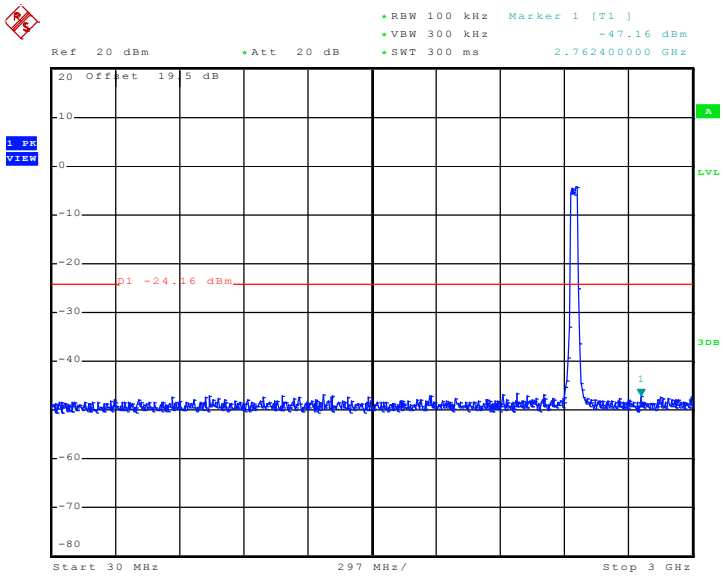
Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

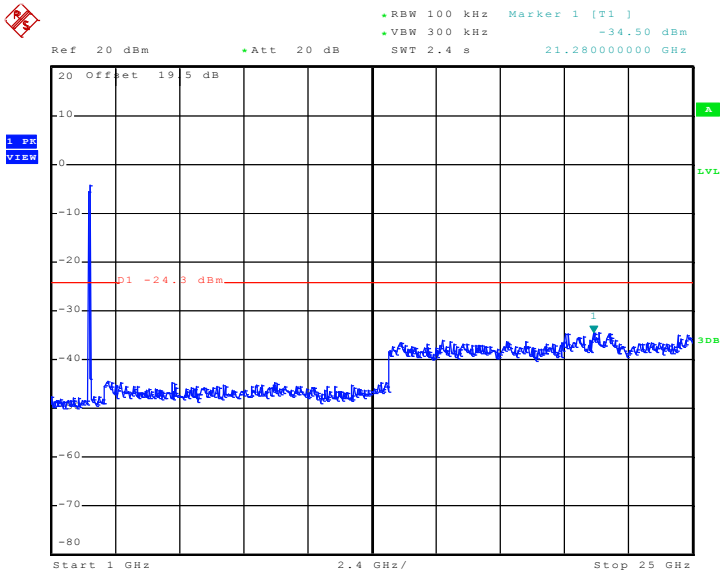
Channel 09 between 30 MHz~3 GHz - Chain B



Date: 9.NOV.2010 04:11:21

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

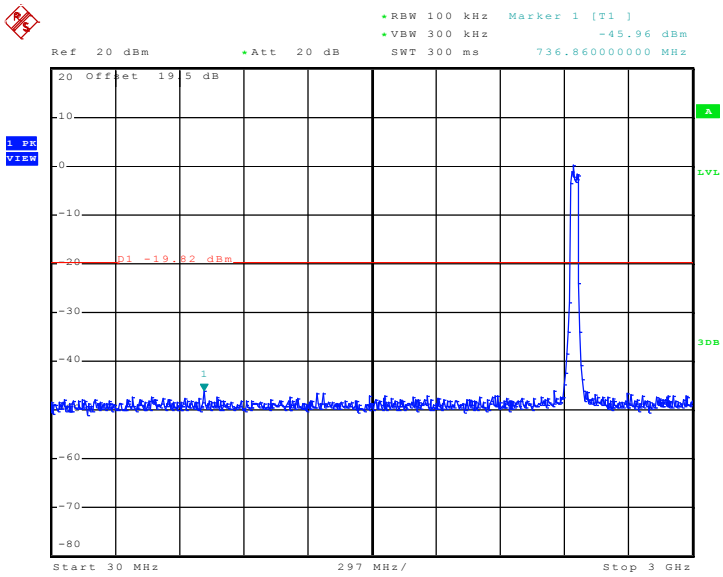
Channel 09 between 1 GHz~25 GHz - Chain B



Date: 9.NOV.2010 03:39:44

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

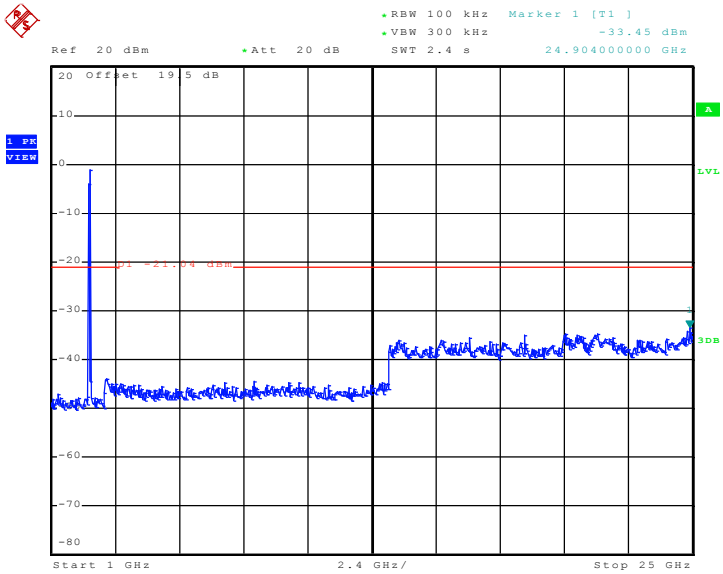
Channel 09 between 30 MHz~3 GHz - Chain A+B(A)



Date: 8.NOV.2010 16:34:37

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

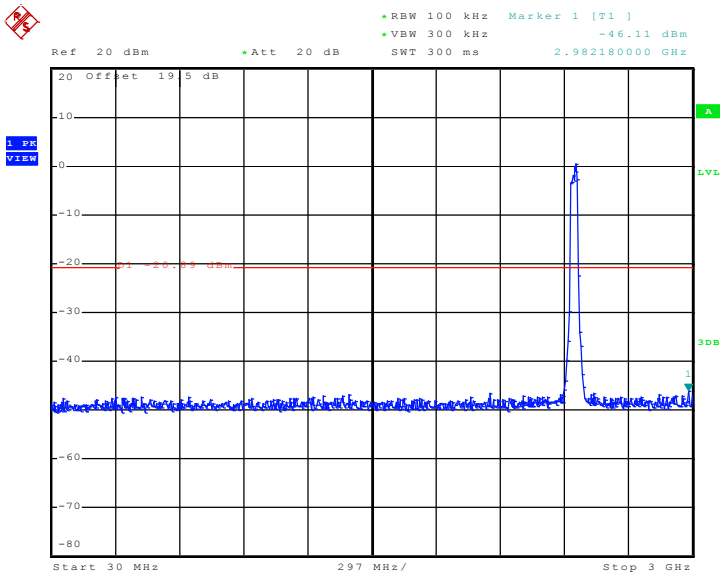
Channel 09 between 1 GHz~25 GHz - Chain A+B(A)



Date: 8.NOV.2010 16:32:23

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

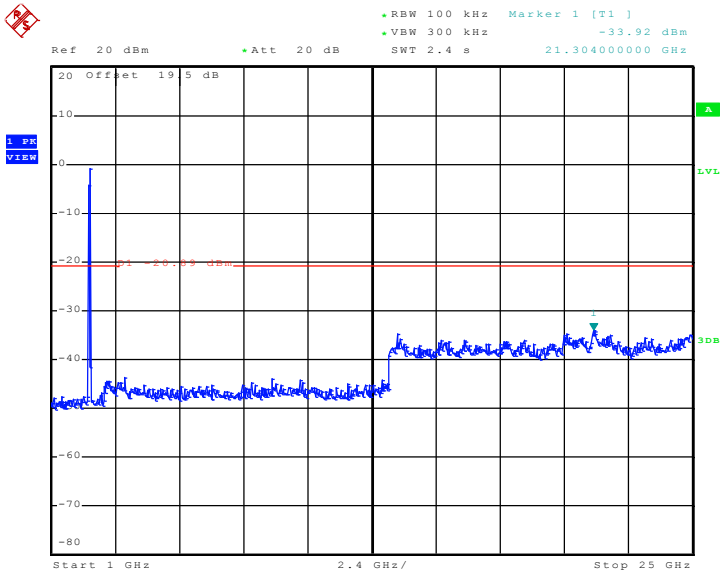
Channel 09 between 30 MHz~3 GHz - Chain A+B(B)



Date: 8.NOV.2010 16:50:11

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

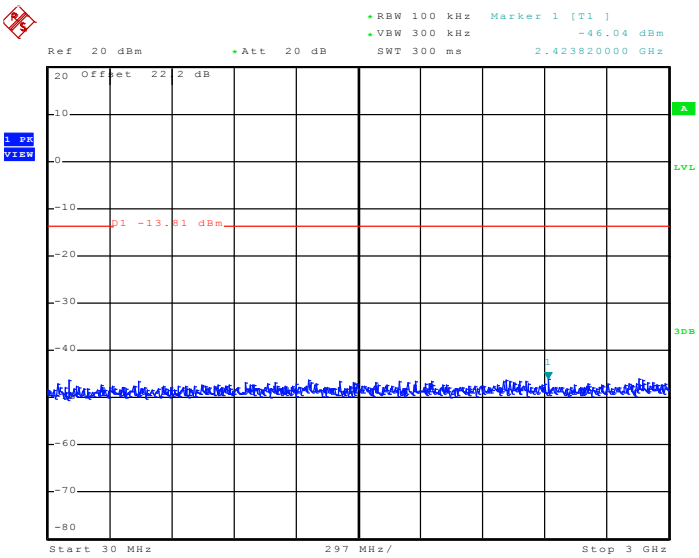
Channel 09 between 1 GHz~25 GHz - Chain A+B(B)



Date: 8.NOV.2010 16:48:44

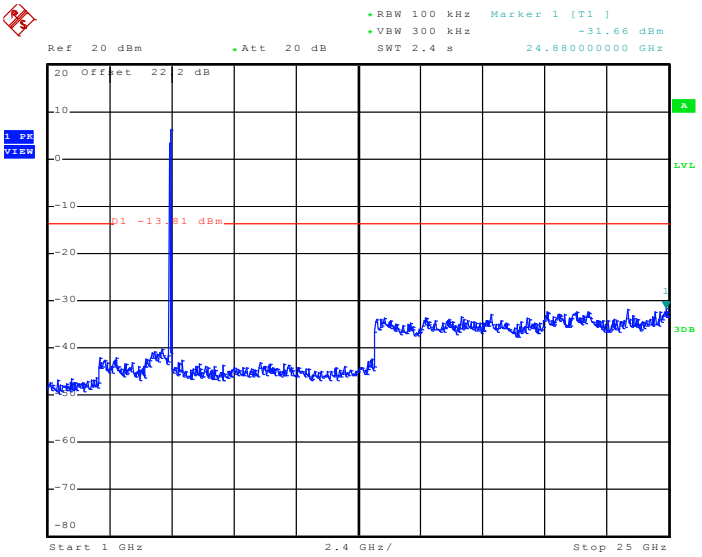
Test Mode :	Mode 23~25	**Temperature :**	25~27℃
Test Band :	802.11a	**Relative Humidity :**	51~54%
Test Channel :	149, 157, 165	**Test Engineer :**	Ken Hsu

Conducted Spurious Emission Plot on 802.11a Channel 149 between 30 MHz~3 GHz - Chain A



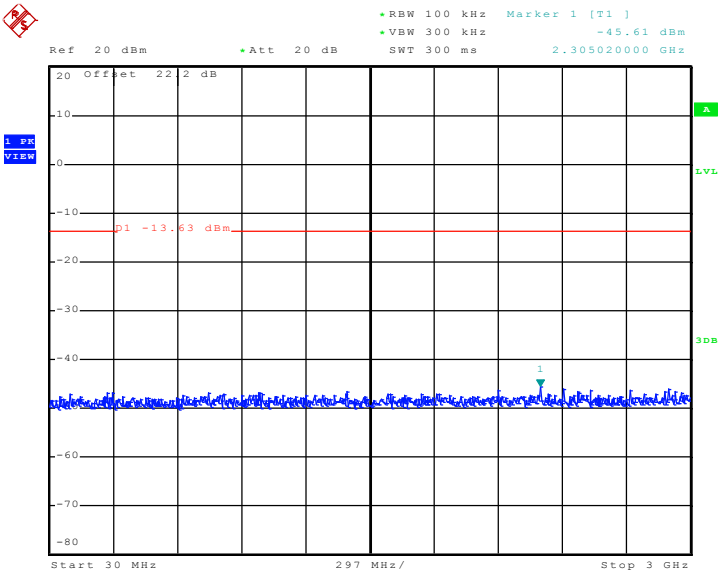
Date: 17.NOV.2010 15:05:35

Conducted Spurious Emission Plot on 802.11a Channel 149 between 1 GHz~25 GHz - Chain A



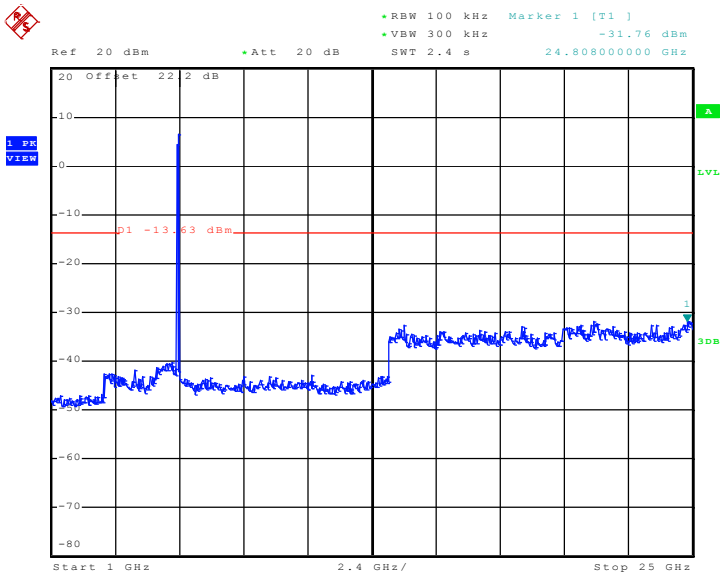
Date: 17.NOV.2010 15:05:18

Conducted Spurious Emission Plot on 802.11a Channel 149 between 30 MHz~3 GHz - Chain B



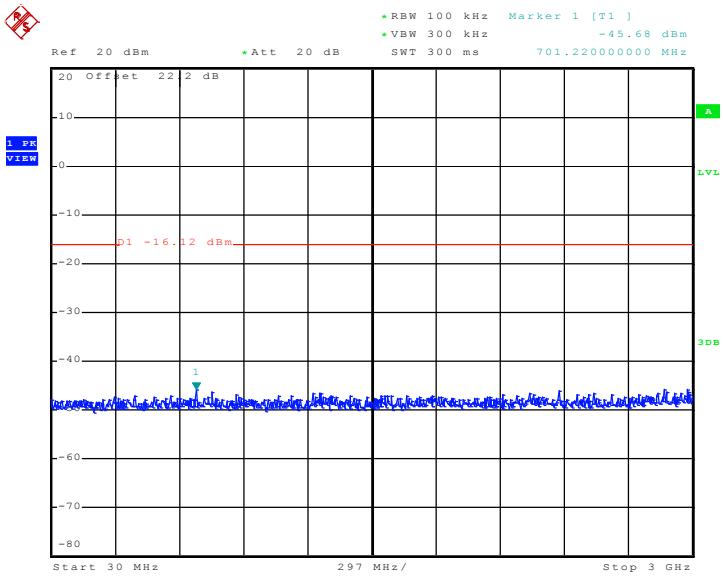
Date: 17.NOV.2010 14:59:39

Conducted Spurious Emission Plot on 802.11a Channel 149 between 1 GHz~25 GHz - Chain B



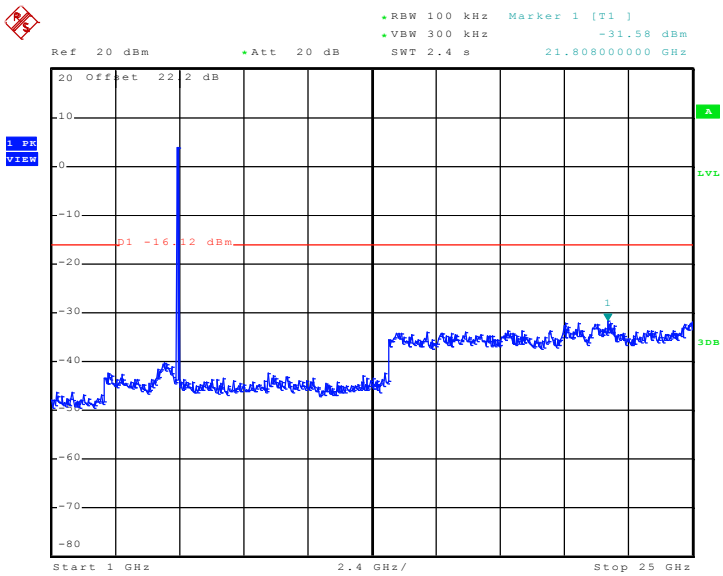
Date: 17.NOV.2010 14:59:22

Conducted Spurious Emission Plot on 802.11a Channel 149 between 30 MHz~3 GHz - Chain A+B(A)



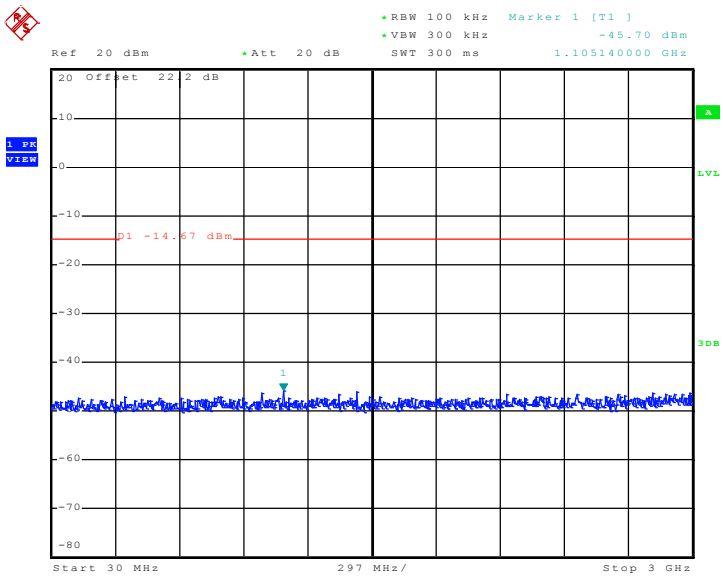
Date: 10.NOV.2010 10:22:52

Conducted Spurious Emission Plot on 802.11a Channel 149 between 1 GHz~25 GHz - Chain A+B(A)



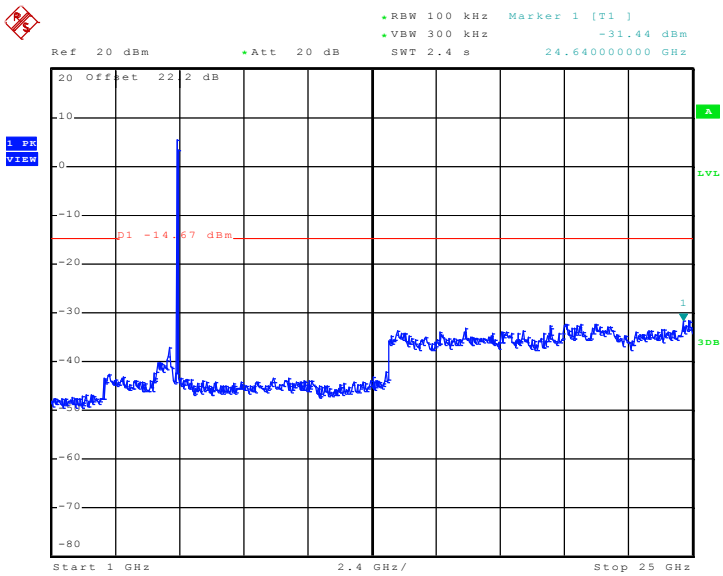
Date: 10.NOV.2010 10:22:36

Conducted Spurious Emission Plot on 802.11a Channel 149 between 30 MHz~3 GHz - Chain A+B(B)



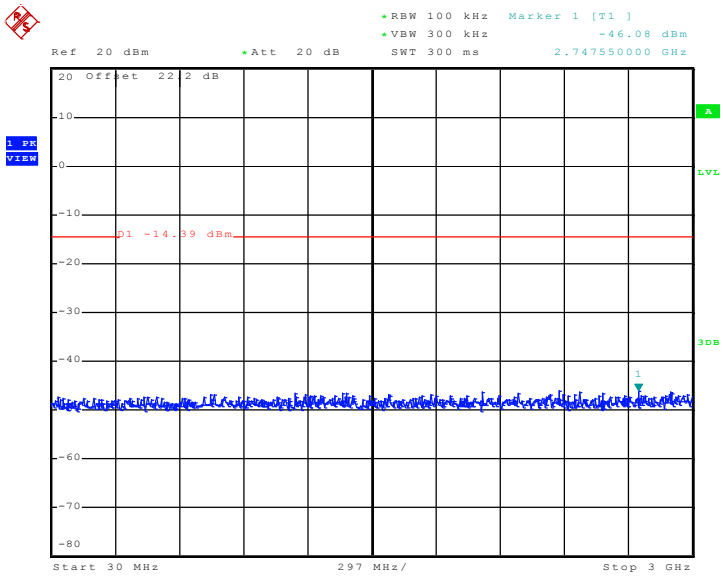
Date: 10.NOV.2010 10:03:25

Conducted Spurious Emission Plot on 802.11a Channel 149 between 1 GHz~25 GHz - Chain A+B(B)



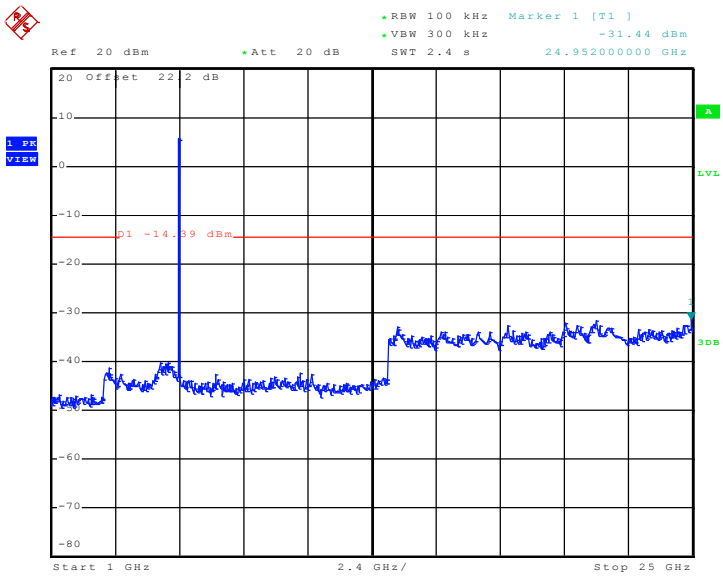
Date: 10.NOV.2010 10:03:08

Conducted Spurious Emission Plot on 802.11a Channel 157 between 30 MHz~3 GHz - Chain A



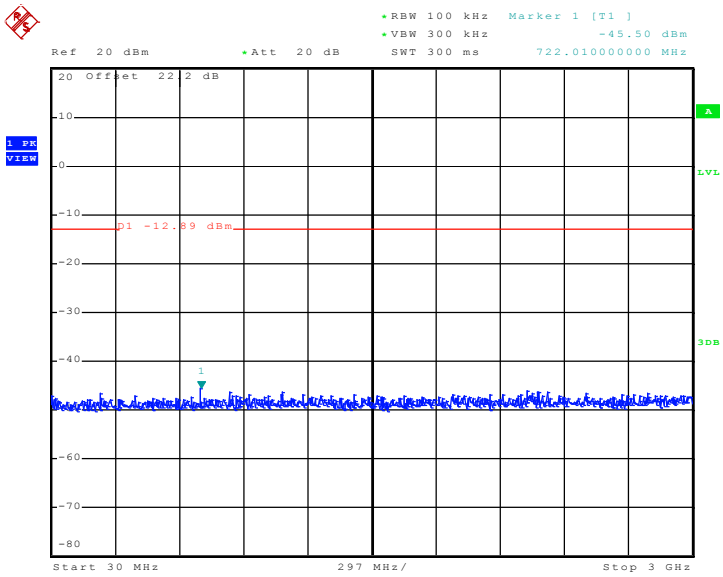
Date: 17.NOV.2010 15:04:38

Conducted Spurious Emission Plot on 802.11a Channel 157 between 1 GHz~25 GHz - Chain A



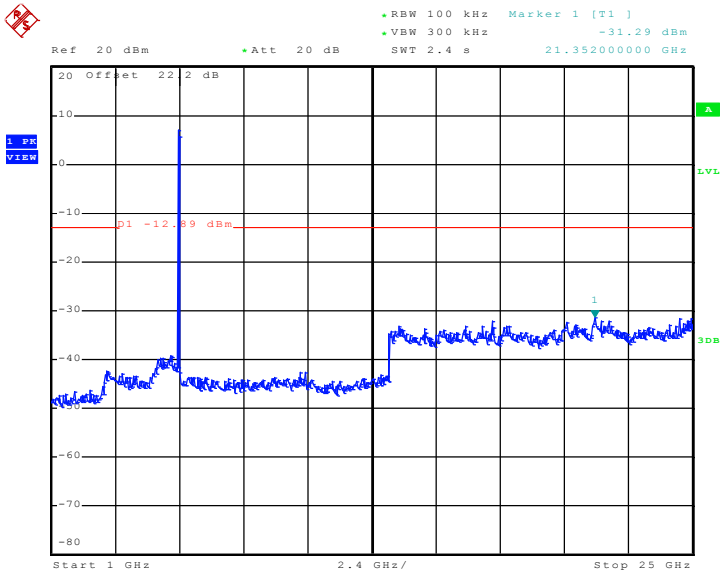
Date: 17.NOV.2010 15:04:22

Conducted Spurious Emission Plot on 802.11a Channel 157 between 30 MHz~3 GHz - Chain B



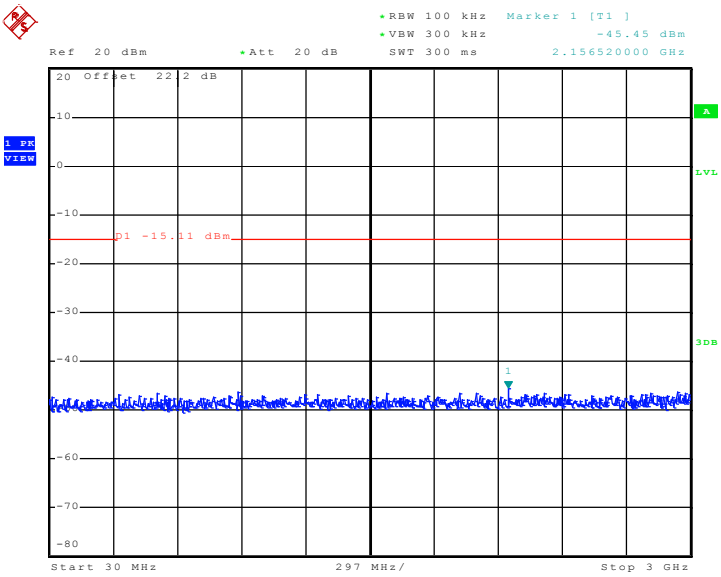
Date: 17.NOV.2010 15:01:07

Conducted Spurious Emission Plot on 802.11a Channel 157 between 1 GHz~25 GHz - Chain B



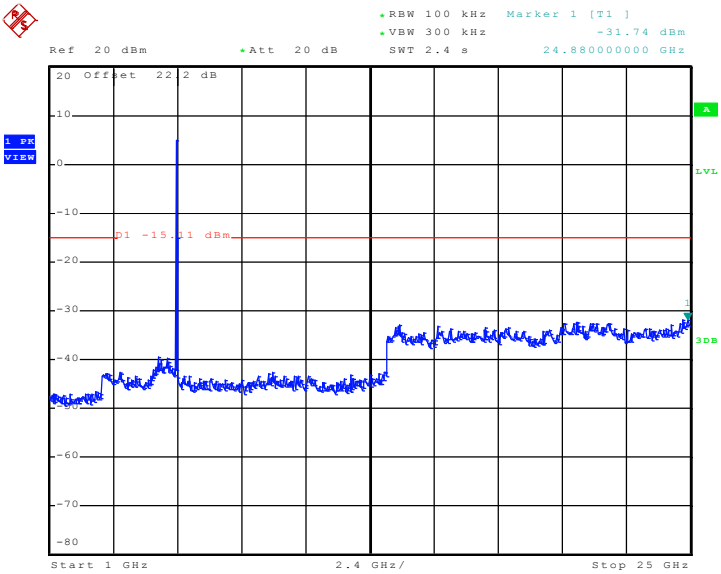
Date: 17.NOV.2010 15:00:51

Conducted Spurious Emission Plot on 802.11a Channel 157 between 30 MHz~3 GHz - Chain A+B(A)



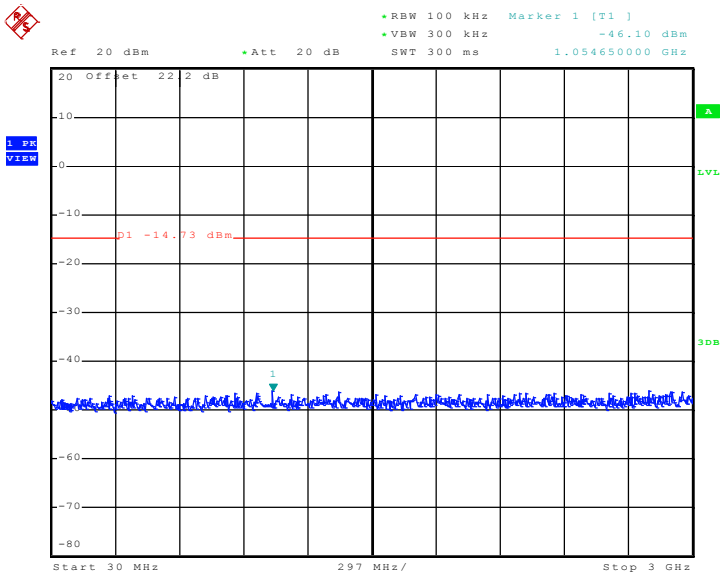
Date: 17.NOV.2010 07:44:39

Conducted Spurious Emission Plot on 802.11a Channel 157 between 1 GHz~25 GHz - Chain A+B(A)



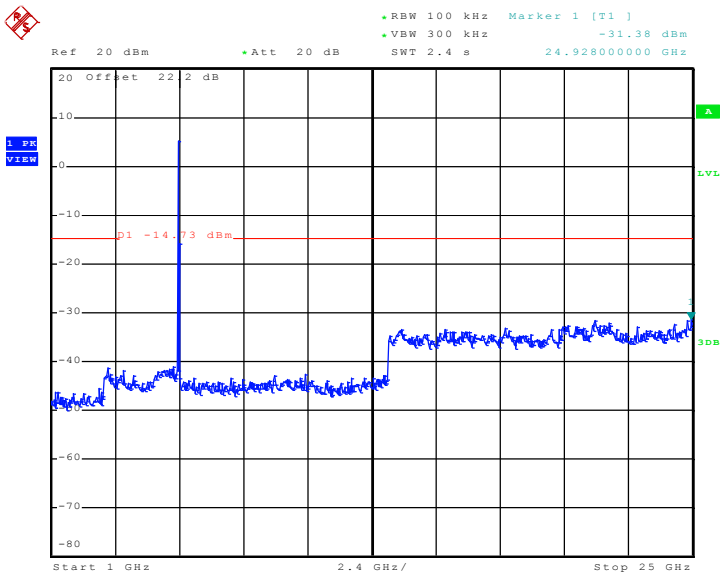
Date: 17.NOV.2010 07:44:22

Conducted Spurious Emission Plot on 802.11a Channel 157 between 30 MHz~3 GHz - Chain A+B(B)



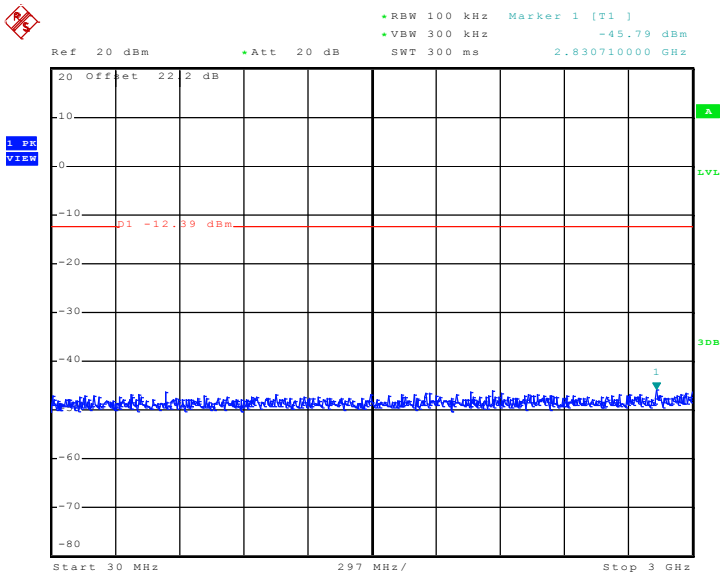
Date: 17.NOV.2010 08:26:11

Conducted Spurious Emission Plot on 802.11a Channel 157 between 1 GHz~25 GHz - Chain A+B(B)



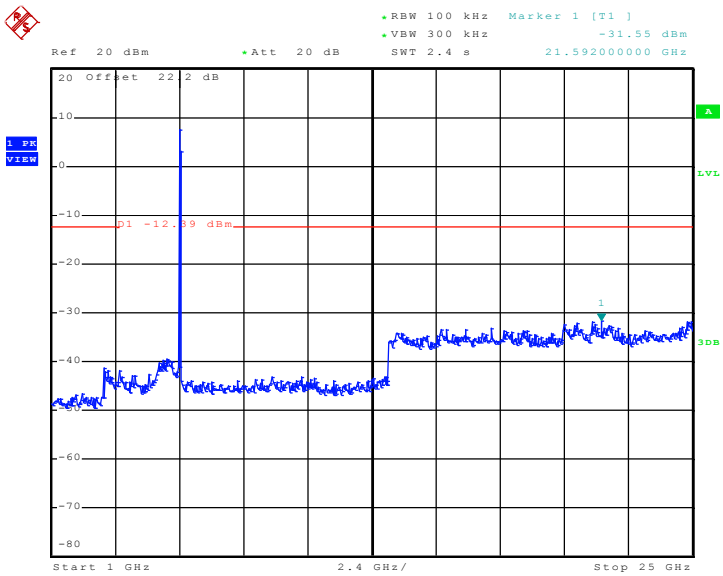
Date: 17.NOV.2010 08:25:54

Conducted Spurious Emission Plot on 802.11a Channel 165 between 30 MHz~3 GHz - Chain A



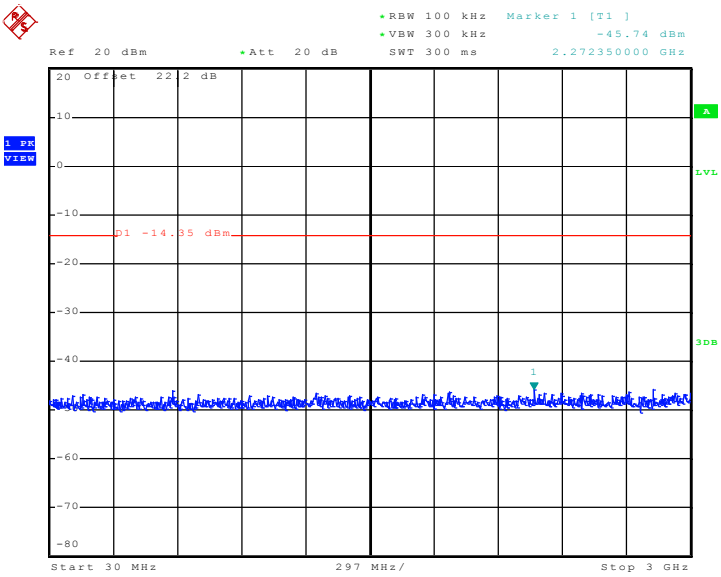
Date: 17.NOV.2010 15:03:40

Conducted Spurious Emission Plot on 802.11a Channel 165 between 1 GHz~25 GHz - Chain A



