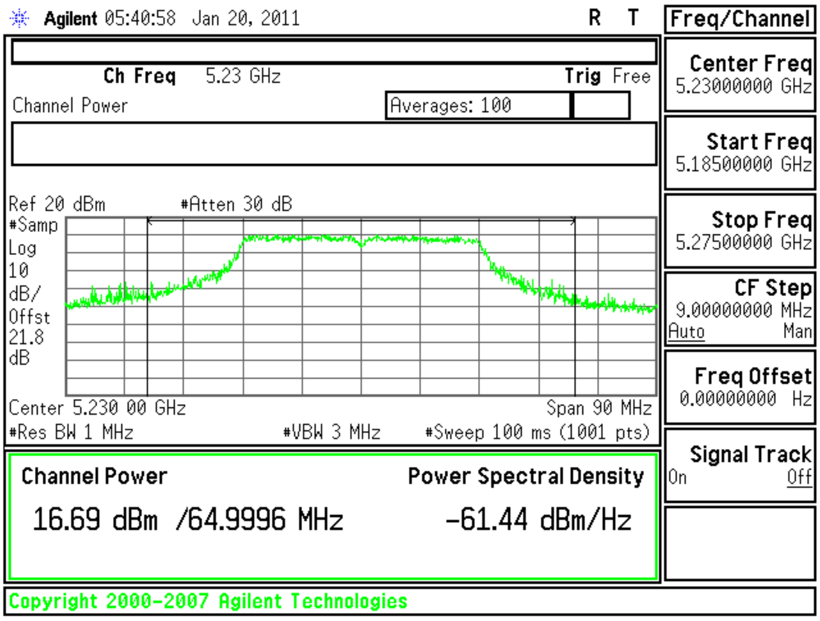
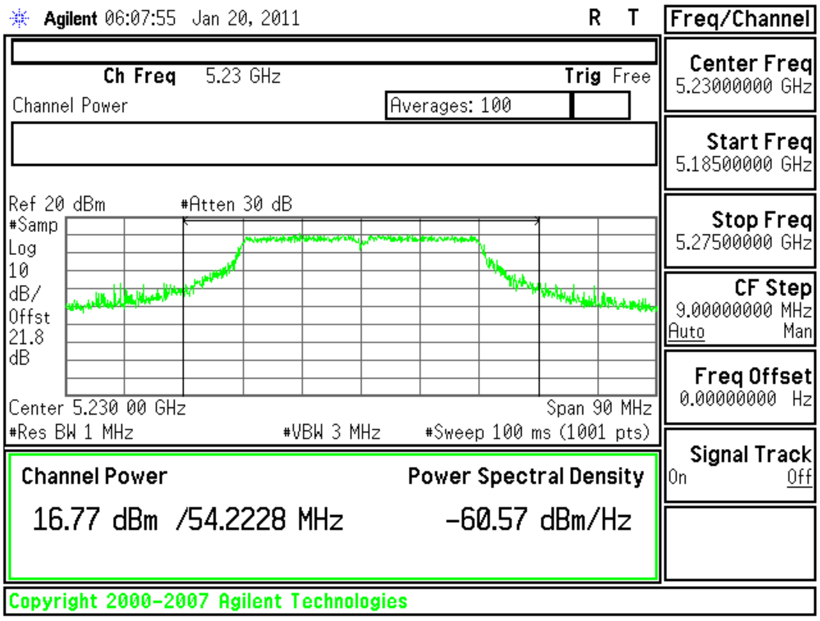
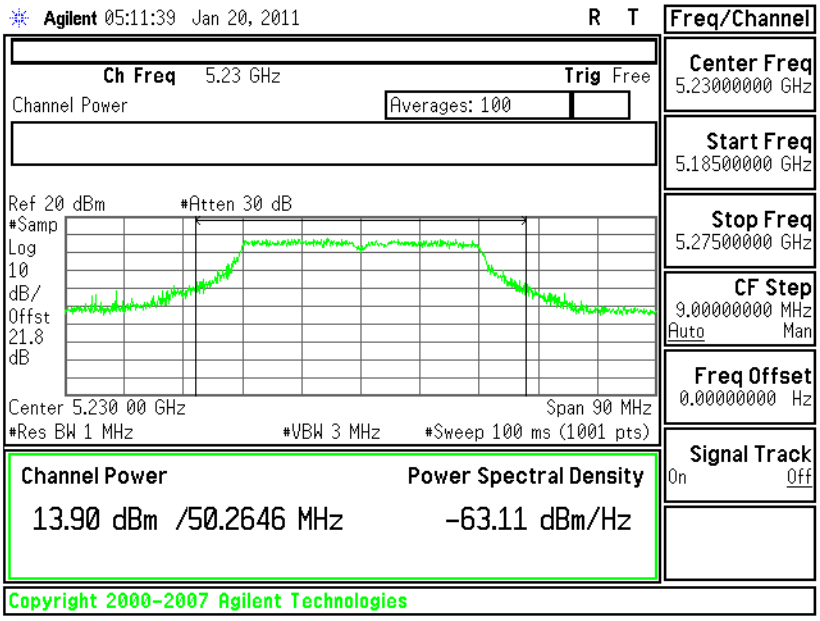
Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain A



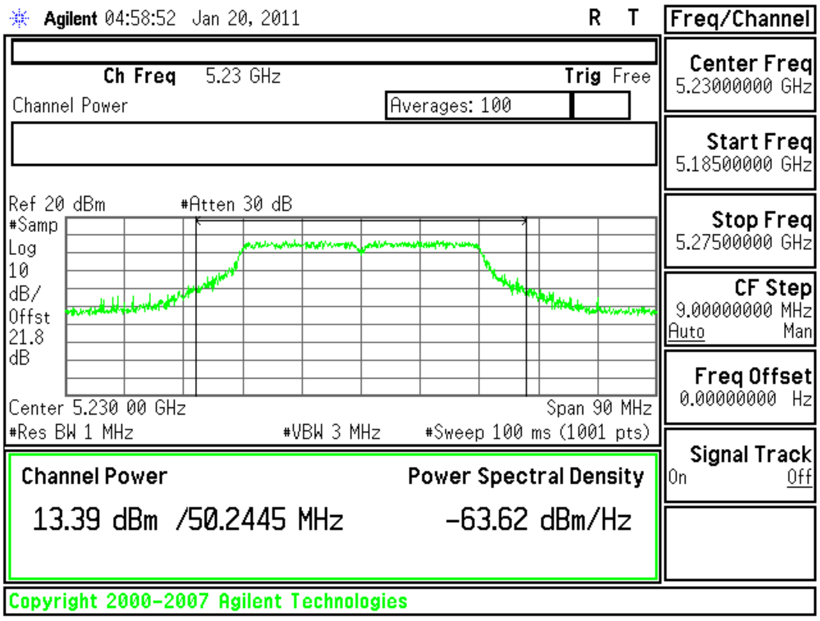
Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain B



Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain A+B(A)

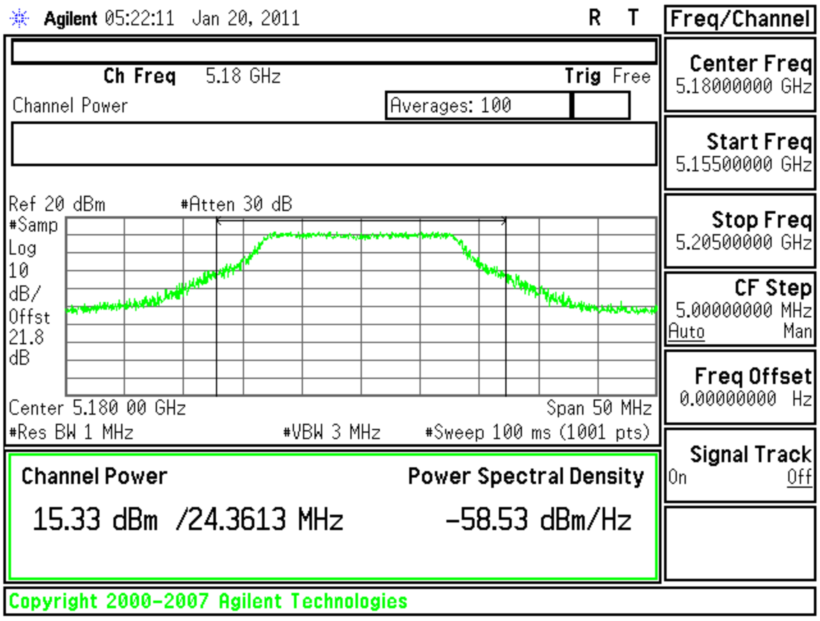


Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain A+B(B)

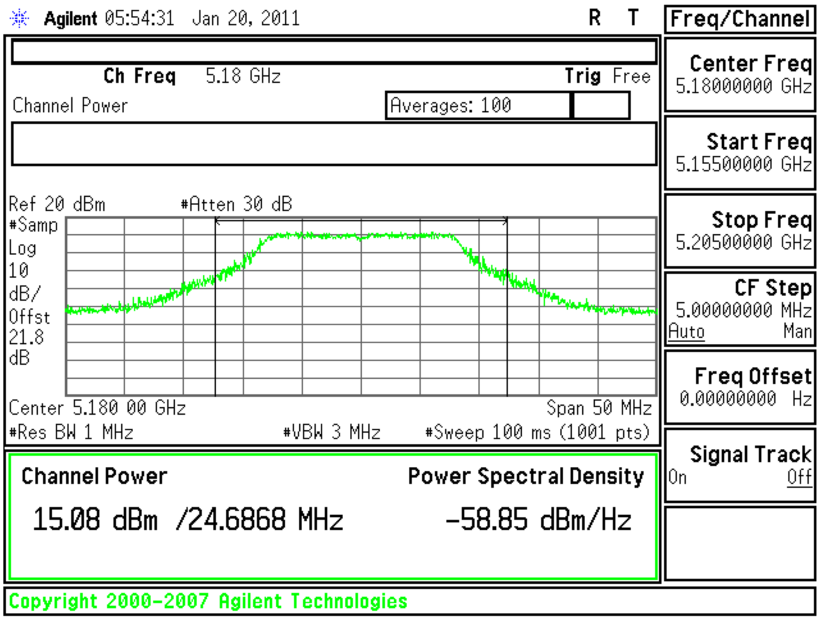


<Antenna 5 for 3.3V>

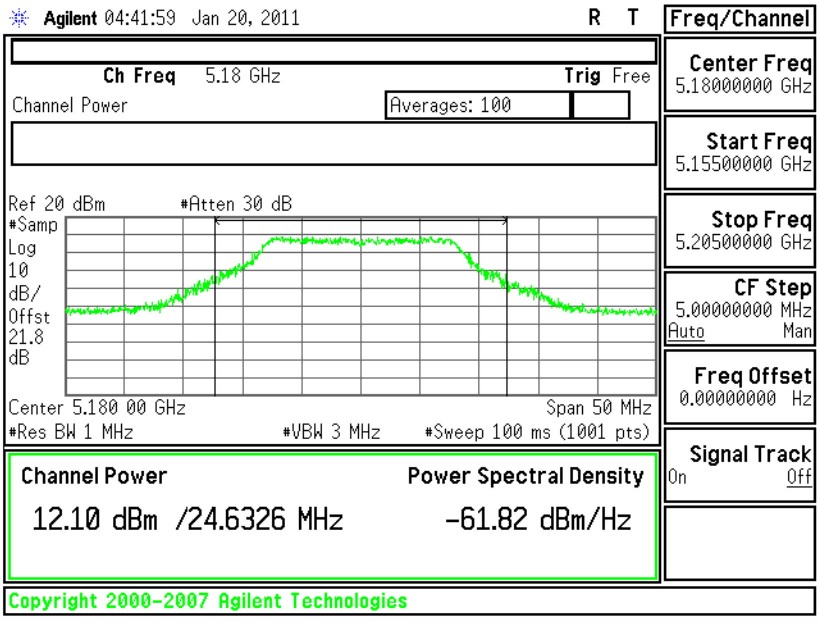
Conducted Output Power on 802.11a Channel 36 - Chain A



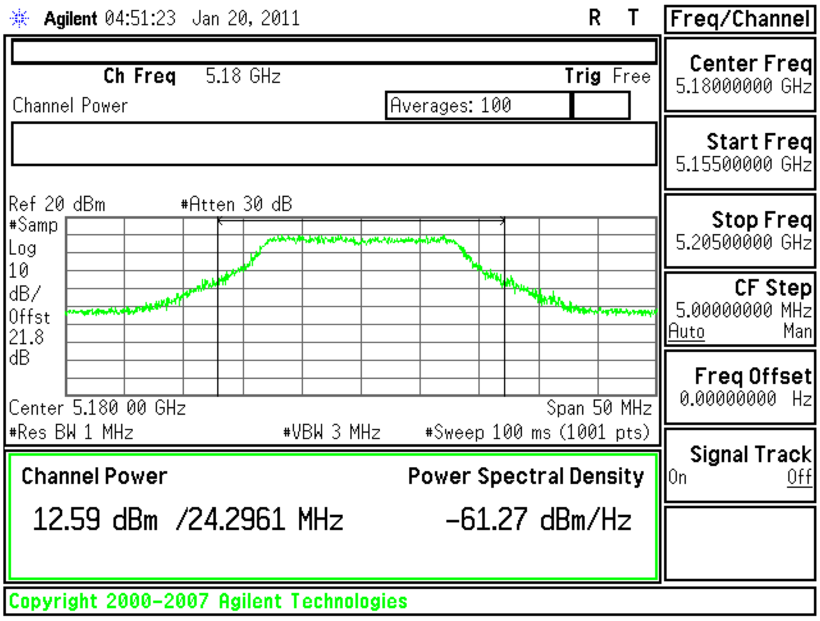
Conducted Output Power on 802.11a Channel 36 - Chain B



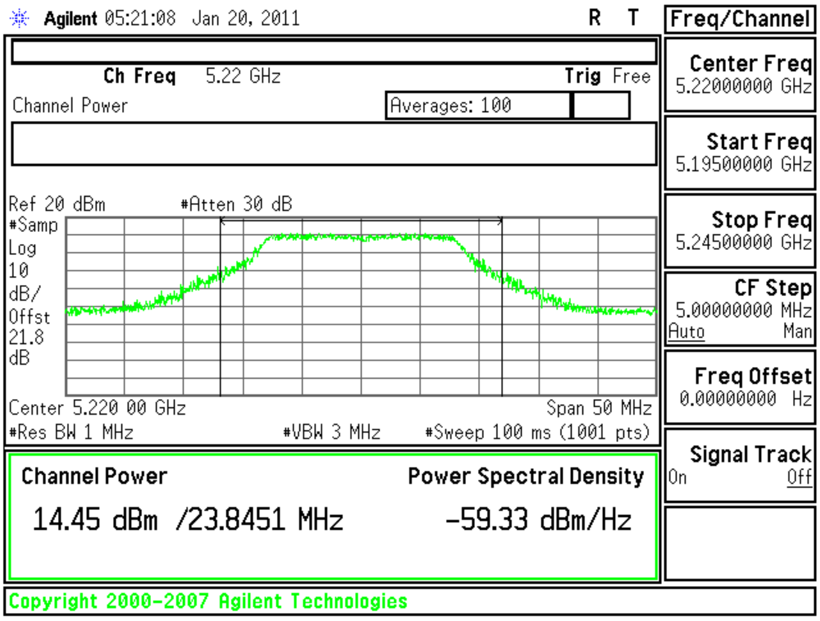
Conducted Output Power on 802.11a Channel 36 - Chain A+B(A)



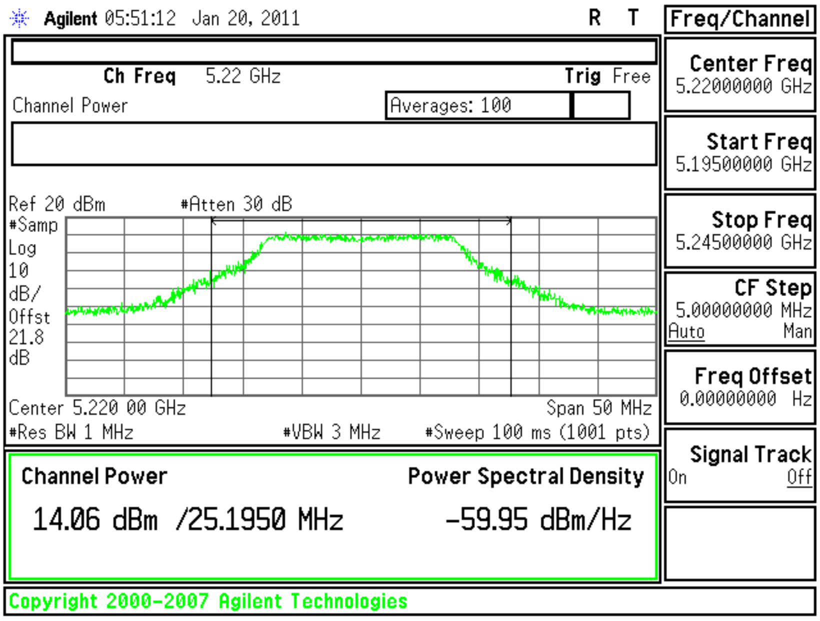
Conducted Output Power on 802.11a Channel 36 - Chain A+B(B)



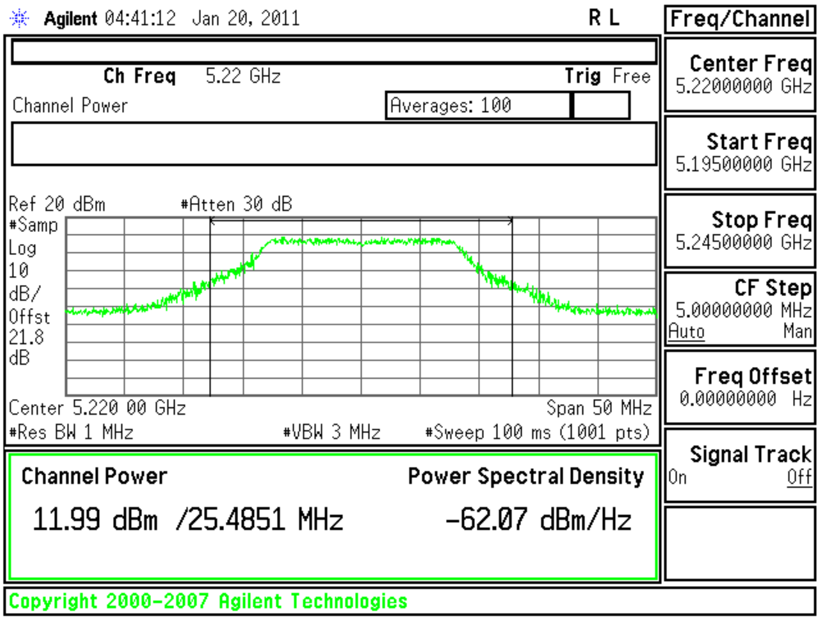
Conducted Output Power on 802.11a Channel 44 - Chain A



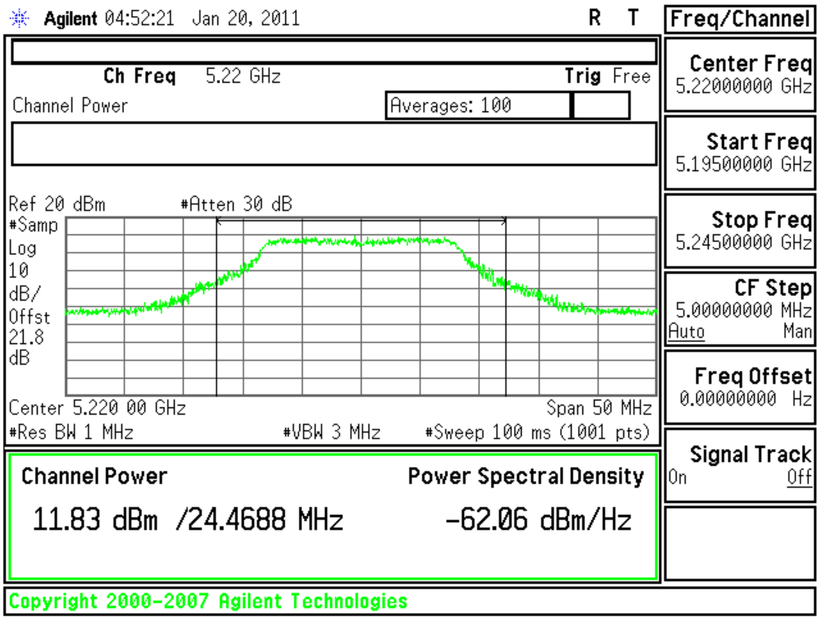
Conducted Output Power on 802.11a Channel 44 - Chain B



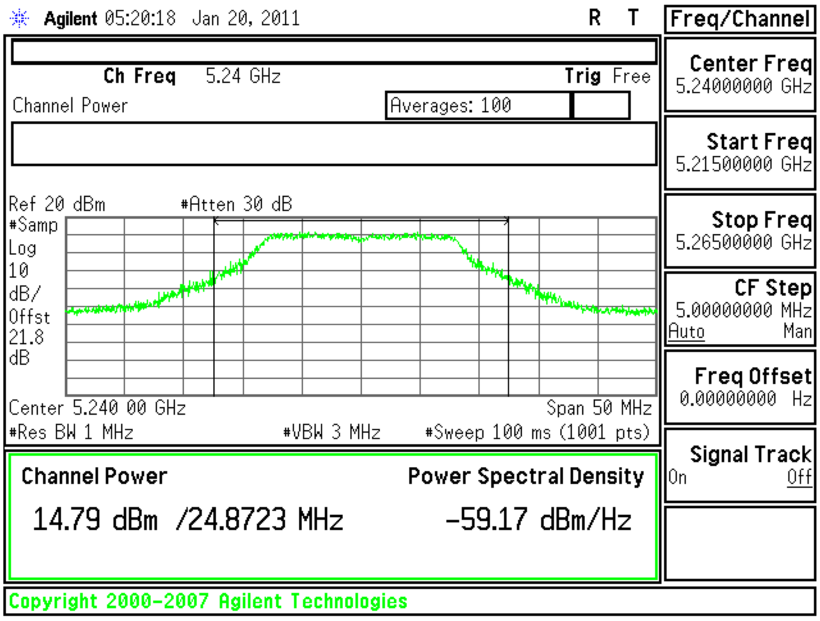
Conducted Output Power on 802.11a Channel 44 - Chain A+B(A)



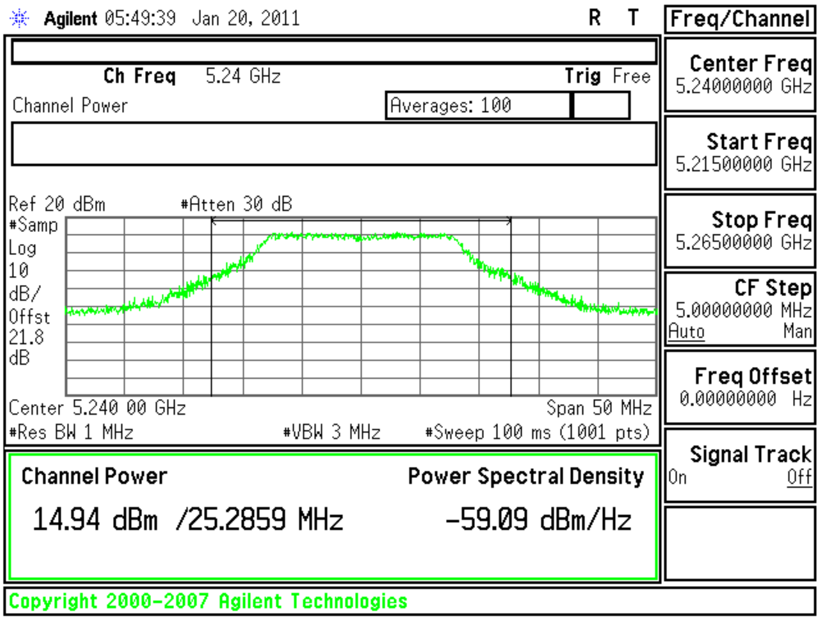
Conducted Output Power on 802.11a Channel 44 - Chain A+B(B)



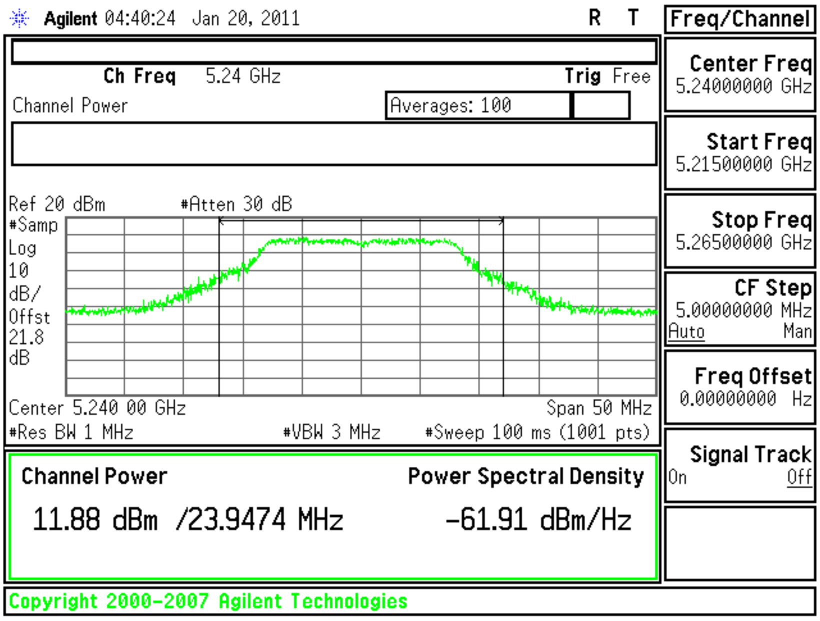
Conducted Output Power on 802.11a Channel 48 - Chain A



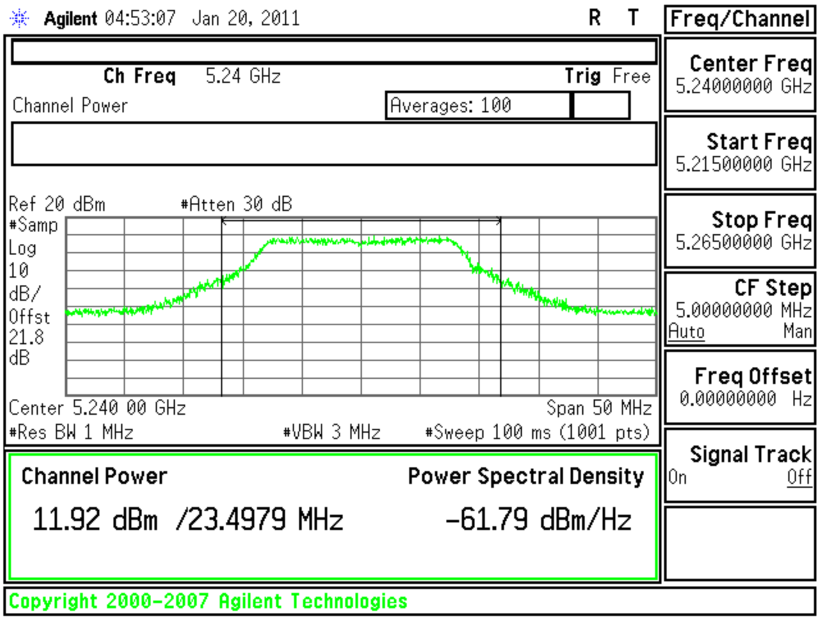
Conducted Output Power on 802.11a Channel 48 - Chain B



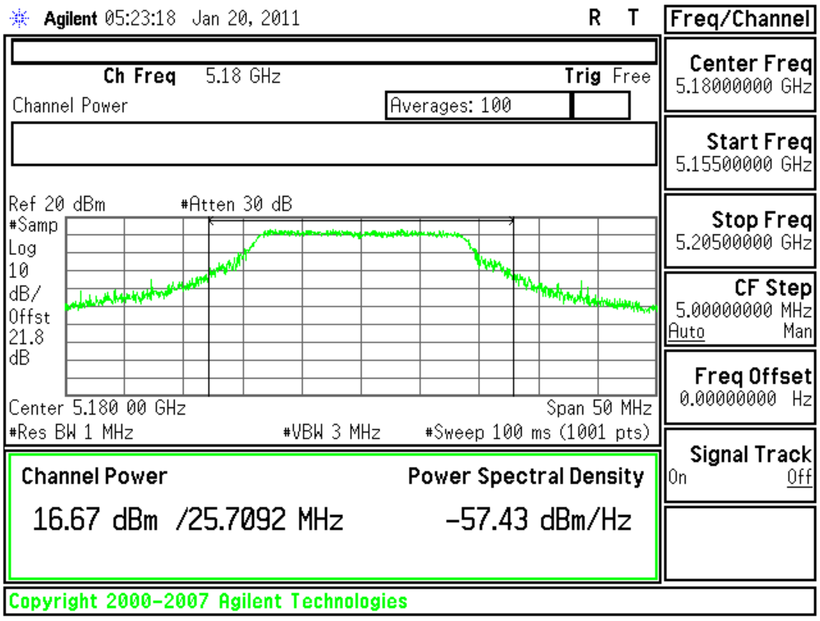
Conducted Output Power on 802.11a Channel 48 - Chain A+B(A)



