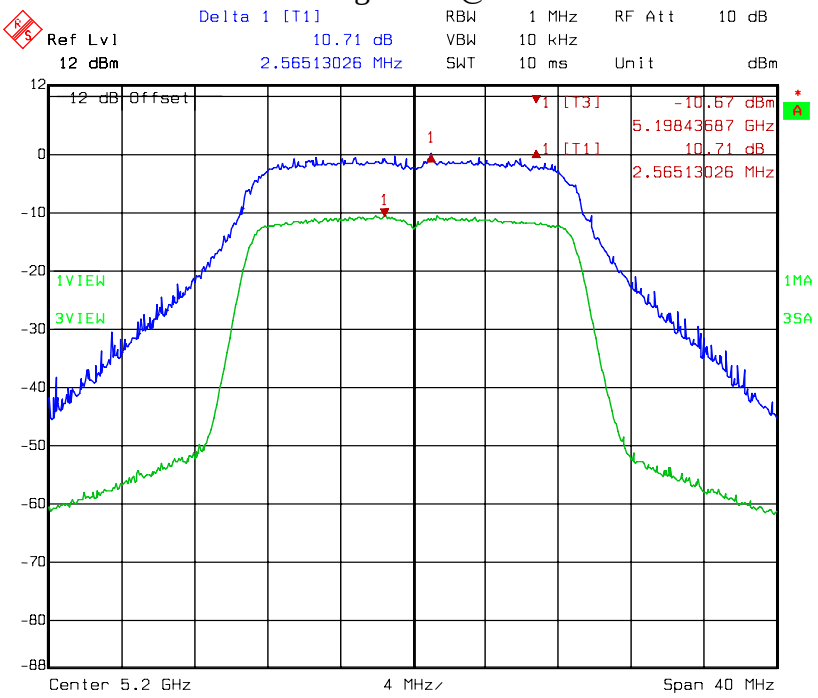
Title: PK Excursion AV
Comment A: CH 48 at 802.11a mode chainC
Date: 04.DEC.2008 13:40:56

Chain C: Peak excursion to average ratio @ 802.11n HT20 mode channel 36



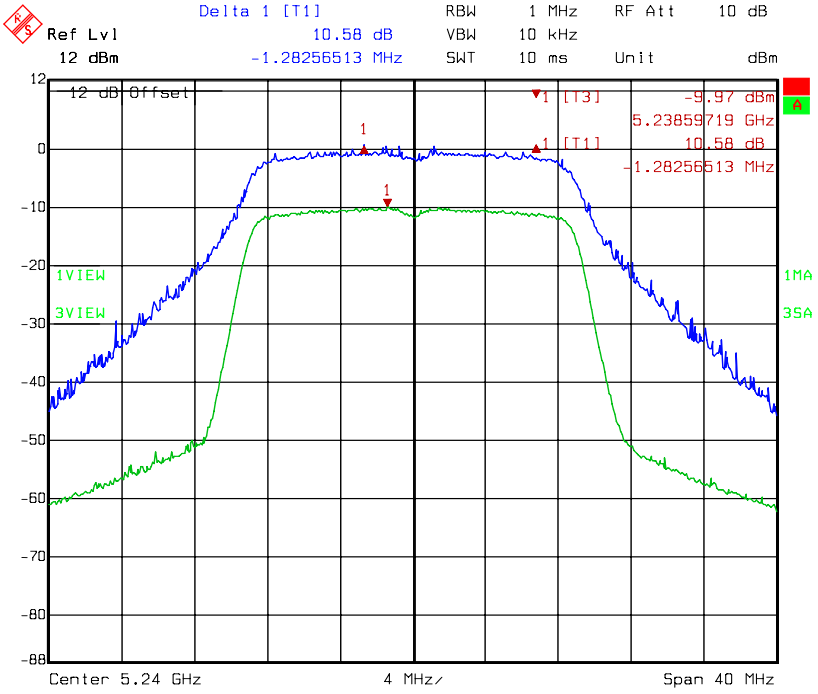
Title: PK Excursion AV
Comment A: 5.180G at 802.11n mode HT20 chainC
Date: 04.DEC.2008 13:47:06

Chain C: Peak excursion to average ratio @ 802.11n HT20 mode channel 40



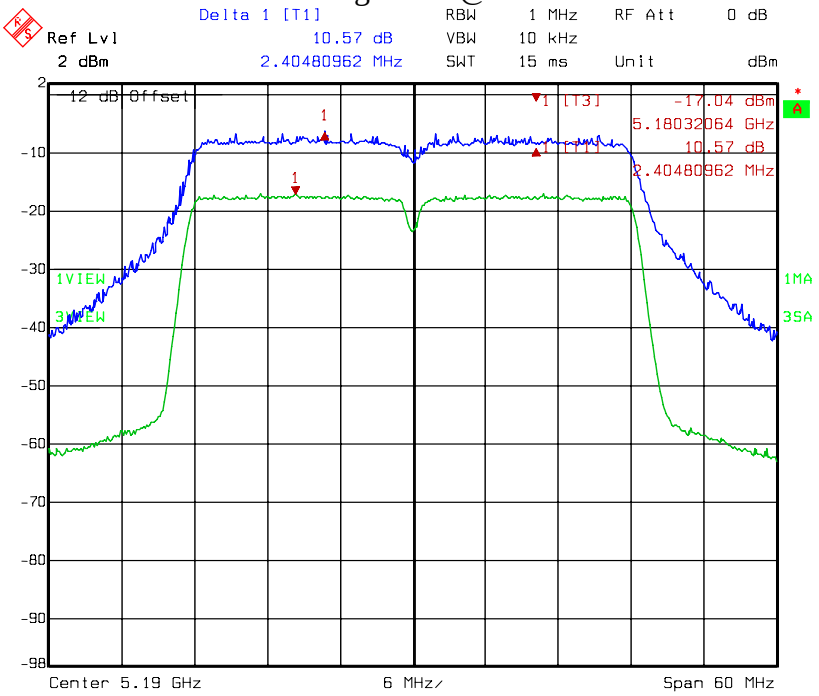
Title: PK Excursion AV
Comment A: 5.200G at 802.11n mode HT20 chainC
Date: 04.DEC.2008 13:51:32