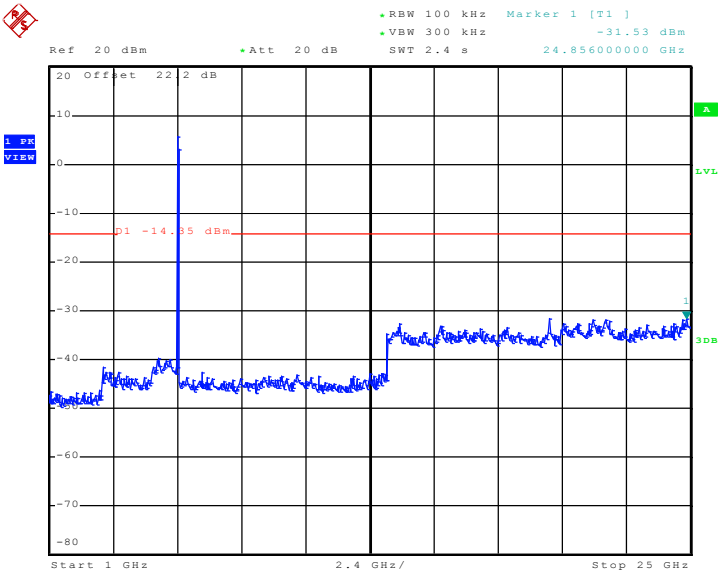
Date: 17.NOV.2010 15:03:24

Conducted Spurious Emission Plot on 802.11a Channel 165 between 30 MHz~3 GHz - Chain B



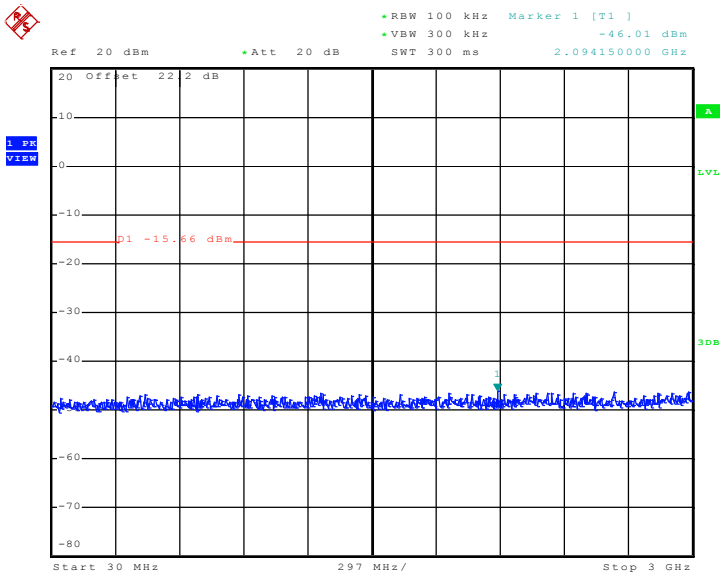
Date: 17.NOV.2010 15:02:12

Conducted Spurious Emission Plot on 802.11a Channel 165 between 1 GHz~25 GHz - Chain B



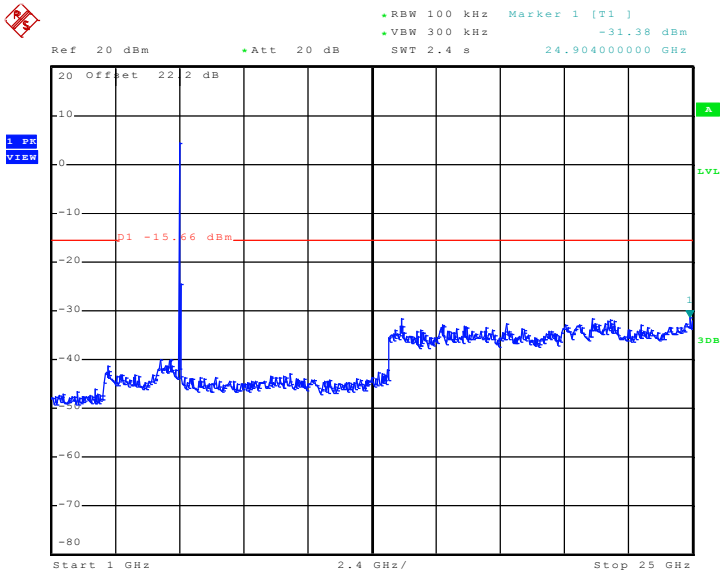
Date: 17.NOV.2010 15:01:55

Conducted Spurious Emission Plot on 802.11a Channel 165 between 30 MHz~3 GHz - Chain A+B(A)



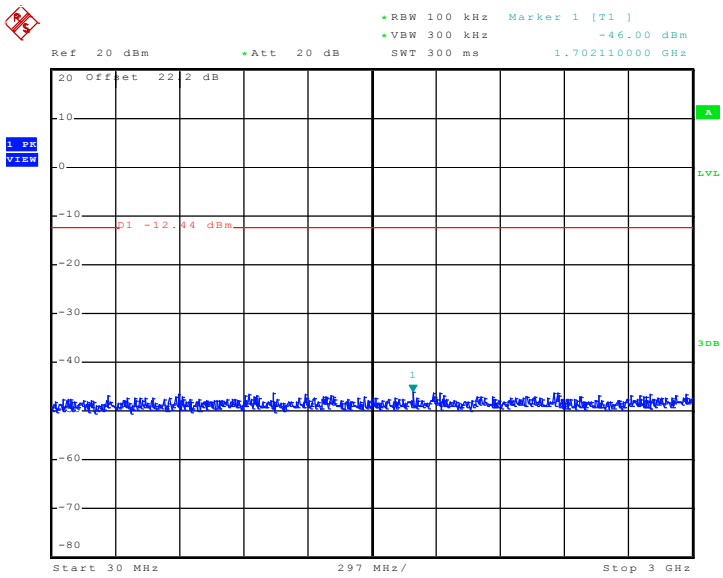
Date: 17.NOV.2010 07:59:01

Conducted Spurious Emission Plot on 802.11a Channel 165 between 1 GHz~25 GHz - Chain A+B(A)



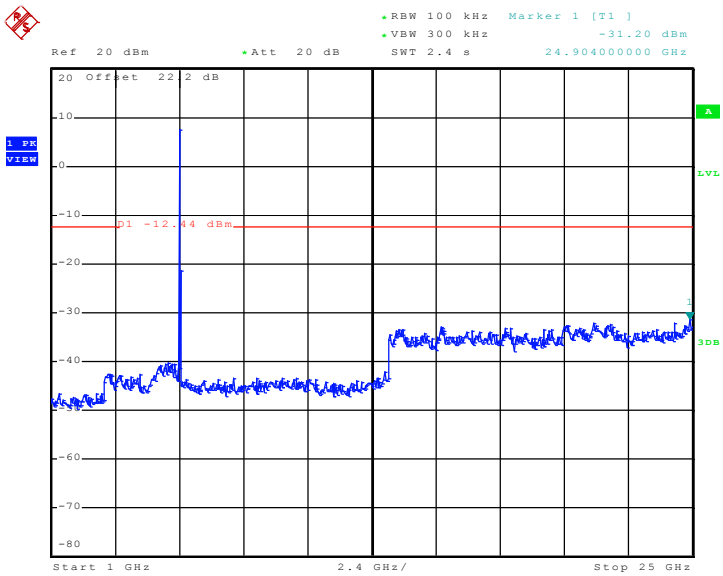
Date: 17.NOV.2010 07:58:44

Conducted Spurious Emission Plot on 802.11a Channel 165 between 30 MHz~3 GHz - Chain A+B(B)



Date: 17.NOV.2010 08:13:53

Conducted Spurious Emission Plot on 802.11a Channel 165 between 1 GHz~25 GHz - Chain A+B(B)

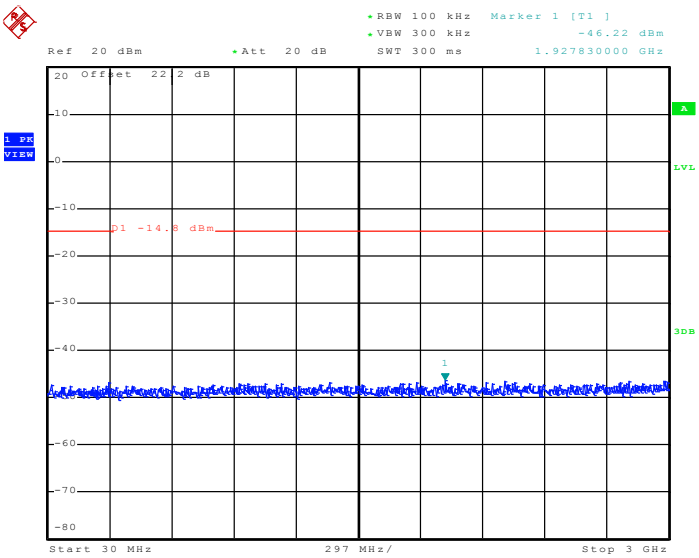


Date: 17.NOV.2010 08:13:37

Test Mode :	Mode 26~28	**Temperature :**	25~27℃
Test Band :	802.11n (BW 20MHz)	**Relative Humidity :**	51~54%
Test Channel :	149, 157, 165	**Test Engineer :**	Ken Hsu

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

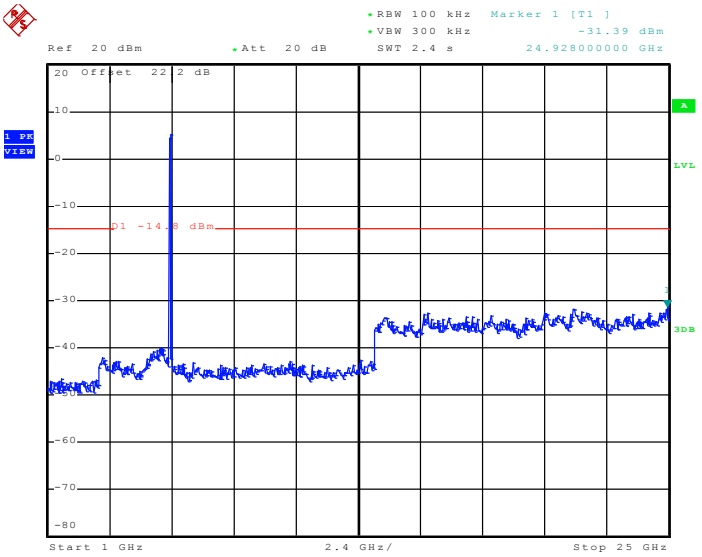
Channel 149 between 30 MHz~3 GHz - Chain A



Date: 17.NOV.2010 14:42:03

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

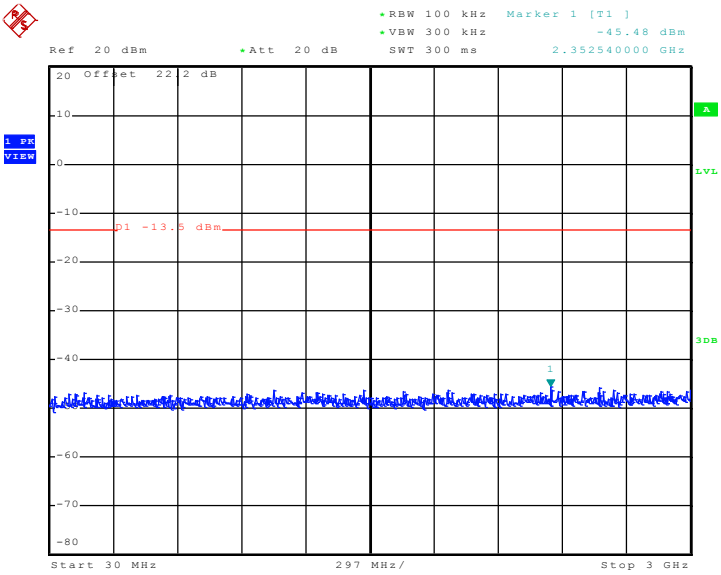
Channel 149 between 1 GHz~25 GHz - Chain A



Date: 17.NOV.2010 14:41:46

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

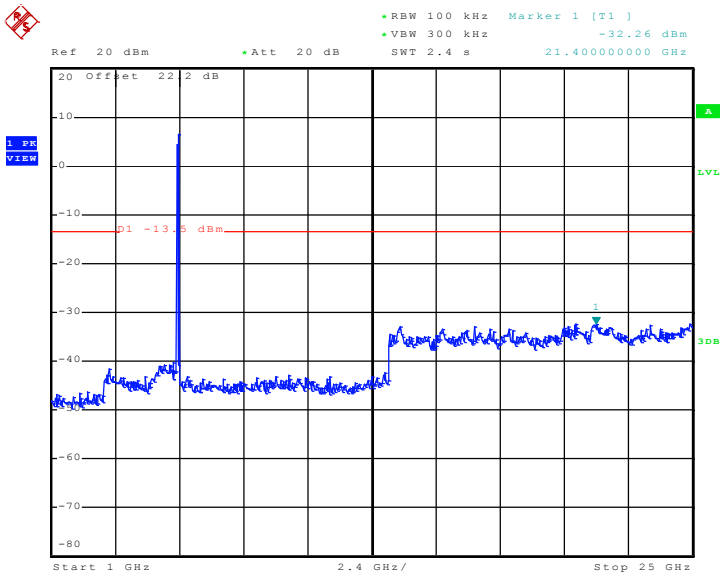
Channel 149 between 30 MHz~3 GHz - Chain B



Date: 17.NOV.2010 14:48:52

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

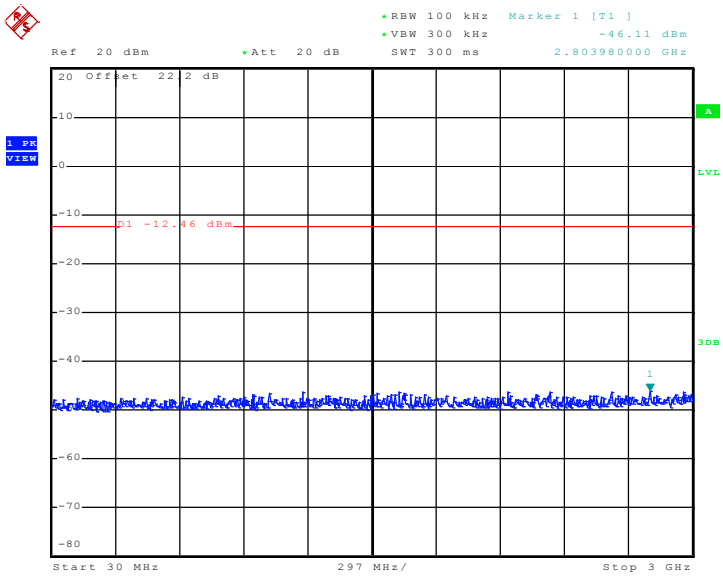
Channel 149 between 1 GHz~25 GHz - Chain B



Date: 17.NOV.2010 14:48:35

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

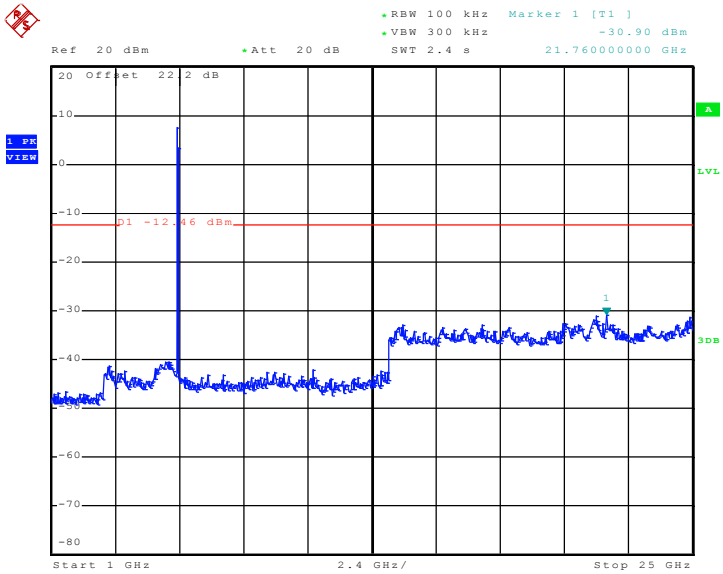
Channel 149 between 30 MHz~3 GHz - Chain A+B(A)



Date: 17.NOV.2010 09:41:43

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

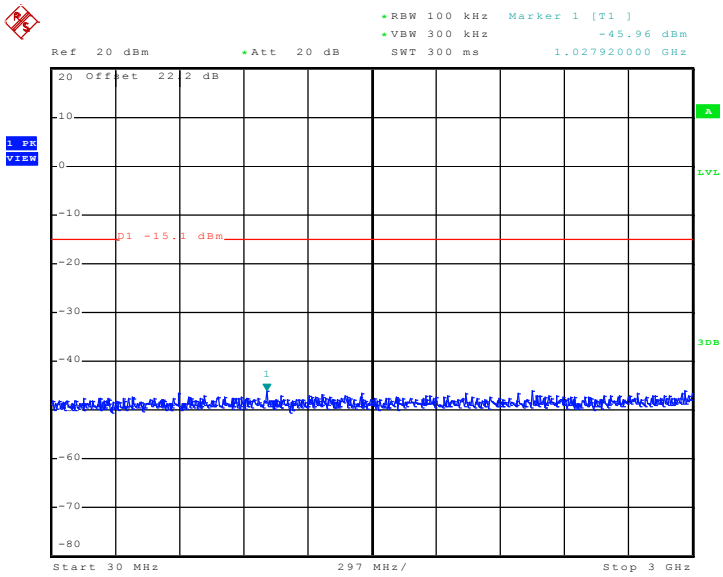
Channel 149 between 1 GHz~25 GHz - Chain A+B(A)



Date: 17.NOV.2010 09:41:26

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

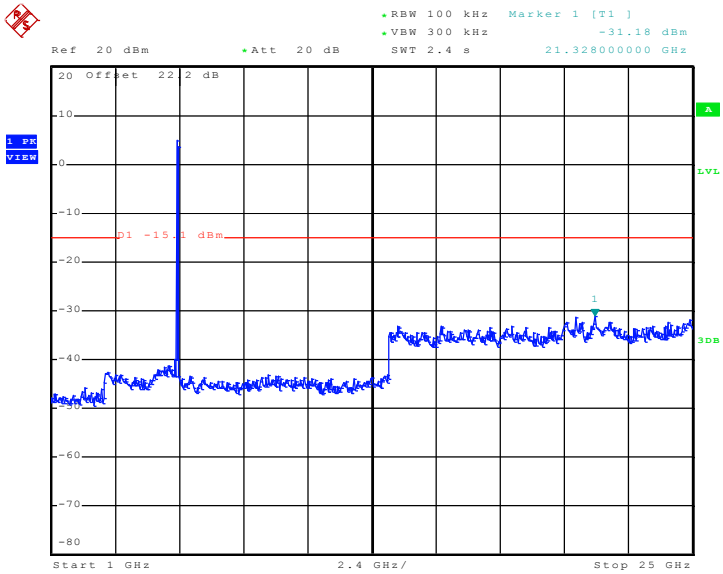
Channel 149 between 30 MHz~3 GHz - Chain A+B(B)



Date: 17.NOV.2010 09:10:25

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

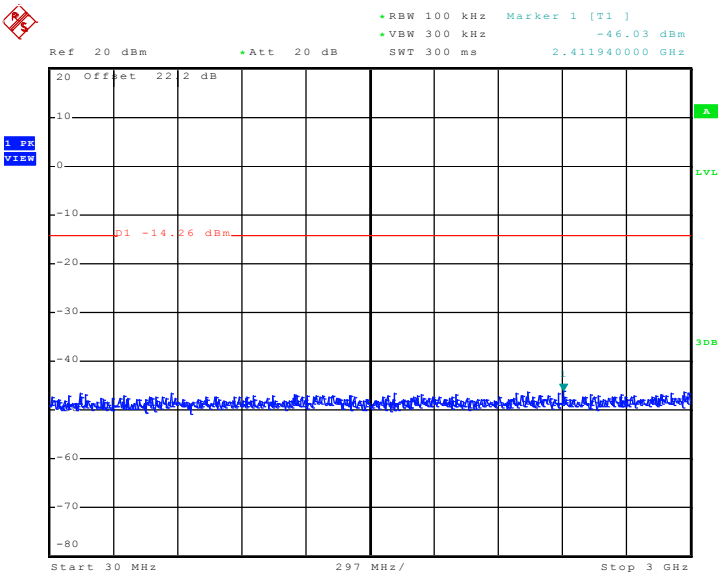
Channel 149 between 1 GHz~25 GHz - Chain A+B(B)



Date: 17.NOV.2010 09:10:09

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

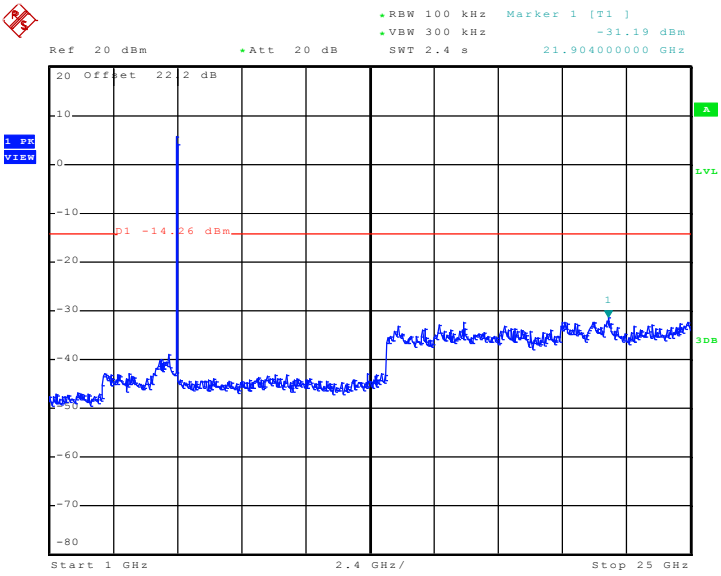
Channel 157 between 30 MHz~3 GHz - Chain A



Date: 17.NOV.2010 14:43:21

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

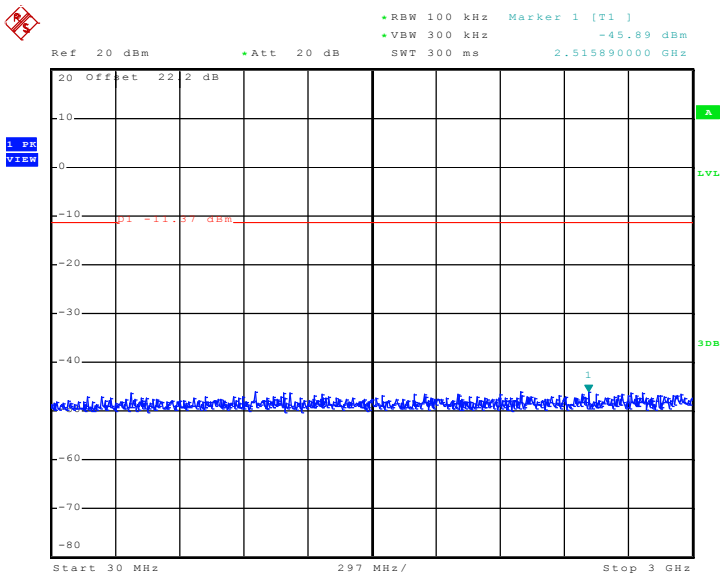
Channel 157 between 1 GHz~25 GHz - Chain A



Date: 17.NOV.2010 14:43:05

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

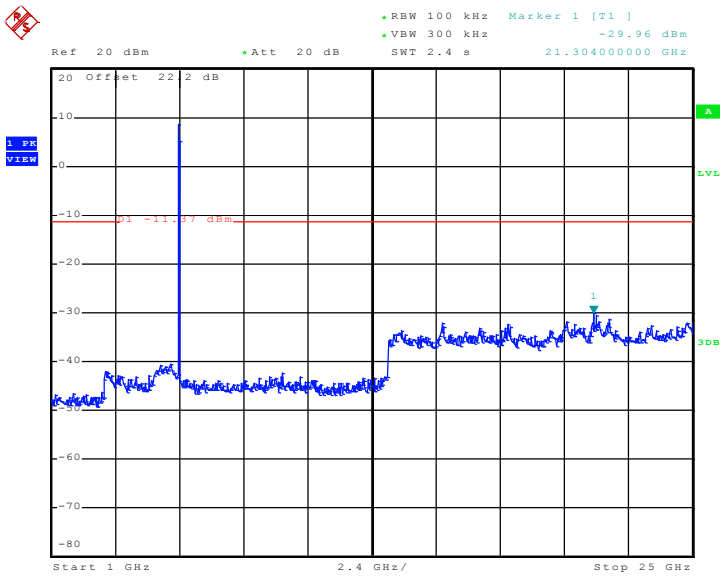
Channel 157 between 30 MHz~3 GHz - Chain B



Date: 17.NOV.2010 14:47:34

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

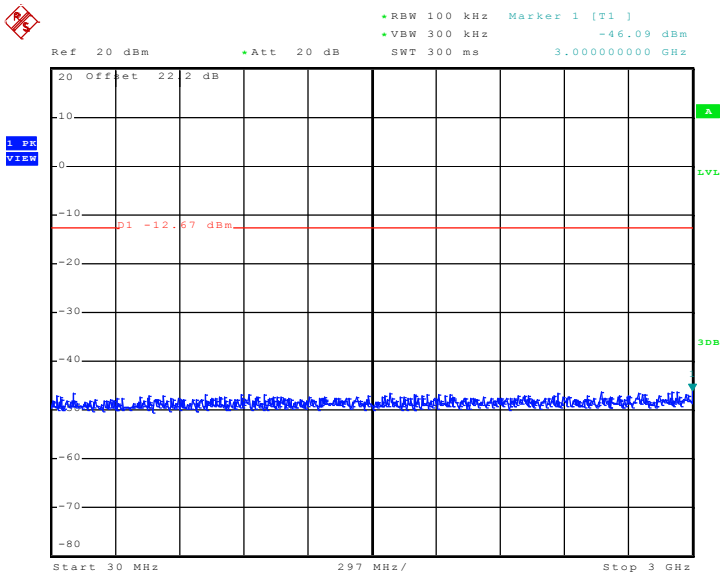
Channel 157 between 1 GHz~25 GHz - Chain B



Date: 17.NOV.2010 14:47:17

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

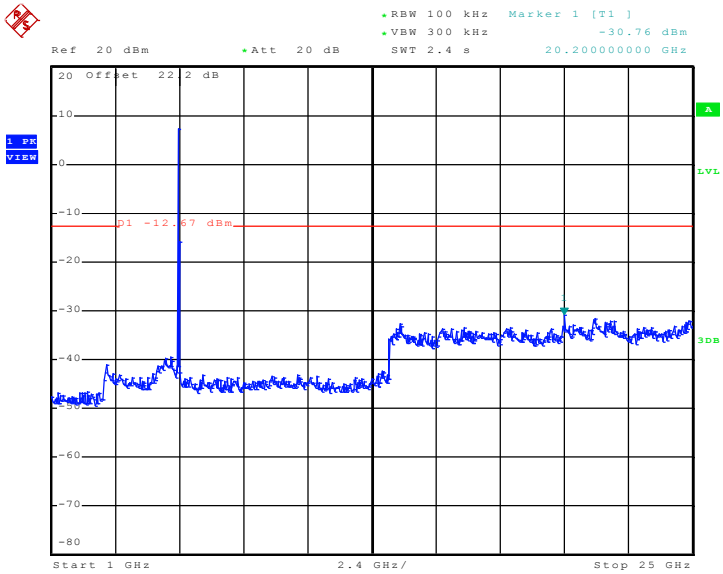
Channel 157 between 30 MHz~3 GHz - Chain A+B(A)



Date: 17.NOV.2010 09:50:01

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

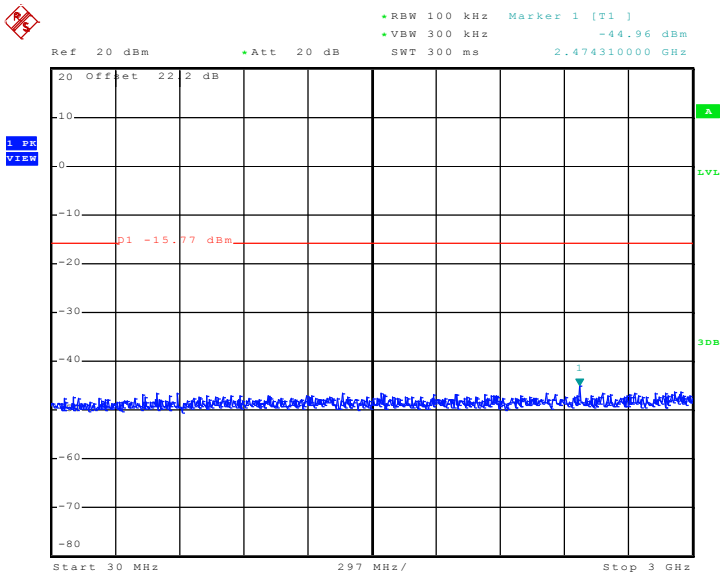
Channel 157 between 1 GHz~25 GHz - Chain A+B(A)



Date: 17.NOV.2010 09:49:45

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

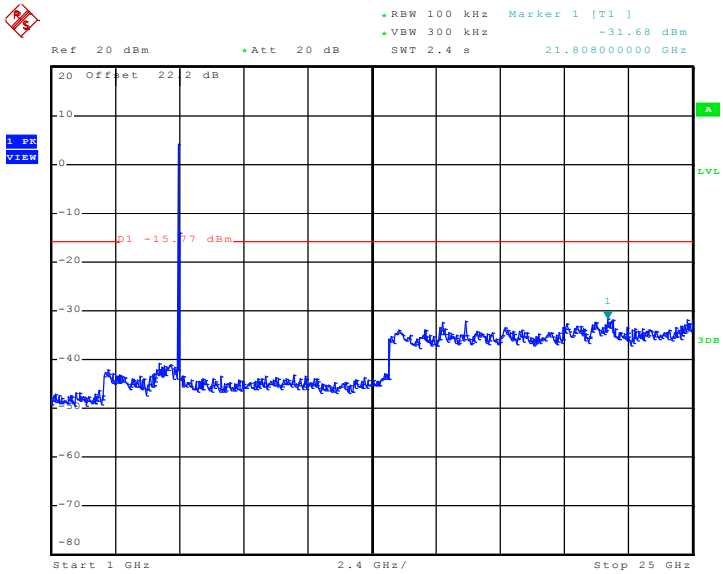
Channel 157 between 30 MHz~3 GHz - Chain A+B(B)



Date: 17.NOV.2010 08:35:41

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

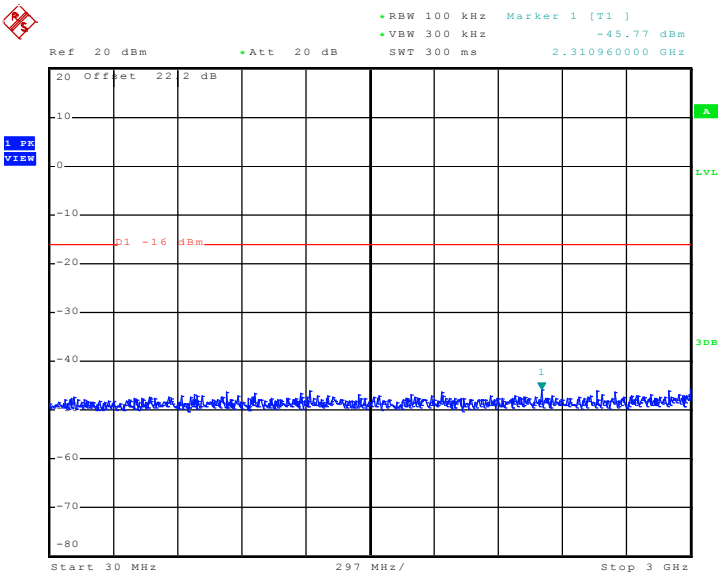
Channel 157 between 1 GHz~25 GHz - Chain A+B(B)



Date: 17.NOV.2010 08:35:24

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

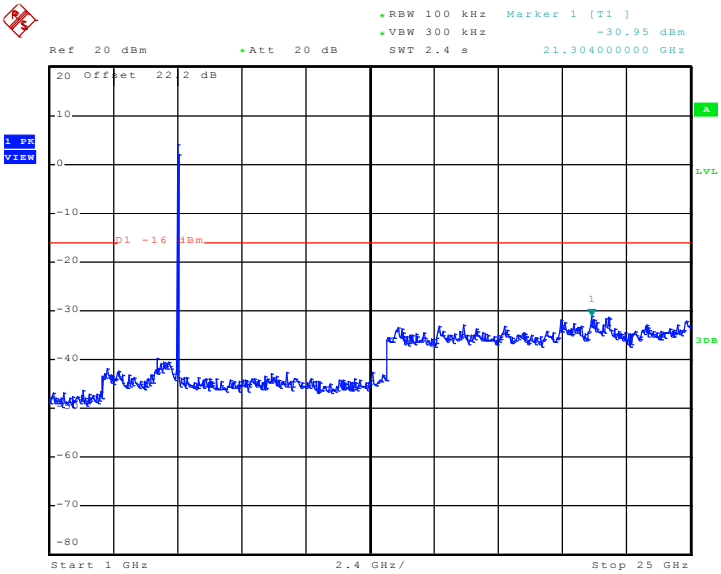
Channel 165 between 30 MHz~3 GHz - Chain A



Date: 17.NOV.2010 14:44:27

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

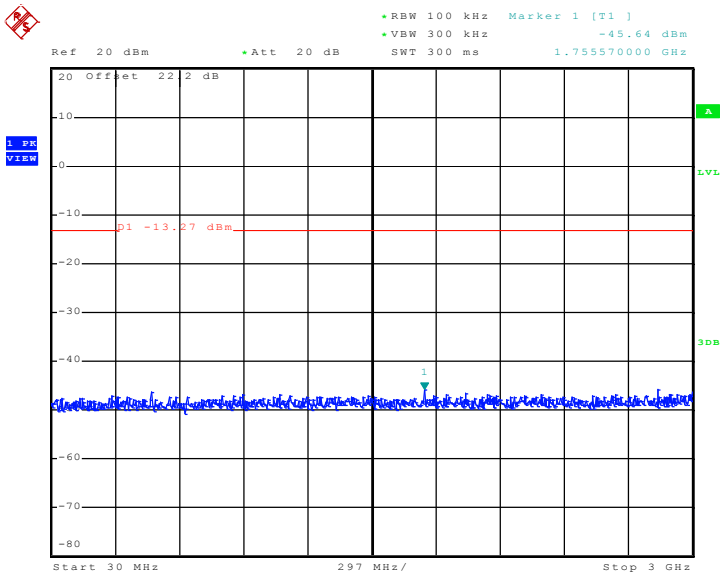
Channel 165 between 1 GHz~25 GHz - Chain A



Date: 17.NOV.2010 14:44:10

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

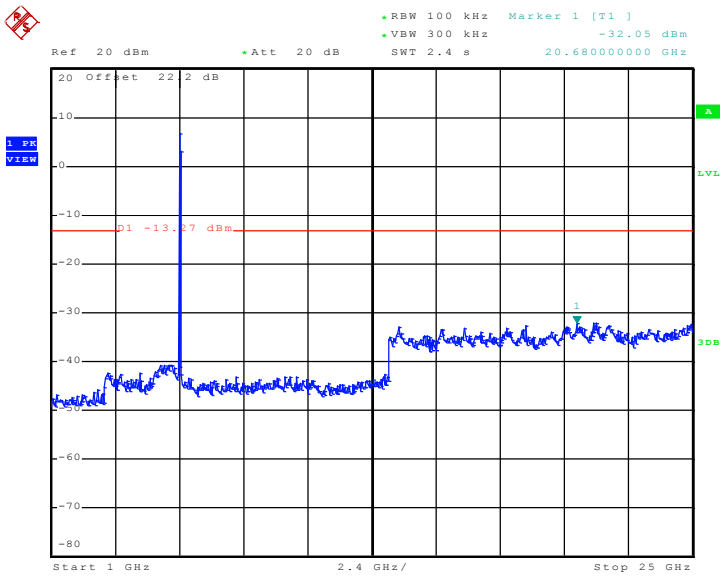
Channel 165 between 30 MHz~3 GHz - Chain B