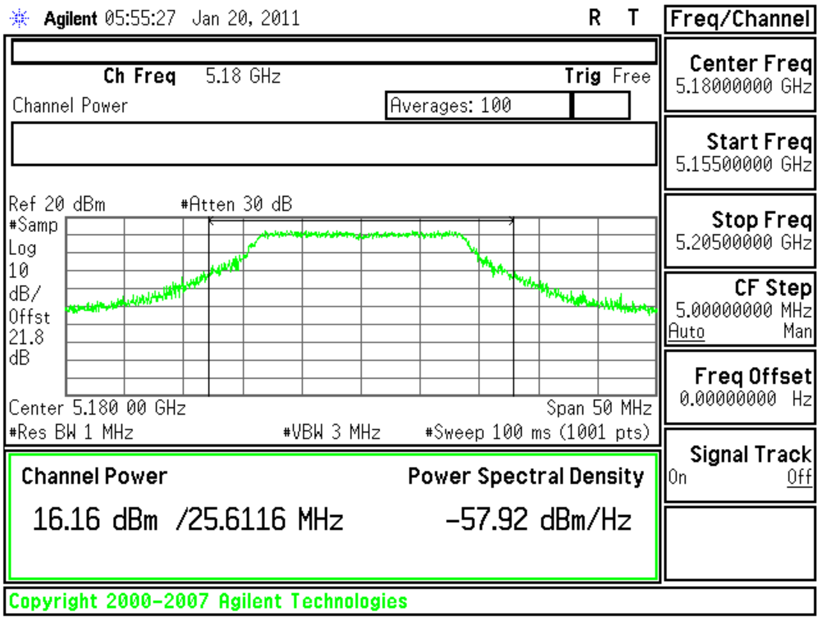
Conducted Output Power on 802.11a Channel 48 - Chain A+B(B)



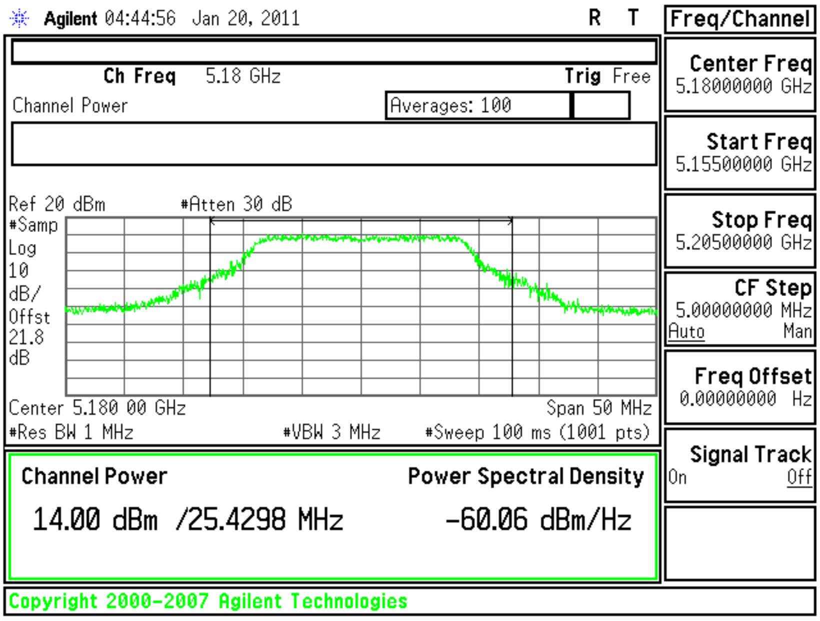
Conducted Output Power on 802.11n (BW 20MHz) Channel 36 - Chain A



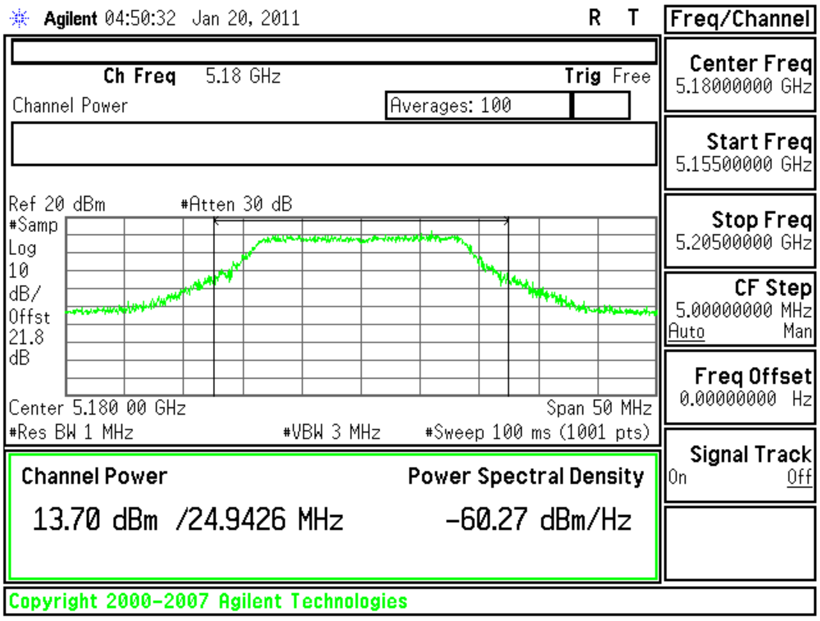
Conducted Output Power on 802.11n (BW 20MHz) Channel 36 - Chain B



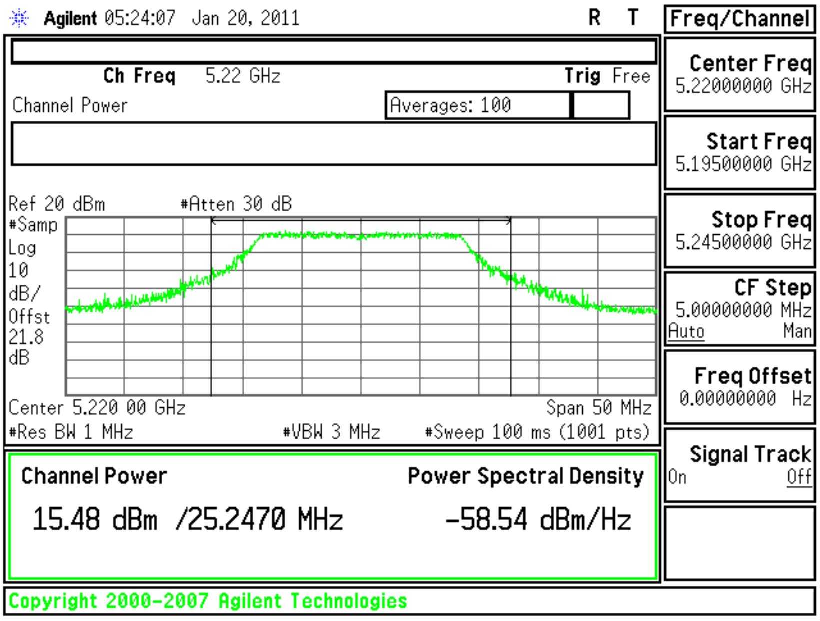
Conducted Output Power on 802.11n (BW 20MHz) Channel 36 - Chain A+B(A)



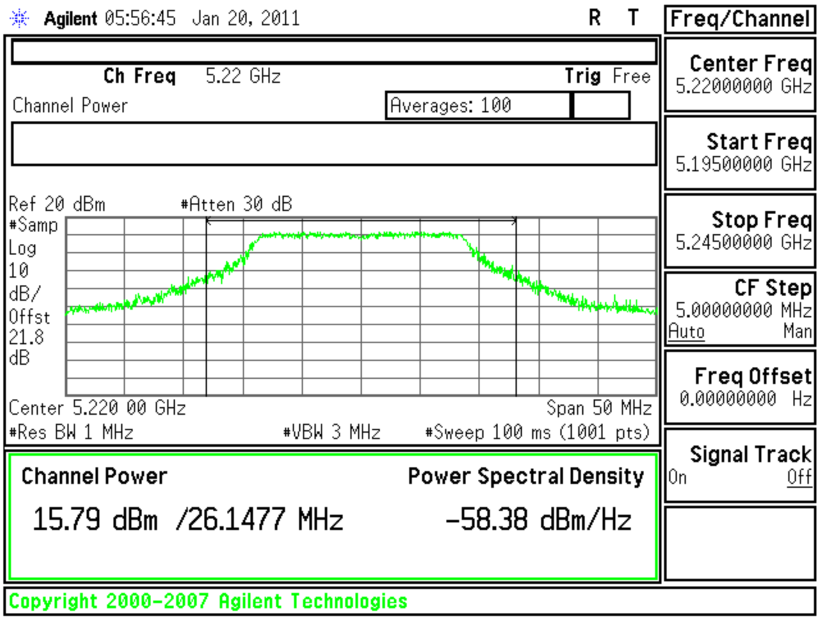
Conducted Output Power on 802.11n (BW 20MHz) Channel 36 - Chain A+B(B)



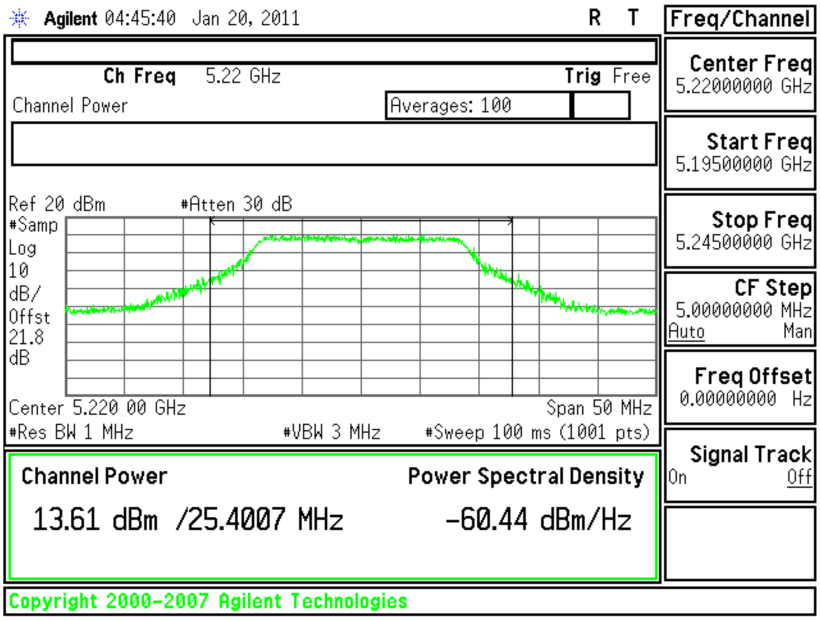
Conducted Output Power on 802.11n (BW 20MHz) Channel 44 - Chain A



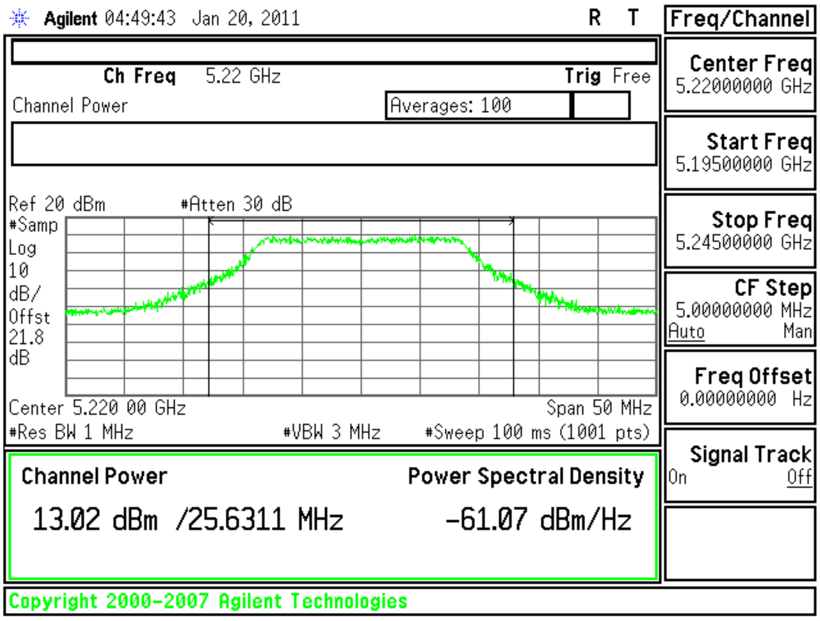
Conducted Output Power on 802.11n (BW 20MHz) Channel 44 - Chain B



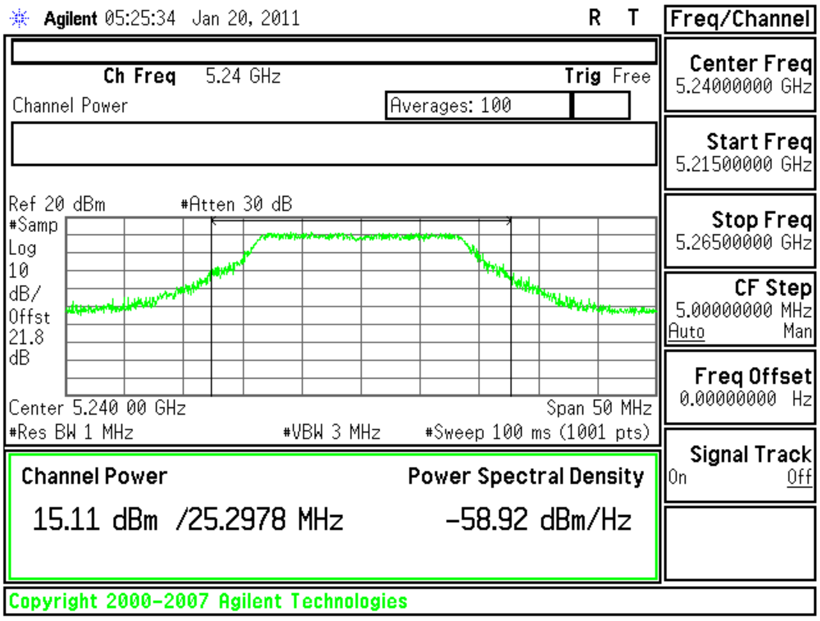
Conducted Output Power on 802.11n (BW 20MHz) Channel 44 - Chain A+B(A)



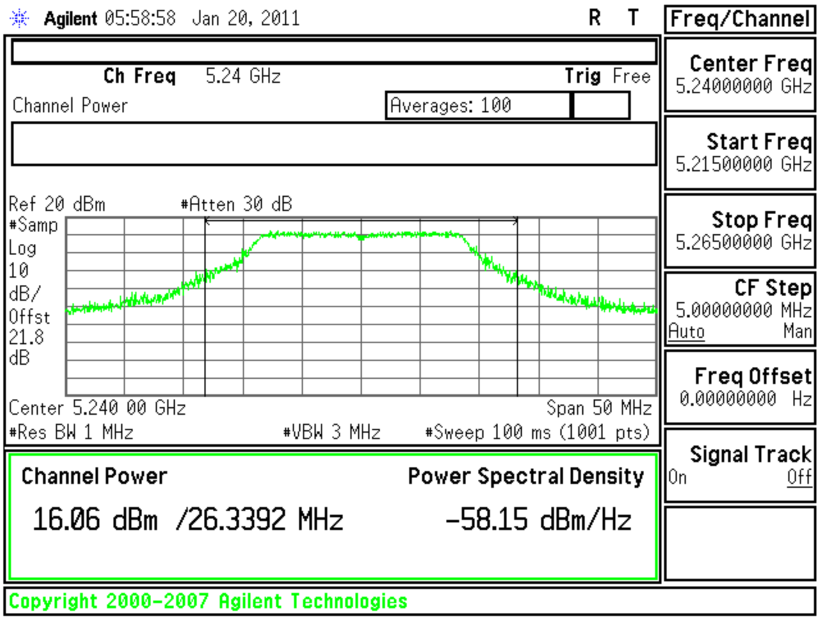
Conducted Output Power on 802.11n (BW 20MHz) Channel 44 - Chain A+B(B)



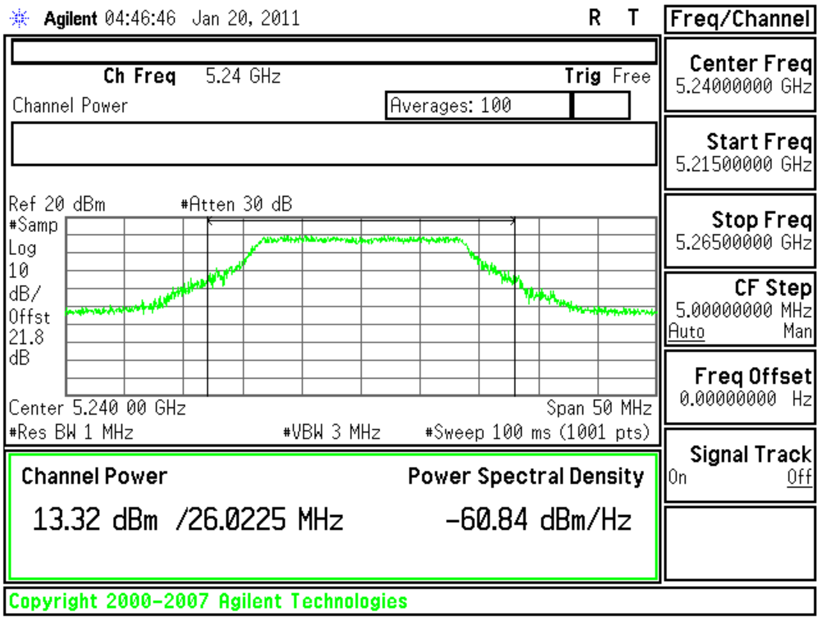
Conducted Output Power on 802.11n (BW 20MHz) Channel 48 - Chain A



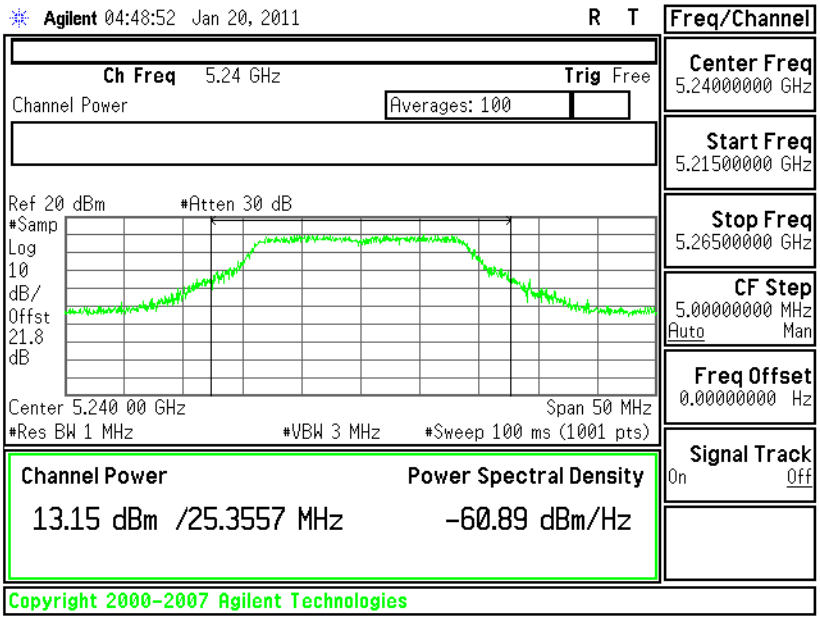
Conducted Output Power on 802.11n (BW 20MHz) Channel 48 - Chain B



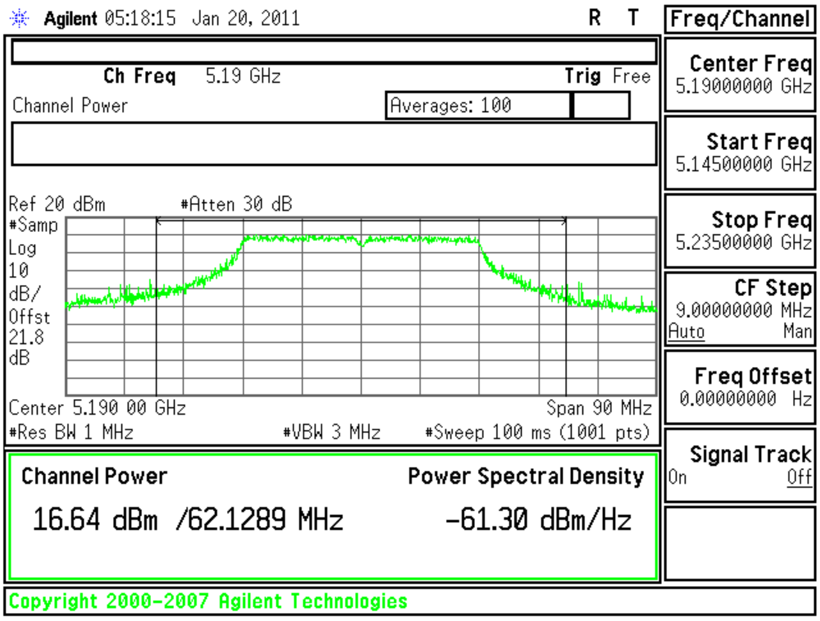
Conducted Output Power on 802.11n (BW 20MHz) Channel 48 - Chain A+B(A)



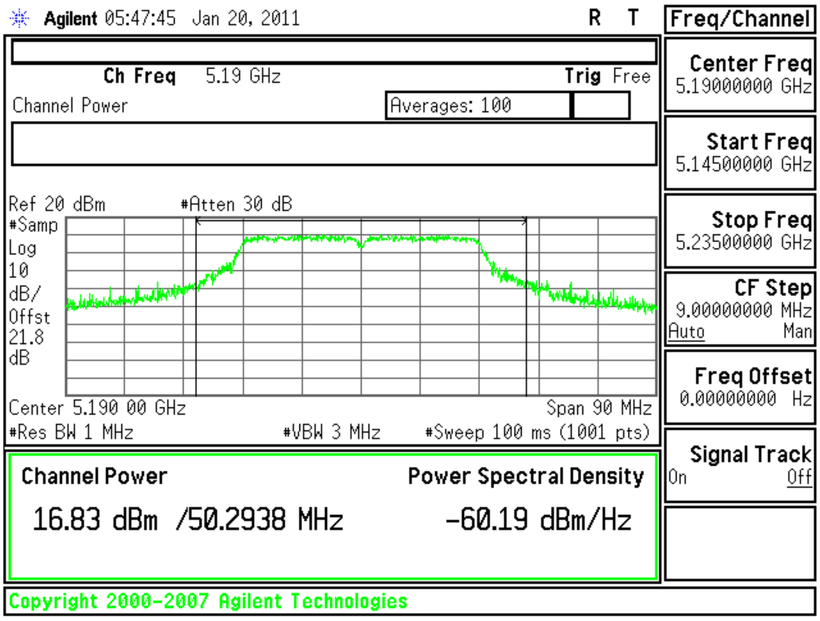
Conducted Output Power on 802.11n (BW 20MHz) Channel 48 - Chain A+B(B)



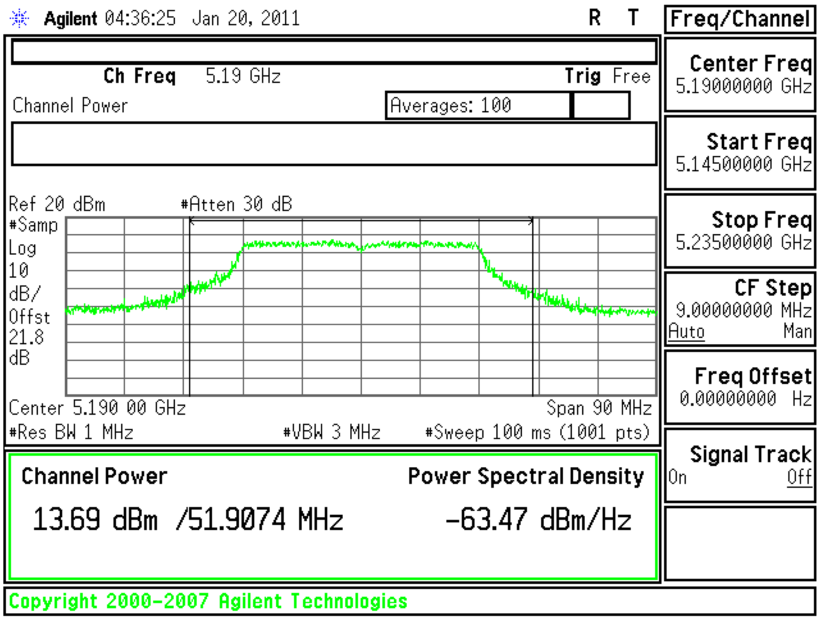
Conducted Output Power on 802.11n (BW 40MHz) Channel 38 - Chain A



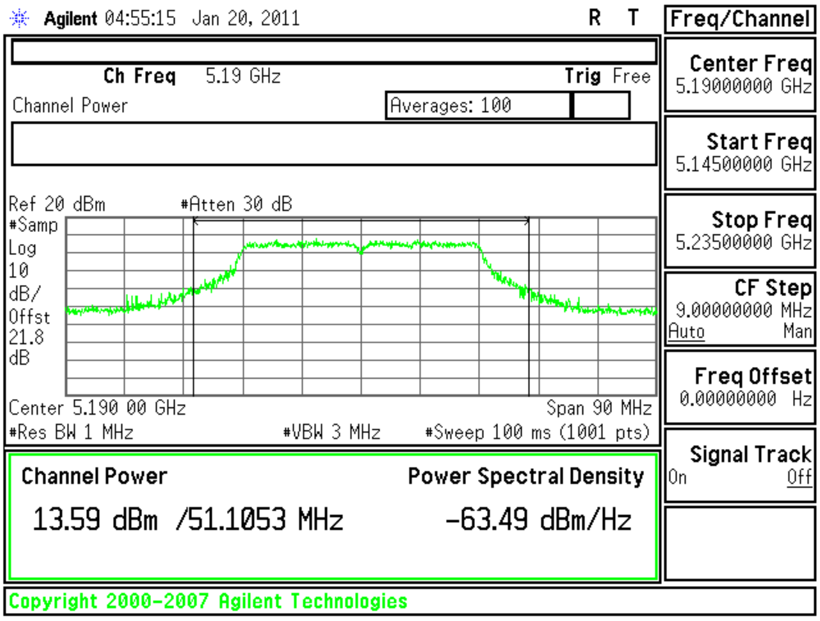
Conducted Output Power on 802.11n (BW 40MHz) Channel 38 - Chain B



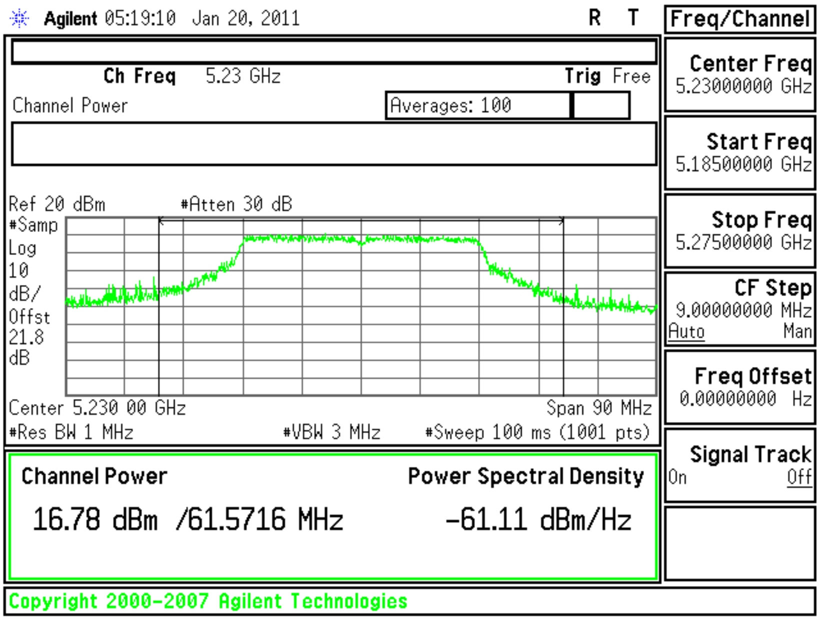
Conducted Output Power on 802.11n (BW 40MHz) Channel 38 - Chain A+B(A)