Chain C: Peak excursion to average ratio @ 802.11n HT20 mode channel 48



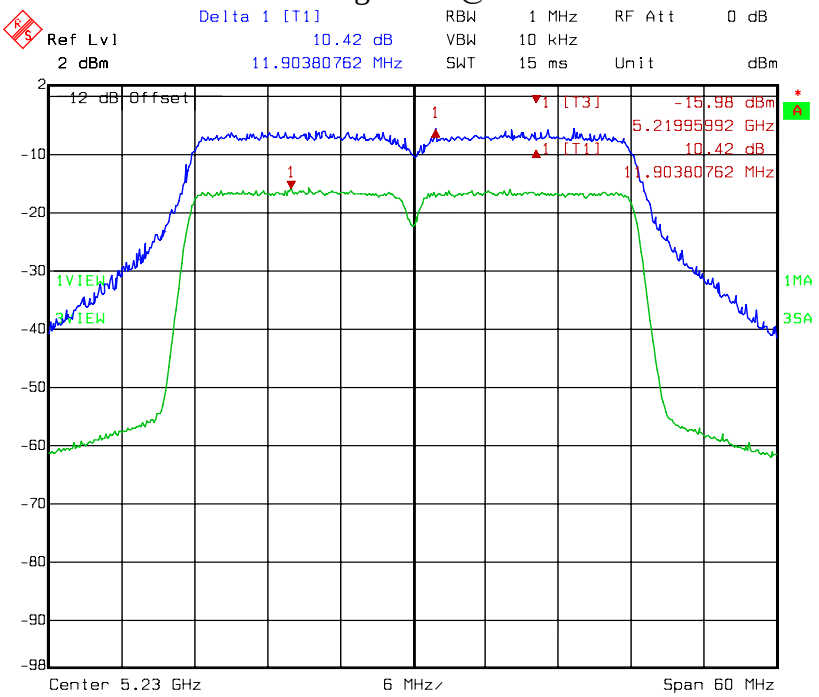
Title: PK Excursion AV
Comment A: 5.240G at 802.11n mode HT20 chainC
Date: 04.DEC.2008 13:55:49

Chain C: Peak excursion to average ratio @ 802.11n HT40 mode channel 38



Title: PK Excursion AV
Comment A: 5.190G at 802.11n mode HT40 chainC
Date: 04.DEC.2008 14:00:51

Chain C: Peak excursion to average ratio @ 802.11n HT40 mode channel 46



Title: PK Excursion AV
Comment A: 5.230G at 802.11n mode HT40 chainC
Date: 04.DEC.2008 14:06:46

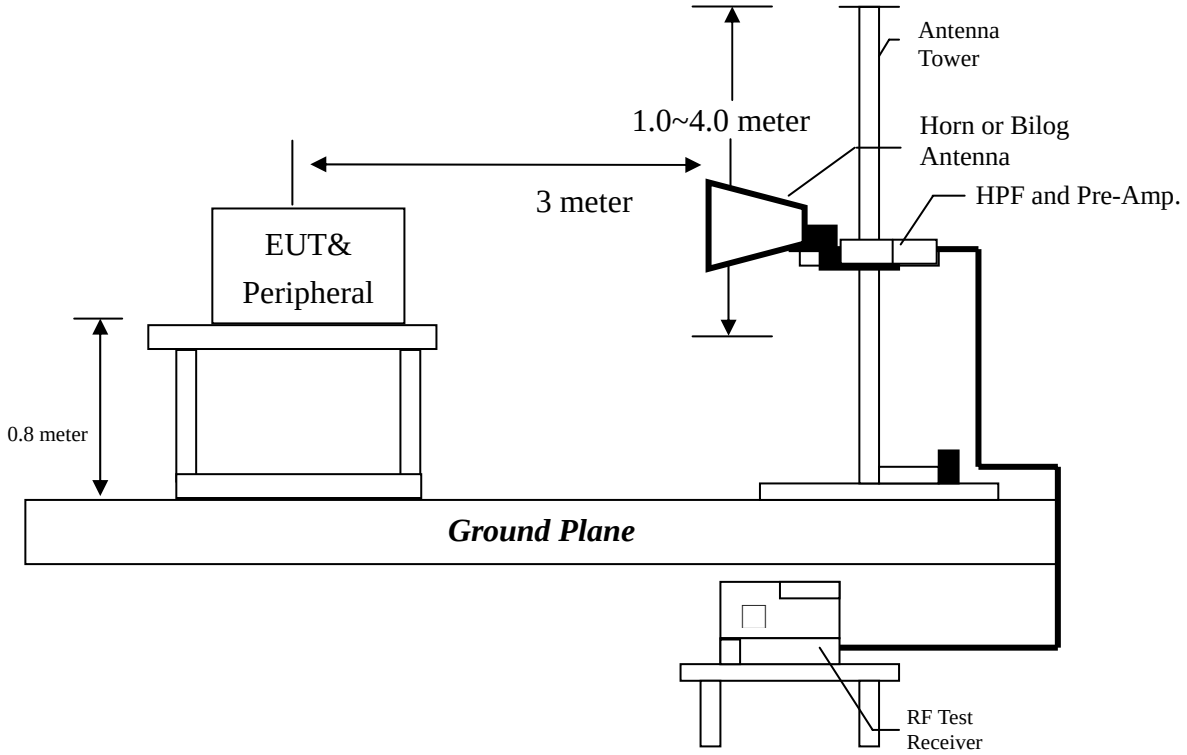
7. Radiated Emission test (FCC 15.205 & 15.209)

7.1 Operating environment

Temperature:	24	℃
Relative Humidity:	52	%
Atmospheric Pressure	1023	hPa

7.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emission measurements were performed from 30MHz to tenth harmonic or 40GHz. The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

7.3 Emission limits

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Frequency (MHz)	Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:
1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of radiated emission measurement is ±3.078 dB.
Expanded uncertainty (k=2) of conducted emission measurement is ±2.02 dB.

7.4 Radiated spurious emission test data

7.4.1 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under 802.11a/n continuously transmitting mode. The worst case occurred at 802.11a Tx channel 36.

EUT : H3C WA2210-AG
Worst Case : 802.11a Tx at channel 36

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	55.220	QP	12.90	8.91	21.80	40.00	-18.20
V	140.580	QP	14.27	16.22	30.49	43.50	-13.01
V	183.260	QP	13.10	12.75	25.84	43.50	-17.66
V	249.220	QP	12.22	15.66	27.87	46.00	-18.13
V	549.920	QP	19.46	8.21	27.67	46.00	-18.33
V	729.370	QP	22.74	9.13	31.87	46.00	-14.13
H	147.370	QP	13.24	12.42	25.65	43.50	-17.85
H	208.480	QP	10.78	24.04	34.81	43.50	-8.69
H	249.220	QP	12.36	26.61	38.97	46.00	-7.03
H	338.460	QP	14.40	15.16	29.55	46.00	-16.45
H	596.480	QP	20.84	13.76	34.59	46.00	-11.41
H	895.240	QP	24.62	9.44	34.05	46.00	-11.95

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

7.4.2 Measurement results: frequency above 1GHz

EUT : H3C DNMA-83
Test Condition : 802.11a Tx at channel 36

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10360.00	PK	V	31.30	50.09	31.23	50.02	54	-3.98
10360.00	PK	H	31.30	50.09	31.55	50.34	54	-3.66

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C DNMA-83
Test Condition : 802.11a Tx at channel 40