Date: 17.NOV.2010 14:46:23

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

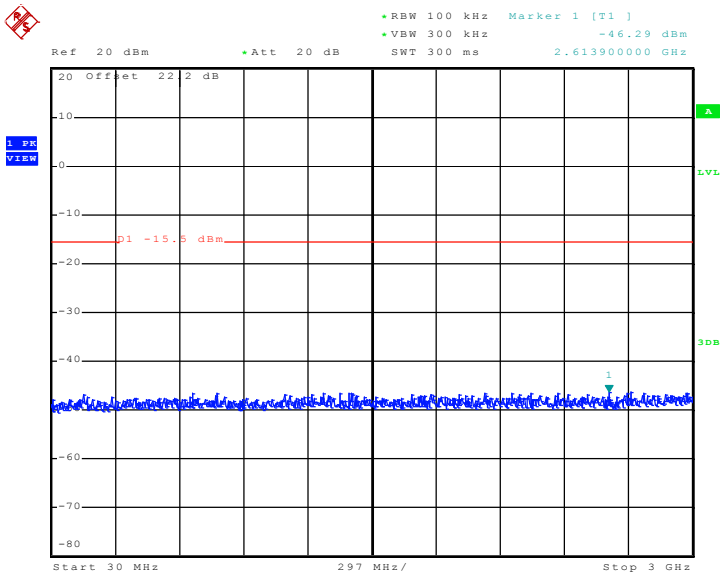
Channel 165 between 1 GHz~25 GHz - Chain B



Date: 17.NOV.2010 14:46:07

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

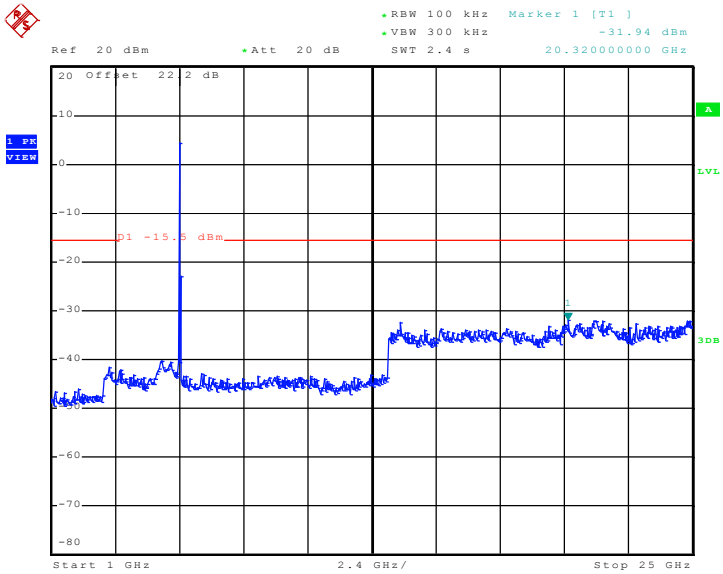
Channel 165 between 30 MHz~3 GHz - Chain A+B(A)



Date: 17.NOV.2010 10:03:35

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

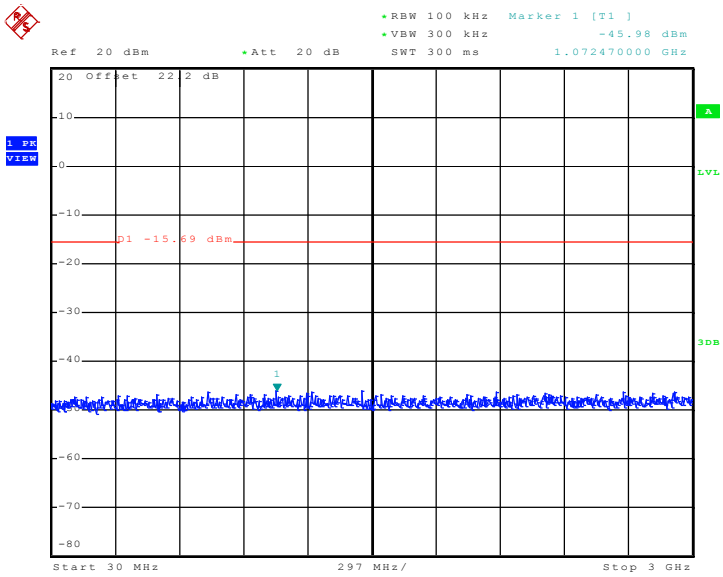
Channel 165 between 1 GHz~25 GHz - Chain A+B(A)



Date: 17.NOV.2010 10:03:18

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

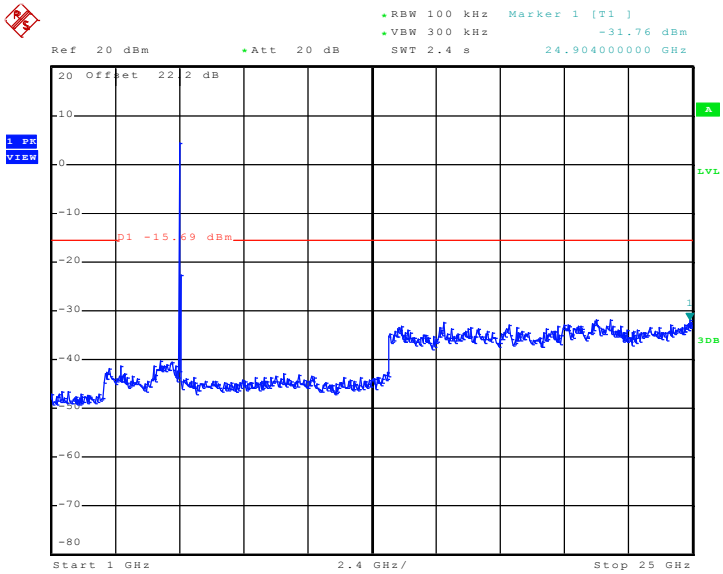
Channel 165 between 30 MHz~3 GHz - Chain A+B(B)



Date: 17.NOV.2010 08:58:50

Conducted Spurious Emission Plot on 802.11n (BW 20MHz)

Channel 165 between 1 GHz~25 GHz - Chain A+B(B)

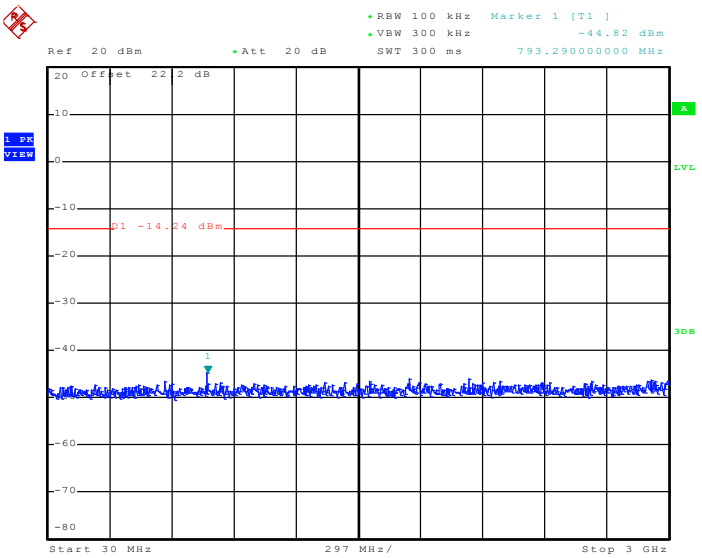


Date: 17.NOV.2010 08:58:33

Test Mode :	Mode 29~30	**Temperature :**	25~27℃
Test Band :	802.11n (BW 40MHz)	**Relative Humidity :**	51~54%
Test Channel :	151 and 159	**Test Engineer :**	Ken Hsu

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

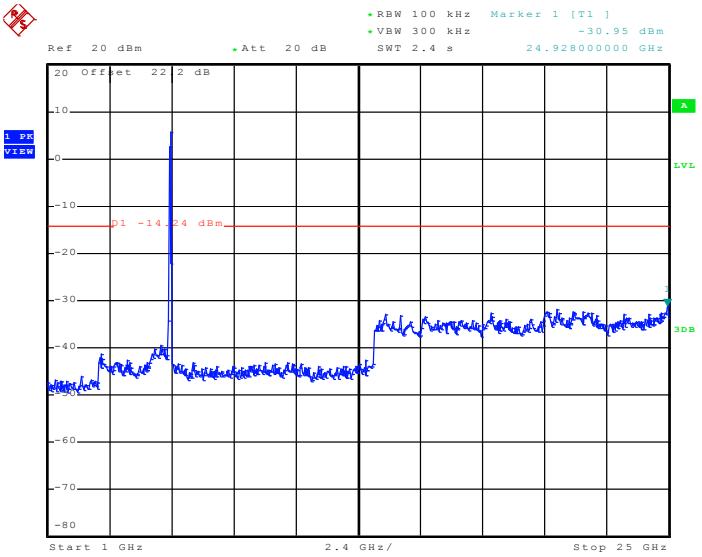
Channel 151 between 30 MHz~3 GHz - Chain A



Date: 17.NOV.2010 14:40:08

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

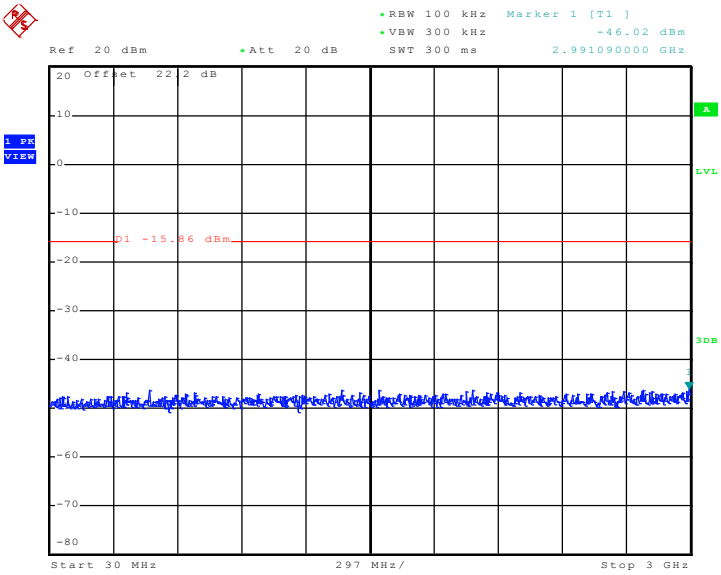
Channel 151 between 1 GHz~25 GHz - Chain A



Date: 17.NOV.2010 14:39:52

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

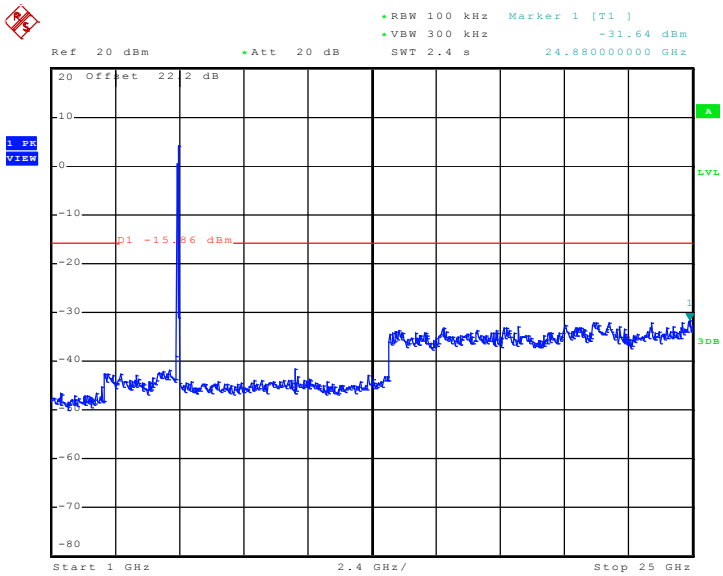
Channel 151 between 30 MHz~3 GHz - Chain B



Date: 17.NOV.2010 14:35:04

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

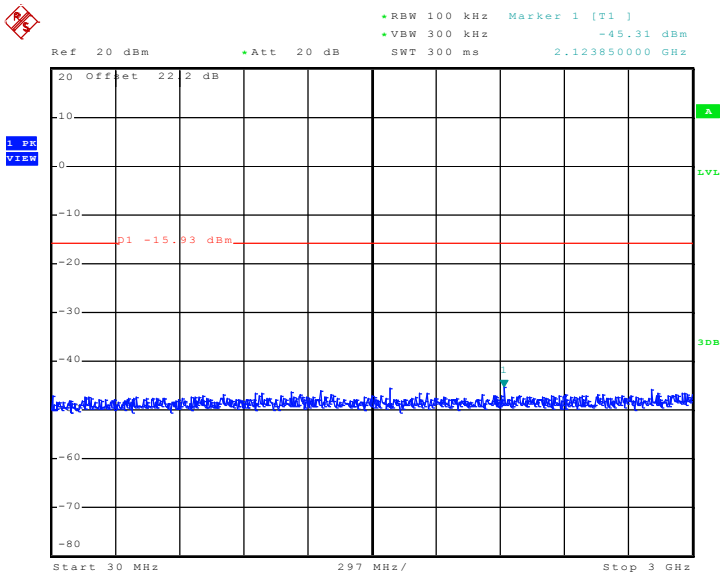
Channel 151 between 1 GHz~25 GHz - Chain B



Date: 17.NOV.2010 14:34:48

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

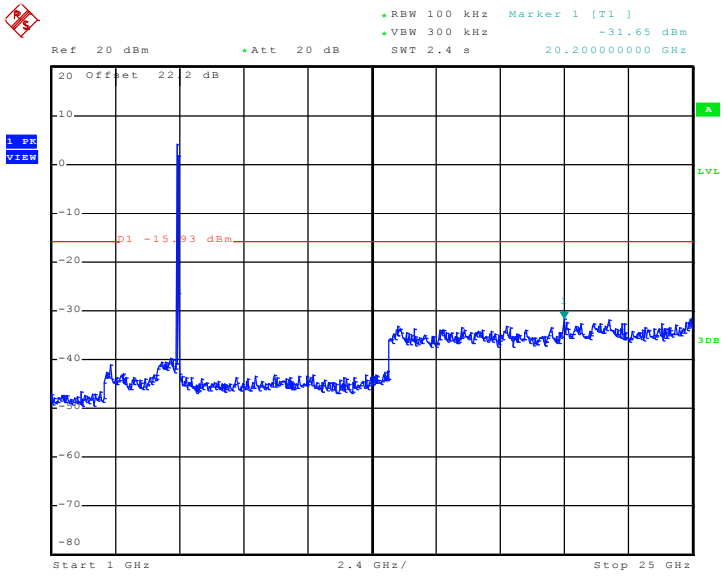
Channel 151 between 30 MHz~3 GHz - Chain A+B(A)



Date: 17.NOV.2010 10:27:51

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

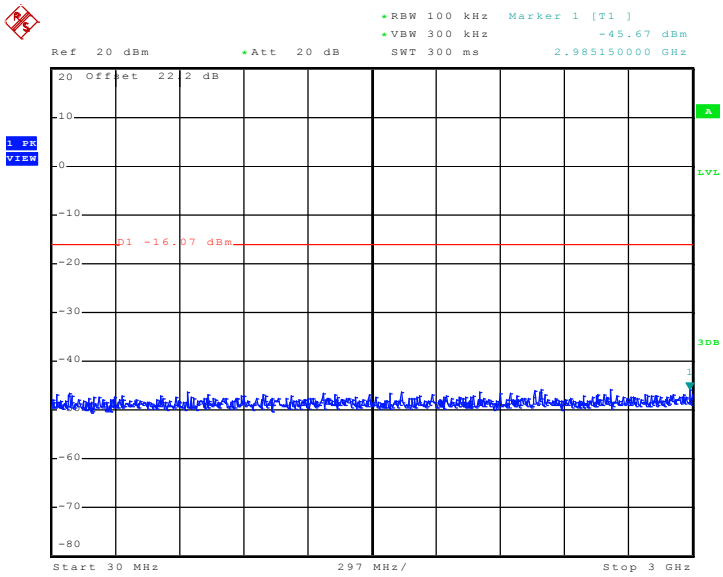
Channel 151 between 1 GHz~25 GHz - Chain A+B(A)



Date: 17.NOV.2010 10:27:35

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

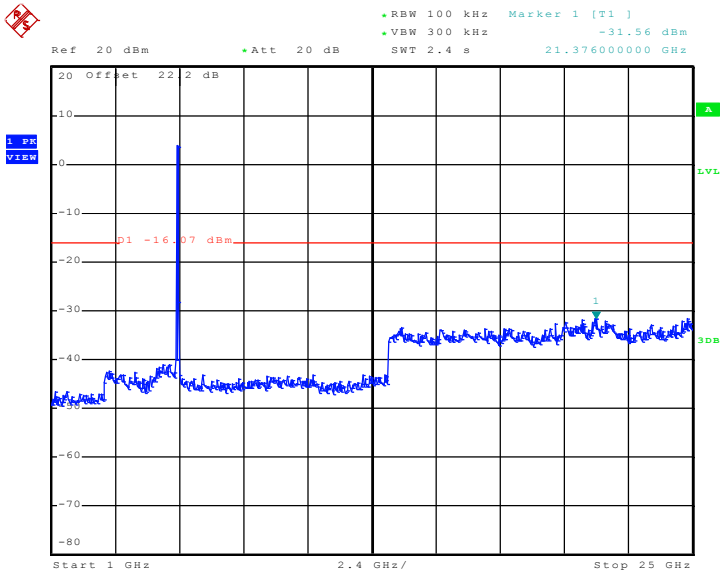
Channel 151 between 30 MHz~3 GHz - Chain A+B(B)



Date: 17.NOV.2010 12:31:54

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

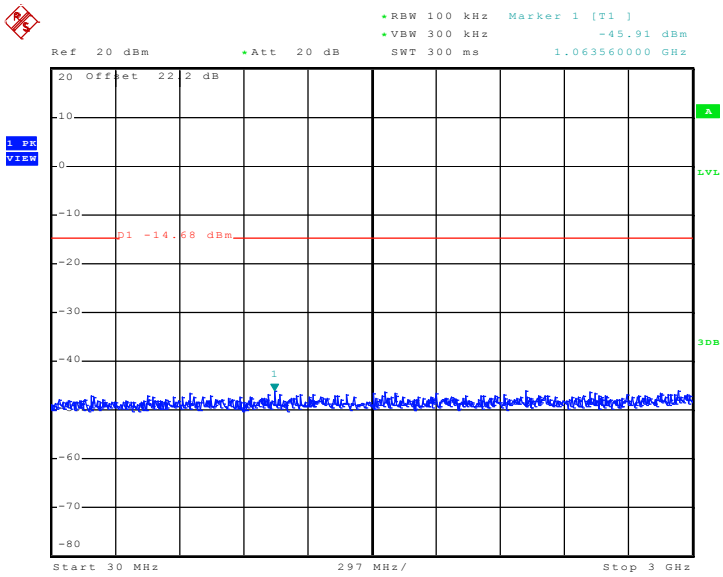
Channel 151 between 1 GHz~25 GHz - Chain A+B(B)



Date: 17.NOV.2010 12:31:37

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

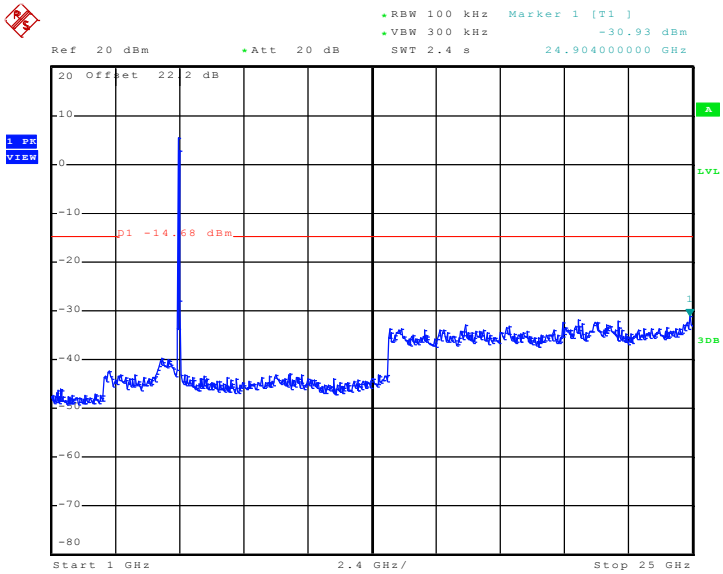
Channel 159 between 30 MHz~3 GHz - Chain A



Date: 17.NOV.2010 14:38:55

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

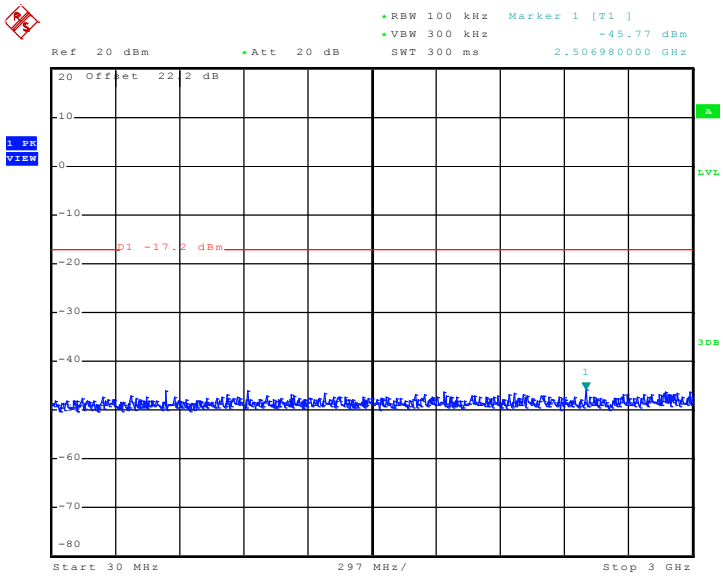
Channel 159 between 1 GHz~25 GHz - Chain A



Date: 17.NOV.2010 14:38:37

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

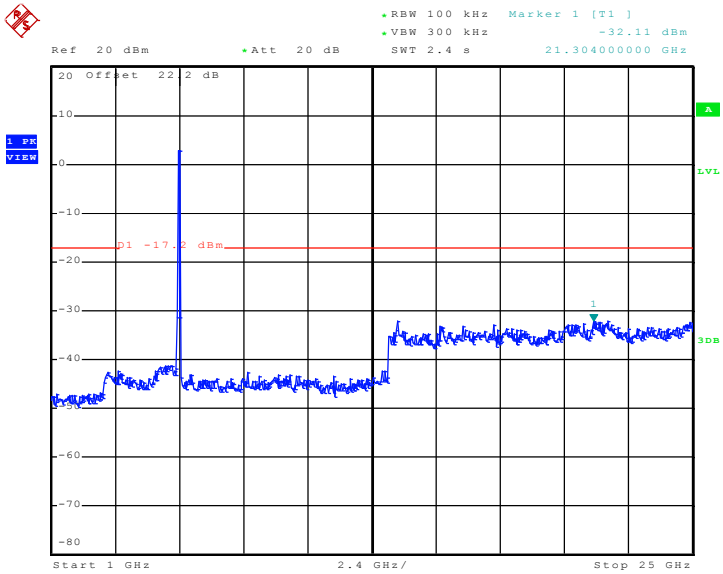
Channel 159 between 30 MHz~3 GHz - Chain B



Date: 17.NOV.2010 14:37:25

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

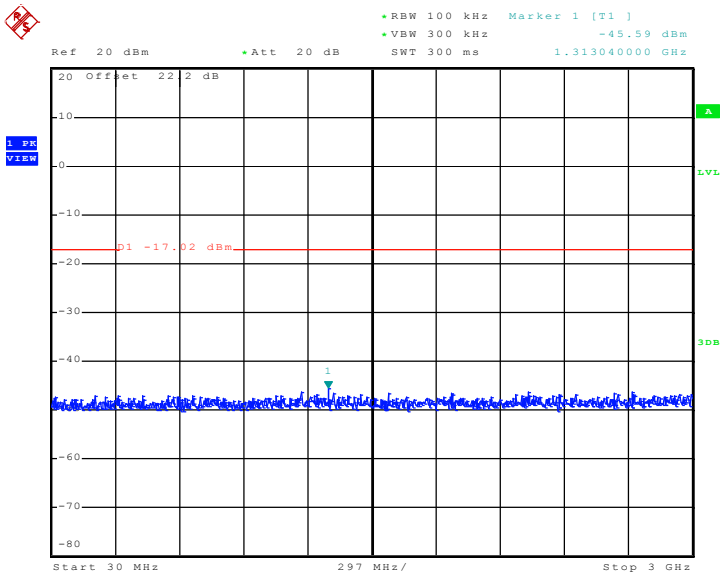
Channel 159 between 1 GHz~25 GHz - Chain B



Date: 17.NOV.2010 14:37:08

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

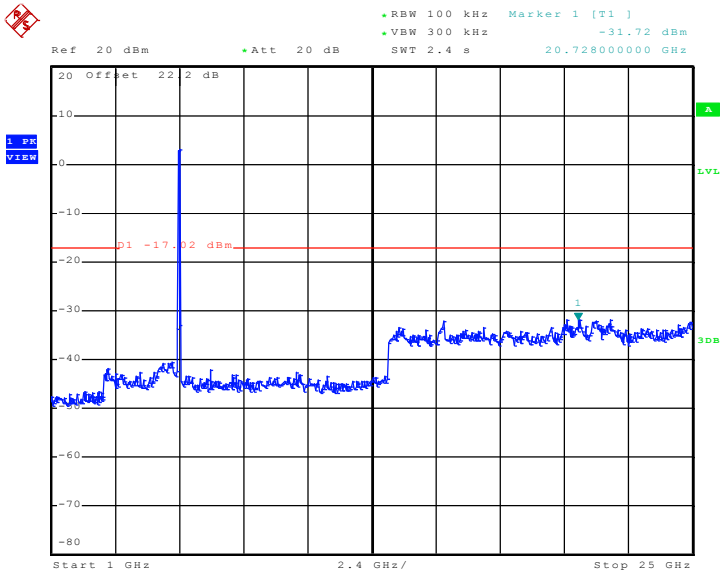
Channel 159 between 30 MHz~3 GHz - Chain A+B(A)



Date: 17.NOV.2010 10:41:51

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

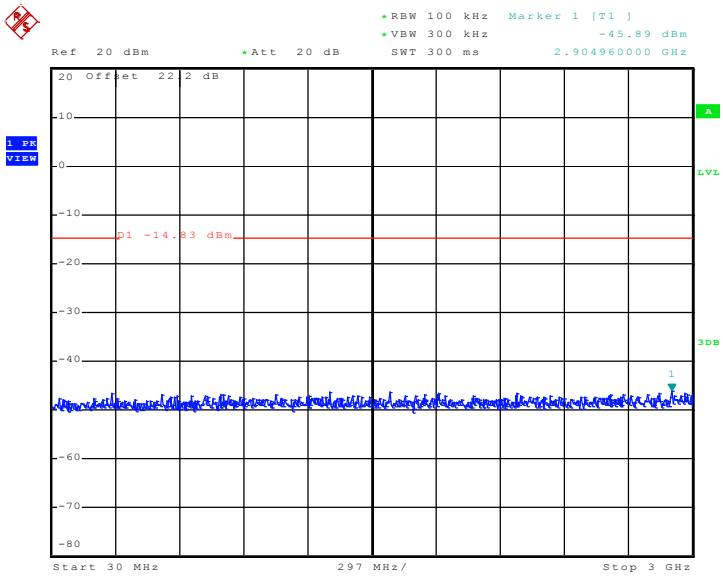
Channel 159 between 1 GHz~25 GHz - Chain A+B(A)



Date: 17.NOV.2010 10:41:35

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

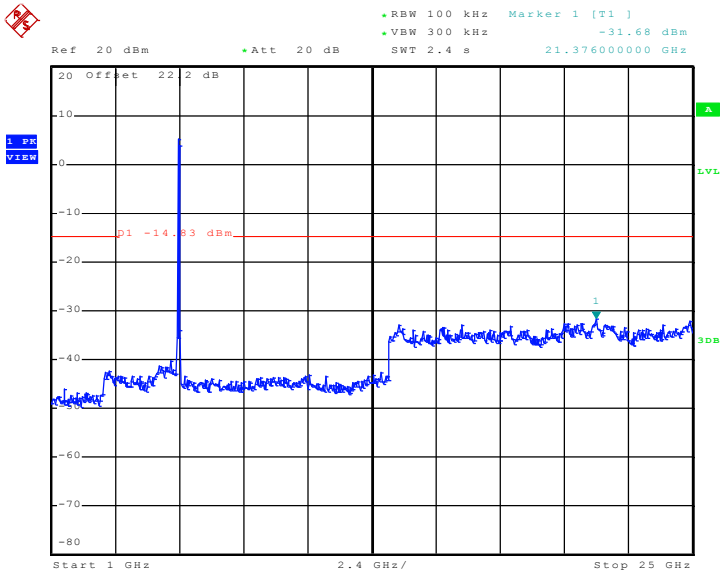
Channel 159 between 30 MHz~3 GHz - Chain A+B(B)



Date: 17.NOV.2010 11:00:27

Conducted Spurious Emission Plot on 802.11n (BW 40MHz)

Channel 159 between 1 GHz~25 GHz - Chain A+B(B)



Date: 17.NOV.2010 11:00:10

3.5 Power Spectral Density Measurement

3.5.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

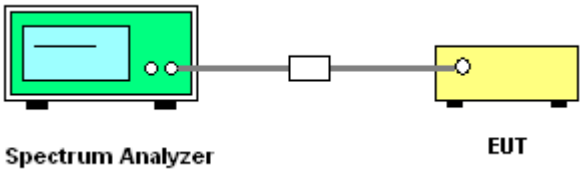
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The transmitter output is connected to the spectrum analyzer. According to the PSD Option 1 of FCC KDB Publication No. 558074, the resolution bandwidth is set to 3 KHz, video bandwidth is 10 KHz, Span is 1.5MHz, Sweet time is Span/3KHz = 500s, and Peak detection is used, and the analyzer is set for Max hold.
4. The cable loss (0.5 dB) and attenuator loss (19 dB) are normalized / entered in to the Spectrum Analyzer as an offset as below examples,
   (1) For SISO mode,
   For 802.11b Channel 11 Chain A, the final power in test report is -2.60 dBm which is the reading of spectrum analyzer with offseted cable loss (0.5 dB), and attenuator loss (19 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 802.11b Channel 01 Chain A+B: the total final power is 1.82 dBm from the formula of 10*LOG (10^ (-1.47 dBm/10) + 10^ (-0.92 dBm/10)).
   (a) Plot: PSD Plot on 802.11b Channel 01 - Chain A+B (A): -1.47 dBm
   (b) Plot: PSD Plot on 802.11b Channel 01 - Chain A+B (B): -0.92 dBm.
5. Each plots has already offseted with cable loss (0.5 dB), and attenuator loss (19 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.
6. Measure the power and record it.

3.5.4 Test Setup



3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1~5	Temperature :	25~27℃
Test Engineer :	Ken Hsu	Relative Humidity :	51~54%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)					Max. Limits (dBm)	Pass/Fail
		SISO		2Tx				
		Chain A	Chain B	Chain A+B(A)	Chain A+B(B)	Summation		
01	2412	-2.60	-1.48	-1.47	-0.92	1.82	8	Pass
02	2417	-2.10	-2.34	-0.62	-1.50	1.97	8	Pass
06	2437	1.39	1.83	1.90	2.44	5.19	8	Pass
10	2457	-1.02	-0.27	-1.91	-1.26	1.44	8	Pass
11	2462	-2.03	-1.22	-1.11	-1.42	1.75	8	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 6~10	Temperature :	25~27℃
Test Engineer :	Ken Hsu	Relative Humidity :	51~54%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)					Max. Limits (dBm)	Pass/Fail
		SISO		2Tx				
		Chain A	Chain B	Chain A+B(A)	Chain A+B(B)	Summation		
01	2412	-0.38	0.53	-0.57	-2.74	1.49	8	Pass
02	2417	-0.59	1.11	-3.38	-1.93	0.42	8	Pass
06	2437	-4.57	1.27	-2.58	-7.81	-1.44	8	Pass
10	2457	-0.34	-0.43	-1.40	-3.28	0.77	8	Pass
11	2462	-0.90	-3.10	-2.07	-5.22	-0.36	8	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 11~15	Temperature :	25~27℃
Test Engineer :	Ken Hsu	Relative Humidity :	51~54%

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		
01	2412	1.12	-1.25	-1.84	-1.77	1.21	8	Pass
02	2417	1.03	-1.56	-1.74	-2.61	0.86	8	Pass
06	2437	1.90	-1.76	-1.72	-4.46	0.13	8	Pass
10	2457	1.26	-3.82	-1.88	-2.02	1.06	8	Pass
11	2462	-5.59	-9.35	-2.23	-1.54	1.14	8	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 16~22	Temperature :	25~27℃
Test Engineer :	Ken Hsu	Relative Humidity :	51~54%

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		
03	2422	-11.19	-11.80	-7.82	-5.38	-3.42	8	Pass
04	2427	-9.37	-11.32	-11.28	-9.42	-7.24	8	Pass
05	2732	-11.99	-10.61	-7.99	-8.98	-5.45	8	Pass
06	2437	-10.51	-8.90	-7.42	-11.07	-5.86	8	Pass
07	2442	-11.88	-9.31	-9.85	-9.83	-6.83	8	Pass
08	2447	-11.11	-10.63	-10.80	-9.52	-7.10	8	Pass
09	2452	-11.64	-11.60	-11.17	-10.69	-7.91	8	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 23~25	Temperature :	25~27℃
Test Engineer :	Ken Hsu	Relative Humidity :	51~54%

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		
149	5745	-4.85	-7.20	-3.94	-0.58	1.07	8	Pass
157	5785	-2.24	0.06	-1.73	-5.65	-0.25	8	Pass
165	5825	-2.24	-1.67	-5.74	-5.41	-2.56	8	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 26~28	Temperature :	25~27℃
Test Engineer :	Ken Hsu	Relative Humidity :	51~54%

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		
149	5745	-2.26	-1.14	-3.88	-5.68	-1.68	8	Pass
157	5785	-4.47	-5.57	-5.41	-5.61	-2.50	8	Pass
165	5825	-4.82	-2.79	-3.05	-5.34	-1.04	8	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 29~30	Temperature :	25~27℃
Test Engineer :	Ken Hsu	Relative Humidity :	51~54%

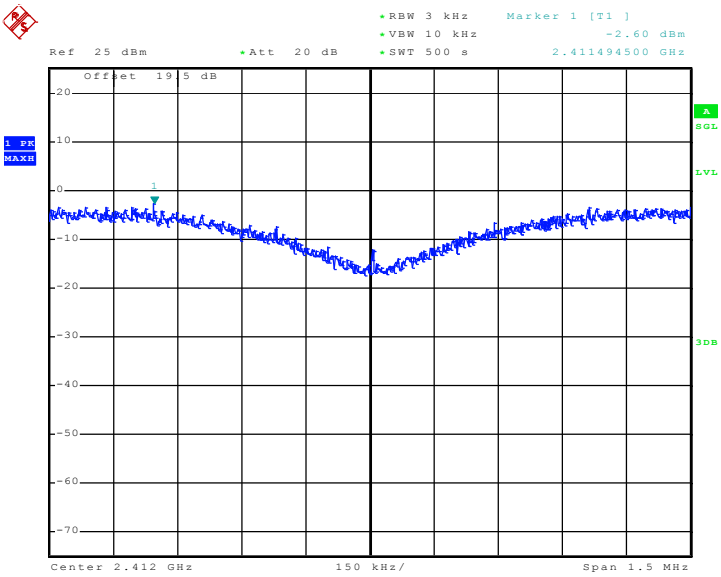
Channel	Frequency (MHz)	802.11n (BW 40MHz) Measured PSD (dBm)					Max. Limits (dBm)	Pass/Fail
		SISO		2Tx				
		Chain A	Chain B	Chain A+B(A)	Chain A+B(B)	Summation		
151	5755	-6.32	-3.88	-2.35	-8.03	-1.31	8	Pass
159	5795	-7.66	-7.61	-6.64	-7.62	-4.09	8	Pass

Note: Each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain

A/10) + 10^ (chain B/10)).