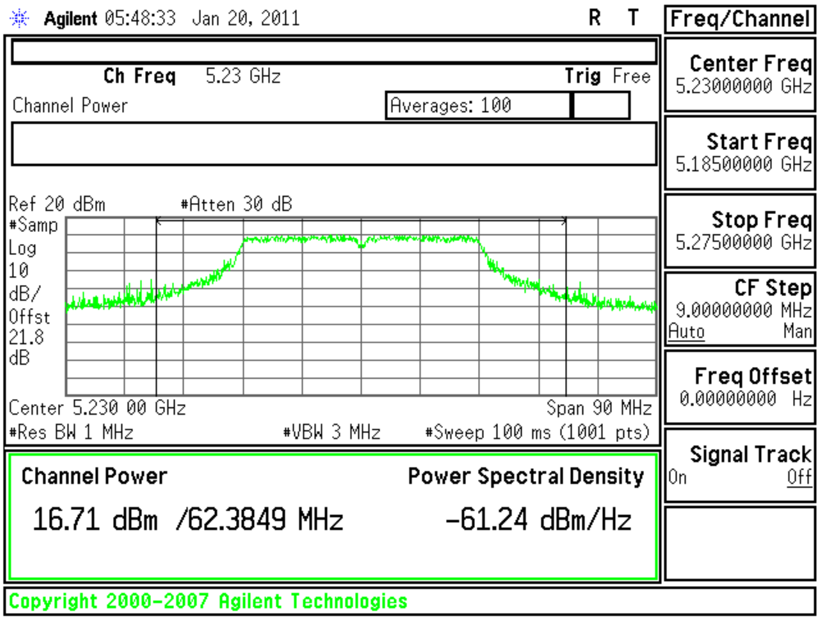
Conducted Output Power on 802.11n (BW 40MHz) Channel 38 - Chain A+B(B)



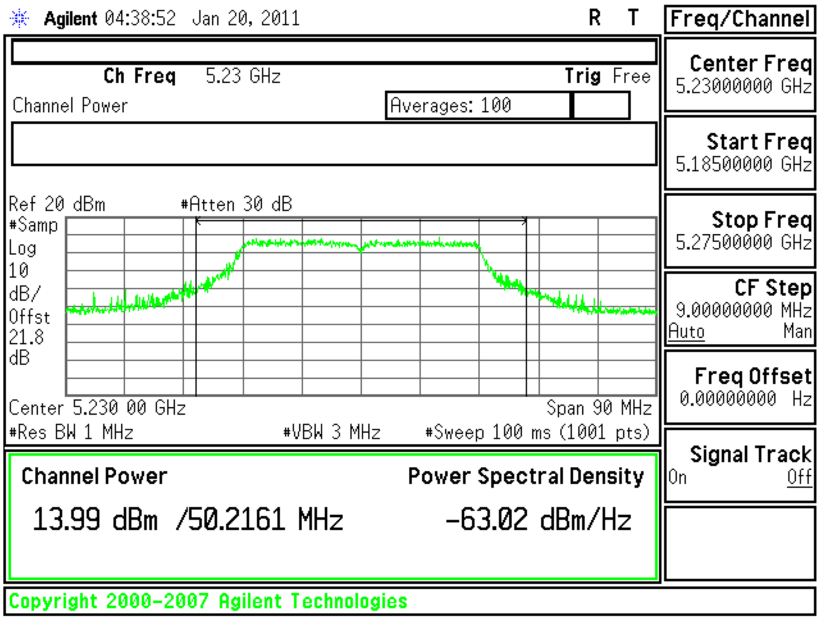
Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain A



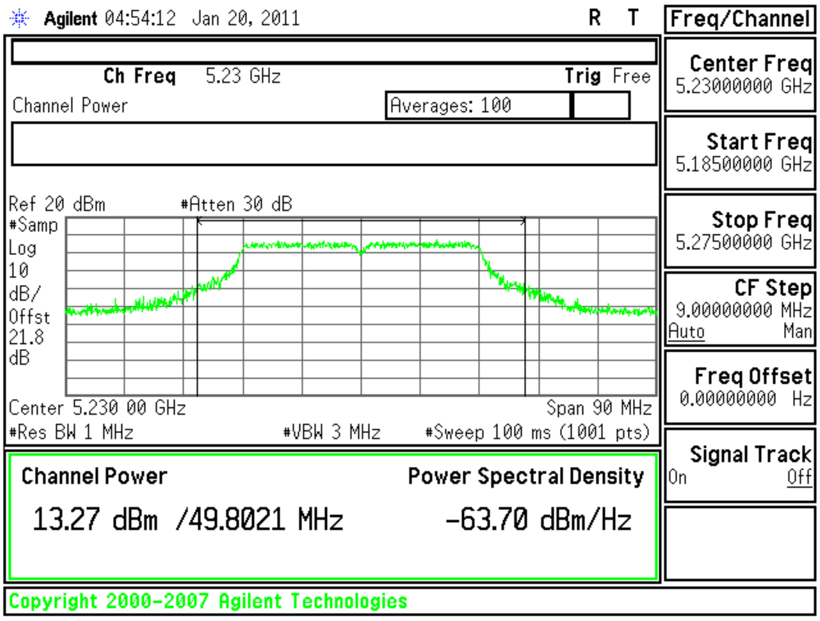
Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain B



Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain A+B(A)



Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain A+B(B)



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5.15–5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1MHz band. For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

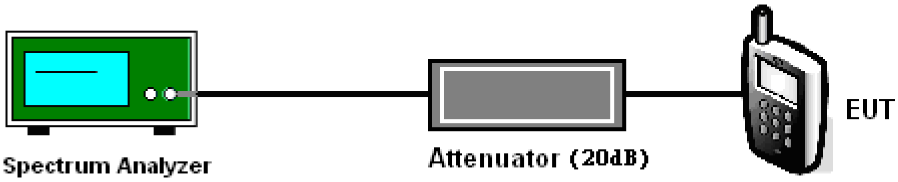
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The transmitter output is connected to the spectrum analyzer. According to the method 2 of DA-02-2138, the resolution bandwidth is set to 1 MHz, video bandwidth is 3MHz, trace average 100 traces in power averaging mode, and sample detection is used, and the analyzer is set for video averaging.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The cable loss (1.8 dB) and attenuator loss (20 dB) are normalized / entered in to the Spectrum Analyzer as an offset as below examples,
   (1) For SISO mode,
   For 802.11a Channel 36 Chain A, the final power in test report is 3.50 dBm which is the reading of spectrum analyzer with offseted cable loss (1.8 dB), and attenuator loss (20 dB).
   (2) For MIMO mode, each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10)).
   For 802.11a Channel 36 Chain A+B: the total final power is 3.59 dBm from the formula of 10*LOG (10^ (0.54 dBm/10) + 10^ (0.62 dBm/10)).
   (a) Plot: PSD Plot on 802.11a Channel 36 - Chain A+B (A): 0.54 dBm
   (b) Plot: PSD Plot on 802.11a Channel 36 - Chain A+B (B): 0.62 dBm.
4. Each plots has already offseted with cable loss (1.8 dB), and attenuator loss (20 dB).When the radio transmitter enables both transmit chains, the power on each chain is reduced below when only chain A or chain B is enabled.
5. Measure the power and record it.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Test Mode :	Mode 1~3	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11a Measured PSD (dBm)					Max. Limits (dBm)	Pass/Fail
		SISO		2Tx				
		Chain A	Chain B	Chain A+B(A)	Chain A+B(B)	Summation		
36	5180	3.50	3.66	0.54	0.62	3.59	4	Pass
44	5220	3.87	3.69	0.87	0.34	3.62	4	Pass
48	5240	3.77	3.78	0.23	0.78	3.52	4	Pass

Note: Each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10)).

Test Mode :	Mode 4~6	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured PSD (dBm)					Max. Limits (dBm)	Pass/Fail
		SISO		2Tx				
		Chain A	Chain B	Chain A+B(A)	Chain A+B(B)	Summation		
36	5180	3.90	3.93	0.84	0.85	3.86	4	Pass
44	5220	3.55	3.83	1.14	0.74	3.95	4	Pass
48	5240	3.61	3.98	0.40	1.01	3.73	4	Pass

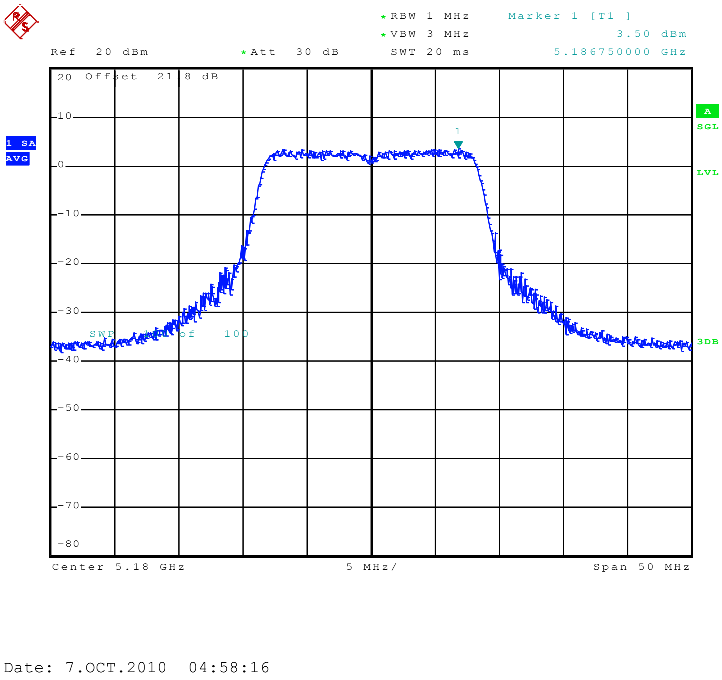
Note: Each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10)).

Test Mode :	Mode 7~8	**Temperature :**	**24~26℃**
Test Engineer :	**Ken Hsu**	**Relative Humidity :**	**52~55%**

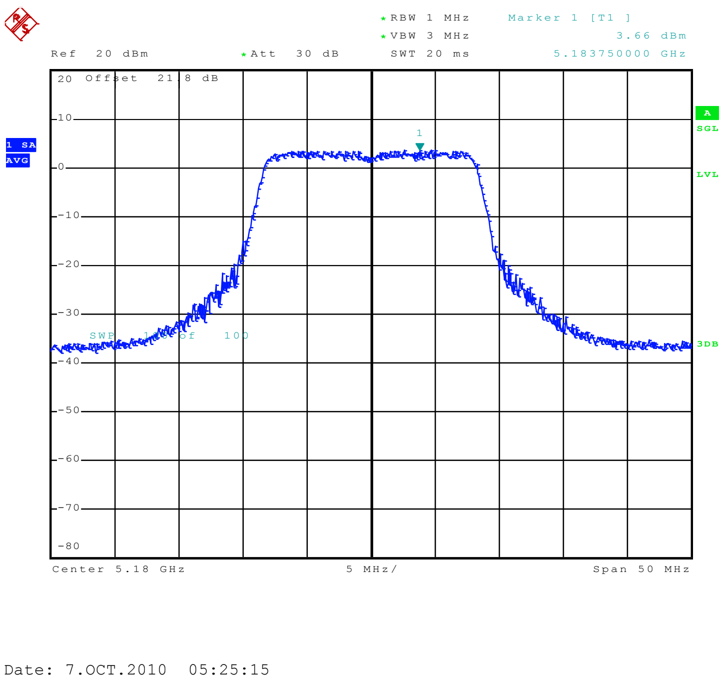
Channel	**Frequency (MHz)**	**802.11n (BW 40MHz) Measured PSD (dBm)**					**Max. Limits (dBm)**	**Pass/Fail**
		SISO		**2Tx**				
		Chain A	**Chain B**	**Chain A+B(A)**	**Chain A+B(B)**	**Summation**		
38	5190	1.80	2.84	0.59	0.94	3.78	4	Pass
46	5230	2.63	2.61	0.25	0.63	3.45	4	Pass

Note: Each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10)).

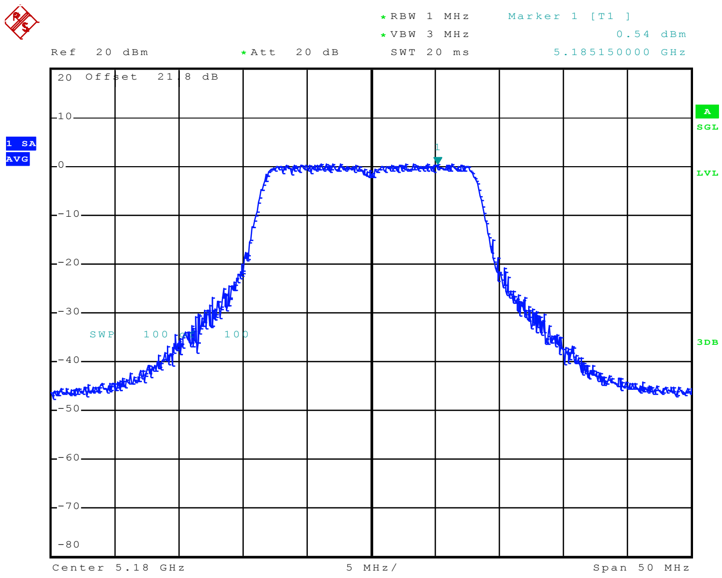
PSD Plot on 802.11a Channel 36 - Chain A



PSD Plot on 802.11a Channel 36 - Chain B

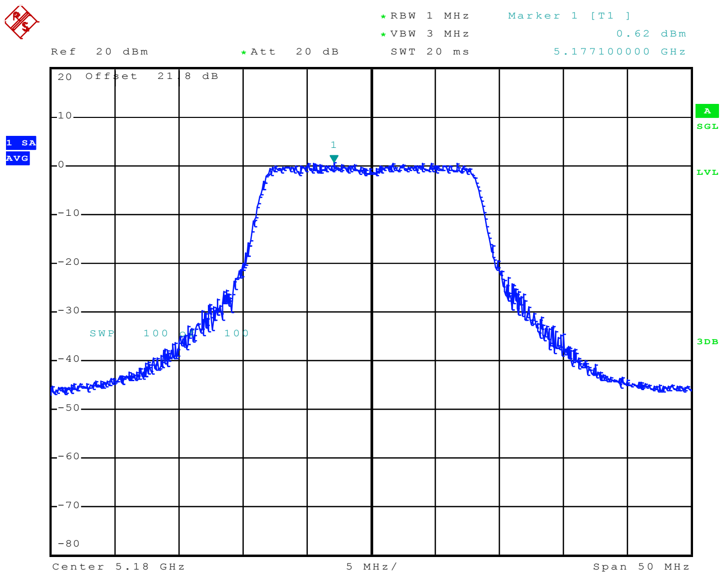


PSD Plot on 802.11a Channel 36 - Chain A+B(A)



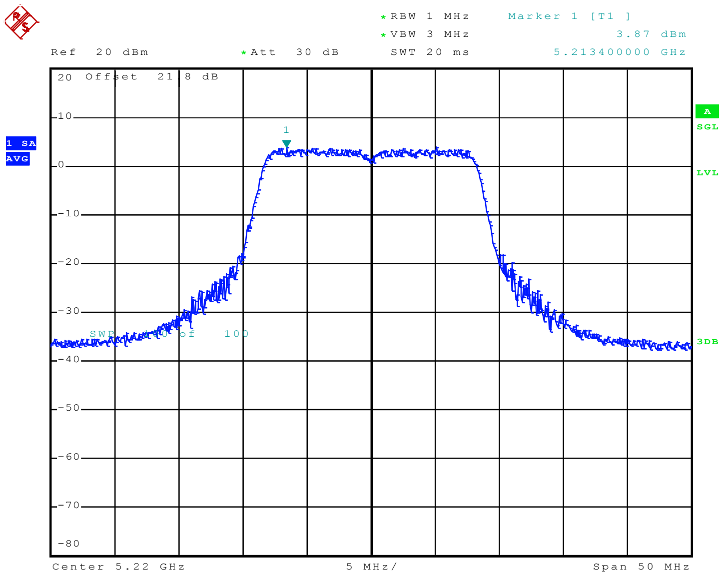
Date: 21.OCT.2010 11:05:31

PSD Plot on 802.11a Channel 36 - Chain A+B(B)



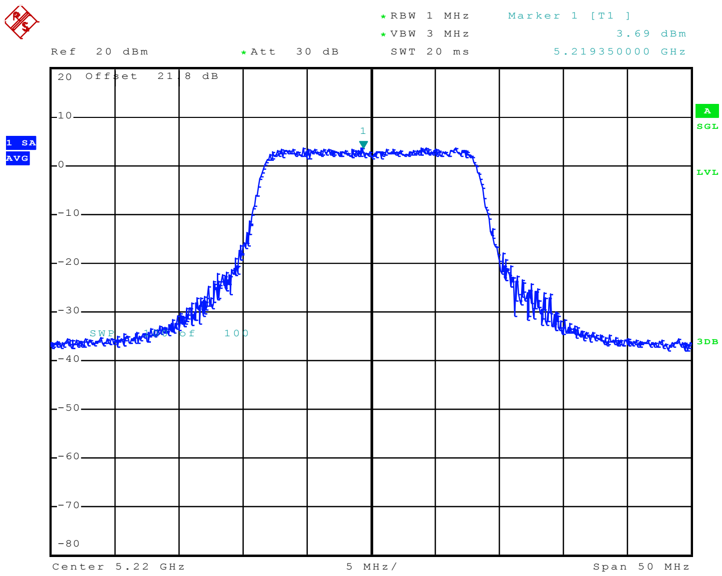
Date: 21.OCT.2010 11:07:00

PSD Plot on 802.11a Channel 44 - Chain A



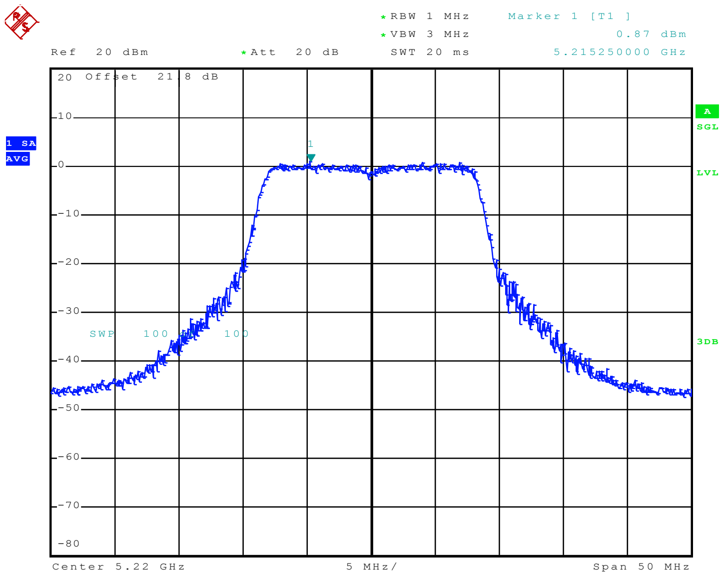
Date: 7.OCT.2010 05:00:10

PSD Plot on 802.11a Channel 44 - Chain B



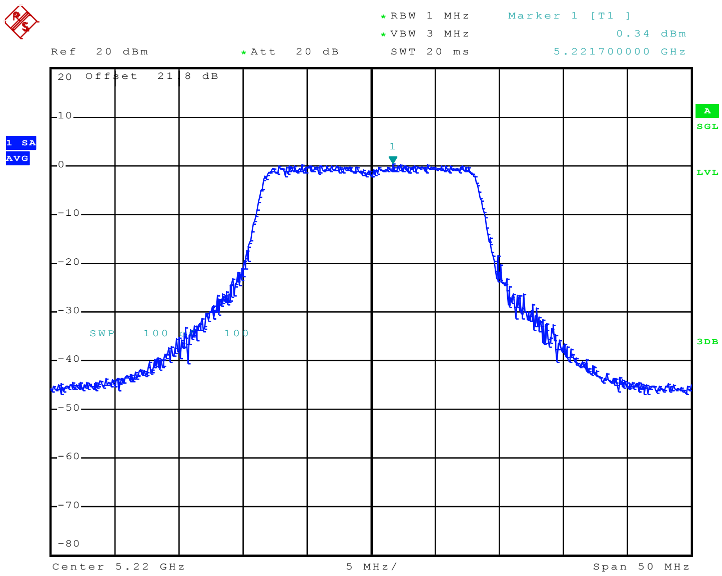
Date: 7.OCT.2010 05:26:36

PSD Plot on 802.11a Channel 44 - Chain A+B(A)



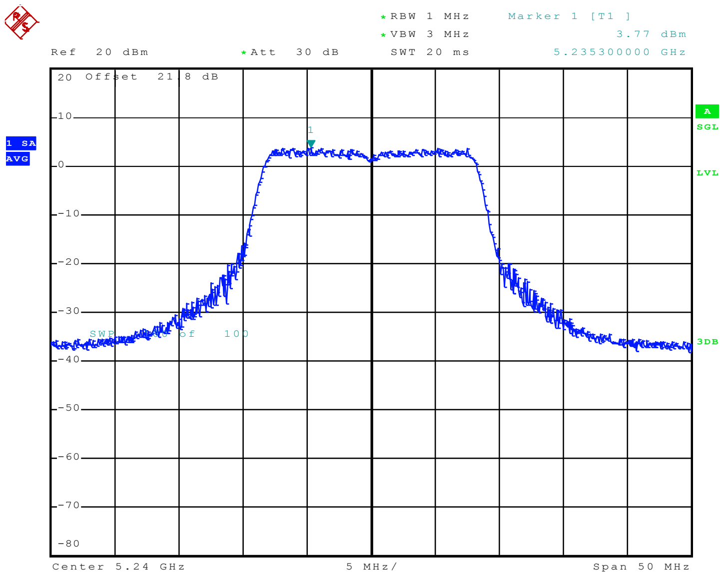
Date: 21.OCT.2010 11:09:24

PSD Plot on 802.11a Channel 44 - Chain A+B(B)



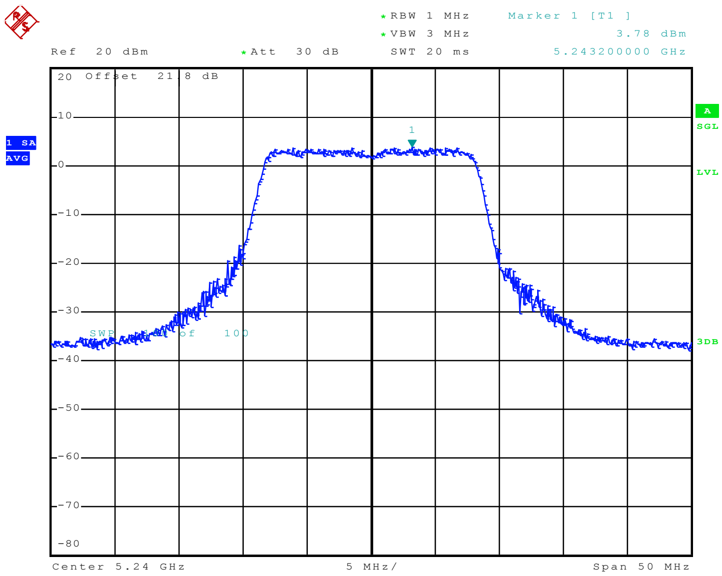
Date: 21.OCT.2010 11:08:08

PSD Plot on 802.11a Channel 48 - Chain A



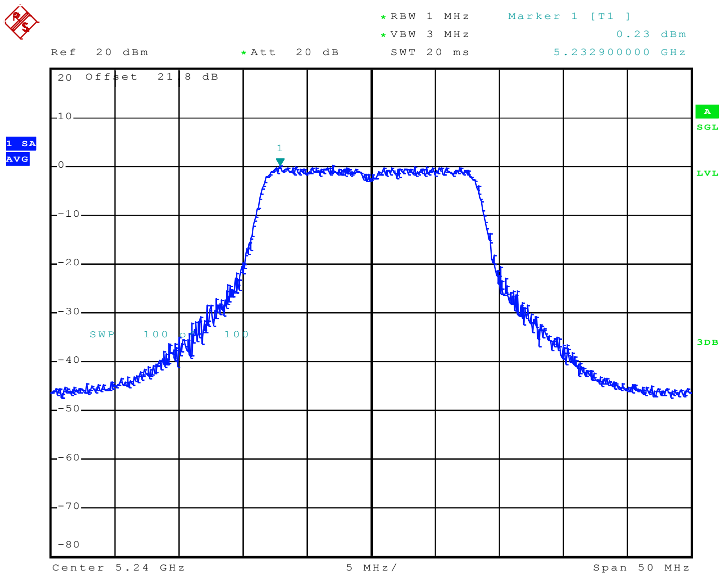
Date: 7.OCT.2010 05:01:12

PSD Plot on 802.11a Channel 48 - Chain B



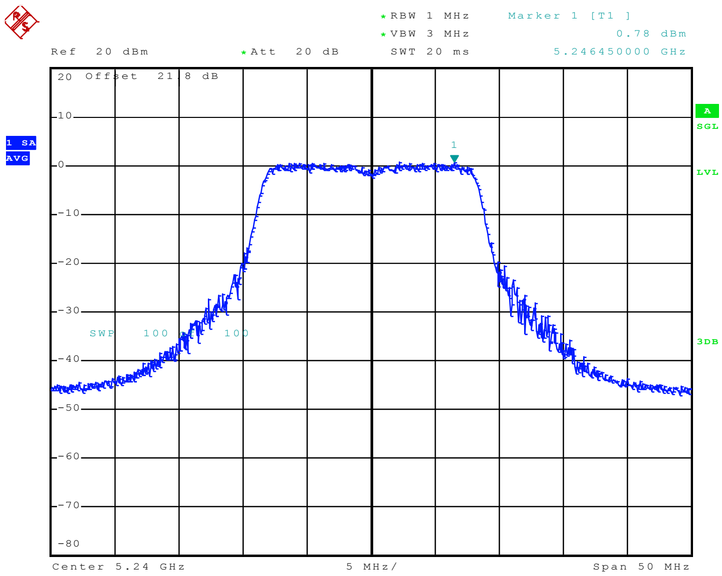
Date: 7.OCT.2010 05:29:00

PSD Plot on 802.11a Channel 48 - Chain A+B(A)



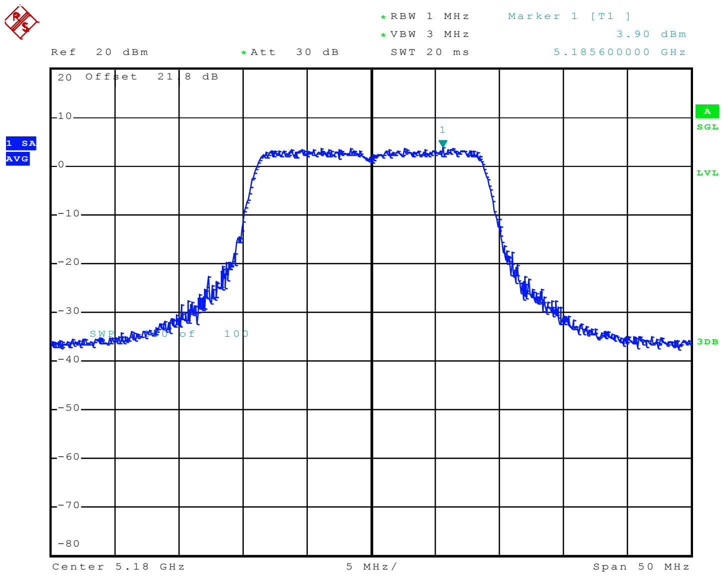
Date: 21.OCT.2010 11:31:13

PSD Plot on 802.11a Channel 48 - Chain A+B(B)