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10400.00	PK	V	31.30	50.09	31.52	50.31	54	-3.69
10400.00	PK	H	31.30	50.09	31.62	50.41	54	-3.59

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C DNMA-83
Test Condition : 802.11a Tx at channel 48

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10480.00	PK	V	31.30	50.09	31.89	50.68	74	-23.32
10480.00	PK	H	31.30	50.09	32.00	50.79	54	-3.21

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C DNMA-83
Test Condition : 802.11n HT20 Tx at channel 36

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10360.00	PK	V	31.30	50.09	31.12	49.91	54	-4.09
10360.00	PK	H	31.30	50.09	31.00	49.79	54	-4.21

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C DNMA-83
Test Condition : 802.11n HT20 Tx at channel 40

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10400.00	PK	V	31.30	50.09	31.64	50.43	54	-3.57
10400.00	PK	H	31.30	50.09	31.55	50.34	54	-3.66

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C DNMA-83
Test Condition : 802.11n HT20 Tx at channel 48

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10480.00	PK	V	31.30	50.09	32.28	51.07	74	-22.93
10480.00	PK	H	31.30	50.09	31.55	50.34	54	-3.66

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C DNMA-83
Test Condition : 802.11n HT40 Tx at channel 38

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10380.00	PK	V	31.30	50.09	30.61	49.40	54	-4.60
10380.00	PK	H	31.30	50.09	30.40	49.19	54	-4.81

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C DNMA-83
Test Condition : 802.11n HT40 Tx at channel 46

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10460.00	PK	V	31.30	50.09	30.27	49.06	54	-4.94
10460.00	PK	H	31.30	50.09	32.05	50.84	54	-3.16

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the system noise floor.

8. Emission on the band edge §FCC 15.205

The measurement was made to the average and peak field strength of the fundamental frequency. And the spurious emission in the restrict band must also comply with the FCC subpart C 15.209.

8.1 Operating environment

Temperature:	22	℃
Relative Humidity:	56	%
Atmospheric Pressure	1023	hPa

8.2 Test setup & procedure

The output of EUT was connected to spectrum analyzer via a 50ohm cable.

The setting of spectrum analyzer is:

Peak: RBW = 100kHz ; VBW = 100kHz
Average: RBW = 1MHz ; VBW = 10Hz

8.3 Test Result

Test mode: 802.11a mode Chain A

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
36	PK	106.37	56.12	50.25	74	-23.75
	AV	92.67	58.26	34.41	54	-19.59

Test mode: 802.11n HT20 mode Chain A

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
36	PK	105.95	56.41	49.54	74	-24.46
	AV	92.63	57.97	34.66	54	-19.34

Test mode: 802.11n HT40 mode Chain A

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
38	PK	101.19	48.20	52.99	74	-21.01
	AV	86.24	49.76	36.48	54	-17.52

Test mode: 802.11a mode Chain B

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
36	PK	106.37	52.16	54.21	74	-19.79
	AV	92.67	53.90	38.77	54	-15.23

Test mode: 802.11n HT20 mode Chain B

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
36	PK	105.95	51.87	54.08	74	-19.92
	AV	92.63	53.46	39.17	54	-14.83

Test mode: 802.11n HT40 mode Chain B

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
38	PK	101.19	46.54	54.65	74	-19.35
	AV	86.24	47.17	39.07	54	-14.93

Test mode: 802.11a mode Chain C

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
36	PK	106.37	52.23	54.14	74	-19.86
	AV	92.67	53.88	38.79	54	-15.21

Test mode: 802.11n HT20 mode Chain C

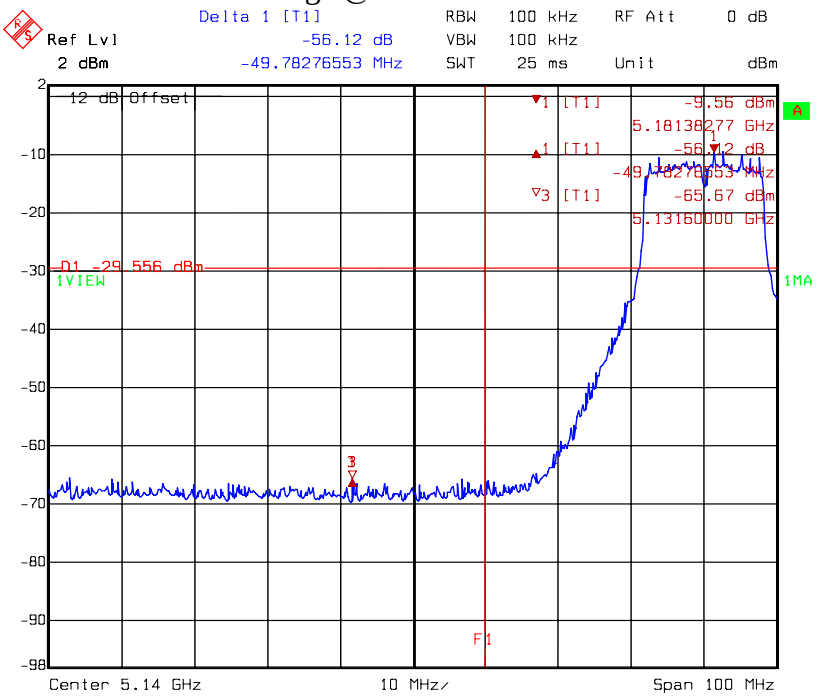
Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
36	PK	105.95	51.85	54.10	74	-19.90
	AV	92.63	53.64	38.99	54	-15.01

Test mode: 802.11n HT40 mode Chain C

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
38	PK	101.19	46.87	54.32	74	-19.68
	AV	86.24	47.40	38.84	54	-15.16

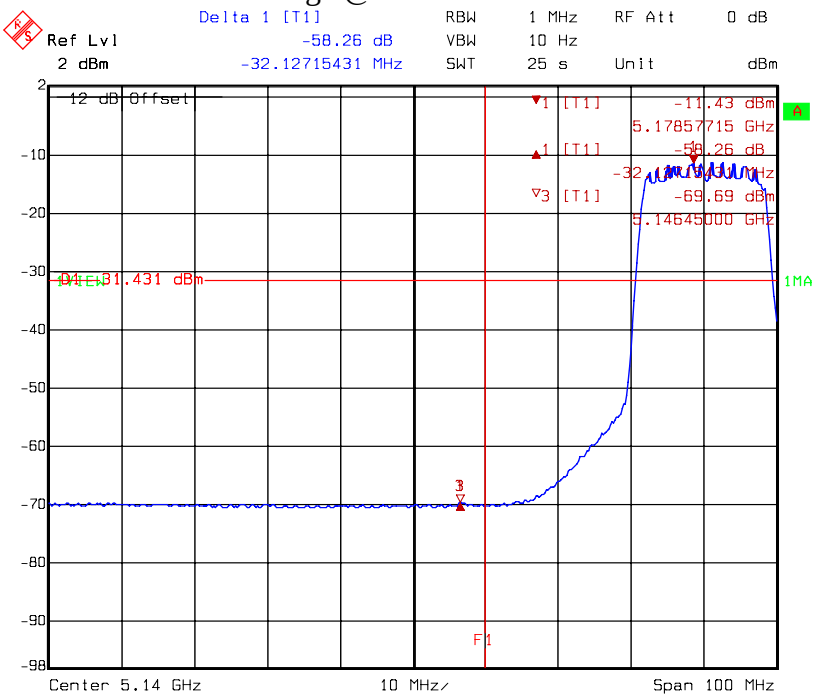
Please see the plots as below pages for conducted method test result.