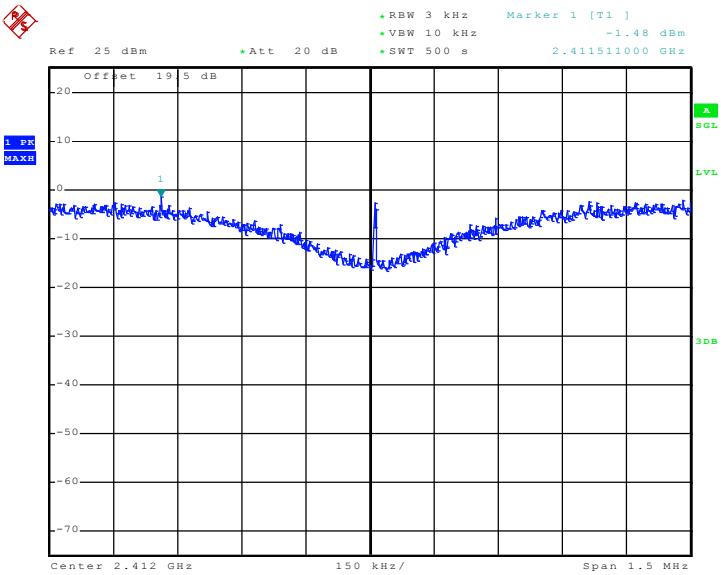
3.5.6 Test Result of Power Spectral Density Plots

PSD Plot on 802.11b Channel 01 - Chain A



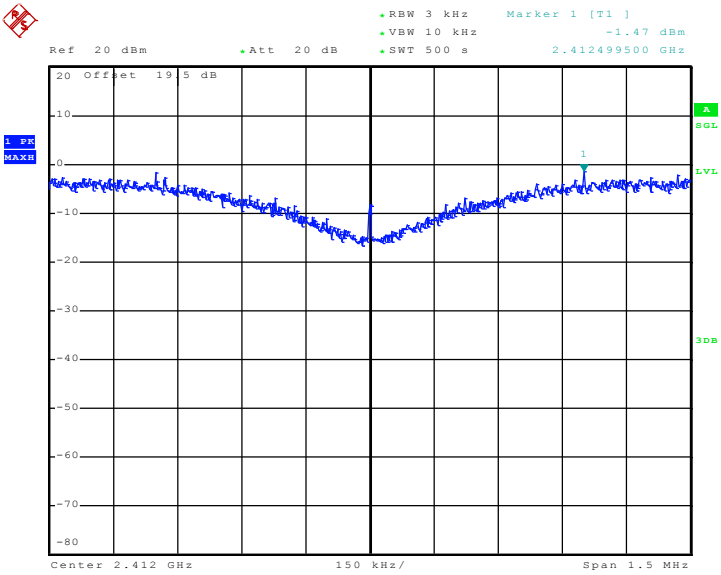
Date: 1.NOV.2010 00:56:05

PSD Plot on 802.11b Channel 01 - Chain B



Date: 1.NOV.2010 02:29:19

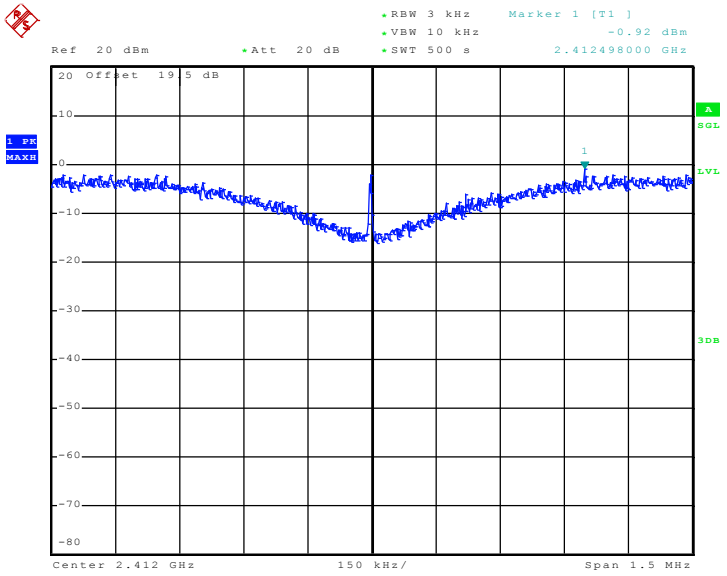
PSD Plot on 802.11b Channel 01 - Chain A+B(A)



Pra01

Date: 7.NOV.2010 15:36:37

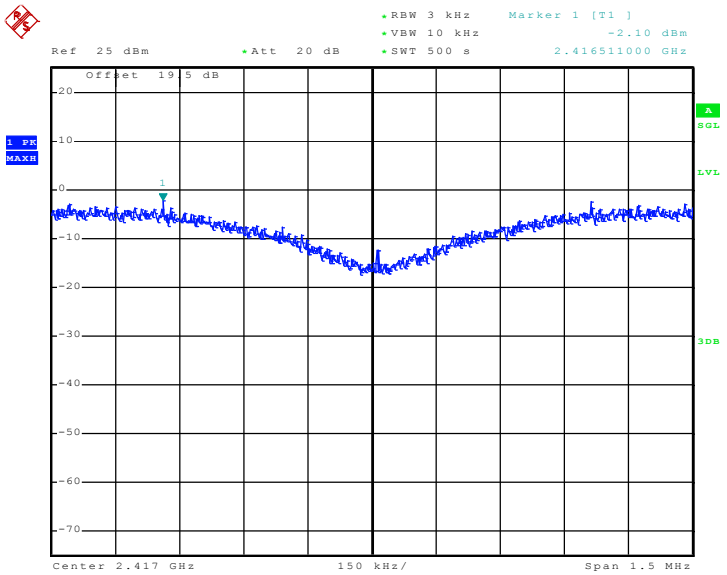
PSD Plot on 802.11b Channel 01 - Chain A+B(B)



Pra01

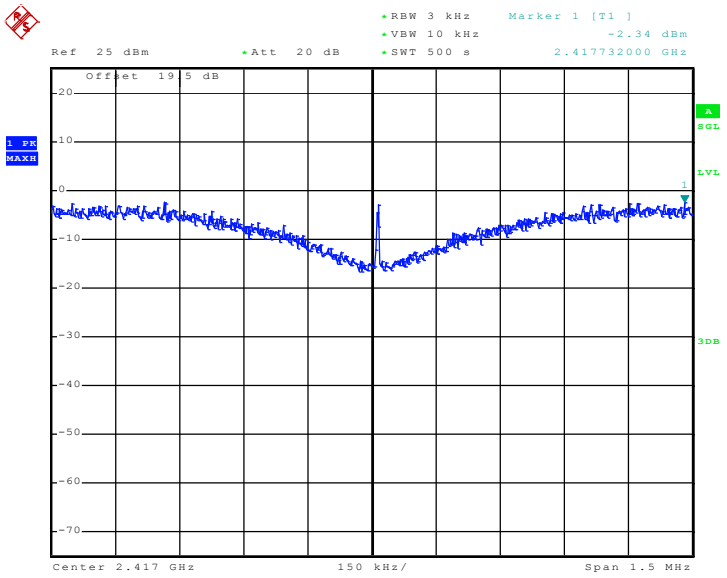
Date: 7.NOV.2010 15:49:07

PSD Plot on 802.11b Channel 02 - Chain A



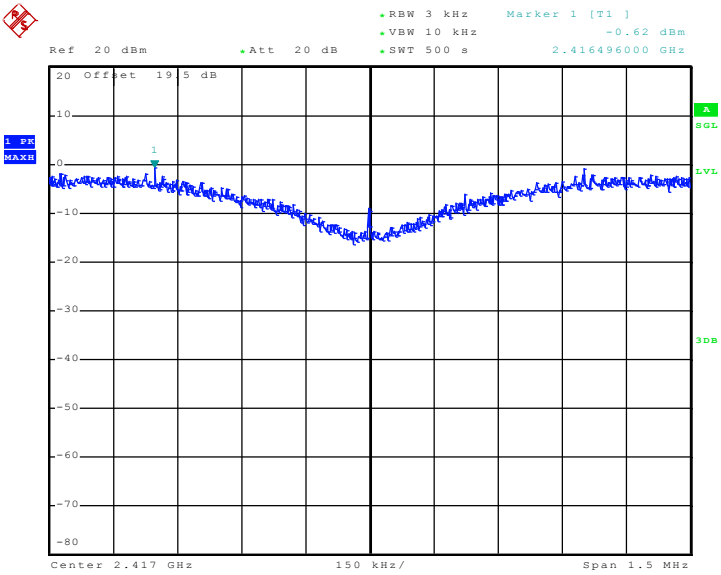
Date: 1.NOV.2010 01:05:07

PSD Plot on 802.11b Channel 02 - Chain B



Date: 1.NOV.2010 02:14:07

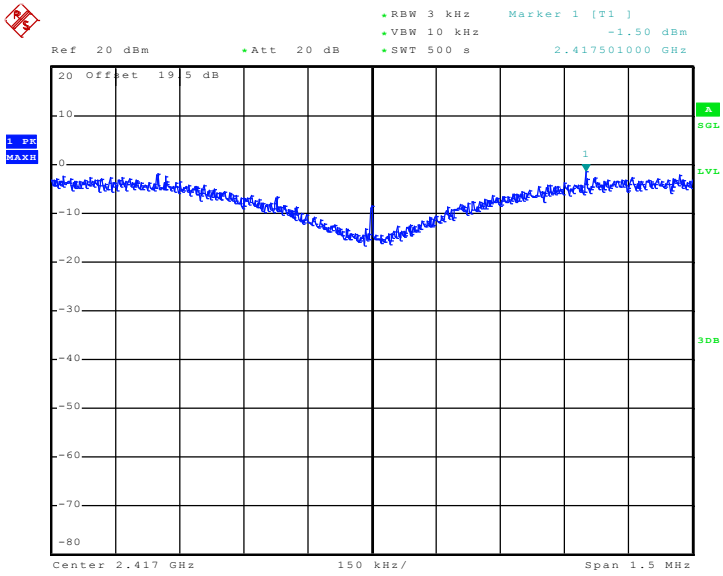
PSD Plot on 802.11b Channel 02 - Chain A+B(A)



Pra01

Date: 7.NOV.2010 16:14:52

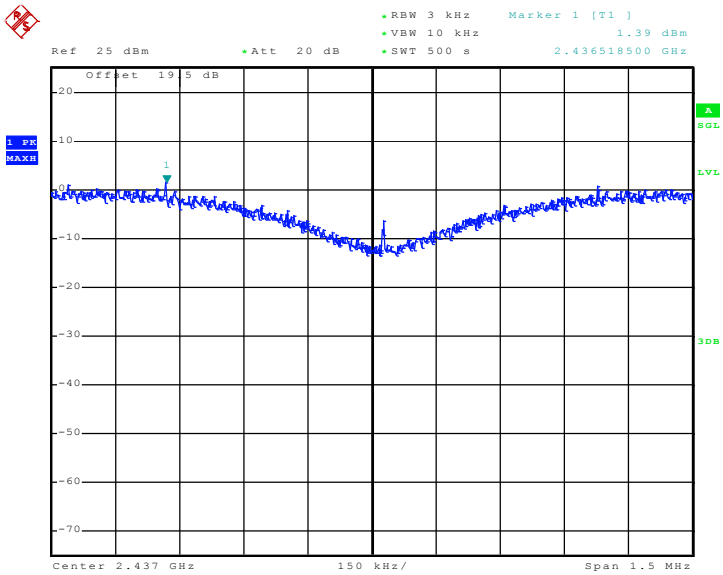
PSD Plot on 802.11b Channel 02 - Chain A+B(B)



Pra01

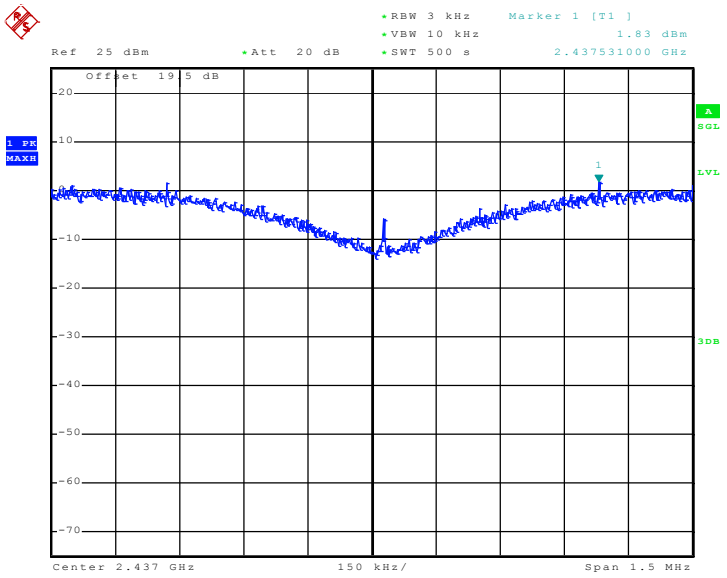
Date: 7.NOV.2010 16:01:41

PSD Plot on 802.11b Channel 06 - Chain A



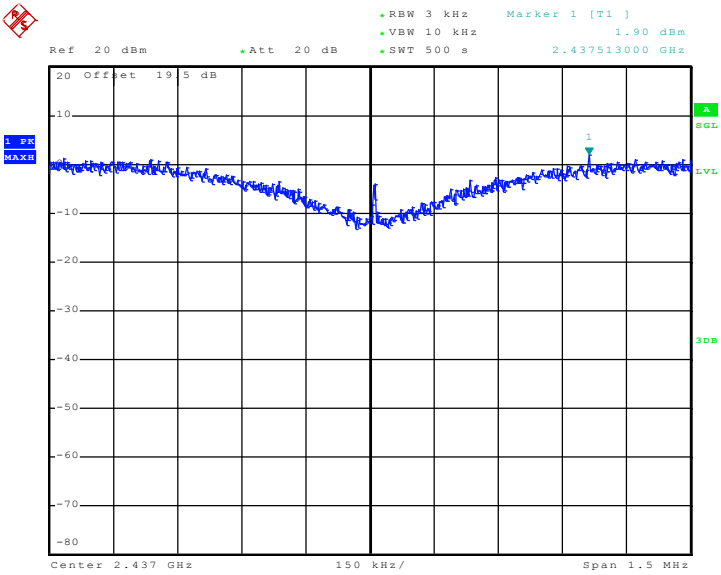
Date: 1.NOV.2010 01:14:14

PSD Plot on 802.11b Channel 06 - Chain B



Date: 1.NOV.2010 02:04:04

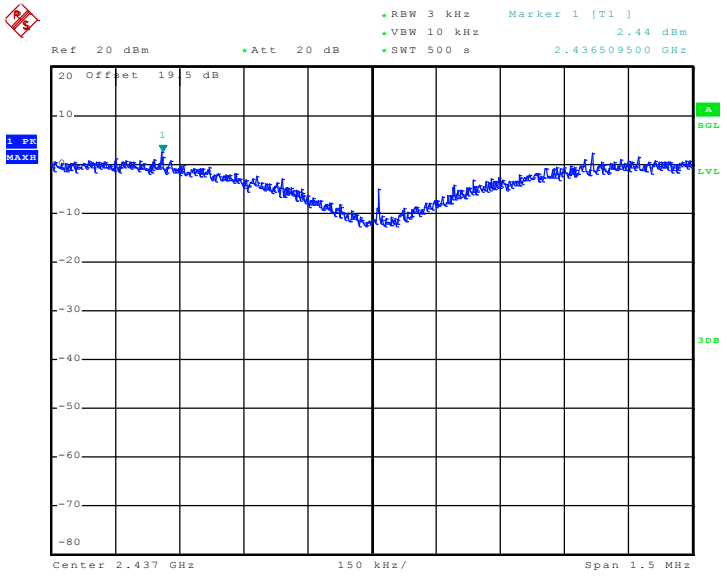
PSD Plot on 802.11b Channel 06 - Chain A+B(A)



Pra01

Date: 7.NOV.2010 16:26:01

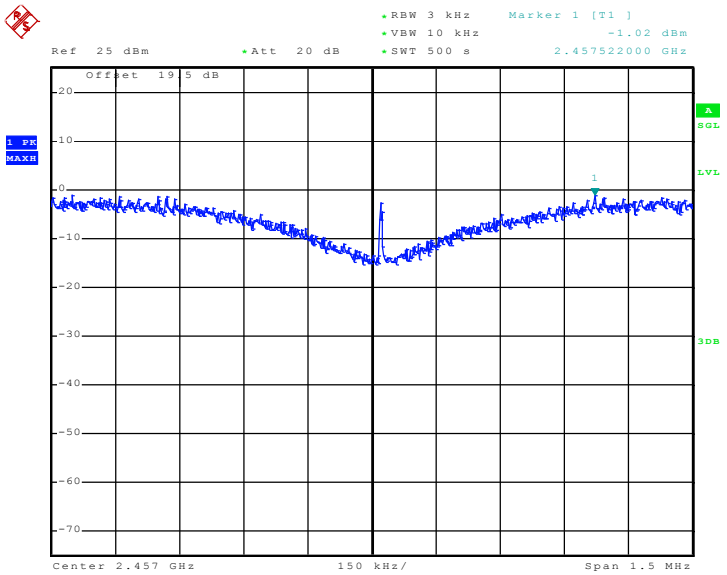
PSD Plot on 802.11b Channel 06 - Chain A+B(B)



Pra01

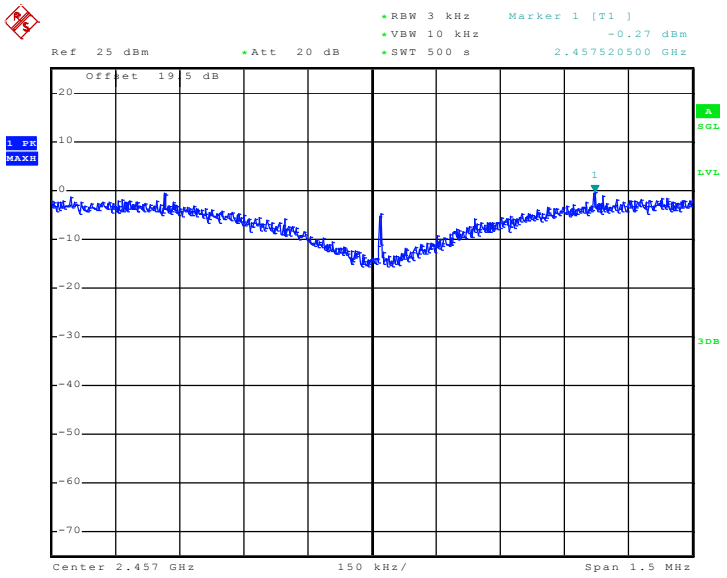
Date: 7.NOV.2010 16:36:58

PSD Plot on 802.11b Channel 10 - Chain A



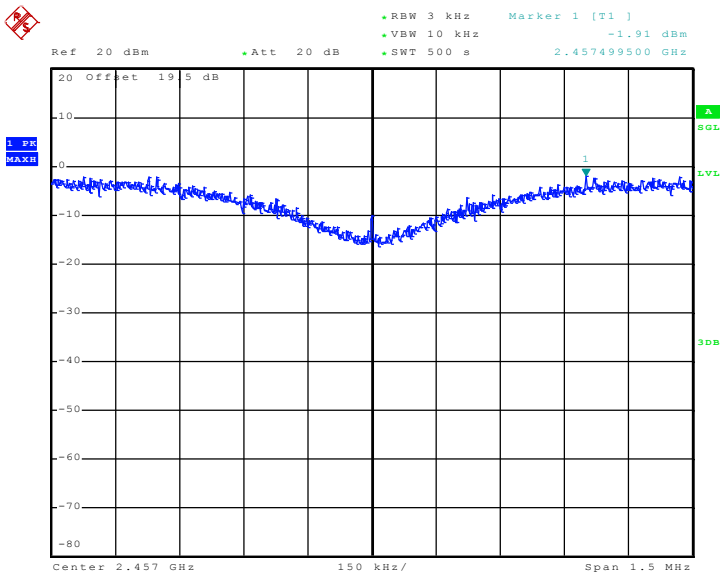
Date: 1.NOV.2010 01:24:34

PSD Plot on 802.11b Channel 10 - Chain B



Date: 1.NOV.2010 01:55:01

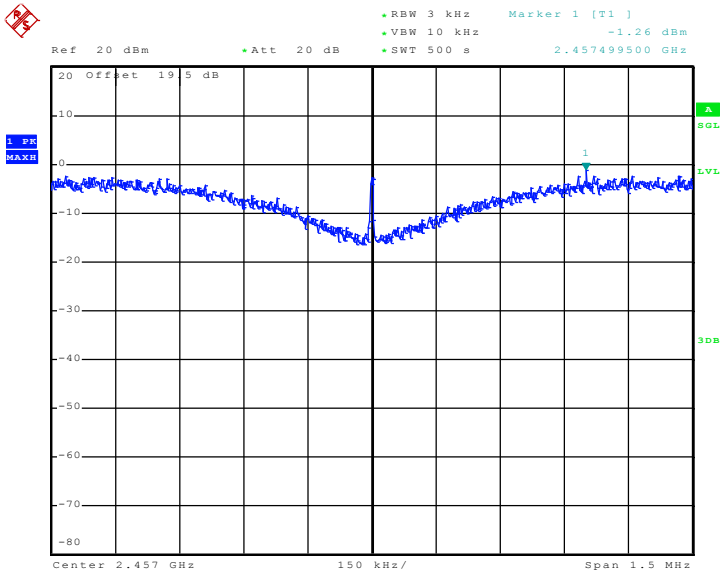
PSD Plot on 802.11b Channel 10 - Chain A+B(A)



Pra01

Date: 7.NOV.2010 17:01:57

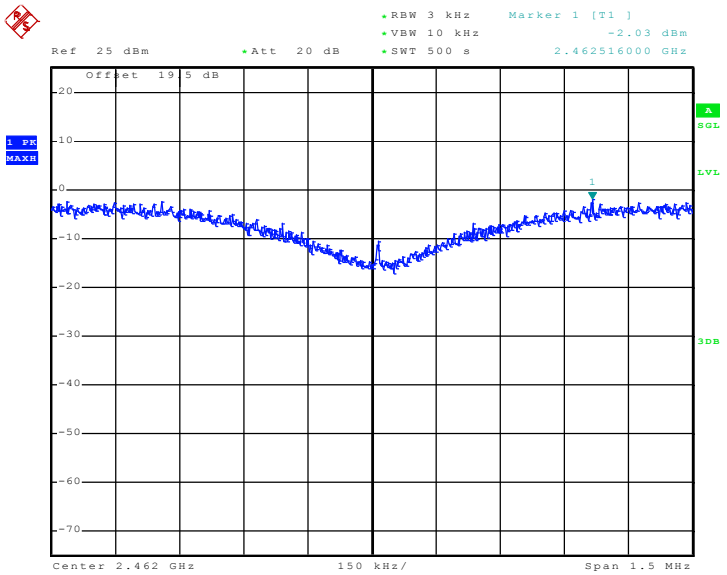
PSD Plot on 802.11b Channel 10 - Chain A+B(B)



Pra01

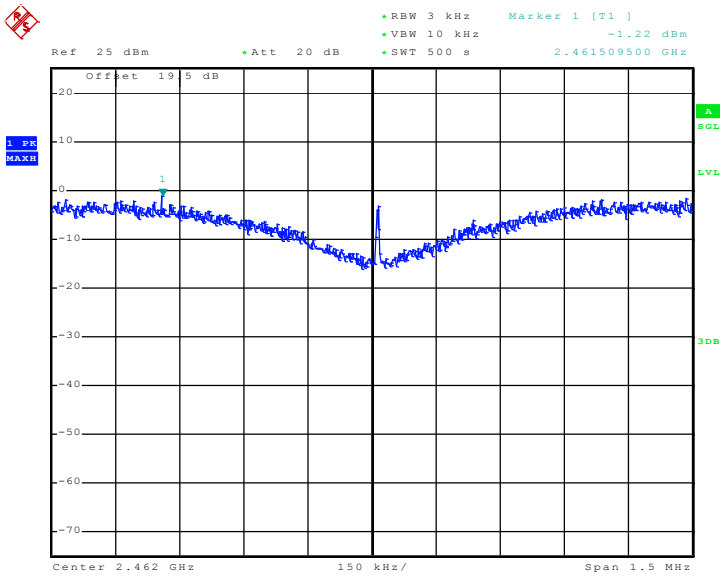
Date: 7.NOV.2010 16:50:59

PSD Plot on 802.11b Channel 11 - Chain A



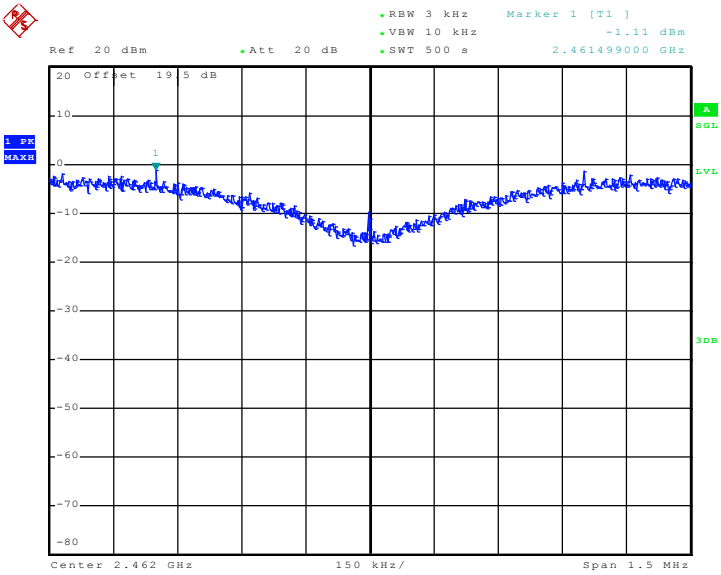
Date: 1.NOV.2010 01:35:21

PSD Plot on 802.11b Channel 11 - Chain B



Date: 1.NOV.2010 01:45:35

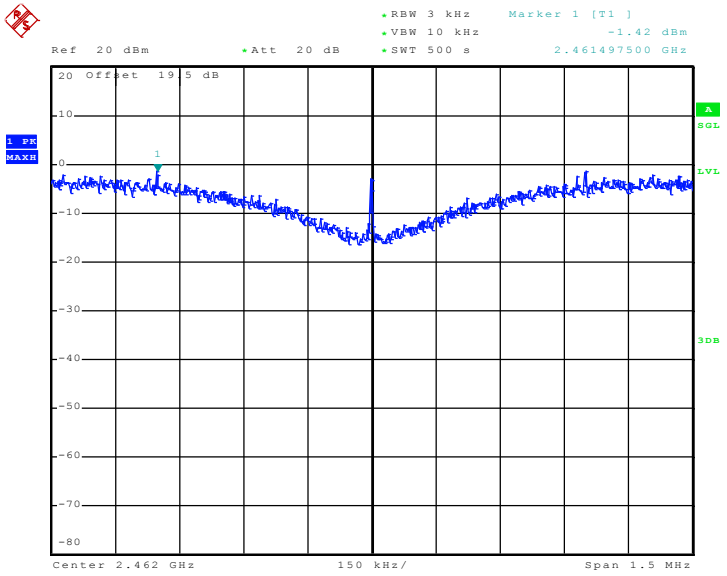
PSD Plot on 802.11b Channel 11 - Chain A+B(A)



Pra01

Date: 7.NOV.2010 17:14:02

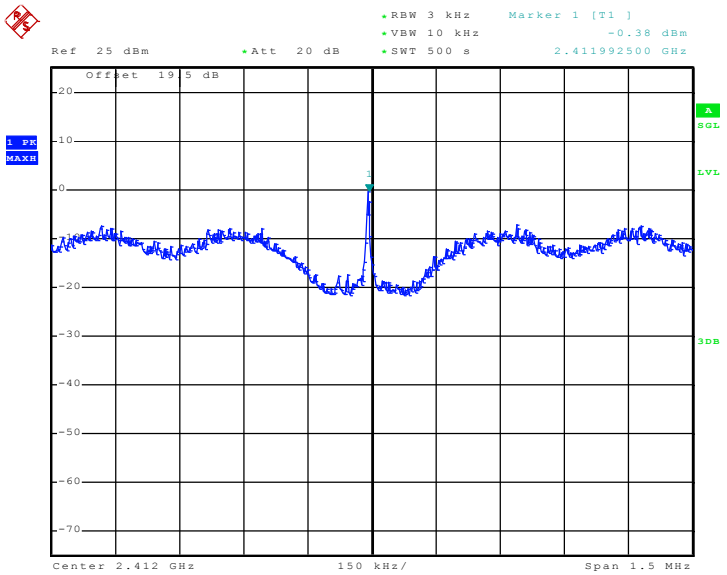
PSD Plot on 802.11b Channel 11 - Chain A+B(B)



Pra01

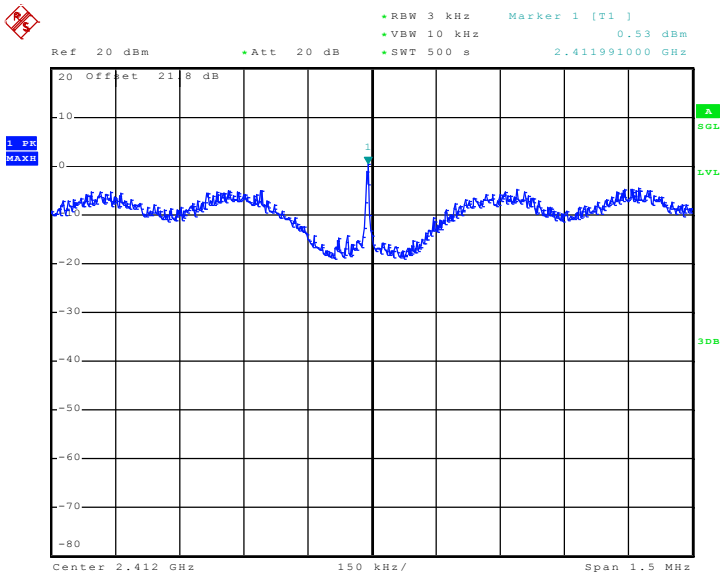
Date: 7.NOV.2010 17:25:32

PSD Plot on 802.11g Channel 01 - Chain A



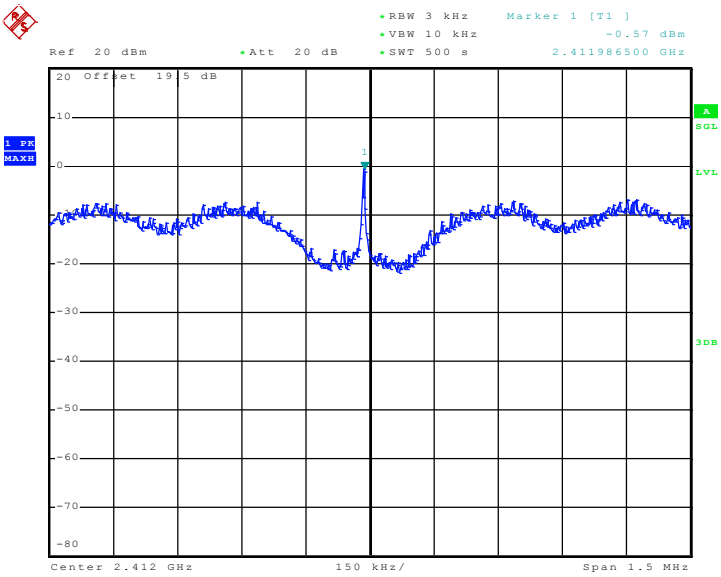
Date: 1.NOV.2010 02:58:44

PSD Plot on 802.11g Channel 01 - Chain B



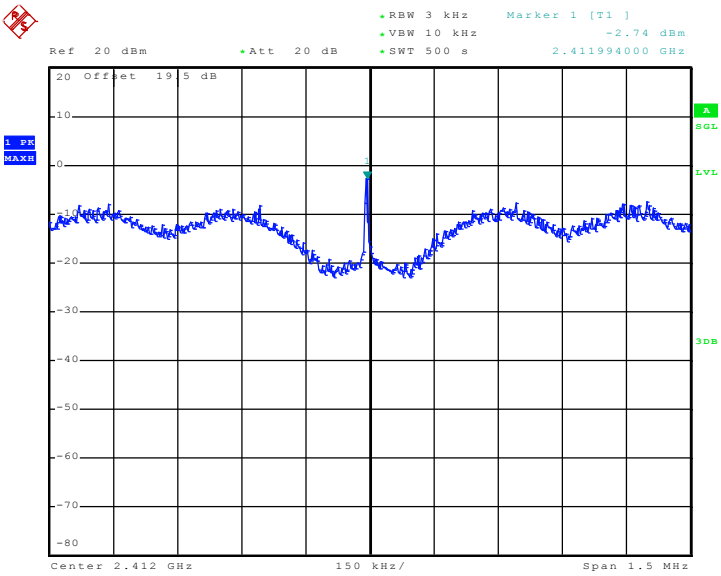
Date: 17.NOV.2010 18:20:50

PSD Plot on 802.11g Channel 01 - Chain A+B(A)



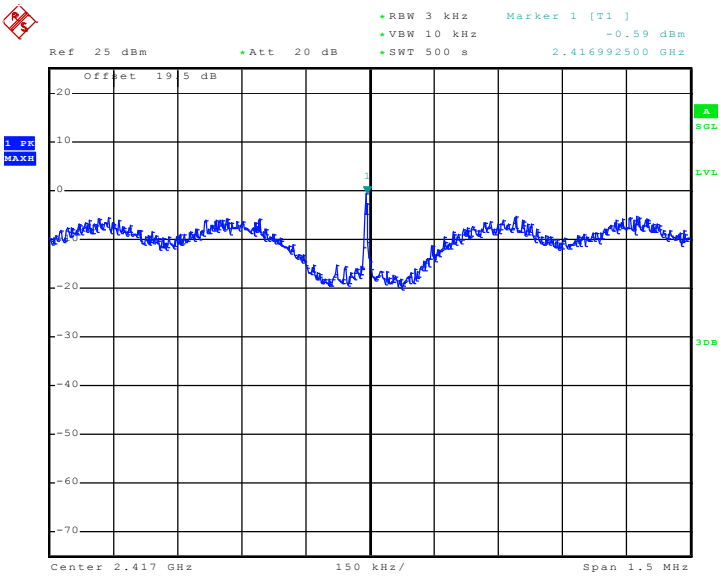
Date: 8.NOV.2010 09:30:15

PSD Plot on 802.11g Channel 01 - Chain A+B(B)



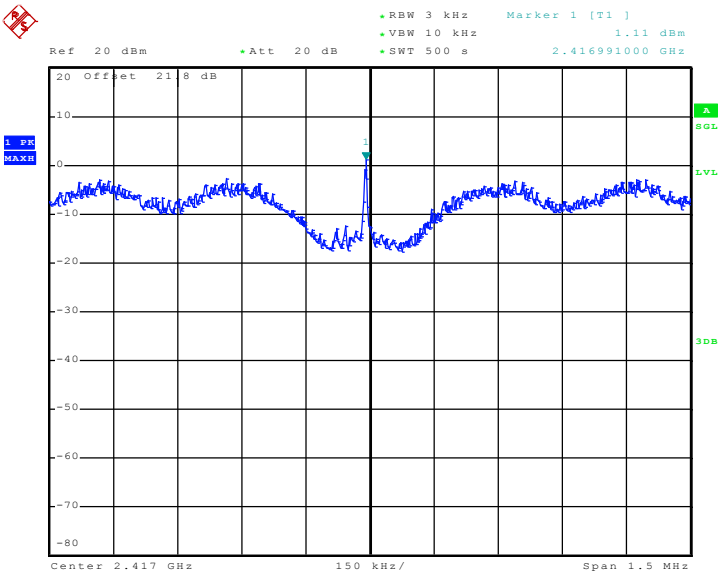
Date: 8.NOV.2010 09:46:07

PSD Plot on 802.11g Channel 02 - Chain A



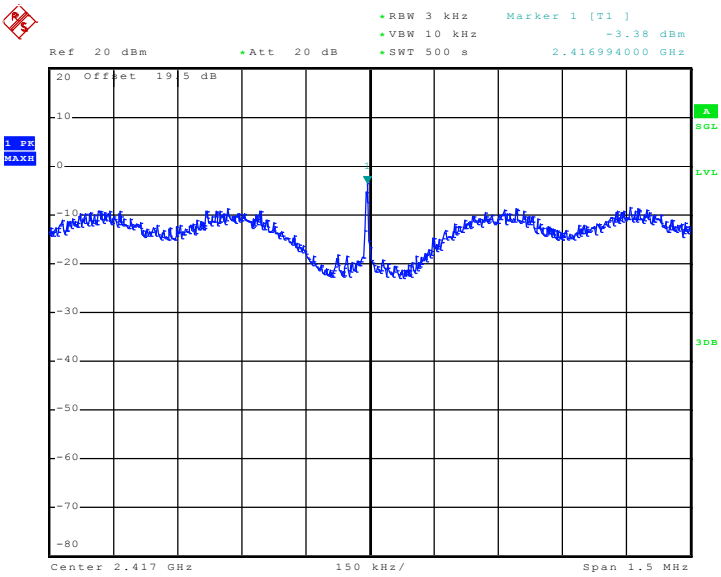
Date: 1.NOV.2010 03:11:05

PSD Plot on 802.11g Channel 02 - Chain B



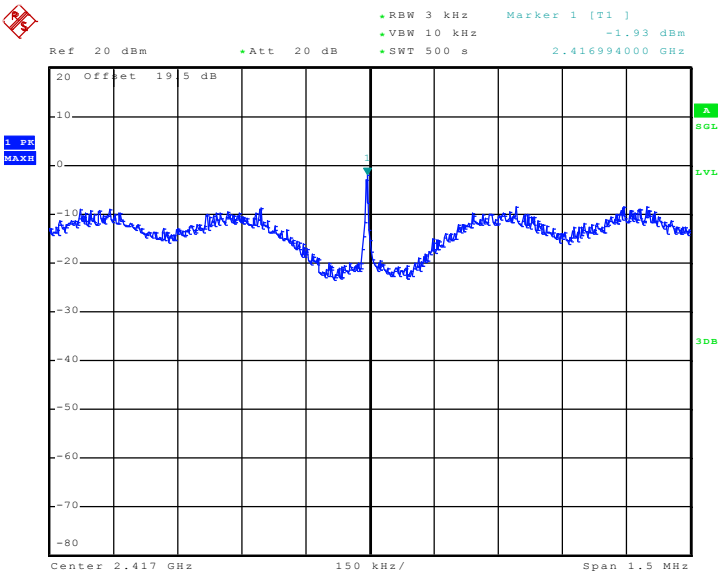
Date: 17.NOV.2010 18:31:18

PSD Plot on 802.11g Channel 02 - Chain A+B(A)