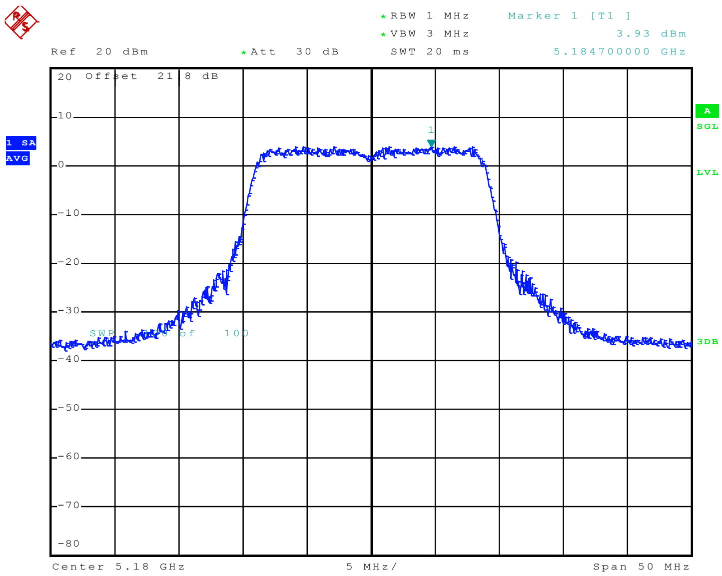
Date: 21.OCT.2010 11:29:42

PSD Plot on 802.11n (BW 20MHz) Channel 36 - Chain A



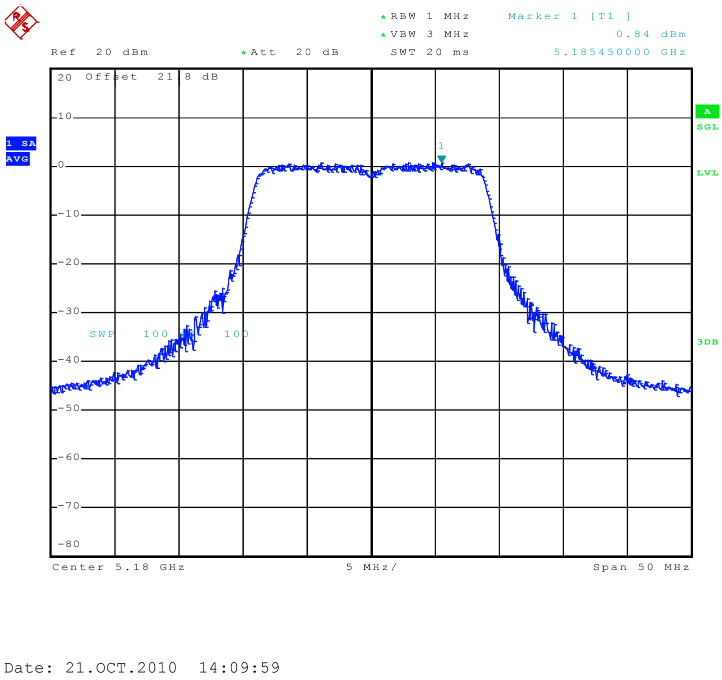
Date: 7.OCT.2010 06:01:32

PSD Plot on 802.11n (BW 20MHz) Channel 36 - Chain B

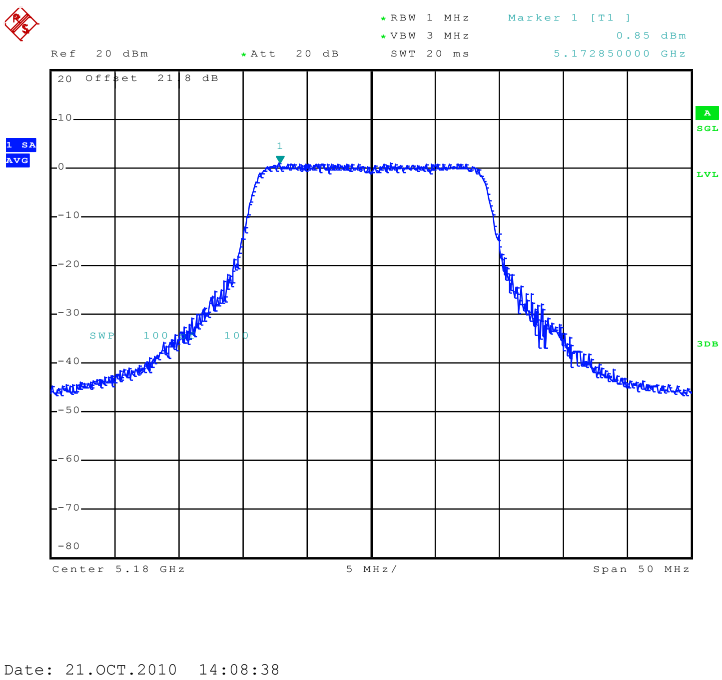


Date: 7.OCT.2010 05:39:26

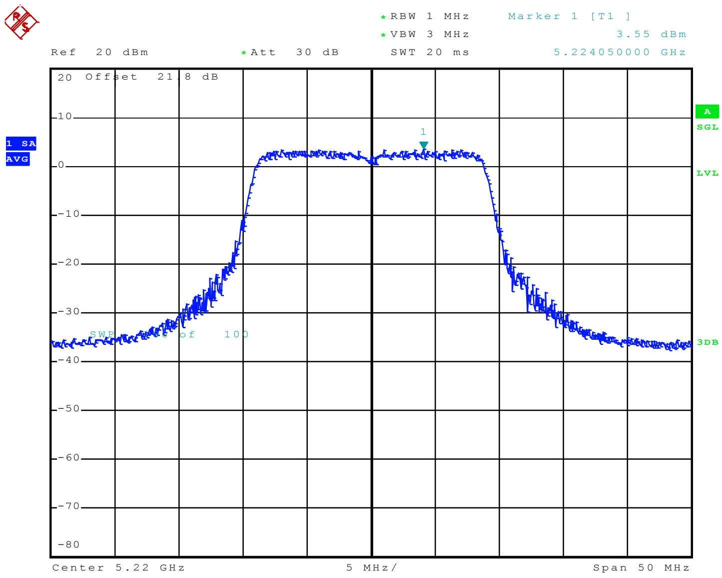
PSD Plot on 802.11n (BW 20MHz) Channel 36 - Chain A+B(A)



PSD Plot on 802.11n (BW 20MHz) Channel 36 - Chain A+B(B)

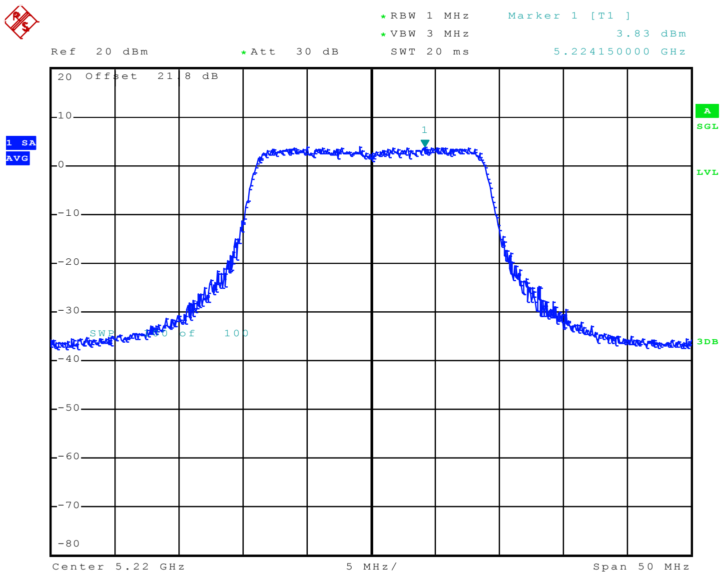


PSD Plot on 802.11n (BW 20MHz) Channel 44 - Chain A



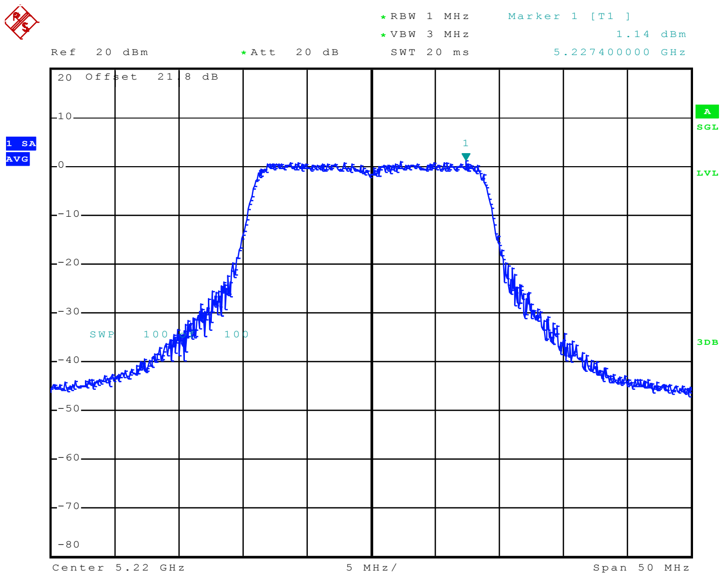
Date: 7.OCT.2010 06:00:29

PSD Plot on 802.11n (BW 20MHz) Channel 44 - Chain B



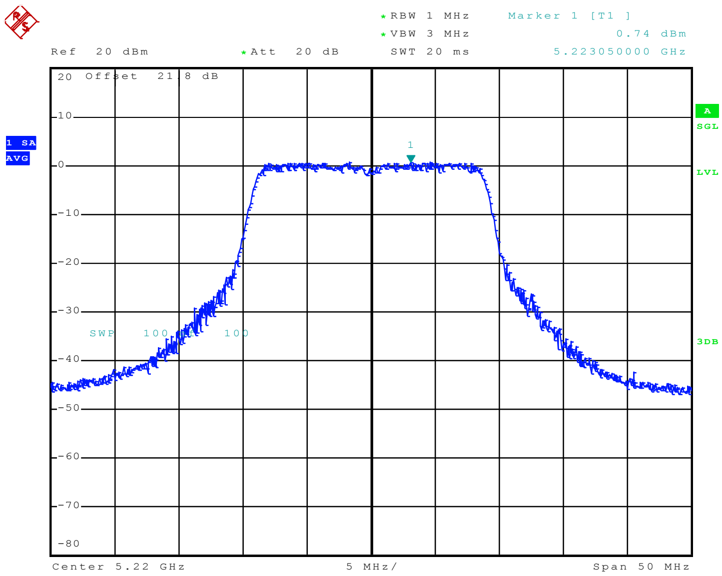
Date: 7.OCT.2010 05:42:04

PSD Plot on 802.11n (BW 20MHz) Channel 44 - Chain A+B(A)



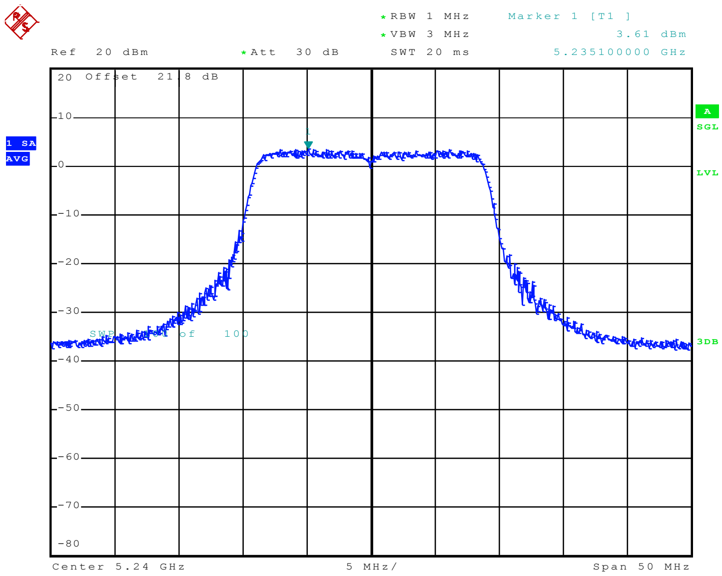
Date: 21.OCT.2010 14:05:19

PSD Plot on 802.11n (BW 20MHz) Channel 44 - Chain A+B(B)



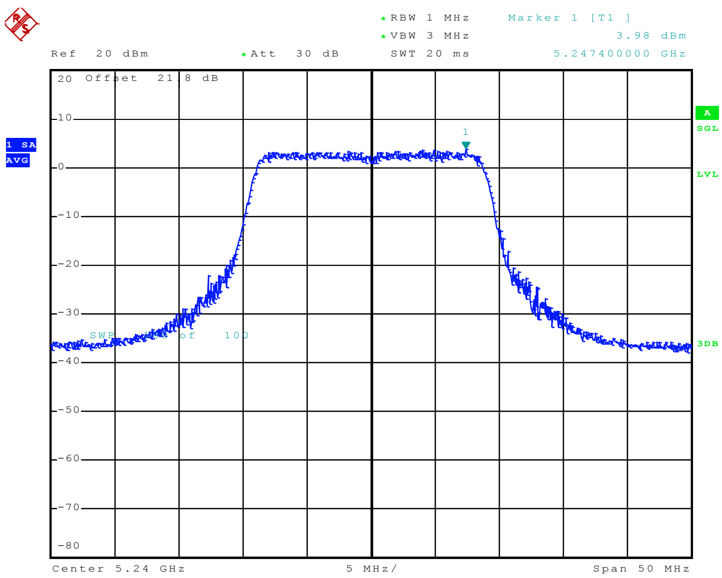
Date: 21.OCT.2010 14:06:36

PSD Plot on 802.11n (BW 20MHz) Channel 48 - Chain A



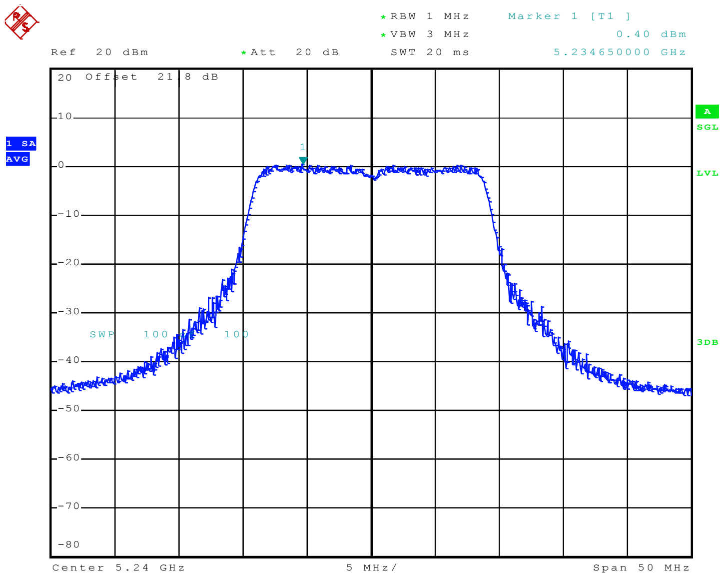
Date: 7.OCT.2010 05:59:37

PSD Plot on 802.11n (BW 20MHz) Channel 48 - Chain B



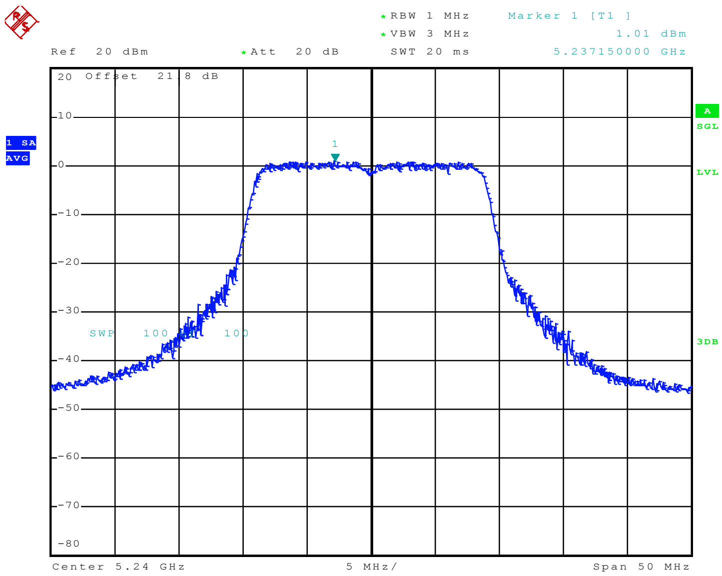
Date: 7.OCT.2010 05:43:24

PSD Plot on 802.11n (BW 20MHz) Channel 48 - Chain A+B(A)



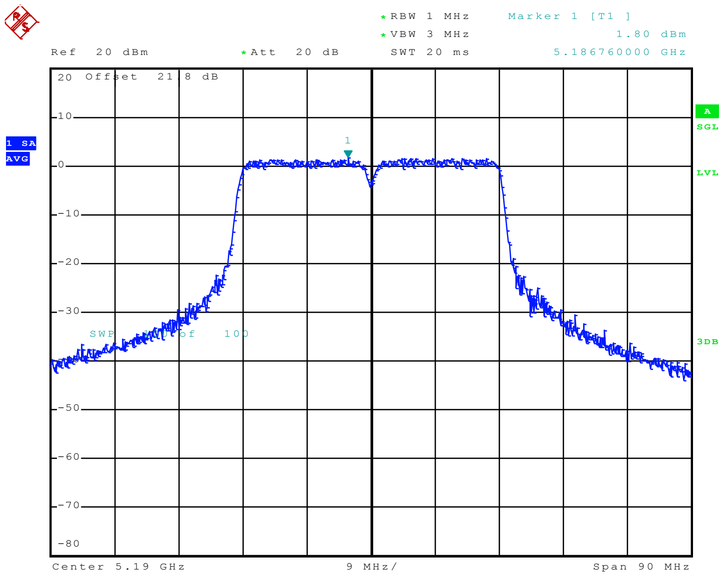
Date: 21.OCT.2010 14:03:41

PSD Plot on 802.11n (BW 20MHz) Channel 48 - Chain A+B(B)



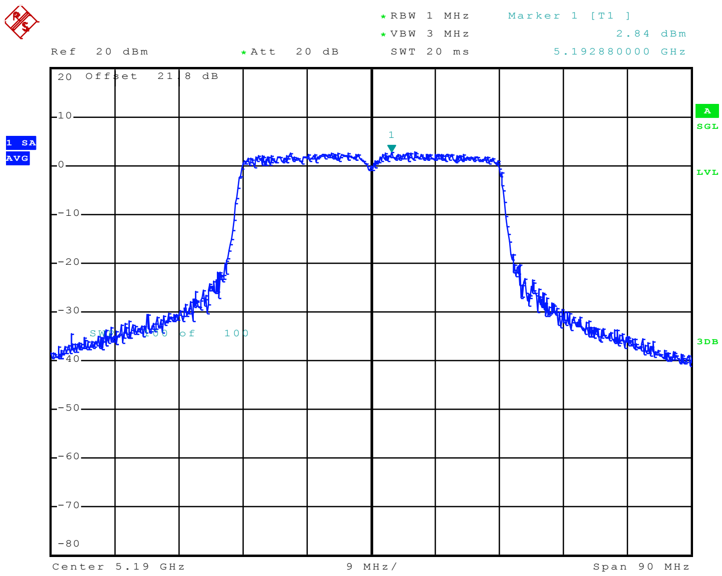
Date: 21.OCT.2010 14:00:58

PSD Plot on 802.11n (BW 40MHz) Channel 38 - Chain A



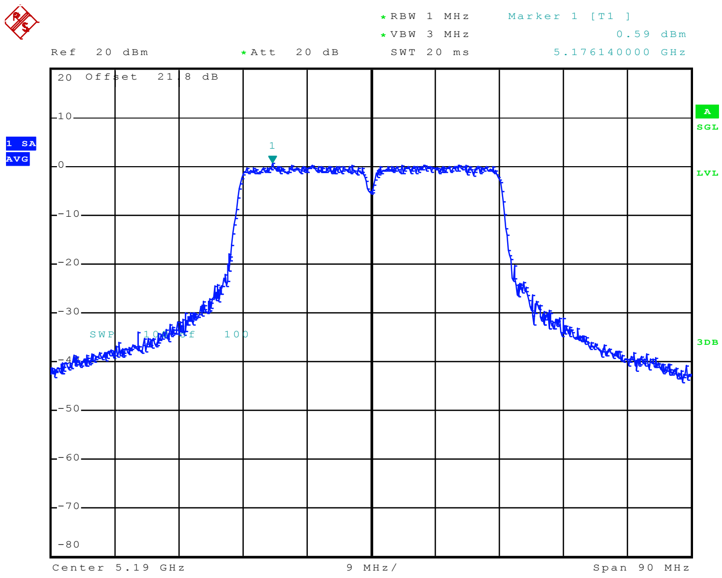
Date: 28.OCT.2010 14:12:31

PSD Plot on 802.11n (BW 40MHz) Channel 38 - Chain B



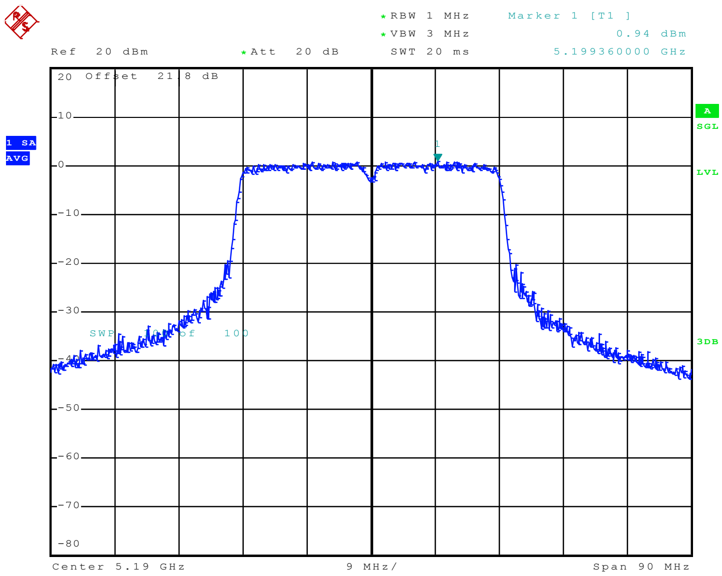
Date: 28.OCT.2010 14:09:26

PSD Plot on 802.11n (BW 40MHz) Channel 38 - Chain A+B(A)



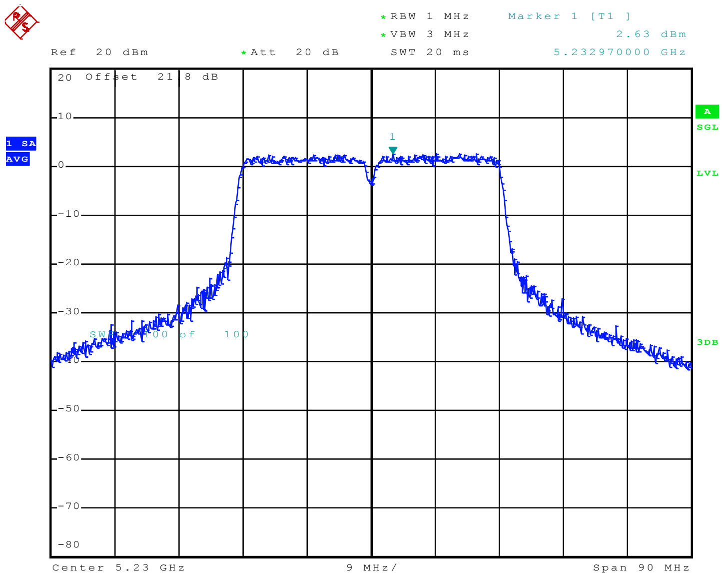
Date: 21.OCT.2010 14:59:06

PSD Plot on 802.11n (BW 40MHz) Channel 38 - Chain A+B(B)



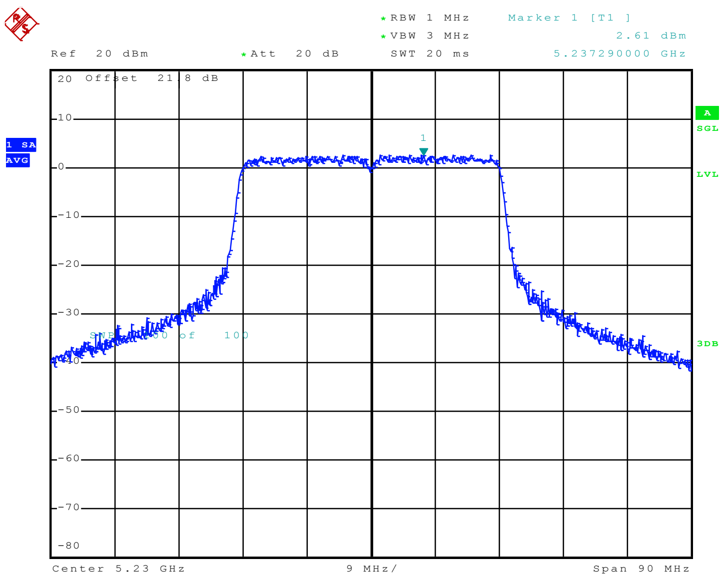
Date: 21.OCT.2010 14:48:54

PSD Plot on 802.11n (BW 40MHz) Channel 46 - Chain A



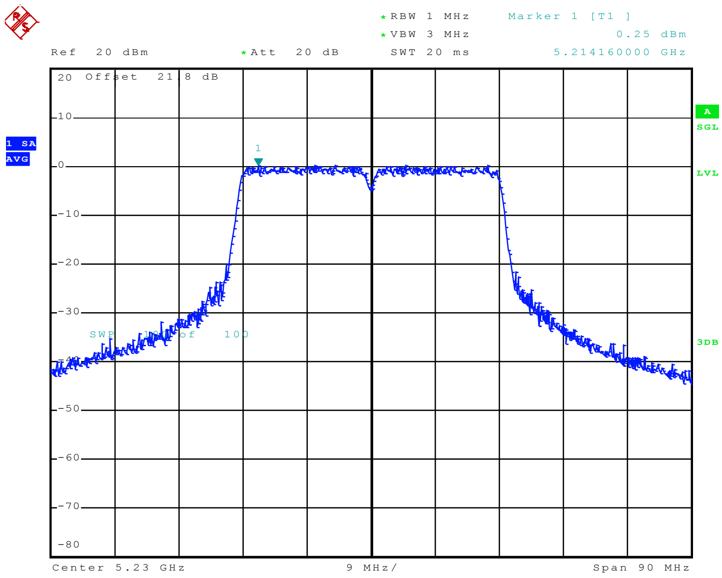
Date: 28.OCT.2010 14:11:41

PSD Plot on 802.11n (BW 40MHz) Channel 46 - Chain B



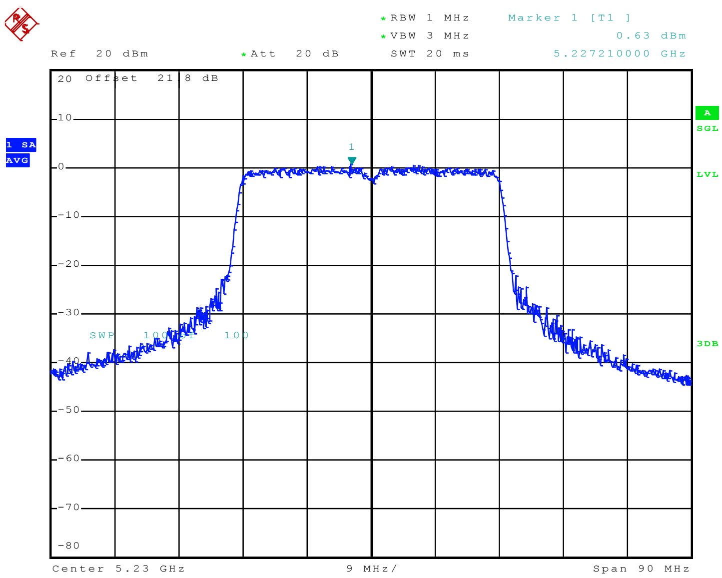
Date: 28.OCT.2010 14:10:18

PSD Plot on 802.11n (BW 40MHz) Channel 46 - Chain A+B(A)



Date: 21.OCT.2010 15:03:40

PSD Plot on 802.11n (BW 40MHz) Channel 46 - Chain A+B(B)



Date: 21.OCT.2010 15:02:25

3.4 Band Edges Measurement

3.4.1 Limit of Band Edges

(1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band. For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) The provisions of Section 15.205 Restricted bands of operation of this part apply to intentional radiators operating under this section.

3.4.2 Measuring Instruments

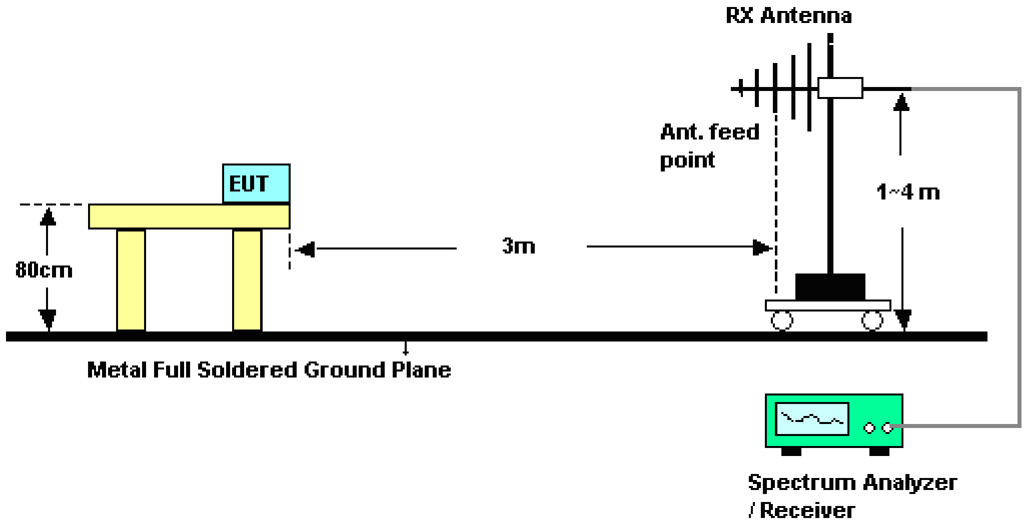
See list of measuring instruments of this test report.

3.4.3 Test Procedures

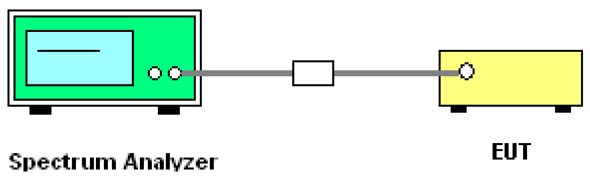
1. Set both RBW and VBW of spectrum analyzer to 1MHz with convenient frequency span including 1MHz bandwidth from band edge.
2. The band edges was measured and recorded.

3.4.4 Test Setup

<Radiated>



<Conducted>



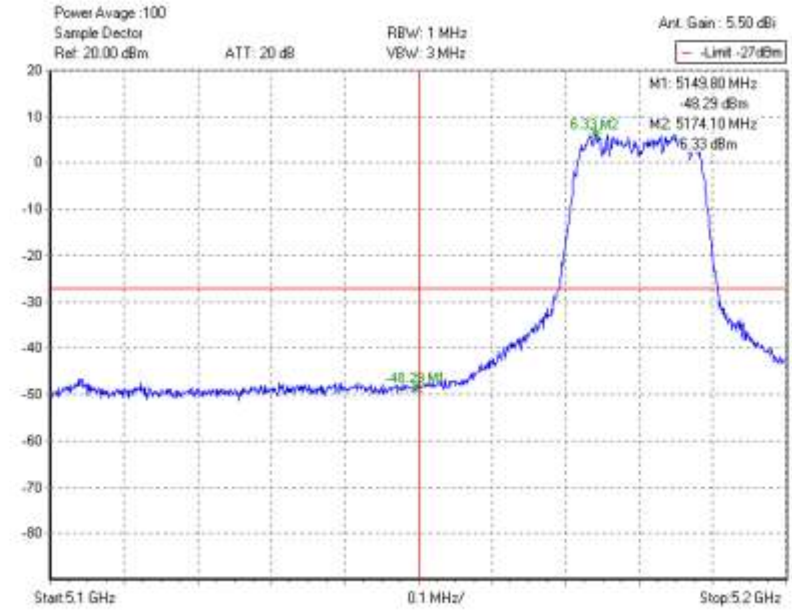
3.4.5 Test Result of Radiated Band Edges

Please refer to Appendix A to E.