Chain A: Band edge @ 802.11a mode channel 36 PK



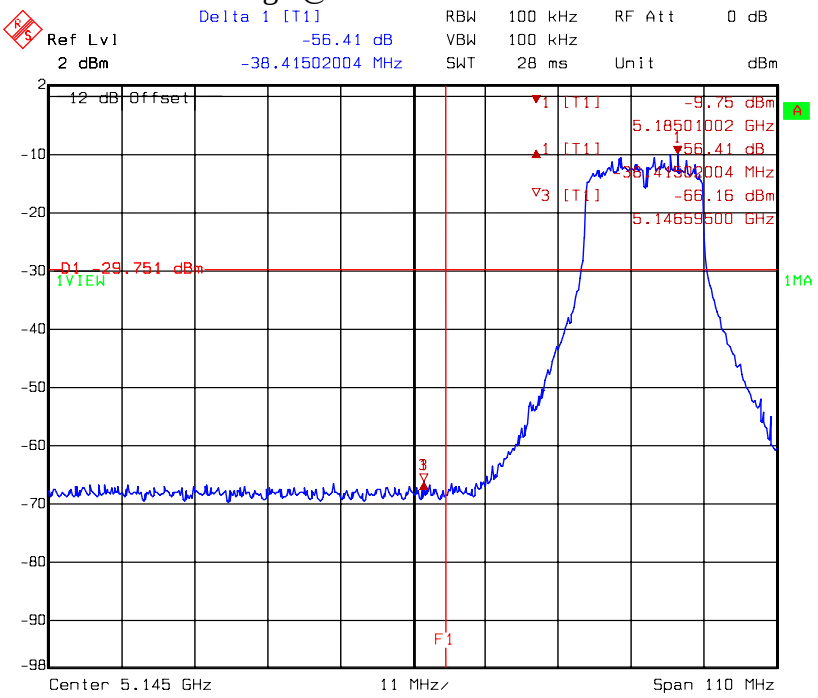
Title: Band Edge
Comment A: CH 36 at 802.11a mode chainA
Date: 04.DEC.2008 10:51:14

Chain A: Band edge @ 802.11a mode channel 36 AV



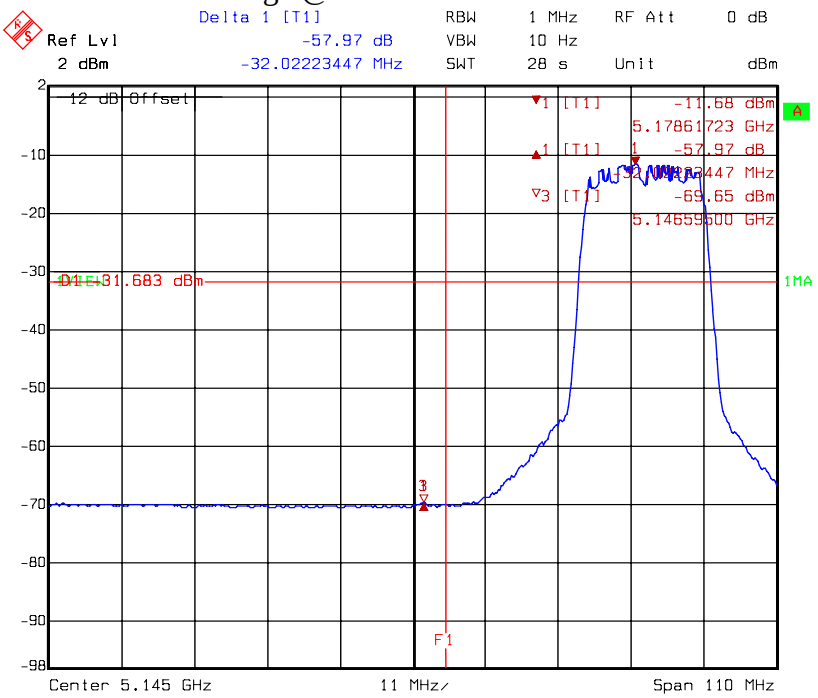
Title: Band Edge
Comment A: CH 36 at 802.11a mode chainA
Date: 04.DEC.2008 10:52:28

Chain A: Band edge @ 802.11n HT20 mode channel 36 PK



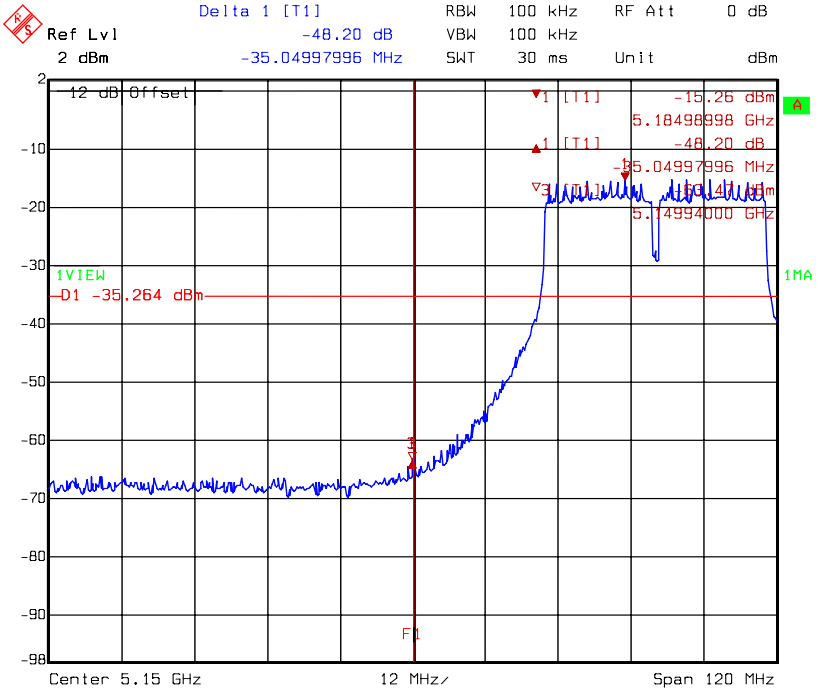
Title: Band Edge
Comment A: 5.180G at 802.11n mode HT20 chainA
Date: 04.DEC.2008 11:22:28