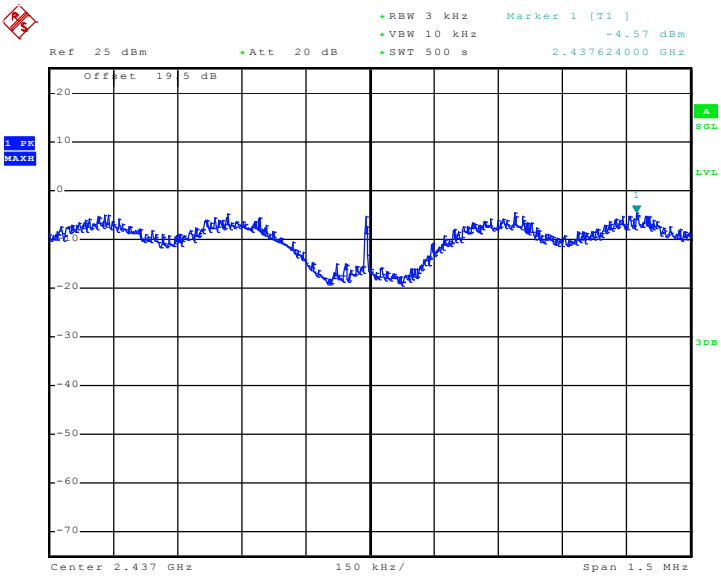
Date: 8.NOV.2010 10:14:21

PSD Plot on 802.11g Channel 02 - Chain A+B(B)



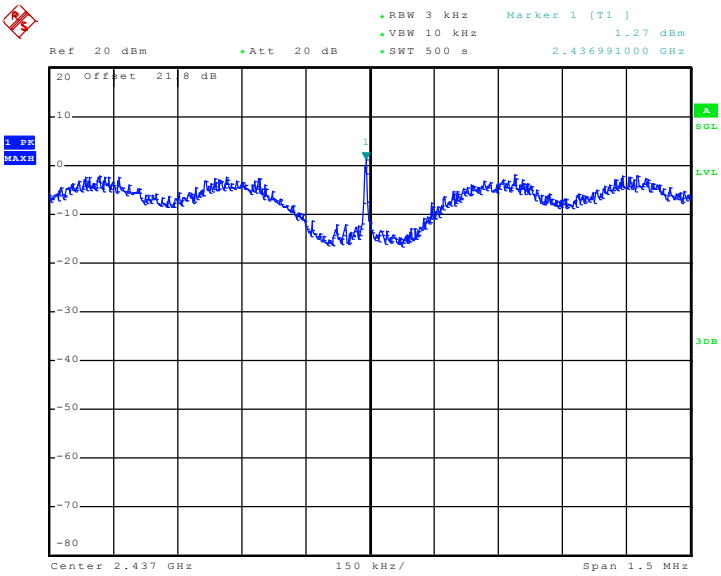
Date: 8.NOV.2010 09:59:55

PSD Plot on 802.11g Channel 06 - Chain A



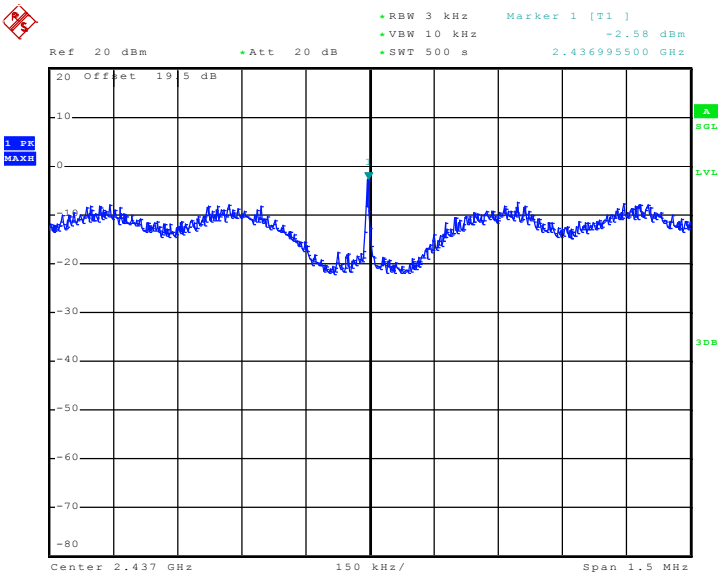
Date: 1.NOV.2010 03:24:30

PSD Plot on 802.11g Channel 06 - Chain B



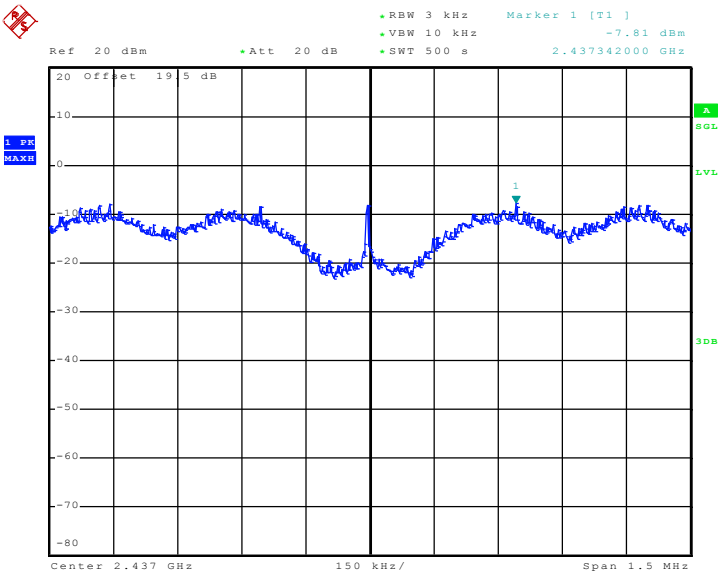
Date: 17.NOV.2010 18:45:46

PSD Plot on 802.11g Channel 06 - Chain A+B(A)



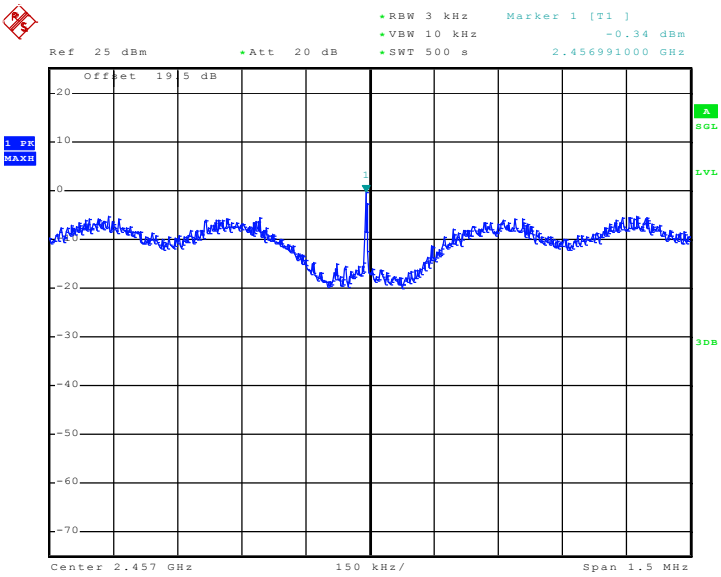
Date: 8.NOV.2010 10:26:45

PSD Plot on 802.11g Channel 06 - Chain A+B(B)



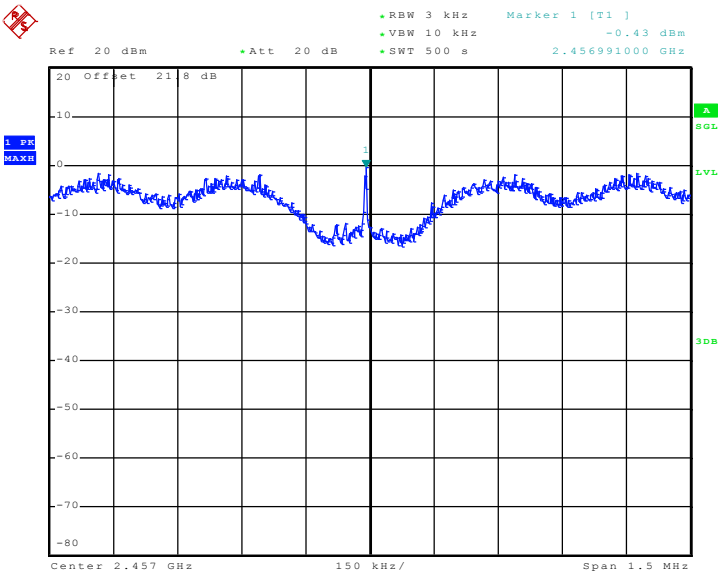
Date: 8.NOV.2010 10:39:44

PSD Plot on 802.11g Channel 10 - Chain A



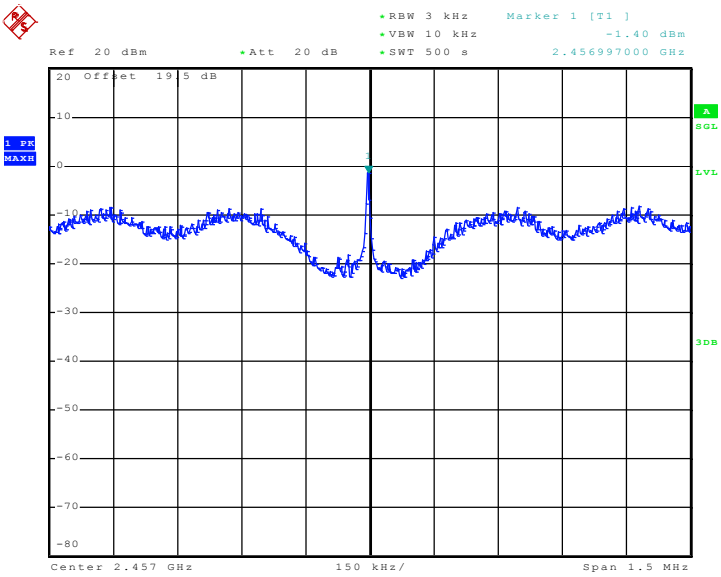
Date: 1.NOV.2010 03:38:13

PSD Plot on 802.11g Channel 10 - Chain B



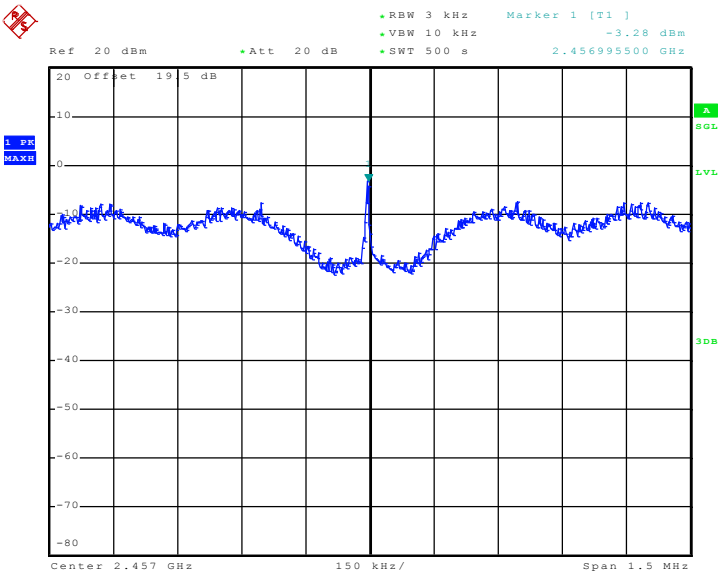
Date: 17.NOV.2010 18:57:14

PSD Plot on 802.11g Channel 10 - Chain A+B(A)



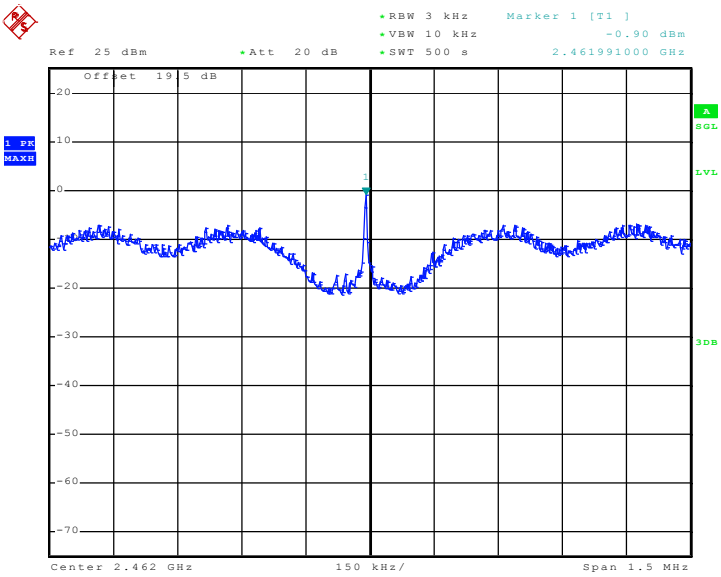
Date: 8.NOV.2010 11:25:29

PSD Plot on 802.11g Channel 10 - Chain A+B(B)



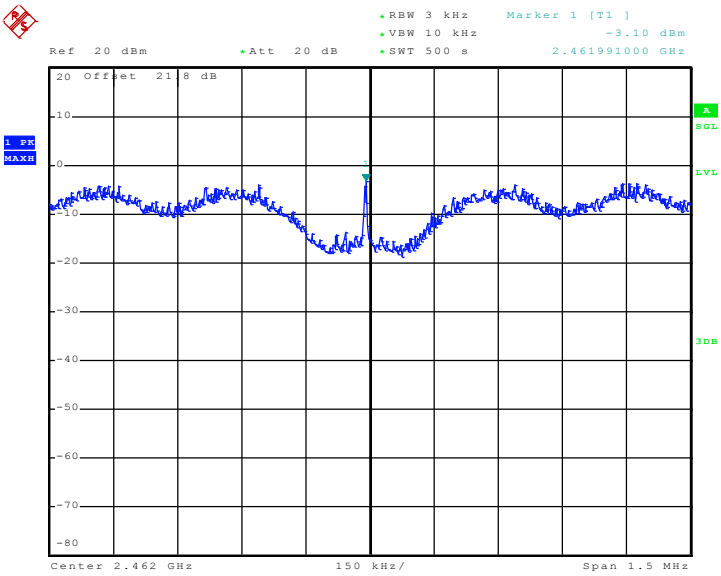
Date: 8.NOV.2010 10:52:31

PSD Plot on 802.11g Channel 11 - Chain A



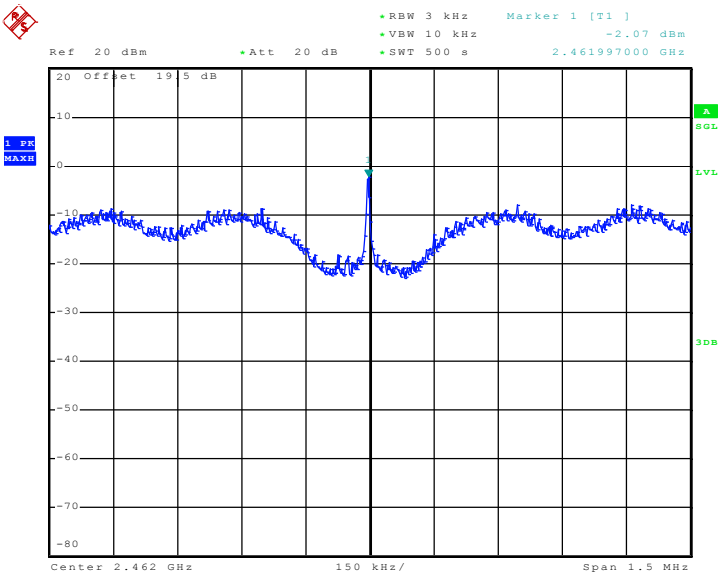
Date: 1.NOV.2010 03:52:44

PSD Plot on 802.11g Channel 11 - Chain B



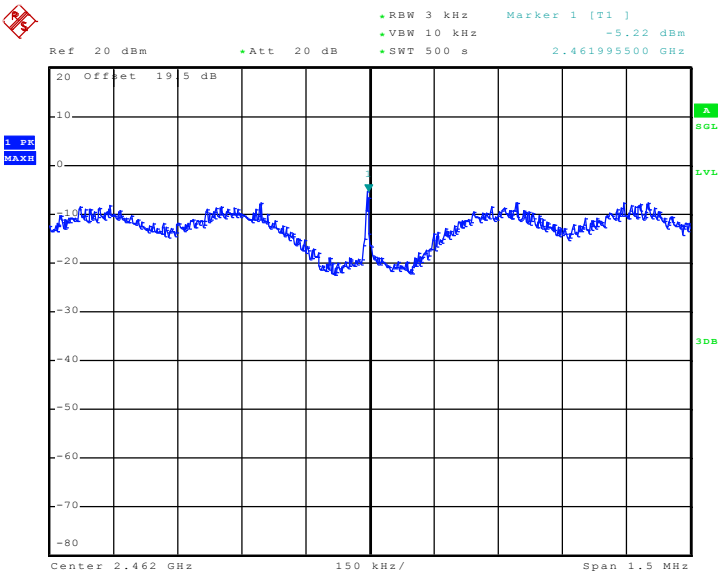
Date: 17.NOV.2010 19:10:21

PSD Plot on 802.11g Channel 11 - Chain A+B(A)



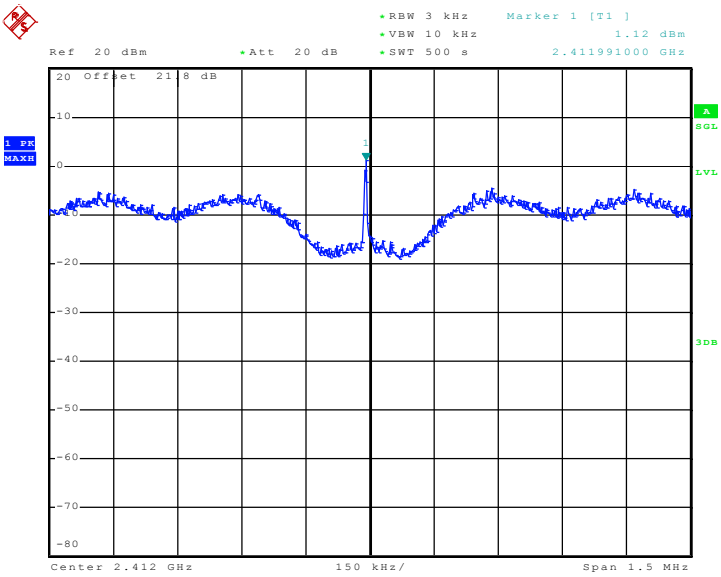
Date: 8.NOV.2010 12:30:22

PSD Plot on 802.11g Channel 11 - Chain A+B(B)



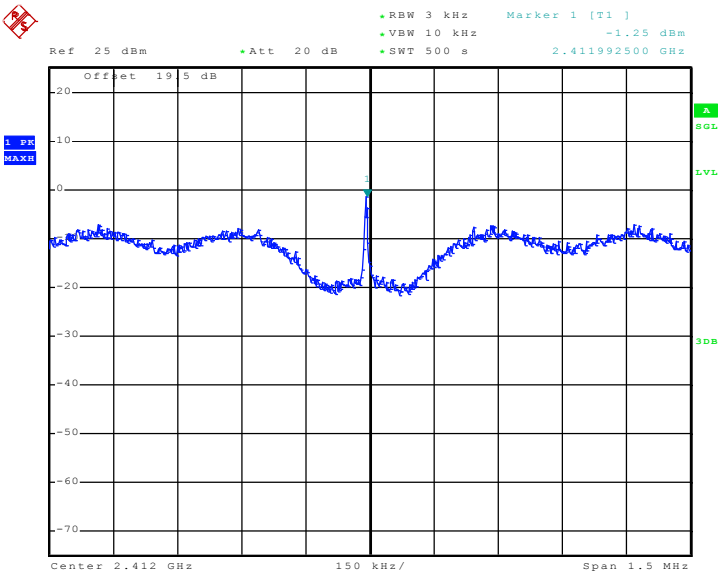
Date: 8.NOV.2010 12:44:38

PSD Plot on 802.11n (BW 20MHz) Channel 01 - Chain A



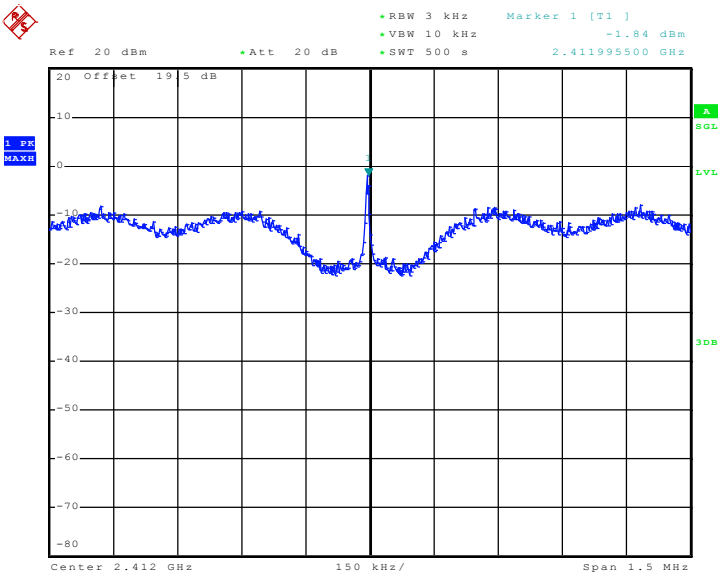
Date: 17.NOV.2010 16:39:37

PSD Plot on 802.11n (BW 20MHz) Channel 01 - Chain B



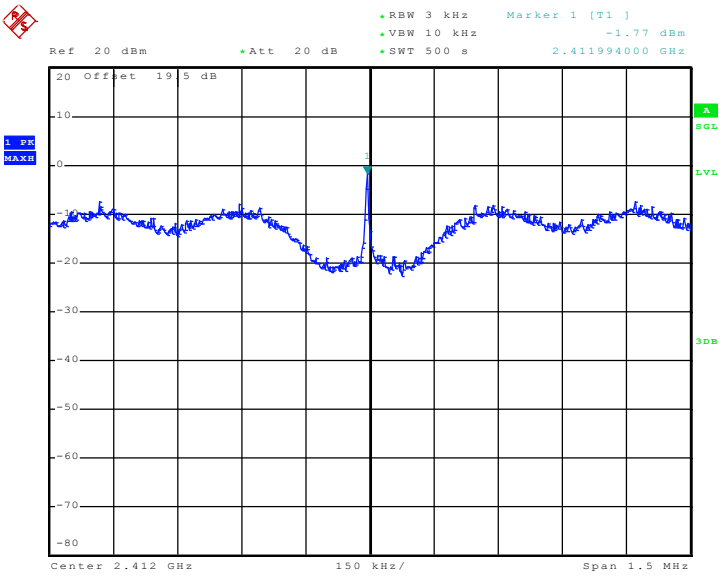
Date: 1.NOV.2010 04:07:30

PSD Plot on 802.11n (BW 20MHz) Channel 01 - Chain A+B(A)



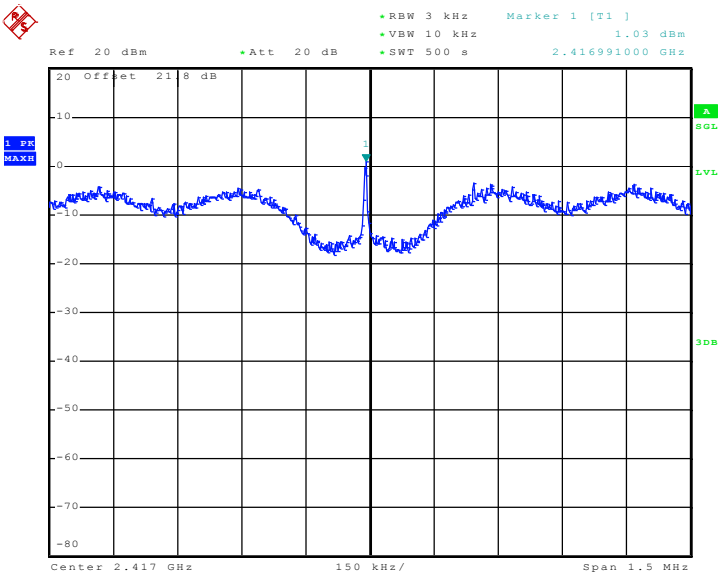
Date: 8.NOV.2010 13:38:12

PSD Plot on 802.11n (BW 20MHz) Channel 01 - Chain A+B(B)



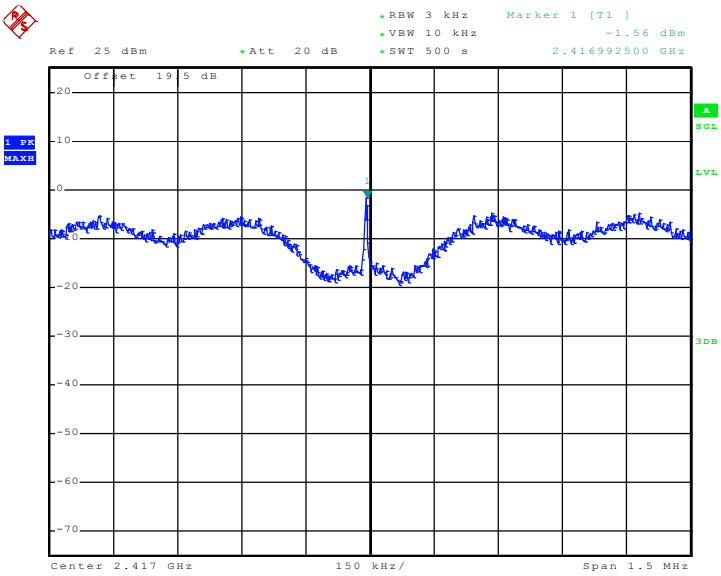
Date: 8.NOV.2010 13:59:51

PSD Plot on 802.11n (BW 20MHz) Channel 02 - Chain A



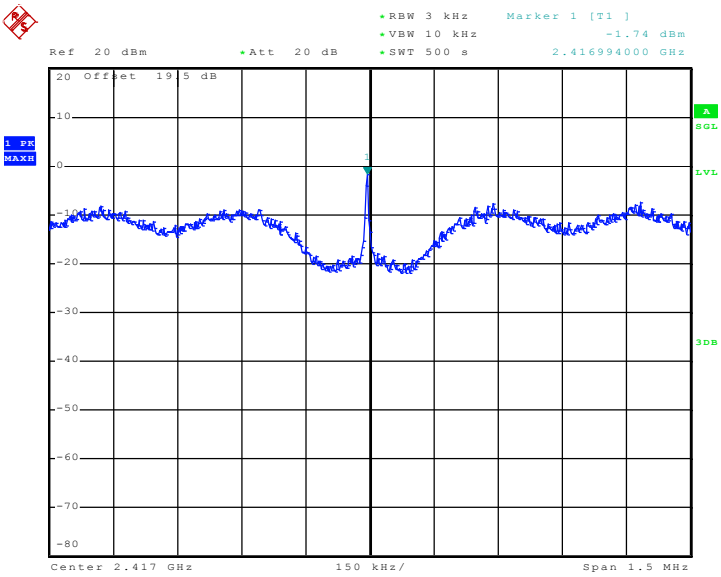
Date: 17.NOV.2010 16:54:12

PSD Plot on 802.11n (BW 20MHz) Channel 02 - Chain B



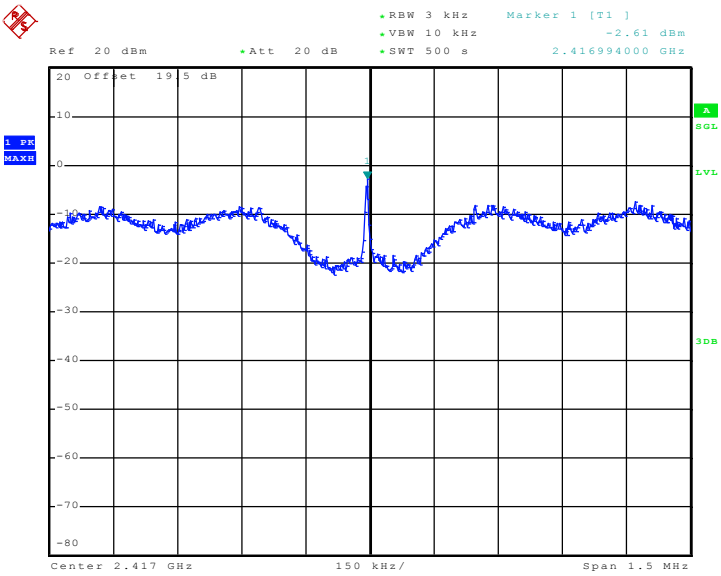
Date: 1.NOV.2010 04:19:11

PSD Plot on 802.11n (BW 20MHz) Channel 02 - Chain A+B(A)



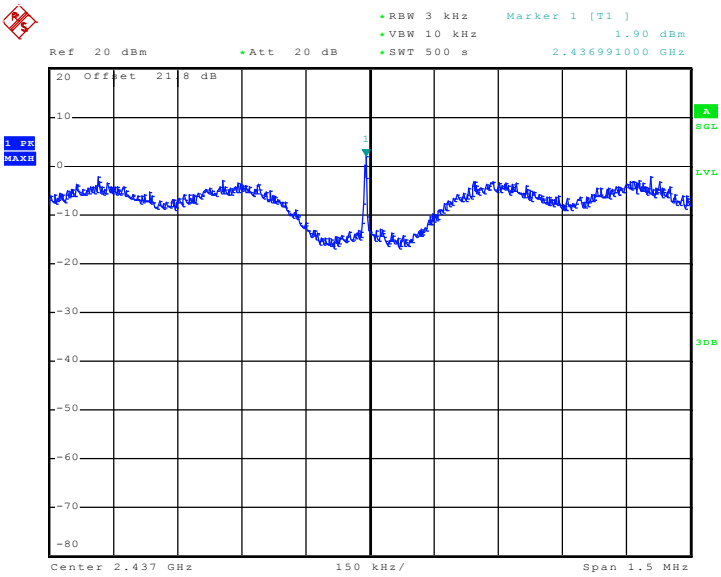
Date: 8.NOV.2010 14:16:32

PSD Plot on 802.11n (BW 20MHz) Channel 02 - Chain A+B(B)



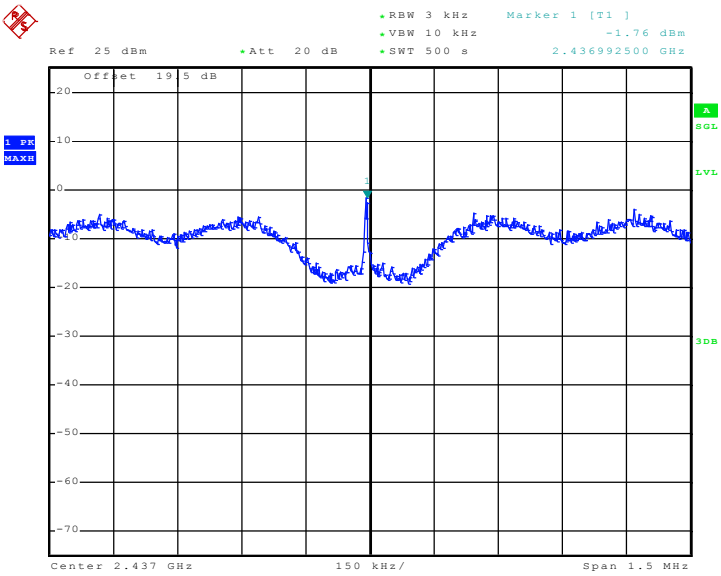
Date: 8.NOV.2010 14:29:55

PSD Plot on 802.11n (BW 20MHz) Channel 06 - Chain A



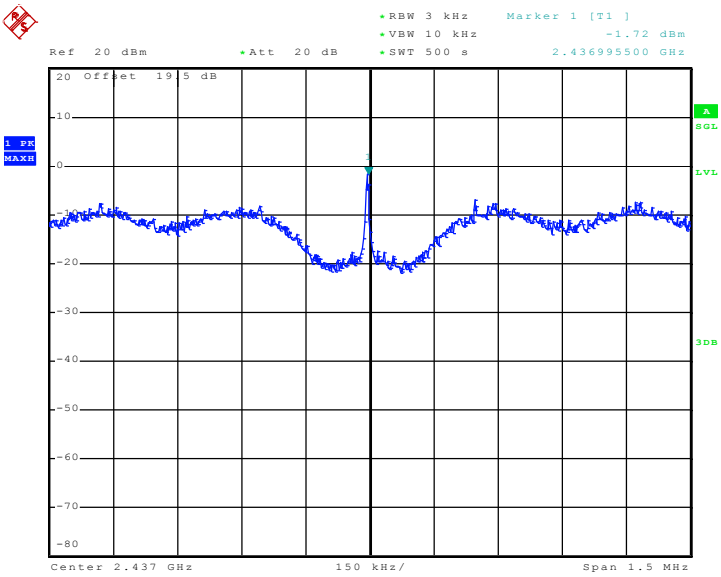
Date: 17.NOV.2010 17:06:09

PSD Plot on 802.11n (BW 20MHz) Channel 06 - Chain B



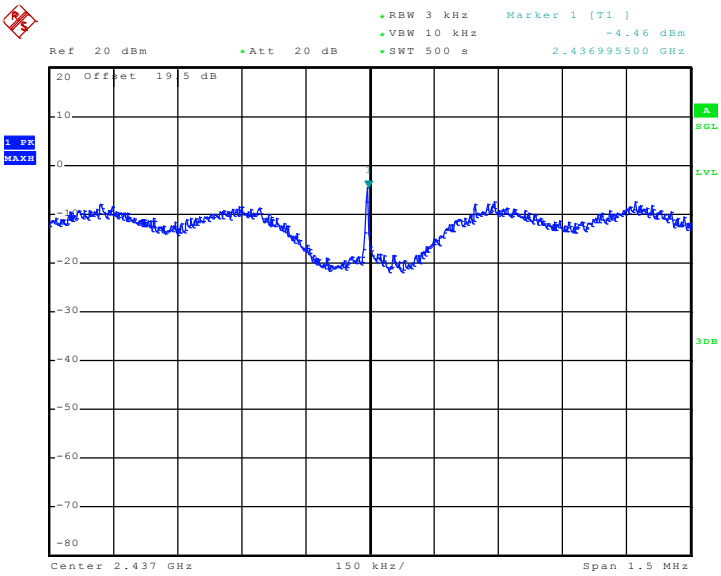
Date: 1.NOV.2010 04:32:00

PSD Plot on 802.11n (BW 20MHz) Channel 06 - Chain A+B(A)



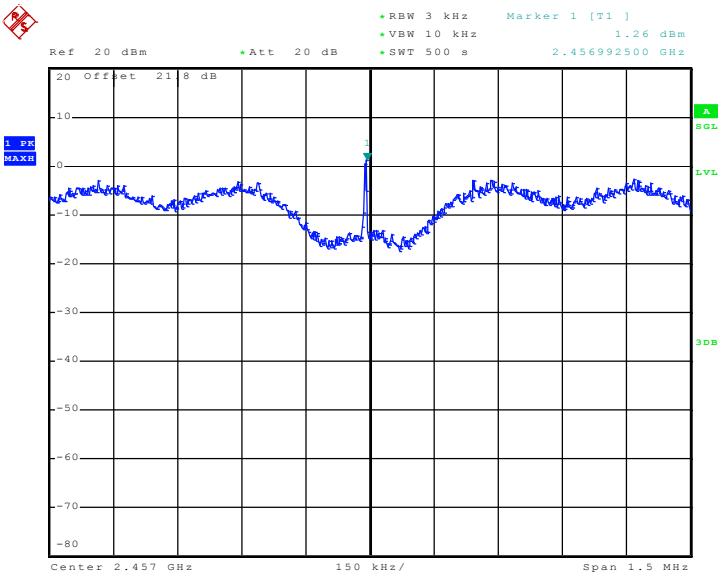
Date: 8.NOV.2010 15:00:19

PSD Plot on 802.11n (BW 20MHz) Channel 06 - Chain A+B(B)