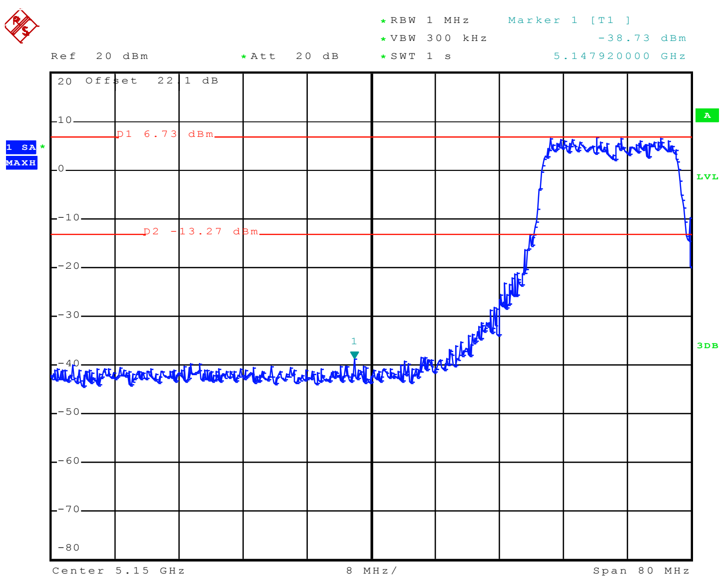
3.4.6 Test Result of Conducted Band Edges

Test Mode :	Mode 1 and 3	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

Low Band Edge Plot on 802.11a Channel 36 - Chain A

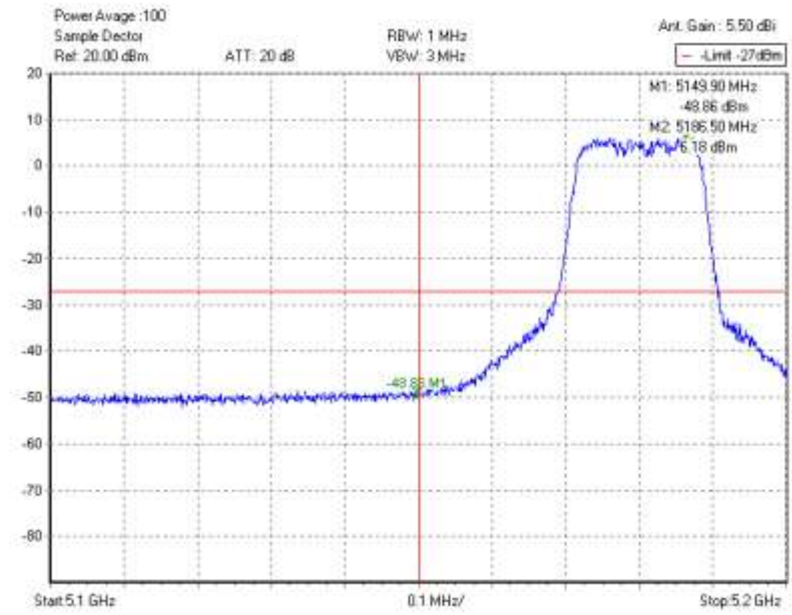


Test result was offseted with path loss, and antenna gain.

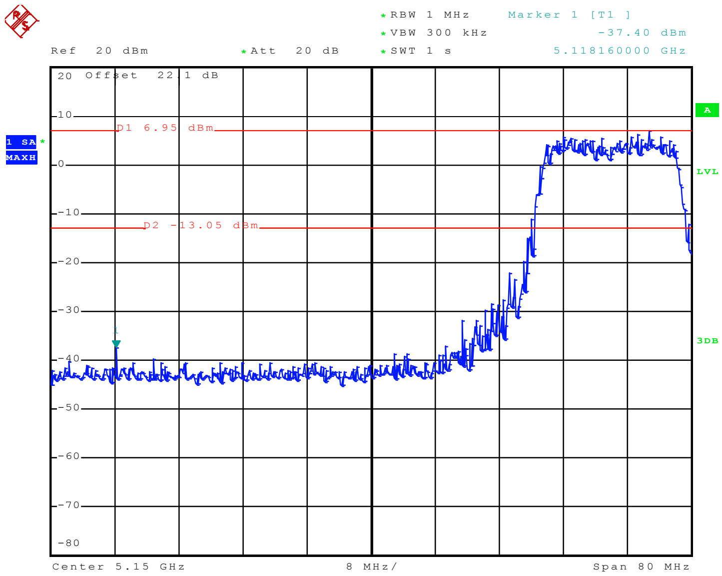


Date: 26.NOV.2010 17:35:10

Low Band Edge Plot on 802.11a Channel 36 - Chain B

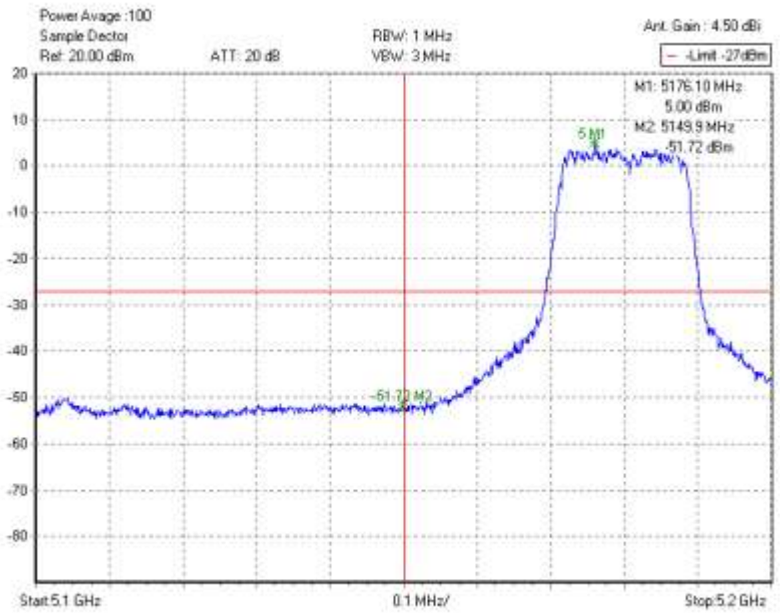


Test result was offseted with path loss, and antenna gain.

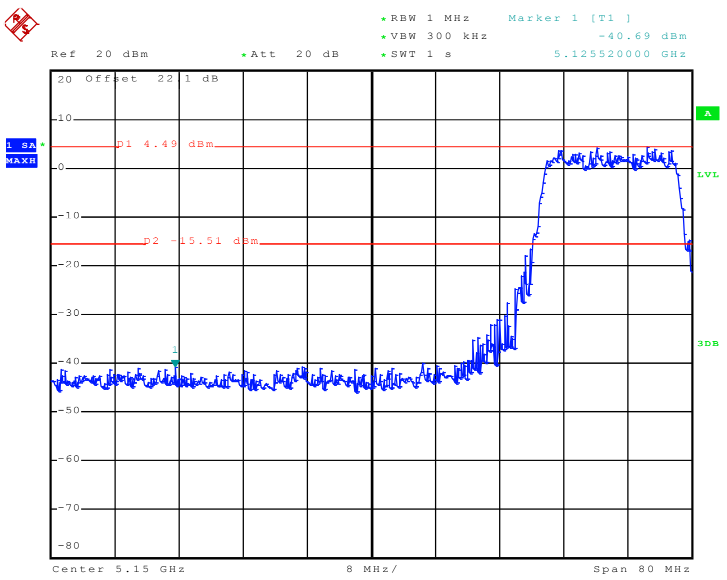


Date: 26.NOV.2010 17:37:25

Low Band Edge Plot on 802.11a Channel 36 - Chain A+B(A)

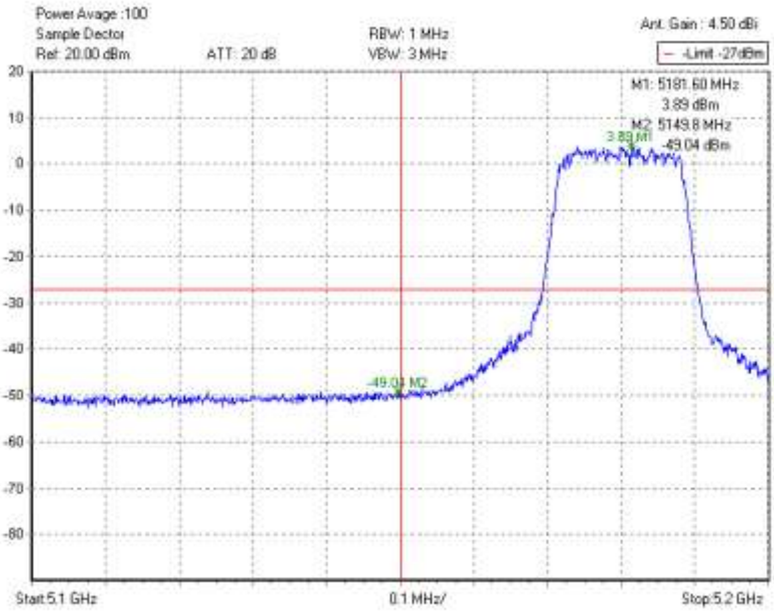


Test result was offseted with path loss, and antenna gain.

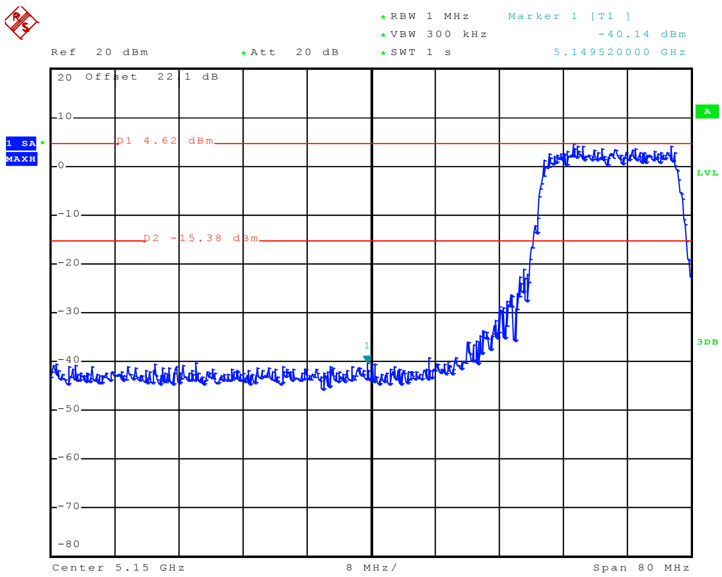


Date: 26.NOV.2010 17:46:31

Low Band Edge Plot on 802.11a Channel 36 - Chain A+B(B)

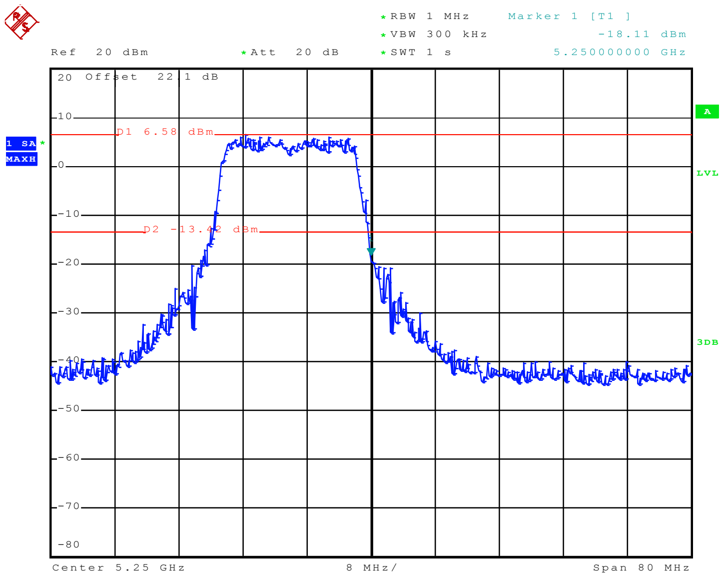


Test result was offseted with path loss, and antenna gain.



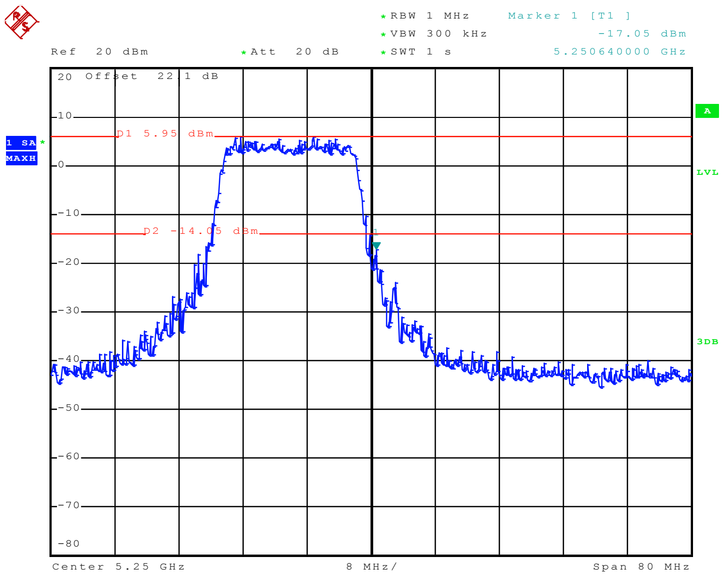
Date: 26.NOV.2010 17:45:39

High Band Edge Plot on 802.11a Channel 48 - Chain A



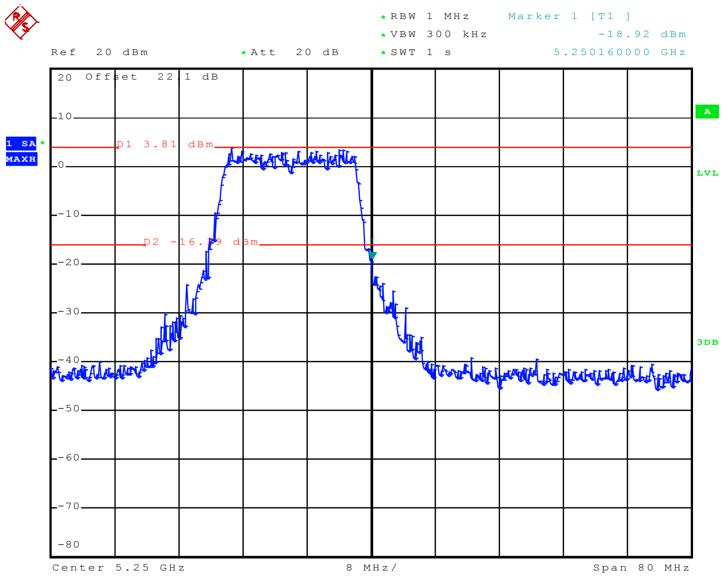
Date: 26.NOV.2010 17:40:44

High Band Edge Plot on 802.11a Channel 48 - Chain B



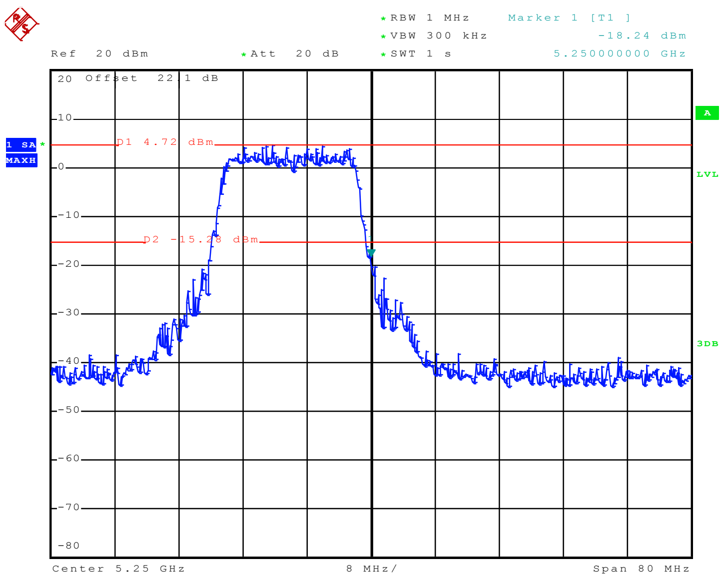
Date: 26.NOV.2010 17:38:35

High Band Edge Plot on 802.11a Channel 48 - Chain A+B(A)



Date: 26.NOV.2010 17:43:31

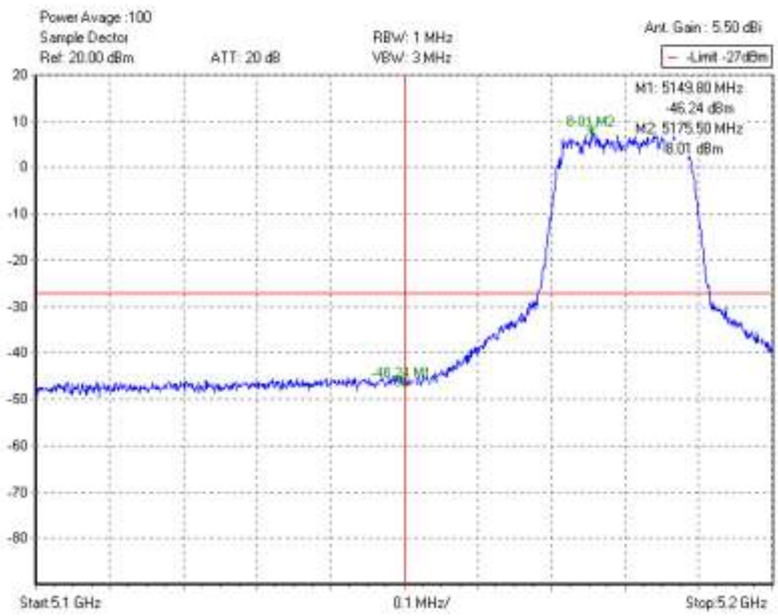
High Band Edge Plot on 802.11a Channel 48 - Chain A+B(B)



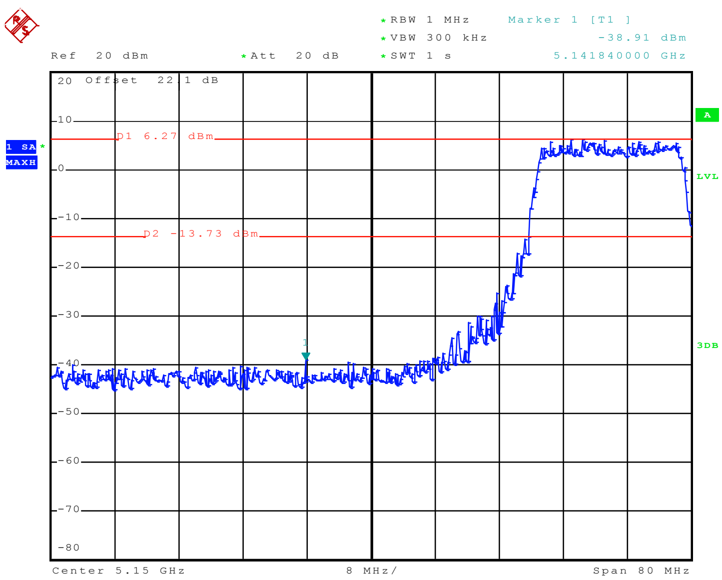
Date: 26.NOV.2010 17:44:37

Test Mode :	Mode 4 and 6	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 36 - Chain A

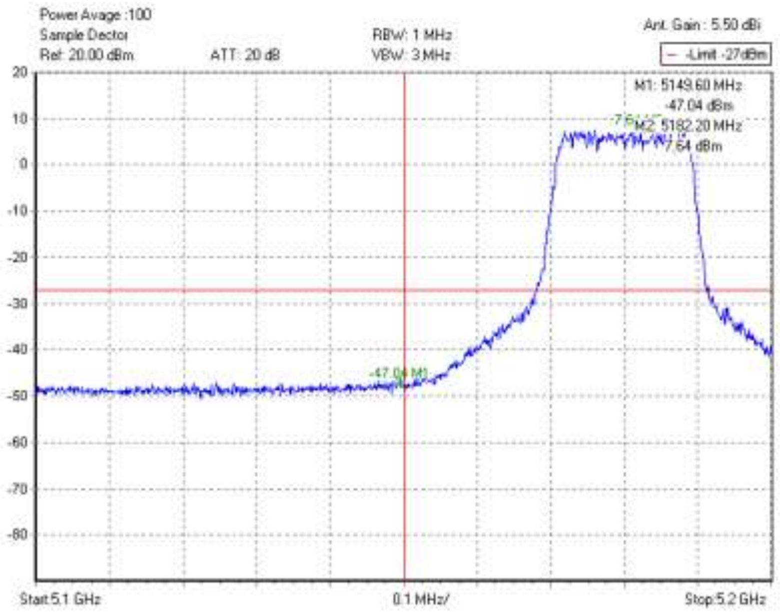


Test result was offseted with path loss, and antenna gain.

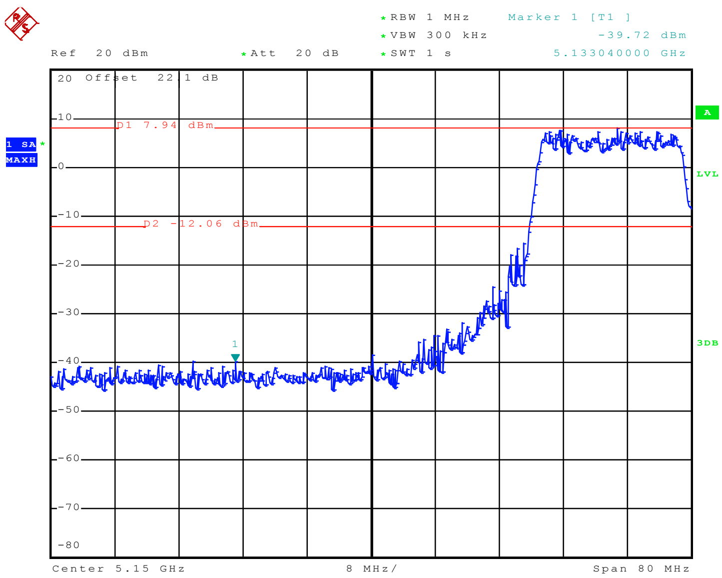


Date: 26.NOV.2010 18:08:20

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 36 - Chain B

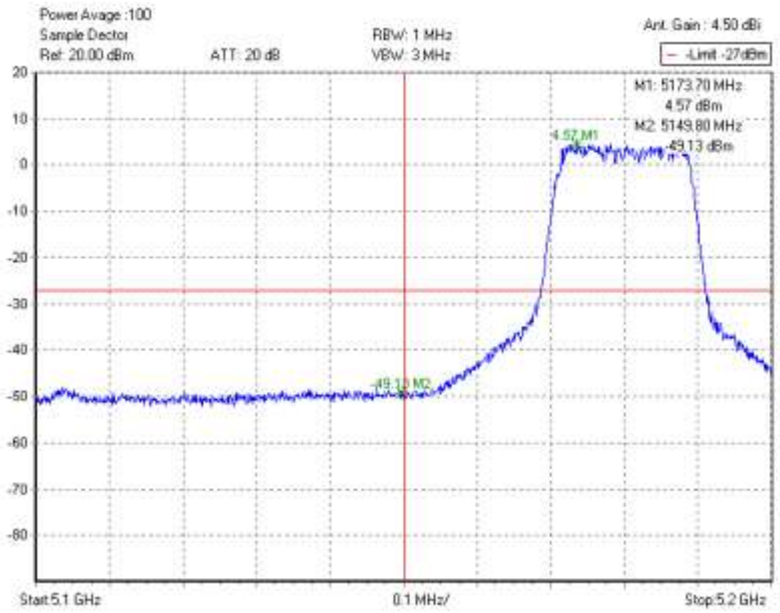


Test result was offseted with path loss, and antenna gain.

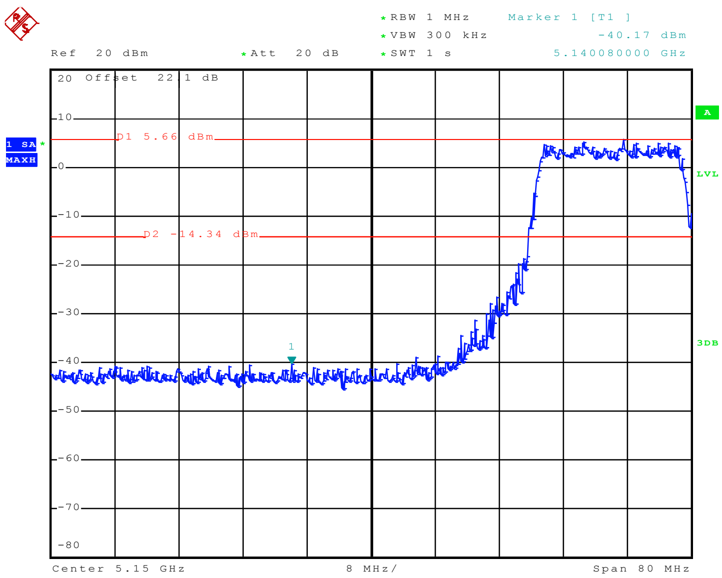


Date: 26.NOV.2010 18:07:10

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 36 - Chain A+B(A)

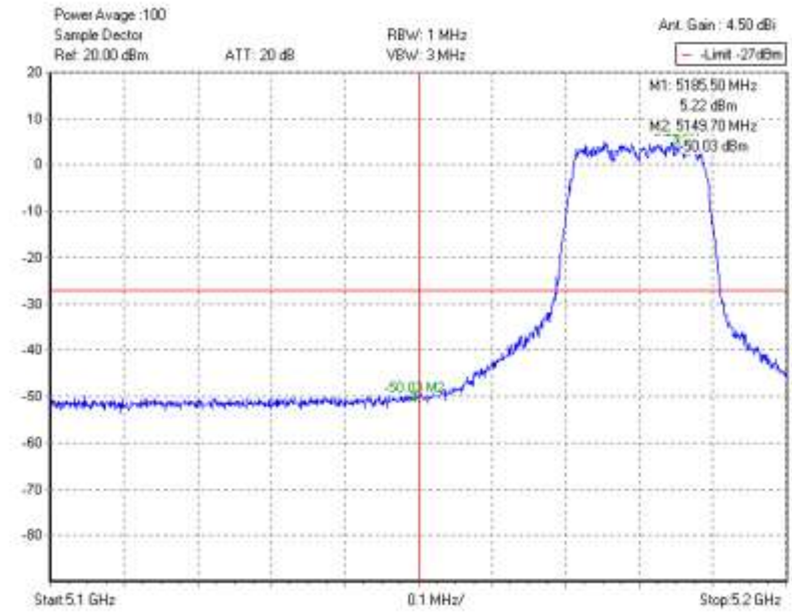


Test result was offseted with path loss, and antenna gain.

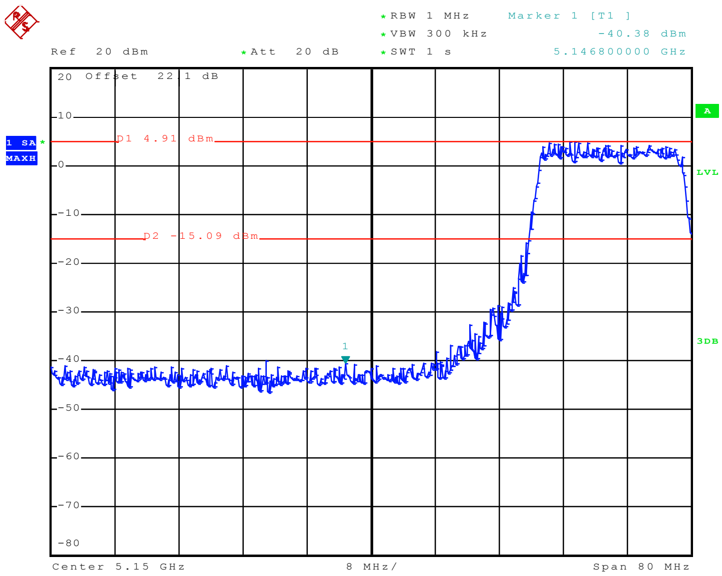


Date: 26.NOV.2010 17:48:54

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 36 - Chain A+B(B)

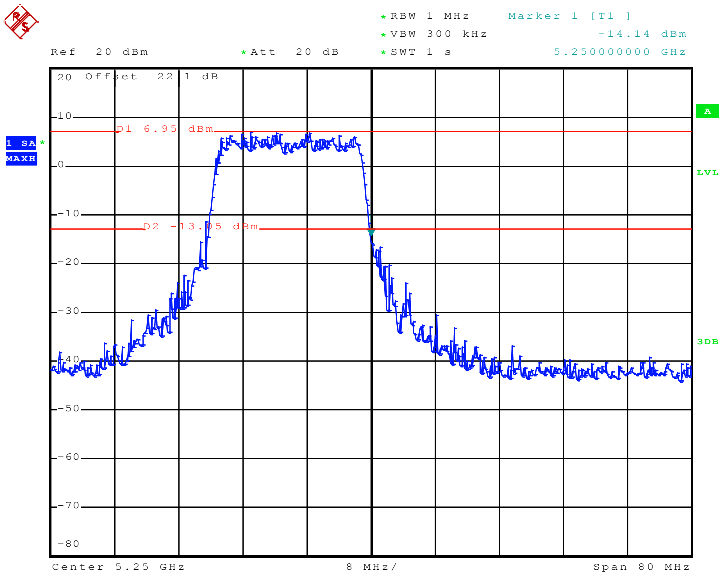


Test result was offseted with path loss, and antenna gain.