Chain A: Band edge @ 802.11n HT20 mode channel 36 AV



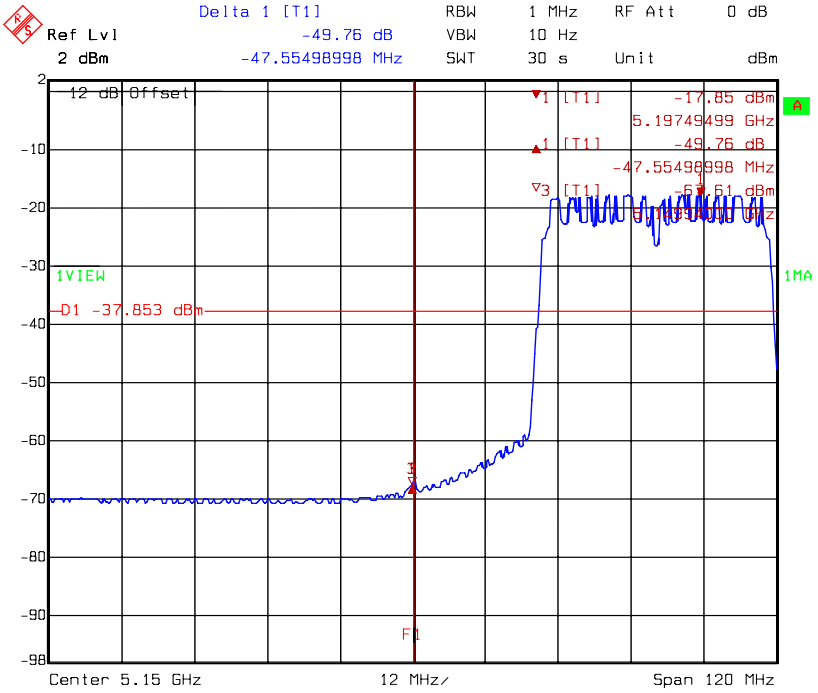
Title: Band Edge
Comment A: 5.180G at 802.11n mode HT20 chainA
Date: 04.DEC.2008 11:23:48

Chain A: Band edge @ 802.11n HT40 mode channel 38 PK



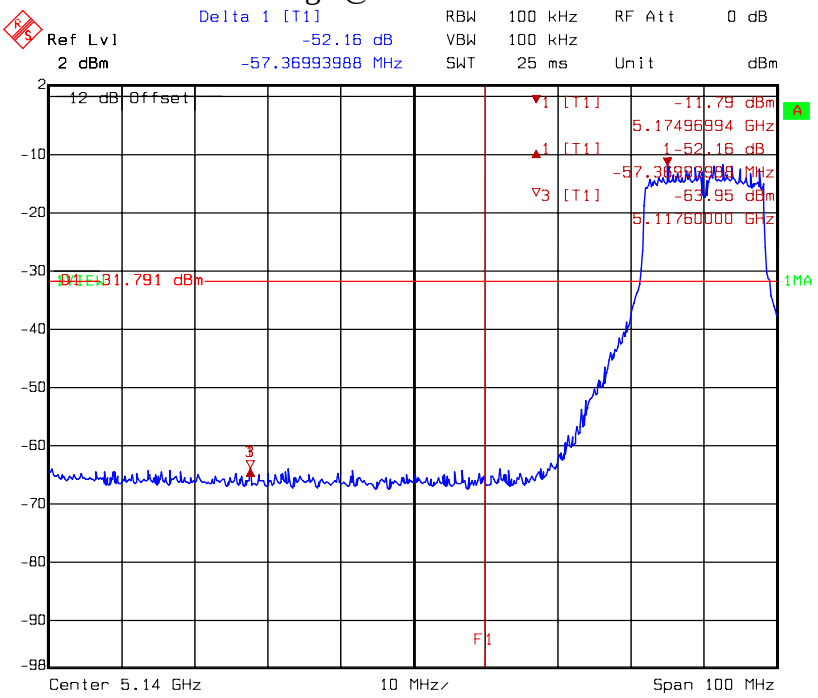
Title: Band Edge
Comment A: 5.190G at 802.11n mode HT40 chainA
Date: 04.DEC.2008 11:39:29

Chain A: Band edge @ 802.11n HT40 mode channel 38 AV



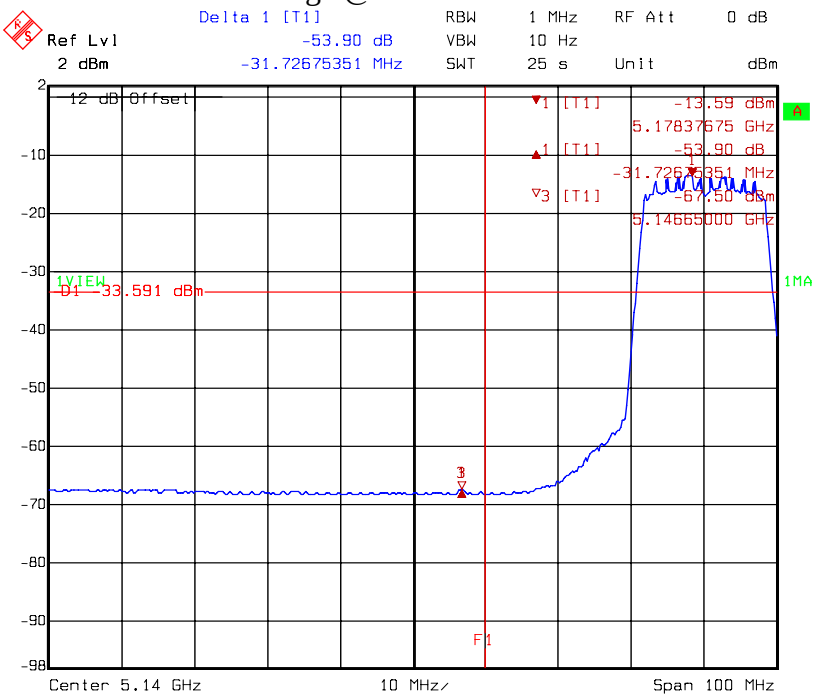
Title: Band Edge
Comment A: 5.190G at 802.11n mode HT40 chainA
Date: 04.DEC.2008 11:40:51