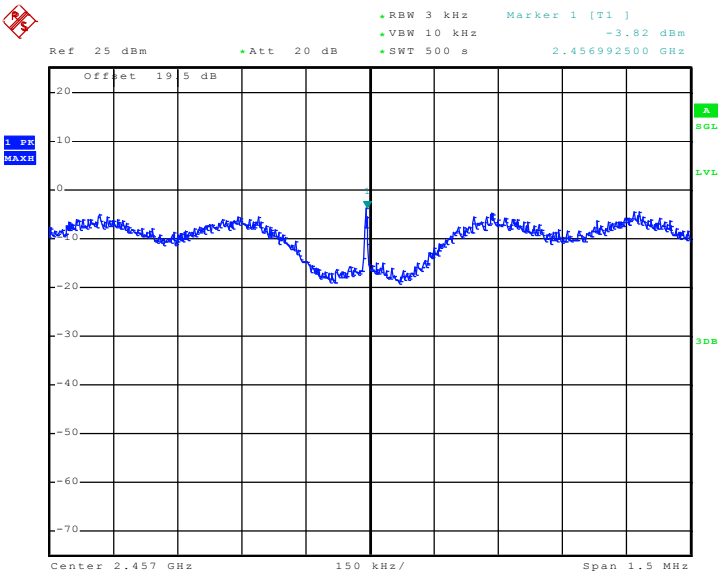
Date: 8.NOV.2010 14:43:12

PSD Plot on 802.11n (BW 20MHz) Channel 10 - Chain A



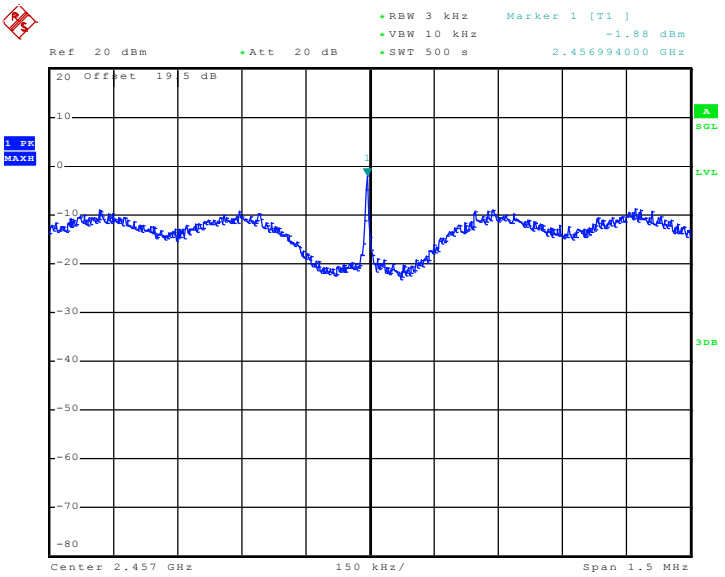
Date: 17.NOV.2010 17:17:56

PSD Plot on 802.11n (BW 20MHz) Channel 10 - Chain B



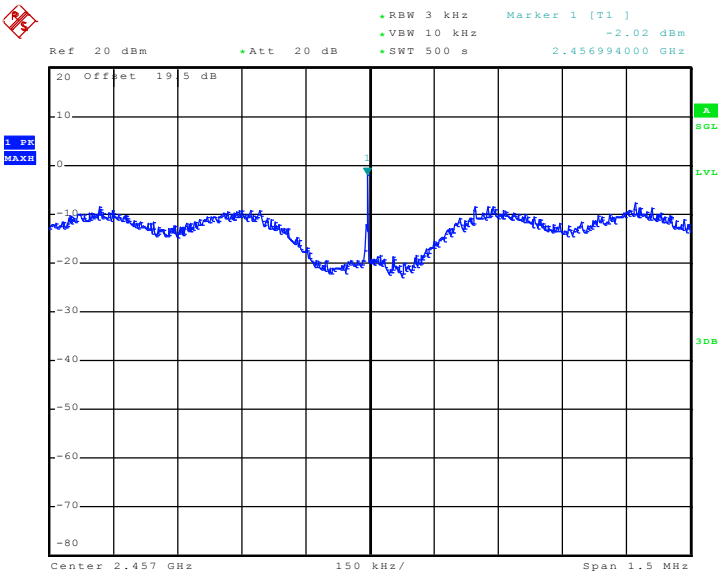
Date: 1.NOV.2010 04:46:25

PSD Plot on 802.11n (BW 20MHz) Channel 10 - Chain A+B(A)



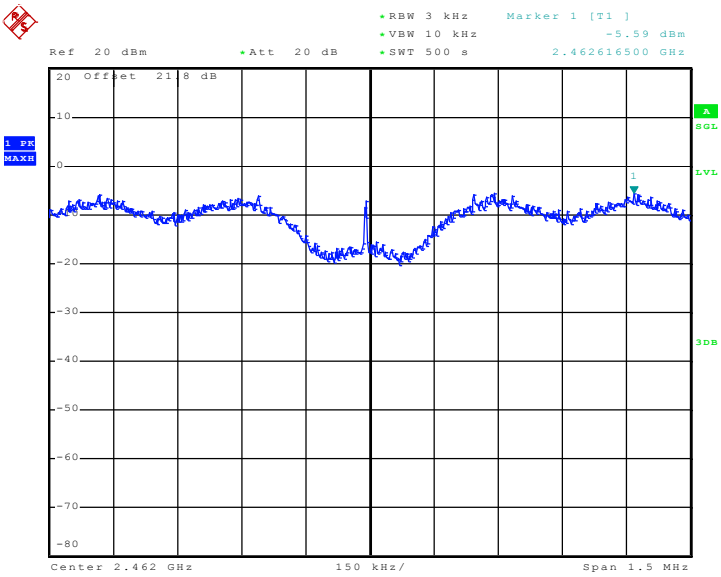
Date: 8.NOV.2010 15:13:06

PSD Plot on 802.11n (BW 20MHz) Channel 10 - Chain A+B(B)



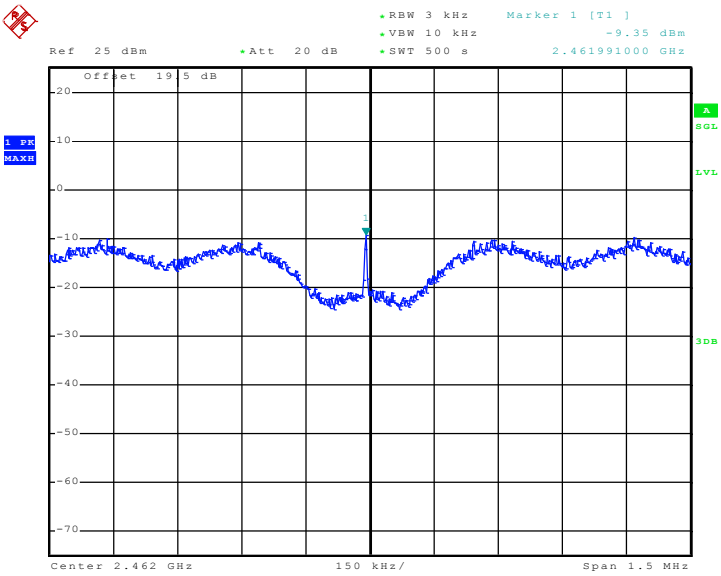
Date: 8.NOV.2010 15:35:02

PSD Plot on 802.11n (BW 20MHz) Channel 11 - Chain A



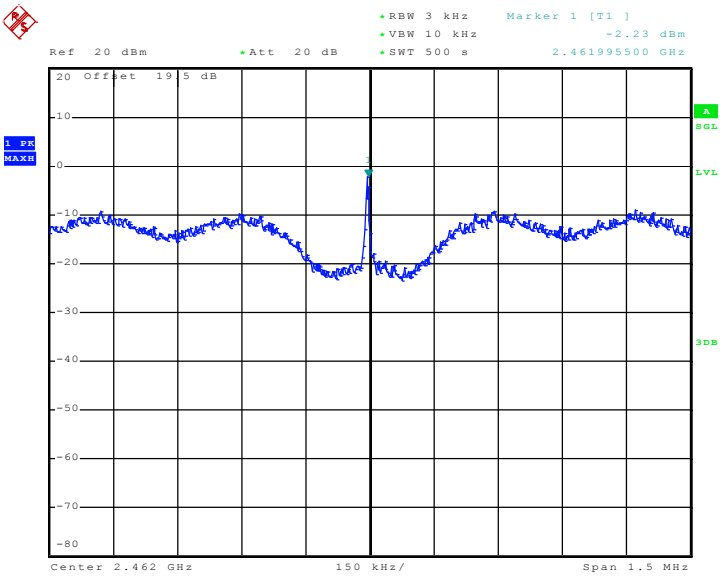
Date: 17.NOV.2010 17:35:33

PSD Plot on 802.11n (BW 20MHz) Channel 11 - Chain B



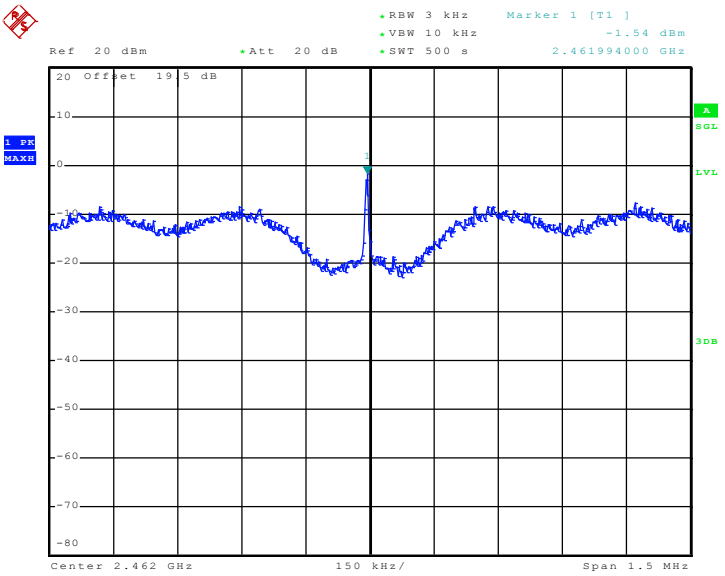
Date: 1.NOV.2010 04:59:38

PSD Plot on 802.11n (BW 20MHz) Channel 11 - Chain A+B(A)



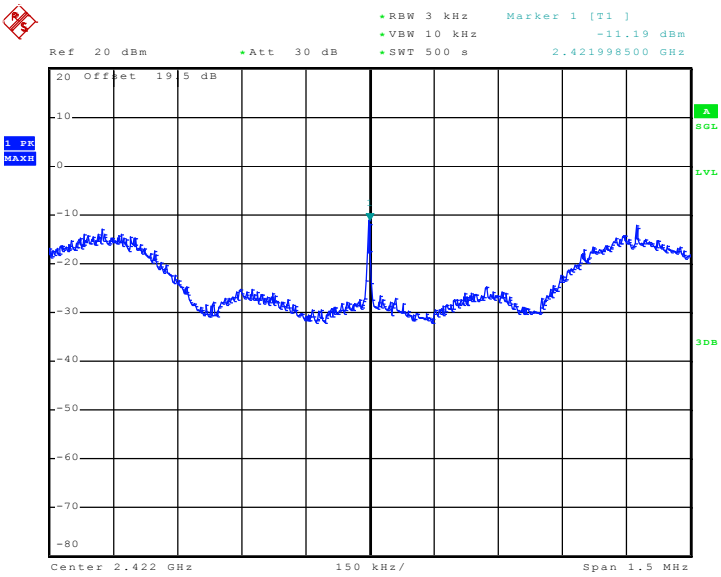
Date: 8.NOV.2010 16:03:09

PSD Plot on 802.11n (BW 20MHz) Channel 11 - Chain A+B(B)



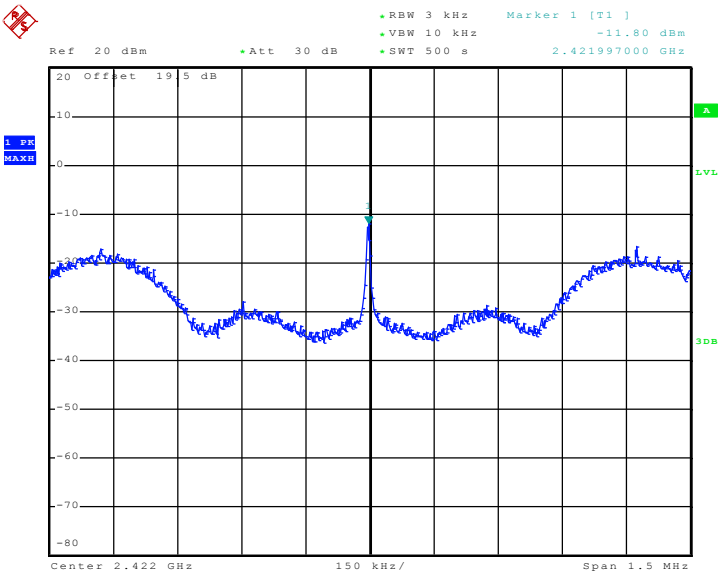
Date: 8.NOV.2010 15:49:35

PSD Plot on 802.11n (BW 40MHz) Channel 03 - Chain A



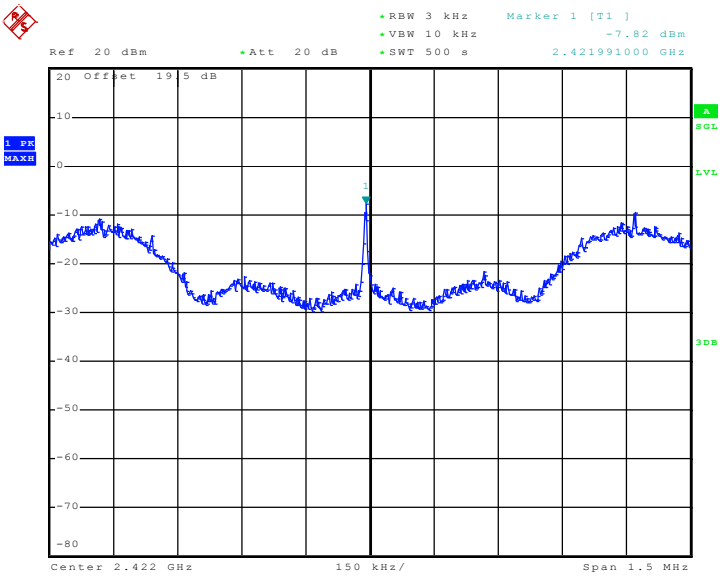
Date: 8.OCT.2010 11:46:07

PSD Plot on 802.11n (BW 40MHz) Channel 03 - Chain B



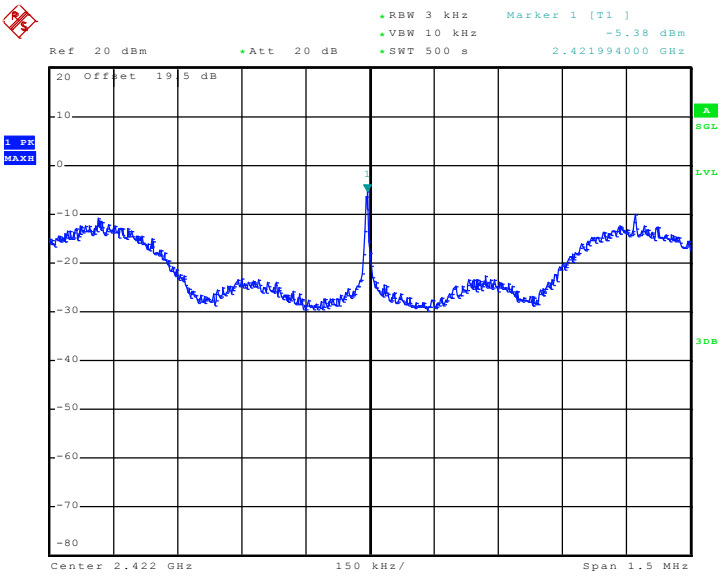
Date: 8.OCT.2010 05:19:13

PSD Plot on 802.11n (BW 40MHz) Channel 03 - Chain A+B(A)



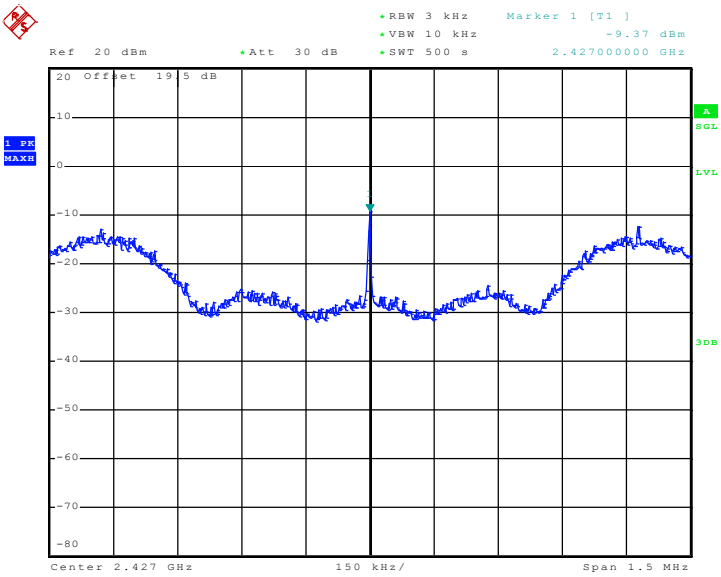
Date: 10.NOV.2010 08:02:32

PSD Plot on 802.11n (BW 40MHz) Channel 03 - Chain A+B(B)



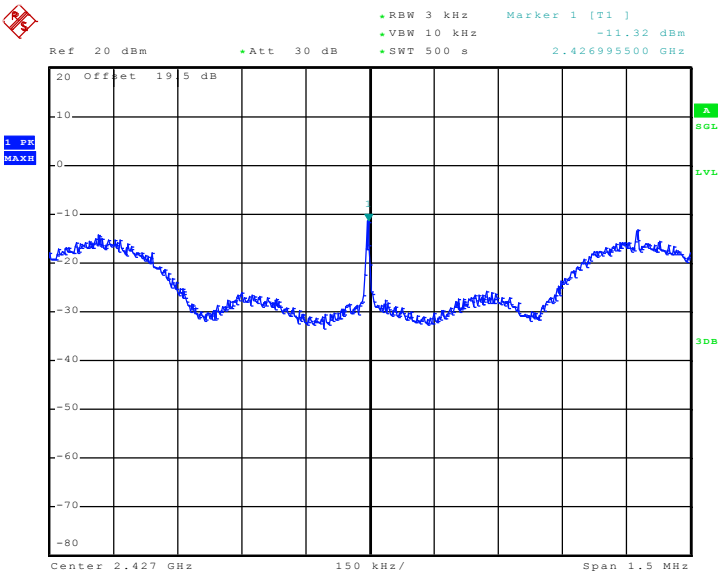
Date: 10.NOV.2010 08:12:27

PSD Plot on 802.11n (BW 40MHz) Channel 04 - Chain A



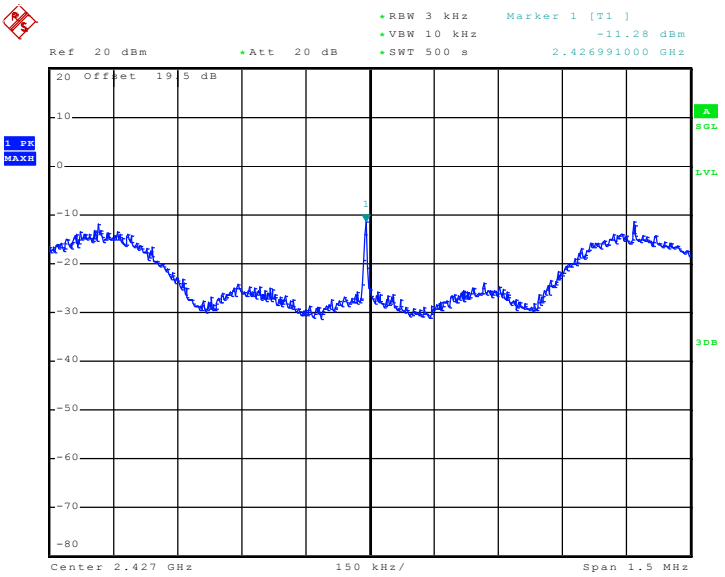
Date: 8.OCT.2010 12:28:34

PSD Plot on 802.11n (BW 40MHz) Channel 04 - Chain B



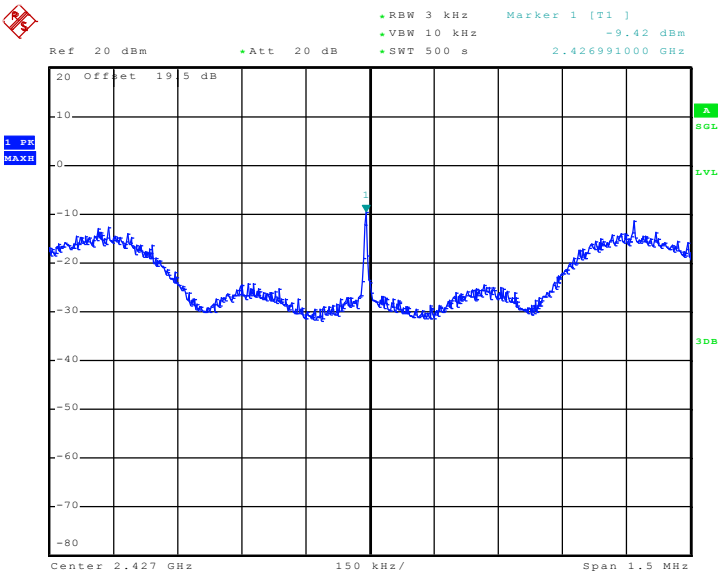
Date: 8.OCT.2010 06:00:18

PSD Plot on 802.11n (BW 40MHz) Channel 04 - Chain A+B(A)



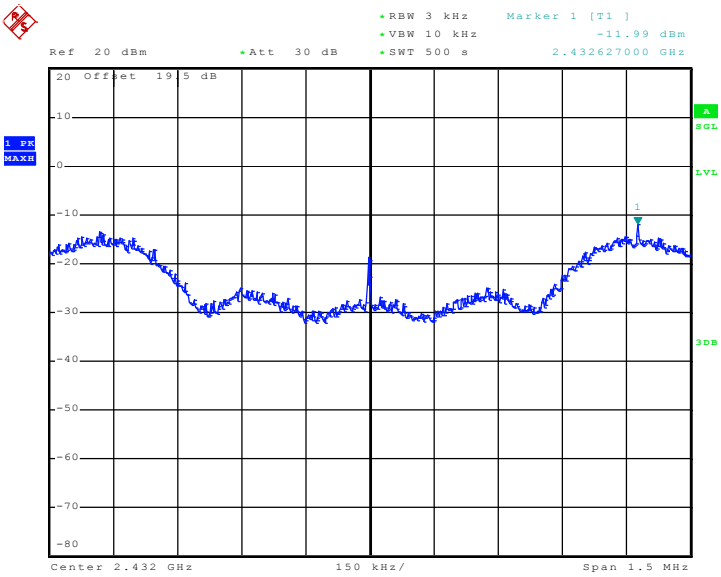
Date: 9.NOV.2010 19:52:07

PSD Plot on 802.11n (BW 40MHz) Channel 04 - Chain A+B(B)



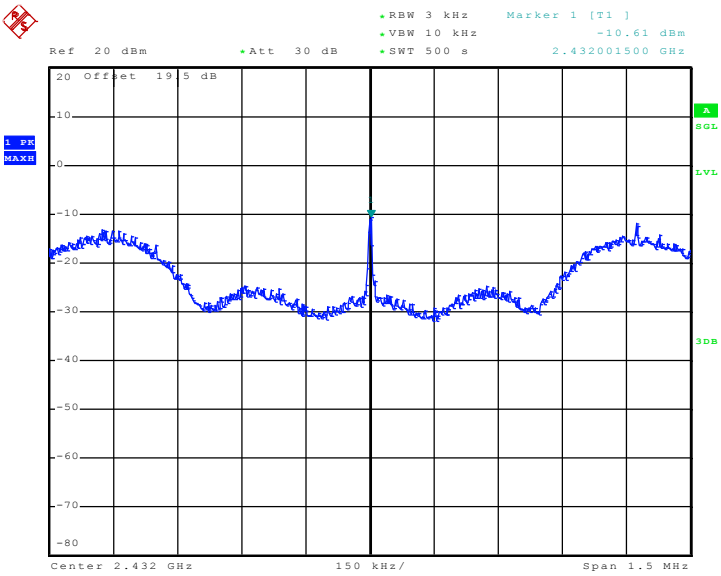
Date: 9.NOV.2010 19:06:39

PSD Plot on 802.11n (BW 40MHz) Channel 05 - Chain A



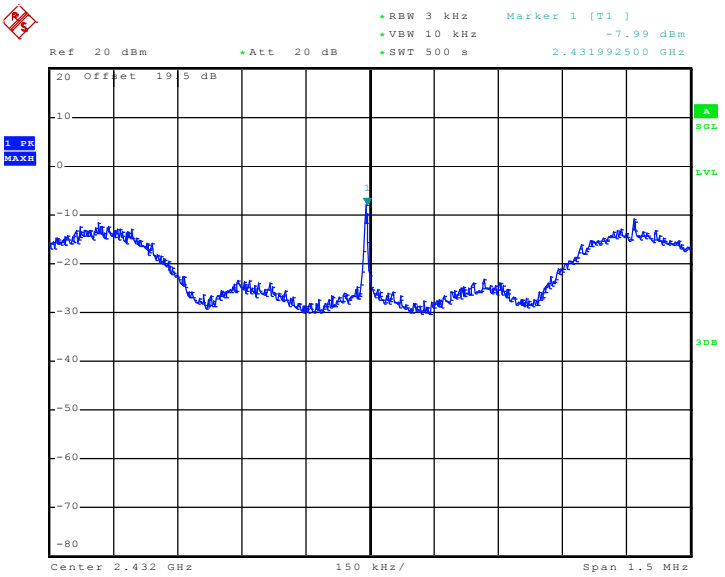
Date: 8.OCT.2010 08:21:21

PSD Plot on 802.11n (BW 40MHz) Channel 05 - Chain B



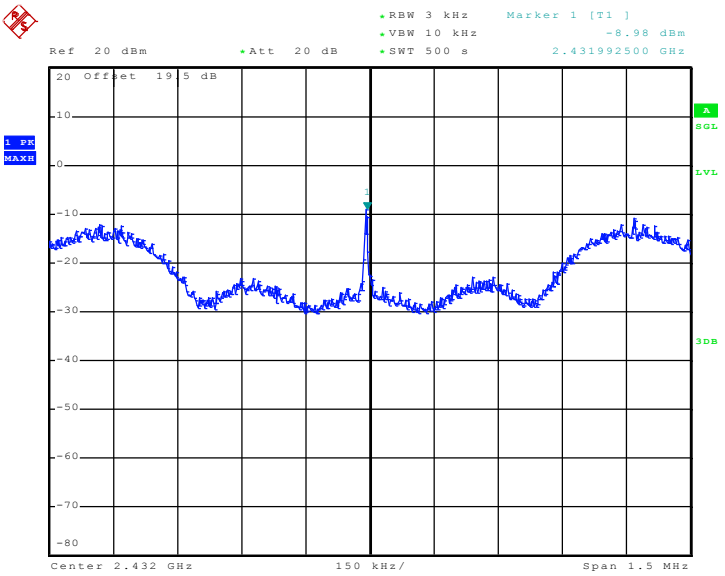
Date: 8.OCT.2010 06:09:43

PSD Plot on 802.11n (BW 40MHz) Channel 05 - Chain A+B(A)



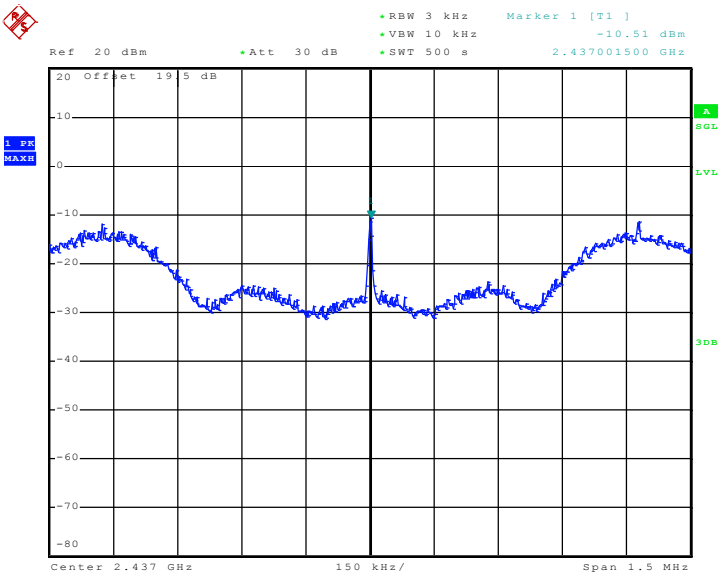
Date: 9.NOV.2010 18:12:05

PSD Plot on 802.11n (BW 40MHz) Channel 05 - Chain A+B(B)



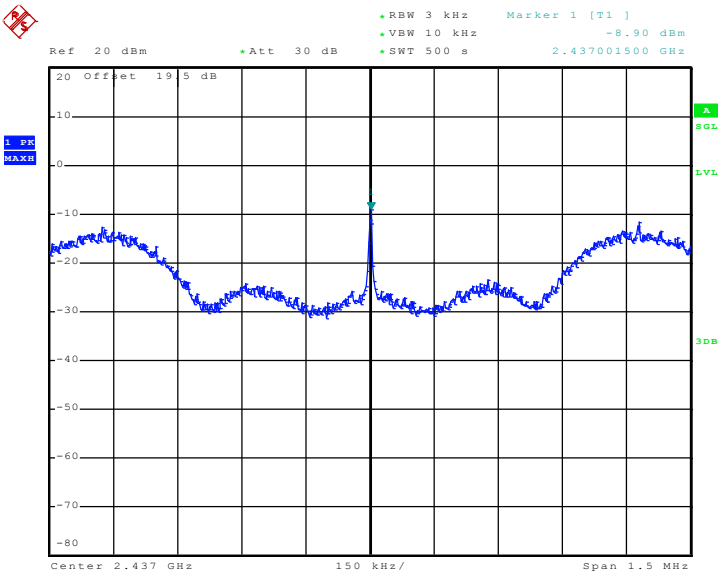
Date: 9.NOV.2010 18:47:56

PSD Plot on 802.11n (BW 40MHz) Channel 06 - Chain A



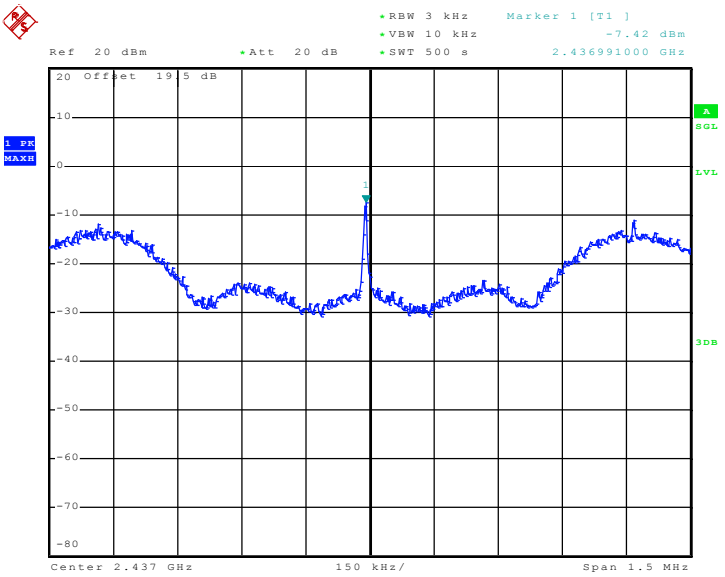
Date: 8.OCT.2010 07:59:19

PSD Plot on 802.11n (BW 40MHz) Channel 06 - Chain B



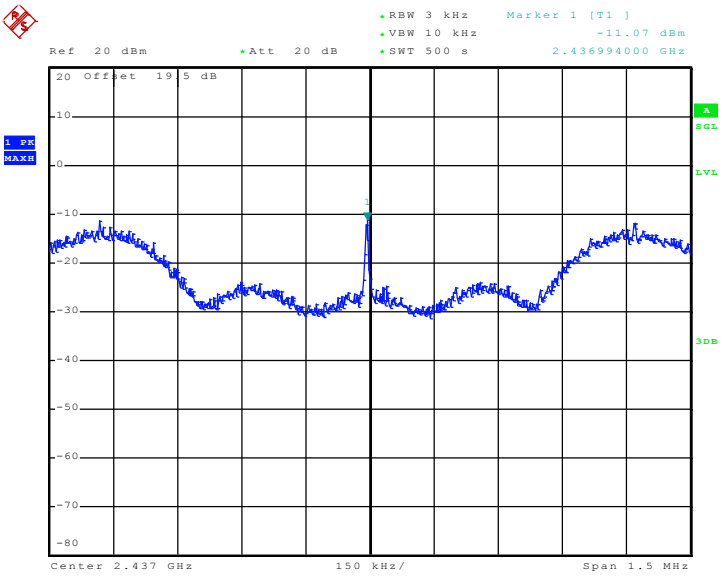
Date: 8.OCT.2010 06:19:01

PSD Plot on 802.11n (BW 40MHz) Channel 06 - Chain A+B(A)



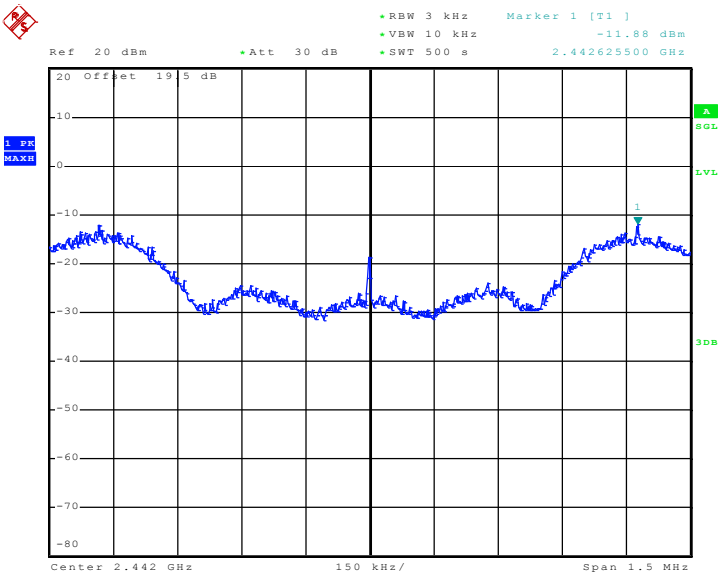
Date: 9.NOV.2010 07:54:35

PSD Plot on 802.11n (BW 40MHz) Channel 06 - Chain A+B(B)