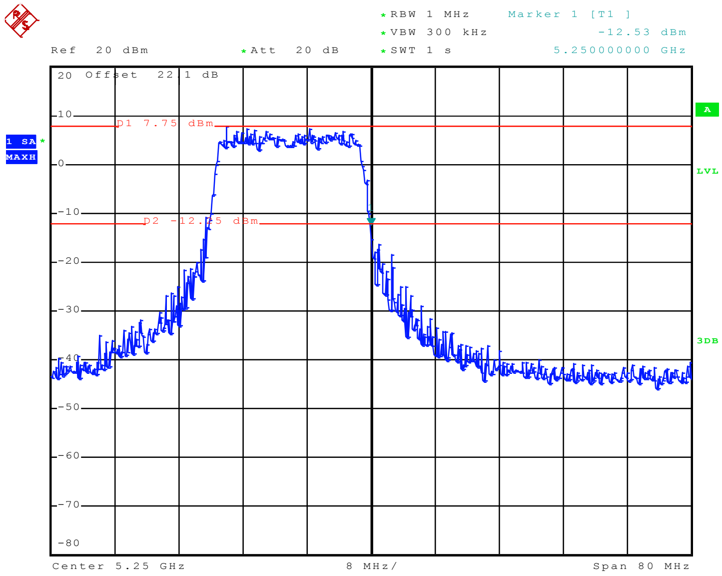
Date: 26.NOV.2010 17:49:55

High Band Edge Plot on 802.11n (BW 20MHz) Channel 48 - Chain A



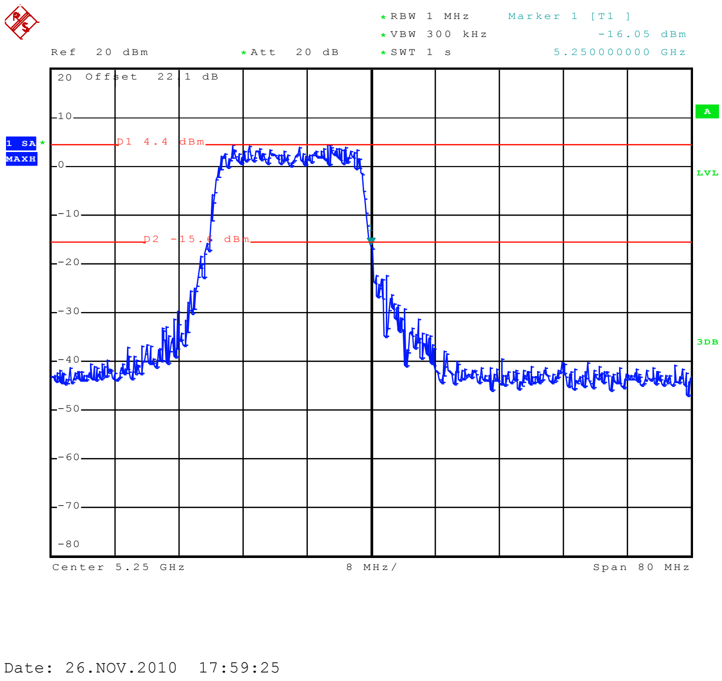
Date: 26.NOV.2010 18:02:46

High Band Edge Plot on 802.11n (BW 20MHz) Channel 48 - Chain B

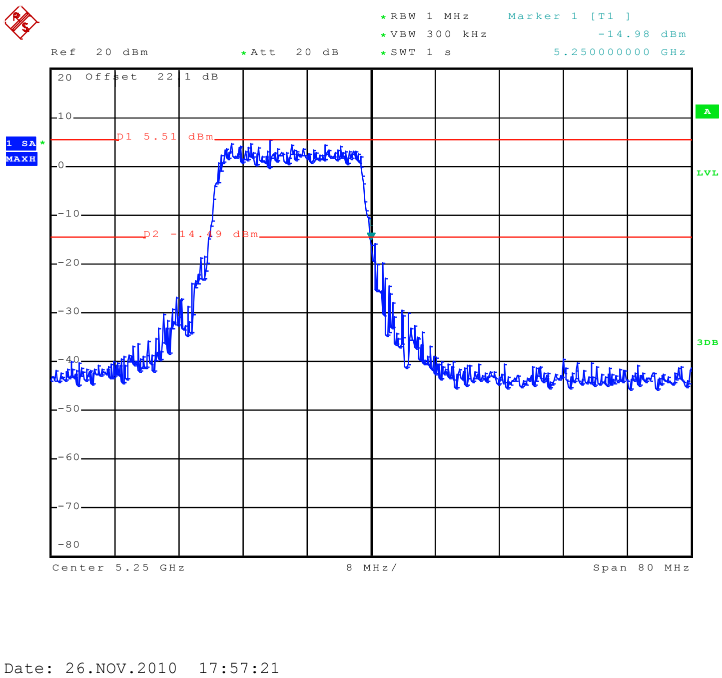


Date: 26.NOV.2010 18:06:17

High Band Edge Plot on 802.11n (BW 20MHz) Channel 48 - Chain A+B(A)

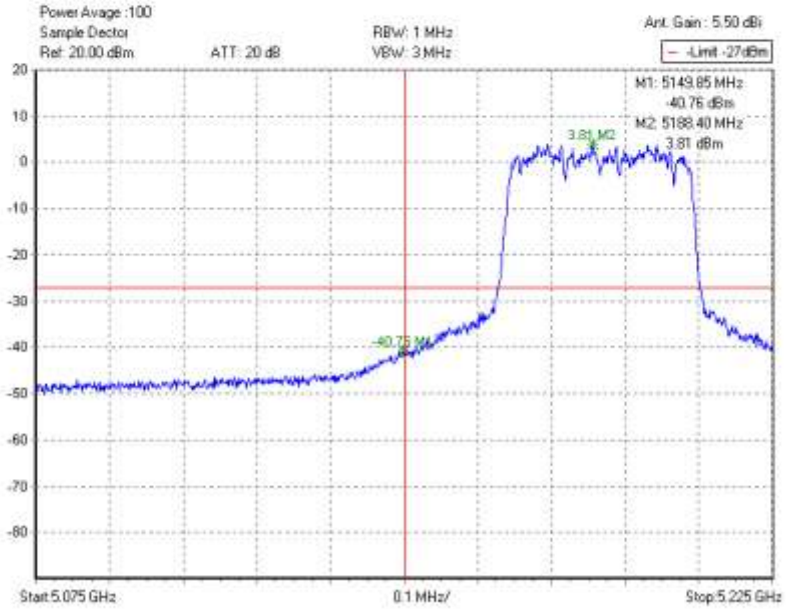


High Band Edge Plot on 802.11n (BW 20MHz) Channel 48 - Chain A+B(B)

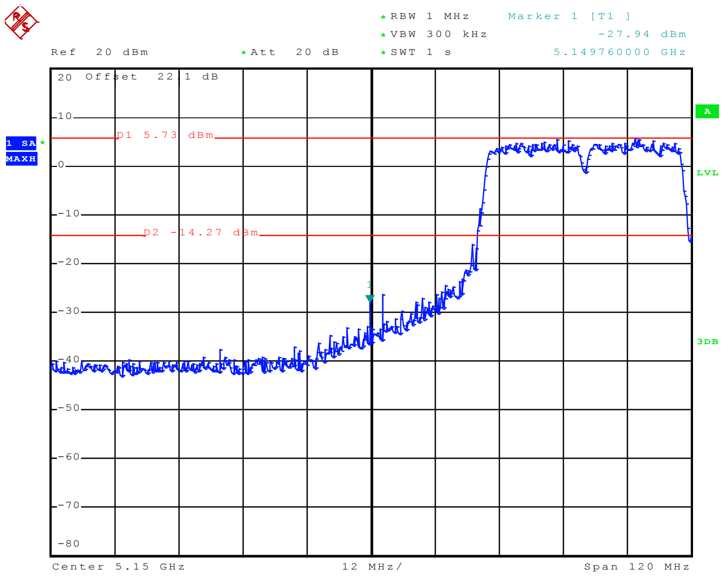


Test Mode :	Mode 7 and 8	**Temperature :**	**24~26℃**
Test Engineer :	**Ken Hsu**	**Relative Humidity :**	**52~55%**

Low Band Edge Plot on 802.11n (BW 40MHz) Channel 38 - Chain A

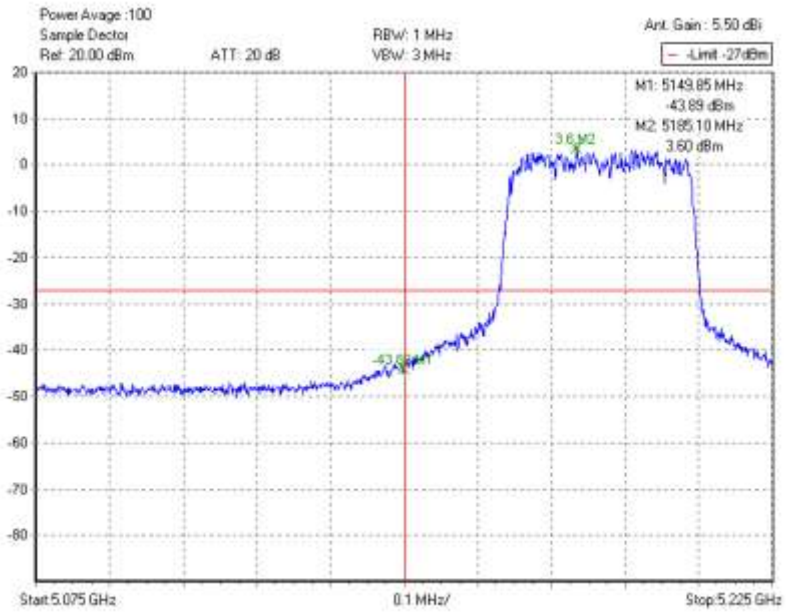


Test result was offseted with path loss, and antenna gain.

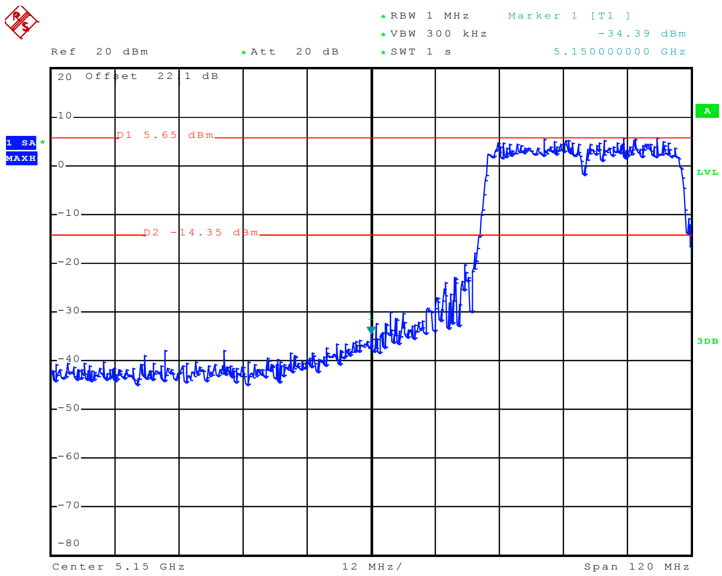


Date: 26.NOV.2010 17:28:54

Low Band Edge Plot on 802.11n (BW 40MHz) Channel 38 - Chain B

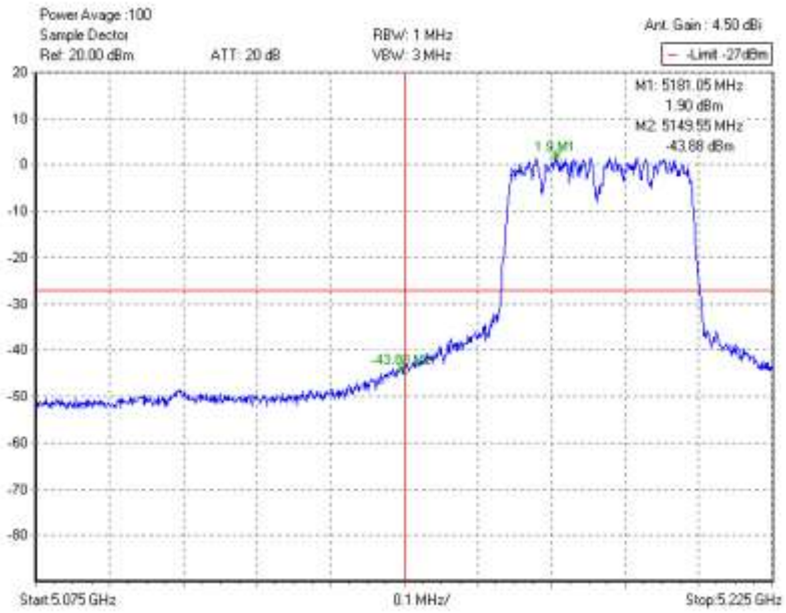


Test result was offseted with path loss, and antenna gain.

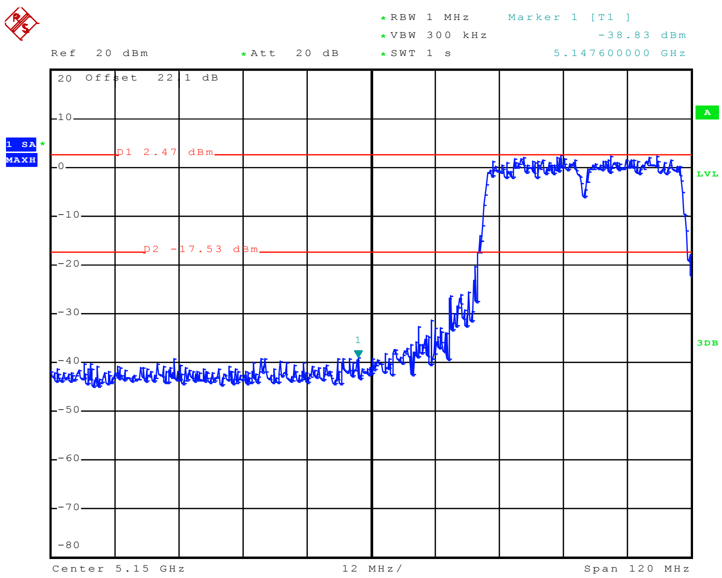


Date: 26.NOV.2010 17:26:43

Low Band Edge Plot on 802.11n (BW 40MHz) Channel 38 - Chain A+B(A)

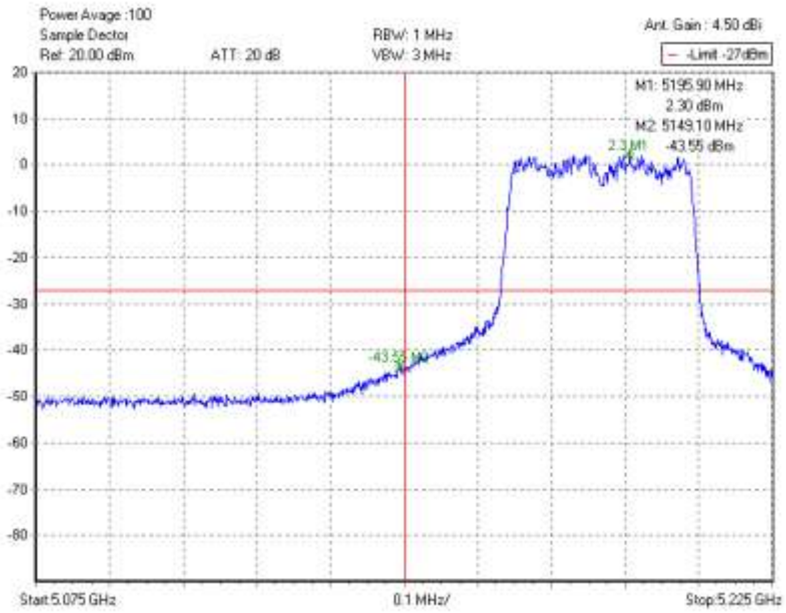


Test result was offseted with path loss, and antenna gain.

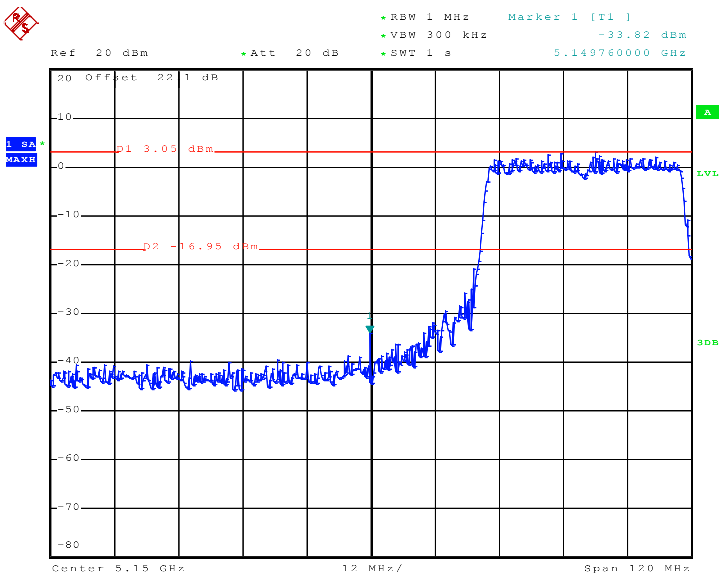


Date: 26.NOV.2010 17:13:13

Low Band Edge Plot on 802.11n (BW 40MHz) Channel 38 - Chain A+B(B)

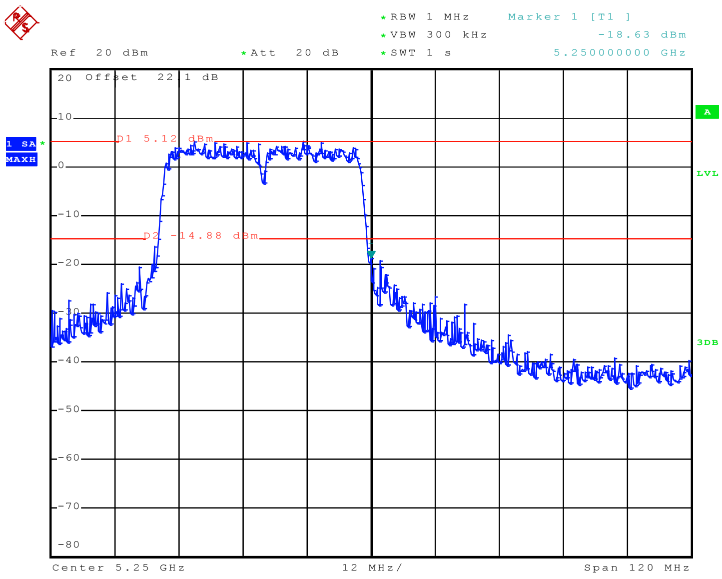


Test result was offseted with path loss, and antenna gain.



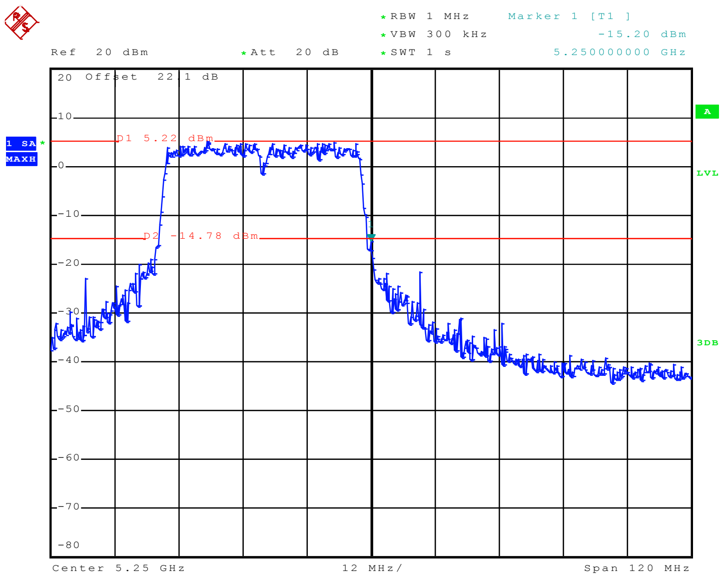
Date: 26.NOV.2010 17:14:14

High Band Edge Plot on 802.11n (BW 40MHz) Channel 46 - Chain A



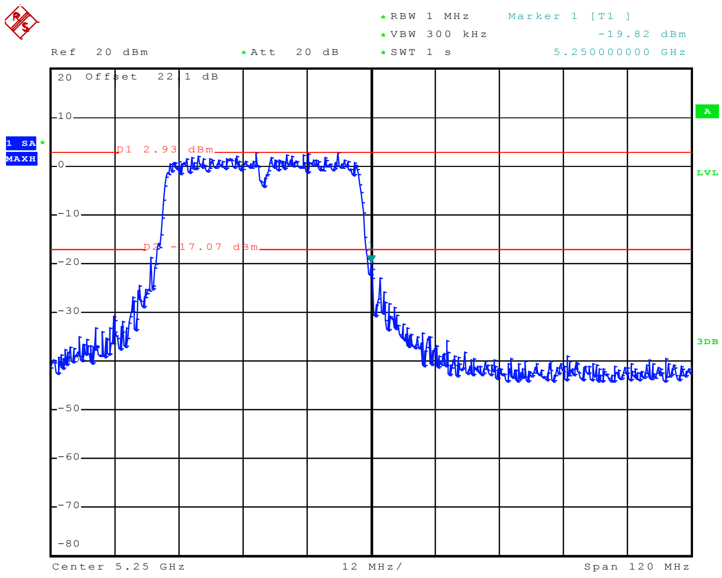
Date: 26.NOV.2010 17:21:41

High Band Edge Plot on 802.11n (BW 40MHz) Channel 46 - Chain B



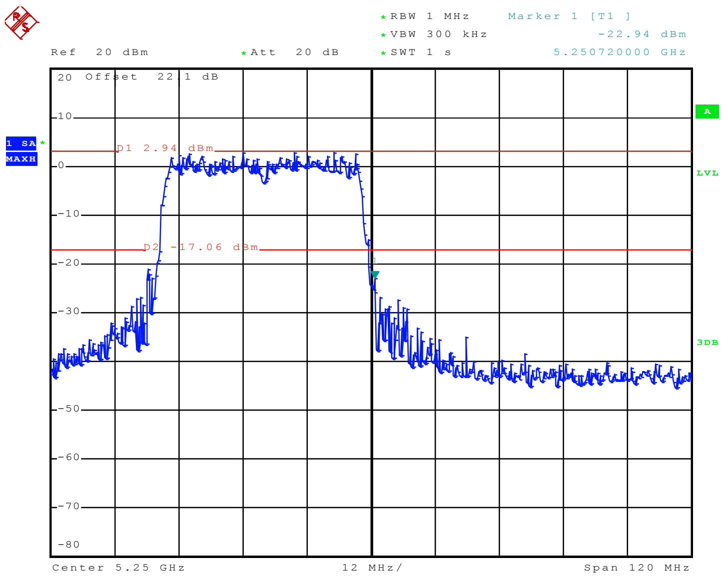
Date: 26.NOV.2010 17:25:16

High Band Edge Plot on 802.11n (BW 40MHz) Channel 46 - Chain A+B(A)



Date: 26.NOV.2010 17:16:30

High Band Edge Plot on 802.11n (BW 40MHz) Channel 46 - Chain A+B(B)



Date: 26.NOV.2010 17:15:15

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

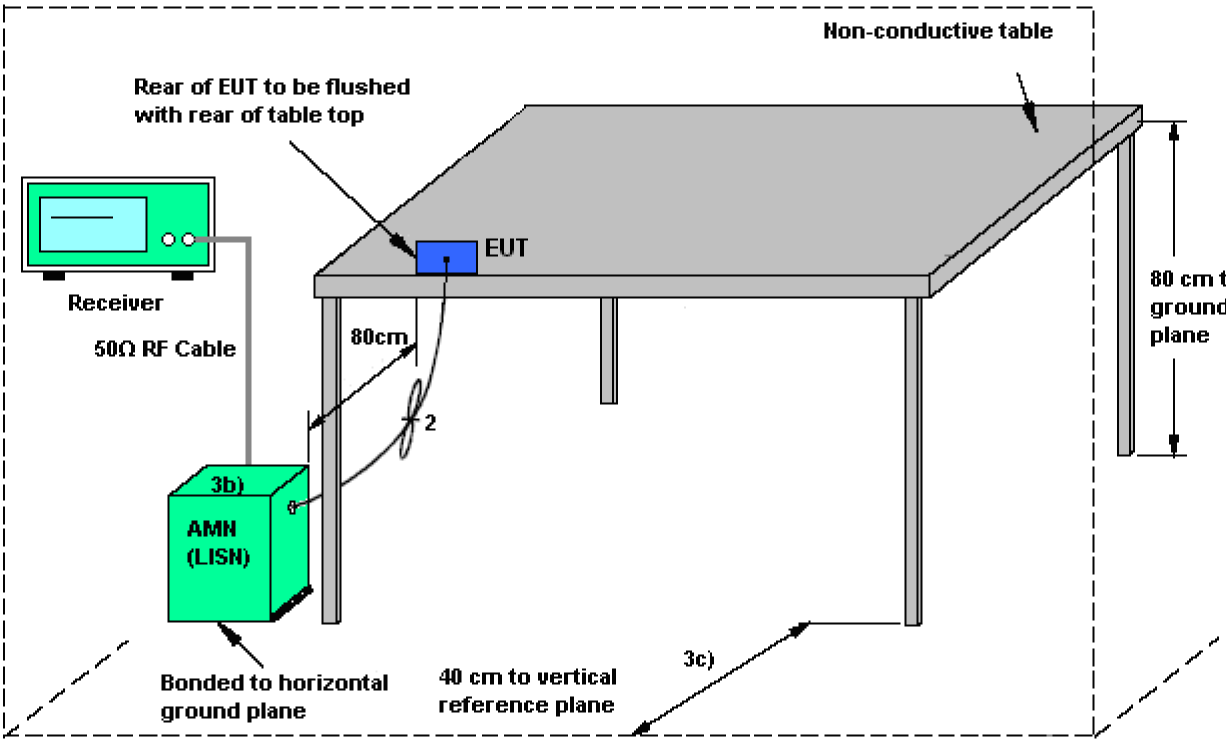
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. Please follow the guidelines in FCC Public Notice DA 02-2138.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

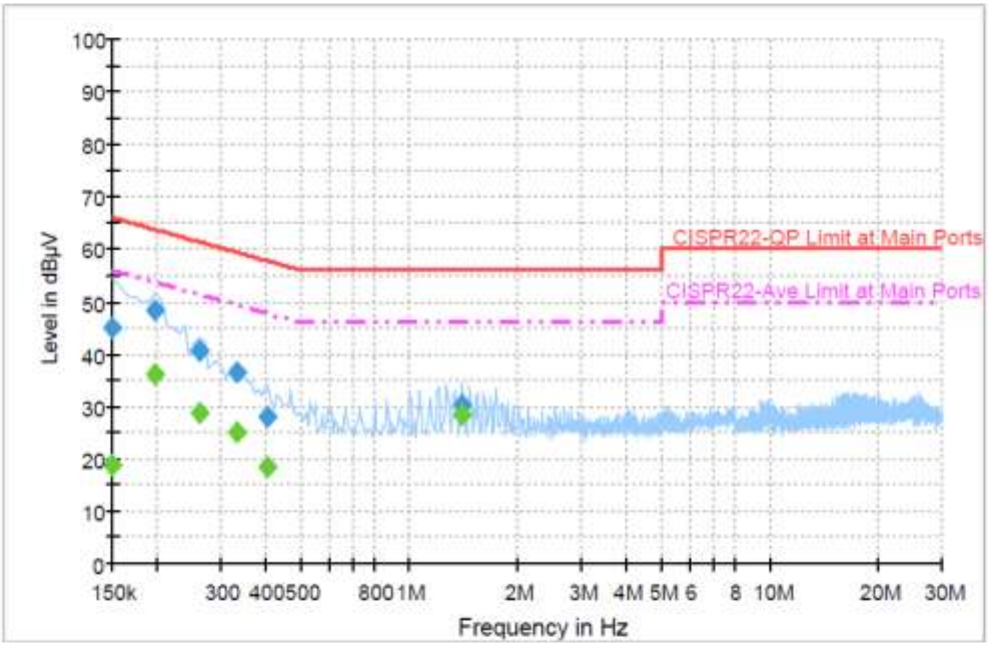
3.5.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Novic Chiang	Relative Humidity :	48~50%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (5G) Link		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



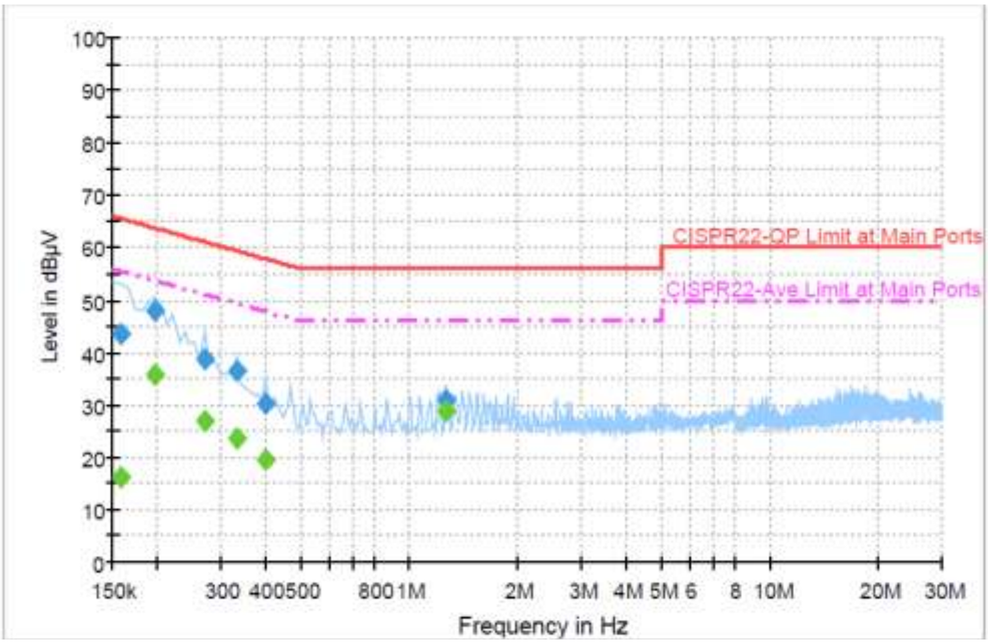
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	44.9	Off	L1	19.4	21.1	66.0
0.198000	48.2	Off	L1	19.3	15.5	63.7
0.262000	40.6	Off	L1	19.3	20.8	61.4
0.334000	36.4	Off	L1	19.3	23.0	59.4
0.406000	28.0	Off	L1	19.4	29.7	57.7
1.406000	30.4	Off	L1	19.4	25.6	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	18.7	Off	L1	19.4	37.3	56.0
0.198000	36.2	Off	L1	19.3	17.5	53.7
0.262000	28.6	Off	L1	19.3	22.8	51.4
0.334000	25.3	Off	L1	19.3	24.1	49.4
0.406000	18.4	Off	L1	19.4	29.3	47.7
1.406000	28.4	Off	L1	19.4	17.6	46.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Novic Chiang	Relative Humidity :	48~50%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5G) Link		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	43.5	Off	N	19.4	22.1	65.6
0.198000	48.0	Off	N	19.3	15.7	63.7
0.270000	38.6	Off	N	19.3	22.5	61.1
0.334000	36.7	Off	N	19.3	22.7	59.4
0.398000	30.1	Off	N	19.4	27.8	57.9
1.270000	30.9	Off	N	19.5	25.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	16.3	Off	N	19.4	39.3	55.6
0.198000	35.7	Off	N	19.3	18.0	53.7
0.270000	27.1	Off	N	19.3	24.0	51.1
0.334000	23.7	Off	N	19.3	25.7	49.4
0.398000	19.5	Off	N	19.4	28.4	47.9
1.270000	28.8	Off	N	19.5	17.2	46.0

3.6 Radiated Emission Measurement

3.6.1 Limit of Radiated Emission

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
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

(1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15–5.25 GHz band.