Chain B: Band edge @ 802.11a mode channel 36 PK



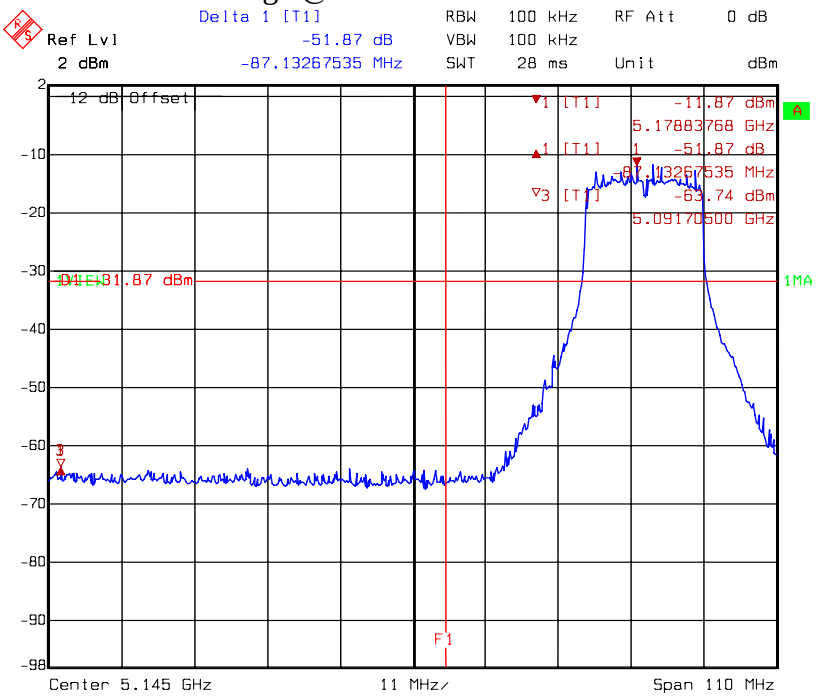
Title: Band Edge
Comment A: CH 36 at 802.11a mode chainB
Date: 04.DEC.2008 12:12:18

Chain B: Band edge @ 802.11a mode channel 36 AV



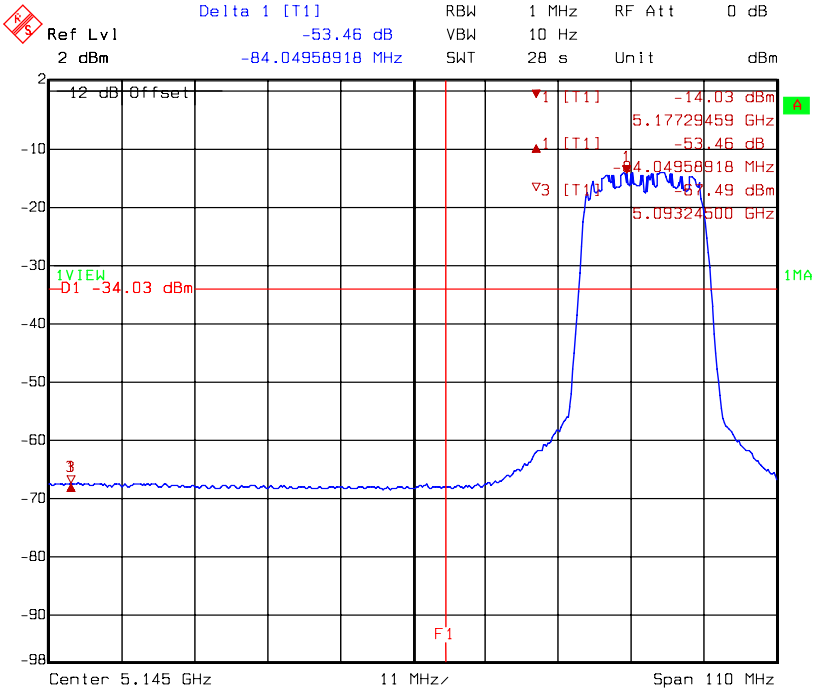
Title: Band Edge
Comment A: CH 36 at 802.11a mode chainB
Date: 04.DEC.2008 12:13:32

Chain B: Band edge @ 802.11n HT20 mode channel 36 PK



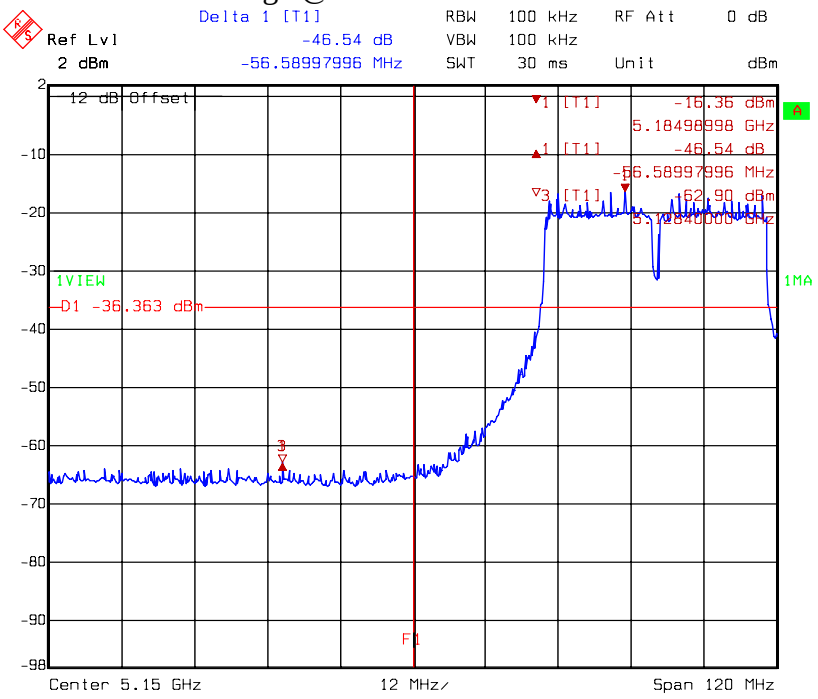
Title: Band Edge
Comment A: 5.180G at 802.11n mode HT20 chainB
Date: 04.DEC.2008 11:58:41

Chain B: Band edge @ 802.11n HT20 mode channel 36 AV



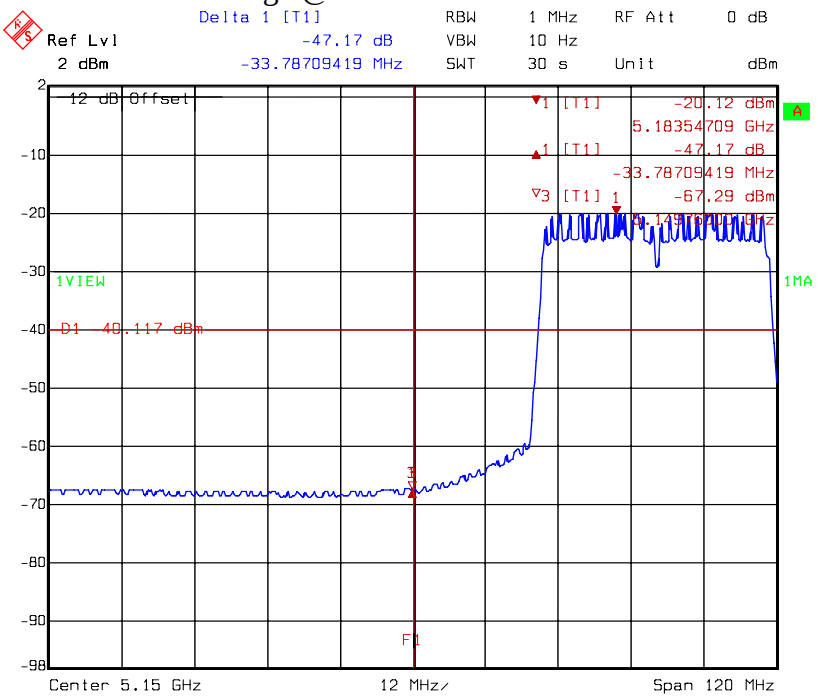
Title: Band Edge
Comment A: 5.180G at 802.11n mode HT20 chainB
Date: 04.DEC.2008 12:00:01