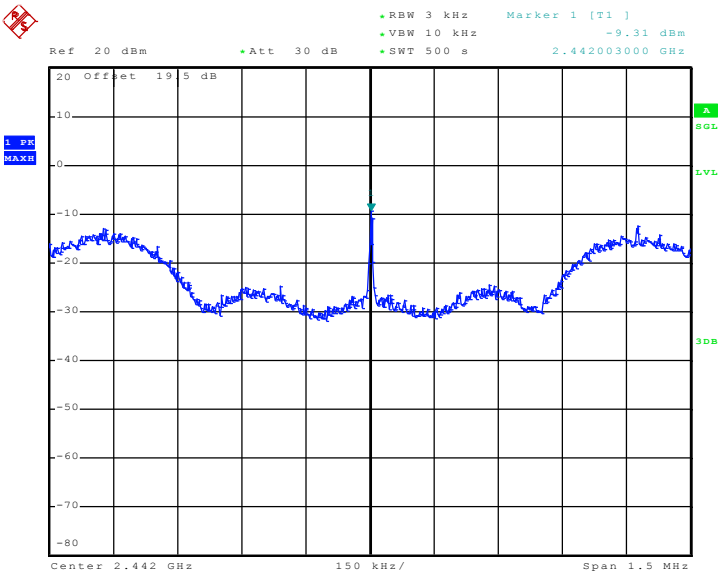
Date: 8.NOV.2010 18:50:12

PSD Plot on 802.11n (BW 40MHz) Channel 07 - Chain A



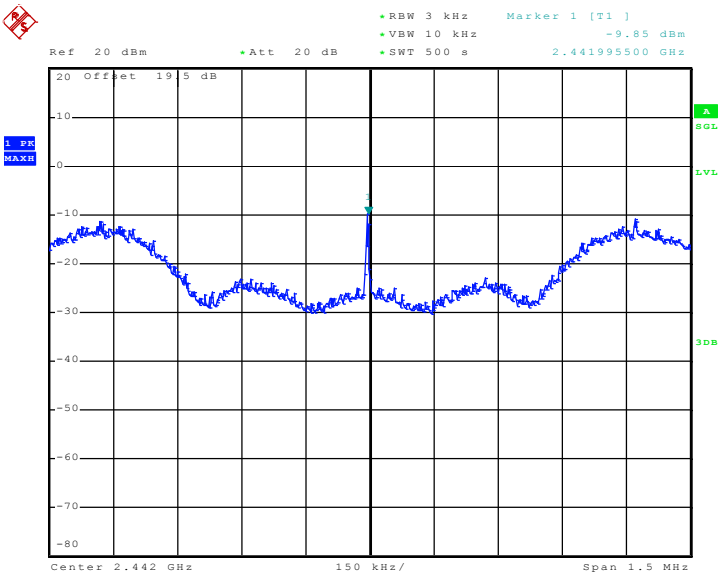
Date: 8.OCT.2010 07:49:21

PSD Plot on 802.11n (BW 40MHz) Channel 07 - Chain B



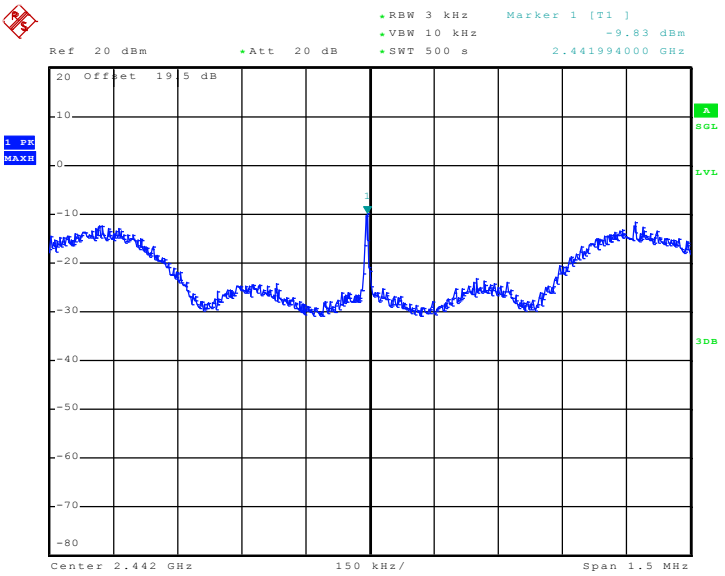
Date: 8.OCT.2010 06:28:33

PSD Plot on 802.11n (BW 40MHz) Channel 07 - Chain A+B(A)



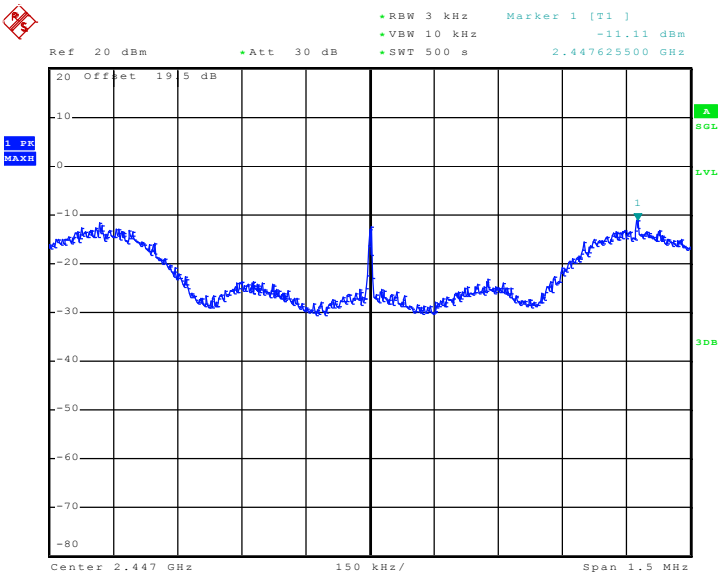
Date: 8.NOV.2010 18:15:29

PSD Plot on 802.11n (BW 40MHz) Channel 07 - Chain A+B(B)



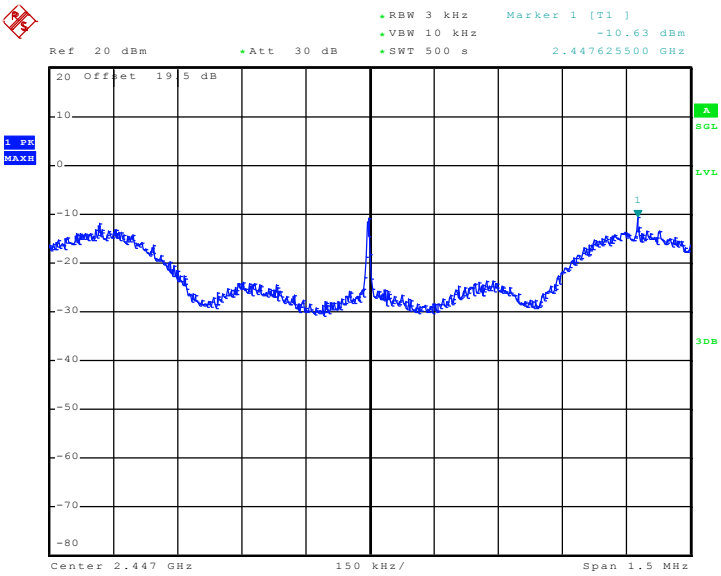
Date: 8.NOV.2010 18:32:18

PSD Plot on 802.11n (BW 40MHz) Channel 08 - Chain A



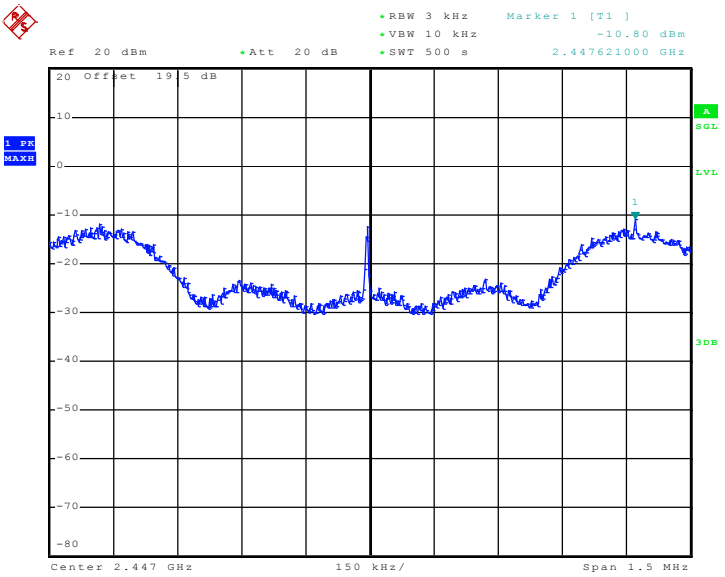
Date: 8.OCT.2010 07:37:47

PSD Plot on 802.11n (BW 40MHz) Channel 08 - Chain B



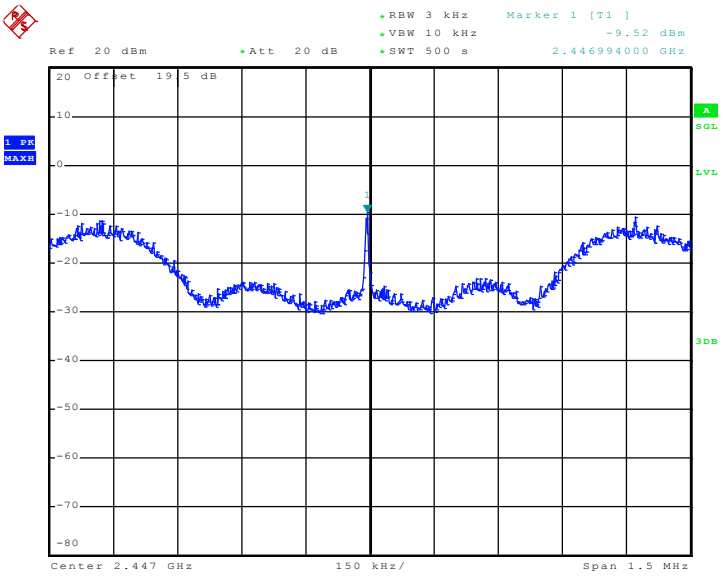
Date: 8.OCT.2010 06:55:54

PSD Plot on 802.11n (BW 40MHz) Channel 08 - Chain A+B(A)



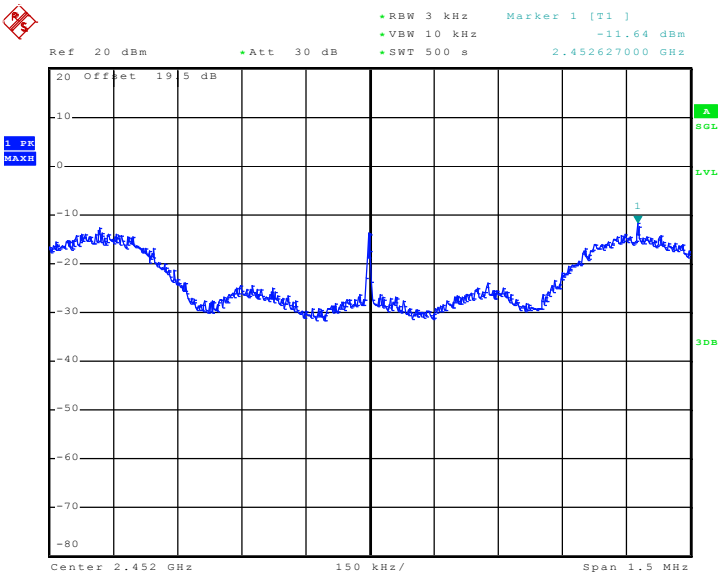
Date: 8.NOV.2010 18:00:57

PSD Plot on 802.11n (BW 40MHz) Channel 08 - Chain A+B(B)



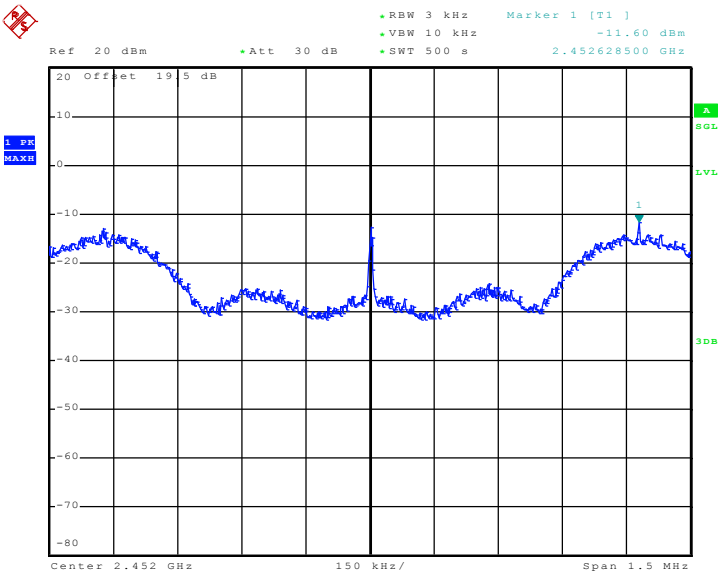
Date: 8.NOV.2010 17:05:48

PSD Plot on 802.11n (BW 40MHz) Channel 09 - Chain A



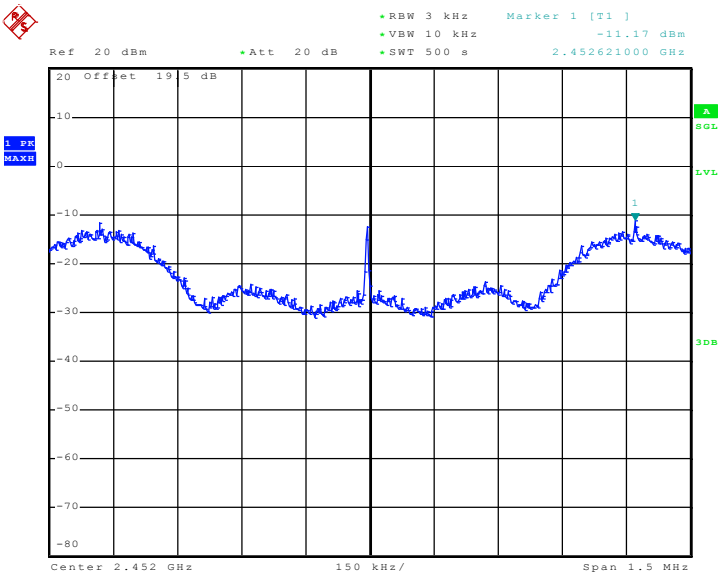
Date: 8.OCT.2010 07:23:05

PSD Plot on 802.11n (BW 40MHz) Channel 09 - Chain B



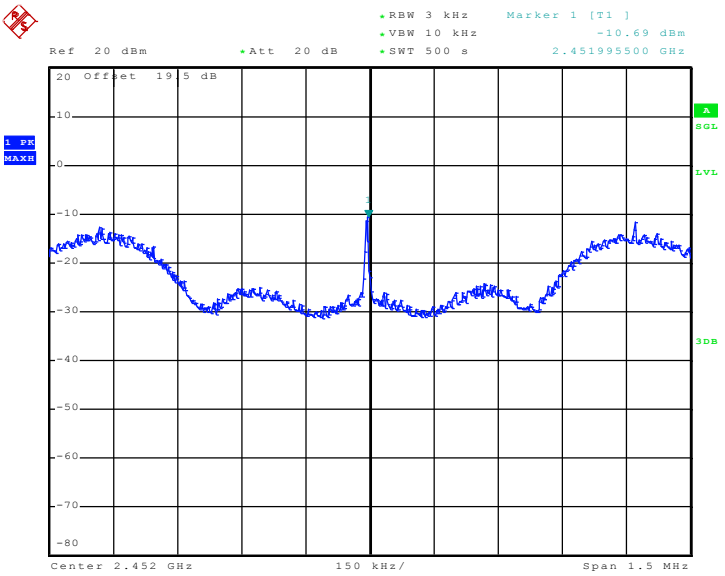
Date: 8.OCT.2010 07:05:03

PSD Plot on 802.11n (BW 40MHz) Channel 09 - Chain A+B(A)



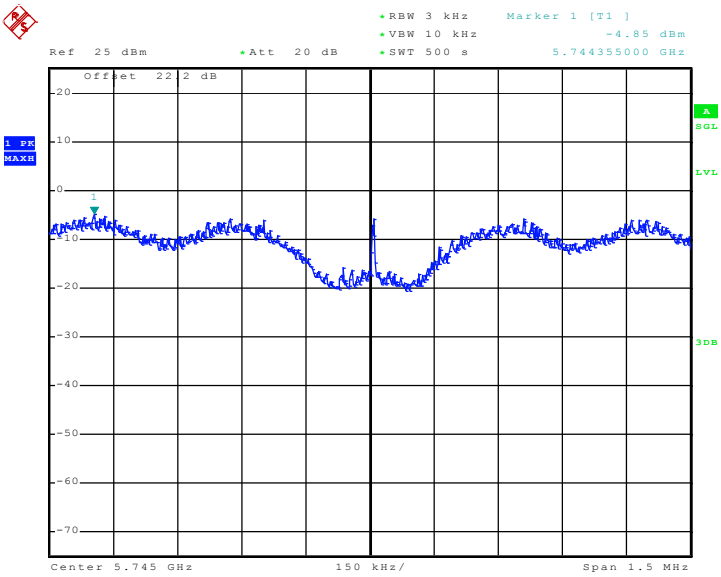
Date: 8.NOV.2010 16:31:45

PSD Plot on 802.11n (BW 40MHz) Channel 09 - Chain A+B(B)



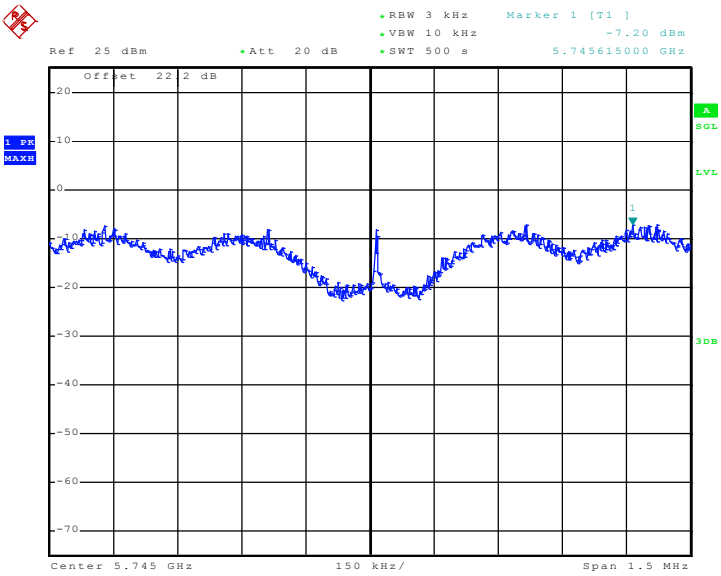
Date: 8.NOV.2010 16:48:05

PSD Plot on 802.11a Channel 149 - Chain A



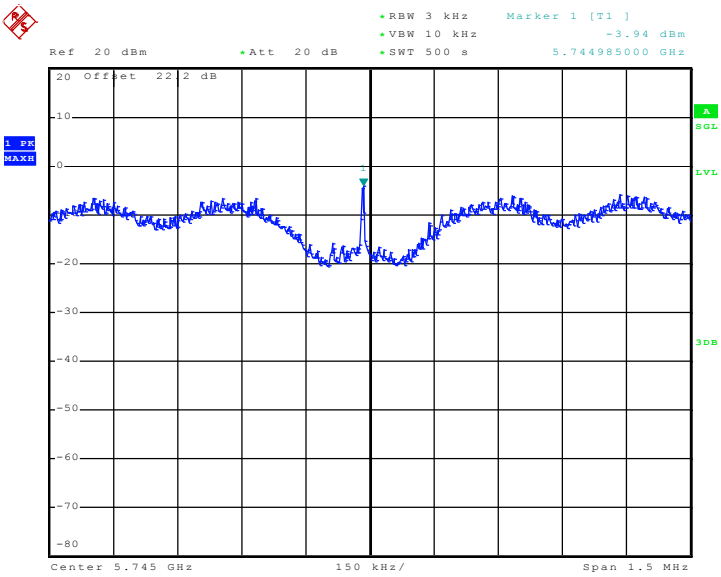
Date: 2.NOV.2010 00:42:54

PSD Plot on 802.11a Channel 149 - Chain B



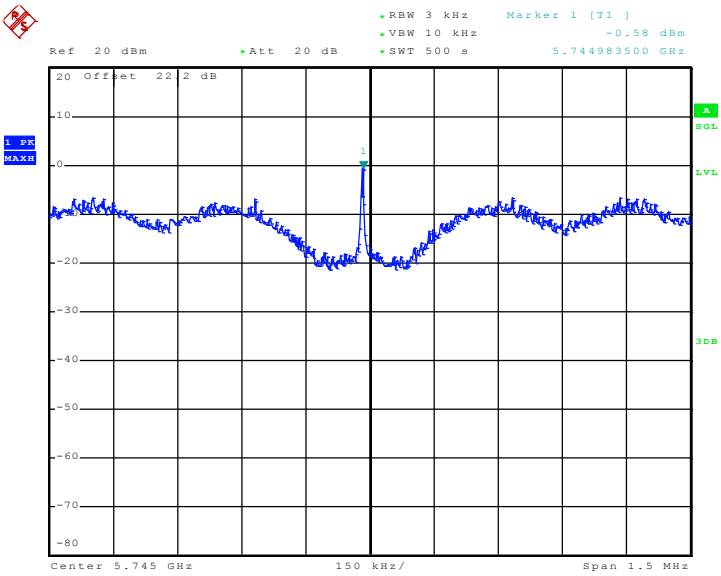
Date: 2.NOV.2010 00:52:22

PSD Plot on 802.11a Channel 149 - Chain A+B(A)



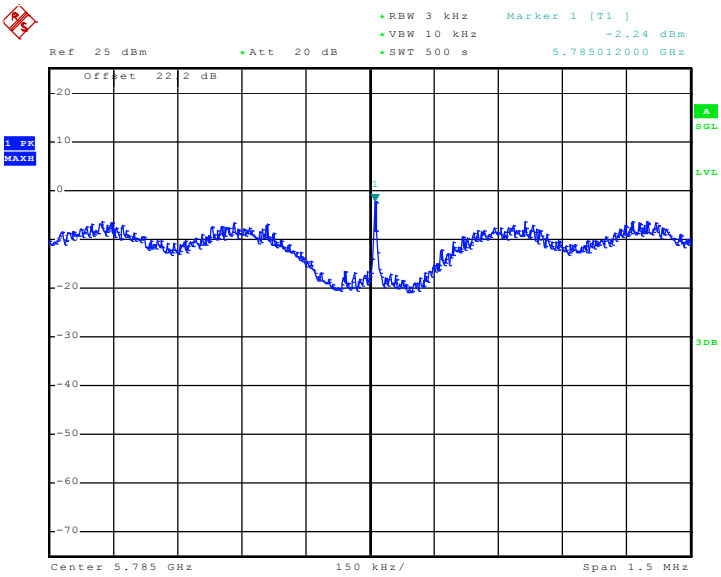
Date: 10.NOV.2010 10:32:47

PSD Plot on 802.11a Channel 149 - Chain A+B(B)



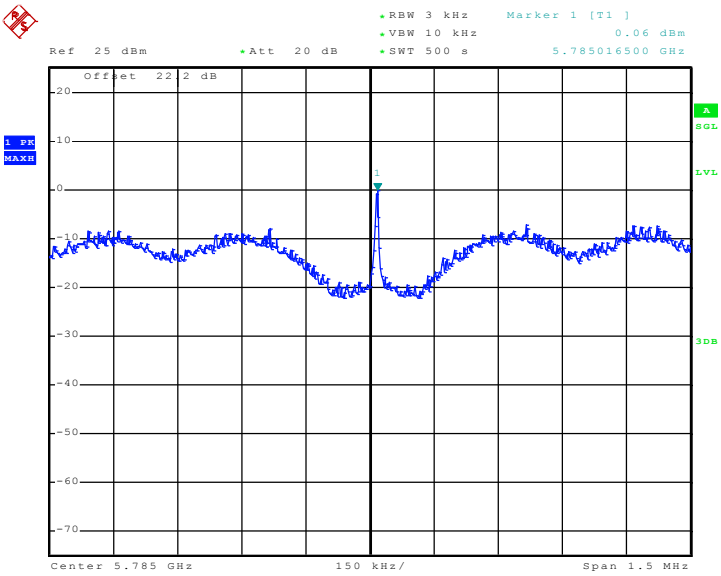
Date: 10.NOV.2010 10:13:37

PSD Plot on 802.11a Channel 157 - Chain A



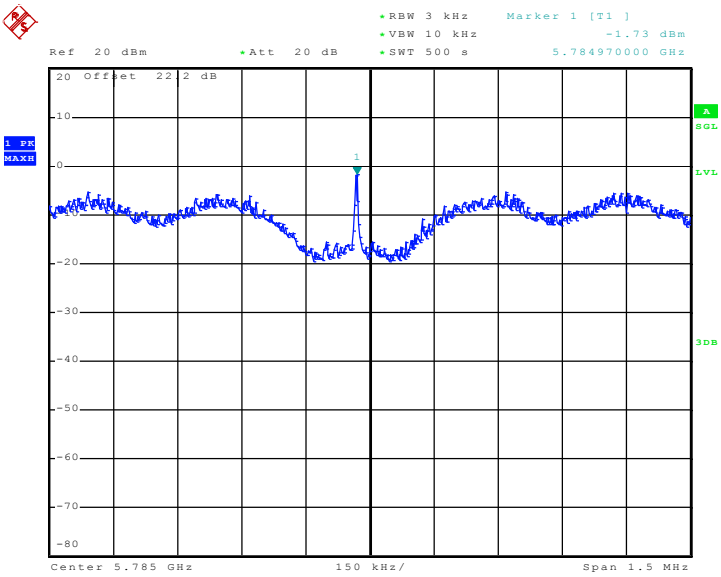
Date: 2.NOV.2010 01:12:44

PSD Plot on 802.11a Channel 157 - Chain B



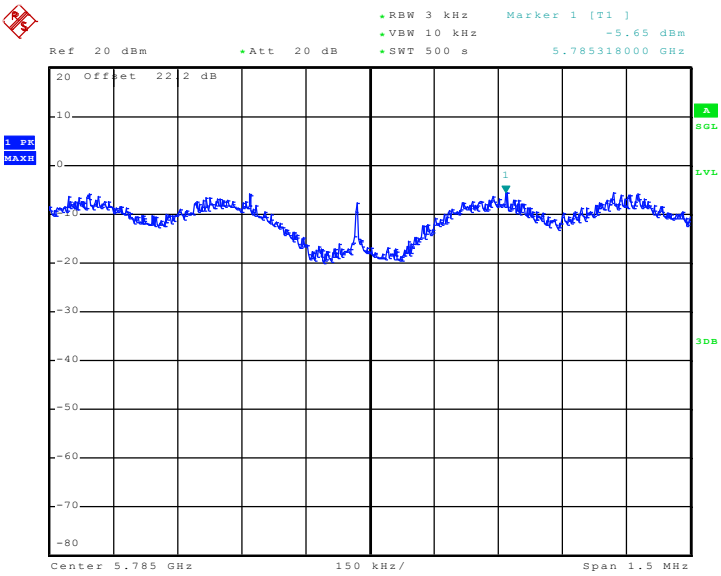
Date: 2.NOV.2010 01:02:59

PSD Plot on 802.11a Channel 157 - Chain A+B(A)



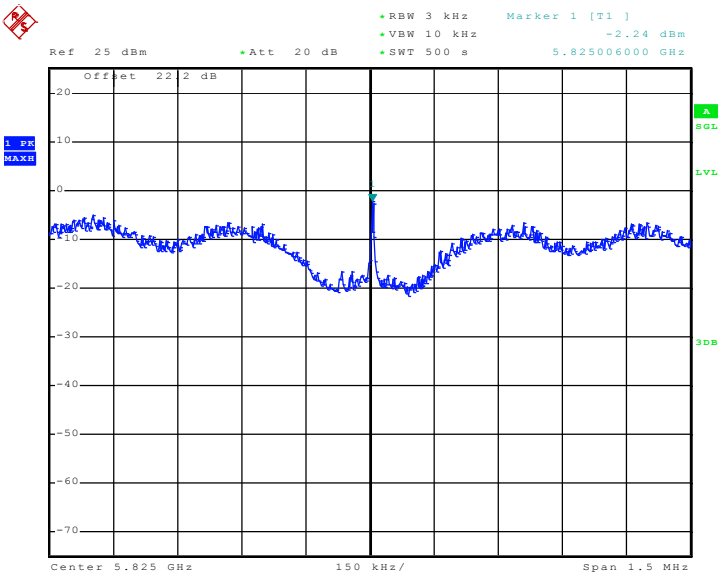
Date: 17.NOV.2010 07:44:03

PSD Plot on 802.11a Channel 157 - Chain A+B(B)



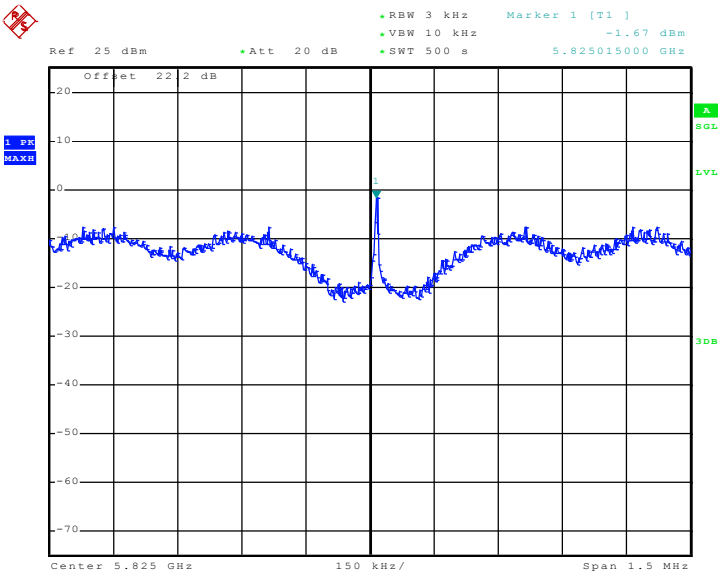
Date: 17.NOV.2010 08:25:32

PSD Plot on 802.11a Channel 165 - Chain A



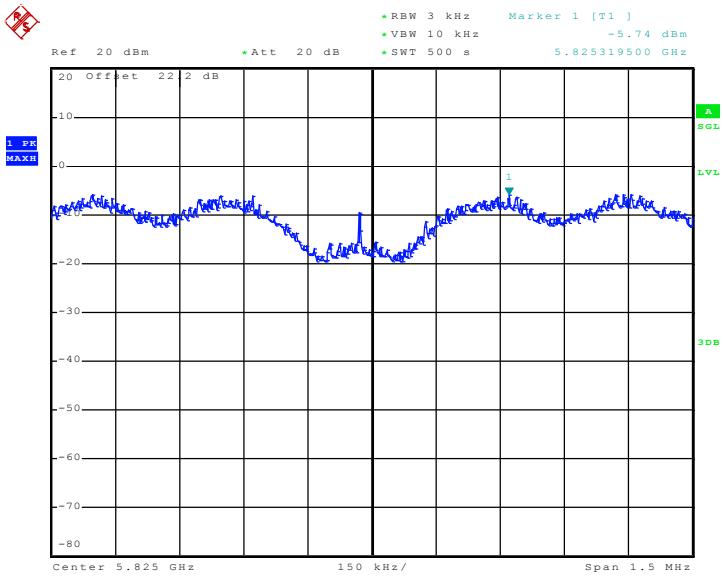
Date: 2.NOV.2010 01:37:18

PSD Plot on 802.11a Channel 165 - Chain B



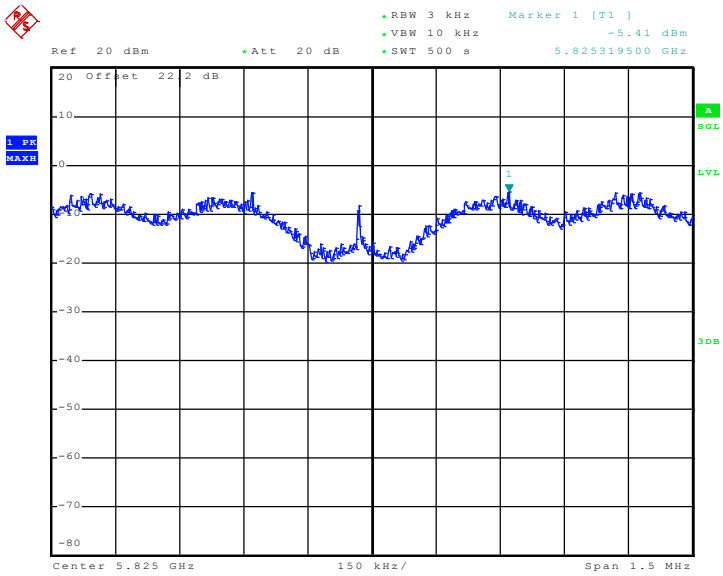
Date: 2.NOV.2010 01:46:51

PSD Plot on 802.11a Channel 165 - Chain A+B(A)



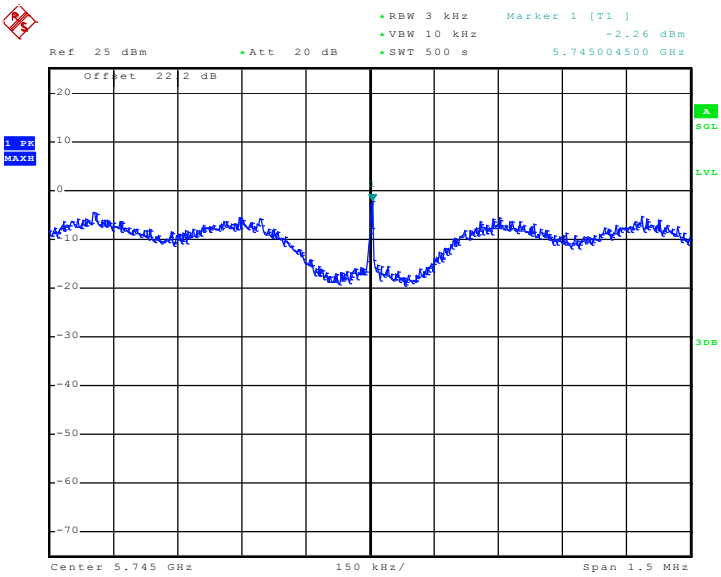
Date: 17.NOV.2010 07:58:24

PSD Plot on 802.11a Channel 165 - Chain A+B(B)



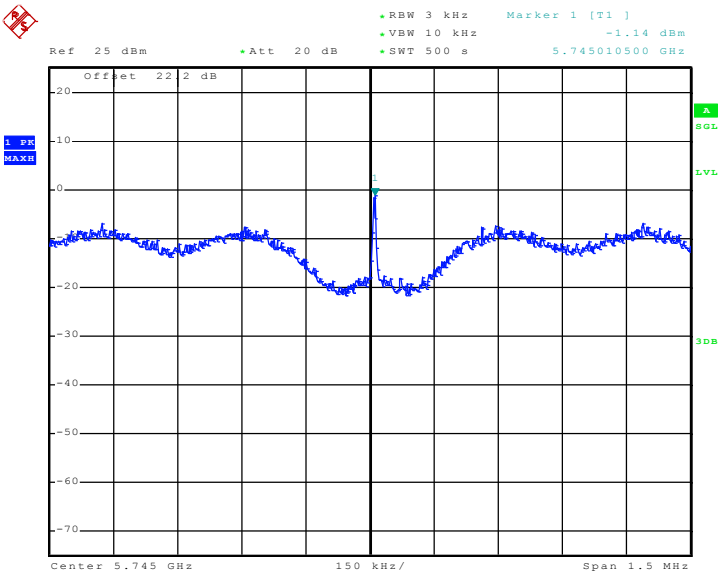
Date: 17.NOV.2010 08:13:13

PSD Plot on 802.11n (BW 20MHz) Channel 149 - Chain A



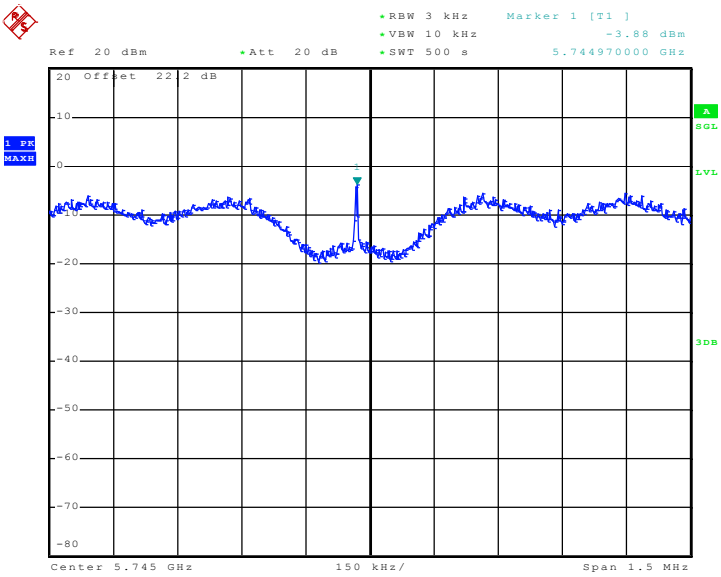
Date: 2.NOV.2010 06:29:34

PSD Plot on 802.11n (BW 20MHz) Channel 149 - Chain B



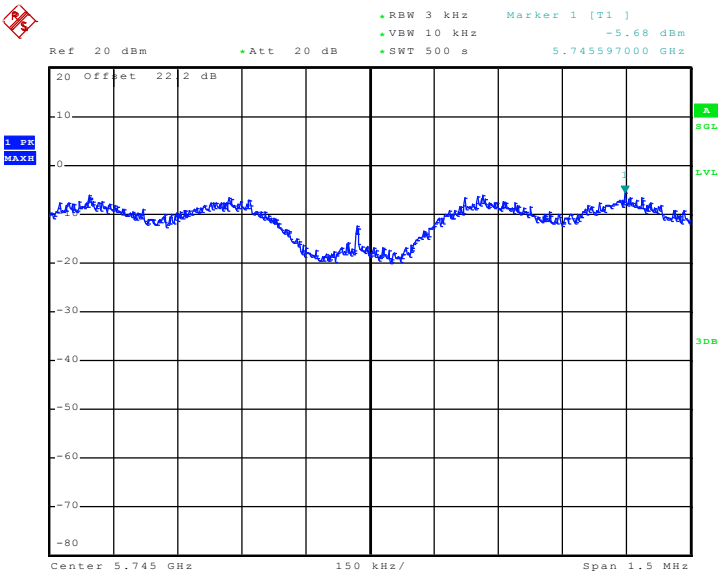
Date: 2.NOV.2010 06:39:24

PSD Plot on 802.11n (BW 20MHz) Channel 149 - Chain A+B(A)