(3) For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

(4) The provisions of Section 15.205 Restricted bands of operation of this part apply to intentional radiators operating under this section.

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBuV/m)
- 27	68.3

3.6.2 Measuring Instruments

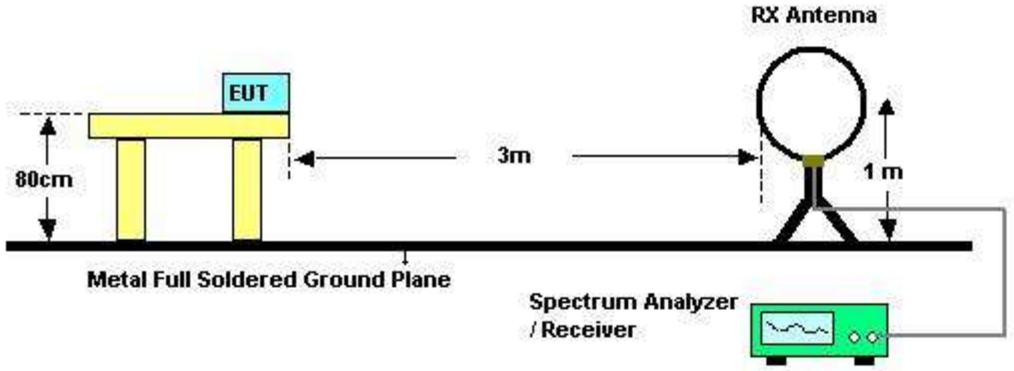
See list of measuring instruments of this test report.

3.6.3 Test Procedures

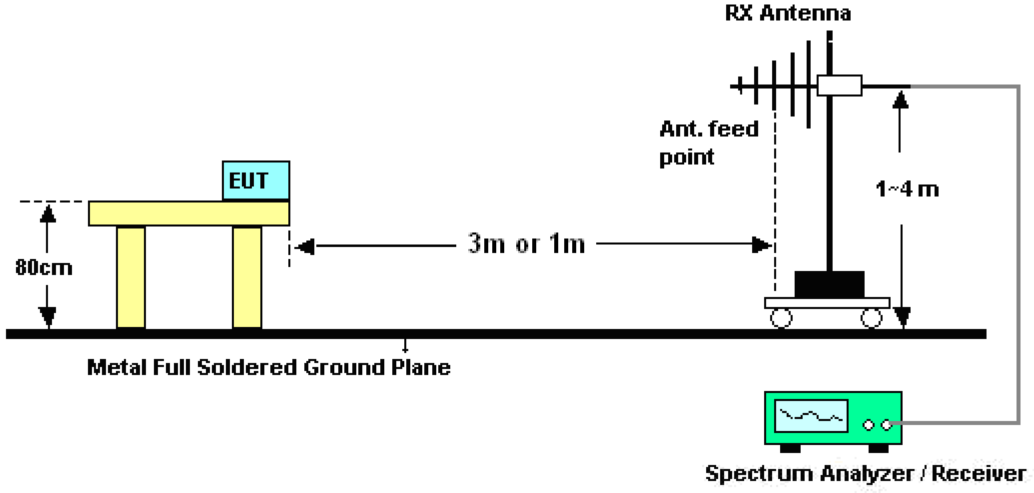
1. The testing follows the guidelines in FCC Public Notice DA 02-2138, (Measurement Guidelines of UNII)
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest radiation.
5. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
6. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
7. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
8. For testing below 1GHz, If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.
9. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.6.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



3.6.5 Test Results of Radiated Emissions (9kHz ~ 30MHz)

Temperature	21~25°C	Humidity	46~54%
Test Engineer	David Yang, Ivan Jiang and Wii Cheng		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

3.6.6 Test Result of Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix A to E.

3.7 Peak Excursion Ratio Measurement

3.7.1 Limit of Peak Excursion Ratio

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.

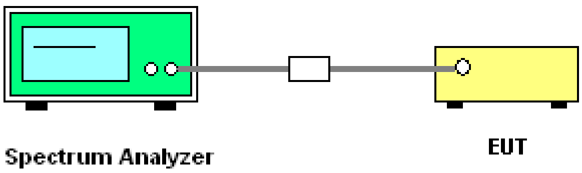
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedures

1. The transmitter output is connected to the spectrum analyzer.
2. The resolution bandwidth and video bandwidth are set as below,
   Trace A: RBW=1 MHz, VBW=3 MHz
   Trace B: RBW=1 MHz, VBW=300 kHz
3. Trace A is set peak detector and to Max Hold, then to View. Then the detector is readjusted to sample detector, max hold to run for 60 seconds, and the signal under this measurement condition is captured in Trace B in Accordance with the method 1 of DA-02-2138.
4. The difference between the traces is investigated. The marker is placed at the frequency, which shows the largest difference. The amplitude delta between the traces at this frequency is the peak excursion.

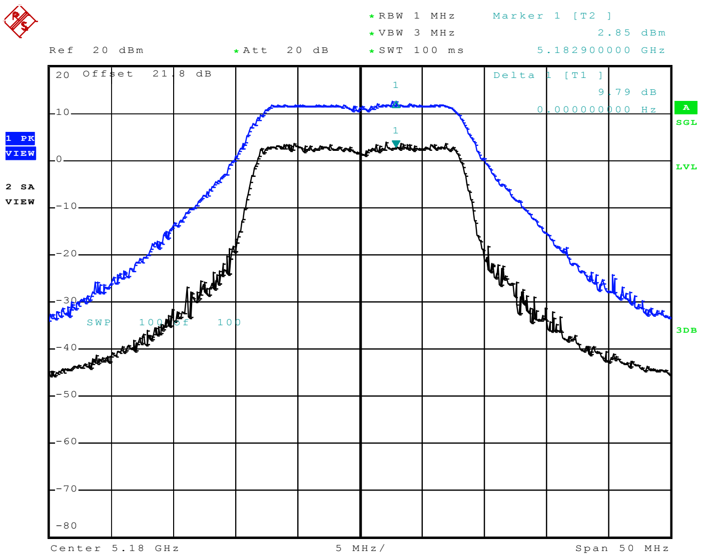
3.7.4 Test Setup



3.7.5 Test Result of Peak Excursion Ratio

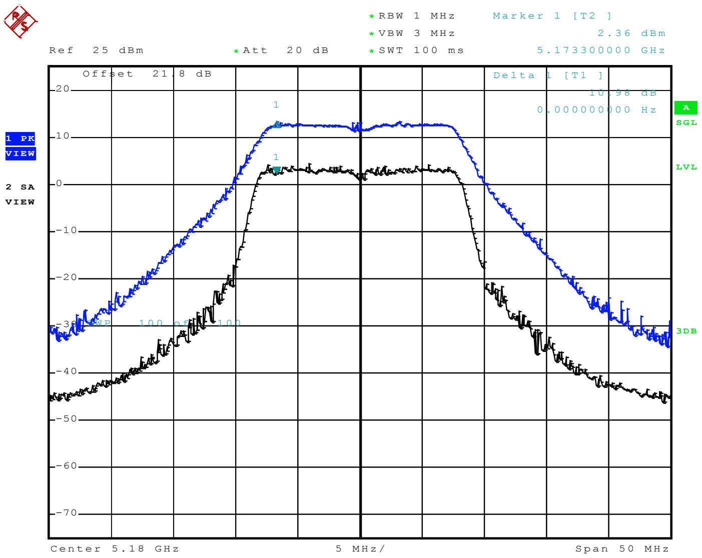
Test Mode :	Mode 1~3	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

Peak Excursion Ratio Plot on 802.11a Channel 36 - Chain A



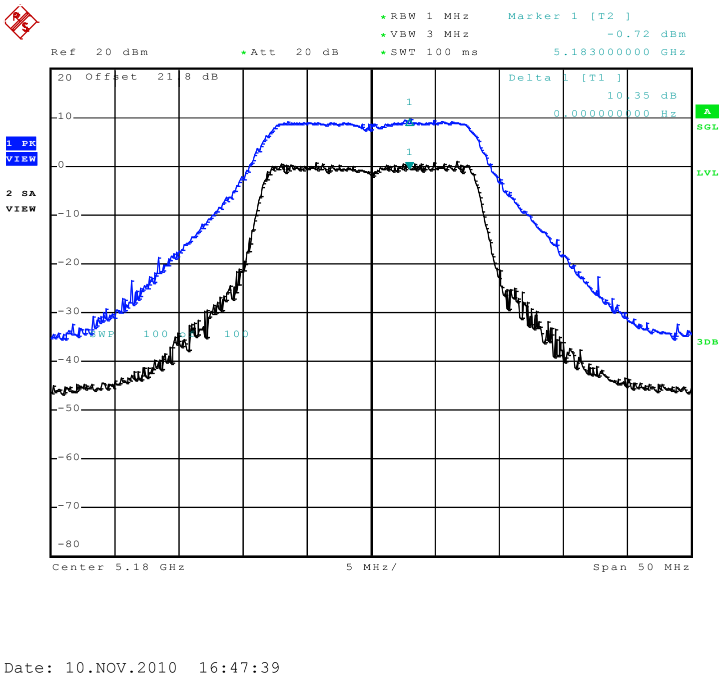
Date: 18.NOV.2010 04:12:50

Peak Excursion Ratio Plot on 802.11a Channel 36 - Chain B

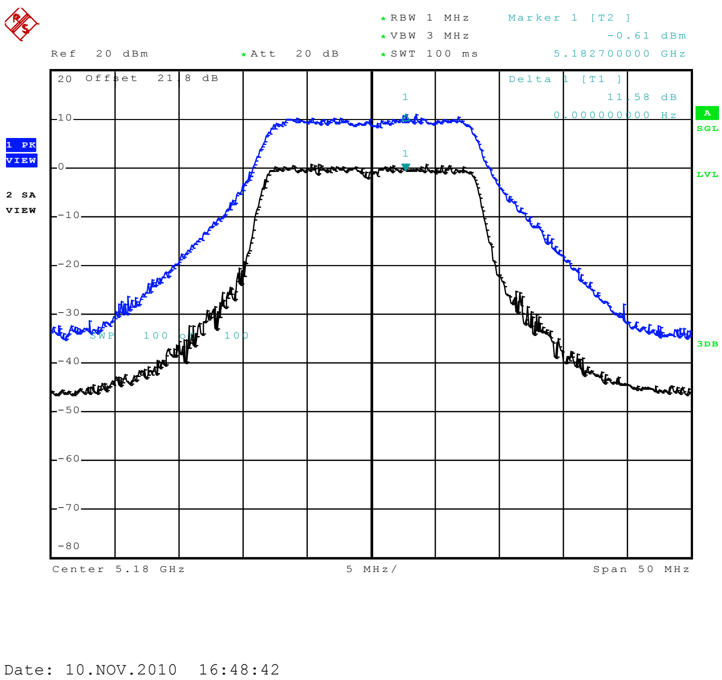


Date: 18.NOV.2010 04:49:36

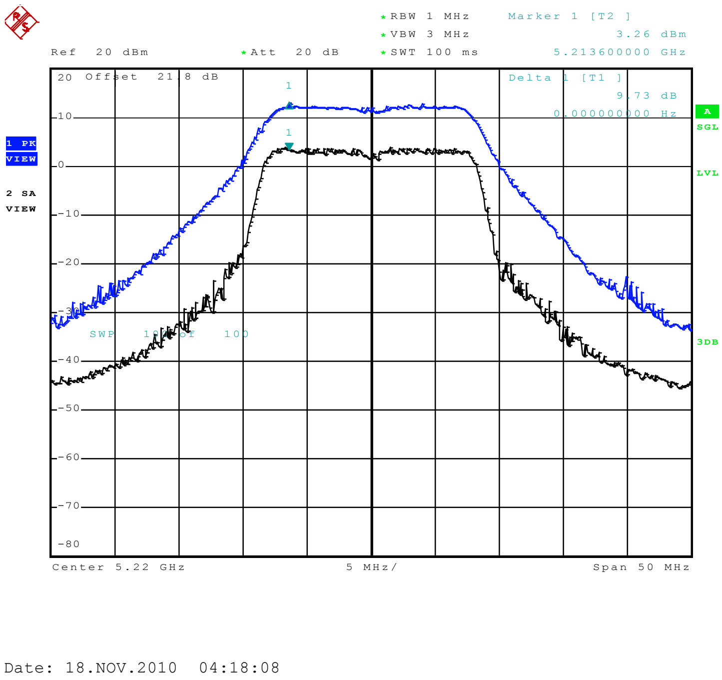
Peak Excursion Ratio Plot on 802.11a Channel 36 - Chain A+B(A)



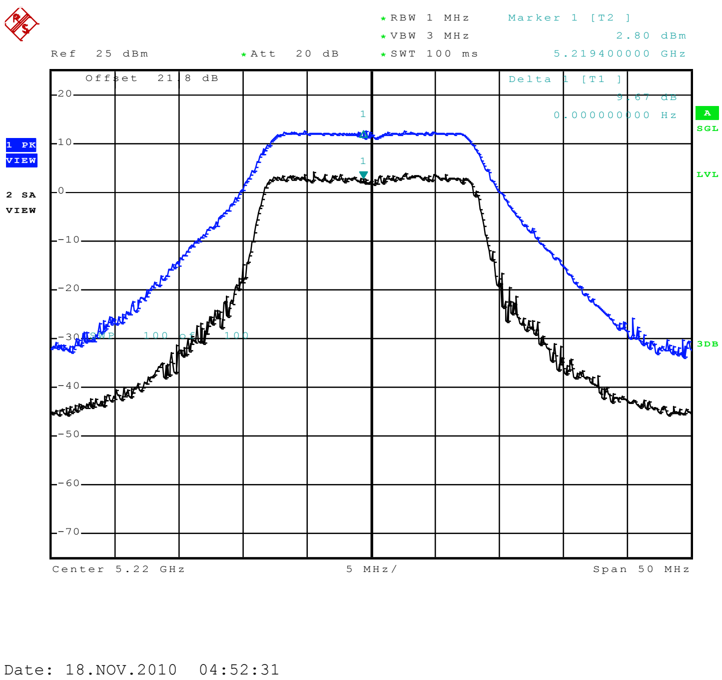
Peak Excursion Ratio Plot on 802.11a Channel 36 - Chain A+B(B)



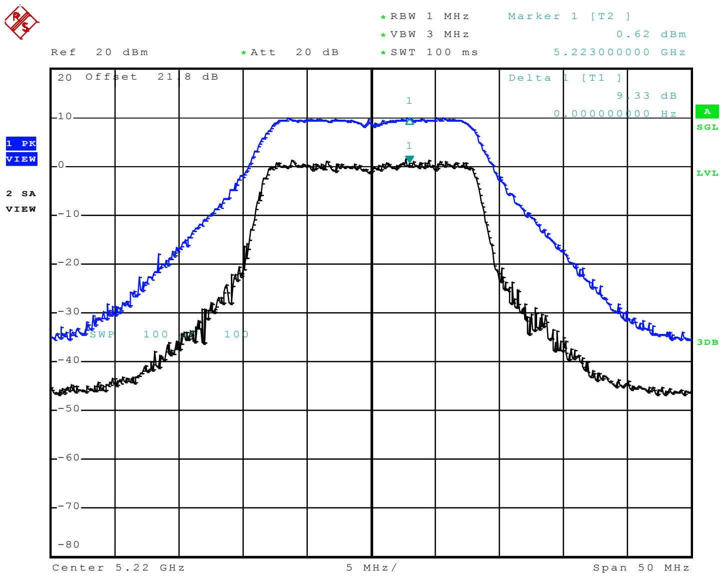
Peak Excursion Ratio Plot on 802.11a Channel 44 - Chain A



Peak Excursion Ratio Plot on 802.11a Channel 44 - Chain B

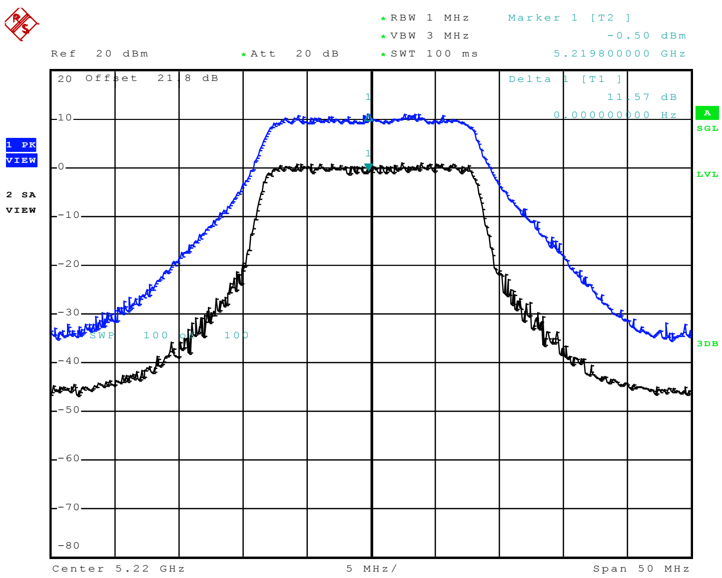


Peak Excursion Ratio Plot on 802.11a Channel 44 - Chain A+B(A)



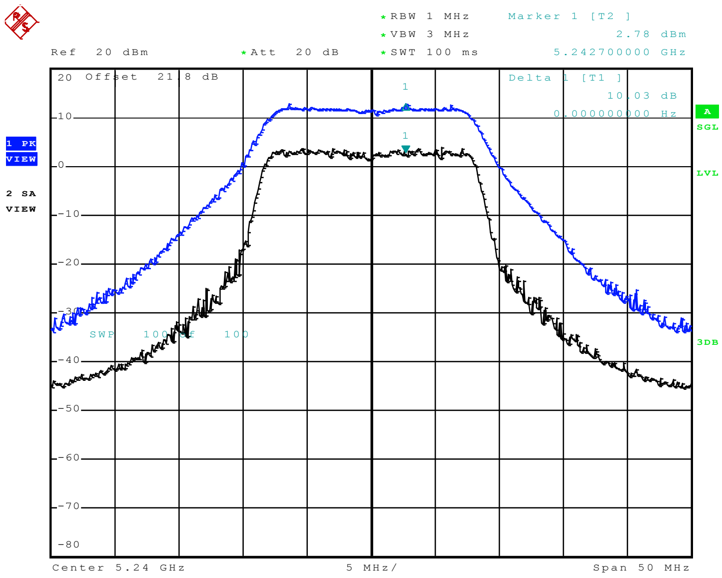
Date: 10.NOV.2010 16:45:27

Peak Excursion Ratio Plot on 802.11a Channel 44 - Chain A+B(B)



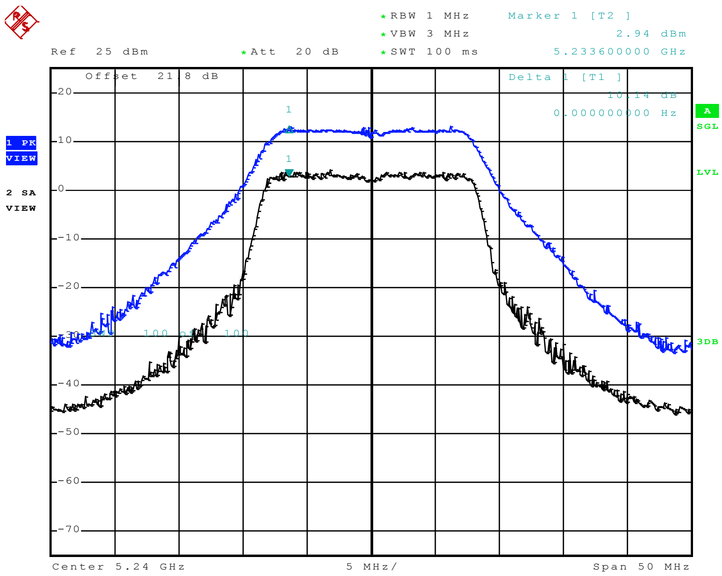
Date: 10.NOV.2010 16:44:06

Peak Excursion Ratio Plot on 802.11a Channel 48 - Chain A



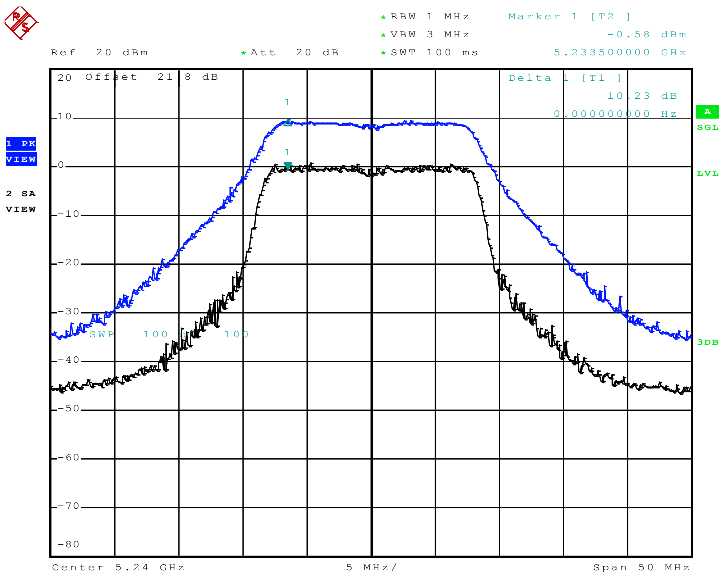
Date: 18.NOV.2010 04:19:51

Peak Excursion Ratio Plot on 802.11a Channel 48 - Chain B



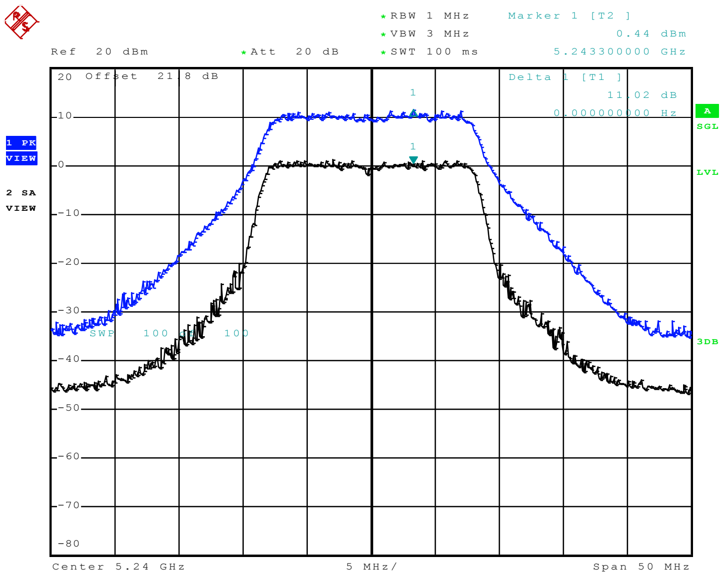
Date: 18.NOV.2010 04:54:35

Peak Excursion Ratio Plot on 802.11a Channel 48 - Chain A+B(A)



Date: 10.NOV.2010 16:41:03

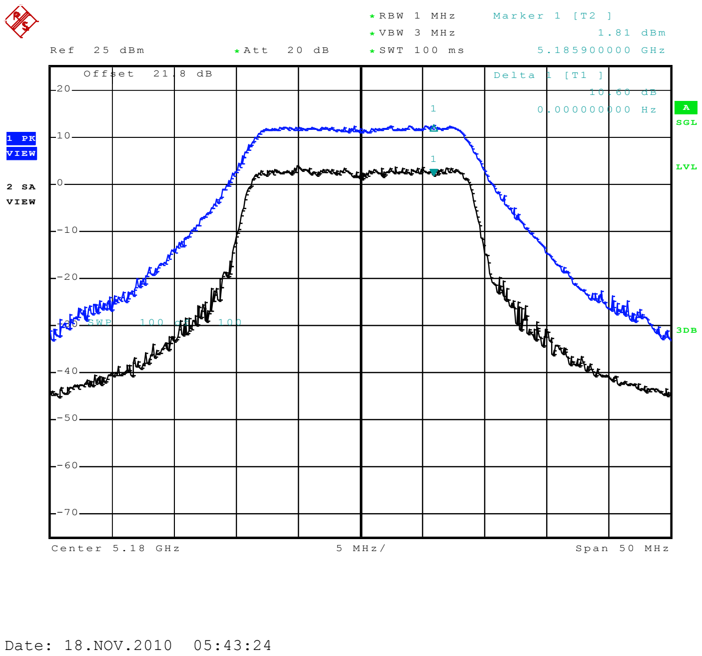
Peak Excursion Ratio Plot on 802.11a Channel 48 - Chain A+B(B)