Chain B: Band edge @ 802.11n HT40 mode channel 38 PK



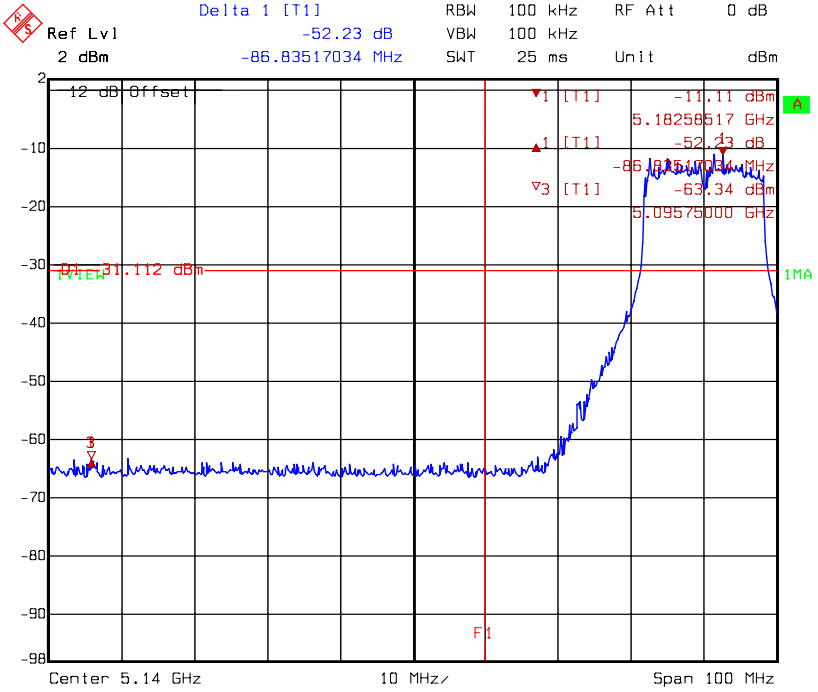
Title: Band Edge
Comment A: 5.190G at 802.11n mode HT40 chainB
Date: 04.DEC.2008 11:52:35

Chain B: Band edge @ 802.11n HT40 mode channel 38 AV



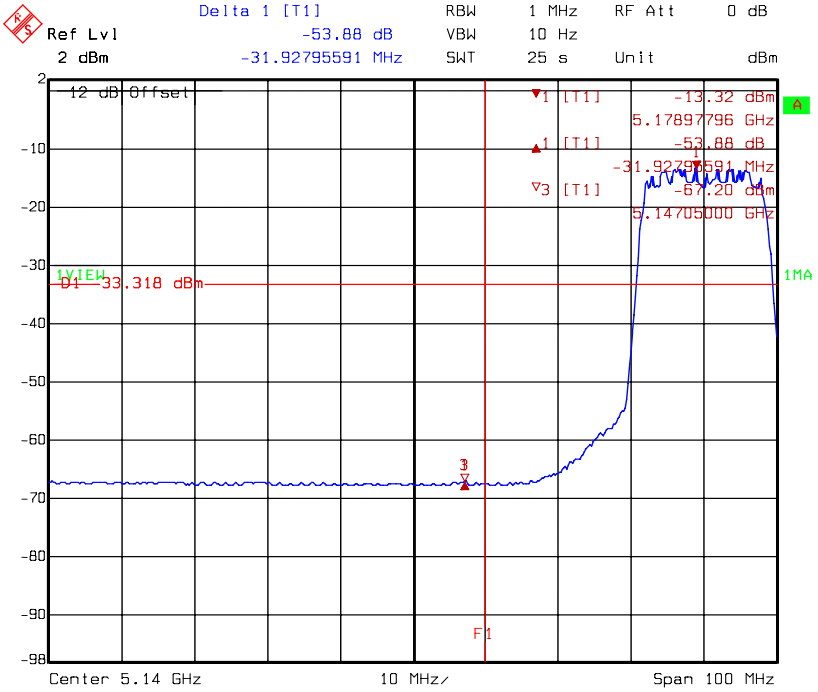
Title: Band Edge
Comment A: 5.190G at 802.11n mode HT40 chainB
Date: 04.DEC.2008 11:53:57

Chain C: Band edge @ 802.11a mode channel 36 PK



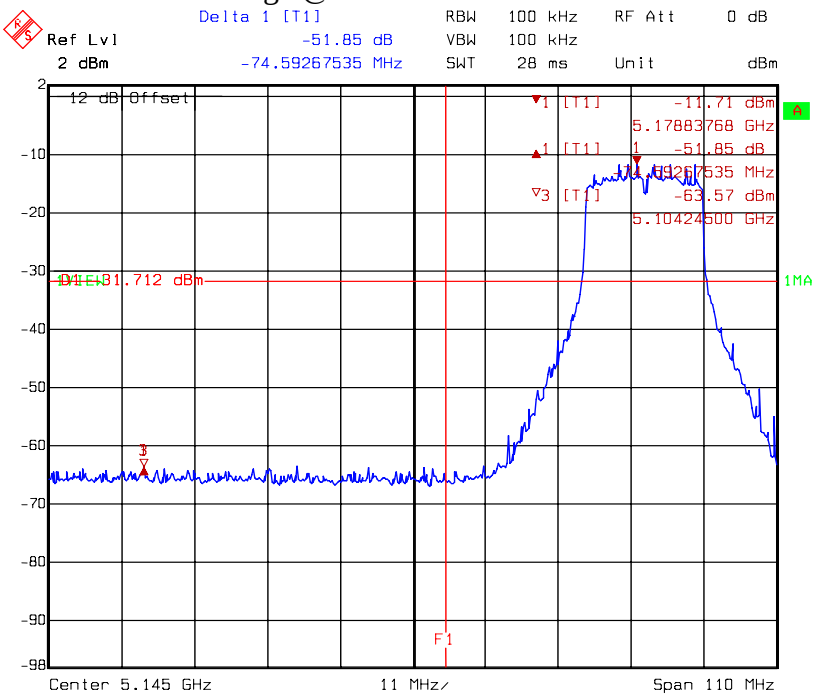
Title: Band Edge
Comment A: CH 36 at 802.11a mode chainC
Date: 04.DEC.2008 13:31:37