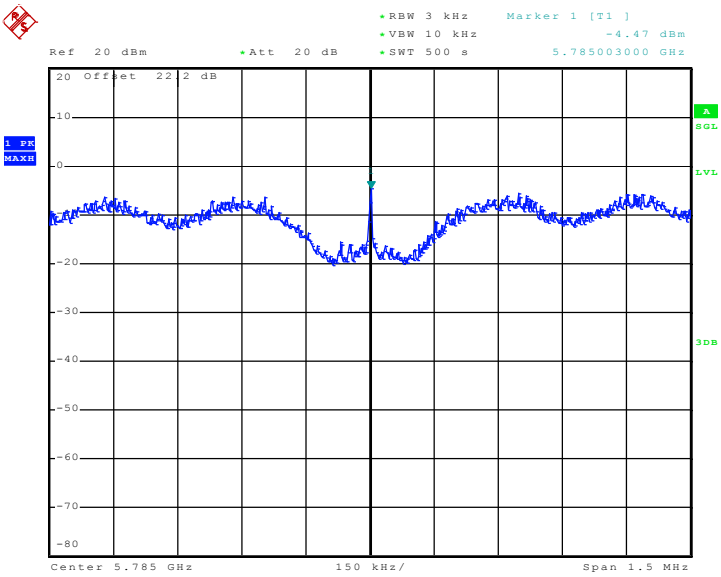
Date: 17.NOV.2010 09:34:28

PSD Plot on 802.11n (BW 20MHz) Channel 149 - Chain A+B(B)



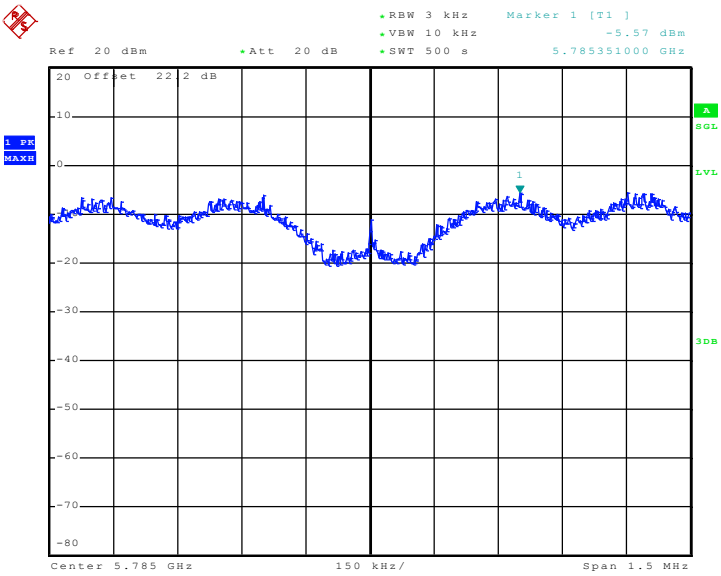
Date: 17.NOV.2010 09:22:03

PSD Plot on 802.11n (BW 20MHz) Channel 157 - Chain A



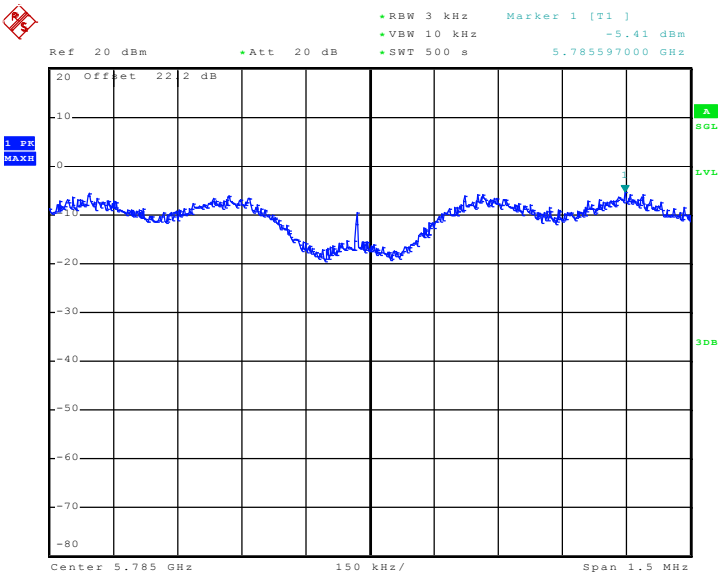
Date: 8.OCT.2010 15:44:28

PSD Plot on 802.11n (BW 20MHz) Channel 157 - Chain B



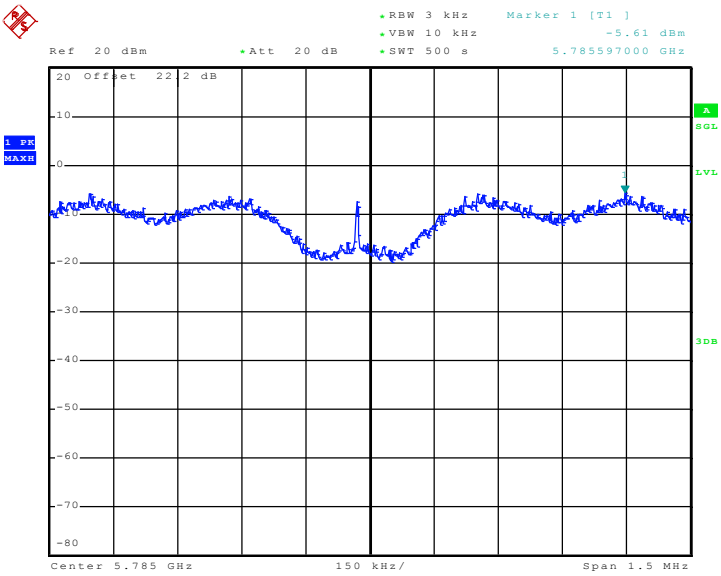
Date: 8.OCT.2010 15:35:01

PSD Plot on 802.11n (BW 20MHz) Channel 157 - Chain A+B(A)



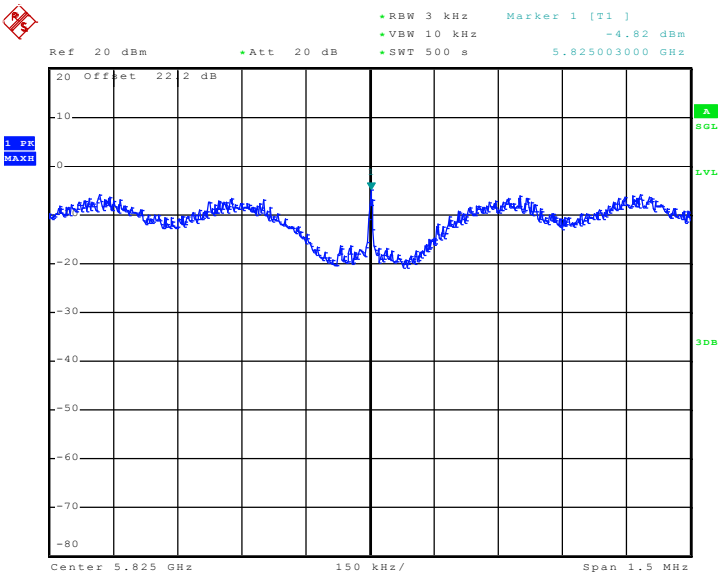
Date: 17.NOV.2010 09:59:32

PSD Plot on 802.11n (BW 20MHz) Channel 157 - Chain A+B(B)



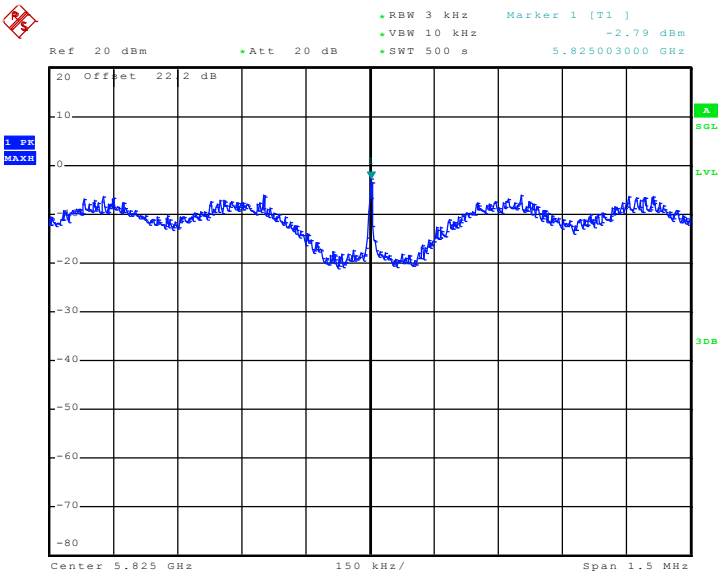
Date: 17.NOV.2010 08:47:48

PSD Plot on 802.11n (BW 20MHz) Channel 165 - Chain A



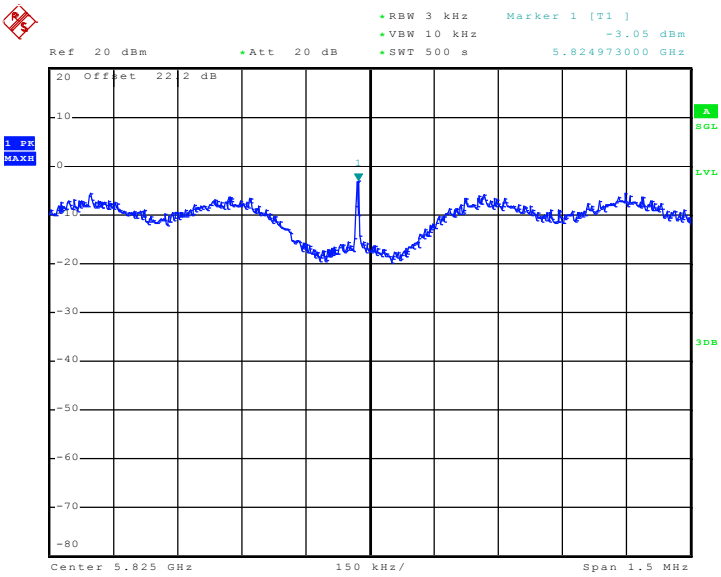
Date: 8.OCT.2010 15:12:51

PSD Plot on 802.11n (BW 20MHz) Channel 165 - Chain B



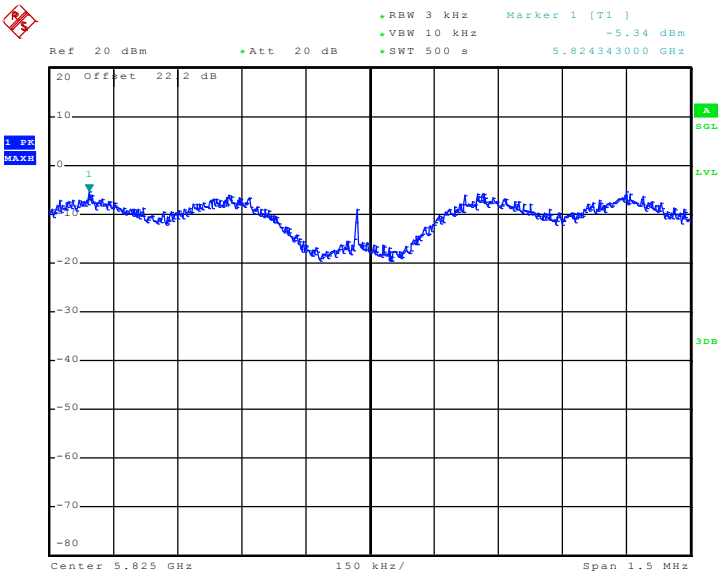
Date: 8.OCT.2010 15:24:29

PSD Plot on 802.11n (BW 20MHz) Channel 165 - Chain A+B(A)



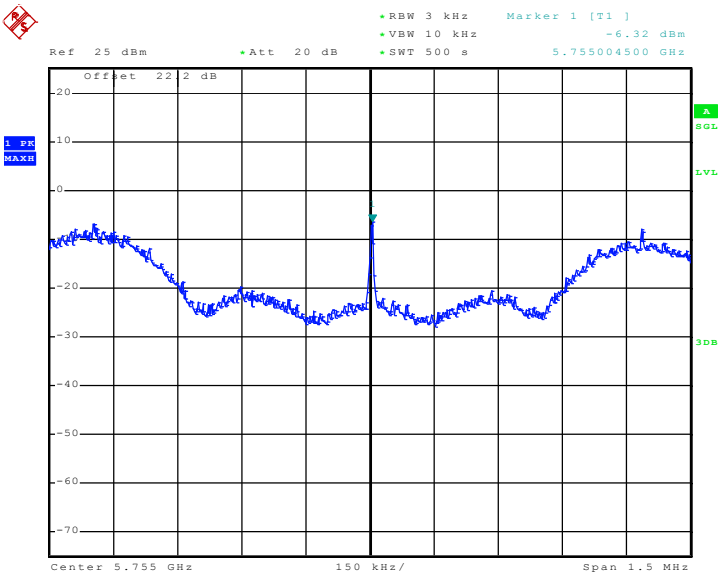
Date: 17.NOV.2010 10:12:43

PSD Plot on 802.11n (BW 20MHz) Channel 165 - Chain A+B(B)



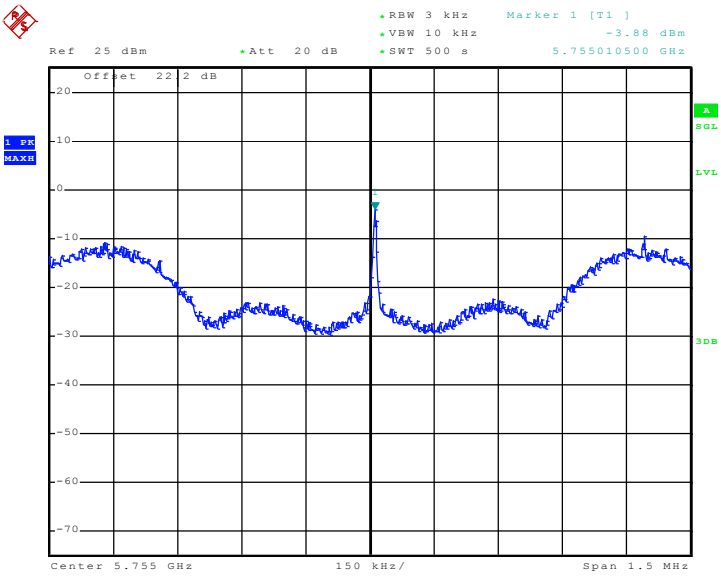
Date: 17.NOV.2010 08:58:12

PSD Plot on 802.11n (BW 40MHz) Channel 151 - Chain A



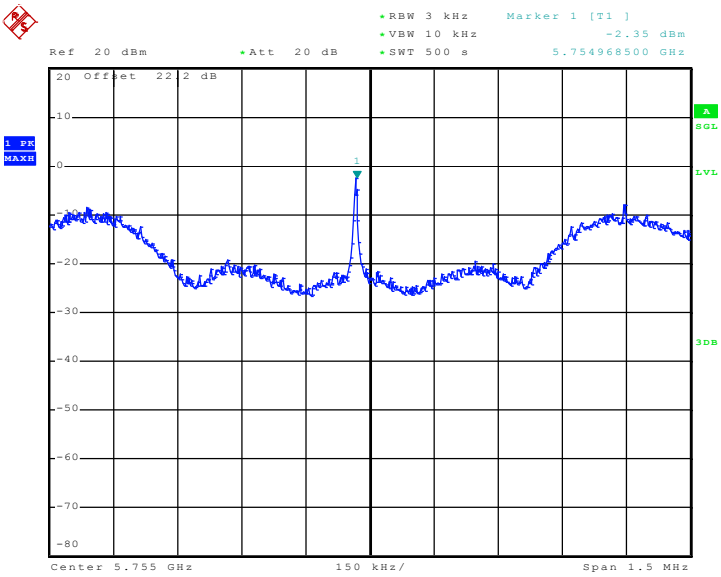
Date: 2.NOV.2010 05:10:19

PSD Plot on 802.11n (BW 40MHz) Channel 151 - Chain B



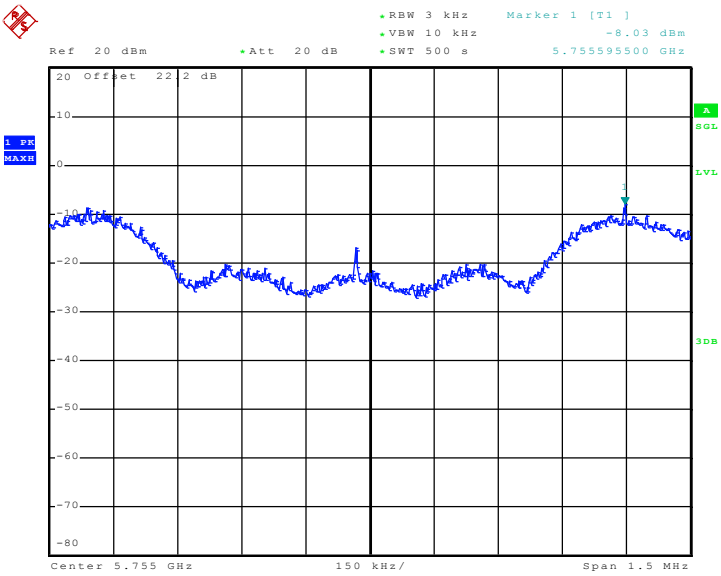
Date: 2.NOV.2010 04:57:04

PSD Plot on 802.11n (BW 40MHz) Channel 151 - Chain A+B(A)



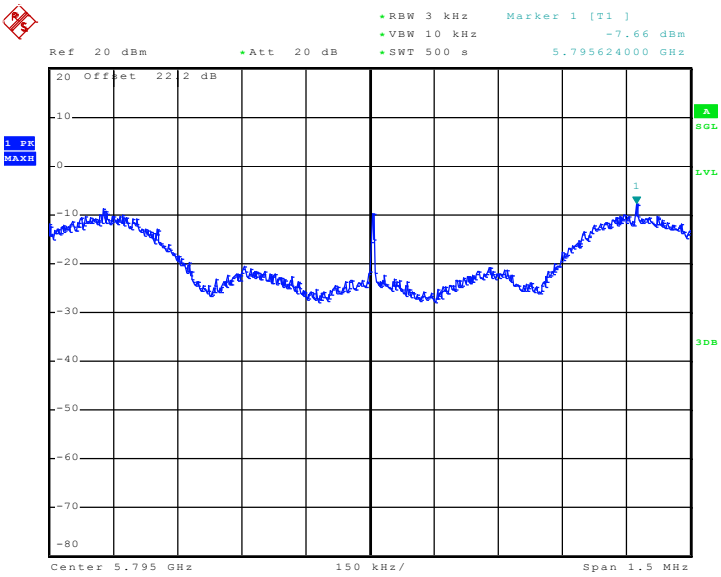
Date: 17.NOV.2010 10:37:49

PSD Plot on 802.11n (BW 40MHz) Channel 151 - Chain A+B(B)



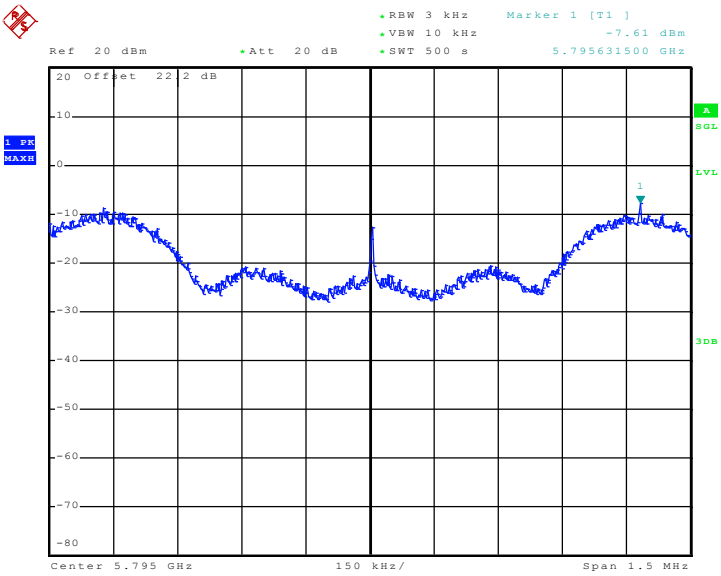
Date: 17.NOV.2010 12:28:34

PSD Plot on 802.11n (BW 40MHz) Channel 159 - Chain A



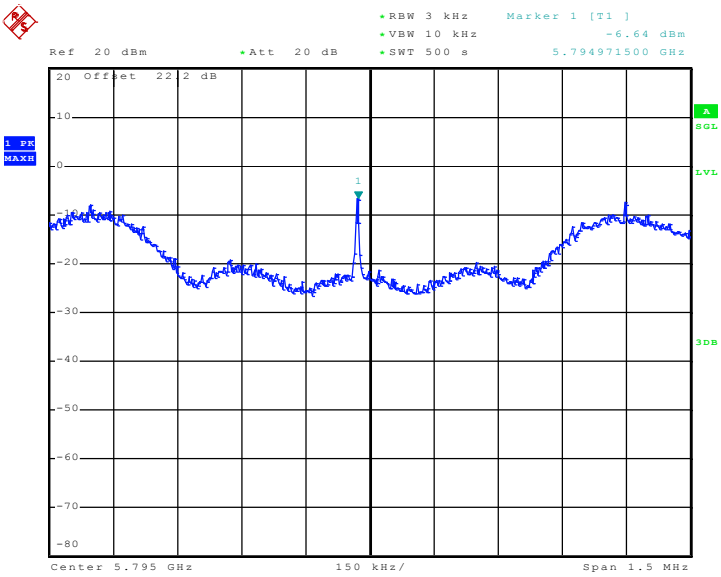
Date: 8.OCT.2010 17:15:21

PSD Plot on 802.11n (BW 40MHz) Channel 159 - Chain B



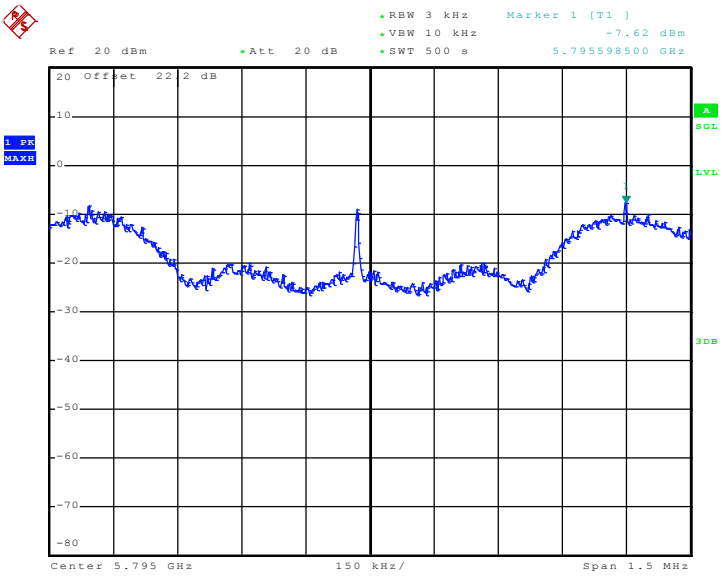
Date: 8.OCT.2010 17:25:10

PSD Plot on 802.11n (BW 40MHz) Channel 159 - Chain A+B(A)



Date: 17.NOV.2010 10:56:13

PSD Plot on 802.11n (BW 40MHz) Channel 159 - Chain A+B(B)



Date: 17.NOV.2010 11:28:27

3.6 AC Conducted Emission Measurement

3.6.1 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.

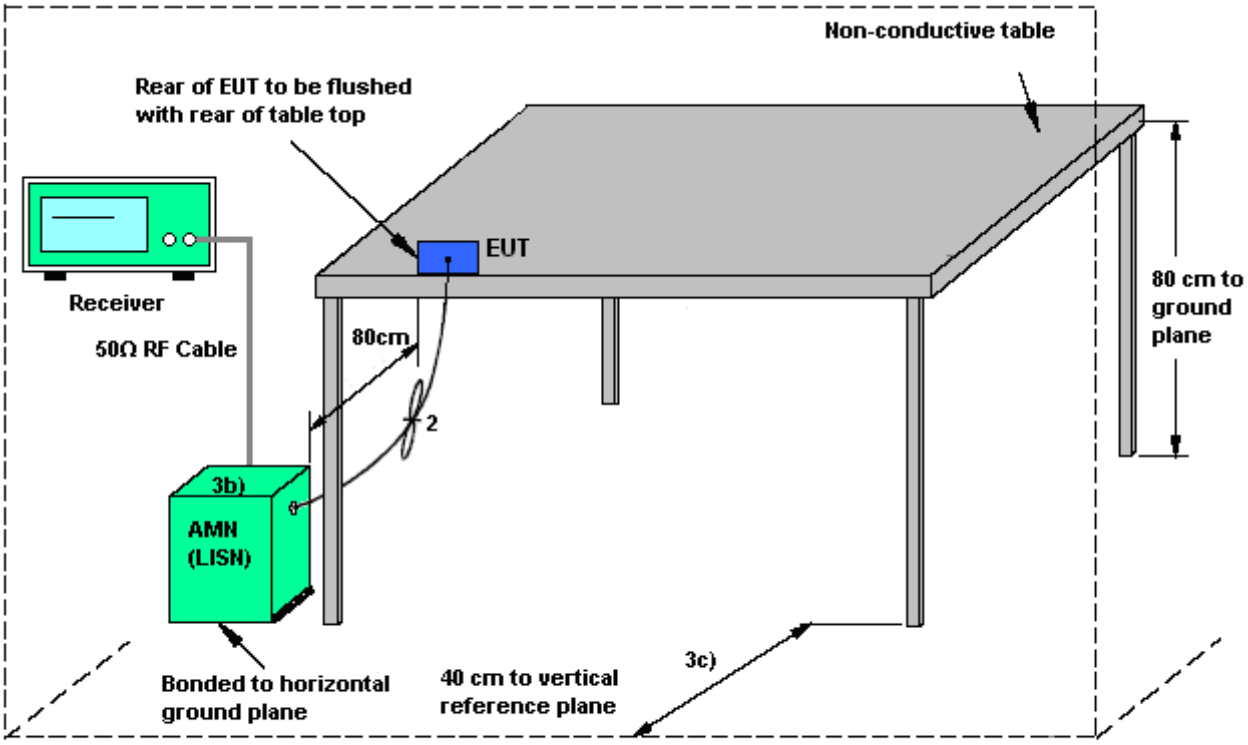
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

7. The testing follows the guidelines in FCC KDB Publication No. 558074.
8. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
9. Connect EUT to the power mains through a line impedance stabilization network (LISN).
10. All the support units are connecting to the other LISN.
11. The LISN provides 50 ohm coupling impedance for the measuring instrument.
12. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
13. Both sides of AC line were checked for maximum conducted interference.
14. The frequency range from 150 kHz to 30 MHz was searched.
15. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

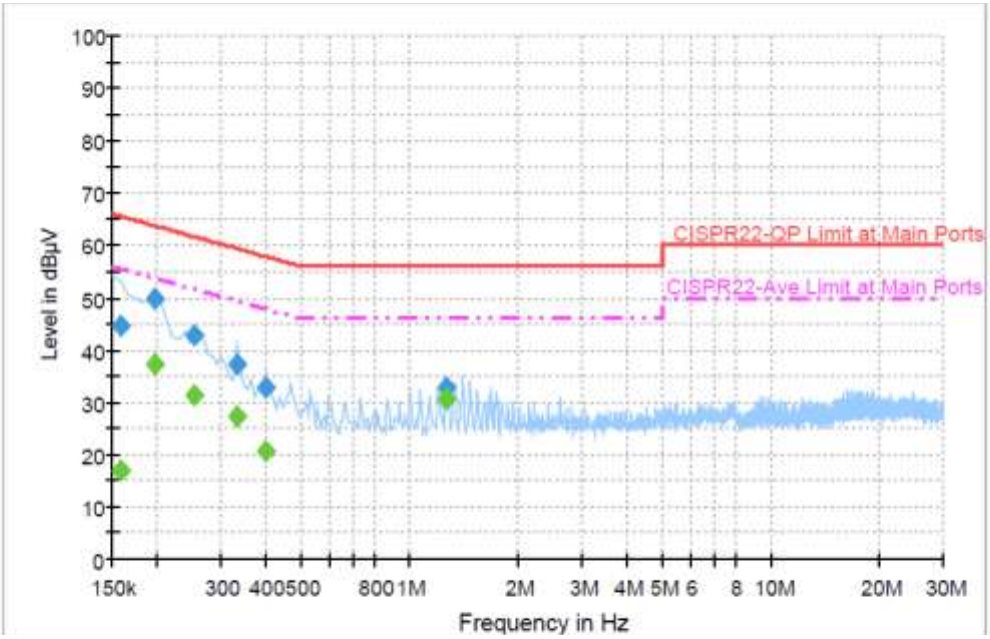
3.6.4 Test Setup



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

3.6.5 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 (2.4G) Link		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



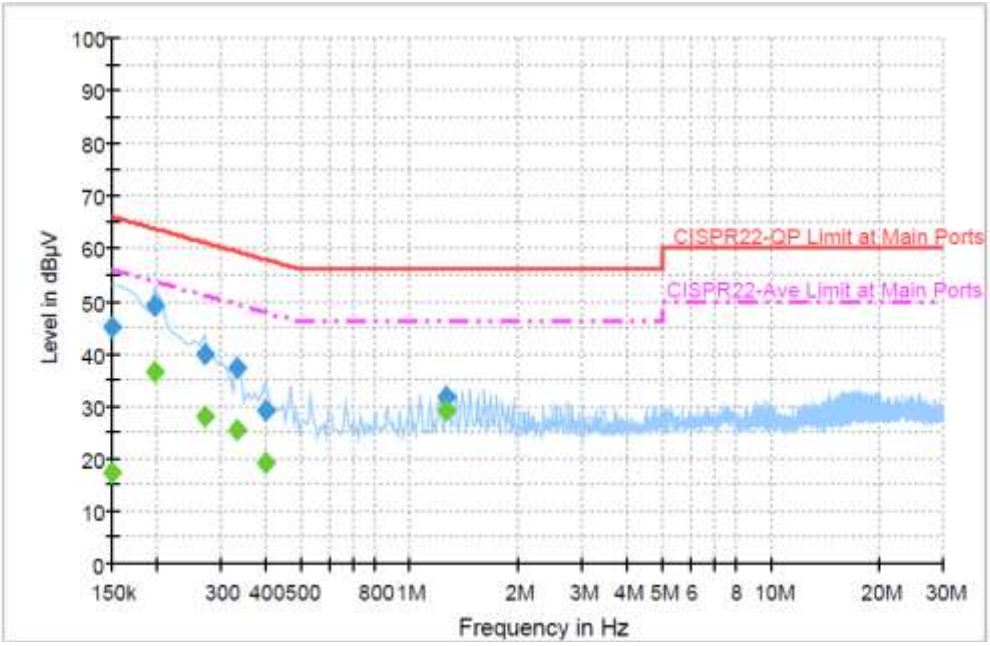
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	44.6	Off	L1	19.3	21.0	65.6
0.198000	49.7	Off	L1	19.3	14.0	63.7
0.254000	42.7	Off	L1	19.3	18.9	61.6
0.334000	37.2	Off	L1	19.3	22.2	59.4
0.398000	32.9	Off	L1	19.4	25.0	57.9
1.270000	32.9	Off	L1	19.4	23.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	16.8	Off	L1	19.3	38.8	55.6
0.198000	37.2	Off	L1	19.3	16.5	53.7
0.254000	31.4	Off	L1	19.3	20.2	51.6
0.334000	27.3	Off	L1	19.3	22.1	49.4
0.398000	20.6	Off	L1	19.4	27.3	47.9
1.270000	30.8	Off	L1	19.4	15.2	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 (2.4G) 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	45.1	Off	N	19.4	20.9	66.0
0.198000	48.9	Off	N	19.3	14.8	63.7
0.270000	39.9	Off	N	19.3	21.2	61.1
0.334000	37.3	Off	N	19.3	22.1	59.4
0.398000	29.2	Off	N	19.4	28.7	57.9
1.270000	31.9	Off	N	19.5	24.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	17.4	Off	N	19.4	38.6	56.0
0.198000	36.7	Off	N	19.3	17.0	53.7
0.270000	28.1	Off	N	19.3	23.0	51.1
0.334000	25.4	Off	N	19.3	24.0	49.4
0.398000	19.3	Off	N	19.4	28.6	47.9
1.270000	29.2	Off	N	19.5	16.8	46.0

3.7 Radiated Emission Measurement

3.7.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

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

3.7.2 Measuring Instruments

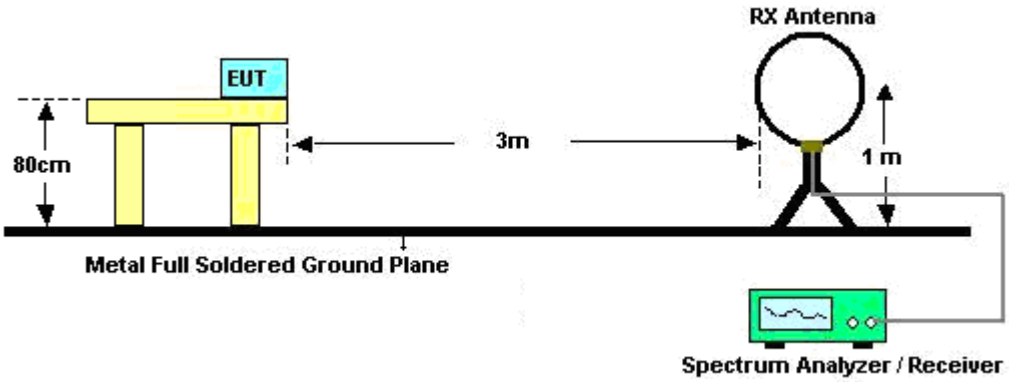
See list of measuring instruments of this test report.

3.7.3 Test Procedures

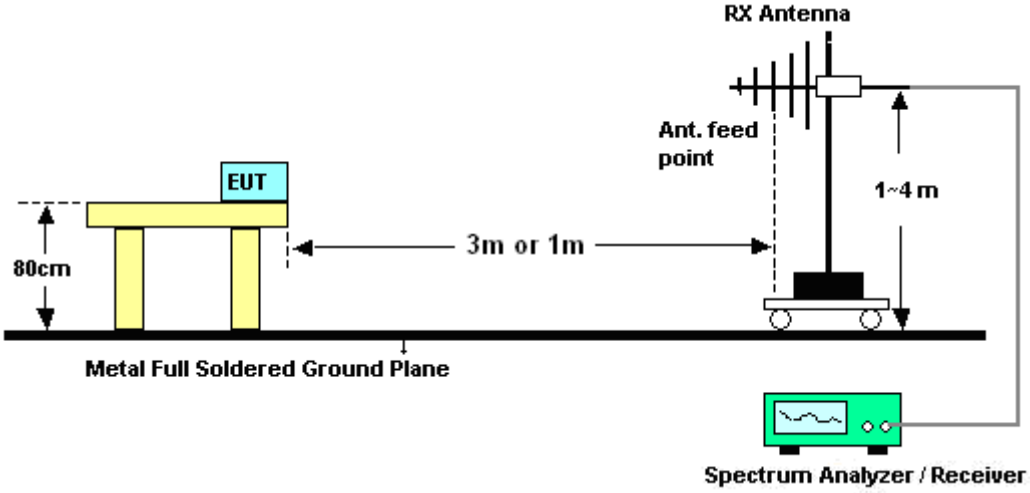
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
   (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
   (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
   Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB)
3. Follow the guidelines in FCC KDB Publication No. 558074 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

3.7.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



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

Test Engineer :	David Yang, Ivan Jiang and Wii Cheng	Temperature :	23~25°C
		Relative Humidity :	46~53%

Frequency (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.

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

Please refer to Appendix A to E.

3.8 Antenna Requirements

3.8.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.8.2 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.

3.8.3 Antenna Gain

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

4 List of Measuring Equipment

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	BBHA9170 251	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 Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+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**				