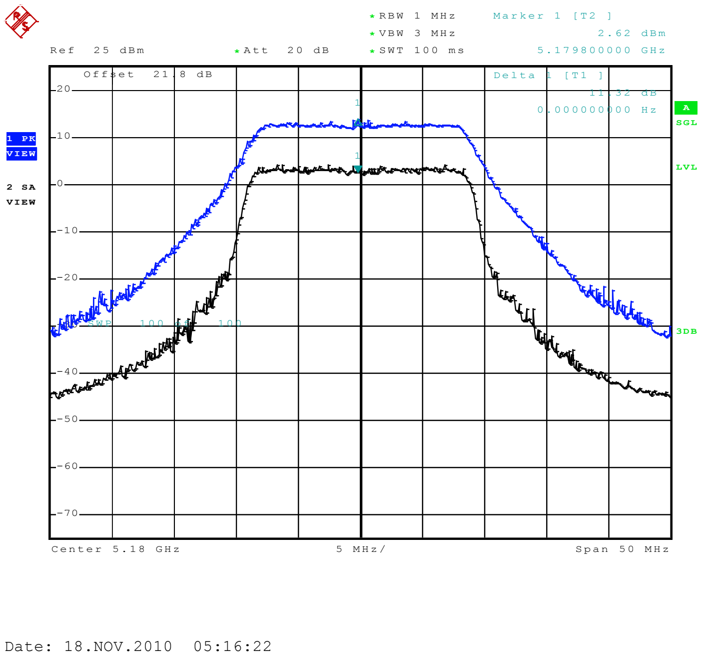
Date: 10.NOV.2010 16:42:14

Test Mode :	Mode 4~6	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

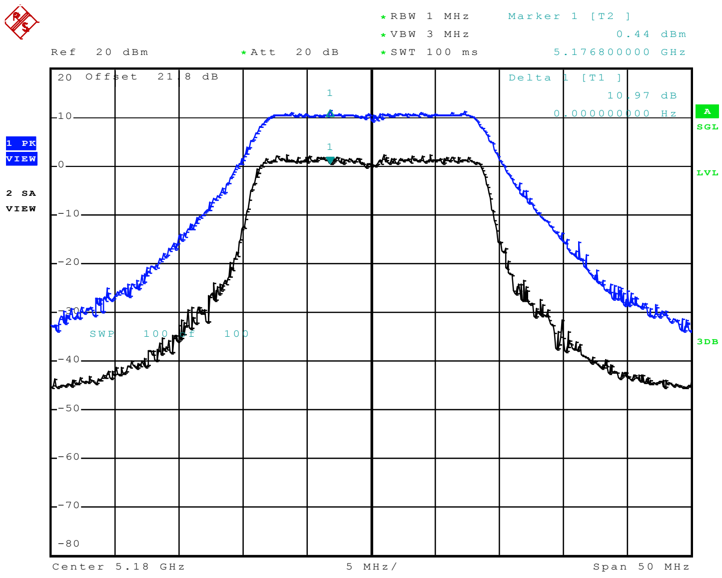
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - Chain A



Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - Chain B

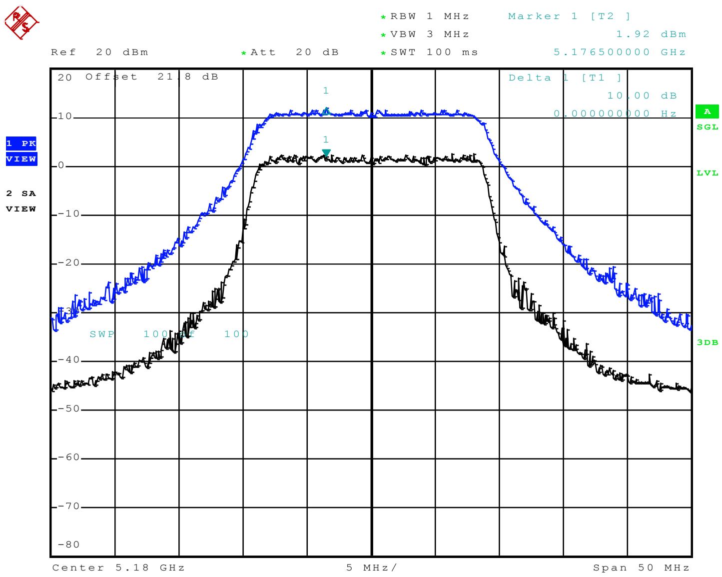


Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - Chain A+B(A)



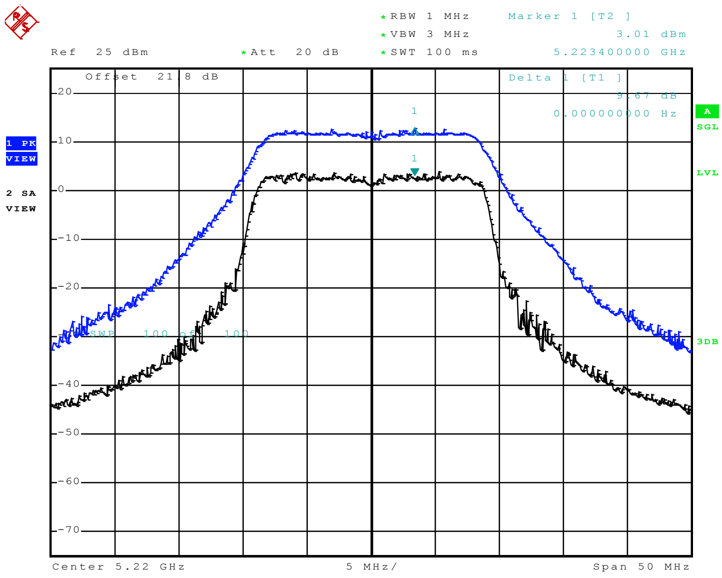
Date: 17.NOV.2010 21:22:33

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - Chain A+B(B)



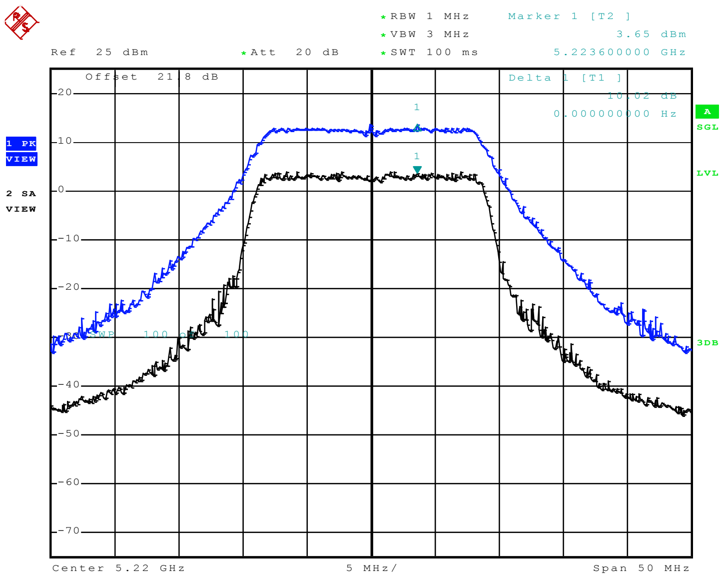
Date: 17.NOV.2010 21:24:54

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44 - Chain A



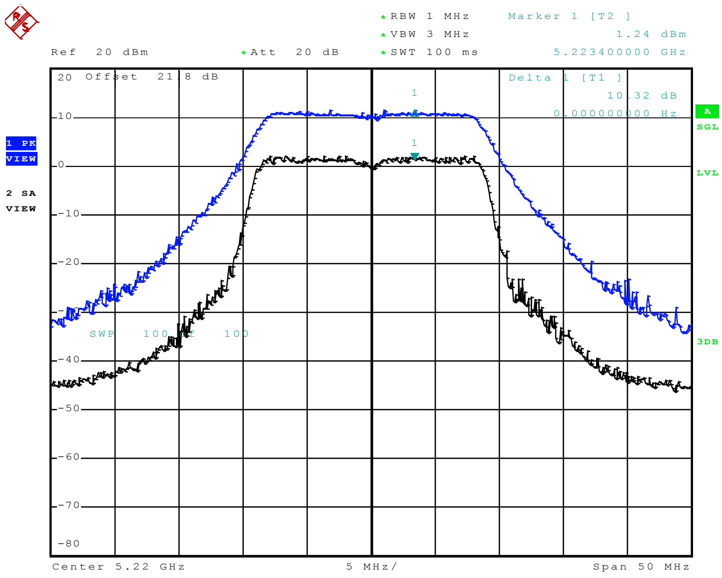
Date: 18.NOV.2010 05:45:56

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44 - Chain B



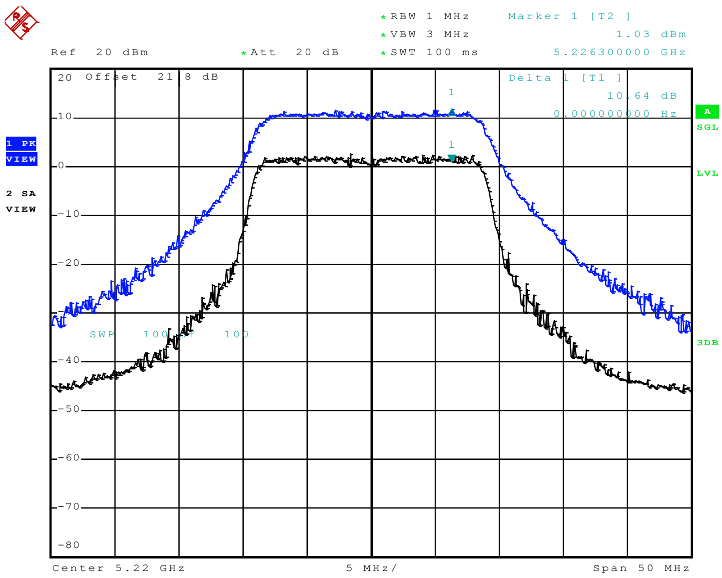
Date: 18.NOV.2010 05:18:16

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44 - Chain A+B(A)



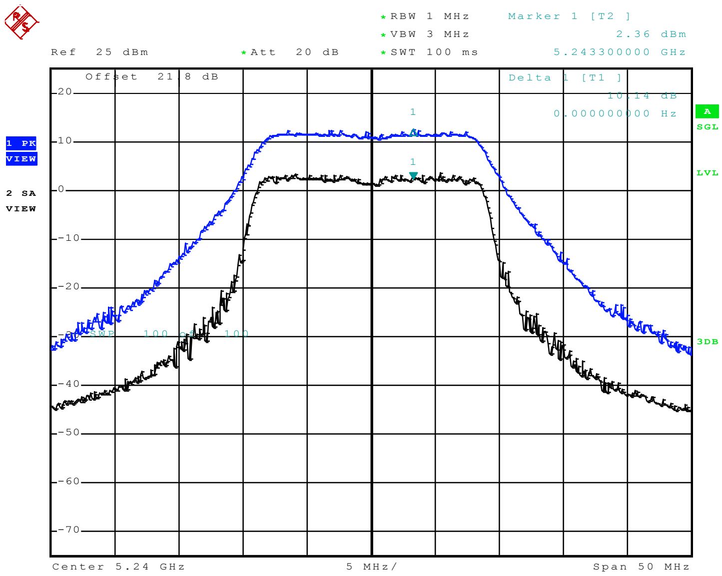
Date: 17.NOV.2010 21:33:40

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44 - Chain A+B(B)



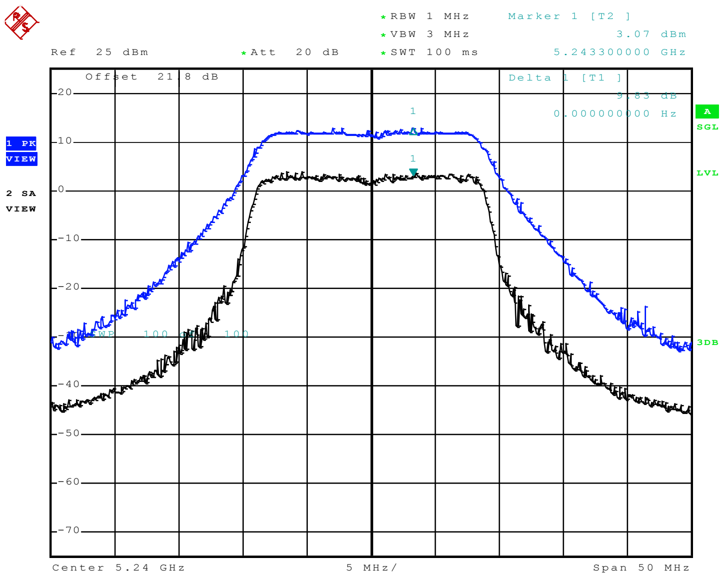
Date: 17.NOV.2010 21:29:35

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - Chain A



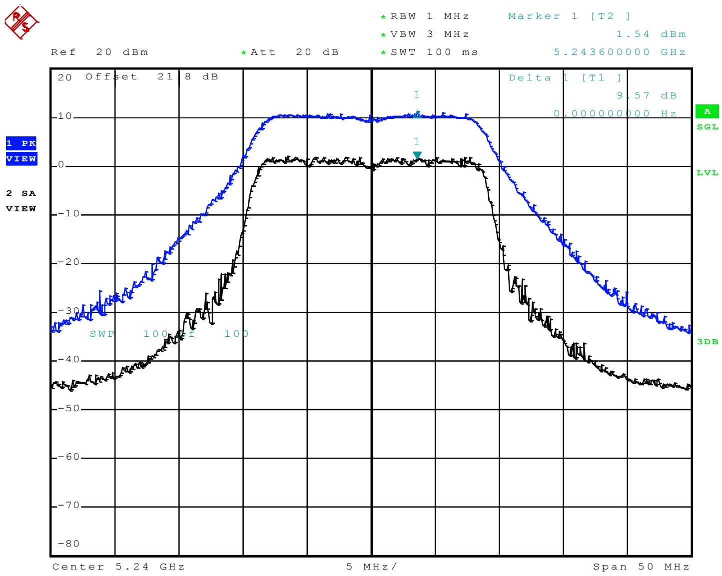
Date: 18.NOV.2010 05:47:17

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - Chain B



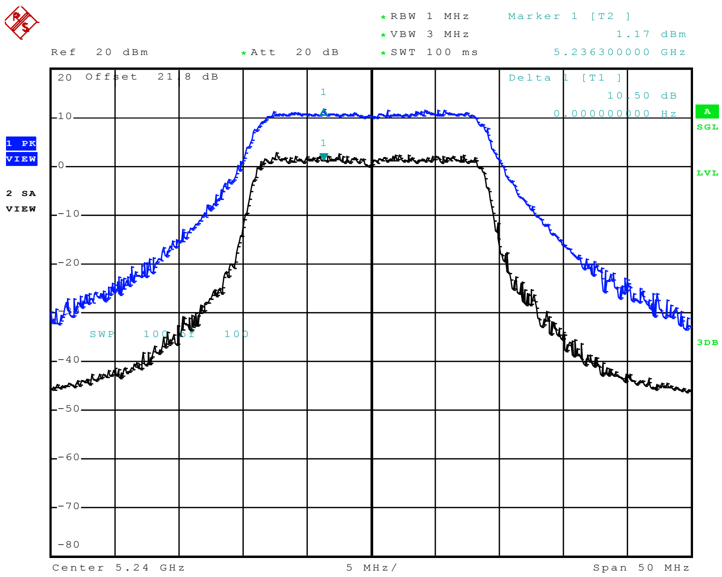
Date: 18.NOV.2010 05:20:49

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - Chain A+B(A)



Date: 17.NOV.2010 21:37:57

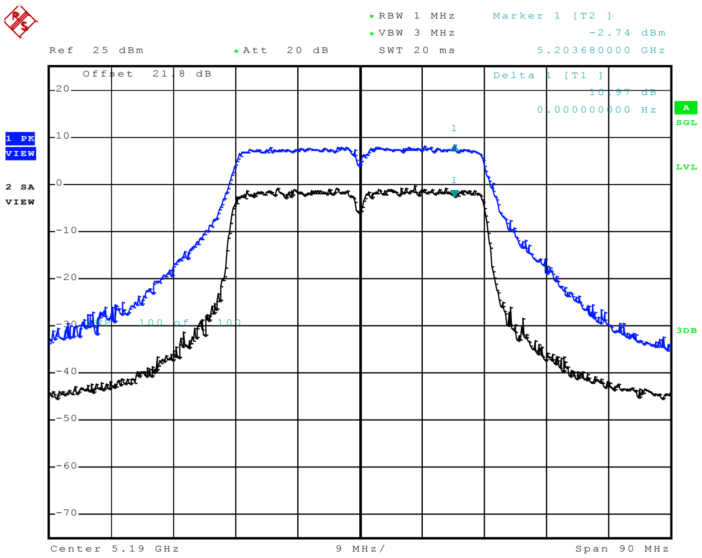
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - Chain A+B(B)



Date: 17.NOV.2010 21:40:06

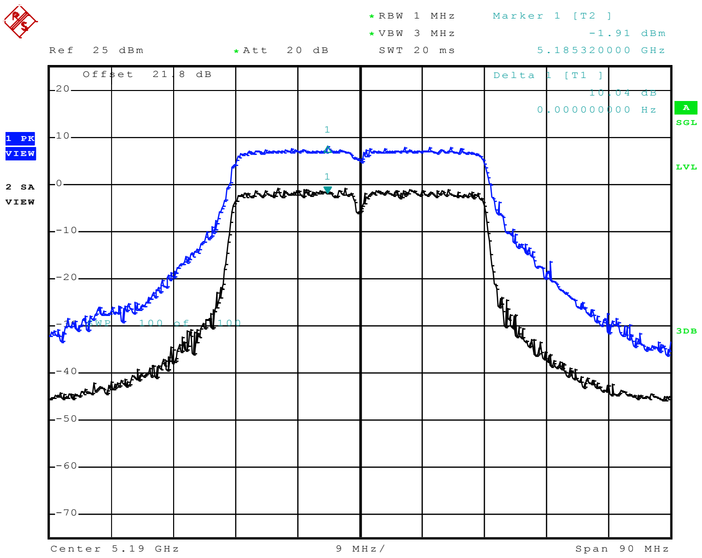
Test Mode :	Mode 7~8	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - Chain A



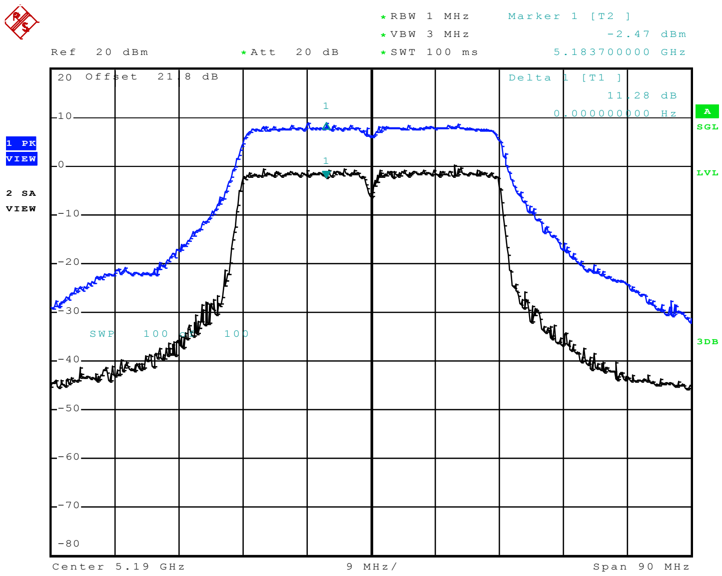
Date: 6.NOV.2010 02:27:49

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - Chain B



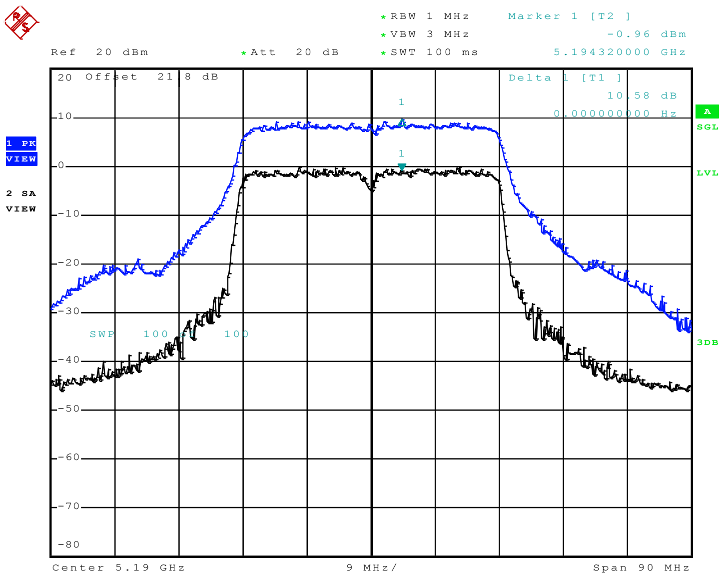
Date: 6.NOV.2010 02:52:51

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - Chain A+B(A)



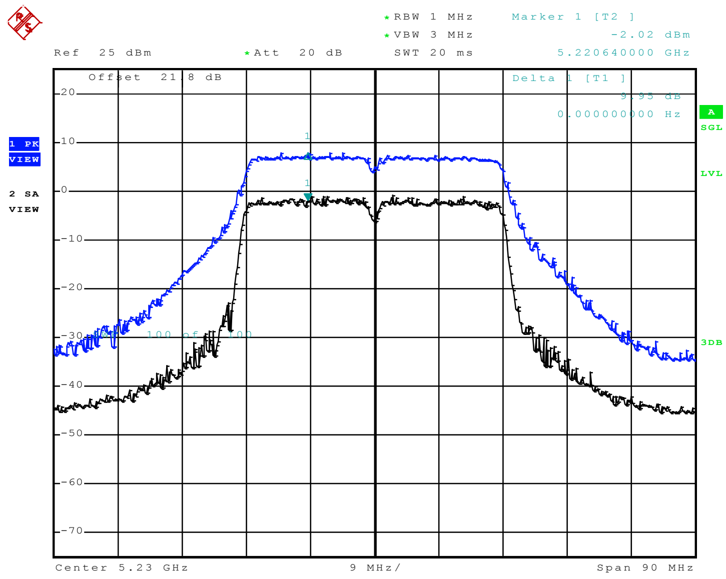
Date: 17.NOV.2010 22:31:58

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - Chain A+B(B)



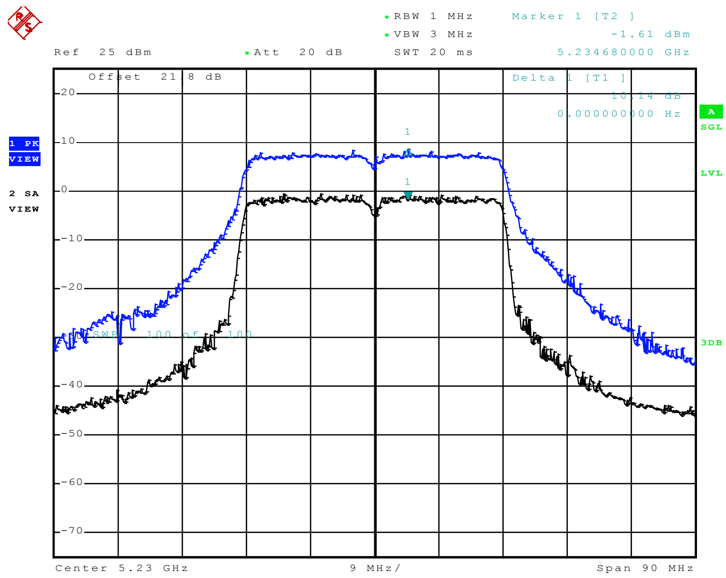
Date: 17.NOV.2010 22:30:05

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 - Chain A



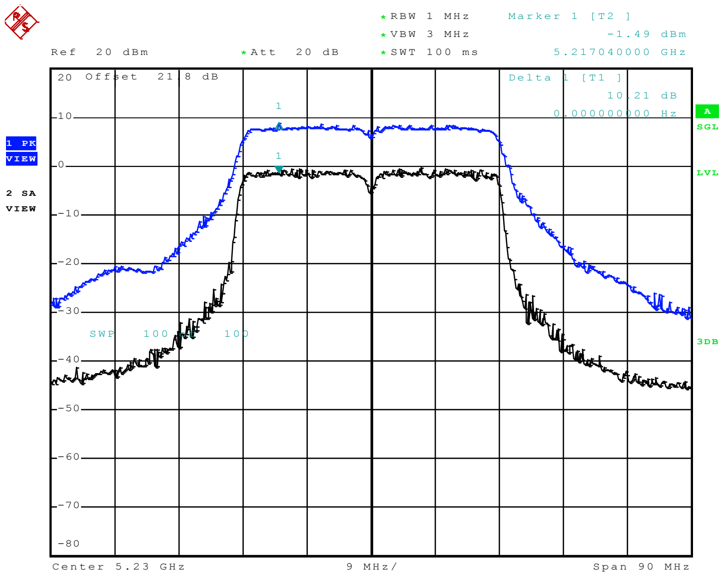
Date: 6.NOV.2010 02:29:05

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 - Chain B



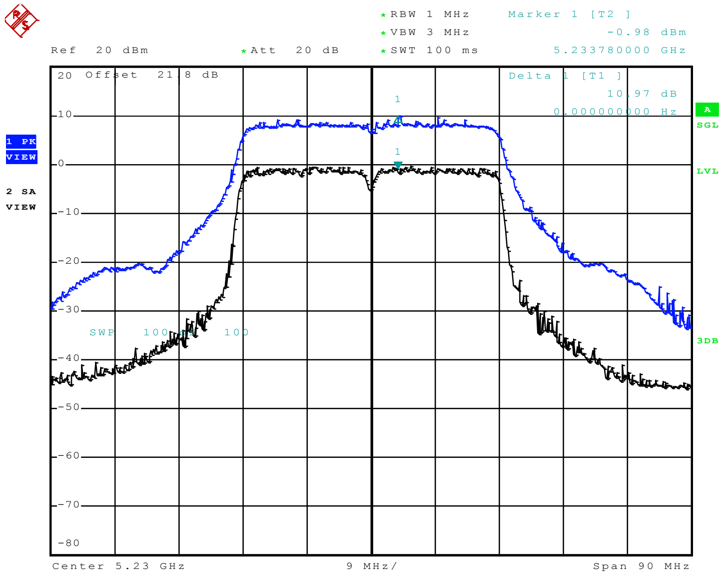
Date: 6.NOV.2010 02:51:50

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 - Chain A+B(A)



Date: 17.NOV.2010 22:40:09

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 - Chain A+B(B)



Date: 17.NOV.2010 22:42:03

3.8 Automatically Discontinue Transmission

3.8.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Result of Automatically Discontinue Transmission

During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.9 Frequency Stability Measurement

3.9.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

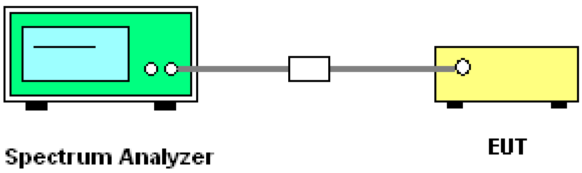
3.9.2 Measuring Instruments

See list of measuring instruments of this test report.

3.9.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.9.4 Test Setup



3.9.5 Test Result of Frequency Stability

Test Mode :	Mode 1~3	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

Chain A				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.68	5188.32	0.00
44	5220	5211.68	5228.32	0.00
48	5240	5231.64	5248.32	-3.82

Chain B				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.68	5188.32	0.00
44	5220	5211.68	5228.32	0.00
48	5240	5231.68	5248.32	0.00

Chain A+B(A)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.68	5188.32	0.00
44	5220	5211.64	5228.32	-3.83
48	5240	5231.68	5248.32	0.00

Chain A+B(B)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.68	5188.32	0.00
44	5220	5211.68	5228.28	-3.83
48	5240	5231.68	5248.32	0.00

Test Mode :	Mode 4~6	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

Chain A				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.04	5189.12	15.44
44	5220	5211.04	5228.92	-3.83
48	5240	5231.04	5248.92	-3.82

Chain B				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.04	5188.92	-3.86
44	5220	5211.04	5228.92	-3.83
48	5240	5231.04	5248.92	-3.82

Chain A+B(A)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.06	5188.9	-3.86
44	5220	5211.06	5228.90	-3.83
48	5240	5231.04	5248.92	-3.82

Chain A+B(B)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.06	5188.92	-1.93
44	5220	5211.06	5228.90	-3.83
48	5240	5231.08	5248.90	-1.91

Test Mode :	Mode 7~8	Temperature :	24~26℃
Test Engineer :	Ken Hsu	Relative Humidity :	52~55%

Chain A				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.68	5208.32	0.00
46	5230	5211.68	5248.32	0.00

Chain B				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.68	5208.32	0.00
46	5230	5211.68	5248.32	0.00

Chain A+B(A)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.68	5208.28	-3.85
46	5230	5211.68	5248.32	0.00

Chain A+B(B)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.68	5208.28	-3.85
46	5230	5211.68	5248.32	0.00

3.10 Antenna Requirements

3.10.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.10.2 Antenna Connected Construction

The antennas type used in this product are Dipole Antenna, Panel Antenna, Patch Antenna, and PIFA Antenna without connector and it is considered to meet antenna requirement of FCC.

3.10.3 Antenna Gain

The antenna gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101329	9kHz~30GHz	Apr. 26, 2010	Apr. 25, 2011	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2010	Aug. 18, 2011	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 27, 2010	Mar. 26, 2011	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty Uc(y)	1.13		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.26		

Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty Uc(y)	1.27		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.54		

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	C_i * $u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma 1$ = 0.197 Antenna VSWR $\Gamma 2$ = 0.194 Uncertainty = $20Log(1-\Gamma 1*\Gamma 2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	2.36				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.72				