Chain C: Band edge @ 802.11a mode channel 36 AV



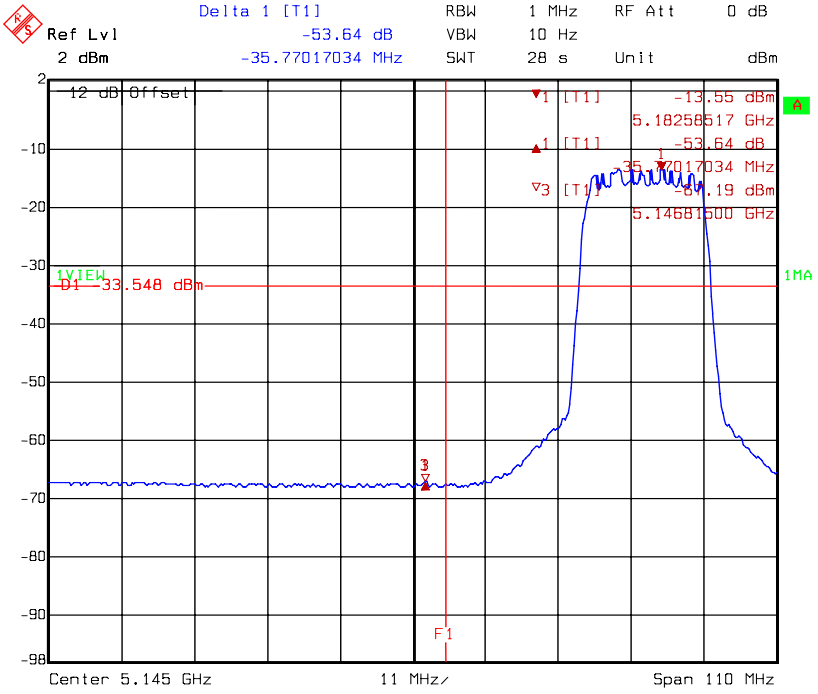
Title: Band Edge
Comment A: CH 36 at 802.11a mode chainC
Date: 04.DEC.2008 13:32:51

Chain C: Band edge @ 802.11n HT20 mode channel 36 PK



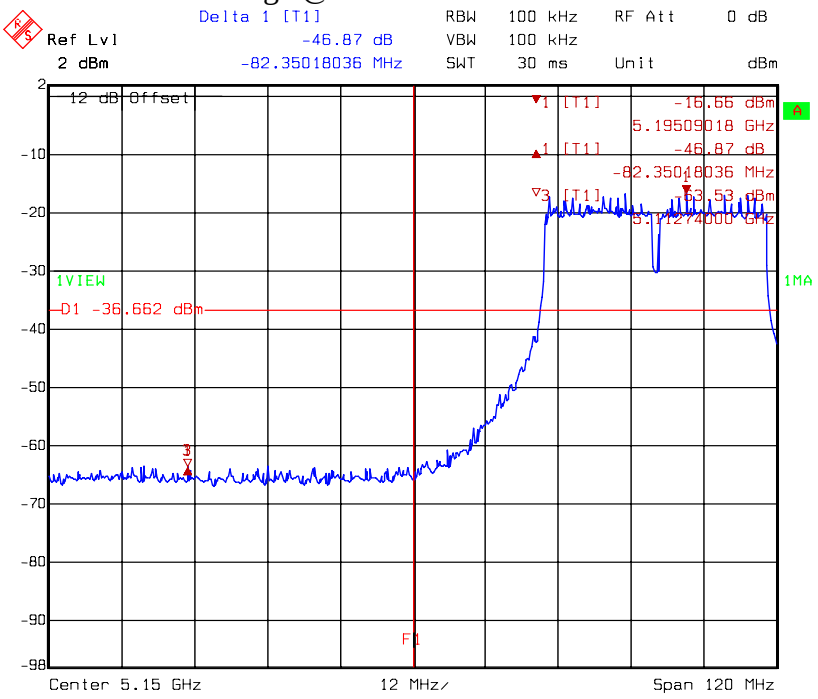
Title: Band Edge
Comment A: 5.180G at 802.11n mode HT20 chainC
Date: 04.DEC.2008 13:48:02

Chain C: Band edge @ 802.11n HT20 mode channel 36 AV



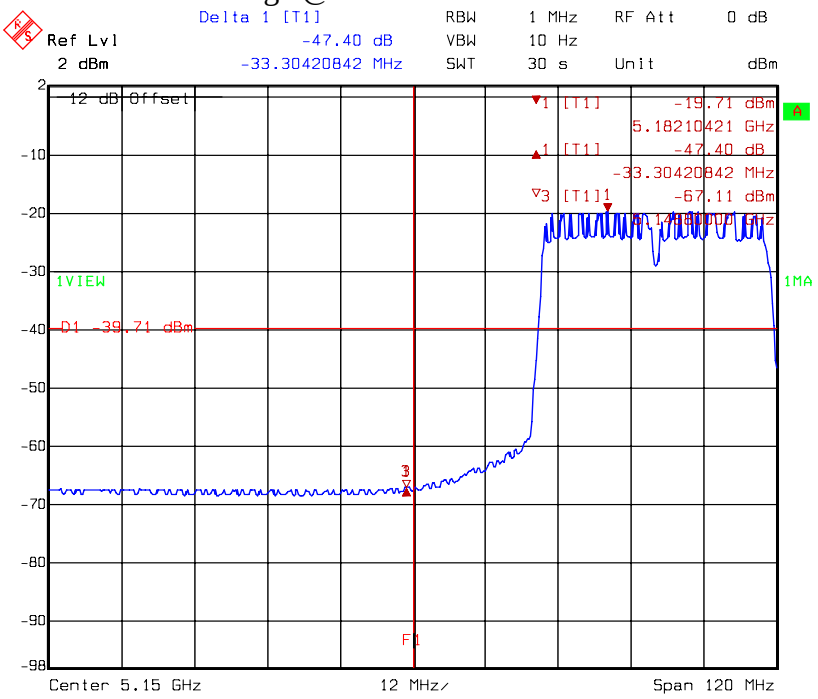
Title: Band Edge
Comment A: 5.180G at 802.11n mode HT20 chainC
Date: 04.DEC.2008 13:49:21

Chain C: Band edge @ 802.11n HT40 mode channel 38 PK



Title: Band Edge
Comment A: 5.190G at 802.11n mode HT40 chainC
Date: 04.DEC.2008 14:01:47

Chain C: Band edge @ 802.11n HT40 mode channel 38 AV



Title: Band Edge
Comment A: 5.190G at 802.11n mode HT40 chainC
Date: 04.DEC.2008 14:03:10